REPORT No.: SZ15080102W04

FCC RF TEST REPORT

APPLICANT	:	Shenzhen Renqing technology CO.,LTD.
PRODUCT NAME	:	Mumo bluetooth earphone
MODEL NAME	:	RAU0503
TRADE NAME	:	ROCK
BRAND NAME	:	ROCK
FCC ID	:	2ADYI-RAU0503
STANDARD(S)	:	47 CFR Part 15 Subpart C
ISSUE DATE	:	2015-10-13

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DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	2015-10-13	First edition

TEST REPORT DECLARATION

Applicant	Shenzhen Renqing technology CO.,LTD.
Applicant Address	3/F，Block A7 Nanshan iPark， NO. 1001 Xueyuan Road，Nanshan District，Shenzhen
Manufacturer	Shenzhen Hongnanke Communication Equipment Co.,Ltd
Manufacturer Address	No:16,2nd IndustrialArea,XiakengTongle,Longguang District,Shenzhen,Guangdong
Product Name	Mumo bluetooth earphone
Model Name	RAU0503
Brand Name	ROCK
HW Version	SP03-8645_V01
SW Version	SP06-BC8645-2015-7-22-CHEN.XUV
Test Standards	47 CFR Part 15 Subpart C
Test Date	2015-9-20 to 2015-9-25
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 Renqing technology CO.,LTD.
Address:	3/F，Block A7 Nanshan iPark， NO. 1001 Xueyuan Road， Nanshan District，Shenzhen

1.2 Equipment under Test (EUT) Description

Brand Name:	ROCK
Trade Name:	ROCK
Model Name:	RAU0503
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:	PIFAAntenna
Antenna Gain:	0dBi

NOTE:

The EUT is a Mumo 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).

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

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	SP03-8645_V01	SP06-BC8645-2015-7-22-CHEN.XUV

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	Sep 22, 2015	**PASS**
3	15.247(b)	Peak Output Power	Sep 22, 2015	**PASS**
4	15.247(a)	20dB Bandwidth	Sep 22, 2015	**PASS**
5	15.247(a)	Carrier Frequency Separation	Sep 22, 2015	**PASS**
6	15.247(a)	Time of Occupancy (Dwell time)	Sep 22, 2015	**PASS**
7	15.247(d)	Conducted Spurious Emission	Sep 22, 2015	**PASS**
8	15.247(d)	Restricted Frequency Bands	Sep 23, 2015	**PASS**
9	15.207	Conducted Emission	Sep 23, 2015	**PASS**
10	15.209 15.247(d)	Radiated Emission	Sep 23, 2015	**PASS**
11	15.247(i),1.1307& 2.1093	RF exposure evaluation	NA	**PASS**

NOTE: The tests were performed according to the method of measurements prescribed in DA-00-705, ANSI C63.4-2009 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.

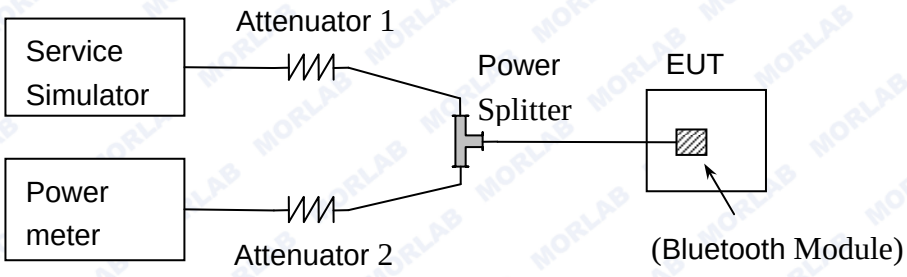
2.2 Number of Hopping Frequency

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

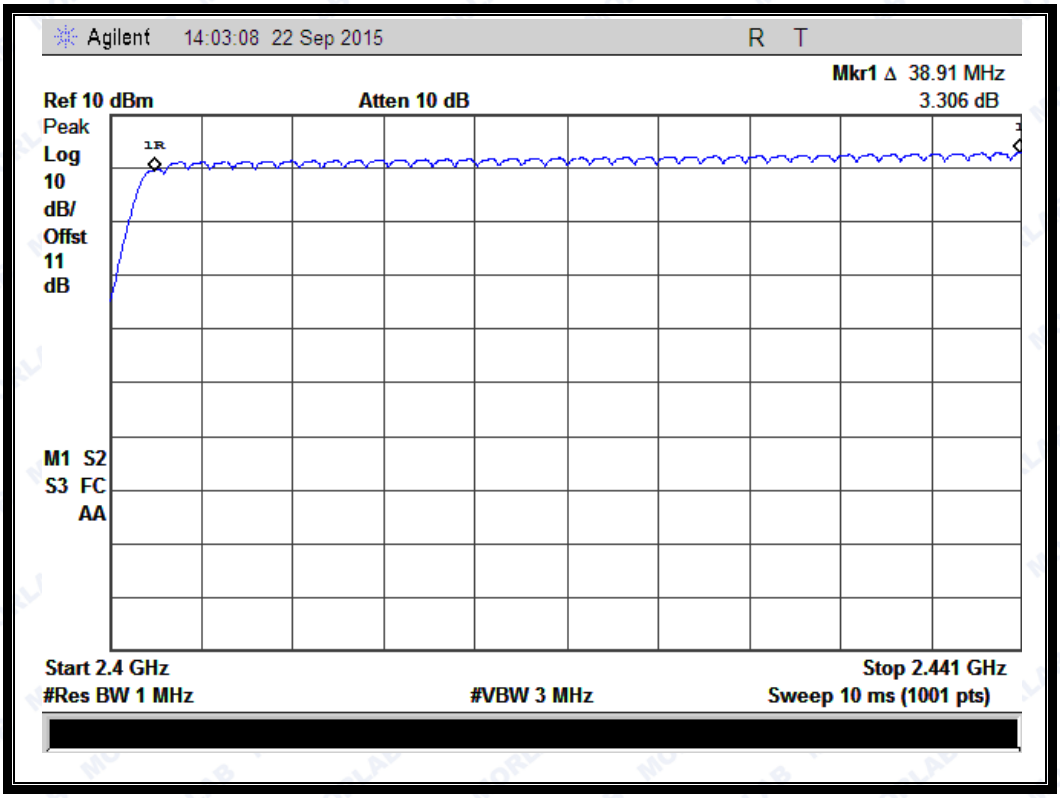
2.2.4 Test Result

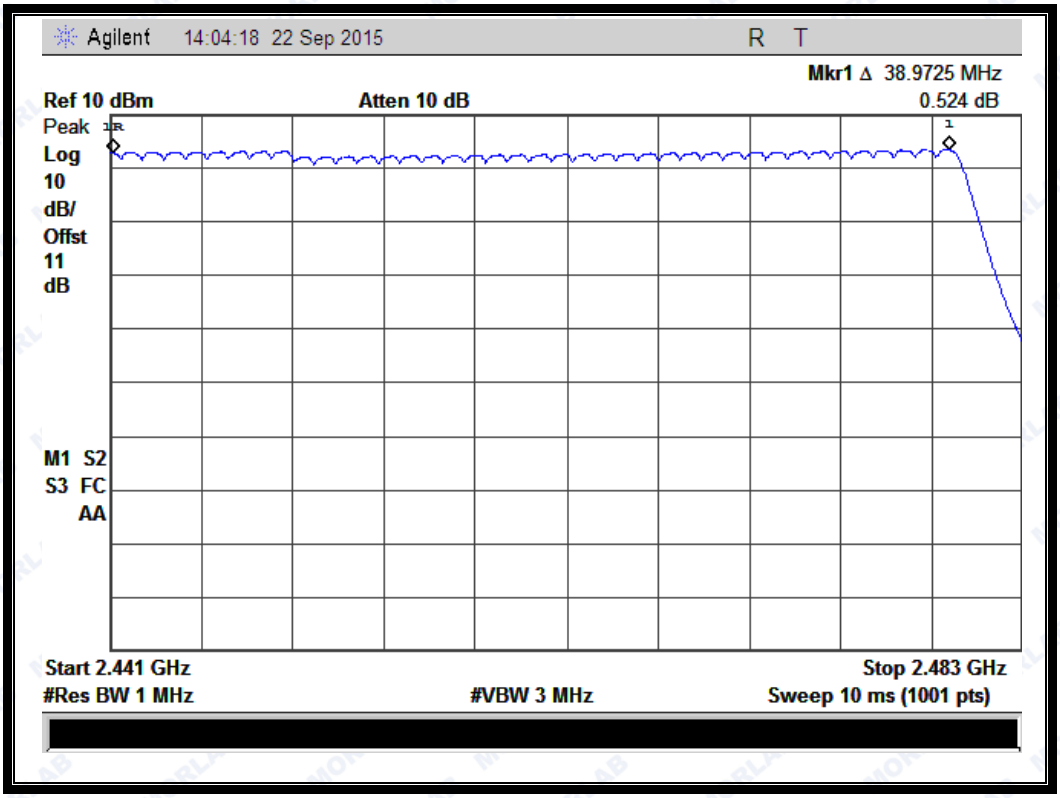
The Bluetooth Module operates at hopping-on test mode; the frequencies number employed is counted to verify the Module's using the number of hopping frequency.

A. Test Verdict:

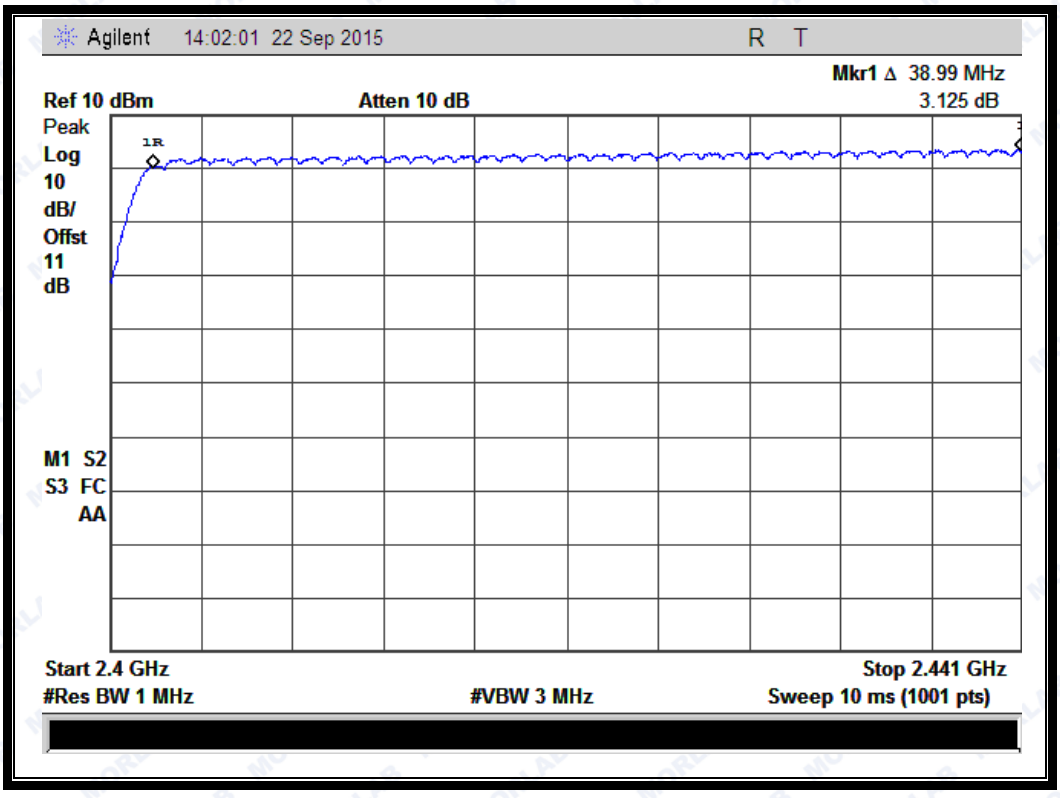
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Refer to Plot	Verdict
GFSK	2400 - 2483.5	79	15	Plot A	PASS
π/4-DQPSK	2400 - 2483.5	79	15	Plot B	PASS
8-DPSK	2400 - 2483.5	79	15	Plot C	PASS

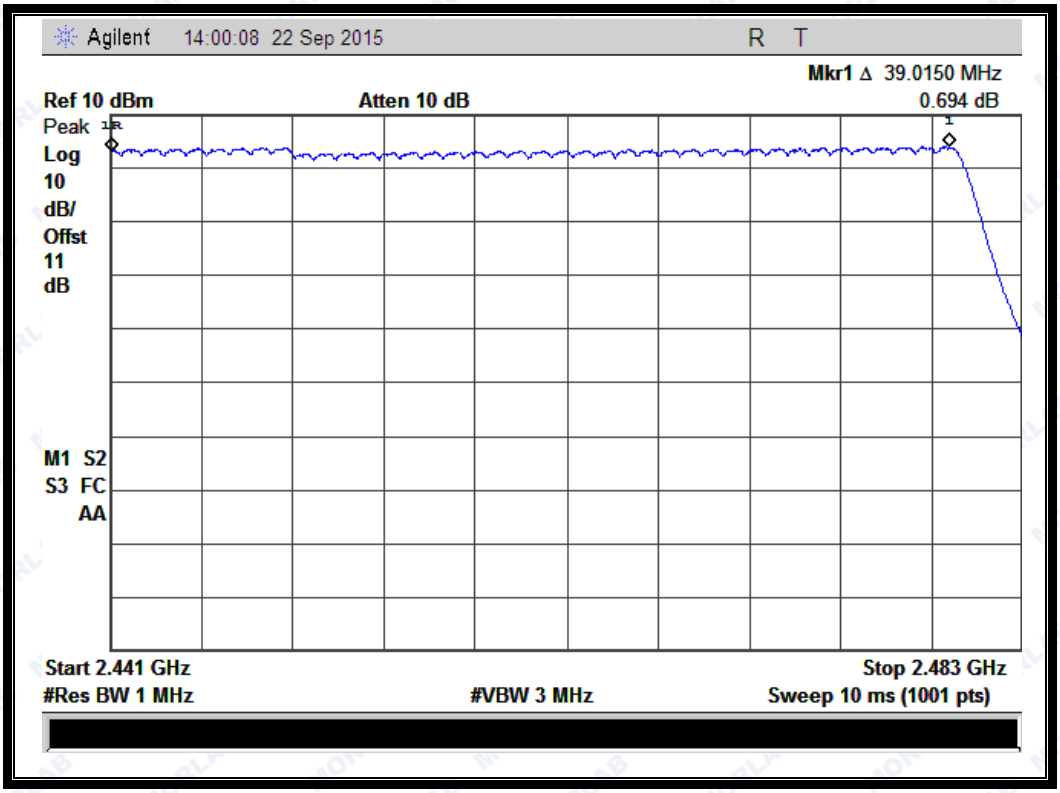
B. Test Plots:



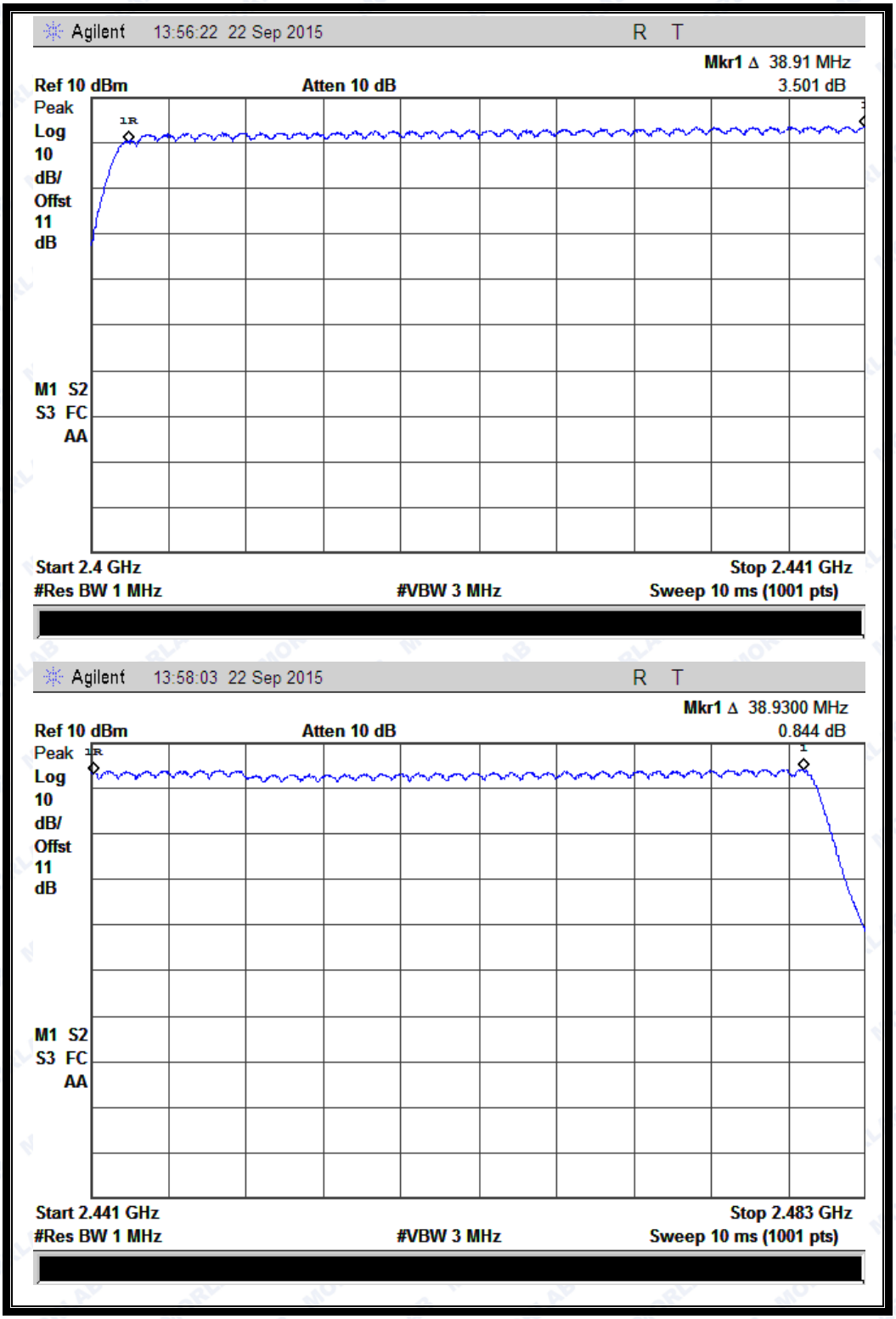

Agilent 14:04:18 22 Sep 2015
R T
Mkr1 Δ 38.9725 MHz
0.524 dB
Ref 10 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11
dB
1R
1
M1 S2
S3 FC
AA
Start 2.441 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2.483 GHz
Sweep 10 ms (1001 pts)

(Plot A: GFSK)


Agilent 14:02:01 22 Sep 2015
R T
Mkr1 Δ 38.99 MHz
3.125 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 10 ms (1001 pts)



(Plot B: π/4-DQPSK)


Agilent 13:56:22 22 Sep 2015
R T
Mkr1 Δ 38.91 MHz
3.501 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 10 ms (1001 pts)
Agilent 13:58:03 22 Sep 2015
R T
Mkr1 Δ 38.9300 MHz
0.844 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 10 ms (1001 pts)

(Plot C: 8- DPSK)

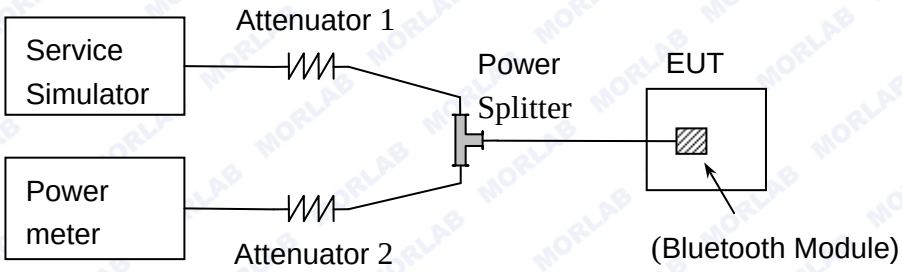
2.3 Peak Output Power

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	3.155	0.002067759	20.97	0.125	PASS
39	2441	5.645	0.003668597			PASS
78	2480	3.484	0.002230489			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	0.64	0.001158777	20.97	0.125	PASS
39	2441	3.681	0.002333995			PASS
78	2480	4.202	0.00263148			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	0.847	0.001215346	20.97	0.125	PASS
39	2441	3.885	0.002446245			PASS
78	2480	4.38	0.002741574			PASS

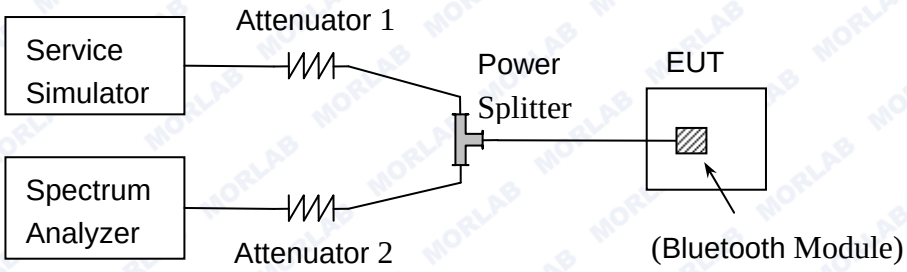
2.4 20dB Bandwidth

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.

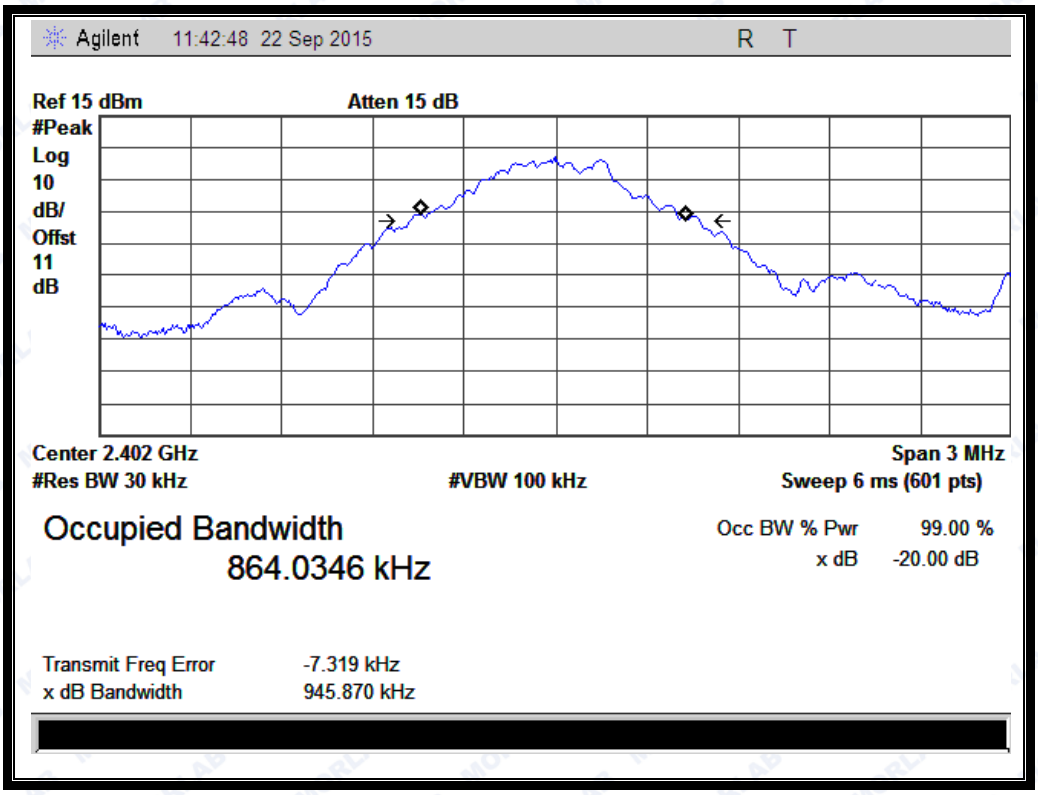
2.4.4.1 GFSK Mode

A. Test Verdict:

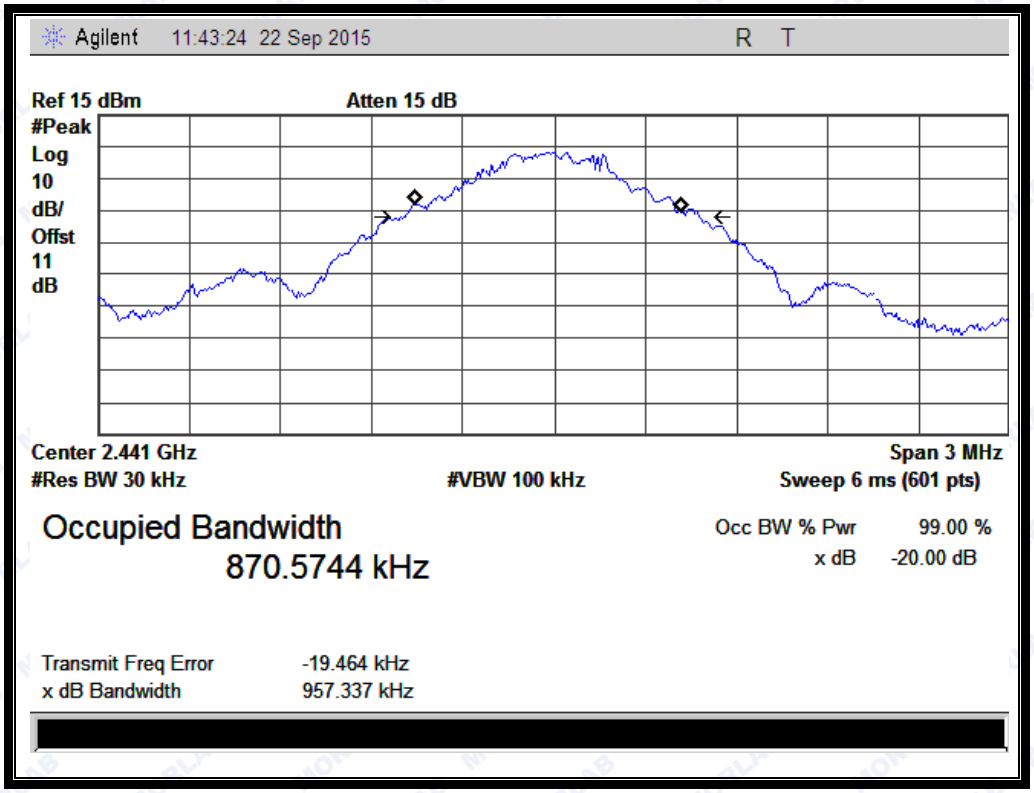
The maximum 20dB bandwidth measured is 0.9573MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	0.9459	Plot A
39	2441	0.9573	Plot B
78	2480	0.9428	Plot C

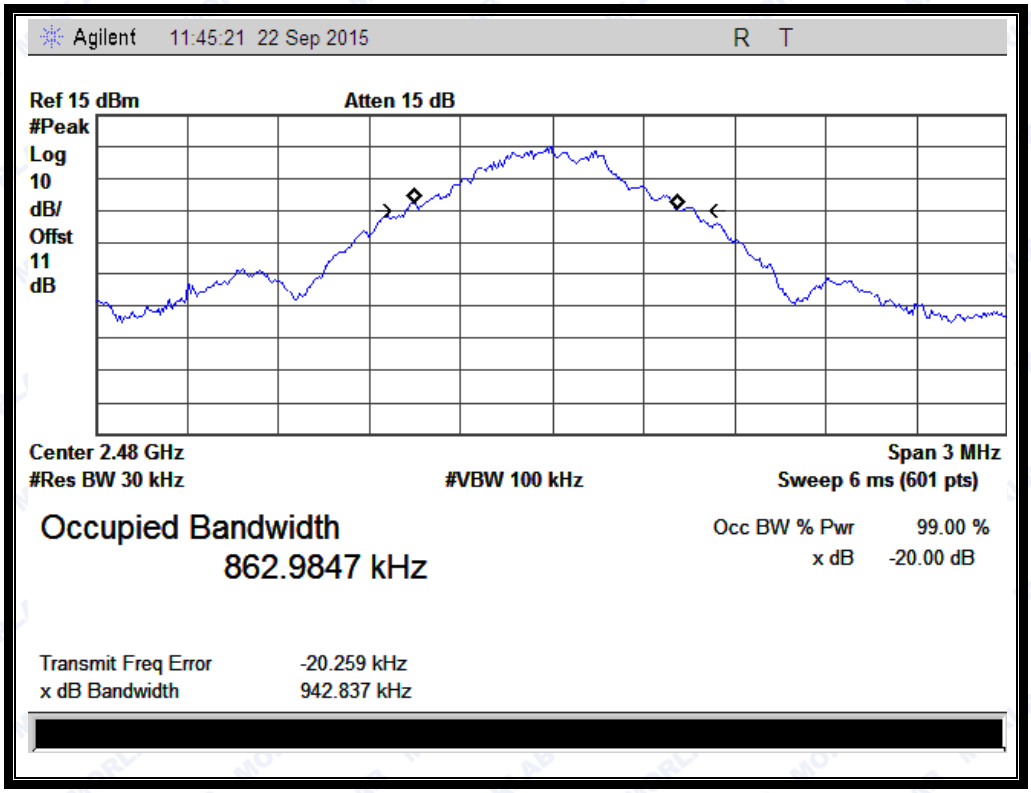
B. Test Plots:



(Plot A: Channel = 2402 @ GFSK)



(Plot B: Channel = 2441 @ GFSK)



(Plot C: Channel = 2480 @ GFSK)

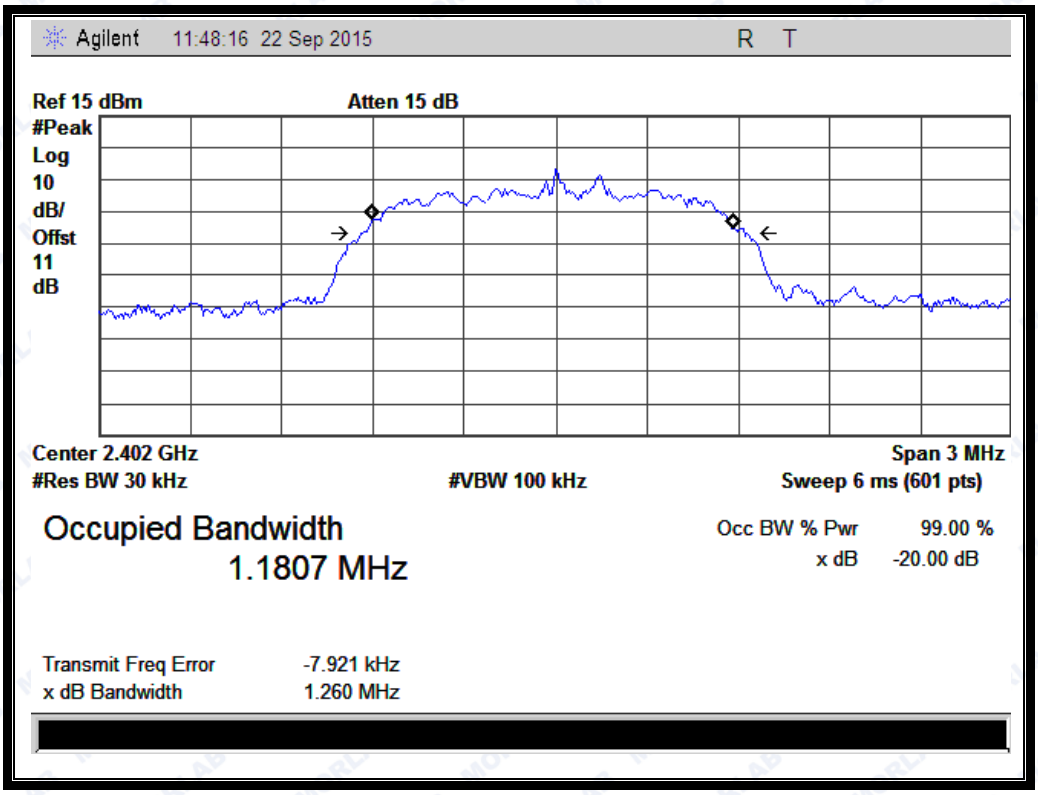
2.4.4.2 π/4-DQPSK Mode

A. Test Verdict:

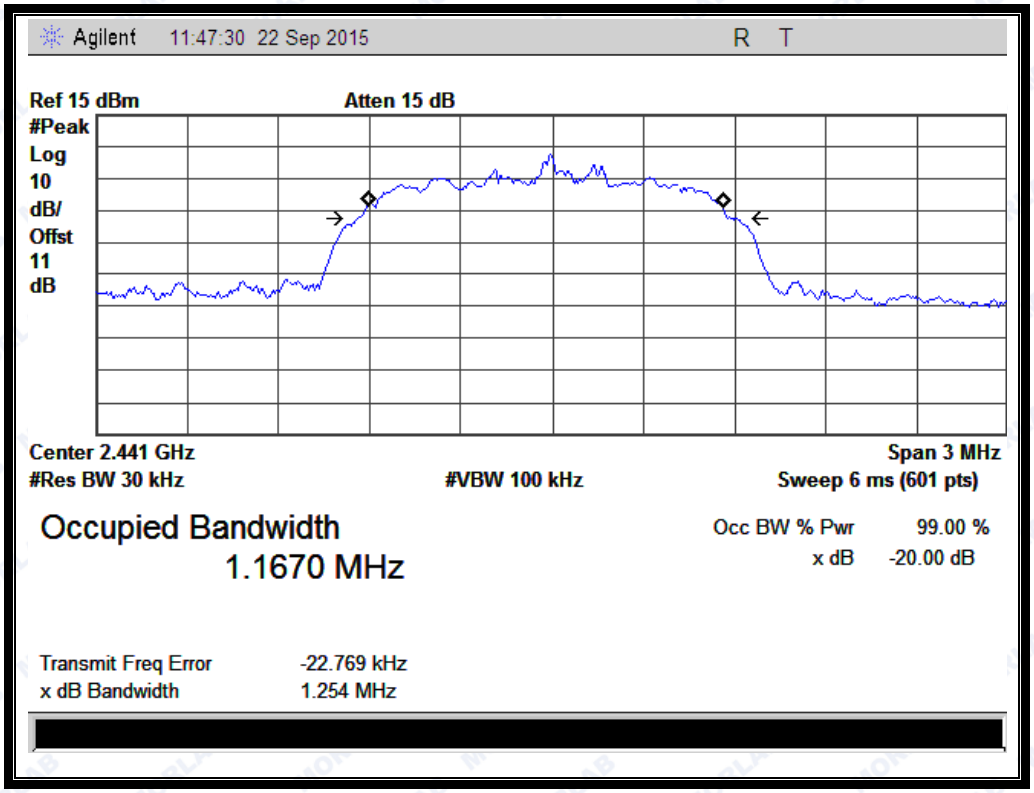
The maximum 20dB bandwidth measured is 1.260MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.260	Plot D
39	2441	1.254	Plot E
78	2480	1.258	Plot F

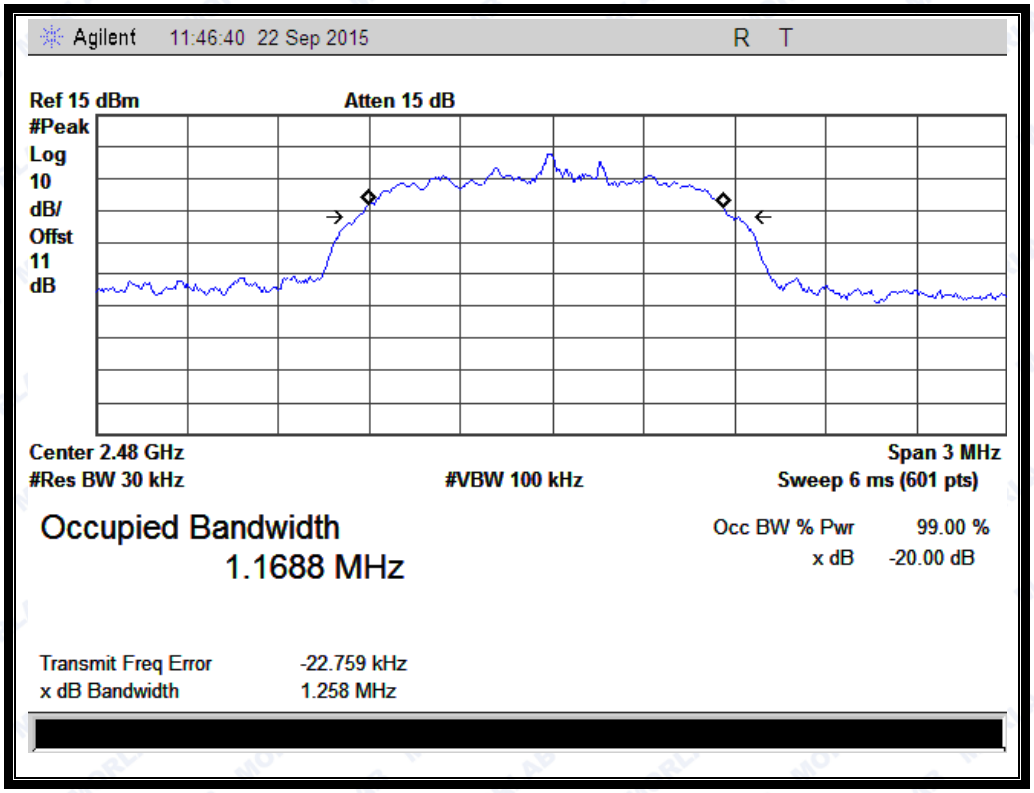
B. Test Plots:



(Plot D: Channel = 2402 @ π/4-DQPSK)



(Plot E: Channel = 2441 @ π/4-DQPSK)



(Plot F: Channel = 2480 @ π/4-DQPSK)

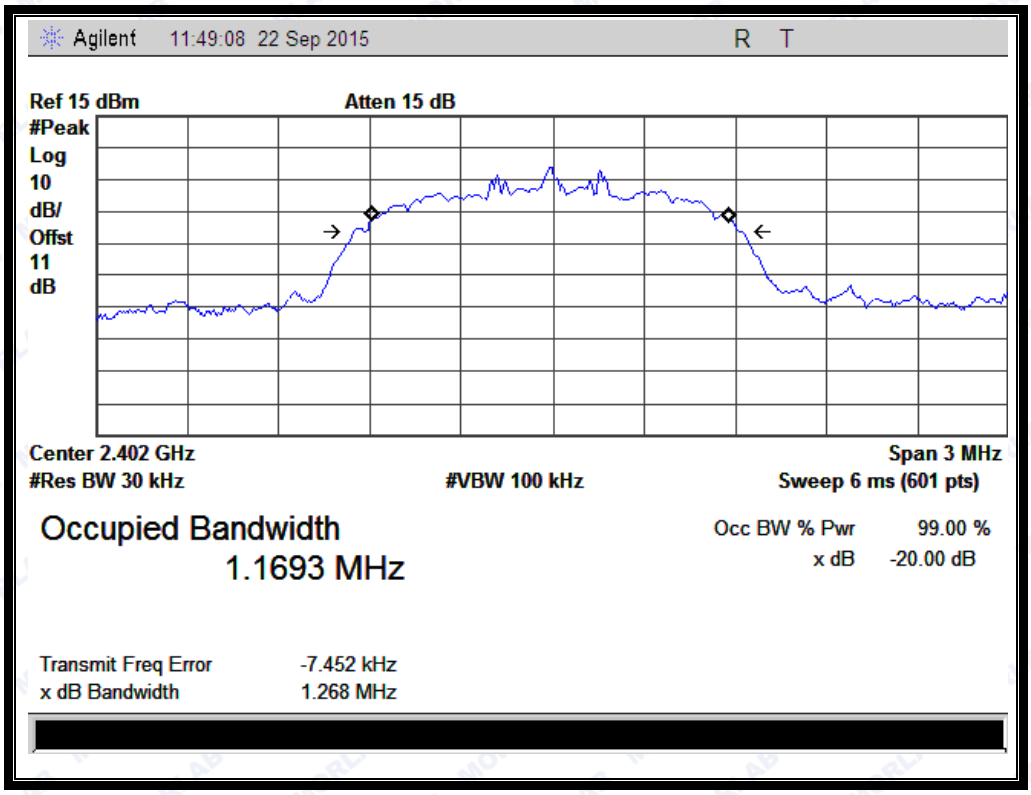
2.4.4.3 8-DPSK Mode

A. Test Verdict:

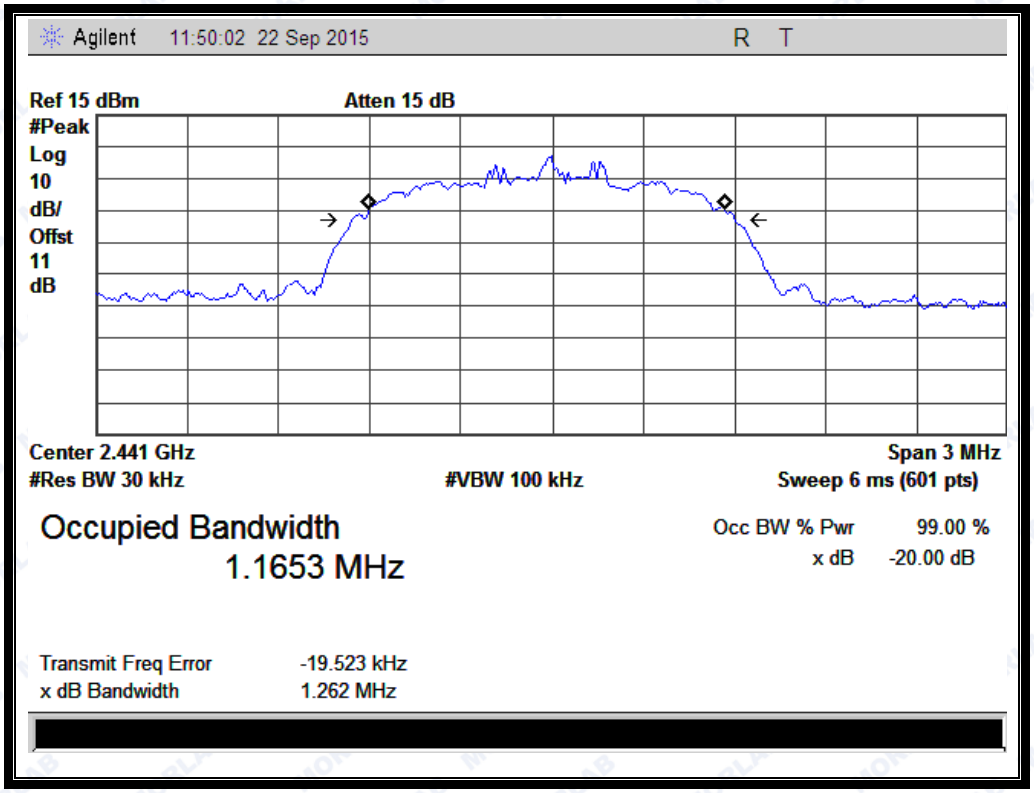
The maximum 20dB bandwidth measured is 1.268MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.268	Plot G
39	2441	1.262	Plot H
78	2480	1.267	Plot I

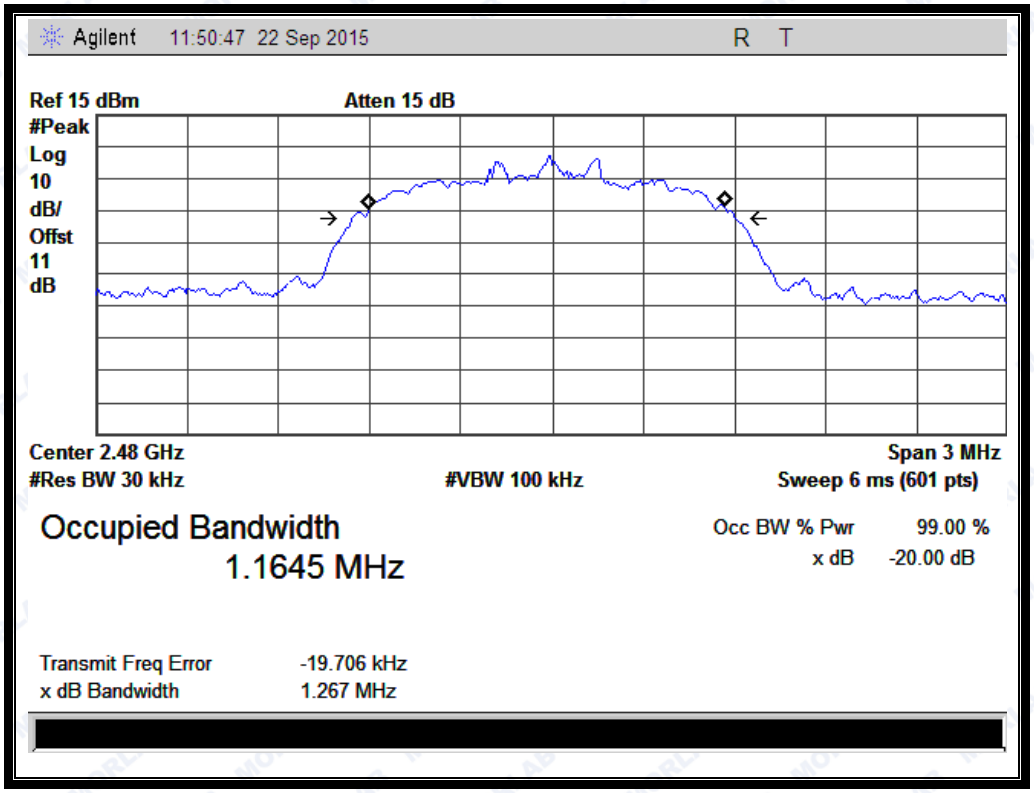
B. Test Plots:



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



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



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

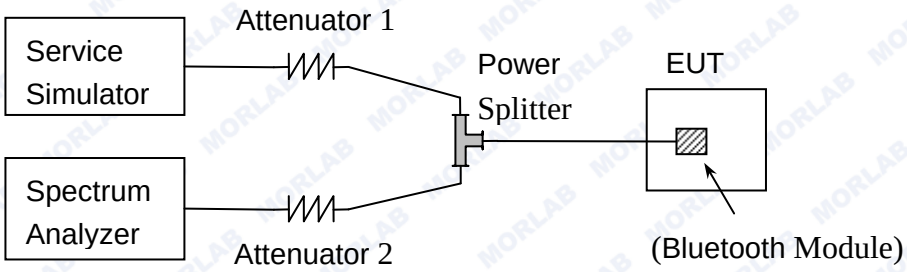
2.5 Carried Frequency Separation

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:

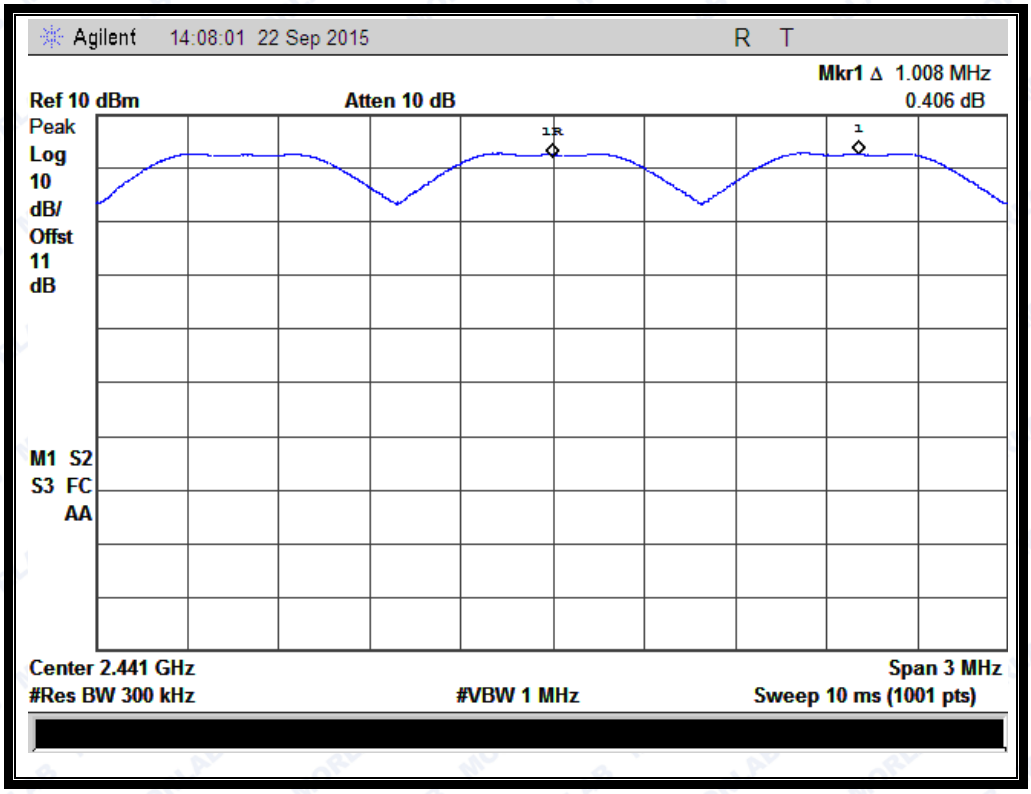
Please reference ANNEX A(1.4).

2.5.3 Test Procedure

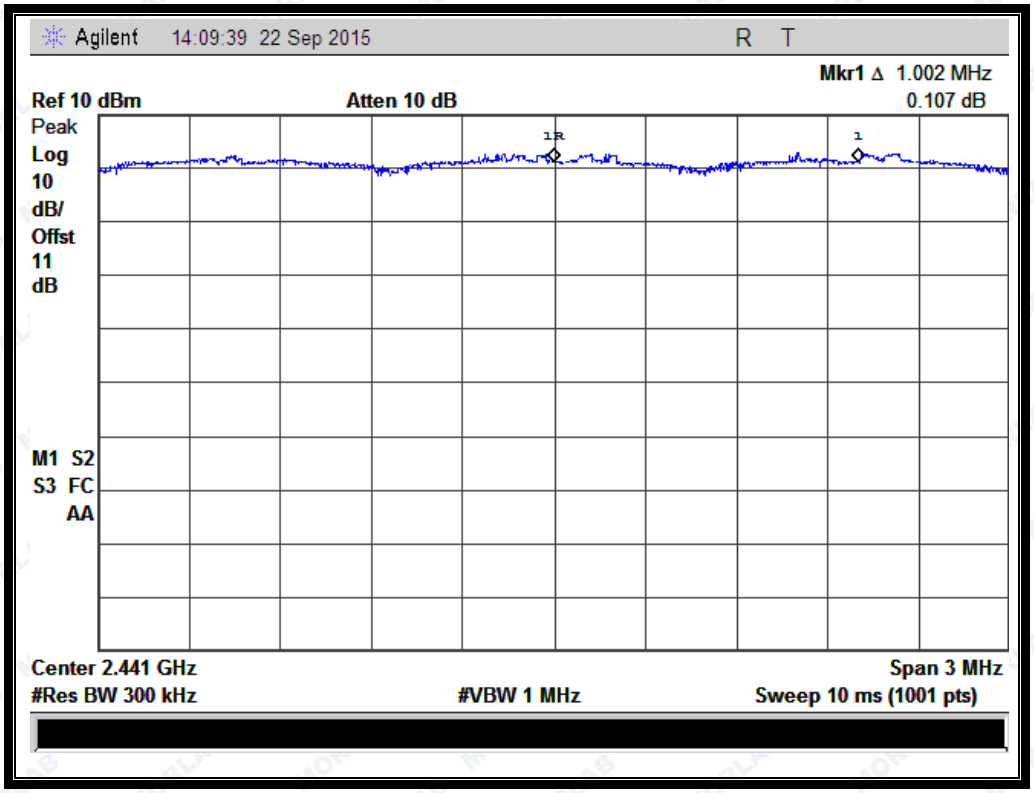
The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
Video (or Average) Bandwidth (VBW) ≥ RBW
Sweep = auto
Detector function = peak
Trace = max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

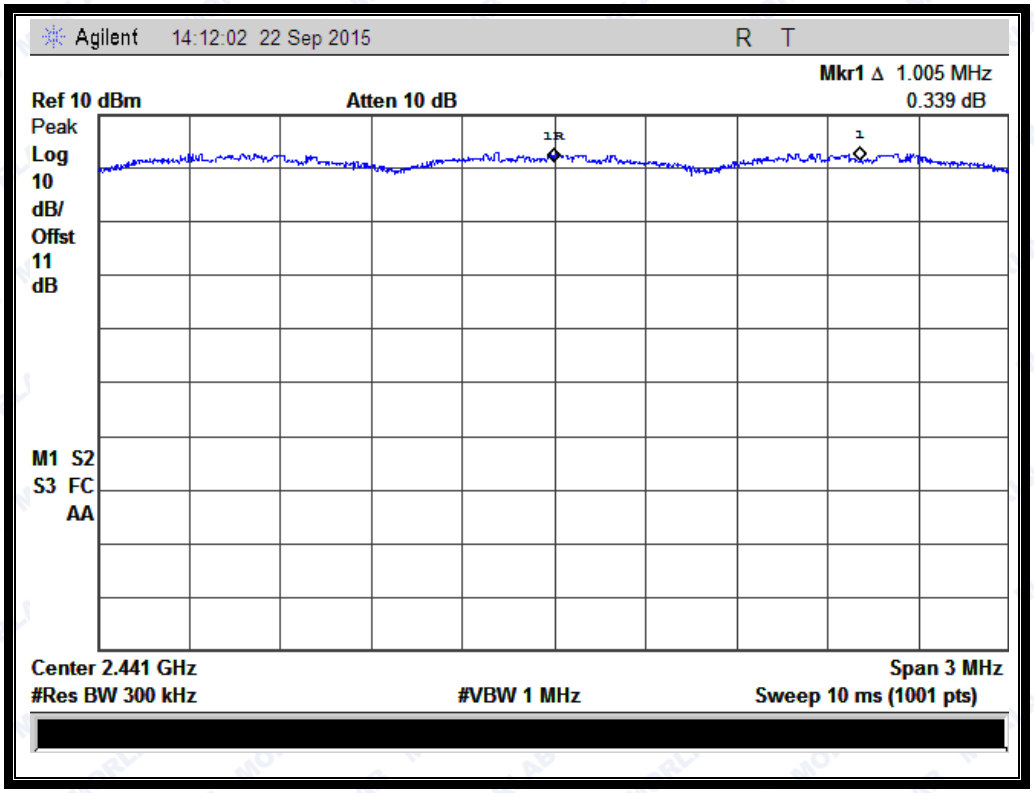
The Bluetooth Module operates at hopping-on test mode. For any adjacent channels (e.g. the channel 39 and 40 as showed in the Plot A), the Module does have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel (refer to section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



(Plot A: GFSK)



(Plot B: π/4-DQPSK)



(Plot C: 8-DPSK)

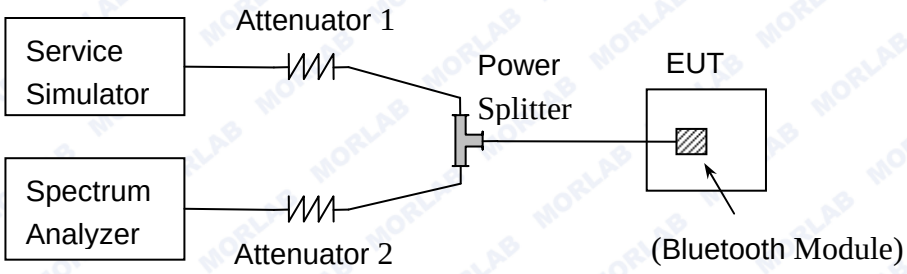
2.6 Time of Occupancy (Dwell time)

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.

