
RED-ORANGE PARAMETERS

Facility Type: FM

Parameter	Comparison Results	ID
Coverage	8200 doesn't meet A10 for any	604

Unlike other Nav facilities, the MKR output power (signal strength) is adjusted to achieve a specified coverage area (width).

The Annex 10 measurand of Field strength of the ILS Fan Marker antenna pattern is not directly measured in 8200.1. Rather, the distance through the pattern for which the received signal exceeds the light illumination level is used as an end-end measurement. This method of measurement assumes that receiver sensitivity is sufficient regardless of marker field strength. Given any modern receiver, this assumption is sufficient.

It is an unproven assumption is that the 8200 edge definition (1700uV) is considered equivalent to the Annex 10 edge definition (1.5mV/m). Since the units of signal LEVEL (1700 uV) in 8200 appear to be received voltage level at the receiver input terminals across a 50 ohm load, it is not possible to determine whether the Annex 10 field strength or power density requirements are met, without knowledge of the airborne flight inspection antenna's Gain Factor or Capture Area.

Editorially, the 1700 uV criterion appears sufficient in daily use, given the myriad combinations of user receivers, feedlines, and antennas producing satisfactory marker indications.

Although it isn't possible at present to say that 8200 fully meets Annex 10 because of the units differences, this should not warrant filing an ICAO difference.

FAA does not specify a minimum for the peak field strength as is specified in Annex 10 (≥ 3.0 mV/m).

Recommendation: Add an 8200.1 check of the minimum received level, based on experience with existing facilities.

Facility Type: GBAS

Parameter	Comparison Results	ID
Data Content	8200 doesn't meet A10 for any	614

ICAO Doc 8071 is a guidance manual, and as a result its contents to not require compliance.

For GBAS, FAA Order 8200.1 does not yet contain any flight testing content. For the purposes of this comparison database, the 8071 "requirements" will be considered as if they were Annex 10 requirements. As a result, this parameter is considered non-compliant.

When 8200.1 content for GBAS is published, it is likely this parameter will match or exceed Annex 10 requirements.

FAS Data **8200 doesn't meet A10 for any** **615**

ICAO Doc 8071 is a guidance manual, and as a result its contents to not require compliance.

For GBAS, FAA Order 8200.1 does not yet contain any flight testing content. For the purposes of this comparison database, the 8071 "requirements" will be considered as if they were Annex 10 requirements. As a result, this parameter is considered non-compliant.

When 8200.1 content for GBAS is published, it is likely this parameter will match or exceed Annex 10 requirements.

Message Block Header **8200 doesn't meet A10 for any** **617**

ICAO Doc 8071 is a guidance manual, and as a result its contents to not require compliance.

For GBAS, FAA Order 8200.1 does not yet contain any flight testing content. For the purposes of this comparison database, the 8071 "requirements" will be considered as if they were Annex 10 requirements. As a result, this parameter is considered non-compliant.

When 8200.1 content for GBAS is published, it is likely this parameter will match or exceed Annex 10 requirements.

Position Domain Accuracy **8200 doesn't meet A10 for any** **620**

ICAO Doc 8071 is a guidance manual, and as a result its contents to not require compliance.

For GBAS, FAA Order 8200.1 does not yet contain any flight testing content. For the purposes of this comparison database, the 8071 "requirements" will be considered as if they were Annex 10 requirements. As a result, this parameter is considered non-compliant.

When 8200.1 content for GBAS is published, it is likely this parameter will match or exceed Annex 10 requirements.

Procedure Validation **8200 doesn't meet A10 for any** **621**

ICAO Doc 8071 is a guidance manual, and as a result its contents to not require compliance.

For GBAS, FAA Order 8200.1 does not yet contain any flight testing content. For the purposes of this comparison database, the 8071 "requirements" will be considered as if they were Annex 10 requirements. As a result, this parameter is considered non-compliant.

When 8200.1 content for GBAS is published, it is likely this parameter will match or exceed Annex 10 requirements.

Resistance to Interference **8200 doesn't meet A10 for any** **622**

ICAO Doc 8071 is a guidance manual, and as a result its contents to not require compliance.

