

EMC TEST REPORT

No. 170600310SHA-001

Applicant : ZHEJIANG DAHUA VISION TECHNOLOGY
CO.,LTD.
No.1199, Bin'an Road, Binjiang District, Hangzhou,
P.R. China

Manufacturer : ZHEJIANG DAHUA VISION TECHNOLOGY
CO.,LTD.
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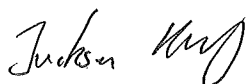
Product Name : IP CAMERA

Type/Model : DH-IPC-HDW5231RN-Z, DH-IPC-HDW5231RP-Z,
IPC-HDW5231RN-Z, IPC-HDW5231RP-Z,
DH-IPC-HDW5231RP-Z-S2, DH-IPC-
HDW5431RN-Z, DH-IPC-HDW5431RP-Z, IPC-
HDW5431RN-Z, IPC-HDW5431RP-Z, DH-IPC-
HDW5431RP-Z-S2, DH-IPC-HDW5830RN-Z,
DH-IPC-HDW5830RP-Z, IPC-HDW5830RN-Z,
DH-IPC-HDW5830RP-Z-S2, DH-IPC-
HDW5830RP, N58BH4Z, N58BH4ZI,
IPC-HDW2231RP-ZS, IPC-HDW2231RN-ZS,
DH-IPC-HDW2231RP-ZS, DH-IPC-
HDW2231RN-ZS, IPC-HDW2231RP-ZS-S2, IPC-
HDW2230RP-ZS, DH-IPC-HDW2230RP-ZS, DH-
IPC-HDW2230RN-ZS, IPC-HDW2230RN-ZS,
IPC-HDW2431RN-ZS, IPC-HDW2431RP-ZS, DH-
IPC-HDW2431RP-ZS, DH-IPC-HDW2431RN-ZS,
IPC-HDW2431RP-ZS-S2, DH-IPC-HDW2531RP-
ZS-27135, DH-IPC-HDW2531RN-ZS-27135,
IPC-HDW2531RP-ZS-27135, IPC-HDW2531RN-
ZS-27135, DH-IPC-HDW2531RP-ZS, DH-IPC-
HDW2531RN-ZS, IPC-HDW2531RP-ZS, IPC-
HDW2531RN-ZS

TEST RESULT : PASS

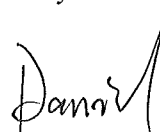
Date of issue: June 9, 2017

Prepared by:



Jackson Huang (*Project Engineer*)

Reviewed by:



Daniel Zhao (*Reviewer*)

SUMMARY

The equipment complies with the requirements according to the following standard(s):

EN 55032:2012/AC:2013 (Class B): Electromagnetic compatibility of multimedia equipment - Emission requirements

EN 50130-4:2011: Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

EN 55024:2010: Information Technology Equipment – Immunity Characteristics – Limits and methods of measurement.

EN 61000-3-2:2014: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

EN 61000-3-3:2013: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A

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1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product Name	: IP CAMERA
Type/Model	: DH-IPC-HDW5231RN-Z, DH-IPC-HDW5231RP-Z, IPC-HDW5231RN-Z, IPC-HDW5231RP-Z, DH-IPC-HDW5231RP-Z-S2, DH-IPC-HDW5431RN-Z, DH-IPC-HDW5431RP-Z, IPC-HDW5431RN-Z, IPC-HDW5431RP-Z, DH-IPC-HDW5431RP-Z-S2, DH-IPC-HDW5830RN-Z, DH-IPC-HDW5830RP-Z, IPC-HDW5830RN-Z, DH-IPC-HDW5830RP-Z-S2, DH-IPC-HDW5830RP, N58BH4Z, N58BH4ZI, IPC-HDW2231RP-ZS, IPC-HDW2231RN-ZS, DH-IPC-HDW2231RP-ZS, DH-IPC-HDW2231RN-ZS, IPC-HDW2231RP-ZS-S2, IPC-HDW2230RP-ZS, DH-IPC-HDW2230RP-ZS, DH-IPC-HDW2230RN-ZS, IPC-HDW2230RN-ZS, IPC-HDW2431RN-ZS, IPC-HDW2431RP-ZS, DH-IPC-HDW2431RP-ZS, DH-IPC-HDW2431RN-ZS, IPC-HDW2431RP-ZS-S2, DH-IPC-HDW2531RP-ZS-27135, DH-IPC-HDW2531RN-ZS-27135, IPC-HDW2531RP-ZS-27135, IPC-HDW2531RN-ZS-27135, DH-IPC-HDW2531RP-ZS, DH-IPC-HDW2531RN-ZS, IPC-HDW2531RP-ZS, IPC-HDW2531RN-ZS
Description of EUT	: EUT has serial models. They have the same main PCB board. All the models were pre-checked and the worst model of DH-IPC-HDW5830RP-Z and DH-IPC-HDW2231RP-ZS were chosen to perform all the tests and the worst result was listed in the report as representative.
Rating	: DC12V, 1A /POE: 48V, 200mA /with adaptor input: 100-240V~ 50/60Hz Output: 12V DC, 1.0A
Category of EUT	: Class B
EUT type	: <input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Sample received date	: January 11, 2017
Date of test	: January 11, 2017 ~ January 25, 2017

1.2 Description of Client

Applicant : ZHEJIANG DAHUA VISION TECHNOLOGY
CO.,LTD.
No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R.
China

Manufacturing site : ZHEJIANG DAHUA VISION TECHNOLOGY
CO.,LTD.
No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R.
China

1.3 Description of Test Facility

Name : Intertek Testing Service Shanghai
Address : Building 86, No. 1198 Qinzhou Road(North), Shanghai
200233, P.R. China
Telephone : 86 21 61278200
Telefax : 86 21 54262353

Subcontractor:

☐ Name : Shanghai Institute of Measurement Technology
Address : 716 Yishan Road, Shanghai 200233, P.R. China
Telephone : 86 21 64700066
Telefax : 86 21 64514252

☐ Name : Jiangsu Electronic Information Product Quality
Supervision & Inspection Institute
Address : No.100, Jinshui Road, Wuxi, Jiangsu, China
Telephone : 86 510 85140037
Telefax : --

2 TEST SPECIFICATIONS

2.1 Standards or specification

EN 55032:2012/AC:2013: Electromagnetic compatibility of multimedia equipment - Emission requirements

EN 50130-4:2011: Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

EN 55024:2010: Information Technology Equipment – Immunity Characteristics – Limits and methods of measurement.

EN 61000-3-2:2014: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

EN 61000-3-3:2013: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A

2.2 Mode of operation during the test / Test peripherals used

2.2.1 Description of operation:

Within this test report, EUT was tested with all available operation modes and tested under its rating voltage and frequency.

2.2.2 Test peripherals used:

Item No	Description	Band and Model	S/N
1	Laptop computer	HP, EliteBook 2530P	-
2	POE adaptor	PowerDsine 9001G	-

2.3 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESCS 30	R&S	EC 2107	2016-11-20	2017-11-19
Test Receiver	ESIB 26	R&S	EC 3045	2016-11-20	2017-11-19
Test Receiver	ESCI 7	R&S	EC 4501	2016-02-24	2017-02-23
Voltage Probe	ESH2-Z3	R&S	EC 3405	2016-03-10	2017-03-09
Voltage Probe	TK9420	Schwarzbeck	EC 4888	2016-09-18	2017-09-17
A.M.N.	ESH2-Z5	R&S	EC 3119	2016-12-16	2017-12-15
A.M.N.	ENV 216	R&S	EC 3393	2016-07-30	2017-07-29
A.M.N.	ENV 216	R&S	EC 3394	2016-07-30	2017-07-29
A.M.N.	ENV4200	R&S	EC 3558	2016-07-30	2017-07-29
Click meter	DDA55	AFJ	EC 5320	2016-12-15	2017-12-14
I.S.N.	FCC-TLISN -T2-02	FCC	EC 3754	2016-02-16	2017-02-15
I.S.N.	FCC-TLISN -T4-02	FCC	EC 3755	2016-02-16	2017-02-15
I.S.N.	FCC-TLISN -T8-02	FCC	EC 3756	2016-02-16	2017-02-15
Current probe	EZ-17	R&S	EC 3221	2016-03-10	2017-03-09
Absorbing clamp	MDS 21	R&S	EC 2108	2016-04-13	2017-04-12
Tri-loop	HXYZ 9170	Schwarzbeck	EC 3384	2016-06-03	2017-06-02
Harmnic-fliker	5001ix-PACS-1	CI	EC 2110	2016-08-24	2017-08-23
Conduct immunity system	UCS 500M6B	EM TEST	EC 2958	2016-04-08	2017-04-07
Automatic transformer	MV2616	EM TEST	EC 2957	Not required	Not required
Capacity clamp	HFK	EM TEST	EC 2959	Not required	Not required
ESD generator	ditto	EM TEST	EC 2956	2016-05-19	2017-05-18
ESD generator	NSG 437	TESEQ	EC 4792-4	2016-03-08	2017-03-07
Surge generator	TSS 500M2F	EM TEST	EC 2960	2016-08-09	2017-08-08
Surge generator	TSS 500M4	EM TEST	EC 2961	2017-01-09	2018-01-08
Surge Coupling network	CNV 504M	EM TEST	EC 2958-2	2017-01-09	2018-01-08
Surge Coupling network	CNV 504S1	EM TEST	EC 2958-1	2017-01-09	2018-01-08
Signal generator	SML 01	R&S	EC 2338	2016-09-26	2017-09-25
Power amplifier	75A250	AR	EC 3043-1	2016-08-14	2017-08-13
CDN	CDN M216	Schaffner	EC 2113-2	2016-07-28	2017-07-27
CDN	CDN M316	Schaffner	EC 2113-1	2016-09-26	2017-09-25
CDN	CDN T2	EM TEST	EC 4970	2016-10-20	2017-10-19
CDN	CDN T4	EM TEST	EC 3043-4	2017-01-09	2018-01-08
CDN	CDN M1/16A	EM TEST	EC 4792-6	2016-02-16	2017-02-15
CDN	CDN M1/16A	EM TEST	EC 4792-7	2016-02-16	2017-02-15
CDN	CDN M1/32A	EM TEST	EC 4792-10	2017-01-09	2018-01-08
CDN	CDN M3N/16A	EM TEST	EC 4792-12	2016-02-16	2017-02-15

