



CISPR/D/428/CC

COMPILATION OF COMMENTS ON COMMITTEE DRAFT

Project number: CISPR 12 Ed. 7.0	Reference number of the CD CISPR/D/427/CD
IEC/TC or SC CISPR/D	Date of circulation 2016-05-06
Title of the TC or SC: Electromagnetic disturbances related to electric/electronic equipment on vehicles and internal combustion engine powered devices	

Title of the committee draft: Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers
The above-mentioned document was distributed to National Committees with a request that comments be submitted
Report of comments See printout attached
Comments received – see annex ¹
DECISION OF THE CHAIRMAN (in cooperation with the secretariat) a <input type="checkbox"/> A revised committee draft will be distributed as a committee draft for vote (CDV) by (date) b <input checked="" type="checkbox"/> A revised committee draft will be distributed for comment by (date) 2016-12 c <input type="checkbox"/> The committee draft and comments will be discussed at the next meeting (date) NOTE In the case of a proposal <i>a</i> or <i>b</i> made by the chairman, P-members objecting to such a proposal shall inform the Central Office with copy to the secretary in writing within 2 months of the circulation of this compilation (see ISO/IEC Directives, Part 1, 2.5.3).

Name or signature of the Secretary Holger Hirsch, Germany	Name or signature of the Chairman Mike Beetlestone, UK
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Due to the huge amount of comments, not all comments could be handled at the last WG1 meeting. WG1 will discuss the remaining comments at the CISPR WG1 meeting in October 2016 and may reconsider some comments, which already have been agreed or not agreed.

¹ To be collated on FormComments and annexed

Report of Comments on CIS/D/427/CD				
Circulation Date: 2015-11-06			Closing Date: 2016-02-12	
CISPR 12 Ed. 7.0 CISPR 12: Vehicles, boats and internal combustion engines - Radio disturbanc characteristics - Limits and methods of measurent for the protection of off-board receivers				
Country	Status	Comments	Received	
Australia	P	Y	2016-02-09	
Austria	P	N	2016-02-11	
Belarus	O	N	2016-02-12	
Belgium	P	Y	2016-02-08	
Bulgaria	O			
Canada	O	Y	2016-01-26	
China	P	Y	2016-02-02	
Croatia	O			
Czech Republic	P	N	2016-01-28	
Denmark	P	N	2016-02-11	
Estonia	-	N	2016-02-08	
Finland	P	N	2016-02-08	
France	P	Y	2016-02-08	
Germany	P	Y	2016-02-12	
Greece	O	N	2016-02-12	
Hungary	O			
India	O			
Ireland	O	N	2015-11-24	
Israel	O			
Italy	P	N	2016-02-09	
Japan	P	Y	2016-02-10	
Korea, Republic of	P	Y	2016-02-05	
Malaysia	O			
Mexico	O	N	2016-02-11	
Netherlands	O			
New Zealand	O			
Norway	O	Y	2016-02-11	
Poland	O			
Portugal	O	Y	2016-02-12	
Romania	P	N	2016-02-05	
Russian Federation	P	N	2016-02-11	
Serbia	O			
Singapore	O			
Slovakia	O			
South Africa	O			
Spain	O			
Sweden	P			
Switzerland	P	Y	2016-01-28	
Thailand	O			
Turkey	O	N	2016-02-11	
Ukraine	O			
United Kingdom	P	Y	2016-02-10	
United States of America	P	Y	2016-01-15	
International Amateur Radio Union	-	Y	2016-02-08	
	P-members	O-members	Non-members	Total
Y : comments	10	3	1	14
N : no comments	7	5	1	13
- : no response	1	16	0	17
Notes				
P-members with no response: Sweden				
*Comments rejected because they were not submitted in the IEC Comment form.				

Date	Document	Project Nr.
	CIS/D/427/CD	

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
CA-1		Title		Ge	The title of the standard is no longer appropriate	Recommend to change the title of the standard to: "CISPR 12: Vehicles, boats and <u>devices with internal combustion engines or traction batteries</u> – Radio disturbance characteristics – Limits and methods of measurement for the protection of off-board receivers".	To be discussed at the next WG1 meeting
CH-01				Ge	The Swiss NC is very unhappy with the answer to comment CH-01 in document CISPR/D/423A/CC.		<p>1. This flowchart has been used for a number of years without any issues for vehicles in the field (including electric and hybrid vehicles).</p> <p>2. Whenever specific products with own regulation, which meet the requirements of CISPR 12 still show issues in the field they can consider using CISPR 12 in a different manner e.g. using only QP limits.</p> <p>3. More and more receivers to be protected within the scope of CISPR 12 use digital services for which the use of QP detector is becoming less appropriate.</p> <p>4. A vehicle is a more complex system than many</p>

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							<p>other products. Typically there are a number of impulsive sources such as brush commutator motors and ignition systems as well as other sources such as micro controllers, PWM sources, databus systems.</p> <p>5. Furthermore, vehicles are moving systems which require a disturbance model that is different to fixed installations. Independent of CISPR 12, other product committees also take these demands of moving equipment operated on streets into account (e.g. IEC 62236-3-1 for trams, trolley buses etc.)</p>
CH-03				Ge	Another point of view: In Europe, the presumption of conformity cannot be based on such a wrong standard.	Change flowchart in Figure 1, so that appliances are measured correctly within CISPR 12 and fulfils the essential requirements for EMC in Europe.	Not agreed, See CH-01
DE 01				Ge	Charging mode is not clearly defined. Is the charging of the 12V or 24V battery used in camping vehicles also addressed by CISPR 12 ?	Add definition: Charging mode operation mode, which is intended to charge traction battery.	Agreed in principle Definition of "Charging mode" will be added. in addition: definition 3.16. traction battery changed to "...high voltage battery"
DE 02				Ge	Is the charging of traction batteries for boats also covered by CISPR 12 ?	Exclude charging mode for boats in the text and add it as item for future work in Annex J.	To be discussed at the next WG1 meeting
JP-01				Ge	Japan National Committee supports this CD.		Noted

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					Concerning the chamber correlation test method should be developed as an amendment of 7 th version.		
KR1				ge	The Korean NC supports and submits the following comments		Noted
KR2				ge	During the charging mode test, there are not the requirements for voltage and a.c. frequency.	<p>Insert</p> <p>The DC power supply voltage during the test shall be nominal ± 10 %.</p> <p>The AC power supply voltage during the test shall be nominal -15 % +10 %. The rated value of the frequency shall be nominal ± 1 %.</p>	To be discussed at the next WG1 meeting
NO-01				ge	<p>The EMC properties of cars and boats nowadays resemble IT and multimedia equipment much more than in the past since nowadays they have processor systems and displays and are designed to support systems/concepts such as "connected vehicle"/Intelligent Transport System (ITS) that in the past were not common in such products.</p> <p>For instance many modern vehicles get software updates over the air while the vehicle is in use. And many vehicles transmit data to central servers.</p>	In this document the frequency range up to 5xFx (max 6 GHz) (refer to table 1 in CISPR 32) should be covered in the same way as CISPR 32.	Not agreed, but the frequency range above 1GHz will be added to the items for future work in Annex J
NO-02				ge	Modern cars and boats contain noise sources that appear in clusters, i.e. multiple sources in a limited area. This means that a vehicle may cause interference even if these noise sources did not cause interference when used separately. This document should take this into consideration.	Modify requirements such that it is a requirement that the potential noise sources such as installed IT and multimedia equipment (e.g. ITS, displays, positioning devices, communications such as GSM, UMTS/WCDMA, 4G, 5G, Bluetooth, USB and entertainment equipment such as video cameras) and on board data communications equipment (e.g. High-Speed CAN bus) must be active during the emissions measurements.	Not agreed, electronic systems are too complex to specify in detail, which devices need to be in which operating mode. Clause 5.5.2.1 already states that the vehicle's electronic systems shall be in their normal operating mode. Especially, radio systems are already tested according specific standards on component level.

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PT				ge	We would like to have in normative annex G.4.2, PLC on power lines, the same approach as in CENELEC standard EN50561: consider the introduction of notch filters, dynamic power control, etc.		Not agreed, CISPR 12 does not cover methods for conducted emissions. These are defined in other standards (e.g. TC69 standards). For radiated emissions annex G just provides information on proper termination of the charging cable including the optional communication wires.
CN- 01	72	Introduction	--	G	In technical documents, the word like “extremely” shall be removed. This kind of word is too extreme. This new version is not related to pure vehicle powered by internal combustion engines only, the test methods for hybrid or electrical vehicle are added, therefore, the effect of this standard for the new energy vehicle shall be evaluated in the future.	Delete “extremely” or add the attribute after “vehicle”, e.g. “ powered by internal combustion Engine” in line 73.	To be discussed at the next WG1 meeting
CA-2	77	Title		Ge	The title of the standard is no longer appropriate	See CA-1.	See CA-1
CA-5	84 – 98	1	Figure	Ed	The figure is outdated. It does not depict interference that may come from the AC mains cable when the car is plugged in for charging. It also depicts only a TV as being the victim, while nowadays there are many other radio communications used in residential environments (see also CA-3).	Recommend to remove the figure.	To be discussed at the next WG1 meeting
CA-3	86 – 87	1	1 st par., 1 st phrase	Ge	“broadcast receivers” is outdated. There are many other radio services used nowadays in residential environments (e.g. cell phones, cordless phones, Wi-Fi, home automation).	Recommend to change “broadcast receivers” to “radio communications”.	To be discussed at the next WG1 meeting
CA-4	87	1	1 st par., 1 st phrase	Te	With the advent of electrical and hybrid vehicles and the inclusion of these in CISPR 12, new interference scenarios are now possible through the AC mains network. See also CA-6.	Please replace “30 MHz” with “150 kHz”.	Not agreed, the frequency range below 30MHz will be covered by the future CISPR 36 (for radiated phenomena) and is covered by other standards (e.g.

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							IEC 61851-21-1) for conducted phenomena
CA-6	113 – 116	1	5 th par. and Note 3	Te	Based on the first sentence from this clause (lines 85 – 89), compliance with CISPR 12 provides a high degree of confidence that the vehicle/boat/device will not interfere with the reception of radio communications in the residential environment. However, with the introduction of electrical and hybrid EUTs, this statement is no longer true unless limits are also included in CISPR 12 to control emissions from the AC mains cable.	Recommend to make compliance with conducted emissions limits mandatory, for example, by replacing the 5 th paragraph and Note 3 with the following new text: “The measurement of conducted electromagnetic disturbances while the vehicle / boat / device is connected to power mains for charging shall follow the procedures described in IEC 61851-21-1. The vehicle / boat / device shall meet the limits specified in IEC 61851-21-1 for conducted disturbances on AC or DC power lines, as applicable.”	Not agreed see CA-4
FR-01	119	2		ed	IEC 61851-21-1 is quoted in the CD (line 116) and should therefore be added in normative references.	Add : “IEC 61851-21-1 : 2016-XX Electric vehicle conductive charging system - Part 21-1 Electric vehicle on board charger EMC requirements for conductive connection to a.c./d.c. supply”	To be discussed at the next WG1 meeting
CA-7	125 – 127	2	2 nd entry in the list	Te	The reference to CISPR 16-1-1 is outdated. The latest published edition is Ed.4 from 2015, which adds requirements for the calibration of the receiver and for the case where external preamplifier is used during measurements.	Please replace with “CISPR 16-1-1: 2015-09 (Ed.4)”, keep the same title for the standard, but delete “Amendment 1 (2010)” from line 127.	Agreed in principle (changes will be applied according to IEC rules)
CA-8	128 – 130	2	3 rd entry in the list	Te	The reference to CISPR 16-1-2 is outdated.	Please replace with “CISPR 16-1-2: 2014-03 (Ed. 2)” and update the ending of the standard’s title by replacing “Ancillary equipment – Conducted disturbances” with “Coupling devices for conducted disturbance measurements”.	Agreed
GB1	128	2		te	Confirmation that CISPR 16-1-2:2006 is correct as 2014 edition exists	Proposed update to CISPR 16-1-2:2014 if agreed	See CA-8
CA-9	131	2	4 th entry in the list	Ed	Should also mention the edition	Please update to “CISPR 16-1-3: 2004-06 (Ed. 2)”	According to IEC rules the edition will not be shown
CA-10	134 – 136	2	5 th entry in the list	Te	The reference to CISPR 16-1-4 is outdated.	Please replace with “CISPR 16-1-4: 2012-07 (Ed. 3.1)” and update the ending of the standard’s title by replacing “Ancillary equipment – Radiated disturbances” with “Antennas and test sites for radiated disturbance measurements”.	Agreed in principle (changes will be applied according to IEC rules)

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GB2	134	2		te	Confirmation that CISPR 16-1-4:2007 is correct as a 2010 edition exists	Proposed updated to CISPR 16-1-4:2010 if agreed	See CA-10
CA-11	137 – 140	2	6 th entry in the list	Te	The reference to CISPR 16-2-3 is outdated.	Please replace with “CISPR 16-2-3: 2014-03 (Ed. 3.2)” and delete “Amendment 1 (2010)” from line 140.	Agreed in principle (changes will be applied according to IEC rules)
CA-12	141	2	7 th entry in the list	Te	The reference to CISPR 16-4-2 is outdated.	Please replace with “CISPR 16-4-2: 2014-02 (Ed. 2.1)”.	Agreed in principle (changes will be applied according to IEC rules)
CA-13	144 – 147	2	8 th entry in the list	Te	The reference to CISPR 16-4-3 is outdated.	Please replace with “CISPR 16-4-3: 2007-01 (Ed. 2.1)” and delete “Amendment 1 (2006)” from line 147.	Agreed in principle (changes will be applied according to IEC rules)
DE 03	148	2		Te	Reference to CISPR 25 is undated. Due to significant changes in CISPR 25 this may not be appropriate.	Change to dated reference	To be discussed in WG1 See also FR-02
FR-02	148	2		te	CISPR 25 is not dated which means that when applying Annex F, clause F2 for type approval test in FM band, the last version of CISPR 25, without narrowband/broadband discrimination should be used. In UNECE-R10, it is possible to use for narrowband radiated emission, a simplified method in FM band which refers to CISPR 25 Ed.2 with narrowband/broadband discrimination. This might be considered as an inconsistency between CISPR 12 and UNECE-R10.	Keep CISPR 25 undated in clause 2 (because CISPR 25 is quoted in different parts of CISPR 12 which are all not concerning FM band) and replace in 4.3 (line 303) and clause F2 (line 1402) “CISPR 25” by “CISPR 25 :2002”	To be discussed in WG1 See also DE-03 Since CISPR 25:2002 is outdated, we may put the reference into the bibliography
CA-14	150	2		Te	IEC 61851-21-1 needs to be added to the list of normative references. See CA-6. Also, ANSI C63.5 is called in clause 5.1.2.2, so it should be added to the list of normative references.	Please add IEC 61851-21-1 to the list. Please also add ANSI C63.5 to the list. Since this standard is not developed by IEC, a dated reference must be used. See also CA-148 and CA-163.	See FR-01
DE 04	150	2		Ed	CISPR 32 is referenced in line 602/p.30	Add Reference to CISPR 32	Agreed
CA-15	156	3.1		Te	This definition does not cover some of the vehicles given as examples in the Note from lines 157 – 158, except by some stretching of the meaning of the verb “carry”. For example, excavators do not “carry persons or goods”. Also an editorial issue: “which” is always	Recommend to extend this definition as follows: “machine operating on land_which is intended to carry persons or goods_and/or that is <u>operated by an on-board person</u> ”	Agreed

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					preceded by a comma; if no comma is present, "that" should be used.		
CA-16	164 – 167	3.3		Ge	The term "traction batteries" seems to imply that these batteries are only (or mainly) used for propulsion. This would exclude for example battery-powered chainsaws. The definition for traction batteries in 3.16 does not help as it is very general and vague. See CA-21 below.	Recommend to clarify what battery-powered devices are in the scope by narrowing down the definition for "traction batteries" in 3.16. See CA-21 below. However, the above recommendation does not apply if the proposal under CA-17 is accepted.	Agreed in principle, a more precise definition for traction batteries will be given.
CA-17	164 – 167	3.3		Ge	All of the examples of "device" given in the Note from lines 166-167, if they do not include an internal combustion engine, they will fall under the scope of CISPR 14.	Recommend to remove "or traction batteries" from line 164 and also remove "or devices" from line 219 (in clause 3.16). Only devices powered by internal combustion engines should be in the scope of CISPR 12 as electrical devices are covered in other CISPR product standards. For completeness, either here or in clause 1, there should be added a statement that hybrid devices, having both an internal combustion engine and an electrical motor, fall under CISPR 12 when operated with the internal combustion engine and under CISPR 14 when operated with the electrical motor. (Note: clause 5.5.3 seems to confirm that only devices with internal combustion engine are in the scope of CISPR 12: see first bullet on lines 799 – 800. However, this should be clearly stated in the scope of CISPR 12 and its definitions.)	Agreed to remove "or traction batteries" Agreed, a statement will be added to the scope. In the scope a restriction to internal combustion engines will be added.
CA-18	177	3.6		Ed	CISPR 16 is a series of standards	Recommend to replace with "CISPR 16-1-4" or with "CISPR 16 series"	Agreed
DE 05	177	3.6		Ed	Reference to CISPR16 which does not exist	Either change wording to "as specified in CISPR 16 series..." or give reference to specific part of (e.g. CISPR 16-1-4)	See CA-18
CA-19	185	3.8		Te	As per previous comments, the frequency spectrum should also include the conducted emissions frequency range. See also CA-4 and CA-6.	Please replace "30 MHz" with "150 kHz".	Not agreed, See CA-4
CA-20	207	3.13		Ed	The spark plug is not doing the measurement, it is just associated equipment used for exercising the EUT.	Recommend to delete "measuring" from line 207.	To be discussed in WG1

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CA-21	219	3.16		Ge	The term “traction batteries” implies batteries that are used exclusively for propulsion while the definition from line 219 is too general, encompassing any “high power” battery, with no indication of what constitutes “high power”.	Recommend to narrow down the definition for traction batteries to clearly convey what “devices” are in the scope of CISPR 12. “Device” is a very general term and the only restriction on what types of “devices” are in the scope of CISPR 12 is by means of the statement that they must be equipped with combustion engines or “traction batteries” (see line 105 / bullet c from clause 1). As such, “traction batteries” must be very clearly and narrowly defined in order to exclude “devices” that are not in scope of CISPR 12 (for example, battery-powered tools and toys fall under CISPR 14, battery-powered ITE falls under CISPR 32, etc.). However, the above recommendation does not apply if the proposal under CA-17 is accepted.	See CA-17
CA-22	219	3.16		Ge	The definition does not cover boats. It is also restricted to “electric vehicles”, therefore excluding hybrid vehicles.	Please replace “electric vehicle” with “electric or hybrid vehicle or boat”.	Agreed
CA-23	222	3.17		Ed	Boats are missing from this definition. Also, the definition does not clearly specify if the operator (or driver) is also excluded or not.	Please include boats and also clarify if the operator or driver is included in this restriction or not.	To be discussed at the next WG1 meeting See also DE-02
DE 06	230	3.19		Ed	This sub clause gives a general definition of an AN. The note is giving the example for a specific HV-AN.	Replace definition of AN (is not used in the document) by definition of HV-AN (from CISPR 25 CDV). Also replace d,c by d.c.	To be discussed at the next WG1 meeting
CA-24	242	3.20		Ed	Missing end of sentence	Recommend to add “interchangeably” at the end of the text in line 242.	Agreed
CA-25	244	3.20	Note	Ed		Please remove the quotes from the end of the text on line 244.	Agreed
CA-26	254 – 255	3.23		Ed	The material does not “absorb radio frequency”; instead it absorbs radiated emissions at radio frequencies. Also, additional text suggested clarifying that no absorbers should be placed on the floor.	Please update this definition as follows: “shielded enclosure/screened room with radio frequency <u>emissions</u> -absorbing material on its internal ceiling and walls, <u>but not on its metallic floor</u> ”	To be discussed at the next WG1 meeting

