

TEST REPORT

Applicant/Manufacturer: Shenzhen Huafului Technology Co., Ltd.
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Report Number : SZ1230414-19311E-EM-02

Test Standard (s)

ETSI EN 301 489-1 V2.2.3 (2019-11); ETSI EN 301 489-3 V2.3.2 (2023-01);
DRAFT ETSI EN 301 489-17 V3.2.5 (2022-08); ETSI EN 301 489-19 V2.2.1 (2022-09);
ETSI EN 301 489-52 V1.2.1 (2021-11)

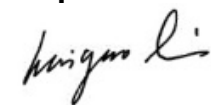
Sample Description

Product Type: Smartphone
Model No.: KINGKONG STAR
Multiple Model(s) No.: N/A
Trade Mark: CUBOT
Date Received: 2023/04/14
Report Date: 2023/05/24

Test Result:	Pass*
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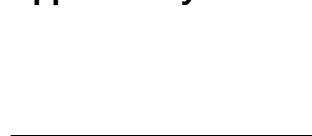
* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:



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Approved By:



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EMC Supervisor

Note: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk "*". Customer model name, addresses, names, trademarks etc. are not considered data.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZ1230414-19311E-EM-02	Original Report	2023-05-24

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Highest operating Frequency	5.825GHz
Voltage Range	DC3.87V from rechargeable Li-ion battery or DC 5/9/12V from adapter
Sample serial number	2407_1 (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	Model:HJ-PD33W-EU Input:AC100-240V~50/60Hz 0.8A Output:DC5.0V.3.0A 15.0W OR DC9.0V. 3.0A 27.0W OR DC 12.0V.2.75A 33.0W MAX

Objective

This test report is in accordance with ETSI EN 301 489-1 V2.2.3 (2019-11), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility; ETSI EN 301 489-3 V2.3.2 (2023-01), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU. DRAFT ETSI EN 301 489-17 V3.2.5 (2022-08), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility. ETSI EN 301 489-19 V2.2.1 (2022-09), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 19: Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications and GNSS receivers operating in the RNSS band (ROGNSS) providing positioning, navigation, and timing data; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and ETSI EN 301 489-52 V1.2.1 (2021-11), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication User Equipment (UE) radio and ancillary equipment; Harmonised Standard for ElectroMagnetic Compatibility.

The objective is to determine compliance with ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-3 V2.3.2 (2023-01), DRAFT ETSI EN 301 489-17 V3.2.5 (2022-08), ETSI EN 301 489-19 V2.2.1 (2022-09) and ETSI EN 301 489-52 V1.2.1 (2021-11).

Performance criterion

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.

Measurement Uncertainty

Item	Frequency Range		Expanded Measurement uncertainty
Conducted Emissions	AC Mains	150KHz~30MHz	2.84 dB (k=2, 95% level of confidence)
Radiated emission	30MHz~200MHz	Horizontal	4.26 dB (k=2, 95% level of confidence)
	30MHz~200MHz	Vertical	4.14 dB (k=2, 95% level of confidence)
	200MHz~1000MHz	Horizontal	4.64 dB (k=2, 95% level of confidence)
	200MHz~1000MHz	Vertical	4.42 dB (k=2, 95% level of confidence)
	1GHz~6GHz	/	4.96 dB (k=2, 95% level of confidence)

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

Each test item follows test standards and with no deviation.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user)

Test Mode 1: Charging & GPS receiving (working with N5182B)

Test Mode 2: Charging & Bluetooth transmitting (working and monitoring with CMW500)

Test Mode 3: Charging & Wi-Fi transmitting (working and monitoring with Wireless Router)

Test Mode 4: Charging & GSM/GPRS/EDGE transmitting (working and monitoring with CMU200 & sound analyzer)

Test Mode 5: Charging & WCDMA transmitting (working and monitoring with CMW500 & sound analyzer)

Test Mode 6: Charging & LTE transmitting (working and monitoring with CMW500 & sound analyzer)

Test Mode 7: Charging & NR transmitting (working and monitoring with MT8821C & sound analyzer)

Test Mode 8: Charging & NFC transmitting (working with contactless card)

Note: All of the above test modes were evaluated, but for EMI test item, only the worst-case data was shown in the test report.

Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

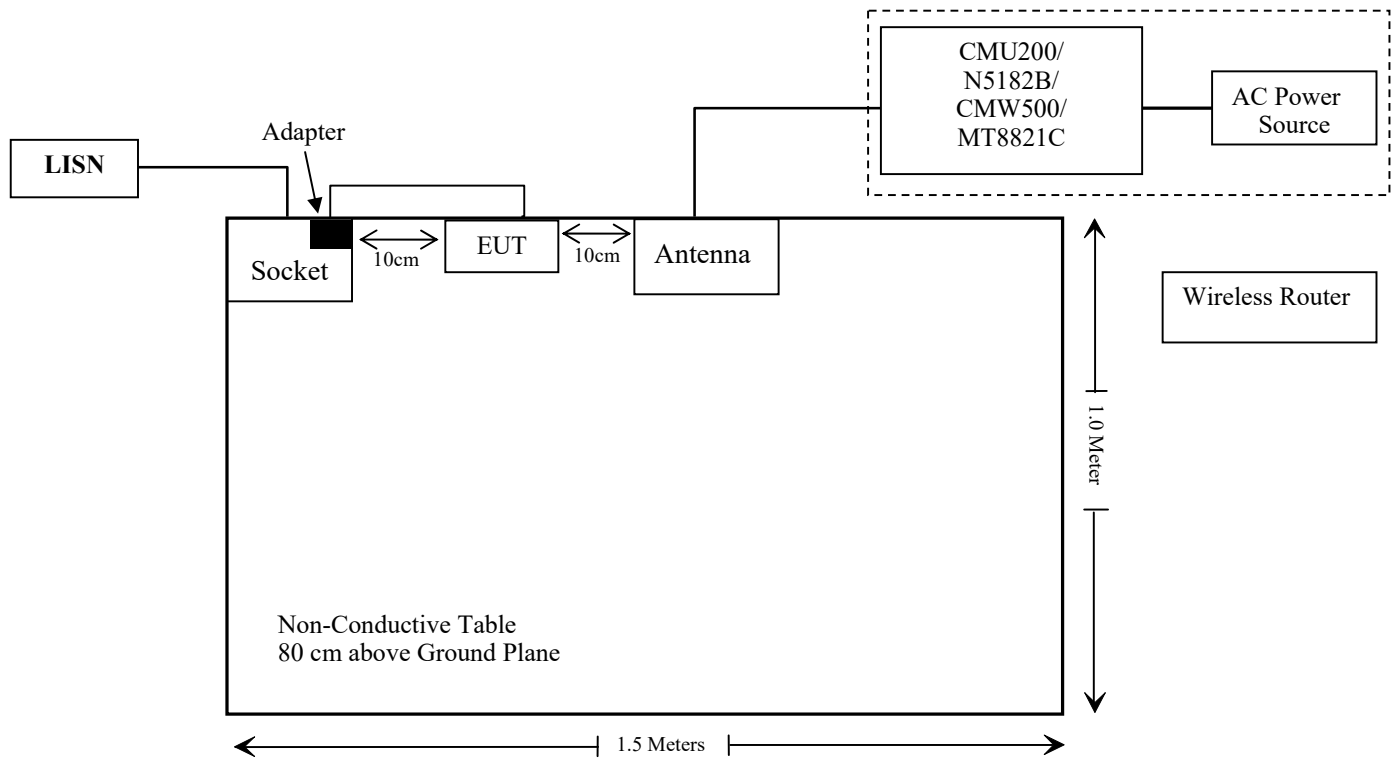
Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891
SAGEM	Wireless ADSL Router	SAGEM F@ST TM 2604 White	Unknown
KEYSIGHT	Vector signal source	N5182B	MY53051503
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh
Rohde & Schwarz	Radio Communication Analyzer	MT8821C	6262287697
OUPU	SOCKET	PDU-OP1606K	6971041358020

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-Shielding un-detachable AC Cable	1.0	LISN	Socket
Un-Shielding detachable USB Cable	1.0	EUT	Adapter

Block Diagram of Test Setup

Test Mode 1 & Test Mode 2 & Test Mode 3 & Test Mode 4 & Test Mode 5 & Test Mode 6 & Test Mode 7 & Test Mode 8



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
§7.1	Reference to clauses EN 301 489-1 §8.4 AC mains power input/output ports	Compliant
	Reference to clauses EN 301 489-1 §8.3 DC power input/output ports	Not Applicable
	Reference to clauses EN 301 489-1 §8.2 Enclosure port of ancillary equipment measured on a stand alone basis	Compliant
	Reference to clauses EN 301 489-1 §8.5 Harmonic current emissions (AC mains input port)	Compliant*
	Reference to clauses EN 301 489-1 §8.6 Voltage fluctuations and flicker (AC mains input port)	Compliant
	Reference to clauses EN 301 489-1 §8.7 Wired network ports	Not Applicable
§7.2	Reference to clauses EN 301 489-1 §9.2 Radio frequency electromagnetic field (80 MHz to 6000 MHz) (EN 61000-4-3)	Compliant
	Reference to clauses EN 301 489-1 §9.3 Electrostatic discharge (EN 61000-4-2)	Compliant
	Reference to clauses EN 301 489-1 §9.4 Fast transients, common mode (EN 61000-4-4)	Compliant
	Reference to clauses EN 301 489-1 §9.5 Radio frequency, common mode (EN 61000-4-6)	Compliant
	Reference to clauses EN 301 489-1 §9.6 Transients and surges in the vehicular environment (ISO 7637-2)	Not Applicable
	Reference to clauses EN 301 489-1 §9.8 Surges (EN 61000-4-5)	Compliant
	Reference to clauses EN 301 489-1 §9.7 Voltage dips and interruptions (EN 61000-4-11)	Compliant

Not Applicable: Please refer to Applicability overview tables in sections 7.1 and 7.2 of EN 301 489-1 requirements for Radio and ancillary equipment.

