REPORT No. : SZ17100152W09

TEST REPORT

APPLICANT	:	Pycom Ltd
PRODUCT NAME	:	Double Network (WiFi and Bluetooth) IoT development Module powered by MicroPython.
MODEL NAME	:	WiPy 3.0
BRAND NAME	:	Pycom
FCC ID	:	2AJMTWIPY3R
STANDARD(S)	:	47 CFR Part 15 Subpart C
TEST DATE	:	2017-11-06 to 2017-11-26
ISSUE DATE	:	2017-11-28

Tested by: Tu Ya'nan

Tu Ya'nan (Test Engineer)

Approved by: Andy Yeh

Andy Yeh (Technical Director)

MORLAB

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DIRECTORY

Change History		
Issue	**Date**	**Reason for change**
1.0	2017-11-28	First edition

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Pycom Ltd
Applicant Address:	High Point 9 Sydenham Road Guildford Surrey GU1 3RX UK
Manufacturer:	In-Tech Electronics Ltd
Manufacturer Address:	2/F Rhythm Home,119 Shazui Road, Futian, Shenzhen, Guangdong, P.R.China

1.2. Equipment Under Test (EUT) Description

Product Name:	Double Network (WiFi and Bluetooth) IoT development Module powered by MicroPython.
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	3.0r
Software Version:	3.0
Modulation Type:	Bluetooth: FHSS (GFSK(1Mbps), π/4-DQPSK(EDR 2Mbps), 8-DPSK(EDR 3Mbps))
Operating Frequency Range:	The frequency range used is 2402MHz – 2480MHz (79 channels, at intervals of 1MHz); The frequency block is 2400MHz to 2483.5MHz.
Bluetooth Version:	Bluetooth 4.2(BR/EDR)
Antenna1 Type:	Ceramic Antenna
Antenna1 Gain:	-0.5 dBi
Antenna 2 Type:	Rod Antenna
Antenna 2 Gain:	2.0 dBi

Note 1: The EUT contains Bluetooth Module operating at 2.4GHz ISM band; the frequencies 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.

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

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	Test Engineer	Result
1	15.203	Antenna Requirement	N/A	N/A	PASS
2	15.247(a)	Number of Hopping Frequency	Nov 06, 2017	Tu Ya'nan	PASS
3	15.247(b)	Peak Output Power	Nov 06, 2017	Tu Ya'nan	PASS
4	15.247(a)	20dB Bandwidth	Nov 06, 2017	Tu Ya'nan	PASS
5	15.247(a)	Carrier Frequency Separation	Nov 06, 2017	Tu Ya'nan	PASS
6	15.247(a)	Time of Occupancy (Dwell time)	Nov 06, 2017	Tu Ya'nan	PASS
7	15.247(d)	Conducted Spurious Emission	Nov 06, 2017	Tu Ya'nan	PASS
8	15.247(d)	Restricted Frequency Bands	Nov 10&26, 2017	Wang Dalong	PASS
9	15.209, 15.247(d)	Radiated Emission	Nov 10&26, 2017	Wang Dalong	PASS
10	15.207	Conducted Emission	Nov 10, 2017	Wang Dalong	PASS

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

1.4. Environmental Conditions

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

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

2. 47 CFR Part 15C Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

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

2.1.2. Result: Compliant

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

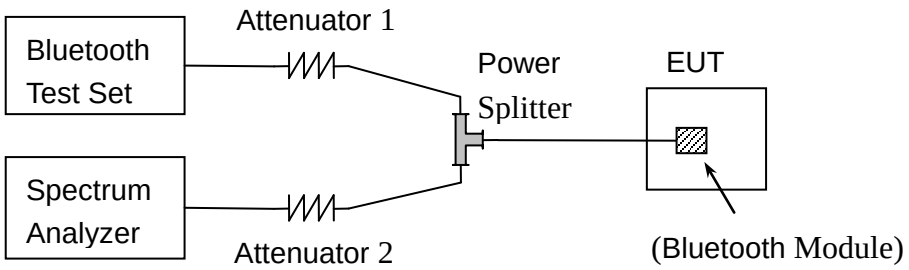
2.2. Number of Hopping Frequency

2.2.1. Requirement

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

2.2.2. Test Description

A. Test Setup:



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

B. Equipments List:

Please reference ANNEX 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

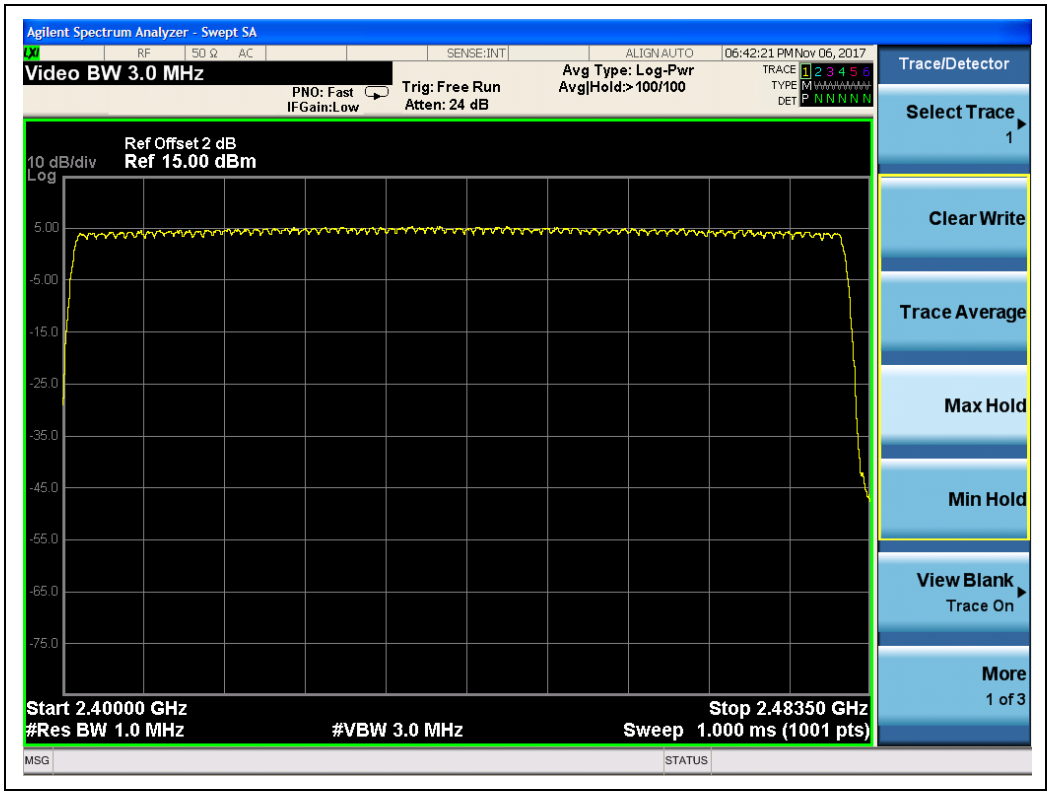
The Bluetooth Module operates at hopping-on test mode; the frequencies number employed is counted to verify the Module's using the number of hopping frequency.

A. Test Verdict:

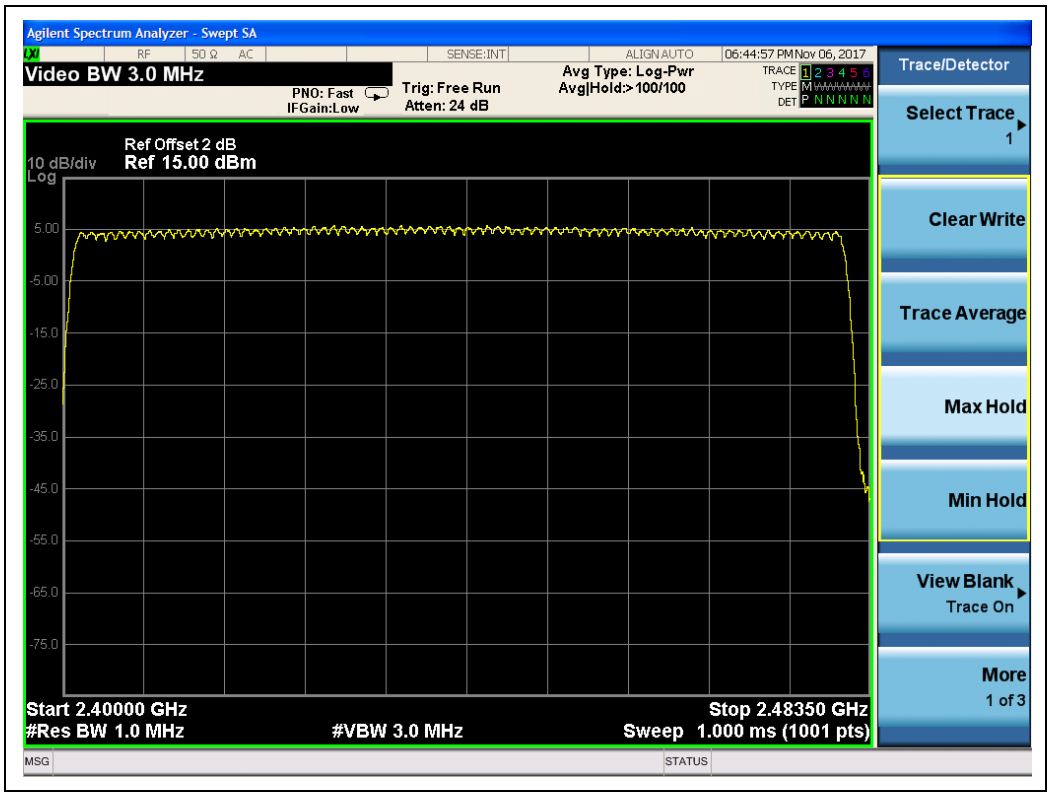
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Refer to Plot	Verdict
GFSK	2400 - 2483.5	79	15	Plot A	PASS
π/4-DQPSK	2400 - 2483.5	79	15	Plot B	PASS
8-DPSK	2400 - 2483.5	79	15	Plot C	PASS

B. Test Plots:

(Plot A: GFSK)



(Plot B: π/4-DQPSK)



(Plot C: 8- DPSK)

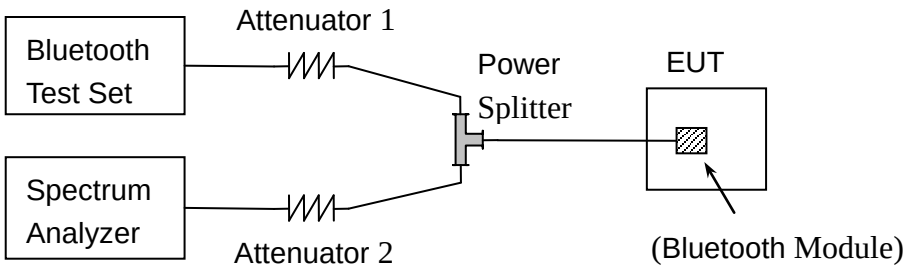
2.3. Peak Output Power

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 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).

2.3.3. 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.

GFSK Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	2.41	0.00174	30	1	PASS
39	2441	3.45	0.00221			PASS
78	2480	2.45	0.00176			PASS

π/4-DQPSK Mode

B. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	4.19	0.00262	20.97	0.125	PASS
39	2441	5.21	0.00332			PASS
78	2480	4.27	0.00267			PASS

8-DPSK Mode

C. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
0	2402	4.52	0.00283	20.97	0.125	PASS
39	2441	5.49	0.00354			PASS
78	2480	4.61	0.00289			PASS

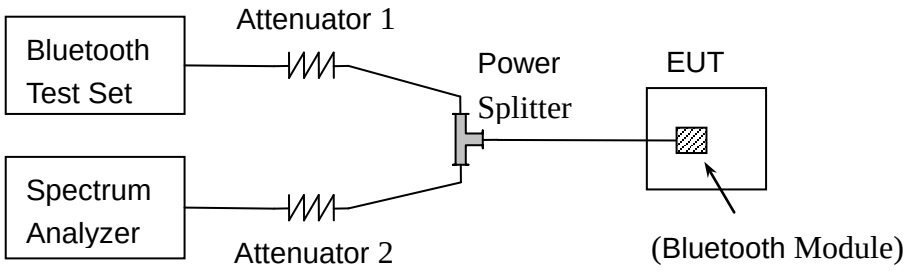
2.4. 20dB Bandwidth

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.

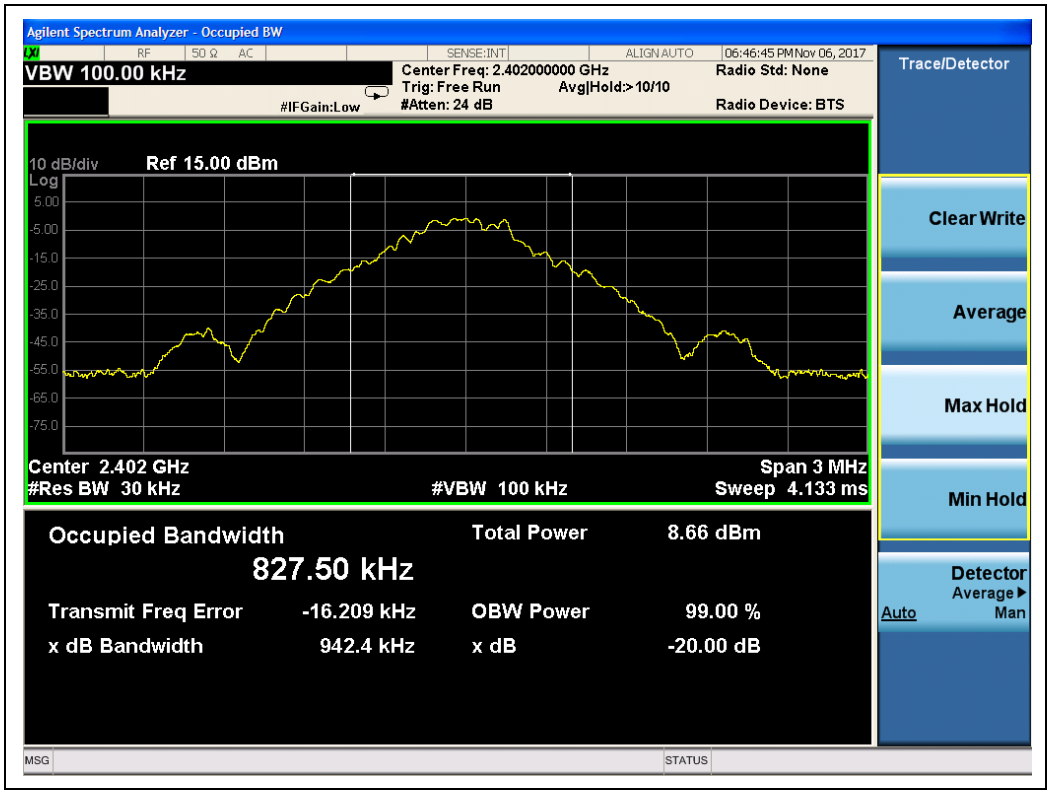
GFSK Mode

A. Test Verdict:

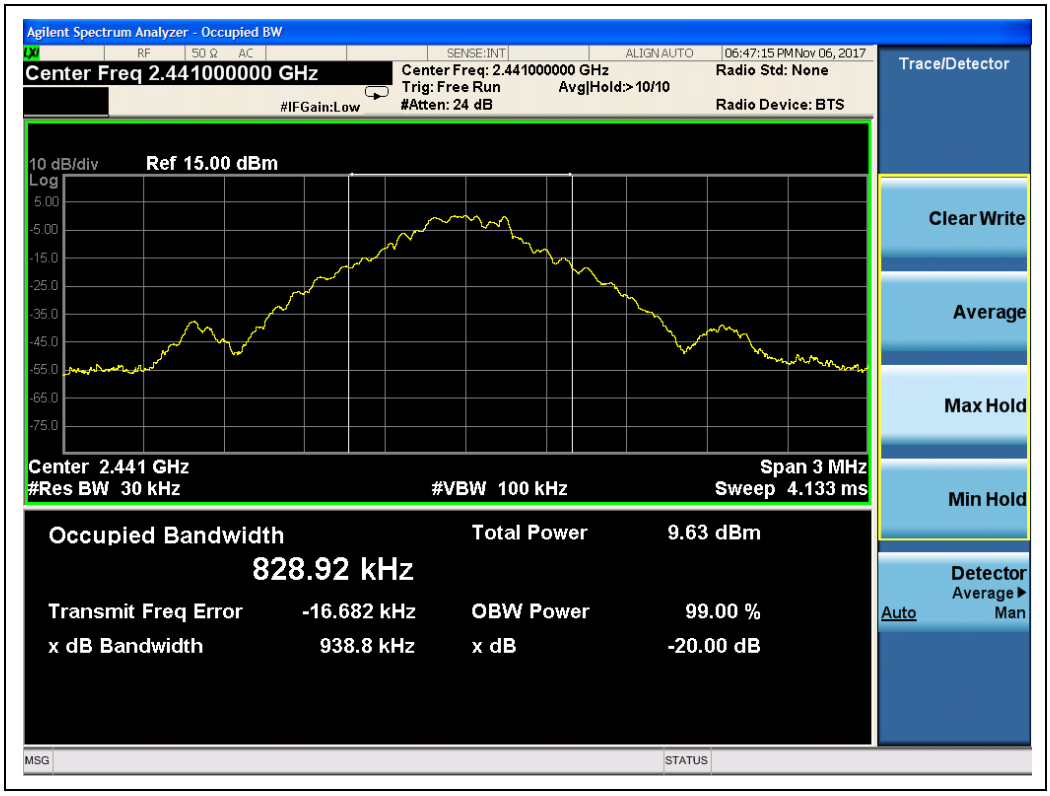
The maximum 20dB bandwidth measured is 0.9424 MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	0.9424	Plot A
39	2441	0.9388	Plot B
78	2480	0.9408	Plot C

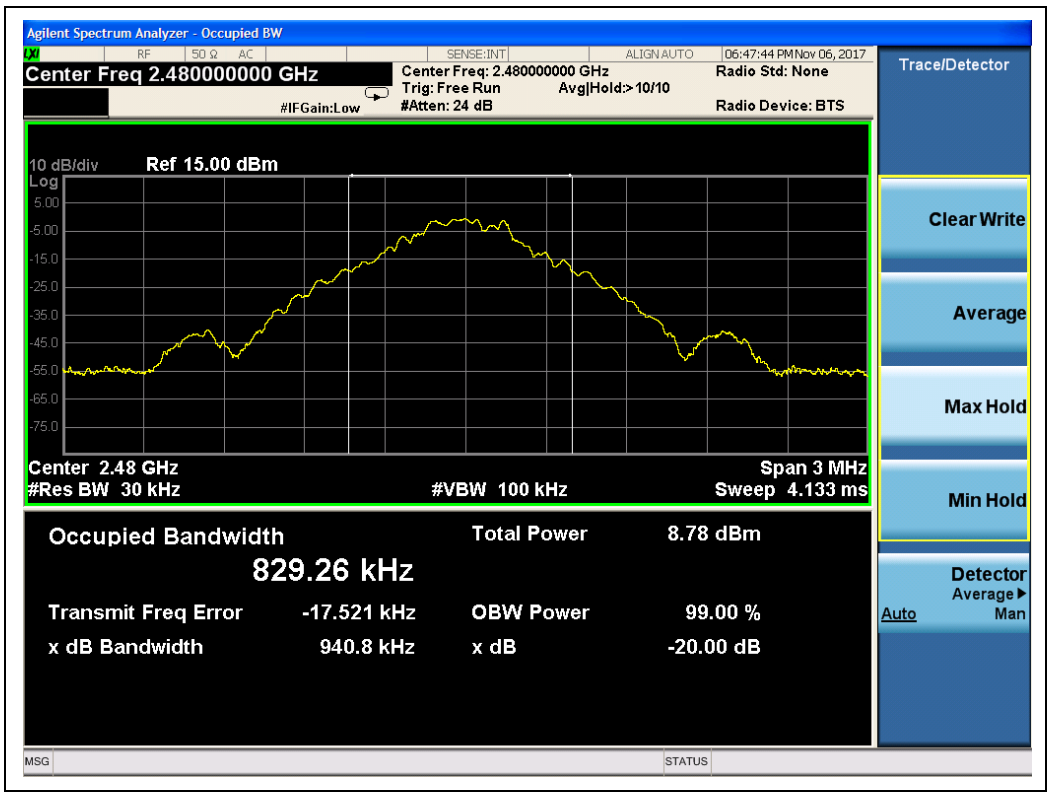
B. Test Plots:



(Plot A: Channel = 2402 @ GFSK)



(Plot B: Channel = 2441 @ GFSK)



(Plot C: Channel = 2480 @ GFSK)

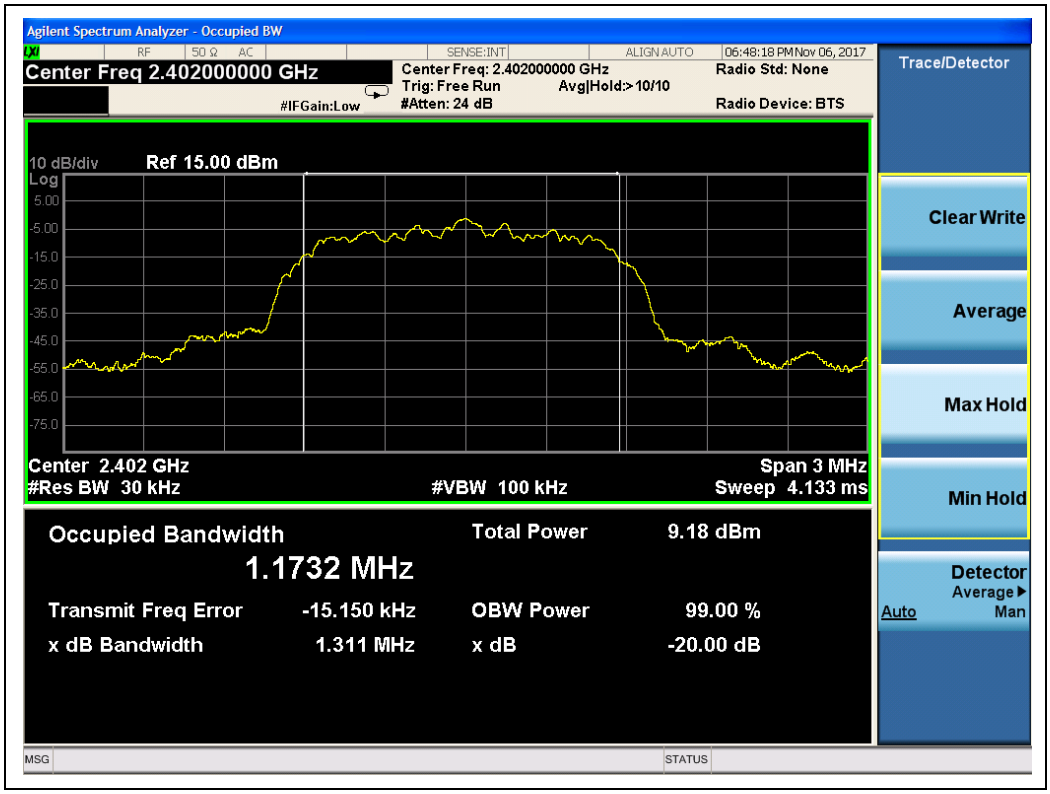
π/4-DQPSK Mode

A. Test Verdict:

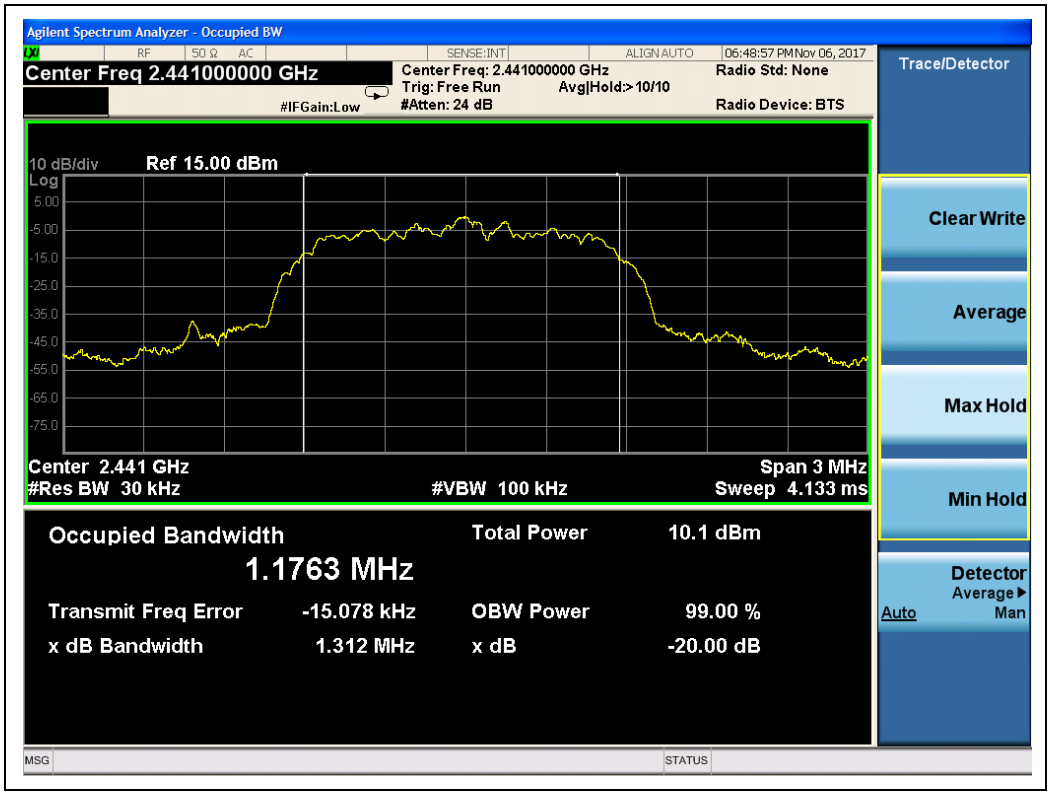
The maximum 20dB bandwidth measured is 1.315 MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.311	Plot D
39	2441	1.312	Plot E
78	2480	1.315	Plot F

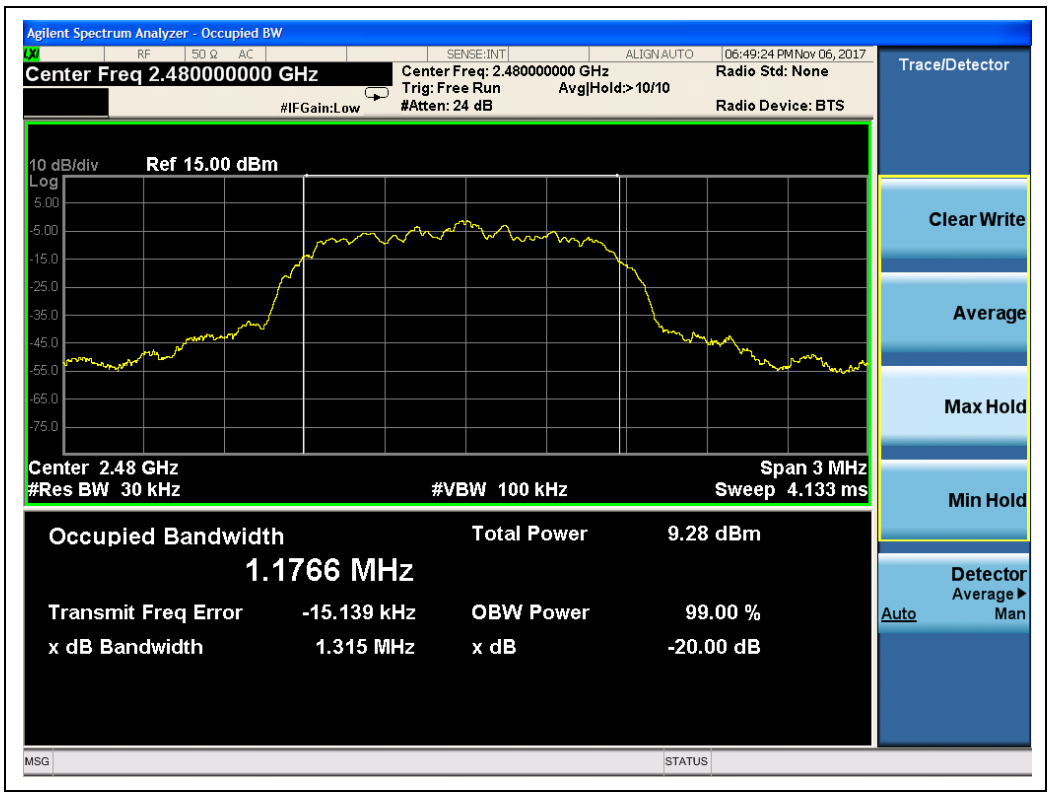
B. Test Plots:



(Plot D: Channel = 2402 @ π/4-DQPSK)



(Plot E: Channel = 2441 @ π/4-DQPSK)



(Plot F: Channel = 2480 @ π/4-DQPSK)

