



TEST REPORT

Product Name : Emax Pro BT Comms
Brand Name : Caldwell
Model : 1136235
Series Model : N/A
FCC ID : 2AF3W-1136235
Applicant : **AOB Products Company**
Address : 1800 North Route Z Suite A, Columbia, Missouri, United States, 65202
Manufacturer : **Wenzhou Only Electronics Co.,Ltd.**
No.139 Jiangnan Avenue,Nanbin
Address : Street,Ruian,Wenzhou,Zhejiang(Room 401,402,501,502,Building 23,Gexiang High-Tech Industrial Park)
Standard(s) : FCC CFR Title 47 Part 15 Subpart B
Date of Receipt : Aug. 08, 2024
Date of Test : Aug. 09, 2024~ Aug. 27, 2024
Issued Date : Sep. 03, 2024

Issued By: **Guangdong Asia Hongke Test Technology Limited**
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Reviewed by: 
Leon.yi

Approved by: 
Sean She



Note: This device has been tested and found to comply with the standard(s) listed, this test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory. This report shall not be reproduced except in full, without the written approval of Guangdong Asia Hongke Test Technology Limited. If there is a need to alter or revise this document, the right belongs to Guangdong Asia Hongke Test Technology Limited, and it should give a prior written notice of the revision document. This test report must not be used by the client to claim product endorsement.

**Report Revise Record**

Report Version	Issued Date	Notes
M1	Sep. 03, 2024	Initial Release

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

[47 CFR FCC Part 15 Subpart B](#) - Unintentional Radiators

[ANSI C63.4: 2014](#) – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

1.2 Test Summary

Test Item	Section in CFR 47	Test Result
AC Power Line Conducted Emission	FCC Part 15 B (Section15.107)	N/A
Radiated Emissions	FCC Part 15 B (Section15.109)	PASS

Note: This report was updated based on the original report No. AIT22110413E (FCC ID: 2AF3W-1136235) for FRS antenna changed, only difference test items was tested and recorded in this report.

1.3 Test Facility

Test Laboratory:

Guangdong Asia Hongke Test Technology Limited

B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

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

FCC-Registration No.: 251906 Designation Number: CN1376

Guangdong Asia Hongke Test Technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 31737 CAB identifier: CN0165

The 3m Semi-anechoic chamber of Guangdong Asia Hongke Test Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 31737

A2LA-Lab Cert. No.: 7133.01

Guangdong Asia Hongke Test Technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

1.4 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Guangdong Asia Hongke Test Technology Limited's quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Asia Hongke laboratory is reported:

Test	Measurement Uncertainty	Notes
Power Line Conducted Emission	150KHz~30MHz ± 1.20 dB	(1)
Radiated Emission	9KHz~30Hz ± 3.10 dB	(1)
Radiated Emission	9KHz~1GHz ± 3.75 dB	(1)
Radiated Emission	1GHz~18GHz ± 3.88 dB	(1)
Radiated Emission	18GHz~40GHz ± 3.88 dB	(1)
RF power, conducted	30MHz~6GHz ± 0.16 dB	(1)
RF power density, conducted	± 0.24 dB	(1)
Spurious emissions, conducted	± 0.21 dB	(1)
Temperature	$\pm 1^{\circ}\text{C}$	(1)
Humidity	$\pm 3\%$	(1)
DC and low frequency voltages	$\pm 1.5\%$	(1)
Time	$\pm 2\%$	(1)
Duty cycle	$\pm 2\%$	(1)

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

2 GENGGENERAL INFORMATION

2.1 Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Name of EUT	Emax Pro BT Comms
Model Number	1136235
Power Supply	DC 3.70V from battery
Frequency Range	FRS: 462.5625MHz~462.7125MHz(1~7 channel) FRS: 462.5500MHz~462.7250MHz(8~14 channel) FRS: 467.5625MHz~467.7125MHz(15~22 channel)
Rate Power	0.002511886W
Modulation Type	FM
Channel Separation	12.5KHz
Antenna Type	FPC antenna
Antennal Gain	-1.11dBi

2.3 Description of Test Modes

The device, according to the function of the EUT, select the following operating modes for testing.

