CE EMC Test Report

Applicant: Nebra Ltd

Address of Applicant: Unit 4 Bells Yew Green Business Court, Bells Yew Green, Tunbridge Wells, East Sussex, TN3 9BJ

Equipment Under Test (EUT)

Product Name: Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version

Model No.: NEBHNT-HHRK4-433, NEBHNT-HHRK4-470, NEBHNT-HHRK4-868, NEBHNT-HHRK4-915, NEBHNT-HHRK4-433-2, NEBHNT-HHRK4-470-2, NEBHNT-HHRK4-868-2, NEBHNT-HHRK4-915-2, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3

Applicable standards: EN 55032:2015, EN 55035:2017
EN IEC 61000-3-2:2019
EN 61000-3-3:2013+A1:2019

Date of sample receipt: 05 Jan., 2022

Date of Test: 06 Jan., to 14 Feb., 2022

Date of report issue: 15 Feb., 2022

Test Result: PASS

Tested by:	Mike.ou ***Test Engineer***	***Date:***	*25 Jan., 2022*
Reviewed by:	Winner Zhang ***Project Engineer***	***Date:***	*25 Jan., 2022*
Approved by:	***Manager***	***Date:***	*25 Jan., 2022*

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

2 Version

Version No.	Date	Description
00	*25 Jan., 2022*	*Original*

3 Contents

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4 Test Summary

Test Items	Test Requirement	Test Method	Result
Radiated emission	EN 55032	EN 55032	PASS
Conducted emission	EN 55032	EN 55032	PASS
Harmonic emission	EN IEC 61000-3-2	EN IEC 61000-3-2	N/A
Flicker emission	EN61000-3-3	EN61000-3-3	N/A
Electrostatic discharges (ESD)	EN 55035	EN61000-4-2:2009	PASS
Continuous RF electromagnetic field disturbances	EN 55035	EN61000-4-3: 2006+A1:2007+A2:2010	PASS
Electrical fast transients/burst (EFT/B)	EN 55035	EN61000-4-4:2012	PASS
Surges	EN 55035	EN 61000-4-5: 2014+A1:2017	PASS
Continuous induced RF disturbances	EN 55035	EN61000-4-6: 2014+AC:2015	PASS
Power frequency magnetic field	EN 55035	EN 61000-4-8:2010	PASS
Voltage dips and interruptions	EN 55035	EN61000-4-11: 2004+A1:2017	PASS

Remark:

1. *UT is the nominal supply voltage.*
2. *Pass: Meet the requirements.*
3. *N/A: not applicable.*

5 General Information

5.1 Client Information

Applicant:	Nebra Ltd
Address:	Unit 4 Bells Yew Green Business Court, Bells Yew Green, Tunbridge Wells, East Sussex, TN3 9BJ
Manufacturer/Factor:	Nebra Ltd
Address:	Unit 4 Bells Yew Green Business Court, Bells Yew Green, Tunbridge Wells, East Sussex, TN3 9BJ

5.2 General Description of E.U.T.

Product name:	Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version
Model no.:	NEBHNT-HHRK4-433, NEBHNT-HHRK4-470, NEBHNT-HHRK4-868, NEBHNT-HHRK4-915, NEBHNT-HHRK4-433-2, NEBHNT-HHRK4-470-2, NEBHNT-HHRK4-868-2, NEBHNT-HHRK4-915-2, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3
Hardware version:	v1
Software version:	781099d
AC adapter:	Model No.:R241-1202500I Input: AC100-240V, 50/60Hz 1.5 A Output: DC 12.0V, 2.5A
Remark:	Model no.: NEBHNT-HHRK4-433, NEBHNT-HHRK4-470, NEBHNT-HHRK4-868, NEBHNT-HHRK4-915, NEBHNT-HHRK4-433-2, NEBHNT-HHRK4-470-2, NEBHNT-HHRK4-868-2, NEBHNT-HHRK4-915-2, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3, NEBHNT-HHRK4-433-3, NEBHNT-HHRK4-470-3, NEBHNT-HHRK4-868-3, NEBHNT-HHRK4-915-3, The difference between the models is that the LoRa Radio module used inside is different for each variant. Along with a respective antenna for each region / frequency. The -2 and -3 flags at the end of the model number relates to the specific chip part number for the main LoRa chip.

5.3 Test mode, test voltage and test environment

Working:	Keep the EUT in Lanlink mode
Test voltage:	AC 230V/50Hz
Remark:	1. During the test, pre-scan 110Vac/60Hz and 230Vac/50Hz of the Power supply, found 230Vac/50Hz was worse case mode. 2. The report only reflects the worst mode.
Operating Environment:	
Temperature:	Normal: 15℃ ~ 35℃, Extreme: -20℃ ~ +40℃
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar

5.4 Description of Support Units

Manufacturer	Description	Model	S/N	FCC ID/DoC
Lenovo	Laptop	ThinkPad T14 Gen 1	SL10Z47277	DoC

5.5 Description of Cable Used

Cable Type	Description	Length	From	To
N/A	N/A	N/A	N/A	N/A

5.6 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Conducted Emission for LISN (9kHz ~ 150kHz)	±3.11 dB
Conducted Emission for LISN (150kHz ~ 30MHz)	±2.62 dB
Conducted Emission for ISN (150kHz ~ 30MHz)	±3.54 dB
Radiated Emission (30MHz ~ 1GHz) (3m SAC)	±4.45 dB
Radiated Emission (1GHz ~ 18GHz) (3m SAC)	±5.34 dB
Radiated Emission (30MHz ~ 1GHz) (10m SAC)	±4.32 dB
Note: *All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.*	

5.7 Additions to, deviations, or exclusions from the method

No

5.8 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.9 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax:+86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

5.10 Monitoring of EUT for the Immunity Test

Visual:	Monitored the LED lighting of EUT
Sound:	N/A
Other:	Monitored the data link of EUT

5.11 Test Instruments list

Radiated Emission(3m SAC):					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal.Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	ETS	9m*6m*6m	WXJ001-1	01-19-2021	01-18-2024
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	03-03-2021	03-02-2022
Biconical Antenna	Schwarzbeck	VUBA9117	WXJ002-1	06-20-2021	06-19-2022
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	03-03-2021	03-02-2022
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-3	06-18-2021	06-17-2022
Loop Antenna	Schwarzbeck	FMZB 1519 B	WXJ002-4	03-07-2021	03-06-2022
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXG001-7	03-07-2021	03-06-2022
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXG001-3	03-07-2021	03-06-2022
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA-180400G45B	WXG001-9	03-07-2021	03-06-2022
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	03-03-2021	03-02-2022
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	03-07-2021	03-06-2022
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG001-5	03-07-2021	03-06-2022
Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYT3M-1G-BB-5M	WXG001-6	03-07-2021	03-06-2022
Coaxial Cable (18GHz ~ 40GHz)	JYTSZ	JYT3M-40G-SS-8M	WXG001-7	03-07-2021	03-06-2022
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		

Conducted Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal.Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
EMI Test Receiver	Rohde & Schwarz	ESCI 3	WXJ003	03-03-2021	03-02-2022
RF Switch	TOP PRECISION	RSU0301	WXG003	03-03-2021	03-02-2022
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	03-18-2021	03-17-2022
LISN	Rohde & Schwarz	ESH3-Z5	WXJ005-1	06-18-2021	06-17-2022
ISN	Schwarzbeck	CAT3 8158	WXJ018	03-03-2021	03-02-2022
ISN	Schwarzbeck	CAT5 8158	WXJ018-1	03-03-2021	03-02-2022
ISN	Schwarzbeck	NTFM 8158	WXJ018-2	03-03-2021	03-02-2022
LISN Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYTCE-1G-NN-2M	WXG003-1	03-03-2021	03-02-2022
ISN Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYTCE-1G-BN-3M	WXG003-2	03-03-2021	03-02-2022
Test Software	AUDIX	E3	Version: 6.110919b		

ESD:					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
ESD Simulator	Haefely	ONYX30	WXJ016	03-05-2021	03-04-2022

Radiated Immunity:					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
Signal Generator	Rohde & Schwarz	SMB 100B-B106	QCJ005	04-06-2021	04-05-2022
Solid State Amplifiers	BONN	BLWA 0810-1000/500D	QCJ005-6	06-21-2021	06-20-2022
Broadband Amplifier	Rohde & Schwarz	BBA 150 D400/E100	QCJ005-6	06-21-2021	06-20-2022
Power Mete	Rohde & Schwarz	NRX	QCJ005-1	04-08-2021	04-07-2022
Power Sensor	Rohde & Schwarz	NRP6A	QCJ005-2	04-08-2021	04-07-2022
Power Sensor	Rohde & Schwarz	NRP6A	QCJ005-3	04-08-2021	04-07-2022
Stacked Log Periodic Antenna	Schwarzbeck	STLP 9128E	QCJ005-11	N/A	N/A
Stacked Microwave Log.-Per. Antenna	Schwarzbeck	STLP 9149	QCJ005-8	N/A	N/A

Surge \ EFT \ V-dips \ RW :					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
Four-in-one Immunity test system	EMC PARTNER	IMU-MGE	WXJ079	01-30-2021	01-29-2022
				01-21-2022	01-20-2023
Lightning test system module	EMC PARTNER	EXT-IMU3000S6（Surge1.2/50us）	WXJ079-4	01-30-2021	01-29-2022
				01-21-2022	01-20-2023
Lightning surge high speed communication line coupling network 8 lines (Surge, RW)	EMC PARTNER	CDN-UTP8 ED3	WXJ079-3	01-30-2021	01-29-2022
				01-21-2022	01-20-2023
Lightning test module of telecommunication terminal	EMC PARTNER	EXT-IMU3000 T6 (Surge 10/700μs)	WXJ079-5	01-30-2021	01-29-2022
				01-21-2022	01-20-2023
Coupling decoupling network of power line (Surge, EFT, RW)	EMC PARTNER	CDN-A-6-32	WXJ079-2	01-30-2021	01-29-2022
				01-21-2022	01-20-2023
EFT test system module	EMC PARTNER	EXT-IMU3000F5	WXJ079-6	01-30-2021	01-29-2022
				01-21-2022	01-20-2023
Capacitive coupling clamp EFT	EMC PARTNER	CN-EFT1000/VERI-CP-EFT	WXJ079-7	01-30-2021	01-29-2022
				01-21-2022	01-20-2023
Voltage dips and Interruption test module	EMC PARTNER	EXT-IMU D	WXJ079-1	01-30-2021	01-29-2022
				01-21-2022	01-20-2023
Ring wave test module	EMC PARTNER	EXT-IMU3000 R6	WXJ079-8	01-30-2021	01-29-2022
				01-21-2022	01-20-2023

