Lumi United Technology Co., Ltd.

CE TEST REPORT

SCOPE OF WORK:
EMC directive (2014/30/EU) – EMC report

Model:
HM1S-G02

REPORT NUMBER
220200836SHA-004

ISSUE DATE
March 17, 2022

DOCUMENT CONTROL NUMBER
TTRF55032_V1

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TEST REPORT

Report no. 220200836SHA-004

Applicant	:	Lumi United Technology Co., Ltd. Room 801-804, Building 1, Chongwen Park,Nanshan iPark,No.3370, Liuxian Ave, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China.
Manufacturer	:	Same as applicant
Manufacturing site	:	Same as applicant

Summary

The equipment complies with the requirements according to the following standard(s) or Specification:
EN 55032: 2015/A11:2020: Electromagnetic compatibility of multimedia equipment - Emission requirements. **EN 55035: 2017/A11:2020:** Electromagnetic compatibility of multimedia equipment - Immunity requirements **EN IEC 61000-3-2: 2019:** Limits for harmonic current emissions (equipment input current <=16A per phase) **EN 61000-3-3: 2013+A1:2019:** Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current <=16A

PREPARED BY:	**REVIEWED BY:**
Stephanie Zhang	Wakeyou Wang
Project Engineer	Reviewer

Contents

Revision History

Report No.	Version	Description	Issued Date
220200836SHA-004	Rev. 01	Initial issue of report	March 21, 2022

Measurement result summary

TEST ITEM	TEST RESULT	NOTE
Conducted disturbance voltage at mains terminals	Pass	
Conducted disturbance for asymmetric mode	Pass	There's no cable longer than 3 m
Conducted differential voltage emission	NA	The product is not Class B broadcasting receiver
Radiation emission	Pass	
Harmonic current emission	Pass	
Voltage fluctuations and flicker	Pass	
Electrostatic discharges	Pass	
Continuous RF disturbances	Pass	
Continuous induced RF disturbances	Pass	
Power frequency magnetic field	NA	The product does not contain devices susceptible to magnetic fields.
Electrical fast transients/burst	Pass	
Surges	Pass	
Voltage dips and interruptions	Pass	
Broadband impulsive conducted disturbances	NA	There's no xDSL ports

Notes: 1: NA =Not Applicable
2: Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.
3: Additions, Deviations and Exclusions from Standards: None.

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name	:	Hub M1S Gen 2
Type/Model	:	HM1S-G02
Description of EUT	:	It is a product with WiFi & Zigbee function, there is one model only.
Rating	:	100-240Vac, 50/60Hz,0.2A, Class II
Category of EUT	:	☒ Class B ☐ Class A
EUT type	:	☒ Table-top ☐ Floor standing
Port identification	:	Refer to the user's manual
Cable supplied	:	Refer to the user's manual
Sample received date	:	2022.3.3
Date of test	:	2022.3.7-2022.3.17

1.2 Description of Test Facility

Name	:	Intertek Testing Services Shanghai
Address	:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone	:	86 21 61278200
Telefax	:	86 21 54262353
The test facility is recognized, certified, or accredited by these organizations	:	CNAS Accreditation Lab Registration No. CNAS L0139 FCC Accredited Lab Designation Number: CN1175 IC Registration Lab CAB identifier.: CN0051 VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252 A2LA Accreditation Lab Certificate Number: 3309.02

Subcontractor

Name	:	Fangguang Inspection & Testing Co., Ltd.
Address	:	G9 Building, China Sensor Network International innovation Park, No.200, Linghu Avenue, Wuxi, Jiangsu, China
Telephone	:	0510-68790033
Telefax	:	0510-68790022
The test facility is recognized, certified, or accredited by these organizations	:	CNAS Accreditation Lab Registration No. CNAS L9092 FCC Accredited Lab Designation Number: CN5037 NVLAP Lab CODE: 600222-0

2 TEST SPECIFICATIONS

2.1 Normative references

EN 55032: 2015/A11:2020: “Electromagnetic compatibility of multimedia equipment - Emission requirements”.

EN 55035: 2017/A11:2020: “Electromagnetic compatibility of multimedia equipment - Immunity requirements”.

EN IEC 61000-3-2: 2019: "Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ⩽ 16 A per phase)".

EN 61000-3-3: 2013+A1:2019: "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 ⩽ 16 A per phase and not subject to conditional connection".

2.2 Mode of operation during the test

Within this test report, EUT was tested under all available operation modes and tested under its rating voltage and frequency. Other voltage and frequency is specified if used.

2.3 Test peripherals used

Item No	Description	Band and Model	S/No
1	Laptop computer	HP, 6470b	NA

2.4 Record of climatic conditions

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (Kpa)
Conducted disturbance voltage at mains terminals	NA	NA	NA
Conducted disturbance for asymmetric mode	15	51	NA
Conducted differential voltage emission	NA	NA	NA
Radiation emission	NA	NA	NA
Harmonic current emission	15	51	NA
Voltage fluctuations and flicker	15	51	NA
Electrostatic discharges	15	51	101
Continuous RF disturbances	15	51	NA
Continuous induced RF disturbances	15	51	NA
Power frequency magnetic field	NA	NA	NA
Electrical fast transients/burst	15	51	NA
Surges	15	51	NA
Voltage dips and interruptions	15	51	NA
Broadband impulsive conducted disturbances	NA	NA	NA

Notes: NA =Not Applicable

2.5 Instrument list

Conducted Emission/Disturbance Power/Tri-loop Test/CDN method					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	EMI Receiver	R&S	ESR3	FWXGJC-2016-181	2022-05-30
☒	L.I.S.N	R&S	ENV216	FWXGJC-2016-182	2022-12-21
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	EMI Receiver	R&S	ESR26	FWXGJC-2016-267-01	2022-11-26
☒	Bi-Log Antenna	R&S	HL562E	FWXGJC-2016-267-06	2023-03-30
☒	Preamplifier	R&S	SCU-18D	FWXGJC-2016-267-05	2022-12-12
☒	Broadband Horn Antenna	R&S	HF907	FWXGJC-2016-267-07	2022-03-30
Harmonics/Flicker/Low-frequency immunity test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Harmonic analyzer	Ametek	100-CTS-230	FWXGJC-2016-176	2022-07-27
☒	Harmonic power supply	Ametek	5001ix-CTS-400-413-411	FWXGJC-2016-177	2022-05-17
ESD					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	ESD TESTER	3ctest	EDS 30T	FWXGDB-2016-129	2022-12-03
EFT/Surge/Voltage Dips					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	EFT Generator	3ctest	EFT 500T	FWXGDA-2016-130	2023-03-17
☒	Surge Generator	3ctest	CWS 600G	FWXGDA-2016-141	2022-04-26
☒	Harmonic analyzer	Ametek	100-CTS-230	FWXGJC-2016-176	2022-07-27
☒	Harmonic power supply	Ametek	5001ix-CTS-400-413-411	FWXGJC-2016-177	2022-05-17
Conducted Immunity					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Signal Generator	TESEQ	NSG 4070-35	FWXGJC-2016-188	2023-01-18

☒	Attenuator	TESEQ	ATN 6050	FWXGJC-2016-193	2022-12-21
☒	CDN	TESEQ	CDN M016	FWXGJC-2016-189	2022-12-12
Radiated Immunity					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Signal Generator	Keysight	N5171B-506	FWXGJC-2016-269-05	2022-12-12
☒	double-Logarithmic antenna	Frankonia	AXL-80	FWXGJC-2016-269-03	2022-03-30
☒	Rf power probe	Agilent	U2001A	FGZZ-2020-004	2022-04-29
☒	Rf power probe	Agilent	U2001A	FGZZ-2020-005	2022-04-29
☒	Amplifier	Frankonia	VLH-200B1	FWXGJC-2016-269-02	2022-12-21
☒	Horn Antenna	Frankonia	HAX-6	FWXGJC-2016-269-04	2022-03-30
☒	Power Amplifier	Frankonia	VLG-40/30G	FWXGJC-2016-269-01	2023-01-19
Tet Site					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Shielded room	Zhongyu	-	EC 2838	2023-01-13
☒	Shielded room	Zhongyu	-	EC 2839	2023-01-13
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2023-06-31
☒	Fully-anechoic chamber	Albatross project	-	EC 3047	2023-06-31
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Spectrum analyzer	Agilent	E7402A	EC 2254	2023-07-14
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3783	2023-03-10
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3481	2023-12-22
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 5198	2023-02-27
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3325	2023-04-07
☒	Pressure meter	YM3	Shanghai Mengde	EC 3320	2023-07-14

2.6 Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted disturbance voltage at mains terminals	9kHz ~ 150kHz	3.71 dB
	150kHz ~ 30MHz	3.31 dB
Conducted disturbance measurements using a VP	150kHz ~ 30MHz	2.75 dB
Continuous disturbance voltage at telecom port with AAN	150kHz ~ 30MHz	4.10 dB
Continuous disturbance current at telecom port	150kHz ~ 30MHz	2.73 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.04 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.97 dB
	6GHz ~ 18GHz	5.29 dB
Harmonic current	0-2000Hz /0-40 orders	3.90%
Voltage fluctuation and flicker	/	10.34%
ESD (Discharge Voltage)	/	6.65%
EFT (Test Voltage at mains terminal)	/	11.57%
EFT (Test Voltage at signal/Telecom line)	/	11.62%
Surge (Test Voltage at mains terminal)	/	11.57%
Surge (Test Voltage at signal/Telecom line)	/	11.89%
Injected current at mains terminal	/	1.88 dB
Injected current at unshielded signal ports	/	3.41 dB
Injected current at shielded signal ports	/	3.30 dB
Radiated susceptibility test (80-1000MHz)	/	2.38 dB
Voltage dips and interruption (Test Voltage)	/	6.05%

3 Conducted disturbance voltage at mains terminals

Test result: Pass

3.1 Limits

3.1.1 Limits for class A equipment

Frequency range (MHz)	Quasi-peak (dBuV)	Average (dBuV)
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

Note: 1. Coupling device is AMN;
2. Detector type is Quasi Peak or Average
3. Bandwidth is 9 kHz

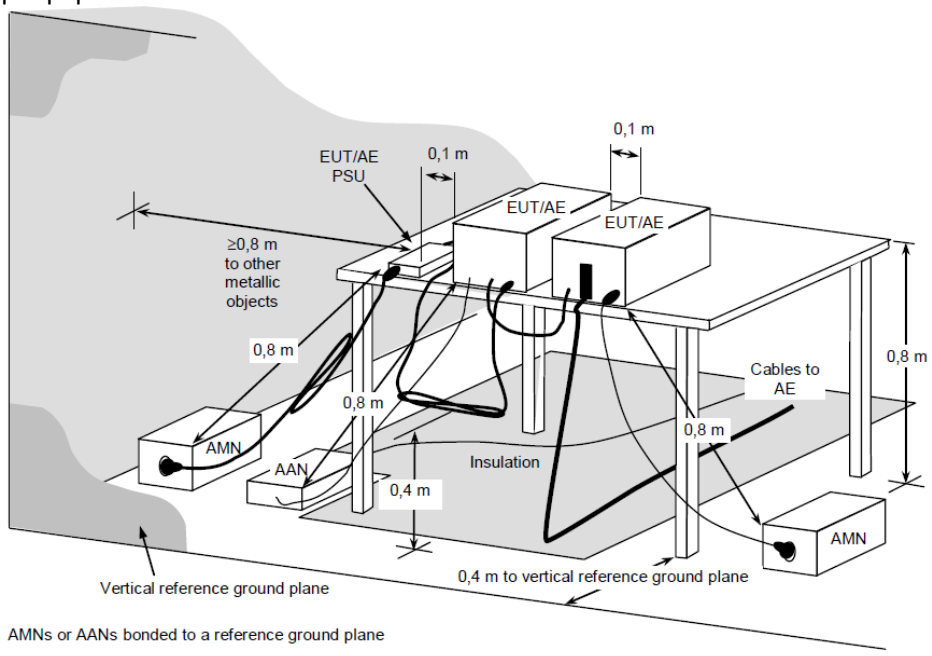
3.1.2 Limits for class B equipment

Frequency range (MHz)	Quasi-peak (dBuV)	Average (dBuV)
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

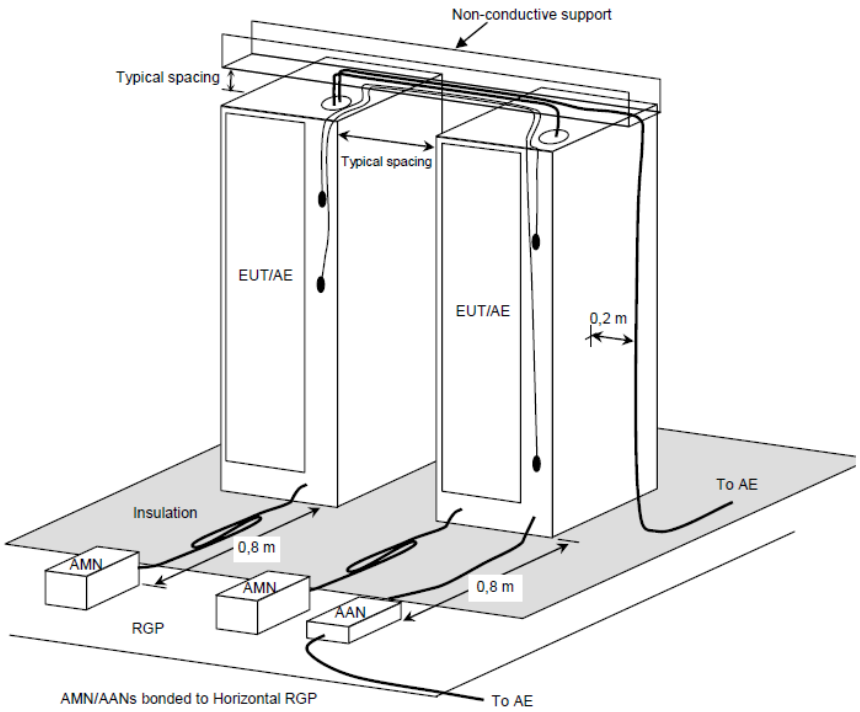
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
2. Coupling device is AMN;
3. Detector type is Quasi Peak or Average
4. Bandwidth is 9 kHz