Note:

No.	TEST MODES
1	Scanning Receiving Mode at low channel of CH1 to CH7
2	Scanning Receiving Mode at middle channel of CH1 to CH7
3	Scanning Receiving Mode at high channel of CH1 to CH7
4	Scanning Receiving Mode at low channel of CH8 to CH14
5	Scanning Receiving Mode at middle channel of CH8 to CH14
6	Scanning Receiving Mode at high channel of CH8 to CH14
7	Scanning Receiving Mode at low channel of CH15 to CH22
8	Scanning Receiving Mode at middle channel of CH15 to CH22
9	Scanning Receiving Mode at high channel of CH15 to CH22

1. Pre-testing on all test modes, only the worst case mode was recorded in this report.
2. After the pre-testing, the following test modes were found to be the worst mode for the corresponding test items and recorded in the report

Test item	Test mode (Worse case operation mode)
EMI	Test mode 1

2.4 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Serial No.	Provided by	Other
Adapter	HNT	HNT-QC530	/	Test lab	/
Glass	/	/	/	Test lab	/

2.5 Equipment List for the Test

<input checked="" type="checkbox"/> Radiation Emission Test Equipment (AiT 966 chamber)						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Measuring Receiver	R&S	ESR	101160	2023.09.08	2024.09.07
2	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2023.09.08	2024.09.07
3	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3207	2023.09.08	2024.09.07
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2023.09.08	2024.09.07
5	Spectrum Analyzer	R&S	FSV40	101470	2023.09.08	2024.09.07
6	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2023.09.08	2024.09.07
7	Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	452	2023.09.08	2024.09.07
8	Filter	MICRO-TRONICS	BRM50702-02	16	2023.09.08	2024.09.07
9	Filter	MICRO-TRONICS	BRC50703-02	17	2023.09.08	2024.09.07
10	Filter	MICRO-TRONICS	BRC50705-02	18	2023.09.08	2024.09.07

<input checked="" type="checkbox"/> Conducted Emission Test Equipment (AiT shielded room)						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Test Receiver	R&S	ESCI	100124	2023.09.08	2024.09.07
2	LISN	Kyoritsu	KNW-242	8-837-4	2023.09.08	2024.09.07
3	LISN	R&S	ESH3-Z2	0357.8810.54101161-S2	2023.09.08	2024.09.07
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2023.09.08	2024.09.07
5	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2023.09.08	2024.09.07
6	Broadband Horn Antenna	SCHWARZBECK	BBHA 9120D	452	2023-08-29	2025-08-28

3 TEST CONDITIONS AND RESULTS

3.1 Conducted Emission

LIMIT

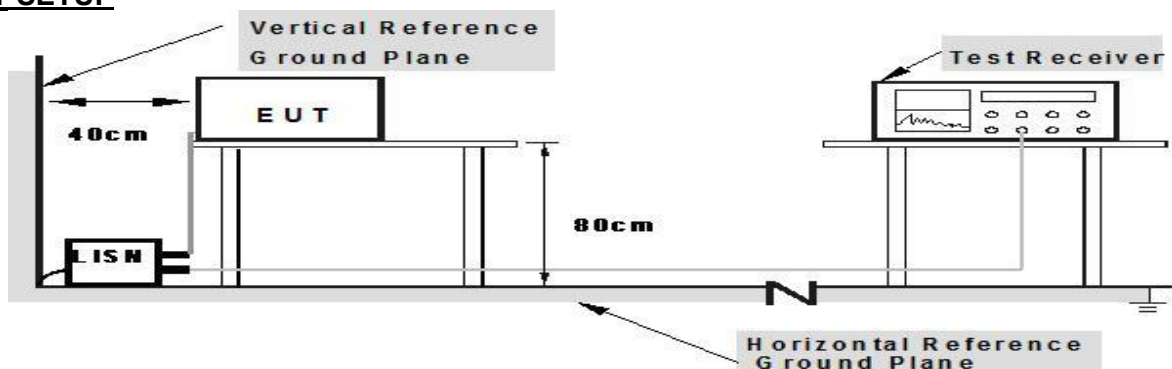
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following :

FREQUENCY (MHz)	□ Class A (dBuV)		☒ Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

TEST PROCEDURE

- The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4-2014.
- Support equipment, if needed, was placed as per ANSI C63.4-2014.
- All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2014.
- The EUT received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- All support equipments received AC power from a second LISN, if any.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.

