



EMC TEST REPORT

Product Name: CrowPi 3

Trade mark: /

Model No.: SER14003P

S/N: /

Report No.: CTB25082615604E01

Applicant: Shenzhen Elecrow Limited

Address: Elecrow, 5th Floor, Fengze Building B, Nanchang Huafeng Industrial Park,
Hangcheng Street Hangkong Road, Baoan District, Shenzhen city, China

Manufacturer: Shenzhen Elecrow Limited

Address: Elecrow, 5th Floor, Fengze Building B, Nanchang Huafeng Industrial Park,
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Prepared by: Shenzhen CTB Testing Technology Co., Ltd.

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Shenzhen, Guangdong, China

Sample No.: 25082615604

Date of Receipt: Sep. 23, 2025

Date of Test(s): Sep. 24, 2025 ~ Sep. 29, 2025

Date of Issue: Oct. 30, 2025

Test Standard(s): EN 55032:2015+A11:2020+A1:2020, EN 55035:2017+A11:2020,
EN IEC 61000-3-2:2019+A1:2021+A2:2024,
EN 61000-3-3:2013+A1:2019+A2:2021

Test Result: Pass

In the configuration tested, the EUT complied with the standards specified above.

Compiled by:

Reviewed by:

Approved by:

Blake Cai

Blake Cai

Bin Mei

Bin Mei

Rita Xiao

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Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "★" indicates the testing items were fulfilled by subcontracted lab. "×" indicates the items are not in CNAS accreditation scope.

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1. Description of version

Report No.	Issue Date	Description	Approved
CTB25082615604E01	Oct. 30, 2025	Original	Valid

2. Test summary

Emission		
Test Item	Test Method	Result
Conducted Emission	EN 55032	PASS
Radiated emissions at frequencies up to 1 GHz		PASS
Radiated emissions at frequencies above 1 GHz		PASS
Harmonic current emissions	EN IEC 61000-3-2	N/A ¹
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3	PASS
Immunity(EN 55035)		
Test Item	Test Method	Result
Electrostatic discharges (ESD)	IEC 61000-4-2	PASS
Continuous RF electromagnetic field disturbances	IEC 61000-4-3	PASS
Electrical fast transients/burst (EFT/B)	IEC 61000-4-4	PASS
Surges	IEC 61000-4-5	PASS
Continuous induced RF disturbance	IEC 61000-4-6	PASS
Power frequency magnetic field	IEC 61000-4-8	N/A ²
Voltage dips and Voltage interruptions	IEC 61000-4-11	PASS

Note: N/A is abbreviation for Not Applicable.

1. The Product belongs to Class A, and its power is less than 75W, so it deems to fulfil this standard without testing.
2. The Product doesn't contain any device susceptible to magnetic fields.

3. Measurement uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
No.1 Conducted Emission	150 kHz to 30 MHz	± 3.1 dB
No.2 Conducted Emission	150 kHz to 30 MHz	± 3.2 dB
Radiated Emission	30 MHz to 1000 MHz	± 4.1 dB
Radiated Emission	1000 MHz to 6000 MHz	± 4.8 dB

4. General information

4.1. Description of EUT

Product name	CrowPi 3
Trade Mark	/
Model	SER14003P
Serial Model No.	/
Model Difference	/
Rated Power	/
Rated Voltage& current	DC 5V
Highest Internal Frequency	>108MHz
Configuration	<input checked="" type="checkbox"/> Table-top <input type="checkbox"/> Floor-standing
Classification	<input type="checkbox"/> Class A <input checked="" type="checkbox"/> Class B
The highest frequency of the internal sources of the EUT	<input type="checkbox"/> less than 108 MHz, the measurement shall only be made up to 1 GHz. <input type="checkbox"/> between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. <input type="checkbox"/> between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. <input checked="" type="checkbox"/> above 1 GHz, the measurement shall be made up to 6 GHz.
Adapter Information	Model No.: XS-GaN-27WUSB-C Power Supply EU Input: AC 100-240V 50/60Hz 0.8A Max Output: 5.1V $\overline{\text{---}}$ 5A 25.5W, 9V $\overline{\text{---}}$ 3A 27W, 12V $\overline{\text{---}}$ 2.25A 27W, 15V $\overline{\text{---}}$ 1.8A 27W

Note: The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

4.2. Description of accessory device

Description	Manufacturer	Model	Specification	Note
Monitor	AOC	238LM00026	/	<input type="checkbox"/> Applicant <input checked="" type="checkbox"/> CTB
Monitor	ASUS	VG28U	4K	<input type="checkbox"/> Applicant <input checked="" type="checkbox"/> CTB
Mouse	DELL	KB216t	/	<input type="checkbox"/> Applicant <input checked="" type="checkbox"/> CTB
Keyboard and Mouse Combo	/	CRU12300S	/	<input checked="" type="checkbox"/> Applicant <input type="checkbox"/> CTB
Laptop	Lenovo	21CU-A0F0CD	/	<input type="checkbox"/> Applicant <input checked="" type="checkbox"/> CTB

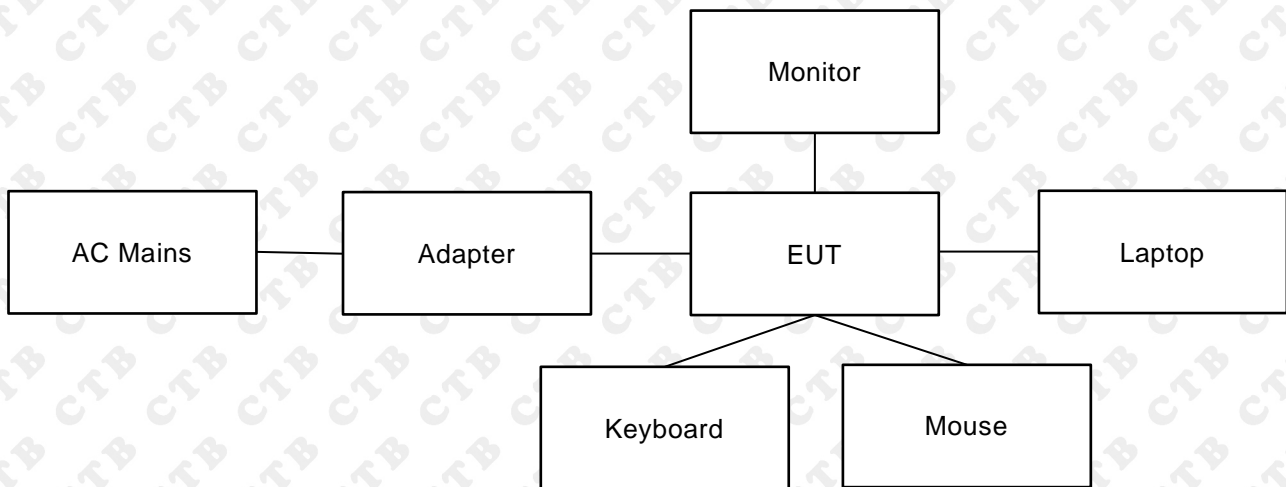
External I/O Cable

Cable Description	Shielded Type	Ferrite Core	Length(m)	Note
HDMI Cable	<input checked="" type="checkbox"/> Shielded <input type="checkbox"/> Non-shielded	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	2	<input type="checkbox"/> Applicant <input checked="" type="checkbox"/> CTB
RJ45 Cable	<input checked="" type="checkbox"/> Shielded <input type="checkbox"/> Non-shielded	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	2	<input type="checkbox"/> Applicant <input checked="" type="checkbox"/> CTB

4.3. Test conditions

Temperature: 15-25℃
 Relative Humidity: 30-60 %
 Atmospheric pressure: 800hPa-1060hPa

4.4. Block diagram of EUT configuration



4.5. Operating condition of EUT

The test system was pre-tested based on the consideration of all possible combinations of EUT operation modes according to test plan. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively. All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, (*)the worst data were recorded and reported.

Pretest Test Mode	Description	Test Voltage
Mode 1*	Working	AC 230V/50Hz
Mode 2*	PING IP	AC 230V/50Hz

Conducted emission test		
Final Test Mode	Description	Test Voltage
Mode 1*	Working	AC 230V/50Hz
Mode 2*	PING IP	AC 230V/50Hz

Radiated emission test		
Final Test Mode	Description	Test Voltage
Mode 1*	Working	AC 230V/50Hz

Harmonic current emissions & Voltage changes, voltage fluctuations and flicker test		
Final Test Mode	Description	Test Voltage
Mode 1*	Working	AC 230V/50Hz

Immunity test		
Final Test Mode	Description	Test Voltage

Mode 1*	Working	AC 230V/50Hz
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5. List of Test and Measurement Instruments

No.1 Continuous disturbance						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	843 Shield Room	C/ R/ T	843	/	/	2027/6/21
2	LISN	ROHDE&SCHWARZ	ESH3-Z5	100318	/	2026/5/21
3	Pulse limiter	ROHDE&SCHWARZ	ESH3-Z2	0357.8810.54-1 02700-NB	/	2026/5/21
4	EMI TEST RECEIVER	R&S	ESCI	100428	V4.42.SP3	2026/5/21
5	Coaxial cable	Agilent	UCE500-SMNM-1. 5M	/	/	2026/5/21
6	ISN	Schwarzbeck	NTFM8158	183	/	2026/6/17
7	ISN	Schwarzbeck	CAT5 8158	473	/	2026/6/17
8	Voltage Probe	Schwarzbeck	TK 9420	01189	/	2026/9/18
9	EMI test software	Frad	EZ-EMC	Ver/ EMC-con3A1/1	/	/
10	Current Probe	FCC	F-52B	199453	/	2026/5/23

Radiated emission(No.1 Chamber)						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2027/6/21
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	/	2026/6/1
3	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2026/6/28
4	Preamplifier	Agilent	8449B	3008A01838	/	2026/6/3
5	Amplifier	HP	8447E	2945A02747	/	2026/5/23
6	loop antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2026/6/1
7	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESPI	100362	RF_ATTEN_7 (104489/003)	2026/5/23
8	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2026/5/22
9	26.5G cable	ETS	RFC-SNS-100-N MS-80	/	/	2026/5/23
10	26.5G cable	ETS	RFC-SN-100-NM S-20	/	/	2026/5/23
11	26.5G cable	ETS	RFC-SNS-100-S MS-20	/	/	2026/5/23
12	26.5G cable	ETS	RFC-NNS-100-N MS-300	/	/	2026/5/23
13	EMI test software	Frad	EZ-EMC	Ver/ FA-03A2 RE	/	/

Harmonic current emission& Voltage changes, voltage fluctuations and flicker						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	Flicker & Harmonic Tester	Laplace Instruments	AC2000A	311363	Version 2.0	2026/5/29
2	POWER SOURCE	HTEC Instruments	HPF5010	633088	/	2026/6/17
3	H&F Test PC	HVAEIPC	S25	/	/	/
4	Flicker & Harmonic test software	HTEC	Version 2.0	/	V2.0	/

Electrostatic discharges						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	ESD Simulator	TESTQ	NSG437	329	V01.00	2026/6/2

Surges & Fast transients						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	Surge& Burst Generator	Lioncel	LSE-545CB	0180602	/	2026/5/21
2	Capacitive coupling clamp	Lioncel	EFTC	018071801	/	2026/5/21

Voltage dips						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	Voltage dip simulator	Lioncel	VDS-1102	180902	V1.04	2026/5/22

Injected currents						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	C/S Test System	SKET	CITS-150K230M-75W	SK20210604	20H2	2026/6/17
2	CDN	SKET	CDN-150K230M-M2/M3-16A	21302	/	2026/5/21
3	CDN	Schaffner	CDNT400	/	/	2026/5/21
4	Attenuator	PRIMA	WDTS100-6-4-B	/	/	2026/5/29
5	Electromagnetic Injection Clamp	Prima	PECL-100	/	/	2026/6/17
6	50Ω Load	SKET	TL-DC01G-2W-50BNC	/	/	2026/6/17
7	CS test software	SKET	EMC-S	V2.0.0.11	/	/