For GBAS, FAA Order 8200.1 does not yet contain any flight testing content. For the purposes of this comparison database, the 8071 "requirements" will be considered as if they were Annex 10 requirements. As a result, this parameter is considered non-compliant.

When 8200.1 content for GBAS is published, it is likely this parameter will match or exceed Annex 10 requirements.

VDB Coverage **8200 doesn't meet A10 for any** **623**

ICAO Doc 8071 is a guidance manual, and as a result its contents to not require compliance.

For GBAS, FAA Order 8200.1 does not yet contain any flight testing content. For the purposes of this comparison database, the 8071 "requirements" will be considered as if they were Annex 10 requirements. As a result, this parameter is considered non-compliant.

When 8200.1 content for GBAS is published, it is likely this parameter will match or exceed Annex 10 requirements.

Facility Type: **GS**

Parameter	Comparison Results	ID
------------------	---------------------------	-----------

Alignment **8200 matches Annex 10 for some, doesn't for others** **624**

NOTE: Only the setting or ADJUST tolerance is addressed under this parameter of Alignment. See MONITOR parameter for the maintenance limits discussion and comparison.

[subparameter 1 - Angle]

Angle -- 8200 easily exceeds Annex 10

[subparameter 2 - Tilt]

There is no angle accuracy requirement in the Tilt text of Annex 10 (see Annex 10 Remarks).

NOTE: In the 8200 GS Tolerances table, for Tilt, the words "Clearance Above Path, Modulation" appear, with no apparent tolerances.

This parameter is marked "Matches for some, doesn't for others" solely due to this apparent missing tolerance. Once this is corrected or deemed acceptable, this parameter should be changed to "...matches Annex 10 for All."

Clearance **8200 matches Annex 10 for some, doesn't for others** **625**

[subparameter 1 - Clearances below path]

8200 matches Annex 10 in the basic requirement to provide at least 190 uA by an angle as low as 0.3 θ .

Annex 10 also defines how to handle meeting the 190 uA at angles above 0.45 θ , by saying that DDM may not drop below 190 uA before that angle, and must remain above 190 uA down to 0.3 θ if required by the procedure.

However, 8200 does not specifically address this, and it is possible for 190 uA to occur above 0.45 θ , then DDM could drop below 190 uA at an angle between 0.30 θ and 0.45 θ without violating 8200 tolerances.

[See also OBSTRUCTION CLEARANCE parameter.]

[subparameter 2 - Clearances above path]

[Use Doc 8071 definition of coverage above path.]

8200's requirement for 150 uA prior to the first false path could have 150 uA occurring at 1.9 θ . This would exceed the Annex 10/Doc 8071 requirement of exceeding 150 uA by 1.75 θ .

Recommendation: Consider modifying Order 8200.1 to address the two above anomalies. These issues do not warrant filing a difference with ICAO.

[subparameter 1 - Coverage Volume]

Given the physical limits of the coverage volume of the Annex 10 reference are met, 8200 meets this requirement.

[subparameter 2 - Signal Strength]

Since the units of signal LEVEL in 8200 appear to be received voltage level at the receiver input terminals across a 50 ohm load, it is not possible to determine whether the Annex 10 field strength or power density requirements are met, without knowledge of the airborne flight inspection antenna's Gain Factor or Capture Area.

Editorially, the 15 uV criterion appears sufficient in daily use, given the myriad combinations of user receivers, feedlines, and antennas producing satisfactory landing guidance.

Although it isn't possible at present to say that 8200 fully meets Annex 10 because of the units differences, this should not warrant filing an ICAO difference.

[subparameter 1 - Monitor Action]

This is a design qualification and/or ground maintenance issue. Flight testing does not address this.

[subparameter 2 - Angle/Alignment Limit]

The requirement that an alarm occur at the flown values is a ground maintenance issue. Flight testing does not address this.

The alarm limits match Annex 10.

[subparameter 3 - Power Reduction Limit]

The requirement that an alarm occur at the flown values and at or before specific dB change limits is a ground maintenance issue. Flight testing does not address this.

The 8200 tolerances do not specifically ensure that the structure tolerances of Annex 10 para 3.1.5.4 are met at the power reduction alarm limit.

This subparameter does not meet Annex 10.

