REPORT No.: SZ17050133W14A

FCC RF TEST REPORT

APPLICANT	:	Pycom Ltd
PRODUCT NAME	:	Triple Network (LoRa, WiFi and Bluetooth) IoT development Module powered by MicroPython.
MODEL NAME	:	L01 1.0
TRADE NAME	:	LoPy OEM
BRAND NAME	:	Pycom
FCC ID	:	2AJMTLOPY01R
STANDARD(S)	:	47 CFR Part 15 Subpart C
ISSUE DATE	:	2017-09-21

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

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Change History		
Issue	Date	Reason for change
1.0	2017-09-21	First edition

TEST REPORT DECLARATION

Applicant	Pycom Ltd
Applicant Address	Highpoint, 9 Sydenham Road, GU1 3RX Guildford, Surrey UK
Manufacturer	In-Tech Electronics Ltd
Manufacturer Address	2/F Rhythm Home,119 ShazuiRoad, Futian, Shenzhen, Guangdong, P.R.China
Product Name	Triple Network (LoRa, WiFi and Bluetooth) IoT development Module powered by MicroPython.
Model Name	L01 1.0
Brand Name	Pycom
HW Version	1.0r
SW Version	1.0
Test Standards	47 CFR Part 15 Subpart C
Test Date	2017-07-07 to 2017-09-19
Test Result	PASS

Tested by : Tu Ya'nan

Tu Ya'nan (Test Engineer)

Approved by : Andy Yeh

Andy Yeh (Supervisor)

1. TECHNICAL INFORMATION

Note: Provide by applicant.

1.1 Applicant Information

Company:	Pycom Ltd
Address:	Highpoint, 9 Sydenham Road, GU1 3RX Guildford, Surrey UK

1.2 Equipment under Test (EUT) Description

Brand Name:	Pycom
Trade Name:	LoPy OEM
Model Name:	L01 1.0
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:	Bluetooth 2.1 + EDR
Antenna 1 Type:	Ceramic Antenna
Antenna 1Gain:	-0.5dBi
Antenna 2 Type:	External Antenna
Antenna 2Gain:	2.0dBi

NOTE 1: The EUT is a Triple Network (LoRa, WiFi and Bluetooth) IoT development Module powered by MicroPython. 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).

NOTE 2: The EUT connected to the serial port of the computer with a serial communication cable, we use the dedicated software to control the EUT into the test mode, and then use MT8852B base station to control the EUT continuous transmission.

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
01	1.0r	1.0

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 (10-1-15 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	Jul 07, 2017	**PASS**
3	15.247(b)	Peak Output Power	Jul 07, 2017	**PASS**
4	15.247(a)	20dB Bandwidth	Jul 07, 2017	**PASS**
5	15.247(a)	Carrier Frequency Separation	Jul 07, 2017	**PASS**
6	15.247(a)	Time of Occupancy (Dwell time)	Jul 08, 2017	**PASS**
7	15.247(d)	Conducted Spurious Emission	Jul 07, 2017	**PASS**
8	15.247(d)	Restricted Frequency Bands	Aug 10, 2017& Sep 19, 2017	**PASS**
9	15.209 15.247(d)	Radiated Emission	Aug 09, 2017	**PASS**
10	15.207	Conducted Emission	Aug 15, 2017& Sep 19, 2017	**PASS**

NOTE: The tests were performed according to the method of measurements prescribed in 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.

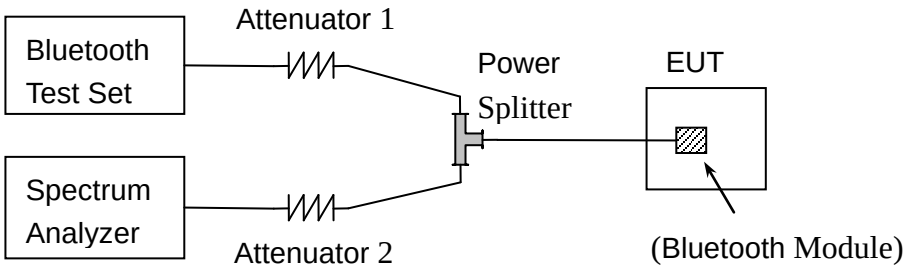
2.2 Number of Hopping Frequency

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

B. Equipments List:

Please reference ANNEX A(1.5).

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

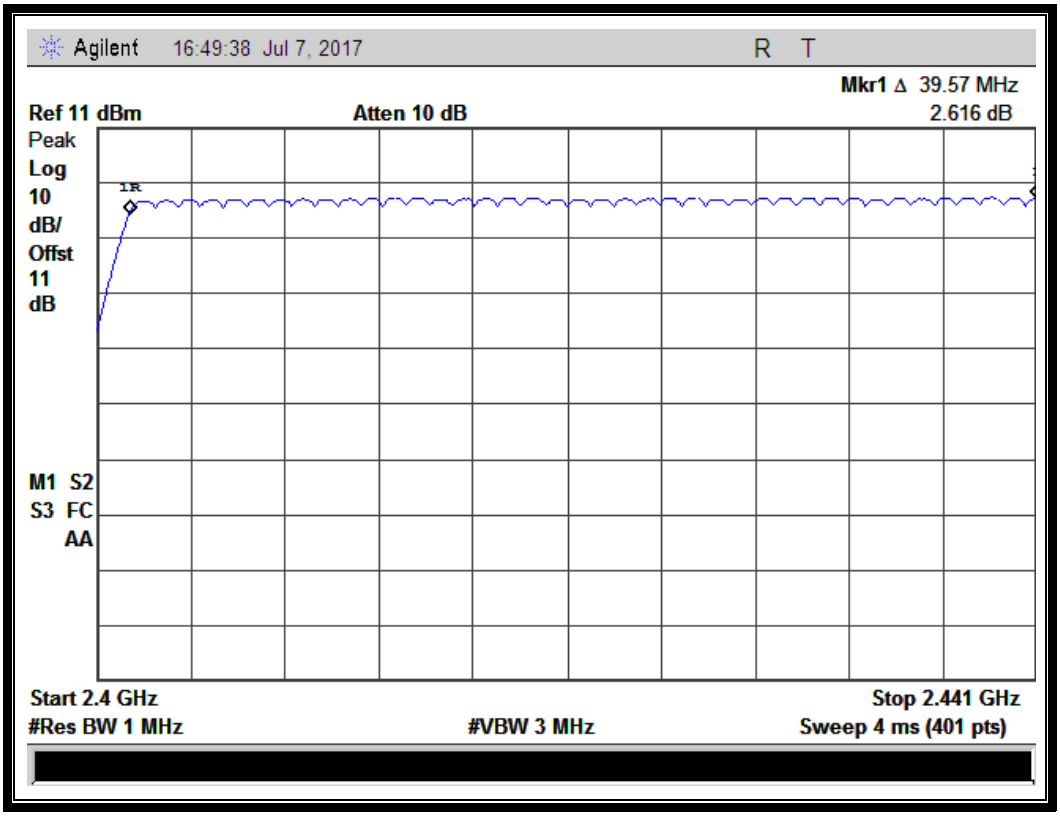
2.2.4 Test Result

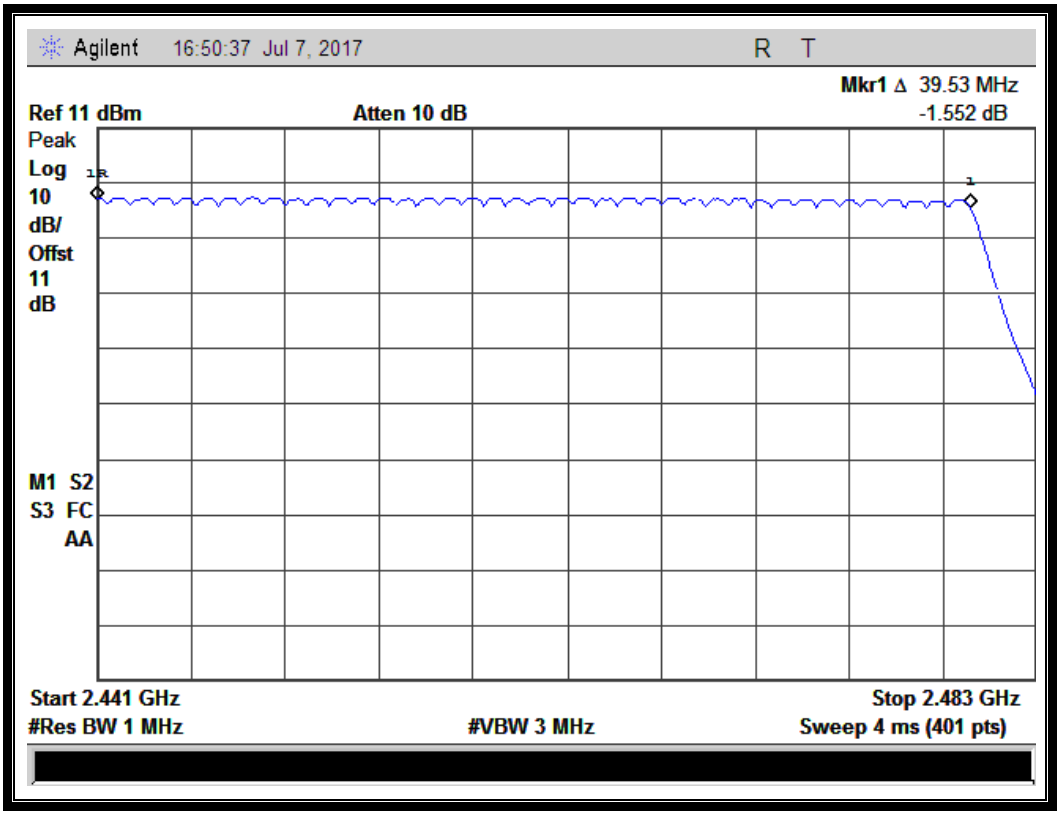
The Bluetooth Module operates at hopping-on test mode; the frequencies number employed is counted to verify the Module's using the number of hopping frequency.

A. Test Verdict:

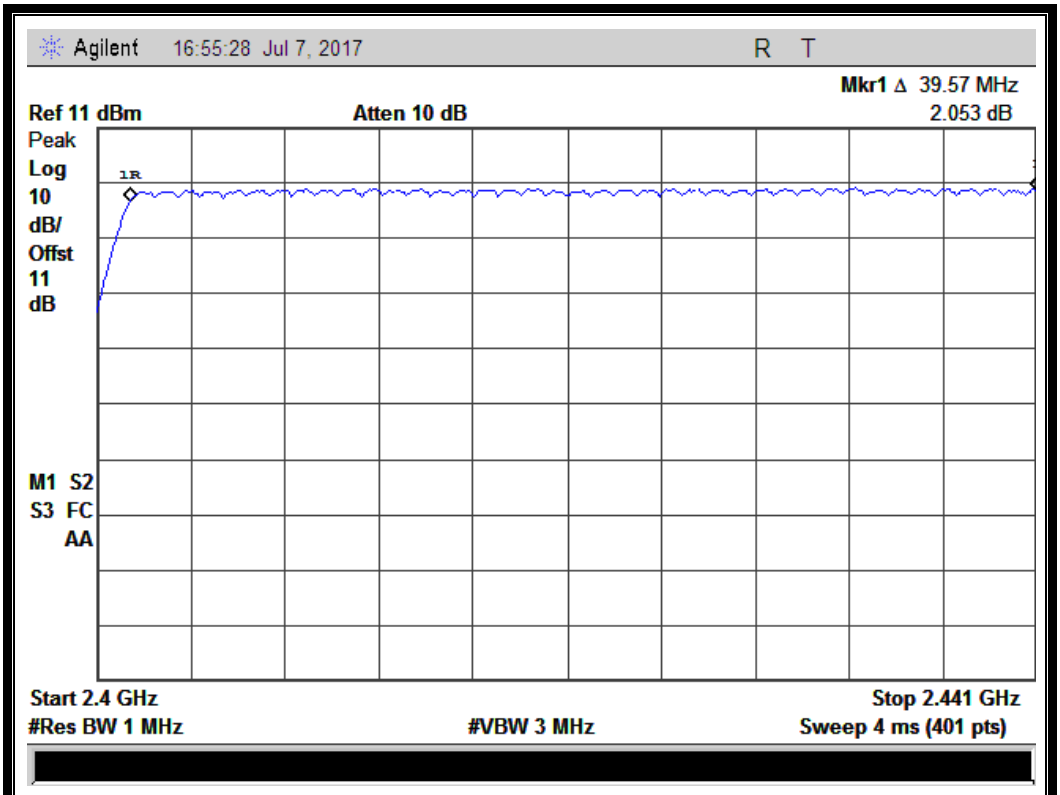
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Refer to Plot	Verdict
GFSK	2400 - 2483.5	79	15	Plot A	PASS
π/4-DQPSK	2400 - 2483.5	79	15	Plot B	PASS
8-DPSK	2400 - 2483.5	79	15	Plot C	PASS

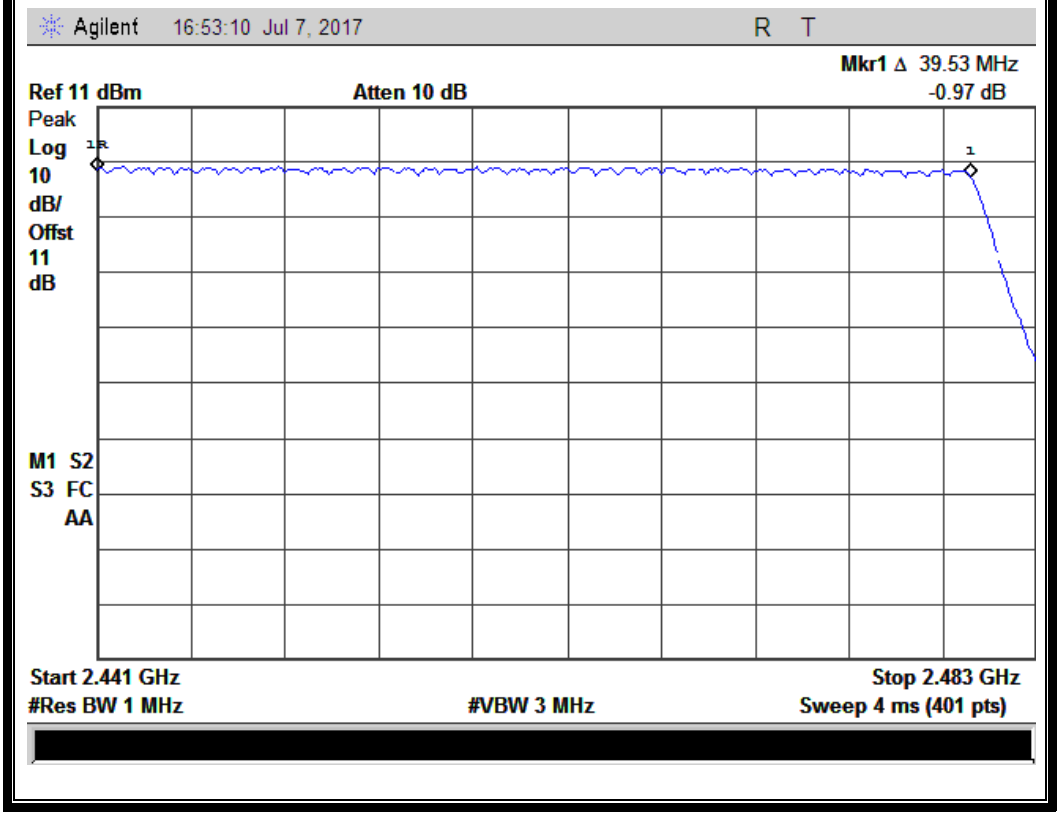
B. Test Plots:



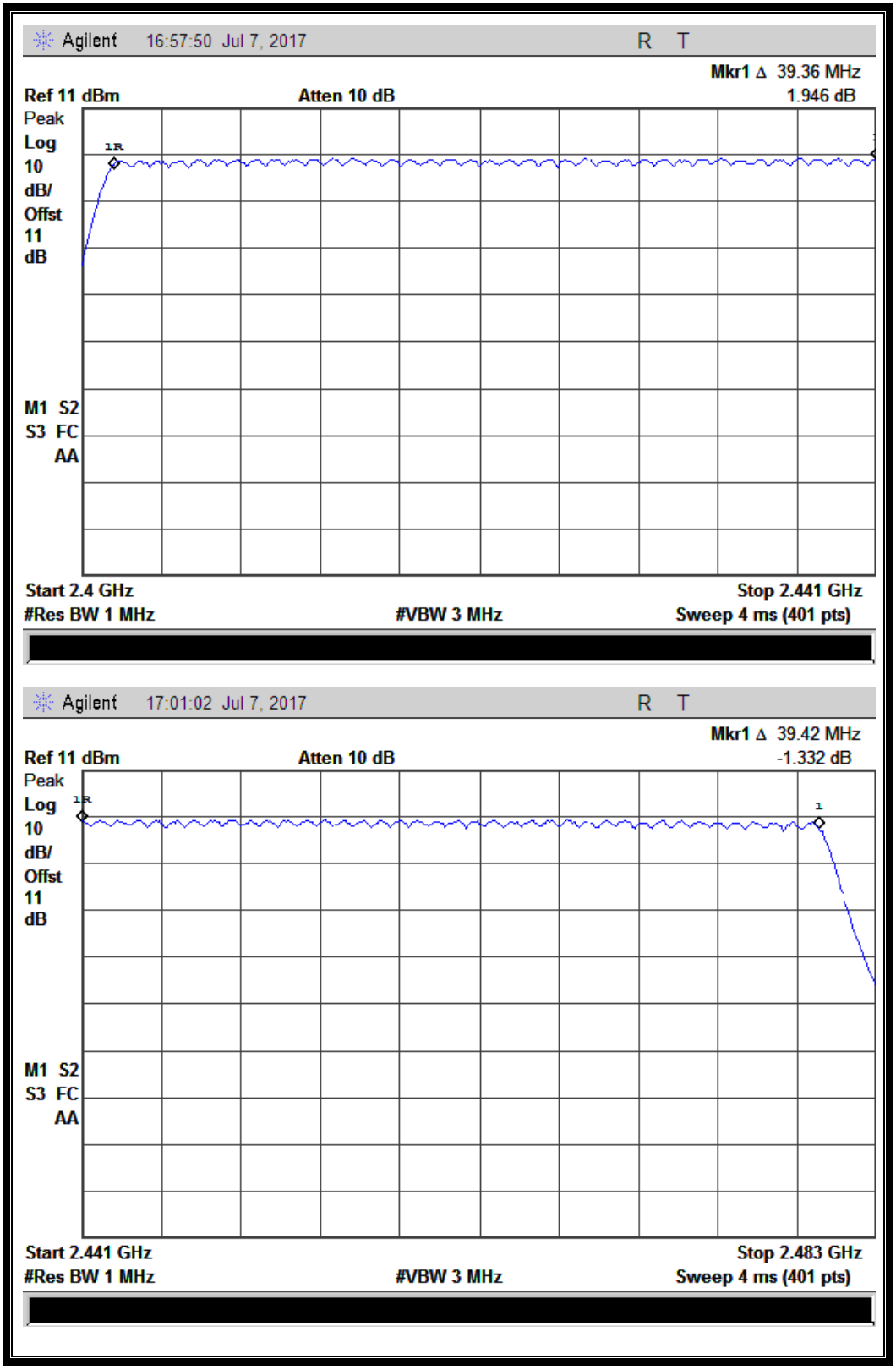

Agilent 16:50:37 Jul 7, 2017
R T
Mkr1 Δ 39.53 MHz
-1.552 dB
Ref 11 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11
dB
M1 S2
S3 FC
AA
Start 2.441 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2.483 GHz
Sweep 4 ms (401 pts)

(Plot A: GFSK)





(Plot B: π/4-DQPSK)


Agilent 16:57:50 Jul 7, 2017
R T
Mkr1 Δ 39.36 MHz
1.946 dB
Ref 11 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11
dB
1R
M1 S2
S3 FC
AA
Start 2.4 GHz
Stop 2.441 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 4 ms (401 pts)
Agilent 17:01:02 Jul 7, 2017
R T
Mkr1 Δ 39.42 MHz
-1.332 dB
Ref 11 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11
dB
1R
1
M1 S2
S3 FC
AA
Start 2.441 GHz
Stop 2.483 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 4 ms (401 pts)

(Plot C: 8- DPSK)

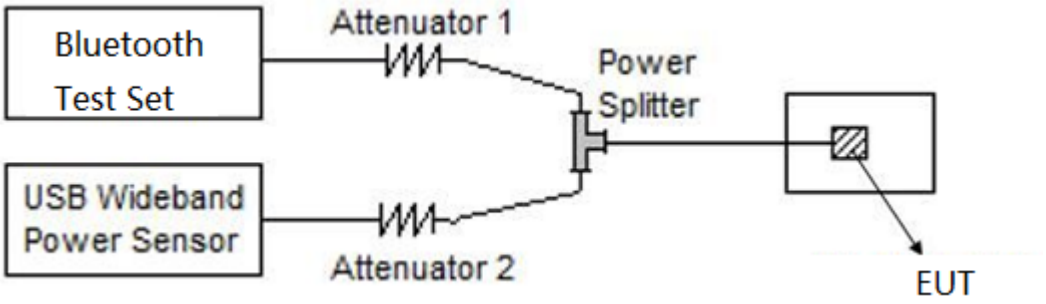
2.3 Peak Output Power

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

B. Equipments List:

Please reference ANNEX A(1.5).

2.3.3 Test Result

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

2.3.3.1 GFSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	-2.02	0.00063	30	1	PASS
39	2441	-1.73	0.00067			PASS
78	2480	-2.15	0.00061			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	-0.53	0.00089	20.97	0.125	PASS
39	2441	-0.08	0.00098			PASS
78	2480	-0.34	0.00092			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	-0.25	0.00094	20.97	0.125	PASS
39	2441	0.19	0.00104			PASS
78	2480	-0.03	0.00099			PASS

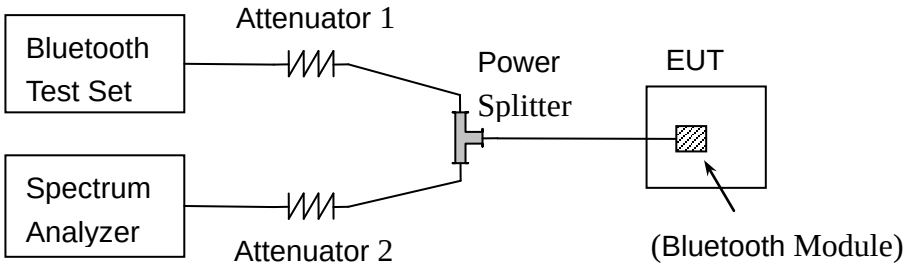
2.4 20dB Bandwidth

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

B. Equipments List:

Please reference ANNEX A(1.5).

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.

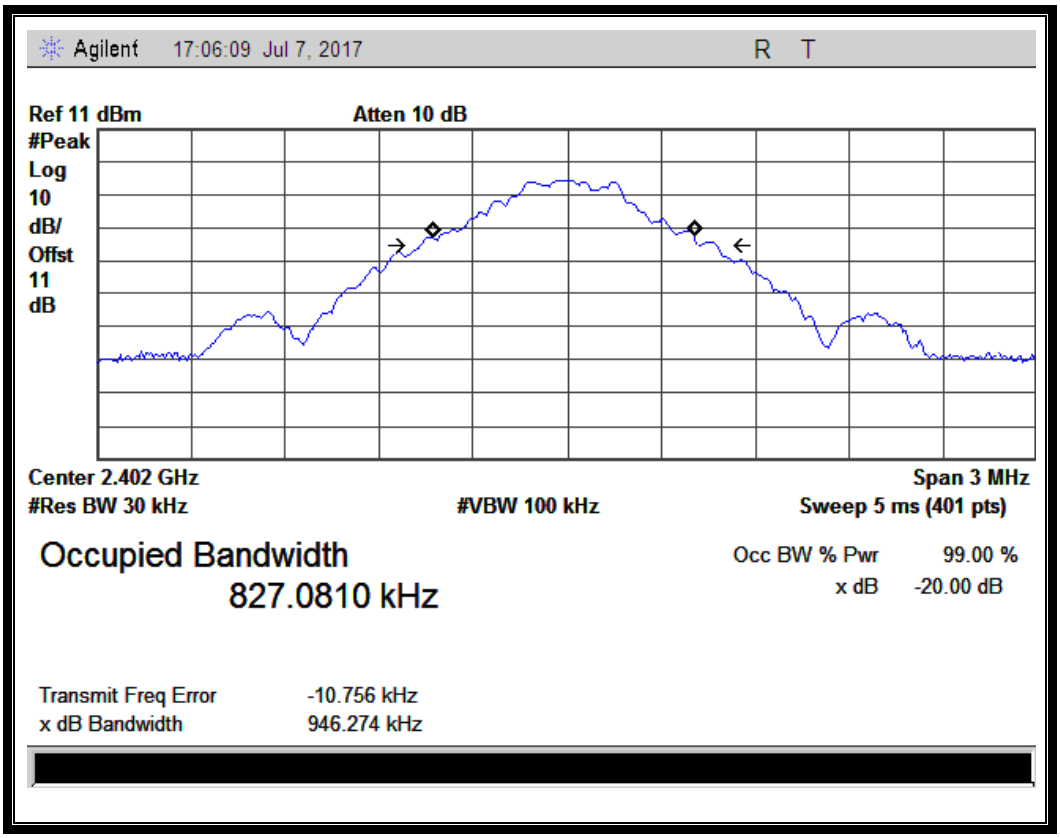
2.4.4.1 GFSK Mode

A. Test Verdict:

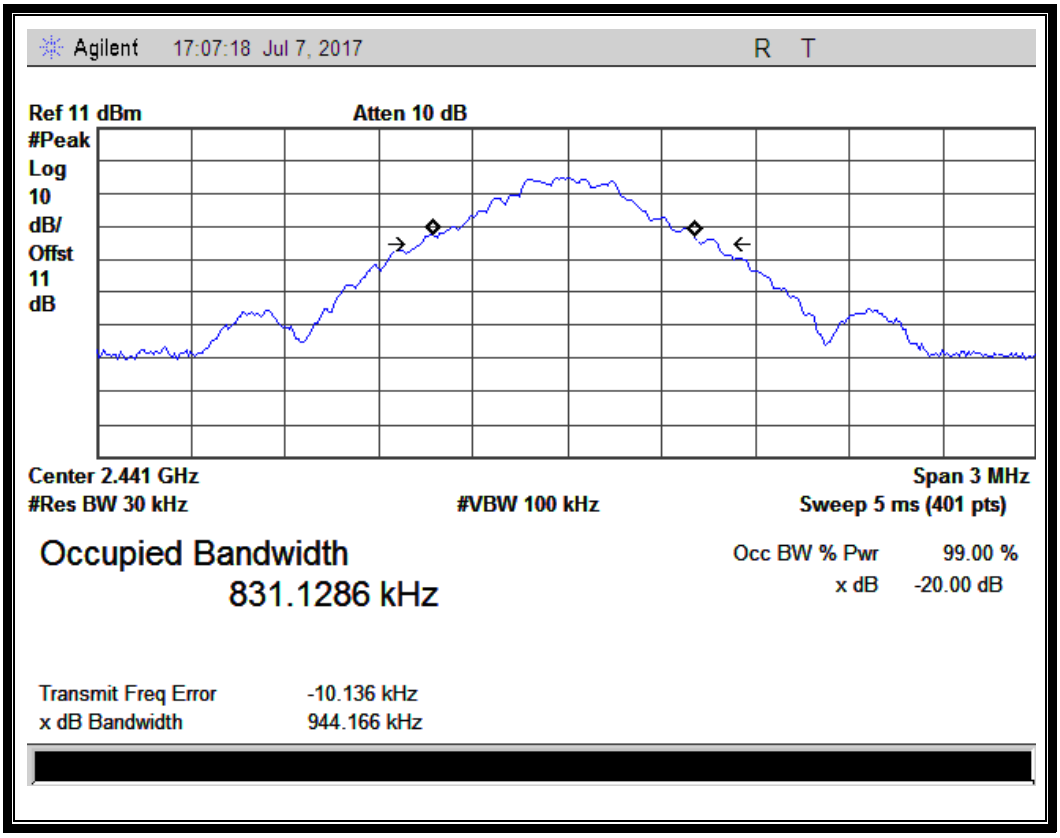
The maximum 20dB bandwidth measured is 0.9463 MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	0.9463	Plot A
39	2441	0.9442	Plot B
78	2480	0.9408	Plot C

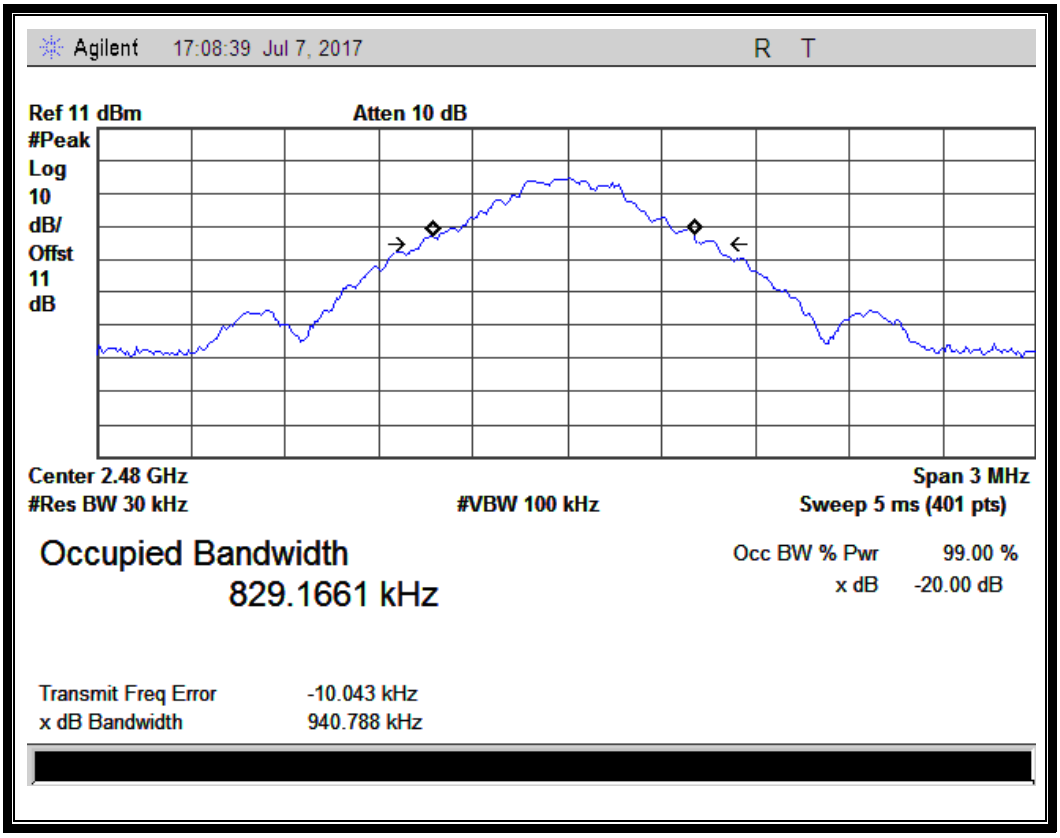
B. Test Plots:



(Plot A: Channel = 2402 @ GFSK)



(Plot B: Channel = 2441 @ GFSK)



(Plot C: Channel = 2480 @ GFSK)

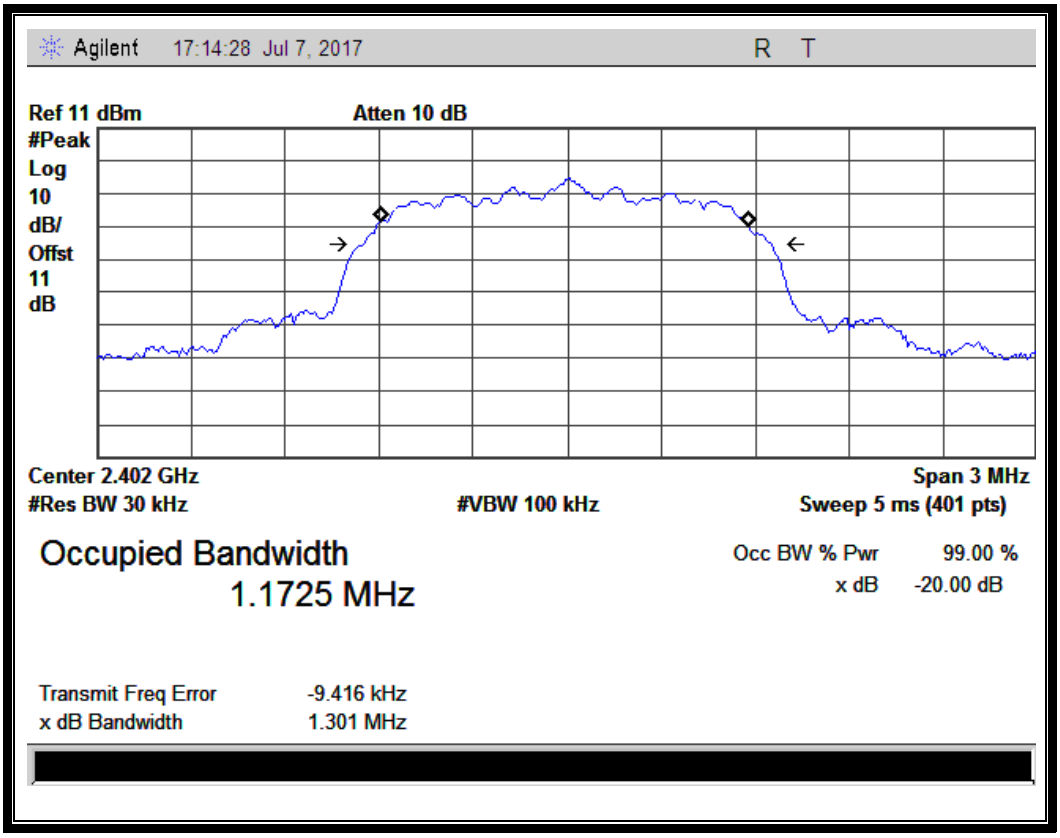
2.4.4.2 π/4-DQPSK Mode

A. Test Verdict:

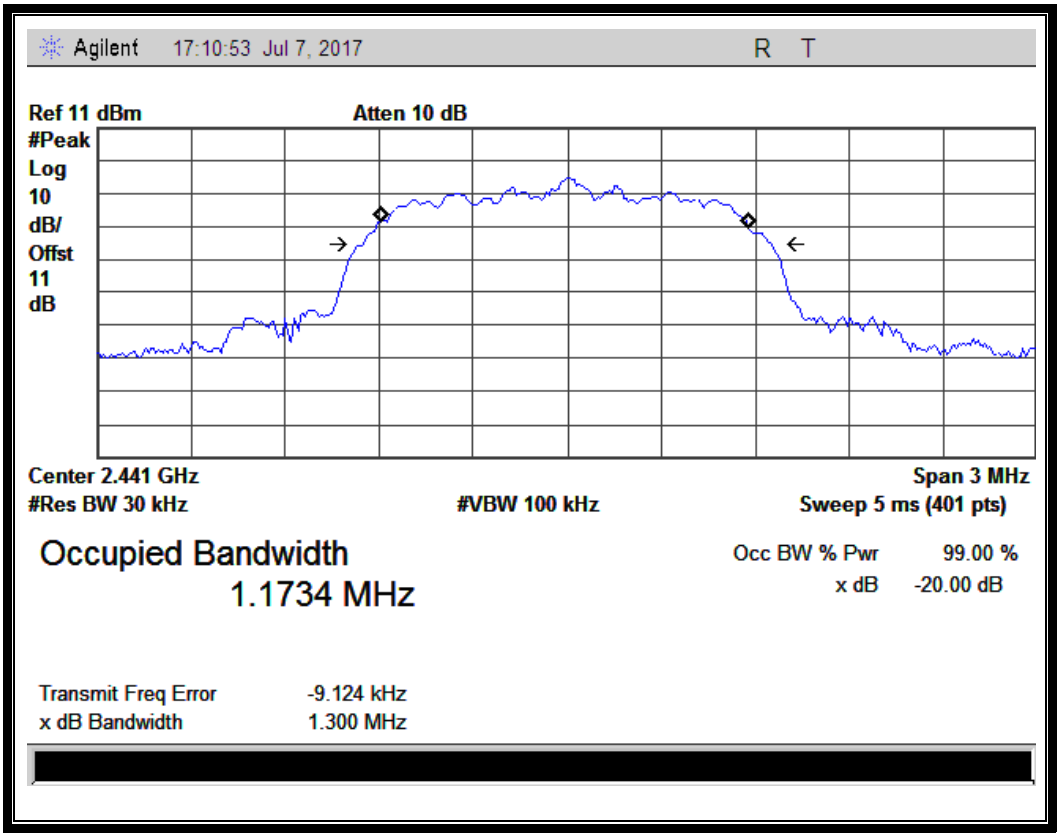
The maximum 20dB bandwidth measured is 1.301 MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.301	Plot D
39	2441	1.300	Plot E
78	2480	1.296	Plot F