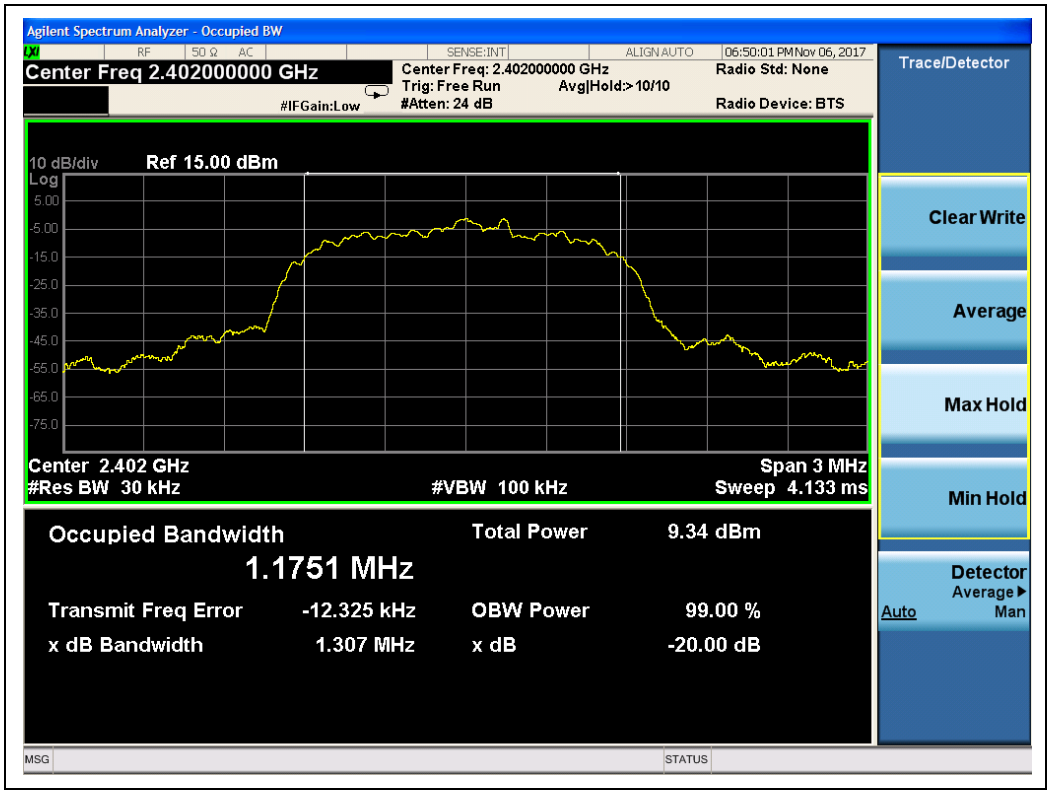
8-DPSK Mode

A. Test Verdict:

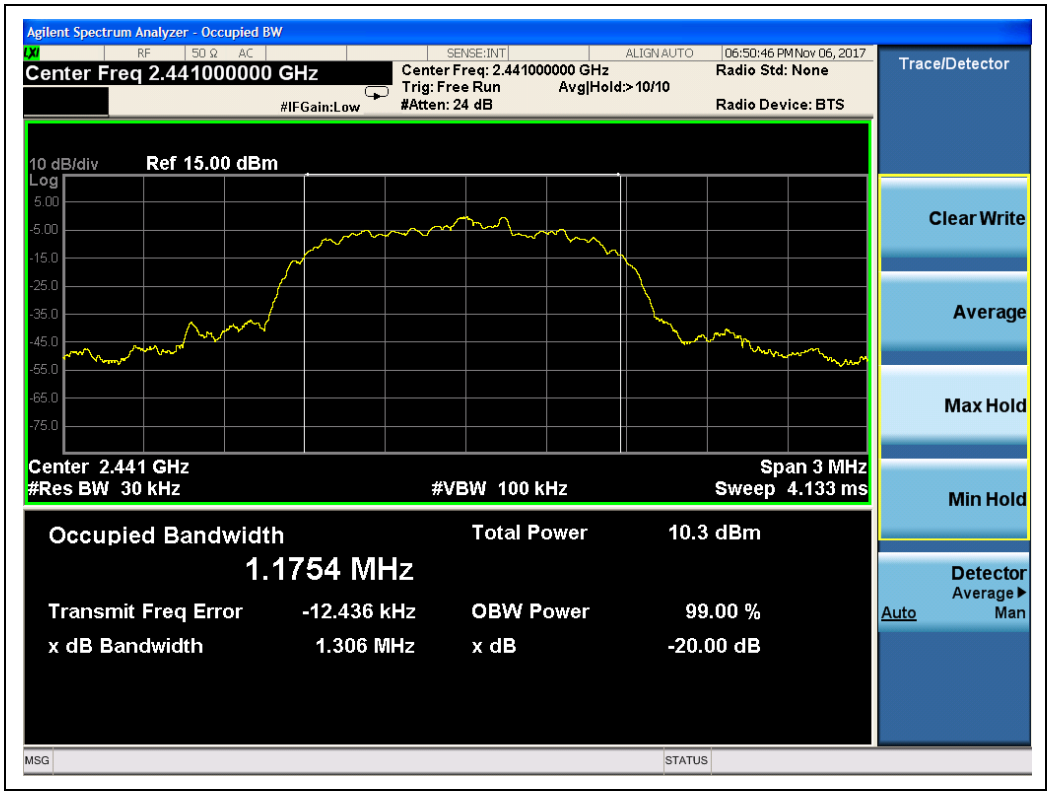
The maximum 20dB bandwidth measured is 1.309 MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.307	Plot G
39	2441	1.306	Plot H
78	2480	1.309	Plot I

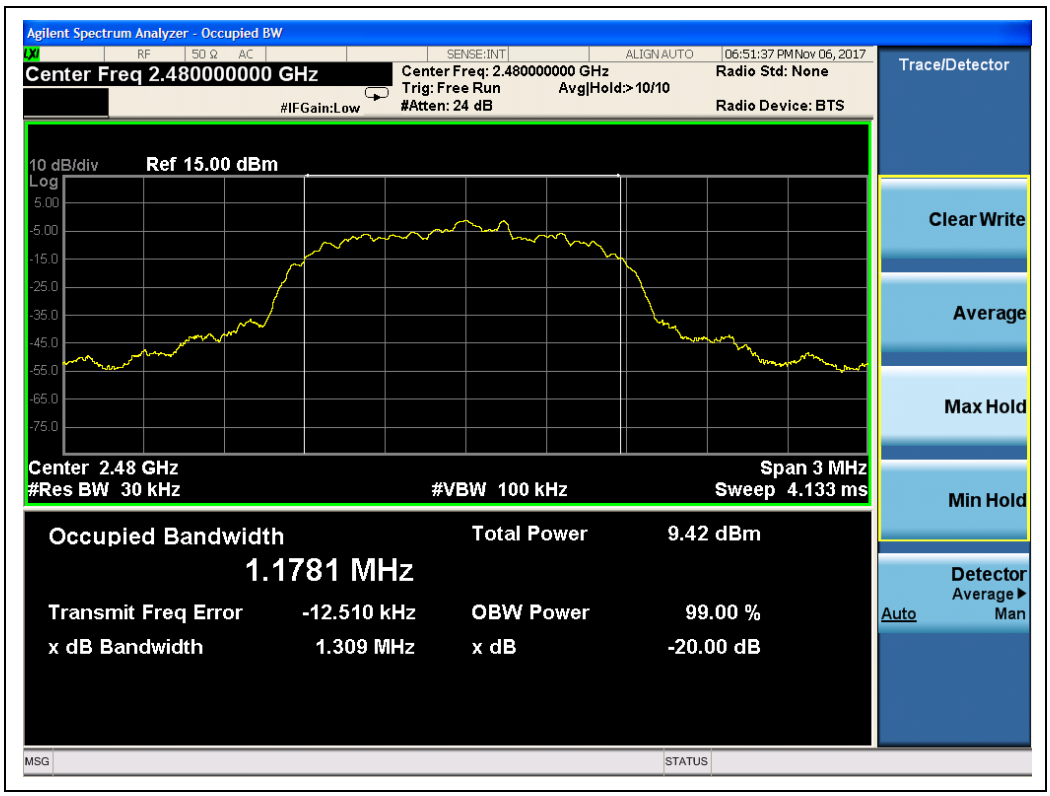
B. Test Plots:



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



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



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

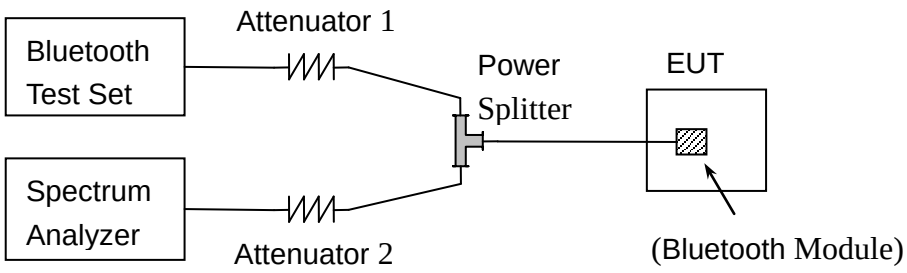
2.5. Carried Frequency Separation

2.5.1. Definition

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

2.5.2. Test Description

A. Test Setup:



The Bluetooth Module of the EUT is coupled to the Spectrum Analyzer (SA) and the Bluetooth 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).

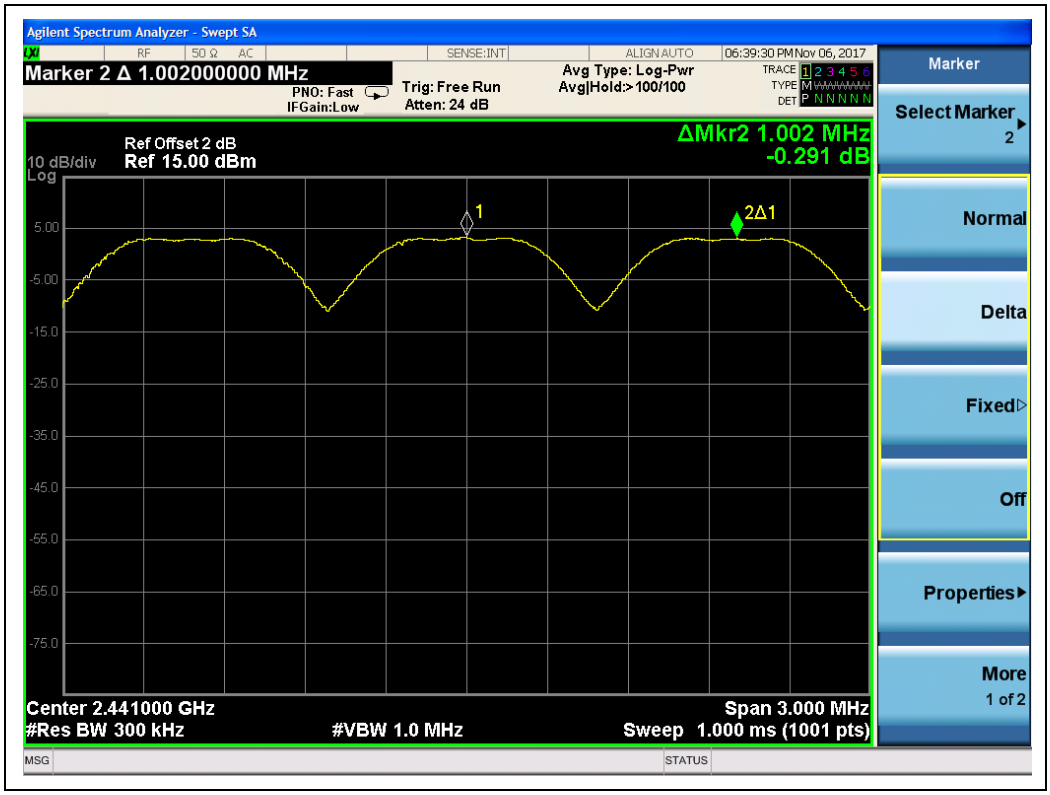
2.5.3. Test Procedure

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.

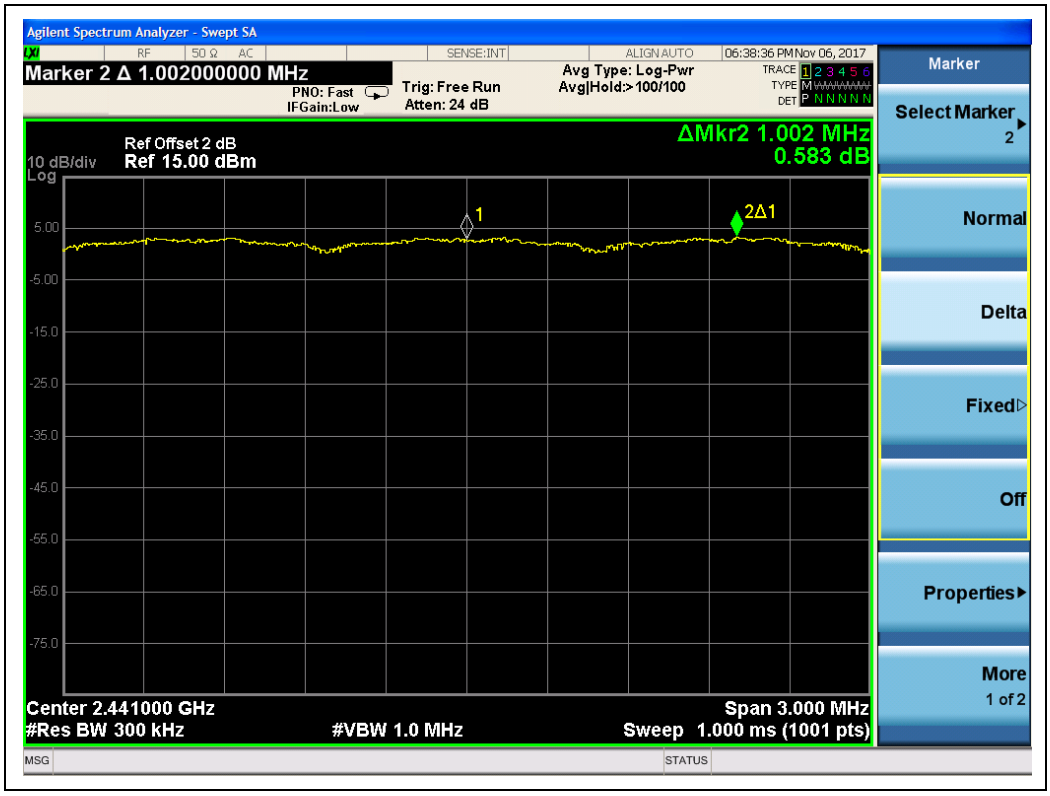
2.5.4. Test Result

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

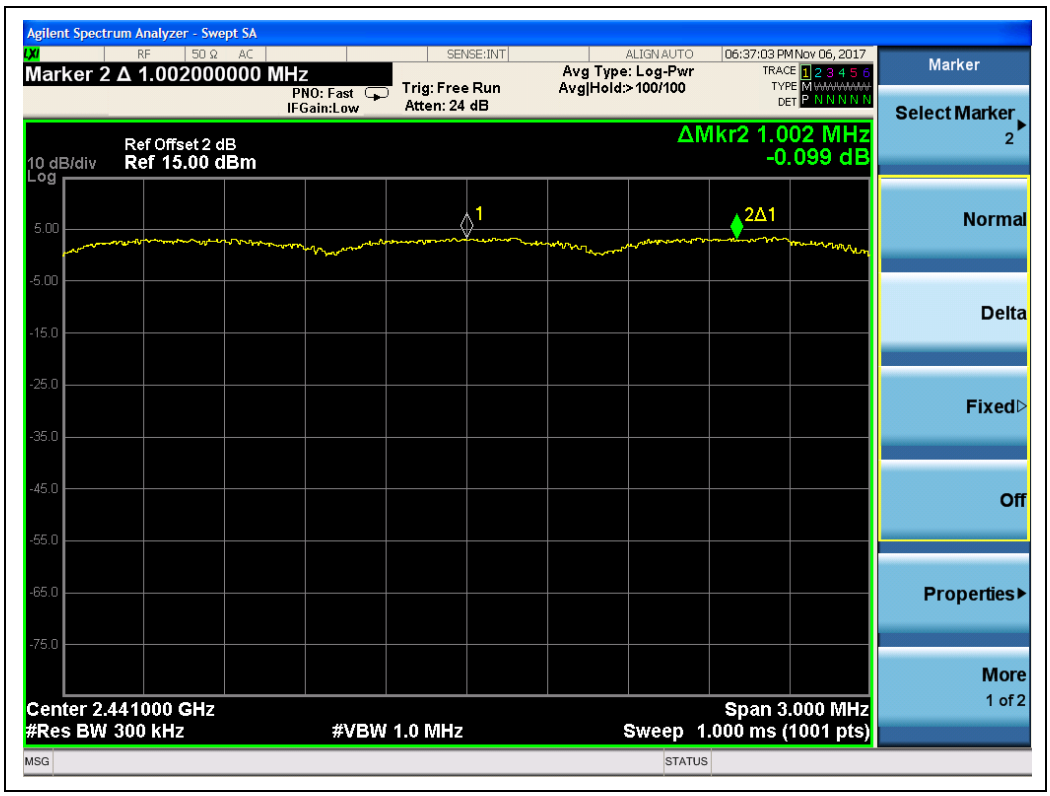
Test Mode	Measured Channel Numbers	Carried Frequency Separation	Refer to Plot	20dB bandwidth (MHz)	Min. Limit	Verdict
GFSK	39 and 40	1.002	Plot A	0.9388	two-thirds of the 20dB bandwidth	PASS
π/4-DQPSK	39 and 40	1.002	Plot B	1.311		PASS
8-DPSK	39 and 40	1.002	Plot C	1.306		PASS



(Plot A: GFSK)



(Plot B: π/4-DQPSK)



(Plot C: 8-DPSK)

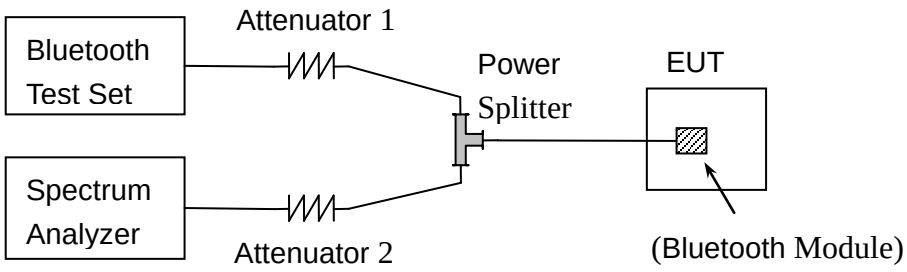
2.6. Time of Occupancy (Dwell time)

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 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.

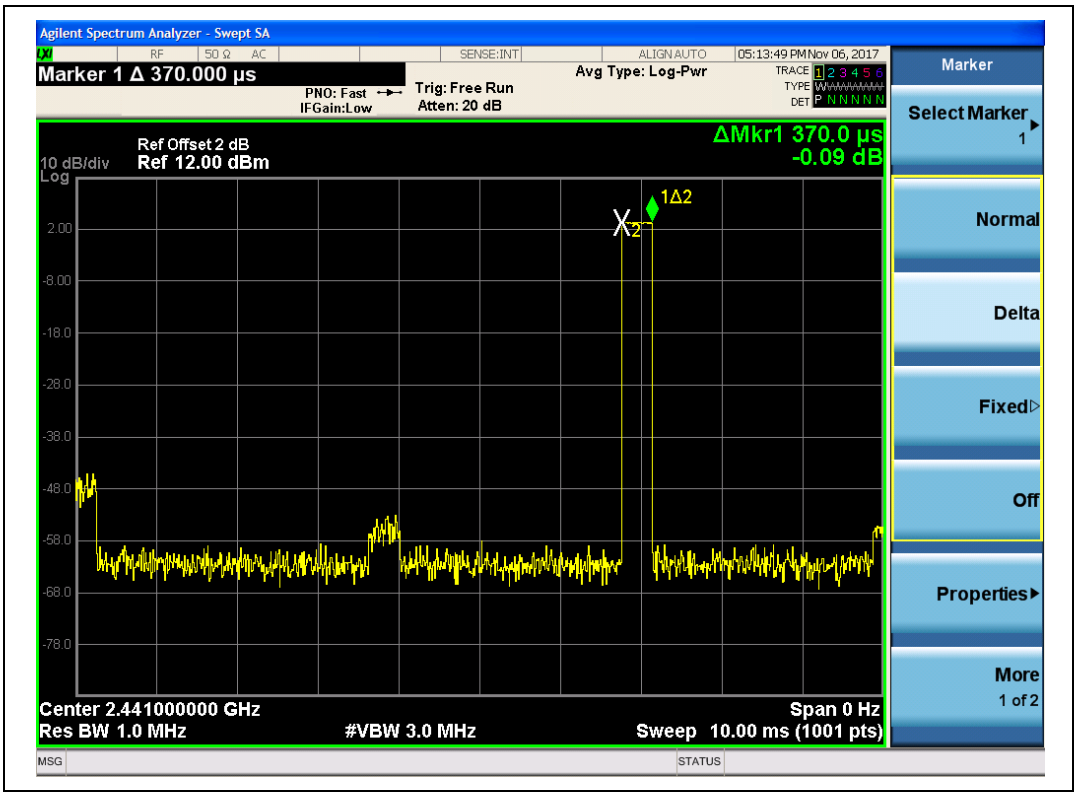
2.6.4. Test Result

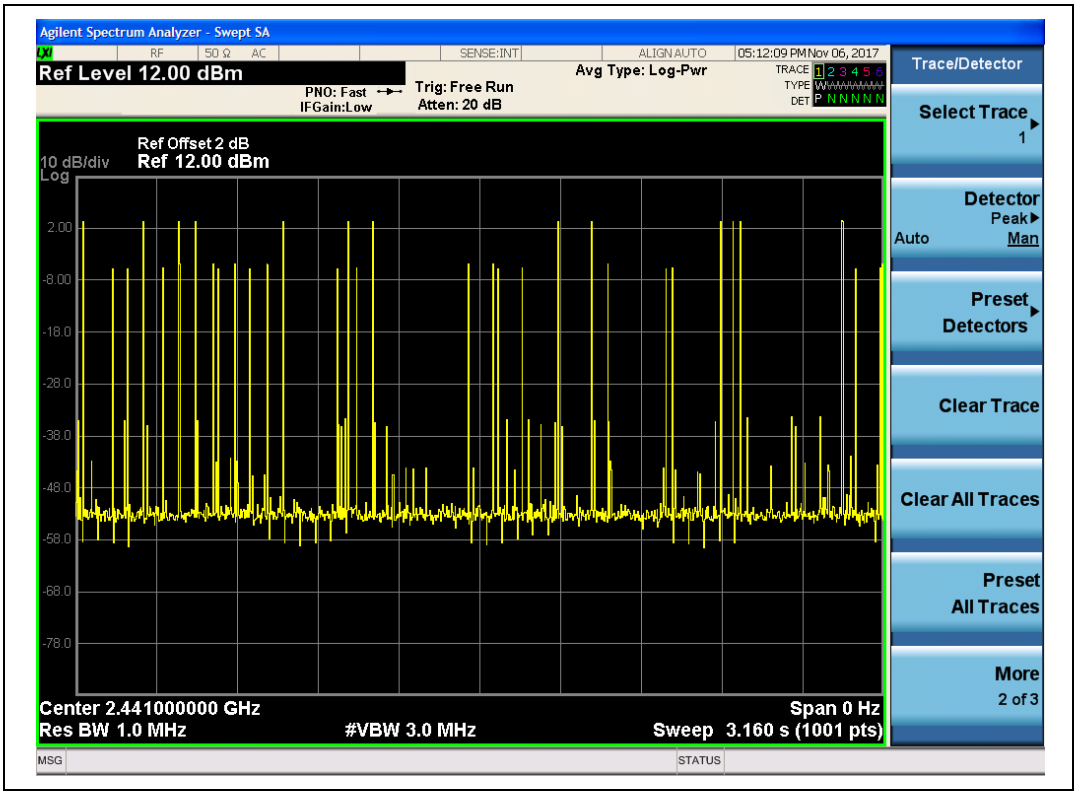
GFSK Mode

A. Test Verdict:

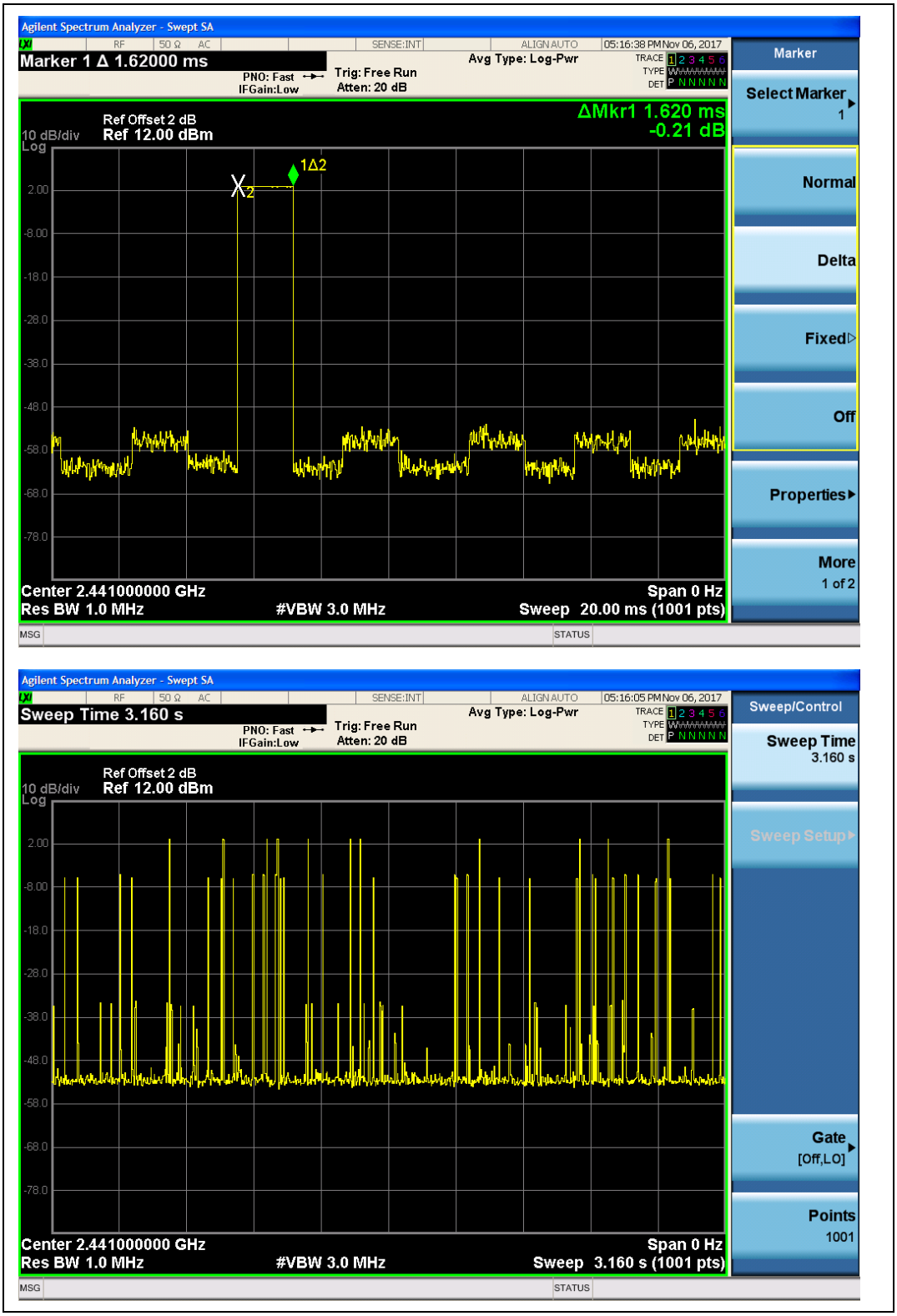
DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.37	13	0.00481	0.0481	0.4	PASS
DH3	1.62	11	0.01782	0.1782		PASS
DH5	2.88	7	0.02016	0.2016		PASS

B. Test Plots:

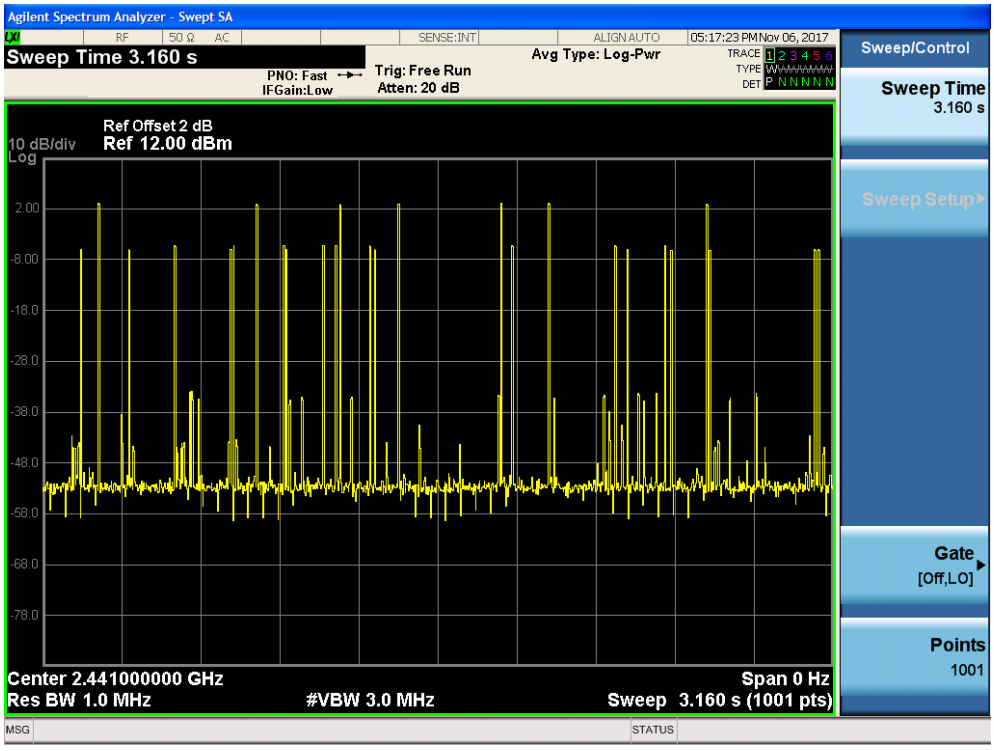




(Plot A: DH1 @ GFSK)



(Plot B: DH3 @ GFSK)



