

Test report

Number: **T252-0064/25** Project file: C20251417
Date: 2025-08-13
Pages: 91

Product: **VoiceToys Multisensory Educational System**

Type reference: **SpaceY, SpreadY, VibeY, JumpY**

Ratings: JumpY : L/N 230V; 50Hz - DC : 5 VDC
SpaceY, SpreadY, VibeY : 3.6 VDC

Trademark: VoiceToys

Applicant: **VoiceToys d.o.o. Beograd – Zvezdara,
Veljka Dugoševića 54, RS11050 Beograd, Republika Srbija**

Manufacturer: VoiceToys d.o.o. Beograd – Zvezdara,
Veljka Dugoševića 54, RS11050 Beograd, Republika Srbija

Place of manufacture: VoiceToys d.o.o. Beograd – Zvezdara,
Veljka Dugoševića 54, RS11050 Beograd, Republika Srbija

Summary of testing

Testing method: EN 303 446-1 V1.2.1 in conjunction with EN 301 489-17 V3.2.4
EN 55032:2015 + A11:2020,
EN 55035:2017 + A11:2020,
EN IEC 61000-3-2 :2019 + A1 :2021,
EN 61000-3-2 :2013 +A1 :2019 + A2 :2021

Testing location: SIQ d.o.o. Beograd
Cara Dušana 266, RS-11080 Beograd-Zemun, Serbia

Remarks: Date of receipt of test items: 2025-05-30
Number of items tested: 12
Date of performance of tests: 2025-06-02 - 2025-08-07
The test results presented in this report relate only to the items tested.
The test items were tested in the condition as received.
The product complies with the requirements of the testing methods.

Tested by: Nenad Cvetić

Approved by: Miroslav Biočanin



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1. General

Abbreviations and markings:

AC mains power port	Port used to connect to the mains supply network
DC network power port	Port, not powered by a dedicated AC/DC power converter and not supporting communication, that connects to a DC supply network
Signal/control port	Port intended for the interconnection of components of an EUT, or between an EUT and local AE and used in accordance with relevant functional specifications
Port	Physical interface through which electromagnetic energy enters or leaves the EUT
Wired network port	Point of connection for voice, data and signalling transfers intended to interconnect widely dispersed systems by direct connection to a single-user or multi-user communication network (for example CATV, PSTN, ISDN, xDSL, LAN and similar networks).
AE associated equipment	Equipment needed to exercise and/or monitor the operation of the EUT
Equipment Under Test (EUT)	Multimedia equipment (MME) being evaluated for compliance with the requirements of EN 55032 standard
Highest internal frequency (F_x)	Highest fundamental frequency generated or used within the EUT or highest frequency at which it operates
ESD	Electrostatic Discharge
CDN	Coupling and Decoupling Network
RF	Radio Frequency

Possible test case verdicts:

Test does not apply to the tested sample:	N/A
Tested sample passed the requirements:	P (Pass)
Tested sample failed the requirements:	F (Fail)
Test was not performed:	N/P (Not performed)

Throughout this report a comma is used as the decimal separator. Numerical data taken from IEC standards are using a comma as the decimal separator.

History sheet:

Date:	Report No.:	Change:	Revision:
2025-08-13	T252-0064/25	Initial Test Report issued.	--

2. Measurement uncertainty

The following measurement uncertainty levels have been calculated according to the SIQ internal document EN122_RS, as specified in CISPR 16-4-2 and EN 55016-4-2. The uncertainties represent an expanded uncertainty expressed at 95% confidence level using a coverage factor $k=2$.

The following measurement uncertainty has been included in test results as specified in each of the basic referenced standards as applicable.

Emission:

Measurement / test method		U_{LAB}	U_{CISPR}
Conducted emission measurement-Main port	(150 kHz to 30 MHz)	3,2 dB	3,4 dB
Conducted emission measurement-Tel.port	(150 kHz to 30 MHz)	3,54 dB	5 dB
Radiated emission measurement (electric field strength at an OATS or in a SAC)	(30 MHz to 1000 MHz)	4,4 dB	6,3 dB
Radiated emission measurement (electric field strength at an OATS or in a SAC)	(1 GHz to 6 GHz)	4,62 dB	5,2 dB

Immunity:

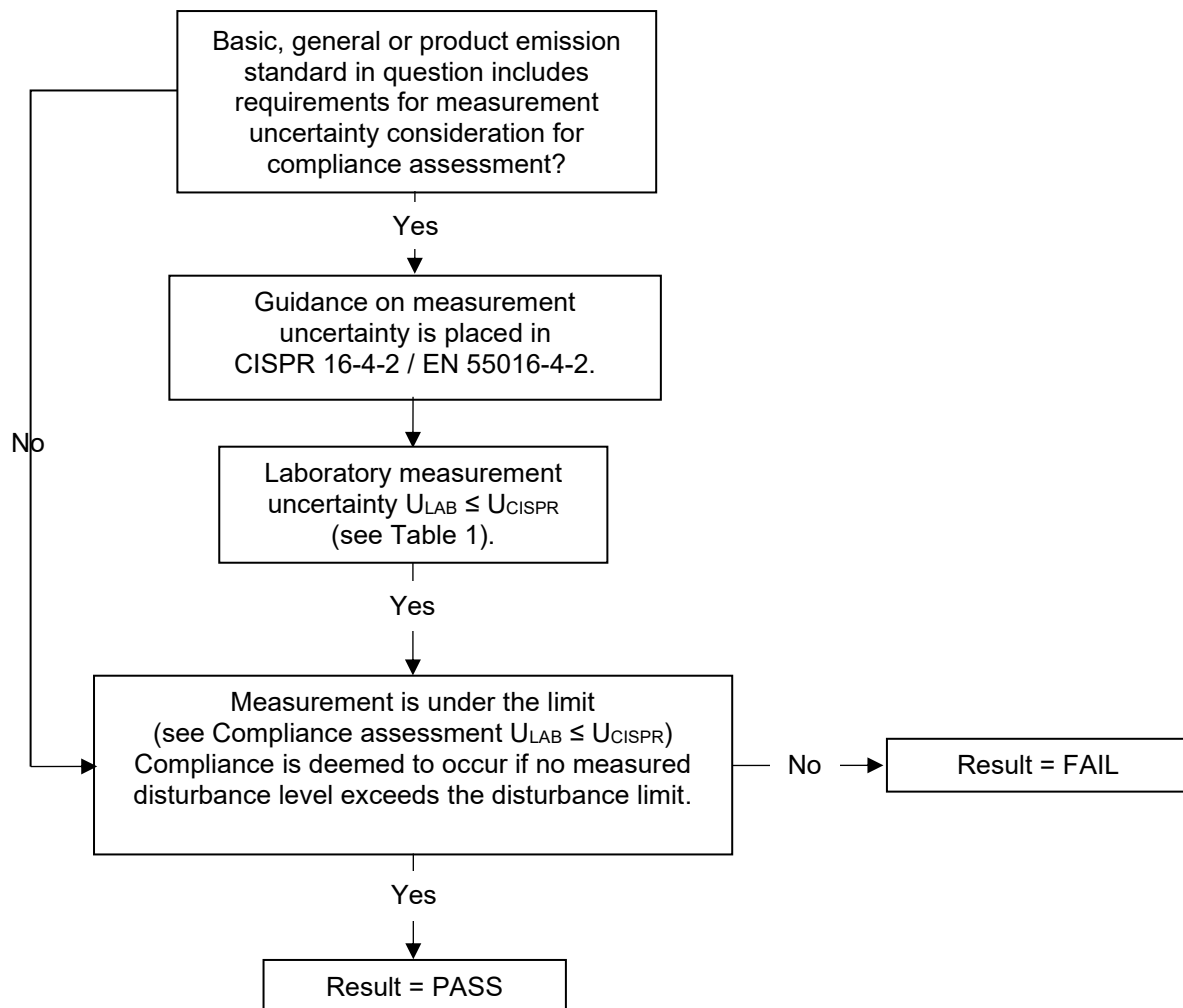
Measurement / test method	Parameter values
Electrostatic discharge immunity measurement	All required parameters comply with requirements of standard.
Radiated, RF electromagnetic field immunity measurement	2,5 dB
Electrical fast transients/burst immunity measurement	All required parameters comply with requirements of standard.
Surge immunity measurement	All required parameters comply with requirements of standard.
Conducted disturbances, induced by RF fields immunity measurement	2,6 dB
Power frequency magnetic field immunity measurement	All required parameters comply with requirements of standard.
Voltage dips, short interruptions, and voltage variations immunity measurement	All required parameters comply with requirements of standard.

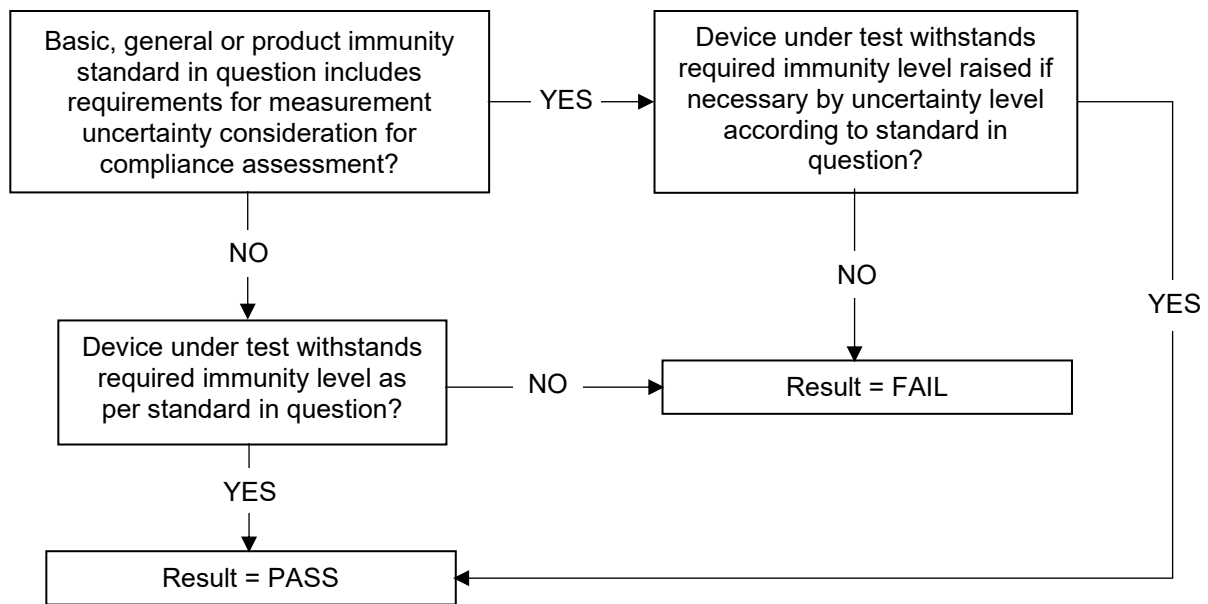
3. Decision rule

Application of decision rule and statement of conformity is defined in document TN023_RS Decision rule and measurement uncertainty.

As a general rule Pass/Fail decisions are based on simple acceptance rule and acceptance limits chosen based on simple acceptance ($w = 0$, $AL = TL$) except if a decision rule is governed by particular standard or guidance document.

Decision rule applicable for emission:



Decision rule applicable for immunity:

4. Product specific data

General description of test item Vibey:

VibeY is a device designed to provide real-time audiovisual and vibrotactile feedback. It responds to acoustic pitch and intensity by generating multi-colored visual signals and mild-to-moderate mechanical vibrations.

Product key:

Power supply type:	3.6 VDC		
Hardware version:	5		
Firmware/software version:	5.01		
Mounting position:	☒	Table-top equipment:	
	☐	Floor-standing equipment:	
	☐	Wall/ceiling mounted equipment:	
	☐	Hand-held equipment:	
	☐	Other:	
Highest Internal Operating Frequencies:	Name:		Frequency:
	BT module		2412-2483.5 MHz

Port(s):

Port No.	Name	Type	Cable Length / m	Cable Shielded
0	Enclosure	N/E	/	/
Note:	AC = AC mains power port DC = DC network power port / input d.c. power port I/O = Signal/control port WNP = wired network port GND = grounding N/E = Non-Electrical			

Copy of marking plate:



NOTE: The information in this section has been provided by the applicant.

General description of test item SpreadY:

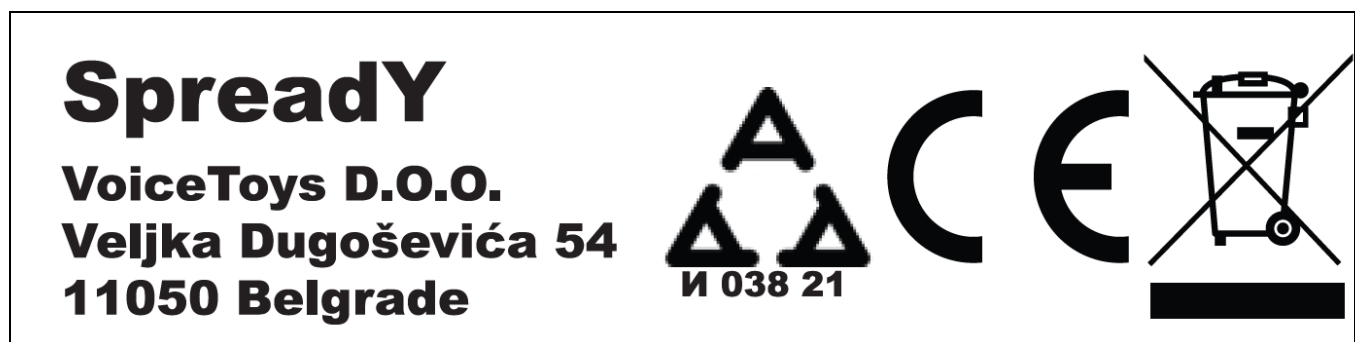
Spread Y is a system comprising five wireless light columns that can be activated via voice commands or a dedicated user application.

Product key:

Power supply type:	3.6 VDC	
Hardware version:	5	
Firmware/software version:	5.01	
Mounting position:	☒	Table-top equipment:
	☐	Floor-standing equipment:
	☐	Wall/ceiling mounted equipment:
	☐	Hand-held equipment:
	☐	Other:
Highest Internal Operating Frequencies:	Name:	Frequency:
	BT module	2412-2483.5 MHz

Port(s):

Port No.	Name	Type	Cable Length / m	Cable Shielded
0	Enclosure	N/E	/	/
Note:	AC = AC mains power port DC = DC network power port / input d.c. power port I/O = Signal/control port WNP = wired network port GND = grounding N/E = Non-Electrical			

Copy of marking plate:

NOTE: The information in this section has been provided by the applicant.

General description of test item Spacey:

SpaceY is a system comprising five wireless speakers that emit sounds selected and activated via a mobile user application.

Product key:

Power supply type:	3.6 VDC		
Hardware version:	5		
Firmware/software version:	5.01		
Mounting position:	☒	Table-top equipment:	
	☐	Floor-standing equipment:	
	☐	Wall/ceiling mounted equipment:	
	☐	Hand-held equipment:	
	☐	Other:	
Highest Internal Operating Frequencies:	Name:		Frequency:
	BT module		2412-2483.5 MHz

Port(s):

Port No.	Name	Type	Cable Length / m	Cable Shielded
0	Enclosure	N/E	/	/
Note:	AC = AC mains power port DC = DC network power port / input d.c. power port I/O = Signal/control port WNP = wired network port GND = grounding N/E = Non-Electrical			

Copy of marking plate:



NOTE: The information in this section has been provided by the applicant.

General description of test item Jumpy:

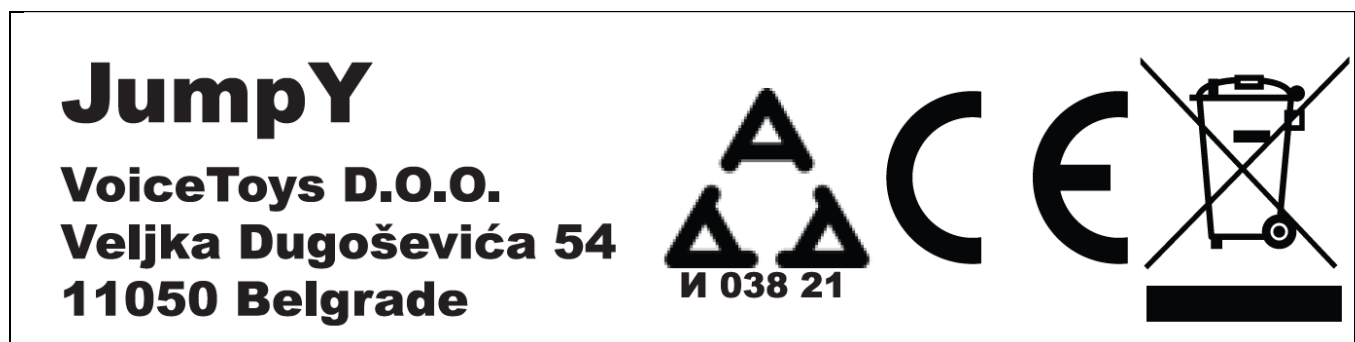
JumpY is an audiovisual LED panel featuring an integrated microphone for sound detection and a supplementary wireless sensor for motion detection, translating inputs into dynamic, multi-colored light effects.

Product key:

Power supply type:	230V 50Hz	
Hardware version:	5	
Firmware/software version:	5.01	
Mounting position:	☐	Table-top equipment:
	☐	Floor-standing equipment:
	☒	Wall/ceiling mounted equipment:
	☐	Hand-held equipment:
	☐	Other:
Highest Internal Operating Frequencies:	Name:	Frequency:
	BT module	2412-2483.5 MHz

Port(s):

Port No.	Name	Type	Cable Length / m	Cable Shielded
0	Enclosure	N/E	/	/
Note:	AC = AC mains power port DC = DC network power port / input d.c. power port I/O = Signal/control port WNP = wired network port GND = grounding N/E = Non-Electrical			

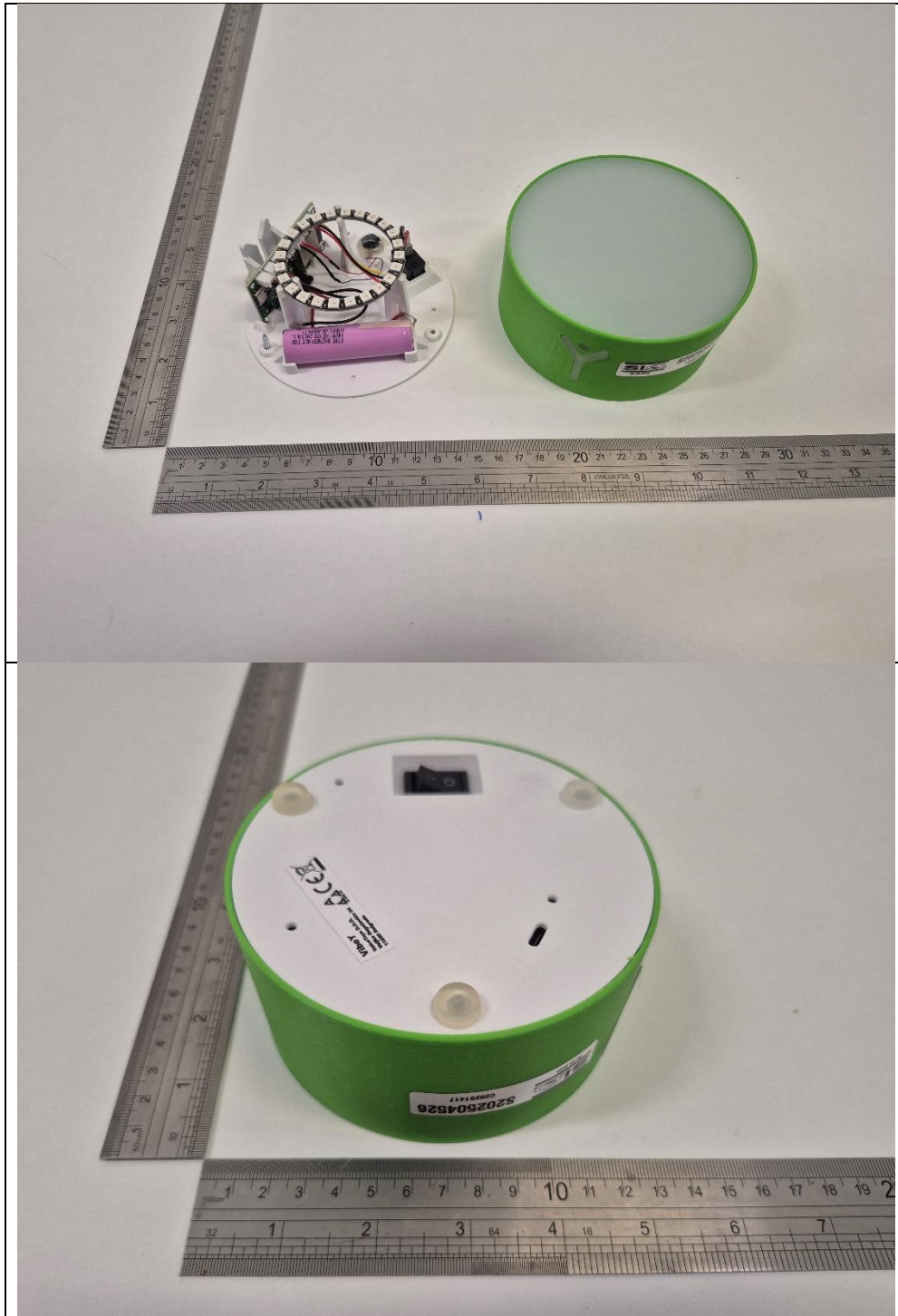
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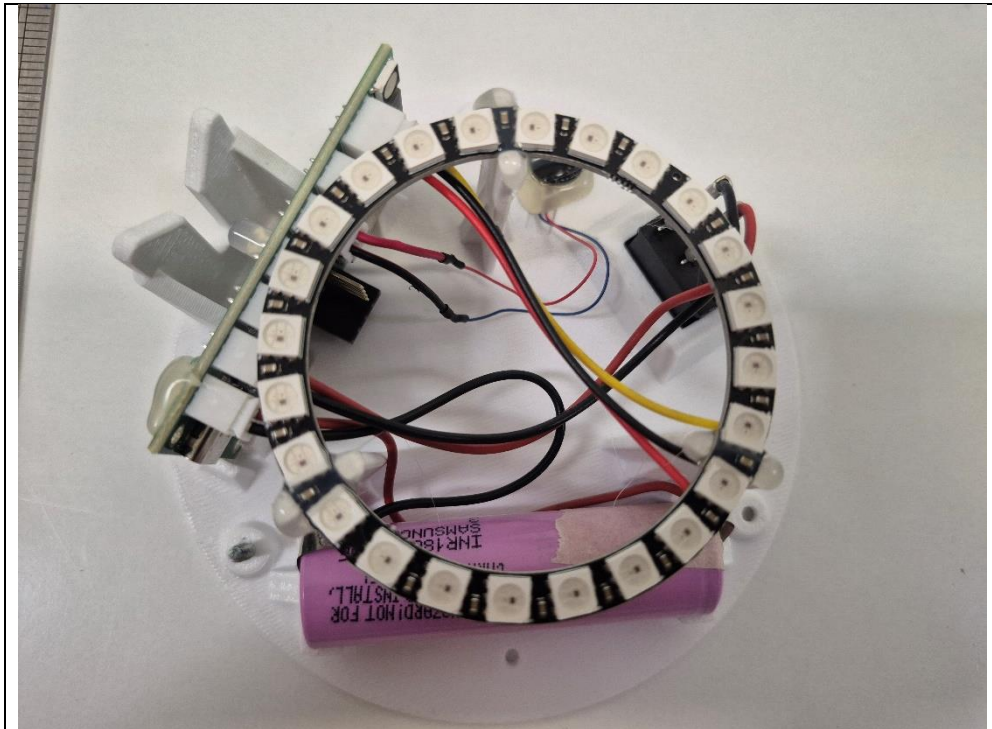
NOTE: The information in this section has been provided by the applicant.

