

## Variant FCC Test Report

**Report No.:** RFBAYS-WTW-P20110319A

**FCC ID:** W23-WMU62XX

**Test Model:** WMU6202

**Series Model:** WMU6203, WMU6204, WMU6205, WMU6206, WMU6207

**Received Date:** Apr. 14, 2021

**Test Date:** Apr. 26 ~ Apr. 27, 2021

**Issued Date:** May 14, 2021

**Applicant:** jjPlus Corporation

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan

**FCC Registration /**  
**Designation Number:** 427177 / TW0011



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## Table of Contents

<b>Release Control Record .....</b>	<b>3</b>
<b>1 Certificate of Conformity .....</b>	<b>4</b>
<b>2 Summary of Test Results.....</b>	<b>5</b>
2.1 Measurement Uncertainty.....	5
2.2 Modification Record .....	5
<b>3 General Information .....</b>	<b>6</b>
3.1 General Description of EUT .....	6
3.2 Description of Test Modes.....	7
3.2.1 Test Mode Applicability and Tested Channel Detail.....	8
3.3 Duty Cycle of Test Signal .....	8
3.4 Description of Support Units .....	9
3.4.1 Configuration of System under Test .....	9
3.5 General Description of Applied Standards and References .....	10
<b>4 Test Types and Results .....</b>	<b>11</b>
4.1 Radiated Emission and Bandedge Measurement .....	11
4.1.1 Limits of Radiated Emission and Bandedge Measurement .....	11
4.1.2 Test Instruments .....	12
4.1.3 Test Procedures.....	13
4.1.4 Deviation from Test Standard .....	13
4.1.5 Test Set Up .....	14
4.1.6 EUT Operating Conditions.....	15
4.1.7 Test Results .....	16
<b>5 Pictures of Test Arrangements.....</b>	<b>24</b>
<b>Annex A- Band Edge Measurement .....</b>	<b>25</b>
<b>Appendix – Information of the Testing Laboratories .....</b>	<b>31</b>

### Release Control Record

Issue No.	Description	Date Issued
RFBAYS-WTW-P20110319A	Original Release	May 14, 2021

## 1 Certificate of Conformity

**Product:** 11ac 2T2R WIFI & BT Module

**Brand:** jjPlus

**Test Model:** WMU6202

**Series Model:** WMU6203, WMU6204, WMU6205, WMU6206, WMU6207

**Sample Status:** wifi module

**Applicant:** jjPlus Corporation

**Test Date:** Apr. 26 ~ Apr. 27, 2021

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10:2013

This report is issued as a supplementary report to BV CPS report no.: RF181127C08. This report shall be used by combining with its original report.

**Prepared by :** Gina Liu, **Date:** May 14, 2021

Gina Liu / Specialist

**Approved by :** Dylan Chiou, **Date:** May 14, 2021

Dylan Chiou / Senior Project Engineer

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	N/A	Refer to Note
15.247(a)(1) (iii)	Number of Hopping Frequency Used	N/A	Refer to Note
15.247(a)(1) (iii)	Dwell Time on Each Channel	N/A	Refer to Note
15.247(a)(1)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	N/A	Refer to Note
15.247(a)(1)	Maximum Peak Output Power	N/A	Refer to Note
---	Occupied Bandwidth Measurement	N/A	Refer to Note
15.205 & 209	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -7.37 dB at 57.54 MHz.
15.247(d)	Band Edge Measurement	N/A	Refer to Note
15.247(d)	Antenna Port Emission	N/A	Refer to Note
15.203	Antenna Requirement	Pass	Antenna connector is U.FLx2 not a standard connector.

**Note:**

- Only Radiated Emissions test was performed for this addendum. Refer to original report for other test data.
- For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

<b>Product</b>	11ac 2T2R WIFI & BT Module
<b>Brand</b>	jjPlus
<b>Test Model</b>	WMU6202
<b>Series Model</b>	WMU6203, WMU6204, WMU6205, WMU6206, WMU6207
<b>Status of EUT</b>	wifi module
<b>Power Supply Rating</b>	3.3 Vdc (host equipment)
<b>Modulation Type</b>	GFSK, π/4-DQPSK, 8DPSK
<b>Transfer Rate</b>	1/2/3 Mbps
<b>Operating Frequency</b>	2402 ~ 2480 MHz
<b>Number of Channel</b>	79
<b>Antenna Type</b>	Refer to Note
<b>Antenna Connector</b>	Refer to Note
<b>Accessory Device</b>	N/A
<b>Data Cable Supplied</b>	N/A

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to BV CPS report no. RF181127C08. The difference compared with original report is adding new Antennas. Therefore, only Radiated Emissions re-test and recorded in this report.
2. All models and antennas are listed as below.

Test Mode	Model	RF Chip	RF Design	Interface	Antenna type	Antenna connector
v	WMU6202	RTL8822BU	The Same	mPCIe	Dipole	U.FLx2
	WMU6203			M.2		MHF4
	WMU6204			USB Type-A		U.FLx2
	WMU6205			4Pin Wafer		U.FLx2
	WMU6206			USB Type-A	PCB Antenna	none (like solder)
	WMU6207			4Pin Wafer	x2	none (like solder)

\*The difference Models are pre-tested, because the connector and interface are difference with difference Model, and selected the worst Model for testing.

3. The antennas information is listed as below. (New antenna is marked in boldface.)

Antenna Type	Brand	Model	Antenna Gain (dBi)		
			BT	2.4G	5G
Dipole	LYNwave	AOA160-221020-000000	3.0	3.0	2.0
	LYNwave	AOA160-221034-000000	3.0	3.0	3.0
	LYNwave	AOA160-221050-000000	5.0	5.0	5.0
PCB	N/A	N/A	3.6	3.6	5.3
	N/A	N/A	3.6	3.6	4.7
PIFA	<b>SINBON</b>	<b>A9706632</b>	<b>4.1</b>	<b>4.1</b>	<b>3.5</b>
	<b>SINBON</b>	<b>A9706633</b>	<b>4.8</b>	<b>4.8</b>	<b>4.1</b>

4. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
5. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.

### 3.2 Description of Test Modes

79 channels are provided to this EUT:

Channel	Freq. (MHz)						
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To		Description
	RE≥1G	RE<1G	
-	✓	✓	-

Where RE≥1G: Radiated Emission above 1 GHz      RE<1G: Radiated Emission below 1 GHz

Note: “-” means no effect.

#### Radiated Emission Test (Above 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	0, 39, 78	FHSS	GFSK	DH5
	0 to 78	0, 39, 78	FHSS	8DPSK	3DH5

#### Radiated Emission Test (Below 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

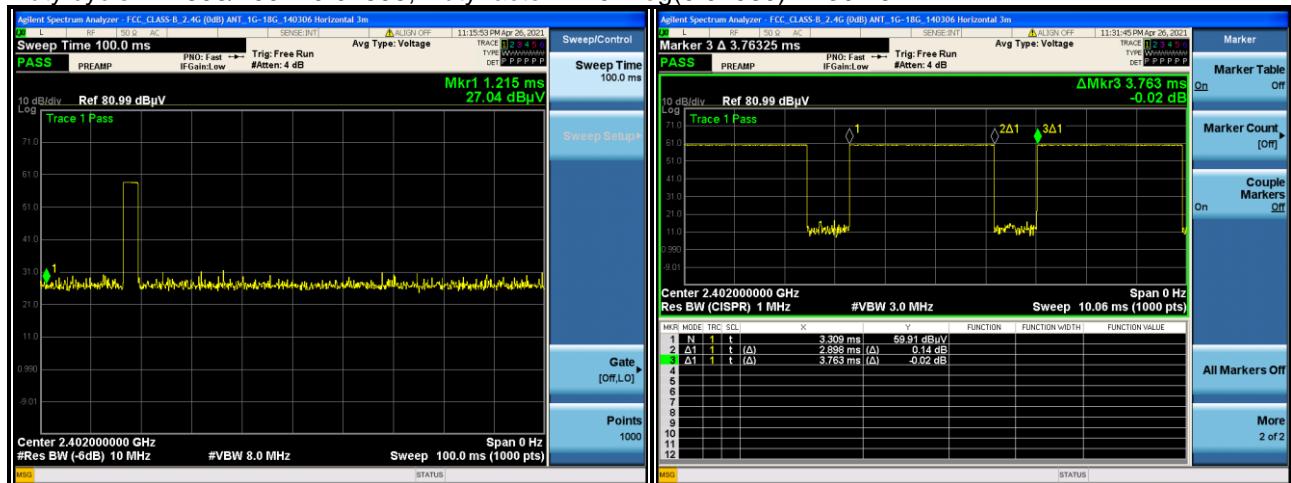
EUT Configure Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Packet Type
-	0 to 78	39	FHSS	GFSK	DH5

#### Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee

### 3.3 Duty Cycle of Test Signal

Duty cycle = 2.898/100 = 0.02898, Duty factor = 20 \* log(0.02989) = -30.76



### 3.4 Description of Support Units

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.

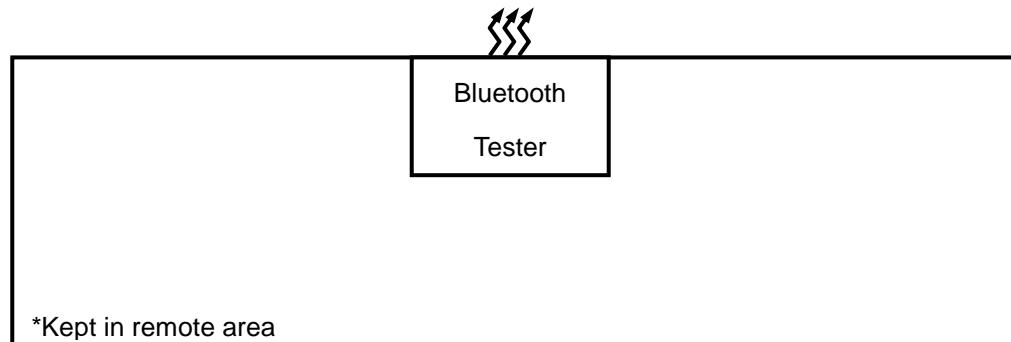
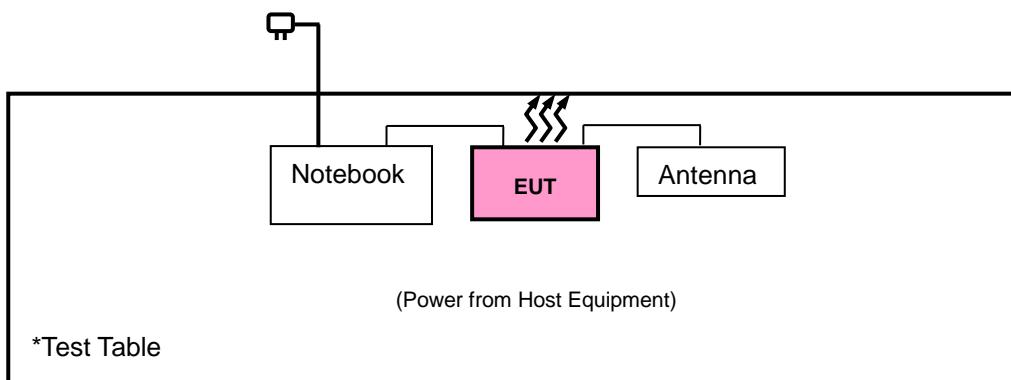
No.	Product	Brand	Model No.	Serial No.	FCC ID
A.	Notebook	DELL	E6420	D3T96R1	N/A

No.	Signal Cable Description of The Above Support Units
1.	N/A

Note:

1. All power cords of the above support units are non-shielded (1.8m).

#### 3.4.1 Configuration of System under Test



### **3.5 General Description of Applied Standards and References**

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

**Test Standard:**

**FCC Part 15, Subpart C (15.247)**

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

**References Test Guidance:**

**KDB 558074 D01 15.247 Meas Guidance v05r02**

All test items have been performed as a reference to the above KDB test guidance.

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/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

**Note:**

- The lower limit shall apply at the transition frequencies.
- Emission level (dB<sub>uV/m</sub>) = 20 log Emission level (uV/m).
- For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

#### 4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 24, 2020	Aug. 23, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 12, 2021	Apr. 11, 2022
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 09, 2020	Nov. 08, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 22, 2020	Nov. 21, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
Bluetooth Tester	CBT	100980	Jul. 14, 2019	Jul. 13, 2021
Loop Antenna	EM-6879	269	Sep. 17, 2020	Sep. 16, 2021
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2020	Nov. 24, 2021
Preamplifier Agilent	310N	187226	Jun. 17, 2020	Jun. 16, 2021
Preamplifier Agilent	83017A	MY39501357	Jun. 17, 2020	Jun. 16, 2021
Preamplifier EMCI	EMC 184045	980116	Oct. 07, 2020	Oct. 06, 2021
Power Meter Anritsu	ML2495A	1012010	Sep. 01, 2020	Aug. 31, 2021
Power Sensor Anritsu	MA2411B	1315050	Sep. 01, 2020	Aug. 31, 2021
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-MS-400)	Jun. 17, 2020	Jun. 16, 2021
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 17, 2020	Jun. 17, 2021
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HsinTien Chamber 1.

#### 4.1.3 Test Procedures

##### For Radiated Emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case 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 Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

**Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

##### For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. 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 height of antenna 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

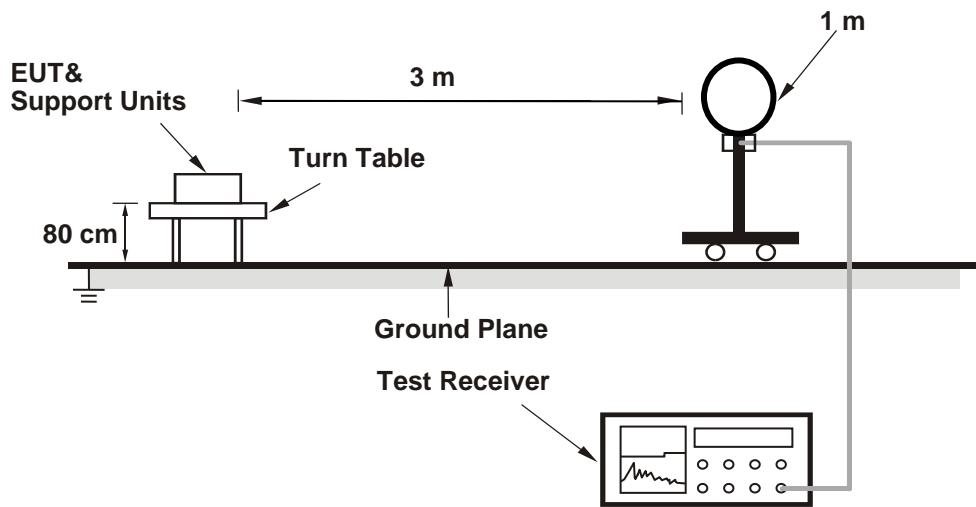
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle  $< 98\%$ ) or 10 Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1 GHz. (RBW = 1 MHz, VBW = 3 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

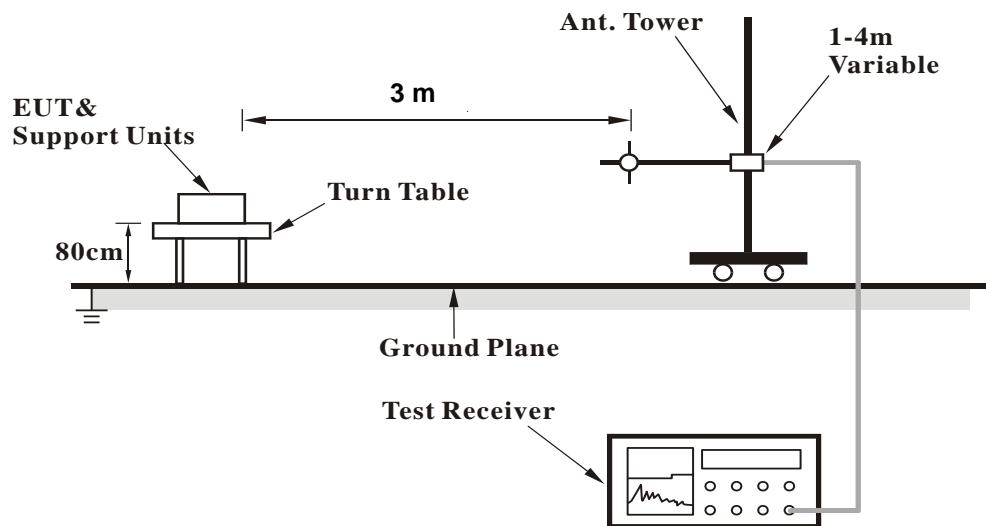
No deviation.

#### 4.1.5 Test Set Up

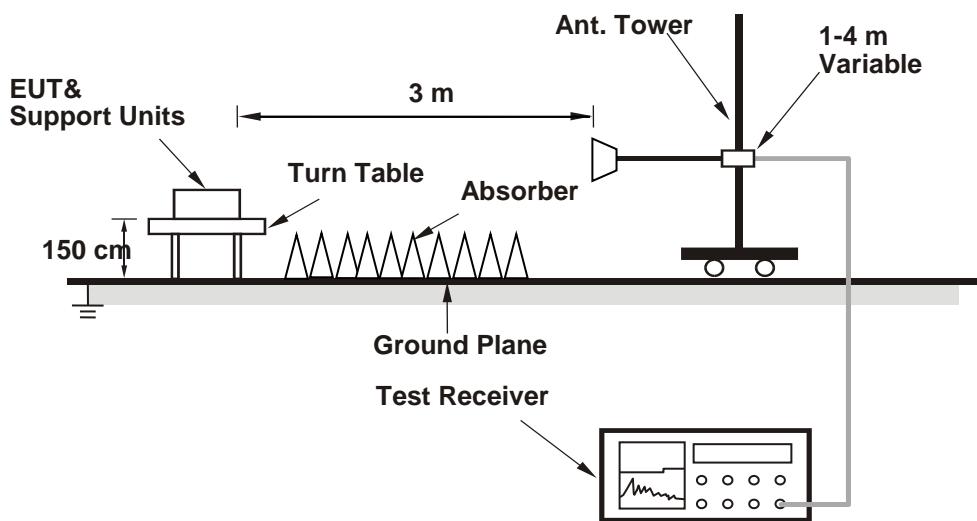
##### <Radiated Emission below 30 MHz>



##### <Radiated Emission 30 MHz to 1 GHz>



**<Radiated Emission above 1 GHz>**



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

##### Above 1 GHz Data:

##### GFSK

EUT Test Condition		Measurement Detail			
Channel		Channel 0		Frequency Range	1 GHz ~ 25 GHz
Input Power		120 Vac, 60 Hz		Detector Function	Peak (PK) Average (AV)
Environmental Conditions		25 deg. C, 65 % RH		Tested By	Karl Lee

##### Antenna Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.2	36.7	4.5	54	-12.8	123	237	Average
2390	51.45	46.95	4.5	74	-22.55	123	237	Peak
2402	67.47	62.95	4.52			123	237	Average
2402	98.23	93.71	4.52			123	237	Peak
4804	17.48	7.13	10.35	54	-36.52	217	165	Average
4804	48.24	37.89	10.35	74	-25.76	217	165	Peak

##### Antenna Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.27	36.77	4.5	54	-12.73	247	86	Average
2390	51.84	47.34	4.5	74	-22.16	247	86	Peak
2402	65.47	60.95	4.52			247	86	Average
2402	96.23	91.71	4.52			247	86	Peak
4804	17.04	6.69	10.35	54	-36.96	153	181	Average
4804	47.8	37.45	10.35	74	-26.2	153	181	Peak

##### Remarks:

1. Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
2. 2402 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail		
Channel		Frequency Range		1 GHz ~ 25 GHz
Input Power		Detector Function		Peak (PK) Average (AV)
Environmental Conditions		Tested By		Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.32	36.82	4.5	54	-12.68	123	237	Average
2390	51.89	47.39	4.5	74	-22.11	123	237	Peak
2441	67.53	62.95	4.58			123	237	Average
2441	98.29	93.71	4.58			123	237	Peak
2483.5	21.42	16.76	4.66	54	-32.58	123	237	Average
2483.5	52.18	47.52	4.66	74	-21.82	123	237	Peak
4882	17.62	7.41	10.21	54	-36.38	129	82	Average
4882	48.38	38.17	10.21	74	-25.62	129	82	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.3	36.8	4.5	54	-12.7	247	86	Average
2390	52.19	47.69	4.5	74	-21.81	247	86	Peak
2441	66.03	61.45	4.58			247	86	Average
2441	96.79	92.21	4.58			247	86	Peak
2483.5	21.46	16.8	4.66	54	-32.54	247	86	Average
2483.5	52.22	47.56	4.66	74	-21.78	247	86	Peak
4882	16.38	6.17	10.21	54	-37.62	188	102	Average
4882	47.14	36.93	10.21	74	-26.86	188	102	Peak

Remarks:

1. Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
2. 2441 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail		
Channel		Frequency Range		1 GHz ~ 25 GHz
Input Power		Detector Function		Peak (PK) Average (AV)
Environmental Conditions		Tested By		Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	67.14	62.5	4.64			123	257	Average
2480	97.9	93.26	4.64			123	257	Peak
2483.5	21.28	16.62	4.66	54	-32.72	123	257	Average
2483.5	52.04	47.38	4.66	74	-21.96	123	257	Peak
4960	17.09	6.73	10.36	54	-36.91	116	28	Average
4960	47.85	37.49	10.36	74	-26.15	116	28	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	65.77	61.13	4.64			247	86	Average
2480	96.53	91.89	4.64			247	86	Peak
2483.5	21.13	16.47	4.66	54	-32.87	247	86	Average
2483.5	51.89	47.23	4.66	74	-22.11	247	86	Peak
4960	16.92	6.56	10.36	54	-37.08	273	168	Average
4960	47.68	37.32	10.36	74	-26.32	273	168	Peak

Remarks:

1. Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
2. 2480 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

**8DPSK**

EUT Test Condition		Measurement Detail		
<b>Channel</b>		<b>Frequency Range</b>		1 GHz ~ 25 GHz
<b>Input Power</b>		<b>Detector Function</b>		Peak (PK) Average (AV)
<b>Environmental Conditions</b>		<b>Tested By</b>		Karl Lee

**Antenna Polarity & Test Distance: Horizontal at 3 m**

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.27	36.77	4.5	54	-12.73	123	257	Average
2390	51.84	47.34	4.5	74	-22.16	123	257	Peak
2402	67.92	63.4	4.52			123	257	Average
2402	98.68	94.16	4.52			123	257	Peak
4804	16.41	6.06	10.35	54	-37.59	136	229	Average
4804	47.17	36.82	10.35	74	-26.83	136	229	Peak

**Antenna Polarity & Test Distance: Vertical at 3 m**

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.23	36.73	4.5	54	-12.77	247	86	Average
2390	51.79	47.29	4.5	74	-22.21	247	86	Peak
2402	65.86	61.34	4.52			247	86	Average
2402	96.62	92.1	4.52			247	86	Peak
4804	16.3	5.95	10.35	54	-37.7	115	49	Average
4804	47.06	36.71	10.35	74	-26.94	115	49	Peak

Remarks:

1. Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
2. 2402 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail		
Channel		Frequency Range		1 GHz ~ 25 GHz
Input Power		Detector Function		Peak (PK) Average (AV)
Environmental Conditions		Tested By		Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.31	36.81	4.5	54	-12.69	123	257	Average
2390	51.7	47.2	4.5	74	-22.3	123	257	Peak
2441	68.09	63.51	4.58			123	257	Average
2441	98.85	94.27	4.58			123	257	Peak
2483.5	21.61	16.95	4.66	54	-32.39	123	257	Average
2483.5	52.37	47.71	4.66	74	-21.63	123	257	Peak
4882	16.71	6.5	10.21	54	-37.29	139	226	Average
4882	47.47	37.26	10.21	74	-26.53	139	226	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.23	36.73	4.5	54	-12.77	247	86	Average
2390	52.05	47.55	4.5	74	-21.95	247	86	Peak
2441	66.67	62.09	4.58			247	86	Average
2441	97.43	92.85	4.58			247	86	Peak
2483.5	21.13	16.47	4.66	54	-32.87	247	86	Average
2483.5	51.89	47.23	4.66	74	-22.11	247	86	Peak
4882	17.6	7.39	10.21	54	-36.4	104	19	Average
4882	48.36	38.15	10.21	74	-25.64	104	19	Peak

Remarks:

1. Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
2. 2441 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail		
Channel		Frequency Range		1 GHz ~ 25 GHz
Input Power		Detector Function		Peak (PK) Average (AV)
Environmental Conditions		Tested By		Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	66.71	62.07	4.64			123	257	Average
2480	97.57	92.93	4.64			123	257	Peak
2483.5	21.5	16.84	4.66	54	-32.5	123	257	Average
2483.5	52.26	47.6	4.66	74	-21.74	123	257	Peak
4960	17.42	7.06	10.36	54	-36.58	262	342	Average
4960	48.18	37.82	10.36	74	-25.82	262	342	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	65.1	60.46	4.64			247	86	Average
2480	95.86	91.22	4.64			247	86	Peak
2483.5	20.97	16.31	4.66	54	-33.03	247	86	Average
2483.5	51.73	47.07	4.66	74	-22.27	247	86	Peak
4960	16.51	6.15	10.36	54	-37.49	165	208	Average
4960	47.27	36.91	10.36	74	-26.73	165	208	Peak

Remarks:

1. Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
2. 2480 MHz: Fundamental frequency.
3. The emission levels of other frequencies were very low against the limit.

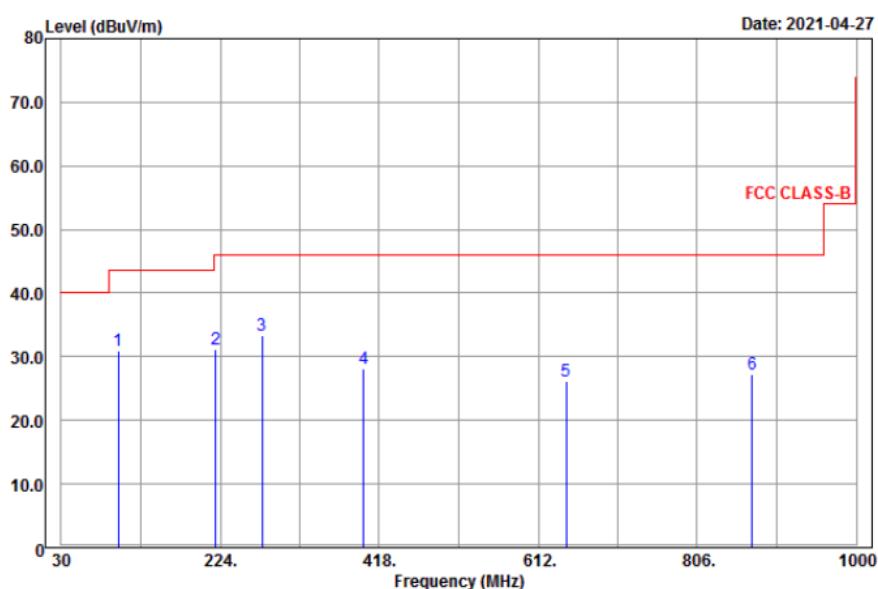
### 9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

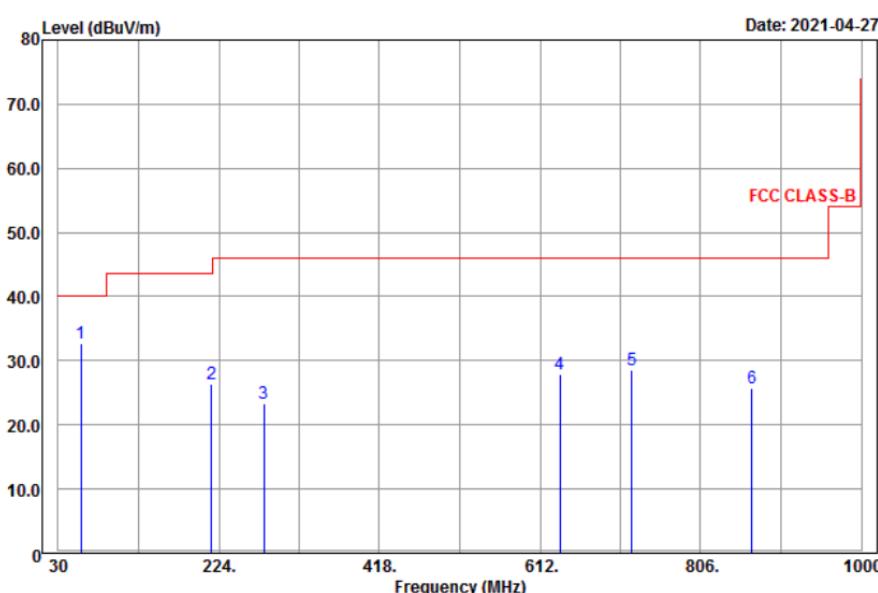
### 30 MHz ~ 1 GHz Worst-Case Data:

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

#### Horizontal



#### Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
99.66	30.86	48.06	-17.2	43.5	-12.64	105	122	Peak
218.46	31.17	49.07	-17.9	46	-14.83	146	132	Peak
275.43	33.3	49.76	-16.46	46	-12.7	105	2	Peak
398.7	28.14	42.09	-13.95	46	-17.86	189	144	Peak
646.5	26.21	36.35	-10.14	46	-19.79	105	166	Peak
873.3	27.14	33.44	-6.3	46	-18.86	131	14	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
<b>57.54</b>	<b>32.63</b>	<b>48.35</b>	<b>-15.72</b>	<b>40</b>	<b>-7.37</b>	<b>154</b>	<b>174</b>	<b>Peak</b>
214.95	26.29	44.28	-17.99	43.5	-17.21	105	222	Peak
278.13	23.42	39.86	-16.44	46	-22.58	157	7	Peak
636	27.8	38.13	-10.33	46	-18.2	189	96	Peak
722.8	28.62	37.36	-8.74	46	-17.38	105	241	Peak
867.7	25.77	32.14	-6.37	46	-20.23	115	228	Peak

Remarks:

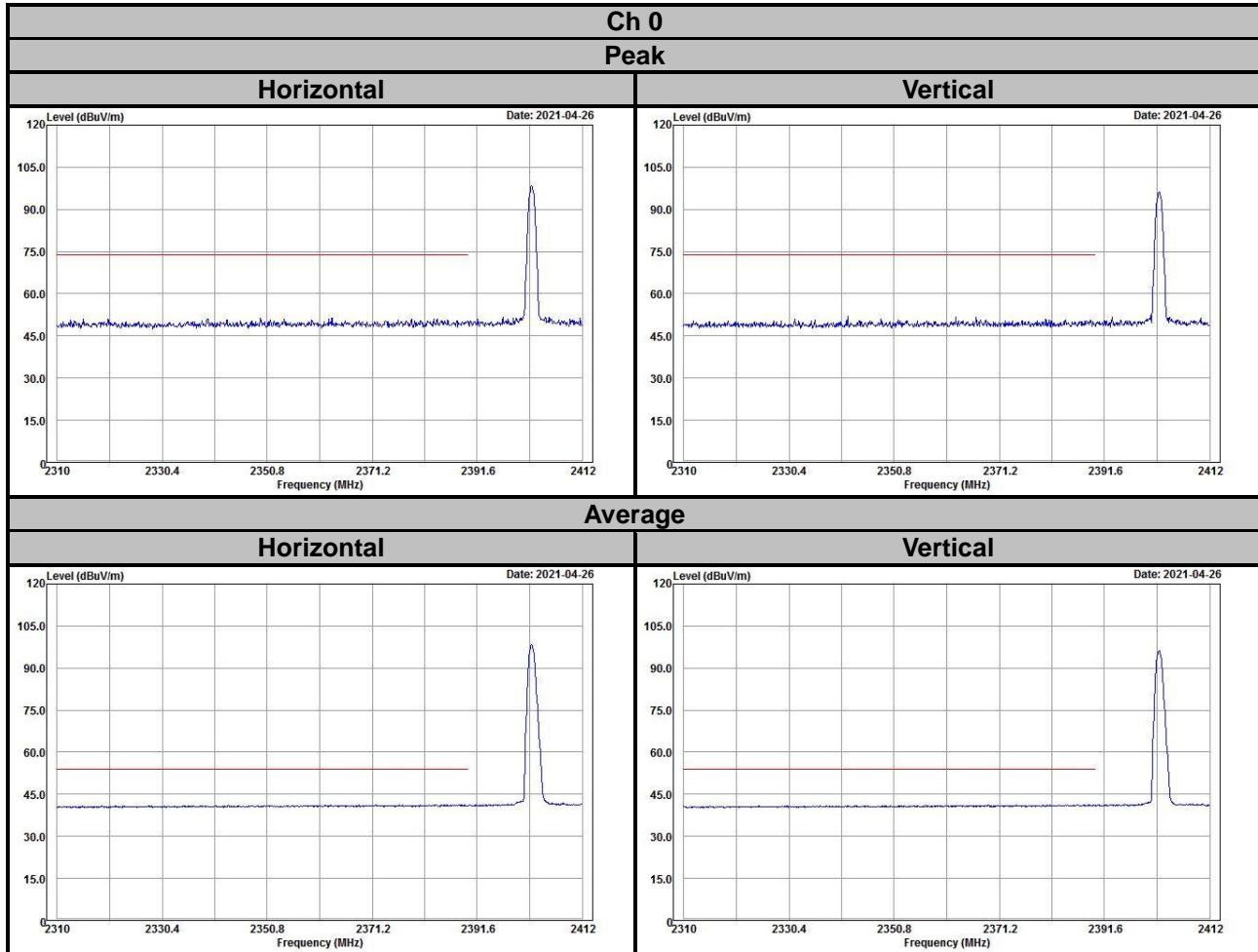
1. Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
2. The emission levels of other frequencies were very low against the limit.

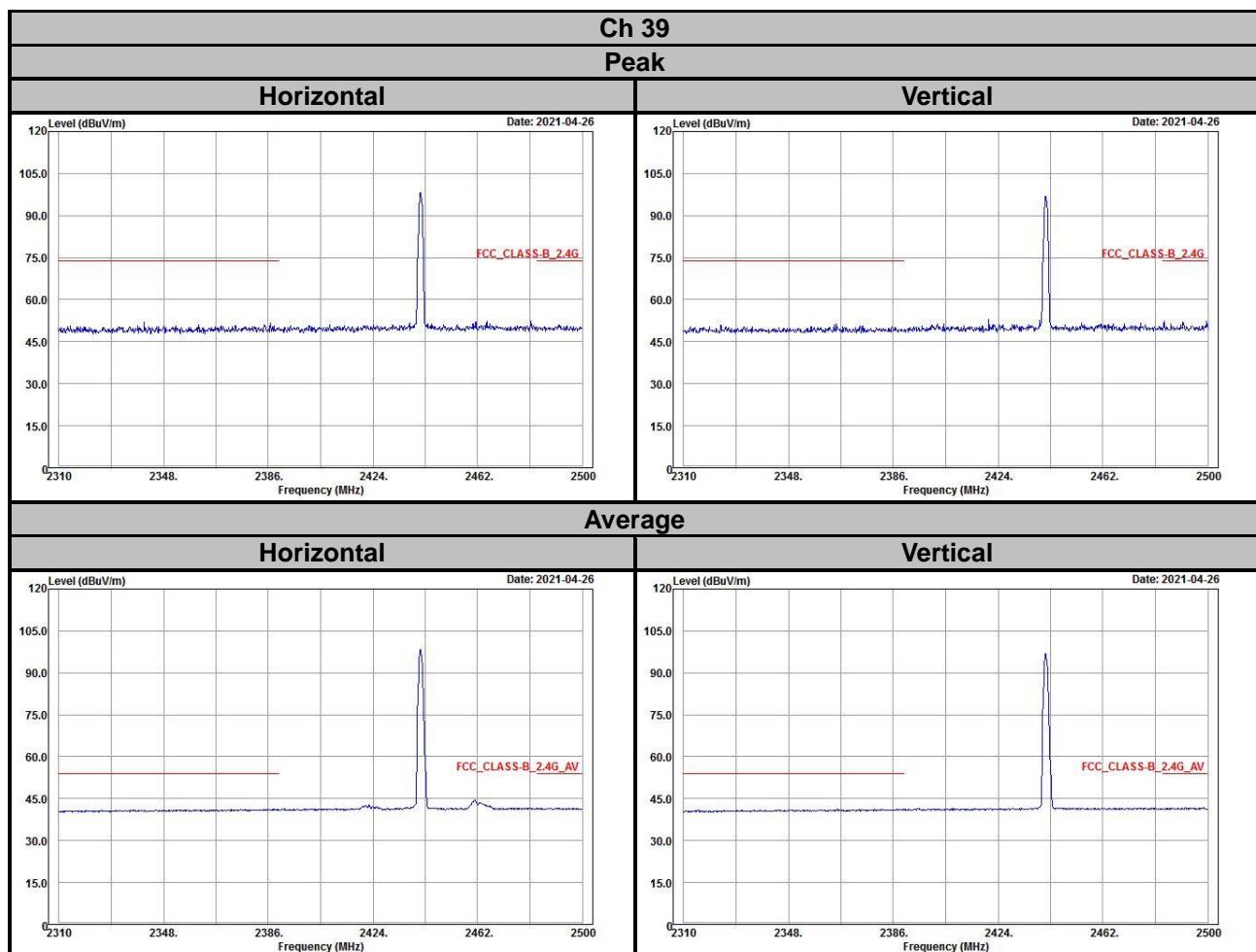
## 5 Pictures of Test Arrangements

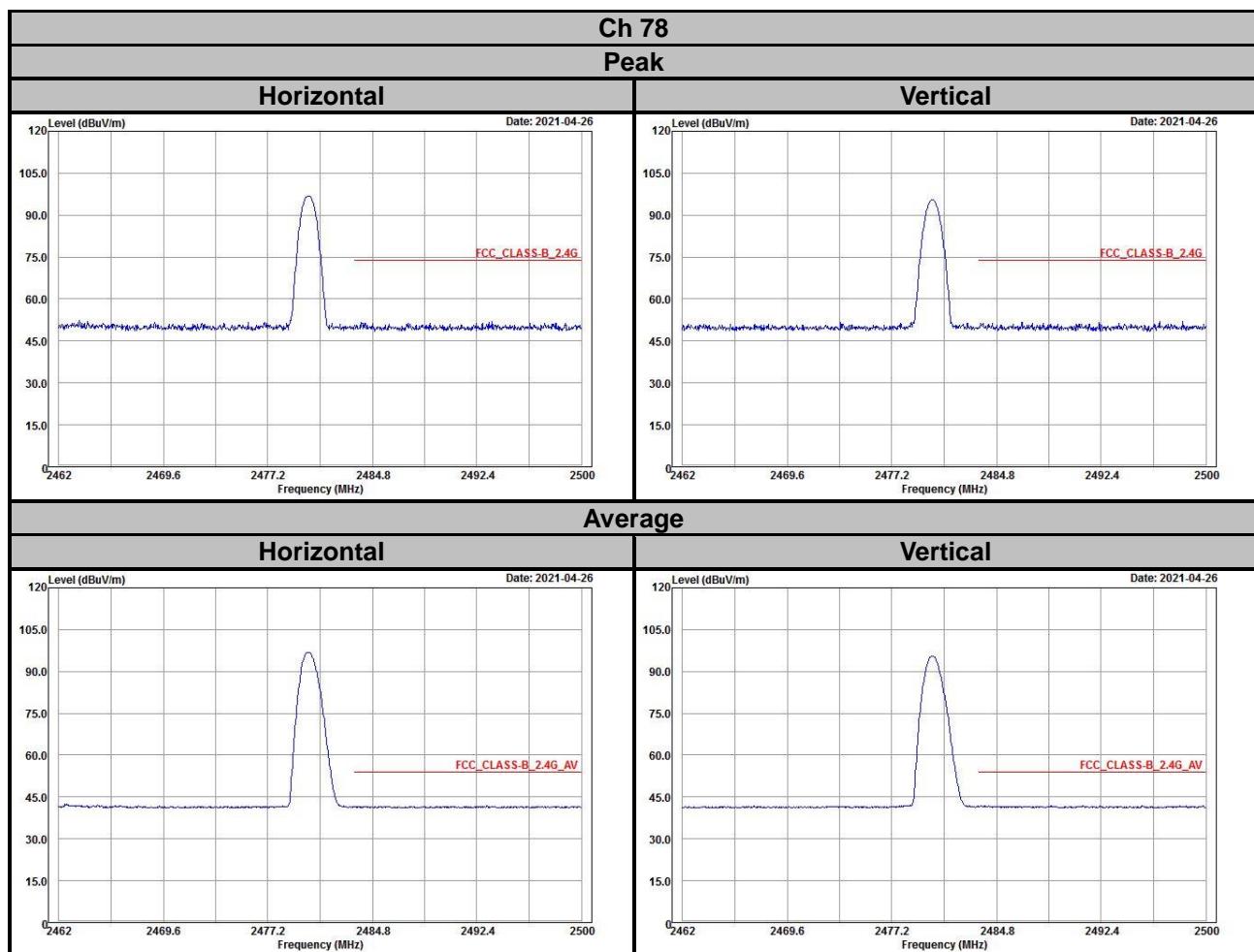
Please refer to the attached file (Test Setup Photo).

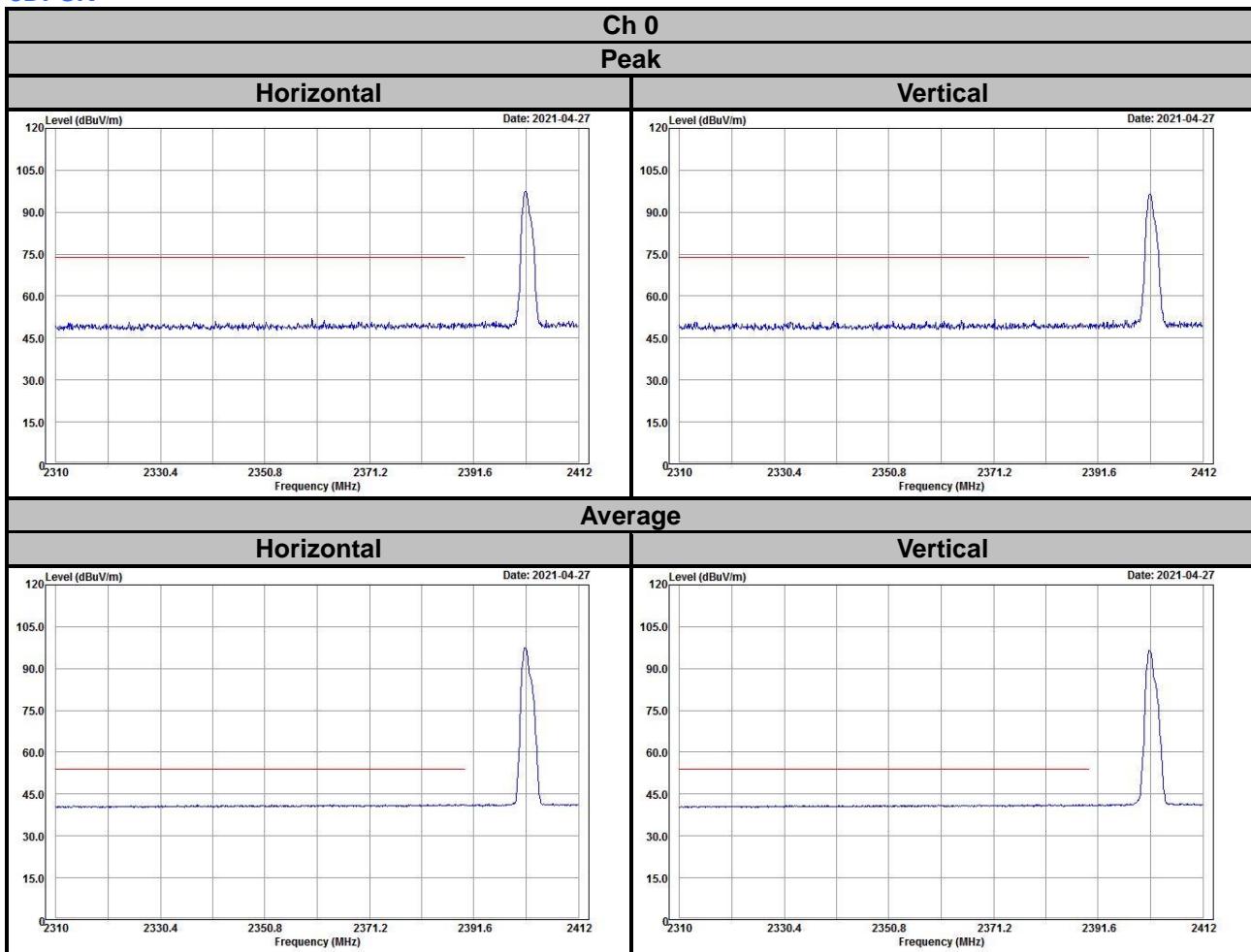
## Annex A- Band Edge Measurement

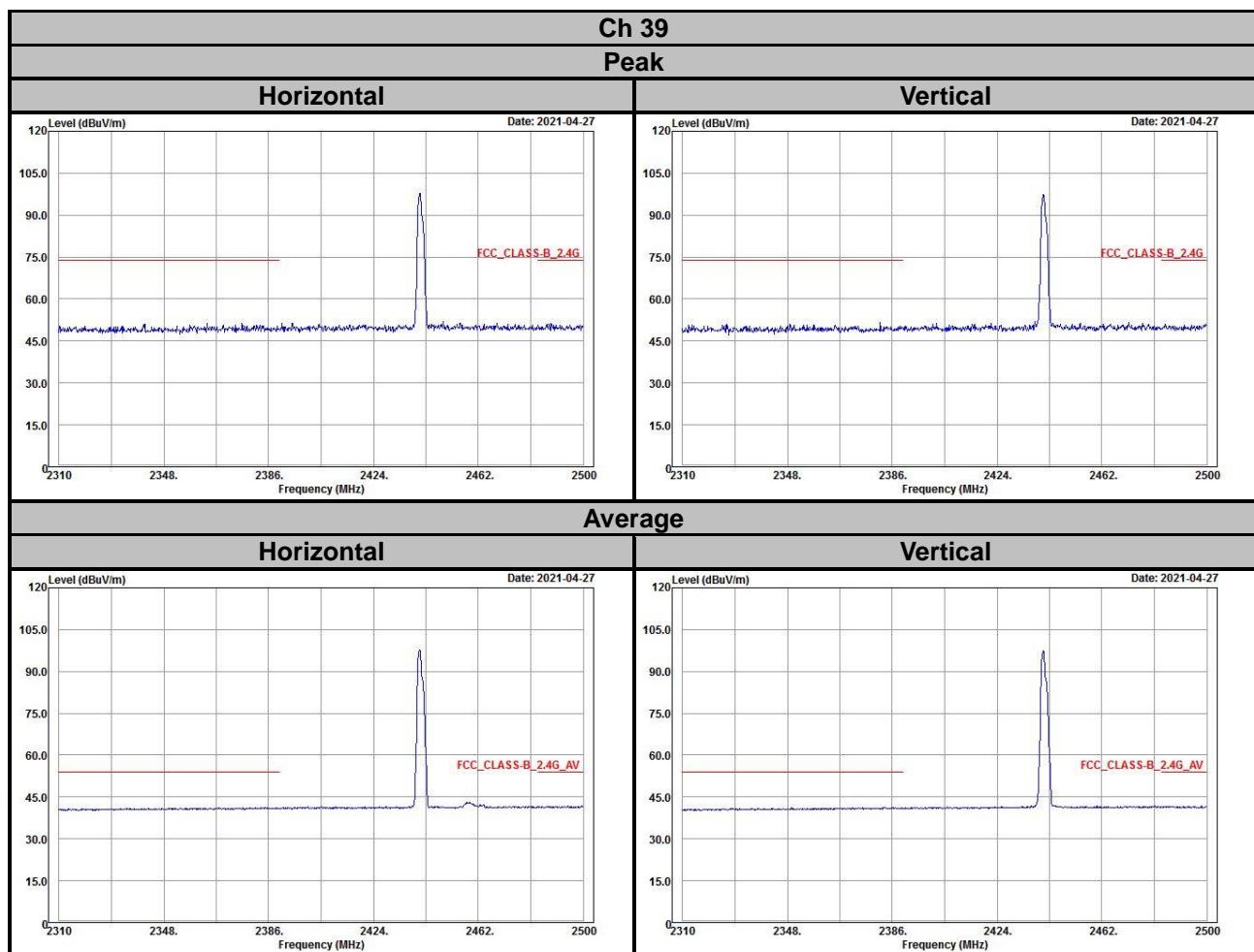
GFSK

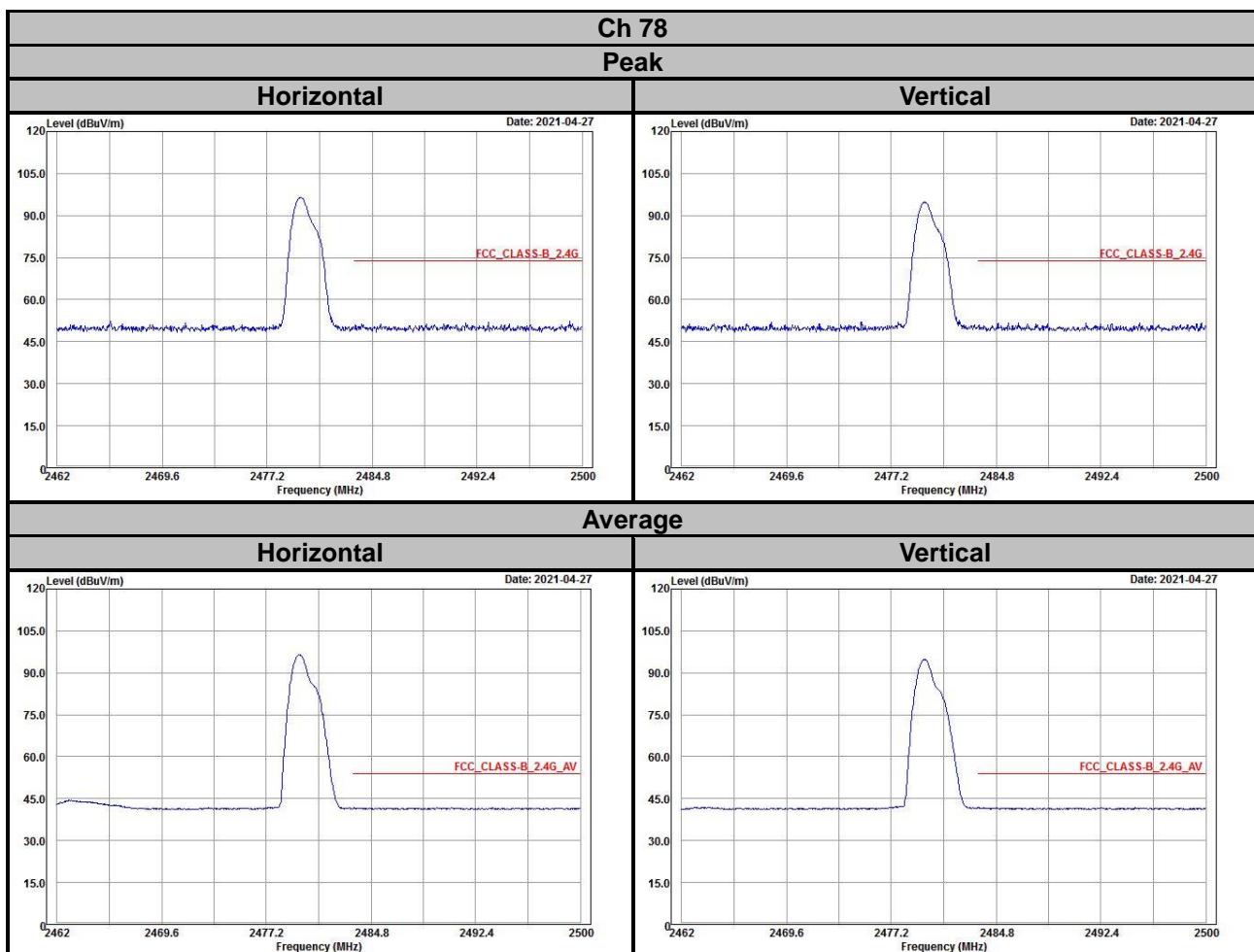






**8DPSK**






## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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The address and road map of all our labs can be found in our web site also.

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