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FR-03	264	3		ed	Definition of bonded is clear enough and doesn't need additional reference.	Delete the following wording "(see 5.3 of CISPR 16-2-1)"	Agreed
CA-27	267	3		Ge	There are other terms used inside CISPR 12 that are not defined: <ul style="list-style-type: none"> - Communication line; - Signal line; - Wired network line / port; - Private / local comm./signal line. 	Recommend to add definition for these terms in clause 3.	To be discussed at the next WG1 meeting
CN-07		4	/	T	We can consider about add CE limit for EV, because this standard aim to protect receiver outside vehicle, if the EV connect to power net IEC61000-6-3 CE emission	Suggested that add CE limit for EV, both power line and signal line according to IEC61000-6-3	Not agreed, because the conducted emissions are already covered by other standards (e.g. IEC 61851-21-1 and IEC 61851-21-2) There is a liaison between the responsible committee TC69 and CISPR/B.
CA-28	270	4.1	1 st par.	Ed	There are three bullets listed on lines 271 – 276, not two.	Please correct this sentence by deleting "both" from the end of line 270.	Agreed
CA-29	270	4.1		Te	As per previous comments, the frequency spectrum should also include the conducted emissions frequency range. See also CA-4, CA-6 and CA-19.	Recommend to add a new phrase stating that conducted emissions from AC or DC power lines in charging mode must comply with applicable limits in IEC 61851-21-1.	Not agreed, see CN-07, a guide is already given in the scope
CN-06	270	4.1	Para 1	E	The word 'both' could be replaced by 'the following', because the requirement is three rather than two.	In the 30 MHz – 1 GHz frequency range, the vehicle/boat/device shall comply with the following :	See CA-28
CA-30	273	4.1	1 st par., 2 nd bullet	Te	The use of "or" essentially means that the manufacturer / test lab can choose only one of the two limits (either peak or quasi-peak) and not test to the other limit. Is this the intent?	If this was not the intent and instead the EUT needs to pass both the peak and the quasi-peak limits, please replace "or" with "and" in line 273.	Yes, It was the intent.
CA-31	275	4.1	1 st par., 3 rd bullet	Te	The use of "or" essentially means that the manufacturer / test lab can choose only one of the two limits (either peak or quasi-peak) and not test to the other limit. Is this the intent?	If this was not the intent and instead the EUT needs to pass both the peak and the quasi-peak limits, please replace "or" with "and" in line 275. Please also add a comma after "if applicable".	See CA-30
CA-32	279	4.1	Figure 1	Ed / Te	On the right-hand-side branch of the flowchart, testing against the quasi-peak limit is only performed if the EUT fails the peak limit. This will allow an EUT that transmits excessive peak emissions to pass,	If this was not the intent and instead the EUT needs to pass both the peak and the quasi-peak limits, please correct the flowchart by changing the two branches out of the second diamond decision block on the right ("are	See CA-30

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					as long as its emissions, when measured with QP detector, are below the QP limit. Such an EUT is more likely to cause interference, especially to new digital radio technologies.	peak data below peak limit?"); - If yes, should go to the next block ("measurement with QP detector"); - If no, should go down to "fail".	
CA-33	279	4.1	Figure 1	Ed	Double "detector" inside the second rectangular block on the right of the chart.	Please remove one of the two "detector" instances from inside the "measurement with QP det." block	Agreed
CA-34	279	4.1	Figure 1	Te	The "and/or" used in the last diamond decision block (lower-middle of the chart) implies that the manufacturer / test lab can choose to test only "engine-running" mode or "charging" mode, but not both.	Please correct the text inside this diamond decision block as follows (used "<<" and ">>" for quotes as the text already includes quotes): << "Key-on, engine-off" pass and "engine-running" and "charging" (if applicable) all pass? >>	To be discussed at the next WG1 meeting
CH-02	279		Figure 1	Te	It seems, our comment to the wrong flowchart has not been clearly understood. So we try to explain the situation in another way with numbers. Please imagine an electronic module with a disturbance source at 40 MHz with a Peak value of 53 dBuV/m and Quasi-Peak of 51 dBuV/m, typical for a switch mode power supply. Any other appliance within a residential environment would fail the appropriate limits (for example 30 dBuV/m according to IEC 61000-6-3) with 21 dB (!) and even the limits for industrial environment with 11 dB ! But within CISPR 12 such a product passes the flow-chart in figure 1 at the first decision (53 dBuV/m < limit 54 dBuV/m) , although the limits for Quasi-Peak are 34 dBuV/m at this frequency, giving in fact a relaxation of 17 dB !	Change flowchart, so that appliances are measured correctly within CISPR 12 and fulfils the quasi-peak limits in any case. See for example CH-01 of CISPR/423/CC or Annex to DE-01 in the same document.	Not agreed, see CH-01
CH-04	279		Figure 1	Te	Please imagine another source, for example a sinusoidal disturbance at 450 MHz, typical for an oscillator, with 64 dBuV/m Peak and Quasi-Peak. In comparison to the limit for a residential environment (37 dBuV/m according to 61000-6-3) this gives a difference of 27 dB for 2 different products, probably used within the same environment.		See CH-01

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CA-35	280 – 283	4.1	Figure 1, footnote a	Te	Footnote “a” is confusing because it tries to convey two different ideas. The first one is that if peak detector measurement is below the average or quasi-peak limit, there is no need to repeat the measurement with average / quasi-peak detector. The second one is related to the CISPR 12-specific compliance criterion for peak and quasi-peak limits (see CA-30, CA-31 and CA-32 above).	Please reword footnote “a” to restrict it to the first idea only, as follows: “a) Measurement with peak detector always gives an indication higher than or equal to that obtained with an average or quasi-peak detector. As such, peak detector can be used for speeding up the measurement.” Additionally, add a new phrase in between lines 276 and 277 (normal paragraph text), as follows: “For the “Engine-Running” and “Charging, connected to the power grid” modes, testing with quasi-peak detector and comparing to the quasi-peak limit is only required if the EUT fails the peak limit when measured with a peak detector.” (this additional phrase is not required and should not be inserted in the text if the proposals at CA-30, CA-31 and CA-32 above are accepted and implemented)	To be discussed at the next WG1 meeting
CA-36	284 – 285	4.1	Figure 1, footnote b	Ed / Te	This footnote again tries to cover both ideas mentioned at CA-35 above. It is also not true in case of quasi-peak (based on the chart and on the use of “or” in lines 273 and 275): as shown in the chart, if peak measurement is below peak limit, the result is considered a pass and measurement with quasi-peak is not performed at all in this case. Also, “e.g.” should be “i.e.” as what follows is an explanation of the first half of this phrase, not merely an example. Finally, it is not the frequency that is measured, but the emission at that frequency.	If the proposals at CA-30, CA-31 and CA-32 above are accepted and implemented, then please reword footnote “b” as follows: “b) This flow-chart is applicable for each individual frequency, i.e. only the emissions that are above the applicable limit (average or quasi-peak) when measured with peak detector need to be remeasured with average or quasi-peak detector, as applicable.” If, however, the changes recommended at CA-30, CA-31 and CA-32 are not accepted, please reword footnote “b” as follows: “b) This flow-chart is applicable for each individual frequency, i.e. only the emissions that are above the applicable limit (average or peak) when measured with peak detector need to be remeasured with average or quasi-peak detector, as applicable.”	To be discussed at the next WG1 meeting
CA-37	288 – 289	4.2	1 st par.	Ed	Figure 2 includes two limits: one for peak and the other for quasi-peak.	Please replace “limit” with “limits”, replace “or” with “and”, replace “detector” with “detectors” and replace “is” with “are” in line	To be discussed at the next WG1 meeting

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
						288. Please also replace “is” with “are” in line 289.	
CA-38	292	4.2	In between 1 st par. and Figure 2	Ge	Missing requirements for peak and quasi-peak detectors.	Please add requirements for these detectors, similar to those for the average detector given in clause 4.3 (on line 307): “The peak and quasi-peak detectors are defined in CISPR 16-1-1.”	To be discussed at the next WG1 meeting
CA-39	294	4.2	Figure 2, Note 1	Ge	Clause 5.4.2 details the test setup requirements for “Charging” mode measurements. This is only one of the two modes that need to be tested against the limits in Figure 2. This note may give the wrong impression that for electrical vehicles only the test setup given in 5.4.2 needs to be tested.	Recommend to remove Note 1 to avoid confusion. Clause 4 is for limits. Test setups are defined in other clauses.	To be discussed at the next WG1 meeting
DE 07	294	4.2	Fig. 2	Te	Note 1 gives reference to 5.4.2 for vehicles with electric propulsion motors, which seems to be a relict from a former version. 1. There is no need for this reference 2. 5.4.2 is dealing with test setup for charging mode which is not the same as vehicles with electric propulsion motors	Delete note	See CA-39
CA-40	295	4.2	Figure 2, Note 2	Ge	Clause 5.5 is about EUT operating conditions during test. Why is this clause referred to for peak measurements?	Recommend to remove Note 2	To be discussed at the next WG1 meeting
DE 08	295	4.2	Fig. 2	Te	Note 2 gives reference to 5.5, which seems to be a relict from a former version (measurement with 1MHz bandwidth)	Delete note	See CA-40
FR-04	295	4.2		ed	The NOTE 2 in Figure 2 has no added value	Suppress NOTE 2	See CA-40
US1	295	4.2	NOTE 2	ed.	Reference: For peak measurements, see 5.5. This should direct the user to 5.6 (not 5.5)	Change “5.5” to “5.6”	See CA-40
DE 09	304	4.3		Te	Compliance to AV detector can be shown, when the AV requirements of CISPR 25, Clause 5 are met. Which bands? All bands up to 2,5GHz? Only those bands which are installed in the	Add reference to Annex F, e.g. add at the end of the last sentence (in line 304): (see F.2)	To be discussed at the next WG1 meeting

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					vehicle?		
CA-41	308 – 309	4.3	Note	Ge	Annex D of CISPR 16-2-3 is about APD measurements, not about the average detector. Also, there is no need to explain what the average detector is (2002 will probably be 15 years in the past when Ed.7 of CISPR 12 will be published). The requirement to be compliant with CISPR 16-1-1, given on line 307, is sufficient.	Recommend to remove the Note from lines 308 – 309.	To be discussed at the next WG1 meeting
FR-05	310 - 312	4.3		te	The average detector limit is not in line with the corresponding average detector limit of UNECE-R10.	Replace average detector limit of CISPR 12 by average detector limit of UNECE-R10.	To be discussed at the next WG1 meeting
CN-08		5	/	T	We can consider about add CE test method for EV	Suggested that add CE setup of EV CISPR16-2-1	Not agreed, see CN-07
CA-42	323 – 324	5.1.1.1	Note 2	Ed	Should indicate where the 6dB noise floor requirement is stated in CISPR 12.	Please add a parenthesis at the end of the first phrase from this note, as follows: “...in order to achieve the 6 dB noise floor requirements (see clause 5.3.1.3).”	Agreed
CA-43	325	5.1.1.1	Note 2	Ed / Te	Ed: “overload” in line 325 should be “overloading” Te: the presence of the preamplifier also increases the risk that the receiver may be overloaded, even if the preamplifier is not. Also, the test lab must prevent overloading of the receiver even when no external preamp is used.	Please update the ending of Note 2 as follows: “...to avoid overloading of the preamplifier, such as using a step attenuator. <u>The laboratory should also ensure the receiver is not overloaded in all measurement scenarios, with or without an external preamplifier.</u> ”	Agreed to use “overloading” Other proposals to be discussed at the next WG1 meeting
DE 10	326	5.1.1.1		Te	Statement about QP re-measure should not be in this sub-clause, which is dealing with measuring receivers. The term “test limit” may be misleading.	Move sentence to sub-clause 4.2. Replace “test limit” by “quasi-peak limit”.	To be discussed at the next WG1 meeting
US2	343 /344	5.1.1.3	Table 2	Te	Normally in CISPR step size when using a scanning receiver is defined as less than or equal to 50% of the RBW.	Change the Step size defined from 50 kHz to 60 kHz.	To be discussed at the next WG1 meeting
FR-06	348 and 361	5.1.2.1 and 5.1.2.2		ed/te	Some antenna characteristics are referred to CISPR 16-1-4 when there is a new CISPR 16-1-6 standard “Specification for radio disturbance and immunity measuring apparatus and methods -	Refer to CISPR 16-1-6 instead of CISPR 16-1-4	To be discussed at the next WG1 meeting

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					Part 1-6: Radio disturbance and immunity measuring apparatus - EMC antenna calibration"		
CA-44	353 – 354	5.1.2.2	1 st par., 1 st phrase	Te	The type of the antenna should not be restricted by the type of the measurement (automated or manual), nor by the type of measuring instrument (receiver or spectrum analyser).	Recommend to delete the ending of this phrase: “Any linearly polarized broadband antenna may be used for measurements when making measurements with an automated receiver system using a scanning measuring receiver. ”	Agreed
CA-45	354 – 358	5.1.2.2	1 st par., 2 nd phrase	Ge	Annex B is an informative annex. Since it is referred to in clause 5.1.2.2 as one of the only two methods allowed for qualifying a broadband antenna for CISPR 12 measurements, Annex B should be made normative. In addition to the procedural issue (defining as requirements a set of guidelines given in an informative annex), this also opens up a loophole in the standard, since, as per the second paragraph of clause B.1, any other non-specified method is acceptable.	Annex B should be made normative. See also CA-139.	Agreed in principle, The normative parts of Annex B will be moved to a new normative Annex.
FR-07	356 to 359	5.1.2.2		ed/te	Presently the antenna factor of alternative antenna can be determined either by using the alternate antenna characterization method described in Annex B or by using ANSI C63.5 method. This may lead to obtain various antenna factors for given antenna due to the fact that different methods are allowed (including ANSI C63.5 which already includes different methods). French experts propose that antenna factor is determined with reference to a single standardized method (e.g. one of those of CISPR 16-1-6)	Replace in 5.1.2.2 “and its antenna factor is determined with one of the following methods: • Alternate Antenna Characterization (See annex B) • ANSI C63.5 method” By “and its antenna factor is determined according to xxxxxx”. In Annex B : – Delete “and characterization in the title” – Delete clauses B.3 to B.14	Not agreed, There is still a need to apply the alternate antenna characterization method from annex B as well as ANSI C63.5.
CA-46	358	5.1.2.2	1 st bullet	Ed		In the parenthesis from line 358, please change “See annex B” with “see Annex B”.	To be discussed at the next WG1 meeting
DE 11	359	5.1.2.2		Ed	ANSI C63.5 is referenced here, but not listed in Clause 2	Add ANSI C63.5 to list of normative references	To be discussed at the next WG1 meeting

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BE1	363	5.2		ed	Mistape of "Measurment"	Change in Measurement	See FR-08
DE 12	363	5.2		Ed	Typo (2x): measurment	Correct typo: measurement	See FR-08
FR- 08	363 and 368	5.2		ed		Typo error (3 times) : measurement	Agreed
GB3	363	5.2		ed	Measurement spelt "measurment" in two places on same line	"measurement" and "Measurement"	See FR-08
US3	363	5.2		ed	The word "measurement" is spelled incorrectly.	Correct the spelling of "measurement"; check document overall for any other instances.	See FR-08
CA- 47	366	5.2	2 nd par., 2 nd phrase	Ed	"uncertainty" is singular	Please correct the middle of this phrase as follows: "...exceeds that-these of the <u>corresponding</u> example in Annex I..."	Agreed
DE 13	368	5.2	Note	Ed	Typo: measurement	Correct typo: measurement	See FR-08
US4	371	5.2	NOTE	ed	"by site imperfections cannot be made and which leaves MIU incomplete"	Change the note to read: The provisions for measurement instrumentation uncertainty (MIU) in this document do not follow CISPR 16-4-2 for considering MIU. The deviation from policy is justified due to the missing site validation method which will be covered in a future project for CISPR 12. An estimation of the uncertainty contribution caused by site imperfections cannot be made without site validation criterion.	Agreed
CA- 48	376	5.3.1.1	1 st par., 1 st phrase	Te	The first phrase states that the test site must be free from electromagnetic reflecting surfaces, but there are no specific requirements for the ground. The fact that the ground is not specifically mentioned seems to imply that it is understood to be bundled in "surfaces", which means that the ground too must be non-reflecting. However, the fact that this is not clearly stated opens up this clause to various interpretations.	If the intent is to require that the ground is made of non-reflecting material, this must be specifically mentioned in the text. Otherwise, this will be open to interpretations and significantly increase the uncertainty of measurements. For example, a test site with asphalt ground plane will lead to significantly different measurement results than a site built over earth or grass, the latter, depending on the level of moisture in the ground and/or presence of underground cables and pipes,	CISPR/D is currently working on a site validation procedure, which will be added to the document in a future amendment. Therefore, stricter specification for the ground or the measurement method (e.g. antenna height variations) will not be included for the time

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						exhibiting some degree of reflections.	being.
CA-49	382 – 383	5.3.1.1	2 nd par.	Te	Is there any exception for the measuring equipment (or test hut, or vehicle containing the measuring equipment) in this case?	Recommend to add a phrase stating that the test equipment / test hut / vehicle containing the test equipment must be located outside the obstruction-free area depicted in Figures 2 and 3 of CISPR 16-1-4.	To be discussed at the next WG1 meeting
CA-50	386	5.3.1.1	Figure 4	Ed	A number of editorial suggestions for this figure.	<p>Please update the upper-left text as follows: “Midpoint of vehicle / device positioned on normal from antenna—midpoint reference point”.</p> <p>Please add “vehicle / device under test” label next to the rectangle depicting the EUT.</p> <p>Please add a note similar to the one in Figure 5: “Note – The horizontal distance is from the reference point of the antenna to the nearest peripheral part of the vehicle or device”. However, please also see CA-68 (“nearest peripheral part” of the EUT should not include side-mounted rear view mirrors or other small items).</p>	<p>Agreed</p> <p>Agreed</p> <p>To be discussed in WG1</p>
CA-59	391 – 411	5.3.1.2		Te	<p>In the case where the measuring equipment is located on land (in a vehicle or test hut), there will be some portion of land within the test site. It is not clear up to where is the land permitted to extend: up to the antenna? Only in the shaded area? Up to the EUT?</p> <p>This also opens up the same issue with ground reflections. Different ground types will have different conductivities and hence different reflection characteristics (rocks vs. asphalt vs. muddy earth vs. grassy field vs. dry sand, etc.).</p>	Recommend to specify requirements for the maximum extension of the land into the test site, for example restricting it only to the shaded area in Figure 5.	See CA-48
CA-51	392	5.3.1.2	1 st par., 1 st phrase	Te	<p>Same as in 5.3.1.1, there are no specific requirements for the ground (see CA-48). Even though in this case the ground is the water surface, seawater will have less conductivity than fresh water, leading to different reflections.</p> <p>For reproducible measurements, the test site should be clearly specified, including the ground (in this case, water surface).</p>	Either require that the test site is over seawater or otherwise add a requirement that the antenna height shall be scanned, not fixed. See also CA-67.	See CA-48

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CA-52	393	5.3.1.2	1 st par., 1 st phrase	Ed	Missing text (this method applies to boats <u>and</u> to devices (engines) mounted on boats).	Please update the ending of this phrase to: “...measured from a point midway between the <u>boat or the</u> engine under test and the antenna.”	Agreed
CA-53	395	5.3.1.2	1 st par., 3 rd phrase	Ed	The second phrase already mentions the “exceptions”.	Please delete “As an exception, the measuring equipment may be within the test site” and move the remaining of this phrase at the end of the 4 th phrase (the last one) of this first paragraph.	To be discussed in WG1
CA-54	396 – 397	5.3.1.2	1 st par., 4 th phrase	Te	Why is the boat carrying the measurement equipment required to be non-metallic? There is no such a requirement for the test hut, nor for the vehicle (and most, if not all vehicles will be metallic anyway).	Recommend to remove the requirement that the boat (or test fixture) is non-metallic. It will be located in the permitted (shaded) area anyway.	Agreed, but see also CA-53
CA-55	397	5.3.1.2	1 st par., 4 th phrase	Ed	Typo	Please replace “of” with “or” in line 397.	Agreed
CA-56	398	5.3.1.2	2 nd par.	Te	Salt and fresh water have different conductivities and hence different reflection behaviours for electromagnetic waves.	See CA-51.	See CA-48
CA-57	400	5.3.1.2	Figure 5	Ed	A number of editorial suggestions for this figure.	<p>Please update the upper-right text as follows: “Boat length (<u>or engine</u>) midpoint positioned on normal from antenna—midpoint <u>reference point</u>”.</p> <p>Please add “boat under test or” to the upper-left text (the label for the EUT).</p> <p>Please update the note in the middle of the figure: “Note – The horizontal distance is from the centre of the <u>reference point of the</u> antenna to the nearest peripheral part of the boat-marine installation (or engine if tested separately)”. However, please also see CA-68 (“nearest peripheral part” of the EUT should not include side-mounted rear view mirrors or other small items).</p> <p>Please update the text linked to the middle of the distance between the EUT and the antenna: “Centre of 30 m radius clear area (20 m for 3 m measurements) at midpoint between <u>the reference point of the antenna and EUT’s periphery</u>”.</p> <p>Please add the bottom note from Figure 4</p>	<p>Agreed</p> <p>Agreed</p> <p>Agreed</p> <p>To be discussed in WG1</p> <p>Agreed</p> <p>Agreed</p>

