



TEST REPORT

Report No..... : ZHT-240529036E

Product..... : Human Machine Interface

Trademark..... : **XINJE**

Model(s)..... : See Section 3.1

Applicant..... : Wuxi Xinje Electric Co., Ltd.

Address..... : No.816, Jianzhu West Road, Binhu District, Wuxi City, Jiangsu Province, China

Manufacturer..... : Wuxi Xinje Electric Co., Ltd.

Address..... : No.816, Jianzhu West Road, Binhu District, Wuxi City, Jiangsu Province, China

Prepared by..... : Guangdong Zhonghan Testing Technology Co., Ltd.

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Date of Receipt..... : May 29, 2024

Date of Test(s)..... : This report does not include tests.

Date of Issue..... : May 31, 2024

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

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

Tested by:

Kimi Lu

Kimi Lu/ Engineer

Reviewed by:

Baret Wu

Baret Wu/ Director



Note: The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report shall not be reproduced except in full, without prior written approval of ZHT. This document may be altered or revised by ZHT, personnel only, and shall be noted in the revision of the document.



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1. Revision History

Report No.	Issue Date	Description	Approved
ZHT-240529036E	May 31, 2024	Original	Valid

This testing report has added model name on the basis of ZHT-230307005E and ZHT-230925055E. Adding model name will not affect the test results. No further testing of EUT is required. All test data is based on the original report ZHT-230307005E and ZHT-230925055E.



2. Test Summary

Emission			
Requirement - Test	Test Method	Limit	Result
Conducted Emission	EN 55032:2015+A11:2020	Class B	PASS
Radiated Emission	EN 55032:2015+A11:2020	Class B	PASS
Immunity			
Requirement - Test	Test Method	Performance criteria	Result
Electrostatic discharges	EN 61000-4-2:2009	B	PASS
Continuous RF electromagnetic field disturbances	EN 61000-4-3:2020	A	PASS
Fast transients	EN 61000-4-4:2012	B	N/A
Surges	EN 61000-4-5:2014	B	N/A
Continuous induced RF disturbances	EN 61000-4-6:2014	A	N/A
Power frequency magnetic fields	EN 61000-4-8:2010	A	N/A
Voltage dips and short interruptions	EN 61000-4-11:2020	B & C & C	N/A

Requirement - Test	Test Method	Limit	Result
Harmonic current emissions	EN IEC 61000-3-2:2019	Class A	N/A
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3:2013+A1:2019	Clause 5	N/A

Remark: N/A is abbreviation for Not Applicable.



3. General Information

3.1. Description of EUT

Product:	Human Machine Interface
Model Name:	<p>OP320</p> <p>OP320-S, OP320-A, OP320-A_时, OP320-A-N_时, OP320-A-S, OP320-A-S_时, OP330, OP330_时, OP330-S 时, TG765-MT, TG465G-ZT, TG765-UT, TG765-ET, TG765-XT-C-左右双开口, TG765-MT (P) , TG765-UT(P), TG765-NT, TG765-XT(P)-C, TG765S-ET, TG765S-MT, TG765S-UT, TG765S-XT, TG765G-ET, TG765G-MT, TG765G-UT, TG765G-XT, TG765G-ZT, TG865-ET, TG865-MT, TGA62-ET, TGA62-MT, TGA62-ET(P), TGA62-MT(P), TGA63-ET, TGA63-MT, TGA63-UT, TGA63-NT, TGA63G-ET, TGA63G-MT, TGA63G-UT, TGA63S-ET, TGA63S-MT, TGA63S-UT, TGC65-ET, TG465-MT, TG465-UT, TG465-MT(P), TG465-XT, TG465-MT2, TG465-UT2, TG465-ET, TE765-MT, TE765-ET, TG465G-ET, TG465G-UT, TGM765S-MT, TGM765S-ET, TGM765-ETW, TGM765-MTW, TGM765B-ET, TGM765B-MT, TGM765L-ET, TGM765L-MT, TGM865-ET, TGMA63S-MT, TGMA63S-ET, TGMA63D-ET, TGM465-ET, TGM465-MT2, TGM65-ET, TGM465B, TGMA63B-ET, RT750, RT711, RT712, RT760, RT720, TS3-700-E, TS3-700-M, TS5-700-E, TS3-1000-M, TS3-1000-E, TS5-700-4G, TS5-700-W, TS5-1000-E, TS5-1000-4G, TS5-1000-W, TS3-700-Z, CCSG-765MT, CCSG-765UT, CCSG-765ET, CCSG-A62ET, CCSG-C65ET, TS-4G-BD, TS-W-BD, MTG765-UT, MTG765-HT, TS2-700-Z, TS2-700-E, TS5D-1500-E, TGM765D-ET, TS5-700H-E, TS5-700H-W, TS5-700H-4G, TS5D-1500-E2, TS5D-1500-W, TS5D-1500-4G, TS2-400-Z, TS2-400-E, TS2-1000-Z, TS2-1000-E, TS3-700-Z, TS3-1000-Z, RTS700-E, TS5-400-E, TS5-400-W, TS5-400-4G, RT720-E, TS5D-1200-E2, TS5D-1200-4G, TS5D-1200-W, TS3-400-M, TS3-400-E, TS3-400-Z, TS3-700-M3, TS7-1000-E2, TS7-1000-4G, TS7-1000-W, 监控软件, AutoWin Pro, OP320-A_时, TS5-1000A-E, TS5-1000A-4G, TS5-1000A-W</p>
Model Difference:	Only the model name is different
Rated Power Supply:	Input: DC 24-26 V
Normal Testing Voltage:	DC 24 V
DC Line	/
I/O Ports	Refer to User Manual
Highest Frequency Generated	1 GHz



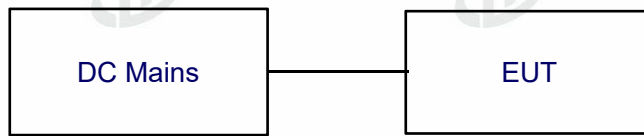
Note:

1) Other Accessory Device List and Details

Description	Manufacturer	Model	Note

2) 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.

3.2. Block diagram of EUT configuration



3.3. Test Mode

Test Item	Test mode
Conducted Emission	Conducted Emission
Radiated Emission	Working mode
Electrostatic discharges	Working mode
Continuous RF electromagnetic field disturbances	Working mode

3.4. Test Site Environment

Test Item	Required (IEC 60068-1)		Actual
Conducted Emission	Temperature (°C)	15-35	23.8
	Humidity (%RH)	25-75	53
	Barometric pressure (mbar)	860-1060	1004
Radiated Emission	Temperature (°C)	15-35	24.0
	Humidity (%RH)	25-75	54
	Barometric pressure (mbar)	860-1060	1004
Electrostatic discharges	Temperature (°C)	15-35	24.0
	Humidity (%RH)	25-75	52.0
	Barometric pressure (mbar)	860-1060	1014
Continuous RF electromagnetic field disturbances	Temperature (°C)	15-35	24.1
	Humidity (%RH)	25-75	53.9
	Barometric pressure (mbar)	860-1060	1014



4. Facilities

4.1. Test Facility

All measurement facilities used to collect the measurement data are located at ZHT.

4.2. Test Instruments

This testing report has added model name on the basis of ZHT-230307005E and ZHT-230925055E. Adding model name will not affect the test results. No further testing of EUT is required. All test data is based on the original report ZHT-230307005E and ZHT-230925055E.