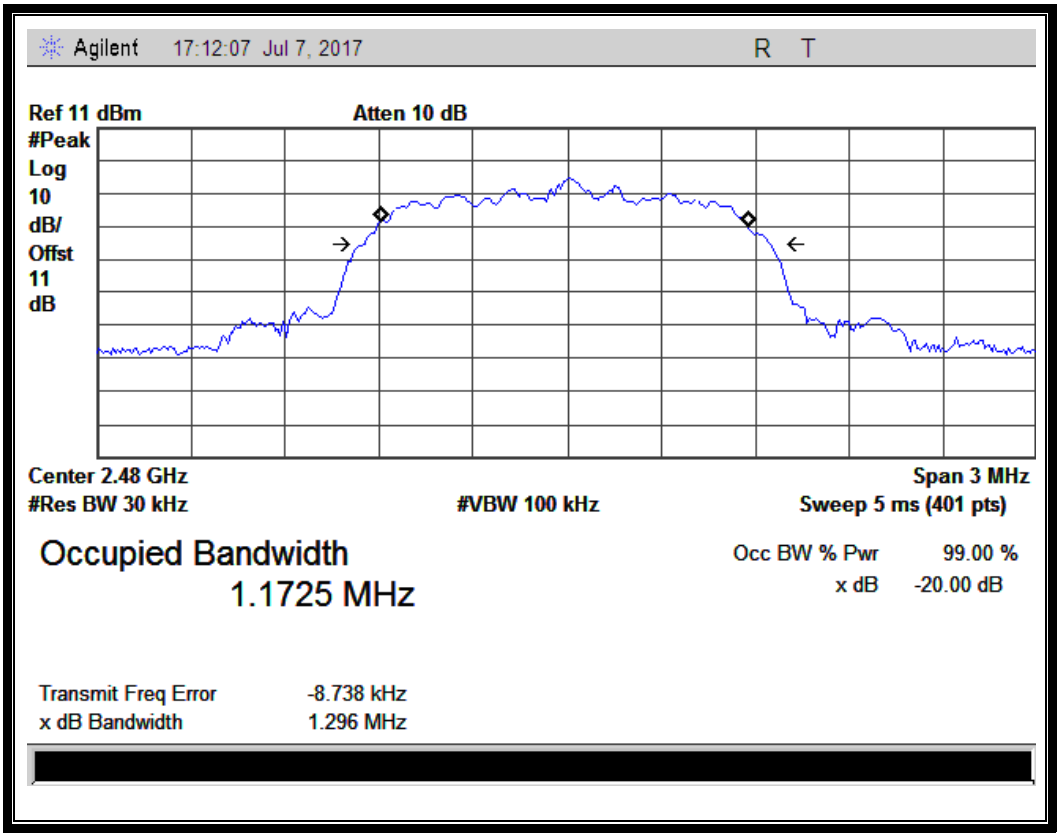
B. Test Plots:



(Plot D: Channel = 2402 @ π/4-DQPSK)



(Plot E: Channel = 2441 @ π/4-DQPSK)



(Plot F: Channel = 2480 @ π/4-DQPSK)

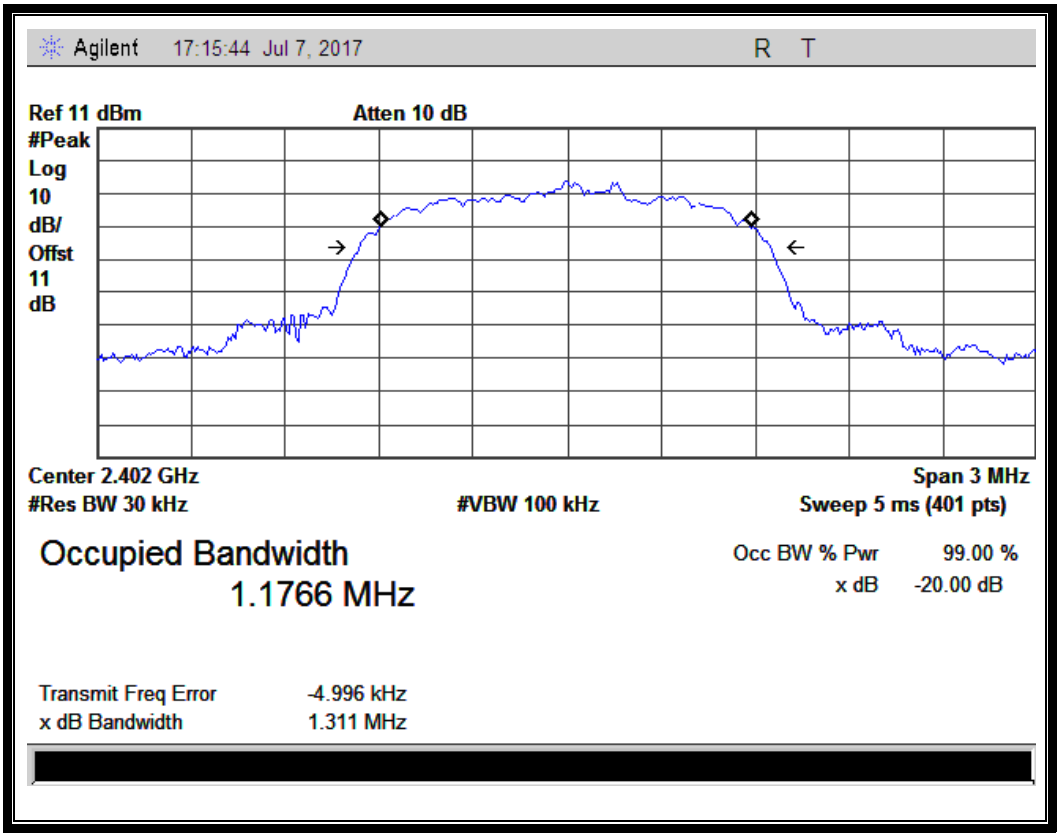
2.4.4.3 8-DPSK Mode

A. Test Verdict:

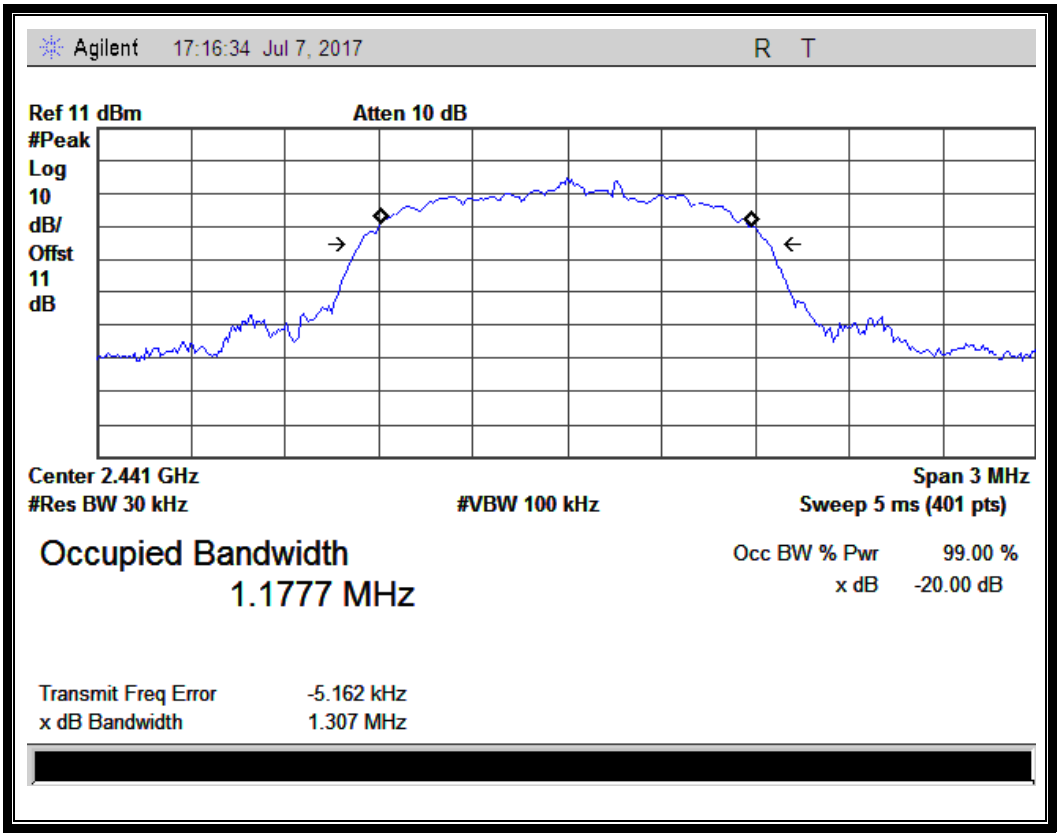
The maximum 20dB bandwidth measured is 1.314 MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.311	Plot G
39	2441	1.307	Plot H
78	2480	1.314	Plot I

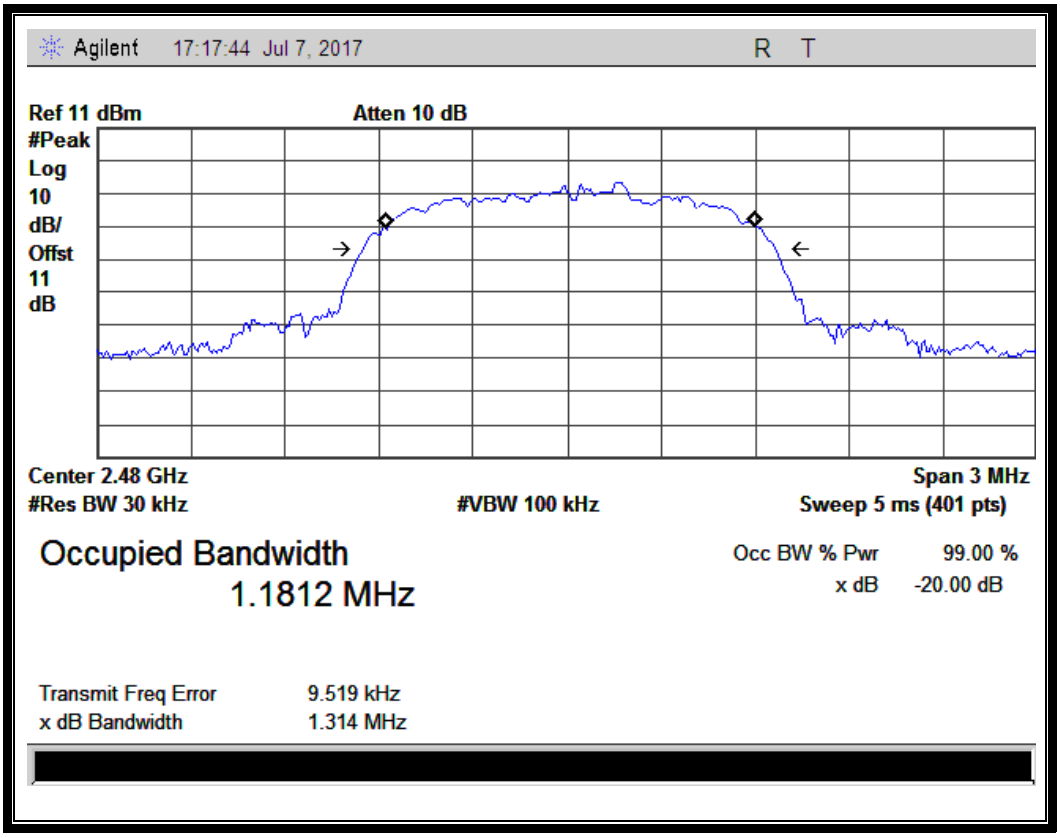
B. Test Plots:



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



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



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

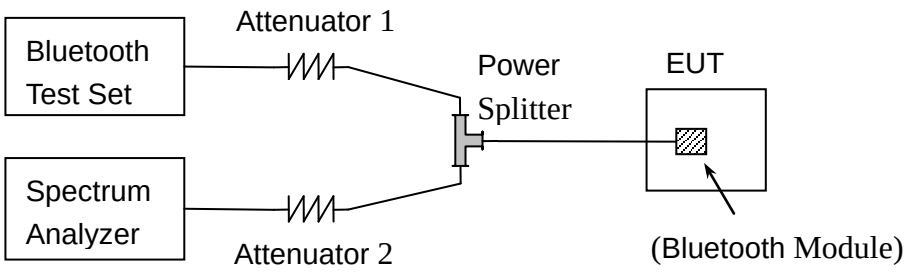
2.5 Carried Frequency Separation

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

B. Equipments List:

Please reference ANNEX A(1.5).

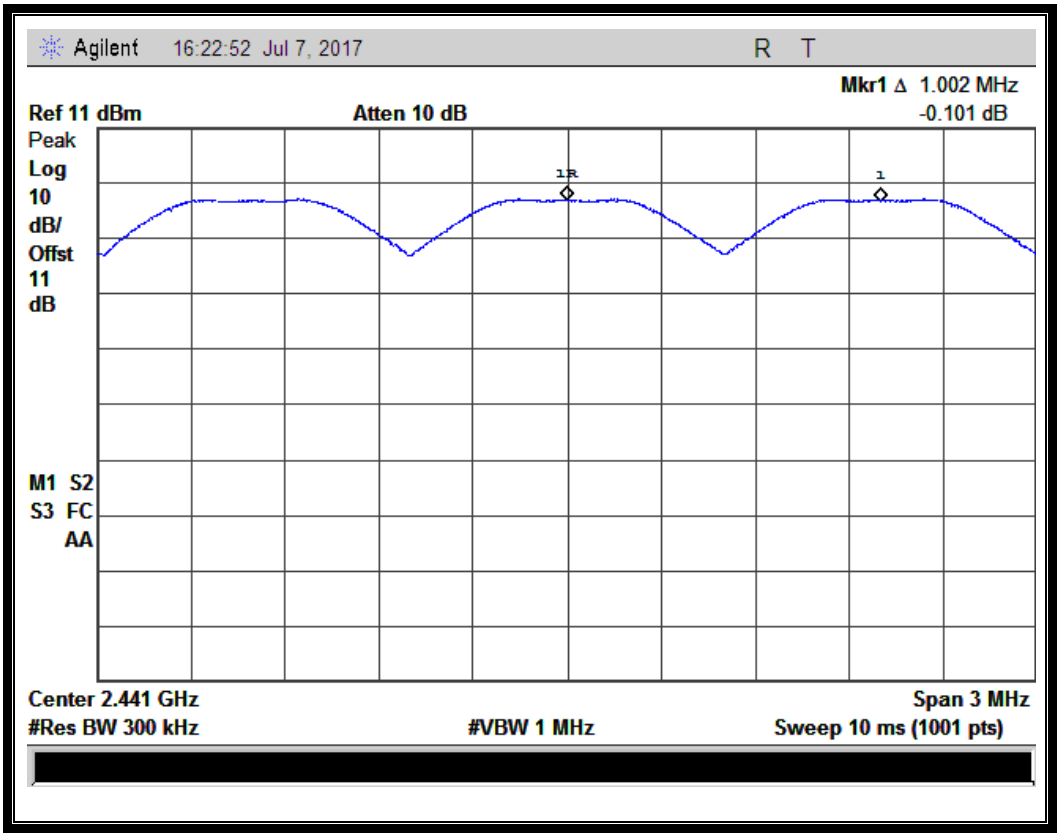
2.5.3 Test Procedure

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.

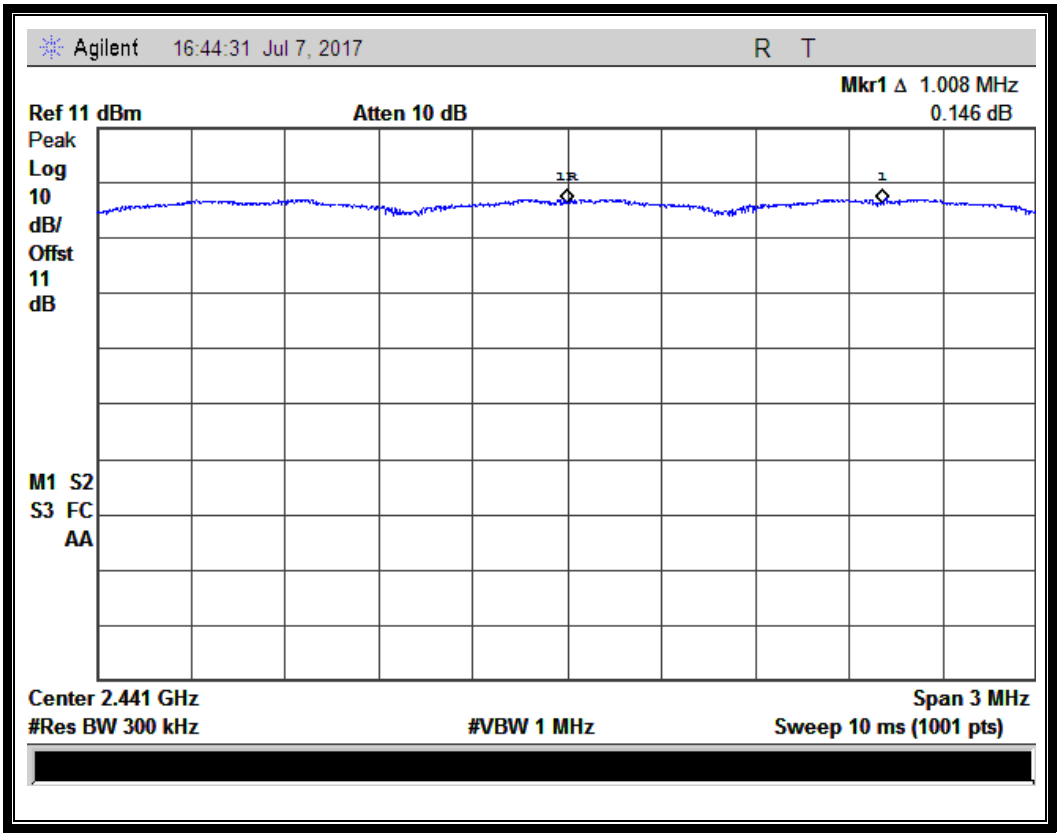
2.5.4 Test Result

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 2.4.4), whichever is greater. So, the verdict is PASSING

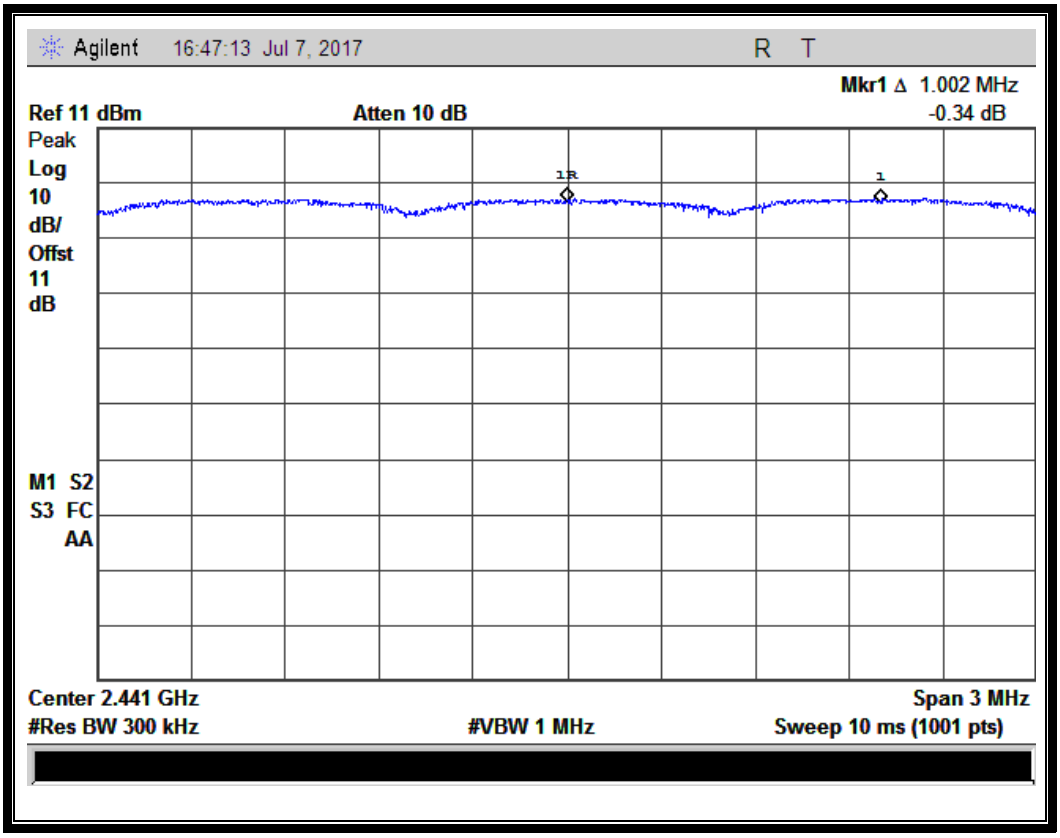
Test Mode	Measured Channel Numbers	Carried Frequency Separation	Refer to Plot	20dB bandwidth (MHz)	Min. Limit	Verdict
GFSK	39 and 40	1.002	Plot A	0.9463	20dB bandwidth	PASS
π/4-DQPSK	39 and 40	1.008	Plot B	1.301	two-thirds of the 20dB bandwidth	PASS
8-DPSK	39 and 40	1.002	Plot C	1.314		PASS



(Plot A: GFSK)



(Plot B: π/4-DQPSK)


Agilent 16:47:13 Jul 7, 2017
R T
Mkr1 Δ 1.002 MHz
-0.34 dB
Ref 11 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11
dB
1R
1
M1 S2
S3 FC
AA
Center 2.441 GHz
Span 3 MHz
#Res BW 300 kHz
#VBW 1 MHz
Sweep 10 ms (1001 pts)

(Plot C: 8-DPSK)

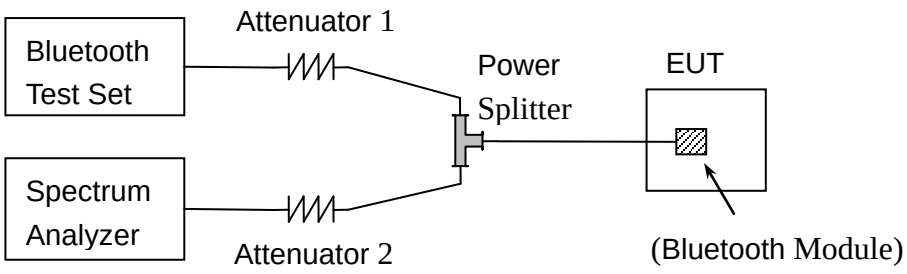
2.6 Time of Occupancy (Dwell time)

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

B. Equipments List:

Please reference ANNEX A(1.5).

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.

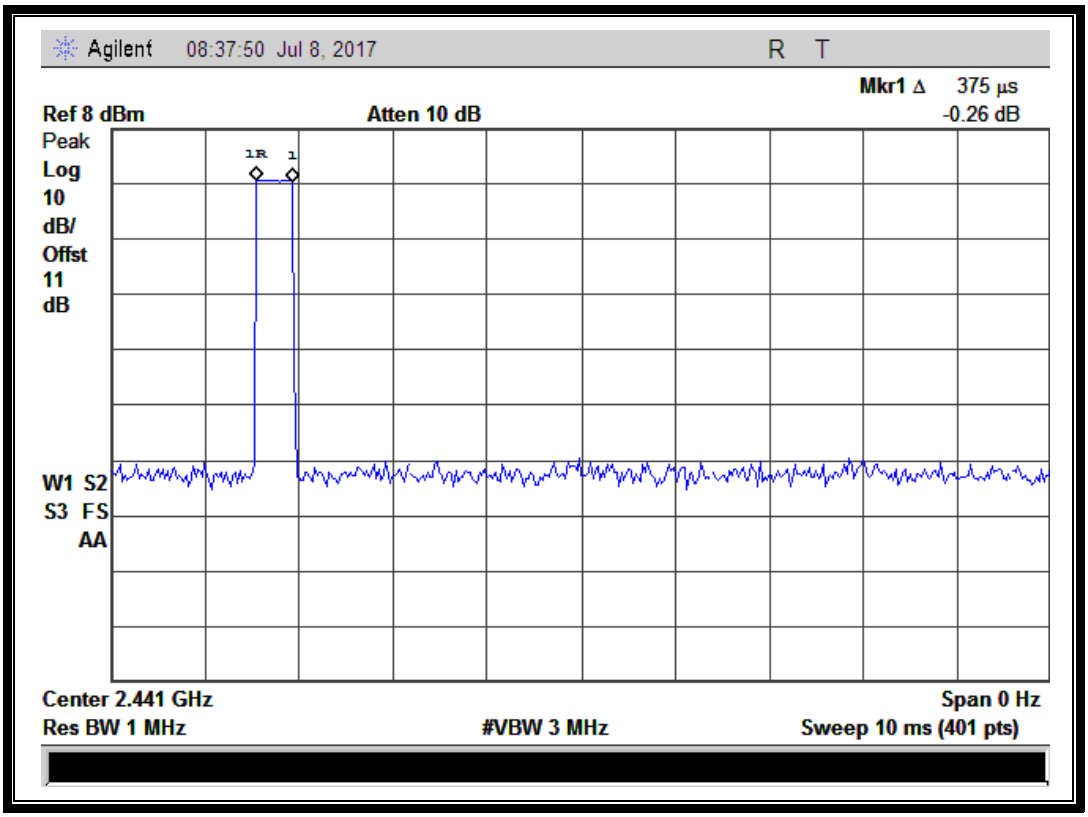
2.6.4 Test Result

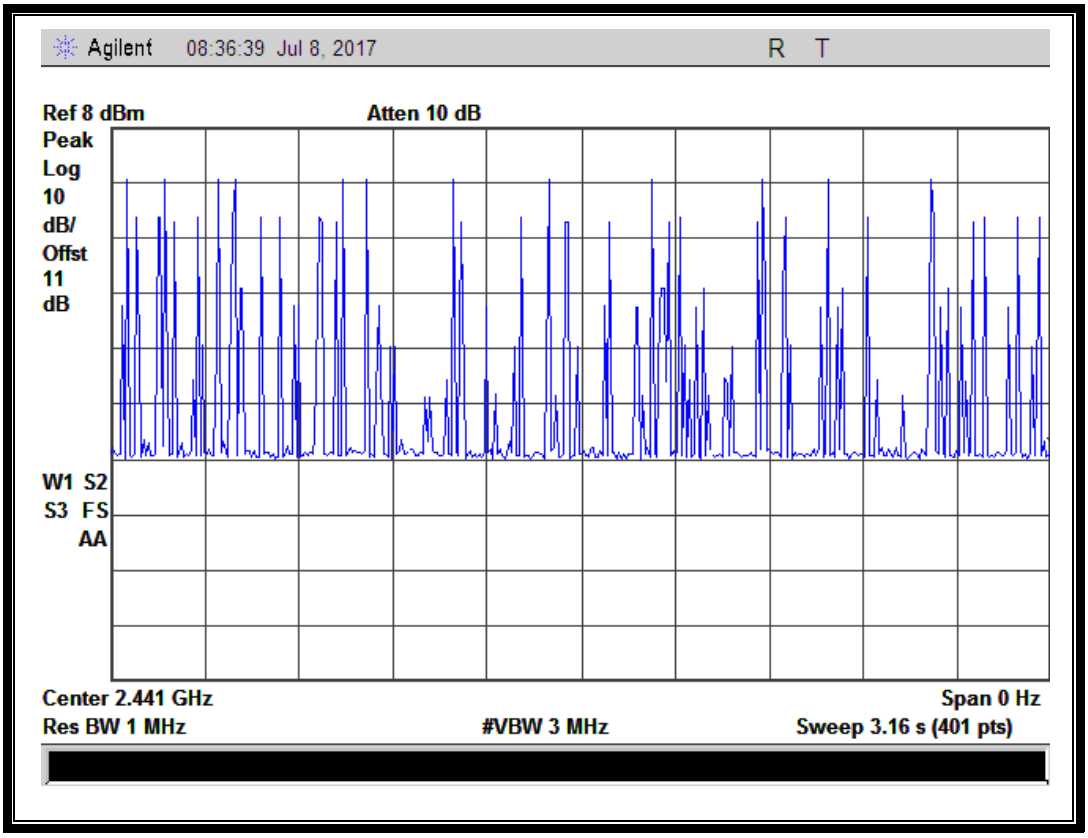
2.6.4.1 GFSK Mode

A. Test Verdict:

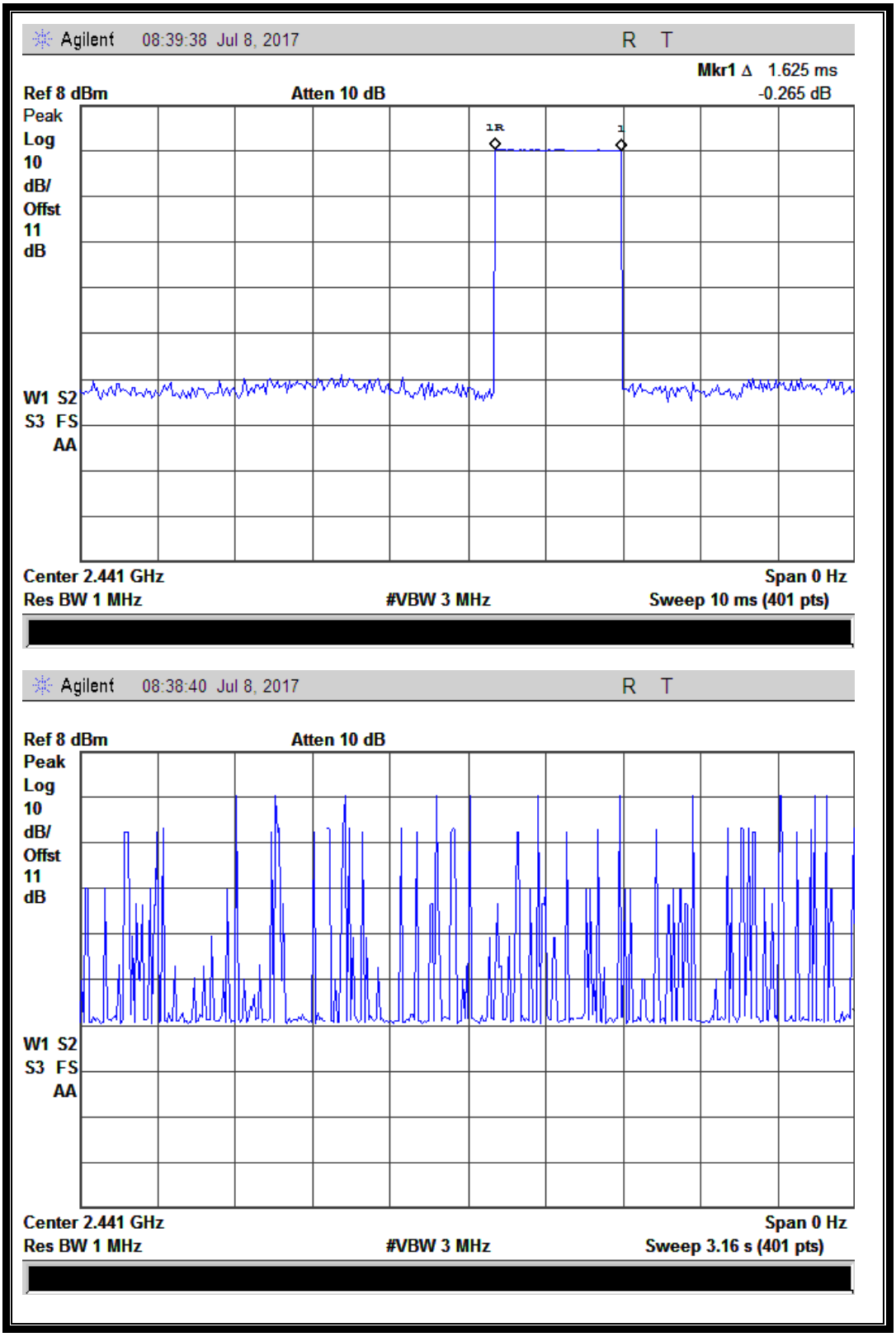
DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.38	12	0.00456	0.0456	0.4	PASS
DH3	1.63	11	0.01793	0.1793		PASS
DH5	2.90	7	0.02030	0.2030		PASS

