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.:	TC6203P_D2
Trade Mark:	Top-Chip
FCC ID:	2AVUD- TC6203P
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of sample receipt:	Oct 11,2021
Date of Test:	Oct 11-Nov 02,2021
Date of report issued:	Nov 03,2021
Test Result :	PASS *

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

Authorized Signature:

Robinson Luo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	*Nov 03,2021*	*Original*

Prepared By: ***Date:*** ***Nov 03,2021***

Project Engineer

Check By: ***Date:*** ***Nov 03,2021***

Reviewer

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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	Pass
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 Occupied Bandwidth	15.215 (c)	Pass

Remarks:

1. *Test according to ANSI C63.10: 2013.*
2. *Pass: The EUT complies with the essential requirements in the standard.*

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.:	TC6203P_D2
Serial No.:	-
Hardware Version:	-
Software Version:	V1.1
Test sample(s) ID:	GTSL202111000040
Sample(s) Status	Engineered sample
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	40
Channel separation:	2MHz
Modulation type:	GFSK
Antenna Type:	PCB Antenna
Antenna gain:	0.68dBi(declare by applicant)
Power supply:	DC 3.3V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402 MHz	11	2422 MHz	21	2442 MHz	31	2462 MHz
2	2404 MHz	12	2424 MHz	22	2444 MHz	32	2464 MHz
3	2406 MHz	13	2426 MHz	23	2446 MHz	33	2466 MHz
4	2408 MHz	14	2428 MHz	24	2448 MHz	34	2468 MHz
5	2410 MHz	15	2430 MHz	25	2450 MHz	35	2470 MHz
6	2412 MHz	16	2432 MHz	26	2452 MHz	36	2472 MHz
7	2414 MHz	17	2434 MHz	27	2454 MHz	37	2474 MHz
8	2416 MHz	18	2436 MHz	28	2456 MHz	38	2476 MHz
9	2418 MHz	19	2438 MHz	29	2458 MHz	39	2478 MHz
10	2420 MHz	20	2440 MHz	30	2460 MHz	40	2480 MHz

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)	98.71	99.47	97.82

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
DELL	PC Host	OPTIPLEX745	GTS312

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**

Designation Number: CN5029

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.

● **IC —Registration No.: 9079A**

CAB identifier: CN0091

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

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

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

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

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. 02 2020	July. 01 2025
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. 24 2021	June. 23 2022
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 24 2021	June. 23 2022
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 24 2021	June. 23 2022
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 24 2021	June. 23 2022
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 24 2021	June. 23 2022
9	Coaxial Cable	GTS	N/A	GTS211	June. 24 2021	June. 23 2022
10	Coaxial cable	GTS	N/A	GTS210	June. 24 2021	June. 23 2022
11	Coaxial Cable	GTS	N/A	GTS212	June. 24 2021	June. 23 2022
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 24 2021	June. 23 2022
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 24 2021	June. 23 2022
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 24 2021	June. 23 2022
15	Band filter	Amindeon	82346	GTS219	June. 24 2021	June. 23 2022
16	Power Meter	Anritsu	ML2495A	GTS540	June. 24 2021	June. 23 2022
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 24 2021	June. 23 2022
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 24 2021	June. 23 2022
19	Splitter	Agilent	11636B	GTS237	June. 24 2021	June. 23 2022
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 24 2021	June. 23 2022
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 17 2021	Oct. 16 2022
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 17 2021	Oct. 16 2022
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 17 2021	Oct. 16 2022
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 24 2021	June. 23 2022

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. 24 2021	June. 23 2022
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 24 2021	June. 23 2022
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 24 2021	June. 23 2022
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. 24 2021	June. 23 2022
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 24 2021	June. 23 2022
9	ISN	SCHWARZBECK	NTFM 8158	GTS565	June. 24 2021	June. 23 2022
10	High voltage probe	SCHWARZBECK	TK9420	GTS537	July. 09 2021	July. 08 2022

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. 24 2021	June. 23 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 24 2021	June. 23 2022
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 24 2021	June. 23 2022
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 24 2021	June. 23 2022
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 24 2021	June. 23 2022
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 24 2021	June. 23 2022
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 24 2021	June. 23 2022