3.2 Test setup

For table-top equipment



For floor standing equipment

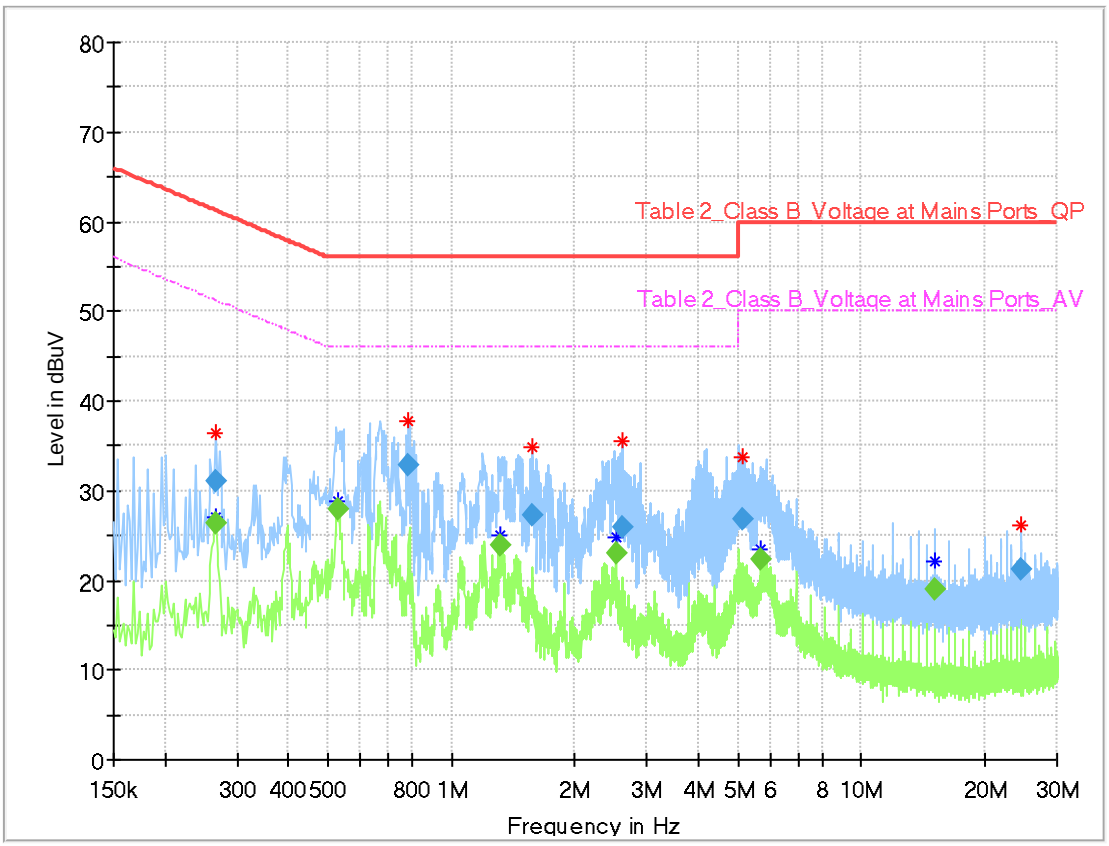


3.3 Test Procedure

Measurement was performed in shielded room, and instruments used were followed CISPR 16-2-1 clause 7.
Detailed test procedure was following clause 7 of CISPR 16-2-1.
Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9 kHz.

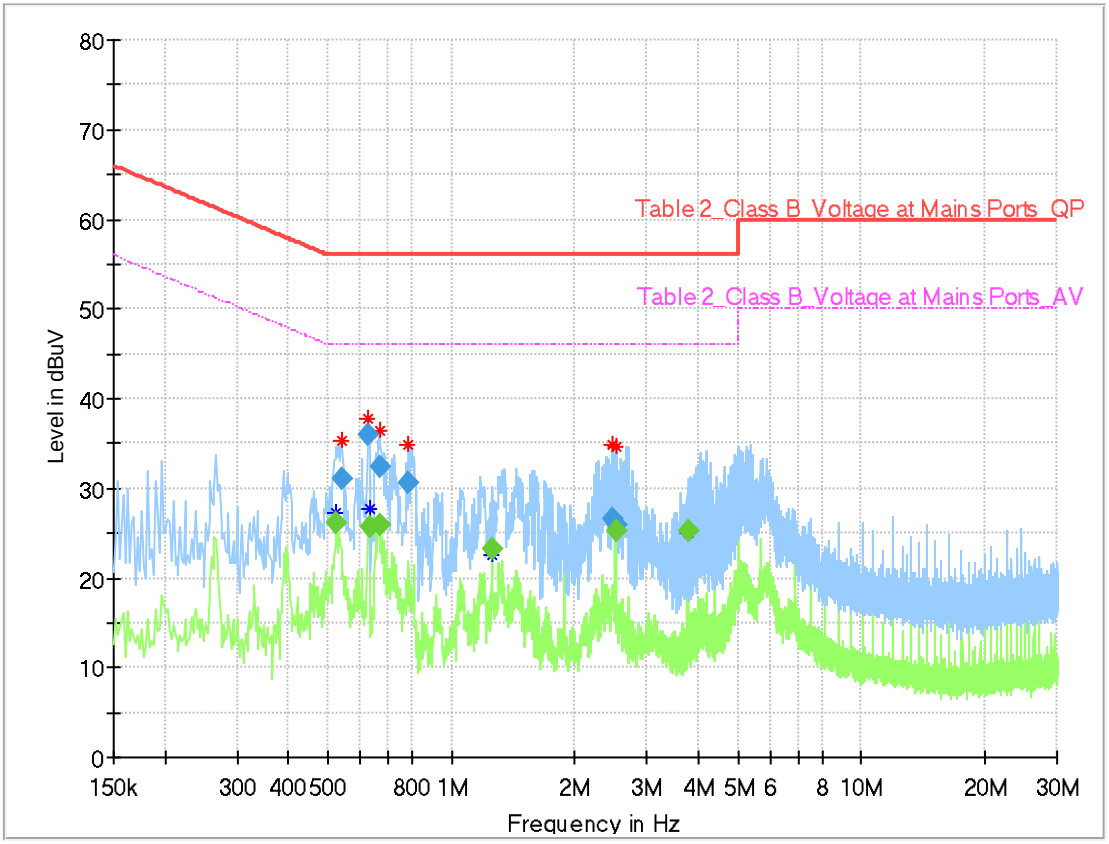
3.4 Test Result

Test Curve:



Test Data:

Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.266000	---	26.27	51.24	24.98	1000.	9.000	L1	ON	9.5
0.266000	31.03	---	61.24	30.22	1000.	9.000	L1	ON	9.5
0.530000	---	27.84	46.00	18.16	1000.	9.000	L1	ON	9.5
0.788000	32.77	---	56.00	23.23	1000.	9.000	L1	ON	9.5
1.308000	---	23.83	46.00	22.17	1000.	9.000	L1	ON	9.5
1.580000	27.31	---	56.00	28.69	1000.	9.000	L1	ON	9.5
2.516000	---	23.03	46.00	22.97	1000.	9.000	L1	ON	9.6
2.620000	26.01	---	56.00	29.99	1000.	9.000	L1	ON	9.6
5.140000	26.79	---	60.00	33.22	1000.	9.000	L1	ON	9.6
5.658000	---	22.24	50.00	27.76	1000.	9.000	L1	ON	9.6
15.082000	---	18.90	50.00	31.10	1000.	9.000	L1	ON	9.8
24.508000	21.12	---	60.00	38.88	1000.	9.000	L1	ON	9.8



Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.524000	---	26.24	46.00	19.76	1000.	9.000	N	ON	9.5
0.538000	31.17	---	56.00	24.83	1000.	9.000	N	ON	9.5
0.628000	35.99	---	56.00	20.01	1000.	9.000	N	ON	9.5
0.630000	---	25.69	46.00	20.31	1000.	9.000	N	ON	9.5
0.666000	---	25.95	46.00	20.05	1000.	9.000	N	ON	9.5
0.666000	32.42	---	56.00	23.58	1000.	9.000	N	ON	9.5
0.784000	30.59	---	56.00	25.41	1000.	9.000	N	ON	9.5
1.256000	---	23.28	46.00	22.72	1000.	9.000	N	ON	9.5
2.464000	26.63	---	56.00	29.37	1000.	9.000	N	ON	9.6
2.512000	---	25.29	46.00	20.71	1000.	9.000	N	ON	9.6
2.516000	25.95	---	56.00	30.05	1000.	9.000	N	ON	9.6
3.766000	---	25.19	46.00	20.81	1000.	9.000	N	ON	9.6

4 Conducted disturbance for asymmetric mode

Test result: NA

4.1 Limits

4.1.1 Limits for class A equipment

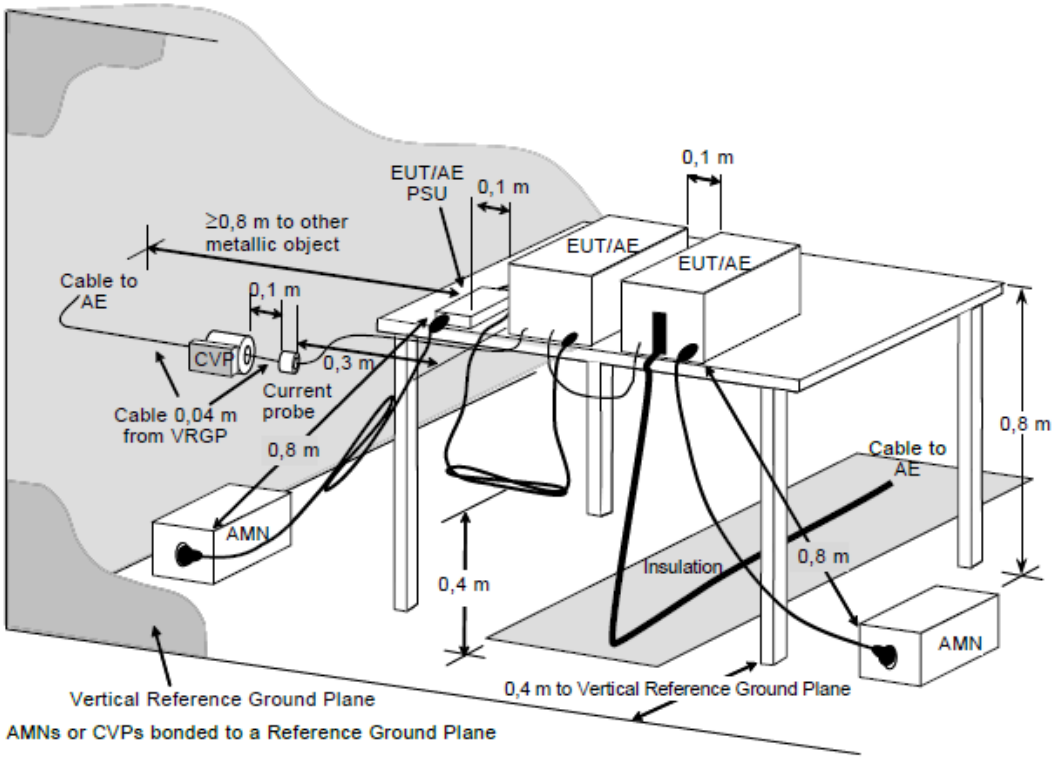
Frequency range (MHz)	Voltage Limits dB(μV)		Current limits dB(μA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	97 ~ 87	84 ~ 74	53 ~ 43	40 ~ 30
0.5 ~ 30	87	74	43	30
Note: if “150Ω to 50Ω adaptor” applied, correction factor of 9.5dB should be added to the test data.				

4.1.2 Limits for class B equipment

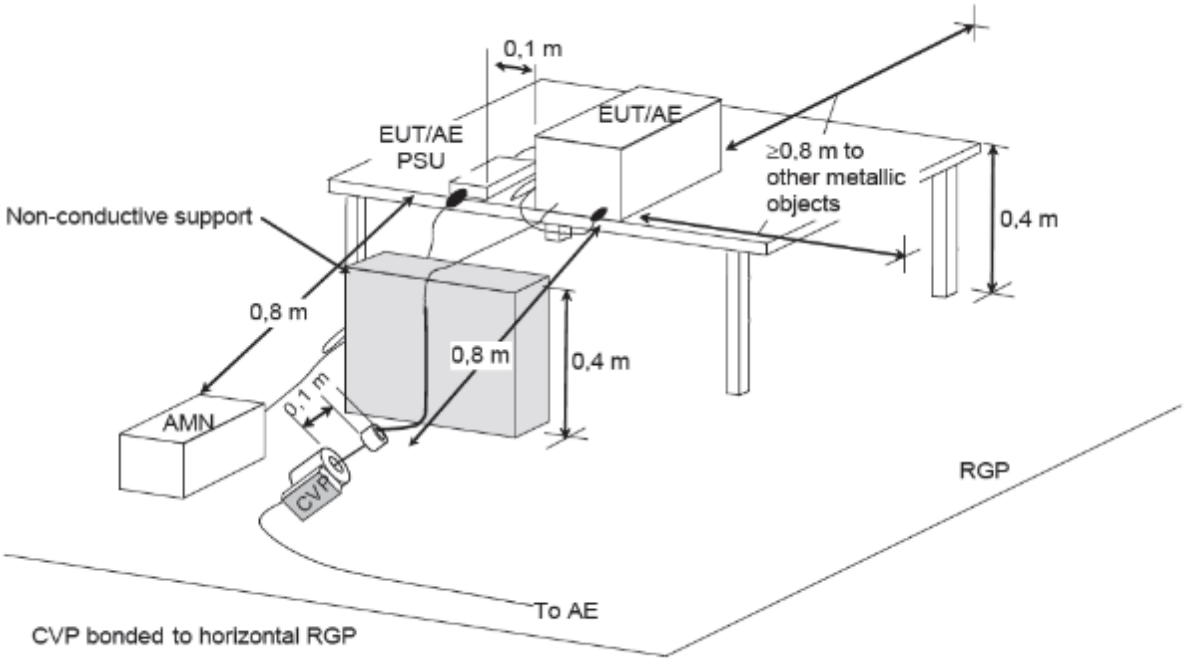
Frequency range (MHz)	Voltage Limits dB(μV)		Current limits dB(μA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	84 ~ 74	74 ~ 64	40 ~ 30	30 ~ 20
0.5 ~ 30	74	64	30	20
Note: if “150Ω to 50Ω adaptor” applied, correction factor of 9.5dB should be added to the test data.				