4.3. Testing software

Project	Software name	Edition
Conducted Emission	EZ-EMC	EMC-CON 3A1.1+
Radiated Emission	EZ-EMC	FA-03A2 RE+

4.4. Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Test item	Value (dB)
Conducted Emission (150kHz-30MHz)	2.60
Radiated Emission(30MHz~1GHz)	4.60
Radiated Emission(1GHz~6GHz)	4.30

Decision Rule

- Uncertainty is not included
 Uncertainty is included





5. Emission

5.1. Conducted Emission

5.1.1. Limit

A.C. Mains Conducted Interference Limit

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

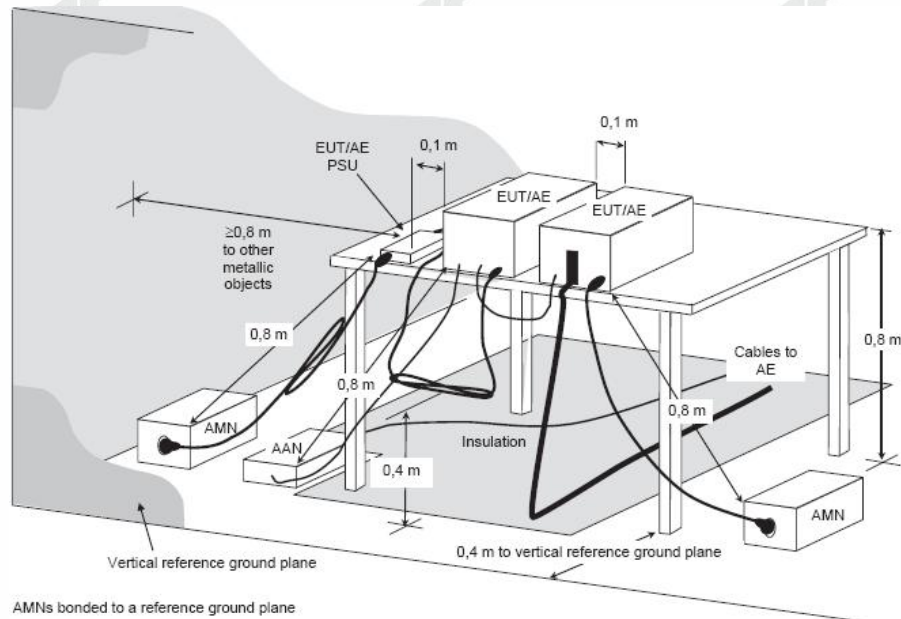
Note:

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases in line with the logarithm of the frequency in the range 0.15 to 0.50 MHz.
- (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

Telecommunication Port Asymmetric mode Conducted Interference Limit

Requirement (MHz)	Class A Equipment				Class B Equipment			
	Voltage Limit (dB μ V)		Current Limit (dB μ A)		Voltage Limit (dB μ V)		Current Limit (dB μ A)	
	QP	Avg.	QP	Avg.	QP	Avg.	QP	Avg.
0.15 to 0.50	97 to 87	84 to 74	53 to 43	40 to 30	84 to 74	74 to 64	40 to 30	30 to 20
0.50 to 30	87	74	43	30	74	64	30	20

5.1.2. Test setup



5.1.3. Test procedure

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak(mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.
Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

Telecommunication Port Conducted Interference

Selecting ISN for unscreened cable and screened cable to make measurement and Current probe for coaxial cable.

The port of the EUT was connected to the remote side support equipment through the ISN/Current Probe and communication in normal condition.

Making a overall range scan by using the test receiver controlled by controller and record at least six highest emissions for showing in the test report.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

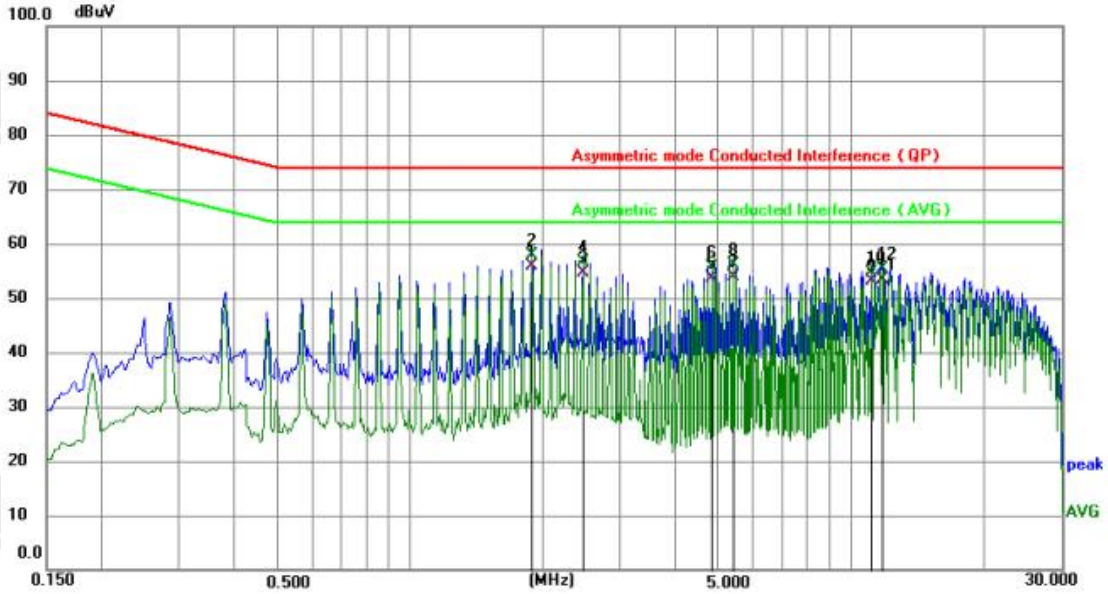
In case of measuring on the screened cable, the current limit shall be applied; otherwise the voltage limit should be applied.



5.1.4. Test results

PASS

Telecommunication Port Asymmetric mode Conducted Interference



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	1.8960	45.72	10.18	55.90	74.00	-18.10	QP	P	
2 *	1.8960	47.75	10.18	57.93	64.00	-6.07	AVG	P	
3	2.4630	44.46	10.14	54.60	74.00	-19.40	QP	P	
4	2.4630	46.49	10.14	56.63	64.00	-7.37	AVG	P	
5	4.8345	43.49	10.11	53.60	74.00	-20.40	QP	P	
6	4.8345	45.62	10.11	55.73	64.00	-8.27	AVG	P	
7	5.4015	43.70	10.10	53.80	74.00	-20.20	QP	P	
8	5.4015	46.04	10.10	56.14	64.00	-7.86	AVG	P	
9	11.1840	43.09	10.01	53.10	74.00	-20.90	QP	P	
10	11.1840	44.72	10.01	54.73	64.00	-9.27	AVG	P	
11	11.7510	43.48	10.02	53.50	74.00	-20.50	QP	P	
12	11.7510	45.38	10.02	55.40	64.00	-8.60	AVG	P	