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. 24 2021	June. 23 2022
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022

7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
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. **15.247(c) (1)(i) requirement:** (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
EUT Antenna:	
The antenna is PCB antenna, the best case gain of the antenna is 0.68dBi, reference to the appendix II for details	

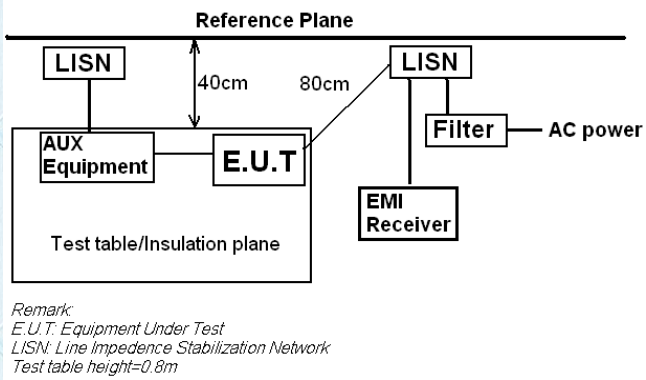
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	

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 setup:



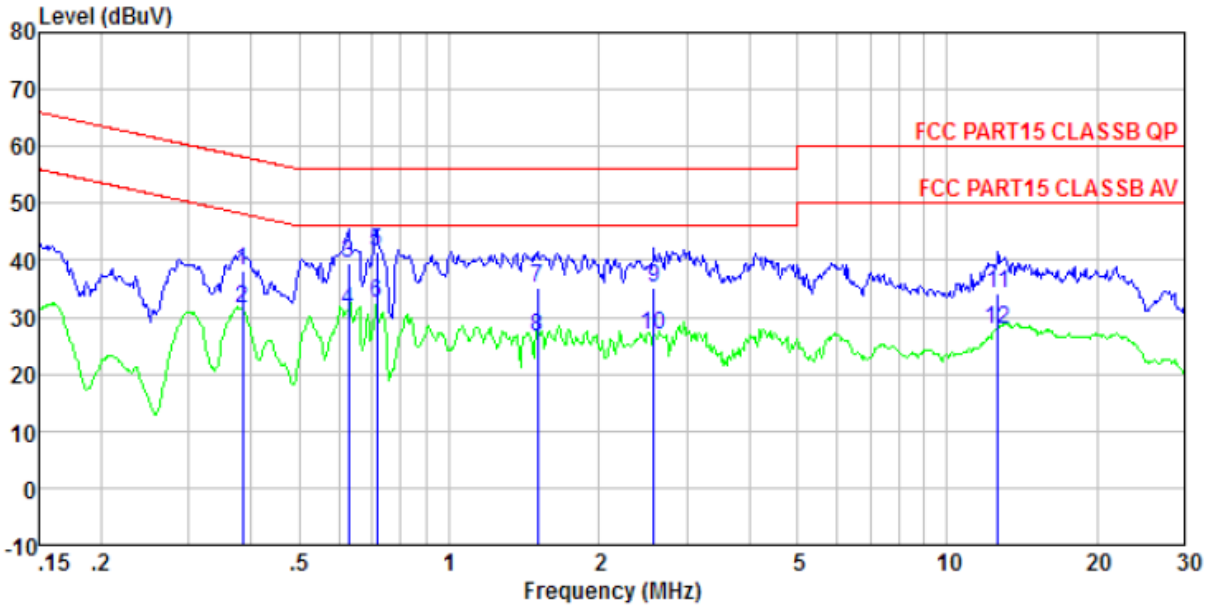
Test procedure:

1. The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.

Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

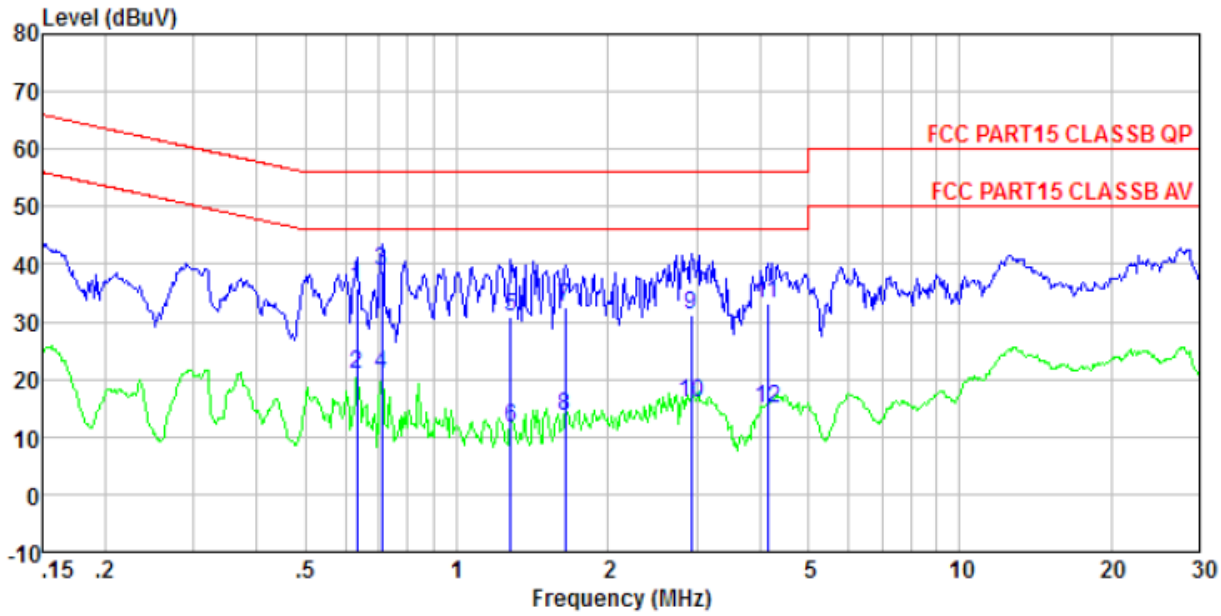
Measurement data:

Test mode:	Transmitting mode	Phase Polarity:	Line



Freq MHz	Reading level dBuV	lISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.385	37.71	0.36	0.10	38.17	58.17	-20.00	QP
0.385	30.96	0.36	0.10	31.42	48.17	-16.75	Average
0.627	39.15	0.28	0.12	39.55	56.00	-16.45	QP
0.627	30.74	0.28	0.12	31.14	46.00	-14.86	Average
0.716	41.05	0.26	0.13	41.44	56.00	-14.56	QP
0.716	32.21	0.26	0.13	32.60	46.00	-13.40	Average
1.503	34.91	0.20	0.16	35.27	56.00	-20.73	QP
1.503	26.29	0.20	0.16	26.65	46.00	-19.35	Average
2.581	34.83	0.20	0.18	35.21	56.00	-20.79	QP
2.581	26.41	0.20	0.18	26.79	46.00	-19.21	Average
12.649	33.73	0.20	0.21	34.14	60.00	-25.86	QP
12.649	27.34	0.20	0.21	27.75	50.00	-22.25	Average

Test mode:	Transmitting mode	Phase Polarity:	Neutral



Freq MHz	Reading level dBuV	lISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.634	35.29	0.28	0.12	35.69	56.00	-20.31	QP
0.634	20.61	0.28	0.12	21.01	46.00	-24.99	Average
0.708	38.45	0.26	0.13	38.84	56.00	-17.16	QP
0.708	20.63	0.26	0.13	21.02	46.00	-24.98	Average
1.282	30.61	0.20	0.16	30.97	56.00	-25.03	QP
1.282	11.39	0.20	0.16	11.75	46.00	-34.25	Average
1.645	32.13	0.20	0.17	32.50	56.00	-23.50	QP
1.645	13.24	0.20	0.17	13.61	46.00	-32.39	Average
2.931	30.86	0.20	0.19	31.25	56.00	-24.75	QP
2.931	15.54	0.20	0.19	15.93	46.00	-30.07	Average
4.158	32.80	0.20	0.18	33.18	56.00	-22.82	QP
4.158	14.66	0.20	0.18	15.04	46.00	-30.96	Average