B. Test Plots:

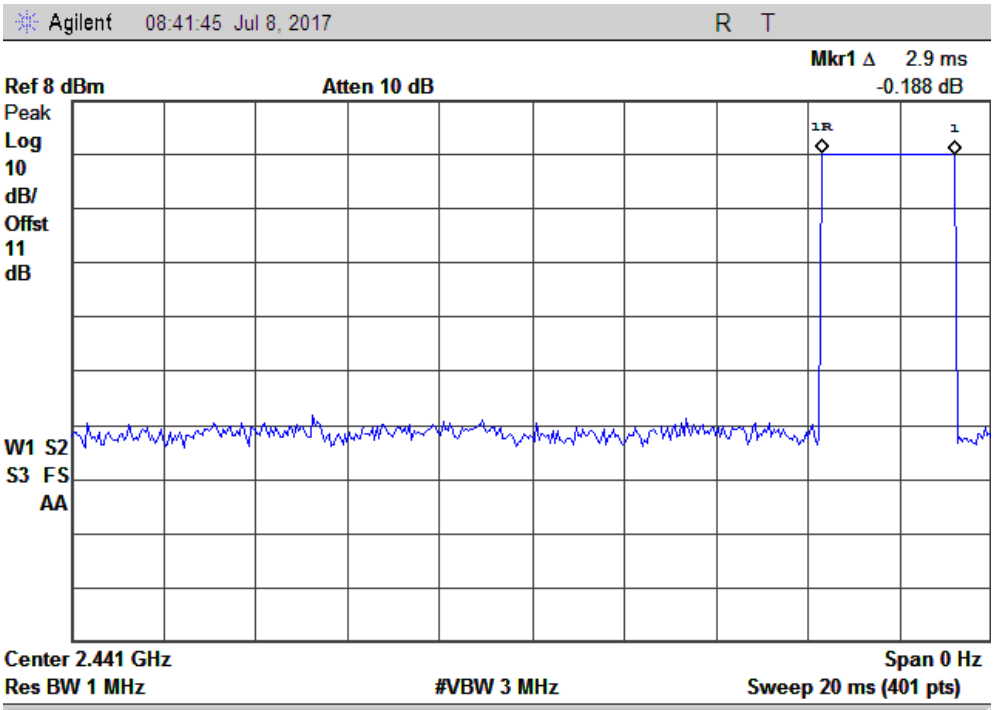


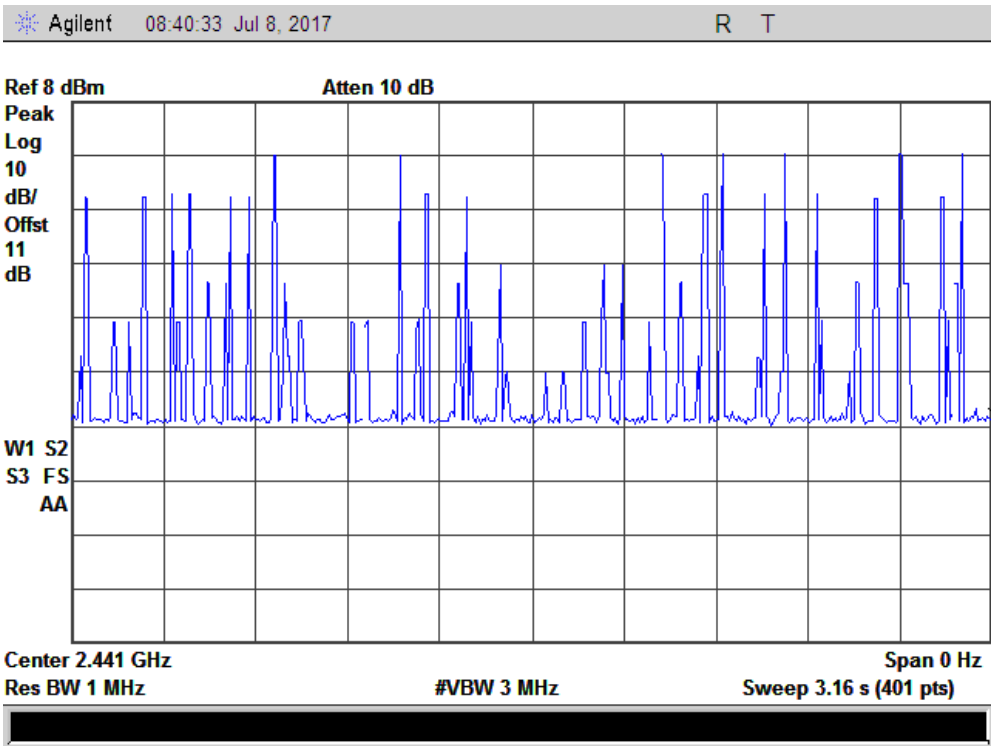


(Plot A: DH1 @ GFSK)



(Plot B: DH3 @ GFSK)





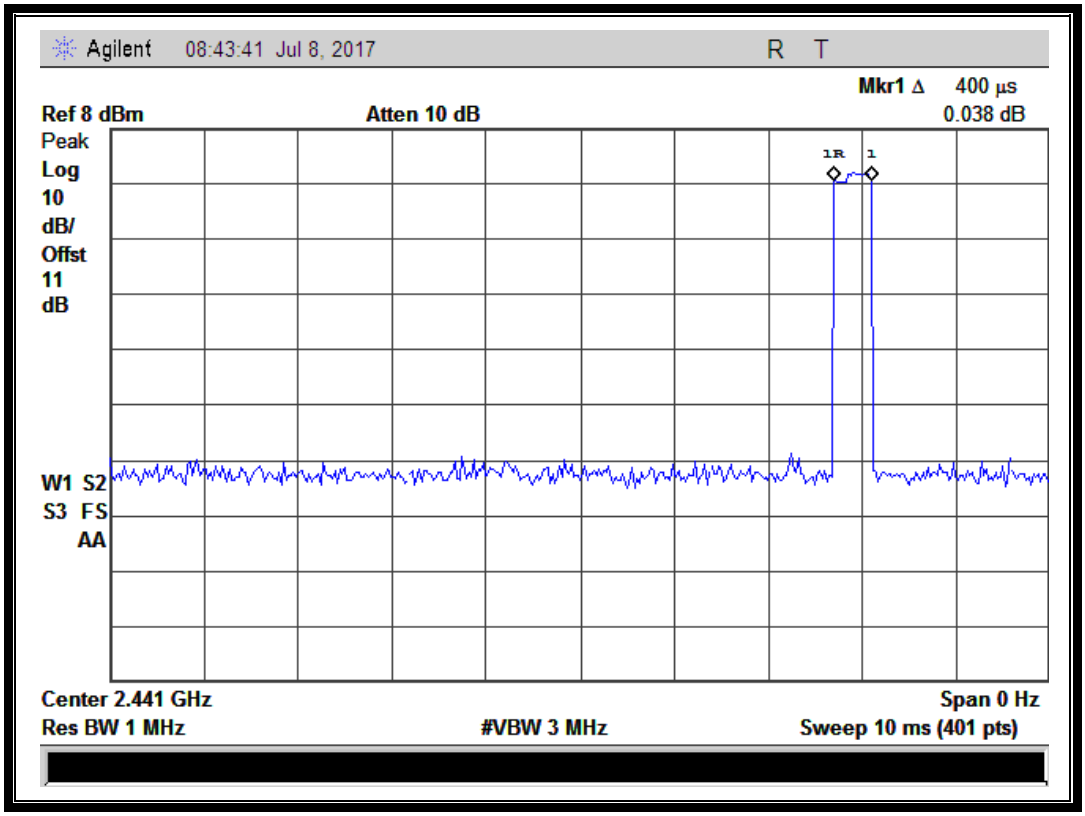
(Plot C: DH5 @ GFSK)

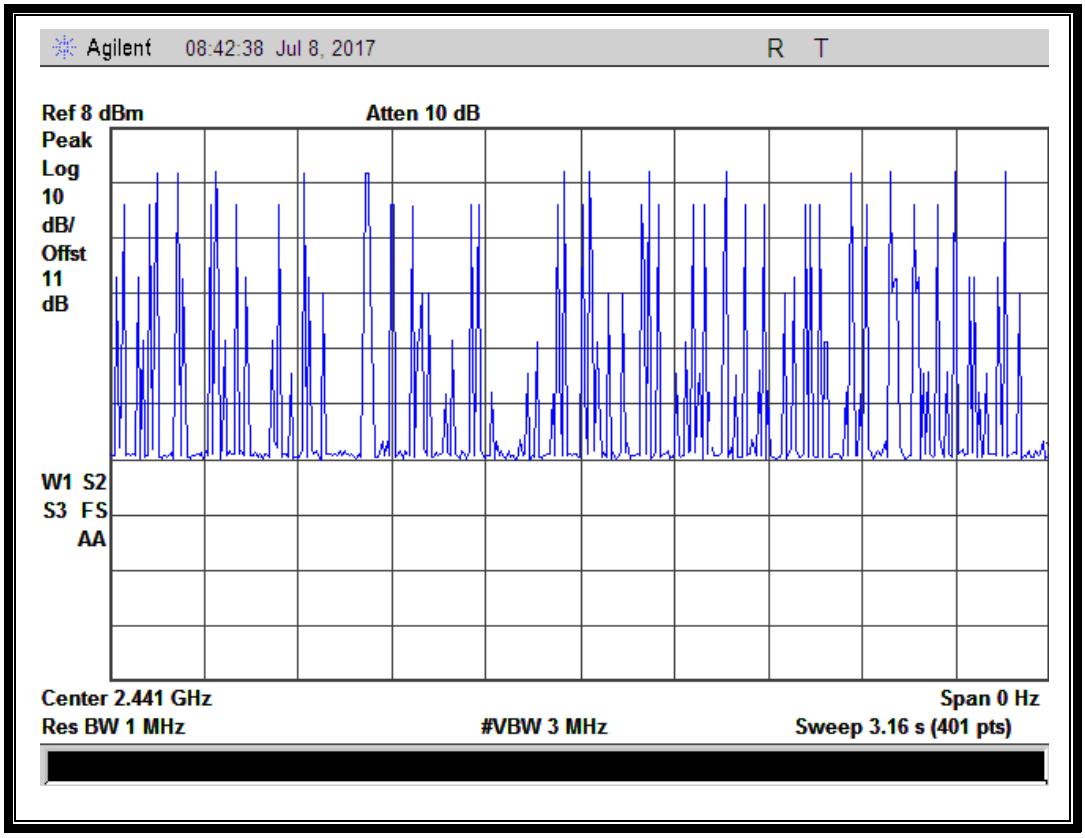
2.6.4.2 π/4-DQPSK Mode

A. Test Verdict:

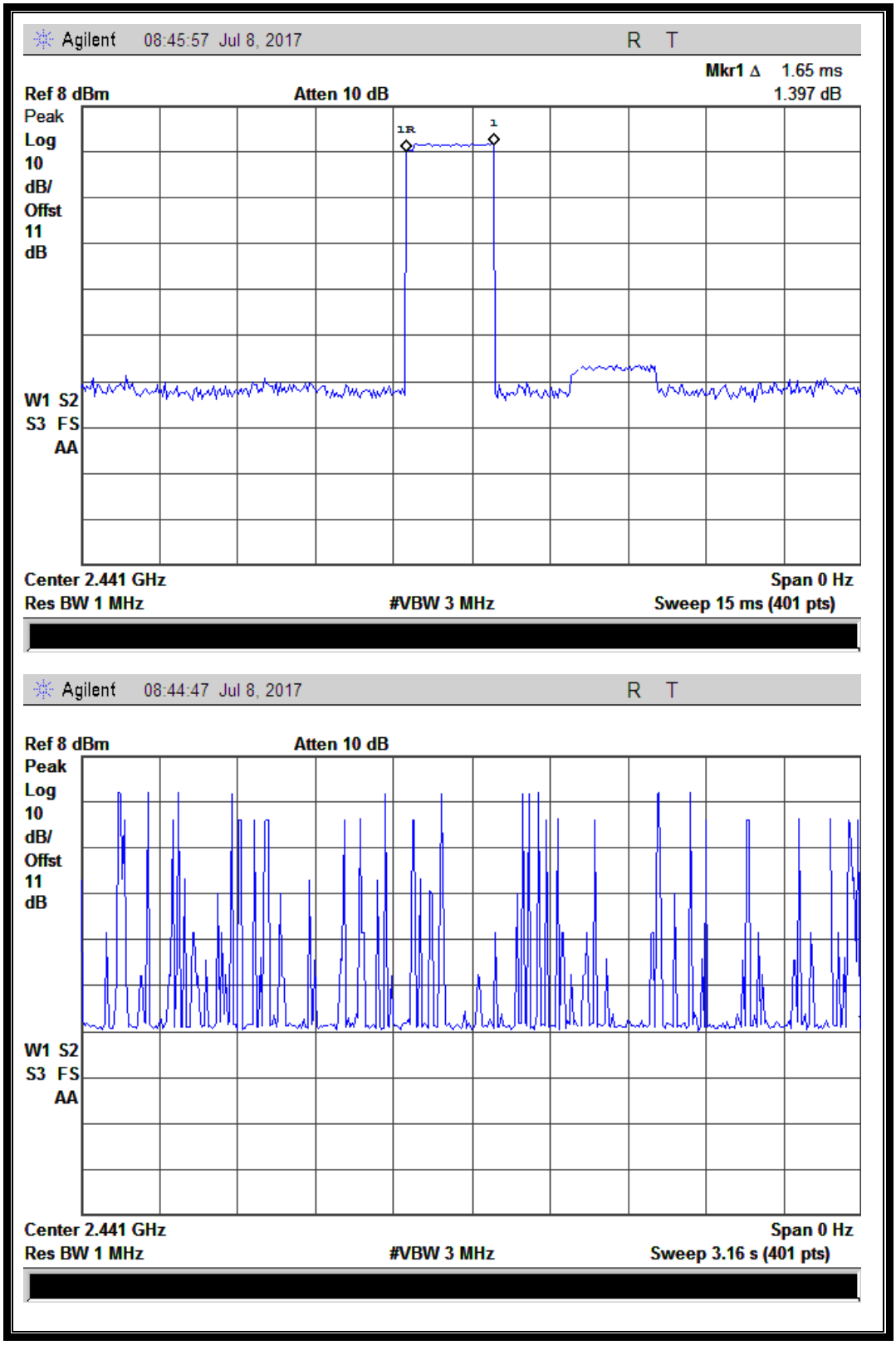
DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.40	13	0.00520	0.0520	0.4	PASS
DH3	1.65	11	0.01815	0.1815		PASS
DH5	2.85	8	0.02280	0.2280		PASS

B. Test Plots:

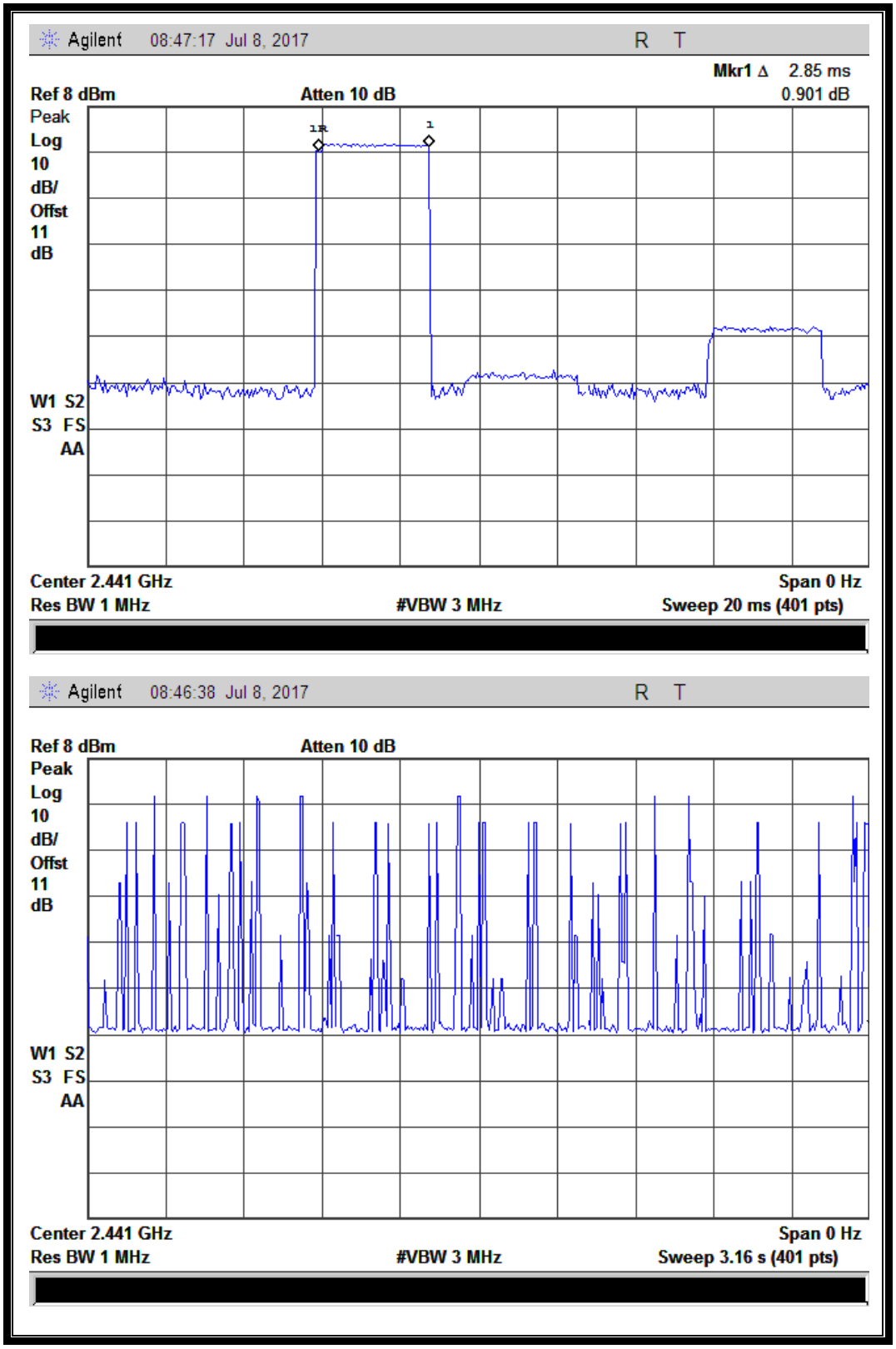




(Plot D: DH1 @ π/4-DQPSK)



(Plot E: DH3 @ π/4-DQPSK)



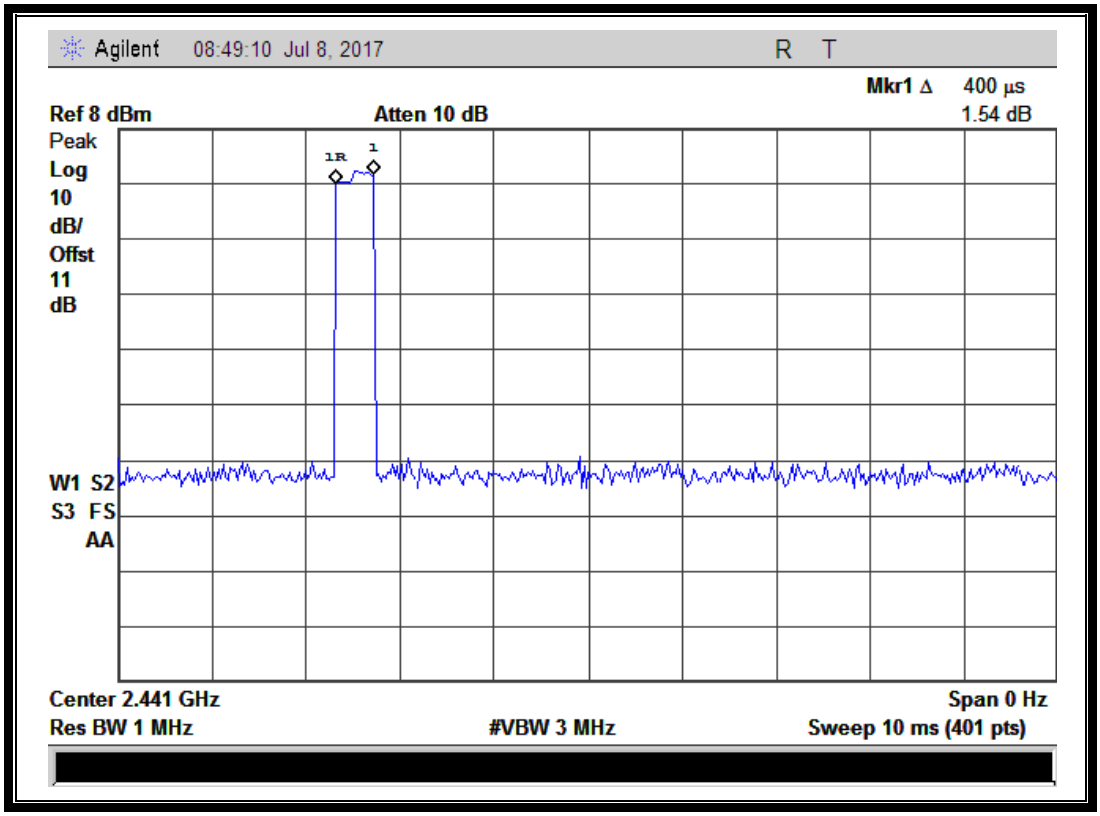
(Plot F: DH5 @ π/4-DQPSK)

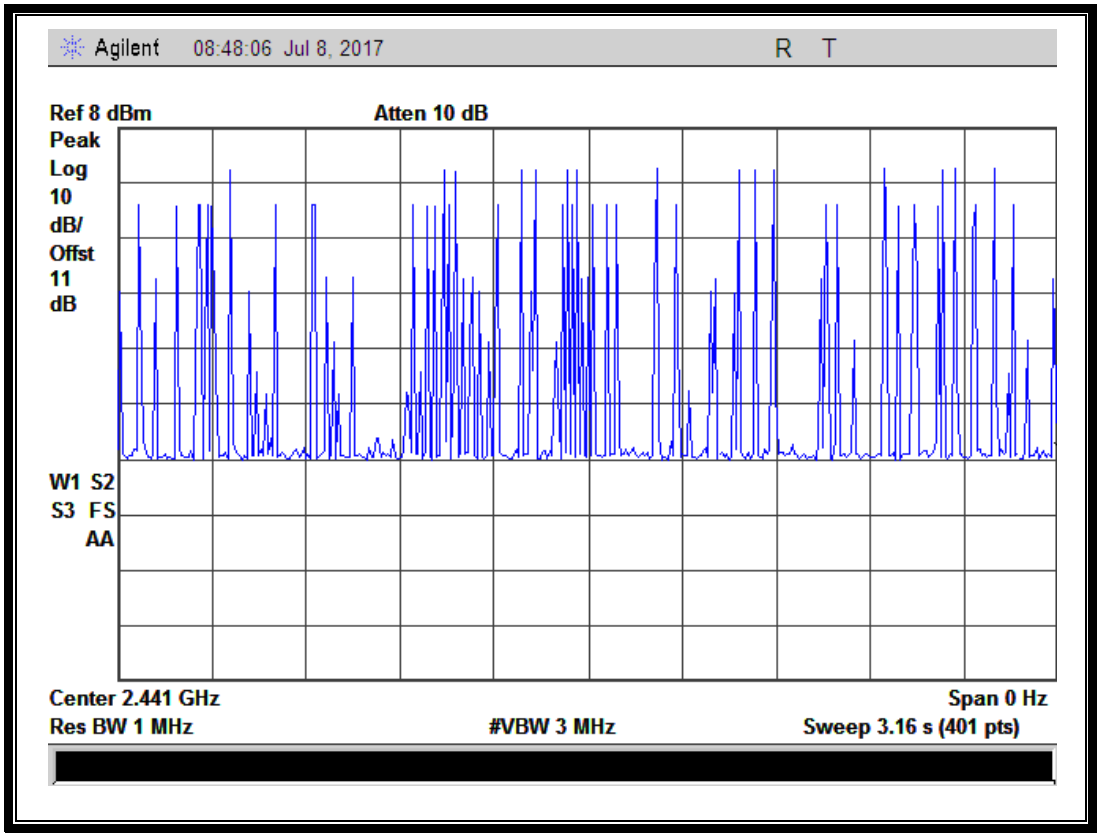
2.6.4.3 8-DPSK mode

A. Test Verdict:

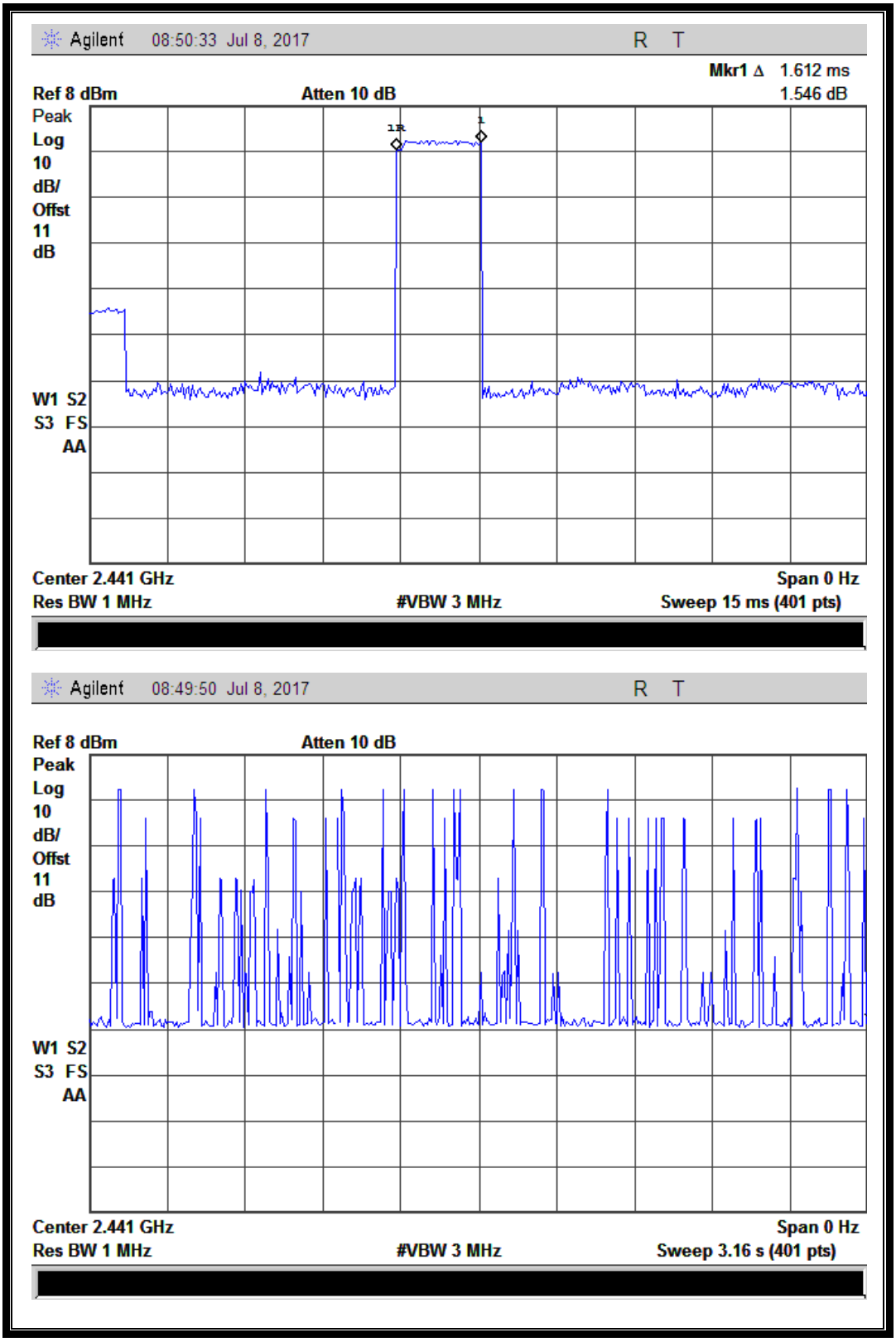
DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.40	15	0.00600	0.0600	0.4	PASS
DH3	1.61	15	0.02415	0.2415		PASS
DH5	1.61	11	0.01771	0.1771		PASS

B. Test Plots:

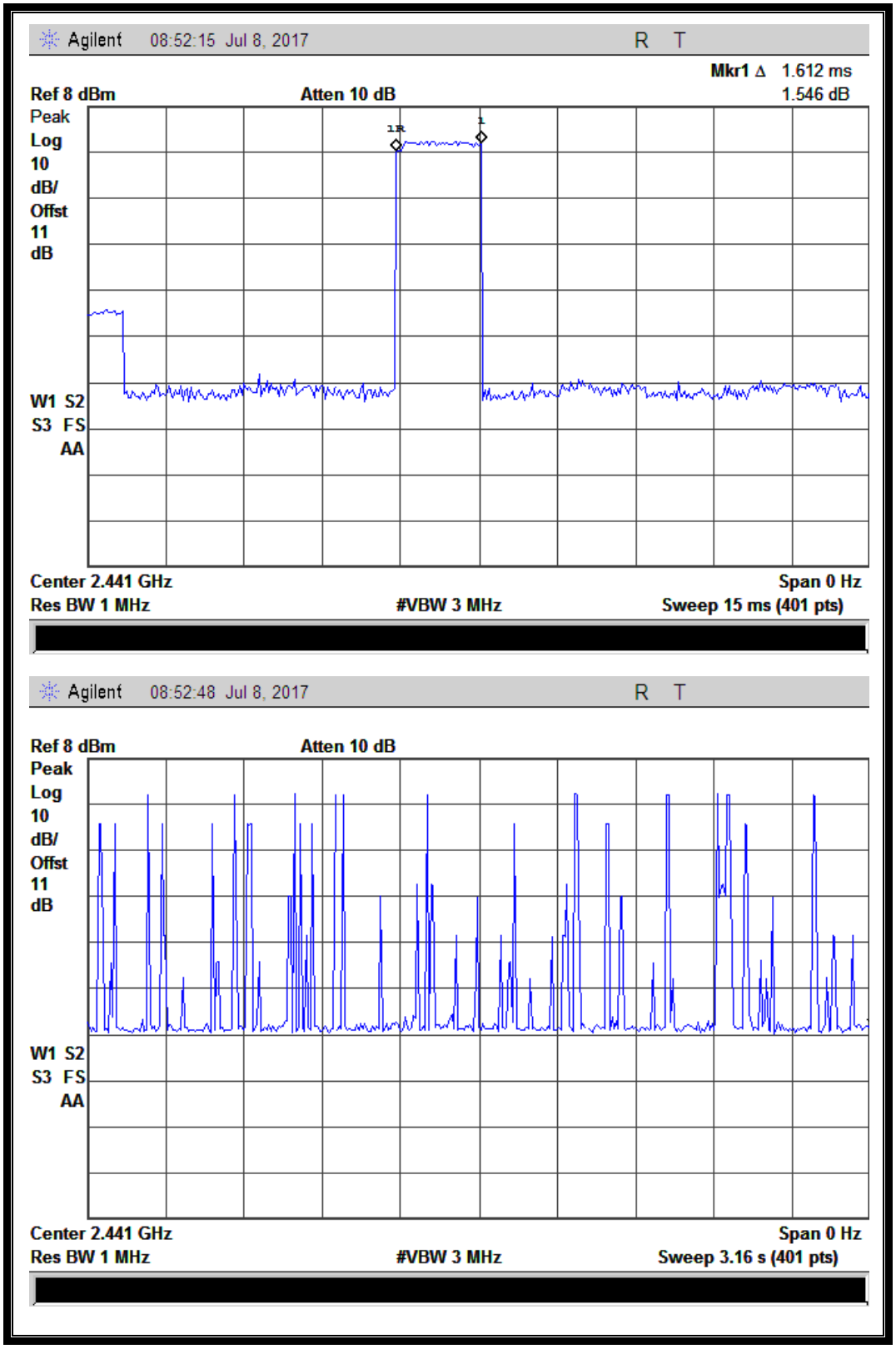




(Plot G: DH1 @ 8-DPSK)



(Plot H: DH3 @ 8-DPSK)



(Plot I: DH5 @ 8-DPSK)

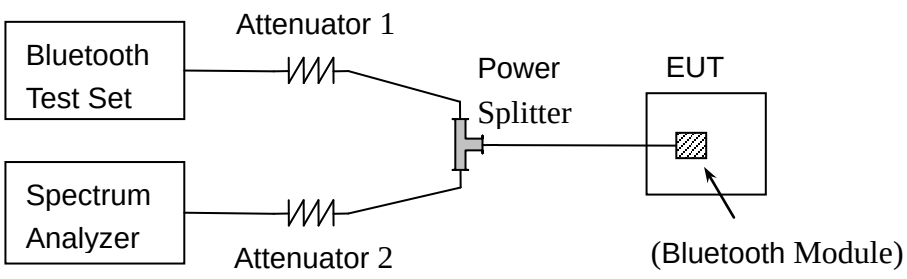
2.7 Conducted Spurious Emissions

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

B. Equipments List:

Please reference ANNEX A(1.5).

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.

