




TEST REPORT

Report No. : **CHTEW21100007** **Report Verification:** 

Project No. : **SHT2107003404EW**

FCC ID : **2AYEZ-TE620**

Applicant's name : **Telo Communication (Shenzhen) Co., Ltd**

Address : **6/F, No.42 Liuxian 1st Road, Bao'an District, Shenzhen, China**

Test item description : **TE620**

Trade Mark : **TELOX, Telo Systems**

Model/Type reference : **TE620**

Listed Model(s) : **TELOX-TE620, Telo-TE620, TE620A, TE620B, TE620C, TE620D, TE620E, TE620F, TE620G, TE620H, TE620J, TE620K, TE620L, TE620M, TE620Q, TE620R, TE620S, TE620T, TE620U, TE620V, TE620X, TE620Y**

Standard : **FCC CFR Title 47 Part 15 Subpart E Section 15.407**

Date of receipt of test sample : **Sep. 10, 2021**

Date of testing : **Sep. 11, 2021- Oct. 08, 2021**

Date of issue : **Oct. 09, 2021**

Result : **PASS**

Compiled by
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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 correspond 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 Rules Part 15.407](#): General technical requirements.
- [ANSI C63.10:2013](#): American National Standard for Testing Unlicensed Wireless Devices
- [KDB789033 D02 v02r01](#): GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E

1.2. Report version

Revision No.	Date of issue	Description
N/A	2021-10-09	We have spot check test on the product, and the result have no major different from the value in the module report, which meets the requirements of reference module certification from KDB 484596.

2. TEST DESCRIPTION

Report clause	Test Items	Standard Requirement	Result
5.1	Antenna Requirement	15.203/15.247(c)	PASS*
5.2	AC Conducted Emission	15.207	PASS
5.3	Maximum Conducted Output Power	15.407(a)	PASS*
5.4	Maximum Power Spectral Density	15.407(a)	PASS*
5.5	26dB Bandwidth and 99% Occupancy bandwidth	15.407(a)	PASS*
5.6	6dB Bandwidth	15.407(a)	PASS*
5.7	Band edge	15.407(b)	PASS
5.8	Radiated Spurious Emissions	15.209	PASS
5.9	Frequency Stability	15.407(g)	PASS*

Note:

- The measurement uncertainty is not included in the test result.
- * reference to module report , which FCC ID is XMR202005SC200RNA

3. SUMMARY

3.1. Client Information

Applicant:	Telo Communication (Shenzhen) Co., Ltd
Address:	6/F, No.42 Liuxian 1st Road, Bao'an District, Shenzhen, China
Manufacturer:	Telo Communication (Shenzhen) Co., Ltd
Address:	6/F, No.42 Liuxian 1st Road, Bao'an District, Shenzhen, China

3.2. Product Description

Name of EUT:	TE620
Trade Mark:	TELOX, Telo Systems
Model No.:	TE620
Listed Model(s):	TELOX-TE620, Telo-TE620, TE620A, TE620B, TE620C, TE620D, TE620E, TE620F, TE620G, TE620H, TE620J, TE620K, TE620L, TE620M, TE620Q, TE620R, TE620S, TE620T, TE620U, TE620V, TE620X, TE620Y
Power supply:	DC 3.8V
Hardware version:	TE620 V2.2
Software version:	TE620_INT_V7_20210902

3.3. Radio Specification Description

Support type ^{*1}	<input checked="" type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input checked="" type="checkbox"/> 802.11n(HT40)
Function:	<input type="checkbox"/> Outdoor AP	<input type="checkbox"/> Indoor AP	<input type="checkbox"/> Fixed P2P
	<input checked="" type="checkbox"/> Client		
Modulation:	BPSK, QPSK, 16QAM, 64QAM		
Operation frequency:	<input checked="" type="checkbox"/> Band I: 5150MHz~5250MHz		
	<input checked="" type="checkbox"/> Band IV: 5725MHz~5850MHz		
Channel number:	6 for 802.11a/802.11n(HT20) 4 for 802.11n(HT40)		
Supported Bandwidth	20MHz: 802.11n, 802.11a		
	40MHz: 802.11n		
Antenna type:	PIFA Antenna		
Antenna gain:	0.3dBi		

Note:

*1: only show the RF function associated with this report.

*2: The module supports UNII Band 2A, UNII Band 2C, and the device does not require testing but software to disable them.

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:	Phone: 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. Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channels which were tested. The Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the below .

Band	Test Channel	20MHz		40MHz	
		Channel	Frequency (MHz)	Channel	Frequency (MHz)
I	CH _L	36	5180	38	5190
	CH _M	44	5220	-	-
	CH _H	48	5240	46	5230
IV	CH _L	149	5745	151	5755
	CH _M	157	5785	-	-
	CH _H	165	5825	159	5795

4.2. Descriptions of Test mode

Preliminary tests were performed in different data rates, final test modes are considering the modulation and worse data rates as below table.

Modulation	Data rate
802.11a	6Mbps
802.11n(HT20)	MCS0
802.11n(HT40)	MCS0

4.3. Test mode

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit.
For AC power line conducted emissions:
The EUT was set to connect with the WLAN AP under large package sizes transmission.
For Radiated spurious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data Recorded in the report.

