REPORT No.: SZ15110067W04

FCC RF TEST REPORT

APPLICANT	:	SHENZHEN DBK ELECTRONICS CO.,LTD
PRODUCT NAME	:	BLUETOOTH EARPHONE
MODEL NAME	:	BT-HF005, BH-2406BK
TRADE NAME	:	DBK, Poweradd
BRAND NAME	:	DBK, Poweradd
FCC ID	:	2AGSA-BTHF005
STANDARD(S)	:	47 CFR Part 15 Subpart C
ISSUE DATE	:	2015-12-29

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

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DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	2015-12-29	First edition

TEST REPORT DECLARATION

Applicant	SHENZHEN DBK ELECTRONICS CO.,LTD
Applicant Address	1st-5th floor Building 1,Jinyuan company, Longhua Industrial Park, the north of Longguan Rd, Hualian Community, Longhua Town, 518109 Baoan District, ShenZhen,Guangdong, China
Manufacturer	SHENZHEN DBK ELECTRONICS CO.,LTD
Manufacturer Address	1st-5th floor Building 1,Jinyuan company, Longhua Industrial Park, the north of Longguan Rd, Hualian Community, Longhua Town, 518109 Baoan District, ShenZhen, Guangdong, China
Product Name	BLUETOOTH EARPHONE
Model Name	BT-HF005, BH-2406BK
Brand Name	DBK, Poweradd
HW Version	BT-HF005_V1.3
SW Version	N/A
Test Standards	47 CFR Part 15 Subpart C
Test Date	2015-11-25 to 2015-12-10
Test Result	PASS

Tested by : Zou Jian

Zou Jian (Test Engineer)

Reviewed by : Qiu Xiaojun

Qiu Xiaojun(RF Manager)

Approved by : Zeng Dexin

Zeng Dexin(Chief Engineer)

1. TECHNICAL INFORMATION

Note: Provide by applicant.

1.1 Applicant Information

Company:	SHENZHEN DBK ELECTRONICS CO.,LTD
Address:	1st-5th floor Building 1,Jinyuan company, Longhua Industrial Park, the north of Longguan Rd, Hualian Community, Longhua Town,518109 Baoan District, ShenZhen, Guangdong, China

1.2 Equipment under Test (EUT) Description

Brand Name:	DBK, Poweradd
Trade Name:	DBK, Poweradd
Model Name:	BT-HF005, BH-2406BK
Frequency Range:	The frequency range used is 2402MHz – 2480MHz (79 channels, at intervals of 1MHz); The frequency block is 2400MHz to 2483.5MHz.
Modulation Type:	Bluetooth: FHSS (GFSK(1Mbps), π/4-DQPSK(EDR 2Mbps), 8-DPSK(EDR 3Mbps))
Bluetooth Version:	2.1+EDR
Antenna Type:	PCB Antenna
Antenna Gain:	2dBi

NOTE:

1. The EUT is a BLUETOOTH EARPHONE, it contains Bluetooth Module operating at 2.4GHz ISM band; the frequencies allocated for the Bluetooth Module is F(MHz)=2402+1*n (0<=n<=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).
2. For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.
3. The undersigned, hereby confirm that 2series models listed in the following table are the same both in hardware and software design, except the changed the model, brand/trade name for marketing requirements.

Item No.	Model Name	Brand Name/Trade Name
1	BT-HF005	DBK
2	BH-2406BK	Poweradd

1.2.1 Identification of all used EUTs

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
A01	BT-HF005_V1.3	N/A

1.3 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-13 Edition)	Radio Frequency Devices

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

No.	Section in CFR 47	Description	Test Date	Result
1	15.203	Antenna Requirement	N.A	**PASS**
2	15.247(a)	Number of Hopping Frequency	Dec 07, 2015	**PASS**
3	15.247(b)	Peak Output Power	Dec 07, 2015	**PASS**
4	15.247(a)	20dB Bandwidth	Dec 07, 2015	**PASS**
5	15.247(a)	Carrier Frequency Separation	Dec 07, 2015	**PASS**
6	15.247(a)	Time of Occupancy (Dwell time)	Dec 07, 2015	**PASS**
7	15.247(d)	Conducted Spurious Emission	Dec 07, 2015	**PASS**
8	15.247(d)	Restricted Frequency Bands	Dec 09, 2015	**PASS**
9	15.209 15.247(d)	Radiated Emission	Dec 09, 2015	**PASS**

NOTE: The tests were performed according to the method of measurements prescribed in DA-00-705 and ANSI C63.10-2013.

1.3.1 Test Environment 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.

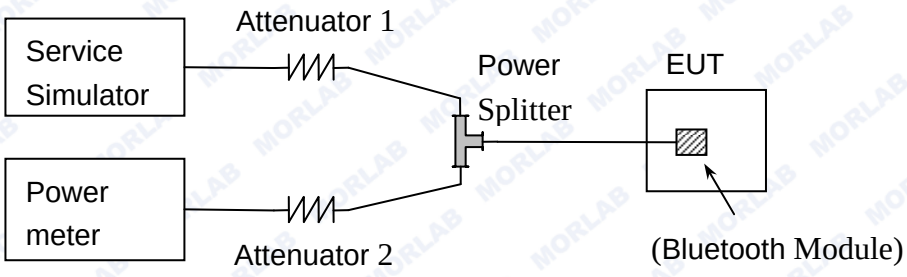
2.2 Number of Hopping Frequency

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 Service Simulator (SS) 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 A(1.4).

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 ≥ 1% of the span
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize

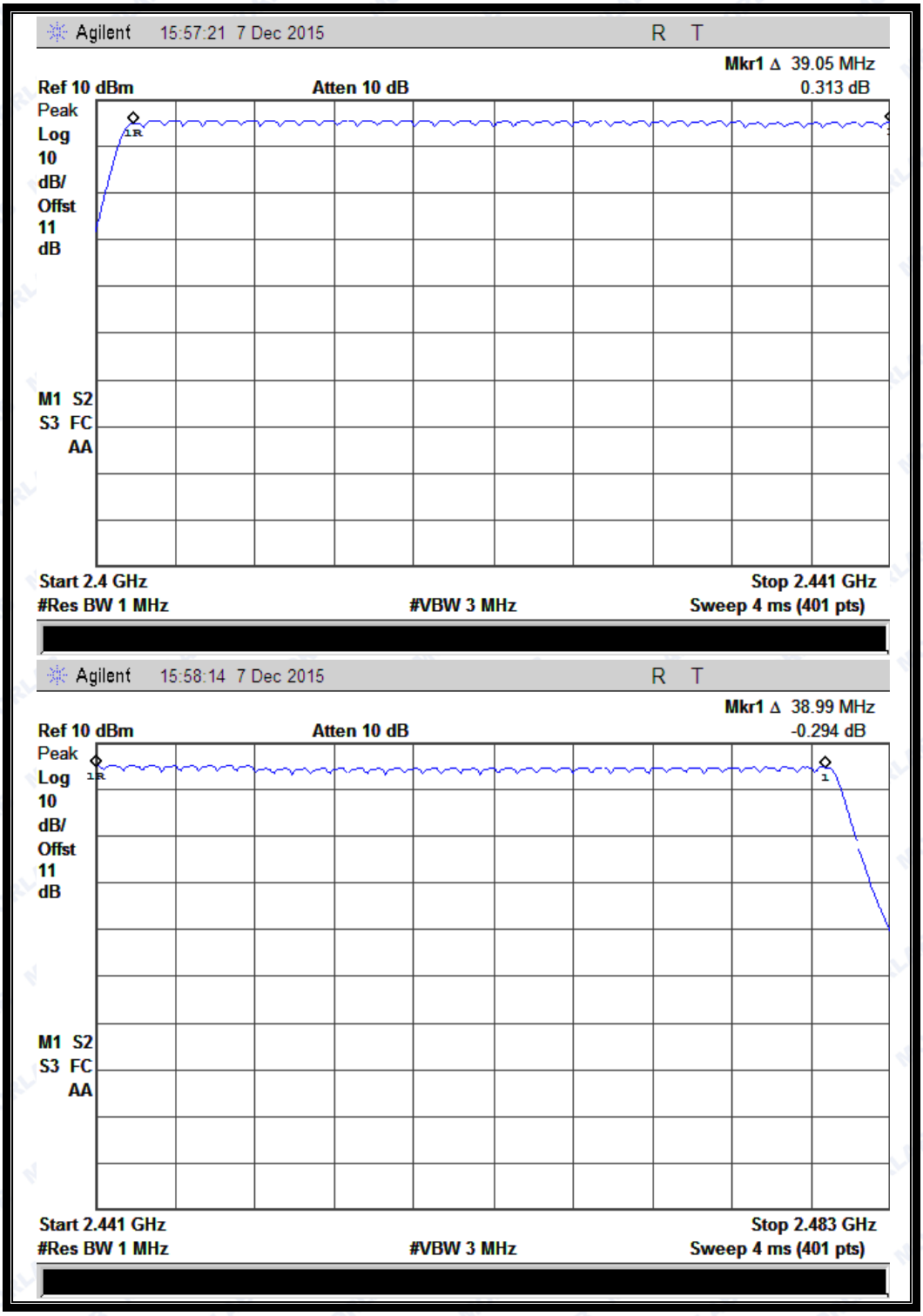
2.2.4 Test Result

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.

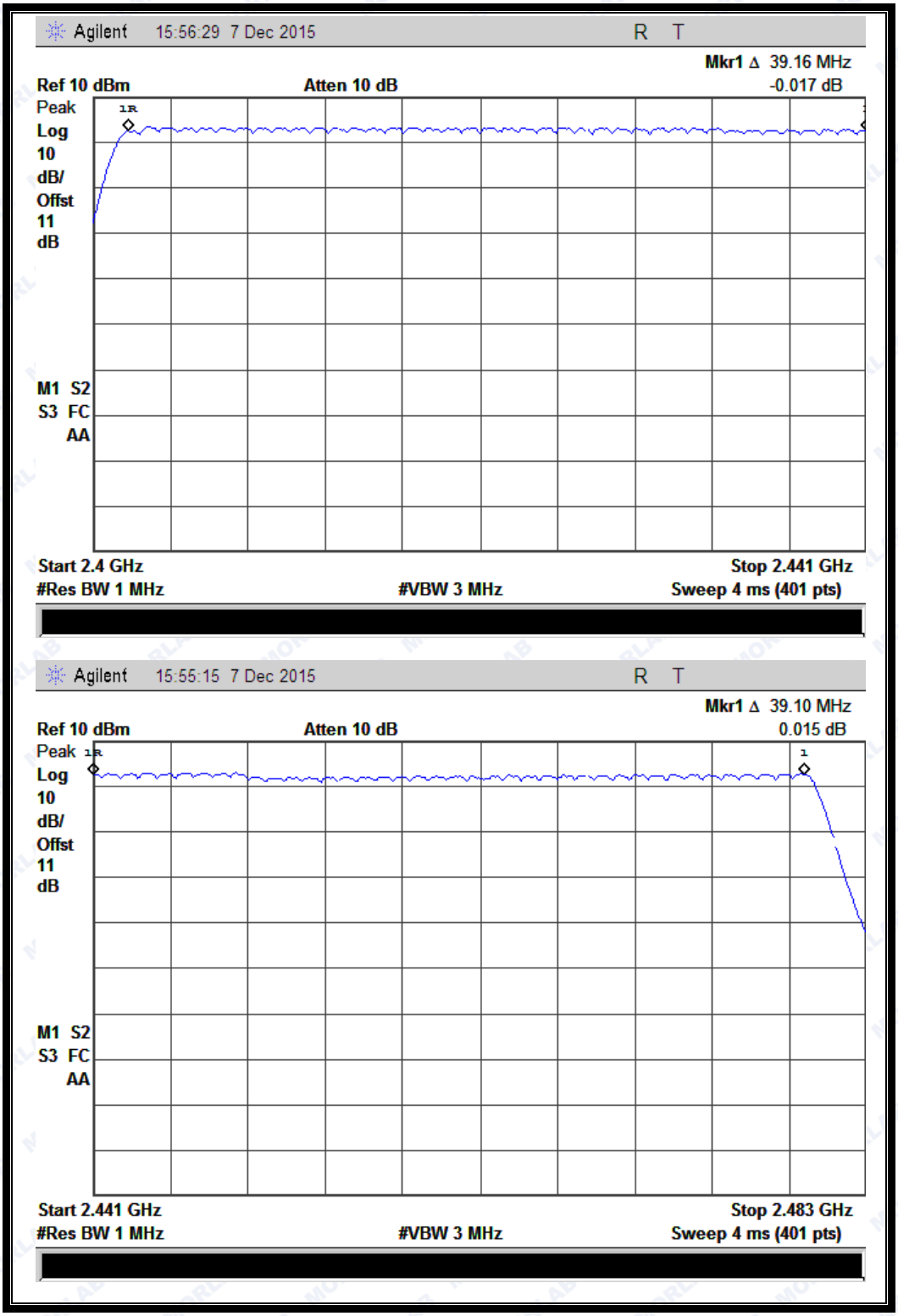
A. Test Verdict:

Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Refer to Plot	Verdict
GFSK	2400 - 2483.5	79	15	Plot A	PASS
π/4-DQPSK	2400 - 2483.5	79	15	Plot B	PASS
8-DPSK	2400 - 2483.5	79	15	Plot C	PASS

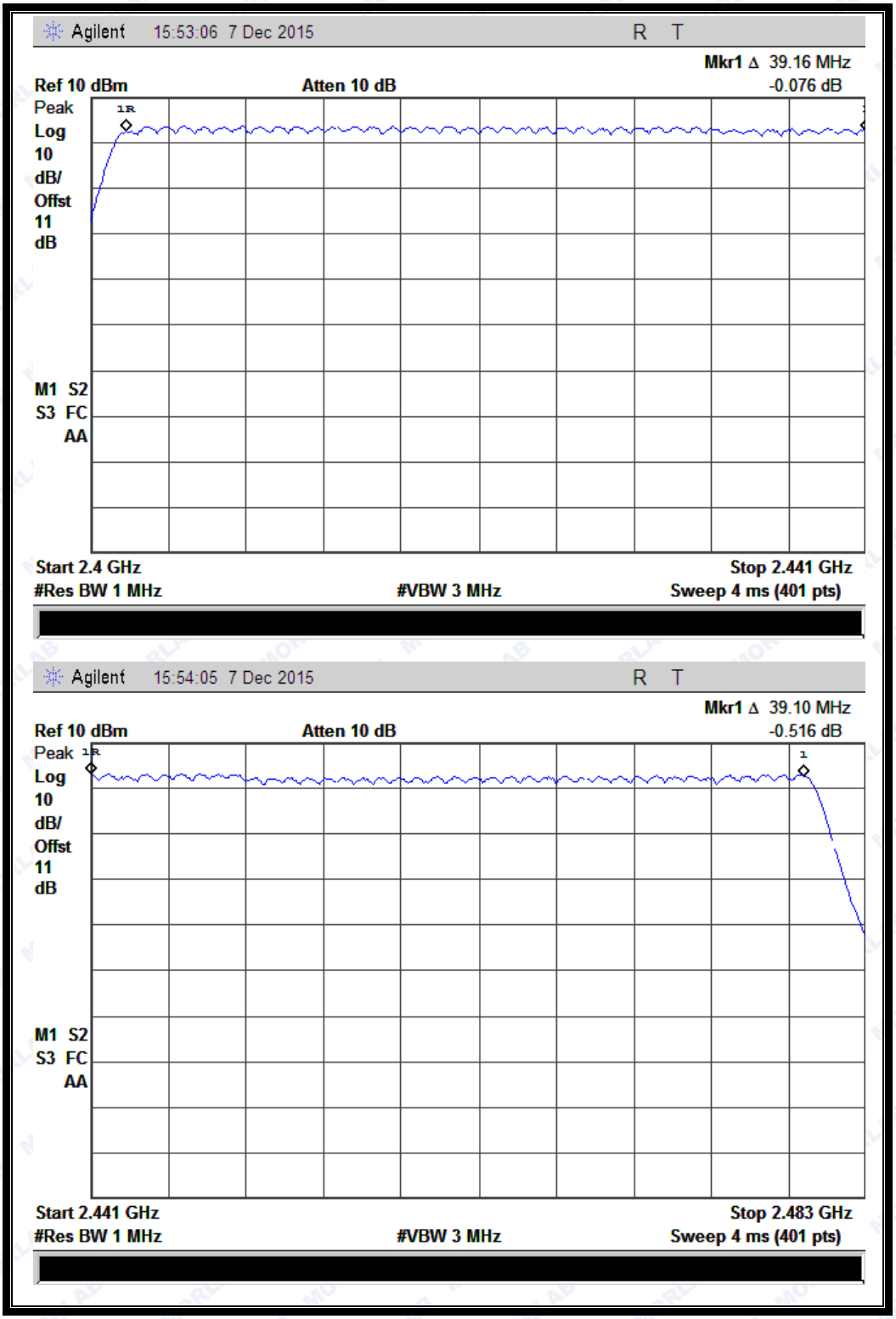
B. Test Plots:


Agilent 15:57:21 7 Dec 2015
R T
Mkr1 Δ 39.05 MHz
0.313 dB
Ref 10 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11
dB
M1 S2
S3 FC
AA
Start 2.4 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2.441 GHz
Sweep 4 ms (401 pts)
Agilent 15:58:14 7 Dec 2015
R T
Mkr1 Δ 38.99 MHz
-0.294 dB
Ref 10 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11
dB
M1 S2
S3 FC
AA
Start 2.441 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2.483 GHz
Sweep 4 ms (401 pts)

(Plot A: GFSK)



(Plot B: π/4-DQPSK)


Agilent 15:53:06 7 Dec 2015
R T
Mkr1 Δ 39.16 MHz
-0.076 dB
Ref 10 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11
dB
1R
M1 S2
S3 FC
AA
Start 2.4 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2.441 GHz
Sweep 4 ms (401 pts)
Agilent 15:54:05 7 Dec 2015
R T
Mkr1 Δ 39.10 MHz
-0.516 dB
Ref 10 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11
dB
1R
1
M1 S2
S3 FC
AA
Start 2.441 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2.483 GHz
Sweep 4 ms (401 pts)

(Plot C: 8- DPSK)

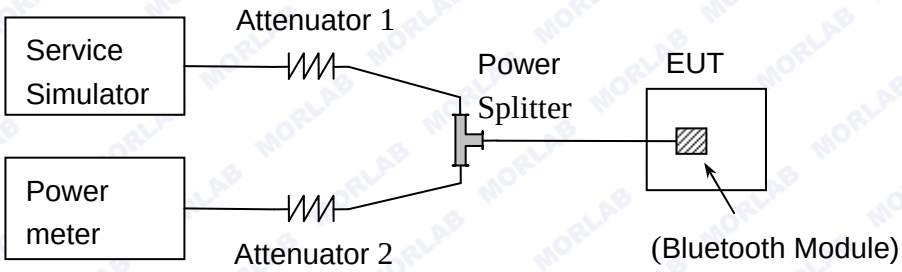
2.3 Peak Output Power

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 Power meter and the Bluetooth Service Simulator (SS) 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 A(1.4).

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 power meter.

2.3.3.1 GFSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	5.01	0.00317	20.97	0.125	PASS
39	2441	5.14	0.00327			PASS
78	2480	4.84	0.00305			PASS

2.3.3.2 π/4-DQPSK Mode

B. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	2.64	0.00184	20.97	0.125	PASS
39	2441	3.05	0.00202			PASS
78	2480	2.93	0.00196			PASS

2.3.3.3 8-DPSK Mode

C. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	2.86	0.00193	20.97	0.125	PASS
39	2441	3.29	0.00213			PASS
78	2480	3.12	0.00205			PASS

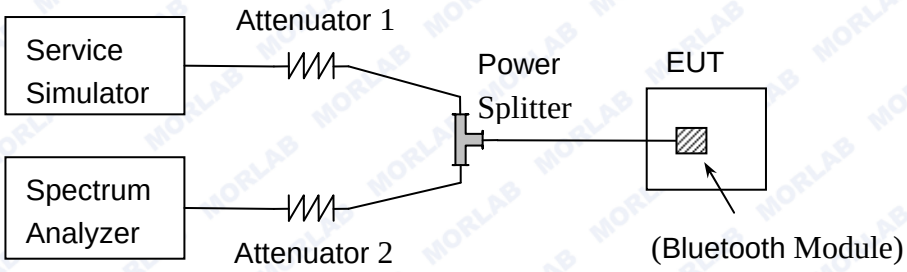
2.4 20dB Bandwidth

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*log1% = 20dB) 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 Service Simulator (SS) 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 A(1.4).

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 ≥ 1% of the 20 dB bandwidth
VBW ≥ 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.

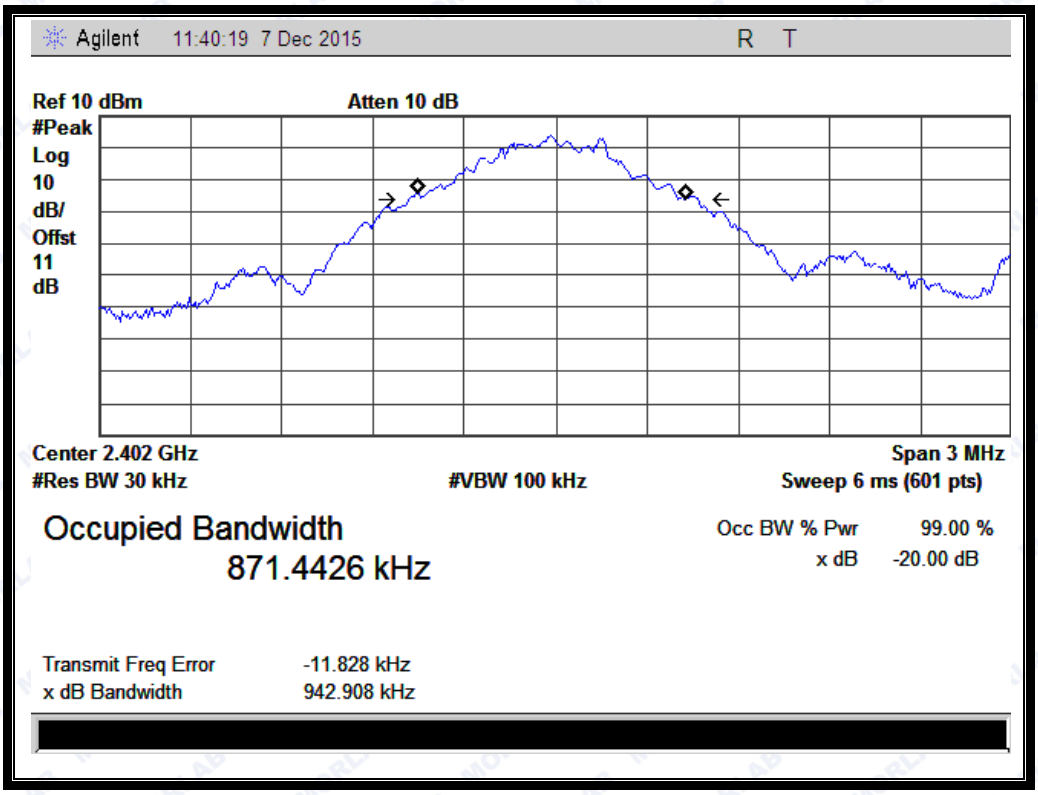
2.4.4.1 GFSK Mode

A. Test Verdict:

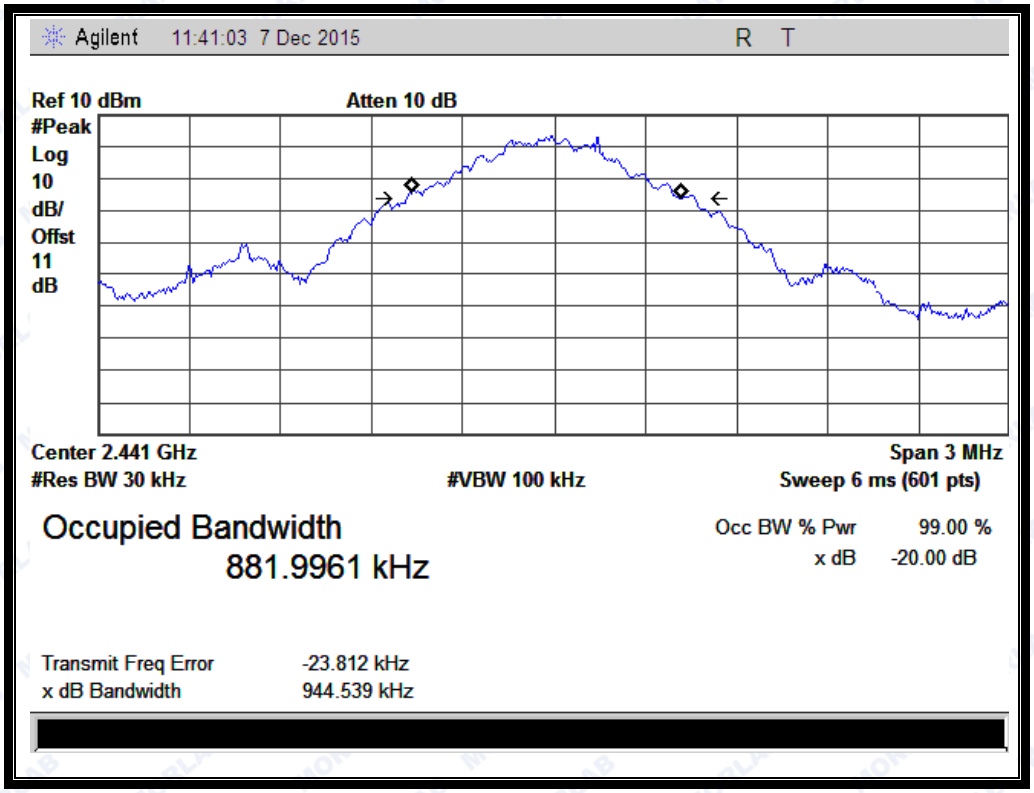
The maximum 20dB bandwidth measured is 0.9445MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	0.9429	Plot A
39	2441	0.9445	Plot B
78	2480	0.9436	Plot C

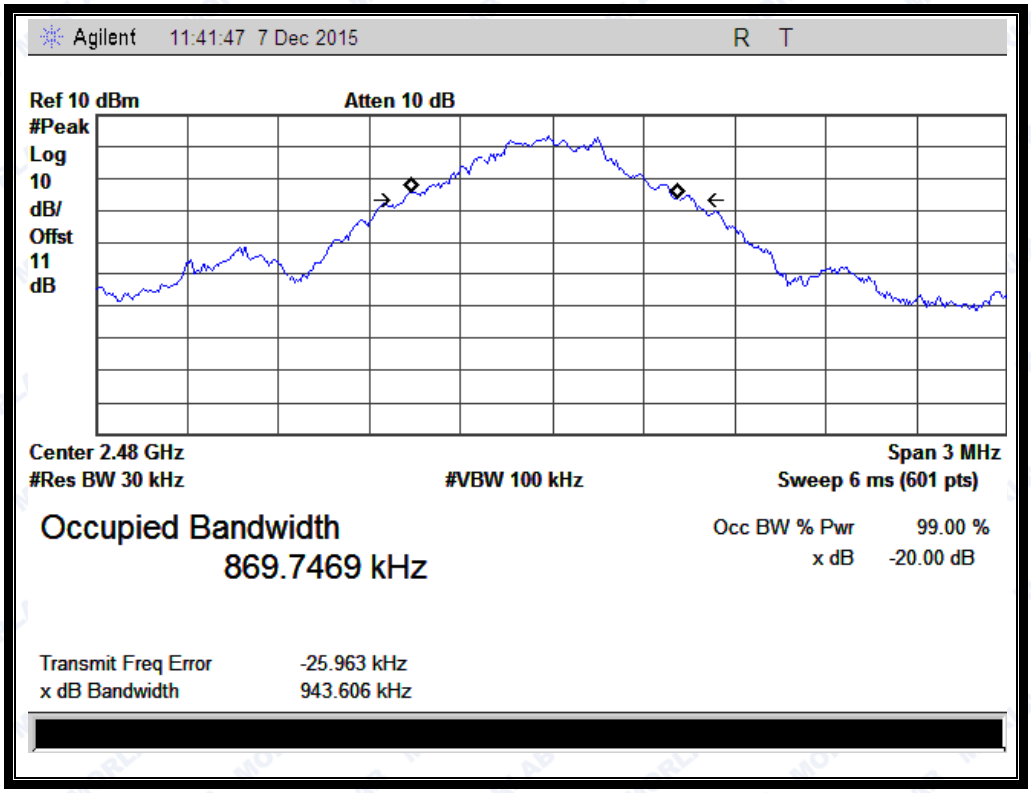
B. Test Plots:



(Plot A: Channel = 2402 @ GFSK)



(Plot B: Channel = 2441 @ GFSK)



(Plot C: Channel = 2480 @ GFSK)

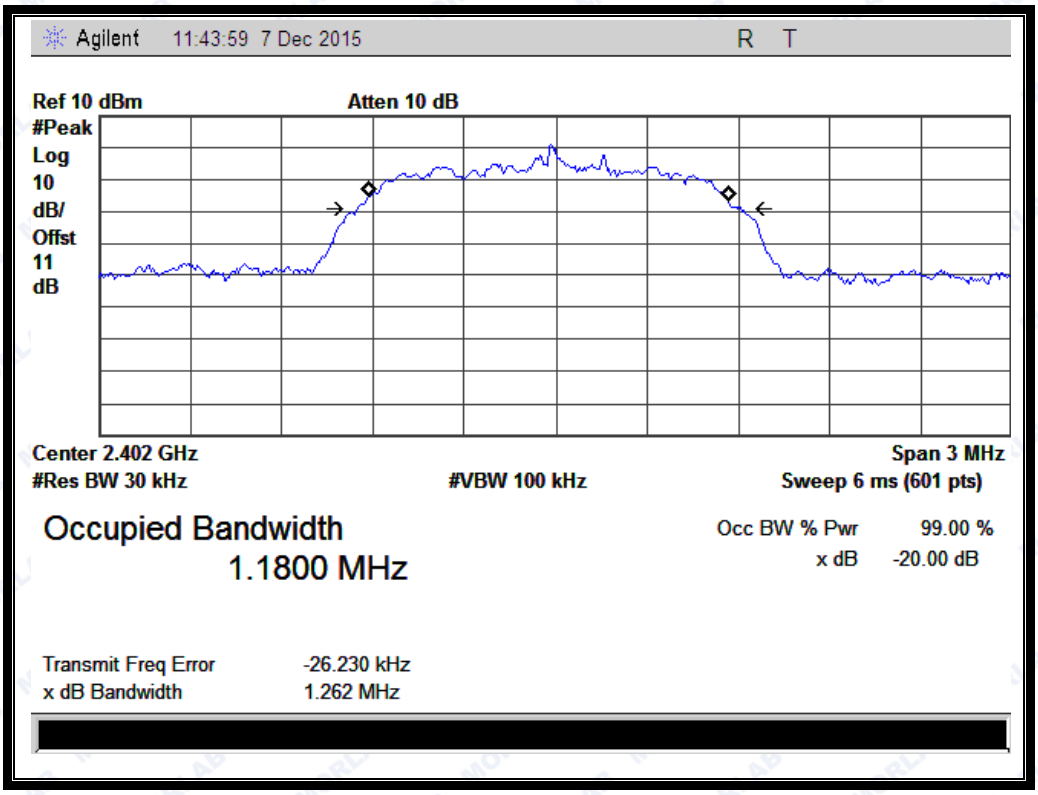
2.4.4.2 π/4-DQPSK Mode

A. Test Verdict:

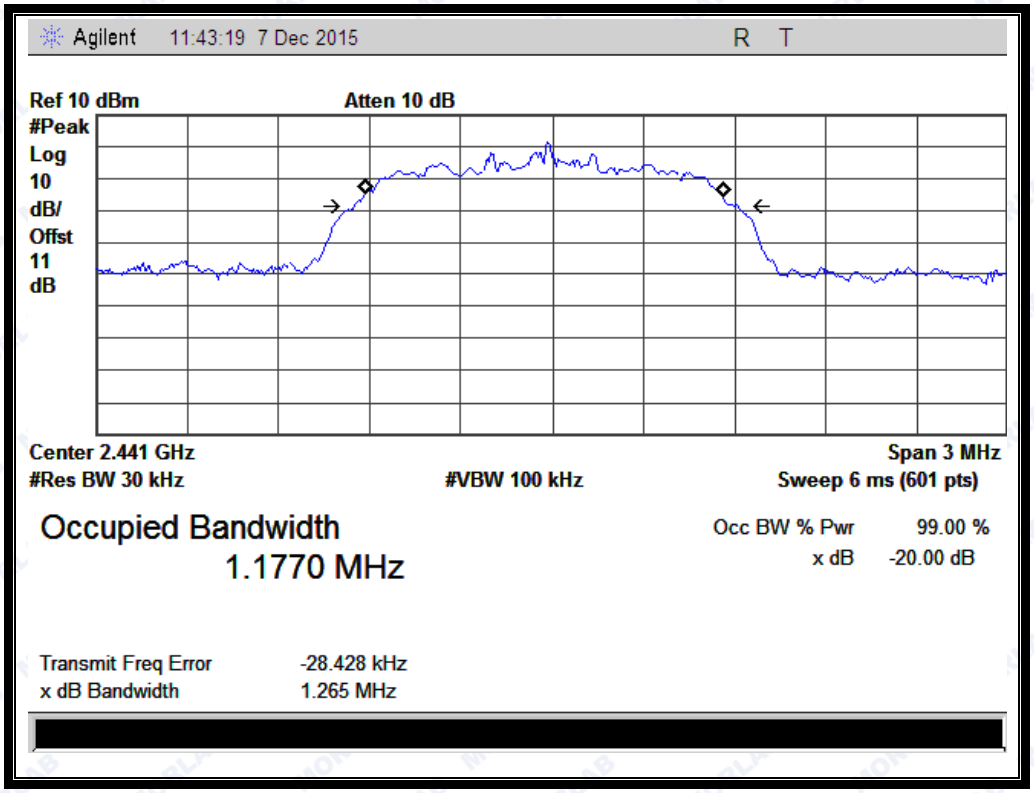
The maximum 20dB bandwidth measured is 1.266MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.262	Plot D
39	2441	1.265	Plot E
78	2480	1.266	Plot F

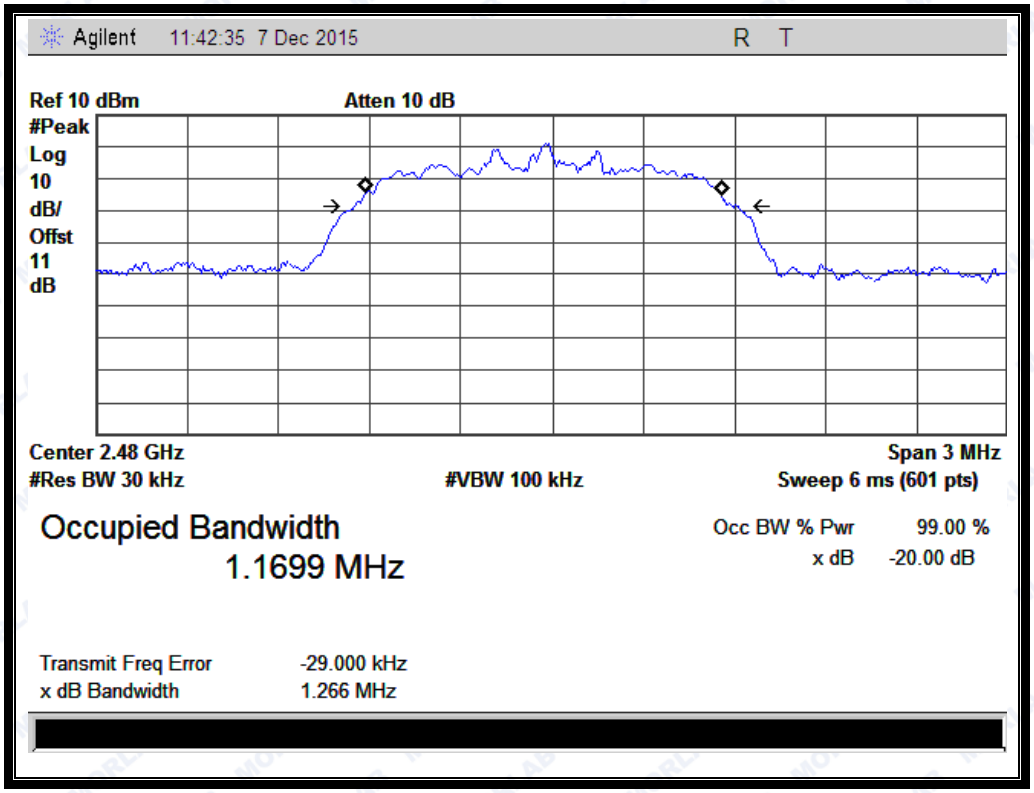
B. Test Plots:



(Plot D: Channel = 2402 @ π/4-DQPSK)



(Plot E: Channel = 2441 @ π/4-DQPSK)



(Plot F: Channel = 2480 @ π/4-DQPSK)

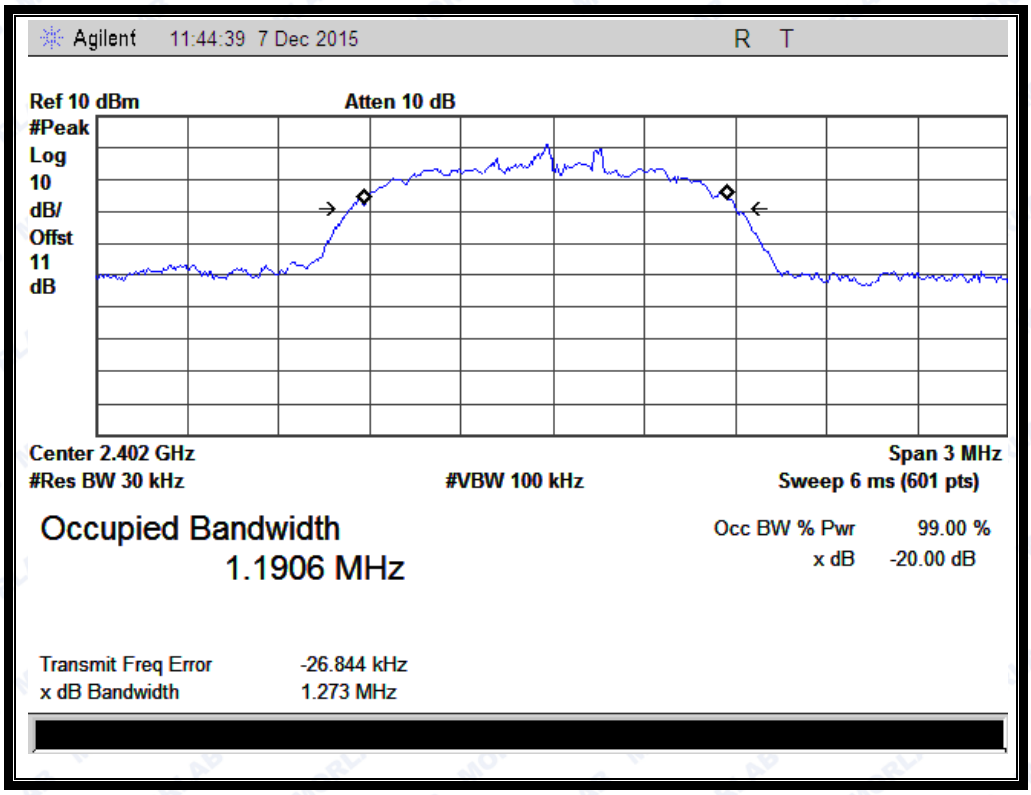
2.4.4.3 8-DPSK Mode

A. Test Verdict:

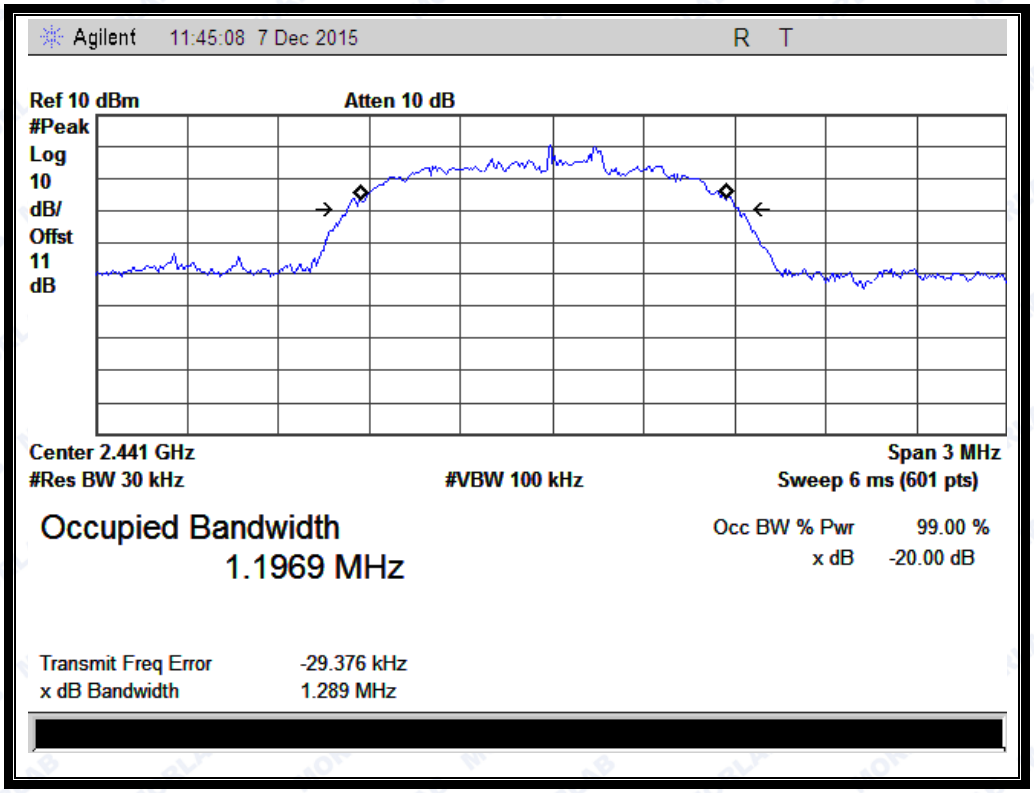
The maximum 20dB bandwidth measured is 1.309MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.273	Plot G
39	2441	1.289	Plot H
78	2480	1.309	Plot I

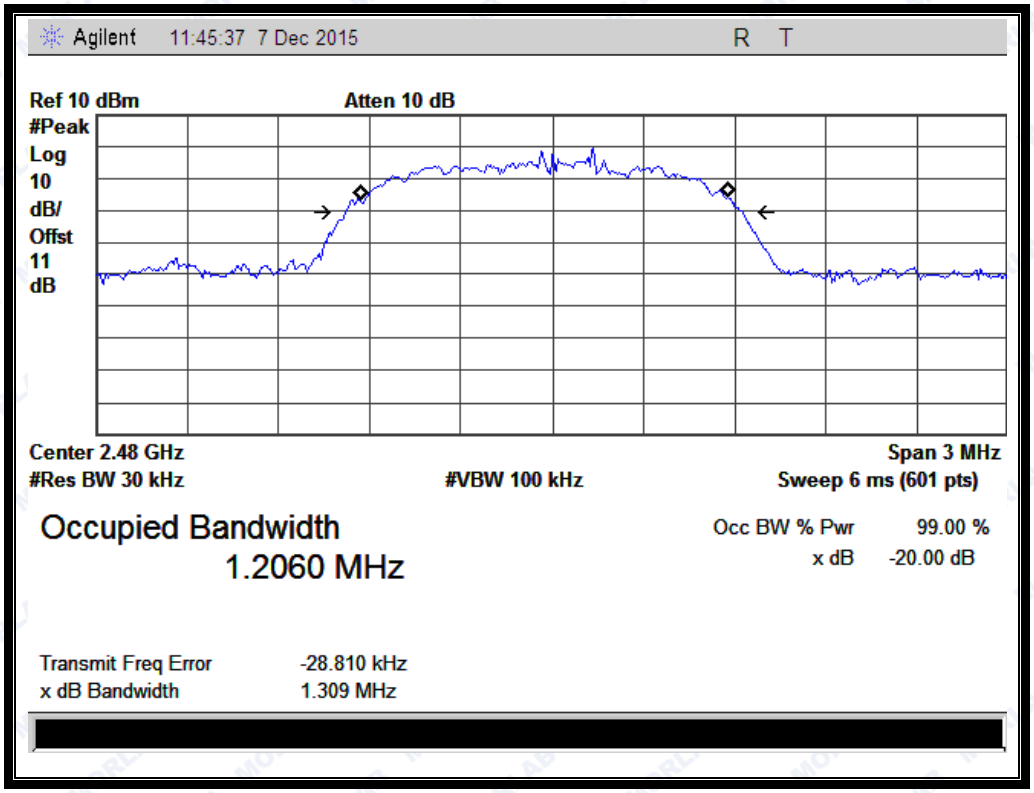
B. Test Plots:



(Plot G: Channel = 2402 @ 8-DPSK)



(Plot H: Channel = 2441 @ 8-DPSK)



(Plot I: Channel = 2480 @ 8-DPSK)

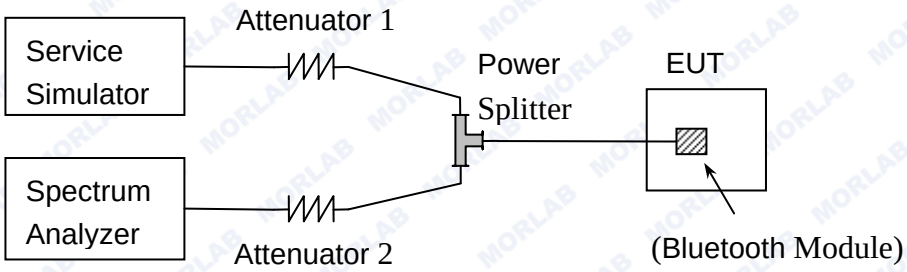
2.5 Carried Frequency Separation

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 Service Simulator (SS) 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:

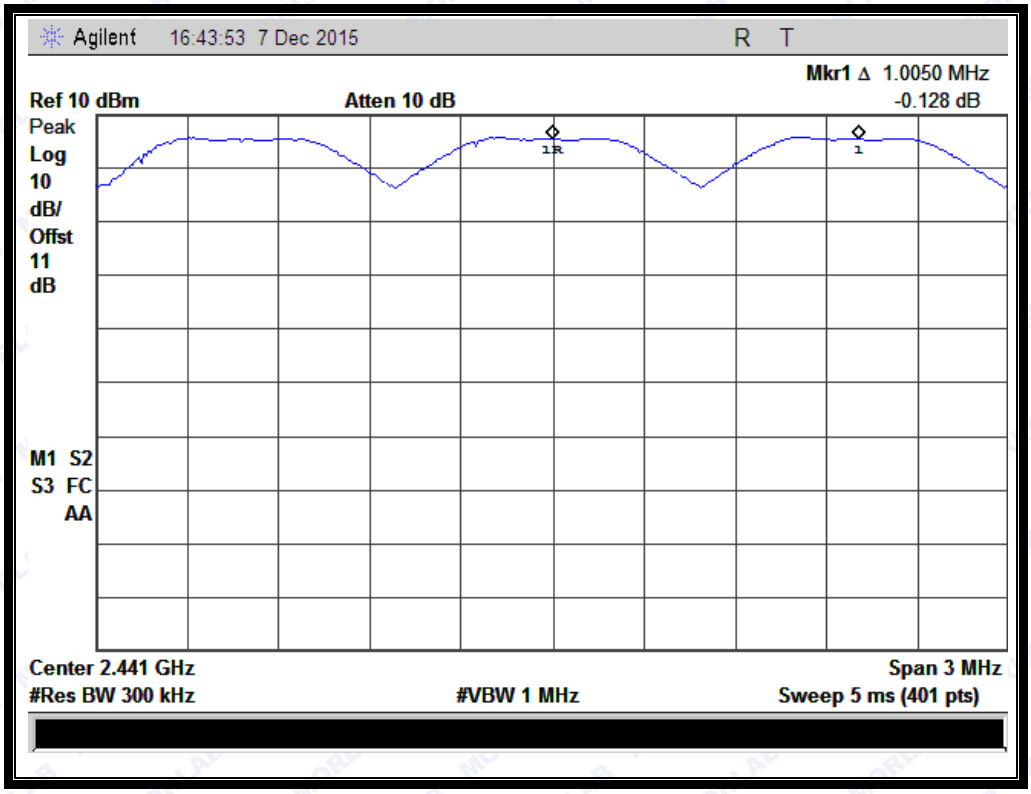
Please reference ANNEX A(1.4).

2.5.3 Test Procedure

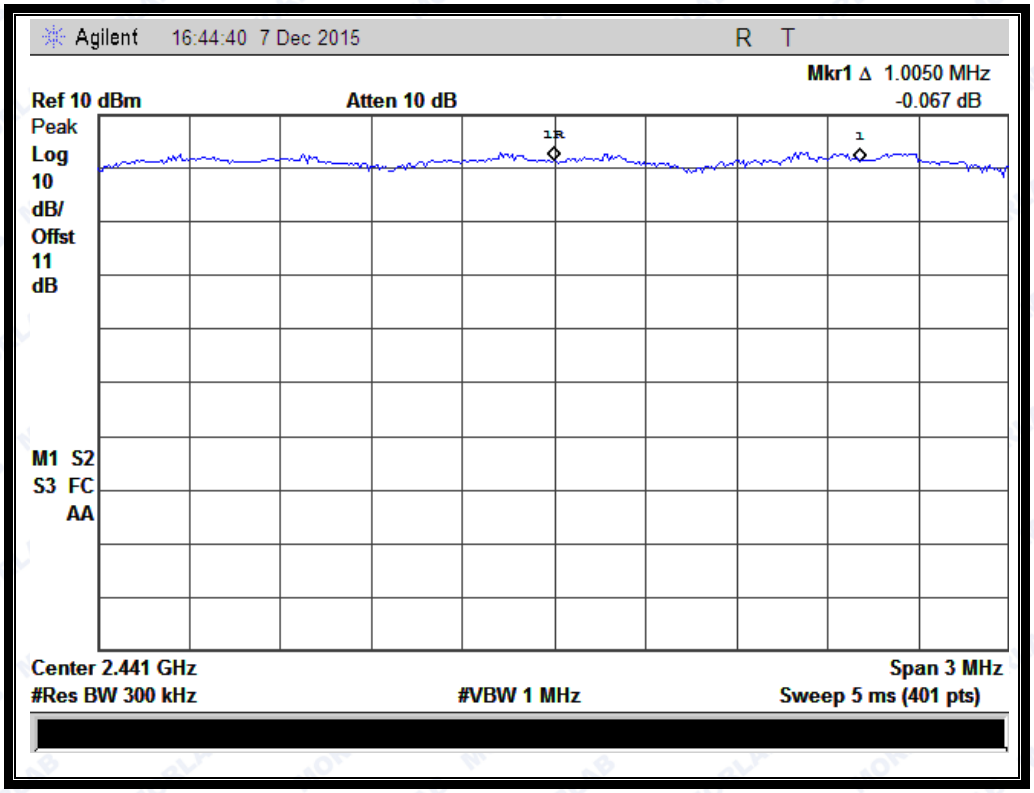
The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
Video (or Average) Bandwidth (VBW) ≥ RBW
Sweep = auto
Detector function = peak
Trace = max 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

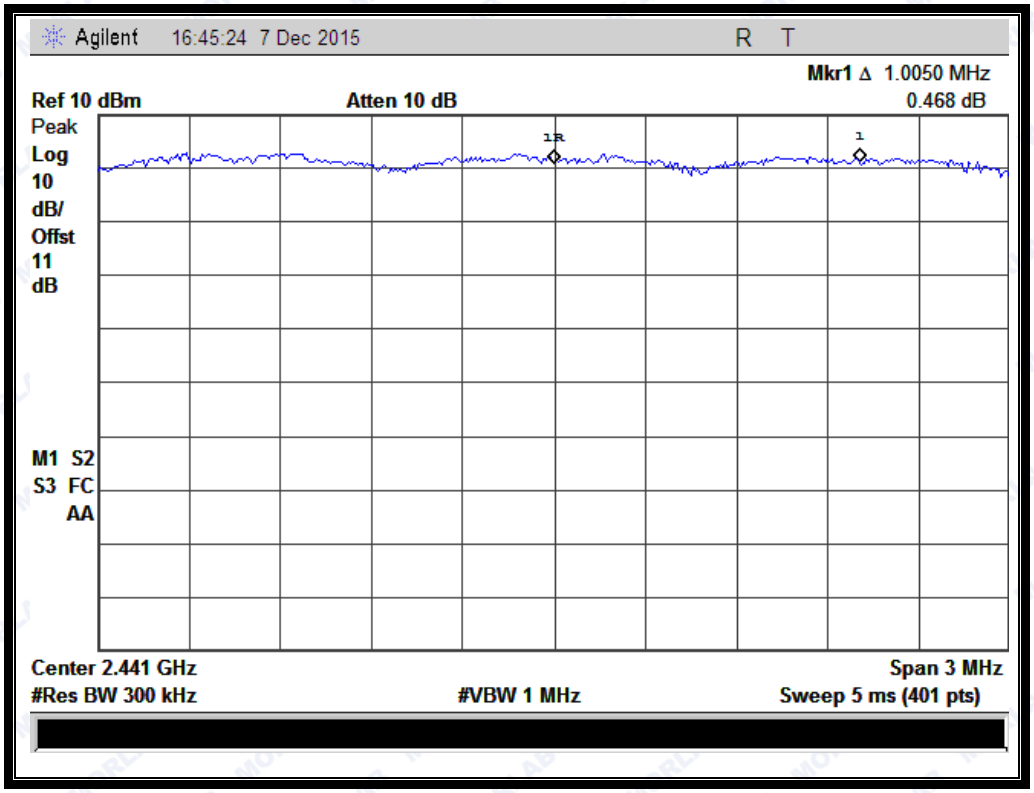
The Bluetooth Module operates at hopping-on test mode. For any adjacent channels (e.g. the channel 39 and 40 as showed in the Plot A), the Module does have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel (refer to section 0), whichever is greater. So, the verdict is PASSING



(Plot A: GFSK)



(Plot B: π/4-DQPSK)



(Plot C: 8-DPSK)

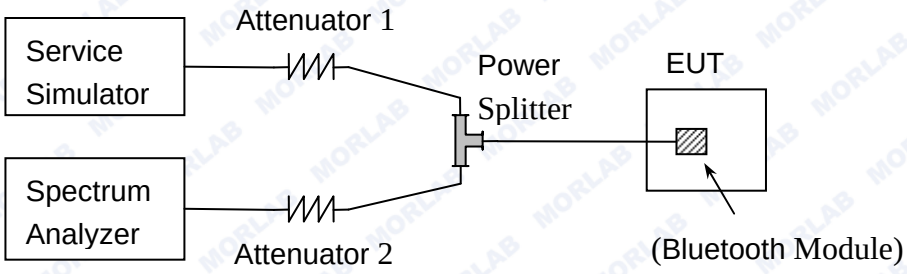
2.6 Time of Occupancy (Dwell time)

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 Service Simulator (SS) 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 A(1.4).

