TEST REPORT

Applicant:	Shanghai Top-chip Micro-electronics Tech Co.,Ltd.
Address of Applicant:	Rm 2501,Building 2,1077 ZuChongZhi Rd, Zhang Jiang Hi-Tech Park,Pudong New Area, Shanghai, China
Manufacturer/Factory:	Shanghai Top-chip Micro-electronics Tech Co.,Ltd.
Address of Manufacturer/Factory:	Rm 2501,Building 2,1077 ZuChongZhi Rd, Zhang Jiang Hi-Tech Park,Pudong New Area, Shanghai, China

Equipment Under Test (EUT)

Product Name:	Top-Chip Bluetooth Mesh Module
Model No.:	TC6203D
Trade Mark :	Top-Chip
FCC ID:	2AVUD-TC6203D
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of sample receipt:	Mar 05,2019
Date of Test:	Mar 05-13,2020
Date of report issued:	Mar 13,2020
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*Mar 13,2020*	*Original*

Prepared By: ***Date:*** ***Mar 13,2020***

Project Engineer

Check By: ***Date:*** ***Mar 13,2020***

Reviewer

3 Contents

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	N/A
Field strength of the fundamental signal	15.249 (a)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205	Pass
20dB Bandwidth and 99% Occupied Bandwidth	15.215 (c)	Pass

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.10: 2013 and ANSI C63.4: 2014.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	Top-Chip Bluetooth Mesh Module
Model No.:	TC6203D
Serial No.:	0000001
Test sample(s) ID:	GTS202003000062-1
Sample(s) Status	Engineered sample
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	40
Channel separation:	2MHz
Modulation type:	GFSK
Antenna Type:	PCB antenna
Antenna gain:	-2.5dBi
Power supply:	DC 3.3V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2	2404MHz	12	2424MHz	22	2444MHz	32	2464MHz
· : …	· : …	· : …	· : …	· : …	· : …	· : …	· : …
9	2418MHz	19	2438MHz	29	2458MHz	39	2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the dutycycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	87.42	91.84	88.65

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
N/A	N/A	N/A	N/A

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

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

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory 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 files. Registration 381383.

● **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 26 2019	June. 25 2020
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 26 2019	June. 25 2020
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 26 2019	June. 25 2020
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 26 2019	June. 25 2020
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 26 2019	June. 25 2020

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 26 2019	June. 25 2020
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 26 2019	June. 25 2020
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 26 2019	June. 25 2020
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 26 2019	June. 25 2020
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 26 2019	June. 25 2020
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 26 2019	June. 25 2020
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 26 2019	June. 25 2020

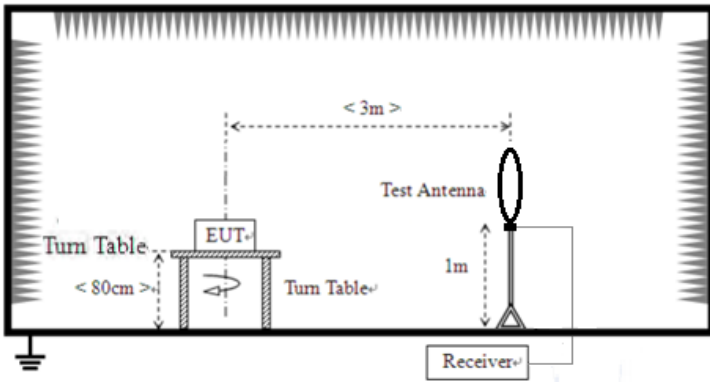
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

