


TEST REPORT

For FCC Part15B

Report No.: **CHTEW22050047** Report verification: 

Project No.: **SHT2106125001EW**

FCC ID.....: **2ATDI-E2000**

Applicant's name: **NRadio Technologies, Co., Ltd.**

Address.....: Room 408, Ziyun Building, No.211, Xin'an 2nd Rd., Bao'an District, Shenzhen, P.R.C.

Product Name: **Multi-band Wireless Router**

Trade Mark: NRadio

Model No.: E2000

Listed Model(s): E2000-128, E2000-R, E2800, E2900, E3000, E3800, E3900, E5000, E5800, E6000

Standard: **47 CFR FCC Part 15 Subpart B**

Date of receipt of test sample.....: Aug.23, 2021

Date of testing.....: Aug.23, 2021-May 06, 2022

Date of issue.....: May 09, 2022

Result.....: **Pass**

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Testing Laboratory Name: **Shenzhen Huatongwei International Inspection Co., Ltd.**

Address.....: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

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The test report merely corresponds to the test sample.

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1. TEST STANDARDS AND REPORT VERSION

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. Report version information

Revision No.	Date of issue	Description
N/A	2022-05-09	Original

2. TEST DESCRIPTION

Section	Test Item	Section in CFR 47	Result ^{#1}	Test Engineer
5.1	Conducted Emissions	15.107(a)	PASS	Jian Li
5.2	Radiated Emissions	15.109(a)	PASS	Hongtao Meng

Note:

#1: The test result does not include measurement uncertainty value

3. SUMMARY

3.1. Client Information

Applicant:	NRadio Technologies, Co., Ltd.
Address:	Room 408, Ziyun Building, No.211, Xin'an 2nd Rd., Bao'an District, Shenzhen, P.R.C.
Manufacturer:	NRadio Technologies, Co., Ltd.
Address:	Room 408, Ziyun Building, No.211, Xin'an 2nd Rd., Bao'an District, Shenzhen, P.R.C.

3.2. Product Description

Main unit information:	
Product Name:	Multi-band Wireless Router
Trade Mark:	NRadio
Model No.:	E2000
Listed Model(s):	E2000-128, E2000-R, E2800, E2900, E3000, E3800, E3900, E5000, E5800, E6000
Power supply:	DC 48V
Hardware version:	V1
Software version:	1.8
Accessory unit information:	
Adapter information:	Model: RP025-4800630YG Input: 100-240Va.c., 50/60Hz 0.7A Max Output: 48Vd.c., 0.63A 30.24W

3.3. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Connect information:	Tel: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn	
Qualifications	Type	Accreditation Number
	FCC	762235

4. TEST CONFIGURATION

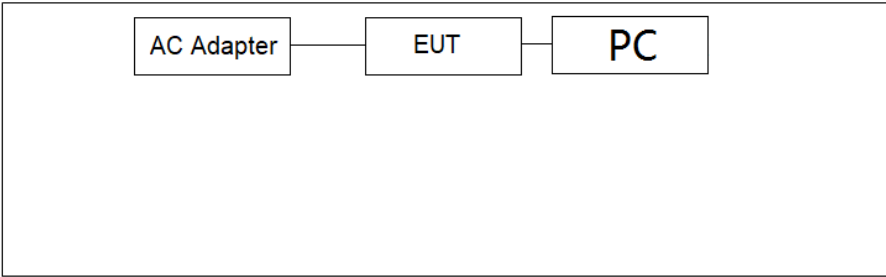
4.1. Descriptions of test mode

Test mode	Description
Ping LAN mode	Keep the EUT in transmission status

Pre-scan above all test mode, found below test mode which it was worse case mode, so only show the test data for worse case mode on the test report

Test Item	Test mode for worse case
Conducted Emissions	Ping LAN mode
Radiated Emissions	Ping LAN mode