CDN	CDN M3N/32A	EM TEST	EC 4792-13	2016-02-16	2017-02-15
CDN	CDN T8-RJ45	EM TEST	EC 4792-15	2016-02-16	2017-02-15
EM clamp	EM 101	EM TEST	EC 3043-6	2017-01-09	2018-01-08
Power meter	PM2002	AR	EC 3043-7	2016-10-18	2017-10-17
Power sensor	PH2000	AR	EC 3043-8	2016-10-18	2017-10-17
Attenuator	ATT6/75	EM TEST	EC 3043-3	2017-01-09	2018-01-08
Attenuator	68-6-44	Weinschel	EC 3043-9	2017-01-09	2018-01-08
DDC	DC 2600	AR	EC 3043-5	2017-01-09	2018-01-08
DDC	DC 6180A	AR	EC 3044-5	2016-07-31	2017-07-30
DDC	DC 7144A	AR	EC 3044-6	2017-01-09	2018-01-08
Ultra-broadband antenna	HL 562	R&S	EC 3046-1	2016-12-18	2017-12-17
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2016-06-02	2017-06-01
Horn antenna	HF 906	R&S	EC 3049	2016-09-24	2017-09-23
Horn antenna	3117	ETS	EC 4792-1	2016-08-25	2017-08-24
Horn antenna	HAP18-26W	TOYO	EC 4792-3	2014-06-12	2017-06-11
Pre-amplifier	Pre-amp 18	R&S	EC 5262	2016-06-30	2017-06-29
Pre-amplifier	Tpa0118-40	R&S	EC 4792-2	2016-04-12	2017-04-11
Log-period antenna	AT 1080	AR	EC 3044-7	2016-08-16	2017-08-15
Horn antenna	AT 4002	AR	EC 3044-8	2016-08-25	2017-08-24
Signal generator	SMR 20	R&S	EC 3044-1	2016-07-31	2017-07-30
Power amplifier	150W1000	AR	EC 3044-2	2016-06-13	2017-06-12
Power amplifier	25S1G4	AR	EC 3044-4	2016-07-31	2017-07-30
Field meter	FM 5004	AR	EC 3044-3	2016-07-31	2017-07-30
Field sensor	FP 6001	AR	EC 3044-9	2016-07-31	2017-07-30
Semi-anechoic chamber	-	Albatross project	EC 3048	2016-09-10	2017-09-09
Fully-anechoic chamber	-	Albatross project	EC 3047	2016-09-10	2017-09-09
Shielded room	-	Zhongyu	EC 2838	2017-01-09	2018-01-08
Shielded room	-	Zhongyu	EC 2839	2017-01-09	2018-01-08
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2017-01-09	2018-01-08
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC 4297-2	2017-01-09	2018-01-08
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC 4297-3	2017-01-09	2018-01-08
Band Reject Filter	WRCGV	Wainwright	EC 4297-4	2017-01-09	2018-01-08
Power sensor / Power meter	N1911A/ N1921A	Agilent	EC 4318	2016-05-18	2017-05-17
Spectrum analyzer	E7402A	Agilent	EC 2254	2016-08-12	2017-08-11
EMF meter	ELT-400	NARDA	EC 2928	2016-08-12	2017-08-11
Protection Network	VDHH 9502	Schwarzbeck	EC 4631	2016-06-30	2017-06-29
Harmonic	ES2000U	NF	EC 4793-1	2016-03-15	2017-03-14

generator					
Harmonic generator	ES2000B	NF	EC 4793-2	2016-03-15	2017-03-14
Function Generator	WF1974	NF	EC 4793-3	2016-03-15	2017-03-14
Function Generator	WF1974	NF	EC 4793-4	2016-03-15	2017-03-14
Time relay	-	-	EC 4186-1	2016-10-10	2017-10-09
DIPs generator	SKS-1130GT	SANKI	EC 5033	2017-01-09	2018-01-08
Ring wave generator	SKS-1206GB	SANKI	EC 5033-1	2017-01-09	2018-01-08
EFT generator	SKS-0404IB	SANKI	EC 5033-2	2017-01-09	2018-01-08
Surge generator	SKS-0506GB-30	SANKI	EC 5033-3	2017-01-09	2018-01-08
PXA Signal Analyzer	N9030A	Agilent	EC 5338	2016-03-04	2017-03-03
Power sensor	U2021XA	Agilent	EC 5338-1	2016-03-04	2017-03-03
Vector Signal Generator	N5182B	Agilent	EC 5175	2016-03-04	2017-03-03
MXG Analog Signal Generator	N5181A	Agilent	EC 5338-2	2016-03-04	2017-03-03
Mobile Test System	Iqxel	Litepoint	EC 5176	2017-01-09	2018-01-08
Three phase Harmonic-flicker system	PFS 503N	EM TEST	EC 5383	2016-12-30	2017-12-29
	DPA 503N	EM TEST	EC 5383-1	2016-03-25	2017-03-27
	NETWAVE30	EM TEST	EC 5383-2	2016-09-18	2017-09-17
Active loop antenna	FMZB1519	Schwarzbeck	EC 5345	2016-01-28	2017-01-27

2.4 Test Summary

This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST EQUIPMENTM	RESULT	NOTE
Conducted disturbance voltage at mains terminals	Pass	
Conducted disturbance for asymmetric mode	Pass	For cables longer than 3 m only.
Conducted differential voltage emission	NA	For Class B broadcasting receiver only.
Radiated emission	Pass	
Harmonics	Pass	
Voltage fluctuation-Flicker	Pass	
Electrostatic Discharge	Pass	
Radiated electromagnetic fields	Pass	
Fast transient bursts	Pass	
Slow high energy voltage surge	Pass	
Conducted disturbances induced by electromagnetic fields	Pass	
Mains supply voltage dips and short interruptions	Pass	
Mains supply voltage variations	Pass	
Power-frequency magnetic field	NA	

Notes: 1: NA =Not Applicable

2: This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Emission Test

3 Conducted emissions from the AC mains power ports

Test result: Pass

3.1 Limits

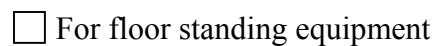
3.1.1 Limits for class A equipment

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
Note 1: Coupling device is AMN; Note 2: Detector type is Quasi Peak or Average Note 3: Bandwidth is 9 kHz		

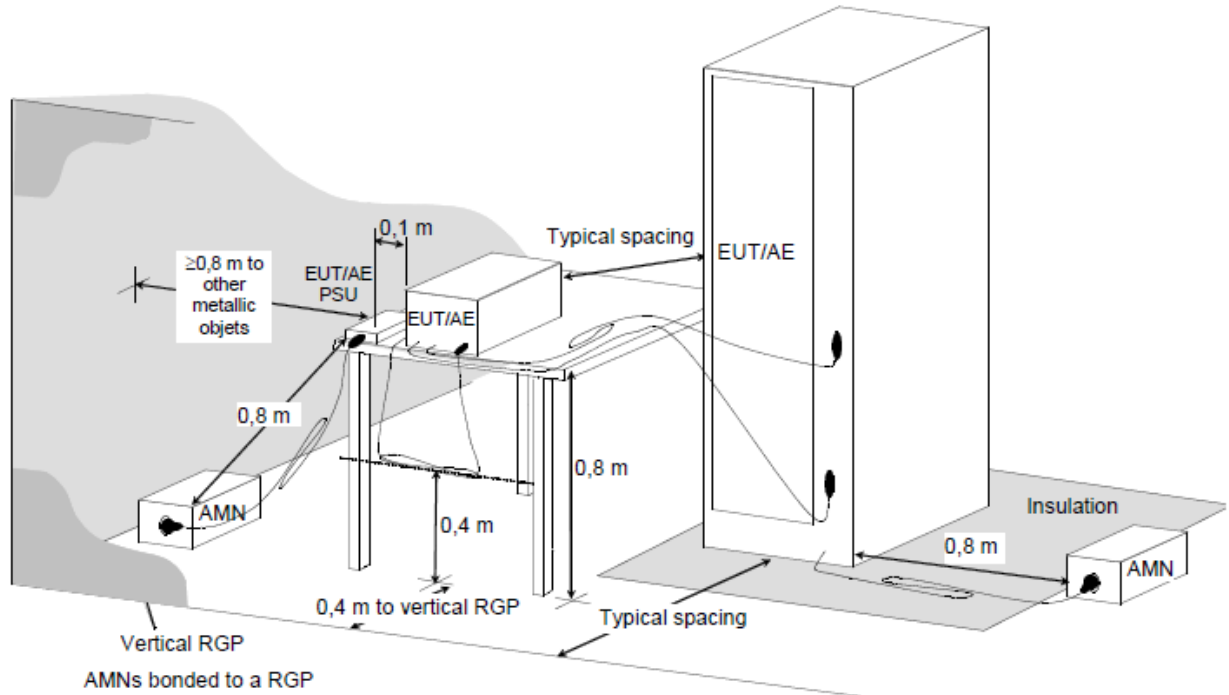
3.1.2 Limits for class B equipment

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50
Note 1: Coupling device is AMN; Note 2: Detector type is Quasi Peak or Average Note 3: Bandwidth is 9 kHz		

☒ For table top equipment



☐ For combination equipment

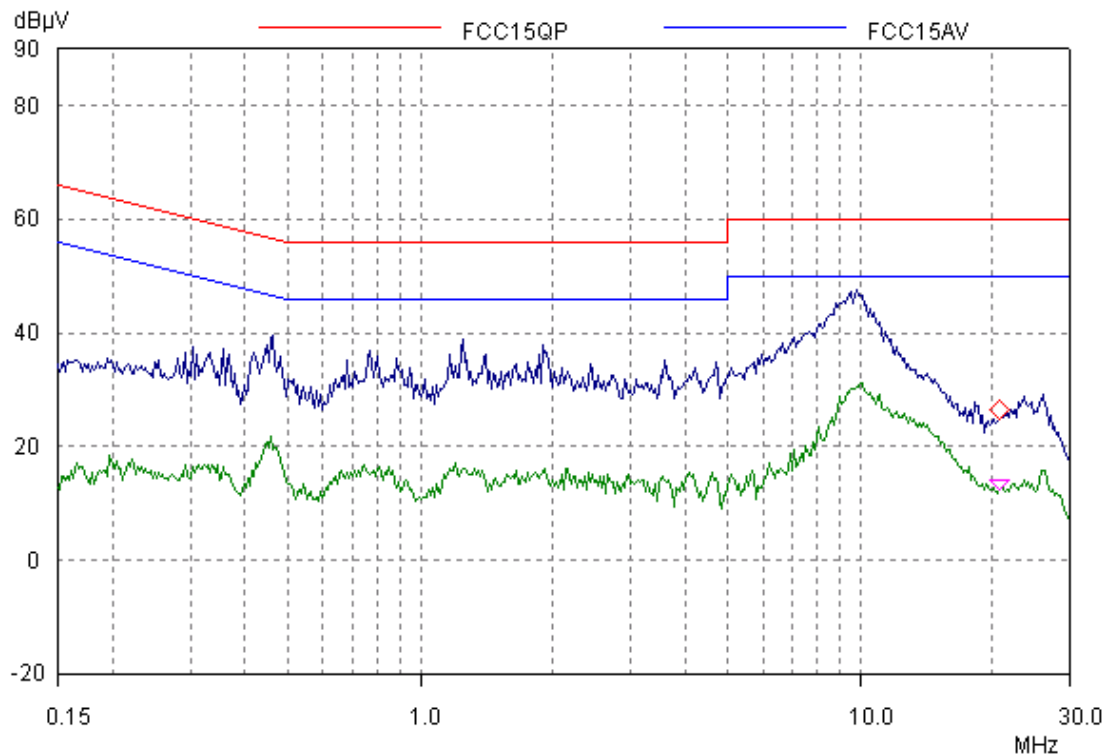


3.3 Test Setup and Test Procedure

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 Protocol

Temperature : 22 °C
Relative Humidity : 54 %



3.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty at mains terminal: $\pm 3.19\text{dB}$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

4 Conducted disturbance for asymmetric mode

Test result: Pass

4.1 Limits

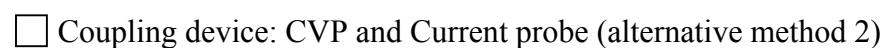
4.1.1 Limits for class A equipment

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.				