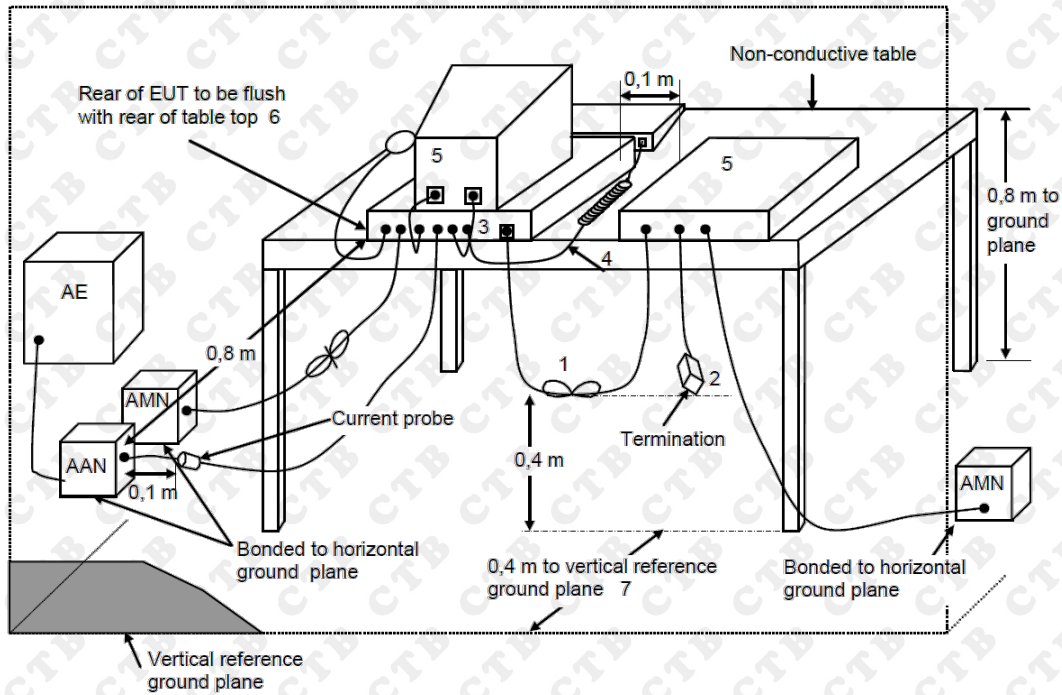
Radio frequency electromagnetic field						
No.	Equipment	Manufacturer	Type No.	Serial No.	Firmware version	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2027/6/21
2	Signal Generator	Agilent	N5181A	MY50140365	A.01.60	2026/5/22
3	Stacked Double Log.-Per. Antenna	SKET	STLP 9129 Plus	2106070106	/	/
4	Switch Controller	SKET	RFSU-DC18G-4C	2106070105	/	/
5	RF Power Meter	Agilent	E9304A	MY41490462	/	2026/5/22
6	RF Power Meter	Agilent	E9301A	MY41495675	/	2026/5/22
7	E-Field Probe	Narda	EP-601	811ZX10305	/	2026/6/2
8	Power Amplifier	SKET	HAP-80M01G-250W	2106070103	/	2026/5/29
9	Power Amplifier	SKET	HAP-01G 06G-75W	2106070104	/	2026/5/29
10	Audio Analysis	R&S	ATS-1	ATS 1-41152	/	2026/5/22
11	Audio Output Matching Network	SKET	RCO Network	/	/	2026/5/22
12	Power Meter	Agilent	E4419B	GB42421440	/	2026/5/22
13	RS test software	SKET	EMC-S	V2.0.0.19	/	/

6. Emission

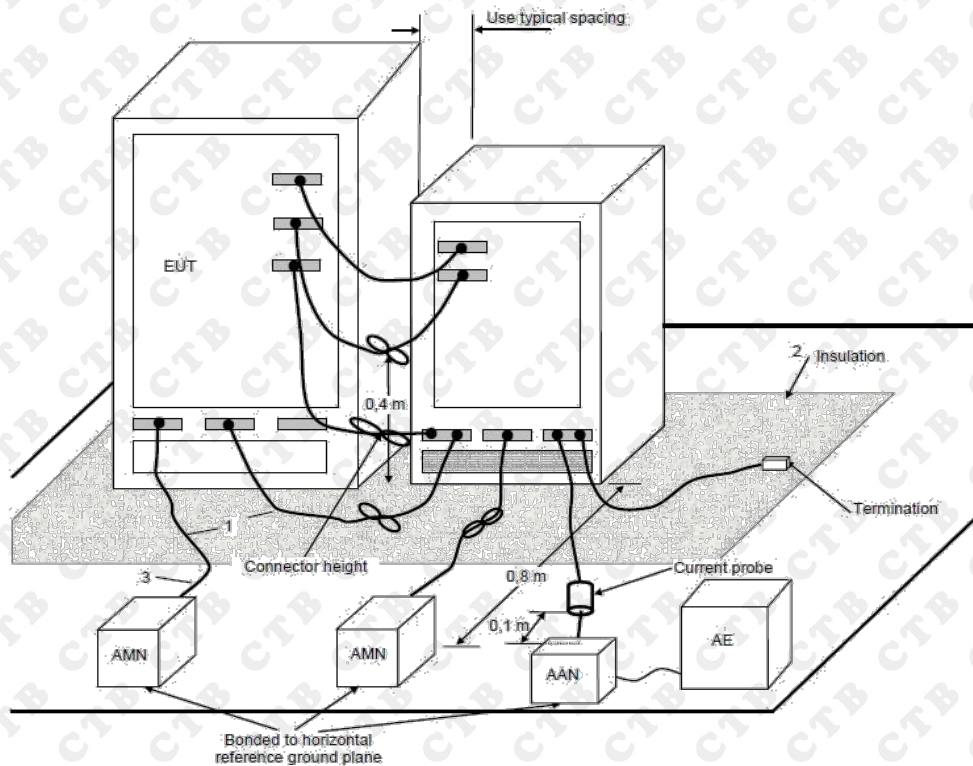
6.1. Conducted emission

6.1.1. Block diagram of test setup

For table-top equipment



For floor standing equipment



6.1.2. Limit

Requirements for conducted emissions from the AC mains power ports of Class A equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class A limits dB(μ V)
0,15 to 0,5	AMN	Quasi Peak / 9 kHz	79
0,5 to 30			73
0,15 to 0,5		Average / 9 kHz	66
0,5 to 30			60

Requirements for conducted emissions from the AC mains power ports of Class B equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μ V)
0,15 to 0,5	AMN	Quasi Peak / 9 kHz	66 to 56
0,5 to 5			56
5 to 30			60
0,15 to 0,5		Average / 9 kHz	56 to 46
0,5 to 5			46
5 to 30			50

Requirements for asymmetric mode conducted emissions from Class A equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class A limits dB(μ V)
0,15 to 0,5	AAN	Quasi Peak / 9 kHz	97 to 87
0,5 to 30			87
0,15 to 0,5		Average / 9 kHz	84 to 74
0,5 to 30			74

Requirements for asymmetric mode conducted emissions from Class B equipment

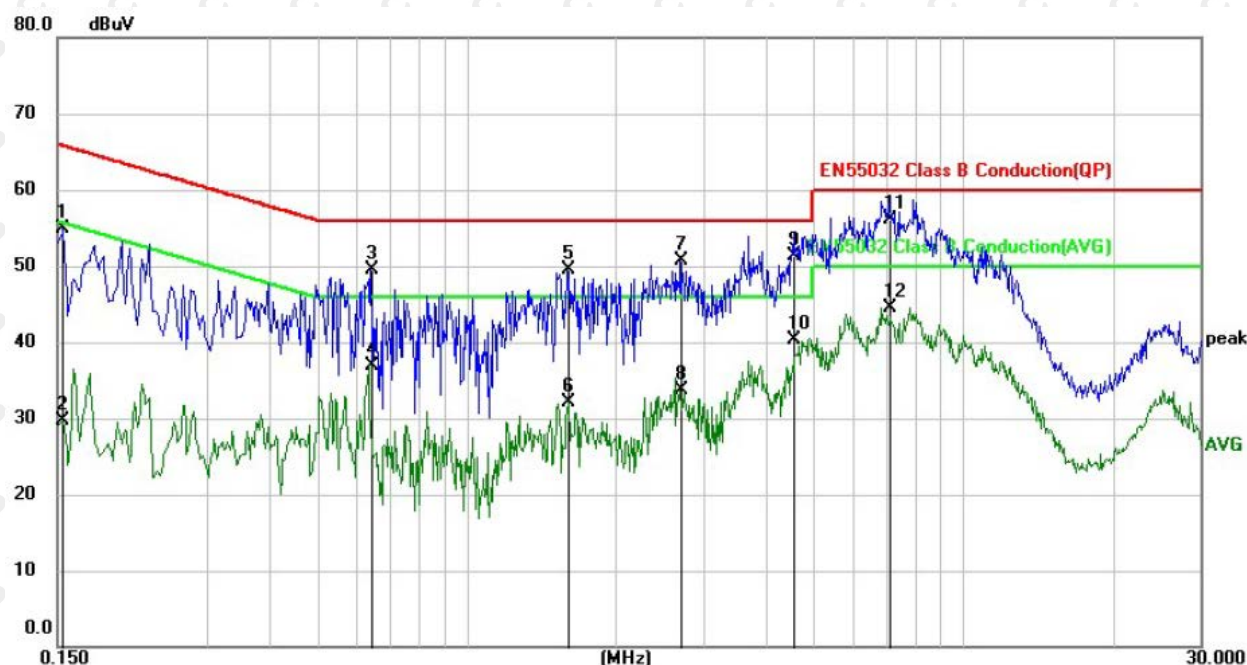
Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μ V)
0,15 to 0,5	AAN	Quasi Peak / 9 kHz	84 to 74
0,5 to 30			74
0,15 to 0,5		Average / 9 kHz	74 to 64
0,5 to 30			64

6.1.3. Test procedure

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

6.1.4. Test results

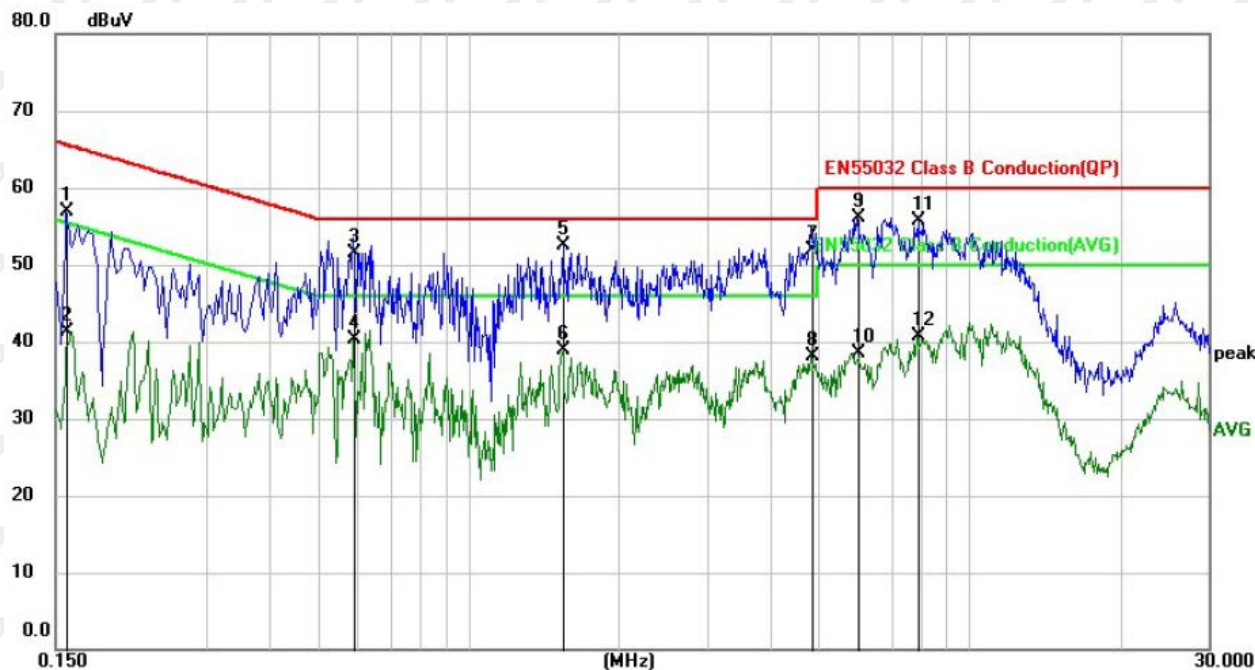
Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Phase :	Line
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 1



