




# TEST REPORT

Report No.....: CHTEW21090044 Report Verification: 

Project No.....: SHT2012019901EW

FCC ID.....: Q9SAWRRP9000N

Applicant's name.....: Northfield Telecommunications, Inc. d/b/a Advanced Wireless Communications

Address.....: 20809 Kensington Blvd. Lakeville MN 55044 United States Of America

Test item description .....: Repeater

Trade Mark .....: AWC

Model/Type reference.....: AWR-RP9000N

Listed Model(s) .....: -

Standard .....: FCC CFR Title 47 Part 15 Subpart B

Date of receipt of test sample.....: May.27, 2021

Date of testing.....: May.28, 2021-Sep.12, 2021

Date of issue.....: Sep.14, 2021

Result.....: PASS

Compiled by

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*Cheng Xiao*

Approved by

(Position-Printed name-Signature) : RF Manager Hans Hu

*Hans Hu*

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:

[FCC CFR Title 47 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

Revision No.	Date of issue	Description
N/A	2021-09-14	Original

## 2. TEST DESCRIPTION

Section	Test Item	Section in CFR 47	Result	Test Engineer
5.1	Conducted Emissions	15.107(a)	Pass	Quanhai Deng
5.2	Radiated Emissions	15.109(a)	Pass	Hongtao Meng

Note:

1. The measurement uncertainty is not included in the test result.

### 3. SUMMARY

#### 3.1. Client information

Applicant:	Northfield Telecommunications, Inc. d/b/a Advanced Wireless Communications
Address:	20809 Kensington Blvd. Lakeville MN 55044 United States Of America
Manufacturer:	Northfield Telecommunications, Inc. d/b/a Advanced Wireless Communications
Address:	20809 Kensington Blvd. Lakeville MN 55044 United States Of America

#### 3.2. Product description

Name of EUT:	Repeater
Trade mark:	AWC
Model/Type reference:	AWR-RP9000N
Listed model(s):	-
Power supply:	DC 12V
Adapter information:	Model: KT241120200US Input: 100-240V, 50/60Hz, 0.8A Output: 12V, 2A
Hardware version:	V4
Software version:	0.01.45

#### 3.3. Radio Specification Description

Support Frequency Range:	450MHz~470MHz		
Rated Output Power:	<input checked="" type="checkbox"/> High Power: 4W		<input checked="" type="checkbox"/> Low Power: 2W
Modulation Type:	Analog:		FM
Channel Separation:	Analog:	<input checked="" type="checkbox"/> 6.25kHz	<input checked="" type="checkbox"/> 12.5kHz
Emission Designator: *3	Analog:	11K0F3E	
Support data rate:	9.6kbps		
Antenna Type:	External		

### 3.4. 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: <a href="mailto:cs@szhtw.com.cn">cs@szhtw.com.cn</a> <a href="http://www.szhtw.com.cn">http://www.szhtw.com.cn</a>	
Qualifications	Type	Accreditation Number
	FCC Test Firm Registration Number	762235
	FCC Designation Number	CN1181

## 4. TEST CONFIGURATION

### 4.1. Operation mode

Test mode	Describe
Receive mode	Keep the EUT in receiving mode.

Receive frequency: 450.0125MHz

Section	Test item	Test mode
5.1	Conducted emissions	Receive mode
5.2	Radiated emissions	Receive mode

### 4.2. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?			
No			
Item	Equipement	Trade Name	Model No.
1			
2			

### 4.3. Testing environmental condition

Type	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

### 4.4. Statement of the measurement uncertainty

Test	Frequency range	Measurement uncertainty
Radiated Emission	30~1000MHz	4.90 dB
Radiated Emission	1~18GHz	4.96 dB
Conducted Disturbance	0.15~30MHz	3.02 dB