Compliant*: Equipment rated at 75w or below is exempt from testing.

TEST EQUIPMENT LIST

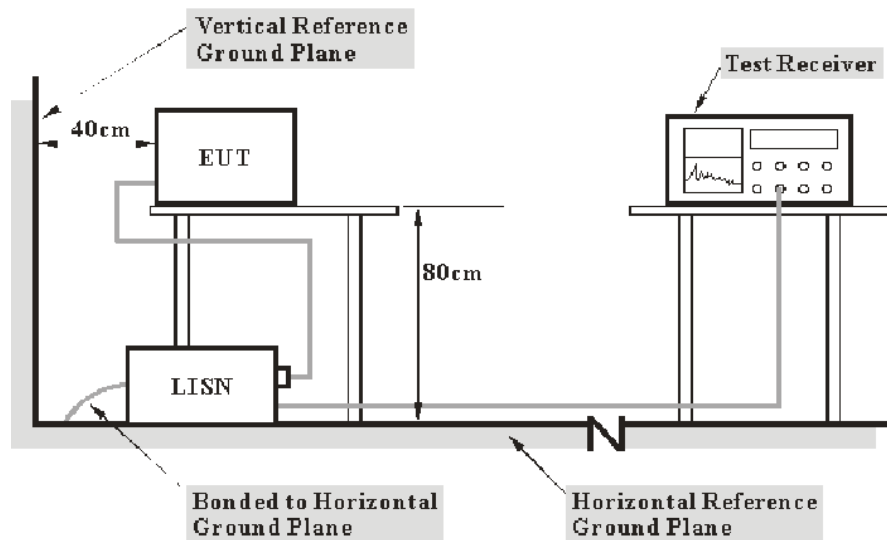
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMI					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2023/2/8	2024/2/7
Rohde & Schwarz	LISN	ENV216	101613	2023/2/8	2024/2/7
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2022/11/11	2023/11/10
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2022/11/11	2023/11/10
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
R&S	EMI Test Receiver	ESR3	102455	2023/2/8	2024/2/7
Sonoma instrument	Pre-amplifier	310 N	186238	2022/11/11	2023/11/10
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2020/12/22	2023/12/21
Unknown	Cable	Chamber Cable 1	F-03-EM236	2022/11/11	2023/11/10
Unknown	Cable	Chamber Cable 4	EC-007	2022/11/11	2023/11/10
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2023/2/10	2024/2/9
COM-POWER	Pre-amplifier	PA-122	181919	2022/11/25	2023/11/24
Sunol Sciences	Horn Antenna	3115	9107-3694	2021/1/15	2024/1/14
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2022/11/25	2023/11/24
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2022/11/25	2023/11/24
Audix	EMI Test software	E3	191218(V9)	NCR	NCR
EM TEST	Harmonics/flicker Analyer	DPA 500N	V0939105176	2023/2/10	2024/2/9
EM TEST	AC Source	ACS500	303276	2023/2/8	2024/2/7
EM Test	DPA.Control	V5.0.3.0	Unknown	NCR	NCR

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMS					
EM Test	ESD Generator	NSG 438	1476	2022/10/7	2023/10/6
HP	Signal Generator	8665B	3744A01692	2023/2/8	2024/2/7
AR	Amplifier	500W1000B	0348446	NCR	NCR
AR	Amplifier	60S1G6	0348712	NCR	NCR
AR	Antenna	ATL80M1G	0348837	NCR	NCR
AR	Antenna	ATT700M12G	0349411	NCR	NCR
BACL	Test Software	VEE PRO	V2.3 VXE	NCR	NCR
HP	Signal Generator	8648C	3426A01345	2023/2/8	2024/2/7
A&R	Power Amplifier	15A250	13444	NCR	NCR
WEINSCHEL	6dB Attenuator	50-6	R4376	NCR	NCR
Com-Power Corporation	CDN	CDN M325E	521145	2022/6/27	2023/6/26
BACL	Test Software	VEE PRO	V2.3 VXE	NCR	NCR
EM TEST	EMS Combination Tester	UCS 500 N5	V0939105172	2022/10/7	2023/10/6
EM TEST	AC Source	MV2616	V0939105173	2022/10/7	2023/10/6

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

§7.1 - CONDUCTED EMISSIONS

EUT Setup



Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per EN 301 489-1 measurement procedures. The specification used was with the EN 301 489-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

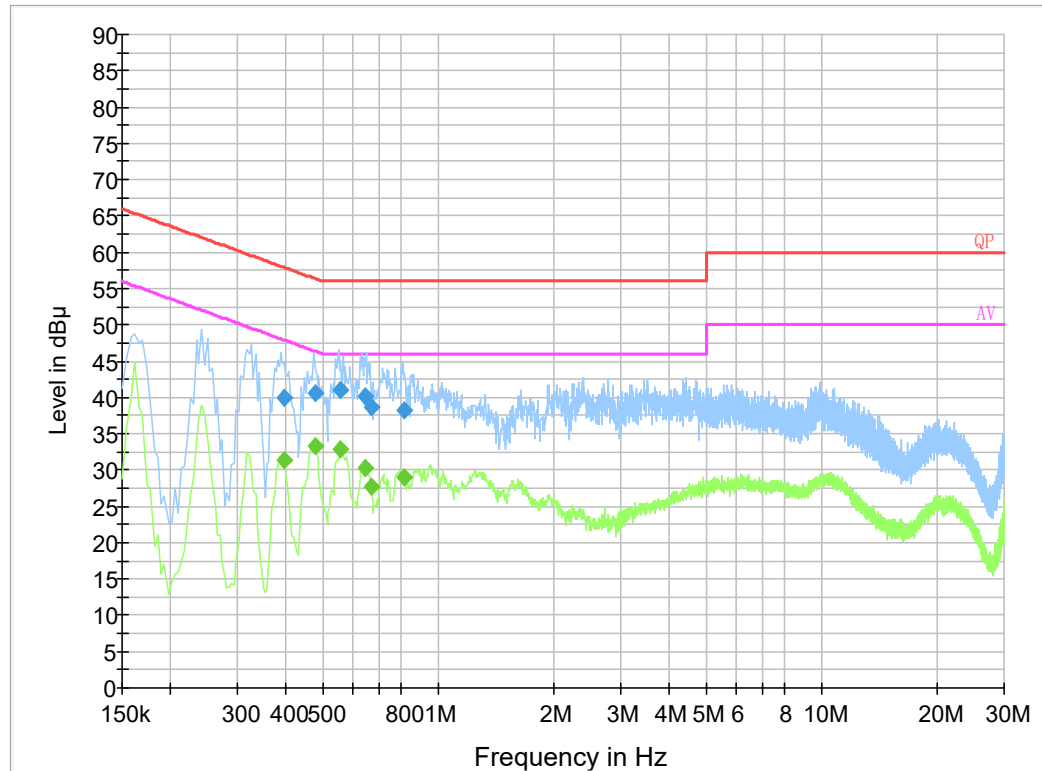
According to the recorded data in following table, the EUT complied with the EN 301 489-1,

Test Data**Environmental Conditions**

Temperature:	26 °C
Relative Humidity:	69 %
ATM Pressure:	101.0 kPa

The testing was performed by Macy Shi on 2023-05-20.

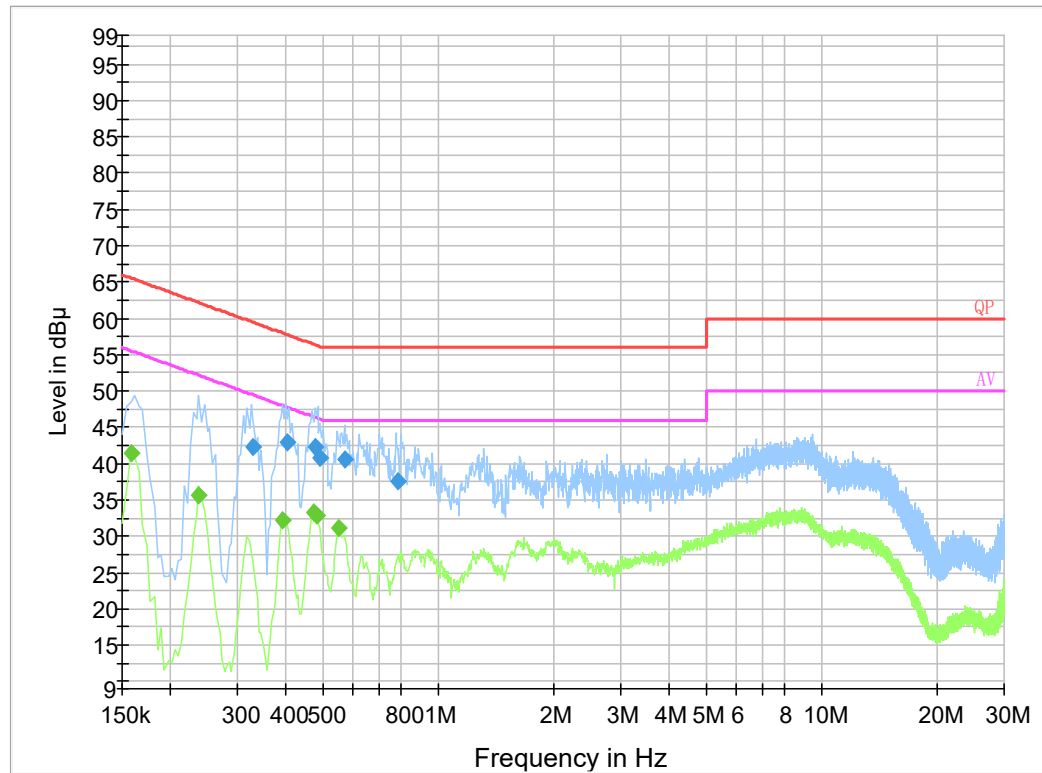
Test Mode 4 (worst case):