[subparameter 4 - Displacement Sensitivity Limit]

The requirement that an alarm occur at the flown values is a ground maintenance issue. Flight testing does not address this

Annex 10 signal-in-space limits displacement sensitivity are in terms of percentages of path angle, while 8200 limits are in terms of absolute path width (actually, path half-width).

Example calculation for $\theta = 3.00$ degrees:

Annex specifies the nominal position of the 75uA line below path angle at 0.12θ , or at 2.64 degrees. The tightest requirement for monitor action is the CAT II/III change limit of 25%, which corresponds to 0.09θ and 0.15θ -below the path angle -- angles of 2.73 and 2.55 respectively. The corresponding widths would be 0.72 (nominal), 0.54 (narrow), and 0.90 (wide). In this case, the 8200 limits would not protect the ICAO 0.54 width value, since 8200 would allow widths as narrow as 0.50 degrees.

This subparameter does not meet Annex 10.

[subparameter 5 - Monitor Shutdown Times]

This is a design qualification and/or ground maintenance issue. Flight testing does not address this.

[subparameter 6 - Remote Shutdown Annunciation]

This is a design qualification and/or ground maintenance issue. Flight testing does not address this.

Recommendation 1: Consider modifying 8200.1 to require in-tolerance structure performance for 2-frequency glide paths at the power reduction limit.

Recommendation 2: Modify 8200.1 to address the possibility of exceeding Annex 10 requirements for displacement sensitivity.

Given the large experience base for U.S. glide paths, these two issues do not warrant filing a difference with ICAO.

Facility Type: LOC

Parameter	Comparison Results	ID
------------------	---------------------------	-----------

Coverage	8200 doesn't meet A10 for any	661
-----------------	--------------------------------------	------------

[subparameter 1 - Service Volume)

The Standard Service Volume (SSV) definition differs between Annex 10 and Order 8200.1:

8200 SSV 18 NM within $\pm 10^\circ$
10 NM between 10° and 35°
Annex 10 25 NM within $\pm 10^\circ$
17 NM between 10° and 35°

8200 applies the 25/17 NM limit for "ICAO Service Volumes".

Annex 10 has provisions for 18/10 NM limits when "topographical features or operational requirements permit."

Given the extensive US experience with Localizers, filing a difference with ICAO is not necessary, since clearly operational requirements permit reducing the SSV to 18/10 NM.

[subparameter 2 - Field Strength)

The Annex 10 measurand of Field strength is not directly measured in 8200.1. Rather, the received signal strength at the receiver's input terminals is measured. This method of measurement assumes that receiver sensitivity is sufficient regardless of localizer field strength. Given any modern receiver, this assumption is sufficient.

It is an unproven assumption is that the 8200 limit-of-coverage definition (5uV) is equivalent to the Annex 10 definition (-114 dBW/m²). Since the units of signal LEVEL in 8200 appear to be received voltage level at the receiver input terminals across a 50 ohm load, it is not possible to determine whether the Annex 10 field strength or power density requirements are met, without knowledge of the airborne flight inspection antenna's Gain Factor or Capture Area.

Editorially, the 5 uV criterion appears sufficient in daily use, given the myriad combinations of user receivers, feedlines, and antennas producing satisfactory localizer indications.

Although it isn't possible at present to say that 8200 fully meets Annex 10 because of the units differences, this should not warrant filing an ICAO difference.

Order 8200.1 does not address the Annex 10 increased field strength requirements of paragraphs 3.1.3.3.2.1 , 3.1.3.3.2.2, and 3.1.3.3.2.3, when on glide path and within the localizer course. However, again due to the extensive US experience and satisfactory localizer performance, no filing of an ICAO difference is required.

Parameter	Comparison Results	ID
------------------	---------------------------	-----------

[Sub 1 - depth of modulation]

8200 tolerances in SDM do not fully protect the Annex 10/8071 stated 90/150 individual tone tolerances. For example, 90 Mod could be 17, and 150 Mod 19 - the sum would be in tolerance at 36%, while the 90 Mod would be below the 18% ICAO tolerance. If Modulation Equality is assumed to be reasonable or very close to zero as maintained on the ground, the 8200 tolerance is essentially identical to the ICAO tolerance. (Modulation Equality is a ground maintenance issue. Flight testing is not required to address this.)