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1539	44.67	10.17	54.84	65.79	-10.95	QP
2		0.1539	19.61	10.17	29.78	55.79	-26.01	AVG
3		0.6419	39.32	10.23	49.55	56.00	-6.45	QP
4		0.6419	26.65	10.23	36.88	46.00	-9.12	AVG
5		1.5940	39.15	10.44	49.59	56.00	-6.41	QP
6		1.5940	21.65	10.44	32.09	46.00	-13.91	AVG
7		2.7060	39.97	10.79	50.76	56.00	-5.24	QP
8		2.7060	22.97	10.79	33.76	46.00	-12.24	AVG
9		4.5540	39.75	11.47	51.22	56.00	-4.78	QP
10		4.5540	28.88	11.47	40.35	46.00	-5.65	AVG
11	*	7.1100	43.45	12.60	56.05	60.00	-3.95	QP
12		7.1100	31.94	12.60	44.54	50.00	-5.46	AVG

Note: Result=Reading + Factor
Over Limit=Result – Limit

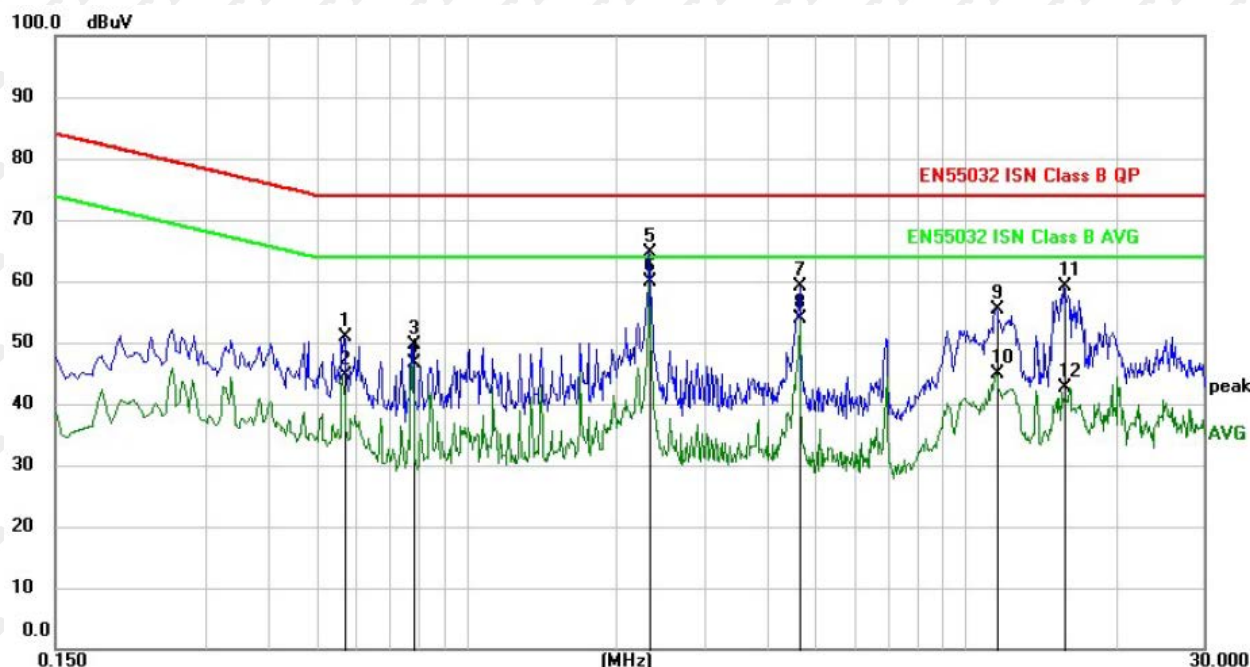
Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Phase :	Neutral
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 1



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1580	46.72	10.17	56.89	65.57	-8.68	QP
2		0.1580	31.06	10.17	41.23	55.57	-14.34	AVG
3		0.5899	41.25	10.22	51.47	56.00	-4.53	QP
4		0.5899	30.03	10.22	40.25	46.00	-5.75	AVG
5	*	1.5460	42.01	10.43	52.44	56.00	-3.56	QP
6		1.5460	28.54	10.43	38.97	46.00	-7.03	AVG
7		4.8300	40.32	11.57	51.89	56.00	-4.11	QP
8		4.8300	26.53	11.57	38.10	46.00	-7.90	AVG
9		5.9740	44.04	12.08	56.12	60.00	-3.88	QP
10		5.9740	26.44	12.08	38.52	50.00	-11.48	AVG
11		7.9260	42.73	12.99	55.72	60.00	-4.28	QP
12		7.9260	27.72	12.99	40.71	50.00	-9.29	AVG

Note: Result=Reading + Factor
Over Limit=Result – Limit

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	LAN Port :	100Mbps
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 2

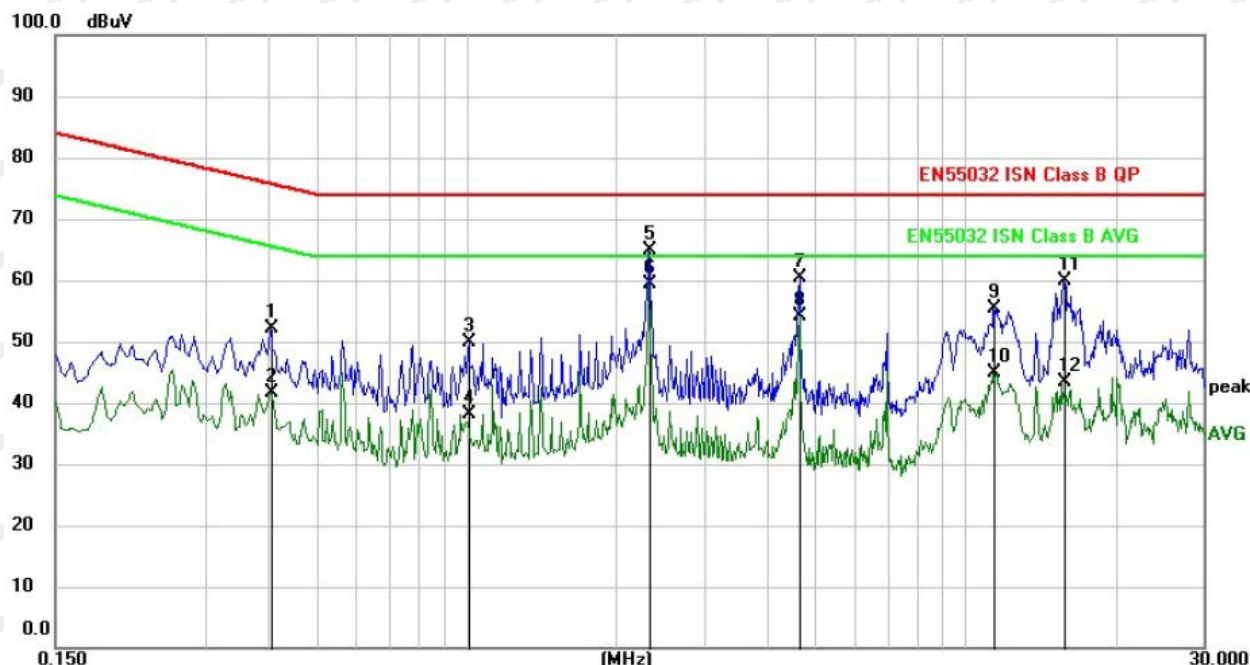


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.5700	31.21	19.57	50.78	74.00	-23.22	QP
2		0.5700	25.08	19.57	44.65	64.00	-19.35	AVG
3		0.7820	30.04	19.53	49.57	74.00	-24.43	QP
4		0.7820	27.00	19.53	46.53	64.00	-17.47	AVG
5		2.3260	45.06	19.47	64.53	74.00	-9.47	QP
6	*	2.3260	40.45	19.47	59.92	64.00	-4.08	AVG
7		4.6577	39.62	19.43	59.05	74.00	-14.95	QP
8		4.6577	34.42	19.43	53.85	64.00	-10.15	AVG
9		11.5219	35.98	19.45	55.43	74.00	-18.57	QP
10		11.5219	25.44	19.45	44.89	64.00	-19.11	AVG
11		15.7819	39.62	19.49	59.11	74.00	-14.89	QP
12		15.7819	23.02	19.49	42.51	64.00	-21.49	AVG

Note: Result=Reading + Factor

Over Limit=Result – Limit

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	LAN Port :	1000Mbps
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 2



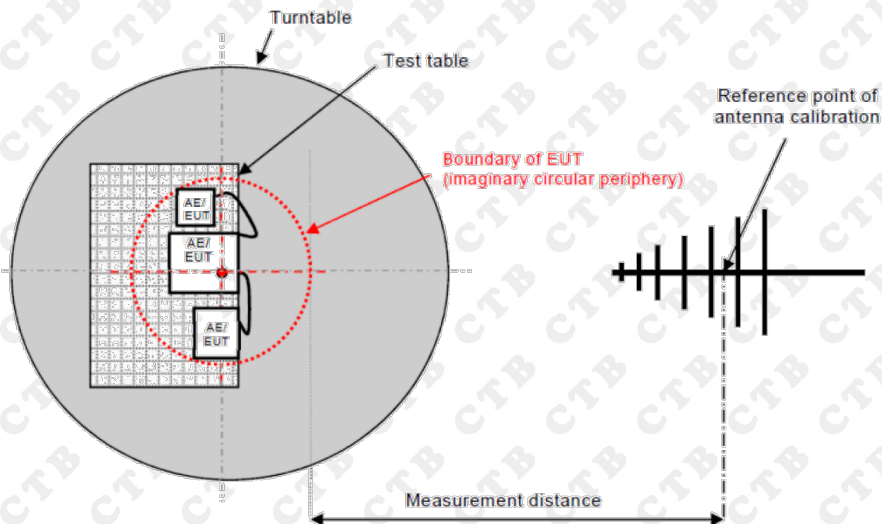
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	0.4060	32.45	19.67	52.12	75.73	-23.61	QP
2	0.4060	21.87	19.67	41.54	65.73	-24.19	AVG
3	1.0140	30.49	19.51	50.00	74.00	-24.00	QP
4	1.0140	18.72	19.51	38.23	64.00	-25.77	AVG
5	2.3260	45.41	19.47	64.88	74.00	-9.12	QP
6 *	2.3260	39.95	19.47	59.42	64.00	-4.58	AVG
7	4.6539	40.95	19.43	60.38	74.00	-13.62	QP
8	4.6539	34.68	19.43	54.11	64.00	-9.89	AVG
9	11.4300	35.94	19.45	55.39	74.00	-18.61	QP
10	11.4300	25.44	19.45	44.89	64.00	-19.11	AVG
11	15.7939	40.30	19.49	59.79	74.00	-14.21	QP
12	15.7939	23.80	19.49	43.29	64.00	-20.71	AVG