4.2 Test setup

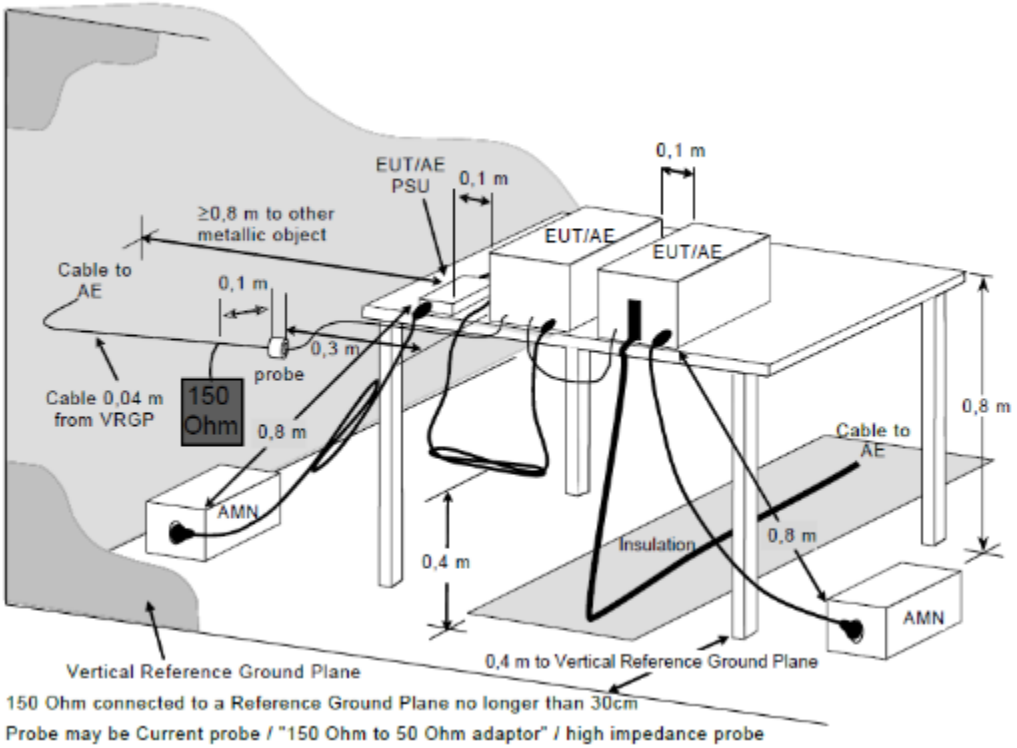
Coupling device: CVP and Current probe (alternative method 1)



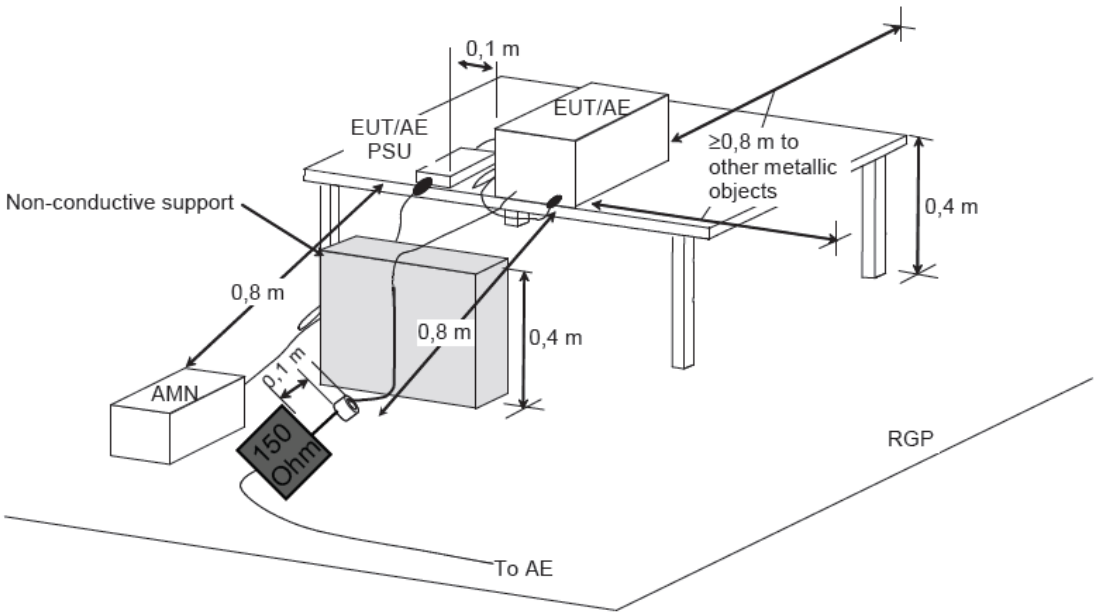
Coupling device: CVP and Current probe (alternative method 2)



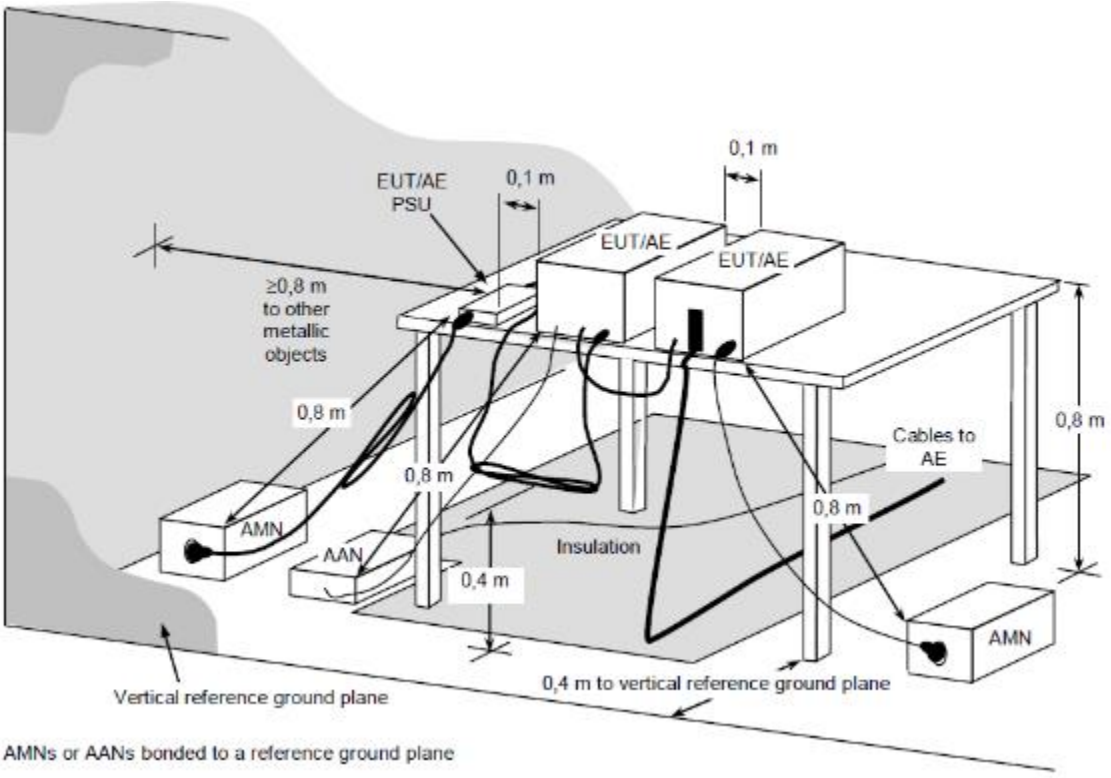
Coupling device: Current probe / “150Ω to 50Ω adaptor” / high impedance probe (alternative method 1)



Coupling device: Current probe / “150Ω to 50Ω adaptor” / high impedance probe (alternative method 2)



Coupling device: AAN



4.3 Test Procedure

Measurement was performed in shielded room, and instruments used were followed EN 55032 clause C.4.1.
Detailed test procedure was following clause C.4.1 of EN 55032.
Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9 kHz.

Used	Data Port	Measurement type	Coupling device	No. of Pairs
☐	Balanced Unscreened	Voltage	AAN	≤ 4
☐	Balanced Unscreened	Voltage and Current	CVP & Current probe	>4 or unable to AAN
☐	Screened or Coaxial	Voltage	AAN	N/A
☐	Screened or Coaxial	Voltage or Current	Current probe / “150Ω to 50Ω adaptor” / high impedance probe	N/A
☐	Unbalanced cables	Voltage and Current	CVP & Current probe	N/A

4.4 Test Result

Test Curve:

Test Data:

Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)
Note: * means the emission level 20dB below the relevant limit.						

Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Limit - Corrected Reading
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming LISN Factor = 10.00dB, Cable Loss = 2.00dB,
Original Receiver Reading = 10.00dBuV, Limit = 66.00dBuV.
Then Correct Factor = 10.00 + 2.00 = 12.00dB;
Corrected Reading = 10dBuV + 12.00dB = 22.00dBuV;
Margin = 66.00dBuV – 22.00dBuV = 44.00dB.

5 Conducted differential voltage emission

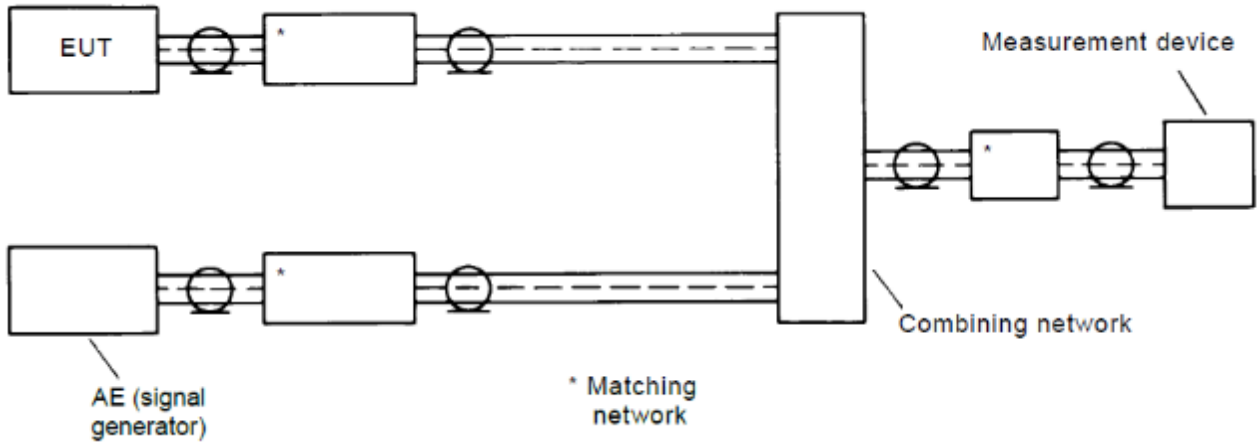
Test result: NA

5.1 Limits

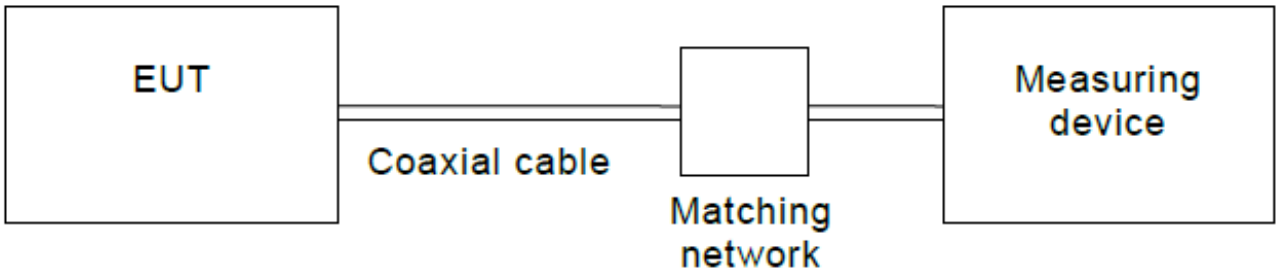
Applicability	Frequency range (MHz)	Differential voltage limit @ 75Ω (dBuV)		
		Other	Local Oscillator Fundamental	Local Oscillator Harmonics
Television receivers; video recorders; PC TV broadcast receiver tuner cards; Digital audio receivers;	30 ~ 950	46	46	46
	950 ~ 2150	46	54	54
Tuner units (not the LNB) for satellite signal reception	950 ~ 2150	46	54	54
FM audio receivers and PC tuner cards	30 ~ 300	46	54	50
	300 ~ 1000	46	54	52
FM car radios	30 ~ 300	46	66	59
	300 ~ 1000	46	66	52
RF modulator output ports connect to TV broadcast receiver tuner ports	30 ~ 950	46	76	46
	950 ~ 2150	46	/	54

5.2 Test setup

TV/FM broadcast receiver tuner ports



RF modulator output port



5.3 Test Procedure

Measurement was performed in shielded room, and instruments used were followed EN 55032 clause C4.2 and C4.3.
Detailed test procedure and arrangement was followed EN 55032 clause C.4.2 and C.4.3.
Frequency range 30MHz – 2150MHz was checked and EMI receiver measurement bandwidth was set to 120kHz / 1MHz.

5.4 Test Result

Test Curve:

Test Data:

☐ TV/FM broadcast receiver tuner ports

Receiving Frequency (MHz)	Oscillator Frequency (MHz)	Harmonics No.	Measured dB(uV)	Limits dB(uV)	Result
88.1					
98.1					
107.9					
Other					

☐ RF modulator output port

Frequency (MHz)	Disturbance level dB(μV)	Permitted limit dB(μV)
Harmonics		
Harmonics		
Other		
Other		

6 Radiated emission

Test result: Pass

6.1 Limits

6.1.1 Limits for radiated disturbance of class A Equipment

Frequency (MHz)	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 3m	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 10M
30-230	50	40
230-1000	57	47
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.		