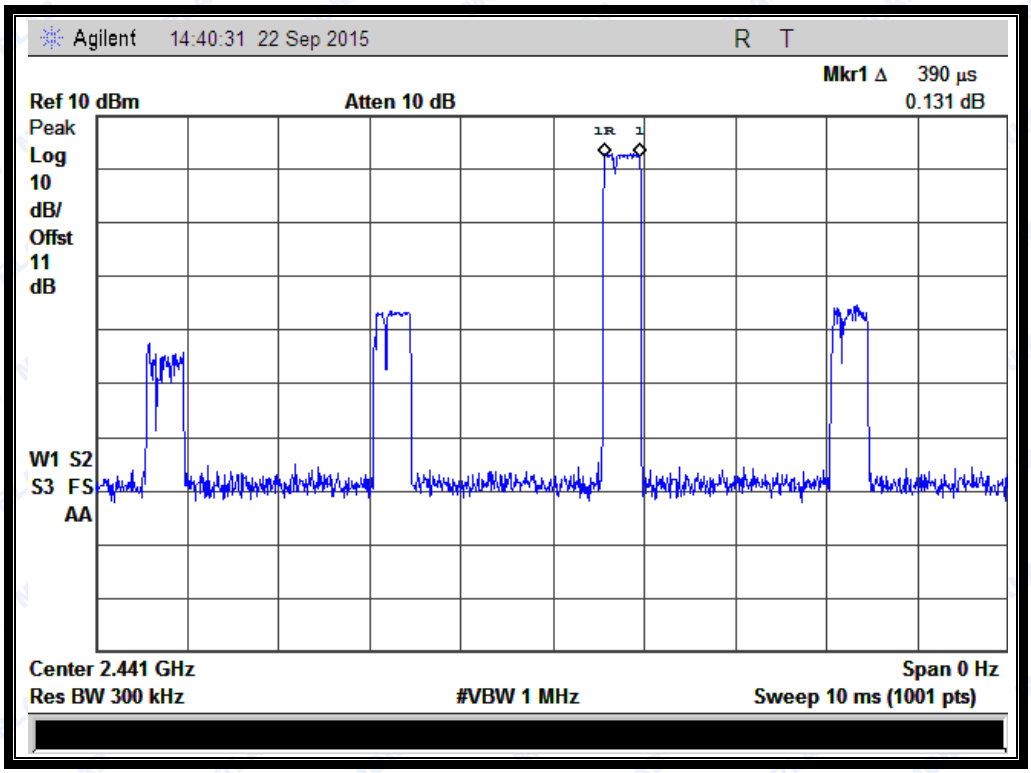
2.6.4 Test Result

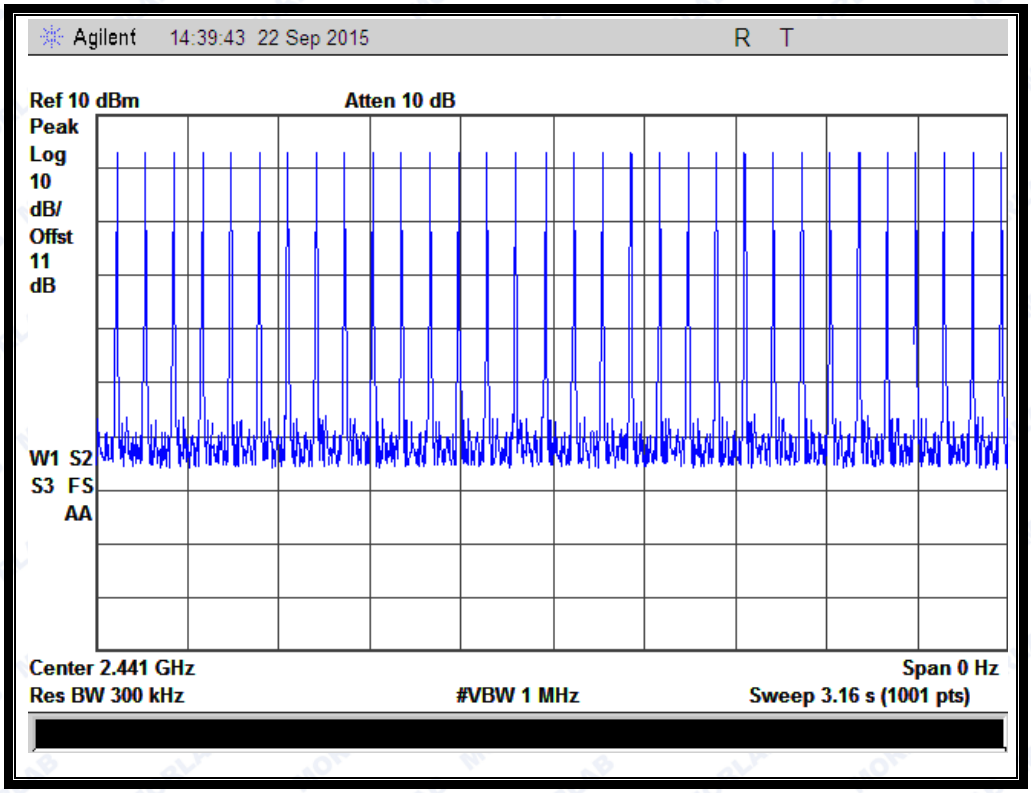
2.6.4.1 GFSK Mode

A. Test Verdict:

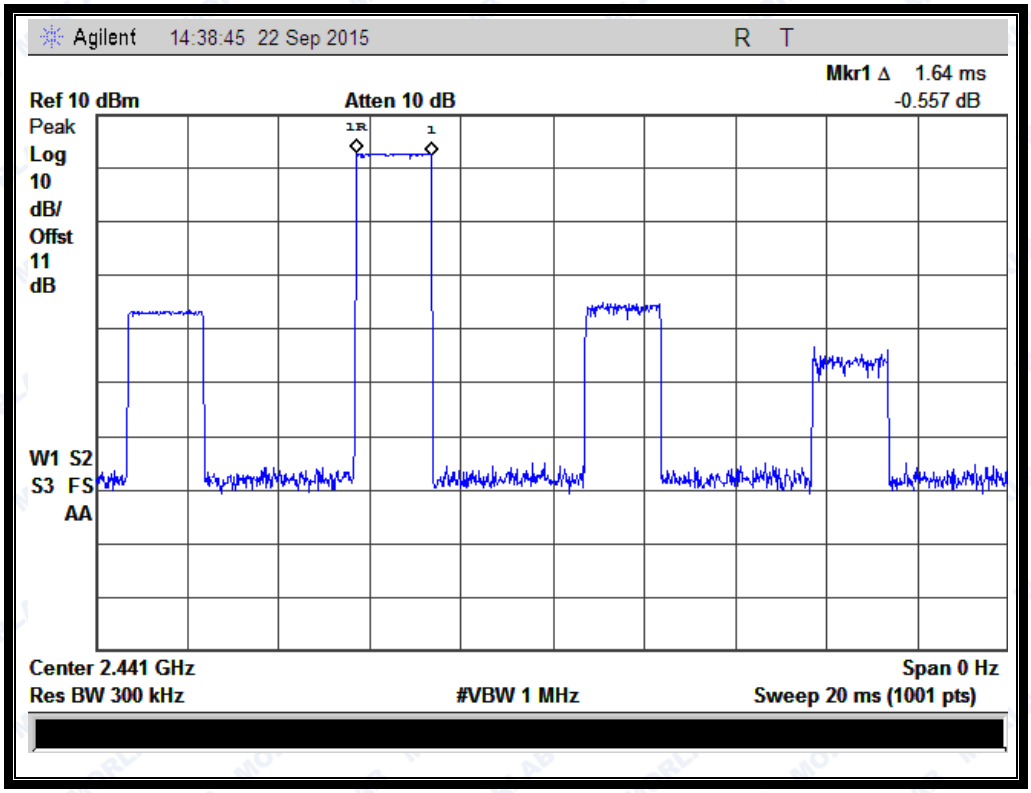
DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.39	32	0.01248	0.1248	0.4	PASS
DH3	1.64	16	0.02624	0.2624		PASS
DH5	2.9	11	0.03190	0.3190		PASS

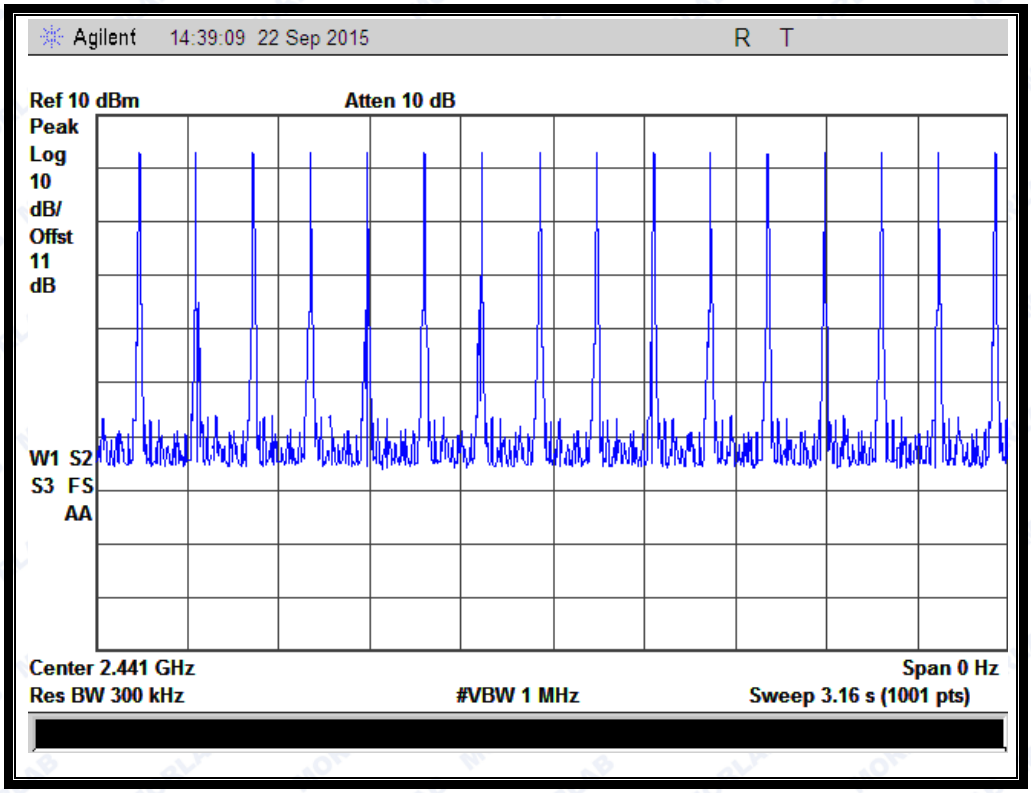
B. Test Plots:



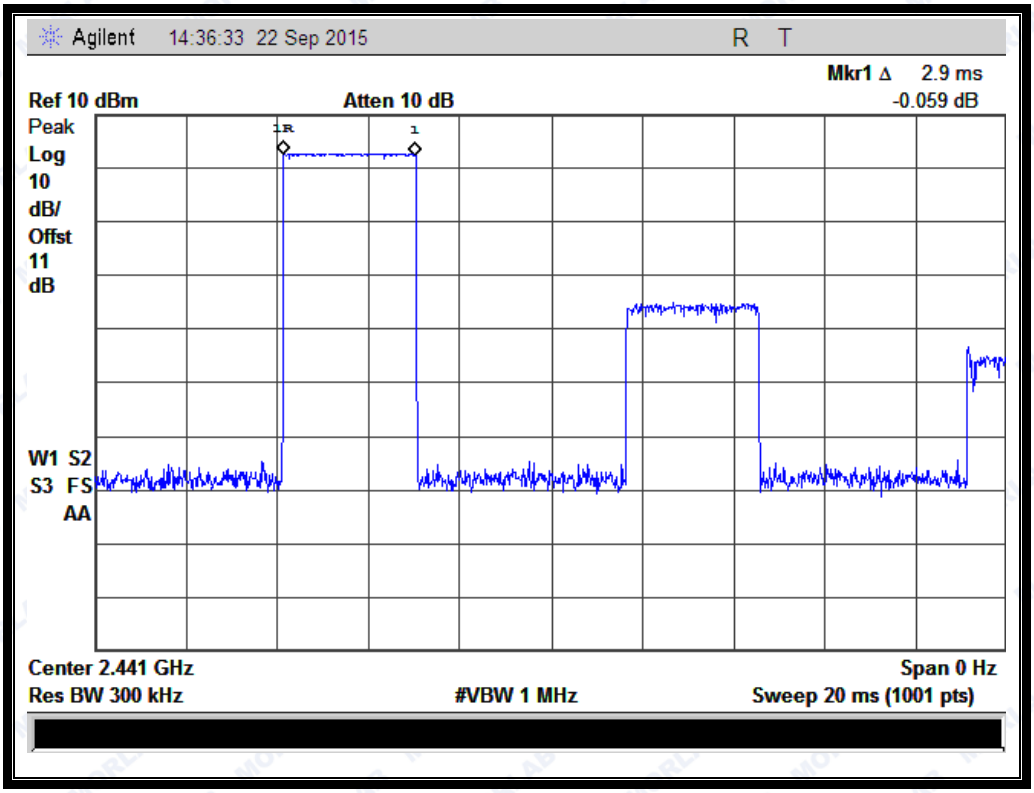


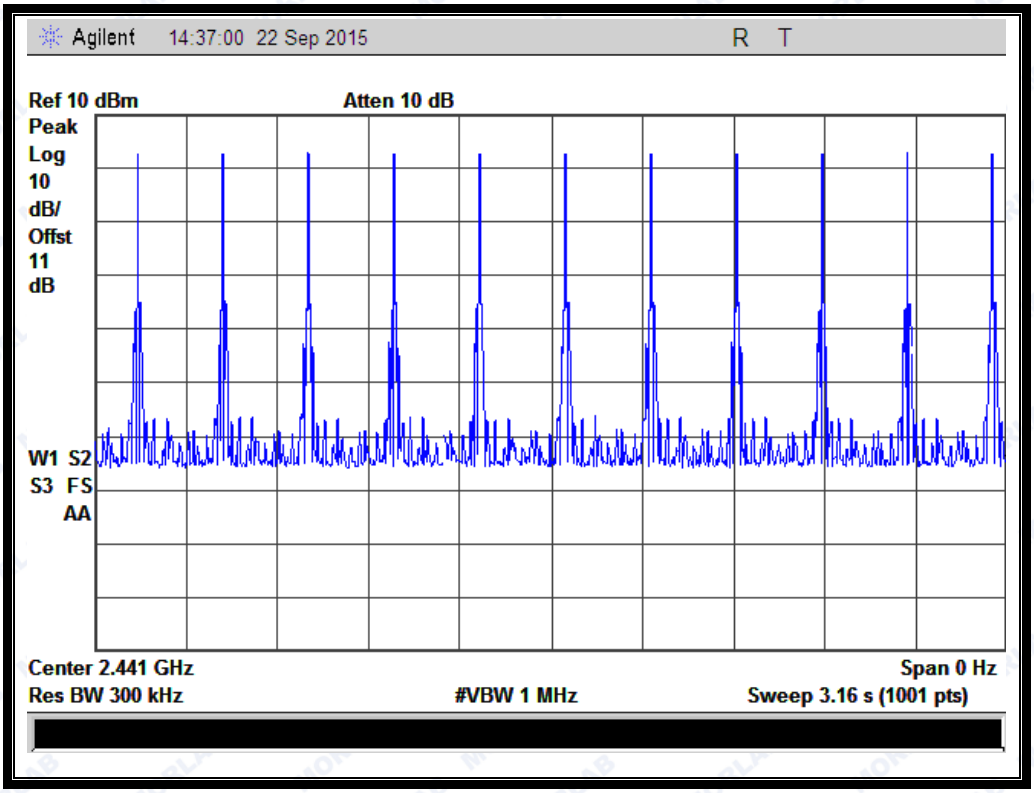
(Plot A: DH1 @ GFSK)





(Plot B: DH3 @ GFSK)





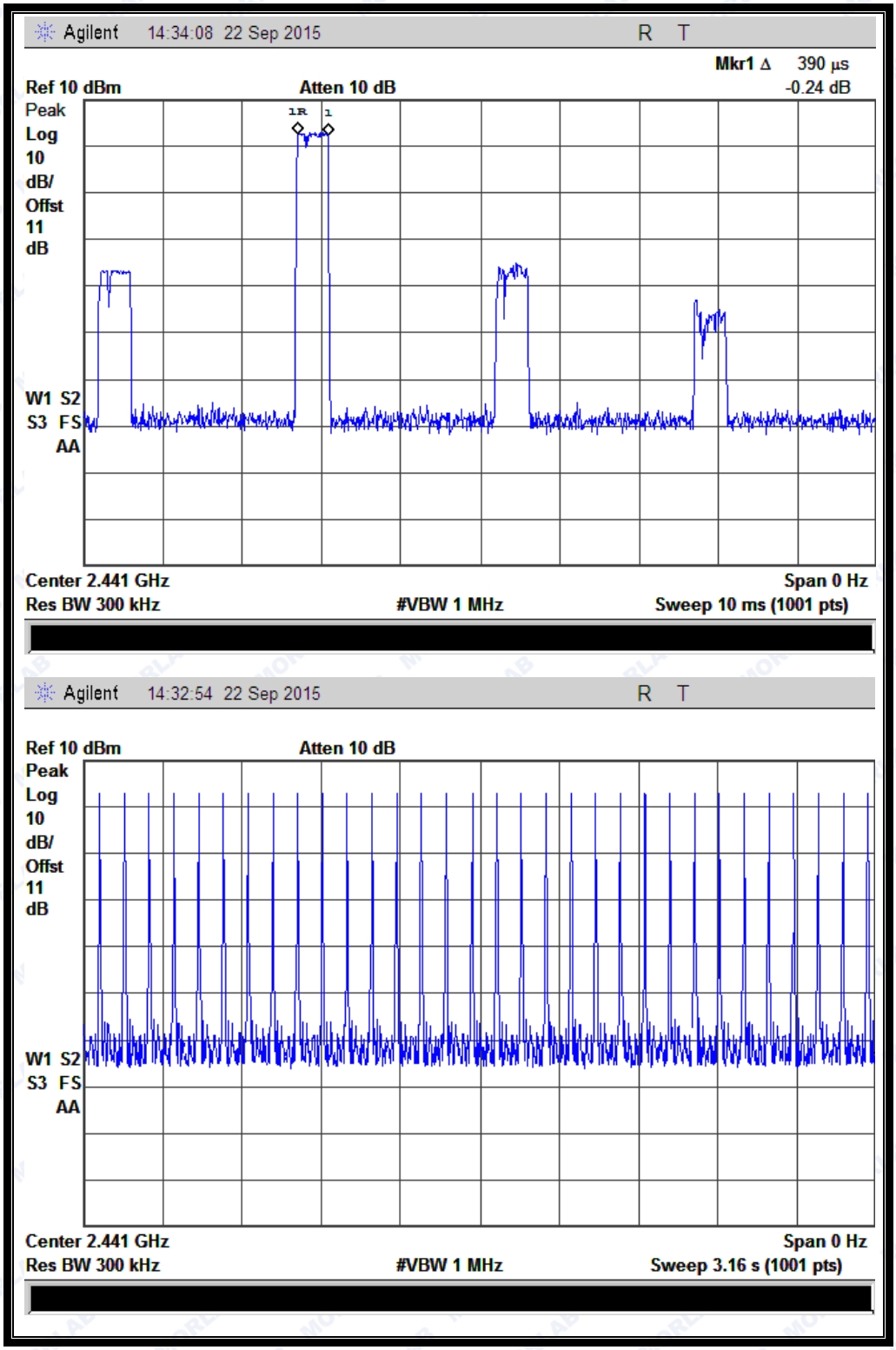
(Plot C: DH5 @ GFSK)

2.6.4.2 π/4-DQPSK Mode

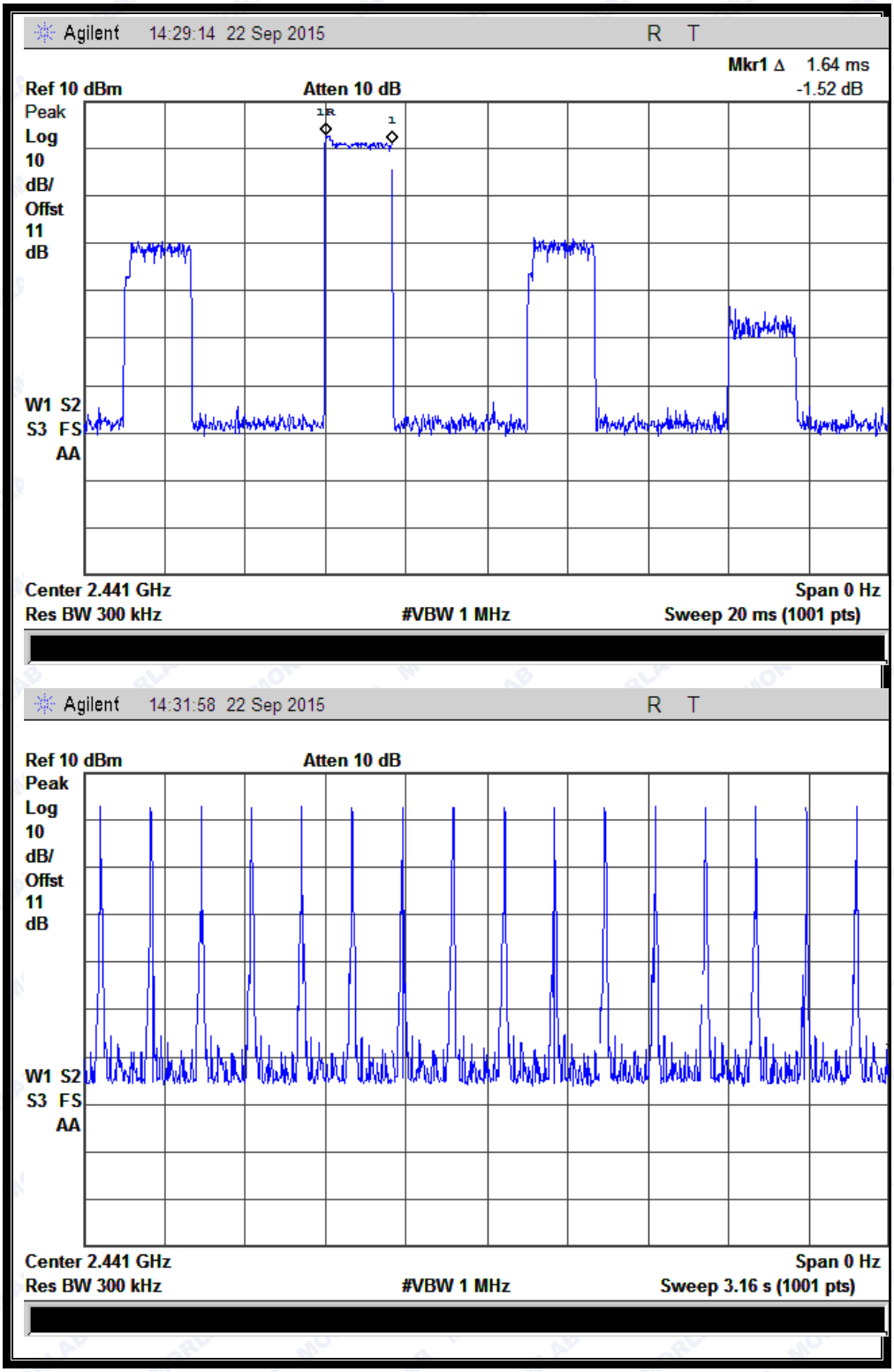
A. Test Verdict:

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	0.39	32	0.01248	0.1248	0.4	PASS
DH3	1.64	16	0.02624	0.2624		PASS
DH5	2.9	11	0.03190	0.3190		PASS

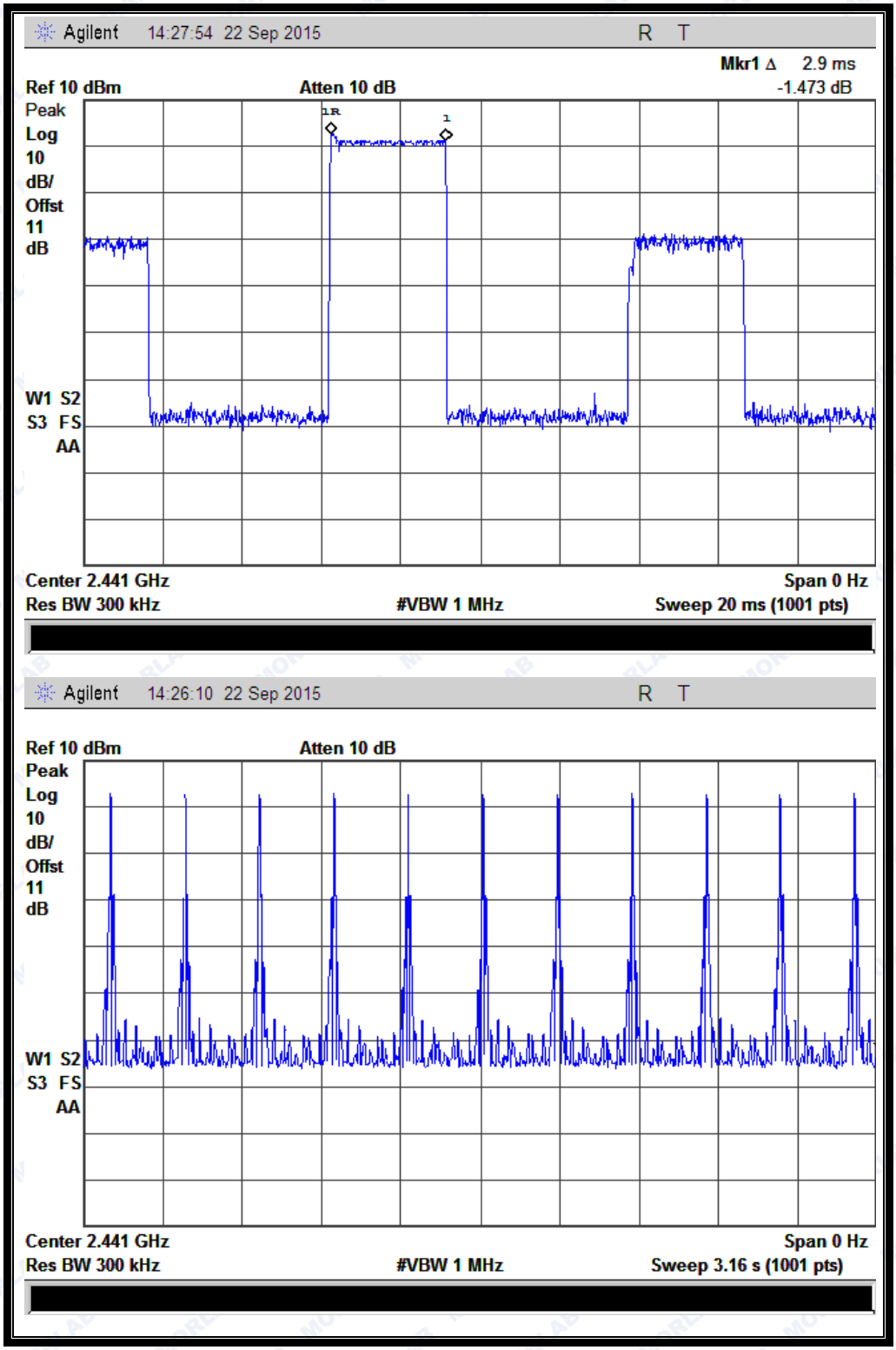
B. Test Plots:



(Plot D: DH1 @ π/4-DQPSK)



(Plot E: DH3 @ π/4-DQPSK)



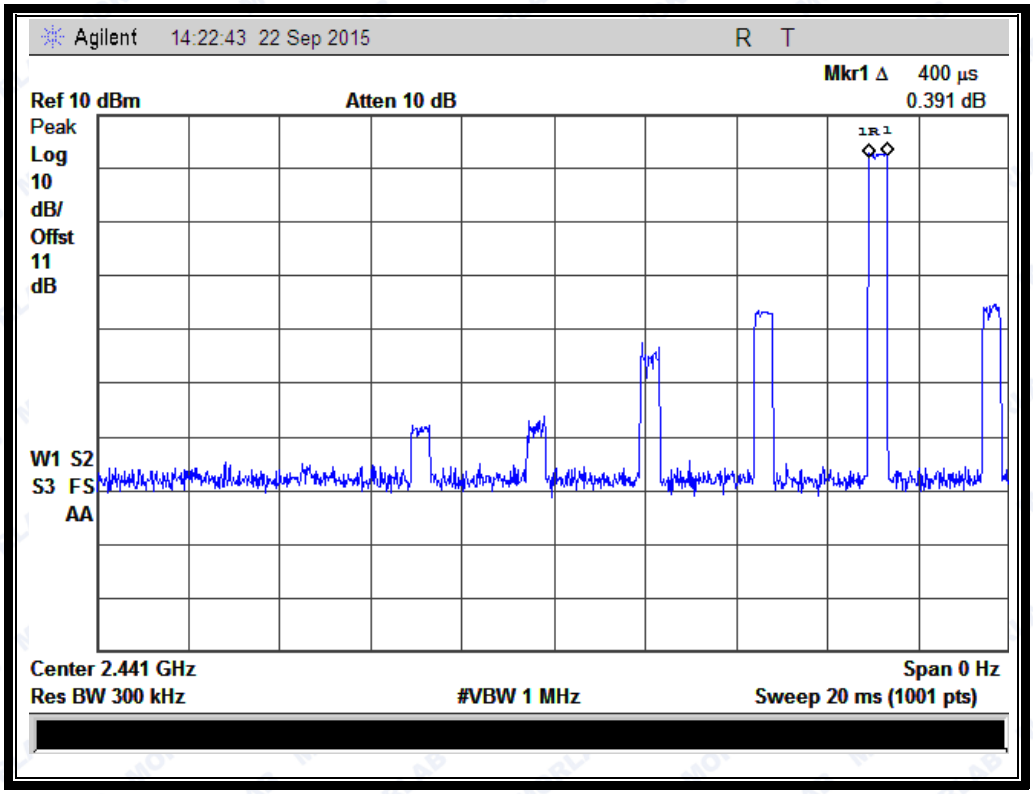
(Plot F: DH5 @ π/4-DQPSK)

