

Lumi United Technology Co., Ltd.

CE TEST REPORT

SCOPE OF WORK:

EMC report

Model:

HM1S-G01

REPORT NUMBER

200702409SHA-004+A1

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DOCUMENT CONTROL NUMBER

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Applicant : **Lumi United Technology Co., Ltd.**
**8th Floor, JinQi Wisdom Valley, No.1 Tangling Road, Liuxian Ave,
Taoyuan Residential District, Nanshan District, Shenzhen. China**

Manufacturer : **Same as applicant**

Factory : **GUANGDONG NEW ENERGY TECHNOLOGY CO., LTD.**
**Floor1-4, Building 2, No.197 plant, East Side of Xinhua Road,
Tongqiao Town, Zhongkai High-tech Zone, Huizhou, Guangdong,
516032, China**

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: Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current \leq 16A 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 \leq 16 A per phase and not subject to conditional connection (IEC 61000-3-3:2013+A1:2017)

PREPARED BY:

REVIEWED BY:



Project Engineer
Eric Li

Reviewer
Wakeyou Wang

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Revision History

Report No.	Version	Description	Issued Date
200702409SHA-003+A1	Rev. 01	<p>This report is based on the original report 200702409SHA-004 for amendment on 2021-07-20 to include the following changes:</p> <ol style="list-style-type: none"> 1. Added one alternative source for plastic enclosure and plug holder 2. Added one alternative source for Transformer, 3. Added one alternative source for CM choke, 4. Added one alternative source for Y1 capacitor, 5. Changed design of ventilation openings, 6. Remove the HomeKit chip <p>These changes have no effect on the RF function, only the EMC tests were conducted.</p>	July 20, 2021

Measurement result summary

TEST ITEM	TEST RESULT	NOTE
Conducted disturbance voltage at mains terminals	Pass	
Conducted disturbance for asymmetric mode	NA	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

Type/Model : HM1S-G01

Description of EUT : This report is based on the original report 200702409SHA-004 for amendment on 2021-07-20 to include the following changes:
1. Added one alternative source for plastic enclosure and plug holder
2. Added one alternative source for Transformer,
3. Added one alternative source for CM choke,
4. Added one alternative source for Y1 capacitor,
5. Changed design of ventilation openings,
These changes have no effect on the RF function, only the EMC tests were conducted.

Rating : 100-240V AC 50/60Hz 0.2A

EUT type : Table-top
 Floor standing

Port identification : Main power

Cable supplied : Refer to the user's manual

Sample received date : April 21, 2021

Date of test : April 25~April 28, 2021

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:

<input checked="" type="checkbox"/>	Name	GRG Metrology & Test (Shenzhen) Co., Ltd.
	Address	Room 402, Silver Star Hi-Tech Building, No. 1301, Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen, China
	Telephone	+86-755-61180008
	CNAS No	L0446

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: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

EN 61000-3-3:2013+A1:2019: 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 are specified if used.

2.3 Test peripherals used

Item No	Description	Band and Model	S/No
1	/	/	/

2.4 Record of climatic conditions

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (Kpa)
Conducted disturbance voltage at mains terminals	24	53	NA
Conducted disturbance for asymmetric mode	NA	NA	NA
Conducted differential voltage emission	NA	NA	NA
Radiation emission	25	51	NA
Harmonic current emission	NA	NA	NA
Voltage fluctuations and flicker	NA	NA	NA
Electrostatic discharges	25	54	101
Continuous RF disturbances	25	54	NA
Continuous induced RF disturbances	25	54	NA
Power frequency magnetic field	NA	NA	NA
Electrical fast transients/burst	24	52	NA
Surges	24	52	NA
Voltage dips and interruptions	24	52	NA
Broadband impulsive conducted disturbances	NA	NA	NA

Notes: NA =Not Applicable

2.5 Instrument list

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Conduction Emission				
EZ-EMC	EZ	CCS-3A1-CE	/	/
EMI Receiver	R&S	ESCI	100783	2021-10-08
LISN(EUT)	R&S	ENV216	101543	2022-02-25
Radiated Emission (Below 1GHz)				
Test S/W	EZ	CCS-2ANT	/	/
Test Receiver	R&S	ESCI	100145	2021-10-07
Preamplifier	EMEC	EM330	/	2022-03-21
Bi-log Antenna	TESEQ	CBL6143A	26039	2021-11-25
Radiated Emission (Above 1GHz)				
Test software	Tonscend	JS32-RE	/	/
Spectrum Analyzer	Agilent	N9010A	MY52221469	2021-05-16
Preamplifiers	Tonscend	TAP01018048	AP20E8060075	2021-06-28
Horn antenna	Schwarzbeck	BBHA 9120D	02143	2021-12-17
Voltage Fluctuation and Flicks				
Test S/W	/	CTS4	/	/
Power Source	SCHAFFNER	NSG1007	54789	2022-03-21
Harmonic & Flicker Tester	SCHAFFNER	CCN1000	72045	2021-11-15
Electrostatic discharge				
Dito ESD Simulator	EM Test	dito	V0809103493	2021-11-18
Radio-Frequency Electromagnetic Field				
Test S/W	Tonscend	JS35-RS	/	/
Signal generator	R&S	SMA100A	100434	2021-10-08
Switch	TOYO	BS5000	/	/
Power Amplifier	SCHAFFNER	CBA9433	3007	2021-12-22
Power Amplifier	TESEQ	CBA 3G-050	T44161	2021-05-22
Power Amplifier	Milmega	AS1860-50	1079232	2021-11-15

Dual directional Coupler	AR	DC 6180A	0328212	2021-10-08
Dual directional Coupler	AR	DC 7144A	327057	2021-10-08
Log-periodic broadband antenna	Schaffner	CBL6143	5082	2021-10-08
Microwave Log.-Per. Antenna	Schwarzbeck	STLP9149	9149-163	2021-10-09
Power Meter	Keysight	N1914A	MY57090009	2021-10-16
Power Probe	Keysight	E9301A	MY57060008	2021-10-08
Electrical fast transient/burst				
Test S/W	/	Win3025 Version 4.00	/	/
Fast Transients/Burst Generator	TESEQ	NSG 3025	26861	2021-10-16
Surge				
Surge simulator	3ctest	CWS 600G	ES0381813	2021-11-15
Lightning surge coupling decoupling network	3ctest	SPN 3618T	ES0941720	2021-11-15
Conducted radio frequency disturbances				
Test S/W	Tonscend	JS35-CS	/	/
Conduction and radiation immunity testing system	TESEQ	NSG4070	25807	2021-05-16
Attenuator	weinschel corp	40-6-34	QQ986	2021-10-08
Coupled decoupled network	Luthi	CDN801-M2	1897	2021-10-08
Voltage Dip & Voltage Interruptions				
Test S/W	AMETEK	AC Source CIGuiSII-500lix	2.0.0.7-No v.2006	/
Power Source	SCHAFFNER	NSG1007	54789	2022-03-21
current switchgear	TESEQ	NSG2200-1	A17820	2021-10-16

2.6 Measurement Uncertainty

Measurement	Frequency	Uncertainty
Conduction Emission	9 kHz ~ 150 kHz	2.2 dB
	150 kHz ~ 30 MHz	2.8 dB
Radiated Emission (10m)	30MHz~200MHz(H)	4.5 dB
	200MHz~1000MHz(H)	4.4 dB
	30MHz~200MHz(V)	4.4 dB
	200MHz~1000MHz(V)	4.5 dB
Radiated Emission (3m)	30MHz~200MHz(H)	4.3 dB
	200MHz~1000MHz(H)	4.5 dB
	30MHz~200MHz(V)	4.4 dB
	200MHz~1000MHz(V)	4.5 dB
	1GHz~6GHz(H)	4.5 dB
	1GHz~6GHz(V)	4.5 dB
Voltage Fluctuation and Flicks	/	1)
Electrostatic discharge	/	1)
Radio-Frequency Electromagnetic Field	/	1)
Electrical fast transient/burst	/	1)
Surge	/	1)
Conducted radio frequency disturbances	/	1)
Voltage Dip & Voltage Interruptions	/	1)

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

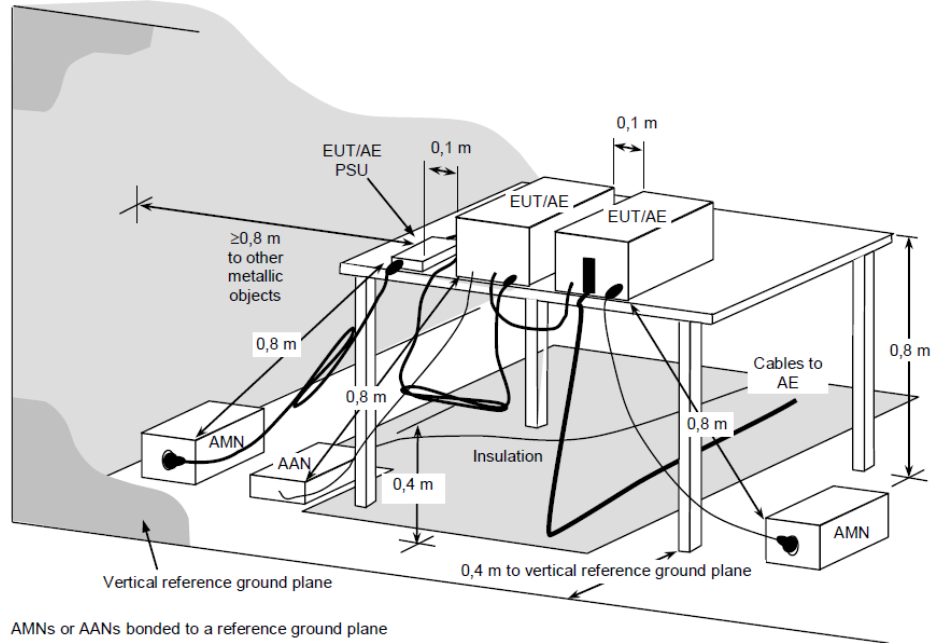
3.1.2 Limits for class B equipment

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

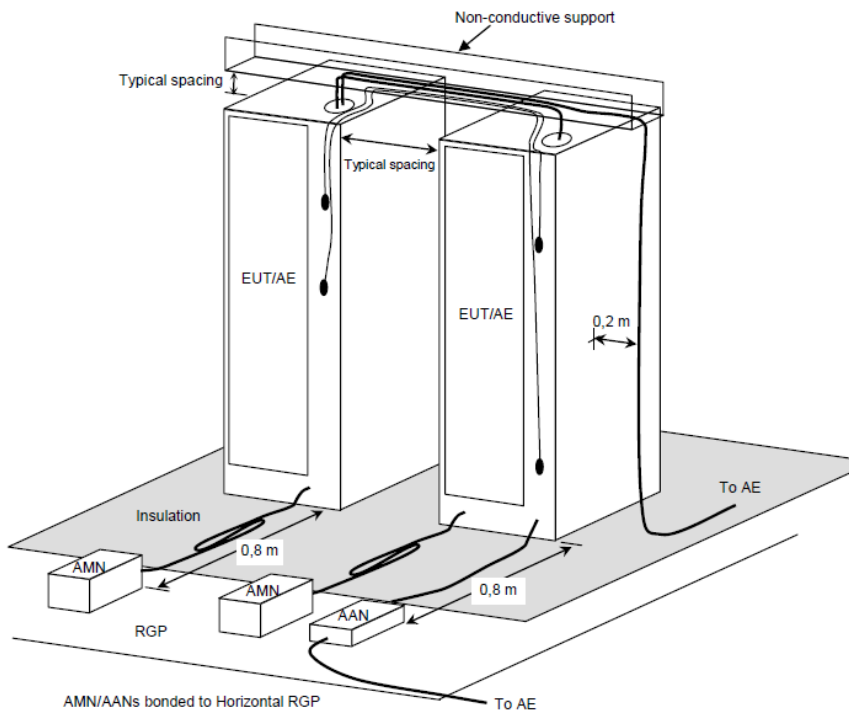
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
 2. Coupling device is AMN;
 3. Detector type is Quasi Peak or Average
 4. Bandwidth is 9 kHz