Note: Result=Reading + Factor
Over Limit=Result – Limit

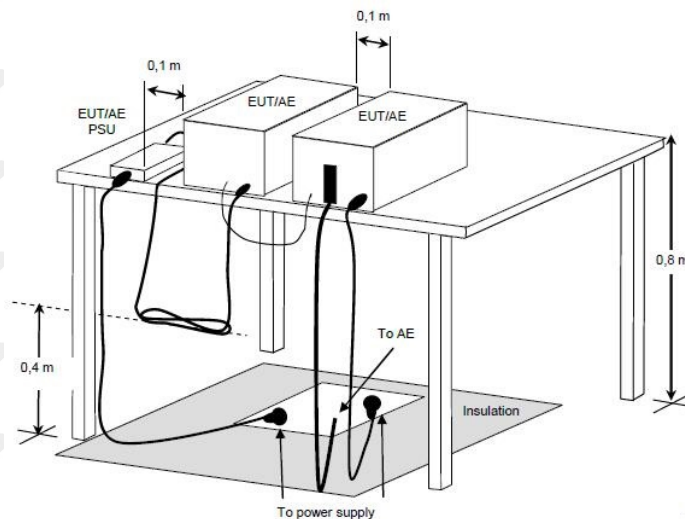
6.2. Radiated emissions

6.2.1. Block diagram of test setup

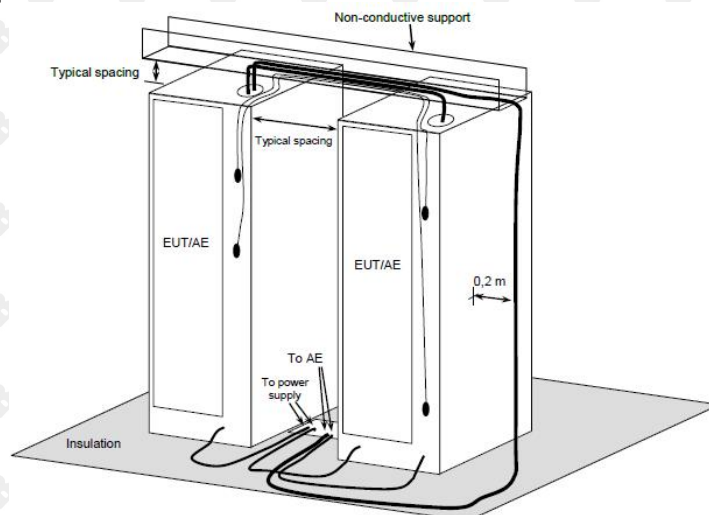
Measurement distance



For table-top equipment



For floor standing equipment



6.2.2. Limit

Requirements for radiated emissions at frequencies up to 1 GHz for class A equipment

Frequency range MHz	Measurement			Class A limits dB(μ V/m)
	Facility	Distance m	Detector type / bandwidth	
30 to 230	SAC	3	Quasi Peak / 120 kHz	50
230 to 1 000				57

Requirements for radiated emissions at frequencies above 1 GHz for class A equipment

Frequency range MHz	Measurement			Class A limits dB(μ V/m)
	Facility	Distance m	Detector type / bandwidth	
1 000 to 6 000	FSOATS	3	Average / 1MHz	60
1 000 to 6 000		3	Peak / 1MHz	80

Requirements for radiated emissions at frequencies up to 1 GHz for class B equipment

Frequency range MHz	Measurement			Class B limits dB(μ V/m)
	Facility	Distance m	Detector type / bandwidth	
30 to 230	SAC	3	Quasi Peak / 120 kHz	40
230 to 1 000				47

Requirements for radiated emissions at frequencies above 1 GHz for class B equipment

Frequency range MHz	Measurement			Class B limits dB(μ V/m)
	Facility	Distance m	Detector type / bandwidth	
1 000 to 6 000	FSOATS	3	Average / 1MHz	54
1 000 to 6 000		3	Peak / 1MHz	74

6.2.3. Test procedure

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

6.2.4. Test results

Up to 1GHz

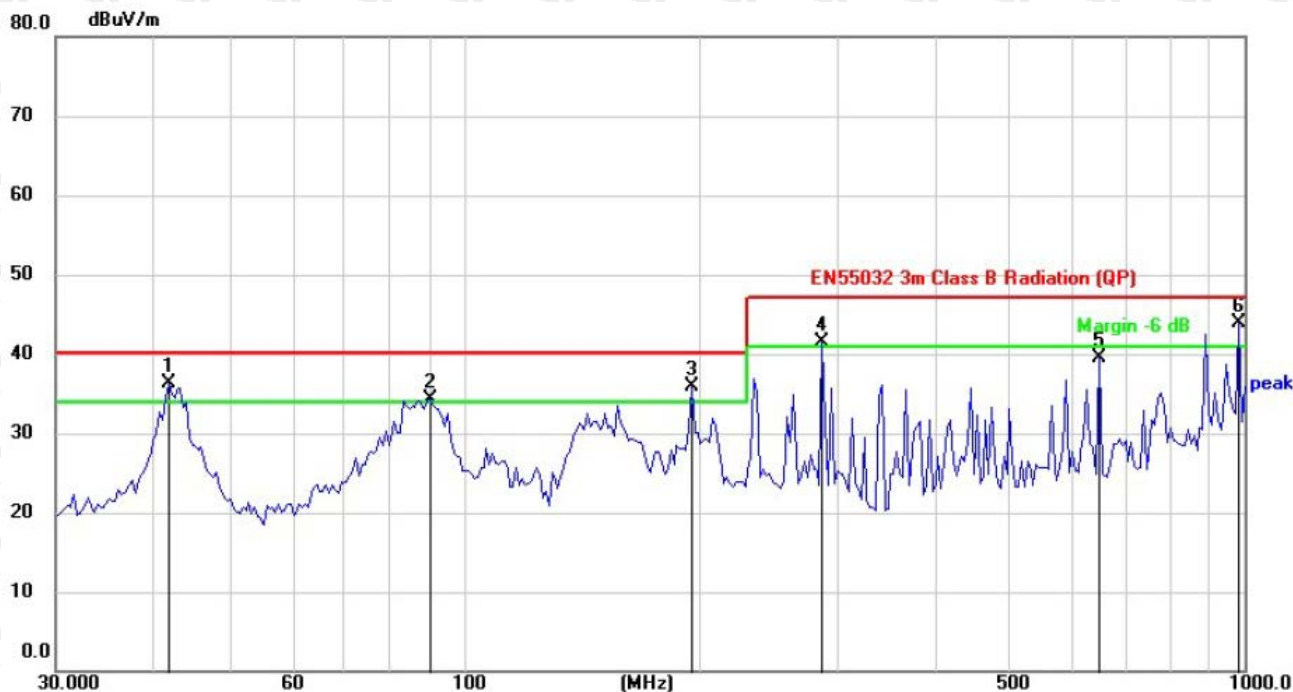
Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Horizontal
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 1



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dB/m	dB	
1	*	195.8219	41.00	-5.95	35.05	40.00	-4.95	QP
2		235.4032	41.29	-5.25	36.04	47.00	-10.96	QP
3		266.1419	40.32	-4.03	36.29	47.00	-10.71	QP
4		287.9904	43.14	-3.06	40.08	47.00	-6.92	QP
5		446.4140	37.70	-0.05	37.65	47.00	-9.35	QP
6	!	982.6200	32.90	9.15	42.05	47.00	-4.95	QP

Note: Result=Reading+Factor
Over Limit=Result-Limit

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Vertical
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 1

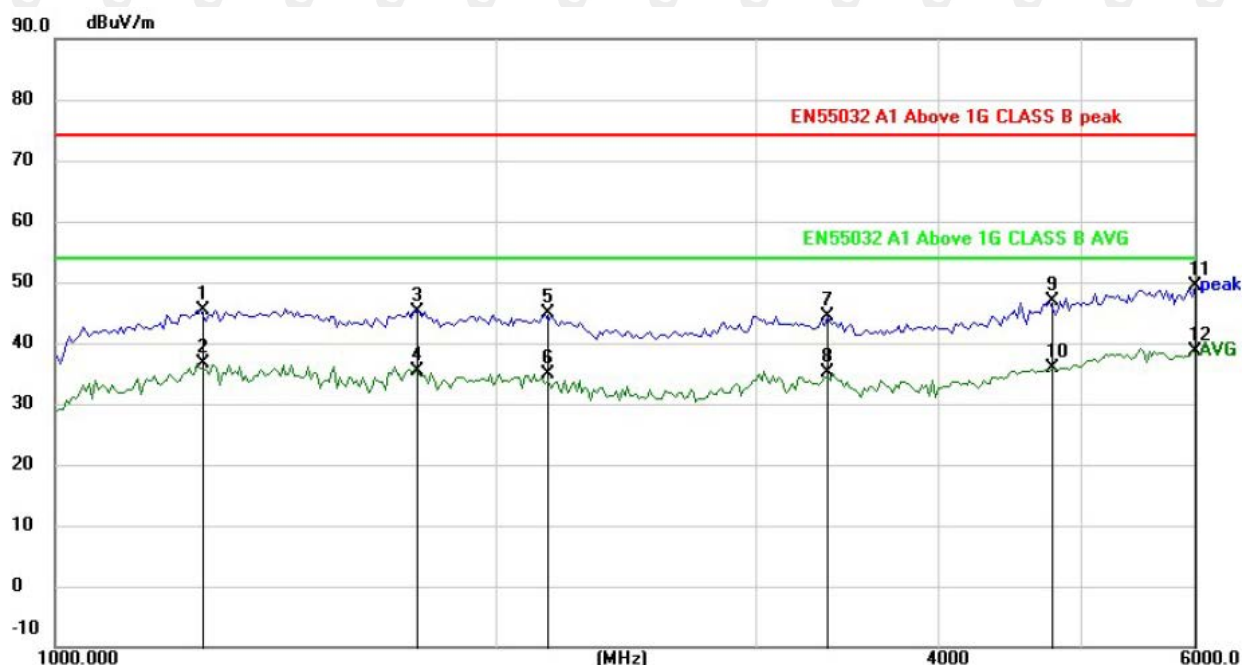


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	!	41.8594	42.21	-5.97	36.24	40.00	-3.76	QP
2	!	90.5374	42.11	-7.88	34.23	40.00	-5.77	QP
3	!	195.8218	41.79	-5.95	35.84	40.00	-4.16	QP
4	!	287.9904	44.53	-3.06	41.47	47.00	-5.53	QP
5		650.7997	34.31	5.20	39.51	47.00	-7.49	QP
6	*	982.6200	34.76	9.15	43.91	47.00	-3.09	QP

