Report on entire Annex

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 1 Reference **Definition**	***Altitude.*** The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).	Civil Aviation Rules, (CAR) Part 1, Definitions and Abbreviations.	No Difference		Civil Aviation Rules and Advisory Circulars are available on the CAANZ website, www.caa.govt.nz. AIP New Zealand is available on www.aip.net.nz.
Chapter 1 Reference **Definition**	***Area navigation (RNAV).*** A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these. *Note.— Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.*	CAR Part 1.	No Difference		
Chapter 1 Reference **Definition**	***Effective acceptance bandwidth.*** The range of frequencies with respect to the assigned frequency for which reception is assured when all receiver tolerances have been taken into account.	CAR 171.53(a)(1).	No Difference		Note: any definition not otherwise referenced is deemed to be incorporated by reference (IBR) in CAR 171.53(a)(1).
Chapter 1 Reference **Definition**	***Effective adjacent channel rejection.*** The rejection that is obtained at the appropriate adjacent channel frequency when all relevant receiver tolerances have been taken into account.	CAR 171.53(a)(1)(ii).	No Difference		IBR.

Report on entire Annex

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 1 Reference **Definition**	***Elevation.*** The vertical distance of a point or a level, on or affixed to the surface of the earth, measured from mean sea level.	CAR Part 1.	No Difference		
Chapter 1 Reference **Definition**	***Essential radio navigation service.*** A radio navigation service whose disruption has a significant impact on operations in the affected airspace or aerodrome.	CAR 171.53(a)(1)(ii).	No Difference		IBR.
Chapter 1 Reference **Definition**	***Fan marker beacon.*** A type of radio beacon, the emissions of which radiate in a vertical fan-shaped pattern.		Not Applicable		
Chapter 1 Reference **Definition**	***Height.*** The vertical distance of a level, a point or an object considered as a point, measured from a specified datum.	CAR Part 1.	No Difference		
Chapter 1 Reference **Definition**	***Human Factors principles.*** Principles which apply to design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.	CARs.	Less protective or partially implemented or not implemented	Not specifically defined.	Common usage term.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 1 Reference **Definition**	***Mean power (of a radio transmitter).*** The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions. *Note.— A time of 1/10 second* during *which the mean power is greatest will be selected normally.*	CAR 171.53(a)(1)(ii).	No Difference		IBR.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 1 Reference **Definition**	***Navigation specification.*** A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications: *Required navigation performance (RNP)* specification. A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH. *Area navigation (RNAV) specification.* A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1. *Note.1— The* Performance-based Navigation (PBN) Manual *(Doc 9613), Volume II, contains detailed guidance on navigation specifications.* *Note 2.— The term RNP, previously defined as "a statement of the navigation performance necessary for operation within a defined airspace", has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613.*	AIPNZ GEN 2.2.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 1 Reference **Definition**	***Performance-based navigation (PBN).*** Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace. *Note.— Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.*	AIPNZ GEN 2.2.	No Difference		
Chapter 1 Reference **Definition**	***Pressure-altitude.*** An atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the Standard Atmosphere.	CAR Part 1.	No Difference		
Chapter 1 Reference **Definition**	***Protected service volume.*** A part of the facility coverage where the facility provides a particular service in accordance with relevant SARPs and within which the facility is afforded frequency protection.	CAR 171.53(a)(1)(ii).	No Difference		IBR.
Chapter 1 Reference **Definition**	***Radio navigation service.*** A service providing guidance information or position data for the efficient and safe operation of aircraft supported by one or more radio navigation aids.	CAR Part 1.	No Difference		See under "Aeronautical telecommunication service".

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 1 Reference **Definition**	***Touchdown.*** The point where the nominal glide path intercepts the runway. *Note.— "Touchdown" as defined above is only a datum and is not necessarily the actual point at which the aircraft will touch the runway.*	CAR 171.53(a)(1)(ii).	No Difference		IBR.
Chapter 1 Reference **Definition**	***Z marker beacon.*** A type of radio beacon, the emissions of which radiate in a vertical cone-shaped pattern.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 2 Reference **2.1.1** **Standard**	**CHAPTER 2. GENERAL PROVISIONS FOR RADIO NAVIGATION AIDS** **2.1 Standard radio navigation aids** 2.1.1 The standard radio navigation aids shall be: a) the instrument landing system (ILS) conforming to the Standards contained in Chapter 3, 3.1; b) the microwave landing system (MLS) conforming to the Standards contained in Chapter 3, 3.11; c) the global navigation satellite system (GNSS) conforming to the Standards contained in Chapter 3, 3.7; d) the VHF omnidirectional radio range (VOR) conforming to the Standards contained in Chapter 3, 3.3; e) the non-directional radio beacon (NDB) conforming to the Standards contained in Chapter 3, 3.4; f) the distance measuring equipment (DME) conforming to the Standards contained in Chapter 3, 3.5; and g) the en-route VHF marker beacon conforming to the Standards contained in Chapter 3, 3.6.	AIPNZ GEN 3.7.	No Difference		Note: New Zealand does not use MLS or VHF marker beacons.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	Note 1.— Since visual reference is essential for the final stages of approach and landing, the installation of a radio navigation aid does not obviate the need for visual aids to approach and landing in conditions of low visibility. *Note 2.— It is intended that introduction and application of radio navigation aids to support precision approach and landing operations will be in accordance with the strategy shown in Attachment B. It is intended that rationalization of conventional radio navigation aids and evolution toward supporting performance-based navigation will be in accordance with the strategy shown in Attachment H.* *Note 3.— Categories of precision approach and landing operations are classified in Annex 6, Part I, Chapter 1.* *Note 4.— Information on operational objectives associated with ILS facility performance categories is given in Attachment C, 2.1 and 2.14.* *Note 5.— Information on operational objectives associated with MLS facility performance is given in Attachment G, 11.*				
Chapter 2 Reference **2.1.2** **Standard**	2.1.2 Differences in radio navigation aids in any respect from the Standards of Chapter 3 shall be published in an Aeronautical Information Publication (AIP).	AIP NZ GEN 3.7.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 2 Reference **2.1.3** **Standard**	2.1.3 Wherever there is installed a radio navigation aid that is neither an ILS nor an MLS, but which may be used in whole or in part with aircraft equipment designed for use with the ILS or MLS, full details of parts that may be so used shall be published in an Aeronautical Information Publication (AIP). *Note.— This provision is to establish a requirement for promulgation of relevant information rather than to authorize such installations.*		Not Applicable		
Chapter 2 Reference **2.1.4.1** **Standard**	2.1.4 GNSS-specific provisions 2.1.4.1 It shall be permissible to terminate a GNSS satellite service provided by one of its elements (Chapter 3, 3.7.2) on the basis of at least a six-year advance notice by a service provider.		Not Applicable		
Chapter 2 Reference **2.1.4.2** **Recommendation**	2.1.4.2 **Recommendation.—** *A State that approves GNSS-based operations should ensure that GNSS data relevant to those operations are recorded.* *Note 1.— These recorded data can support accident and incident investigations. They may also support periodic analysis to verify the GNSS performance parameters detailed in the relevant Standards in this Annex.* *Note 2.— Guidance material on the recording of GNSS parameters and on GNSS performance assessment is contained in Attachment D, 11 and 12.*	LINZ (Land Information New Zealand) PositioNZ.	No Difference		The PositioNZ network comprises 39 continuous monitoring stations in NZ and Antarctica. See the website https://www.linz.govt.nz/data/geodetic-services/positionz for details.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 2 Reference **2.1.4.3** **Recommendation**	2.1.4.3 **Recommendation.—** *Recordings should be retained for a period of at least 14 days. When the recordings are pertinent to accident and incident investigations, they should be retained for longer periods until it is evident that they will no longer be required.*	LINZ (Land Information New Zealand) PositioNZ.	No Difference		The PositioNZ network comprises 39 continuous monitoring stations in NZ and Antarctica. See the website https://www.linz.govt.nz/data/geodetic-services/positionz for details. Retrospective data is available from 2002 onwards from the RINEX archive (see the website).
Chapter 2 Reference **2.1.5.1** **Standard**	2.1.5 Precision approach radar 2.1.5.1 A precision approach radar (PAR) system, where installed and operated as a radio navigation aid together with equipment for two-way communication with aircraft and facilities for the efficient coordination of these elements with air traffic control, shall conform to the Standards contained in Chapter 3, 3.2. *Note 1.— The precision approach radar (PAR) element of the precision approach radar system may be installed and operated without the surveillance radar element (SRE), when it is determined that the SRE is not necessary to meet the requirements of air traffic control for the handling of aircraft.* *Note 2.— Although SRE is not considered, in any circumstances, a satisfactory alternative to the precision approach radar system, the SRE may be installed and operated without the PAR for the assistance of air traffic control in handling aircraft intending to use a radio navigation aid, or for surveillance radar approaches and departures.*		Not Applicable		NZ does not use PAR.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 2 Reference **2.1.6** **Recommendation**	2.1.6 **Recommendation.—** *When a radio navigation aid is provided to support precision approach and landing, it should be supplemented, as necessary, by a source or sources of guidance information which, when used in conjunction with appropriate procedures, will provide effective guidance to, and efficient coupling (manual or automatic) with, the desired reference path.* *Note.— DME, GNSS, NDB, VOR and aircraft navigation systems have been used for such purposes.*	AIPNZ.	No Difference		
Chapter 2 Reference **2.2.1** **Standard**	**2.2 Ground and flight testing** 2.2.1 Radio navigation aids of the types covered by the specifications in Chapter 3 and available for use by aircraft engaged in international air navigation shall be the subject of periodic ground and flight tests. *Note.— Guidance on the ground and flight testing of ICAO standard facilities, including the periodicity of the testing, is contained in Attachment C and in the* Manual on Testing of Radio Navigation Aids *(Doc 8071).*	CAR 171.59.	Less protective or partially implemented or not implemented	Some NDBs are not subject to priodic flight testing.	Stand-alone NDBs are flight tested only as required for special or post-accident-incident inspection.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 2 Reference **2.3.1** **Standard**	**2.3 Provision of information on the operational status of radio navigation services** 2.3.1 Aerodrome control towers and units providing approach control service shall be provided with information on the operational status of radio navigation services essential for approach, landing and take-off at the aerodrome(s) with which they are concerned, on a timely basis consistent with the use of the service(s) involved. *Note.— Guidance material on the application of this Standard in the case of PBN-based operations supported by GNSS is contained in the* Performance-based Navigation (PBN) Manual *(Doc 9613).*	CAR 171.19.	No Difference	NIL	NIL
Chapter 2 Reference **2.4.1** **Standard**	**2.4 Power supply for radio navigation aids and communication systems** 2.4.1 Radio navigation aids and ground elements of communication systems of the types specified in Annex 10 shall be provided with suitable power supplies and means to ensure continuity of service consistent with the use of the service(s) involved. *Note.— Guidance material on power supply switch-over is contained in Attachment C, 8.*	CAR 171.53(a)(3).	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 2 Reference **2.5.1** **Recommendation**	**2.5 Human Factors considerations** 2.5.1 **Recommendation.—** *Human Factors principles should be observed in the design and certification of radio navigation aids.* *Note.— Guidance material on Human Factors principles can be found in the* Human Factors Training Manual *(Doc 9683) and Circular 249* (Human Factors Digest No. 11 — Human Factors in CNS/ATM Systems).		Not Applicable		
Chapter 3 Reference **Definition**	**CHAPTER 3. SPECIFICATIONS FOR RADIO NAVIGATION AIDS** *Note.— Specifications concerning the siting and construction of equipment and installations on operational areas aimed at reducing the hazard to aircraft to a minimum are contained in Annex 14, Chapter 8.* **3.1 Specification for ILS** 3.1.1 Definitions ***Angular displacement sensitivity.*** The ratio of measured DDM to the corresponding angular displacement from the appropriate reference line.	CAR Part 171.	No Difference		The applicable standards of this Chapter are incorporated by reference in Part 171.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Back course sector.*** The course sector which is situated on the opposite side of the localizer from the runway.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Course line.*** The locus of points nearest to the runway centre line in any horizontal plane at which the DDM is zero.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Course sector.*** A sector in a horizontal plane containing the course line and limited by the loci of points nearest to the course line at which the DDM is 0.155.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***DDM — Difference in depth of modulation.*** The percentage modulation depth of the larger signal minus the percentage modulation depth of the smaller signal, divided by 100.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Displacement sensitivity (localizer).*** The ratio of measured DDM to the corresponding lateral displacement from the appropriate reference line.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Facility Performance Category I — ILS.*** An ILS which provides guidance information from the coverage limit of the ILS to the point at which the localizer course line intersects the ILS glide path at a height of 30 m (100 ft) or less above the horizontal plane containing the threshold. *Note.— The lower limit is set to 30 m (100 ft) below the minimum Category I decision height (DH).*	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Facility Performance Category II — ILS.*** An ILS which provides guidance information from the coverage limit of the ILS to the point at which the localizer course line intersects the ILS glide path at a height of 15 m (50 ft) or less above the horizontal plane containing the threshold. *Note.— The lower limit is set to 15 m (50 ft) below the minimum Category II decision height (DH).*	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Facility Performance Category III — ILS.*** An ILS which, with the aid of ancillary equipment where necessary, provides guidance information from the coverage limit of the facility to, and along, the surface of the runway.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Front course sector.*** The course sector which is situated on the same side of the localizer as the runway.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Half course sector.*** The sector, in a horizontal plane containing the course line and limited by the loci of points nearest to the course line at which the DDM is 0.0775.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Half ILS glide path sector.*** The sector in the vertical plane containing the ILS glide path and limited by the loci of points nearest to the glide path at which the DDM is 0.0875.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***ILS continuity of service.*** That quality which relates to the rarity of radiated signal interruptions. The level of continuity of service of the localizer or the glide path is expressed in terms of the probability of not losing the radiated guidance signals.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***ILS glide path.*** That locus of points in the vertical plane containing the runway centre line at which the DDM is zero, which, of all such loci, is the closest to the horizontal plane.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***ILS glide path angle.*** The angle between a straight line which represents the mean of the ILS glide path and the horizontal.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***ILS glide path sector.*** The sector in the vertical plane containing the ILS glide path and limited by the loci of points nearest to the glide path at which the DDM is 0.175. *Note.— The ILS glide path sector is located in the vertical plane containing the runway centre line, and is divided by the radiated glide path in two parts called upper sector and lower sector, referring respectively to the sectors above and below the glide path.*	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***ILS integrity.*** That quality which relates to the trust which can be placed in the correctness of the information supplied by the facility. The level of integrity of the localizer or the glide path is expressed in terms of the probability of not radiating false guidance signals.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***ILS Point "A".*** A point on the ILS glide path measured along the extended runway centre line in the approach direction a distance of 7.5 km (4 NM) from the threshold.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***ILS Point "B".*** A point on the ILS glide path measured along the extended runway centre line in the approach direction a distance of 1 050 m (3 500 ft) from the threshold.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***ILS Point "C".*** A point through which the downward extended straight portion of the nominal ILS glide path passes at a height of 30 m (100 ft) above the horizontal plane containing the threshold.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***ILS Point "D".*** A point 4 m (12 ft) above the runway centre line and 900 m (3 000 ft) from the threshold in the direction of the localizer.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***ILS Point "E".*** A point 4 m (12 ft) above the runway centre line and 600 m (2 000 ft) from the stop end of the runway in the direction of the threshold. *Note.— See Attachment C, Figure C-1.*	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***ILS reference datum (Point "T").*** A point at a specified height located above the intersection of the runway centre line and the threshold and through which the downward extended straight portion of the ILS glide path passes.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Two-frequency glide path system.*** An ILS glide path in which coverage is achieved by the use of two independent radiation field patterns spaced on separate carrier frequencies within the particular glide path channel.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Two-frequency localizer system.*** A localizer system in which coverage is achieved by the use of two independent radiation field patterns spaced on separate carrier frequencies within the particular localizer VHF channel.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.2.1** **Standard**	3.1.2 Basic requirements 3.1.2.1 The ILS shall comprise the following basic components: a) VHF localizer equipment, associated monitor system, remote control and indicator equipment; b) UHF glide path equipment, associated monitor system, remote control and indicator equipment; c) an appropriate means to enable glide path verification checks. *Note.— The* Procedures for Air Navigation Services — Aircraft Operations *(PANS-OPS) (Doc 8168) provide guidance on the conduct of glide path verification checks.*	CAR Part 171.	No Difference		Note: c) DME is used in all cases.
Chapter 3 Reference **3.1.2.1.1** **Recommendation**	3.1.2.1.1 **Recommendation.—** *Distance to threshold information to enable glide path verification checks should be provided by either VHF marker beacons or distance measuring equipment (DME), together with associated monitor systems and remote control and indicator equipment.*	CAR Part 171.	No Difference		Note: DME is used in all cases.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.2.1.2** **Standard**	3.1.2.1.2 If one or more VHF marker beacons are used to provide distance to threshold information, the equipment shall conform to the specifications in 3.1.7. If DME is used in lieu of marker beacons, the equipment shall conform to the specifications in 3.1.7.6.5. *Note.— Guidance material relative to the use of DME and/or other standard radio navigation aids as an alternative to the marker beacon is contained in Attachment C, 2.11.*	CAR Part 171.	No Difference		Note: DME is used in all cases.
Chapter 3 Reference **3.1.2.1.3** **Standard**	3.1.2.1.3 Facility Performance Categories I, II and III — ILS shall provide indications at designated remote control points of the operational status of all ILS ground system components, as follows: a) for all Facility Performance Category II and Category III ILS, the air traffic services unit involved in the control of aircraft on the final approach shall be one of the designated remote control points and shall receive information on the operational status of the ILS, with a delay commensurate with the requirements of the operational environment; b) for a Facility Performance Category I ILS, if that ILS provides an essential radio navigation service, the air traffic services unit involved in the control of aircraft on the final approach shall be one of the designated remote control points and shall receive information on the operational status of the ILS, with a delay commensurate with the requirements of the operational environment. *Note.— The indications required by this Standard are intended as a tool to support air traffic management functions, and the applicable timeliness requirements are sized accordingly (consistently with 2.3.1).*	CAR Part 171.	No Difference		

Report on entire Annex

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.2.2** **Standard**	3.1.2.2 The ILS shall be constructed and adjusted so that, at a specified distance from the threshold, similar instrumental indications in the aircraft represent similar displacements from the course line or ILS glide path as appropriate, irrespective of the particular ground installation in use.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.2.3** **Standard**	3.1.2.3 The localizer and glide path components specified in 3.1.2.1 a) and b) which form part of a Facility Performance Category I — ILS shall comply at least with the Standards in 3.1.3 and 3.1.5 respectively, excepting those in which application to Facility Performance Category II — ILS is prescribed.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.2.4** **Standard**	3.1.2.4 The localizer and glide path components specified in 3.1.2.1 a) and b) which form part of a Facility Performance Category II — ILS shall comply with the Standards applicable to these components in a Facility Performance Category I — ILS, as supplemented or amended by the Standards in 3.1.3 and 3.1.5 in which application to Facility Performance Category II — ILS is prescribed.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.2.5** **Standard**	3.1.2.5 The localizer and glide path components and other ancillary equipment specified in 3.1.2.1.3, which form part of a Facility Performance Category III — ILS, shall otherwise comply with the Standards applicable to these components in Facility Performance Categories I and II — ILS, except as supplemented by the Standards in 3.1.3 and 3.1.5 in which application to Facility Performance Category III — ILS is prescribed.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.2.6** **Standard**	3.1.2.6 To ensure an adequate level of safety, the ILS shall be so designed and maintained that the probability of operation within the performance requirements specified is of a high value, consistent with the category of operational performance concerned.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.2.6.1** **Standard**	3.1.2.6.1 For Facility Performance Category II and III localizers and glide paths, the level of integrity and continuity of service shall be at least Level 3, as defined in 3.1.3.12.4 (localizer) and 3.1.5.8.4 (glide path). *Note.— The specifications for Facility Performance Categories II and III — ILS are intended to achieve the highest degree of system integrity, reliability and stability of operation under the most adverse environmental conditions to be encountered. Guidance material to achieve this objective is given in 2.8 of Attachment C.*	CAR	No Difference	NIL	NIL

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.1.2.7** **Standard**	3.1.2.7 At those locations where two separate ILS facilities serve opposite ends of a single runway, and operationally harmful interference would be present if both facilities were transmitting, an interlock shall ensure that only the localizer serving the approach direction in use shall radiate. *Note 1.— While a low height overflight of a transmitting localizer may generate interference within airborne ILS receivers, this interference may only be considered as operationally harmful when it occurs in specific conditions, e.g. without visual cues of the runway, or when the autopilot is engaged. Additional guidance material is contained in 2.1.8 and 2.13 of Attachment C.* *Note 2.— Interference may also be caused by transmissions from other localizers not serving the opposite end of the same runway (i.e. crossing, parallel or adjacent runways). In such cases, use of interlock to prevent the interference can also be considered.* *Note 3.— An interlock can be provided through hardware, software or an equivalent procedural means.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.2.7.1** **Standard**	3.1.2.7.1 At locations where ILS facilities serving opposite ends of the same runway or different runways at the same airport use the same paired frequencies, an interlock shall ensure that only one facility shall radiate at a time. When switching from one ILS facility to another, radiation from both shall be suppressed for not less than 20 seconds. *Note.— Additional guidance material on the operation of localizers on the same frequency channel is contained in Volume V, Chapter 4.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.2.8** **Standard**	3.1.2.8 At those locations where an ILS facility and a GBAS facility serve opposite approach directions to the same runway, when the approach direction in use is not the direction served by the ILS, the localizer shall not radiate when GBAS low visibility operations that require GAST D are being conducted, except where it can be demonstrated that the localizer signal supports compliance with the requirements in Appendix B, 3.6.8.2.2.5 and 3.6.8.2.2.6 defining the desired to undesired signal ratios and the maximum adjacent channel power tolerable by the GBAS VDB receiver. *Note.— If the localizer is radiating there is a possibility of interference to the GBAS VDB signals in the region where the aircraft overflies the localizer. A means to ensure that the localizer does not radiate can be provided through either hardware or software interlock or a procedural mitigation. Additional guidance material is contained in Attachment C, 2.1.8.1 and Attachment D, 7.2.3.3.*	CAR	No Difference	NIL	NIL
Chapter 3 Reference **3.1.3.1.1** **Standard**	3.1.3.1 *General* 3.1.3.1.1 The radiation from the localizer antenna system shall produce a composite field pattern which is amplitude modulated by a 90 Hz and a 150 Hz tone. The radiation field pattern shall produce a course sector with one tone predominating on one side of the course and with the other tone predominating on the opposite side.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.1.2** **Standard**	3.1.3.1.2 When an observer faces the localizer from the approach end of a runway, the depth of modulation of the radio frequency carrier due to the 150 Hz tone shall predominate on the observer's right hand and that due to the 90 Hz tone shall predominate on the observer's left hand.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.1.3** **Standard**	3.1.3.1.3 All horizontal angles employed in specifying the localizer field patterns shall originate from the centre of the localizer antenna system which provides the signals used in the front course sector.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.2.1** **Standard**	3.1.3.2 *Radio frequency* 3.1.3.2.1 The localizer shall operate in the band 108 MHz to 111.975 MHz. Where a single radio frequency carrier is used, the frequency tolerance shall not exceed plus or minus 0.005 per cent. Where two radio frequency carriers are used, the frequency tolerance shall not exceed 0.002 per cent and the nominal band occupied by the carriers shall be symmetrical about the assigned frequency. With all tolerances applied, the frequency separation between the carriers shall not be less than 5 kHz nor more than 14 kHz.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.2.2** **Standard**	3.1.3.2.2 The emission from the localizer shall be horizontally polarized. The vertically polarized component of the radiation on the course line shall not exceed that which corresponds to a DDM error of 0.016 when an aircraft is positioned on the course line and is in a roll attitude of 20 degrees from the horizontal.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.2.2.1** **Standard**	3.1.3.2.2.1 For Facility Performance Category II localizers, the vertically polarized component of the radiation on the course line shall not exceed that which corresponds to a DDM error of 0.008 when an aircraft is positioned on the course line and is in a roll attitude of 20 degrees from the horizontal.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.1.3.2.2.2** **Standard**	3.1.3.2.2.2 For Facility Performance Category III localizers, the vertically polarized component of the radiation within a sector bounded by 0.02 DDM either side of the course line shall not exceed that which corresponds to a DDM error of 0.005 when an aircraft is in a roll attitude of 20 degrees from the horizontal.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.2.3** **Standard**	3.1.3.2.3 For Facility Performance Category III localizers, signals emanating from the transmitter shall contain no components which result in an apparent course line fluctuation of more than 0.005 DDM peak to peak in the frequency band 0.01 Hz to 10 Hz.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.3.1** **Standard**	3.1.3.3.1 The localizer shall provide signals sufficient to allow satisfactory operation of a typical aircraft installation within the localizer and glide path coverage sectors. The localizer coverage sector shall extend from the centre of the localizer antenna system to distances of: *46.3 km (25 NM) within plus or minus 10 degrees from the front course line;* *31.5 km (17 NM) between 10 degrees and 35 degrees from the front course line;* *18.5 km (10 NM) outside of plus or minus 35 degrees from the front course line if coverage is provided;* except that, where topographical features dictate or operational requirements permit, the limits may be reduced down to 33.3 km (18 NM) within the plus or minus 10-degree sector and 18.5 km (10 NM) within the remainder of the coverage when alternative navigational means provide satisfactory coverage within the intermediate approach area. The localizer signals shall be receivable at the distances specified at and above a height of 600 m (2 000 ft) above the elevation of the threshold, or 300 m (1 000 ft) above the elevation of the highest point within the intermediate and final approach areas, whichever is the higher, except that, where needed to protect ILS performance and if operational requirements permit, the lower limit of coverage at angles beyond 15 degrees from the front course line shall be raised linearly from its height at 15 degrees to as high as 1 350 m (4 500 ft) above the elevation of the threshold at 35 degrees from the front course line. Such signals shall be receivable, to the distances specified, up to a surface extending outward from the localizer antenna and inclined at 7 degrees above the horizontal. *Note.— Where intervening obstacles penetrate the lower*	CAR Part 171.	Less protective or partially implemented or not implemented	Because of siting problems and terrain limitations some localizers do not meet Category I facility performance criteria for off course clearance.	Note: details of limitations are published in AIPNZ.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	surface, it is intended that guidance need not be provided at less than line-of-sight heights .				
Chapter 3 Reference **3.1.3.3.2** **Standard**	3.1.3.3.2 In all parts of the coverage volume specified in 3.1.3.3.1, other than as specified in 3.1.3.3.2.1, 3.1.3.3.2.2 and 3.1.3.3.2.3, the field strength shall be not less than 40 microvolts per metre (minus 114 dBW/m2). *Note.— This minimum field strength is required to permit satisfactory operational usage of ILS localizer facilities.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.3.2.1** **Standard**	3.1.3.3.2.1 For Facility Performance Category I localizers, the minimum field strength on the ILS glide path and within the localizer course sector from a distance of 18.5 km (10 NM) to a height of 30 m (100 ft) above the horizontal plane containing the threshold shall be not less than 90 microvolts per metre (minus 107 dBW/m2).	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.3.2.2** **Standard**	3.1.3.3.2.2 For Facility Performance Category II localizers, the minimum field strength on the ILS glide path and within the localizer course sector shall be not less than 100 microvolts per metre (minus 106 dBW/m2) at a distance of 18.5 km (10 NM) increasing to not less than 200 microvolts per metre (minus 100 dBW/m2) at a height of 15 m (50 ft) above the horizontal plane containing the threshold.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.3.2.3** **Standard**	3.1.3.3.2.3 For Facility Performance Category III localizers, the minimum field strength on the ILS glide path and within the localizer course sector shall be not less than 100 microvolts per metre (minus 106 dBW/m2) at a distance of 18.5 km (10 NM), increasing to not less than 200 microvolts per metre (minus 100 dBW/m2) at 6 m (20 ft) above the horizontal plane containing the threshold. From this point to a further point 4 m (12 ft) above the runway centre line, and 300 m (1 000 ft) from the threshold in the direction of the localizer, and thereafter at a height of 4 m (12 ft) along the length of the runway in the direction of the localizer, the field strength shall be not less than 100 microvolts per metre (minus 106 dBW/m2). *Note.— The field strengths given in 3.1.3.3.2.2 and 3.1.3.3.2.3 are necessary to provide the signal-to-noise ratio required for improved integrity.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.3.3** **Recommendation**	3.1.3.3.3 **Recommendation.—** *Above 7 degrees, the signals should be reduced to as low a value as practicable.* *Note 1.— The requirements in 3.1.3.3.1, 3.1.3.3.2.1, 3.1.3.3.2.2 and 3.1.3.3.2.3 are based on the assumption that the aircraft is heading directly toward the facility.* *Note 2.— Guidance material on significant airborne receiver parameters is given in 2.2.2 of Attachment C.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.3.4** **Standard**	3.1.3.3.4 When coverage is achieved by a localizer using two radio frequency carriers, one carrier providing a radiation field pattern in the front course sector and the other providing a radiation field pattern outside that sector, the ratio of the two carrier signal strengths in space within the front course sector to the coverage limits specified at 3.1.3.3.1 shall not be less than 10 dB. *Note.— Guidance material on localizers achieving coverage with two radio frequency carriers is given in the Note to 3.1.3.11.2 and in 2.7 of Attachment C.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.3.5** **Recommendation**	3.1.3.3.5 **Recommendation.—** *For Facility Performance Category III localizers, the ratio of the two carrier signal strengths in space within the front course sector should not be less than 16 dB.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.4.1** **Standard**	3.1.3.4 *Course structure* 3.1.3.4.1 For Facility Performance Category I localizers, bends in the course line shall not have amplitudes which exceed the following:	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.4.2** **Standard**	3.1.3.4.2 For Facility Performance Categories II and III localizers, bends in the course line shall not have amplitudes which exceed the following: and, for Facility Performance Category III only: *Note 1.— The amplitudes referred to in 3.1.3.4.1 and 3.1.3.4.2 are the DDMs due to bends as realized on the mean course line, when correctly adjusted.* *Note 2.— Guidance material relevant to the localizer course structure is given in 2.1.3, 2.1.5, 2.1.6 and 2.1.9 of Attachment C.*	CAR Part 171.	No Difference		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.1.3.5.1** **Standard**	3.1.3.5 *Carrier modulation* 3.1.3.5.1 The nominal depth of modulation of the radio frequency carrier due to each of the 90 Hz and 150 Hz tones shall be 20 per cent along the course line.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.5.2** **Standard**	3.1.3.5.2 The depth of modulation of the radio frequency carrier due to each of the 90 Hz and 150 Hz tones shall be within the limits of 18 and 22 per cent.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.5.3** **Standard**	3.1.3.5.3 The following tolerances shall be applied to the frequencies of the modulating tones: a) the modulating tones shall be 90 Hz and 150 Hz within plus or minus 2.5 per cent; b) the modulating tones shall be 90 Hz and 150 Hz within plus or minus 1.5 per cent for Facility Performance Category II installations; c) the modulating tones shall be 90 Hz and 150 Hz within plus or minus 1 per cent for Facility Performance Category III installations; d) the total harmonic content of the 90 Hz tone shall not exceed 10 per cent; additionally, for Facility Performance Category III localizers, the second harmonic of the 90 Hz tone shall not exceed 5 per cent; e) the total harmonic content of the 150 Hz tone shall not exceed 10 per cent.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.5.3.1** **Recommendation**	3.1.3.5.3.1 **Recommendation.—** *For Facility Performance Category I — ILS, the modulating tones should be 90 Hz and 150 Hz within plus or minus 1.5 per cent where practicable.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.5.3.2** **Standard**	3.1.3.5.3.2 For Facility Performance Category III localizers, the depth of amplitude modulation of the radio frequency carrier at the power supply frequency or its harmonics, or by other unwanted components, shall not exceed 0.5 per cent. Harmonics of the supply, or other unwanted noise components that may intermodulate with the 90 Hz and 150 Hz navigation tones or their harmonics to produce fluctuations in the course line, shall not exceed 0.05 per cent modulation depth of the radio frequency carrier.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.5.3.3** **Standard**	3.1.3.5.3.3 The modulation tones shall be phase-locked so that within the half course sector, the demodulated 90 Hz and 150 Hz wave forms pass through zero in the same direction within: a) for Facility Performance Categories I and II localizers: 20 degrees; and b) for Facility Performance Category III localizers: 10 degrees, of phase relative to the 150 Hz component, every half cycle of the combined 90 Hz and 150 Hz wave form. *Note 1.— The definition of phase relationship in this manner is not intended to imply a requirement to measure the phase within the half course sector.* *Note 2.— Guidance material relative to such measurement is given at Figure C-6 of Attachment C.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.5.3.4** **Standard**	3.1.3.5.3.4 With two-frequency localizer systems, 3.1.3.5.3.3 shall apply to each carrier. In addition, the 90 Hz modulating tone of one carrier shall be phase-locked to the 90 Hz modulating tone of the other carrier so that the demodulated wave forms pass through zero in the same direction within: a) for Facility Performance Categories I and II localizers: 20 degrees; and b) for Facility Performance Category III localizers: 10 degrees, of phase relative to 90 Hz. Similarly, the 150 Hz tones of the two carriers shall be phase-locked so that the demodulated wave forms pass through zero in the same direction within: 1) for Facility Performance Categories I and II localizers: 20 degrees; and 2) for Facility Performance Category III localizers: 10 degrees, of phase relative to 150 Hz.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.5.3.5** **Standard**	3.1.3.5.3.5 Alternative two-frequency localizer systems that employ audio phasing different from the normal in-phase conditions described in 3.1.3.5.3.4 shall be permitted. In this alternative system, the 90 Hz to 90 Hz phasing and the 150 Hz to 150 Hz phasing shall be adjusted to their nominal values to within limits equivalent to those stated in 3.1.3.5.3.4. *Note.— This is to ensure correct airborne receiver operation in the region away from the course line where the two carrier signal strengths are approximately equal.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.5.3.6** **Recommendation**	3.1.3.5.3.6 **Recommendation.—** *The sum of the modulation depths of the radio frequency carrier due to the 90 Hz and 150 Hz tones should not exceed 60 per cent or be less than 30 per cent within the required coverage.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.5.3.6.1** **Standard**	3.1.3.5.3.6.1 For equipment first installed after 1 January 2000, the sum of the modulation depths of the radio frequency carrier due to the 90 Hz and 150 Hz tones shall not exceed 60 per cent or be less than 30 per cent within the required coverage. *Note 1.— If the sum of the modulation depths is greater than 60 per cent for Facility Performance Category I localizers, the nominal displacement sensitivity may be adjusted as provided for in 3.1.3.7.1 to achieve the above modulation limit.* *Note 2.— For two-frequency systems, the standard for maximum sum of modulation depths does not apply at or near azimuths where the course and clearance carrier signal levels are equal in amplitude (i.e. at azimuths where both transmitting systems have a significant contribution to the total modulation depth).* *Note 3.— The standard for minimum sum of modulation depths is based on the malfunctioning alarm level being set as high as 30 per cent as stated in 2.3.3 of Attachment C.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.5.3.7** **Standard**	3.1.3.5.3.7 When utilizing a localizer for radiotelephone communications, the sum of the modulation depths of the radio frequency carrier due to the 90 Hz and 150 Hz tones shall not exceed 65 per cent within 10 degrees of the course line and shall not exceed 78 per cent at any other point around the localizer.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.5.4** **Recommendation**	3.1.3.5.4 **Recommendation.—** *Undesired frequency and phase modulation on ILS localizer radio frequency carriers that can affect the displayed DDM values in localizer receivers should be minimized to the extent practical.* *Note.— Relevant guidance material is given in 2.15 of Attachment C.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.6.1** **Standard**	3.1.3.6 *Course alignment accuracy* 3.1.3.6.1 The mean course line shall be adjusted and maintained within limits equivalent to the following displacements from the runway centre line at the ILS reference datum: a) for Facility Performance Category I localizers: plus or minus 10.5 m (35 ft), or the linear equivalent of 0.015 DDM, whichever is less; b) for Facility Performance Category II localizers: plus or minus 7.5 m (25 ft); c) for Facility Performance Category III localizers: plus or minus 3 m (10 ft).	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.6.2** **Recommendation**	3.1.3.6.2 **Recommendation.—** *For Facility Performance Category II localizers, the mean course line should be adjusted and maintained within limits equivalent to plus or minus 4.5 m (15 ft) displacement from runway centre line at the ILS reference datum.* *Note 1.— It is intended that Facility Performance Categories II and III installations be adjusted and maintained so that the limits specified in 3.1.3.6.1 and 3.1.3.6.2 are reached on very rare occasions. It is further intended that design and operation of the total ILS ground system be of sufficient integrity to accomplish this aim.* *Note 2.— It is intended that new Facility Performance Category II installations are to meet the requirements of 3.1.3.6.2.* *Note 3.— Guidance material on measurement of localizer course alignment is given in 2.1.3 of Attachment C. Guidance material on protecting localizer course alignment is given in 2.1.9 of Attachment C.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.7.1** **Standard**	3.1.3.7 *Displacement sensitivity* 3.1.3.7.1 The nominal displacement sensitivity within the half course sector shall be the equivalent of 0.00145 DDM/m (0.00044 DDM/ft) at the ILS reference datum except that for Facility Performance Category I localizers, where the specified nominal displacement sensitivity cannot be met, the displacement sensitivity shall be adjusted as near as possible to that value. For Facility Performance Category I localizers on runway codes 1 and 2, the nominal displacement sensitivity shall be achieved at the ILS Point "B". The maximum course sector angle shall not exceed six degrees. *Note.— Runway codes 1 and 2 are defined in Annex 14.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.7.2** **Standard**	3.1.3.7.2 The lateral displacement sensitivity shall be adjusted and maintained within the limits of plus or minus: a) 17 per cent of the nominal value for Facility Performance Categories I and II; b) 10 per cent of the nominal value for Facility Performance Category III.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.7.3** **Recommendation**	3.1.3.7.3 **Recommendation.—** *For Facility Performance Category II — ILS, displacement sensitivity should be adjusted and maintained within the limits of plus or minus 10 per cent where practicable.* *Note 1.— The figures given in 3.1.3.7.1, 3.1.3.7.2 and 3.1.3.7.3 are based upon a nominal sector width of 210 m (700 ft) at the appropriate point, i.e. ILS Point "B" on runway codes 1 and 2, and the ILS reference datum on other runways.* *Note 2.— Guidance material on the alignment and displacement sensitivity of localizers using two radio frequency carriers is given in 2.7 of Attachment C.* *Note 3.— Guidance material on measurement of localizer displacement sensitivity is given in 2.9 of Attachment C.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.7.4** **Standard**	3.1.3.7.4 The increase of DDM shall be substantially linear with respect to angular displacement from the front course line (where DDM is zero) up to an angle on either side of the front course line where the DDM is 0.180. From that angle to plus or minus 10 degrees, the DDM shall not be less than 0.180. From plus or minus 10 degrees to plus or minus 35 degrees, the DDM shall not be less than 0.155. Where coverage is required outside of the plus or minus 35 degrees sector, the DDM in the area of the coverage, except in the back course sector, shall not be less than 0.155. *Note 1.— The linearity of change of DDM with respect to angular displacement is particularly important in the neighbourhood of the course line.* *Note 2.— The above DDM in the 10-35 degree sector is to be considered a minimum requirement for the use of ILS as a landing aid. Wherever practicable, a higher DDM, e.g. 0.180, is advantageous to assist high speed aircraft to execute large angle intercepts at operationally desirable distances provided that limits on modulation percentage given in 3.1.3.5.3.6 are met.* *Note 3.— Wherever practicable, the localizer capture level of automatic flight control systems is to be set at or below 0.175 DDM in order to prevent false localizer captures.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.8.1** **Standard**	3.1.3.8 *Voice* 3.1.3.8.1 Facility Performance Categories I and II localizers may provide a ground-to-air radiotelephone communication channel to be operated simultaneously with the navigation and identification signals, provided that such operation shall not interfere in any way with the basic localizer function.	CAR Part 171.	No Difference		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.1.3.8.2** **Standard**	3.1.3.8.2 Facility Performance Category III localizers shall not provide such a channel, except where extreme care has been taken in the design and operation of the facility to ensure that there is no possibility of interference with the navigational guidance.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.8.3** **Standard**	3.1.3.8.3 If the channel is provided, it shall conform with the following Standards:	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.8.3.1** **Standard**	3.1.3.8.3.1 The channel shall be on the same radio frequency carrier or carriers as used for the localizer function, and the radiation shall be horizontally polarized. Where two carriers are modulated with speech, the relative phases of the modulations on the two carriers shall be such as to avoid the occurrence of nulls within the coverage of the localizer.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.8.3.2** **Standard**	3.1.3.8.3.2 The peak modulation depth of the carrier or carriers due to the radiotelephone communications shall not exceed 50 per cent but shall be adjusted so that: a) the ratio of peak modulation depth due to the radiotelephone communications to that due to the identification signal is approximately 9:1; b) the sum of modulation components due to use of the radiotelephone channel, navigation signals and identification signals shall not exceed 95 per cent.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.8.3.3** **Standard**	3.1.3.8.3.3 The audio frequency characteristics of the radiotelephone channel shall be flat to within 3 dB relative to the level at 1 000 Hz over the range 300 Hz to 3 000 Hz.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.9.1** **Standard**	3.1.3.9 *Identification* 3.1.3.9.1 The localizer shall provide for the simultaneous transmission of an identification signal, specific to the runway and approach direction, on the same radio frequency carrier or carriers as used for the localizer function. The transmission of the identification signal shall not interfere in any way with the basic localizer function.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.9.2** **Standard**	3.1.3.9.2 The identification signal shall be produced by Class A2A modulation of the radio frequency carrier or carriers using a modulation tone of 1 020 Hz within plus or minus 50 Hz. The depth of modulation shall be between the limits of 5 and 15 per cent except that, where a radiotelephone communication channel is provided, the depth of modulation shall be adjusted so that the ratio of peak modulation depth due to radiotelephone communications to that due to the identification signal modulation is approximately 9:1 (see 3.1.3.8.3.2). The emissions carrying the identification signal shall be horizontally polarized. Where two carriers are modulated with identification signals, the relative phase of the modulations shall be such as to avoid the occurrence of nulls within the coverage of the localizer.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.9.3** **Standard**	3.1.3.9.3 The identification signal shall employ the International Morse Code and consist of two or three letters. It may be preceded by the International Morse Code signal of the letter "I", followed by a short pause where it is necessary to distinguish the ILS facility from other navigational facilities in the immediate area.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.9.4** **Standard**	3.1.3.9.4 The identification signal shall be transmitted by dots and dashes at a speed corresponding to approximately seven words per minute, and shall be repeated at approximately equal intervals, not less than six times per minute, at all times during which the localizer is available for operational use. When the transmissions of the localizer are not available for operational use, as, for example, after removal of navigation components, or during maintenance or test transmissions, the identification signal shall be suppressed. The dots shall have a duration of 0.1 second to 0.160 second. The dash duration shall be typically three times the duration of a dot. The interval between dots and/or dashes shall be equal to that of one dot plus or minus 10 per cent. The interval between letters shall not be less than the duration of three dots.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.10.1** **Standard**	3.1.3.10.1 For Facility Performance Categories II and III, the localizer antenna system shall be located on the extension on the centre line of the runway at the stop end, and the equipment shall be adjusted so that the course lines will be in a vertical plane containing the centre line of the runway served. The antenna height and location shall be consistent with safe obstruction clearance practices.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.10.2** **Standard**	3.1.3.10.2 For Facility Performance Category I, the localizer antenna system shall be located and adjusted as in 3.1.3.10.1, unless site constraints dictate that the antenna be offset from the centre line of the runway.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.10.2.1** **Standard**	3.1.3.10.2.1 The offset localizer system shall be located and adjusted in accordance with the offset ILS provisions of the *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS) (Doc 8168), Volume II, and the localizer standards shall be referenced to the associated fictitious threshold point.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.11.1** **Standard**	3.1.3.11 *Monitoring* 3.1.3.11.1 The automatic monitor system shall provide a warning to the designated control points and cause one of the following to occur, within the period specified in 3.1.3.11.3.1, if any of the conditions stated in 3.1.3.11.2 persist: a) radiation to cease; and b) removal of the navigation and identification components from the carrier.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.11.2** **Standard**	3.1.3.11.2 The conditions requiring initiation of monitor action shall be the following: a) for Facility Performance Category I localizers, a shift of the mean course line from the runway centre line equivalent to more than 10.5 m (35 ft), or the linear equivalent to 0.015 DDM, whichever is less, at the ILS reference datum; b) for Facility Performance Category II localizers, a shift of the mean course line from the runway centre line equivalent to more than 7.5 m (25 ft) at the ILS reference datum; c) for Facility Performance Category III localizers, a shift of the mean course line from the runway centre line equivalent to more than 6 m (20 ft) at the ILS reference datum; d) in the case of localizers in which the basic functions are provided by the use of a single-frequency system, a reduction of power output to a level such that any of the requirements of 3.1.3.3, 3.1.3.4 or 3.1.3.5 are no longer satisfied, or to a level that is less than 50 per cent of the normal level (whichever occurs first); e) in the case of localizers in which the basic functions are provided by the use of a two-frequency system, a reduction of power output for either carrier to less than 80 per cent of normal, except that a greater reduction to between 80 per cent and 50 per cent of normal may be permitted, provided the localizer continues to meet the requirements of 3.1.3.3, 3.1.3.4 and 3.1.3.5; *Note.— It is important to recognize that a frequency*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	change resulting in a loss of the frequency difference specified in 3.1.3.2.1 may produce a hazardous condition. This problem is of greater operational significance for Facility Performance Categories II and III installations. As necessary, this problem can be dealt with through special monitoring provisions or highly reliable circuitry. f) change of displacement sensitivity to a value differing by more than 17 per cent from the nominal value for the localizer facility. *Note.— In selecting the power reduction figure to be employed in monitoring referred to in 3.1.3.11.2 e), particular attention is directed to vertical and horizontal lobe structure (vertical lobing due to different antenna heights) of the combined radiation systems when two carriers are employed. Large changes in the power ratio between carriers may result in low clearance areas and false courses in the off-course areas to the limits of the vertical coverage requirements specified in 3.1.3.3.1.*				
Chapter 3 Reference **3.1.3.11.2.1** **Recommendation**	3.1.3.11.2.1 **Recommendation.—** *In the case of localizers in which the basic functions are provided by the use of a two-frequency system, the conditions requiring initiation of monitor action should include the case when the DDM in the required coverage beyond plus or minus 10 degrees from the front course line, except in the back course sector, decreases below 0.155.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.11.3** **Standard**	3.1.3.11.3 The total period of radiation, including period(s) of zero radiation, outside the performance limits specified in a), b), c), d), e) and f) of 3.1.3.11.2 shall be as short as practicable, consistent with the need for avoiding interruptions of the navigation service provided by the localizer.	CAR Part 171.	No Difference		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.1.3.11.3.1** **Standard**	3.1.3.11.3.1 The total period referred to under 3.1.3.11.3 shall not exceed under any circumstances: 10 seconds for Facility Performance Category I localizers; 5 seconds for Facility Performance Category II localizers; 2 seconds for Facility Performance Category III localizers. *Note 1.— The total time periods specified are never-to-be-exceeded limits and are intended to protect aircraft in the final stages of approach against prolonged or repeated periods of localizer guidance outside the monitor limits. For this reason, they include not only the initial period of outside tolerance operation but also the total of any or all periods of outside tolerance radiation including period(s) of zero radiation and time required to remove the navigation and identification components from the carrier, which might occur during action to restore service, for example, in the course of consecutive monitor functioning and consequent changeover(s) to localizer equipment or elements thereof.* *Note 2.— From an operational point of view, the intention is that no guidance outside the monitor limits be radiated after the time periods given, and that no further attempts be made to restore service until a period in the order of 20 seconds has elapsed.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.11.3.2** **Recommendation**	3.1.3.11.3.2 **Recommendation.—** *Where practicable, the total period under 3.1.3.11.3.1 should be reduced so as not to exceed two seconds for Facility Performance Category II localizers and one second for Facility Performance Category III localizers.*	CAR Part 171.	No Difference		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.1.3.11.4** **Standard**	3.1.3.11.4 Design and operation of the monitor system shall be consistent with the requirement that navigation guidance and identification will be removed and a warning provided at the designated remote control points in the event of failure of the monitor system itself. *Note.— Guidance material on the design and operation of monitor systems is given in Attachment C, 2.1.7.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.12.1** **Standard**	3.1.3.12 Integrity and continuity of service levels and requirements 3.1.3.12.1 A localizer shall be assigned a level of integrity and continuity of service as given in 3.1.3.12.2 to 3.1.3.12.5. *Note.— Levels are used to provide the necessary information for the determination of the category of operation and associated minima, which are a function of the Facility Performance Category, the (separate) integrity and continuity of service level, and a number of operational factors (e.g. aircraft and crew qualification, meteorological conditions, and runway features). If a localizer does not meet its required integrity and continuity of service level, some operational use may still be possible, as stated in the* Manual of All-Weather Operations *(Doc 9365), Appendix C on ILS facility classification and downgrading. Similarly, if a localizer exceeds the minimum integrity and continuity of service level, more demanding operations may be possible.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.12.2** **Standard**	3.1.3.12.2 The localizer level shall be Level 1 if either: a) the localizer's integrity of service or its continuity of service, or both, are not demonstrated; or b) the localizer's integrity of service and its continuity of service are both demonstrated, but at least one of them does not meet the requirements of Level 2.	CAR	No Difference	NIL	NIL
Chapter 3 Reference **3.1.3.12.2.1** **Recommendation**	3.1.3.12.2.1 **Recommendation.—** *The probability of not radiating false guidance signals should not be less than 1 – 1.0 × 10–7 in any one landing for Level 1 localizers.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.12.2.2** **Recommendation**	3.1.3.12.2.2 **Recommendation.—** *The probability of not losing the radiated guidance signal should exceed 1 – 4 × 10–6 in any period of 15 seconds for Level 1 localizers (equivalent to 1 000 hours mean time between outages).* *Note.— A localizer that meets both Recommended Practices 3.1.3.12.2.1 and 3.1.3.12.2.2 also meets Standard 3.1.3.12.3 (Level 2 performance) and is therefore to be identified as Level 2.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.3.12.2.3** **Recommendation**	3.1.3.12.2.3 **Recommendation.—** *In the event that the integrity value for a Level 1 localizer is not available or cannot be readily calculated, a detailed analysis should be performed to assure proper monitor fail-safe operation.*	CAR	No Difference	NIL	NIL