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	2020/10/19	2021/10/18
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2020/10/15	2021/10/14
●	Pulse Limiter	R&S	HTWE0033	ESH3-Z2	100499	2020/10/15	2021/10/14
●	RF Connection Cable	HUBER+SUHNER	HTWE0113-02	ENVIROFLEX_142	EF-NM-BNCM-2M	2020/10/15	2021/10/14
●	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	2021/09/29
●	EMI Test Receiver	R&S	HTWE0099	ESCI	100900	2020/10/19	2021/10/18
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0119	VULB9163	546	2020/04/28	2023/04/27
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	N/A	2020/11/13	2021/11/12
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-01	N/A	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-02	SUCOFLEX104	501184/4	2021/02/26	2022/02/25
●	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	N/A	2018/09/27	2021/09/26
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2020/10/20	2021/10/19
●	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2021/03/05	2022/03/04
●	RF Connection Cable	HUBER+SUHNER	HTWE0121-01	RE-7-FH	N/A	2021/05/09	2022/05/08
●	Test Software	Audix	N/A	E3	N/A	N/A	N/A



## 5. TEST CONDITIONS AND RESULTS

### 5.1. Conducted Emissions

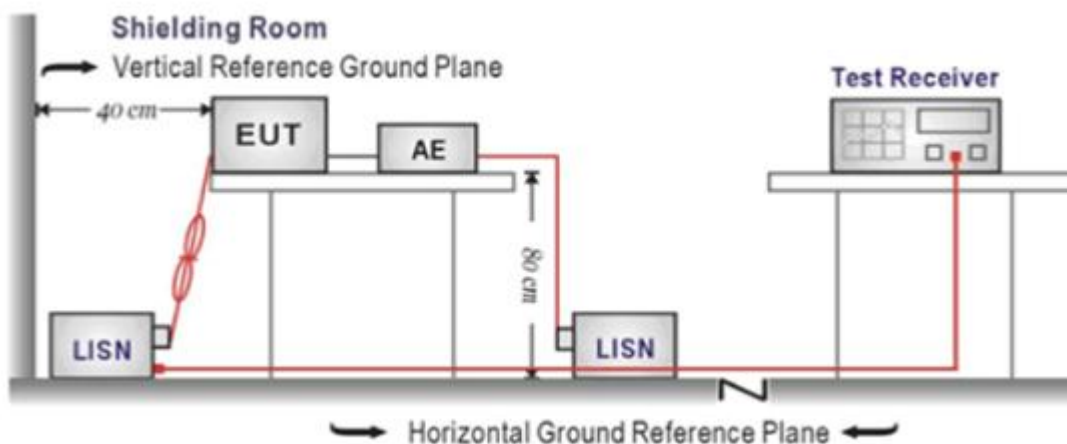
#### LIMIT

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
2. The EUT was placed on a plat form of nominal size, 1 m by 1.5 m, raised 10 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 10 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:

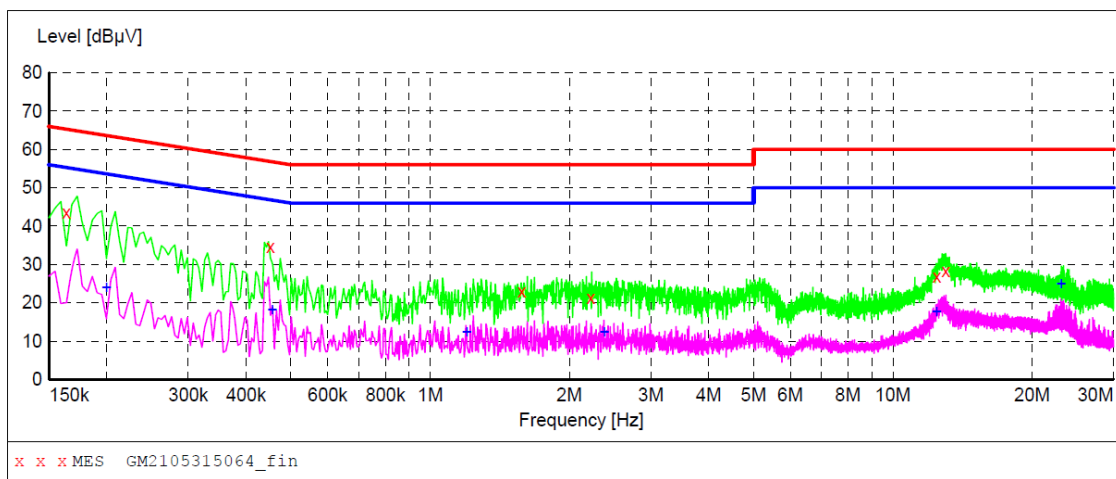
Please refer to the clause 4.1

#### TEST RESULTS

☒ Passed ☐ Not Applicable

Test Line:

L

**MEASUREMENT RESULT: "GM2105315064\_fin"**

5/31/2021 7:06PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.163500	43.60	10.2	65	21.7	QP	L1	GND
0.451500	34.70	10.2	57	22.1	QP	L1	GND
1.576500	23.10	10.2	56	32.9	QP	L1	GND
2.220000	21.30	10.2	56	34.7	QP	L1	GND
12.435000	26.80	10.4	60	33.2	QP	L1	GND
13.006500	28.30	10.4	60	31.7	QP	L1	GND

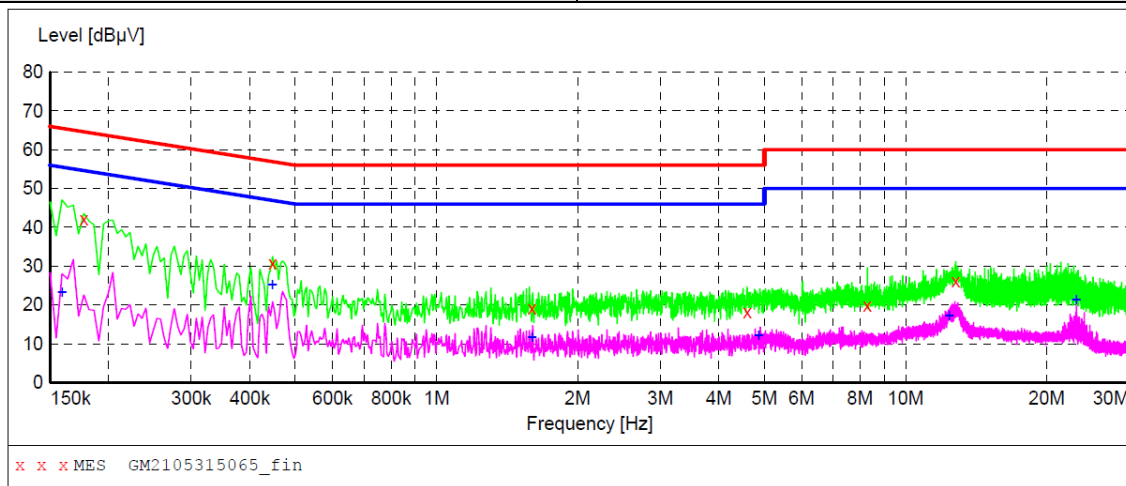
**MEASUREMENT RESULT: "GM2105315064\_fin2"**

5/31/2021 7:06PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.199500	23.90	10.2	54	29.7	AV	L1	GND
0.456000	18.20	10.2	47	28.6	AV	L1	GND
1.198500	12.30	10.2	46	33.7	AV	L1	GND
2.377500	12.50	10.2	46	33.5	AV	L1	GND
12.417000	17.70	10.4	50	32.3	AV	L1	GND
23.127000	24.90	10.5	50	25.1	AV	L1	GND

Test Line:

N

**MEASUREMENT RESULT: "GM2105315065\_fin"**

5/31/2021 7:10PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.177000	42.10	10.2	65	22.5	QP	N	GND
0.447000	30.80	10.2	57	26.1	QP	N	GND
1.599000	19.10	10.2	56	36.9	QP	N	GND
4.596000	18.10	10.2	56	37.9	QP	N	GND
8.290500	19.80	10.4	60	40.2	QP	N	GND
12.790500	26.20	10.4	60	33.8	QP	N	GND