Note: Result=Reading+Factor
Over Limit=Result-Limit

Above 1GHz

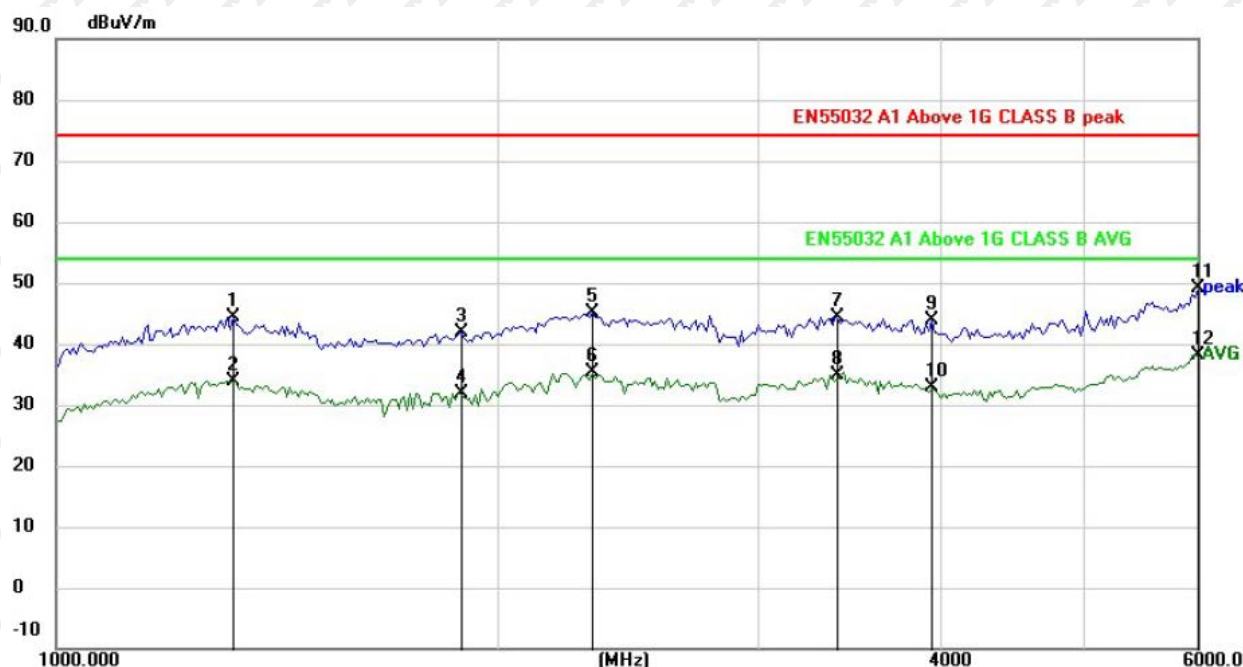
Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Horizontal
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 1



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		1256.650	48.55	-3.13	45.42	74.00	-28.58	peak
2		1256.650	39.72	-3.13	36.59	54.00	-17.41	AVG
3		1766.294	45.04	0.11	45.15	74.00	-28.85	peak
4		1766.294	35.31	0.11	35.42	54.00	-18.58	AVG
5		2160.753	42.05	2.77	44.82	74.00	-29.18	peak
6		2160.753	32.04	2.77	34.81	54.00	-19.19	AVG
7		3366.646	36.47	7.98	44.45	74.00	-29.55	peak
8		3366.646	27.20	7.98	35.18	54.00	-18.82	AVG
9		4774.600	33.18	13.60	46.78	74.00	-27.22	peak
10		4774.600	22.33	13.60	35.93	54.00	-18.07	AVG
11		6000.000	32.29	17.08	49.37	74.00	-24.63	peak
12	*	6000.000	21.52	17.08	38.60	54.00	-15.40	AVG

Note: Result=Reading+Factor
Over Limit=Result-Limit

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Vertical
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 1

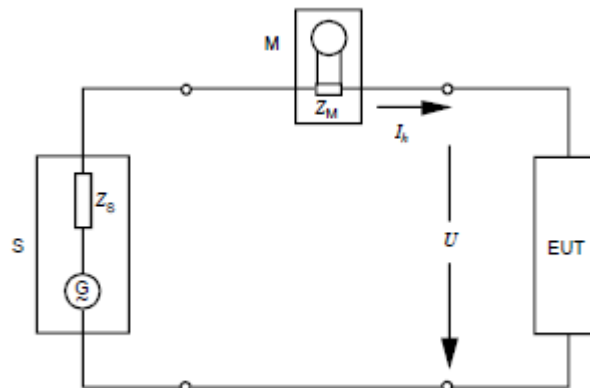


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		1320.120	47.04	-2.78	44.26	74.00	-29.74	peak
2		1320.120	36.62	-2.78	33.84	54.00	-20.16	AVG
3		1889.051	40.68	1.12	41.80	74.00	-32.20	peak
4		1889.051	30.74	1.12	31.86	54.00	-22.14	AVG
5		2321.299	41.70	3.52	45.22	74.00	-28.78	peak
6		2321.299	31.75	3.52	35.27	54.00	-18.73	AVG
7		3396.943	36.31	8.09	44.40	74.00	-29.60	peak
8		3396.943	26.86	8.09	34.95	54.00	-19.05	AVG
9		3955.770	33.84	10.10	43.94	74.00	-30.06	peak
10		3955.770	22.70	10.10	32.80	54.00	-21.20	AVG
11		6000.000	32.14	17.08	49.22	74.00	-24.78	peak
12	*	6000.000	21.10	17.08	38.18	54.00	-15.82	AVG

Note: Result=Reading+Factor
Over Limit=Result-Limit

6.3. Harmonic current emissions

6.3.1. Block diagram of test setup



S power supply source

M measurement equipment

EUT equipment
under test

Z_M input impedance of measurement
equipment

I_h harmonic component of order h of the
line current

U test voltage

Z_s internal impedance of the supply
source

G open-loop voltage of the supply source

6.3.2. Test Specification

Basic Standard(s)	:	EN IEC 61000-3-2
Measurement Equipment requirement	:	IEC 61000-4-7
Measured Harmonics	:	1 – 40
Equipment Class	:	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Limits	:	<input checked="" type="checkbox"/> Clause 7 Table 1 Limits for Class A equipment <input type="checkbox"/> Clause 7.3 Limits for Class B equipment <input type="checkbox"/> Clause 7 Table 2 Limits for Class C equipment <input type="checkbox"/> Clause 7 Table 3 Limits for Class D equipment

6.3.3. Test Procedure

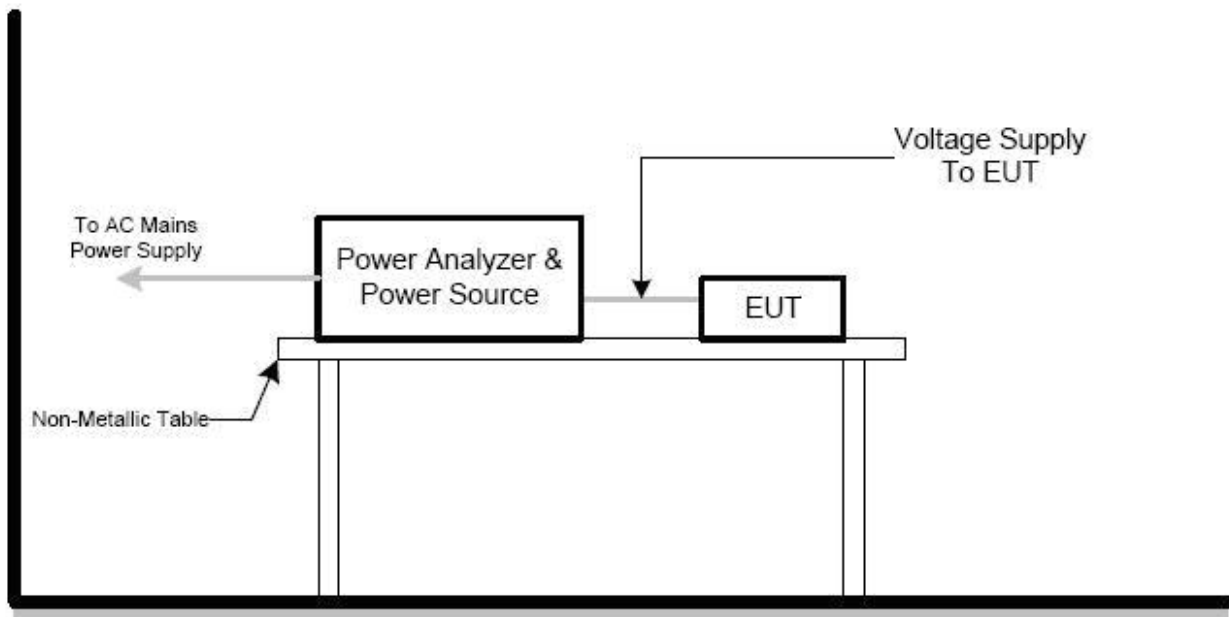
1. EUT is placed on a wooden table with a height of 0,8m in the EMC lab.
2. Apply a 230V/50Hz rated test voltage which shall be maintained within $\pm 2.0\%$ and the frequency within $\pm 0.5\%$ of the nominal value to EUT.
3. Let EUT works as stated and through Universal Power Analyzer to measure the EUT to get the harmonic current for Odd & Even harmonics up to 40th.

6.3.4. Test Result

N/A

6.4. Voltage changes, voltage fluctuations and flicker

6.4.1. Block diagram of test setup



6.4.2. Test Specification

Basic Standard(s)	:	EN 61000-3-3
Measurement Equipment requirement	:	IEC 61000-4-15
Limits	:	Clause 5

6.4.3. Test procedure

1. EUT is placed on a wooden table with a height of 0,8m in the EMC lab.
2. Apply a 230V/50Hz rated test voltage which shall be maintained within $\pm 2.0\%$ and the frequency within $\pm 0.5\%$ of the nominal value to EUT.

6.4.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Load Power : 0.011 kW

Power Factor:0.367

Load Current : 0.129 Arms

Crest Factor:4.674

Nominal Voltage : 231.38 Vrms

Result:

T-max (ms):	0.00	Test limit (ms):	500.00	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.00	Test limit:	1.00	Pass

7. Immunity

Performance criteria

Performance criterion 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.

Performance criterion 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.

Performance criterion 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.

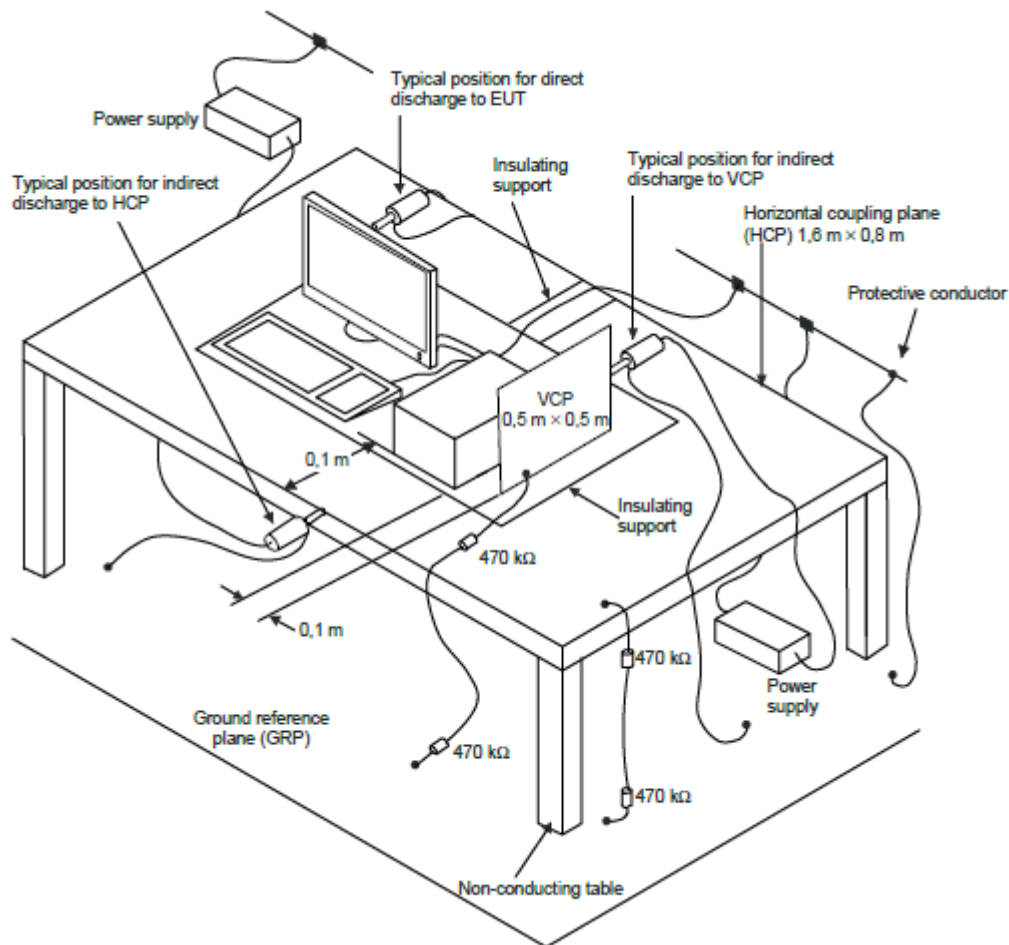
7.1. Electrostatic discharges (ESD)