2.6.3 Test Procedure

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channel * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

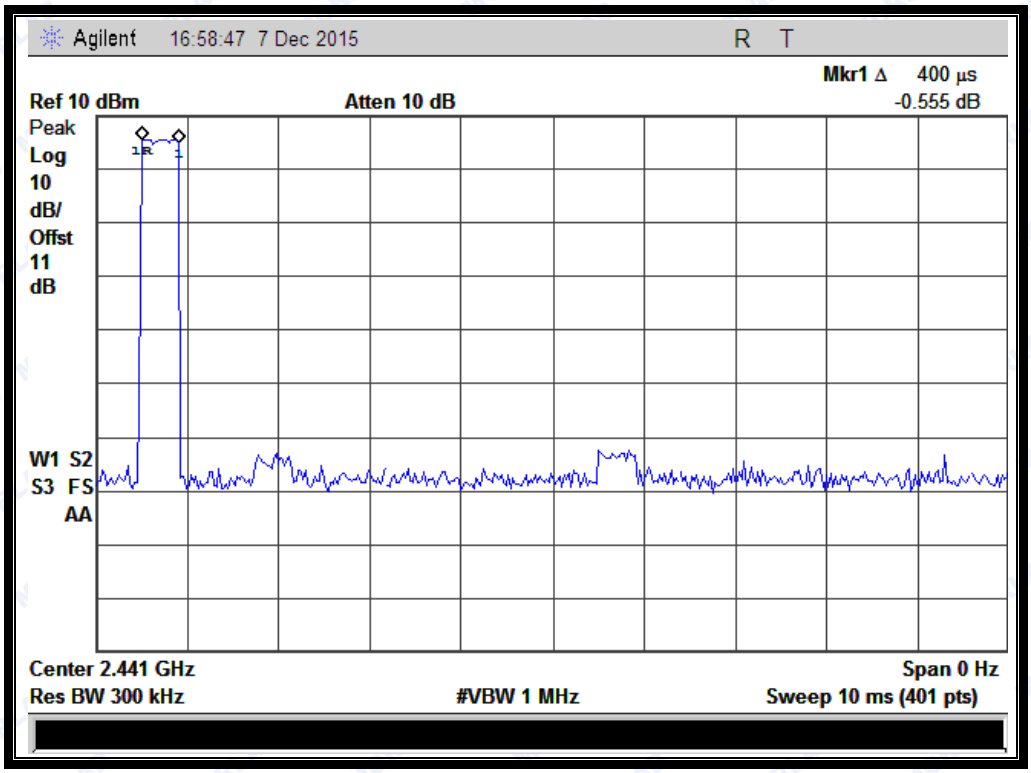
2.6.4 Test Result

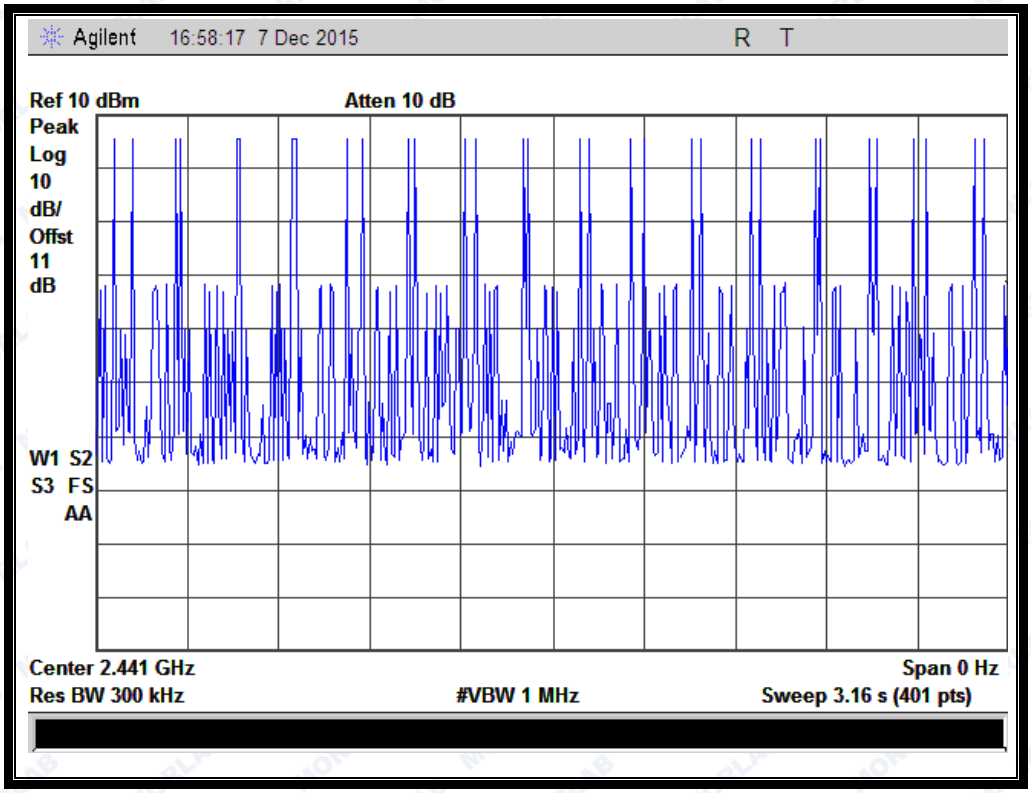
2.6.4.1 GFSK Mode

A. Test Verdict:

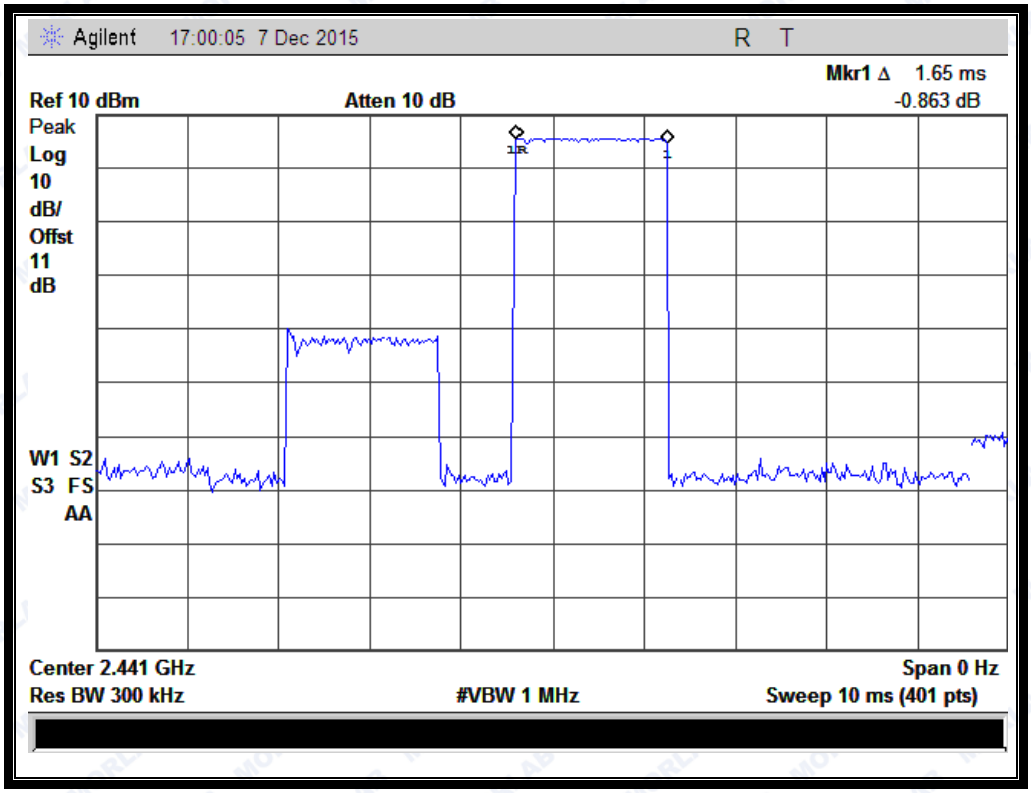
DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.4	30	0.012	0.12	0.4	PASS
DH3	1.65	16	0.0264	0.264		PASS
DH5	2.9	12	0.0348	0.348		PASS

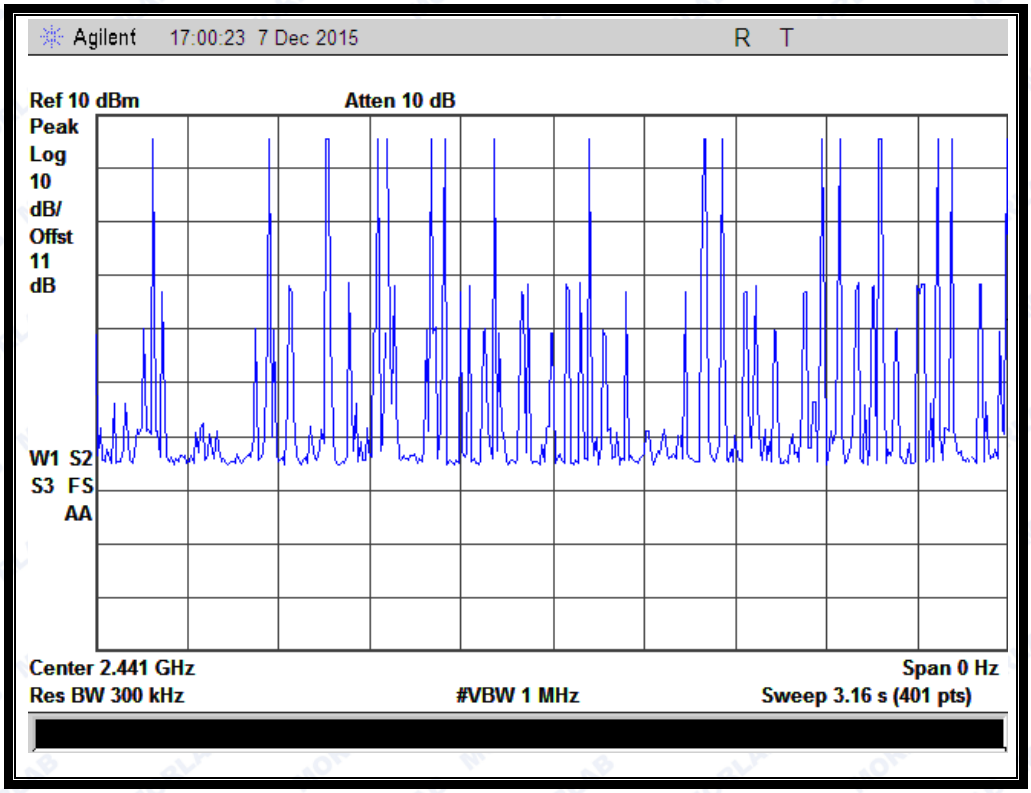
B. Test Plots:



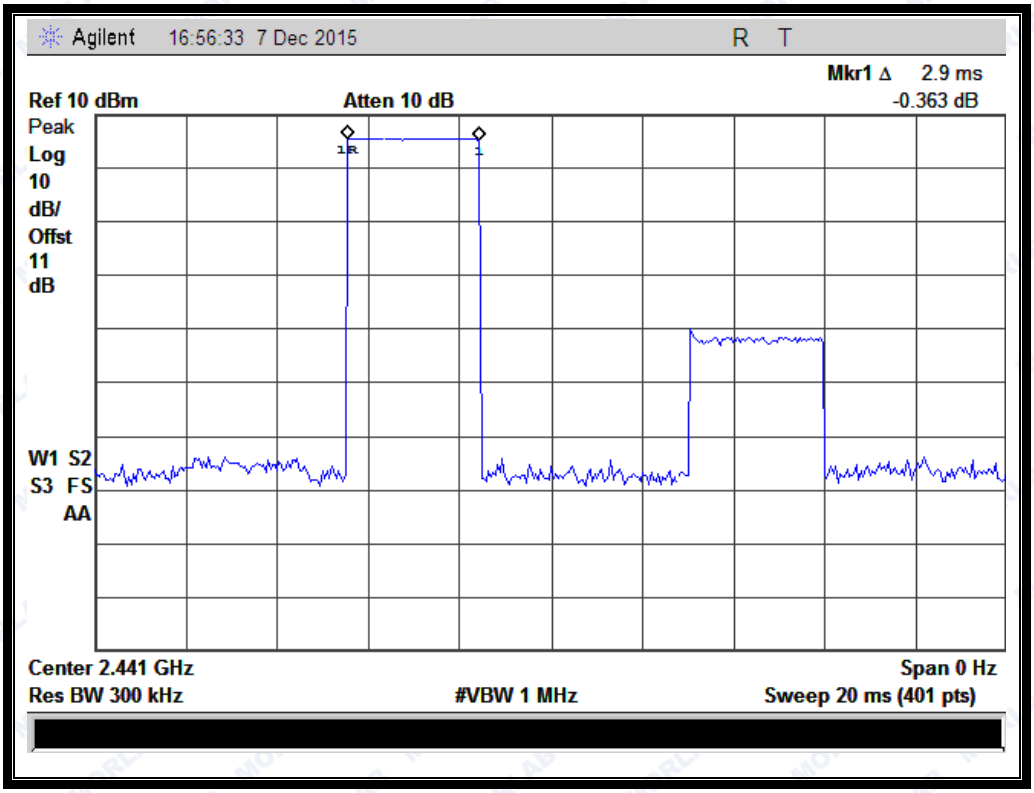


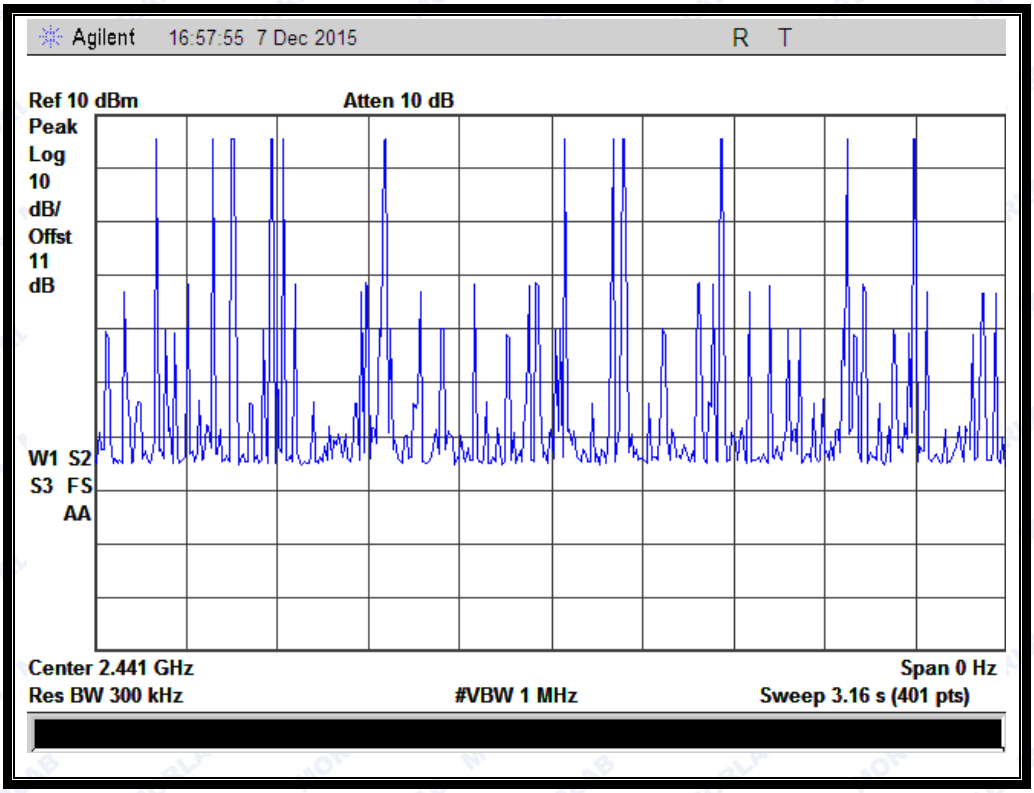
(Plot A: DH1 @ GFSK)





(Plot B: DH3 @ GFSK)





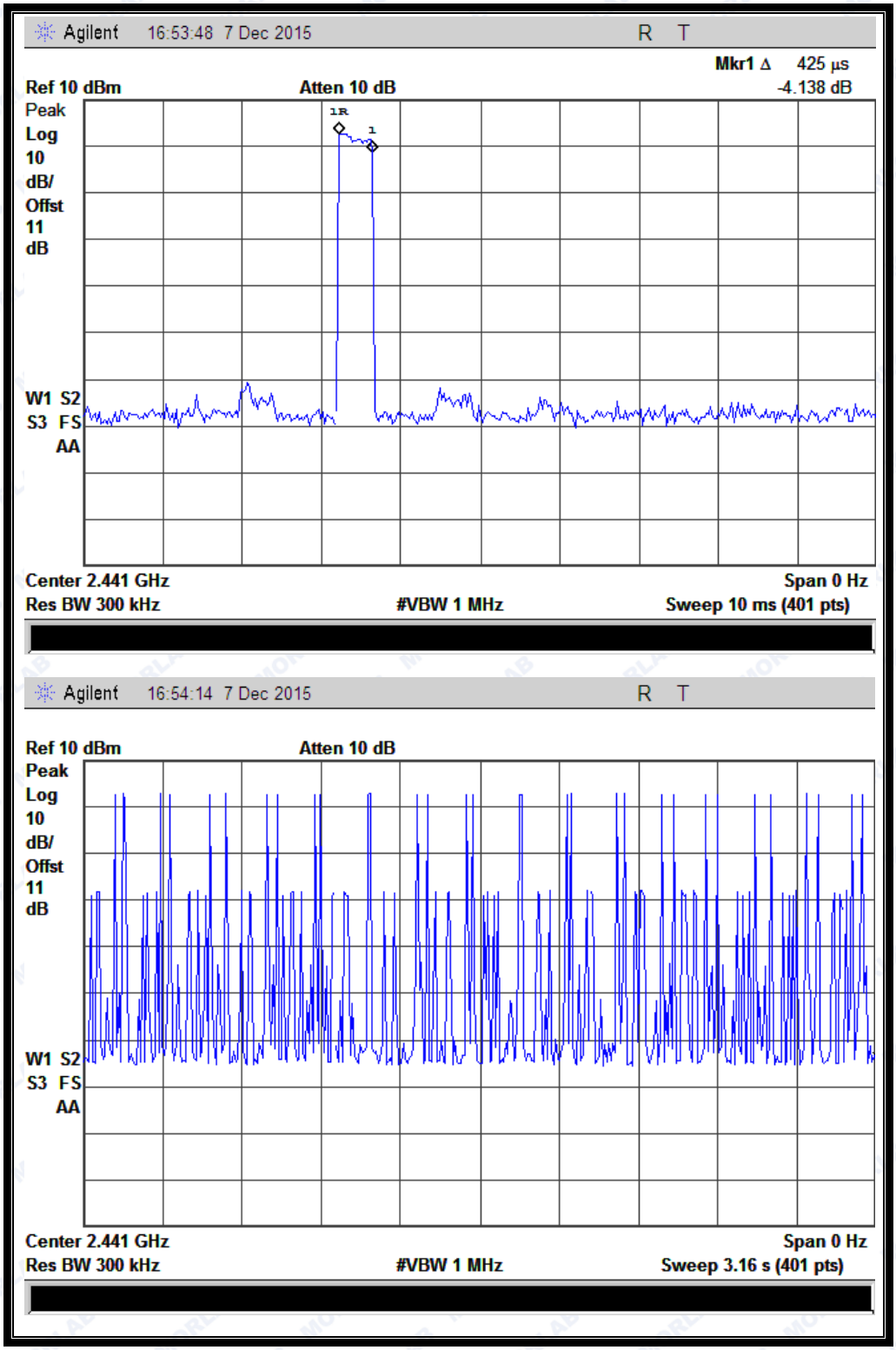
(Plot C: DH5 @ GFSK)

2.6.4.2 π/4-DQPSK Mode

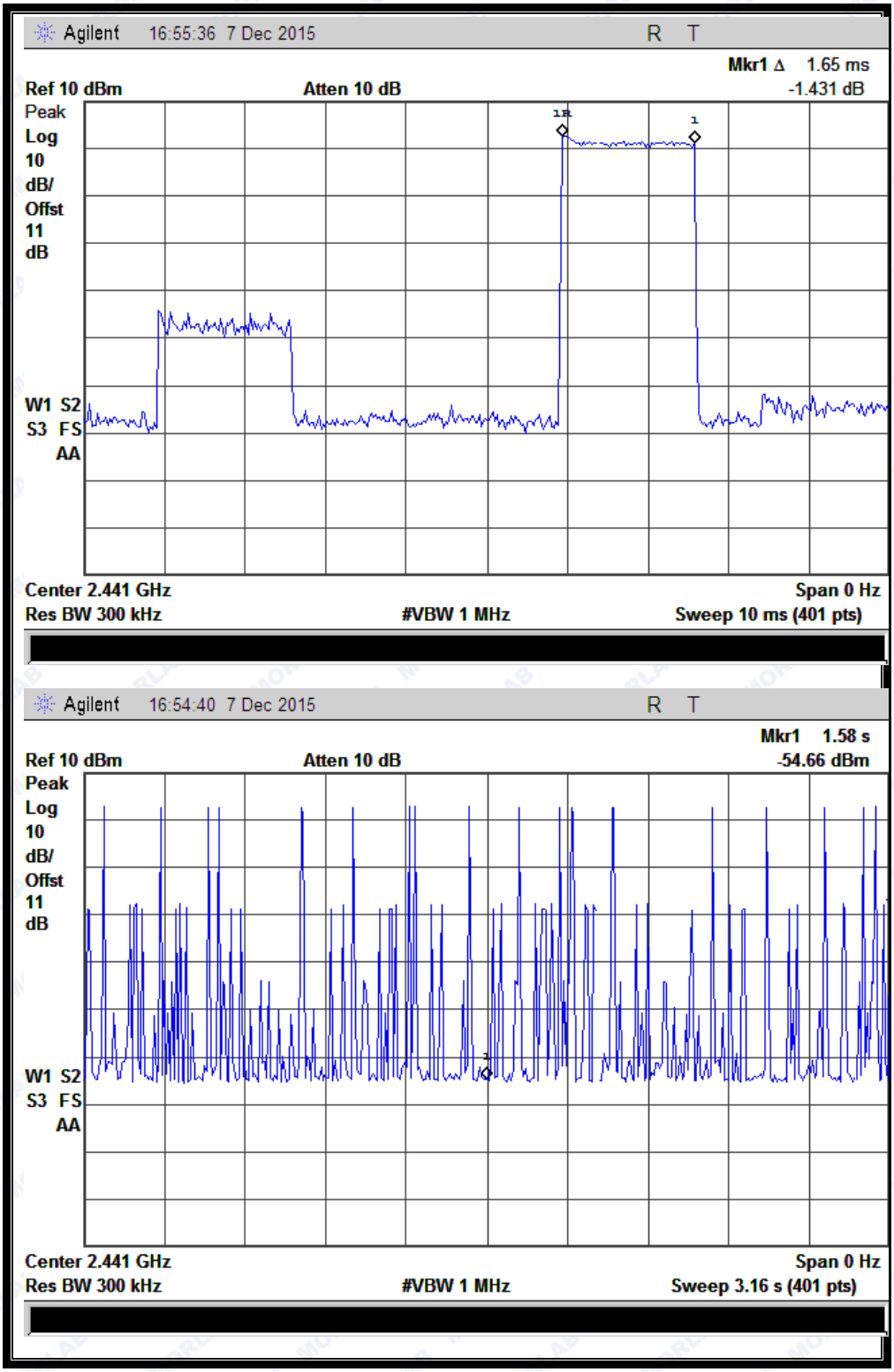
A. Test Verdict:

DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.425	30	0.01275	0.1275	0.4	PASS
DH3	1.65	18	0.0297	0.297		PASS
DH5	2.9	13	0.0377	0.377		PASS

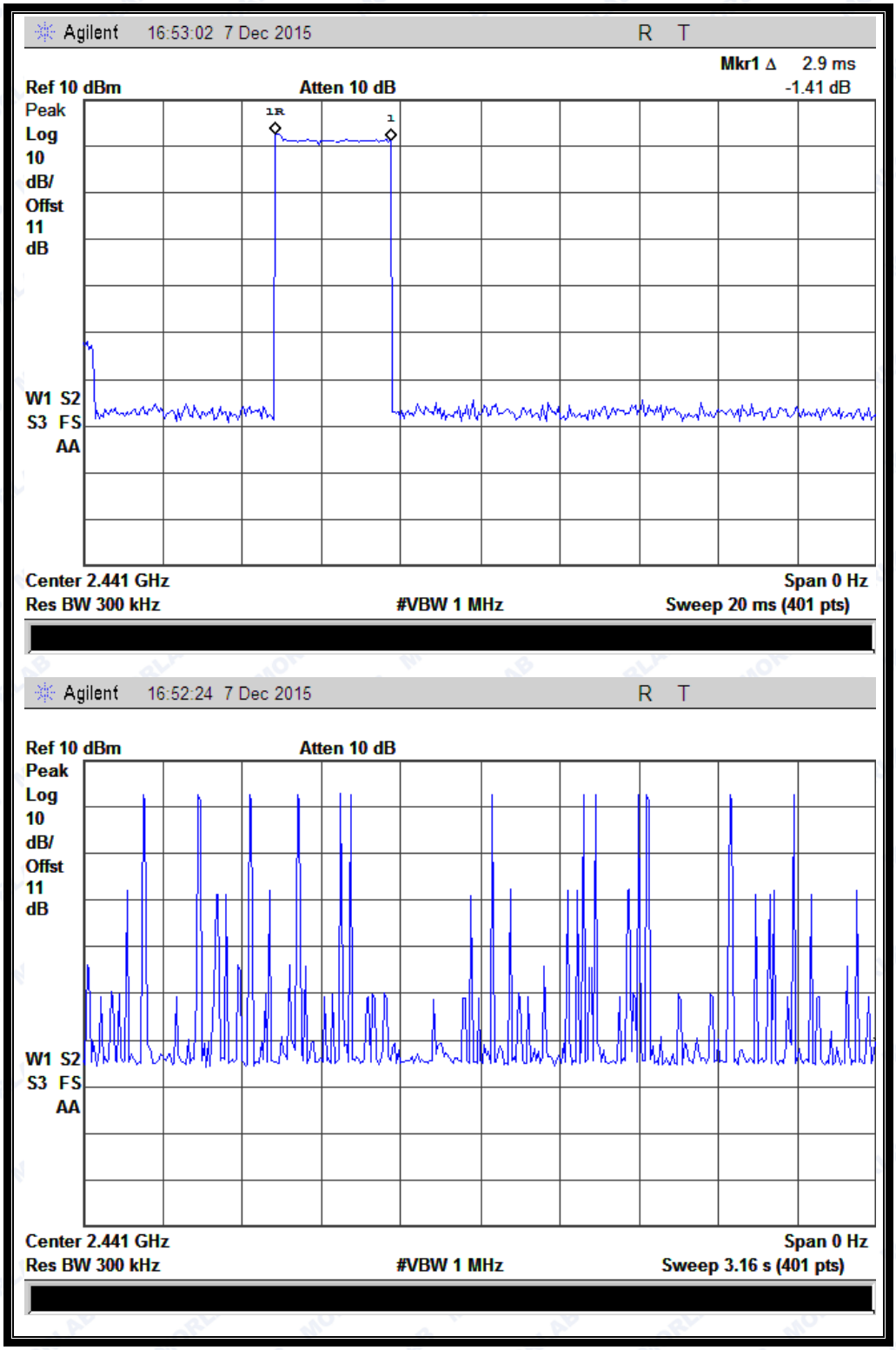
B. Test Plots:



(Plot D: DH1 @ π/4-DQPSK)



(Plot E: DH3 @ π/4-DQPSK)