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.3.12.3** **Standard**	3.1.3.12.3 The localizer level shall be Level 2 if: a) the probability of not radiating false guidance signals is not less than 1 – 1.0 x 10–7 in any one landing; and b) the probability of not losing the radiated guidance is greater than 1 – 4 × 10–6 in any period of 15 seconds (equivalent to 1 000 hours mean time between outages).	CAR	No Difference	NIL	NIL
Chapter 3 Reference **3.1.3.12.4** **Standard**	3.1.3.12.4 The localizer level shall be Level 3 if: a) the probability of not radiating false guidance signals is not less than 1 – 0.5 × 10–9 in any one landing; and b) the probability of not losing the radiated guidance is greater than 1 – 2 × 10–6 in any period of 15 seconds (equivalent to 2 000 hours mean time between outages).	CAR	No Difference	NIL	NIL
Chapter 3 Reference **3.1.3.12.5** **Standard**	3.1.3.12.5 The localizer level shall be Level 4 if: a) the probability of not radiating false guidance signals is not less than 1 – 0.5 × 10–9 in any one landing; and b) the probability of not losing the radiated guidance is greater than 1 – 2 × 10–6 in any period of 30 seconds (equivalent to 4 000 hours mean time between outages). *Note.— Guidance material on ways to achieve integrity and continuity of service is given in Attachment C, 2.8.*	CAR	No Difference	NIL	NIL

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.4.1** **Standard**	3.1.4 Interference immunity performance for ILS localizer receiving systems 3.1.4.1 The ILS localizer receiving system shall provide adequate immunity to interference from two-signal, third-order intermodulation products caused by VHF FM broadcast signals having levels in accordance with the following: $2N1 + N2 + 72 \leq 0$ for VHF FM sound broadcasting signals in the range 107.7 – 108.0 MHz and for VHF FM sound broadcasting signals below 107.7 MHz, where the frequencies of the two VHF FM sound broadcasting signals produce, within the receiver, a two-signal, third-order intermodulation product on the desired ILS localizer frequency. *N*1 and *N*2 are the levels (dBm) of the two VHF FM sound broadcasting signals at the ILS localizer receiver input. Neither level shall exceed the desensitization criteria set forth in 3.1.4.2. $\Delta f = 108.1 - f1$, where f1 is the frequency of N1, the VHF FM sound broadcasting signal closer to 108.1 MHz.	CAR Part 91 Appendix A, A.9.	Less protective or partially implemented or not implemented	Not a mandatory requirement for ILS localizer receiving systems fitted to NZ registered aircraft.	Rules project currently addressing this; estimated applicablity early 2011.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.4.2** **Standard**	3.1.4.2 The ILS localizer receiving system shall not be desensitized in the presence of VHF FM broadcast signals having levels in accordance with the following table: *Note 1.— The relationship is linear between adjacent points designated by the above frequencies.* *Note 2.— Guidance material on immunity criteria to be used for the performance quoted in 3.1.4.1 and 3.1.4.2 is contained in Attachment C, 2.2.2.*	CAR Part 91 Appendix A, A.9.	Less protective or partially implemented or not implemented	Not a mandatory requirement for ILS localizer receiving systems fitted to NZ registered aircraft.	Rules project currently addressing this; estimated applicablity early 2011.
Chapter 3 Reference **3.1.5.1.1** **Standard**	3.1.5.1 *General* 3.1.5.1.1 The radiation from the UHF glide path antenna system shall produce a composite field pattern which is amplitude modulated by a 90 Hz and a 150 Hz tone. The pattern shall be arranged to provide a straight line descent path in the vertical plane containing the centre line of the runway, with the 150 Hz tone predominating below the path and the 90 Hz tone predominating above the path to at least an angle equal to 1.75 θ.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.1.2** **Recommendation**	3.1.5.1.2 **Recommendation.—** *The ILS glide path angle should be 3 degrees. ILS glide path angles in excess of 3 degrees should not be used except where alternative means of satisfying obstruction clearance requirements are impracticable.*	CAR Part 171.	No Difference		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.1.5.1.2.1** **Standard**	3.1.5.1.2.1 The glide path angle shall be adjusted and maintained within: a) 0.075 θ from θ for Facility Performance Categories I and II — ILS glide paths; b) 0.04 θ from θ for Facility Performance Category III — ILS glide paths. *Note 1.— Guidance material on adjustment and maintenance of glide path angles is given in 2.4 of Attachment C.* *Note 2.— Guidance material on ILS glide path curvature, alignment and siting, relevant to the selection of the height of the ILS reference datum is given in 2.4 of Attachment C and Figure C-5.* *Note 3.— Guidance material relevant to protecting the ILS glide path course structure is given in 2.1.9 of Attachment C.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.1.3** **Standard**	3.1.5.1.3 The downward extended straight portion of the ILS glide path shall pass through the ILS reference datum at a height ensuring safe guidance over obstructions and also safe and efficient use of the runway served.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.1.4** **Standard**	3.1.5.1.4 The height of the ILS reference datum for Facility Performance Categories II and III — ILS shall be 15 m (50 ft). A tolerance of plus 3 m (10 ft) is permitted.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.1.5** **Recommendation**	3.1.5.1.5 **Recommendation.—** *The height of the ILS reference datum for Facility Performance Category I — ILS should be 15 m (50 ft). A tolerance of plus 3 m (10 ft) is permitted.* *Note 1.— In arriving at the above height values for the ILS reference datum, a maximum vertical distance of 5.8 m (19 ft) between the path of the aircraft glide path antenna and the path of the lowest part of the wheels at the threshold was assumed. For aircraft exceeding this criterion, appropriate steps may have to be taken either to maintain adequate clearance at threshold or to adjust the permitted operating minima.* *Note 2.— Appropriate guidance material is given in 2.4 of Attachment C.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.1.6** **Recommendation**	3.1.5.1.6 **Recommendation.—** *The height of the ILS reference datum for Facility Performance Category I — ILS used on short precision approach runway codes 1 and 2 should be 12 m (40 ft). A tolerance of plus 6 m (20 ft) is permitted.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.2.1** **Standard**	3.1.5.2 *Radio frequency* 3.1.5.2.1 The glide path equipment shall operate in the band 328.6 MHz to 335.4 MHz. Where a single radio frequency carrier is used, the frequency tolerance shall not exceed 0.005 per cent. Where two carrier glide path systems are used, the frequency tolerance shall not exceed 0.002 per cent and the nominal band occupied by the carriers shall be symmetrical about the assigned frequency. With all tolerances applied, the frequency separation between the carriers shall not be less than 4 kHz nor more than 32 kHz.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.2.2** **Standard**	3.1.5.2.2 The emission from the glide path equipment shall be horizontally polarized.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.2.3** **Standard**	3.1.5.2.3 For Facility Performance Category III — ILS glide path equipment, signals emanating from the transmitter shall contain no components which result in apparent glide path fluctuations of more than 0.02 DDM peak to peak in the frequency band 0.01 Hz to 10 Hz.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.3.1** **Standard**	3.1.5.3 *Coverage* 3.1.5.3.1 The glide path equipment shall provide signals sufficient to allow satisfactory operation of a typical aircraft installation in sectors of 8 degrees in azimuth on each side of the centre line of the ILS glide path, to a distance of at least 18.5 km (10 NM) up to 1.75 θ and down to 0.45 θ above the horizontal or to such lower angle, down to 0.30 θ as required to safeguard the promulgated glide path intercept procedure.	CAR Part 171.	Less protective or partially implemented or not implemented	Because of siting problems and terrain limitations some glide paths do not meet Category I facility performance criteria up to 8 degrees in azimuth on each side of the centre line.	Note: details of limitations are published in AIPNZ.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.3.2** **Standard**	3.1.5.3.2 In order to provide the coverage for glide path performance specified in 3.1.5.3.1, the minimum field strength within this coverage sector shall be 400 microvolts per metre (minus 95 dBW/m2). For Facility Performance Category I glide paths, this field strength shall be provided down to a height of 30 m (100 ft) above the horizontal plane containing the threshold. For Facility Performance Categories II and III glide paths, this field strength shall be provided down to a height of 15 m (50 ft) above the horizontal plane containing the threshold. *Note 1.— The requirements in the foregoing paragraphs are based on the assumption that the aircraft is heading directly toward the facility.* *Note 2.— Guidance material on significant airborne receiver parameters is given in 2.2 of Attachment C.* *Note 3.— Material concerning reduction in coverage outside 8 degrees on each side of the centre line of the ILS glide path appears in 2.4 of Attachment C.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.4.1** **Standard**	3.1.5.4 *ILS glide path structure* 3.1.5.4.1 For Facility Performance Category I — ILS glide paths, bends in the glide path shall not have amplitudes which exceed the following:	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.4.2** **Standard**	3.1.5.4.2 For Facility Performance Categories II and III — ILS glide paths, bends in the glide path shall not have amplitudes which exceed the following: *Note 1.— The amplitudes referred to in 3.1.5.4.1 and 3.1.5.4.2 are the DDMs due to bends as realized on the mean ILS glide path correctly adjusted.* *Note 2.— In regions of the approach where ILS glide path curvature is significant, bend amplitudes are calculated from the mean curved path, and not the downward extended straight line.* *Note 3.— Guidance material relevant to the ILS glide path course structure is given in 2.1.4 of Attachment C. Guidance material relevant to protecting the ILS glide path course structure is given in 2.1.9 of Attachment C.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.5.1** **Standard**	3.1.5.5 *Carrier modulation* 3.1.5.5.1 The nominal depth of modulation of the radio frequency carrier due to each of the 90 Hz and 150 Hz tones shall be 40 per cent along the ILS glide path. The depth of modulation shall not deviate outside the limits of 37.5 per cent to 42.5 per cent.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.5.2** **Standard**	3.1.5.5.2 The following tolerances shall be applied to the frequencies of the modulating tones: a) the modulating tones shall be 90 Hz and 150 Hz within 2.5 per cent for Facility Performance Category I — ILS; b) the modulating tones shall be 90 Hz and 150 Hz within 1.5 per cent for Facility Performance Category II — ILS; c) the modulating tones shall be 90 Hz and 150 Hz within 1 per cent for Facility Performance Category III — ILS; d) the total harmonic content of the 90 Hz tone shall not exceed 10 per cent: additionally, for Facility Performance Category III equipment, the second harmonic of the 90 Hz tone shall not exceed 5 per cent; e) the total harmonic content of the 150 Hz tone shall not exceed 10 per cent.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.5.2.1** **Recommendation**	3.1.5.5.2.1 **Recommendation.—** *For Facility Performance Category I — ILS, the modulating tones should be 90 Hz and 150 Hz within plus or minus 1.5 per cent where practicable.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.5.2.2** **Standard**	3.1.5.5.2.2 For Facility Performance Category III glide path equipment, the depth of amplitude modulation of the radio frequency carrier at the power supply frequency or harmonics, or at other noise frequencies, shall not exceed 1 per cent.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.5.3** **Standard**	3.1.5.5.3 The modulation shall be phase-locked so that within the ILS half glide path sector, the demodulated 90 Hz and 150 Hz wave forms pass through zero in the same direction within: a) for Facility Performance Categories I and II — ILS glide paths: 20 degrees; b) for Facility Performance Category III — ILS glide paths: 10 degrees, of phase relative to the 150 Hz component, every half cycle of the combined 90 Hz and 150 Hz wave form. *Note 1.— The definition of phase relationship in this manner is not intended to imply a requirement for measurement of phase within the ILS half glide path sector.* *Note 2.— Guidance material relating to such measures is given at Figure C-6 of Attachment C.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.5.3.1** **Standard**	3.1.5.5.3.1 With two-frequency glide path systems, 3.1.5.5.3 shall apply to each carrier. In addition, the 90 Hz modulating tone of one carrier shall be phase-locked to the 90 Hz modulating tone of the other carrier so that the demodulated wave forms pass through zero in the same direction within: a) for Facility Performance Categories I and II — ILS glide paths: 20 degrees; b) for Facility Performance Category III — ILS glide paths: 10 degrees, of phase relative to 90 Hz. Similarly, the 150 Hz tones of the two carriers shall be phase-locked so that the demodulated wave forms pass through zero in the same direction, within: 1) for Facility Performance Categories I and II — ILS glide paths: 20 degrees; 2) for Facility Performance Category III — ILS glide paths: 10 degrees, of phase relative to 150 Hz.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.5.3.2** **Standard**	3.1.5.5.3.2 Alternative two-frequency glide path systems that employ audio phasing different from the normal in-phase condition described in 3.1.5.5.3.1 shall be permitted. In these alternative systems, the 90 Hz to 90 Hz phasing and the 150 Hz to 150 Hz phasing shall be adjusted to their nominal values to within limits equivalent to those stated in 3.1.5.5.3.1. *Note.— This is to ensure correct airborne receiver operation within the glide path sector where the two carrier signal strengths are approximately equal.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.5.4** **Recommendation**	3.1.5.5.4 **Recommendation.—** *Undesired frequency and phase modulation on ILS glide path radio frequency carriers that can affect the displayed DDM values in glide path receivers should be minimized to the extent practical.* *Note.— Relevant guidance material is given in 2.15 of Attachment C.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.6.1** **Standard**	3.1.5.6 *Displacement sensitivity* 3.1.5.6.1 For Facility Performance Category I — ILS glide paths, the nominal angular displacement sensitivity shall correspond to a DDM of 0.0875 at angular displacements above and below the glide path between 0.07 θ and 0.14 θ. *Note.— The above is not intended to preclude glide path systems which inherently have asymmetrical upper and lower sectors.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.6.2** **Recommendation**	3.1.5.6.2 **Recommendation.—** *For Facility Performance Category I — ILS glide paths, the nominal angular displacement sensitivity should correspond to a DDM of 0.0875 at an angular displacement below the glide path of 0.12 θ with a tolerance of plus or minus 0.02 θ. The upper and lower sectors should be as symmetrical as practicable within the limits specified in 3.1.5.6.1.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.6.3** **Standard**	3.1.5.6.3 For Facility Performance Category II — ILS glide paths, the angular displacement sensitivity shall be as symmetrical as practicable. The nominal angular displacement sensitivity shall correspond to a DDM of 0.0875 at an angular displacement of: a) 0.12 θ below path with a tolerance of plus or minus 0.02 θ; b) 0.12 θ above path with a tolerance of plus 0.02 θ and minus 0.05 θ	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.6.4** **Standard**	3.1.5.6.4 For Facility Performance Category III — ILS glide paths, the nominal angular displacement sensitivity shall correspond to a DDM of 0.0875 at angular displacements above and below the glide path of 0.12 θ with a tolerance of plus or minus 0.02 θ.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.6.5** **Standard**	3.1.5.6.5 The DDM below the ILS glide path shall increase smoothly for decreasing angle until a value of 0.22 DDM is reached. This value shall be achieved at an angle not less than 0.30 θ above the horizontal. However, if it is achieved at an angle above 0.45 θ, the DDM value shall not be less than 0.22 at least down to 0.45 θ or to such lower angle, down to 0.30 θ, as required to safeguard the promulgated glide path intercept procedure. *Note.— The limits of glide path equipment adjustment are pictorially represented in Figure C-11 of Attachment C.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.6.6** **Standard**	3.1.5.6.6 For Facility Performance Category I — ILS glide paths, the angular displacement sensitivity shall be adjusted and maintained within plus or minus 25 per cent of the nominal value selected.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.6.7** **Standard**	3.1.5.6.7 For Facility Performance Category II — ILS glide paths, the angular displacement sensitivity shall be adjusted and maintained within plus or minus 20 per cent of the nominal value selected.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.6.8** **Standard**	3.1.5.6.8 For Facility Performance Category III — ILS glide paths, the angular displacement sensitivity shall be adjusted and maintained within plus or minus 15 per cent of the nominal value selected.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.7.1** **Standard**	3.1.5.7 *Monitoring* 3.1.5.7.1 The automatic monitor system shall provide a warning to the designated control points and cause radiation to cease within the periods specified in 3.1.5.7.3.1 if any of the following conditions persist: a) shift of the mean ILS glide path angle equivalent to more than minus 0.075 θ to plus 0.10 θ from θ; b) in the case of ILS glide paths in which the basic functions are provided by the use of a single-frequency system, a reduction of power output to less than 50 per cent of normal, provided the glide path continues to meet the requirements of 3.1.5.3, 3.1.5.4 and 3.1.5.5; c) in the case of ILS glide paths in which the basic functions are provided by the use of two-frequency systems, a reduction of power output for either carrier to less than 80 per cent of normal, except that a greater reduction to between 80 per cent and 50 per cent of normal may be permitted, provided the glide path continues to meet the requirements of 3.1.5.3, 3.1.5.4 and 3.1.5.5; *Note.— It is important to recognize that a frequency change resulting in a loss of the frequency difference specified in 3.1.5.2.1 may produce a hazardous condition. This problem is of greater operational significance for Facility Performance Categories II and III installations. As necessary, this problem can be dealt with through special monitoring provisions or highly reliable circuitry.* d) for Facility Performance Category I — ILS glide	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	paths, a change of the angle between the glide path and the line below the glide path (150 Hz predominating) at which a DDM of 0.0875 is realized by more than the greater of: i) plus or minus 0.0375 θ; or ii) an angle equivalent to a change of displacement sensitivity to a value differing by 25 per cent from the nominal value; e) for Facility Performance Categories II and III — ILS glide paths, a change of displacement sensitivity to a value differing by more than 25 per cent from the nominal value; f) lowering of the line beneath the ILS glide path at which a DDM of 0.0875 is realized to less than 0.7475 θ from horizontal; g) a reduction of DDM to less than 0.175 within the specified coverage below the glide path sector. *Note 1.— The value of 0.7475 θ from horizontal is intended to ensure adequate obstacle clearance. This value was derived from other parameters of the glide path and monitor specification. Since the measuring accuracy to four significant figures is not intended, the value of 0.75 θ may be used as a monitor limit for this purpose. Guidance on obstacle clearance criteria is given in the* Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS) *(Doc 8168).* *Note 2.— Subparagraphs f) and g) are not intended to establish a requirement for a separate monitor to protect against deviation of the lower limits of the half-sector below 0.7475 θ from horizontal.*				

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	Note 3.— At glide path facilities where the selected nominal angular displacement sensitivity corresponds to an angle below the ILS glide path which is close to or at the maximum limits specified in 3.1.5.6, it may be necessary to adjust the monitor operating limits to protect against sector deviations below 0.7475 θ from horizontal. *Note 4.— Guidance material relating to the condition described in g) appears in Attachment C, 2.4.11.*				
Chapter 3 Reference **3.1.5.7.2** **Recommendation**	3.1.5.7.2 **Recommendation.—** *Monitoring of the ILS glide path characteristics to smaller tolerances should be arranged in those cases where operational penalties would otherwise exist.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.7.3** **Standard**	3.1.5.7.3 The total period of radiation, including period(s) of zero radiation, outside the performance limits specified in 3.1.5.7.1 shall be as short as practicable, consistent with the need for avoiding interruptions of the navigation service provided by the ILS glide path.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.7.3.1** **Standard**	3.1.5.7.3.1 The total period referred to under 3.1.5.7.3 shall not exceed under any circumstances: 6 seconds for Facility Performance Category I — ILS glide paths; 2 seconds for Facility Performance Categories II and III — ILS glide paths. *Note 1.— The total time periods specified are never-to-be-exceeded limits and are intended to protect aircraft in the final stages of approach against prolonged or repeated periods of ILS glide path guidance outside the monitor limits. For this reason, they include not only the initial period of outside tolerance operation but also the total of any or all periods of outside tolerance radiation, including periods of zero radiation, which might occur during action to restore service, for example, in the course of consecutive monitor functioning and consequent changeovers to glide path equipments or elements thereof.* *Note 2.— From an operational point of view, the intention is that no guidance outside the monitor limits be radiated after the time periods given, and that no further attempts be made to restore service until a period in the order of 20 seconds has elapsed.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.7.3.2** **Recommendation**	3.1.5.7.3.2 **Recommendation.—** *Where practicable, the total period specified under 3.1.5.7.3.1 for Facility Performance Categories II and III — ILS glide paths should not exceed 1 second.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.7.4** **Standard**	3.1.5.7.4 Design and operation of the monitor system shall be consistent with the requirement that radiation shall cease and a warning shall be provided at the designated remote control points in the event of failure of the monitor system itself. *Note.— Guidance material on the design and operation of monitor systems is given in 2.1.7 of Attachment C.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.8.1** **Standard**	3.1.5.8 Integrity and continuity of service levels and requirements 3.1.5.8.1 A glide path shall be assigned a level of integrity and continuity of service as given in 3.1.5.8.2 to 3.1.5.8.4. *Note.— Levels are used to provide the necessary information for the determination of the category of operation and associated minima, which are a function of the Facility Performance Category, the (separate) integrity and continuity of service level, and a number of operational factors (e.g. aircraft and crew qualification, meteorological conditions, and runway features). If a glide path does not meet its required integrity and continuity of service level, some operational use may still be possible, as stated in the* Manual of All-Weather Operations *(Doc 9365), Appendix C on ILS facility classification and downgrading. Similarly, if a glide path exceeds the minimum integrity and continuity of service level, more demanding operations may be possible.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.8.2** **Standard**	3.1.5.8.2 The glide path level shall be Level 1 if either: a) the glide path's integrity of service or its continuity of service, or both, are not demonstrated; or b) the glide path's integrity of service and its continuity of service are both demonstrated, but at least one of them does not meet the requirements of Level 2.	CAR	No Difference	NIL	NIL

