CISPR 32

Edition 2.0 2019-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE
COMITÉ INTERNATIONAL SPÉCIAL DES PERTURBATIONS RADIOÉLECTRIQUES

AMENDMENT 1
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Electromagnetic compatibility of multimedia equipment – Emission requirements

Compatibilité électromagnétique des équipements multimédia – Exigences d'émission

CISPR 32:2015-03/AMD1:2019-10(en-fr)

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Electromagnetic compatibility of multimedia equipment – Emission requirements

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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FOREWORD

This amendment has been prepared by subcommittee CISPR I: Electromagnetic compatibility of information technology equipment, multimedia equipment and receivers, of IEC technical committee CISPR: International special committee on radio interference.

The text of this amendment is based on the following documents:

FDIS	Report on voting
CIS/I/617/FDIS	CIS/I/623/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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1 Scope

Delete the second paragraph starting with "Equipment within the scope..".

Replace the fourth paragraph with the following:

The emission requirements in this standard are not intended to be applicable to the intentional transmissions from a radio communication device operated in accordance with the ITU-R Radio Regulations, nor to any spurious emissions related to these intentional transmissions.

Replace the fifth paragraph with the following:

Equipment for which emission requirements in the frequency range covered by this publication are explicitly formulated in other CISPR publications is excluded from the scope of this publication.

2 Normative references

Replace the existing reference to CISPR 16-1-1:2010 and its amendments with:

CISPR 16-1-1:2015, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

Replace the existing reference to CISPR 16-1-2:2003 and its amendments with:

CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Coupling devices for conducted disturbance measurements*
CISPR 16-1-2:2014/AMD1:2017

Add to CISPR 16-1-4:2010 the following amendment:

CISPR 16-1-4:2010/AMD2:2017

Replace the existing reference to CISPR 16-2-1:2008 and its amendments with:

CISPR 16-2-1:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements*
CISPR 16-2-1:2014/AMD1:2017

Replace the existing reference to CISPR 16-2-3:2010 and its amendments with:

CISPR 16-2-3:2016, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements*

Add to CISPR 16-4-2:2011 the following amendments:

CISPR 16-4-2:2011/AMD1:2014

CISPR 16-4-2:2011/AMD2:2018

Delete the normative reference to ANSI C63.5-2006

Add the following new references to the existing list:

CISPR 16-1-5:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-5: Radio disturbance and immunity measuring apparatus – Antenna calibration sites and reference test sites for 5 MHz to 18 GHz*
CISPR 16-1-5:2014/AMD1:2016

CISPR 16-1-6:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-6: Radio disturbance and immunity measuring apparatus – EMC antenna calibration*
CISPR 16-1-6:2014/AMD 1:2017

As a consequence of the above updates to CISPR 16 normative references the following references throughout the standard require updating as follows. NOTE: some of these may already be addressed with other changes given in this document:

Location of reference	Replace the existing reference	by the following new reference
Clause 2 Footnote 1 to References	CISPR 16-1-2	Delete Footnote 1 related to CISPR 16-1-2
Clause 2 Footnote 2 to References	CISPR 16-2-1	Delete Footnote 2 related to CISPR 16-2-1
3.1.9	CISPR 16-2-1	3.1.28 of CISPR 16-2-1:2014/AMD1:2017
Clause 9	Table 1 of CISPR 16-4-2:2011	Table 1 of CISPR 16-4-2: 2011/ AMD1:2014/AMD2:2018
Clause 11	CISPR 16-4-2	CISPR 16-4-2: 2011/AMD1:2014/AMD2:2018, Clauses 5, 7 and 8
Table A.1, footnote to table	CISPR 16-1-4:2010 /AMD1:2012	Delete Note to Table
Table A.1, footnote to table	CISPR 16-2-3:2010/ AMD1:2010	Delete Note to Table
Table A1.1	5.3 of CISPR 16-1-4:2010/AMD1:2012	5.3 of CISPR 16-1-4:2010/AMD1:2012
Table A1.1	7.3 of CISPR 16-2-3:2010	7.3 of CISPR 16-2-3:2016
Table A1.2	5.2 of CISPR 16-1-4:2010/AMD1:2012	5.2 of CISPR 16-1-4:2010/AMD1:2012
Table A1.2	7.3 of CISPR 16-2-3:2010	7.3 of CISPR 16-2-3:2016
Table A1.3	8.3 of CISPR 16-1-4:2010/AMD1:2012	8.3 of CISPR 16-1-4:2010/ AMD1:2012/AMD2:2017
Table A1.3	7.6.6 of CISPR 16-2-3:2010	7.6.6 of CISPR 16-2-3:2016
Table A1.4	5.4.7 of CISPR 16-1-4:2010/AMD1:2012	5.4.7 of CISPR 16-1-4:2010/AMD1:2012
Table A1.4	Annex C and 7.4 of CISPR 16-2-3:2010	7.4 of CISPR 16-2-3:2016
Table A.8, footnote to table	CISPR 16-1-2:2003/AMD1:2004/ AMD 2:2006	Delete Note to Table
Table A.8, footnote to table	CISPR 16-2-1:2008/AMD1:2010 /AMD2:2013	Delete Note to Table
Table A8.1	Clause 4 of CISPR 16-1-2:2003	Clause 4 of CISPR 16-1-2:2014/ AMD1:2017
Table A8.1	Clause 7 of CISPR 16-2-1:2008	Clause 7 of CISPR 16-2-1:2014/ AMD1:2017
Table A8.2	Clause 7 of CISPR 16-1-2:2003	Clause 7 of CISPR 16-1-2:2014
Table A8.2	Clause 7 of CISPR 16-2-1:2008	Clause 7 of CISPR 16-2-1:2014/ AMD1:2017
Table A8.3	5.1 of CISPR 16-1-2:2003	5.1 of CISPR 16-1-2:2014
Table A8.3	Clause 7 of CISPR 16-2-1:2008	Clause 7 of CISPR 16-2-1:2014/ AMD1:2017
Table A8.4	5.2.2 of CISPR 16-1-2:2003	5.2.2 of CISPR 16-1-2:2014
Table A8.4	Clause 7 of CISPR 16-2-1:2008	Clause 7 of CISPR 16-2-1:2014/ AMD1:2017
Table C.1 row 6	CISPR 16-1-2:2003/AMD1:2004/ AMD2:2006, Figure 5 and Figure 6	CISPR 16-1-2:2014/AMD1:2017, Figure 5
C.2.2.1	CISPR 16-1-1:2010, Clause 2	CISPR 16-1-1:2015, Clauses 4, 5, 6 and 7
C.2.2.1	CISPR 16-1-1:2010, Clause 6	CISPR 16-1-1:2015, Clause 6
C.2.2.3	Annex A of CISPR 16-2-3:2010/ AMD1:2010	Annex A of CISPR 16-2-3:2016
C.2.2.4	Tables 1 and 2 of CISPR 16-1-4:2010/ AMD1:2012	Tables 8, 9 and 10 of CISPR 16-1-4:2010/ AMD1:2012
C.3.5	6.5.1 of CISPR 16-2-1:2008/ AMD1:2010/AMD 2:2013	6.5.1 of CISPR 16-2-1:2014
C.3.6	6.5.1 of CISPR 16-2-1:2008/ AMD1:2010/AMD 2:2013	6.5.1 of CISPR 16-2-1:2014

Location of reference	Replace the existing reference	by the following new reference
C.3.7	6.5.1 of CISPR 16-2-1:2008/ AMD1:2010/AMD 2:2013	6.5.1 of CISPR 16-2-1:2014
C.3.8	6.5.1 of CISPR 16-2-1:2008/ AMD1:2010/AMD 2:2013	6.5.1 of CISPR 16-2-1:2014
C.4.1.4	5.1 of CISPR 16-1-2:2003/ AMD1:2004/AMD 2:2006	5.1 of CISPR 16-1-2:2014
C.4.1.5	5.2.2 of CISPR 16-1-2:2003/ AMD1:2004/AMD 2:2006	5.2.2 of CISPR 16-1-2:2014
C.4.4	CISPR 16-1-4:2010/AMD1:2012	CISPR 16-1-4:2010/AMD1:2012, 5.4
D.1.2	5.5.2 of CISPR 16-1-4:2010/ AMD1:2012	5.5.2 of CISPR 16-1-4:2010/ AMD1:2012
G.2.3	5.2.2 of CISPR 16-1-2:2003/ AMD1:2004/AMD 2:2006	5.2.2 of CISPR 16-1-2:2014
Annex E	Annex B of CISPR 16-2-1:2008/ AMD1:2010/AMD 2:2013	Annex B of CISPR 16-2-1:2014