Note: Level=Reading + Factor
Margin=Level – Limit

5.2. Radiated emissions

5.2.1. Limit

Table 2 - Radiated disturbance limits and testing methods – 30 MHz to 1 000 MHz

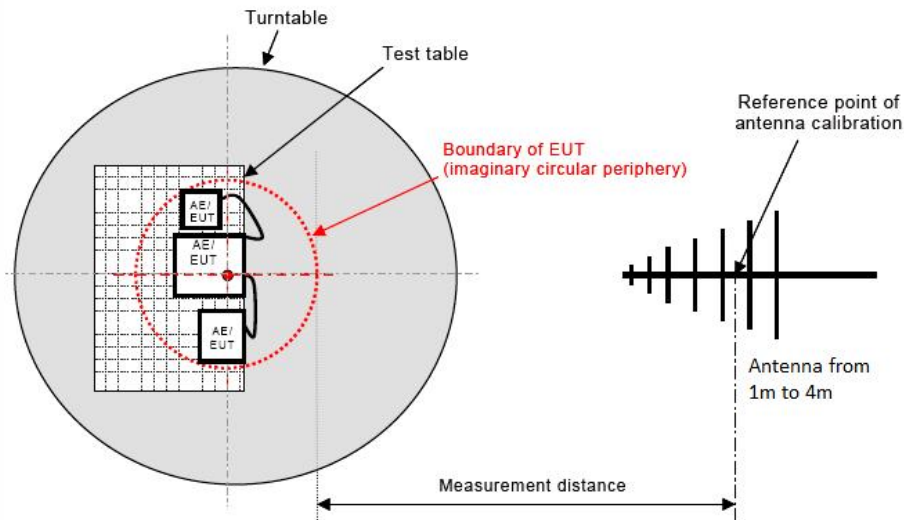
Frequency (MHz)	Quasi-peak limits at 3m dB(μ V/m)
30-230	40
230-1000	47

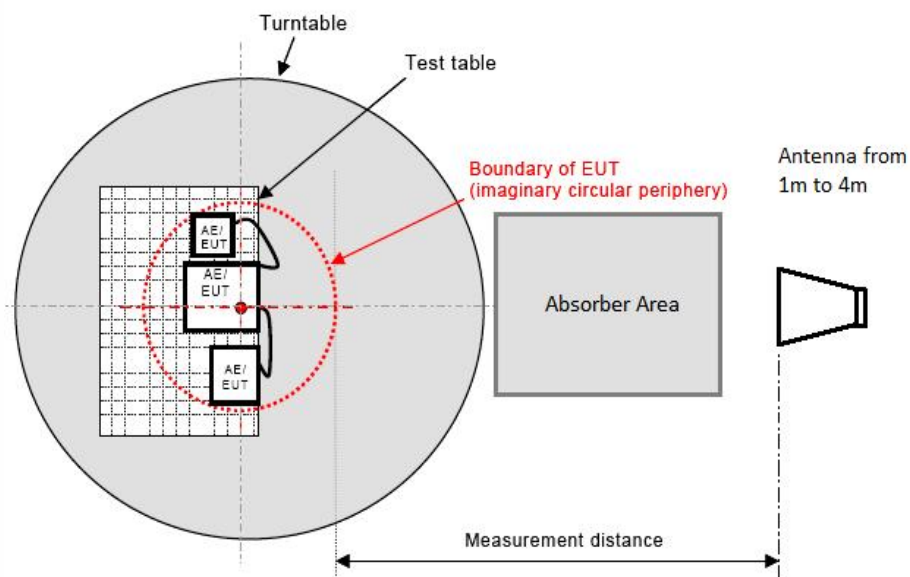
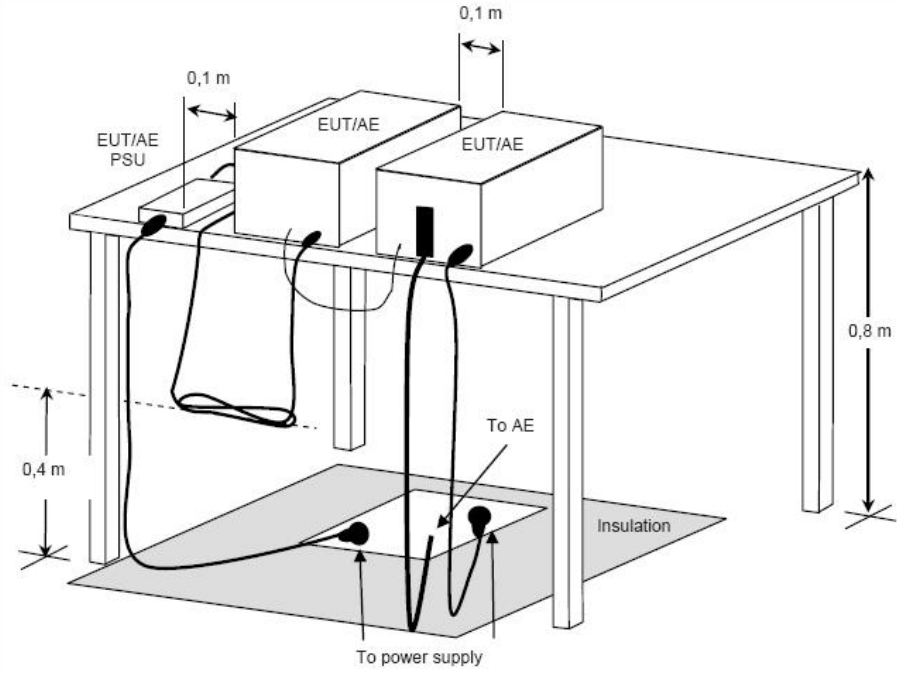
Radiated disturbance limits and testing methods – 1000 MHz to 6 000 MHz

Frequency (MHz)	Quasi-peak limits at 3m dB(μ V/m)	
	QP	AVG
1000-3000	70	50
3000-6000	74	54

5.2.2. Block diagram of test setup

Measurement distance







5.2.3. Test procedure

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

5.2.4. Test results

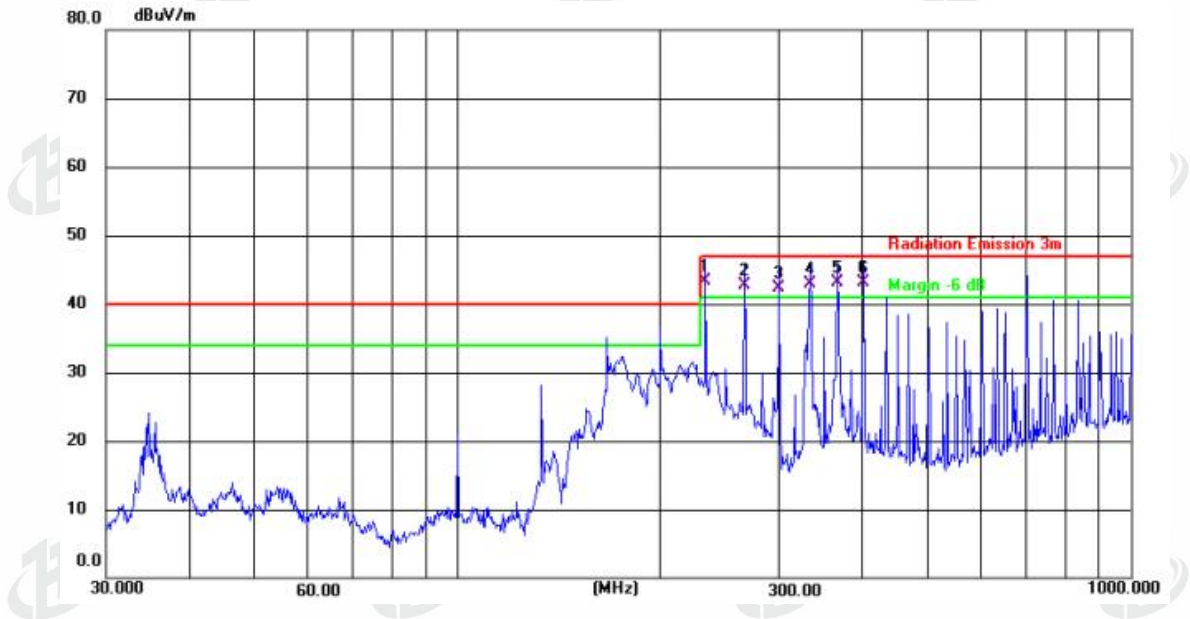
PASS

Please refer to the following page.