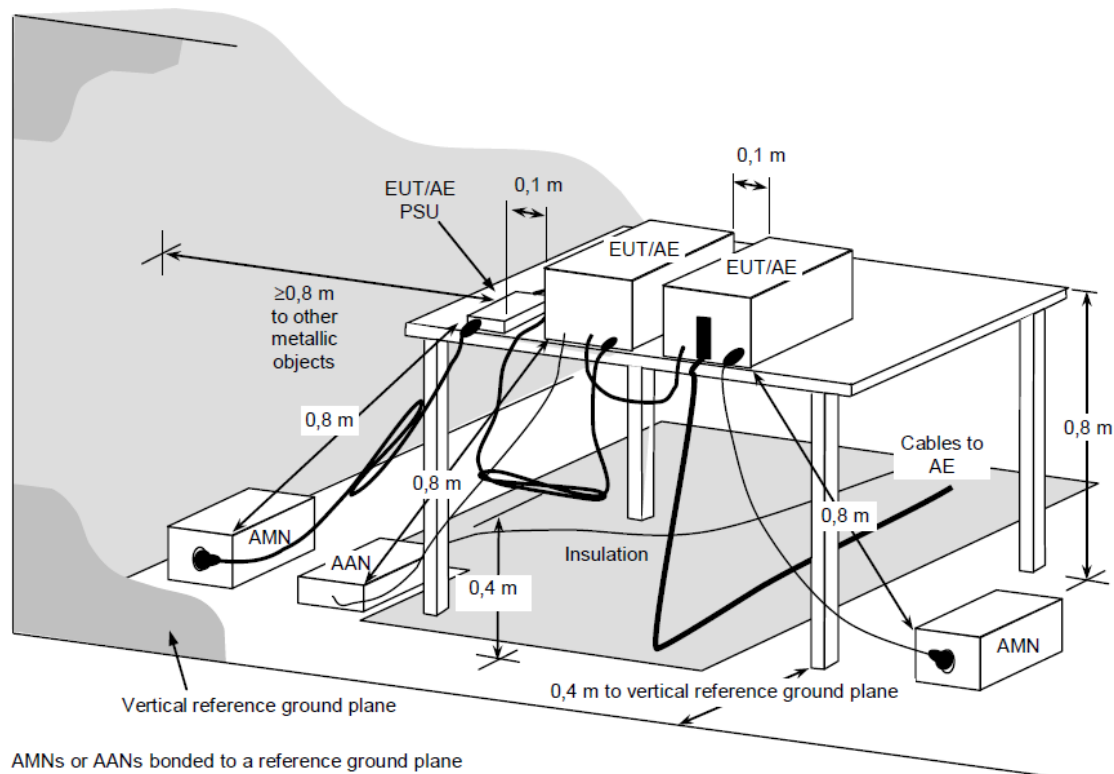
☐ Coupling device: CVP and Current probe (alternative method 1)



-
- $\geq 0,8 \text{ m}$ to other metallic object
- Cable to AE
- 0,1 m
- EUT/AE PSU
- 0,1 m
- EUT/AE
- EUT/AE
- 0,3 m
- probe
- 0,8 m
- 150 Ohm
- AMN
- Cable 0,04 m from VRGP
- 0,1 m
- 0,8 m
- 0,4 m
- Insulation
- 0,8 m
- Cable to AE
- AMN
- 0,4 m to Vertical Reference Ground Plane
- Vertical Reference Ground Plane
- 150 Ohm connected to a Reference Ground Plane no longer than 30cm
- Probe may be Current probe / "150 Ohm to 50 Ohm adaptor" / high impedance probe

- [illegible]

☒ Coupling device: AAN



4.3 Test Setup and Test Procedure

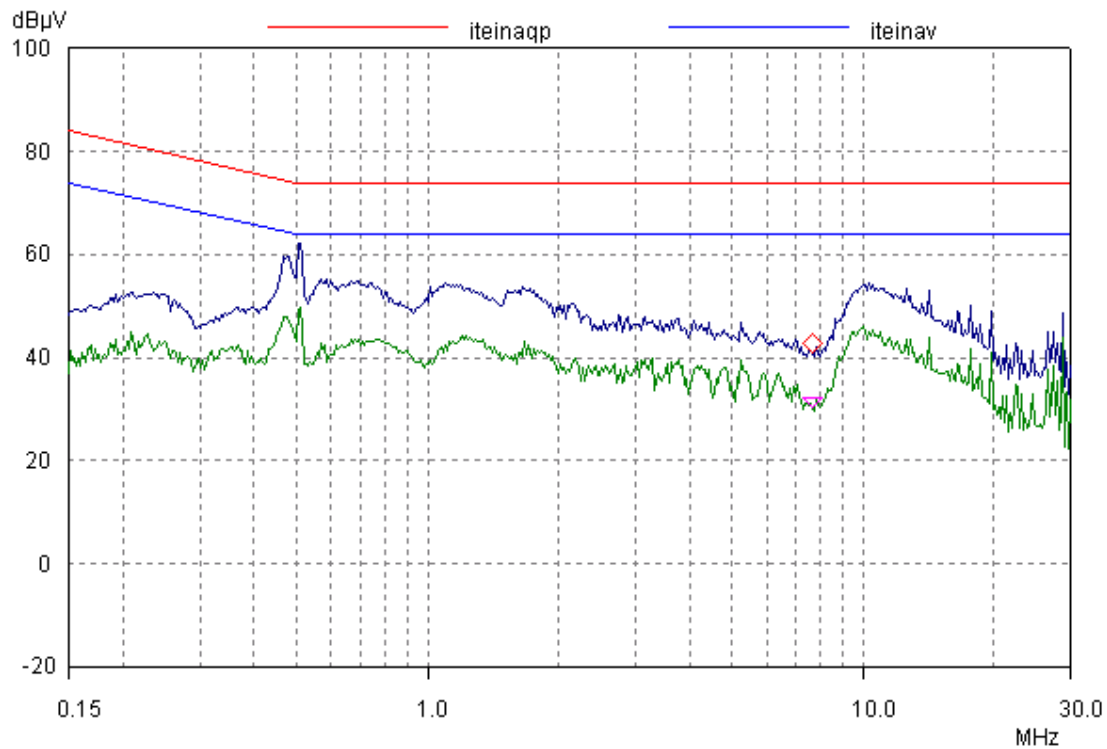
Detailed test procedure was following clause C.4.1 of EN55032.

Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9 kHz.

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 Protocol

Temperature : 22 °C
Relative Humidity : 54 %



4.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of continuous disturbance current at telecom terminal:
 $\pm 2.62\text{dB}$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

5 Conducted differential voltage emission

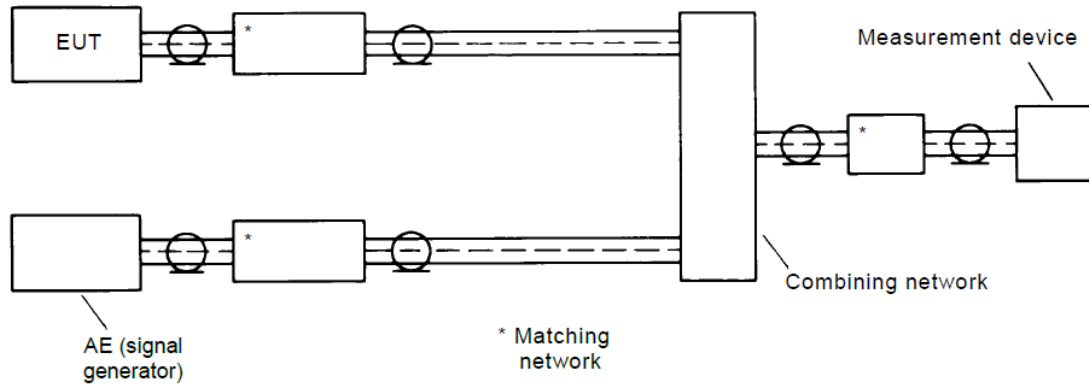
Test result: NA

5.1 Limits

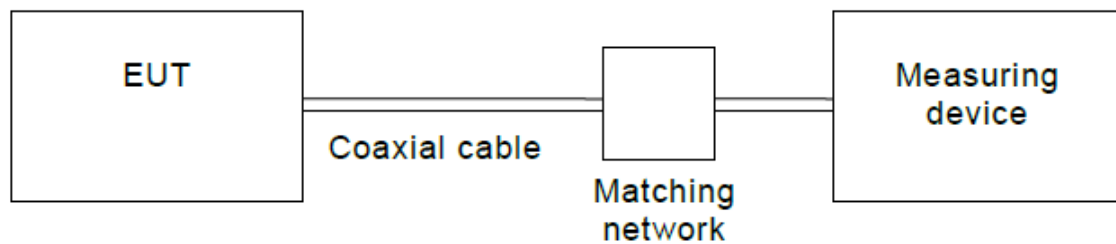
Applicability	Frequency range (MHz)	Differential voltage limit @ 75Ω (dBuV)		
		Other	Local Oscillator Fundamental	Local Oscillator Harmonics
Television receivers; video recorders; PC TV broadcast receiver tuner cards; Digital audio receivers;	30 ~ 950	46	46	46
	950 ~ 2 150	46	54	54
Tuner units (not the LNB) for satellite signal reception	950 ~ 2 150	46	54	54
FM audio receivers and PC tuner cards	30 ~ 300	46	54	50
	300 ~ 1 000	46	54	52
FM car radios	30 ~ 300	46	66	59
	300 ~ 1 000	46	66	52
RF modulator output ports connect to TV broadcast receiver tuner ports	30 ~ 950	46	76	46
	950 ~ 2 150	46	/	54

5.2 Test setup

☐ TV/FM broadcast receiver tuner ports



☐ RF modulator output port



5.3 Test Setup and Test Procedure

Detailed test procedure was following clause C4.2 and C4.3 of EN55023.
Frequency range 30MHz – 2150MHz was checked and EMI receiver measurement bandwidth was set to 120kHz /1MHz.