TEST SETUP



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

TEST RESULTS

Not Applicable, The EUT is powered by dry battery.

3.2 Radiated Emission

LIMITS

LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	<input type="checkbox"/> Class A (at 3m)	<input checked="" type="checkbox"/> Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	50.0	40.0
88 ~ 216	53.5	43.5
216 ~ 960	56.0	46.0
Above 960	64.0	54.0

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	<input type="checkbox"/> Class A (at 3m) dBuV/m		<input checked="" type="checkbox"/> Class B (at 3m) dBuV/m	
	Peak	Avg	Peak	Avg
Above 1000	80	60	74	54

Notes:

- 1) The limit for radiated test was performed according to as following:
CISPR 22/ FCC PART 15B /ICES-003.
- 2) The tighter limit applies at the band edges.
- 3) Emission level (dBuV/m)=20log Emission level (uV/m).

TEST PROCEDURE

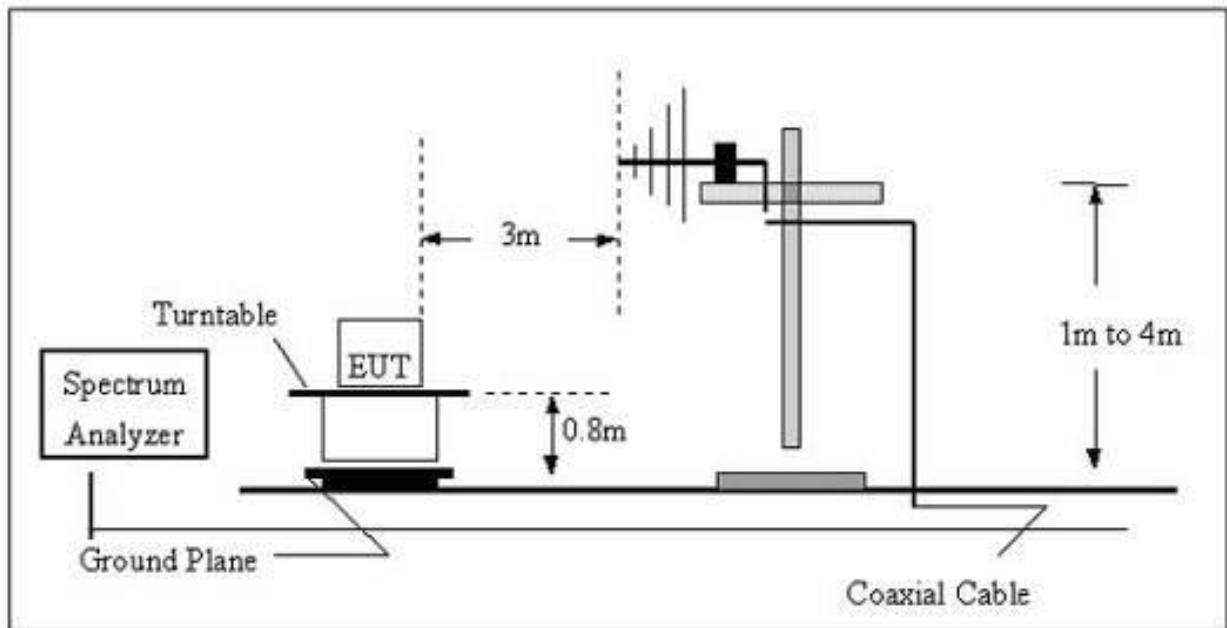
- a) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- b) Support equipment, if needed, was placed as per ANSI C63.4.
- c) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- d) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- e) Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization to maximize the emission reading level with the Analyzer / Receiver setting in Peak detection mode.
- f) If the Peak Mode measured value compliance with and lower than QP (AV) Mode Limit 3dB, the EUT shall be deemed to meet QP (AV) Limits and then no additional QP (AV) Mode measurement performed, otherwise, QP (AV) Value should be measured with the receiver/spectrum setting as following:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
Above 1GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