5. Equipment under test (EUT)

Product Type	Device	Manufacturer	Model No.	Comments
EUT	Vibe Y	VoiceToys	-	-
Note: EUT = Equipment Under Test AE = Associated Equipment				

Pictures of EUT:



**Operating conditions:**

Clause	Test	Connection type	Operating conditions
9.2	Radiated emission measurement	DC	3.6 VDC
10.1	Electrostatic discharge immunity measurement	DC	3.6 VDC

Operating modes:

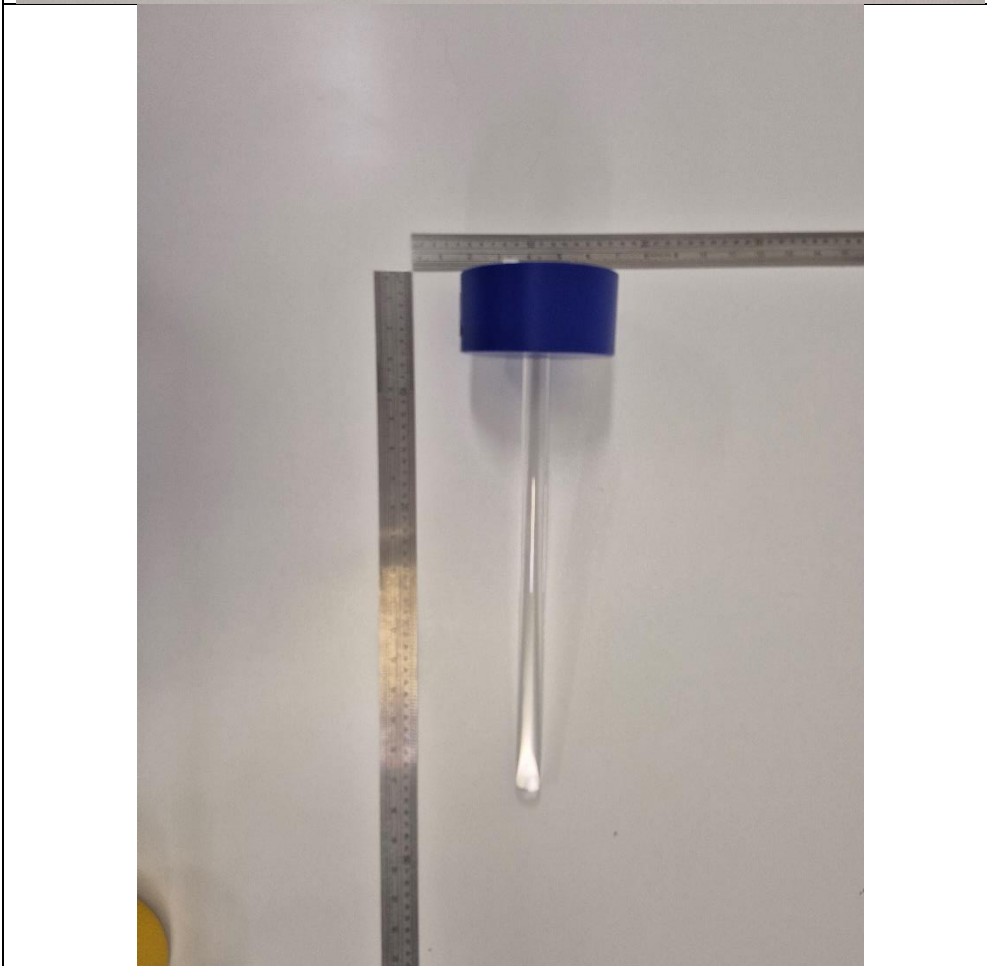
No.	Operating mode
1	Device turn ON and connected to the application via Bluetooth, the test cycles is turned on

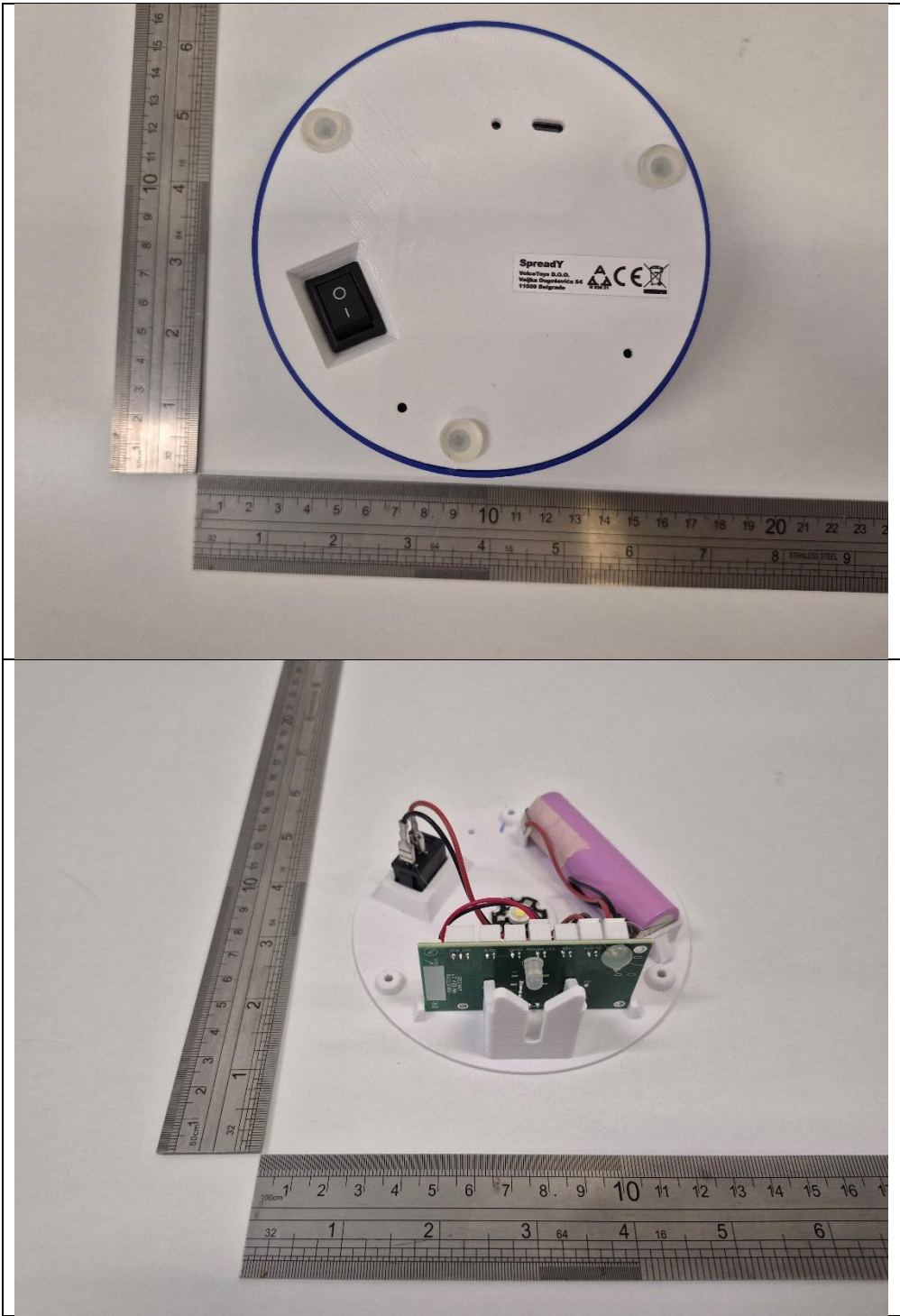
Tested sample:

Sample number	Used for measurement
S202504526	Mark all measurements

Product Type	Device	Manufacturer	Model No.	Comments
EUT	Spready	VoiceToys		
Note: EUT = Equipment Under Test AE = Associated Equipment				

Pictures of EUT:





Operating conditions:

Clause	Test	Connection type	Operating conditions
9.2	Radiated emission measurement	DC	3.6 VDC
10.1	Electrostatic discharge immunity measurement	DC	3.6 VDC

Operating modes:

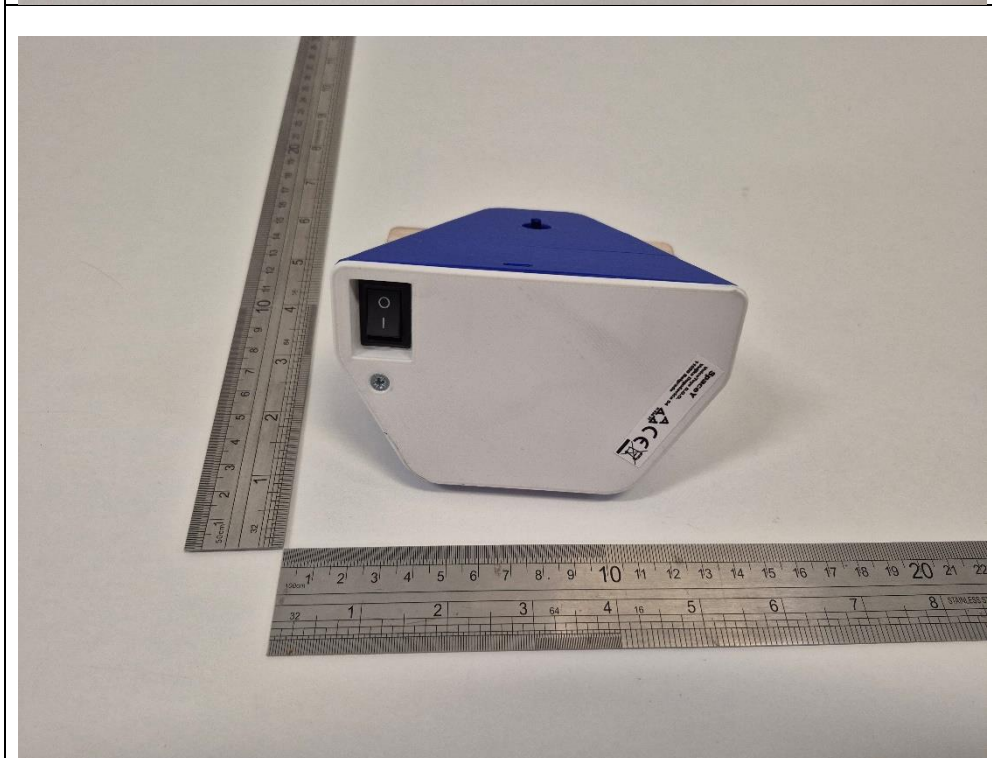
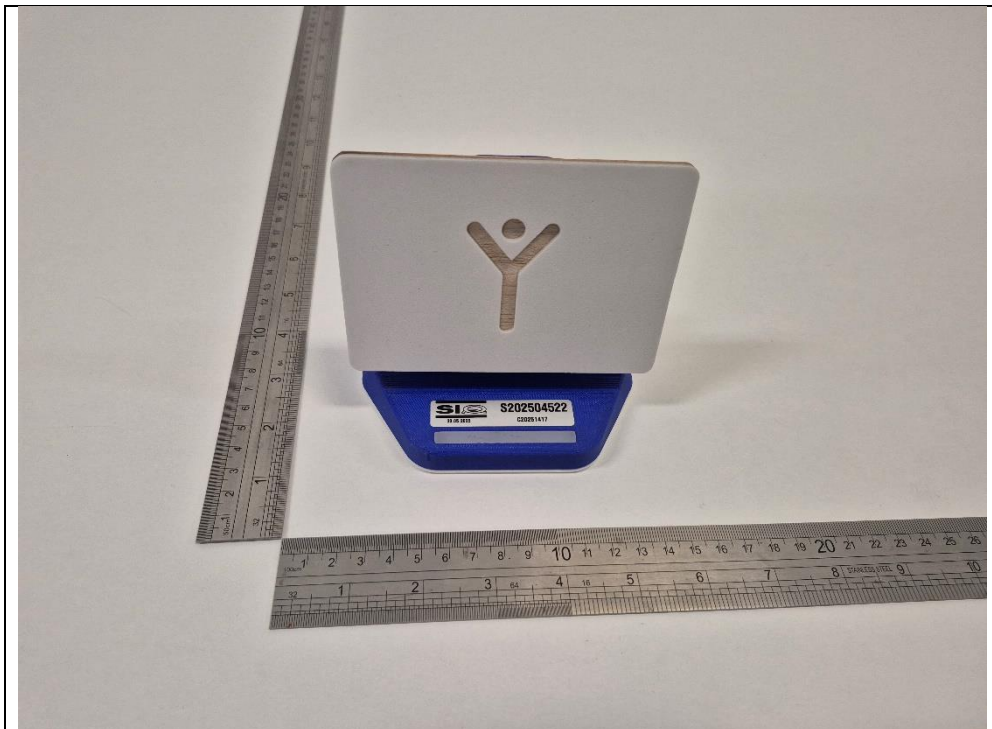
No.	Operating mode
1	Device turn ON and connected to the application via Bluetooth, the test cycles is turned on

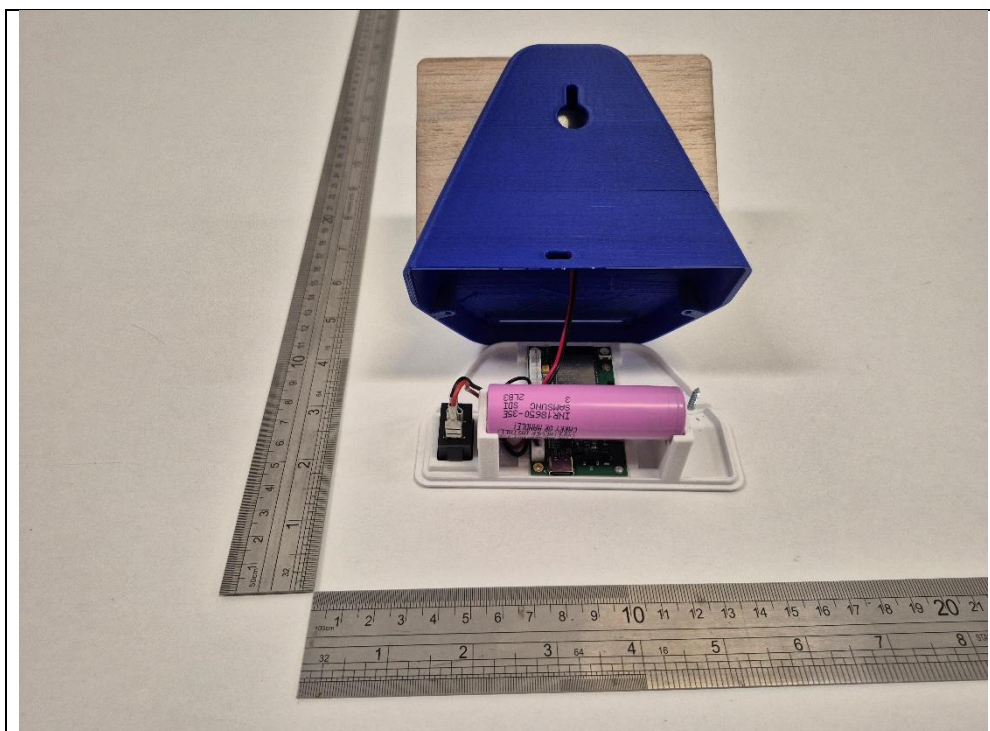
Tested sample:

Sample number	Used for measurement
S202504518	Mark all measurements
S202504516	Only for Radiated emission
S202504517	Only for Radiated emission
S202504519	Only for Radiated emission
S202504520	Only for Radiated emission

Product Type	Device	Manufacturer	Model No.	Comments
EUT	Spacey	VoiceToys		
Note: EUT = Equipment Under Test AE = Associated Equipment				

Pictures of EUT:



Operating conditions:

Clause	Test	Connection type	Operating conditions
9.2	Radiated emission measurement	DC	3.6 VDC
10.1	Electrostatic discharge immunity measurement	DC	3.6 VDC

Operating modes:

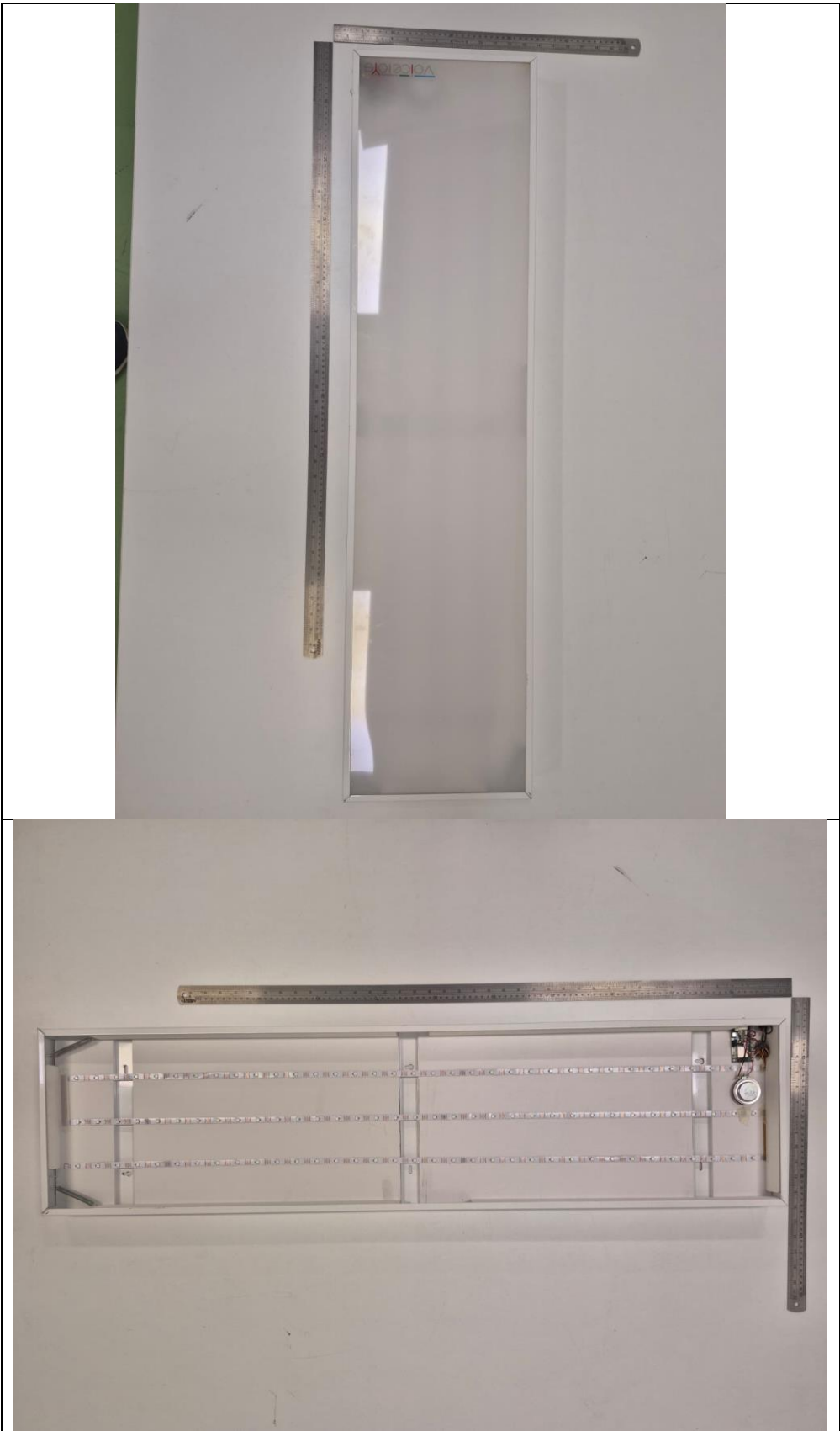
No.	Operating mode
1	Device turn ON and connected to the application via Bluetooth, the test cycles is turned on

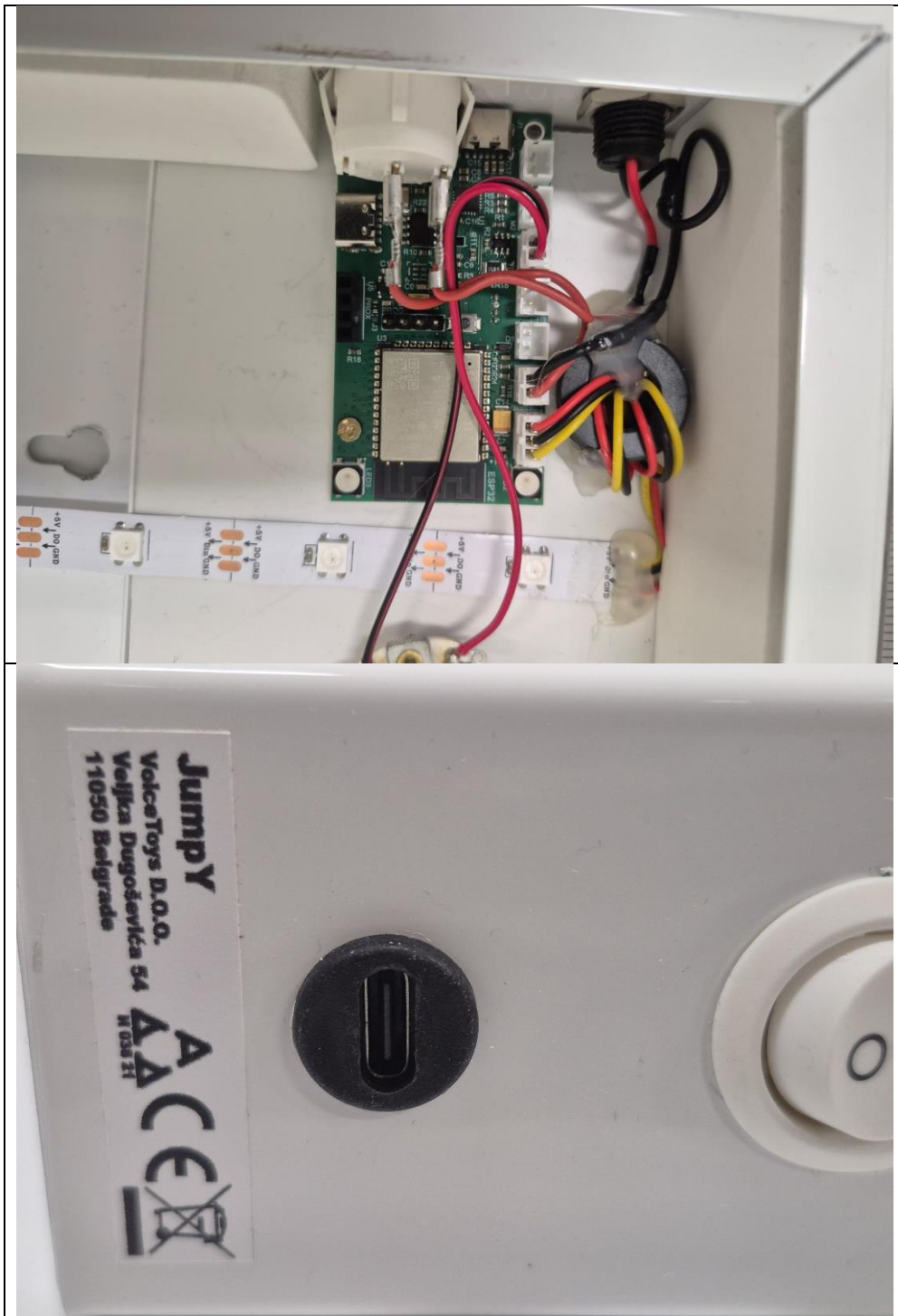
Tested sample:

Sample number	Used for measurement
S202504522	Mark all measurements
S202504521	Only for Radiated emission
S202504523	Only for Radiated emission
S202504524	Only for Radiated emission
S202504525	Only for Radiated emission

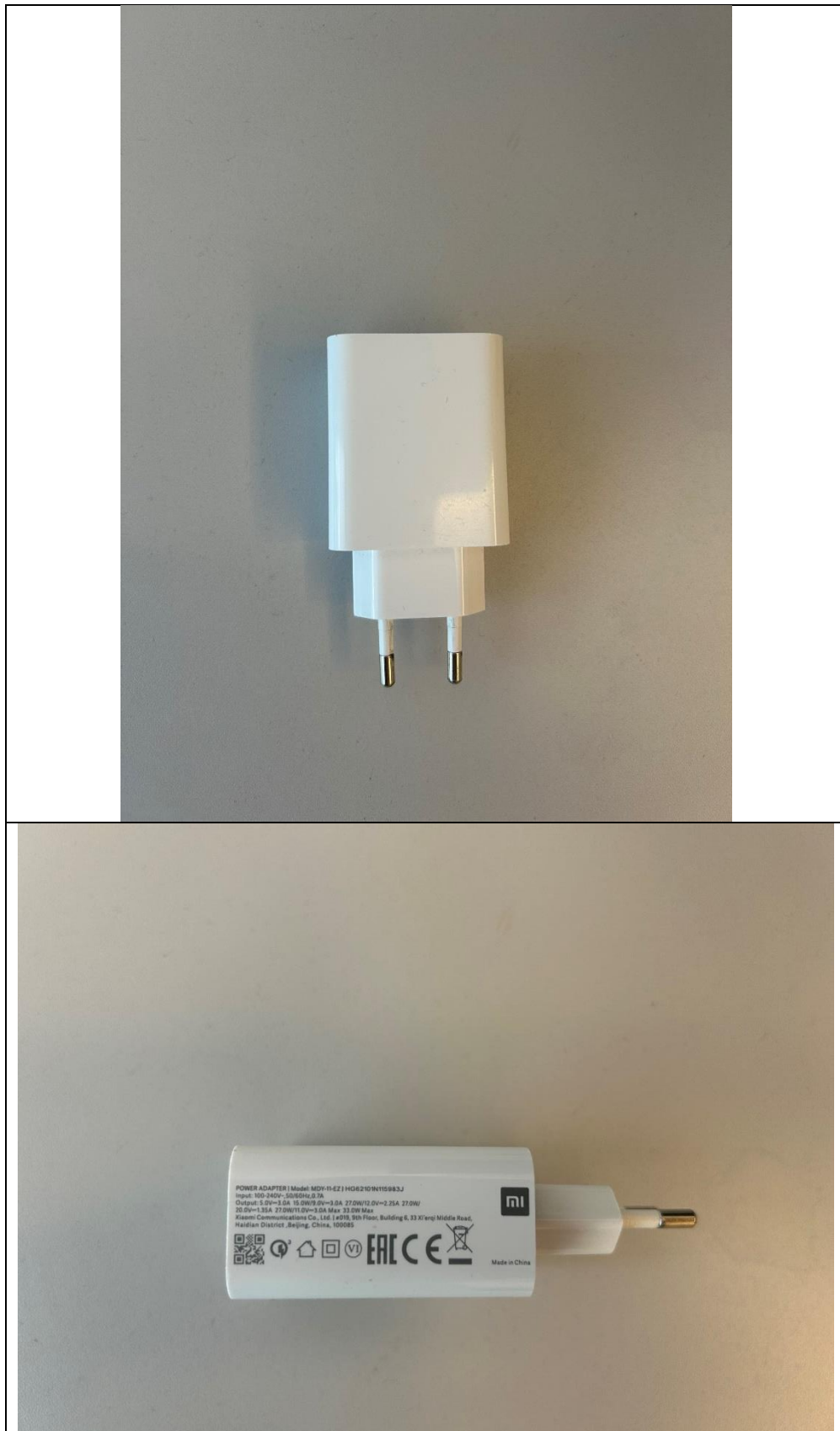
Product Type	Device	Manufacturer	Model No.	Comments
EUT	Jumpy	VoiceToys		
AE	Sensor	VoiceToys		
AE	Power adapter	Xiaomi	MDY-11-EZ	
Note: EUT = Equipment Under Test AE = Associated Equipment				

Pictures of EUT:





Pictures of associated equipment:





**Operating conditions:**

Clause	Test	Connection type	Operating conditions
9.1	Conducted emission measurement	ACof an AC/DC supply	230 V; 50 Hz
9.2	Radiated emission measurement	ACof an AC/DC supply	230 V; 50 Hz
9.3	Harmonic current emissions measurement	ACof an AC/DC supply	230 V; 50 Hz
9.4	Voltage changes, fluctuations, and flicker measurement	ACof an AC/DC supply	230 V; 50 Hz
10.1	Electrostatic discharge immunity measurement	ACof an AC/DC supply	230 V; 50 Hz
10.2	Radiated, RF electromagnetic field immunity measurement	ACof an AC/DC supply	230 V; 50 Hz
10.3	Electrical fast transients/burst immunity measurement	ACof an AC/DC supply	230 V; 50 Hz
10.4	Surge immunity measurement	ACof an AC/DC supply	230 V; 50 Hz
10.5	Conducted disturbances, induced by RF fields immunity measurement	ACof an AC/DC supply	230 V; 50 Hz
10.6	Power frequency magnetic field immunity measurement	-	-
10.7	Voltage dips, short interruptions, and voltage variations immunity measurement	ACof an AC/DC supply	230 V; 50 Hz

Operating modes:

No.	Operating mode
1	Device turn ON with sensor turn ON
2	Device turn ON and connected to the application via Bluetooth and a sound of 1kHz is applied

Tested sample:

Sample number	Used for measurement
S202504515	Mark all measurements

6. Environmental conditions

The climatic conditions during the tests were within the following limits:

Ambient temperature: 15 °C to 35 °C

Relative humidity Electrostatic Discharges (ESD): 30 % to 60 %

Relative humidity all other testing except Electrostatic Discharges (ESD): 15 % to 75 %

Atmospheric pressure: 860 mbar to 1060 mbar

7. Verdict summary section

Product VIBEY :

STANDARDS (details on first page)	PERFORMED ¹⁾	CONCLUSION ¹⁾
EN 303 446-1 V1.2.1 Electromagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment; Part 1: Requirements for equipment intended to be used in residential, commercial and light industry locations.	YES	P
SUBSTANDARD: RADIO PART		
EN 301 489-1 V2.2.3 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; harmonized Standard for ElectroMagnetic Compatibility	YES	P
EN 301 489-17 V3.2.4 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for broadband Data Transmission Systems; Harmonised standard for ElectroMagnetic Compatibility	YES	P
SUBSTANDARD: NON-RADIO PART		
EN 55032:2015 + A11:2020 Electromagnetic compatibility of multimedia equipment – Emission requirements	YES	P
EN 55035:2017 + A11:2020 Electromagnetic compatibility of multimedia equipment – Immunity Requirements	YES	P
¹⁾ See details in table(s) below		

Test (emission)	Referenced standard	Clause within the report	Class	Conclusion
Conducted emission measurement	EN 55032:2015 + A11:2020	9.1	-	N/P
Radiated emission measurement	EN 55032:2015 + A11:2020	9.2	B	P
Harmonic current emissions measurement	EN 61000-3-2:2014	9.3	-	N/P
Voltage changes, fluctuations, and flicker measurement	EN 61000-3-3:2013	9.4	/	N/P

Test (immunity)	Referenced standard	Required criteria	Achieved criteria	Conclusion
Electrostatic discharge immunity measurement	EN 61000-4-2:2009	B	A	P
Radiated, RF electromagnetic field immunity measurement	EN 61000-4-3:2006 + A1:2008 + A2:2010	A	-	N/P
Electrical fast transients/burst immunity measurement	EN 61000-4-4:2012	B	-	N/P
Surge immunity measurement	EN 61000-4-5:2014	B	-	N/P
Conducted disturbances, induced by RF fields immunity measurement	EN 61000-4-6:2014	A	-	N/P
Power frequency magnetic field immunity measurement	EN 61000-4-8:2010	A	-	N/P
Voltage dips, short interruptions, and voltage variations immunity measurement	EN 61000-4-11:2004	B	-	N/P

NOTE: for detailed description of achieved criteria refer to each test separately

NOTE: no non-standard test method used

Product SpreadY :

STANDARDS (details on first page)	PERFORMED ¹⁾	CONCLUSION ¹⁾
EN 303 446-1 V1.2.1 Electromagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment; Part 1: Requirements for equipment intended to be used in residential, commercial and light industry locations.	YES	P
SUBSTANDARD: RADIO PART		
EN 301 489-1 V2.2.3 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; harmonized Standard for ElectroMagnetic Compatibility	YES	P
EN 301 489-17 V3.2.4 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for broadband Data Transmission Systems; Harmonised standard for ElectroMagnetic Compatibility	YES	P
SUBSTANDARD: NON-RADIO PART		
EN 55032:2015 + A11:2020 Electromagnetic compatibility of multimedia equipment – Emission requirements	YES	P
EN 55035:2017 + A11:2020 Electromagnetic compatibility of multimedia equipment – Immunity Requirements	YES	P
¹⁾ See details in table(s) below		

Test (emission)	Referenced standard	Clause within the report	Class	Conclusion
Conducted emission measurement	EN 55032:2015 + A11:2020	9.1	-	N/P
Radiated emission measurement	EN 55032:2015 + A11:2020	9.2	B	P
Harmonic current emissions measurement	EN 61000-3-2:2014	9.3	-	N/P
Voltage changes, fluctuations, and flicker measurement	EN 61000-3-3:2013	9.4	/	N/P

Test (immunity)	Referenced standard	Required criteria	Achieved criteria	Conclusion
Electrostatic discharge immunity measurement	EN 61000-4-2:2009	B	A	P
Radiated, RF electromagnetic field immunity measurement	EN 61000-4-3:2006 + A1:2008 + A2:2010	A	-	N/P
Electrical fast transients/burst immunity measurement	EN 61000-4-4:2012	B	-	N/P
Surge immunity measurement	EN 61000-4-5:2014	B	-	N/P
Conducted disturbances, induced by RF fields immunity measurement	EN 61000-4-6:2014	A	-	N/P
Power frequency magnetic field immunity measurement	EN 61000-4-8:2010	A	-	N/P
Voltage dips, short interruptions, and voltage variations immunity measurement	EN 61000-4-11:2004	B	-	N/P
NOTE: for detailed description of achieved criteria refer to each test separately				

NOTE: no non-standard test method used

Product SpaceY :

STANDARDS (details on first page)	PERFORMED¹⁾	CONCLUSION¹⁾
EN 303 446-1 V1.2.1 Electromagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment; Part 1: Requirements for equipment intended to be used in residential, commercial and light industry locations.	YES	P
SUBSTANDARD: RADIO PART		
EN 301 489-1 V2.2.3 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; harmonized Standard for ElectroMagnetic Compatibility	YES	P
EN 301 489-17 V3.2.4 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for broadband Data Transmission Systems; Harmonised standard for ElectroMagnetic Compatibility	YES	P
SUBSTANDARD: NON-RADIO PART		
EN 55032:2015 + A11:2020 Electromagnetic compatibility of multimedia equipment – Emission requirements	YES	P
EN 55035:2017 + A11:2020 Electromagnetic compatibility of multimedia equipment – Immunity Requirements	YES	P
¹⁾ See details in table(s) below		

Test (emission)	Referenced standard	Clause within the report	Class	Conclusion
Conducted emission measurement	EN 55032:2015 + A11:2020	9.1	-	N/P
Radiated emission measurement	EN 55032:2015 + A11:2020	9.2	B	P
Harmonic current emissions measurement	EN 61000-3-2:2014	9.3	-	N/P
Voltage changes, fluctuations, and flicker measurement	EN 61000-3-3:2013	9.4	/	N/P

Test (immunity)	Referenced standard	Required criteria	Achieved criteria	Conclusion
Electrostatic discharge immunity measurement	EN 61000-4-2:2009	B	A	P
Radiated, RF electromagnetic field immunity measurement	EN 61000-4-3:2006 + A1:2008 + A2:2010	A	-	N/P
Electrical fast transients/burst immunity measurement	EN 61000-4-4:2012	B	-	N/P
Surge immunity measurement	EN 61000-4-5:2014	B	-	N/P
Conducted disturbances, induced by RF fields immunity measurement	EN 61000-4-6:2014	A	-	N/P
Power frequency magnetic field immunity measurement	EN 61000-4-8:2010	A	-	N/P
Voltage dips, short interruptions, and voltage variations immunity measurement	EN 61000-4-11:2004	B	-	N/P
NOTE: for detailed description of achieved criteria refer to each test separately				

NOTE: no non-standard test method used

Product JumpY :

STANDARDS (details on first page)	PERFORMED ¹⁾	CONCLUSION ¹⁾
EN 303 446-1 V1.2.1 Electromagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment; Part 1: Requirements for equipment intended to be used in residential, commercial and light industry locations.	YES	P
SUBSTANDARD: RADIO PART		
EN 301 489-1 V2.2.3 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; harmonized Standard for ElectroMagnetic Compatibility	YES	P
EN 301 489-17 V3.2.4 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for broadband Data Transmission Systems; Harmonised standard for ElectroMagnetic Compatibility	YES	P
SUBSTANDARD: NON-RADIO PART		
EN 55032:2015 + A11:2020 Electromagnetic compatibility of multimedia equipment – Emission requirements	YES	P
EN IEC 61000-3-2:2019 + A1:2021 Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)	YES	P
EN 61000-3-3:2013 + A1:2019 + A2:2021 Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current ≤ 16A per phase and not subjected to conditional connection	YES	P
EN 55035:2017 + A11:2020 Electromagnetic compatibility of multimedia equipment – Immunity Requirements	YES	P
¹⁾ See details in table(s) below		

Test (emission)	Referenced standard	Clause within the report	Class	Conclusion
Conducted emission measurement	EN 55032:2015 + A11:2020	9.1	B	P
Radiated emission measurement	EN 55032:2015 + A11:2020	9.2	B	P
Harmonic current emissions measurement	EN IEC 61000-3-2:2019 + A1:2021	9.3	A	P
Voltage changes, fluctuations, and flicker measurement	EN 61000-3-3:2013 + A1:2019 + A2:2021	9.4	/	P

Test (immunity)	Referenced standard	Required criteria	Achieved criteria	Conclusion
Electrostatic discharge immunity measurement	EN 61000-4-2:2009	B	A	P
Radiated, RF electromagnetic field immunity measurement	EN 61000-4-3:2006 + A1:2008 + A2:2010	A	A	P
Electrical fast transients/burst immunity measurement	EN 61000-4-4:2012	B	A	P
Surge immunity measurement	EN 61000-4-5:2014	B	A	P
Conducted disturbances, induced by RF fields immunity measurement	EN 61000-4-6:2014	A	A	P



Power frequency magnetic field immunity measurement	EN 61000-4-8:2010	A	-	N/P
Voltage dips, short interruptions, and voltage variations immunity measurement	EN 61000-4-11:2004	B	B/C	P
NOTE: for detailed description of achieved criteria refer to each test separately				

NOTE: no non-standard test method used

8. Performance/observation criteria

Radio part for all models :

EN 301 489-17:

Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).
NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended. NOTE 2: Degradation of performance during the test is understood as degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended. NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.		

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

Performance criteria for Continuous phenomena applied to Receivers (CR)

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained.

Performance criteria for Transient phenomena applied to Receivers (TR)

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

Non-Radio part for all models :

If there are no special manufacturer performance criteria defined, those below are used for evaluation.

Criteria A: The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Criteria B: During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Criteria C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Vibey :

Test	Observed function
Electrostatic discharge immunity measurement ^{NOTE}	Communication between mobile phone and EUT, vibration, lighting
NOTE: see section 7, referenced standards	

For Spready :

Test	Observed function
Electrostatic discharge immunity measurement ^{NOTE}	Communication between mobile phone and EUT, lighting
NOTE: see section 7, referenced standards	

For Spacey :

Test	Observed function
Electrostatic discharge immunity measurement ^{NOTE}	Communication between mobile phone and EUT, sound
NOTE: see section 7, referenced standards	

For Jumpy

Test	Observed function
Electrostatic discharge immunity measurement ^{NOTE}	Communication between mobile phone and EUT and lighting

Radiated, RF electromagnetic field immunity measurement ^{NOTE}	Communication between mobile phone and EUT and lighting
Electrical fast transients/burst immunity measurement ^{NOTE}	Communication between mobile phone and EUT and lighting
Surge immunity measurement ^{NOTE}	Communication between mobile phone and EUT and lighting
Conducted disturbances, induced by RF fields immunity measurement ^{NOTE}	Communication between mobile phone and EUT and lighting
Power frequency magnetic field immunity measurement ^{NOTE}	<i>Not performed</i>
Voltage dips, short interruptions, and voltage variations immunity measurement ^{NOTE}	Communication between mobile phone and EUT and lighting
NOTE: see section 7, referenced standards	

9. Emission

9.1 Conducted emission measurement

9.1.1 Limits of conducted emission measurement

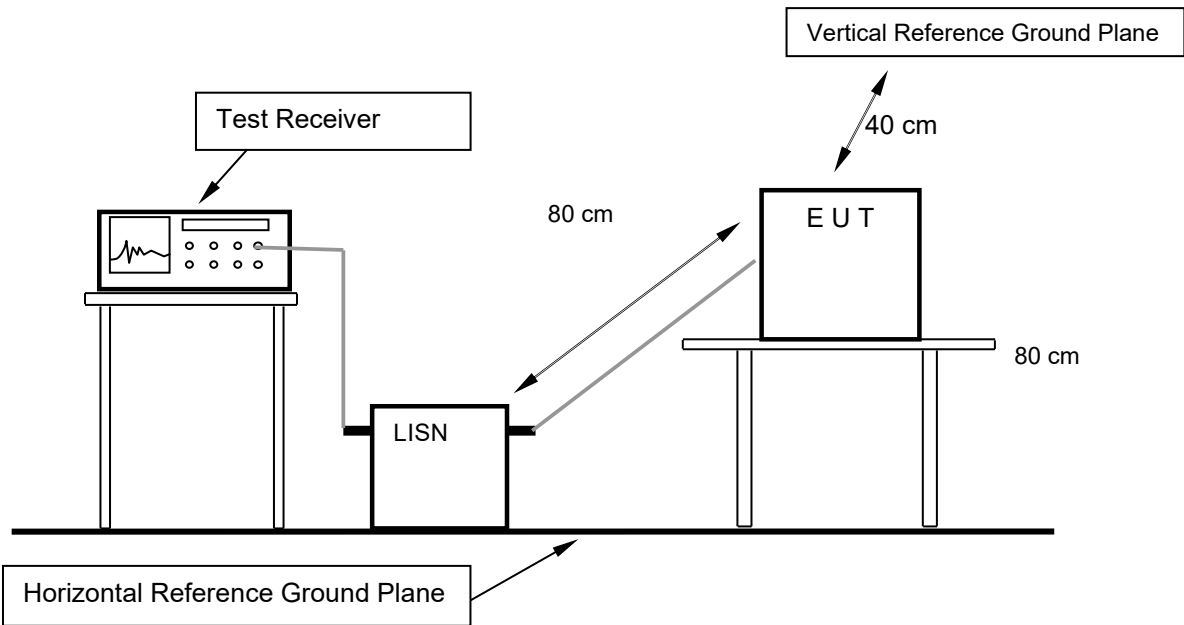
AC ports:

Frequency (MHz)	Limit Class B (dB μ V)	
	Quasi-peak	Average
0,15 – 0,5	79	66
0,5 – 5,0	73	60
5,0 – 30,0	73	60

9.1.2 Test procedure

- The EUT is placed 0,4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). LISN provide 50 Ohm / 50 μ H+5 Ohm of coupling impedance for the measuring instrument.
- EUT is checked for maximum conducted interference:
- Frequency range from 150 kHz to 30 MHz is searched.