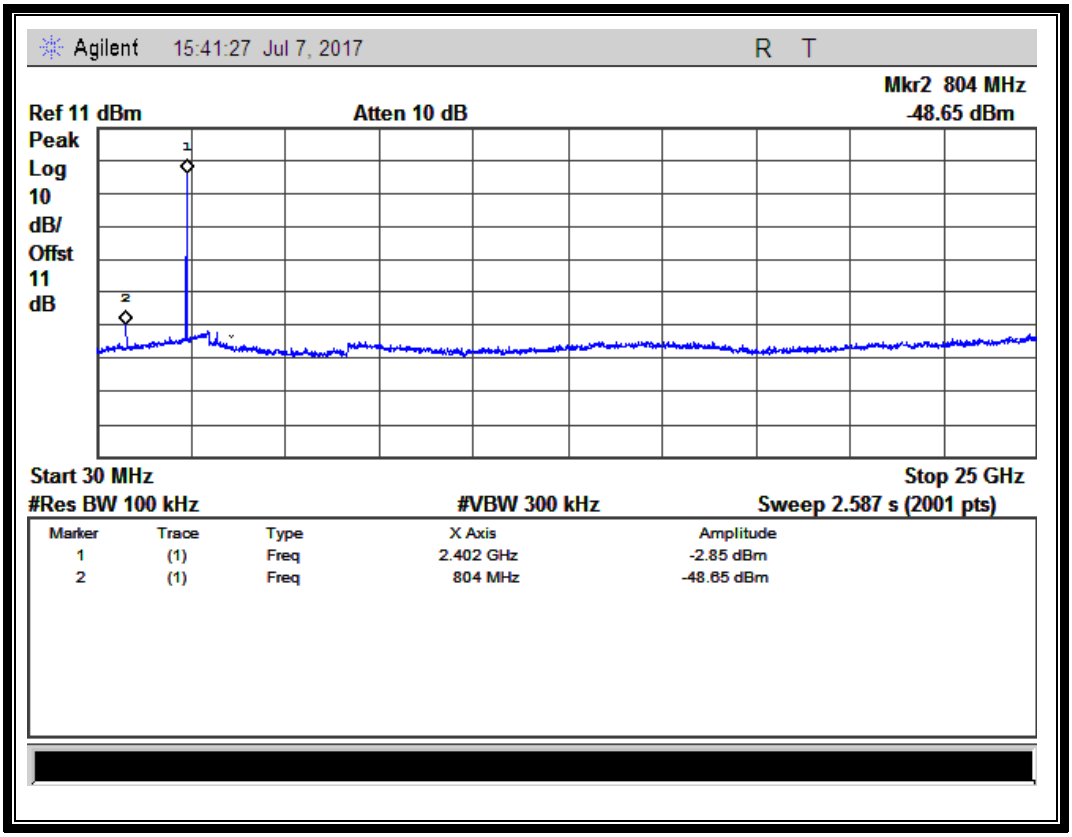
2.7.4.1 GFSK Mode

A. Test Verdict:

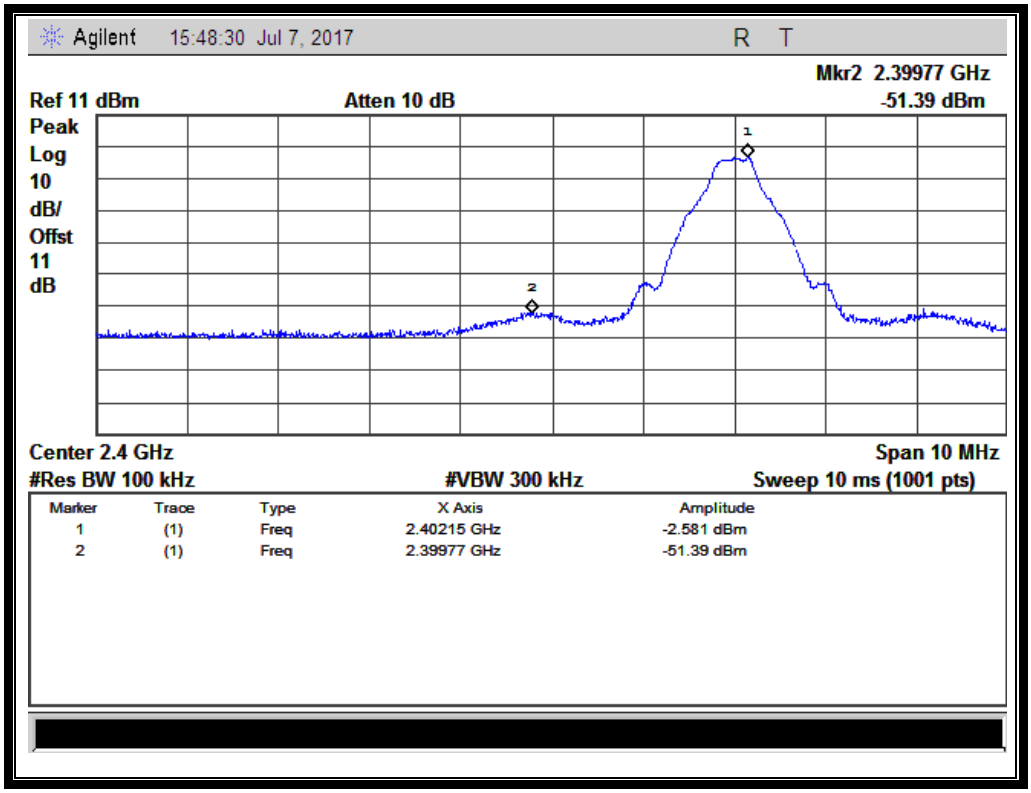
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-48.65	Plot A	-2.85	-22.85	PASS
39	2441	-48.14	Plot B	-2.28	-22.28	PASS
78	2480	-48.93	Plot C	-2.71	-22.71	PASS

B. Test Plots:

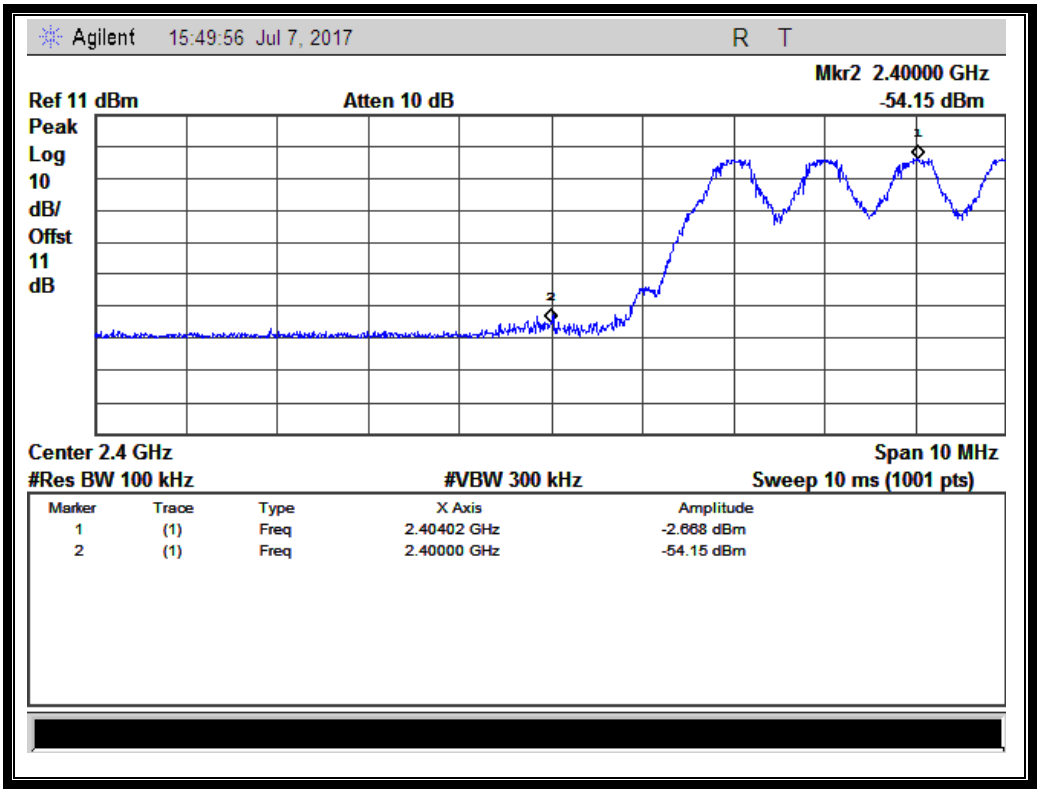
Note: the power of the Module transmitting frequency should be ignored.



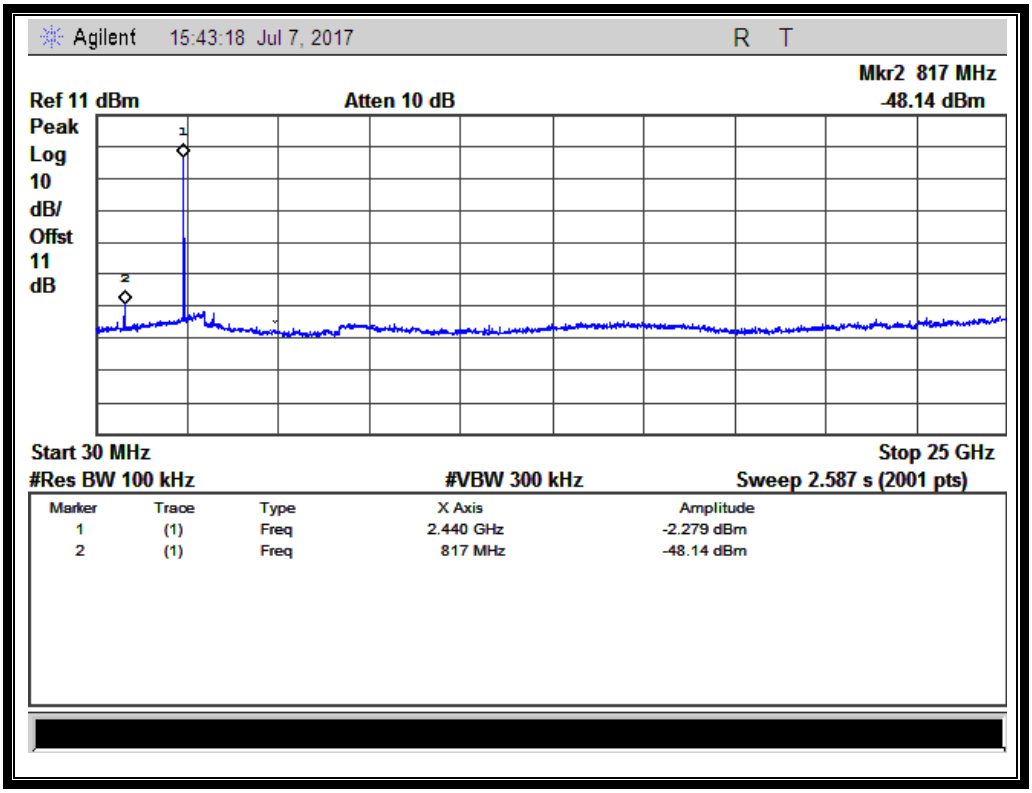
(Plot A: Channel = 0, 30MHz to 25GHz @ GFSK Mode)



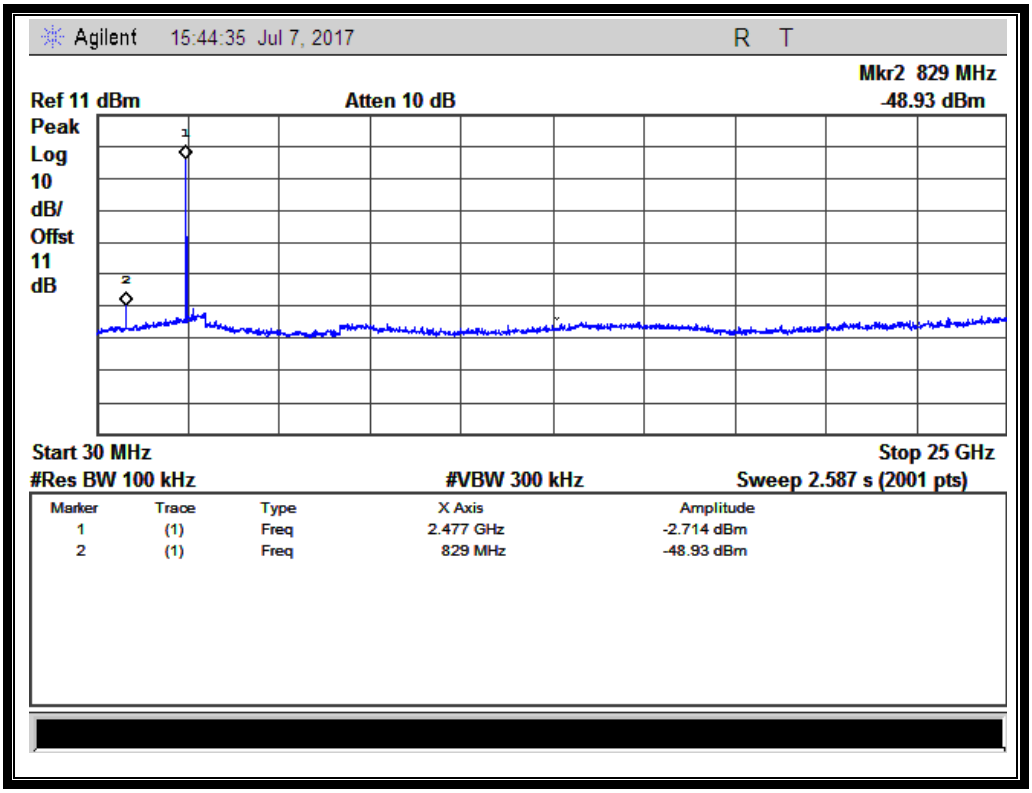
(Channel = 0, Band edge @ GFSK Mode)



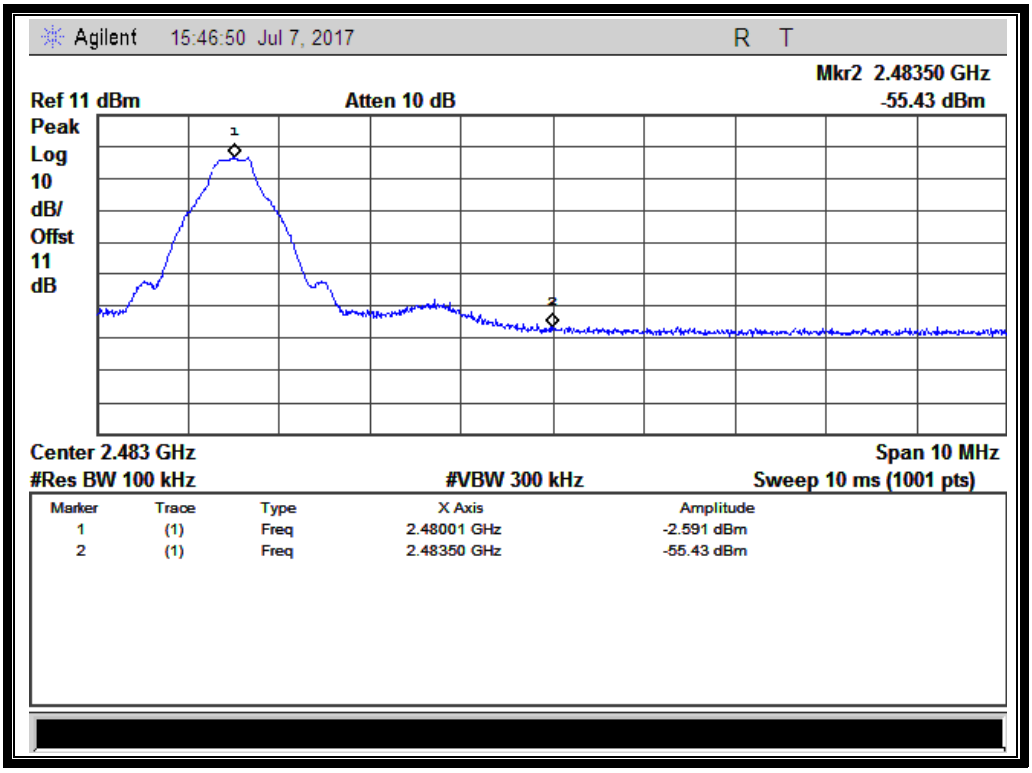
(Channel = 0, Band edge with hopping on @ GFSK Mode)



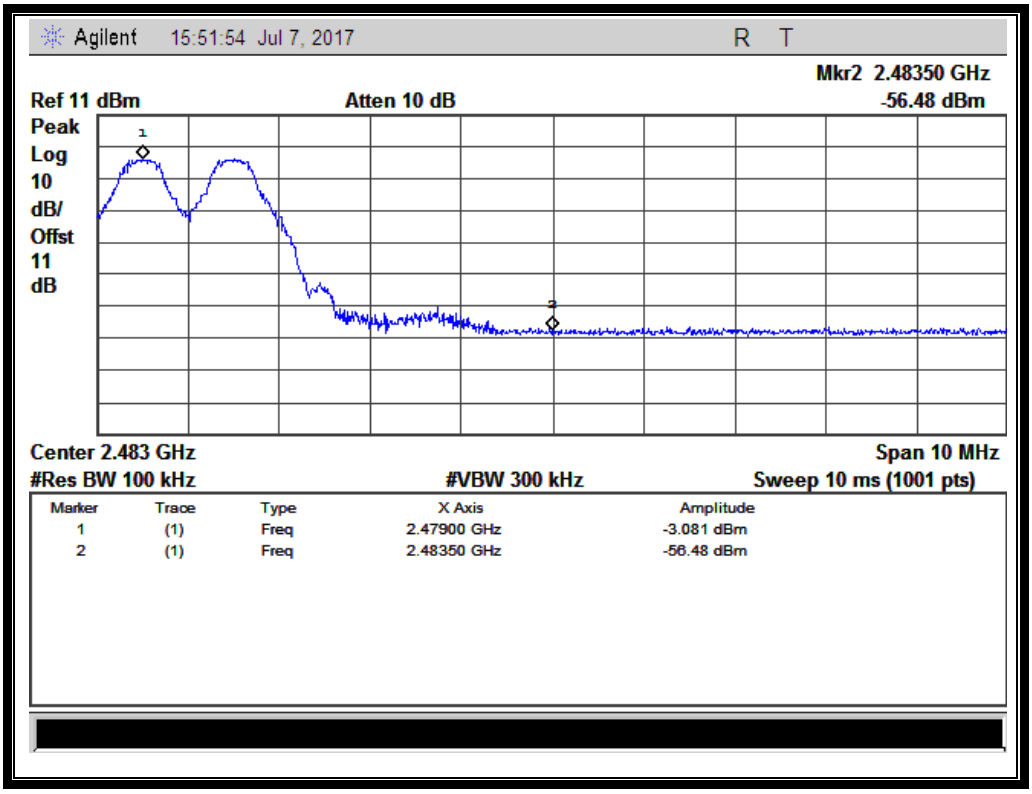
(Plot B: Channel = 39, 30MHz to 25GHz @ GFSK Mode)



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



(Channel = 78, Band edge @ GFSK Mode)



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

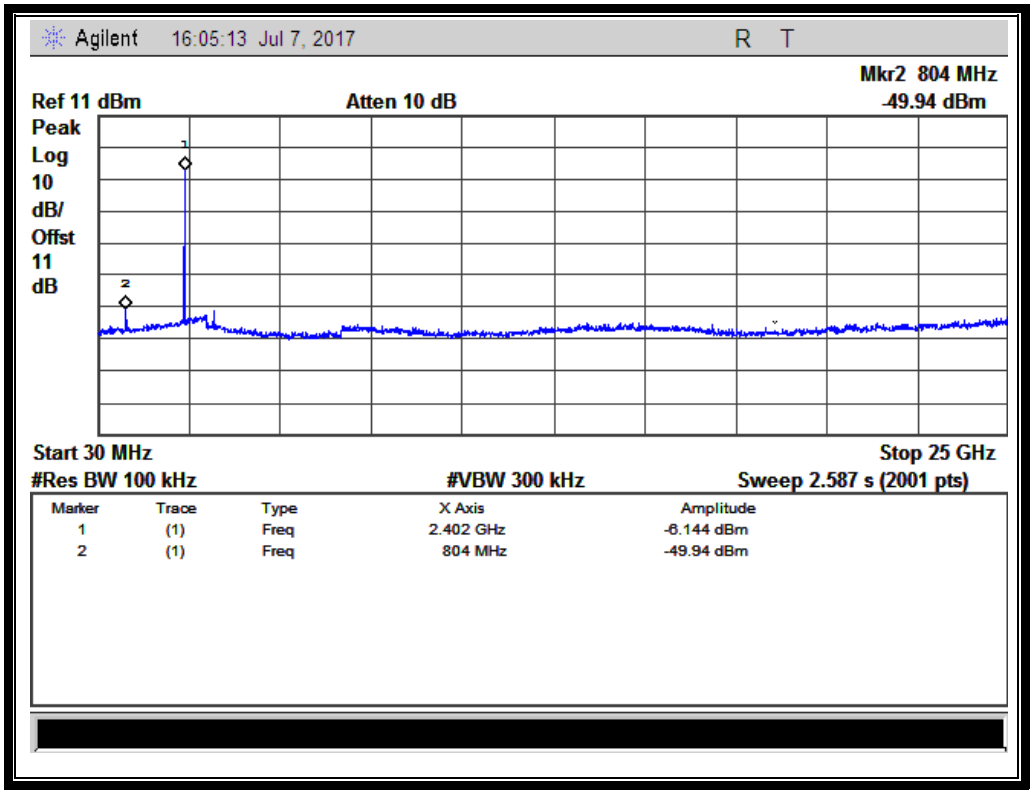
2.7.4.2 π/4-DQPSK Mode

A. Test Verdict:

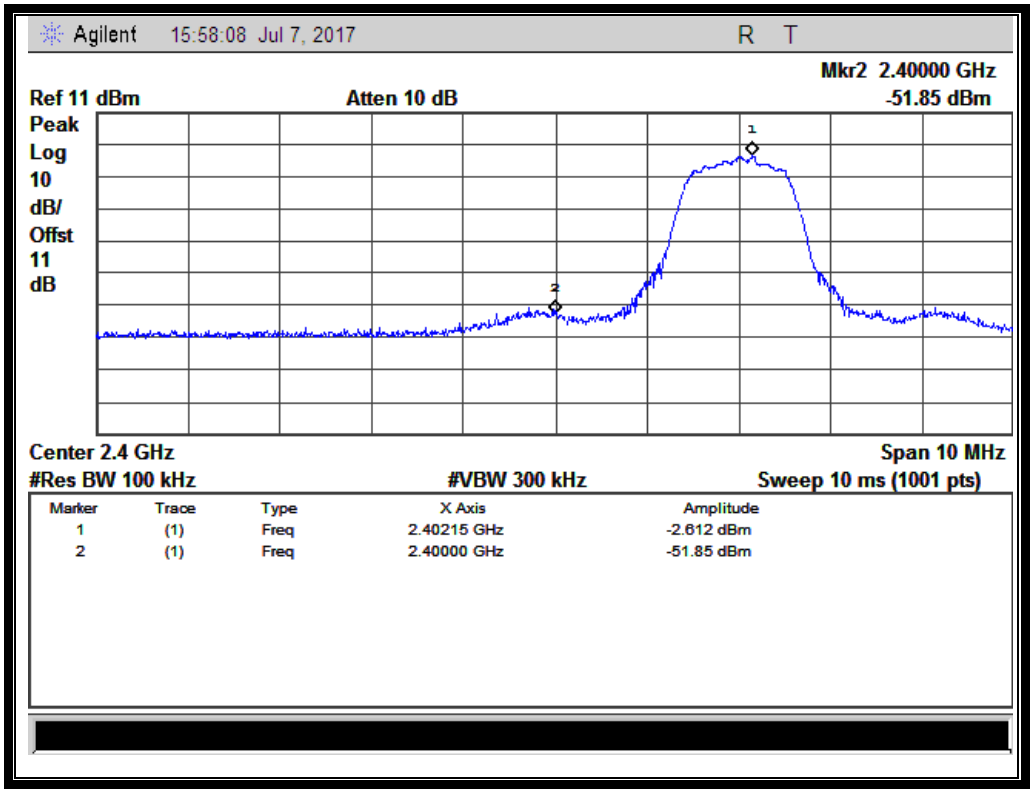
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-49.94	Plot D	-6.14	-26.14	PASS
39	2441	-49.38	Plot E	-5.31	-25.31	PASS
78	2480	-50.74	Plot F	-5.29	-25.29	PASS

B. Test Plots:

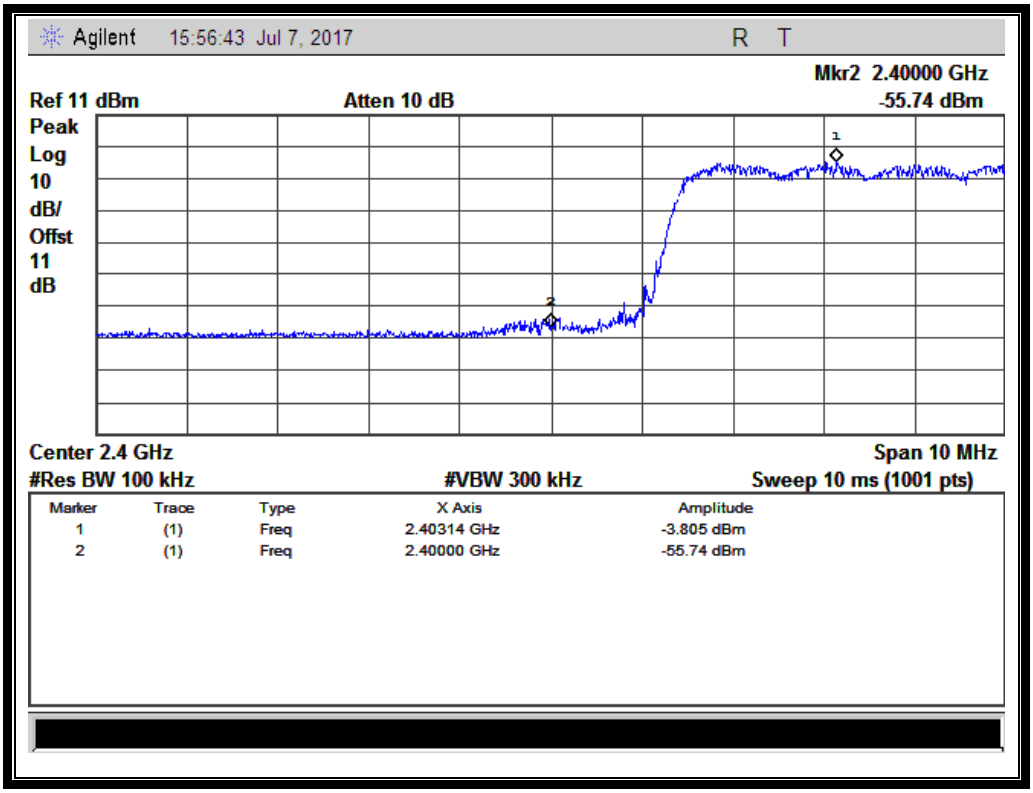
Note: the power of the Module transmitting frequency should be ignored.



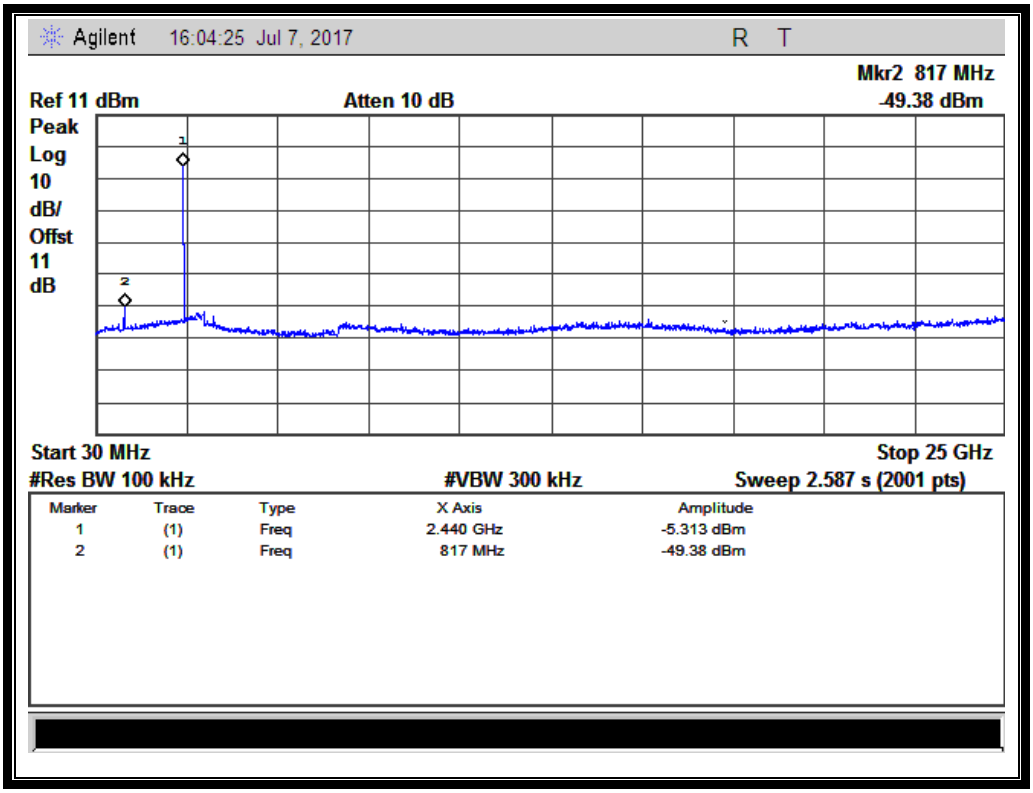
(Plot D: Channel = 0, 30MHz to 25GHz @π/4-DQPSK)



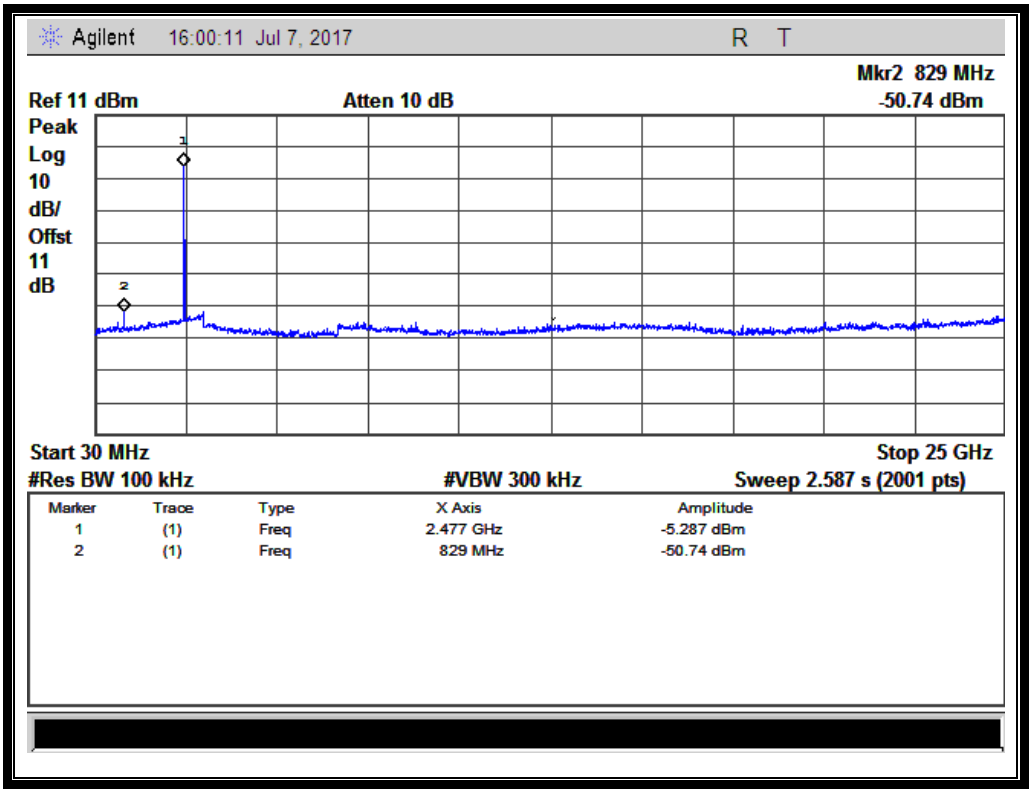
(Channel = 0, Band edge @π/4-DQPSK)



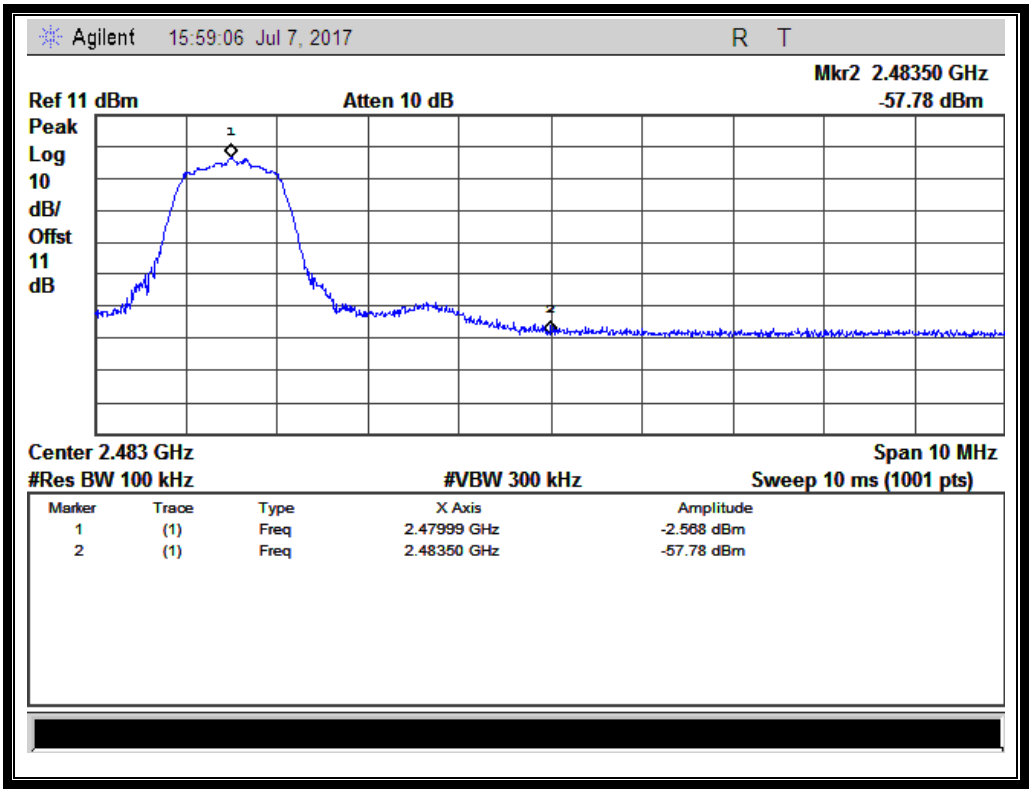
(Channel = 0, Band edge with hopping on @π/4-DQPSK)



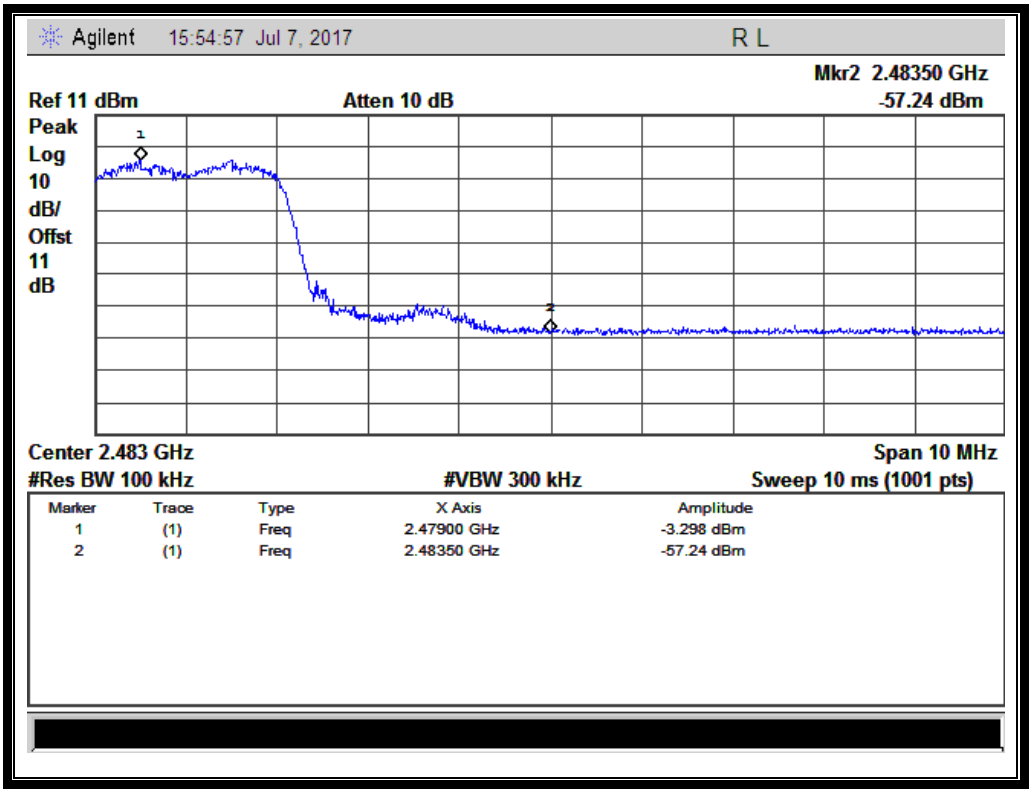
(Plot E: Channel = 39, 30MHz to 25GHz @ π/4-DQPSK)



(Plot F: 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)

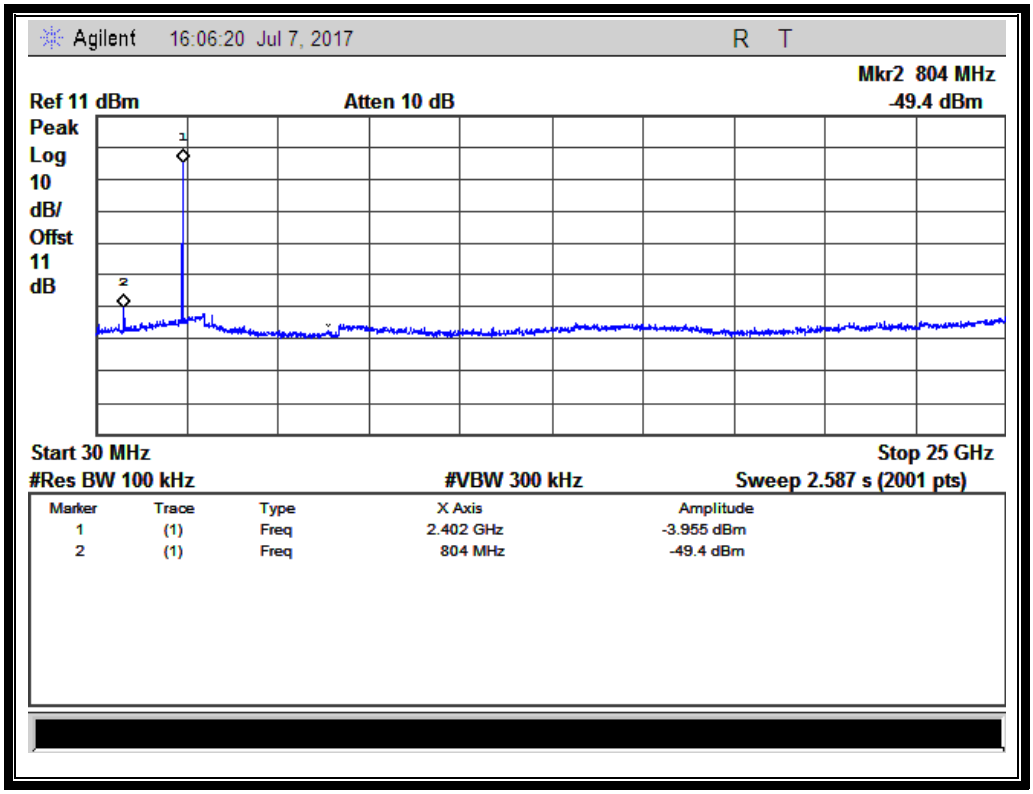
2.7.4.3 8-DPSK Mode

A. Test Verdict:

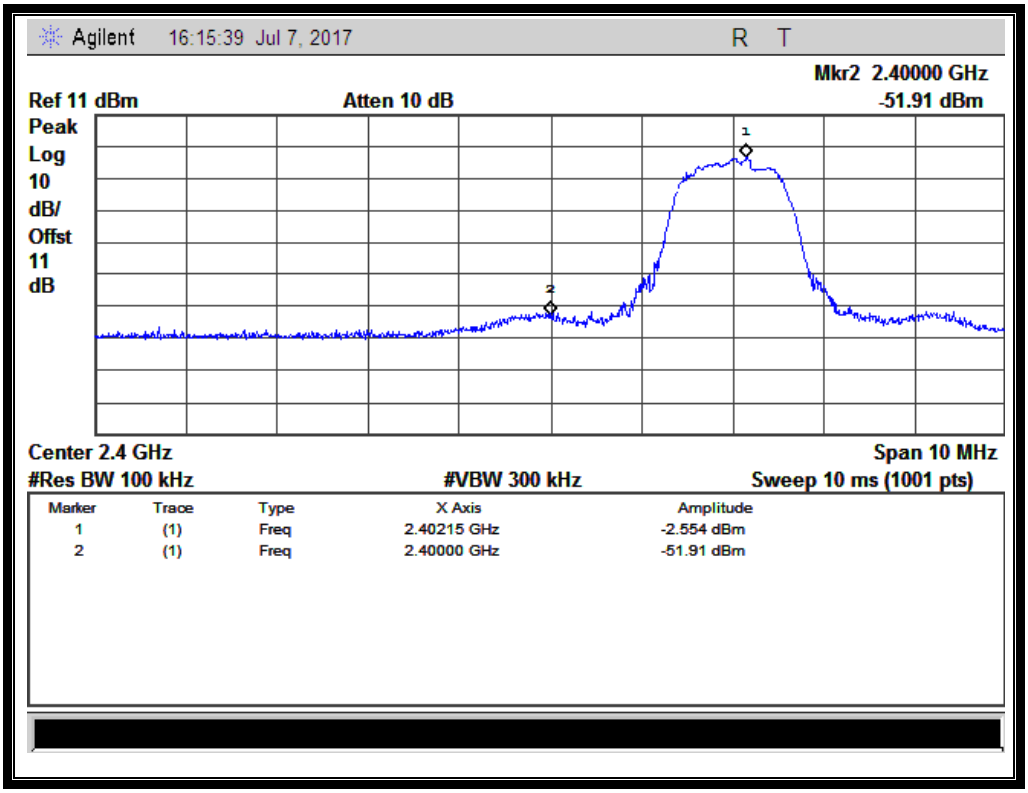
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-49.40	Plot G	-3.96	-23.96	PASS
39	2441	-48.51	Plot H	-4.76	-24.76	PASS
78	2480	-50.23	Plot I	-5.21	-25.21	PASS

B. Test Plots:

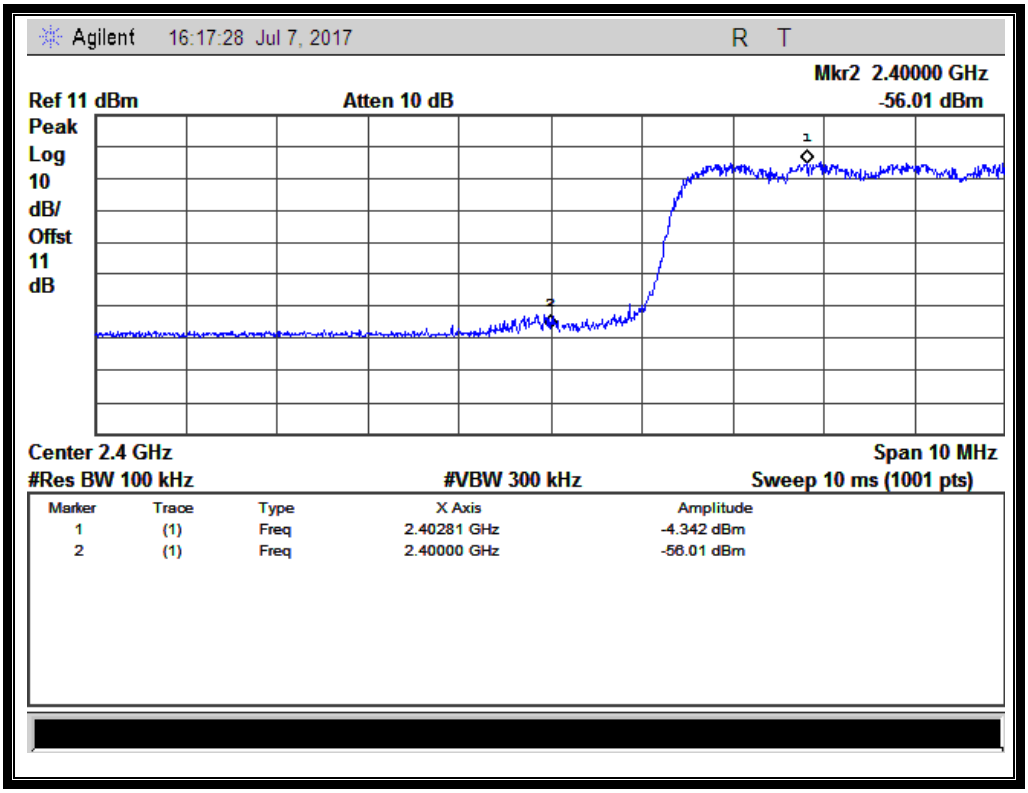
Note: the power of the Module transmitting frequency should be ignored.



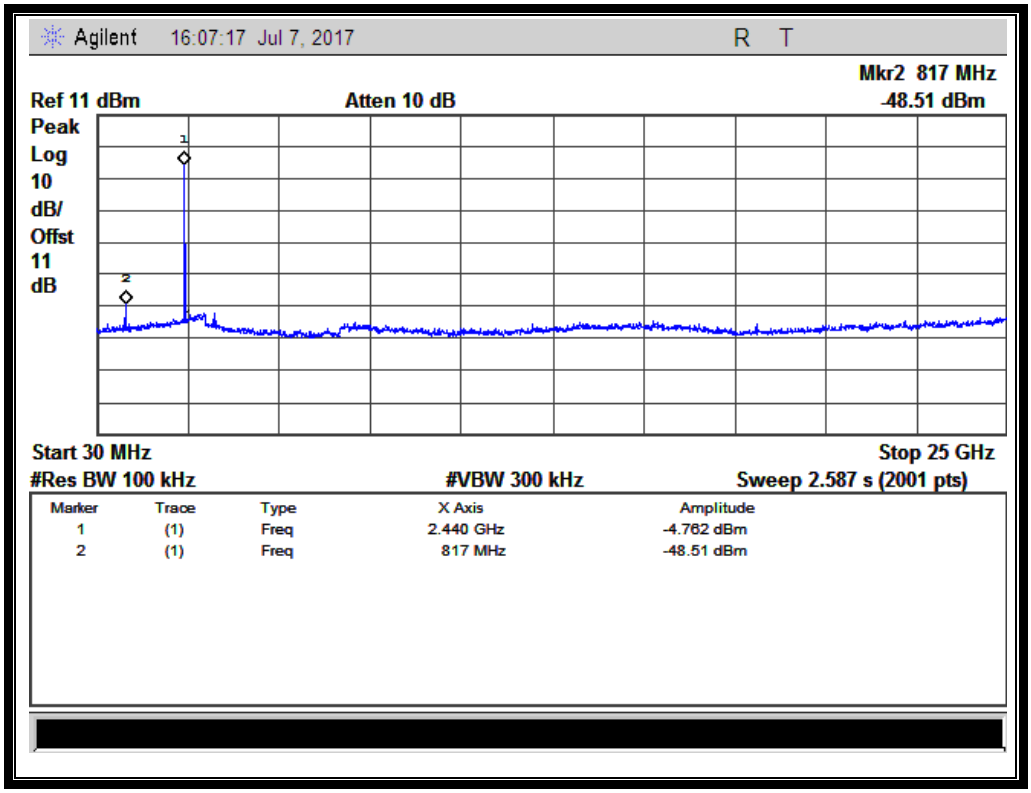
(Plot G: Channel = 0, 30MHz to 25GHz @ 8-DPSK)



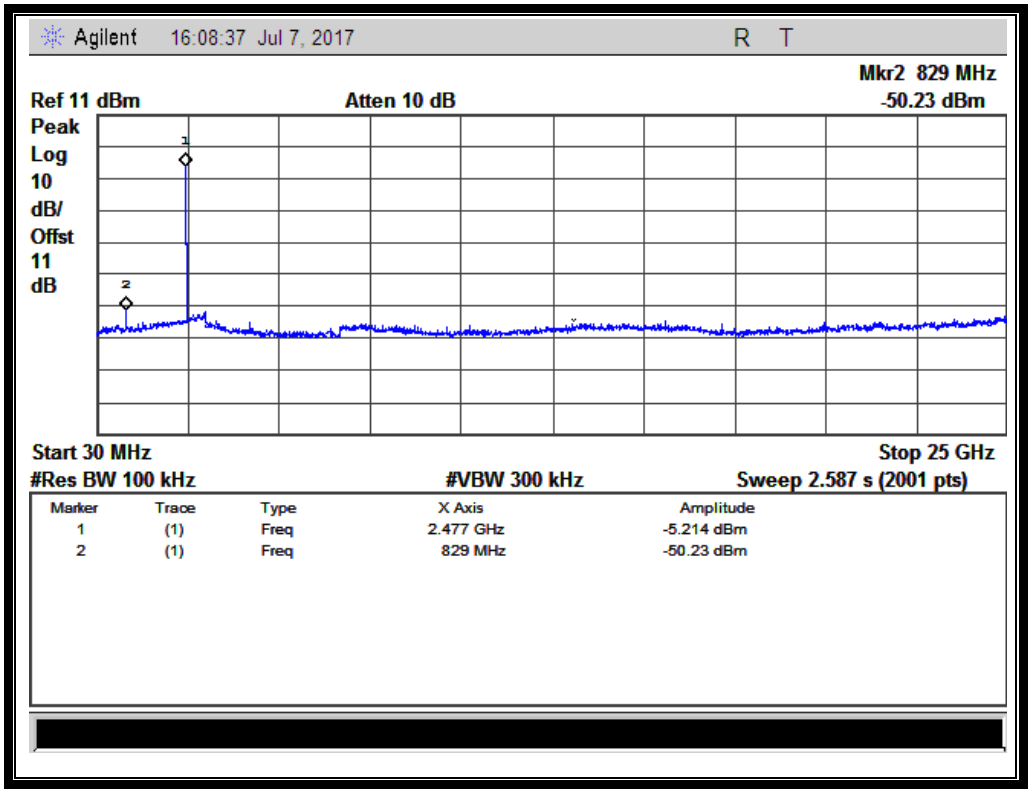
(Channel = 0, Band edge @ 8-DPSK)



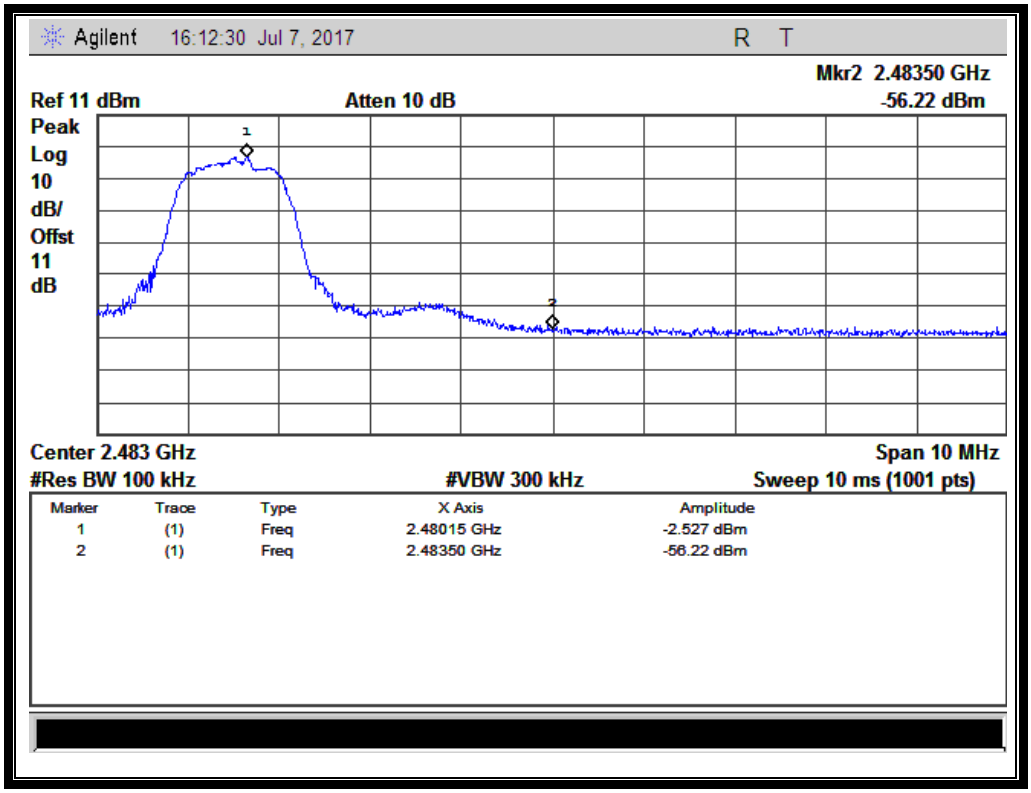
(Channel = 0, Band edge with hopping on @ 8-DPSK)



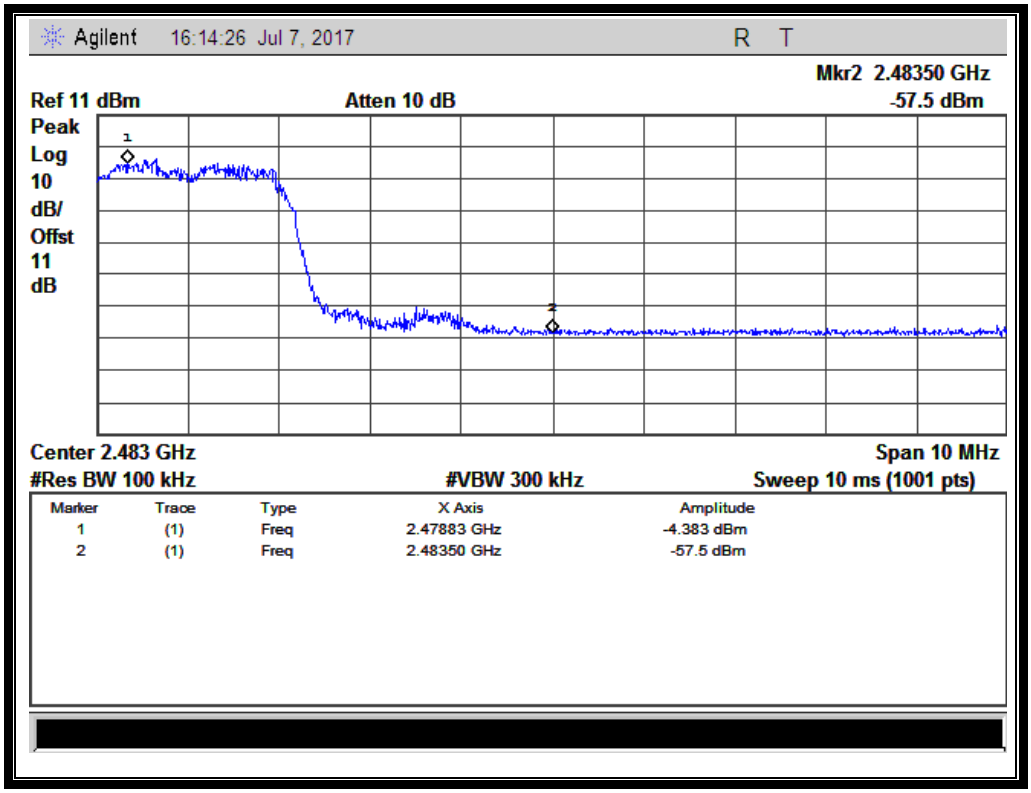
(Plot H: Channel = 39, 30MHz to 25GHz @ 8-DPSK)



(Plot I: 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)

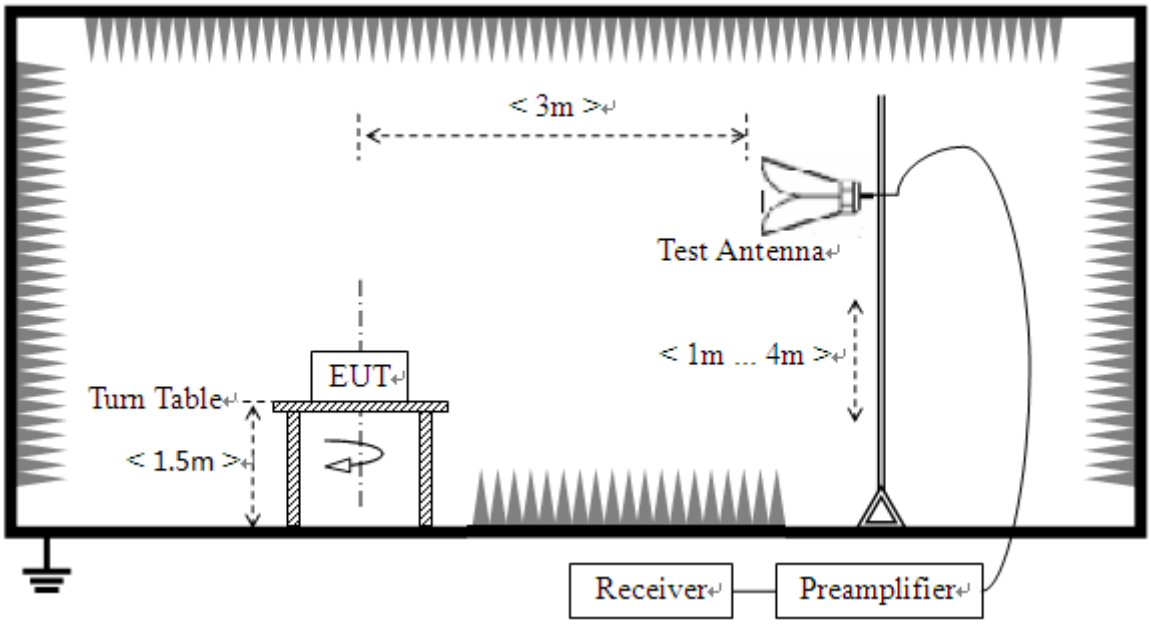
2.8 Restricted Frequency Bands

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

For the Test Antenna:

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

B. Equipments List:

Please reference ANNEX A(1.5).

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

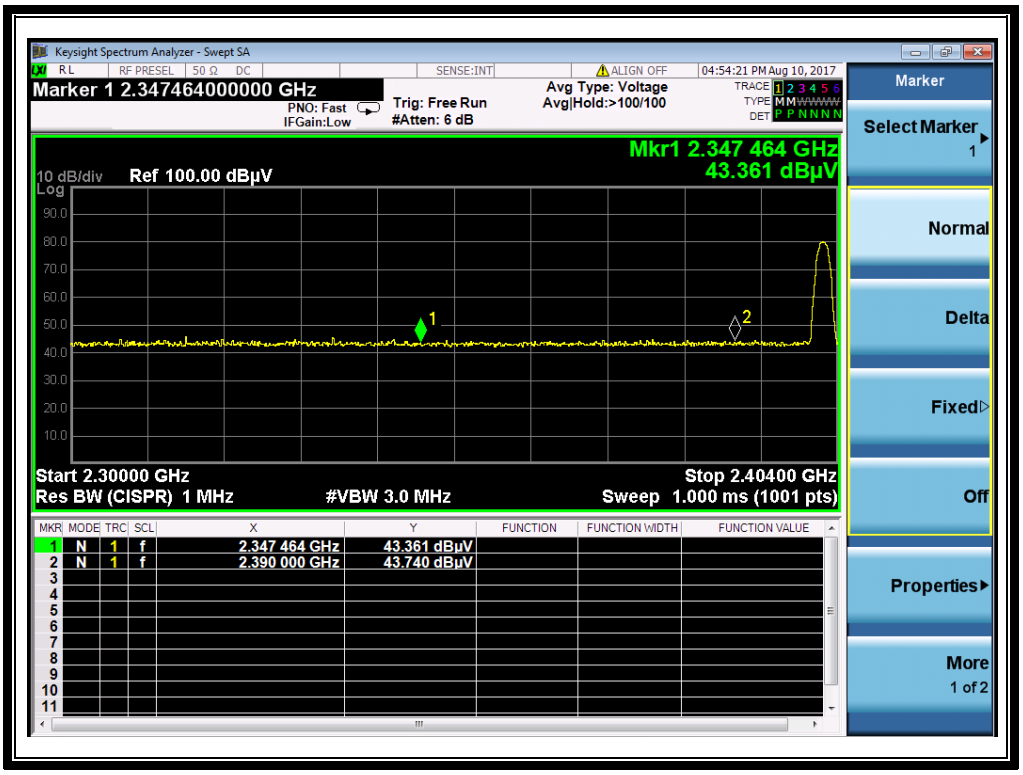
The lowest and highest channels are tested to verify Restricted Frequency Bands.
The measurement results are obtained as below:
E [dBμV/m] $=U_R + A_T + A_{Factor}$ [dB]; AT $=L_{Cable\ loss}$ [dB]$-G_{preamp}$ [dB]
AT: Total correction Factor except Antenna
UR: Receiver Reading
Gpreamp: Preamplifier 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 (Antenna 1)

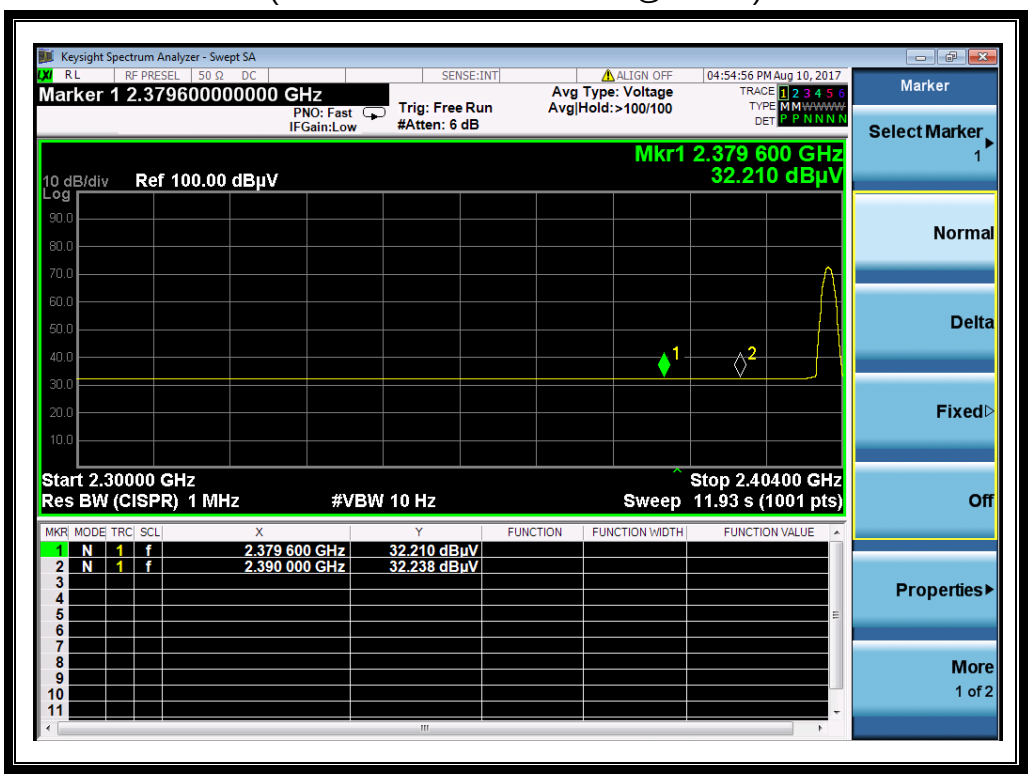
A. Test Verdict:

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	2347.46	PK	43.36	-33.63	32.56	42.29	74	Pass
0	2379.60	AV	32.21	-33.63	32.56	31.14	54	Pass
78	2485.85	PK	43.79	-33.18	32.50	43.11	74	Pass
78	2484.51	AV	32.22	-33.18	32.50	31.54	54	Pass

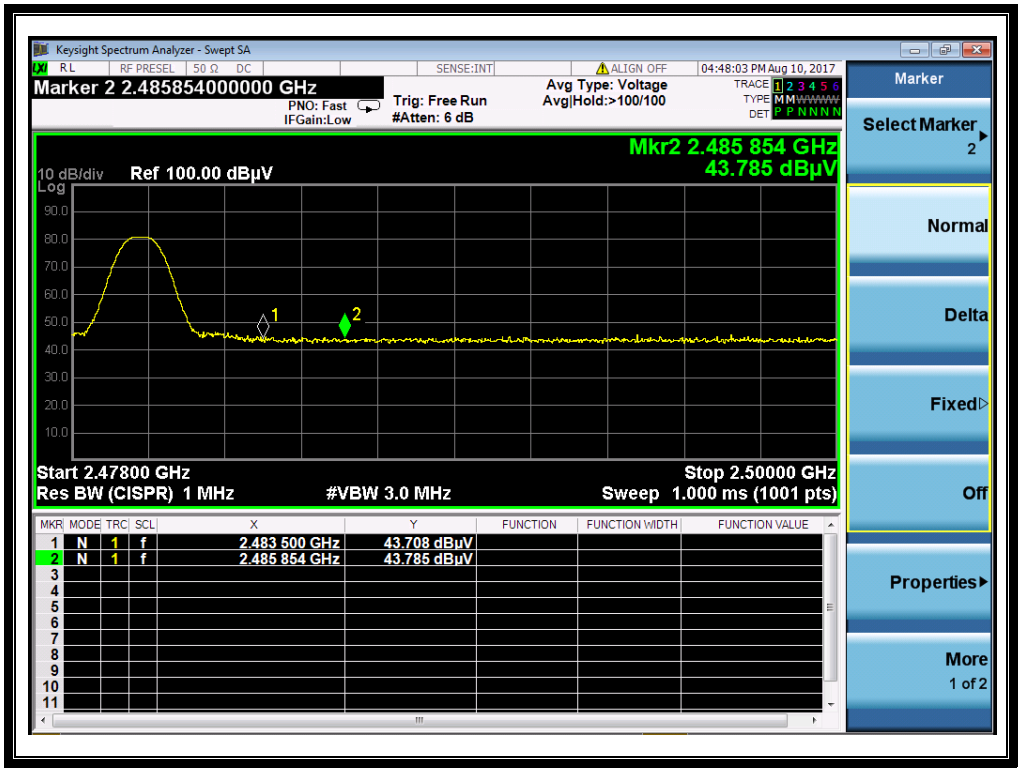
B. Test Plots:



(Plot A1:Channel = 0 PEAK @ GFSK)



(Plot A2:Channel = 0 AVERAGE @ GFSK)



(Plot B1: Channel = 78 PEAK @ GFSK)

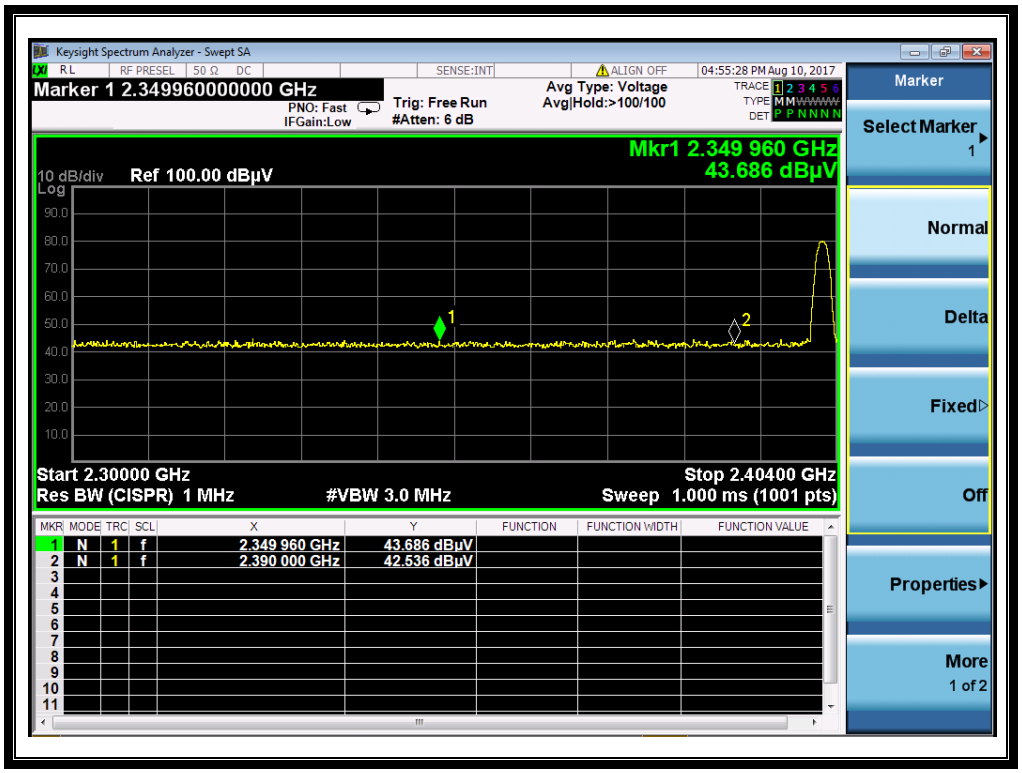
(Plot B2: Channel = 78 AVERAGE @ GFSK)

2.8.4.2 π/4-DQPSK Mode (Antenna 1)

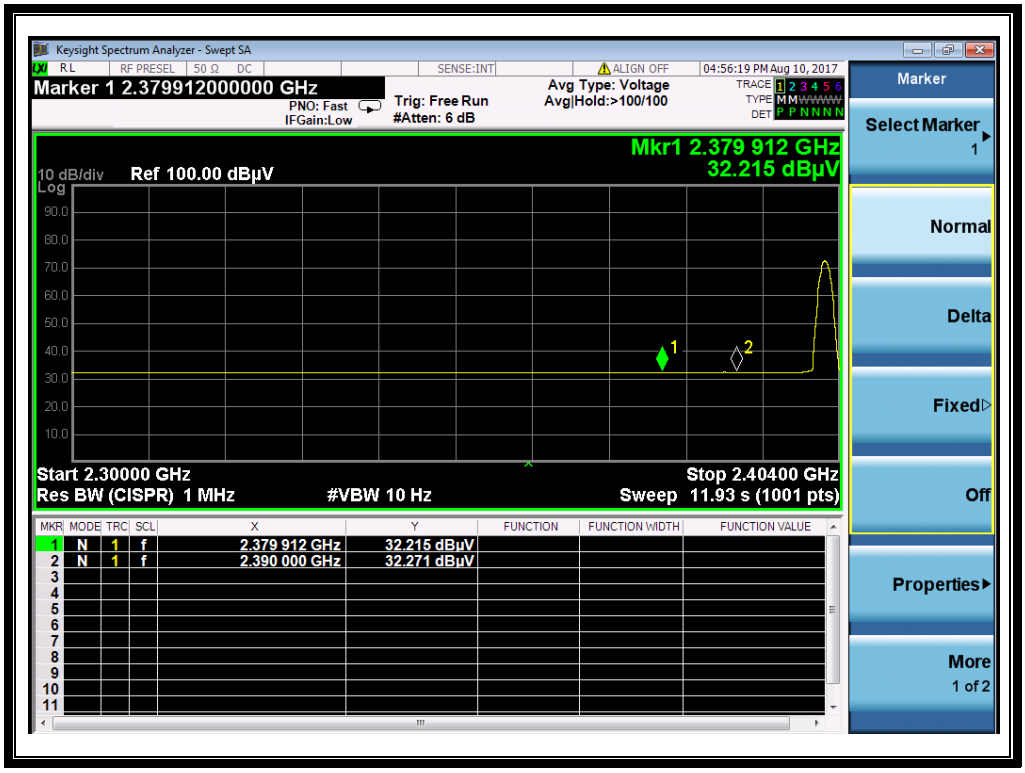
A. Test Verdict:

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	2349.96	PK	43.69	-33.63	32.56	42.62	74	Pass
0	2379.91	AV	32.22	-33.63	32.56	31.15	54	Pass
78	2487.46	PK	43.74	-33.18	32.5	43.06	74	Pass
78	2489.26	AV	32.17	-33.18	32.5	31.49	54	Pass

