EMC Test Report

Report No.: AGC08509200801EE01

PRODUCT DESIGNATION	:	Bluetooth Low Energy Data Transmission Module
BRAND NAME	:	HOPERF
MODEL NAME	:	HM-BT2204, HM-BT2201, HM-BT2202, HM-BT2206, HM-BT2208, HM-BT2210
APPLICANT	:	SHEN ZHEN HOPE MICROELECTRONICS CO., LTD
DATE OF ISSUE	:	Aug. 26, 2020
STANDARD(S)	:	ETSI EN 301 489-1 V2.2.3 (2019-11) Draft ETSI EN 301 489-17 V3.2.2 (2019-12)
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Aug. 26, 2020	Valid	Initial Release

TABLE OF CONTENTS

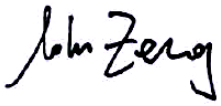
1. TEST REPORT CERTIFICATION

Applicant	SHEN ZHEN HOPE MICROELECTRONICS CO., LTD
Address	30th Floor, Block A, Building 8, Vanke Cloud City Phase III, Xili Street, Nanshan District, Shenzhen, GD, P.R. China
Manufacturer	SHEN ZHEN HOPE MICROELECTRONICS CO., LTD
Address	30th Floor, Block A, Building 8, Vanke Cloud City Phase III, Xili Street, Nanshan District, Shenzhen, GD, P.R. China
Factory	SHEN ZHEN HOPE MICROELECTRONICS CO., LTD
Address	30th Floor, Block A, Building 8, Vanke Cloud City Phase III, Xili Street, Nanshan District, Shenzhen, GD, P.R. China
Product Designation	Bluetooth Low Energy Data Transmission Module
Brand Name	HOPERF
Test Model	HM-BT2204
Series Model	HM-BT2201, HM-BT2202, HM-BT2206, HM-BT2208, HM-BT2210
Difference Description	All the same except for the PCB is slightly different..
Date of test	Aug. 14, 2020 to Aug. 24, 2020
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-EC-EMC

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the Technical Standards mentioned above. The test record, data evaluation and test configuration represented herein are true and accurate accounts of measurements of the sample's EMC characteristics under the conditions herein specified.

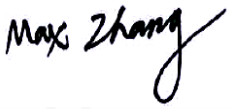
The test results of this report relate only to the tested sample identified in this report

Prepared By



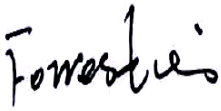
John Zeng
Project Engineer
Aug. 24, 2020

Reviewed By



Max Zhang
Reviewer
Aug. 26, 2020

Approved By



Forrest Lei
Authorized Officer
Aug. 26, 2020

2. GENERAL INFORMATION

2.1. DESCRIPTION OF EUT

The EUT is a short range, Bluetooth device.

Details of technical specification refer to the description in follows:

Operating Frequency	2402MHz~2480MHz
Bluetooth Version	V5.0
Modulation	BR ☐GFSK, EDR ☐π /4-DQPSK, ☐8DPSK BLE ☒GFSK 1Mbps ☒GFSK 2Mbps
Hardware Version	V1.0
Software Version	V1.1
Antenna Type	Integral Antenna
Number of channels	40 for BLE
Antenna Gain	1dBi
Power Supply	DC 3.3V
Note: The EUT doesn't support BR/EDR.	

2.2. OBJECTIVE

Perform Electro Magnetic Interference (EMI) and Electro Magnetic Susceptibility (EMS) tests for CE Marking.

2.3. TEST STANDARDS AND RESULTS

The EUT has been tested according to ETSI EN 301 489-1 V2.2.3 (2019-11) and Draft ETSI EN 301 489-17 V3.2.2 (2019-12).

ETSI EN 301 489-1	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility.
ETSI EN 301 489-17	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

2.4. TEST ITEMS AND THE RESULTS

No.	Basic Standard	Test Type	Result
EMISSION (EN 301 489-1 §7.1)			
1	EN 55032	Radiated emission	PASS
3	EN 55032	Conducted emission, AC ports	N/A
4	EN 55032	Conducted emission, Telecom ports	N/A
5	EN 61000-3-2	Harmonic current emissions	N/A
6	EN 61000-3-3	Voltage fluctuations & flicker	N/A
IMMUNITY (EN 301 489-1 §7.2)			
7	EN 61000-4-2	Electrostatic discharge immunity	PASS
8	EN 61000-4-3	Radiated RF electromagnetic field immunity	PASS
9	EN 61000-4-4	Electrical fast transient/burst immunity	N/A
10	ISO 7637-1, -2	Transients and surges, DC ports	N/A
11	EN 61000-4-5	Surge immunity, AC ports, Telecom ports	N/A
12	EN 61000-4-6	Immunity to conducted disturbances induced by RF fields	N/A
13	EN 61000-4-11	Voltage dips and short interruptions immunity	N/A

Note:

1. N/A- Not Applicable.
2. The latest versions of basic standards are applied.

2.5. ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35ºC
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

3. TEST MODE DESCRIPTION

NO.	TEST MODE DESCRIPTION	WORST
1	BT mode	V
Note:1. means EMI worst mode. Only the data of worst case are recorded in this report.		

I/O Port Information (☐Applicable ☒Not Applicable)

I/O Port of EUT			
I/O Port Type	**Number**	**Cable Description**	**Tested With**
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Note: USB port is only used by the manufacturer to upgrade software and is shielded from users

4. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Radiated Emission, Uc = ±3.1dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±4.0 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	specification
Mobile phone	TCL	J326T	--	--
PC 2	Huawei	Boh-WAQ9RP	--	--
PC 3	Xiao Mi	161301-01	--	--

Note:

1. "-- "means no any support device during testing.

6. IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESCI	10096	May 15, 2020	May 14, 2022
ANTENNA	SCHWARZBECK	VULB9168	494	Sep. 20, 2019	Sep. 19, 2021
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec.11, 2020

TEST EQUIPMENT OF ESD TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ESD Simulator	Schaffner	NSG 438	782	Oct. 25, 2019	Oct. 24, 2020

TEST EQUIPMENT OF RS IMMUNITY TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Signal Generator	R&S	E4421B	MY43351603	Jun. 08, 2020	Jun. 07, 2022
POWER SENSOR	R&S	URV5-Z4	100124	May 22, 2020	May 21, 2022
POWER METER	R&S	NRVD	8323781027	May 22, 2020	May 21, 2022
POWER AMPLIFIER	KALMUS	7100LC	04-02/17-06-001	N/A	N/A
RF AMPLIFIER	Milmega	AS0104-55_55	1004793	N/A	N/A
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
ANTENNA	SCHWARZBECK	VULB9168	494	Sep. 20, 2019	Sep. 19, 2021

7.1. RADIATED DISTURBANCE MEASUREMENT

7.1.1. LIMITS OF RADIATED DISTURBANCES

Limits for radiated disturbance 30M to1 GHz at a measurement distance of 3 m

Frequency range (MHz)	Quasi peak limits(dBuV/m), for Class B ITE, at 3m measurement distance
30 - 230	40
230 - 1000	47

Limits for radiated disturbance above 1 GHz at a measurement distance of 3 m

Frequency range (MHz)	Limits (dBuV/m), Class B ITE	
	Peak	Average
1000-3000MHz	70	50
3000-6000MHz	74	54

Notes:

1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

7.1.2. TEST PROCEDURE

(1). The EUT was placed on the top of an insulating table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

(2). The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

(3).The antenna is a broadband antenna, and its height is varied from 1 to 4 meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

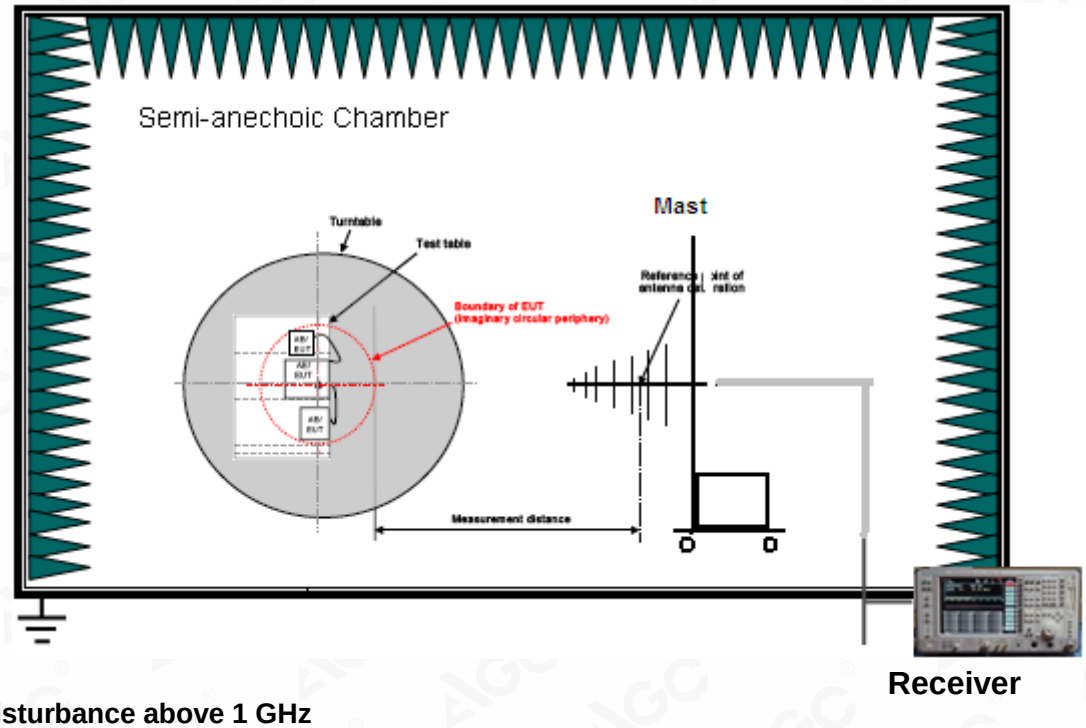
(4). For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the ratable table was turned from 0 degrees to 360 degrees to find the maximum reading.

(5).The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emission that did not have 10dB margin would be retested one by one using the quasi-peak method.

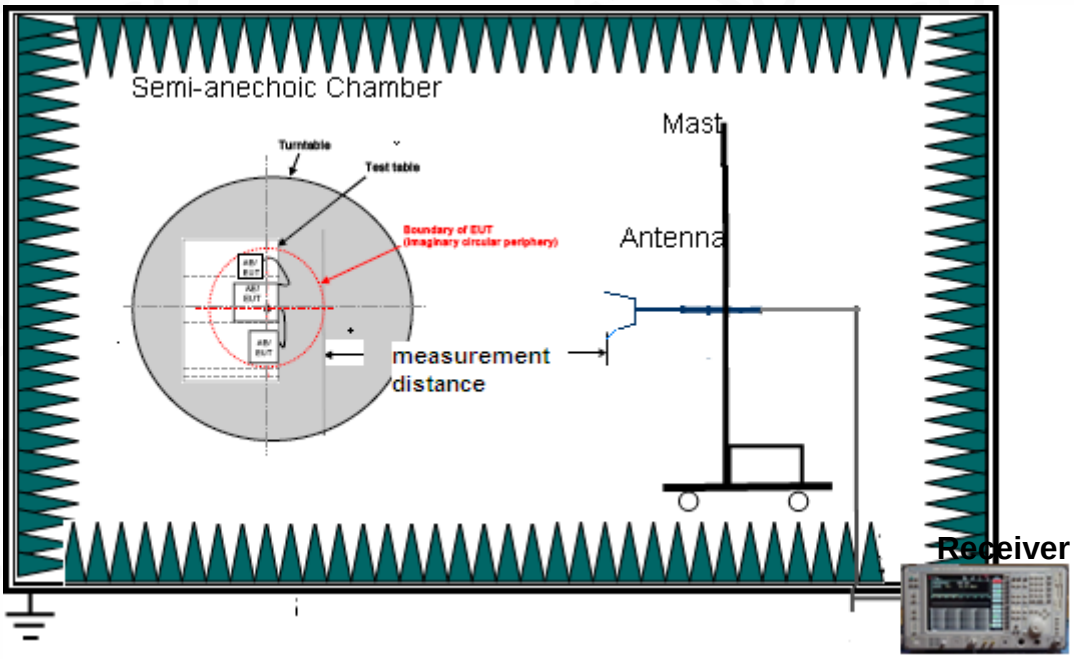
7.1.3. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators

Radiated Disturbance below 1 GHz



Radiated Disturbance above 1 GHz



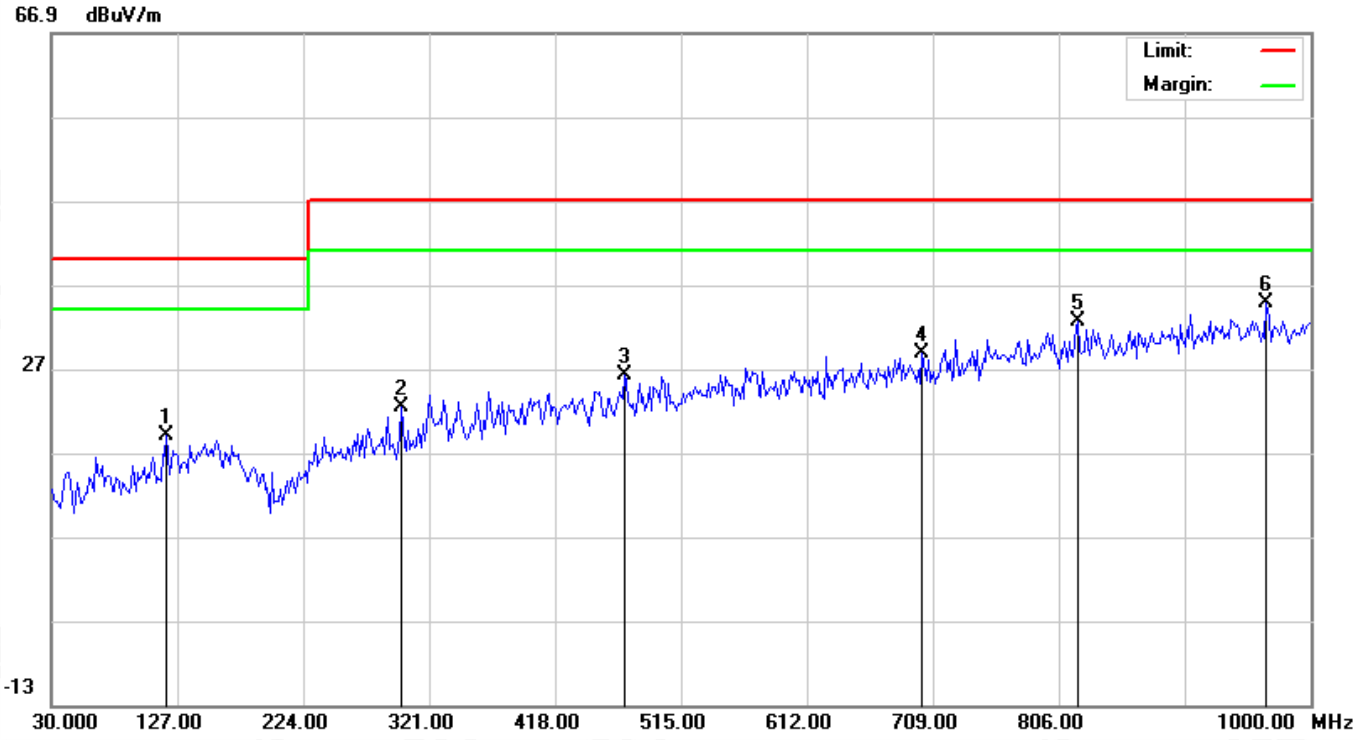
For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.1.4 TEST RESULT

The test modes were carried out for all modes.

The worst test mode of the EUT was Mode 1, and its test data was showed as the follow:

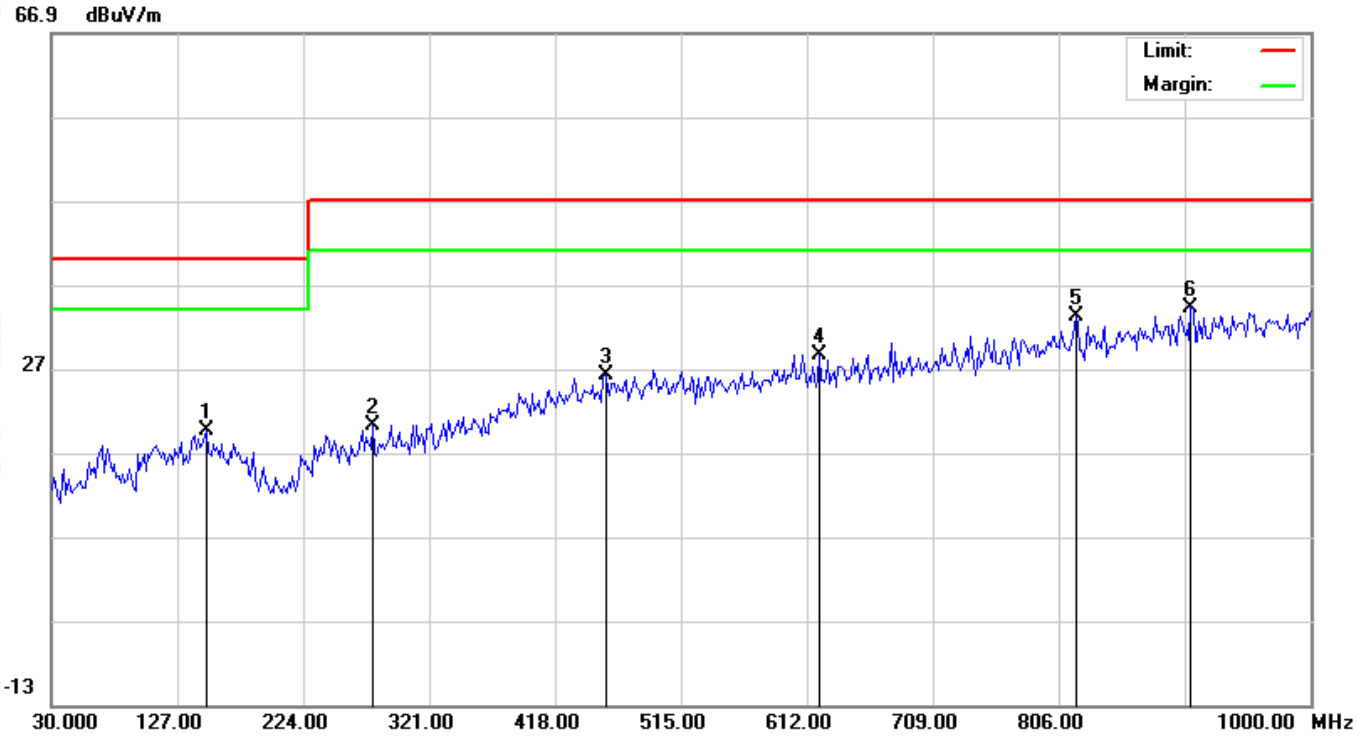
RADIATED EMISSION BELOW 1GHZ– HORIZONTAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		118.9167	1.13	17.86	18.99	40.00	-21.01	peak
2		299.9833	2.94	19.47	22.41	47.00	-24.59	peak
3		471.3500	1.80	24.41	26.21	47.00	-20.79	peak
4		700.9167	0.61	28.17	28.78	47.00	-18.22	peak
5		820.5500	1.95	30.68	32.63	47.00	-14.37	peak
6	*	966.0500	2.60	32.27	34.87	47.00	-12.13	peak

RESULT: PASS

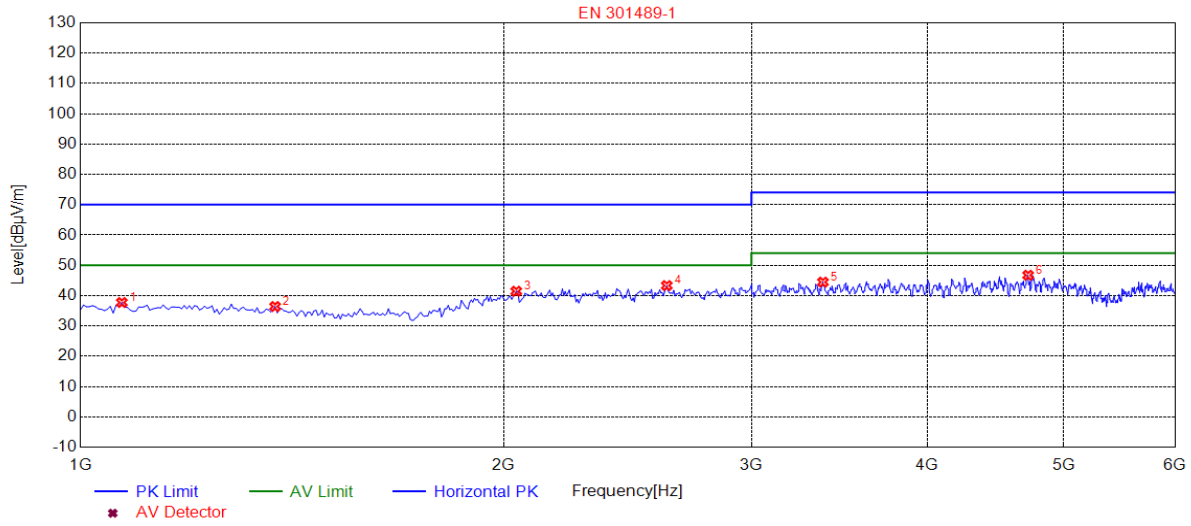
RADIATED EMISSION BELOW 1GHZ– VERTICAL



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		149.6333	0.48	19.21	19.69	40.00	-20.31	peak
2		277.3500	0.58	19.72	20.30	47.00	-26.70	peak
3		456.8000	2.17	24.12	26.29	47.00	-20.71	peak
4		621.7000	1.44	27.21	28.65	47.00	-18.35	peak
5		818.9333	2.64	30.65	33.29	47.00	-13.71	peak
6	*	907.8500	2.53	31.77	34.30	47.00	-12.70	peak