4.4. 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.	FCC ID	Power cord
1					
2					

4.5. Testing environmental condition

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

4.6. Measurement uncertainty

Test Item	Measurement Uncertainty
AC Conducted Emission (150kHz~30MHz)	3.02 dB
Radiated Emission (30MHz~1000MHz)	4.90 dB
Radiated Emissions (1GHz~25GHz)	4.96 dB
Peak Output Power	0.51 dB
Power Spectral Density	0.51 dB
Conducted Spurious Emission	0.51 dB
6dB Bandwidth	70 Hz
Frequency error	70 Hz

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

4.7. Equipment 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	2021/9/13	2022/9/12
●	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2021/9/13	2022/9/12
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2021/9/13	2022/9/12
●	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	2021/9/13	2022/9/12
●	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	2021/9/14	2022/9/13
●	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/04/06	2022/04/05
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0123	VULB9163	538	2021/04/06	2022/04/05
●	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	2022/09/26
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2021/9/13	2022/9/12
●	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
●	Broadband Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2020/4/27	2023/4/27
●	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2020/11/13	2021/11/12
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2021/03/05	2022/03/04
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-03	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0121-01	6m 18GHz S Serisa	N/A	2021/02/26	2022/02/25
●	Test Software	Audix	N/A	E3	N/A	N/A	N/A

● RF Conducted Method						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal and spectrum Analyzer	R&S	FSV40	100048	2020/10/19	2021/10/18
●	Spectrum Analyzer	Agilent	N9020A	MY50510187	2020/10/19	2021/10/18
●	Power Meter	Anritsu	ML249A	N/A	2020/10/19	2021/10/18
○	Radio communication tester	R&S	CMW500	137688-Lv	2020/10/19	2021/10/18

5. TEST CONDITIONS AND RESULTS

5.1. Antenna Requirement

Requirement

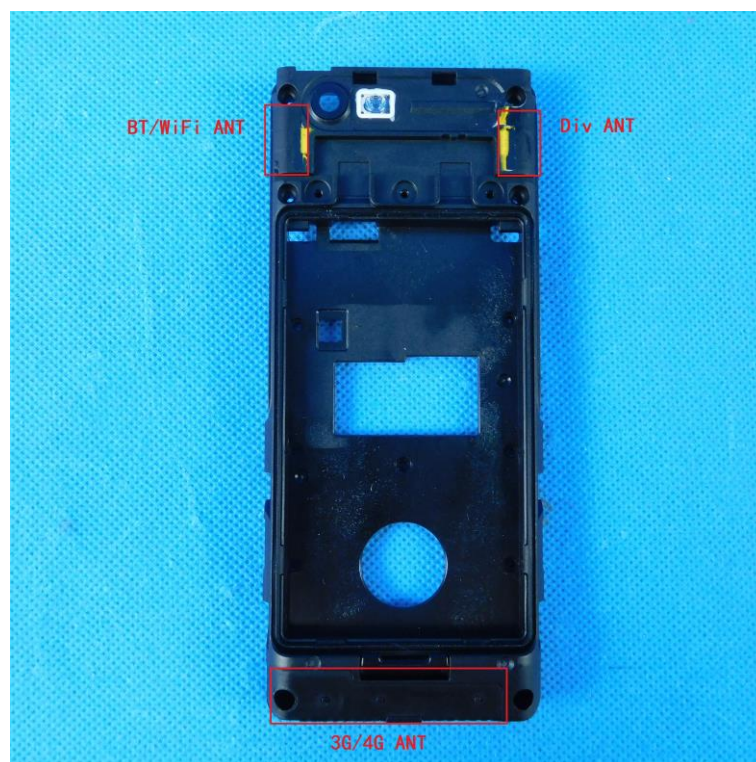
FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

TEST RESULT

☒ **Passed** ☐ **Not Applicable**

The antenna type is a PIFA antenna, the directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



5.2. AC Conducted Emission

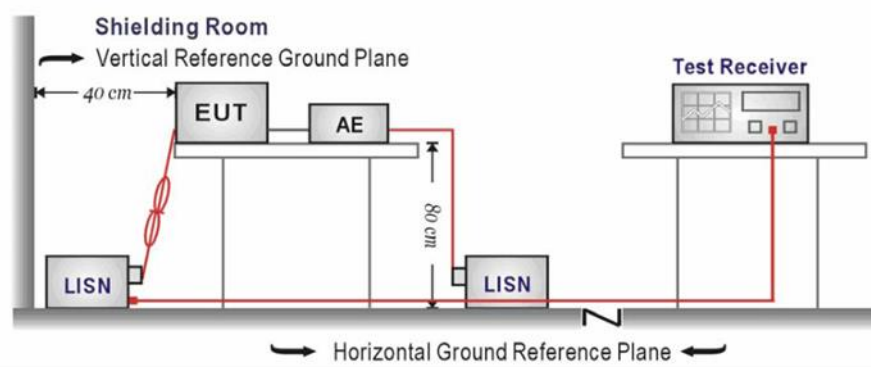
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

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 C63.10 requirements.
2. The EUT was placed on a platform 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 impedances stabilization network (LISN). The LISN provides a 50 ohm /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:

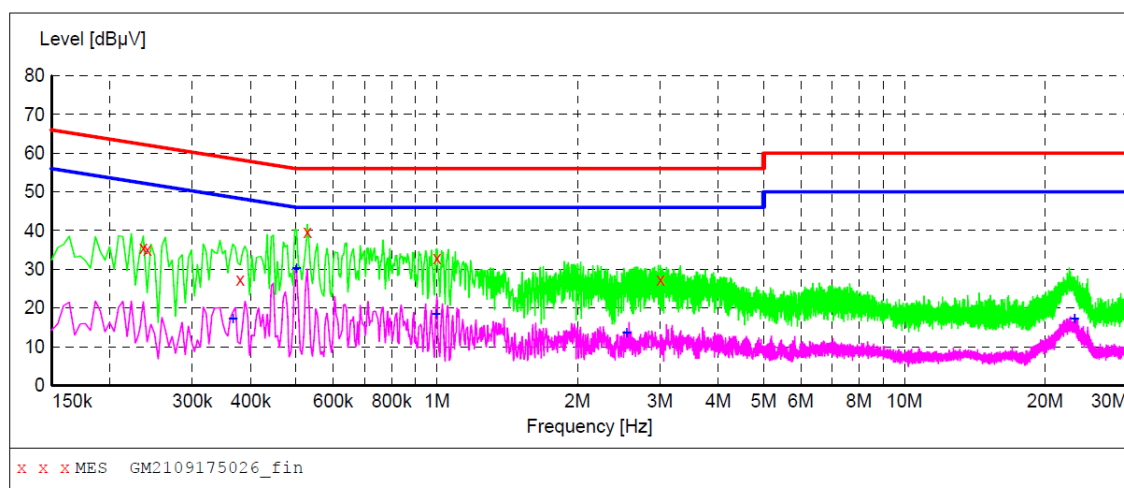
Please refer to the clause 4.3

TEST RESULT

☒ Passed ☐ Not Applicable

Test Line:

L

**MEASUREMENT RESULT: "GM2109175026_fin"**

9/17/2021 10:41AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.235500	35.50	10.2	62	26.8	QP	L1	GND
0.240000	35.00	10.2	62	27.1	QP	L1	GND
0.379500	27.30	10.2	58	31.0	QP	L1	GND
0.528000	39.80	10.2	56	16.2	QP	L1	GND
1.000500	32.90	10.2	56	23.1	QP	L1	GND
3.012000	27.30	10.2	56	28.7	QP	L1	GND

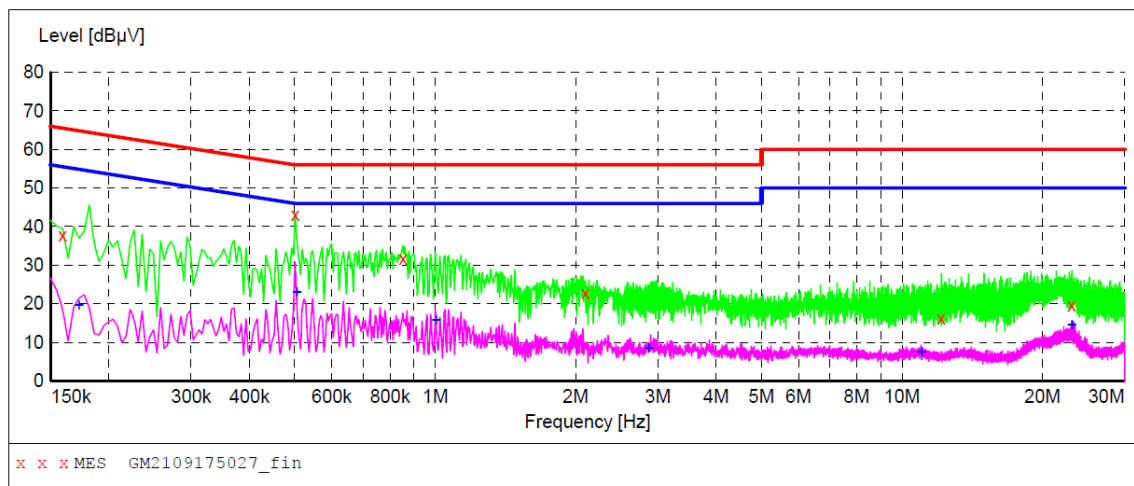
MEASUREMENT RESULT: "GM2109175026_fin2"

9/17/2021 10:41AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.366000	17.10	10.2	49	31.5	AV	L1	GND
0.501000	30.20	10.2	46	15.8	AV	L1	GND
0.996000	18.50	10.2	46	27.5	AV	L1	GND
2.548500	13.50	10.2	46	32.5	AV	L1	GND
23.140500	17.30	10.3	50	32.7	AV	L1	GND

Test Line:

N

**MEASUREMENT RESULT: "GM2109175027_fin"**

9/17/2021 10:44AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.159000	37.80	10.2	66	27.7	QP	N	GND
0.501000	43.00	10.2	56	13.0	QP	N	GND
0.852000	31.80	10.2	56	24.2	QP	N	GND
2.098500	22.80	10.2	56	33.2	QP	N	GND
12.142500	16.30	10.3	60	43.7	QP	N	GND
23.095500	19.60	10.3	60	40.4	QP	N	GND

MEASUREMENT RESULT: "GM2109175027_fin2"