9.1.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

9.1.4 Test results

Operating mode(s):	1
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Rohde & Schwarz

EMI Measurement Test Report

Device Under Test
Operating Conditions
Comment

JumpY
Mode 1
Line N

Scan Settings (1 Range)

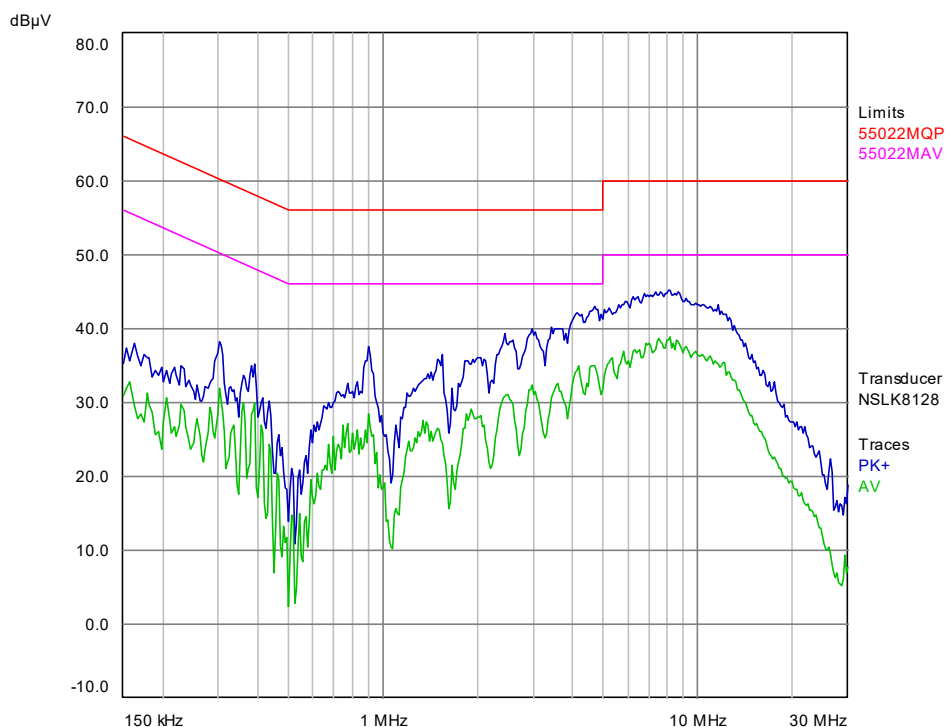
Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	30 MHz	4 kHz	9 kHz (6dB)	5 ms	0 dB	Off

Prescan Measurement

Detectors: PK+ , AV
Peaks: 6

Meas Time: see scan settings
Acc. Margin: 6 dB

Pre-measurement Graph



**Peak Search Results**

Trace	Frequency	Level	Limit	Delta Limit	Delta Ref	Comment
	(MHz)	(dB μ V)	(dB μ V)	(dB)	(dB)	

* = limit exceeded

Rohde & Schwarz

EMI Measurement Test Report

Device Under Test JumpY
Operating Conditions Mode 1
Comment Line L

Scan Settings (1 Range)

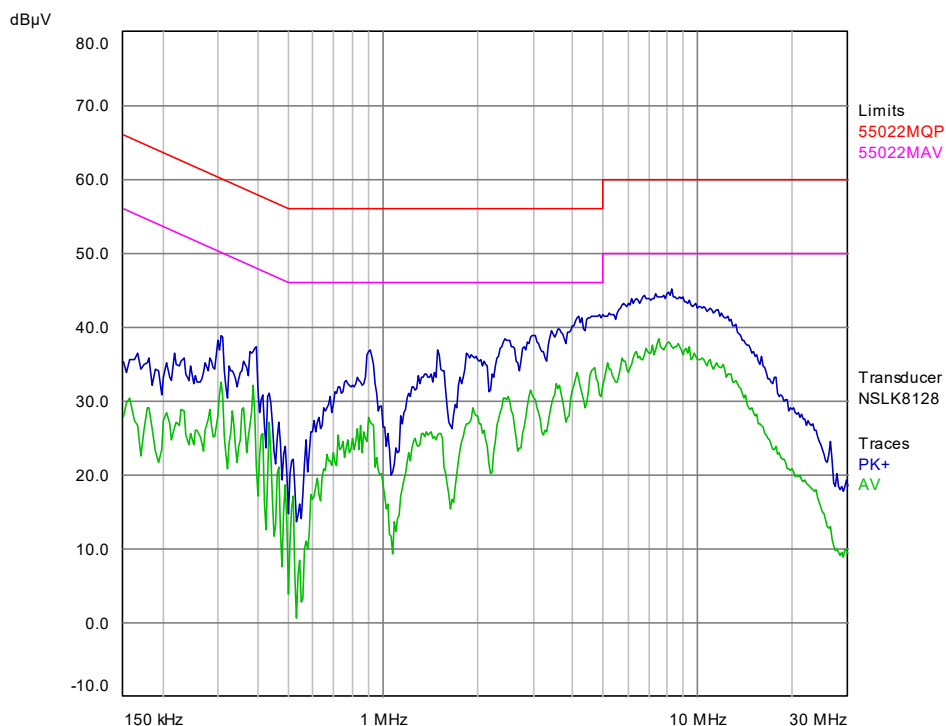
Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	30 MHz	4 kHz	9 kHz (6dB)	5 ms	0 dB	Off

Prescan Measurement

Detectors: PK+ , AV
Peaks: 6

Meas Time: see scan settings
Acc. Margin: 6 dB

Pre-measurement Graph



Peak Search Results

Trace	Frequency	Level	Limit	Delta Limit	Delta Ref	Comment
	(MHz)	(dB μ V)	(dB μ V)	(dB)	(dB)	

* = limit exceeded



Figure 1: Conducted emission measurement

9.2 Radiated emission measurement

9.2.1 Limits of radiated emission measurement

Frequency (MHz)	Limit Class B (at 3 m)	
	(dB μ V/m)	
30 – 230	40	Quasi Peak
230 – 1000	47	Quasi Peak
1000 – 3000	70	Peak
	50	Average
3000 – 6000	74	Peak
	54	Average

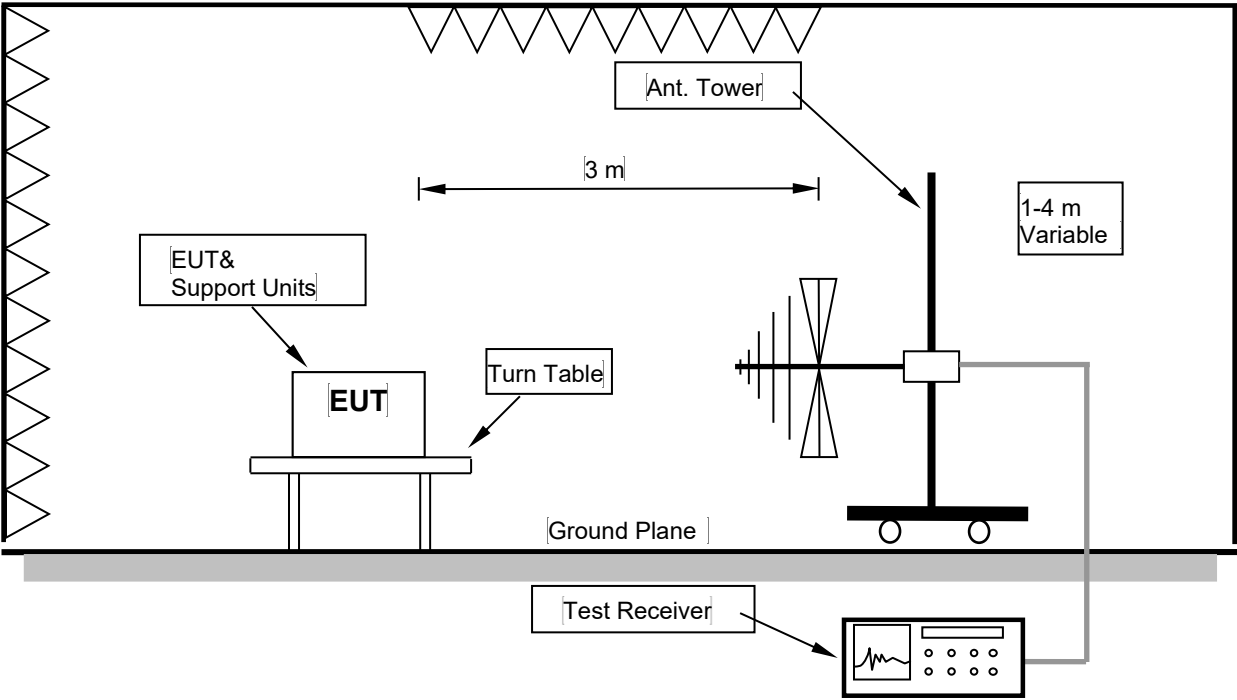
NOTE:

- The lower limit shall apply at the transition frequencies.
- Emission level (dB μ V/m) = 20 log Emission level (μ V/m).

9.2.2 Test procedure

- The EUT is set 3 m away from the interference-receiving antenna, which was mounted on the top of variable-height antenna tower.
- The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT is arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table is turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system is set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- The highest points are to be re-tested one by one using the quasi-peak method.
- CMAD has not been applied in test setup.

9.2.3 Test setup



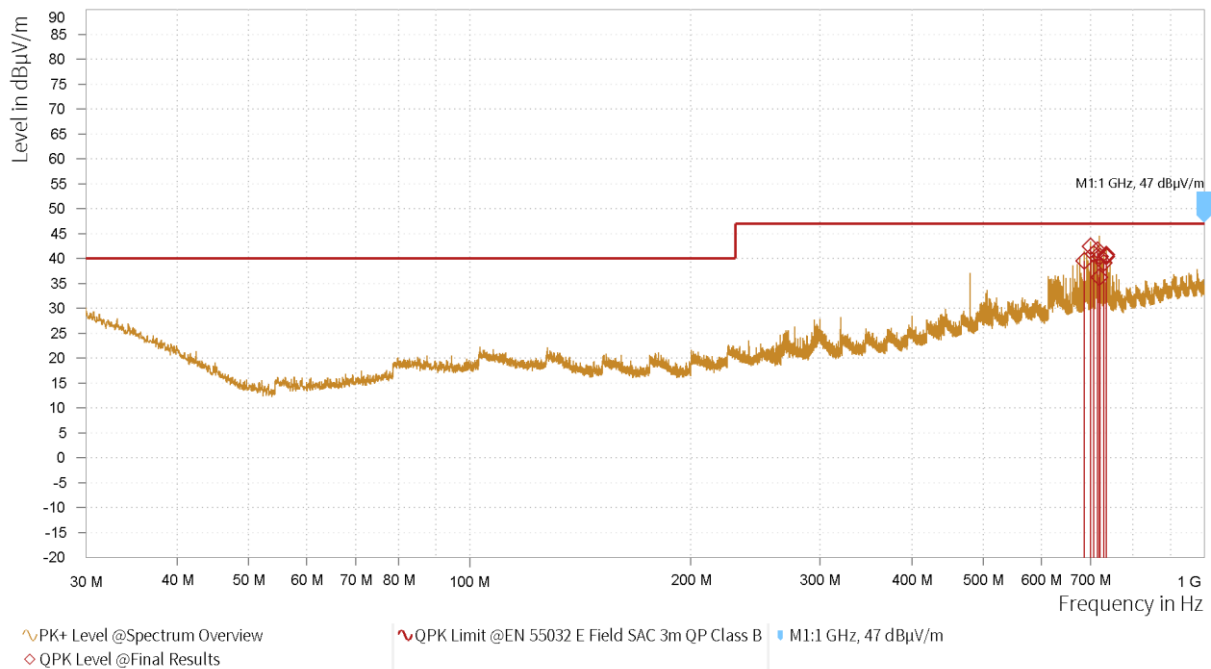
For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

9.2.4 Test result

Operating mode(s):	1
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EMI Test Report for VibeY

From 30 MHz to 1000 MHz



EMI Final Results (1/2)

Rg	Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]	Time of Meas.	Source
1	686.520	39.46	47.00	7.54	21.54	H	270	1.50	120.000	3.000	09:45:36	Critical Points
1	701.100	42.40	47.00	4.60	21.70	H	270	1.50	120.000	3.000	09:45:41	Critical Points
1	706.950	40.84	47.00	6.16	21.76	H	270	1.50	120.000	3.000	09:45:46	Critical Points
1	715.650	41.68	47.00	5.32	21.85	H	270	1.50	120.000	3.000	09:45:51	Critical Points
1	720.000	36.17	47.00	10.83	21.90	H	300	1.50	120.000	3.000	09:46:07	Critical Points
1	721.530	40.40	47.00	6.60	21.91	H	150	1.50	120.000	3.000	09:45:04	Critical Points
1	730.200	39.05	47.00	7.95	22.00	H	270	1.00	120.000	3.000	09:46:35	Critical Points
1	735.840	40.34	47.00	6.66	22.06	H	150	1.50	120.000	3.000	09:45:08	Critical Points
1	736.050	40.78	47.00	6.22	22.06	H	150	1.50	120.000	3.000	09:45:13	Critical Points

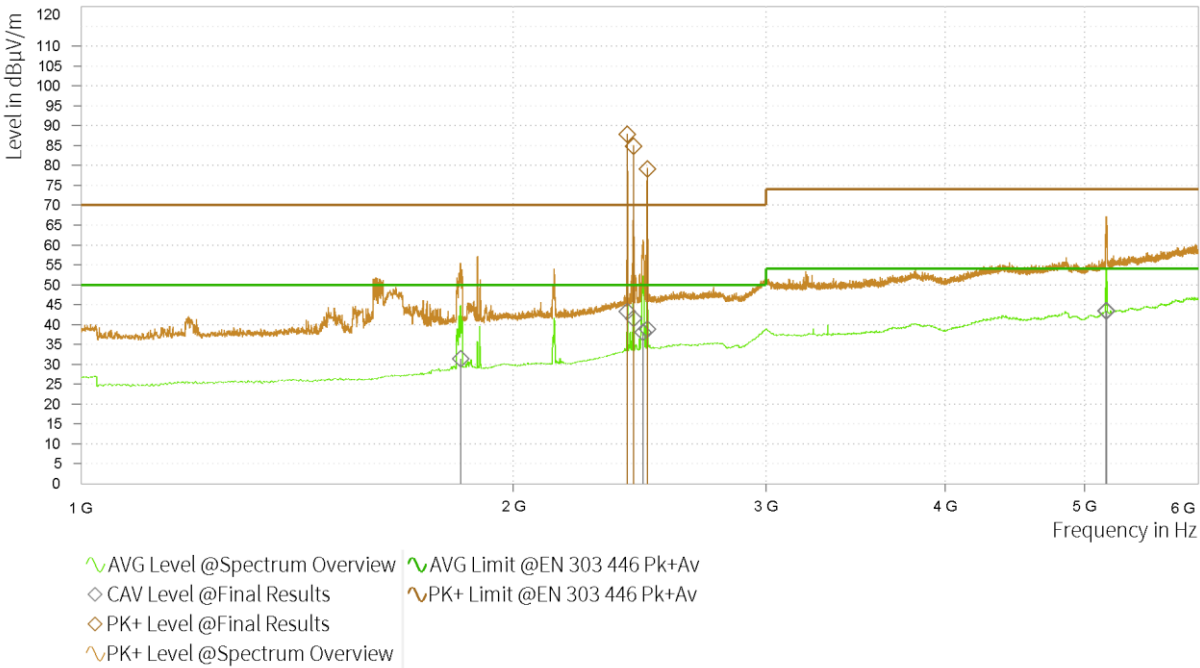
EMI Final Results (2/2)

Rg	Frequency [MHz]	Attachments	Comment
1	686.520		
1	701.100		
1	706.950		
1	715.650		
1	720.000		
1	721.530		
1	730.200		
1	735.840		
1	736.050		



EMI Test Report for VibeY

From 1 GHz to 6 GHz



EMI Final Results (1/2)

Rg	Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	CAV Level [dBµV/m]	CAV: AVG Limit [dBµV/m]	CAV Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
1	1,838.000				31.37	50.00	18.63	31.94	V	270	3.00	1,000.000	2.000
1	2,402.000				43.34	50.00	6.66	35.62	V	300	2.00	1,000.000	2.000
1	2,402.250	87.77	70.00	-17.77				35.62	V	300	2.00	1,000.000	2.000
1	2,425.750	84.81	70.00	-14.81				35.72	H	210	1.00	1,000.000	2.000
1	2,426.000				41.55	50.00	8.45	35.72	H	210	1.00	1,000.000	2.000
1	2,462.750				38.11	50.00	11.89	35.87	H	90	4.00	1,000.000	2.000
1	2,480.000				38.88	50.00	11.12	35.94	V	0	3.00	1,000.000	2.000
1	2,480.250	79.04	70.00	-9.04				35.94	V	0	3.00	1,000.000	2.000
1	5,175.000				43.42	54.00	10.58	43.73	H	30	1.00	1,000.000	2.000
1	5,179.000				43.39	54.00	10.61	43.75	H	120	3.00	1,000.000	2.000

EMI Final Results (2/2)

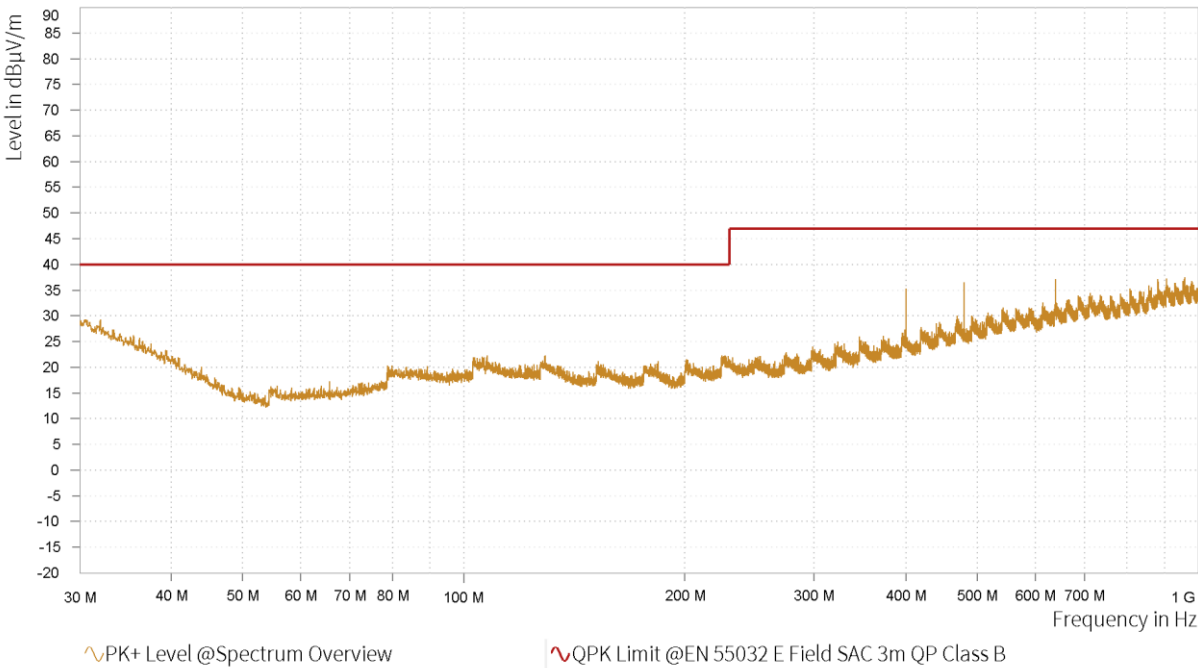
Rg	Frequency [MHz]	Time of Meas.	Source	Attachments	Comment
1	1,838.000	12:44:43	Critical Points		
1	2,402.000	12:45:14	Critical Points		
1	2,402.250	12:45:18	Critical Points		*
1	2,425.750	12:46:41	Critical Points		*
1	2,426.000	12:46:46	Critical Points		
1	2,462.750	12:43:05	Critical Points		
1	2,480.000	12:44:06	Critical Points		
1	2,480.250	12:44:10	Critical Points		*
1	5,175.000	12:46:15	Critical Points		
1	5,179.000	12:43:35	Critical Points		

* = Peak on range between 2400-2483,5 MHz origin from Bluetooth communication and they are excluded from consideration



EMI Test Report for SpreadY

From 30 MHz to 1000 MHz



EMI Final Results (1/2)

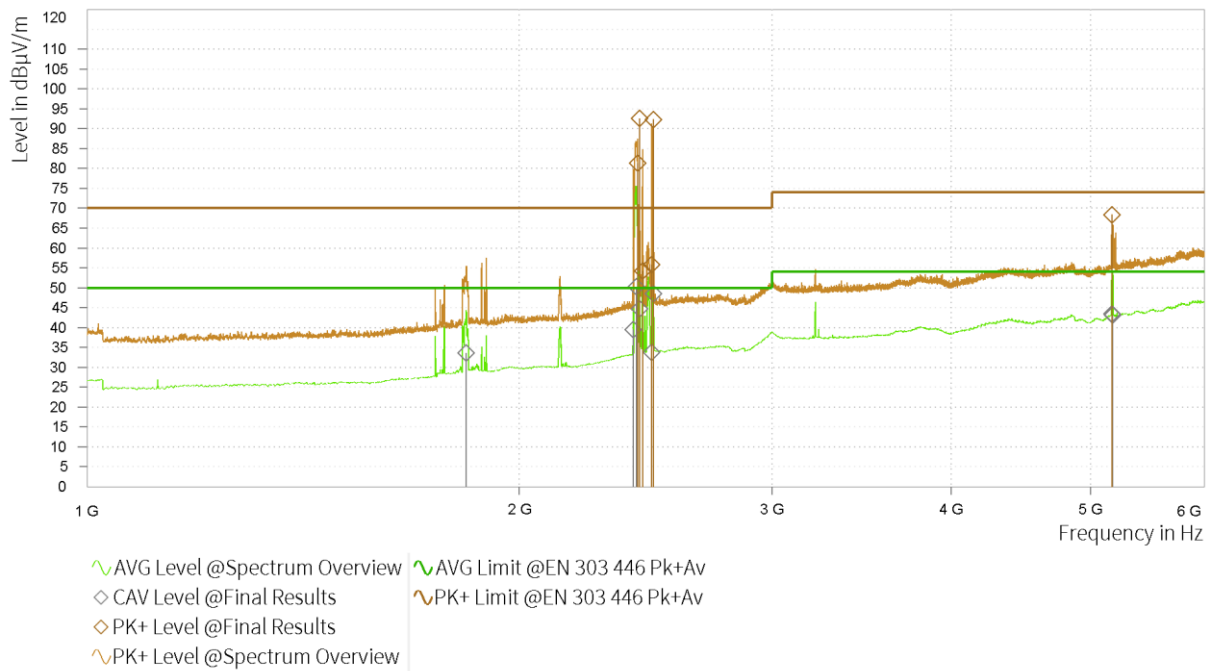
Rg	Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]	Time of Meas.	Source	Attachments

EMI Final Results (2/2)

Rg	Frequency [MHz]	Comment

EMI Test Report for SpreadY

From 1 GHz to 6 GHz



EMI Final Results (1/2)