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 25GHz
Test site:	Measurement Distance: 3m

Receiver setup:

Frequency	Detector	RBW	VBW	Remark
9kHz-150kHz	Quasi-peak	200Hz	300Hz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	10kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

Limit: (Field strength of the fundamental signal)

Frequency	Limit (dBuV/m @3m)	Remark
2400MHz-2483.5MHz	94.00	Average Value
	114.00	Peak Value

Limit: (Spurious Emissions)

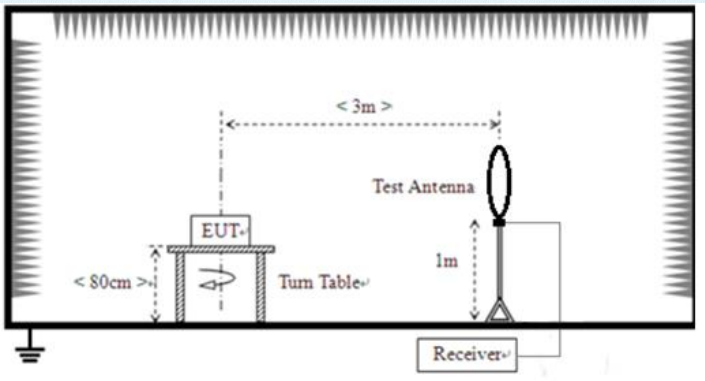
Frequency	Limit (uV/m)	Remark
0.009MHz-0.490MHz	2400/F(kHz) @300m	Quasi-peak Value
0.490MHz-1.705MHz	24000/F(kHz) @30m	Quasi-peak Value
1.705MHz-30.0MHz	30 @30m	Quasi-peak Value
30MHz-88MHz	100 @3m	Quasi-peak Value
88MHz-216MHz	150 @3m	Quasi-peak Value
216MHz-960MHz	200 @3m	Quasi-peak Value
960MHz-1GHz	500 @3m	Quasi-peak Value
Above 1GHz	500 @3m	Average Value
	5000 @3m	Peak Value

Limit: (band edge)

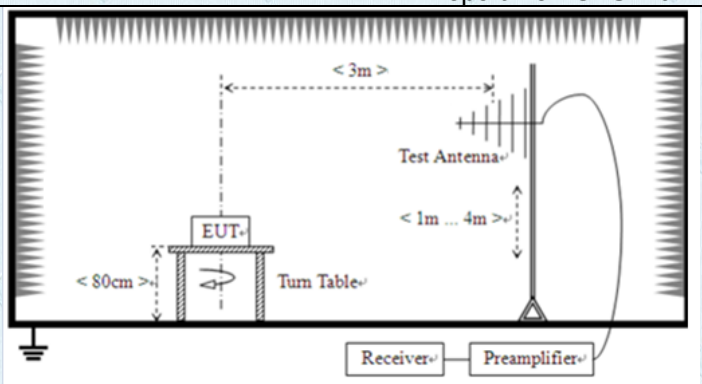
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Test setup:

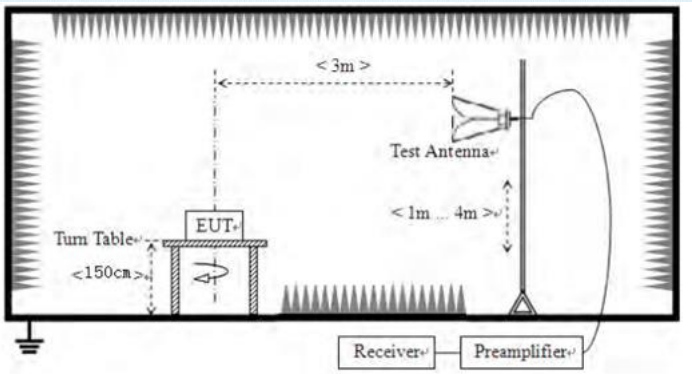
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:	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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1012mbar
Test voltage:	AC 120V, 60Hz
Test results:	Pass