9/17/2021 10:44AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.172500	19.70	10.2	55	35.1	AV	N	GND
0.505500	23.00	10.2	46	23.0	AV	N	GND
1.005000	15.70	10.2	46	30.3	AV	N	GND
2.868000	8.40	10.2	46	37.6	AV	N	GND
11.013000	7.40	10.3	50	42.6	AV	N	GND
23.140500	14.50	10.3	50	35.5	AV	N	GND

5.3. Band edge

LIMIT

FCC CFR Title 47 Part 15 Subpart E Section 15.407(b)

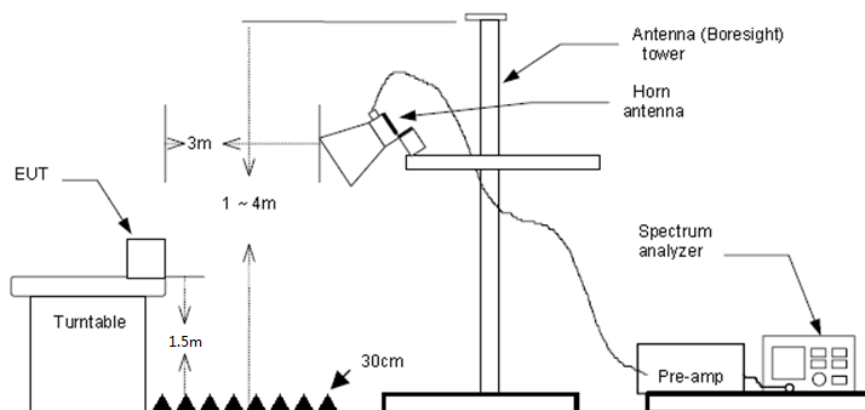
Un-restricted band emissions above 1GHz			
Operating Band	Frequency	EIRP Limit	Value
5150-5250MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
5250-5350MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
5470-5725MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
5725-5850 MHz	1GHz-5.65GHz	-27 dBm/MHz(68.2dBuV/m)@3m	Peak
	5.65GHz-5.7GHz	-27*dBm/MHz to 10dBm/MHz (68.2* dBuV/m to 105.6dBuV/m)	Peak
	5.7GHz-5.72GHz	10*dBm/MHz to 15.6dBm/MHz (105.6*dBuV/m to 110.8dBuV/m)	Peak
	5.72GHz-5.725GHz	15.6*dBm/MHz to 27dBm/MHz (110.8dBuV/m to* 122.2dBuV/m)	Peak
	5.85GHz-5.855GHz	27dBm/MHz to 15.6*dBm/MHz (122.2dBuV/m to110.8* dBuV/m)	Peak
	5.855GHz-5.875GHz	15.6dBm/MHz to 10*dBm/MHz (110.8dBuV/m to 105.6* dBuV/m)	Peak
	5.875GHz-5.925GHz	10dBm/MHz to -27*dBm/MHz (105.6dBuV/m to 68.2* dBuV/m)	Peak
	Above 5.925GHz	-27 dBm/MHz(68.2dBuV/m)@3m	Peak

* Increase/Decreases with the linearly of the frequency.

For emission above 1GHz and in restricted band, according to FCC KDB 789033 D02 General UNII Test Procedure, all emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit. $E[dBuV/m] = EIRP[dBm] + 95.2$, for $d = 3$ meters.

TEST CONFIGURATION

Radiated:



TEST MODE:

Please refer to the clause 4.3

TEST RESULTS

☒ Passed ☐ Not Applicable

Radiated Band Edge Test Data

Mode	a		Frequency		5180			Polarity		Horizontal	
<div><div>Mark</div><div>Frequency</div><div>MHz</div><div>1</div><div>5112.24</div><div>41.29</div><div>32.15</div><div>8.95</div><div>35.47</div><div>10.00</div><div>56.92</div><div>68.20</div><div>-11.28</div><div>Peak</div></div> <div><div>2</div><div>5150.07</div><div>44.74</div><div>32.00</div><div>8.96</div><div>35.44</div><div>10.00</div><div>60.26</div><div>68.20</div><div>-7.94</div><div>Peak</div></div>											
<div><div>Mark</div><div>Frequency</div><div>MHz</div><div>1</div><div>5127.70</div><div>27.19</div><div>32.09</div><div>8.96</div><div>35.46</div><div>10.00</div><div>42.78</div><div>54.00</div><div>-11.22</div><div>Average</div></div> <div><div>2</div><div>5150.07</div><div>27.53</div><div>32.00</div><div>8.96</div><div>35.44</div><div>10.00</div><div>43.05</div><div>54.00</div><div>-10.95</div><div>Average</div></div>											

Mode	a		Frequency		5180			Polarity		Vertical	
<div><div>Mark</div><div>Frequency</div><div>MHz</div><div>1</div><div>5146.64</div><div>48.03</div><div>32.01</div><div>8.96</div><div>35.45</div><div>10.00</div><div>63.55</div><div>68.20</div><div>-4.65</div><div>Peak</div></div> <div><div>2</div><div>5150.07</div><div>47.09</div><div>32.00</div><div>8.96</div><div>35.44</div><div>10.00</div><div>62.61</div><div>68.20</div><div>-5.59</div><div>Peak</div></div>											
<div><div>Mark</div><div>Frequency</div><div>MHz</div><div>1</div><div>5127.70</div><div>28.09</div><div>32.09</div><div>8.96</div><div>35.46</div><div>10.00</div><div>43.68</div><div>54.00</div><div>-10.32</div><div>Average</div></div> <div><div>2</div><div>5150.07</div><div>28.63</div><div>32.00</div><div>8.96</div><div>35.44</div><div>10.00</div><div>44.15</div><div>54.00</div><div>-9.85</div><div>Average</div></div>											