7 Test results and Measurement Data

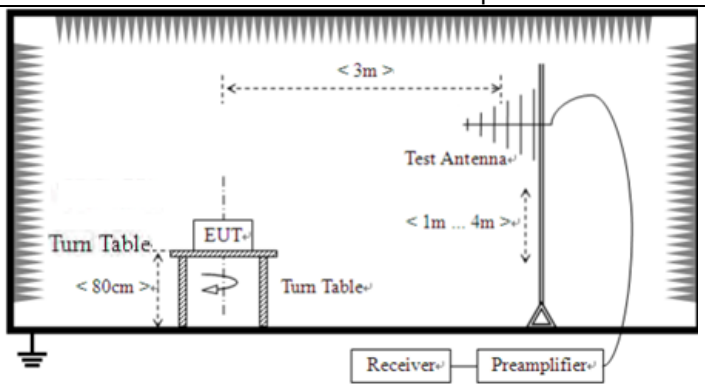
7.1 Antenna requirement

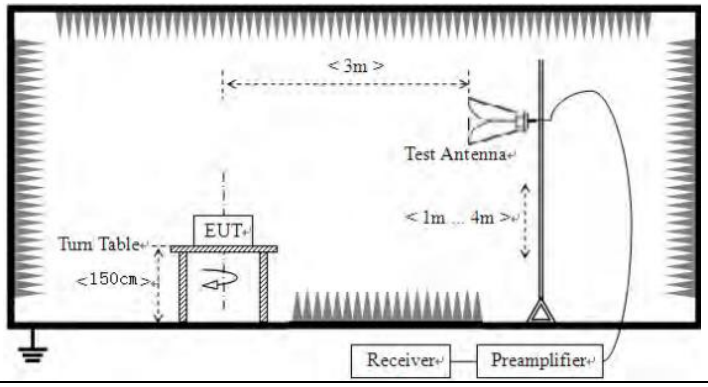
Standard requirement:
FCC part 15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional 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.
EUT Antenna:
The antenna is PCB antenna, the best case gain of the antenna is -2.5dBi

7.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209
RSS-210 B10(a)& RSS-210 B10(b)& RSS-Gen Clause 8.9&8.10</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013 and RSS-Gen</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 25GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>9kHz-150kHz</td><td>Quasi-peak</td><td>200Hz</td><td>300Hz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>10kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Field strength of the fundamental signal)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td rowspan="2">2400MHz-2483.5MHz</td><td>94.00</td><td>Average Value</td></tr>
<tr><td>114.00</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(Spurious Emissions)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Remark</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(kHz) @300m</td><td>Quasi-peak Value</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(kHz) @30m</td><td>Quasi-peak Value</td></tr>
<tr><td>1.705MHz-30.0MHz</td><td>30 @30m</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-88MHz</td><td>100 @3m</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>150 @3m</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>200 @3m</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>500 @3m</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500 @3m</td><td>Average Value</td></tr>
<tr><td>5000 @3m</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:
(band edge)</td><td>Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions from 9kHz to 30MHz
 

For radiated emissions from 30MHz to1GHz</td></tr>
</table>

<table>
<tr><td></td><td>


For radiated emissions above 1GHz


</td></tr>
<tr><td>Test Procedure:</td><td>1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. 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 height is varied from one meter to four meters 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 heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. 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 emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
<tr><td>Test voltage:</td><td colspan="6">AC120V 60Hz</td></tr>
</table>

Measurement data:

7.2.1 Field Strength of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2402.00	87.92	27.58	5.39	30.18	90.71	114.00	-23.29	Vertical
2402.00	86.05	27.58	5.39	30.18	88.84	114.00	-25.16	Horizontal
2440.00	86.62	27.55	5.43	30.06	89.54	114.00	-24.46	Vertical
2440.00	85.14	27.55	5.43	30.06	88.06	114.00	-25.94	Horizontal
2480.00	88.78	27.52	5.47	29.93	91.84	114.00	-22.16	Vertical
2480.00	86.18	27.52	5.47	29.93	89.24	114.00	-24.76	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2402.00	75.80	27.58	5.39	30.18	78.59	94.00	-15.41	Vertical
2402.00	74.16	27.58	5.39	30.18	76.95	94.00	-17.05	Horizontal
2440.00	74.42	27.55	5.43	30.06	77.34	94.00	-16.66	Vertical
2440.00	71.77	27.55	5.43	30.06	74.69	94.00	-19.31	Horizontal
2480.00	76.36	27.52	5.47	29.93	79.42	94.00	-14.58	Vertical
2480.00	74.16	27.52	5.47	29.93	77.22	94.00	-16.78	Horizontal