Recommendation: Consider modifying 8200.1 to protect a minimum per-tone modulation level of 18%. This issue does not warrant filing a difference with ICAO.

8200 equals Annex 10 relative to off-course line tolerance limits ($\leq 60\%$ / $\geq 30\%$)

[Sub 2 - modulation frequency]

This is a design qualification and/or ground maintenance issue. Flight testing does not address this.

[Sub 3 - spurious content]

This is a design qualification and/or ground maintenance issue. Flight testing does not address this, except to the extent that any variations from spurious content visible during flight measurements will have structure tolerances applied to them.

[Sub 4 - modulation phase]

This is a design qualification and/or ground maintenance issue. Flight testing does not address this.

[Sub 5 - undesired FM/PM]

This is a design qualification and/or ground maintenance issue. Flight testing does not address this.

[Sub 6 - Back Course Modulation]

Although not explicitly addressed in Annex 10 or 8200, Doc 8071 does recommend an 18-22% tolerance. This is covered by the 8200 tolerance on SDM (with the same limitations mentioned in Subparameter 1).

Monitor

8200 matches Annex 10 for some, doesn't for others

670

The following subparameters are design qualification and/or ground maintenance issues. Flight testing does not address them.

Subparameter 1 - Monitor Action

Subparameter 5 - Monitor Shutdown Times

Subparameter 6 - Remote Shutdown Annunciation

[Subparameter 2 - Alignment Limit]

8200 and 8071 - Both recommend accomplishment by ground maintenance

[Subparameter 3 - Power Reduction Limit]

8200 alarm checks are part of full coverage checks (refer Coverage). 8071 alarm check is accomplished only on course, with no check prescribed to test the 2 frequency system clearance tolerance.

[Subparameter 4 - Displacement Sensitivity Limit]

8200 is looser than Annex 10/8071, allowing clearances to drop to 135 µA. for two frequency systems. Annex 10 and Doc 8071 only allow the reduced clearance limit (135µA.) on single frequency systems (this is inferred from the lack of any mention). Annex 10 para 3.1.3.11.2.1 recommends a minimum Clearances level of 0.155 DDM, or 150 uA.

Recommendation: Consider requiring 150 uA minimum for 2-frequency localizers, and for 1-frequency localizers if Flight Inspection experience shows this is not problematic. (Modern antenna arrays should have no difficulty providing a minimum of 150 uA.) This issue does not warrant filing a difference with ICAO.

Voice

8200 matches Annex 10 for some, doesn't for others

681

Measurement of tolerances to meet annex10 criteria is a design qualification and/or ground maintenance issue. Flight testing does not address this with the exception that voice not cause interference.

8200 and 8071 criteria equally require a qualitative assessment of clarity and correctness.

8200 places a 5µA allowable limit on the disturbance, whereas 8071 and Annex10 say "no interference" and "shall not interfere in any way" respectively.

Recommendation: Modify Order 8200.1 to change the 5uA value to "no interference" or similar. If this is done, no filing of a difference with ICAO is required.

Facility Type: MKR

Parameter	Comparison Results	ID
-----------	--------------------	----

Unlike other Nav facilities, the MKR output power (signal strength) is adjusted to achieve a specified coverage area (width).

The Annex 10 measurand of Field strength of the ILS Fan Marker antenna pattern is not directly measured in 8200.1. Rather, the distance through the pattern for which the received signal exceeds the light illumination level is used as an end-end measurement. This method of measurement assumes that receiver sensitivity is sufficient regardless of marker field strength. Given any modern receiver, this assumption is sufficient.

It is an unproven assumption is that the 8200 edge definition (1700uV) is considered equivalent to the Annex 10 edge definition (1.5mV/m). Since the units of signal LEVEL (1700 uV) in 8200 appear to be received voltage level at the receiver input terminals across a 50 ohm load, it is not possible to determine whether the Annex 10 field strength or power density requirements are met, without knowledge of the airborne flight inspection antenna's Gain Factor or Capture Area.

Editorially, the 1700 uV criterion appears sufficient in daily use, given the myriad combinations of user receivers, feedlines, and antennas producing satisfactory marker indications.