Conducted Immunity:					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
Conducted Disturbance Test system	SCHLODER	CDG6000	WXJ017	03-03-2021	03-02-2022
				01-21-2022	01-20-2023
Coupling/Decoupling Network	SCHLODER	CDN-M2+3	WXJ017-1	03-03-2021	03-02-2022
				01-21-2022	01-20-2023
EM Clamp	SCHLODER	EMCL-20	WXJ017-2	03-03-2021	03-02-2022
				01-21-2022	01-20-2023
Coupling/Decoupling Network	SCHLODER	CDN M5-32A	WXJ017-3	02-02-2021	02-01-2022
				01-21-2022	01-20-2023

PFMF:					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
Power frequency magnetic field generator	Prima	PFM61008TG	WXJ015	03-03-2021	03-02-2022

6 Test Results

6.1 EMI (Emission)

6.1.1 Radiated emission

Test requirement:	EN 55032
Test method:	EN 55032
Test frequency range:	30MHz to 6GHz
Test distance:	3m

Receiver setup:

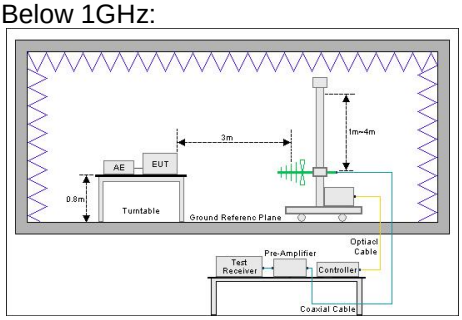
Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	100kHz	300kHz	QP Value
Above 1GHz	Peak	1MHz	3MHz	PK Value
	Average	1MHz	3MHz	AV Value

ITE limit:

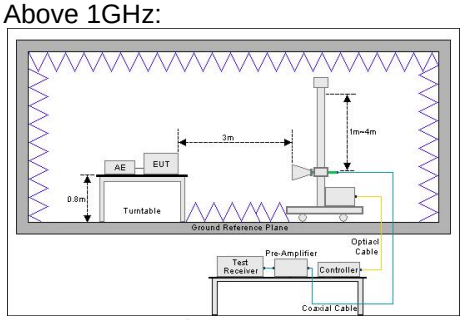
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-230MHz	40.0	QP Value
230MHz-1GHz	47.0	QP Value
1GHz-3GHz	50.0	AV Value
	70.0	PK Value
3GHz-6GHz	54.0	AV Value
	74.0	PK Value

Test setup:

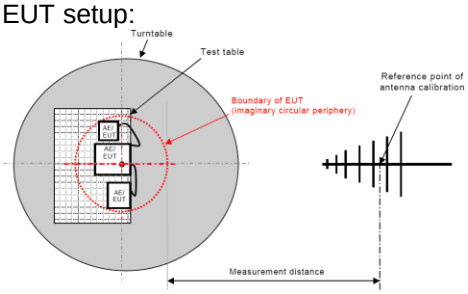
Below 1GHz:

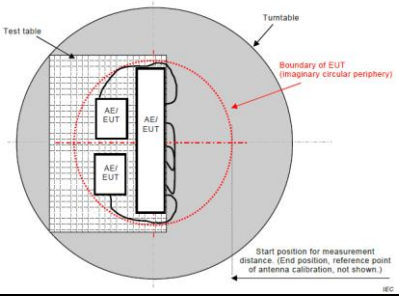


Above 1GHz:



EUT setup:





Test procedure:

30MHz to 1GHz:

1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. The table top EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.
4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

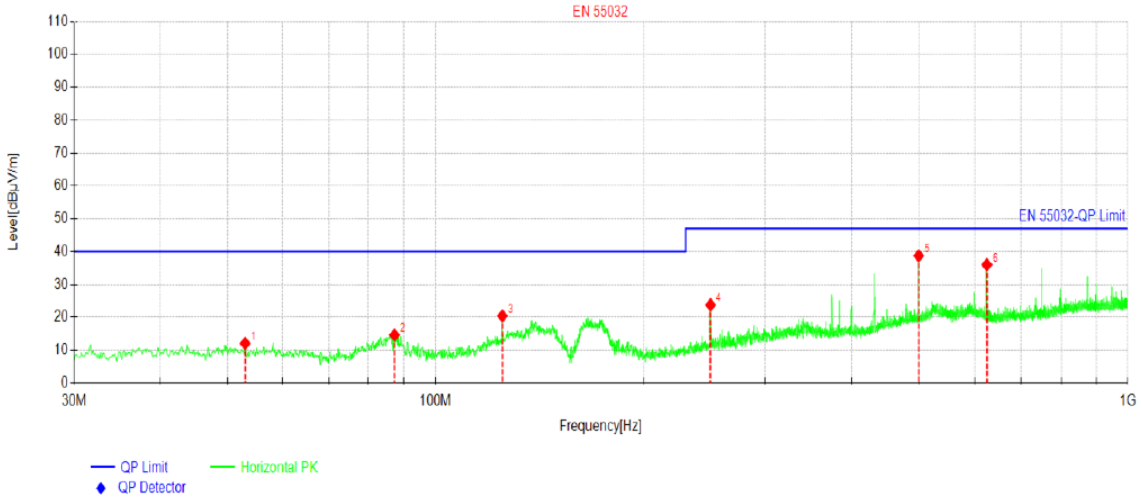
Above 1GHz:

1. The radiated emissions test was conducted in a fully-anechoic chamber.
2. The table top EUT was placed upon anon-metallic table0.8m above the

	ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.
Test instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Product Name:	Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version	**Product Model:**	NEBHNT-HHRK4-868
Test By:	Mike	**Test mode:**	Working mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Horizontal
Test Voltage:	AC 230/50Hz		

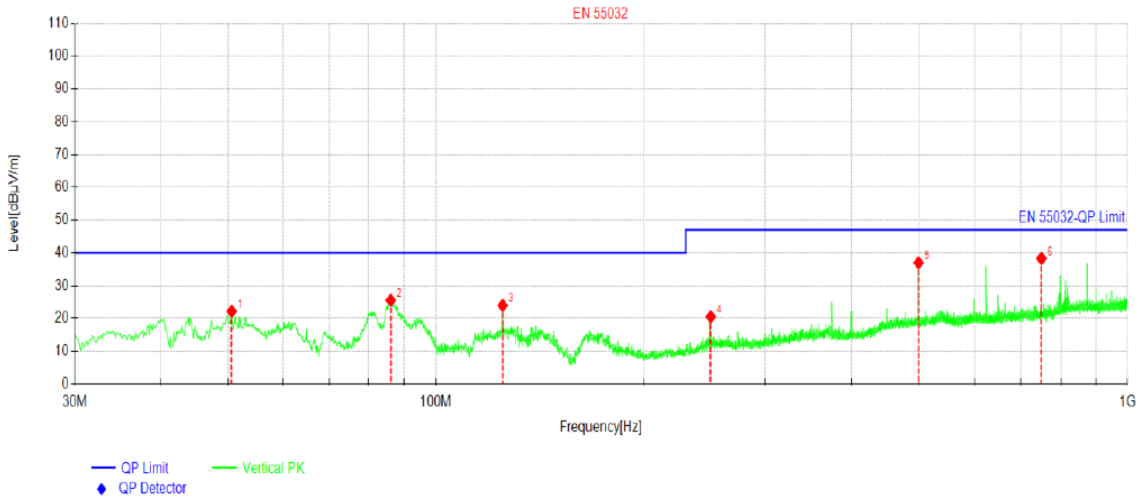


NO.	Freq. [MHz]	Reading[dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	53.0375	26.72	12.07	-14.65	40.00	27.93	PK	Horizontal
2	87.2300	32.11	14.61	-17.50	40.00	25.39	PK	Horizontal
3	124.938	37.21	20.46	-16.75	40.00	19.54	PK	Horizontal
4	249.947	37.60	23.81	-13.79	47.00	23.19	PK	Horizontal
5	499.965	45.68	38.72	-6.96	47.00	8.28	PK	Horizontal
6	625.095	41.33	36.02	-5.31	47.00	10.98	PK	Horizontal

Remark:

1. *Final Level =Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version	Product Model:	NEBHNT-HHRK4-868
Test By:	Mike	Test mode:	Working mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 230/50Hz		

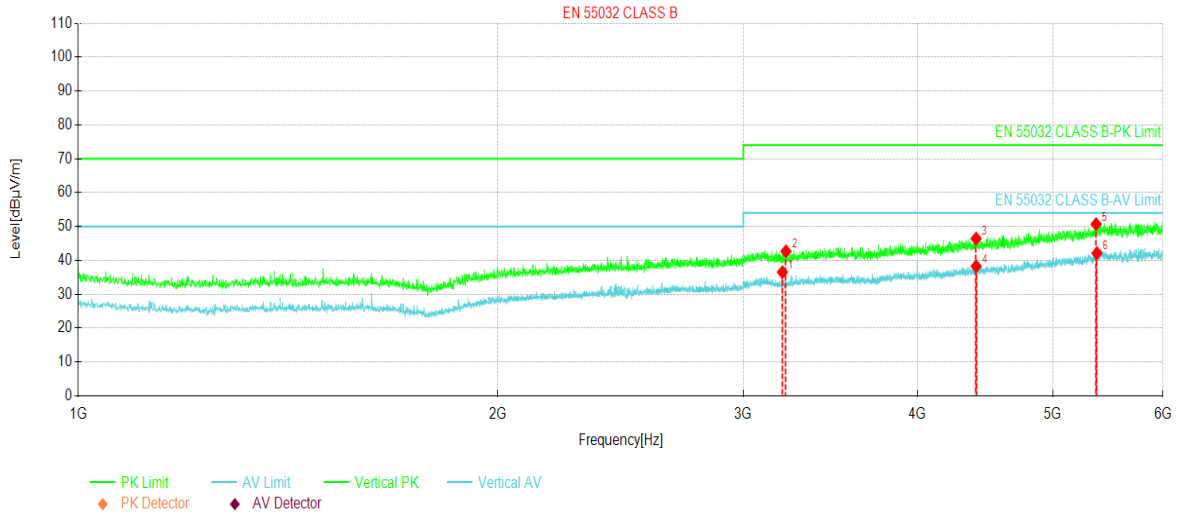


NO.	Freq. [MHz]	Reading[dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	50.6125	36.91	22.21	-14.70	40.00	17.79	PK	Vertical
2	86.0175	43.05	25.56	-17.49	40.00	14.44	PK	Vertical
3	124.938	40.75	24.00	-16.75	40.00	16.00	PK	Vertical
4	250.068	34.34	20.55	-13.79	47.00	26.45	PK	Vertical
5	499.965	43.95	36.99	-6.96	47.00	10.01	PK	Vertical
6	750.103	42.05	38.31	-3.74	47.00	8.69	PK	Vertical