AC 230 V/ 50 Hz, Line:**Final Result 1**

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.395850	40.0	9.000	L1	20.4	17.9	57.9
0.478890	40.7	9.000	L1	20.4	15.7	56.4
0.558250	41.0	9.000	L1	20.4	15.0	56.0
0.644250	40.2	9.000	L1	20.5	15.8	56.0
0.672010	38.6	9.000	L1	20.5	17.4	56.0
0.813850	38.2	9.000	L1	20.5	17.8	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.395850	31.3	9.000	L1	20.4	16.6	47.9
0.478890	33.4	9.000	L1	20.4	13.0	46.4
0.558250	32.9	9.000	L1	20.4	13.1	46.0
0.644250	30.3	9.000	L1	20.5	15.7	46.0
0.672010	27.7	9.000	L1	20.5	18.3	46.0
0.813850	29.1	9.000	L1	20.5	16.9	46.0

AC 230 V/ 50 Hz, Neutral:**Final Result 1**

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.329110	42.2	9.000	N	20.4	17.3	59.5
0.403970	42.9	9.000	N	20.4	14.9	57.8
0.478830	42.2	9.000	N	20.4	14.2	56.4
0.493290	40.8	9.000	N	20.4	15.3	56.1
0.569450	40.7	9.000	N	20.4	15.3	56.0
0.789670	37.5	9.000	N	20.4	18.5	56.0

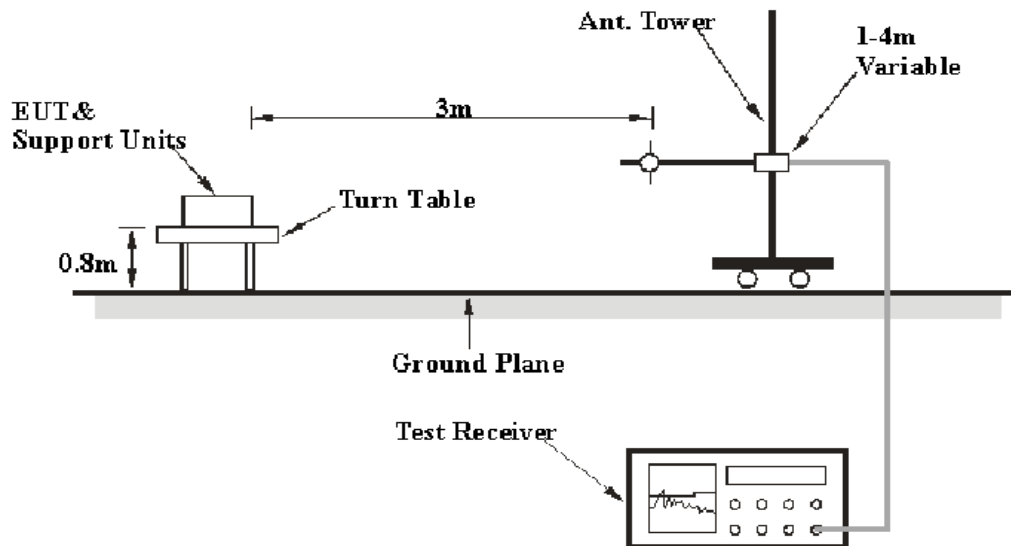
Final Result 2

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	41.3	9.000	N	20.4	14.3	55.6
0.238000	35.6	9.000	N	20.4	16.6	52.2
0.394000	32.2	9.000	N	20.4	15.8	48.0
0.474000	33.3	9.000	N	20.4	13.1	46.4
0.482000	32.8	9.000	N	20.4	13.5	46.3
0.550000	31.1	9.000	N	20.4	14.9	46.0

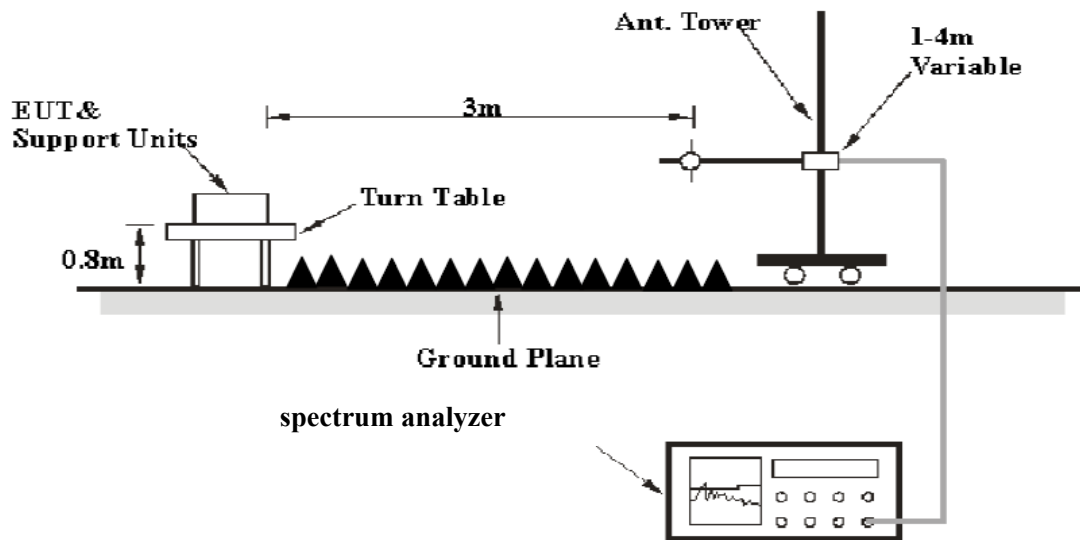
§7.1 - RADIATED EMISSIONS

Test System Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the CISPR 16-1-4:2012, CISPR 16-2-3:2010. The limit was specified in EN 301 489-1.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver and Spectrum analyzer Setup

During the radiated emission test, the EMI test receiver and spectrum analyzer setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
1 GHz – 6 GHz	1 MHz	3 MHz	-	Peak
1 GHz – 6 GHz	1 MHz	10 Hz	-	Ave

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Corrected Amplitude & Margin Calculation

The Corrected Level is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Read Level. The basic equation is as follows:

$$\text{Correction factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

$$\text{Corrected Level} = \text{Read Level} + \text{Correction factor}$$

The “**Over limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over limit of -6 dB means the emission is 6 dB below the limit for Class B. The equation for Over Limit calculation is as follows:

$$\text{Over limit} = \text{Corrected Level} - \text{Limit.}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the EN 301 489-1,

Test Data

Environmental Conditions

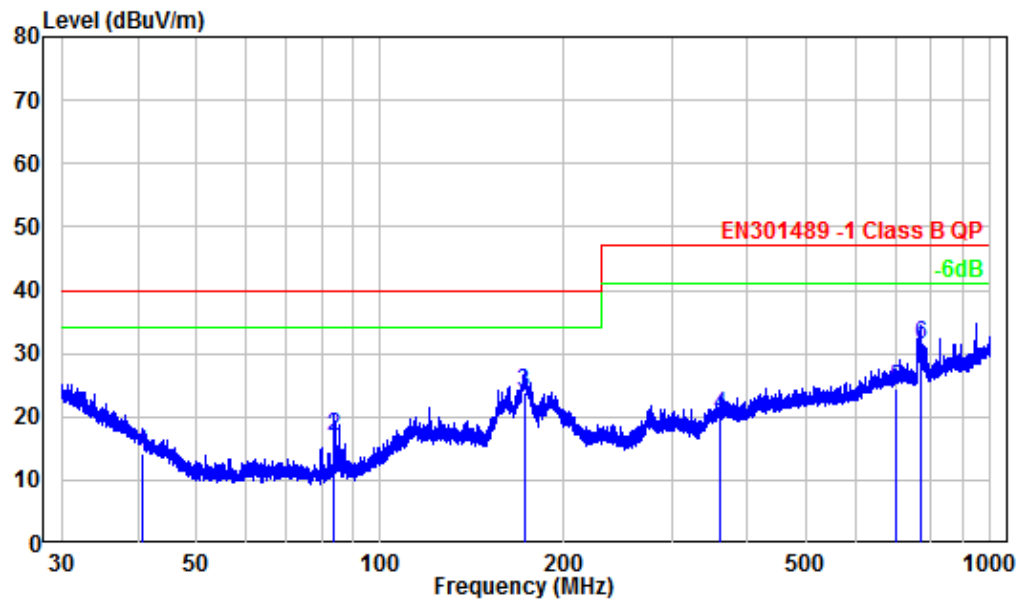
Temperature:	25 °C
Relative Humidity:	55%
ATM Pressure:	101.0 kPa

The testing was performed by Anson Su on 2023-04-21 for below 1GHz and Dio Ding on 2023-04-22 for above 1GHz.