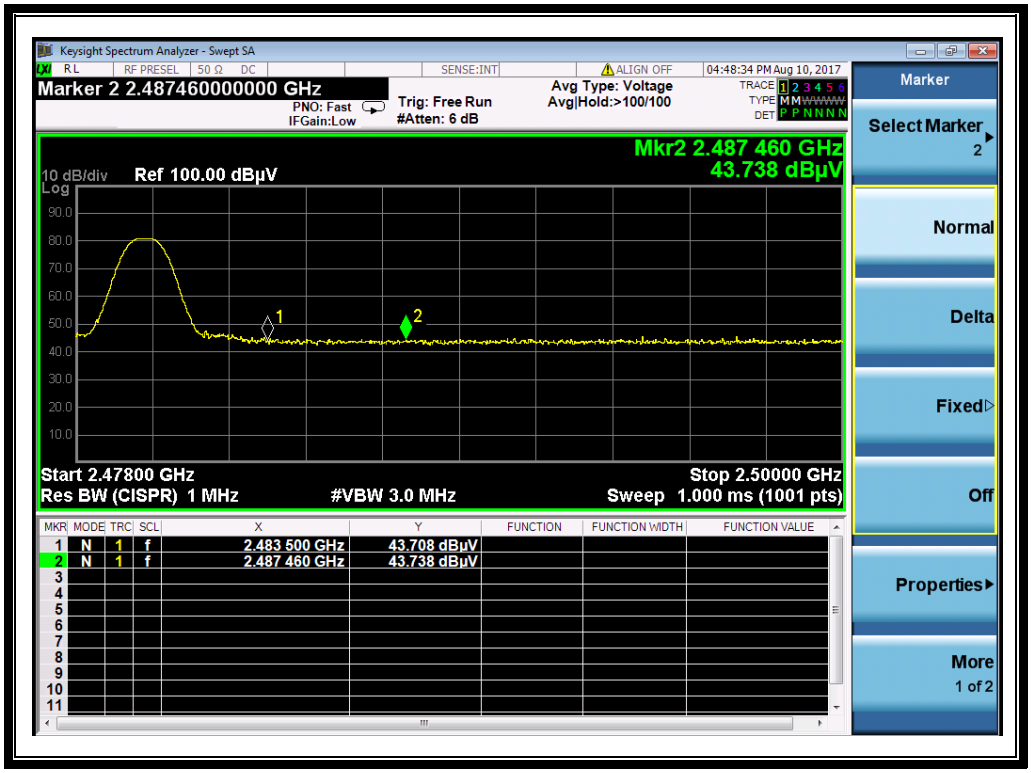
B. Test Plots:



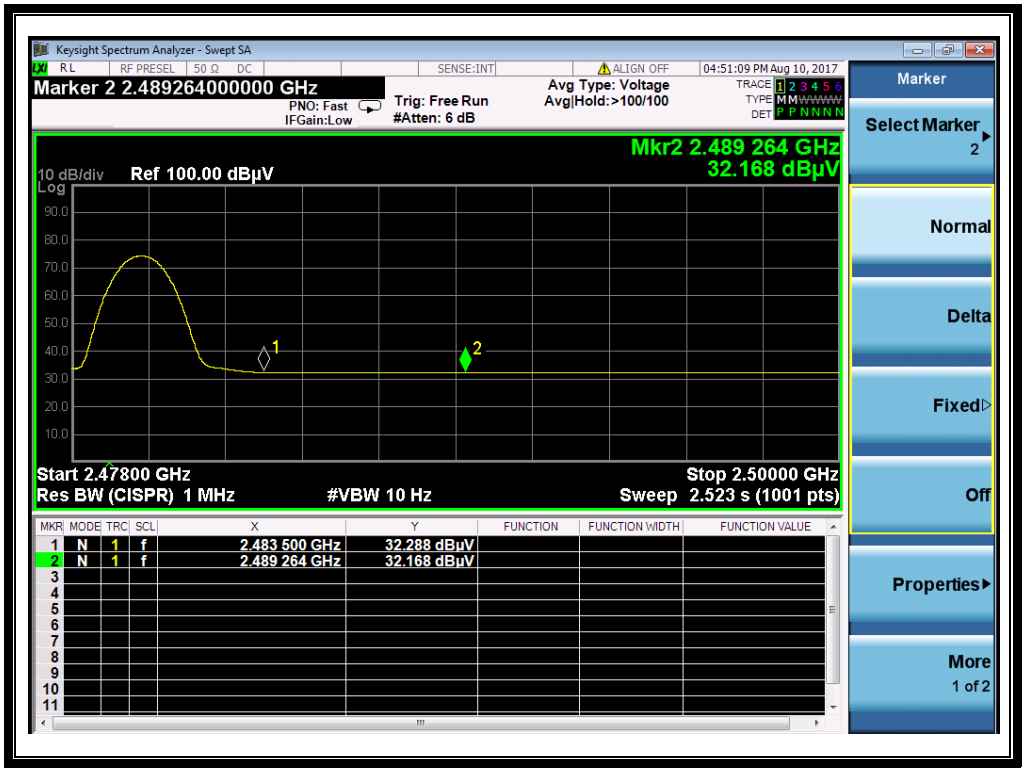
(Plot C1: Channel = 0 PEAK @ π/4-DQPSK)



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



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



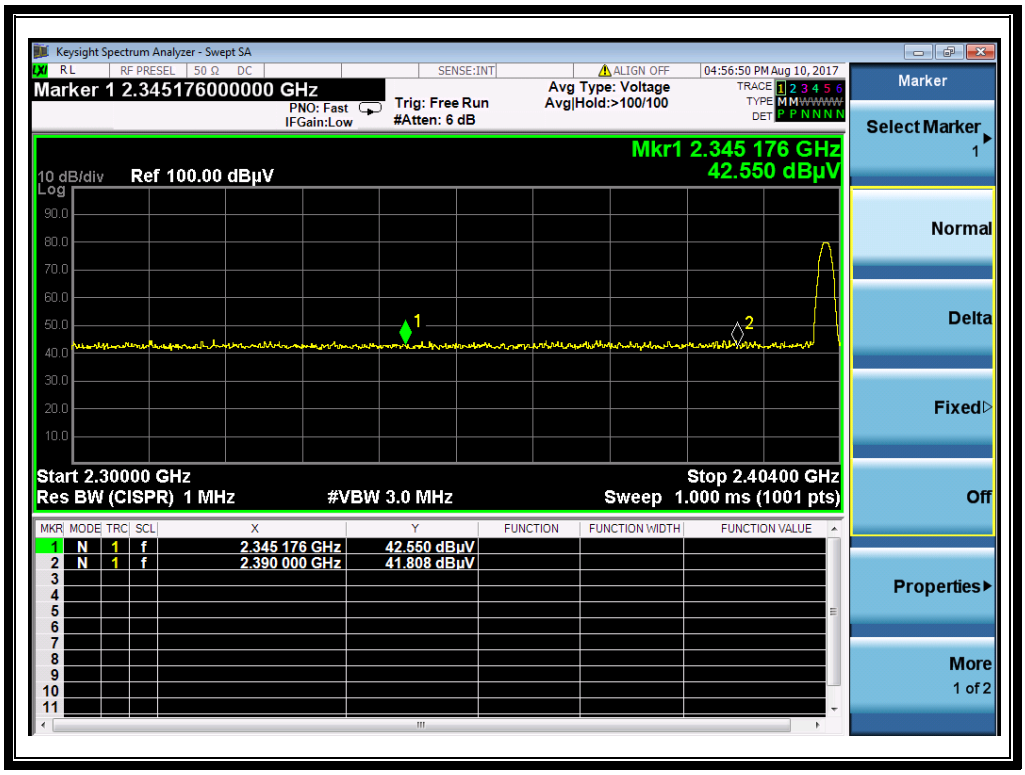
(Plot D2: Channel = 78 AVERAGE@ π/4-DQPSK)

2.8.4.3 8-DPSK Mode (Antenna 1)

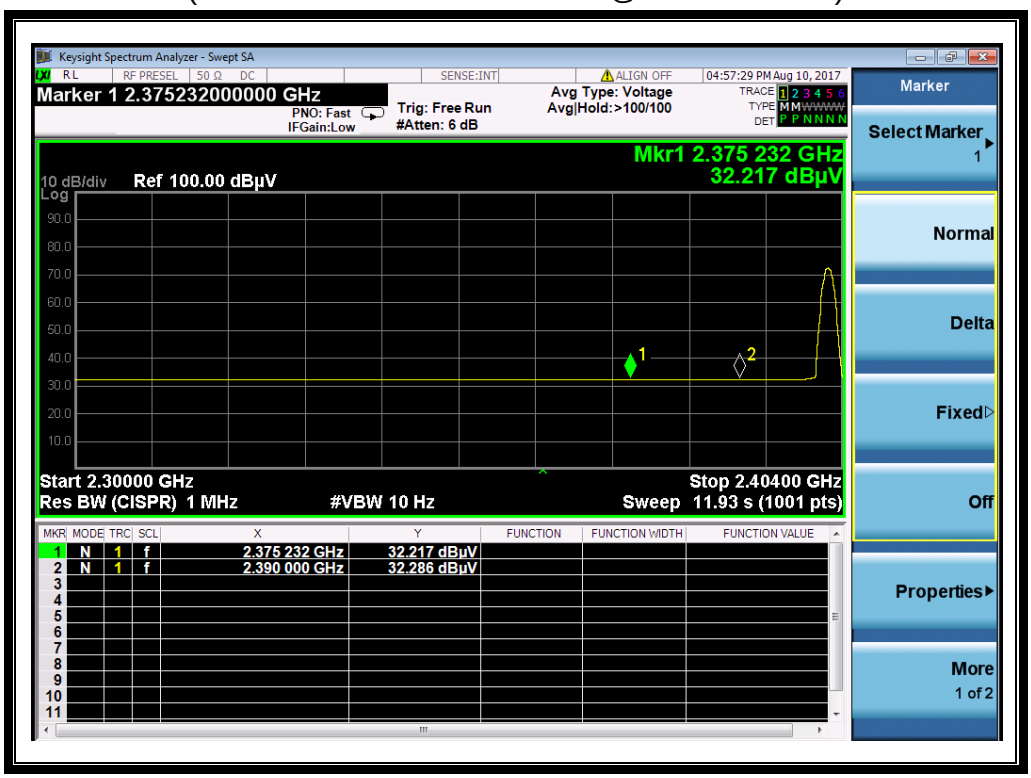
A. Test Verdict:

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	2345.18	PK	42.55	-33.63	32.56	41.48	74	Pass
0	2375.23	AV	32.22	-33.63	32.56	31.15	54	Pass
78	2486.07	PK	43.76	-33.18	32.5	43.08	74	Pass
78	2486.07	AV	32.18	-33.18	32.5	31.5	54	Pass

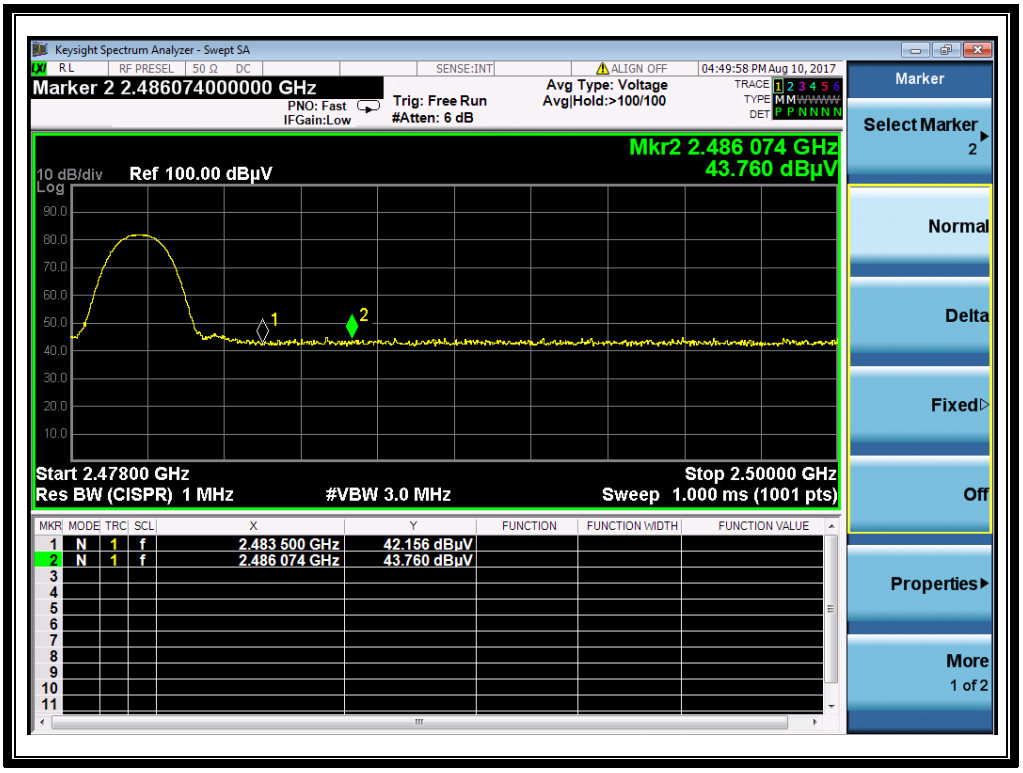
B. Test Plots:



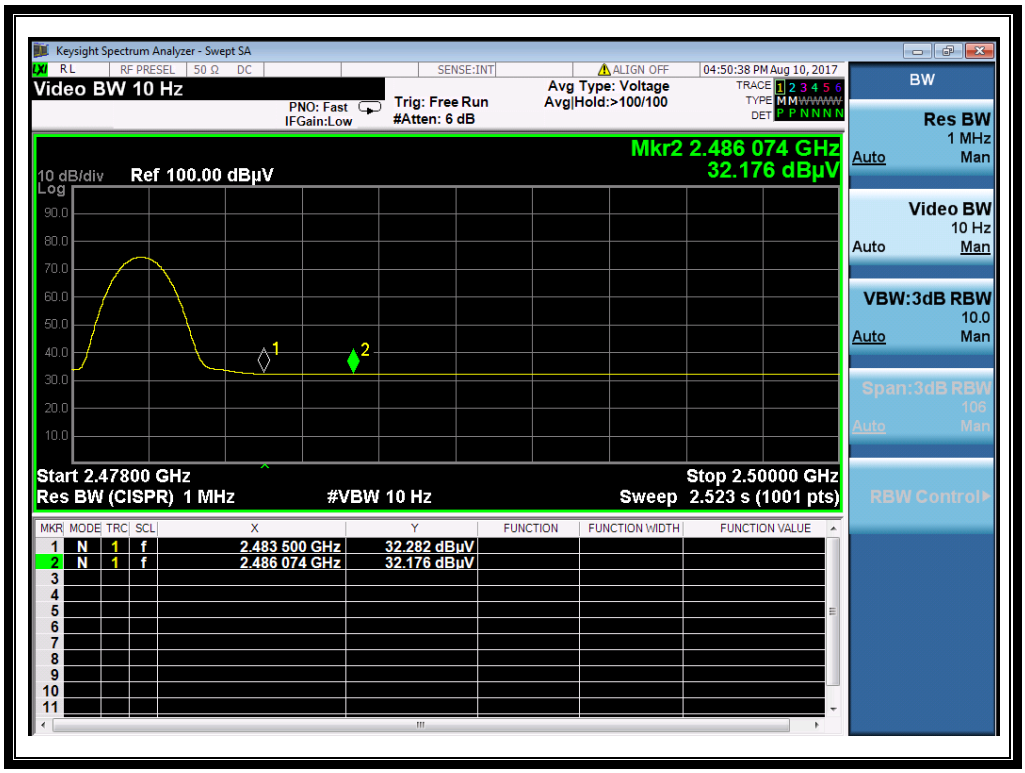
(Plot E1: Channel = 0 PEAK @ 8-DPSK Mode)



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



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



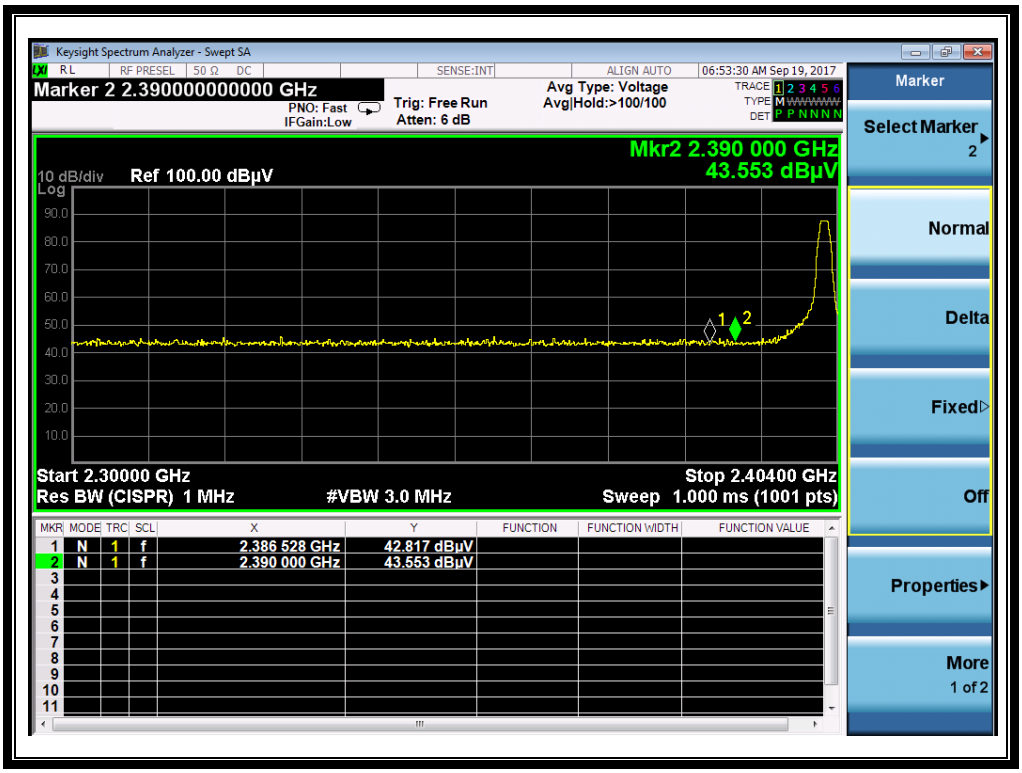
(Plot F2:Channel = 78 AVERAGE @ 8-DPSK Mode)

2.8.4.4 GFSK Mode (Antenna 2)

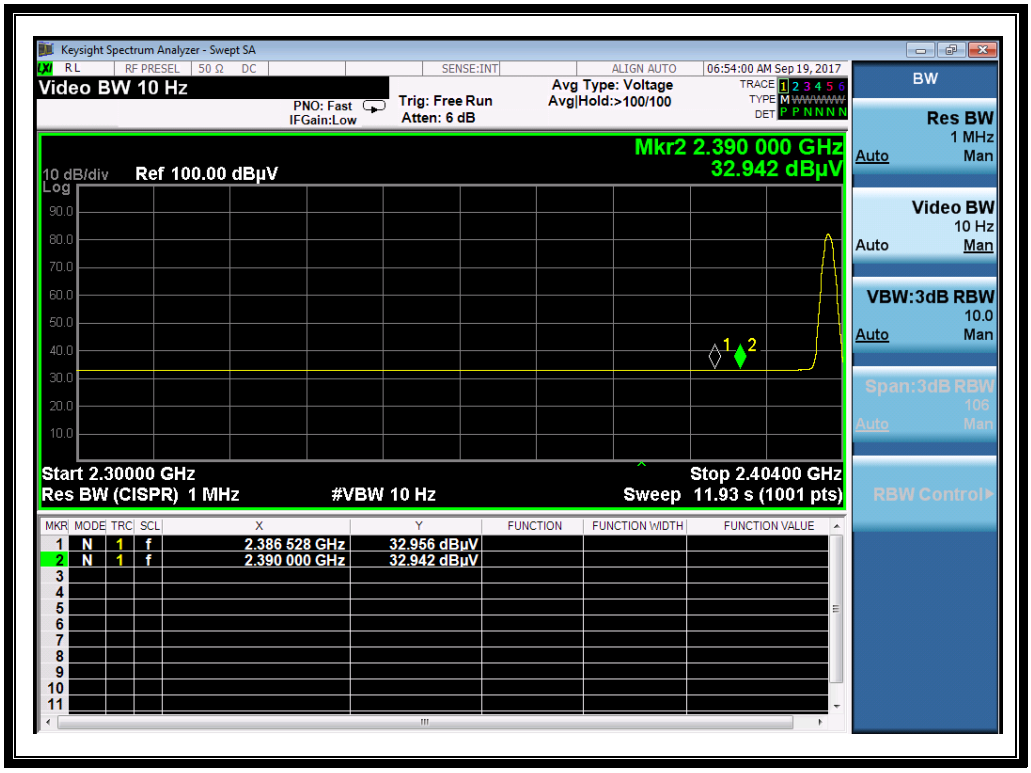
A. Test Verdict:

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	2386.53	PK	42.82	-33.63	32.56	41.75	74	Pass
0	2385.53	AV	32.96	-33.63	32.56	31.89	54	Pass
78	2488.63	PK	43.01	-33.18	32.50	42.33	74	Pass
78	2488.63	AV	32.89	-33.18	32.50	32.21	54	Pass

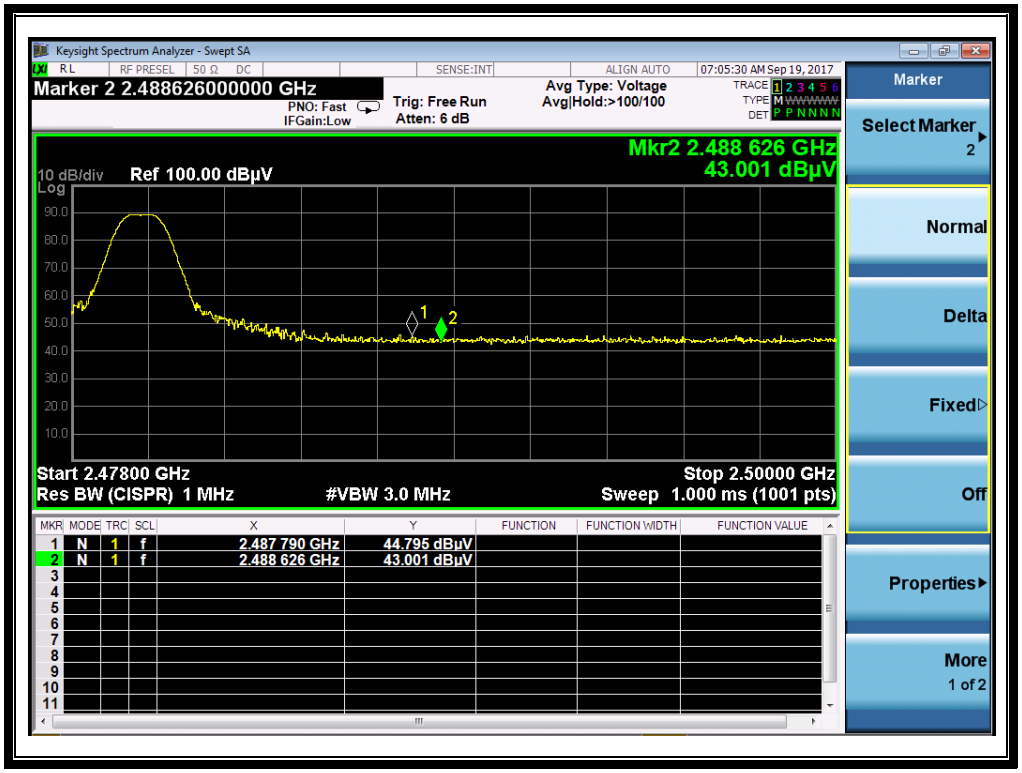
B. Test Plots:



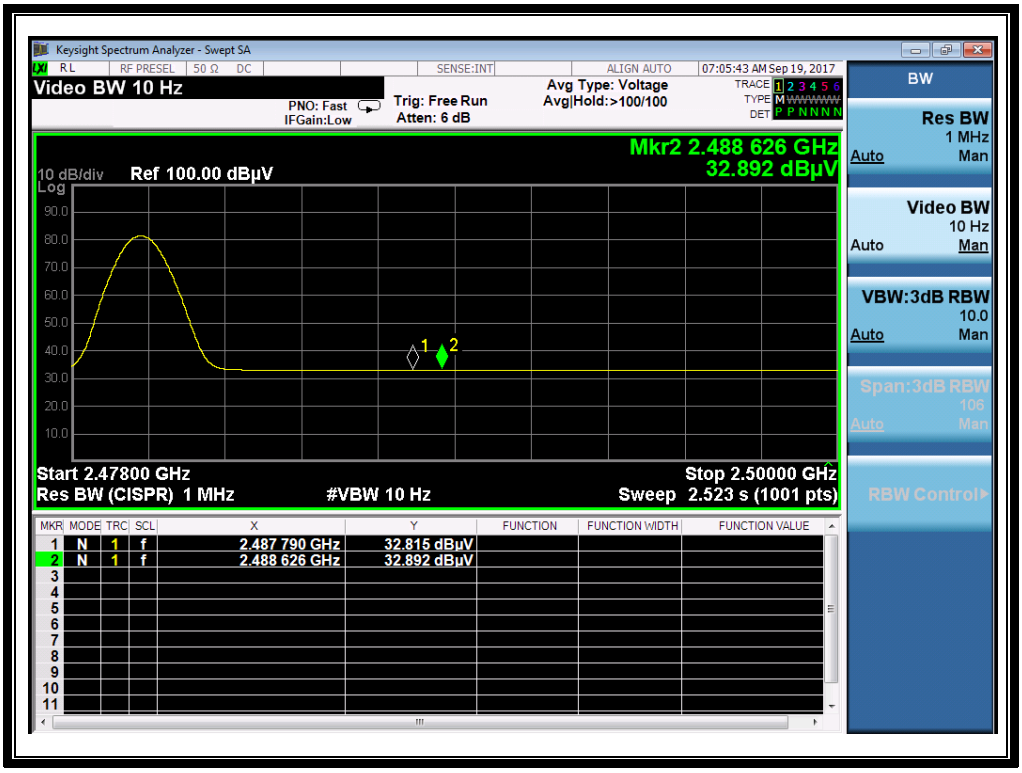
(Plot A1:Channel = 0 PEAK @ GFSK)



(Plot A2:Channel = 0 AVERAGE @ GFSK)



(Plot B1: Channel = 78 PEAK @ GFSK)



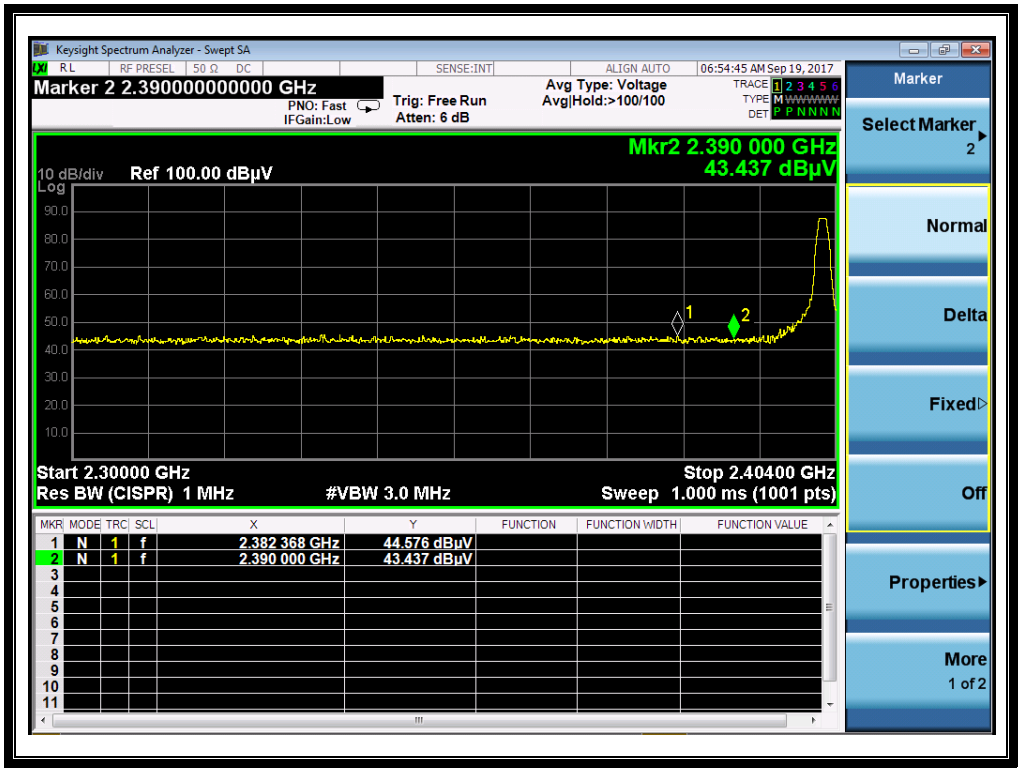
(Plot B2: Channel = 78 AVERAGE @ GFSK)

2.8.4.5 π/4-DQPSK Mode (Antenna 2)

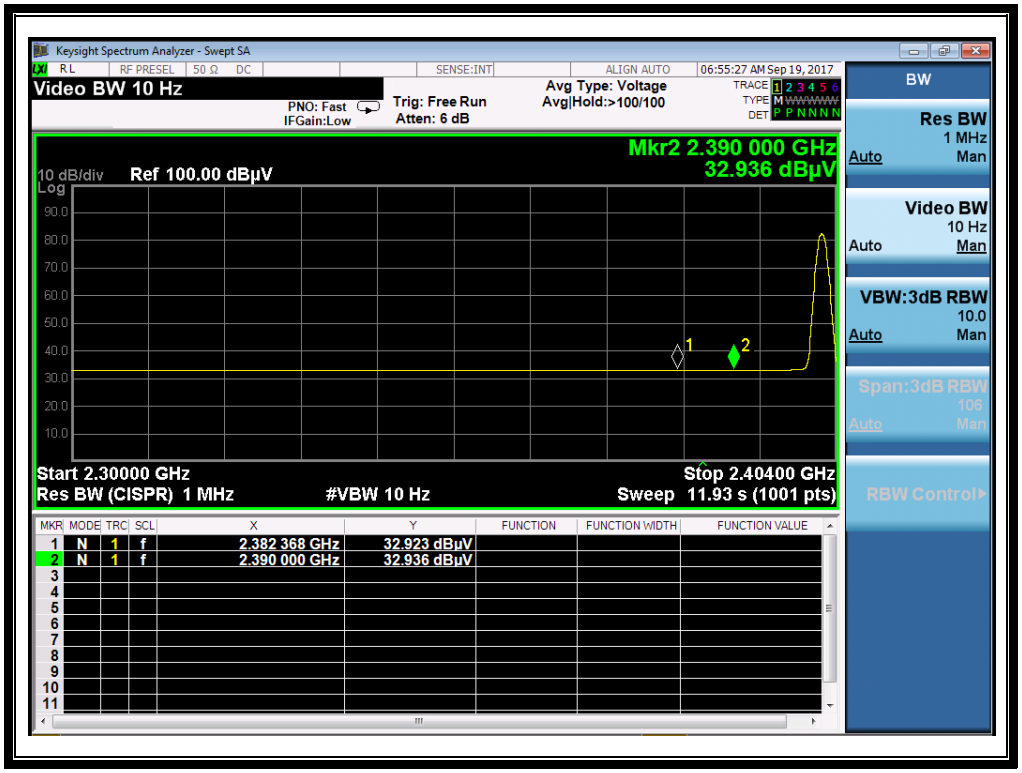
C. Test Verdict:

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	2382.37	PK	44.58	-33.63	32.56	43.51	74	Pass
0	2382.37	AV	32.92	-33.63	32.56	31.85	54	Pass
78	2488.63	PK	43.51	-33.18	32.5	42.83	74	Pass
78	2488.63	AV	32.87	-33.18	32.5	32.19	54	Pass

D. Test Plots:

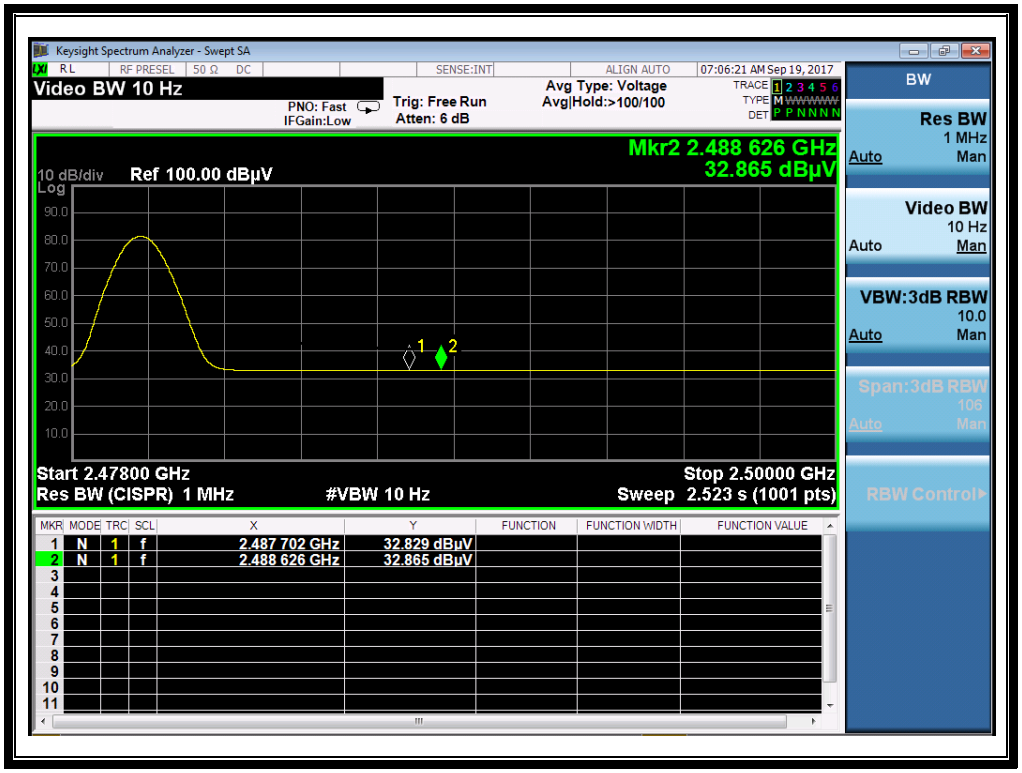


(Plot C1: Channel = 0 PEAK @ π/4-DQPSK)