A. Although it isn't possible at present to say that 8200 fully meets Annex 10 because of the units differences, this should not warrant filing an ICAO difference.

B. FAA does not specify a minimum value for the peak field strength as is specified in Annex 10 (>= 3.0 mV/m). Again, given the large number of markers and receivers and the vast experience in the US without this minimum specification, the markers are clearly operationally acceptable. On this basis, it should not be necessary to file an ICAO difference.

Parameter	Comparison Results	ID
Coverage	8200 matches Annex 10 for some, doesn't for others	682

As coverage is adjusted by power level, width of a prescribed signal level is the measured coverage. Assuming an equal definition of the coverage limits (refer to the FIELD STRENGTH parameter);

[subparameter 1 - Minor Axis Width]

The OM upper limit in Order 8200.1 is looser than the ICAO documents, at 4000. The ICAO limits are 2650'.

Given the very large number of markers and the vast flight inspection experience in the US with the markers and numerous receiver types, the 4000' minor axis upper limit appears procedurally acceptable. On this basis, filing a difference with ICAO should not be necessary.

Major Axis:
8200 specifies major axis criteria, while Annex 10 and Doc 8071 do not address it.

Facility Type: **MLS**

Parameter	Comparison Results	ID
-----------	--------------------	----

Polarization **8200 doesn't meet A10 for any** **706**

For this parameter, (unpublished) Doc 8071 will be considered the requirement.

Order 8200.1 does not address polarization in the MLS Chapter.

Recommendation: Add a polarization check in 8200.1. If this is done, there is no need to file a difference with ICAO.

Signal Level Ratios **8200 doesn't meet A10 for any** **710**

For this parameter, (unpublished) Doc 8071 will be considered the requirement.

Only a single, somewhat obtuse reference to "receiver unlocks" in the section on coverage arcs addresses signal level in 8200.1 in any way. Signal ratios are simply not addressed. No tolerances are provided.

Even the reference to "receiver unlocks" is missing for Elevation stations.

Recommendation: Add 8200.1 measurements and tolerances for received power ratios. If this is added to 8200.1, there is no need to file a difference with ICAO.

Parameter **Comparison Results** **ID**

Power Density **8200 matches Annex 10 for some, doesn't for others** **707**

For this parameter, (unpublished) Doc 8071 will be considered the requirement. Although Annex 10 specifies power density, Doc 8071 measures received signal level (at the receiver input terminals), and remarks that calibrating the receiver and antenna system for actual power density measurements is costly..

Only a single, somewhat obtuse reference to "receiver unlocks" in the section on coverage arcs addresses signal level in 8200.1 in any way. No tolerances are provided.

Even the reference to "receiver unlocks" is missing for Elevation stations.

Recommendation: Add 8200.1 measurements and tolerances for received signal level. It may be necessary to document a variety of existing systems to arrive at an acceptable signal level for the tolerance. If this is added to 8200.1, there is no need to file a difference with ICAO.

[Subparameter 1 - MLS ARD] - not addressed - this is a design qualification type specification.

[Subparameter 2 - MLS Back Az RD] - not addressed - this is a design qualification type specification.

[Subparameter 3 - PFE/CMN/Rx Filter Characteristics] - not addressed - this is a design qualification type specification.

[Subparameter 4 - Az Accuracy]

PFN NTE value should be 0.15, rather than 0.25 degrees. (2 places)

At the ARD, Annex 10 allows defines CMN to be not greater than +/- 10.5 feet or 0.1 degree, whichever is less. 8200.1 states "10.5' NTE 0.1 degree" - this phrasing could allow a CMN value of 0.08 degrees (since the degradations are calculated in terms of angular limits), even though it might exceed 10.5'.

Recommendations:

1. Delete tables for paragraph e(1)(b) and e(1)(c) in 8200.1.
2. Revise table in paragraph e(1)(a) for errors noted above, and make a thorough scrub of each cell in the table against Annex 10 text. A variety of smaller errors appear to exist, e.g., ICAO makes no CMN distinction between autoland and non-autoland, or by Categories.

If these changes are made, there is no need to file a difference with ICAO.