Remark:

1. *Final Level =Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version	Product Model:	NEBHNT-HHRK4-433, NEBHNT-HHRK4-470, NEBHNT-HHRK4-868, NEBHNT-HHRK4-915
Test By:	Mike	Test mode:	Working mode
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Vertical
Test Voltage:	AC 230/50Hz		

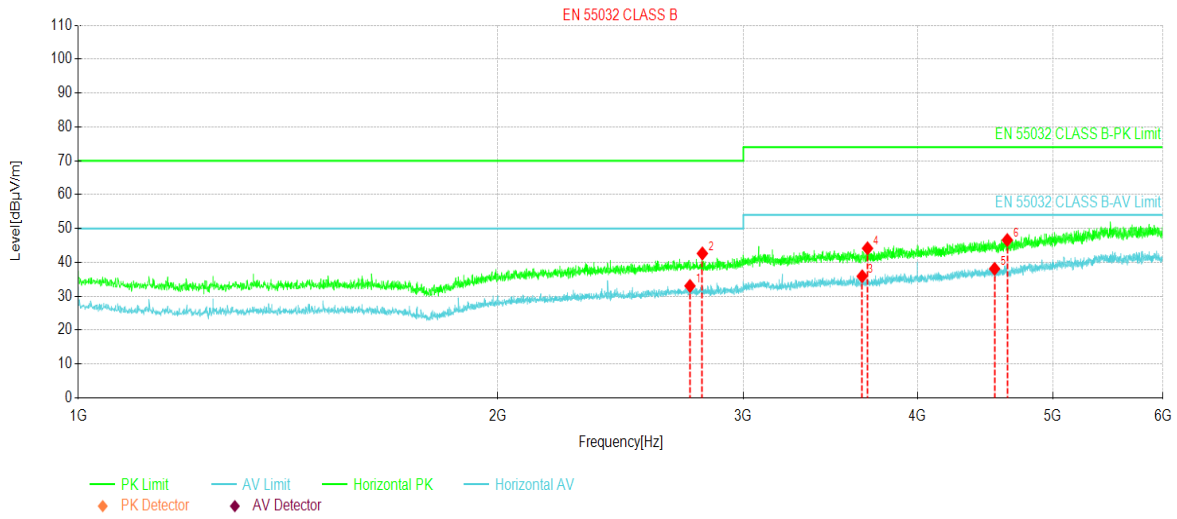


NO.	Freq. [MHz]	Reading[dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	3200.00	52.44	36.51	-15.93	54.00	17.49	AV	Vertical
2	3218.75	58.56	42.69	-15.87	74.00	31.31	PK	Vertical
3	4406.25	57.59	46.43	-11.16	74.00	27.57	PK	Vertical
4	4406.87	49.40	38.25	-11.15	54.00	15.75	AV	Vertical
5	5372.50	56.83	50.70	-6.13	74.00	23.30	PK	Vertical
6	5380.00	48.19	42.12	-6.07	54.00	11.88	AV	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss + Aux Factor – Preamplifier Factor.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version	Product Model:	NEBHNT-HHRK4-433, NEBHNT-HHRK4-470, NEBHNT-HHRK4-868, NEBHNT-HHRK4-915
Test By:	Mike	Test mode:	Working mode
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test Voltage:	AC 230/50Hz		

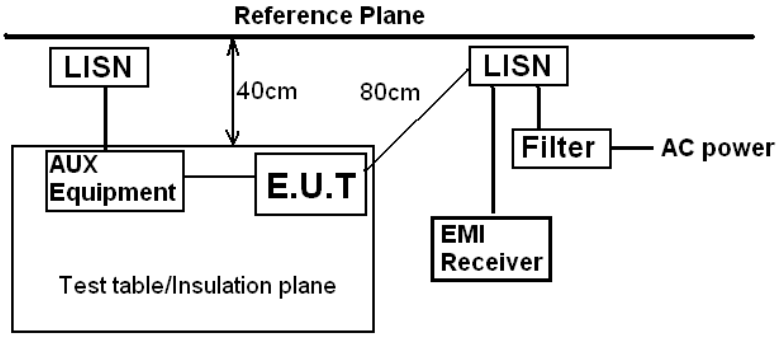


NO.	Freq. [MHz]	Reading[dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	2746.87	50.61	33.04	-17.57	50.00	16.96	AV	Horizontal
2	2803.75	60.15	42.62	-17.53	70.00	27.38	PK	Horizontal
3	3650.62	50.59	35.90	-14.69	54.00	18.10	AV	Horizontal
4	3683.12	58.69	44.14	-14.55	74.00	29.86	PK	Horizontal
5	4543.12	48.72	38.10	-10.62	54.00	15.90	AV	Horizontal
6	4639.37	56.69	46.58	-10.11	74.00	27.42	PK	Horizontal

Remark:

1. *Final Level =Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor_.*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

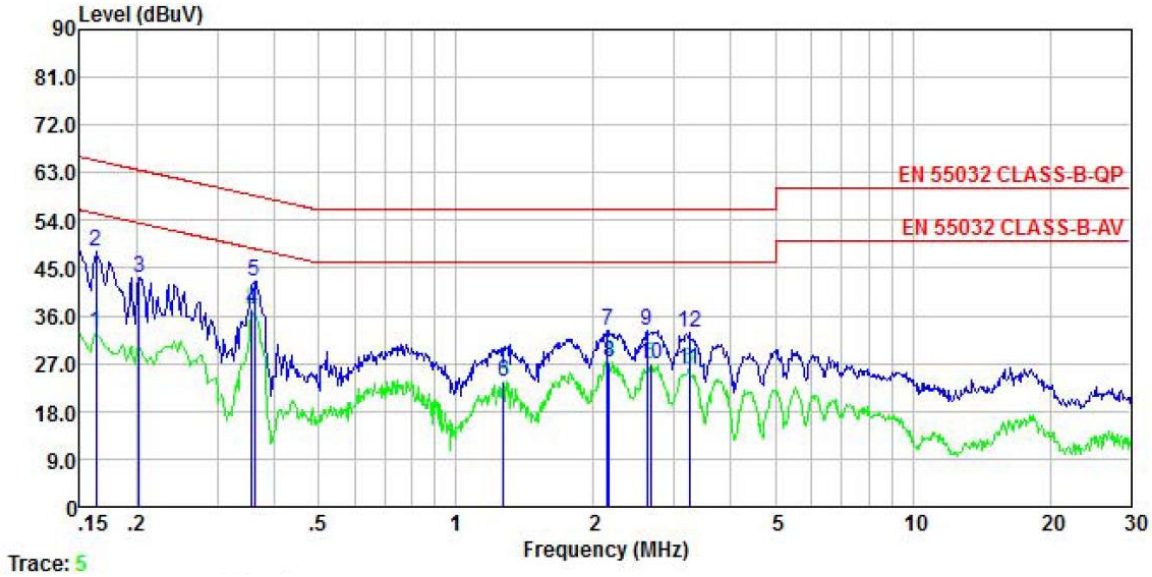
6.1.2 Conducted emission

<table>
<tr><td>Test Requirement:</td><td colspan="3">EN 55032</td></tr>
<tr><td>Test Method:</td><td colspan="3">EN 55032</td></tr>
<tr><td>TestFrequencyRange:</td><td colspan="3">150kHz to 30MHz</td></tr>
<tr><td>Class / Severity: Class B</td><td colspan="3">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="3">RBW=9kHz, VBW=30kHz</td></tr>
<tr><td rowspan="5">Limit:</td><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
<tr><td colspan="3">* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test setup:</td><td colspan="3"> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test procedure</td><td colspan="3">The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). Which provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55032 Class B on conducted measurement.</td></tr>
<tr><td>Test instruments:</td><td colspan="3">Refer to section 5.11 for details</td></tr>
<tr><td>Test mode:</td><td colspan="3">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="3">Passed</td></tr>
</table>

Measurement Data:

Product Name:	Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version	**Product Model:**	NEBHNT-HHRK4-868
Test by:	Mike	**Test mode:**	Working mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 230 V/50 Hz		

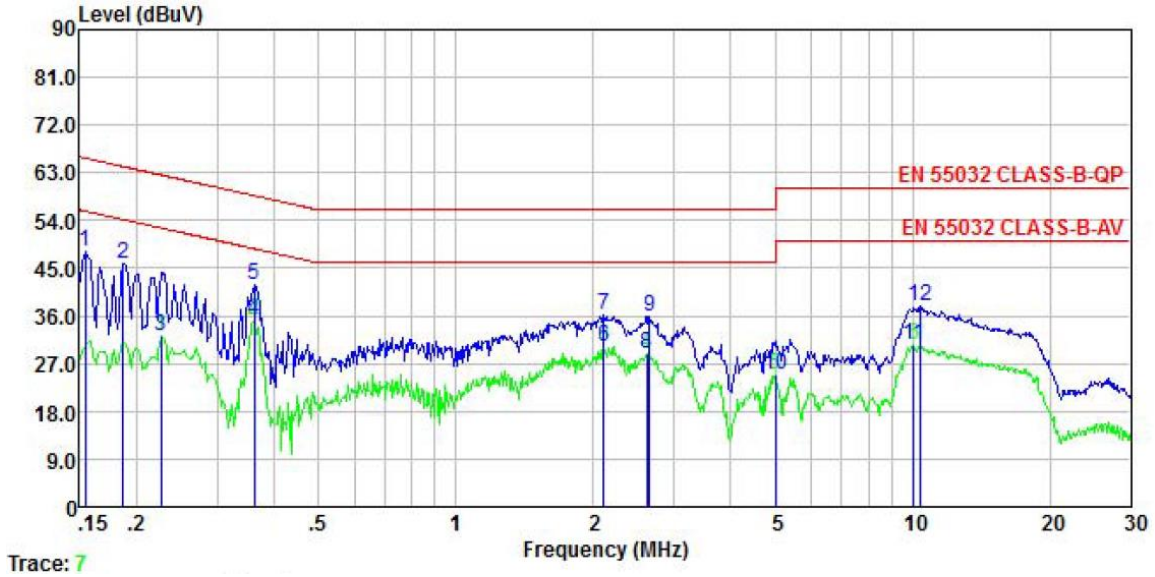


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.162	32.77	0.04	0.01	32.82	55.34	-22.52	Average
2	0.162	47.94	0.04	0.01	47.99	65.34	-17.35	QP
3	0.202	43.18	0.04	0.04	43.26	63.54	-20.28	QP
4	0.358	36.98	0.04	0.02	37.04	48.78	-11.74	Average
5	0.361	42.51	0.04	0.02	42.57	58.69	-16.12	QP
6	1.269	23.57	0.06	0.10	23.73	46.00	-22.27	Average
7	2.144	33.00	0.07	0.18	33.25	56.00	-22.75	QP
8	2.167	27.08	0.07	0.18	27.33	46.00	-18.67	Average
9	2.622	33.09	0.08	0.11	33.28	56.00	-22.72	QP
10	2.664	26.80	0.08	0.11	26.99	46.00	-19.01	Average
11	3.241	25.78	0.09	0.07	25.94	46.00	-20.06	Average
12	3.241	32.58	0.09	0.07	32.74	56.00	-23.26	QP