Frequency range GHz	Average limit of Measurement Distance 3m dB(μV/m)	Peak limit of Measurement Distance 3m dB(μV/m)
1 to 3	56	76
3 to 6	60	80
NOTE The lower limit applies at the transition frequency.		

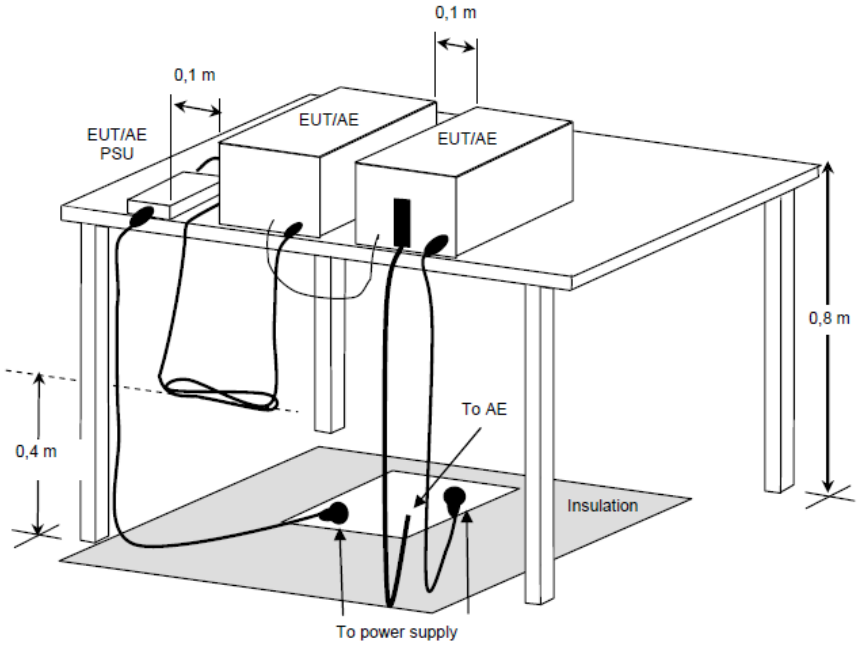
6.1.2 Limits for radiated disturbance of class B Equipment

Frequency (MHz)	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 3m	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 10M
30-230	40	30
230-1000	47	37
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.		

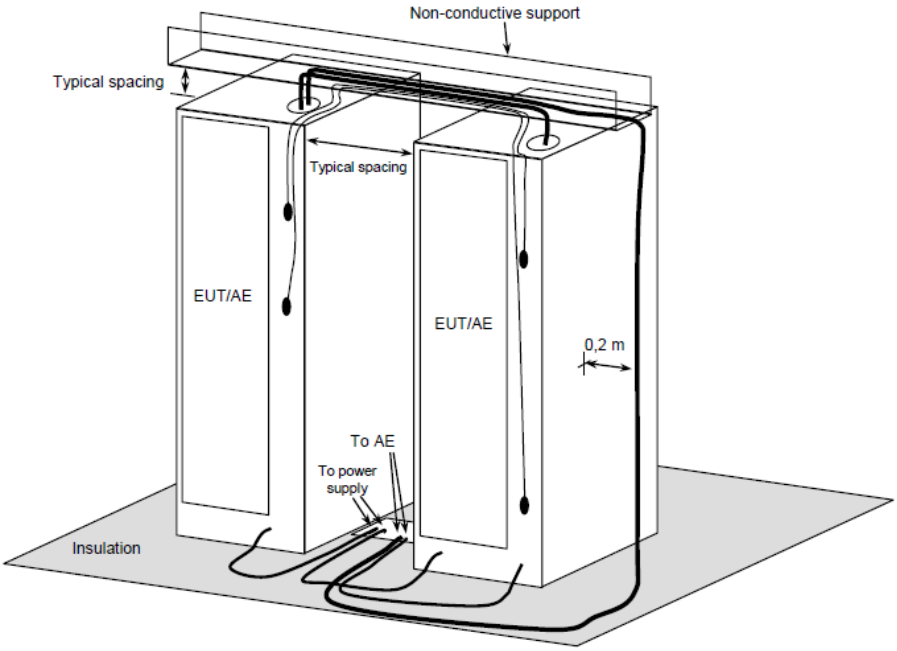
Frequency range GHz	Average limit of Measurement Distance 3m dB(μV/m)	Peak limit of Measurement Distance 3m dB(μV/m)
1 to 3	50	70
3 to 6	54	74
Note: The lower limit applies at the transition frequency.		

6.2 Block diagram of test set up

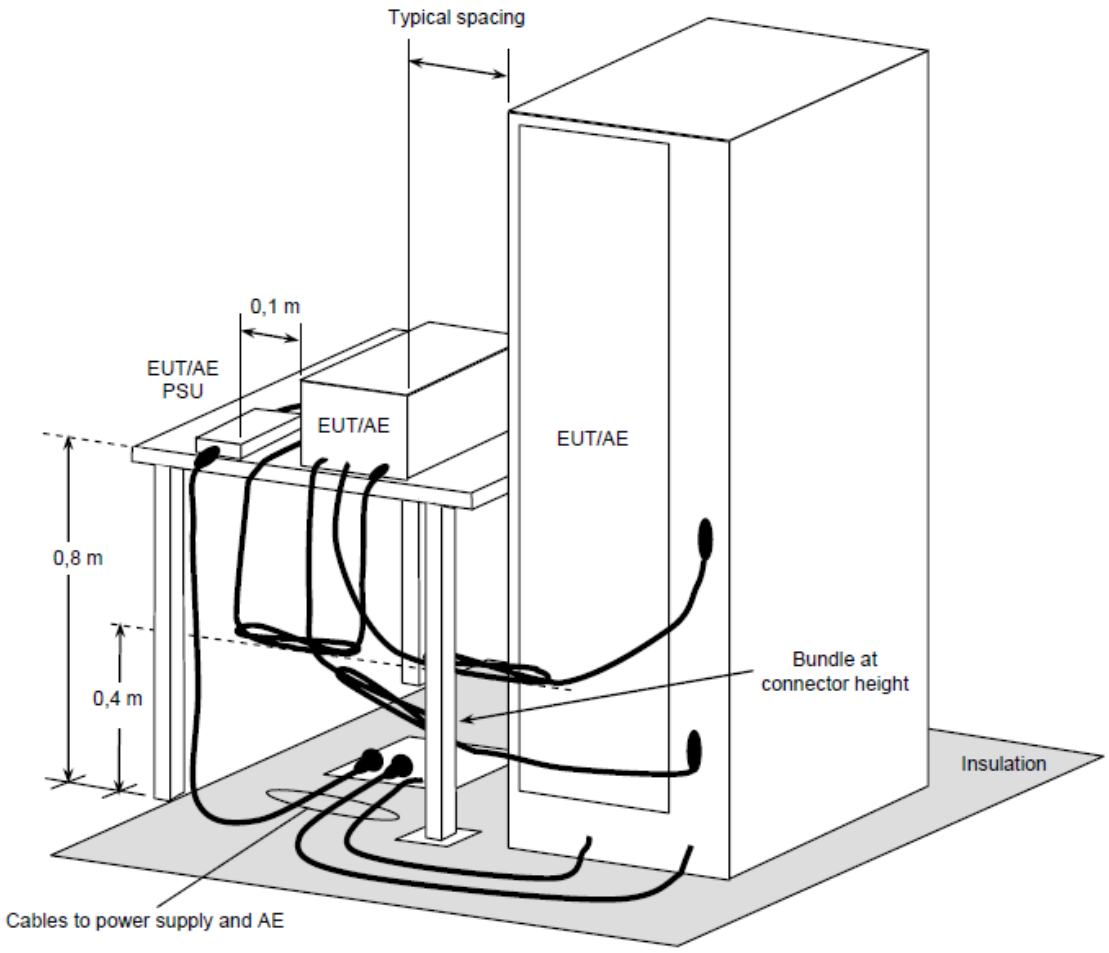
For table-top equipment



For floor standing equipment



For combination equipment



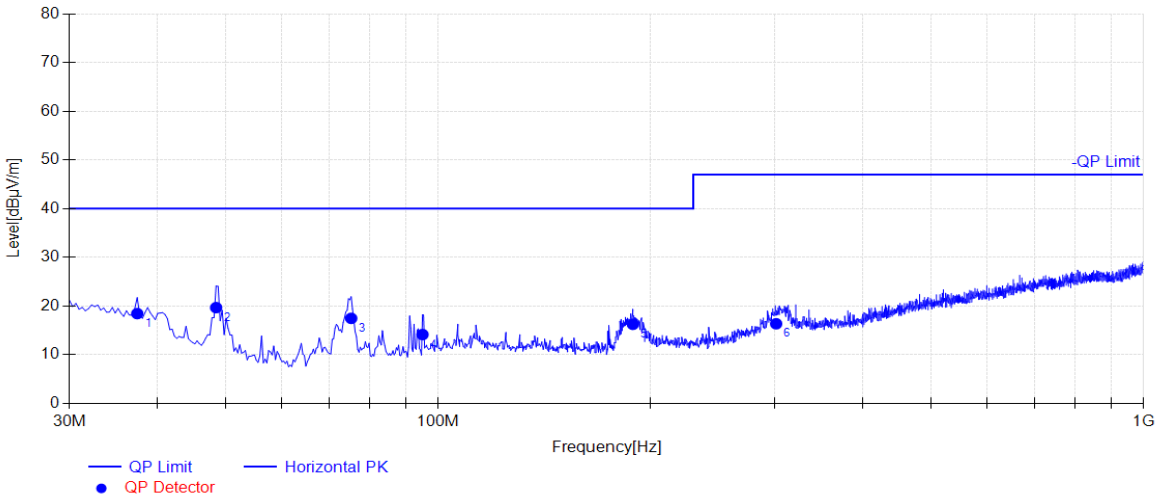
6.3 Test Procedure

The measurement was performed in a semi-anechoic chamber.
The distance from EUT to receiving antenna is 3 meter.
Measurement was performed according to clause 7.3 of CISPR 16-2-3.

Highest internal frequency (Fx)	Highest measured frequency for radiated measurement	Measured Bandwidth
Fx ≤ 108 MHz	1 GHz	120kHz
108 MHz < Fx ≤ 500 MHz	2 GHz	1MHz
500 MHz < Fx ≤ 1 GHz	5 GHz	1MHz
Fx > 1 GHz	5 × Fx up to a maximum of 6 GHz	1MHz
Note: 1. For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies. 2. For outdoor units of home satellite Equipment receiving systems highest measured frequency shall be 18GHz.		

6.4 Test Result

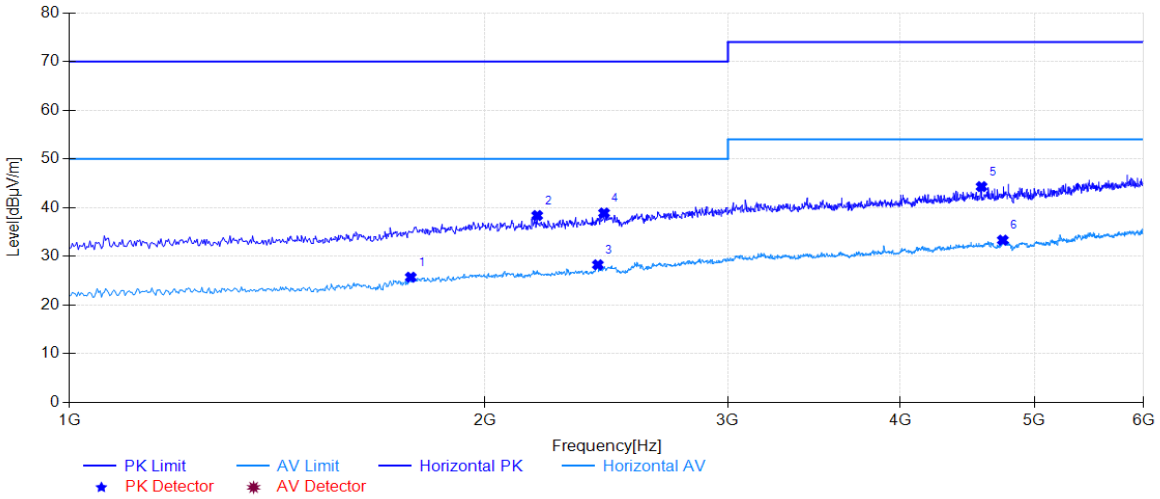
Test Curve: **Horizontal(30M-1G)**



Test data:

Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.4391	15.94	18.45	40.00	21.55	200	154	Horizontal
2	48.4361	10.32	19.68	40.00	20.32	200	266	Horizontal
3	75.2818	9.16	17.48	40.00	22.52	200	154	Horizontal
4	95.0117	10.61	14.15	40.00	25.85	100	278	Horizontal
5	188.8096	10.27	16.25	40.00	23.75	200	60	Horizontal
6	301.3671	13.78	16.36	47.00	30.64	100	264	Horizontal

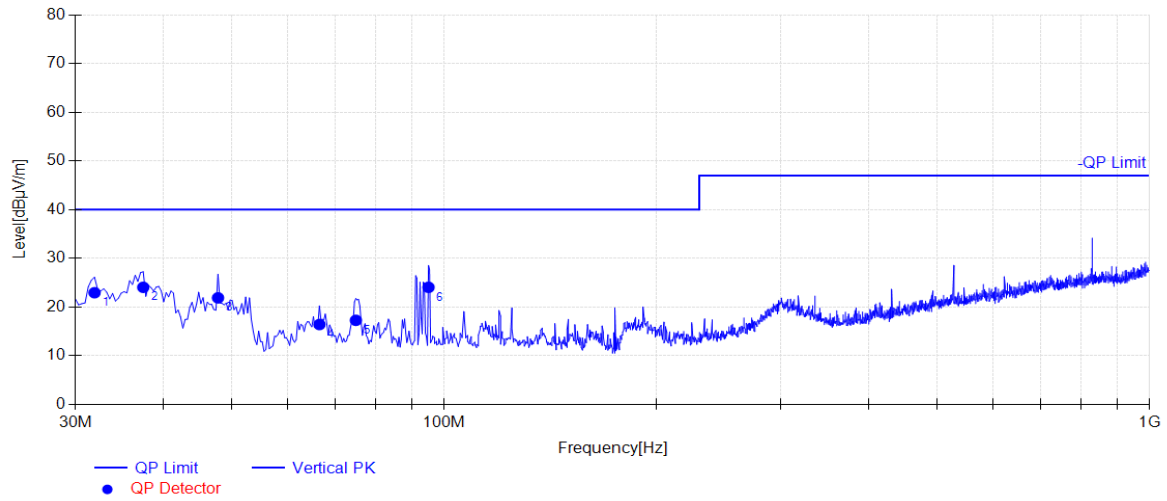
Horizontal(1G-6G)



