

# FCC TEST REPORT

## FCC ID:2AXCX-VERTS0722

**Report Number**..... : BTF230721R01301-5

**Date of Test**..... Jul. 11, 2023- Aug.16, 2023

**Date of issue**..... : Aug. 16, 2023

**Total number of pages**..... 73

**Test Result**..... : PASS

**Testing Laboratory**..... : **BTF Testing Lab (Shenzhen) Co., Ltd.**

**Address** ..... : F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park,  
Tantou Community, Songgang Street, Bao'an District, Shenzhen,  
China

**Applicant's name** ..... : **Shenzhen Foxwell Technology Co., Ltd**

**Address** ..... : 5/F, Plant C, Baocheng 71st Zone, Xin'an Street, Baoan  
District, Shenzhen 518106 · China

**Manufacturer's name** ..... : **Shenzhen Foxwell Technology Co., Ltd**

**Address** ..... : 5/F, Plant C, Baocheng 71st Zone, Xin'an Street, Baoan  
District, Shenzhen 518106 · China

**Test specification:**

**Standard**..... : FCC CFR Title 47 Part 15 Subpart C Section 15.247  
ANSI C63.10:2013

**Test procedure**..... : /

**Non-standard test method** ..... : N/A

**Test Report Form No**..... : TRF-EL-110\_V0

**Test Report Form(s) Originator**..... : BTF Testing

**Master TRF** ..... : Dated: 2022-02-21

This device described above has been tested by BTF, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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**Product name**..... : **Premium Diagnostic & TPMS Scanner**

**Trademark** ..... : N/A

**Model/Type reference**..... : TS5000  
TS7000

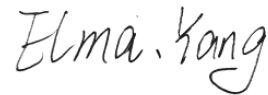
**Ratings**..... : Input: DC 5V  
Battery: DC 3.7V

**Testing procedure and testing location:**

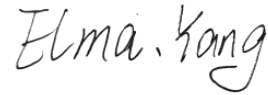
**Testing Laboratory.....: BTF Testing Lab (Shenzhen) Co., Ltd.**

Address.....: F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

Tested by (name + signature).....: elma.yang



Reviewer (name + signature).....: elma.yang



Approved (name + signature).....: Ryan.CJ



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**1. VERSION**

Report No.	Version	Description	Approved
BTF230721R01301-5	Rev.01	Initial issue of report	Aug. 01, 2023

**2. SUMMARY OF TEST RESULTS**

Test procedures according to the technical standards:

<b>FCC Part15 (15.247) , Subpart C</b>			
<b>Standard Section</b>	<b>Test Item</b>	<b>Result</b>	<b>Remark</b>
FCC part 15.203/15.247 (c)	Antenna requirement	PASS	
FCC part 15.207	AC Power Line Conducted Emission	PASS	
FCC part 15.247 (b)(3)	Conducted Peak Output Power	PASS	
FCC part 15.247 (a)(2)	Channel Bandwidth& 99% OCB	PASS	
FCC part 15.247 (e)	Power Spectral Density	PASS	
FCC part 15.247(d)	Band Edge	PASS	
FCC part 15.205/15.209	Spurious Emission	PASS	

NOTE:

(1) " N/A" denotes test is not applicable in this Test Report

## 2.1 TEST FACILITY

BTF Testing Lab (Shenzhen) Co., Ltd.

Add. : F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

FCC Registration Number: 518915

Designation Number: CN1330

Company Number: 27844

CAB Identifier: CN0135

## 2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$  where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$  providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF power conducted	U=1.86dB
8	RF conducted Spurious Emission	U=2.2dB
9	RF Occupied Bandwidth	U=1.8dB
10	RF Power Spectral Density	U=1.75dB
11	humidity uncertainty	U=5.3%
12	Temperature uncertainty	U=0.59°C

**3. GENERAL INFORMATION****3.1 GENERAL DESCRIPTION OF EUT**

Product Name:	Premium Diagnostic & TPMS Scanner
Model No.:	TS5000 TS7000
Model Different.:	All models have the same circuit and RF module, only the appearance color are different
Serial No.:	N/A
Hardware Version:	H1.0
Software Version:	S1.0
Sample(s) Status:	Engineer sample
Channel numbers:	802.11b/802.11g /802.11n(HT20):11  802.11n(HT40):7
Operation Frequency:	2412MHz-2462MHz for 802.11 b/g/n20  2422MHz-2452MHz for 802.11 n40
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum(DSSS)  802.11g/802.11n(H20)/802.11n(HT40):  Orthogonal Frequency Division Multiplexing(OFDM)
Antenna Type:	PCB ANT
Antenna gain:	1.5 dBi
Power supply:	Input: DC 5V Battery: DC 3.7V
Battery:	3.7V 5000mAh 18.5Wh
SWITCHING POWER SUPPLY	Model:PSY0502000 INPUT:AC 100-240V 50/60Hz 0.6A Max OUTPUT:DC 5V 2.0A



Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz	X	

**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:

Test channel	Frequency (MHz)	
	802.11b/802.11g/802.11n(HT20)	802.11n(HT40)
Lowest channel	2412MHz	2422MHz
Middle channel	2437MHz	2437MHz
Highest channel	2462MHz	2452MHz

**3.2 DESCRIPTION OF TEST MODES**

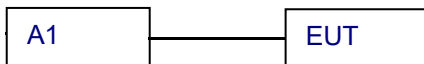
Transmitting mode	Keep the EUT in continuously transmitting mode
Charging mode	Keep the EUT in Charging mode.
Remark: During the test, the duty cycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply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

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:				
Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.				
Mode	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)
Data rate	1Mbps	6Mbps	6.5Mbps	13Mbps

Test Software	Realtek Test Tool
Power level setup	<13dBm

## 3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission



Radiated Emission



Conducted Spurious



## 3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Premium Diagnostic & TPMS Scanner	N/A	TS5000	N/A	EUT
A-1	Adapter	N/A	PSY0502000	N/A	Auxiliary

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 3.5EQUIPMENTS LIST FOR ALL TEST ITEMS

Conducted Emission at AC power line					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2022-11-24	2023-11-23
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2022-11-24	2023-11-23
V-LISN	SCHWARZBECK	NSLK 8127	01073	2022-11-24	2023-11-23
LISN	AFJ	LS16/110VAC	16010020076	2023-02-23	2024-02-22
EMI Receiver	ROHDE&SCHWARZ	ESCI3	101422	2022-11-24	2023-11-23

Occupied Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Maximum Conducted Output Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23

Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23
RF Power Meter	KEYSIGHT	N1912A P	/	2022-11-24	2023-11-23

### Power Spectral Density

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

### Emissions in non-restricted frequency bands

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23

Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

<b>Band edge emissions (Radiated)</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Inventory No</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESC17	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EM C	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

Emissions in restricted frequency bands (below 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1 0m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1 m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWA RZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWA RZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preampilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

Emissions in restricted frequency bands (above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1 0m	21101566	2022-11-24	2023-11-23

RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1 m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWA RZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWA RZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preampilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

## 4. EMC EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

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

#### 4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) \*Decreases with the logarithm of the frequency.

#### 4.1.2 TEST PROCEDURE

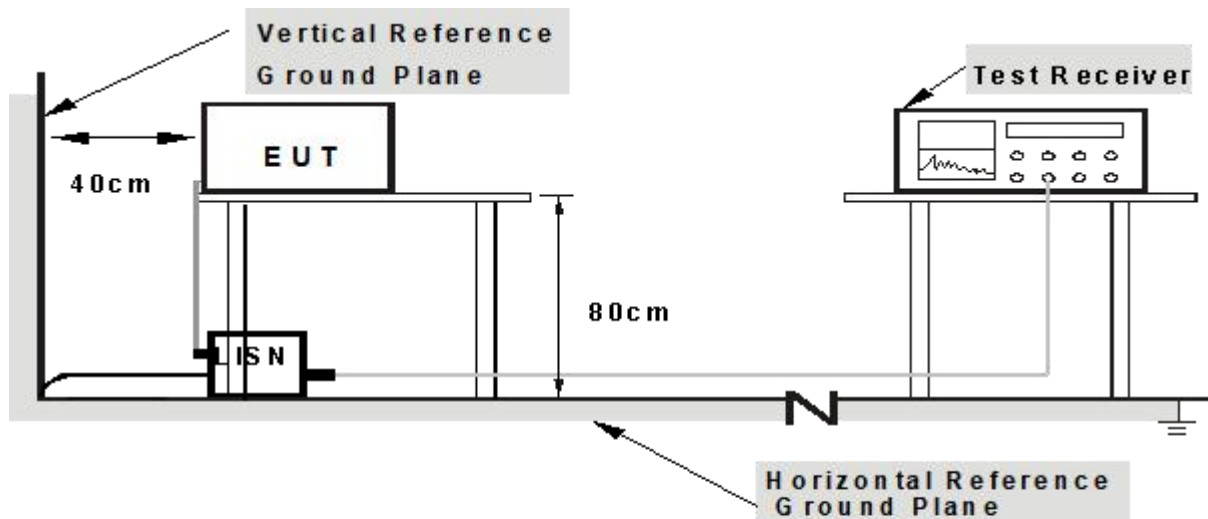
- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation



#### 4.1.4 TEST SETUP



- Note: 1.Support units were connected to second LISN.  
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

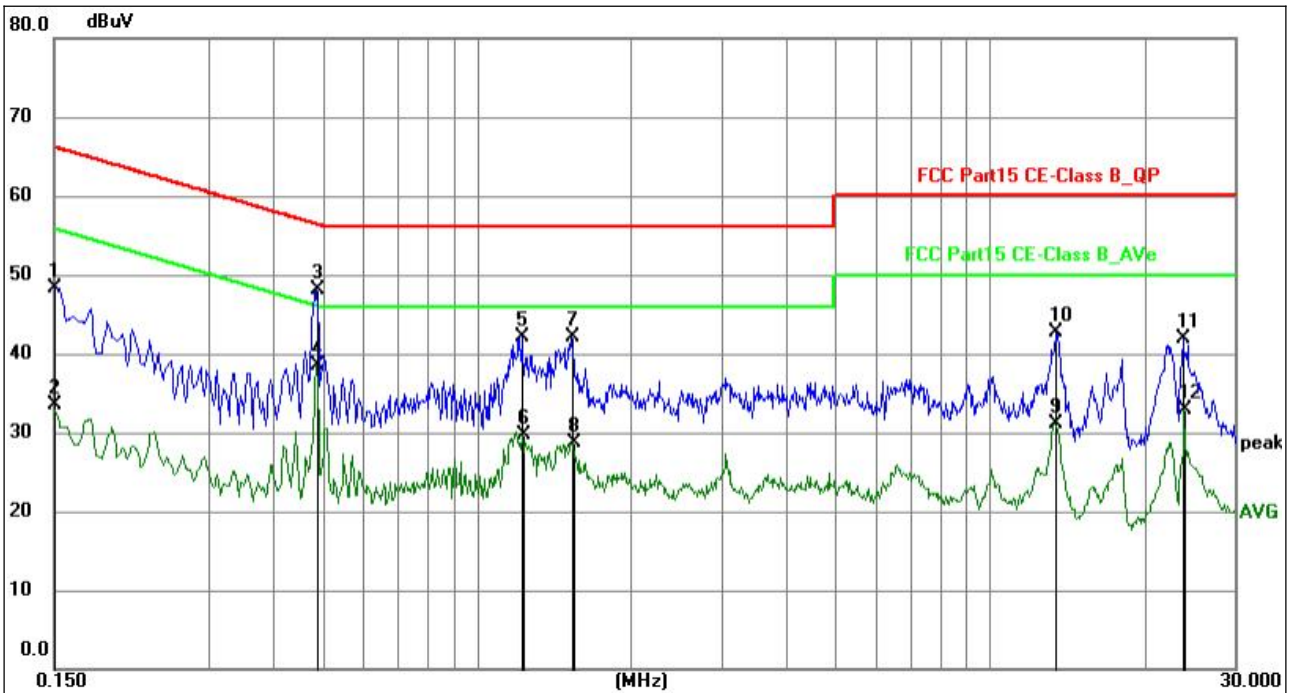
#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

#### 4.1.6 TEST RESULT

Temperature :	26°C	Relative Humidity:	54%
Pressure :	101kPa	Phase :	L
Test Voltage :	AC 120V/60Hz		

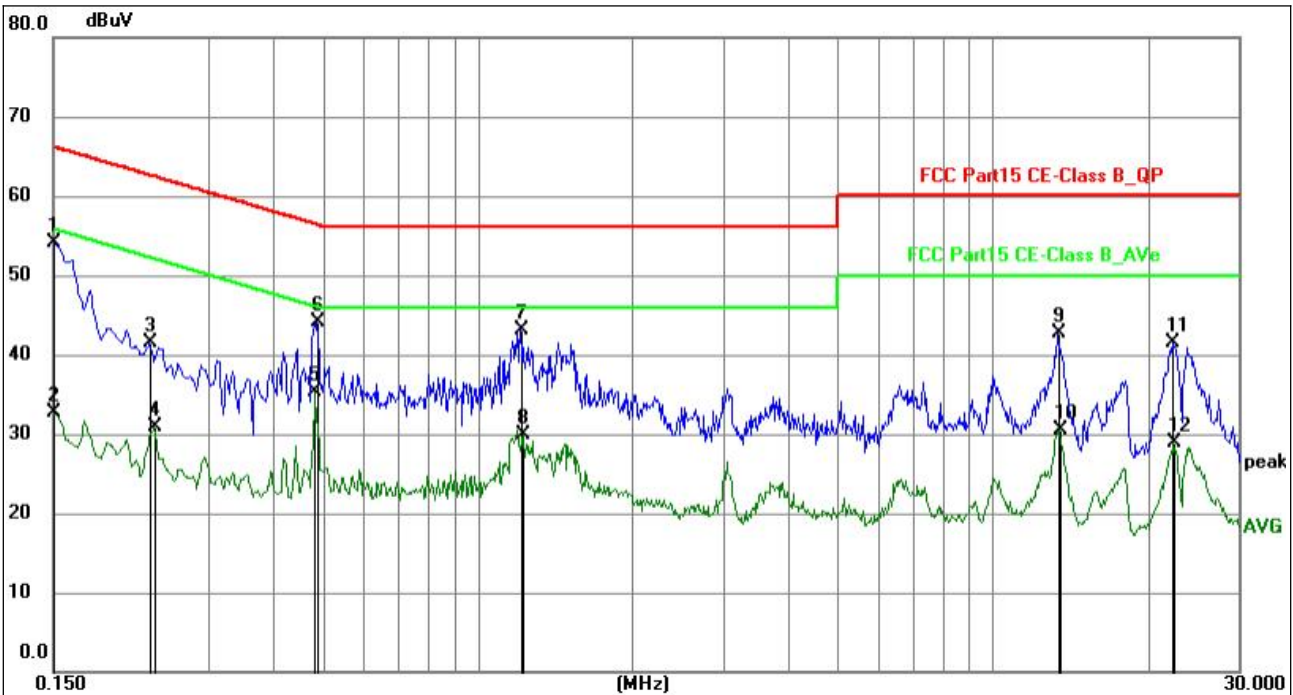


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	27.82	20.48	48.30	66.00	-17.70	QP	P	
2	0.1500	13.01	20.48	33.49	56.00	-22.51	AVG	P	
3	0.4875	27.51	20.55	48.06	56.21	-8.15	QP	P	
4	0.4875	18.04	20.55	38.59	46.21	-7.62	AVG	P	
5	1.2254	21.36	20.77	42.13	56.00	-13.87	QP	P	
6	1.2300	8.99	20.77	29.76	46.00	-16.24	AVG	P	
7	1.5314	21.25	20.81	42.06	56.00	-13.94	QP	P	
8	1.5359	7.87	20.81	28.68	46.00	-17.32	AVG	P	
9	13.3620	9.47	21.60	31.07	50.00	-18.93	AVG	P	
10	13.4340	21.19	21.60	42.79	60.00	-17.21	QP	P	
11	23.8425	20.09	21.79	41.88	60.00	-18.12	QP	P	
12	24.0000	11.10	21.80	32.90	50.00	-17.10	AVG	P	

Notes:

- 1.An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3.Measurement Level = Reading level + Correct Factor

Temperature :	26°C	Relative Humidity:	54%
Pressure :	101kPa	Phase :	N
Test Voltage :	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	33.55	20.58	54.13	66.00	-11.87	QP	P	
2	0.1500	12.10	20.58	32.68	56.00	-23.32	AVG	P	
3	0.2310	20.73	20.78	41.51	62.41	-20.90	QP	P	
4	0.2355	10.11	20.78	30.89	52.25	-21.36	AVG	P	
5	0.4830	14.68	20.69	35.37	46.29	-10.92	AVG	P	
6	0.4875	23.39	20.69	44.08	56.21	-12.13	QP	P	
7	1.2120	22.23	20.81	43.04	56.00	-12.96	QP	P	
8	1.2255	9.18	20.81	29.99	46.00	-16.01	AVG	P	
9	13.4070	21.23	21.53	42.76	60.00	-17.24	QP	P	
10	13.5105	9.01	21.53	30.54	50.00	-19.46	AVG	P	
11	22.3799	19.78	21.65	41.43	60.00	-18.57	QP	P	
12	22.5015	7.19	21.67	28.86	50.00	-21.14	AVG	P	

Notes:

- 1.An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3.Measurement Level = Reading level + Correct Factor

## 4.2 RADIATED EMISSION MEASUREMENT

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	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average

## 4.2.1 RADIATED EMISSION LIMITS

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

## LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

#### 4.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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 10dBmargin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

Both horizontal and vertical antenna polarities were tested

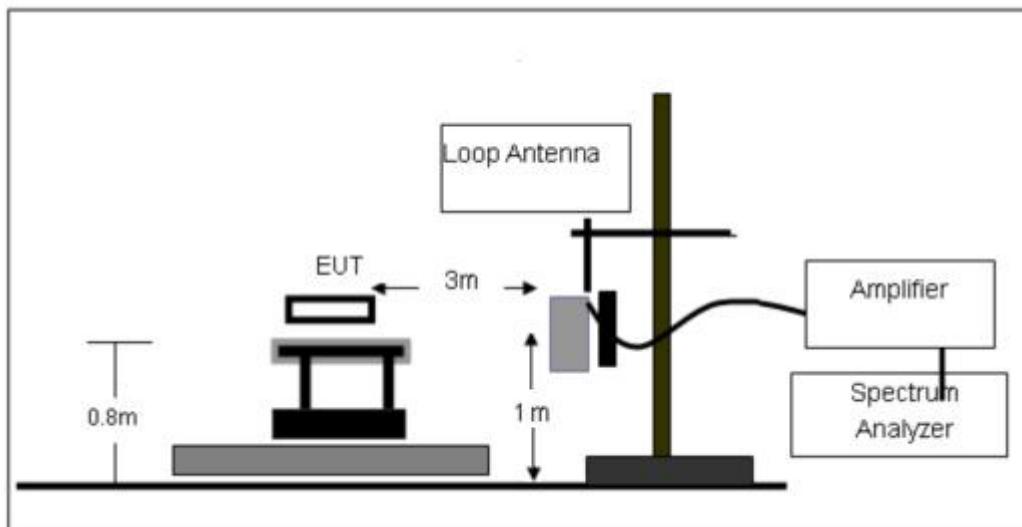
and performed pretest to three orthogonal axis. The worst case emissions were reported

#### 4.2.3 DEVIATION FROM TEST STANDARD

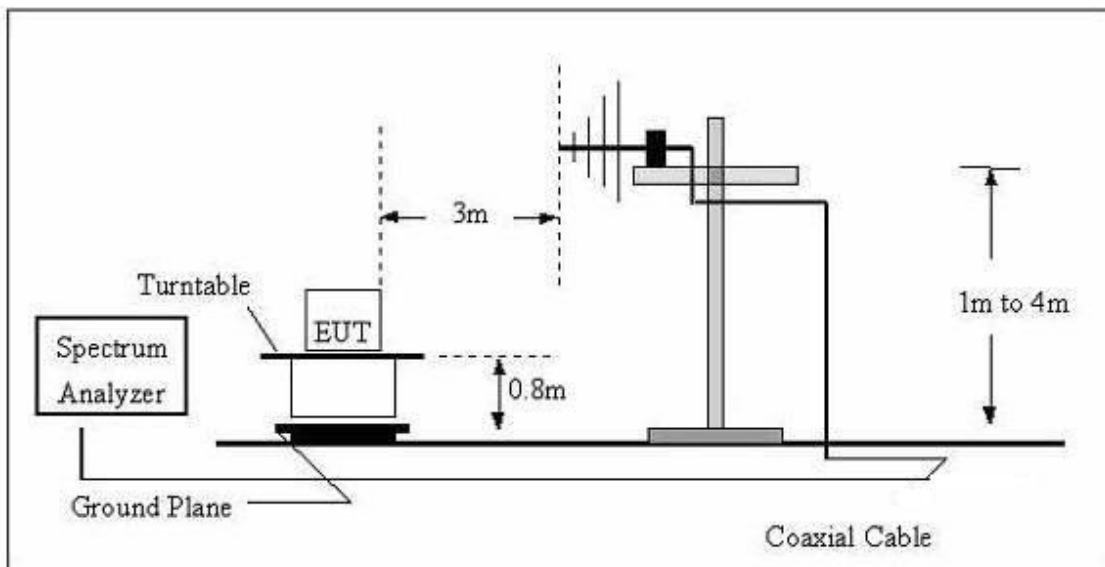
No deviation

#### 4.2.4 TEST SETUP

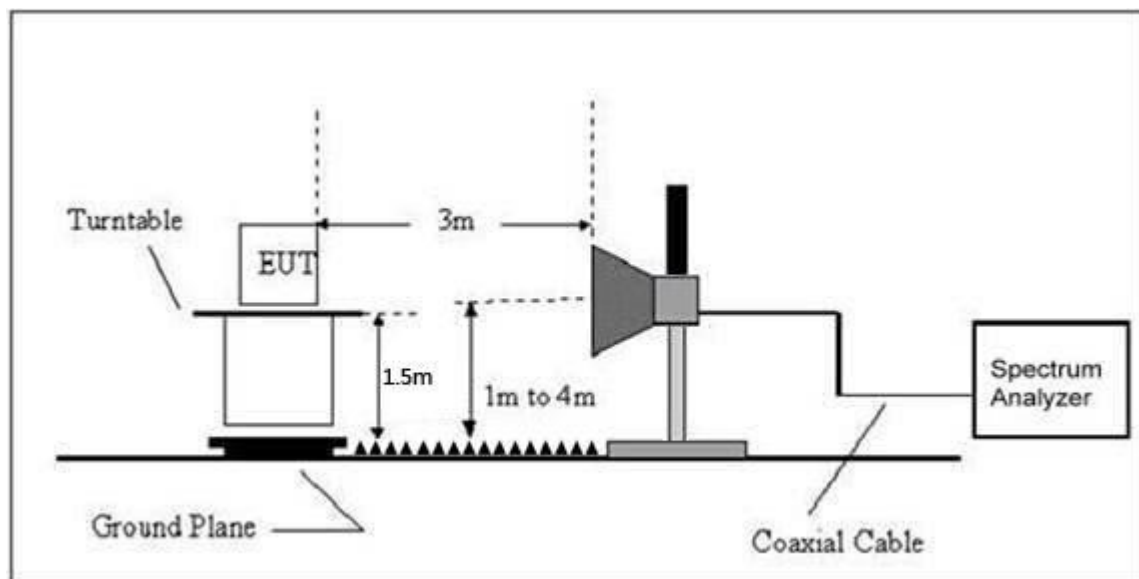
(A) Radiated Emission Test-Up Frequency Below 30MHz



## (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



## (C) Radiated Emission Test-Up Frequency Above 1GHz



## 4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 4.2.6 TEST RESULTS

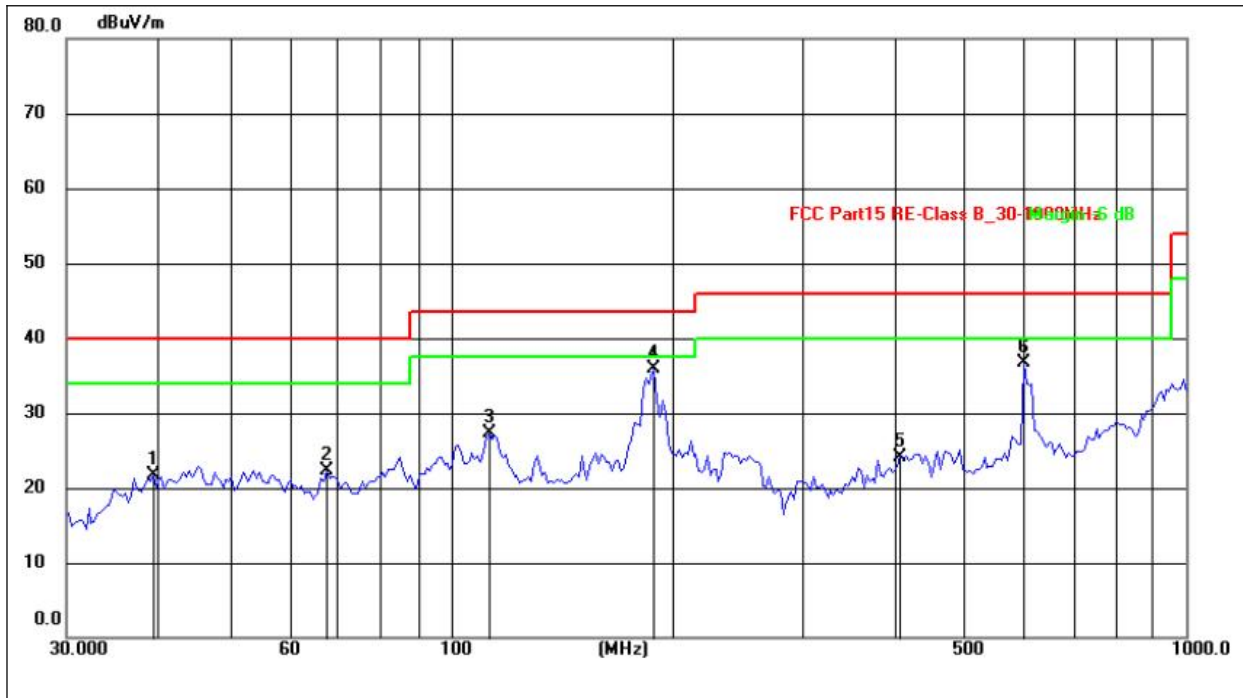
##### BETWEEN 9KHZ – 30MHZ

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) & RSS-Gen 6.13, the test result no need to reported.



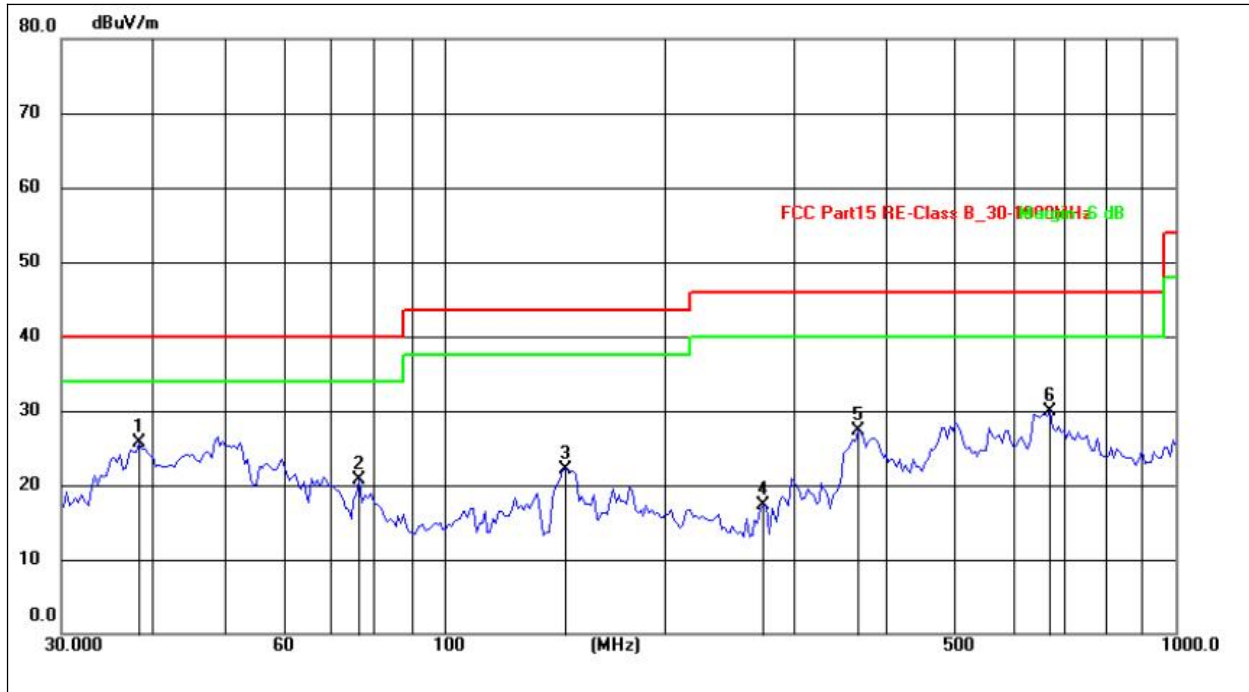
Between 30MHz – 1GHz

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 3.7V	Test Mode	802.11b 2412MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	39.3680	32.71	-10.96	21.75	40.00	-18.25	QP
2	67.7938	35.43	-13.12	22.31	40.00	-17.69	QP
3	112.7218	42.68	-15.32	27.36	43.50	-16.14	QP
4	189.0740	50.06	-14.22	35.84	43.50	-7.66	QP
5	408.9458	32.93	-8.73	24.20	46.00	-21.80	QP
6	601.4265	38.37	-1.76	36.61	46.00	-9.39	QP

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 3.7V	Test Mode	802.11b 2412MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.3462	34.04	-8.43	25.61	40.00	-14.39	QP
2	76.6461	33.36	-12.61	20.75	40.00	-19.25	QP
3	146.6303	32.81	-10.68	22.13	43.50	-21.37	QP
4	273.2339	26.10	-8.75	17.35	46.00	-28.65	QP
5	368.1116	38.09	-10.70	27.39	46.00	-18.61	QP
6	674.0252	31.26	-1.26	30.00	46.00	-16.00	QP

Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. The test data shows only the worst case 802.11b 2412MHz mode

1GHz~25GHz

802.11b

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Low Channel:2412MHz									
V	4824.00	54.48	30.55	5.77	24.66	54.36	74.00	-19.64	PK
V	4824.00	43.89	30.55	5.77	24.66	43.77	54.00	-10.23	AV
V	7236.00	53.41	30.33	6.32	24.55	53.95	74.00	-20.05	PK
V	7236.00	43.06	30.33	6.32	24.55	43.60	54.00	-10.40	AV
V	9648.00	53.86	30.85	7.45	24.69	55.15	74.00	-18.85	PK
V	9648.00	43.46	30.85	7.45	24.69	44.75	54.00	-9.25	AV
V	12060.00	51.32	31.02	8.99	25.57	54.86	74.00	-19.14	PK
V	12060.00	43.01	31.02	8.99	25.57	46.55	54.00	-7.45	AV
H	4824.00	51.70	30.55	5.77	24.66	51.58	74.00	-22.42	PK
H	4824.00	43.22	30.55	5.77	24.66	43.10	54.00	-10.90	AV
H	7236.00	54.47	30.33	6.32	24.55	55.01	74.00	-18.99	PK
H	7236.00	43.37	30.33	6.32	24.55	43.91	54.00	-10.09	AV
H	9648.00	52.82	30.85	7.45	24.69	54.11	74.00	-19.89	PK
H	9648.00	43.26	30.85	7.45	24.69	44.55	54.00	-9.45	AV
H	12060.00	51.73	31.02	8.99	25.57	55.27	74.00	-18.73	PK
H	12060.00	43.00	31.02	8.99	25.57	46.54	54.00	-7.46	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Middle Channel:2437MHz									
V	4874.00	50.49	30.55	5.77	24.66	50.37	74.00	-23.63	PK
V	4874.00	43.12	30.55	5.77	24.66	43.00	54.00	-11.00	AV
V	7311.00	51.19	30.33	6.32	24.55	51.73	74.00	-22.27	PK
V	7311.00	43.07	30.33	6.32	24.55	43.61	54.00	-10.39	AV
V	9748.00	54.17	30.85	7.45	24.69	55.46	74.00	-18.54	PK
V	9748.00	43.52	30.85	7.45	24.69	44.81	54.00	-9.19	AV
V	12185.00	52.42	31.02	8.99	25.57	55.96	74.00	-18.04	PK
V	12185.00	43.78	31.02	8.99	25.57	47.32	54.00	-6.68	AV
H	4874.00	52.94	30.55	5.77	24.66	52.82	74.00	-21.18	PK
H	4874.00	43.62	30.55	5.77	24.66	43.50	54.00	-10.50	AV
H	7311.00	54.48	30.33	6.32	24.55	55.02	74.00	-18.98	PK
H	7311.00	43.06	30.33	6.32	24.55	43.60	54.00	-10.40	AV
H	9748.00	53.83	30.85	7.45	24.69	55.12	74.00	-18.88	PK
H	9748.00	43.62	30.85	7.45	24.69	44.91	54.00	-9.09	AV
H	12185.00	53.20	31.02	8.99	25.57	56.74	74.00	-17.26	PK
H	12185.00	43.57	31.02	8.99	25.57	47.11	54.00	-6.89	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-ampli fier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/ m)	Margin (dB)	Detect or Type
High Channel:2462MHz									
V	4924.00	53.72	30.55	5.77	24.66	53.60	74.00	-20.40	PK
V	4924.00	43.95	30.55	5.77	24.66	43.83	54.00	-10.17	AV
V	7386.00	52.42	30.33	6.32	24.55	52.96	74.00	-21.04	PK
V	7386.00	43.70	30.33	6.32	24.55	44.24	54.00	-9.76	AV
V	9848.00	54.22	30.85	7.45	24.69	55.51	74.00	-18.49	PK
V	9848.00	43.60	30.85	7.45	24.69	44.89	54.00	-9.11	AV
V	12310.00	53.96	31.02	8.99	25.57	57.50	74.00	-16.50	PK
V	12310.00	43.16	31.02	8.99	25.57	46.70	54.00	-7.30	AV
H	4924.00	52.84	30.55	5.77	24.66	52.72	74.00	-21.28	PK
H	4924.00	43.79	30.55	5.77	24.66	43.67	54.00	-10.33	AV
H	7386.00	54.48	30.33	6.32	24.55	55.02	74.00	-18.98	PK
H	7386.00	43.80	30.33	6.32	24.55	44.34	54.00	-9.66	AV
H	9848.00	53.42	30.85	7.45	24.69	54.71	74.00	-19.29	PK
H	9848.00	43.45	30.85	7.45	24.69	44.74	54.00	-9.26	AV
H	12310.00	51.41	31.02	8.99	25.57	54.95	74.00	-19.05	PK
H	12310.00	43.26	31.02	8.99	25.57	46.80	54.00	-7.20	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

## 802.11g

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Low Channel:2412MHz									
V	4824.00	50.03	30.55	5.77	24.66	49.91	74.00	-24.09	PK
V	4824.00	43.53	30.55	5.77	24.66	43.41	54.00	-10.59	AV
V	7236.00	53.41	30.33	6.32	24.55	53.95	74.00	-20.05	PK
V	7236.00	43.77	30.33	6.32	24.55	44.31	54.00	-9.69	AV
V	9648.00	54.14	30.85	7.45	24.69	55.43	74.00	-18.57	PK
V	9648.00	43.72	30.85	7.45	24.69	45.01	54.00	-8.99	AV
V	12060.00	50.95	31.02	8.99	25.57	54.49	74.00	-19.51	PK
V	12060.00	43.57	31.02	8.99	25.57	47.11	54.00	-6.89	AV
H	4824.00	54.28	30.55	5.77	24.66	54.16	74.00	-19.84	PK
H	4824.00	43.22	30.55	5.77	24.66	43.10	54.00	-10.90	AV
H	7236.00	52.99	30.33	6.32	24.55	53.53	74.00	-20.47	PK
H	7236.00	43.01	30.33	6.32	24.55	43.55	54.00	-10.45	AV
H	9648.00	53.50	30.85	7.45	24.69	54.79	74.00	-19.21	PK
H	9648.00	43.11	30.85	7.45	24.69	44.40	54.00	-9.60	AV
H	12060.00	51.05	31.02	8.99	25.57	54.59	74.00	-19.41	PK
H	12060.00	43.42	31.02	8.99	25.57	46.96	54.00	-7.04	AV

Polar	Frequency	Meter Reading	Pre-amp lifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
(H/V)	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Middle Channel:2437MHz									
V	4874.00	52.28	30.55	5.77	24.66	52.16	74.00	-21.84	PK
V	4874.00	43.45	30.55	5.77	24.66	43.33	54.00	-10.67	AV
V	7311.00	52.32	30.33	6.32	24.55	52.86	74.00	-21.14	PK
V	7311.00	43.10	30.33	6.32	24.55	43.64	54.00	-10.36	AV
V	9748.00	52.19	30.85	7.45	24.69	53.48	74.00	-20.52	PK
V	9748.00	43.60	30.85	7.45	24.69	44.89	54.00	-9.11	AV
V	12185.00	52.71	31.02	8.99	25.57	56.25	74.00	-17.75	PK
V	12185.00	43.93	31.02	8.99	25.57	47.47	54.00	-6.53	AV
H	4874.00	51.48	30.55	5.77	24.66	51.36	74.00	-22.64	PK
H	4874.00	43.60	30.55	5.77	24.66	43.48	54.00	-10.52	AV
H	7311.00	50.24	30.33	6.32	24.55	50.78	74.00	-23.22	PK
H	7311.00	43.38	30.33	6.32	24.55	43.92	54.00	-10.08	AV
H	9748.00	53.59	30.85	7.45	24.69	54.88	74.00	-19.12	PK
H	9748.00	43.00	30.85	7.45	24.69	44.29	54.00	-9.71	AV
H	12185.00	51.80	31.02	8.99	25.57	55.34	74.00	-18.66	PK
H	12185.00	43.66	31.02	8.99	25.57	47.20	54.00	-6.80	AV

Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:2462MHz									
V	4924.00	54.69	30.55	5.77	24.66	54.57	74.00	-19.43	PK
V	4924.00	43.19	30.55	5.77	24.66	43.07	54.00	-10.93	AV
V	7386.00	51.84	30.33	6.32	24.55	52.38	74.00	-21.62	PK
V	7386.00	43.25	30.33	6.32	24.55	43.79	54.00	-10.21	AV
V	9848.00	54.87	30.85	7.45	24.69	56.16	74.00	-17.84	PK
V	9848.00	43.78	30.85	7.45	24.69	45.07	54.00	-8.93	AV
V	12310.00	53.14	31.02	8.99	25.57	56.68	74.00	-17.32	PK
V	12310.00	43.22	31.02	8.99	25.57	46.76	54.00	-7.24	AV
H	4924.00	50.97	30.55	5.77	24.66	50.85	74.00	-23.15	PK
H	4924.00	43.32	30.55	5.77	24.66	43.20	54.00	-10.80	AV
H	7386.00	54.25	30.33	6.32	24.55	54.79	74.00	-19.21	PK
H	7386.00	43.68	30.33	6.32	24.55	44.22	54.00	-9.78	AV
H	9848.00	54.01	30.85	7.45	24.69	55.30	74.00	-18.70	PK
H	9848.00	43.00	30.85	7.45	24.69	44.29	54.00	-9.71	AV
H	12310.00	52.28	31.02	8.99	25.57	55.82	74.00	-18.18	PK
H	12310.00	43.11	31.02	8.99	25.57	46.65	54.00	-7.35	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



802.11n20

Polar	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
(H/V)	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:2412MHz									
V	4824.00	54.00	30.55	5.77	24.66	53.88	74.00	-20.12	PK
V	4824.00	43.55	30.55	5.77	24.66	43.43	54.00	-10.57	AV
V	7236.00	53.43	30.33	6.32	24.55	53.97	74.00	-20.03	PK
V	7236.00	43.63	30.33	6.32	24.55	44.17	54.00	-9.83	AV
V	9648.00	53.73	30.85	7.45	24.69	55.02	74.00	-18.98	PK
V	9648.00	43.30	30.85	7.45	24.69	44.59	54.00	-9.41	AV
V	12060.00	54.36	31.02	8.99	25.57	57.90	74.00	-16.10	PK
V	12060.00	43.85	31.02	8.99	25.57	47.39	54.00	-6.61	AV
H	4824.00	50.07	30.55	5.77	24.66	49.95	74.00	-24.05	PK
H	4824.00	43.32	30.55	5.77	24.66	43.20	54.00	-10.80	AV
H	7236.00	53.23	30.33	6.32	24.55	53.77	74.00	-20.23	PK
H	7236.00	43.75	30.33	6.32	24.55	44.29	54.00	-9.71	AV
H	9648.00	52.16	30.85	7.45	24.69	53.45	74.00	-20.55	PK
H	9648.00	43.64	30.85	7.45	24.69	44.93	54.00	-9.07	AV
H	12060.00	50.57	31.02	8.99	25.57	54.11	74.00	-19.89	PK
H	12060.00	43.97	31.02	8.99	25.57	47.51	54.00	-6.49	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Middle Channel:2437MHz									
V	4874.00	52.10	30.55	5.77	24.66	51.98	74.00	-22.02	PK
V	4874.00	43.03	30.55	5.77	24.66	42.91	54.00	-11.09	AV
V	7311.00	53.80	30.33	6.32	24.55	54.34	74.00	-19.66	PK
V	7311.00	43.22	30.33	6.32	24.55	43.76	54.00	-10.24	AV
V	9748.00	52.65	30.85	7.45	24.69	53.94	74.00	-20.06	PK
V	9748.00	43.06	30.85	7.45	24.69	44.35	54.00	-9.65	AV
V	12185.00	51.75	31.02	8.99	25.57	55.29	74.00	-18.71	PK
V	12185.00	43.24	31.02	8.99	25.57	46.78	54.00	-7.22	AV
H	4874.00	51.70	30.55	5.77	24.66	51.58	74.00	-22.42	PK
H	4874.00	43.10	30.55	5.77	24.66	42.98	54.00	-11.02	AV
H	7311.00	54.19	30.33	6.32	24.55	54.73	74.00	-19.27	PK
H	7311.00	43.55	30.33	6.32	24.55	44.09	54.00	-9.91	AV
H	9748.00	51.17	30.85	7.45	24.69	52.46	74.00	-21.54	PK
H	9748.00	43.73	30.85	7.45	24.69	45.02	54.00	-8.98	AV
H	12185.00	51.48	31.02	8.99	25.57	55.02	74.00	-18.98	PK
H	12185.00	43.53	31.02	8.99	25.57	47.07	54.00	-6.93	AV

Polar	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
(H/V)	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:2462MHz									
V	4924.00	50.36	30.55	5.77	24.66	50.24	74.00	-23.76	PK
V	4924.00	43.61	30.55	5.77	24.66	43.49	54.00	-10.51	AV
V	7386.00	53.81	30.33	6.32	24.55	54.35	74.00	-19.65	PK
V	7386.00	43.18	30.33	6.32	24.55	43.72	54.00	-10.28	AV
V	9848.00	53.81	30.85	7.45	24.69	55.10	74.00	-18.90	PK
V	9848.00	43.91	30.85	7.45	24.69	45.20	54.00	-8.80	AV
V	12310.00	54.82	31.02	8.99	25.57	58.36	74.00	-15.64	PK
V	12310.00	43.97	31.02	8.99	25.57	47.51	54.00	-6.49	AV
H	4924.00	51.48	30.55	5.77	24.66	51.36	74.00	-22.64	PK
H	4924.00	43.93	30.55	5.77	24.66	43.81	54.00	-10.19	AV
H	7386.00	50.33	30.33	6.32	24.55	50.87	74.00	-23.13	PK
H	7386.00	43.38	30.33	6.32	24.55	43.92	54.00	-10.08	AV
H	9848.00	51.91	30.85	7.45	24.69	53.20	74.00	-20.80	PK
H	9848.00	43.92	30.85	7.45	24.69	45.21	54.00	-8.79	AV
H	12310.00	52.49	31.02	8.99	25.57	56.03	74.00	-17.97	PK
H	12310.00	43.33	31.02	8.99	25.57	46.87	54.00	-7.13	AV

## Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11n40

Polar (H/V)	Frequenc y (MHz)	Meter Reading (dBuV)	Pre-ampli fier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/ m)	Margin (dB)	Detect or Type
Low Channel:2422MHz									
V	4844.00	50.75	30.55	5.77	24.66	50.63	74.00	-23.37	PK
V	4844.00	43.47	30.55	5.77	24.66	43.35	54.00	-10.65	AV
V	7266.00	53.51	30.33	6.32	24.55	54.05	74.00	-19.95	PK
V	7266.00	43.65	30.33	6.32	24.55	44.19	54.00	-9.81	AV
V	9688.00	54.00	30.85	7.45	24.69	55.29	74.00	-18.71	PK
V	9688.00	43.94	30.85	7.45	24.69	45.23	54.00	-8.77	AV
V	12110.00	51.21	31.02	8.99	25.57	54.75	74.00	-19.25	PK
V	12110.00	43.67	31.02	8.99	25.57	47.21	54.00	-6.79	AV
H	4844.00	54.03	30.55	5.77	24.66	53.91	74.00	-20.09	PK
H	4844.00	43.34	30.55	5.77	24.66	43.22	54.00	-10.78	AV
H	7266.00	54.41	30.33	6.32	24.55	54.95	74.00	-19.05	PK
H	7266.00	43.77	30.33	6.32	24.55	44.31	54.00	-9.69	AV
H	9688.00	53.43	30.85	7.45	24.69	54.72	74.00	-19.28	PK
H	9688.00	43.34	30.85	7.45	24.69	44.63	54.00	-9.37	AV
H	12110.00	54.26	31.02	8.99	25.57	57.80	74.00	-16.20	PK
H	12110.00	43.28	31.02	8.99	25.57	46.82	54.00	-7.18	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
Middle Channel:2437MHz									
V	4874.00	52.83	30.55	5.77	24.66	52.71	74.00	-21.29	PK
V	4874.00	43.35	30.55	5.77	24.66	43.23	54.00	-10.77	AV
V	7311.00	52.67	30.33	6.32	24.55	53.21	74.00	-20.79	PK
V	7311.00	43.54	30.33	6.32	24.55	44.08	54.00	-9.92	AV
V	9748.00	52.47	30.85	7.45	24.69	53.76	74.00	-20.24	PK
V	9748.00	43.79	30.85	7.45	24.69	45.08	54.00	-8.92	AV
V	12185.00	50.04	31.02	8.99	25.57	53.58	74.00	-20.42	PK
V	12185.00	43.28	31.02	8.99	25.57	46.82	54.00	-7.18	AV
H	4874.00	54.08	30.55	5.77	24.66	53.96	74.00	-20.04	PK
H	4874.00	43.94	30.55	5.77	24.66	43.82	54.00	-10.18	AV
H	7311.00	52.51	30.33	6.32	24.55	53.05	74.00	-20.95	PK
H	7311.00	43.37	30.33	6.32	24.55	43.91	54.00	-10.09	AV
H	9748.00	54.35	30.85	7.45	24.69	55.64	74.00	-18.36	PK
H	9748.00	43.99	30.85	7.45	24.69	45.28	54.00	-8.72	AV
H	12185.00	52.68	31.02	8.99	25.57	56.22	74.00	-17.78	PK
H	12185.00	43.95	31.02	8.99	25.57	47.49	54.00	-6.51	AV

Polar (H/V)	Frequency	Meter Reading	Pre-amp lifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detect or Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	
High Channel:2452MHz									
V	4904.00	52.02	30.55	5.77	24.66	51.90	74.00	-22.10	PK
V	4904.00	43.81	30.55	5.77	24.66	43.69	54.00	-10.31	AV
V	7356.00	51.17	30.33	6.32	24.55	51.71	74.00	-22.29	PK
V	7356.00	43.74	30.33	6.32	24.55	44.28	54.00	-9.72	AV
V	9808.00	51.77	30.85	7.45	24.69	53.06	74.00	-20.94	PK
V	9808.00	43.30	30.85	7.45	24.69	44.59	54.00	-9.41	AV
V	12260.00	53.37	31.02	8.99	25.57	56.91	74.00	-17.09	PK
V	12260.00	43.27	31.02	8.99	25.57	46.81	54.00	-7.19	AV
H	4904.00	52.63	30.55	5.77	24.66	52.51	74.00	-21.49	PK
H	4904.00	43.24	30.55	5.77	24.66	43.12	54.00	-10.88	AV
H	7356.00	51.96	30.33	6.32	24.55	52.50	74.00	-21.50	PK
H	7356.00	43.73	30.33	6.32	24.55	44.27	54.00	-9.73	AV
H	9808.00	52.87	30.85	7.45	24.69	54.16	74.00	-19.84	PK
H	9808.00	43.49	30.85	7.45	24.69	44.78	54.00	-9.22	AV
H	12260.00	53.53	31.02	8.99	25.57	57.07	74.00	-16.93	PK
H	12260.00	43.93	31.02	8.99	25.57	47.47	54.00	-6.53	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

**5.RADIATED Band EMISSIONMEASUREMENT**

## 5.1 Test Requirement:

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	All of the restrict bands were tested, only the worst band' s (2310MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Average	1MHz	3MHz	Average

**LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)**

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

## Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

**5.2 TEST PROCEDURE**

Above 1GHz test procedure as below:

- a. 1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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.

- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could bestopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dBmargin would be re-tested one by one using peak, quasi-peak or average method as specified and then reportedin a data sheet.
- g. Test the EUT in the lowest channel,the Highest channel

Note:

Both horizontal and vertical antenna polarities were tested

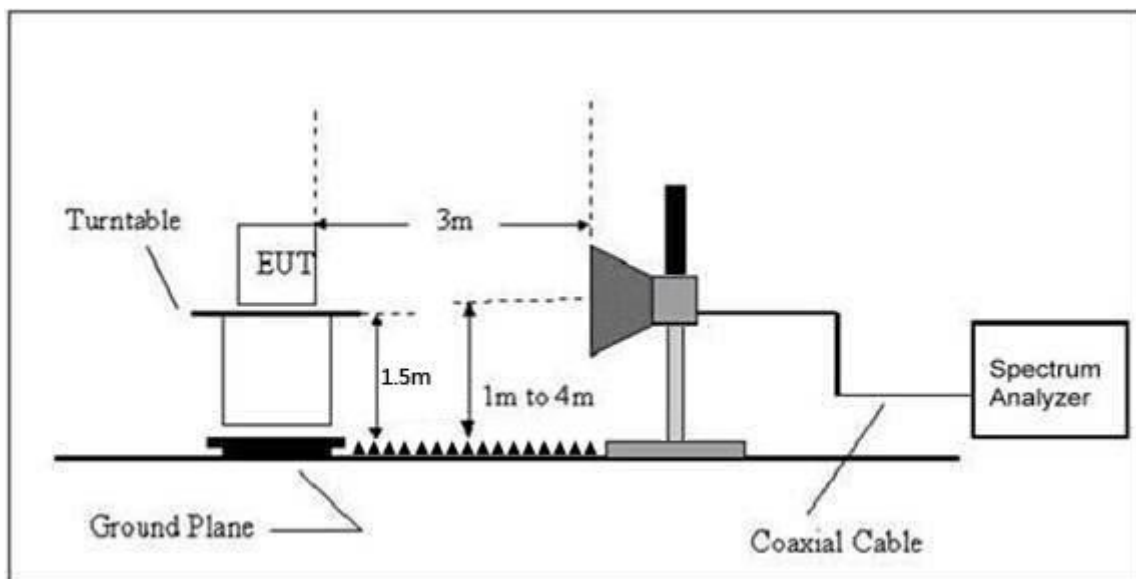
and performed pretest to three orthogonal axis. The worst case emissions were reported

### 5.3 DEVIATION FROM TEST STANDARD

No deviation

### 5.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



### 5.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



## 5.6 TEST RESULT

	Polar (H/V)	Frequenc y (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV /m)	Detec tor Type	Result
802.11b	Low Channel 2412MHz									
	H	2390.00	54.73	30.22	4.85	23.98	53.34	74.00	PK	PASS
	H	2390.00	44.10	30.22	4.85	23.98	42.71	54.00	AV	PASS
	H	2400.00	54.05	30.22	4.85	23.98	52.66	74.00	PK	PASS
	H	2400.00	44.04	30.22	4.85	23.98	42.65	54.00	AV	PASS
	V	2390.00	53.95	30.22	4.85	23.98	52.56	74.00	PK	PASS
	V	2390.00	44.82	30.22	4.85	23.98	43.43	54.00	AV	PASS
	V	2400.00	54.93	30.22	4.85	23.98	53.54	74.00	PK	PASS
	V	2400.00	44.44	30.22	4.85	23.98	43.05	54.00	AV	PASS
	High Channel 2462MHz									
	H	2483.50	53.56	30.22	4.85	23.98	52.17	74.00	PK	PASS
	H	2483.50	44.56	30.22	4.85	23.98	43.17	54.00	AV	PASS
	H	2500.00	53.28	30.22	4.85	23.98	51.89	74.00	PK	PASS
	H	2500.00	44.05	30.22	4.85	23.98	42.66	54.00	AV	PASS
	V	2483.50	54.07	30.22	4.85	23.98	52.68	74.00	PK	PASS
	V	2483.50	44.39	30.22	4.85	23.98	43.00	54.00	AV	PASS
V	2500.00	54.03	30.22	4.85	23.98	52.64	74.00	PK	PASS	
V	2500.00	44.58	30.22	4.85	23.98	43.19	54.00	AV	PASS	
802.11g	Low Channel 2412MHz									
	H	2390.00	53.25	30.22	4.85	23.98	51.86	74.00	PK	PASS
	H	2390.00	44.38	30.22	4.85	23.98	42.99	54.00	AV	PASS
	H	2400.00	54.96	30.22	4.85	23.98	53.57	74.00	PK	PASS
	H	2400.00	44.84	30.22	4.85	23.98	43.45	54.00	AV	PASS
	V	2390.00	54.71	30.22	4.85	23.98	53.32	74.00	PK	PASS
	V	2390.00	44.96	30.22	4.85	23.98	43.57	54.00	AV	PASS
V	2400.00	54.91	30.22	4.85	23.98	53.52	74.00	PK	PASS	

	V	2400.00	44.87	30.22	4.85	23.98	43.48	54.00	AV	PASS
	High Channel 2462MHz									
	H	2483.50	54.70	30.22	4.85	23.98	53.31	74.00	PK	PASS
	H	2483.50	44.40	30.22	4.85	23.98	43.01	54.00	AV	PASS
	H	2500.00	54.57	30.22	4.85	23.98	53.18	74.00	PK	PASS
	H	2500.00	44.26	30.22	4.85	23.98	42.87	54.00	AV	PASS
	V	2483.50	53.33	30.22	4.85	23.98	51.94	74.00	PK	PASS
	V	2483.50	44.26	30.22	4.85	23.98	42.87	54.00	AV	PASS
	V	2500.00	53.29	30.22	4.85	23.98	51.90	74.00	PK	PASS
	V	2500.00	44.53	30.22	4.85	23.98	43.14	54.00	AV	PASS
	Low Channel 2412MHz									
	H	2390.00	53.30	30.22	4.85	23.98	51.91	74.00	PK	PASS
	H	2390.00	44.73	30.22	4.85	23.98	43.34	54.00	AV	PASS
	H	2400.00	53.55	30.22	4.85	23.98	52.16	74.00	PK	PASS
	H	2400.00	44.61	30.22	4.85	23.98	43.22	54.00	AV	PASS
	V	2390.00	54.84	30.22	4.85	23.98	53.45	74.00	PK	PASS
	V	2390.00	44.62	30.22	4.85	23.98	43.23	54.00	AV	PASS
	V	2400.00	54.66	30.22	4.85	23.98	53.27	74.00	PK	PASS
	V	2400.00	44.32	30.22	4.85	23.98	42.93	54.00	AV	PASS
	High Channel 2462MHz									
	H	2483.50	54.10	30.22	4.85	23.98	52.71	74.00	PK	PASS
	H	2483.50	44.22	30.22	4.85	23.98	42.83	54.00	AV	PASS
	H	2500.00	53.75	30.22	4.85	23.98	52.36	74.00	PK	PASS
	H	2500.00	44.89	30.22	4.85	23.98	43.50	54.00	AV	PASS
	V	2483.50	53.30	30.22	4.85	23.98	51.91	74.00	PK	PASS
	V	2483.50	44.22	30.22	4.85	23.98	42.83	54.00	AV	PASS
	V	2500.00	53.59	30.22	4.85	23.98	52.20	74.00	PK	PASS
	V	2500.00	44.41	30.22	4.85	23.98	43.02	54.00	AV	PASS
	Low Channel 2422MHz									
802.11n40	H	2390.00	53.12	30.22	4.85	23.98	51.73	74.00	PK	PASS