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss + Aux Factor.*

Product Name:	Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version	Product Model:	NEBHNT-HHRK4-868
Test by:	Mike	Test mode:	Working mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 230 V/50 Hz		

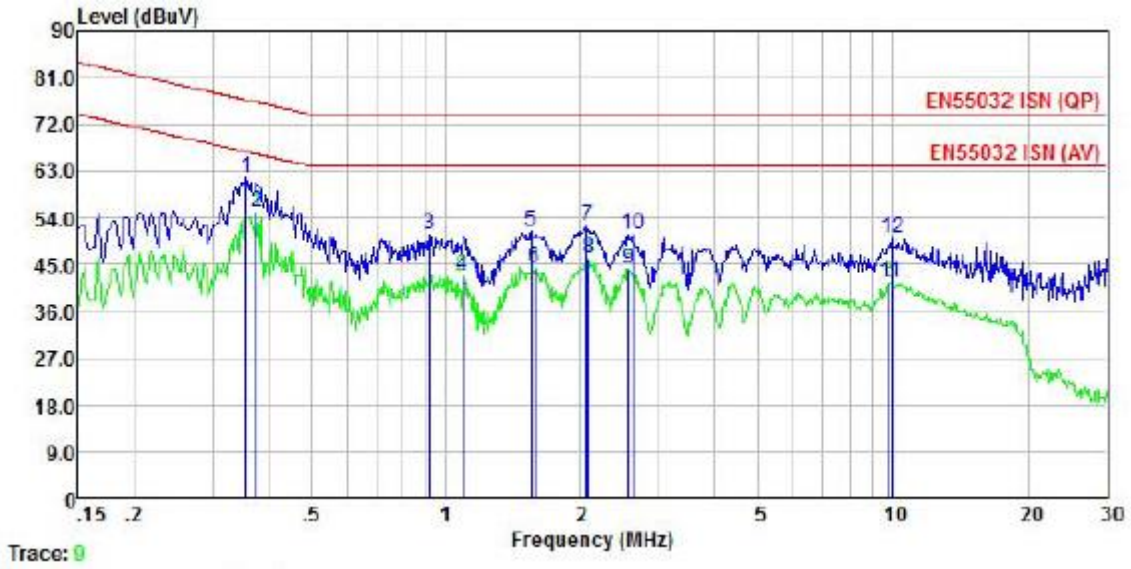


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	48.23	0.05	0.01	48.29	65.78	-17.49	QP
2	0.186	45.80	0.04	0.02	45.86	64.20	-18.34	QP
3	0.226	32.22	0.04	0.02	32.28	52.61	-20.33	Average
4	0.361	35.27	0.04	0.02	35.33	48.69	-13.36	Average
5	0.361	41.72	0.04	0.02	41.78	58.69	-16.91	QP
6	2.110	30.05	0.06	0.19	30.30	46.00	-15.70	Average
7	2.110	35.81	0.06	0.19	36.06	56.00	-19.94	QP
8	2.622	28.82	0.07	0.11	29.00	46.00	-17.00	Average
9	2.650	35.70	0.07	0.11	35.88	56.00	-20.12	QP
10	5.005	24.74	0.10	0.09	24.93	50.00	-25.07	Average
11	10.072	30.08	0.19	0.13	30.40	50.00	-19.60	Average
12	10.397	37.41	0.19	0.12	37.72	60.00	-22.28	QP

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss + Aux Factor.*

Product Name:	Nebra Indoor LoRa Gateway ROCK Pi 4 Version / Nebra Indoor Helium Hotspot ROCK Pi 4 Version	Product Model:	NEBHNT-HHRK4-868
Test by:	Mike	Test mode:	Working mode
Test frequency:	150 kHz ~ 30 MHz	Port:	LAN(Cat5)
Test voltage:	AC 230 V/50 Hz		



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.368	52.01	9.76	0.02	61.79	76.78	-14.99	QP
2	0.377	45.32	9.75	0.03	55.10	66.34	-11.24	Average
3	0.918	41.11	9.55	0.04	50.70	74.00	-23.30	QP
4	1.088	33.37	9.56	0.07	43.00	64.00	-21.00	Average
5	1.552	41.55	9.61	0.15	51.31	74.00	-22.69	QP
6	1.577	34.78	9.62	0.16	44.56	64.00	-19.44	Average
7	2.066	42.55	9.65	0.20	52.40	74.00	-21.60	QP
8	2.088	36.30	9.65	0.20	46.15	64.00	-17.85	Average
9	2.567	34.49	9.66	0.12	44.27	64.00	-19.73	Average
10	2.622	40.95	9.66	0.11	50.72	74.00	-23.28	QP
11	9.861	31.60	9.83	0.13	41.56	64.00	-22.44	Average
12	10.019	40.20	9.83	0.13	50.16	74.00	-23.84	QP

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss + Aux Factor.*

6.1.3 Harmonics Test Result

Test Requirement:	EN IEC 61000-3-2
Test Method:	N/A: See Remark Below
Remark	There is no need for Harmonics test to be performed on this product (rated power is less than 75W) in accordance with EN IEC 61000-3-2. For further details, please refer to Clause 7, Note 1 of EN IEC 61000-3-2 which states: “For the following categories of equipment limits are not specified in this edition of the standard. Note 1: Equipment with a rated power of 75W or less, other than lighting equipment.”

6.1.4 Flicker Test Result

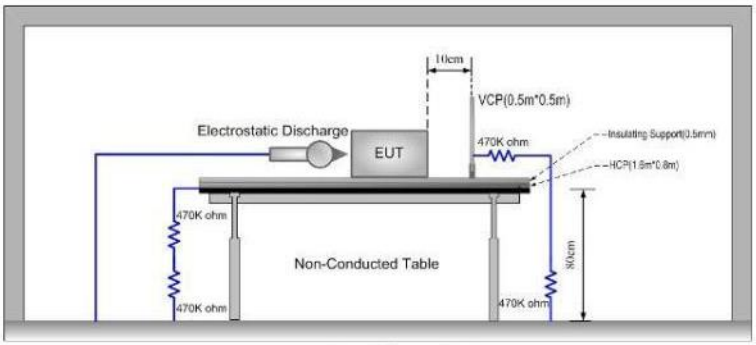
Test Requirement:	EN 61000-3-3
Test Method:	EN 61000-3-3
Remark:	As the section 6.1 of EN 61000-3-3, “Devices and Equipment that do(with the utmost probability) not generate relevant voltage fluctuations or flicker need not to be tested”.

6.2 EMS (Immunity)

6.2.1 Performance Criteria Description in EN 55035

Criterion A:	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 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.
Criterion B:	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena 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. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. 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.
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. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

6.2.2 Electrostatic discharges (ESD)

Test requirement:	EN 55035
Test method:	EN61000-4-2
Discharge voltage:	Contact Discharge, HCP and VCP: ±2kV, ±4kV, Air Discharge: ±2kV, ±4kV, ±8kV
Polarity:	Positive & Negative
Number of discharge:	Contact Discharge: Minimum 25 times at each test point, Air Discharge: Minimum 10 times at each test point.
Discharge mode:	Single Discharge
Discharge period:	1 second minimum
Test setup:	
Test procedure:	**1) Air discharge:** The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure was repeated until all the air discharge completed **2) Contact discharge:** The test was applied on conductive surfaces of EUT. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated. **3) Indirect discharge for horizontal coupling plane** At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.Consideration should be given to exposing all sides of the EUT. **4) Indirect discharge for vertical coupling plane** At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.
Test instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