RESULT: PASS

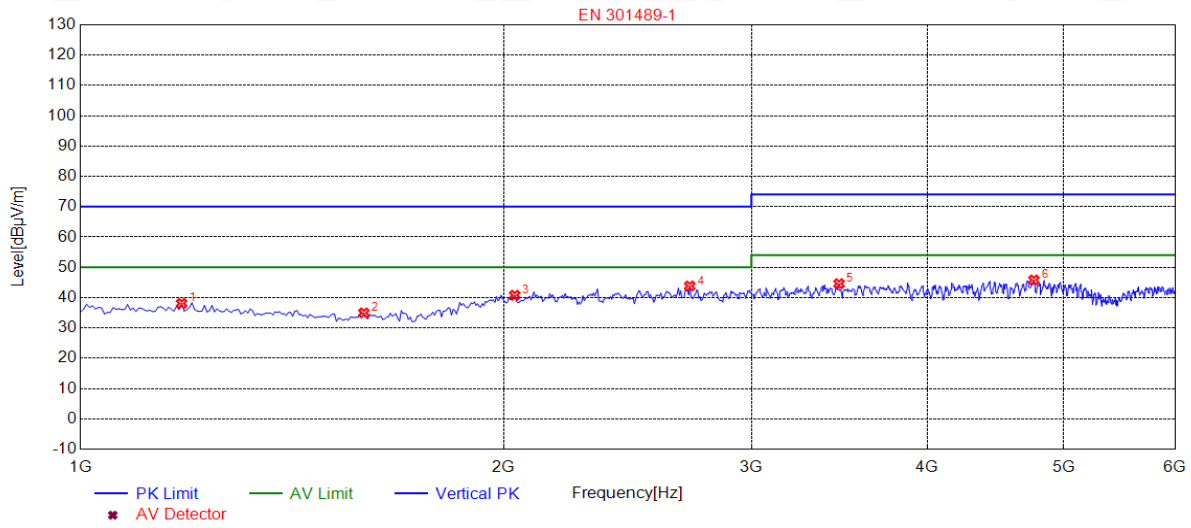
RADIATED EMISSION ABOVE 1GHZ– HORIZONTAL



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Polarity
1	1070.0701	37.73	-16.71	70.00	32.27	Horizontal
2	1375.3754	36.40	-17.01	70.00	33.60	Horizontal
3	2041.0410	41.44	-11.65	70.00	28.56	Horizontal
4	2611.6116	43.31	-9.63	70.00	26.69	Horizontal
5	3372.3724	44.45	-8.04	74.00	29.55	Horizontal
6	4718.7187	46.73	-4.99	74.00	27.27	Horizontal

RESULT: PASS

RADIATED EMISSION ABOVE 1GHZ– VERTICAL



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Polarity
1	1180.1802	38.09	-16.82	70.00	31.91	Vertical
2	1590.5906	34.95	-16.17	70.00	35.05	Vertical
3	2036.0360	40.78	-11.67	70.00	29.22	Vertical
4	2711.7117	43.85	-9.55	70.00	26.15	Vertical
5	3462.4625	44.60	-7.73	74.00	29.40	Vertical
6	4763.7638	45.83	-4.95	74.00	28.17	Vertical

RESULT: PASS

8. IMMUNITY TEST

8.1. EUT SETUP AND OPERATING CONDITIONS

The battery was in full voltage and the charger was connected to the EUT to keep the voltage constant during the tests.

Each immunity test was performed according to the requirements of the standard.

8.2. GENERAL PERFORMANCE CRITERIA

1. Performance criteria for Continuous phenomena applied to Transmitter (CT)

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

2. Performance criteria for Transient phenomena applied to Transmitter (TT)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

3. Performance criteria for Continuous phenomena applied to Receiver (CR)

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

4. Performance criteria for Transient phenomena applied to Receiver (TR)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

5. Performance Table

EN 301 489-17 Performance criteria		
Criteria	**During Test**	**After Test (i.e. as a result of the application of the test)**
A	Shall operate as intended. (see note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.
Note: Operate as intended during the test allows a level of degradation in accordance with the Minimum performance level.		
Minimum performance level		
For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to10 %. For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.		

8.3. ELECTROSTATIC DISCHARGE IMMUNITY TEST

8.3.1 TEST SPECIFICATION

Basic Standard	EN 61000-4-2
Discharge Impedance	330Ω / 150 pF
Discharge Voltage	Air Discharge:8 kV , Contact Discharge:4 kV
Polarity	Positive / Negative
Number of Discharge	Minimum 20 times at each test point
Discharge Mode	Single discharge
Discharge Period	1-second minimum

8.3.2 TEST PROCEDURE

The test procedure was in accordance with EN 61000-4-2:

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.

b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.

c. The time interval between two successive single discharges was at least 1 second.

d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.

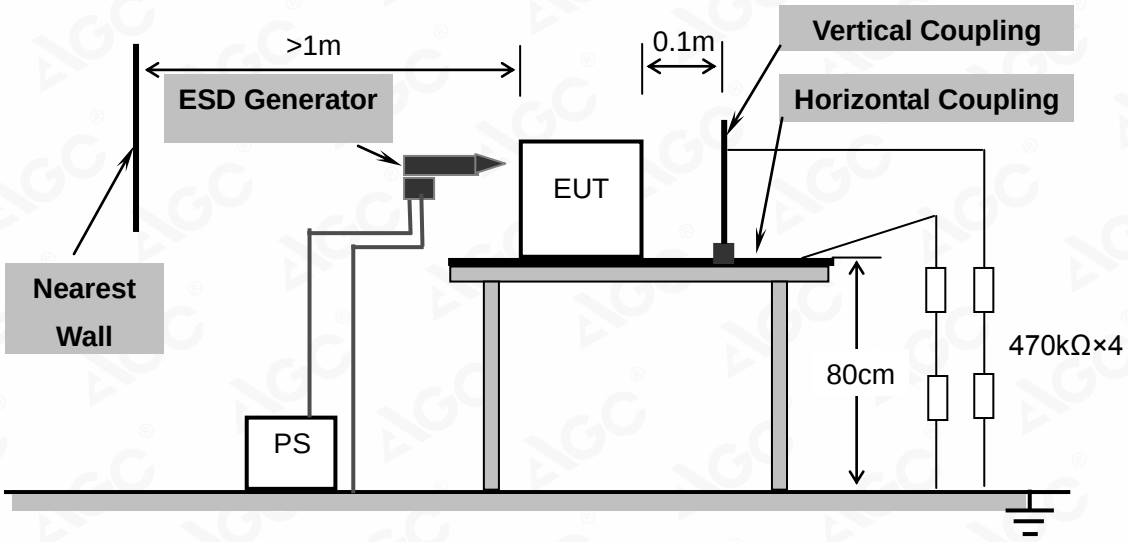
e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were completed.

g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.

h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m×0.5m) was placed vertically to and 0.1 meters from the EUT.