7.1.1. Test standard and Levels

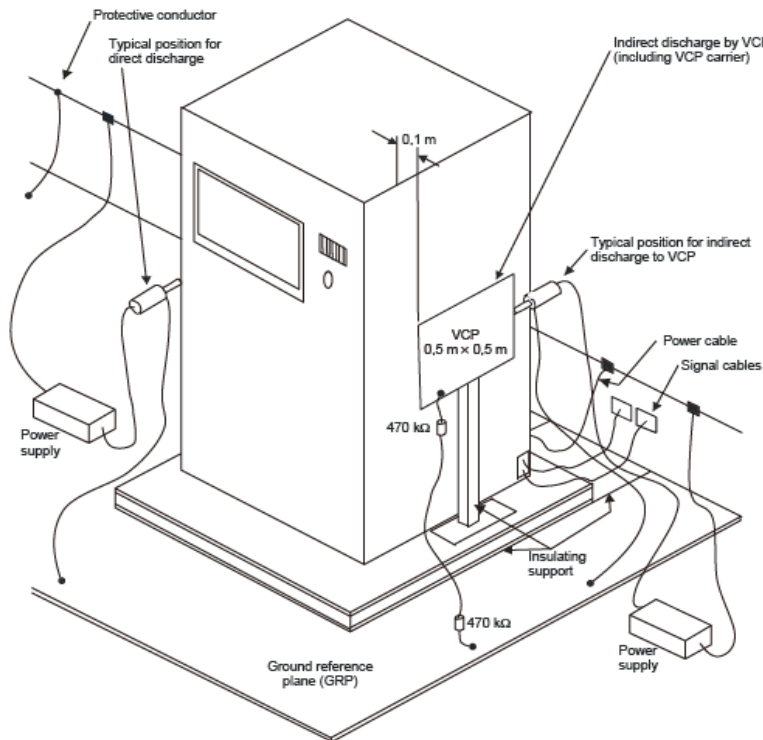
Environmental phenomenon	Test specifications	Basic standard
Electrostatic discharge	± 8 kV air discharge	IEC 61000-4-2
	± 4 kV contact discharge	

7.1.2. Block diagram of test setup

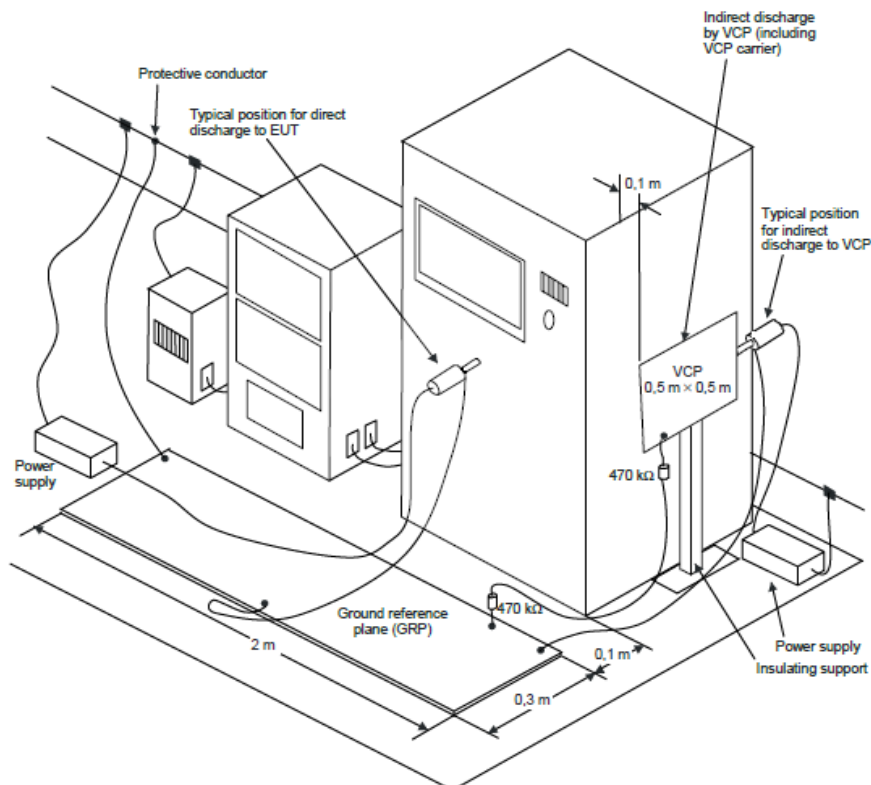
For table-top equipment



For floor standing equipment



For table-top & floor standing equipment



7.1.3. Test Procedure

1. Air discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

2. Contact discharge:

All the procedure shall be same as Section 1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

3. Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

4. Indirect discharge for vertical coupling plane

At least 20 single discharge shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

7.1.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Performance Criterion	Required Criterion
Contact Discharge	Conductive Surfaces	4	10	B	A
	Indirect Discharge HCP	4	10	B	A
	Indirect Discharge VCP	4	10	B	A
Air Discharge	Slots, Apertures, and Insulating Surfaces	8	10	B	A
Note: N/A					

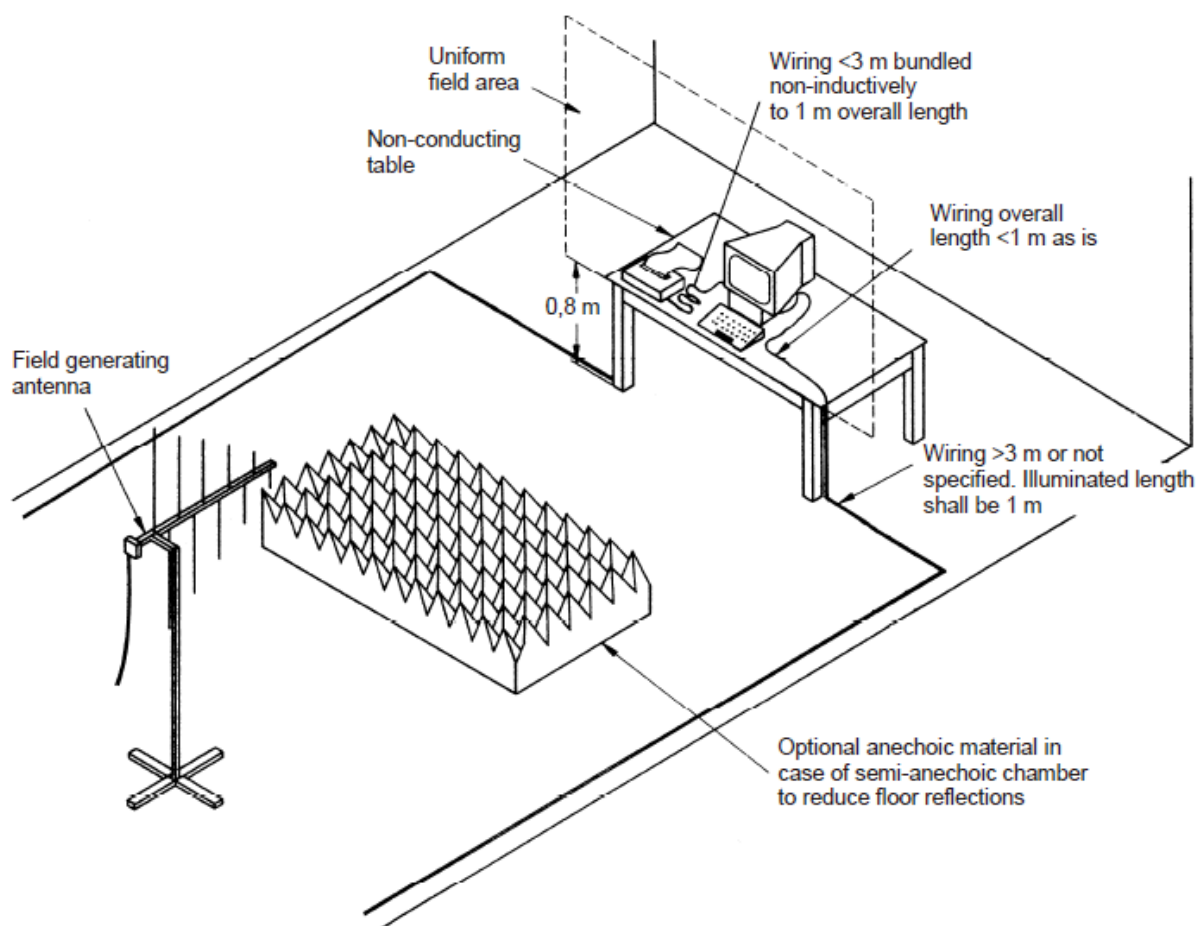
7.2. Continuous RF electromagnetic field disturbances

7.2.1. Test standard and Levels

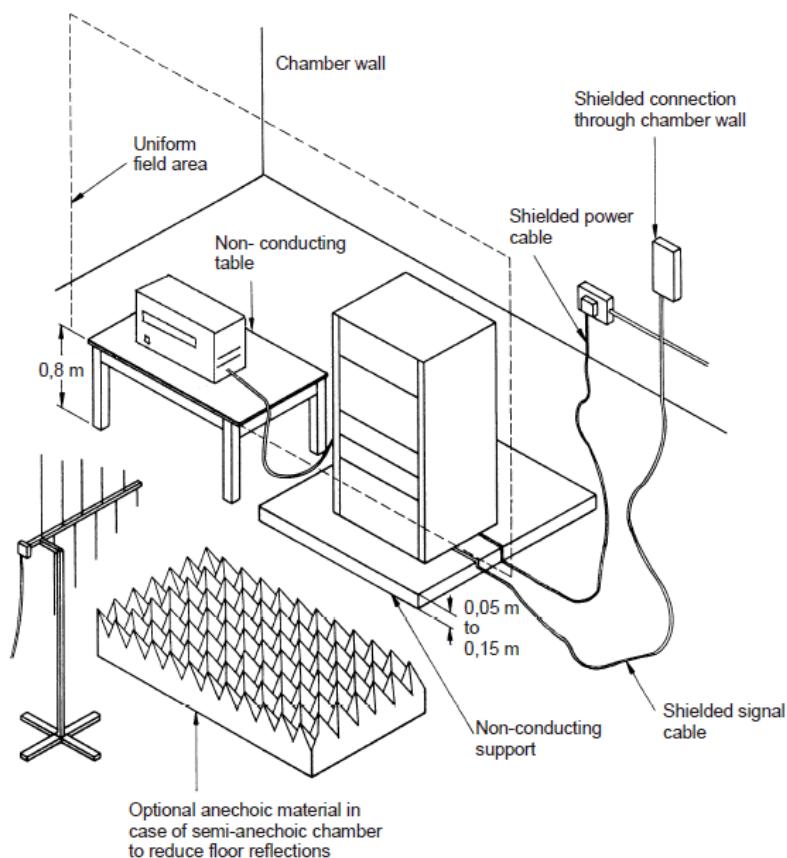
Characteristics	Test levels	Test levels	Basic standard
Frequency range	80 MHz to 1000 MHz,	1800MHz, 2600MHz, 3500MHz, 5000MHz	IEC 61000-4-3
Test level	3 V/m (unmodulated)	3 V/m (unmodulated)	
Modulation	1 kHz, 80 % AM, sine wave	1 kHz, 80 % AM, sine wave	

