Template for comments and secretariat observations

Date: 2016-06-08	Document: **WG3 N 2579** **SC32 N 0186**	Project: **ISO/CD 11452-2**

MB/ NC[1]	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment[2]	Comments	Proposed change	Observations of the secretariat
Fr 1		Foreword	Last line	ed	According to Austin resolution 694, it has been decided to suppress the annex A on AN which leads to only 2 Annexes in ISO 1452-2	Replace "Annex A, B and C of this part of ISO 11452 are for information only" By "Annex A and B of this part of ISO 11452 are for information only"	
Fr 2		2	Last line	ed	The reference of ISO 11452-1 Edition and year should be updated in the footnote 1)	Replace in footnote 1) : "revision 3 of ISO 11452-1: 2005" By: "revision 4 of ISO 11452-1: 2015"	
Fr 3		6.2.6		ed	Couplers are not stated in the measuring equipment.	Replace: " **Powermeter** (or equivalent measuring instrument), for measuring forward power and reflected power" By: **"Powermeter** (or equivalent measuring instrument) and **dual directional coupler**, for measuring forward power and reflected power."	
Fr 4		7		ge	Tittle of clause 7 is Test set-up but it includes a sub clause 7.7 for HV DUT set-up	For clarification, make a clear distinction between LV DUT and HV DUT: Rename clause 7 : "Test set-up for LV DUT" Rearrange clause 7.7 in a new clause 8 "Test set-up for HV DUT" See FR 12	
Fr 5		7: New subclause		ed	Addition of a general sub-clause to precise what is included in "LV DUT"	Add a sub-clause "7.1 General" with the following wording: "This sub-clause concerns DUT powered by LV (12 V, 24 V, 48 V)."	

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Fr 6		7.1	Second §	te	The length of the ground plane takes into consideration the underneath of the equipment which may lead to confusion because it is the underneath of the test setup which is on the table which should be considered. Furthermore, the test setup dimension is not considered for the width of the ground plane	Renumber 7.1 to 7.2. Replace: " The minimum width of the ground plane shall be 1 000 mm. The minimum length of the ground plane shall be 2 000 mm, or the length of the entire underneath of the equipment plus 200 mm, whichever is the larger." By: "The minimum width of the ground plane shall be 1 000 mm, or the width of the entire underneath of the test setup (DUT, harness and associated equipment located on the test bench) plus 200 mm, whichever is the larger. The minimum length of the ground plane shall be 2 000 mm, or the length of the entire underneath of the test setup (DUT, harness and associated equipment located on the test bench) plus 200 mm, whichever is the larger."	
Fr 7		7.2		ed		Renumber 7.2 to 7.3	
Fr 8		7.3	1st §	ed - te	For some DUTs it might be preferable to have the DUT directly on the ground plane.	Renumber 7.3 to 7.4 Add at the end of the 1st paragraph: "unless otherwise specified in the test plan".	
Fr 9		7.4		ed-te	Depending of DUT type (e.g. dashboard, screen, engine control unit, sensor, …), DUT orientation and connector(s) position, the layout of the harness on DUT side between the ground plane front edge and the DUT connector(s) may not be placed as described schematically on Figures 1 to 12 (single straight line to the DUT).	Renumber 7.4 to 7.5 Add after second paragraph the following wording: " The detailed layout (direct, below DUT, around DUT, …) of the harness on DUT side between the ground plane front edge and the DUT connector(s) shall be described in the test plan."	
Fr10		7.5	1st §	ed - te	Use of preferably with a shall is not adequate	Renumber 7.5 to 7.6	

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						Replace "Preferably" by: "unless otherwise specified in the test plan".	
Fr11		7.6		ed		Renumber 7.6 to 7.7	
Fr12		7.6	Figures 1 to 3	te	In CISPR 25 (for LV and HV DUT) there is no minimum distance requirement between harness and shielded enclosure or absorbers but there is a 1000 mm minimum distance requirement between rear part of DUT and absorbers.	In Figures 1 to 3, delete the 2000 and 1000 mm distance requirement between harness and shielded enclosure or absorbers. Add a 1000 mm minimum distance requirement between rear part of DUT and absorbers.	
Fr13		7.7		ed - te	According to Fr4 proposal to rearrange clause 7.7 in a new clause 8 with sub-clauses.	Replace : " 7;7 Test setup for DUT with High Voltage (HV) power supply" By: " 8 Test set-up for HV DUT" And sub-clauses 8.1 to 8.7 (see Annex below)	
Fr14		7.7		te	There is only one LV / HV harness configuration define for the test when in CISPR 25 it is precised that multiple configuration shall be tested.	Add in 7.7: "Unless otherwise specified in the test plan, the configuration with the long segment of HV lines test harness at a distance of (100 ± 10) mm from the edge and the LV lines test harness located at $100\ ^{+100}_{0}$ mm from the HV lines shall also be tested." See Annex below	
Fr15		7.2.3	Figures 4 to 12	te		If Fr13 accepted: Figures 6, 9 and 12 for chargers shall be updated consequently. key d of all figures shall be updated with reference to 7.2 or 8.2	