3.2 Test setup

For table-top equipment



For floor standing equipment



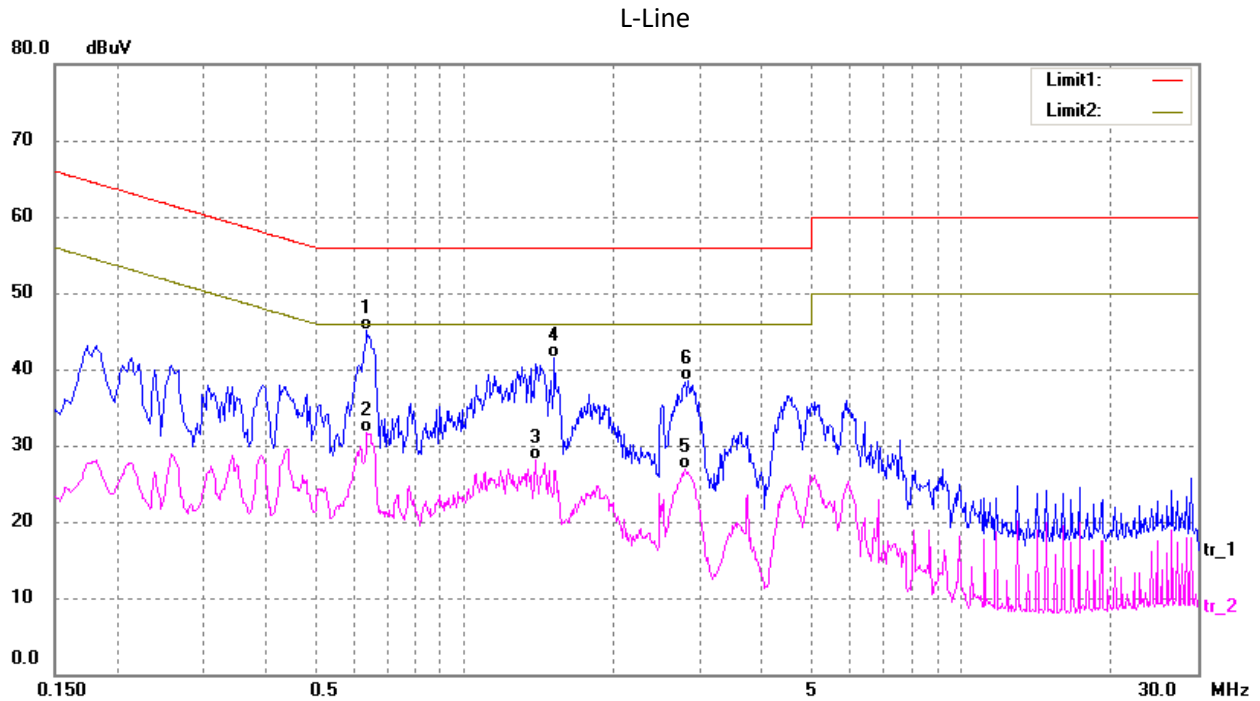
3.3 Test Procedure

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.

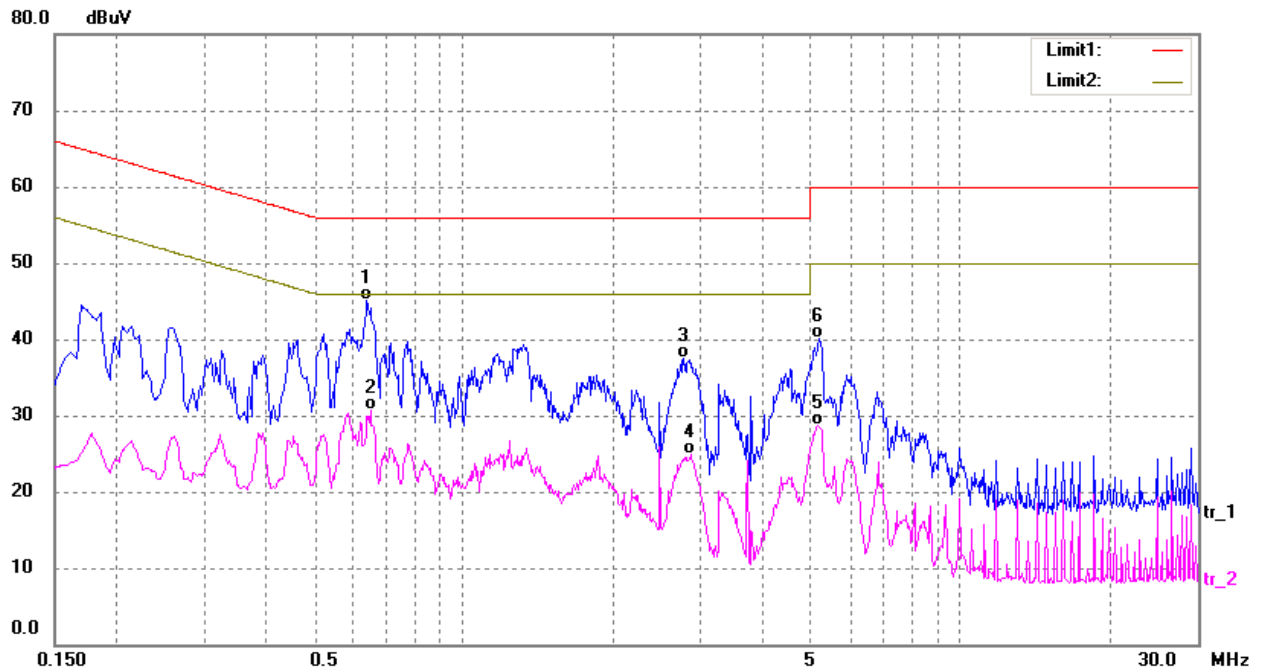
3.4 Test Result of 230VAC



Test Data:

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.6380	35.08	10.05	45.13	56.00	-10.87	QP
2	0.6380	21.70	10.05	31.75	46.00	-14.25	AVG
3	1.3940	17.82	10.37	28.19	46.00	-17.81	AVG
4	1.5260	31.11	10.37	41.48	56.00	-14.52	QP
5	2.7820	16.55	10.39	26.94	46.00	-19.06	AVG
6	2.8260	28.12	10.39	38.51	56.00	-17.49	QP

N-Line

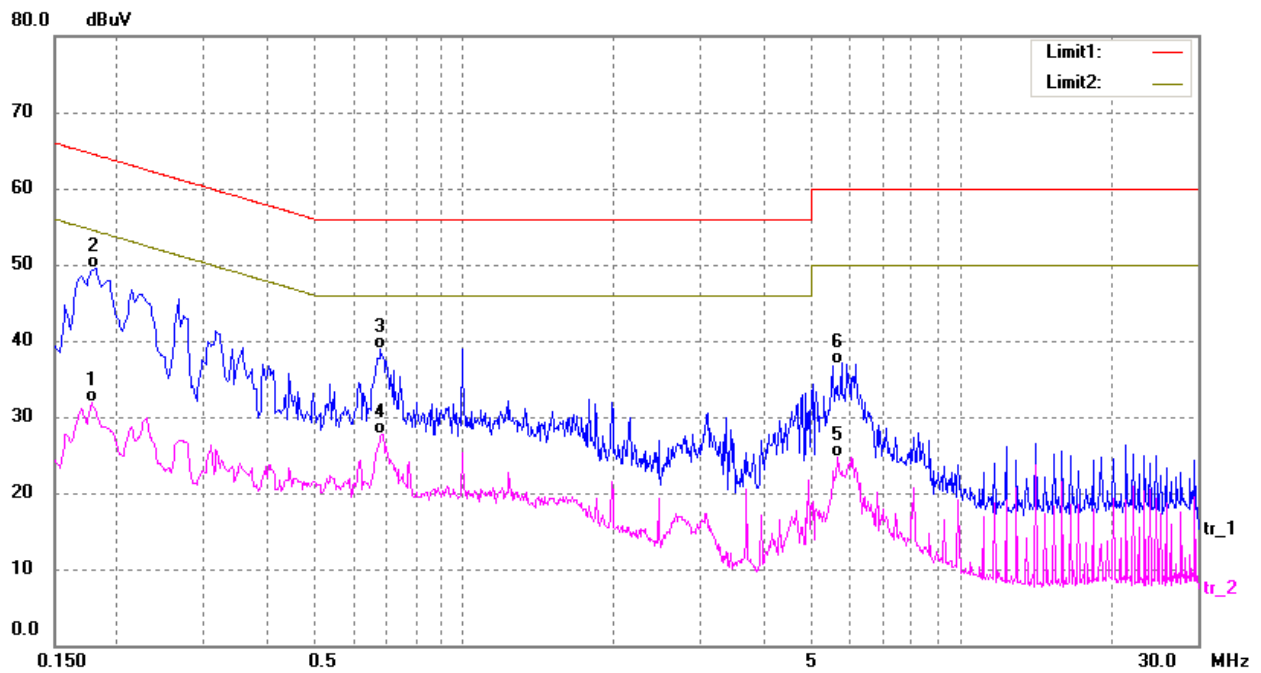


Test Data:

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.6380	35.00	10.05	45.05	56.00	-10.95	QP
2	0.6500	20.59	10.04	30.63	46.00	-15.37	AVG
3	2.7780	27.10	10.39	37.49	56.00	-18.51	QP
4	2.8580	14.51	10.39	24.90	46.00	-21.10	AVG
5	5.1500	18.24	10.39	28.63	50.00	-21.37	AVG
6	5.1700	29.78	10.39	40.17	60.00	-19.83	QP

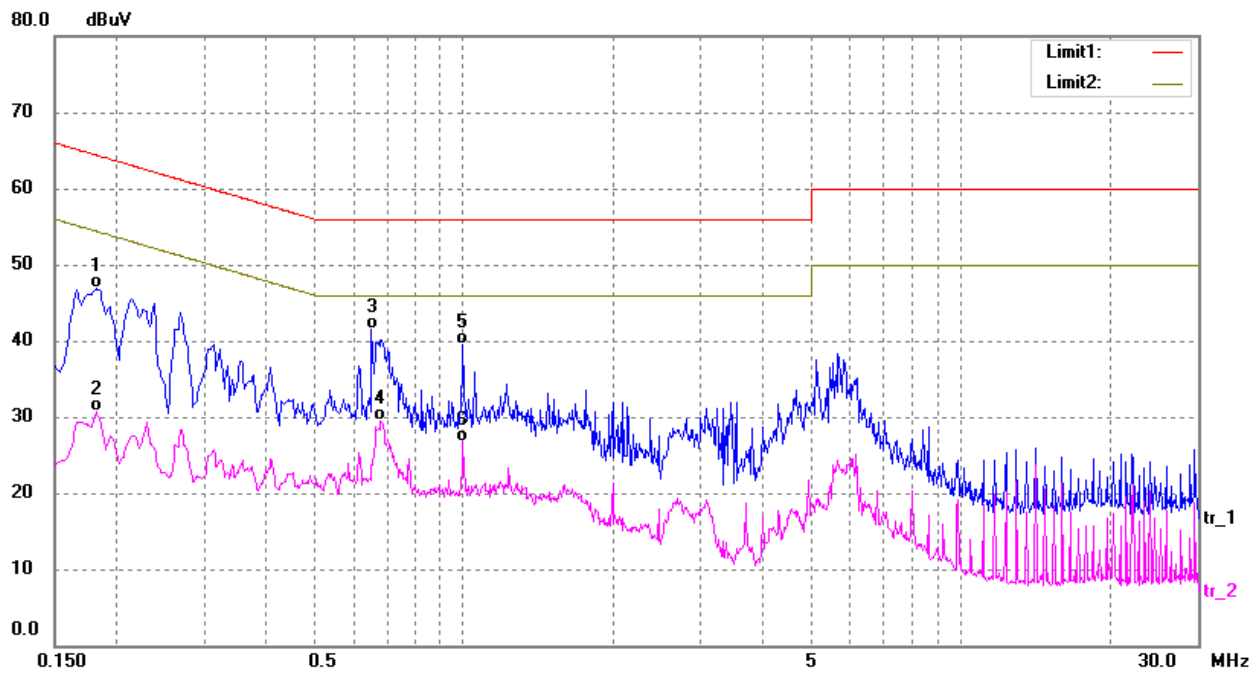
Test Curve of 120VAC:

L Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1780	21.64	10.26	31.90	54.57	-22.67	AVG
2*	0.1819	39.19	10.26	49.45	64.39	-14.94	QP
3	0.6820	28.73	10.17	38.90	56.00	-17.10	QP
4	0.6860	17.56	10.17	27.73	46.00	-18.27	AVG
5	5.6539	14.53	10.23	24.76	50.00	-25.24	AVG
6	5.7499	26.77	10.23	37.00	60.00	-23.00	QP

N Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1819	36.61	10.26	46.87	64.39	-17.52	QP
2	0.1819	20.49	10.26	30.75	54.39	-23.64	AVG
3*	0.6540	31.23	10.19	41.42	56.00	-14.58	QP
4	0.6820	19.37	10.17	29.54	46.00	-16.46	AVG
5	0.9980	29.24	10.20	39.44	56.00	-16.56	QP
6	0.9980	16.41	10.20	26.61	46.00	-19.39	AVG

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.