Measurement data:

7.3.1 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	93.92	27.58	5.39	30.18	96.71	114.00	-17.29	Vertical
2402.00	96.68	27.58	5.39	30.18	99.47	114.00	-14.53	Horizontal
2440.00	92.44	27.55	5.43	30.06	95.36	114.00	-18.64	Vertical
2440.00	95.79	27.55	5.43	30.06	98.71	114.00	-15.29	Horizontal
2480.00	90.27	27.52	5.47	29.93	93.33	114.00	-20.67	Vertical
2480.00	94.76	27.52	5.47	29.93	97.82	114.00	-16.18	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	86.78	27.58	5.39	30.18	89.57	94.00	-4.43	Vertical
2402.00	87.80	27.58	5.39	30.18	90.59	94.00	-3.41	Horizontal
2440.00	85.67	27.55	5.43	30.06	88.59	94.00	-5.41	Vertical
2440.00	87.49	27.55	5.43	30.06	90.41	94.00	-3.59	Horizontal
2480.00	83.53	27.52	5.47	29.93	86.59	94.00	-7.41	Vertical
2480.00	84.86	27.52	5.47	29.93	87.92	94.00	-6.08	Horizontal

Note:For fundamental frequency,RBW=3MHz,VBW=10MHz(RBW ＞ 20db BW,VBW ⩾ 3RBW) ,
Pkdetector for PK value, RMSdetecror for AV value.