4.2. Configuration of Tested System

Test mode	Configuration
Ping LAN mode	

4.3. Environmental conditions

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

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

4.4. Statement of the measurement uncertainty

Test Items	MeasurementUncertainty
Conducted emission	3.25dB
Radiated emission	<1GHz: 4.22dB >1GHz:5.06ppm

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.5. Equipments Used during the Test

● Conducted Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Shielded Room	Albatross projects	HTWE0114	N/A	N/A	2018/09/28	2023/09/27
●	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2021/9/14	2022/9/13
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2021/9/17	2022/9/16
●	Pulse Limiter	R&S	HTWE0033	ESH3-Z2	100499	2021/9/13	2022/9/12
●	RF Connection Cable	HUBER+SUHNER	HTWE0113-02	ENVIROFLEX 142	EF-NM-BNCM-2M	2021/9/17	2022/9/16
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated emission-6th test site							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2018/09/30	2022/09/29
●	EMI Test Receiver	R&S	HTWE0099	ESCI	100900	2021/09/14	2022/09/13
●	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/04/06	2024/04/05
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0123	VULB9163	538	2021/04/06	2024/04/05
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	N/A	2021/11/05	2022/11/04
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-01	N/A	N/A	2022/02/25	2023/02/24
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-02	SUCOFLEX104	501184/4	2022/02/25	2023/02/24
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated emission-7th test site							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	C11121	2018/09/27	2022/09/26
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2021/09/13	2022/09/12
●	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
●	Broadband Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2020/04/27	2023/04/26
●	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2021/11/05	2022/11/04
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2022/02/28	2023/02/27
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2022/02/25	2023/02/24
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
●	RF Connection Cable	HUBER+SUHNER	HTWE0119-05	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
●	Test Software	Audix	N/A	E3	N/A	N/A	N/A

5. TEST CONDITIONS AND RESULTS

5.1. Conducted Emissions

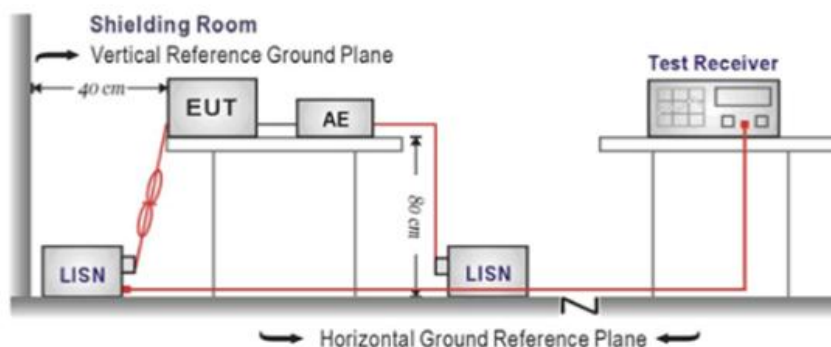
LIMIT

FCC CFR Title 47 Part 15 Subpart B Section 15.107:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was setup according to ANSI C63.4:2014
2. The EUT was placed on a plat form of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50ohm / 50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST MODE:

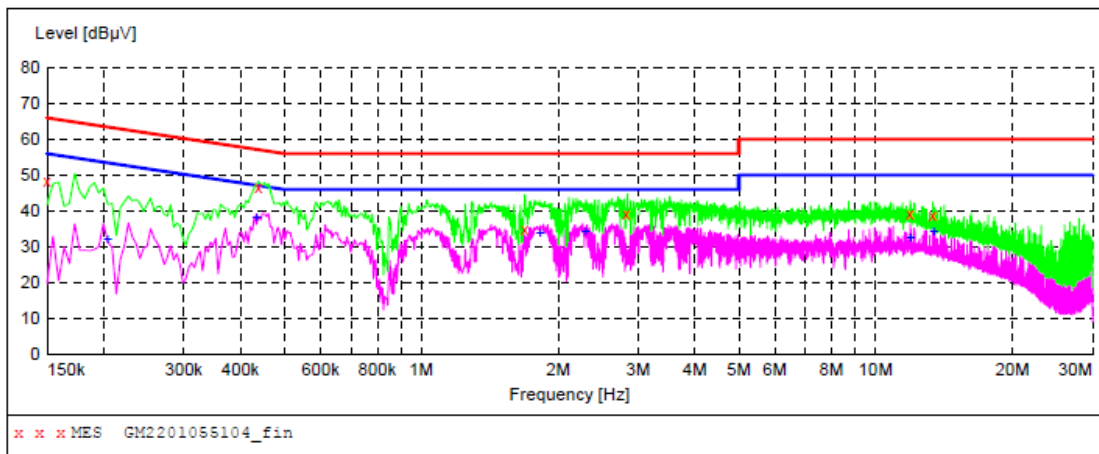
Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