5.4 Test Protocol

Temperature : °C
Relative Humidity : %

☐ TV/FM broadcast receiver tuner ports

Receiving Frequency (MHz)	Oscillator Frequency (MHz)	Harmonics No.	Measured dB(uV)	Limits dB(uV)	Result
88.0	98.7	1	<30	≤54	
	197.4	2	<30	≤50	
	296.1	3	<30	≤50	
	394.8	4	<30	≤52	
	493.5	5	<30	≤52	
	592.2	6	<30	≤52	
	690.9	7	<30	≤52	
	789.6	8	<30	≤52	
	888.3	9	<30	≤52	
	987	10	<30	≤52	
98.0	108.7	1	<30	≤54	
	217.4	2	<30	≤50	
	326.1	3	<30	≤52	
	434.8	4	<30	≤52	
	543.5	5	<30	≤52	
	652.2	6	<30	≤52	
	760.9	7	<30	≤52	
	869.6	8	<30	≤52	
	978.3	9	<30	≤52	
108.0	118.7	1	<30	≤54	
	237.4	2	<30	≤50	
	356.1	3	<30	≤52	
	474.8	4	<30	≤52	
	593.5	5	<30	≤52	
	712.2	6	<30	≤52	
	830.9	7	<30	≤52	
	949.6	8	<30	≤52	
Other	30-1000	-	<40	≤46	

☐ RF modulator output port

Frequency (MHz)	Disturbance level (dBμV)	Permitted limit (dBμV)
Harmonics		
Harmonics		
Other		
Other		

5.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of continuous disturbance current at telecom terminal:
 $\pm 2.62\text{dB}$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

6 Radiated emission

Test result: Pass

6.1 Radiated emission 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.		

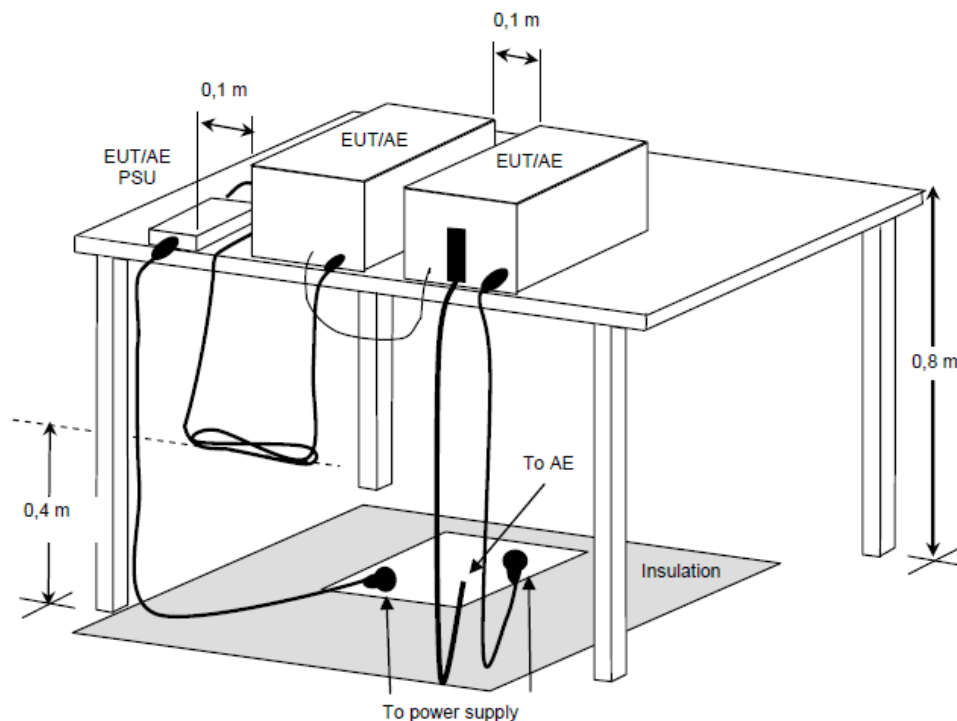
6.1.2 Limits for radiated disturbance of class B Equipment

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.		

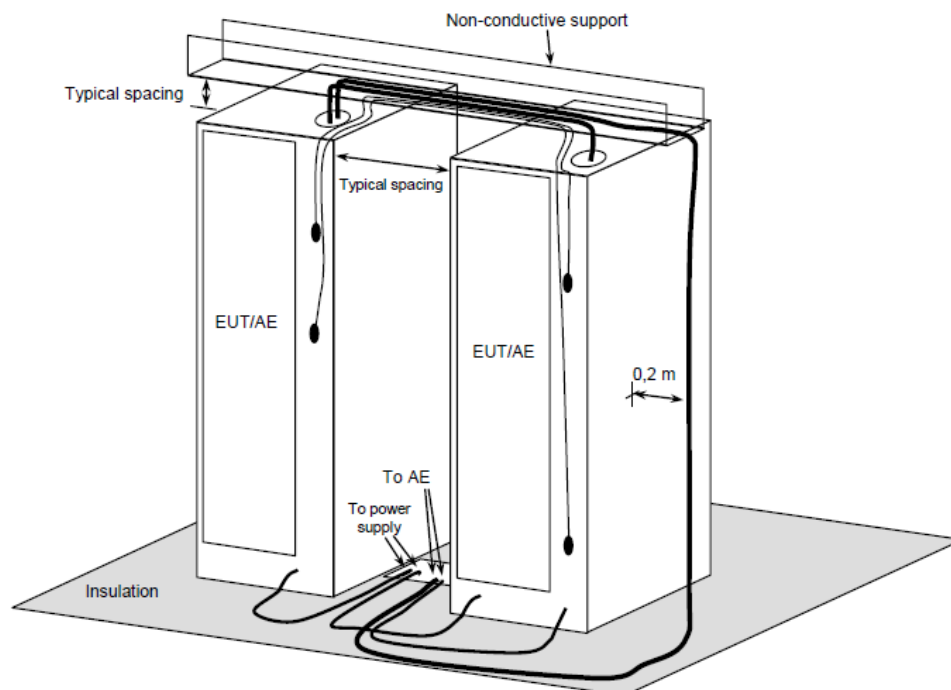
Frequency range GHz	Average limit of Measurement Distance 3m dB(μ V/m)	Peak limit of Measurement Distance 3m dB(μ V/m)
1 to 3	50	70
3 to 6	54	74
NOTE The lower limit applies at the transition frequency.		

6.2 Block diagram and test set up

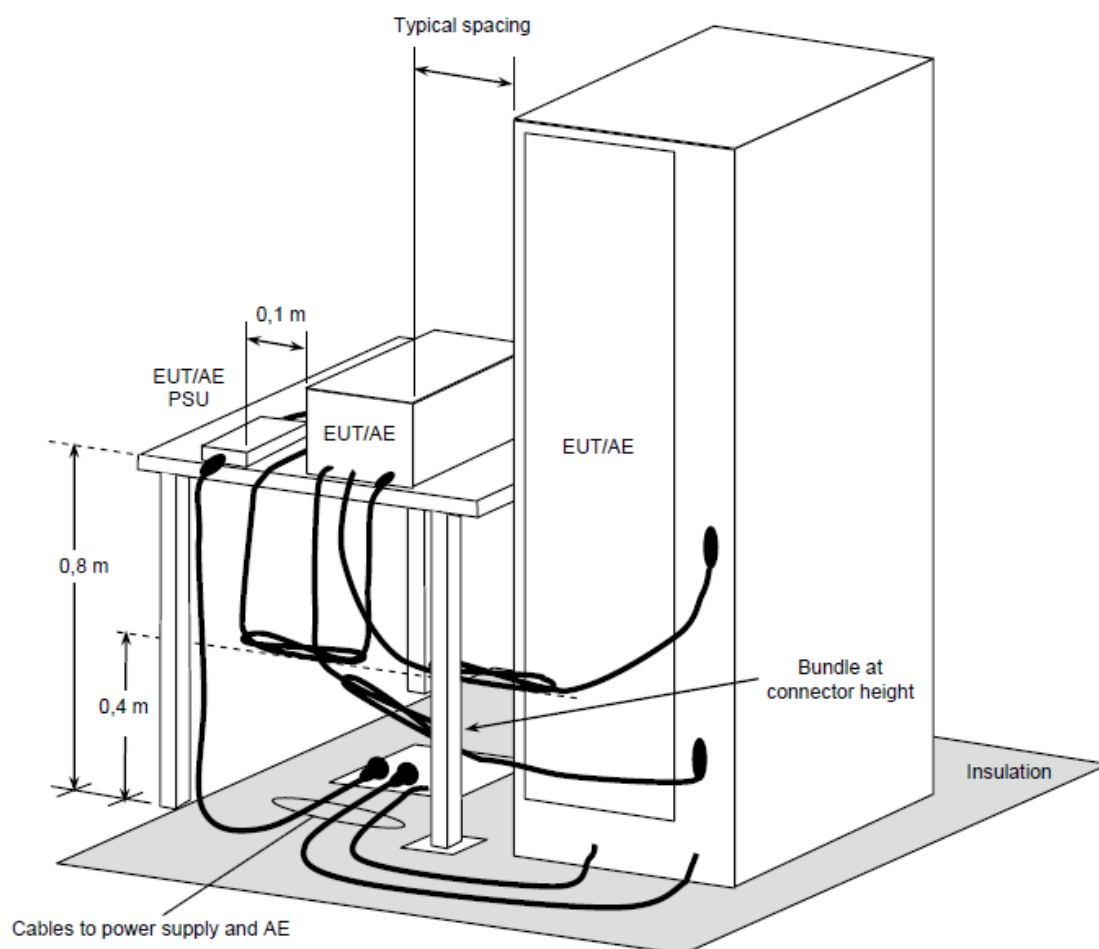
☒ For table top equipment



☐ For floor standing equipment



☐ For combination equipment



6.3 Test Setup and 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

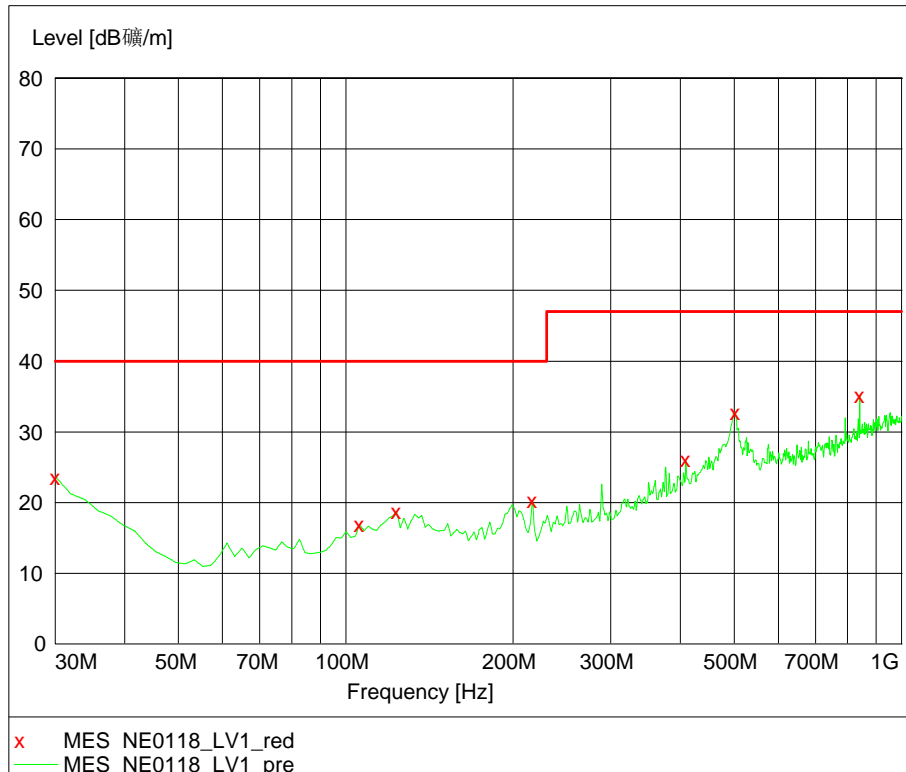
NOTE 1: For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.
 NOTE 2: For outdoor units of home satellite equipment receiving systems highest measured frequency shall be 18GHz.