Test data:

Suspected Data List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1767.5000	25.71	-2.57	50.00	24.29	100	192	Horizontal
2	2182.5000	38.37	-0.83	70.00	31.63	200	357	Horizontal
3	2415.0000	28.26	-0.15	50.00	21.74	200	4	Horizontal
4	2440.0000	38.89	-0.01	70.00	31.11	200	226	Horizontal
5	4580.0000	44.31	5.90	74.00	29.69	100	341	Horizontal
6	4745.0000	33.31	6.06	54.00	20.69	200	4	Horizontal

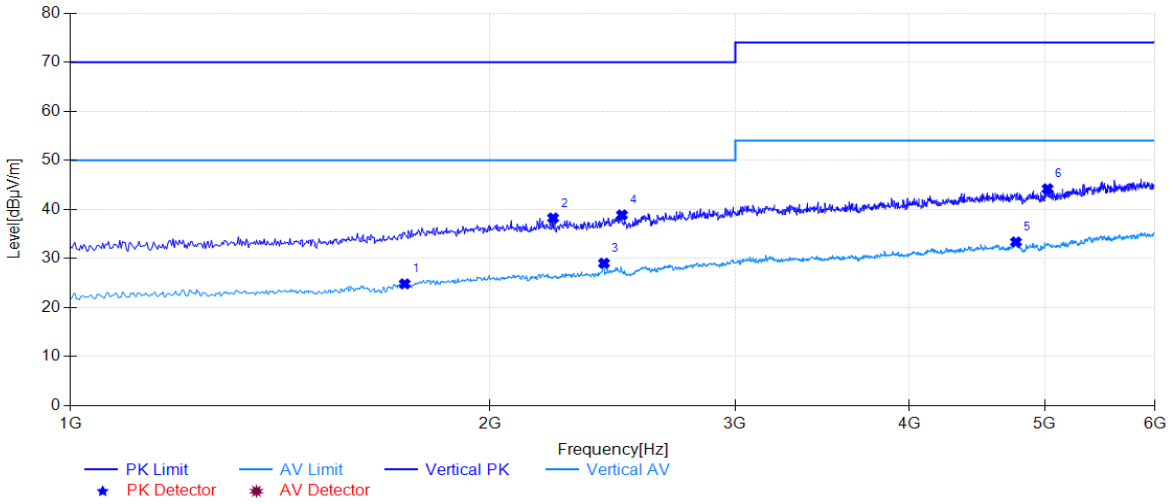
Test curve: **Vertical (30M-1G)**



Test data:

Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.9406	18.73	22.94	40.00	17.06	100	287	Vertical
2	37.4391	15.94	24.06	40.00	15.94	100	256	Vertical
3	47.7893	10.65	21.89	40.00	18.11	100	349	Vertical
4	66.5489	7.95	16.41	40.00	23.59	200	52	Vertical
5	74.9583	9.13	17.28	40.00	22.72	100	278	Vertical
6	95.0117	10.61	24.05	40.00	15.95	100	196	Vertical

Test curve: **Vertical (1G-6G)**

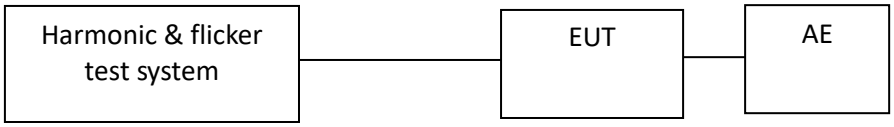


Suspected Data List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1737.5000	24.81	-2.91	50.00	25.19	100	234	Vertical
2	2220.0000	38.23	-0.77	70.00	31.77	200	357	Vertical
3	2415.0000	29.02	-0.15	50.00	20.98	200	166	Vertical
4	2487.5000	38.86	0.06	70.00	31.14	200	14	Vertical
5	4770.0000	33.35	6.15	54.00	20.65	200	357	Vertical
6	5025.0000	44.19	6.41	74.00	29.81	100	209	Vertical

7 Harmonic current emission

Test result: Pass

7.1 Test Setup



7.2 Test Procedure

Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyzer which was integrated in the harmonic & flicker test system. The measurements were carried out under steady conditions.

☐ Measuring instrumentation according to IEC 61000-4-7:2002+A1:2008

☒ This product is not defined as lighting equipment, and has rated power less than 75W, therefore, no limit applies according to EN 61000-3-2

☐ The EUT is kitchen machines as listed in the scope of IEC 60335-2-14, therefore, is deemed to conform to the harmonic current limits of this standard without further testing.

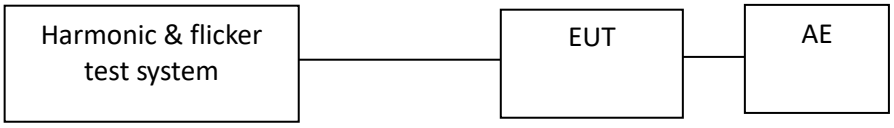
7.3 Test Result

None

8 Voltage fluctuations and flicker

Test result: Pass

8.1 Test Setup



8.2 Test Procedure

8.2.1 Definition

Flicker: impression of unsteadiness of visual sensation induced by a lighting stimulus whose luminance or spectral distribution fluctuates with time.

Pst: Short-term flicker indicator the flicker severity evaluated over a short period (in minutes); Pst=1 is the conventional threshold of irritability

Plt: long-term flicker indicator; the flicker severity evaluated over a long period (a few hours) using successive Pst values.

dc: the relative steady-state voltage change

dmax: the maximum relative voltage change

d(t): the value during a voltage change

8.2.2 Test Precedure

The following limits apply

-- "Plt" shall not exceed 0.65.

-- "Pst" shall not exceed 1.0.

-- "dc" shall not exceed 3.3%.

-- "d(t)" shall not exceed 3.3% for more than 500ms.

-- "dmax" shall not exceed:

☐ 4% without additional conditions,

☐ 6% switched manually or automatically more than twice per day,

☐ 7% attended whilst in use or switched automatically for no more than twice per day or attended while in use.

☐ For manual switch, dmax is measured in accordance with Annex B of standard, average dmax is calculated from 24 times measurement.

☐ The EUT is unlikely to produce significant voltage fluctuations or flicker by technical analysis and evaluation. So it is deemed to fulfil the requirements without testing.

8.3 Test Result

Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.01			
T-max (mS):	0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000	Pass

Immunity Test

Performance criteria

The performance criteria are based on the general criteria of the standard and derived from the product specification

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.

9 Electrostatic Discharges (ESD)

Test result **Pass**

9.1 Severity Level and Performance Criterion

9.1.1 Test level

Contact discharge		Air discharge	
Level	Test voltage (kV)	Level	Test voltage (Kv)
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15
X	Special	X	Special

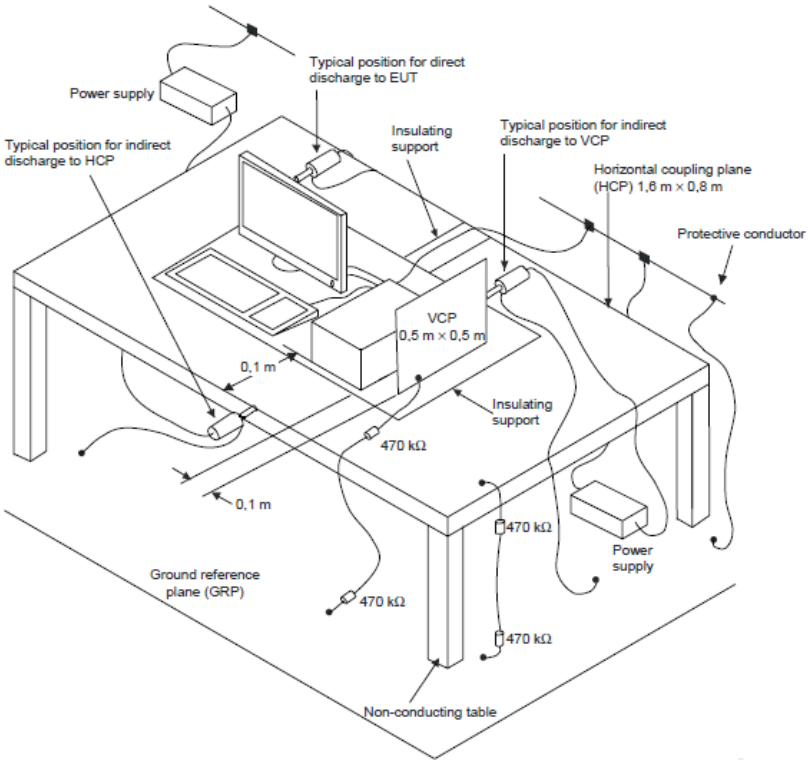
Notes: 1. "X" is an open level. The level has to be specified in the dedicated equipment specification. If higher voltages than those shown are specified, special test equipment may be needed.
2. The gray rows were the selected test level.

9.1.2 Performance Criterion

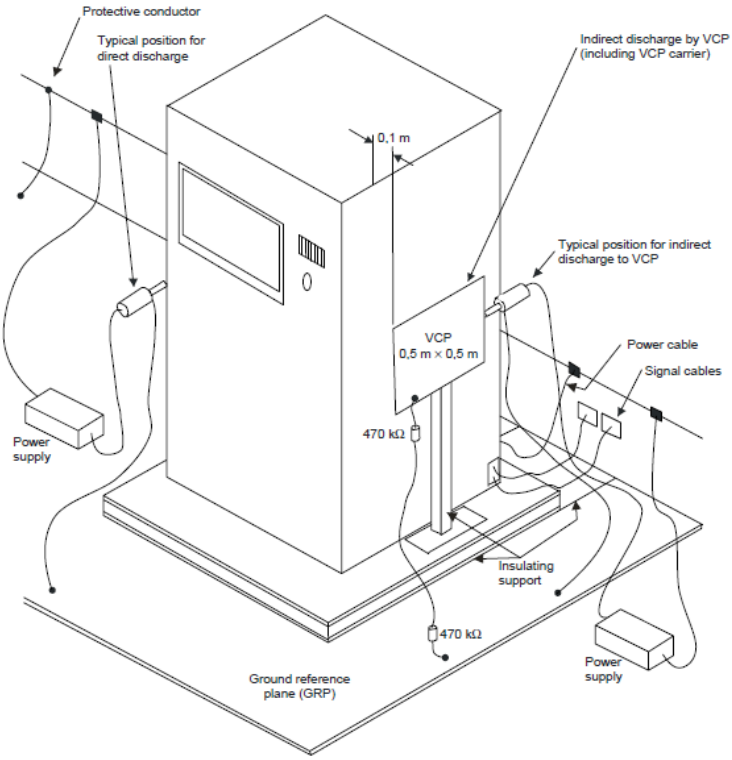
Criterion B

9.2 Test Setup

For table-top equipment



For floor standing equipment



9.3 Test Procedure

Measurement was performed in shielded room.
Measurement procedure was applied according to EN 61000-4-2 clause 8.
The test method and equipment was specified by EN 61000-4-2.

9.4 Test Result

Direct discharges were applied at the following selected points:

Test level [kV]	Air/ Contact	Polarity (+/-)	Pass/Fail/NA	Comment
2/4	Contact	+/-	Pass	Accessible metal parts of the EUT
2/4	Contact	+/-	Pass	All touchable screws of enclosure
2/4/8	Air	+/-	Pass	Air gap of the switch, button
2/4/8	Air	+/-	Pass	Slots around the EUT

Indirect contact discharges were applied to the VCP and the HCP at the following selected points:

For table-top equipment

Position	Description	Point	Pass/Fail/NA
HCP front	0,1m from the front of the EUT	Edge of centre on HCP	Pass
HCP back	0,1m from the back of the EUT	Edge of centre on HCP	Pass
HCP right	0,1m from the right side of the EUT	Edge of centre on HCP	Pass
HCP left	0,1m from the left side of the EUT	Edge of centre on HCP	Pass
VCP front	0,1m from the front of the EUT	Edge of centre on VCP	Pass
VCP back	0,1m from the back of the EUT	Edge of centre on VCP	Pass
VCP right	0,1m from the right of the EUT	Edge of centre on VCP	Pass
VCP left	0,1m from the left of the EUT	Edge of centre on VCP	Pass

For floor standing equipment

Position	Description	Point	Pass/Fail/NA
CP front	0,1m from the front of the EUT	Edge of centre on VCP	NA
CP back	0,1m from the back of the EUT	Edge of centre on VCP	NA
CP right	0,1m from the right of the EUT	Edge of centre on VCP	NA
CP left	0,1m from the left of the EUT	Edge of centre on VCP	NA

Observation: All the functions were operated as normal after the test.
Conclusion: The EUT can meet the requirement of Performance Criterion B.