[Subparameter 5 - Back Az Accuracy]

No specific tolerances are given for Back Az facilities, nor is it clear which of the 4 tables of tolerances should be used. While the basic Annex 10 tolerances are the same as for front Az measurements made at the ARD, the degradation text in Annex 10 differs, especially for CMN, from that for front Az CMN. This difference does not appear in 8200.1.

Recommendation: Modify 8200.1 to make clear the tolerances for Back Az facilities, or delete any mention of Back Az if none exists in the flight inspection area.

[Subparameter 6 - EI Accuracy]

[NOTE: The following commentary assumes that Recommendation 1 for Subparameter 4 above) is adopted.]

There are no units for the PFE, PFN, and CMN tolerances. (probably degrees)

If the tolerances are in degrees, they may still allow Annex 10 tolerances to be exceeded, depending on the ARD/EI station locations. (Should be revised to same format as for Az facilities.)

Recommendations:

1. Add units to tolerances.
2. Revise table in paragraph e(1)(d) for errors noted above, and make a thorough scrub of each cell in the table against Annex 10 text. A variety of smaller errors appear to exist, e.g., ICAO makes no CMN distinction between autoland and non-autoland, or by Categories.

If these changes and Recommendation 1 of Subparameter 4 are made, there is no need to file a difference with ICAO.

Facility Type: NDB

Parameter	Comparison Results	ID
------------------	---------------------------	-----------

Coverage	8200 matches Annex 10 for some, doesn't for others	717
-----------------	---	------------

[Subparameter 1 - Field Strength]

Although Annex 10 defines a specific field strength level, Doc 8071 allow for subjective assessments.

[Subparameter 2 - Coverage Classification]

8200 does not mention diurnal or seasonal variations. However, flight inspections of NDBs are almost always conducted during daylight hours. This potential difference between Annex 10 coverage classification statements and actual practice is minor, and does not warrant filing an ICAO difference.

Facility Type: PAR

Parameter	Comparison Results	ID
------------------	---------------------------	-----------

[Subparameter 1 - Azimuth Accuracy]

8200 does not reflect allowable aircraft deviation in percentage as a function of distance. Rather, it adopts a tolerance of 30 feet or 0.6% of distance, whichever is greater. This is a conservative approach.

8200 does not address the requirement to be able to resolve two aircraft which are at 1.2 degrees of each other. However, this is a function of the antenna beamwidth, and is a design qualification issue, rather than a flight testing issue.

[Subparameter 2 - Elevation Accuracy]

8200 does not reflect aircraft deviation in percentage as either a function of distance or a specific linear error (20 feet). Rather, it adopts a single and simple tolerance of 0.1 or 0.2 degrees for the glide path angle. ICAO's tolerances are stated as a function of distance/deviation, OR 20', whichever is greater. This means that for an aircraft beyond ~5800' in distance, it is possible to exceed the 20' ICAO tolerance when using the 0.2 degree (non-commissioning) tolerance. However, at that distance, the ICAO tolerance of 0.4% is larger. Thus this is a conservative approach.

8200 does not reflect the resolution of two aircraft which are within 0.6 degrees of each other. 8200 utilizes matching of glide slope angle in lieu of absolute elevation accuracy (and tolerances). However, this ability to resolve two targets is a function of antenna beamwidth, and is a design qualification issue, rather than a flight testing issue.

[Subparameter 3 - Distance Accuracy]

Range/Distance: 8200 at first appears to be more demanding than Annex 10 as distance increases from threshold (2% vs. 3%). However, Annex 10 is in units of distance to touchdown, while 8200 uses units of true range. Depending on the PAR antenna location, 8200 can allow range accuracies worse than ICAO's tolerance.

Recommendation - Clarify or restate distance accuracy tolerances to protect the Annex 10 requirement. If this is done, filing a difference with ICAO will not be necessary.

8200 does not reflect the resolution of two aircraft which are with 120m (440 ft) of each other. However, this is a function of the antenna beamwidth, and is a design qualification issue, rather than a flight testing issue.

[Subparameters 1-3 Azimuth, Elevation and Range]

Annex10 does not reflect Doc 8071 notes (recommendations) that tighter tolerances are easily obtained and should be considered.