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Fr16		7.2.3		ed	This paragraph has not be renumbered and shall be suppressed except for the figures.	Paragraph already present for HV DUT clause 7.7 and introduced for chargers in new clause 8.7 (see Fr 13)	
Fr17		7.2.3	Figures 4 to 12	te	The distance between DUT front and edge of the ground plane is not consistent with the wording in 7.3.	Replace in Figures 4 to 12 : "(200 ± 20)" by "(200 ± 10) "	
Fr18		7.2.3	Figures 4 to 12	te	In CISPR 25 (for LV and HV DUT) there is no minimum distance requirement between harness and shielded enclosure or absorbers but there is a 1000 mm minimum distance requirement between rear part of DUT and absorbers.	In Figures 1 to 3, delete the 2000 and 1000 mm distance requirement between harness and shielded enclosure or absorbers. Add a 1000 mm minimum distance requirement between rear part of DUT and absorbers.	
Fr19		7.2.3	Figures 4 to 12	ed	Figures clarification: the tolerance "+100" for the distances between cables in the lower part of the figures is not clearly visible.	Clarify the Figures.	
Fr20		7.2.3	Figures 4 to 12	ed	Figures clarification: the harnesses and the lines for the distances are drawn the same way.	Clarify the Figures as in Figures 1 to 3 with larger lines for harnesses.	
Fr21		8		ed		Renumber clauses 8 and 8.x to 9 and 9.x	
Fr22		8.2		ed - te	If Fr9 accepted an item should be added in the test plan.	Add a bullet with : " – Detailed layout of test harness nearby DUT"	
Fr23		8.3.1	4th and 5th line	ed		Replace 8.3.2 by 9.3.2 and 8.3.3 by 9.3.3	
Fr24		8.3.2		ed - te	There is no requirement about field probe axes orientation.	Add after the two bullets of the second paragraph the following wording: "One of the field probe axes shall be parallel to field polarisation"	
Fr25		8.3.3	1st line	ed		Replace "clause 7" by "clause 7 (for LV DUT) or clause 8 (for HV DUT)."	

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Fr26		8.3.3	3rd line	ed	Placement of field probe "above the wiring harness" may not be practical	Replace "above the wiring harness" By: "close to the wiring harness"	
Fr27		Annex A	Fig A.1 & A.2	ed-te	The location of the battery is not consistent on Figures A.1 and A.2 (outside ground plane) and the figures in the lain part of the standard (on the ground plane).	Modify Figures A.1 and A.2 with extension of ground plane below the battery.	
Fr28		Annex A	Figure A.2	ed		Suppress large black line above Figure A.2	
Fr29		Annex B		ed	FPSC Annex is not using the new frame	See Annex B below	

Annex: Fr13 and Fr14

8 Test set-up for HV DUT

8.1 General

This sub-clause concerns:

- DUT powered by HV d.c.,
- Charger power supply (a.c. or d.c.) for HV battery.

8.2 Ground plane

The ground plane conditions defined in 7.2 apply except for chargers for which the ground plane shall not be bonded to the shielded enclosure but bonded to the test facility earth.

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8.3 Power supply and HV-AN or AMN

Each DUT power supply lead shall be connected to the power supply through an HV-AN (for DUT with d.c. HV supply) and/or AMN (for DUT with a.c. supply).

- DC HV supply shall be applied to the DUT via a 5 µH/50 Ω HV AN (see ISO 11452-1 Annex B for the schematic).
- AC supply shall be applied to the DUT via a 50 µH/50 Ω HV AMN (see ISO 11452-1 Annex B for the schematic).

The HV-AN(s) shall be mounted directly on the ground plane. The case or cases of the HV-AN(s) shall be bonded to the ground plane.
The measuring port of each HV-AN(s) shall be terminated with a 50 Ω load.

The vehicle HV battery should be used; otherwise the external HV power supply shall be connected via feed-through-filtering.
Shielded supply lines for the positive HV d.c. terminal line (HV+), the negative HV d.c. terminal line (HV-) and three phase HV a.c. lines may be separate coaxial cables or in a common shield depending on the connector system used. The original HV harness from the vehicle may be used optionally.

Note 1 Care shall be taken when using a power line filter (Key 16) on the HV supply line. This filter will increase the common mode capacitance between HV+ and ground reference or HV- and ground reference and may lead to the generation of extra resonances.

For charger, the AMN(s) shall be mounted on the test facility floor ground plane. The case or cases of the AMN(s) shall be bonded to the test facility floor ground plane. The charger PE (protective earth) line shall be bounded to the test set-up ground plane and to the AMN(s) PE connection.
The measuring port of each HV-AN(s) / AMN(s) shall be terminated with a 50 Ω load.