10 Continuous RF disturbances

Test result **Pass**

10.1 Severity Level and Performance Criterion

10.1.1 Test level

Level	Test field strength V/m
1	1
2	3
3	10
X	Special

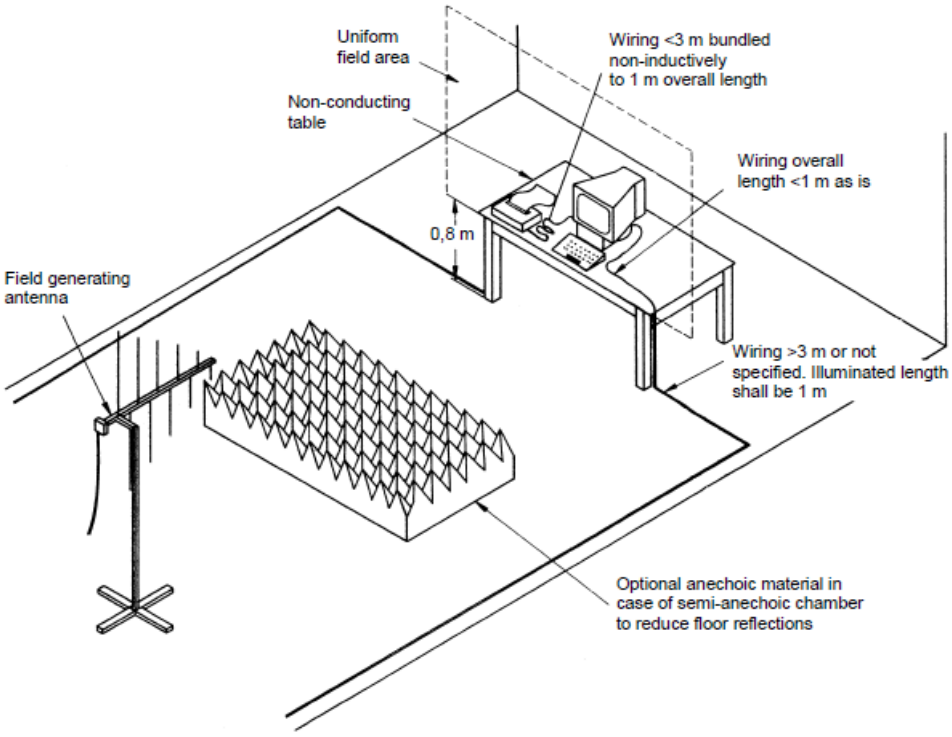
Note: 1. X is an open test level. This level may be given in the product specification.
2. The gray row is the selected test level.

10.1.2 Performance Criterion

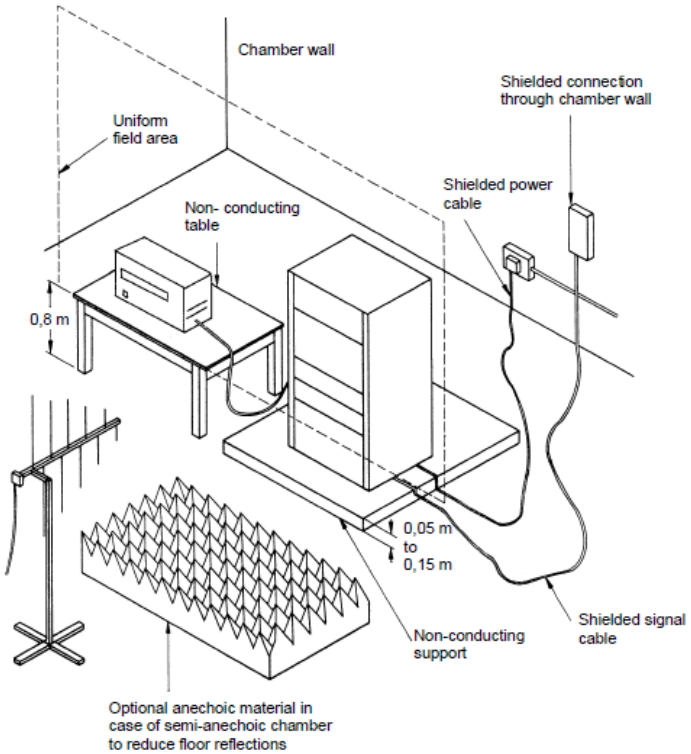
Criterion A

10.2 Test Setup

For table-top equipment



For floor standing equipment



10.3 Test Procedure

Measurement was performed in full-anechoic chamber.
Measurement procedure was applied according to EN 61000-4-3 clause 8.
The test method and equipment was specified by EN 61000-4-3.

10.4 Test Result

Test no.	Frequency (MHz)	Polarization	Test level (V/m)	Modulation	Exposed location	Pass/Fail/NA
1	80-1000	H & V	3	1 kHz, 80% AM 1 % increment	All sides	Pass
2	1800	H & V	3	1 kHz, 80% AM 1 % increment	All sides	Pass
3	2600	H & V	3	1 kHz, 80% AM 1 % increment	All sides	Pass
4	3500	H & V	3	1 kHz, 80% AM 1 % increment	All sides	Pass
5	5000	H & V	3	1 kHz, 80% AM 1 % increment	All sides	Pass

Observation: All the functions were operated as normal during and after test.
Conclusion: The EUT can meet the requirement of Performance Criterion A

11 Continuous induced RF disturbances

Test result **Pass**

11.1 Severity Level and Performance Criterion

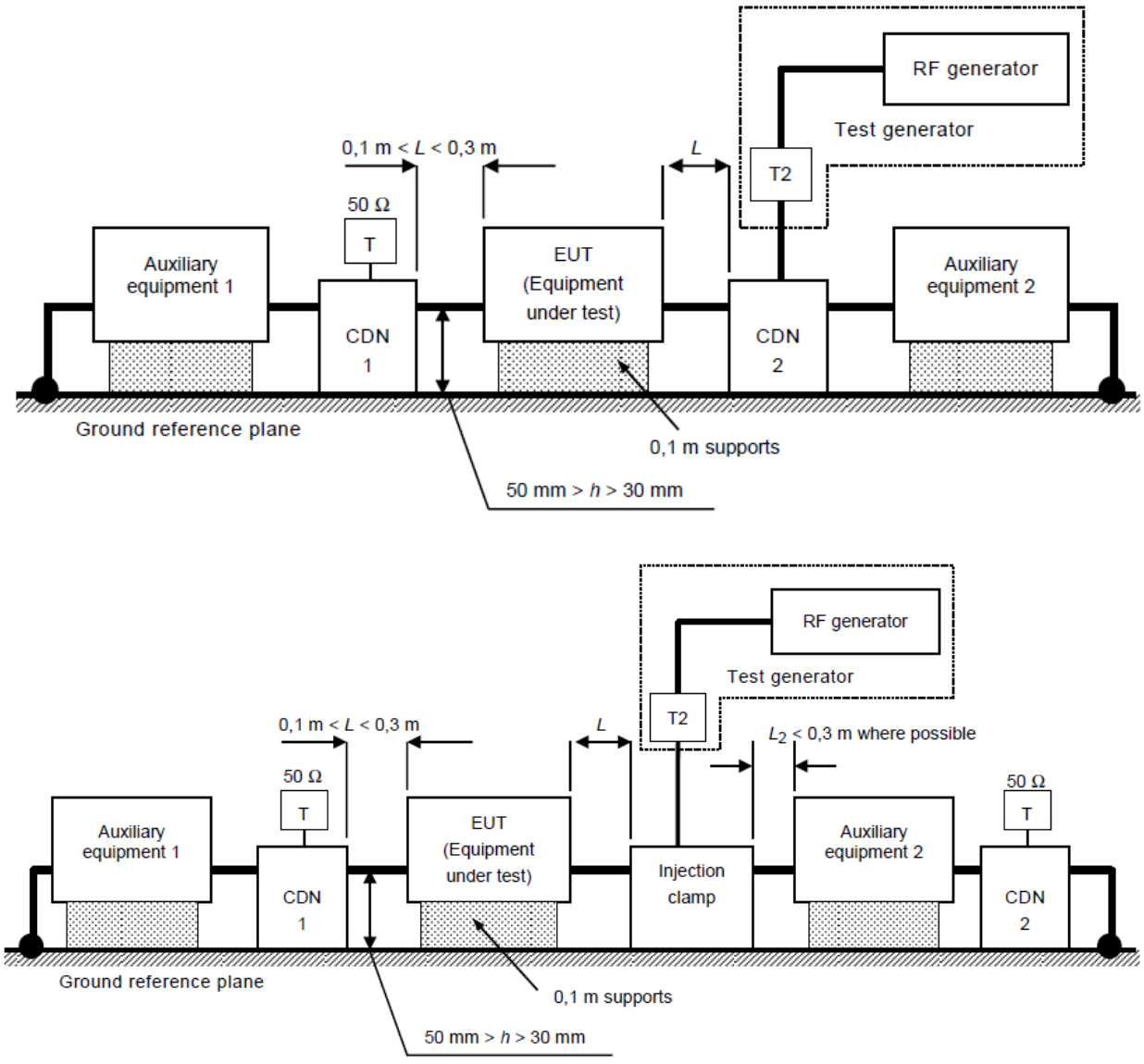
11.1.1 Test level

Frequency range 150kHz – 80MHz		
Level	Voltage level	
	U0 (dBuV)	U0 (V)
1	120	1
2	130	3
3	140	10
X	Special	Special
Notes: 1. “X” is an open level 2. The gray row is the selected test level.		

11.1.2 Performance Criterion

Criterion A

11.2 Block Diagram of Test Setup



T	termination 50 Ω
T2	power attenuator (6 dB)
CDN	coupling and decoupling network

11.3 Test Procedure

Measurement procedure was applied according to EN 61000-4-6 clause 8.
The test method and equipment was specified by EN 61000-4-6.

11.4 Test Result

Test No.	Frequency (MHz)	Level (V)	Modulation	Injected point	Pass/Fail/NA
1	0.15~10	3	80%, 1 kHz, AM	AC mains power ports	Pass
2	10~30	3 to 1	80%, 1 kHz, AM	AC mains power ports	Pass
3	30~80	1	80%, 1 kHz, AM	AC mains power ports	Pass
4	0.15~10	3	80%, 1 kHz, AM	DC network power ports	NA
5	10~30	3 to 1	80%, 1 kHz, AM	DC network power ports	NA
6	30~80	1	80%, 1 kHz, AM	DC network power ports	NA
7	0.15~10	3	80%, 1 kHz, AM	analogue/digital data ports	NA
8	10~30	3 to 1	80%, 1 kHz, AM	analogue/digital data ports	NA
9	30~80	1	80%, 1 kHz, AM	analogue/digital data ports	NA

Observation: All the functions were operated as normal during and after test.
Conclusion: The EUT can meet the requirements of Performance Criterion A

12 Power Frequency Magnetic field

Test result **NA**

12.1 Severity Level and Performance Criterion

12.1.1 Test level

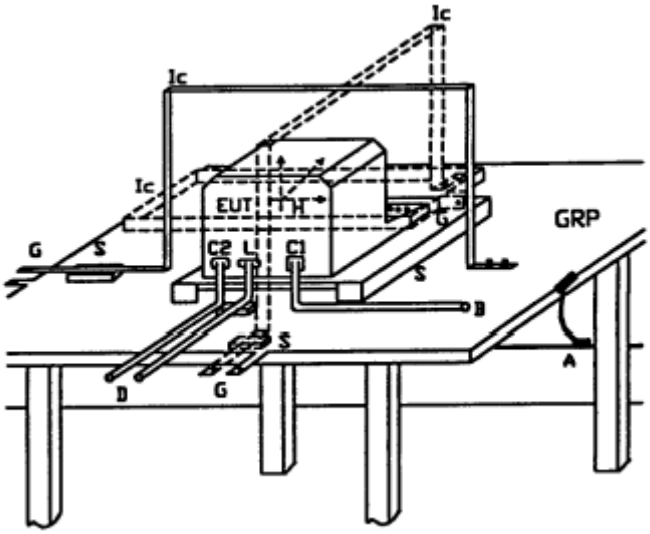
Level	Magnetic field strength A/m
1	1
2	3
3	10
4	30
5	100
X	Special

Note: 1. X is an open test level; this level may be given in the product specification.
2. The gray row is the selected test level.

12.1.2 Performance Criterion

Criterion A

12.2 Test Setup



12.3 Test Procedure

Measurement was performed in shielded room.
Measurement procedure was applied according to EN 61000-4-8 clause 8.
The test method and equipment was specified by EN 61000-4-8.

12.4 Test Result

Test No.	Level A/m	Axis	Result	Comment
1	1	X		
2	1	Y		
3	1	Z		

Observation:
Conclusion:

13 Electrical fast transients/burst

Test result **Pass**

13.1 Severity Level and Performance Criterion

13.1.1 Test level

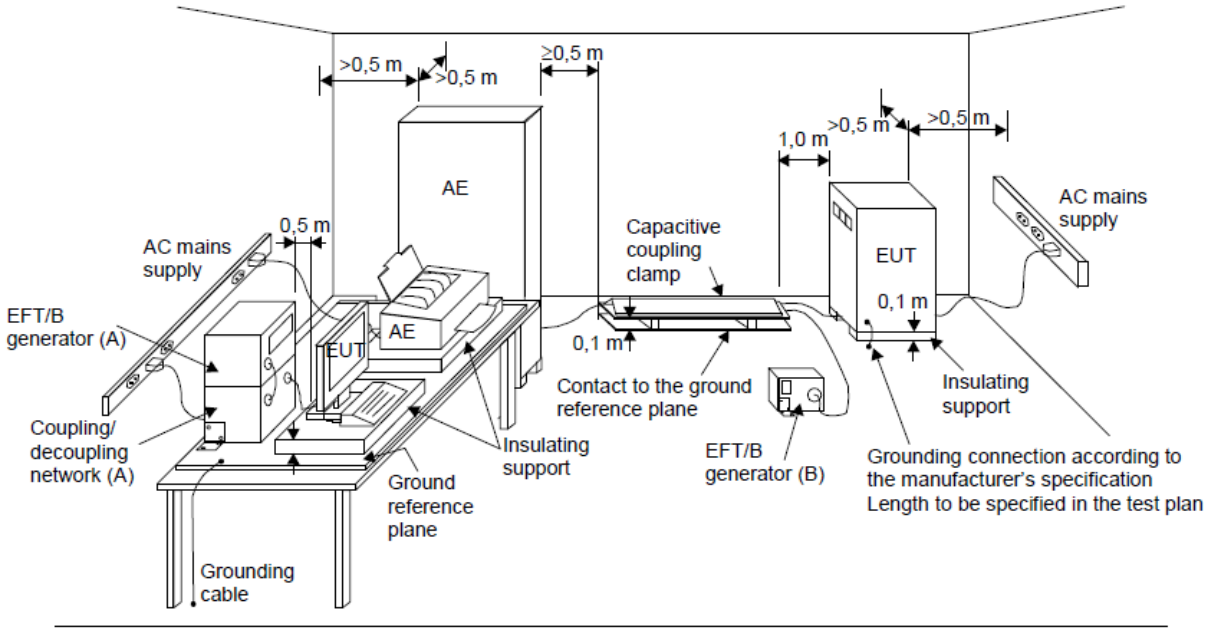
Open circuit output test voltage and repetition rate of the impulses				
Level	AC mains power input ports		Signal ports, wired network ports, control ports, DC power input ports	
	Voltage peak (kV)	Repetition rate (kHz)	Voltage peak (kV)	Repetition rate (kHz)
1	0.5	5	0.25	5/100
2	1	5	0.5	5/100
3	2	5	1	5/100
4	4	2.5	2	5/100
X	Special	Special	Special	Special

Notes: 1. “X” is an open level. The level has to be specified in the dedicated equipment specification.
2. The gray rows were the selected test level.