30MHz-1000MHz

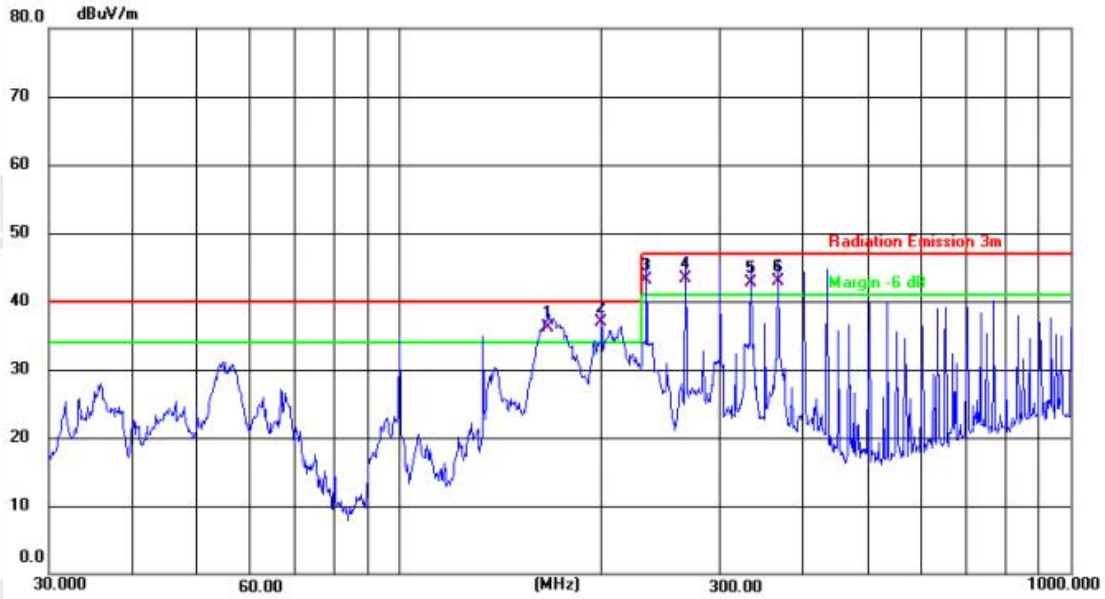
Polarization: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	233.3486	58.83	-15.53	43.30	47.00	-3.70	QP			P	
2 !	266.6090	57.32	-14.62	42.70	47.00	-4.30	QP			P	
3 !	300.3672	56.33	-13.93	42.40	47.00	-4.60	QP			P	
4 !	333.6865	56.07	-13.17	42.90	47.00	-4.10	QP			P	
5 !	366.8231	55.52	-12.42	43.10	47.00	-3.90	QP			P	
6 !	400.4318	54.75	-11.65	43.10	47.00	-3.90	QP			P	



Polarization: Vertical

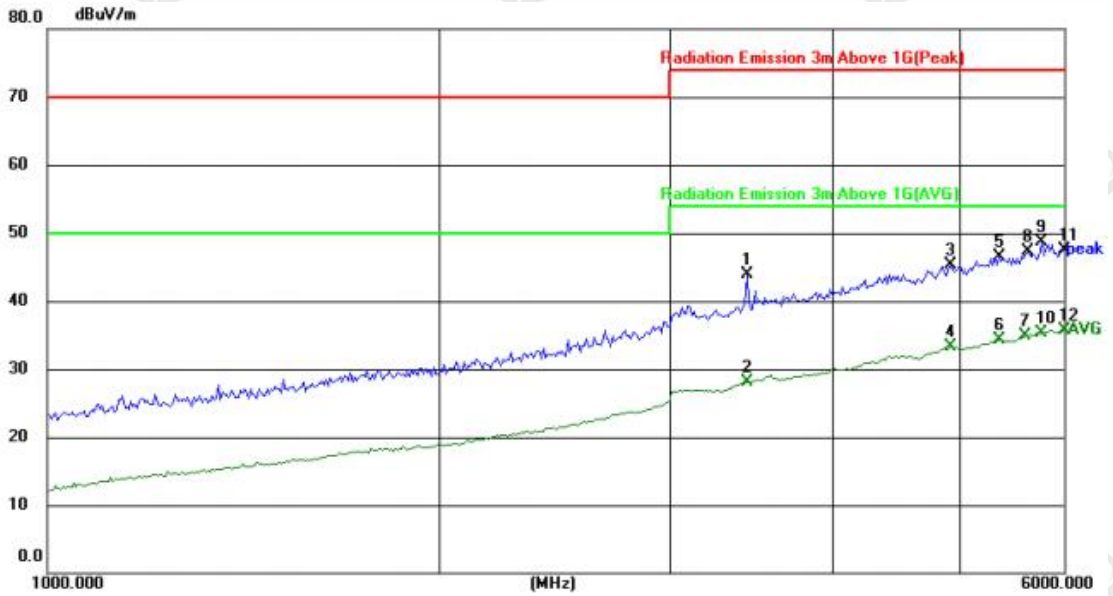


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 !	166.6511	55.18	-18.98	36.20	40.00	-3.80	QP			P	
2 *	199.9855	53.59	-16.69	36.90	40.00	-3.10	QP			P	
3 !	233.3486	58.73	-15.53	43.20	47.00	-3.80	QP			P	
4 !	266.6090	58.02	-14.62	43.40	47.00	-3.60	QP			P	
5 !	333.6865	55.97	-13.17	42.80	47.00	-4.20	QP			P	
6 !	366.8231	55.32	-12.42	42.90	47.00	-4.10	QP			P	