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.8.2.1** **Recommendation**	3.1.5.8.2.1 **Recommendation.—** *The probability of not radiating false guidance signals should not be less than 1 – 1.0 × 10–7 in any one landing for Level 1 glide paths.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.8.2.2** **Recommendation**	3.1.5.8.2.2 **Recommendation.—** *The probability of not losing the radiated guidance signal should exceed 1 – 4 × 10–6 in any period of 15 seconds for Level 1 glide paths (equivalent to 1 000 hours mean time between outages).* *Note.— A glide path that meets both Recommended Practices 3.1.5.8.2.1 and 3.1.5.8.2.2 also meets Standard 3.1.5.8.3 (Level 2 performance) and is therefore to be identified as Level 2.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.5.8.2.3** **Recommendation**	3.1.5.8.2.3 **Recommendation**.— *In the event that the integrity value for a Level 1 glide path is not available or cannot be readily calculated, a detailed analysis should be performed to assure proper monitor fail-safe operation.*	CAR	No Difference	NIL	NIL
Chapter 3 Reference **3.1.5.8.3** **Standard**	3.1.5.8.3 The glide path level shall be Level 2 if: a) the probability of not radiating false guidance signals is not less than 1 – 1.0 x 10–7 in any one landing; and b) the probability of not losing the radiated guidance is greater 1 – 4 × 10–6 in any period of 15 seconds (equivalent to 1 000 hours mean time between outages).	CAR	No Difference	NIL	NIL

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.5.8.4** **Standard**	3.1.5.8.4 The glide path level shall be Level 3 or 4 if: a) the probability of not radiating false guidance signals is not less than 1 – 0.5 × 10–9 in any one landing; and b) the probability of not losing the radiated guidance is greater than 1 – 2 × 10–6 in any period of 15 seconds (equivalent to 2 000 hours mean time between outages). *Note 1.— The requirements for glide path Level 3 and Level 4 are the same. The declaration of the glide path integrity and continuity of service levels should match the declaration of the localizer (i.e. the glide path is declared as Level 4 if the localizer is meeting Level 4).* *Note 2.— Guidance material on ways to achieve integrity and continuity of service is given in 2.8 of Attachment C.*	CAR	No Difference	NIL	NIL
Chapter 3 Reference **3.1.6.1** **Standard**	3.1.6 Localizer and glide path frequency pairing 3.1.6.1 The pairing of the runway localizer and glide path transmitter frequencies of an instrument landing system shall be taken from the following list in accordance with the provisions of Volume V, Chapter 4, 4.2:	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.6.1.1** **Standard**	3.1.6.1.1 In those regions where the requirements for runway localizer and glide path transmitter frequencies of an instrument landing system do not justify more than 20 pairs, they shall be selected sequentially, as required, from the following list:	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.6.2** **Standard**	3.1.6.2 Where existing ILS localizers meeting national requirements are operating on frequencies ending in even tenths of a megahertz, they shall be reassigned frequencies, conforming with 3.1.6.1 or 3.1.6.1.1 as soon as practicable and may continue operating on their present assignments only until this reassignment can be effected.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.6.3** **Standard**	3.1.6.3 Existing ILS localizers in the international service operating on frequencies ending in odd tenths of a megahertz shall not be assigned new frequencies ending in odd tenths plus one twentieth of a megahertz except where, by regional agreement, general use may be made of any of the channels listed in 3.1.6.1 (see Volume V, Chapter 4, 4.2).	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.1.7.1** **Standard**	3.1.7 VHF marker beacons *Note.— Requirements relating to marker beacons apply only when one or more marker beacons are installed.* 3.1.7.1 *General* a) There shall be two marker beacons in each installation except where, in the opinion of the Competent Authority, a single marker beacon is considered to be sufficient. A third marker beacon may be added whenever, in the opinion of the Competent Authority, an additional beacon is required because of operational procedures at a particular site. b) A marker beacon shall conform to the requirements prescribed in 3.1.7. When the installation comprises only two marker beacons, the requirements applicable to the middle marker and to the outer marker shall be complied with. When the installation comprises only one marker beacon, the requirements applicable to either the middle or the outer marker shall be complied with. If marker beacons are replaced by DME, the requirements of 3.1.7.6.5 shall apply. c) The marker beacons shall produce radiation patterns to indicate predetermined distance from the threshold along the ILS glide path.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.7.1.1** **Standard**	3.1.7.1.1 When a marker beacon is used in conjunction with the back course of a localizer, it shall conform with the marker beacon characteristics specified in 3.1.7.		Not Applicable		
Chapter 3 Reference **3.1.7.1.2** **Standard**	3.1.7.1.2 Identification signals of marker beacons used in conjunction with the back course of a localizer shall be clearly distinguishable from the inner, middle and outer marker beacon identifications, as prescribed in 3.1.7.5.1.		Not Applicable		
Chapter 3 Reference **3.1.7.2.1** **Standard**	3.1.7.2 *Radio frequency* 3.1.7.2.1 The marker beacons shall operate at 75 MHz with a frequency tolerance of plus or minus 0.005 per cent and shall utilize horizontal polarization.		Not Applicable		
Chapter 3 Reference **3.1.7.3.1** **Standard**	3.1.7.3 *Coverage* 3.1.7.3.1 The marker beacon system shall be adjusted to provide coverage over the following distances, measured on the ILS glide path and localizer course line: a) *inner marker:* 150 m plus or minus 50 m (500 ft plus or minus 160 ft); b) *middle marker:* 300 m plus or minus 100 m (1 000 ft plus or minus 325 ft); c) *outer marker:* 600 m plus or minus 200 m (2 000 ft plus or minus 650 ft).		Not Applicable		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.1.7.3.2** **Standard**	3.1.7.3.2 The field strength at the limits of coverage specified in 3.1.7.3.1 shall be 1.5 millivolts per metre (minus 82 dBW/m2). In addition, the field strength within the coverage area shall rise to at least 3.0 millivolts per metre (minus 76 dBW/m2). *Note 1.— In the design of the ground antenna, it is advisable to ensure that an adequate rate of change of field strength is provided at the edges of coverage. It is also advisable to ensure that aircraft within the localizer course sector will receive visual indication.* *Note 2.— Satisfactory operation of a typical airborne marker installation will be obtained if the sensitivity is so adjusted that visual indication will be obtained when the field strength is 1.5 millivolts per metre (minus 82 dBW/m2).*		Not Applicable		
Chapter 3 Reference **3.1.7.4.1** **Standard**	3.1.7.4 *Modulation* 3.1.7.4.1 The modulation frequencies shall be as follows: a) *inner marker:* 3 000 Hz; b) *middle marker:* 1 300 Hz; c) *outer marker:* 400 Hz. The frequency tolerance of the above frequencies shall be plus or minus 2.5 per cent, and the total harmonic content of each of the frequencies shall not exceed 15 per cent.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.7.4.2** **Standard**	3.1.7.4.2 The depth of modulation of the markers shall be 95 per cent plus or minus 4 per cent.		Not Applicable		
Chapter 3 Reference **3.1.7.5.1** **Standard**	3.1.7.5 *Identification* 3.1.7.5.1 The carrier energy shall not be interrupted. The audio frequency modulation shall be keyed as follows: a) *inner marker:* 6 dots per second continuously; b) *middle marker:* a continuous series of alternate dots and dashes, the dashes keyed at the rate of 2 dashes per second, and the dots at the rate of 6 dots per second; c) *outer marker:* 2 dashes per second continuously. These keying rates shall be maintained to within plus or minus 15 per cent.		Not Applicable		
Chapter 3 Reference **3.1.7.6.1** **Standard**	3.1.7.6 *Siting* 3.1.7.6.1 The inner marker shall be located so as to indicate in low visibility conditions the imminence of arrival at the runway threshold.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.7.6.1.1** **Recommendation**	3.1.7.6.1.1 **Recommendation.—** *If the radiation pattern is vertical, the inner marker should be located between 75 m (250 ft) and 450 m (1 500 ft) from the threshold and at not more than 30 m (100 ft) from the extended centre line of the runway.* *Note 1.— It is intended that the inner marker pattern should intercept the downward extended straight portion of the nominal ILS glide path at the lowest decision height applicable in Category II operations.* *Note 2.— Care must be exercised in siting the inner marker to avoid interference between the inner and middle markers. Details regarding the siting of inner markers are contained in Attachment C, 2.10.*		Not Applicable		
Chapter 3 Reference **3.1.7.6.1.2** **Recommendation**	3.1.7.6.1.2 **Recommendation.—** *If the radiation pattern is other than vertical, the equipment should be located so as to produce a field within the course sector and ILS glide path sector that is substantially similar to that produced by an antenna radiating a vertical pattern and located as prescribed in 3.1.7.6.1.1.*		Not Applicable		
Chapter 3 Reference **3.1.7.6.2** **Standard**	3.1.7.6.2 The middle marker shall be located so as to indicate the imminence, in low visibility conditions, of visual approach guidance.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.7.6.2.1** **Recommendation**	3.1.7.6.2.1 **Recommendation.—** *If the radiation pattern is vertical, the middle marker should be located 1 050 m (3 500 ft) plus or minus 150 m (500 ft), from the landing threshold at the approach end of the runway and at not more than 75 m (250 ft) from the extended centre line of the runway.* *Note.— See Attachment C, 2.10, regarding the siting of inner and middle marker beacons.*		Not Applicable		
Chapter 3 Reference **3.1.7.6.2.2** **Recommendation**	3.1.7.6.2.2 **Recommendation.—** *If the radiation pattern is other than vertical, the equipment should be located so as to produce a field within the course sector and ILS glide path sector that is substantially similar to that produced by an antenna radiating a vertical pattern and located as prescribed in 3.1.7.6.2.1.*		Not Applicable		
Chapter 3 Reference **3.1.7.6.3** **Standard**	3.1.7.6.3 The outer marker shall be located so as to provide height, distance and equipment functioning checks to aircraft on intermediate and final approach.		Not Applicable		
Chapter 3 Reference **3.1.7.6.3.1** **Recommendation**	3.1.7.6.3.1 **Recommendation.—** *The outer marker should be located 7.2 km (3.9 NM) from the threshold except that, where for topographical or operational reasons this distance is not practicable, the outer marker may be located between 6.5 and 11.1 km (3.5 and 6 NM) from the threshold.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.7.6.4** **Recommendation**	3.1.7.6.4 **Recommendation.—** *If the radiation pattern is vertical, the outer marker should be not more than 75 m (250 ft) from the extended centre line of the runway. If the radiation pattern is other than vertical, the equipment should be located so as to produce a field within the course sector and ILS glide path sector that is substantially similar to that produced by an antenna radiating a vertical pattern.*		Not Applicable		
Chapter 3 Reference **3.1.7.6.5** **Standard**	3.1.7.6.5 The positions of marker beacons, or where applicable, the equivalent distance(s) indicated by the DME when used as an alternative to part or all of the marker beacon component of the ILS, shall be published in accordance with the provisions of Annex 15.	AIPNZ.	No Difference		Note: DME only.
Chapter 3 Reference **3.1.7.6.5.1** **Standard**	3.1.7.6.5.1 When so used, the DME shall provide distance information operationally equivalent to that furnished by marker beacon(s).	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.7.6.5.2** **Standard**	3.1.7.6.5.2 When used as an alternative for the middle marker, the DME shall be frequency paired with the ILS localizer and sited so as to minimize the error in distance information.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.7.6.5.3** **Standard**	3.1.7.6.5.3 The DME in 3.1.7.6.5 shall conform to the specification in 3.5.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.1.7.7.1** **Standard**	3.1.7.7 *Monitoring* 3.1.7.7.1 Suitable equipment shall provide signals for the operation of an automatic monitor. The monitor shall transmit a warning to a control point if either of the following conditions arise: a) failure of the modulation or keying; b) reduction of power output to less than 50 per cent of normal.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.1.7.7.2** **Recommendation**	3.1.7.7.2 **Recommendation.—** *For each marker beacon, suitable monitoring equipment should be provided which will indicate at the appropriate location a decrease of the modulation depth below 50 per cent.*		Not Applicable		
Chapter 3 Reference **3.2.1** **Standard**	**3.2 Specification for precision approach radar system** *Note.— Slant distances are used throughout this specification.* 3.2.1 The precision approach radar system shall comprise the following elements:		Not Applicable		
Chapter 3 Reference **3.2.1.1** **Standard**	3.2.1.1 The precision approach radar element (PAR).		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.2.1.2** **Standard**	3.2.1.2 The surveillance radar element (SRE).		Not Applicable		
Chapter 3 Reference **3.2.2** **Standard**	3.2.2 When the PAR only is used, the installation shall be identified by the term PAR or precision approach radar and not by the term "precision approach radar system". *Note.— Provisions for the recording and retention of radar data are contained in Annex 11, Chapter 6.*		Not Applicable		
Chapter 3 Reference **3.2.3.1.1** **Standard**	3.2.3 The precision approach radar element (PAR) 3.2.3.1 *Coverage* 3.2.3.1.1 The PAR shall be capable of detecting and indicating the position of an aircraft of 15 m2 echoing area or larger, which is within a space bounded by a 20-degree azimuth sector and a 7-degree elevation sector, to a distance of at least 16.7 km (9 NM) from its respective antenna. *Note.— For guidance in determining the significance of the echoing areas of aircraft, the following table is included:* *private flyer (single-engined):* 5 to 10 m2; *small twin-engined aircraft:* from 15 m2; *medium twin-engined aircraft:* from 25 m2; *four-engined aircraft:* from 50 to 100 m2.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.2.3.2.1** **Standard**	3.2.3.2 *Siting* 3.2.3.2.1 The PAR shall be sited and adjusted so that it gives complete coverage of a sector with its apex at a point 150 m (500 ft) from the touchdown in the direction of the stop end of the runway and extending plus or minus 5 degrees about the runway centre line in azimuth and from minus 1 degree to plus 6 degrees in elevation. *Note 1.— Paragraph 3.2.3.2.1 can be met by siting the equipment with a set-back from the touchdown, in the direction of the stop end of the runway, of 915 m (3 000 ft) or more, for an offset of 120 m (400 ft) from the runway centre line, or of 1 200 m (4 000 ft) or more, for an offset of 185 m (600 ft) when the equipment is aligned to scan plus or minus 10 degrees about the centre line of the runway. Alternatively, if the equipment is aligned to scan 15 degrees to one side and 5 degrees to the other side of the centre line of the runway, then the minimum set-back can be reduced to 685 m (2 250 ft) and 915 m (3 000 ft) for offsets of 120 m (400 ft) and 185 m (600 ft) respectively.* *Note 2.— Diagrams illustrating the siting of PAR are given in Attachment C (Figures C-14 to C-17 inclusive).*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.2.3.3.1** **Standard**	3.2.3.3 *Accuracy* 3.2.3.3.1 *Azimuth accuracy.* Azimuth information shall be displayed in such a manner that left-right deviation from the on-course line shall be easily observable. The maximum permissible error with respect to the deviation from the on-course line shall be either 0.6 per cent of the distance from the PAR antenna plus 10 per cent of the deviation from the on-course line or 9 m (30 ft), whichever is greater. The equipment shall be so sited that the error at the touchdown shall not exceed 9 m (30 ft). The equipment shall be so aligned and adjusted that the displayed error at the touchdown shall be a minimum and shall not exceed 0.3 per cent of the distance from the PAR antenna or 4.5 m (15 ft), whichever is greater. It shall be possible to resolve the positions of two aircraft which are at 1.2 degrees in azimuth of one another.		Not Applicable		
Chapter 3 Reference **3.2.3.3.2** **Standard**	3.2.3.3.2 *Elevation accuracy.* Elevation information shall be displayed in such a manner that up-down deviation from the descent path for which the equipment is set shall be easily observable. The maximum permissible error with respect to the deviation from the on-course line shall be 0.4 per cent of the distance from the PAR antenna plus 10 per cent of the actual linear displacement from the chosen descent path or 6 m (20 ft), whichever is greater. The equipment shall be so sited that the error at the touchdown shall not exceed 6 m (20 ft). The equipment shall be so aligned and adjusted that the displayed error at the touchdown shall be a minimum and shall not exceed 0.2 per cent of the distance from the PAR antenna or 3 m (10 ft), whichever is greater. It shall be possible to resolve the positions of two aircraft that are at 0.6 degree in elevation of one another.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.2.3.3.3** **Standard**	3.2.3.3.3 *Distance accuracy.* The error in indication of the distance from the touchdown shall not exceed 30 m (100 ft) plus 3 per cent of the distance from the touchdown. It shall be possible to resolve the positions of two aircraft which are at 120 m (400 ft) of one another on the same azimuth.		Not Applicable		
Chapter 3 Reference **3.2.3.4** **Standard**	3.2.3.4 Information shall be made available to permit the position of the controlled aircraft to be established with respect to other aircraft and obstructions. Indications shall also permit appreciation of ground speed and rate of departure from or approach to the desired flight path.		Not Applicable		
Chapter 3 Reference **3.2.3.5** **Standard**	3.2.3.5 Information shall be completely renewed at least once every second.		Not Applicable		
Chapter 3 Reference **3.2.4.1** **Standard**	3.2.4 The surveillance radar element (SRE) 3.2.4.1 A surveillance radar used as the SRE of a precision approach radar system shall satisfy at least the following broad performance requirements.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.2.4.2.1** **Standard**	3.2.4.2 *Coverage* 3.2.4.2.1 The SRE shall be capable of detecting aircraft of 15 m2 echoing area and larger, which are in line of sight of the antenna within a volume described as follows: The rotation through 360 degrees about the antenna of a vertical plane surface bounded by a line at an angle of 1.5 degrees above the horizontal plane of the antenna, extending from the antenna to 37 km (20 NM); by a vertical line at 37 km (20 NM) from the intersection with the 1.5-degree line up to 2 400 m (8 000 ft) above the level of the antenna; by a horizontal line at 2 400 m (8 000 ft) from 37 km (20 NM) back towards the antenna to the intersection with a line from the antenna at 20 degrees above the horizontal plane of the antenna, and by a 20-degree line from the intersection with the 2 400 m (8 000 ft) line to the antenna.		Not Applicable		
Chapter 3 Reference **3.2.4.2.2** **Recommendation**	3.2.4.2.2 **Recommendation.—** *Efforts should be made in development to increase the coverage on an aircraft of 15 m2 echoing area to at least the volume obtained by amending 3.2.4.2.1 with the following substitutions:* — for *1.5 degrees*, read *0.5 degree*; — for *37 km (20 NM)*, read *46.3 km (25 NM)*; — for *2 400 m (8 000 ft)*, read *3 000 m (10 000 ft)*; — for *20 degrees*, read *30 degrees*. *Note.— A diagram illustrating the vertical coverage of SRE is given in Attachment C (Figure C-18).*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.2.4.3.1** **Standard**	3.2.4.3 *Accuracy* 3.2.4.3.1 *Azimuth accuracy.* The indication of position in azimuth shall be within plus or minus 2 degrees of the true position. It shall be possible to resolve the positions of two aircraft which are at 4 degrees of azimuth of one another.		Not Applicable		
Chapter 3 Reference **3.2.4.3.2** **Standard**	3.2.4.3.2 *Distance accuracy.* The error in distance indication shall not exceed 5 per cent of true distance or 150 m (500 ft), whichever is the greater. It shall be possible to resolve the positions of two aircraft that are separated by a distance of 1 per cent of the true distance from the point of observation or 230 m (750 ft), whichever is the greater.		Not Applicable		
Chapter 3 Reference **3.2.4.3.2.1** **Recommendation**	3.2.4.3.2.1 **Recommendation.—** *The error in distance indication should not exceed 3 per cent of the true distance or 150 m (500 ft), whichever is the greater.*		Not Applicable		
Chapter 3 Reference **3.2.4.4** **Standard**	3.2.4.4 The equipment shall be capable of completely renewing the information concerning the distance and azimuth of any aircraft within the coverage of the equipment at least once every 4 seconds.		Not Applicable		
Chapter 3 Reference **3.2.4.5** **Recommendation**	3.2.4.5 **Recommendation.—** *Efforts should be made to reduce, as far as possible, the disturbance caused by ground echoes or echoes from clouds and precipitation.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.3.1.1** **Standard**	**3.3 Specification for VHF omnidirectional radio range (VOR)** 3.3.1 General 3.3.1.1 The VOR shall be constructed and adjusted so that similar instrumental indications in aircraft represent equal clockwise angular deviations (bearings), degree for degree from magnetic North as measured from the location of the VOR.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.1.2** **Standard**	3.3.1.2 The VOR shall radiate a radio frequency carrier with which are associated two separate 30 Hz modulations. One of these modulations shall be such that its phase is independent of the azimuth of the point of observation (reference phase). The other modulation (variable phase) shall be such that its phase at the point of observation differs from that of the reference phase by an angle equal to the bearing of the point of observation with respect to the VOR.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.1.3** **Standard**	3.3.1.3 The reference and variable phase modulations shall be in phase along the reference magnetic meridian through the station. *Note.— The reference and variable phase modulations are in phase when the maximum value of the sum of the radio frequency carrier and the sideband energy due to the variable phase modulation occurs at the same time as the highest instantaneous frequency of the reference phase modulation.*	CAR Part 171.	No Difference		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.3.2.1** **Standard**	3.3.2 Radio frequency 3.3.2.1 The VOR shall operate in the band 111.975 MHz to 117.975 MHz except that frequencies in the band 108 MHz to 111.975 MHz may be used when, in accordance with the provisions of Volume V, Chapter 4, 4.2.1 and 4.2.3.1, the use of such frequencies is acceptable. The highest assignable frequency shall be 117.950 MHz. The channel separation shall be in increments of 50 kHz referred to the highest assignable frequency. In areas where 100 kHz or 200 kHz channel spacing is in general use, the frequency tolerance of the radio frequency carrier shall be plus or minus 0.005 per cent.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.2.2** **Standard**	3.3.2.2 The frequency tolerance of the radio frequency carrier of all new installations implemented after 23 May 1974 in areas where 50 kHz channel spacing is in use shall be plus or minus 0.002 per cent.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.2.3** **Standard**	3.3.2.3 In areas where new VOR installations are implemented and are assigned frequencies spaced at 50 kHz from existing VORs in the same area, priority shall be given to ensuring that the frequency tolerance of the radio frequency carrier of the existing VORs is reduced to plus or minus 0.002 per cent.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.3.3.1** **Standard**	3.3.3 Polarization and pattern accuracy 3.3.3.1 The emission from the VOR shall be horizontally polarized. The vertically polarized component of the radiation shall be as small as possible. *Note.— It is not possible at present to state quantitatively the maximum permissible magnitude of the vertically polarized component of the radiation from the VOR. (Information is provided in the* Manual on Testing of Radio Navigation Aids *(Doc 8071) as to flight checks that can be carried out to determine the effects of vertical polarization on the bearing accuracy.)*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.3.2** **Standard**	3.3.3.2 The ground station contribution to the error in the bearing information conveyed by the horizontally polarized radiation from the VOR for all elevation angles between 0 and 40 degrees, measured from the centre of the VOR antenna system, shall be within plus or minus 2 degrees.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.4.1** **Standard**	3.3.4 Coverage 3.3.4.1 The VOR shall provide signals such as to permit satisfactory operation of a typical aircraft installation at the levels and distances required for operational reasons, and up to an elevation angle of 40 degrees.	CAR Part 171.	No Difference		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.3.4.2** **Recommendation**	3.3.4.2 **Recommendation.—** *The field strength or power density in space of VOR signals required to permit satisfactory operation of a typical aircraft installation at the minimum service level at the maximum specified service radius should be 90 microvolts per metre or minus 107 dBW/m2.* *Note.— Typical equivalent isotropically radiated powers (EIRPs) to achieve specified ranges are contained in 3.1 of Attachment C. The definition of EIRP is contained in 3.5.1.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.3.5.1** **Standard**	3.3.5 Modulations of navigation signals 3.3.5.1 The radio frequency carrier as observed at any point in space shall be amplitude modulated by two signals as follows: a) a subcarrier of 9 960 Hz of constant amplitude, frequency modulated at 30 Hz: 1) for the conventional VOR, the 30 Hz component of this FM subcarrier is fixed without respect to azimuth and is termed the “reference phase” and shall have a deviation ratio of 16 plus or minus 1 (i.e. 15 to 17); 2) for the Doppler VOR, the phase of the 30 Hz component varies with azimuth and is termed the “variable phase” and shall have a deviation ratio of 16 plus or minus 1 (i.e. 15 to 17) when observed at any angle of elevation up to 5 degrees, with a minimum deviation ratio of 11 when observed at any angle of elevation above 5 degrees and up to 40 degrees; b) a 30 Hz amplitude modulation component: 1) for the conventional VOR, this component results from a rotating field pattern, the phase of which varies with azimuth, and is termed the “variable phase”; 2) for the Doppler VOR, this component, of constant phase with relation to azimuth and constant amplitude, is radiated omnidirectionally and is termed the “reference phase”.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.3.5.2** **Standard**	3.3.5.2 The nominal depth of modulation of the radio frequency carrier due to the 30 Hz signal or the subcarrier of 9 960 Hz shall be within the limits of 28 per cent and 32 per cent. *Note.— This requirement applies to the transmitted signal observed in the absence of multipath.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.5.3** **Standard**	3.3.5.3 The depth of modulation of the radio frequency carrier due to the 30 Hz signal, as observed at any angle of elevation up to 5 degrees, shall be within the limits of 25 to 35 per cent. The depth of modulation of the radio frequency carrier due to the 9 960 Hz signal, as observed at any angle of elevation up to 5 degrees, shall be within the limits of 20 to 55 per cent on facilities without voice modulation, and within the limits of 20 to 35 per cent on facilities with voice modulation. *Note.— When modulation is measured during flight testing under strong dynamic multipath conditions, variations in the received modulation percentages are to be expected. Short-term variations beyond these values may be acceptable. The* Manual on Testing of Radio Navigation Aids *(Doc 8071) contains additional information on the application of airborne modulation tolerances.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.5.4** **Standard**	3.3.5.4 The variable and reference phase modulation frequencies shall be 30 Hz within plus or minus 1 per cent.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.3.5.5** **Standard**	3.3.5.5 The subcarrier modulation mid-frequency shall be 9 960 Hz within plus or minus 1 per cent.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.5.6** **Standard**	3.3.5.6 a) For the conventional VOR, the percentage of amplitude modulation of the 9 960 Hz subcarrier shall not exceed 5 per cent. b) For the Doppler VOR, the percentage of amplitude modulation of the 9 960 Hz subcarrier shall not exceed 40 per cent when measured at a point at least 300 m (1 000 ft) from the VOR.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.5.7** **Standard**	3.3.5.7 Where 50 kHz VOR channel spacing is implemented, the sideband level of the harmonics of the 9 960 Hz component in the radiated signal shall not exceed the following levels referred to the level of the 9 960 Hz sideband:	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.6.1** **Standard**	3.3.6 Voice and identification 3.3.6.1 If the VOR provides a simultaneous communication channel ground-to-air, it shall be on the same radio frequency carrier as used for the navigational function. The radiation on this channel shall be horizontally polarized.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.3.6.2** **Standard**	3.3.6.2 The peak modulation depth of the carrier on the communication channel shall not be greater than 30 per cent.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.6.3** **Standard**	3.3.6.3 The audio frequency characteristics of the speech channel shall be within 3 dB relative to the level at 1 000 Hz over the range 300 Hz to 3 000 Hz.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.6.4** **Standard**	3.3.6.4 The VOR shall provide for the simultaneous transmission of a signal of identification on the same radio frequency carrier as that used for the navigational function. The identification signal radiation shall be horizontally polarized.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.6.5** **Standard**	3.3.6.5 The identification signal shall employ the International Morse Code and consist of two or three letters. It shall be sent at a speed corresponding to approximately 7 words per minute. The signal shall be repeated at least once every 30 seconds and the modulation tone shall be 1 020 Hz within plus or minus 50 Hz.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.3.6.5.1** **Recommendation**	3.3.6.5.1 **Recommendation.—** *The identification signal should be transmitted at least three times each 30 seconds, spaced equally within that time period. One of these identification signals may take the form of a voice identification.* *Note.— Where a VOR and DME are associated in accordance with 3.5.2.5, the identification provisions of 3.5.3.6.4 influence the VOR identification.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.6.6** **Standard**	3.3.6.6 The depth to which the radio frequency carrier is modulated by the code identification signal shall be close to, but not in excess of 10 per cent except that, where a communication channel is not provided, it shall be permissible to increase the modulation by the code identification signal to a value not exceeding 20 per cent.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.6.6.1** **Recommendation**	3.3.6.6.1 **Recommendation.—** *If the VOR provides a simultaneous communication channel ground-to-air, the modulation depth of the code identification signal should be 5 plus or minus 1 per cent in order to provide a satisfactory voice quality.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.6.7** **Standard**	3.3.6.7 The transmission of speech shall not interfere in any way with the basic navigational function. When speech is being radiated, the code identification shall not be suppressed.	CAR Part 171.	No Difference		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.3.6.8** **Standard**	3.3.6.8 The VOR receiving function shall permit positive identification of the wanted signal under the signal conditions encountered within the specified coverage limits, and with the modulation parameters specified at 3.3.6.5, 3.3.6.6 and 3.3.6.7.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.7.1** **Standard**	3.3.7 Monitoring 3.3.7.1 Suitable equipment located in the radiation field shall provide signals for the operation of an automatic monitor. The monitor shall transmit a warning to a control point, and either remove the identification and navigation components from the carrier or cause radiation to cease if any one or a combination of the following deviations from established conditions arises: a) a change in excess of 1 degree at the monitor site of the bearing information transmitted by the VOR; b) a reduction of 15 per cent in the modulation components of the radio frequency signals voltage level at the monitor of either the subcarrier, or 30 Hz amplitude modulation signals, or both.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.3.7.2** **Standard**	3.3.7.2 Failure of the monitor itself shall transmit a warning to a control point and either: a) remove the identification and navigation components from the carrier; or b) cause radiation to cease. *Note.— Guidance material on VOR appears in Attachment C, 3, and Attachment E.*	CAR Part 171.	No Difference		