Test Mode 4 (worst case)

30 MHz~1 GHz

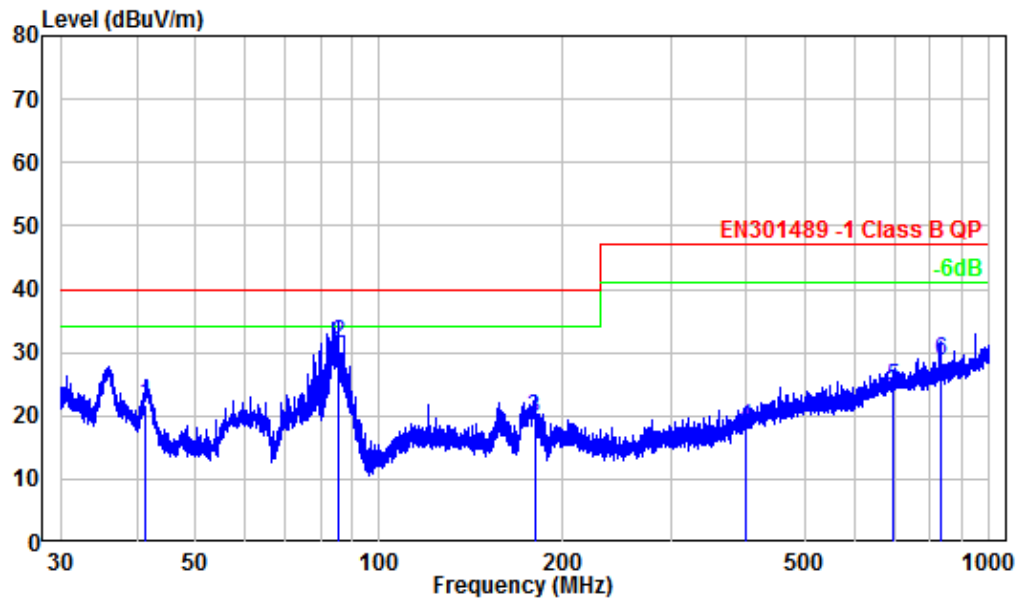
Horizontal



Site : chamber
Condition: 3m Horizontal
Job No. : SZ1230414-19311E-EM

	Freq Factor		Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	40.61	-10.78	24.86	14.08	40.00	-25.92	QP
2	83.63	-16.66	33.70	17.04	40.00	-22.96	QP
3	171.99	-12.10	35.99	23.89	40.00	-16.11	QP
4	360.76	-9.31	29.50	20.19	47.00	-26.81	QP
5	698.39	-1.54	26.11	24.57	47.00	-22.43	QP
6	768.07	-1.26	32.65	31.39	47.00	-15.61	QP

Vertical

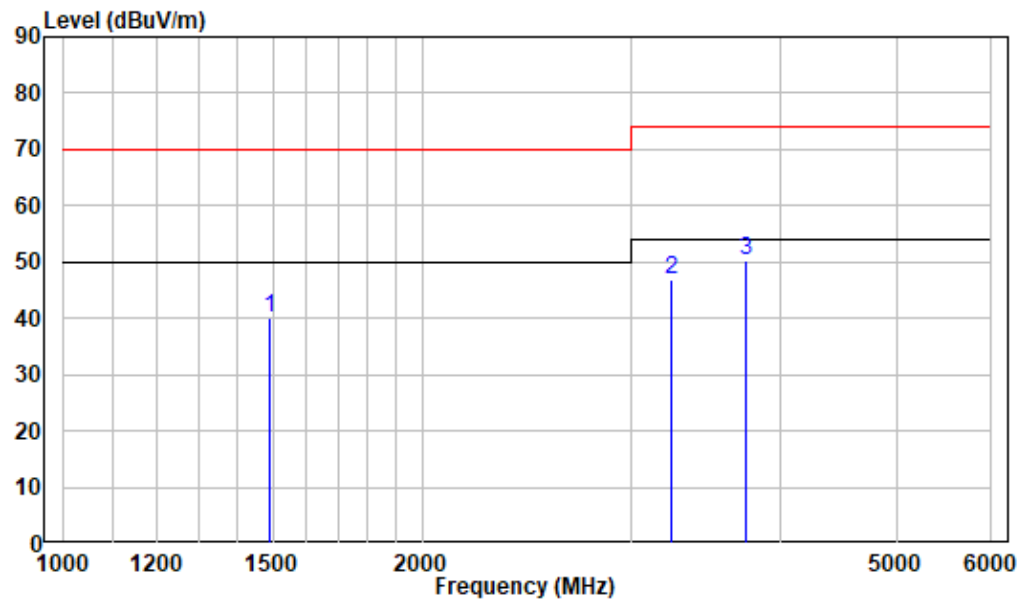


Site : chamber
Condition: 3m Vertical
Job No. : SZ1230414-19311E-EM

	Freq Factor		Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	41.39	-11.27	33.03	21.76	40.00	-18.24	QP
2	85.64	-16.63	47.99	31.36	40.00	-8.64	QP
3	179.62	-12.18	31.87	19.69	40.00	-20.31	QP
4	399.38	-7.39	25.63	18.24	47.00	-28.76	QP
5	696.25	-1.58	25.99	24.41	47.00	-22.59	QP
6	830.76	-0.09	28.77	28.68	47.00	-18.32	QP

1-6 GHz

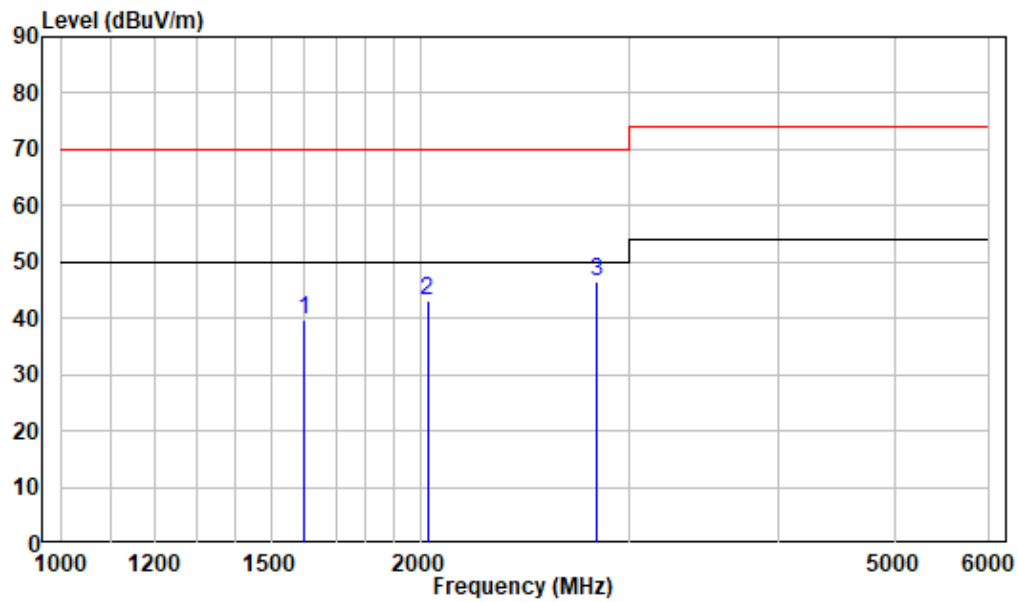
Horizontal



Site : chamber
Condition : 3m Horizontal
Project Number: SZ1230414-19311E-EM

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1493.750	-3.74	43.72	39.98	70.00	-30.02	Peak
2	3237.500	2.43	44.35	46.78	74.00	-27.22	Peak
3	3743.125	3.92	46.34	50.26	74.00	-23.74	Peak

Vertical



Site : chamber
Condition : 3m Vertical
Project Number: SZ1230414-19311E-EM

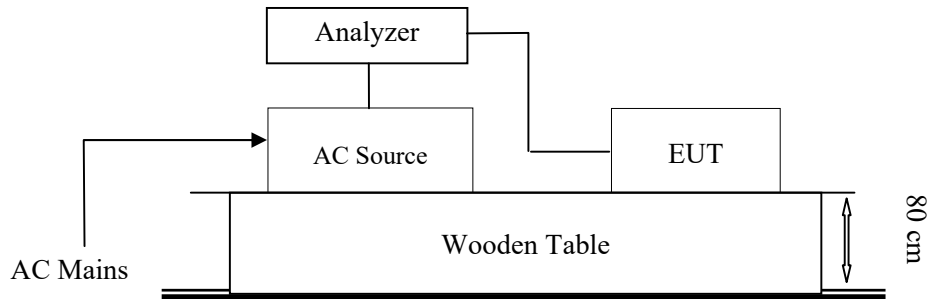
	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	1599.375	-3.55	43.34	39.79	70.00	-30.21	Peak
2	2029.375	-1.13	44.32	43.19	70.00	-26.81	Peak
3	2810.000	1.64	44.84	46.48	70.00	-23.52	Peak

§7.1 - HARMONIC CURRENT EMISSIONS

According to EN 61000-3-2:2014 section 7: Equipment with a rated power of 75 Watt or less, other than lighting equipment, are not included in this standard.