Recommendation: Although these tighter tolerances are possible this should not warrant filing an ICAO difference.

PAR Coverage

8200 matches Annex 10 for some, doesn't for others

730

[Parameter: PAR Coverage]

8200 is not as precise in identifying coverage of different types of aircraft.

Recommendation: Annex10 uses this for guidance and as such should not warrant filing an ICAO difference.

[Subparameter 1 - Coverage Azimuth]

8200 azimuth tolerance is tighter than Annex10 (+/-10 degrees vs. +/-20 degrees).

Recommendation: Since procedural centerline could be different than actual center line this tighter tolerance should not warrant filing an ICAO difference.

[Subparameter 2 - Coverage Elevation]

8200 elevation tolerance is provided in units of range rather than in degrees as for Annex 10. Clarification is needed to ensure that the Annex 10 tolerances are met. If this clarification is provided, there is no need to file a difference with ICAO.

[Subparameter 3 - Coverage Distance]

8200 distance tolerance is less demanding numerically than Annex10 (minimum of 7.5 NM vs. 9NM). However, Annex10 references the range measurement to the antenna locations, whereas 8200 refers to touchdown. Depending on the location of the PAR antenna, this difference may be small or large.

Recommendation: Clarification is needed to protect the Annex 10 tolerance. If this clarification is provided, there is no need to file a difference with ICAO.

[Subparameter 4 - Coverage - MTI/MTD blind speeds]

Annex10 does not differentiate between normal and MTI/MTD operation. Since blind speeds are a function of design (PRF), this does not warrant filing an ICAO difference.

System General

8200 matches Annex 10 for some, doesn't for others

735

[Subparameter 1 - Design Characteristics]

This requirement is a design specification, and is not subject to flight testing.

[Subparameter 2 - Information renewal]

Annex10 requires information to be renewed at least once every second. This will not be possible for 4 second SRE (ASR) equipment. Recommendation: This requirement would only pertain to new equipment, a design parameter, and thus does not warrant filing a difference with ICAO.

Facility Type: RFI

Parameter	Comparison Results	ID
-----------	--------------------	----

General Methods **8200 matches Annex 10 for some, doesn't for others** **757**

Order 8200.1 doesn't specifically address GNSS interference, except by general references.

Annex 10 does not specifically address RFI. For the purposes of this comparison database, the 8071 "requirements" will be considered as if they were Annex 10 requirements. As a result, this parameter is considered non-compliant.

When 8200.1 content for GNSS RFI is re-assessed, and if it is deemed sufficient as-is, the Compare Results for this parameter should be changed to "8200 Matches Annex 10 for all".

Sources and Types **8200 matches Annex 10 for some, doesn't for others** **758**

Order 8200.1 doesn't specifically address GNSS interference, except by general references.

Annex 10 does not specifically address RFI. For the purposes of this comparison database, the 8071 "requirements" will be considered as if they were Annex 10 requirements. As a result, this parameter is considered non-compliant.

When 8200.1 content for GNSS RFI is re-assessed, and if it is deemed sufficient as-is, the Compare Results for this parameter should be changed to "8200 Matches Annex 10 for all".

Facility Type: SBAS

Parameter	Comparison Results	ID
LNAV/VNAV	8200 doesn't meet A10 for any	772

Table 13-3 is not referenced anywhere in Order 8200.1, Chapter 13.

There is no text in Chapter 13 of Order 8200.1 that addresses LNAV/VNAV (other than in the Introductory description), and no text that refers the flight inspector to the tolerances in Table 13-3.

As a result, although Order 8200.1 goes beyond the content of ICAO Doc 8071 for LNAV/VNAV, this parameter is marked as "8200 doesn't meet A10 for any [subparameters]", as a reminder to address this anomaly.

Facility Type: VGSI

Parameter	Comparison Results	ID
Obstacle Clearance	8200 doesn't meet A10 for any	786

8200.1 requires angular coverage to AT LEAST 10 degrees either side, which either intentionally or accidentally matches the definition of an obstacle protection surface.

However, the Annex 10 requirements in 5.3.5.22 and 5.3.5.39 are to physically restrict the light beams whenever an object OUTSIDE the 10 degree limit of the defined surface is within the lateral limit of the light beams.