8.3.3 TEST SETUP



For the actual test configuration, please refer to Appendix II: Photographs of the Test Configuration.

8.3.4 TEST RESULT

TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.3.2 and EN 61000-4-2 for the measurement methods.

Amount of Discharges	Voltage	Coupling	Observation	performance	Result (Pass/Fail)
Mini 20 / Point	±2KV, ±4kV	No Contact Discharge	No Function Loss	N/A	N/A
Mini 20 / Point	±2KV, ±4kV, ±8kV	No Air Discharge	No Function Loss	N/A	N/A
Mini 20 / Point	±2KV, ±4kV	Indirect Discharge HCP	No Function Loss	A	Pass
Mini 20 / Point	±2KV, ±4kV	Indirect Discharge VCP	No Function Loss	A	Pass

Note: operating mode include all modes of EMS in page 7.

PERFORMANCE

☒**Criteria A:**	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
☐**Criteria B:**	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
☐**Criteria C:**	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒***PASS*** ☐***FAIL***

8.4. RADIATED, RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST

8.4.1 TEST SPECIFICATION

Basic Standard	EN 61000-4-3
Frequency Range	80 MHz – 6000MHz
Field Strength	3V/m
Modulation	1 kHz sine wave, 80%, AM modulation
Frequency Step	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance	3m
Antenna Height	1.55m
Dwell Time	3 seconds

8.4.2 TEST PROCEDURE

The test procedure was in accordance with EN 61000-4-3.

a. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.

b. The test signal was 80% amplitude modulated with a 1 kHz sine wave.

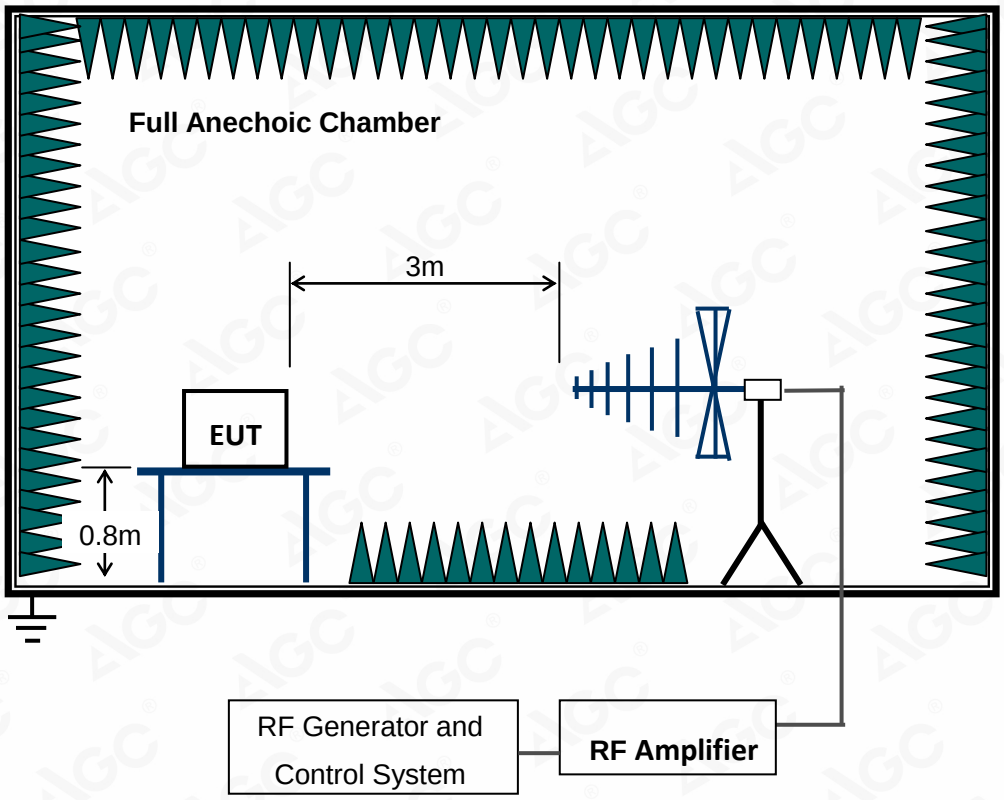
c. The frequency range was swept from 80 MHz to 6000MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.

d. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

e. The field strength level was 3V/m.

f. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

8.4.3 TEST SETUP



For the actual test configuration, please refer to Appendix II: Photographs of the Test Configuration.

8.4.4 TEST RESULT

TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.2.2, ETSI EN 301 489-17 and EN 61000-4-3 for the measurement methods.

☒ **MODE 1**

Freq. Range (MHz)	Field	Modulation	Polarity	Position	Observation	performance	Result (Pass/Fail)
80-6000	3V/m	Yes	H / V	Front	No Function Loss	A	PASS
80-6000	3V/m	Yes	H / V	Back	No Function Loss	A	PASS
80-6000	3V/m	Yes	H / V	Left	No Function Loss	A	PASS
80-6000	3V/m	Yes	H / V	Right	No Function Loss	A	PASS
80-6000	3V/m	Yes	H / V	Top	No Function Loss	A	PASS
80-6000	3V/m	Yes	H / V	Bottom	No Function Loss	A	PASS

Note: operating mode include all modes of EMS in page 7.