13.1.2 Performance Criterion

Criterion B

13.2 Test Setup



(A) location for supply line coupling

(B) location for signal lines coupling

13.3 Test Procedure

Measurement was performed in shielded room.
Measurement procedure was applied according to EN 61000-4-4 clause 8.
The test method and equipment was specified by EN 61000-4-4.

13.4 Test Result

Test No.	Level (kV)	Polarity (+/-)	Line for test	Pass/Fail/NA
1	1	+/-	AC mains power input ports	Pass
2	0.5	+/-	DC power input ports	NA
4	0.5	+/-	analogue/digital data ports	NA

Observation: All the functions were operated as normal after the test.
Conclusion: The EUT can meet the requirement of Performance Criterion B

14 Surges

Test result **Pass**

14.1 Severity Level and Performance Criterion

14.1.1 Test level

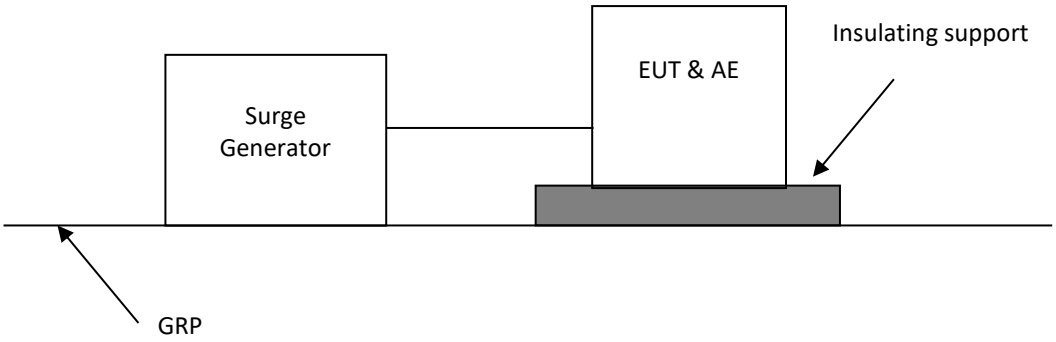
Level	Open-circuit test voltage (kV)
1	0.5
2	1.0
3	2.0
4	4.0
X*	Special

Notes: 1."X" is an open class. This level can be specified in the product specification
2. The gray rows are the selected level.

14.1.2 Performance Criterion

Criterion B

14.2 Test Setup



14.3 Test Procedure

Measurement was performed in shielded room.
Measurement procedure was applied according to EN 61000-4-5 clause 8.
The test method and equipment was specified by EN 61000-4-5.

14.4 Test Result

Test No.	Level [kV]	Polarity +/-	Line for test	Pass/Fail/NA
1	0.5/1	+/-	AC mains power ports (line to line)	Pass
2	0.5/1/2	+/-	AC mains power ports (line to earth)	NA
3	0.5	+/-	DC network power ports (line to earth)	NA
4	1/4	+/-	unshielded symmetrical ports(line to ground)	NA
5	0.5	+/-	coaxial or shielded ports(shield to ground)	NA

Observation: All the functions were operated as normal after the test.
Conclusion: The EUT can meet the requirement of Performance Criterion B

15 Voltage dips and interruptions

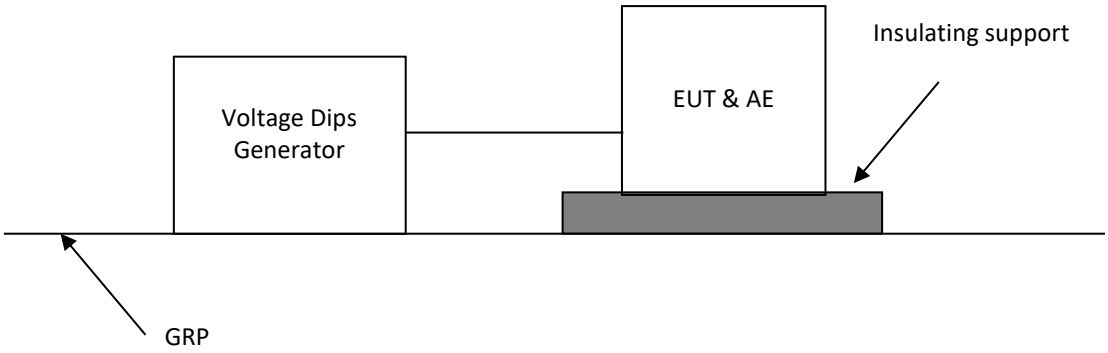
Test result **Pass**

15.1 Severity Level and Performance Criterion

15.1.1 Test level and performance criterion

Test level (% Ut)	Voltage dip and short interruptions (% Ut)	Duration (in period)	Performance criterion
0	100	0.5	B
0	100	250 for 50 Hz / 300 for 60 Hz	C
70	30	25 for 50 Hz / 30 for 60 Hz	C
Notes: The gray rows are selected test level.			

15.2 Test Setup



15.3 Test Procedure

Measurement was performed in shielded room.
Measurement procedure was applied according to EN 61000-4-11 clause 8.
The test method and equipment was specified by EN 61000-4-11.

15.4 Test Result

Test no.	Dips to (% Ut)	Voltage dip and short interruptions (% Ut)	Duration (in periods)	Pass/Fail/NA
1	70	30%	25	Pass
2	0	100%	0.5	Pass
3	0	100%	250	Pass

Observation: All the functions were operated as normal after test.
Conclusion: The EUT can meet the requirements of the standard

16 Broadband impulsive conducted disturbances

Test result **NA**

16.1 Severity Level and Performance Criterion

16.1.1 Test level

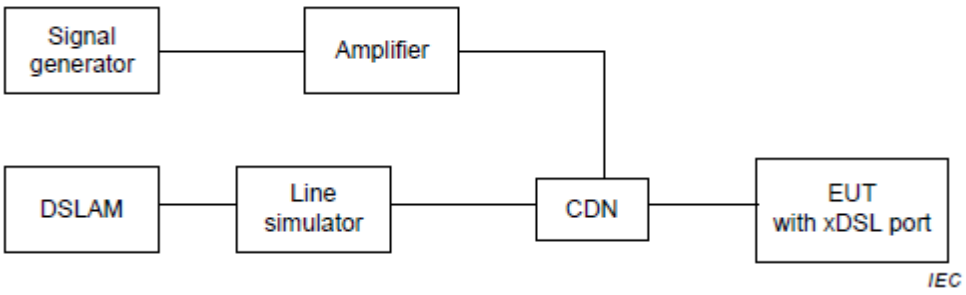
Broadband impulse noise disturbances, repetitive	
Frequency range(MHz)	Level(V)
0.15~0.5	107
0.5~10	107~36
10~30	36~30

Broadband impulse noise disturbances, isolated	
Frequency range(MHz)	Level(V)
0.15~30	110

16.1.2 Performance Criterion

Broadband impulse noise disturbances, repetitive: Criterion A
Broadband impulse noise disturbances, isolated: Criterion B

16.2 Test Setup



16.3 Test Procedure

Measurement procedure was applied according to EN 55035 clause 4.2.7.
The test method and equipment was specified by EN 55035 clause 4.2.7.

16.4 Test Result

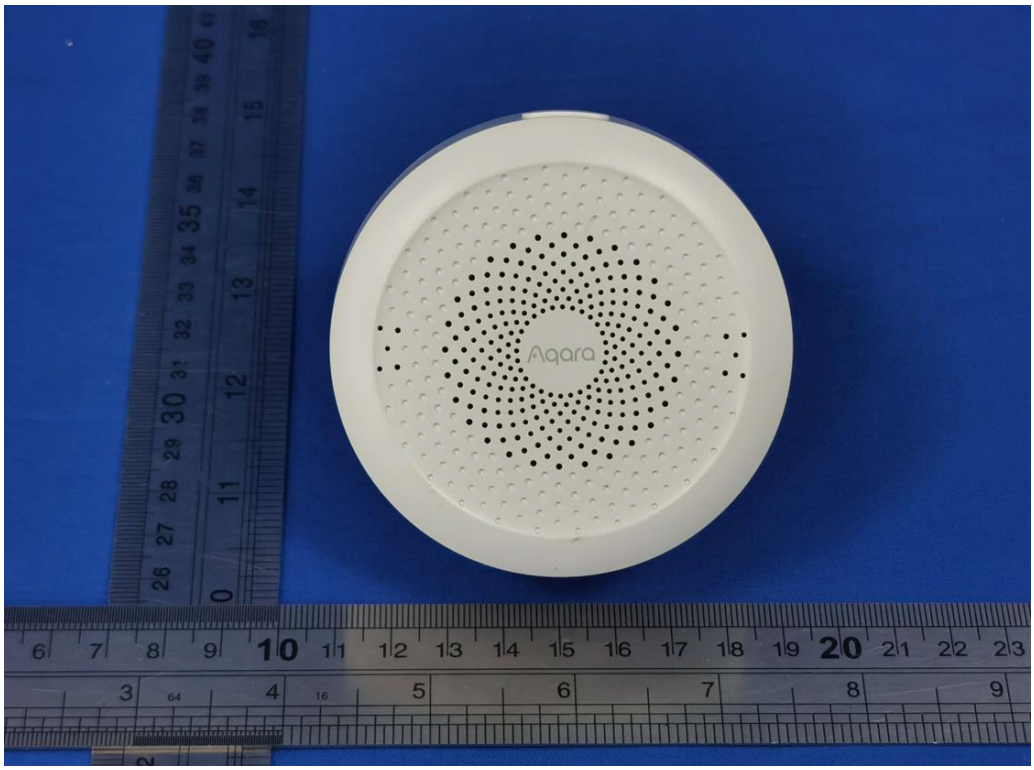
Test No.	Frequency [MHz]	Level [dBµV]	Burst period [ms]	Impulse type	Pass/Fail/NA
1	0.15~0.5	107	10(for 50Hz) 8.3(for 60Hz)	repetitive	
2	0.5~10	107~36	10(for 50Hz) 8.3(for 60Hz)	repetitive	
3	10~30	36~30	10(for 50Hz) 8.3(for 60Hz)	repetitive	

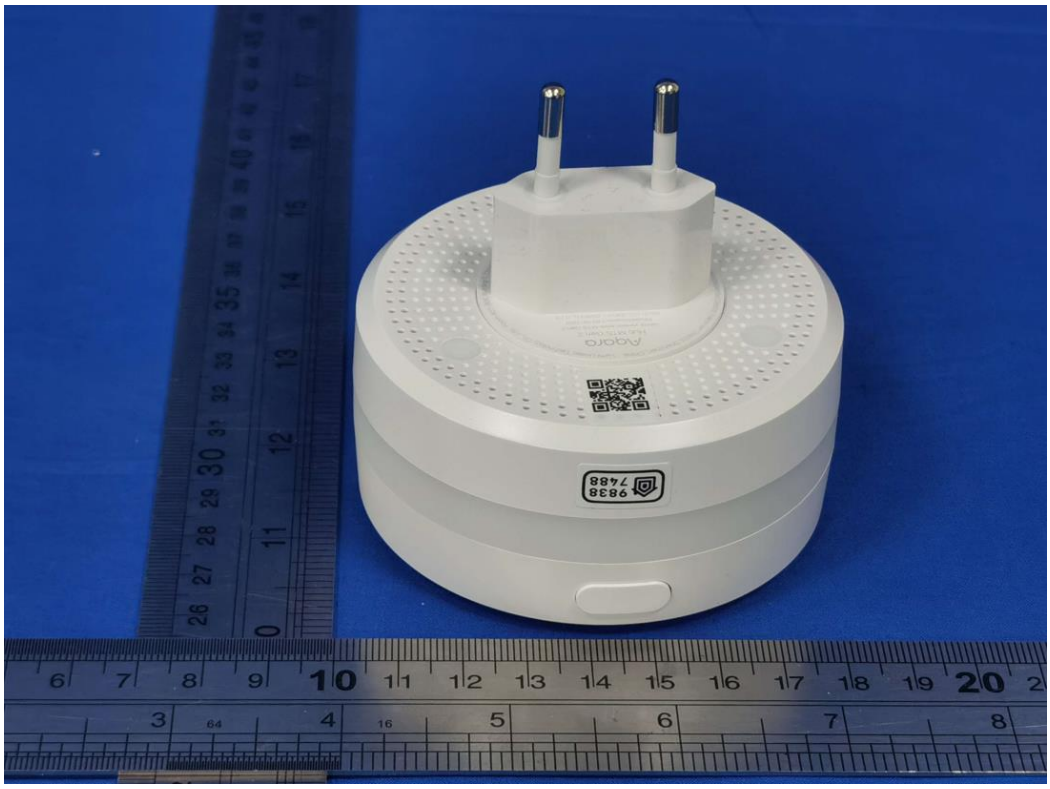
Observation:
Conclusion:

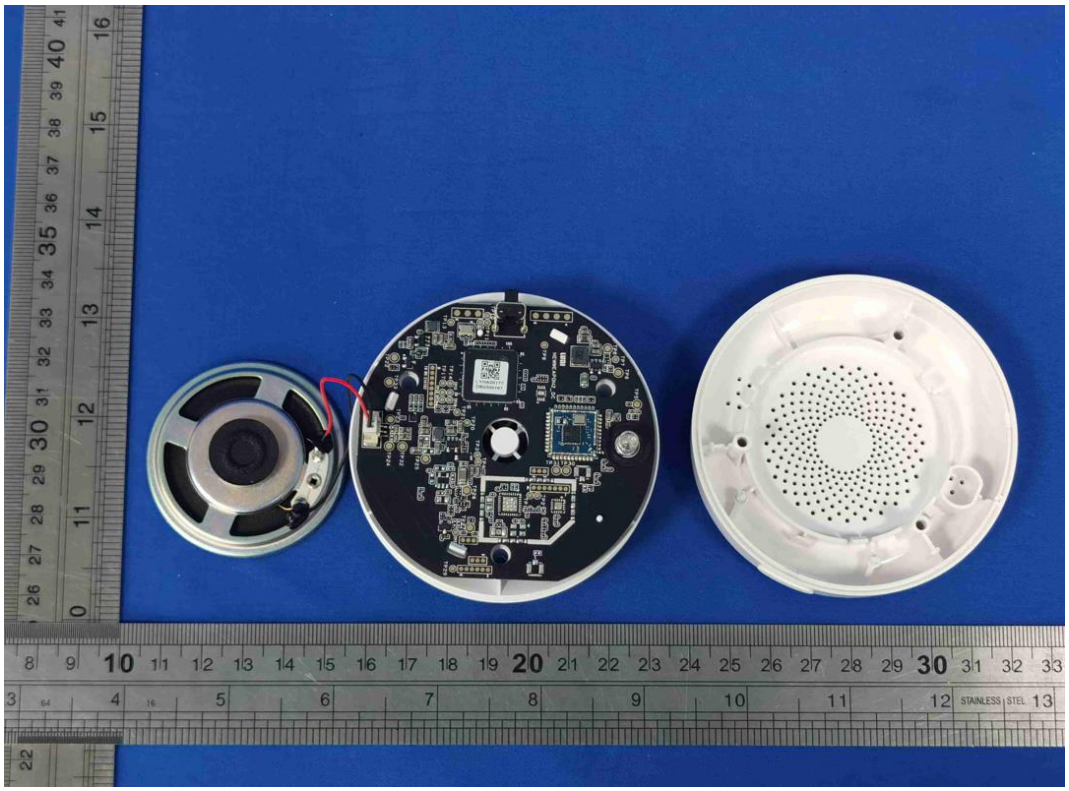
Test No.	Frequency [MHz]	Level [dBµV]	Burst duration [ms]	Impulse type	Pass/Fail/NA
1	0.15~30	110	0.24	isolated	
2	0.15~30	110	10	isolated	
3	0.15~30	110	300	isolated	

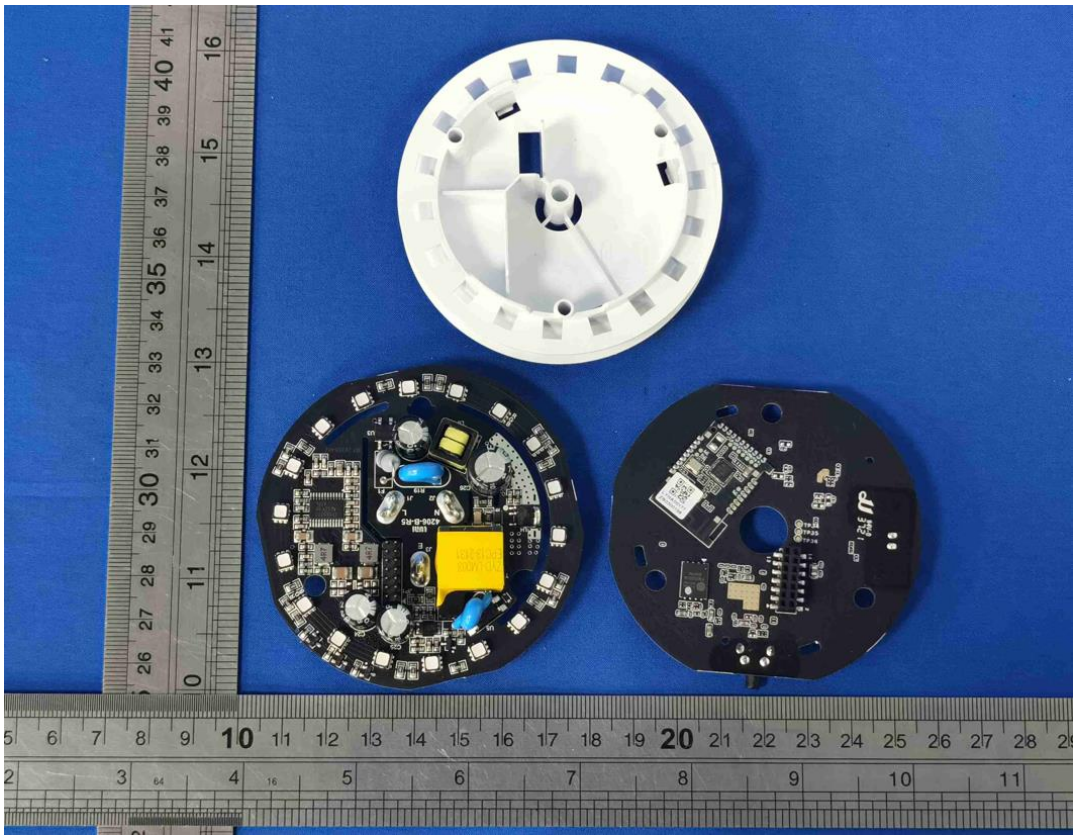
Observation:
Conclusion:

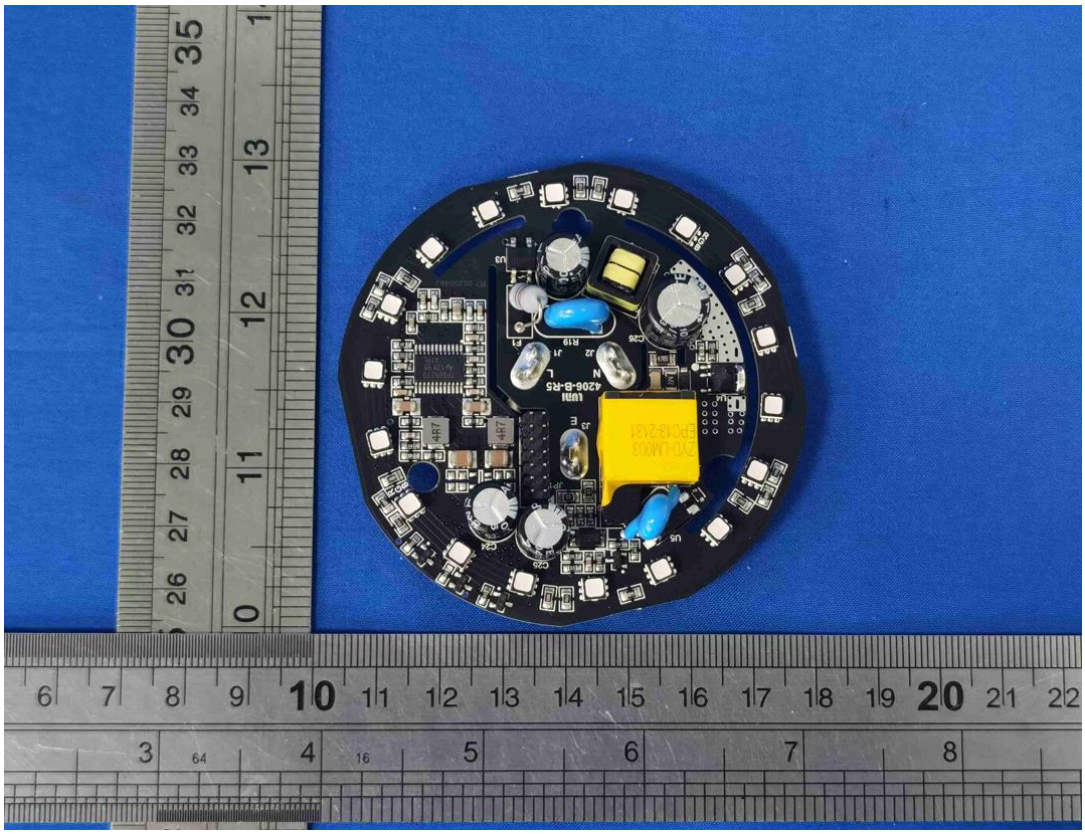
Appendix I: Photograph of equipment under test

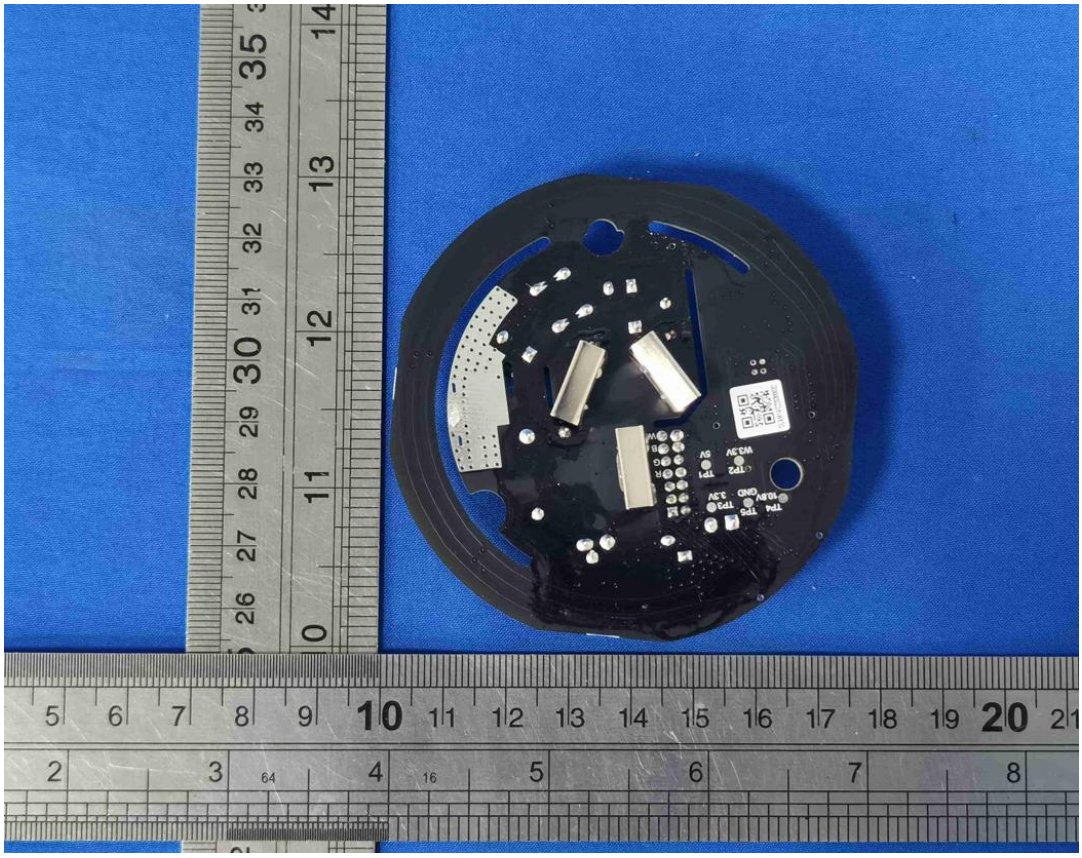


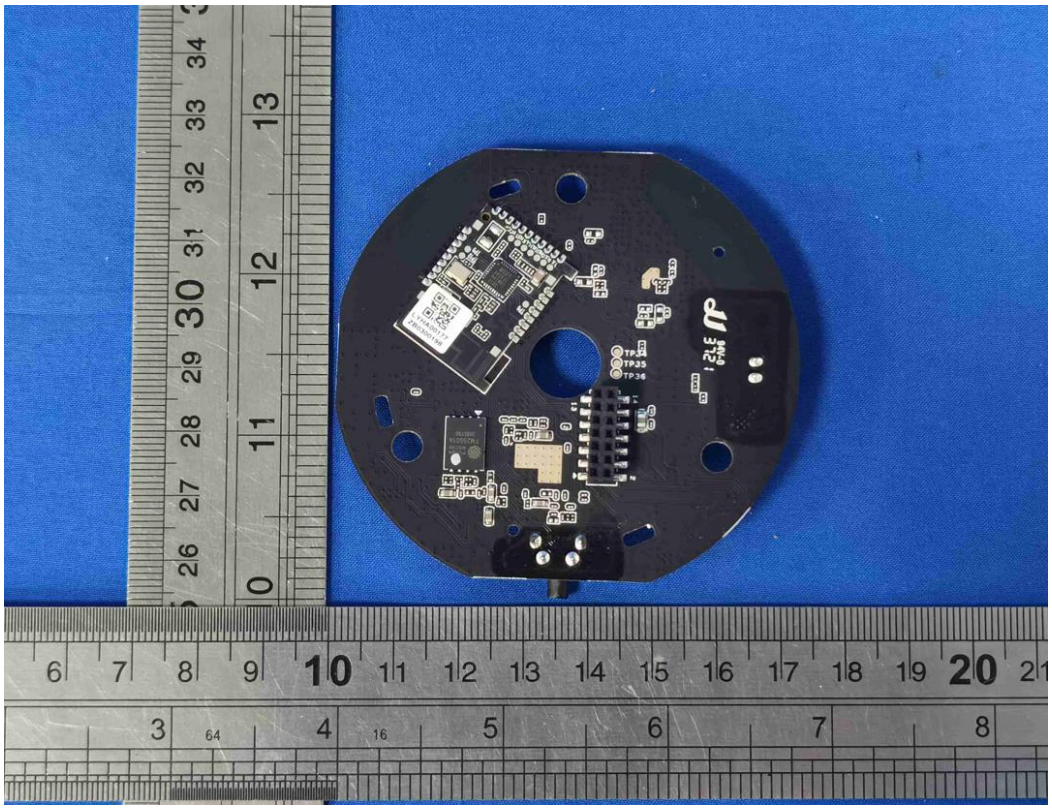












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