Note: Level=Reading + Factor
Margin=Level – Limit



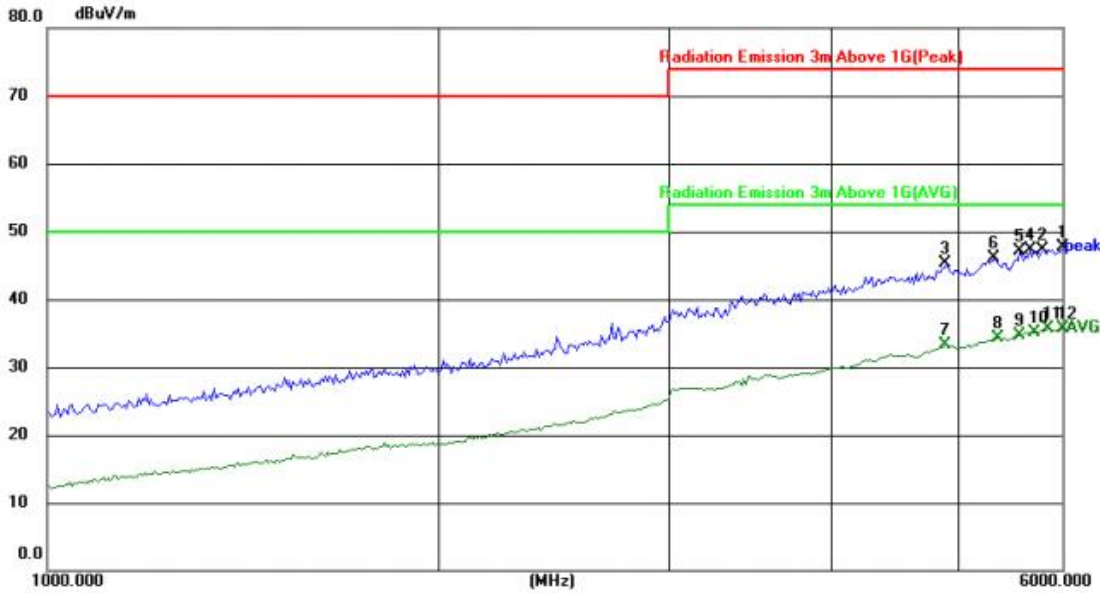
1000 MHz-6000 MHz
Polarization: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	3430.584	32.20	11.61	43.81	74.00	-30.19	peak			P	
2	3430.584	16.44	11.61	28.05	54.00	-25.95	AVG			P	
3	4909.060	29.13	16.21	45.34	74.00	-28.66	peak			P	
4	4909.060	17.07	16.21	33.28	54.00	-20.72	AVG			P	
5	5349.948	29.11	17.45	46.56	74.00	-27.44	peak			P	
6	5349.948	16.78	17.45	34.23	54.00	-19.77	AVG			P	
7	5605.076	16.69	18.17	34.86	54.00	-19.14	AVG			P	
8	5625.198	29.02	18.21	47.23	74.00	-26.77	peak			P	
9	5768.089	30.13	18.58	48.71	74.00	-25.29	peak			P	
10	5768.089	16.70	18.58	35.28	54.00	-18.72	AVG			P	
11	6000.000	28.33	19.18	47.51	74.00	-26.49	peak			P	
12 *	6000.000	16.49	19.18	35.67	54.00	-18.33	AVG			P	



Polarization: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	6000.000	28.61	19.18	47.79	74.00	-26.21	peak			P	
2	5809.577	28.59	18.68	47.27	74.00	-26.73	peak			P	
3	4891.499	29.13	16.16	45.29	74.00	-28.71	peak			P	
4	5665.659	29.09	18.31	47.40	74.00	-26.60	peak			P	
5	5565.048	28.97	18.06	47.03	74.00	-26.97	peak			P	
6	5311.742	28.74	17.32	46.06	74.00	-27.94	peak			P	
7	4891.499	17.07	16.16	33.23	54.00	-20.77	AVG			P	
8	5349.948	16.95	17.45	34.40	54.00	-19.60	AVG			P	
9	5565.048	16.67	18.06	34.73	54.00	-19.27	AVG			P	
10	5726.896	16.72	18.48	35.20	54.00	-18.80	AVG			P	
11	5872.370	16.79	18.85	35.64	54.00	-18.36	AVG			P	
12 *	6000.000	16.48	19.18	35.66	54.00	-18.34	AVG			P	

Note: Level=Reading + Factor
Margin=Level – Limit



5.3. Harmonic current emissions

5.3.1. Test Procedure

The EUT was placed on the top of a wooden table 0.8 meters above the ground and the EUT is supplied in series with power analyzer from a power source having the same normal voltage and frequency as the rated supply voltage and the equipment under test. And the rated voltage at the supply voltage of EUT of 0.94 times and 1.06 times shall be performed.

A definition of the normal load or of the conditions for adequate heat discharge can usually be found in the EN publication corresponding to the equipment under test.

Equipment may have several separately controlled circuits. Each circuit is considered as a single piece of equipment if it can be operated independently and separately from the other circuits.

5.3.2. Limit

Class A Harmonics Currents

Harmonics Order n	Maximum Permissible harmonic current (A)	Harmonics Order n	Maximum Permissible harmonic current (A)
Odd harmonics		Even harmonics	
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.30
9	0.40	8 ≤ n ≤ 40	0.23 * 8/n
11	0.33		
13	0.21		
15 ≤ n ≤ 39	0.15 * 15/n		

Class B Harmonics Currents

For Class B equipment, the harmonic of the input current shall not exceed the maximum permissible values given in table which is the limit of Class A multiplied by a factor of 1.5.



Class C Harmonics Currents

Harmonics Order n	Maximum Permissible harmonic current Expressed as a percentage of the input current at the fundamental frequency (%)
2	2
3	30. λ^*
5	10
7	7
9	5
11 ≤ n ≤ 39 (odd harmonics only)	3

* λ is the circuit power factor

Class D Harmonics Currents

Harmonics Order n	Maximum Permissible harmonic current per watt (mA/W)	Maximum Permissible harmonic current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
11 ≤ n ≤ 39 (odd harmonics only)	3.85/n	See limit of Class A

5.3.3. Test Result

N/A

The EUT is powered by battery, so the test item is not applicable.



5.4. Voltage changes, voltage fluctuations and flicker

5.4.1. Test Procedure

The EUT is supplied in series with power analyzer from a power source having the same normal voltage and frequency as the rated supply voltage and the equipment under test. And the rated voltage at the supply voltage of EUT of 0.94 times and 1.06 times shall be performed.

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

5.4.2. Limit

Test Item	Limit
Pst (Short-term flicker indicator.)	1.0
Plt (Long-term flicker indicator.)	0.65
Td(t)(ms) (Maximum time that d(t) exceeds 3.3%)	500
dmax(%) (Maximum relative voltage change.)	4
dc(%) (Relative steady-state voltage change)	3.3

5.4.3. Test Result

N/A

The EUT is powered by battery, so the test item is not applicable.



6. Immunity

Performance criteria

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss 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 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

The equipment shall continue to operate as intended after the test. No degradation of performance or loss function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from equipment if used as intended.

Performance criterion C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by operation of the controls.