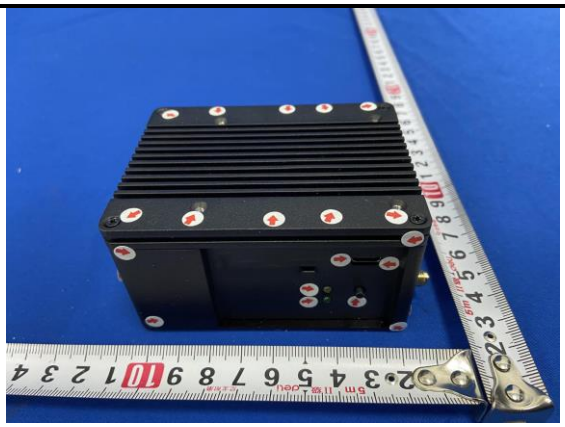
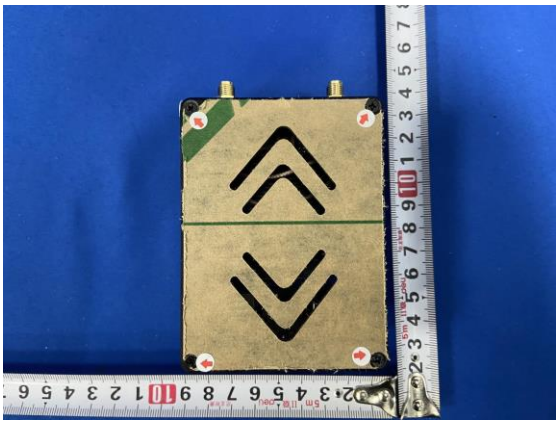
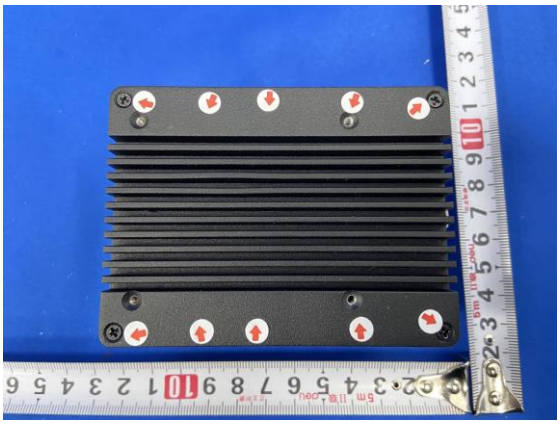
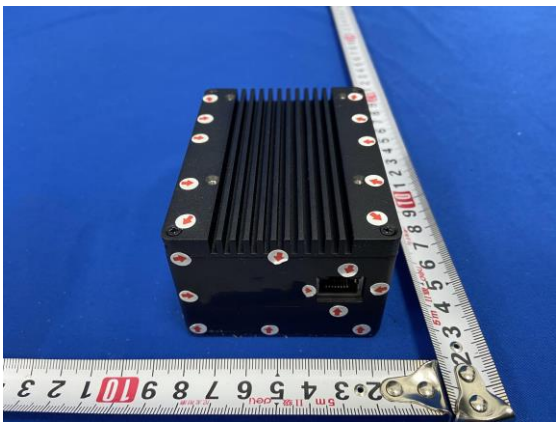
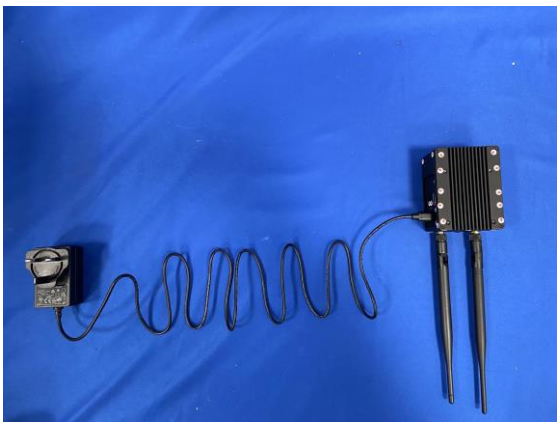
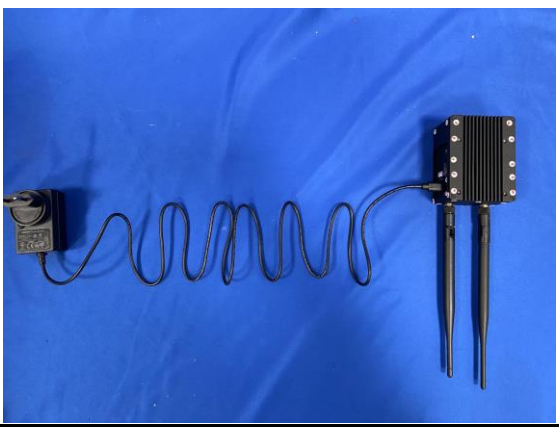
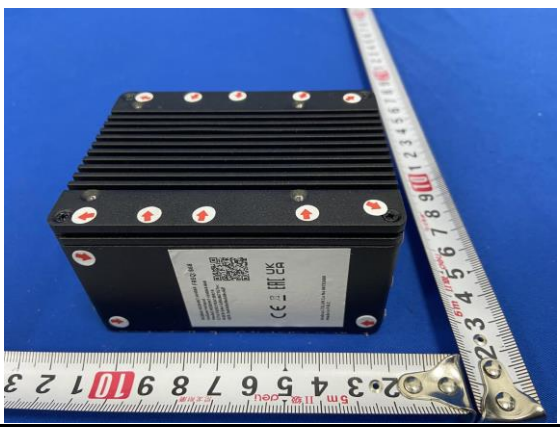
Measurement Record:

Test mode:	Working mode			
Test points:	**I:** Please refer to red arrows as below plots			
	II:N/A			
Direct discharge				
Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observations (Performance Criterion)**	**Result**
± 2, ± 4	Contact	I	A	Pass
± 2, ± 4,± 8	Air	II	N/A	N/A
Indirect discharge				
Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observation Performance**	**Result**
± 2, ± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 2, ± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

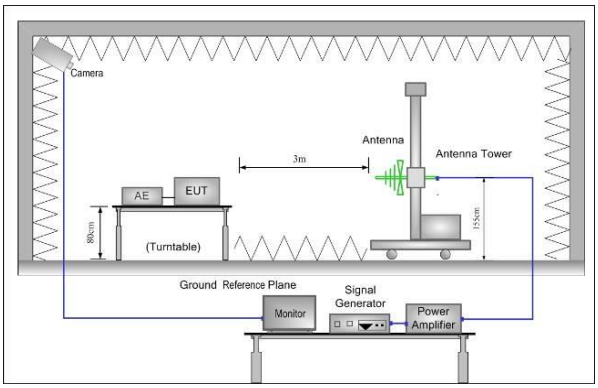
Remark:

1. *A: No degradation in performance of the EUT was observed.*
2. *Red arrow: Air discharge test points.*

ESD Test points as below:

6.2.3 Continuous RF electromagnetic field disturbances

Test requirement:	EN 55035
Test method:	EN61000-4-3
Frequency range:	Swept test:80MHz to 1GHz Spot test: 1800MHz,2600MHz,3500MHz,5000MHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance criterion:	Criteria A
Test setup:	
Test procedure:	1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length. 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary.Where the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value. 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 5 s. 6. The test normally was performed with the generating antenna facing each side of the EUT. 7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. 8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.
Test instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Record:

Test mode: Working mode

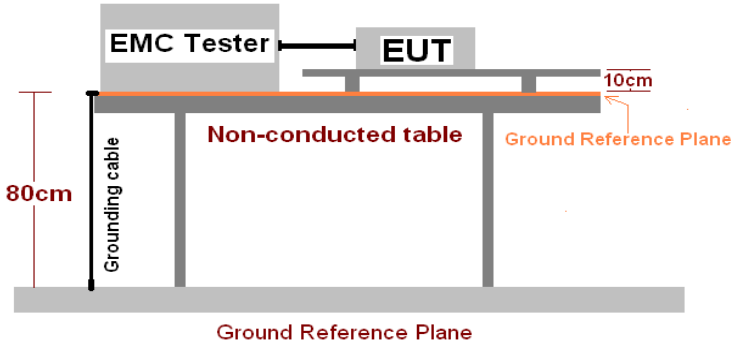
Continuous RF electromagnetic radiated field disturbances swept test

Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)	Result
80 MHz-1 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=5seconds	V	Front	A	Pass
			H		A	Pass
			V	Rear	A	Pass
			H		A	Pass
			V	Left	A	Pass
			H		A	Pass
			V	Right	A	Pass
			H		A	Pass
			V	Top	A	Pass
			H		A	Pass
			V	Bottom	A	Pass
			H		A	Pass
Remarks: *A: No degradation in the performance of the E.U.T. was observed.*						

Continuous RF electromagnetic radiated field disturbances spot test

Frequency (+/-1%)	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)	Result
1800MHz, 2600MHz, 3500MHz, 5000MHz	3V/m	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=5seconds	V	Front	A	Pass
			H		A	Pass
			V	Rear	A	Pass
			H		A	Pass
			V	Left	A	Pass
			H		A	Pass
			V	Right	A	Pass
			H		A	Pass
			V	Top	A	Pass
			H		A	Pass
			V	Bottom	A	Pass
			H		A	Pass
Remarks: *A: No degradation in the performance of the E.U.T. was observed.*						

6.2.4 Electrical fast transients/burst (EFT/B)

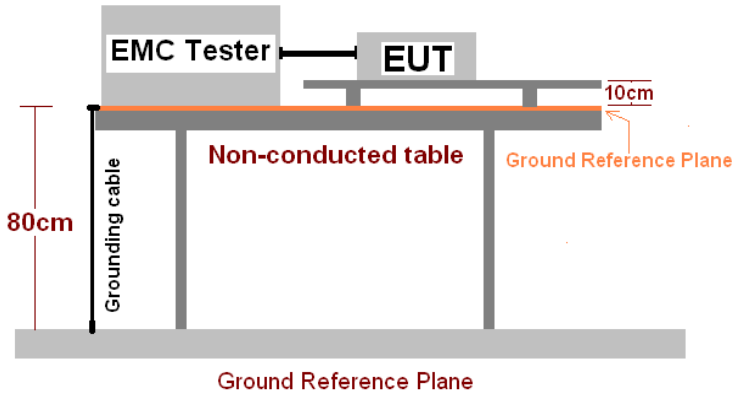
Test requirement:	EN 55035
Test method:	EN61000-4-4
Test level:	1.0kV on AC port 0.5kV on Lan port
Polarity:	Positive & Negative
Repetition frequency:	5kHz
Burst duration:	15ms
Burst period:	300ms
Test duration:	2 minute per level & polarity
Performance criterion:	B
Test setup:	
Test procedure:	The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables. **Test on Signal Ports, Telecommunication Ports and Control Ports:** The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 2 minutes. **Test on power supply ports:** The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes. The length of the signal and power lines between the coupling device and the EUT is 0.5m
Test instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Record:

Test mode: Working mode

Lead under Test	Level (±kV)	Coupling Direct/Clamp	Observations (Performance Criterion)	Result
L	± 1.0	Direct	A	Pass
N	± 1.0	Direct	A	Pass
L-N	± 1.0	Direct	A	Pass
Lan	± 0.5	Clamp	A	Pass
Remark: *A: No degradation in the performance of the E.U.T. was observed.*				

6.2.5 Surges

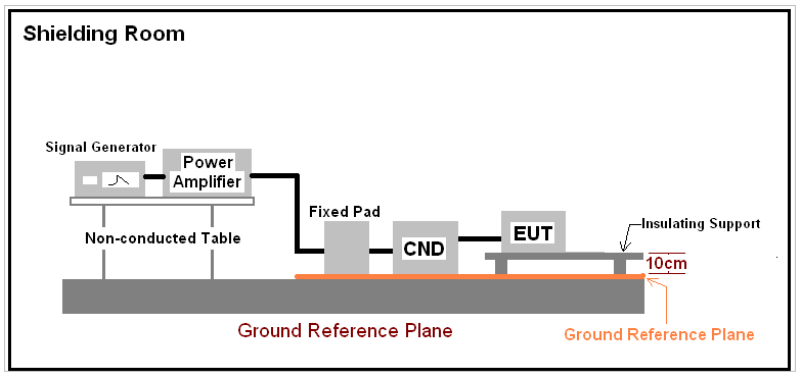
Test requirement:	EN 55035
Test method:	EN61000-4-5
Test level:	± 1 kV Live to Neutral: Differential mode ± 2 kV Live to Earth or Neutral to Earth: Common mode ± 0.5 kV For Lan Port
Polarity:	Positive & Negative
Generator source impedance:	2Ω (line-line coupling)
Test interval:	60s between each surge
No. of surges:	5 positive, 5 negative at 0°, 90°, 180°, 270°.
Performance criterion:	B
Test setup:	
Test procedure:	1) For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV. 2) At least 5 positive and 5 negative (polarity) tests with a maximum 1/minrepetition rate are applied during test. 3) Different phase angles are done individually. 4) Record the EUT operating situation during compliance test and decide the EUTimmunity criterion for above each test.
Test instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Record:

Test mode: Working mode

Location	Level(kV)	Pulse No	Surge Interval	Phase(deg)	Observations (Performance Criterion)	Result
L-N	±1	5	60s	0°	A	Pass
				90°	A	Pass
				180°	A	Pass
				270°	A	Pass
Lan	±0.5	5	60s	/	A	Pass
Remark: *A: During the test, The EUT works normal, and after the test, the function of the EUT is normal.*						