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	CAV Level [dBμV/m]	CAV: AVG Limit [dBμV/m]	CAV Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
1	1,837.500				33.64	50.00	16.36	31.94	V	30	2.00	1,000.000	2.000
1	2,402.000				39.39	50.00	10.61	35.62	V	0	3.00	1,000.000	2.000
1	2,412.750				50.29	50.00	-0.29	35.66	V	150	3.00	1,000.000	2.000
1	2,418.250	81.39	70.00	-11.39				35.69	V	150	3.00	1,000.000	2.000
1	2,425.750	92.53	70.00	-22.53				35.72	H	30	1.00	1,000.000	2.000
1	2,426.000				44.78	50.00	5.22	35.72	H	30	1.00	1,000.000	2.000
1	2,438.000	54.25	70.00	15.75				35.77	V	300	2.00	1,000.000	2.000
1	2,474.000				33.77	50.00	16.23	35.92	H	60	2.00	1,000.000	2.000
1	2,474.250	55.73	70.00	14.27				35.92	H	60	2.00	1,000.000	2.000
1	2,479.750	92.29	70.00	-22.29				35.94	V	90	1.00	1,000.000	2.000
1	2,480.000				48.43	50.00	1.57	35.94	V	90	1.00	1,000.000	2.000
1	2,480.250	92.32	70.00	-22.32				35.94	V	90	1.00	1,000.000	2.000
1	5,176.750				43.44	54.00	10.56	43.74	V	210	3.00	1,000.000	2.000
1	5,177.000	68.27	74.00	5.73				43.74	V	210	3.00	1,000.000	2.000
1	5,181.500				43.19	54.00	10.81	43.77	V	60	4.00	1,000.000	2.000

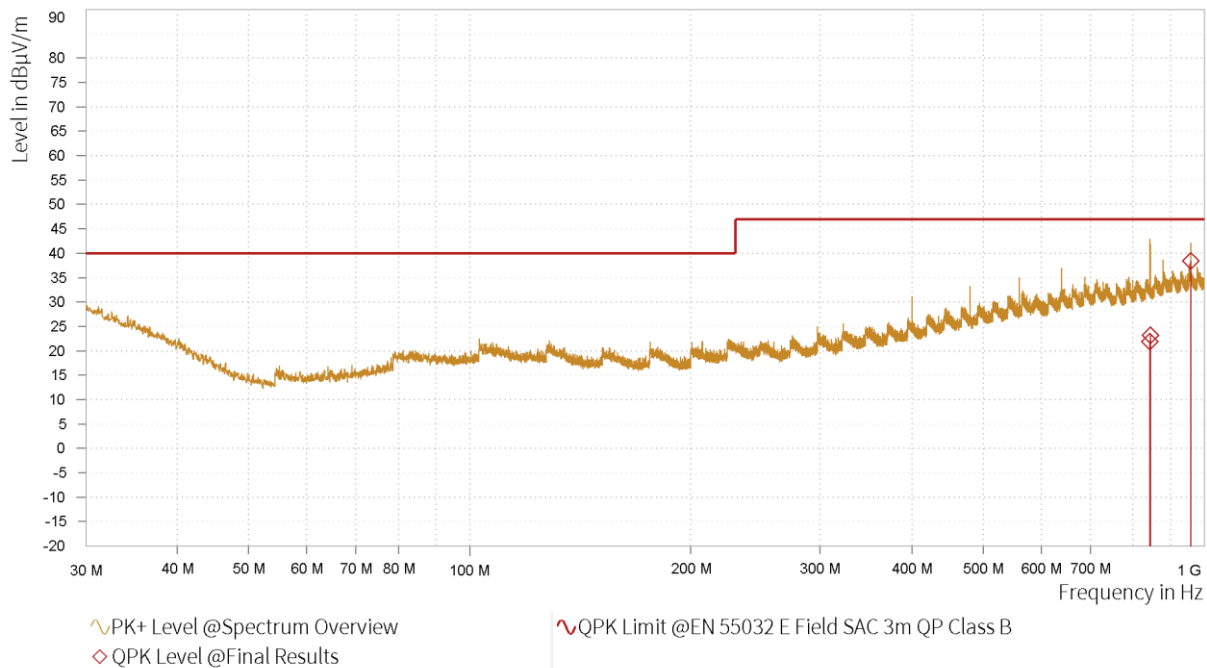
EMI Final Results (2/2)

Rg	Frequency [MHz]	Time of Meas.	Source	Attachments	Comment
1	1,837.500	11:27:31	Critical Points		
1	2,402.000	11:25:37	Critical Points		
1	2,412.750	11:26:00	Critical Points		*
1	2,418.250	11:26:04	Critical Points		*
1	2,425.750	11:28:56	Critical Points		*
1	2,426.000	11:29:01	Critical Points		
1	2,438.000	11:28:04	Critical Points		
1	2,474.000	11:27:07	Critical Points		
1	2,474.250	11:27:12	Critical Points		
1	2,479.750	11:29:23	Critical Points		*
1	2,480.000	11:29:28	Critical Points		
1	2,480.250	11:29:32	Critical Points		*
1	5,176.750	11:26:20	Critical Points		
1	5,177.000	11:26:24	Critical Points		
1	5,181.500	11:25:07	Critical Points		

* * = Peak on range between 2400-2483,5 MHz origin from Bluetooth communication and they are excluded from consideration

EMI Test Report for SpaceY

From 30 MHz to 1000 MHz



EMI Final Results (1/2)

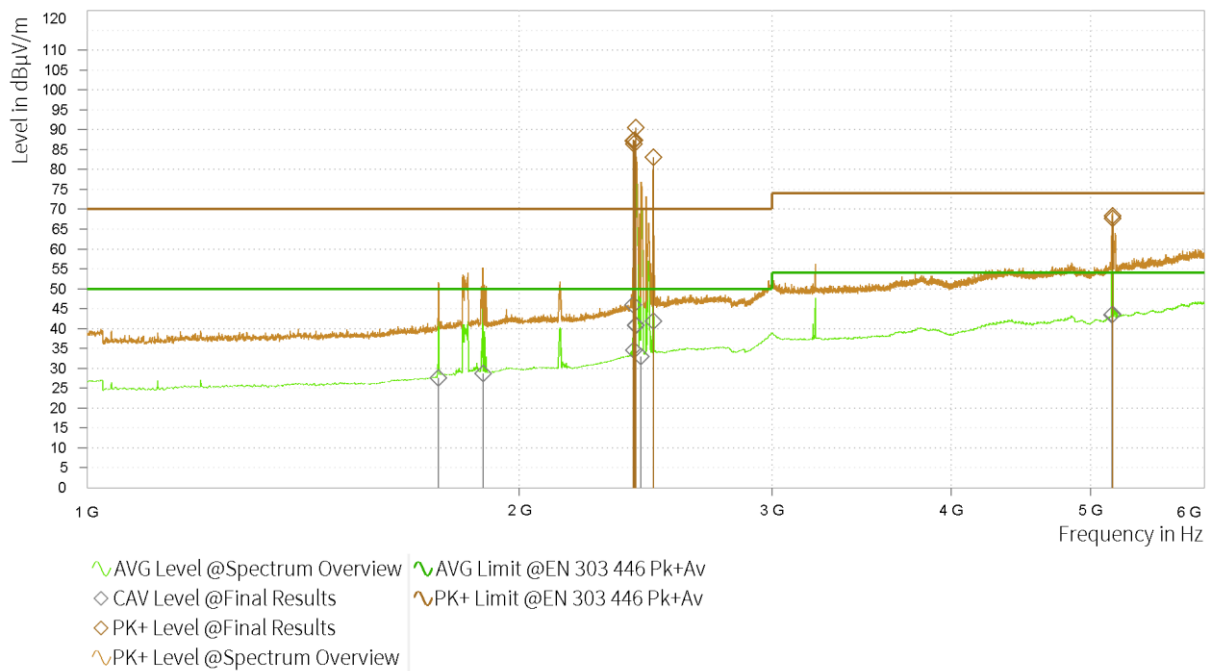
Rg	Frequency [MHz]	QPK Level [dBµV/m]	QPK Limit [dBµV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]	Time of Meas.	Source
1	844.350	21.94	47.00	25.06	22.88	H	180	3.00	120.000	3.000	08:46:43	Critical Points
1	844.530	23.18	47.00	23.82	22.88	H	180	3.00	120.000	3.000	08:46:48	Critical Points
1	960.000	38.42	47.00	8.58	24.41	V	120	1.50	120.000	3.000	08:47:33	Critical Points

EMI Final Results (2/2)

Rg	Frequency [MHz]	Attachments	Comment
1	844.350		
1	844.530		
1	960.000		

EMI Test Report for SpaceY

From 1 GHz to 6 GHz



EMI Final Results (1/2)

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	CAV Level [dBμV/m]	CAV: AVG Limit [dBμV/m]	CAV Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
1	1,757.500				27.58	50.00	22.42	31.30	H	240	3.00	1,000.000	2.000
1	1,887.000				28.73	50.00	21.27	32.29	H	0	4.00	1,000.000	2.000
1	2,402.000				46.03	50.00	3.97	35.62	H	0	2.00	1,000.000	2.000
1	2,402.250	87.26	70.00	-17.26				35.62	H	0	2.00	1,000.000	2.000
1	2,403.750	86.35	70.00	-16.35	34.62	50.00	15.38	35.63	H	60	3.00	1,000.000	2.000
1	2,406.250	87.37	70.00	-17.37				35.64	V	240	1.00	1,000.000	2.000
1	2,410.250				40.74	50.00	9.26	35.65	V	240	1.00	1,000.000	2.000
1	2,411.250				40.83	50.00	9.17	35.66	V	240	1.00	1,000.000	2.000
1	2,412.000	90.54	70.00	-20.54				35.66	V	240	1.00	1,000.000	2.000
1	2,431.250				32.95	50.00	17.05	35.74	V	240	3.00	1,000.000	2.000
1	2,479.750	83.00	70.00	-13.00				35.94	H	0	4.00	1,000.000	2.000
1	2,480.000				41.89	50.00	8.11	35.94	H	0	4.00	1,000.000	2.000
1	5,177.250				43.37	54.00	10.63	43.74	V	90	2.00	1,000.000	2.000
1	5,181.250	67.76	74.00	6.24	43.64	54.00	10.36	43.77	H	300	1.00	1,000.000	2.000
1	5,181.750	68.33	74.00	5.67				43.77	H	300	1.00	1,000.000	2.000

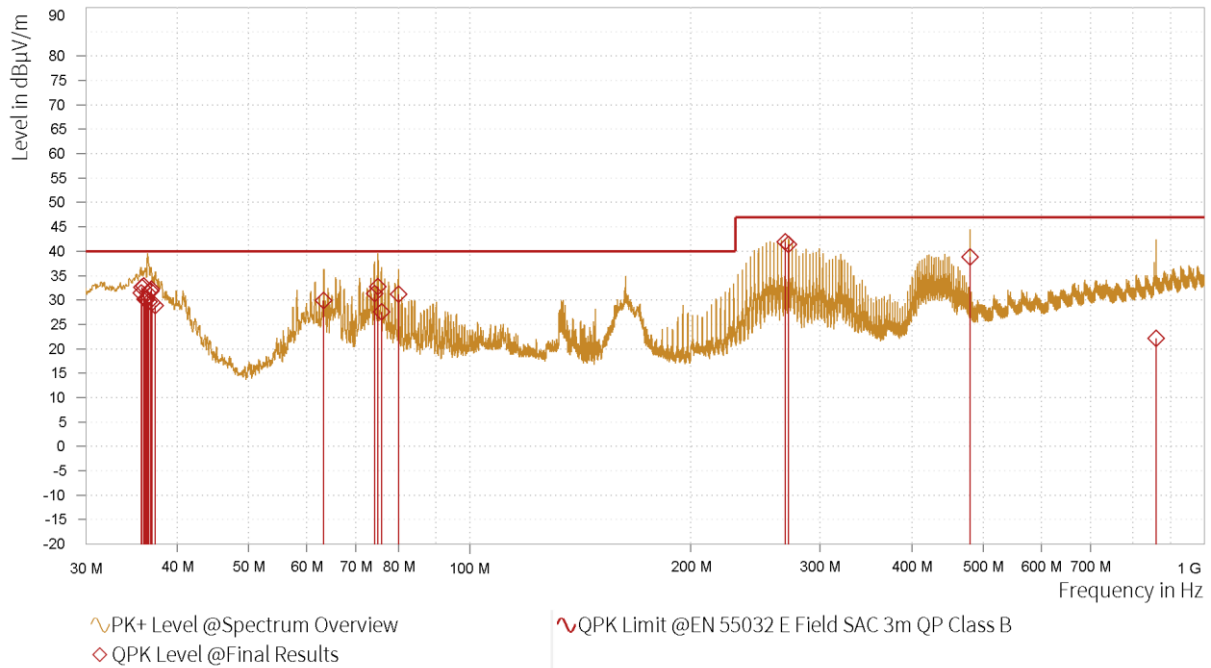
EMI Final Results (2/2)

Rg	Frequency [MHz]	Time of Meas.	Source	Attachments	Comment
1	1,757.500	10:55:58	Critical Points		
1	1,887.000	10:54:56	Critical Points		
1	2,402.000	10:56:58	Critical Points		
1	2,402.250	10:57:02	Critical Points		*
1	2,403.750	10:55:33	Critical Points		*
1	2,406.250	10:58:40	Critical Points		*
1	2,410.250	10:58:45	Critical Points		
1	2,411.250	10:58:49	Critical Points		
1	2,412.000	10:58:54	Critical Points		*
1	2,431.250	10:56:08	Critical Points		
1	2,479.750	10:55:00	Critical Points		*
1	2,480.000	10:55:04	Critical Points		
1	5,177.250	10:57:27	Critical Points		
1	5,181.250	10:58:14	Critical Points		
1	5,181.750	10:58:18	Critical Points		

* = Peak on range between 2400-2483,5 MHz origin from Bluetooth communication and they are excluded from consideration

EMI Test Report for JumpY

From 30 MHz to 1000 MHz MODE 1



EMI Final Results (1/2)

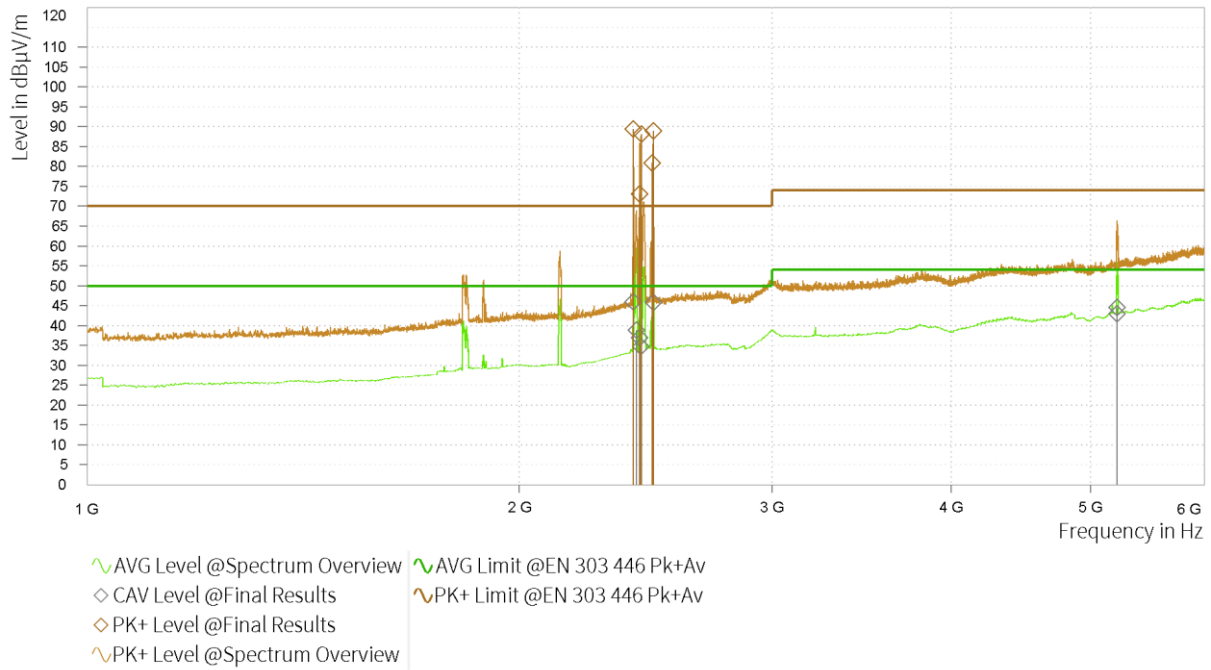
Rg	Frequency [MHz]	QPK Level [dBμV/m]	QPK Limit [dBμV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]	Time of Meas.	Source
1	35.670	31.44	40.00	8.56	16.57	V	300	1.50	120.000	3.000	09:31:05	Critical Points
1	35.790	32.61	40.00	7.39	16.51	V	150	1.00	120.000	3.000	09:32:28	Critical Points
1	36.000	32.88	40.00	7.12	16.41	V	270	1.00	120.000	3.000	09:32:51	Critical Points
1	36.150	30.13	40.00	9.87	16.33	V	180	1.50	120.000	3.000	09:30:21	Critical Points
1	36.240	30.06	40.00	9.94	16.28	V	300	1.50	120.000	3.000	09:31:11	Critical Points
1	36.420	31.38	40.00	8.62	16.19	V	180	1.50	120.000	3.000	09:30:27	Critical Points
1	36.540	29.65	40.00	10.35	16.13	V	180	1.50	120.000	3.000	09:30:32	Critical Points
1	36.780	31.86	40.00	8.14	16.02	V	300	1.50	120.000	3.000	09:31:16	Critical Points
1	36.840	32.20	40.00	7.80	15.99	V	300	1.50	120.000	3.000	09:31:22	Critical Points
1	36.930	29.48	40.00	10.52	15.94	V	180	1.50	120.000	3.000	09:30:37	Critical Points
1	37.320	28.91	40.00	11.09	15.75	V	180	1.50	120.000	3.000	09:30:43	Critical Points
1	63.270	29.84	40.00	10.16	7.15	V	0	2.00	120.000	3.000	09:29:17	Critical Points
1	74.160	31.30	40.00	8.70	9.25	V	90	1.50	120.000	3.000	09:29:50	Critical Points
1	74.970	32.75	40.00	7.25	9.36	V	90	1.50	120.000	3.000	09:29:56	Critical Points
1	75.810	27.57	40.00	12.43	9.47	V	90	1.50	120.000	3.000	09:30:01	Critical Points
1	80.010	31.20	40.00	8.80	9.99	H	30	3.50	120.000	3.000	09:27:26	Critical Points
1	268.800	41.91	47.00	5.09	12.04	H	120	1.00	120.000	3.000	09:28:26	Critical Points
1	271.890	41.43	47.00	5.57	12.14	H	120	1.00	120.000	3.000	09:28:31	Critical Points
1	480.000	38.82	47.00	8.18	17.79	V	60	1.00	120.000	3.000	09:32:08	Critical Points
1	859.980	22.16	47.00	24.84	23.11	H	120	2.50	120.000	3.000	09:28:01	Critical Points

EMI Final Results (2/2)

Rg	Frequency [MHz]	Attachments	Comment
1	35.670		
1	35.790		
1	36.000		
1	36.150		
1	36.240		
1	36.420		
1	36.540		
1	36.780		
1	36.840		
1	36.930		
1	37.320		
1	63.270		
1	74.160		
1	74.970		
1	75.810		
1	80.010		
1	268.800		
1	271.890		
1	480.000		
1	859.980		

EMI Test Report for JumpY

From 1 GHz to 6 GHz



EMI Final Results (1/2)

Rg	Frequency [MHz]	PK+ Level [dBµV/m]	PK+ Limit [dBµV/m]	PK+ Margin [dB]	CAV Level [dBµV/m]	CAV: AVG Limit [dBµV/m]	CAV Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
1	2,402.000				45.92	50.00	4.08	35.62	H	150	1.00	1,000.000	2.000
1	2,402.250	89.37	70.00	-19.37				35.62	H	150	1.00	1,000.000	2.000
1	2,413.250				38.87	50.00	11.13	35.66	V	210	1.00	1,000.000	2.000
1	2,425.750	73.14	70.00	-3.14				35.72	V	210	4.00	1,000.000	2.000
1	2,426.000				37.01	50.00	12.99	35.72	V	210	4.00	1,000.000	2.000
1	2,432.000				34.69	50.00	15.31	35.74	H	120	2.00	1,000.000	2.000
1	2,432.250	88.08	70.00	-18.08				35.74	H	120	2.00	1,000.000	2.000
1	2,475.750	80.80	70.00	-10.80				35.92	V	300	1.00	1,000.000	2.000
1	2,479.750	88.96	70.00	-18.96				35.94	H	330	2.00	1,000.000	2.000
1	2,480.000				45.86	50.00	4.14	35.94	H	330	2.00	1,000.000	2.000
1	5,218.250				44.54	54.00	9.46	43.95	H	300	3.00	1,000.000	2.000
1	5,220.500				42.92	54.00	11.08	43.96	H	300	3.00	1,000.000	2.000

EMI Final Results (2/2)

Rg	Frequency [MHz]	Time of Meas.	Source	Attachments	Comment
1	2,402.000	10:43:01	Critical Points		
1	2,402.250	10:43:06	Critical Points		*
1	2,413.250	10:43:32	Critical Points		
1	2,425.750	10:40:09	Critical Points		*
1	2,426.000	10:40:12	Critical Points		
1	2,432.000	10:41:41	Critical Points		
1	2,432.250	10:41:45	Critical Points		*
1	2,475.750	10:43:52	Critical Points		*
1	2,479.750	10:42:14	Critical Points		*
1	2,480.000	10:42:18	Critical Points		
1	5,218.250	10:40:55	Critical Points		
1	5,220.500	10:40:59	Critical Points		

* = Peak on range between 2400-2483,5 MHz origin from Bluetooth communication and they are excluded from consideration