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						(from line 389, regarding the measurement distance), as it also applies here. Not clear what is meant by “Outboard installation” as the corresponding line from this legend ends somewhere outside the EUT. Please modify the line and possibly add a note to clarify what is meant by “outboard installation”. (if this term is meant to designate engines mounted at the rear of the boat and tested as “devices”, a note should also be added to ask that the engine is centred with the antenna, not as it is shown in the drawing)	To be discussed in WG1
DE 14	400	5.3.1.2	Figure 5	Te/Ed	Arrow for Outboard installation is pointing nowhere	Update figure	Agreed, see also CA-57
CA- 58	409	5.3.1.2.2	1 st par.	Te	Same comment as in CA-54: clause 5.3.1.2.1 allows a test hut or a vehicle, the latter being clearly metallic.	Recommend to delete the two instances of “non-metallic” from line 409. See also CA-54. Should also specify that the boat or test platform holding the measurement antenna must be non-metallic (currently, this boat/platform requirement is only stated inside Figure 5, which creates confusion with the “non-metallic boat or test platform” term used in the text). This requirement should be added inside 5.3.1.2 (possibly on line 403) as it applies to both land-based and water-based equipment scenarios.	Agreed To be discussed in WG1
CA- 60	416	5.3.1.3	1 st par., 1 st phrase	Ed	Only vehicle is mentioned as the EUT	Please replace “vehicle” with “vehicle / boat / device” in line 416.	Agreed
DE 15	416	5.3.1.3		Ed	Paragraph is valid for all three categories: vehicles, boats, devices	Delete “vehicle”	Agreed in principle, see CA-60
CA- 61	420	5.3.1.3	1 st par., 3 rd phrase	Ed		Please replace “shall require investigation” with “shall be investigated” in line 420.	Agreed
CA- 62	422	5.3.1.3	Note	Te	The corresponding clause in the latest CISPR 16-1-4 edition (2010) is 5.2.4 (identical text as clause 5.4 of the 2007 edition). However, this clause of CISPR 16-1-4 only categorizes test sites based on the difference between ambient levels and measured levels. There is no “guidance” given in this clause of CISPR 16-1-4.	Recommend to delete this note.	To be discussed at the next WG1 meeting

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CA-63	426	5.3.2.1		Te	Results is ALSE cannot ever be correlated with those obtained using the OTS. The ALSE has a metallic ground plane (see CA-26), the OTS for vehicles/devices can have any type of ground, with varying degree of reflections (see CA-48) and the OTS for boats/boat engines can be over seawater or fresh water, again with varying reflections (see CA-51). Furthermore, the antenna height is fixed (see CA-67), which, in combination with the lack of clear requirements for the ground plane of the two OTS, will lead to large differences between test sites.	Recommend to remove the alternative ALSE as such measurements will never lead to same (or similar) levels as measurements performed on an OTS. Also, the two OTS are not compatible to each other (one being over water, which will have more reflections than the other, over land) – but this is fine, as each one of the two OTS emulates the actual environment of the corresponding EUT. However, none of the two OTS can be simulated by an ALSE, so ALSE testing should not be allowed as an alternative. Another possible option is to allow ALSE as alternative, but require that, when performing tests in an ALSE, the antenna is scanned in height from 1 to 4 m and also add a note to the user that ALSE measurements will always give worst-case results (measurement results in ALSE will always be higher than or equal to those in OTS).	CISPR already specified a method for correlation between alternative methods and established methods, which is published in CISPR 16-4-5. See CA-48
CA-64	430 – 432	5.3.2.2		Ge	There are no ambients inside an ALSE.	Please remove clause 5.3.2.2 and its contents.	To be discussed at the next WG1 meeting
CA-65	434 – 435	5.4.1, 5.4.1.1		Ge	Clause 5.4.1 is mainly for the antenna requirements.	Recommend to remove the clause headings 5.4.1 and 5.4.1.1 and to renumber clause 5.4.1.2 to “5.4.1 Antenna requirements”. Correspondingly, the sub-clauses of the existing 5.4.1.2 will need to be promoted one level up (for example, 5.4.1.2.1 will become 5.4.1.1 and so on).	To be discussed at the next WG1 meeting
CA-66	436 – 437	5.4.1.1		Ge	This text can be removed (it is evident that the antenna requirements apply to all EUT types and operating conditions).	Please delete the text in lines 436 – 437.	To be discussed at the next WG1 meeting
CN-04	436	5.4.1.1	Para 1	E	The test setup characteristics described in tis clause concern all operating conditions for vehicle/boat/devices.	The test setup characteristics described in this clause concern all operating conditions for vehicle/boat/devices.	See CA-66
GB4	436	5.4.1.1		ed	Typo : tis	“this”	See CA-66
KR3	436	5.4.1.1		ed	There is a typing error. ...in tis clause	Change by in this clause	See CA-66
US5	436	5.4.1.1		ed	“ described in tis clause”	Change “tis” to “this”	See CA-66

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GB5	437	5.4.1.1		ed	Spacing of words is large on line 436	Change "vehicle/boat/devices" to "vehicles, boats and devices"	See CA-66
FR-09	447	5.4.1.2.1	NOTE	ed	The sentence is not clear enough	Add after "a distance of 6 m at a height of 3 m" : "for the 10 m antenna distance"	Agreed
CA-67	451 – 452	5.4.1.2.2		Te	<p>The sources of electromagnetic noise (including the engine / motor) will be at various locations within the EUT, specific to each EUT type (vehicle, device, boat or boat engine) and model. This will influence not only the direct ray, but also the direction of ground reflections. The result, with a fixed antenna height, will be large variations between test sites, for a given EUT, and between EUTs of various models.</p> <p>Additionally, different antennas will have different patterns, which will result in significant differences between results obtained on the same EUT at different test sites/labs if the antenna height is fixed.</p>	Recommend to consider including more strict requirements for the ground plane, as per the corresponding comments above, and to require that the antenna height is scanned, as it is usual for CISPR measurements, in order to ensure reproducible results and minimize the uncertainty of measurement.	See CA-48
KR4	457		Figure 6	ge	To clarify test setup, add Key.	Insert 2. Antenna 3. Ground /floor or water surface	Agreed
CA-68	463	5.4.1.2.3	1 st par.	Te	<p>The horizontal distance is measured between the projections of the reference point of the antenna and the EUT's periphery onto the ground plane / water surface.</p> <p>Additionally, very small objects projecting sideways from the periphery of the EUT should not be considered for determining the measurement distance (for example side-mounted rear view mirrors on vehicles; see also CA-50).</p>	<p>Please update this phrase as follows: "The preferred horizontal distance between the <u>projections on the ground / floor / water surface of the</u> reference point of the antenna and <u>that of</u> the nearest metal part of..." (and continue with the phrase as is).</p> <p>Please also add a new phrase stating that small objects projecting sideways from the periphery of the EUT should not be considered for determining the measurement distance.</p>	Agreed To be discussed in WG1
KR5	470		Figure 7	ge	To clarify test setup, add Key.	Insert 2. Antenna	Agreed
CA-69	487	5.4.1.2.4	3 rd par., 2 nd bullet, 2 nd phrase	Ed		Please update this phrase as follows: "The number of antenna positions shall allow to meet <u>be such that</u> the following condition <u>is satisfied</u> :"	Agreed

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
DE 16	488	5.4.1.2.4.		Te	If multiple antenna position are needed due to the relation of EUT size and antenna beam width, this information should be included in the test report.	Add to the second bullet: "The number of antenna positions and the position of the antenna with respect to the EUT shall be documented in the test report."	To be discussed at the next WG1 meeting
CA- 70	497 – 509	5.4.1.2.4	Figure 8	Ed		For improving the figure clarity, please use dotted lines for the extension lines (same as in Figure 9). Solid lines should only be used for the actual objects (like EUT, antenna, wall absorbers, etc.).	Agreed
CA- 71	497 –509 and 520	5.4.1.2.4	Figure 8 and Figure 9	Ge	Both figures show the test setup inside an ALSE. ALSE is only an alternative to the preferred OTS. Also, these two figures do not depict any requirement specific to the ASLE.	Please remove the walls, absorbers and the bulkhead transition (in between cable 3 and receiver 4) from these two figures in order to make them general (applicable to all types of test site).	To be discussed at the next WG1 meeting
KR6	510 ,521		Figure 8 Figure 9	ge	To clarify test setup, add Key	Insert 5. Bulkhead connector	See CA-71
GB6	516		Figure 8	ed	Change "polarisation" to "polarization" to keep in line with rest of document	"polarization"	Agreed
FR- 10	519	5.4.1.2.4	Figure 9	ed	The line corresponding to the middle of vehicle length might lead to confusion in regard to antenna location.	Delete the dash line corresponding to the middle of vehicle length and delete the "L/2" and the corresponding arrow. See FR-10 proposal in annex below	Agreed in principle, see also CA-71
GB7	527		Figure 9	ed	Change "polarisation" to "polarization" to keep in line with rest of document	"polarization"	Agreed
CA- 72	530 – 531	5.4.1.2.5	1 st par.	Te	Antennas should not be permitted to be placed side-by-side due to coupling that may occur in between them. Also, it should be made clear that only one or two antennas are permitted, not more. If there are two, they should be on opposite sides of the EUT. Finally, if two antennas are located one on each side of the EUT, then necessarily the test equipment connected to one antenna will not meet the requirement for " <i>test equipment located outside of test site or in the shaded area</i> " with respect to the other antenna (shaded area in Figures 4 and 5 is	Please clarify that antennas must not be placed side-by-side and that only a maximum of two antennas can be used, one on each side of the EUT (so that the distance in between them will be double the measurement distance plus the width of the EUT). Also, please add a requirement that test equipment is not permitted on the test site, not even in the shaded area of Figures 4 and 5, when two antennas are used (see also CA-73 below).	To be discussed at the next WG1 meeting

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
					located behind the antenna only). As such, if two antennas are used, their test equipment must be outside the test site, i.e. the allowance for it to be in the shaded area needs to be revoked if two antennas are used.		
CA_7 3	532 – 533	5.4.1.2.5	2 nd par.	Ed / Te	Revised text proposed, for improved clarity and also to add the requirement as per CA-72 above.	Please update this phrase as follows: “The test site clear area requirement of 5.3.1.1 and 5.3.1.2 shall be applied also to for all antennas, based on the points <u>midways between the vehicle/boat/device and the each auxiliary antenna(s). Additionally, if two antennas are used, the test equipment must be located outside the test site (its location in the shaded area of Figures 4 and 5 is not permitted).</u> ”	To be discussed at the next WG1 meeting
CA-74	534	5.4.1.2.6	Clause title	Ed	This clause addresses exemption from the multiple antenna positions rule.	Please change the clause title to “Multiple antenna positions <u>exemption</u> ”.	Agreed
FR-11	535 and 536	5.4.1.2.4 5.4.1.2.5 5.4.1.2.6 5.4.1.2.6		te	The conditions and consequences to use single antenna position vs multiple antenna positions are described both in 5.4.1.2.4, 5.4.1.2.6 and Annex A. There might be some confusion regarding antenna positions, limit correction and choice between one or multiple antenna positions with the present wording. Furthermore, some alternative possibilities are not described in the existing standard (e.g. using multiple antennas positions) with an antenna beamwidth greater than 3 dB. Therefore, French experts would like to propose a simplified and more exhaustive wording.	See FR-11 proposal in Annex below	To be discussed at the next WG1 meeting
DE 17	538	5.4.1.2.6	Note	Ed	Example should be aligned to formula (1) in line 489.	Change wording to: “A typical log periodic antenna has a 3 dB beamwidth of approximately $2\beta=60^\circ$. This results in...”	Agreed
CA-75	539	5.4.1.2.6	Note, 3 rd phrase	Ed	The last phrase of this note should emphasize that this is only an example and the number of antenna positions depends on the specific antenna and EUT.	Please add in the third phrase the following text: “Thus, <u>with this example antenna</u> , a vehicle 8 m long requires...” (and continue with the rest	Agreed

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						of the phrase as is).	
CA-76	541	5.4.2	Clause title	Ge	There is no other similar clause in the document for boats.	Please change the title of this clause to “Test setup for vehicle/ <u>boat</u> in charging mode”. Alternatively, see CA-77 below.	Agreed
KR7	542	5.4.2.1		ge	‘5.4.2.1 General’ is the general section for ‘5.4.2.2 AC power charging without communication’ (See the structure of 5.4.2.3)	5.4.2.1 should move after 5.4.2.2 and need to be renumbered.	To be discussed at the next WG1 meeting
CA-77	543 – 545	5.4.2.1		Ge	Since all text and the example figures in clause 5.4.2 are specific to vehicles, there should be some text added here mentioning boats. It is assumed that CA-17 will be accepted (all electrical devices and all hybrid devices, when operated with the electrical motor, fall under CISPR 14, not under CISPR 12). Otherwise, clause 5.4.2 should also apply to devices, in which case there should be a new sub-clause added since the requirements in the text and figures of 5.4.2, while they may be easy to apply to boats, they are not easily applicable to devices.	Please add the following phrase in clause 5.4.2.1: “The test setups described in this clause are specific to vehicles. However, similar requirements apply to boats in charging mode.” May also need to add some more guidelines / requirements specific to boats. For example, that boats in charging mode are tested either on water (but tied to the dock such that the length of the power harness complies with the 80cm requirement) or in an ALSE. Alternatively, add a statement that electrical boats are not currently covered in CISPR 12 and will be included in a future revision, with a reference to clause J.3. In this case, please also remove “/boat” from lines 581, 592, 669 and 681.	Agreed WG1 believes that the test is to be made in an ALSE.
CA-78	545	5.4.2.1	2 nd par.	Ed	Figures 10 and 11 are only applicable to charging with no communication.	Please delete the text in line 545 and move it instead within sub-clause 5.4.2.2, i.e. in between lines 547 and 548 (this will match the line 606 being inside 5.4.2.3).	Agreed in principle. The amended text in line 547 is a hanging paragraph. A new clause 5.4.2.1 General will be added.
DE 18	545	5.4.2.1		Ed	Further examples for test setups in charging mode are also given in figures 12, 13 and 14.	Append wording: “Examples of test set-ups are shown in Figures 10 to 14.”	See CA-78
CA-79	546	5.4.2.2	Clause title	Ge	While maybe not common, DC charging without communication should not be excluded and should be added to CISPR 12 for completeness (to avoid having holes in the standard).	Please change the clause title to: “AC <u>or</u> DC power charging without communication”	To be discussed at the next WG1 meeting
CA-	550	5.4.2.2.1	1 st and 3 rd	Ge	There is no ground plane in an OTS, only in	Please replace “plane” with “floor” in both	To be discussed at the

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
80	and 553		bullets		an ALSE.	lines 550 and 553.	next WG1 meeting
CA- 81	551 , 555, 557, 559, 560, 564, 575, 584 and 595	5.4.2.2 sub- clauses	5.4.2.2 sub- clauses and figures	Ge	As per CA-79, this clause should also apply to DC charging without communication.	Please replace all instances of “AMN” or “Artificial Mains Network” from clause 5.4.2.2’s text and figures with “AMN or HV-AN”.	See CA-79
CA- 82	557 – 558	5.4.2.2.2	2 nd par.	Te	OTS (for both vehicles and boats) do not have a ground plane; as such, there is nothing to bond the AMN to.	Recommend to require that all tests in charging mode (all clause 5.4.2) are performed in ALSE only. This requirement should be inserted in sub-clause 5.4.2.1 and worded such that it applies to all tests in charging mode.	To be discussed at the next WG1 meeting
CA- 83	560 – 562	5.4.2.2.2	4 th par.	Ge	This paragraph includes requirements for the power cable/harness. As such, it should not be in this sub-clause, but instead in the next one.	Please move this paragraph (lines 560 – 562) to the beginning of sub-clause 5.4.2.2.3 (i.e. replacing the first phrase of the first paragraph of 5.4.2.2.3, from lines 564 – 565; see also CA-84).	Agreed
DE 19	560 also 634 644	5.4.2.2.2 5.4.2.3.3		Ed	Requirements in this paragraph are not dealing with Artificial network, but with power charging cable. The first part is already included in sub-clause 5.4.2.2.3 line 564.	Delete lines 560-562. Add requirement “routed perpendicular” to lines 564-565: “The power charging cable shall be placed in a straight line between the AMN(s) and the vehicle charging plug and shall be routed perpendicular to the vehicle longitudinal axis (see Figures 10 and 11).”	See CA-83
CA- 84	564 – 565	5.4.2.2.3	1 st par., 1 st phrase	Ge	This phrase repeats (incompletely) the last phrase of the previous sub-clause.	Please delete this first phrase and instead move here the last phrase from previous sub-clause (see CA-83).	See CA-83
CA- 85	565	5.4.2.2.3	1 st par., 2 nd phrase	Ed		Please add “and Figure 11” at the end of this phrase in line 565.	Agreed, see also DE-20
DE 20	565 also in 652	5.4.2.2.3 5.4.2.3.5		Te	The requirement of the projected cable length is in contradiction to Figure 11. Although Figure 11 is only an example, it should be clearly stated what is the real requirement: cable length = 0,8m	Proposal: Change wording in line 565: The projected cable length from the edge of the	To be discussed at the next WG1 meeting

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
					or distance of edge AMN to edge of vehicle = 0,8m.	AMN(s) to the edge of the vehicle longitudinal axis shall be 800 (+200/-0) mm as shown in Figure 10 and Figure 11, respectively.	
CA-86	566	5.4.2.2.3	2 nd par., 1 st phrase	Ge	Should not restrict this requirement to cables longer than 1m only. The exact length of the cable required such that the 80cm separation between the vehicle and the AMN is ensured will depend on the actual AMN and, more significantly, on the actual vehicle. This length can be shorter or longer than 1m.	Please delete "If the length of the cable is longer than 1 m" and replace with "For longer cables" in line 566.	To be discussed at the next WG1 meeting
NO-05	566	5.4.2.2.3	Figure 10, Figure 11, Figure 12, Figure 13	ge	Taking into consideration the fact that we expect fairly low frequency noise on the charging cables, and taking into consideration the fact that in real life in most cases the length of the charging cable will be longer than 2 meters, and in any case be connected to a power supply network that is more than this, the test setup should have at least 3 meters of charging cable.	We propose to modify the test setup in Figure 10, Figure 11, Figure 12 and Figure 13 by placing the cable parallel to the vehicle, with a cable length of 3 meters. The figures "NOR – annex 2" and "NOR – annex 1" in annexes below shows this change for the lower half of Figure 10 and the lower half of Figure 11.	To be discussed at the next WG1 meeting
CA-87	567	5.4.2.2.3	2 nd par., 1 st phrase	Ge	Should have some guidance / requirement of where exactly the Z-folding should be located.	Recommend to add "approximately around the middle of the distance AMN – vehicle" at the end of this first phrase in line 567 (i.e. after "width").	To be discussed at the next WG1 meeting
DE 21	574 also in 662	5.4.2.2.4 5.4.2.3.6		Te	The reference to sub-clause 5.4.1.2.4 might not be enough to help learn how the antenna should be positioned for the charging mode. Sub-clause 5.4.1.2.4 is only dealing with multiple antenna positions.	To give additional help for the read of this standard the wording of the first sentence should be extended: "The measuring antenna shall be placed as defined in clause 5.4.1.2 at a distance of 10 m (or 3 m) to the nearest metal part of the vehicle."	To be discussed at the next WG1 meeting
CN-03		5.4.2	Figure10 Figure 11 Figure 12 Figure 13 Figure 14	G	Since clause 5.4.2 is the independent chapter to define the test set-up of vehicle in charging mode, the set-up figures should include all necessary measurement elements, especially for the antenna which's missing in current CD version.	Suggest to add the antenna and relevant information in the test set-up figures, which's the same as ECE-R10_Version 5:	To be discussed at the next WG1 meeting