3.1 Terms and definitions

3.1.30
signal/control port

Replace the existing Note 1 to entry with the following note:

Note 1 to entry: Examples include RS-232, Universal Serial Bus (USB), High-Definition Multimedia Interface (HDMI), IEEE Standard 1394 (“Fire Wire”), and waveguide ports used for interconnecting MME.

3.2 Abbreviations

Add the following abbreviation to the existing list:

PSD Power Spectral Density

6.2 Host systems and modular EUT

Replace the third bullet with the following new bullet:

- a plug-in module, for example a portable memory drive;

9 Test report

Replace, in the second bullet point of the last existing list, "Table 1 of CISPR 16-4-2:2011" *by* "Table 1 of CISPR 16-4-2:2011/AMD1:2014/AMD2:2018".

10 Compliance with this publication

Replace last sentence of the second existing paragraph with the following new sentence:

Requirements for conducted emission measurements are defined in Table A.7 and Table A.9 to Table A.13 with the restrictions defined in Table A.8.

11 Measurement uncertainty

Replace the existing clause with the following new heading and text:

11 Measurement instrumentation uncertainty

Where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in CISPR 16-4-2: 2011/AMD1:2014/AMD2:2018, Clauses 5, 7 and 8, except for measurements in accordance with C.4.1.6.4, this shall be followed and for these measurements the determination of compliance with the limits in this standard shall take into consideration the measurement instrumentation uncertainty in accordance with CISPR 16-4-2: 2011/AMD1:2014 clause 4. For measurements in accordance with C.4.1.6.4, the measurement instrumentation uncertainty shall not be taken into account in the determination of compliance.

For all measurements where guidance for the calculation of measurement instrumentation uncertainty is given in CISPR 16-4-2: 2011/AMD1:2014/AMD2:2018, Clauses 5, 7 and 8, this shall be used and reported as described in Clause 9. Calculations to determine the measurement result and any adjustment of the test result required when the test laboratory uncertainty is larger than the value for U_{cispr} given in CISPR 16-4-2:2011/AMD1:2014/AMD2:2018, Table 1 shall be included in the test report as described in Clause 9.

For measurements where no guidance for the calculation of the instrumentation uncertainty is specified in CISPR 16-4-2: 2011/AMD1:2014/AMD2:2018 the measurement instrumentation uncertainty shall not be taken into account for determining compliance with the limits in this standard.

Annex A
(normative)

Requirements

A.1 General

Add, after the first paragraph of this clause, the following new paragraph:

When the excluded transmissions from a radio communication device (as defined in Clause 1) appear in a measured conducted or radiated emission spectrum, those signals do not need to be reported and shall not be considered in identifying the top six emissions for reporting (see Clause 9). The test report may indicate that the signals were observed and were identified as being excluded transmissions.

*Replace the existing fourth paragraph of this clause starting with "*Other measurement methods..*" with:*

Other measurement methods and associated limits for RVCs and GTEM cells are presented in Annex I for information, however, they cannot be used for demonstrating compliance with this publication.

A.2 Requirements for radiated emissions

Replace the existing second paragraph of this clause by the following new text and new figure:

Measurements for showing compliance shall only be performed at measurement distances for which the test site is compliant with the appropriate test site validation requirements and restrictions defined in Table A.1. In addition, for facilities covered by Table clause A1.1, this includes any receive antenna position between (and including) R1 to R2 as given in Figure A.2 that results in a test distance meeting the requirements defined in Table D.2. These antenna positions are those used during the test site validation.