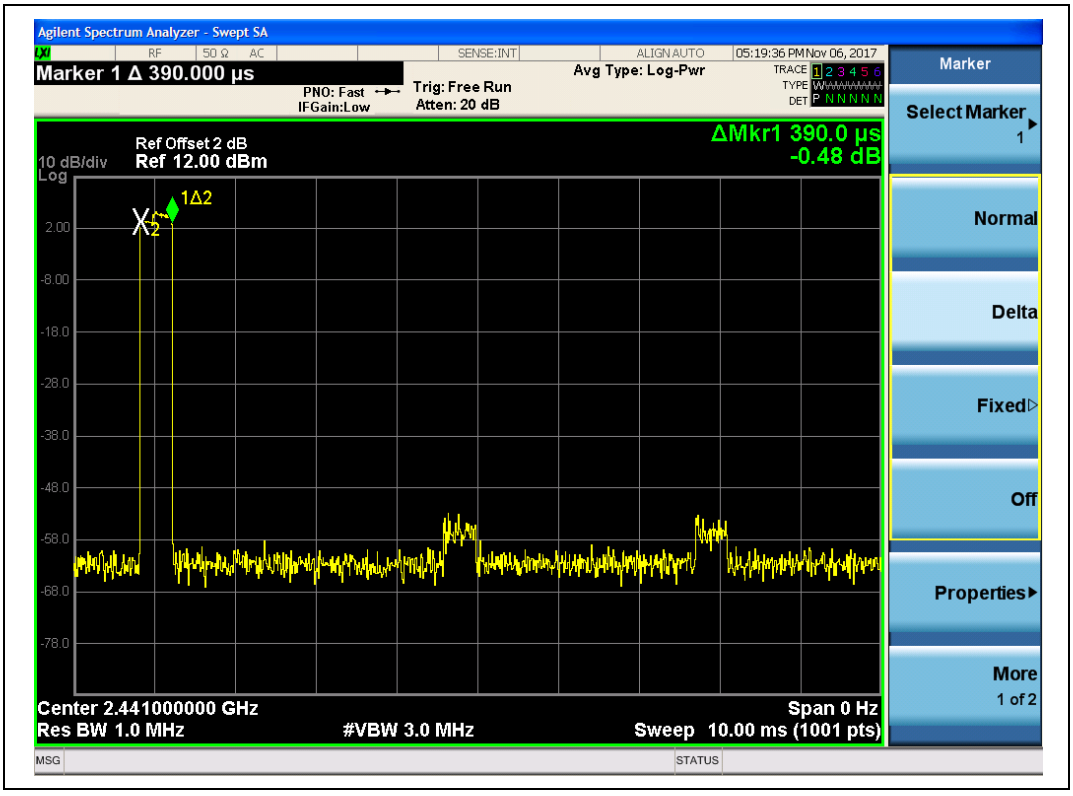
(Plot C: DH5 @ GFSK)

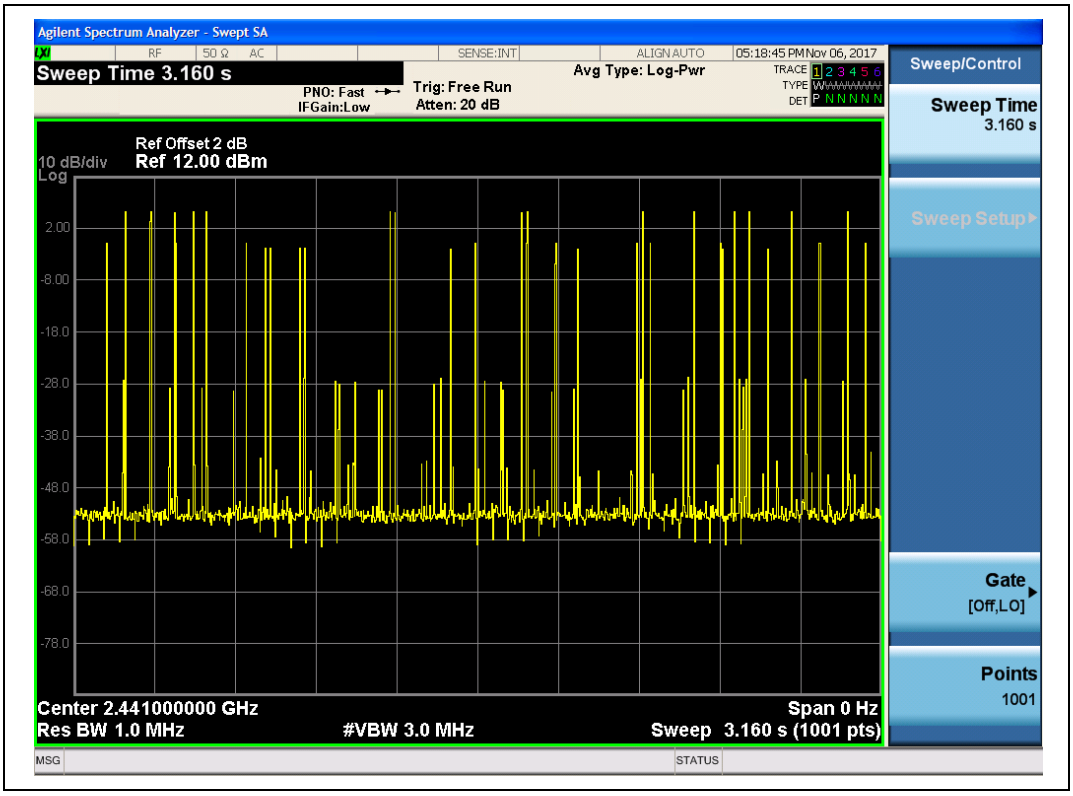
π/4-DQPSK Mode

A. Test Verdict:

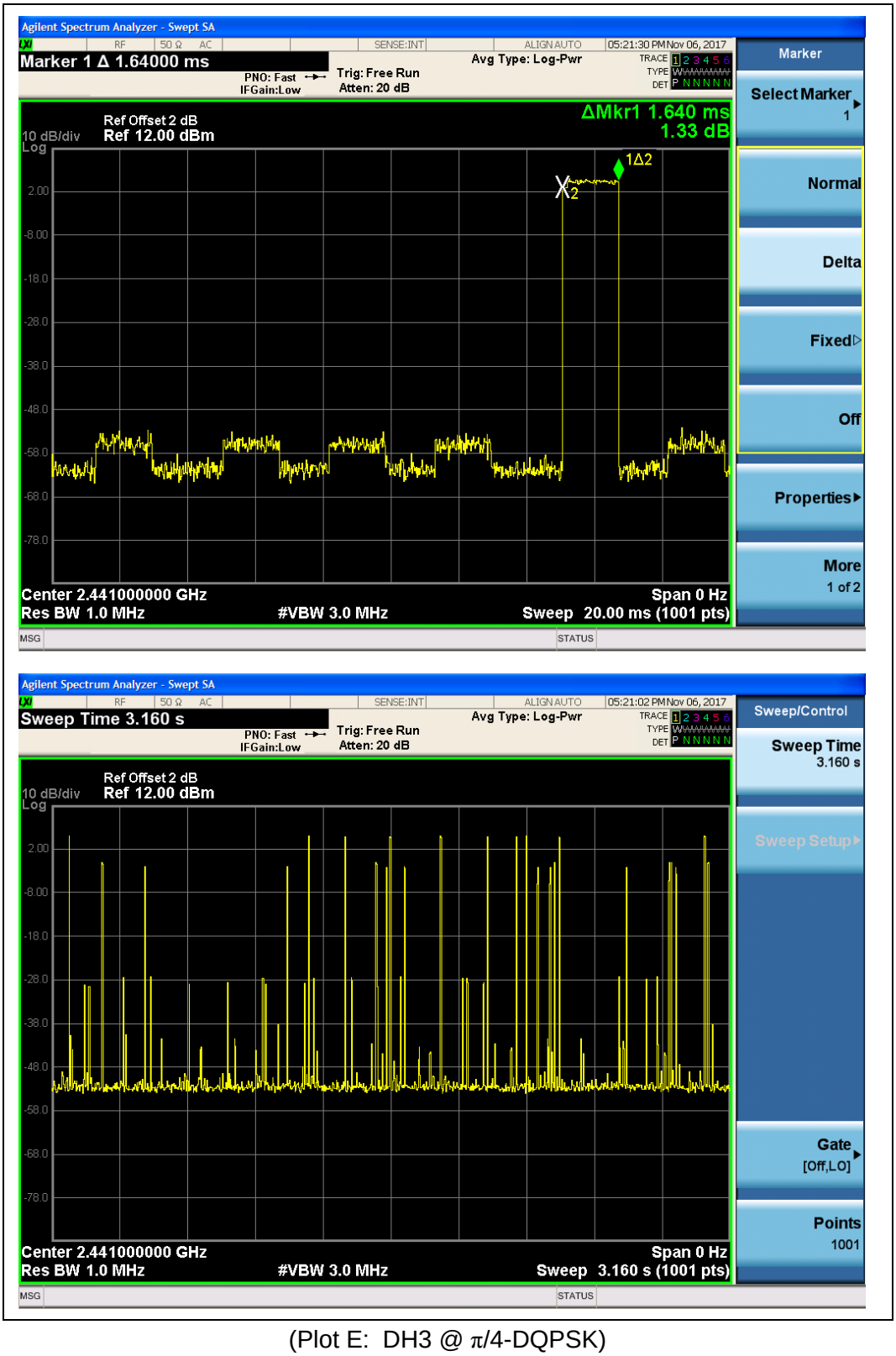
DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.39	15	0.00585	0.0585	0.4	PASS
DH3	1.64	10	0.01640	0.1640		PASS
DH5	2.91	10	0.02910	0.2910		PASS

B. Test Plots:

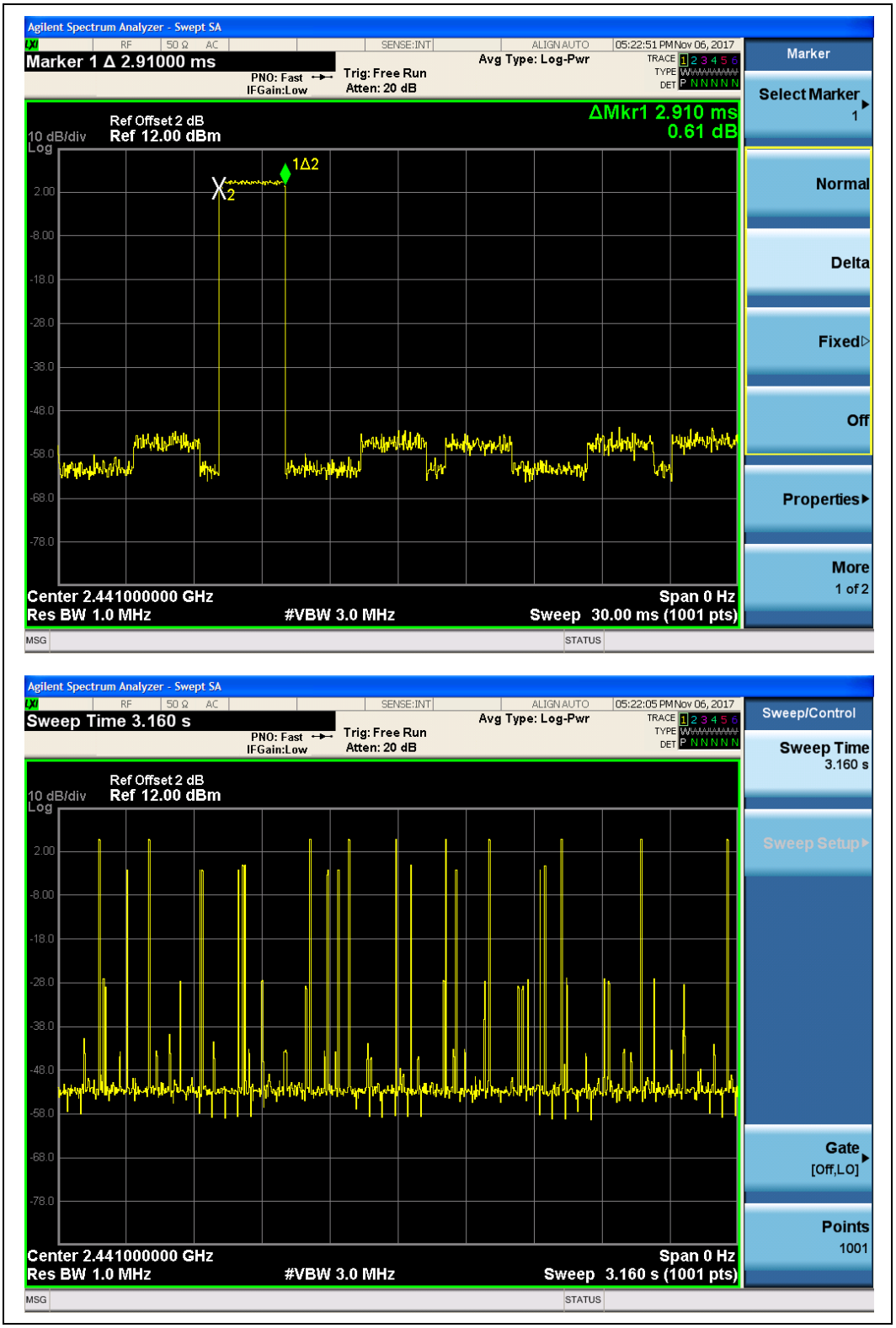




(Plot D: DH1 @ π/4-DQPSK)



(Plot E: DH3 @ π/4-DQPSK)



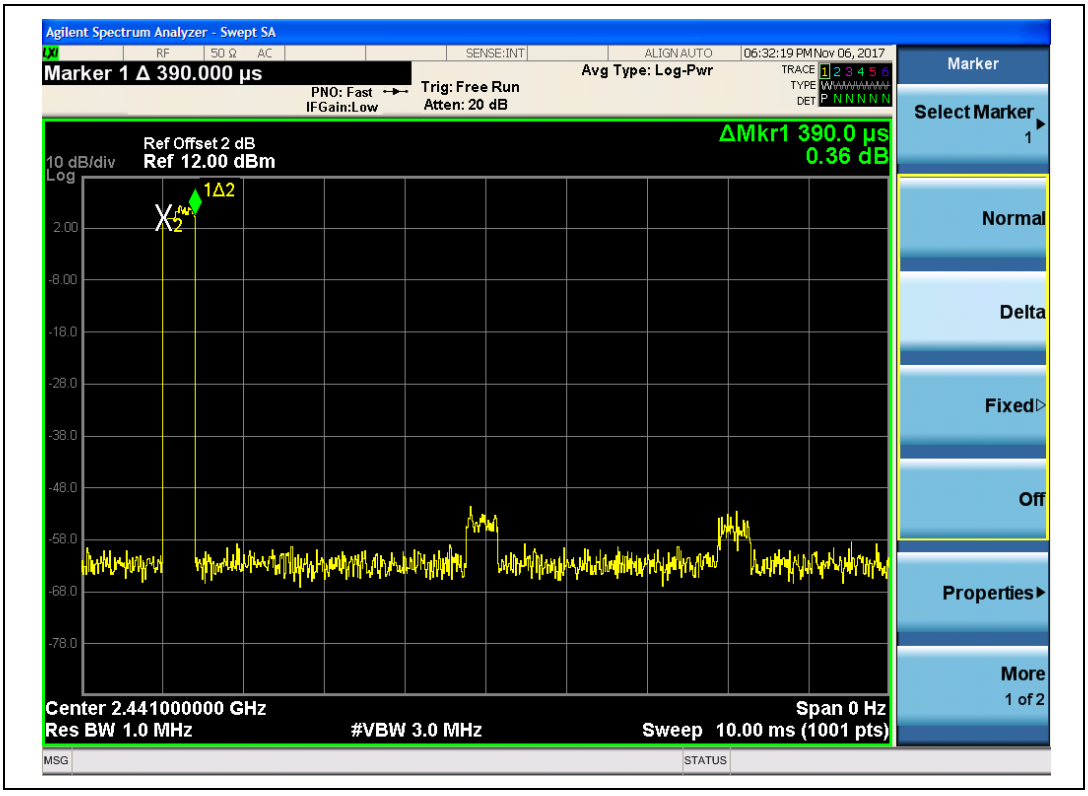
(Plot F: DH5 @ π/4-DQPSK)

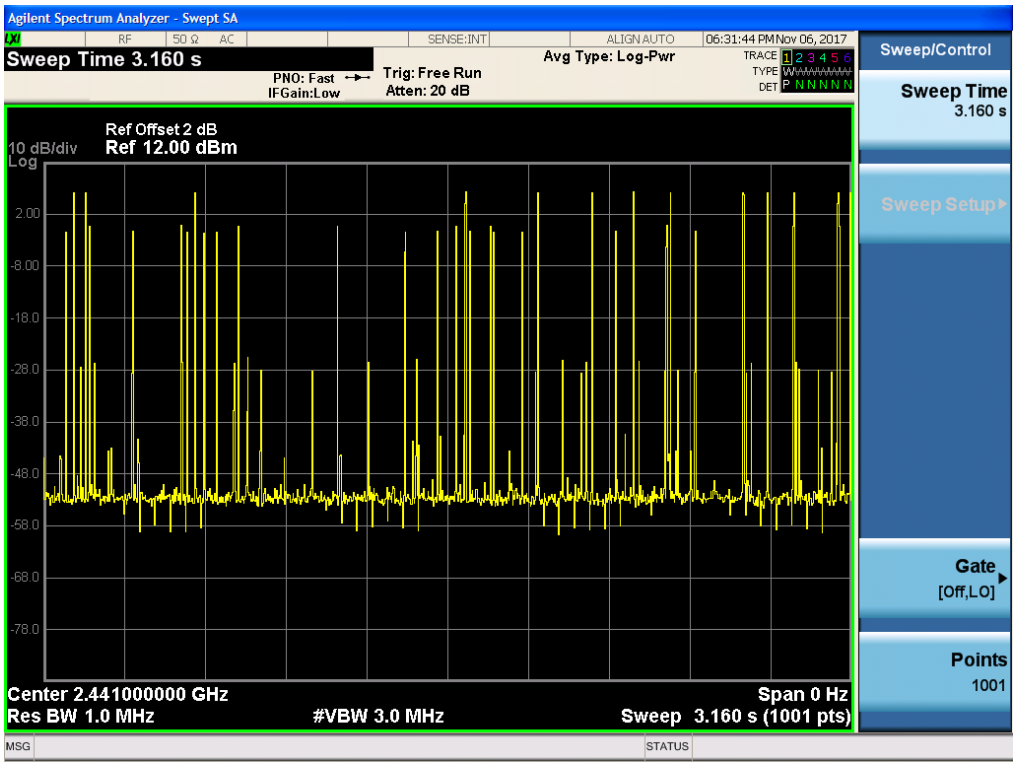
8-DPSK mode

A. Test Verdict:

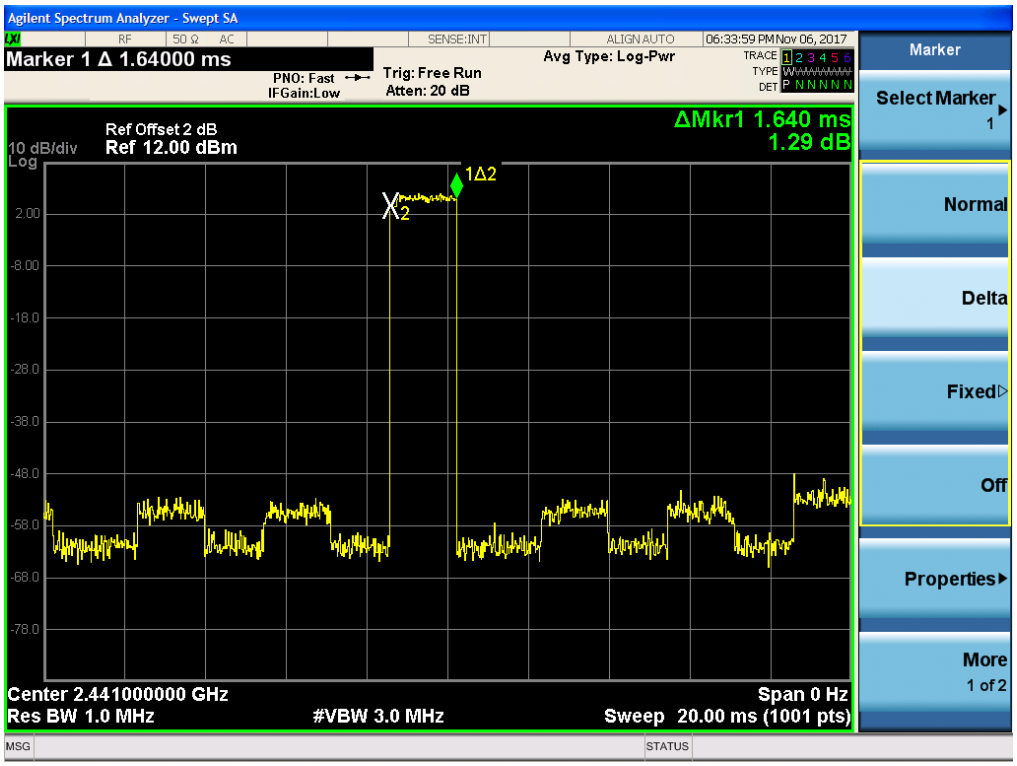
DH Packet	Pulse Width (msec)	Number of pulse in 3.16 seconds	Average Time of Occupancy in 3.16 seconds (sec)	Average Time of Occupancy in 31.6 seconds (sec)	Limit (sec)	Verdict
DH1	0.39	13	0.00507	0.0507	0.4	PASS
DH3	1.64	10	0.01640	0.1640		PASS
DH5	2.88	7	0.02016	0.2016		PASS

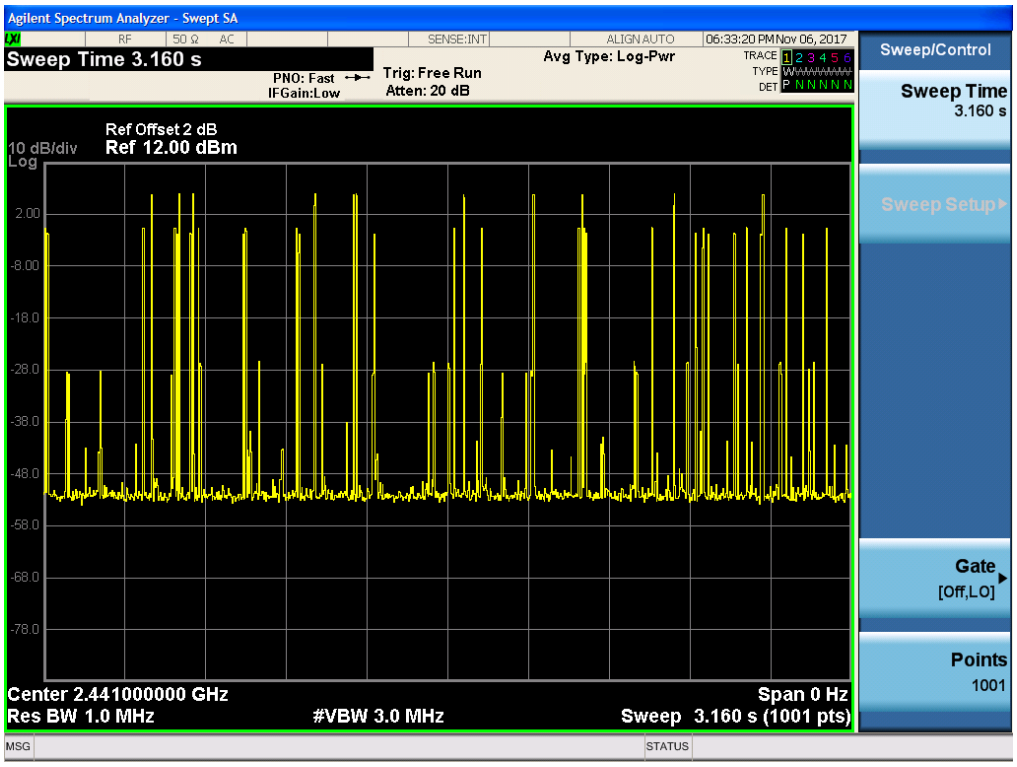
B. Test Plots:



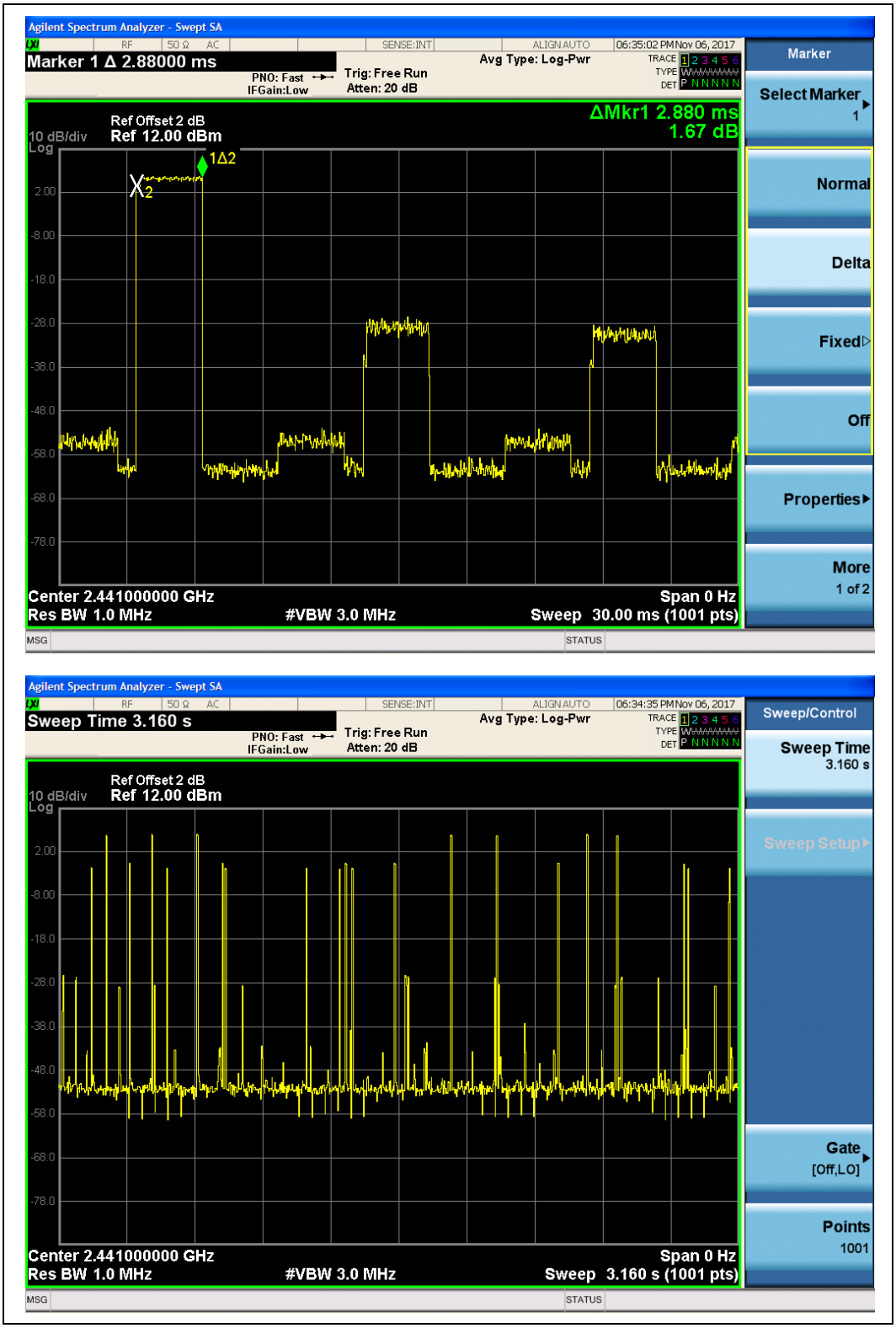


(Plot G: DH1 @ 8-DPSK)





(Plot H: DH3 @ 8-DPSK)



(Plot I: DH5 @ 8-DPSK)

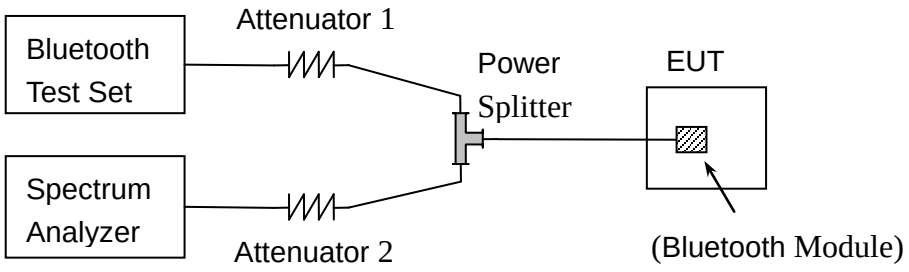
2.7. Conducted Spurious Emissions

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.