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KR8	577 589	5.4.2.1	Figure 10 Figure 11	ed	The type of a dotted line between key5s is different in Figure 10 and Figure 11	The type of dotted lines should be same if there is no difference.	Agreed
CA-88	578	5.4.2.2.3	Figure 10, "top view"	Te	The alternate location of the power mains socket (5), shown with a thick dashed line in the figure, is acceptable for conducted emissions (which is covered in IEC 61851-21-1, from where this figure was copied, but not in CISPR 12). For radiated emissions, additional cable length on the AE side of the AMN will add non-EUT-generated emissions and these must be minimized as much as possible. This alternate location of the mains socket also contradicts the second bullet of clause 5.4.2.2.1.	Please delete the alternate location for the mains socket from this figure (delete the leftmost "5" rectangle and the thick dashed line).	To be discussed at the next WG1 meeting 1
DE 22	581 592 669 681	5.4.2.2.4	Figure 10 Figure 11 Figure 12 Figure 13	Te	Key 1 reads "Vehicle/boat under test", but headline of clause 5.4.2 is "Test setup for vehicle in charging mode" and although the title of figure 10 is stating, that figure 10 is only showing an example, one might ask the question if this setup is suitable for boats.	Delete boat in Key 1	Not agreed, see CA-76
CA-89	586 – 587	5.4.2.2.3	Figure 10, caption	Ed	On the vehicle there is usually a socket, not a plug.	Please replace "plug" with "socket" in the caption in line 586. Also, please add a comma after "AC powered" inside the parenthesis from line 587.	Agreed
NO-03	586		Figure 10	te	This is a very nice drawing of a vehicle, but a schematic with slightly more details is required too to be sure that things are connected in the	Please add a figure with a schematic to complement the information in the drawing in Figure 10.	To be discussed at the next WG1 meeting

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
					right way.		
CA-90	590	5.4.2.2.3	Figure 11, "top view"	Te	Same comment as CA-88 above.	Please delete the alternate location for the mains socket from this figure (delete the leftmost "5" rectangle and the thick dashed line).	See CA-88
CA-91	597 – 598	5.4.2.2.3	Figure 11, caption	Ed	On the vehicle there is usually a socket, not a plug.	Please replace "plug" with "socket" in the caption in line 597. Also, please add a comma after "AC powered" inside the parenthesis from line 598.	Agreed
NO-04	597		Figure 11	te	This is a very nice drawing of a vehicle, but a schematic with slightly more details is required too to be sure that things are connected in the right way.	Please add a figure with a schematic to complement the information in the drawing in Figure 11.	See NO-3
FR-12	601	All document		ge	In the 2 nd CD, the term AC and DC are used.	Make consistency by using the adequate term a.c. and d.c.	Agreed a.c. and d.c. will be used
CA-92	602	5.4.2.3.1	1 st par., 2 nd phrase	Te	If the cable is shielded, CISPR 32 specifies special ANs that have to be used, based on the cable type (coaxial or multi-conductor).	Please change "AAN" with "AAN / AN" in line 602 and add some text in Annex G referring to CISPR 32 for ANs for shielded cables (see CA-99, CA-185, CA-192 and CA-194).	To be discussed at the next WG1 meeting
FR-13	602	5.4.2.3.1		ed	CISPR 32 is quoted but not referred in clause 2 (Normative references).	Add in Clause 2 : "CISPR 32:2012 – Electromagnetic Compatibility of multimedia equipment – Emission requirements"	See DE-04
CA-93	608	5.4.2.3.2	1 st par.	Te	If the charging station is placed outside the test site, the cable harness connecting it to the socket(s) on the AE side of the AMNs, HV-ANs, AANs or ANs will be very long and introduce non-EUT-generated emissions in the test site.	Recommend to add the following requirements: <ul style="list-style-type: none"> - If the charging station is placed inside the test site, it must be placed as close as possible to the socket (item 5 in Figures 12 and 13). - If the charging station is placed outside the test site, the cable(s) connecting it to the socket (5) must be placed under the ground plane and its length that is brought above the ground plane to connect to the socket (5) must be kept as short as possible and laid out directly onto the ground plane. This assumes that CA-82 is accepted and all "EUT in charging mode" tests are performed in ALSE only. Otherwise, OTS' have no	To be discussed at the next WG1 meeting

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
						ground planes and minimization of the emissions from this cable / harness cannot be guaranteed if the charging station is placed outside the test site.	
CA-94	610	5.4.2.3.2	Note 1	Ed	The use of the definite article “the” is not appropriate here.	Please change “replaced by the supply from power mains” to “replaced by a power supply from the AC power mains network”.	Agreed, but use of the term a.c. instead of AC
CA-95	611 – 617	5.4.2.3.2	2 nd par.	Ge / Ed	Various issues with this paragraph and its three bullets. However, if CA-93 is accepted, this paragraph together with its three bullets should be deleted.	1) on line 611, “duplicated” only applies to the situation where the charging station is placed outside the test site, while this phrase applies to both scenarios. As such, “duplicated” should be removed from line 611. 2) “in the test location” (lines 611-612) is vague and should be replaced with “inside the test site”. 3) in the first bullet on line 613, the pronoun “it” is not appropriate (can be “socket” or “sockets”) and vague. Should be replaced with “the socket(s) is(are) placed on the ground plane”. 4) also in line 613 (and in 617), “ground plane” only exists in an ALSE. There is no ground plane on OTS (see CA-82). 5) the second and third bullets require that the cable/harness between the socket(s) and the AMN/HV-AN/AAN is as short as possible and placed as close as possible to the ground plane. These precautions aim to minimize non-EUT emissions from entering the test site, but they will be useless if the charging station is placed far away from these sockets (see CA-93). Recommend to remove all text from lines 611 to 617 and implement the changes at CA-93.	To be discussed at the next WG1 meeting
CA-96	620 – 624	5.4.2.3.2	3 rd par.	Ge / Ed	A few editorial issues with this paragraph and its two bullets. However, if CA-93 is accepted, this paragraph should be removed and its two bullets merged with CA-93 suggested text.	1) on line 620, “the” should be added before the second instance of “charging station”. 2) on line 621, “shall be placed with” should be replaced by “shall satisfy”. 3) on lines 622 and 623, “ground plane” only exists in an ALSE. There is no ground plane on OTS (see CA-82).	Agreed Agreed To be discussed in WG1

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
						4) on line 623, "of" should be replaced by "to". Recommend to remove the text from lines 620 – 621 and merge the two bullets from lines 622 – 624 with the suggested text from CA-93.	Agreed To be discussed in WG1
CA-99	628 – 633	5.4.2.3.3		Ge	Shielded cables need to use the AN for shielded cables described in CISPR 32 (see also CA-92, CA-185, CA-192 and CA-194). Also, an unrelated comment for line 632 that OTS have no ground plane, which is only present in an ALSE (see CA-82).	ANs for shielded cable should also be mentioned in this clause, by adding another paragraph/phrase between lines 630 and 631 (referring to CISPR 32). If this comment is accepted, please disregard comment CA-98 above ("AN" can then be used to designate both the HV-AN and the AN for shielded cable) and also remove "HV-" from line 633.	See CA-92
CA-97	630	5.4.2.3.3	2 nd par.	Ed	Annex G includes not only the schematic but also other requirements, like impedance.	Please remove "for the schematic" from inside the parenthesis at the end of line 630.	Agreed
CA-98	631	5.4.2.3.3	3 rd par.	Ed		Please replace "AN(s)" by "HV-AN(s)" (two instances in line 631).	Agreed
DE 23	631	5.4.2.3.3		Ed	Typo: AN(s)	Correct typo: HV-AN(s)	See CA-98
KR9	631	5.4.2.3.3		ed	AN(s) include both LV-AN and HV-AN. In this clause, AN means HV-AN.	Change AN(s) by HV-AN	See CA-98
CA-100	634 – 636	5.4.2.3.3	5 th par.	Ge / Ed	A few editorial issues with this phrase. Also, this phrase states requirements for the cable, not for the ANs. As such, it should be moved in 5.4.2.3.5.	1) please change "placed" to "laid out" in line 634. 2) please change "AMN(s), HV-AN(s)" to "AMN(s) / HV-AN(s)" in line 634, since the comma implies an enumeration of three items (AMN, HV-AN and vehicle charging plug). 3) please change "plug" to "socket" in line 635 (the vehicle will have a socket, while the plug is on the cable's end). 4) please change "routet" to "routed" in line 635. Recommend to implement the above editorial changes and move the entire phrase to 5.4.2.3.5.	Agreed Agreed Agreed Agreed
BE5	635	5.4.2.3.3		ed	Mistape "routet"	Change with "routed"	See CA-100
FR-	635	5.4.2.3.3		ed		Change "routet" by "routed"	See CA-100

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14							
BE6	638	5.4.2.3.4		ed	Mistape “ ports-shall ”	Change with “ ports shall ” (no -)	Agreed
CA-101	641 – 642	5.4.2.3.4	2 nd par.	Ge	OTS have no ground plane, which is only present in an ALSE (see CA-82).	No change required if CA-82 is implemented. Otherwise, more guidance and instructions need to be added to explain how the AMN/AN/AAN can be grounded when there is no ground plane to bond them to.	To be discussed at the next WG1 meeting
CA-102	644 – 646	5.4.2.3.4	4 th par.	Ge / Ed	A few editorial issues with this phrase. Also, this phrase states requirements for the cable, not for the AANs. As such, it should be moved in 5.4.2.3.5.	1) please change “placed” to “laid out” in line 644. 2) please change “plug” to “socket” in line 645 (the vehicle will have a socket, while the plug is on the cable’s end). Recommend to implement the above editorial changes and move the entire phrase to 5.4.2.3.5.	Agreed Agreed
FR-15	644	5.4.2.3.4		ed		Change “straighth” by “straight”	Agreed
GB8	644	5.4.2.3.4		ed	Typo : straighth	“straight”	See FR-15
CA-103	647 – 649	5.4.2.3.4	5 th par.	Te / Ed	Two editorial issues and one technical with this paragraph. Also, this phrase states requirements for the cable, not for the AANs. As such, it should be moved in 5.4.2.3.5.	Editorial: 1) please change “communication” to “communication / signal” in line 647. 2) please change “The AAN is not connected to these lines” to “These lines are not connected through an AAN” in lines 648 – 649. Technical: Why are the communication / signal lines not connected through AANs? This not only contradicts previous text (e.g. lines 614 – 617) and Figures 12 and 13, but also will make it impossible to maintain a controlled impedance on the vehicle side, which will significantly increase the measurement uncertainty. Recommend to remove the second phrase from this paragraph. Recommend to implement the above changes and move the entire paragraph to 5.4.2.3.5.	To be discussed in WG1 Agreed To be discussed in WG1
CA-	650	5.4.2.3.5	Clause title	Ge	Previous text maintained generality in the sense that the vehicle may have one	Please preserve the generality by changing this clause’s title to “Power charging and	To be discussed at the

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
104					charging cable (including power lines and associated communication or signal lines) or a charging harness (including a number of cables).	communication / signal cables or harness".	next WG1 meeting
CA-105	654	5.4.2.3.5	2 nd par., 1 st phrase	Ge	Should not restrict this requirement to cables longer than 1m only. The exact length of the cable required such that the 80cm separation between the vehicle and the AMN/AN/AAN is ensured will depend on the actual AMN/AN/AAN and, more significantly, on the actual vehicle. This length can be shorter or longer than 1m.	Please delete "If the length of the cable is longer than 1 m" and replace with "For longer cables" in line 654.	See CA-86
CA-106	655	5.4.2.3.5	2 nd par., 1 st phrase	Ge	Should have some guidance / requirement of where exactly the Z-folding should be located.	Recommend to add "approximately around the middle of the distance AMN/AN/AAN – vehicle" at the end of this first phrase in line 655 (i.e. after "width").	See CA-87
CA-107	666	5.4.2.3	Figure 12, "front view"	Ed / Te	The AAN (item 6) is shown behind the AMN / HV-AN (4), in contradiction to the "top view" and to the requirement for 80cm distance.	Please remove the box 6 from the "front view" and replace "4" in its corresponding box with "4 / 6".	Agreed
FR-16	666 and 667	5.4.2.3.6	Figure 12	ed	Units errors on figure 12 concerning the distance between AN and vehicle.	Replace units "m" by "mm"	Agreed
KR10	666 678	5.4.2.3.1	Figure 12 Figure 13	ed	The type of a dotted line between key5s is different in Figure 12 and Figure 13	The type of dotted lines should be same if there is no difference.	Agreed
KR11	666	5.4.2.3.1	Figure 12	te	There are two dotted lines between key5s	Below dotted line should be connected to key7 directly and change the line type.	Agreed, but a dotted line will still be used
CA-108	667	5.4.2.3	Figure 12, "top view"	Te	The alternate location of the power mains socket (5), shown with a thick dashed line in the figure, is acceptable for conducted emissions (which is covered in IEC 61851-21-1, from where this figure was copied, but not in CISPR 12). For radiated emissions, additional cable length on the AE side of the AMN/AN/AAN will add non-EUT-generated emissions and these must be minimized as much as possible. This alternate location of the mains socket also contradicts the second bullet of clause 5.4.2.3.2.	Please delete the alternate location for the mains socket from this figure (delete the leftmost "5" rectangle and the thick dashed lines).	See CA-88
CA-109	667	5.4.2.3	Figure 12, "top view"	Te	The cable/harness between mains socket (5) and charging station (7) is shown to be of	Please add text next to this cable/harness specifying "as short as possible" (see also	To be discussed at the

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
					some undetermined, rather long length.	CA-93).	next WG1 meeting
CA-110	673	5.4.2.3	Figure 12, "key"	Ed		Please add "(see 5.4.2.3.2)" at the end of line 673.	Agreed
CA-111	676 – 677	5.4.2.3	Figure 12, caption	Ed	On the vehicle there is usually a socket, not a plug.	Please replace "plug" with "socket" in the caption in line 676. Also, please add a comma after "AC or DC powered" inside the parenthesis from line 677.	Agreed Agreed
CA-112	678	5.4.2.3	Figure 13, "front view"	Ed / Te	Same comment as CA-107 above.	Please remove the box 6 from the "front view" and replace "4" in its corresponding box with "4 / 6".	Agreed
KR12	678	5.4.2.3.1	Figure 13	te	There are two dotted lines between key5s	Below dotted line should be connected to key7 directly and change the line type.	See KR-11
CA-113	679	5.4.2.3	Figure 13, "top view"	Te	Same comment as CA-108 above.	Please delete the alternate location for the mains socket from this figure (delete the leftmost "5" rectangle and the thick dashed lines).	See CA-88
CA-114	679	5.4.2.3	Figure 13, "top view"	Te	Same comment as CA-109 above.	Please add text next to the cable/harness between (5) and (7) specifying "as short as possible" (see also CA-93).	See CA-109
CA-115	685	5.4.2.3	Figure 13, "key"	Ed	Same comment as CA-110 above.	Please add "(see 5.4.2.3.2)" at the end of line 685.	Agreed
CA-116	688 – 689	5.4.2.3	Figure 13, caption	Ed	Same comment as CA-111 above.	Please replace "plug" with "socket" in the caption in line 688. Also, please add a comma after "AC or DC powered" inside the parenthesis from line 689.	Agreed
CA-117	693	5.4.2.4.1	2 nd par.	Ed		Please delete "mainly" from line 693.	To be discussed at the next WG1 meeting
CA-118	695 – 696	5.4.2.4.1	Note	Ge		Please delete this note as this text is a definition and is already included in 3.24.	Agreed
CA-119	698 – 699	5.4.2.4.2	1 st par.	Ed / Te	Two editorial issues and one technical with this paragraph.	Editorial: 1) Only ALSE is mentioned. This is fine, if CA-82 is accepted. Otherwise, OTS should be added, together with instructions on where to place the off-board power unit in the case of OTS. 2) If the off-board unit is placed inside the ALSE (or test site), it is impossible to avoid its emissions. Please replace "avoid disturbances"	To be discussed at the next WG1 meeting

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						in line 699 with “minimize emissions”. Technical: The primary device is always inside the test site, right under the vehicle. As such, it is impossible to avoid or even minimize its emissions. Please remove “and the primary device” from the end of line 699.	
CA-120	701	5.4.2.4.2	2 nd par.	Ed	Two editorial issues.	Please replace “of” with “to” in line 701. Please replace “with” with “and shall have” in line 701.	Agreed Agreed
DE 24	701	5.4.2.4.1		Ed	Improve wording	“The harness between the off-board power unit and the primary device shall be placed as close as possible on the ground plane of the ALSE with a length...”	See CA-120
CA-121	702 – 706	5.4.2.4.2	3 rd par.	Ed / Te	Two editorial issues and one technical with this paragraph.	Editorial: 1) Please change “location” with “site” in line 702. 2) Please change “be placed with” in line 703 with “satisfy”. Technical: If the cable length is long enough to place the off-board unit outside the ALSE, then it should be a requirement that this is implemented in order to eliminate its emissions from the test site. Recommend to change the second bullet from lines 705 – 706 with text reflecting this requirement. However, keep the requirement that this cable is placed directly on the ground, or better under the ground plane.	Agreed Agreed To be discussed in WG1
CA-122	710	5.4.2.4.3	1 st par., 2 nd phrase	Ed	The primary and/or secondary may have a number of coils, not only one.	Please change “coil” with “unit” (two instances, both in line 710).	Agreed Needs also to be changed for the keys to Figure 14.
CA-123	710 – 712	5.4.2.4.3	1 st par., 3 rd phrase	Ed / Te	There are a few editorial and technical issues with this phrase.	Editorial: 1) Please change “should be adjusted” with “can be adjusted” in line 711. 2) Please change “should be set” with “shall be set” in line 711 (this is a	Agreed Agreed

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
						<p>requirement, not an informative guideline).</p> <p>Technical:</p> <p>If the separation distance can be adjusted, its value may affect emissions from the EUT. As such, this third phrase should be replaced with a requirement that, if the separation distance can be adjusted, then exploratory measurements must be performed while varying this distance to find the value that generates worst-case emissions and that the final radiated measurements be performed on that configuration.</p>	To be discussed in WG1
DE 25	715	5.4.2.4.3	Figure 14	Te	Air gap as defined in the text above the figure is not shown in figure 14	Add additional key/dimension for air gap between (2) and (3). To be consistent with other figures the length of the cable should be given in mm.	To be discussed in WG1 Agreed
CA- 124	729	5.5.1	1 st par., 2 nd phrase	Ed	Boats also should fall under this exemption.	Please add "boats and" in line 729 in between "For" and "outboard".	To be discussed at the next WG1 meeting
CA- 125	747 – 748	5.5.2	5 th par., 3 rd bullet	Te	The "with on board charger" from inside the parenthesis restricts the application of this test mode only to those boats and vehicles that incorporate the charger and are able to be connected directly to the AC mains (i.e. they do not need an external charging station). This contradicts earlier text (e.g. the entire clause 5.4.2.3 and clause 5.4.2.4).	Please remove "with on board charger" from inside the parenthesis in lines 747 – 748.	Agreed
DE	747	5.5.2		Te	Improve wording and exclude boats from charging mode tests	"Charging mode, vehicle connected to the power grid"....	To be discussed at the next WG1 meeting
FR- 17	747 and 748	5.5.2		ed	The wording "on-board charger" is not adequate (e.g. for d.c. charge"	Suppress "with on-board charger"	See CA-125
DE 26	748	5.5.2		Te	Is 3 rd bullet "Charging mode connected to the power grid" also including WPT?	<p>Add 4th bullet:</p> <ul style="list-style-type: none"> - Wireless Power Transfer (WPT) charging mode (if applicable) 	Can be agreed
CA- 126	749 – 750	5.5.2	Last par.	Ge	This phrase is redundant. The scope (clause 1) and the title of the CISPR 12 clearly state that these two technologies of boats and vehicles are what CISPR 12 is applicable to.	Recommend to remove this phrase from lines 749 – 750.	Agreed