Figure 2: Radiated emission measurement for Vibey < 1GHz

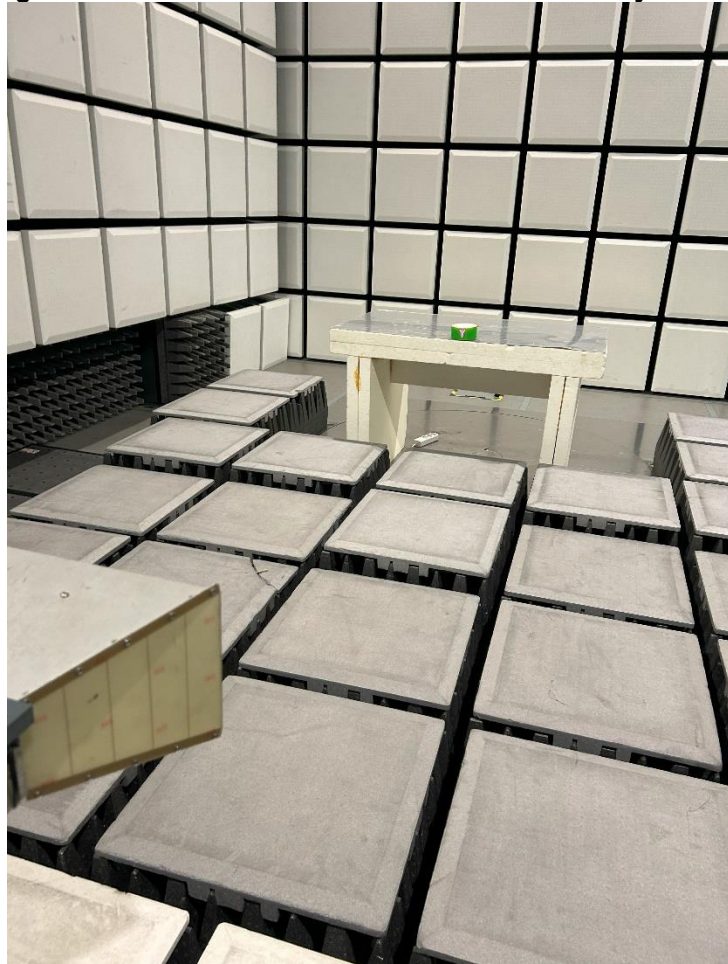


Figure 3: Radiated emission measurement for Vibey > 1GHz



Figure 4: Radiated emission measurement for SpreadY < 1GHz

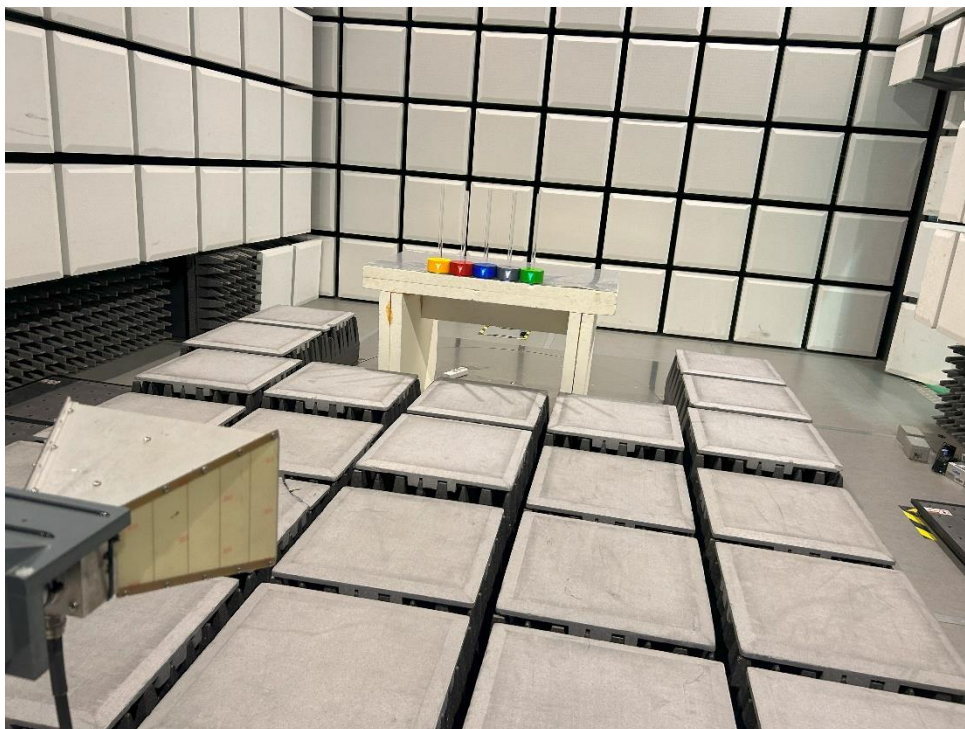


Figure 5: Radiated emission measurement for SpreadY > 1GHz

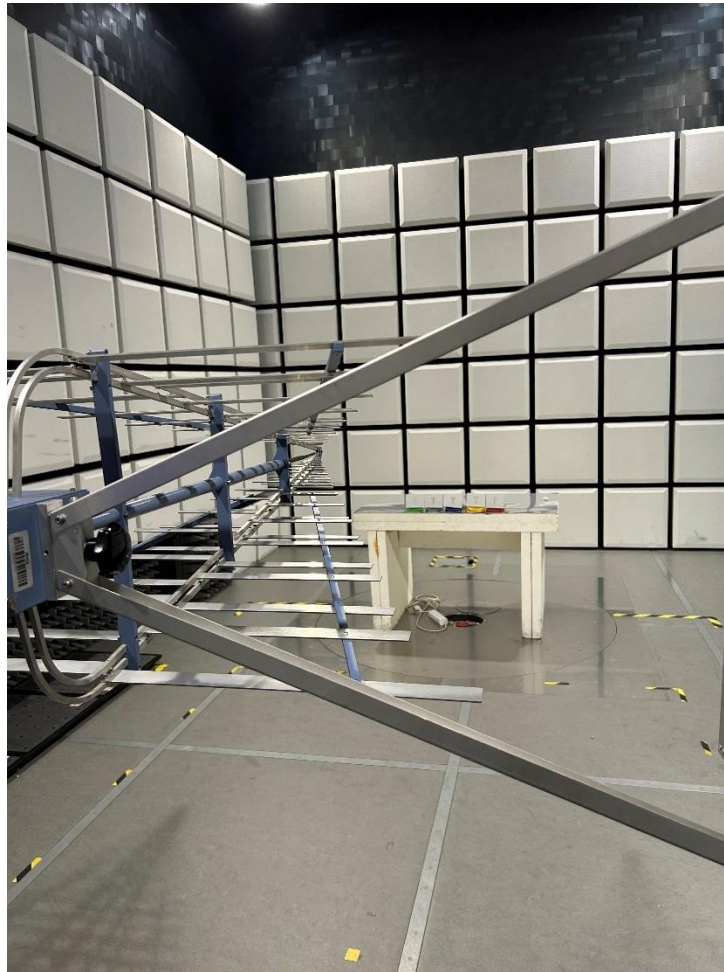


Figure 6: Radiated emission measurement for SpaceY < 1GHz



Figure 7: Radiated emission measurement for SpaceY > 1GHz

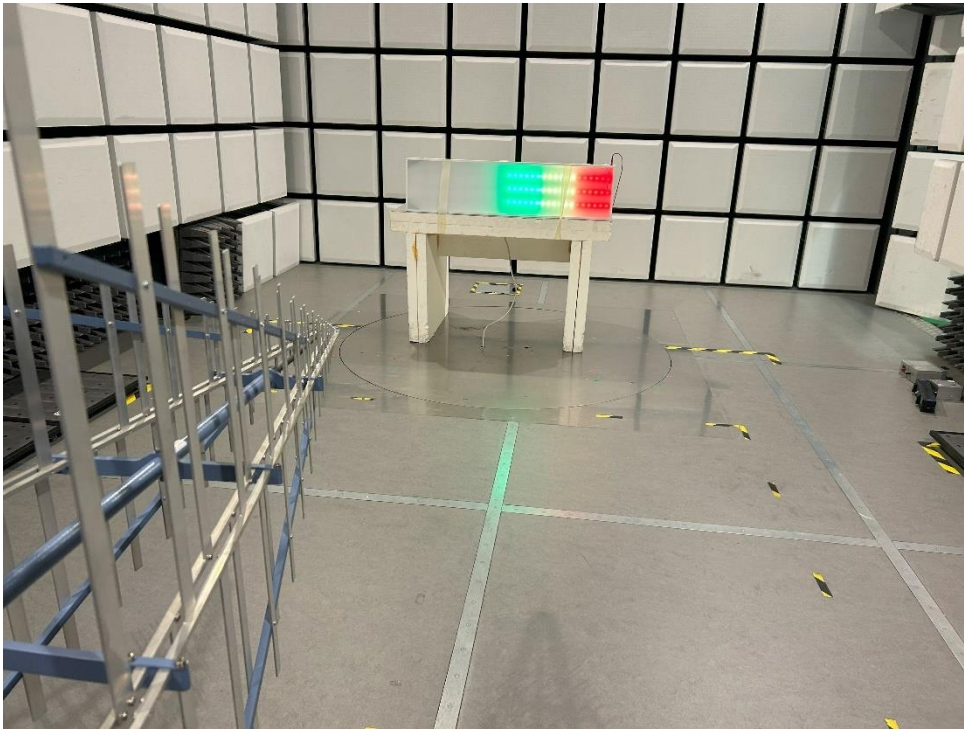


Figure 8: Radiated emission measurement for JumpY < 1GHz

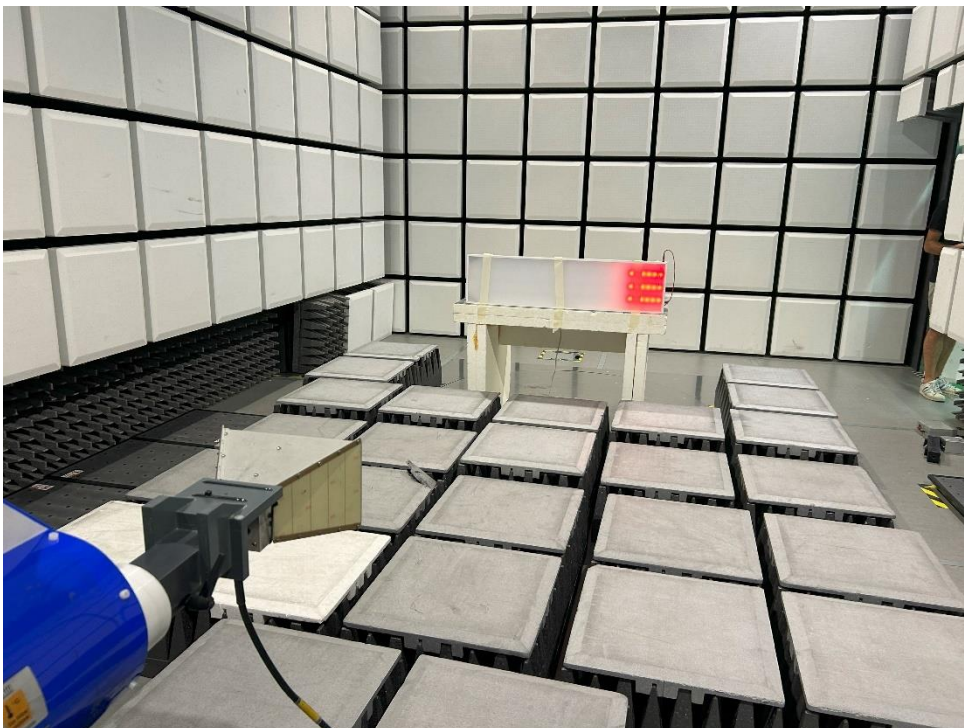


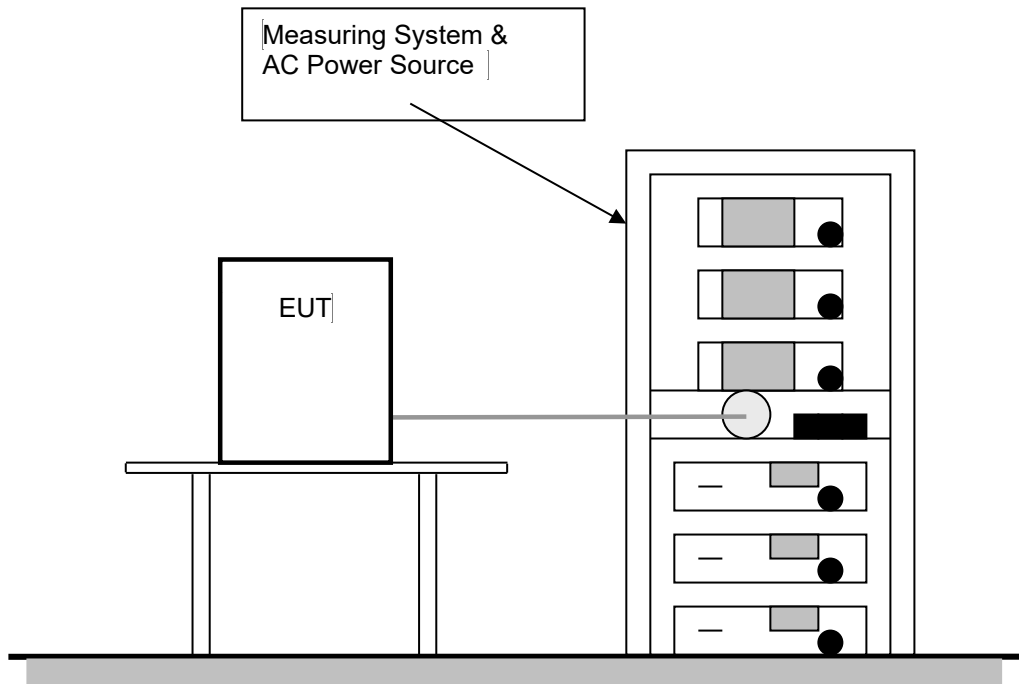
Figure 9: Radiated emission measurement for JumpY > 1GHz

9.3 Harmonic current emissions measurement

9.3.1 Configuration

- The EUT is placed on the top of an insulating support 0,1 (floor equipment) or 0,8 (table-top equipment) meters in height above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

9.3.2 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

9.3.3 Test results

Operating mode(s):	1
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Test Report

Report Number : Voice toys - Jumpy

Test Standard : IEC 61000-3-2 (Edition 5)
Limits for harmonic current emissions (equipment input current < 16 A per phase)

Test Date : 7/17/2025 1:57:36 PM

Result

E.U.T. : PASS Source : PASS

Measures & Analysis

Measure Window : 10 periods Voltage Range : 500 V

Refresh Interval : 2 s Current Range : 50 A

Sampling Rate : 10.24 kS/s

Scaled Window : Rectangular

According : IEC 61000-3-2 (Edition 5)
Limits for harmonic current emissions (equipment input current < 16 A per phase)

Observation Period : Quasi-stationary

Measure Results

Standard Specific Results for IEC 61000-3-2 (Edition 5)

Standard Group: Industry

Standard Name: IEC 61000-3-2 (Edition 5)
Limits for harmonic current emissions (equipment input current < 16 A per phase)

Device Under Test: **PASS**

Power Source: **PASS**

Connection Type: L - N

Classification: Class A

Appli. of Limits: less than or equal to 150 %

Check Harmonics 2..40 [exception odd 21..39]

First detected harmonic order > 150 %

Line 1: **None**

Harmonics orders > 150 %

Line 1: **None**

Harmonics orders with average > 100 %

Line 1: **None**

Check Odd Harmonics 21..39

<i>First detected time window with partial > partial limits</i>			
	<i>time window (time)</i>	<i>measured value</i>	<i>limit</i>
Line 1:	None		0.251 A
<i>Maximal time window with partial > partial limits</i>			
	<i>time window (time)</i>	<i>measured value</i>	<i>limit</i>
Line 1:	None		0.251 A
<i>First detected harmonic order > 150 %</i>			
Line 1:	None		
<i>Harmonics orders > 150 %</i>			
Line 1:	None		
<i>Harmonics orders with average > 150 %</i>			
Line 1:	None		

Measured values			
<i>Fundamental Current</i>			
Line 1:	0.01 A		
<i>Active input Power</i>			
Line 1:	2.37 W *		
<i>Circuit power factor</i>			
Line 1:	0.341 *		

* Absolute value.

Current Test Result

Average and Maximum harmonic current results									
Hn	Average (100% / 150% *)				Maximum (150%)				Harmonic Result
	I _{eff} [A]	of Limit [%]	Limit [A]	Result	I _{eff} [A]	of Limit [%]	Limit [A]	Result	
1	0.008				0.010				
2	0.001	0.120	1.080	n/a	0.002	0.093	1.620	n/a	n/a
3	0.006	0.245	2.300	PASS	0.008	0.245	3.450	PASS	PASS
4	0.001	0.343	0.430	n/a	0.002	0.246	0.645	n/a	n/a
5	0.006	0.498	1.140	PASS	0.008	0.493	1.710	PASS	PASS
6	0.001	0.394	0.300	n/a	0.001	0.301	0.450	n/a	n/a
7	0.006	0.720	0.770	PASS	0.008	0.710	1.155	PASS	PASS
8	0.001	0.439	0.230	n/a	0.001	0.333	0.345	n/a	n/a
9	0.005	1.363	0.400	PASS	0.008	1.340	0.600	PASS	PASS
10	0.001	0.551	0.184	n/a	0.001	0.407	0.276	n/a	n/a
11	0.005	1.599	0.330	PASS	0.008	1.547	0.495	PASS	PASS
12	0.001	0.645	0.153	n/a	0.001	0.497	0.230	n/a	n/a
13	0.005	2.453	0.210	PASS	0.007	2.368	0.315	PASS	PASS
14	0.001	0.724	0.131	n/a	0.001	0.563	0.197	n/a	n/a
15	0.005	3.287	0.150	n/a	0.007	3.147	0.225	PASS	PASS
16	0.001	0.813	0.115	n/a	0.001	0.631	0.173	n/a	n/a
17	0.005	3.577	0.132	n/a	0.007	3.445	0.199	PASS	PASS
18	0.001	0.893	0.102	n/a	0.001	0.656	0.153	n/a	n/a
19	0.005	3.826	0.118	n/a	0.006	3.597	0.178	PASS	PASS
20	0.001	0.999	0.092	n/a	0.001	0.730	0.138	n/a	n/a

21	0.005	2.861	0.161	n/a	0.006	3.834	0.161	PASS	PASS
22	0.001	1.255	0.084	n/a	0.001	1.012	0.125	n/a	n/a
23	0.005	3.615	0.147	PASS	0.007	4.505	0.147	PASS	PASS
24	0.001	1.420	0.077	n/a	0.002	1.781	0.115	n/a	n/a
25	0.004	2.840	0.135	n/a	0.005	3.794	0.135	PASS	PASS
26	0.002	2.226	0.071	n/a	0.002	1.583	0.106	n/a	n/a
27	0.004	2.835	0.125	n/a	0.005	3.718	0.125	n/a	n/a
28	0.001	2.147	0.066	n/a	0.002	1.692	0.099	n/a	n/a
29	0.003	2.838	0.116	n/a	0.004	3.583	0.116	n/a	n/a
30	0.001	1.398	0.061	n/a	0.001	1.057	0.092	n/a	n/a
31	0.003	2.811	0.109	n/a	0.004	3.426	0.109	n/a	n/a
32	0.001	1.189	0.058	n/a	0.001	0.887	0.086	n/a	n/a
33	0.003	2.710	0.102	n/a	0.003	3.275	0.102	n/a	n/a
34	0.001	1.449	0.054	n/a	0.001	1.109	0.081	n/a	n/a
35	0.003	2.628	0.096	n/a	0.003	3.110	0.096	n/a	n/a
36	0.001	1.467	0.051	n/a	0.001	1.145	0.077	n/a	n/a
37	0.002	2.475	0.091	n/a	0.003	2.842	0.091	n/a	n/a
38	0.001	1.556	0.048	n/a	0.001	1.158	0.073	n/a	n/a
39	0.002	2.339	0.087	n/a	0.002	2.558	0.087	n/a	n/a
40	0.001	2.284	0.046	n/a	0.001	2.024	0.069	n/a	n/a

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

Voltage Source Verification

Harmonic voltage results				
Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	231.379	100.600		
2	0.013	0.005	0.200	PASS
3	0.039	0.017	0.900	PASS
4	0.030	0.013	0.200	PASS
5	0.075	0.033	0.400	PASS
6	0.022	0.010	0.200	PASS
7	0.025	0.011	0.300	PASS
8	0.017	0.008	0.200	PASS
9	0.019	0.008	0.200	PASS
10	0.014	0.006	0.200	PASS
11	0.076	0.033	0.100	PASS
12	0.018	0.008	0.100	PASS
13	0.019	0.008	0.100	PASS
14	0.024	0.010	0.100	PASS
15	0.043	0.019	0.100	PASS
16	0.019	0.008	0.100	PASS
17	0.072	0.031	0.100	PASS
18	0.009	0.004	0.100	PASS
19	0.037	0.016	0.100	PASS
20	0.014	0.006	0.100	PASS
21	0.070	0.030	0.100	PASS
22	0.008	0.004	0.100	PASS

23	0.042	0.018	0.100	PASS
24	0.008	0.003	0.100	PASS
25	0.026	0.012	0.100	PASS
26	0.014	0.006	0.100	PASS
27	0.047	0.021	0.100	PASS
28	0.014	0.006	0.100	PASS
29	0.016	0.007	0.100	PASS
30	0.006	0.003	0.100	PASS
31	0.044	0.019	0.100	PASS
32	0.010	0.004	0.100	PASS
33	0.044	0.019	0.100	PASS
34	0.006	0.002	0.100	PASS
35	0.016	0.007	0.100	PASS
36	0.005	0.002	0.100	PASS
37	0.040	0.017	0.100	PASS
38	0.012	0.005	0.100	PASS
39	0.029	0.013	0.100	PASS
40	0.011	0.005	0.100	PASS

60/91Voice toys - Jumpy17/07/2025

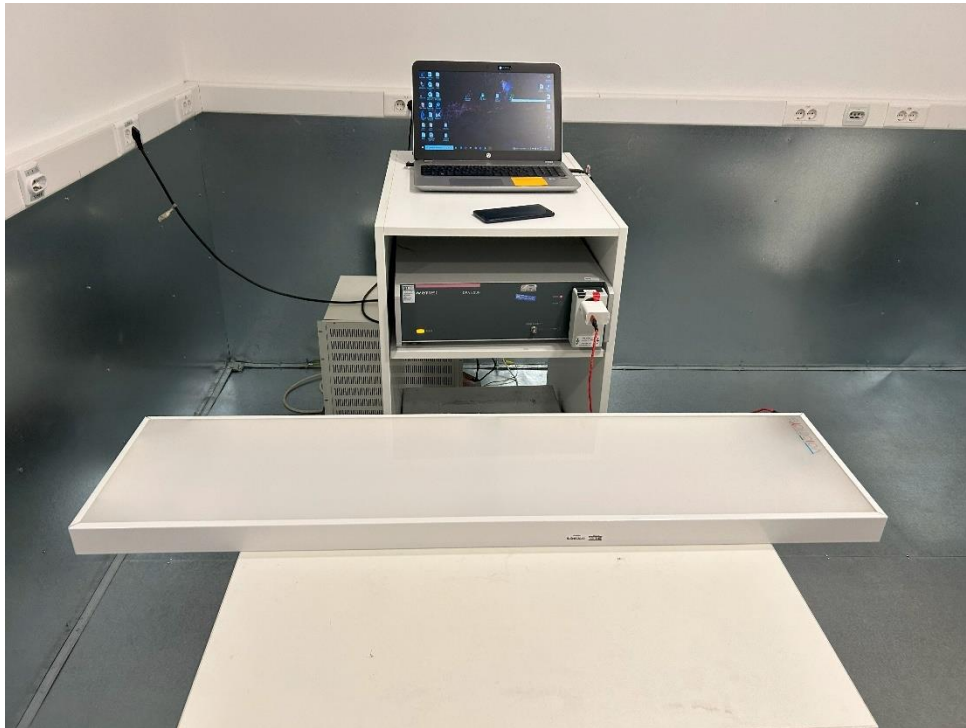


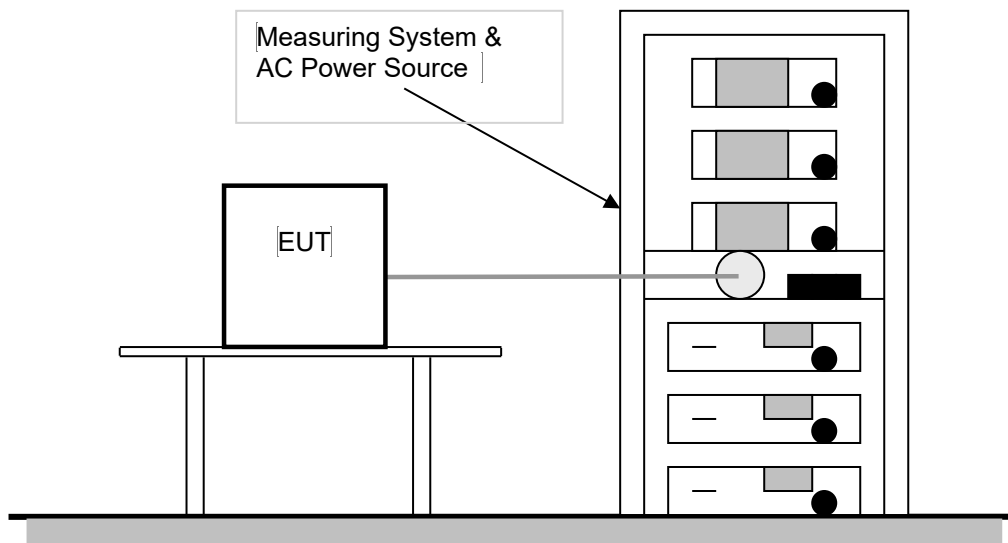
Figure 10: Harmonic current emissions and Voltage changes, fluctuations, and flicker measurement

9.4 Voltage changes, fluctuations, and flicker measurement

9.4.1 Configuration

- The EUT is placed on the top of an insulating support 0,1 (floor equipment) or 0,8 (table-top equipment) meters in height above the ground and operated to produce the **most unfavourable sequence of voltage changes under normal operating** conditions.
- During the flicker measurement, the measure time shall include that part of whole operating cycle in which the EUT produce the most unfavourable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

9.4.2 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

9.4.3 Test results

Test parameter	Limit	Note
P_{st}	1,0	Choose an item.
P_{lt}	0,65	Choose an item.
D_t (ms)	500	Choose an item.
D_{max} (%)	4	Choose an item.
dc (%)	3,3	Choose an item.