6.4 Test Protocol

Temperature : 24 °C Relative Humidity : 52 %

30MHz-1GHz

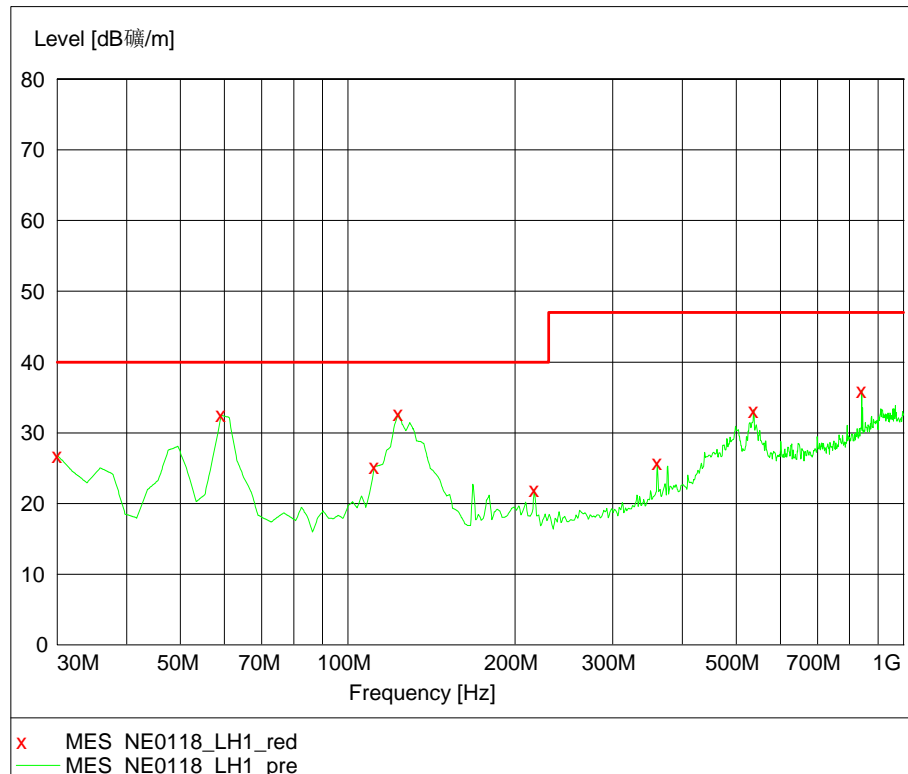
Horizontal



MEASUREMENT RESULT: "NE0118_LV1_red"

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB
30.000000	23.60	21.0	40.0	16.4
105.811623	16.90	12.8	40.0	23.1
123.306613	18.70	13.9	40.0	21.3
216.613226	20.30	12.1	40.0	19.7
409.058116	26.00	18.8	47.0	21.0
502.364729	32.80	20.2	47.0	14.2
840.601202	35.20	24.1	47.0	11.8

Vertical

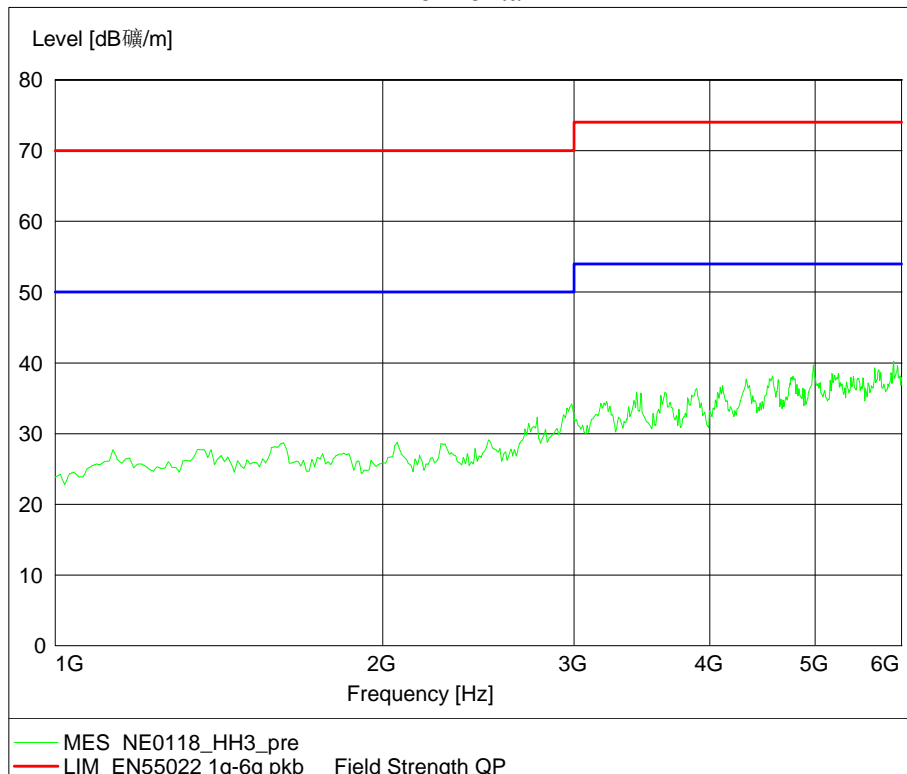


MEASUREMENT RESULT: "NE0118_LH1_red"

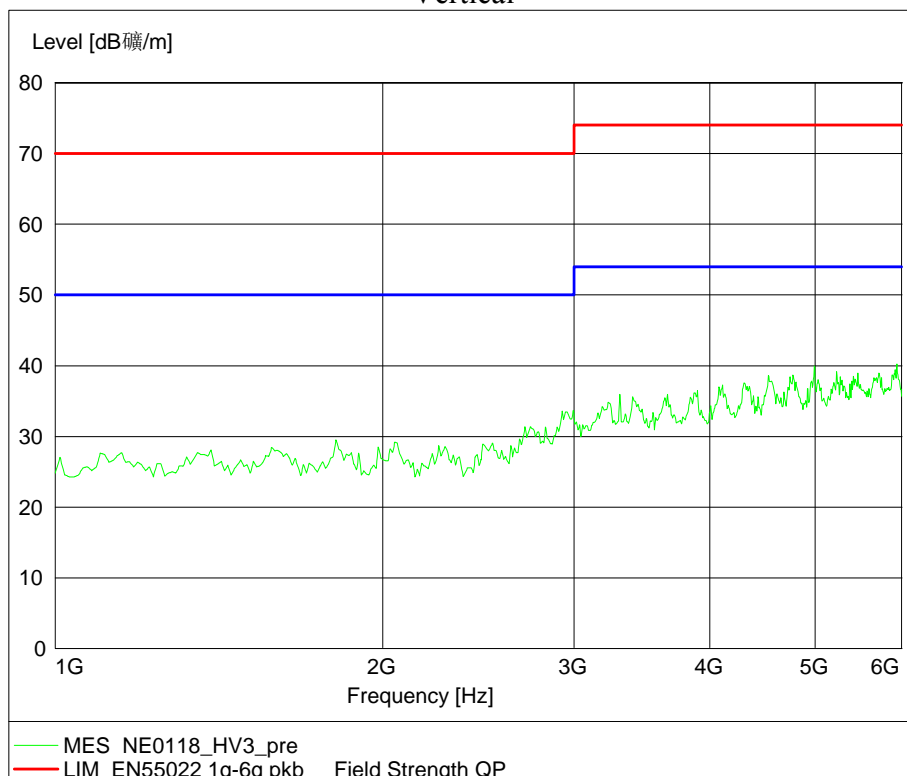
Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB
30.000000	26.80	21.0	40.0	13.2
59.158317	32.50	7.5	40.0	7.5
111.643287	25.20	13.3	40.0	14.8
123.306613	32.70	13.9	40.0	7.3
216.613226	22.00	12.1	40.0	18.0
360.460922	25.80	17.5	47.0	21.2
537.354709	33.20	20.8	47.0	13.8
840.601202	36.00	24.1	47.0	11.0

1GHz-6GHz

Horizontal



Vertical



6.5 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of radiated emission (30MHz-1000MHz) is: $\pm 4.90\text{dB}$

Measurement uncertainty of radiated emission (1000MHz-6000MHz) is: $\pm 5.02\text{dB}$

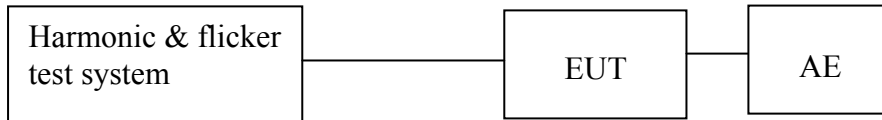
The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

7 Harmonics

Test result: Pass

7.1 Block Diagram of Test Setup



7.2 Test Setup and 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 analyser 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 apply 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 Protocol and Wave form

Temperature : °C
Relative Humidity : %

7.4 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of harmonic test is: $\pm 3.90\%$

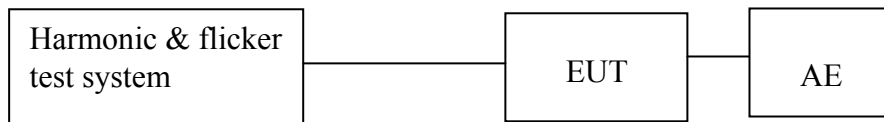
The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

8 Voltage Fluctuations-Flicker

Test result: Pass

8.1 Block Diagram of Test Setup



8.2 Test Setup and 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 condition

The EUT was set to produce the most unfavorable sequence of voltage changes.

8.3 Test Protocol

The tested object operated under the operating condition specified in EN 61000-3-3

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 rate power of the EUT is no greater than 75W, which is unlikely to produce significant voltage fluctuations or flicker by technical analysis and evaluation. So it is deemed to fulfil the requirements without testing.