8200.1 does not directly address objects outside the 20-degree wide surface but yet within the light beam azimuthal coverage. Further, the referenced Figures 7-D/G/H/J are merely side views of the vertical structure of the VGSI systems, and do not define lateral characteristics.

Finally, the definition of "commissioned operational service volume" is not clear or defined.

Recommendation: Modify 8200.1 to ensure that these lighting systems are baffled when the angular azimuthal coverage exceed +/- 10 degrees, and there are objects in that area above the obstacle protection surface. Also, provide a definition for commissioned operational service volume. If these changes are made, there is no need to file a difference with ICAO.

Facility Type: VOR

Parameter	Comparison Results	ID
Coverage	8200 matches Annex 10 for some, doesn't for others	802
<p>Since the units of signal LEVEL in 8200 appear to be received voltage level at the receiver input terminals across a 50 ohm load, it is not possible to determine whether the Annex 10 field strength or power density requirements are met, without knowledge of the airborne flight inspection antenna's Gain Factor or Capture Area.</p> <p>Editorially, the 5 uV criterion appears sufficient in daily use, given the myriad combinations of user receivers, feedlines, and antennas producing satisfactory landing guidance.</p> <p>Although it isn't possible at present to say that 8200 fully meets Annex 10 because of the units differences, this should not warrant filing an ICAO difference.</p>		
Modulation - Nav Signals	8200 matches Annex 10 for some, doesn't for others	805
<p>[Subparameter 1 - Signal Description]</p> <p>This is the definition of the design of the VOR system signal, and is not flight tested.</p> <p>[Subparameter 2 - Modulation Depth and Deviation]</p> <p>8200 is wider than Doc 8071 and Annex 10. Although airborne adjustment is allowed, ground maintenance adjustments are preferred. 8200 allows 20-55% and application of 95% rule of modulation depth. ICAO is in the process of adopting this range of modulations, but it is not yet published in Annex 10. The US submitted a paper offering its experience with several hundred DVORs since 1991 as validation for the proposed and accepted proposal. However, recent estimates from the CN&TSG Secretary suggest it may be 2009 until formal adoption occurs.</p> <p>Recommendation: No difference letter be filed due to pending adoption.</p> <p>[Subparameter 3 - Modulation Frequencies]</p> <p>Set by equipment design and ground adjustments.</p> <p>[Subparameter 4 - Undesired Modulations]</p> <p>Not measured under 8200. Recommendation: No letter required, not measured under Doc 8071 or AVN</p>		
Polarizat'n, Pattern Accuracy	8200 matches Annex 10 for some, doesn't for others	808
<p>[Subparameter 1 - Polarization]</p> <p>8200 procedure and tolerance matches Annex 10 for polarization.</p> <p>[Subparameter 2 - Bearing Accuracy]</p> <p>8200 tolerance matches 8071 for Bends and roughness/scalloping</p> <p>8200 tolerance is wider than A10 for alignment (2.5 degrees vs 2.0 degrees).</p> <p>Recommendation: File letter for difference and acceptability of wider tolerance given the history of findings and variances in user fleet receivers.</p>		

[Subparameter 1 - Voice modulation depth]

This is a ground maintenance issue. Flight testing does not address this subparameter.

[Subparameter 2 - Voice frequency response]

This is a design qualification and/or ground maintenance issue. Flight testing does not address this subparameter.

[Subparameter 3 - Morse Identification]

This is a design qualification and/or ground maintenance issue. Flight testing does not address this subparameter.

[Subparameter 4 - Morse Identification Depth]

This is a design qualification and/or ground maintenance issue. Flight testing does not address this subparameter.

[Subparameter 5 - Voice modulation effects]

The allowable Course change during voice modulation is wider in 8200 (up to 0.5 degree) than in 8071 (up to 0.3 degree). The 8200 tolerance is also wider than Annex 10 ("shall not interfere in any way").

Given the small number of VORs with voice modulation in the US, and an extensive experience base, this does not warrant filing a difference with ICAO.

[Subparameter 6 - Received Identification]

This is a design qualification and/or avionics certification issue. Flight testing does not address this subparameter.