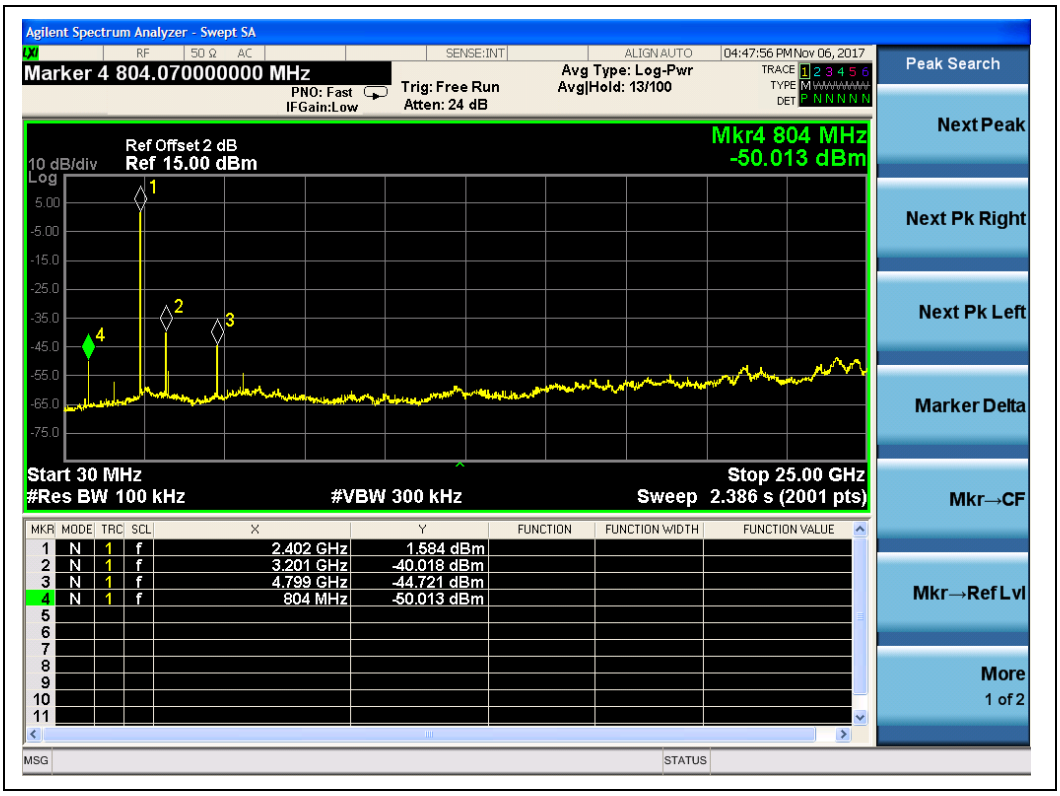
GFSK Mode

A. Test Verdict:

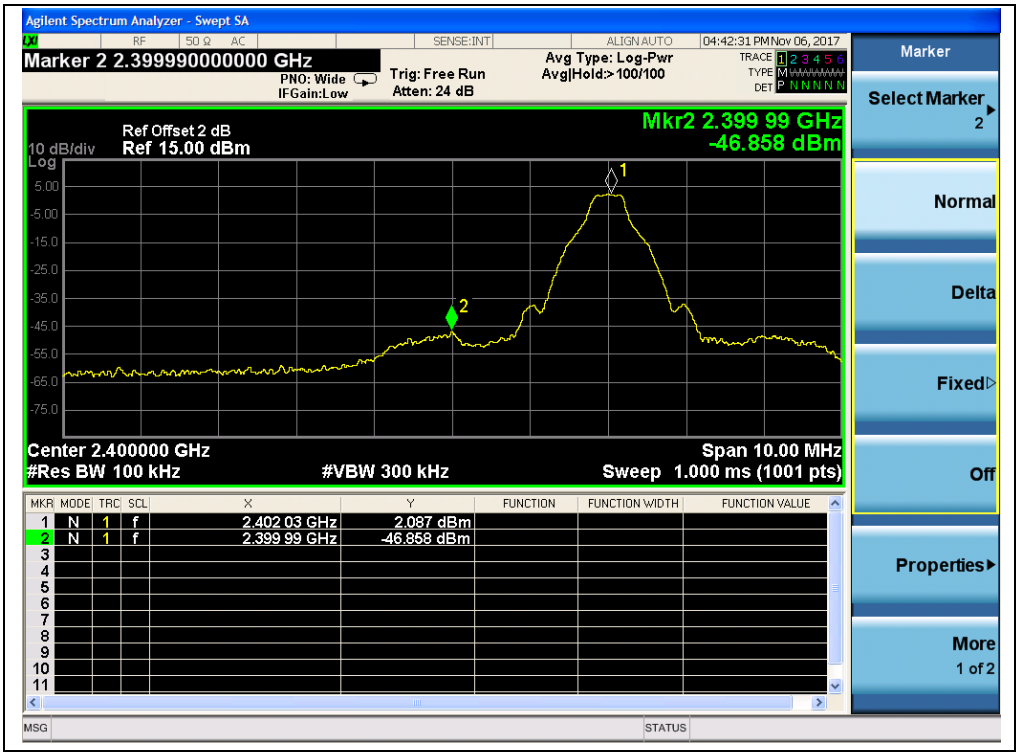
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-40.02	Plot A	1.58	-18.42	PASS
39	2441	-42.35	Plot B	2.60	-17.40	PASS
78	2480	-43.15	Plot C	1.25	-18.75	PASS

B. Test Plots:

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

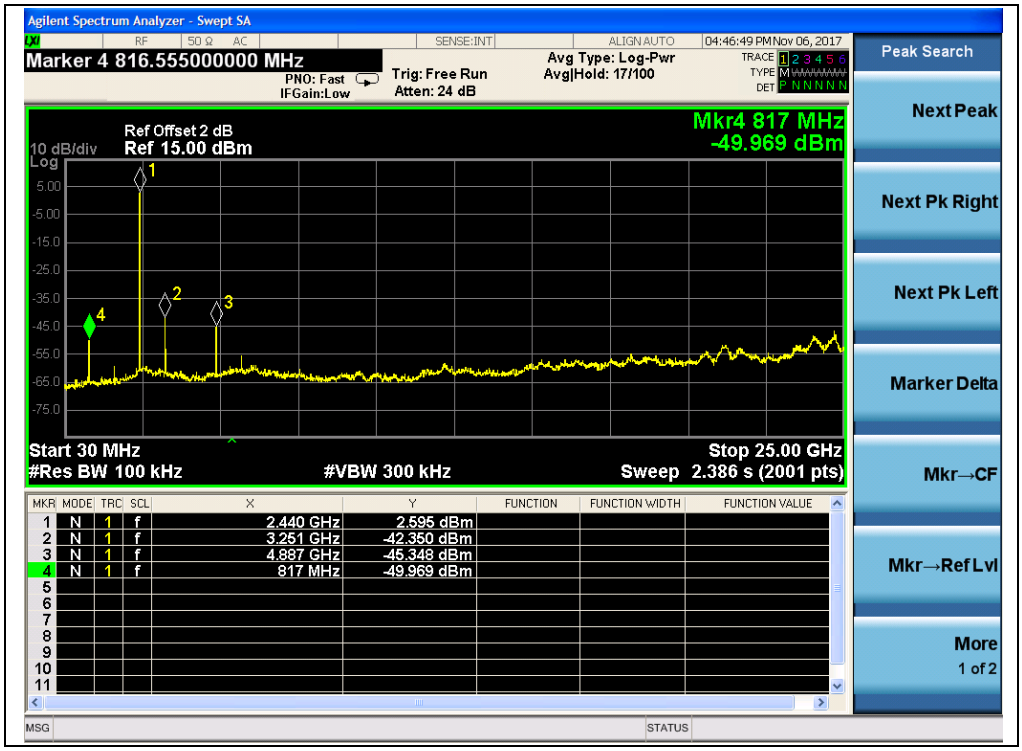


(Plot A: Channel = 0, 30MHz to 25GHz @ GFSK Mode)

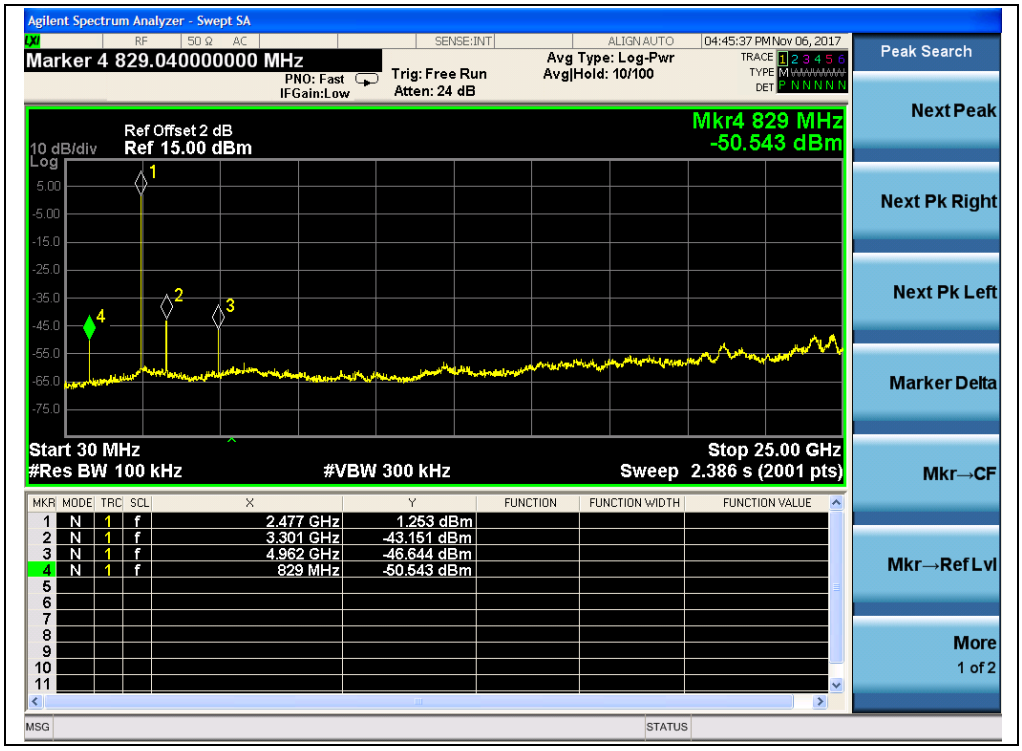


(Channel = 0, Band edge @ GFSK Mode)

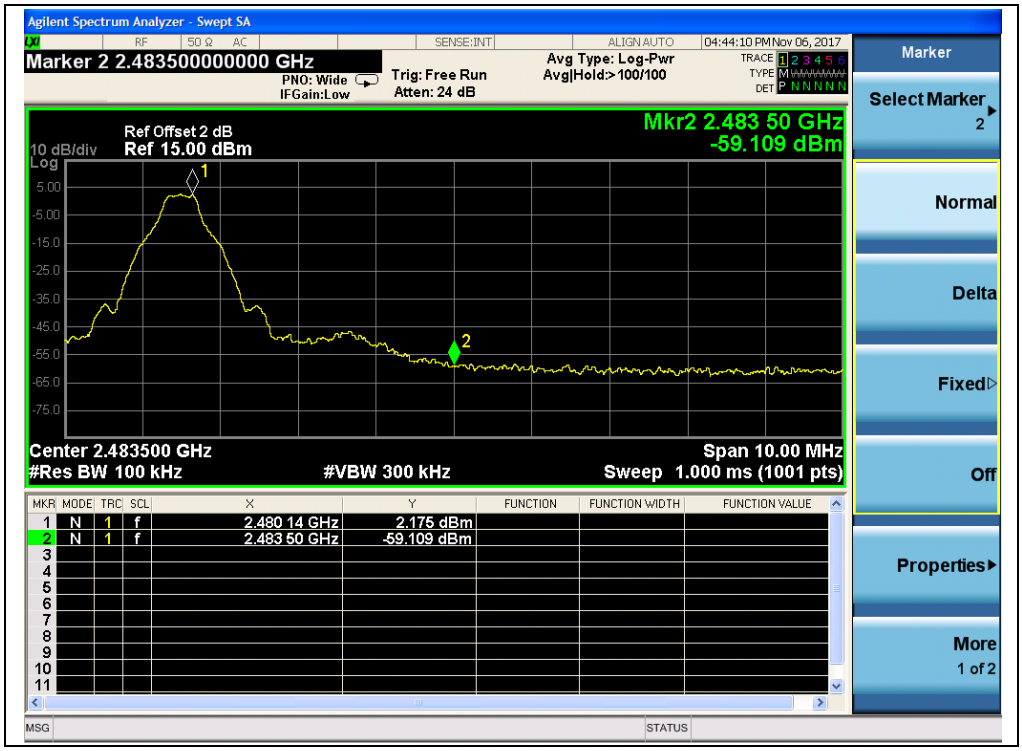
(Channel = 0, Band edge with hopping on @ GFSK Mode)



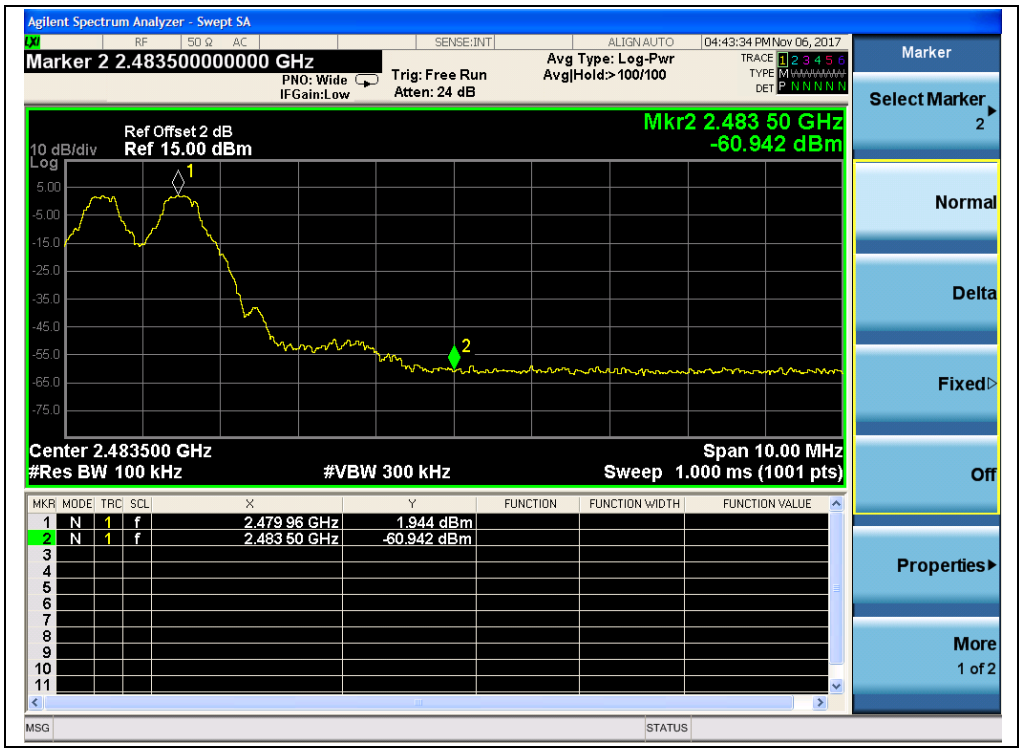
(Plot B: Channel = 39, 30MHz to 25GHz @ GFSK Mode)



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



(Channel = 78, Band edge @ GFSK Mode)



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

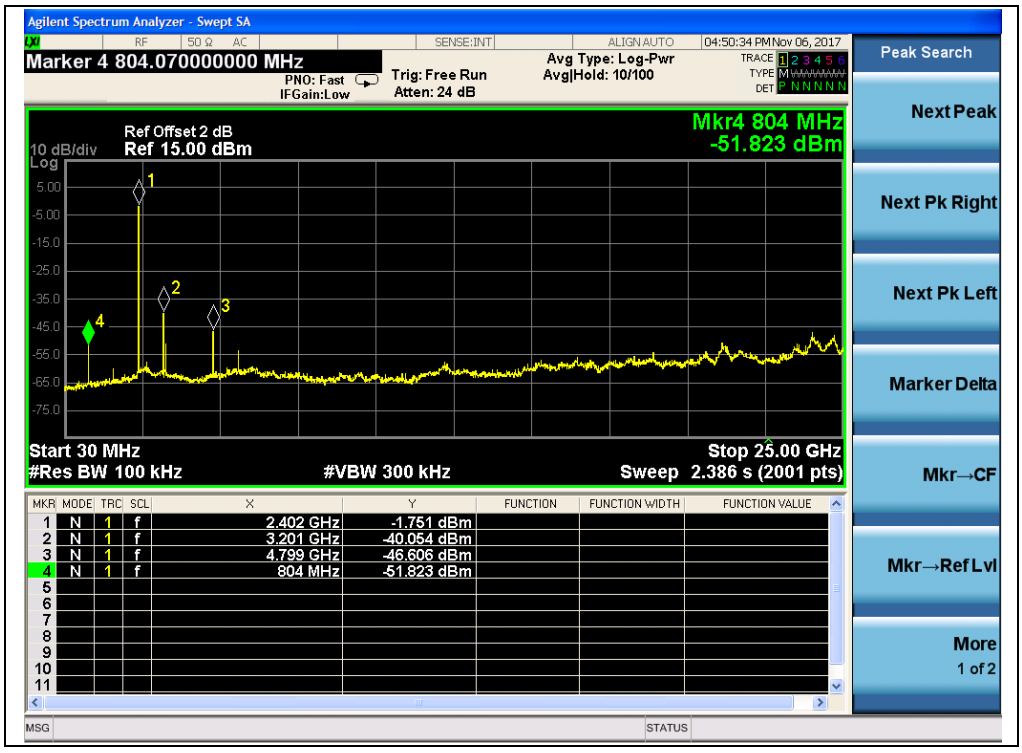
π/4-DQPSK Mode

A. Test Verdict:

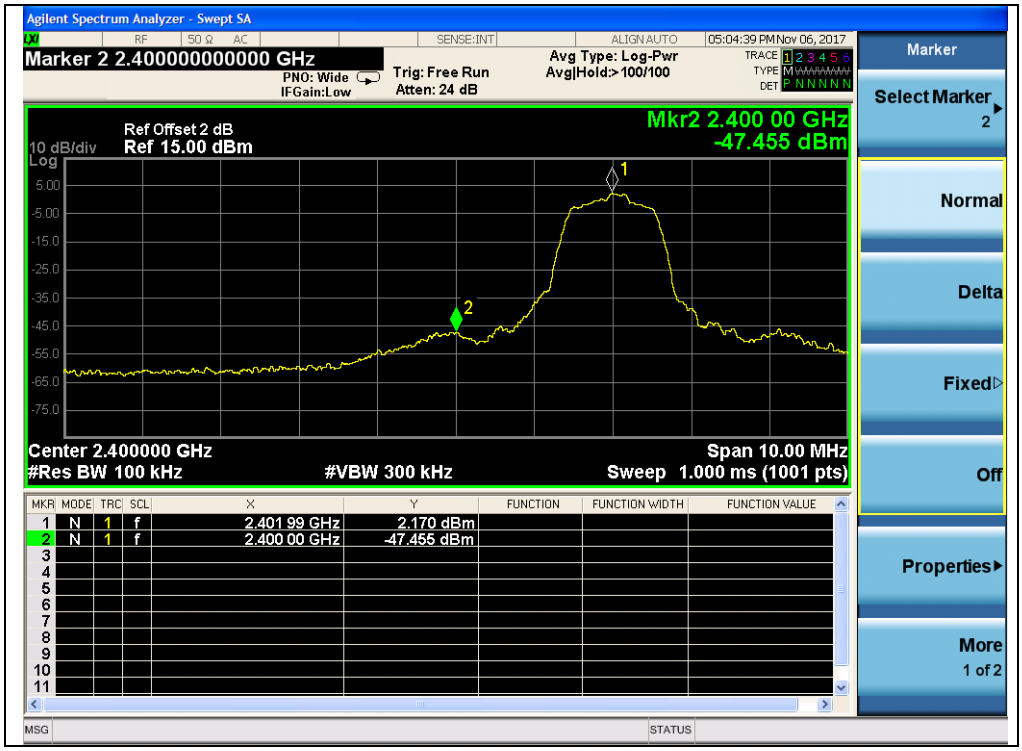
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-40.05	Plot D	-1.75	-21.75	PASS
39	2441	-42.23	Plot E	-0.75	-20.75	PASS
78	2480	-43.28	Plot F	-0.54	-20.54	PASS

B. Test Plots:

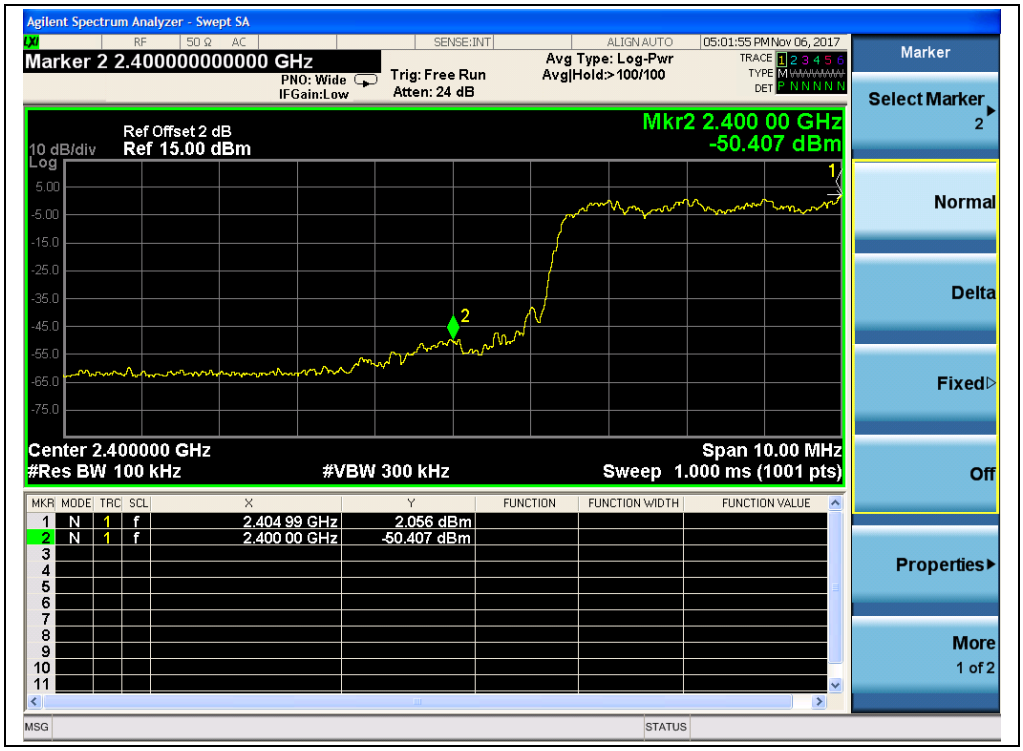
Note: the power of the Module transmitting frequency should be ignored.



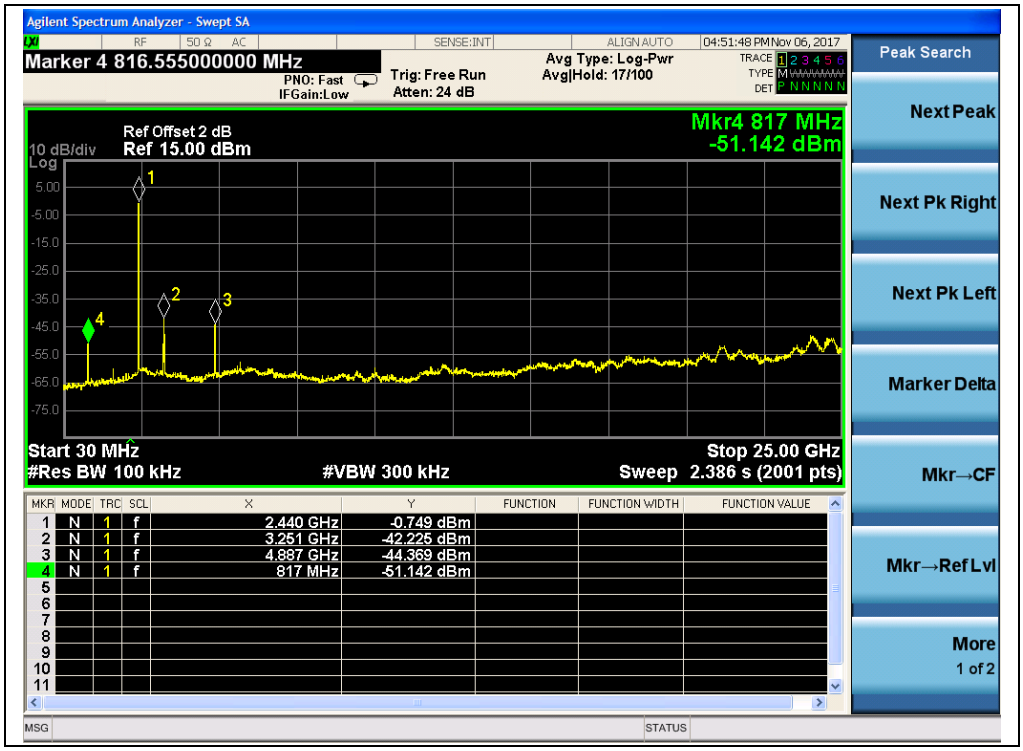
(Plot D: Channel = 0, 30MHz to 25GHz @π/4-DQPSK)



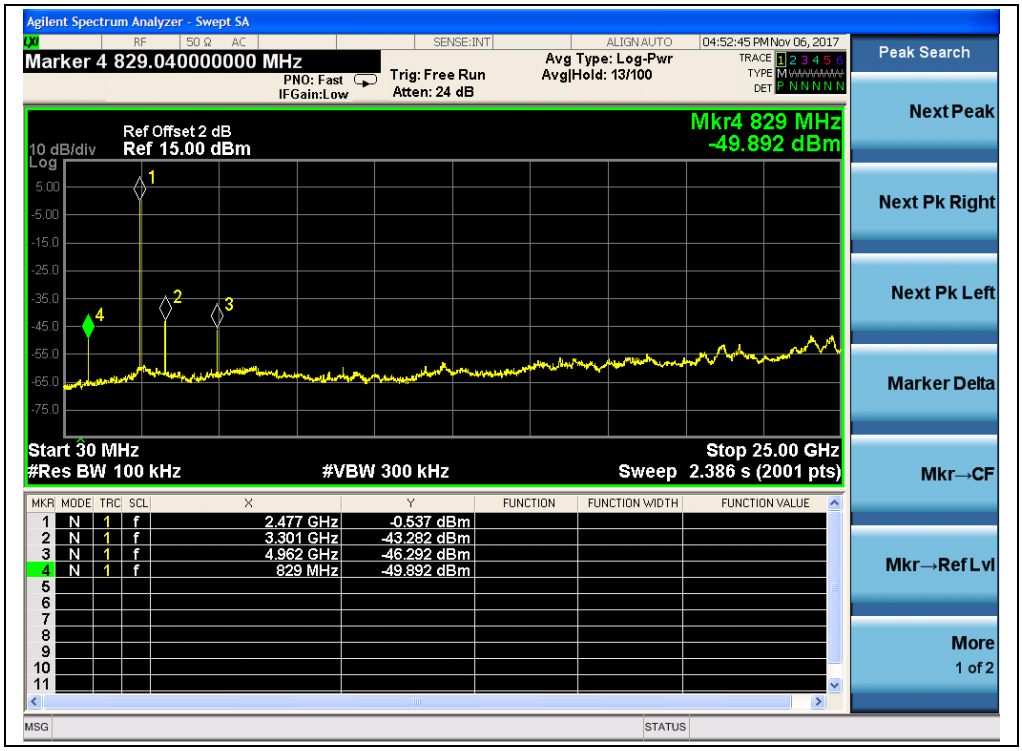
(Channel = 0, Band edge @π/4-DQPSK)



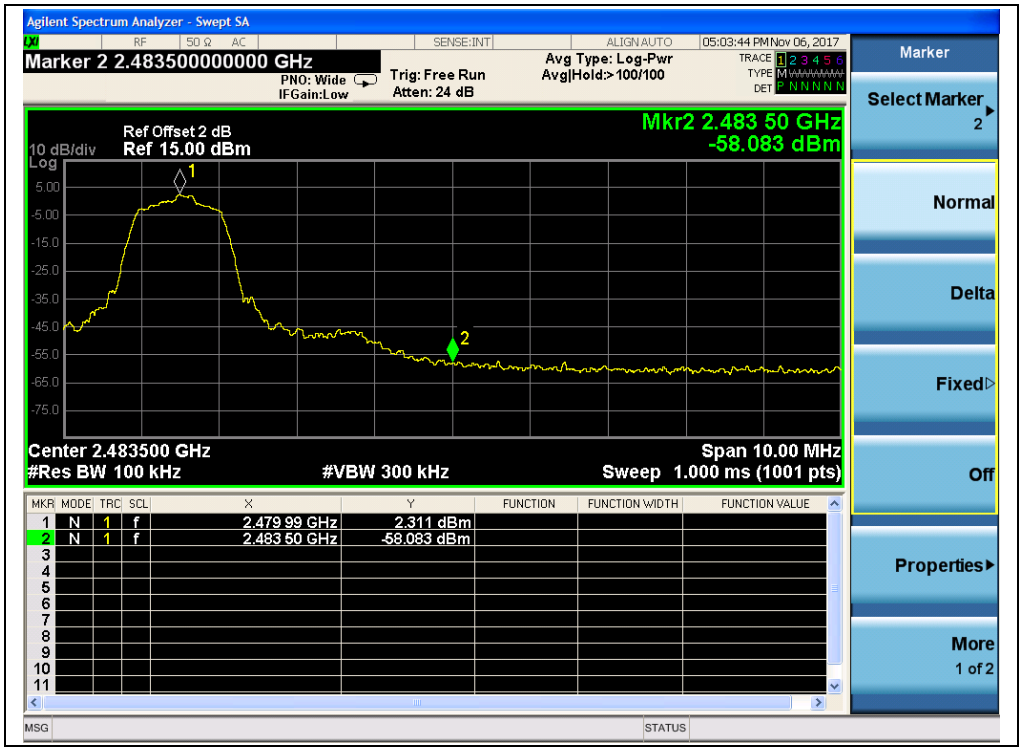
(Channel = 0, Band edge with hopping on @π/4-DQPSK)



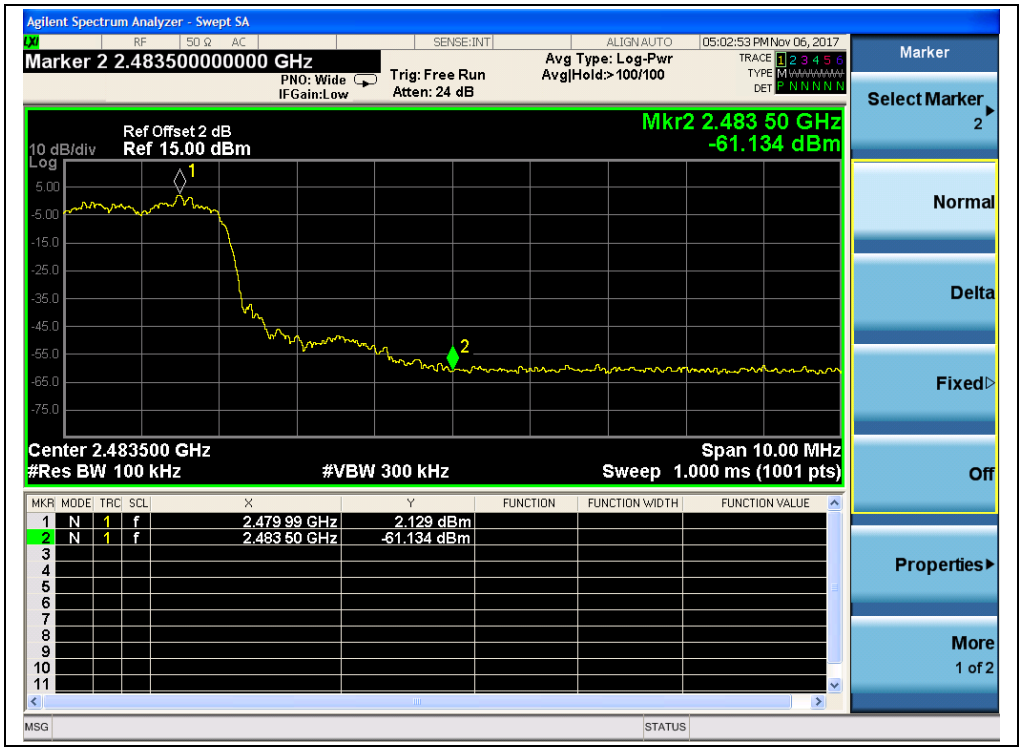
(Plot E: Channel = 39, 30MHz to 25GHz @ π/4-DQPSK)



(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)