Temperature	:	°C
Relative Humidity	:	%

8.4 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of voltage fluctuation and flicker is: $\pm 10.34\%$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

Immunity Test

Basic EMC standard:

EN 61000-4-2:2009: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 2: electrostatic discharge immunity test

EN 61000-4-3:2006/+A1:2008/+A2:2010: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 3: radiated, radio frequency, electromagnetic field immunity test

EN 61000-4-4:2004/+A1:2010: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 4: electric fast transient/burst immunity test

EN 61000-4-5:2006: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 5: surge immunity test

EN 61000-4-6:2009: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 6: immunity to conducted disturbance, induced by radio frequency field

EN 61000-4-11:2004: Electromagnetic Compatibility (EMC) – Part 4: testing and measurement techniques – section 11: voltage dips, short interruption and voltage variations immunity test

9 Electrostatic Discharge (ESD)

Test result **Pass**

9.1 Severity Level and Performance Criterion

9.1.1 Test level

1a – Contact discharge		1b – 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
<p>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.</p> <p>2. The gray rows were the selected test level.</p>			

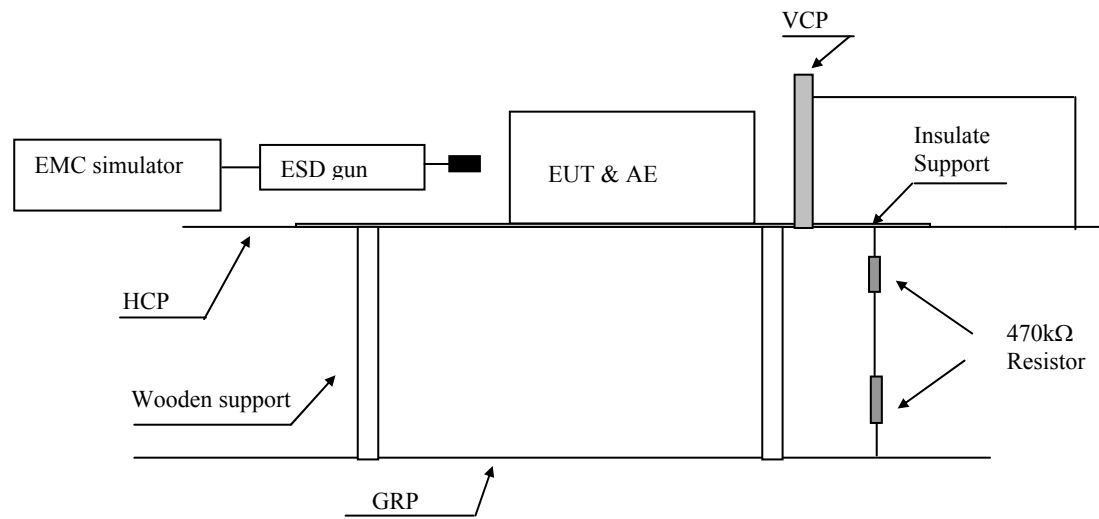
9.1.2 Performance Criterion

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

The EUT shall meet the acceptance criteria for the functional test, after the conditioning.

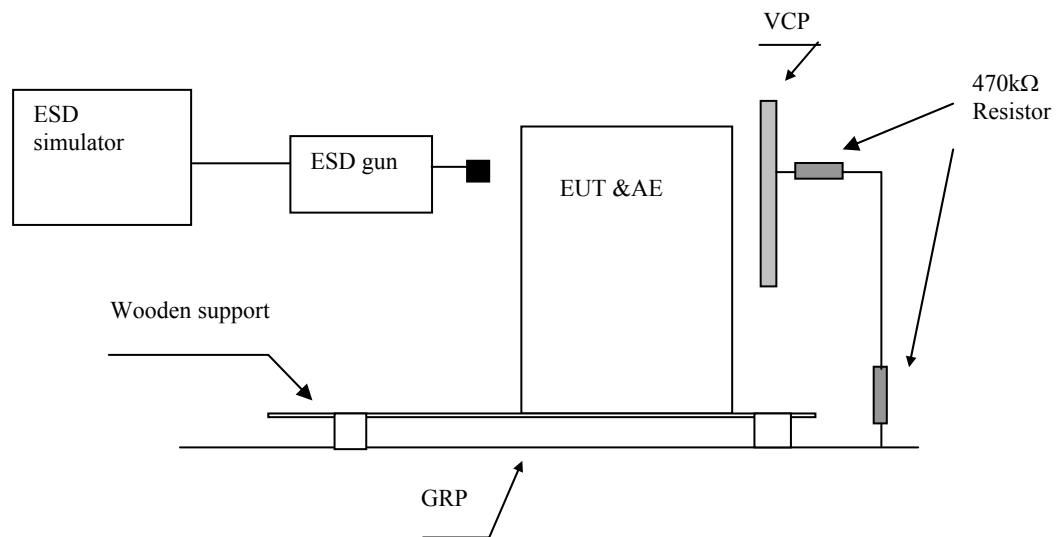
9.2 Block Diagram of Test Setup

☒ For table-top equipment



Note: HCP means Horizontal Coupling Plane
VCP means Vertical Coupling Plane
GRP means Ground Reference Plane
Wooden support is a 0.8m height table

☐ For floor standing equipment



Note: VCP means Vertical Coupling Plane
GRP means Ground Reference Plane
Wooden support is a 0.1m height rack

9.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to EN61000-4-2 clause 7.1.

The test method and equipment was specified by EN61000-4-2.

9.4 Test Protocol

Temperature: 22°C
Relative Humidity: 56%
Atmospheric pressure: 101kPa

Direct discharges were applied at the following selected points:

Test point	Test level [kV]	Air/Contact	Polarity (+/-)	Pass/Fail	Comment
A	4/6	Contact	+/-	Pass	All touchable screws of enclosure
B	4/6	Contact	+/-	Pass	Accessible metal parts of the EUT
C	2/4/8	Air	+/-	Pass	Air gap of the switch, button
D	2/4/8	Air	+/-	Pass	The air in-taking opening
E	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

Point	Description	Point	Result
HCP f	0,1m from the front of the EUT	Edge of centre on HCP	Pass
HCP b	0,1m from the back of the EUT	Edge of centre on HCP	Pass
HCP r	0,1m from the right side of the EUT	Edge of centre on HCP	Pass
HCP l	0,1m from the left side of the EUT	Edge of centre on HCP	Pass
VCP f	0,1m from the front of the EUT	Edge of centre on VCP	Pass
VCP b	0,1m from the back of the EUT	Edge of centre on VCP	Pass
VCP r	0,1m from the right of the EUT	Edge of centre on VCP	Pass
VCP l	0,1m from the left of the EUT	Edge of centre on VCP	Pass

☐ For floor standing equipment

Point	Description	Point	Result
VCP f	0,1m from the front of the EUT	Edge of centre on VCP	-
VCP b	0,1m from the back of the EUT	Edge of centre on VCP	-
VCP r	0,1m from the right of the EUT	Edge of centre on VCP	-
VCP l	0,1m from the left of the EUT	Edge of centre on VCP	-

Conclusion: The EUT can comply with the requirement of the standard.

9.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of ESD test is: $\pm 6.65 \%$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

10 Radiated electromagnetic fields

Test result

Pass

10.1 Severity Level and Performance Criterion

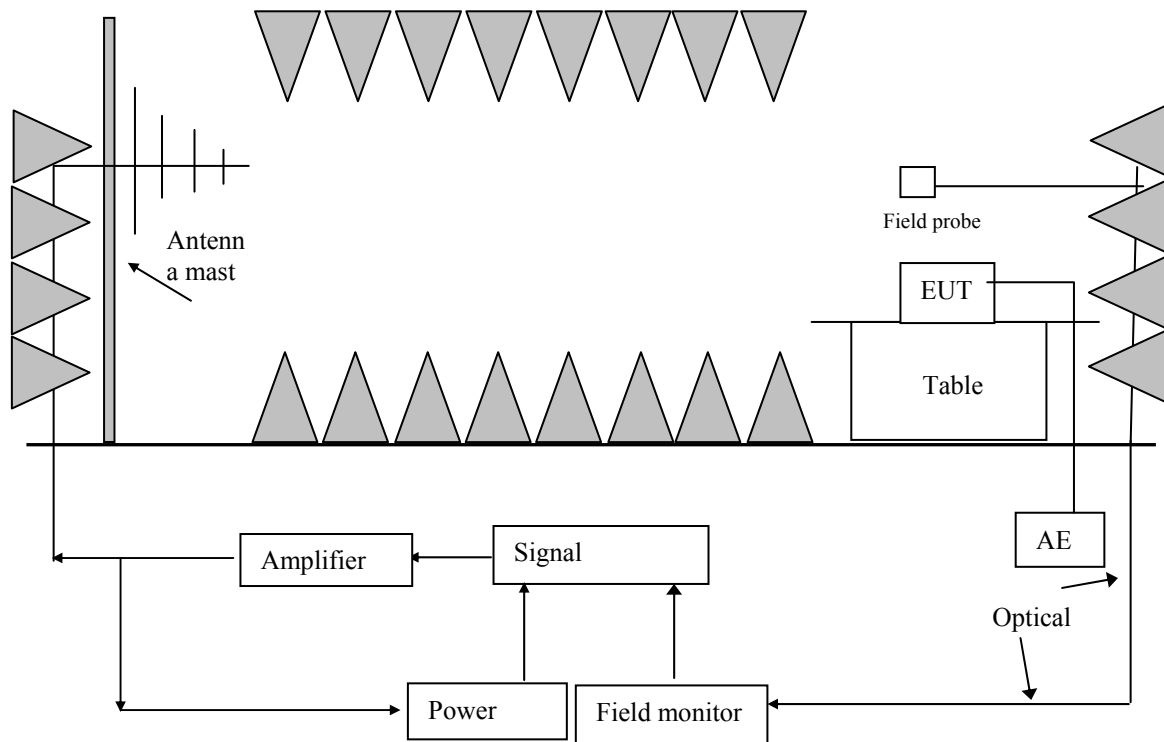
10.1.1 Test level

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

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at a field strength of 3 V/m.

10.2 Block diagram of test setup



10.3 Test Setup and Test Procedure

Measurement was performed in full-anechoic chamber.
Measurement and setting of EUT was applied according to EN61000-4-3 clause 7.
The test method and equipment was specified by EN61000-4-3.

10.4 Test Protocol

Temperature : 24°C
Relative Humidity: 54%

Test no.	Frequency (MHz)	Polarization	Test level (V/m)	Exposed location	Result
1	80-1000	H & V	3	All sides	Pass
2	80-2700	H & V	10	All sides	Pass

Conclusion: The EUT can comply with the requirement of the standard.

10.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of radiated susceptibility test is: $\pm 2.38\text{dB}$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

11 Fast transient bursts

Test result **Pass**

11.1 Severity Level and Performance Criterion

11.1.1 Test level

Open circuit output test voltage (+/-10%) and repetition rate of the impulses (+/- 20%)				
Level	On power supply ports PE		On I/O (input & output) signal, data and control ports	
	Voltage peak kV	Repetition rate kHz	Voltage peak kV	Repetition rate kHz
1	0.5	100	0.25	100
2	1	100	0.5	100
3	2	100	1	100
4	4	100	2	100
X	Special	Special	Special	Special
<p>Notes : 1. "X" is a an open level. The level has to be specified in the dedicated equipment specification.</p> <p>2. The gray rows were the selected test level.</p>				

11.1.2 Performance Criterion

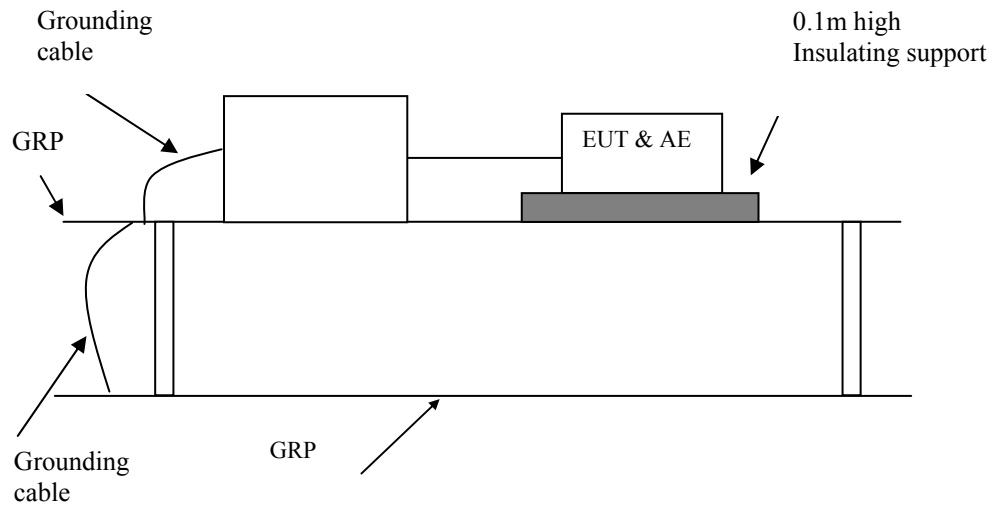
There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the bursts is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

The EUT shall meet the acceptance criteria for the functional test, after the conditioning.