Test Line:

L

**MEASUREMENT RESULT: "GM2201055104_fin"**

1/5/2022 8:42PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.150000	48.50	10.1	66	17.5	QP	L1	GND
0.438000	46.90	10.1	57	10.2	QP	L1	GND
1.693500	35.00	10.1	56	21.0	QP	L1	GND
2.823000	39.30	10.1	56	16.7	QP	L1	GND
11.890500	39.10	10.5	60	20.9	QP	L1	GND
13.357500	39.00	10.5	60	21.0	QP	L1	GND

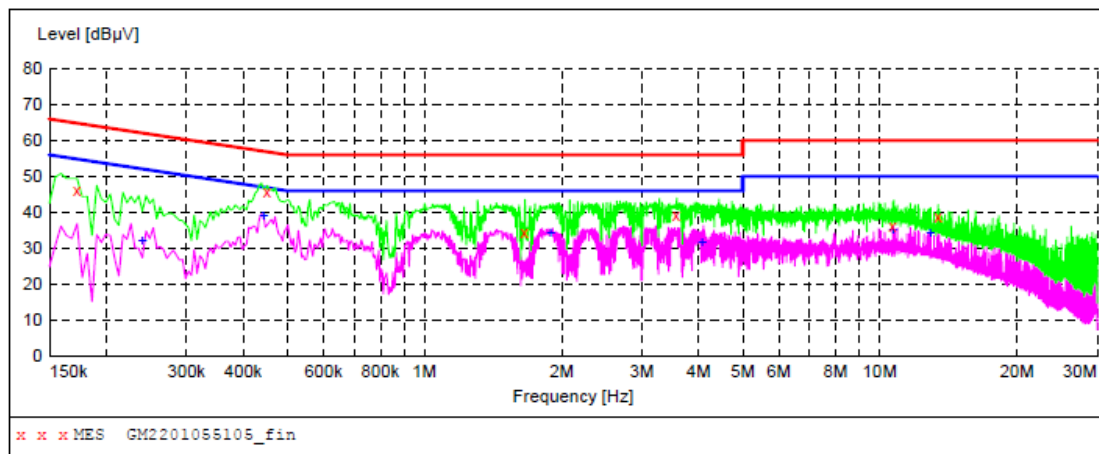
MEASUREMENT

1/5/2022 8:42PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.204000	32.50	10.1	53	20.9	AV	L1	GND
0.433500	38.50	10.1	47	8.7	AV	L1	GND
1.828500	34.10	10.1	46	11.9	AV	L1	GND
2.296500	34.70	10.1	46	11.3	AV	L1	GND
11.917500	32.90	10.5	50	17.1	AV	L1	GND
13.420500	34.60	10.5	50	15.4	AV	L1	GND

Test Line:

N

**MEASUREMENT RESULT: "GM2201055105_fin"**

1/5/2022 8:45PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.172500	46.40	10.1	65	18.4	QP	N	GND
0.451500	46.00	10.1	57	10.8	QP	N	GND
1.657500	34.40	10.1	56	21.6	QP	N	GND
3.574500	39.30	10.2	56	16.7	QP	N	GND
10.689000	36.20	10.5	60	23.8	QP	N	GND
13.420500	38.90	10.5	60	21.1	QP	N	GND

MEASUREMENT:

1/5/2022 8:45PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.240000	32.20	10.1	52	19.9	AV	N	GND
0.442500	39.30	10.1	47	7.7	AV	N	GND
1.891500	34.60	10.1	46	11.4	AV	N	GND
4.065000	32.10	10.3	46	13.9	AV	N	GND
10.675500	35.20	10.5	50	14.8	AV	N	GND
12.912000	34.50	10.5	50	15.5	AV	N	GND

5.2. Radiated Emissions

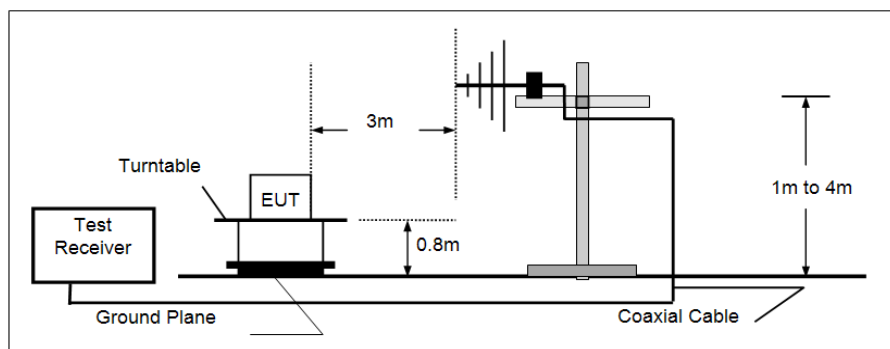
LIMIT

FCC CFR Title 47 Part 15 Subpart B Section 15.109

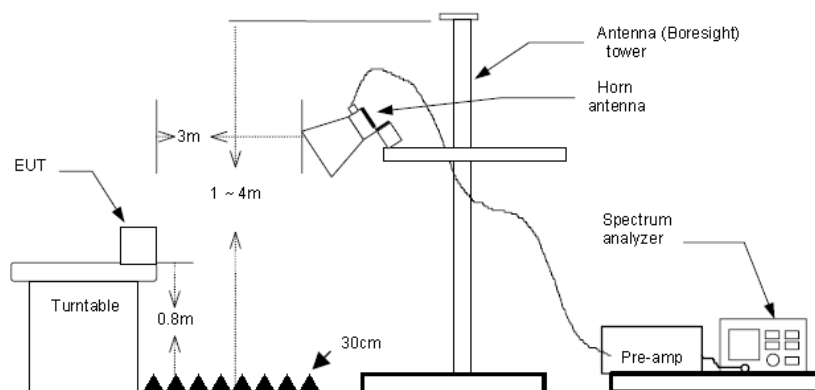
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

➤ 30MHz ~ 1GHz



➤ Above 1GHz



TEST PROCEDURE

1. The EUT was tested according to ANSI C63.4:2014.
2. The EUT is placed on a turn table which is 0.8 meter above ground.
3. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
4. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
5. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna.
6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1GHz,
RBW=120KHz, VBW=300KHz, Sweep=auto, Detector function=peak, Trace=max hold;
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - (3) From 1GHz to 5th harmonic, RBW=1MHz, VBW=3MHz

TEST MODE:

Please refer to the clause 3.3

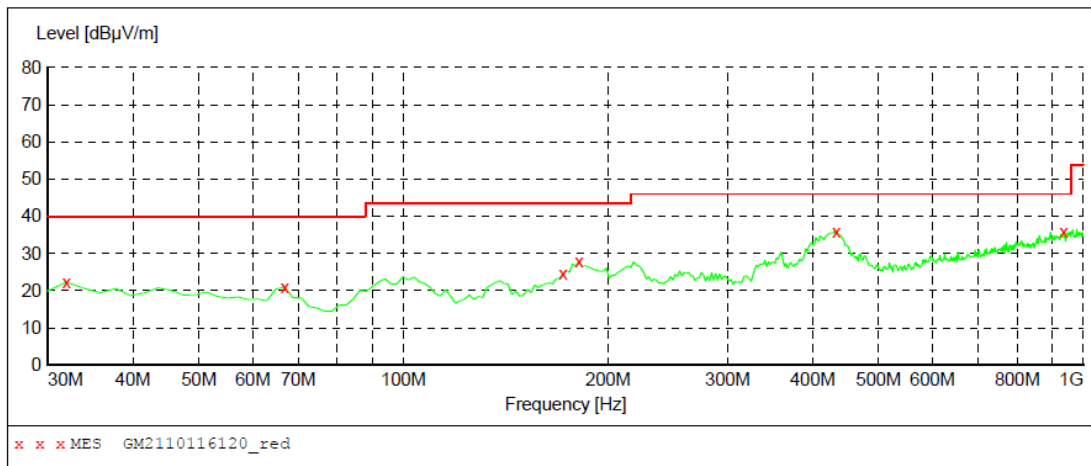
TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note: Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
The emission levels of frequency above 6GHz are very lower than limit and not show in test report.

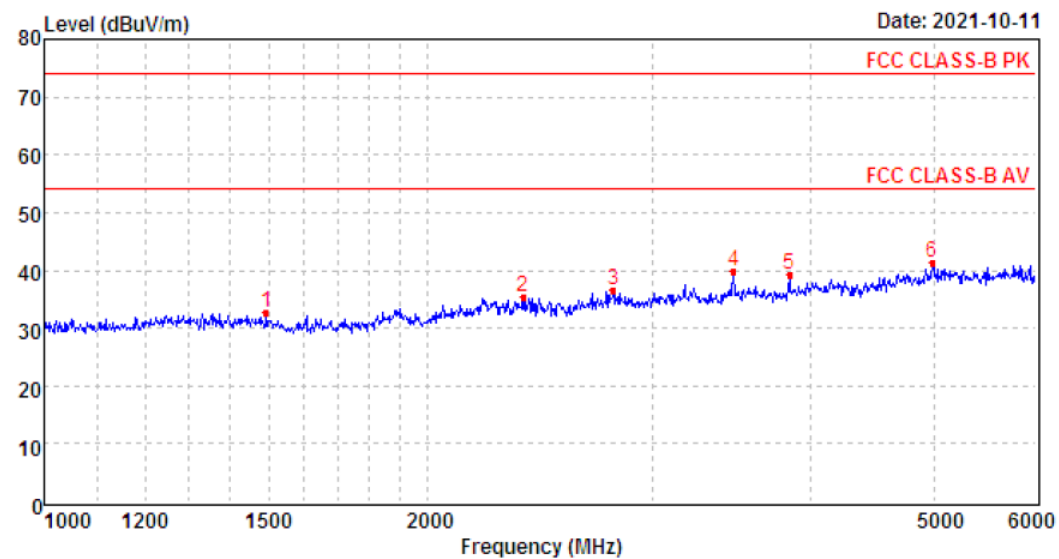
Polarization:

Horizontal

**MEASUREMENT RESULT: "GM2110116120_red"**

10/11/2021 11:14PM

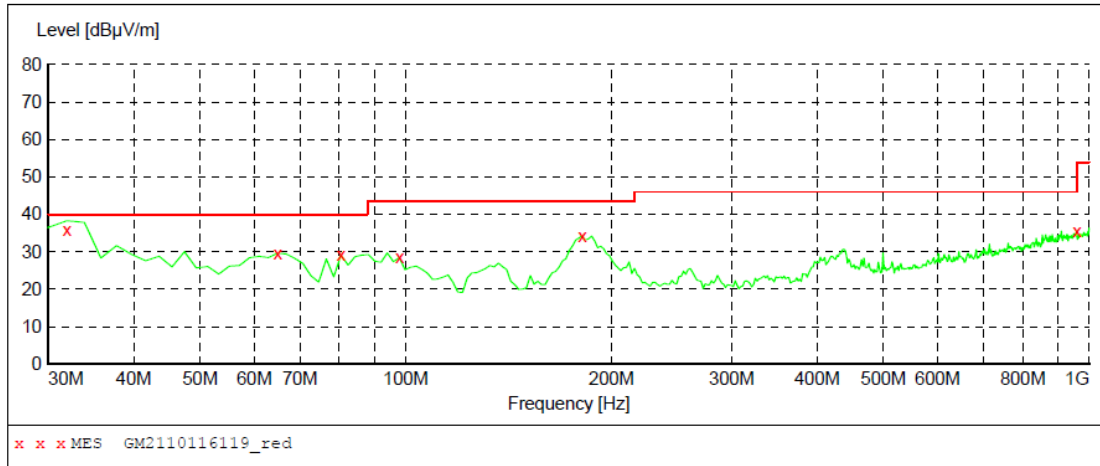
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	22.30	-12.4	40.0	17.7	QP	300.0	152.00	HORIZONTAL
66.860000	21.00	-11.8	40.0	19.0	QP	300.0	152.00	HORIZONTAL
171.620000	24.50	-12.8	43.5	19.0	QP	100.0	74.00	HORIZONTAL
181.320000	27.80	-12.1	43.5	15.7	QP	100.0	74.00	HORIZONTAL
433.520000	36.00	-3.1	46.0	10.0	QP	100.0	345.00	HORIZONTAL
935.980000	35.90	7.7	46.0	10.1	QP	100.0	229.00	HORIZONTAL



Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamplifier dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1493.85	39.21	25.92	4.31	36.81	32.63	74.00	-41.37	Peak
2	2376.00	39.55	27.75	5.51	37.48	35.33	74.00	-38.67	Peak
3	2796.78	39.43	28.39	6.03	37.25	36.60	74.00	-37.40	Peak
4	3473.88	40.62	29.00	6.77	36.58	39.81	74.00	-34.19	Peak
5	3847.42	39.24	29.79	7.21	36.87	39.37	74.00	-34.63	Peak
6	4979.93	36.03	31.74	8.80	35.21	41.36	74.00	-32.64	Peak

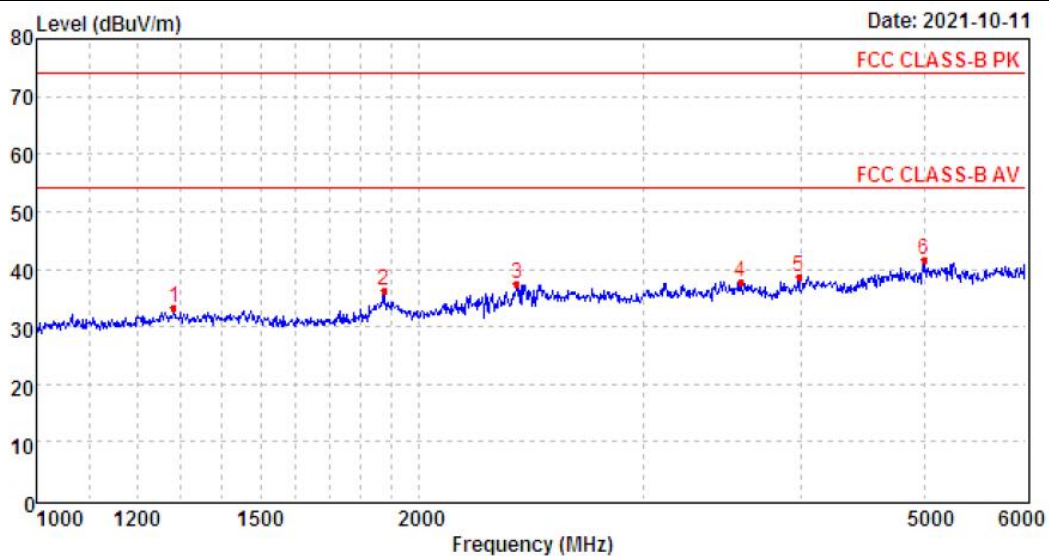
Polarization:

Vertical

**MEASUREMENT RESULT: "GM2110116119_red"**

10/11/2021 11:10PM

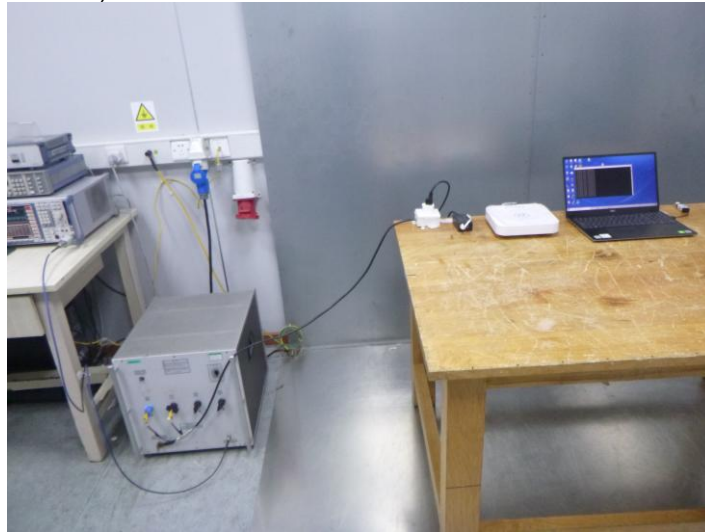
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	35.80	-12.4	40.0	4.2	QP	100.0	325.00	VERTICAL
64.920000	29.60	-11.2	40.0	10.4	QP	100.0	190.00	VERTICAL
80.440000	29.20	-15.6	40.0	10.8	QP	100.0	336.00	VERTICAL
97.900000	28.40	-10.8	43.5	15.1	QP	100.0	154.00	VERTICAL
181.320000	34.30	-12.1	43.5	9.2	QP	100.0	228.00	VERTICAL
959.260000	35.60	8.0	46.0	10.4	QP	100.0	91.00	VERTICAL



Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1282.81	39.78	25.97	4.00	36.36	33.39	74.00	-40.61	Peak
2	1875.56	42.58	25.70	4.86	36.98	36.16	74.00	-37.84	Peak
3	2388.81	41.82	27.72	5.53	37.45	37.62	74.00	-36.38	Peak
4	3581.33	38.47	29.36	6.89	36.88	37.84	74.00	-36.16	Peak
5	3980.66	37.75	29.90	7.37	36.41	38.61	74.00	-35.39	Peak
6	4988.86	36.25	31.81	8.80	35.23	41.63	74.00	-32.37	Peak

6. TEST SETUP PHOTOS

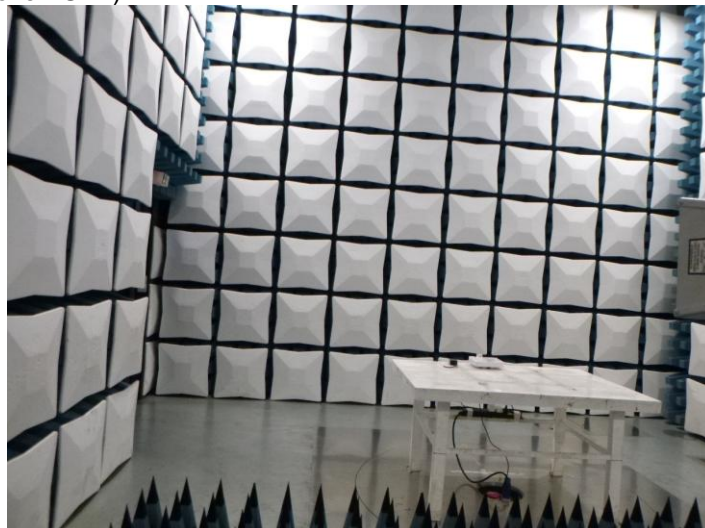
Conducted Emissions (AC Mains)



Radiated Emissions (30MHz-1GHz)



Radiated Emissions (Above 1GHz)



7. **EXTERNAL AND INTERNAL PHOTOS**

Refer to the test report No.: CHTEW22050045

-----End of Report-----