In Figure A.2, the circle defines the maximum allowable EUT volume from the test site validation.

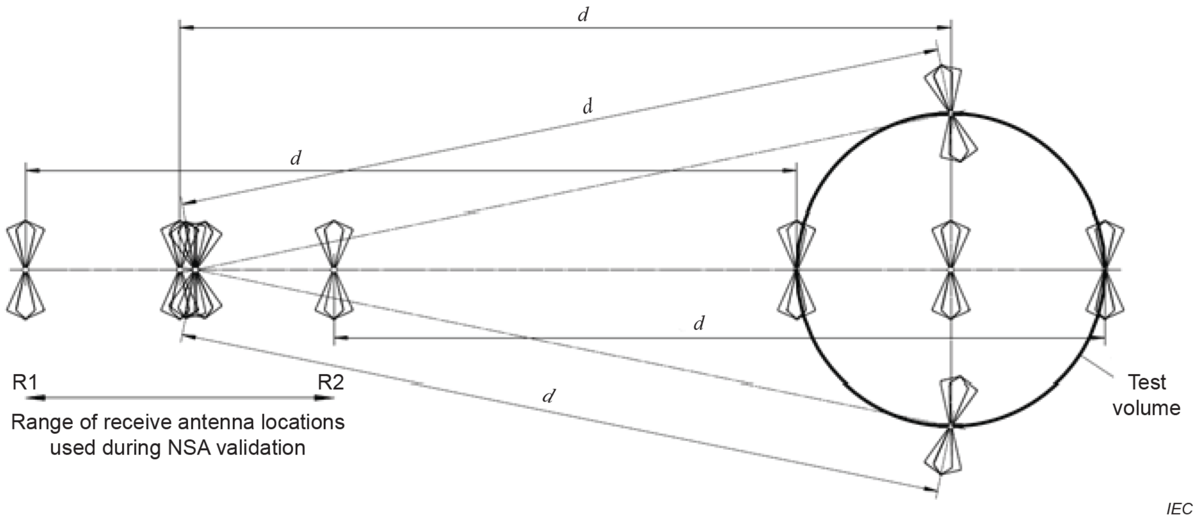

Figure A.2 – Example of the range of receive antenna locations used during NSA validation of a weather-protected OATS or SAC

Table A.1 – Radiated emissions, basic standards and the limitation of the use of particular methods

Replace the existing table by the following new table:

Table clause	Measurement facility	Validation method	Measurement		Limitations and clarifications
			Procedure	Arrangement	
A1.1	SAC or OATS with weather protection cover	5.2, 5.3.1, 5.4 of CISPR 16-1-4:2010/ AMD1:2012	7.3 of CISPR 16-2-3:2016	Annex D	The maximum width of the EUT, local AE and associated cabling shall be within the validated test volume as demonstrated during site validation. The validated test volume does not need to encompass any AE and associated cabling that are located below the ground plane or turntable, or remotely located, as described in D.1. During site validation the transmit and receive antennas shall not both be within the test volume at the same time. Theoretical NSA values for 5 m test sites are presented in Table C.3.
A1.2	OATS without weather protection cover	5.2 of CISPR 16-1-4:2010/ AMD1:2012	7.3 of CISPR 16-2-3:2016	Annex D	Theoretical NSA values for 5 m test sites are presented in Table C.3
A1.3	FSOATS	8.3 of CISPR 16-1-4:2010/ AMD1:2012/ AMD2:2017	7.6.6 of CISPR 16-2-3:2016	Annex D	A facility validated against the FSOATS requirements shall be used for measurements above 1 GHz. The EUT, local AE and associated cabling shall be within the validated test volume as demonstrated during the test site validation. An FSOATS may be a SAC/OATS with RF absorber on the ground plane or a FAR. The antenna used for emission measurements shall be either the same receive antenna that was used during the test site validation measurements, or another antenna of the same model number Independent of the antenna beamwidth or height of the EUT (including Local AE and interconnecting cables), the receiving antenna shall be height scanned continuously from 1 m to 4 m. Boresighting or tilting of the receive antenna is not required.