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CA- 127	757 – 758	5.5.2.1	2 nd par.	Ed / Te	Editorial and technical issues with this phrase.	Editorial: 1) “>9kHz” should be after “or repetitive signals”. Technical: 2) Please replace “> 9 kHz” with “≥ 9 kHz”. 3) Please replace “should” with “shall”.	To be discussed at the next WG1 meeting
DE 27	766	5.5.2.2.2		Ed	A test of a boat on a dynamometer does not make sense.	Delete boat in the title and the text.	Not agreed, The clause will be amended to give guidance on the test of boats.
CA- 128	771 – 779	5.5.2.2.3		Ge	Hybrid propulsion systems come in two variants: series and parallel. In the series variant, the combustion engine is only used for generating electricity for charging the battery and propulsion of the boat/vehicle is achieved with the electrical motor only. In the parallel variant, both the combustion engine and the electrical motor can be coupled to the wheels / propulsion helix (but not both at the same time).	May want to clarify this in the text of this clause. For example, by restricting the “single mode” (lines 771 – 776) to series hybrid and the “two modes” (lines 777 – 779) to parallel hybrid.	Agreed, Definitions for series hybrid and parallel hybrid will be added.
CA- 129	808 – 809	5.6	3 rd par.	Ge	What is the purpose of this phrase?	If the idea is to ensure that measurements are taken with the 120 kHz bandwidth and not with a smaller bandwidth, this is also valid for the other two detectors. In this case, either remove this phrase (as this is common knowledge and also already stated in CISPR 16 series) or replace it with a requirement that the RBW must be equal to or greater than 120 kHz for all three detectors. If the idea is to ask that all measurements are performed with RBW exactly of 120 kHz (in order to prevent the use of higher RBW, which may result in higher measurement results) so that statistical analysis is carried out on consistent footing, this again is valid for all detectors. In this case, update this phrase to include the other two detectors and also state the reason for this requirement to make it clearer to the user. If none of the above, please either remove	To be discussed at the next WG1 meeting

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						this phrase or update it to clarify what is the exact requirement here.	
CA-130	812	6.1		Ge	“some” is not appropriate here and confusing. Also, should mention that this is valid only for a given engine (i.e. differences in the construction of the engine will have a high impact on emissions).	Please remove “some” from line 812 and add in line 813, at the end of this phrase, “for a given internal combustion engine”.	To be discussed at the next WG1 meeting
DE 28	812	6.1		Te	What is the sense/use of this sentence?	Delete sentence	See CA-130
CA-131	825 – 827	6.3	2 nd par.	Te	This compliance verification method is not possible in Canada. The Radiocommunication Act requires that each unit of an equipment model is compliant with the applicable standards.	Please add a phrase at the end of this paragraph stating that compliance based on statistical analysis may not be acceptable in some countries due to legislative requirements that each unit of an equipment model is compliant with applicable standards.	To be discussed at the next WG1 meeting
CA-138	829 – 856	Annex A	All	Te	Antenna patterns are usually measured with the antenna under test oriented straight towards the measurement antenna. On the other hand, for CISPR 12, the antenna is at a height of 3m (for 10m measurement distance) or 1.8m (for 3m measurement distance), with no tilt. Significant additional attenuation is to be expected from the manufacturer antenna pattern.	<p>This annex is incomplete as it only considers the antenna gain attenuation due to the horizontal length of the EUT's surface facing the antenna. For completeness, Annex A should be updated to also include a similar evaluation based on the vertical plane, where distance “d” is the same as in Figure A.1 (with the correction in CA-133), but the maximum deviation angle in this case will be based on the actual antenna height and measurement distance (worst-case displacement will be right at the ground level on the EUT side, so that EUT's height does not matter in this case).</p> <p>Again, this evaluation needs to consider both antenna polarizations and the worst-case attenuation from both the horizontal evaluation (existing text in Annex A and Figure A.1) and the vertical evaluation (additional evaluation outlined in this comment) must be deducted from the limit.</p>	To be discussed at the next WG1 meeting
CA-132	836	Annex A	1 st par.	Te	The “reference point” of the antenna for emissions is not its tip (for a log-periodic antenna, as depicted in Figure A.1). And, in any case, for the purpose of this annex, the “reference point” should be that that was used by the manufacturer or the antenna	Please replace “antenna reference point” in line 836 with “antenna reference point where its radiation pattern was measured”.	To be discussed at the next WG1 meeting

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					calibration lab for the purpose of measuring its radiation pattern.		
CA-133	838	Annex A	Figure A.1	Te	Same as CA-132 above: the distance “d” depicted in this figure should start from the point on the antenna where its radiation pattern was measured.	Please update the figure by moving the reference point somewhere in between the rear and the tip of the antenna. Also, please add another horizontal two-way-pointing arrow spanning the distance between some other point inside the antenna (usually the middle) and the EUT side surface with the text “measurement distance” above it. Finally, please add a note under the figure with the following text: “The antenna reference point for emissions measurements may be at a different location than the point used by the manufacturer for determining the radiation pattern of the antenna.”	To be discussed at the next WG1 meeting
CA-135	842 – 845	Annex A	3 rd par.	Te	The text does not mention the polarization of the antenna.	Should also mention that the worst-case from the horizontal and vertical radiation patterns must be used as measurements are performed in both polarizations.	To be discussed at the next WG1 meeting
CA-134	843	Annex A	3 rd par.	Te	The maximum gain reduction is not “typically at the highest frequency”. The example antenna given in lines 846 – 847 has maximum gain attenuation at 150 MHz (see CA-137 below).	Please remove the parenthesis and its text from line 843.	To be discussed at the next WG1 meeting
CA-136	846	Annex A	2 nd “Example”	Ed / Te	The Schwarzbeck antenna used in this example has a nominal frequency range of 30 – 1000 MHz and a usable range of 25 – 1700 MHz. Also, this antenna is not “log-periodic” but “biconilog” (“trilog” is the name Schwarzbeck uses for this antenna), as it also includes a bowtie element for lower frequencies. Finally, it should be emphasized that these numbers are for an example antenna, not for any log-periodic antenna.	Please change “for a” to “for a particular” in line 846. Please change “log-periodic” with “biconilog” in line 846. Please change “80” with “30” inside the parenthesis in line 846.	To be discussed at the next WG1 meeting
CA-137	846 – 847	Annex A	2 nd “Example”	Ed / Te	From the manufacturer’s radiation patterns for this example antenna, the worst-case gain attenuation for an angle of 40 degrees is not of 6dB at 200MHz E-plane. Instead, it is of 9dB at 150MHz E-plane.	Please change “6 dB” with “9 dB” in line 846 and also change “200 MHz” with “150 MHz” in line 847.	To be discussed at the next WG1 meeting

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CA-139	858 and 869 – 872	Annex B	Annex type and 2 nd par. of B.1	Te	Annex B is called up in 5.1.2.2 as one of the two acceptable methods for antenna calibration. As such, this annex cannot be informative. See also CA-45. Furthermore, the second paragraph of B.1 (lines 869 – 872) allows any other, non-specified, method to be used for antenna calibration. This essentially voids the antenna calibration requirement, since any other method can be used, at the user's choice.	Strongly recommend to make this annex normative (line 858) and to delete the second paragraph of B.1 (lines 869 – 872).	See CA-45
CA-140	864	B.1	1 st par., 1 st phrase	Ed	There is no clause 5.1.3 in this document.	Please change “5.1.3” with “5.1.2.2” in line 864.	Agreed
GB9	864	B.1	Para 1	ed	Incorrect reference to Antenna Types “with the intent of 5.1.3”	“with the intent of 5.1.2”	See CA-140
CA-141	895 , 898, 901, 902, etc.	Annex B	All	Te	Cannot use “shall” in an informative annex.	All “shall” must be changed into “should” throughout Annex B. Also “requirements” must be changed into “guidelines” in line 905. However, please disregard this comment if CA-45 and CA-139 are accepted (i.e. Annex B is made normative).	According to ISO/IEC directive 2, clause 6.4. an informative annex gives additional information intended to assist the understanding or use of the document. Informative annexes shall not contain requirements, except described in clause 6.4.1.2. 6.4.1.2 allows optional requirements for informative annexes. For example, a test method that is optional may contain requirements but there is no need to comply with these requirements to claim compliance with the document. The topic was already discussed in the WG1 meeting in Frankfurt (2014). CO responded

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							on the question, if “shall” can be used in informative annexes: “This is a classical case. Yes, we can have a shall in an informative annex. The reasoning being that if the users chose to use the Annex, then the procedures have to be followed as described...hence the use of shall” (see also the WG1 minutes in CISPR/D/WG1/N446)
CA-142	899	B.2.1.3.2	2 nd sentence	Ed		Please add “in these cases” at the end of the second sentence, in line 899.	Agreed
CA-143	901 – 903	B.2.1.4		Ed / Te	“higher loss” applies to cables, not to antennas. There is no “electrical examination” method available for antennas, except for VSWR measurement, with a network analyzer, or full antenna calibration.	Recommend to remove “antennas and” from line 901 and also to remove “the antenna” and “or the combination” from line 902. Please also add a second paragraph, for antennas, mentioning VSWR measurement instead of loss (the only quick “electrical examination” possible for antennas).	To be discussed at the next WG1 meeting
CA-144	909	B.2.2.2		Ed / Te	Same as in CA-143 above, the term “loss” applies only to cables, not to antennas.	Please delete “with separate losses, etc.” from line 909.	See CA-143
CA-145	911	B.3	Clause title	Ge	The content of this clause has nothing to do with antenna characterization.	Please change the title of this clause to “Calculation of the electric field strength” (line 911).	To be discussed at the next WG1 meeting
BE8	918 914,926	B.3, Equation B.1, B.5		ed	Antenna Factor is shown as F_a , this should align with the symbols used in Annex I and Annex H.	Antenna Factor symbol: to use AF instead of F_a	Agreed, the symbols from equation H.1 will be used.
CA-146	921 – 922	B.4		Ge	This clause is redundant and does not add any value.	Please remove this clause (delete lines 921 and 922).	To be discussed at the next WG1 meeting
CA-147	931	B.5	Note 2, 1 st phrase	Ed	This clause is general in nature, not aimed at specific antenna type.	Please change “resonant dipoles” to “antennas” in line 931.	To be discussed at the next WG1 meeting
CA-148	934	B.5	Note 2, last phrase	Ed		Please add “the” in front of “antenna factor” in line 934. Please change “B.14” to “2” inside the	Agreed,

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						parenthesis in line 934 (see CA-14 and CA-163).	The ANSI standard is now in the normative references
CA-149	935 – 937	B.6	All	Ge	This phrase does not add any value and, in fact, may be confusing. Antenna factor is determined by height scanning, while the antenna gain is not one single number, as is the case for the antenna factor (at a given frequency and polarization). Instead, the antenna gain, at a given frequency and polarization, consists of a radiation pattern, with values dependent on the direction (in 3D space).	Recommend deleting clause B.6 and its contents (delete lines 935 – 937).	To be discussed at the next WG1 meeting
CA-150	939	B.7	2 nd sentence	Ed		Please change “T” with “a _C ” in line 939 and add “given by” at the end of this sentence.	Agreed, the symbol used in equation H.1 will be used
CA-151	941 – 943	B.7	Note	Te	Calibrating the receiver together with the cable is awkward and quite unusual. Was it the intent to state that the cable can be calibrated together with the antenna?	Recommend to delete the second and third phrases from the Note or to replace “measurement receiver” with “antenna” in line 942. In the second case, please add some text explaining that the cable loss must be included in the antenna factor values in order to drop a _C from equation (B.1).	To be discussed at the next WG1 meeting
DE 29	950	B.8.1		Ed	Typo: “be” missing	“...shall be known to be within ±1,0 dB.”	Agreed
CA-152	953	B.8.1	3 rd par.	Ge	Why is an impulse generator less accurate? As long as its output level is stable at each frequency, any generator can be used since the antenna is characterized by the substitution method.	Recommend to delete this sentence.	To be discussed at the next WG1 meeting
CA-153	955	B.8.1	Note 1	Te	What is the purpose of the requirement that the spectrum produced by the impulse generator is uniform within +/-3dB? The only two requirements for the signal generator (of any type, including impulse generator) should be that its output is stable at all frequencies and that it is capable of generating sufficient field strength (in combination with the Tx antenna and amplifier, if used) such that the level measured by the receiver is 6dB or more	Recommend to remove Note 1 and instead add a requirement in normal paragraph text (not in a note) for the generator's output level stability.	To be discussed at the next WG1 meeting

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					above the latter's noise floor at all frequencies (the second requirement depending on the cable loss, amplifier gain, Tx and Rx antenna factors). The uniformity of the generator's spectrum has no bearing on the antenna characterization through substitution method.		
CA-154	957 – 961	B.8.1	Note 2	Te	<p>a) The field strength produced at the Rx antenna depends on cable losses, amplifier gain and Tx antenna factor. All of these vary with frequency. What is the basis for the specific numbers given in Note 2 (lines 957 – 958)?</p> <p>b) The meaning of the third phrase (from line 960) is not clear. How can this “approximate value” be used in characterizing the antenna under test?</p> <p>c) Same for the fourth phrase (line 961): how is this helping in estimating the “required sensitivities” and “tolerable losses”?</p>	Recommend to remove Note 2 altogether.	To be discussed at the next WG1 meeting
CA-155	965 – 966	B.8 (missing sub-clause)		Ge	There should be another sub-clause in B.8 (i.e. B.8.3) for the power amplifier used on the Tx side and for the preamplifier used on the Rx side, stating that at least one of the two, if not both, may need to be used for obtaining sufficient signal level at the receiver input.	Recommend to add B.8.3 for amplifier on Tx side and preamplifier on Rx side.	To be discussed at the next WG1 meeting
CA-156	971 – 973	B.9	Note	Ge	Other error factors missing from the list are: coupling between Tx and Rx antennas (especially at 3m distance and for large antennas) and unpredictable ground reflections (the ground plane is not defined and there are no requirements for it, except for the ALSE, as pointed in a number of the comments above).	Please add these two missing error sources to the list.	To be discussed at the next WG1 meeting
CA-159	975 – 985	B.10		Te	There are no requirements for the test site in this clause. The test site used for antenna calibration should be as per ANSI C63.5. There is no point for this antenna calibration procedure to be applied at the actual test site where the EUT will be tested (if a resonant dipole is available at that test site, then that dipole must be used, as this is the	Please add requirements for the test site to be used for antenna calibration.	To be discussed at the next WG1 meeting

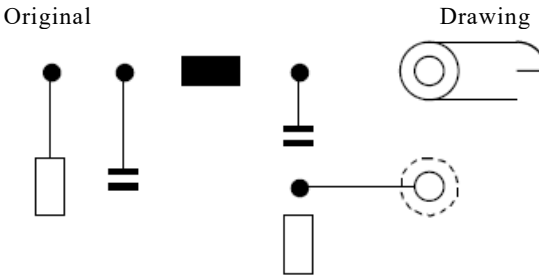
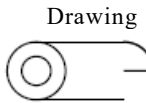
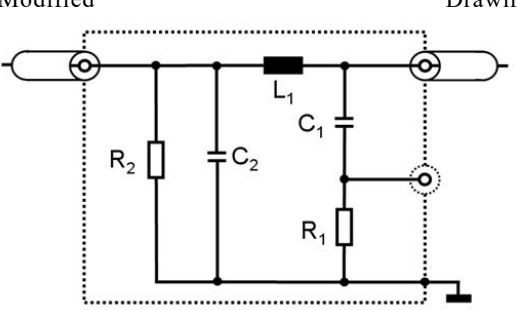
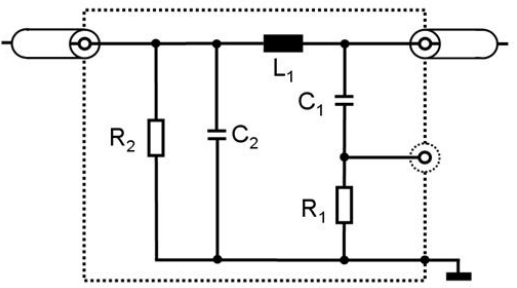
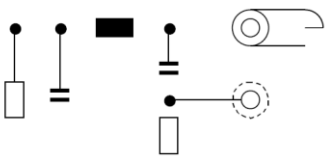
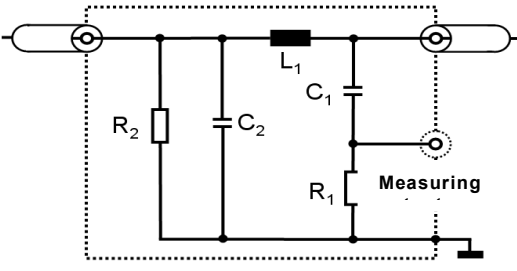
MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
					preferred antenna, as per 5.1.2.1).		
CA-157	980	B.10	1 st par., 3 rd bullet	Te	The reference point of a log-periodic antenna is usually marked by the manufacturer on the central axis of the antenna (usually midway between the tip and the rear end). The true reference point is not fixed, but its location varies with frequency along this axis. It is never the tip of the log-periodic antenna.	Recommend to correct the text in this bullet by stating that the reference point varies with frequency; at lower frequencies it is the midpoint of the bowtie element (if present) and moves towards the tip of the antenna as the frequency increases. However, for practical use, the reference point must be taken as the one marked by the manufacturer on the antenna axis.	To be discussed at the next WG1 meeting
CA-158	982 and 984	B.10	2 nd and 3 rd paragraphs	Ed		Please add "reference point of the" at the beginning of the 2 nd paragraph on line 982, in between "The" and "transmitting". Please change "10 m" with "10 ± 0,2 m" in line 982. Please change "3 m" with "3 ± 0,05 m" in line 984.	Agreed Agreed Agreed
CA-160	987 – 989	B.11	1 st par.	Te	Antenna calibration must be performed with Rx antenna (reference antenna and antenna under calibration) height scanning. Otherwise, if the Rx antenna is at a fixed height (1m as in B.10 and Figure B.1), that specific height may happen to be at or very close to a null at one or more frequencies, which will result in very high uncertainty. This is acknowledged in ANSI C63.5, even for the reference antenna method, where height scanning is recommended and, if not used, the requirement exists to select a height that avoids nulls (which may lead to different heights at different frequencies, unnecessarily complicating the calibration procedure).	Strongly recommend to add the requirement that the Rx antennas (both the reference antenna and the antenna under calibration) are scanned in height from 1 to 4 m and the maximum value obtained is recorded and used.	Not agreed, The characterization needs to be done in the same way as used for measurements.
CA-161	991	B.11	2 nd par., 1 st sentence	Te	Clause B.6 is incorrect (see CA-149).	Please replace the first sentence (line 991) with the following: "The antenna factor for the alternate antenna is calculated at each frequency as the antenna factor of the reference antenna plus 20 lg (Vref/V), where Vref and V are the maximum levels measured with the receiver for the reference antenna and for the alternate antenna, respectively."	To be discussed at the next WG1 meeting