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(μ V)		Current limits dB(μ A)	
	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 "150 Ω to 50 Ω adaptor" applied, correction factor of 9.5dB should be added to the test data.

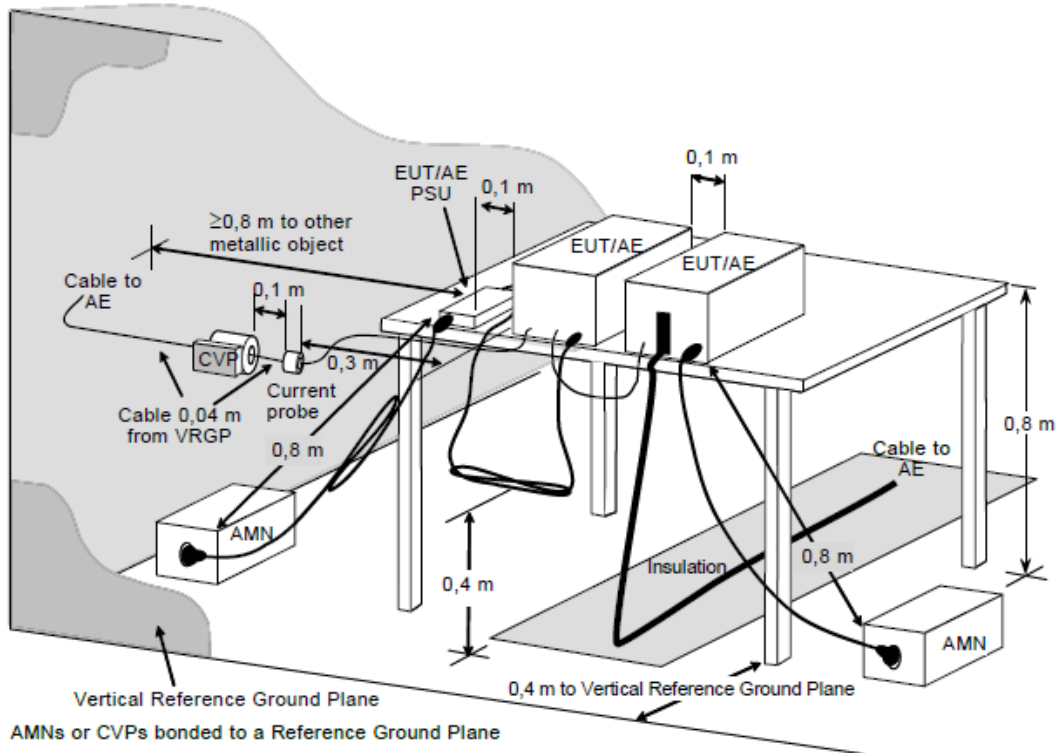
4.1.2 Limits for class B equipment

Frequency range (MHz)	Voltage Limits dB(μ V)		Current limits dB(μ A)	
	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

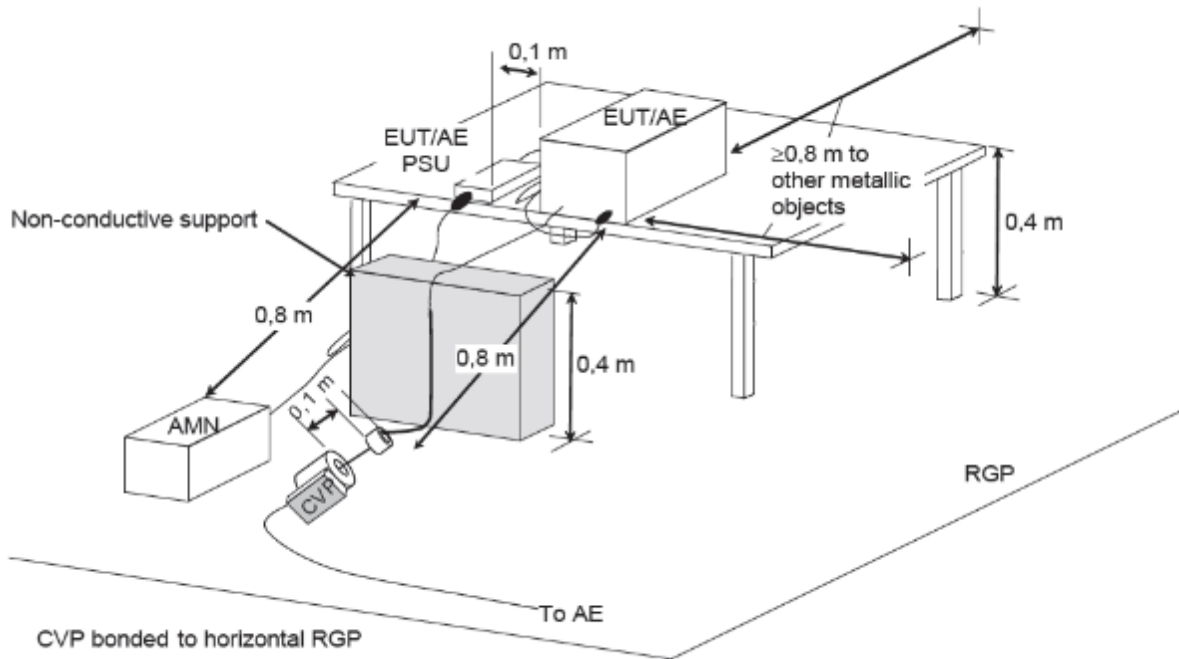
Note: if "150 Ω to 50 Ω adaptor" applied, correction factor of 9.5dB should be added to the test data.

4.2 Test setup

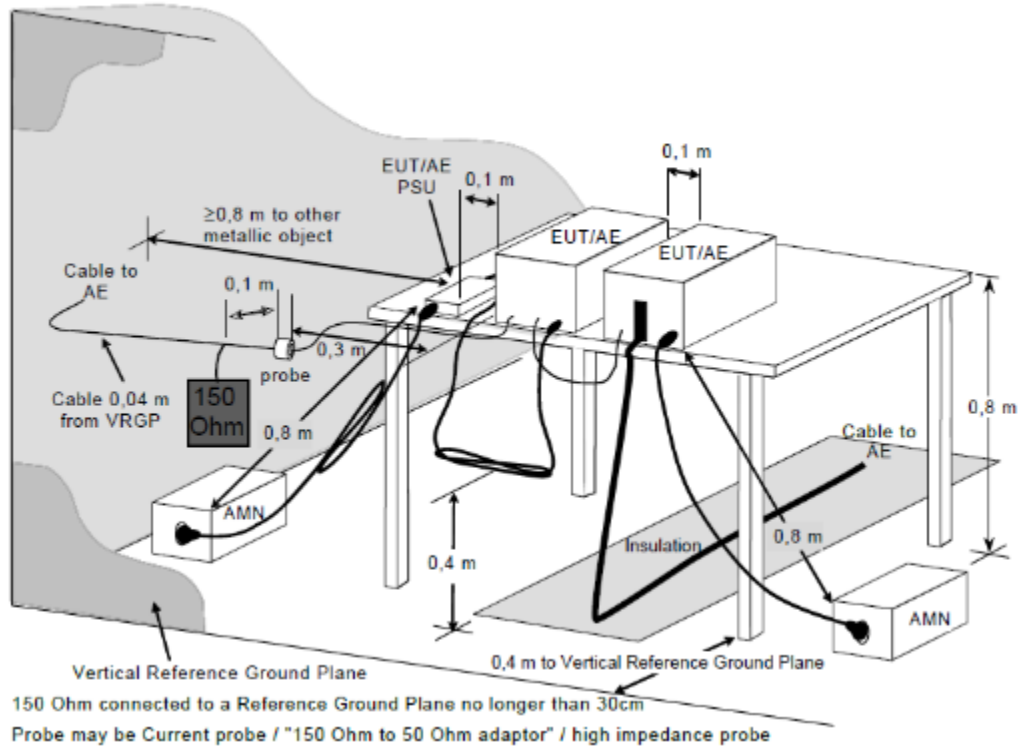
Coupling device: CVP and Current probe (alternative method 1)



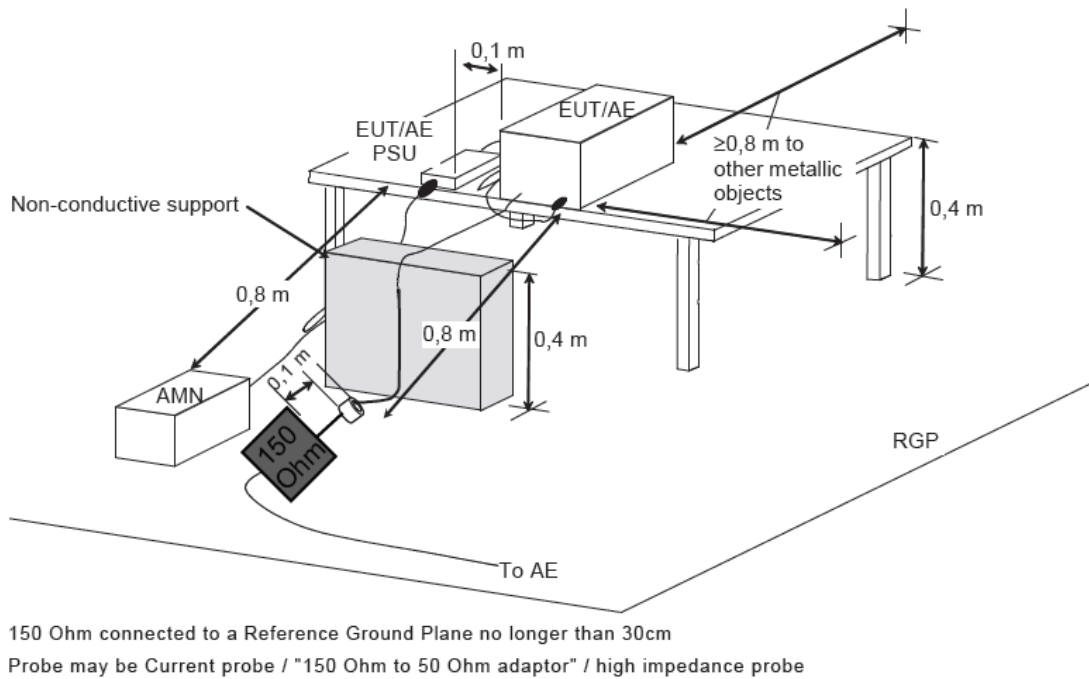
Coupling device: CVP and Current probe (alternative method 2)