Table clause	Measurement facility	Validation method	Measurement		Limitations and clarifications
			Procedure	Arrangement	
A1.4	FAR	5.4.7 of CISPR 16-1-4:2010/ AMD1:2012	Annex C and 7.4 of CISPR 16-2-3:2016	Annex D	This table clause applies to radiated emission measurement up to 1 GHz for an EUT set-up in the table top arrangement as shown in Figure D.11 and Figure D.12. Where the same room is to be used for radiated emission testing above 1 GHz, apply table clause A1.3 and use the room as a FSOATS. The maximum width and height of an EUT, local AE including cables connected to local AE shall be less than half of the measurement distance as demonstrated during the test site validation. Where relevant, the height of the EUT includes 0,8 m of vertically exposed cable. Where relevant, the width of the EUT includes 0,8 m of horizontally exposed cable.
The arrangement of the EUT is defined within Annex D of CISPR 32 and not that given in CISPR 16-2-3:2016. Requirements defined within CISPR 16-2-3:2016 that conflict with or are in addition to the requirements of this standard shall not be followed.					

Table A.3 – Requirements for radiated emissions at frequencies above 1 GHz for class A equipment

Replace the existing table by the following new table:

Table clause	Frequency range MHz	Measurement			Class A limits dB(μV/m)
		Facility (see table A.1)	Distance m	Detector type / bandwidth	
A3.1	1 000 to 6 000	FSOATS	3	Average / 1 MHz	60
A3.2	1 000 to 6 000			Peak / 1 MHz	80
Apply A3.1 and A3.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.					

Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for class B equipment

Replace the existing table by the following new table:

Table clause	Frequency range MHz	Measurement			Class B limits dB(μV/m)
		Facility (see table A.1)	Distance m	Detector type/ bandwidth	
A5.1	1 000 to 6 000	FSOATS	3	Average/ 1 MHz	54
A5.2	1 000 to 6 000			Peak/ 1 MHz	74
Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1 . These requirements are not applicable to the local oscillator and harmonics frequencies of equipment covered by Table A.7.					

Table A.7 – Requirements for outdoor units of home satellite receiving systems

Replace the existing table by the following new table:

Table Clause	Frequency Range MHz	Measurement			Class B Limits	Notes
		Facility (see Table A.1)	**Distance** m	**Detector type / Bandwidth**		
A7.1	30 to 1 000	SAC / OATS / FAR	See Table A.4	Quasi Peak / 120 kHz	See Table A.4	See Annex H
A7.2	1 000 to 2 500	FSOATS	3	Average / 1 MHz	50 dB(μV/m)	LO leakage and spurious radiated emissions from the EUT, in the region outside ±7° azimuth of the main beam axis. See Annex H
	2 500 to 18 000				64 dB(μV/m)	
A7.3	1 000 to 18 000	FSOATS	3	Average / 1 MHz	70 dB(μV/m)	LO leakage from the EUT, in the region within ±7° azimuth of the main beam axis. See Annex H
A7.4	1 000 to 18 000	Conducted (Clause H.4)	n/a	Average / 1 MHz	63 dBpW	
Apply the limits defined in table Clause A7.1 and A7.2. Also apply the limits defined in either table Clause A7.3 or A7.4. For details of the EUT configuration, see Annex H. For radiated emissions measurements at frequencies up to 1 GHz, the requirements defined in Table A.4 shall be satisfied. Apply the appropriate limits across the entire frequency range.						

A.3 Requirements for conducted emissions

Replace the existing first paragraph of this clause by the following new text:

The EUT is deemed to comply with the conducted emission requirements when it has been shown to be compliant with all applicable limits as given in Table A.7 and Table A.9 to Table A.13. The required measurement methods are stated in Table A.8.