§7.1-VOLTAGE FLUCTUATION AND FLICKER

Test System Setup



Test Standard

EN 61000-3-3:2013

Flicker Test Limits:

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6 and annex A. Tests made to prove compliance with the limits are considered to be type tests.

The following limits apply:

- the value of Pst shall not be greater than 1,0;
- the value of Plt shall not be greater than 0,65;
- the value of d(t) during a voltage change shall not exceed 3,3 % for more than 500 ms;
- the relative steady-state voltage change, dc, shall not exceed 3,3 %;
- the maximum relative voltage change dmax, shall not exceed
 - a) 4 % without additional conditions;
 - b) 6 % for equipment which is:
 - switched manually, or
 - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Note: The cycling frequency will be further limited by the Pst and Plt limit. For example: a dmax of 6 % producing a rectangular voltage change characteristic twice per hour will give a Plt of about 0,65.

c) 7 % for equipment which is

- attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
- switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

In the case of equipment having several separately controlled circuits in accordance with 6.6, limits b) and c) shall apply only if there is delayed or manual restart after a power supply interruption; for all equipment with automatic switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply depending on the rate of switching. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

Test Data and Setup Photo

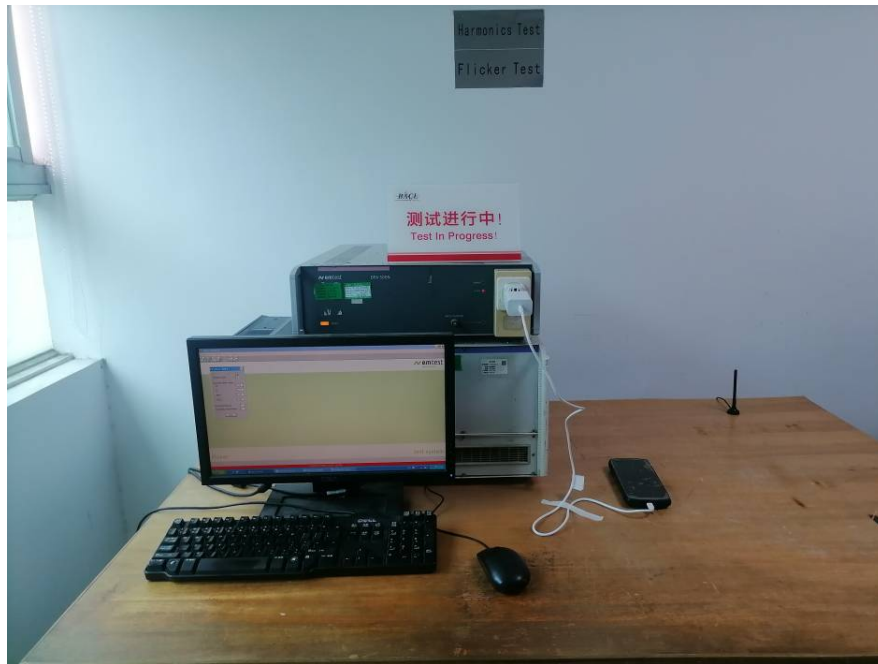
Environmental Conditions

Temperature:	26 °C
Relative Humidity:	60 %
ATM Pressure:	101.0 kPa

Date of test:	11:08 22 May 2023
Tester:	Ethan Bu
Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurements)
Flicker meter:	230V / 50Hz
Flicker Impedance:	Zref (IEC 60725)
Model:	KINGKONG STAR
EUT operation mode	Test Mode 4 (Worst case)

Maximum Flicker results

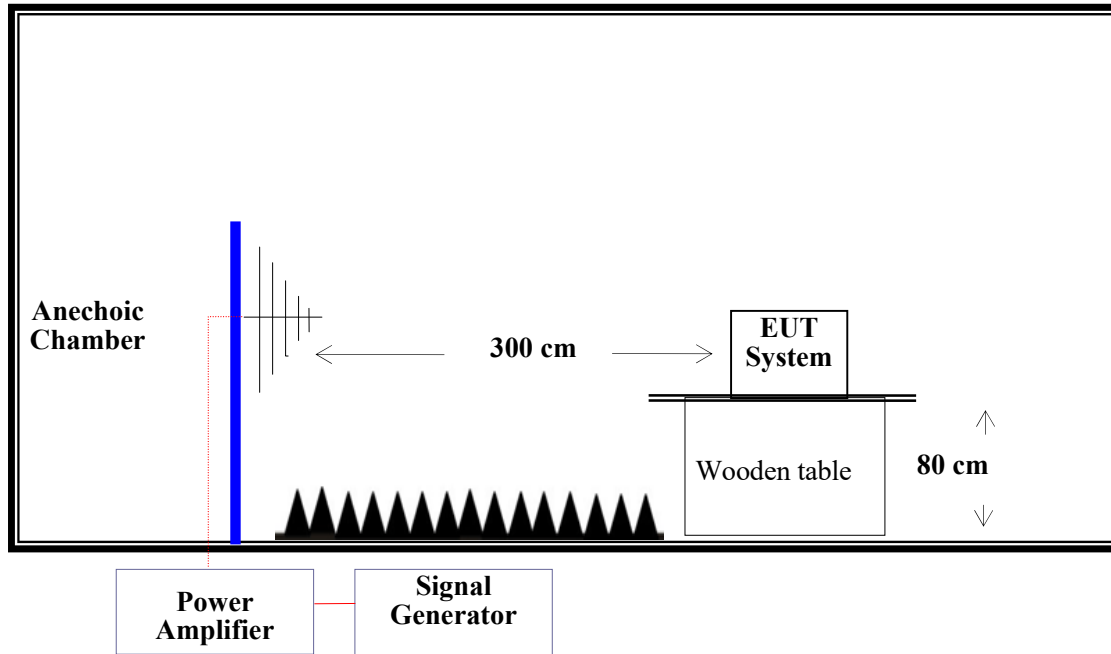
	EUT values	Limit	Result
Pst	0.028	1.00	Pass
Plt	0.028	0.65	Pass
dc [%]	0.014	3.30	Pass
dmax [%]	0.058	4.00	Pass
dt [s]	0.000	0.50	Pass



Test Setup Photo

§7.2 - RF ELECTROMAGNETIC FIELD (80 MHz to 6000 MHz)

Test System Setup



Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-3:2006+A1:2008 +A2: 2010

Test Level

Level	Field Strength (V/m)
1.	1
2.	3
3.	10
X.	Special

Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a CCD camera and smart phone are used to monitor the EUT or an artificial ear and sound level meter were used to monitor the sound pressure level.

All the scanning conditions are as follows:

Condition of Test	Remarks
-----	-----
1. Field Strength	3 V/m (Test Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 - 6000 MHz
4. Frequency step	1%
5. Dwell Time	1 Sec.

Test Data and Setup Photo

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Ethan Bu on 2023-05-22.

Test Mode 1&2&3&4&5&6&7&8

Modulation: Amplitude 80%, 1 kHz sine wave

Frequency Range (MHz)	Front Side (3 V/m)		Rear Side (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-6000	A	A	A	A	A	A	A	A

EUT Operation Mode 1& 8

Note: “A” stand for, during test, operate as intended No loss function, and after test, operate as intended.

EUT Operation Mode 2 & 3

Note: “A” stand for, during test, operate as intended No loss function, no degradation of performance, no unintentional transmissions. and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

EUT Operation Mode 4:

Note: “A” stand for, the uplink/downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check). The RXQUAL of the downlink is not exceeding the value of three, measured during each individual exposure in the test sequence. Or during and after the test, the apparatus continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level

EUT Operation Mode 5:

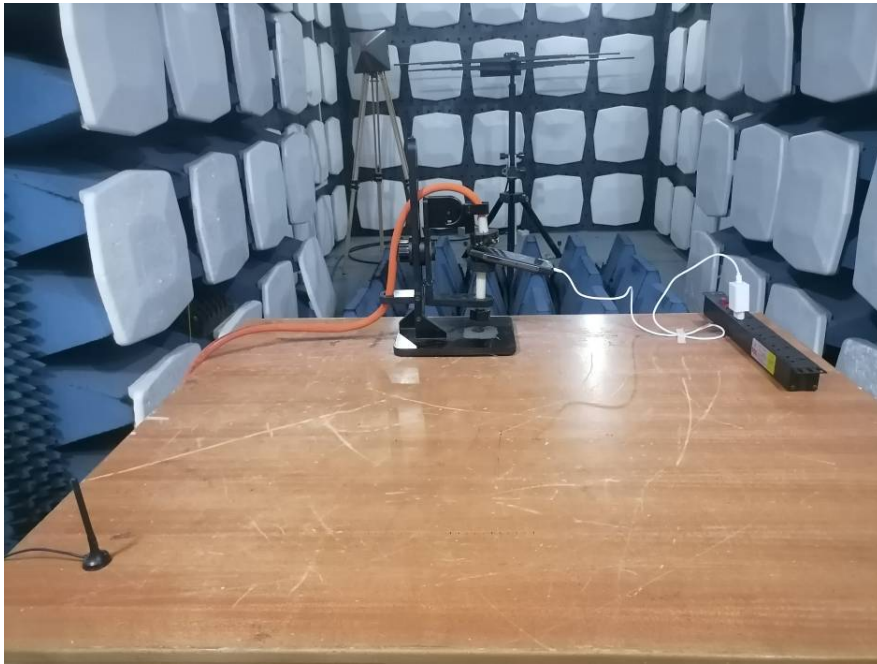
Note: “A” stand for, In the data transfer mode, the BER (as referred in TS 134 109 [8]) is used, it shall not exceed 0,001 during the test sequence, in the speech mode, the performance criteria shall be that the up link and downlink speech output levels shall be at least 35 dB less than the recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz. in idle mode, the transmitter is not unintentionally operate.