7.2.2. Block diagram of test setup

For table-top equipment



For floor standing equipment



7.2.3. Test Procedure

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

7.2.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Frequency range [MHz]	Test Level [V/m]	Polarization	EUT Face	Performance Criterion	Required Criterion
80 to 1000, 1800, 2600, 3500, 5000	3	Horizontal & Vertical	Front/ Rear	A	A
			Right/ Left	A	A
			Top/ Underside	A	A
Note: N/A					

7.3. Electrical fast transients/burst (EFT/B)

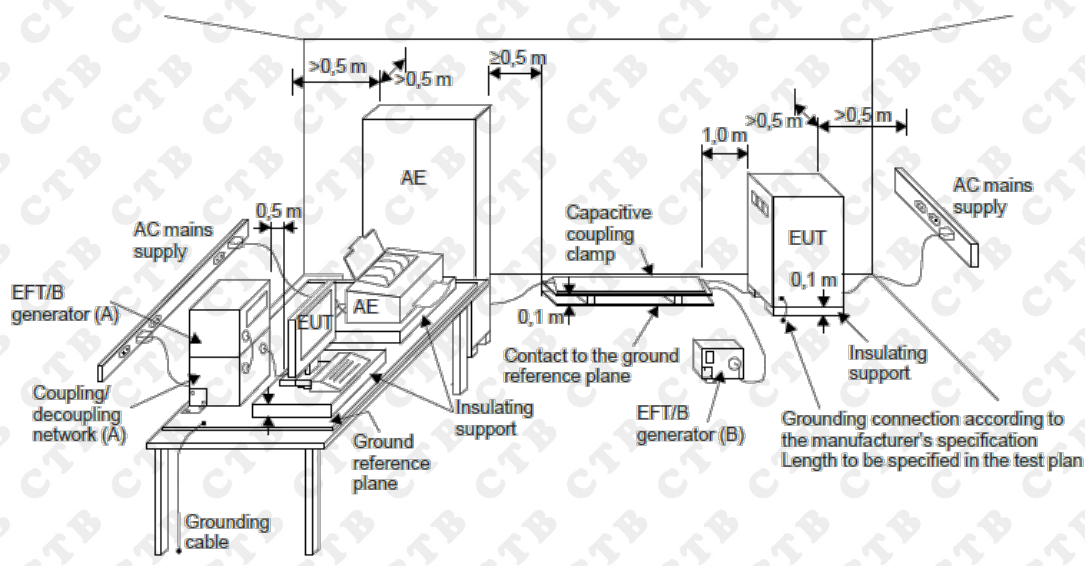
7.3.1. Test standard and Levels

Analogue/digital data ports		
Environmental phenomenon	Test specifications	Basic Standard
Fast transients common mode	±0,5 kV (peak)	IEC 61000-4-4
	5/50 ns <i>Tr/Td</i>	
	5 kHz repetition frequency	
Applicable only to ports which, according to the manufacturer's specification, support cable lengths greater than 3 m.		

DC network power ports		
Environmental phenomenon	Test specifications	Basic Standard
Fast transients common mode	±0,5 kV (peak)	IEC 61000-4-4
	5/50 ns Tr/Td	
	5 kHz repetition frequency	
Applicable only to ports which, according to the manufacturer's specification, support cable lengths greater than 3 m.		

AC mains power ports		
Environmental phenomenon	Test specifications	Basic Standard
Fast transients common mode	± 1 kV (peak)	IEC 61000-4-4
	5/50 ns T_r/T_d	
	5 kHz repetition frequency	

7.3.2. Block diagram of test setup



7.3.3. Test Procedure

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

7.3.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Coupling	Voltage (kV)	Polarity	Performance Criterion	Required Criterion
AC MainsL-N	1.0	±	B	A
Signal Line	0.5	±	B	N/A
Telec Ports	0.5	±	B	N/A
DC Ports	0.5	±	B	N/A
Note: N/A				

7.4. Surges

7.4.1. Test standard and Levels

Analogue/digital data ports		
Environmental phenomenon	Test specifications	Basic Standard
Surge	Port type: unshielded symmetrical Apply: lines to ground	IEC 61000-4-5
	Apply where primary protection is intended	
	10/700 (5/320) μ s Tr/Td	
	± 1 and ± 4 kV line-to-earth, See ^{a,b}	
	Apply where primary protection is not intended	
	10/700 (5/320) μ s Tr/Td	
	± 1 line-to-earth, See ^b	
	Port type: coaxial or shielded Apply: shield to ground	
	1,2/50 (8/20) μ s Tr/Td	
	± 0.5 kV line-to-earth	

Applicable only to ports which, according to the manufacturer's specification, support cable lengths greater than 3 m.

a Surges are applied with primary protection fitted. Where possible, use the actual primary protector intended to be used in the installation.

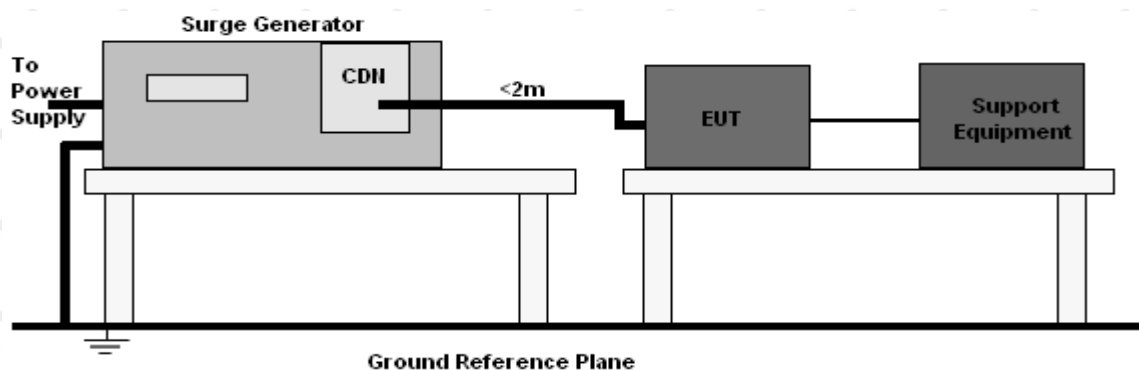
b Where the surge coupling network for the 10/700 (5/320) μ s waveform affects the functioning of high speed data ports, the test shall be carried out using a 1,2/50 (8/20) μ s waveform and appropriate coupling network.

DC network power ports		
Environmental phenomenon	Test specifications	Basic Standard
Surge	Surges are applied line to reference ground for each individual line	IEC 61000-4-5
	1,2/50 (8/20) μ s Tr/Td	
	± 0.5 kV line-to-earth	

Applicable only to ports which, according to the manufacturer's specification, support cable lengths greater than 3 m.

AC mains power ports		
Environmental phenomenon	Test specifications	Basic Standard
Surge	1,2/50 (8/20) μ s Tr/Td	IEC 61000-4-5
	± 2 kV line-to-earth	
	± 1 kV line-to-line	

7.4.2. Block diagram of test setup



7.4.3. Test Procedure

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

7.4.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Coupling	Level [kV]	Phase angles [°]	Performance Criterion	Required Criterion
Line-to-Neutral	1	+ 90, - 270	B	A
Line-to-Earth	2	+ 90, - 270	B	N/A
Neutral-to-Earth	2	+ 90, - 270	B	N/A
Note*: N/A				

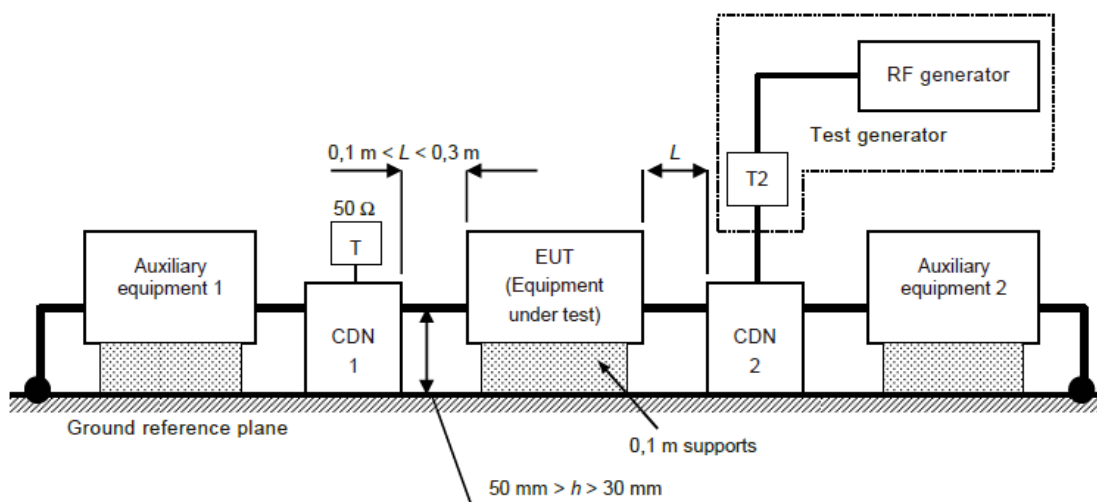
7.5. Continuous induced RF disturbance

7.5.1. Test standard and Levels

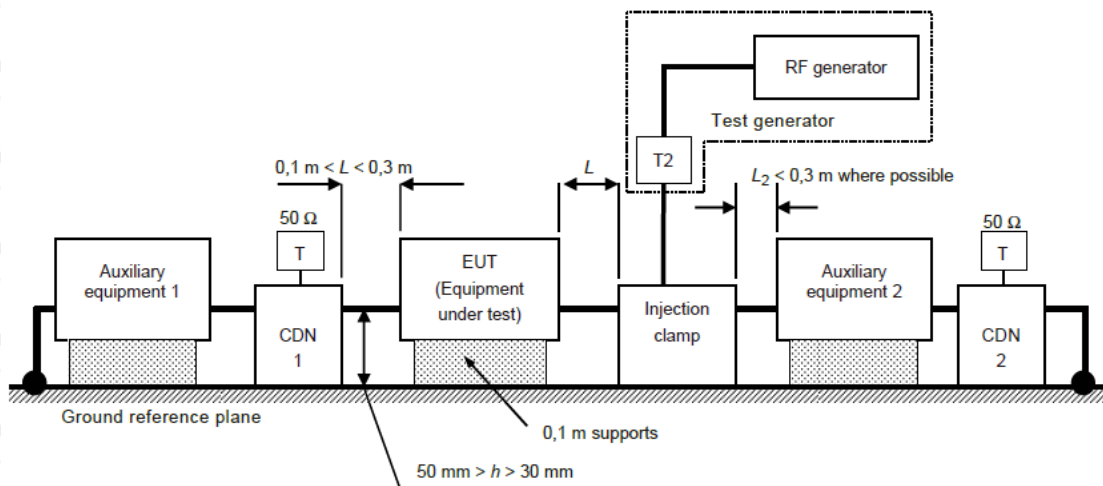
Analogue/digital data ports & DC network power ports & AC mains power ports		
Environmental phenomenon	Test specifications	Basic Standard
RF current common mode 1 kHz, 80 % AM	0,15 MHz to 10 MHz, 3 V	IEC 61000-4-6
	10 MHz to 30 MHz, 3 to 1 V	
	30 MHz to 80 MHz, 1 V	
Applicable only to ports which, according to the manufacturer's specification, support cable lengths greater than 3 m.		

7.5.2. Block diagram of test setup

For input a.c. power port:



For signal lines and control lines:



7.5.3. 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.