Report on entire Annex

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.3.8.1** **Standard**	3.3.8 Interference immunity performance for VOR receiving systems 3.3.8.1 The VOR receiving system shall provide adequate immunity to interference from two signal, third-order intermodulation products caused by VHF FM broadcast signals having levels in accordance with the following: $2N1 + N2 + 72 \leq 0$ for VHF FM sound broadcasting signals in the range 107.7 – 108.0 MHz and for VHF FM sound broadcasting signals below 107.7 MHz, where the frequencies of the two VHF FM sound broadcasting signals produce, within the receiver, a two-signal, third-order intermodulation product on the desired VOR frequency. N1 and N2 are the levels (dBm) of the two VHF FM sound broadcasting signals at the VOR receiver input. Neither level shall exceed the desensitization criteria set forth in 3.3.8.2. Δf = 108.1 – f1, where f1 is the frequency of N1, the VHF FM sound broadcasting signal closer to 108.1 MHz.	CAR Part 171.	Less protective or partially implemented or not implemented	Not a mandatory requirement for VOR receiving systems fitted to NZ registered aircraft.	Rules project currently addressing this; estimated applicablity early 2011.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.3.8.2** **Standard**	3.3.8.2 The VOR receiving system shall not be desensitized in the presence of VHF FM broadcast signals having levels in accordance with the following table: *Note 1.— The relationship is linear between adjacent points designated by the above frequencies.* *Note 2.— Guidance material on immunity criteria to be used for the performance quoted in 3.3.8.1 and 3.3.8.2 is contained in Attachment C, 3.6.5.*	CAR Part 91, Appendix A, A.9.	Less protective or partially implemented or not implemented	Not a mandatory requirement for VOR receiving systems fitted to NZ registered aircraft.	Rules project currently addressing this; estimated applicablity early 2011.
Chapter 3 Reference **Definition**	**3.4 Specification for non-directional radio beacon (NDB)** 3.4.1 Definitions *Note.— In Attachment C, guidance is given on the meaning and application of rated coverage and effective coverage and on coverage of NDBs.* ***Average radius of rated coverage.*** The radius of a circle having the same area as the rated coverage.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Effective coverage.*** The area surrounding an NDB within which bearings can be obtained with an accuracy sufficient for the nature of the operation concerned.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Locator.*** An LF/MF NDB used as an aid to final approach. *Note.— A locator usually has an average radius of rated coverage of between 18.5 and 46.3 km (10 and 25 NM).*	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Rated coverage.*** The area surrounding an NDB within which the strength of the vertical field of the ground wave exceeds the minimum value specified for the geographical area in which the radio beacon is situated. *Note.— The above definition is intended to establish a method of rating radio beacons on the normal coverage to be expected in the absence of sky wave transmission and/or anomalous propagation from the radio beacon concerned or interference from other LF/MF facilities, but taking into account the atmospheric noise in the geographical area concerned.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.4.2.1** **Recommendation**	3.4.2 Coverage 3.4.2.1 **Recommendation.—** *The minimum value of field strength in the rated coverage of an NDB should be 70°microvolts per metre.* *Note 1.— Guidance on the field strengths required particularly in the latitudes between 30°N and 30°S is given in 6.1 of Attachment C, and the relevant ITU provisions are given in Chapter VIII, Article 35, Section IV, Part B of the Radio Regulations.* *Note 2.— The selection of locations and times at which the field strength is measured is important in order to avoid abnormal results for the locality concerned; locations on air routes in the area around the beacon are operationally most significant.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.2.2** **Standard**	3.4.2.2 All notifications or promulgations of NDBs shall be based upon the average radius of the rated coverage. *Note 1.— In classifying radio beacons in areas where substantial variations in rated coverage may occur diurnally and seasonally, such variations should be taken into account.* *Note 2.— Beacons having an average radius of rated coverage of between 46.3 and 278 km (25 and 150 NM) may be designated by the nearest multiple of 46.3 km (25 NM) to the average radius of rated coverage, and beacons of rated coverage over 278 km (150 NM) to the nearest multiple of 92.7 km (50 NM).*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.4.2.3** **Recommendation**	3.4.2.3 **Recommendation.—** *Where the rated coverage of an NDB is materially different in various operationally significant sectors, its classification should be expressed in terms of the average radius of rated coverage and the angular limits of each sector as follows:* *Radius of coverage of sector/angular limits of sector expressed as magnetic bearing clockwise from the beacon.* *Where it is desirable to classify an NDB in such a manner, the number of sectors should be kept to a minimum and preferably should not exceed two.* *Note.— The average radius of a given sector of the rated coverage is equal to the radius of the corresponding circle-sector of the same area. Example:* *150/210° – 30°* *100/30° – 210°.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.3** **Standard**	3.4.3 Limitations in radiated power The power radiated from an NDB shall not exceed by more than 2 dB that necessary to achieve its agreed rated coverage, except that this power may be increased if coordinated regionally or if no harmful interference to other facilities will result.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.4.1** **Standard**	3.4.4 Radio frequencies 3.4.4.1 The radio frequencies assigned to NDBs shall be selected from those available in that portion of the spectrum between 190 kHz and 1 750 kHz.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.4.4.2** **Standard**	3.4.4.2 The frequency tolerance applicable to NDBs shall be 0.01 per cent except that, for NDBs of antenna power above 200 W using frequencies of 1 606.5 kHz and above, the tolerance shall be 0.005 per cent.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.4.3** **Recommendation**	3.4.4.3 **Recommendation.—** *Where two locators are used as supplements to an ILS, the frequency separation between the carriers of the two should be not less than 15 kHz to ensure correct operation of the radio compass, and preferably not more than 25 kHz in order to permit a quick tuning shift in cases where an aircraft has only one radio compass.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.4.4** **Standard**	3.4.4.4 Where locators associated with ILS facilities serving opposite ends of a single runway are assigned a common frequency, provision shall be made to ensure that the facility not in operational use cannot radiate. *Note.— Additional guidance on the operation of locator beacons on common frequency channels is contained in Volume V, Chapter 3, 3.2.2.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.5.1** **Standard**	3.4.5 Identification 3.4.5.1 Each NDB shall be individually identified by a two- or three-letter International Morse Code group transmitted at a rate corresponding to approximately 7 words per minute.	CAR Part 171.	No Difference		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.4.5.2** **Standard**	3.4.5.2 The complete identification shall be transmitted at least once every 30 seconds, except where the beacon identification is effected by on/off keying of the carrier. In this latter case, the identification shall be at approximately 1-minute intervals, except that a shorter interval may be used at particular NDB stations where this is found to be operationally desirable.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.5.2.1** **Recommendation**	3.4.5.2.1 **Recommendation.—** *Except for those cases where the beacon identification is effected by on/off keying of the carrier, the identification signal should be transmitted at least three times each 30 seconds, spaced equally within that time period.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.5.3** **Standard**	3.4.5.3 For NDBs with an average radius of rated coverage of 92.7 km (50 NM) or less that are primarily approach and holding aids in the vicinity of an aerodrome, the identification shall be transmitted at least three times each 30 seconds, spaced equally within that time period.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.5.4** **Standard**	3.4.5.4 The frequency of the modulating tone used for identification shall be 1 020 Hz plus or minus 50 Hz or 400 Hz plus or minus 25 Hz. *Note.— Determination of the figure to be used would be made regionally, in the light of the considerations contained in Attachment C, 6.5.*	CAR Part 171.	No Difference		The 1020 Hz option is used in New Zealand.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.4.6.1** **Standard**	3.4.6 Characteristics of emissions *Note.— The following specifications are not intended to preclude employment of modulations or types of modulations that may be utilized in NDBs in addition to those specified for identification, including simultaneous identification and voice modulation, provided that these additional modulations do not materially affect the operational performance of the NDBs in conjunction with currently used airborne direction finders, and provided their use does not cause harmful interference to other NDB services.* 3.4.6.1 Except as provided in 3.4.6.1.1, all NDBs shall radiate an uninterrupted carrier and be identified by on/off keying of an amplitude modulating tone (NON/A2A).	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.6.1.1** **Standard**	3.4.6.1.1 NDBs other than those wholly or partly serving as holding, approach and landing aids, or those having an average radius of rated coverage of less than 92.7 km (50 NM), may be identified by on/off keying of the unmodulated carrier (NON/A1A) if they are in areas of high beacon density and/or where the required rated coverage is not practicable of achievement because of: a) radio interference from radio stations; b) high atmospheric noise; c) local conditions. *Note.— In selecting the types of emission, the possibility of confusion, arising from an aircraft tuning from a NON/A2A facility to a NON/A1A facility without changing the radio compass from "MCW" to "CW" operation, will need to be kept in mind.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.4.6.2** **Standard**	3.4.6.2 For each NDB identified by on/off keying of an audio modulating tone, the depth of modulation shall be maintained as near to 95 per cent as practicable.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.6.3** **Standard**	3.4.6.3 For each NDB identified by on/off keying of an audio modulating tone, the characteristics of emission during identification shall be such as to ensure satisfactory identification at the limit of its rated coverage. *Note 1.— The foregoing requirement necessitates as high a percentage modulation as practicable, together with maintenance of an adequate radiated carrier power during identification.* *Note 2.— With a direction-finder pass band of plus or minus 3 kHz about the carrier, a signal to noise ratio of 6 dB at the limit of rated coverage will, in general, meet the foregoing requirement.* *Note 3.— Some considerations with respect to modulation depth are contained in Attachment C, 6.4.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.6.4** **Recommendation**	3.4.6.4 **Recommendation.—** *The carrier power of an NDB with NON/A2A emissions should not fall when the identity signal is being radiated except that, in the case of an NDB having an average radius of rated coverage exceeding 92.7 km (50 NM), a fall of not more than 1.5 dB may be accepted.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.4.6.5** **Standard**	3.4.6.5 Unwanted audio frequency modulations shall total less than 5 per cent of the amplitude of the carrier. *Note.— Reliable performance of airborne automatic direction-finding equipment (ADF) may be seriously prejudiced if the beacon emission contains modulation by an audio frequency equal or close to the loop switching frequency or its second harmonic. The loop switching frequencies in currently used equipment lie between 30 Hz and 120 Hz.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.6.6** **Standard**	3.4.6.6 The bandwidth of emissions and the level of spurious emissions shall be kept at the lowest value that the state of technique and the nature of the service permit. *Note.— Article S3 of the ITU Radio Regulations contains the general provisions with respect to technical characteristics of equipment and emissions. The Radio Regulations contain specific provisions relating to necessary bandwidth, frequency tolerance, spurious emissions and classification of emissions (see Appendices APS1, APS2 and APS3).*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.7.1** **Recommendation**	3.4.7 Siting of locators 3.4.7.1 **Recommendation.—** *Where locators are used as a supplement to the ILS, they should be located at the sites of the outer and middle marker beacons. Where only one locator is used as a supplement to the ILS, preference should be given to location at the site of the outer marker beacon. Where locators are employed as an aid to final approach in the absence of an ILS, equivalent locations to those applying when an ILS is installed should be selected, taking into account the relevant obstacle clearance provisions of the* PANS-OPS *(Doc 8168).*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.4.7.2** **Recommendation**	3.4.7.2 **Recommendation.—** *Where locators are installed at both the middle and outer marker positions, they should be located, where practicable, on the same side of the extended centre line of the runway in order to provide a track between the locators which will be more nearly parallel to the centre line of the runway*.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.8.1** **Standard**	3.4.8 Monitoring 3.4.8.1 For each NDB, suitable means shall be provided to enable detection of any of the following conditions at an appropriate location: a) a decrease in radiated carrier power of more than 50 per cent below that required for the rated coverage; b) failure to transmit the identification signal; c) malfunctioning or failure of the means of monitoring itself.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.4.8.2** **Recommendation**	3.4.8.2 **Recommendation.—** *When an NDB is operated from a power source having a frequency which is close to airborne ADF equipment switching frequencies, and where the design of the NDB is such that the power supply frequency is likely to appear as a modulation product on the emission, the means of monitoring should be capable of detecting such power supply modulation on the carrier in excess of 5 per cent.*	CAR Part 171.	More Exacting or Exceeds	Mandatory Standard	
Chapter 3 Reference **3.4.8.3** **Standard**	3.4.8.3 During the hours of service of a locator, the means of monitoring shall provide for a continuous check on the functioning of the locator as prescribed in 3.4.8.1 a), b) and c).	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.4.8.4** **Recommendation**	3.4.8.4 **Recommendation.—** *During the hours of service of an NDB other than a locator, the means of monitoring should provide for a continuous check on the functioning of the NDB as prescribed in 3.4.8.1 a), b) and c).* *Note.— Guidance material on the testing of NDBs is contained in 6.6 of Attachment C.*	CAR Part 171.	More Exacting or Exceeds	Mandatory Standard	
Chapter 3 Reference **Definition**	**3.5 Specification for UHF distance measuring equipment (DME)** *Note.— In the following section, provision is made for two types of DME facility: DME/N for general application, and DME/P as outlined in 3.11.3.* 3.5.1 Definitions ***Control motion noise (CMN).*** That portion of the guidance signal error which causes control surface, wheel and column motion and could affect aircraft attitude angle during coupled flight, but does not cause aircraft displacement from the desired course and/or glide path. (See 3.11.)	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***DME dead time.*** A period immediately following the decoding of a valid interrogation during which a received interrogation will not cause a reply to be generated. *Note.— Dead time is intended to prevent the transponder from replying to echoes resulting from multipath effects.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***DME/N.*** Distance measuring equipment, primarily serving operational needs of en-route or TMA navigation, where the "N" stands for narrow spectrum characteristics.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***DME/P.*** The distance measuring element of the MLS, where the "P" stands for precise distance measurement. The spectrum characteristics are those of DME/N.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Equivalent isotropically radiated power (EIRP).*** The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Final approach (FA) mode.*** The condition of DME/P operation which supports flight operations in the final approach and runway regions.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Initial approach (IA) mode.*** The condition of DME/P operation which supports those flight operations outside the final approach region and which is interoperable with DME/N.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Key down time.*** The time during which a dot or dash of a Morse character is being transmitted.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***MLS approach reference datum.*** A point on the minimum glide path at a specified height above the threshold. (See 3.11.)		Not Applicable		
Chapter 3 Reference **Definition**	***MLS datum point.*** The point on the runway centre line closest to the phase centre of the approach elevation antenna. (See 3.11.)		Not Applicable		
Chapter 3 Reference **Definition**	***Mode W, X, Y, Z.*** *A* method *of coding the DME transmissions by time spacing pulses of a pulse pair, so that each frequency can be used more than once.*	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Partial rise time.*** The time as measured between the 5 and 30 per cent amplitude points on the leading edge of the pulse envelope, i.e. between points h and i on Figures 3-1 and 3-2.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Path following error (PFE).*** That portion of the guidance signal error which could cause aircraft displacement from the desired course and/or glide path. (See 3.11.)	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Pulse amplitude.*** The maximum voltage of the pulse envelope, i.e. A in Figure 3-1.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Pulse decay time.*** The time as measured between the 90 and 10 per cent amplitude points on the trailing edge of the pulse envelope, i.e. between points e and g on Figure 3-1.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Pulse code.*** The method of differentiating between W, X, Y and Z modes and between FA and IA modes.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Pulse duration.*** The time interval between the 50 per cent amplitude point on leading and trailing edges of the pulse envelope, i.e. between points b and f on Figure 3-1.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Pulse rise time.*** The time as measured between the 10 and 90 per cent amplitude points on the leading edge of the pulse envelope, i.e. between points a and c on Figure 3-1.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Reply efficiency.*** The ratio of replies transmitted by the transponder to the total of received valid interrogations.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Search.*** The condition which exists when the DME interrogator is attempting to acquire and lock onto the response to its own interrogations from the selected transponder.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***System efficiency.*** The ratio of valid replies processed by the interrogator to the total of its own interrogations.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Track.*** The condition which exists when the DME interrogator has locked onto replies in response to its own interrogations, and is continuously providing a distance measurement.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Transmission rate.*** The average number of pulse pairs transmitted from the transponder per second.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Virtual origin.*** The point at which the straight line through the 30 per cent and 5 per cent amplitude points on the pulse leading edge intersects the 0 per cent amplitude axis (see Figure 3-2).	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.2.1** **Standard**	3.5.2 General 3.5.2.1 The DME system shall provide for continuous and accurate indication in the cockpit of the slant range distance of an equipped aircraft from an equipped ground reference point.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.2.2** **Standard**	3.5.2.2 The system shall comprise two basic components, one fitted in the aircraft, the other installed on the ground. The aircraft component shall be referred to as the interrogator and the ground component as the transponder.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.2.3** **Standard**	3.5.2.3 In operation, interrogators shall interrogate transponders which shall, in turn, transmit to the interrogator replies synchronized with the interrogations, thus providing means for accurate measurement of distance.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.2.4** **Standard**	3.5.2.4 DME/P shall have two operating modes, IA and FA. **Figure 3-1**	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	Figure 3-2				
Chapter 3 Reference **3.5.2.5** **Standard**	3.5.2.5 When a DME is associated with an ILS, MLS or VOR for the purpose of constituting a single facility, they shall: a) be operated on a standard frequency pairing in accordance with 3.5.3.3.4; b) be collocated within the limits prescribed for associated facilities in 3.5.2.6; and c) comply with the identification provisions of 3.5.3.6.4.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.2.6.1** **Standard**	3.5.2.6 *Collocation limits for a DME facility associated with an ILS, MLS or VOR facility* 3.5.2.6.1 Associated VOR and DME facilities shall be collocated in accordance with the following: a) for those facilities used in terminal areas for approach purposes or other procedures where the highest position fixing accuracy of system capability is required, the separation of the VOR and DME antennas does not exceed 80 m (260 ft); b) for purposes other than those indicated in a), the separation of the VOR and DME antennas does not exceed 600 m (2 000 ft).	CAR Part 171.	No Difference		Amdt 84 deletes a) and b).
Chapter 3 Reference **3.5.2.6.3.1** **Recommendation**	3.5.2.6.3 *Association of DME with MLS* 3.5.2.6.3.1 **Recommendation.—** *If a DME/P is used to provide ranging information, it should be sited as close as possible to the MLS azimuth facility.* *Note.— Attachment G, 5 and Attachment C, 7.1.6 give guidance on siting of DME with MLS. This guidance sets forth, in particular, appropriate steps to be taken to prevent different zero range indication if DME/P associated with MLS and DME/N associated with ILS serve the same runway.*		Not Applicable		
Chapter 3 Reference **3.5.2.7** **Standard**	3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.3.1.1** **Standard**	3.5.3 System characteristics 3.5.3.1 *Performance* 3.5.3.1.1 *Range.* The system shall provide a means of measurement of slant range distance from an aircraft to a selected transponder to the limit of coverage prescribed by the operational requirements for the selected transponder.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.1.2.1** **Standard**	3.5.3.1.2 *Coverage* 3.5.3.1.2.1 When associated with a VOR, DME/N coverage shall be at least that of the VOR to the extent practicable.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.1.2.2** **Standard**	3.5.3.1.2.2 When associated with either an ILS or an MLS, DME/N coverage shall be at least that of the respective ILS or of the MLS azimuth angle guidance coverage sectors.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.1.2.3** **Standard**	3.5.3.1.2.3 DME/P coverage shall be at least that provided by the MLS azimuth angle guidance coverage sectors. *Note.— This is not intended to specify the operational range and coverage to which the system may be used; spacing of facilities already installed may limit the range in certain areas.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.5.3.1.3.1** **Standard**	3.5.3.1.3 *Accuracy* 3.5.3.1.3.1 *System accuracy.* The accuracy standards specified in 3.5.3.1.4, 3.5.4.5 and 3.5.5.4 shall be met on a 95 per cent probability basis.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.1.4.1** **Standard**	3.5.3.1.4.1 *Error components.* The path following error (PFE) shall be comprised of those frequency components of the DME/P error at the output of the interrogator which lie below 1.5 rad/s. The control motion noise (CMN) shall be comprised of those frequency components of the DME/P error at the output of the interrogator which lie between 0.5 rad/s and 10 rad/s. *Note.— Specified error limits at a point are to be applied over a flight path that includes that point. Information on the interpretation of DME/P errors and the measurement of those errors over an interval appropriate for flight inspection is provided in Attachment C, 7.3.6.1.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.1.4.2** **Standard**	3.5.3.1.4.2 Errors on the extended runway centre line shall not exceed the values given in Table B at the end of this chapter.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.1.4.3** **Standard**	3.5.3.1.4.3 In the approach sector, away from the extended runway centre line, the allowable PFE for both standard 1 and standard 2 shall be permitted to increase linearly with angle up to plus or minus 40 degrees MLS azimuth angle where the permitted error is 1.5 times that on the extended runway centre line at the same distance. The allowable CMN shall not increase with angle. There shall be no degradation of either PFE or CMN with elevation angle.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.3.2** **Standard**	3.5.3.2 *Radio frequencies and polarization*. The system shall operate with vertical polarization in the frequency band 960 MHz to 1 215 MHz. The interrogation and reply frequencies shall be assigned with 1MHz spacing between channels.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.3.1** **Standard**	3.5.3.3 *Channelling* 3.5.3.3.1 DME operating channels shall be formed by pairing interrogation and reply frequencies and by pulse coding on the paired frequencies.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.3.2** **Standard**	3.5.3.3.2 *Pulse coding.* DME/P channels shall have two different interrogation pulse codes as shown in the table in 3.5.4.4.1. One shall be used in the initial approach (IA) mode; the other shall be used in the final approach (FA) mode.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.3.3** **Standard**	3.5.3.3.3 DME operating channels shall be chosen from Table A (located at the end of this chapter), of 352 channels in which the channel numbers, frequencies, and pulse codes are assigned.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.3.3.4** **Standard**	3.5.3.3.4 *Channel pairing.* When a DME transponder is intended to operate in association with a single VHF navigation facility in the 108 MHz to 117.95 MHz frequency band and/or an MLS angle facility in the 5 031.0 MHz to 5 090.7 MHz frequency band, the DME operating channel shall be paired with the VHF channel and/or MLS angle frequency as given in Table A. *Note.— There may be instances when a DME channel will be paired with both the ILS frequency and an MLS channel (see Volume V, Chapter 4, 4.3).*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.4.1** **Standard**	3.5.3.4.1 *DME/N.* The interrogator average pulse repetition frequency (PRF) shall not exceed 30 pairs of pulses per second, based on the assumption that at least 95 per cent of the time is occupied for tracking.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.4.2** **Standard**	3.5.3.4.2 *DME/N.* If it is desired to decrease the time of search, the PRF may be increased during search but shall not exceed 150 pairs of pulses per second.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.4.3** **Recommendation**	3.5.3.4.3 *DME/N.* **Recommendation.—** *After 15 000 pairs of pulses have been transmitted without acquiring indication of distance, the PRF should not exceed 60 pairs of pulses per second thereafter, until a change in operating channel is made or successful search is completed.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.3.4.4** **Standard**	‡3.5.3.4.4 *DME/N.* When, after a time period of 30 seconds, tracking has not been established, the pulse pair repetition frequency shall not exceed 30 pulse pairs per second thereafter. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.4.5** **Standard**	3.5.3.4.5 *DME/P.* The interrogator pulse repetition frequency shall not exceed the following number of pulse pairs per second: a) search 40 b) aircraft on the ground 5 c) initial approach mode track 16 d) final approach mode track 40 *Note 1.— A pulse repetition frequency (PRF) of 5 pulse pairs per second for aircraft on the ground may be exceeded if* the *aircraft requires accurate range information*. *Note 2.— It is intended that all PRF changes be achieved by automatic means.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.5.1** **Standard**	3.5.3.5 *Aircraft handling capacity of the system* 3.5.3.5.1 The aircraft handling capacity of transponders in an area shall be adequate for the peak traffic of the area or 100 aircraft, whichever is the lesser.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.3.5.2** **Recommendation**	3.5.3.5.2 **Recommendation.—** *Where the peak traffic in an area exceeds 100 aircraft, the transponder should be capable of handling that peak traffic.* *Note.— Guidance material on aircraft handling capacity will be found in Attachment C, 7.1.5.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.6.1** **Standard**	3.5.3.6 *Transponder identification* 3.5.3.6.1 All transponders shall transmit an identification signal in one of the following forms as required by 3.5.3.6.5: a) an "independent" identification consisting of coded (International Morse Code) identity pulses which can be used with all transponders; b) an "associated" signal which can be used for transponders specifically associated with a VHF navigation or an MLS angle guidance facility which itself transmits an identification signal. *Note.— An MLS angle guidance facility provides its identification as a digital word transmitted on the data channel into the approach and back azimuth coverage regions as specified in 3.11.4.6.2.1.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.6.2** **Standard**	3.5.3.6.2 Both systems of identification shall use signals, which shall consist of the transmission for an appropriate period of a series of paired pulses transmitted at a repetition rate of 1 350 pulse pairs per second, and shall temporarily replace all reply pulses that would normally occur at that time except as in 3.5.3.6.2.2. These pulses shall have similar characteristics to the other pulses of the reply signals.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.3.6.2.1** **Standard**	‡3.5.3.6.2.1 *DME/N.* Reply pulses shall be transmitted between key down times. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.6.2.2** **Recommendation**	3.5.3.6.2.2 *DME/N.* **Recommendation.—** *If it is desired to preserve a constant duty cycle, an equalizing pair of pulses, having the same characteristics as the identification pulse pairs, should be transmitted 100 microseconds plus or minus 10 microseconds after each identity pair.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.6.2.3** **Standard**	3.5.3.6.2.3 *DME/P.* Reply pulses shall be transmitted between key down times.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.6.2.4** **Standard**	3.5.3.6.2.4 For the DME/P transponder, reply pulse pairs to valid FA mode interrogations shall also be transmitted during key down times and have priority over identification pulse pairs.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.6.2.5** **Standard**	3.5.3.6.2.5 The DME/P transponder shall not employ the equalizing pair of pulses of 3.5.3.6.2.2.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.3.6.3** **Standard**	3.5.3.6.3 The characteristics of the "independent" identification signal shall be as follows: a) the identity signal shall consist of the transmission of the beacon code in the form of dots and dashes (International Morse Code) of identity pulses at least once every 40 seconds, at a rate of at least 6 words per minute; and b) the identification code characteristic and letter rate for the DME transponder shall conform to the following to ensure that the maximum total key down time does not exceed 5 seconds per identification code group. The dots shall be a time duration of 0.1 second to 0.160 second. The dashes shall be typically 3 times the duration of the dots. The duration between dots and/or dashes shall be equal to that of one dot plus or minus 10 per cent. The time duration between letters or numerals shall not be less than three dots. The total period for transmission of an identification code group shall not exceed 10 seconds. *Note.— The tone identification signal is transmitted at a repetition rate of 1 350 pps. This frequency may be used directly in the airborne equipment as an aural output for the pilot, or other frequencies may be generated at the option of the interrogator designer (see 3.5.3.6.2).*	CAR 171.201(2).	More Exacting or Exceeds	The beacon identity code signal must be transmitted at least once but not more than twice every 40 seconds with code groups equally spaced.	

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.3.6.4** **Standard**	3.5.3.6.4 The characteristics of the "associated" signal shall be as follows: a) when associated with a VHF or an MLS angle facility, the identification shall be transmitted in the form of dots and dashes (International Morse Code) as in 3.5.3.6.3 and shall be synchronized with the VHF facility identification code; b) each 40-second interval shall be divided into four or more equal periods, with the transponder identification transmitted during one period only and the associated VHF and MLS angle facility identification, where these are provided, transmitted during the remaining periods; c) for a DME transponder associated with an MLS, the identification shall be the last three letters of the MLS angle facility identification specified in 3.11.4.6.2.1.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.6.5.1** **Standard**	3.5.3.6.5 *Identification implementation* 3.5.3.6.5.1 The "independent" identification code shall be employed wherever a transponder is not specifically associated with a VHF navigational facility or an MLS facility.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.6.5.2** **Standard**	3.5.3.6.5.2 Wherever a transponder is specifically associated with a VHF navigational facility or an MLS facility, identification shall be provided by the "associated" code.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.3.6.5.3** **Standard**	3.5.3.6.5.3 When voice communications are being radiated on an associated VHF navigational facility, an "associated" signal from the transponder shall not be suppressed.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.7.1** **Standard**	3.5.3.7 *DME/P mode transition* 3.5.3.7.1 The DME/P interrogator for standard 1 accuracy shall change from IA mode track to FA mode track at 13 km (7 NM) from the transponder when approaching the transponder, or any other situation when within 13 km (7 NM).	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.7.2** **Standard**	3.5.3.7.2 For standard 1 accuracy, the transition from IA mode to FA mode track operation may be initiated within 14.8 m (8 NM) from the transponder. Outside 14.8 km (8 NM), the interrogator shall not interrogate in the FA mode. *Note.— Paragraph 3.5.3.7.1 does not apply if the transponder is a DME/N or if the DME/P transponder FA mode is inoperative.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.3.8** **Standard**	3.5.3.8 *System efficiency.* The DME/P system accuracy of 3.5.3.1.4 shall be achieved with a system efficiency of 50 per cent or more.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.1.1** **Standard**	3.5.4 Detailed technical characteristics of transponder and associated monitor 3.5.4.1 *Transmitter* 3.5.4.1.1 *Frequency of operation.* The transponder shall transmit on the reply frequency appropriate to the assigned DME channel (see 3.5.3.3.3).	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.2** **Standard**	3.5.4.1.2 *Frequency stability.* The radio frequency of operation shall not vary more than plus or minus 0.002 per cent from the assigned frequency.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.1.3** **Standard**	3.5.4.1.3 *Pulse shape and spectrum.* The following shall apply to all radiated pulses: a) *Pulse rise time.* 1) *DME/N.* Pulse rise time shall not exceed 3 microseconds. 2) *DME/P.* Pulse rise time shall not exceed 1.6 microseconds. For the FA mode, the pulse shall have a partial rise time of 0.25 plus or minus 0.05 microsecond. With respect to the FA mode and accuracy standard 1, the slope of the pulse in the partial rise time shall not vary by more than plus or minus 20 per cent. For accuracy standard 2, the slope shall not vary by more than plus or minus 10 per cent. 3) *DME/P.* **Recommendation.—** *Pulse rise time should not exceed 1.2 microseconds.* b) Pulse duration shall be 3.5 microseconds plus or minus 0.5 microsecond. c) Pulse decay time shall nominally be 2.5 microseconds but shall not exceed 3.5 microseconds. d) The instantaneous amplitude of the pulse shall not, at any instant between the point of the leading edge which is 95 per cent of maximum amplitude and the point of the trailing edge which is 95 per cent of the maximum amplitude, fall below a value which is 95 per cent of the maximum voltage amplitude of the pulse. e) For DME/N and DME/P: the spectrum of the pulse modulated signal shall be such that during the pulse the EIRP contained in a 0.5 MHz band centred on	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	frequencies 0.8 MHz above and 0.8 MHz below the nominal channel frequency in each case shall not exceed 200 mW, and the EIRP contained in a 0.5 MHz band centred on frequencies 2 MHz above and 2 MHz below the nominal channel frequency in each case shall not exceed 2 mW. The EIRP contained within any 0.5 MHz band shall decrease monotonically as the band centre frequency moves away from the nominal channel frequency. *Note.— Guidance material relating to the pulse spectrum measurement is provided in Document EUROCAE ED-57 (including Amendment No. 1).* f) To ensure proper operation of the thresholding techniques, the instantaneous magnitude of any pulse turn-on transients which occur in time prior to the virtual origin shall be less than one per cent of the pulse peak amplitude. Initiation of the turn-on process shall not commence sooner than 1 microsecond prior to the virtual origin. *Note 1.— The time "during the pulse" encompasses the total interval from the beginning of pulse transmission to its end. For practical reasons, this interval may be measured between the 5 per cent points on the leading and trailing edges of the pulse envelope.* *Note 2.— The power contained in the frequency bands specified in 3.5.4.1.3 e) is the average power during the pulse. Average power in a given frequency band is the energy contained in this frequency band divided by the time of pulse transmission according to Note 1.*				