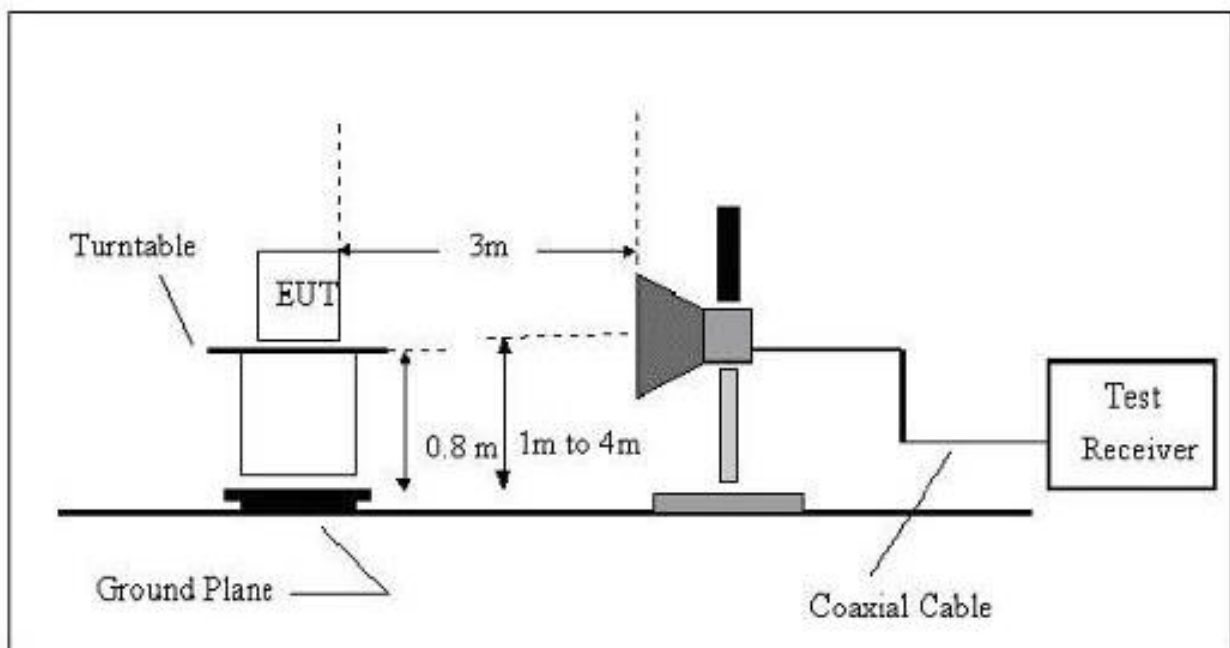
- g) Recorded at least the six highest emissions.