Mode	a		Frequency		5320			Polarity		Horizontal	
<div><div>Mark</div><div>Frequency</div><div>MHz</div><div>1</div><div>5349.93</div><div>41.80</div><div>31.50</div><div>9.45</div><div>35.37</div><div>10.00</div><div>57.38</div><div>68.20</div><div>-10.82</div><div>Peak</div></div> <div><div>2</div><div>5352.30</div><div>42.77</div><div>31.51</div><div>9.44</div><div>35.36</div><div>10.00</div><div>58.36</div><div>68.20</div><div>-9.84</div><div>Peak</div></div>											
<div><div>Mark</div><div>Frequency</div><div>MHz</div><div>1</div><div>5349.93</div><div>27.02</div><div>31.50</div><div>9.45</div><div>35.37</div><div>10.00</div><div>42.60</div><div>54.00</div><div>-11.40</div><div>Average</div></div> <div><div>2</div><div>5372.27</div><div>26.78</div><div>31.59</div><div>9.42</div><div>35.29</div><div>10.00</div><div>42.50</div><div>54.00</div><div>-11.50</div><div>Average</div></div>											

Mode	a		Frequency		5320			Polarity		Vertical	
<div><div>Mark</div><div>Frequency</div><div>MHz</div><div>1</div><div>5349.93</div><div>45.54</div><div>31.50</div><div>9.45</div><div>35.37</div><div>10.00</div><div>61.12</div><div>68.20</div><div>-7.08</div><div>Peak</div></div> <div><div>2</div><div>5354.49</div><div>48.19</div><div>31.52</div><div>9.44</div><div>35.36</div><div>10.00</div><div>63.79</div><div>68.20</div><div>-4.41</div><div>Peak</div></div>											
<div><div>Mark</div><div>Frequency</div><div>MHz</div><div>1</div><div>5349.93</div><div>28.51</div><div>31.50</div><div>9.45</div><div>35.37</div><div>10.00</div><div>44.09</div><div>54.00</div><div>-9.91</div><div>Average</div></div> <div><div>2</div><div>5372.44</div><div>27.51</div><div>31.59</div><div>9.42</div><div>35.29</div><div>10.00</div><div>43.23</div><div>54.00</div><div>-10.77</div><div>Average</div></div>											

Band: IV			Worst mode: 802.11a					Test channel: CH _L		
Frequency (MHz)	Read Level	Antenna Factor	Cable Loss (dB)	Preamplifier Factor	Aux Factor	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit	Test value	Polarization
5650.00	38.20	31.90	9.48	34.99	10.00	54.59	68.20	-13.61	Vertical	Peak
5699.96	39.56	31.90	9.53	34.91	10.00	56.08	105.20	-49.12	Vertical	Peak
5719.96	48.15	31.90	9.55	34.88	10.00	64.72	110.80	-46.08	Vertical	Peak
5650.00	38.44	31.90	9.48	34.99	10.00	54.83	68.20	-13.37	Horizontal	Peak
5699.96	38.37	31.90	9.53	34.91	10.00	54.89	105.20	-50.31	Horizontal	Peak
5719.67	51.03	31.90	9.55	34.88	10.00	67.60	110.80	-43.20	Horizontal	Peak

Band: IV			Worst mode: 802.11a					Test channel: CH _H		
Frequency (MHz)	Read Level	Antenna Factor	Cable Loss (dB)	Preamplifier Factor	Aux Factor	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit	Test value	Polarization
5855.08	41.48	32.21	9.59	34.91	10.00	58.37	110.80	-52.43	Vertical	Peak
5875.04	38.77	32.25	9.58	34.97	10.00	55.63	105.20	-49.57	Vertical	Peak
5924.99	38.74	32.35	9.58	35.04	10.00	55.63	68.20	-12.57	Vertical	Peak
5855.08	37.83	32.21	9.59	34.91	10.00	54.72	110.80	-56.08	Horizontal	Peak
5875.04	37.01	32.25	9.58	34.97	10.00	53.87	105.20	-51.33	Horizontal	Peak
5924.99	37.84	32.35	9.58	35.04	10.00	54.73	68.20	-13.47	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Test 802.11a, 802.11n mode, all modulations have been tested, only worst case is reported

5.4. Radiated Spurious Emissions

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209 and Part 15 Subpart E Section 15.407

Frequency	Limit (dBuV/m)	Value
0.009 MHz ~0.49 MHz	2400/F(kHz) @300m	Quasi-peak
0.49 MHz ~ 1.705 MHz	24000/F(kHz) @30m	Quasi-peak
1.705 MHz ~30 MHz	30 @30m	Quasi-peak