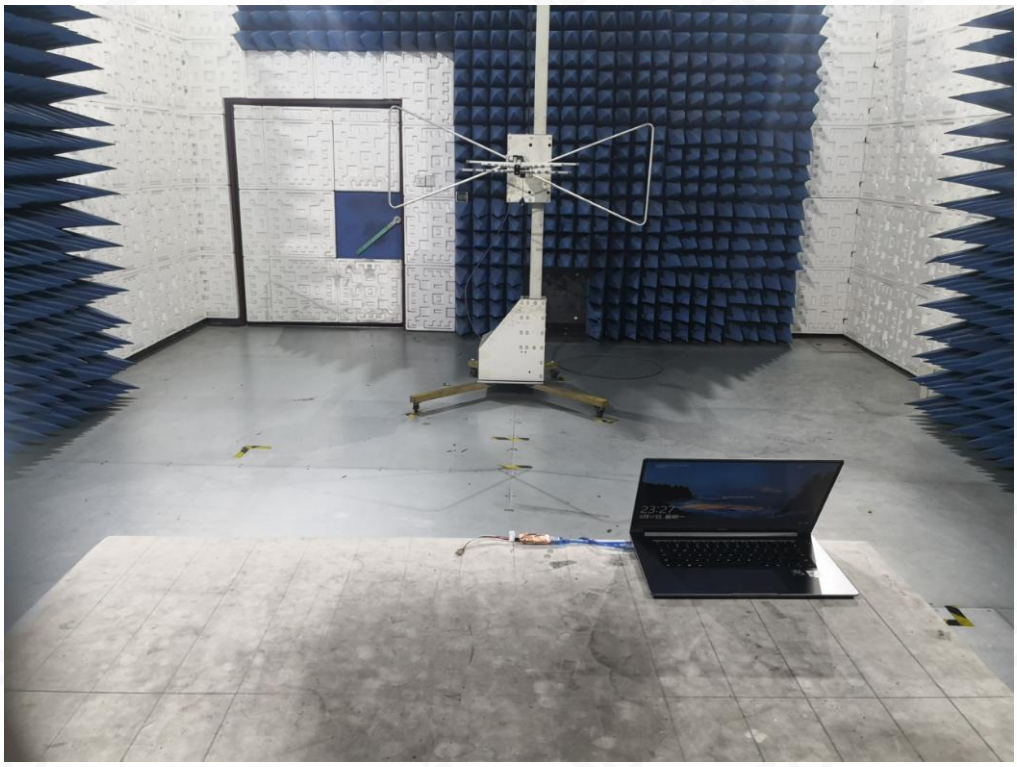
PERFORMANCE

☒**Criteria A:**	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
☐**Criteria B:**	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
☐**Criteria C:**	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

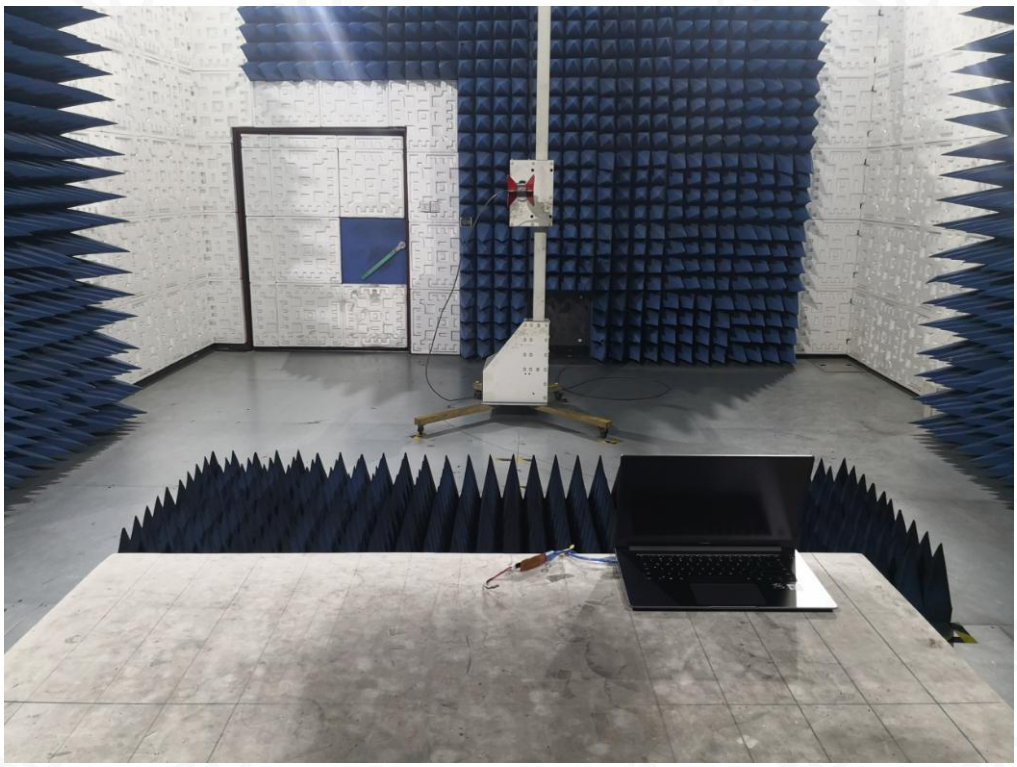
☒***PASS*** ☐***FAIL***

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP (Below 1GHz)