NOTE:

- P_{st} means short-term flicker indicator.
- P_{lt} means long-term flicker indicator.
- D_t means maximum time that dt exceeds 3.3 %.
- d_{max} means maximum relative voltage change.

Operating mode(s):	1
--------------------	---

Test Report

Report Number : Voice toys - Jumpy flicker

Test Standard : IEC 61000-3-3 (Edition 3)
Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

Test Date : 7/17/2025 14:01:27 PM

Result

E.U.T. : Test passed

Flicker Results

Standard Specific Results for IEC 61000-3-3 (Edition 3)

Standard Industry
Group:

Standard IEC 61000-3-3 (Edition 3)
Name:

Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

Test General Test Conditions
Condition
:

Analysis **PASS**
Status:

Flicker Measurements Settings

Main line:	230V, 50Hz	
Flicker Meter:	230V / 50Hz	
Flicker Impedance:	Zref	
Observation Time:	1 × 10 min	
Measurements performed:	1	

Flicker Measurements

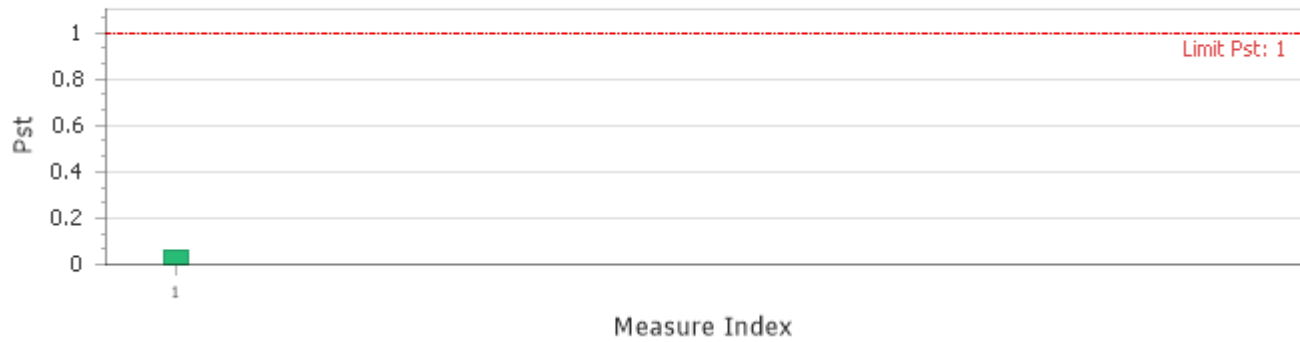
	P _{It}	Max P _{st}	Max D _c	Max D _{max}	Max T _{max}
Line 1:	0.028	0.064	0	0.205	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

Pst Data

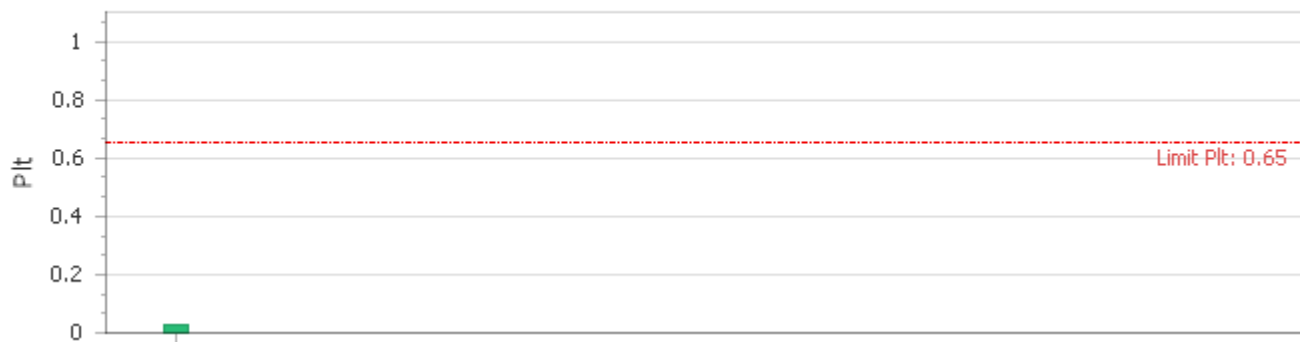
Flicker (Line 1)

Meas. Number	P0,1	P1s	P3s	P10s	P50s	Pst	dc	dmax	Tmax
							[%]	[%]	[s]
1	0.018	0.012	0.011	0.006	0.005	0.064	0	0.205	0

Short-term Flicker Severity (Pst) (Line 1)



Long-term Flicker Severity (Plt) (Line 1)



10. Immunity

10.1 Electrostatic discharge immunity measurement

10.1.1 Test specifications

Referenced Standard:	See clause 7.
Discharge Impedance:	330 Ω / 150 pF
Discharge Voltage:	Air Discharges – 8 kV (Direct) Contact Discharge- 4 kV (Indirect, Direct)
Polarity:	Positive / Negative
Number of Discharges:	Minimum 20 discharges (10 positive and 10 negative polarity)
Discharge Mode:	Single Discharge
Discharge Period:	1-second minimum

10.1.2 Test procedure

The discharges shall be applied in two ways:

- Contact discharges to the conductive surfaces and coupling planes:
The EUT shall be exposed to at least 20 discharges, 10 each at negative and positive polarity on each accessible metal part. If no direct contact points are available, then at least 20 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.
- Air discharges at slots and apertures and insulating surfaces:
On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user.

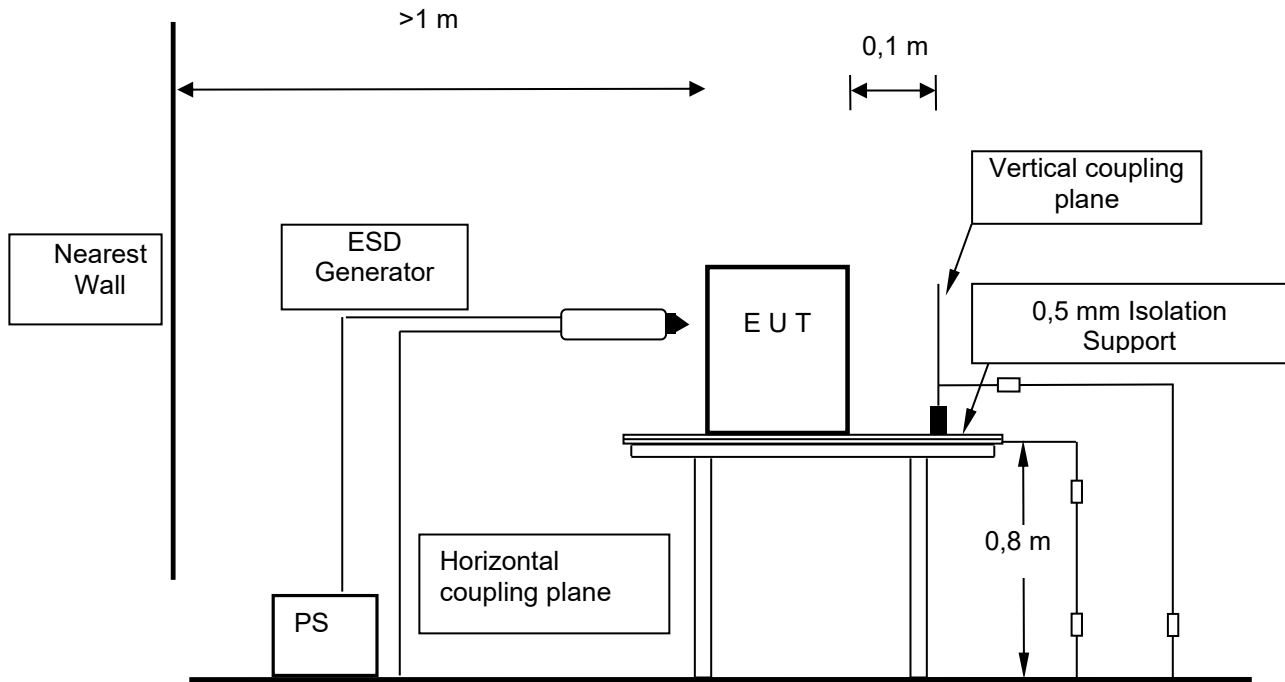
For air discharge testing, the test starts with 2 kV and continues with value multiplied by 2 up to and including the specified test level.

The test procedure is in accordance with referenced standard:

- Electrostatic discharges are applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- The test is performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- The time interval between two successive single discharges is at least 1 second.
- The ESD generator is held perpendicularly to the surface to which the discharge is applied, and the return cable is at least 0,2 meters from the EUT.
- Contact discharges are applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- Air discharges are applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator is removed from the EUT and re-triggered for a new single discharge. The test is repeated until all discharges are complete.
- At least ten single discharges (in the most sensitive polarity) are applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator is positioned vertically at 0,1 meters from the EUT with the discharge electrode touching the Horizontal Coupling Plane.

- At least ten single discharges (in the most sensitive polarity) were applied to the centre of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The Vertical Coupling Plane (dimensions 0,5 m x 0,5 m) was placed vertically to and 0,1 meters from the EUT.

10.1.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

The **GRP** is of a sheet of aluminium at least 0,25 mm thick, and it projects beyond the EUT by at least 0,5 meters and is connected to the protective grounding system. A **Horizontal Coupling Plane** (1,6 m x 0,8 m) is placed on the table and attached to the **GRP** by means of a cable with 940 kΩ total impedance. The equipment under test, is installed in a representative system as described in referenced standard on an insulating support 0,1 (floor equipment) or 0,8 (table-top equipment) meters in height, and its cables are placed on the **HCP** and isolated by an insulating support of 0,5 mm thickness. A distance of 0,8-meter minimum is provided between the EUT and the walls of the laboratory and any other metallic structure.

10.1.4 Test results

VIBEY :

Operating mode(s):		1				
Discharge Level (kV)	Polarity	Test Point	Contact Discharge	Air Discharge	Required criteria	Achieved criteria
2	+ / -			X	B	A
4	+ / -			X	B	A
8	+ / -			X	B	A
4	+ / -		X		B	A
Changes in operation observed during testing:						
		No changes observed.				
		No changes observed.				

Legend:

- contact discharge points (including HCP and VCP)
- air discharge points



Figure 11: Electrostatic discharge immunity measurement



Figure 12: Electrostatic discharge immunity measurement



Figure 13: Electrostatic discharge immunity measurement

SpreadY :

Operating mode(s):	1
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Discharge Level (kV)	Polarity	Test Point	Contact Discharge	Air Discharge	Required criteria	Achieved criteria
2	+ / -			X	B	A
4	+ / -			X	B	A
8	+ / -			X	B	A
4	+ / -		X		B	A
Changes in operation observed during testing:						
		No changes observed.				
		No changes observed.				

Legend:

- contact discharge points (including HCP and VCP)
- air discharge points

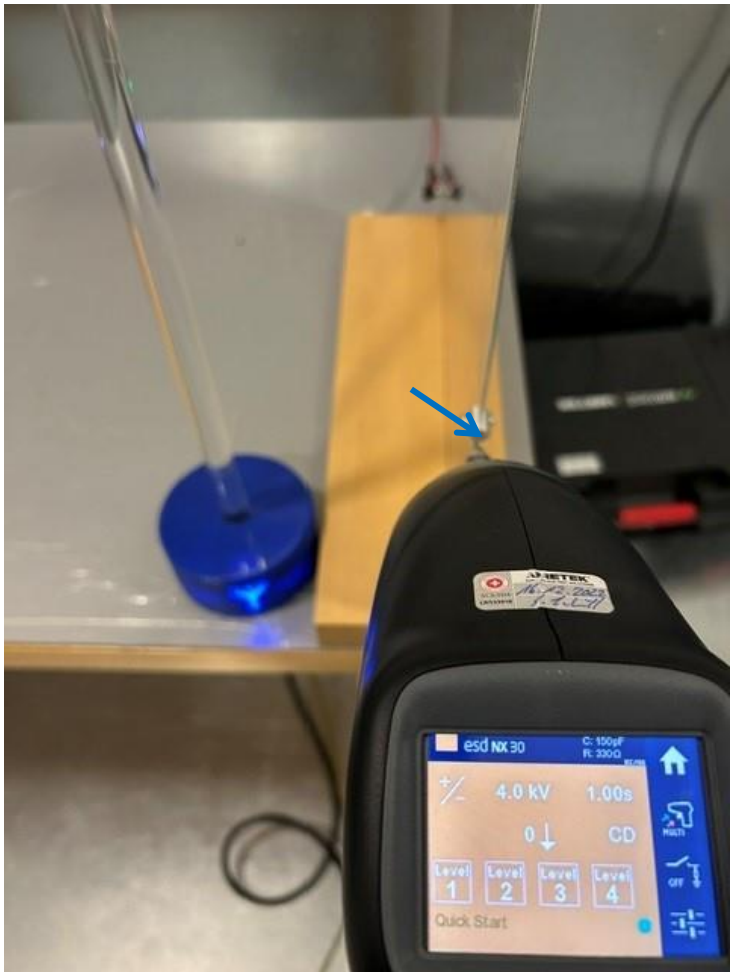


Figure 14: Electrostatic discharge immunity measurement



Figure 15: Electrostatic discharge immunity measurement



Figure 16: Electrostatic discharge immunity measurement



Figure 17: Electrostatic discharge immunity measurement

SpaceY :

Operating mode(s):	1
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Discharge Level (kV)	Polarity	Test Point	Contact Discharge	Air Discharge	Required criteria	Achieved criteria
2	+ / -			X	B	A
4	+ / -			X	B	A
8	+ / -			X	B	A
4	+ / -		X		B	A
Changes in operation observed during testing:						

Legend:

- contact discharge points (including HCP and VCP)
- air discharge points



Figure 18: Electrostatic discharge immunity measurement



Figure 19: Electrostatic discharge immunity measurement



Figure 20: Electrostatic discharge immunity measurement

JumpY :

Operating mode(s):	1
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Discharge Level (kV)	Polarity	Test Point	Contact Discharge	Air Discharge	Required criteria	Achieved criteria
2	+ / -			X	B	A
4	+ / -			X	B	A
8	+ / -			X	B	A
4	+ / -		X		B	A

Changes in operation observed during testing:

 No changes observed.

 No changes observed.

Legend:

 - contact discharge points (including HCP and VCP)

 - air discharge points

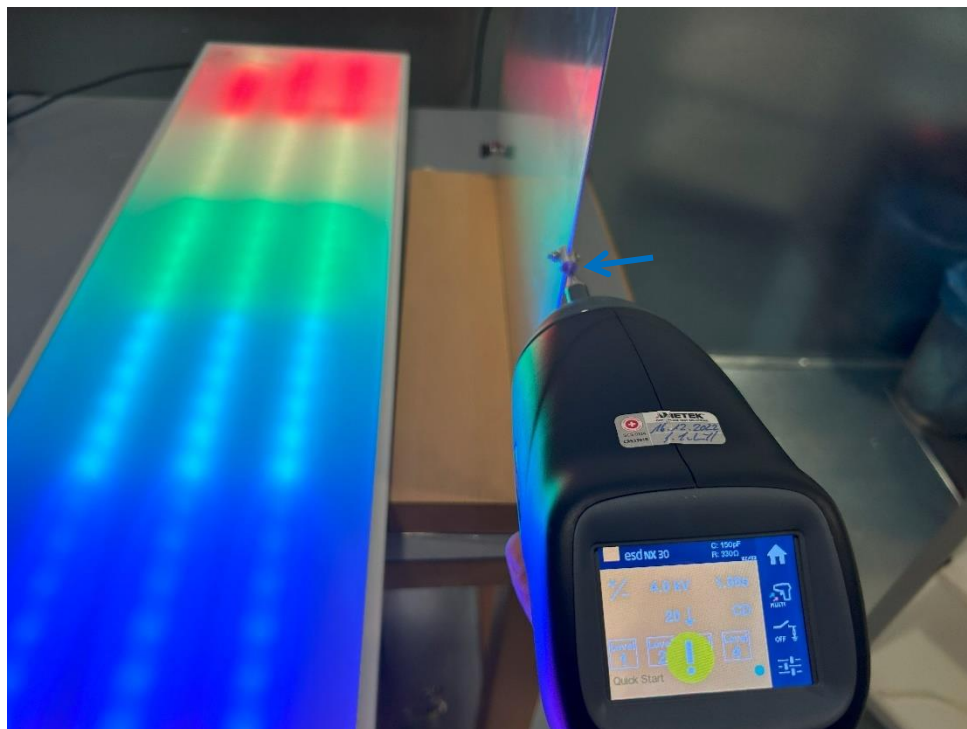


Figure 21: Electrostatic discharge immunity measurement

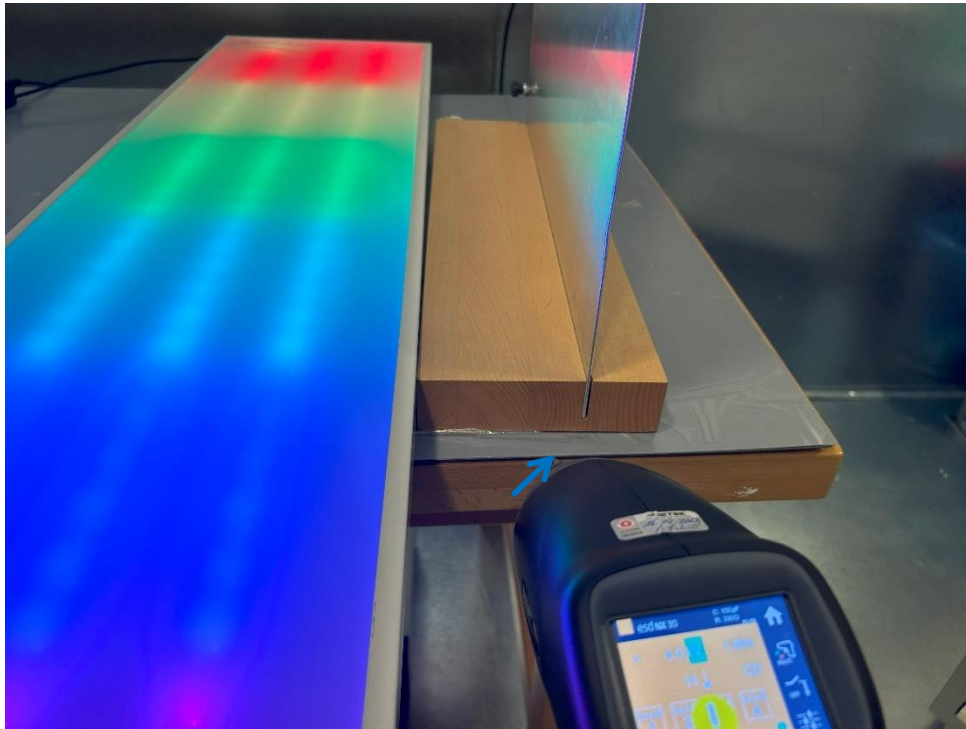


Figure 22: Electrostatic discharge immunity measurement



Figure 23: Electrostatic discharge immunity measurement



Figure 24: Electrostatic discharge immunity measurement



Figure 25: Electrostatic discharge immunity measurement

10.2 Radiated, RF electromagnetic field immunity measurement

10.2.1 Test specification

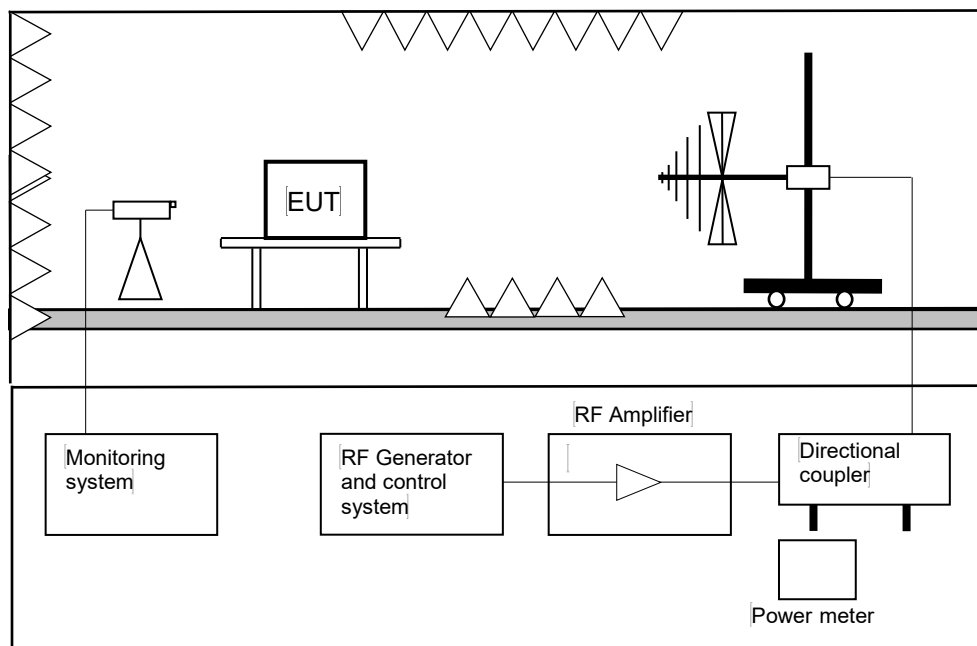
Referenced Standard:	See clause 7.
Frequency Range:	80 – 6000 MHz
Field Strength:	3 V/m
Modulation:	1 kHz Sine Wave, 80 %, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Illumination sides:	Front, Rear, Left and Right side
Test Distance:	3 m
Antenna Height:	1,55 m

10.2.2 Test procedure

The test procedure was in accordance with referenced standard.