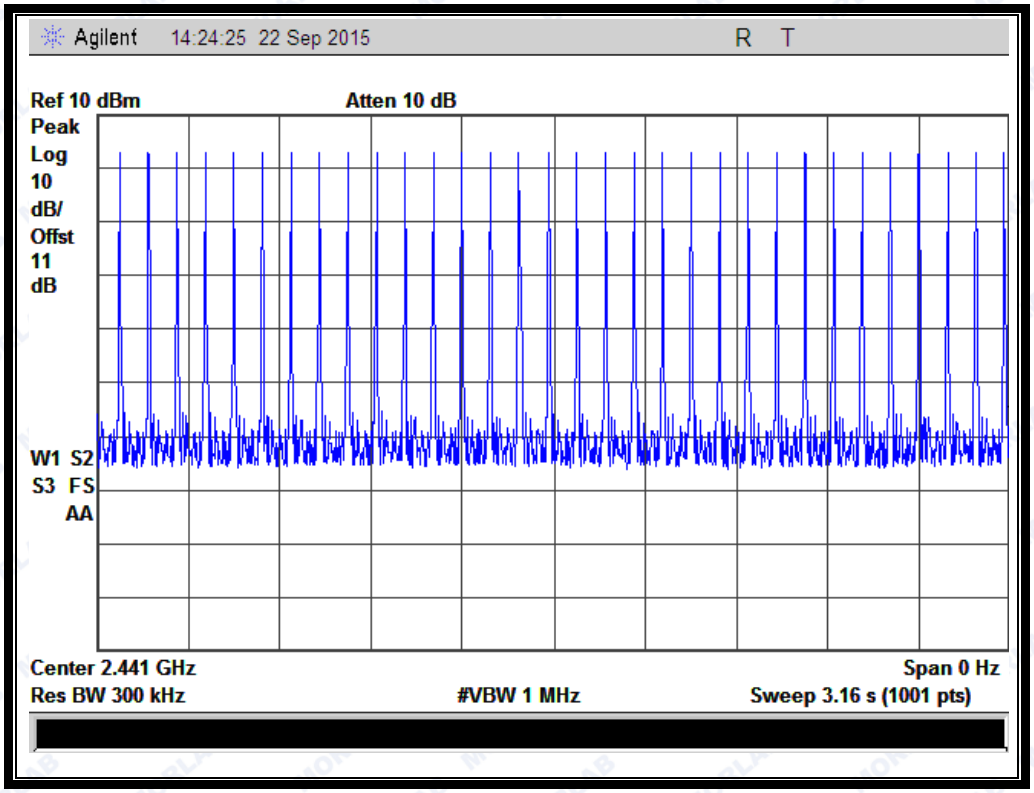
2.6.4.3 8-DPSK mode

A. Test Verdict:

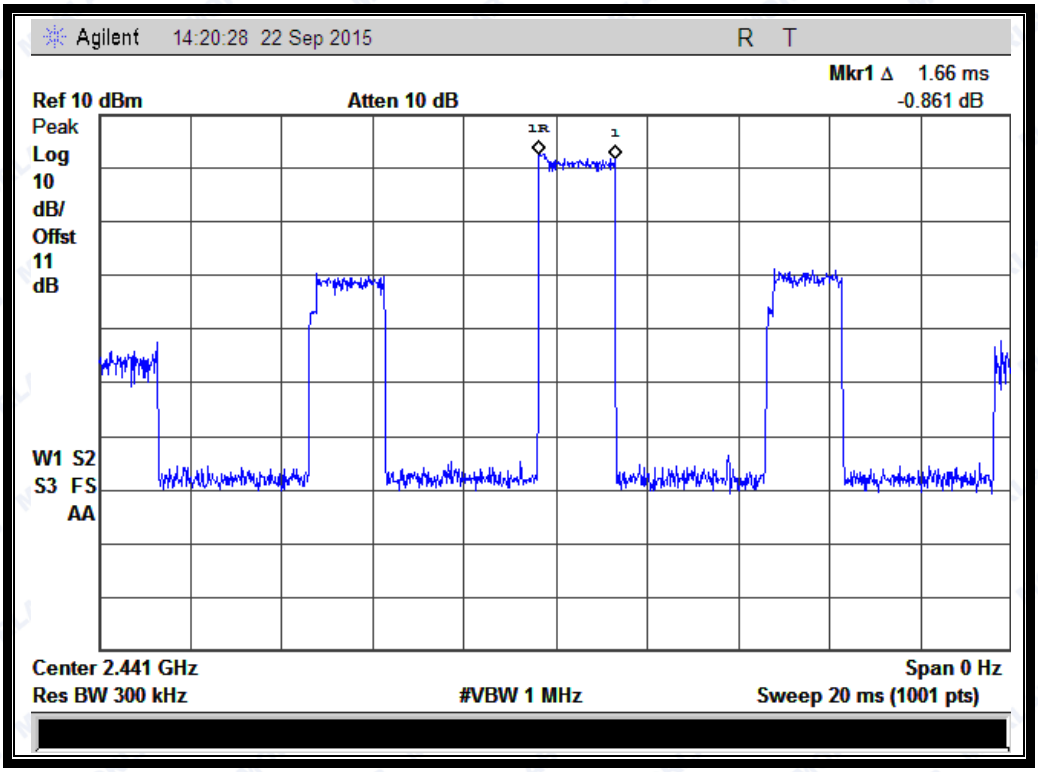
DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.4	32	0.01280	0.1280	0.4	PASS
DH3	1.66	16	0.02656	0.2656		PASS
DH5	2.88	11	0.03168	0.3168		PASS

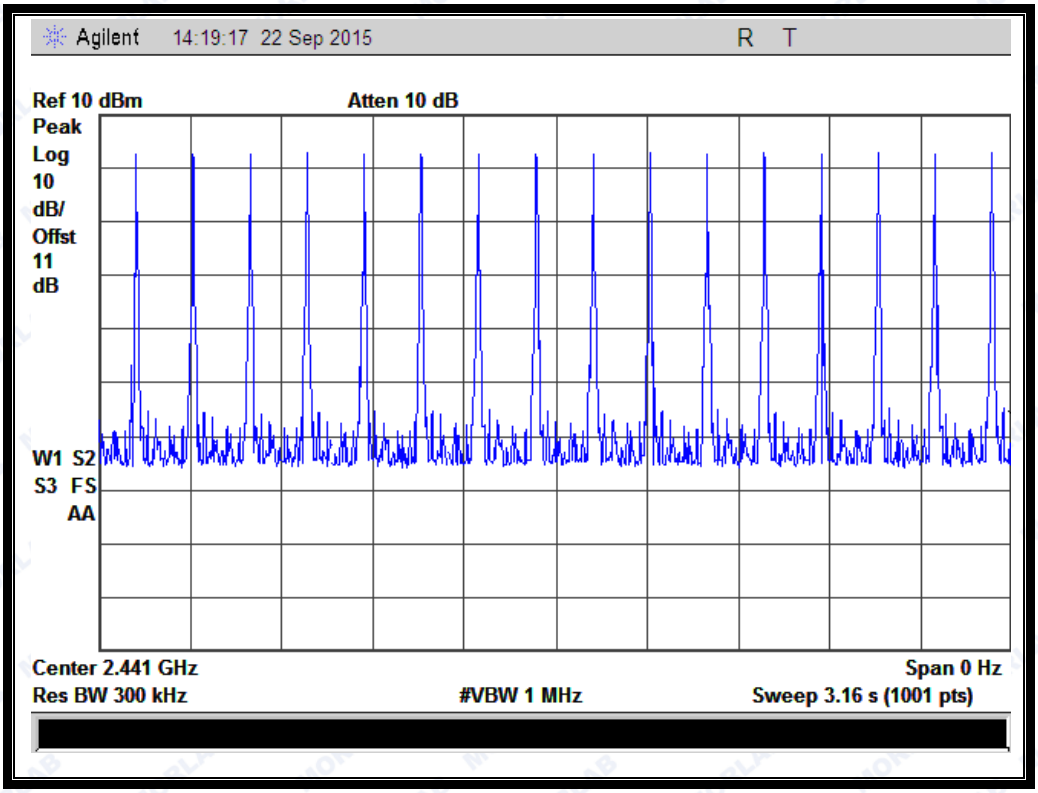
B. Test Plots:



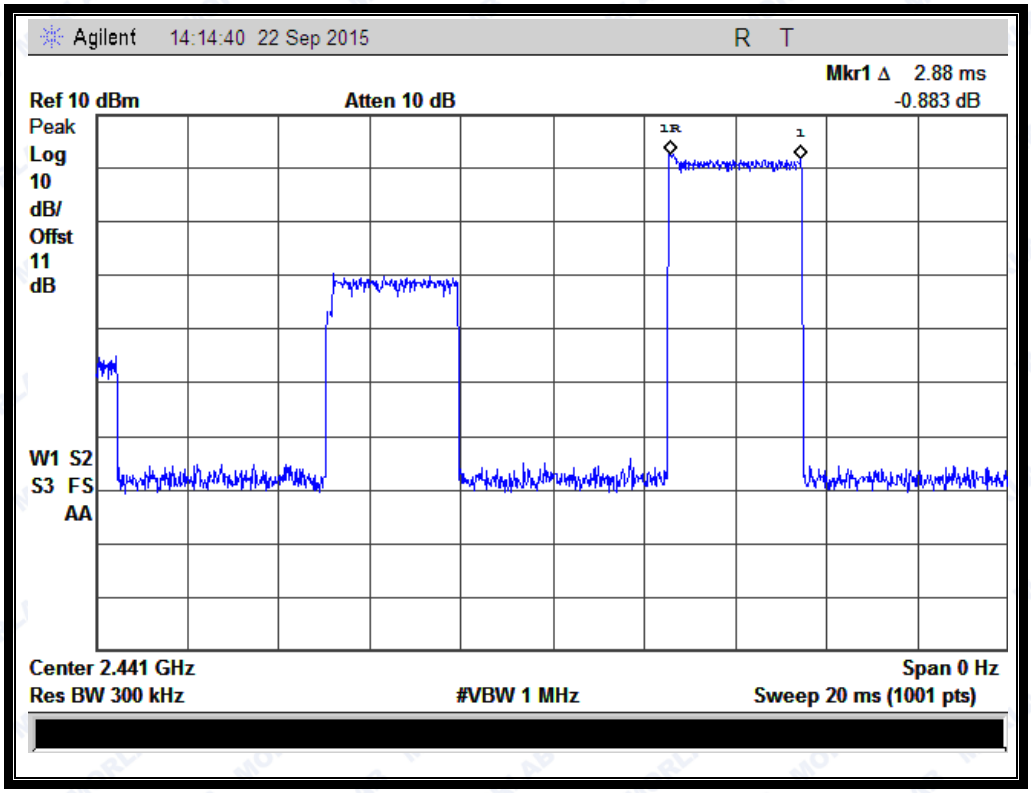


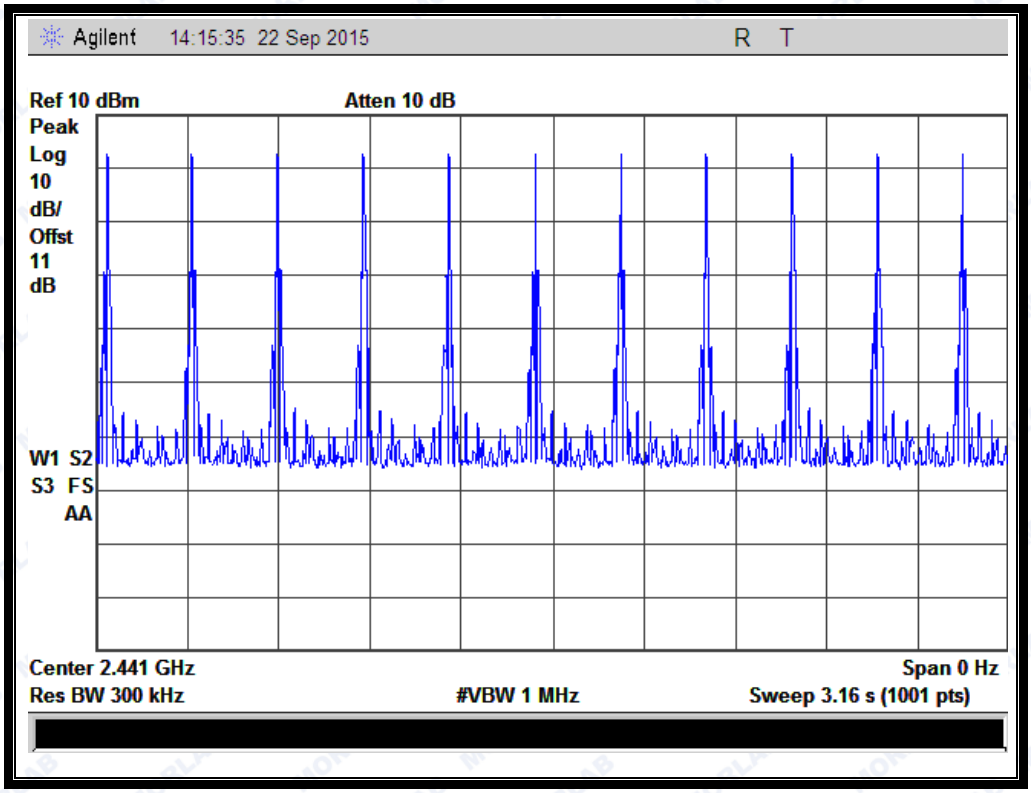
(Plot G: DH1 @ 8-DPSK)





(Plot H: DH3 @ 8-DPSK)





(Plot I: DH5 @ 8-DPSK)

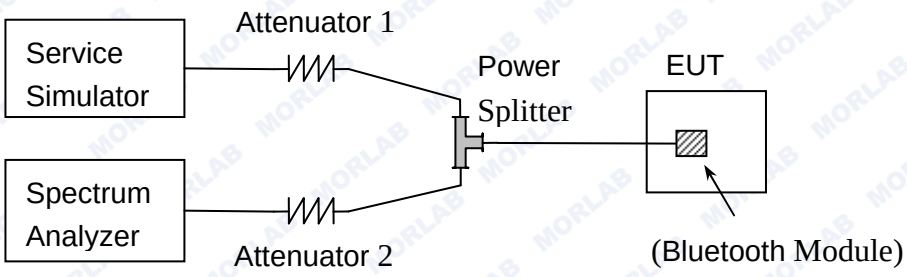
2.7 Conducted Spurious Emissions

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.

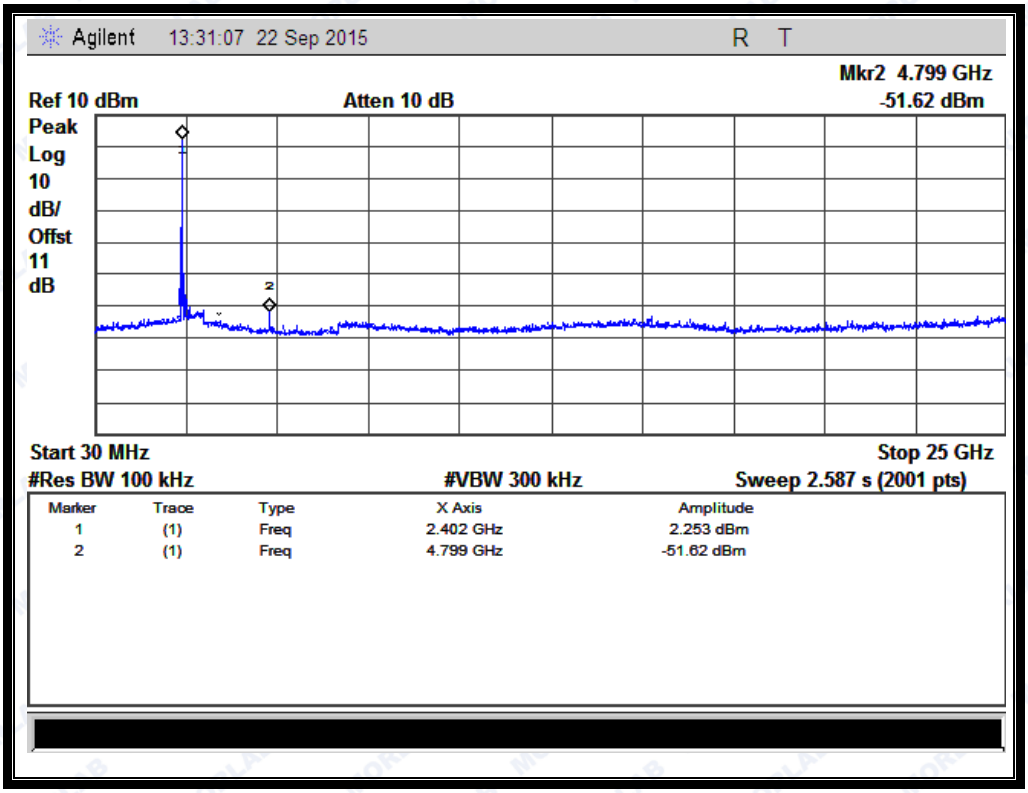
2.7.4.1 GFSK Mode

A. Test Verdict:

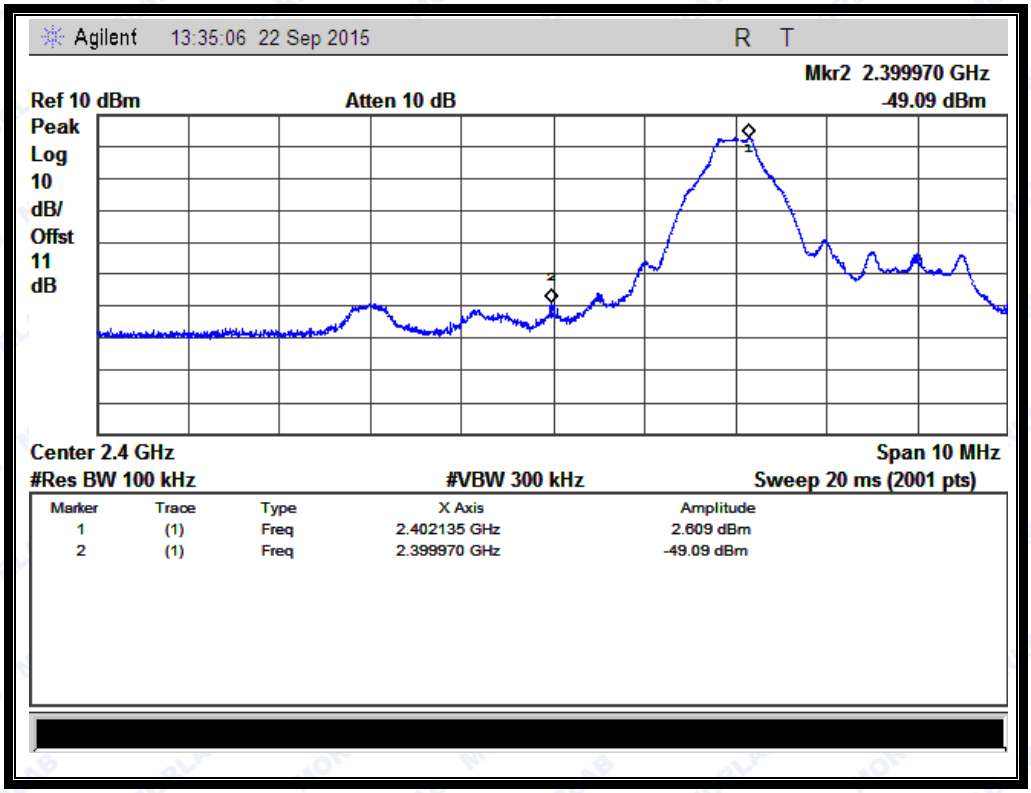
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-51.62	Plot A.1	2.253	-17.747	PASS
39	2441	-51.4	Plot B.1	4.494	-15.506	PASS
78	2480	-53.39	Plot C.1	5.075	-14.925	PASS

B. Test Plots:

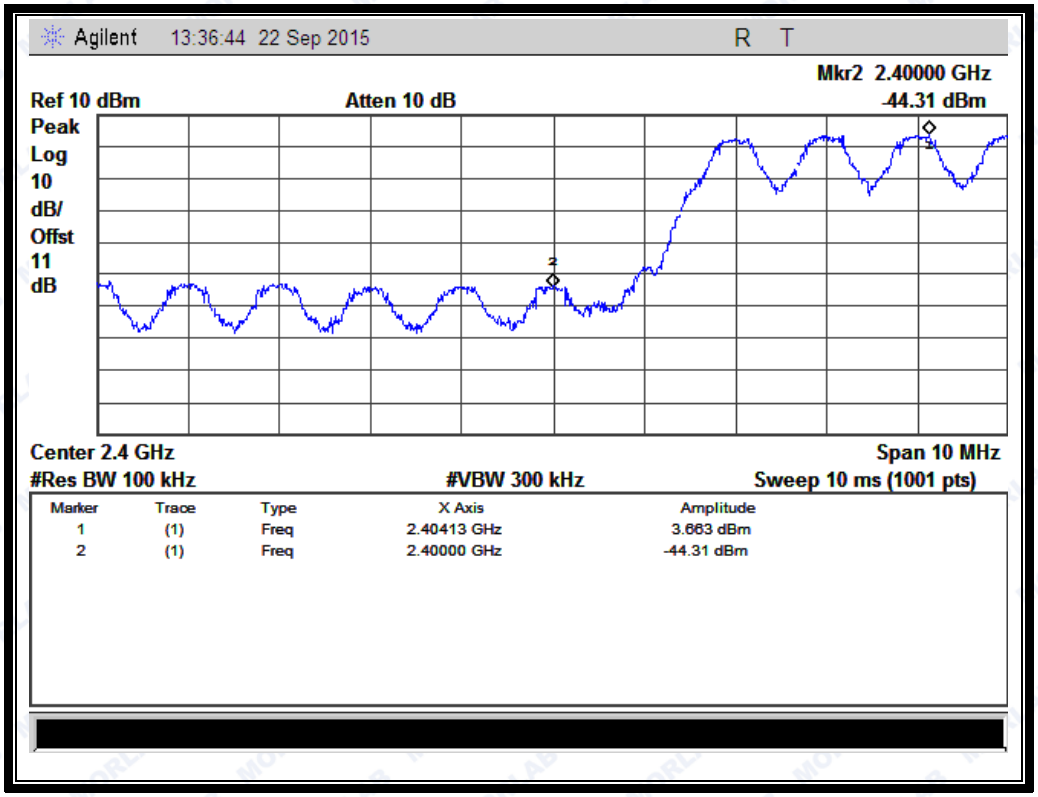
Note: the power of the Module transmitting frequency should be ignored.



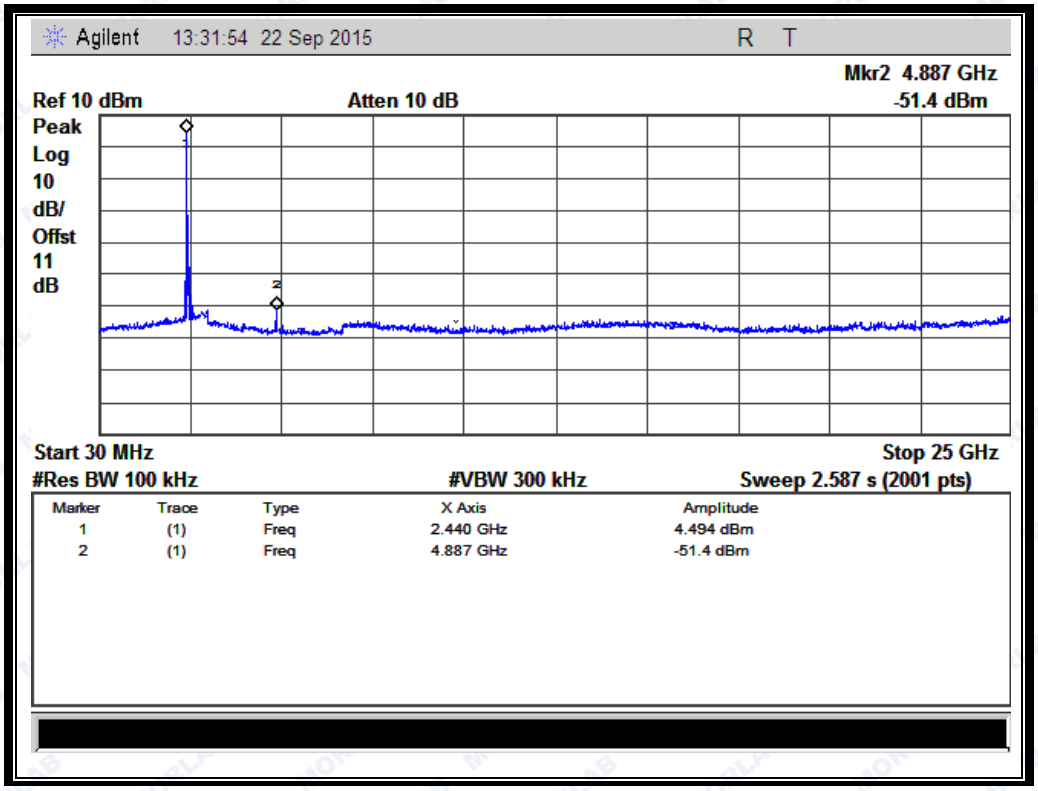
(Plot A.1: Channel = 0, 30MHz to 25GHz @ GFSK Mode)



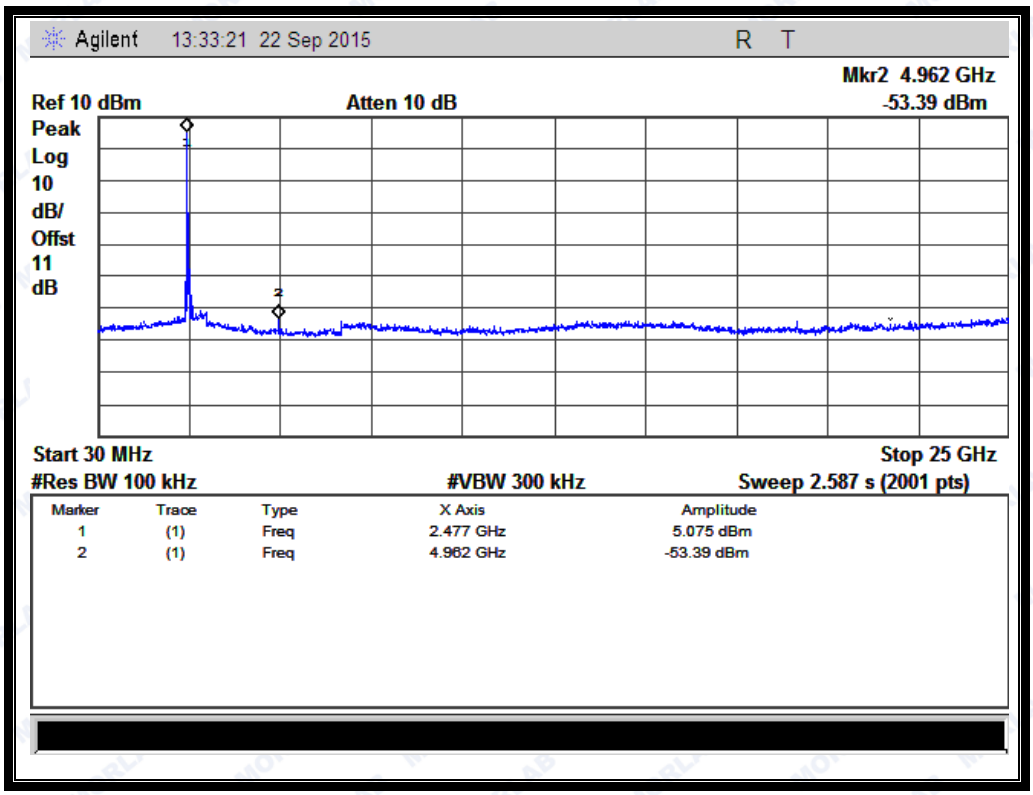
(Channel = 0, Band edge @ GFSK Mode)