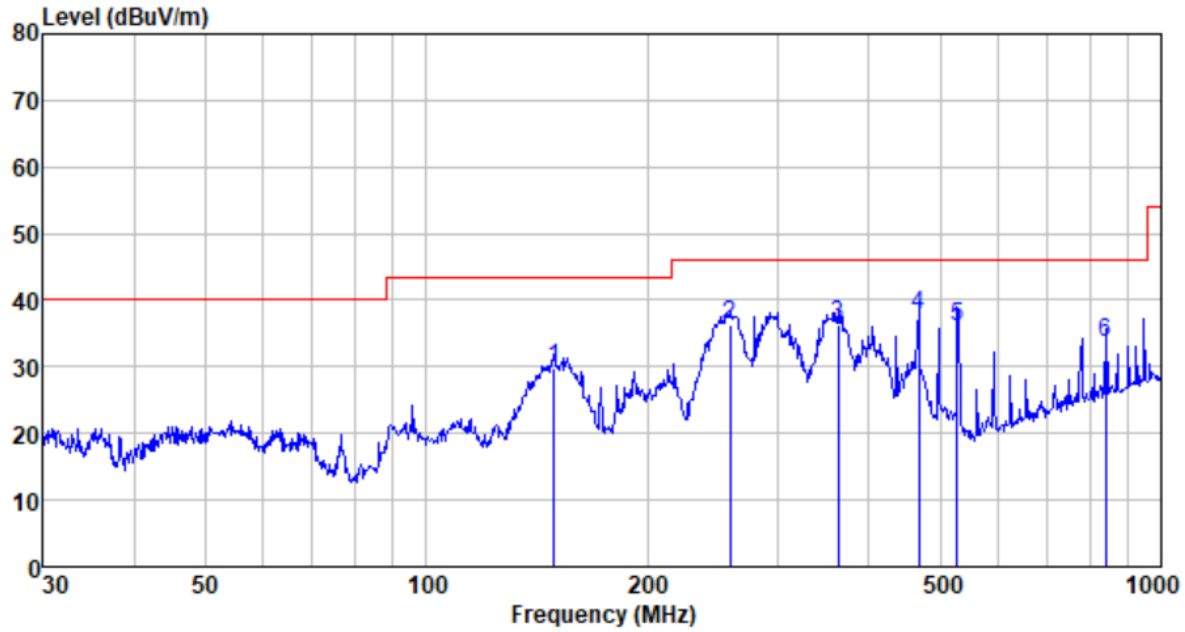
7.3.2 Spurious emissions

■ **Below 30MHz**

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

■ **Below 1GHz**

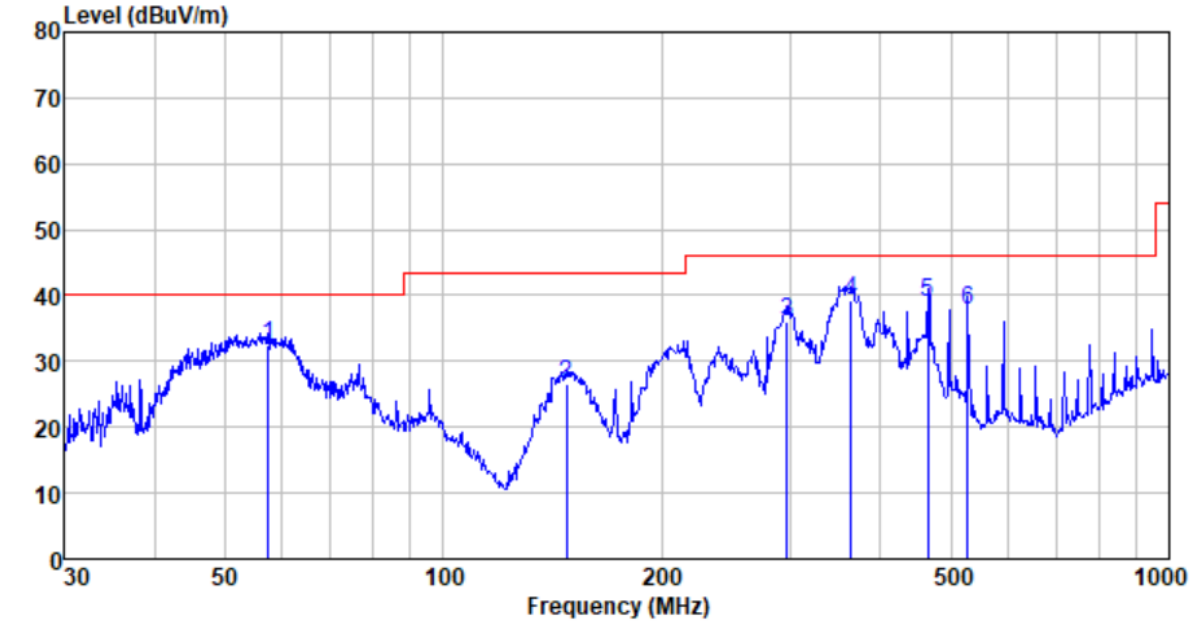
Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
148.963	46.81	11.76	2.05	30.88	29.74	43.50	-13.76	QP
259.234	51.84	12.92	2.72	31.13	36.35	46.00	-9.65	QP
362.985	48.20	16.10	3.48	31.46	36.32	46.00	-9.68	QP
467.235	47.95	17.60	4.09	31.81	37.83	46.00	-8.17	QP
528.246	44.75	18.47	4.47	31.82	35.87	46.00	-10.13	QP
839.182	34.99	24.11	5.89	31.35	33.64	46.00	-12.36	QP

Remarks: level = Reading level + Antenna factor + Cable loss - Preamp Factor

Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
57.392	51.03	9.76	1.34	29.78	32.35	40.00	-7.65	QP
147.921	45.89	9.46	2.05	30.88	26.52	43.50	-16.98	QP
297.224	51.26	13.04	2.91	31.20	36.01	46.00	-9.99	QP
364.260	50.69	16.51	3.49	31.47	39.22	46.00	-6.78	QP
465.599	47.86	18.78	4.08	31.80	38.92	46.00	-7.08	QP
528.246	45.58	19.53	4.47	31.82	37.76	46.00	-8.24	QP