**MEASUREMENT RESULT: "GM2105315065\_fin2"**

5/31/2021 7:10PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.159000	23.30	10.2	56	32.2	AV	N	GND
0.447000	25.10	10.2	47	21.8	AV	N	GND
1.599000	11.60	10.2	46	34.4	AV	N	GND
4.857000	12.10	10.2	46	33.9	AV	N	GND
12.385500	17.20	10.4	50	32.8	AV	N	GND
23.127000	21.20	10.5	50	28.8	AV	N	GND

## 5.2. Radiated Emissions

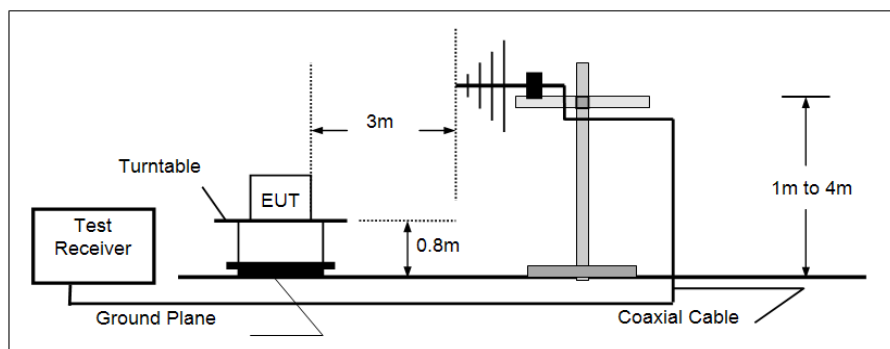
### LIMIT

#### FCC CFR Title 47 Part 15 Subpart B Section 15.109

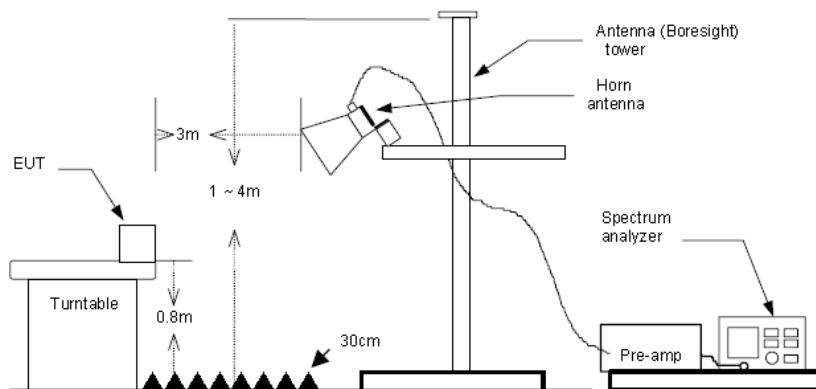
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