6.2.6 Continuous induced RF disturbances

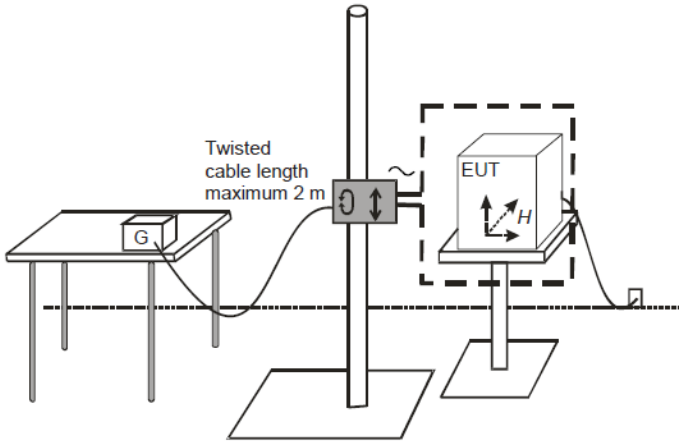
Test requirement:	EN 55035
Test method:	EN61000-4-6
Frequency range:	0.15MHz to 80MHz
Test level:	0.15-10MHz:3V 10-30MHz:3-1V 30-80MHz:1V Audio output function: 0.15MHz-30MHz: -20dB, 30MHz-80MHz: -10dB
Modulation:	80%, 1kHz Amplitude Modulation
Performance criterion:	Criteria A
Test setup:	
Test procedure:	1) Let the EUT work in test mode and test it. 2) The EUT are placed on an insulating support 0.1m high above a groundreference plane. CDN (coupling and decoupling device) is placed on theground plane about 0.3m from EUT. Cables between CDN and EUT are asshort as possible, and their height above the ground reference plane shall bebetween 30 and 50 mm (where possible). 3) The disturbance signal described below is injected to EUT through CDN. 4) The EUT operates within its operational mode(s) under intended climaticconditions after power on. 5) The frequency range is swept from 0.150MHz to 80MHz using 3V signal level,and with the disturbance signal 80% amplitude modulated with a 1 kHz sinewave. 6) The rate of sweep shall not exceed 1.5*10-3decades/s. Where the frequency isswept incrementally; the step size shall not exceed 1% of the start andthereafter 1% of the preceding frequency value. 7) Recording the EUT operating situation during compliance testing and decidethe EUT immunity criterion.
Test instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Record:

Test mode: Working mode

Frequency	Injected Position	Test Level	Modulation	Step Size	Dwell Time	Observations (Performance Criterion)	Result
150kHz to 10MHz	AC Main Lan Port	3V	80%, 1kHz Amp. Mod.	1%	2s	A	Pass
10MHz to 30MHz		3V to1V				A	Pass
30MHz to 80MHz		1V				A	Pass
Remark: *A: No loss of function was observed.*							

6.2.7 Power frequency magnetic field

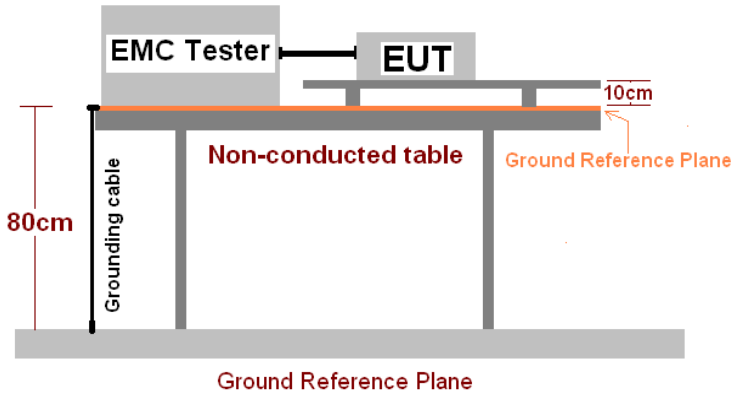
Test requirement:	EN 55035
Test method:	EN61000-4-8
Test frequency:	50/60 Hz
Test level:	1 A/m
Performance criterion:	Criteria A
Test setup:	
Test procedure:	The EUT place center of the test magnetic field coils. The plane of the inductive coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations. The signal generator generates a magnetic field of 1A/m for testing.
Test instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Record:

Test mode: Working mode

Test Frequency (Hz)	Test Level (A/m)	Observations (Performance Criterion)	Result
50	1	A	Pass
60	1	A	Pass
Remark: *A: No loss of function was observed.*			

6.2.8 Voltage dips and interruptions

Test requirement:	EN 55035
Test method:	EN61000-4-11
Test level:	0% of VT(Supply Voltage) for 0.5 period 70% of VT(Supply Voltage) for 25 period 0% of VT(Supply Voltage) for 250 period
No. of dips / Interruptions:	3 per Level
Performance criterion:	>95% VD, 0.5 period----Performance criterion: B 30% VD, 25 period----Performance criterion: C >95% VI, 250 period----Performance criterion: C
Test setup:	
Test procedure:	1) The EUT and test generator were setup as shown on above setup photo. 2) The interruptions are introduced at selected phase angles with specified duration. 3) Record any degradation of performance.
Test instruments:	Refer to section 5.11 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

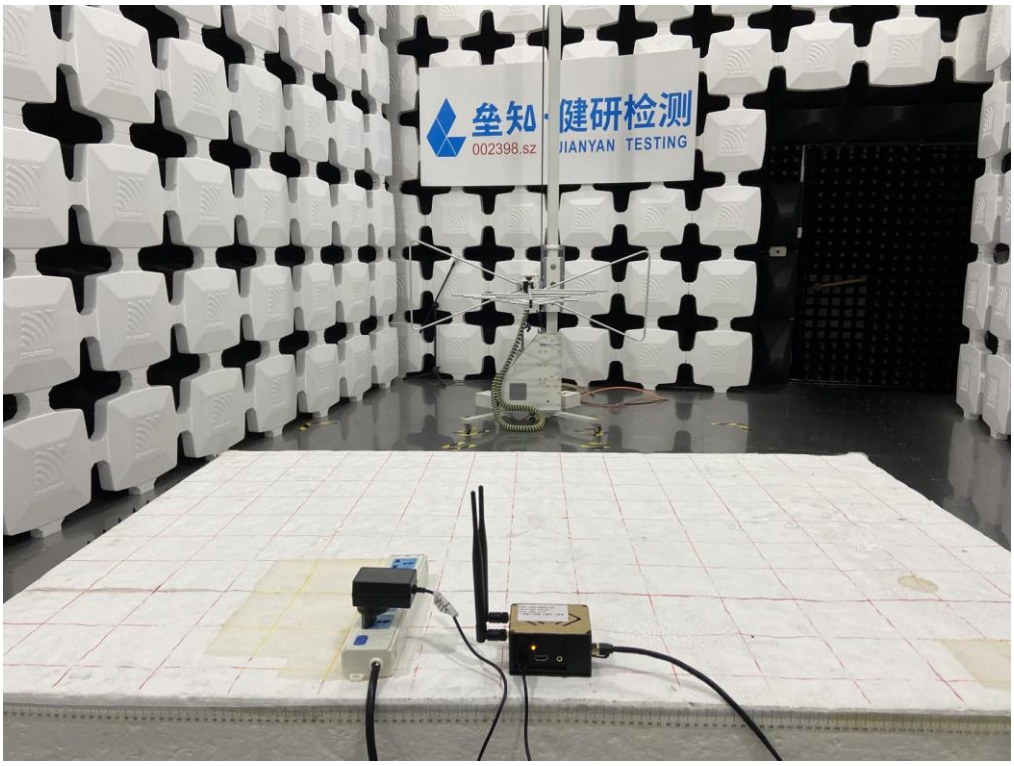
Measurement Record:

Test mode: Working mode

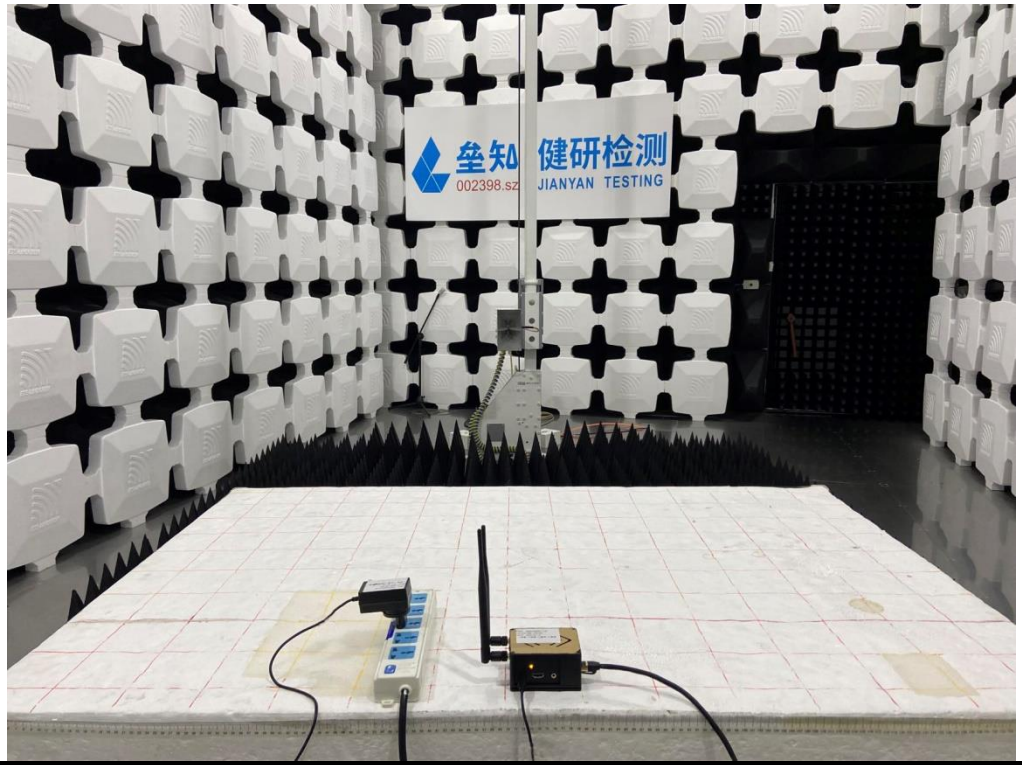
Test Level % U_T	Duration (Periods)	Phase angle	No of dropout	Time between dropout	Observations (Performance Criterion)	Result
Test voltage: AC 230V/50Hz						
0	0.5	0°, 90°, 180°, 270°	3	10ms	A	Pass
70	25	0°, 90°, 180°, 270°	3	500ms	A	Pass
0	250	0°, 90°, 180°, 270°	3	5000ms	B	Pass
Test voltage: AC 110V/60Hz						
0	0.5	0°, 90°, 180°, 270°	3	10ms	A	Pass
70	30	0°, 90°, 180°, 270°	3	500ms	A	Pass
0	300	0°, 90°, 180°, 270°	3	5000ms	B	Pass
Remark: *A: No loss of function was observed.* *B:After the test, the equipment can operate as intended without operator intervention.No loss of function was observed.*						