Remarks: level = Reading level + Antenna factor + Cable loss - Preamp Factor

■ 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	36.30	31.78	8.60	32.09	44.59	74.00	-29.41	Vertical
7206.00	31.17	36.15	11.65	32.00	46.97	74.00	-27.03	Vertical
9608.00	30.88	37.95	14.14	31.62	51.35	74.00	-22.65	Vertical
12010.00	*					74.00		Vertical
14412.00	*					74.00		Vertical
4804.00	40.38	31.78	8.60	32.09	48.67	74.00	-25.33	Horizontal
7206.00	32.83	36.15	11.65	32.00	48.63	74.00	-25.37	Horizontal
9608.00	30.20	37.95	14.14	31.62	50.67	74.00	-23.33	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	25.31	31.78	8.60	32.09	33.60	54.00	-20.40	Vertical
7206.00	19.96	36.15	11.65	32.00	35.76	54.00	-18.24	Vertical
9608.00	19.10	37.95	14.14	31.62	39.57	54.00	-14.43	Vertical
12010.00	*					54.00		Vertical
14412.00	*					54.00		Vertical
4804.00	29.42	31.78	8.60	32.09	37.71	54.00	-16.29	Horizontal
7206.00	22.07	36.15	11.65	32.00	37.87	54.00	-16.13	Horizontal
9608.00	18.75	37.95	14.14	31.62	39.22	54.00	-14.78	Horizontal
12010.00	*					54.00		Horizontal
14412.00	*					54.00		Horizontal

Remarks:

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. *"*", means this data is the too weak instrument of signal is unable to test.*

Test channel:	Middle

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	36.32	31.85	8.67	32.12	44.72	74.00	-29.28	Vertical
7320.00	31.18	36.37	11.72	31.89	47.38	74.00	-26.62	Vertical
9760.00	30.89	38.35	14.25	31.62	51.87	74.00	-22.13	Vertical
12200.00	*					74.00		Vertical
14640.00	*					74.00		Vertical
4880.00	40.40	31.85	8.67	32.12	48.80	74.00	-25.20	Horizontal
7320.00	32.84	36.37	11.72	31.89	49.04	74.00	-24.96	Horizontal
9760.00	30.22	38.35	14.25	31.62	51.20	74.00	-22.80	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	25.33	31.85	8.67	32.12	33.73	54.00	-20.27	Vertical
7320.00	19.98	36.37	11.72	31.89	36.18	54.00	-17.82	Vertical
9760.00	19.12	38.35	14.25	31.62	40.10	54.00	-13.90	Vertical
12200.00	*					54.00		Vertical
14640.00	*					54.00		Vertical
4880.00	29.45	31.85	8.67	32.12	37.85	54.00	-16.15	Horizontal
7320.00	22.09	36.37	11.72	31.89	38.29	54.00	-15.71	Horizontal
9760.00	18.77	38.35	14.25	31.62	39.75	54.00	-14.25	Horizontal
12200.00	*					54.00		Horizontal
14640.00	*					54.00		Horizontal

Remarks:

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. *"*", means this data is the too weak instrument of signal is unable to test.*

Test channel:	Highest

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	36.45	31.93	8.73	32.16	44.95	74.00	-29.05	Vertical
7440.00	31.26	36.59	11.79	31.78	47.86	74.00	-26.14	Vertical
9920.00	30.96	38.81	14.38	31.88	52.27	74.00	-21.73	Vertical
12400.00	*					74.00		Vertical
14880.00	*					74.00		Vertical
4960.00	40.56	31.93	8.73	32.16	49.06	74.00	-24.94	Horizontal
7440.00	32.94	36.59	11.79	31.78	49.54	74.00	-24.46	Horizontal
9920.00	30.30	38.81	14.38	31.88	51.61	74.00	-22.39	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	25.49	31.93	8.73	32.16	33.99	54.00	-20.01	Vertical
7440.00	20.09	36.59	11.79	31.78	36.69	54.00	-17.31	Vertical
9920.00	19.21	38.81	14.38	31.88	40.52	54.00	-13.48	Vertical
12400.00	*					54.00		Vertical
14880.00	*					54.00		Vertical
4960.00	29.63	31.93	8.73	32.16	38.13	54.00	-15.87	Horizontal
7440.00	22.21	36.59	11.79	31.78	38.81	54.00	-15.19	Horizontal
9920.00	18.88	38.81	14.38	31.88	40.19	54.00	-13.81	Horizontal
12400.00	*					54.00		Horizontal
14880.00	*					54.00		Horizontal