EUT Operation Mode 6:

Note: “A” stand for, In the data transfer mode, the performance criteria shall be that the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channel as specified in annex C in TS 136 101 [13] with parameters specified in tables 7.3.1-1 and 7.3.1-2 in TS 136 101 [13] during the test sequence.

EUT Operation Mode 7:

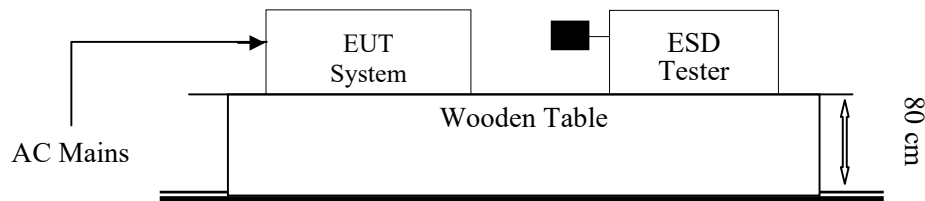
Note: “A” stand for, In the data transfer mode, the performance criteria shall be that the throughput shall be $\geq 95\%$ of the maximum throughput of the reference measurement channel as specified in annex C in TS 138 101 [14] with parameters specified in tables 5.2-1 in TS 138 101 [14] during the test sequence.



Test Setup Photo

§7.2 - ELECTROSTATIC DISCHARGE

Test System Setup



Remark: ■ is the tip of the electrode

EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-2:2009

Test Level

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

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 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.

Contact Discharge:

All the procedure shall be same as Section 8.3.1 of EN 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

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.

Indirect discharge for vertical coupling plane

At least 20 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m × 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.

Test Data and Setup Photo

Environmental Conditions

Temperature:	28 °C
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

The testing was performed by Ethan Bu on 2023-05-22.

Test Mode 1&2&3&4&5&6&7&8

Table 1: Electrostatic Discharge Immunity (Air Discharge)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Front (1 point)	A	A	A	A	A	A	/	/
Left (1 point)	A	A	A	A	A	A	/	/
Right (1 point)	A	A	A	A	A	A	/	/
Top (3 points)	A	A	A	A	A	A	/	/
Bottom (2 points)	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front (1 point)	A	A	A	A	/	/	/	/
Left (3 points)	A	A	A	A	/	/	/	/
Right (2 points)	A	A	A	A	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

IEC 61000-4-2 Test Points	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/



Note: ➡ represents air discharge, ➡ represents direct contact

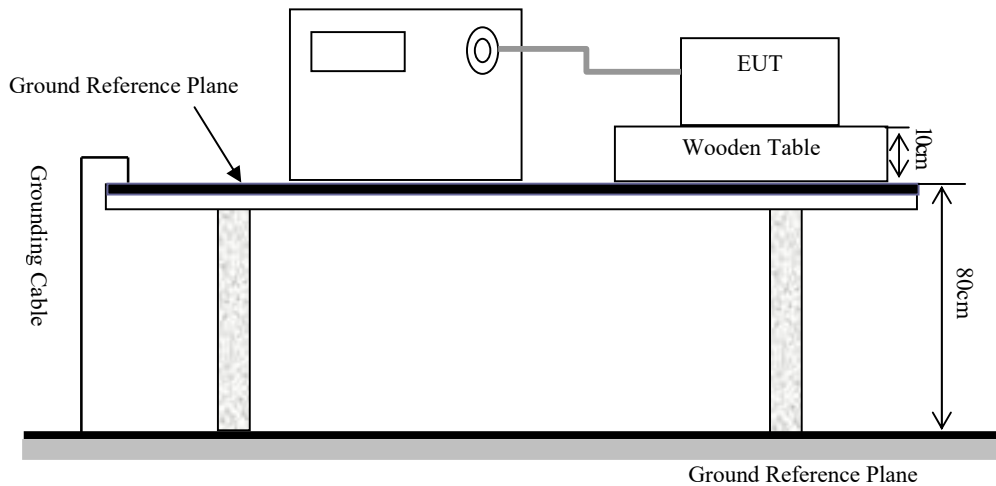
Note: The list is only for photos of the location where the discharge can be made, the others not listed are without discharge points, or not the EUT part.



Test setup photo

§7.2 - ELECTRICAL FAST TRANSIENT IMMUNITY

Test System Setup



Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-4: 2004 + A1:2010

Test Level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance Criterion: B

Test Procedure

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility's electrical earth.

Test Data and Setup Photo

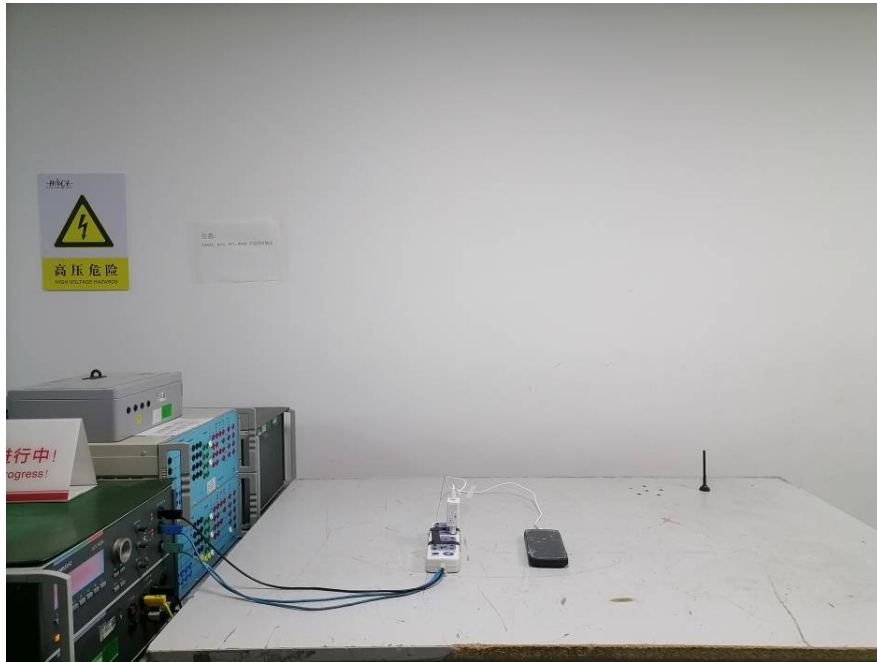
Environmental Conditions

Temperature:	27 °C
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Ethan Bu on 2023-05-22.

Test Mode 1&2&3&4&5&6&7&8

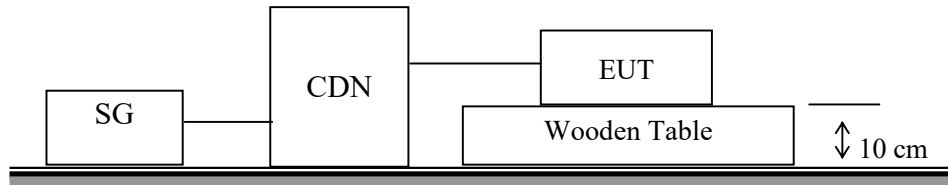
EN 61000-4-4 Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC Mains Power Input Ports	L	/	/	A	A	/	/	/	/
	N	/	/	A	A	/	/	/	/
	PE	/	/	/	/	/	/	/	/
	L-N	/	/	A	A	/	/	/	/
	L-PE	/	/	/	/	/	/	/	/
	N-PE	/	/	/	/	/	/	/	/
	L+N-PE	/	/	/	/	/	/	/	/
Signal Port	/	/	/	/	/	/	/	/	/



Test Setup Photo

§7.2 - RF COMMON MODE

Test Setup



Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) /EN 61000-4-6: 2009

Test Level

Level	Voltage Level (r.m.s.) (U ₀)
1	1
2	3
3	10
X	Special

Performance Criterion: A

Note: “A” stand for, during test, operate as intended no loss function, no degradation of performance, no unintentional retransmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

Test Procedure

- 1) Let the EUT work in test mode and test it.
- 2) The EUT are placed on an insulating support 0.1 m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3 m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 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 climatic conditions after power on.
- 5) 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 1 kHz sine wave.
- 6) 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.
- 7) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Test Data and Setup Photo**Environmental Conditions**

Temperature:	28 °C
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

The testing was performed by Ethan Bu on 2023-05-22.

Test Mode 1&2&3&4&5&6&7&8

Table 1: AC mains power input port

Frequency range: 150 kHz to 80 MHz

Modulation: Amplitude 80%, 1 kHz sine wave

Test level: 3V r.m.s.