TEST SETUP

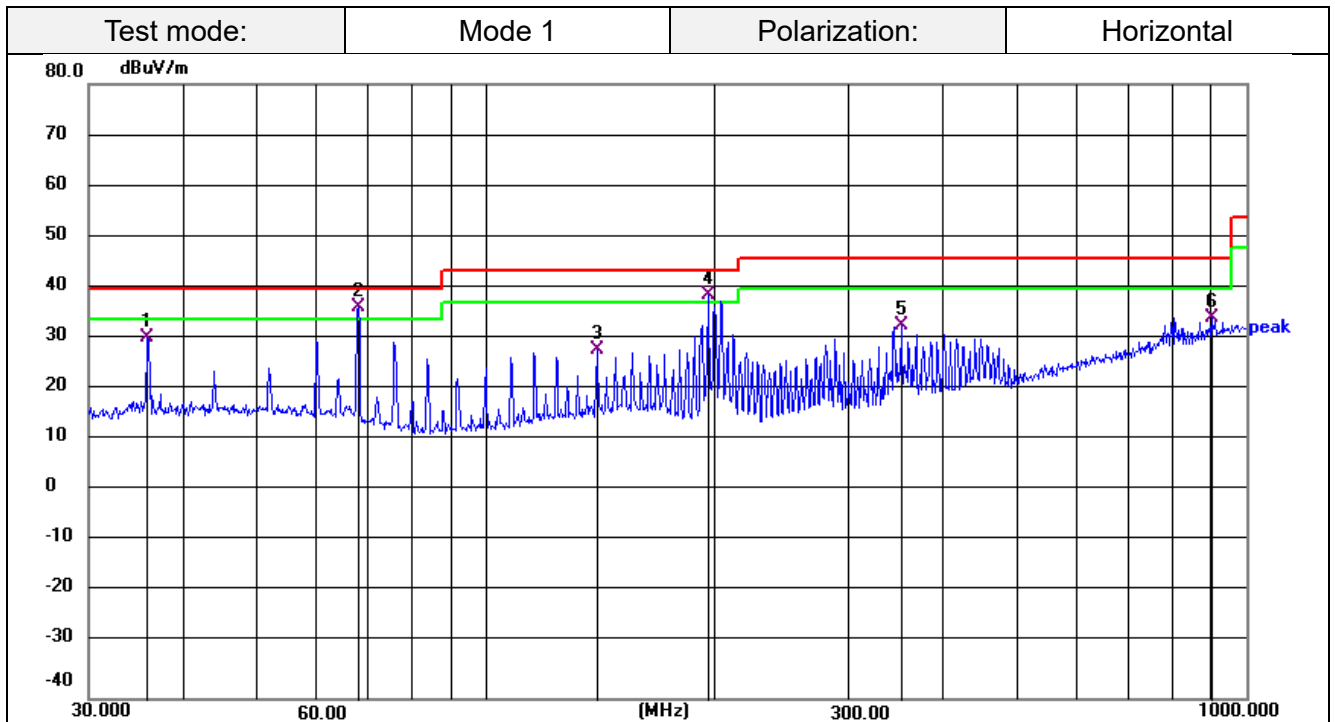
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-UP Frequency Above 1GHz



For 30MHz-1GHz



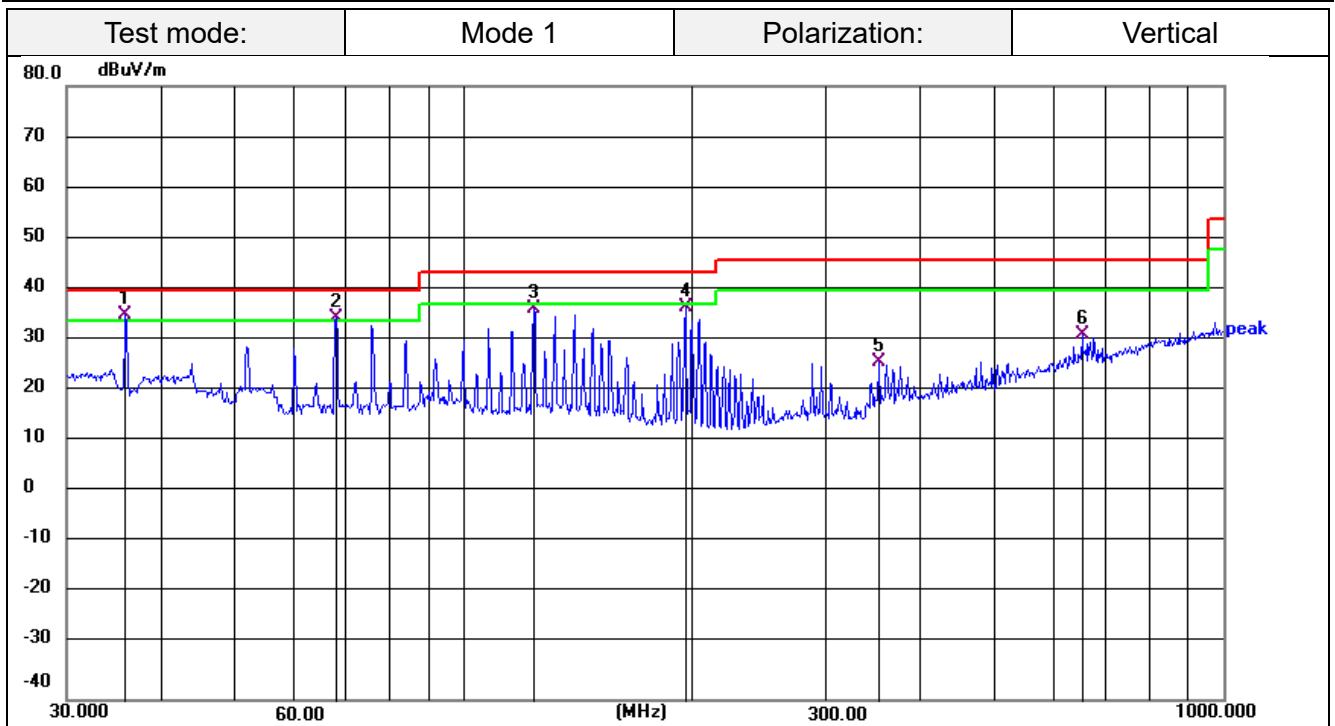
Remark:

Emission Level = Reading + Factor;

Factor = Antenna Factor + Cable Loss – Pre-amplifier;

Margin= Emission Level - Limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	35.8746	47.61	-17.09	30.52	40.00	-9.48	QP
2 *	67.9128	55.17	-18.57	36.60	40.00	-3.40	QP
3	139.8508	45.62	-17.33	28.29	43.50	-15.21	QP
4	195.8220	58.75	-19.80	38.95	43.50	-4.55	QP
5	351.7080	48.72	-15.72	33.00	46.00	-13.00	QP
6	900.1474	39.27	-4.82	34.45	46.00	-11.55	QP



Remark:

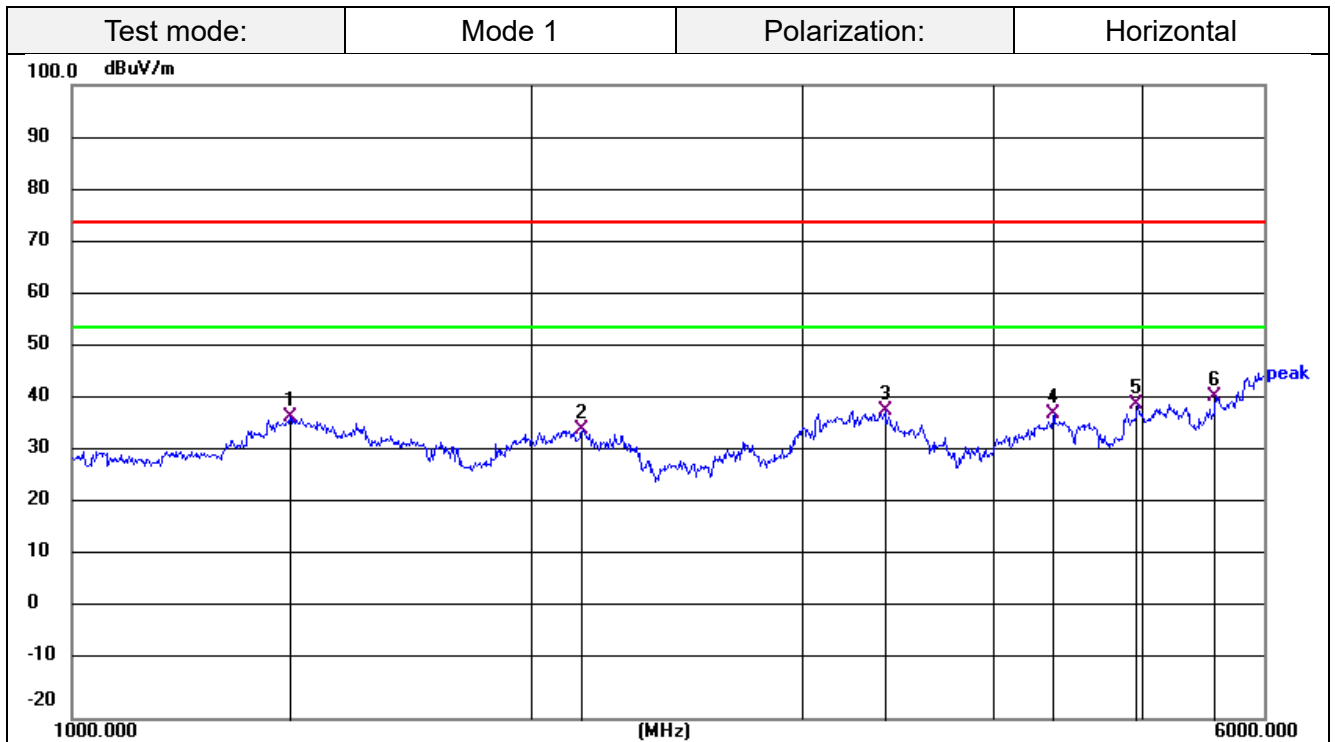
Emission Level = Reading + Factor;