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
CA-162	999 – 1003	B.13		Te	As previously mentioned, if the Rx antenna is not scanned in height, the uncertainty will be very high. Therefore, complete system verifications performed as per B.13 at different times may lead to large differences not because there is anything wrong with any of the test equipment items, but because the two antennas are not exactly at the same heights. The $\pm 5\text{cm}$ allowed tolerance for the height of each antenna (Tx and Rx) may be a quite significant error factor if, at some frequencies, this antennas' configuration is close to a null.	Recommend to remove the entire clause B.13 or at least require that the Rx antenna is scanned in height between 1 and 4 m.	To be discussed at the next WG1 meeting
CA-163	1029 – 1032	B.14		Ge	The ANSI C63.5 is a normative reference, as it is called in clause 5.1.2.2. As such, it should be listed in clause 2, not in Annex B.	Please remove clause B.14 and its text. See CA-14 and CA-148.	See CA-14
CA-164	1047 – 1050	C.1.2	Legend for equation (C.1)	Ed		Please add a new line of text in between lines 1047 and 1048, as follows: "A = insertion loss of the suppressor, expressed in dB;"	Agreed
CA-165	1053 and 1055	C.2.1.1	Clause title and 2 nd phrase	Ed	Two editorial issues.	Please correct the clause number from "C.2.1.1" to "C.2.1" in line 1053. Please add "only" at the end of line 1055, as follows: "At present, this method is used <u>only</u> in the frequency range from 30 MHz to 300 MHz."	Agreed Agreed
CA-166	1067	C.2.2	Last phrase	Ed	There is no clause 5.2.2	Please change "5.2.2" with "5.3.2".	Agreed
CA-167	1077	C.3.2	1 st par., 2 nd sentence	Ed		Please add "each" at the end of the second sentence in line 1077, after "10 dB".	Agreed
CA-168	1083 and 1084	C.3.3	1 st and 2 nd phrases	Ed	Two editorial issues.	Please change "the usual" with "a typical" at the beginning of line 1083. Please also change the colon ":" with a semicolon ";" in line 1084.	Agreed Agreed
CA-169	1107	Annex C	Figure C.3, Note	Ed	The test box has no upper face.	Please replace "upper face" with "upper opening" in line 1107.	Agreed
CA-170	1140	D.1	1 st par.	Ed		Please change the comma from line 1140 to "or".	Agreed
CA-	1143	Annex D	All	Te	Cannot use "shall" in an informative annex.	All "shall" must be changed into "should"	See CA-141

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
171	1156, etc.					throughout Annex D. Also “must” must be changed into “should” in line 1163.	Agreed
CA-172	1145	D.2	Note	Ed		Please change “a” with “the” at the end of line 1145.	Agreed
CA-173	1151	D.3	2 nd par.	Ge	CISPR 16-1-3 is for the clamp requirements, not for the test method.	Please replace “according to” with “that complies with” at the end of line 1151.	Agreed
CA-174	1158 – 1159	D.3	4 th par., 4 th phrase	Te	Usually the clamp position is scanned along the length of the cable to find the maximum value. This is due to the fact that the standing waves maximums and minimums will vary with frequency. If a fixed clamp position is used, there will be very high measurement uncertainties.	Recommend to require that the clamp position is varied along the tested cable such that the maximum level is determined, as per CISPR 16-2-2.	To be discussed at the next WG1 meeting
CA-175	1300	D.6.4.1	Last sentence	Ge	Since the measurement distance is the length of the ignition cable plus 120mm, the distance between the ignition cable and the absorbing clamp will always be greater than 50mm.	Please remove the last sentence (lines 1299 and 1300). However, please disregard this comment if CA-174 is accepted (in which case, all instances of fixed measurement distance from Annex D will need to be updated instead).	According to Figure D.7, which does not contradict to the text, the distance mentioned in the text is not necessarily greater than 50mm.
CA-176	1334 and 1336 – 1337	E.1		Ed / Te	Editorial: there is no need for clause E.1 title as this annex does not have any other clauses. Technical: cannot use “shall” in an informative annex. Also, the second phrase (lines 1336 – 1337) is redundant. Annex E is informative; therefore, it is evident that clause 1 takes precedence.	Please remove the clause title and number from line 1334. Please delete the second phrase (lines 1336 – 1337).	To be discussed at the next WG1 meeting
CA-177	1355 – 1357	Annex E	Flowchart	Te	The second diamond decision block will exclude chainsaws from the scope of CISPR 12 (they are not operated “on land or surface of water”).	Recommend to remove the second diamond decision block.	Not agreed, WG2 is on the opinion that a chainsaw is operated on land.
CA-178	1399 1405, etc.	Annex F	All	Te	Cannot use “shall” or “must” in an informative annex.	All “shall” and “must” instances must be changed into “should” throughout Annex F.	See CA-141
CA-179	1402 – 1405	F.2	Note, 3 rd phrase	Te	Cannot have a requirement in a note (also, cannot have a requirement in an informative annex, see CA-178). Why compliance with this limit of 10uV at the antenna terminal within 76 – 108 MHz would	Please either remove the Note from clause F.2 or add some justification on why testing over the entire frequency range of the limit in Figure 3 is not required in this case.	To be discussed at the next WG1 meeting 1

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
					ensure compliance with the limit in Figure 3 over 30 – 1000 MHz frequency range?		
CA-180	1406 – 1408	F.2.1		Te	Need to specify that the prototype must be representative of production units. However, since this is an informative annex, it cannot be worded as a requirement.	Please add a third sentence to this paragraph, as follows: “The prototype should be representative of the later production units.”	To be discussed at the next WG1 meeting
CA-181	1406 – 1408	F.2.1		Te	As previously pointed out (see CA-131), in Canada, the Radiocommunication Act requires that each unit of an equipment model that is subject to a technical standard is compliant with that standard. As such, “type approval” for Canada consists in testing one (or more) units of the equipment against the applicable limits (clause 4, in this case) and proving that all tested units are compliant. Asking for an additional 2dB margin may be appropriate if compliance with CISPR 12 is to be determined using statistical analysis (and, in case of clause F.2.1, the 2dB margin is meant to compensate for not testing more than one sample), but it is confusing for Canada, where all units must comply with the limits in clause 4.	Since Annex F is informative, there is not a stringent requirement for change here. However, for clarification and for preventing confusion, it would be best to add a note at the end of clause F.1 advising the user that in some countries, due to legislative requirements that each unit of an equipment model must comply with the applicable standard, the contents of Annex F will not be applicable.	To be discussed at the next WG1 meeting
NO-11	1408	F.2.1		te	How did you arrive at the conclusion that the results shall be at least 2 dB below the limits in Clause 4. (i.e. is this based on t test, z test or t^2 test or another test? Degrees of freedom? Etc.)	Please explain how this was calculated, i.e. the parameters used.	To be discussed at the next WG1 meeting
CA-182	1409 – 1427	F.2.2 and F.3		Te	Same comment as CA-181 above.	Recommend to add the explanatory note in F.1, as proposed at CA-181.	To be discussed at the next WG1 meeting
NO-12	1410	F.2.2		te	How did you arrive at the conclusion that the number of samples of 5 or more? (i.e. is this based on t test, z test or t^2 test or another test? Degrees of freedom? Etc.)	Please explain how this was calculated, i.e. the parameters used.	To be discussed at the next WG1 meeting
NO-13	1420	F.3.1		te	How did you arrive at the conclusion that the results of the measurements shall be a maximum of 2 dB above the specified limits in Clause 4? (i.e. is this based on t test, z test or t^2 test or another test? Degrees of freedom? Etc.)	Please explain how this was calculated, i.e. the parameters used.	To be discussed at the next WG1 meeting
NO-	1426	F.3.2		te	Which parameters did you use to calculate “a maximum of 2 dB above the specified limit of	Please explain how this was calculated, i.e. the	To be discussed at the

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
14					Clause 4" (i.e. is this based on t test, z test or t^2 test or another test? Degrees of freedom? Etc.)	parameters used.	next WG1 meeting
CA-183	1438 – 1439	F.5	2 nd par., 1 st phrase	Ed	There is no "performance penalty" mentioned above this paragraph in Annex F.	Please replace "above" in line 1439 with "in clause 6.2.2".	To be discussed at the next WG1 meeting
CA-184	1451 1453, etc.	Annex G		Ed	Only "vehicle" is mentioned in many places throughout this annex.	Please change "vehicle" to "vehicle / boat / device" all throughout Annex G. Alternatively, add a statement that electrical boats are not currently covered in CISPR 12 and will be included in a future revision, with a reference to clause J.3 (see also CA-77).	Agreed in principle, "vehicle / boat" will be used.
CA-185	1454 – 1456	G.1		Te	There is one type of AN missing from the list. See also CA-92, CA-99, CA-192 and CA-194.	Please add a fourth bullet to the list, as follows: "- Artificial network (AN): used only for shielded / coaxial communication / signal lines."	See CA-92
CA-186	1460	G.2	2 nd par.	Ed	Since the plural "ports" is used, cannot terminate all with just one 50 Ohms load.	Please delete "a" and change "load" to "loads" in line 1460.	Agreed
CA-188	1461 – 1463 and 1473 – 1475	G.2	3 rd par. and Figure G.2	Te	The required impedance of the HV-AN should also be given in table format, which is much more useful than the plot in Figure G.2. With only the plot of Figure G.2 available, it will be very difficult, not to say impossible, to verify the compliance of a particular HV-AN with the $\pm 20\%$ tolerance. For example, at lower frequencies, the tolerance will be $\pm 1 \Omega$ or less, which is impossible to assess using Figure G.2, where it is not even possible to "read" the required impedance with this tolerance.	Strongly recommend to add a table with the required HV-AN impedance values, including sufficient frequency points. Figure G.2 can be kept, for illustration purposes, but since it is not really useful, it can also be removed.	To be discussed at the next WG1 meeting
CA-187	1463	G.2	3 rd par., 2 nd phrase	Ed		Please add "and" in line 1463, as follows: "...on the measurement port <u>and</u> with terminals A and B (of Figure G.1) short circuited."	Agreed
BE7	1464	G.2	Figure G.1	ed	It is a a mistake from CISPR D/417/CD. Schematic is unclear. Please input link between Figure and Key. Please show terminals P and B and measurement terminals A and B.		Agreed, the Figure will be redrawn.
KR13	1464		Figure G.1	ed	5 μ H HV-AN schematic is missed.	Add the schematic.	See BE7

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AU-1	1465		Figure G.1	te	The diagram in Figure G.1 is missing the interconnecting lines – please amend figure	Please amend the figure	See BE7
CA-189	1465 – 1466	G.2	Figure G.1	Ed	This figure is corrupted.	Please fix this figure to clearly show the example diagram of the HV-AN.	See BE7
CN-05	1465	G.2	Figure G.1	E	<p>Original</p>  <p>Drawing</p> 	<p>Modified</p>  <p>Drawing</p> 	See BE7
FR-18	1465	G.2	Figure G.1	ed		Figure G.1 to be updated (from document N451)	See BE7
GB10	1465	G.2		ed	Schematic diagram is incomplete - missing links	Update schematic diagram	See BE7
KR14	1465	Annex G	Fig. (G.1)	ed	<p>'Figure G.1' is not precise</p>  <p> L_1: 5 μH C_1: 0.1 μF C_2: 1 μF (default value, if another value is used, it has to be justified) R_1: 1 kΩ R_2: 1 MΩ (discharging C_2 to < 50 V_{dc} within 60 s) </p>	<p>Clarify and amend accordingly</p> 	See BE7
NO-06	1465	G.1		ed	Fig. G.1 is incomplete.	Please complete Fig. G.1	See BE7
US6	1465	G-2	Figure G.1	ed	Drawing is not clear.	Correct the drawing.	See BE7
FR-19	1469	G.2	Figure G.1	ed		Replace for key C2 "it has to be justified" by "it shall be documented in the test plan"	To be discussed in WG1.
KR15	1473		Figure G.2	ge	To clarify the magnitude of the HV-AN impedance, add the magnitude table of the HV AN impedance.	<p>Insert</p> <p>AN impedance table at line 1476.</p>	See CA-188

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US8	1476		G.2		Add a table to quantify graph in figure G.2	Use the Table E.1 3 in proposed CISPR_D_425A_CDV (CISPR25) lines 1386 to define the normative values and criteria.	See CA-188
CA-190	1480	G.3	1 st par.	Ge	The edition must be mentioned right after the name of the standard, not after the clause number. However, there is no need to mention the edition for any normative reference, as that is already mentioned in clause 2. Also, as pointed out in CA-8, the latest edition of CISPR 16-1-2 is Ed.2 and the corresponding clause number for the 50uH/50Ohm AMN is 4.4.	Please replace "CISPR 16-1-2 clause 4.3 edition 1.2" with "clause 4.4 of CISPR 16-1-2" in line 1480.	Agreed
CA-191	1481	G.3	2 nd par.	Ed	Since the plural "ports" is used, cannot terminate all with just one 50 Ohms load.	Please delete "a" and change "load" to "loads" in line 1481.	Agreed
CA-192	1482	G.4	Clause title	Ge	As previously commented, the ANs for coaxial/shielded cables should be added, for completeness (see also CA-92, CA-99, CA-185 and CA-194).	This clause title should be renamed to the more general term "Artificial network (AN)" and a fourth sub-clause (G.4.4) should be added for covering ANs for coaxial and shielded cables.	See CA-92
CA_1 93	1483 – 1484	G.4	1 st par., 1 st phrase	Ed	This phrase includes three instances of "communication".	Please rephrase it as follows: "Currently, different technologies and cabling types are used for the communication between the charging station and the vehicle."	To be discussed at the next WG1 meeting
CA-194	1486	G.4	2 nd par.	Ed	Since the plural "ports" is used, cannot terminate all with just one 50 Ohms load. Also, as per CA-192 above, the more general term of "AN" should be used here.	Please replace "AAN" with "AN", delete "a" and change "load" to "loads" in line 1486.	Agreed
US7	1486		G.1		Please describe the proposed HV-AN schematic	Use the schematic Figure E.3 in proposed CISPR_D_425A_CDV (CISPR25) lines 1398-1403 to indicate labels and interconnects.	See BE7 and FR-19
CA-195	1499	G.4.2	Clause title	Ed	"PLC" means "power line communication"	Please remove "on power lines" from the clause title. Instead, rename the clause to "Power Line Communication (PLC)".	To be discussed at the next WG1 meeting
IARU 01	1499	G.4.2.		Te	Why is it necessary to define a network for PLC technology, if there is no measurement procedure and requirements available within CISPR anywhere. The work for PLC device has failed in CISPR/I/PLPLT many years ago. The European standard EN 50561-1 is currently	Delete G.4.2	Not agreed, It is the intention to cover measurements of radiated emissions only. The measurement of conducted

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					<p>available in Europe, but is not used by industry. PLC in charging systems for cars is just not covered, this network definition unneeded.</p> <p>IARU commented this already during the last CD stage. The Observation by the secretariat in CISPR/D/423/CC state "Annex G does not contain any requirements for PLC. It just defines networks." While being correct, the explanation is not satisfactory, it does not explain why a network is needed, when no requirement is given and no defined measurement procedure exist.</p>		<p>emission is handled by other standards (e.g. IEC 61851-21-1).</p> <p>The network is used just for termination purposes. It also allows to set up the communication link in order to allow the charging mode.</p>
NO-07	1499	G.4.2		te	<p>There are some issues with this section as we all know PLC is a controversial topic in the EMC standardisation community.</p> <p>We know that:</p> <ul style="list-style-type: none"> - IEC TC 77 is not finished with the task of reaching agreement on compatibility levels at low frequencies, so it is challenging to set limits that everyone finds acceptable. - The CISPR SC I PT PLT proposal represented a relaxation of the CISPR 22 limits in the order of 25 dB so it is not strange that the CISPR SC I PT PLT project had to give up in the end after having worked on the issue for more than 10 years. - The CENELEC EMC standard for in-home PLT EN 50561-1 is a little bit better than the CISPR document, but it covers only SISO PLC. It does not cover MIMO PLC, although CENELEC will start working on a MIMO PLC amendment. - at first glance G.4.2 looks like a proposal for a PLC conducted emissions test but does not represent a complete emission test method with limit. <p>It is very confusing to have a dedicated part of the standard dedicated to power line communication.</p> <p>Therefore it is not beneficial to add this</p>	Delete section G.4.2 "PLC on power lines" or explicitly state that the emissions from PLC communications is assessed with the antenna measurements.	See IARU-01

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					controversial and apparently only partially covered issue at this stage.		
CA-196	1500	G.4.2	1 st par.	Ed	Revised text proposed for improved readability	Please replace the text after the comma with: "an AAN might not be required for PLC communication."	Agreed
CA-197	1502 – 1505	G.4.2	2 nd par.	Ed	Revised text proposed for improved readability	Please reword this entire paragraph as follows: "If the presence of the AMN prevents proper PLC communication with the original charging station, the PLC communication shall be simulated by means of an associated equipment (e.g. a PLC modem) instead of the original charging station. In this case, it is necessary to add an AAN between the AE (e.g. the PLC modem) and the AMN's output (vehicle side), as shown in Figure G.4."	Agreed in principle
CA-198	1506 – 1507	G.4.2	Note	Ed / Te	The AAN has two roles: decoupling (preventing noise from outside to enter the EUT setup) and controlling the CM impedance to ground.	Please update the text at the end of this note as follows: "...adequate decoupling between <u>the PLC modem and the vehicle's</u> power mains, <u>as well as to provide controlled common mode impedance to ground.</u> "	Agreed
CA-199	1508 and 1515	G.4.2	3 rd par., 1 st sentence and Figure G.4	Ed	"AN" is a general term that includes AMN, HV-AN, AAN and other ANs (e.g. for coaxial / shielded cables).	Please replace "AN/AMN" with "AMN / HV-AN" in line 1508. Please replace "AMN / AN" with "AMN / HV-AN" inside the Figure G.4.	Agreed Agreed
NO-09	1514 -1515		Figure G.4	te	The coupling device towards "AE(PLC)" in figure G.4 is not fully described/characterised. What are the characteristics of the coupling devices towards "AE (PLC)" in figure G.4 (over the frequency range from 9 kHz to 6 GHz? This should be described such that the lab uses an appropriate device.	What are the characteristics of the coupling device(s) towards "AE(PLC)" in figure G.4?	To be discussed at the next WG1 meeting
FR-20	1515 and 1537	G.4.2	Figure G.4 Figure G.5	ed	Figures are not in line with IEC rules.	These figures should be updated by replacing resistor, capacitors and inductance values by symbols and adding keys with symbol values as in figures G.1 and G.2	Agreed, the Figures from CISPR 25 will be used.
IARU 02	1520	G.4.3.		Te	Why is it necessary to define a network for PLC technology, if there is no measurement procedure and requirements available within	Delete G.4.3	Not agreed, see IARU-1

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					<p>CISPR anywhere. The work for PLC device has failed in CISPR/PLPLT many years ago. The European standard EN 50561-1 is currently available in Europe, but is not used by industry. PLC in charging systems for cars is just not covered, this network definition unneeded.</p> <p>IARU commented this already during the last CD stage. The Observation by the secretariat in CISPR/D/423/CC state "Annex G does not contain any requirements for PLC. It just defines networks." While being correct, the explanation is not satisfactory, it does not explain why a network is needed, when no requirement is given an no defined measurement procedure exist.</p>		
NO-08	1521	G.4.3		te	To avoid any confusion, it should be made clear that the emissions from PLC is assessed using the antenna measurements.	To avoid any confusion, it should be made clear that the emissions from PLC is assessed using the antenna measurements.	See NO-7
NO-10	1536 -1537		Figure G.5	te	<p>The coupling device towards "AE(PLC)" in figure G.4 is not fully described/characterised.</p> <p>What are the characteristics of the coupling devices towards "AE (PLC)" in figure G.4 (over the frequency range from 9 kHz to 6 GHz?</p> <p>This should be described such that the lab uses an appropriate device.</p>	What are the characteristics of the coupling device(s) towards "AE(PLC)" in figure G.5?	See NO-9
CN-02		Annex H&Annex I		E	The symbol such as δV_{CW} in annex H and annex I is the same meaning as it in the CISPR 16-4-2:2011. But that is δV_{sw} in CISPR 16-4-2. The other symbol such as δV_{PA} , δV_{PR} , δV_{NF} and ect. is not the same as CISPR 16-4-2:2011.	The symbols in annex H and annex I should be in accord with CISPR 16-4-2:2011.	Agreed to use the same symbols where appropriate.
CA-200	1552 – 1556	H.1	3 rd par.	Te	<p>CISPR 16-4-2 is also called "measurement instrumentation uncertainty" but includes test method-related contributors.</p> <p>Also, the second bullet is not entirely true. The measurement distance is partially and indirectly included in the "directivity difference" antenna contributor.</p>	<p>Please expand the text in clause H.1 to:</p> <ul style="list-style-type: none"> a) explain that the term "measurement instrumentation uncertainty" is used much more restrictively in CISPR 12 than in CISPR 16-4-2; b) include a more complete list of contributors not considered in CISPR 12 uncertainty budgets; c) clearly state that the actual uncertainty of CISPR 12 measurements will most probably be 	Not agreed. There have been more contributors in former stages of the document, which were removed due to the fact that only measurement instrumentation uncertainties are addressed, which is in line with CISPR 16-4-2.