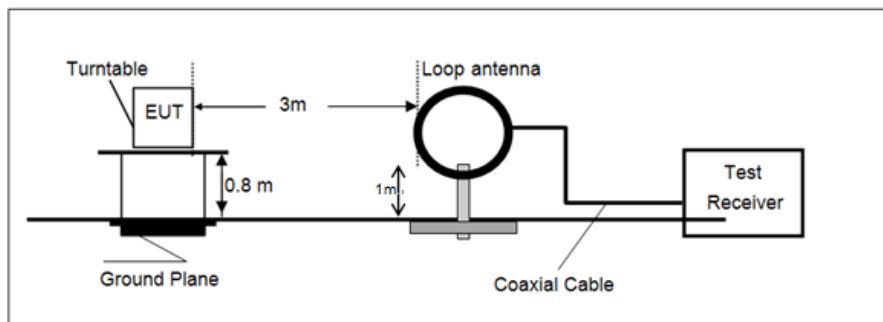
Note: Limit dBuV/m @3m = Limit dBuV/m @300m + 40*log(300/3)= Limit dBuV/m @300m +80,

Limit dBuV/m @3m = Limit dBuV/m @30m +40*log(30/3)= Limit dBuV/m @30m + 40.

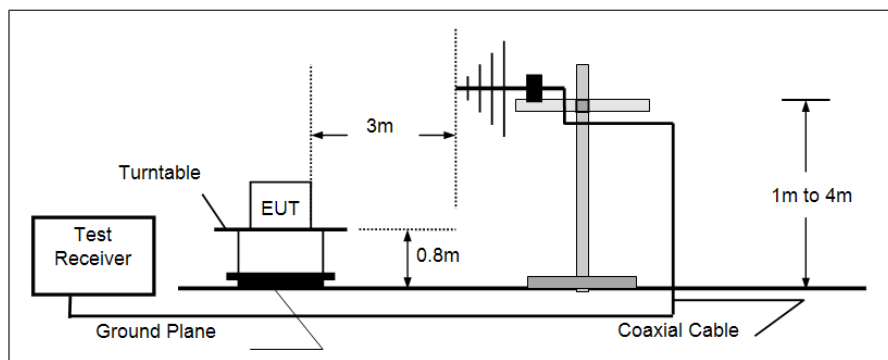
Unwanted emissions below 1GHz and Restricted band emissions above 1GHz		
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

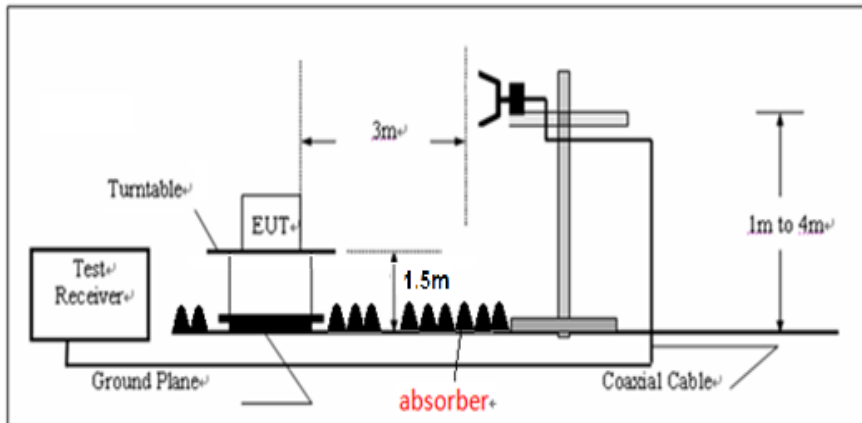
- 9KHz ~30MHz



- 30MHz ~ 1GHz



➤ Above 1GHz

**TEST PROCEDURE**

1. The EUT was setup and tested according to ANSI C63.10:2013
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
 - a) Span shall wide enough to fully capture the emission being measured;
 - b) Below 1 GHz:
RBW=120 kHz, VBW=300 kHz, 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.
 - c) From 1 GHz to 10th harmonic:
RBW=1MHz, VBW=3MHz Peak detector for Peak value.
RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 4.3

TEST RESULT

☒ Passed ☐ Not Applicable

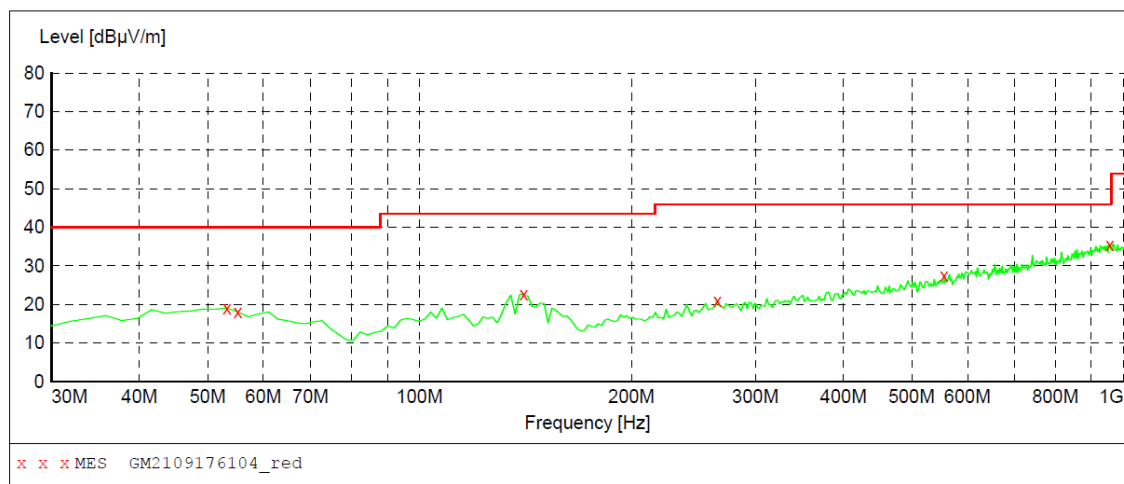
TEST Data**TEST DATA FOR 9 kHz ~ 30 MHz**