7.2.2 Spurious emissions

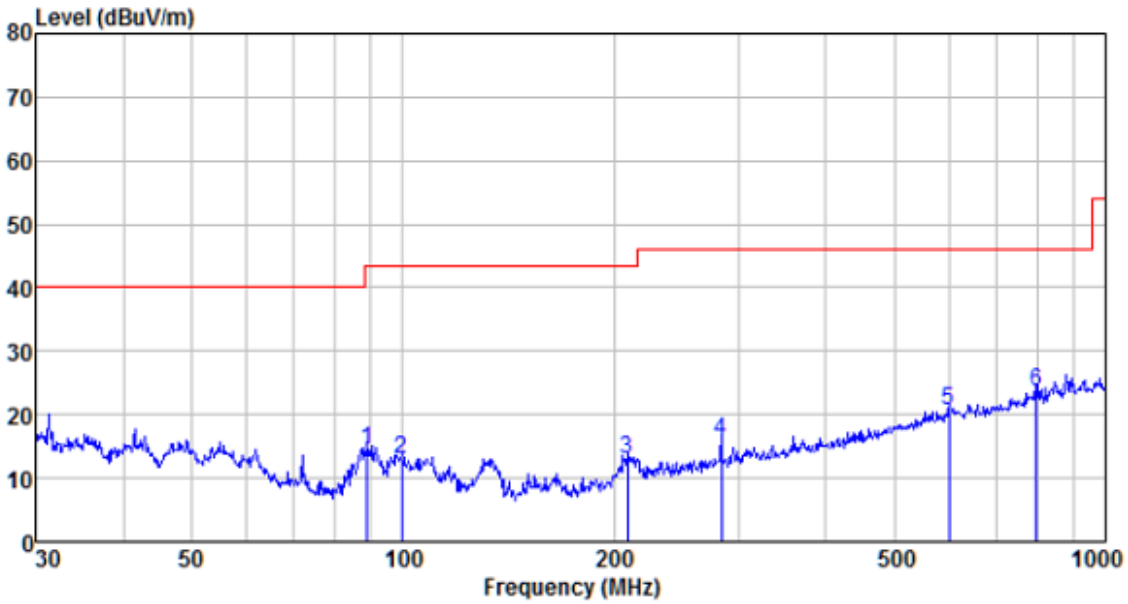
■ **9kHz~30MHz**

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

■ Below 1GHz

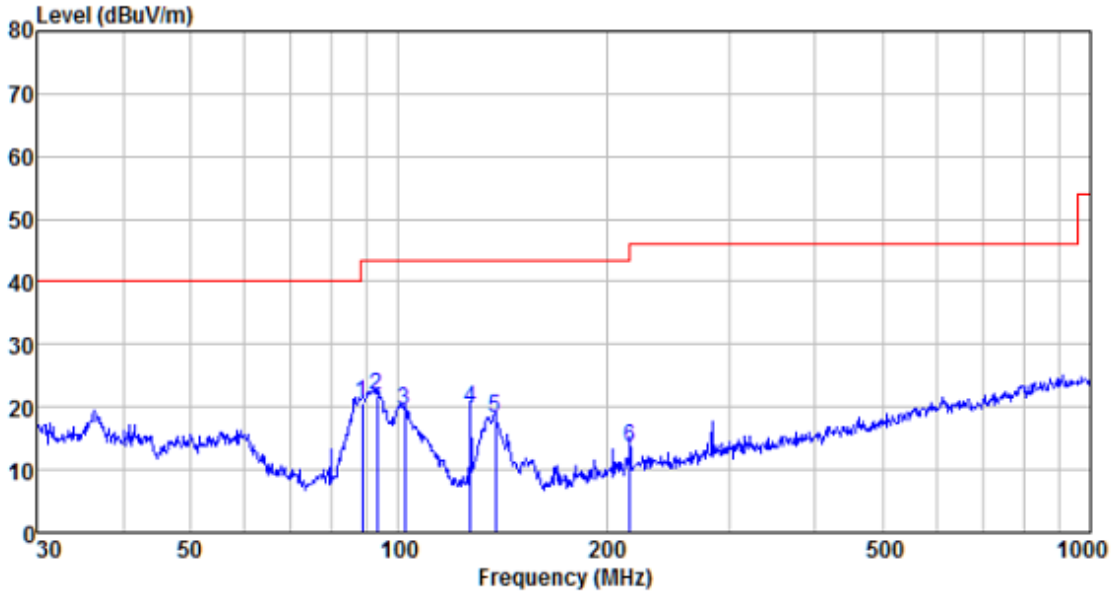
Lowest channel

Horizontal



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
88.964	39.80	10.32	1.10	36.63	14.59	43.50	-28.91	QP
99.528	36.30	12.13	1.19	36.72	12.90	43.50	-30.60	QP
208.580	37.65	10.73	1.89	37.34	12.93	43.50	-30.57	QP
283.979	37.75	13.16	2.29	37.41	15.79	46.00	-30.21	QP
599.321	35.01	19.44	3.72	37.54	20.63	46.00	-25.37	QP
796.183	35.44	21.34	4.45	37.62	23.61	46.00	-22.39	QP