6.1. Electrostatic discharges

6.1.1. Test Specification

- Test Port : Enclosure port
- Discharge Impedance : 330 ohm / 150 pF
- Discharge Mode : Single Discharge
- Discharge Period : one second between each discharge

6.1.2. Test Levels and Performance Criterion

Test Standard

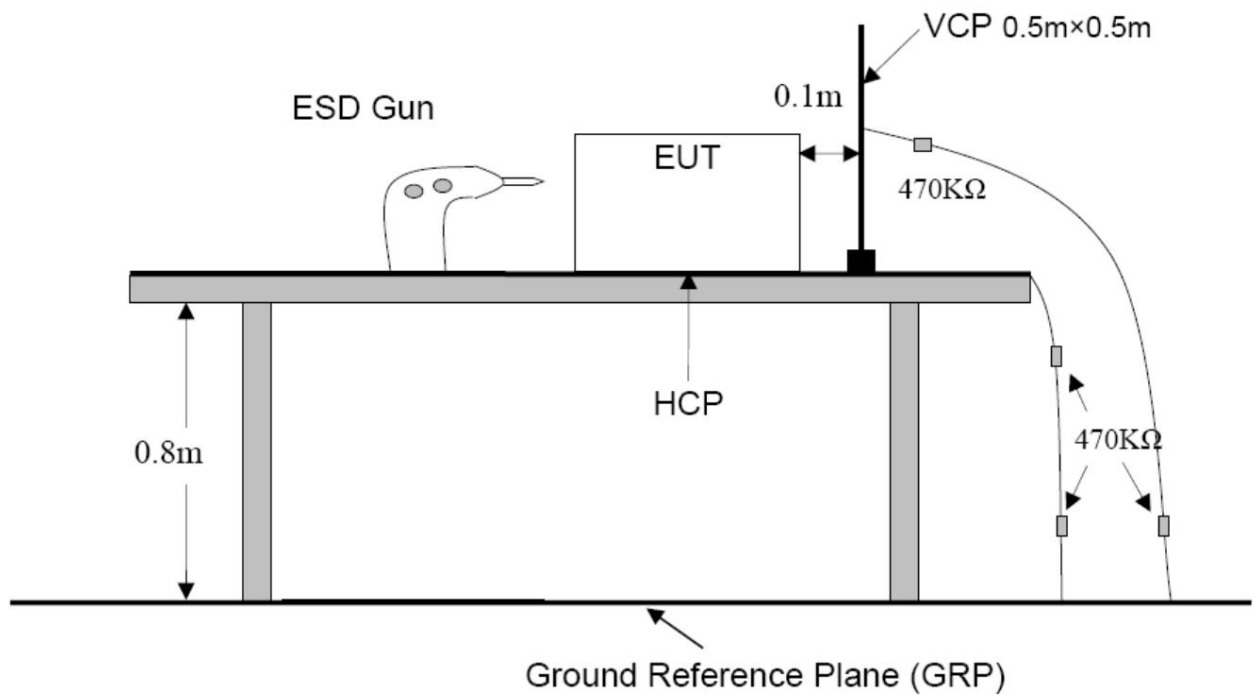
EN 55035:2017+A11:2020

(EN 61000-4-2: 2009)

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±15
X	Special	Special

Performance criterion: **B**

6.1.3. Test setup





6.1.4. Test Procedure

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 E.U.T.. After each discharge, the discharge electrode shall be removed from the E.U.T.. The generator is then re-triggered for a new single discharge and repeated (10 of each polarity) for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Contact Discharge:

All the procedure shall be same as Section Air Discharge except that the tip of the discharge electrode shall touch the E.U.T..

Indirect discharge for horizontal coupling plane:

At least 10 single discharges(in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit(if applicable) of the E.U.T. and 0.1m from the front of the E.U.T.. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

Indirect discharge for vertical coupling plane:

At least 10 single discharge (in the most sensitive polarity) 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 E.U.T.. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the E.U.T. are completely illuminated.

6.1.5. Test Result

PASS

Test Point	Kind A-Air Discharge C-Contact Discharge	Performance Criterion	Result (Performance Criterion)
Surface of EUT	A	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	PASS
Ports	A	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	PASS
Display	A	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	PASS
Indirect Discharge (HCP)	C	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	PASS
Indirect Discharge (VCP)	C	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	PASS
Metal	C	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	PASS



6.2. Continuous RF electromagnetic field disturbances

6.2.1. Test Specification

- Test Port : Enclosure port
- Step Size : 1%
- Modulation : 1kHz, 80% AM
- Dwell Time : 1 second
- Polarization : Horizontal & Vertical

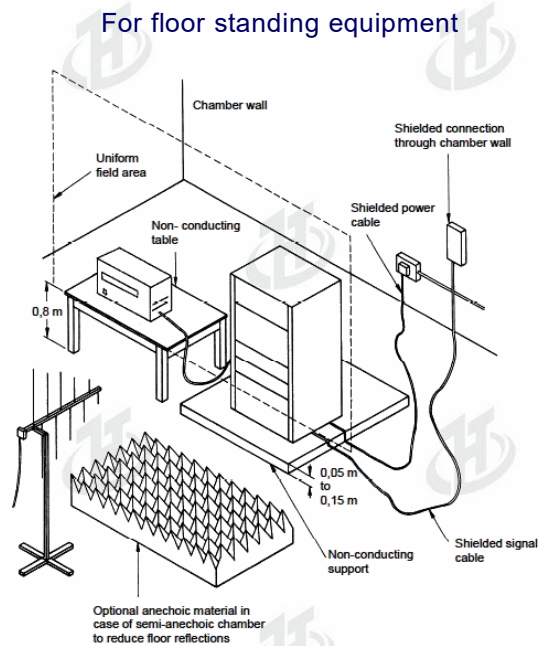
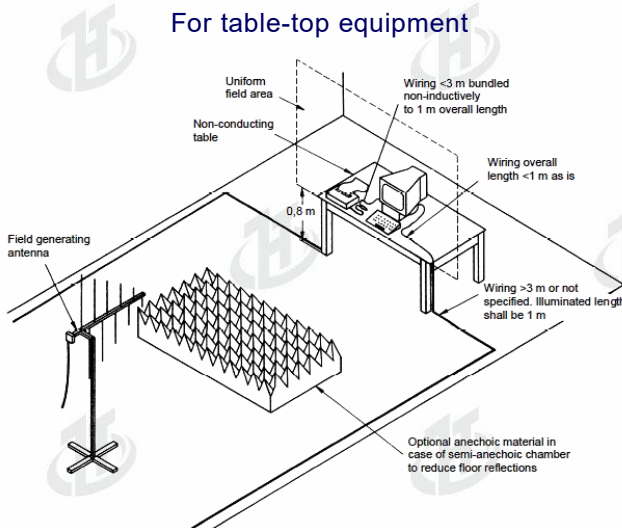
6.2.2. Test Levels and Performance Criterion

Test Standard
 EN 55035:2017+A11:2020
 (EN 61000-4-3:2020)

Characteristics	Test levels
Frequency range	80 MHz to 1 000 MHz, 1 800 MHz, 2 600 MHz, 3 500 MHz, 5000 MHz
Test level	3 V/m (unmodulated)
Modulation	1 kHz, 80 % AM, sine wave

Performance criterion: **A**

6.2.3. Test setup





6.2.4. 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.