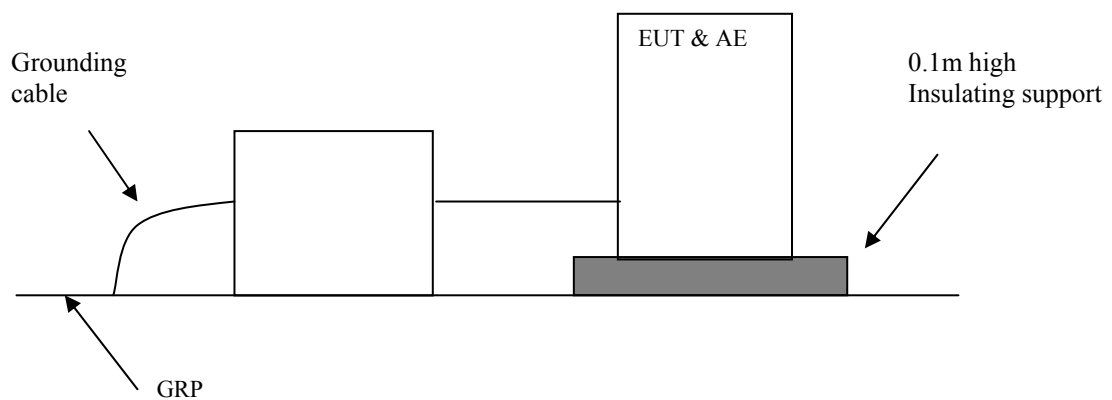
11.2 Block Diagram of Test Setup

11.2.1 Block Diagram for input a.c./d.c. power line

☒ For table-top equipment

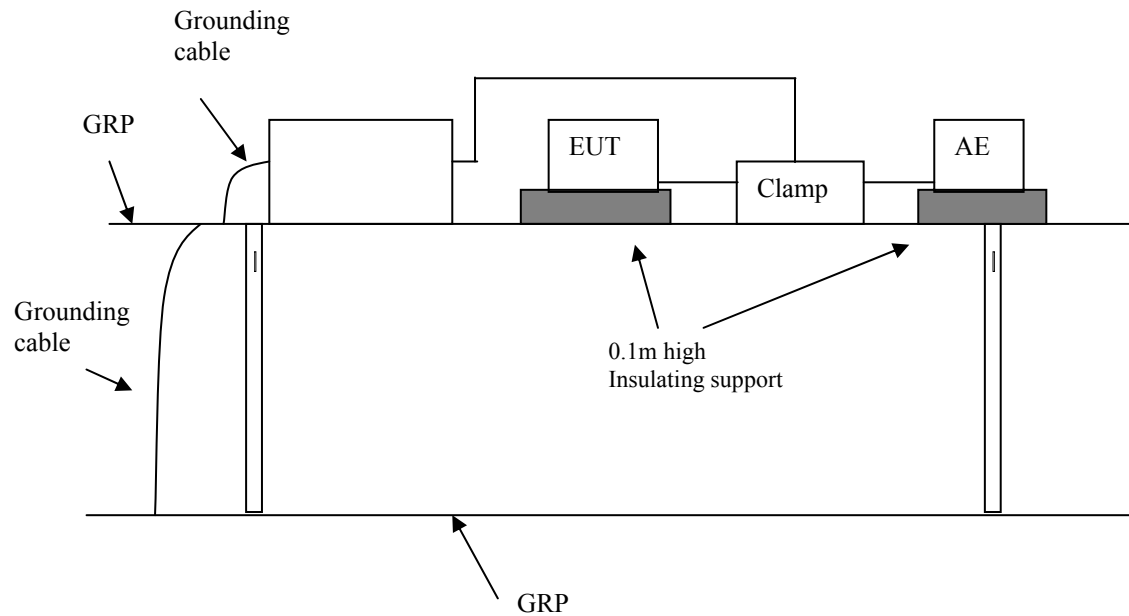


☐ For floor standing equipment

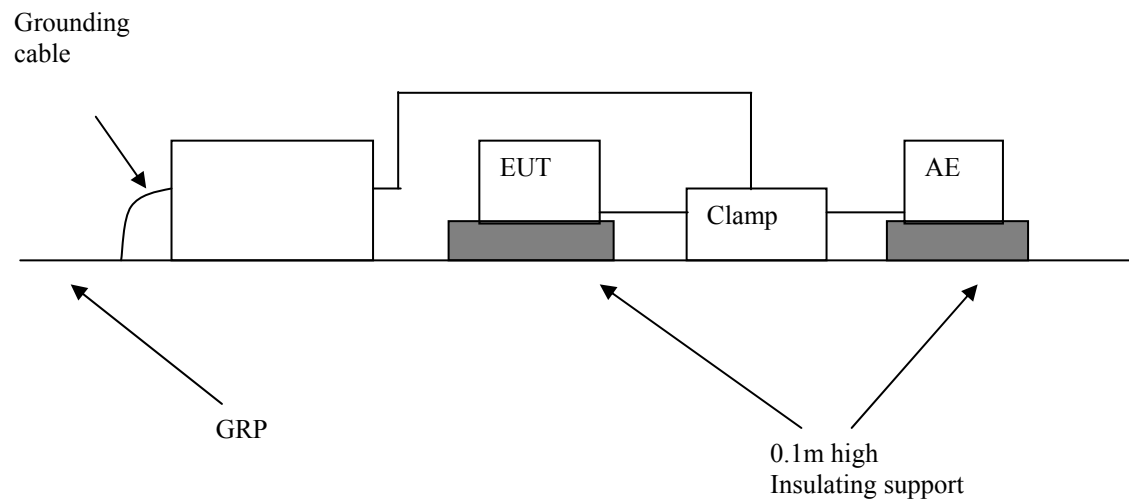


11.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

☒ For table-top equipment



☐ For floor standing equipment



11.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to EN61000-4-4 clause 7.2.

The test method and equipment was specified by EN61000-4-4.

11.4 Test Protocol

Temperature: 22°C

Relative Humidity: 54%

Test No. #	Level [kV]	Polarity +/-	Line for test	Pass/ Fail
1	1/2	+/-	a.c. Mains	Pass
2	0.5/1	+/-	Signal line	Pass

Conclusion: The EUT can comply with the requirement of the standard.

11.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of EFT test at main terminal is: $\pm 11.57\%$

Measurement uncertainty of EFT test at signal line is: $\pm 11.62\%$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

12 Slow high energy voltage surge

Test result **Pass**

12.1 Severity Level and Performance Criterion

12.1.1 Test level

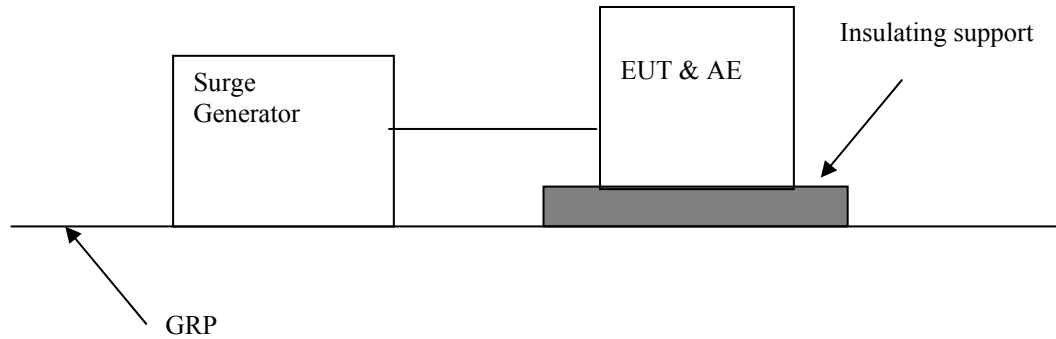
Level	Open-circuit test voltage +/-10% kV
1	0.5
2	1.0
3	2.0
4	4.0
X*	Special
Notes: 1."X" is an open class. This level can be specified in the product Specification 2. The gray rows are the selected level.	

12.1.2 Performance Criterion

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the surges is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

The EUT shall meet the acceptance criteria for the functional test, after the conditioning.

12.2 Block Diagram of Test Setup



12.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to EN61000-4-5 clause 7.

The test method and equipment was specified by EN61000-4-5.

12.4 Test Protocol

Temperature: 24 °C
Relative Humidity: 54 %

Test No. #	Level [kV]	Polarity +/-	Line for test	Pass/ Fail
1	0.5/1	+/-	a.c. Mains (line to line)	Pass
3	0.5/1/2	+/-	a.c. Mains (line to earth)	Pass
4	0.5/1	+/-	Signal line	Pass

Conclusion: The EUT can comply with the requirement of the standard.

12.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of surge test at main terminal is: $\pm 11.57\%$

Measurement uncertainty of surge test at signal line is: $\pm 11.89\%$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

13 Conducted disturbances induced by electromagnetic fields

Test result **Pass**

13.1 Severity Level and Performance Criterion

13.1.1 Test level

Frequency range 150kHz – 80MHz		
Level	Voltage level (e.m.f.)	
	U ₀ [dB(uV)]	U ₀ (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.		