Factor = Antenna Factor + Cable Loss – Pre-amplifier;

Margin= Emission Level - Limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1 *	35.8746	52.32	-17.09	35.23	40.00	-4.77	QP
2	67.9128	53.38	-18.57	34.81	40.00	-5.19	QP
3	123.6984	54.77	-18.14	36.63	43.50	-6.87	QP
4	195.8220	56.69	-19.80	36.89	43.50	-6.61	QP
5	351.7080	41.69	-15.72	25.97	46.00	-20.03	QP
6	651.9417	40.30	-8.85	31.45	46.00	-14.55	QP

Above 1GHz



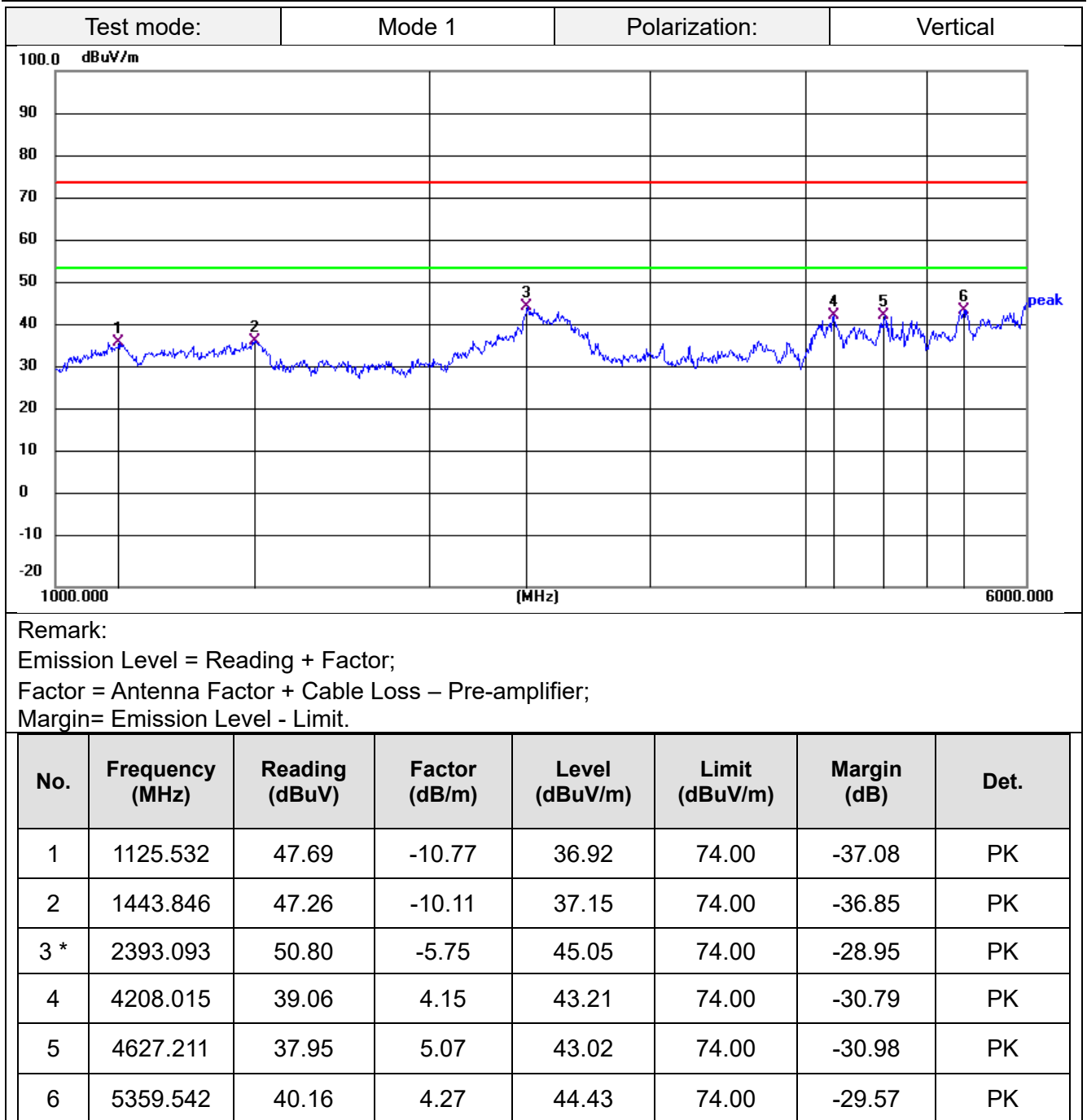
Remark:

Emission Level = Reading + Factor;

Factor = Antenna Factor + Cable Loss – Pre-amplifier;

Margin= Emission Level - Limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	1388.039	47.53	-10.31	37.22	74.00	-36.78	PK
2	2156.884	42.62	-7.78	34.84	74.00	-39.16	PK
3	3393.901	39.24	-0.92	38.32	74.00	-35.68	PK
4	4377.202	33.14	4.49	37.63	74.00	-36.37	PK
5	4962.119	34.42	5.22	39.64	74.00	-34.36	PK
6 *	5585.026	37.04	3.92	40.96	74.00	-33.04	PK

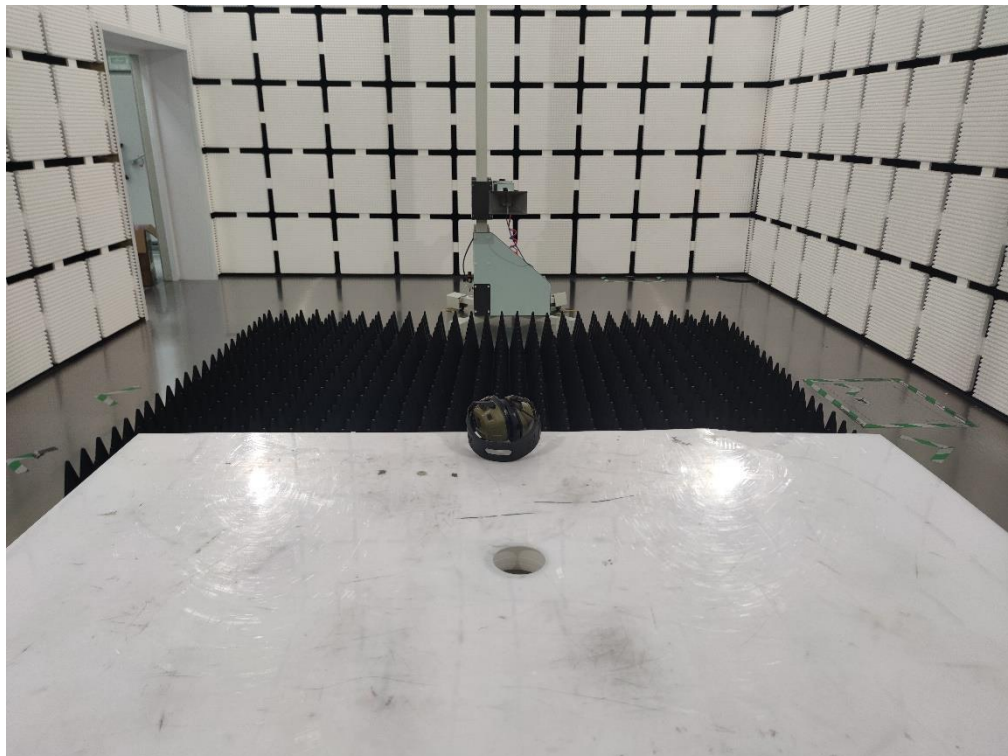


4 Test Setup Photographs of EUT

Radiated Emission 30MHz-1GHZ



Radiated Emission above 1GHz



5 External Photographs of EUT

Please refer to separated files for External Photos of the EUT.

6 Internal Photographs of EUT

Please refer to separated files for Internal Photos of the EUT.

******* End of Report *******