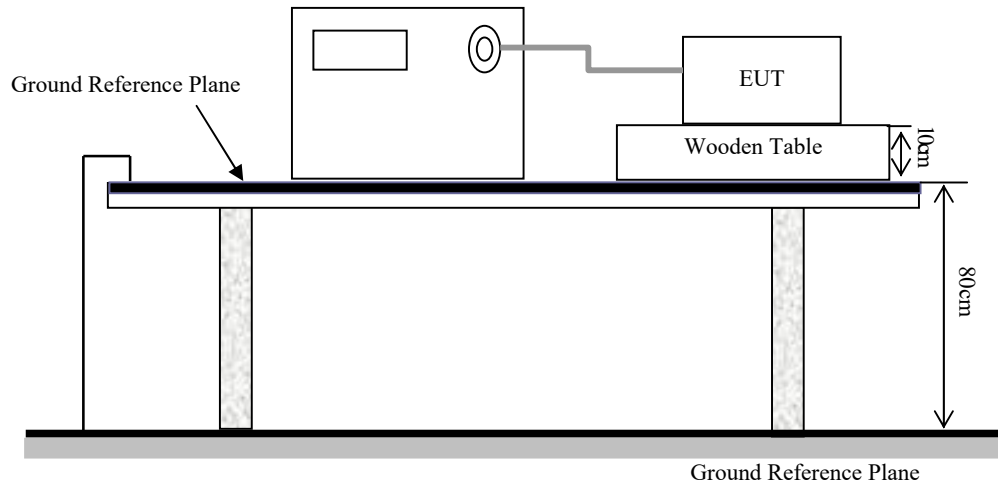
Level	Voltage Level (r.m.s.) U_0	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/



Test Setup Photo

§7.2 - SURGES, LINE TO LINE AND LINE TO GROUND

Test System Setup



Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-5: 2006

Test Level

Level	Open Circuit Output Test Voltage $\pm 10\%$	Performance Criterion	
		AC Mains	Signal Port
1	0.5 kV	B	C
2	1 kV	B	C
3	2 kV	B	C
4	4 kV	B	C
X	Special	/	/

Test Procedure

- 1) For line to line coupling mode, provide a 1.2/50 μ s voltage surge (at open-circuit condition) and a 8/20 μ s current surge into a short circuit.
- 2) For telecommunication port, provide a 10/700 μ s voltage surge (at open-circuit condition) and a 5/320 μ s current surge into a short circuit.
- 3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 4) Different phase angles are done individually.
- 5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Test Data and Setup Photo

Environmental Conditions

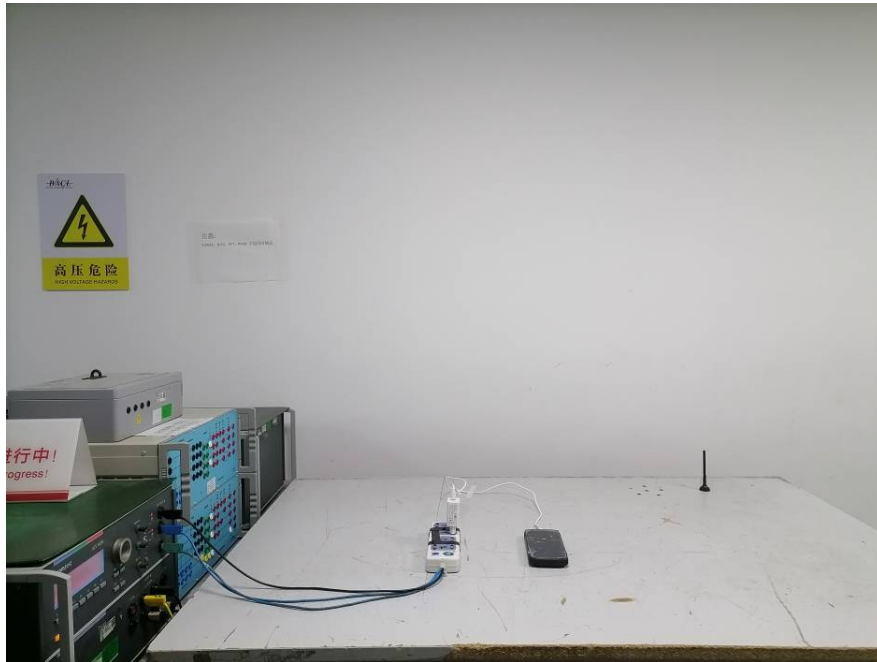
Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Ethan Bu on 2023-05-22.

Test Mode 1&2&3&4&5&6&7&8

Table 1: AC mains power input port

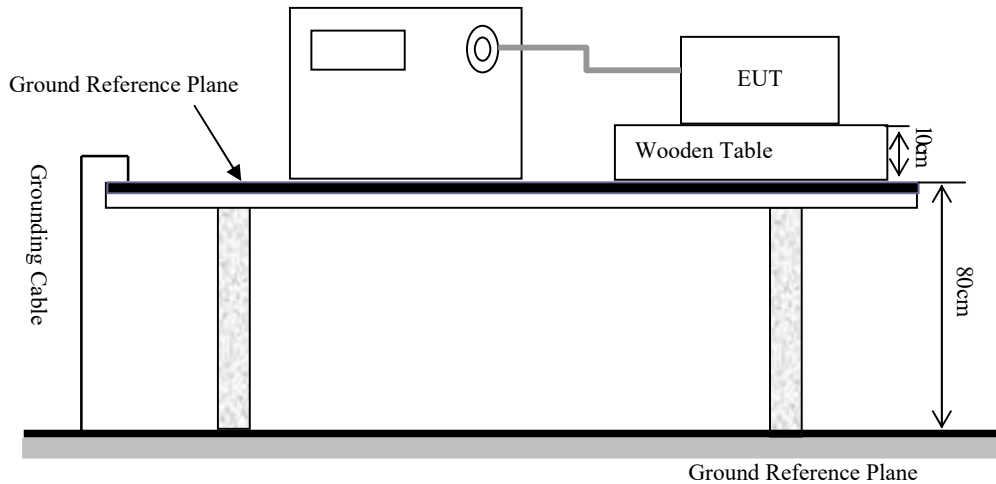
Level	Voltage	Poll	Path	Pass	Fail
1	0.5 kV	\pm	L-N	A	/
2	1 kV	\pm	L-N	A	/
3	2 kV	\pm	/	/	/
4	4 kV	\pm	/	/	/



Test Setup Photo

§7.2 - VOLTAGE DIPS AND INTERRUPTIONS IMMUNITY TEST

Test Setup



Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-11: 2004

Test Level

Test Level	Voltage dip and short interruptions (% Residual Voltage)	Duration (in period)	Performance criterion:
1	0	0.5	B
2	0	1	B
3	70	25	C
4	0	250	C

Test Procedure

- 1) The interruption is introduced at selected phase angles with specified duration.
- 2) Record any degradation of performance.

Test Data and Setup Photo

Environmental Conditions

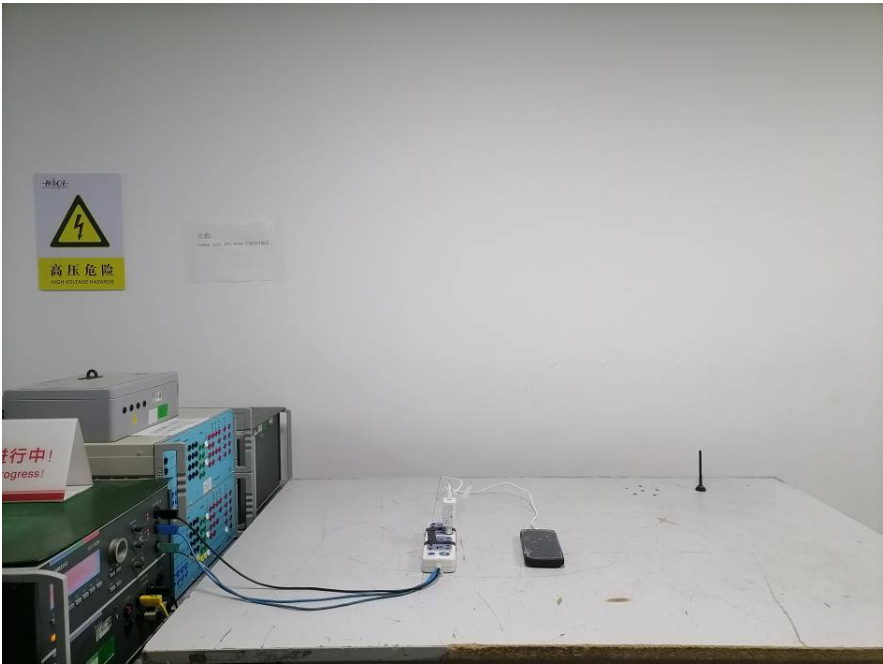
Temperature:	27 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Ethan Bu on 2023-05-22.

Test Mode 1&2&3&4&5&6&7&8

Level	Voltage dip and short interruptions (% Residual Voltage)	Periods	Phase Angle	N	Result
1	0	0.5	0/180	3	A
2	0	1	0/180	3	A
3	70	25	0/180	3	A
4	0	250	0/180	3	B

Note: B means charging interrupt and restore automatically.