6.2.5. Test Result

PASS

Frequency (MHz)	Polarization	Test level (V/m)	Modulation	Exposed location	Result (Performance Criterion)
80-1 000, 1 800, 2 600, 3 500, 5000	H & V	3	1 kHz, 80% AM, 1 % increment	All sides	A



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

6.3.1. Test Specification

Test Port : input a.c. power port
 Impulse Frequency : 5 kHz
 Impulse Wave-shape : 5/50 ns
 Burst Duration : 15 ms
 Burst Period : 300 ms
 Test Duration : 2 minutes per polarity

6.3.2. Test Levels and Performance Criterion

Test Standard
 EN 55035:2017+A11:2020
 (EN 61000-4-4: 2012)

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, 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	5 or 100	0.25	5 or 100
2.	1.0	5 or 100	0.5	5 or 100
3.	2.0	5 or 100	1.0	5 or 100
4.	4.0	5 or 100	2.0	5 or 100
X	Special	Special	Special	Special

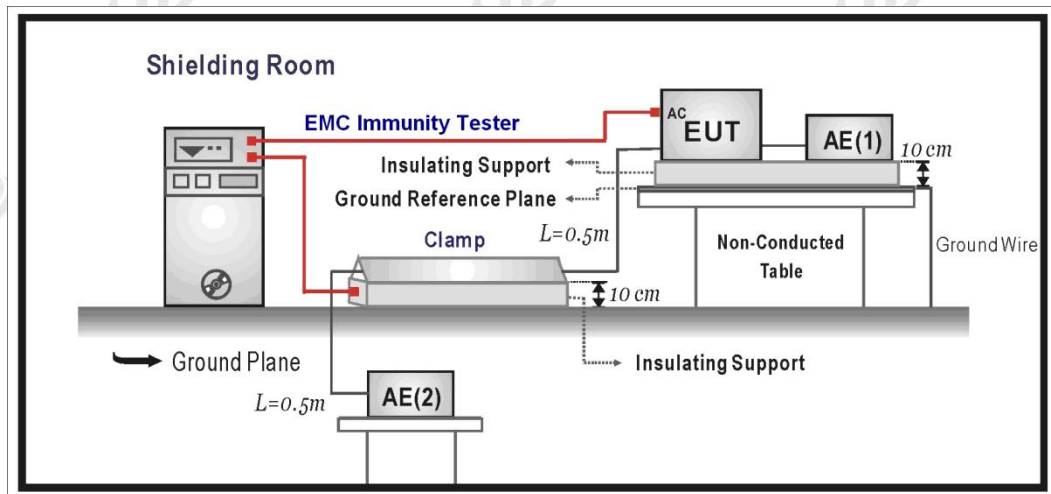
Note 1 Use of 5 KHz repetition rates is traditional; however, 100 KHz is closer to reality. Product committees should determine which frequencies are relevant for specific products or product types.

Note 2 With some products, there may be no clear distinction, between power ports and I/O ports, in which case it is up to product committees to make this determination for test purposes.

Note 3 "X" is an open level. The level has to be specified in the dedicated equipment specification.

Performance criterion: **B**

6.3.3. Test setup



6.3.4. Test Procedure

The E.U.T. is put on the table which is 0.8 meter high above the ground. This reference ground plane shall project beyond the E.U.T. by at least 0.1m on all sides and the minimum distance between E.U.T. and all other conductive structure, except the ground plane beneath the E.U.T., shall be more than 0.5m.

For input and output AC power ports:

The E.U.T. is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minus.

For signal lines ports:

The E.U.T. is connected to the power mains by using a coupling device which couples the EFT interference signal to Signal lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minus.

For DC ports:

It's unnecessary to test.

6.3.5. Test Result

N/A

The EUT is powered by battery, so the test item is not applicable.



6.4. Surges

6.4.1. Test Specification

- Test Port : input a.c. power port
- Wave-Shape : Open Circuit Voltage - 1.2 / 50 us
Short Circuit Current - 8 / 20 us
- Pulse Repetition Rate : 1 pulse / min.
- Phase Angle : 90° / 270°
- Test Events : 5 pulses (positive & negative) for each polarity

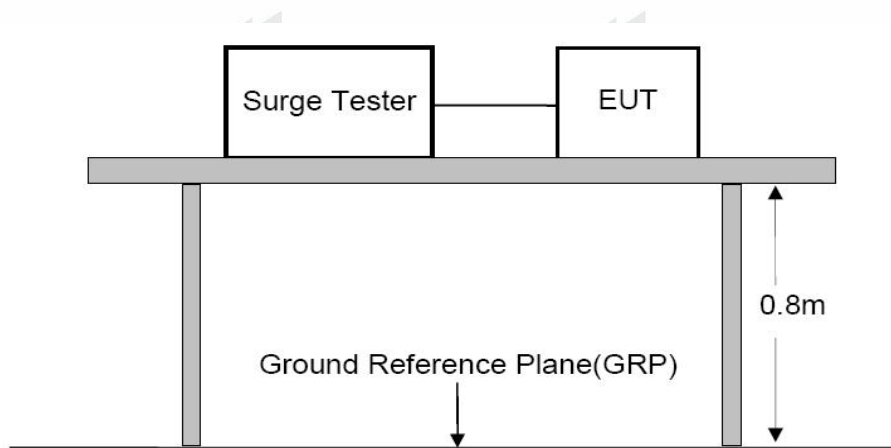
6.4.2. Test Levels and Performance Criterion

Test Standard
 EN 55035:2017+A11:2020
 (EN 61000-4-5: 2014)

Severity Level	Open-Circuit Test Voltage KV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

Performance criterion: **B**

6.4.3. Test setup





6.4.4. Test Procedure

1. Set up the E.U.T. and test generator as shown on Section 12.1.
2. For line to line coupling mode, provide a 1.0KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to E.U.T. selected points.
3. Five positive pulses Line-to-neutral at 90°phase, Five negative pulses Line-to-neutral at 270°phase. with a maximum 1/min repetition rate are conducted during test.
4. Different phase angles are done individually.
5. Record the E.U.T. operating situation during compliance test and decide the E.U.T. immunity criterion for above each test.

6.4.5. Test Result

N/A

The EUT is powered by battery, so the test item is not applicable.

6.5. Continuous induced RF disturbances

6.5.1. Test Specification

Test Port : input a.c. power port
 Step Size : 1%
 Modulation : 1kHz, 80% AM
 Dwell Time : 1 second

6.5.2. Test Levels and Performance Criterion

Test Standard

EN 55035:2017+A11:2020

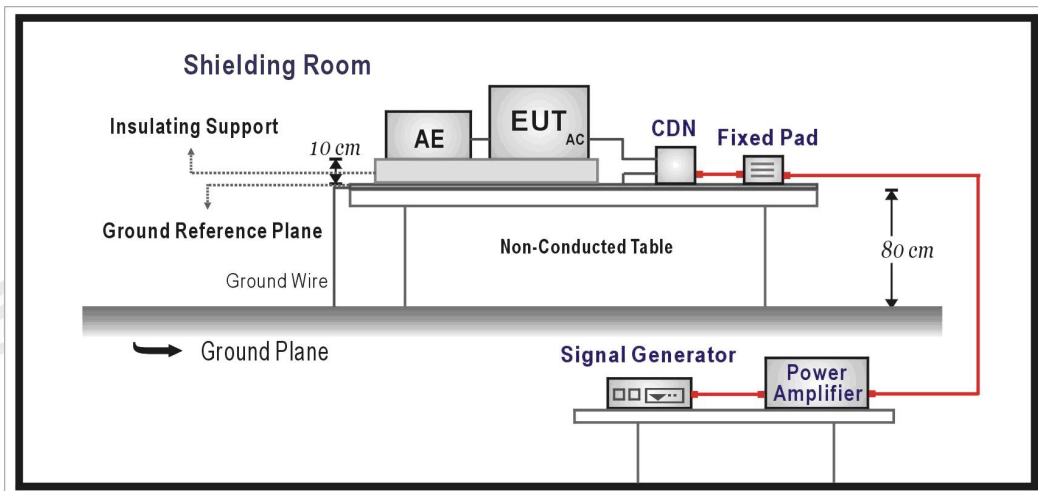
(EN 61000-4-6: 2014)