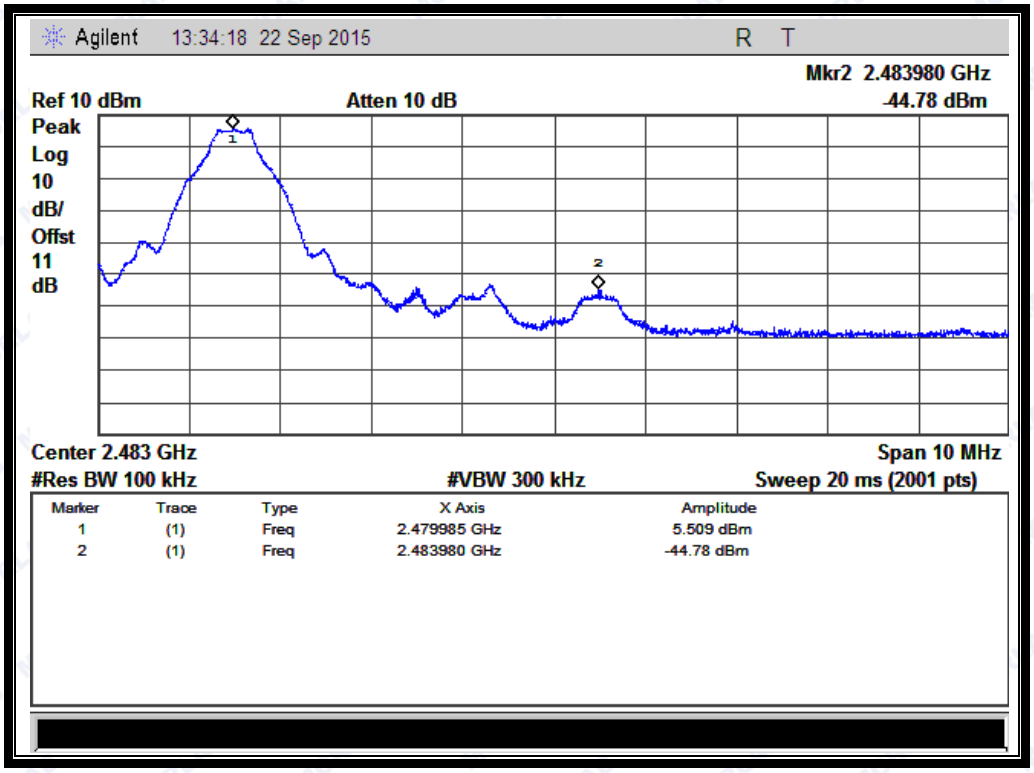
(Channel = 0, Band edge with hopping on @ GFSK Mode)



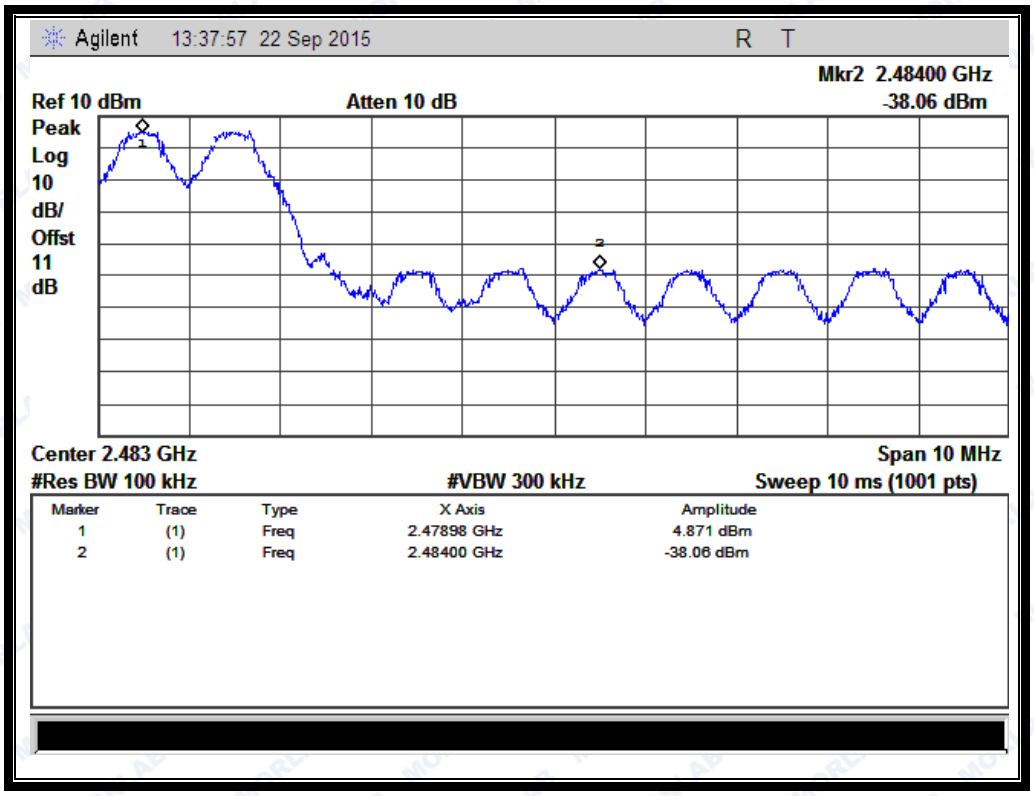
(Plot B.1: Channel = 39, 30MHz to 25GHz @ GFSK Mode)



(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)

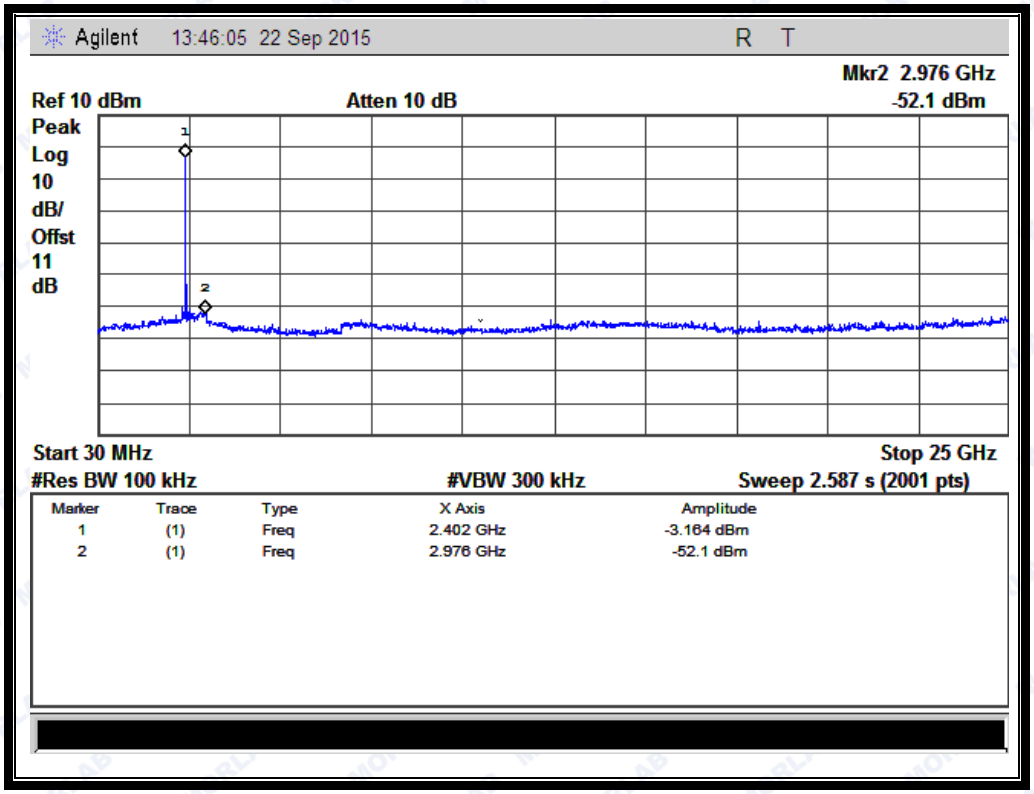
2.7.4.2 π/4-DQPSK Mode

A. Test Verdict:

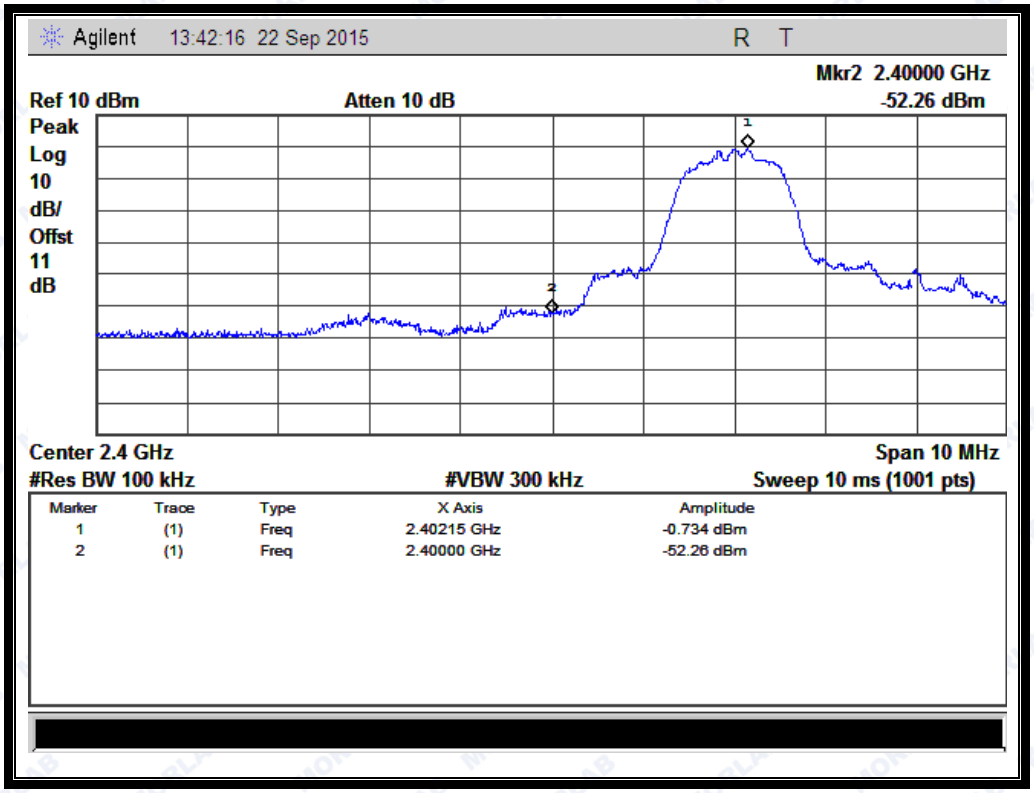
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-52.1	Plot D.1	-3.164	-23.164	PASS
39	2441	-51.08	Plot E.1	1.83	-18.17	PASS
78	2480	-51.44	Plot F.1	0.01	-19.99	PASS

B. Test Plots:

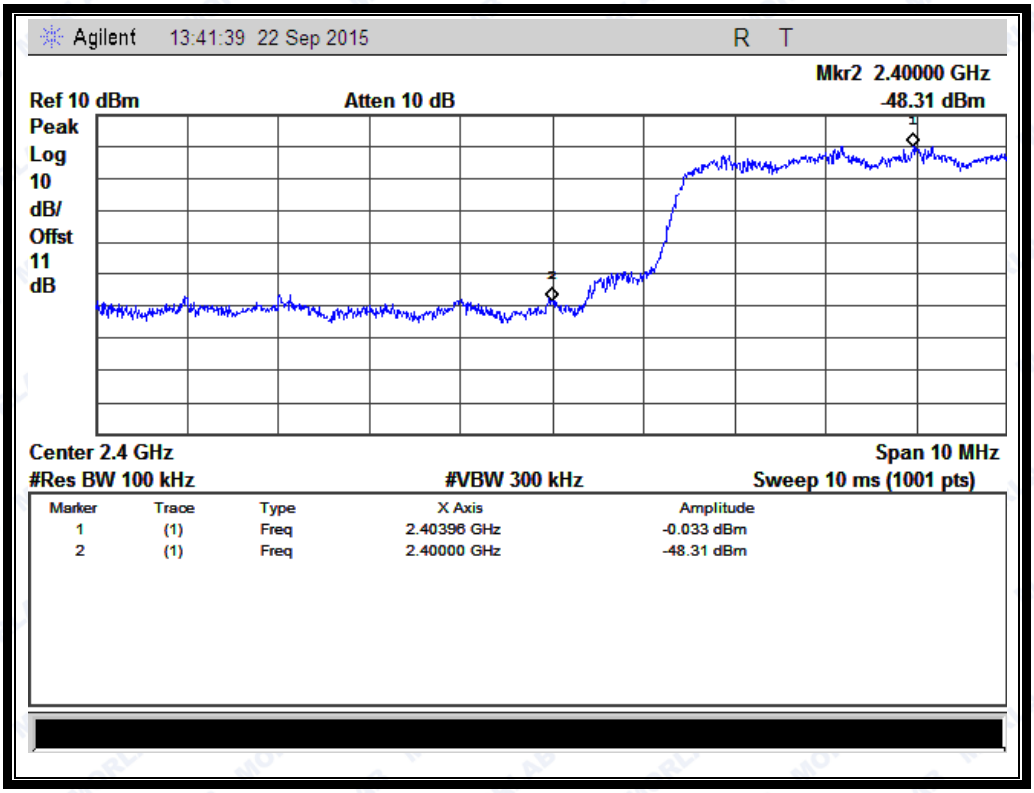
Note: the power of the Module transmitting frequency should be ignored.



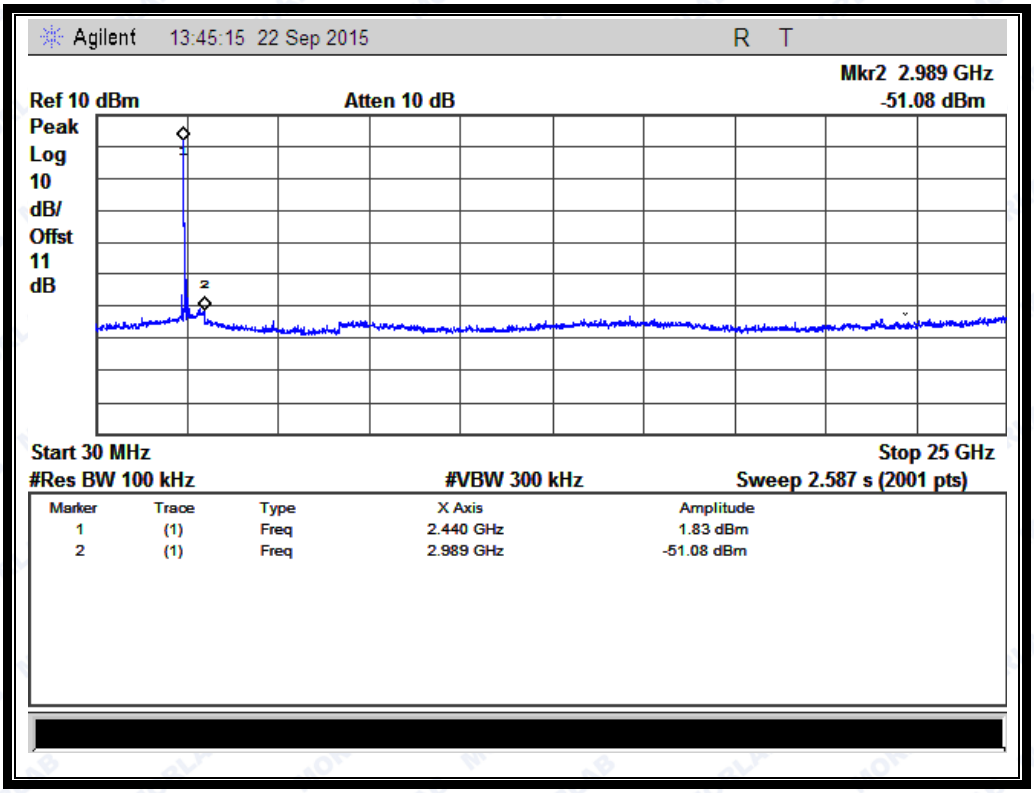
(Plot D.1: Channel = 0, 30MHz to 25GHz @π/4-DQPSK)



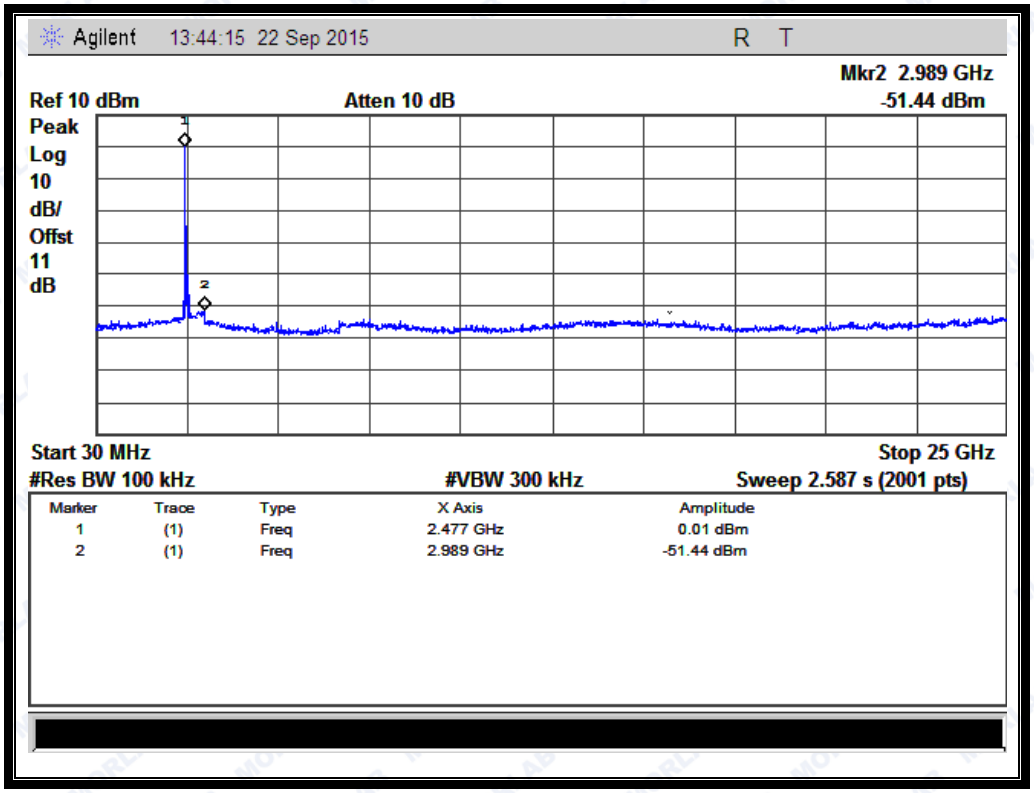
(Channel = 0, Band edge @π/4-DQPSK)



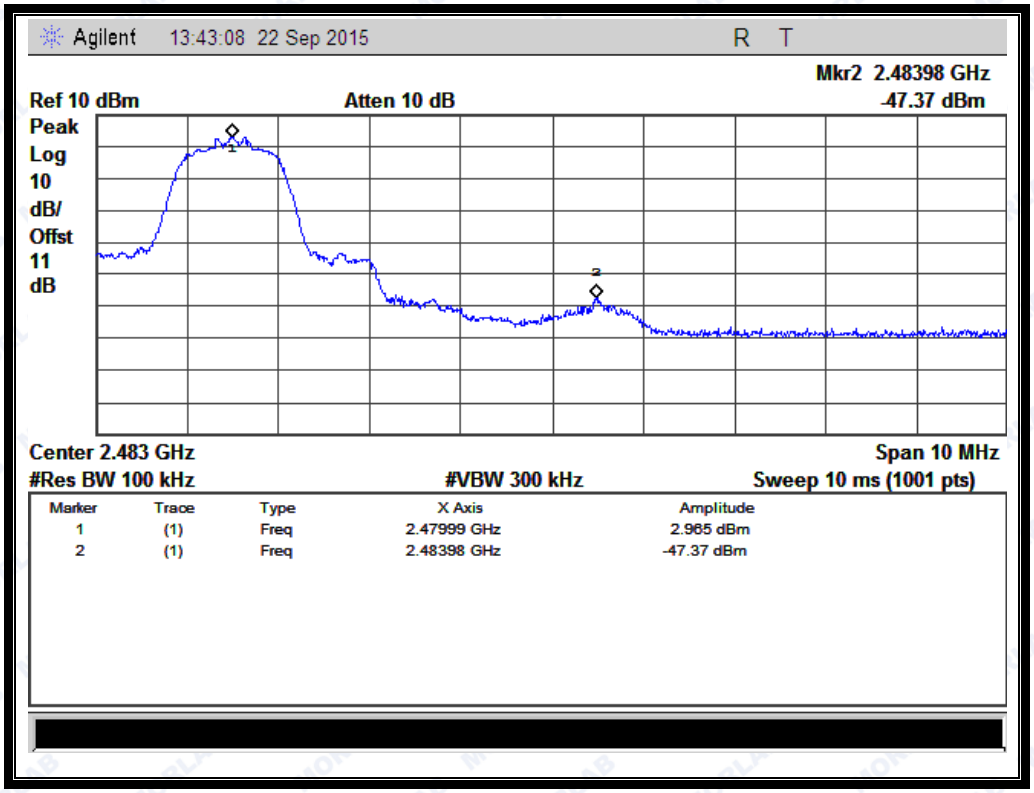
(Channel = 0, Band edge with hopping on @π/4-DQPSK)



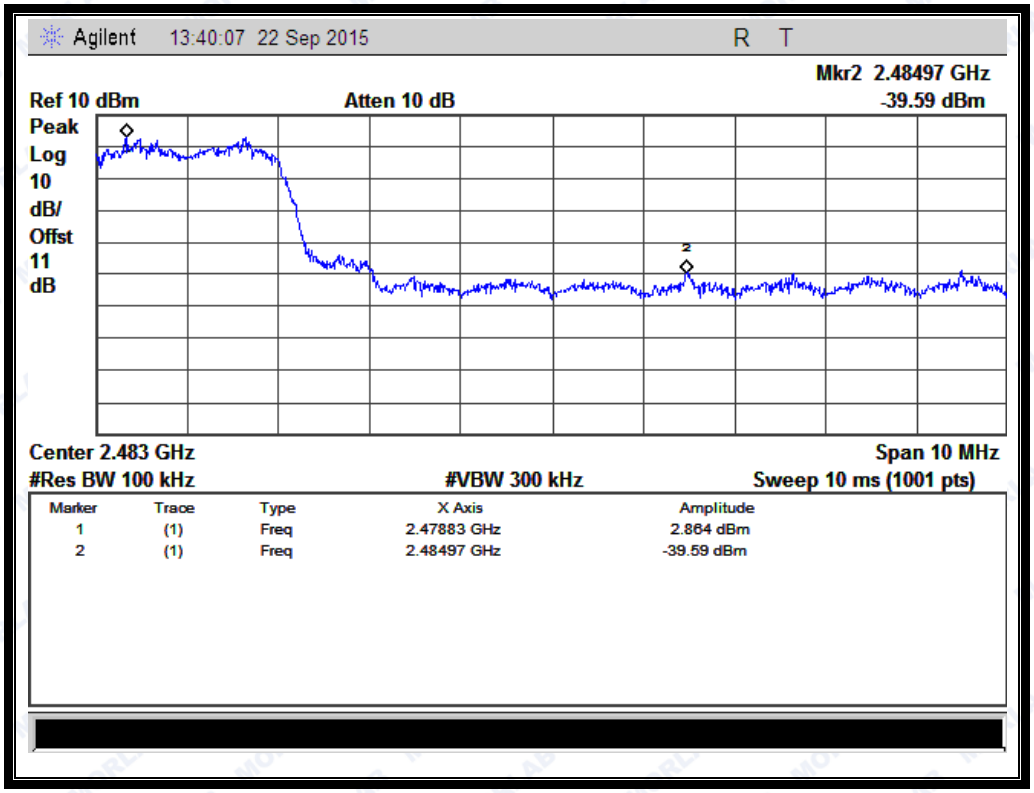
(Plot E.1: Channel = 39, 30MHz to 25GHz @ π/4-DQPSK)



(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)

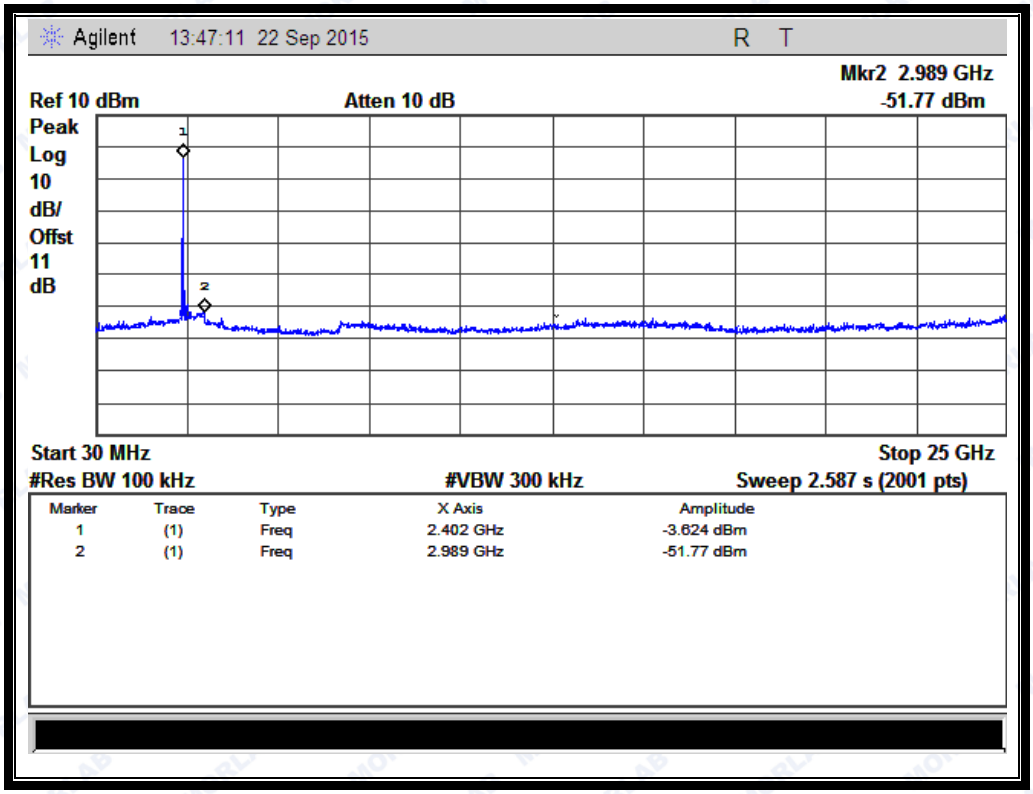
2.7.4.3 8-DPSK Mode

A. Test Verdict:

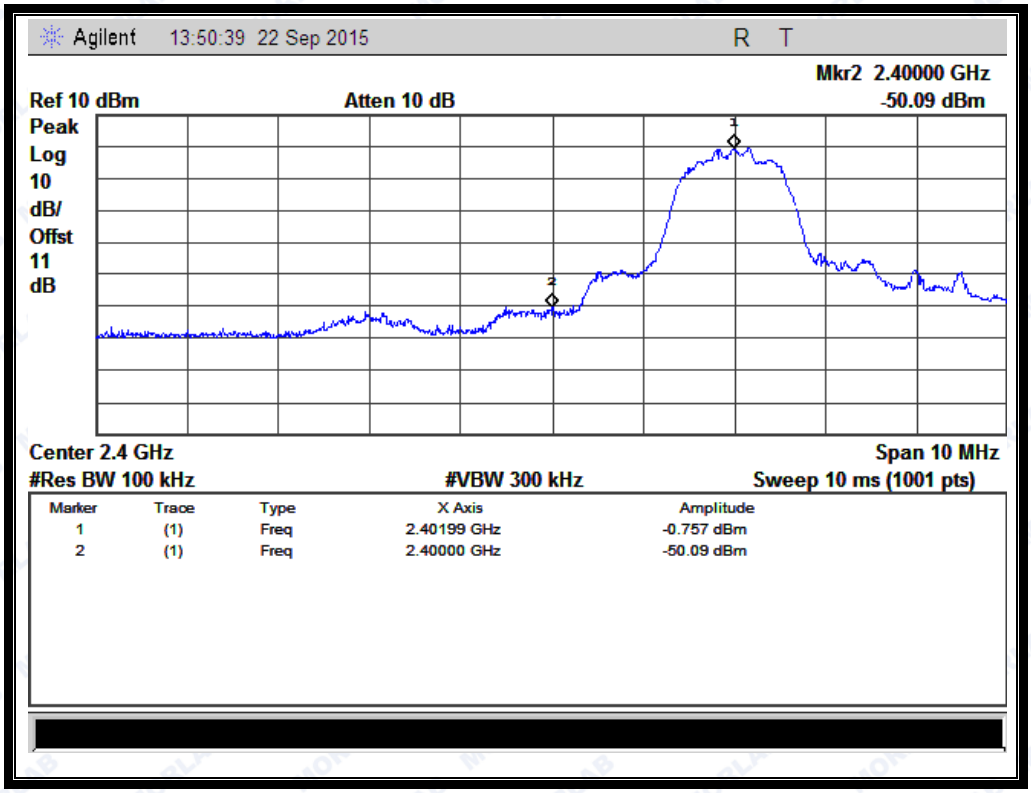
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-51.77	Plot G.1	-3.624	-23.624	PASS
39	2441	-51.42	Plot H.1	1.523	-18.477	PASS
78	2480	-51.4	Plot I.1	1.4	-18.6	PASS

B. Test Plots:

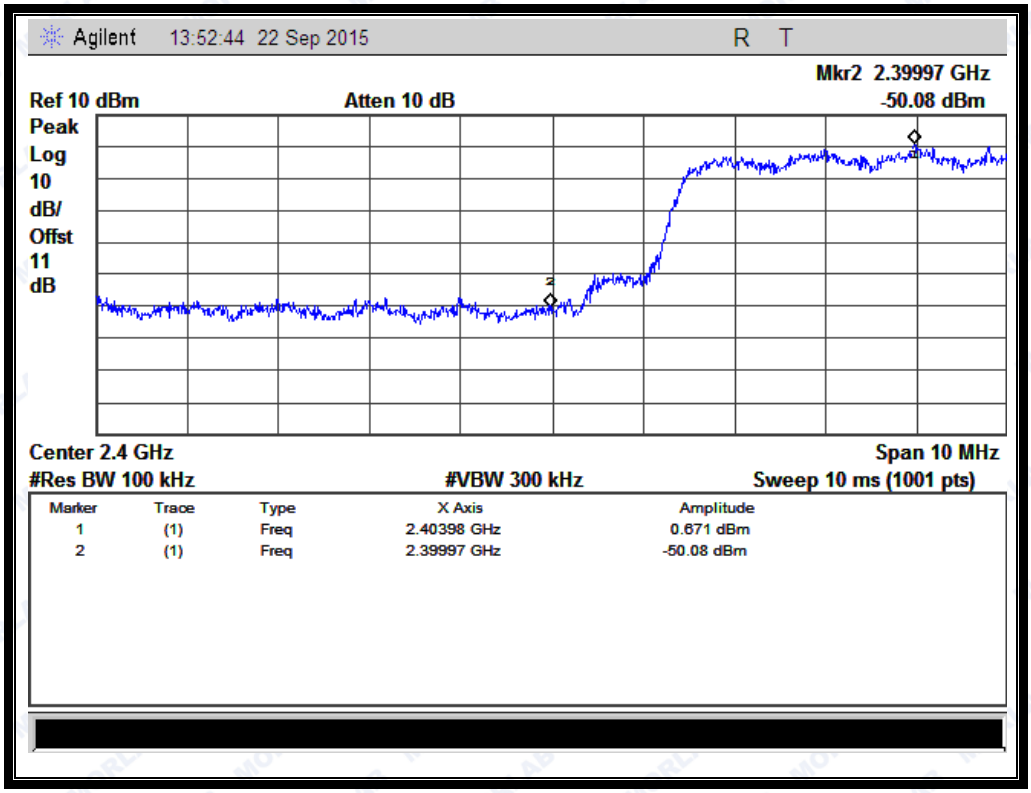
Note: the power of the Module transmitting frequency should be ignored.



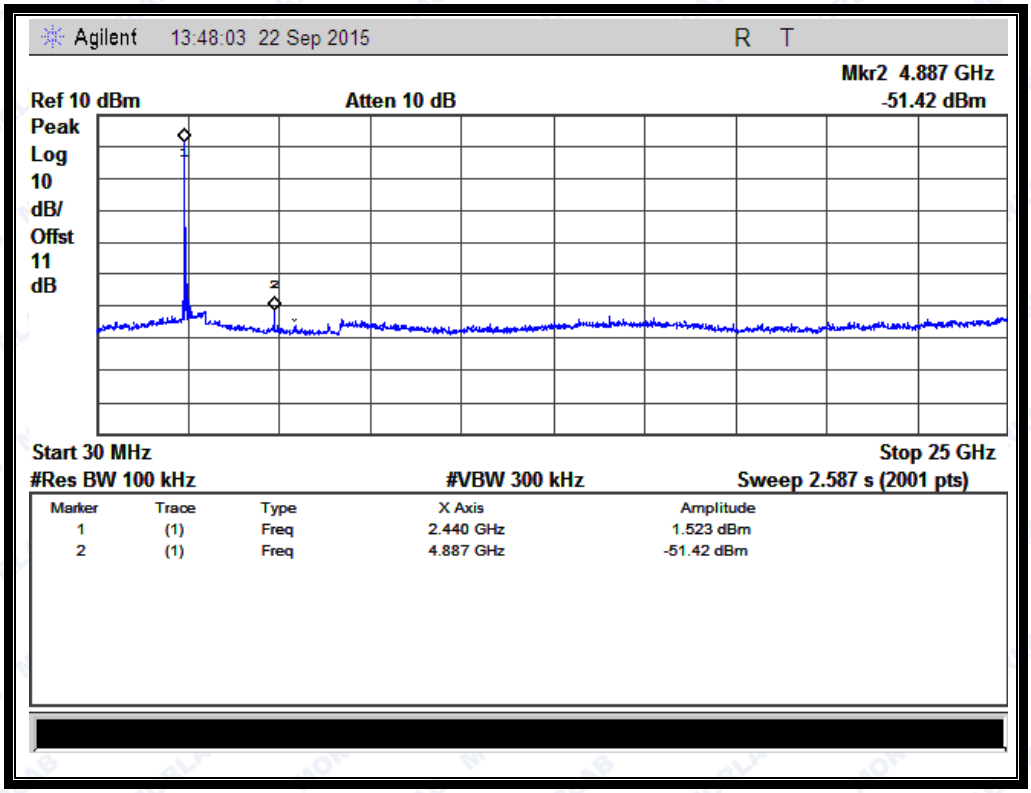
(Plot G.1: Channel = 0, 30MHz to 25GHz @ 8-DPSK)



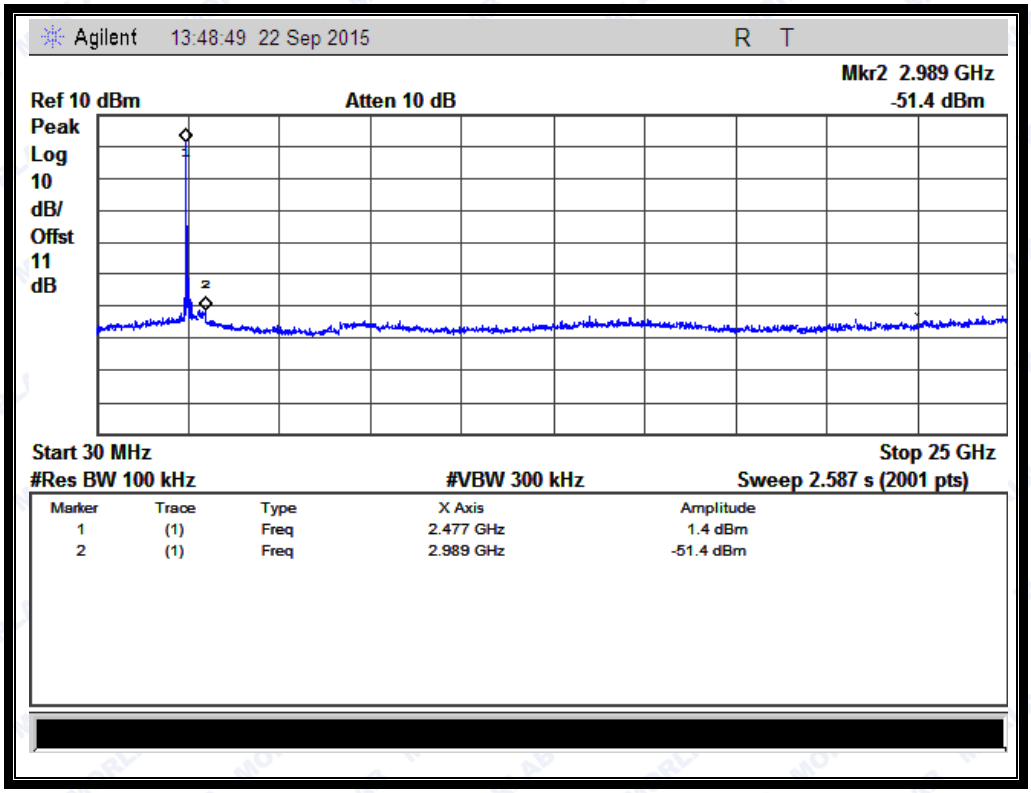
(Channel = 0, Band edge @ 8-DPSK)



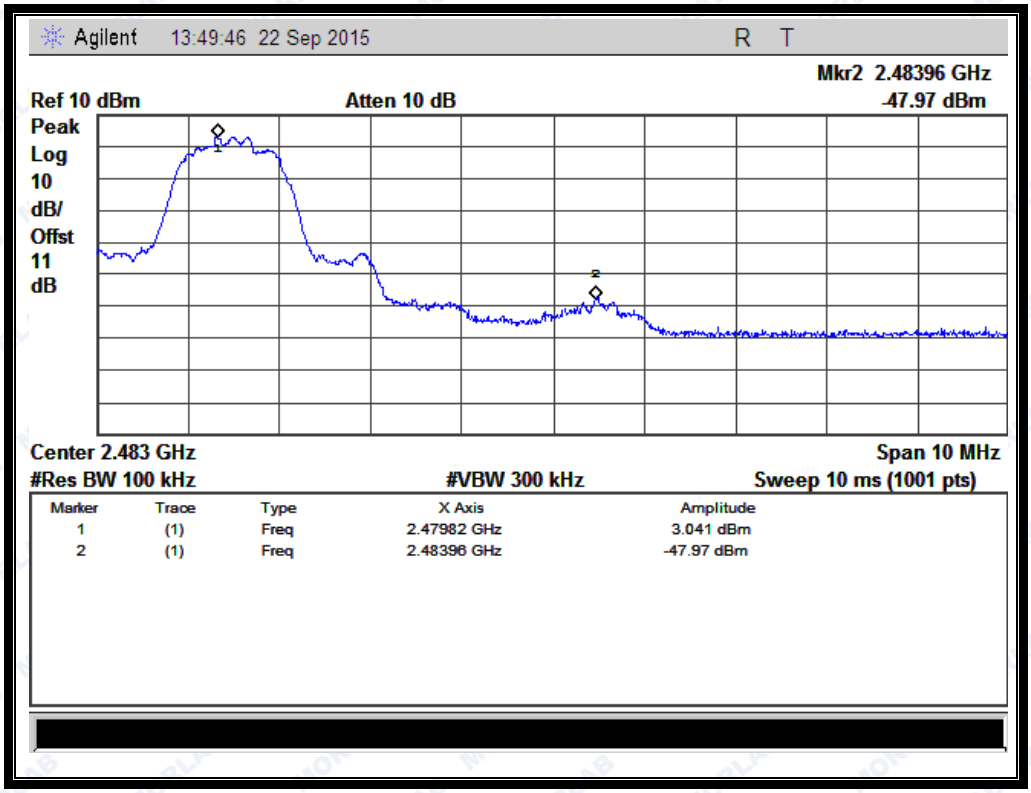
(Channel = 0, Band edge with hopping on @ 8-DPSK)



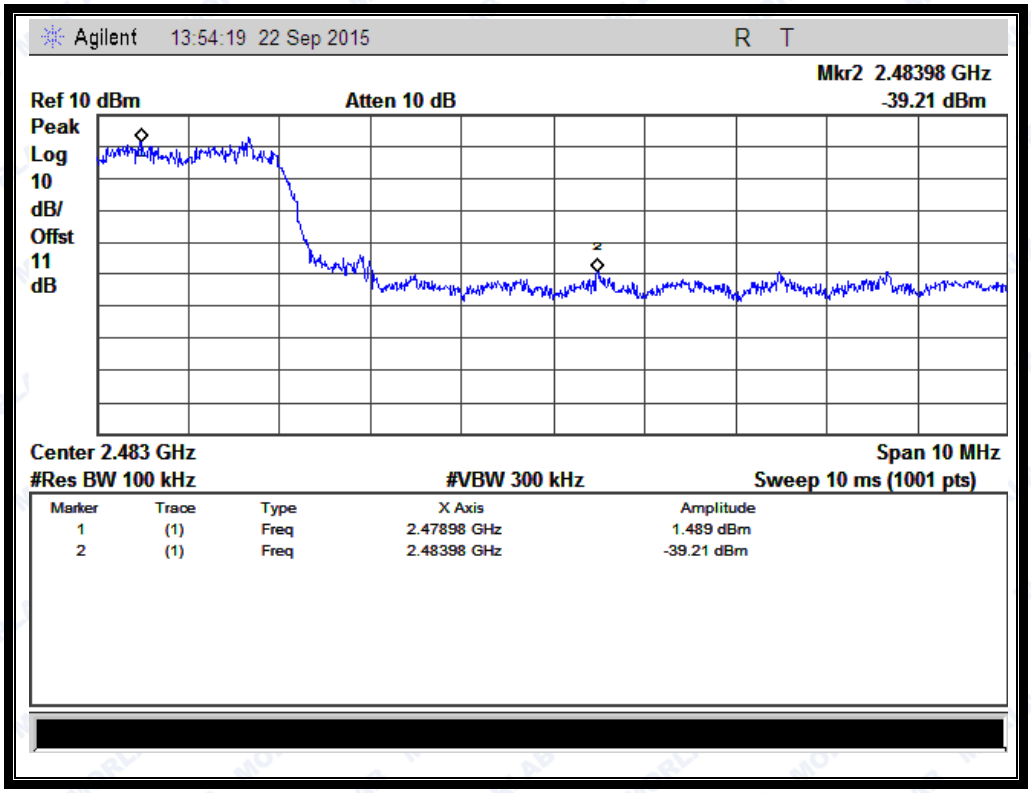
(Plot H.1: Channel = 39, 30MHz to 25GHz @ 8-DPSK)



(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)

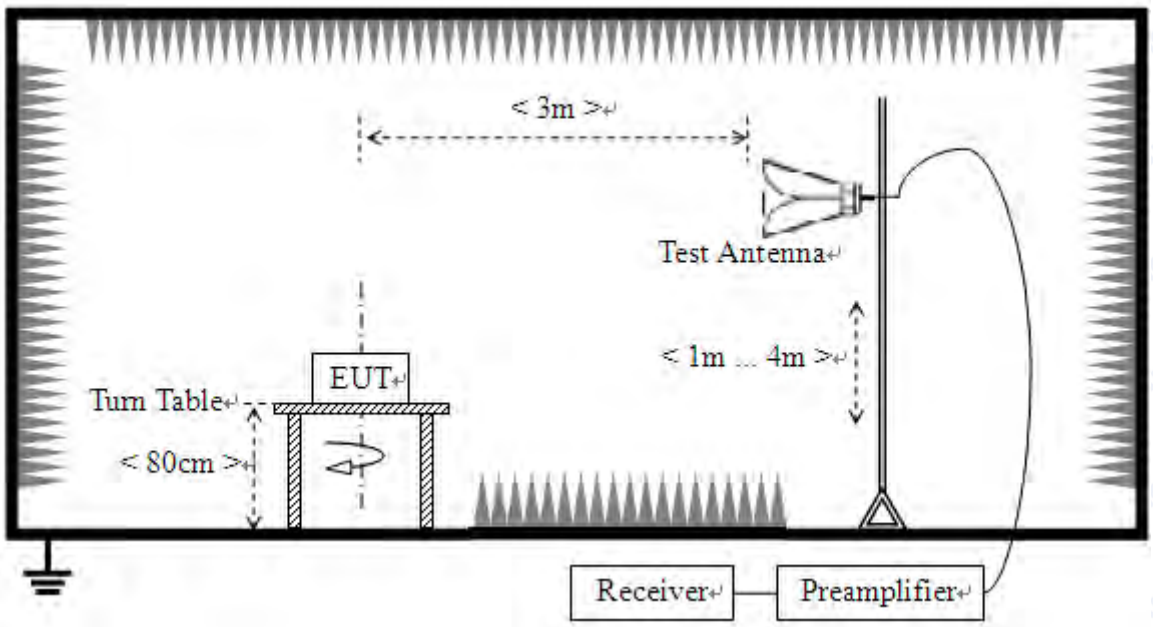
2.8 Restricted Frequency Bands

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

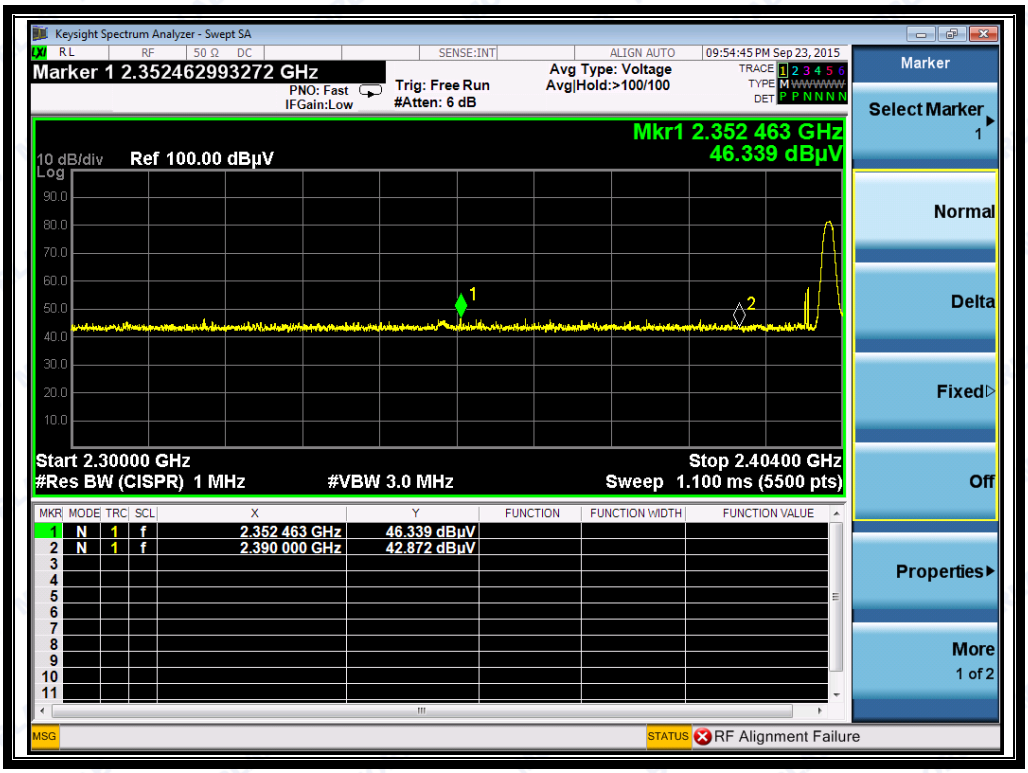
The lowest and highest channels are tested to verify Restricted Frequency Bands.
The measurement results are obtained as below:
E [dBμV/m] =U_R + A_T + A_{Factor} [dB]; AT =$L_{Cable\ loss}$ [dB]-G_{preamp} [dB]
AT: Total correction Factor except Antenna
UR: Receiver Reading
Gpreamp: Preamplifier Gain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

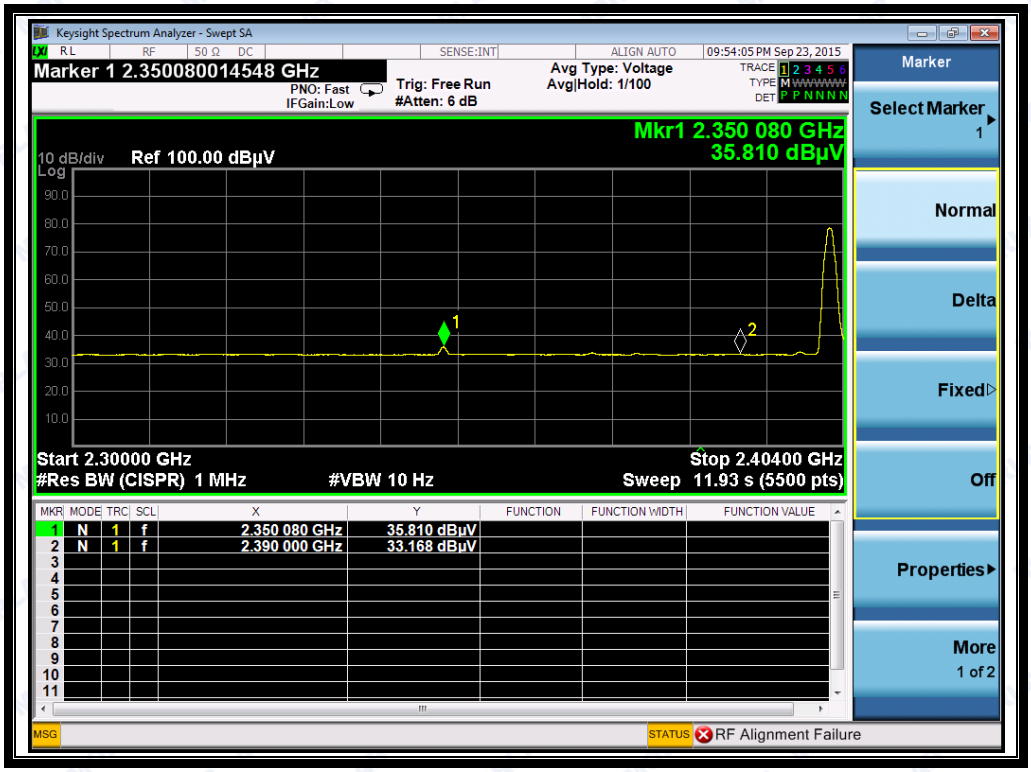
A. Test Verdict:

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	2352.46	PK	46.34	-33.63	32.56	45.27	74	Pass
0	2350.08	AV	35.81	-33.63	32.56	34.74	54	Pass
78	2484.15	PK	47.96	-33.18	32.5	47.28	74	Pass
78	2484.01	AV	41.23	-33.18	32.5	40.55	54	Pass

B. Test Plots:

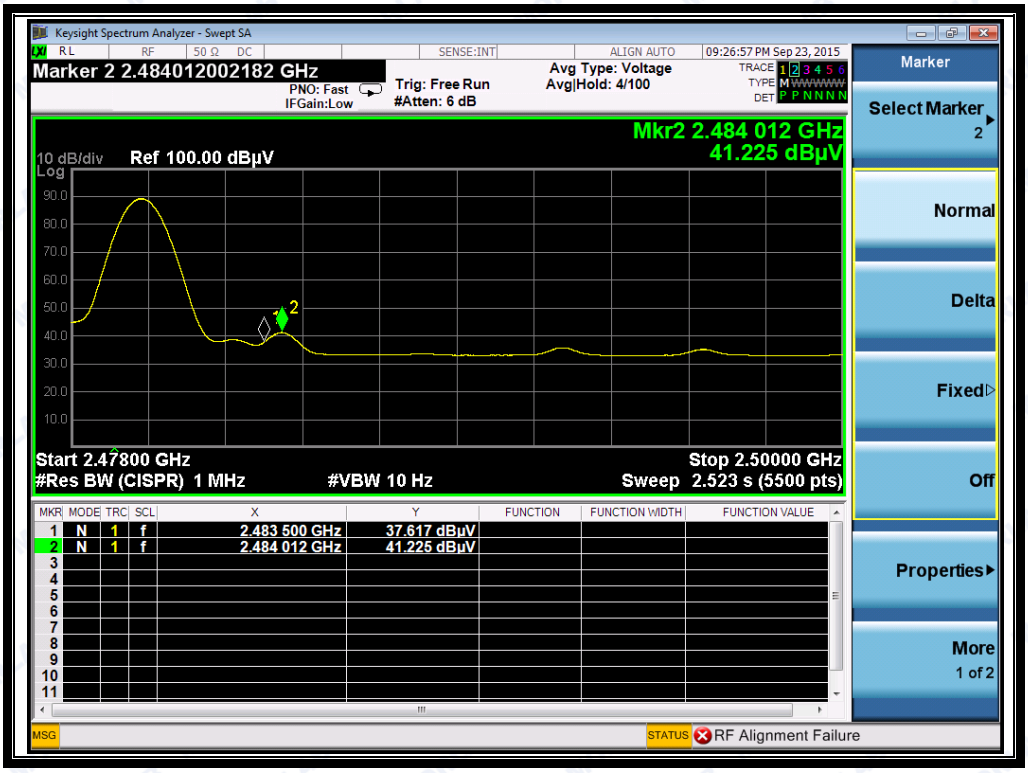


(Plot A1:Channel = 0 PEAK @ GFSK)



(Plot A2:Channel = 0 AVERAGE @ GFSK)

(Plot B1: Channel = 78 PEAK @ GFSK)



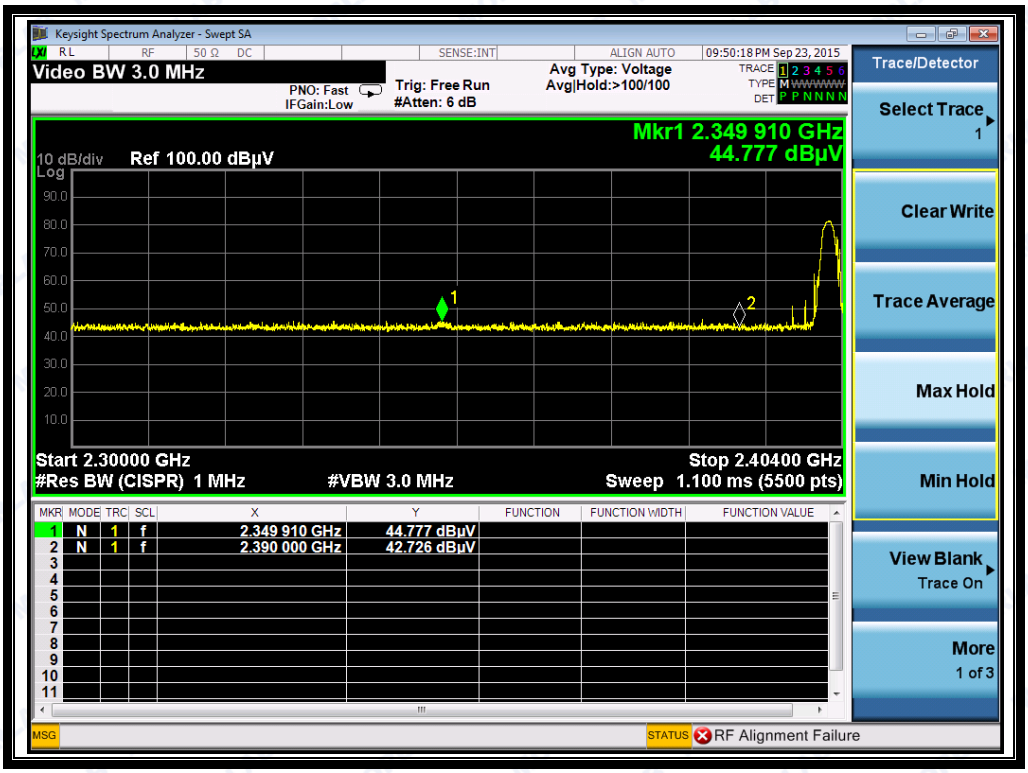
(Plot B2: Channel = 78 AVERAGE @ GFSK)

2.8.4.2 π/4-DQPSK Mode

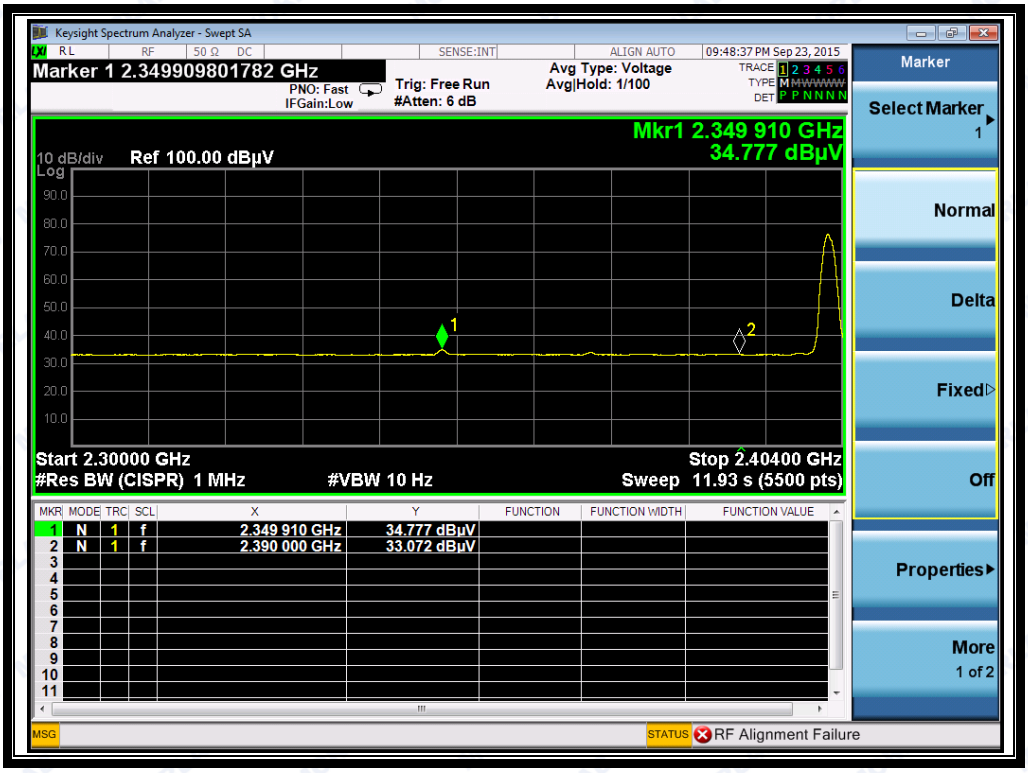
A. Test Verdict:

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	2349.91	PK	44.78	-33.63	32.56	43.71	74	Pass
0	2349.91	AV	34.77	-33.63	32.56	33.70	54	Pass
78	2483.72	PK	48.34	-33.18	32.5	47.66	74	Pass
78	2484.06	AV	37.71	-33.18	32.5	37.03	54	Pass

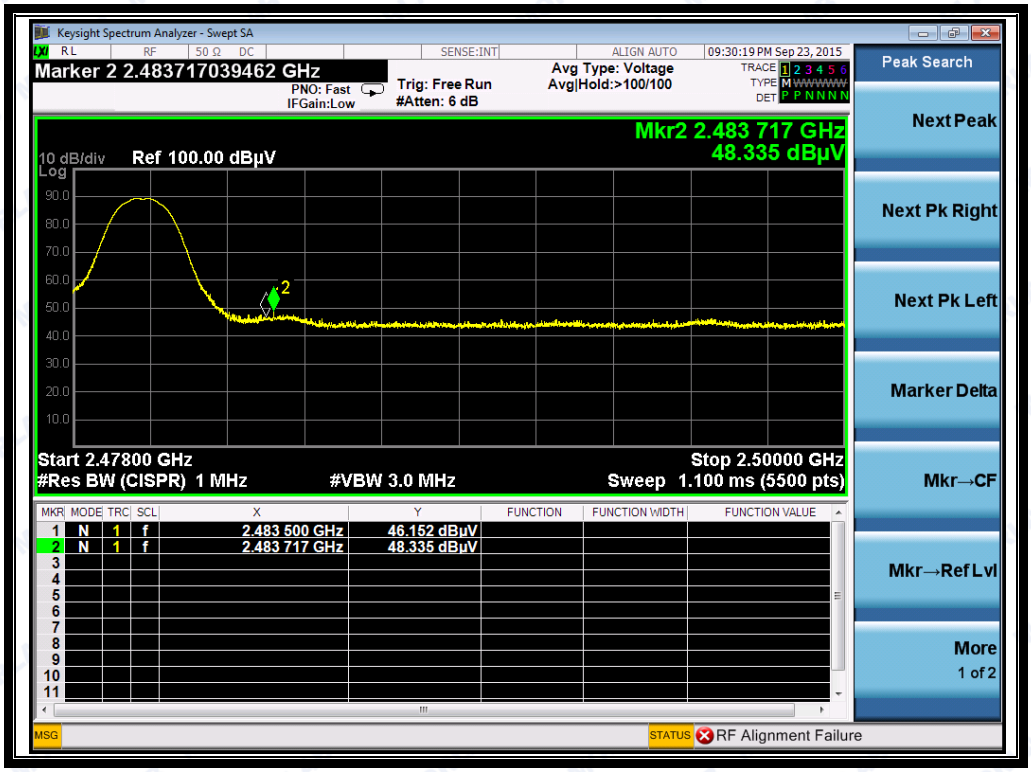
B. Test Plots:



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



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



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

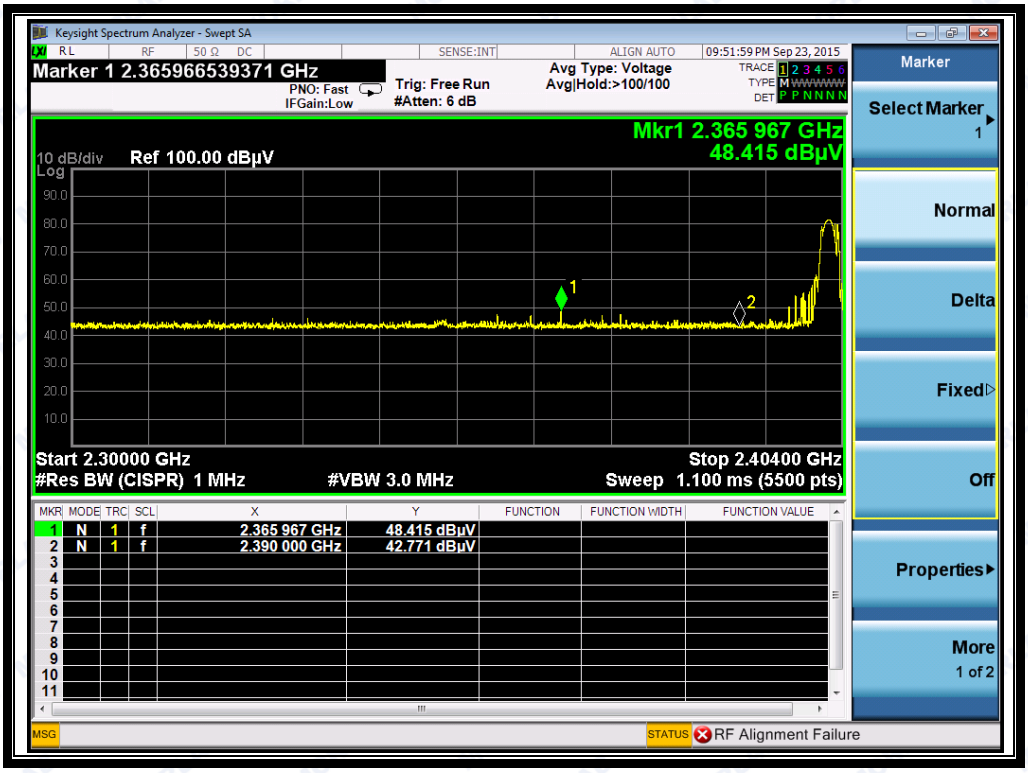
(Plot D2: Channel = 78 AVERAGE@ π/4-DQPSK)

2.8.4.3 8-DPSK Mode

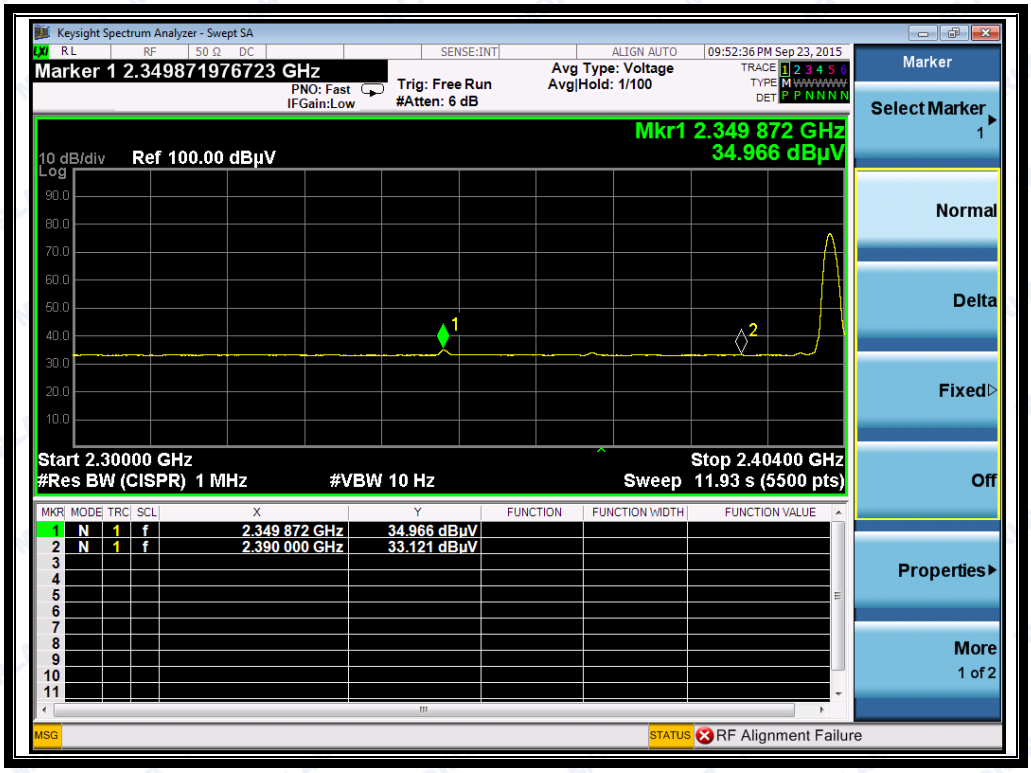
A. Test Verdict:

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	2365.97	PK	48.42	-33.63	32.56	47.35	74	Pass
0	2349.87	AV	34.97	-33.63	32.56	33.90	54	Pass
78	2484.00	PK	46.17	-33.18	32.5	45.49	74	Pass
78	2483.95	AV	37.35	-33.18	32.5	36.67	54	Pass

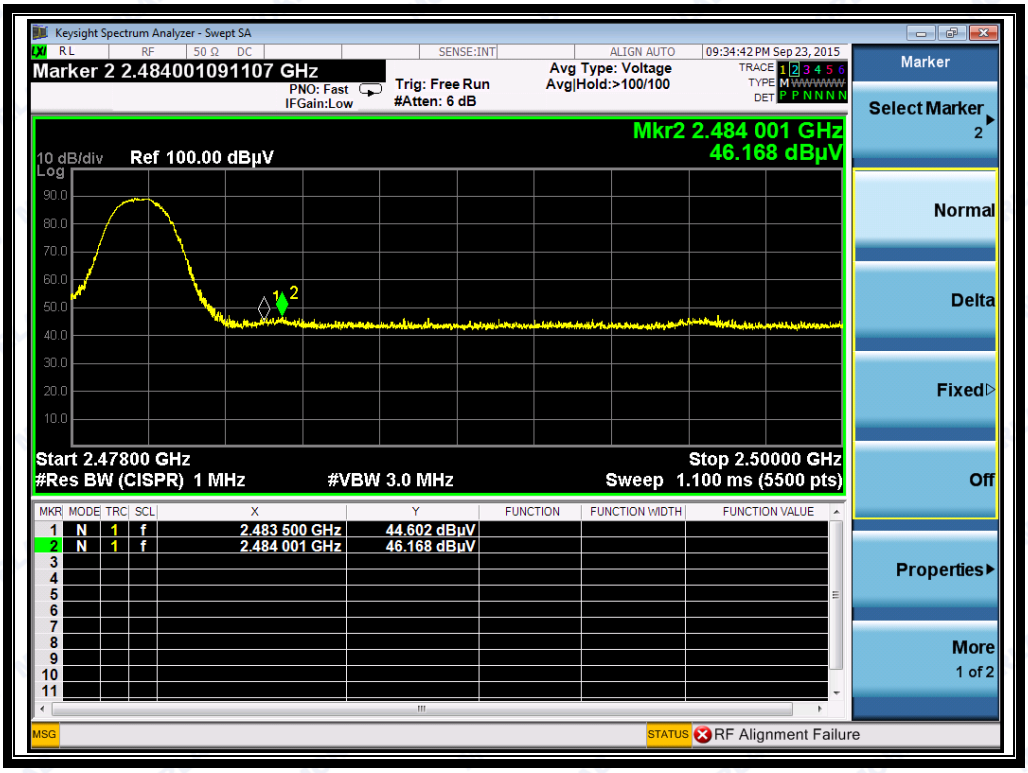
B. Test Plots:



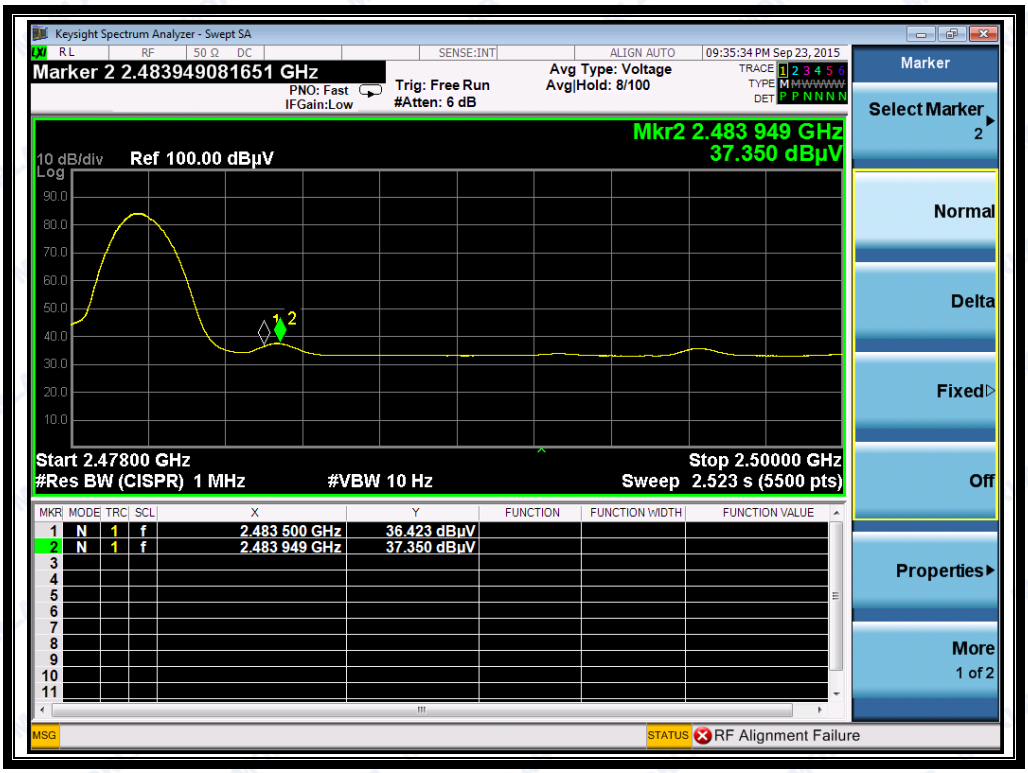
(Plot E1: Channel = 0 PEAK @ 8-DPSK Mode)



(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 Conducted Emission

2.9.1 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 50μH/50Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5- 30	60	50

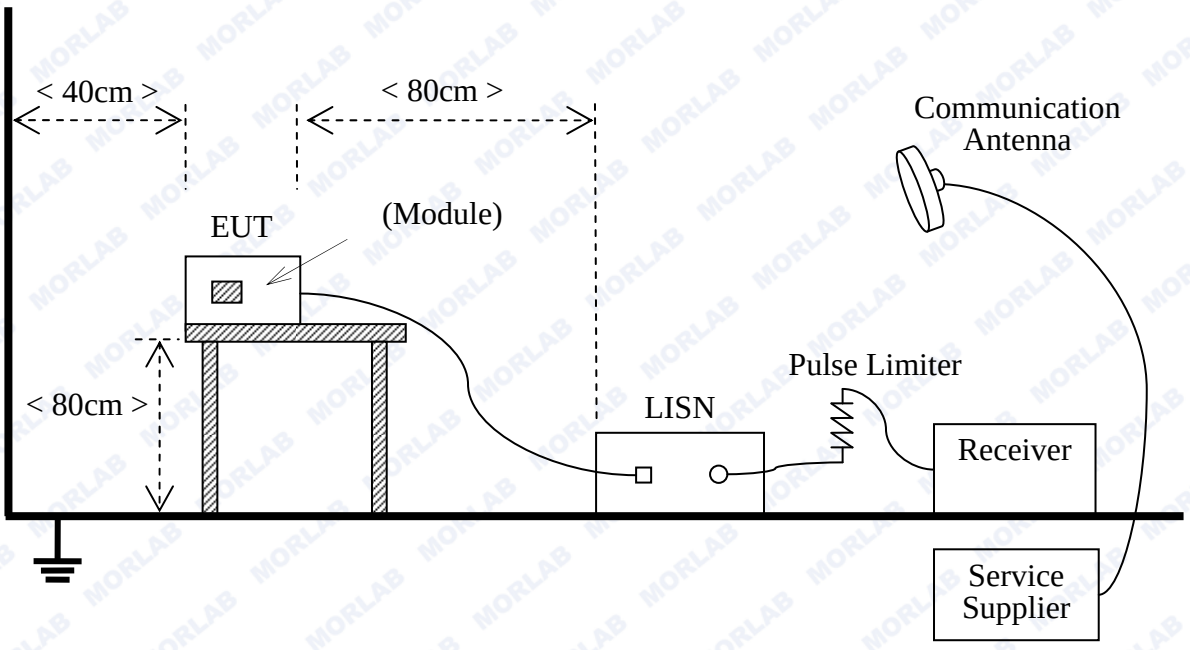
NOTE:

(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.

2.9.2 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 C63.4:2009

The factors of the site are calibrated 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.

B. Equipments List:

Please reference ANNEX A(1.4).

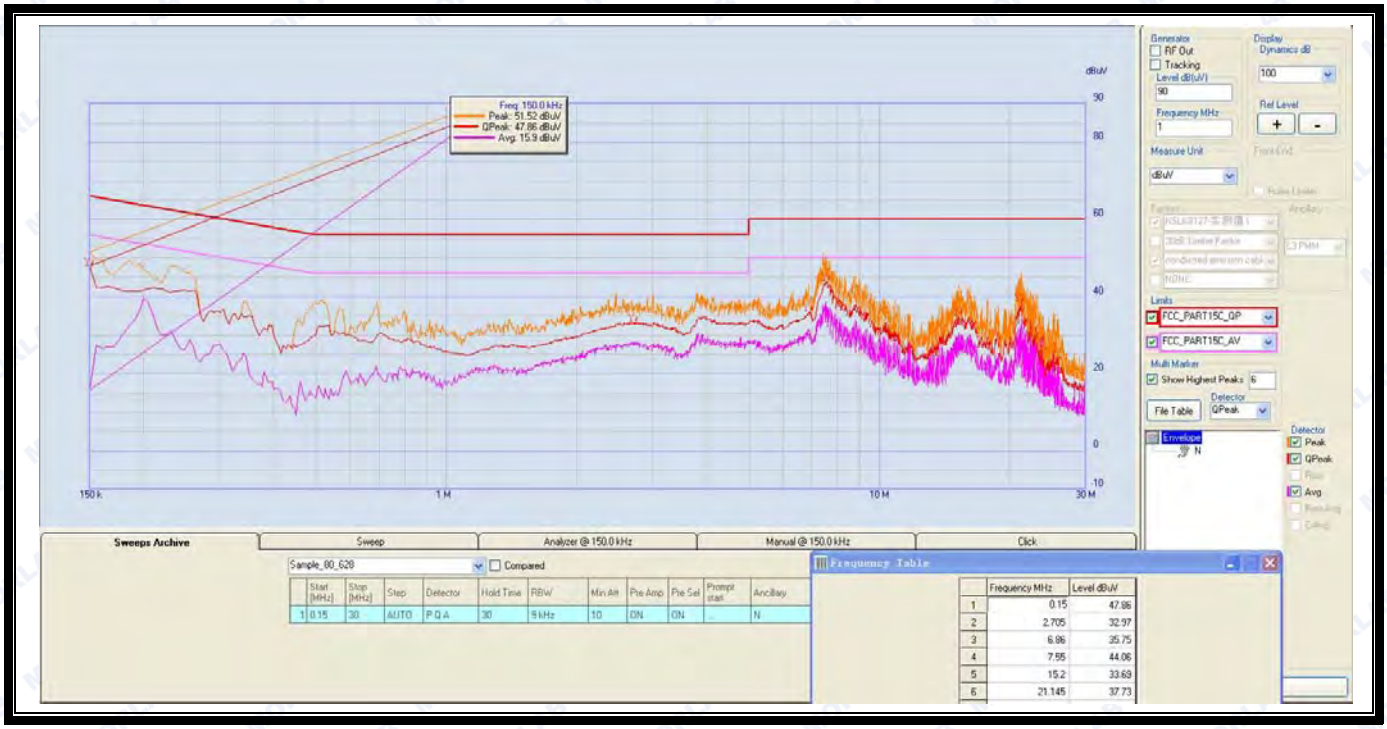
2.9.3 Test Result

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.

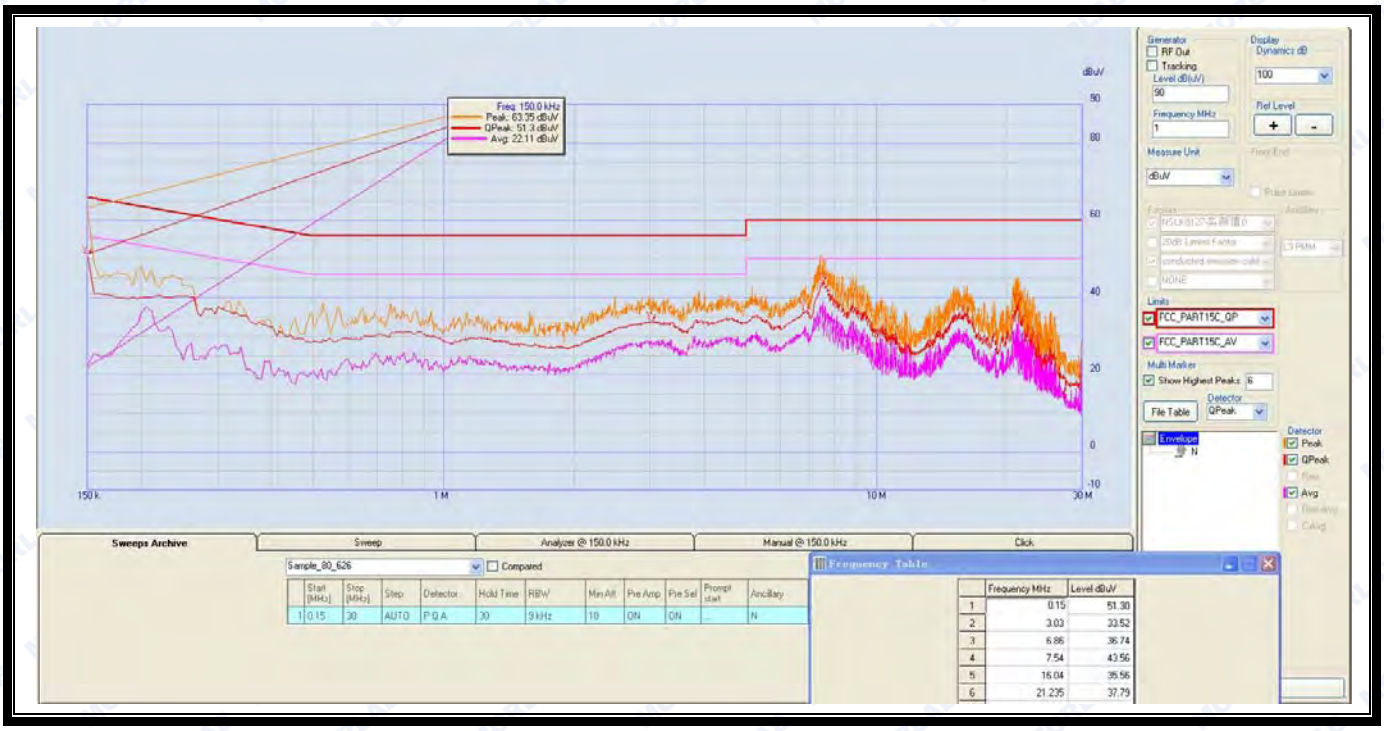
A. Test setup:

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

B. Test Plots:



(Plot A: L Phase)



(Plot B: N Phase)

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 (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:

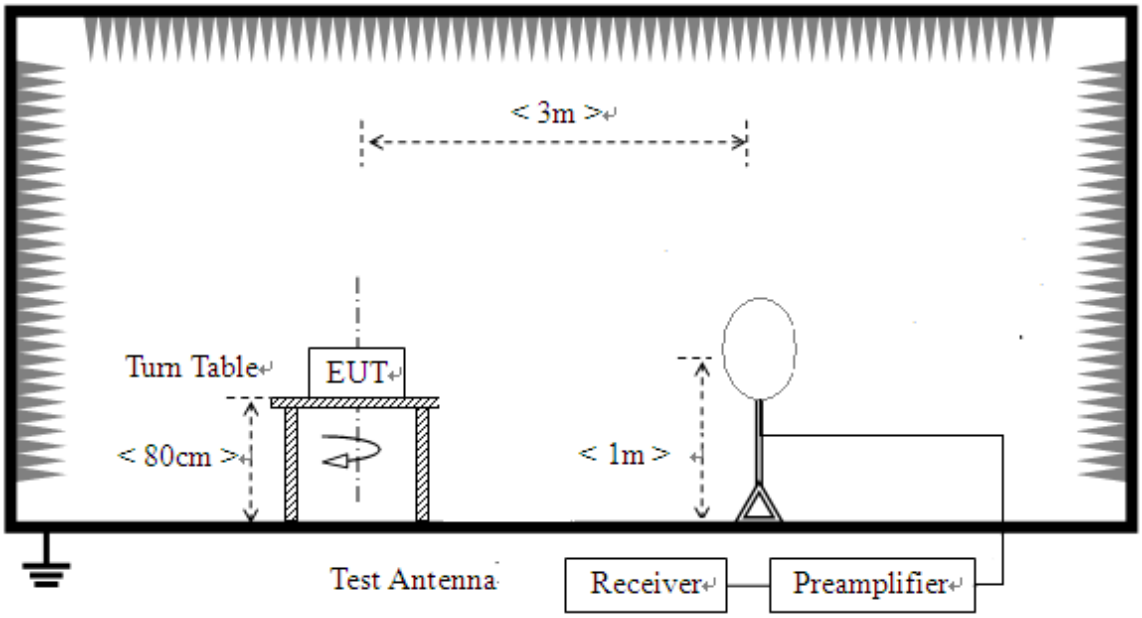
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength 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)