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						significantly higher than the estimates obtained using annexes H and I due to the fact that the antenna height is fixed instead of the normal radiated measurement procedure of scanning from 1 to 4m and also due to the uncontrolled ground plane properties (land, water or a mix of the two, in case of OTS, or metal in case of ALSE).	In the note in 5.2 and in H.1 it is clearly stated that contributors from the test site are not covered for the time being, since it is part of current work for test site validation.
CA-201	1582 – 1596	H.2	Figure H.1	Te	One antenna contributor missing.	Please add “phase centre location” in the leftmost box labelled “antenna”.	To be discussed at the next WG1 meeting
CA-202	1598	H.2.1		Te	The measurand is incompletely defined.	Please add the following text at the end of the definition for “E”: “...above the ground/floor or the water surface, from the specified sides of the EUT.”	Could be agreed
CA-203	1599 – 1600	H.2.1	Eqn. (H.1)	Ed		Please move the sentence from line 1599 and the equation (H.1) from line 1600 to line 1608, just before the table.	Could be agreed
CA-204	1600	H.2.1	Eqn. (H.1)	Te	Same as CA-201.	Please add the missing contributor for antenna phase centre location to this equation.	To be discussed at the next WG1 meeting
CA-205	1603 – 1604	H.2.2	1 st par.	Ge	Mentioning “OTS” and “ALSE” in this sentence is confusing and misleading. The uncertainty budget described here does not include any consideration of the OTS vs. ALSE (which, as pointed out at CA-200, may lead to large uncertainty due to the unpredictability of the ground reflections, also exacerbated by the fixed antenna height).	Recommend to remove “at an OTS or in an ALSE” from this sentence.	Agreed. It will also be removed in the title of H.2.2 and the title for Table H.1.
CA-206	1607 1608	H.2.2	3 rd bullet and Table H.1's header	Ed		Please replace “rational” with “rationale” in line 1607 and in the header of the last column of Table H.1.	Agreed
BE2	1608	H.2.2	Table H.1, Note (4)	ed	Mistake of “chamber bulkhead connector ant antenna”, “measurements are performed without feedthrough “	Change in “and”, “feedthrough”	Agreed
CA-207	1608	H.2.2	Table H.1, rows 1 – 2	Ed	A few editorial issues in the first two table rows.	Please add “normal” in the third column for the first two rows (just above “k=1” and “k=2”,	To be discussed at the next WG1 meeting

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
						respectively). Please delete the carriage return from the text in the last column for the first row (that breaks the second phrase in two).	
CA-208	1608	H.2.2	Table H.1, rows 3 – 4	Ed	The text in the last column for these contributors is identical to that for sinewave voltage contributor.	Please replace the text in the last column of rows 3 and 4 with appropriate text taken from A4) of clause A.2 of CISPR 16-4-2 Ed.2.	Agreed, 3 rd row to read: “A verification report stating that the receiver pulse amplitude response complies with the CISPR 16-1-1 tolerance of $\pm 1,5$ dB for peak, quasi-peak or average or rms average detection is assumed to be available. The correction δV_{pa} is estimated to be zero with a rectangular probability distribution function having a half-width of 1,5 dB ” 4 th row: “The CISPR 16-1-1 tolerance for pulse repetition rate response varies with repetition rate and detector type. A verification report stating that the receiver pulse repetition rate responses comply with the CISPR 16-1-1 tolerances is assumed to be available. The correction δV_{pr} is estimated to be zero with a rectangular probability distribution function. having a half width of 1,5 dB, a value considered to be representative of the various

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
							CISPR _____ 16 1 1 tolerances"
CA-209	1608	H.2.2	Table H.1, row 6 (2 nd on page 76)	Ed	Various editorial issues in the text from the last column of the row for "receiver's frequency step"	<p>Please correct as follows:</p> <p>"This correction concerns the error which depends of <u>on</u> the frequency step size used with <u>on</u> the measuring receiver in comparison as a function of the used measurement bandwidth.</p> <p>This correction can be evaluated experimentally with a frequency generator and a <u>the</u> receiver used for the actual measurements by means of with adjustment of adjusting the receiver's tuning frequency of the signal with a variation of + half and – half the step size and noting the amplitude change on the receiver (see annex I clause I.3)."</p>	Agreed
CA-210	1608	H.2.2	Table H.1, row 9 (last on page 76)	Ed	A few editorial issues with the text in the last column for the "bulkhead – receiver mismatch"	<p>Please correct the first sentence as follows:</p> <p>"This parameter concerns the impedance mismatch of between the bulkhead connector and the measuring receiver input <u>connection</u>."</p>	Agreed
CA-211	1608	H.2.2	Table H.1, row 10 (1 st on page 77)	Ed	A few editorial issues with the text in the last column for the "antenna – bulkhead mismatch"	<p>Please correct the first sentence as follows:</p> <p>"This parameter concerns the impedance mismatch of between the antenna and the bulkhead connector <u>liaison</u>."</p>	Agreed
CA-212	1608	H.2.2	Table H.1, row 13 (4 th on page 77)	Te	Since the antenna is at a fixed height, this factor can be calculated and the corresponding value used directly for correcting the measurement result, which will result in a zero contributor for "AF variation with height".	<p>Should revise the text for this contributor stating that this is a systematic error that can be directly corrected for during measurement and it should only be included in the uncertainty budget if such a correction is not made during measurements.</p> <p>However, if previous comments for changing the test method by requiring that the antenna is scanned in height between 1-4m are accepted, please ignore this comment.</p>	To be discussed at the next WG1 meeting
CA-213	1608	H.2.2	Table H.1	Te	Same as CA-201 and CA-204.	Please add the missing contributor for antenna phase centre location to Table H.1.	To be discussed at the next WG1 meeting See CA-201
KR16	1608		Table H.1	ed	There is a typing error at Note (4).	Change	Agreed

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
						Between chamber bulkhead connector ant antenna By Between chamber bulkhead connector and antenna	
KR17	1608	H.2.2	Table H.1	te	Need to update Rational for the estimates for Receiver correction – Pulse amplitude response (same with Receiver corrections – Sine wave voltage)	Change An estimate of the correction for receiver sine-wave voltage accuracy is assumed to be available from a calibration report, along with an expanded uncertainty and a coverage factor. (1) To A verification report stating that the receiver pulse amplitude response complies with the CISPR 16-1-1 tolerance of $\pm 1,5$ dB for peak, quasi-peak, average or r.m.s.-average detection is assumed to be available. The correction δV_{PA} is estimated to be zero with a rectangular probability distribution having a half-width of 1,5 dB	See CA-208
KR18	1608	H.2.2	Table H.1	te	Need to update Rational for the estimates for Receiver correction – Pulse repetition rate response (same with Receiver corrections – Sine wave voltage)	Change An estimate of the correction for receiver sine-wave voltage accuracy is assumed to be available from a calibration report, along with an expanded uncertainty and a coverage factor. (1) To A verification report stating that the receiver pulse repetition rate responses comply with the CISPR 16-1-1 tolerances is assumed to be available. The correction δV_{PR} is estimated to be zero with a rectangular probability distribution having a half-width of 1,5 dB, a value considered to be representative of the various CISPR 16-1-1 tolerances.	See CA-208
FR-21	Various lines	Annex H and Annex I	Tables H.1, I.1 to I.4	ed	It is not necessary to specify edition of CISPR 16-4-2 because it is already stated in normative references.	Replace “CISPR 16-4-2 ed 2.0” by “CISPR 16-4-2”	Agreed
CA-214	1615, 1618 and 1620	Annex I, I.1 and I.2		Ge	As mentioned at CA-205, “OTS” and “ALSE” should not be included in uncertainty text within CISPR 12 because this is misleading and prone to confusion. The CISPR 12 uncertainty budgets do not include any consideration of the OTS vs. ALSE (which, as pointed out at CA-200, may lead to large	Recommend to remove “at an OTS or in an ALSE” from the title of this annex (line 1615). Please also remove “at an OTS” from line 1618. Finally, please remove the entire sentence from line 1620. This sentence only states that	Agreed Not agreed, the text gives some explanation for the uncertainty

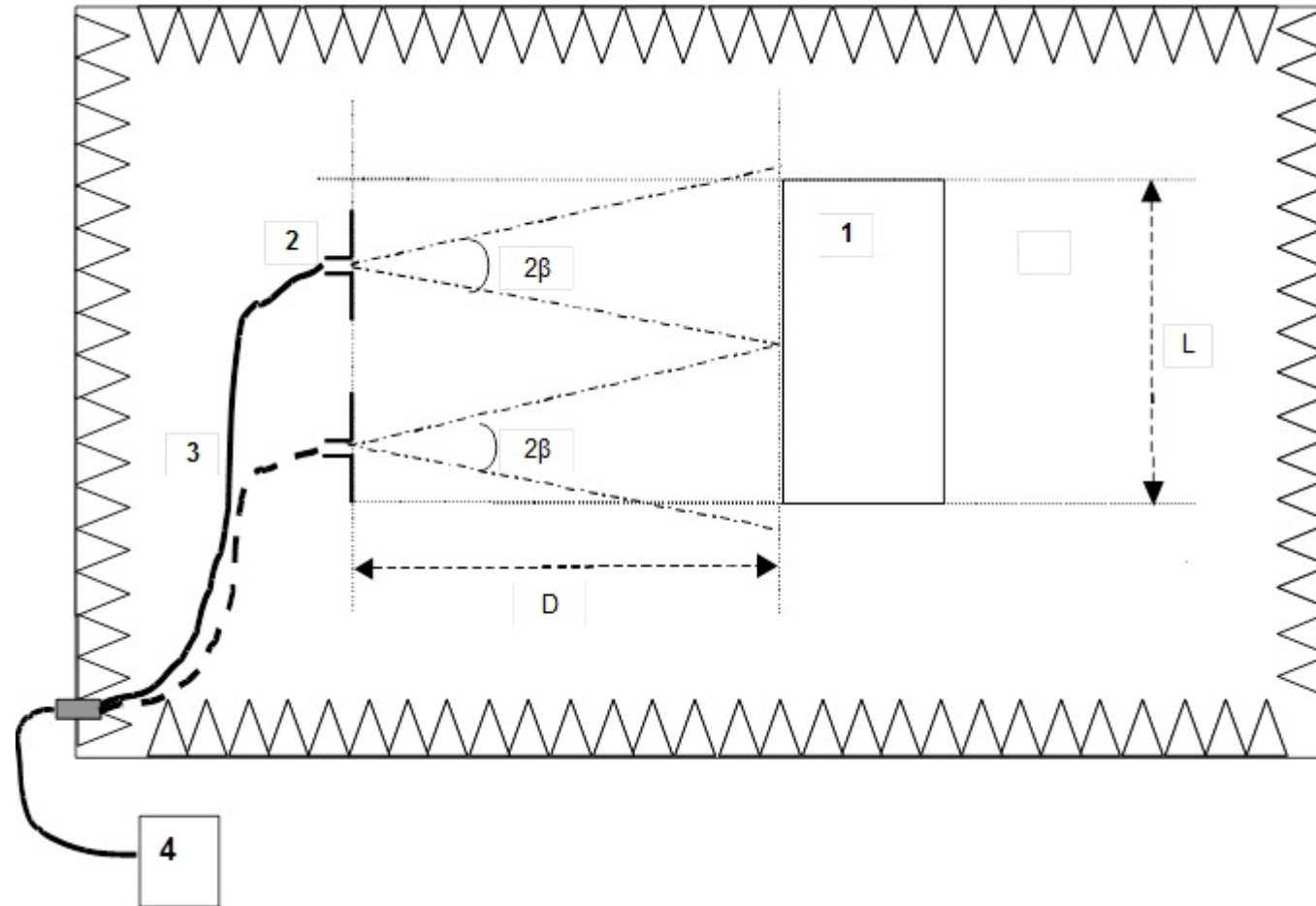
MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat												
					uncertainty due to the unpredictability of the ground reflections, also exacerbated by the fixed antenna height).	the site imperfections are not considered, which gives the false impression that all other uncertainty contributors due to the test site are included.	budgets.												
BE3	1620 1624, 1629, 1635	Note(5), (6)	Table I.1, Table I.2, Table I.3, Table I.4	ed	Mistape of “ reflexion ”	Change in “ reflection ”	Agreed												
BE4	1620 ,1620, 1624, 1629, 1635	I.2	Equation H.1, Table I.1, Table I.2, Table I.3, Table I.4 and Table H.1	Ed, ge	Table I.1 symbols are same symbols used in Equation H.1, but Table I.2, I.3 and I.4 symbols are not all same as Equation H.1. Need to use same symbols in Table I.1, Table I.2, Table I.3, Table I.4 , Table H.1 and Equation H.1. Mistake in all symbols in the Table from Antenna Factor to Unbalance: e.g. In Table I.1 symbol is F_a , in Table I.2 symbol is AF.	Antenna Factor is better identified as AF. BE NC proposes to use δAF symbol when the value is related to the Antenna Factor and δA symbol when the value is related to other antenna parameter. BE NC proposes to use symbols as follows: <table><tr><td>Antenna Factor</td><td>AF</td></tr><tr><td>AF frequency interpolation</td><td>δAF_F</td></tr><tr><td>AF variation with height</td><td>δAF_H</td></tr><tr><td>Directivity difference</td><td>δA_{DIR}</td></tr><tr><td>Cross-polarization</td><td>δA_{CP}</td></tr><tr><td>Unbalance</td><td>δA_{BAL}</td></tr></table> These symbols should be adjusted in Equation H.1 and in Table I.1 and Table I.2 and Table I.3 and Table I.4 and Table H.1.	Antenna Factor	AF	AF frequency interpolation	δAF_F	AF variation with height	δAF_H	Directivity difference	δA_{DIR}	Cross-polarization	δA_{CP}	Unbalance	δA_{BAL}	See CN-02
Antenna Factor	AF																		
AF frequency interpolation	δAF_F																		
AF variation with height	δAF_H																		
Directivity difference	δA_{DIR}																		
Cross-polarization	δA_{CP}																		
Unbalance	δA_{BAL}																		
CA-215	1620 – 1622	I.2	Table I.1	Ed	Should mention that this budget applies within 30 – 200 MHz.	Please add “, 30 – 200 MHz” at the end of the title of this table, inside its topmost row, as well as at the end of its caption (line 1622).	To be discussed at the next WG1 meeting												
CA-216	1620 – 1621	I.2	Table I.1	Ed	Editorial error in the table header of the fifth column.	Please change “ $C_i U x_i$ ” to “ $c_i u(x_i)$ ”, since the capital “U” is used for the expanded uncertainty, while here the value is for the standard uncertainty, which is a function of x_i .	Agreed												
CA-217	1620 – 1621	I.2	Table I.1, footnotes (5) and (6)	Ed / Te	Should mention that the cable is assumed to have no loss and perfect matching.	Please delete “cable maximum transmission parameter of 1” from the second bullet of footnotes (5) and (6).	To be discussed at the next WG1 meeting												

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
						Please add a third bullet to each footnote, (5) and (6), as follows: “- cable is assumed to have no loss ($ S_{21} = 1$) and be perfectly matched ($ S_{11} = S_{22} = 0$).”	
CA-218	1624 – 1626	I.2	Table I.2	Ed	Should mention that this budget applies within 30 – 200 MHz.	Please add “, 30 – 200 MHz” at the end of the title of this table, inside its topmost row, as well as at the end of its caption (line 1626).	See CA-215
CA-219	1624 – 1625	I.2	Table I.2	Ed	Editorial error in the table header of the fifth column.	Please change “ $C_i U x_i$ ” to “ $c_i u(x_i)$ ”, since the capital “U” is used for the expanded uncertainty, while here the value is for the standard uncertainty, which is a function of x_i .	Agreed
CA-220	1624 – 1625	I.2	Table I.2, footnotes (5) and (6)	Ed / Te	Should mention that the cable is assumed to have no loss and perfect matching.	Please delete “cable maximum transmission parameter of 1” from the second bullet of footnotes (5) and (6). Please add a third bullet to each footnote, (5) and (6), as follows: “- cable is assumed to have no loss ($ S_{21} = 1$) and be perfectly matched ($ S_{11} = S_{22} = 0$).”	To be discussed at the next WG1 meeting
CA-221	1629 – 1631	I.2	Table I.3	Ed	Should mention that this budget applies within 200 – 1000 MHz.	Please add “, 200 – 1000 MHz” at the end of the title of this table, inside its topmost row, as well as at the end of its caption (line 1631).	See CA-215
CA-222	1629 – 1630	I.2	Table I.3	Ed	Editorial error in the table header of the fifth column.	Please change “ $C_i U x_i$ ” to “ $c_i u(x_i)$ ”, since the capital “U” is used for the expanded uncertainty, while here the value is for the standard uncertainty, which is a function of x_i .	Agreed
CA-223	1629 – 1630	I.2	Table I.3, footnotes (5) and (6)	Ed / Te	Should mention that the cable is assumed to have no loss and perfect matching.	Please delete “cable maximum transmission parameter of 1” from the second bullet of footnotes (5) and (6). Please add a third bullet to each footnote, (5) and (6), as follows: “- cable is assumed to have no loss ($ S_{21} = 1$) and be perfectly matched ($ S_{11} = S_{22} = 0$).”	To be discussed at the next WG1 meeting
KR19	1629	I.2	Table I.3	ed	Mention of biconical antenna in the table of Log-periodic antenna (Note 2)	Change (2): based on CISPR 16-4-2 ed 2.0 (value for biconical antenna not tilted used in OATS or ALSE and 3 m / 10 m distance) To (2): based on CISPR 16-4-2 ed 2.0 (value for log-periodic antenna not tilted used in OATS or ALSE	Agreed in principle, there is no need to explicitly mention ed 2.0, because the reference is already given in clause 2

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
						and 3 m / 10 m distance)	
CA-224	1634 – 1636	I.2	Table I.4	Ed	Should mention that this budget applies within 200 – 1000 MHz.	Please add “, 200 – 1000 MHz” at the end of the title of this table, inside its topmost row, as well as at the end of its caption (line 1636).	See CA-215
CA-225	1634 – 1635	I.2	Table I.4	Ed	Editorial error in the table header of the fifth column.	Please change “ $C_i U_{x_i}$ ” to “ $c_i u(x_i)$ ”, since the capital “U” is used for the expanded uncertainty, while here the value is for the standard uncertainty, which is a function of x_i .	Agreed
CA-226	1634 – 1635	I.2	Table I.4, footnotes (5) and (6)	Ed / Te	Should mention that the cable is assumed to have no loss and perfect matching.	Please delete “cable maximum transmission parameter of 1” from the second bullet of footnotes (5) and (6). Please add a third bullet to each footnote, (5) and (6), as follows: “- cable is assumed to have no loss ($ S_{21} = 1$) and be perfectly matched ($ S_{11} = S_{22} = 0$).”	To be discussed at the next WG1 meeting
KR20	1634	I.2	Table I.4	ed	Mention of biconical antenna in the table of Log-periodic antenna (Note 2)	Change (2): based on CISPR 16-4-2 ed 2.0 (value for biconical antenna not tilted used in OATS or ALSE and 3 m / 10 m distance) To (2): based on CISPR 16-4-2 ed 2.0 (value for log-periodic antenna not tilted used in OATS or ALSE and 3 m / 10 m distance)	Agreed in principle, there is no need to explicitly mention ed 2.0, because the reference is already given in clause 2
CA-227	1641	I.3	1 st par.	Ed	This is not a “correction” that is applied to the measurement result. Instead, it is an evaluation of the uncertainty value for the frequency step contributor.	Please delete the sentence in line 1641 and replace with the following: “Example evaluation of the uncertainty contribution due to the receiver’s frequency step. This example is based on the particular conditions stated below:”	To be discussed at the next WG1 meeting
CA-228	1653	I.3	Figure I.1	Te	This plot shows the shape of the receiver’s 120 kHz RBW filter when tuned on 100 MHz. The procedure for estimating this uncertainty contributor is incorrect. Instead, it should consist of the following steps: a) configure the receiver with the RBW of 120 kHz, step size equal to that that is used by the receiver during actual measurements and a small span of maximum two to three times the RBW;	Please update the clause I.3 with a more detailed procedure, as outlined in this comment. Also, please remove Figure I.1 as it is not relevant to this procedure and misleading.	To be discussed at the next WG1 meeting

MB/N C	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment	Comments	Proposed change	Observations of the secretariat
					<ul style="list-style-type: none"> b) tune the receiver on the signal generator's frequency and record the maximum level measured within the span (marker on peak search); c) tune the receiver at the signal generator's frequency minus half the step size setting of the receiver (do not change the receiver's step size) and again record the maximum level across the span; d) repeat step c) but tuning the receiver at a frequency half the value of the step size above the generator's frequency; e) take the largest difference in dB between the levels recorded at c) / d) and the level recorded at b) as the negative value of the uncertainty (the positive value being 0dB); f) if the receiver changes its step size with frequency, repeat the entire procedure for the other step sizes and take the worst case difference as the uncertainty's negative value (not likely to apply here since the receiver usually sets its step size based on RBW and the RBW is constant over the frequency range measured in CISPR 12; nonetheless, the text here should warn the user that this step may be required, possibly in a note). 		
JP-02	1669	Annex J	J.4	Ge	OTS correlation can be developed in CISPR/D WG1.	Replace "The work on this topic has been started in the CISPR/A – CISPR/D Joint Task Force" by "The work on this topic has been started in the CISPR/D task Force".	Agreed

ANNEX FR-10



ANNEX FR-11

5.4.1.2.4 Position

For vehicle/boat, measurements shall be made on the left and right sides of the vehicle/boat (see Figures 6 and 7)

For devices, measurements shall be made in the direction of the maximum disturbance emission. Where practical, the device under test shall be measured in three orthogonal planes.