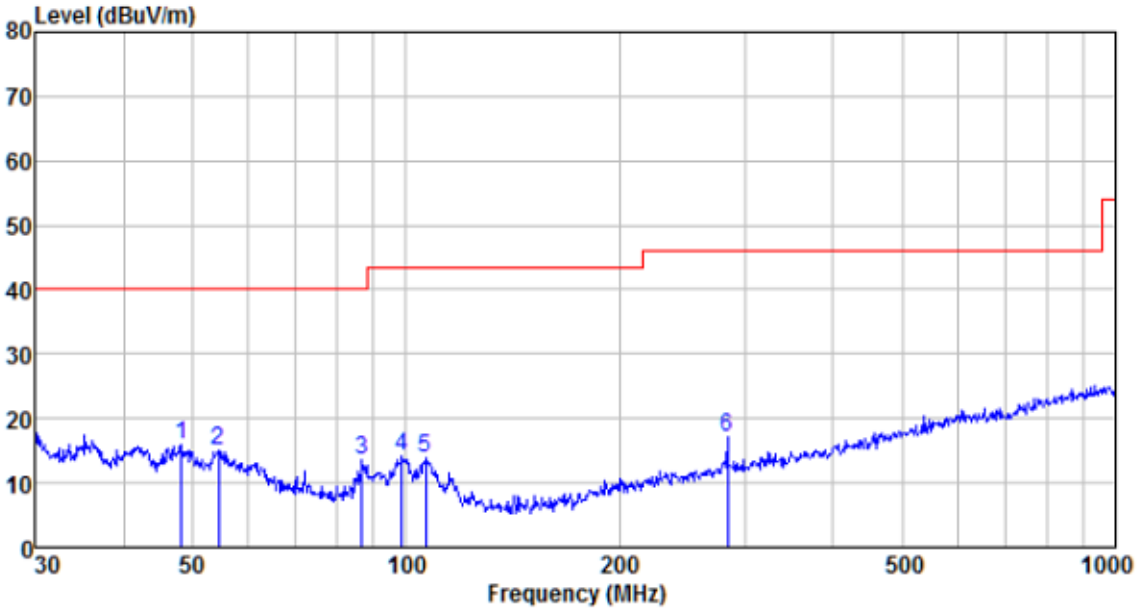
Vertical



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
88.652	45.99	10.19	1.10	36.63	20.65	43.50	-22.85	QP
93.113	46.14	11.18	1.14	36.66	21.80	43.50	-21.70	QP
102.001	43.06	11.94	1.21	36.74	19.47	43.50	-24.03	QP
127.218	46.92	8.51	1.41	36.93	19.91	43.50	-23.59	QP
137.903	46.17	7.59	1.49	37.00	18.25	43.50	-25.25	QP
216.024	37.83	11.02	1.93	37.35	13.43	46.00	-32.57	QP