Remarks:

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. *"*", means this data is the too weak instrument of signal is unable to test.*

7.3.3 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	38.67	27.59	5.38	30.18	41.46	74.00	-32.54	Horizontal
2400.00	54.86	27.58	5.40	30.18	57.66	74.00	-16.34	Horizontal
2390.00	38.82	27.59	5.38	30.18	41.61	74.00	-32.39	Vertical
2400.00	56.45	27.58	5.40	30.18	59.25	74.00	-14.75	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	30.17	27.59	5.38	30.18	32.96	54.00	-21.04	Horizontal
2400.00	41.16	27.58	5.40	30.18	43.96	54.00	-10.04	Horizontal
2390.00	29.82	27.59	5.38	30.18	32.61	54.00	-21.39	Vertical
2400.00	42.41	27.58	5.40	30.18	45.21	54.00	-8.79	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	40.28	27.53	5.47	29.93	43.35	74.00	-30.65	Horizontal
2500.00	40.25	27.55	5.49	29.93	43.36	74.00	-30.64	Horizontal
2483.50	40.42	27.53	5.47	29.93	43.49	74.00	-30.51	Vertical
2500.00	40.85	27.55	5.49	29.93	43.96	74.00	-30.04	Vertical

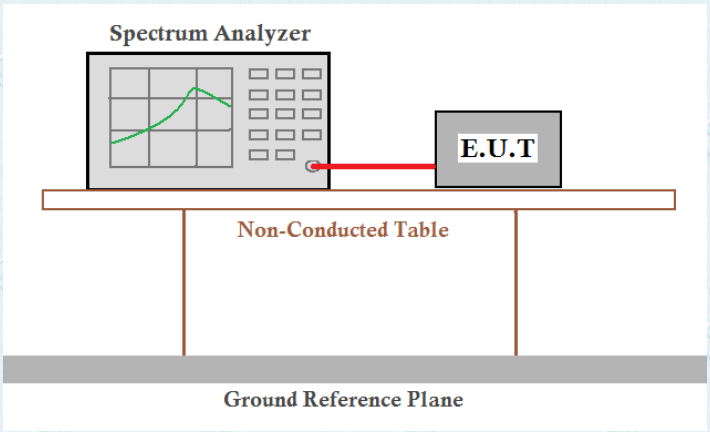
Average value:

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	32.95	27.53	5.47	29.93	36.02	54.00	-17.98	Horizontal
2500.00	31.55	27.55	5.49	29.93	34.66	54.00	-19.34	Horizontal
2483.50	33.81	27.53	5.47	29.93	36.88	54.00	-17.12	Vertical
2500.00	31.13	27.55	5.49	29.93	34.24	54.00	-19.76	Vertical

Remark:

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

7.4 20dB Occupy Bandwidth

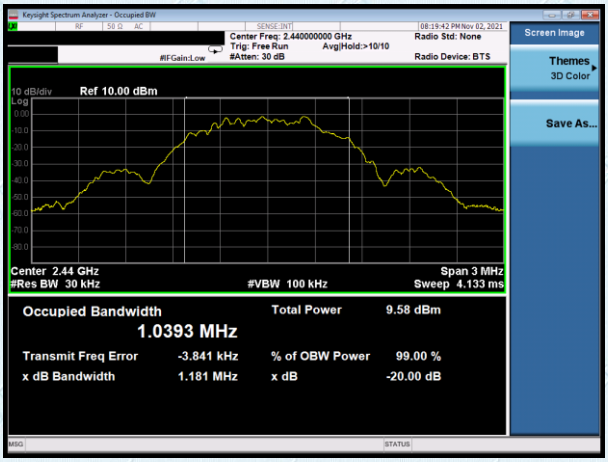
Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.10:2013
Limit:	Operation Frequency range 2400MHz~2483.5MHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

Test channel	20dB bandwidth(MHz)	Result
Lowest	1.1810	Pass
Middle	1.1810	Pass
Highest	1.1810	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------