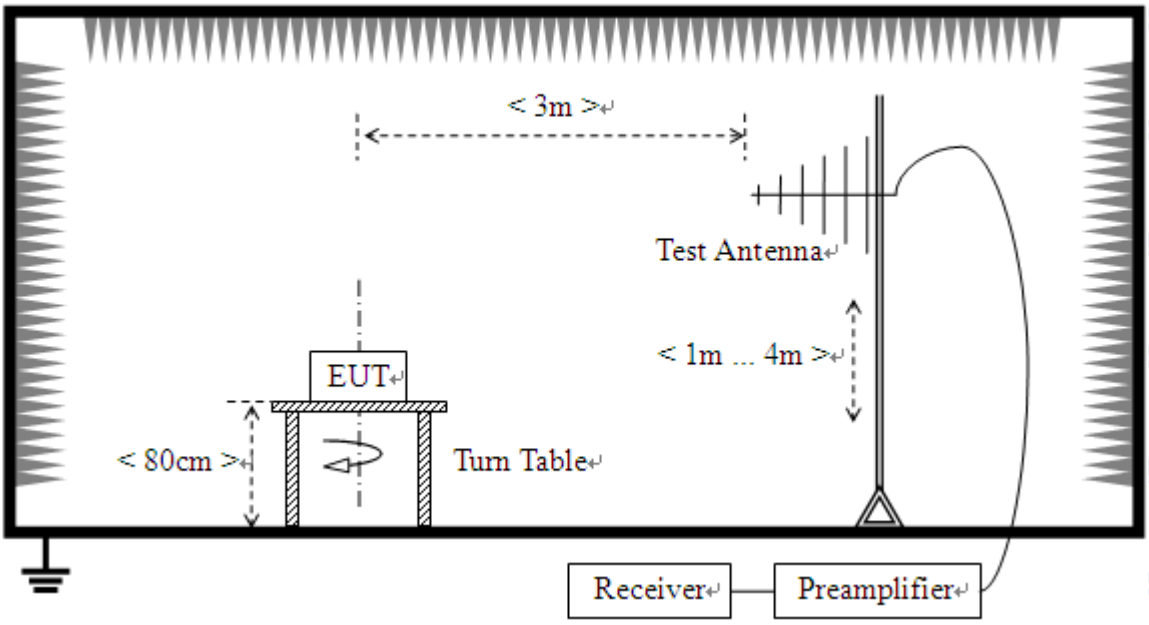
2.10.2 Test Description

A. Test Setup:

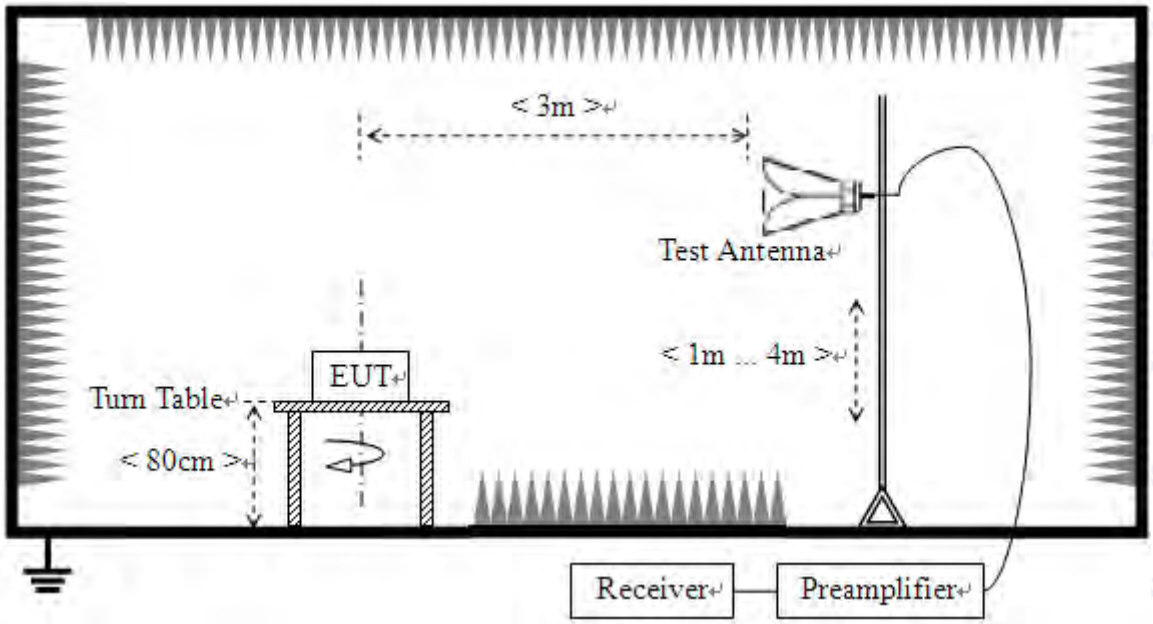
1) For radiated emissions from 9kHz to 30MHz



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 C63.4 (2009). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4.

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).

2.10.3 Test Procedure

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

2.10.4 Test Result

According to ANSI C63.4 selection 4.2.2, 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.

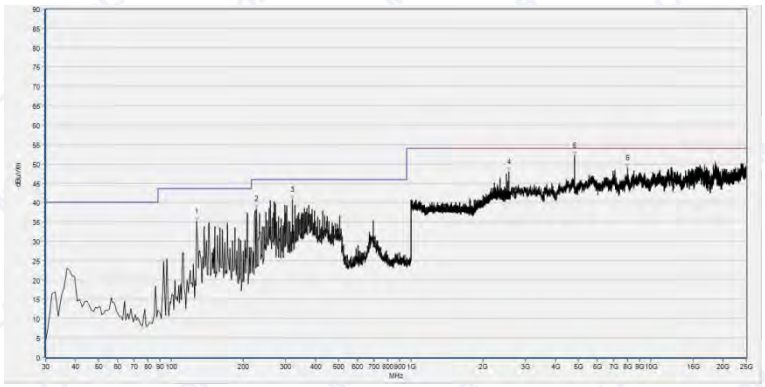
Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

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.

2.10.4.1 GFSK Mode：

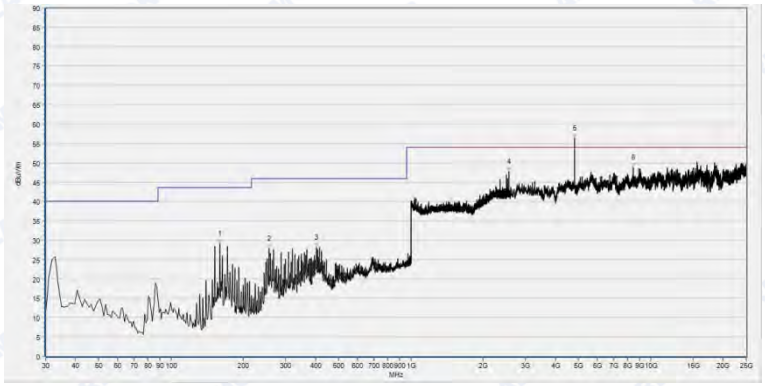
A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
127.970	35.26	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
226.910	38.43	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
320.030	40.66	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2557.743	47.86	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
4803.900	48.52	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
7993.272	48.88	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

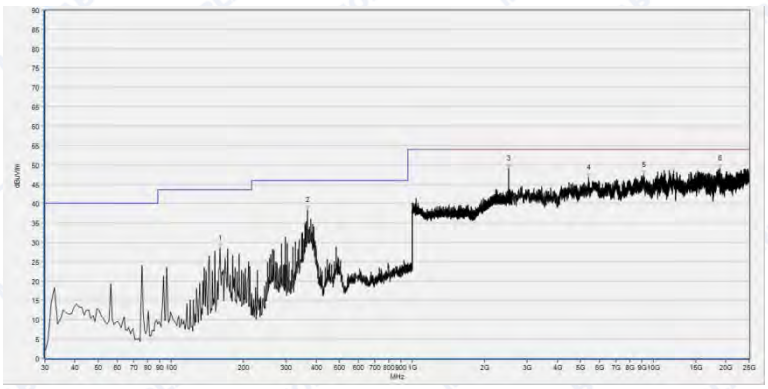
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 0)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
159.980	29.17	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
256.010	27.90	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
404.420	28.12	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2557.743	47.73	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
4804.300	57.85	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
10877.287	48.21	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

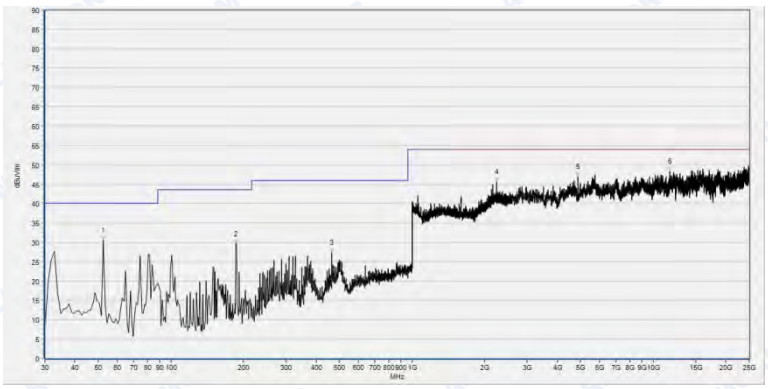
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 0)

Plot for Channel = 39



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
159.980	28.50	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
367.560	38.41	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2516.767	49.08	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
5390.326	46.82	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
9129.769	47.36	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
18869.431	49.19	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

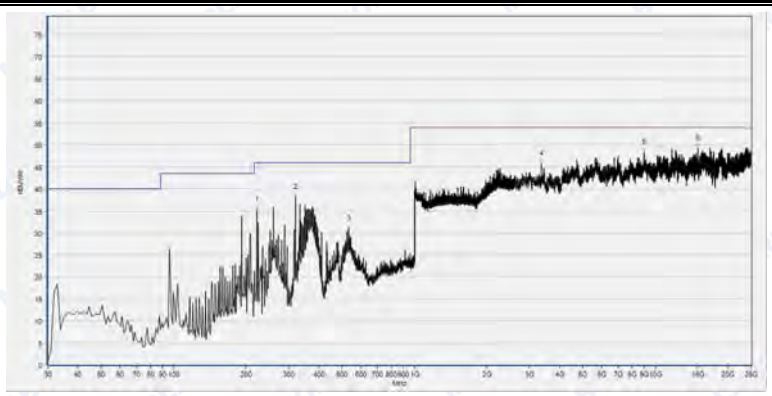
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 39)



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
52.310	30.44	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
186.170	29.50	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
463.590	27.26	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2236.335	45.61	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
4881.142	46.99	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
11749.009	48.24	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

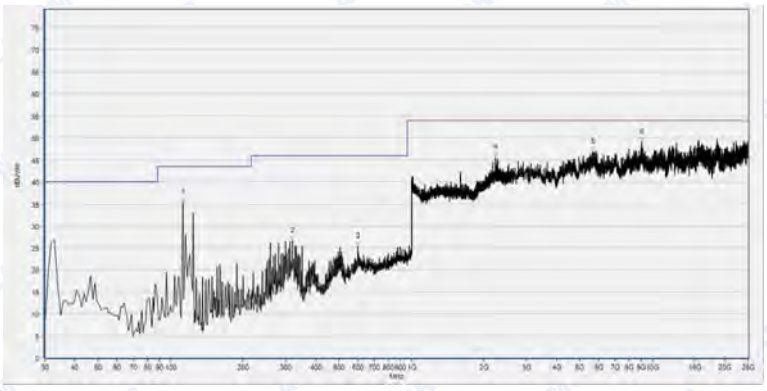
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 39)

Plot for Channel = 78



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
221.090	35.25	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
320.030	38.16	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
532.460	31.09	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
3365.812	45.75	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
8954.610	48.33	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
15011.857	49.30	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

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



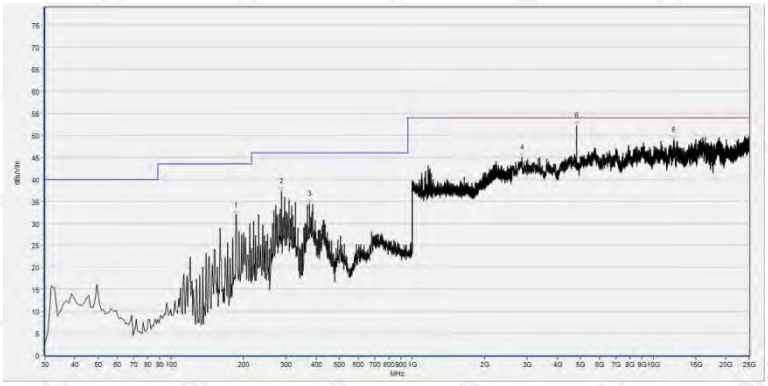
Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
112.450	35.45	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
320.030	26.68	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
598.420	25.49	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2233.133	45.78	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5663.248	46.91	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
9019.785	49.16	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

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

2.10.4.2 π/4-DQPSK Mode:

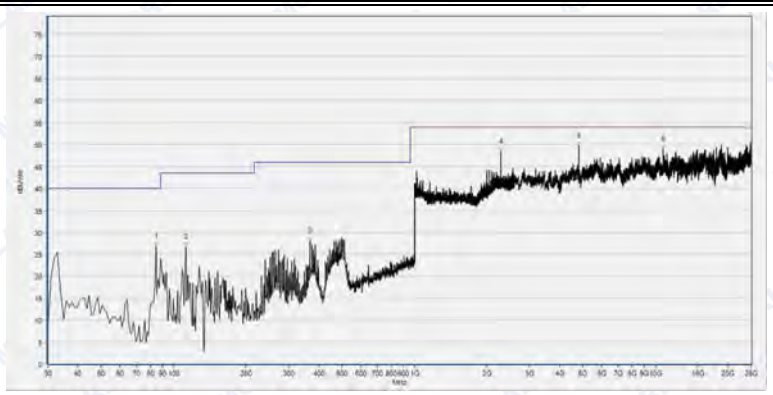
B. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
186.170	31.86	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
288.020	37.27	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
376.290	34.44	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2860.702	44.94	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
4803.746	52.23	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
12131.915	48.91	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

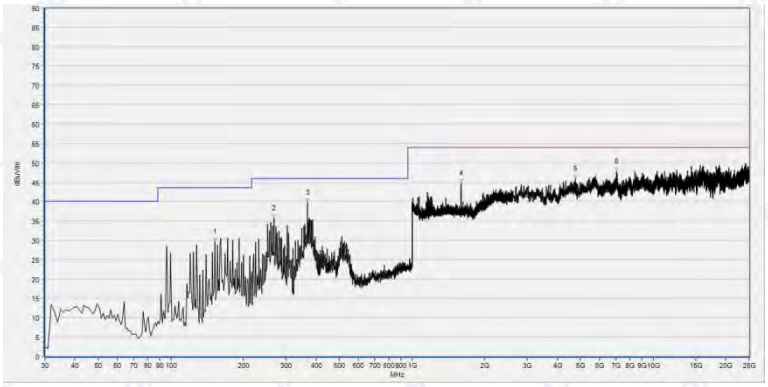
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 0)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
84.320	36.88	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
112.450	26.64	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
367.560	28.05	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2283.713	48.38	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
4803.746	49.67	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
10795.817	48.95	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

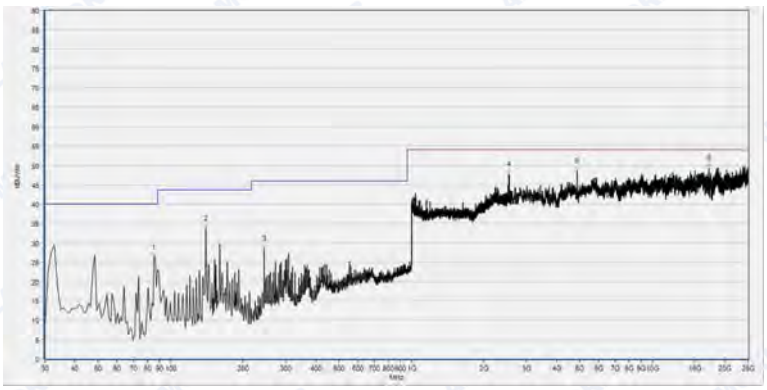
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 0)

Plot for Channel = 39



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
152.220	29.73	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
267.650	35.63	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
367.560	39.71	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
1599.280	44.69	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
4738.571	46.00	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
7036.007	47.84	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

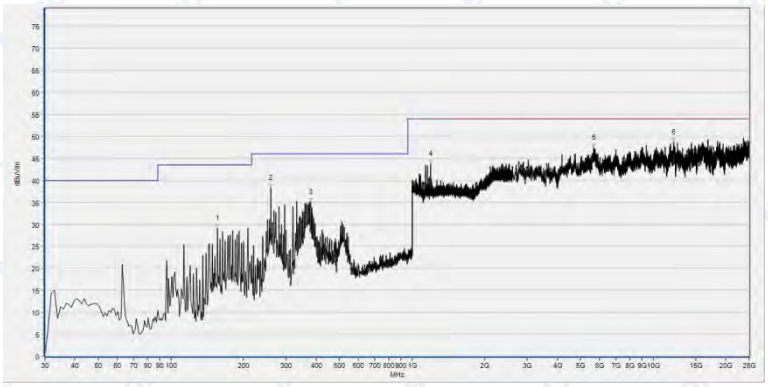
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 39)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
85.290	26.36	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
139.610	33.64	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
244.370	28.50	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2538.535	47.77	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
4881.142	48.69	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
17138.207	49.36	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

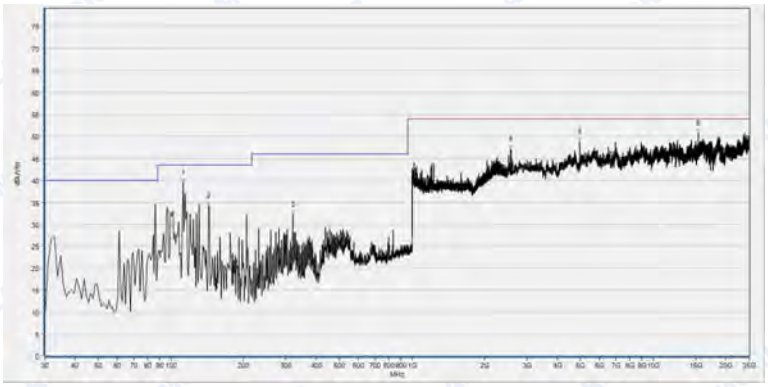
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 39)

Plot for Channel = 78



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
156.100	29.18	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
259.890	38.35	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
380.170	35.09	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
1195.278	43.74	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
5655.101	47.49	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
12131.915	48.64	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

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



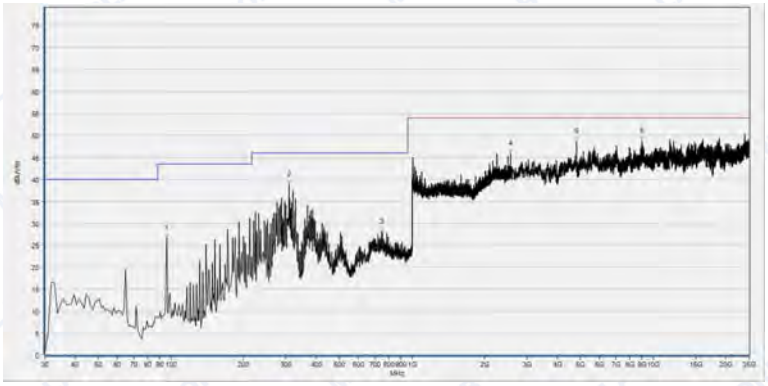
Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
112.450	39.46	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
143.490	34.22	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
320.030	32.23	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2559.664	47.16	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
4958.538	48.78	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
15435.497	50.76	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

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

2.10.4.3 8-DPSK Mode：

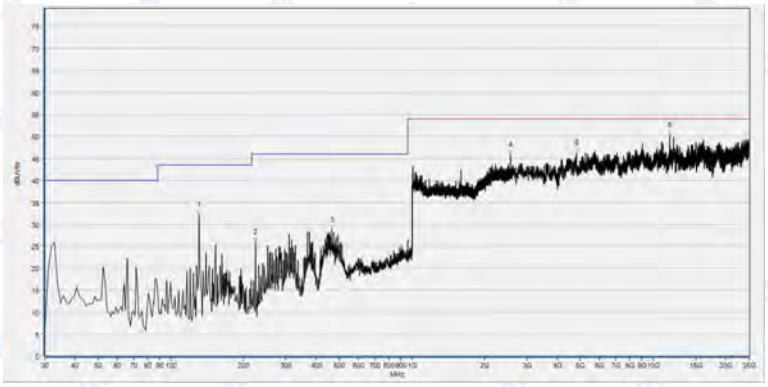
C. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
95.960	26.62	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
308.390	38.93	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
747.800	28.11	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2557.743	46.05	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
4803.746	48.74	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
8962.757	48.82	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

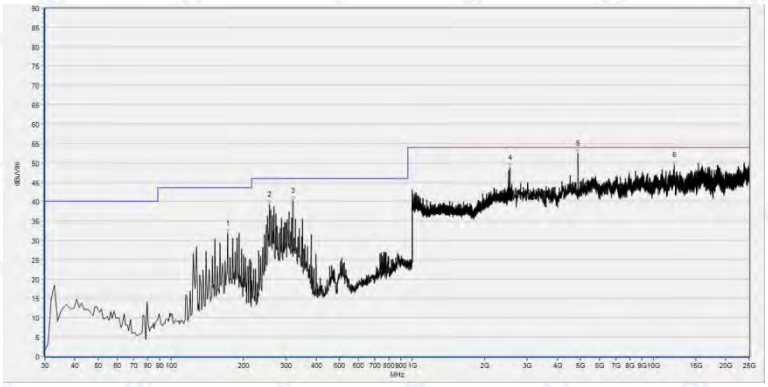
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 0)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
130.880	32.35	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
224.000	25.96	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
463.590	28.79	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2557.743	45.82	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
4803.746	46.28	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
11740.862	50.27	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

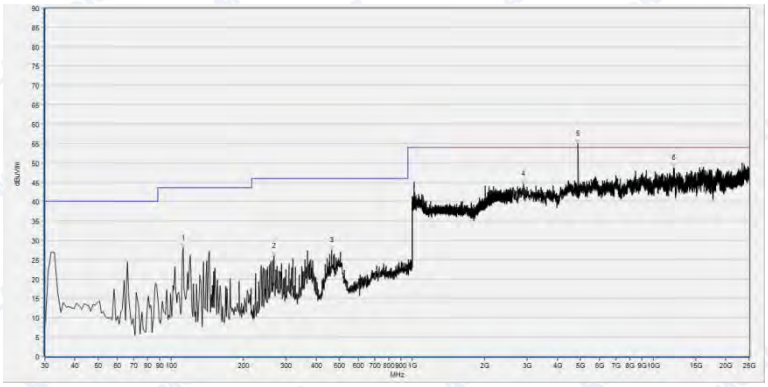
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 0)

Plot for Channel = 39



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
171.620	31.90	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
256.010	39.28	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
320.030	40.21	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2544.938	48.81	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
4881.700	55.58	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
12209.311	49.45	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

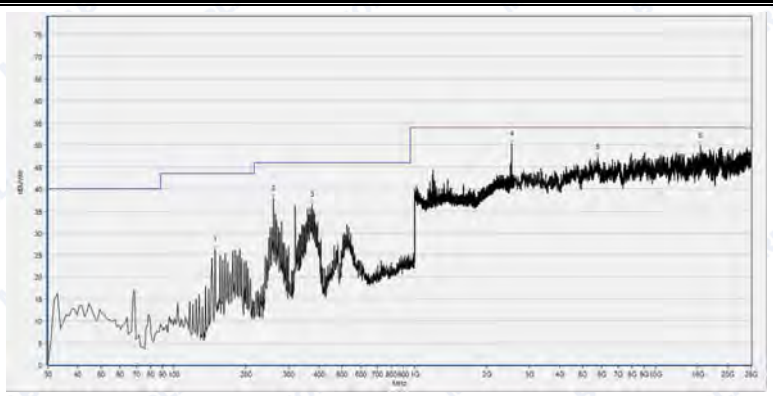
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 39)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
112.450	27.99	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
267.650	25.92	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
463.590	27.46	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2897.363	44.61	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
4882.100	55.76	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
12140.062	48.85	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

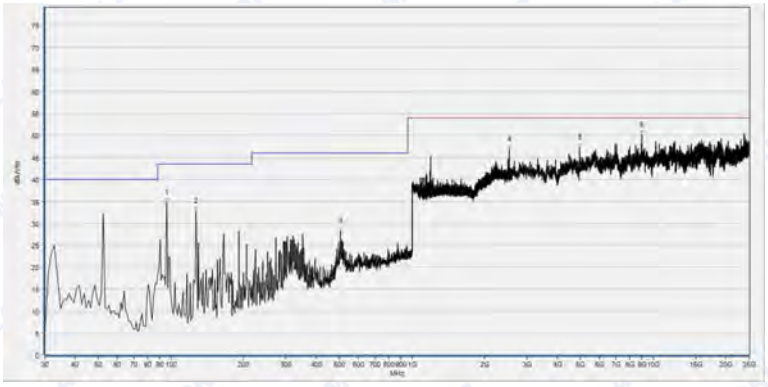
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 39)

Plot for Channel = 78



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
148.340	26.27	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
259.890	37.72	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
376.290	36.38	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2531.493	50.35	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
5773.231	47.20	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
15419.203	49.81	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
95.960	34.76	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
127.000	32.96	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
504.330	28.33	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2531.493	46.88	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
4958.538	47.41	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
8983.124	50.10	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

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

2.11 RF exposure evaluation

2.11.1 Requirement

According to § 1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy lever in excess of Commission's guideline.

2.11.2 Result

Please refer to SAR report.

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

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

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, ANSI C63.4 2009 and CISPR Publication 22; the FCC registration number is 695796.

1.4 Test Equipments Utilized

1.4.1 Conducted Test Equipments

Conducted Test Equipment						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal. Due**
1	System Simulator	6K00006210	MT8852B	Anritsu	2015.02.26	2016.02.25
2	Spectrum Analyzer	MY45101810	E4407B	Agilent	2015.02.26	2016.02.25
3	Power Splitter	NW521	1506A	Weinschel	2015.02.26	2016.02.25
4	Attenuator 1	(n.a.)	10dB	Resnet	2015.02.26	2016.02.25
5	Attenuator 2	(n.a.)	3dB	Resnet	2015.02.26	2016.02.25
6	EXA Signal Analzyer	MY51440152	N9010A	Agilent	2015.02.26	2016.02.25
7	RF cable	CB01	RF01	Morlab	N/A	N/A
8	Coaxial cable	CB02	RF02	Morlab	N/A	N/A
9	SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

1.4.2 Conducted Emission Test Equipments

Conducted Emission Test Equipments						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal. Due**
1	Receiver	US44210471	E7405A	Agilent	2015.02.26	2016.02.25
2	LISN	812744	NSLK 8127	Schwarzbeck	2015.02.26	2016.02.25
3	Service Supplier	100448	CMU200	R&S	2015.02.26	2016.02.25
4	Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2015.02.26	2016.02.25
5	Coaxial cable(BNC)	CB01	EMC01	Morlab	N/A	N/A

1.4.3 Radiated Test Equipments

Radiated Test Equipments						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal. Date**	**Cal.Due Date**
1	System Simulator	100448	CMU200	R&S	2015.02.26	2016.02.25
2	Receiver	US44210471	E7405A	Agilent	2015.02.26	2016.02.25
3	Test Antenna - Bi-Log	9163-274	9m*6m*6m	Albatross	2015.02.26	2016.02.25
4	Test Antenna - Horn	9120D-963	VULB 9163	Schwarzbeck	2015.02.26	2016.02.25
5	Test Antenna - Horn	71688	BBHA 9120D	Schwarzbeck	2015.02.26	2016.02.25
6	Test Antenna - Loop	1519-022	HL050S7	R&S	2015.02.26	2016.02.25
7	Reject Filter	(n.a.)	BRM50702	Micro-Tronics	2015.02.26	2016.02.25
8	Coaxial cable (N male)	CB02	EMC02	Morlab	N/A	N/A
9	Coaxial cable (N male)	CB03	EMC03	Morlab	N/A	N/A

1.4.4 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

1.4.5 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

1.4.6 Anechoic Chamber

Anechoic Chamber						
No.	**Equipment Name**	**Serial No.**	**Type**	**Manufacturer**	**Cal.Date**	**Cal.Due Date**
1	Anechoic Chamber	N/A	9m*6m*6m	Albatross	2015.02.26	2016.02.25

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