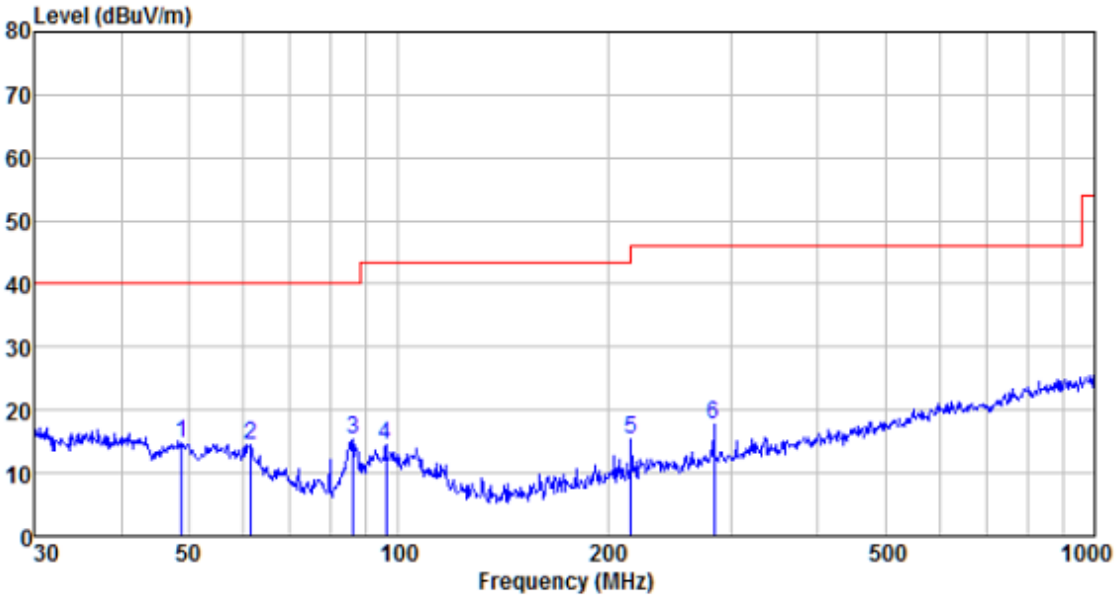
Middle channel

Horizontal



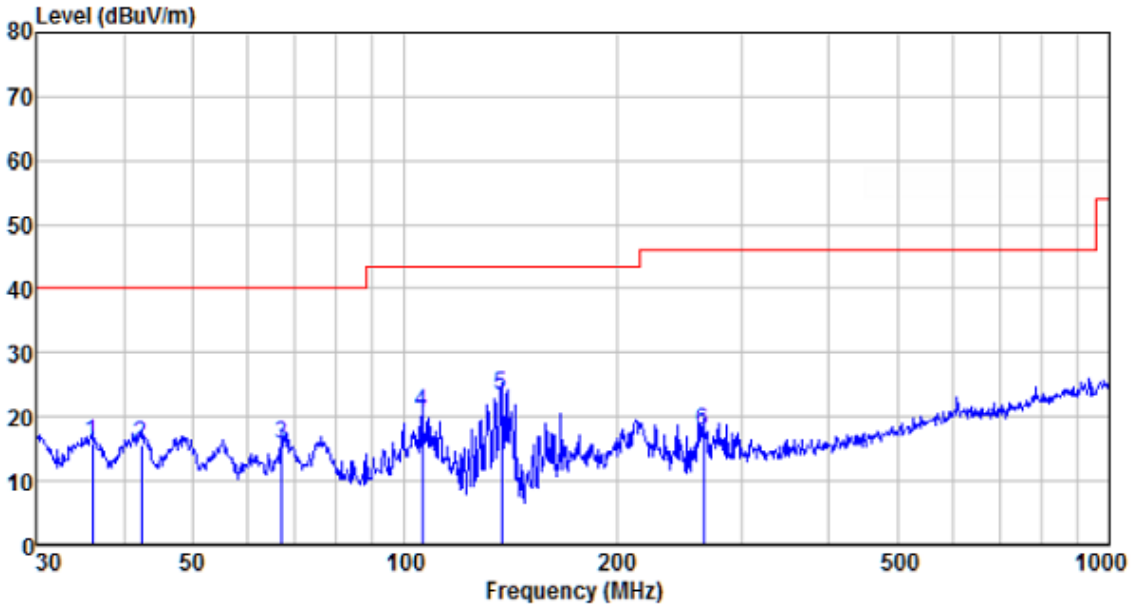
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
48.332	39.02	12.29	0.75	36.10	15.96	40.00	-24.04	QP
54.452	38.63	11.85	0.81	36.25	15.04	40.00	-24.96	QP
86.807	39.39	9.68	1.08	36.61	13.54	40.00	-26.46	QP
98.833	37.53	12.06	1.18	36.71	14.06	43.50	-29.44	QP
106.759	38.12	11.41	1.25	36.78	14.00	43.50	-29.50	QP
283.979	39.10	13.16	2.29	37.41	17.14	46.00	-28.86	QP