- The testing is performed in an anechoic chamber. The transmit antenna is located at 3 meters from the EUT.
- The frequency range is swept from 80 MHz to 1000 MHz and 1GHz to 6 GHz with the signal 80 % amplitude modulated with 1 kHz sine wave. The rate of sweep does not exceed $1,5 \times 10^{-3}$ decade/s. Where the frequency range is swept incrementally, the step size is 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The field strength level is 3 V/m.
- The test is performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

10.2.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

The EUT shall be installed in a representative system as described in referenced standard on an insulating support 0,1 (floor equipment) or 0,8 (table-top equipment) meters in height. The system under test is connected to the power and signal wire according to relevant installation instructions.

10.2.4 Test results

Operating mode(s):		1			
Frequency	Level	Dwell time	Illuminated side	Required criteria	Achieved criteria
80 MHz – 6000 MHz	3 V/m	2 s	Front	A	A
			Rear	A	A
			Left	A	A
			Right	A	A
Changes in operation observed during testing: No changes observed.					

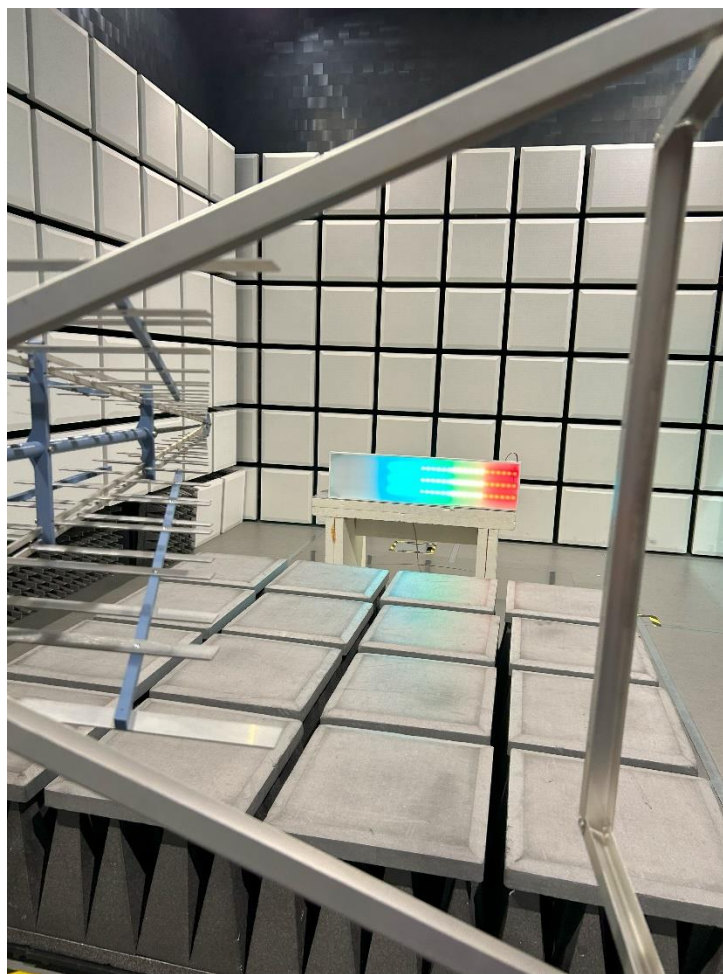


Figure 26: Radiated, RF electromagnetic field immunity measurement < 1GHz

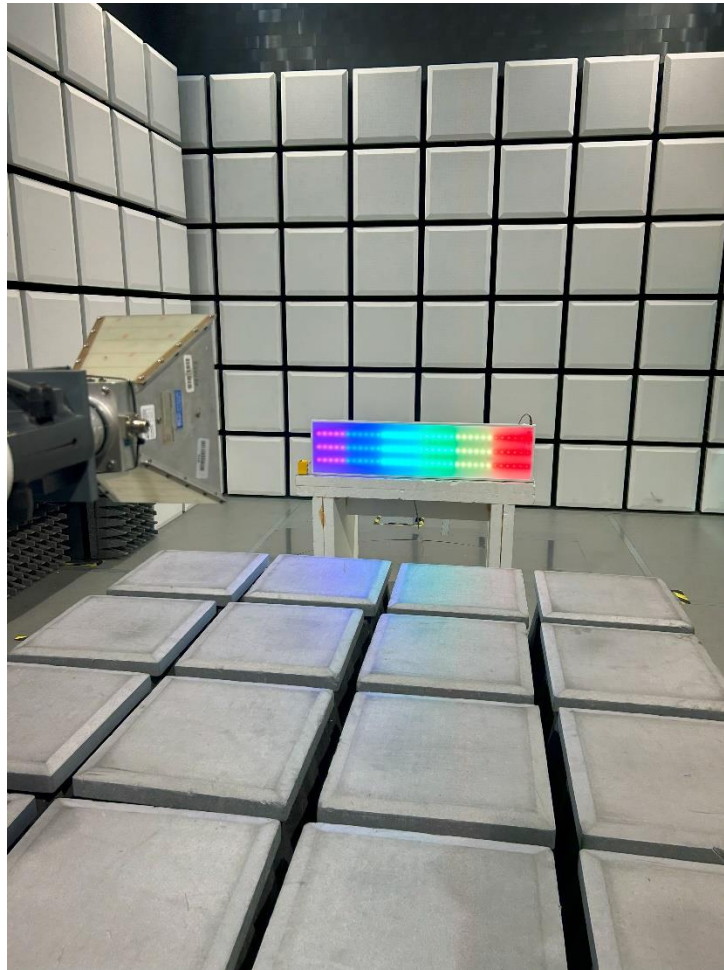


Figure 27: Radiated, RF electromagnetic field immunity measurement >1GHz

10.3 Electrical fast transients/burst immunity measurement

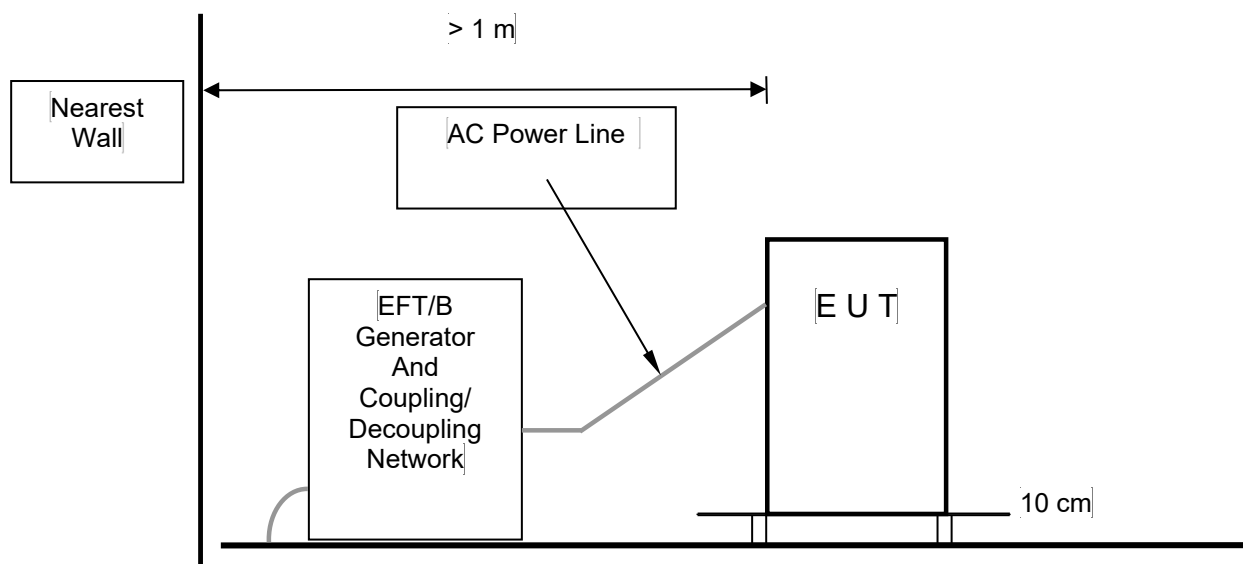
10.3.1 Test specification

Referenced Standard:	See clause 7.
Test Voltage:	AC power Line – 1 kV
Polarity:	Positive/Negative
Impulse Frequency:	5 kHz
Impulse Waveshape:	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	not less than 1 min.

10.3.2 Test procedure

- The EUT is tested with 1000 Volt discharges to the AC power input leads.
- Both positive and negative polarity discharges are applied.
- The cable length between the EUT and the coupling device shall be as intended for installation.
- The duration time of each test sequential is 1 minute.
- The transient/burst waveform is in accordance with referenced standard, 5/50 ns.
- Artificial hand is not applied.

10.3.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

The EUT is installed in a representative system as described in referenced standard on an insulating support 0,1 meters in height and its cables are isolated from the Ground Reference Plane. The GRP consists of a sheet of aluminium (at least 0,25 mm thick and 2,5 m square) connected to the protective grounding system.

10.3.4 Test results

Operating mode(s):		1			
	Test Point	Polarity	Test Level (kV)	Required criteria	Achieved criteria
1)	AC port L+N	+/-	1	B	A
Changes in operation observed during testing:					
1) No changes observed.					



Figure 28: Electrical fast transient/burst and Surges immunity measurement

10.4 Surge immunity measurement

10.4.1 Test specification

Referenced Standard:	See clause 7.
Wave-Shape:	Combination Wave
Test Voltage:	± 1 kV symmetrical – Differential mode,
Generator Source:	2 ohm between networks 12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	$90^\circ / 270^\circ$
Pulse Repetition rate:	10 s – 60 s
Number of Tests:	5 positive and 5 negative at selected points

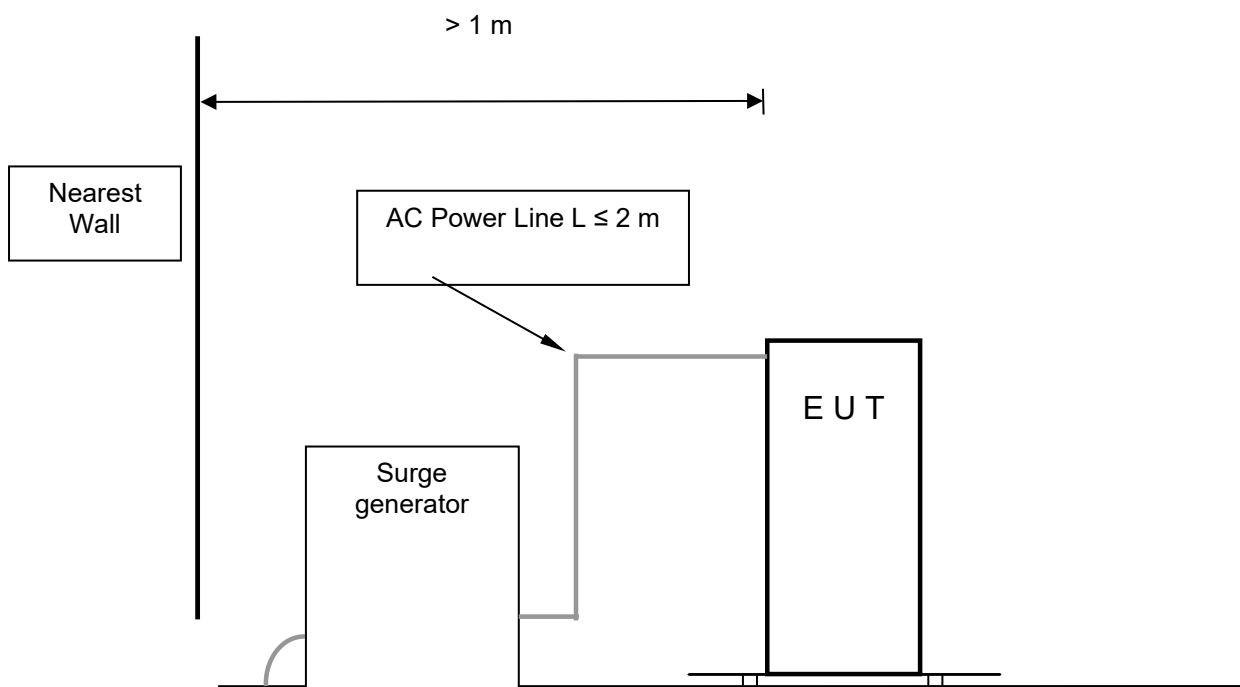
10.4.2 Test procedure

For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

The test shall be started with low voltage 0,5 kV and continued with level, which is higher for 0,5 kV.

10.4.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

10.4.4 Test results

Operating mode(s):	1
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Test Point		Polarity	Angle (°)	Test Level (kV)	Required criteria	Achieved criteria
1)	L -N	+	90	1	B	A
2)	L -N	-	270	1	B	A
Changes in operation observed during testing: 1) No changes observed. 2) No changes observed.						

For test setup photo refer to Section 10.3.4.

10.5 Conducted disturbances, induced by RF fields immunity measurement

10.5.1 Test specification

Referenced Standard:	See clause 7.
Frequency Range:	0,15 MHz – 10 MHz
Field Strength:	3 V rms
Frequency Range:	10 MHz – 30 MHz
Field Strength:	3 V rms – 1 V rms
Frequency Range:	30 MHz – 80 MHz
Field Strength:	1 V rms
Modulation:	1 kHz Sine Wave, 80 %, AM Modulation
Frequency Step:	1 % of fundamental
Coupled Cable:	Power Mains

10.5.2 Test procedure

- The EUT shall be tested within its intended operating and climatic conditions.
- The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50 Ω load resistor.
- The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate shall not exceed $1,5 \times 10^{-3}$ decades/s. The step size shall not exceed 1 % of the start and thereafter 1 % of the preceding frequency value where the frequency is swept incrementally.
- The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, shall be analysed separately.
- Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.
- Artificial hand is not applied.

The diagram illustrates the measurement setup for the EUT. It shows a horizontal arrangement of components on a 'Ground Reference Plane'. From left to right, the components are: an 'RF Generator', an 'AC Power Supply', a 'CDN', and the 'EUT'. The 'AC Power Supply' is connected to the 'CDN'. The 'RF Generator' is connected to the 'CDN'. The 'CDN' is connected to the 'EUT'. A dimension line indicates a distance of $0,1\text{ m} < L < 0,3\text{ m}$ between the 'CDN' and the 'EUT'. The 'EUT' is supported by a '0,1 m wooden support'.

The equipment to be tested is placed on an insulating support 0,1 meters in height on a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0,1 meters and 0,3 meters from the projected geometry of the EUT on the ground reference plane.

Operating mode(s):		1						
Test point		Level	Dwell time	Frequency	CDN type	Port with terminated CDN	Required criteria	Achieved criteria
1)	AC power port	3 V	1 s	150 kHz – 10 MHz	M2	-	A	A
2)	AC power port	3 V- 1 V	1 s	10 MHz – 30 MHz	M2	-	A	A
3)	AC power port	1 V	1 s	30 MHz – 80 MHz	M2	-	A	A
Changes in operation observed during testing: 1) No changes observed. 2) No changes observed. 3) No changes observed.								



Figure 29: Conducted disturbances, induced by RF fields immunity measurement

10.6 Power frequency magnetic field immunity measurement

Not performed

10.7 Voltage dips, short interruptions, and voltage variations immunity measurement

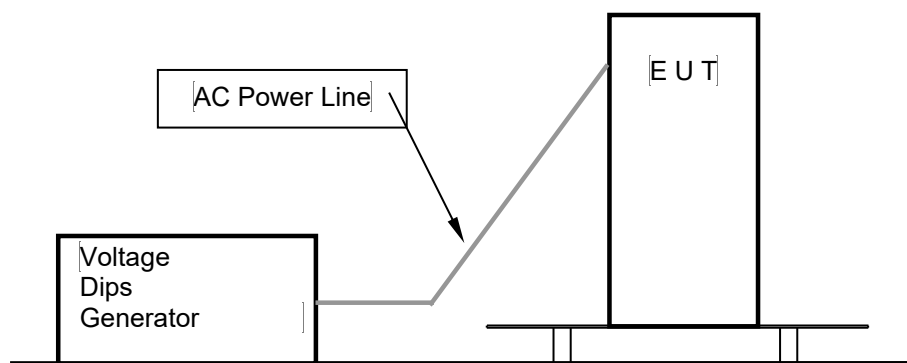
10.7.1 Test specification

Referenced Standard:	See clause 7.
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0 °
Test Cycle:	3 times

10.7.2 Test procedure

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

10.7.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

10.7.4 Test result

Operating mode(s):	1
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Phenomena	Test level (dip)	Duration (in periods)	Required criteria	Achieved criteria
1) Voltage dips	>95%	0,5	B	A
2) Voltage dips	>95%	20	B	A
3) Voltage dips	>95%	250	C	B
4) Voltage dips	30%%	25	C	A

Changes in operation observed during testing:

- 1) No changes observed.
- 2) No changes observed.
- 3) EUT switches off, communication is lost. After the test, return to normal state.
- 4) No changes observed.



Figure 30: Voltage dips, short interruptions, and voltage variations immunity measurement

11. Used test equipment

9.1 Conducted emission measurement

Equipment	Manufacturer	Type	SIQ Number	Last calibration date	Last due date
RFI receiver	Rohde & Schwarz	ESCI 3	SBG800050 / ID B 100	2024-09-18	2026-09-18
Artificial Mains Network (AMN)	SCHWARZB ECK MESS ELEKTRONIK	NSLK 8128	SBG800366 / ID B 159	2024-05-19	2027-05-19
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SBG800074 / ID B 116	2025-01-21	2028-01-21

9.2 Radiated emission measurement

Equipment	Manufacturer	Type	SIQ Number	Last calibration date	Last due date
RFI receiver	Rohde & Schwarz	ESR 7	SBG800314 / ID B 152	2024-01-24	2026-01-24
ULTRALOG antenna	Rohde & Schwarz	HL562E	SBG800252 / ID B 150	2024-08-12	2027-08-12
Horn antenna	ETS	3115	SBG800231/17 / ID B 144	2024-08-12	2027-08-12
Semi-anechoic chamber	COMTEST	3 m	ID B 124	2025-02-03	2028-02-03
Antenna mast	MATURO	AM 4.0	ID B 125	/	/
Turntable	MATURO	TT 2.0 SI	ID B 126	/	/
Multiple Control Unit	MATURO	MCU/461/17390915	ID B 127	/	/

9.3 Harmonic current emissions measurement

Equipment	Manufacturer	Type	SIQ Number	Last calibration date	Last due date
Harmonic&Flicker meter	EM TEST	DPA 500N	SBG800232/ ID B 147	2024-12-09	2026-12-09

9.4 Voltage changes, fluctuations, and flicker measurement

Equipment	Manufacturer	Type	SIQ Number	Last calibration date	Last due date
Harmonic&Flicker meter	EM TEST	DPA 500N	SBG800232/ ID B 147	2024-12-09	2026-12-09

10.1 Electrostatic discharge immunity measurement

Equipment	Manufacturer	Type	SIQ Number	Last calibration date	Last due date
ESD Discharge unit	AMETEK	ESD NX30	SBG800333 / ID B 158	2025-01-23	2027-01-23

10.2 Radiated, RF electromagnetic field immunity measurement

Equipment	Manufacturer	Type	SIQ Number	Last calibration date	Last due date
RF Signal generator	RIGOL	DSG3060	SBG800231/18/ ID B 145	2024-05-09	2026-05-09

Arbitrary Function Generator	RIGOL	DG1022Z	SBG800231/19 / ID B 146	2024-05-09	2026-05-09
ULTRALOG antenna	Rohde & Schwarz	HL562E	SBG800252 / ID B 150	2024-08-12	2027-08-12
Horn antenna	ETS	3115	SBG800231/17 / ID B 144	2024-08-12	2027-08-12
Semi-anechoic chamber	COMTEST	3 m	ID B 124	2025-02-03	2028-02-03
Antenna mast	MATURO	AM 4.0	ID B 125	/	/
Turntable	MATURO	TT 2.0 SI	ID B 126	/	/
Miltiple Control Unit	MATURO	MCU/461/17390915	ID B 127	/	/
RF amplifier	Kalmus	827FC	SBG800231/1/ ID B 128	/	/
RF amplifier	OPHIR	1-3 GHz	SBG800231/5/ ID B 132	/	/
RF amplifier	Prana	2-6 GHz	SBG800231/6/ ID B 131	/	/

10.3 Electrical fast transients/burst

Equipment	Manufacturer	Type	SIQ Number	Last calibration date	Last due date
Ultra compact simulator	EM TEST	UCS 500 N5	SBG800062 / ID B 113	2023-11-07	2025-11-07

10.4 Surge

Equipment	Manufacturer	Type	SIQ Number	Last calibration date	Last due date
Ultra compact simulator	EM TEST	UCS 500 N5	SBG800062 / ID B 113	2023-11-07	2025-11-07

10.5 Conducted disturbances, induced by RF

Equipment	Manufacturer	Type	SIQ Number	Last calibration date	Last due date
Compact Immunity Test System	AMETEK CTS Europe	NSG4070C2-80	SBG800368 / ID B 161	2023-09-27	2025-09-27
Coupling/Decoupling Device	EM TEST	CDN-M2	SBG800058 / ID B 109	2023-08-08	2026-08-08

10.6 Power frequency

Not performed

10.7 Voltage dips, short

Equipment	Manufacturer	Type	SIQ Number	Last calibration date	Last due date
Ultra compact simulator	EM TEST	UCS 500 N5	SBG800062 / ID B 113	2023-11-07	2025-11-07
AC source	EM TEST	EAC/MT 2716	SBG800057 / IDB 108	/	/

-----END OF TEST REPORT-----