Table A.8 – Conducted emissions, basic standards and the limitation of the use of particular methods

Replace the existing table by the following new table:

Table clau-se	Coupling device	Basic standard	Validation method	Measurement arrangement	Measurement procedure and clarifications
A8.1	AMN	Clause 7 of CISPR 16-2-1: 2014/AMD1: 2017	Clause 4 of CISPR 16-1-2: 2014/AMD1:2017	Annex D	Use the measurement procedures defined in C.3. The impedance and phase requirements of CISPR 16-1-2:2014/AMD1:2017 in the range 0,15 MHz to 30 MHz apply.
A8.2	AAN	Clause 7 of CISPR 16-2-1: 2014/AMD1: 2017	Clause 7 of CISPR 16-1-2: 2014applying the requirements of Table C.2. of this standard	Annex D and C.4.1.1.	Use the measurement procedures defined in Clause C.3.. and C.4.1.1. Using the clarifications in Clause C.3.6..
A8.3	Current probe	Clause 7 of CISPR 16-2-1: 2014/AMD1: 2017	Clause 5.1 of CISPR 16-1-2: 2014	Annex D and C.4.1.1.	
A8.4	CVP	Clause 7 of CISPR 16-2-1: 2014/AMD1: 2017	Clause 5.2.2 of CISPR 16-1-2: 2014	Annex D and C.4.1.1.	
A8.5	Matching and combining networks for voltage measureme nt into 75 Ω	n/a	C.4.2.	C.4.2.	Use the measurement procedures defined in C.4.2 for the measurement of the unwanted emission voltages at a TV/FM broadcast receiver tuner port
A8.6	Matching network for voltage measureme nt into 75 Ω	n/a	C.4.3.	C.4.3.	Use the measurement procedures defined in C.4.3. for wanted signal and emission voltage at the RF modulator output port.
A8.7	Directional Coupler	Annex H	N/A	Annex H	See Annex H. Applicable only to outdoor unit of home satellite receiving systems

Annex B
(normative)

Exercising the EUT during measurement and test signal specifications

Table B.1 – Methods of exercising displays and video ports

Replace the existing notes to Table B.1 with the following new notes:

[a] This display image is also valid for monochrome displays which will display grey scale bars.

When there is more than one display or video port, each display/port shall be exercised appropriately subject to the provisions of B.2.2.

The display image(s) selected should be consistent with the normal product operation and should be reported in the test report.

The display images may be modified, when necessary to exercise primary functions of the EUT. Where possible, these modifications should be restricted to the bottom or top half of the display area so that the image defined in the table fills the majority of the display.

For analogue television sets, only colour bars should be displayed, defined in complexity 3.

The standard colour bar image (complexity 3 or 4) is described in Annex J.

Annex C
(normative)

Measurement procedures, instrumentation and supporting information

C.2.2.1 General

Replace the first paragraph with the following

The measuring receiver shall meet the relevant specifications of CISPR 16-1-1:2015, Clauses 4, 5, 6 and 7. Detectors and bandwidths shall be used as specified in relevant tables in Annex A of CISPR 16-1-1:2015. Where this publication specifies the use of an average detector, the linear average detector defined in Clause 6 of CISPR 16-1-1:2015 shall be used.

C.2.2.2 Antennas for radiated emissions measurements

Replace the last sentence of this subclause with the following and add the new note as follows:

These shall be calibrated in free space conditions using the procedures in CISPR 16-1-6:2014/AMD1:2017 using facilities defined in CISPR 16-1-5:2014/AMD1:2016.

NOTE Previously, CISPR 32 referenced ANSI C63.5 for antenna calibration requirements. In order to simplify the transition to these new requirements, the test laboratory should have their antennas calibrated using methods defined in CISPR 16-1-6:2014/AMD1:2017 which emulate those of ANSI C63.5, using the antenna calibration facilities defined in CISPR 16-1-5:2014/AMD1:2016. This may include using a CALTS (calibration test sites) for the frequency range below 1 GHz and a FAR above 1 GHz.

C.2.2.3 Ambient signals

*Replace the reference to "*CISPR 16-2-3:2010/AMD1:2010*" with "*CISPR 16-2-3:2016*".*

Figure C.1 – Measurement distance

Replace the existing figure with the following new figure: