



REPORT No.: SZ18100034W01

# TEST REPORT

**APPLICANT** : General Procurement, Inc  
**PRODUCT NAME** : 7inch wifi tablet  
**MODEL NAME** : DT0706W08  
**BRAND NAME** : DENALI  
**FCC ID** : 2AIOHDT0706W08  
**STANDARD(S)** : 47 CFR Part 15 Subpart C  
**TEST DATE** : 2018-10-16 to 2018-11-06  
**ISSUE DATE** : 2018-11-06

Tested by:

Zhou zi jiang  
Zhou Zijiang (Test Engineer)

Approved by:

Peng Huarui  
Peng Huarui ( Supervisor )

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FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,  
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 Fax: 86-755-36698525  
Http://www.morlab.cn E-mail: service@morlab.cn





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Change History		
Issue	Date	Reason for change
1.0	2018-11-06	First edition

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FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,  
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555      Fax: 86-755-36698525  
[Http://www.morlab.cn](http://www.morlab.cn)      E-mail: service@morlab.cn



# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	General Procurement, Inc
<b>Applicant Address:</b>	800 E Dyer Road , Santa Ana, California 92705, United States
<b>Manufacturer:</b>	XIAMEN CANDOUR CO.,LTD.
<b>Manufacturer Address:</b>	19/F,C&D International Building, No.1699 Huandao East Road, Xiamen, China

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	7inch wifi tablet	
<b>Serial No:</b>	(N/A, marked #1 by test site)	
<b>Hardware Version:</b>	TH863_V2.0	
<b>Software Version:</b>	Android Go	
<b>Modulation Type:</b>	FHSS (GFSK(1Mbps), π/4-DQPSK(EDR 2Mbps), 8-DPSK(EDR 3Mbps))	
<b>Operating Frequency Range:</b>	The frequency range used is 2402MHz – 2480MHz (79 channels, at intervals of 1MHz);	
<b>Bluetooth Version:</b>	Bluetooth classic	
<b>Antenna Type:</b>	FPC Antenna	
<b>Antenna Gain:</b>	-4.5 dBi	
<b>Accessory Information:</b>	Battery	
	<b>Brand Name:</b>	JY
	<b>Model No.:</b>	317090
	<b>Serial No.:</b>	(N/A, marked #1 by test site)
	<b>Capacity:</b>	2000mAh
	<b>Rated Voltage:</b>	3.7V
	<b>Charge Limit:</b>	4.2V



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<b>Accessory Information:</b>	AC Adapter	
	Brand Name:	DENALI
	Model No.:	JML-0500150Z-LW
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	~ 100-240V, 50/60Hz, 0.2A
	Rated Output:	=5V, 1.5A

**Note 1:** This test report is updated from original report SZ18100035W01(Model: HT1004X16, FCC ID: 2AOHHT1004X16). According to the certificate holder, they declared that the model DT0706W08 in this report only the product name, the model name, the brand name, the antenna wiring, the battery capacity and the adaptor are changed. The two models are accordant in both hardware and software, the whole circuit board is exactly the same.

The changes only affect the test results of restricted frequency bands and radiated emission.

**Note 2:** The EUT contains Bluetooth Module operating at 2.4GHz ISM band; the frequencies is  $F(\text{MHz})=2402+1*n$  ( $0 \leq n \leq 78$ ). The lowest, middle, highest channel numbers of the Bluetooth Module used and tested in this report are separately 0 (2402MHz), 39 (2441MHz) and 78 (2480MHz).

**Note 3:** For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

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SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.  
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,  
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555      Fax: 86-755-36698525  
[Http://www.morlab.cn](http://www.morlab.cn)      E-mail: service@morlab.cn



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## 1.3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 15	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	Description	Test Date	Test Engineer	Result
1	15.203	Antenna Requirement	N/A	N/A	PASS Note1
2	15.247(a)	Number of Hopping Frequency	Nov 01, 2018	Zhou Zijiang	PASS Note1
3	15.247(b)	Peak Output Power	Nov 01, 2018	Zhou Zijiang	PASS Note1
4	15.247(a)	20dB Bandwidth	Oct 29, 2018	Zhou Zijiang	PASS Note1
5	15.247(a)	Carrier Frequency Separation	Nov 01, 2018	Zhou Zijiang	PASS Note1
6	15.247(a)	Time of Occupancy (Dwell time)	Nov 01, 2018	Zhou Zijiang	PASS Note1
7	15.247(d)	Conducted Spurious Emission	Nov 01, 2018	Zhou Zijiang	PASS Note1
8	15.207	Conducted Emission	Oct 16, 2018	Wang Dalong	PASS Note1
9	15.247(d)	Restricted Frequency Bands	Nov 06, 2018	Wang Dalong	PASS
10	15.209, 15.247(d)	Radiated Emission	Nov 06, 2018	Wang Dalong	PASS

**Note1:** The test results of these test items in this report refer to the test report (Report No.: SZ18100035W01).

**Note 2:** The tests were performed according to the method of measurements prescribed in ANSI C63.10-2013.

## 1.4. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

## 2. 47 CFR Part 15C Requirements

### 2.1. Antenna requirement

#### 2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

#### 2.1.2. Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

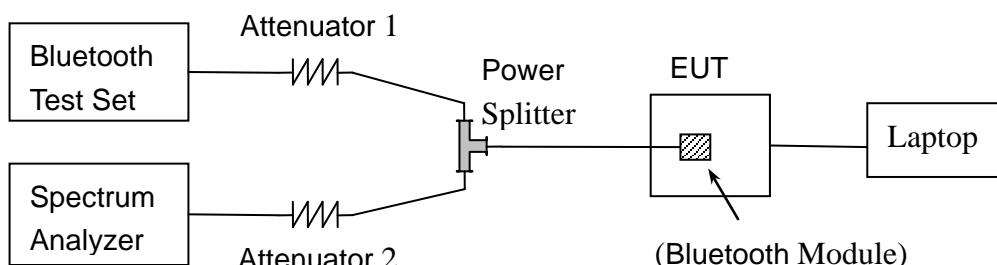
### 2.2. Number of Hopping Frequency

#### 2.2.1. Requirement

According to FCC §15.247(a)(1)(iii), frequency hopping systems operating in the 2400MHz to 2483.5MHz bands shall use at least 15 hopping frequencies.

#### 2.2.2. Test Description

##### A. Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. During the measurement, the Bluetooth Module of the EUT is activated and controlled by the SS, and is set to operate under test mode transmitting 339 bytes DH5 packages at maximum power.

**B. Equipments List:**

Please reference ANNEX B(4).

**2.2.3. Test Procedure**

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW  $\geq$  1% of the span

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

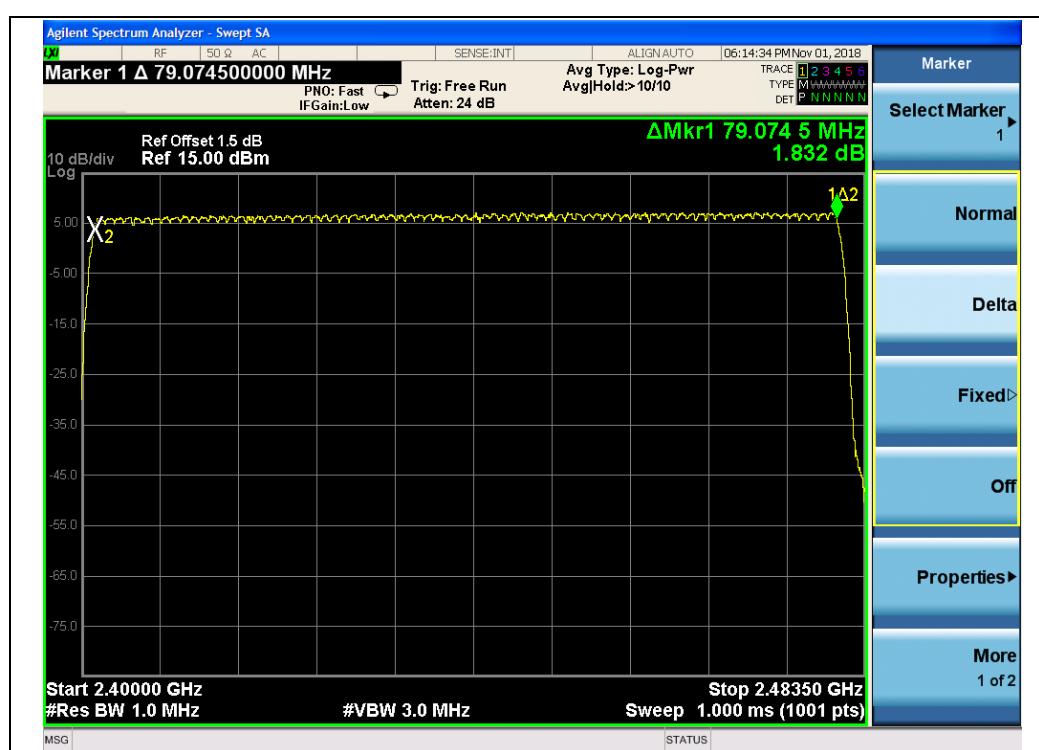
Allow the trace to stabilize

**2.2.4. Test Result**

The Bluetooth Module operates at hopping-on test mode; the frequencies number employed is counted to verify the Module's using the number of hopping frequency.

**A. Test Verdict:**

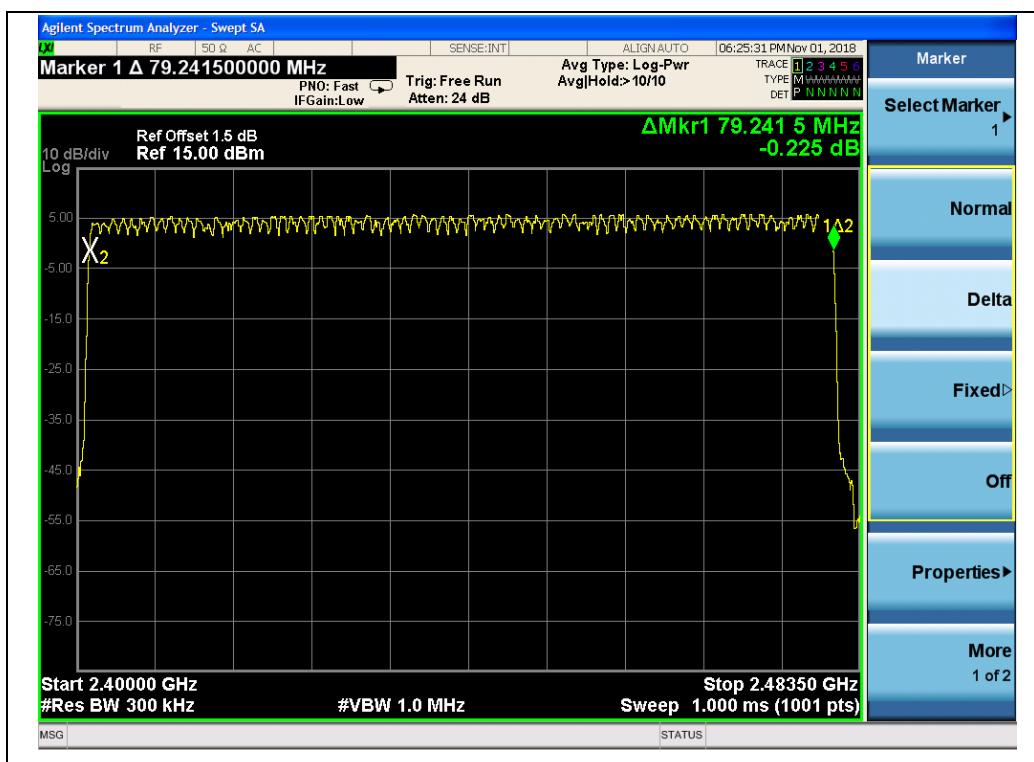
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
GFSK	2400 - 2483.5	79	15	PASS
$\pi/4$ -DQPSK	2400 - 2483.5	79	15	PASS
8-DPSK	2400 - 2483.5	79	15	PASS

**B. Test Plots:**

(π/4-DQPSK)



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(8- DPSK)

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SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.  
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,  
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555      Fax: 86-755-36698525  
Http://www.morlab.cn      E-mail: service@morlab.cn

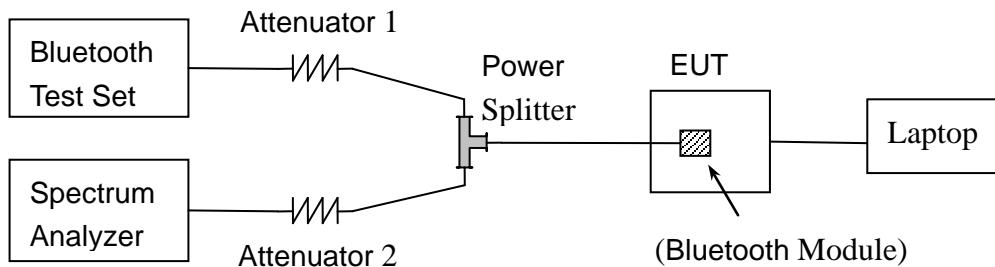
## 2.3. Peak Output Power

### 2.3.1. Requirement

According to FCC §15.247(b)(1), for frequency hopping systems that operates in the 2400MHz to 2483.5MHz band employing at least 75 hopping channels, the maximum peak output power of the intentional radiator shall not exceed 1Watt. For all other frequency hopping systems in the 2400MHz to 2483.5MHz band, it is 0.125Watts.

### 2.3.2. Test Description

#### A. Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. During the measurement, the Bluetooth Module of the EUT is activated and controlled by the SS, and is set to operate under test mode transmitting 339 bytes DH5 packages at maximum power.

#### B. Equipments List:

Please refer ANNEX B(4).

### 2.3.3. Test Result

The Bluetooth Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the module. The lowest, middle and highest channel were tested by USB Wideband Power Sensor.

**GFSK Mode****A. Test Verdict:**

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	2.54	0.002	20.97	0.125	PASS
39	2441	3.34	0.002			PASS
78	2480	3.47	0.002			PASS

**B. Test Plots:**

(GFSK, Channel 0, 2402MHz)



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(GFSK, Channel 39, 2441MHz)



(GFSK, Channel 78, 2480MHz)

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FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,  
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 Fax: 86-755-36698525  
Http://www.morlab.cn E-mail: service@morlab.cn

**π/4-DQPSK Mode****A. Test Verdict:**

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	3.71	0.002	20.97	0.125	PASS
39	2441	4.44	0.003			PASS
78	2480	4.74	0.003			PASS

**B. Test Plots:**

(π/4-DQPSK, Channel 0, 2402MHz)



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(π/4-DQPSK, Channel 39, 2441MHz)



(π/4-DQPSK, Channel 78, 2480MHz)

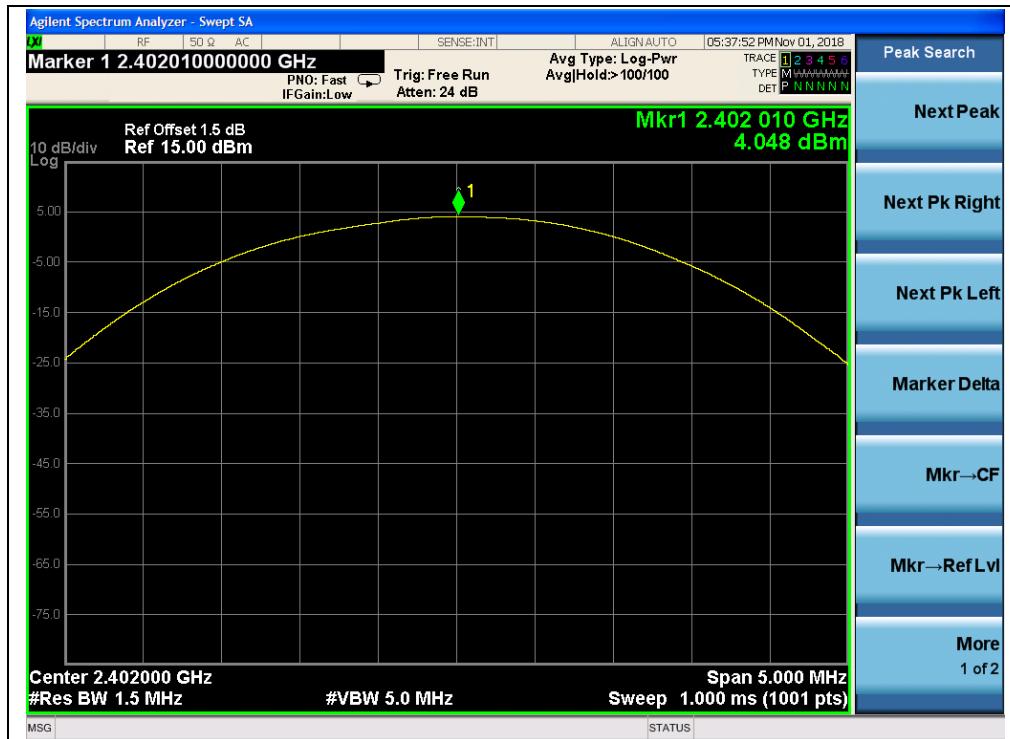
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FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,  
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 Fax: 86-755-36698525  
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**8-DPSK Mode****A. Test Verdict:**

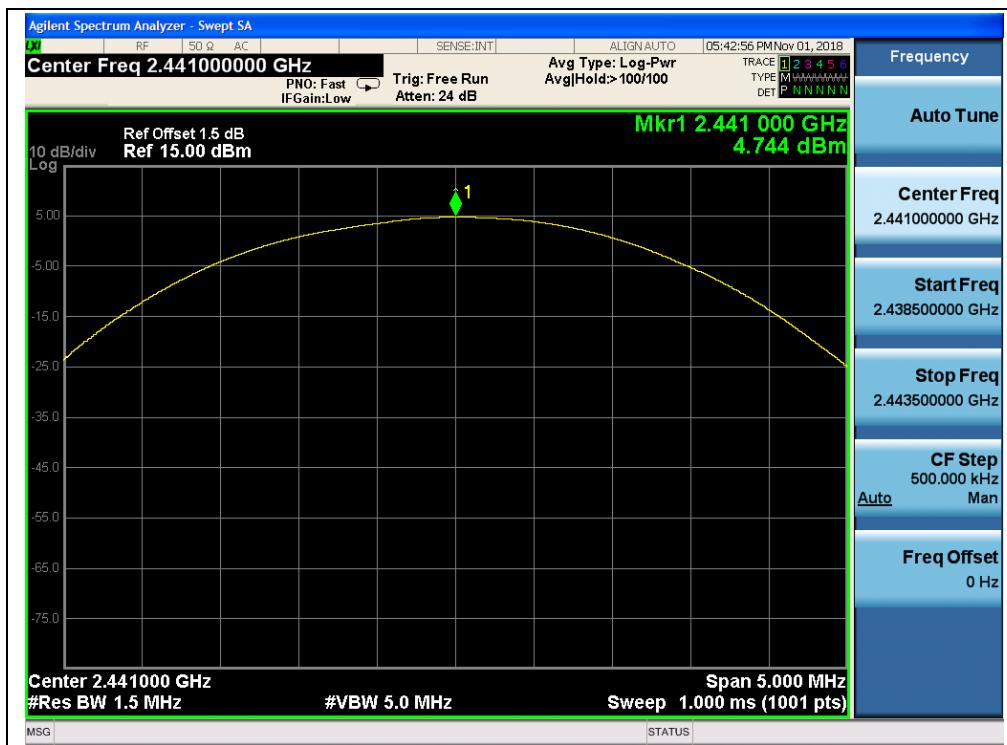
Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	4.05	0.003	20.97	0.125	PASS
39	2441	4.74	0.003			PASS
78	2480	4.93	0.003			PASS

**B. Test Plots:**

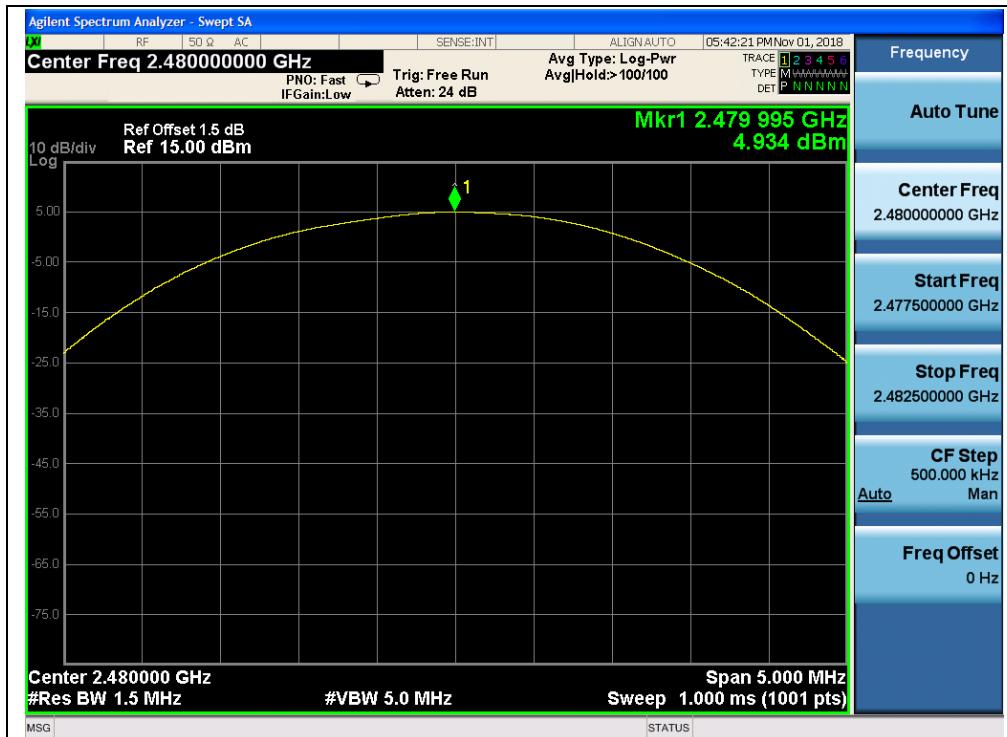
(8-DPSK, Channel 0, 2402MHz)



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(8-DPSK, Channel 39, 2441MHz)



(8-DPSK, Channel 78, 2480MHz)

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Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 Fax: 86-755-36698525  
Http://www.morlab.cn E-mail: service@morlab.cn

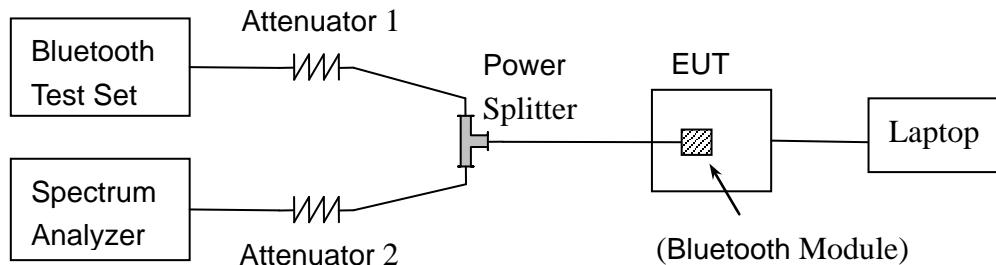
## 2.4. 20dB Bandwidth

### 2.4.1. Definition

According to FCC §15.247(a)(1), the 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth ( $10 \times \log 1\% = 20\text{dB}$ ) taking the total RF output power.

### 2.4.2. Test Description

#### A. Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. During the measurement, the Bluetooth Module of the EUT is activated and controlled by the SS, and is set to operate under test mode transmitting 339 bytes DH5 packages at maximum power.

#### B. Equipments List:

Please refer ANNEX B(4).

### 2.4.3. Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW  $\geq$  1% of the 20 dB bandwidth

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold



#### 2.4.4. Test Result

The Bluetooth Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to record the 20dB bandwidth of the Module.

##### GFSK Mode

###### A. Test Verdict:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
0	2402	1.029	PASS
39	2441	1.027	PASS
78	2480	1.028	PASS

###### B. Test Plots:



(GFSK, Channel 0, 2402MHz)



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(GFSK, Channel 39, 2441MHz)



(GFSK, Channel 78, 2480MHz)



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## π/4-DQPSK Mode

### A. Test Verdict:

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
0	2402	1.330	PASS
39	2441	1.329	PASS
78	2480	1.328	PASS

### B. Test Plots:



(π/4-DQPSK, Channel 0, 2402MHz)



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(π/4-DQPSK, Channel 39, 2441MHz)



(π/4-DQPSK, Channel 78, 2480MHz)

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Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 | Fax: 86-755-36698525  
Http://www.morlab.cn | E-mail: service@morlab.cn

**8-DPSK Mode****A. Test Verdict:**

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Result
0	2402	1.319	PASS
39	2441	1.320	PASS
78	2480	1.321	PASS

**B. Test Plots:**

(8-DPSK, Channel 0, 2402MHz)



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(8-DPSK, Channel 39, 2441MHz)



(8-DPSK, Channel 78, 2480MHz)

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Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 | Fax: 86-755-36698525  
Http://www.morlab.cn | E-mail: service@morlab.cn

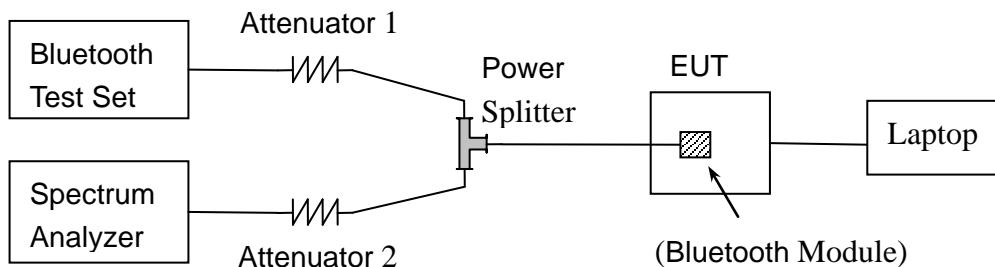
## 2.5. Carried Frequency Separation

### 2.5.1. Definition

According to FCC §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

### 2.5.2. Test Description

#### A. Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. During the measurement, the Bluetooth Module of the EUT is activated and controlled by the SS, and is set to operate under test mode transmitting 339 bytes DH5 packages at maximum power.

#### B. Equipments List:

Please refer ANNEX B(4).

### 2.5.3. Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW)  $\geq 1\%$  of the span

Video (or Average) Bandwidth (VBW)  $\geq$  RBW

Sweep = auto

Detector function = peak

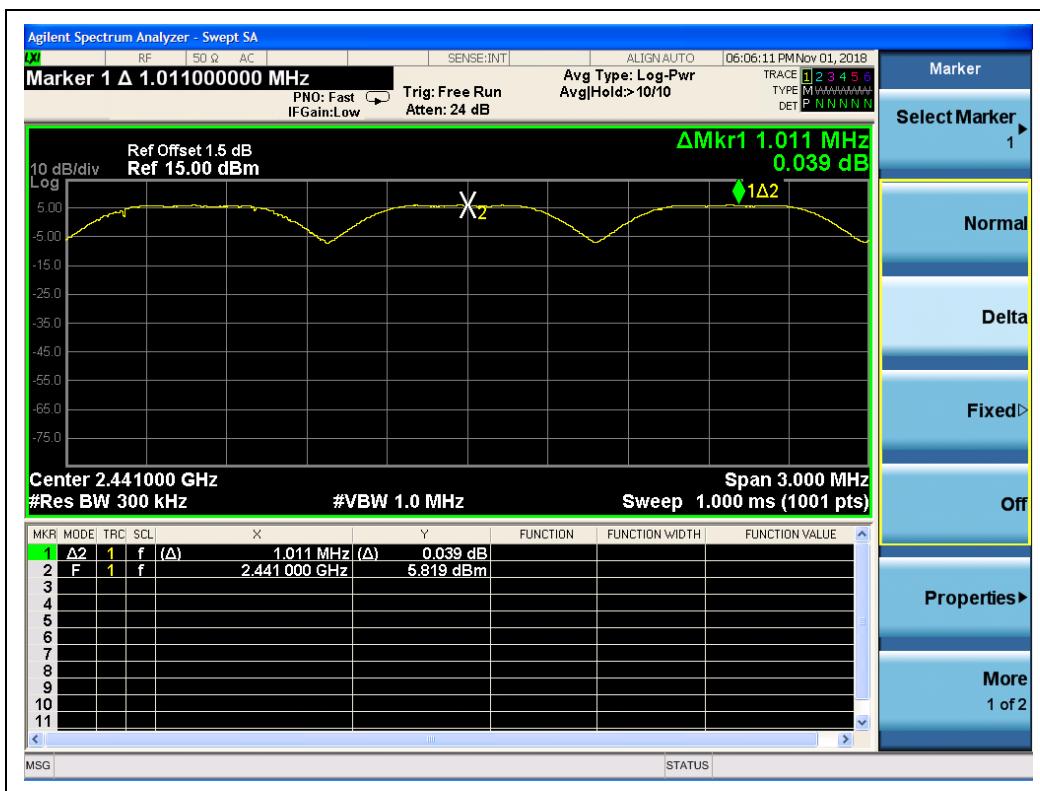
Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

## 2.5.4. Test Result

The Bluetooth Module operates at hopping-on test mode. For any adjacent channels (e.g. the channel 39 and 40 as showed below), the Module does have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel (refer to section 2.4.4), whichever is greater. So, the verdict is PASSING.

Test Mode	Measured Channel Numbers	Carried Frequency Separation	20dB bandwidth (MHz)	Min. Limit	Verdict
GFSK	39 and 40	1.011	1.027	two-thirds of the 20dB bandwidth	PASS
π/4-DQPSK	39 and 40	1.002	1.328		PASS
8-DPSK	39 and 40	1.008	1.319		PASS



(GFSK)



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(π/4-DQPSK)



(8-DPSK)

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Tel: 86-755-36698555  
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Http://www.morlab.cn  
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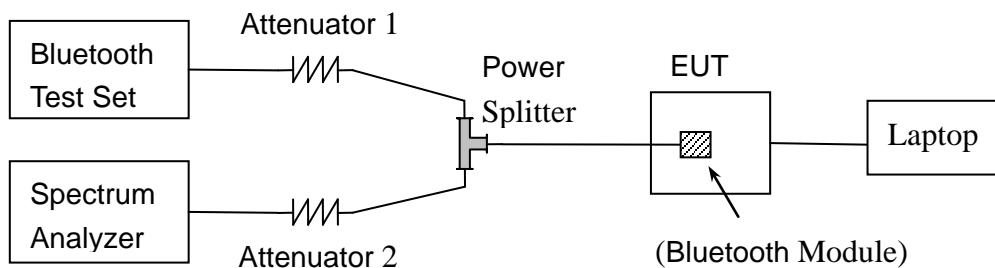
## 2.6. Time of Occupancy (Dwell time)

### 2.6.1. Requirement

According to FCC §15.247(a) (1) (iii), frequency hopping systems in the 2400 - 2483.5MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### 2.6.2. Test Description

#### A. Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. During the measurement, the Bluetooth Module of the EUT is activated and controlled by the SS, and is set to operate under test mode transmitting 339 bytes DH5 packages at maximum power.

#### B. Equipments List:

Please refer ANNEX B(4).

### 2.6.3. Test Procedure

Option 1:

DH1: Dwell time equal to Pulse time (ms) \*(1600 / 2 /79)\*31.6 Millisecond  
 DH3: Dwell time equal to Pulse time (ms) \* (1600 / 4 /79) \*31.6 Millisecond  
 DH5: Dwell time equal to Pulse Time (ms)\*( 1600 / 6 /79) \*31.6 Millisecond

**AFH Mode:**

DH1: Dwell time equal to Pulse time (ms) \*(800 / 2 /20)\*(0.4\*20) Millisecond  
 DH3: Dwell time equal to Pulse time (ms) \* (800 / 4 /20)\*(0.4\*20) Millisecond  
 DH5: Dwell time equal to Pulse Time (ms)\* (800 / 6 /20)\*(0.4\*20) Millisecond

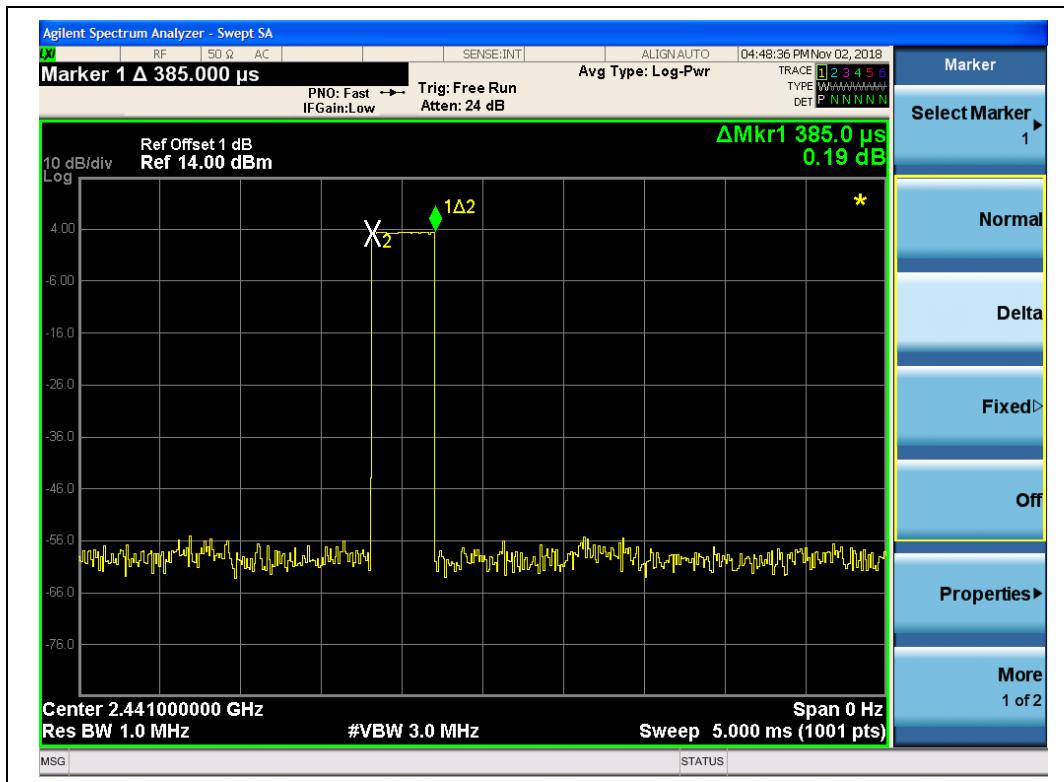
#### 2.6.4. Test Result

##### GFSK Mode

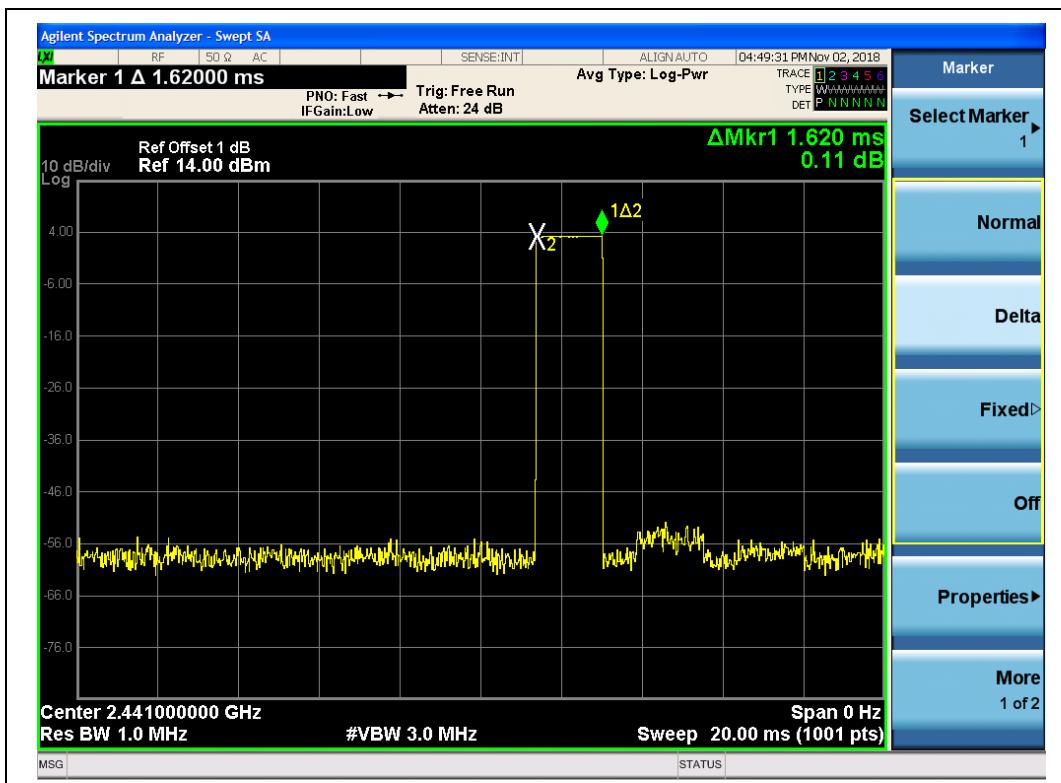
###### A. Test Verdict:

DH Packet	Pulse Width (ms)	Dwell Time (ms)		Limit (sec)	Verdict
		Normal Mode	AFH Mode		
DH1	0.39	124.80	62.40	0.4	PASS
DH3	1.62	259.20	129.60		PASS
DH5	2.88	307.20	153.60		PASS

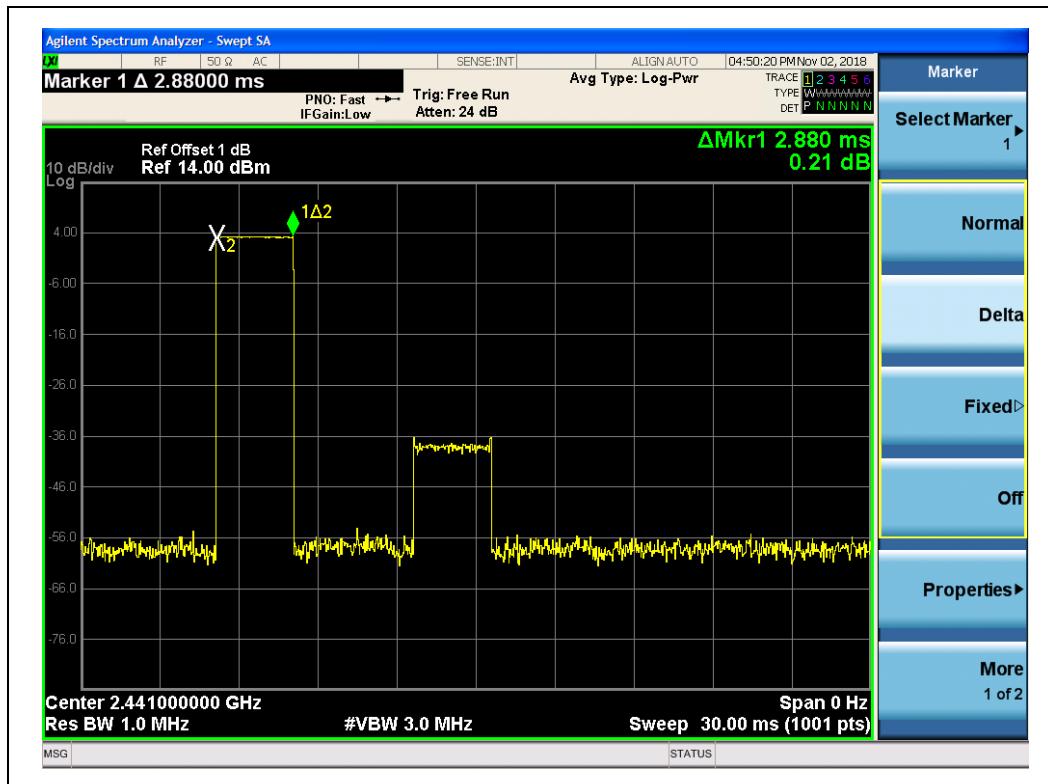
###### B. Test Plots:



(DH1, GFSK)



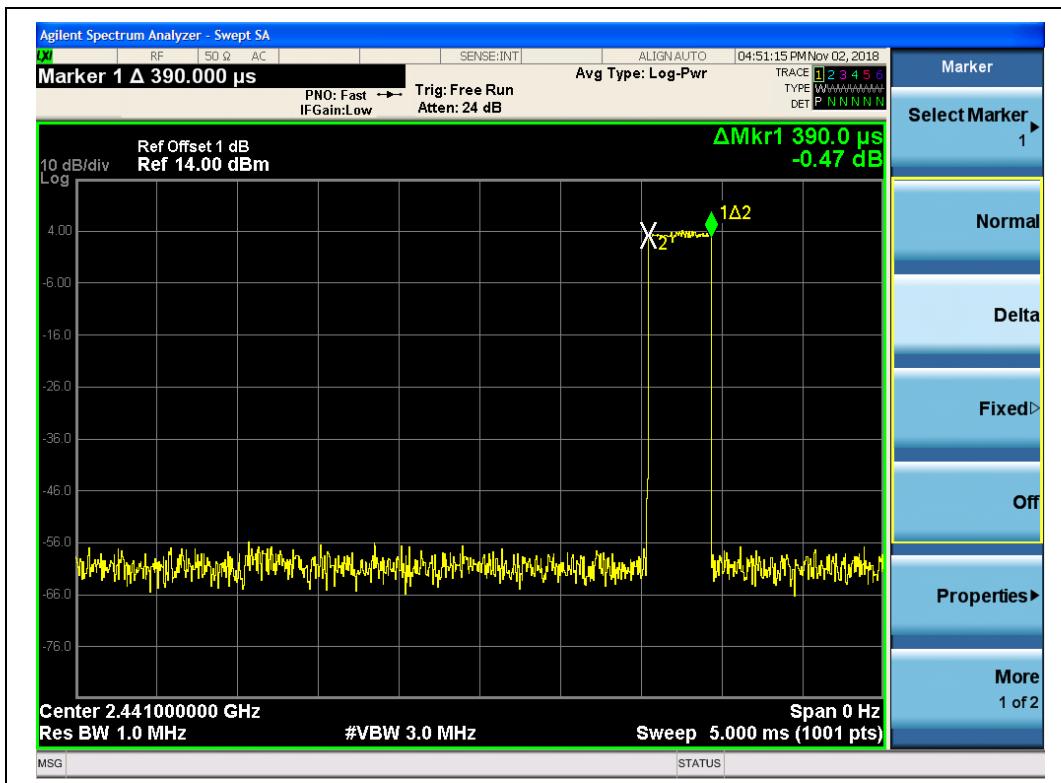
(DH3, GFSK)



(DH5, GFSK)

**π/4-DQPSK Mode****A. Test Verdict:**

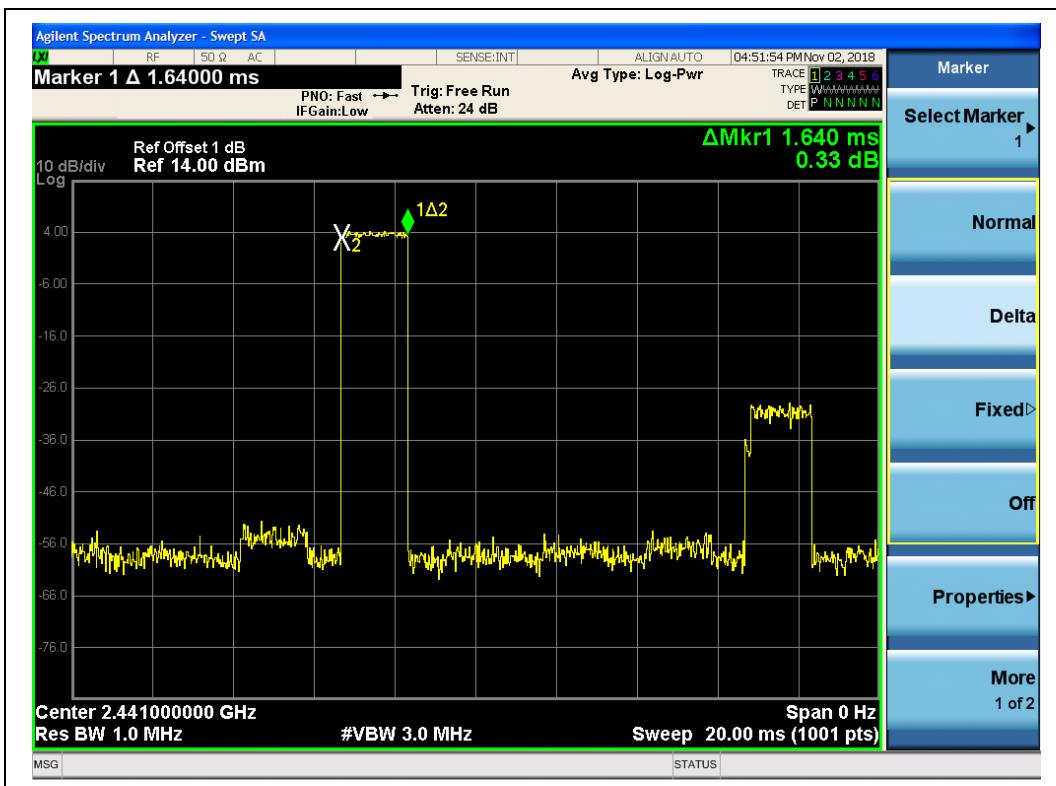
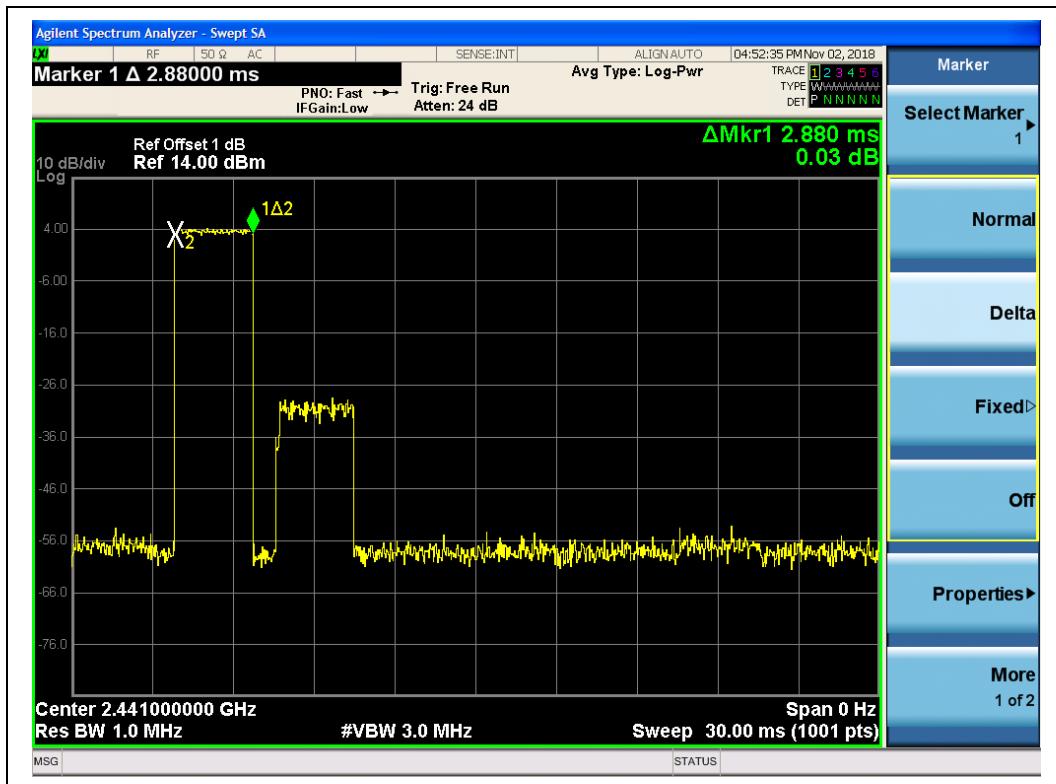
DH Packet	Pulse Width (ms)	Dwell Time (ms)		Limit (sec)	Verdict
		Normal Mode	AFH Mode		
DH1	0.39	124.80	62.40	0.4	PASS
DH3	1.64	262.40	131.20		PASS
DH5	2.88	307.20	153.60		PASS

**B. Test Plots:**

(DH1, π/4-DQPSK)



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(DH3,  $\pi/4$ -DQPSK)(DH5,  $\pi/4$ -DQPSK)

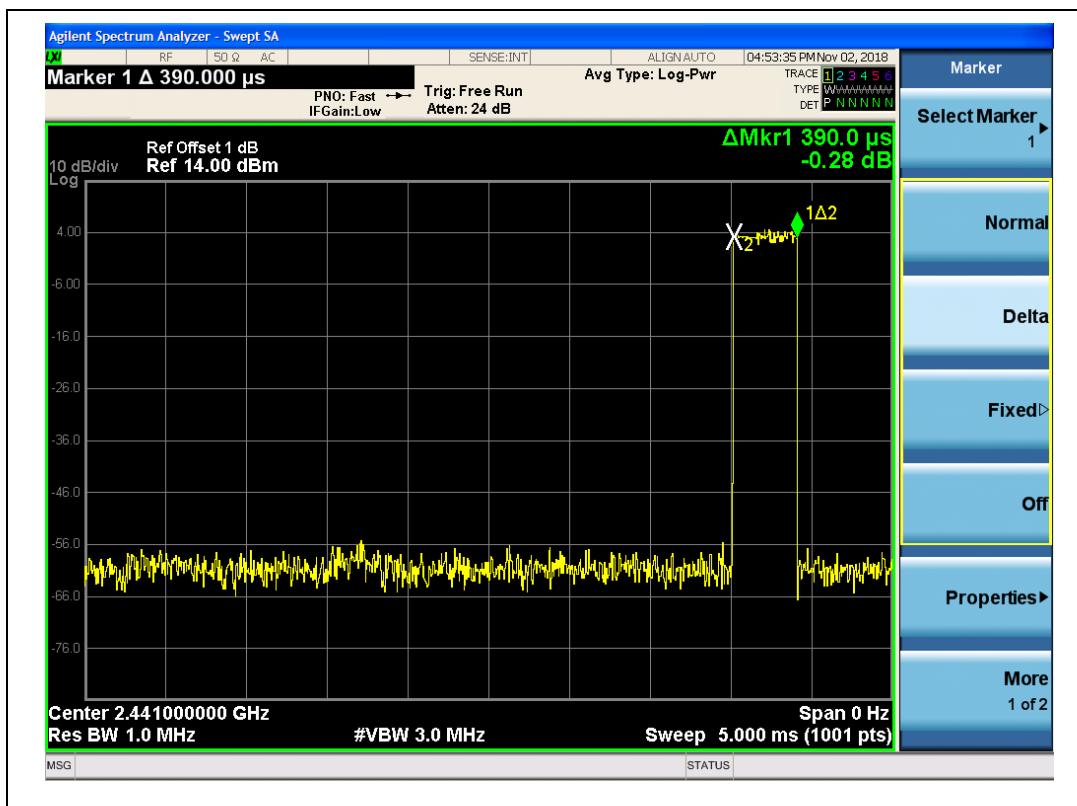
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Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555  
Fax: 86-755-36698525  
Http://www.morlab.cn  
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**8-DPSK mode**
**A. Test Verdict:**

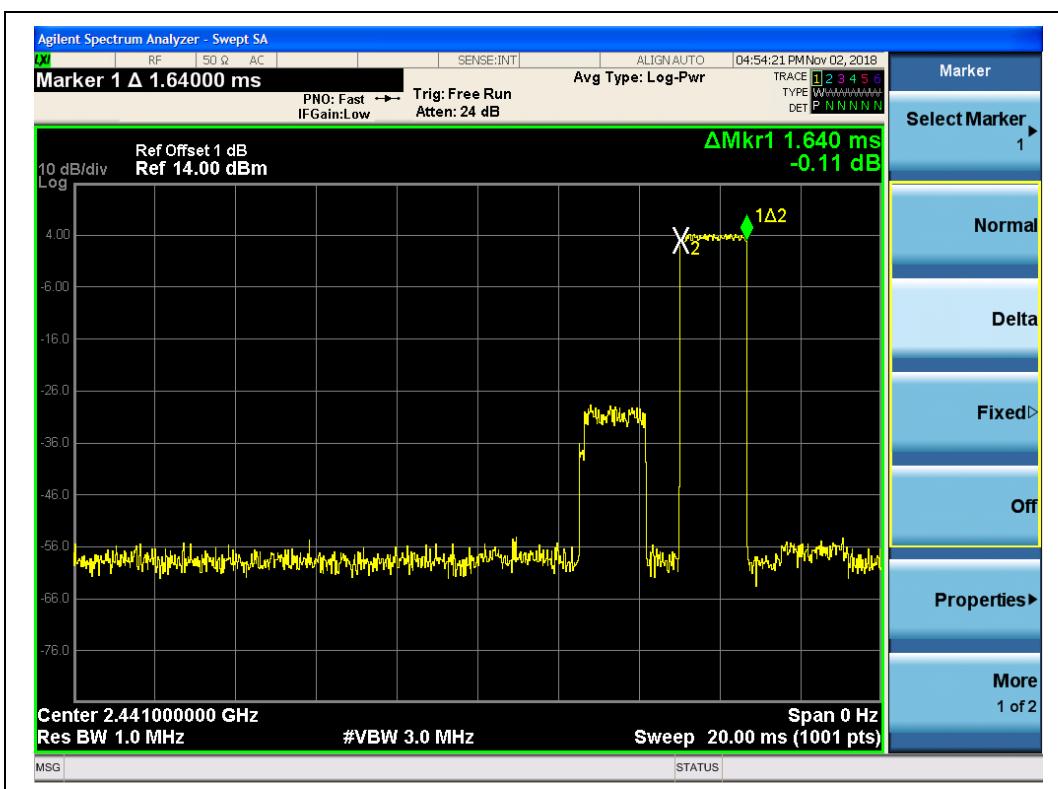
DH Packet	Pulse Width (ms)	Dwell Time (ms)		Limit (sec)	Verdict
		Normal Mode	AFH Mode		
DH1	0.39	124.80	62.40	0.4	PASS
DH3	1.64	262.40	131.20		PASS
DH5	2.88	307.20	153.60		PASS

**B. Test Plots:**


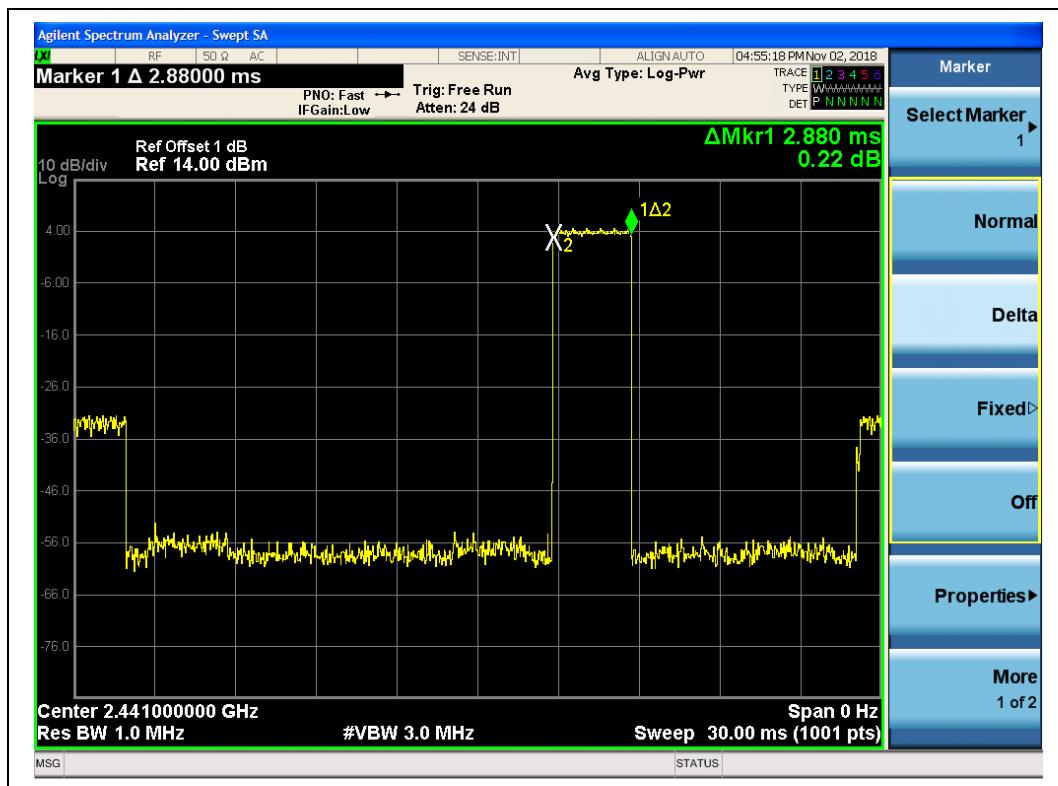
(DH1, 8-DPSK)



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(DH3, 8-DPSK)



(DH5, 8-DPSK)

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Tel: 86-755-36698555  
Fax: 86-755-36698525  
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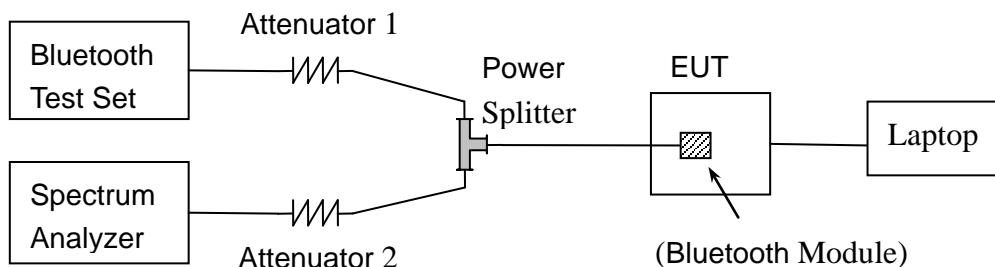
## 2.7. Conducted Spurious Emissions

### 2.7.1. Requirement

According to FCC §15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

### 2.7.2. Test Description

#### A. Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth Test Set with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. During the measurement, the Bluetooth Module of the EUT is activated and controlled by the SS, and is set to operate under test mode transmitting 339 bytes DH5 packages at maximum power.

#### B. Equipments List:

Please refer ANNEX B(4).

### 2.7.3. Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak



Trace = max hold

Allow the trace to stabilize.

#### 2.7.4. Test Result

The Bluetooth Module operates at hopping-off test mode. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

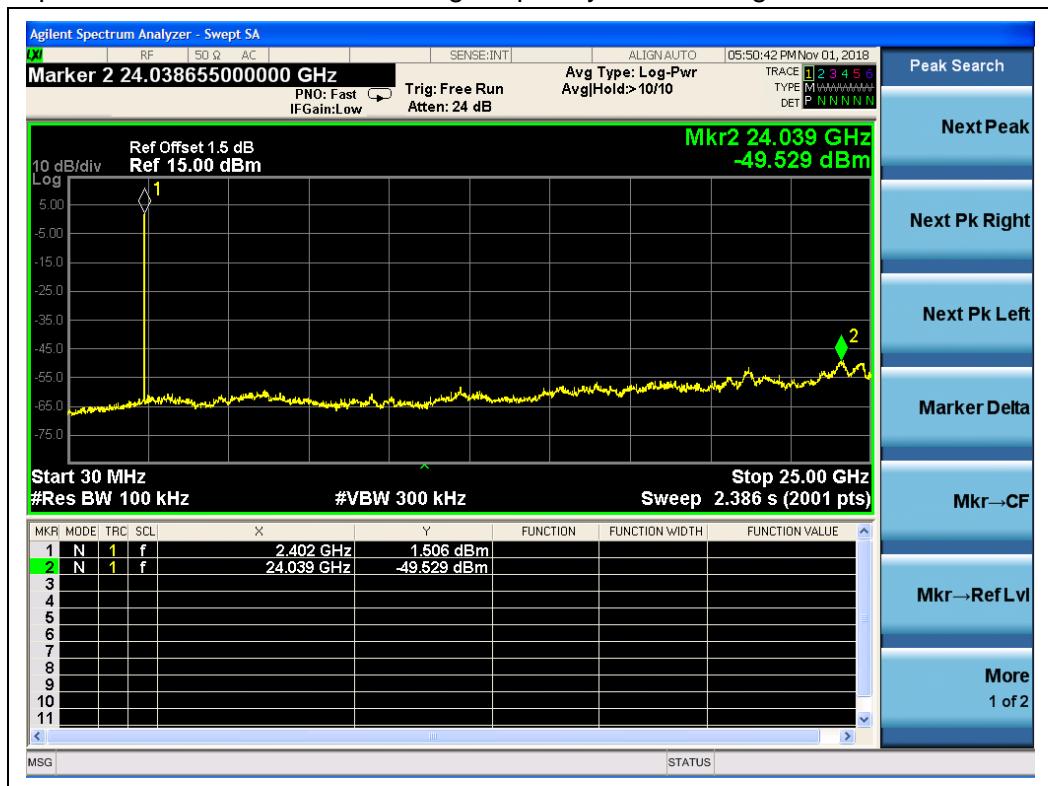
#### GFSK Mode

##### A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
0	2402	-49.53	1.51	-18.49	PASS
39	2441	-48.57	2.11	-17.89	PASS
78	2480	-48.74	2.51	-17.49	PASS

##### B. Test Plots:

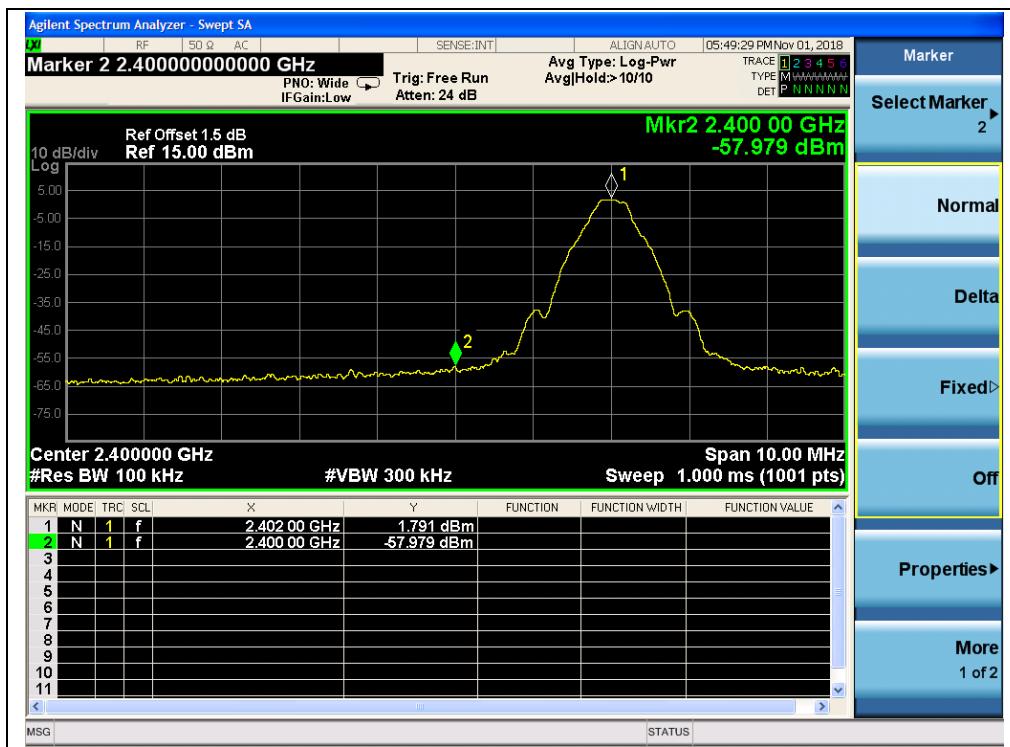
Note: The power of the Module transmitting frequency should be ignored.



(Channel = 0, 30MHz to 25GHz, GFSK Mode)



REPORT No.: SZ18100034W01



(Channel = 0, Band edge, GFSK Mode)



(Channel = 0, Band edge with hopping on, GFSK Mode)

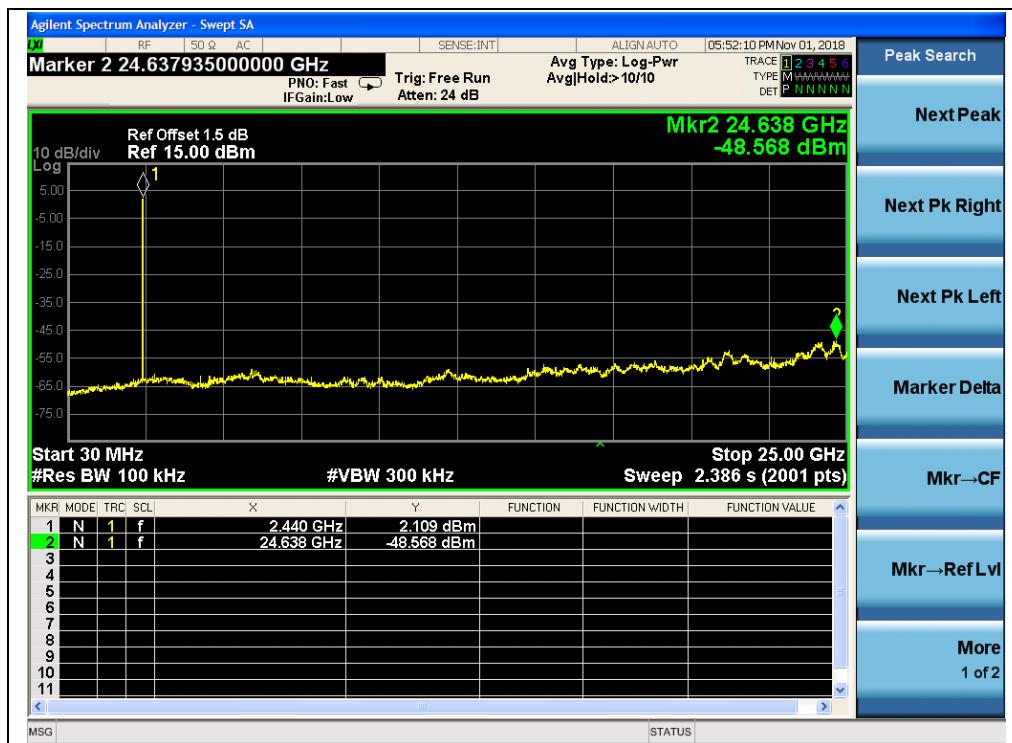
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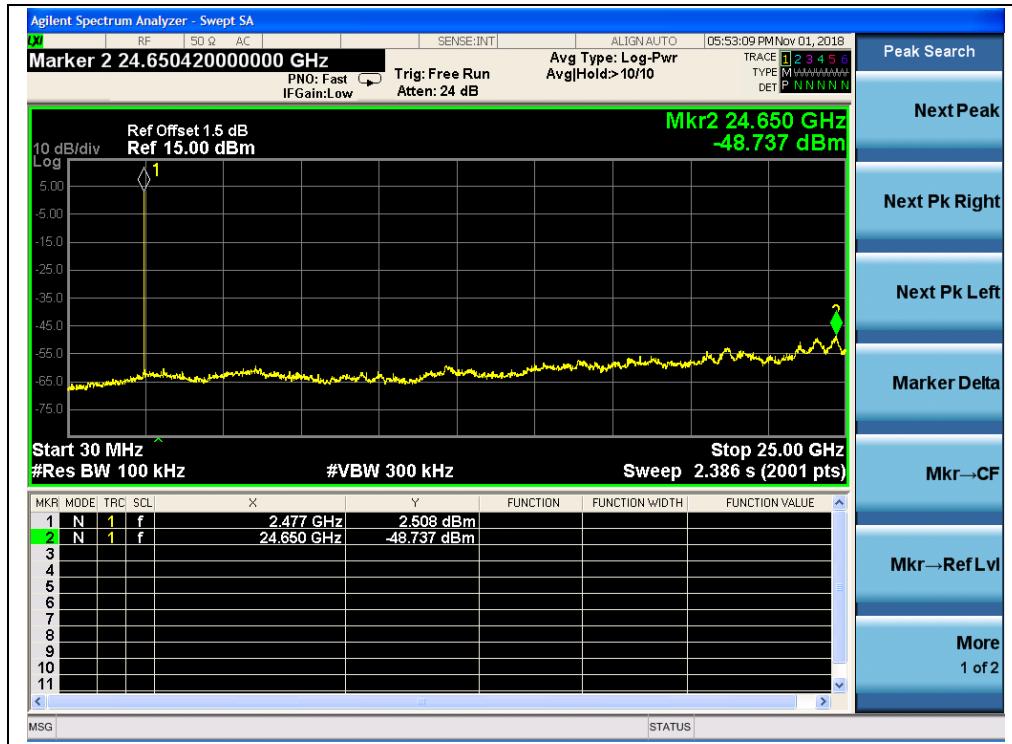
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(Channel = 39, 30MHz to 25GHz, GFSK Mode)



(Channel = 78, 30MHz to 25GHz, GFSK Mode)

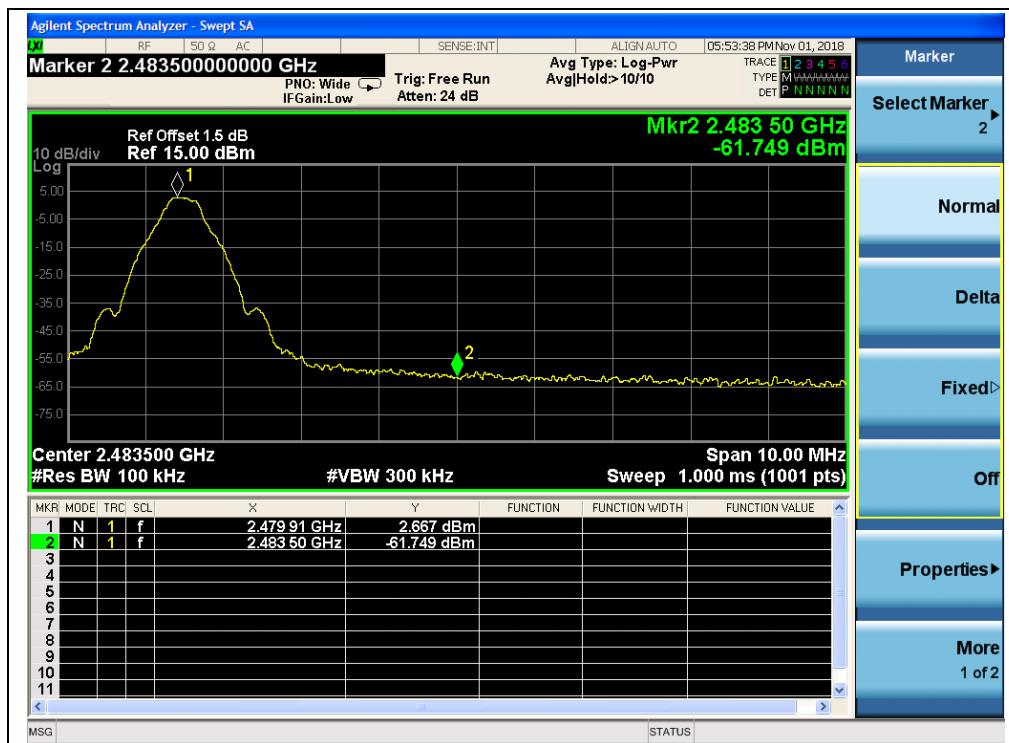
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Fax: 86-755-36698525  
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(Channel = 78, Band edge, GFSK Mode)



(Channel = 78, Band edge with hopping on, GFSK Mode)

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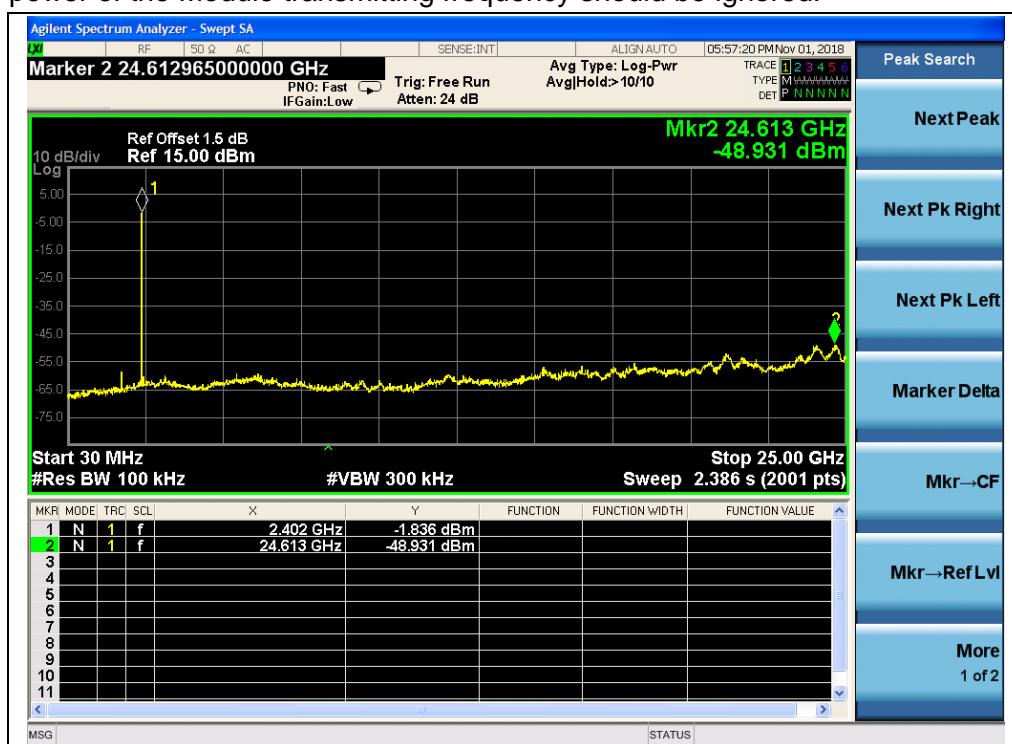
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**π/4-DQPSK Mode****A. Test Verdict:**

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
0	2402	-48.93	-1.84	-21.84	PASS
39	2441	-48.20	-0.32	-20.32	PASS
78	2480	-48.61	-0.73	-20.73	PASS

**B. Test Plots:**

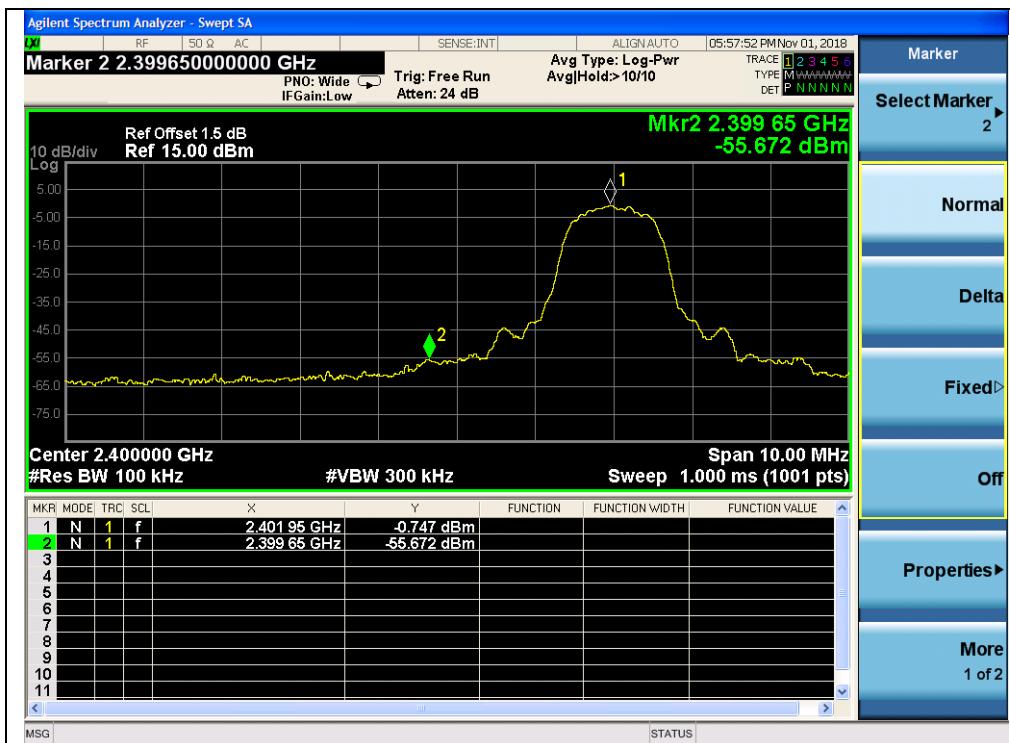
Note: the power of the Module transmitting frequency should be ignored.



(Channel = 0, 30MHz to 25GHz, π/4-DQPSK)



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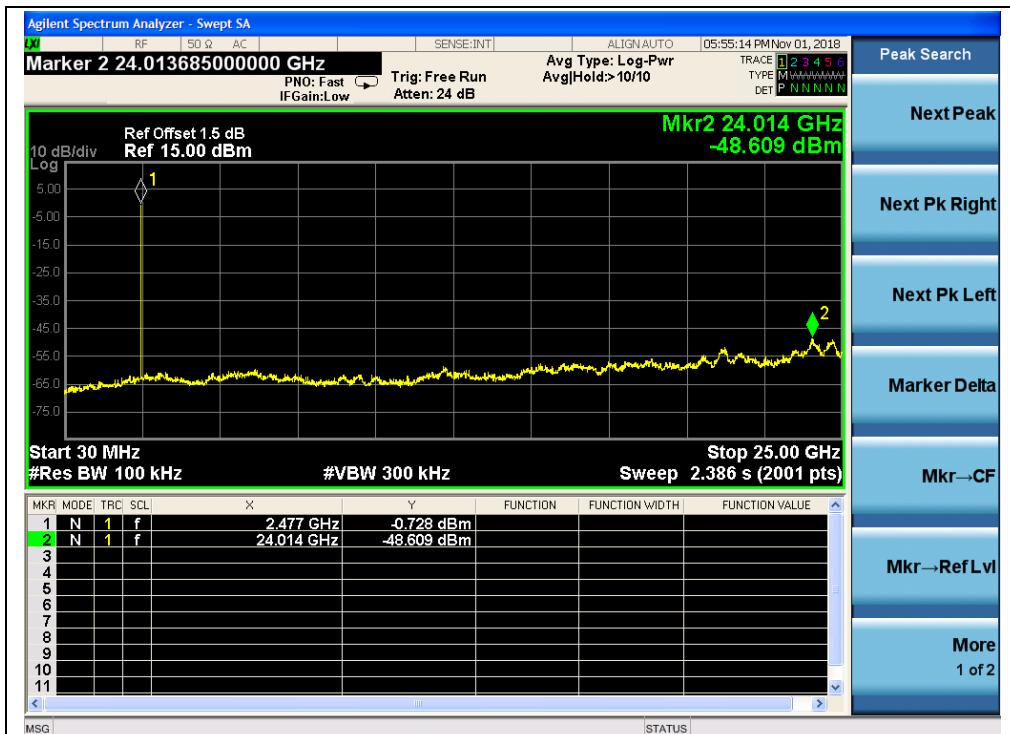
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(Channel = 39, 30MHz to 25GHz, π/4-DQPSK)



(Channel = 78, 30MHz to 25GHz, π/4-DQPSK)

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Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

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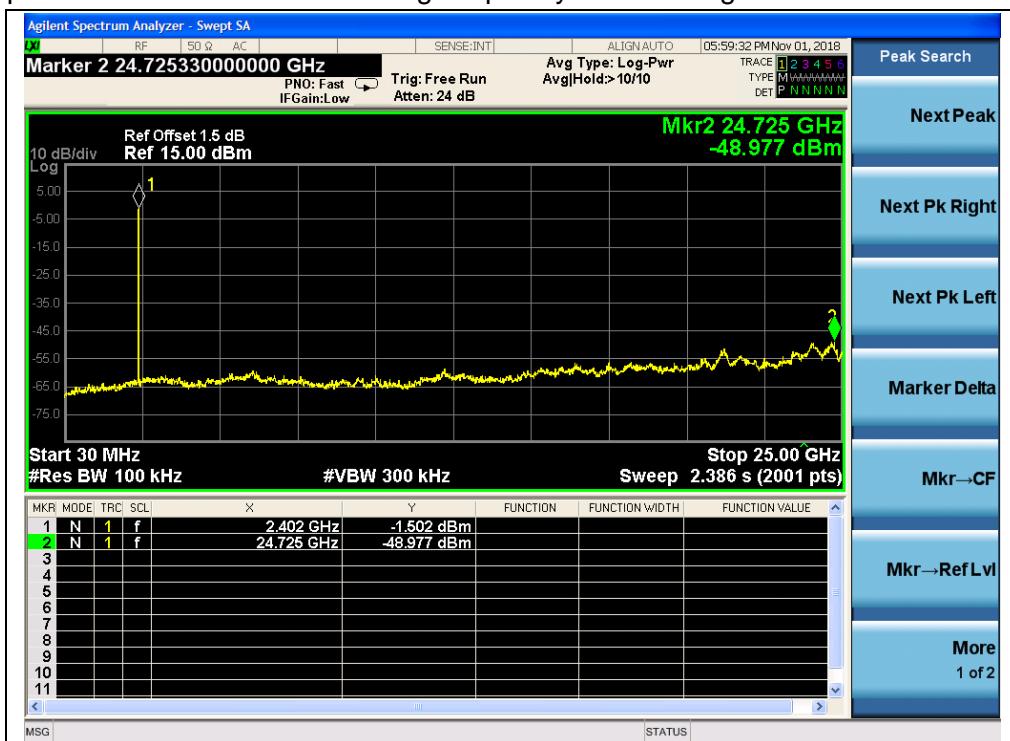
(Channel = 78, Band edge,  $\pi/4$ -DQPSK)(Channel = 78, Band edge with hopping on,  $\pi/4$ -DQPSK)

**8-DPSK Mode****A. Test Verdict:**

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
0	2402	-48.98	-1.50	-21.50	PASS
39	2441	-48.17	-0.27	-20.27	PASS
78	2480	-48.65	0.04	-19.96	PASS

**B. Test Plots:**

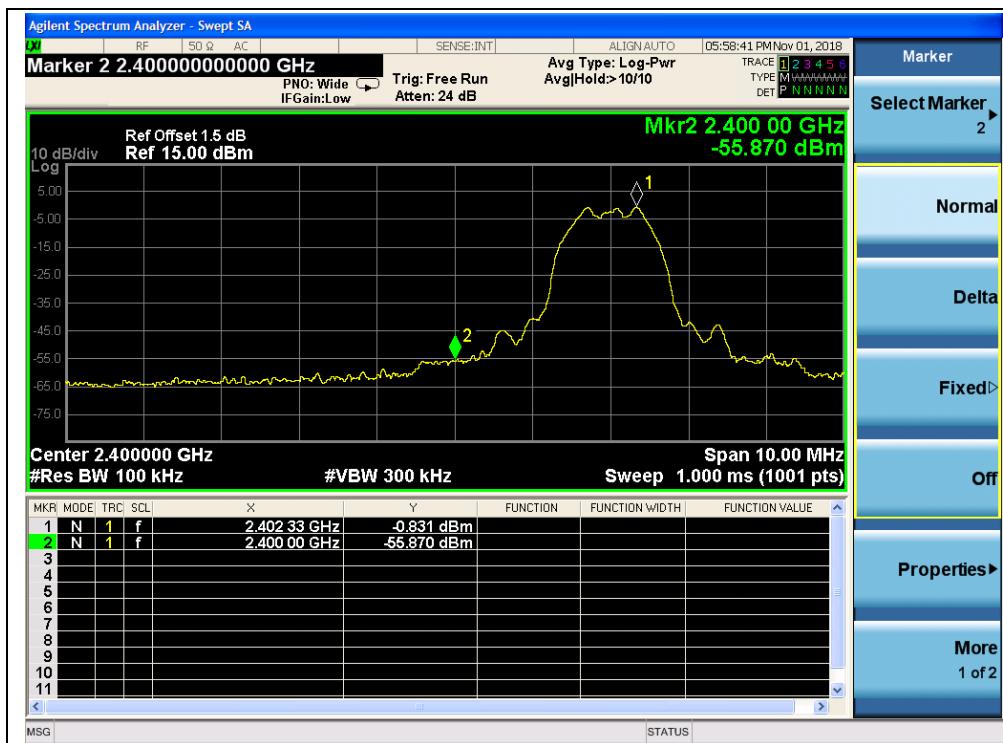
Note: the power of the Module transmitting frequency should be ignored.



(Channel = 0, 30MHz to 25GHz, 8-DPSK)



REPORT No.: SZ18100034W01



(Channel = 0, Band edge, 8-DPSK)



(Channel = 0, Band edge with hopping on, 8-DPSK)

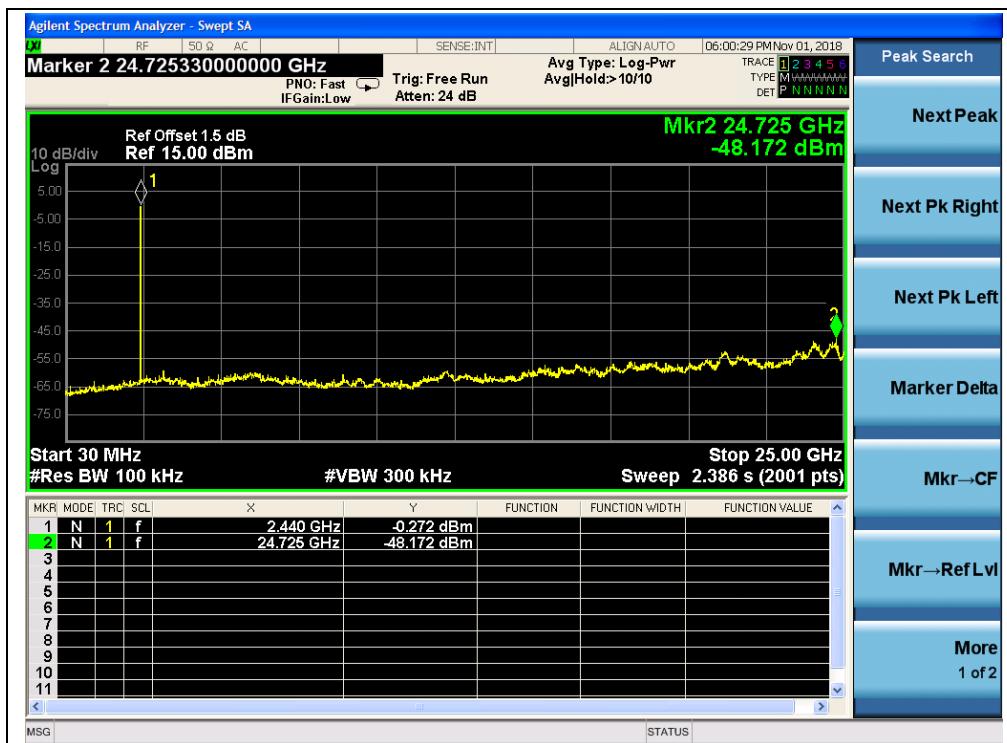
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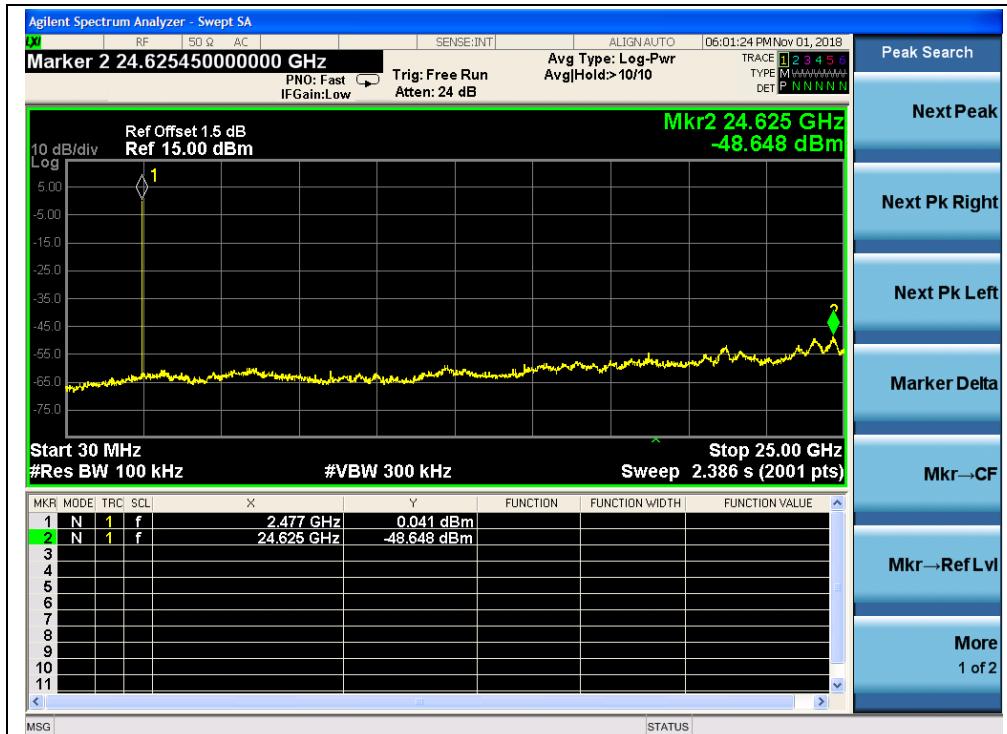
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(Channel = 39, 30MHz to 25GHz, 8-DPSK)



(Channel = 78, 30MHz to 25GHz, 8-DPSK)

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Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555  
Fax: 86-755-36698525  
Http://www.morlab.cn  
E-mail: service@morlab.cn



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(Channel = 78, Band edge, 8-DPSK)



(Channel = 78, Band edge with hopping on, 8-DPSK)

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FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,  
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555 Fax: 86-755-36698525  
Http://www.morlab.cn E-mail: service@morlab.cn

## 2.8. Conducted Emission

### 2.8.1. Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

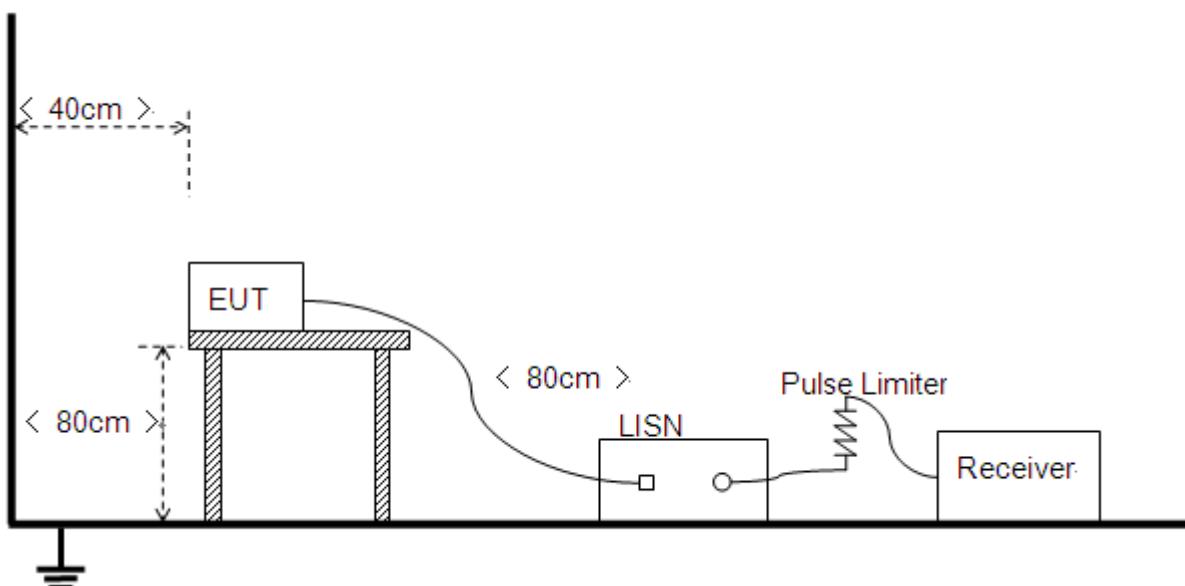
Frequency range (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

**NOTE:**

- (a) The lower limit shall apply at the band edges.
- (b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

### 2.8.2. Test Description

#### A. Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.

The factors of the site are calibrated to correct the reading. During the measurement, the Bluetooth



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EUT is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna, and is set to operate under hopping-on test mode transmitting 339 bytes DH5 packages at maximum power.

**B. Equipments List:**

Please reference ANNEX B(4)..

**2.8.3. Test Result**

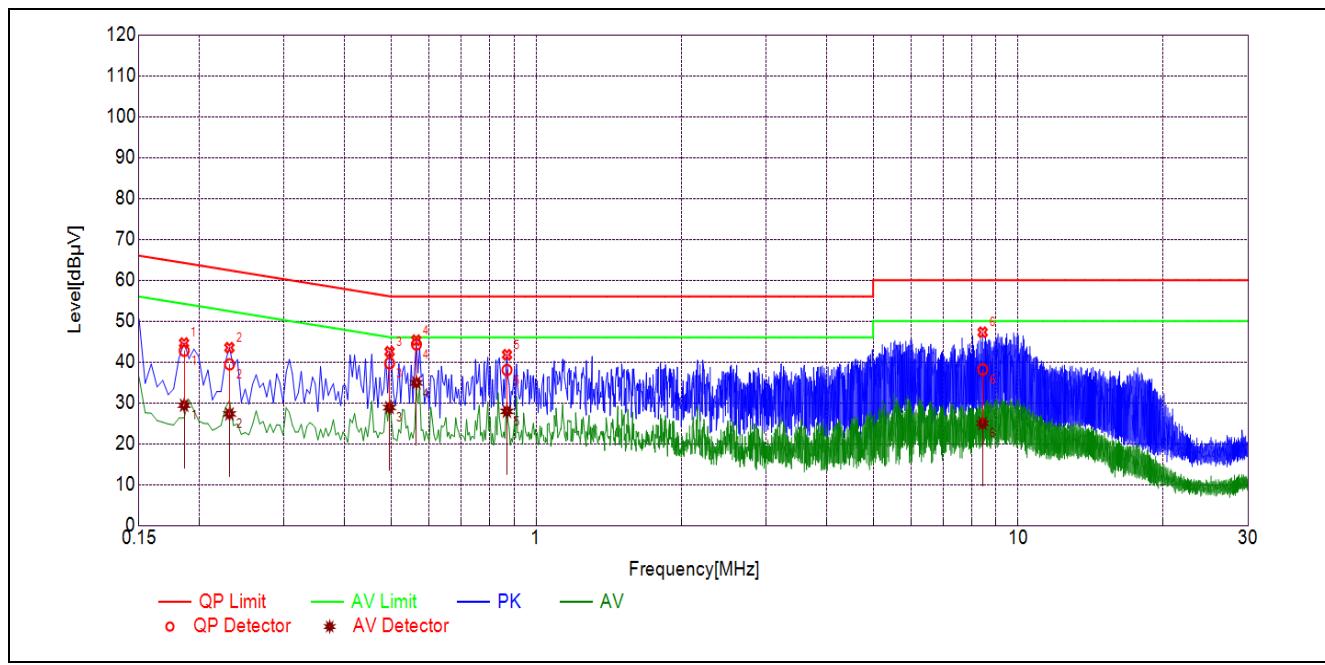
The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

**Note:** Both of the test voltage AC 120V/60Hz and AC 230V/50Hz were considered and tested respectively, only the results of the worst case AC 120V/60Hz were recorded in this report.

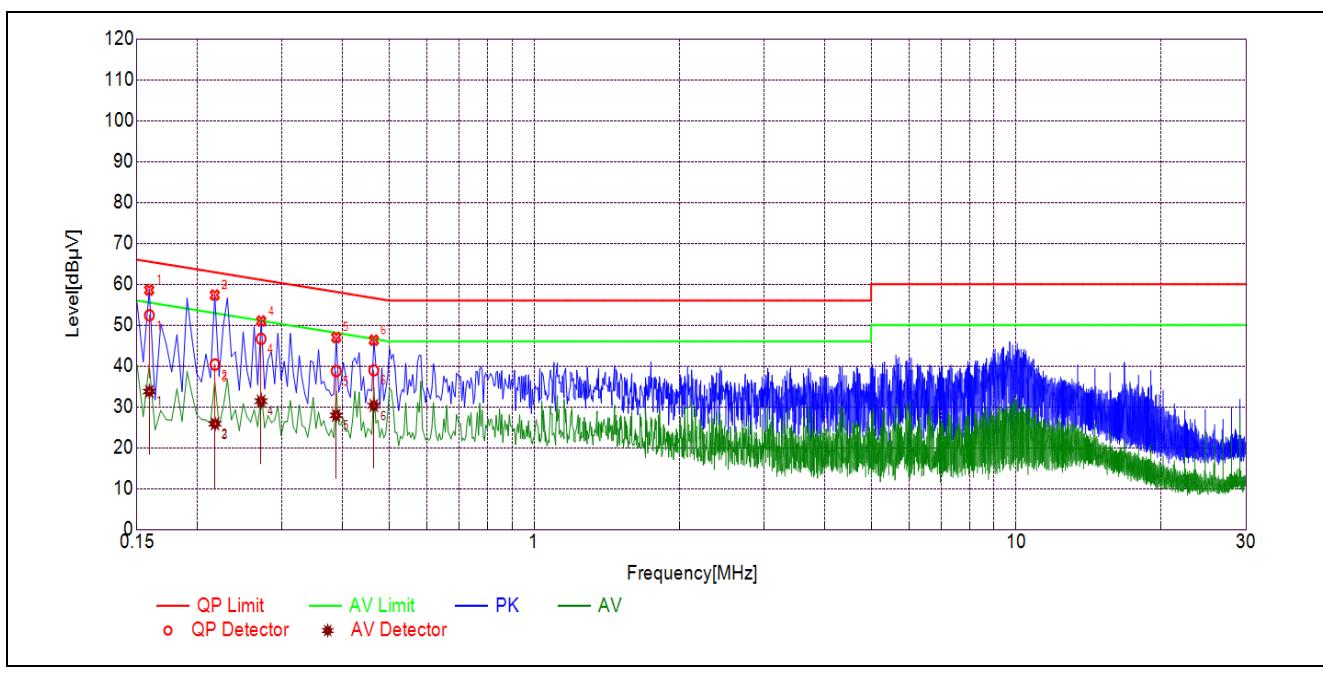
**A. Test setup:**

The EUT configuration of the emission tests is Adaptor + EUT + Link.

**Note:** The test voltage is AC 120V/60Hz.

**B. Test Plots:**


NO.	Fre. (MHz)	Emission Level (dB $\mu$ V)		Limit (dB $\mu$ V)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1861	42.75	29.42	64.21	54.21	Line	PASS
2	0.2311	39.42	27.29	62.41	52.41		PASS
3	0.4964	39.69	28.86	56.06	46.06		PASS
4	0.5644	44.28	34.92	56.00	46.00		PASS
5	0.8696	38.03	27.92	56.00	46.00		PASS
6	8.4388	38.15	25.00	60.00	50.00		PASS



NO.	Fre. (MHz)	Emission Level (dB $\mu$ V)		Limit (dB $\mu$ V)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1591	52.40	33.77	65.51	55.51	Neutral	PASS
2	0.2177	40.35	25.85	62.91	52.91		PASS
3	0.2175	39.71	25.61	62.91	52.91		PASS
4	0.2713	46.63	31.38	61.08	51.08		PASS
5	0.3884	38.73	27.93	58.10	48.10		PASS
6	0.4649	38.92	30.33	56.60	46.60		PASS

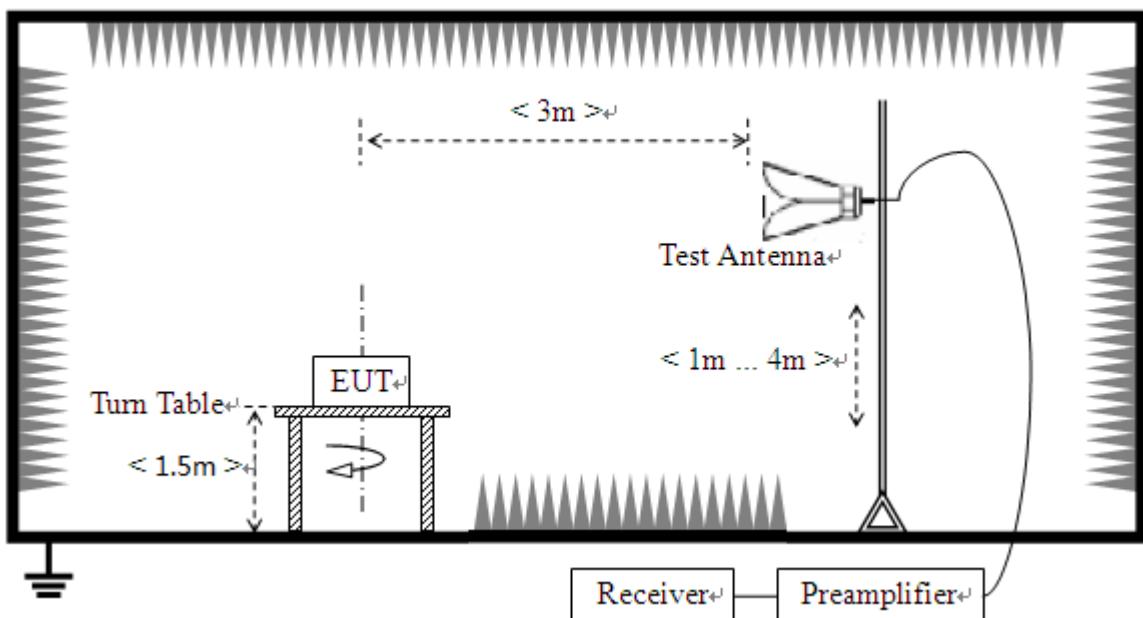
## 2.9. Restricted Frequency Bands

### 2.9.1. Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

### 2.9.2. Test Description

#### A. Test Setup:



The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the Bluetooth Module of the EUT is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna, and is set to operate under non hopping-on test mode transmitting 339 bytes DH5, 679 bytes 2DH5 and 1021 bytes 3DH5 packages at maximum power.

For the Test Antenna:

Horn Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

**B. Equipments List:**

Please refer ANNEX B(4).

**2.9.3. Test Procedure**

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1\text{GHz}$ , 100 KHz for  $f < 1\text{GHz}$

VBW = 3 MHz for peak and 10Hz for average

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize.

**2.9.4. Test Result**

The lowest and highest channels are tested to verify Restricted Frequency Bands.

The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V}/\text{m}] = U_R + A_T + A_{\text{Factor}} [\text{dB}]; A_T = L_{\text{Cable loss}} [\text{dB}] - G_{\text{preamp}} [\text{dB}]$$

AT: Total correction Factor except Antenna

UR: Receiver Reading

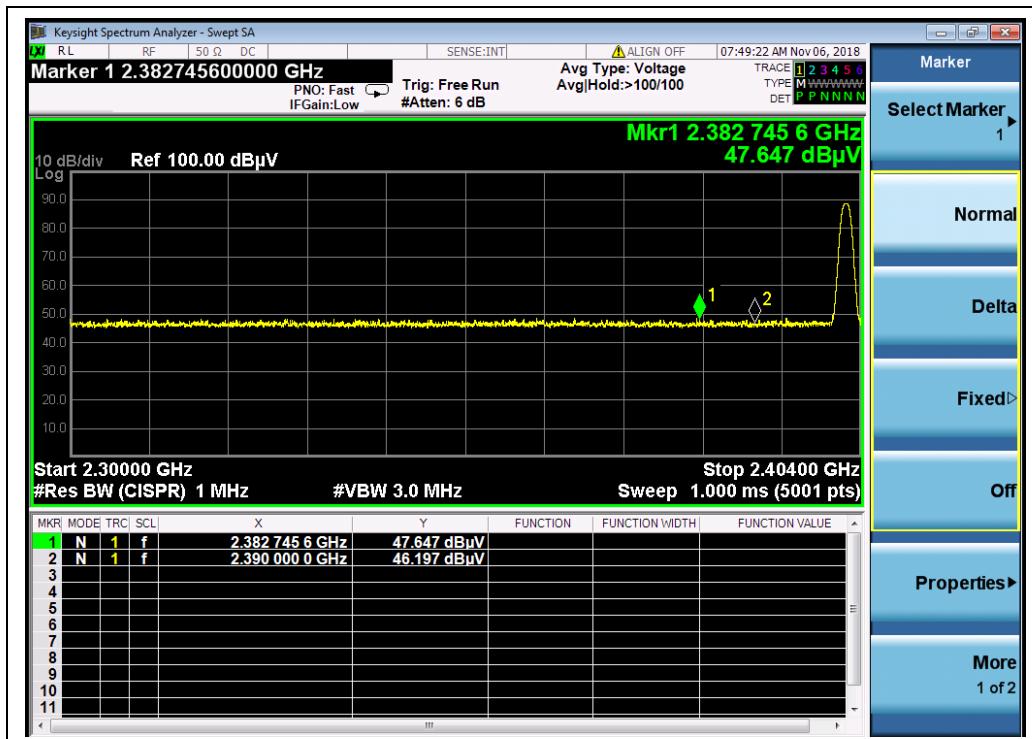
Gpreamp: Preamplifier Gain

AFactor: Antenna Factor at 3m

**Note:** Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

**GFSK Mode****A. Test Verdict:**

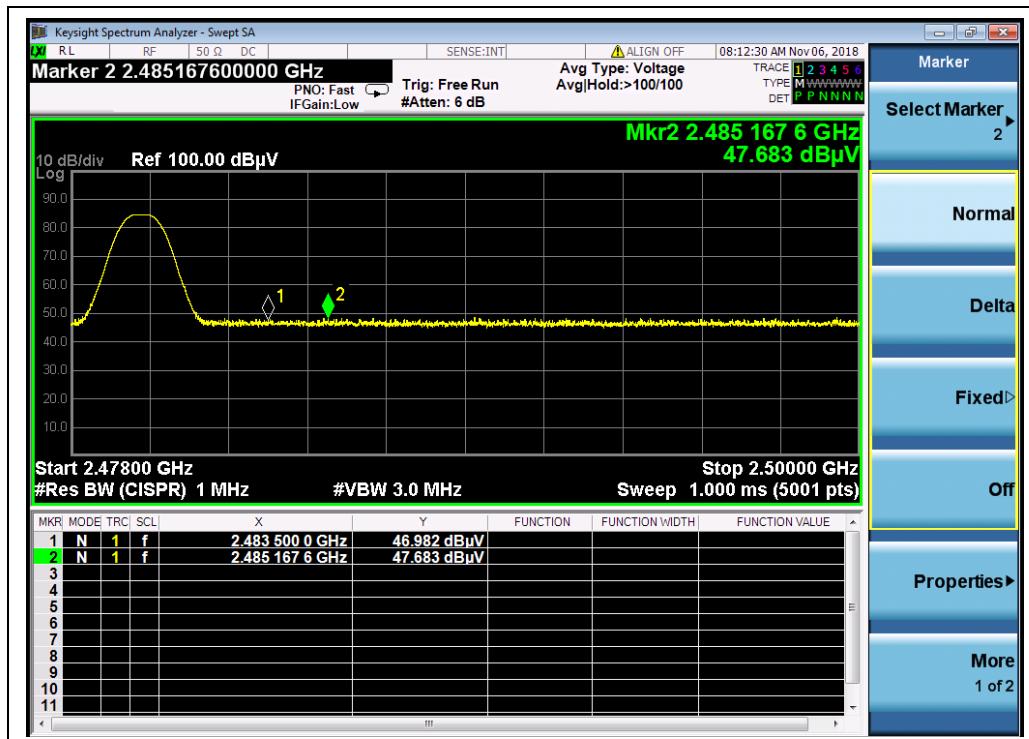
Channel	Frequency (MHz)	Detector	Receiver	$A_T$ (dB)	$A_{\text{Factor}}$ (dB@3m)	Max. Emission $E$ ( $\text{dB}\mu\text{V}/\text{m}$ )	Limit ( $\text{dB}\mu\text{V}/\text{m}$ )	Verdict
			UR (dBuV)					
0	2382.75	PK	47.65	-29.67	32.56	50.54	74	PASS
0	2390.00	AV	36.08	-29.67	32.56	38.97	54	PASS
78	2485.17	PK	47.68	-29.67	32.56	50.57	74	PASS
78	2483.50	AV	36.10	-29.67	32.56	38.99	54	PASS

**B. Test Plots:**


(Channel = 0, PEAK, GFSK)



(Channel = 0, AVERAGE, GFSK)



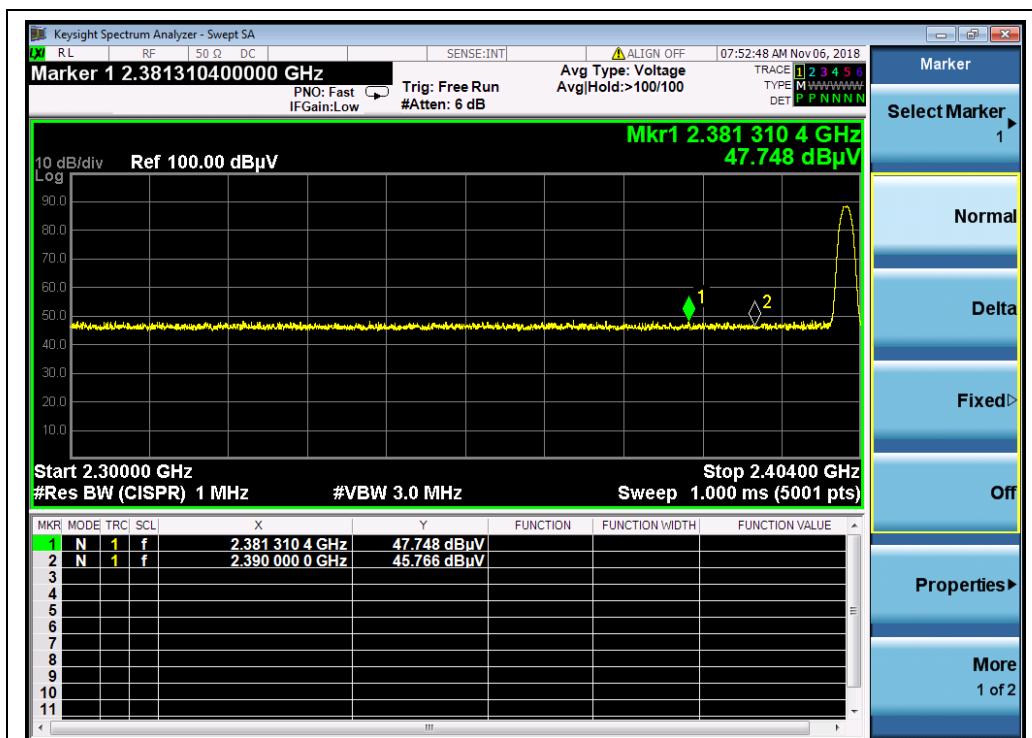
(Channel = 78, PEAK, GFSK)

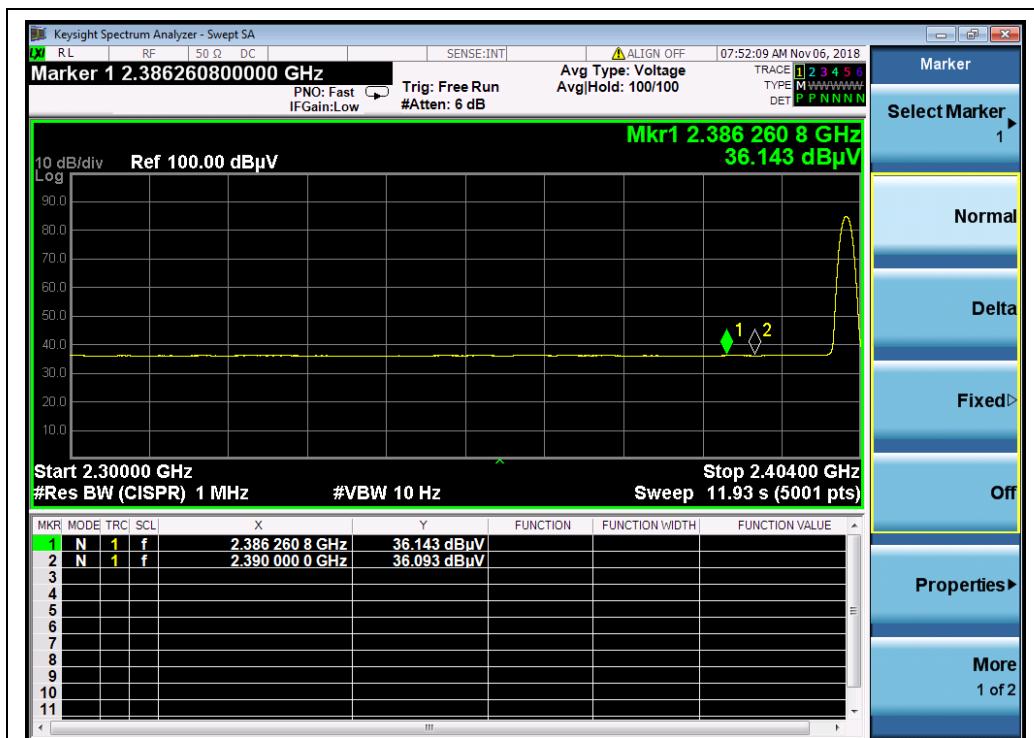


(Channel = 78, AVERAGE, GFSK)

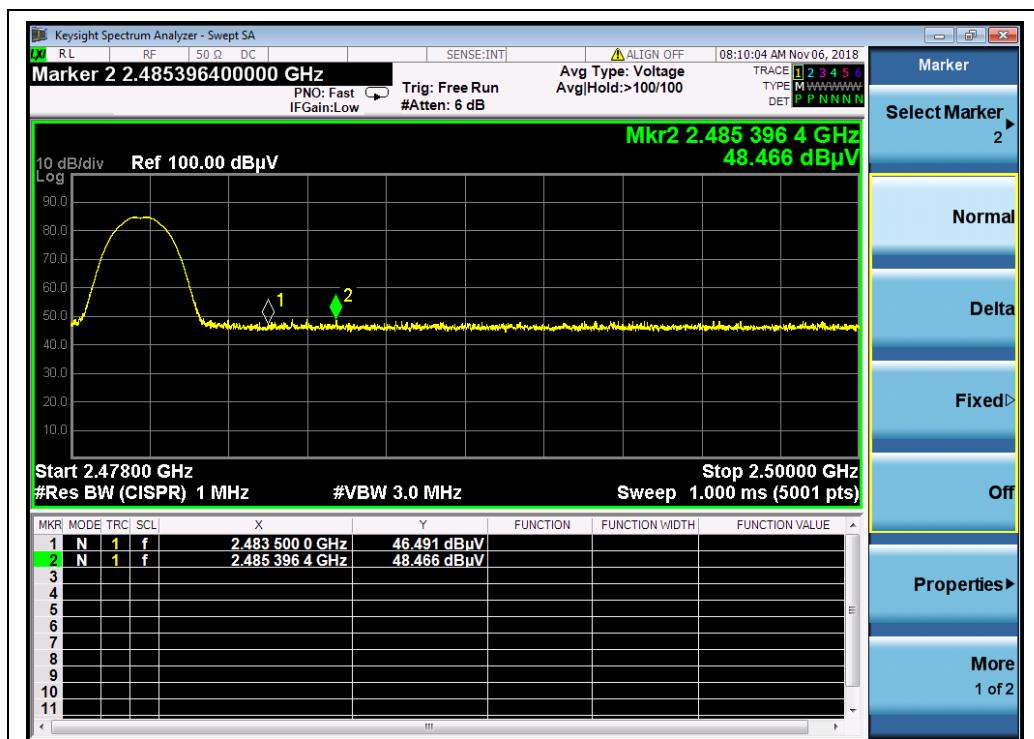
**$\pi/4$ -DQPSK Mode**
**A. Test Verdict:**

Channel	Frequency (MHz)	Detector	Receiver	$A_T$ (dB)	$A_{\text{Factor}}$ (dB@3m)	Max. Emission E (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Verdict
			U <sub>R</sub> (dB $\mu$ V)					
0	2381.31	PK	47.75	-29.67	32.56	50.64	74	Pass
0	2386.26	AV	36.14	-29.67	32.56	39.03	54	Pass
78	2485.40	PK	48.47	-29.67	32.56	51.36	74	Pass
78	2483.50	AV	36.07	-29.67	32.56	38.96	54	Pass

**B. Test Plots:**

 (Channel = 0, PEAK,  $\pi/4$ -DQPSK)



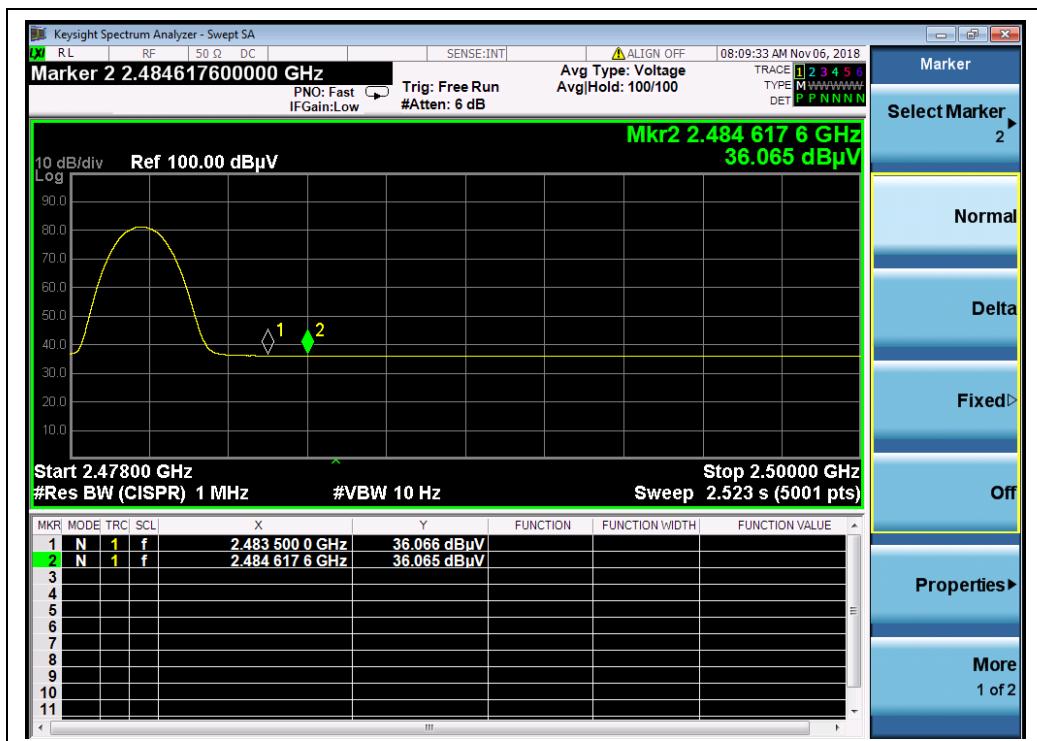
(Channel = 0, AVERAGE, π/4-DQPSK)



(Channel = 78, PEAK, π/4-DQPSK)



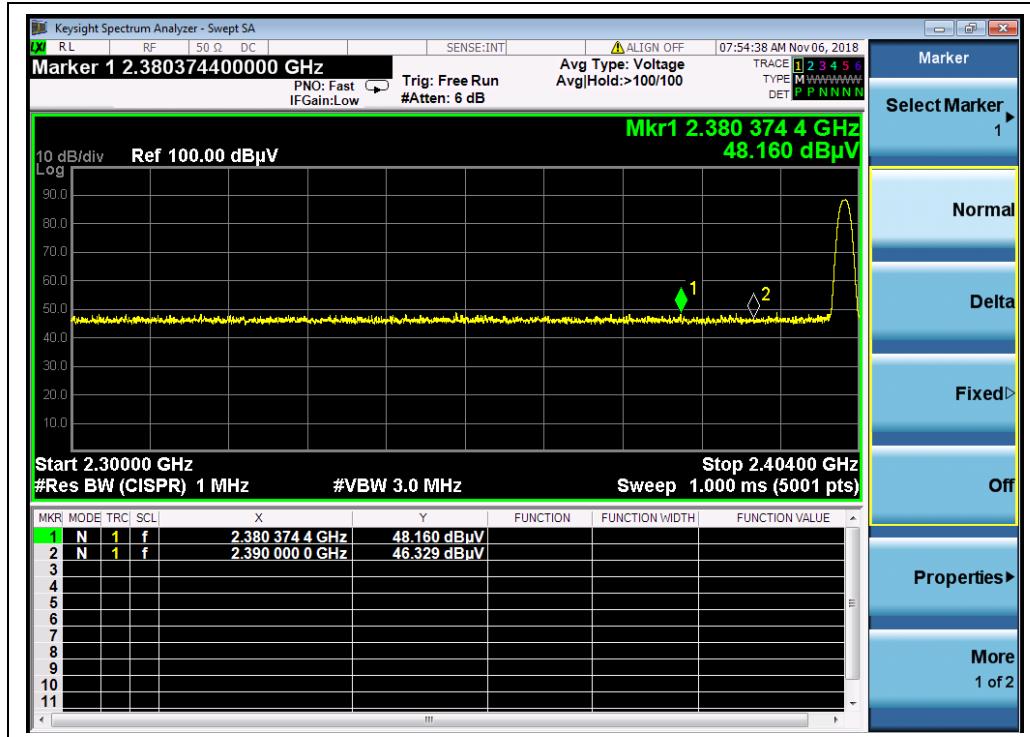
REPORT No.: SZ18100034W01

(Channel = 78, AVERAGE,  $\pi/4$ -DQPSK)

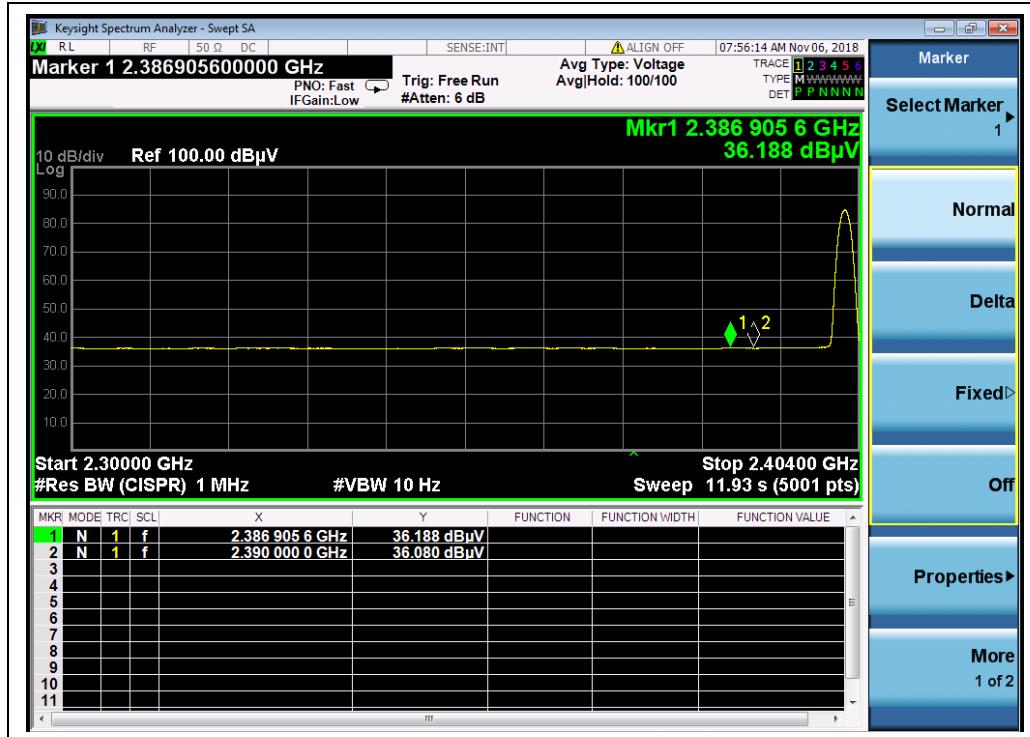
## 8-DPSK Mode

### A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver	A <sub>T</sub> (dB)	A <sub>Factor</sub> (dB@3m)	Max. Emission E (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Verdict
			U <sub>R</sub> (dB $\mu$ V)					
0	2380.37	PK	48.16	-29.67	32.56	51.05	74	Pass
0	2386.91	AV	36.19	-29.67	32.56	39.08	54	Pass
78	2484.37	PK	49.00	-29.67	32.56	51.89	74	Pass
78	2484.31	AV	36.12	-29.67	32.56	39.01	54	Pass

**B. Test Plots:**


(Channel = 0, PEAK, 8-DPSK)



(Channel = 0, AVERAGE, 8-DPSK)



(Channel = 78, PEAK, 8-DPSK)



(Channel = 78, AVERAGE, 8-DPSK)



## 2.10. Radiated Emission

### 2.10.1. Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ( $\mu$ V/m)	Measurement Distance (m)
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:**

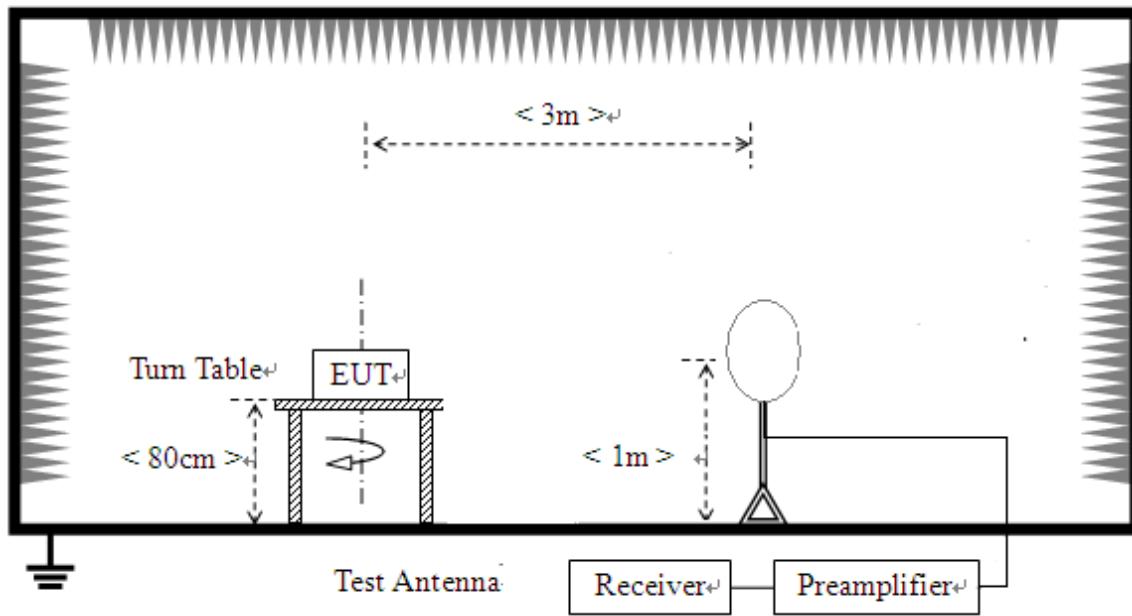
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength of harmonics: 54dB<sub>UV</sub>/m@3m (AV) and 74dB<sub>UV</sub>/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

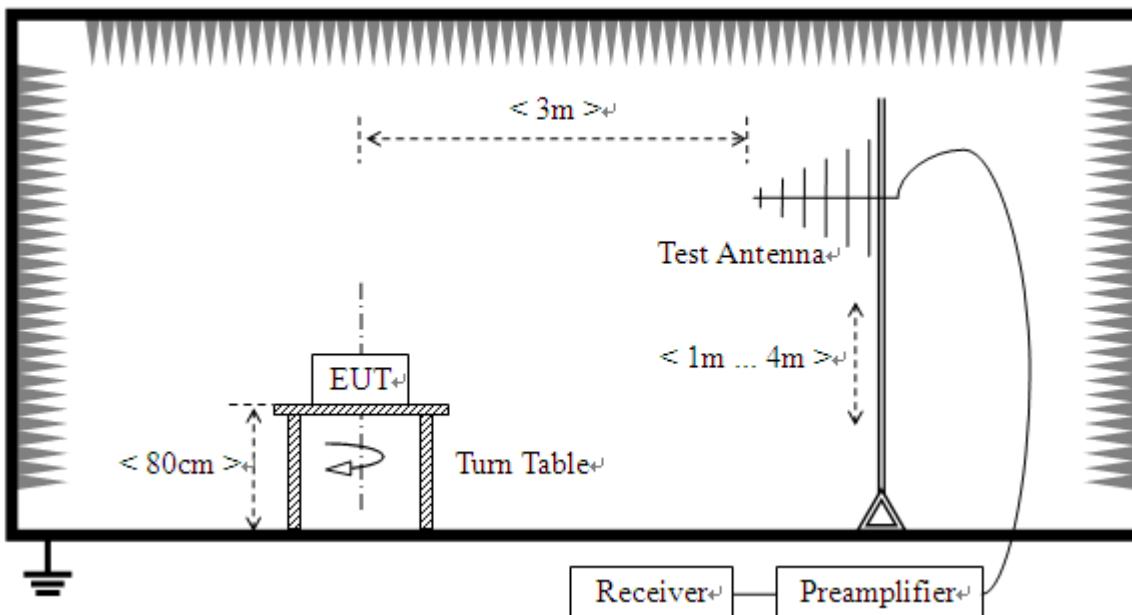
## 2.10.2. Test Description

### A. Test Setup:

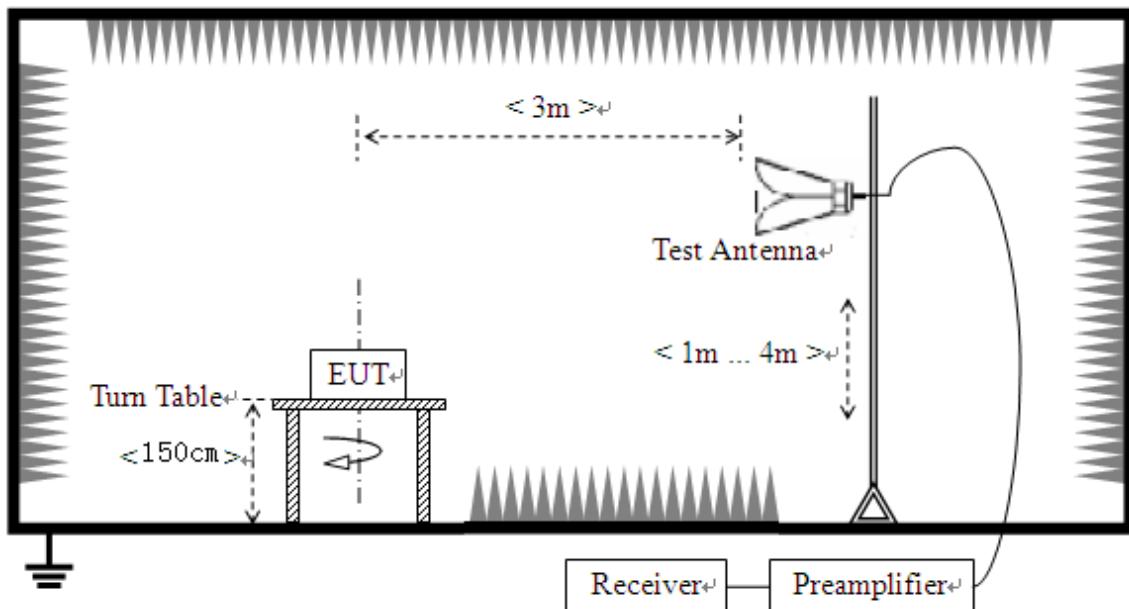
- 1) For radiated emissions from 9kHz to 30MHz



- 2) For radiated emissions from 30MHz to 1GHz



## 3) For radiated emissions above 1GHz



The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10 (2013). For radiated emissions below or equal to 1GHz, the EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10.

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

- In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Place the test antenna at 3m away from area of the EUT, while keeping the test antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The test antenna may have to be



higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final test antenna elevation shall be that which maximizes the emissions. The test antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. The emission levels at both horizontal and vertical polarizations should be tested.

## B. Equipments List:

Please reference ANNEX B(4).

### 2.10.3. Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

### 2.10.4. Test Result

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V/m}] = U_R + A_T + A_{\text{Factor}} [\text{dB}]; A_T = L_{\text{Cable loss}} [\text{dB}] - G_{\text{preamp}} [\text{dB}]$$

$A_T$ : Total correction Factor except Antenna

$U_R$ : Receiver Reading

$G_{\text{preamp}}$ : Preamplifier Gain

$A_{\text{Factor}}$ : Antenna Factor at 3m

During the test, the total correction Factor AT and  $A_{\text{Factor}}$  were built in test software.

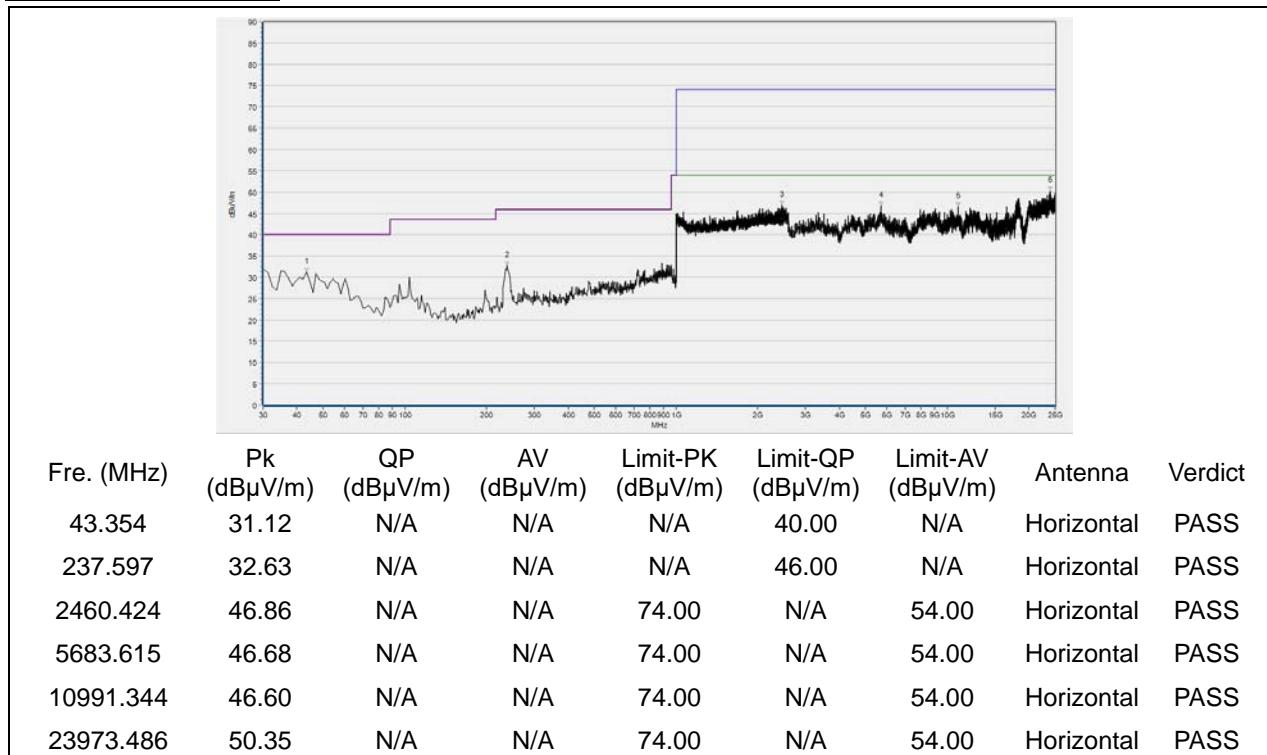
**Note1:** All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

**Note2:** For the frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

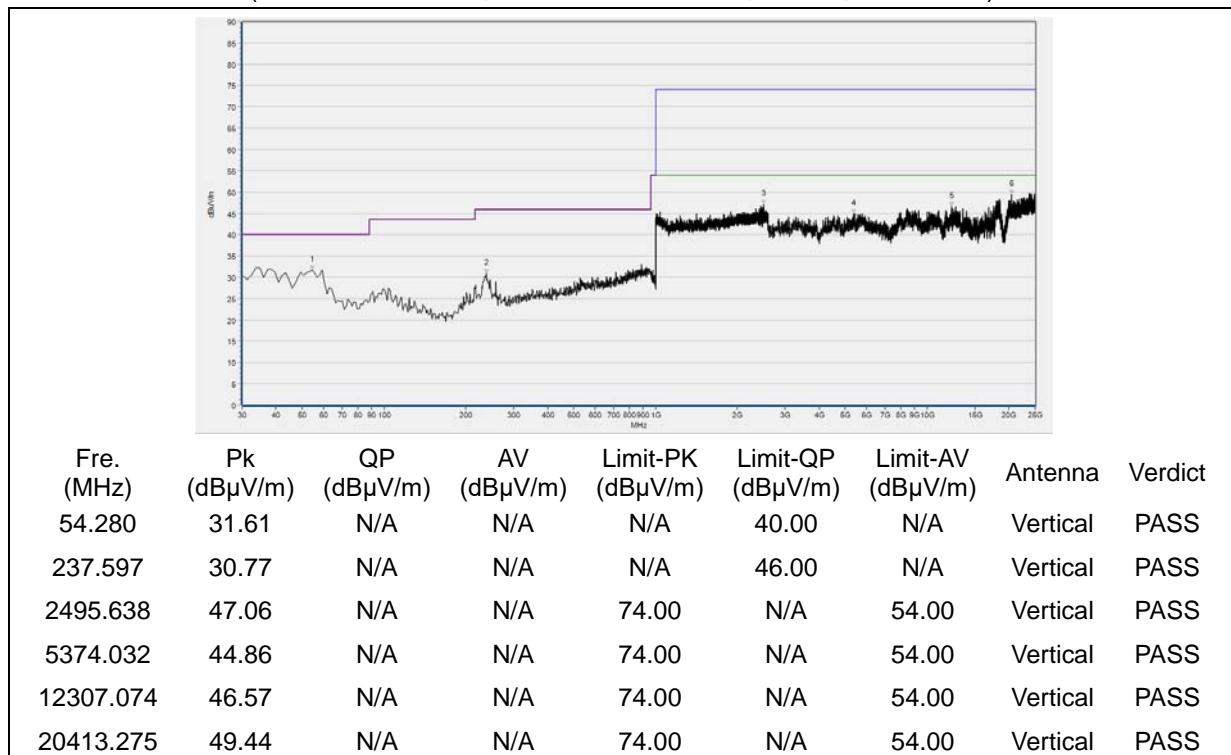
**Note3:** For the frequency, which started from 25GHz to 40GHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

**GFSK Mode**

Plots for Channel = 0

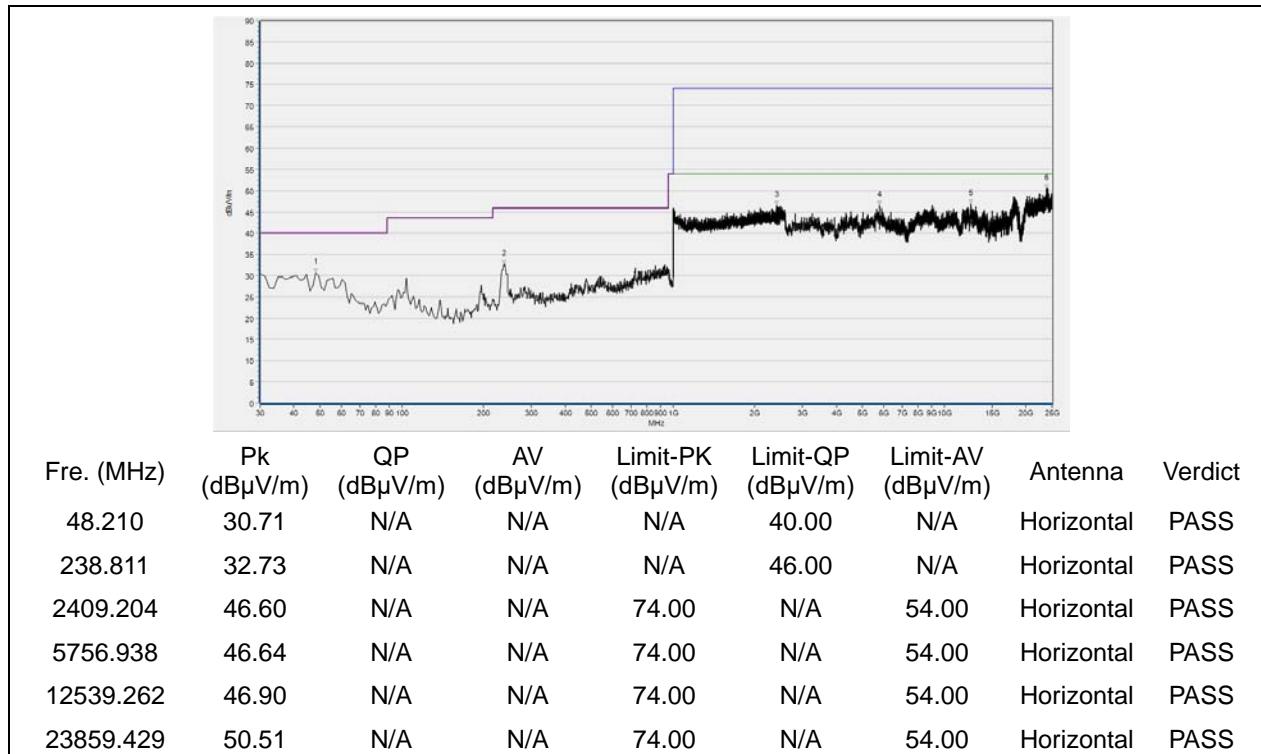


(30MHz to 25GHz, Antenna Horizontal, GFSK, channel 0)

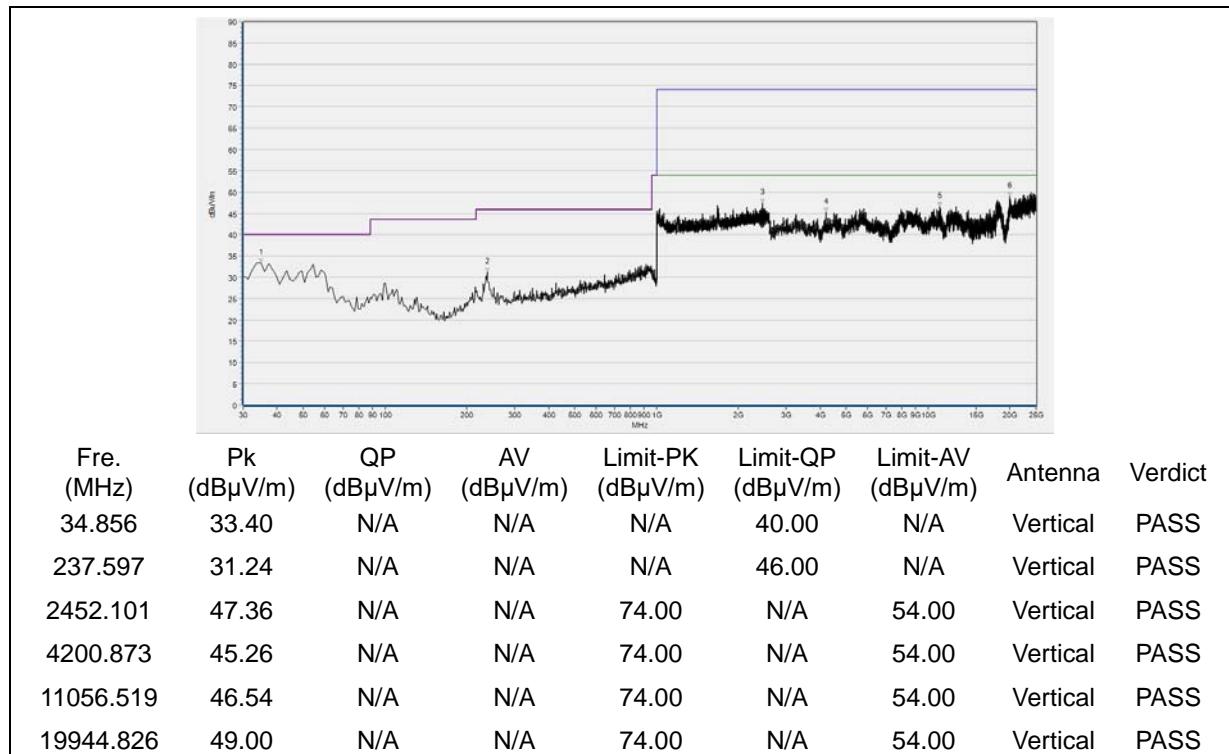


(30MHz to 25GHz, Antenna Vertical, GFSK, channel 0)

## Plot for Channel = 39

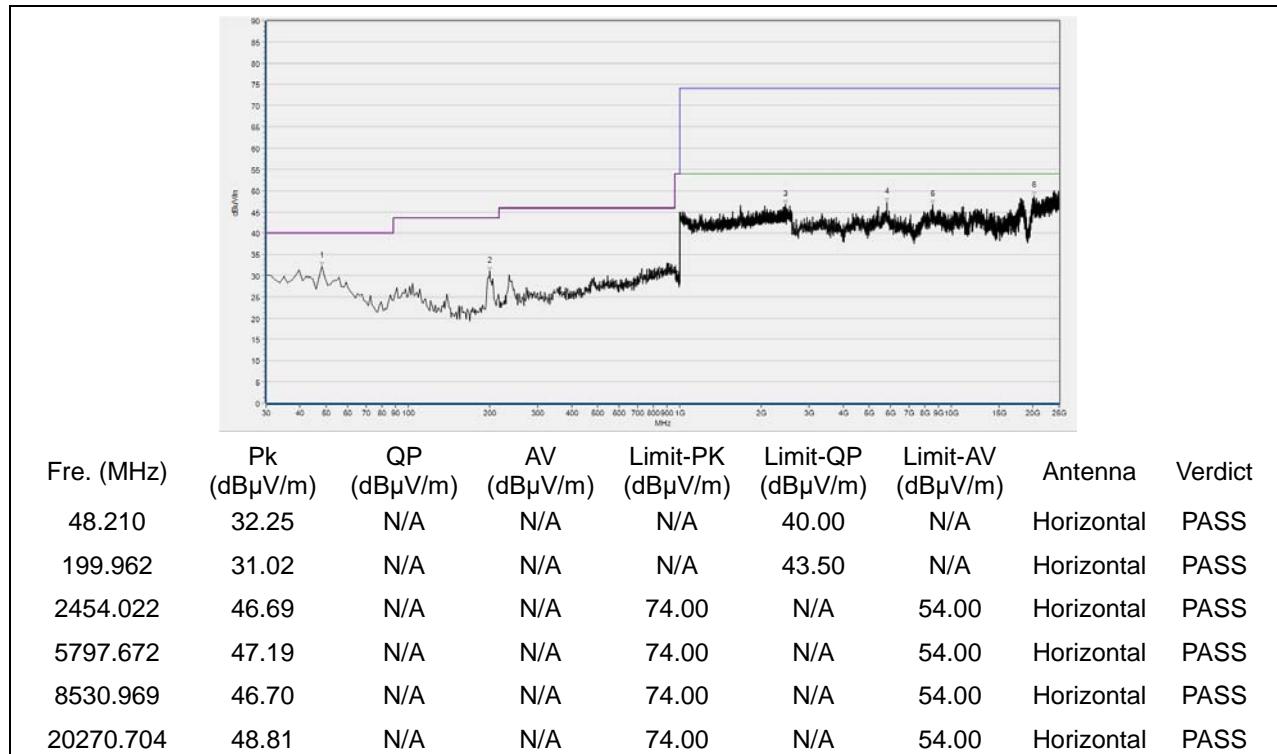


(30MHz to 25GHz, Antenna Horizontal, GFSK, channel 39)

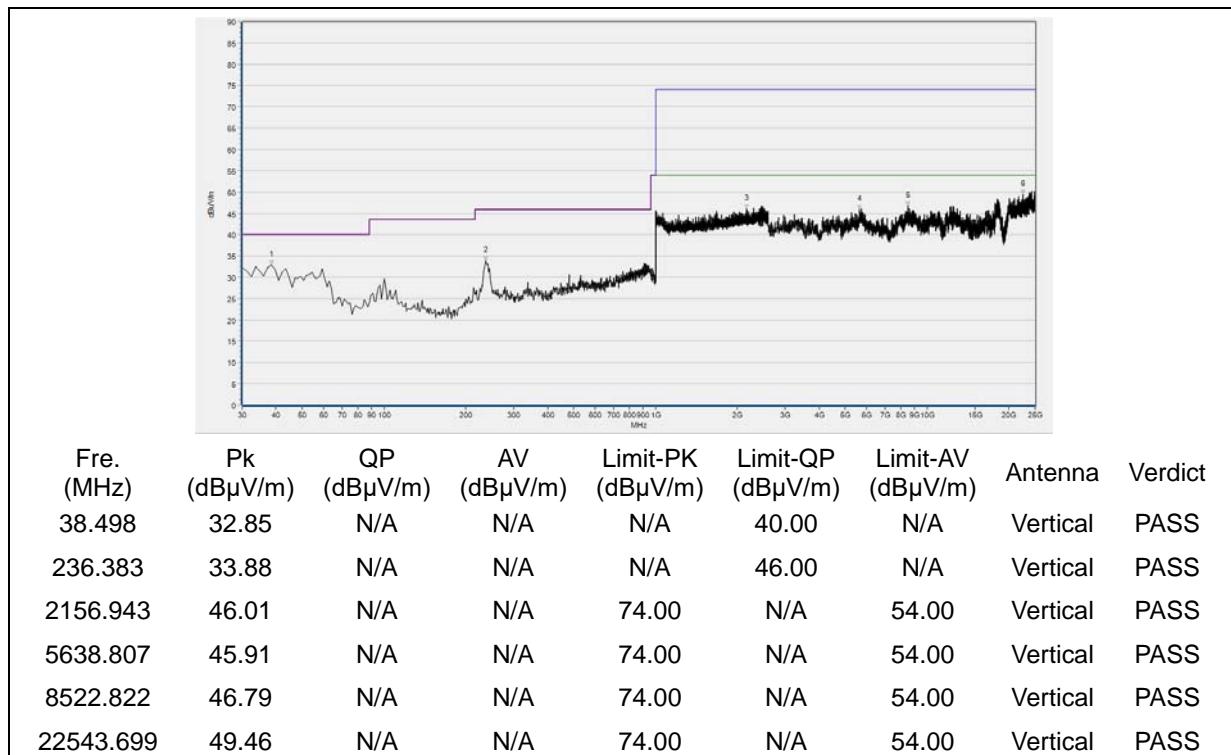


(30MHz to 25GHz, Antenna Vertical, GFSK, channel 39)

## Plot for Channel = 78



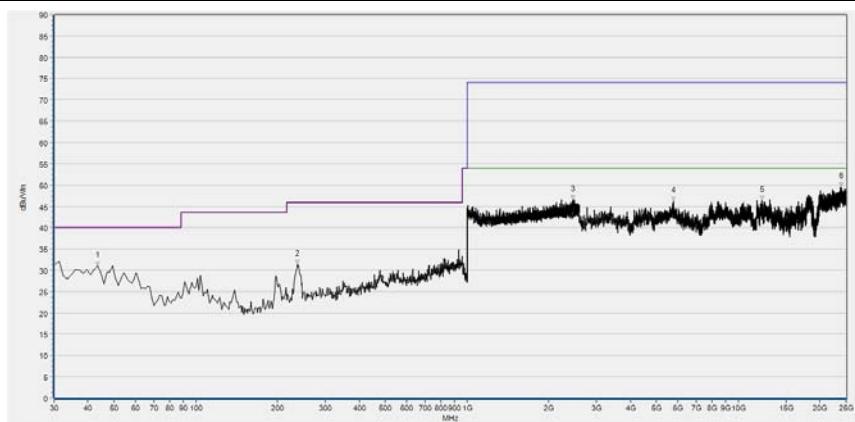
(30MHz to 25GHz, Antenna Horizontal, GFSK, channel 78)



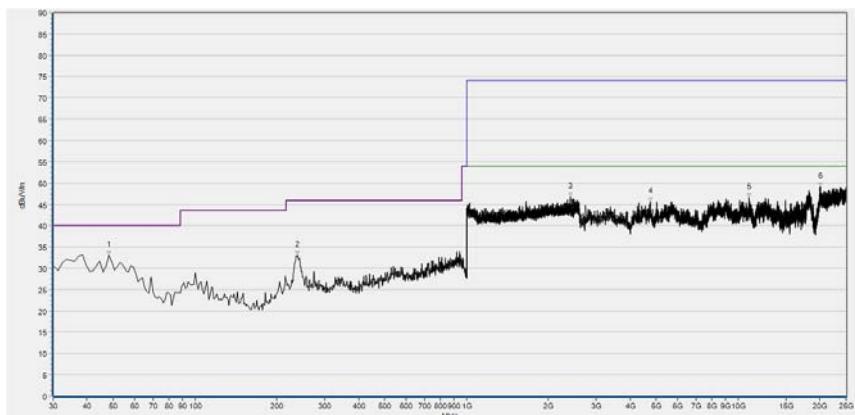
(30MHz to 25GHz, Antenna Vertical, GFSK, channel 78)

**$\pi/4$ -DQPSK Mode**

Plots for Channel = 0

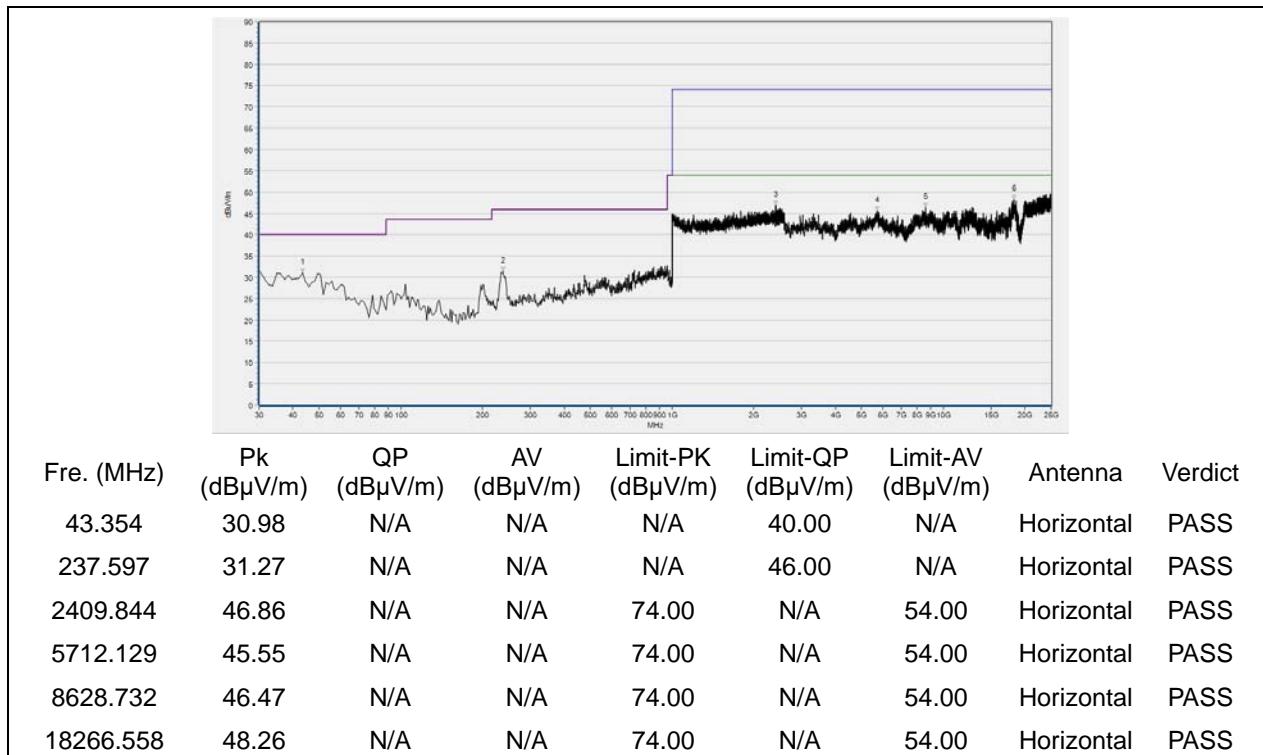


Fre. (MHz)	Pk (dB $\mu$ V/m)	QP (dB $\mu$ V/m)	AV (dB $\mu$ V/m)	Limit-PK (dB $\mu$ V/m)	Limit-QP (dB $\mu$ V/m)	Limit-AV (dB $\mu$ V/m)	Antenna	Verdict
43.354	30.98	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
236.383	31.40	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2452.741	46.56	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5769.158	46.23	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12197.090	46.41	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
23932.751	49.61	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

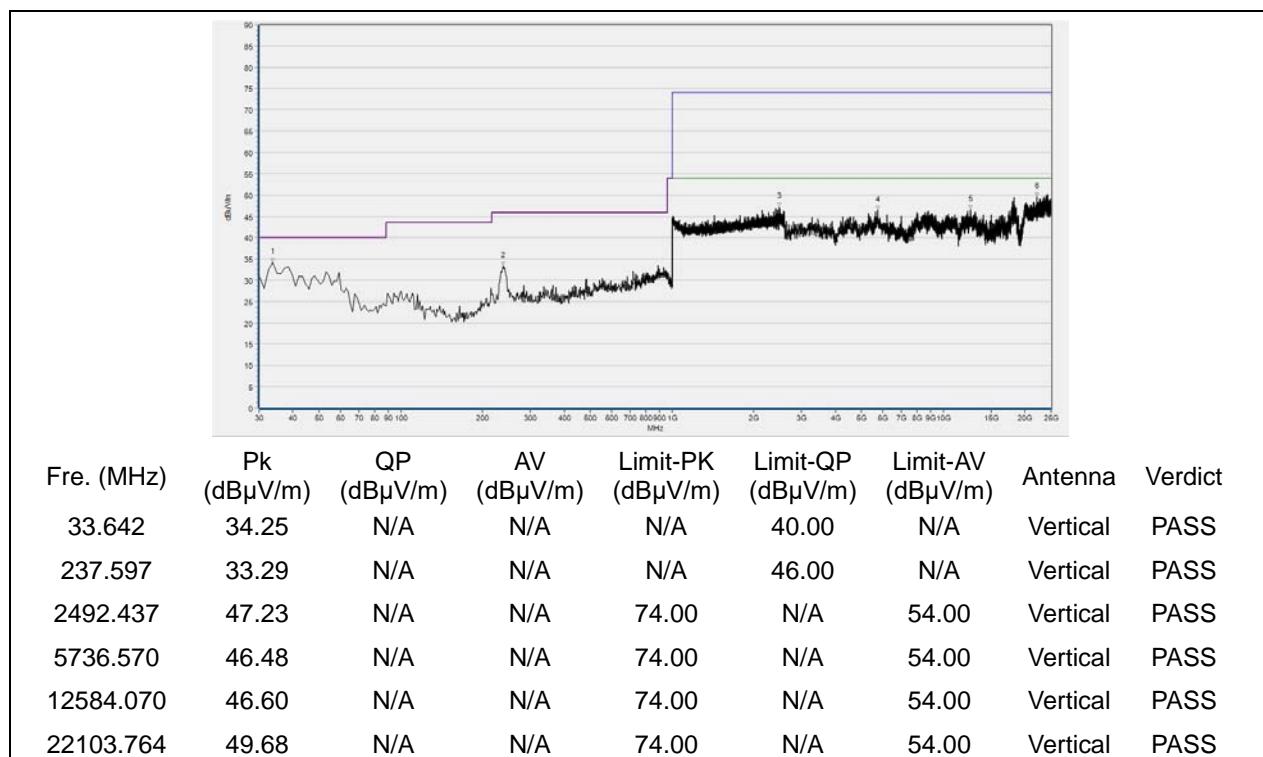
 (30MHz to 25GHz, Antenna Horizontal,  $\pi/4$ -DQPSK, channel 0)


Fre. (MHz)	Pk (dB $\mu$ V/m)	QP (dB $\mu$ V/m)	AV (dB $\mu$ V/m)	Limit-PK (dB $\mu$ V/m)	Limit-QP (dB $\mu$ V/m)	Limit-AV (dB $\mu$ V/m)	Antenna	Verdict
48.210	33.01	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
238.811	33.04	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2414.326	46.73	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4738.571	45.65	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10999.491	46.62	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
20071.104	49.05	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

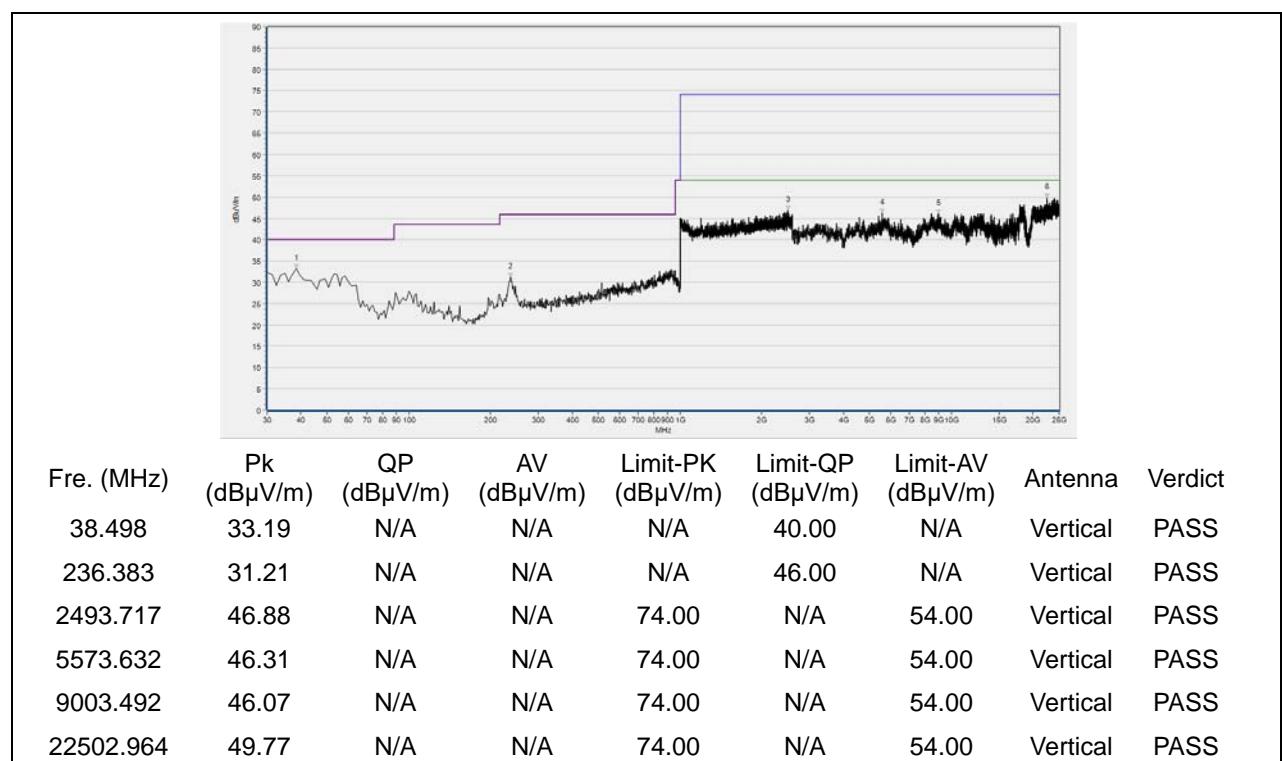
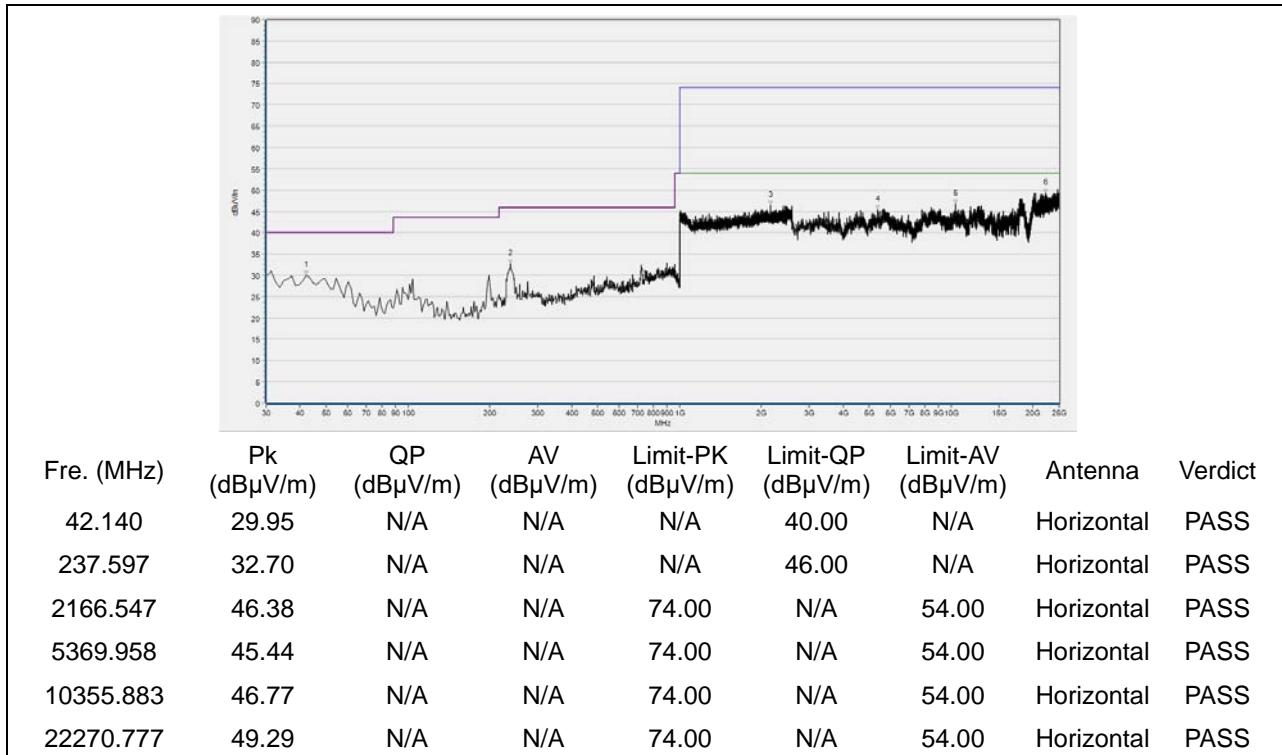
 (30MHz to 25GHz, Antenna Vertical,  $\pi/4$ -DQPSK, channel 0)

Plot for Channel = 39


(30MHz to 25GHz, Antenna Horizontal, π/4-DQPSK, channel 39)



(30MHz to 25GHz, Antenna Vertical, π/4-DQPSK, channel 39)

Plot for Channel = 78


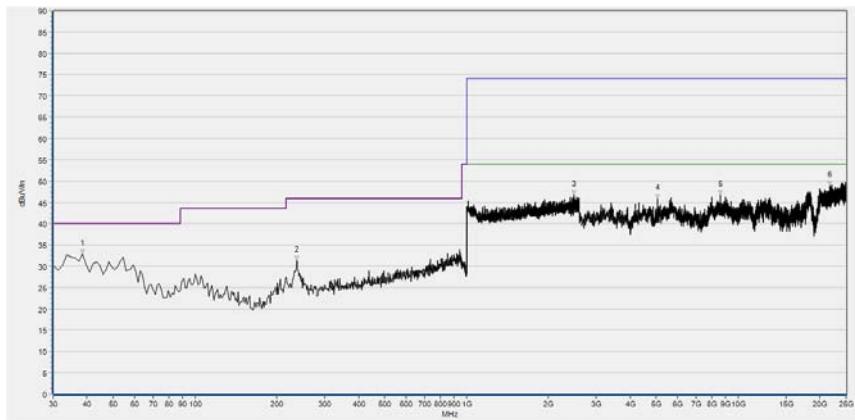
**8-DPSK Mode**

Plots for Channel = 0



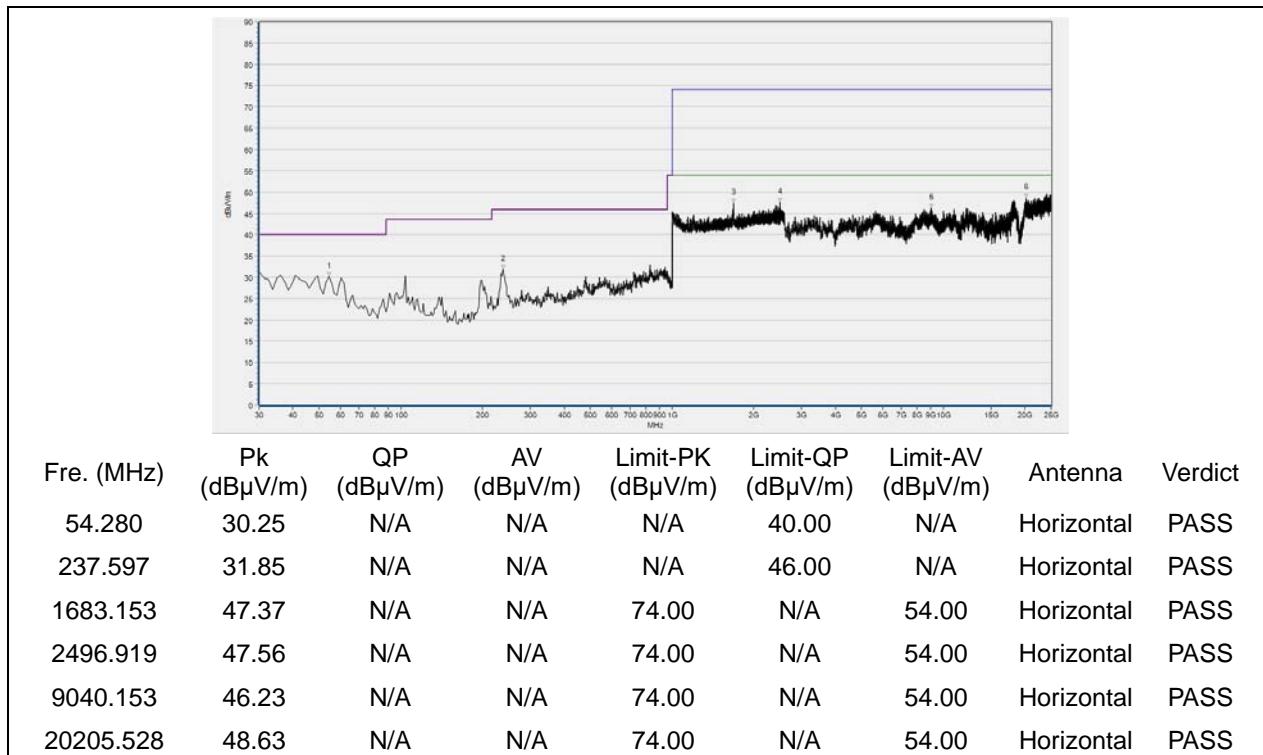
Fre. (MHz)	Pk (dB $\mu$ V/m)	QP (dB $\mu$ V/m)	AV (dB $\mu$ V/m)	Limit-PK (dB $\mu$ V/m)	Limit-QP (dB $\mu$ V/m)	Limit-AV (dB $\mu$ V/m)	Antenna	Verdict
48.210	31.20	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
237.597	32.54	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2408.563	46.10	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5614.366	45.88	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12127.841	46.81	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
22792.180	49.68	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(30MHz to 25GHz, Antenna Horizontal, 8-DPSK, channel 0)

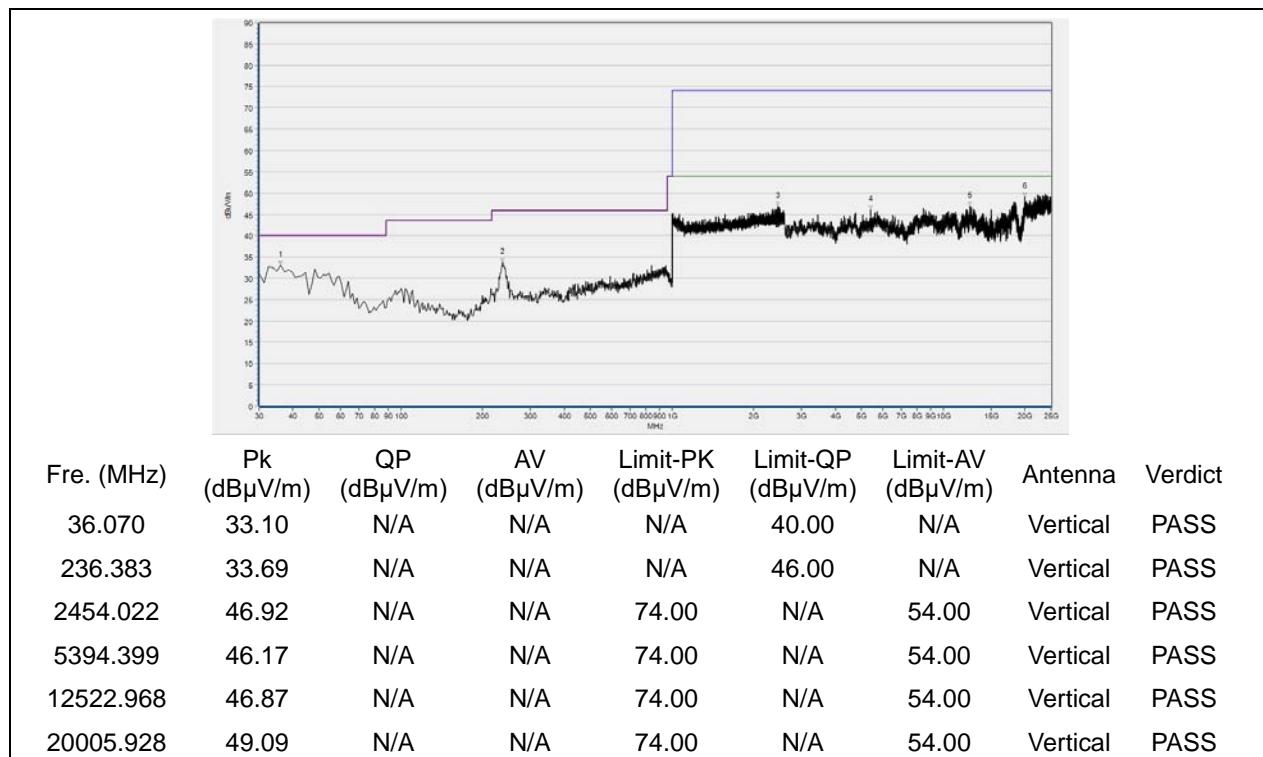


Fre. (MHz)	Pk (dB $\mu$ V/m)	QP (dB $\mu$ V/m)	AV (dB $\mu$ V/m)	Limit-PK (dB $\mu$ V/m)	Limit-QP (dB $\mu$ V/m)	Limit-AV (dB $\mu$ V/m)	Antenna	Verdict
38.498	32.86	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
236.383	31.29	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2488.595	46.70	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5052.228	45.95	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8624.659	46.70	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
21688.271	48.92	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

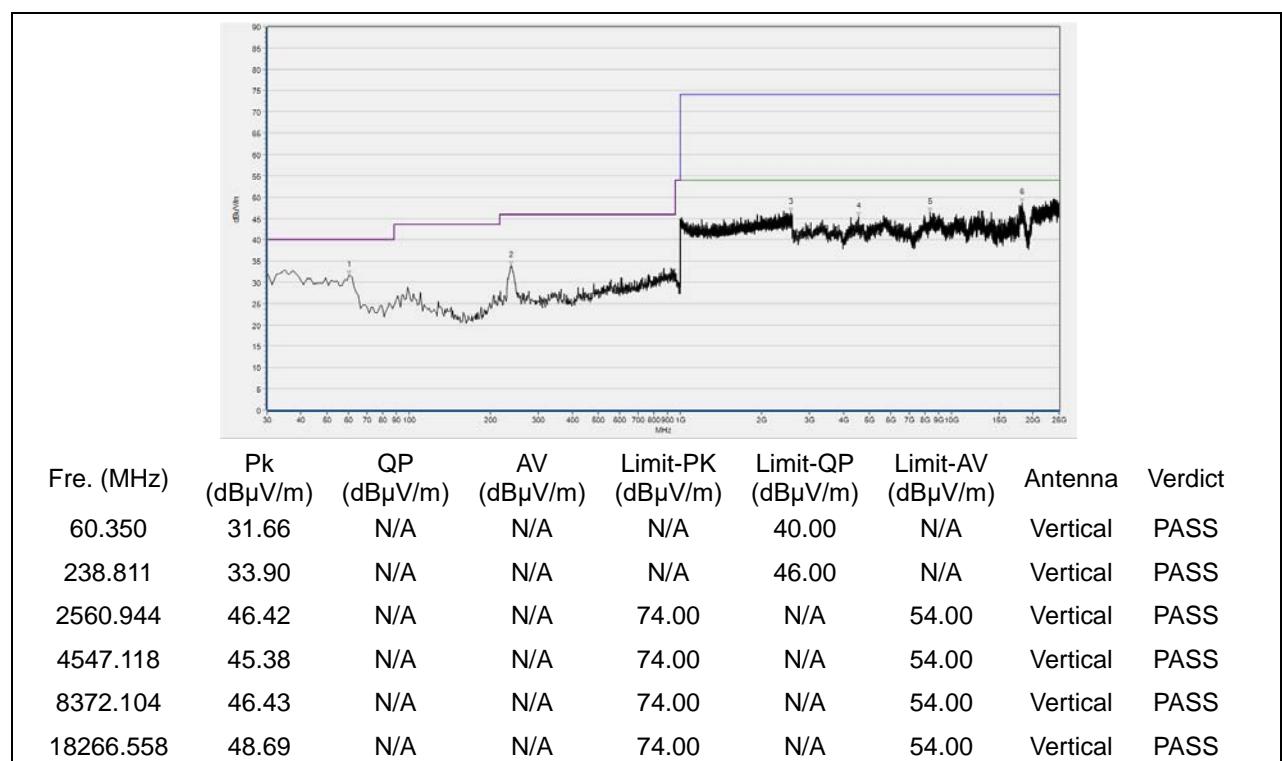
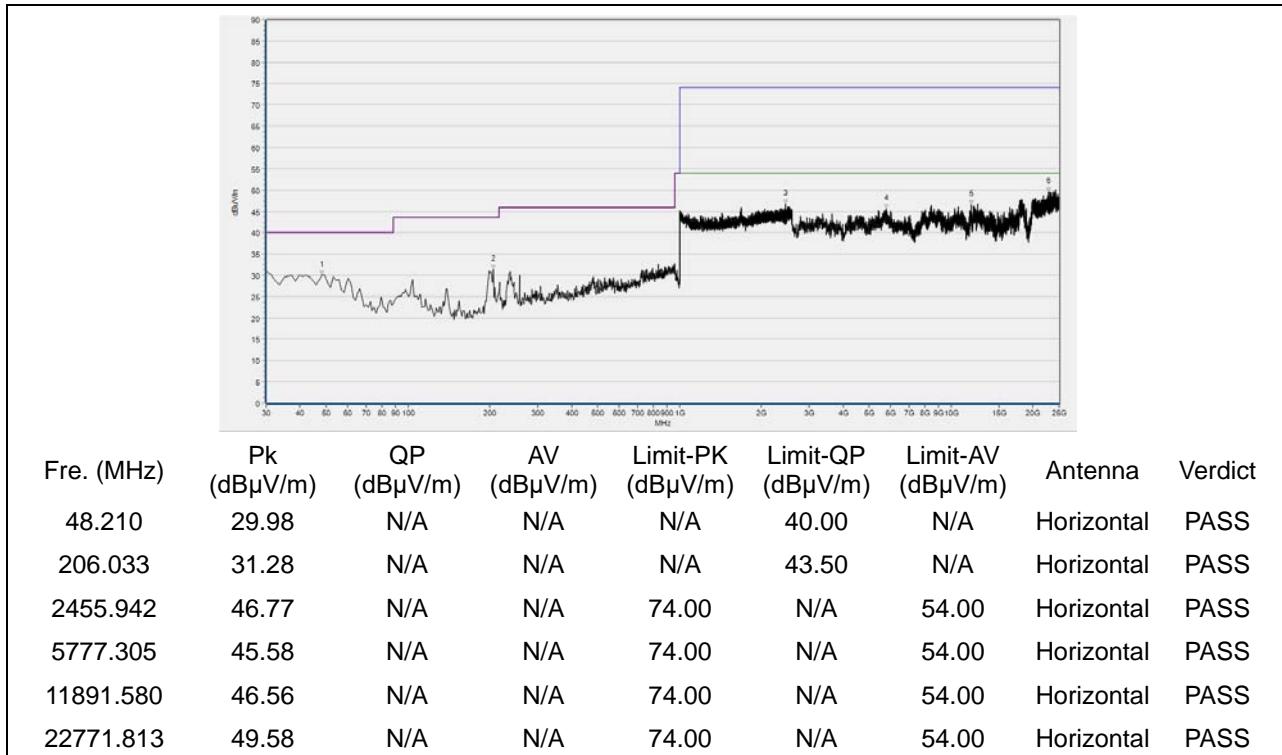
(30MHz to 25GHz, Antenna Vertical, 8-DPSK, channel 0)

Plot for Channel = 39


(30MHz to 25GHz, Antenna Horizontal, 8-DPSK, channel 39)



(30MHz to 25GHz, Antenna Vertical, 8-DPSK, channel 39)

Plot for Channel = 78




## Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test items	Uncertainty
Number of Hopping Frequency	$\pm 5\%$
Peak Output Power	$\pm 2.22\text{dB}$
20dB Bandwidth	$\pm 5\%$
Carrier Frequency Separation	$\pm 5\%$
Time of Occupancy (Dwell time)	$\pm 5\%$
Conducted Spurious Emission	$\pm 2.77 \text{ dB}$
Restricted Frequency Bands	$\pm 5\%$
Radiated Emission	$\pm 2.95\text{dB}$
Conducted Emission	$\pm 2.44\text{dB}$

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2



REPORT No.: SZ18100034W01

## Annex B Testing Laboratory Information

### 1. Identification of the Responsible Testing Laboratory

<b>Company Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd.
<b>Department:</b>	Morlab Laboratory
<b>Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
<b>Responsible Test Lab Manager:</b>	Mr. Su Feng
<b>Telephone:</b>	+86 755 36698555
<b>Faxsimile:</b>	+86 755 36698525

### 2. Identification of the Responsible Testing Location

<b>Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
<b>Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

### 3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.



#### 4. Test Equipments Utilized

##### 4.1 Conducted Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Bluetooth Base Station	6K00006210	MT8852B	Anritsu	2018.04.17	2019.04.16
Power Splitter	NW521	1506A	Weinschel	2018.04.17	2019.04.16
Attenuator 1	(N/A.)	10dB	Resnet	2018.04.17	2019.04.16
Attenuator 2	(N/A.)	3dB	Resnet	2018.04.17	2019.04.16
EXA Signal Analyser	MY53470836	N9010A	Agilent	2017.12.03	2018.12.02
RF cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
Coaxial cable	CB02	RF02	Morlab	N/A	N/A
SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A
Computer	T430i	Think Pad	Lenovo	N/A	N/A

##### 4.2 Conducted Emission Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	MY56400093	N9038A	KEYSIGHT	2018.05.08	2019.05.07
LISN	812744	NSLK 8127	Schwarzbeck	2018.05.08	2019.05.07
Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2018.05.08	2019.05.07
Coaxial cable(BNC) (30MHz-26GHz)	CB01	EMC01	Morlab	N/A	N/A

##### 4.3 List of Software Used

Description	Manufacturer	Software Version
Test system	Tonscend	V2.6
Power Panel	Agilent	V3.8
MORLAB EMCR V1.2	MORLAB	V 1.0



#### 4.4 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	MY54130016	N9038A	Agilent	2018.08.04	2019.08.03
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2018.05.18	2019.05.17
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2018.03.03	2019.03.02
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2018.08.06	2019.08.05
Test Antenna – Horn	BBHA9170 #774	BBHA9170	Schwarzbeck	2018.08.02	2019.08.01
Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
1-18GHz pre-Amplifier	MA02	TS-PR18	Rohde& Schwarz	2018.05.08	2019.05.07
18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde& Schwarz	2018.05.08	2019.05.07
Anechoic Chamber	N/A	9m*6m*6m	CRT	2017.11.19	2020.11.18

— END OF REPORT —