7 Test Setup Photo

Radiated Emission Below1GHz

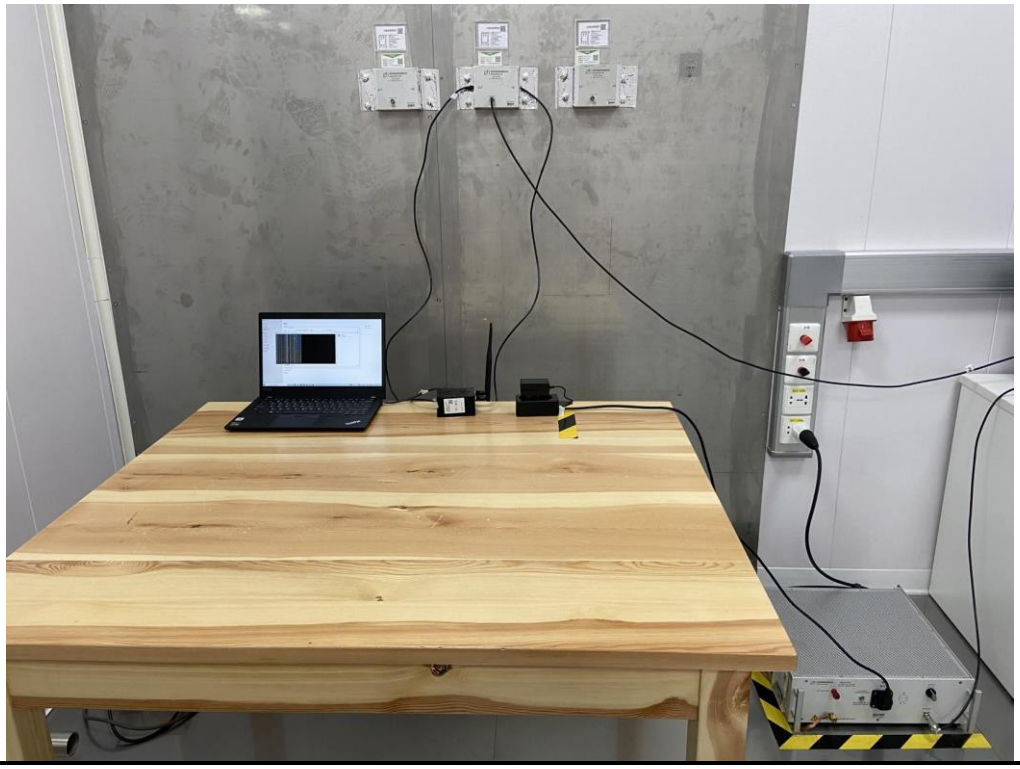


Radiated Emission Above1GHz

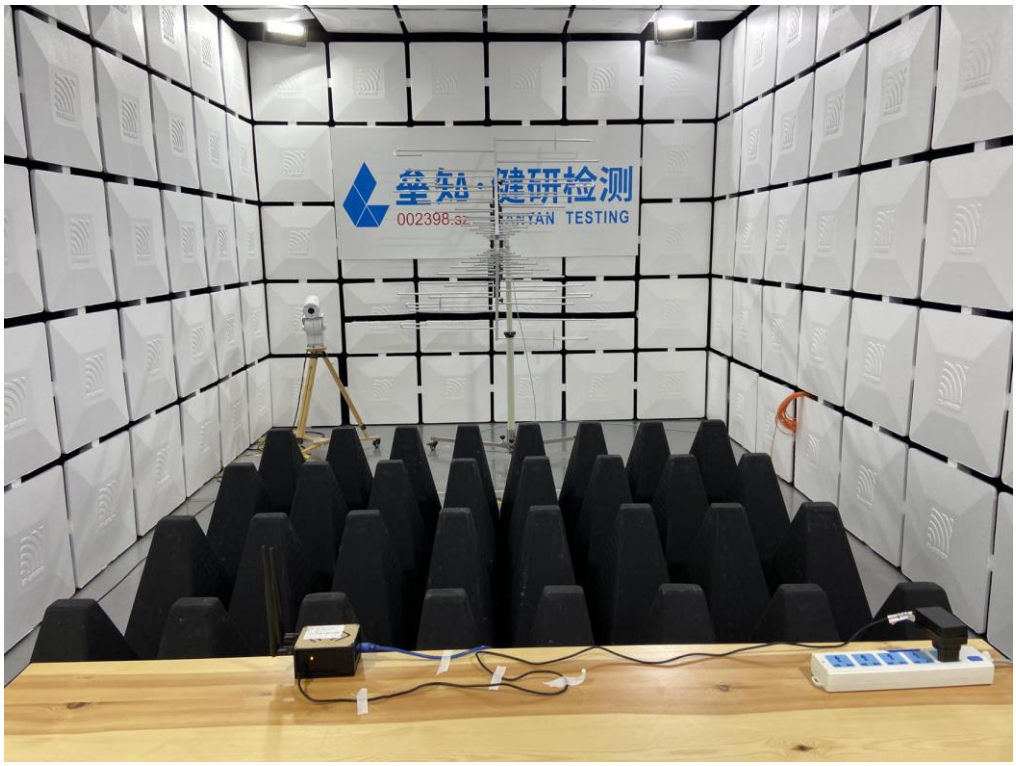


Conducted Emission (AC Main Port)

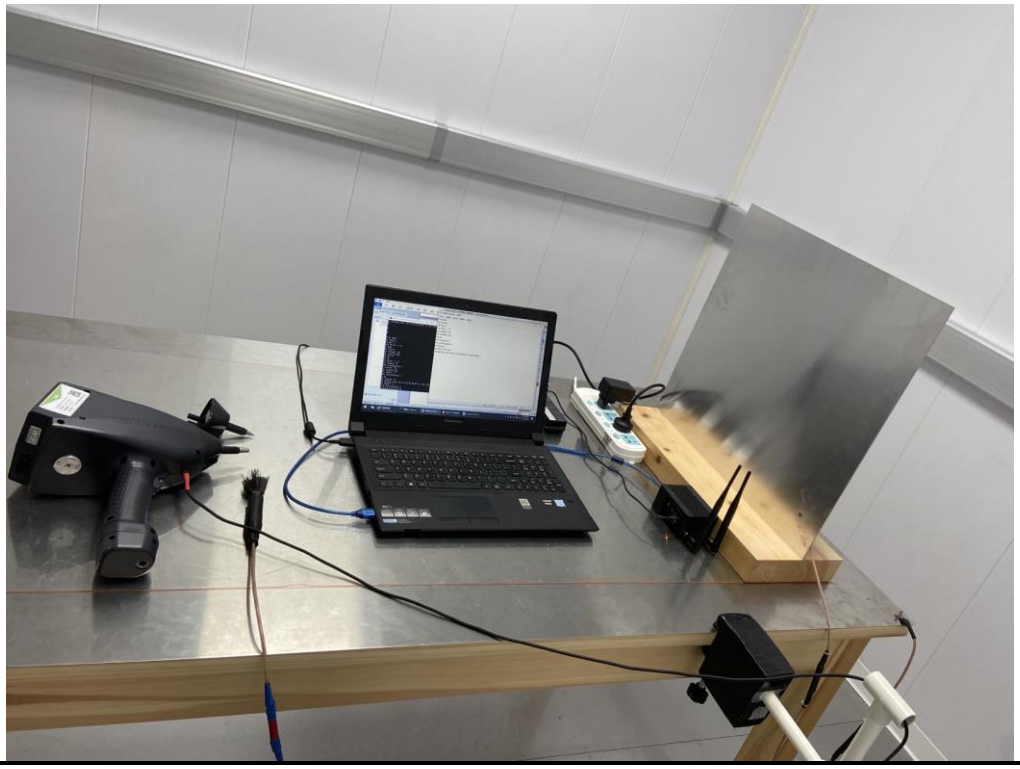
Conducted Emission (LAN Port)