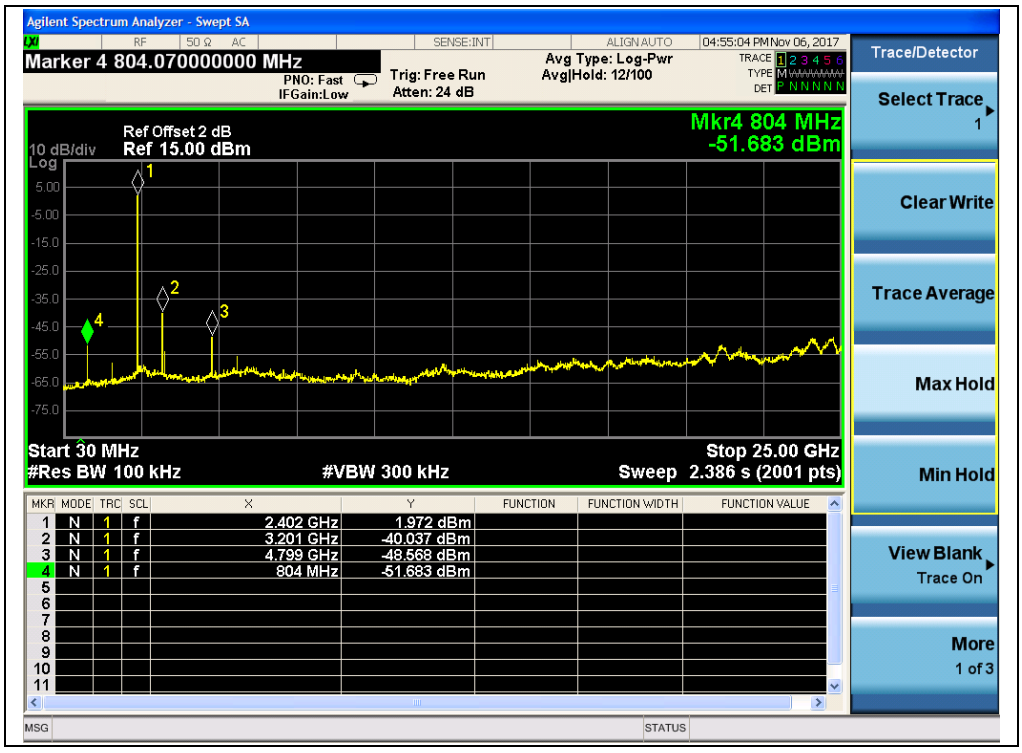
8-DPSK Mode

A. Test Verdict:

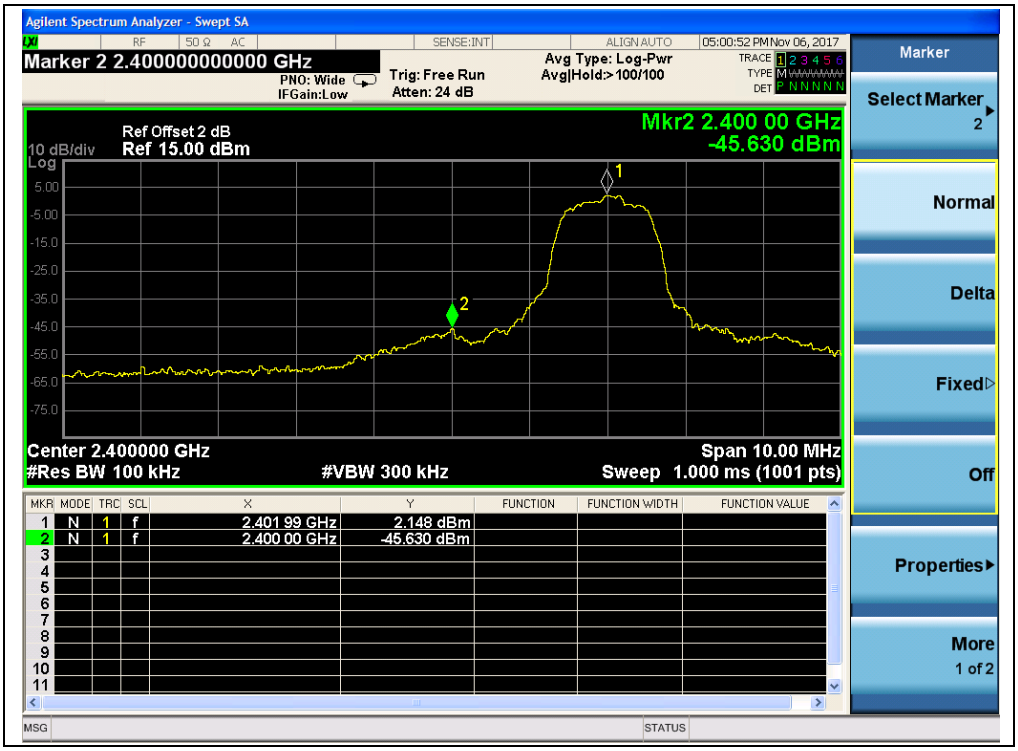
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-40.04	Plot G	1.97	-18.03	PASS
39	2441	-42.43	Plot H	-0.17	-20.17	PASS
78	2480	-43.43	Plot I	-1.21	-21.21	PASS

B. Test Plots:

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

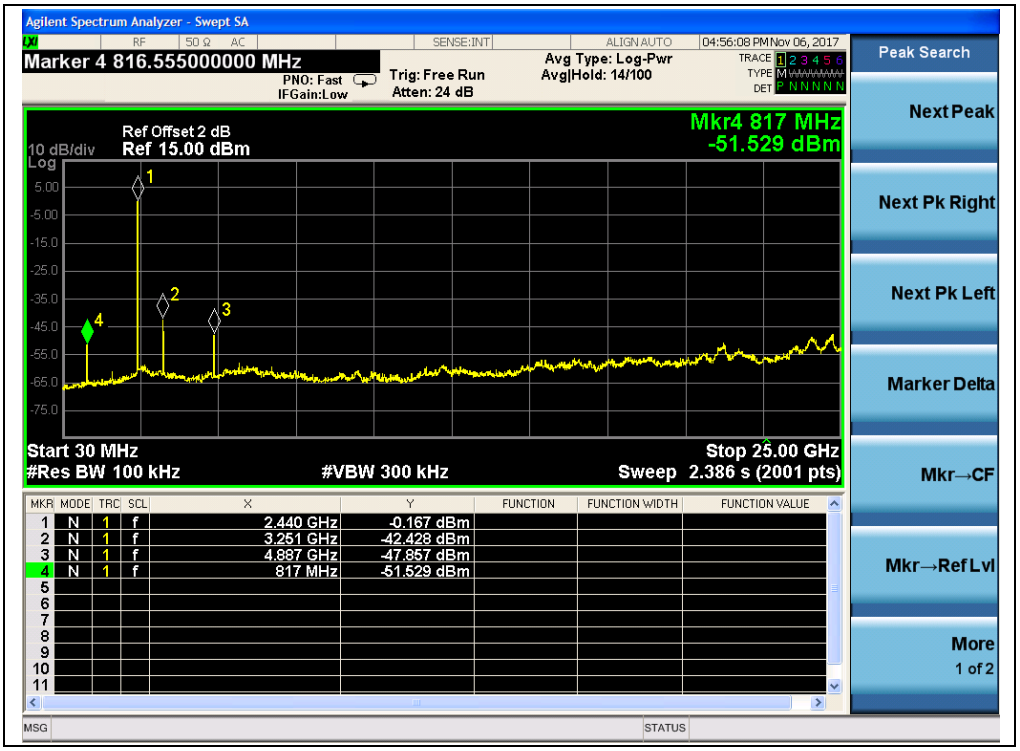


(Plot G: Channel = 0, 30MHz to 25GHz @ 8-DPSK)

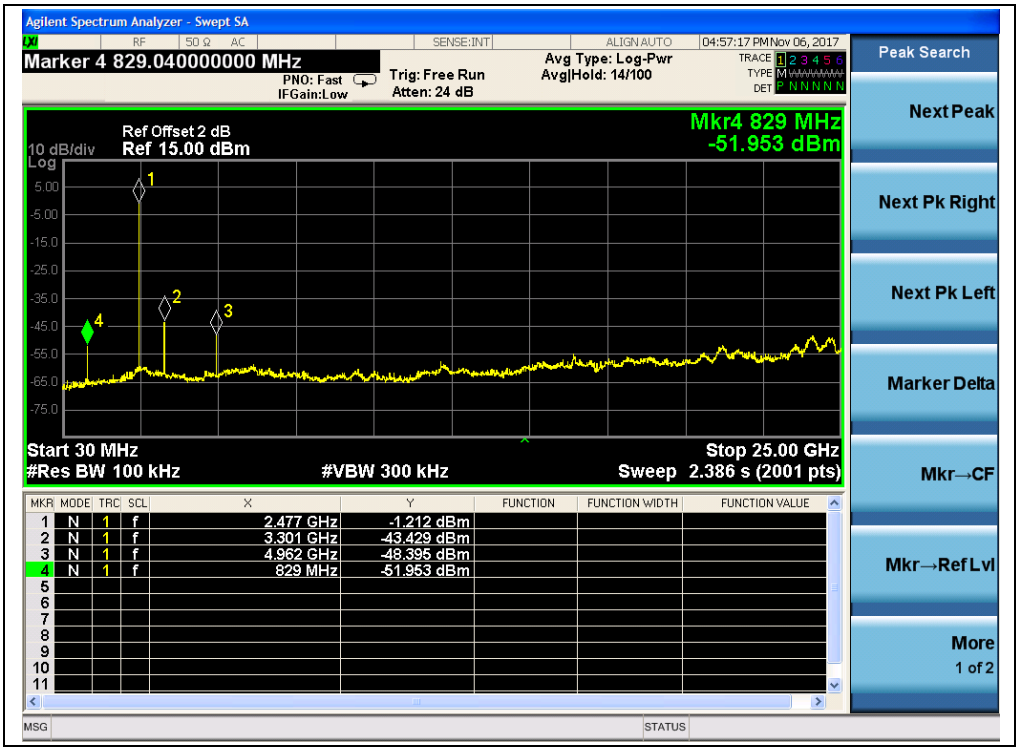


(Channel = 0, Band edge @ 8-DPSK)

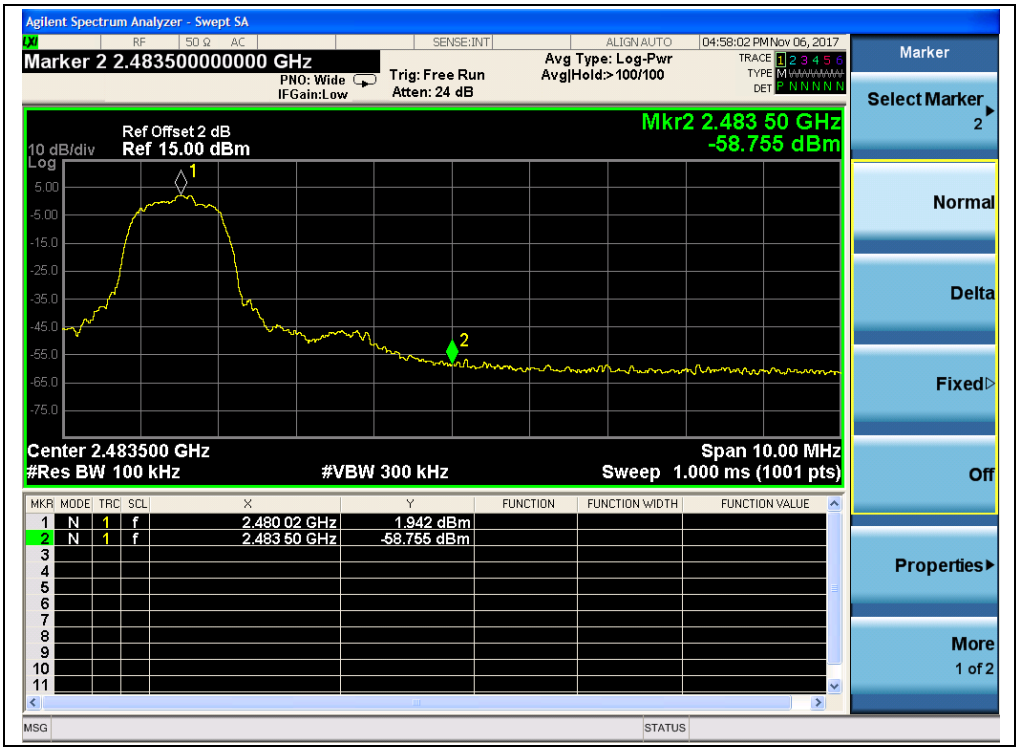
(Channel = 0, Band edge with hopping on @ 8-DPSK)



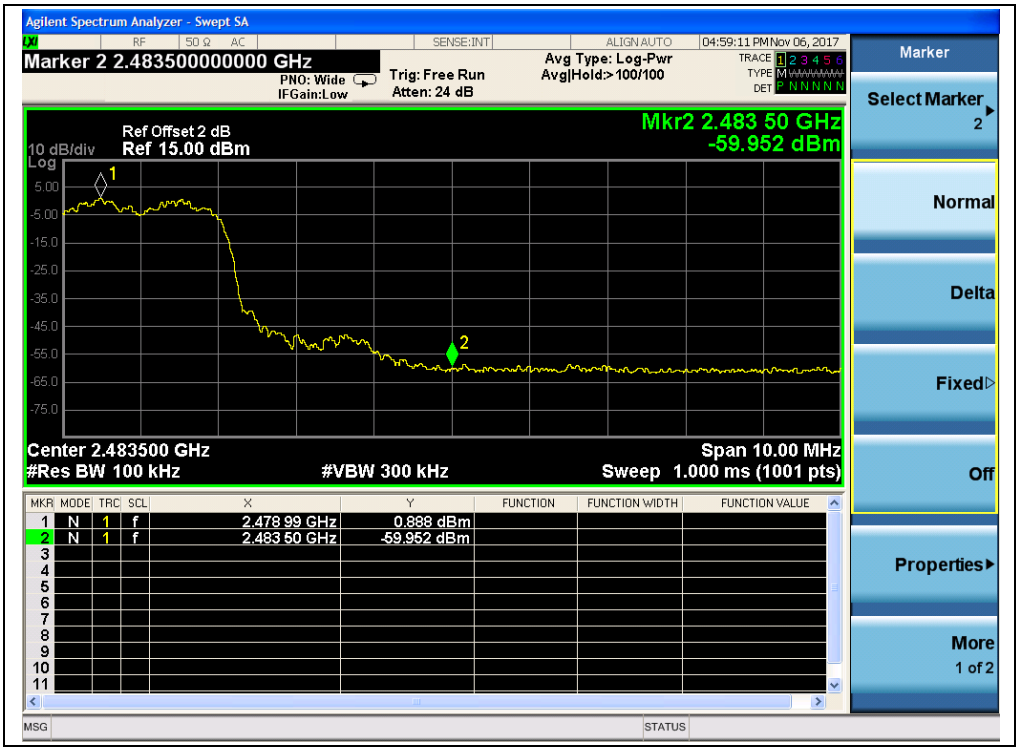
(Plot H: Channel = 39, 30MHz to 25GHz @ 8-DPSK)



(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)

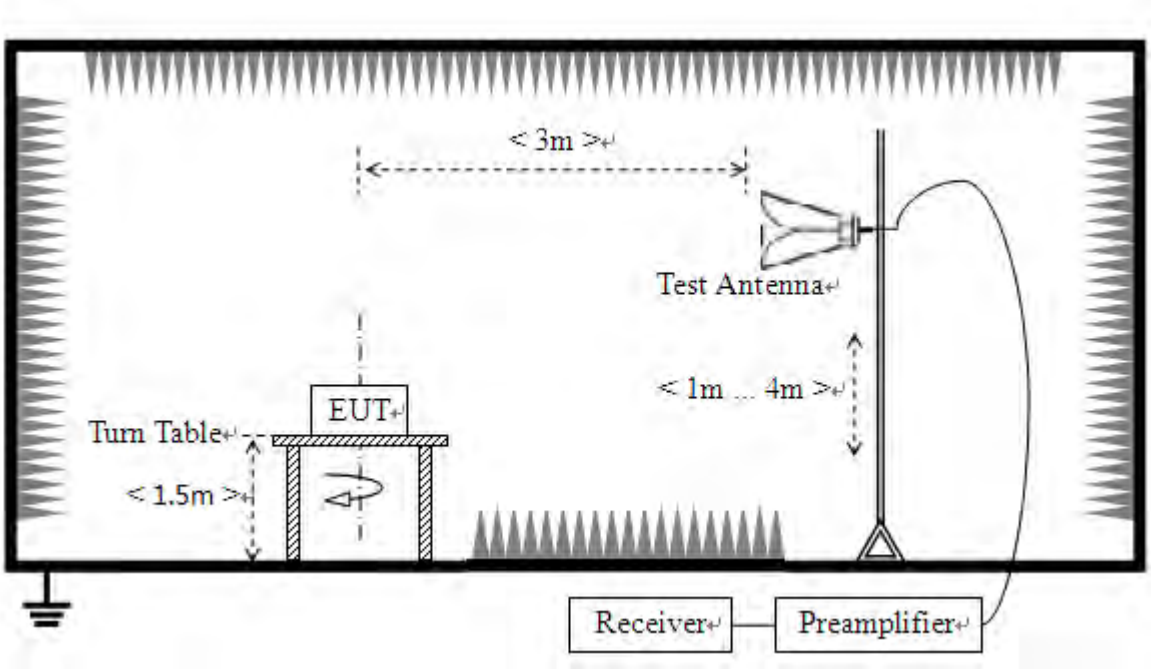
2.8. Restricted Frequency Bands

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.

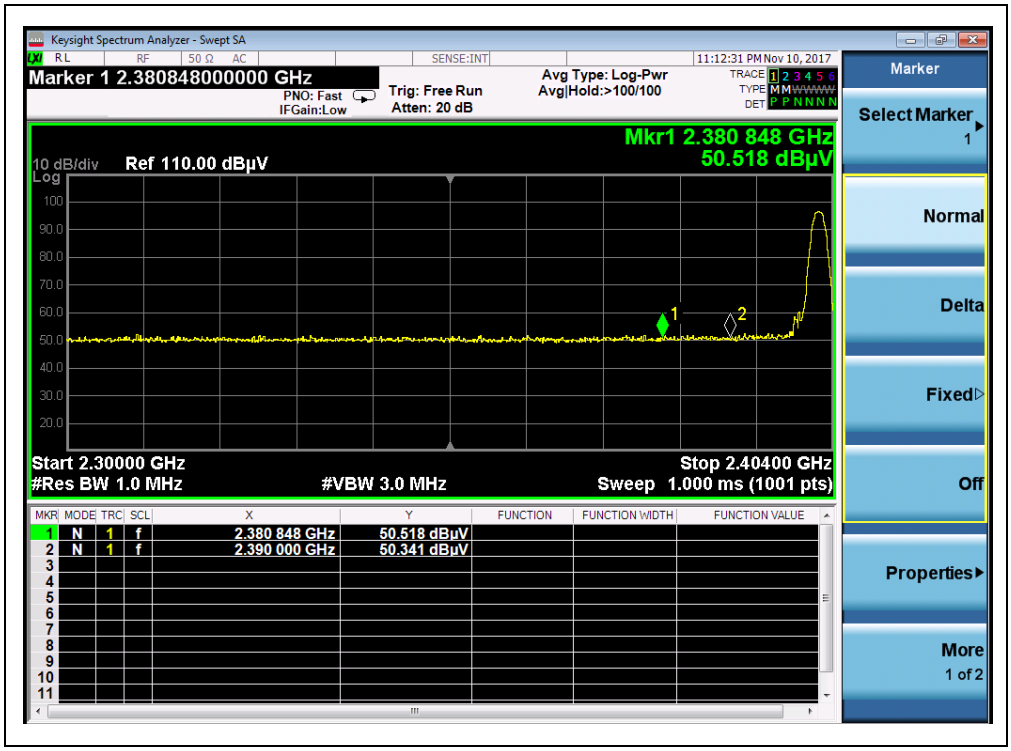
Result for Antenna1

2.8.4.1 GFSK Mode

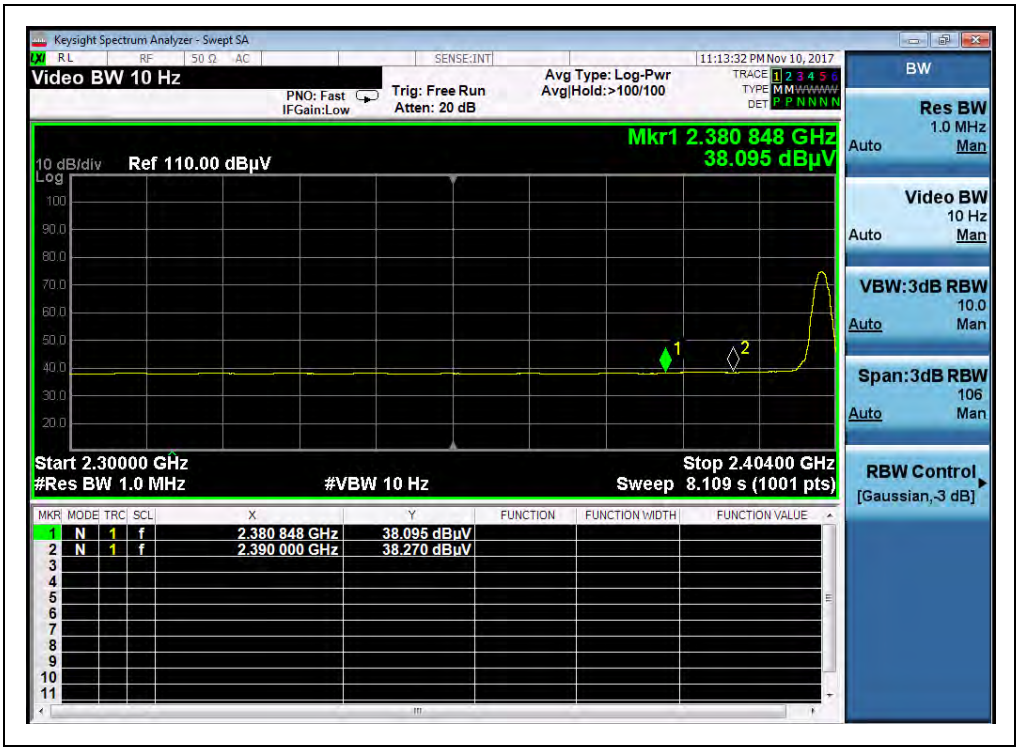
A. Test Verdict:

Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
0	2380.85	PK	50.52	-47.23	32.6	35.89	74	Pass
0	2380.85	AV	38.10	-47.23	32.6	23.47	54	Pass
78	2486.23	PK	50.00	-47.31	32.6	35.29	74	Pass
78	2486.23	AV	37.96	-47.31	32.6	23.25	54	Pass

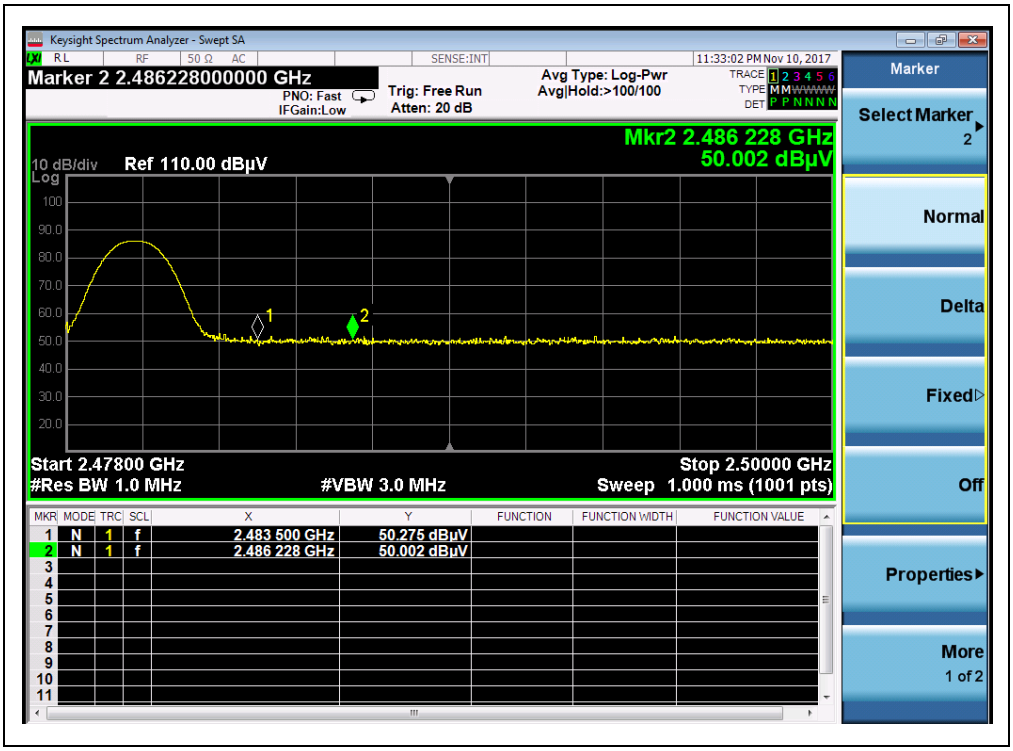
B. Test Plots:



(Channel = 0 PEAK @ GFSK)



(Channel = 0 AVERAGE @ GFSK)



(Channel = 78 PEAK @ GFSK)

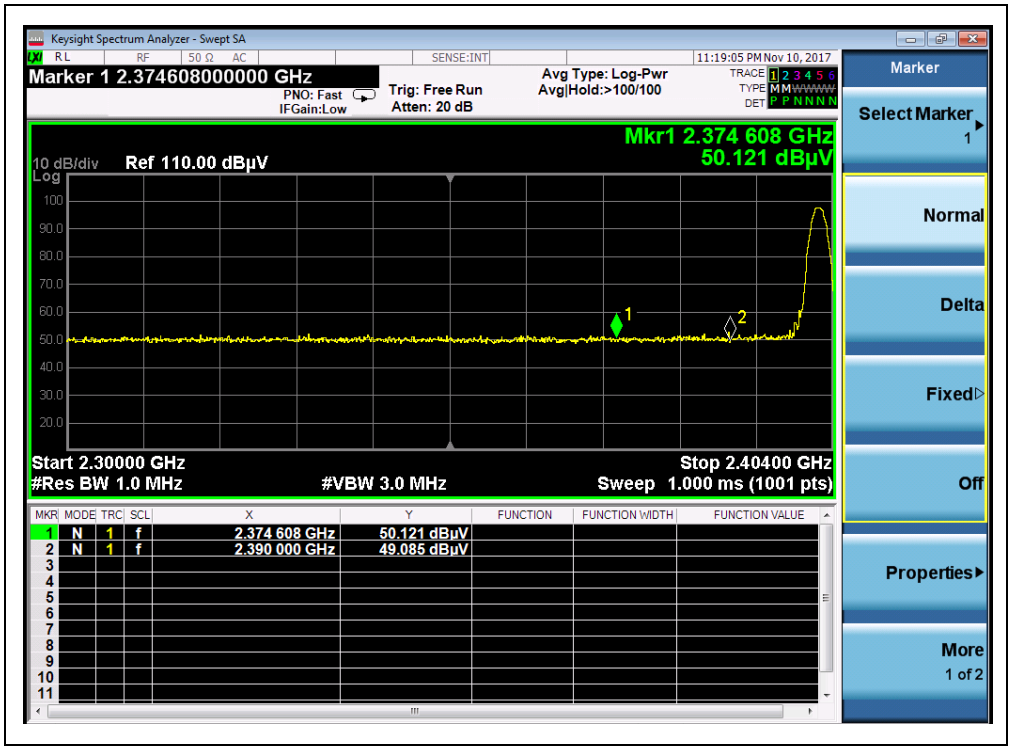
(Channel = 78 AVERAGE @ GFSK)

2.8.4.2 π/4-DQPSK Mode

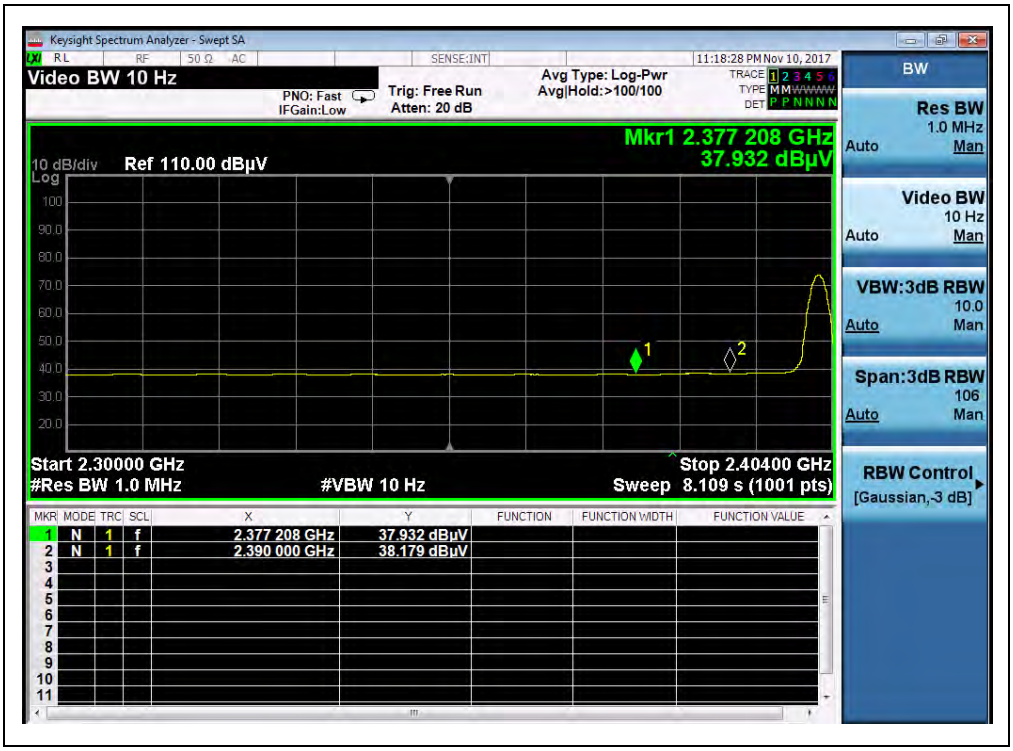
A. Test Verdict:

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	2374.61	PK	50.12	-47.23	32.6	35.49	74	Pass
0	2377.21	AV	37.93	-47.23	32.6	23.30	54	Pass
78	2488.32	PK	49.83	-47.31	32.6	35.12	74	Pass
78	2488.54	AV	37.84	-47.23	32.6	23.13	54	Pass