7.5.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

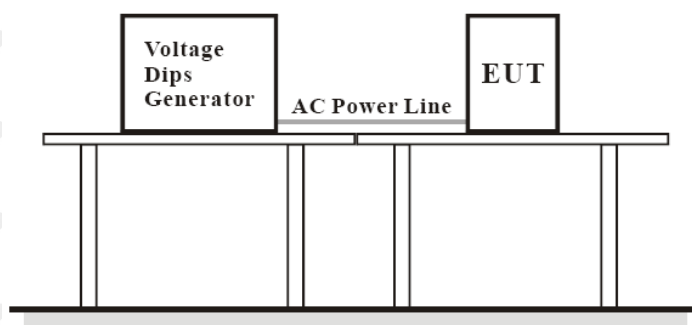
Inject Line	Frequency (MHz)	Voltage Level (V r.m.s.)	Performance Criterion	Required Criterion
a.c. port	0.15 – 10	3	A	A
	10 – 30	3 to 1		
	30 – 80	1		
Note: N/A				

7.6. Voltage dips and Voltage interruptions

7.6.1. Test standard and Levels

Environmental phenomena		Test level in % UT	Durations for voltage dips and voltage interruptions		Basic standard
			50Hz	60Hz	
voltage dips and voltage interruptions in % UT	>95	<5	0,5 cycle	0,5 cycle	IEC 61000-4-11 Voltage change shall occur at zero crossing
	30	70	25 cycle	30 cycle	
	>95	< 5	250 cycle	300 cycle	
UT is the rated voltage of the equipment under test.					

7.6.2. Block diagram of test setup



7.6.3. 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.

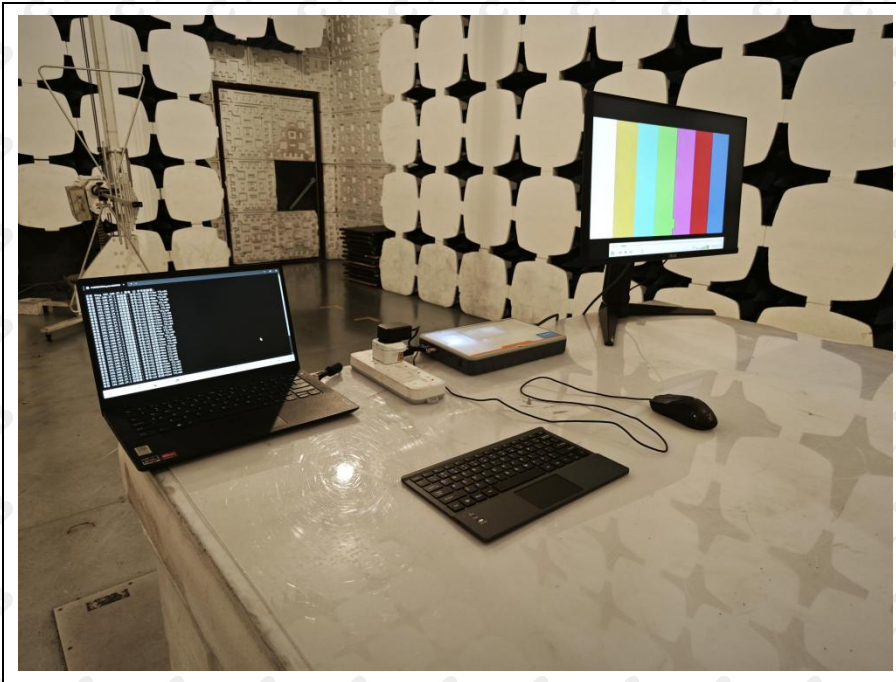
7.6.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

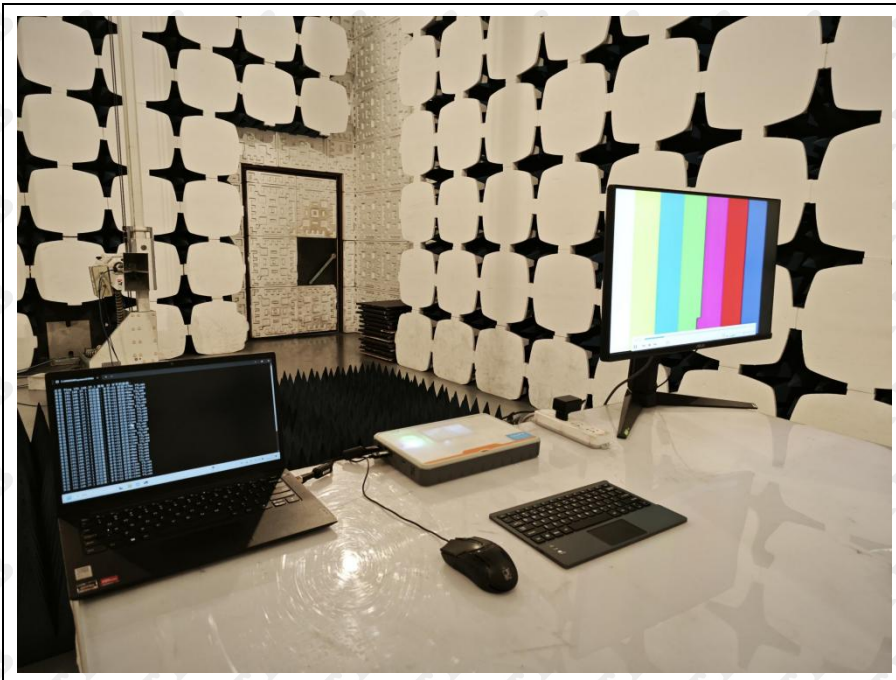
Test Level % U_T	Voltage dips and voltage interruptions in % U_T	Duration (cycles)		Performance Criterion	Required Criterion
		50Hz	60Hz		
<5	>95	0.5	0.5	B	B
70	30	25	30	C	B
< 5	>95	250	300	C	B
Note: The EUT test is completed, the system automatically recovers to normal operation					

8. Photographs of test setup

RE up to 1GHz



RE above 1GHz



CE



TELE



H&F



ESD



(EFT/B) & Surges



DIPS



CS



RS



9. Photographs of EUT

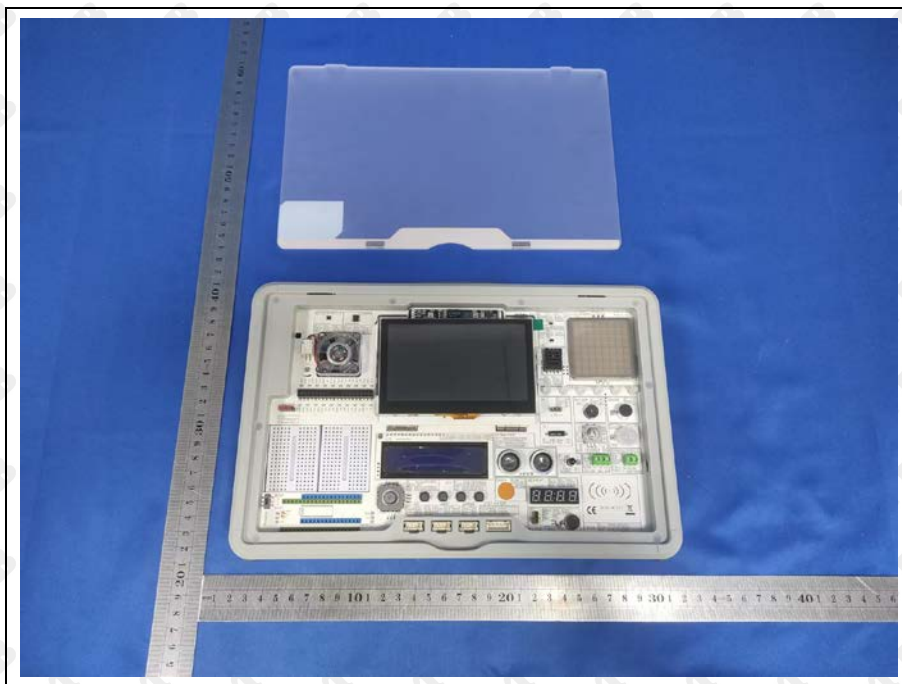
EUT photo 1



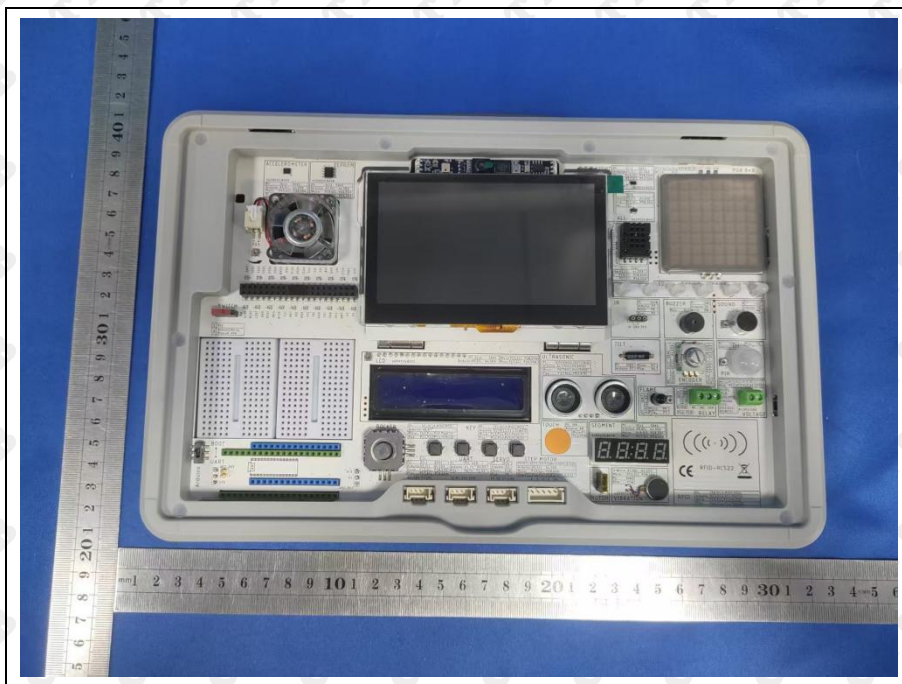
EUT photo 2



EUT photo 3



EUT photo 4



EUT photo 5



EUT photo 6



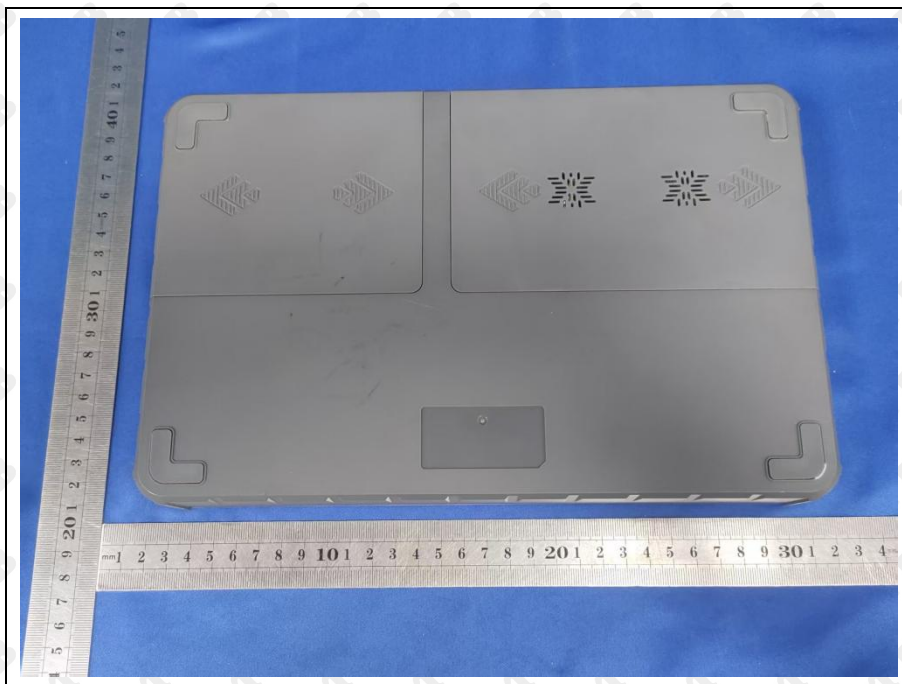
EUT photo 7



EUT photo 8



EUT photo 9



EUT photo 10



EUT photo 11



End of report