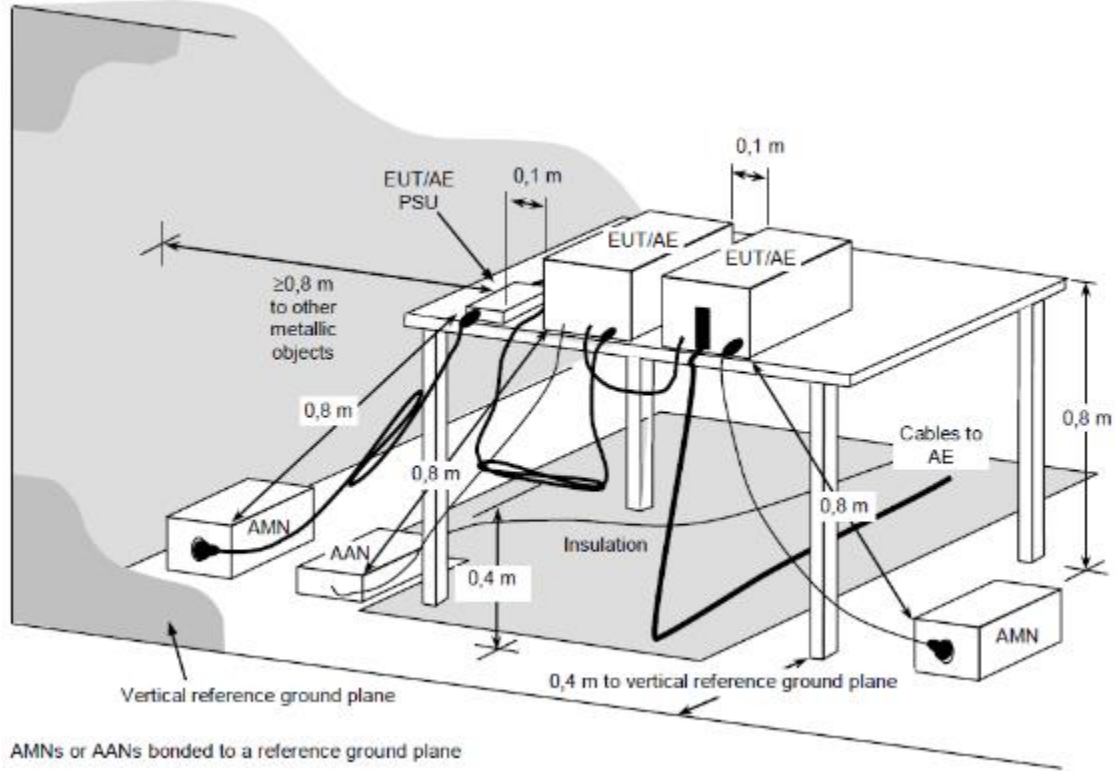
Coupling device: Current probe / "150Ω to 50Ω adaptor" / high impedance probe (alternative method 1)



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
<input type="checkbox"/>	Balanced Unscreened	Voltage	AAN	≤ 4
<input type="checkbox"/>	Balanced Unscreened	Voltage and Current	CVP & Current probe	>4 or unable to AAN
<input type="checkbox"/>	Screened or Coaxial	Voltage	AAN	N/A
<input type="checkbox"/>	Screened or Coaxial	Voltage or Current	Current probe / "150Ω to 50Ω adaptor" / high impedance probe	N/A
<input type="checkbox"/>	Unbalanced cables	Voltage and Current	CVP & Current probe	N/A

5 Conducted differential voltage emission

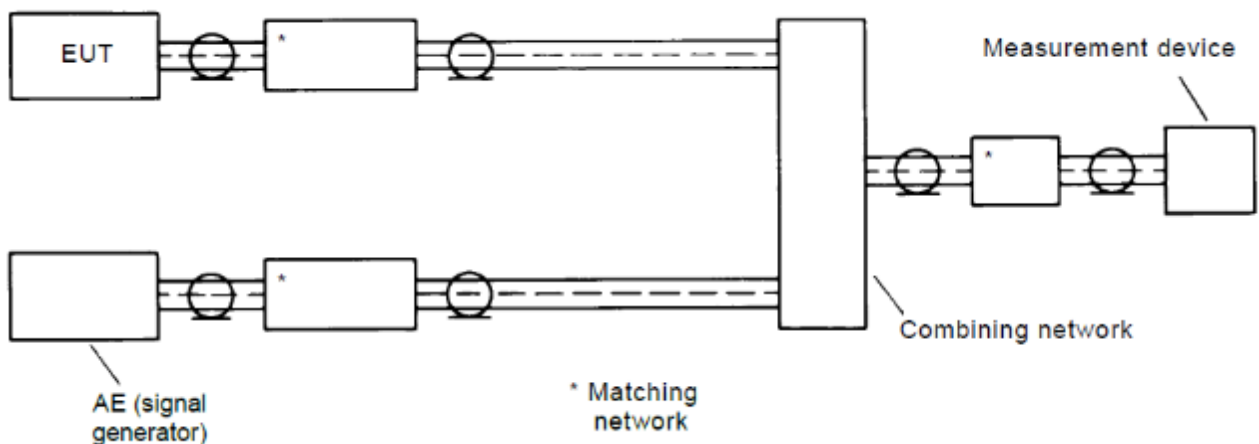
Test result: NA

5.1 Limits

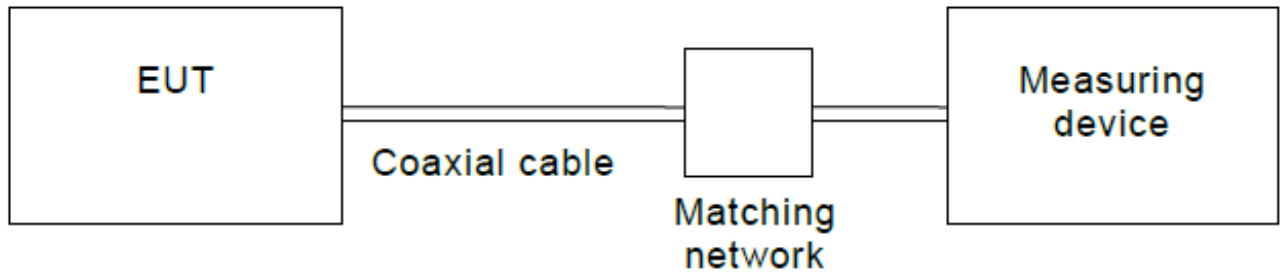
Applicability	Frequency range (MHz)	Differential voltage limit @ 75Ω (dBuV)		
		Other	Local Oscillator Fundamental	Local Oscillator Harmonics
Television receivers; video recorders; PC TV broadcast receiver tuner cards; Digital audio receivers;	30 ~ 950	46	46	46
	950 ~ 2150	46	54	54
Tuner units (not the 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 dB μ V/m (Quasi-peak) of Measurement Distance 3m	Permitted limit in dB μ V/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(μ V/m)	Peak limit of Measurement Distance 3m dB(μ V/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 dB μ V/m (Quasi-peak) of Measurement Distance 3m	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 10M
30-230	40	30
230-1000	47	37

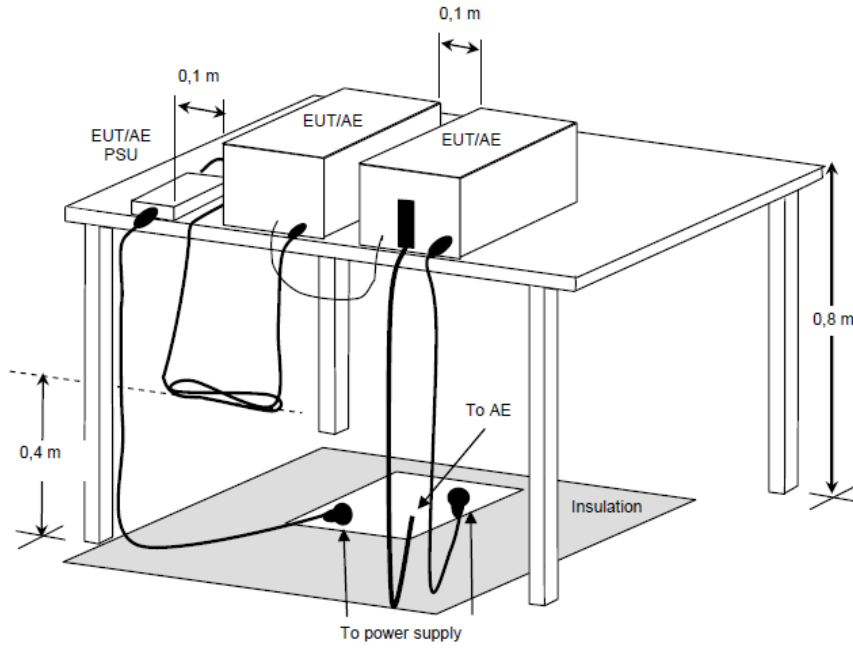
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.

Frequency range GHz	Average limit of Measurement Distance 3m dB(μ V/m)	Peak limit of Measurement Distance 3m dB(μ V/m)
1 to 3	50	70
3 to 6	54	74

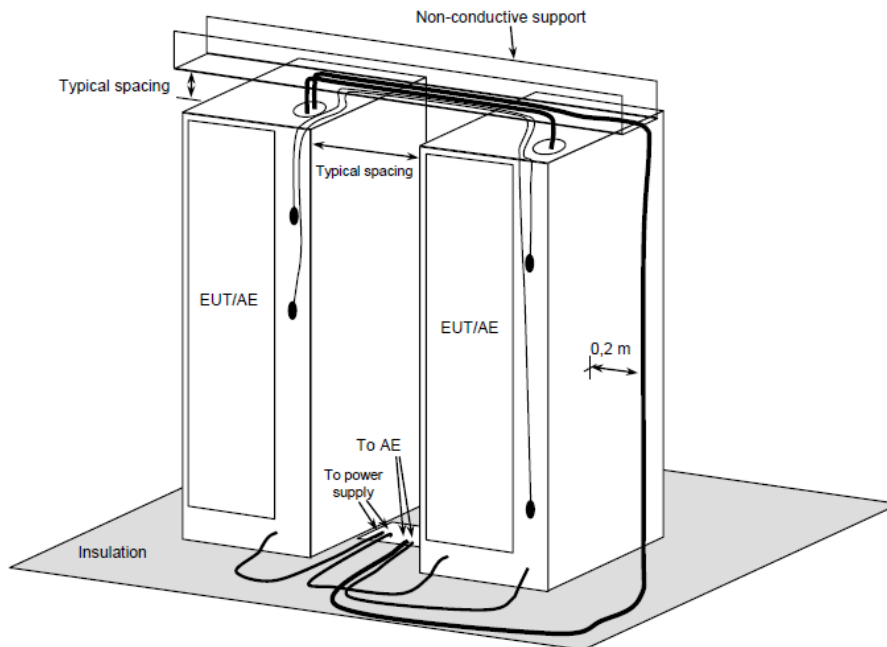
Note: The lower limit applies at the transition frequency.

6.2 Block diagram of test set up

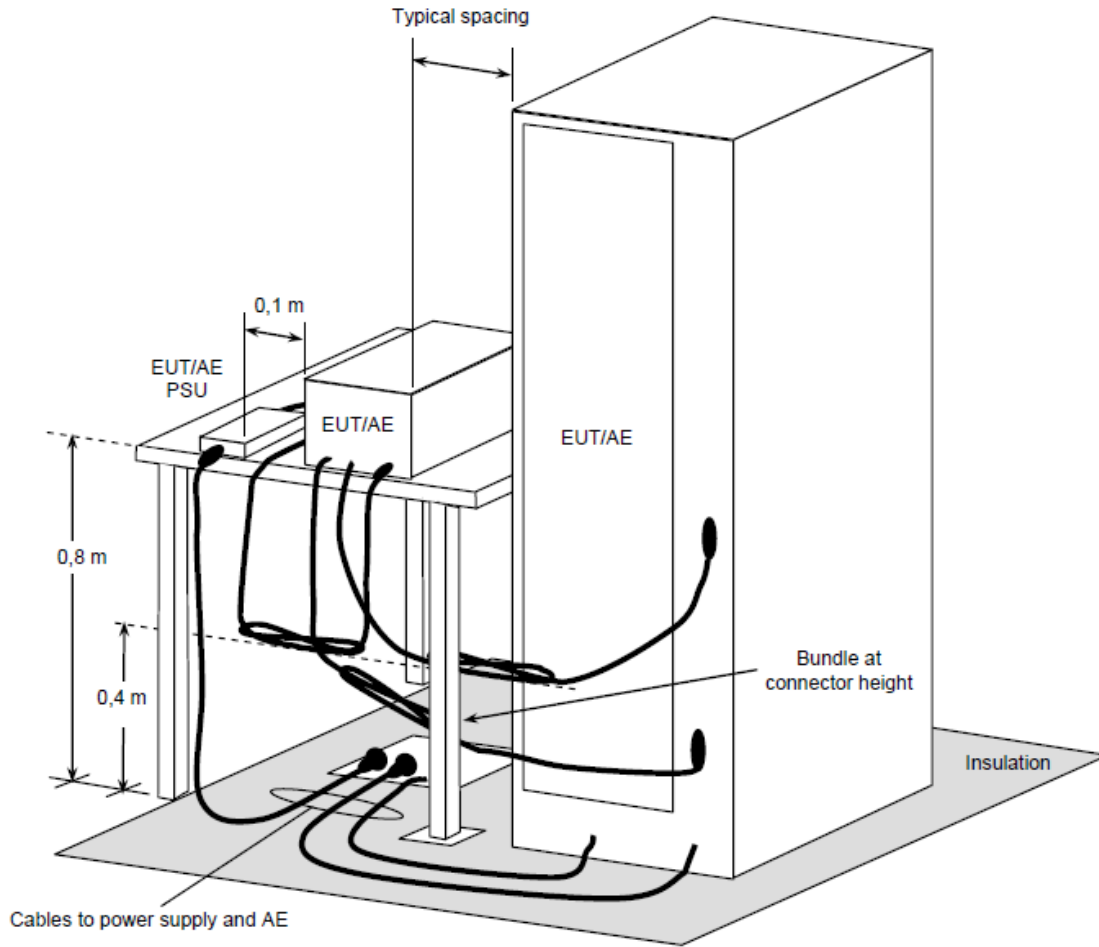
For table-top equipment



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.