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.1.4.1** **Standard**	3.5.4.1.4 *Pulse spacing* 3.5.4.1.4.1 The spacing of the constituent pulses of transmitted pulse pairs shall be as given in the table in 3.5.4.4.1.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.4.2** **Standard**	3.5.4.1.4.2 *DME/N.* The tolerance on the pulse spacing shall be plus or minus 0.25 microsecond.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.4.3** **Recommendation**	3.5.4.1.4.3 *DME/N.* **Recommendation.—** *The tolerance on the DME/N pulse spacing should be plus or minus 0.10 microsecond.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.4.4** **Standard**	3.5.4.1.4.4 *DME/P.* The tolerance on the pulse spacing shall be plus or minus 0.10 microsecond.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.4.5** **Standard**	3.5.4.1.4.5 The pulse spacings shall be measured between the half voltage points on the leading edges of the pulses.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.1.5.1** **Recommendation**	3.5.4.1.5 *Peak power output* 3.5.4.1.5.1 *DME/N.* **Recommendation.—** *The peak EIRP should not be less than that required to ensure a peak pulse power density of approximately minus 83 dBW/m2 at the maximum specified service range and level.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.5.2** **Standard**	‡3.5.4.1.5.2 *DME/N.* The peak equivalent isotropically radiated power shall not be less than that required to ensure a peak pulse power density of minus 89 dBW/m2 under all operational weather conditions at any point within coverage specified in 3.5.3.1.2. *Note.— Although the Standard in 3.5.4.1.5.2 implies an improved interrogator receiver sensitivity, it is intended that the power density specified in 3.5.4.1.5.1 be available at the maximum specified service range and level.* -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.1.5.3** **Standard**	3.5.4.1.5.3 *DME/P.* The peak equivalent isotropically radiated power shall not be less than that required to ensure the following peak pulse power densities under all operational weather conditions: a) minus 89 dBW/m2 at any point within the coverage specified in 3.5.3.1.2 at ranges greater than 13 km (7 NM) from the transponder antenna; b) minus 75 dBW/m2 at any point within the coverage specified in 3.5.3.1.2 at ranges less than 13 km (7 NM) from the transponder antenna; c) minus 70 dBW/m2 at the MLS approach reference datum; d) minus 79 dBW/m2 at 2.5 m (8 ft) above the runway surface, at the MLS datum point, or at the farthest point on the runway centre line which is in line of sight of the DME transponder antenna. *Note.— Guidance material relating to the EIRP may be found in Attachment C, 7.2.1 and 7.3.8.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.5.4** **Standard**	3.5.4.1.5.4 The peak power of the constituent pulses of any pair of pulses shall not differ by more than 1 dB.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.1.5.5** **Recommendation**	3.5.4.1.5.5 **Recommendation.—** *The reply capability of the transmitter should be such that the transponder should be capable of continuous operation at a transmission rate of 2 700 plus or minus 90 pulse pairs per second (if 100 aircraft are to be served).* *Note.— Guidance on the relationship between number of aircraft and transmission rate is given in Attachment C, 7.1.5.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.5.6** **Standard**	3.5.4.1.5.6 The transmitter shall operate at a transmission rate, including randomly distributed pulse pairs and distance reply pulse pairs, of not less than 700 pulse pairs per second except during identity. The minimum transmission rate shall be as close as practicable to 700 pulse pairs per second. For DME/P, in no case shall it exceed 1 200 pulse pairs per second. *Note.— Operating DME transponders with quiescent transmission rates close to 700 pulse pairs per second will minimize the effects of pulse interference, particularly to other aviation services such as GNSS.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.6** **Standard**	3.5.4.1.6 *Spurious radiation*. During intervals between transmission of individual pulses, the spurious power received and measured in a receiver having the same characteristics as a transponder receiver, but tuned to any DME interrogation or reply frequency, shall be more than 50 dB below the peak pulse power received and measured in the same receiver tuned to the reply frequency in use during the transmission of the required pulses. This provision refers to all spurious transmissions, including modulator and electrical interference.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.5.4.1.6.1** **Standard**	‡3.5.4.1.6.1 *DME/N.* The spurious power level specified in 3.5.4.1.6 shall be more than 80 dB below the peak pulse power level. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.6.2** **Standard**	3.5.4.1.6.2 *DME/P.* The spurious power level specified in 3.5.4.1.6 shall be more than 80 dB below the peak pulse power level.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.6.3** **Standard**	3.5.4.1.6.3 *Out-of-band spurious radiation*. At all frequencies from 10 to 1 800 MHz, but excluding the band of frequencies from 960 to 1 215 MHz, the spurious output of the DME transponder transmitter shall not exceed minus 40 dBm in any one kHz of receiver bandwidth.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.1.6.4** **Standard**	3.5.4.1.6.4 The equivalent isotropically radiated power of any CW harmonic of the carrier frequency on any DME operating channel shall not exceed minus 10 dBm.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.2.1** **Standard**	3.5.4.2 *Receiver* 3.5.4.2.1 *Frequency of operation.* The receiver centre frequency shall be the interrogation frequency appropriate to the assigned DME operating channel (see 3.5.3.3.3).	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.2** **Standard**	3.5.4.2.2 *Frequency stability.* The centre frequency of the receiver shall not vary more than plus or minus 0.002 per cent from the assigned frequency.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.3.1** **Standard**	3.5.4.2.3 *Transponder sensitivity* 3.5.4.2.3.1 In the absence of all interrogation pulse pairs, with the exception of those necessary to perform the sensitivity measurement, interrogation pulse pairs with the correct spacing and nominal frequency shall trigger the transponder if the peak power density at the transponder antenna is at least: a) minus 103 dBW/m2 for DME/N with coverage range greater than 56 km (30 NM); b) minus 93 dBW/m2 for DME/N with coverage range not greater than 56 km (30 NM); c) minus 86 dBW/m2 for DME/P IA mode; d) minus 75 dBW/m2 for DME/P FA mode.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.2.3.2** **Standard**	3.5.4.2.3.2 The minimum power densities specified in 3.5.4.2.3.1 shall cause the transponder to reply with an efficiency of at least: a) 70 per cent for DME/N; b) 70 per cent for DME/P IA mode; c) 80 per cent for DME/P FA mode.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.3.3** **Standard**	‡3.5.4.2.3.3 *DME/N dynamic range.* The performance of the transponder shall be maintained when the power density of the interrogation signal at the transponder antenna has any value between the minimum specified in 3.5.4.2.3.1 up to a maximum of minus 22 dBW/m2 when installed with ILS or MLS and minus 35 dBW/m2 when installed for other applications. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.3.4** **Standard**	3.5.4.2.3.4 *DME/P dynamic range.* The performance of the transponder shall be maintained when the power density of the interrogation signal at the transponder antenna has any value between the minimum specified in 3.5.4.2.3.1 up to a maximum of minus 22 dBW/m2.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.3.5** **Standard**	3.5.4.2.3.5 The transponder sensitivity level shall not vary by more than 1 dB for transponder loadings between 0 and 90 per cent of its maximum transmission rate.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.2.3.6** **Standard**	‡3.5.4.2.3.6 *DME/N.* When the spacing of an interrogator pulse pair varies from the nominal value by up to plus or minus 1 microsecond, the receiver sensitivity shall not be reduced by more than 1 dB. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.3.7** **Standard**	3.5.4.2.3.7 *DME/P.* When the spacing of an interrogator pulse pair varies from the nominal value by up to plus or minus 1 microsecond, the receiver sensitivity shall not be reduced by more than 1 dB.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.4.1** **Recommendation**	3.5.4.2.4 *Load limiting* 3.5.4.2.4.1 *DME/N.* **Recommendation.—** *When transponder loading exceeds 90 per cent of the maximum transmission rate, the receiver sensitivity should be automatically reduced in order to limit the transponder replies, so as to ensure that the maximum permissible transmission rate is not exceeded. (The available range of sensitivity reduction should be at least 50 dB.)*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.4.2** **Standard**	3.5.4.2.4.2 *DME/P.* To prevent transponder overloading the transponder shall automatically limit its replies, so as to ensure that the maximum transmission rate is not exceeded. If the receiver sensitivity reduction is implemented to meet this requirement, it shall be applied to the IA mode only and shall not affect the FA mode.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.2.5** **Standard**	3.5.4.2.5 *Noise.* When the receiver is interrogated at the power densities specified in 3.5.4.2.3.1 to produce a transmission rate equal to 90 per cent of the maximum, the noise generated pulse pairs shall not exceed 5 per cent of the maximum transmission rate.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.6.1** **Standard**	3.5.4.2.6 *Bandwidth* 3.5.4.2.6.1 The minimum permissible bandwidth of the receiver shall be such that the transponder sensitivity level shall not deteriorate by more than 3 dB when the total receiver drift is added to an incoming interrogation frequency drift of plus or minus 100 kHz.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.6.2** **Standard**	3.5.4.2.6.2 *DME/N.* The receiver bandwidth shall be sufficient to allow compliance with 3.5.3.1.3 when the input signals are those specified in 3.5.5.1.3.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.6.3** **Standard**	3.5.4.2.6.3 *DME/P — IA mode.* The receiver bandwidth shall be sufficient to allow compliance with 3.5.3.1.3 when the input signals are those specified in 3.5.5.1.3. The 12 dB bandwidth shall not exceed 2 MHz and the 60 dB bandwidth shall not exceed 10 MHz.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.6.4** **Standard**	3.5.4.2.6.4 *DME/P — FA mode.* The receiver bandwidth shall be sufficient to allow compliance with 3.5.3.1.3 when the input signals are those specified in 3.5.5.1.3. The 12 dB bandwidth shall not exceed 6 MHz and the 60 dB bandwidth shall not exceed 20 MHz.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.2.6.5** **Standard**	3.5.4.2.6.5 Signals greater than 900 kHz removed from the desired channel nominal frequency and having power densities up to the values specified in 3.5.4.2.3.3 for DME/N and 3.5.4.2.3.4 for DME/P shall not trigger the transponder. Signals arriving at the intermediate frequency shall be suppressed at least 80 dB. All other spurious response or signals within the 960 MHz to 1 215 MHz band and image frequencies shall be suppressed at least 75 dB.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.7** **Standard**	3.5.4.2.7 *Recovery time.* Within 8 microseconds of the reception of a signal between 0 dB and 60 dB above minimum sensitivity level, the minimum sensitivity level of the transponder to a desired signal shall be within 3 dB of the value obtained in the absence of signals. This requirement shall be met with echo suppression circuits, if any, rendered inoperative. The 8 microseconds are to be measured between the half voltage points on the leading edges of the two signals, both of which conform in shape, with the specifications in 3.5.5.1.3.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.8** **Standard**	3.5.4.2.8 *Spurious radiations*. Radiation from any part of the receiver or allied circuits shall meet the requirements stated in 3.5.4.1.6.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.2.9** **Recommendation**	3.5.4.2.9 *CW and echo suppression* **Recommendation.—** *CW and echo suppression should be adequate for the sites at which the transponders will be used.* *Note.— In this connection, echoes mean undesired signals caused by multipath transmission (reflections, etc.).*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.2.10** **Recommendation**	3.5.4.2.10 *Protection against interference* **Recommendation.—** *Protection against interference outside the DME frequency band should be adequate for the sites at which the transponders will be used.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.3.1** **Standard**	3.5.4.3 *Decoding* 3.5.4.3.1 The transponder shall include a decoding circuit such that the transponder can be triggered only by pairs of received pulses having pulse duration and pulse spacings appropriate to interrogator signals as described in 3.5.5.1.3 and 3.5.5.1.4.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.3.2** **Standard**	3.5.4.3.2 The decoding circuit performance shall not be affected by signals arriving before, between, or after, the constituent pulses of a pair of the correct spacing.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.3.3** **Standard**	‡3.5.4.3.3 *DME/N — Decoder rejection.* An interrogation pulse pair with a spacing of plus or minus 2 microseconds, or more, from the nominal value and with any signal level up to the value specified in 3.5.4.2.3.3 shall be rejected such that the transmission rate does not exceed the value obtained when interrogations are absent. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.3.4** **Standard**	3.5.4.3.4 *DME/P — Decoder rejection.* An interrogation pulse pair with a spacing of plus or minus 2 microseconds, or more, from the nominal value and with any signal level up to the value specified in 3.5.4.2.3.4 shall be rejected such that the transmission rate does not exceed the value obtained when interrogations are absent.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.4.1** **Standard**	3.5.4.4 *Time delay* 3.5.4.4.1 When a DME is associated only with a VHF facility, the time delay shall be the interval from the half voltage point on the leading edge of the second constituent pulse of the interrogation pair and the half voltage point on the leading edge of the second constituent pulse of the reply transmission. This delay shall be consistent with the following table, when it is desired that aircraft interrogators are to indicate distance from the transponder site. *Note 1.— W and X are multiplexed on the same frequency.* *Note 2.— Z and Y are multiplexed on the same frequency.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.4.2** **Standard**	3.5.4.4.2 When a DME is associated with an MLS angle facility, the time delay shall be the interval from the half voltage point on the leading edge of the first constituent pulse of the interrogation pair and the half voltage point on the leading edge of the first constituent pulse of the reply transmission. This delay shall be 50 microseconds for mode X channels and 56 microseconds for mode Y channels, when it is desired that aircraft interrogators are to indicate distance from the transponder site.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.4.2.1** **Standard**	3.5.4.4.2.1 For DME/P transponders, no time delay adjustment shall be permitted.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.4.3** **Recommendation**	3.5.4.4.3 **Recommendation.—** *For the DME/N the transponder time delay should be capable of being set to an appropriate value between the nominal value of the time delay minus 15 microseconds and the nominal value of the time delay, to permit aircraft interrogators to indicate zero distance at a specific point remote from the transponder site*. *Note.— Modes not allowing for the full 15 microseconds range of adjustment in transponder time delay may only be adjustable to the limits given by the transponder circuit delay and recovery time.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.4.3.1** **Standard**	‡3.5.4.4.3.1 *DME/N.* The time delay shall be the interval from the half voltage point on the leading edge of the first constituent pulse of the interrogation pair and the half voltage point on the leading edge of the first constituent pulse of the reply transmission. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.4.3.2** **Standard**	3.5.4.4.3.2 *DME/P — IA mode.* The time delay shall be the interval from the half voltage point on the leading edge of the first constituent pulse of the interrogation pulse pair to the half voltage point on the leading edge of the first constituent pulse of the reply pulse pair.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.4.3.3** **Standard**	3.5.4.4.3.3 *DME/P — FA mode.* The time delay shall be the interval from the virtual origin of the first constituent pulse of the interrogation pulse pair to the virtual origin of the first constituent pulse of the reply pulse pair. The time of arrival measurement points shall be within the partial rise time of the first constituent pulse of the pulse pair in each case.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.4.4** **Recommendation**	3.5.4.4.4 *DME/N.* **Recommendation.—** *Transponders should be sited as near to the point at which zero indication is required as is practicable.* *Note 1.— It is desirable that the radius of the sphere at the surface of which zero indication is given be kept as small as possible in order to keep the zone of ambiguity to a minimum.* *Note 2.— Guidance material on siting DME with MLS is provided in 7.1.6 of Attachment C and 5 of Attachment G. This guidance material sets forth, in particular, appropriate steps to be taken to prevent different zero range indication if DME/P associated with MLS and DME/N associated with ILS serve the same runway.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.5.1** **Standard**	3.5.4.5 *Accuracy* 3.5.4.5.1 *DME/N.* The transponder shall not contribute more than plus or minus 1 microsecond (150 m (500 ft)) to the overall system error.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.5.1.1** **Recommendation**	3.5.4.5.1.1 *DME/N.* **Recommendation.—** *The contribution to the total system error due to the combination of the transponder errors, transponder location coordinate errors, propagation effects and random pulse interference effects should be not greater than plus or minus 340 m (0.183 NM) plus 1.25 per cent of distance measure.* *Note.— This error contribution limit includes errors from all causes except the airborne equipment, and assumes that the airborne equipment measures time delay based on the first constituent pulse of a pulse pair.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.5.1.2** **Standard**	‡3.5.4.5.1.2 *DME/N.* The combination of the transponder errors, transponder location coordinate errors, propagation effects and random pulse interference effects shall not contribute more than plus or minus 185 m (0.1 NM) to the overall system error. *Note.— This error contribution limit includes errors from all causes except the airborne equipment, and assumes that the airborne equipment measures time delay based on the first constituent pulse of a pulse pair.* -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.5.2** **Standard**	‡3.5.4.5.2 *DME/N.* A transponder associated with a landing aid shall not contribute more than plus or minus 0.5 microsecond (75 m (250 ft)) to the overall system error. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.5.3.1** **Standard**	3.5.4.5.3 *DME/P — FA mode* 3.5.4.5.3.1 *Accuracy standard 1.* The transponder shall not contribute more than plus or minus 10 m (plus or minus 33 ft) PFE and plus or minus 8 m (plus or minus 26 ft) CMN to the overall system error.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.5.3.2** **Standard**	3.5.4.5.3.2 *Accuracy standard 2.* The transponder shall not contribute more than plus or minus 5 m (plus or minus 16 ft) PFE and plus or minus 5 m (plus or minus 16 ft) CMN to the overall system error.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.5.4** **Standard**	3.5.4.5.4 *DME/P — IA mode.* The transponder shall not contribute more than plus or minus 15 m (plus or minus 50 ft) PFE and plus or minus 10 m (plus or minus 33 ft) CMN to the overall system error.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.5.5** **Recommendation**	3.5.4.5.5 **Recommendation.—** *When a DME is associated with an MLS angle facility, the above accuracy should include the error introduced by the first pulse detection due to the pulse spacing tolerances.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.6.1** **Standard**	3.5.4.6 *Efficiency* 3.5.4.6.1 The transponder reply efficiency shall be at least 70 per cent for DME/N and DME/P (IA mode) and 80 per cent for DME/P (FA mode) at all values of transponder loading up to the loading corresponding to 3.5.3.5 and at the minimum sensitivity level specified in 3.5.4.2.3.1 and 3.5.4.2.3.5. *Note.— When considering the transponder reply efficiency value, account is to be taken of the DME dead time and of the loading introduced by the monitoring function*.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.6.2** **Standard**	3.5.4.6.2 *Transponder dead time*. The transponder shall be rendered inoperative for a period normally not to exceed 60 microseconds after a valid interrogation decode has occurred. In extreme cases when the geographical site of the transponder is such as to produce undesirable reflection problems, the dead time may be increased but only by the minimum amount necessary to allow the suppression of echoes for DME/N and DME/P IA mode.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.6.2.1** **Standard**	3.5.4.6.2.1 In DME/P the IA mode dead time shall not blank the FA mode channel and vice versa.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.7.1** **Standard**	3.5.4.7 *Monitoring and control* 3.5.4.7.1 Means shall be provided at each transponder site for the automatic monitoring and control of the transponder in use.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.7.2.1** **Standard**	3.5.4.7.2 *DME/N monitoring action* 3.5.4.7.2.1 In the event that any of the conditions specified in 3.5.4.7.2.2 occur, the monitor shall cause the following action to take place: a) a suitable indication shall be given at a control point; b) the operating transponder shall be automatically switched off; and c) the standby transponder, if provided, shall be automatically placed in operation.	CAR Part 171.	Less protective or partially implemented or not implemented	Certain remotely-sited DME are not equipped with standby transponders.	
Chapter 3 Reference **3.5.4.7.2.2** **Standard**	3.5.4.7.2.2 The monitor shall cause the actions specified in 3.5.4.7.2.1 if: a) the transponder delay differs from the assigned value by 1 microsecond (150 m (500 ft)) or more; ‡b) in the case of a DME/N associated with a landing aid, the transponder delay differs from the assigned value by 0.5 microsecond (75 m (250 ft)) or more. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.7.2.3** **Recommendation**	3.5.4.7.2.3 **Recommendation.—** *The monitor should cause the actions specified in 3.5.4.7.2.1 if the spacing between the first and second pulse of the transponder pulse pair differs from the nominal value specified in the table following 3.5.4.4.1 by 1 microsecond or more.*	CAR Part 171.	More Exacting or Exceeds	Mandatory Standard	