Vertical



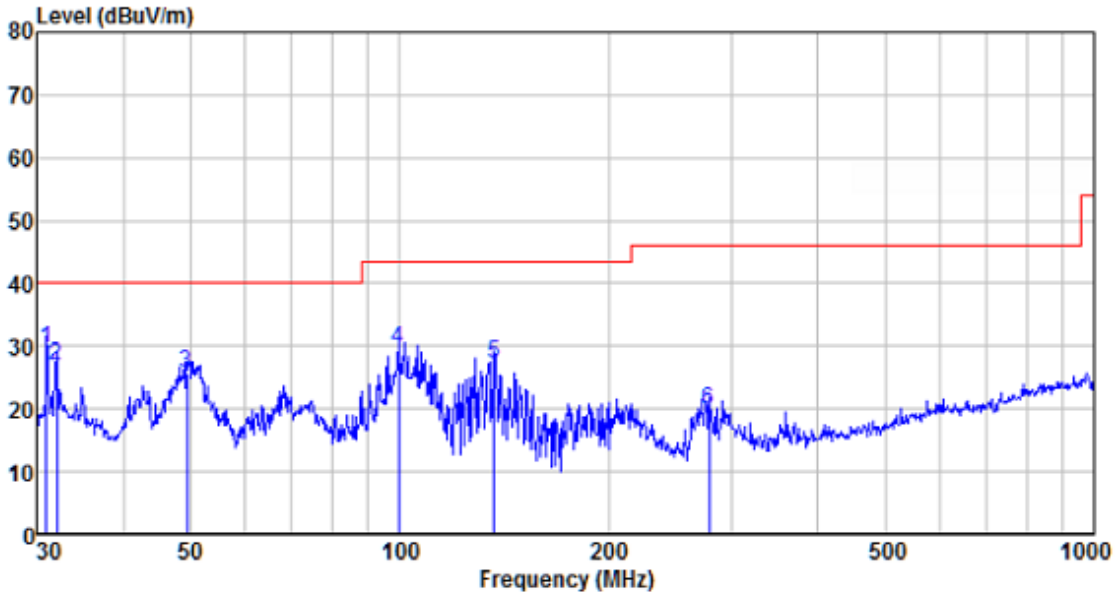
Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
48.843	37.70	12.29	0.76	36.13	14.62	40.00	-25.38	QP
61.346	39.06	10.84	0.87	36.34	14.43	40.00	-25.57	QP
86.200	41.45	9.43	1.08	36.60	15.36	40.00	-24.64	QP
96.099	38.45	11.65	1.16	36.69	14.57	43.50	-28.93	QP
216.024	39.89	11.02	1.93	37.35	15.49	46.00	-30.51	QP
283.979	39.60	13.16	2.29	37.41	17.64	46.00	-28.36	QP

Highest
Horizontal



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
36.001	39.09	11.52	0.62	35.42	15.81	40.00	-24.19	QP
42.302	38.55	12.23	0.69	35.79	15.68	40.00	-24.32	QP
66.967	42.46	8.65	0.92	36.41	15.62	40.00	-24.38	QP
106.013	44.69	11.52	1.25	36.77	20.69	43.50	-22.81	QP
137.420	51.17	7.64	1.49	37.00	23.30	43.50	-20.20	QP
265.676	40.32	12.65	2.20	37.39	17.78	46.00	-28.22	QP

Vertical



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
30.962	52.82	11.22	0.56	35.07	29.53	40.00	-10.47	QP
32.067	50.24	11.24	0.57	35.15	26.90	40.00	-13.10	QP
49.359	48.64	12.29	0.77	36.15	25.55	40.00	-14.45	QP
99.528	52.79	12.13	1.19	36.72	29.39	43.50	-14.11	QP
136.939	55.00	7.64	1.48	37.00	27.12	43.50	-16.38	QP
279.044	41.96	13.02	2.27	37.40	19.85	46.00	-26.15	QP

■ Above 1GHz

Test channel:	Lowest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	35.59	31.78	8.60	32.09	43.88	74.00	-30.12	Vertical
7206.00	30.69	36.15	11.65	32.00	46.49	74.00	-27.51	Vertical
9608.00	30.46	37.95	14.14	31.62	50.93	74.00	-23.07	Vertical
12010.00	*					74.00		Vertical
14412.00	*					74.00		Vertical
4804.00	39.53	31.78	8.60	32.09	47.82	74.00	-26.18	Horizontal
7206.00	32.30	36.15	11.65	32.00	48.10	74.00	-25.90	Horizontal
9608.00	29.72	37.95	14.14	31.62	50.19	74.00	-23.81	Horizontal
12010.00	*					74.00		Horizontal
14412.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804.00	24.73	31.78	8.60	32.09	33.02	54.00	-20.98	Vertical
7206.00	19.57	36.15	11.65	32.00	35.37	54.00	-18.63	Vertical
9608.00	18.76	37.95	14.14	31.62	39.23	54.00	-14.77	Vertical
12010.00	*					54.00		Vertical
14412.00	*					54.00		Vertical
4804.00	28.77	31.78	8.60	32.09	37.06	54.00	-16.94	Horizontal
7206.00	21.63	36.15	11.65	32.00	37.43	54.00	-16.57	Horizontal
9608.00	18.35	37.95	14.14	31.62	38.82	54.00	-15.18	Horizontal
12010.00	*					54.00		Horizontal
14412.00	*					54.00		Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*