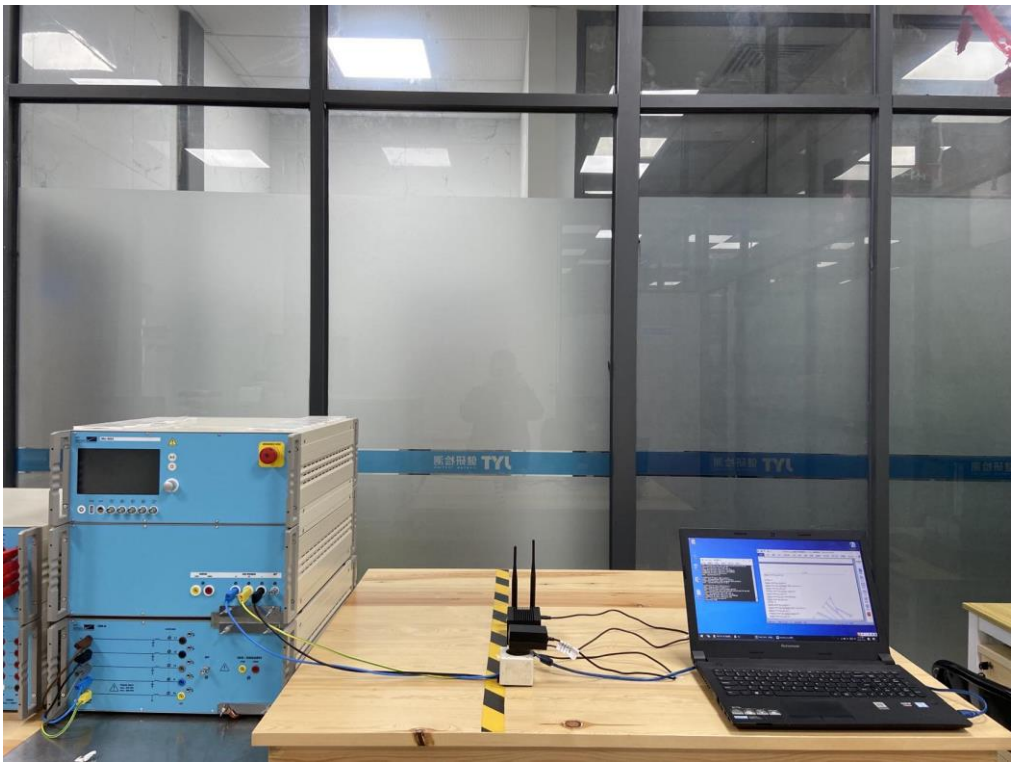
R/S



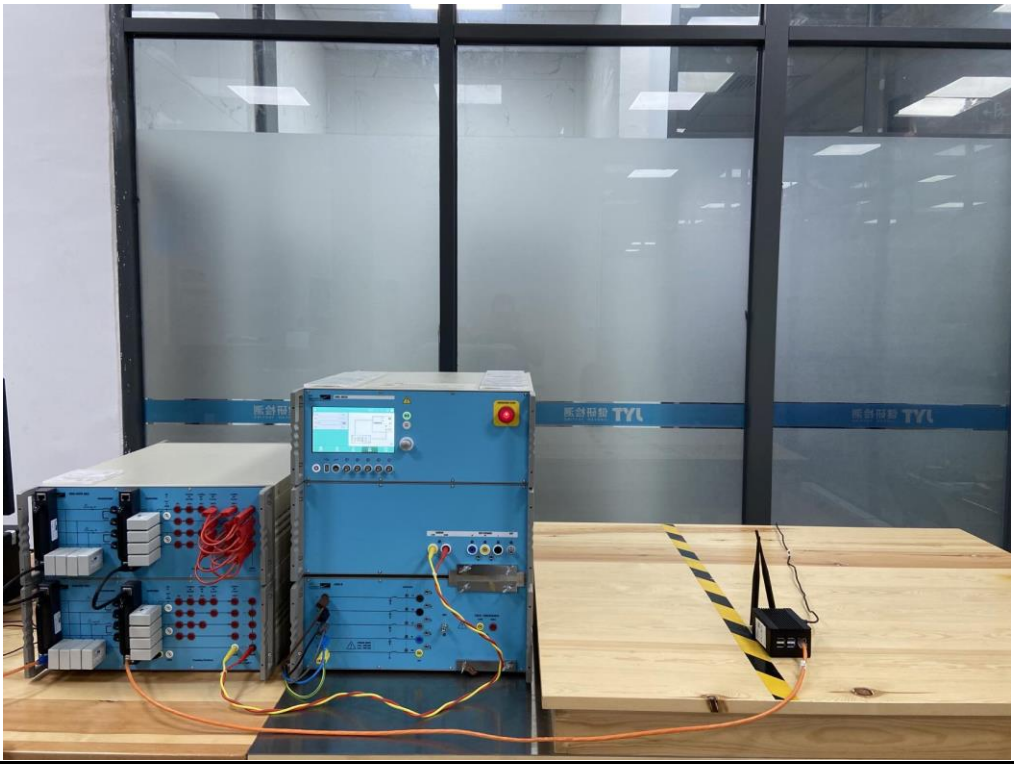
ESD



EFT/B & Surge & V-dips (AC Main Port)

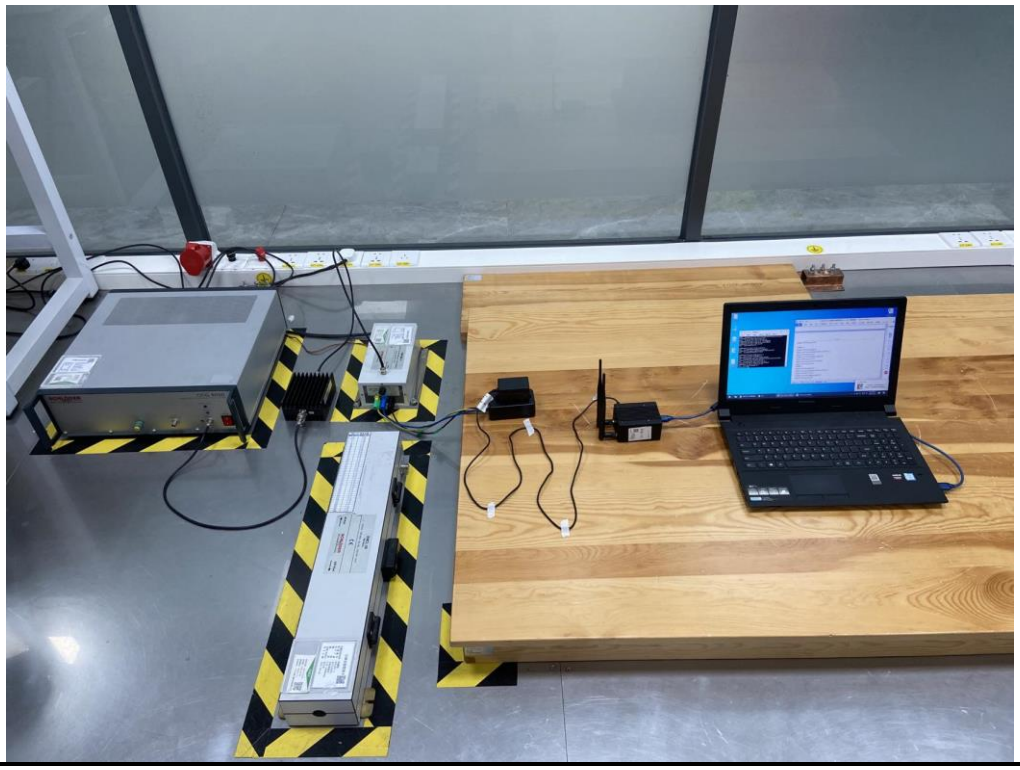


Surge (LAN Port)

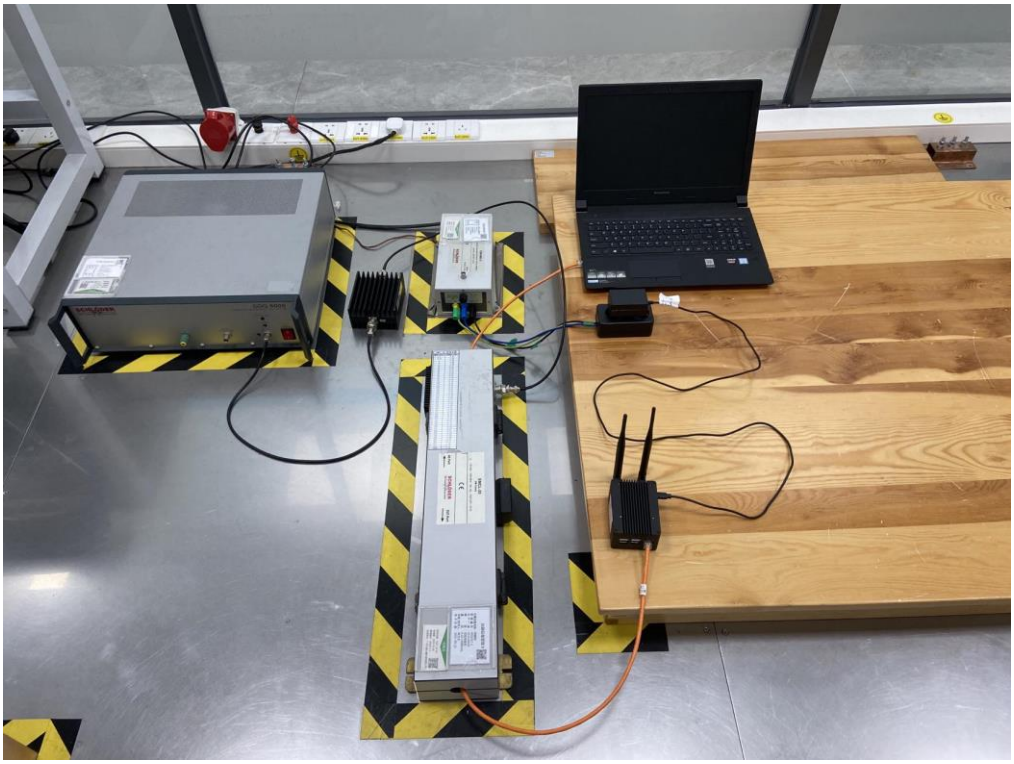


EFT/B (LAN Port)

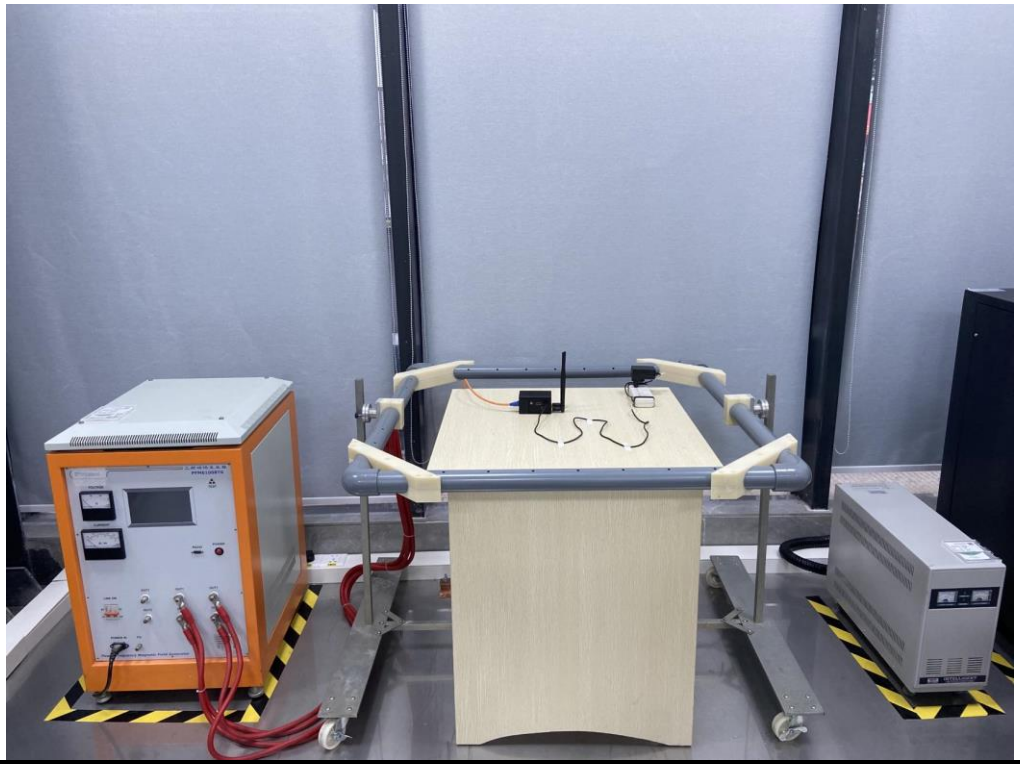
C/S (AC Main Port)



C/S (LAN Port)



PFMF



8 EUT Constructional Details

Reference to the test report No. JYTSZ-R01-2200018.

------End of report------