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

TEST DATA FOR 30MHz-1GHz

Polarization:

Horizontal

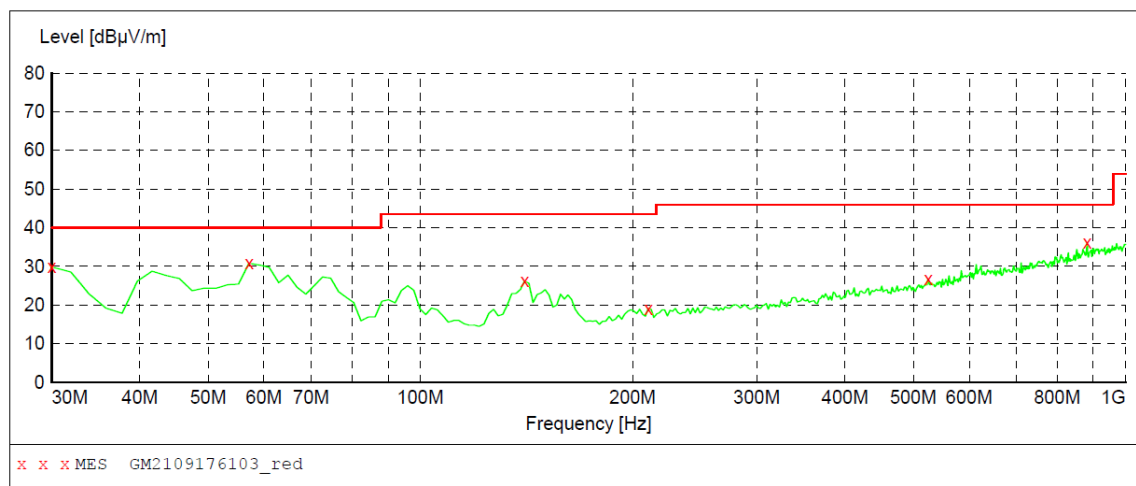
**MEASUREMENT RESULT: "GM2109176104_red"**

9/17/2021 5:42PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
53.280000	19.10	-8.9	40.0	20.9	QP	100.0	355.00	HORIZONTAL
55.220000	18.10	-9.1	40.0	21.9	QP	100.0	69.00	HORIZONTAL
140.580000	22.70	-14.1	43.5	20.8	QP	100.0	302.00	HORIZONTAL
264.740000	21.00	-7.8	46.0	25.0	QP	100.0	254.00	HORIZONTAL
555.740000	27.40	-0.2	46.0	18.6	QP	100.0	81.00	HORIZONTAL
955.380000	35.50	7.9	46.0	10.5	QP	100.0	81.00	HORIZONTAL

Polarization:

Vertical

**MEASUREMENT RESULT: "GM2109176103_red"**

9/17/2021 5:40PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	29.90	-12.4	40.0	10.1	QP	100.0	95.00	VERTICAL
57.160000	30.80	-9.4	40.0	9.2	QP	100.0	254.00	VERTICAL
140.580000	26.20	-14.1	43.5	17.3	QP	100.0	95.00	VERTICAL
210.420000	19.10	-10.5	43.5	24.4	QP	100.0	168.00	VERTICAL
524.700000	26.70	-1.0	46.0	19.3	QP	100.0	351.00	VERTICAL
881.660000	36.10	7.0	46.0	9.9	QP	100.0	328.00	VERTICAL

Remark:

Transd=Cable lose+ Antenna factor- Pre-amplifier; Margin=Limit -Level

TEST DATA FOR Above 1GHz

Band: I		Worst mode: 802.11a			Test channel: CH _L		
Frequency (MHz)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Factor (dB)	Test value	Polarization
2457.00	23.67	21.43	74.00	52.57	-2.24	Vertical	Peak
4663.06	27.95	34.10	74.00	39.90	6.15	Vertical	Peak
7381.72	28.44	43.75	74.00	30.25	15.31	Vertical	Peak
9628.91	30.46	47.58	74.00	26.42	17.12	Vertical	Peak
1298.16	22.32	16.75	74.00	57.25	-5.57	Horizontal	Peak
4182.78	28.12	31.84	74.00	42.16	3.72	Horizontal	Peak
7170.22	27.08	41.90	74.00	32.10	14.82	Horizontal	Peak
9286.69	28.40	46.16	74.00	27.84	17.76	Horizontal	Peak

Band: I		Worst mode: 802.11a			Test channel: CH _M		
Frequency (MHz)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Factor (dB)	Test value	Polarization
1248.22	23.07	17.37	74.00	56.63	-5.70	Vertical	Peak
4156.34	27.19	30.76	74.00	43.24	3.57	Vertical	Peak
6761.91	29.11	42.41	74.00	31.59	13.30	Vertical	Peak
9082.53	28.72	45.41	74.00	28.59	16.69	Vertical	Peak
1449.44	20.93	15.33	74.00	58.67	-5.60	Horizontal	Peak
4560.25	27.01	32.61	74.00	41.39	5.60	Horizontal	Peak
6231.69	27.29	38.21	74.00	35.79	10.92	Horizontal	Peak
9054.63	29.09	45.80	74.00	28.20	16.71	Horizontal	Peak