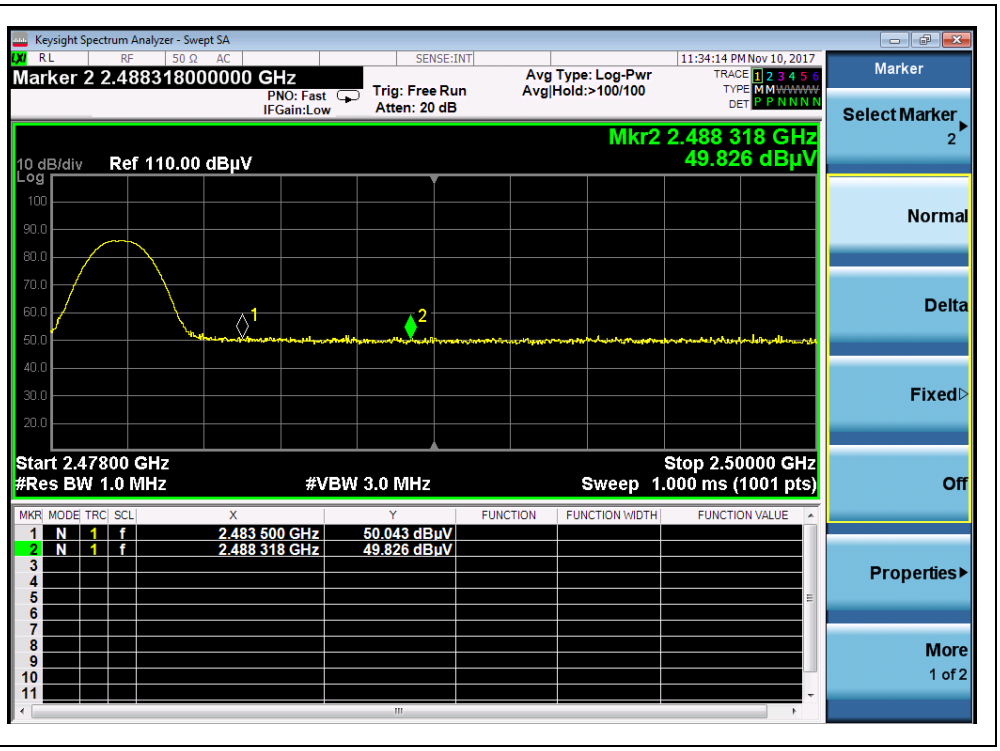
B. Test Plots:



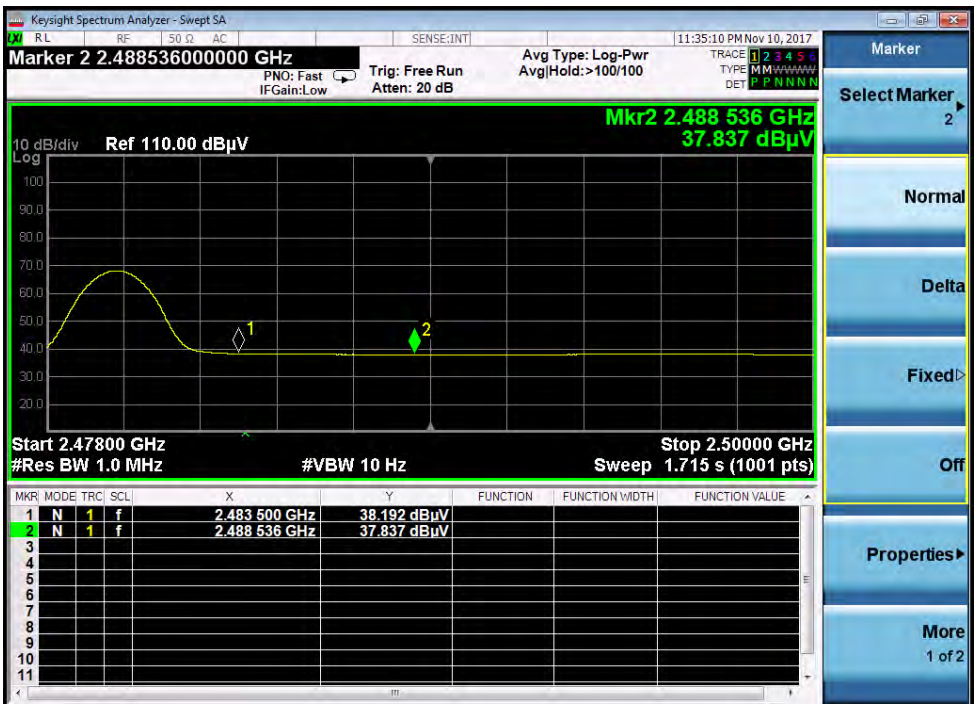
(Channel = 0 PEAK @ π/4-DQPSK)



(Channel = 0 AVERAGE @ π/4-DQPSK)



(Channel = 78 PEAK @ π/4-DQPSK)



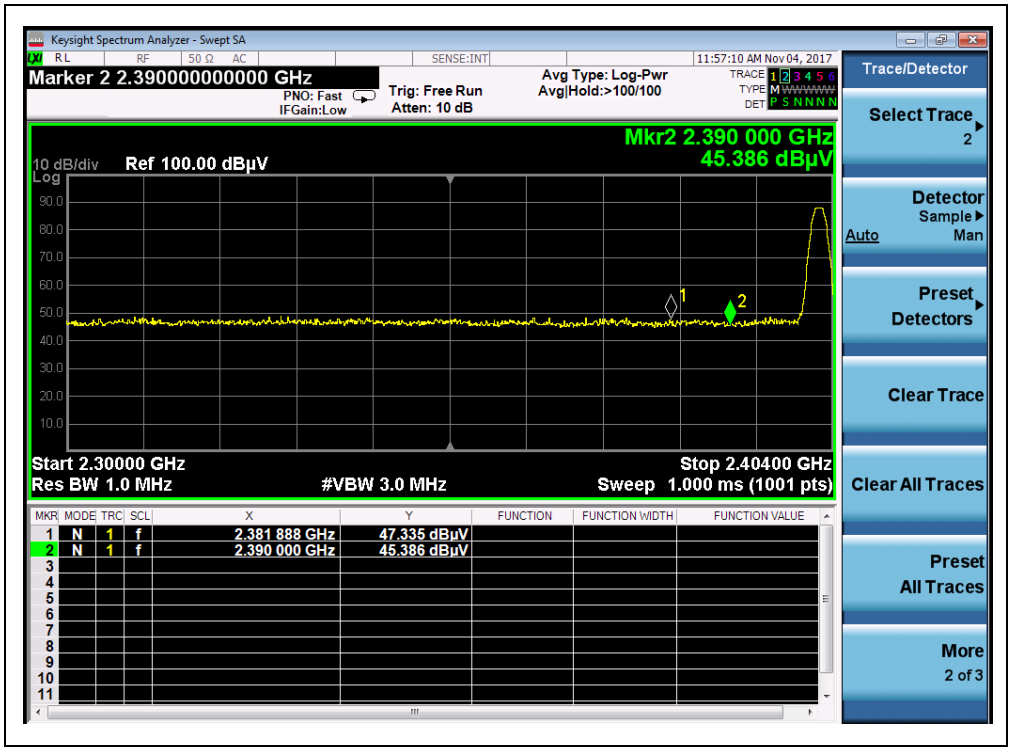
(Channel = 78 AVERAGE@ π/4-DQPSK)

2.8.4.3 8-DPSK Mode

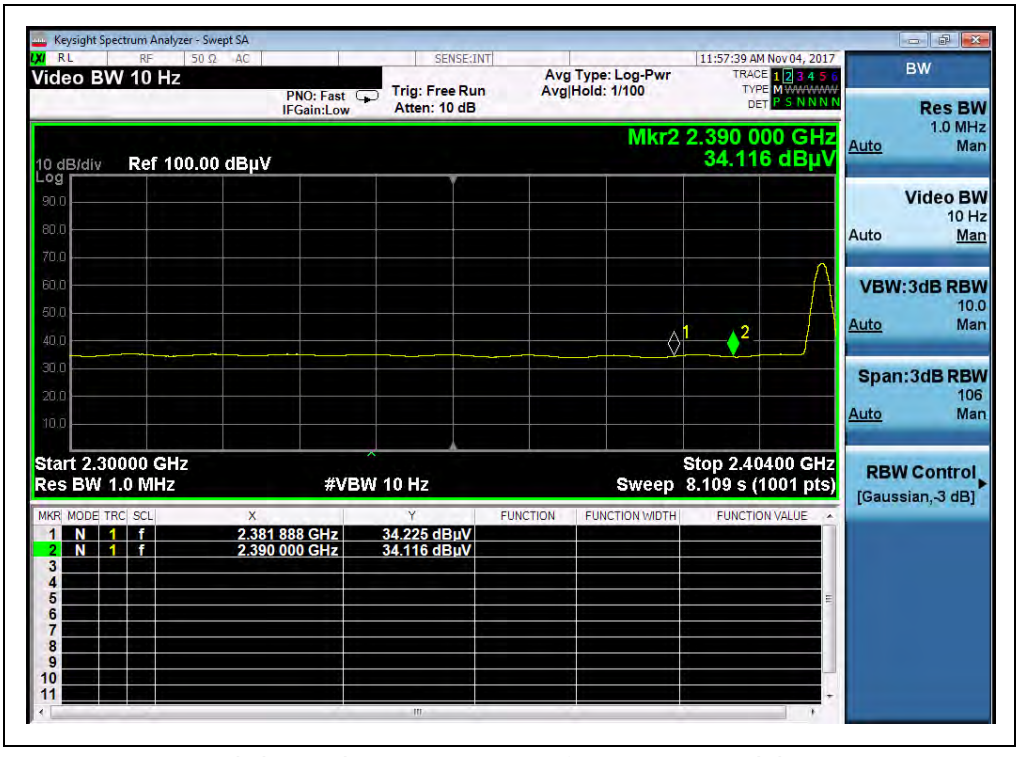
A. Test Verdict:

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	2377.21	PK	50.27	-47.23	32.6	35.64	74	Pass
0	2378.25	AV	37.86	-47.23	32.6	23.23	54	Pass
78	2487.33	PK	50.06	-47.31	32.6	35.35	74	Pass
78	2487.33	AV	37.87	-47.23	32.6	23.16	54	Pass

B. Test Plots:



(Channel = 0 PEAK @ 8-DPSK Mode)



(Channel = 0 AVERAGE @ 8-DPSK Mode)

(Channel = 78 PEAK @ 8-DPSK Mode)

(Channel = 78 AVERAGE @ 8-DPSK Mode)

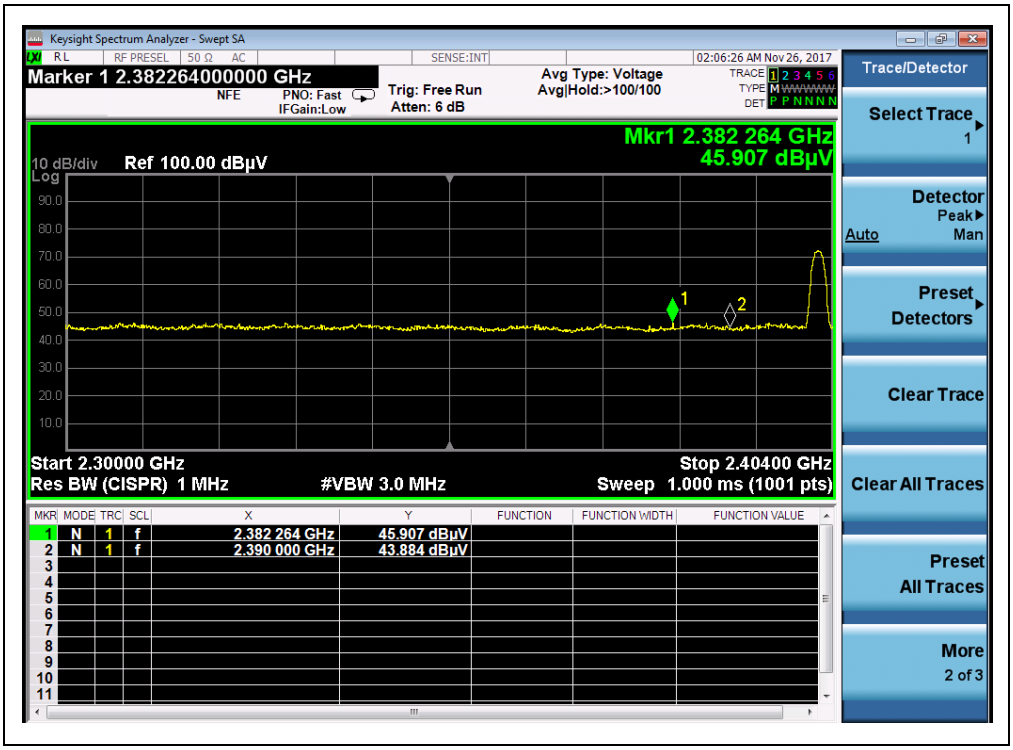
Result for Antenna2

2.8.4.4 GFSK Mode

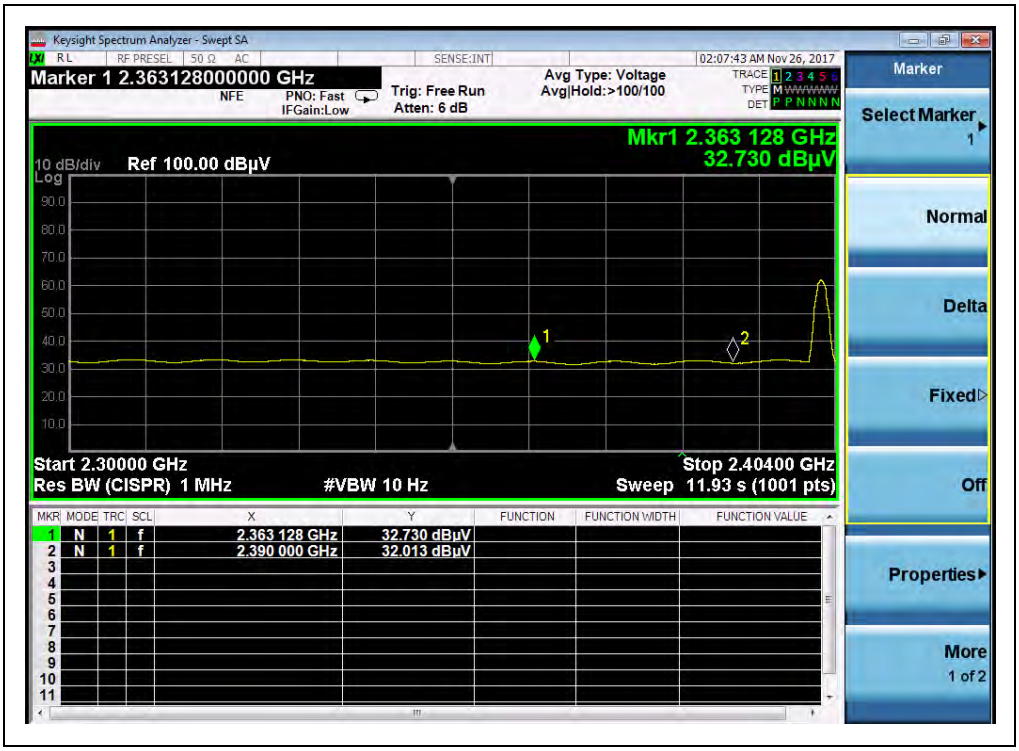
A. Test Verdict:

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	2382.26	PK	45.91	-47.23	32.6	31.28	74	Pass
0	2363.13	AV	32.73	-47.23	32.6	18.10	54	Pass
78	2488.66	PK	42.19	-47.31	32.6	27.48	74	Pass
78	2488.66	AV	31.92	-47.31	32.6	17.21	54	Pass

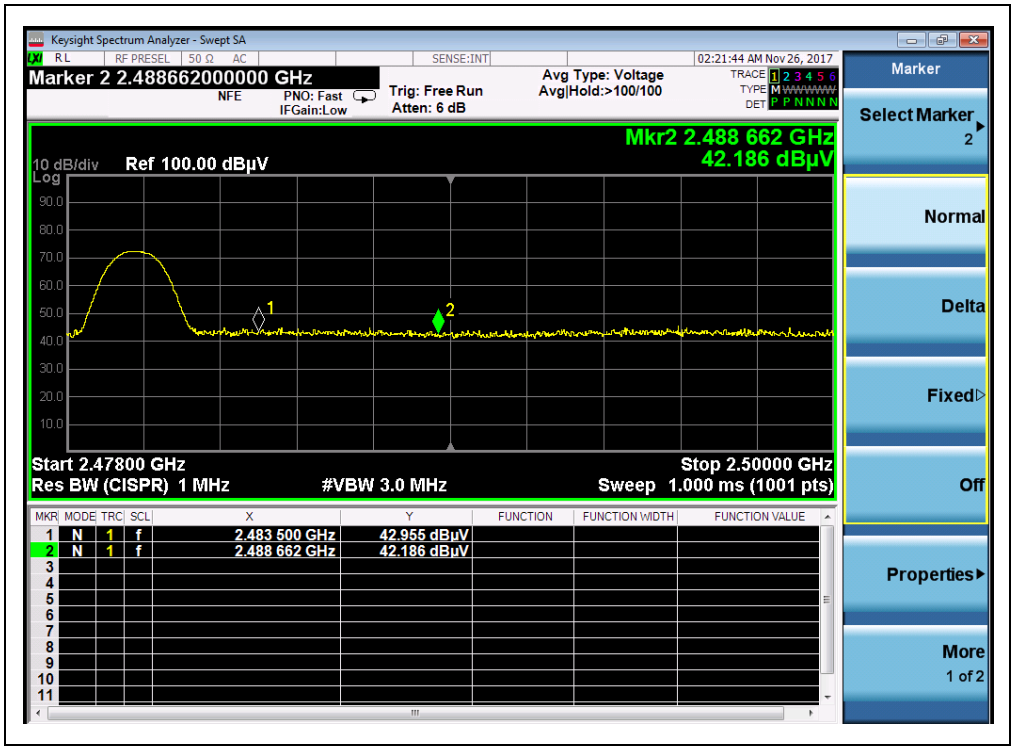
B. Test Plots:



(Channel = 0 PEAK @ GFSK)



(Channel = 0 AVERAGE @ GFSK)



(Channel = 78 PEAK @ GFSK)

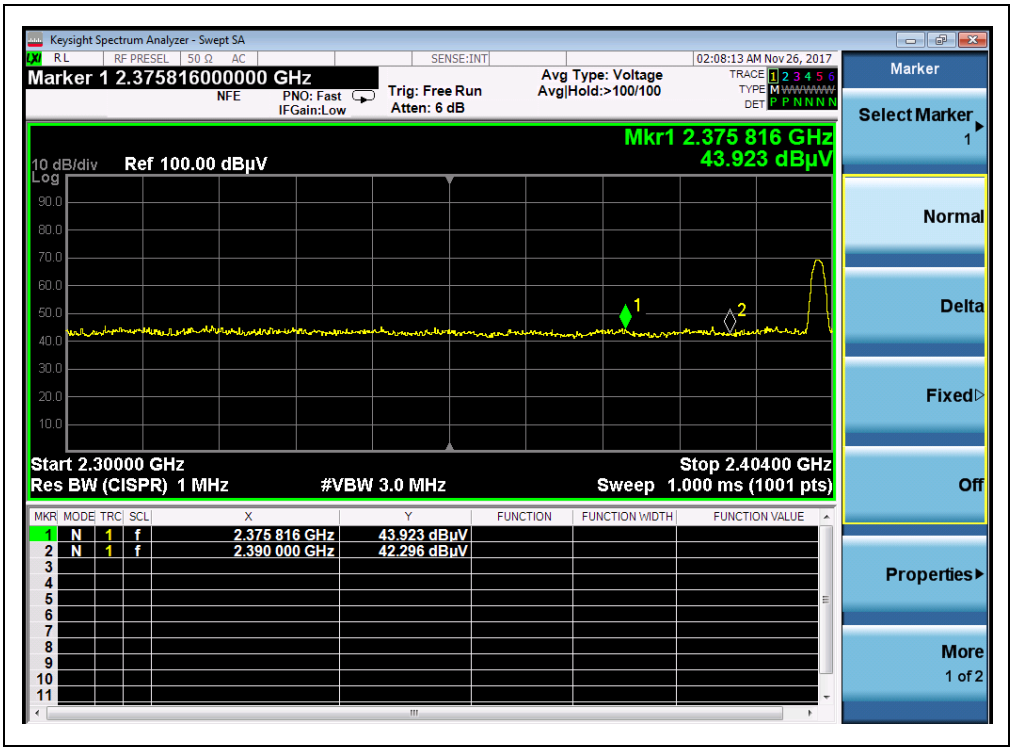
(Channel = 78 AVERAGE @ GFSK)

2.8.4.5 π/4-DQPSK Mode

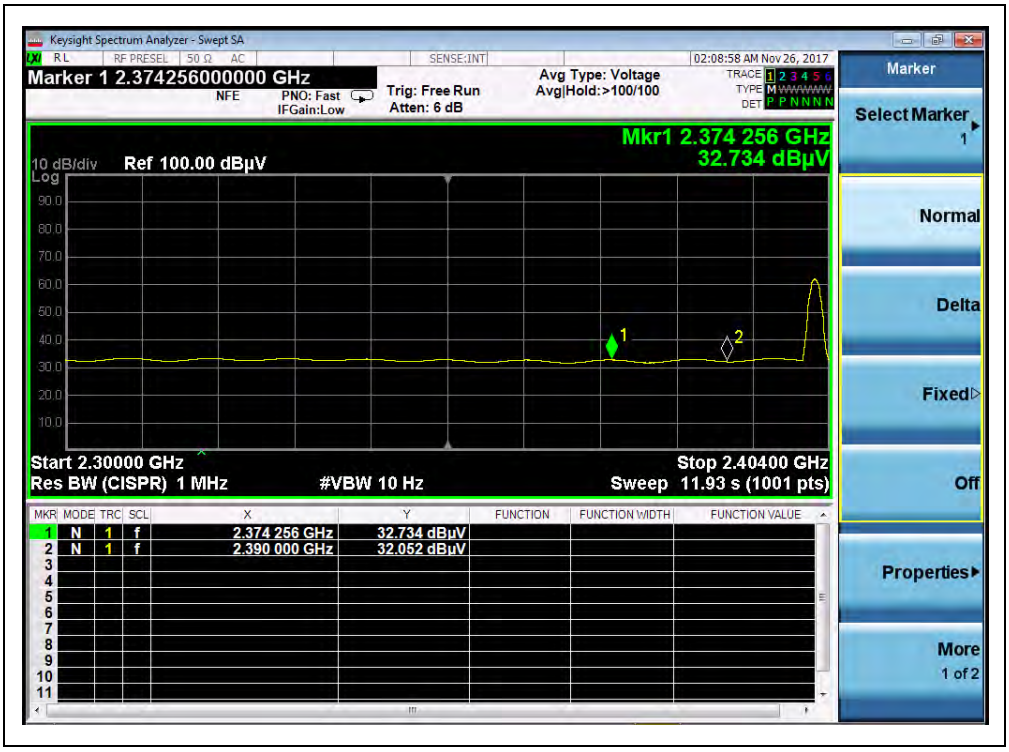
C. Test Verdict:

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	2375.82	PK	43.92	-47.23	32.6	29.29	74	Pass
0	2374.26	AV	32.73	-47.23	32.6	18.10	54	Pass
78	2486.18	PK	42.89	-47.31	32.6	28.18	74	Pass
78	2486.18	AV	32.51	-47.23	32.6	17.80	54	Pass

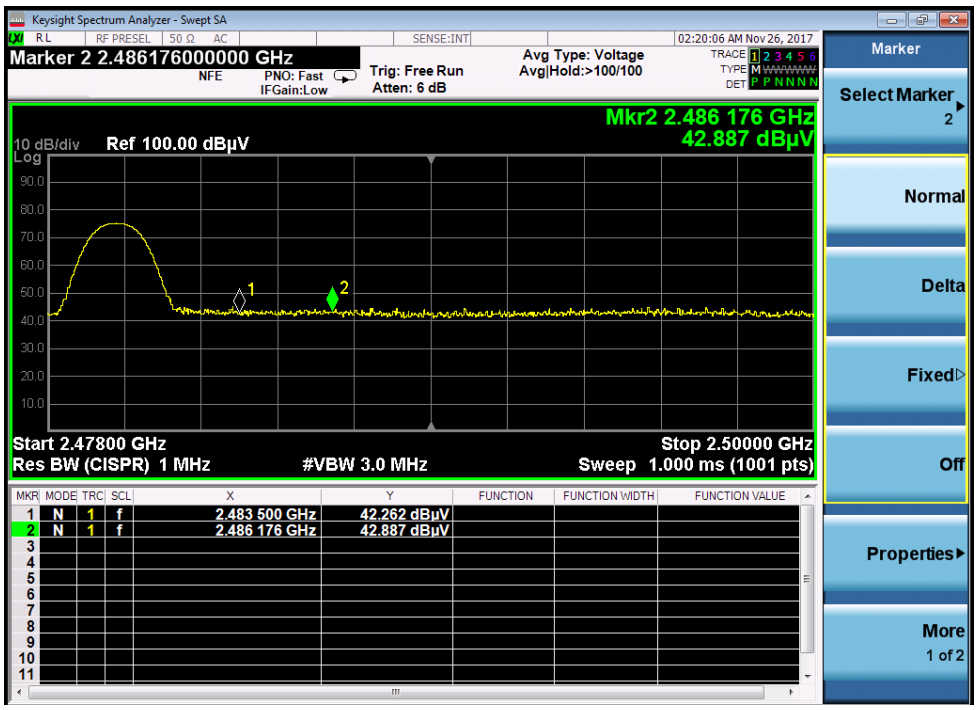
D. Test Plots:



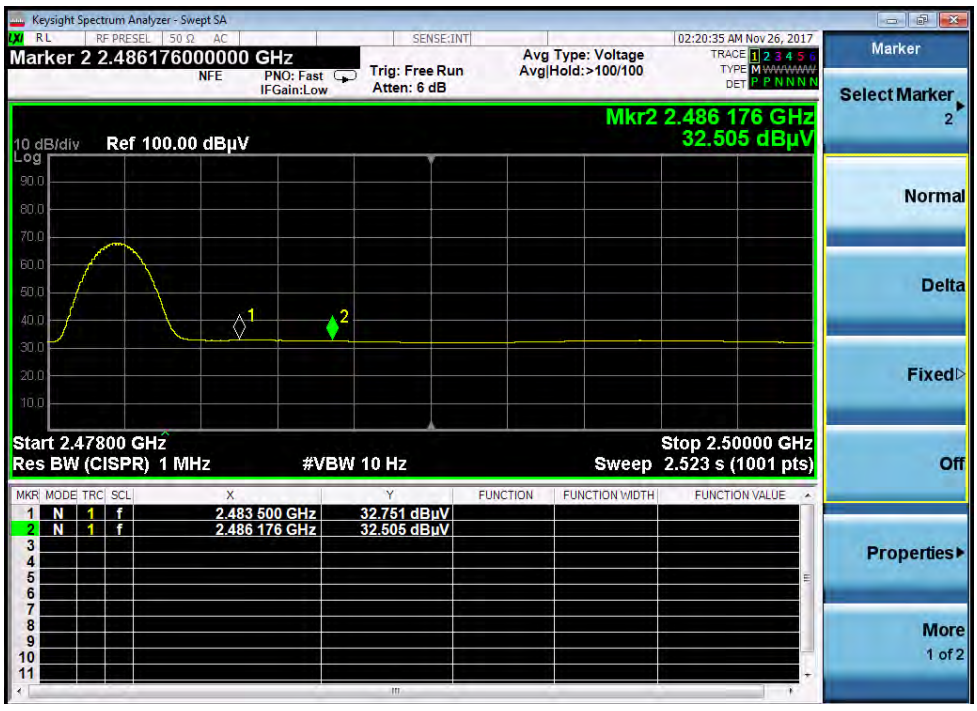
(Channel = 0 PEAK @ π/4-DQPSK)



(Channel = 0 AVERAGE @ π/4-DQPSK)



(Channel = 78 PEAK @ π/4-DQPSK)



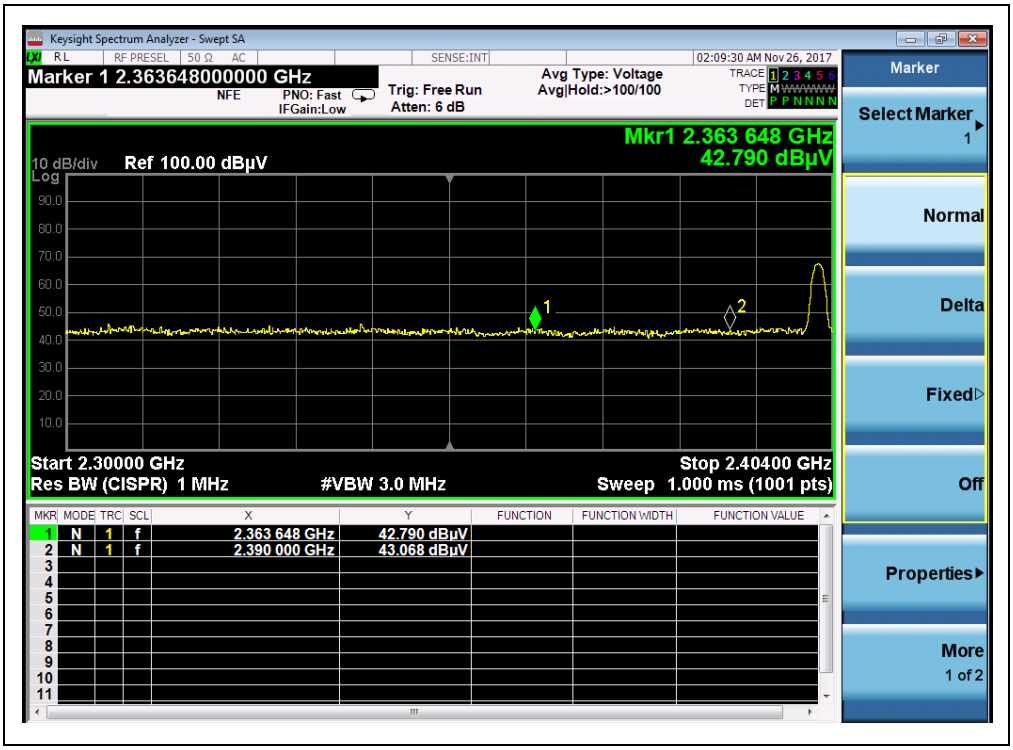
(Channel = 78 AVERAGE@ π/4-DQPSK)