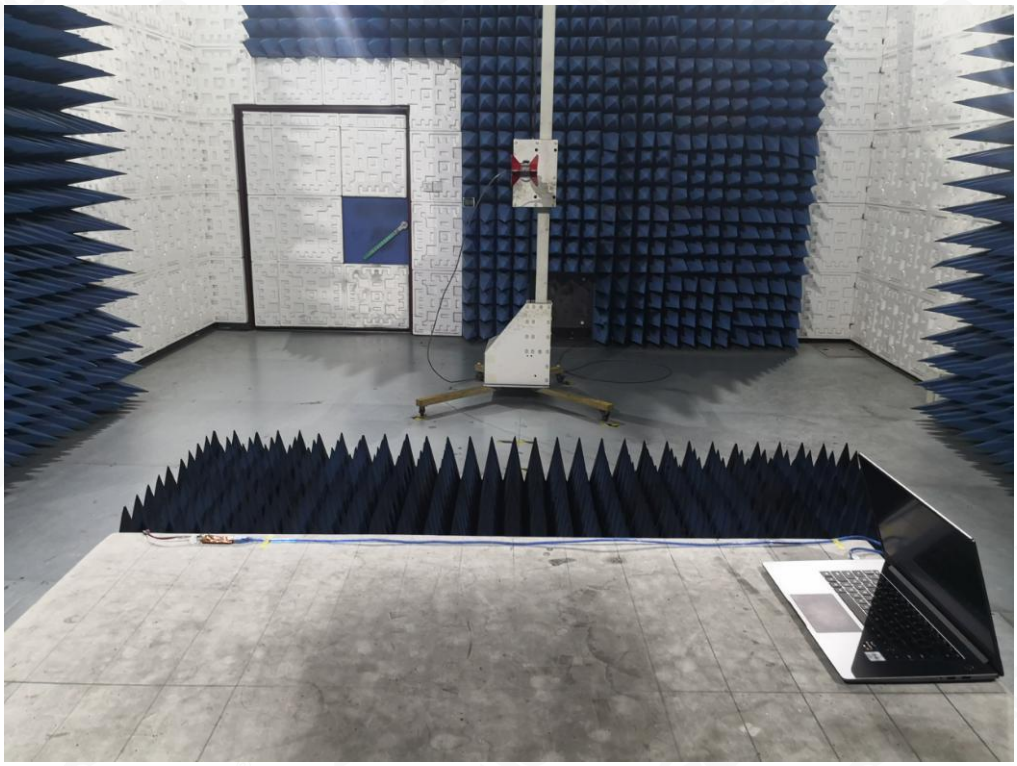


RADIATED EMISSION TEST SETUP (Above 1GHz)

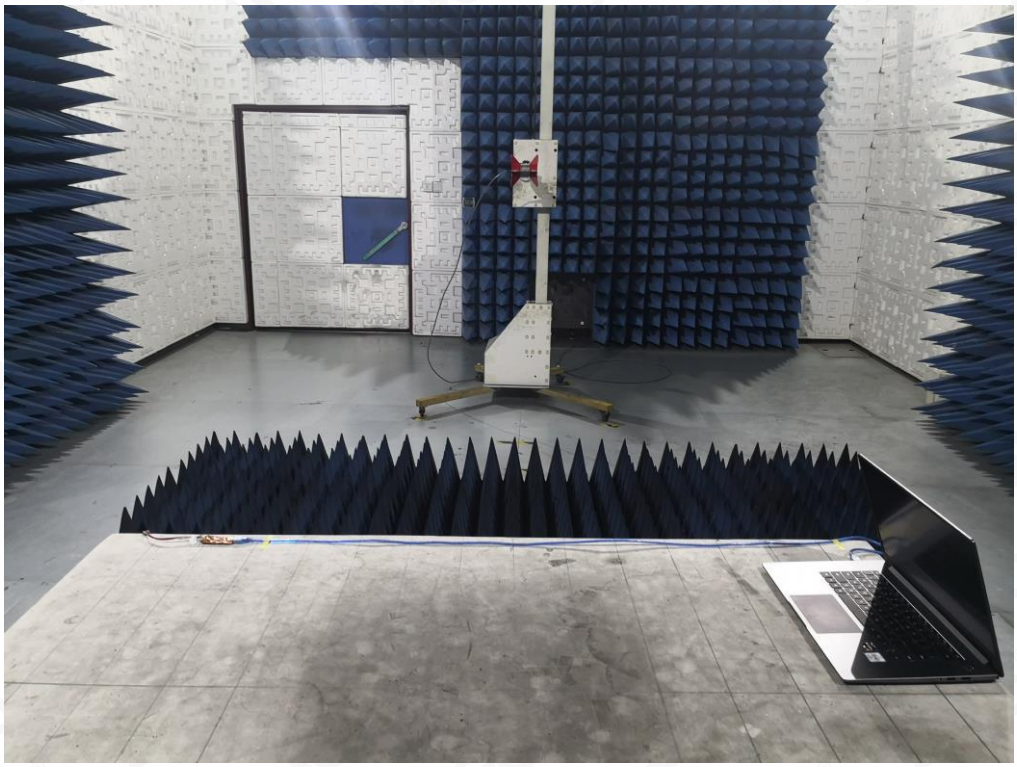


EN 61000-4-2 ESD TEST SETUP

EN 61000-4-3 RS TEST SETUP (Below 1GHz)



EN 61000-4-3 RS TEST SETUP (Above 1GHz)



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APPENDIX B: PHOTOGRAPHS OF THE EUT

Refer to Attached file (APPENDIX I).

----END OF REPORT----

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. The non-CMA report issued by AGC is only permitted to be used by the client as internal reference use and shall not be used for public demonstration purpose.

5. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

6. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

7. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

8.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

9. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

10. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.