Test channel:	Middle channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880.00	35.86	31.85	8.67	32.12	44.26	74.00	-29.74	Vertical
7320.00	30.87	36.37	11.72	31.89	47.07	74.00	-26.93	Vertical
9760.00	30.61	38.35	14.25	31.62	51.59	74.00	-22.41	Vertical
12200.00	*					74.00		Vertical
14640.00	*					74.00		Vertical
4880.00	39.85	31.85	8.67	32.12	48.25	74.00	-25.75	Horizontal
7320.00	32.50	36.37	11.72	31.89	48.70	74.00	-25.30	Horizontal
9760.00	29.90	38.35	14.25	31.62	50.88	74.00	-23.12	Horizontal
12200.00	*					74.00		Horizontal
14640.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880.00	24.95	31.85	8.67	32.12	33.35	54.00	-20.65	Vertical
7320.00	19.73	36.37	11.72	31.89	35.93	54.00	-18.07	Vertical
9760.00	18.89	38.35	14.25	31.62	39.87	54.00	-14.13	Vertical
12200.00	*					54.00		Vertical
14640.00	*					54.00		Vertical
4880.00	29.02	31.85	8.67	32.12	37.42	54.00	-16.58	Horizontal
7320.00	21.80	36.37	11.72	31.89	38.00	54.00	-16.00	Horizontal
9760.00	18.50	38.35	14.25	31.62	39.48	54.00	-14.52	Horizontal
12200.00	*					54.00		Horizontal
14640.00	*					54.00		Horizontal

RRemark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*

Test channel:	Highest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960.00	35.85	31.93	8.73	32.16	44.35	74.00	-29.65	Vertical
7440.00	30.87	36.59	11.79	31.78	47.47	74.00	-26.53	Vertical
9920.00	30.61	38.81	14.38	31.88	51.92	74.00	-22.08	Vertical
12400.00	*					74.00		Vertical
14880.00	*					74.00		Vertical
4960.00	39.84	31.93	8.73	32.16	48.34	74.00	-25.66	Horizontal
7440.00	32.50	36.59	11.79	31.78	49.10	74.00	-24.90	Horizontal
9920.00	29.90	38.81	14.38	31.88	51.21	74.00	-22.79	Horizontal
12400.00	*					74.00		Horizontal
14880.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960.00	24.99	31.93	8.73	32.16	33.49	54.00	-20.51	Vertical
7440.00	19.75	36.59	11.79	31.78	36.35	54.00	-17.65	Vertical
9920.00	18.91	38.81	14.38	31.88	40.22	54.00	-13.78	Vertical
12400.00	*					54.00		Vertical
14880.00	*					54.00		Vertical
4960.00	29.06	31.93	8.73	32.16	37.56	54.00	-16.44	Horizontal
7440.00	21.83	36.59	11.79	31.78	38.43	54.00	-15.57	Horizontal
9920.00	18.52	38.81	14.38	31.88	39.83	54.00	-14.17	Horizontal
12400.00	*					54.00		Horizontal
14880.00	*					54.00		Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

7.2.3 Bandedge emissions

All of the restriction bands were tested, and only the data of worst case was exhibited.

Test channel:	Lowest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	39.53	27.59	5.38	30.18	42.32	74.00	-31.68	Horizontal
2400.00	55.84	27.58	5.39	30.18	58.63	74.00	-15.37	Horizontal
2390.00	39.76	27.59	5.38	30.18	42.55	74.00	-31.45	Vertical
2400.00	57.52	27.58	5.39	30.18	60.31	74.00	-13.69	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	30.84	27.59	5.38	30.18	33.63	54.00	-20.37	Horizontal
2400.00	41.88	27.58	5.39	30.18	44.67	54.00	-9.34	Horizontal
2390.00	30.54	27.59	5.38	30.18	33.33	54.00	-20.67	Vertical
2400.00	43.21	27.58	5.39	30.18	46.00	54.00	-8.01	Vertical

Test channel:	Highest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	41.24	27.53	5.47	29.93	44.31	74.00	-29.70	Horizontal
2500.00	41.05	27.55	5.49	29.93	44.16	74.00	-29.85	Horizontal
2483.50	41.52	27.53	5.47	29.93	44.59	74.00	-29.41	Vertical
2500.00	41.73	27.55	5.49	29.93	44.84	74.00	-29.17	Vertical