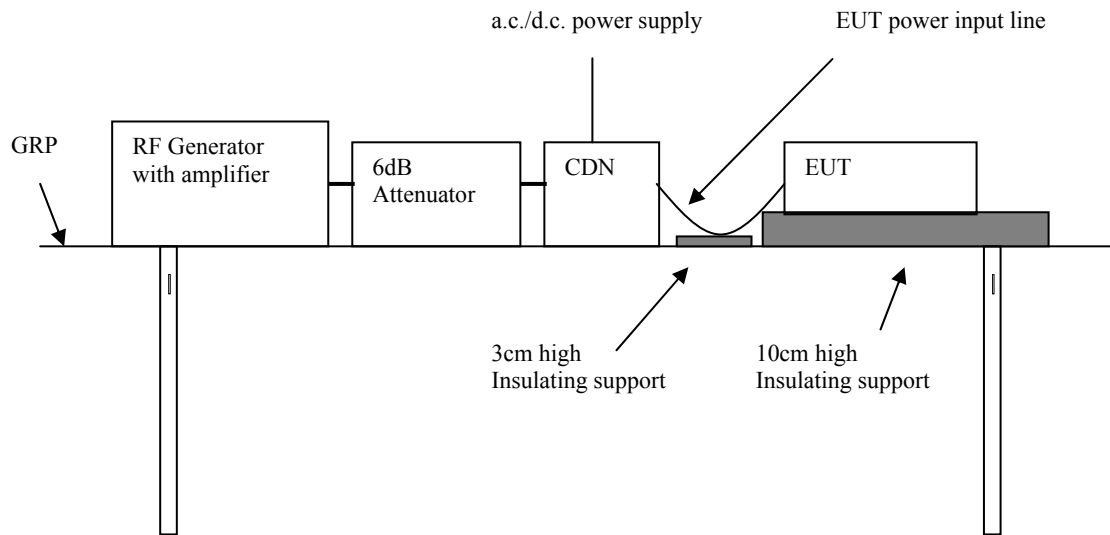
13.1.2 Performance Criterion

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at U₀ = 130 dBμV.

13.2 Block Diagram of Test Setup

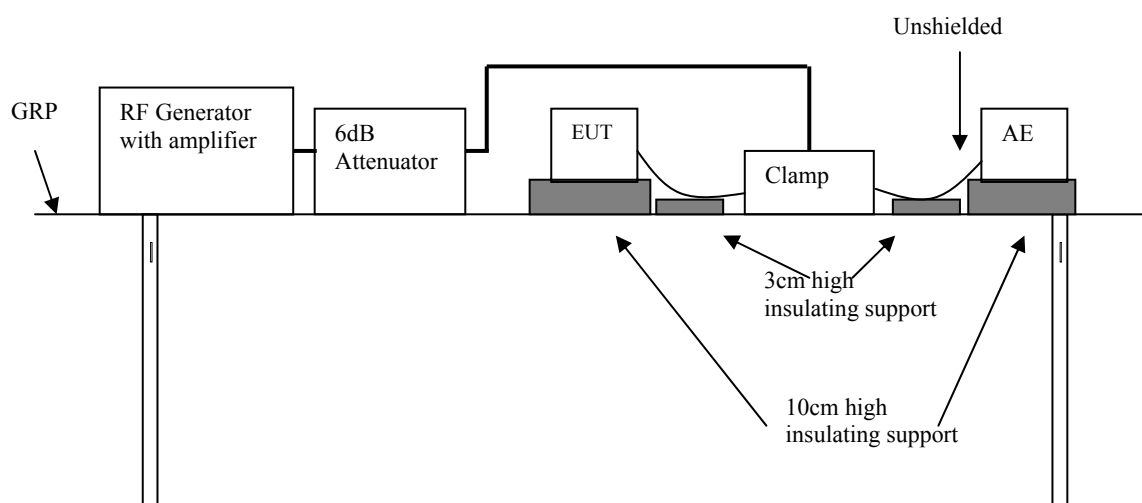
13.2.1 Block Diagram for a.c./d.c input power line

☒ Block Diagram for a.c./d.c input power line

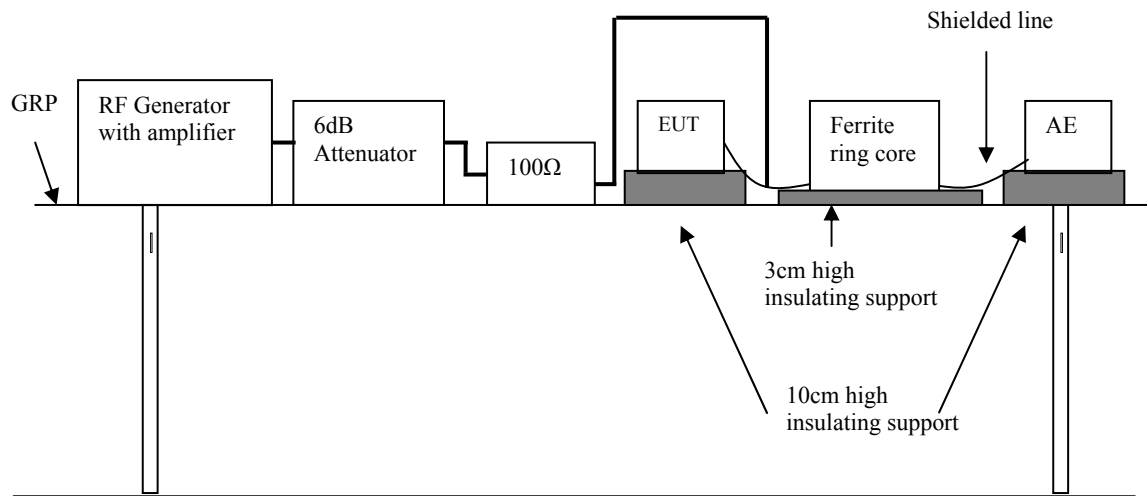


13.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

☒ Unshielded line



☐ Shielded line



13.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to EN61000-4-6 clause 7.

The test method and equipment was specified by EN61000-4-6.

13.4 Test Protocol

Temperature: 23°C

Relative Humidity: 56%

Test No.	Frequency (MHz)	Level V (r.m.s.)	Injected point	Result
1	0.15~80	3/10	a.c. Mains	Pass
2	0.15~80	3/10	d.c. power ports	Pass
2	0.15~80	3/10	Signal line	Pass

Conclusion: The EUT can comply with the requirement of the standard.

13.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of injected current test at main terminal is $\pm 1.88\text{dB}$.

Measurement uncertainty of injected current test at unshielded signal line is $\pm 3.41\text{dB}$.

Measurement uncertainty of injected current test at shielded signal line is $\pm 3.30\text{dB}$.

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

14 Mains supply voltage dips and short interruptions

Test result **Pass**

14.1 Severity Level and Performance Criterion

14.1.1 Test level

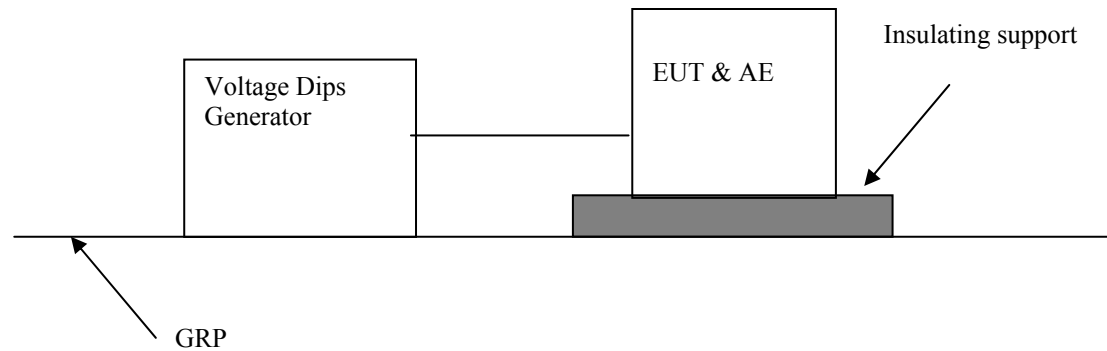
Test level (% Ut)	Voltage dip and short interruptions (% Ut)	Duration (in period)
80	20	250
70	30	25
40	60	10
0	100	250
0	100	0.5
Notes:		

14.1.2 Performance Criterion

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

The EUT shall meet the acceptance criteria for the functional test (see Clause 6), after the conditioning.

14.2 Block diagram of test setup



14.3 Test Setup and Test Procedure

The test apparatus and procedure shall be as described in EN 61000-4-11.

14.4 Test Protocol

Temperature: 22°C
Relative Humidity: 54%

Test no.	Dips to (% Ut)	Voltage dip and short interruptions (% Ut)	Duration (in periods)	Pass/Fail
1	80	20	250	Pass
2	70	30	25	Pass
3	40	60	10	Pass
4	0	100	250	Pass
5	0	100	0.5	Pass

Conclusion: The EUT can comply with the requirement of the standard.

14.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of voltage dips and interruption test is: $\pm 6.05\%$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

15 Mains supply voltage variations

Test result

Pass

15.1 Severity Level and Performance Criterion

15.1.1 Test level

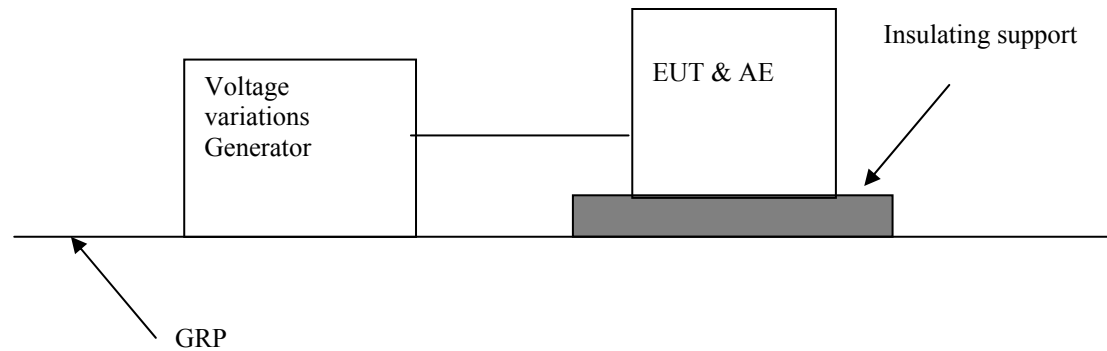
Test Item	Test Level
Supply voltage max (U _{max})	U _{nom} + 10 %
Supply voltage min (U _{min})	U _{nom} - 15 %
<p>Note: U_{nom} = Nominal mains voltage. Where provision is made to adapt the equipment to suit a number of nominal supply voltages (e.g. by transformer tap changing), the above conditioning severity shall be applied for each nominal voltage, with the equipment suitably adapted. For equipment which is claimed to be suitable for a range of nominal mains voltages (e.g. 220/240 V) without adaptation, U_{max} = (Maximum U_{nom}) + 10 %, and U_{min} = (Minimum U_{nom}) – 15 %. In any case the range of U_{nom} shall include the European nominal mains voltage of 230 V.</p>	

15.1.2 Performance Criterion

There shall be no damage, malfunction or change of status due to the different supply voltage conditions.

The EUT shall meet the acceptance criteria for the functional test, during the conditioning.

15.2 Block diagram of test setup



15.3 Test Protocol

Temperature: 23°C
Relative Humidity: 56%

Test no.	Test Item	Test Level	Pass/ Fail
1	Supply voltage max (Umax)	Unom + 10 %	Pass
2	Supply voltage min (Umin)	Unom - 15 %	Pass

Conclusion: The EUT can comply with the requirement of the standard.

15.4 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty of voltage variations test is: $\pm 6.05\%$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

The measurement uncertainty is traceable to internal procedure TI-036.

Appendix I: Photograph of equipment under test