2.8.4.6 8-DPSK Mode

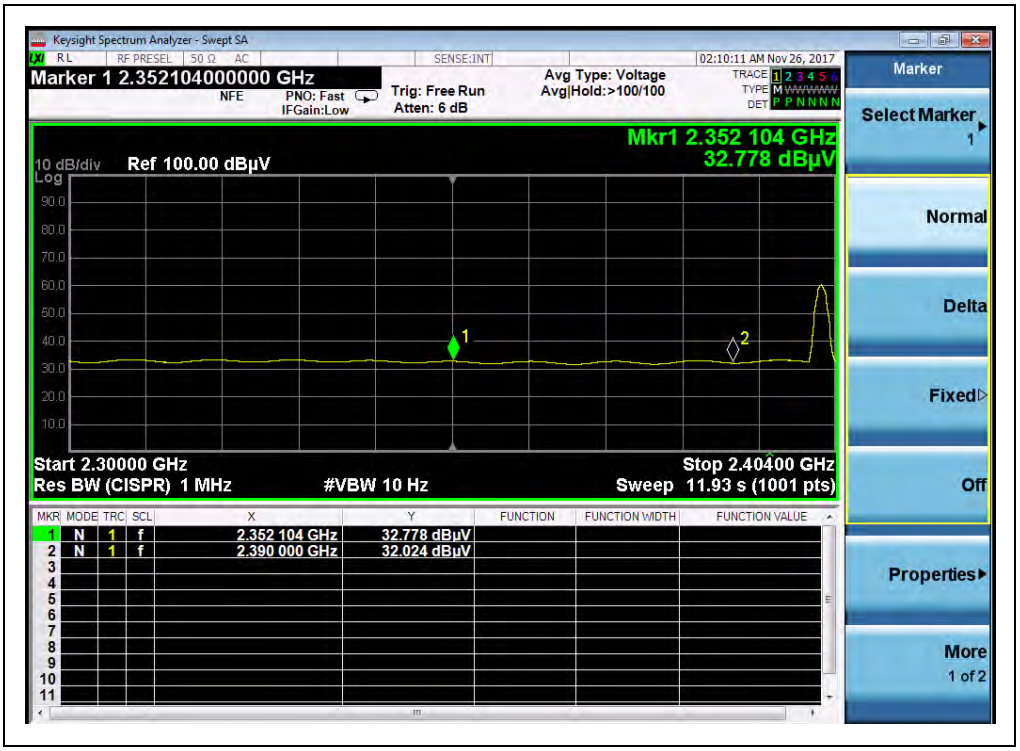
C. Test Verdict:

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	2363.65	PK	42.79	-47.23	32.6	28.16	74	Pass
0	2352.10	AV	32.78	-47.23	32.6	18.15	54	Pass
78	2488.24	PK	44.64	-47.31	32.6	29.93	74	Pass
78	2488.24	AV	31.98	-47.23	32.6	17.27	54	Pass

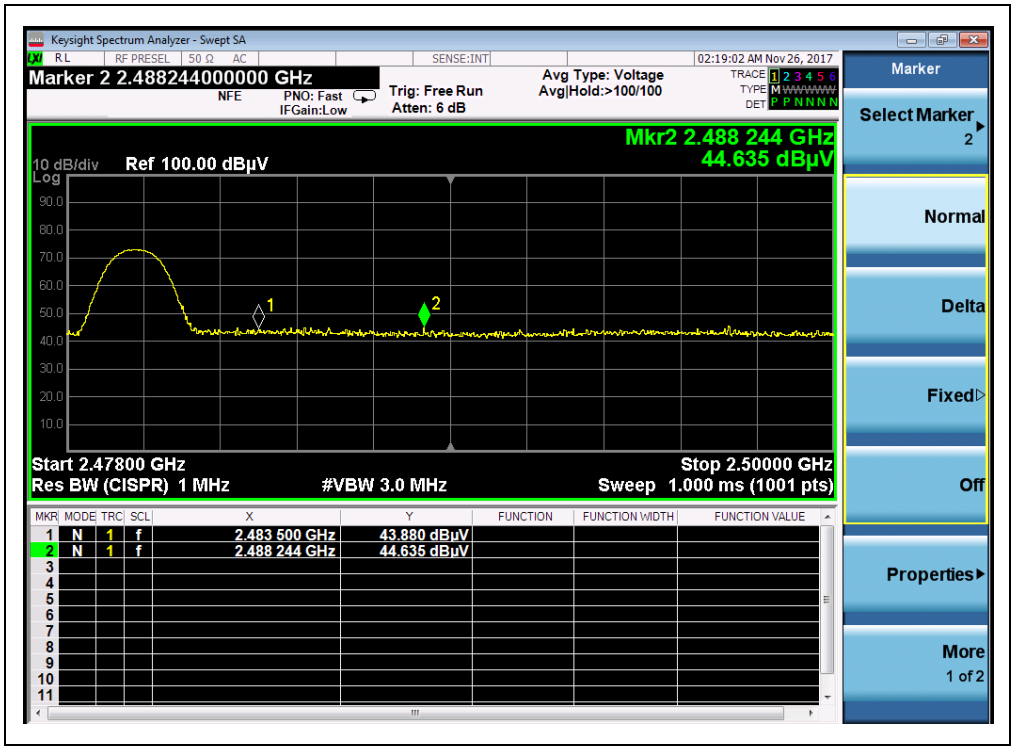
D. Test Plots:



(Channel = 0 PEAK @ 8-DPSK Mode)



(Channel = 0 AVERAGE @ 8-DPSK Mode)



(Channel = 78 PEAK @ 8-DPSK Mode)

(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

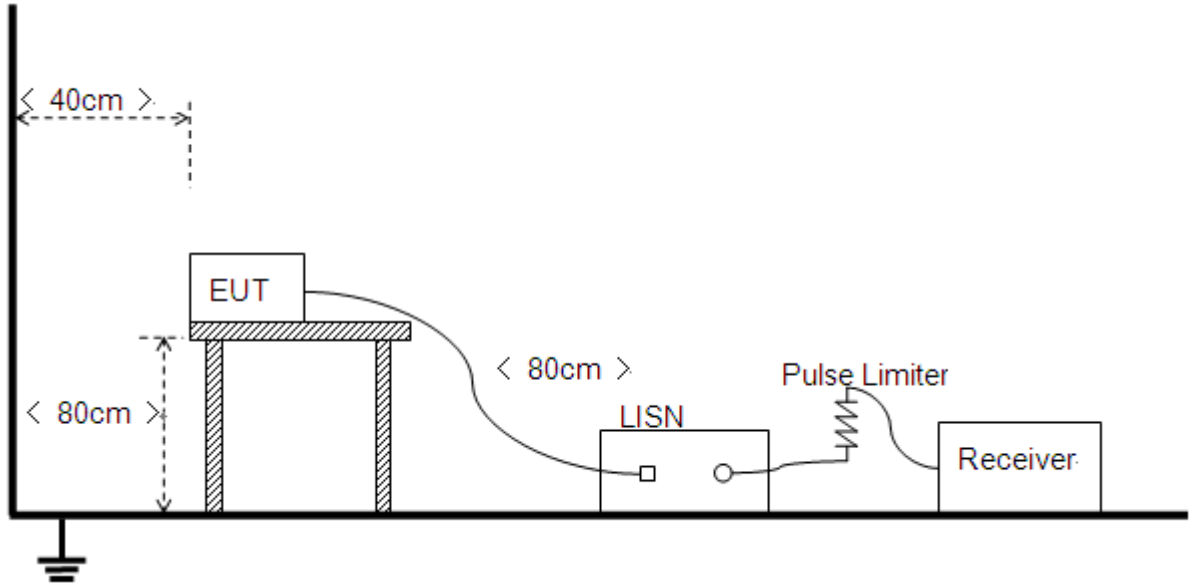
NOTE:

(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

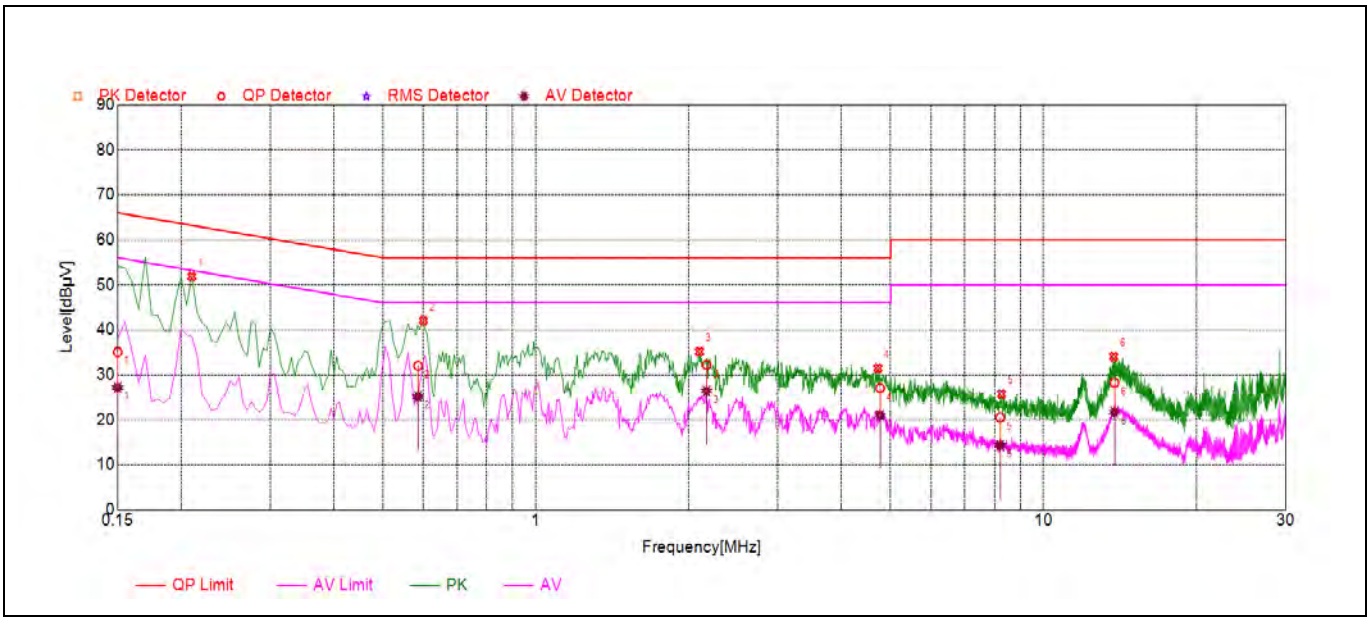
The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT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

A. Test setup:

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

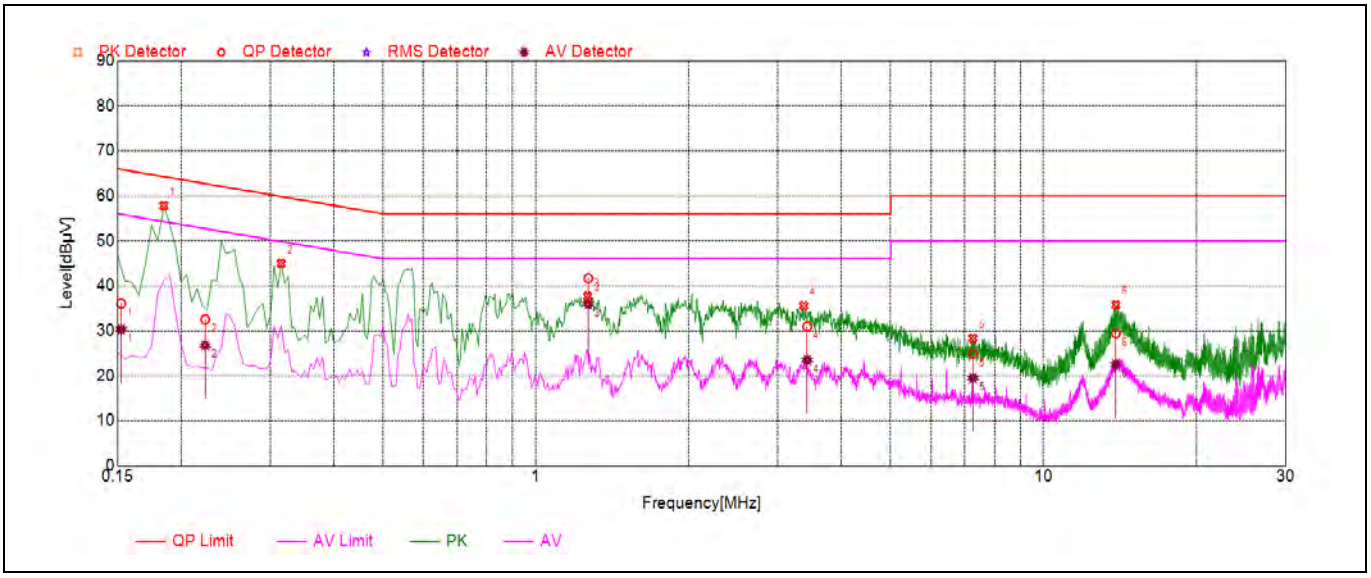
Note: The test voltage is AC 120V/60Hz.

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	0.15	35.09	27.15	66.00	56.00	Line	PASS
2	0.5858	32.02	25.17	56.00	46.00		PASS
3	2.1678	32.19	26.40	56.00	46.00		PASS
4	4.765	27.04	21.01	56.00	46.00		PASS
5	8.214	20.51	14.37	60.00	50.00		PASS
6	13.7956	28.26	21.74	60.00	50.00		PASS



(Plot B: N Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1524	36.10	30.35	65.87	55.87	Line	PASS
2	0.223	32.54	26.77	62.71	52.71		PASS
3	1.2684	41.68	35.97	56.00	46.00		PASS
4	3.4238	30.97	23.49	56.00	46.00		PASS
5	7.263	24.86	19.53	60.00	50.00		PASS
6	13.8872	29.43	22.54	60.00	50.00		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:

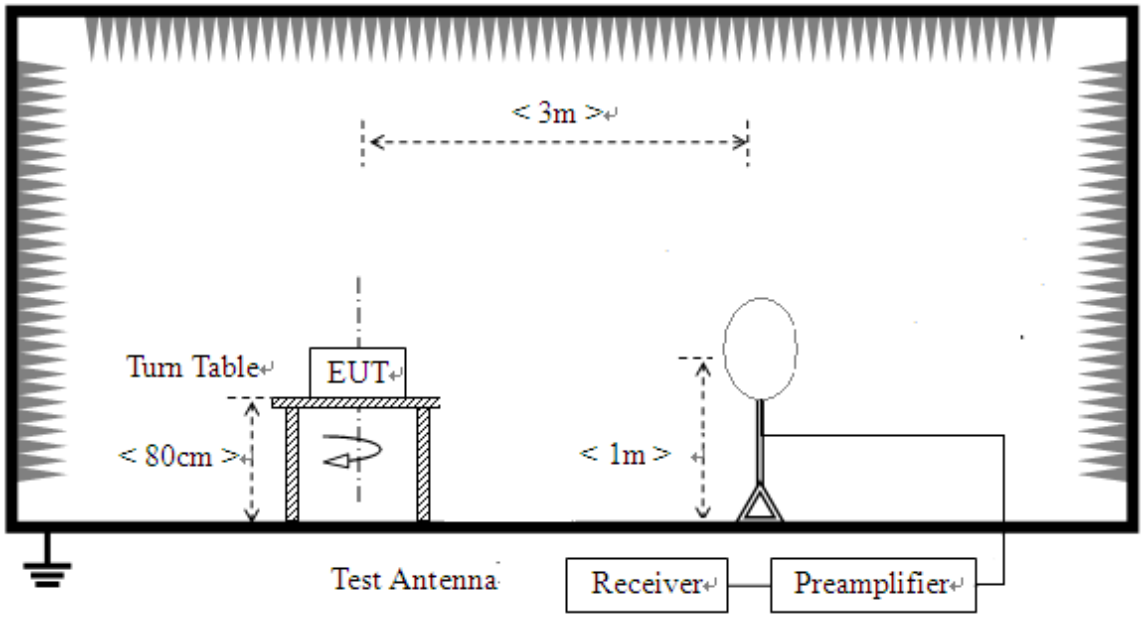
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength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

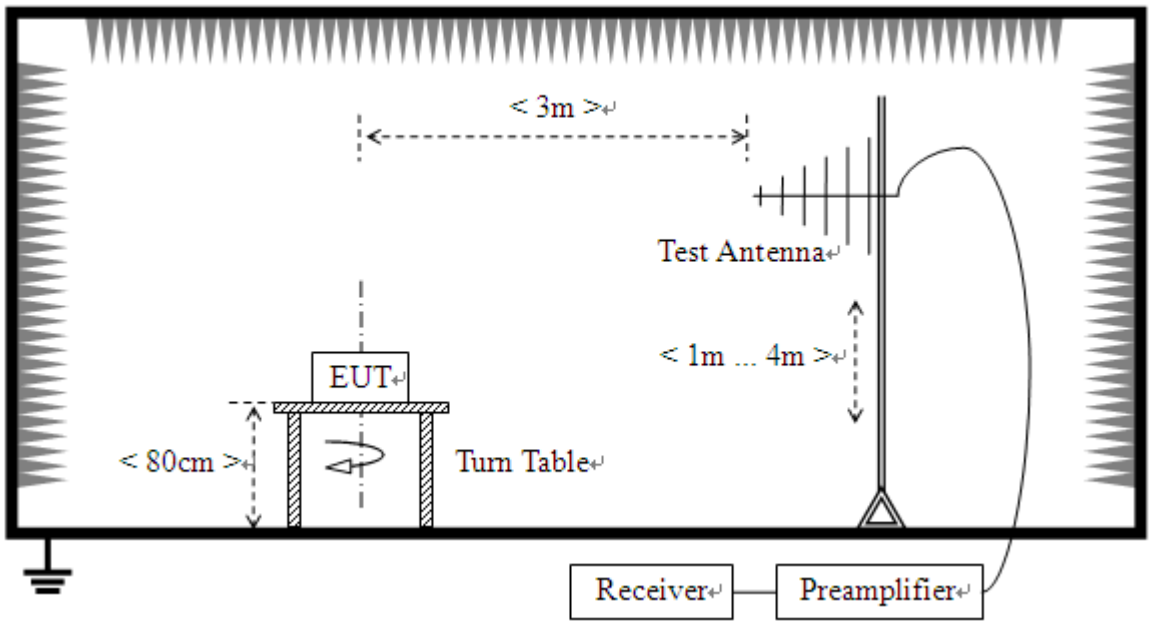
2.10.2. Test Description

A. Test Setup:

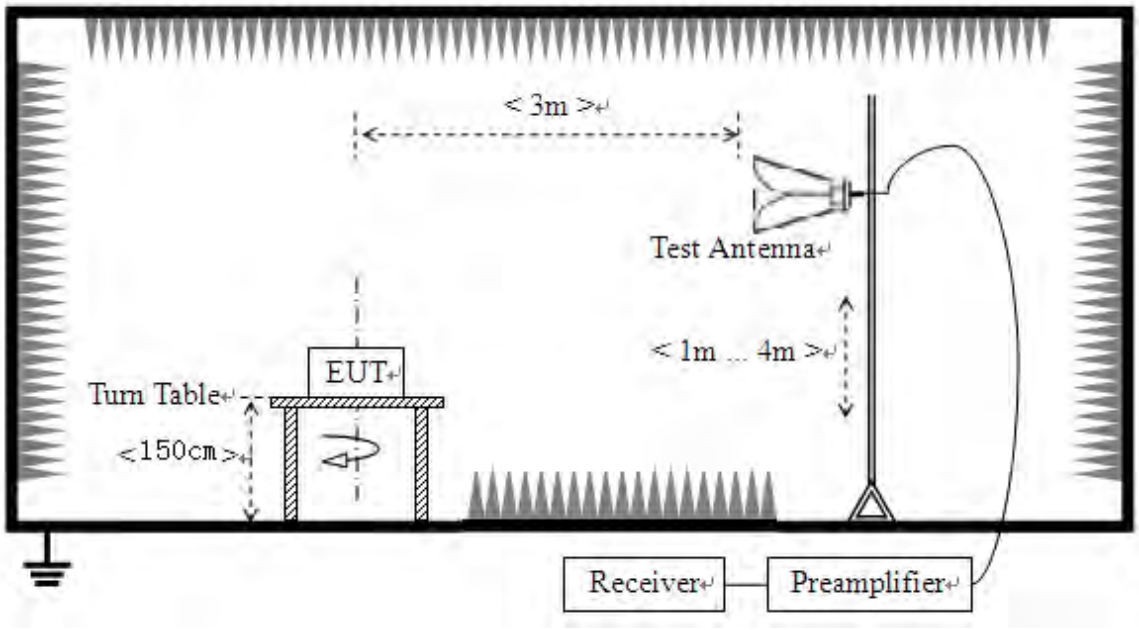
1) For radiated emissions from 9kHz to 30MHz



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:

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

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.

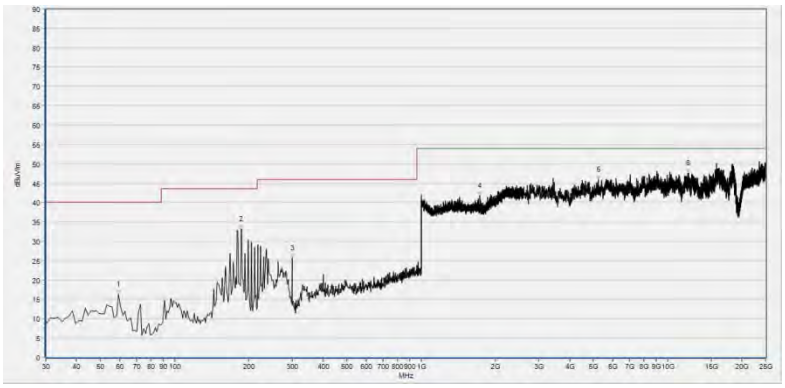
The low frequency, which started from 9KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

Result for Antenna 1

GFSK Mode：

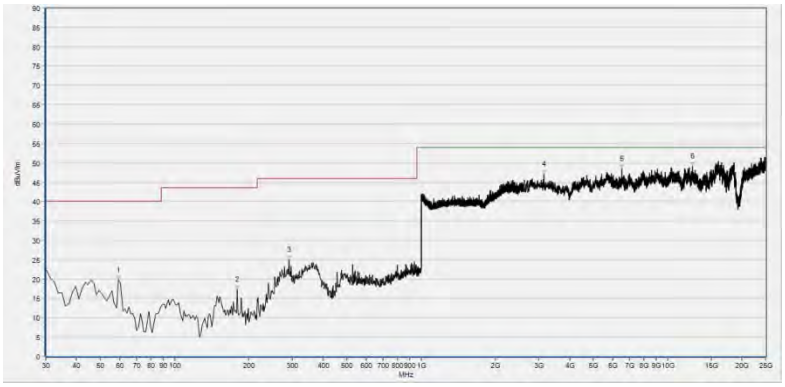
A. Test Plots for the Whole Measurement Frequency Range:

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
59.136	16.18	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
185.394	33.24	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
299.512	25.61	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1733.093	41.69	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
5223.313	45.97	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
12074.886	47.65	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

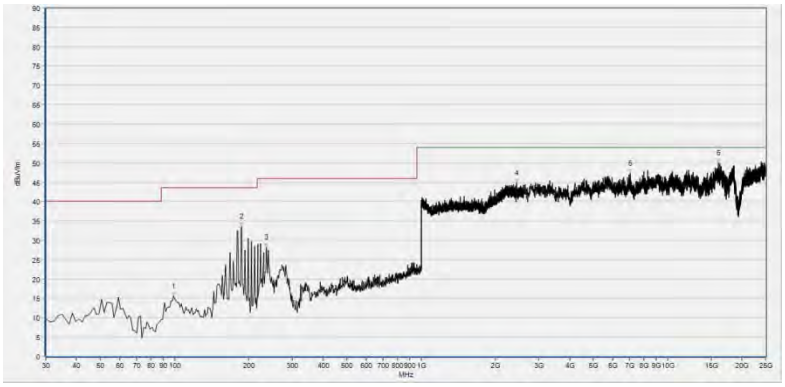
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 0)



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	19.83	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
179.324	17.25	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
291.014	25.05	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
3149.918	47.06	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
6502.382	48.50	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
12600.364	49.17	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

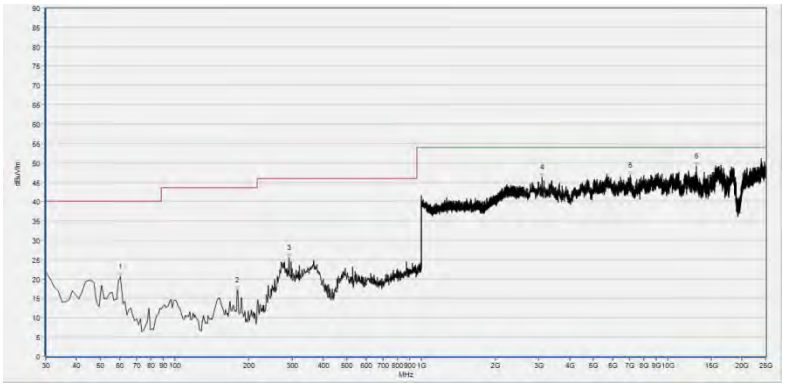
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 0)

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
99.199	15.52	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
186.608	33.51	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
235.169	28.13	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2446.339	44.83	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
7056.374	47.32	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
16038.371	50.01	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

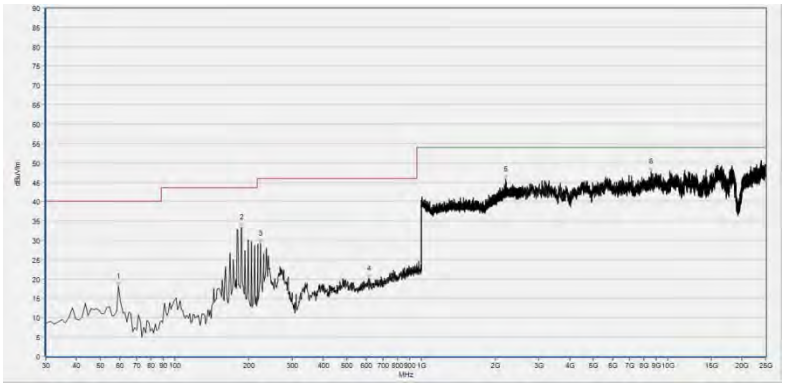
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 39)



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
60.350	20.56	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
179.324	17.05	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
291.014	25.44	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
3096.963	46.27	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
7027.860	46.84	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
13105.474	49.18	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

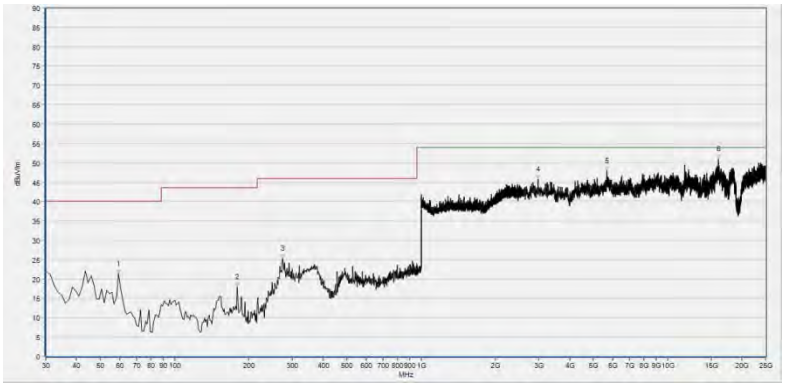
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 39)

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
59.136	18.18	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
186.608	33.31	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
223.029	29.17	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
611.514	20.12	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2197.919	45.73	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
8579.851	47.74	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

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



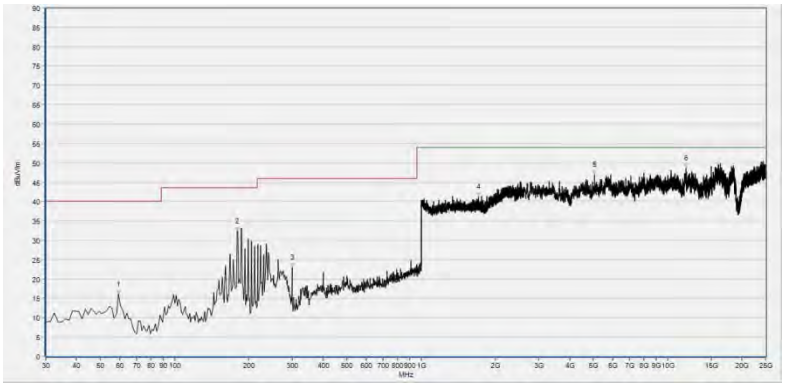
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
59.136	21.24	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
179.324	17.93	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
274.018	25.37	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2974.759	45.79	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
5671.395	47.87	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
16058.738	50.95	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

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

π/4-DQPSK Mode：

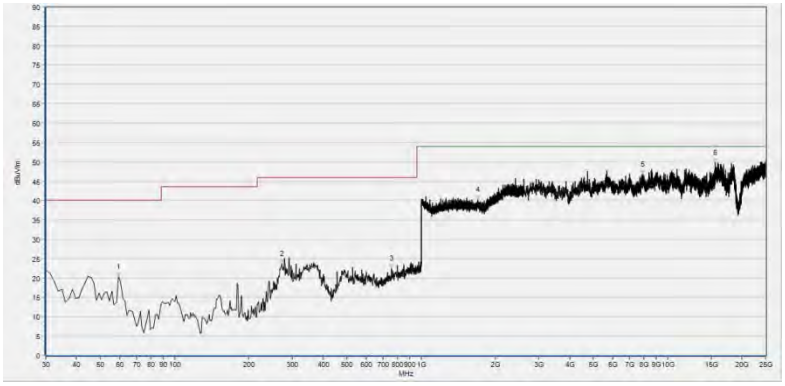
B. Test Plots for the Whole Measurement Frequency Range:

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
59.136	16.03	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
179.324	32.42	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
299.512	22.97	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1711.965	41.18	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
5052.228	46.88	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
11887.507	48.67	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