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.7.2.4** **Recommendation**	3.5.4.7.2.4 **Recommendation.—** *The monitor should also cause a suitable indication to be given at a control point if any of the following conditions arise:* *a) a fall of 3 dB or more in transponder transmitted power output;* *b) a fall of 6 dB or more in the minimum transponder receiver sensitivity (provided that this is not due to the action of the receiver automatic gain reduction circuits);* *c) the spacing between the first and second pulse of the transponder reply pulse pair differs from the normal value specified in 3.5.4.1.4 by 1 microsecond or more;* *d) variation of the transponder receiver and transmitter frequencies beyond the control range of the reference circuits (if the operating frequencies are not directly crystal controlled).*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.7.2.5** **Standard**	3.5.4.7.2.5 Means shall be provided so that any of the conditions and malfunctioning enumerated in 3.5.4.7.2.2, 3.5.4.7.2.3 and 3.5.4.7.2.4 which are monitored can persist for a certain period before the monitor takes action. This period shall be as low as practicable, but shall not exceed 10 seconds, consistent with the need for avoiding interruption, due to transient effects, of the service provided by the transponder.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.7.2.6** **Standard**	3.5.4.7.2.6 The transponder shall not be triggered more than 120 times per second for either monitoring or automatic frequency control purposes, or both.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.7.3.1** **Standard**	3.5.4.7.3 *DME/P monitoring action* 3.5.4.7.3.1 The monitor system shall cause the transponder radiation to cease and provide a warning at a control point if any of the following conditions persist for longer than the period specified: a) there is a change in transponder PFE that exceeds the limits specified in either 3.5.4.5.3 or 3.5.4.5.4 for more than one second. If the FA mode limit is exceeded, but the IA mode limit is maintained, the IA mode may remain operative; b) there is a reduction in the EIRP to less than that necessary to satisfy the requirements specified in 3.5.4.1.5.3 for a period of more than one second; c) there is a reduction of 3 dB or more in the transponder sensitivity necessary to satisfy the requirements specified in 3.5.4.2.3 for a period of more than five seconds in FA mode and ten seconds in IA mode (provided that this is not due to the action of the receiver automatic sensitivity reduction circuits); d) the spacing between the first and second pulse of the transponder reply pulse pair differs from the value specified in the table in 3.5.4.4.1 by 0.25 microsecond or more for a period of more than one second.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.4.7.3.2** **Recommendation**	3.5.4.7.3.2 **Recommendation.—** *The monitor should cause a suitable indication to be given at a control point if there is an increase above 0.3 microseconds or a decrease below 0.2 microseconds of the reply pulse partial rise time which persists for more than one second.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.7.3.3** **Standard**	3.5.4.7.3.3 The period during which erroneous guidance information is radiated shall not exceed the periods specified in 3.5.4.7.3.1. Attempts to clear a fault by resetting the primary ground equipment or by switching to standby ground equipment, if fitted, shall be completed within this time. If the fault is not cleared within the time allowed, the radiation shall cease. After shutdown, no attempt shall be made to restore service until a period of 20 seconds has elapsed.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.7.3.4** **Standard**	3.5.4.7.3.4 The transponder shall not be triggered for monitoring purposes more than 120 times per second in the IA mode and 150 times per second in the FA mode.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.4.7.3.5** **Standard**	3.5.4.7.3.5 *DME/N and DME/P monitor failure.* Failure of any part of the monitor itself shall automatically produce the same results as the malfunctioning of the element being monitored.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.1.1** **Standard**	3.5.5.1 *Transmitter* 3.5.5.1.1 *Frequency of operation.* The interrogator shall transmit on the interrogation frequency appropriate to the assigned DME channel (see 3.5.3.3.3). *Note.— This specification does not preclude the use of airborne interrogators having less than the total number of operating channels.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.1.2** **Standard**	3.5.5.1.2 *Frequency stability.* The radio frequency of operation shall not vary more than plus or minus 100 kHz from the assigned value.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.1.3** **Standard**	3.5.5.1.3 *Pulse shape and spectrum.* The following shall apply to all radiated pulses: a) *Pulse rise time.* 1) *DME/N.* Pulse rise time shall not exceed 3 microseconds. 2) *DME/P.* Pulse rise time shall not exceed 1.6 microseconds. For the FA mode, the pulse shall have a partial rise time of 0.25 plus or minus 0.05 microsecond. With respect to the FA mode and accuracy standard 1, the slope of the pulse in the partial rise time shall not vary by more than plus or minus 20 per cent. For accuracy standard 2 the slope shall not vary by more than plus or minus 10 per cent. 3) *DME/P.* **Recommendation.—** *Pulse rise time should not exceed 1.2 microseconds.* b) Pulse duration shall be 3.5 microseconds plus or minus 0.5 microsecond. c) Pulse decay time shall nominally be 2.5 microseconds, but shall not exceed 3.5 microseconds. d) The instantaneous amplitude of the pulse shall not, at any instant between the point of the leading edge which is 95 per cent of maximum amplitude and the point of the trailing edge which is 95 per cent of the maximum amplitude, fall below a value which is 95 per cent of the maximum voltage amplitude of the pulse. e) The spectrum of the pulse modulated signal shall be such that at least 90 per cent of the energy in each	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	pulse shall be within 0.5 MHz in a band centred on the nominal channel frequency. f) To ensure proper operation of the thresholding techniques, the instantaneous magnitude of any pulse turn-on transients which occur in time prior to the virtual origin shall be less than one per cent of the pulse peak amplitude. Initiation of the turn-on process shall not commence sooner than 1 microsecond prior to the virtual origin. *Note 1.— The lower limit of pulse rise time (see 3.5.5.1.3 a)) and decay time (see 3.5.5.1.3 c)) are governed by the spectrum requirements in 3.5.5.1.3 e).* *Note 2.— While 3.5.5.1.3 e) calls for a practically attainable spectrum, it is desirable to strive for the following spectrum control characteristics: the spectrum of the pulse modulated signal is such that the power contained in a 0.5 MHz band centred on frequencies 0.8 MHz above and 0.8 MHz below the nominal channel frequency is, in each case, at least 23 dB below the power contained in a 0.5 MHz band centred on the nominal channel frequency. The power contained in a 0.5 MHz band centred on frequencies 2 MHz above and 2 MHz below the nominal channel frequency is, in each case, at least 38 dB below the power contained in a 0.5 MHz band centred on the nominal channel frequency. Any additional lobe of the spectrum is of less amplitude than the adjacent lobe nearer the nominal channel frequency.*				
Chapter 3 Reference **3.5.5.1.4.1** **Standard**	3.5.5.1.4 *Pulse spacing* 3.5.5.1.4.1 The spacing of the constituent pulses of transmitted pulse pairs shall be as given in the table in 3.5.4.4.1.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.1.4.2** **Standard**	3.5.5.1.4.2 *DME/N.* The tolerance on the pulse spacing shall be plus or minus 0.5 microsecond.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.1.4.3** **Recommendation**	3.5.5.1.4.3 *DME/N.* **Recommendation.—** *The tolerance on the pulse spacing should be plus or minus 0.25 micro-second.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.1.4.4** **Standard**	3.5.5.1.4.4 *DME/P.* The tolerance on the pulse spacing shall be plus or minus 0.25 microsecond.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.1.4.5** **Standard**	3.5.5.1.4.5 The pulse spacing shall be measured between the half voltage points on the leading edges of the pulses.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.1.5.1** **Standard**	3.5.5.1.5 *Pulse repetition frequency* 3.5.5.1.5.1 The pulse repetition frequency shall be as specified in 3.5.3.4.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.1.5.2** **Standard**	3.5.5.1.5.2 The variation in time between successive pairs of interrogation pulses shall be sufficient to prevent false lock-on.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.1.5.3** **Standard**	3.5.5.1.5.3 *DME/P.* In order to achieve the system accuracy specified in 3.5.3.1.4, the variation in time between successive pairs of interrogation pulses shall be sufficiently random to decorrelate high frequency multipath errors. *Note.— Guidance on DME/P multipath effects is given in Attachment C, 7.3.7.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.1.6** **Standard**	3.5.5.1.6 *Spurious radiation*. During intervals between transmission of individual pulses, the spurious pulse power received and measured in a receiver having the same characteristics of a DME transponder receiver, but tuned to any DME interrogation or reply frequency, shall be more than 50 dB below the peak pulse power received and measured in the same receiver tuned to the interrogation frequency in use during the transmission of the required pulses. This provision shall apply to all spurious pulse transmissions. The spurious CW power radiated from the interrogator on any DME interrogation or reply frequency shall not exceed 20 microwatts (minus 47 dBW). *Note.— Although spurious CW radiation between pulses is limited to levels not exceeding minus 47 dBW, States are cautioned that where DME interrogators and secondary surveillance radar transponders are employed in the same aircraft, it may be necessary to provide protection to airborne SSR in the band 1 015 MHz to 1 045 MHz. This protection may be provided by limiting conducted and radiated CW to a level of the order of minus 77 dBW. Where this level cannot be achieved, the required degree of protection may be provided in planning the relative location of the SSR and DME aircraft antennas. It is to be noted that only a few of these frequencies are utilized in the VHF/DME pairing plan.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.1.7** **Recommendation**	3.5.5.1.7 **Recommendation.—** *The spurious pulse power received and measured under the conditions stated in 3.5.5.1.6 should be 80 dB below the required peak pulse power received.* *Note.— Reference 3.5.5.1.6 and 3.5.5.1.7 — although limitation of spurious CW radiation between pulses to levels not exceeding 80 dB below the peak pulse power received is recommended, States are cautioned that where users employ airborne secondary surveillance radar transponders in the same aircraft, it may be necessary to limit direct and radiated CW to not more than 0.02 microwatt in the frequency band 1 015 MHz to 1 045 MHz. It is to be noted that only a few of these frequencies are utilized in the VHF/DME pairing plan.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.1.8** **Standard**	3.5.5.1.8 *DME/P.* The peak EIRP shall not be less than that required to ensure the power densities in 3.5.4.2.3.1 under all operational weather conditions.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.2.1** **Standard**	3.5.5.2 *Time delay* 3.5.5.2.1 The time delay shall be consistent with the table in 3.5.4.4.1.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.2.2** **Standard**	3.5.5.2.2 *DME/N.* The time delay shall be the interval between the time of the half voltage point on the leading edge of the second constituent interrogation pulse and the time at which the distance circuits reach the condition corresponding to zero distance indication.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.2.3** **Standard**	‡3.5.5.2.3 *DME/N.* The time delay shall be the interval between the time of the half voltage point on the leading edge of the first constituent interrogation pulse and the time at which the distance circuits reach the condition corresponding to zero distance indication. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.2.4** **Standard**	3.5.5.2.4 *DME/P — IA mode.* The time delay shall be the interval between the time of the half voltage point on the leading edge of the first constituent interrogation pulse and the time at which the distance circuits reach the condition corresponding to zero distance indication.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.2.5** **Standard**	3.5.5.2.5 *DME/P — FA mode.* The time delay shall be the interval between the virtual origin of the leading edge of the first constituent interrogation pulse and the time at which the distance circuits reach the condition corresponding to zero distance indication. The time of arrival shall be measured within the partial rise time of the pulse.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.3.1** **Standard**	3.5.5.3 *Receiver* 3.5.5.3.1 *Frequency of operation.* The receiver centre frequency shall be the transponder frequency appropriate to the assigned DME operating channel (see 3.5.3.3.3).	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.3.2.1** **Standard**	3.5.5.3.2 *Receiver sensitivity* ‡3.5.5.3.2.1 *DME/N.* The airborne equipment sensitivity shall be sufficient to acquire and provide distance information to the accuracy specified in 3.5.5.4 for the signal power density specified in 3.5.4.1.5.2. *Note.— Although the Standard in 3.5.5.3.2.1 is for DME/N interrogators, the receiver sensitivity is better than that necessary in order to operate with the power density of DME/N transponders given in 3.5.4.1.5.1 in order to assure interoperability with the IA mode of DME/P transponders.* -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.3.2.2** **Standard**	3.5.5.3.2.2 *DME/P.* The airborne equipment sensitivity shall be sufficient to acquire and provide distance information to the accuracy specified in 3.5.5.4.2 and 3.5.5.4.3 for the signal power densities specified in 3.5.4.1.5.3.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.3.2.3** **Standard**	‡3.5.5.3.2.3 *DME/N.* The performance of the interrogator shall be maintained when the power density of the transponder signal at the interrogator antenna is between the minimum values given in 3.5.4.1.5 and a maximum of minus 18 dBW/m2. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.3.2.4** **Standard**	3.5.5.3.2.4 *DME/P.* The performance of the interrogator shall be maintained when the power density of the transponder signal at the interrogator antenna is between the minimum values given in 3.5.4.1.5 and a maximum of minus 18 dBW/m2.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.3.3.1** **Standard**	3.5.5.3.3 *Bandwidth* 3.5.5.3.3.1 *DME/N.* The receiver bandwidth shall be sufficient to allow compliance with 3.5.3.1.3, when the input signals are those specified in 3.5.4.1.3.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.3.3.2** **Standard**	3.5.5.3.3.2 *DME/P — IA mode.* The receiver bandwidth shall be sufficient to allow compliance with 3.5.3.1.3 when the input signals are those specified in 3.5.4.1.3. The 12-dB bandwidth shall not exceed 2 MHz and the 60-dB bandwidth shall not exceed 10 MHz.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.5.5.3.3.3** **Standard**	3.5.5.3.3.3 *DME/P — FA mode.* The receiver bandwidth shall be sufficient to allow compliance with 3.5.3.1.3 when the input signals are those specified in 3.5.5.1.3. The 12-dB bandwidth shall not exceed 6 MHz and the 60-dB bandwidth shall not exceed 20 MHz.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.3.4.1** **Standard**	3.5.5.3.4 *Interference rejection* 3.5.5.3.4.1 When there is a ratio of desired to undesired co-channel DME signals of at least 8 dB at the input terminals of the airborne receiver, the interrogator shall display distance information and provide unambiguous identification from the stronger signal. *Note.— Co-channel refers to those reply signals that utilize the same frequency and the same pulse pair spacing.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.3.4.2** **Standard**	‡3.5.5.3.4.2 *DME/N.* DME signals greater than 900 kHz removed from the desired channel nominal frequency and having amplitudes up to 42 dB above the threshold sensitivity shall be rejected. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.3.4.3** **Standard**	3.5.5.3.4.3 *DME/P.* DME signals greater than 900 kHz removed from the desired channel nominal frequency and having amplitudes up to 42 dB above the threshold sensitivity shall be rejected.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.3.5.1** **Standard**	3.5.5.3.5 *Decoding* 3.5.5.3.5.1 The interrogator shall include a decoding circuit such that the receiver can be triggered only by pairs of received pulses having pulse duration and pulse spacings appropriate to transponder signals as described in 3.5.4.1.4.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.3.5.2** **Standard**	‡3.5.5.3.5.2 *DME/N — Decoder rejection.* A reply pulse pair with a spacing of plus or minus 2 microseconds, or more, from the nominal value and with any signal level up to 42 dB above the receiver sensitivity shall be rejected. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.3.5.3** **Standard**	3.5.5.3.5.3 *DME/P — Decoder rejection.* A reply pulse pair with a spacing of plus or minus 2 microseconds, or more, from the nominal value and with any signal level up to 42 dB above the receiver sensitivity shall be rejected.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.4.1** **Standard**	3.5.5.4 *Accuracy* ‡3.5.5.4.1 *DME/N.* The interrogator shall not contribute more than plus or minus 315 m (plus or minus 0.17 NM) or 0.25 per cent of indicated range, whichever is greater, to the overall system error. -- ‡ Referenced by 3.5.2.7 The Standards in 3.5.3, 3.5.4 and 3.5.5 denoted by ‡ shall apply only to DME equipment first installed after 1 January 1989.	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.5.5.4.2** **Standard**	3.5.5.4.2 *DME/P — IA mode.* The interrogator shall not contribute more than plus or minus 30 m (plus or minus 100 ft) to the overall system PFE and not more than plus or minus 15 m (plus or minus 50 ft) to the overall system CMN.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.4.3.1** **Standard**	3.5.5.4.3 *DME/P — FA mode* 3.5.5.4.3.1 *Accuracy standard 1.* The interrogator shall not contribute more than plus or minus 15 m (plus or minus 50 ft) to the overall system PFE and not more than plus or minus 10 m (plus or minus 33 ft) to the overall system CMN.	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.4.3.2** **Standard**	3.5.5.4.3.2 *Accuracy standard 2.* The interrogator shall not contribute more than plus or minus 7 m (plus or minus 23 ft) to the overall system PFE and not more than plus or minus 7 m (plus or minus 23 ft) to the overall system CMN. *Note.— Guidance material on filters to assist in achieving this accuracy is given in Attachment C, 7.3.4.*	CAR Part 171.	No Difference		
Chapter 3 Reference **3.5.5.4.4** **Standard**	3.5.5.4.4 *DME/P.* The interrogator shall achieve the accuracy specified in 3.5.3.1.4 with a system efficiency of 50 per cent or more. *Note.— Guidance material on system efficiency is given in Attachment C, 7.1.1.*	CAR Part 171.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.6.1.1** **Standard**	**3.6 Specification for en-route VHF marker beacons (75 MHz)** 3.6.1 Equipment 3.6.1.1 *Frequencies.* The emissions of an en-route VHF marker beacon shall have a radio frequency of 75 MHz plus or minus 0.005 per cent.		Not Applicable		Not used in New Zealand.
Chapter 3 Reference **3.6.1.2.1** **Standard**	3.6.1.2 *Characteristics of emissions* 3.6.1.2.1 Radio marker beacons shall radiate an uninterrupted carrier modulated to a depth of not less than 95 per cent or more than 100 per cent. The total harmonic content of the modulation shall not exceed 15 per cent.		Not Applicable		
Chapter 3 Reference **3.6.1.2.2** **Standard**	3.6.1.2.2 The frequency of the modulating tone shall be 3 000 Hz plus or minus 75 Hz.		Not Applicable		
Chapter 3 Reference **3.6.1.2.3** **Standard**	3.6.1.2.3 The radiation shall be horizontally polarized.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.6.1.2.4** **Standard**	3.6.1.2.4 *Identification.* If a coded identification is required at a radio marker beacon, the modulating tone shall be keyed so as to transmit dots or dashes or both in an appropriate sequence. The mode of keying shall be such as to provide a dot-and-dash duration together with spacing intervals corresponding to transmission at a rate equivalent to approximately six to ten words per minute. The carrier shall not be interrupted during identification.		Not Applicable		
Chapter 3 Reference **3.6.1.2.6** **Standard**	3.6.1.2.6 *Determination of coverage.* The limits of coverage of marker beacons shall be determined on the basis of the field strength specified in 3.1.7.3.2.		Not Applicable		
Chapter 3 Reference **3.6.1.2.7** **Recommendation**	3.6.1.2.7 *Radiation pattern.* **Recommendation.—** *The radiation pattern of a marker beacon normally should be such that the polar axis is vertical, and the field strength in the pattern is symmetrical about the polar axis in the plane or planes containing the flight paths for which the marker beacon is intended.* *Note.— Difficulty in siting certain marker beacons may make it necessary to accept a polar axis that is not vertical.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.6.1.3** **Recommendation**	3.6.1.3 *Monitoring.* **Recommendation.—** *For each marker beacon, suitable monitoring equipment should be provided which will show at an appropriate location:* *a) a decrease in radiated carrier power below 50 per cent of normal;* *b) a decrease of modulation depth below 70 per cent;* *c) a failure of keying.*		Not Applicable		
Chapter 3 Reference **Definition**	**3.7 Requirements for the Global Navigation Satellite System (GNSS)** 3.7.1 Definitions ***Aircraft-based augmentation system (ABAS).*** An augmentation system that augments and/or integrates the information obtained from the other GNSS elements with information available on board the aircraft.		Not Applicable		New Zealand is not a GNSS provider.
Chapter 3 Reference **Definition**	***Alert.*** An indication provided to other aircraft systems or annunciation to the pilot to identify that an operating parameter of a navigation system is out of tolerance.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Alert limit.*** For a given parameter measurement, the error tolerance not to be exceeded without issuing an alert.		Not Applicable		
Chapter 3 Reference **Definition**	***Antenna port.*** A point where the received signal power is specified. For an active antenna, the antenna port is a fictitious point between the antenna elements and the antenna pre-amplifier. For a passive antenna, the antenna port is the output of the antenna itself.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Axial ratio.*** The ratio, expressed in decibels, between the maximum output power and the minimum output power of an antenna to an incident linearly polarized wave as the polarization orientation is varied over all directions perpendicular to the direction of propagation.	CAR Part 171.	No Difference		
Chapter 3 Reference **Definition**	***Channel of standard accuracy (CSA).*** The specified level of positioning, velocity and timing accuracy that is available to any GLONASS user on a continuous, worldwide basis.		Not Applicable		
Chapter 3 Reference **Definition**	***Core satellite constellation(s).*** The core satellite constellations are GPS and GLONASS.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Global navigation satellite system (GNSS).*** A worldwide position and time determination system that includes one or more satellite constellations, aircraft receivers and system integrity monitoring, augmented as necessary to support the required navigation performance for the intended operation.		Not Applicable		
Chapter 3 Reference **Definition**	***Global navigation satellite system (GLONASS).*** The satellite navigation system operated by the Russian Federation.		Not Applicable		
Chapter 3 Reference **Definition**	***Global positioning system (GPS).*** The satellite navigation system operated by the United States.		Not Applicable		
Chapter 3 Reference **Definition**	***GNSS position error.*** The difference between the true position and the position determined by the GNSS receiver.		Not Applicable		
Chapter 3 Reference **Definition**	***Ground-based augmentation system (GBAS).*** An augmentation system in which the user receives augmentation information directly from a ground-based transmitter.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Ground-based regional augmentation system (GRAS).*** An augmentation system in which the user receives augmentation information directly from one of a group of ground-based transmitters covering a region.		Not Applicable		
Chapter 3 Reference **Definition**	***Integrity.*** A measure of the trust that can be placed in the correctness of the information supplied by the total system. Integrity includes the ability of a system to provide timely and valid warnings to the user (alerts).		Not Applicable		
Chapter 3 Reference **Definition**	***Pseudo-range.*** The difference between the time of transmission by a satellite and reception by a GNSS receiver multiplied by the speed of light in a vacuum, including bias due to the difference between a GNSS receiver and satellite time reference.		Not Applicable		
Chapter 3 Reference **Definition**	***Satellite-based augmentation system (SBAS).*** A wide coverage augmentation system in which the user receives augmentation information from a satellite-based transmitter.		Not Applicable		
Chapter 3 Reference **Definition**	***Standard positioning service (SPS).*** The specified level of positioning, velocity and timing accuracy that is available to any global positioning system (GPS) user on a continuous, worldwide basis.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Time-to-alert.*** The maximum allowable time elapsed from the onset of the navigation system being out of tolerance until the equipment enunciates the alert.		Not Applicable		
Chapter 3 Reference **3.7.2.1.1** **Standard**	3.7.2 General 3.7.2.1 *Functions* 3.7.2.1.1 The GNSS shall provide position and time data to the aircraft. *Note.— These data are derived from pseudo-range measurements between an aircraft equipped with a GNSS receiver and various signal sources on satellites or on the ground.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.2.2.1** **Standard**	3.7.2.2 *GNSS elements* 3.7.2.2.1 The GNSS navigation service shall be provided using various combinations of the following elements installed on the ground, on satellites and/or on board the aircraft: a) Global Positioning System (GPS) that provides the Standard Positioning Service (SPS) as defined in 3.7.3.1; b) Global Navigation Satellite System (GLONASS) that provides the Channel of Standard Accuracy (CSA) navigation signal as defined in 3.7.3.2; c) aircraft-based augmentation system (ABAS) as defined in 3.7.3.3; d) satellite-based augmentation system (SBAS) as defined in 3.7.3.4; e) ground-based augmentation system (GBAS) as defined in 3.7.3.5; f) ground-based regional augmentation system (GRAS) as defined in 3.7.3.5; and g) aircraft GNSS receiver as defined in 3.7.3.6.		Not Applicable		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.7.2.3.1** **Standard**	3.7.2.3 *Space and time reference* 3.7.2.3.1 *Space reference*. The position information provided by the GNSS to the user shall be expressed in terms of the World Geodetic System — 1984 (WGS-84) geodetic reference datum. *Note 1.— SARPs for WGS-84 are contained in Annex 4, Chapter 2, Annex 11, Chapter 2, Annex 14, Volumes I and II, Chapter 1 and Annex 15, Chapter 1.* *Note 2.— If GNSS elements using other than WGS-84 coordinates are employed, appropriate conversion parameters are to be applied.*		Not Applicable		
Chapter 3 Reference **3.7.2.3.2** **Standard**	3.7.2.3.2 *Time reference*. The time data provided by the GNSS to the user shall be expressed in a time scale that takes the Coordinated Universal Time (UTC) as reference.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.2.4.1** **Standard**	3.7.2.4 *Signal-in-space performance* 3.7.2.4.1 The combination of GNSS elements and a fault-free GNSS user receiver shall meet the signal-in-space requirements defined in Table 3.7.2.4-1 (located at the end of section 3.7). *Note 1.— The concept of a fault-free user receiver is applied only as a means of defining the performance of combinations of different GNSS elements. The fault-free receiver is assumed to be a receiver with nominal accuracy and time-to-alert performance. Such a receiver is assumed to have no failures that affect the integrity, availability and continuity performance.* *Note 2.— For GBAS approach service (as defined in Attachment D, 7.1.2.1) intended to support approach and landing operations using Category III minima, performance requirements are defined that apply in addition to the signal-in-space requirements defined in Table 3.7.2.4-1.*		Not Applicable		
Chapter 3 Reference **3.7.3.1.1.1** **Standard**	3.7.3.1.1.1 *Positioning accuracy*. The GPS SPS position errors shall not exceed the following limits:		Not Applicable		
Chapter 3 Reference **3.7.3.1.1.2** **Standard**	3.7.3.1.1.2 *Time transfer accuracy*. The GPS SPS time transfer errors shall not exceed 40 nanoseconds 95 per cent of the time.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.7.3.1.1.3** **Standard**	3.7.3.1.1.3 *Range domain accuracy*. The range domain error shall not exceed the following limits: a) range error of any satellite — 30 m (100 ft) with reliability specified in 3.7.3.1.3; b) 95th percentile range rate error of any satellite — 0.006 m (0.02 ft) per second (global average); c) 95th percentile range acceleration error of any satellite — 0.002 m (0.006 ft) per second-squared (global average); and d) 95th percentile range error for any satellite over all time differences between time of data generation and time of use of data — 7.8 m (26 ft) (global average).		Not Applicable		
Chapter 3 Reference **3.7.3.1.2** **Standard**	3.7.3.1.2 *Availability*. The GPS SPS availability shall be as follows: ≥99 per cent horizontal service availability, average location (17 m 95 per cent threshold) ≥99 per cent vertical service availability, average location (37 m 95 per cent threshold) ≥90 per cent horizontal service availability, worst-case location (17 m 95 per cent threshold) ≥90 per cent vertical service availability, worst-case location (37 m 95 per cent threshold)		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.1.3** **Standard**	3.7.3.1.3 *Reliability*. The GPS SPS reliability shall be within the following limits: a) reliability — at least 99.94 per cent (global average); and b) reliability — at least 99.79 per cent (worst single point average).		Not Applicable		
Chapter 3 Reference **3.7.3.1.4** **Standard**	3.7.3.1.4 *Probability of major service failure.* The probability that the user range error (URE) of any satellite will exceed 4.42 times the upper bound on the user range accuracy (URA) broadcast by that satellite without an alert received at the user receiver antenna within 10 seconds shall not exceed 1×10-5 per hour. *Note.— The different alert indications are described in the United States Department of Defense,* Global Positioning System – Standard Positioning Service – Performance Standard, *4th Edition, September 2008, Section 2.3.4.*		Not Applicable		
Chapter 3 Reference **3.7.3.1.5** **Standard**	3.7.3.1.5 *Continuity.* The probability of losing GPS SPS signal-in-space (SIS) availability from a slot of the nominal 24-slot constellation due to unscheduled interruption shall not exceed 2×10-4 per hour.		Not Applicable		
Chapter 3 Reference **3.7.3.1.6** **Standard**	3.7.3.1.6 *Coverage.* The GPS SPS shall cover the surface of the earth up to an altitude of 3 000 kilometres. *Note.— Guidance material on GPS accuracy, availability, reliability and coverage is given in Attachment D, 4.1.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.1.7.1** **Standard**	3.7.3.1.7 *Radio frequency (RF) characteristics* *Note.— Detailed RF characteristics are specified in Appendix B, 3.1.1.1.* 3.7.3.1.7.1 *Carrier frequency*. Each GPS satellite shall broadcast an SPS signal at the carrier frequency of 1 575.42 MHz (GPS L1) using code division multiple access (CDMA). *Note.— A new civil frequency will be added to the GPS satellites and will be offered by the United States for critical safety-of-life applications. SARPs for this signal may be developed at a later date.*		Not Applicable		
Chapter 3 Reference **3.7.3.1.7.2** **Standard**	3.7.3.1.7.2 *Signal spectrum*. The GPS SPS signal power shall be contained within a ±12 MHz band (1 563.42 –1 587.42 MHz) centred on the L1 frequency.		Not Applicable		
Chapter 3 Reference **3.7.3.1.7.3** **Standard**	3.7.3.1.7.3 *Polarization*. The transmitted RF signal shall be right-hand (clockwise) circularly polarized.		Not Applicable		
Chapter 3 Reference **3.7.3.1.7.4** **Standard**	3.7.3.1.7.4 *Signal power level*. Each GPS satellite shall broadcast SPS navigation signals with sufficient power such that, at all unobstructed locations near the ground from which the satellite is observed at an elevation angle of 5 degrees or higher, the level of the received RF signal at the antenna port of a 3 dBi linearly-polarized antenna is within the range of –158.5 dBW to –153 dBW for all antenna orientations orthogonal to the direction of propagation.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.1.7.5** **Standard**	3.7.3.1.7.5 *Modulation*. The SPS L1 signal shall be bipolar phase shift key (BPSK) modulated with a pseudo random noise (PRN) 1.023 MHz coarse/acquisition (C/A) code. The C/A code sequence shall be repeated each millisecond. The transmitted PRN code sequence shall be the Modulo-2 addition of a 50 bits per second navigation message and the C/A code.		Not Applicable		
Chapter 3 Reference **3.7.3.1.8** **Standard**	3.7.3.1.8 *GPS time*. GPS time shall be referenced to UTC (as maintained by the U.S. Naval Observatory).		Not Applicable		
Chapter 3 Reference **3.7.3.1.9** **Standard**	3.7.3.1.9 *Coordinate system*. The GPS coordinate system shall be WGS-84.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.1.10** **Standard**	3.7.3.1.10 *Navigation information*. The navigation data transmitted by the satellites shall include the necessary information to determine: a) satellite time of transmission; b) satellite position; c) satellite health; d) satellite clock correction; e) propagation delay effects; f) time transfer to UTC; and g) constellation status. *Note.— Structure and contents of data are specified in Appendix B, 3.1.1.2 and 3.1.1.3, respectively.*		Not Applicable		
Chapter 3 Reference **3.7.3.2.1.1** **Standard**	3.7.3.2.1.1 *Positioning accuracy*. The GLONASS CSA position errors shall not exceed the following limits:		Not Applicable		
Chapter 3 Reference **3.7.3.2.1.2** **Standard**	3.7.3.2.1.2 *Time transfer accuracy*. The GLONASS CSA time transfer errors shall not exceed 700 nanoseconds 95 per cent of the time.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.2.1.3** **Standard**	3.7.3.2.1.3 *Range domain accuracy*. The range domain error shall not exceed the following limits: a) range error of any satellite — 18 m (59.7 ft); b) range rate error of any satellite — 0.02 m (0.07 ft) per second; c) range acceleration error of any satellite — 0.007 m (0.023 ft) per second squared; d) root-mean-square range error over all satellites — 6 m (19.9 ft).		Not Applicable		
Chapter 3 Reference **3.7.3.2.2** **Standard**	3.7.3.2.2 *Availability*. The GLONASS CSA availability shall be as follows: a) ≥99 per cent horizontal service availability, average location (12 m, 95 per cent threshold); b) ≥99 per cent vertical service availability, average location (25 m, 95 per cent threshold); c) ≥90 per cent horizontal service availability, worst-case location (12 m, 95 per cent threshold); d) ≥90 per cent vertical service availability, worst-case location (25 m, 95 per cent threshold).		Not Applicable		
Chapter 3 Reference **3.7.3.2.3** **Standard**	3.7.3.2.3 *Reliability*. The GLONASS CSA reliability shall be within the following limits: a) frequency of a major service failure — not more than three per year for the constellation (global average); and b) reliability — at least 99.7 per cent (global average).		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.2.4** **Standard**	3.7.3.2.4 *Coverage*. The GLONASS CSA shall cover the surface of the earth up to an altitude of 2 000 km. *Note.— Guidance material on GLONASS accuracy, availability, reliability and coverage is given in Attachment D, 4.2.*		Not Applicable		
Chapter 3 Reference **3.7.3.2.5.1** **Standard**	3.7.3.2.5.1 *Carrier frequency.* Each GLONASS satellite shall broadcast CSA navigation signal at its own carrier frequency in the L1 (1.6 GHz) frequency band using frequency division multiple access (FDMA). *Note 1.— GLONASS satellites may have the same carrier frequency but in this case they are located in antipodal slots of the same orbital plane.* *Note 2.— GLONASS-M satellites will broadcast an additional ranging code at carrier frequencies in the L2 (1.2 GHz) frequency band using FDMA.*		Not Applicable		
Chapter 3 Reference **3.7.3.2.5.2** **Standard**	3.7.3.2.5.2 *Signal spectrum.* GLONASS CSA signal power shall be contained within a ±5.75 MHz band centred on each GLONASS carrier frequency.		Not Applicable		
Chapter 3 Reference **3.7.3.2.5.3** **Standard**	3.7.3.2.5.3 *Polarization*. The transmitted RF signal shall be right-hand circularly polarized.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.2.5.4** **Standard**	3.7.3.2.5.4 *Signal power level*. Each GLONASS satellite shall broadcast CSA navigation signals with sufficient power such that, at all unobstructed locations near the ground from which the satellite is observed at an elevation angle of 5 degrees or higher, the level of the received RF signal at the antenna port of a 3 dBi linearly polarized antenna is within the range of –161 dBW to –155.2 dBW for all antenna orientations orthogonal to the direction of propagation. *Note 1.— The power limit of 155.2 dBW is based on the predetermined characteristics of a user antenna, atmospheric losses of 0.5 dB and an error of an angular position of a satellite that does not exceed one degree (in the direction causing the signal level to increase).* *Note 2.— GLONASS-M satellites will also broadcast a ranging code on L2 with sufficient power such that, at all unobstructed locations near the ground from which the satellite is observed at an elevation angle of 5 degrees or higher, the level of the received RF signal at the antenna port of a 3 dBi linearly polarized antenna is not less then –167 dBW for all antenna orientations orthogonal to the direction of propagation.*		Not Applicable		
Chapter 3 Reference **3.7.3.2.5.5.1** **Standard**	3.7.3.2.5.5 *Modulation* 3.7.3.2.5.5.1 Each GLONASS satellite shall transmit at its carrier frequency the navigation RF signal using a BPSK-modulated binary train. The phase shift keying of the carrier shall be performed at π-radians with the maximum error ±0.2 radian. The pseudo-random code sequence shall be repeated each millisecond.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.2.5.5.2** **Standard**	3.7.3.2.5.5.2 The modulating navigation signal shall be generated by the Modulo-2 addition of the following three binary signals: a) ranging code transmitted at 511 kbits/s; b) navigation message transmitted at 50 bits/s; and c) 100 Hz auxiliary meander sequence.		Not Applicable		
Chapter 3 Reference **3.7.3.2.6** **Standard**	3.7.3.2.6 *GLONASS time.* GLONASS time shall be referenced to UTC(SU) (as maintained by the National Time Service of Russia).		Not Applicable		
Chapter 3 Reference **3.7.3.2.7** **Standard**	3.7.3.2.7 *Coordinate system*. The GLONASS coordinate system shall be PZ-90. *Note.— Conversion from the PZ-90 coordinate system used by GLONASS to the WGS-84 coordinates is defined in Appendix B, 3.2.5.2.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.2.8** **Standard**	3.7.3.2.8 *Navigation information*. The navigation data transmitted by the satellite shall include the necessary information to determine: a) satellite time of transmission; b) satellite position; c) satellite health; d) satellite clock correction; e) time transfer to UTC; and f) constellation status. *Note.— Structure and contents of data are specified in Appendix B, 3.2.1.2 and 3.2.1.3, respectively.*		Not Applicable		
Chapter 3 Reference **3.7.3.3.1** **Standard**	3.7.3.3 *Aircraft-based augmentation system (ABAS)* 3.7.3.3.1 *Performance*. The ABAS function combined with one or more of the other GNSS elements and both a fault-free GNSS receiver and fault-free aircraft system used for the ABAS function shall meet the requirements for accuracy, integrity, continuity and availability as stated in 3.7.2.4.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.4.1** **Standard**	3.7.3.4 *Satellite-based augmentation system (SBAS)* 3.7.3.4.1 *Performance*. SBAS combined with one or more of the other GNSS elements and a fault-free receiver shall meet the requirements for system accuracy, integrity, continuity and availability for the intended operation as stated in 3.7.2.4, throughout the corresponding service area (see 3.7.3.4.3). *Note.— SBAS complements the core satellite constellation(s) by increasing accuracy, integrity, continuity and availability of navigation provided within a service area, typically including multiple aerodromes.*		Not Applicable		
Chapter 3 Reference **3.7.3.4.1.1** **Standard**	3.7.3.4.1.1 SBAS combined with one or more of the other GNSS elements and a fault-free receiver shall meet the requirements for signal-in-space integrity as stated in 3.7.2.4, throughout the SBAS coverage area. *Note.— Message Types 27 or 28 can be used to comply with the integrity requirements in the coverage area. Additional guidance on the rationale and interpretation of this requirement is provided in Attachment D, 3.3.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.4.2** **Standard**	3.7.3.4.2 *Functions.* SBAS shall perform one or more of the following functions: a) ranging: provide an additional pseudo-range signal with an accuracy indicator from an SBAS satellite (3.7.3.4.2.1 and Appendix B, 3.5.7.2); b) GNSS satellite status: determine and transmit the GNSS satellite health status (Appendix B, 3.5.7.3); c) basic differential correction: provide GNSS satellite ephemeris and clock corrections (fast and long-term) to be applied to the pseudo-range measurements from satellites (Appendix B, 3.5.7.4); and d) precise differential correction: determine and transmit the ionospheric corrections (Appendix B, 3.5.7.5). *Note.— If all the functions are provided, SBAS in combination with core satellite constellation(s) can support departure, en-route, terminal and approach operations including Category I precision approach. The level of performance that can be achieved depends upon the infrastructure incorporated into SBAS and the ionospheric conditions in the geographic area of interest.*		Not Applicable		
Chapter 3 Reference **3.7.3.4.2.1.1** **Standard**	3.7.3.4.2.1 *Ranging* 3.7.3.4.2.1.1 Excluding atmospheric effects, the range error for the ranging signal from SBAS satellites shall not exceed 25 m (82 ft) (95 per cent).		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.4.2.1.2** **Standard**	3.7.3.4.2.1.2 The probability that the range error exceeds 150 m (490 ft) in any hour shall not exceed 10–5.		Not Applicable		
Chapter 3 Reference **3.7.3.4.2.1.3** **Standard**	3.7.3.4.2.1.3 The probability of unscheduled outages of the ranging function from an SBAS satellite in any hour shall not exceed 10–3.		Not Applicable		
Chapter 3 Reference **3.7.3.4.2.1.4** **Standard**	3.7.3.4.2.1.4 The range rate error shall not exceed 2 m (6.6 ft) per second.		Not Applicable		
Chapter 3 Reference **3.7.3.4.2.1.5** **Standard**	3.7.3.4.2.1.5 The range acceleration error shall not exceed 0.019 m (0.06 ft) per second-squared.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.4.3** **Standard**	3.7.3.4.3 *Service area*. An SBAS service area for any approved type of operation shall be a declared area within the SBAS coverage area where SBAS meets the corresponding requirements of 3.7.2.4. *Note 1.— An SBAS system can have different service areas corresponding to different types of operation (e.g. APV-I, Category I, etc.).* *Note 2.— The coverage area is that area within which the SBAS broadcast can be received (i.e. the geostationary satellite footprints).* *Note 3.— SBAS coverage and service areas are discussed in Attachment D, 6.2.*		Not Applicable		
Chapter 3 Reference **3.7.3.4.4.1** **Standard**	3.7.3.4.4.1 *Carrier frequency*. The carrier frequency shall be 1 575.42 MHz. *Note.— After 2005, when the upper GLONASS frequencies are vacated, another type of SBAS may be introduced using some of these frequencies.*		Not Applicable		
Chapter 3 Reference **3.7.3.4.4.2** **Standard**	3.7.3.4.4.2 *Signal spectrum*. At least 95 per cent of the broadcast power shall be contained within a ±12 MHz band centred on the L1 frequency. The bandwidth of the signal transmitted by an SBAS satellite shall be at least 2.2 MHz.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.4.4.3.1** **Standard**	3.7.3.4.4.3 *SBAS satellite signal power level* 3.7.3.4.4.3.1 Each SBAS satellite placed in orbit before 1 January 2014 shall broadcast navigation signals with sufficient power such that, at all unobstructed locations near the ground from which the satellite is observed at an elevation angle of 5 degrees or higher, the level of the received RF signal at the antenna port of a 3 dBi linearly polarized antenna is within the range of –161 dBW to –153 dBW for all antenna orientations orthogonal to the direction of propagation.		Not Applicable		
Chapter 3 Reference **3.7.3.4.4.3.2** **Standard**	3.7.3.4.4.3.2 Each SBAS satellite placed in orbit after 31 December 2013 shall comply with the following requirements: a) The satellite shall broadcast navigation signals with sufficient power such that, at all unobstructed locations near the ground from which the satellite is observed at or above the minimum elevation angle for which a trackable GEO signal needs to be provided, the level of the received RF signal at the antenna port of the antenna specified in Appendix B, Table B-88, is at least –164.0 dBW. b) The minimum elevation angle used to determine GEO coverage shall not be less than 5 degrees for a user near the ground. c) The level of a received SBAS RF signal at the antenna port of a 0 dBic antenna located near the ground shall not exceed –152.5 dBW. d) The ellipticity of the broadcast signal shall be no worse than 2 dB for the angular range of ±9.1° from boresight.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.7.3.4.4.4** **Standard**	3.7.3.4.4.4 *Polarization*. The broadcast signal shall be right-hand circularly polarized.		Not Applicable		
Chapter 3 Reference **3.7.3.4.4.5** **Standard**	3.7.3.4.4.5 *Modulation*. The transmitted sequence shall be the Modulo-2 addition of the navigation message at a rate of 500 symbols per second and the 1 023 bit pseudo-random noise code. It shall then be BPSK-modulated onto the carrier at a rate of 1.023 megachips per second.		Not Applicable		
Chapter 3 Reference **3.7.3.4.5** **Standard**	3.7.3.4.5 *SBAS network time (SNT)*. The difference between SNT and GPS time shall not exceed 50 nanoseconds.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.4.6** **Standard**	3.7.3.4.6 *Navigation information*. The navigation data transmitted by the satellites shall include the necessary information to determine: a) SBAS satellite time of transmission; b) SBAS satellite position; c) corrected satellite time for all satellites; d) corrected satellite position for all satellites; e) ionospheric propagation delay effects; f) user position integrity; g) time transfer to UTC; and h) service level status. *Note.— Structure and contents of data are specified in Appendix B, 3.5.3 and 3.5.4, respectively.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.5.1** **Standard**	3.7.3.5.1 *Performance*. GBAS combined with one or more of the other GNSS elements and a fault-free GNSS receiver shall meet the requirements for system accuracy, continuity, availability and integrity for the intended operation as stated in 3.7.2.4 within the service volume for the service used to support the operation as defined in 3.7.3.5.3. *Note.— GBAS is intended to support all types of approach, landing, guided take-off, departure and surface operations and may support en-route and terminal operations. GRAS is intended to support en-route, terminal, non-precision approach, departure, and approach with vertical guidance. The following SARPs are developed to support all categories of precision approach, approach with vertical guidance, and a GBAS positioning service.*		Not Applicable		
Chapter 3 Reference **3.7.3.5.2** **Standard**	3.7.3.5.2 *Functions*. GBAS shall perform the following functions: a) provide locally relevant pseudo-range corrections; b) provide GBAS-related data; c) provide final approach segment data when supporting precision approach; d) provide predicted ranging source availability data; and e) provide integrity monitoring for GNSS ranging sources.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.5.3.1** **Standard**	3.7.3.5.3 *Service volume* 3.7.3.5.3.1 *General requirement for approach services.* The minimum GBAS approach service volume shall be as follows, except where topographical features dictate and operational requirements permit: a) laterally, beginning at 140 m (450 ft) each side of the landing threshold point/fictitious threshold point (LTP/FTP) and projecting out ±35 degrees either side of the final approach path to 28 km (15 NM) and ±10 degrees either side of the final approach path to 37 km (20 NM); and b) vertically, within the lateral region, up to the greater of 7 degrees or 1.75 promulgated glide path angle (GPA) above the horizontal with an origin at the glide path interception point (GPIP) to an upper bound of 3 000 m (10 000 ft) height above threshold (HAT) and 0.45 GPA above the horizontal or to such lower angle, down to 0.30 GPA, as required, to safeguard the promulgated glide path intercept procedure. The lower bound is half the lowest decision height supported or 3.7 m (12 ft), whichever is larger . *Note 1.— LTP/FTP and GPIP are defined in Appendix B, 3.6.4.5.1.* *Note.2 — Guidance material concerning the approach service volume is provided in Attachment D, 7.3.*		Not Applicable		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.7.3.5.3.2** **Standard**	3.7.3.5.3.2 *Approach services supporting autoland and guided take-off*. The minimum additional GBAS service volume to support approach operations that include automatic landing and roll-out, including during guided take-off, shall be as follows, except where operational requirements permit: a) Horizontally, within a sector spanning the width of the runway beginning at the stop end of the runway and extending parallel with the runway centre line towards the LTP to join the minimum service volume as described in 3.7.3.5.3.1. b) Vertically, between two horizontal surfaces one at 3.7 m (12 ft) and the other at 30 m (100 ft) above the runway centre line to join the minimum service volume as described in 3.7.3.5.3.1. *Note.— Guidance material concerning the approach service volume is provided in Attachment D, 7.3.*		Not Applicable		
Chapter 3 Reference **3.7.3.5.3.3** **Standard**	3.7.3.5.3.3 *GBAS positioning service.* The service volume for the GBAS positioning service shall be where the data broadcast can be received and the positioning service meets the requirements of 3.7.2.4 and supports the corresponding approved operations. *Note.— Guidance material concerning the positioning service volume is provided in Attachment D, 7.3.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.5.4.1** **Standard**	3.7.3.5.4.1 *Carrier frequency*. The data broadcast radio frequencies used shall be selected from the radio frequencies in the band 108 to 117.975 MHz. The lowest assignable frequency shall be 108.025 MHz and the highest assignable frequency shall be 117.950 MHz. The separation between assignable frequencies (channel spacing) shall be 25 kHz. *Note 1.— Guidance material on VOR/GBAS frequency assignments and geographical separation criteria is given in Attachment D, 7.2.1.* *Note 2.— ILS/GBAS geographical separation criteria and geographical separation criteria for GBAS and VHF communication services operating in the 118 – 137 MHz band are under development. Until these criteria are defined and included in SARPs, it is intended that frequencies in the band 112.050 – 117.900 MHz will be used.*		Not Applicable		
Chapter 3 Reference **3.7.3.5.4.2** **Standard**	3.7.3.5.4.2 *Access technique*. A time division multiple access (TDMA) technique shall be used with a fixed frame structure. The data broadcast shall be assigned one to eight slots. *Note.— Two slots is the nominal assignment. Some GBAS facilities that use multiple VHF data broadcast (VDB) transmit antennas to improve VDB coverage may require assignment of more than two time slots. Guidance on the use of multiple antennas is given in Attachment D, 7.12.4; some GBAS broadcast stations in a GRAS may use one time slot.*		Not Applicable		
Chapter 3 Reference **3.7.3.5.4.3** **Standard**	3.7.3.5.4.3 *Modulation*. GBAS data shall be transmitted as 3-bit symbols, modulating the data broadcast carrier by D8PSK, at a rate of 10 500 symbols per second.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.5.4.4.1.1** **Standard**	3.7.3.5.4.4.1 *GBAS/H* 3.7.3.5.4.4.1.1 A horizontally polarized signal shall be broadcast.		Not Applicable		
Chapter 3 Reference **3.7.3.5.4.4.1.2** **Standard**	3.7.3.5.4.4.1.2 The effective isotropically radiated power (EIRP) shall provide for a horizontally polarized signal with a minimum field strength of 215 microvolts per metre (–99 dBW/m2) and a maximum field strength of 0.879 volts per metre (–27 dBW/m2) within the GBAS service volume as specified in 3.7.3.5.3.1. The field strength shall be measured as an average over the period of the synchronization and ambiguity resolution field of the burst. Within the additional GBAS service volume, as specified in 3.7.3.5.3.2, the effective isotropically radiated power (EIRP) shall provide for a horizontally polarized signal with a minimum field strength of 215 microvolts per metre (–99 dBW/m2) below 36 ft and down to 12 ft above the runway surface and 650 microvolts per metre (–89.5 dBW/m2) at 36 ft or more above the runway surface. *Note.— Guidance material concerning the approach service volume is provided in Attachment D, 7.3.*		Not Applicable		
Chapter 3 Reference **3.7.3.5.4.4.2.1** **Recommendation**	3.7.3.5.4.4.2 *GBAS/E* 3.7.3.5.4.4.2.1 **Recommendation.—** *An elliptically polarized signal should be broadcast whenever practical*.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.5.4.4.2.2** **Standard**	3.7.3.5.4.4.2.2 When an elliptically polarized signal is broadcast, the horizontally polarized component shall meet the requirements in 3.7.3.5.4.4.1.2, and the effective isotropically radiated power (EIRP) shall provide for a vertically polarized signal with a minimum field strength of 136 microvolts per metre (–103 dBW/m2) and a maximum field strength of 0.555 volts per metre (–31 dBW/m2) within the GBAS service volume. The field strength shall be measured as an average over the period of the synchronization and ambiguity resolution field of the burst.		Not Applicable		
Chapter 3 Reference **3.7.3.5.4.5** **Standard**	3.7.3.5.4.5 *Power transmitted in adjacent channel*s. The amount of power during transmission under all operating conditions when measured over a 25 kHz bandwidth centred on the ith adjacent channel shall not exceed the values shown in Table 3.7.3.5-1 (located at the end of section 3.7).		Not Applicable		
Chapter 3 Reference **3.7.3.5.4.6** **Standard**	3.7.3.5.4.6 *Unwanted emissions.* Unwanted emissions, including spurious and out-of-band emissions, shall be compliant with the levels shown in Table 3.7.3.5-2 (located at the end of section 3.7). The total power in any VDB harmonic or discrete signal shall not be greater than –53 dBm.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.3.5.5** **Standard**	3.7.3.5.5 *Navigation information*. The navigation data transmitted by GBAS shall include the following information: a) pseudo-range corrections, reference time and integrity data; b) GBAS-related data; c) final approach segment data when supporting precision approach; and d) predicted ranging source availability data. *Note.— Structure and contents of data are specified in Appendix B, 3.6.3.*		Not Applicable		
Chapter 3 Reference **3.7.3.6.1** **Standard**	3.7.3.6 *Aircraft GNSS receiver* 3.7.3.6.1 The aircraft GNSS receiver shall process the signals of those GNSS elements that it intends to use as specified in Appendix B, 3.1 (for GPS), Appendix B, 3.2 (for GLONASS), Appendix B, 3.3 (for combined GPS and GLONASS), Appendix B, 3.5 (for SBAS) and Appendix B, 3.6 (for GBAS and GRAS).	CAR Part 91 Appendix A, A.9.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.4.1** **Standard**	3.7.4 Resistance to interference 3.7.4.1 GNSS shall comply with performance requirements defined in 3.7.2.4 and Appendix B, 3.7 in the presence of the interference environment defined in Appendix B, 3.7. *Note.— GPS and GLONASS operating in the frequency band 1 559 – 1 610 MHz are classified by the ITU as providing a radio navigation satellite service (RNSS) and aeronautical radio navigation service (ARNS) and are afforded special spectrum protection status for RNSS. In order to achieve the performance objectives for precision approach guidance to be supported by the GNSS and its augmentations, RNSS/ARNS is intended to remain the only global allocation in the 1 559 –1 610 MHz band and emissions from systems in this and adjacent frequency bands are intended to be tightly controlled by national and/or international regulation.*	CAR Part 91 Appendix A, A.9.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.7.5.1** **Standard**	3.7.5 Database *Note.— SARPs applicable to aeronautical data are provided in Annex 4, Annex 11, Annex 14 and Annex 15.* 3.7.5.1 Aircraft GNSS equipment that uses a database shall provide a means to: a) update the electronic navigation database; and b) determine the Aeronautical Information Regulation and Control (AIRAC) effective dates of the aeronautical database. *Note.— Guidance material on the need for a current navigation database in aircraft GNSS equipment is provided in Attachment D, 11.* **Table 3.7.2.4-1 Signal-in-space performance requirements** **Table 3.7.3.5-1. GBAS broadcast power transmitted in adjacent channels** **Table 3.7.3.5-2. GBAS broadcast unwanted emissions**	CAR Part 91 Appendix A, A.9.	No Difference		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.9.1.1** **Standard**	**3.9 System characteristics of airborne ADF receiving systems** 3.9.1 Accuracy of bearing indication 3.9.1.1 The bearing given by the ADF system shall not be in error by more than plus or minus 5 degrees with a radio signal from any direction having a field strength of 70 microvolts per metre or more radiated from an LF/MF NDB or locator operating within the tolerances permitted by this Annex and in the presence also of an unwanted signal from a direction 90 degrees from the wanted signal and: a) on the same frequency and 15 dB weaker; or b) plus or minus 2 kHz away and 4 dB weaker; or c) plus or minus 6 kHz or more away and 55 dB stronger. *Note.— The above bearing error is exclusive of aircraft magnetic compass error.*	CAR Part 91 Appendix A, A.9.	No Difference		
Chapter 3 Reference **Definition**	**3.11 Microwave landing system (MLS) characteristics** 3.11.1 Definitions ***Auxiliary data.*** Data, transmitted in addition to basic data, that provide ground equipment siting information for use in refining airborne position calculations and other supplementary information.		Not Applicable		MLS is not used in New Zealand.

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Basic data.*** Data transmitted by the ground equipment that are associated directly with the operation of the landing guidance system.		Not Applicable		
Chapter 3 Reference **Definition**	***Beam centre.*** The midpoint between the two minus 3-dB points on the leading and trailing edges of the scanning beam main lobe.		Not Applicable		
Chapter 3 Reference **Definition**	***Beamwidth.*** The width of the scanning beam main lobe measured at the minus 3-dB points and defined in angular units on the boresight, in the horizontal plane for the azimuth function and in the vertical plane for the elevation function.		Not Applicable		
Chapter 3 Reference **Definition**	***Clearance guidance sector.*** The volume of airspace, inside the coverage sector, within which the azimuth guidance information provided is not proportional to the angular displacement of the aircraft, but is a constant left or right indication of which side the aircraft is with respect to the proportional guidance sector.		Not Applicable		
Chapter 3 Reference **Definition**	***Control motion noise (CMN).*** That portion of the guidance signal error which causes control surface, wheel and column motion and could affect aircraft attitude angle during coupled flight, but does not cause aircraft displacement from the desired course and/or glide path. (See 3.5.)		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Coordinate system — conical.*** A function is said to use conical coordinates when the decoded guidance angle varies as the minimum angle between the surface of a cone containing the receiver antenna, and a plane perpendicular to the axis of the cone and passing through its apex. The apex of the cone is at the antenna phase centre. For approach azimuth or back azimuth functions, the plane is the vertical plane containing the runway centre line. For elevation functions, the plane is horizontal.		Not Applicable		
Chapter 3 Reference **Definition**	***Coordinate system — planar.*** A function is said to use planar coordinates when the decoded guidance angle varies as the angle between the plane containing the receiver antenna and a reference plane. For azimuth functions, the reference plane is the vertical plane containing the runway centre line and the plane containing the receiver antenna is a vertical plane passing through the antenna phase centre.		Not Applicable		
Chapter 3 Reference **Definition**	***Coverage sector.*** A volume of airspace within which service is provided by a particular function and in which the signal power density is equal to or greater than the specified minimum.		Not Applicable		
Chapter 3 Reference **Definition**	***DME/P.*** The distance measuring element of the MLS, where the "P" stands for precise distance measurement. The spectrum characteristics are those of DME/N.		Not Applicable		