Band: I		Worst mode: 802.11a			Test channel: CH _H		
Frequency (MHz)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Factor (dB)	Test value	Polarization
1417.13	21.67	16.08	74.00	57.92	-5.59	Vertical	Peak
2222.00	23.37	20.54	74.00	53.46	-2.83	Vertical	Peak
5185.94	26.85	35.80	74.00	38.20	8.95	Vertical	Peak
9101.63	29.46	46.13	74.00	27.87	16.67	Vertical	Peak
1245.28	21.93	16.22	74.00	57.78	-5.71	Horizontal	Peak
2166.19	22.31	18.99	74.00	55.01	-3.32	Horizontal	Peak
5185.94	27.19	36.14	74.00	37.86	8.95	Horizontal	Peak
8994.41	28.02	44.73	74.00	29.27	16.71	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz.
4. Test 802.11a, 802.11n mode, all modulations have been tested, only worst case is reported

Band: IV		Worst mode: 802.11a			Test channel: CH _L		
Frequency (MHz)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Factor (dB)	Test value	Polarization
1383.34	21.52	15.94	74.00	58.06	-5.58	Vertical	Peak
4106.41	26.65	29.94	74.00	44.06	3.29	Vertical	Peak
7941.31	28.14	44.40	74.00	29.60	16.26	Vertical	Peak
9671.50	29.65	46.81	74.00	27.19	17.16	Vertical	Peak
1815.16	22.20	16.40	74.00	57.60	-5.80	Horizontal	Peak
4005.06	27.83	30.86	74.00	43.14	3.03	Horizontal	Peak
6427.03	27.14	38.76	74.00	35.24	11.62	Horizontal	Peak
8105.81	29.36	45.68	74.00	28.32	16.32	Horizontal	Peak

Band: IV		Worst mode: 802.11a			Test channel: CH _M		
Frequency (MHz)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Factor (dB)	Test value	Polarization
1361.31	22.11	16.53	74.00	57.47	-5.58	Vertical	Peak
2266.06	21.89	19.34	74.00	54.66	-2.55	Vertical	Peak
4666.00	26.04	32.21	74.00	41.79	6.17	Vertical	Peak
8029.44	27.90	44.13	74.00	29.87	16.23	Vertical	Peak
1265.84	22.58	16.92	74.00	57.08	-5.66	Horizontal	Peak
3182.56	29.92	30.67	74.00	43.33	0.75	Horizontal	Peak
7145.25	27.92	42.60	74.00	31.40	14.68	Horizontal	Peak
9483.50	28.96	46.86	74.00	27.14	17.90	Horizontal	Peak

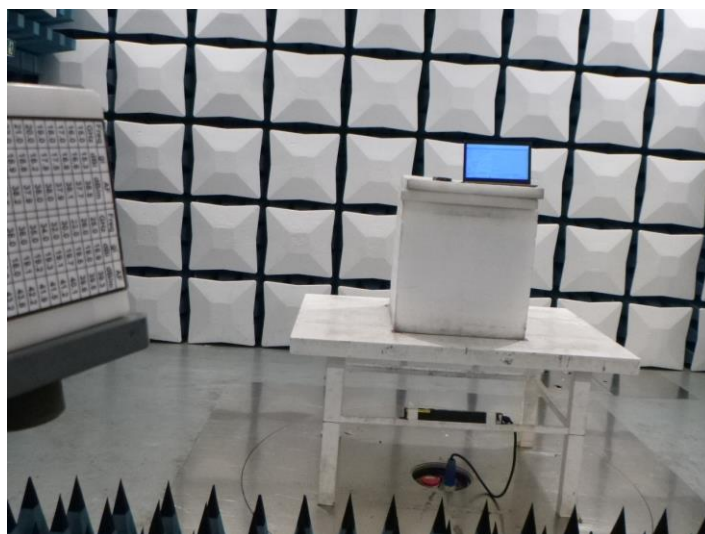
Band: IV		Worst mode: 802.11a			Test channel: CH _H		
Frequency (MHz)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Factor (dB)	Test value	Polarization
1198.28	23.12	17.27	74.00	56.73	-5.85	Vertical	Peak
3665.78	29.85	31.39	74.00	42.61	1.54	Vertical	Peak
7913.41	27.77	44.06	74.00	29.94	16.29	Vertical	Peak
9323.41	28.55	46.34	74.00	27.66	17.79	Vertical	Peak
1361.31	22.13	16.55	74.00	57.45	-5.58	Horizontal	Peak
4746.78	26.76	33.45	74.00	40.55	6.69	Horizontal	Peak
7521.25	27.85	43.36	74.00	30.64	15.51	Horizontal	Peak
10919.94	28.02	45.79	74.00	28.21	17.77	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz.
4. Test 802.11a, 802.11n mode, all modulations have been tested, only worst case is reported

6. TEST SETUP PHOTOS

Radiated Emission



AC Conducted Emission

**7. EXTERANAL AND INTERNAL PHOTOS**

Reference to the test report No. : CHTEW21100001.

-----END OF REPORT-----