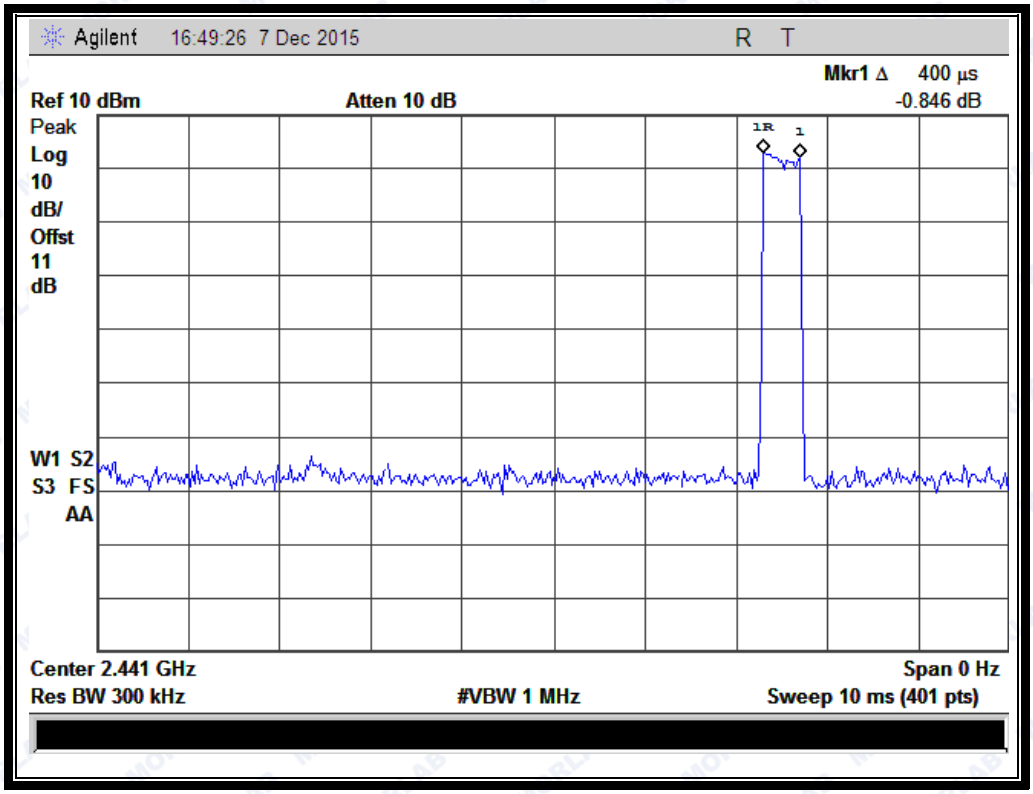
(Plot F: DH5 @ π/4-DQPSK)

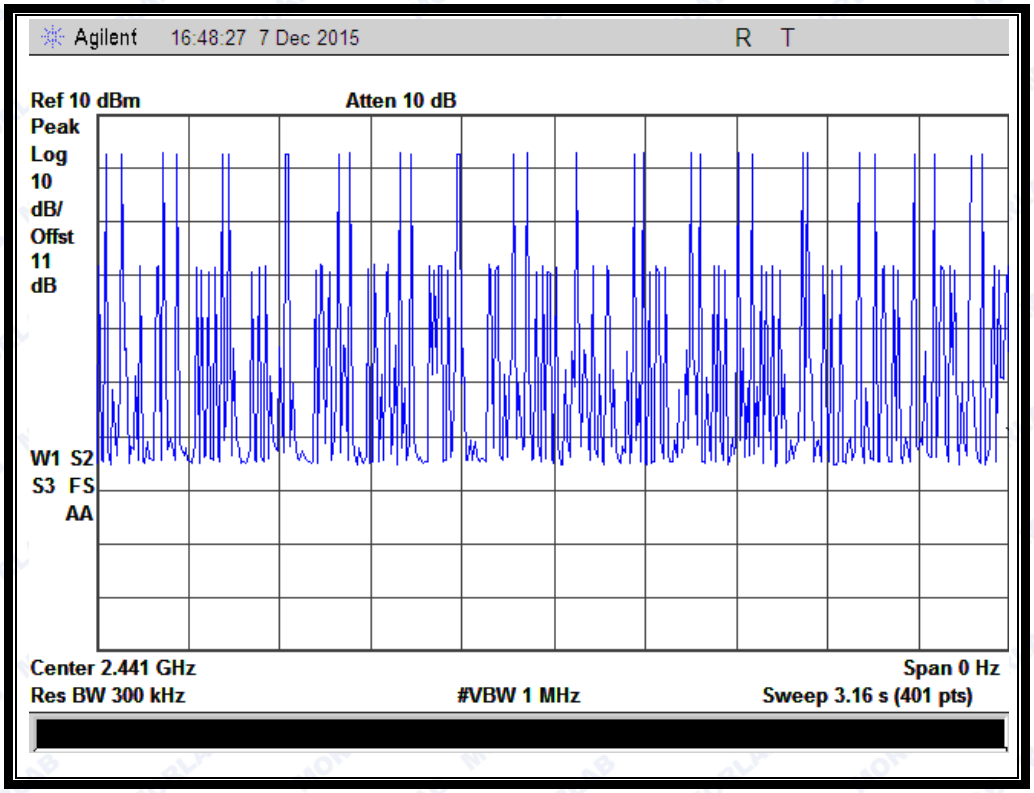
2.6.4.3 8-DPSK mode

A. Test Verdict:

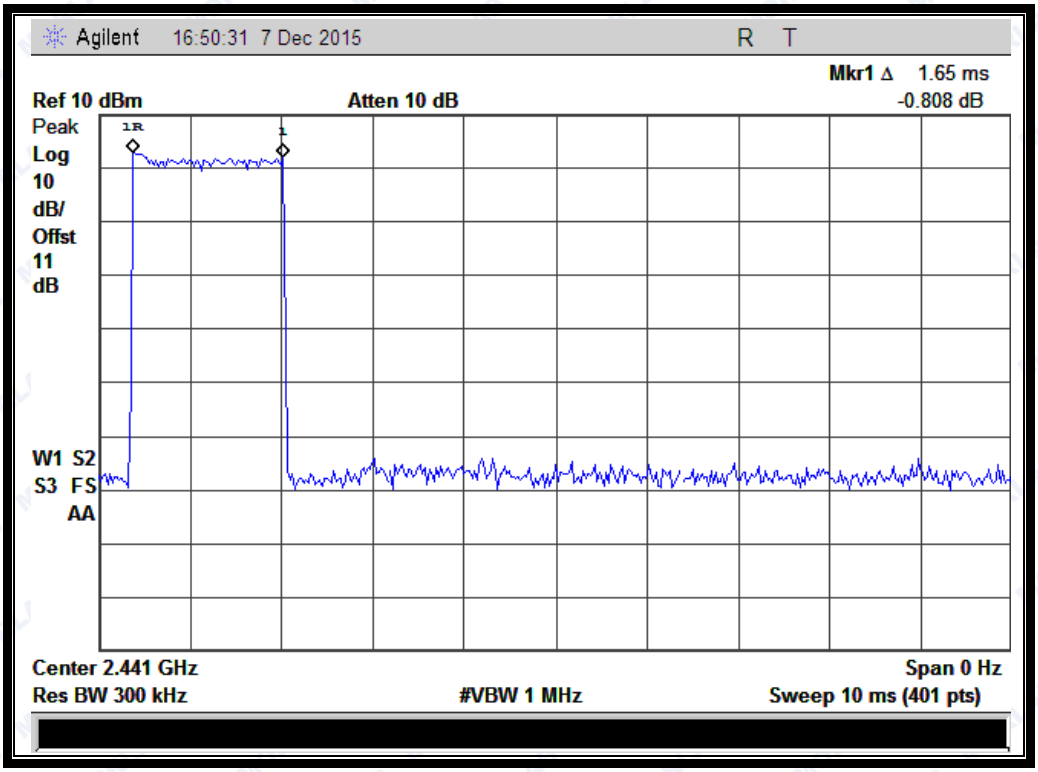
DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.4	29	0.0116	0.116	0.4	PASS
DH3	1.65	19	0.03135	0.3135		PASS
DH5	2.9	12	0.0348	0.348		PASS

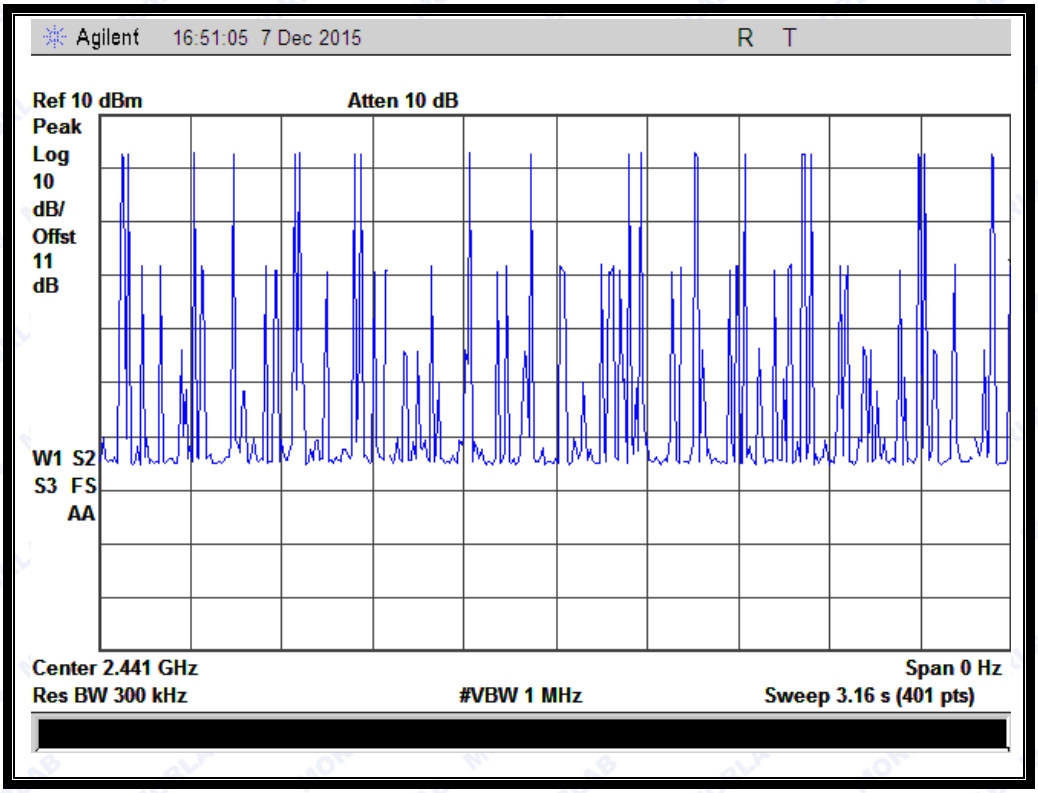
B. Test Plots:



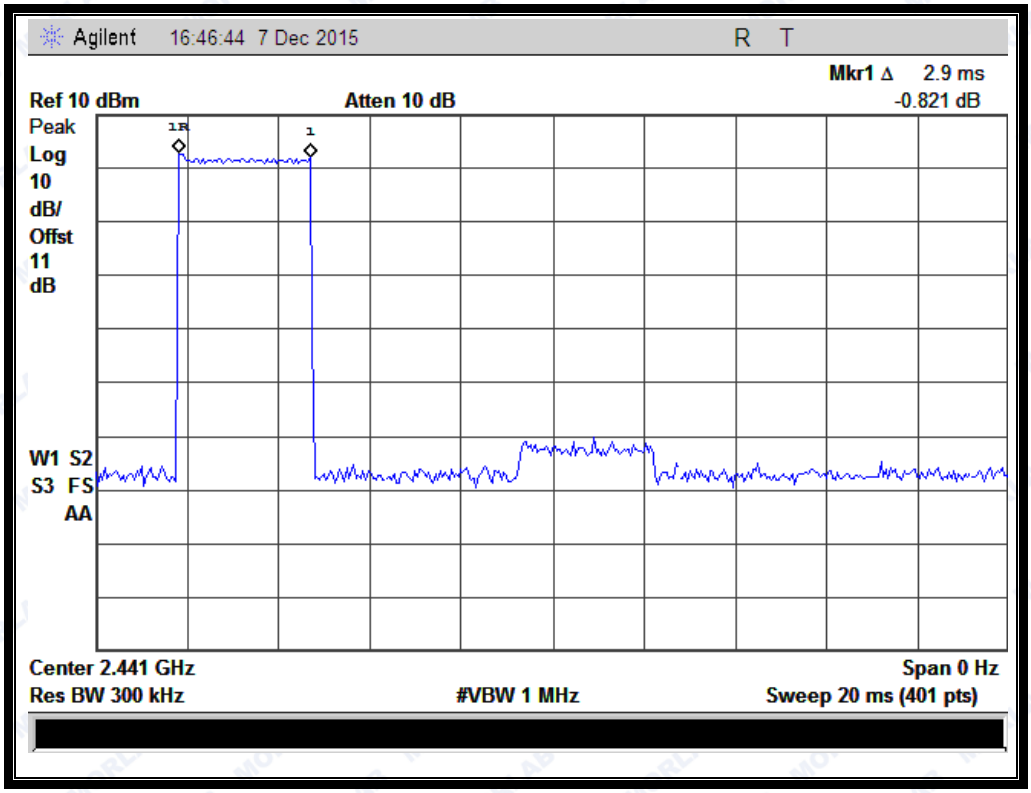


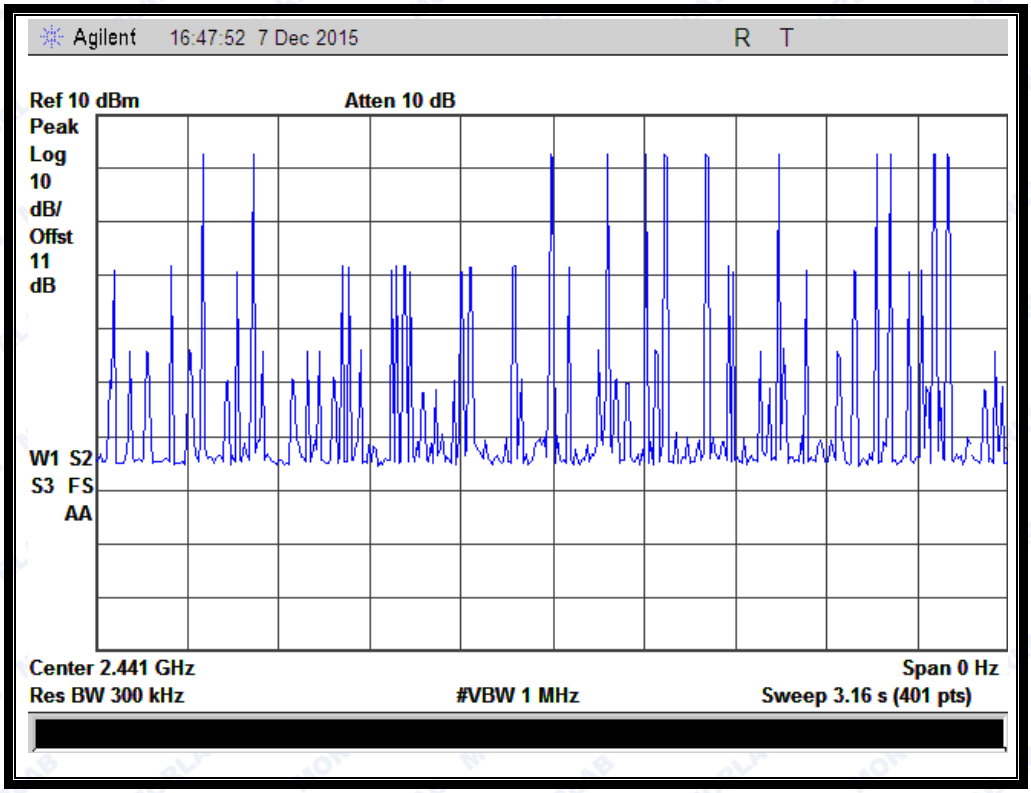
(Plot G: DH1 @ 8-DPSK)





(Plot H: DH3 @ 8-DPSK)





(Plot I: DH5 @ 8-DPSK)

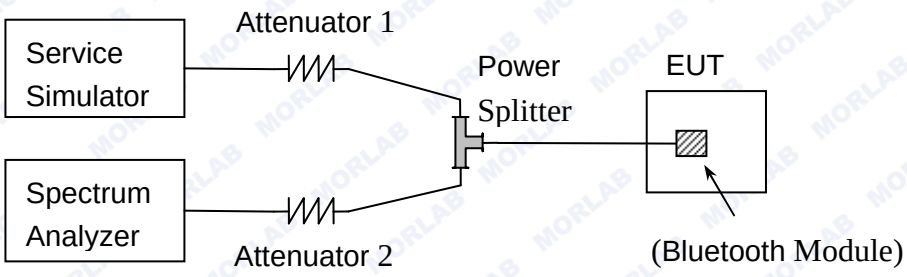
2.7 Conducted Spurious Emissions

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 Service Simulator (SS) 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 A(1.4).

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 ≥ 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.

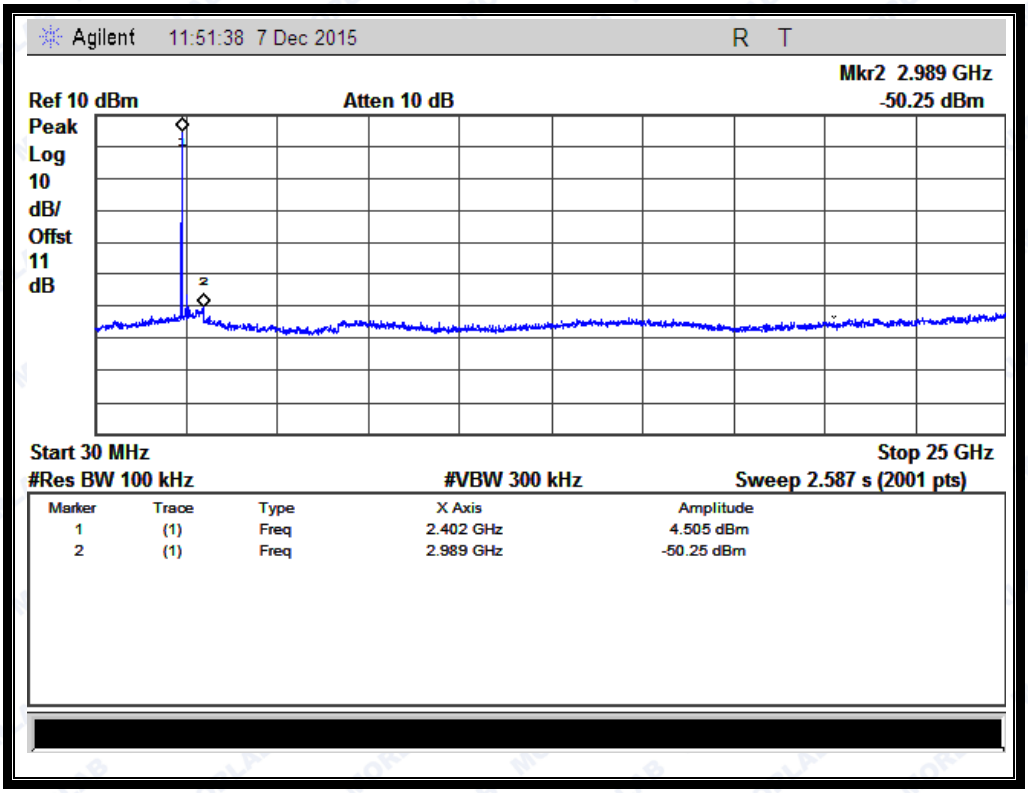
2.7.4.1 GFSK Mode

A. Test Verdict:

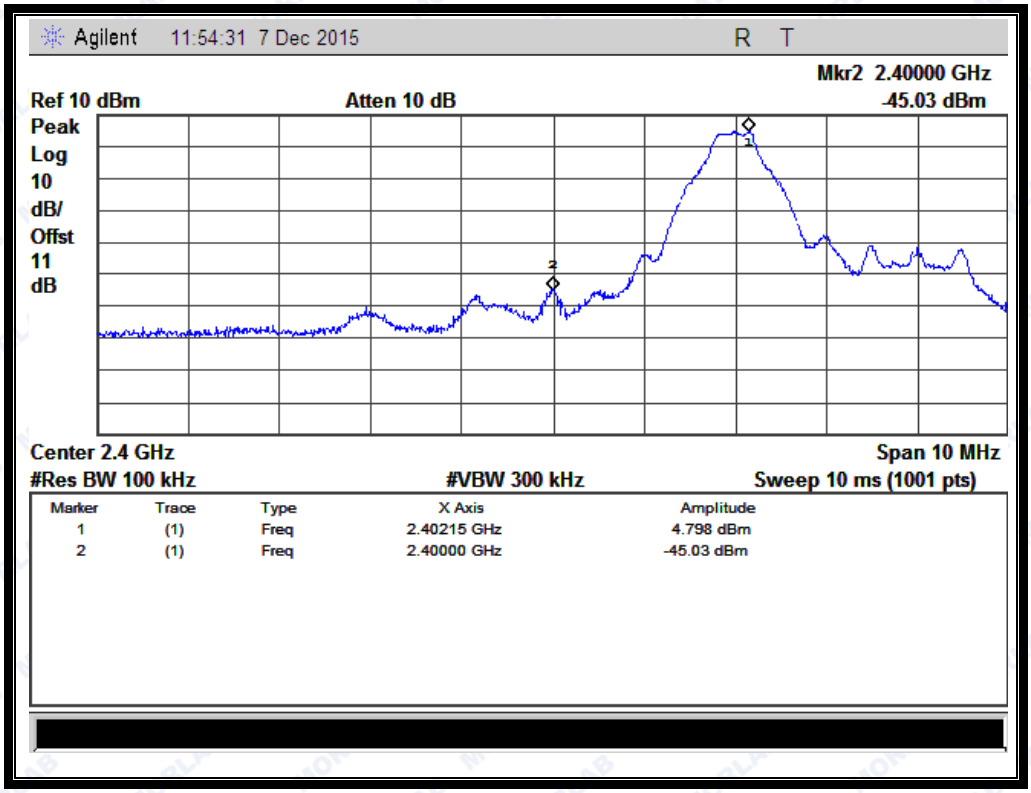
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-50.25	Plot A.1	4.51	-15.49	PASS
39	2441	-51.96	Plot B.1	3.86	-16.14	PASS
78	2480	-51.49	Plot C.1	3.51	-16.49	PASS

B. Test Plots:

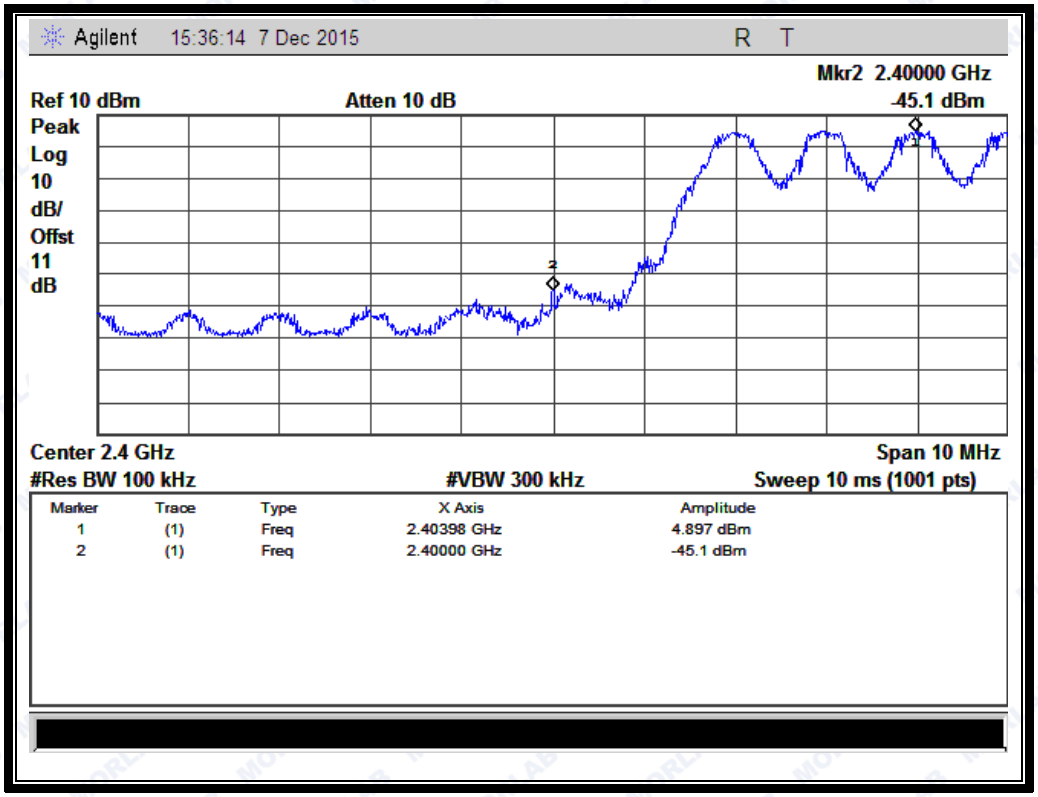
Note: the power of the Module transmitting frequency should be ignored.



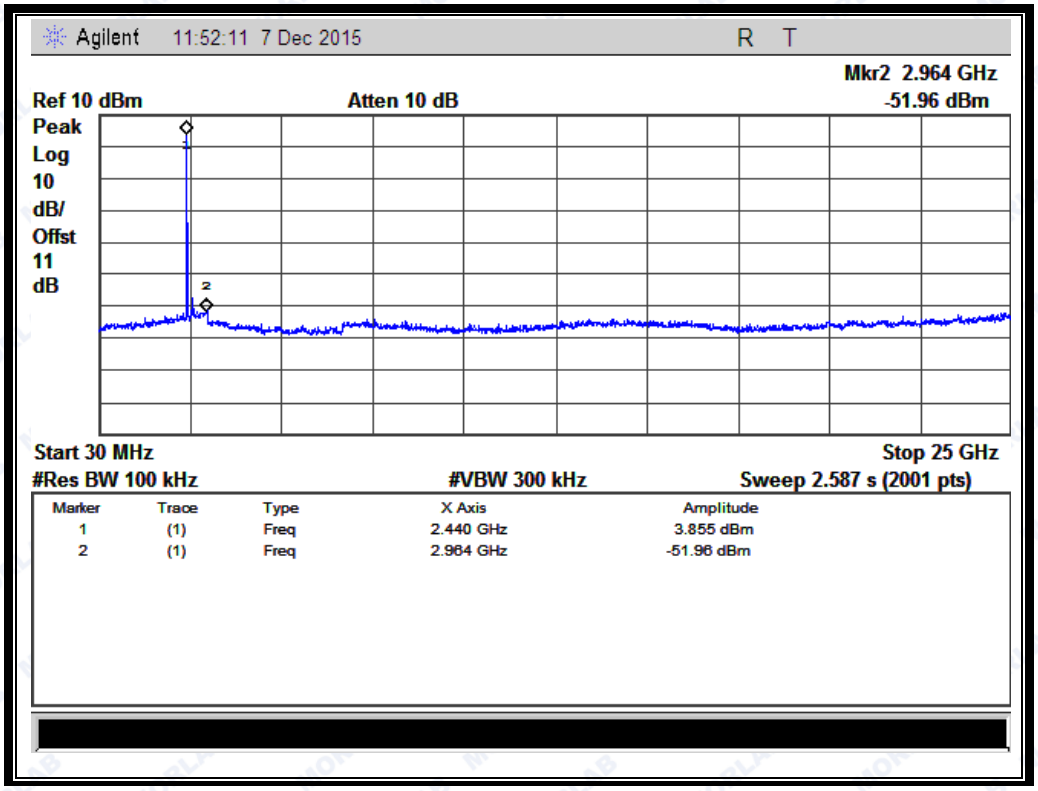
(Plot A.1: Channel = 0, 30MHz to 25GHz @ GFSK Mode)



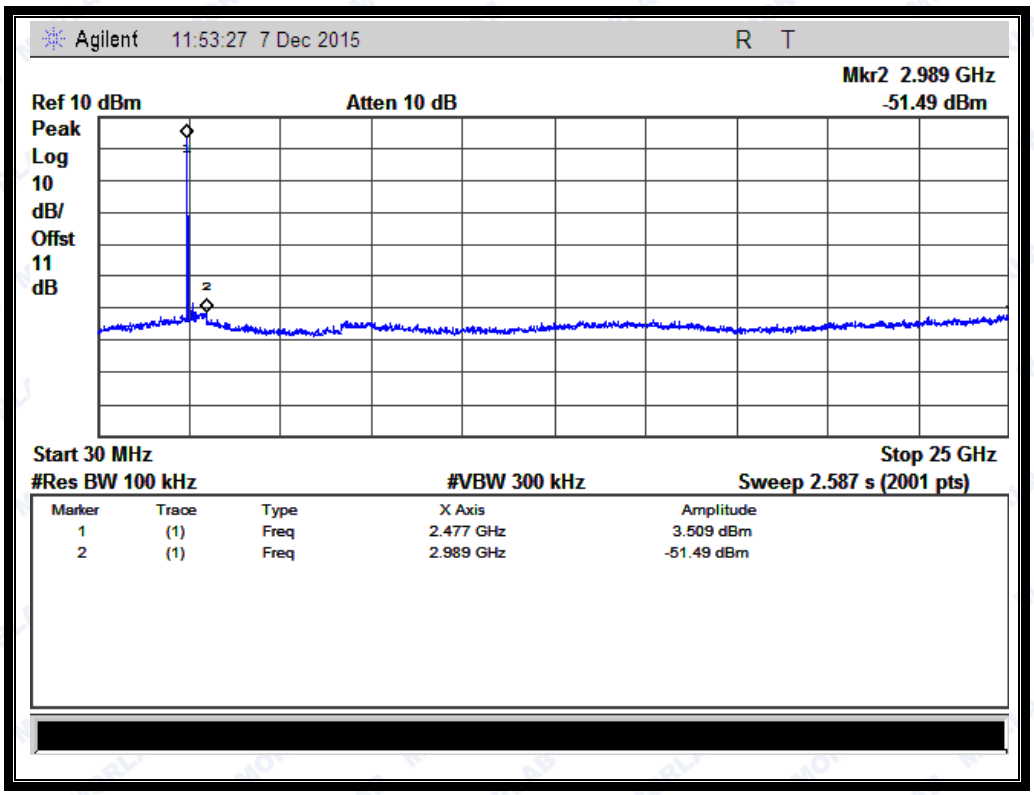
(Channel = 0, Band edge @ GFSK Mode)



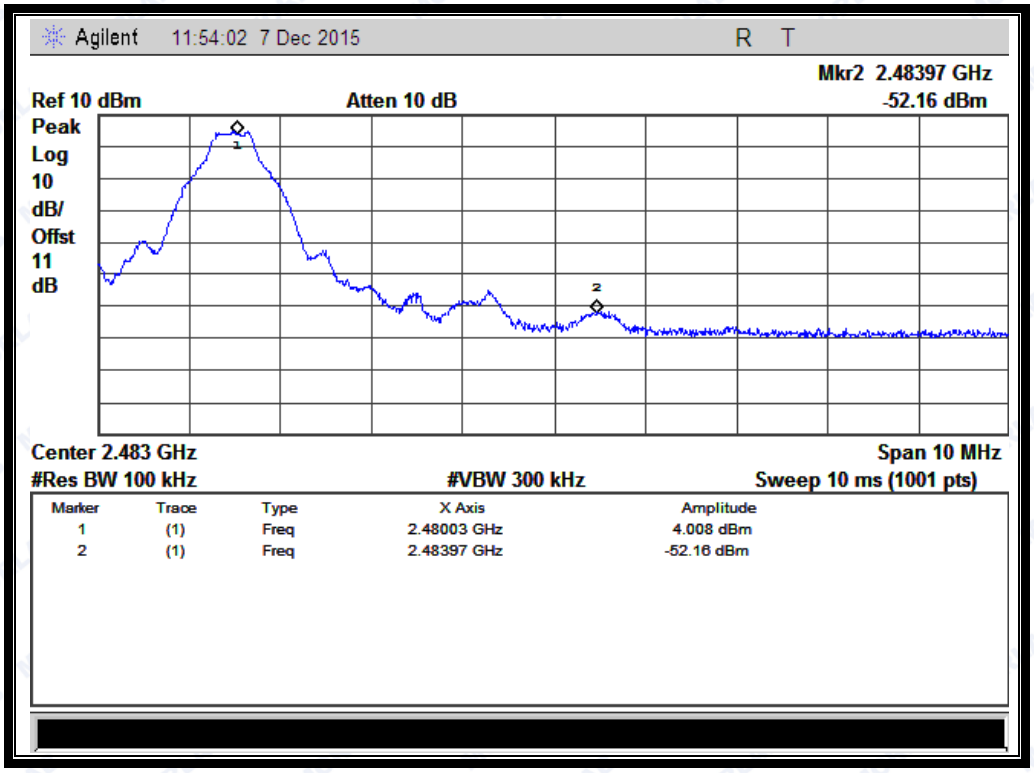
(Channel = 0, Band edge with hopping on @ GFSK Mode)



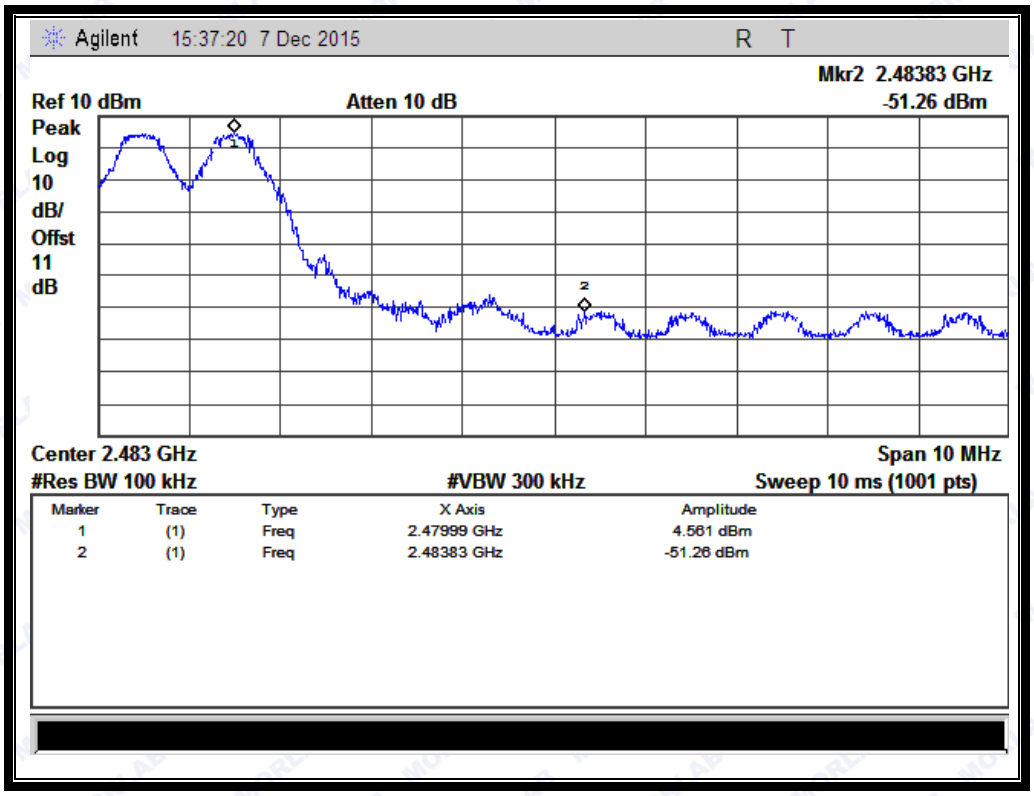
(Plot B.1: Channel = 39, 30MHz to 25GHz @ GFSK Mode)



(Plot C.1: Channel = 78, 30MHz to 25GHz @ GFSK Mode)



(Channel = 78, Band edge @ GFSK Mode)



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

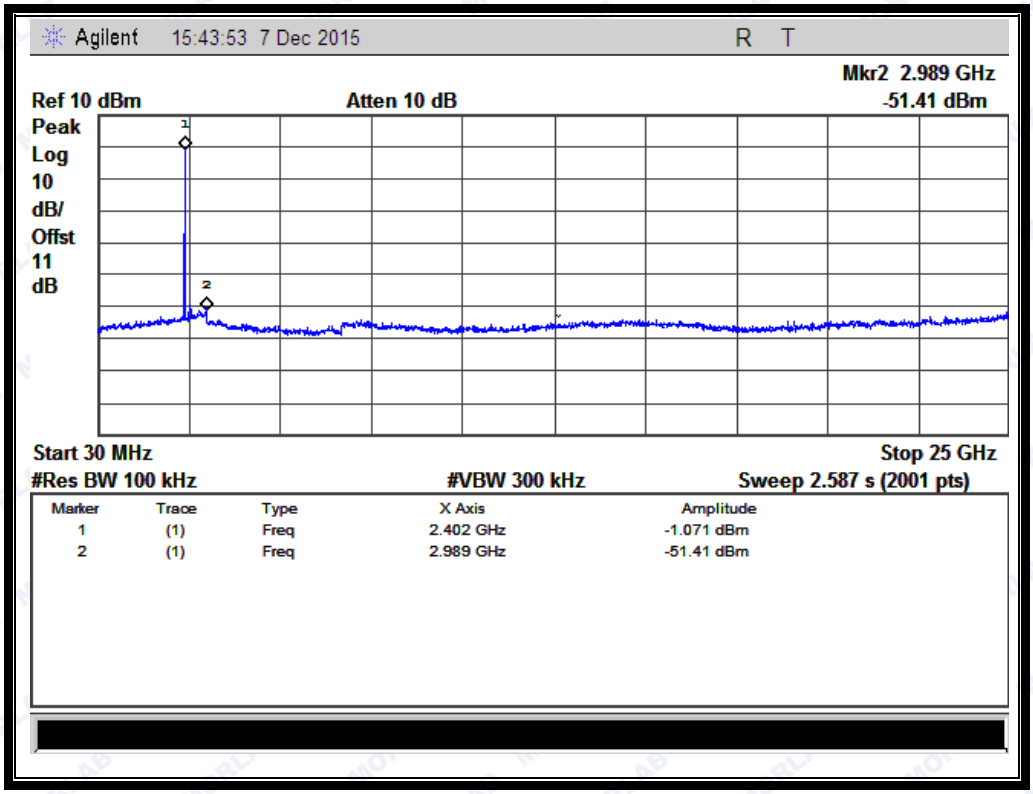
2.7.4.2 π/4-DQPSK Mode

A. Test Verdict:

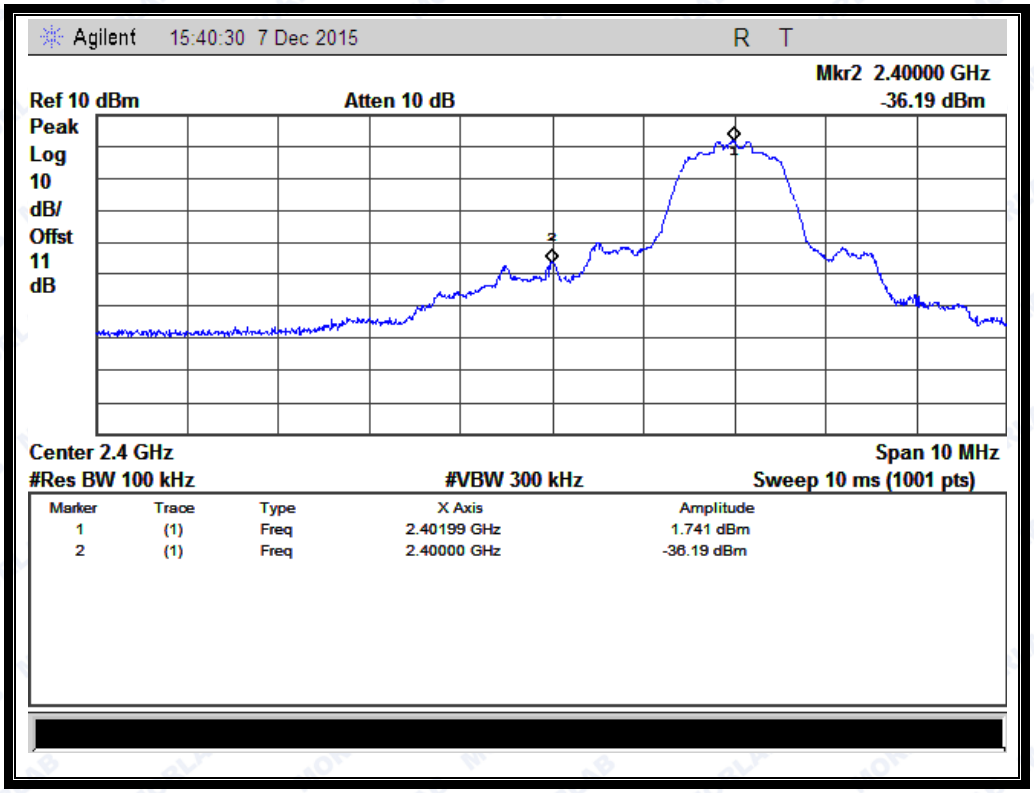
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-51.41	Plot D.1	-1.07	-21.07	PASS
39	2441	-50.98	Plot E.1	-2.12	-22.12	PASS
78	2480	-51.4	Plot F.1	-1.83	-21.83	PASS

B. Test Plots:

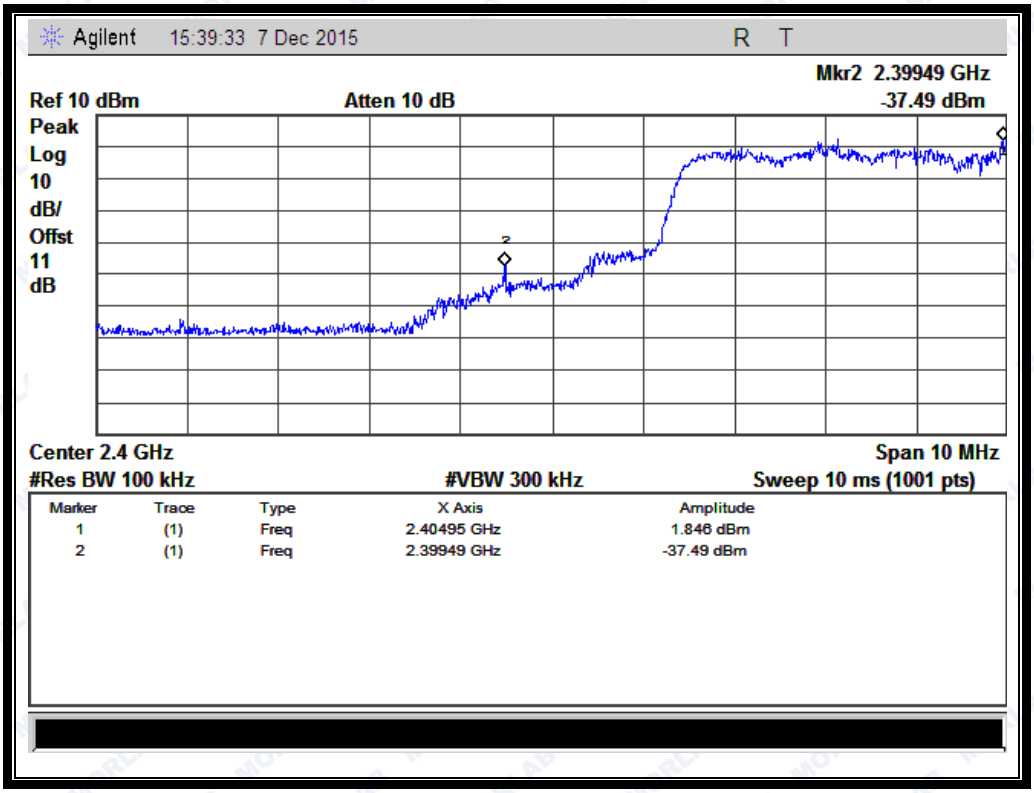
Note: the power of the Module transmitting frequency should be ignored.



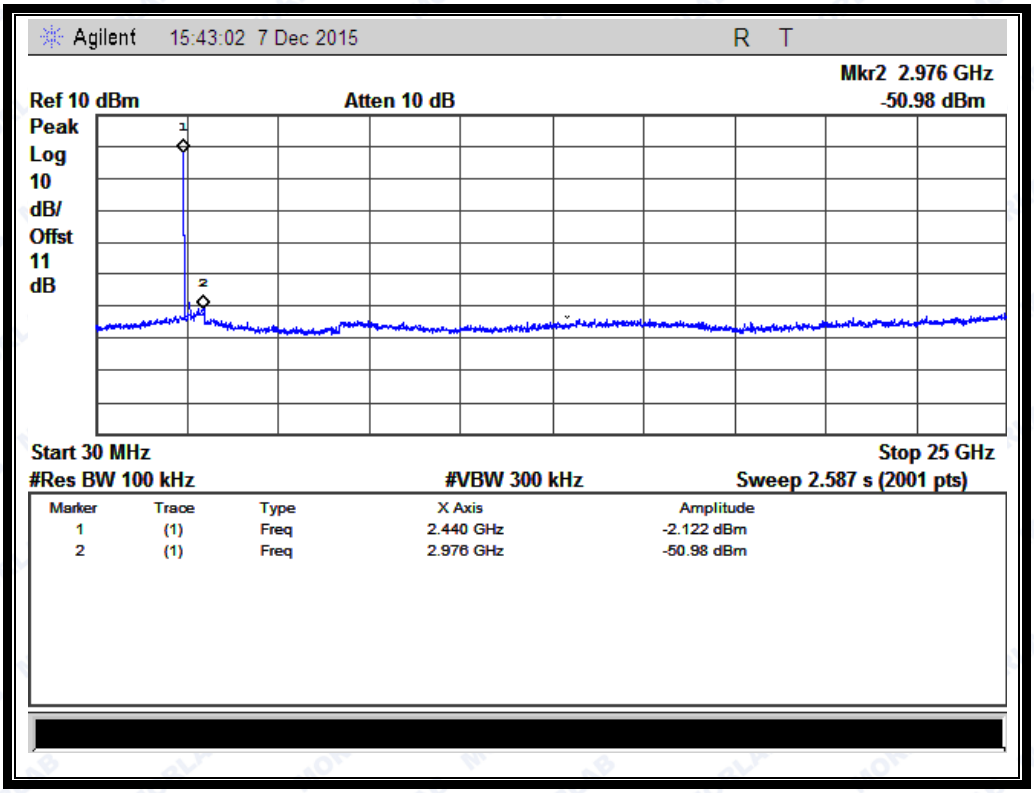
(Plot D.1: Channel = 0, 30MHz to 25GHz @π/4-DQPSK)



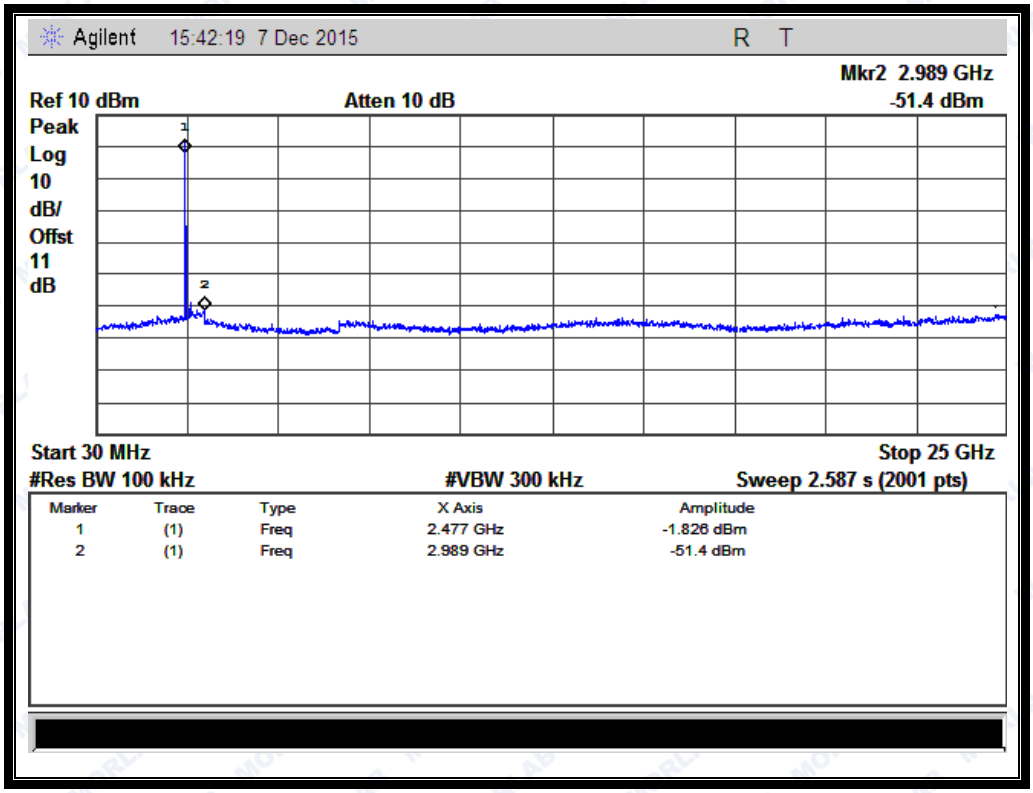
(Channel = 0, Band edge @π/4-DQPSK)



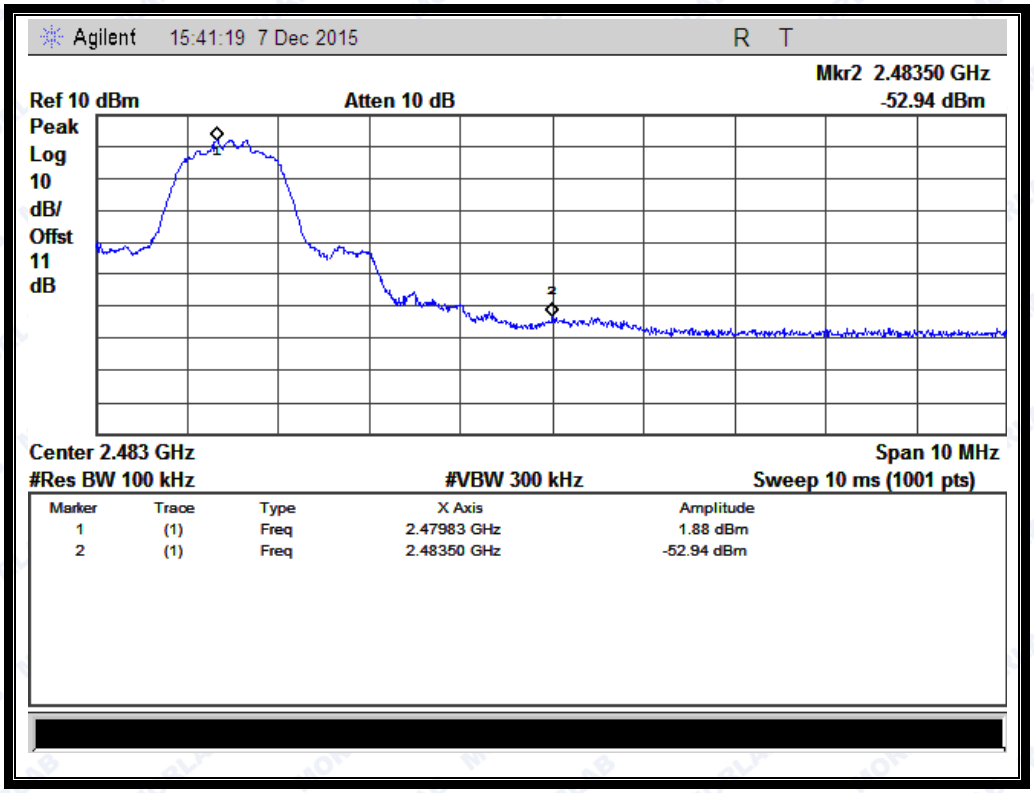
(Channel = 0, Band edge with hopping on @π/4-DQPSK)



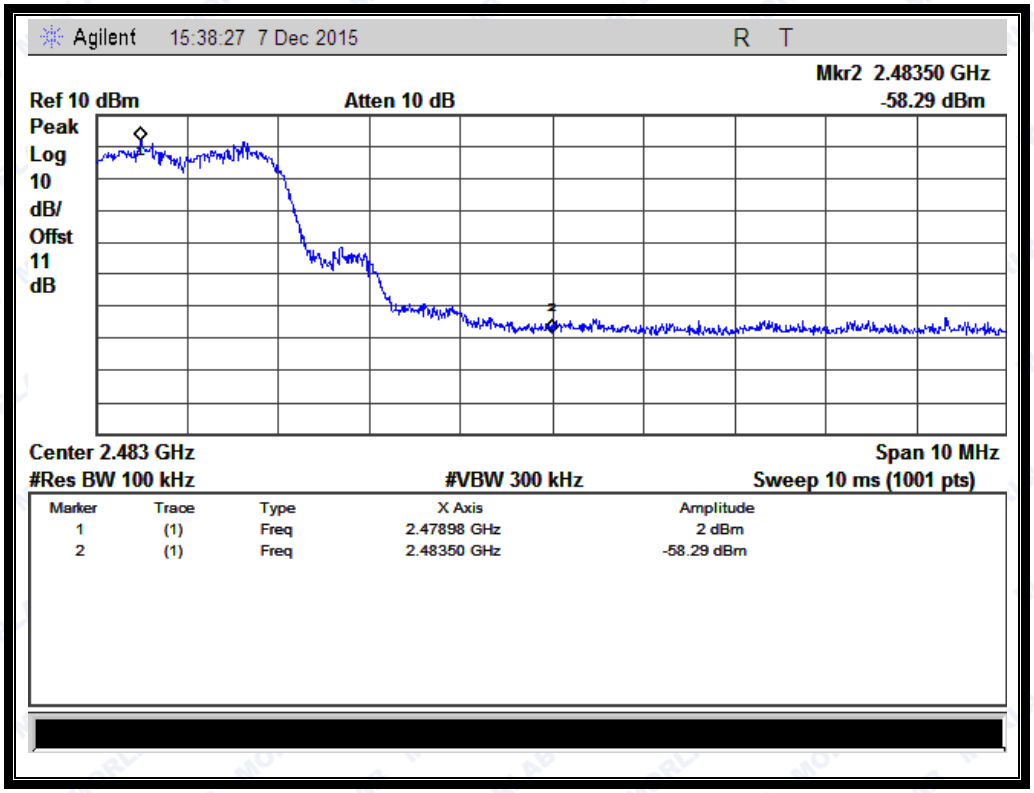
(Plot E.1: Channel = 39, 30MHz to 25GHz @ π/4-DQPSK)



(Plot F.1: Channel = 78, 30MHz to 25GHz @π/4-DQPSK)



(Channel = 78, Band edge @π/4-DQPSK)



(Channel = 78, Band edge with hopping on @ π/4-DQPSK)

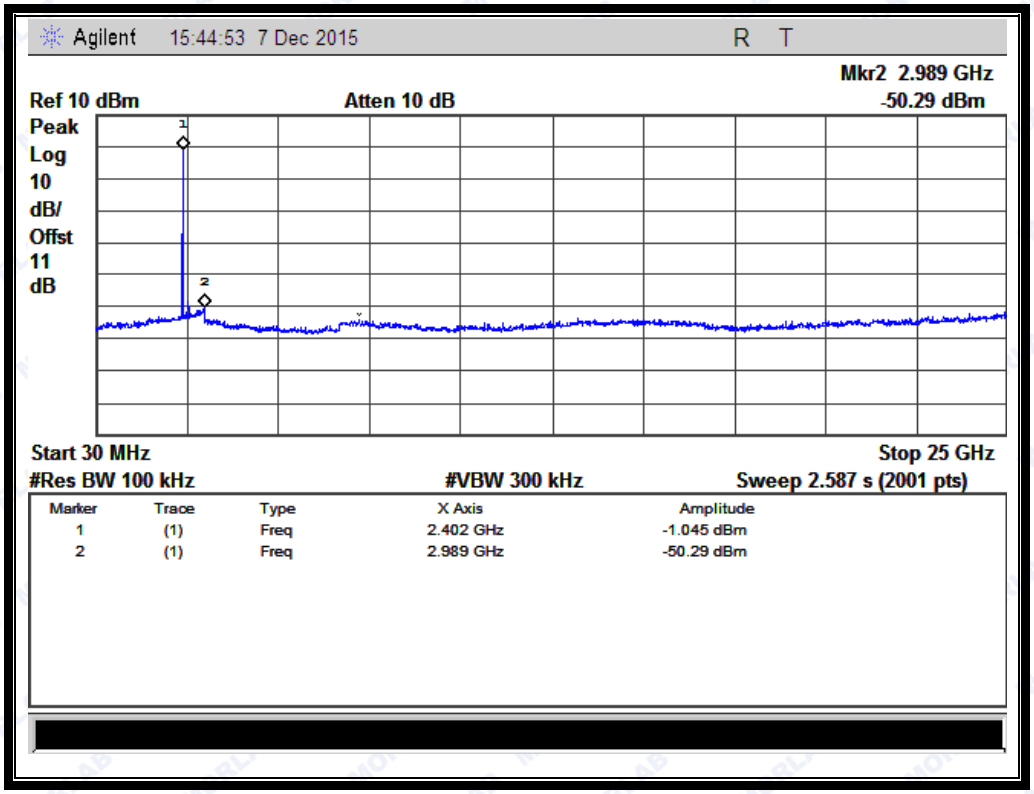
2.7.4.3 8-DPSK Mode

A. Test Verdict:

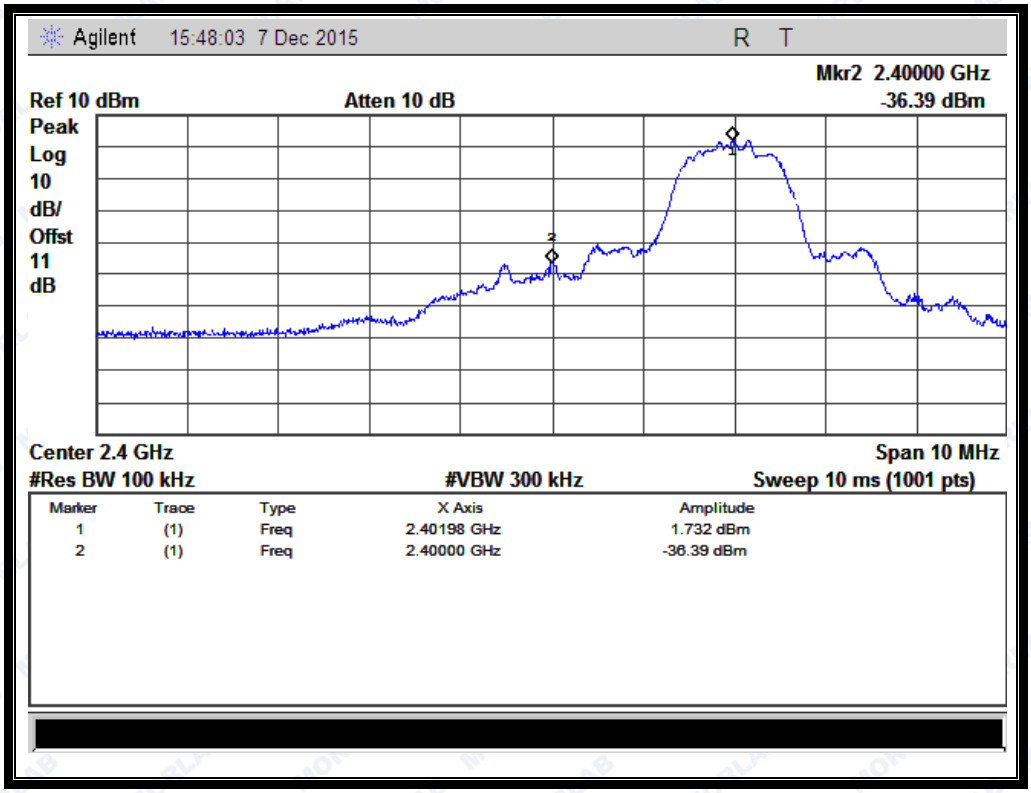
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-50.29	Plot G.1	-1.05	-21.05	PASS
39	2441	-50.08	Plot H.1	-0.59	-20.59	PASS
78	2480	-50.92	Plot I.1	-1.47	-21.47	PASS

B. Test Plots:

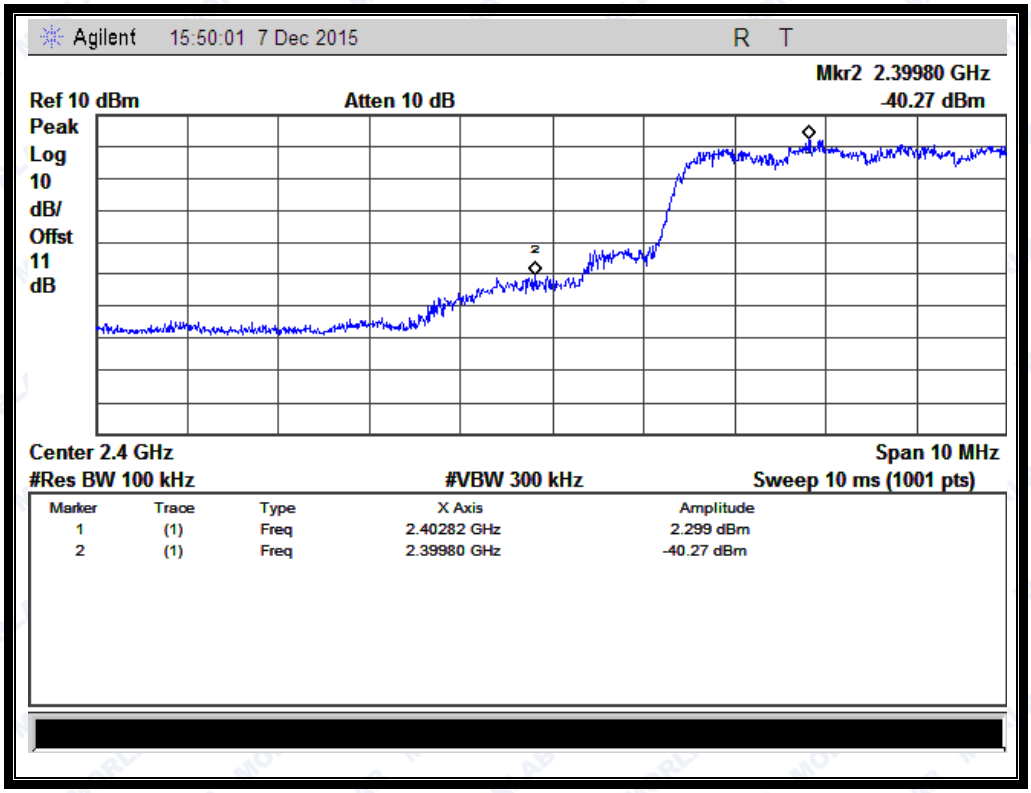
Note: the power of the Module transmitting frequency should be ignored.



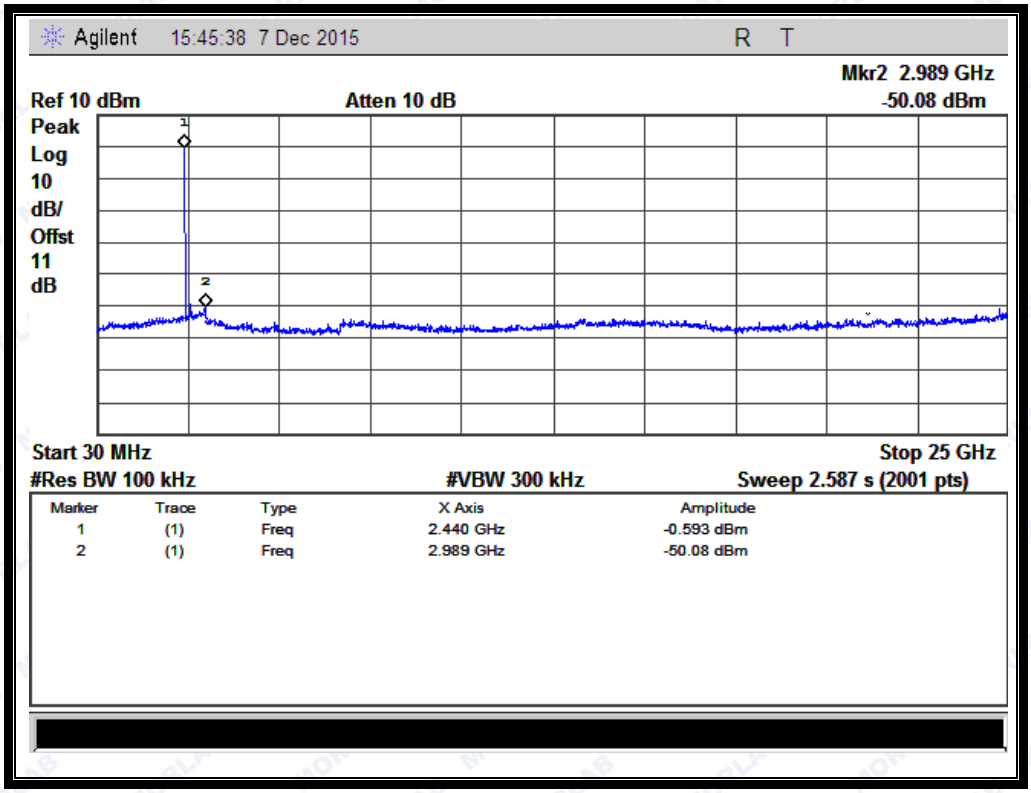
(Plot G.1: Channel = 0, 30MHz to 25GHz @ 8-DPSK)



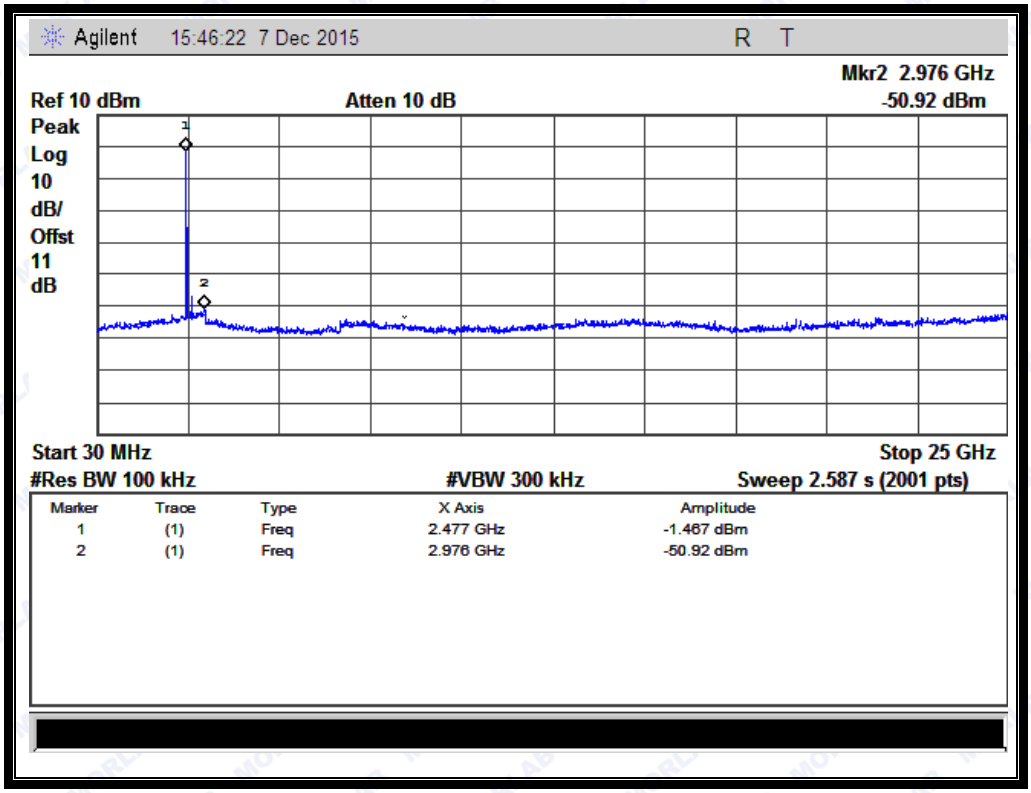
(Channel = 0, Band edge @ 8-DPSK)



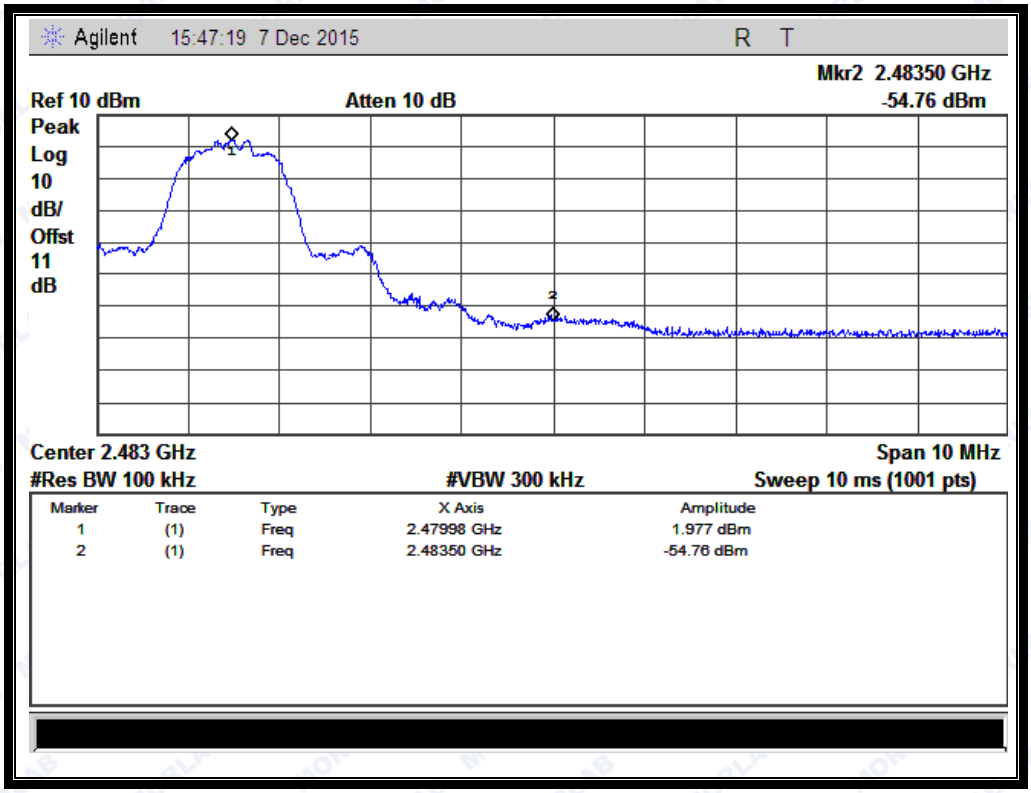
(Channel = 0, Band edge with hopping on @ 8-DPSK)



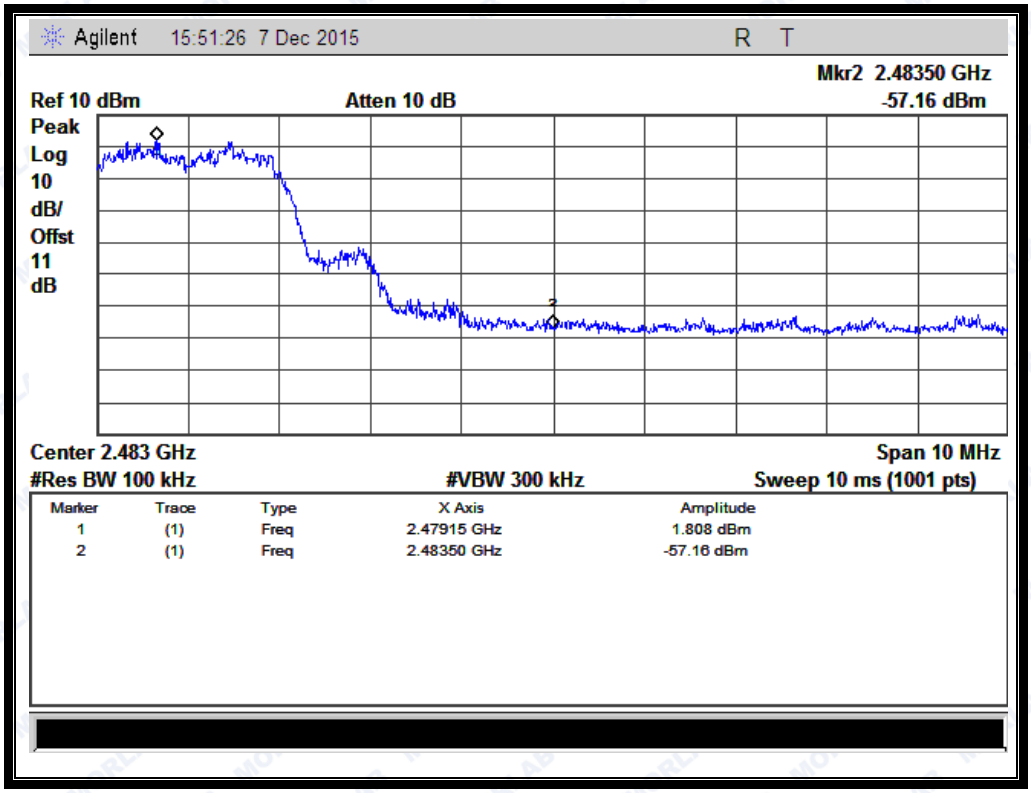
(Plot H.1: Channel = 39, 30MHz to 25GHz @ 8-DPSK)



(Plot I.1: Channel = 78, 30MHz to 25GHz @ 8-DPSK)



(Plot I.1: Channel = 78, Band edge @ 8-DPSK)



(Plot I.1: Channel = 78, Band edge with hopping on @ 8-DPSK)

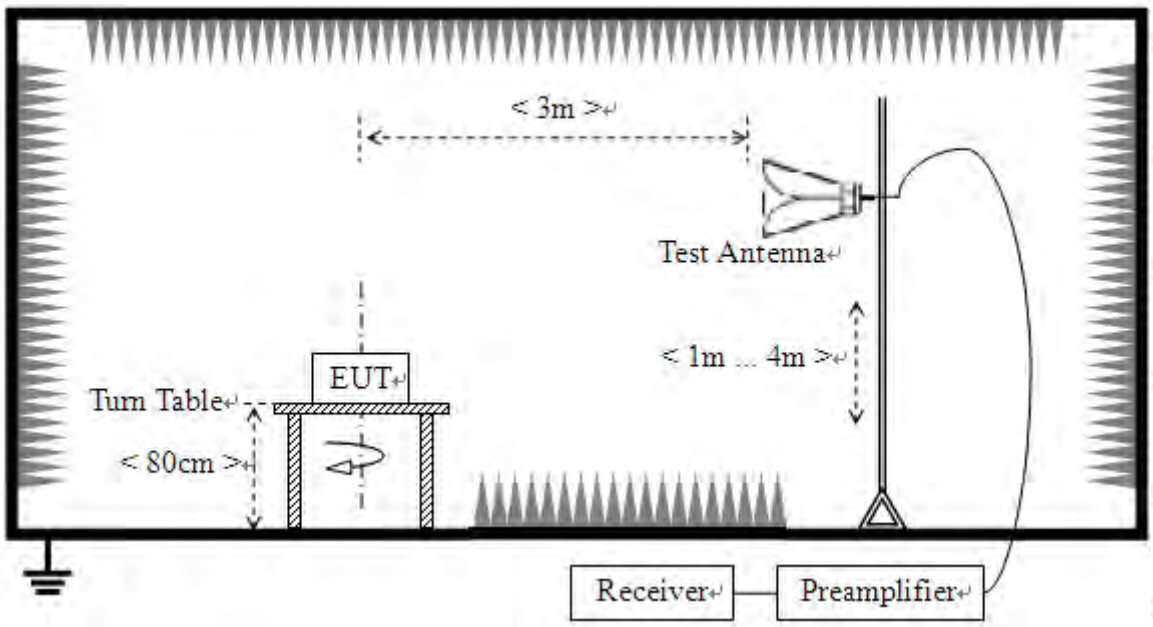
2.8 Restricted Frequency Bands

2.8.1 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).

2.8.2 Test Description

A. Test Setup:



The Module 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 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.

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 reference ANNEX A(1.4).

2.8.3 Test Procedure

Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1GHz, 100 KHz for f < 1GHz
VBW = 3 MHz for peak and 10Hz for average
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize.

2.8.4 Test Result

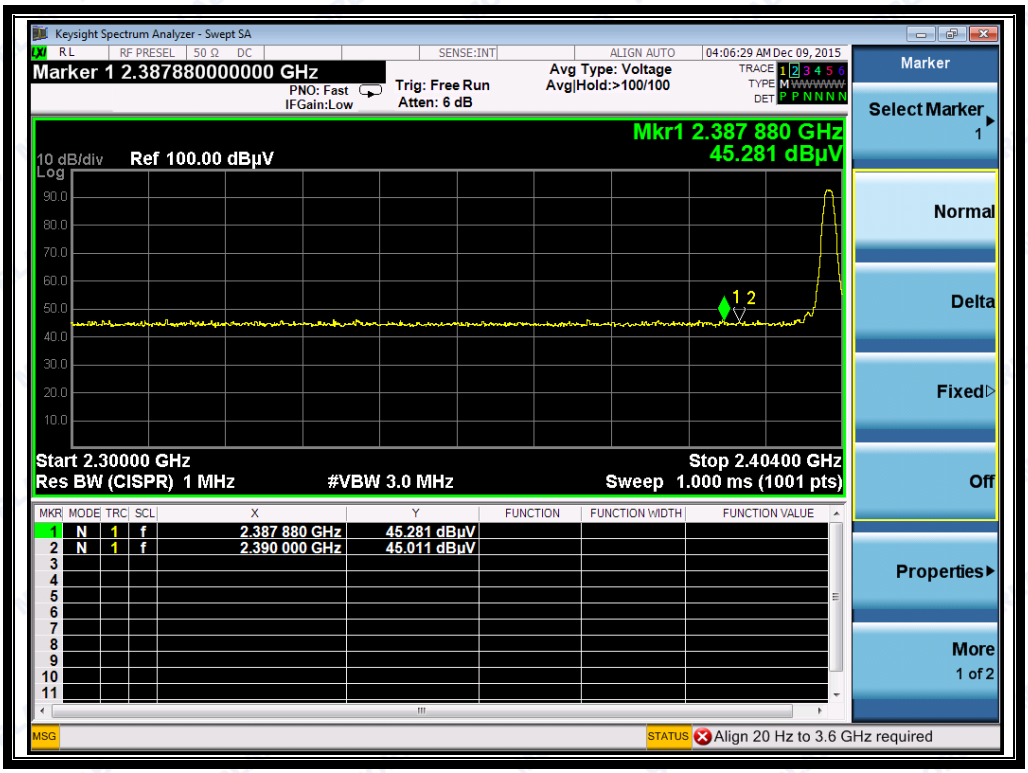
The lowest and highest channels are tested to verify Restricted Frequency Bands.
The measurement results are obtained as below:
E [dBμV/m] =U_R + A_T + A_{Factor} [dB]; AT =$L_{Cable\ loss}$ [dB]-G_{preamp} [dB]
AT: Total correction Factor except Antenna
UR: Receiver Reading
Gpreamp: Preamplifier Gain
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.

2.8.4.1 GFSK Mode

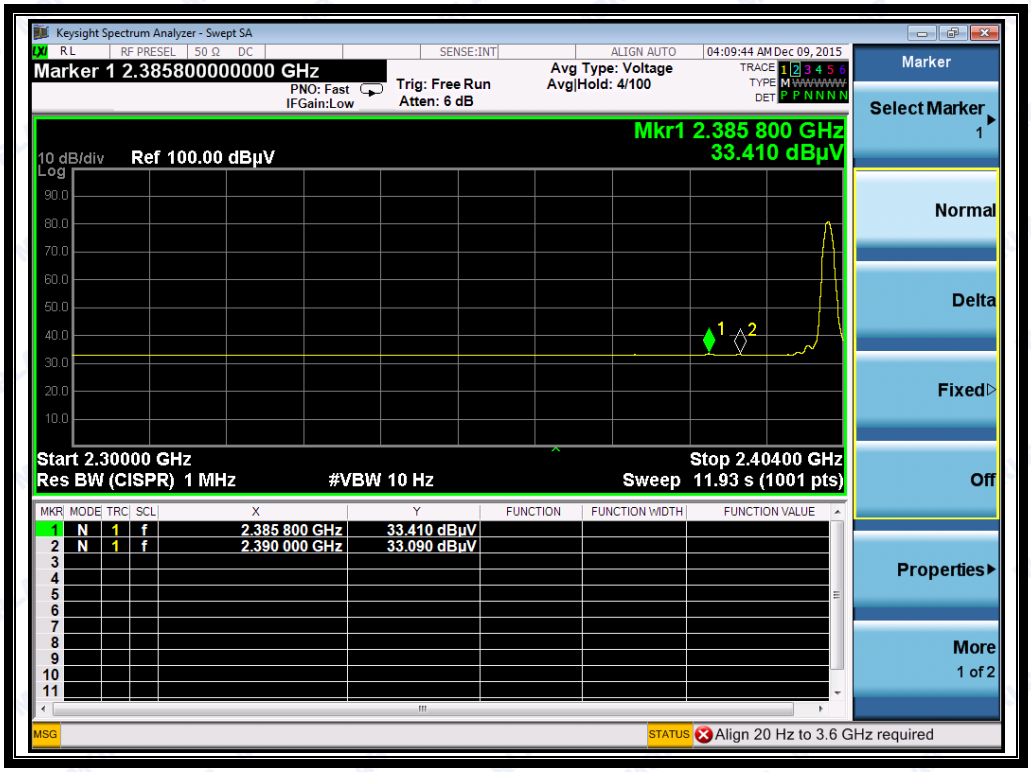
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
0	2387.88	PK	45.28	-33.63	32.56	44.11	74	Pass
0	2385.80	AV	33.41	-33.63	32.56	32.34	54	Pass
78	2487.42	PK	45.31	-33.18	32.5	44.63	74	Pass
78	2483.76	AV	32.94	-33.18	32.5	32.26	54	Pass

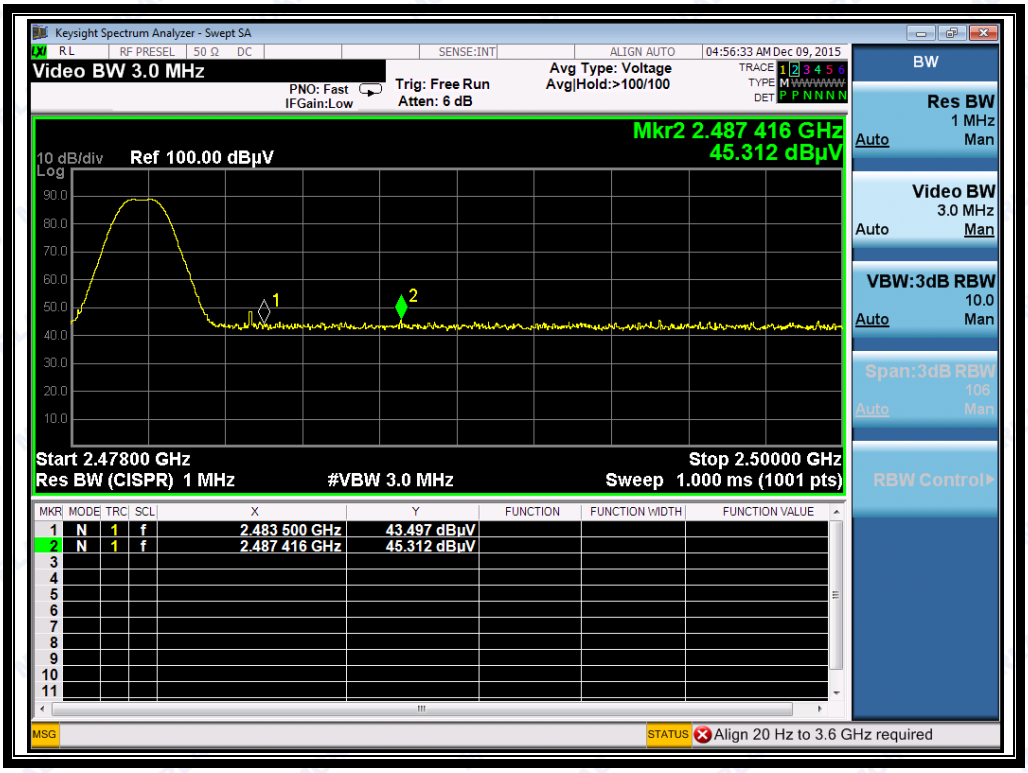
B. Test Plots:



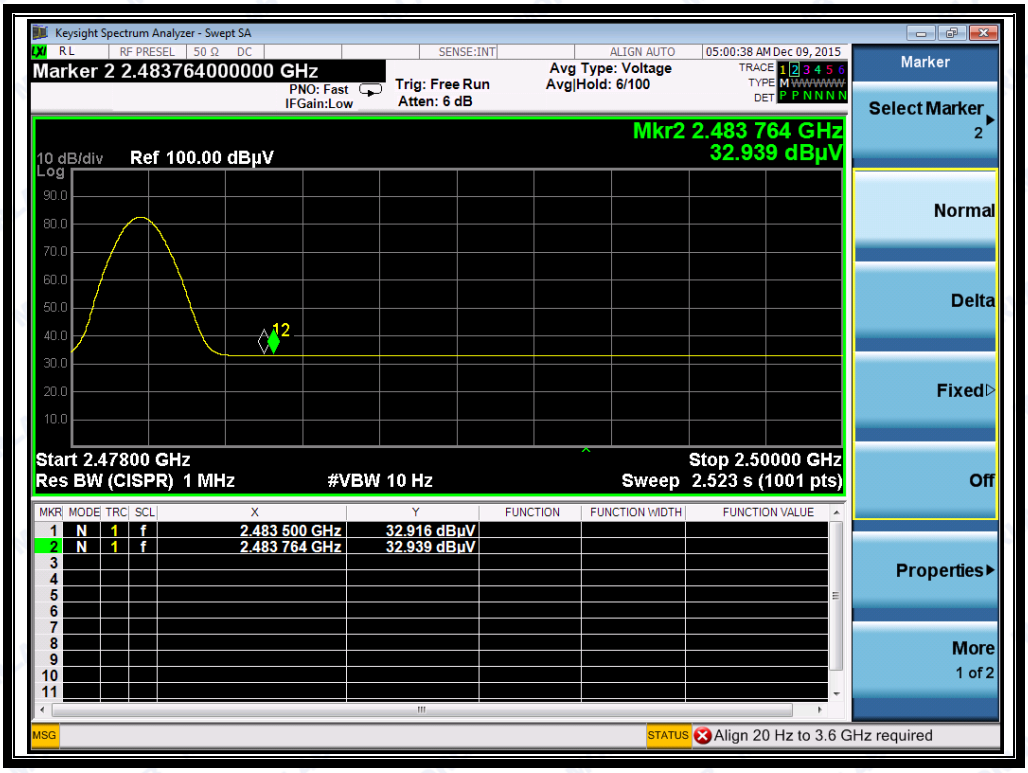
(Plot A1:Channel = 0 PEAK @ GFSK)



(Plot A2:Channel = 0 AVERAGE @ GFSK)



(Plot B1: Channel = 78 PEAK @ GFSK)



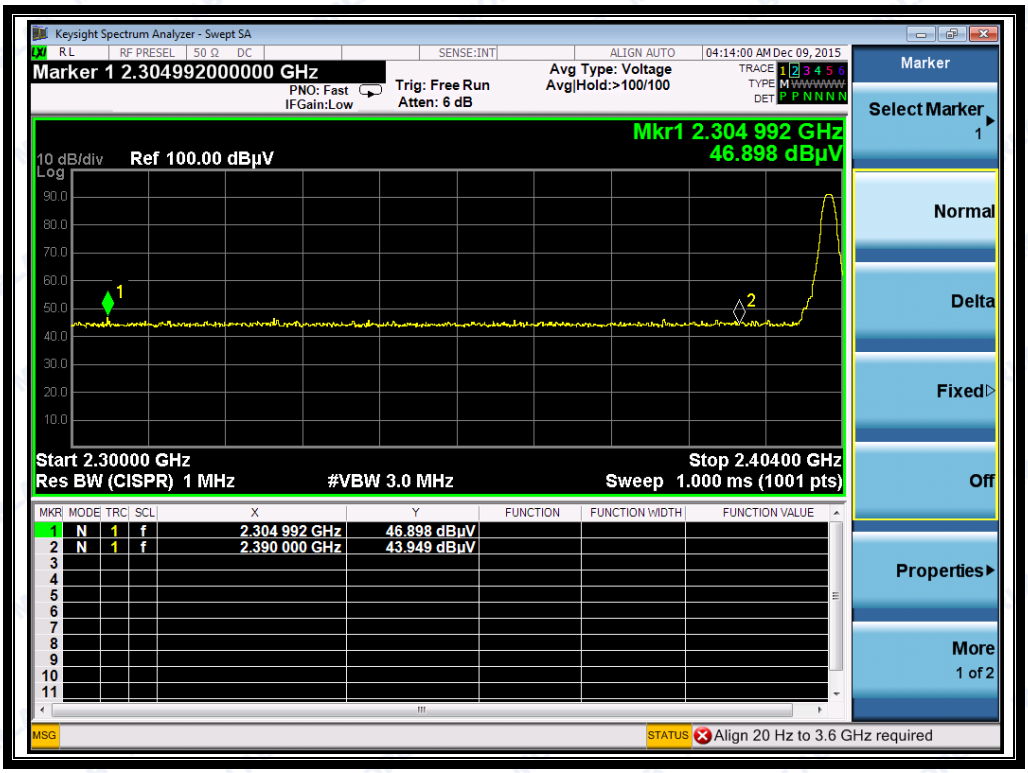
(Plot B2: Channel = 78 AVERAGE @ GFSK)

2.8.4.2 π/4-DQPSK Mode

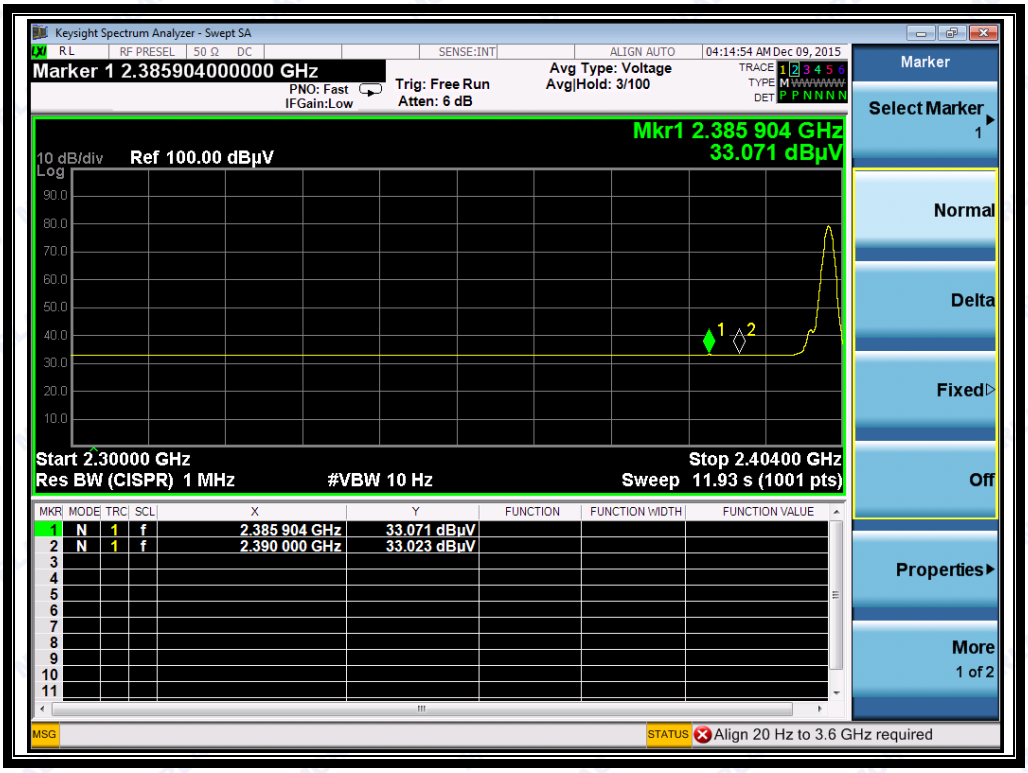
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
0	2304.99	PK	46.90	-33.63	32.56	45.83	74	Pass
0	2385.90	AV	33.07	-33.63	32.56	32.00	54	Pass
78	2493.77	PK	45.13	-33.18	32.5	44.45	74	Pass
78	2483.92	AV	33.06	-33.18	32.5	32.38	54	Pass

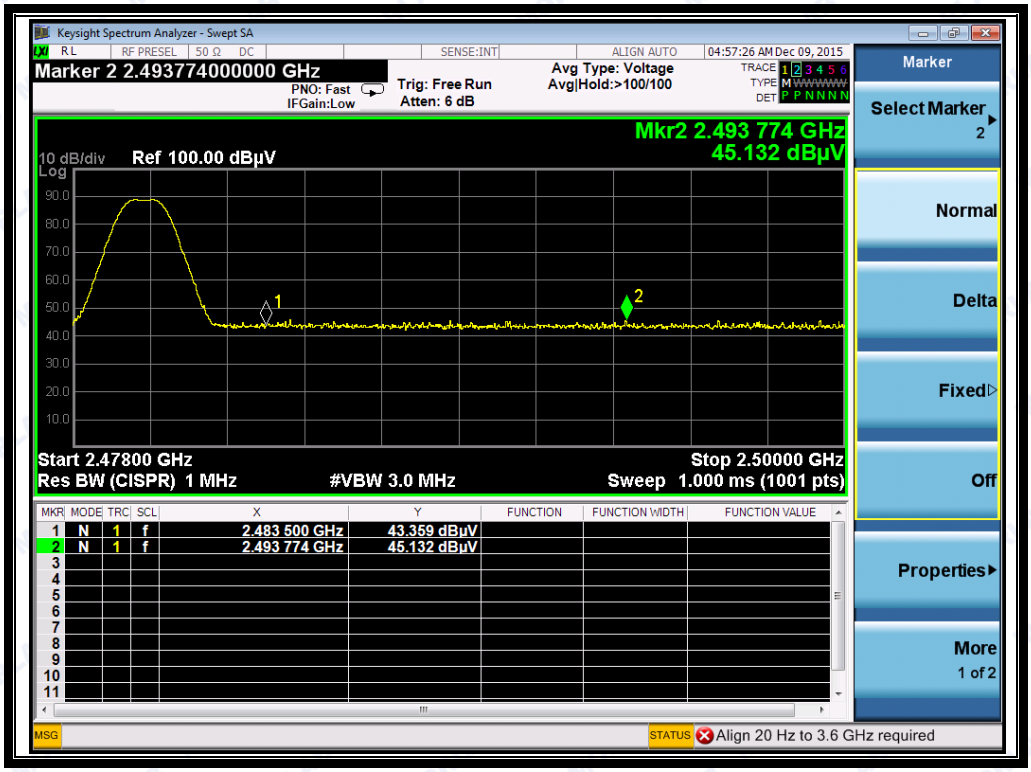
B. Test Plots:



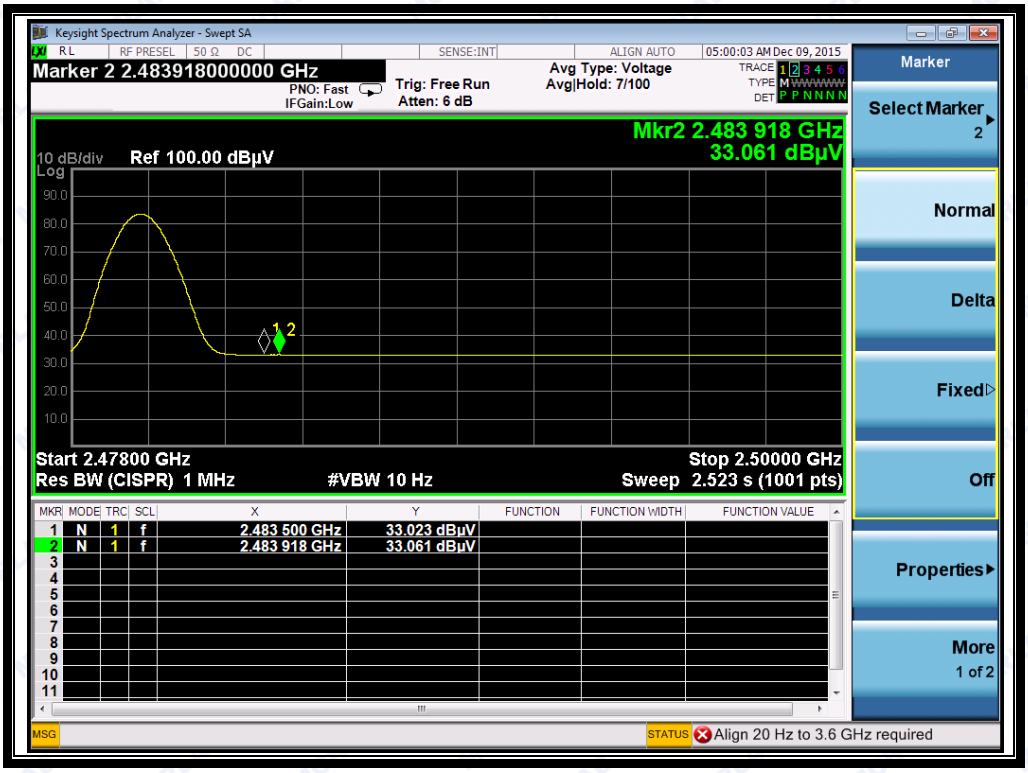
(Plot C1: Channel = 0 PEAK @ π/4-DQPSK)



(Plot C2: Channel = 0 AVERAGE @ π/4-DQPSK)



(Plot D1: Channel = 78 PEAK @ π/4-DQPSK)



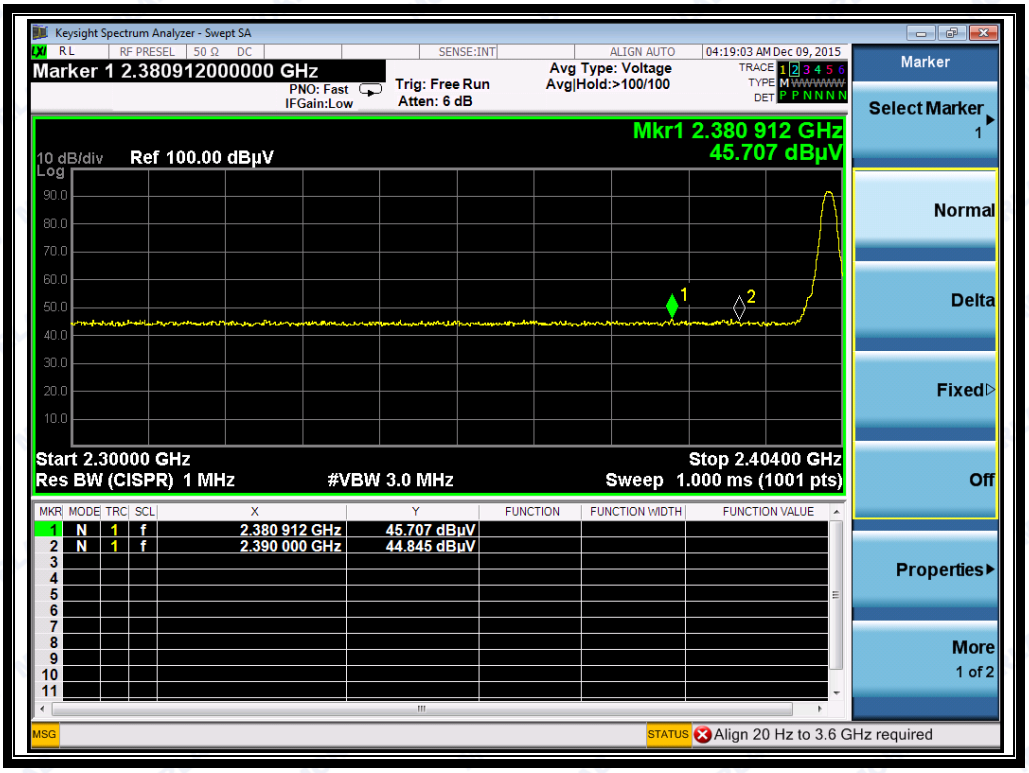
(Plot D2: Channel = 78 AVERAGE@ π/4-DQPSK)

2.8.4.3 8-DPSK Mode

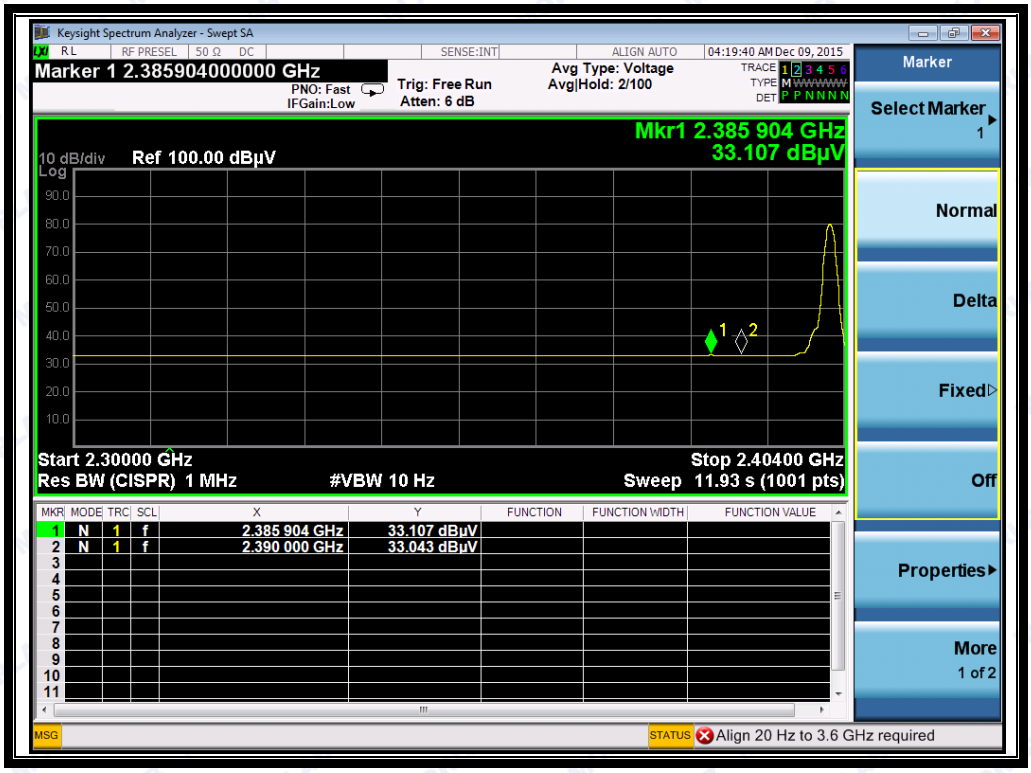
A. Test Verdict:

Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBµV/m)	Limit (dBµV/m)	Verdict
0	2380.91	PK	45.71	-33.63	32.56	44.64	74	Pass
0	2385.90	AV	33.11	-33.63	32.56	32.04	54	Pass
78	2485.99	PK	44.75	-33.18	32.5	44.07	74	Pass
78	2484.05	AV	33.04	-33.18	32.5	32.36	54	Pass

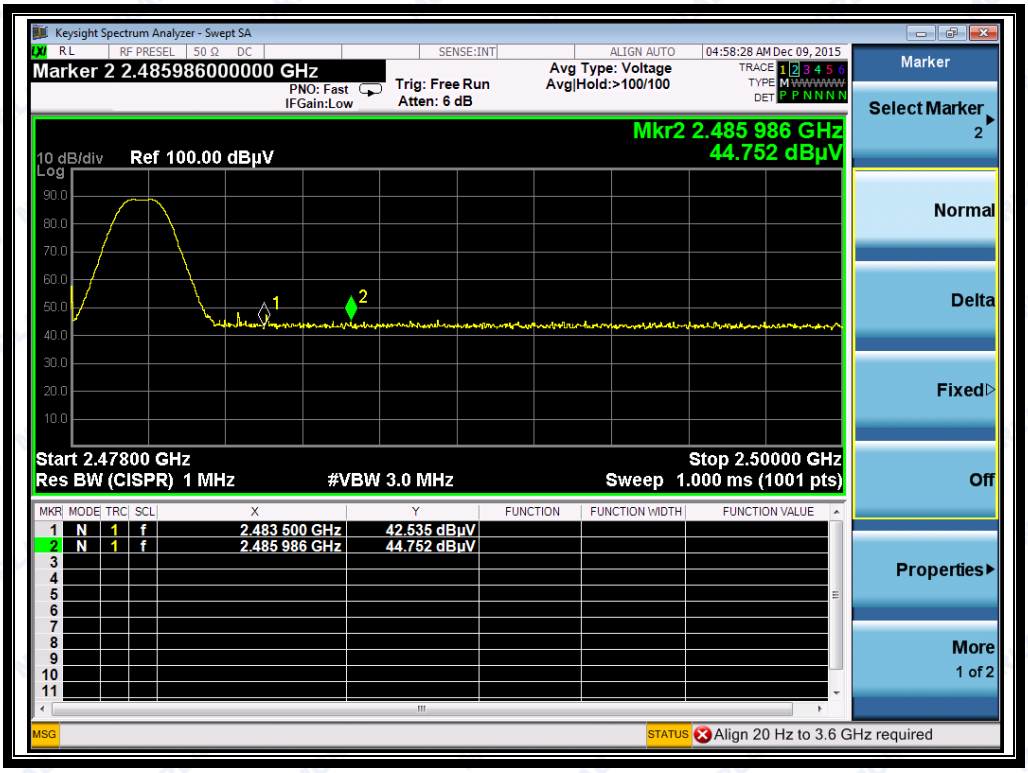
B. Test Plots:



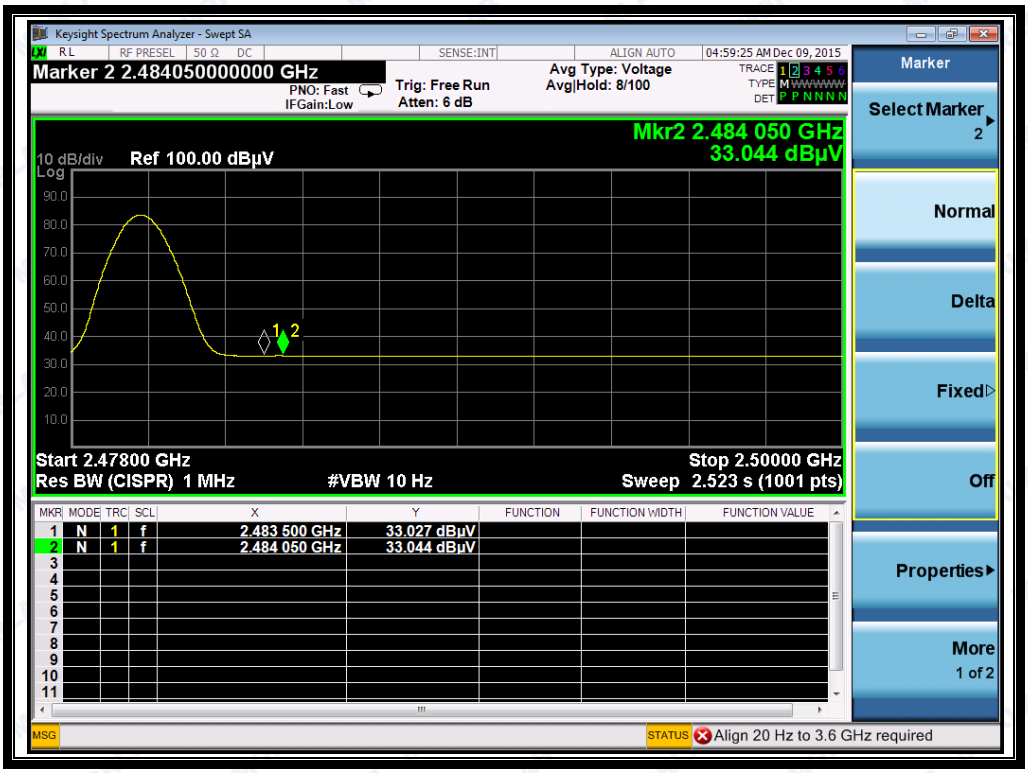
(Plot E1: Channel = 0 PEAK @ 8-DPSK Mode)



(Plot E2: Channel = 0 AVERAGE @ 8-DPSK Mode)



(Plot F1:Channel = 78 PEAK @ 8-DPSK Mode)



(Plot F2:Channel = 78 AVERAGE @ 8-DPSK Mode)

2.9 Radiated Emission

2.9.1 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 (μV/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:

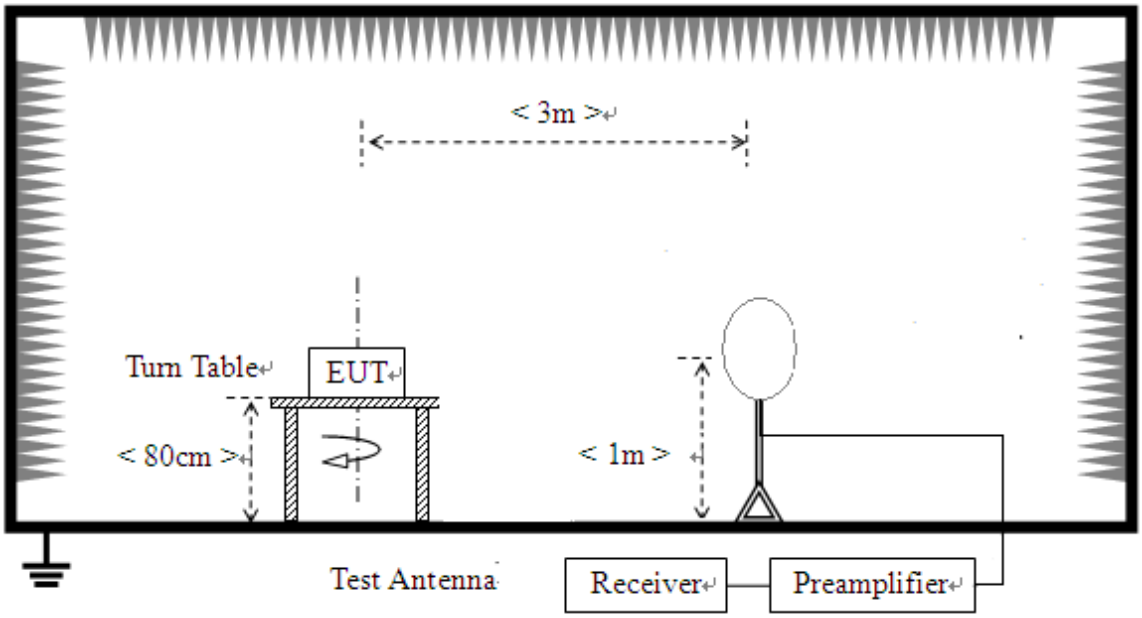
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength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

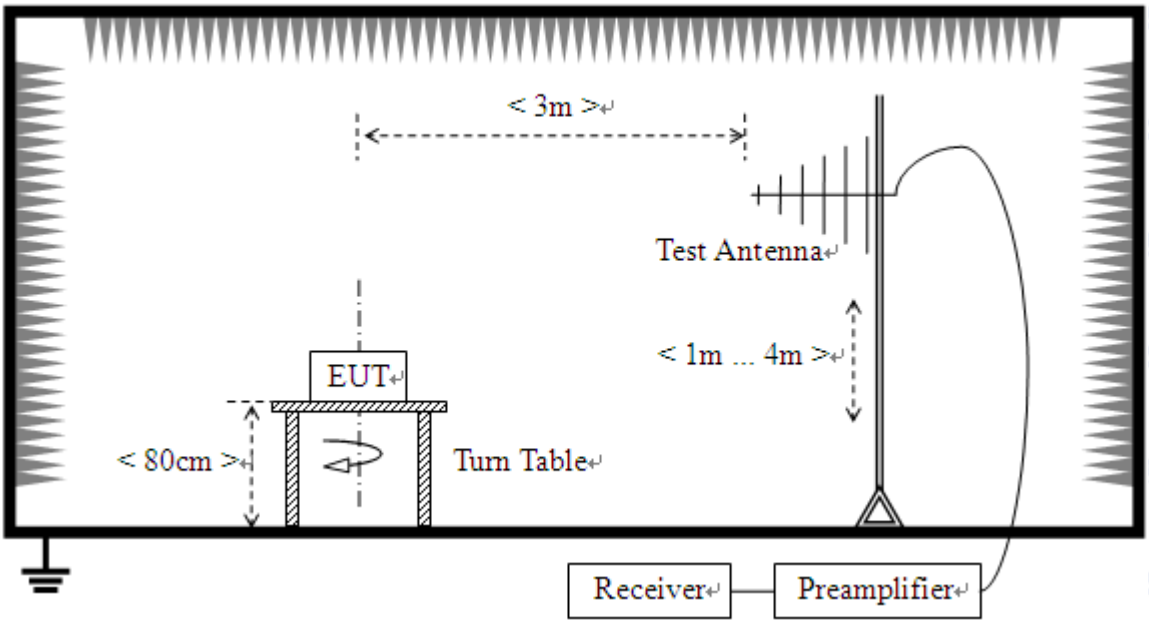
2.9.2 Test Description

A. Test Setup:

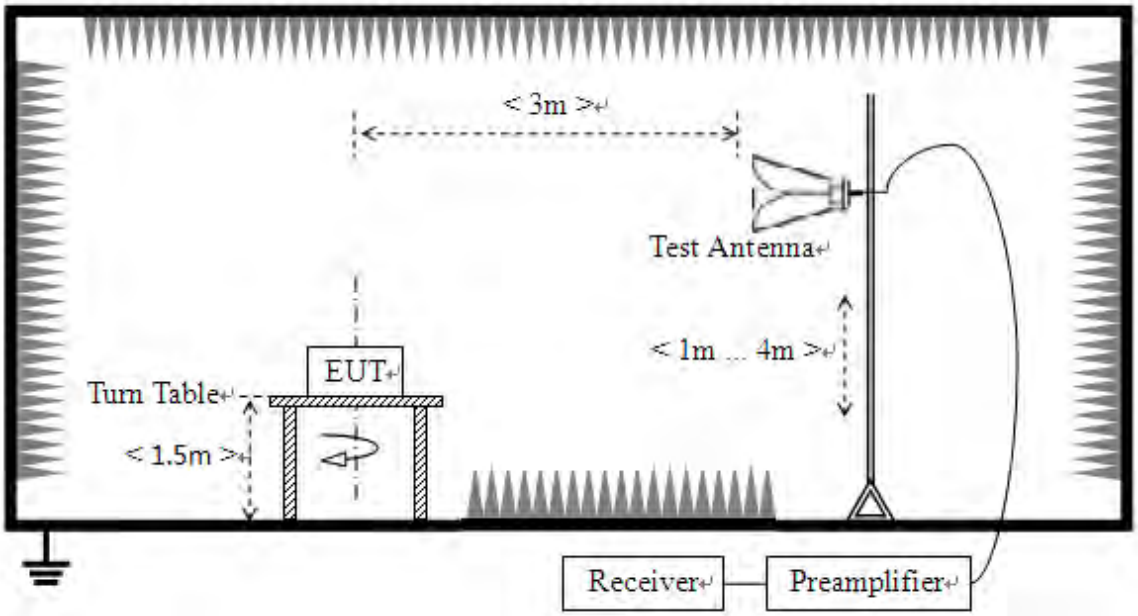
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



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:

(a) 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.
(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. 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. The emission levels at both horizontal and vertical polarizations should be tested.

B. Equipments List:

Please reference ANNEX A(1.4).

2.9.3 Test Procedure

Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

2.9.4 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:

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

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

A_{Factor}: Antenna Factor at 3m

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

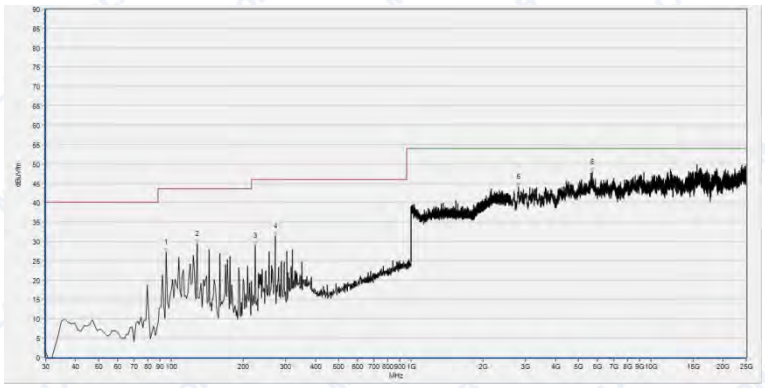
Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

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

2.9.4.1 GFSK Mode：

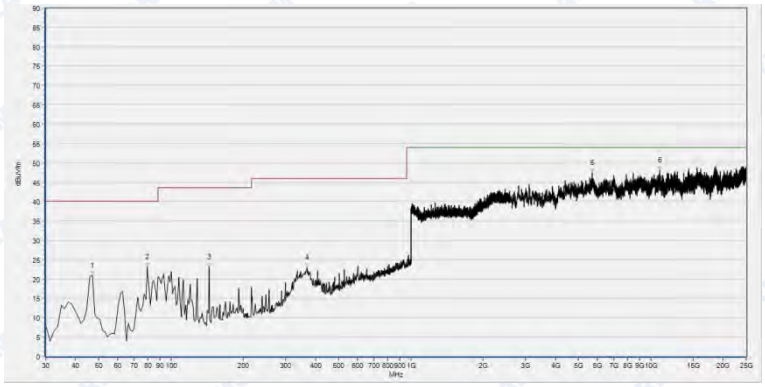
A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
95.557	27.23	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
128.335	29.29	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
224.243	28.90	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
271.589	31.37	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2811.820	44.06	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
5687.689	48.00	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

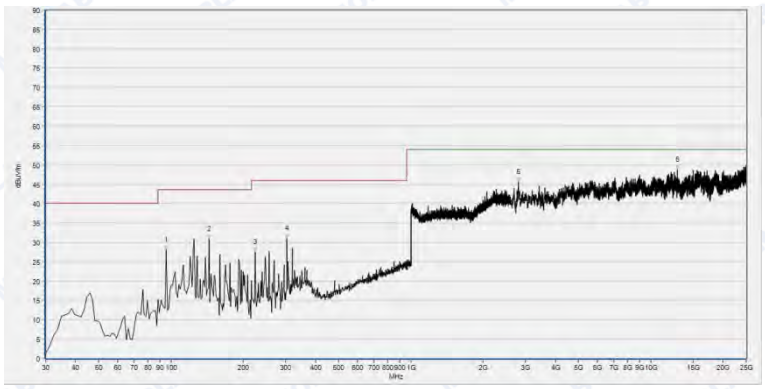
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 0)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
46.996	20.91	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
79.775	23.09	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
144.118	23.11	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
368.711	23.03	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
5683.615	47.36	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
10893.581	48.05	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

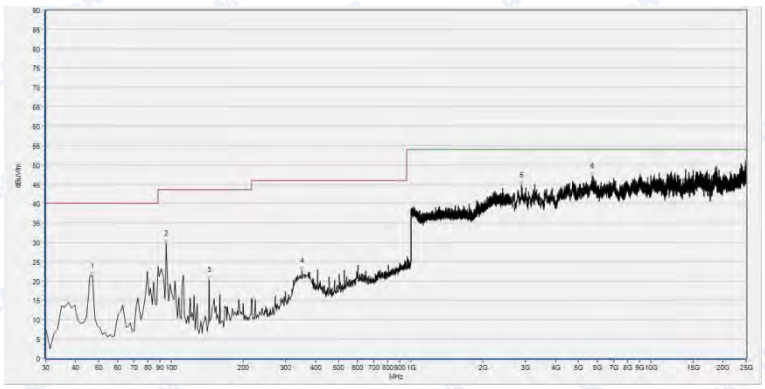
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 0)

Plot for Channel = 39



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
95.557	27.98	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
144.118	30.90	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
224.243	27.54	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
304.368	31.09	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2799.600	45.65	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
12901.800	48.70	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

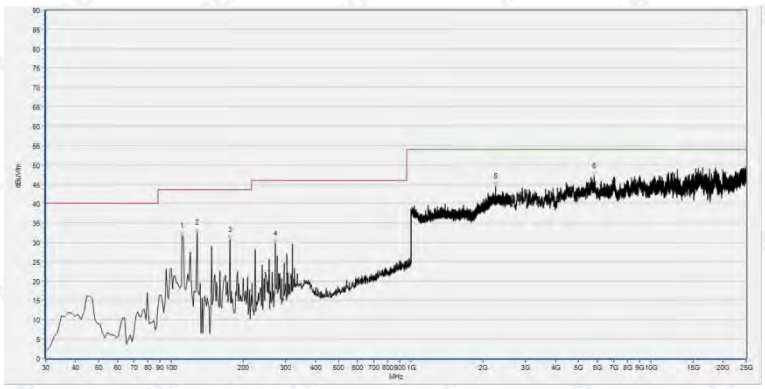
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 39)



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
46.996	21.22	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
95.557	29.71	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
144.118	20.33	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
351.715	22.65	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2893.290	44.67	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5695.836	47.15	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

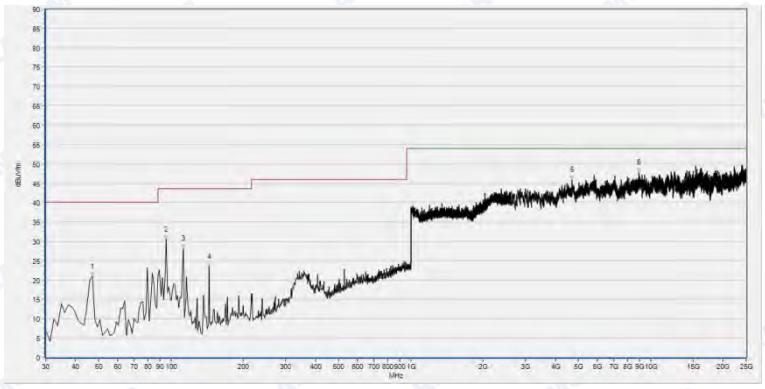
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 39)

Plot for Channel = 78



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
111.339	31.72	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
128.335	32.52	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
175.682	30.60	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
271.589	29.63	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2249.140	44.49	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
5801.746	47.04	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

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



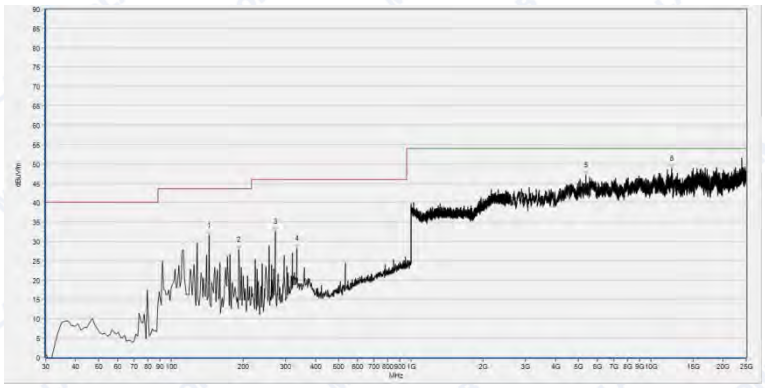
Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
46.996	20.91	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
95.557	30.48	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
112.553	28.10	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
144.118	23.44	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
4697.836	46.00	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
8909.802	47.83	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

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

2.9.4.2 π/4-DQPSK Mode:

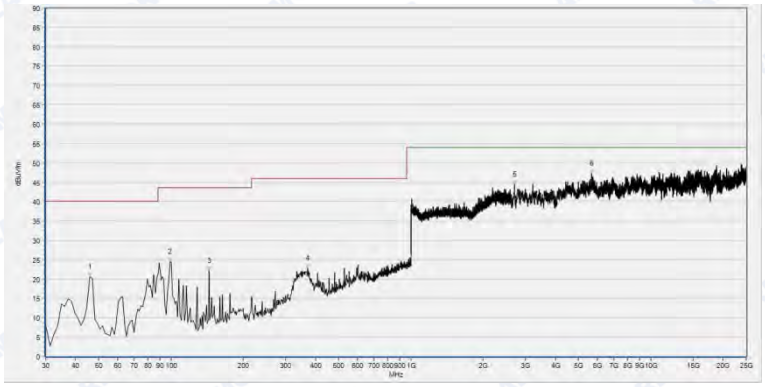
B. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
144.118	31.44	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
191.464	27.83	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
271.589	32.43	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
333.504	28.16	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
5349.591	47.10	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
12197.090	48.80	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

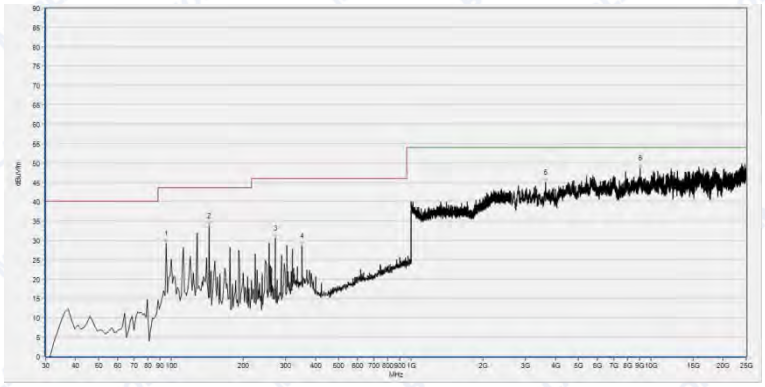
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 0)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
45.782	20.64	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
99.199	24.48	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
144.118	22.18	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
371.139	22.86	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2697.763	44.43	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5671.395	47.34	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

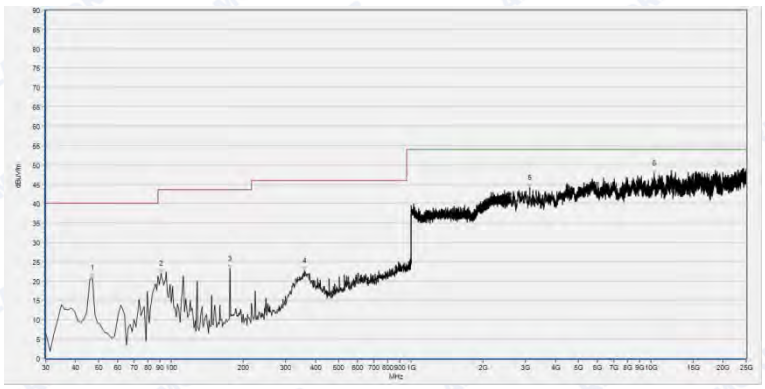
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 0)

Plot for Channel = 39



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
95.557	29.12	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
144.118	33.61	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
271.589	30.55	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
351.715	28.56	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
3650.955	44.93	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
9036.079	48.57	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

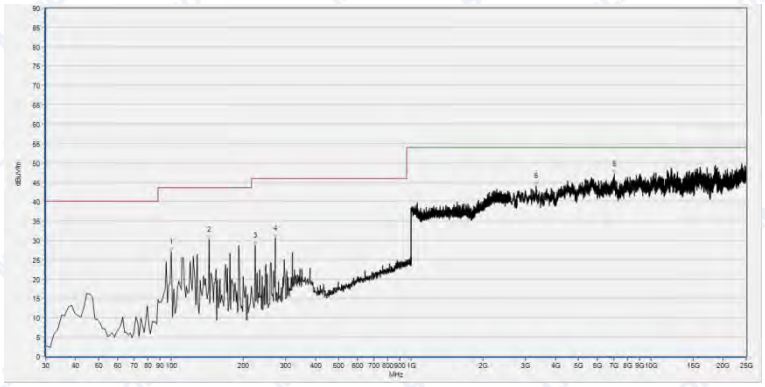
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 39)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
46.996	20.75	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
90.701	21.88	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
175.682	23.17	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
358.999	22.64	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
3129.551	44.06	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
10327.369	47.84	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

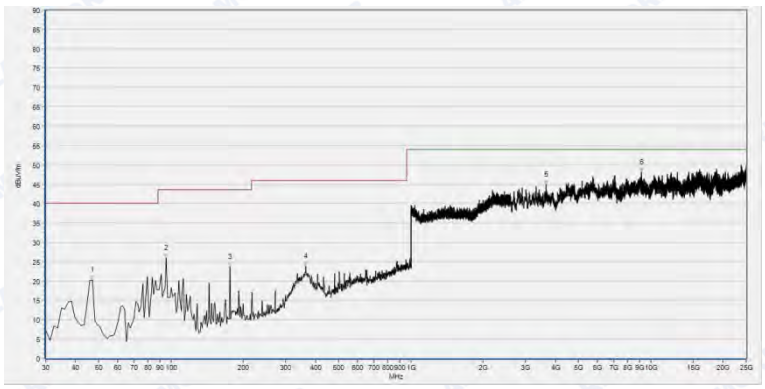
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 39)

Plot for Channel = 78



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
100.413	26.91	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
144.118	30.23	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
224.243	28.68	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
271.589	30.56	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
3321.004	44.02	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
7040.080	47.13	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 78)



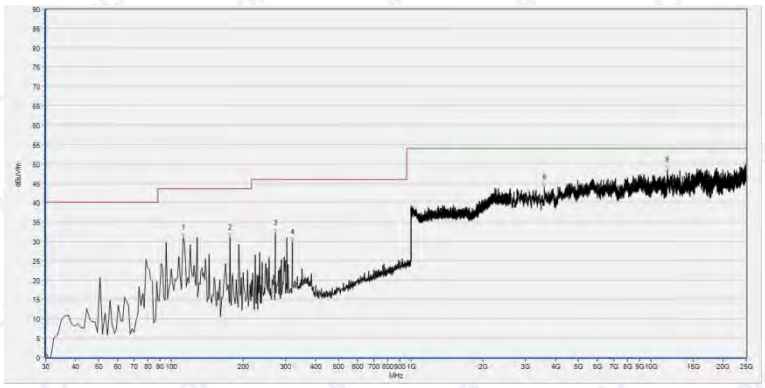
Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
46.996	20.33	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
95.557	25.92	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
175.682	23.71	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
365.069	23.82	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
3655.028	44.92	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
9141.989	48.05	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 78)

2.9.4.3 8-DPSK Mode：

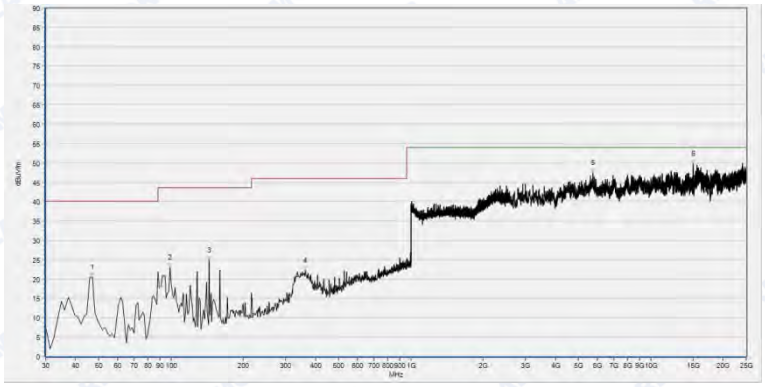
C. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
112.553	30.97	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
175.682	31.06	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
271.589	32.15	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
320.150	29.81	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
3602.073	43.91	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
11736.789	48.52	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

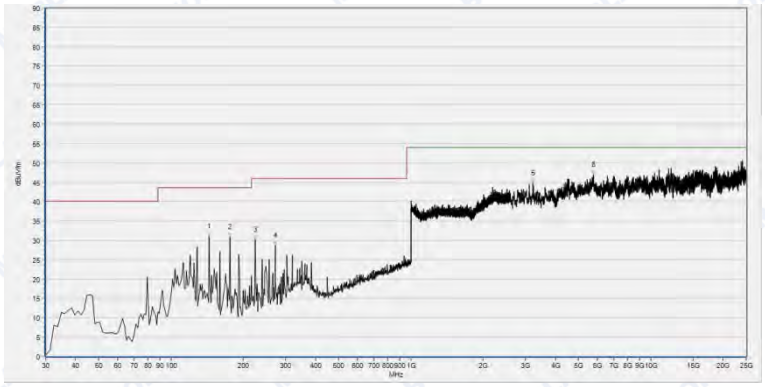
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 0)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
46.996	20.47	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
99.199	22.88	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
144.118	24.73	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
362.641	22.13	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
5740.644	47.42	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
15024.077	49.70	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

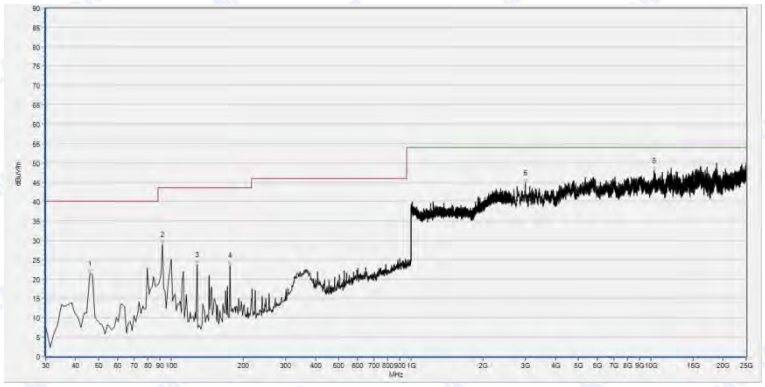
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 0)

Plot for Channel = 39



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
144.118	30.99	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
175.682	30.78	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
224.243	30.09	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
271.589	28.61	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
5761.011	46.85	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
12176.723	48.57	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

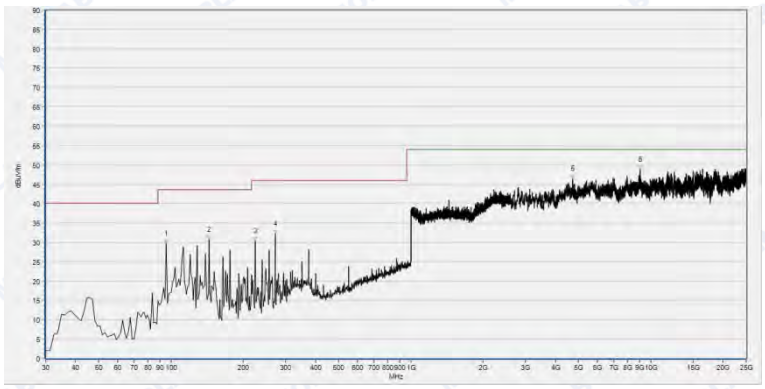
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 39)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
45.782	21.23	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
91.915	28.75	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
128.335	23.63	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
175.682	23.40	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
3003.273	44.69	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
10294.781	47.90	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

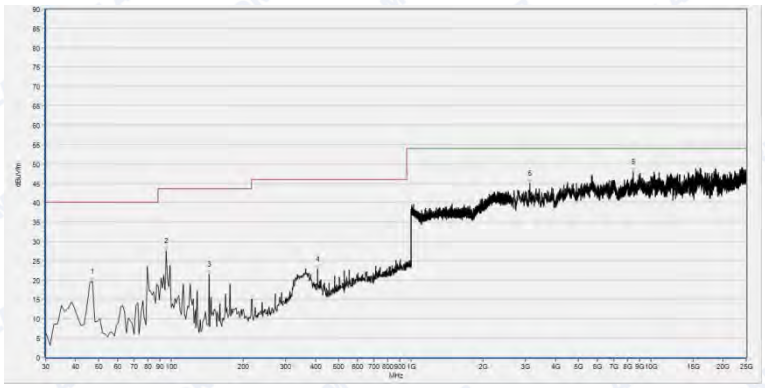
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 39)

Plot for Channel = 78



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
95.557	29.70	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
144.118	30.69	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
224.243	30.39	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
271.589	32.18	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
4722.277	46.34	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
9007.565	48.71	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 78)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
46.996	19.57	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
95.557	27.40	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
144.118	21.43	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
407.559	22.86	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
3137.698	44.84	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
8445.426	47.93	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 78)

ANNEX A GENERAL INFORMATION

1.1 Identification of the Responsible Testing Laboratory

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

1.2 Identification of the Responsible Testing Location

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

1.3 Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.1, 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 registration number is 695796.

1.4 Maximum measurement uncertainty

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

Measurements	**Frequency**	**Uncertainty**（dB）
Conducted emissions	9KHz~30MHz	2.44
Radiated emissions	9KHz~30MHz	2.44
	30MHz~200MHz	2.93
	200MHz~1000MHz	2.95
	1GHz~18GHz	2.26
	18GHz~40GHz	1.94

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

1.5 Test Equipments Utilized

1.5.1 Conducted Test Equipments

Conducted Test Equipment						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal. Due**
1	Spectrum Analyzer	MY45101810	E4407B	Agilent	2015.03.28	2016.03.27
2	USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2015.03.28	2016.03.27
3	EXA Signal Analzyer	MY53470838	N9010A	Agilent	2015.08.26	2016.08.25
4	RF cable	CB01	RF01	Morlab	N/A	N/A
5	Attenuator	(n.a.)	10dB	Resnet	N/A	N/A
6	SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A
7	System Simulator	6K00006210	MT8852B	Anritsu	2015.03.28	2016.03.27

1.5.2 Auxiliary Test Equipment

Auxiliary Test Equipment						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Computer	N.A	N.A	Asus	N.A	N.A

1.5.3 Conducted Emission Test Equipments

Conducted Emission Test Equipments						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal. Due**
1	Receiver	595WX11007	PMM9010	Narda S.T.S/PMM	2015.05.07	2016.05.06
2	LISN	812744	NSLK 8127	Schwarzbeck	2015.06.18	2016.06.17
3	Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2015.05.07	2016.05.06
4	Coaxial cable(BNC)	CB01	EMC01	Morlab	N/A	N/A

1.5.4 Radiated Test Equipments

Radiated Test Equipments						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal.Due Date**
1	System Simulator	GB45360846	8960-E5515C	Agilent	2015.05.07	2016.05.06
2	Receiver	MY54130016	N9038A	Agilent	2015.05.07	2016.05.06
3	Test Antenna - Bi-Log	N/A	VULB9163	Schwarzbeck	2015.05.14	2016.05.13
4	Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2015.03.31	2016.03.30
5	Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2015.02.26	2016.02.25
6	Test Antenna - Horn	71688	BBHA 9120D	Schwarzbeck	2015.02.26	2016.02.25
7	Coaxial cable(N male)	CB02	EMC02	Morlab	N/A	N/A
8	Coaxial cable(N male)	CB03	EMC03	Morlab	N/A	N/A

1.5.5 Climate Chamber

Climate Chamber						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Climate Chamber	2004012	HL4003T	Yinhe	2015.02.26	2016.02.25

1.5.6 Vibration Table

Vibration Table						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Vibration Table	N/A	ACT2000-S015L	CMI-COM	2015.02.26	2016.02.25

1.5.7 Anechoic Chamber

Anechoic Chamber						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Anechoic Chamber	N/A	9m*6m*6m	常宁	2015.05.14	2016.05.13

***** END OF REPORT *****