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

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



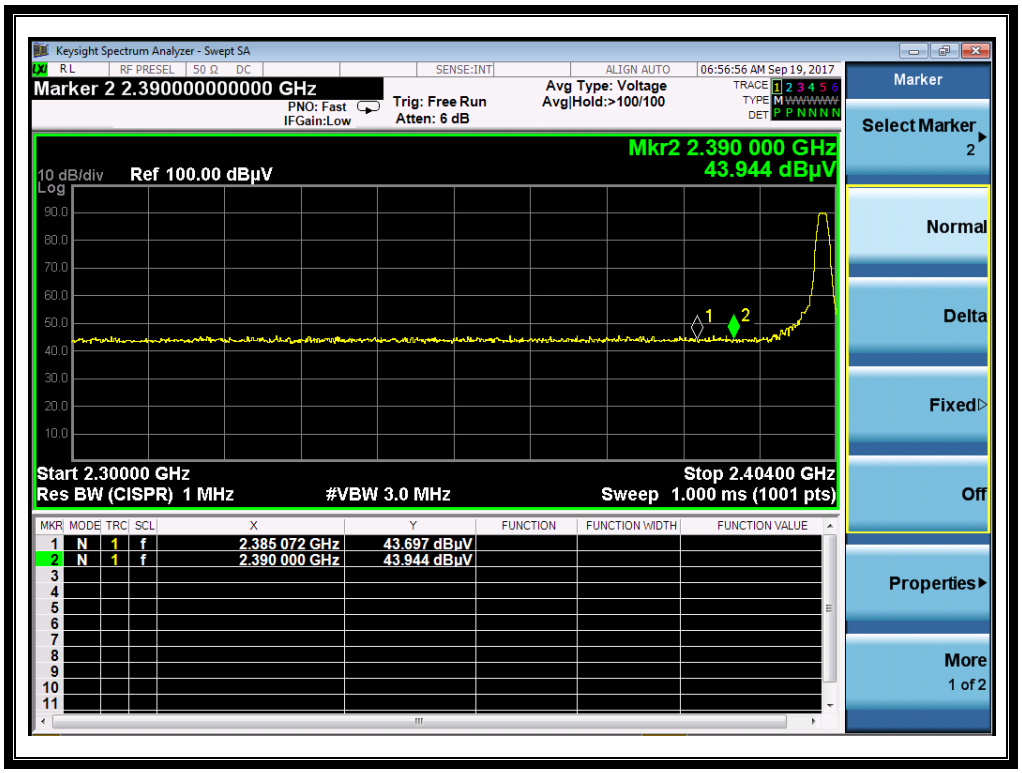
(Plot D2: Channel = 78 AVERAGE@ π/4-DQPSK)

2.8.4.6 8-DPSK Mode (Antenna 2)

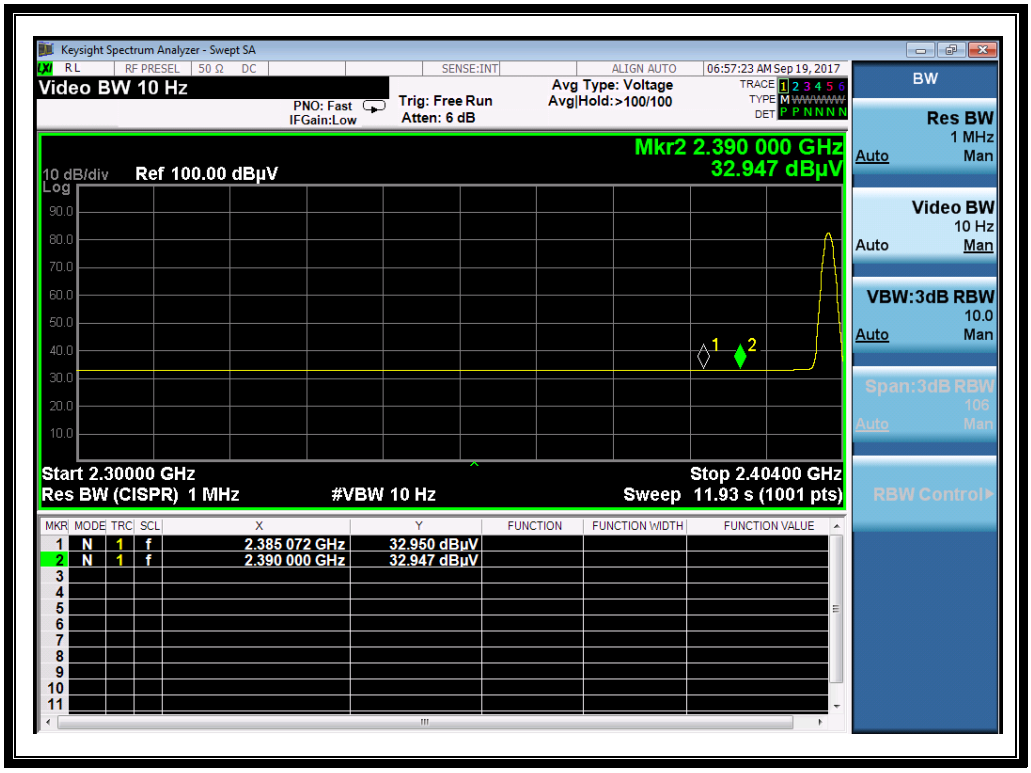
C. Test Verdict:

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	2385.07	PK	43.70	-33.63	32.56	42.63	74	Pass
0	2385.07	AV	32.95	-33.63	32.56	31.88	54	Pass
78	2488.74	PK	44.07	-33.18	32.5	43.39	74	Pass
78	2488.74	AV	32.88	-33.18	32.5	32.20	54	Pass

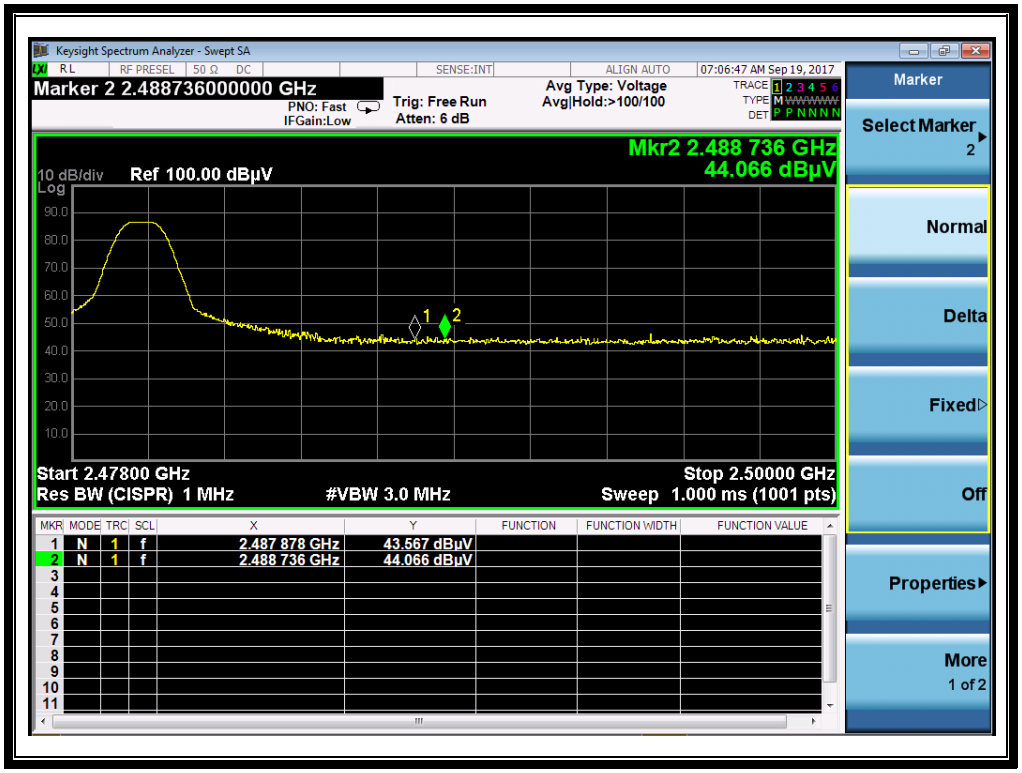
D. Test Plots:



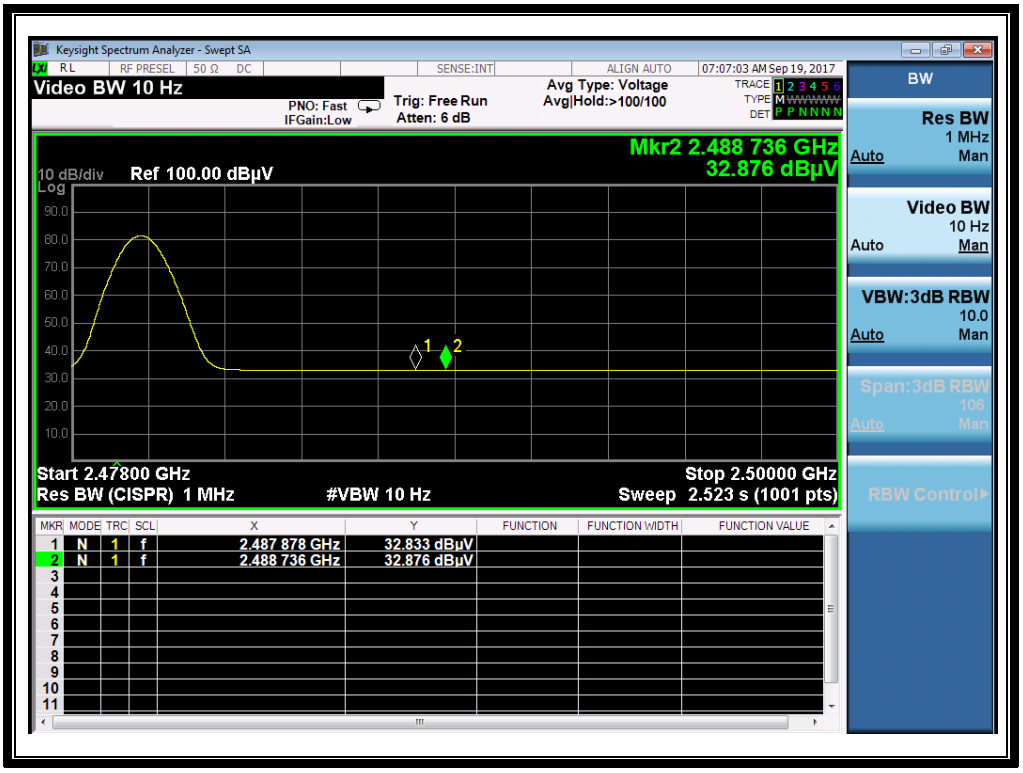
(Plot E1: Channel = 0 PEAK @ 8-DPSK Mode)



(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 RSS-GEN section 8.8, 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

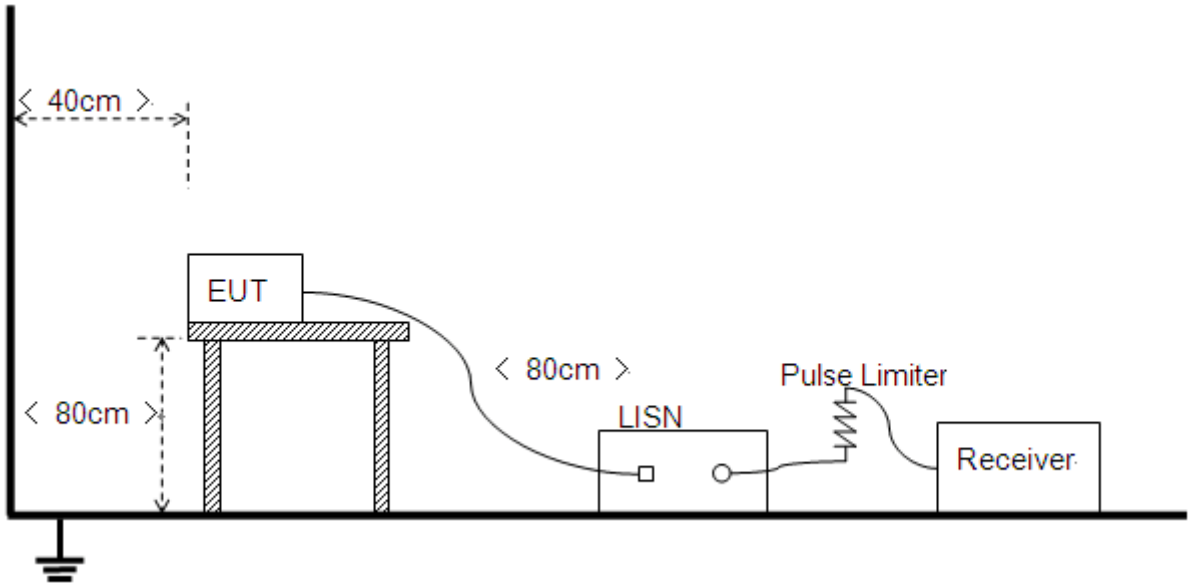
NOTE:

(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 C63.10: 2013.

The factors of the site are calibrated to correct the reading. During the measurement, the Bluetooth EUT is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna, and is set to operate under hopping-on test mode transmitting 339 bytes DH5 packages at maximum power.

B. Equipments List:

Please reference ANNEX A(1.5).

2.9.3 Test Result

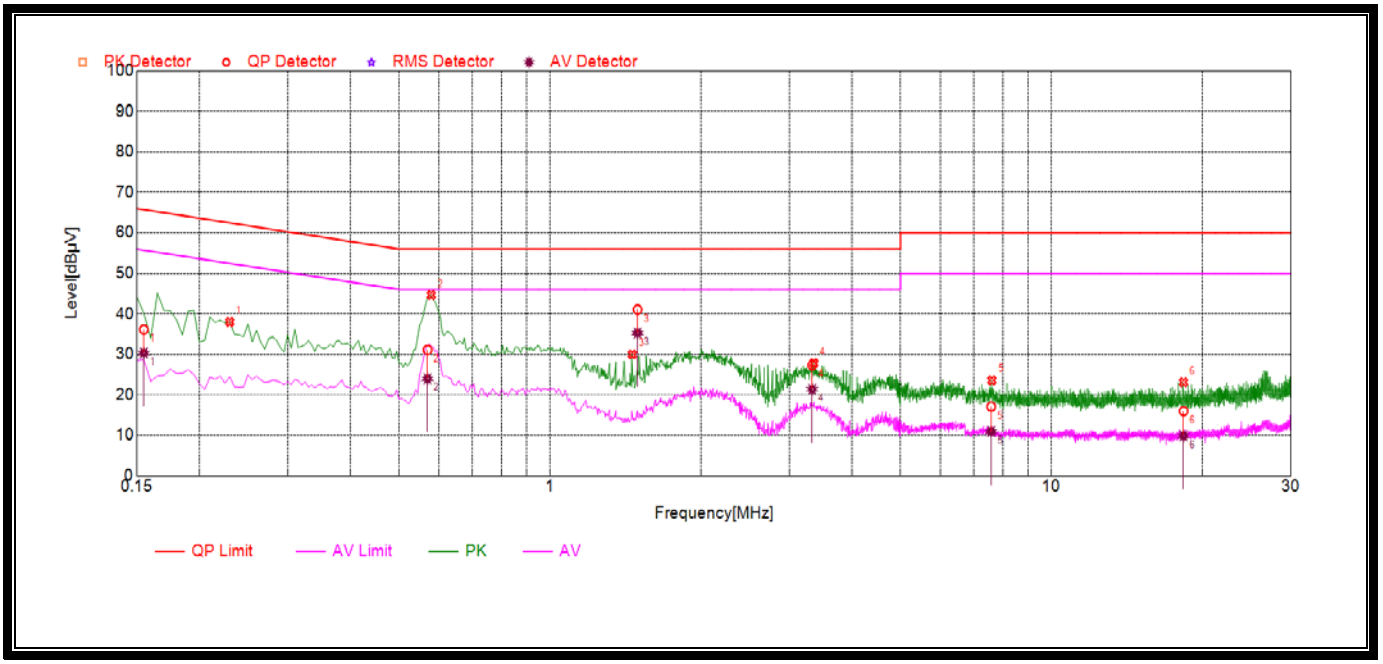
The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT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

A. Test setup:

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

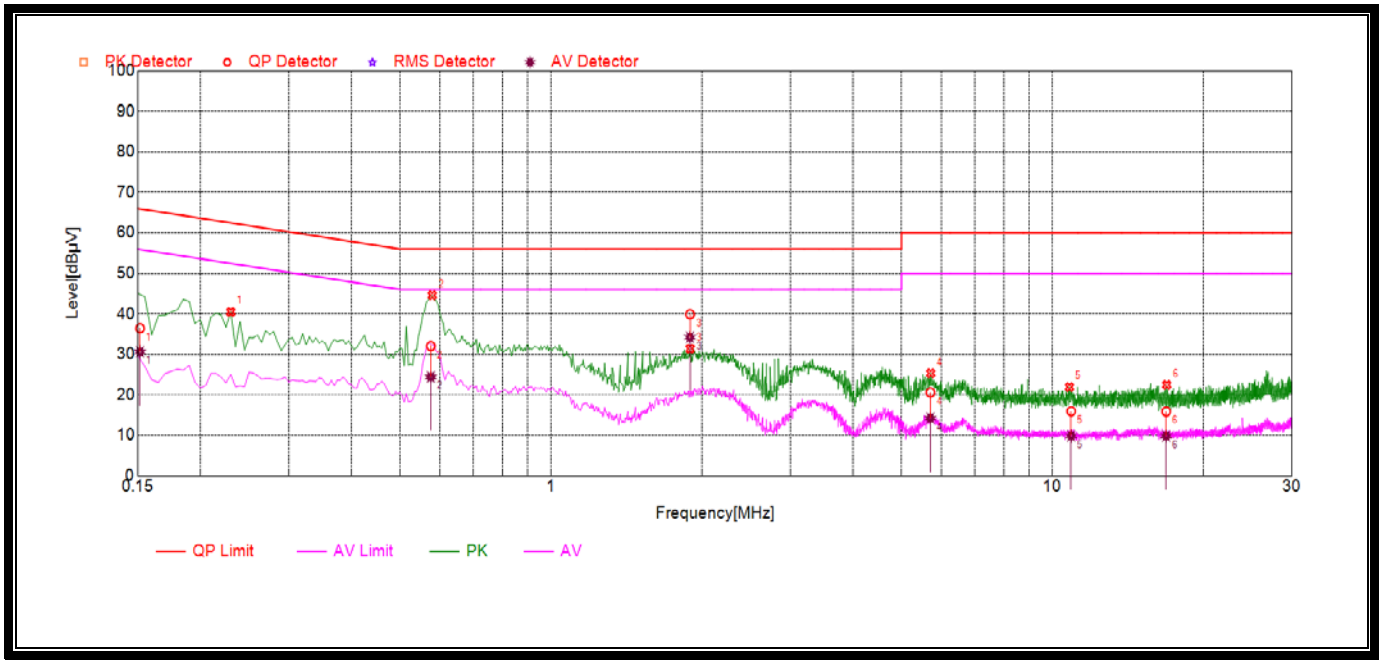
Note: The test voltage is AC 120V/60Hz.

B. Test Plots:



(Plot A: L Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.155	36.13	30.32	65.86	55.86	Line	PASS
2	0.5702	31.12	24.00	56	46		PASS
3	1.4956	41.05	35.28	56	46		PASS
4	3.3344	27.29	21.38	56	46		PASS
5	7.584	17.09	10.95	60	50		PASS
6	18.3456	15.99	9.89	60	50		PASS



(Plot B: N Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1516	36.44	30.62	65.95	55.95	Line	PASS
2	0.5762	32.05	24.42	56	46		PASS
3	1.894	39.91	34.22	56	46		PASS
4	5.7114	20.60	14.24	60	50		PASS
5	10.8994	15.95	9.86	60	50		PASS
6	16.8588	15.90	9.83	60	50		PASS

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:

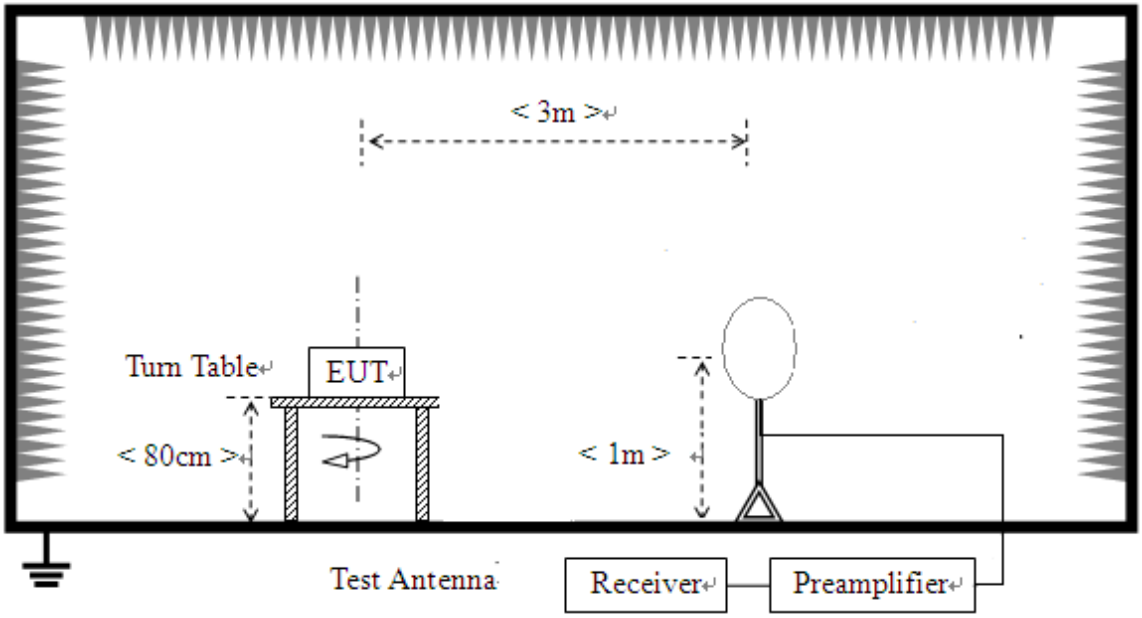
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength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

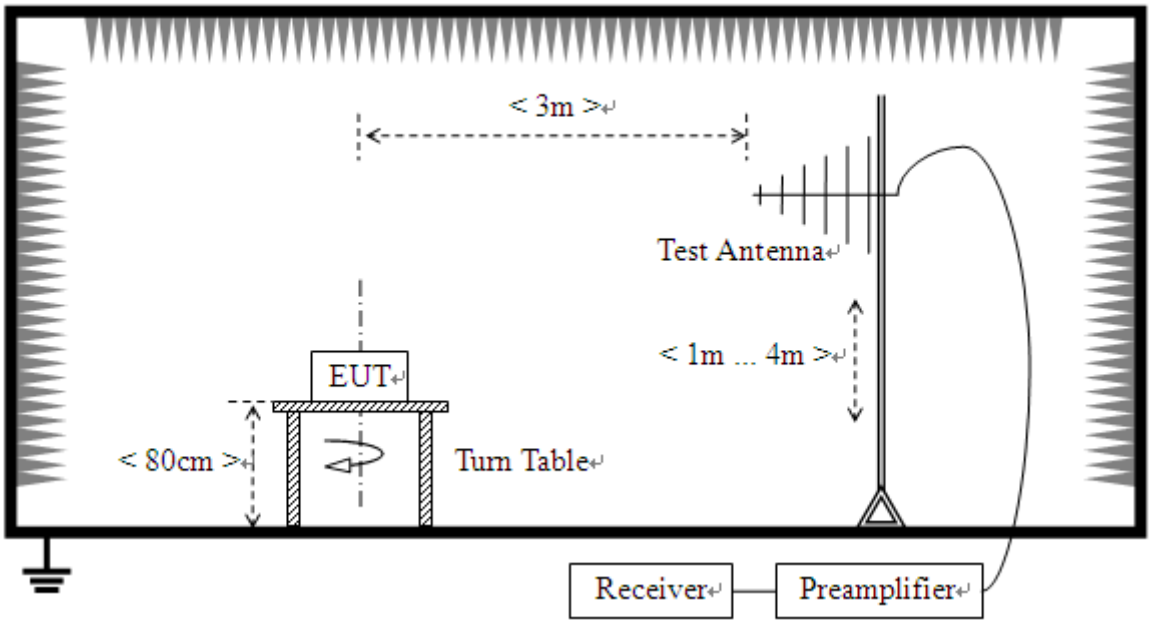
2.10.2 Test Description

A. Test Setup:

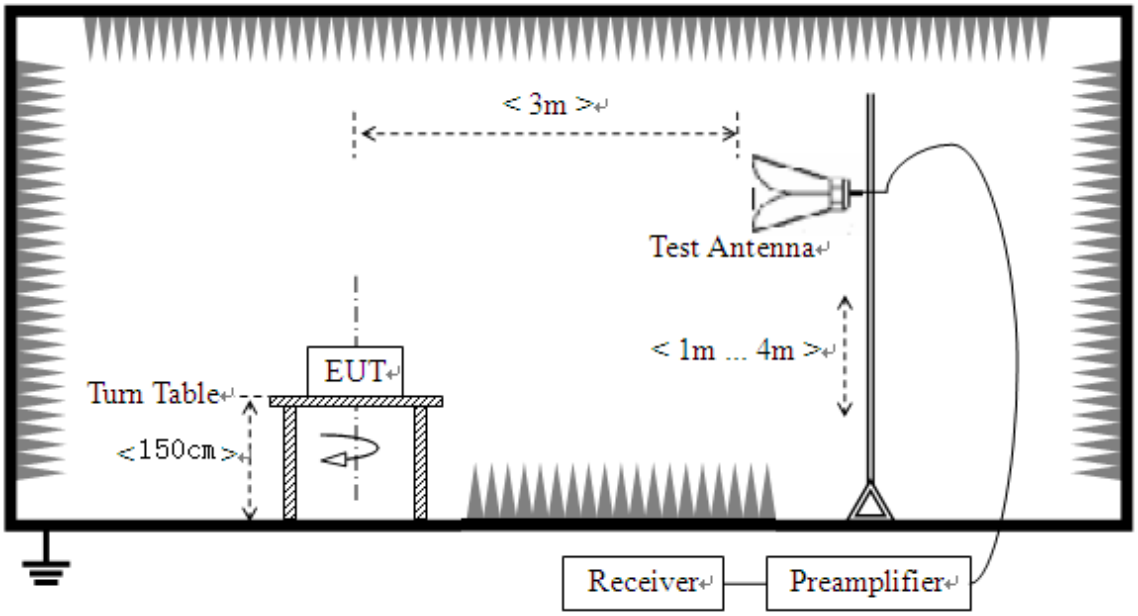
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz. Test site have a minimum area of the ground plane covered with RF absorbing material as specified in Figure 6 of ANSI C63.4: 2014.

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. Place the test antenna at 3m away from area of the EUT, while keeping the test antenna aimed at the source of emissions at each frequency of significant

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

B. Equipments List:

Please reference ANNEX A(1.5).

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 C63.10, 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 [dBμV/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.

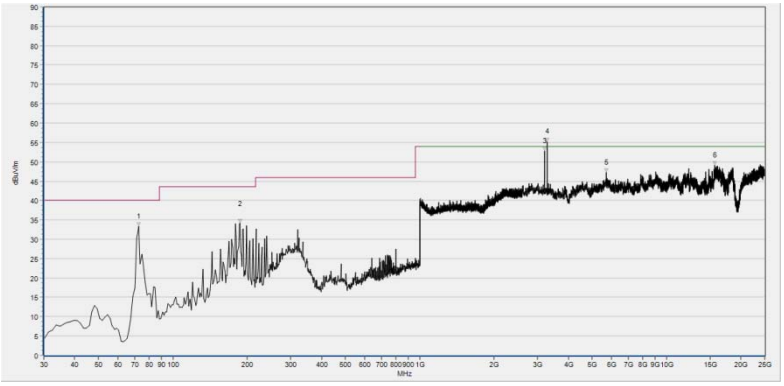
Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

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 (Antenna 1)

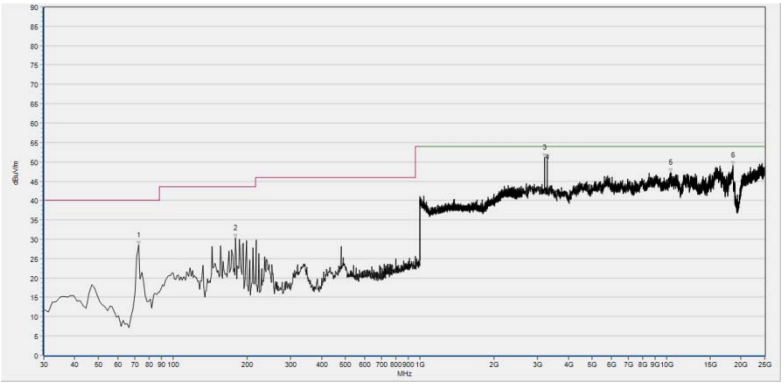
A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	33.38	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
186.608	34.13	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
3202.600	55.05	53.10	48.01	74.0	N/A	54.00	Horizontal	PASS
3282.700	56.69	54.99	45.81	74.0	N/A	54.00	Horizontal	PASS
5712.129	47.30	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
15667.685	49.19	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

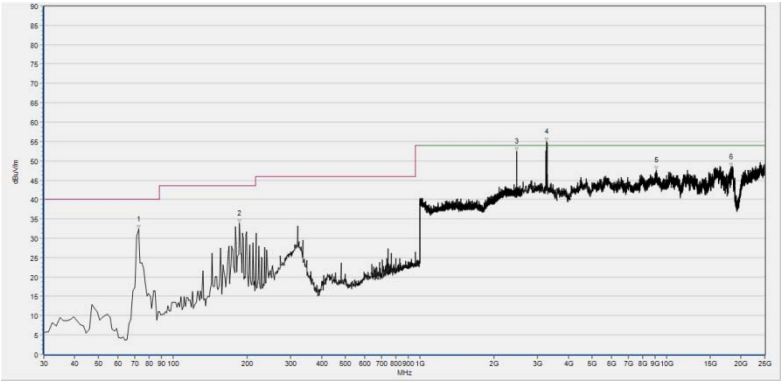
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 0)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	28.53	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
179.324	30.40	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
3202.873	51.15	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
3284.343	50.82	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
10376.250	47.30	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
18539.480	49.06	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

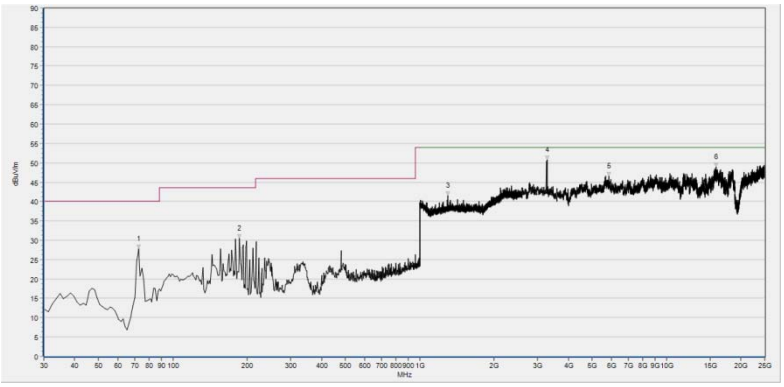
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 0)

Plot for Channel = 39



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	32.36	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
185.394	33.87	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2466.186	52.43	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3254.700	55.92	54.48	49.67	74.0	N/A	54.00	Horizontal	PASS
9105.328	47.57	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
18266.558	48.44	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

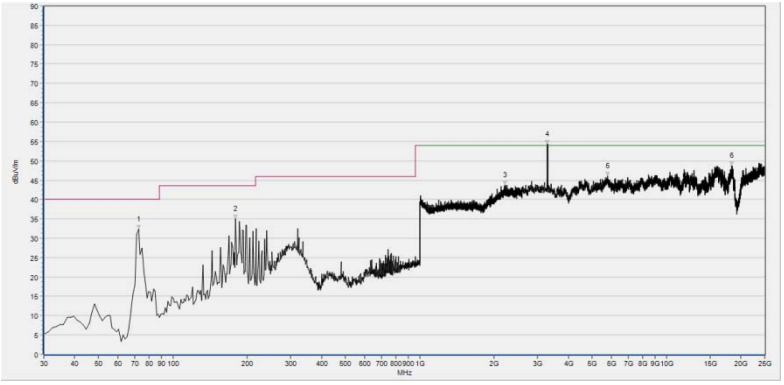
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 39)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	27.87	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
185.394	30.55	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1301.561	41.54	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
3284.343	50.74	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
5838.407	46.57	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
15867.285	48.93	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

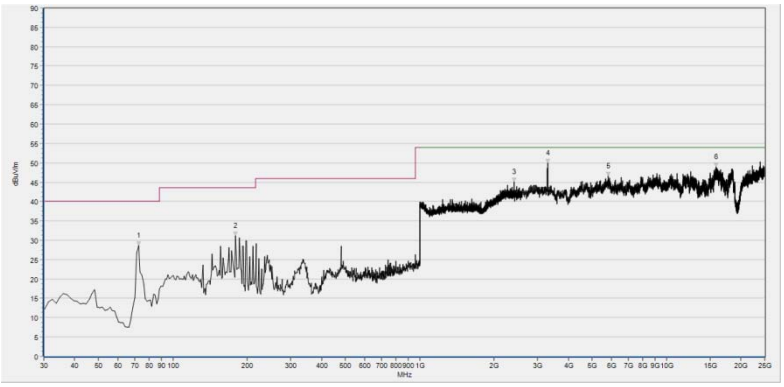
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 39)

Plot for Channel = 78



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	32.28	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
179.324	34.99	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2209.444	43.69	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3282.800	55.67	53.58	44.53	74.0	N/A	54.00	Horizontal	PASS
5756.938	46.08	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
18384.688	48.71	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

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



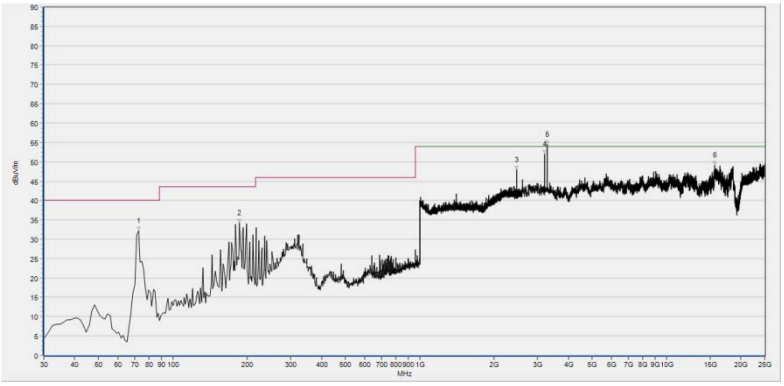
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	28.63	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
179.324	31.11	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2411.765	45.16	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
3304.710	49.92	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
5805.819	46.54	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
72.491	28.63	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

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

2.10.4.2 π/4-DQPSK Mode (Antenna 1)

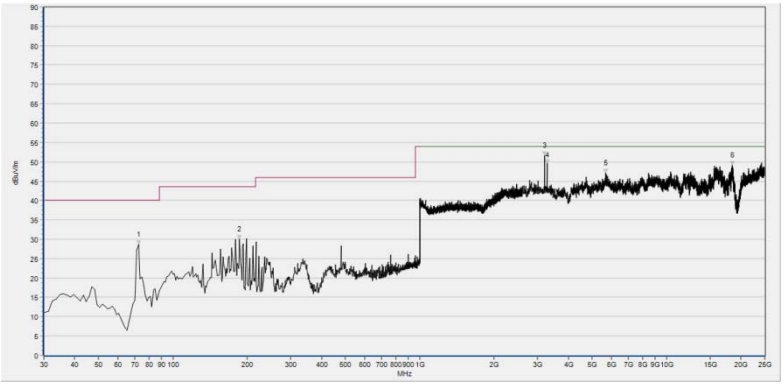
B. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	32.21	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
185.394	34.12	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2466.186	47.99	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3202.873	51.92	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3282.500	52.97	50.84	41.92	74.0	N/A	54.00	Horizontal	PASS
15679.905	49.09	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