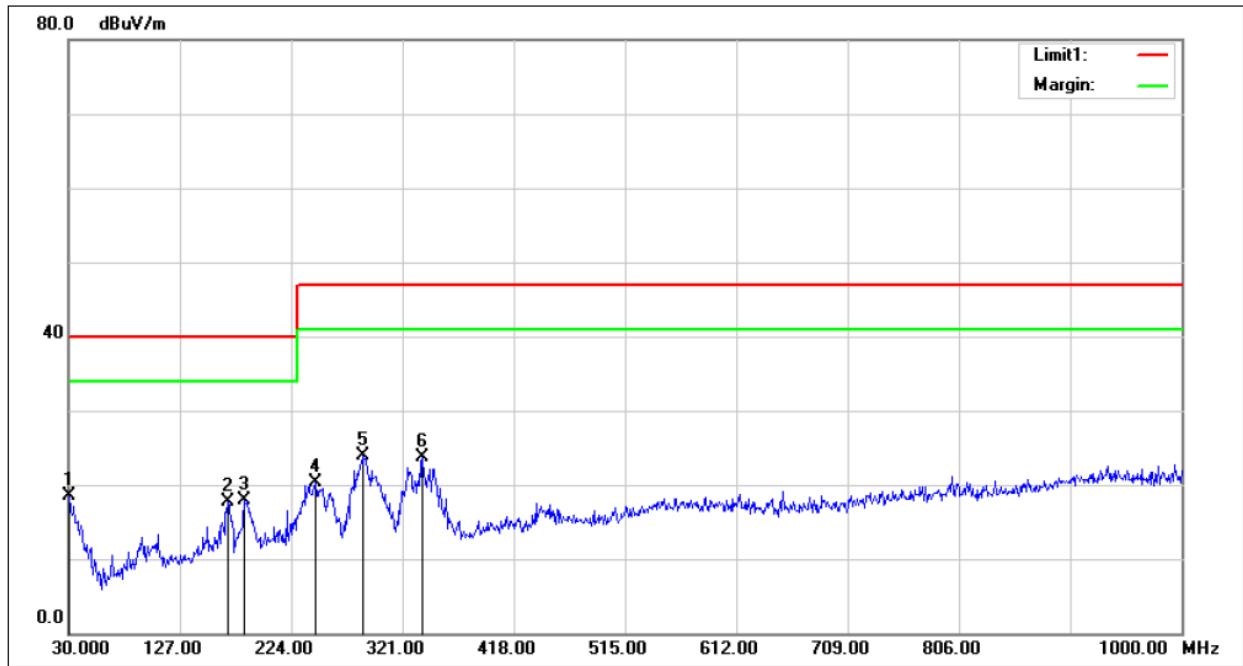
Measurement was performed according to clause 7.3 of CISPR 16-2-3.

Highest internal frequency (Fx)	Highest measured frequency for radiated measurement	Measured Bandwidth
$F_x \leq 108 \text{ MHz}$	1 GHz	120kHz
$108 \text{ MHz} < F_x \leq 500 \text{ MHz}$	2 GHz	1MHz
$500 \text{ MHz} < F_x \leq 1 \text{ GHz}$	5 GHz	1MHz
$F_x > 1 \text{ GHz}$	$5 \times F_x$ 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.

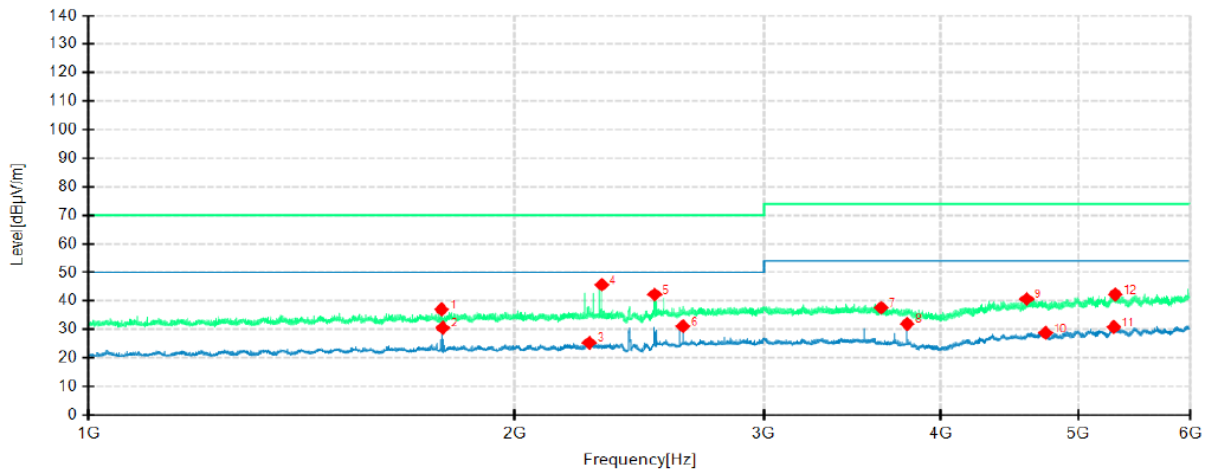
6.4 Test Result of 120VAC

Horizontal



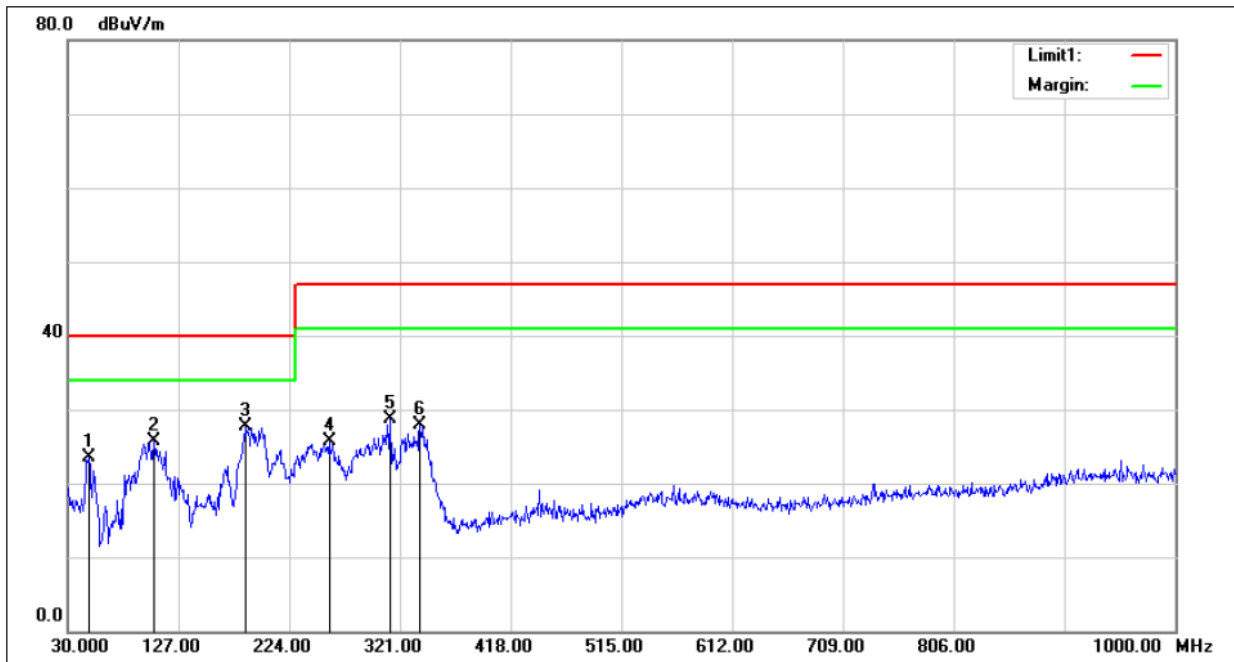
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg)	Remark
1*	30.9700	36.08	-17.52	18.56	40.00	-21.44	200	20	QP
2	168.7100	45.99	-28.34	17.65	40.00	-22.35	100	105	QP
3	183.2600	46.40	-28.44	17.96	40.00	-22.04	100	299	QP
4	245.3400	46.33	-26.08	20.25	47.00	-26.75	100	99	QP
5	287.0500	48.96	-25.12	23.84	47.00	-23.16	100	91	QP
6	338.4600	47.72	-23.93	23.79	47.00	-23.21	100	251	QP

Test Graph



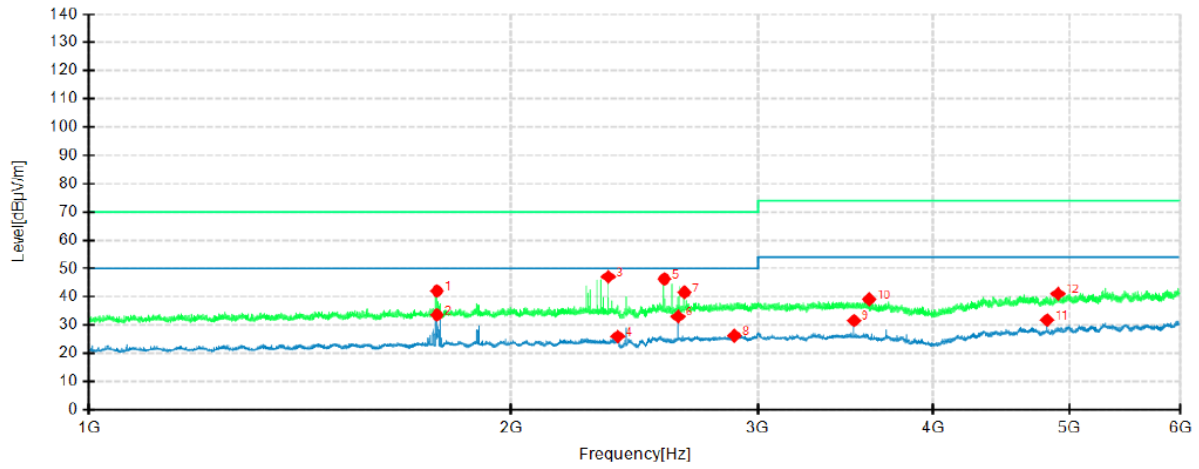
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1776.2000	59.32	36.99	-22.33	70.00	33.01	100	194	Horizontal
2	1779.6000	52.84	30.54	-22.30	50.00	19.46	100	261	Horizontal
3	2258.8000	46.21	25.37	-20.84	50.00	24.63	100	85	Horizontal
4	2305.0000	66.26	45.65	-20.61	70.00	24.35	100	68	Horizontal
5	2511.6000	62.46	42.27	-20.19	70.00	27.73	200	195	Horizontal
6	2630.2000	50.77	31.10	-19.67	50.00	18.90	100	160	Horizontal
7	3630.9000	53.07	37.60	-15.47	74.00	36.40	100	174	Horizontal
8	3787.5000	47.23	31.93	-15.30	54.00	22.07	100	350	Horizontal
9	4600.2000	52.63	40.66	-11.97	74.00	33.34	200	48	Horizontal
10	4744.5000	39.21	28.79	-10.42	54.00	25.21	100	15	Horizontal
11	5299.8000	41.23	30.79	-10.44	54.00	23.21	200	232	Horizontal
12	5312.7000	52.75	42.29	-10.46	74.00	31.71	100	23	Horizontal