Multiple antenna positions are required (both for 10 m and 3 m antenna distance) depending on the vehicle/boat/device length. The same positions shall be used for both horizontal and vertical polarization measurements.

if the length of the vehicle/boat/device is smaller than the 3 dB beamwidth of the antenna, only one antenna position is necessary. The antenna shall be aligned with the middle of the total vehicle/boat/device length (see Figure 8)

if the length of the vehicle/boat/device is greater than the 3 dB beamwidth of the antenna, multiple antenna positions are necessary in order to cover the total length of the vehicle/boat/device (see Figure 9). The number of antenna positions shall allow to meet the following condition:

$$N \cdot 2 \cdot D \cdot \tan(\beta) \geq L \quad (1)$$

with

N : number of antenna positions

D : measurement distance (3 m or 10 m)

$2 \cdot \beta$: 3 dB antenna beamwidth angle

L : total vehicle/boat/device length

The measurement shall be performed for a number N of antenna positions depending of the vehicle/boat/device length L and of the X dB antenna beamwidth angle $2 \cdot \beta$ which allow to meet the following conditions

$$N \cdot 2 \cdot D \cdot \tan(\beta) \geq L \quad (1)$$

with

N : number of antenna positions

D : measurement distance (3 m or 10 m)

$2 \cdot \beta$: X dB antenna beamwidth angle

L : total vehicle/boat/device length

There are different (N, X) possibilities for a given vehicle/boat/device length to meet the conditions of equation (1). The users of this standard may choose one of the possible (N, X) possibilities but should consider that :

- Using a single antenna position ($N=1$) with an X value greater than 3 dB will lead to a shorter test measurement time but to use limits stringent than the original limits
- Using multiple antenna positions ($N>1$) with an X value equal to 3 dB will lead to a longer test measurement time but to use the original limits
- Using multiple antenna positions ($N>1$) with an X value greater than 3 dB will lead to an intermediate test measurement time (in-between the two previous ones) and to use limits stringent than the original limits

Depending of the choosen values of N (number of antenna positions) and X (maximum gain reduction corresponding to the 2β antenna beamwidth angle), different set-up and applicable limits shall be used :

- if $N=1$ (only one antenna position is necessary) and $X = 3$ dB

- The antenna shall be aligned with the middle of the total vehicle/boat/device length (see Figure 8)
- The applicable limits are the original limit values

- if $N=1$ (only one antenna position is necessary) and $X > 3$ dB

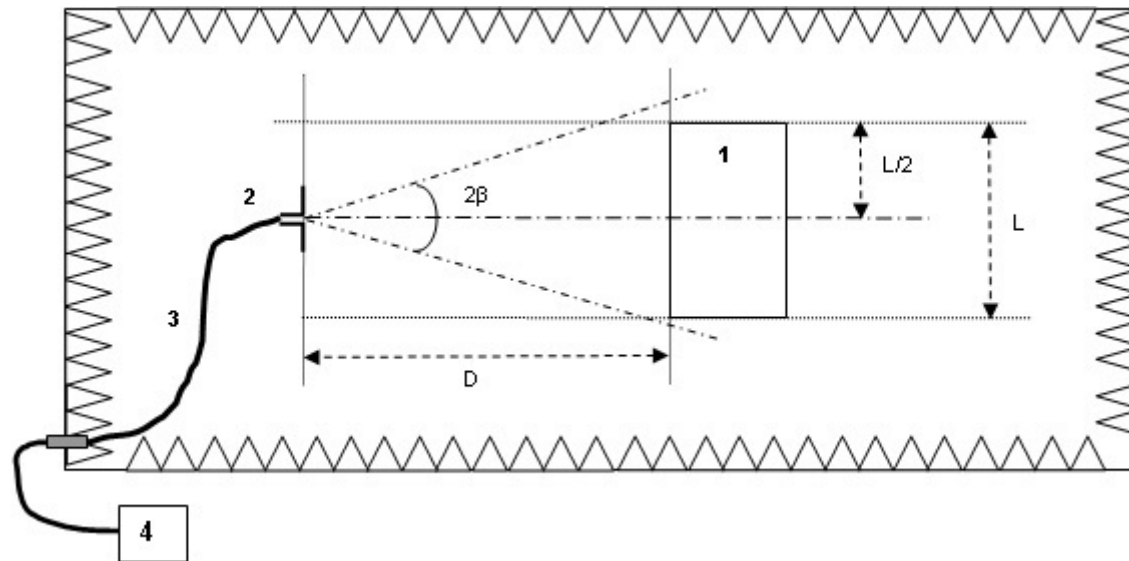
- The antenna shall be aligned with the middle of the total vehicle/boat/device length (see Figure 8)
- the applicable limits are the original limit values minus a correction calculated from the antenna gain data (see Annex A).

- if $N>1$ (more than one antenna position is necessary) and $X = 3$ dB

- multiple antenna positions are necessary in order to cover the total length of the vehicle/boat/device (see Figure 9).
- The applicable limits are the original limit values

- if $N>1$ (more than one antenna position is necessary) and $X > 3$ dB

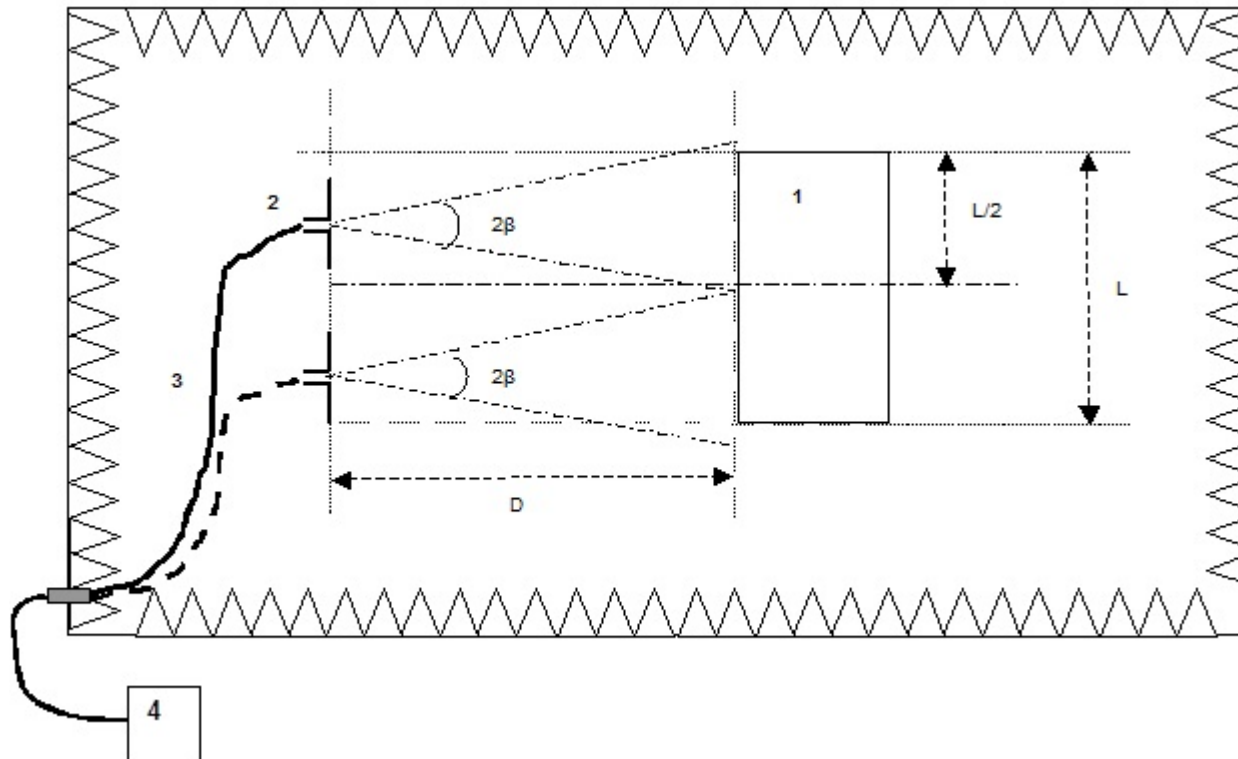
- multiple antenna positions are necessary in order to cover the total length of the vehicle/boat/device (see Figure 9).
- the applicable limits are the original limit values minus a correction calculated from the antenna gain data (see Annex A).



Key

- 1 Vehicle/boat/device under test
- 2 Antenna
- 3 Cable
- 4 Measuring equipment

Figure 8 – Antenna position when length of the vehicle/boat/device is smaller than the 3 dB beamwidth of the antenna N (number of antenna positions) = 1 and X (maximum gain reduction corresponding to the 2β antenna beamwidth angle) ≥ 3 dB, – Horizontal polarisation shown



Key

- 1 Vehicle/boat/device under test
- 2 Antenna (two or more positions)
- 3 Cable
- 4 Measuring equipment

Figure 9 – Multiple Antenna positions when length of the vehicle/boat/device is greater than the 3 dB beamwidth of the antenna N (number of antenna positions) > 1 and X (maximum gain reduction corresponding to the $2\cdot\beta$ antenna beamwidth angle) ≥ 3 dB, - Horizontal polarisation shown

5.4.1.2.5 Auxiliary (multiple) antennas

Auxiliary antennas are permitted, but if two antennas are facing each other, one shall be vertically polarized while the other is horizontally polarized.

The test site clear area requirement of 5.3.1.1 and 5.3.1.2 shall be applied also to the point midway between the vehicle/boat/device and the auxiliary antenna(s).

5.4.1.2.6 Multiple antenna positions

Multiple antenna positions can be avoided in the case where the measured emissions are lower than the original limit values minus a gain reduction calculated from the geometric dimensions of the test set up and the antenna gain data (see Annex A).

NOTE — A typical log periodic antenna has a 3 dB beamwidth of approximately 60°. This results in about 3,5 m of illumination at 3 m antenna distance, e.g. 1,75 m either side of the antenna centreline. Thus, a vehicle 8 m long requires three antenna positions on each side to quantify the radiation signature of that vehicle.

Annex A (normative)

Procedure to determine an alternative emission limit for measurements

Calculate the maximum antenna angle α_{\max} from the vehicle dimensions, the antenna distance (vehicle surface — antenna reference point), and the antenna position (see Figure A.1).

Example: $d = 3$ m, vehicle length = 5 m $\rightarrow \alpha_{\max} = 40^\circ$.

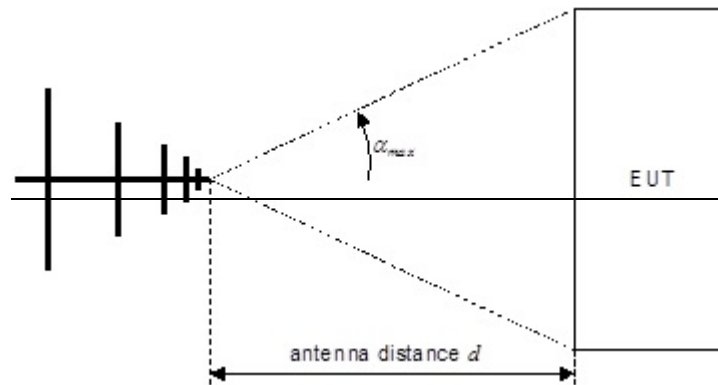


Figure A.1 — Determination of the maximum antenna angle

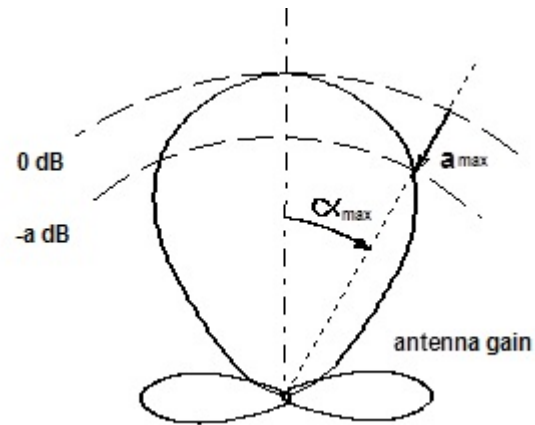
Read from the antenna directional pattern the gain reduction a_{\max} X dB at the maximum antenna angle α_{\max} β (see Figure A.2 A.1).

Because antennas have a frequency dependent gain, either the maximum gain reduction over the whole frequency range (typically at the highest frequency) has to be used or the gain attenuation shall be determined for a number of frequency steps. In each of those frequency sub-bands the local maximum gain reduction shall be used.

Example: for a log-periodic antenna (80 MHz to 1 000 MHz) and $\alpha_{\max} \beta = 40^\circ$ this leads to a_{\max} X dB = 6 dB (VULB 9160 200 MHz E-plane).

NOTE 1 Reference for the gain is the reference antenna (see 5.1.2.2)

NOTE 2 The radiation pattern provided from the manufacturer can be used unless visible damage of the antenna can be observed.



In Figure A.1 replace α_{max} by β and $-a$ dB by $-X$ dB

Figure A.1 – Calculation of the resulting gain reduction a X

Calculate the alternative emission limit by subtracting from the original limit line the absolute value of the maximum gain reduction a_{max} :

Calculate the alternative emission limit by subtracting from the original limit line the absolute value of :

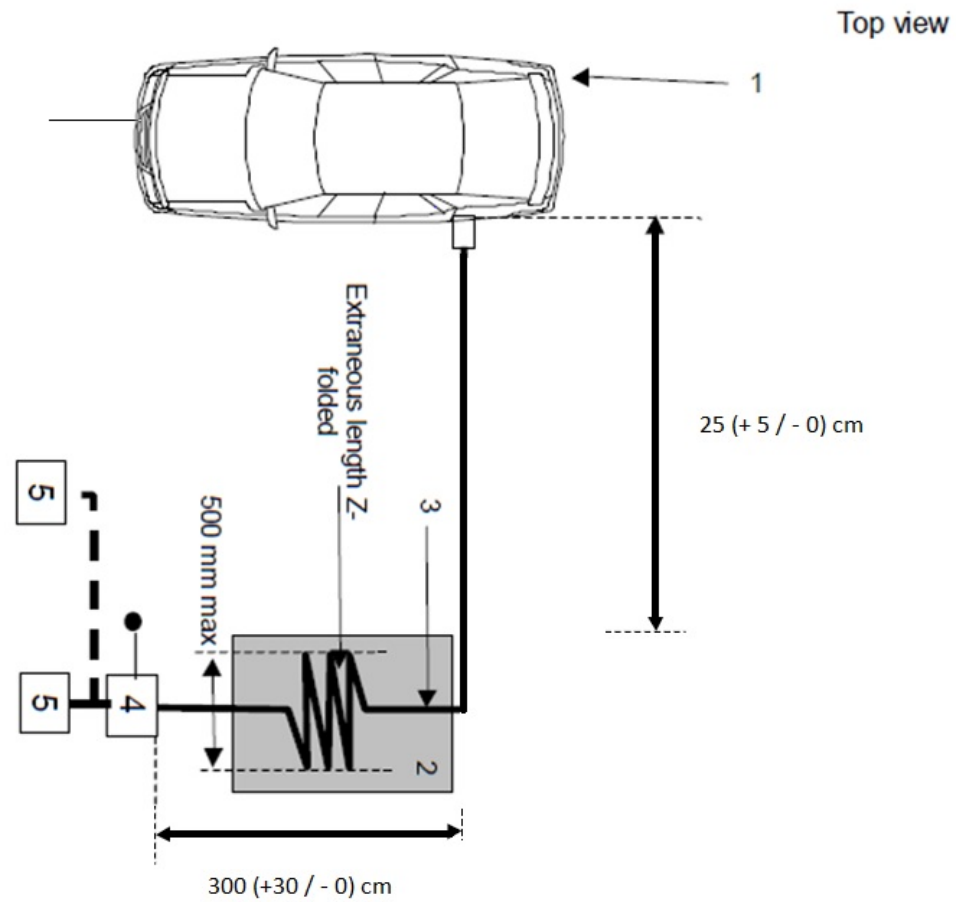
$$COR_{dB} = 3 - X_{dB}$$

Where X_{dB} is the maximum gain reduction

Annex of NO.doc

NOTE: There are two figures on the next pages.

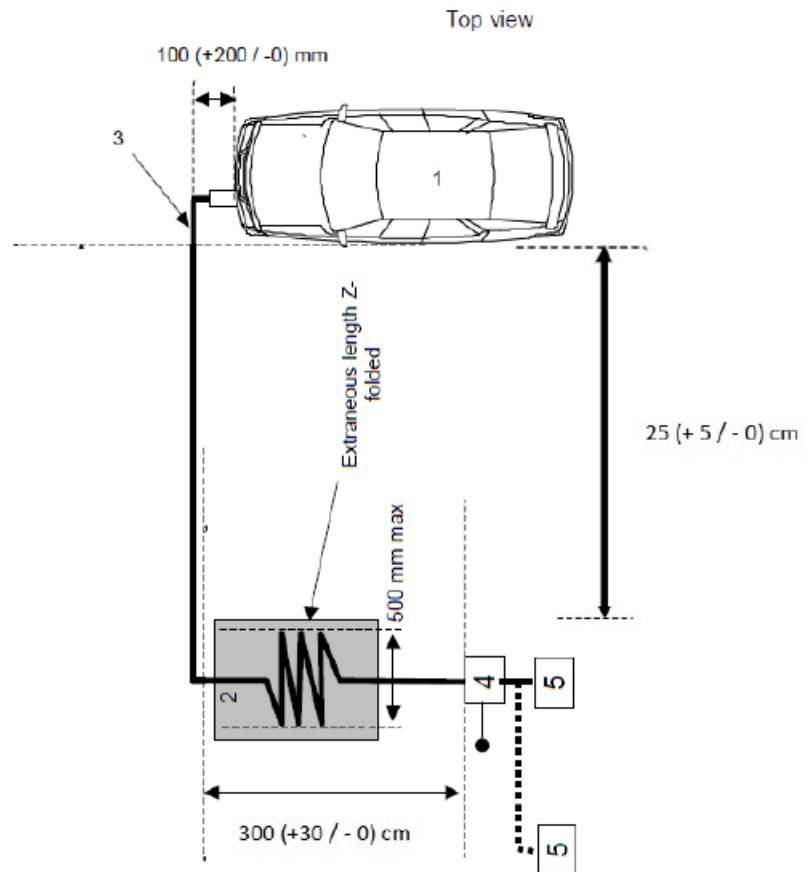
Modified version of the lower half of Figure 10:



NOR - annex 1

New proposal for lower half of Figure 10 - Example of test setup for vehicle with plug located on vehicle side

Modified version of the lower half of Figure 11:



NOR - annex 2

New proposal for lower half of Figure 11 - Example of test setup for vehicle with plug located in the front of the vehicle