H	2390.00	44.32	30.22	4.85	23.98	42.93	54.00	AV	PASS
H	2400.00	54.95	30.22	4.85	23.98	53.56	74.00	PK	PASS
H	2400.00	44.55	30.22	4.85	23.98	43.16	54.00	AV	PASS
V	2390.00	54.44	30.22	4.85	23.98	53.05	74.00	PK	PASS
V	2390.00	44.51	30.22	4.85	23.98	43.12	54.00	AV	PASS
V	2400.00	53.60	30.22	4.85	23.98	52.21	74.00	PK	PASS
V	2400.00	44.19	30.22	4.85	23.98	42.80	54.00	AV	PASS
High Channel 2452MHz									
H	2483.50	53.85	30.22	4.85	23.98	52.46	74.00	PK	PASS
H	2483.50	44.54	30.22	4.85	23.98	43.15	54.00	AV	PASS
H	2500.00	54.35	30.22	4.85	23.98	52.96	74.00	PK	PASS
H	2500.00	44.79	30.22	4.85	23.98	43.40	54.00	AV	PASS
V	2483.50	54.32	30.22	4.85	23.98	52.93	74.00	PK	PASS
V	2483.50	44.16	30.22	4.85	23.98	42.77	54.00	AV	PASS
V	2500.00	54.74	30.22	4.85	23.98	53.35	74.00	PK	PASS
V	2500.00	44.54	30.22	4.85	23.98	43.15	54.00	AV	PASS
Remark:									
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit									

**6. POWER SPECTRAL DENSITY TEST**

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074 D0115.247 Meas Guidancev05r02

**6.1 APPLIED PROCEDURES / LIMIT**

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8dBm/3kHz	2400-2483.5	PASS

**6.2 TEST PROCEDURE**

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
4. Set the VBW  $\geq 3 \times \text{RBW}$ .
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

**6.3 DEVIATION FROM STANDARD**

No deviation.

**6.4 TEST SETUP**



#### 6.5 EUT OPERATION CONDITIONS

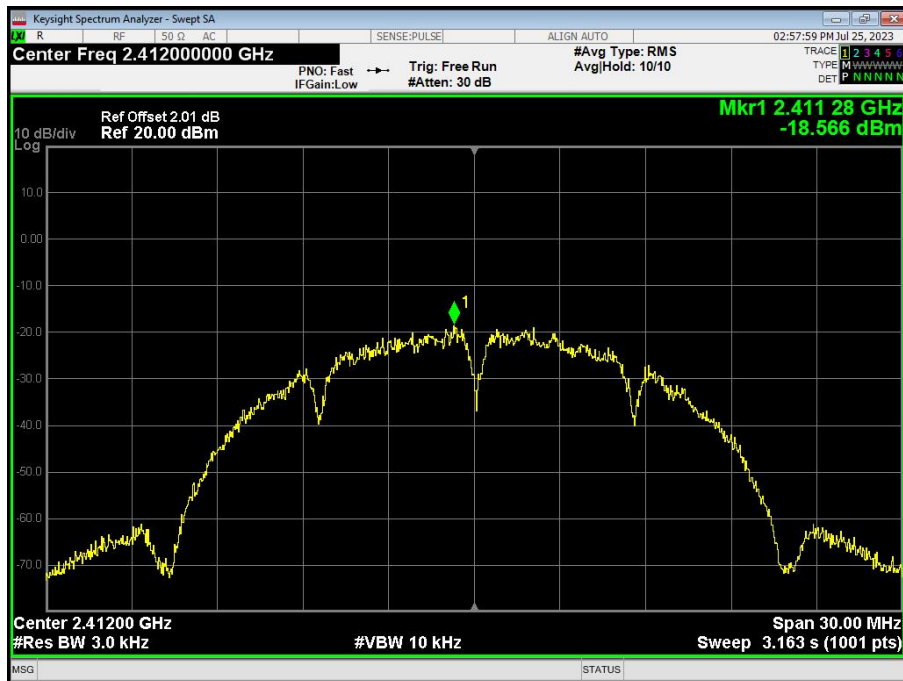
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULT

Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 3.7V
Test Mode :	TX b Mode		

Frequency	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-18.566	8	PASS
2437 MHz	-18.552	8	PASS
2462 MHz	-17.88	8	PASS

TX CH01



### TX CH06



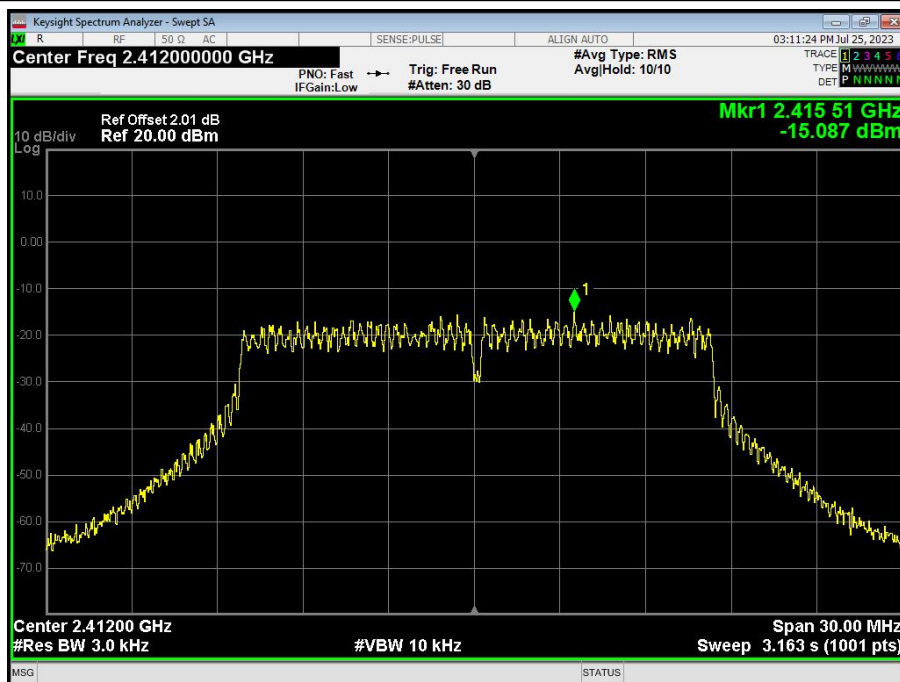
### TX CH11



Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 3.7V
Test Mode :	TX g Mode		

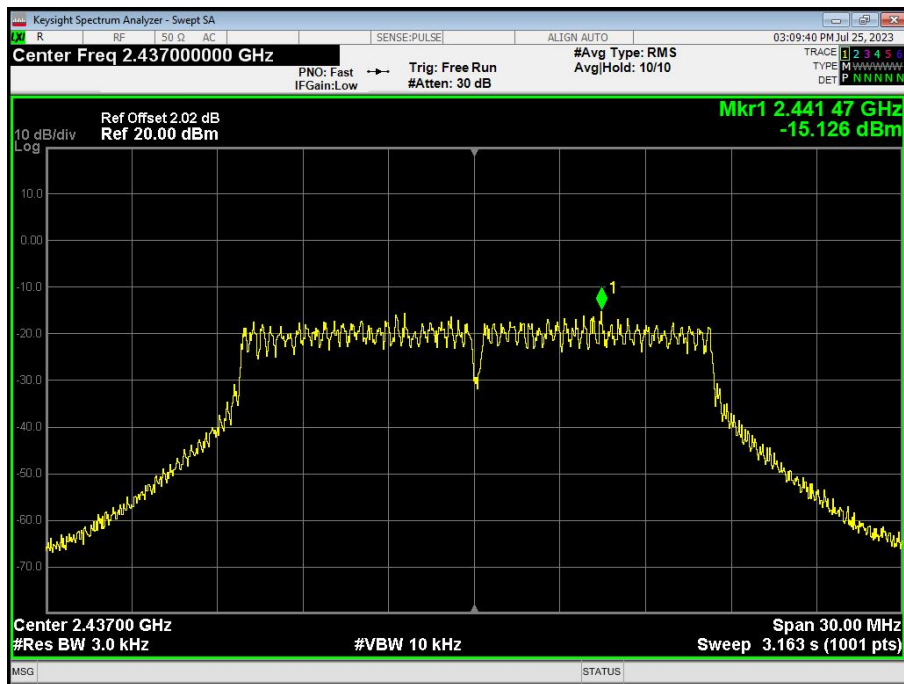
Frequency	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-15.087	8	PASS
2437 MHz	-15.126	8	PASS
2462 MHz	-14.338	8	PASS