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg)	Remark
1	48.4300	49.47	-25.94	23.53	40.00	-16.47	100	259	QP
2	105.6600	53.78	-28.03	25.75	40.00	-14.25	100	211	QP
3*	186.1700	56.04	-28.36	27.68	40.00	-12.32	100	125	QP
4	258.9200	51.19	-25.52	25.67	47.00	-21.33	100	131	QP
5	312.2700	52.93	-24.27	28.66	47.00	-18.34	100	299	QP
6	338.4600	51.93	-23.93	28.00	47.00	-19.00	100	302	QP

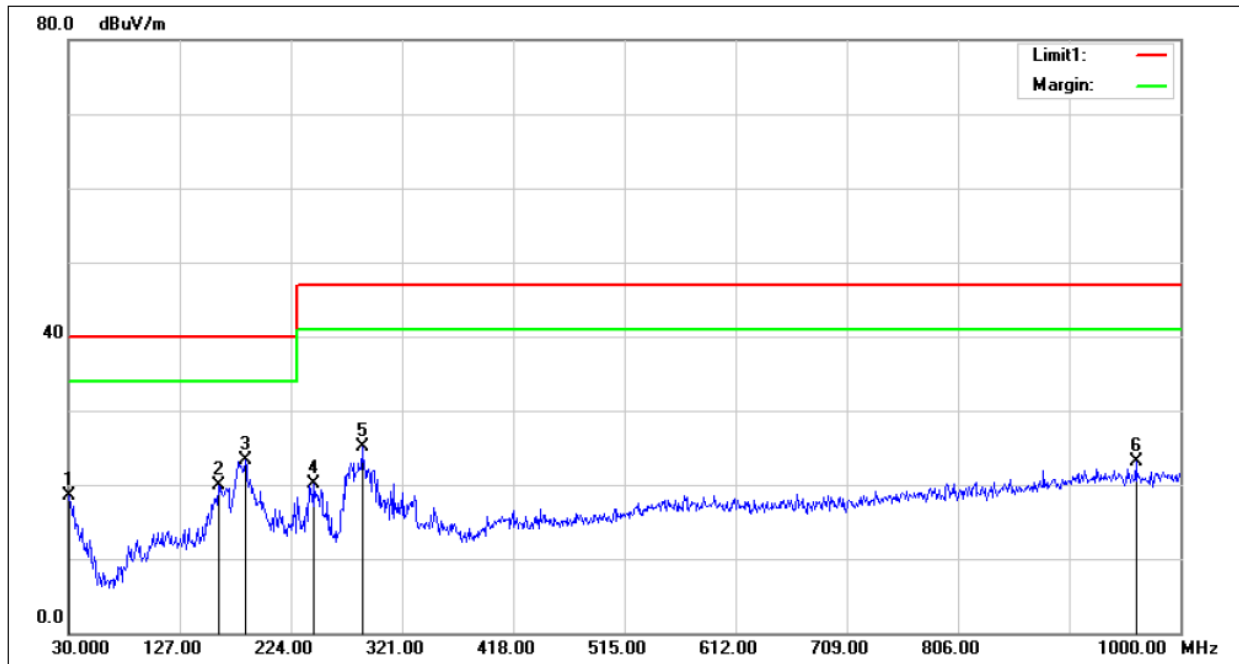
Test Graph



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1771.0000	64.45	42.08	-22.37	70.00	27.92	200	322	Vertical
2	1771.2000	55.96	33.59	-22.37	50.00	16.41	200	322	Vertical
3	2346.2000	68.12	47.11	-21.01	70.00	22.89	100	353	Vertical
4	2383.6000	46.71	26.00	-20.71	50.00	24.00	200	353	Vertical
5	2573.4000	66.16	46.33	-19.83	70.00	23.67	100	329	Vertical
6	2632.2000	52.65	33.01	-19.64	50.00	16.99	200	128	Vertical
7	2659.2000	60.91	41.57	-19.34	70.00	28.43	100	94	Vertical
8	2886.8000	44.95	26.28	-18.67	50.00	23.72	200	52	Vertical
9	3513.3000	48.04	31.59	-16.45	54.00	22.41	100	64	Vertical
10	3601.5000	54.32	39.12	-15.20	74.00	34.88	100	198	Vertical
11	4824.3000	42.44	31.80	-10.64	54.00	22.20	100	2	Vertical
12	4911.0000	52.08	41.09	-10.99	74.00	32.91	100	257	Vertical

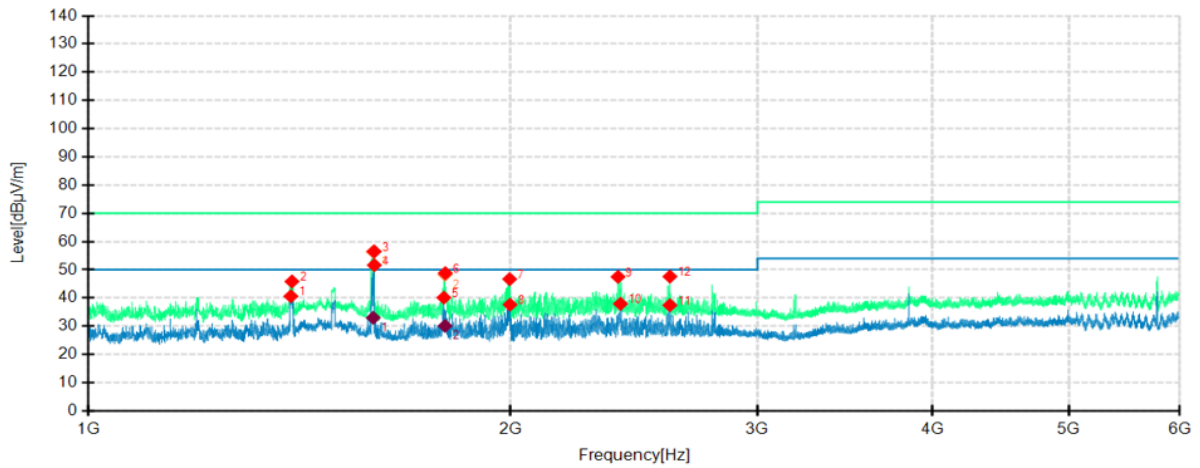
Test Result of 230VAC

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg)	Remark
1	30.0000	35.53	-17.05	18.48	40.00	-21.52	400	150	QP
2	160.9500	47.97	-28.04	19.93	40.00	-20.07	300	328	QP
3*	184.2300	51.66	-28.42	23.24	40.00	-16.76	200	126	QP
4	244.3700	46.31	-26.12	20.19	47.00	-26.81	197	0	QP
5	286.0800	50.21	-25.14	25.07	47.00	-21.93	100	134	QP
6	961.2000	37.73	-14.58	23.15	47.00	-23.85	400	78	QP

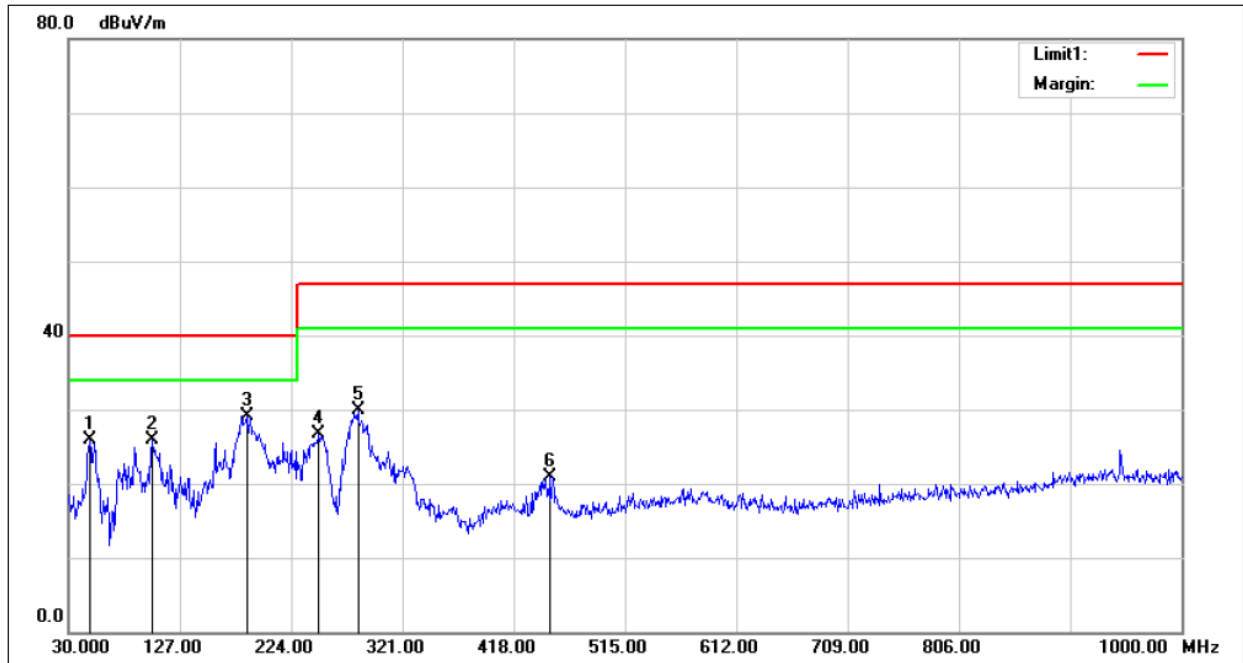
Test Graph



Test data:

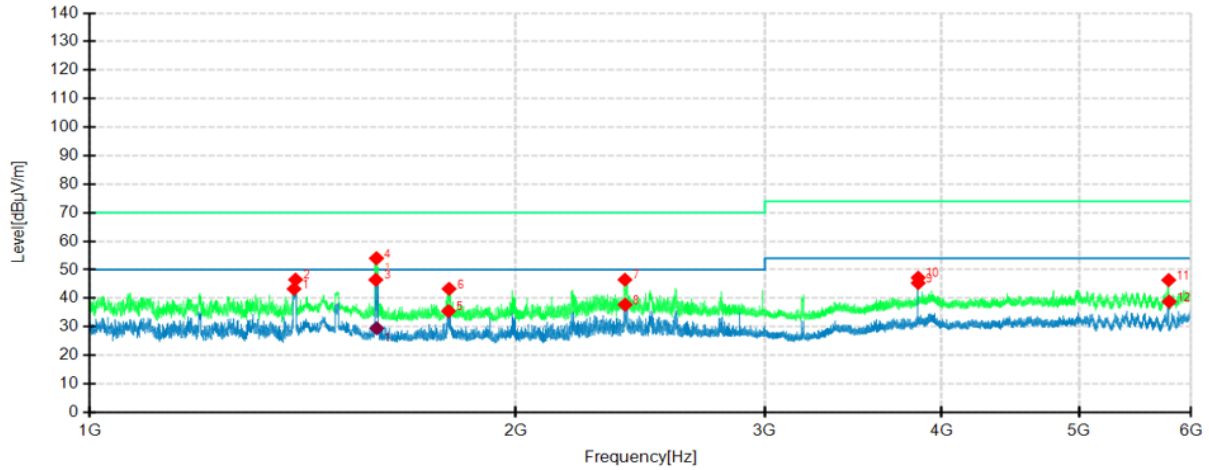
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1394.5000	64.30	40.62	-23.68	50.00	9.38	100	358	Horizontal
2	1397.0000	69.51	45.85	-23.66	70.00	24.15	100	184	Horizontal
3	1596.4896	79.47	56.39	-23.08	70.00	13.61	116	119	Horizontal
4	1596.4896	56.07	32.99	-23.08	50.00	17.01	116	119	Horizontal
5	1792.7500	62.32	40.12	-22.20	50.00	9.88	100	110	Horizontal
6	1797.0000	70.99	48.83	-22.16	70.00	21.17	100	289	Horizontal
7	1997.2500	68.26	46.69	-21.57	70.00	23.31	100	205	Horizontal
8	1998.5000	59.21	37.65	-21.56	50.00	12.35	100	89	Horizontal
9	2386.2500	68.18	47.49	-20.69	70.00	22.51	100	299	Horizontal
10	2396.0000	58.54	37.95	-20.59	50.00	12.05	100	299	Horizontal
11	2598.2500	57.56	37.45	-20.11	50.00	12.55	100	205	Horizontal
12	2598.5000	67.71	47.60	-20.11	70.00	22.40	100	205	Horizontal