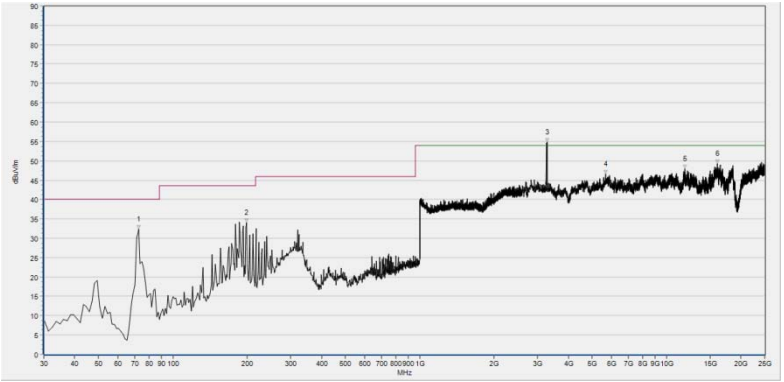
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 0)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	28.67	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
185.394	30.07	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
3202.873	51.59	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
3284.343	49.58	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
5655.101	47.09	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
18515.039	49.12	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

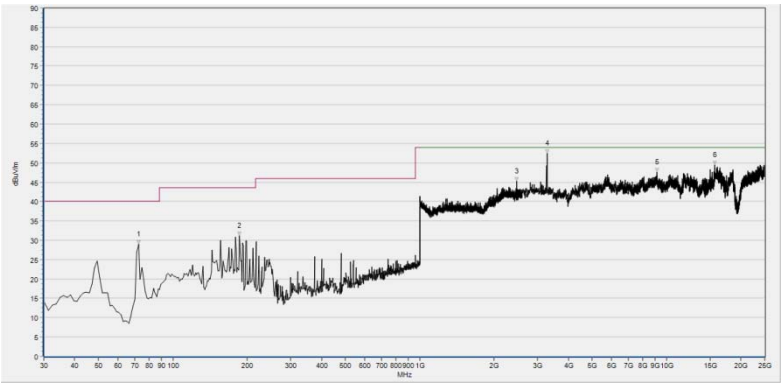
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 0)

Plot for Channel = 39



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	32.35	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
198.748	33.96	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
3282.700	55.84	54.27	45.12	74.0	N/A	54.00	Horizontal	PASS
5671.395	46.64	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
11875.286	47.90	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
16050.591	49.19	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

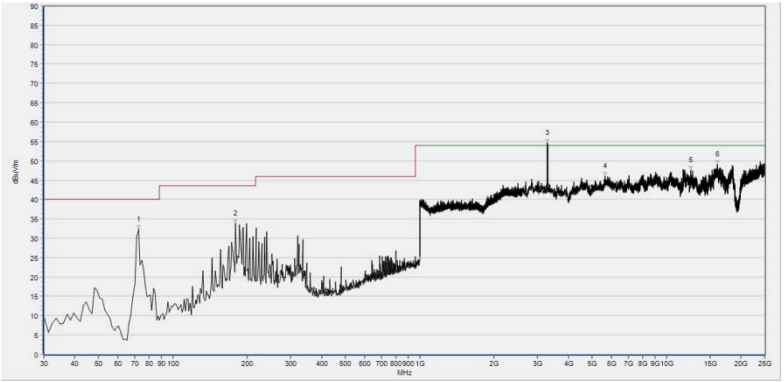
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 39)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	28.96	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
185.394	31.17	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2465.546	45.21	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
3282.600	52.41	49.97	41.06	74.0	N/A	54.00	Vertical	PASS
9146.063	47.59	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
15671.759	49.47	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

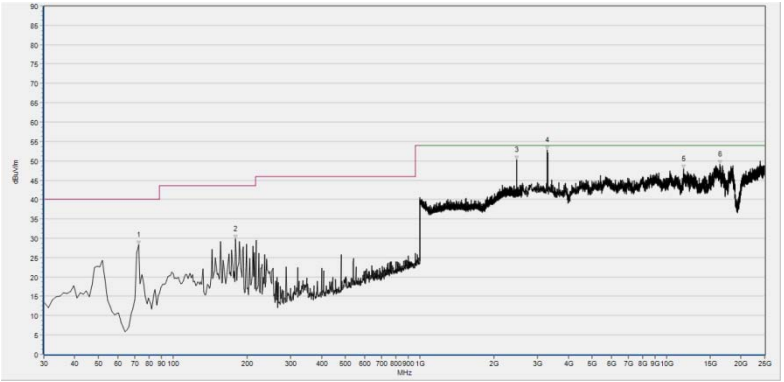
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 39)

Plot for Channel = 78



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	32.43	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
179.324	33.93	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
3282.600	55.70	54.25	45.10	74.0	N/A	54.00	Horizontal	PASS
5622.513	46.04	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
12559.629	47.56	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
16030.224	49.14	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

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



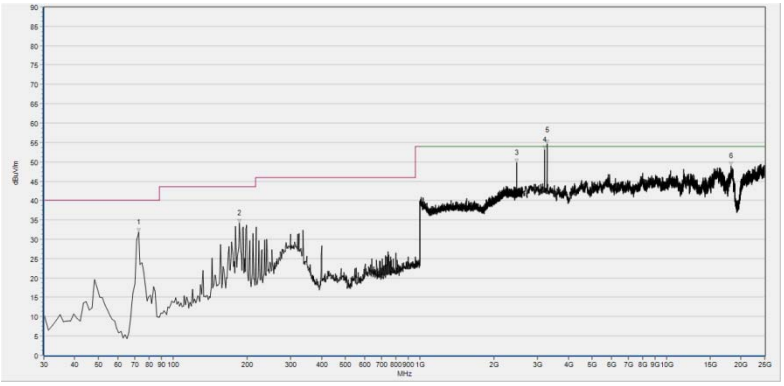
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	28.37	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
179.324	29.84	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2465.546	50.22	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
3282.700	52.12	49.97	41.04	74.0	N/A	54.00	Vertical	PASS
11744.935	47.88	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
16421.277	49.07	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

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

2.10.4.3 8-DPSK Mode (Antenna 1)

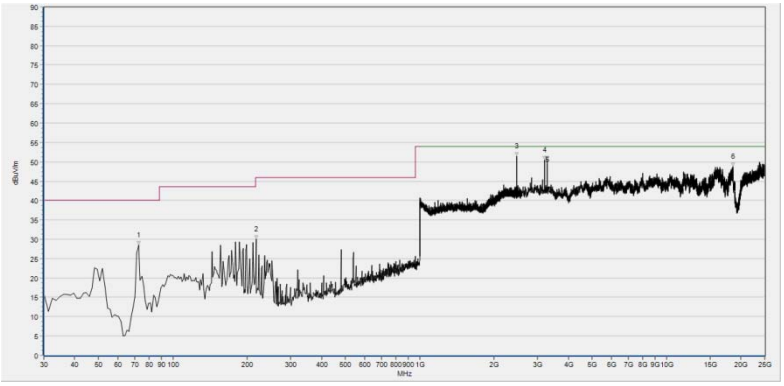
C. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	31.83	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
185.394	34.12	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2466.186	49.84	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3202.873	53.05	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3282.600	54.23	52.49	43.53	74.0	N/A	54.00	Horizontal	PASS
18262.484	48.95	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

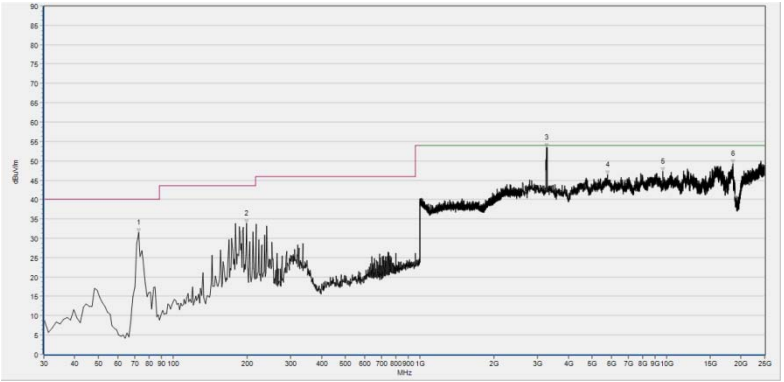
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 0)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	28.57	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
216.959	29.92	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2466.186	51.38	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
3202.873	50.48	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
3284.343	50.41	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
18543.553	48.71	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

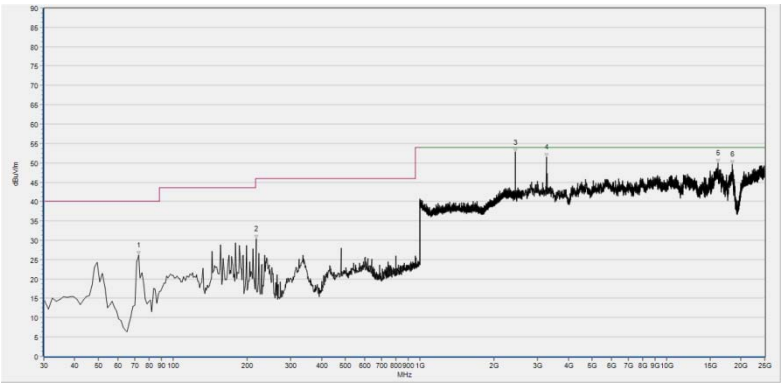
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 0)

Plot for Channel = 39



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	31.45	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
198.748	33.79	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
3254.600	55.33	53.91	49.09	74.0	N/A	54.0	Horizontal	PASS
5752.864	46.37	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
9643.026	47.20	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18539.480	49.33	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

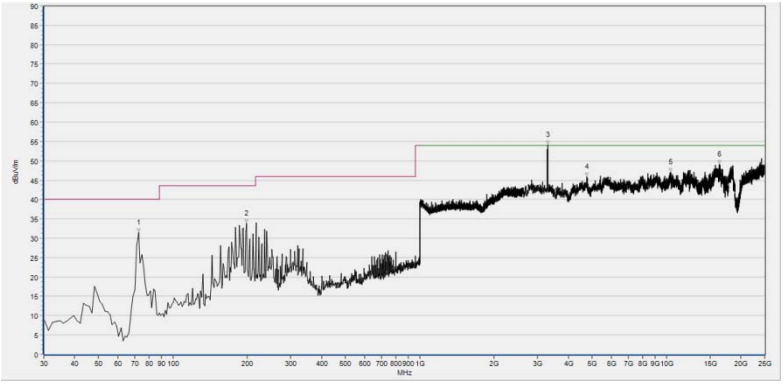
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 39)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	26.22	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
216.959	30.30	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2434.200	56.91	52.72	49.01	74.0	N/A	54.0	Vertical	PASS
3255.828	51.50	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
16164.648	49.88	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18486.525	49.56	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

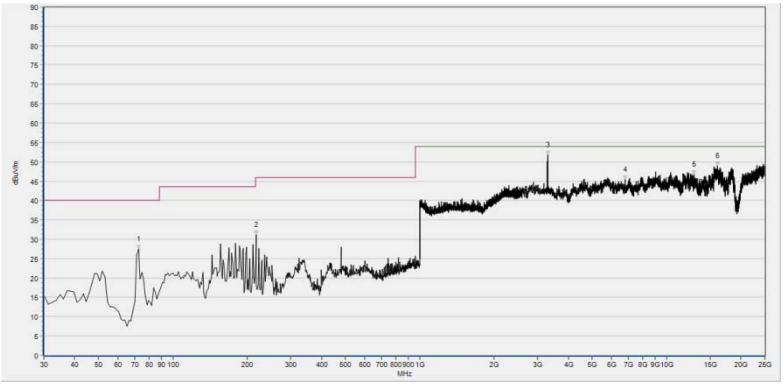
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 39)

Plot for Channel = 78



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	31.45	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
198.748	33.81	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
3306.700	56.05	54.42	49.63	74.0	N/A	54.00	Horizontal	PASS
4754.865	45.87	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
10355.883	47.07	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
16392.762	49.10	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

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



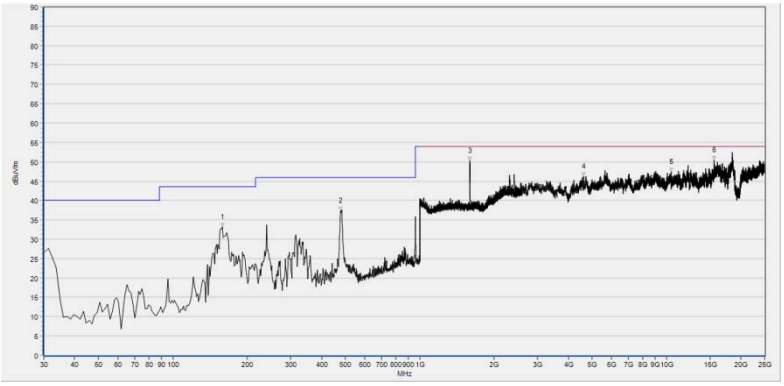
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	27.49	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
216.959	31.22	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
3306.600	49.39	45.45	39.22	74.0	N/A	54.0	Vertical	PASS
6779.378	45.41	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
12922.168	46.78	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
16038.371	48.94	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

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

2.10.4.4 GFSK Mode (Antenna 2)

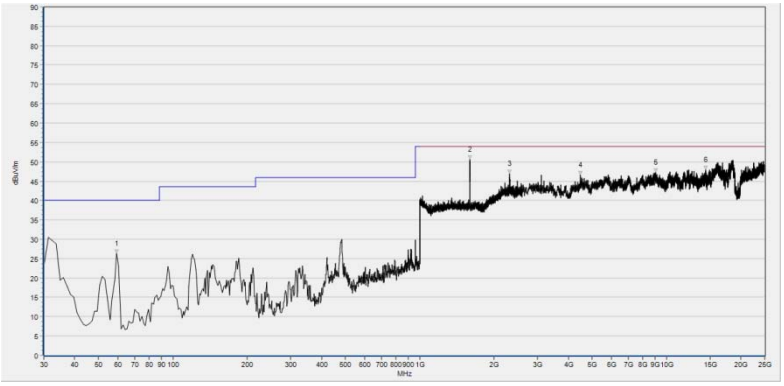
A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
158.686	33.20	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
477.972	37.39	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1593.517	50.25	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
4620.440	46.24	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
10433.279	47.36	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
15602.510	50.52	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

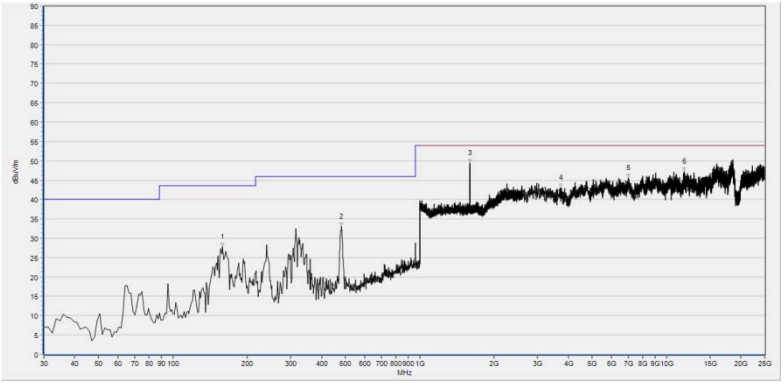
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 0)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
59.136	26.33	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
1594.798	50.58	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
2316.367	46.87	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
4486.016	46.55	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
9019.785	47.20	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
14437.498	47.97	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

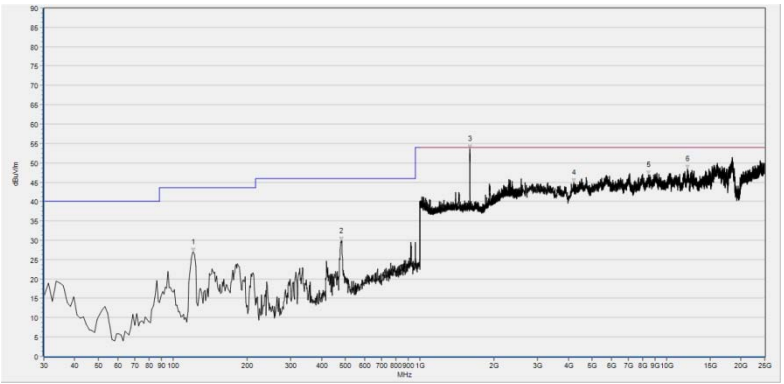
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 0)

Plot for Channel = 39



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
158.686	27.84	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
481.615	32.96	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1594.158	49.43	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3740.571	43.04	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
7007.492	45.60	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
11797.891	47.25	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

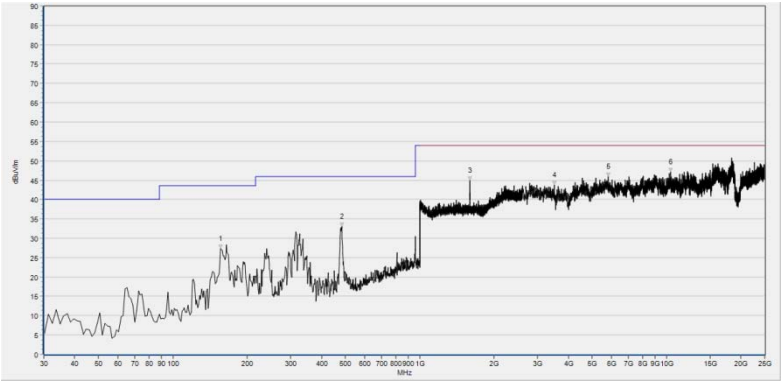
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 39)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
121.051	27.02	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
480.401	29.82	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1593.300	51.88	45.64	27.30	74.0	N/A	54.00	Vertical	PASS
4209.020	44.88	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
8449.500	46.88	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
12188.943	48.43	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

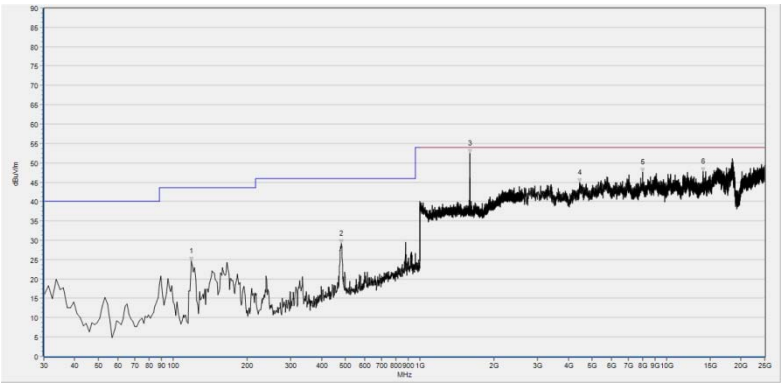
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 39)

Plot for Channel = 78



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
156.258	27.24	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
482.829	32.99	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1595.438	44.86	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3516.530	43.68	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
5797.672	45.90	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
10372.177	47.13	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

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



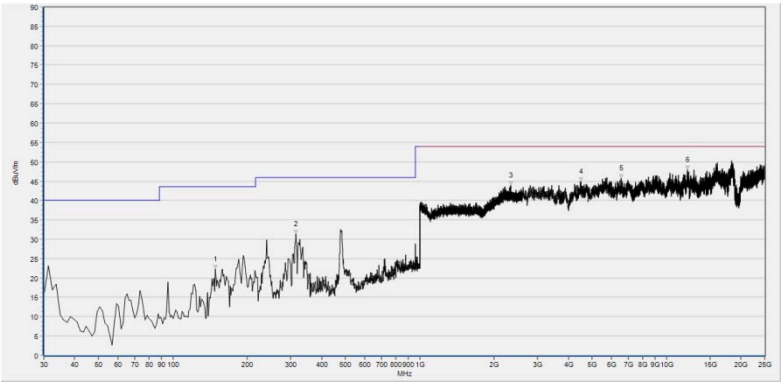
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
118.623	24.62	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
481.615	29.11	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1594.798	46.46	46.85	27.82	74.0	N/A	54.00	Vertical	PASS
4441.207	44.85	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
8005.492	47.56	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
14054.592	47.70	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

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

2.10.4.5 π/4-DQPSK Mode (Antenna 2)

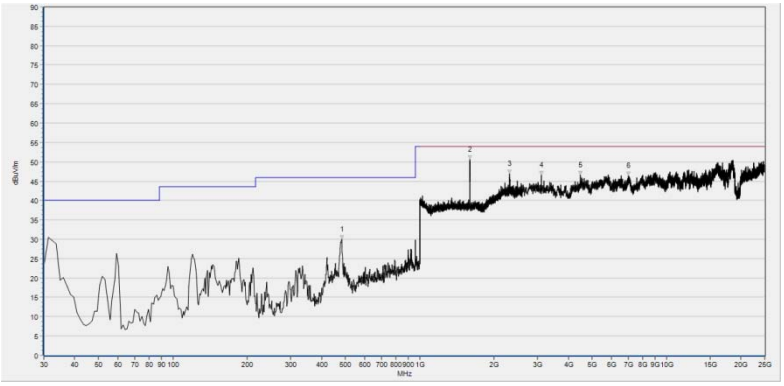
B. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
148.974	22.34	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
315.294	31.40	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2343.257	43.89	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
4494.163	44.93	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
6539.043	45.79	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
12144.135	47.98	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

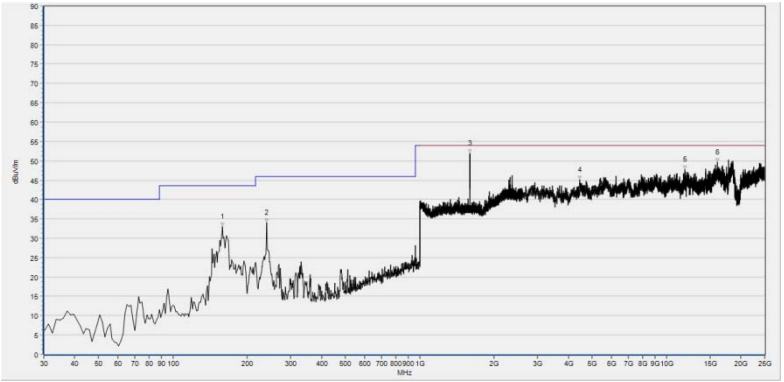
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 0)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
482.829	30.07	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1594.798	50.58	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
2316.367	46.87	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
3113.257	46.63	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
4486.016	46.55	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
7011.566	46.49	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

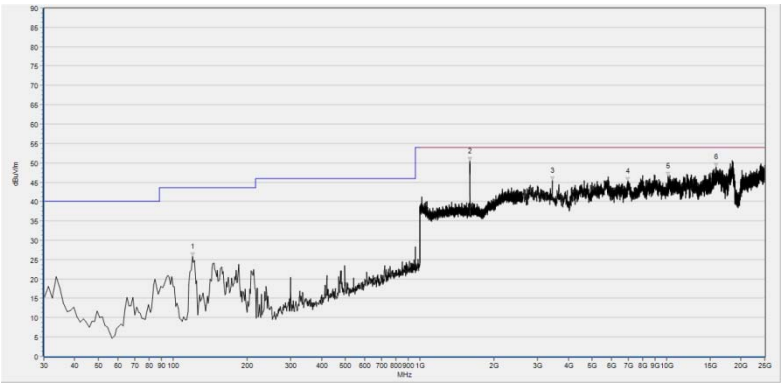
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 0)

Plot for Channel = 39



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
158.686	32.93	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
240.025	34.08	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1593.517	52.02	44.21	25.62	74.0	N/A	54.00	Horizontal	PASS
4453.428	45.07	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
11895.654	47.83	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
16107.620	49.53	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

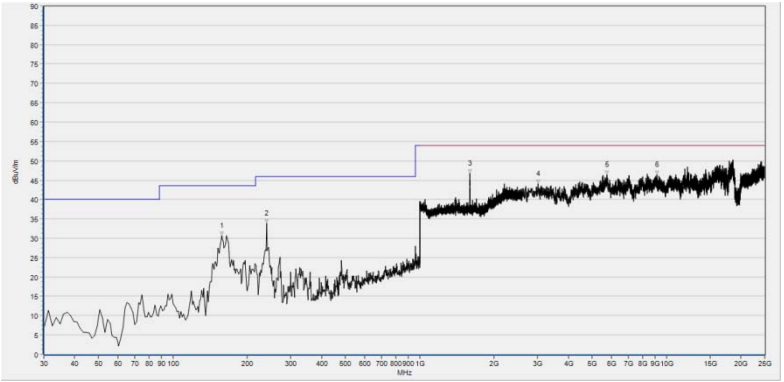
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 39)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
119.837	25.75	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1594.158	50.47	44.87	26.74	74.0	N/A	54.00	Vertical	PASS
3439.134	45.48	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
6946.390	45.29	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
10156.283	46.51	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
15846.918	48.90	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

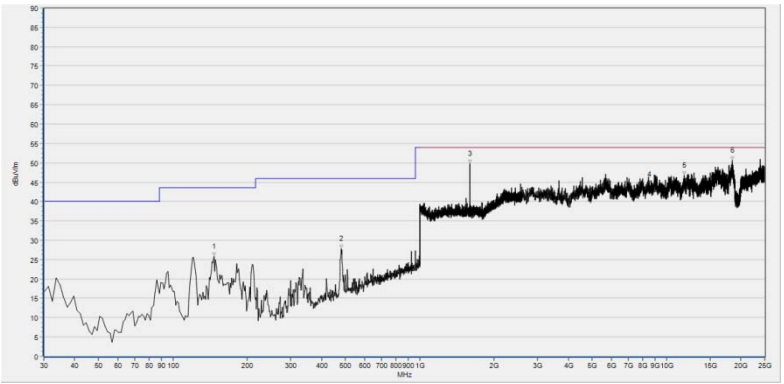
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 39)

Plot for Channel = 78



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
157.472	30.65	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
240.025	33.92	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1597.359	46.70	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3015.494	44.00	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
5740.644	46.38	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
9121.622	46.35	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

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



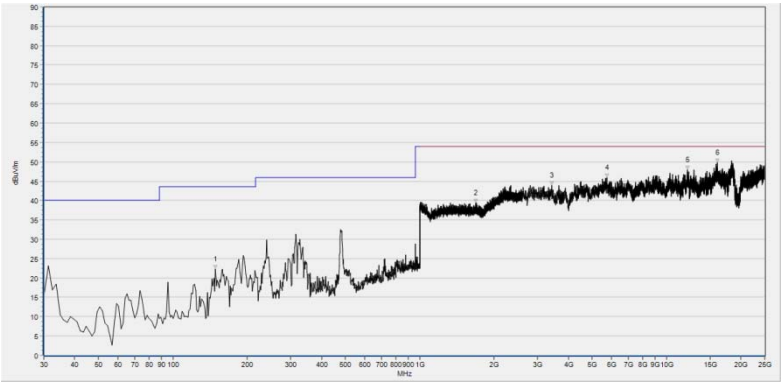
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
146.546	25.75	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
480.401	27.86	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1594.158	42.73	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
8486.161	44.37	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
11773.450	46.79	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
18458.011	50.64	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

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

2.10.4.6 8-DPSK Mode (Antenna 2)

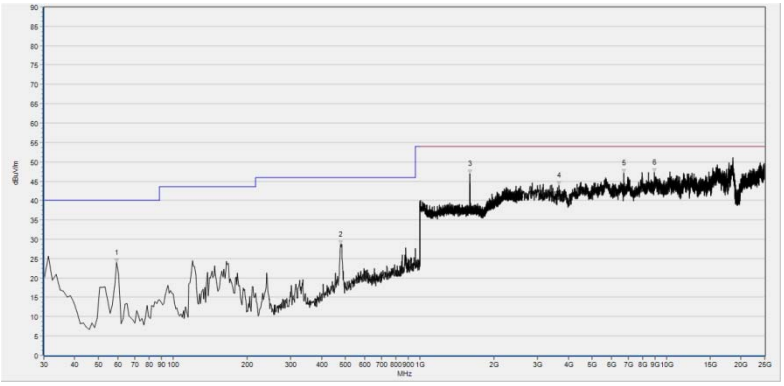
C. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
148.974	22.34	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1688.275	39.38	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3426.914	43.93	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
5732.497	45.97	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
12144.135	47.98	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
16026.150	49.85	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

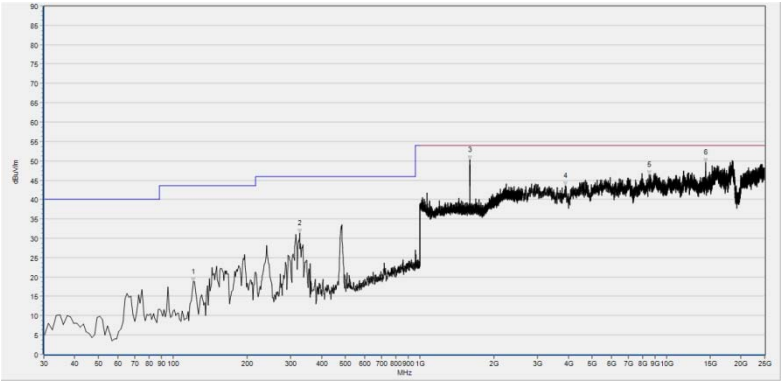
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 0)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
59.136	23.97	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
477.972	28.68	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1594.158	46.86	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
3671.322	43.84	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
6722.350	47.18	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
8938.316	47.24	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

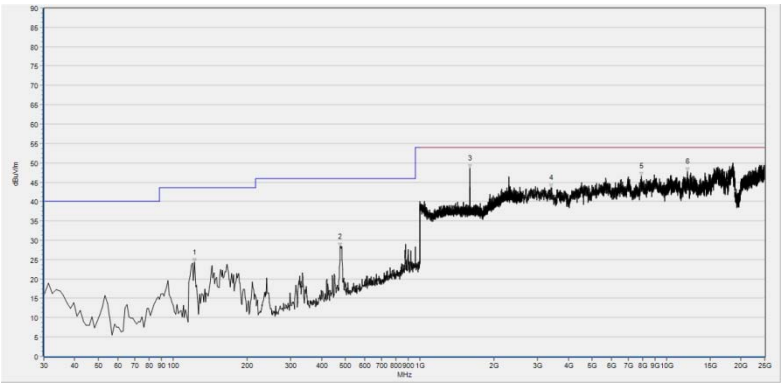
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 0)

Plot for Channel = 39



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
121.051	18.83	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
326.220	31.35	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1593.517	50.22	42.12	24.28	74.0	N/A	54.0	Horizontal	PASS
3895.363	43.57	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
8518.749	46.37	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
14417.130	49.61	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

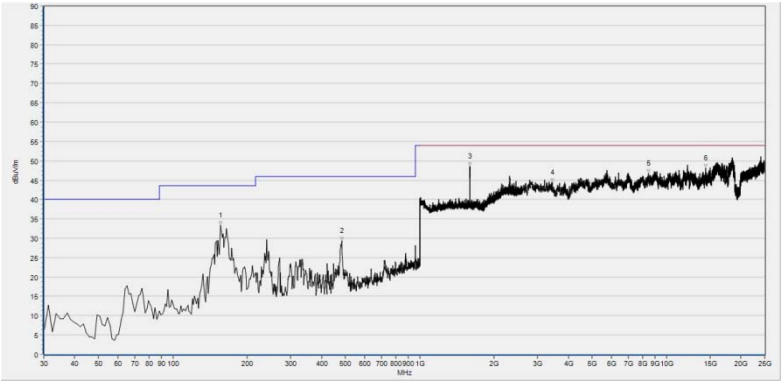
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 39)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
122.265	24.27	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
476.758	28.25	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1597.999	48.66	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
3402.473	43.65	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
7928.096	46.66	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
12135.988	47.83	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

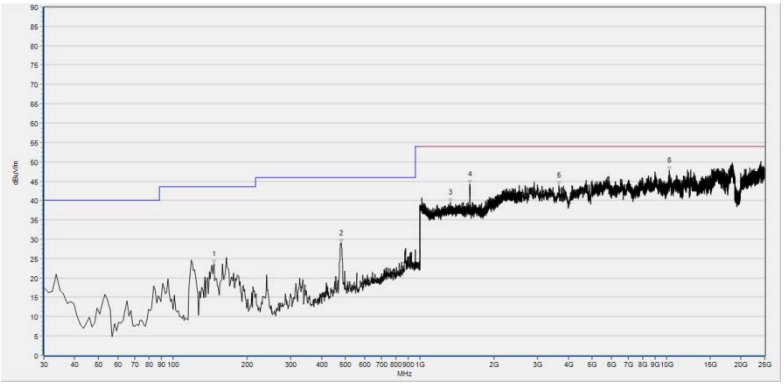
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 39)

Plot for Channel = 78



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
156.258	33.43	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
482.829	29.26	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1596.719	48.67	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
3443.208	44.35	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
8457.647	46.79	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
14421.204	48.09	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

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



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
146.546	23.65	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
480.401	29.03	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1331.012	39.56	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
1597.359	44.29	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
3667.249	43.89	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
10237.752	47.70	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

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.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192.

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:

Test items	Uncertainty
Number of Hopping Frequency	±5%
Peak Output Power	±2.22dB
20dB Bandwidth	±5%
Carrier Frequency Separation	±5%
Time of Occupancy (Dwell time)	±5%
Conducted Spurious Emission	±2.77 dB
Restricted Frequency Bands	±5%

Radiated Emission	±2.95dB
Conducted Emission	±2.44dB

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	2017.05.24	2018.05.23
2	Power Splitter	NW521	1506A	Weinschel	2017.05.24	2018.05.23
3	Attenuator 1	(N/A.)	10dB	Resnet	2017.05.24	2018.05.23
4	Attenuator 2	(N/A.)	3dB	Resnet	2017.05.24	2018.05.23
5	EXA Signal Analzyer	MY53470836	N9010A	Agilent	2016.12.07	2017.12.06
6	Bluetooth Test Set	6K00006210	MT8852B	Anritsu	2017.05.24	2018.05.23
7	USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2017.05.24	2018.05.23
8	RF cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
9	Coaxial cable	CB02	RF02	Morlab	N/A	N/A
10	SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

1.5.2 Conducted Emission Test Equipments

Conducted Emission Test Equipments

No.	Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
1	Receiver	US44210471	E7405A	Agilent	2017.05.24	2018.05.23
2	LISN	812744	NSLK 8127	Schwarzbeck	2017.05.24	2018.05.23
3	Service Supplier	100448	CMU200	R&S	2017.05.24	2018.05.23
4	Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2017.05.24	2018.05.23
5	Coaxial cable(BNC) (30MHz-26GHz)	CB01	EMC01	Morlab	N/A	N/A

1.5.3 Auxiliary Test Equipment

Auxiliary Test Equipment

No.	Equipment Name	Model No.	Brand Name	Manufacturer	Cal.Date	Cal.Due Date
1	Computer	T430i	Think Pad	Lenovo	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	2017.05.17	2018.05.16
2	Receiver	MY54130016	N9038A	Agilent	2017.05.17	2018.05.16
3	Test Antenna - Bi-Log	N/A	VULB9163	Schwarzbeck	2016.12.09	2017.12.08
4	Test Antenna - Horn	9120C-384	BBHA 9120C	Schwarzbeck	2017.03.30	2018.03.29
5	Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2017.03.30	2018.03.29
6	Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
7	Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
8	Coaxial cable(N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
9	1-18GHz pre-Amplifier	MA02	TS-PR18	Rohde& Schwarz	2017.05.17	2018.05.16
10	18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde& Schwarz	2017.05.17	2018.05.16

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	2017.01.11	2018.01.10

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	2017.01.11	2018.01.10

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	Changning	2017.01.11	2018.01.10

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