**TX CH01**

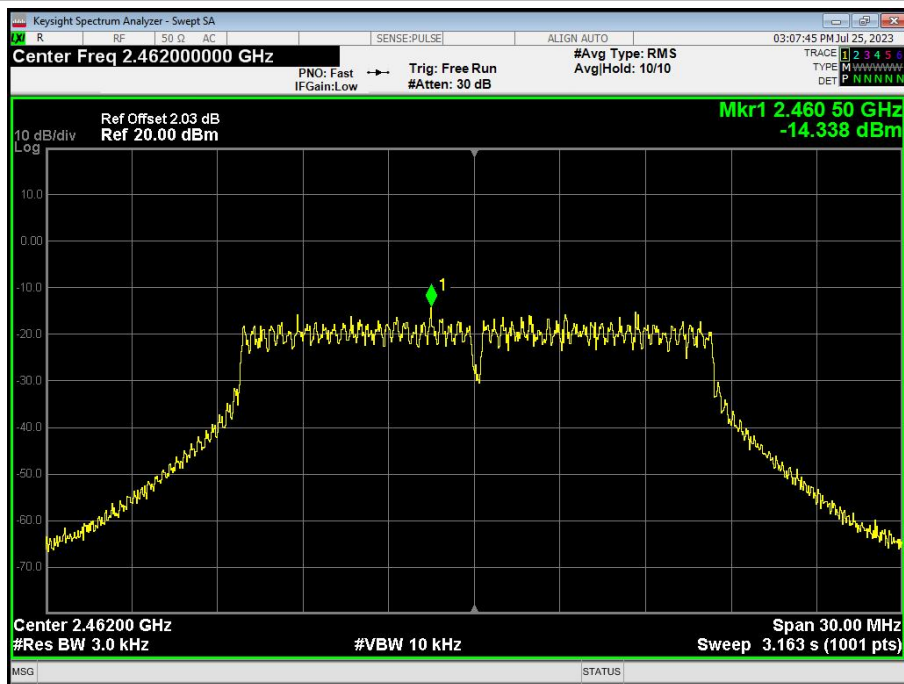




### TX CH06



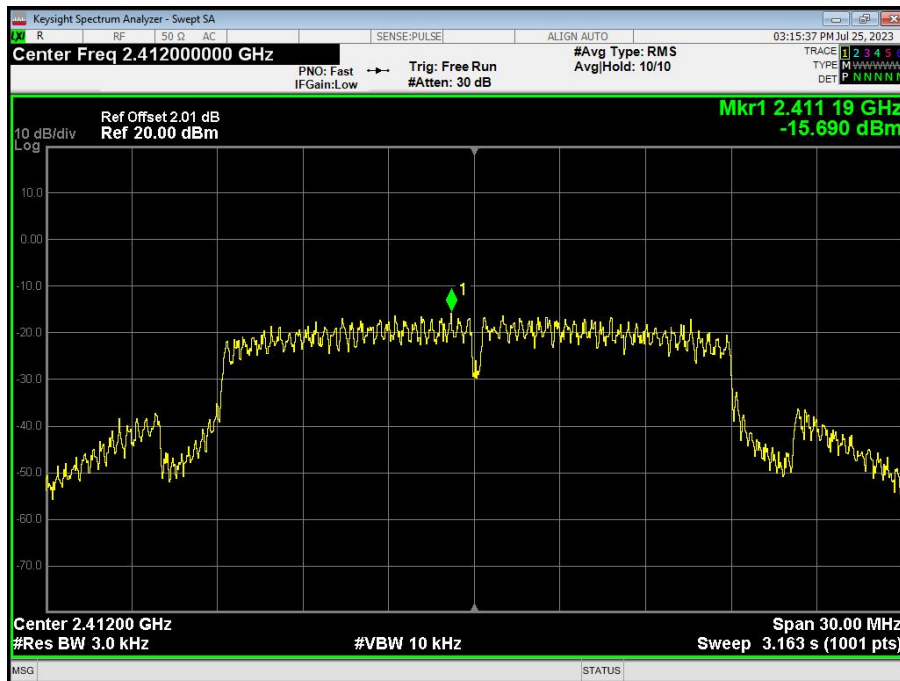
### TX CH11



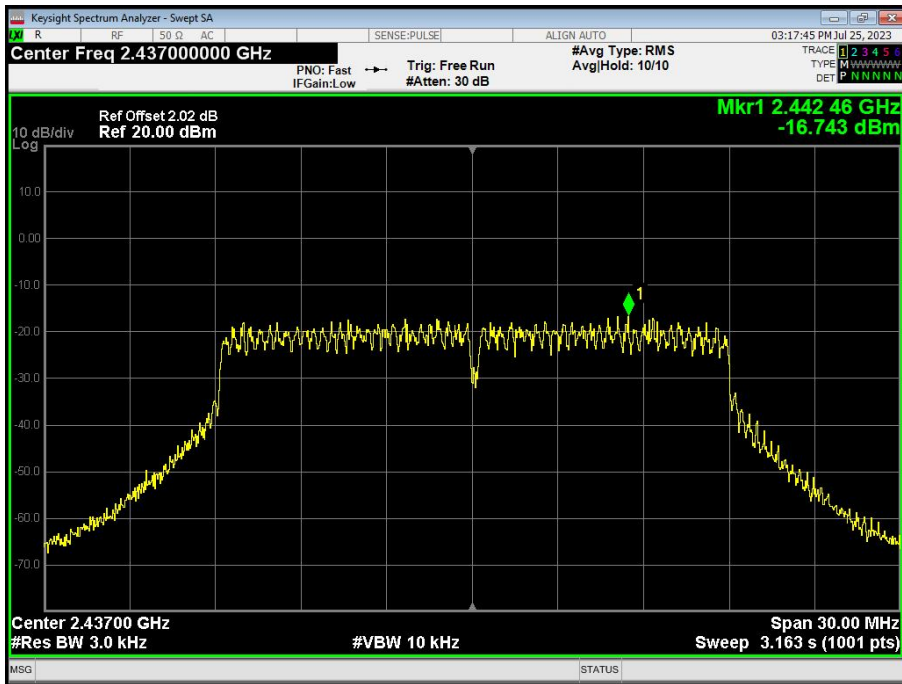
Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 3.7V
Test Mode :	TX n Mode(20M)		

Frequency	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2412 MHz	-15.69	8	PASS
2437 MHz	-16.743	8	PASS
2462 MHz	-15.912	8	PASS

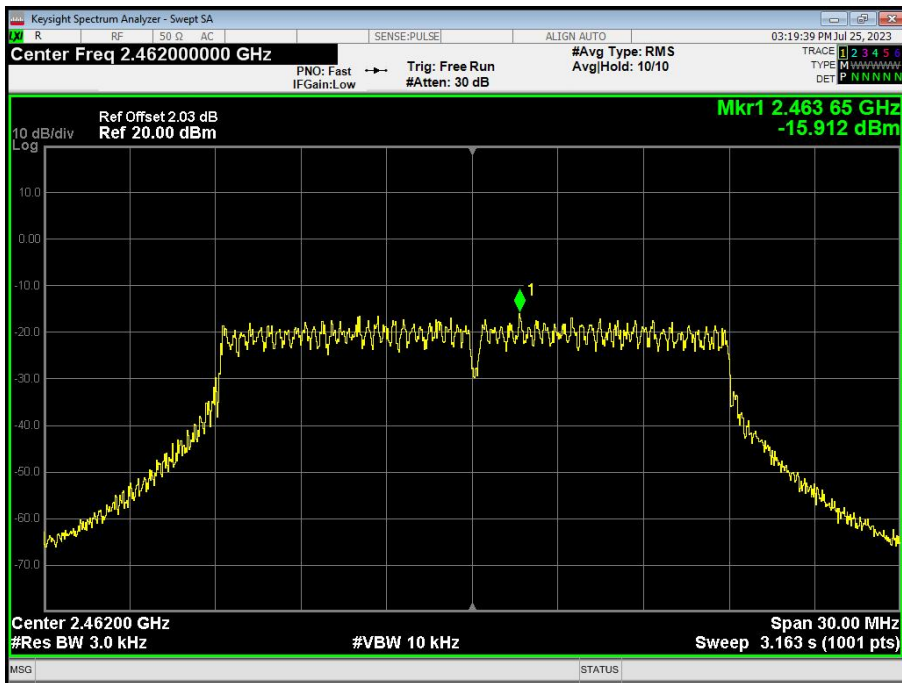
**TX CH01**



### TX CH06



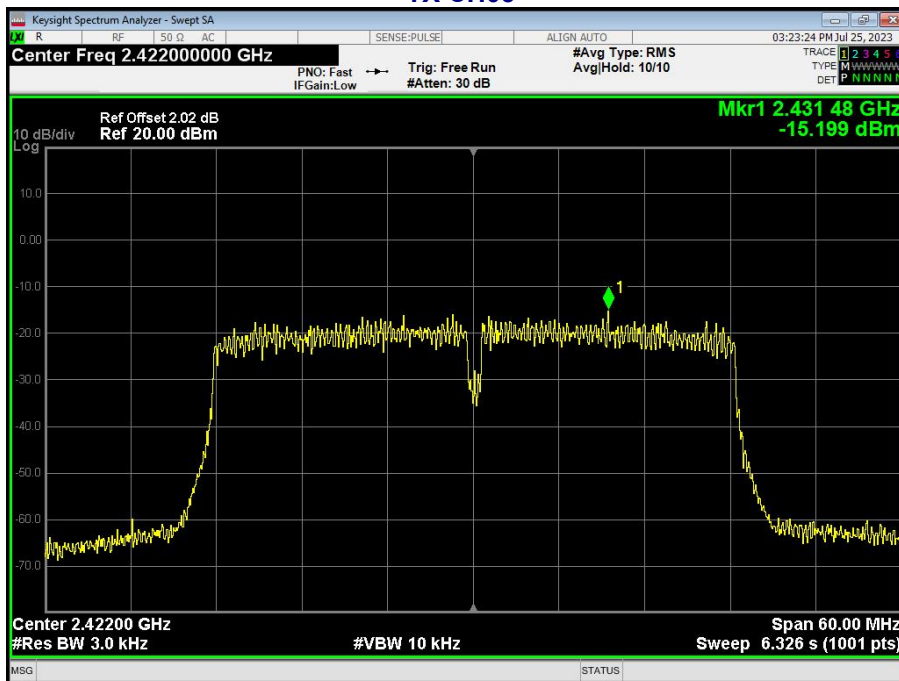
### TX CH11



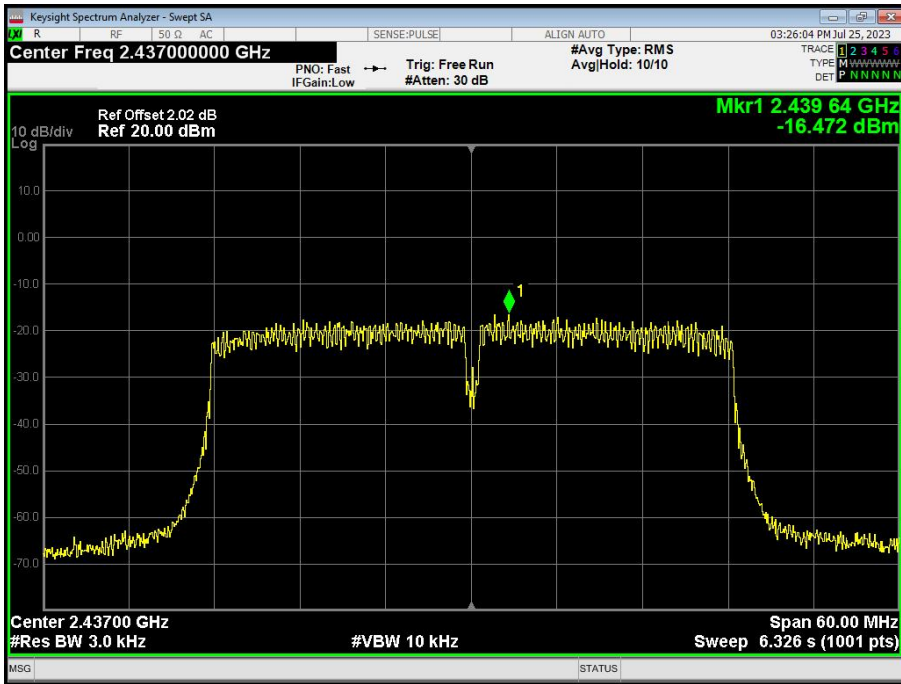
Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 3.7V
Test Mode :	TX n Mode(40M)		

Frequency	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
2422 MHz	-15.199	8	PASS
2437 MHz	-16.472	8	PASS
2452 MHz	-15.847	8	PASS

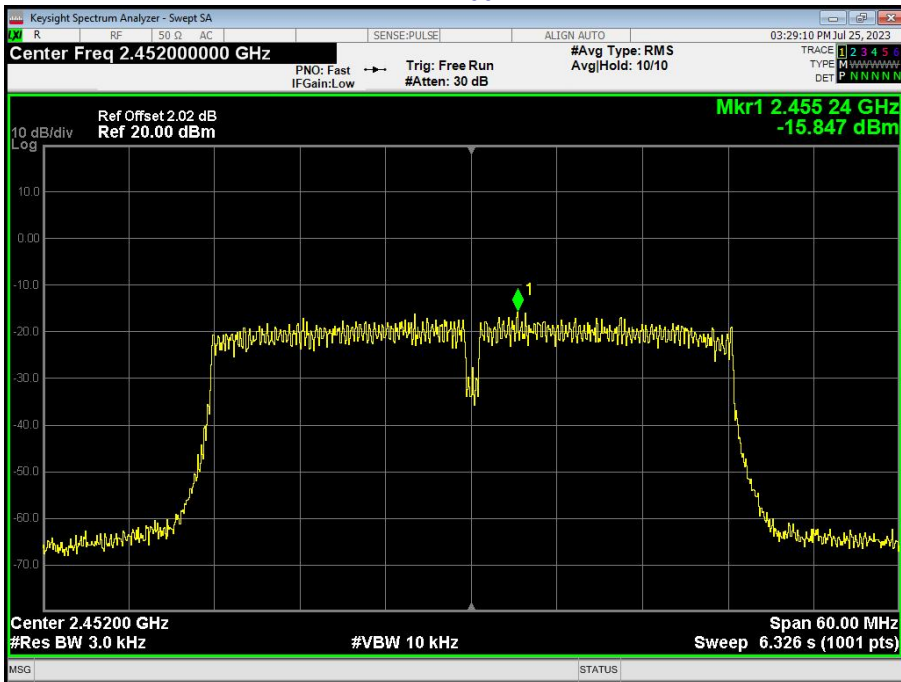
**TX CH03**



### TX CH06



### TX CH09



**7. CHANNEL BANDWIDTH& 99% OCCUPY BANDWIDTH**

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB558074 D0115.247 Meas Guidancev05r02

**7.1 APPLIED PROCEDURES / LIMIT**

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

**7.2 TEST PROCEDURE**

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times \text{RBW}$ .
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

**7.3 DEVIATION FROM STANDARD**

No deviation.