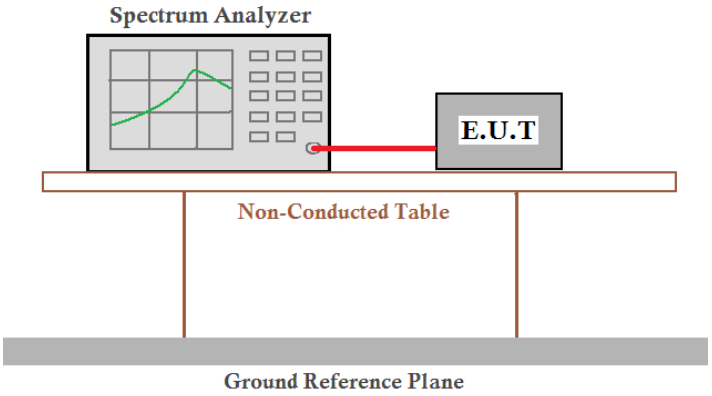
Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	33.63	27.53	5.47	29.93	36.70	54.00	-17.31	Horizontal
2500.00	32.11	27.55	5.49	29.93	35.22	54.00	-18.79	Horizontal
2483.50	34.56	27.53	5.47	29.93	37.63	54.00	-16.37	Vertical
2500.00	31.75	27.55	5.49	29.93	34.86	54.00	-19.14	Vertical

Remark:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

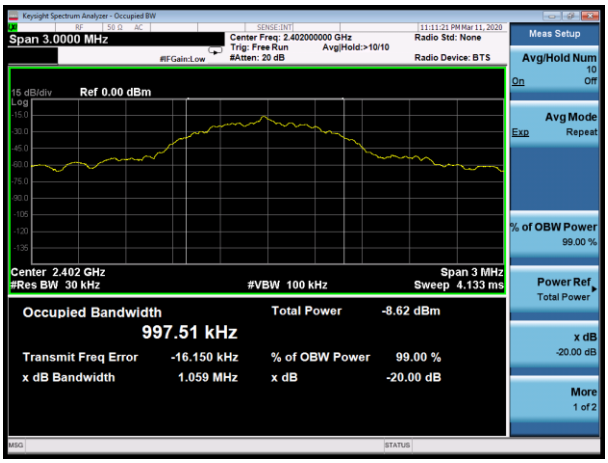
7.3 20dB Bandwidth and 99% Occupied Bandwidth

Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.10:2013
Limit:	Operation Frequency range 2400MHz~2483.5MHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

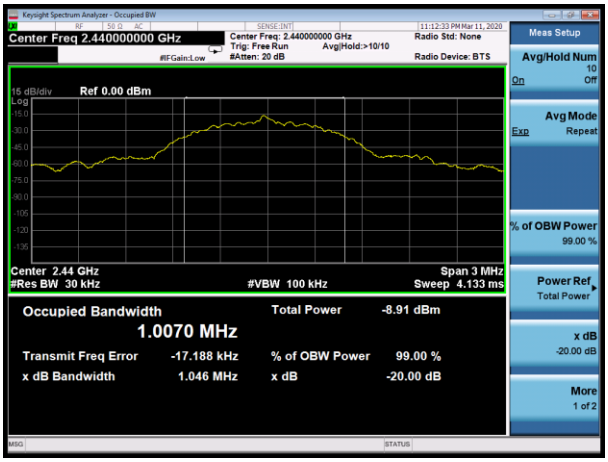
Measurement Data

Test channel	20dB bandwidth(MHz)	99% Occupied bandwidth(MHz)	Result
Lowest	1.059	0.99751	Pass
Middle	1.046	1.0070	Pass
Highest	1.071	1.0241	Pass

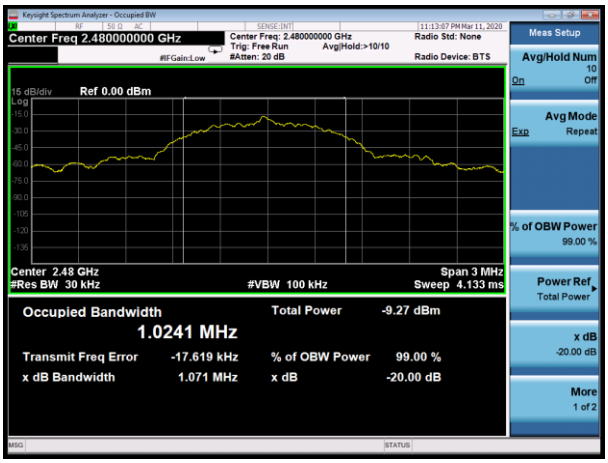
Test plot as follows:



Lowest channel



Middle channel



Highest channel

8 Test Setup Photo

Reference to the appendix I for details.

9 EUT Constructional Details

Reference to the appendix II for details.

------ End ------