Frequency ranges MHz	Test level V	Modulation	Performance criterion
0,15 to 10	3	80% AM (1kHz)	A
10 to 30	3 to 1	80% AM (1kHz)	A
30 to 80	1	80% AM (1kHz)	A

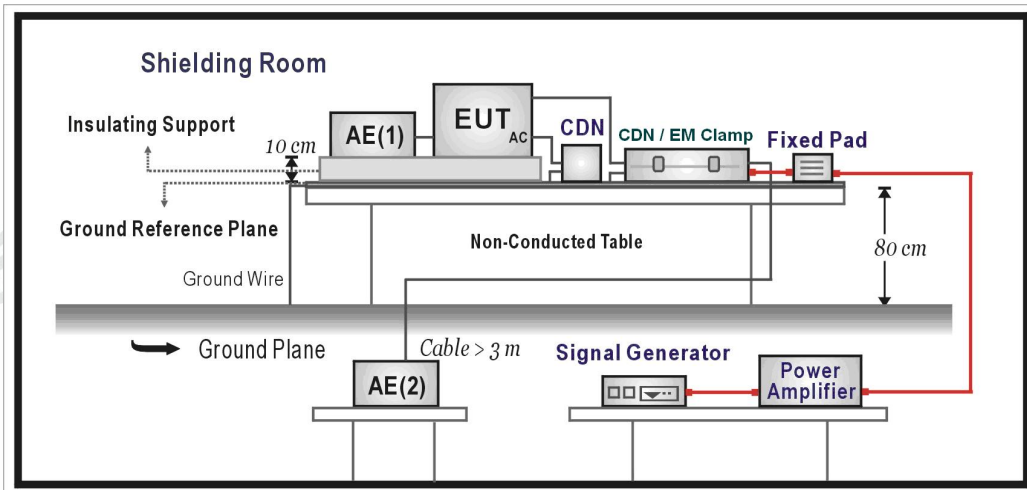
Performance criterion: **A**

6.5.3. Test setup

CDN Method



EM Clamp Method



6.5.4. Test Procedure

1. Set up the E.U.T., CDN and test generators as shown on Section 5.6.1.
2. Let the E.U.T. work in test mode and measure it.
3. The E.U.T. are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from E.U.T.. Cables between CDN and E.U.T. are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
4. The disturbance signal described below is injected to E.U.T. through CDN.
5. The E.U.T. operates within its operational mode(s) under intended climatic conditions after power on.
6. The frequency range is swept from 150 KHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.
7. The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
8. Recording the E.U.T. operating situation during compliance testing and decide the E.U.T. immunity criterion.

6.5.5. Test Result

N/A

The EUT is powered by battery, so the test item is not applicable.

6.6. Power frequency magnetic fields.

6.6.1. Test Levels and Performance Criterion

Test Standard

EN 55035:2017+A11:2020

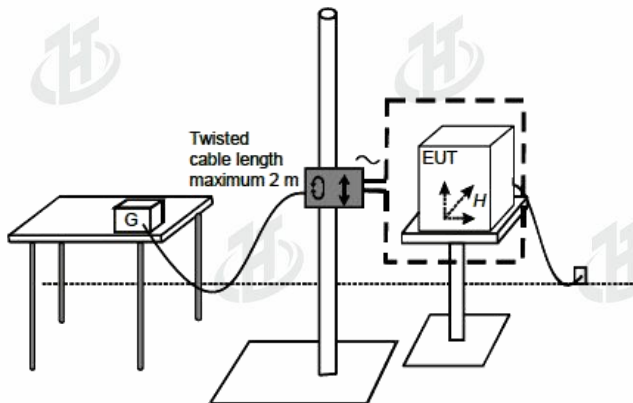
(EN 61000-4-8:2010)

Characteristics	Test levels
Field frequency	50/60 Hz
Test level	1 A/m

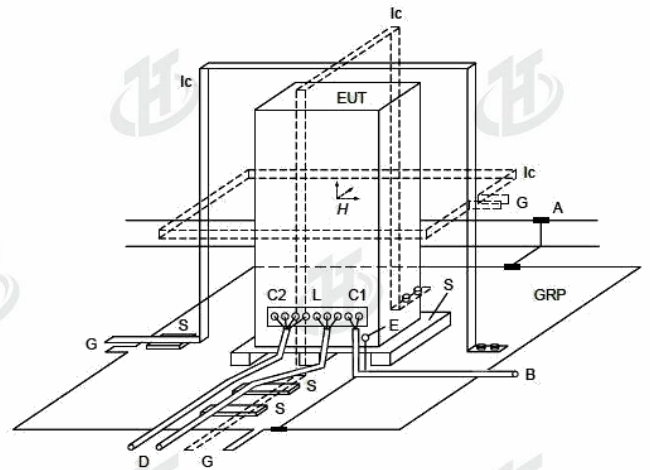
Performance criterion: **A**

6.6.2. Test setup

For table-top equipment



For floor standing equipment



6.6.3. 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.

6.6.4. Test Result

N/A

The product is not a magnetically sensitive device

6.7. Voltage dips and interruptions

6.7.1. Test Specification

Test Port : input a.c. power port
Phase Angle : 0°, 180°
Test cycle : 3 times

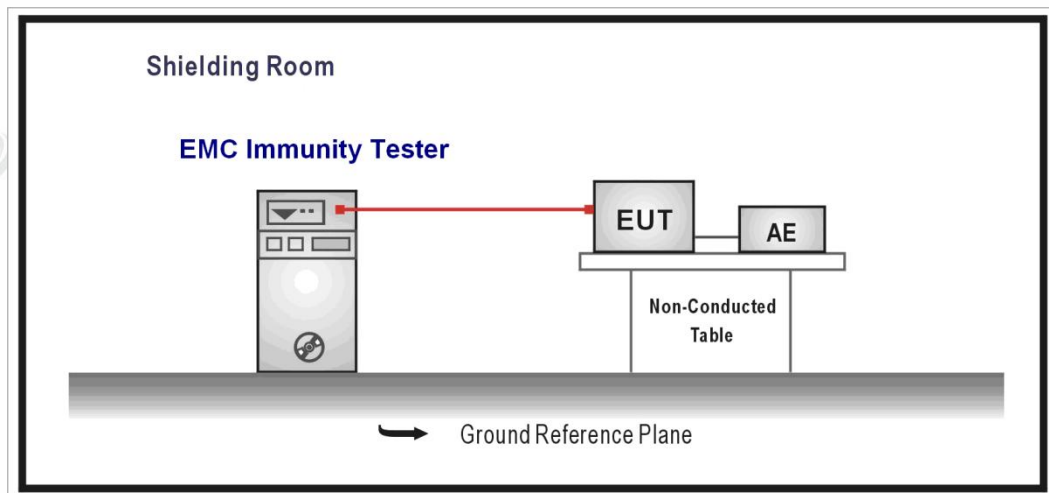
6.7.2. Test Levels and Performance Criterion

Test Standard
EN 55035:2017+A11:2020
(EN 61000-4-11: 2020)

Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)
< 5	95	0.5
70	30	25
< 5	95	250

Performance criterion: **B, C, C**

6.7.3. Test setup





6.7.4. Test Procedure

1. Set up the E.U.T. and test generator as shown on Section 5.7.1.
2. The interruptions is introduced at selected phase angles with specified duration.Record any degradation of performance.

6.7.5. Test Result

N/A

The EUT is powered by battery, so the test item is not applicable.



7. 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



End of report