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg)	Remark
1	48.4300	51.93	-25.94	25.99	40.00	-14.01	100	8	QP
2	102.7500	54.47	-28.50	25.97	40.00	-14.03	100	321	QP
3*	185.2000	57.55	-28.39	29.16	40.00	-10.84	100	90	QP
4	248.2500	52.66	-25.96	26.70	47.00	-20.30	100	106	QP
5	282.2000	55.22	-25.26	29.96	47.00	-17.04	100	223	QP
6	450.0100	41.69	-20.71	20.98	47.00	-26.02	100	342	QP

Test Graph



Test data:

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1394.5000	66.97	43.29	-23.68	50.00	6.71	100	360	Vertical
2	1398.0000	70.19	46.53	-23.66	70.00	23.47	100	353	Vertical
3	1595.4248	77.12	54.04	-23.07	70.00	15.96	190	210	Vertical
4	1595.4248	52.55	29.47	-23.07	50.00	20.53	190	210	Vertical
5	1793.2500	57.71	35.52	-22.19	50.00	14.48	200	354	Vertical
6	1794.5000	65.49	43.31	-22.18	70.00	26.69	100	332	Vertical
7	2389.0000	67.16	46.50	-20.66	70.00	23.50	200	196	Vertical
8	2390.0000	58.39	37.74	-20.65	50.00	12.26	100	195	Vertical
9	3850.0000	59.45	45.35	-14.10	54.00	8.65	100	343	Vertical
10	3850.0000	61.31	47.21	-14.10	74.00	26.79	100	332	Vertical
11	5787.2500	56.30	46.38	-9.92	74.00	27.62	100	131	Vertical
12	5791.5000	48.78	38.83	-9.95	54.00	15.17	200	61	Vertical

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), 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 Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB, Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV, Limit = 40.00dBuV/m.

Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;

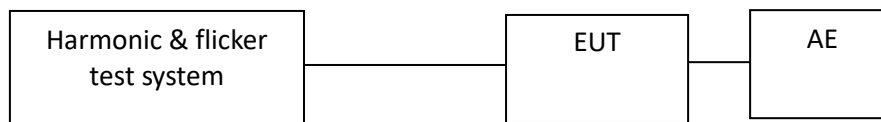
Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;

Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

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.

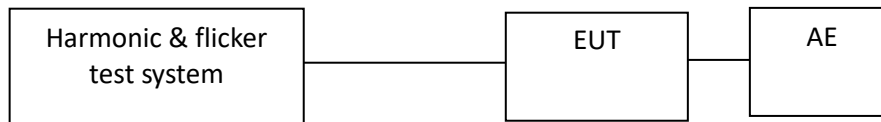
7.3 Test Result

Pass

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 Procedure

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

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

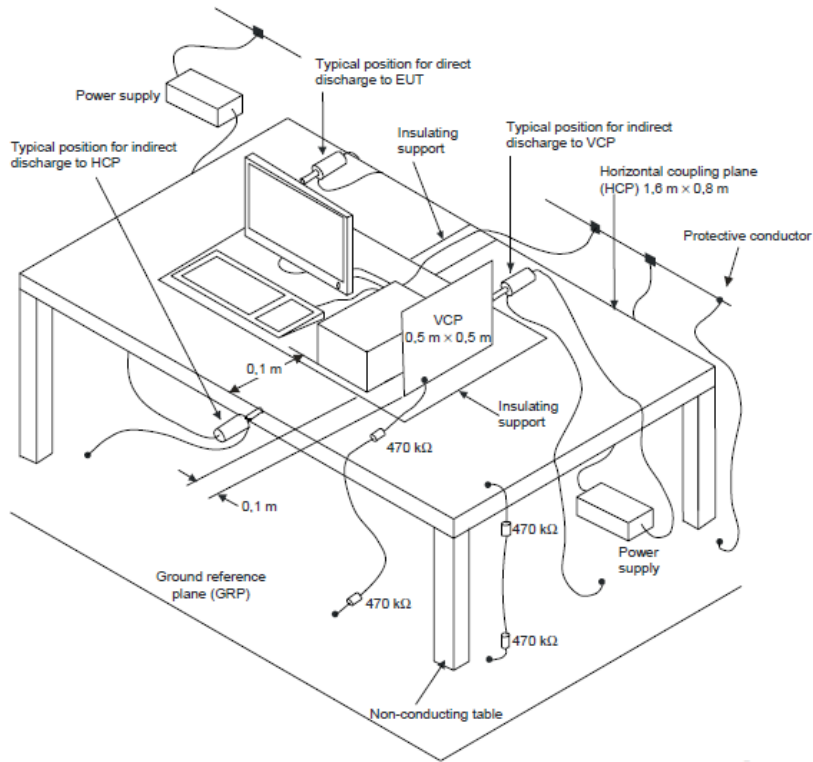
Notes: 1. "X" is an open level. The level has to be specified in the dedicated equipment specification.
 If higher voltages than those shown are specified, special test equipment may be needed.
 2. The gray rows were the selected test level.

9.1.2 Performance Criterion

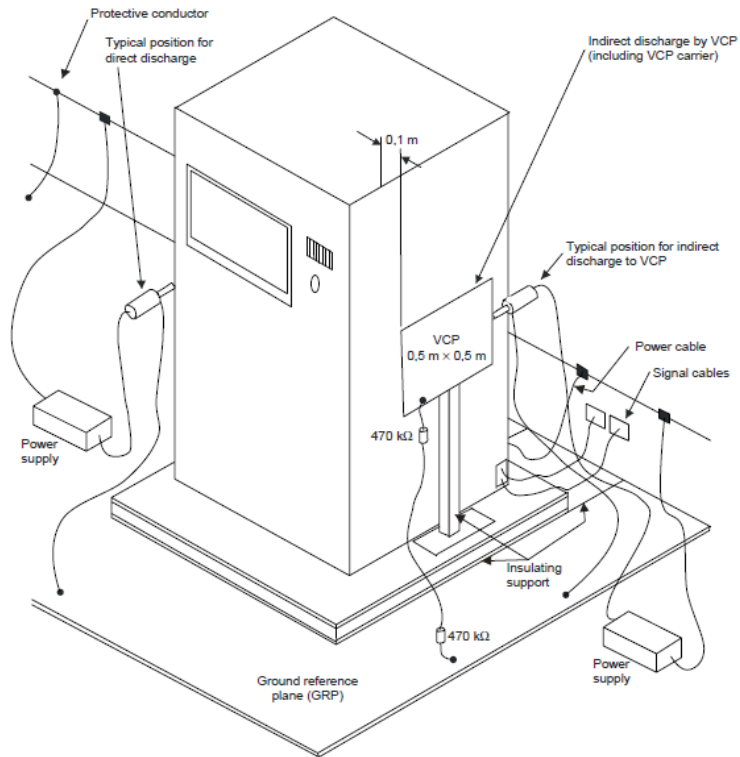
Criterion B

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
4	Contact	+/-	Pass	Accessible metal parts of the EUT
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 during and after 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

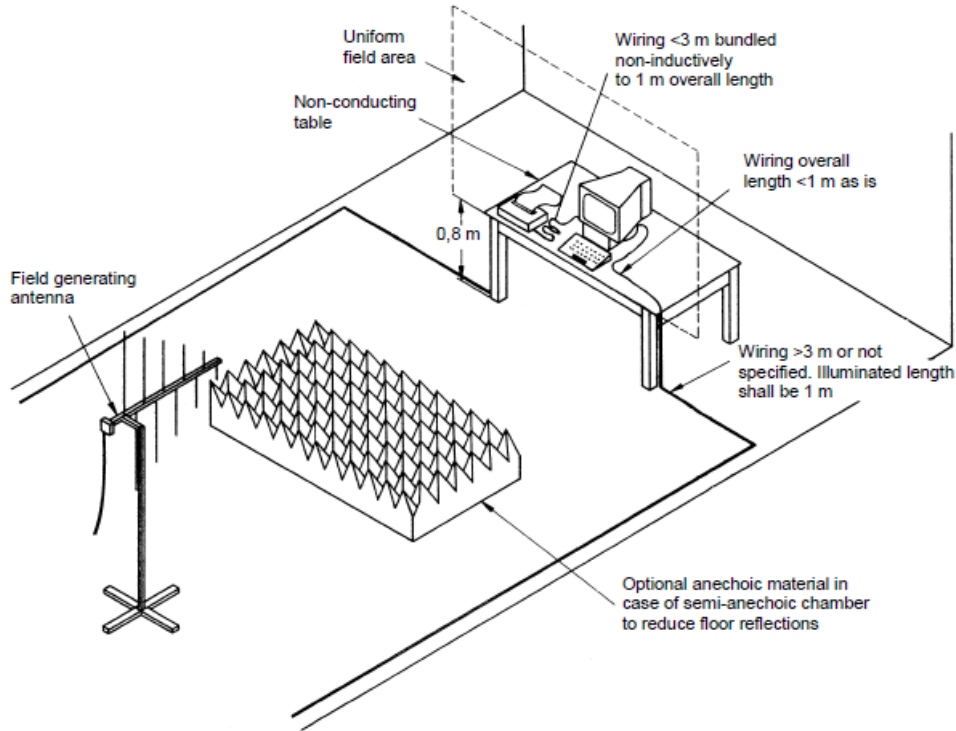
Note: 1. X is an open test level. This level may be given in the product specification.
 2. The gray row is the selected test level.