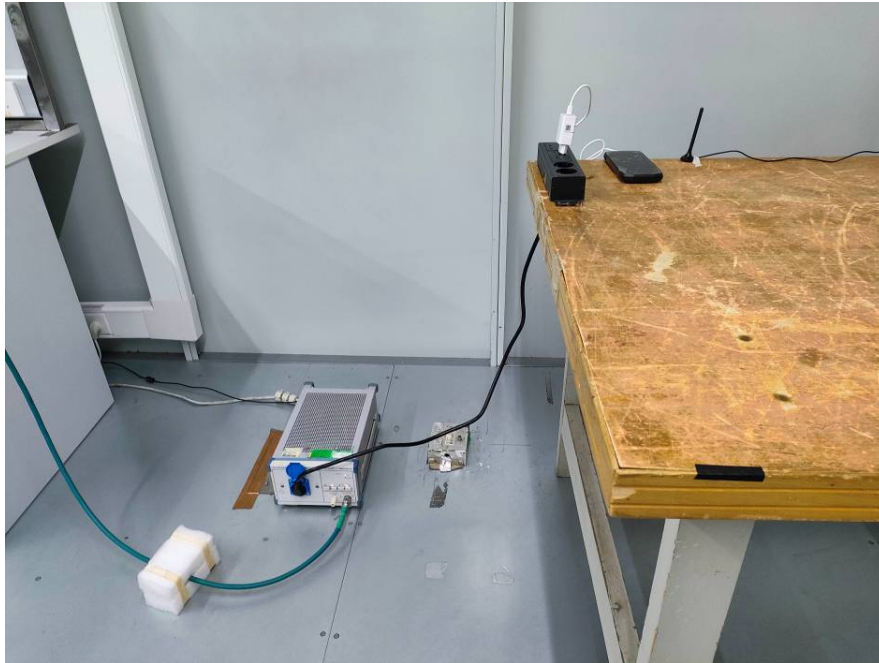
Test Setup Photo

EXHIBIT A - EUT PHOTOGRAPHS

Please refer to the report number is SZ1230414-19311E-EUT.

EXHIBIT B - TEST SETUP PHOTOGRAPHS

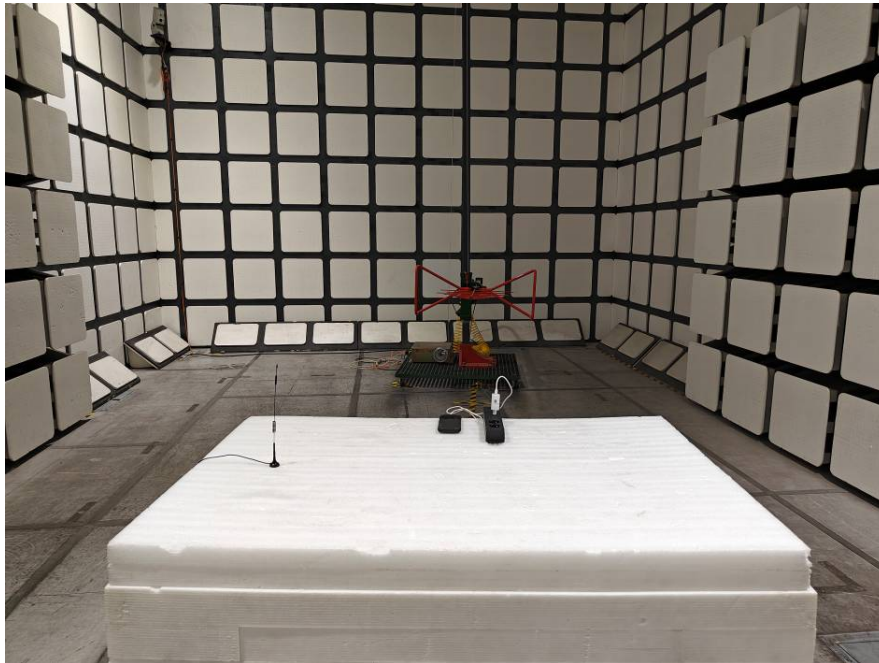
Conducted Emissions - Front View



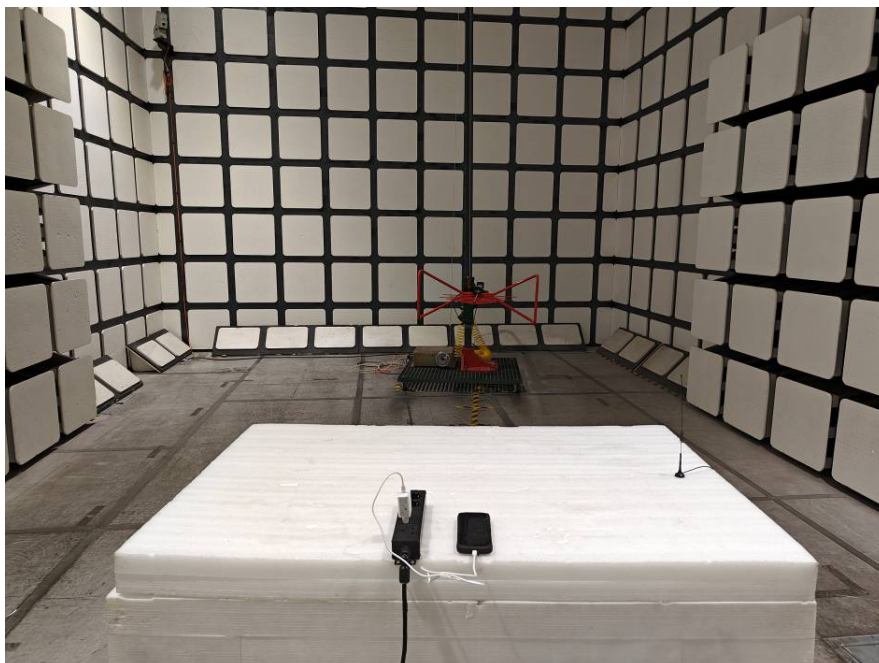
Conducted Emissions - Side View



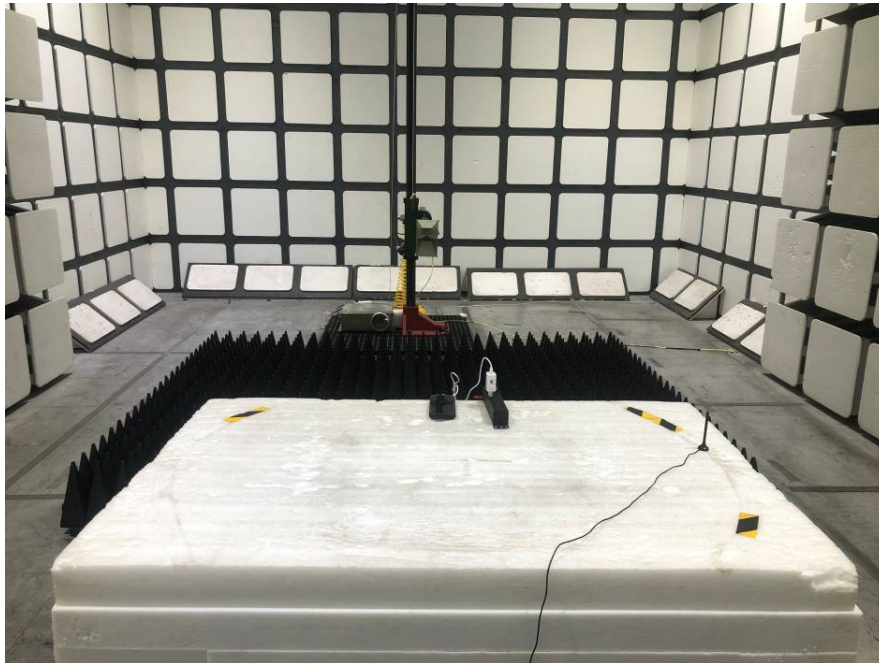
Radiated Emissions – Front View (Below 1 GHz)



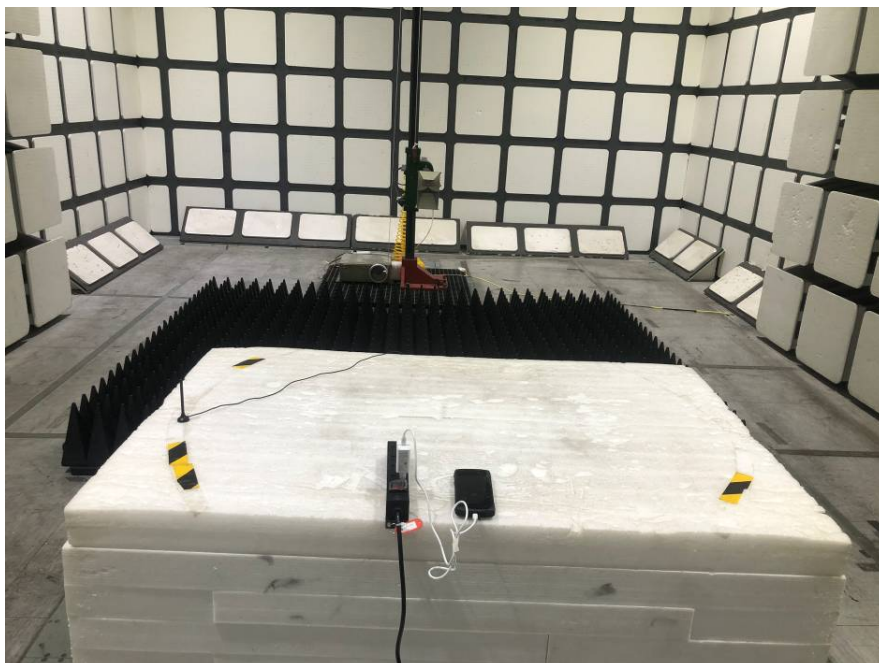
Radiated Emissions – Rear View (Below 1 GHz)



Radiated Emissions – Front View (Above 1 GHz)



Radiated Emissions – Rear View (Above 1 GHz)



******* END OF REPORT *******