Report on entire Annex

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Function.*** A particular service provided by the MLS, e.g. approach azimuth guidance, back azimuth guidance or basic data, etc.		Not Applicable		
Chapter 3 Reference **Definition**	***Mean course error.*** The mean value of the azimuth error along the runway extended centre line.		Not Applicable		
Chapter 3 Reference **Definition**	***Mean glide path error.*** The mean value of the elevation error along the glide path of an elevation function.		Not Applicable		
Chapter 3 Reference **Definition**	***Minimum glide path.*** The lowest angle of descent along the zero degree azimuth that is consistent with published approach procedures and obstacle clearance criteria. *Note.— This is the lowest elevation angle which has been approved and promulgated for the instrument runway.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***MLS antenna boresight.*** The plane passing through the antenna phase centre perpendicular to the horizontal axis contained in the plane of the antenna array. *Note.— In the azimuth case, the boresight of the antenna and the zero degree azimuth are normally aligned. However, the preferred designation in a technical context is "boresight" whereas the preferred designation in an operational context is "zero degree azimuth" (see definition below).*		Not Applicable		
Chapter 3 Reference **Definition**	***MLS azimuth.*** The locus of points in any horizontal plane where the decoded guidance angle is constant.		Not Applicable		
Chapter 3 Reference **Definition**	***MLS approach reference datum.*** A point at a specified height above the intersection of the runway centre line and the threshold.		Not Applicable		
Chapter 3 Reference **Definition**	***MLS back azimuth reference datum.*** A point at a specified height above the runway centre line at the runway midpoint.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***MLS datum point.*** The point on the runway centre line closest to the phase centre of the approach elevation antenna.		Not Applicable		
Chapter 3 Reference **Definition**	***MLS elevation.*** The locus of points in any vertical plane where the decoded guidance angle is constant.		Not Applicable		
Chapter 3 Reference **Definition**	***MLS zero degree azimuth.*** The MLS azimuth where the decoded guidance angle is zero degrees.		Not Applicable		
Chapter 3 Reference **Definition**	***Out-of-coverage indication signal.*** A signal radiated into areas outside the intended coverage sector where required to specifically prevent invalid removal of an airborne warning indication in the presence of misleading guidance information.		Not Applicable		
Chapter 3 Reference **Definition**	***Path following error (PFE).*** That portion of the guidance signal error which could cause aircraft displacement from the desired course and/or glide path.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **Definition**	***Path following noise (PFN).*** That portion of the guidance signal error which could cause aircraft displacement from the mean course line or mean glide path as appropriate.		Not Applicable		
Chapter 3 Reference **Definition**	***Proportional guidance sector.*** The volume of airspace within which the angular guidance information provided by a function is directly proportional to the angular displacement of the airborne antenna with respect to the zero angle reference.		Not Applicable		
Chapter 3 Reference **3.11.2.1** **Standard**	3.11.2 General 3.11.2.1 MLS is a precision approach and landing guidance system which provides position information and various ground to air data. The position information is provided in a wide coverage sector and is determined by an azimuth angle measurement, an elevation angle measurement and a range (distance) measurement. *Note.— Unless specifically indicated as the MLS airborne equipment, the text in 3.11 refers to the MLS ground equipment.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.3.1** **Standard**	3.11.3 MLS configurations 3.11.3.1 *Basic MLS.* The basic configuration of the MLS shall be composed of the following: a) approach azimuth equipment, associated monitor, remote control and indicator equipment; b) approach elevation equipment, associated monitor, remote control and indicator equipment; c) a means for the encoding and transmission of essential data words, associated monitor, remote control and indicator equipment; *Note.— The essential data are those basic and essential auxiliary data words specified in 3.11.5.4.* d) DME/N, associated monitor, remote control and indicator equipment.		Not Applicable		
Chapter 3 Reference **3.11.3.2** **Recommendation**	3.11.3.2 **Recommendation.—** *If precise ranging information throughout the azimuth coverage sector is required, the option of DME/P, conforming to the Standards of Chapter 3, 3.5 should be applied.* *Note.— DME is the MLS ranging element and is expected to be installed as soon as possible. However, marker beacons installed for ILS may be used temporarily with MLS while ILS service is maintained at the same runway.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.3.3** **Standard**	3.11.3.3 *Expanded MLS configurations*. It shall be permissible to derive expanded configurations from the basic MLS, by addition of one or more of the following functions or characteristic improvements: a) back azimuth equipment, associated monitor, remote control and indicator equipment; b) flare elevation equipment, associated monitor, remote control and indicator equipment; c) DME/P, associated monitor, remote control and indicator equipment; d) a means for the encoding and transmission of additional auxiliary data words, associated monitor, remote control and indicator equipment; e) a wider proportional guidance sector exceeding the minimum specified in 3.11.5. *Note 1.— Although the Standard has been developed to provide for flare elevation function, this function is not implemented and is not intended for future implementation.* *Note 2.— The MLS signal format allows further system growth to include additional functions, such as 360 degrees azimuth.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.3.4** **Standard**	3.11.3.4 *Simplified MLS configurations*. It shall be permissible to derive simplified configurations from the basic MLS (3.11.3.1), by relaxation of characteristics as follows: a) an approach azimuth coverage provided in approach region (3.11.5.2.2.1.1) only; b) an approach azimuth and elevation coverage (3.11.5.2.2 and 3.11.5.3.2) not extending below a height of 30 m (100 ft) above the threshold; c) accuracy limits for PFE and PFN expanded to be not greater than 1.5 times the values specified in 3.11.4.9.4 for approach azimuth guidance and in 3.11.4.9.6 for elevation guidance; d) ground equipment contribution to the mean course error and to the mean glide path error expanded to be 1.5 times the values specified in 3.11.5.2.5 and 3.11.5.3.5, respectively; e) CMN requirements (3.11.4.9.4 and 3.11.4.9.6) waived; and f) monitor and control action period (3.11.5.2.3 and 3.11.5.3.3) expanded to a six-second period. *Note.— Guidance material on application of the simplified MLS configurations is provided in Attachment G, 15.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.1.1** **Standard**	3.11.4 Signal-in-space characteristics — angle and data functions 3.11.4.1 *Channelling* 3.11.4.1.1 *Channel arrangement.* The MLS angle and data functions shall operate on any one of the 200 channels assigned on the frequencies from 5 031.0 MHz to 5 090.7 MHz as shown in Table A.		Not Applicable		
Chapter 3 Reference **3.11.4.1.1.1** **Standard**	3.11.4.1.1.1 Channel assignments in addition to those specified in 3.11.4.1.1 shall be made within the 5 030.4 to 5 150.0 MHz sub-band as necessary to satisfy future air navigation requirements.		Not Applicable		
Chapter 3 Reference **3.11.4.1.2** **Standard**	3.11.4.1.2 *Channel pairing with DME.* The channel pairing of the angle and data channel with the channel of the ranging function shall be in accordance with Table A.		Not Applicable		
Chapter 3 Reference **3.11.4.1.3** **Standard**	3.11.4.1.3 *Frequency tolerance.* The operating radio frequency of the ground equipment shall not vary more than plus or minus 10 kHz from the assigned frequency. The frequency stability shall be such that there is no more than a plus or minus 50 Hz deviation from the nominal frequency when measured over a one-second interval.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.1.4.1** **Standard**	3.11.4.1.4 *Radio frequency signal spectrum* 3.11.4.1.4.1 The transmitted signal shall be such that, during the transmission time, the mean power density above a height of 600 m (2 000 ft) shall not exceed –94.5 dBW/m2 for angle guidance or data signals, as measured in a 150 kHz bandwidth centred 840 kHz or more from the nominal frequency.		Not Applicable		
Chapter 3 Reference **3.11.4.1.4.2** **Standard**	3.11.4.1.4.2 The transmitted signal shall be such that, during the transmission time, the mean power density beyond a distance of 4 800 m (2.6 NM) from any antennas and for a height below 600 m (2 000 ft) shall not exceed –94.5 dBW/m² for angle guidance or data signals, as measured in a 150 kHz bandwidth centred 840 kHz or more from the nominal frequency. *Note 1.— Requirements in 3.11.4.1.4.2 are applicable when the operational coverage of another MLS ground station has overlap with the radio-horizon of the considered ground station.* *Note 2.— Guidance material on MLS frequency planning is provided in Attachment G, 9.3.*		Not Applicable		
Chapter 3 Reference **3.11.4.2** **Standard**	3.11.4.2 *Polarization.* The radio frequency transmissions from all ground equipment shall be nominally vertically polarized. The effect of any horizontally polarized component shall not cause the guidance information to change by more than 40 per cent of the PFE allowed at that location with the airborne antenna rotated 30 degrees from the vertical position or cause the PFE limit to be exceeded.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.3.1** **Standard**	3.11.4.3 *Time-division-multiplex (TDM) organization* 3.11.4.3.1 Both angle information and data shall be transmitted by TDM on a single radio frequency channel.		Not Applicable		
Chapter 3 Reference **3.11.4.3.2** **Standard**	3.11.4.3.2 *Synchronization.* The transmissions from the various angle and data ground equipment serving a particular runway shall be time synchronized to assure interference-free operations on the common radio frequency channel of operation.		Not Applicable		
Chapter 3 Reference **3.11.4.3.3** **Standard**	3.11.4.3.3 *Function rates.* Each function transmitted shall be repeated at the rates shown in the following table:		Not Applicable		
Chapter 3 Reference **3.11.4.3.3.1** **Recommendation**	3.11.4.3.3.1 **Recommendation.—** *When the proportional guidance sector is not greater than plus or minus 40 degrees and a need for flare elevation or other growth functions at that facility is not anticipated, the high rate approach azimuth function should be used.* *Note.— Application information is contained in Attachment G, 2.3.3.*		Not Applicable		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.11.4.3.4** **Standard**	3.11.4.3.4 *Function timing.* Timing standards for each angle and data function shall be as specified in Appendix A, Tables A-1 through A-6 and A-8. The ground equipment internal timing accuracy of each listed event including jitter shall be the specified nominal value plus or minus 2 microseconds. The timing jitter shall be less than 1 microsecond root mean square (RMS). *Note 1.— The timing of each listed event indicates the beginning of the event time slot and the end of the previous event time slot. The characteristics and timing of the actual transmissions are as specified in the applicable paragraphs*. *Note 2.— Information on the measurement of the timing accuracy is contained in Attachment G, 2.2.2.*		Not Applicable		
Chapter 3 Reference **3.11.4.3.5** **Standard**	3.11.4.3.5 *Function sequence.* The time interval between repetitive transmissions of any one function shall be varied in a manner which provides protection from synchronous interference. *Note 1.— Each function transmission is an independent entity which can occur in any position in the TDM sequence (with the exception that back azimuth must be preceded by basic data word 2).* *Note 2.— Some sequences which have demonstrated protection from synchronous interference are illustrated in Attachment G, 2.1.4.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.4.1** **Standard**	3.11.4.4 *Preamble* 3.11.4.4.1 A preamble signal shall be transmitted throughout the applicable coverage sector to identify the particular function to follow. The preamble shall consist of a radio frequency carrier acquisition period, a receiver reference time code, and a function identification code. The timing of the preamble transmissions shall be as specified in Appendix A, Table A-1.		Not Applicable		
Chapter 3 Reference **3.11.4.4.2** **Standard**	3.11.4.4.2 *Carrier acquisition.* The preamble transmission shall begin with a period of unmodulated radio frequency carrier as specified in Appendix A, Table A-1.		Not Applicable		
Chapter 3 Reference **3.11.4.4.3.1** **Standard**	3.11.4.4.3 *Modulation and coding* 3.11.4.4.3.1 *Differential phase shift keying (DPSK).* The preamble codes and the basic and auxiliary data signals specified in 3.11.4.8 shall be transmitted by DPSK of the radio frequency carrier. A “zero” shall be represented by a 0 degrees plus or minus 10 degrees phase shift and a “one” shall be represented by a 180 degrees plus or minus 10 degrees phase shift. The modulation rate shall be 15 625 bauds. The internal timing accuracy of the DPSK transition shall be as specified in 3.11.4.3.4. There shall be no amplitude modulation applied during the phase transition. The transition time shall not exceed 10 microseconds, and the phase shall advance or retard monotonically throughout the transition region.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.4.3.2** **Standard**	3.11.4.4.3.2 *Receiver reference time.* All preambles shall contain the receiver reference time code, 11101 (bits I1 to I5). The time of the last phase transition midpoint in the code shall be the receiver reference time. The receiver reference time code shall be validated by decoding a valid function identification immediately following the receiver reference time code.		Not Applicable		
Chapter 3 Reference **3.11.4.4.3.3** **Standard**	3.11.4.4.3.3 *Function identification.* A code for function identification shall follow the receiver reference time code. This code shall consist of the five information bits (I6 to I10) allowing identification of 31 different functions, plus two parity bits (I11 and I12) as shown in the following table: *Note.— The function identification codes have been chosen so that parity bits I11 and I12 satisfy the equations:* I6 + I7 + I8 + I9 + I10 + I11 = EVEN I6 + I8 + I10 + I12 = EVEN		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.5** **Standard**	3.11.4.5 *Angle guidance parameters.* Angle guidance information shall be encoded by the amount of time separation between the centres of the received TO and FRO scanning beam main lobes. The coding shall be interpreted in the airborne equipment as a linear function of time as follows: $\theta = (T0 - t)\ V/2$ where: θ = Azimuth or elevation guidance angle in degrees t = Time separation in microseconds between TO and FRO beam centres T0 = Time separation in microseconds between TO and FRO beam centres corresponding to zero degrees V = Scan velocity scaling constant in degrees per microsecond.		Not Applicable		
Chapter 3 Reference **3.11.4.5.1** **Standard**	3.11.4.5.1 The values of the angle guidance parameters shall be as shown in the following table: *Note 1.— Between the end of the TO scan and the beginning of the FRO scan there is a pause time of no radiation of appropriate duration. Additional information is provided in Attachment G, 2.2.1.* *Note 2.— The maximum scan angles shown recognize that the scan angle must exceed the proportional guidance sector limit by at least one half of the width of the detected scanning beam envelope (in equivalent angle) to allow successful decoding.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.11.4.5.2** **Standard**	3.11.4.5.2 The tolerances on the ground equipment scanning beam velocity and the time separation between TO and FRO pulses corresponding to zero degrees shall be sufficient to satisfy the accuracy requirements specified in 3.11.4.9.		Not Applicable		
Chapter 3 Reference **3.11.4.5.3** **Standard**	3.11.4.5.3 The TO and FRO scan transmissions shall be symmetrically disposed about the mid-scan point listed in each of Tables A-2 through A-5 of Appendix A. The mid-scan point and the centre of the time interval between the TO and FRO scan transmissions shall coincide with a tolerance of plus or minus 10 microseconds.		Not Applicable		
Chapter 3 Reference **3.11.4.6.1** **Standard**	3.11.4.6 *Azimuth guidance functions* 3.11.4.6.1 Each transmission of a guidance angle shall consist of a clockwise TO scan followed by a counterclockwise FRO scan as viewed from above the antenna. For approach azimuth functions, increasing angle values shall be in the direction of the TO scan. For the back azimuth functions, increasing angle values shall be in the direction of the FRO scan. *Note.— A diagram illustrating the scanning conventions is provided in Attachment G, 2.3.1.*		Not Applicable		
Chapter 3 Reference **3.11.4.6.2** **Standard**	3.11.4.6.2 *Sector signals.* The transmission format of any azimuth function shall include time slots for airborne antenna selection, out-of-coverage indication, and test pulses as specified in Appendix A, Tables A-2 and A-3. The internal timing accuracy of the sector signals shall conform to the internal timing accuracy of the DPSK transitions specified in 3.11.4.3.4.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.6.2.1** **Standard**	3.11.4.6.2.1 *Ground equipment identification*. The MLS providing services for a particular runway shall be identified by a four-character alphabetic designator starting with the letter M. This designator less the first letter shall be transmitted as a digital word as listed in Appendix A, Table A-7. *Note.— It is not required that MLS ground equipment will transmit identification outside the angle guidance coverage sectors. If MLS channel identification is operationally required outside angle guidance coverage sectors, it may be derived from associated omnidirectional DME. (See 3.11.5.5.2 and Attachment G, 8.2.)*		Not Applicable		
Chapter 3 Reference **3.11.4.6.2.1.1** **Standard**	3.11.4.6.2.1.1 The signal shall be transmitted on the data channel into the approach and back azimuth coverage regions.		Not Applicable		
Chapter 3 Reference **3.11.4.6.2.1.2** **Standard**	3.11.4.6.2.1.2 The code bit in the time slot previously allocated for the alternate (Morse code) ground equipment identification following the azimuth preamble shall be fixed in the “ZERO” state.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.6.2.2** **Standard**	3.11.4.6.2.2 *Airborne antenna selection signal.* A signal for airborne antenna selection shall be transmitted as a “zero” DPSK signal lasting for a six-bit period. The signal shall be available throughout the coverage sector in which approach or back azimuth guidance is provided. *Note.— The signal provides an opportunity for the selection of the most appropriate antenna in a multiple antenna airborne installation.*		Not Applicable		
Chapter 3 Reference **3.11.4.6.2.3** **Standard**	3.11.4.6.2.3 *Azimuth out-of-coverage indication pulses.* Where out-of-coverage indication pulses are used, they shall be: a) greater than any guidance signal in the out-of-coverage sector; b) at least 5 dB less than the fly-left (fly-right) clearance level within the fly-left (fly-right) clearance sector; and c) at least 5 dB less than the scanning beam level within the proportional coverage region. The duration of each pulse measured at the half amplitude point shall be at least 100 microseconds, and the rise and fall times shall be less than 10 microseconds.		Not Applicable		
Chapter 3 Reference **3.11.4.6.2.3.1** **Standard**	3.11.4.6.2.3.1 If desired, it shall be permissible to sequentially transmit two pulses in each out-of-coverage indication time slot. Where the pulse pairs are used, the duration of each pulse shall be at least 50 microseconds and the rise and fall times shall be less than 10 microseconds.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.6.2.3.2** **Standard**	3.11.4.6.2.3.2 The transmissions of out-of-coverage indication pulses radiated from antennas with overlapping coverage patterns shall be separated by at least 10 microseconds.		Not Applicable		
Chapter 3 Reference **3.11.4.6.2.5** **Standard**	3.11.4.6.2.5 *Clearance guidance.* Where the proportional guidance sector provided is less than the minimum coverage specified in 3.11.5.2.2.1.1 a) and 3.11.5.2.2.2 a), clearance guidance shall be provided to supplement the coverage sector by the transmission of fly-left/fly-right clearance pulses in the formats for the approach azimuth, high rate approach azimuth and back azimuth functions. Alternatively, it shall be permissible to provide clearance guidance by permitting the scanning beam to scan beyond the designated proportional guidance sector to provide fly-left or fly-right clearance information as appropriate when the decoded angle exceeds the designated limits of proportional guidance coverage.		Not Applicable		
Chapter 3 Reference **3.11.4.6.2.5.1** **Standard**	3.11.4.6.2.5.1 Clearance guidance information shall be provided by transmitting pairs of pulses within the angle scan time slots. One pair shall consist of one pulse adjacent to the start time of the scanning beam TO scan and one pulse adjacent to the stop time of the FRO scan. A second pair shall consist of one pulse adjacent to the stop time of the scanning beam TO scan, and one pulse adjacent to the start time of the FRO scan. The fly-right clearance pulses shall represent positive angles and the fly-left clearance pulses shall represent negative angles. The duration of each clearance pulse shall be 50 microseconds with a tolerance of plus or minus 5 microseconds. The transmitter switching time between the clearance pulses and the scanning beam transmissions shall not exceed 10 microseconds. The rise time at the edge of each clearance pulse not adjacent to the scanning beam shall be less than 10 microseconds.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.6.2.5.2** **Standard**	3.11.4.6.2.5.2 The signal-in-space characteristics of the clearance guidance pulses shall be as follows: a) within the fly-right clearance guidance sector, the fly-right clearance guidance signal shall exceed the scanning beam side lobes and all other guidance and out-of-coverage indication signals by at least 5 dB; b) within the fly-left clearance guidance sector, the fly-left clearance guidance signal shall exceed the scanning beam side lobes and all other guidance and out-of-coverage indication signals by at least 5 dB; c) within the proportional guidance sector, the clearance guidance signals shall be at least 5 dB below the scanning beam main lobe.		Not Applicable		
Chapter 3 Reference **3.11.4.6.2.5.3** **Standard**	3.11.4.6.2.5.3 The power density of the clearance signal shall be as required in 3.11.4.10.1. *Note 1.— Attachment G, 2.3.4 contains guidance information on the following:* *a) clearance and scanning beam timing arrangements;* *b) pulse envelopes in the transition regions between clearance and scanning beam signals;* *c) clearance (fly-right/fly-left) convention changes.* *Note 2.— The proportional coverage limits are transmitted in basic data as specified in 3.11.4.8.2.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.7.1** **Standard**	3.11.4.7 *Elevation guidance functions* 3.11.4.7.1 *Scanning conventions*. For the approach elevation function, increasing elevation guidance angles shall be in the upward direction. Zero elevation angle shall coincide with a horizontal plane through the respective antenna phase centre. Each guidance angle transmission shall consist of a TO scan followed by a FRO scan. The TO scan shall be in the direction of increasing angle values.		Not Applicable		
Chapter 3 Reference **3.11.4.7.2** **Standard**	3.11.4.7.2 *Sector signal*. Provision for transmission of one out-of-coverage indication pulse shall be made in the format for the approach elevation function. Where an out-of-coverage indication pulse is used, it shall be: (1) greater than any guidance signal in the out-of-coverage indication sector and (2) at least 5 dB less than the guidance signals within the guidance sector. The elevation out-of-coverage indication timing shall be as shown in Appendix A, Table A-4. The duration of each pulse measured at the half amplitude points shall be at least 100 microseconds, and the rise and fall times shall be less than 10 microseconds.		Not Applicable		
Chapter 3 Reference **3.11.4.7.2.1** **Standard**	3.11.4.7.2.1 If desired, it shall be permissible to sequentially transmit two pulses in each obstacle clearance indication time slot. Where pulse pairs are used, the duration of each pulse shall be at least 50 microseconds, and the rise and fall times shall be less than 10 microseconds.		Not Applicable		
Chapter 3 Reference **3.11.4.8** **Standard**	3.11.4.8 *Data functions*. Provision shall be made in the MLS signal format for the transmission of basic data and auxiliary data. *Note.— Ground equipment data coverage and monitoring requirements are specified in 3.11.5.4.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.8.1** **Standard**	3.11.4.8.1 *Data transmission*. Data shall be transmitted as specified in 3.11.4.4.3.1.		Not Applicable		
Chapter 3 Reference **3.11.4.8.2** **Standard**	3.11.4.8.2 *Basic data structure and timing*. Basic data shall be encoded as 32-bit words consisting of a function preamble (12 bits) specified in 3.11.4.4, and data content as specified in Appendix A, Table A-7. The timing of the basic data words shall be as specified in Appendix A, Table A-6. The content, maximum interval between transmission of the same word and organization of the words shall be as specified in Appendix A, Table A-7. Data containing digital information shall be transmitted with the least significant bit first. The smallest binary number shall represent the lower absolute range limit with increments in binary steps to the upper absolute range limit specified in Appendix A, Table A-7.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.8.2.1** **Standard**	3.11.4.8.2.1 *Basic data contents.* The data items specified in Appendix A, Table A-7 shall be defined as follows: a) *Approach azimuth antenna to threshold distance* shall represent the minimum distance between the approach azimuth antenna phase centre to the vertical plane perpendicular to the centre line which contains the runway threshold. b) *Approach azimuth proportional coverage limit* shall represent the limit of the sector in which proportional approach azimuth guidance is transmitted. c) *Clearance signal type* shall indicate the method of providing the azimuth clearance signal. d) *Minimum glide path* shall represent the lowest angle of descent along the zero-degree azimuth as defined in 3.11.1. e) *Back azimuth status* shall represent the operational status of the back azimuth equipment. f) *DME status* shall represent the operational status of the DME equipment. g) *Approach azimuth status* shall represent the operational status of the approach azimuth equipment. h) *Approach elevation status* shall represent the operational status of the approach elevation equipment. i) *Beamwidth* shall represent, for a particular function, the antenna beamwidth as defined in 3.11.1. j) *DME distance* shall represent the minimum distance		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	between the DME antenna phase centre and the vertical plane perpendicular to the runway centre line which contains the MLS datum point. k) *Approach azimuth magnetic orientation* shall represent the angle measured in the horizontal plane clockwise from Magnetic North to the zero-degree approach azimuth, originating from the approach azimuth antenna. The vertex of the measured angle shall be the approach azimuth antenna phase centre. l) *Back azimuth magnetic orientation* shall represent the angle measured in the horizontal plane clockwise from Magnetic North to the zero-degree back azimuth, originating from the back azimuth antenna. The vertex of the measured angle shall be the back azimuth antenna phase centre. m) *Back azimuth proportional coverage limit* shall represent the limit of the sector in which proportional back azimuth guidance is transmitted. n) *MLS ground equipment identification* shall represent the last three characters of the system identification specified in 3.11.4.6.2.1. The characters shall be encoded in accordance with International Alphabet No. 5 (IA-5) using bits b1 through b6. *Note 1.— International Alphabet No. 5 (IA-5) is defined in Annex 10, Volume III.* *Note 2.— Bit b7 of this code may be reconstructed in the airborne receiver by taking the complement of bit b6.*				

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.8.3** **Standard**	3.11.4.8.3 *Auxiliary data organization and timing.* Auxiliary data shall be organized into 76-bit words consisting of the function preamble (12 bits) as specified in 3.11.4.4, the address (8 bits) as specified in Appendix A, Table A-9, and data content and parity (56 bits) as specified in Appendix A, Tables A-10, A-11, A-12, A-13 and A-15. Three function identification codes are reserved to indicate transmission of auxiliary data A, auxiliary data B and auxiliary data C. The timing of the auxiliary data function shall be as specified in Appendix A, Table A-8. Two auxiliary data word formats shall be provided, one for digital data and one for alphanumeric character data. Data containing digital information shall be transmitted with the least significant bit first. Alpha characters in data words B1 through B39 shall be encoded in accordance with International Alphabet No. 5 (IA-5) using bits b1 to b5 with b1 transmitted first. Alphanumeric data characters in other data words shall be encoded in accordance with IA-5 using seven information bits, plus one even parity bit added to each character. Alphanumeric data shall be transmitted in the order in which they are to be read. The serial transmission of a character shall be with the lower order bit transmitted first and the parity bit transmitted last. *Note 1.— International Alphabet No. 5 (IA-5) is defined in Annex 10, Volume III.* *Note 2.— Auxiliary data A contents are specified in 3.11.4.8.3.1. Auxiliary data B contents are specified in 3.11.4.8.3.2. Auxiliary data C contents are reserved for national use.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.8.3.1** **Standard**	3.11.4.8.3.1 *Auxiliary data A content.* The data items contained in auxiliary data words A1 through A4 as specified in Appendix A, Table A-10 shall be defined as follows: a) *Approach azimuth antenna offset* shall represent the minimum distance between the approach azimuth antenna phase centre and a vertical plane containing the runway centre line. b) *Approach azimuth antenna to MLS datum point distance* shall represent the minimum distance between the approach azimuth antenna phase centre and the vertical plane perpendicular to the runway centre line which contains the MLS datum point. c) *Approach azimuth alignment with runway centre line* shall represent the minimum angle between the zero-degree approach azimuth and the runway centre line. d) *Approach azimuth antenna coordinate system* shall represent the coordinate system (planar or conical) of the angle data transmitted by the approach azimuth antenna. *Note.— Although the above Standard has been developed to provide for alternate coordinate systems, the planar coordinate system is not implemented and it is not intended for future implementation.* e) *Approach azimuth antenna height* shall represent the vertical location of the antenna phase centre with respect to the *MLS datum point.* f) *Approach elevation antenna offset* shall represent		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
	the minimum distance between the elevation antenna phase centre and a vertical plane containing the runway centre line. g) *MLS datum point to threshold distance* shall represent the distance measured along the runway centre line from the MLS datum point to the runway threshold. h) *Approach elevation antenna height* shall represent the vertical location of the elevation antenna phase centre with respect to the MLS datum point. i) *MLS datum point elevation* shall represent the datum point elevation relative to mean sea level (msl). j) *Runway threshold height* shall represent the vertical location of the intersection of the runway threshold and centre line with respect to the MLS datum point. k) *DME offset* shall represent the minimum distance between the DME antenna phase centre and a vertical plane containing the runway centre line. l) *DME to MLS datum point distance* shall represent the minimum distance between the DME antenna phase centre and the vertical plane perpendicular to the runway centre line which contains the MLS datum point. m) *DME antenna height* shall represent the vertical location of the antenna phase centre with respect to the MLS datum point. n) *Runway stop-end distance* shall represent the distance along centre line between the runway				

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	stop-end and the MLS datum point. o) *Back azimuth antenna offset* shall represent the minimum distance between the back azimuth antenna phase centre and a vertical plane containing the runway centre line. p) *Back azimuth to MLS datum point distance* shall represent the minimum distance between the back azimuth antenna and the vertical plane perpendicular to the runway centre line which contains the MLS datum point. q) *Back azimuth alignment with runway centre line* shall represent the minimum angle between the zero-degree back azimuth and the runway centre line. r) *Back azimuth antenna coordinate system* shall represent the coordinate system (planar or conical) of the angle data transmitted by the back azimuth antenna. *Note.— Although the above Standard has been developed to provide for alternate coordinate systems, the planar coordinate system is not implemented and it is not intended for future implementation.* s) *Back azimuth antenna height* shall represent the vertical location of the antenna phase centre with respect to the MLS datum point. *Note.— It is intended that no additional auxiliary data A words be defined.*				

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.8.3.2** **Standard**	3.11.4.8.3.2 Auxiliary data B content. Auxiliary data B words shall be defined as specified in Appendix A, Tables A-11 and A-13.		Not Applicable		
Chapter 3 Reference **3.11.4.8.3.2.1** **Standard**	3.11.4.8.3.2.1 *Microwave landing system/area navigation (MLS/RNAV) procedure data.* Where required, auxiliary data words B1 through B39 shall be used to transmit data to support MLS/RNAV procedures. It shall be permissible to divide this procedure data into two separate databases: one for transmission in the approach azimuth sector, the other for transmission in the back azimuth sector. Data for each procedure shall be transmitted in the database for the coverage sector in which the procedure commences. Missed approach procedure data shall be included in the database containing the associated approach procedure.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.8.3.2.2** **Standard**	3.11.4.8.3.2.2 *Procedure database structure.* Where used, each procedure database shall be constructed as follows: a) a map/CRC word shall identify the size of the database, the number of procedures defined, and the cyclic redundancy check (CRC) code for validation of the database; b) procedure descriptor words shall identify all named approach and departure procedures within the database; and c) way-point data words shall define the location and sequence of way-points for the procedures. *Note.— The structure and coding of auxiliary B words B1 through B39 are defined in Appendix A, Tables A-14 through A-17. Guidance material concerning the coding of MLS/RNAV procedures is given in Attachment G.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.9** **Standard**	3.11.4.9 *System accuracy.* The accuracy standards specified herein shall be met on a 95 per cent probability basis unless otherwise stated. *Note 1.— The overall error limits include errors from all causes such as those from airborne equipment, ground equipment, and propagation effects.* *Note 2.— It is intended that the error limits are to be applied over a flight path interval that includes the approach reference datum or back azimuth reference datum. Information on the interpretation of MLS errors and the measurement of these errors over an interval appropriate for flight inspection is provided in Attachment G, 2.5.2.* *Note 3.— To determine the allowable errors for degradation allowances at points other than the appropriate reference datum, the accuracy specified at the reference datum should first be converted from its linear value into its equivalent angular value with an origin at the antenna.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.9.1** **Standard**	3.11.4.9.1 *MLS approach reference datum.* The height of the MLS approach reference datum shall be 15 m (50 ft). A tolerance of plus 3 m (10 ft) shall be permitted. *Note 1.— The operational objective of defining the height of the MLS approach reference datum is to ensure safe guidance over obstructions and also safe and efficient use of the runway served. The heights noted in 3.11.4.9.1 assume Code 3 or Code 4 runways as defined by Annex 14.* *Note 2.— At the same time, the reference datum is to provide a convenient point at which the accuracy and other parameters of the function may be specified.* *Note 3.— In arriving at the above height values for the MLS approach reference datum, a maximum vertical distance of 5.8 m (19 ft) between the path of the aircraft MLS antenna selected for final approach and the path of the lowest part of the wheels at the threshold was assumed. For aircraft exceeding this criterion, appropriate steps may have to be taken either to maintain adequate clearance at threshold or to adjust the permitted operating minima.*		Not Applicable		
Chapter 3 Reference **3.11.4.9.2** **Standard**	3.11.4.9.2 *MLS back azimuth reference datum.* The height of the MLS back azimuth reference datum shall be 15 m (50 ft). A tolerance of plus 3 m (10 ft) shall be permitted. *Note.— The objective of defining the MLS back azimuth reference datum is to provide a convenient point at which the accuracy and other parameters of the function may be specified.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.9.3** **Standard**	3.11.4.9.3 The PFE shall be comprised of those frequency components of the guidance signal error at the output of the airborne receiver which lie below 0.5 rad/s for azimuth guidance information or below 1.5 rad/s for elevation guidance information. The control motion noise shall be comprised of those frequency components of the guidance signal error at the output of the airborne receiver which lie above 0.3 rad/s for azimuth guidance or above 0.5 rad/s for elevation guidance information. The output filter corner frequency of the receiver used for this measurement is 10 rad/s.		Not Applicable		
Chapter 3 Reference **3.11.4.9.4** **Standard**	3.11.4.9.4 *Approach azimuth guidance functions*. Except as allowed for simplified MLS configurations in 3.11.3.4, at the approach reference datum, the approach azimuth function shall provide performance as follows: a) the PFE shall not be greater than plus or minus 6 m (20 ft); b) the PFN shall not be greater than plus or minus 3.5 m (11.5 ft); c) the CMN shall not be greater than plus or minus 3.2 m (10.5 ft) or 0.1 degree, whichever is less.		Not Applicable		
Chapter 3 Reference **3.11.4.9.4.1** **Recommendation**	3.11.4.9.4.1 **Recommendation.—** *At the approach reference datum, the PFE should not be greater than plus or minus 4 m (13.5 ft).*		Not Applicable		