### TEST CONFIGURATION

#### ➤ 30MHz ~ 1GHz



#### ➤ Above 1GHz



### TEST PROCEDURE

1. The EUT was tested according to ANSI C63.4.
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:**

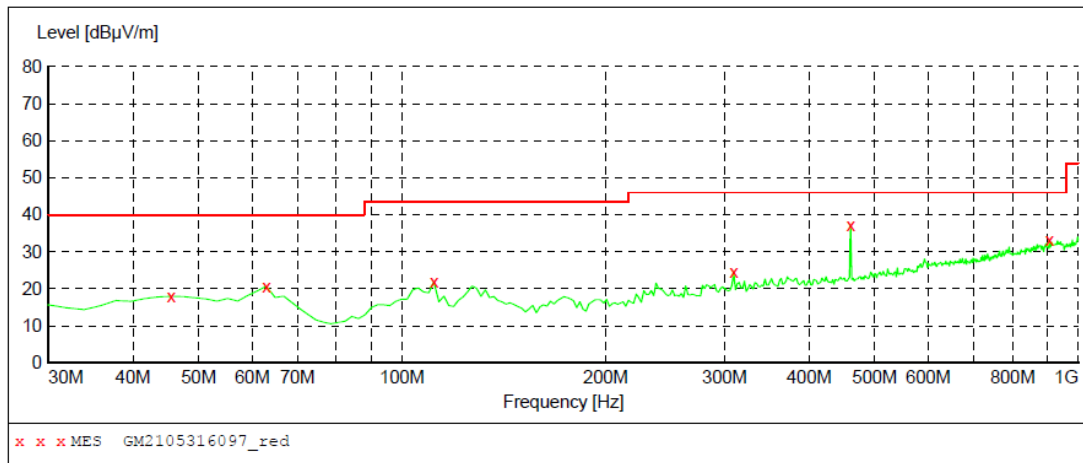
Please refer to the clause 4.1

**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.

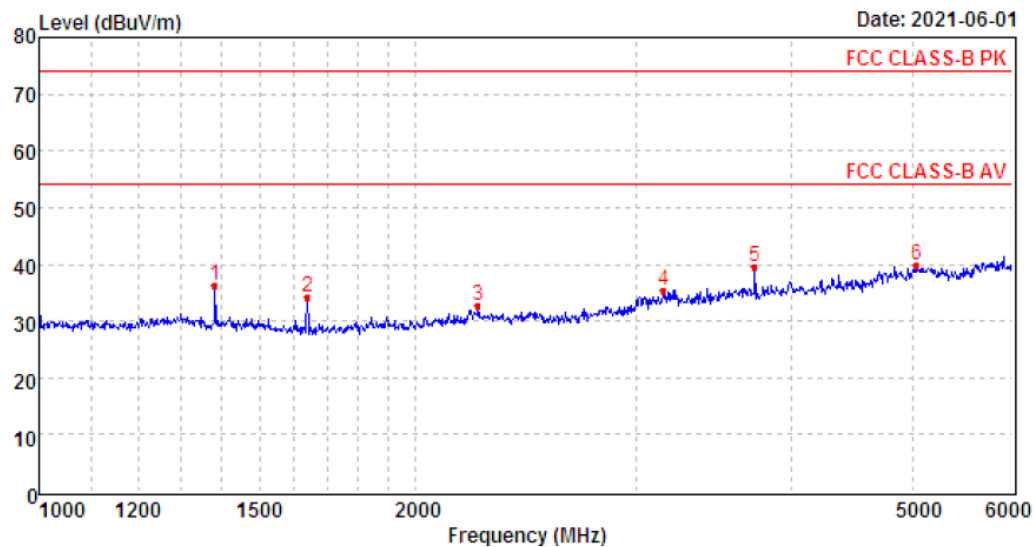
Test mode	Charging mode	Polarization:	Horizontal
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### MEASUREMENT RESULT: "GM2105316097\_red"