10.1.2 Performance Criterion

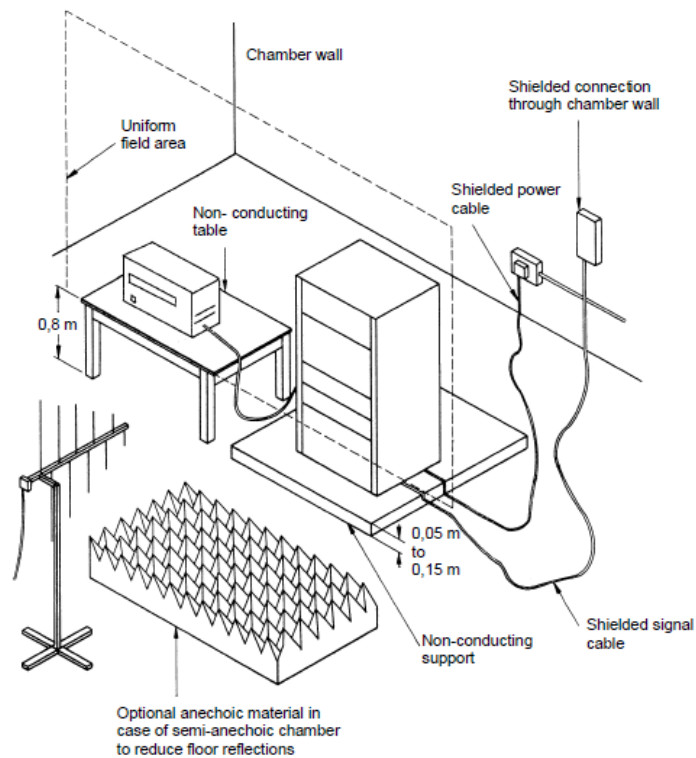
Criterion A

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

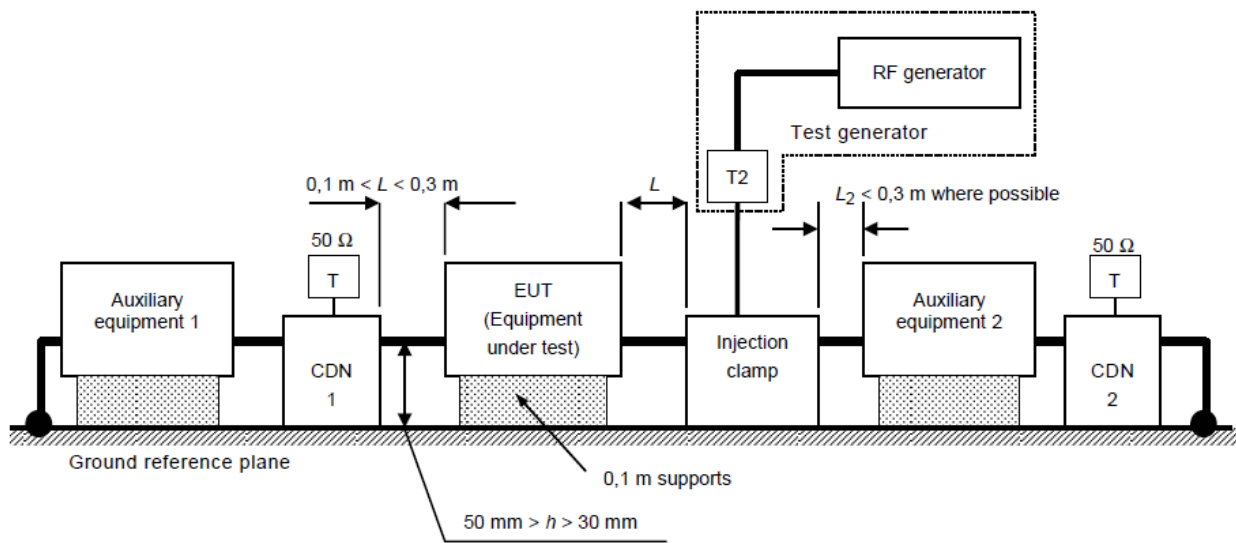
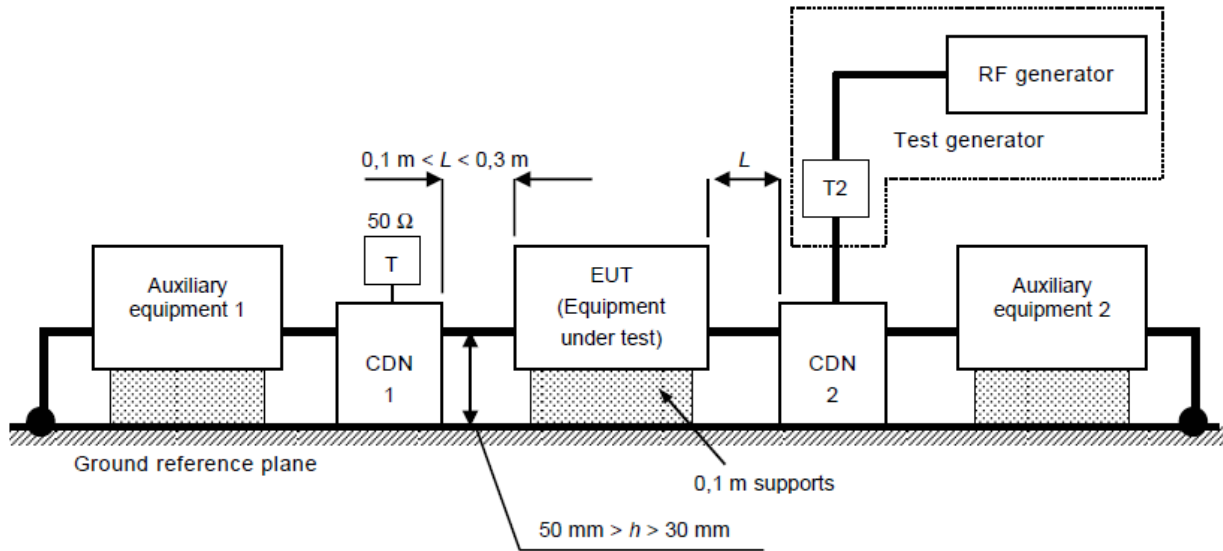
11.1.1 Test level

Test specification	
Frequency range (MHz)	Test level (V)
0.15~10	3
10~30	3 to 1
30~80	1

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 requirement of Performance Criterion A

12 Power Frequency Magnetic field

Test result NA

12.1 Severity Level and Performance Criterion

12.1.1 Test level

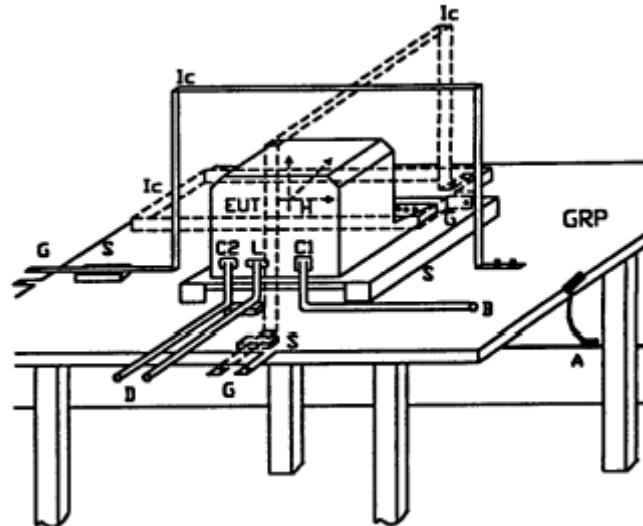
Level	Magnetic field strength A/m
1	1
2	3
3	10
4	30
5	100
X	Special

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

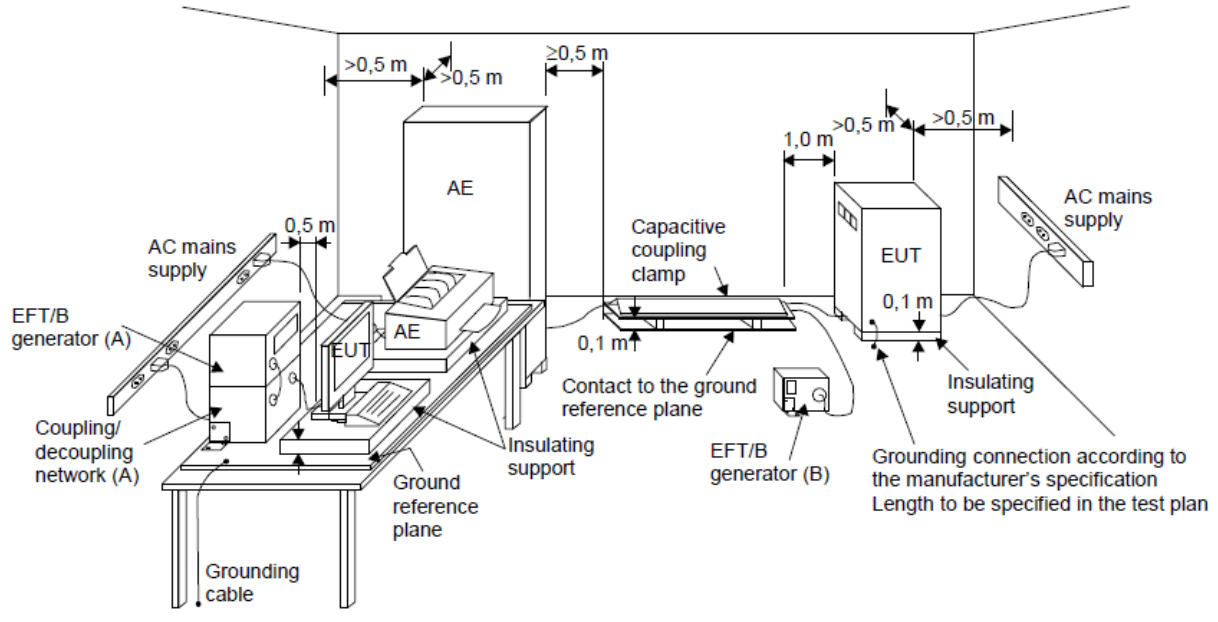
Open circuit output test voltage and repetition rate of the impulses				
Level	AC mains power input ports		Signal ports, wired network ports, control ports, DC power input ports	
	Voltage peak (kV)	Repetition rate (kHz)	Voltage peak (kV)	Repetition rate (kHz)
1	0.5	5	0.25	5/100
2	1	5	0.5	5/100
3	2	5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

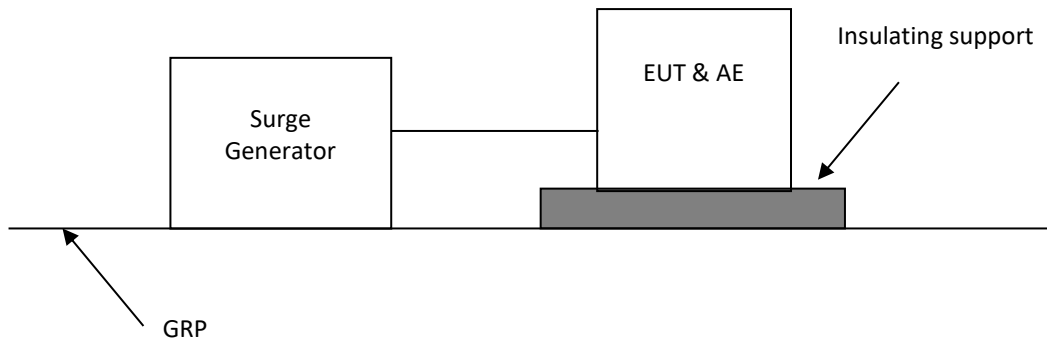
Level	Open-circuit test voltage (kV)
1	0.5
2	1.0
3	2.0
4	4.0
X*	Special

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**

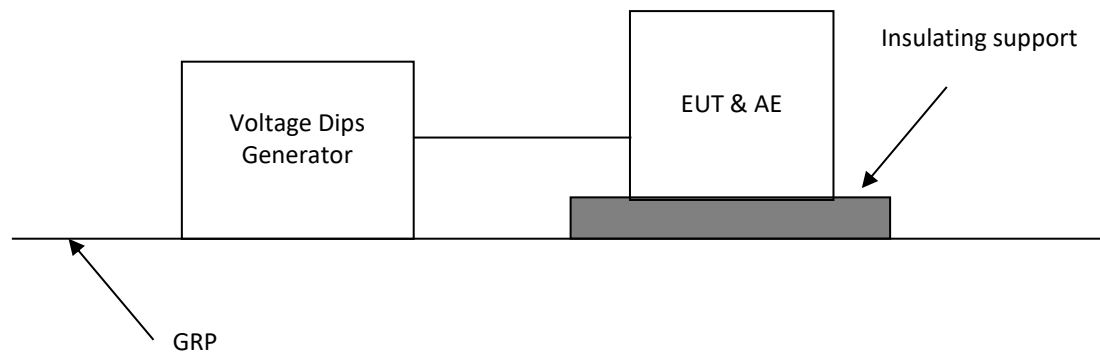
15.1 Severity Level and Performance Criterion

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: During 0% 250 periods test, the EUT lights flash. After testing, it can recover normal state.
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

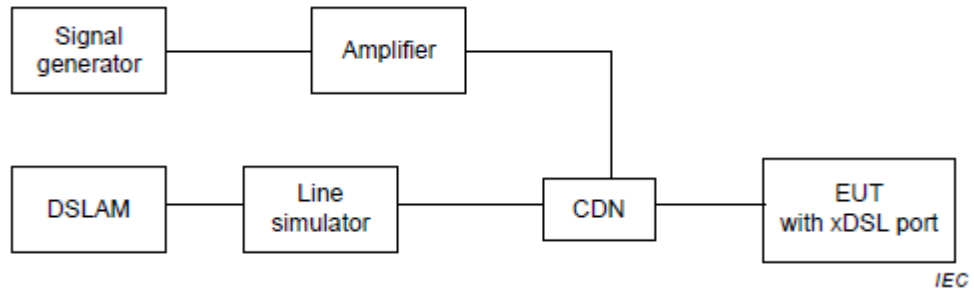
Broadband impulse noise disturbances, isolated	
Frequency range(MHz)	Level(V)
0.15~30	110

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	NA
2	0.5~10	107~36	10(for 50Hz) 8.3(for 60Hz)	repetitive	NA
3	10~30	36~30	10(for 50Hz) 8.3(for 60Hz)	repetitive	NA

Observation:

Conclusion:

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

Observation:

Conclusion:

Appendix I: Photograph of equipment under test

Refer to Report No. 200702409SHA-001+A1 for EUT external and internal photos.

***** END *****