8.4 Location of DUT

The DUT shall be placed on a non-conductive, low relative permittivity (dielectric-constant) material ($\varepsilon_r \leq 1{,}4$), at (50 ± 5) mm above the ground plane.
Unless otherwise specified in the test plan the DUT case shall be connected to the ground plane either directly or via defined impedance.

The front of the DUT shall be located at a distance of (200 ± 10) mm from the edge of the ground plane.

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In case of a charger, the battery charger case shall be bonded to the ground plane.

8.5 Location of test harness

Unless otherwise specified in the test plan (e.g. use of original vehicle harnesses), the length of harnesses shall be as follows:

- 200 $^{+200}_{0}$ mm for the LV lines
- 1700 $^{+300}_{0}$ mm for the HV lines and the length of the HV test harness parallel to the front of the ground plane shall be (1500 ± 75) mm.
- less than 1000 mm for the three phase lines between DUT and electric motor(s)

All of the harnesses shall be placed on a non-conductive, low relative permittivity material ($\varepsilon r \leq 1{,}4$) at (50 ± 5) mm above the ground plane.

The detailed layout (direct, below DUT, around DUT, …) of the harness on DUT side between the ground plane front edge and the DUT connector(s) shall be described in the test plan

HV lines shall be placed at a minimum distance of 100 mm from the edge of the ground plane.
Unless otherwise specified in the test plan, the configuration with the long segment of HV lines test harness at a distance of (100 ± 10) mm from the edge and the LV lines test harness located at 100 $^{+100}_{0}$ mm from the HV lines shall also be tested.

8.6 Location of load simulator

Unless otherwise specified in the test plan, the load simulator shall be placed directly on the ground plane. If the load simulator has a metallic case, this case shall be bonded to the ground plane.
Alternatively, the load simulator may be located adjacent to the ground plane (with the case of the load simulator bonded to the ground plane) or outside of the test chamber, provided the test harness from the DUT passes through an RF boundary bonded to the ground plane.
When the load simulator is located on the ground plane, the d.c. power supply lines of the load simulator shall be connected through the AN(s).

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The electric motor shall be mounted on a non-conductive insulating support and its housing bonded to the ground plane, if applicable. The load machine emulation shall be placed outside the shielded room. In case of using a load machine emulation, the test plan shall define the connection conditions between the DUT and the load machine emulation and also the necessary grounding conditions. The load machine emulation will replace the “electric motor”, the “mechanical connection”, the “filtered mechanical bearing” and the “brake or propulsion motor”. The three phase motor supply lines will be fed through a power line filter.

The electric motor may be placed on a separate ground plane. In this case, the test plan shall define the connection configuration between this separate motor ground plane and the DUT ground plane (representing the vehicle grounding configuration).

8.7 Location of field generating device (antenna)

The height of the phase centre of the antenna shall be (100 ± 10) mm above the ground plane.
No part of any antenna radiating element shall be closer than 250 mm to the floor. The radiating elements of the antenna shall not be closer than 500 mm to any absorber material.
The distance between the wiring harness and the antenna shall be (1 000 ± 10) mm. This distance is measured from

— the phase centre (mid-point) of the biconical antenna, or

— the nearest part of the log-periodic antenna, or

— the nearest part of the horn antenna.

The phase centre of the antenna for frequencies from 80 MHz to 1 000 MHz shall be in line with the centre of the longitudinal part (1 500 mm length) of the wiring harness.
The phase centre of the antenna for frequencies above 1 000 MHz shall be in line with the DUT.

Examples of test set-ups are shown in Figures 4, 5, 7, 8, 10 and 11 (for HV DUT) and figures 6, 9 and 12 (for chargers).

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Annex: Fr29

Annex B

(informative)

Function performance status classification

B.1 General

This annex gives examples of test severity levels which should be used in line with the principle of functional performance status classification (FPSC) described in ISO 11452-1.

B.2 Classification of test severity level

Examples of test severity levels for ALSE are given in Table B.1.

Table B.1 — Example of test severity levels (ALSE)

Frequency band (MHz)	Test Level I (V/m)	Test Level II (V/m)	Test Level III (V/m)	Test Level IV (V/m)	Test Level V (V/m)
80 to 200	20	40	60	80	Specific values agreed between the users of this part of ISO 11452
200 to 1000	20	40	60	80	
1000 to 8000	25	50	75	100	
8000 to 18000	25	50	75	100	

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					Frequency bands and test levels values given in this table are examples		

B.1 Example of FPSC application using test severity levels

An example of severity levels is given in table B.2.

Table B.2 — Example of test severity levels (ALSE)

Test Severity Level	Function Category 1	Function Category 2	Function Category 3	Function Category 4
L_{4i}	Level IV	---	---	---
L_{3i}	Level III	Level IV	---	---
L_{2i}	Level II	Level III	Level IV	---
L_{1i}	Level I	Level II	Level III	Level IV

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