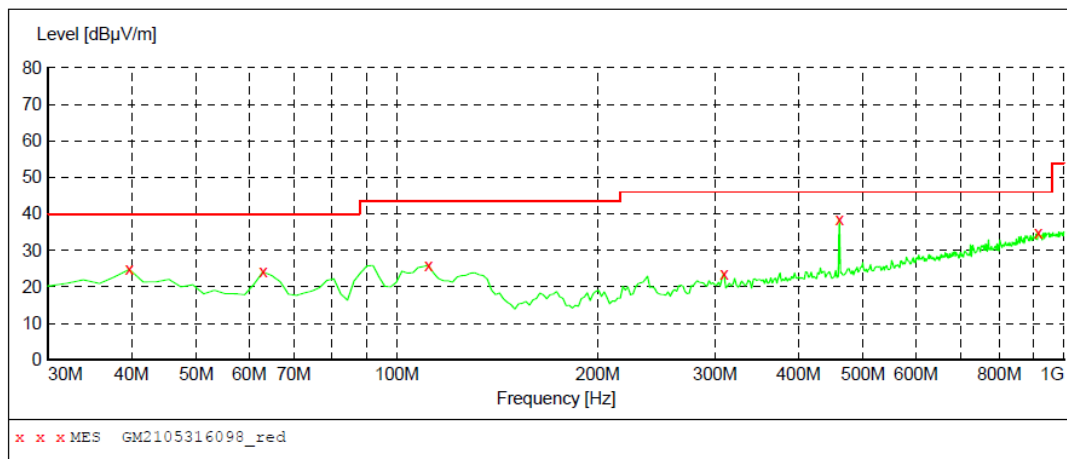
5/31/2021 9:30PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	18.00	-8.9	40.0	22.0	QP	300.0	63.00	HORIZONTAL
62.980000	20.70	-10.8	40.0	19.3	QP	300.0	154.00	HORIZONTAL
111.480000	21.80	-11.1	43.5	21.7	QP	300.0	193.00	HORIZONTAL
309.360000	24.70	-7.0	46.0	21.3	QP	100.0	154.00	HORIZONTAL
460.680000	37.10	-2.9	46.0	8.9	QP	100.0	351.00	HORIZONTAL
906.880000	33.10	7.2	46.0	12.9	QP	100.0	0.00	HORIZONTAL



Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1383.07	41.03	26.17	5.52	36.50	36.22	74.00	-37.78	Peak
2	1639.72	40.24	25.16	6.01	37.19	34.22	74.00	-39.78	Peak
3	2243.60	34.79	28.11	7.22	37.42	32.70	74.00	-41.30	Peak
4	3159.17	34.75	28.98	8.69	37.15	35.27	74.00	-38.73	Peak
5	3732.00	37.35	29.46	9.81	37.13	39.49	74.00	-34.51	Peak
6	5033.76	31.45	32.10	11.52	35.33	39.74	74.00	-34.26	Peak

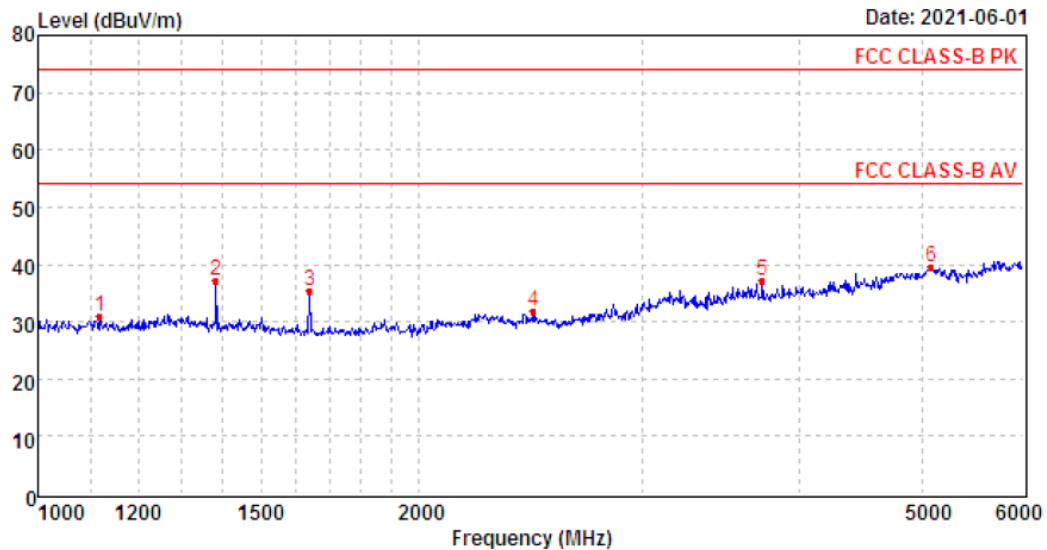
Test mode	Charging mode	Polarization:	Vertical
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### MEASUREMENT RESULT: "GM2105316098\_red"