Report on entire Annex

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.9.4.2** **Standard**	3.11.4.9.4.2 The linear accuracy specified at the reference datum shall be maintained throughout the runway coverage region specified in 3.11.5.2.2.1.2 except where degradation is allowed as specified in 3.11.4.9.4.3.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.9.4.3** **Standard**	3.11.4.9.4.3 *Degradation allowance.* Except as allowed for simplified MLS configurations in 3.11.3.4, the approach azimuth angular PFE, PFN and CMN shall be allowed to degrade linearly to the limits of coverage as follows: a) *With distance.* The PFE limit and PFN limit, expressed in angular terms at 37 km (20 NM) from the runway threshold along the extended runway centre line, shall be 2 times the value specified at the approach reference datum. The CMN limit shall be 0.1 degree at 37 km (20 NM) from the approach reference datum along the extended runway centre line at the minimum glide path angle. b) *With azimuth angle.* The PFE limit and PFN limit, expressed in angular terms at plus or minus 40 degrees azimuth angle, shall be 1.5 times the value on the extended runway centre line at the same distance from the approach reference datum. The CMN limit, expressed in angular terms at plus or minus 40 degrees azimuth angle is 1.3 times the value on the extended runway centre line at the same distance from the approach reference datum. c) *With elevation angle.* The PFE limit and PFN limit shall not degrade up to an elevation angle of 9 degrees. The PFE limit and PFN limit, expressed in angular terms at an elevation angle of 15 degrees from the approach azimuth antenna phase centre, shall be 2 times the value permitted below 9 degrees at the same distance from the approach reference datum and the same azimuth angle. The CMN limit shall not degrade with elevation angle. d) *Maximum CMN.* The CMN limits shall not exceed 0.2 degree in any region of coverage.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.9.4.3.1** **Recommendation**	3.11.4.9.4.3.1 **Recommendation.—** *The CMN should not exceed 0.1 degree in any region of coverage.*		Not Applicable		
Chapter 3 Reference **3.11.4.9.4.4** **Standard**	3.11.4.9.4.4 *Maximum angular PFE and PFN.* Except as allowed for simplified MLS configurations in 3.11.3.4, in any region within coverage, the angular error limits shall be as follows: a) the PFE shall not exceed plus or minus 0.25 degree; and b) the PFN shall not exceed plus or minus 0.15 degree.		Not Applicable		
Chapter 3 Reference **3.11.4.9.5** **Standard**	3.11.4.9.5 *Back azimuth guidance function.* At the back azimuth reference datum, the back azimuth function shall provide performance as follows: a) the PFE shall not be greater than plus or minus 6 m (20 ft); b) the PFN component shall not be greater than plus or minus 3.5 m (11.5 ft); c) the CMN shall not be greater than plus or minus 3.2 m (10.5 ft) or 0.1 degree, whichever is less.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.9.5.1** **Standard**	3.11.4.9.5.1 *Degradation allowance.* The back azimuth angular PFE, PFN and CMN shall be allowed to degrade linearly to the limits of coverage as follows: a) *With distance.* The PFE limit and PFN limit, expressed in angular terms at the limit of coverage along the extended runway centre line, shall be 2 times the value specified at the back azimuth reference datum. The CMN limit, expressed in angular terms at 18.5 km (10 NM) from the runway stop end along the extended runway centre line, shall be 1.3 times the value specified at the back azimuth reference datum. b) *With azimuth angle.* The PFE limit and PFN limit, expressed in angular terms at plus or minus 20 degrees azimuth angle, shall be 1.5 times the value on the extended runway centre line at the same distance from the back azimuth reference datum. The CMN limit, expressed in angular terms at plus or minus 20 degrees azimuth angle, shall be 1.3 times the value on the extended runway centre line at the same distance from the back azimuth reference datum. c) *With elevation angle.* The PFE limit and PFN limit shall not degrade up to an elevation angle of 9 degrees. The PFE limit and PFN limit, expressed in angular terms at an elevation angle of 15 degrees from the back azimuth antenna phase centre, shall be 2 times the value permitted below 9 degrees at the same distance from the back azimuth reference datum and the same azimuth angle. The CMN limit shall not degrade with elevation angle. d) *Maximum CMN.* The CMN limits shall not exceed 0.2 degree in any region of coverage.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.9.5.2** **Standard**	3.11.4.9.5.2 *Maximum angular PFE and PFN.* In any region within coverage, the angular error limits shall be as follows: a) the PFE shall not exceed plus or minus 0.50 degree; and b) the PFN shall not exceed plus or minus 0.30 degree.		Not Applicable		
Chapter 3 Reference **3.11.4.9.6** **Standard**	3.11.4.9.6 *Elevation guidance function.* For equipment sited to provide a minimum glide path of nominally 3 degrees or lower, except as allowed for simplified MLS configurations in 3.11.3.4, the approach elevation function shall provide performance at the approach reference datum as follows: a) the PFE shall not be greater than plus or minus 0.6 m (2 ft); b) the PFN shall not be greater than plus or minus 0.4 m (1.3 ft); c) the CMN shall not be greater than plus or minus 0.3 m (1 ft).		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.9.6.1** **Standard**	3.11.4.9.6.1 *Degradation allowance.* Except as allowed for simplified MLS configurations in 3.11.3.4, the approach elevation angular PFE, PFN and CMN shall be allowed to degrade linearly to the limits of coverage as follows: a) *With distance.* The PFE limit and PFN limit, expressed in angular terms at 37 km (20 NM) from the runway threshold on the minimum glide path, shall be 0.2 degree. The CMN limit shall be 0.1 degree at 37 km (20 NM) from the approach reference datum along the extended runway centre line at the minimum glide path angle. b) *With azimuth angle.* The PFE limit and PFN limit, expressed in angular terms at plus or minus 40 degrees azimuth angle, shall be 1.3 times the value on the extended runway centre line at the same distance from the approach reference datum. The CMN limit, expressed in angular terms at plus or minus 40 degrees azimuth angle, shall be 1.3 times the value on the extended runway centre line at the same distance from the approach reference datum. c) *With elevation angle.* For elevation angles above the minimum glide path or 3 degrees, whichever is less and up to the maximum of the proportional guidance coverage and at the locus of points directly above the approach reference datum the PFE limit, PFN limit and the CMN limit expressed in angular terms shall be allowed to degrade linearly such that at an elevation angle of 15 degrees the limits are 2 times the value specified at the reference datum. In no case shall the CMN directly above the reference datum exceed plus or minus 0.07 degree. For other regions of coverage within the angular sector from an elevation angle equivalent to the minimum glide path up to the maximum angle of proportional coverage,		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	the degradations with distance and azimuth angle specified in a) and b) shall apply. d) The PFE, PFN and CMN limits shall not degrade with elevation angle in the region between the minimum glide path and 60 per cent of the minimum glide path. For elevation angles below 60 per cent of the minimum glide path and down to the limit of coverage specified in 3.11.5.3.2.1.2, and at the locus of points directly below the approach reference datum the PFE limit, the PFN limit and the CMN limit expressed in angular terms, shall be allowed to increase linearly to 6 times the value at the approach reference datum. For other regions of coverage within the angular sector from an elevation angle equivalent to 60 per cent of the minimum glide path angle value, and down to the limit of coverage, the degradation with distance and azimuth angle specified in a) and b) shall apply. In no case shall the PFE be allowed to exceed 0.8 degree, or the CMN be allowed to exceed 0.4 degree. e) *Maximum CMN.* For elevation angles above 60 per cent of the minimum glide path, the CMN limits shall not exceed 0.2 degree in any region of coverage.				
Chapter 3 Reference **3.11.4.9.6.2** **Standard**	3.11.4.9.6.2 *Maximum angular PFE and PFN.* Except as allowed for simplified MLS configurations in 3.11.3.4, in any region within coverage, the angular error limits for elevation angles above 60 per cent of the minimum glide path shall be as follows: a) the PFE shall not exceed plus or minus 0.25 degree; and b) the PFN shall not exceed plus or minus 0.15 degree.		Not Applicable		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.11.4.9.6.3** **Recommendation**	3.11.4.9.6.3 **Recommendation.—** *The limit expressed in angular terms on the linear degradation of the PFE limit, the PFN limit and the CMN limit at angles below 60 per cent of the minimum glide path and down to the limit of coverage should be 3 times the value permitted at the approach reference datum.* *Note.— For other regions of coverage within the angular sector from an elevation angle equivalent to 60 per cent of the minimum glide path and down to the limit of coverage, the degradation with distance and azimuth angle specified in 3.11.4.9.6.1 a) and b) applies.*		Not Applicable		
Chapter 3 Reference **3.11.4.9.6.4** **Recommendation**	3.11.4.9.6.4 **Recommendation.—** Maximum CMN. *For elevation angles above 60 per cent of the minimum glide path, the CMN limits should not exceed 0.1 degree in any region of coverage.*		Not Applicable		
Chapter 3 Reference **3.11.4.9.6.5** **Recommendation**	3.11.4.9.6.5 **Recommendation.—** *The PFE should not exceed 0.35 degree, and the CMN should not exceed 0.2 degree.*		Not Applicable		
Chapter 3 Reference **3.11.4.9.6.6** **Standard**	3.11.4.9.6.6 Approach elevation equipment sited to provide a minimum glide path higher than 3 degrees shall provide angular accuracies not less than those specified for equipment sited for a 3-degree minimum glide path within the coverage volume.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.10.1** **Standard**	3.11.4.10 *Power density* 3.11.4.10.1 The power density for DPSK, clearance and angle guidance signals shall be at least the values shown in the following table under all operational weather conditions at any point within coverage except as specified in 3.11.4.10.2. *Note.— The table above specifies the minimum power densities for clearance signals and scanning beam signals. The relative values of the two signals are specified in 3.11.4.6.2.5.2.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.10.2** **Standard**	3.11.4.10.2 The power density of the approach azimuth angle guidance signals shall be greater than that specified in 3.11.4.10.1 by at least: a) 15 dB at the approach reference datum; b) 5 dB for one degree or 9 dB for 2 degree or larger beamwidth antennas at 2.5 m (8 ft) above the runway surface, at the MLS datum point, or at the farthest point of the runway centre line which is in line of sight of the azimuth antenna. *Note 1.— Near the runway surface the approach azimuth equipment will normally provide power densities higher than those specified for angle signals in 3.11.4.10.1 to support auto-land operations. Attachment G provides guidance as regards antenna beamwidth and power budget considerations.* *Note 2.— The specifications for coverage in 3.11.5.2.2 and 3.11.5.3.2 make provision for difficult ground equipment siting conditions in which it may not be feasible to provide the power density specified in 3.11.4.10.2.*		Not Applicable		
Chapter 3 Reference **3.11.4.10.3.1** **Standard**	3.11.4.10.3 *Multipath relative power densities* 3.11.4.10.3.1 Within the MLS azimuth coverage at 60 m (200 ft) or more above threshold, the duration of a reflected scanning beam signal whose power density is higher than four decibels below the approach azimuth guidance, or high rate azimuth guidance scanning beam signal power density, shall be shorter than one second, as seen by an aircraft on a published approach.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.4.10.3.2** **Standard**	3.11.4.10.3.2 Within the MLS azimuth proportional guidance sector, below 60 m (200 ft) above threshold, the power density of any reflected approach azimuth guidance or high rate approach azimuth guidance scanning beam signal shall be less than ten decibels above the power density of the approach azimuth guidance or high rate approach azimuth guidance scanning beam signal. On the runway centre line, this reflected signal shall not degrade the azimuth scanning beam shape and generate at the output of a receiver an error beyond the tolerances as stated in 3.11.4.9.		Not Applicable		
Chapter 3 Reference **3.11.4.10.3.3** **Standard**	3.11.4.10.3.3 Within the MLS elevation coverage, the duration of a reflected approach elevation guidance scanning beam signal whose power density is higher than four decibels below the approach elevation guidance scanning beam signal power density shall be shorter than one second, as seen by an aircraft on a published approach.		Not Applicable		
Chapter 3 Reference **3.11.5.1** **Standard**	3.11.5 Ground equipment characteristics 3.11.5.1 *Synchronization and monitoring*. The synchronization of the time-division-multiplexed angle guidance and data transmissions which are listed in 3.11.4.3.3 shall be monitored. *Note.— Specific monitoring requirements for various MLS functions are specified in 3.11.5.2.3 and 3.11.5.3.3.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.1.1** **Standard**	3.11.5.1.1 *Residual radiation of MLS functions*. The residual radiation of an MLS function at times when another function is radiating shall be at least 70 dB below the level provided when transmitting. *Note.— The acceptable level of residual radiation for a particular function is that level which has no adverse effect on the reception of any other function and is dependent upon equipment siting and aircraft position*.		Not Applicable		
Chapter 3 Reference **3.11.5.2.1** **Standard**	3.11.5.2 *Azimuth guidance equipment* 3.11.5.2.1 *Scanning beam characteristics.* Azimuth ground equipment antennas shall produce a fan-shaped beam which is narrow in the horizontal plane, broad in the vertical plane and which is scanned horizontally between the limits of the proportional guidance sector.		Not Applicable		
Chapter 3 Reference **3.11.5.2.1.1** **Standard**	3.11.5.2.1.1 *Coordinate system.* Azimuth guidance information shall be radiated in either conical or planar coordinates.		Not Applicable		
Chapter 3 Reference **3.11.5.2.1.2** **Standard**	3.11.5.2.1.2 *Antenna beamwidth.* The antenna beamwidth shall not exceed 4 degrees. *Note.— It is intended that the detected scanning beam envelope, throughout the coverage should not exceed 250 microseconds (equivalent to a beamwidth of 5 degrees) in order to ensure proper angle decoding by the airborne equipment.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.11.5.2.1.3** **Standard**	3.11.5.2.1.3 *Scanning beam shape.* The minus 10-dB points on the beam envelope shall be displaced from the beam centre by at least 0.76 beamwidth, but not more than 0.96 beamwidth. *Note.— The beam shape described applies on boresight in a multipath free environment using a suitable filter. Information on beam shape and side lobes is provided in Attachment G, 3.1 and 3.2.*		Not Applicable		
Chapter 3 Reference **3.11.5.2.2.1** **Standard**	3.11.5.2.2.1 *Approach azimuth.* Except as allowed for simplified MLS configurations in 3.11.3.4, the approach azimuth ground equipment shall provide guidance information in at least the following volumes of space:		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.2.2.1.1** **Standard**	3.11.5.2.2.1.1 *Approach region.* a) Laterally, within a sector of 80 degrees (normally plus and minus 40 degrees about the antenna boresight) which originates at the approach azimuth antenna phase centre. b) Longitudinally, from the approach azimuth antenna to 41.7 km (22.5 NM). c) Vertically, between: 1) a lower conical surface originating at the approach azimuth antenna phase centre and inclined upward to reach, at the longitudinal coverage limit, a height of 600 m (2 000 ft) above the horizontal plane which contains the antenna phase centre; and 2) an upper conical surface originating at the approach azimuth antenna phase centre inclined at 15 degrees above the horizontal to a height of 6 000 m (20 000 ft). *Note 1.— Where intervening obstacles penetrate the lower surface, it is intended that guidance need not be provided at less than line-of-sight heights.* *Note 2.— Where it is determined that misleading guidance information exists outside the promulgated coverage sector and appropriate operational procedures cannot provide an acceptable solution, techniques to minimize the effects are available. These techniques include adjustment of the proportional guidance sector or use of out-of-coverage indication signals. Guidance material on the use of these techniques is contained in Attachment G, 8.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	Note 3.— Where the proportional guidance sector provided is less than the minimum lateral coverage specified in 3.11.5.2.2.1.1 a), clearance guidance signals specified in 3.11.4.6.2.5 are required.				
Chapter 3 Reference **3.11.5.2.2.1.2** **Standard**	3.11.5.2.2.1.2 *Runway region.* a) Horizontally within a sector 45 m (150 ft) each side of the runway centre line beginning at the stop end and extending parallel with the runway centre line in the direction of the approach to join the minimum operational coverage region as described in 3.11.5.2.2.1.3. b) Vertically between: 1) a horizontal surface which is 2.5 m (8 ft) above the farthest point of the runway centre line which is in line of sight of the azimuth antenna; and 2) a conical surface originating at the azimuth ground equipment antenna inclined at 20 degrees above the horizontal up to a height of 600 m (2 000 ft). *Note 1.— Information on the determination of the point referred to in b) 1) is given in Attachment G, 2.3.6.* *Note 2.— It is intended that guidance below the line of sight may be allowed as long as the signal quality can satisfy the accuracy requirements in 3.11.4.9.4.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.11.5.2.2.1.2.1** **Recommendation**	3.11.5.2.2.1.2.1 **Recommendation.—** *The lower level of the coverage in the runway region should be 2.5 m (8 ft) above the runway centre line.*		Not Applicable		
Chapter 3 Reference **3.11.5.2.2.1.2.2** **Standard**	3.11.5.2.2.1.2.2 Where required to support automatic landing, roll-out or take-off, the lower level of coverage in the runway region shall not exceed 2.5 m (8 ft) above the runway centre line. *Note.— The lower coverage limit of 2.5 m (8 ft) is intended to serve all runways. Information on the possibility of relaxing the power density requirements in 3.11.4.10.2 at 2.5 m (8 ft) is provided at Attachment G, 2.3.6.*		Not Applicable		
Chapter 3 Reference **3.11.5.2.2.1.3** **Standard**	3.11.5.2.2.1.3 *Minimum operational coverage region.* a) Laterally, within a sector of plus and minus 10 degrees about the runway centre line which originates at the MLS datum point. b) Longitudinally, from the runway threshold in the direction of the approach to the longitudinal coverage limit specified in 3.11.5.2.2.1.1 b). c) Vertically, between: 1) a lower plane which contains the line 2.5 m (8 ft) above the runway threshold and is inclined upward to reach the height of the surface specified in 3.11.5.2.2.1.1 c) 1) at the longitudinal coverage limit; and 2) the upper surface specified in 3.11.5.2.2.1.1 c) 2).		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.2.2.1.4** **Recommendation**	3.11.5.2.2.1.4 **Recommendation.—** *The approach azimuth ground equipment should provide guidance vertically to 30 degrees above the horizontal.*		Not Applicable		
Chapter 3 Reference **3.11.5.2.2.1.5** **Standard**	3.11.5.2.2.1.5 The minimum proportional guidance sector shall be as follows:		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.2.2.2** **Standard**	3.11.5.2.2.2 *Back azimuth.* The back azimuth ground equipment shall provide information in at least the following volume of space: a) Horizontally, within a sector plus or minus 20 degrees about the runway centre line originating at the back azimuth ground equipment antenna and extending in the direction of the missed approach at least 18.5 km (10 NM) from the runway stop end. b) Vertically, in the runway region between: 1) a horizontal surface 2.5 m (8 ft) above the farthest point of runway centre line that is in line-of-sight of the back azimuth antenna; and 2) a conical surface originating at the back azimuth ground equipment antenna inclined at 20 degrees above the horizontal up to a height of 600 m (2 000 ft). c) Vertically, in the back azimuth region between: 1) a conical surface originating 2.5 m (8 ft) above the runway stop end, inclined at 0.9 degree above the horizontal; and 2) a conical surface originating at the back azimuth ground equipment antenna, inclined at 15 degrees above the horizontal up to a height of 3 000 m (10 000 ft). *Note 1.— Information on the determination of the point referred to in b) 1) is given in Attachment G, 2.3.6.* *Note 2.— When physical characteristics of the runway or obstacles prevent the achievement of the Standards in b) and c), it is intended that guidance need not be provided at*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	less than line-of-sight heights.				
Chapter 3 Reference **3.11.5.2.2.2.1** **Recommendation**	3.11.5.2.2.2.1 **Recommendation.—** *The back azimuth facility should provide guidance information to 30 degrees above the horizontal.*		Not Applicable		
Chapter 3 Reference **3.11.5.2.2.2.2** **Standard**	3.11.5.2.2.2.2 The minimum proportional guidance sector shall be plus or minus 10 degrees about the runway centre line. *Note.— Application information is provided in Attachment G, 7.5.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.2.3.1** **Standard**	3.11.5.2.3 *Monitor and control* 3.11.5.2.3.1 Except as allowed for simplified MLS configurations in 3.11.3.4, the approach azimuth and back azimuth monitor systems shall cause the radiation of their respective functions to cease and a warning shall be provided at the designated control points if any of the following conditions persist for longer than the periods specified: a) there is a change in the ground equipment contribution to the mean course error such that the PFE at the approach reference datum or in the direction of any azimuth radial exceeds the limits specified in 3.11.4.9.4 and 3.11.4.9.5 for a period of more than one second; b) there is a reduction in the radiated power to less than that necessary to satisfy the requirements specified in 3.11.4.10.1 and 3.11.4.6.2.5.2 for a period of more than one second; c) there is an error in the preamble DPSK transmissions which occurs more than once in any one-second period; d) there is an error in the TDM synchronization of a particular azimuth function such that the requirement specified in 3.11.4.3.2 is not satisfied, and this condition persists for more than one second. *Note.— Guidance material is provided in Attachment G, 6.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.2.3.2** **Standard**	3.11.5.2.3.2 Design and operation of the monitor system shall cause radiation to cease and a warning shall be provided at the designated control points in the event of failure of the monitor system itself.		Not Applicable		
Chapter 3 Reference **3.11.5.2.3.3** **Standard**	3.11.5.2.3.3 The period during which erroneous guidance information is radiated, including period(s) of zero radiation, shall not exceed the periods specified in 3.11.5.2.3.1. Any attempts to clear a fault by resetting the primary ground equipment or by switching to standby ground equipment shall be completed within this time, and any period(s) of zero radiation shall not exceed 500 milliseconds. If the fault is not cleared within the time allowed, the radiation shall cease. After shutdown, no attempt shall be made to restore service until a period of 20 seconds has elapsed.		Not Applicable		
Chapter 3 Reference **3.11.5.2.4.1** **Standard**	3.11.5.2.4 *Integrity and continuity of service requirements for MLS azimuth* 3.11.5.2.4.1 The probability of not radiating false guidance signals shall not be less than 1 – 0.5 × 10–9 in any one landing for an MLS azimuth intended to be used for Categories II and III operations.		Not Applicable		
Chapter 3 Reference **3.11.5.2.4.2** **Recommendation**	3.11.5.2.4.2 **Recommendation.—** *The probability of not radiating false guidance signals should not be less than 1 – 1.0 × 10–7 in any one landing for an MLS azimuth intended to be used for Category I operations.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.2.4.3** **Standard**	3.11.5.2.4.3 The probability of not losing the radiated guidance signal shall be greater than: a) 1 – 2 × 10–6 in any period of 15 seconds for an MLS azimuth intended to be used for Category II or Category IIIA operations (equivalent to 2 000 hours mean time between outages); and b) 1 – 2 × 10–6 in any period of 30 seconds for an MLS azimuth intended to be used for the full range of Category III operations (equivalent to 4 000 hours mean time between outages).		Not Applicable		
Chapter 3 Reference **3.11.5.2.4.4** **Recommendation**	3.11.5.2.4.4 **Recommendation.—** *The probability of not losing the radiated guidance signal should exceed 1 – 4 × 10–6 in any period of 15 seconds for an MLS azimuth intended to be used for Category I operations (equivalent to 1 000 hours mean time between outages).* *Note.— Guidance material on integrity and continuity of service is given in Attachment G, 11.*		Not Applicable		
Chapter 3 Reference **3.11.5.2.5.1** **Standard**	3.11.5.2.5 *Ground equipment accuracy* 3.11.5.2.5.1 Except as allowed for simplified MLS configurations in 3.11.3.4, the ground equipment contribution to the mean course error shall not exceed an error equivalent to plus or minus 3 m (10 ft) at the MLS approach reference datum.		Not Applicable		

Annex Reference	**AERONAUTICAL TELECOMMUNICATIONS** **Standard or Recommended Practice**	**State Legislation, Regulation or Document Reference**	**Level of implementation of SARP's**	**Text of the difference to be notified to ICAO**	**Comments including the reason for the difference**
Chapter 3 Reference **3.11.5.2.5.2** **Recommendation**	3.11.5.2.5.2 **Recommendation.—** *The ground equipment contribution to the CMN at the reference datum should not exceed 1 m (3.3 ft) or 0.03 degree, whichever is less, on a 95 per cent probability basis.* *Note 1.— This is the equipment error, and does not include any propagation effects.* *Note 2.— Guidance on the measurement of this parameter can be found in Attachment G, 2.5.2.*		Not Applicable		
Chapter 3 Reference **3.11.5.2.6.1** **Standard**	3.11.5.2.6.1 Normally, the approach azimuth ground equipment antenna shall be located on the extension of the runway centre line beyond the stop end and shall be adjusted so that the vertical plane containing the zero degree course line will contain the MLS approach reference datum. Siting of the antenna shall be consistent with safe obstacle clearance SARPs in Annex 14.		Not Applicable		
Chapter 3 Reference **3.11.5.2.6.2** **Standard**	3.11.5.2.6.2 The back azimuth ground equipment antenna shall normally be located on the extension of the runway centre line at the threshold end, and the antenna shall be adjusted so that the vertical plane containing the zero degree course line will contain the back azimuth reference datum.		Not Applicable		
Chapter 3 Reference **3.11.5.3.1** **Standard**	3.11.5.3 *Elevation guidance equipment* 3.11.5.3.1 *Scanning beam characteristics.* The elevation ground equipment antenna shall produce a fan-shaped beam that is narrow in the vertical plane, broad in the horizontal plane and which is scanned vertically between the limits of the proportional guidance sector.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.3.1.1** **Standard**	3.11.5.3.1.1 *Coordinate system.* Approach elevation guidance information shall be radiated in conical coordinates.		Not Applicable		
Chapter 3 Reference **3.11.5.3.1.2** **Standard**	3.11.5.3.1.2 *Antenna beamwidth.* The antenna beamwidth shall not exceed 2.5 degrees.		Not Applicable		
Chapter 3 Reference **3.11.5.3.1.3** **Standard**	3.11.5.3.1.3 *Scanning beam shape.* The minus 10-dB points on the beam envelope shall be displayed from the centre line by at least 0.76 beamwidth but not more than 0.96 beamwidth. *Note.— The beam shape described applies on boresight in a multipath-free environment using a suitable filter. Information on beam shape and side lobes is provided in Attachment G, 3.1 and 3.2.*		Not Applicable		
Chapter 3 Reference **3.11.5.3.2.1** **Standard**	3.11.5.3.2.1 *Approach elevation.* Except as allowed for simplified MLS configurations in 3.11.3.4, the approach elevation ground equipment shall provide proportional guidance information in at least the following volume of space:		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.3.2.1.1** **Standard**	3.11.5.3.2.1.1 *Approach region.* a) Laterally, within a sector originating at the elevation antenna phase centre which has an angular extent at least equal to the proportional guidance sector provided by the approach azimuth ground equipment at the longitudinal coverage limit. b) Longitudinally, from the elevation antenna in the direction of the approach to 37 km (20 NM) from threshold. c) Vertically, between: 1) a lower conical surface originating at the elevation antenna phase centre and inclined upward to reach, at the longitudinal coverage limit, a height of 600 m (2 000 ft) above the horizontal plane which contains the antenna phase centre; and 2) an upper conical surface originating at the elevation antenna phase centre and inclined 7.5 degrees above the horizontal up to a height of 6 000 m (20 000 ft). *Note.— When the physical characteristics of the approach region prevent the achievement of the Standards under a), b) and c) 1), it is intended that guidance need not be provided below the line of sight.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.3.2.1.1.1** **Recommendation**	3.11.5.3.2.1.1.1 **Recommendation.—** *The approach elevation ground equipment should provide proportional guidance to angles greater than 7.5 degrees above the horizontal when necessary to meet operational requirements.*		Not Applicable		
Chapter 3 Reference **3.11.5.3.2.1.2** **Standard**	3.11.5.3.2.1.2 *Minimum operational coverage region.* a) Laterally, within a sector originating at the MLS datum point, of plus and minus 10 degrees about the runway centre line; b) Longitudinally, 75 m (250 ft) from the MLS datum point in the direction of threshold, to the far coverage limit specified in 3.11.5.3.2.1.1 b); c) Vertically, between the upper surface specified in 3.11.5.3.2.1.1 c) 2), and the higher of: 1) a surface which is the locus of points 2.5 m (8 ft) above the runway; or 2) a plane originating at the MLS datum point and inclined upward to reach, at the longitudinal coverage limit, the height of the surface specified in 3.11.5.3.2.1.1 c) 1). *Note.— Information related to the horizontal radiation pattern of the approach elevation is provided in Attachment G, 3.3.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.3.3.1** **Standard**	3.11.5.3.3 *Monitor and control* 3.11.5.3.3.1 Except as allowed for simplified MLS configurations in 3.11.3.4, the approach elevation monitor system shall cause the radiation of its respective functions to cease and a warning shall be provided at the designated control point if any of the following conditions persist for longer than the periods specified: a) there is a change in the ground equipment contribution to the mean glide path error component such that the PFE at the approach reference datum or on any glide path consistent with published approach procedures exceeds the limits specified in 3.11.4.9.6 for a period of more than one second; b) there is a reduction in the radiated power to less than that necessary to satisfy the requirements specified in 3.11.4.10.1 for a period of more than one second; c) there is an error in the preamble DPSK transmissions which occurs more than once in any one-second period; d) there is an error in the TDM synchronization of a particular elevation function such that the requirement specified in 3.11.4.3.2 is not satisfied and this condition persists for more than one second. *Note.— Guidance material is provided in Attachment G, 6.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.3.3.2** **Standard**	3.11.5.3.3.2 Design and operation of the monitor system shall cause radiation to cease and a warning shall be provided at the designated control points in the event of failure of the monitor system itself.		Not Applicable		
Chapter 3 Reference **3.11.5.3.3.3** **Standard**	3.11.5.3.3.3 The period during which erroneous guidance information is radiated, including period(s) of zero radiation, shall not exceed the periods specified in 3.11.5.3.3.1. Any attempts to clear a fault by resetting the primary ground equipment or by switching to standby ground equipment shall be completed within this time, and any period(s) of zero radiation shall not exceed 500 milliseconds. If the fault is not cleared within the time allowed, radiation shall cease. After shutdown, no attempt shall be made to restore service until a period of 20 seconds has elapsed.		Not Applicable		
Chapter 3 Reference **3.11.5.3.4.1** **Standard**	3.11.5.3.4 *Integrity and continuity of service requirements for MLS approach elevation* 3.11.5.3.4.1 The probability of not radiating false guidance signals shall not be less than 1 – 0.5 × 10–9 in any one landing for an MLS approach elevation intended to be used for Categories II and III operations.		Not Applicable		
Chapter 3 Reference **3.11.5.3.4.2** **Recommendation**	3.11.5.3.4.2 **Recommendation.—** *The probability of not radiating false guidance signals should not be less than 1 – 1.0 × 10–7 in any one landing on MLS approach elevation intended to be used for Category I operations.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.3.4.3** **Standard**	3.11.5.3.4.3 The probability of not losing the radiated guidance signal shall be greater than 1 – 2 × 10–6 in any period of 15 seconds for an MLS approach elevation intended to be used for Categories II and III operations (equivalent to 2 000 hours mean time between outages).		Not Applicable		
Chapter 3 Reference **3.11.5.3.4.4** **Recommendation**	3.11.5.3.4.4 **Recommendation.—** *The probability of not losing the radiated guidance signal should exceed 1 – 4 × 10-6 in any period of 15 seconds for an MLS approach elevation intended to be used for Category I operations (equivalent to 1 000 hours mean time between outages).* *Note.— Guidance material on integrity and continuity of service is given in Attachment G, 11.*		Not Applicable		
Chapter 3 Reference **3.11.5.3.5.1** **Standard**	3.11.5.3.5 *Ground equipment accuracy* 3.11.5.3.5.1 Except as allowed for simplified MLS configurations in 3.11.3.4, the ground equipment contribution to the mean glide path error component of the PFE shall not exceed an error equivalent to plus or minus 0.3 m (1 ft) at the approach reference datum.		Not Applicable		
Chapter 3 Reference **3.11.5.3.5.2** **Recommendation**	3.11.5.3.5.2 **Recommendation.—** *The ground equipment contribution to the CMN at the reference datum should not exceed 0.15 m (0.5 ft) on a 95 per cent probability basis.* *Note 1.— This is the equipment error, and does not include any propagation effects.* *Note 2.— Guidance on the measurement of this parameter can be found in Attachment G, 2.5.2.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.3.6.1** **Standard**	3.11.5.3.6.1 The approach elevation ground equipment antenna shall be located beside the runway. Siting of the antennas shall be consistent with obstacle clearance Standards and Recommended Practices in Annex 14.		Not Applicable		
Chapter 3 Reference **3.11.5.3.6.2** **Standard**	3.11.5.3.6.2 The approach elevation ground equipment antenna shall be sited so that the asymptote of the minimum glide path crosses the threshold at the MLS approach reference datum.		Not Applicable		
Chapter 3 Reference **3.11.5.3.6.2.1** **Recommendation**	3.11.5.3.6.2.1 **Recommendation.—** *The minimum glide path angle is normally 3 degrees and should not exceed 3 degrees except where alternative means of satisfying obstacle clearance requirements are impractical.* *Note.— It is intended that the choice of a minimum glide path angle higher than 3 degrees be determined by operational rather than technical factors.*		Not Applicable		
Chapter 3 Reference **3.11.5.3.6.2.2** **Recommendation**	3.11.5.3.6.2.2 **Recommendation.—** *The approach elevation ground equipment antenna should be sited so that the height of the point which corresponds to the decoded guidance signal of the minimum glide path above the threshold does not exceed 18 m (60 ft).* *Note.— The offset of the elevation antenna from the runway centre line will cause the minimum glide path elevation guidance to be above the approach reference datum.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.3.6.3** **Recommendation**	3.11.5.3.6.3 **Recommendation.—** *When ILS and MLS simultaneously serve the same runway, the ILS reference datum and the MLS approach reference datum should coincide within a tolerance of 1 m (3 ft).* *Note 1.— It is intended that this recommendation would apply only if the ILS reference datum satisfies the height specifications in 3.1.5.1.4 and 3.1.5.1.5.* *Note 2.— Information related to collocated MLS/ILS siting is provided in Attachment G, 4.1.*		Not Applicable		
Chapter 3 Reference **3.11.5.4.1.1** **Standard**	3.11.5.4.1 *Basic data* 3.11.5.4.1.1 The basic data words 1, 2, 3, 4 and 6 shall be transmitted throughout the approach azimuth coverage sector. *Note.— The composition of the basic data words is given in Appendix A, Table A-7.*		Not Applicable		
Chapter 3 Reference **3.11.5.4.1.2** **Standard**	3.11.5.4.1.2 Where the back azimuth function is provided, basic data words 4, 5 and 6 shall be transmitted throughout the approach azimuth and back azimuth coverage sectors.		Not Applicable		
Chapter 3 Reference **3.11.5.4.2.1** **Standard**	3.11.5.4.2 *Auxiliary data* 3.11.5.4.2.1 Auxiliary data words A1, A2 and A3 shall be transmitted throughout the approach azimuth coverage sector.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.4.2.2** **Standard**	3.11.5.4.2.2 Where the back azimuth function is provided, auxiliary data words A3 and A4 shall be transmitted throughout the approach azimuth and back azimuth coverage sectors. *Note.— Auxiliary data words B42 and B43 are transmitted in place of A1 and A4, respectively, to support applications which require azimuth antenna rotation beyond the alignment range available in A1 and A4.*		Not Applicable		
Chapter 3 Reference **3.11.5.4.2.3** **Standard**	3.11.5.4.2.3 When provided, auxiliary data B words shall be transmitted throughout the approach azimuth sector, except that the words comprising the back azimuth procedure database shall be transmitted throughout the back azimuth sector.		Not Applicable		
Chapter 3 Reference **3.11.5.4.2.4** **Recommendation**	3.11.5.4.2.4 **Recommendation.—** *If the back azimuth function is provided, the appropriate auxiliary data B words should be transmitted.* *Note.— The composition of the auxiliary data words is given in Appendix A, Tables A-10, A-12 and A-15.*		Not Applicable		
Chapter 3 Reference **3.11.5.4.3.1** **Standard**	3.11.5.4.3 *Monitor and control* 3.11.5.4.3.1 The monitor system shall provide a warning to the designated control point if the radiated power is less than that necessary to satisfy the DPSK requirement specified in 3.11.4.10.1.		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.5.4.3.2** **Standard**	3.11.5.4.3.2 If a detected error in the basic data radiated into the approach azimuth coverage occurs in at least two consecutive samples, radiation of these data, approach azimuth and elevation functions shall cease.		Not Applicable		
Chapter 3 Reference **3.11.5.4.3.3** **Standard**	3.11.5.4.3.3 If a detected error in the basic data radiated into the back azimuth coverage occurs in at least two consecutive samples, radiation of these data and the back azimuth function shall cease.		Not Applicable		
Chapter 3 Reference **3.11.5.5.1** **Standard**	3.11.5.5 *Distance measuring equipment* 3.11.5.5.1 DME information shall be provided at least throughout the coverage volume in which approach and back azimuth guidance is available.		Not Applicable		
Chapter 3 Reference **3.11.5.5.2** **Recommendation**	3.11.5.5.2 **Recommendation.—** *DME information should be provided throughout 360° azimuth if operationally required.* *Note.— Siting of DME ground equipment is dependent on runway length, runway profile and local terrain. Guidance on siting of DME ground equipment is given in Attachment C, 7.1.6 and Attachment G, 5.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.6.1.1.1** **Standard**	3.11.6 Airborne equipment characteristics 3.11.6.1 *Angle and data functions* 3.11.6.1.1 *Accuracy* 3.11.6.1.1.1 Where the DPSK and scanning beam signal power densities are the minimum specified in 3.11.4.10.1, the airborne equipment shall be able to acquire the signal and any decoded angle signal shall have a CMN not exceeding 0.1 degree, except that the back azimuth guidance function CMN shall not exceed 0.2 degree. *Note 1.— It is intended that basic and auxiliary data words which contain information essential for the desired operation be decoded within a time period and with an integrity which is suitable for the intended application.* *Note 2.— Information related to the acquisition and validation of angle guidance and data functions is given in Attachment G, 7.3.*		Not Applicable		
Chapter 3 Reference **3.11.6.1.1.2** **Standard**	3.11.6.1.1.2 Where the radiated signal power density is high enough to cause the airborne receiver noise contribution to be insignificant, the airborne equipment shall not degrade the accuracy of any decoded angle guidance signal by greater than plus or minus 0.017 degree (PFE), and plus or minus 0.015 degree (azimuth), and plus or minus 0.01 degree (elevation) CMN.		Not Applicable		
Chapter 3 Reference **3.11.6.1.1.3** **Standard**	3.11.6.1.1.3 In order to obtain accurate guidance to 2.5 m (8 ft) above the runway surface, the airborne equipment shall produce less than 0.04 degree CMN with the power densities indicated in 3.11.4.10.2 b).		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.6.1.2.1** **Standard**	3.11.6.1.2 *Dynamic range* 3.11.6.1.2.1 The airborne equipment shall be able to acquire the signal and the performance in 3.11.6.1.1.2 shall be met where the power density of any of the radiated signals has any value between the minimum specified in 3.11.4.10.1 up to a maximum of minus 14.5 dBW/m2.		Not Applicable		
Chapter 3 Reference **3.11.6.1.2.2** **Standard**	3.11.6.1.2.2 The receiver performance shall not degrade beyond the specified limits when the maximum differential levels permitted in 3.11.6.1.2.1 exist between signal power densities of individual functions.		Not Applicable		
Chapter 3 Reference **3.11.6.1.3.1** **Standard**	3.11.6.1.3 *Receiver angle data output filter characteristics* 3.11.6.1.3.1 For sinusoidal input frequencies, receiver output filters shall not induce amplitude variations or phase lags in the angle data which exceed those obtained with a single pole low-pass filter with a corner frequency of 10 rad/s by more than 20 per cent. *Note.— Receiver outputs intended only to operate visual displays may benefit from appropriate additional filtering. Additional information on output data filtering is given in Attachment G, 7.4.2.*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
Chapter 3 Reference **3.11.6.1.4** **Standard**	3.11.6.1.4 *Adjacent channel spurious response.* The receiver performance specified in 3.11.6 shall be met when the ratio between the desired tracked signals and the noise produced by the adjacent channel signals in a 150 kHz bandwidth centred around the desired frequency is equal to or greater than the signal-to-noise ratio (SNR) values: a) as specified in Table X1 when the power density received from the desired ground station is equal to or higher than the values as specified in Table Y, or b) as specified in the Table X2 when the power density received from the desired ground station is between the minimum density power values specified in 3.11.4.10.1 and the values specified in Table Y. **Table Y** **Table X1** **Table X2** *Note 1.— When the radiated desired signal power density is high enough to cause the airborne receiver noise contribution to be insignificant, the airborne CMN contribution for elevation and approach azimuth guidance (not for back azimuth) is required as stated in 3.11.6.1.1, to be reduced compared to the CMN contribution when the radiated desired signal power density is at the minimum*		Not Applicable		

Annex Reference	AERONAUTICAL TELECOMMUNICATIONS Standard or Recommended Practice	State Legislation, Regulation or Document Reference	Level of implementation of SARP's	Text of the difference to be notified to ICAO	Comments including the reason for the difference
	specified in 3.11.4.10.1 and the minimum SNR values are therefore higher. *Note 2.— The relationship is linear between adjacent points designated by the beam widths.* *Note 3.— These SNR values are to be protected through application of frequency separation criteria as explained in Attachment G, 9.3.* *Note 4.— As there is no change in back azimuth guidance accuracy when the airborne receiver noise may be considered as insignificant, the same SNR values are applied for back azimuth.* **Table A. DME/MLS angle, DME/VOR and DME/ILS/MLS channelling and pairing** **Table B. Allowable DME/P errors**				

- END -