#### 7.4 TEST SETUP



#### 7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

## 7.6 TEST RESULT

Temperature :	26°C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 3.7V
Test Mode :	TX b Mode		

Test CH	-6dB Occupy Bandwidth (MHz)				Limit(KHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	9.074	15.948	15.989	35.086	>500	Pass
Middle	9.553	16.31	17.259	34.178		
Highest	9.069	16.312	17.554	35.056		

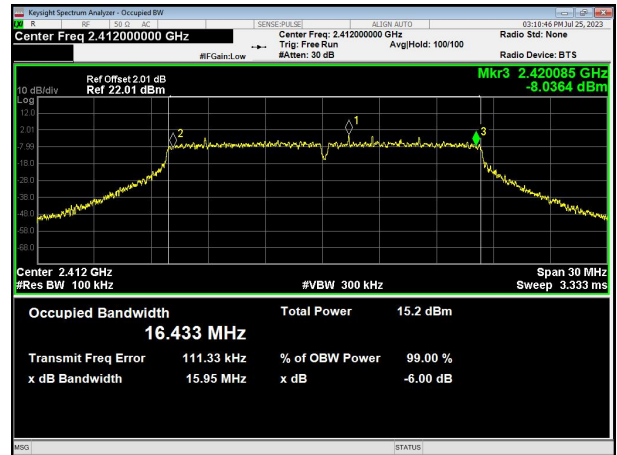


Test plot as follows:

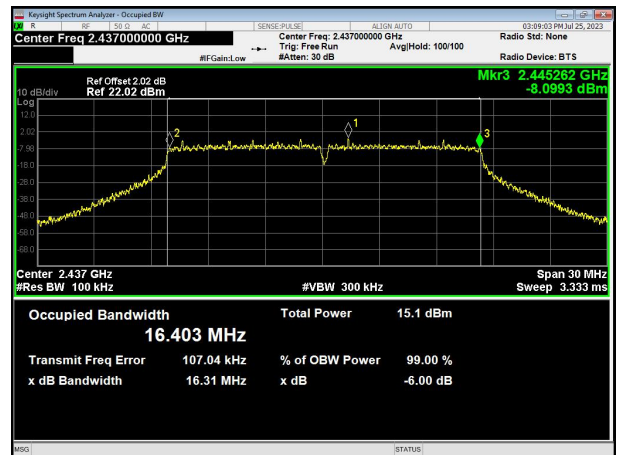
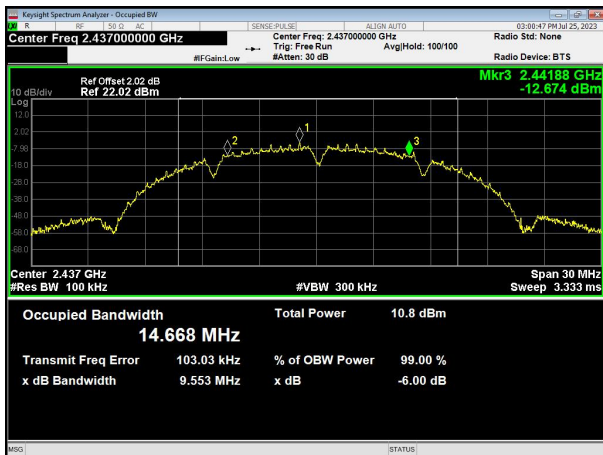
802.11b

802.11g

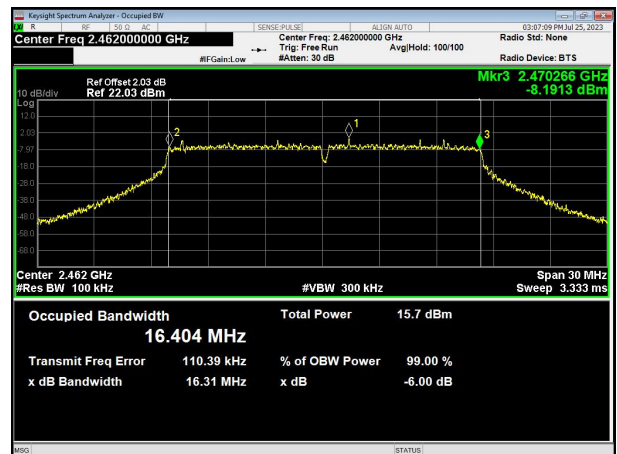
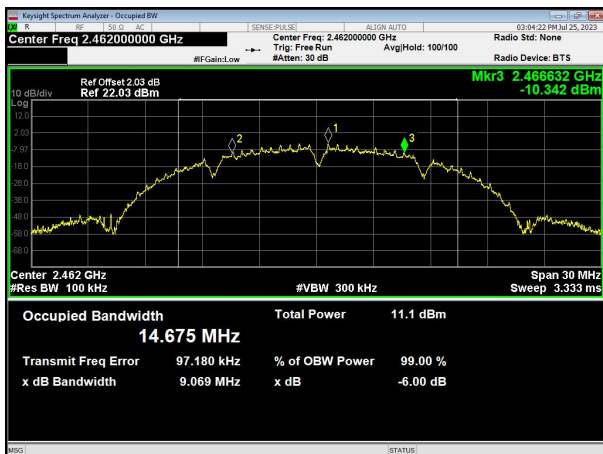
Lowest channel



Middle channel



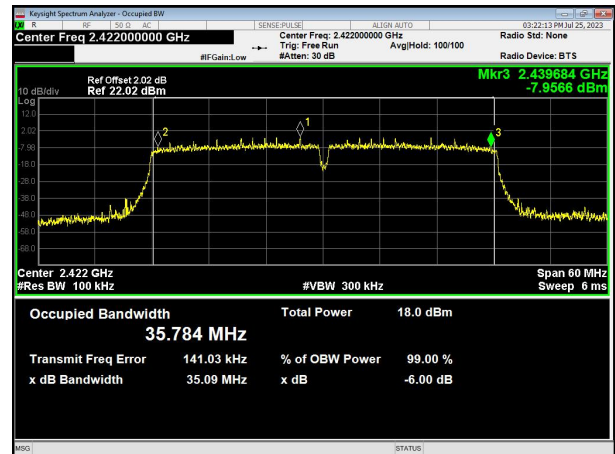
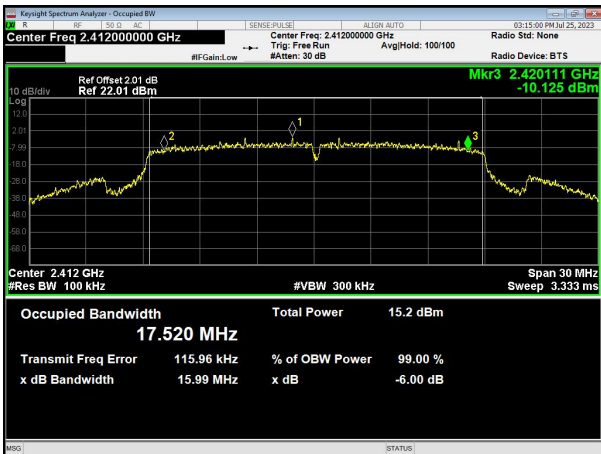
Highest channel



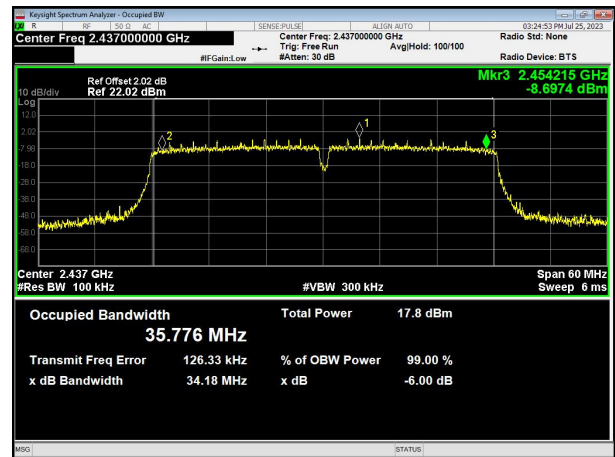
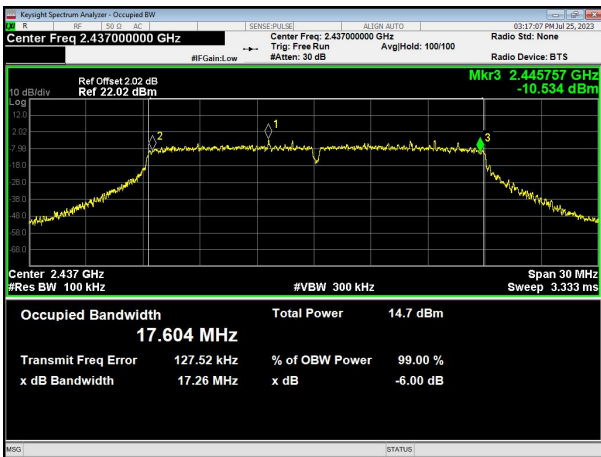
802.11n20

802.11n40

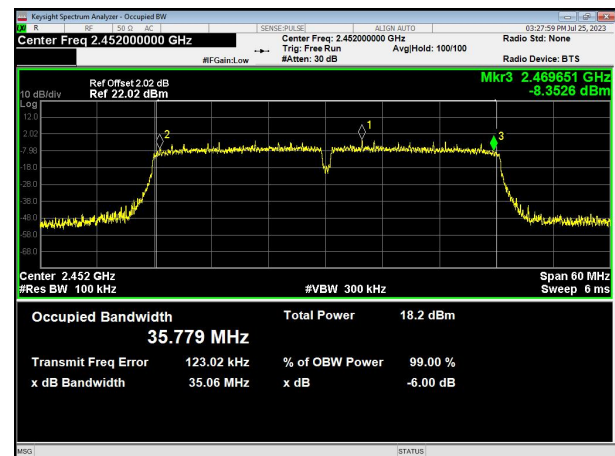
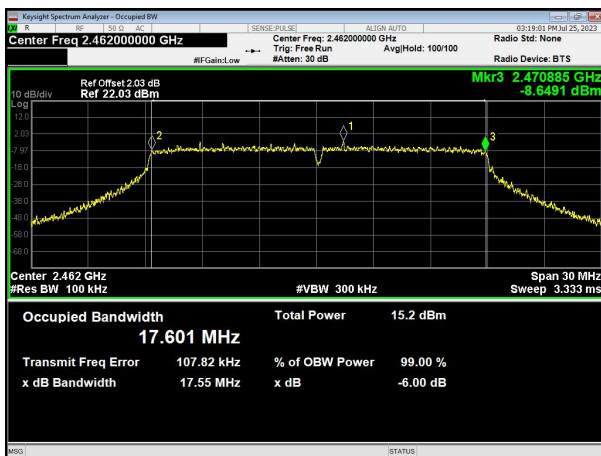
Lowest channel



Middle channel



Highest channel



**8. PEAK OUTPUT POWER TEST**

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB558074 D0115.247 Meas Guidancev05r02

**8.1 APPLIED PROCEDURES/LIMIT**

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

**8.2 TEST PROCEDURE**

- a. The EUT was directly connected to the Power meter

**8.3 DEVIATION FROM STANDARD**

No deviation.

**8.4 TEST SETUP****8.5 EUT OPERATION CONDITIONS**

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.