5/31/2021 9:33PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
39.700000	24.80	-10.0	40.0	15.2	QP	100.0	82.00	VERTICAL
62.980000	24.10	-10.8	40.0	15.9	QP	100.0	323.00	VERTICAL
111.480000	26.00	-11.1	43.5	17.5	QP	100.0	211.00	VERTICAL
309.360000	23.70	-7.0	46.0	22.3	QP	100.0	55.00	VERTICAL
460.680000	38.40	-2.9	46.0	7.6	QP	100.0	94.00	VERTICAL
914.640000	34.90	7.5	46.0	11.1	QP	100.0	188.00	VERTICAL

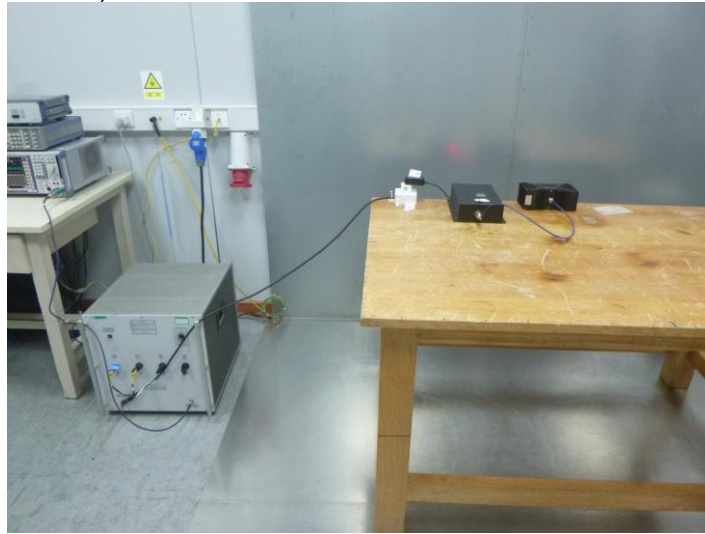


Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1119.50	37.36	25.40	4.99	36.85	30.90	74.00	-43.10	Peak
2	1383.07	41.87	26.17	5.52	36.50	37.06	74.00	-36.94	Peak
3	1639.72	41.49	25.16	6.01	37.19	35.47	74.00	-38.53	Peak
4	2462.69	33.77	27.47	7.80	37.27	31.77	74.00	-42.23	Peak
5	3732.00	34.89	29.46	9.81	37.13	37.03	74.00	-36.97	Peak
6	5079.06	31.41	32.20	11.46	35.44	39.63	74.00	-34.37	Peak

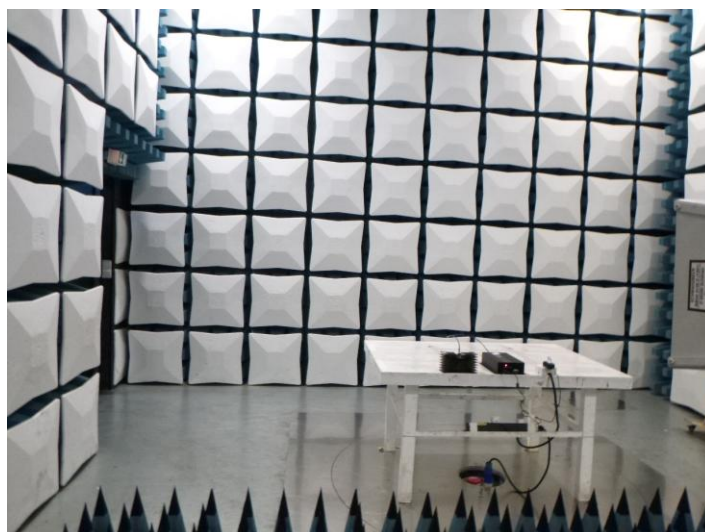


## 6. TEST SETUP PHOTOS OF THE EUT

### Conducted Emissions (AC Mains)



### Radiated Emissions





## **7. EXTERNAL AND INTERNAL PHOTOS OF THE EUT**

Refer to the test report No.: CHTEW21090043

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