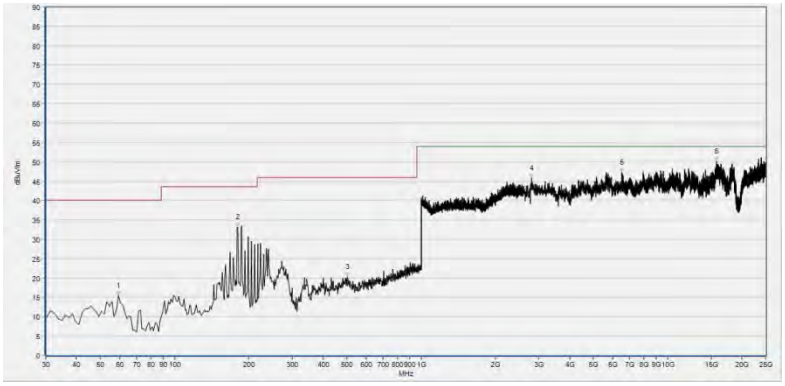
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 0)



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
59.136	20.26	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
271.589	23.58	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
755.982	22.42	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1695.318	40.18	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
7919.949	46.84	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
15569.922	49.70	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

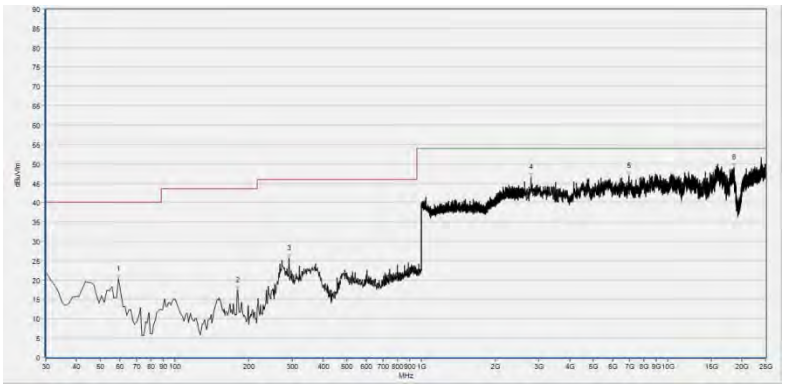
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 0)

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
59.136	15.50	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
180.538	33.20	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
503.467	20.36	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2803.673	45.67	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
6502.382	47.28	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
15798.036	50.09	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

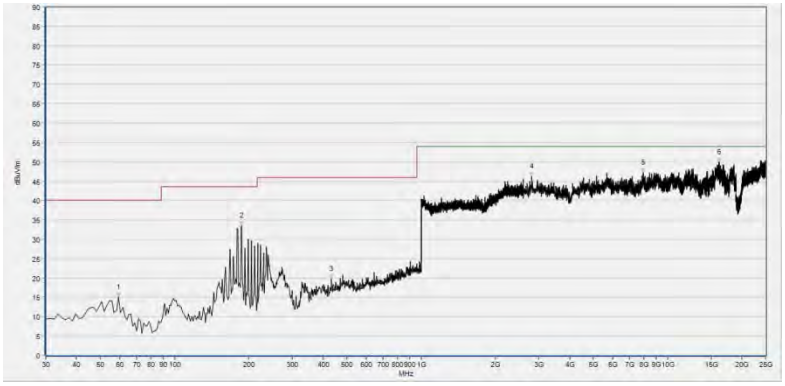
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 39)



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
59.136	20.32	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
180.538	17.37	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
291.014	25.56	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2791.453	46.54	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
6942.317	47.00	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
18563.921	49.10	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

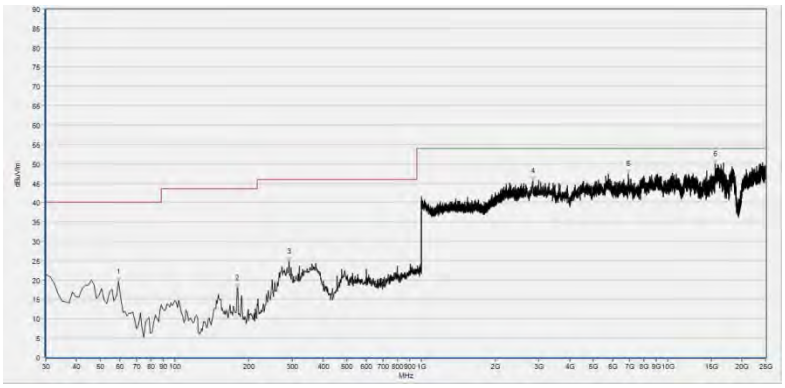
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 39)

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
59.136	15.10	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
186.608	33.46	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
431.840	19.74	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2811.820	46.31	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
7976.978	47.26	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
16152.428	49.97	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

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



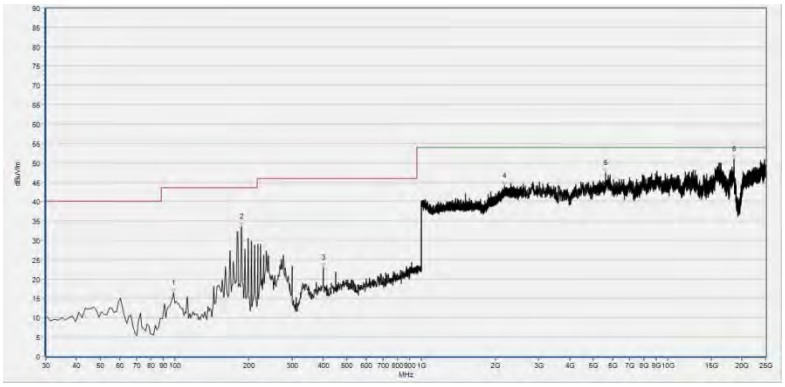
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
59.136	19.60	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
179.324	17.92	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
291.014	24.76	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2832.188	45.64	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
6917.876	47.41	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
15606.583	50.02	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

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

8-DPSK Mode：

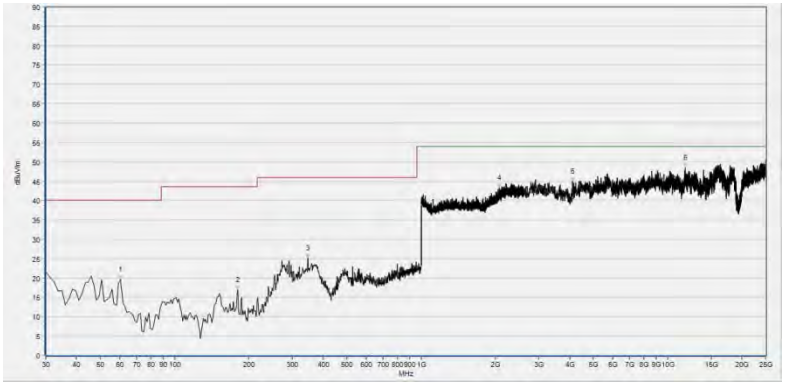
C. Test Plots for the Whole Measurement Frequency Range:

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
99.199	16.46	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
186.608	33.48	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
400.275	22.94	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2181.273	44.01	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
5598.072	47.40	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
18535.406	51.03	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

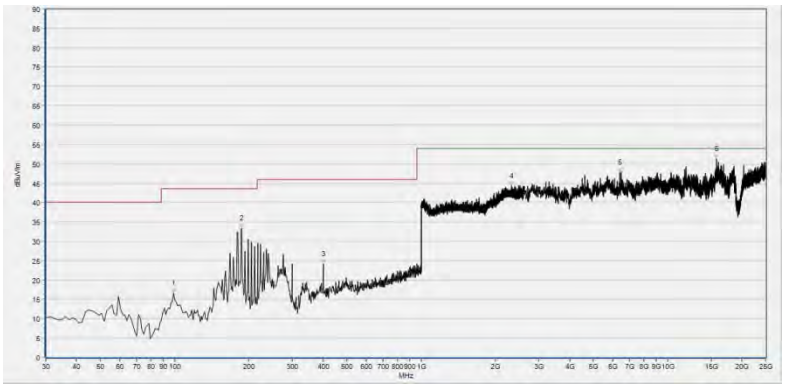
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 0)



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
60.350	19.60	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
180.538	16.93	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
346.859	25.12	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2068.587	43.17	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
4111.257	44.91	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
11761.229	48.44	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



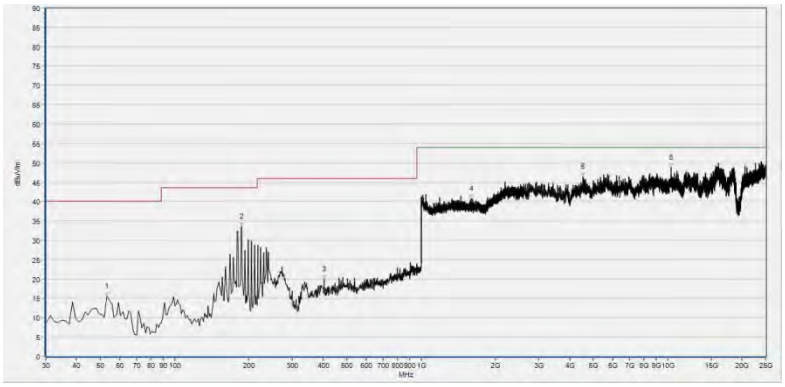
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
99.199	16.66	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
186.608	33.43	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
400.275	24.16	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2325.970	44.31	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
6380.178	47.74	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
15765.448	51.31	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
59.136	22.11	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
151.402	15.53	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
278.874	25.04	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1675.470	41.45	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
4579.705	45.81	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
16103.546	50.00	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

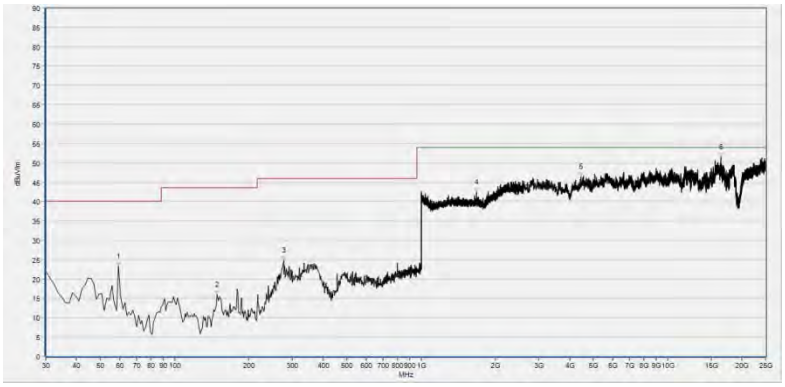
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 39)

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
53.066	15.52	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
186.608	33.48	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
402.703	20.00	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1592.877	40.66	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
4530.824	46.37	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
10347.736	48.72	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
59.136	23.37	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
148.974	15.95	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
276.446	24.87	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1676.110	42.36	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
4445.281	46.35	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
16409.056	51.40	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

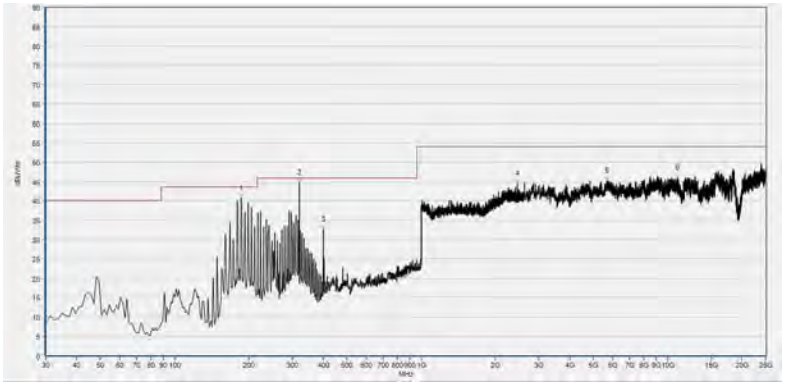
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 78)

Result for Antenna 2

GFSK Mode：

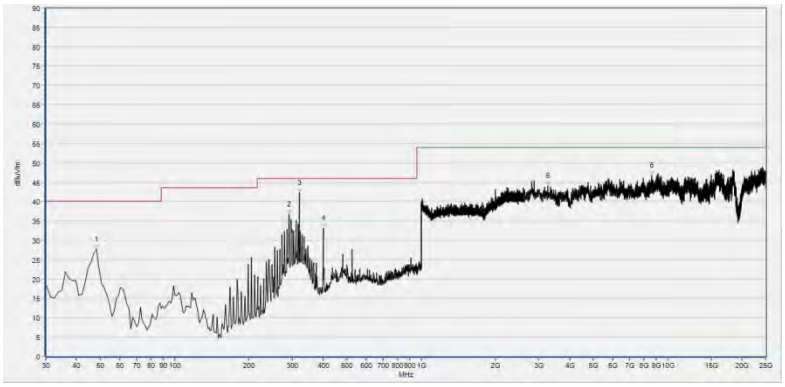
A. Test Plots for the Whole Measurement Frequency Range:

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
185.394	40.65	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.150	44.69	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
400.275	32.71	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2450.820	44.53	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
5675.468	45.30	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
10999.491	46.05	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

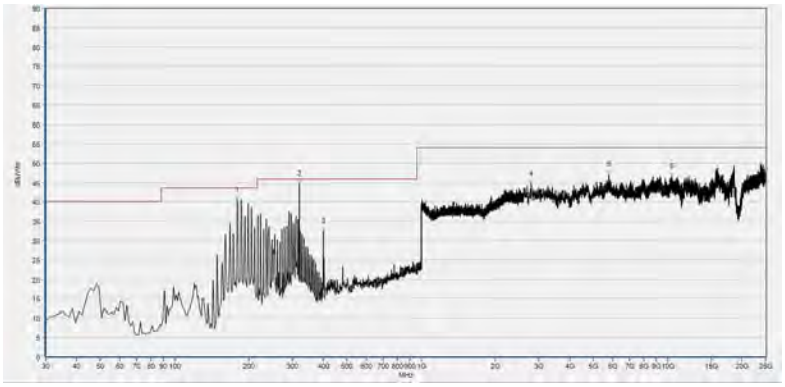
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 0)



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
48.210	27.68	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
291.014	36.74	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
320.150	42.30	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
400.275	33.25	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
3259.902	44.02	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
8628.732	46.81	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

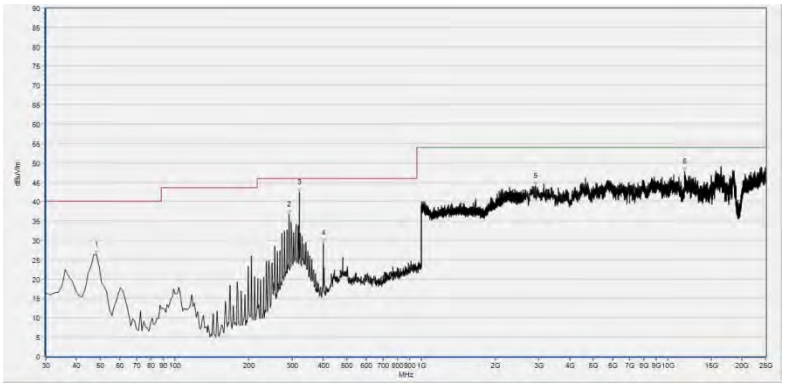
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 0)

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
179.324	40.56	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.150	44.77	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
400.275	32.58	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2795.526	44.71	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
5756.938	47.02	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
10359.956	46.53	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

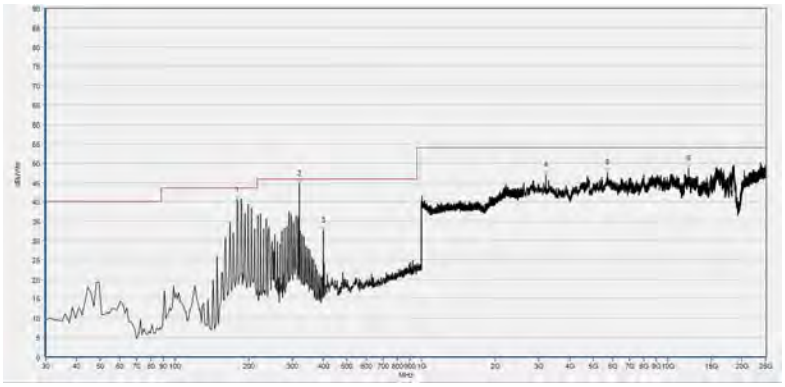
(30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 39)



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
48.210	26.24	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
291.014	36.68	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
320.150	42.41	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
400.275	29.37	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2909.584	44.15	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
11736.789	47.77	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

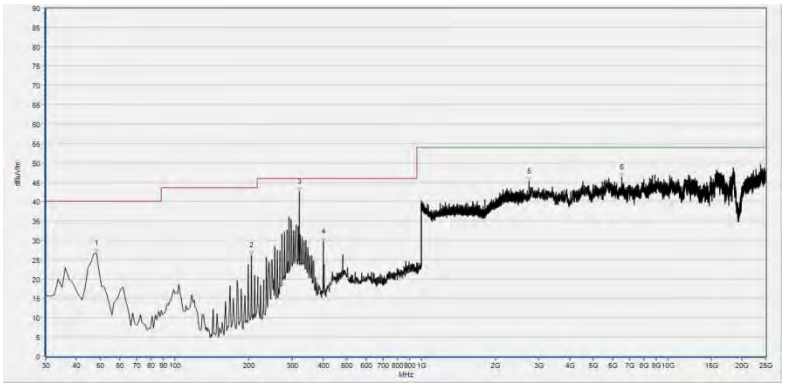
(30MHz to 25GHz, Antenna Vertical @ GFSK, channel 39)

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
179.324	40.48	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.150	44.78	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
400.275	32.62	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
3202.873	46.98	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
5695.836	47.65	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
12127.841	48.60	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

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



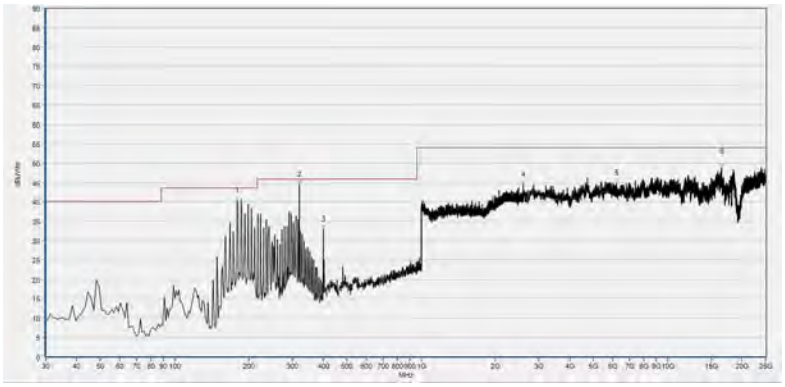
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
48.210	26.65	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
204.819	26.20	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
320.150	42.51	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
400.275	29.75	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2742.571	45.20	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
6518.676	46.19	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

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

π/4-DQPSK Mode：

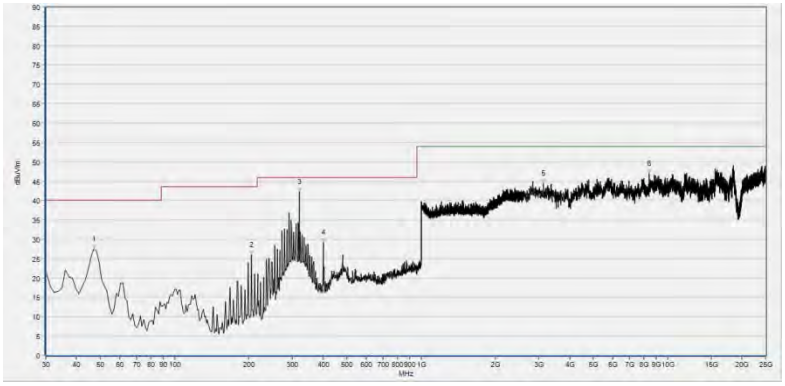
B. Test Plots for the Whole Measurement Frequency Range:

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
179.324	40.35	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.150	44.64	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
400.275	33.01	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2600.000	40.17	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
6188.725	44.90	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
16555.701	48.71	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

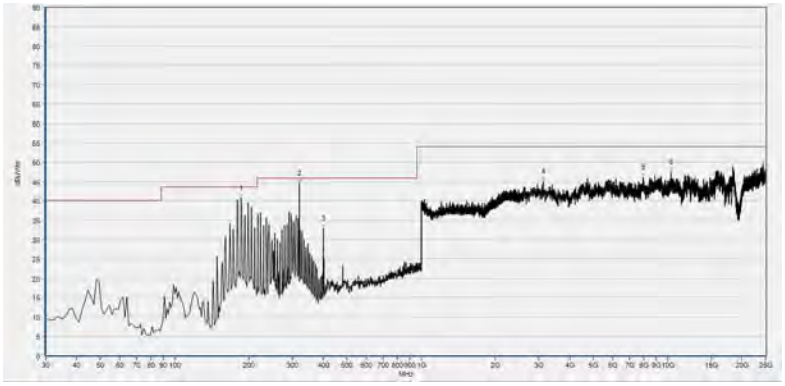
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 0)



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
46.996	27.56	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
204.819	25.95	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
320.150	42.32	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
400.275	29.12	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
3137.698	44.38	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
8425.059	47.00	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

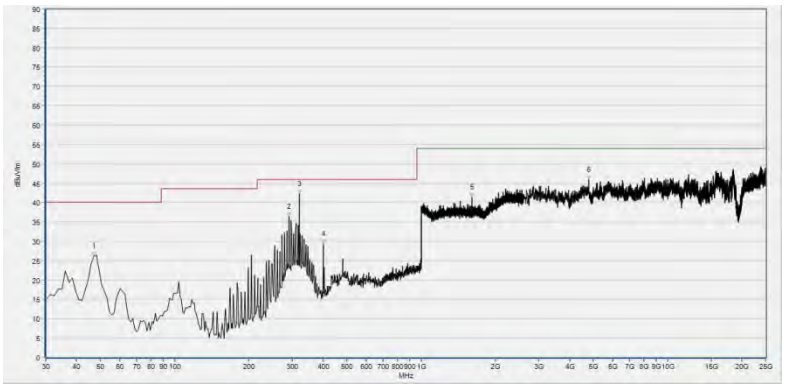
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 0)

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
185.394	40.67	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.150	44.60	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
400.275	32.92	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
3133.624	45.06	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
7952.537	46.08	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
10347.736	47.37	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

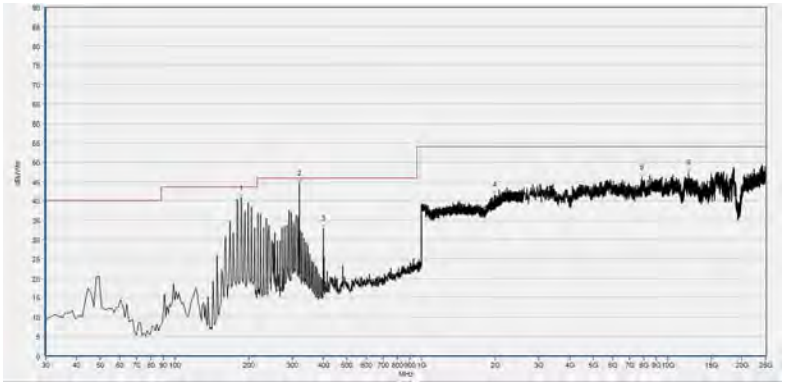
(30MHz to 25GHz, Antenna Horizontal @ π/4-DQPSK, channel 39)



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
46.996	26.12	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
291.014	36.37	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
320.150	42.27	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
400.275	29.41	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1606.963	41.46	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
4791.526	45.90	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

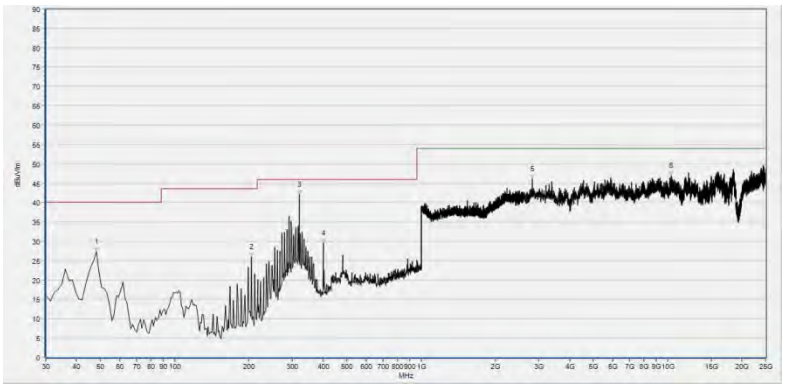
(30MHz to 25GHz, Antenna Vertical @ π/4-DQPSK, channel 39)

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
185.394	40.67	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.150	44.55	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
400.275	32.89	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1980.232	41.63	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
7862.921	46.01	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
12123.768	47.24	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

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



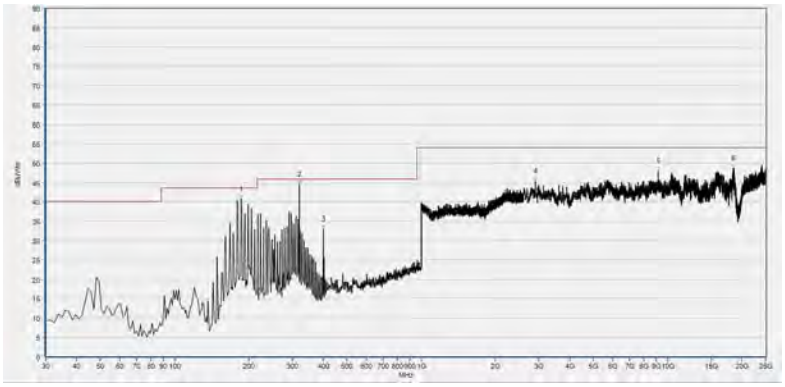
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
48.210	27.24	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
204.819	25.92	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
320.150	42.14	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
400.275	29.52	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2819.967	46.14	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
10351.809	46.85	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

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

8-DPSK Mode：

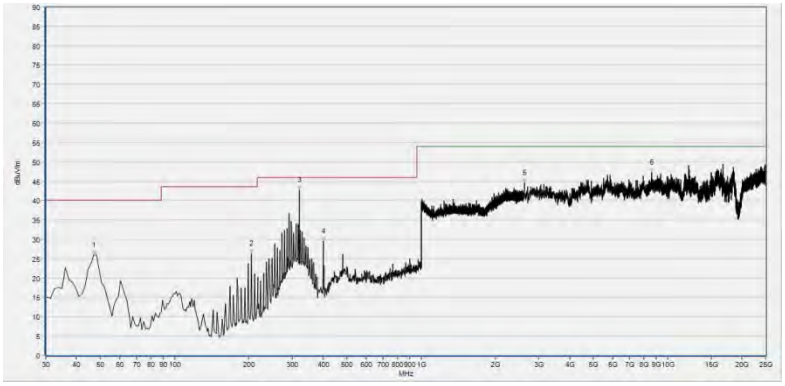
C. Test Plots for the Whole Measurement Frequency Range:

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
185.394	40.76	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.150	44.56	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
400.275	32.95	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2905.510	45.40	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
9141.989	47.92	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
18474.304	48.59	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS

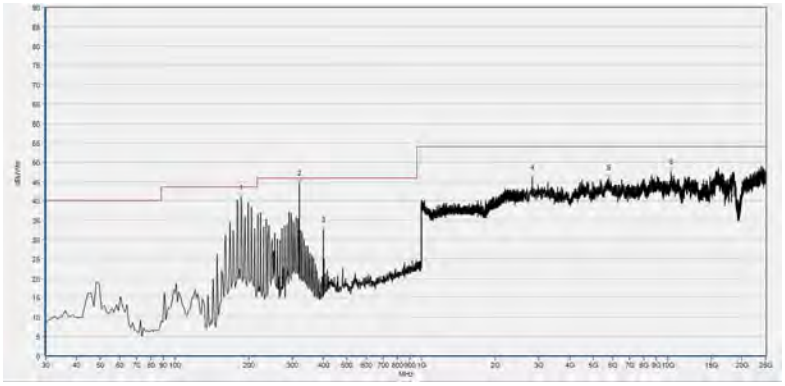
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 0)



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
46.996	25.90	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
204.819	26.37	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
320.150	42.71	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
400.275	29.51	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2624.441	44.52	N/A	N/A	74.0	N/A	54.00	Vertical	PASS
8616.512	47.26	N/A	N/A	74.0	N/A	54.00	Vertical	PASS

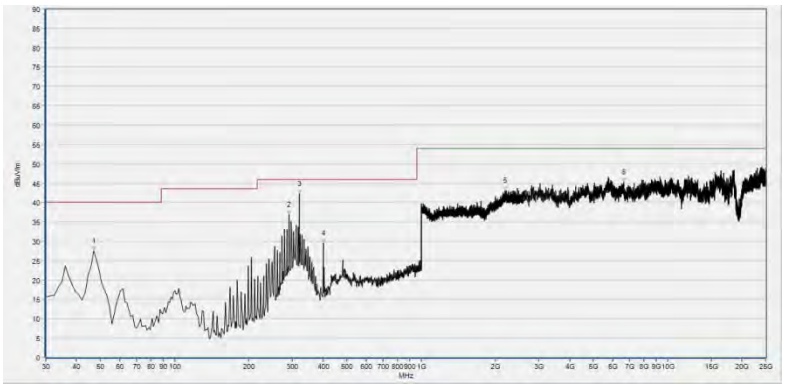
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 0)

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
185.394	40.83	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.150	44.59	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
400.275	32.60	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2824.041	45.88	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
5756.938	45.87	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
10307.001	47.36	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

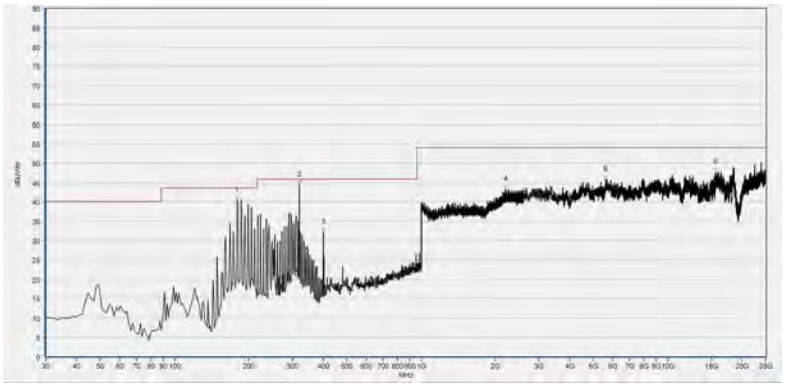
(30MHz to 25GHz, Antenna Horizontal @8-DPSK, channel 39)



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
46.996	27.46	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
291.014	36.93	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
320.150	42.23	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
400.275	29.45	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2191.517	43.14	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
6636.807	45.24	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

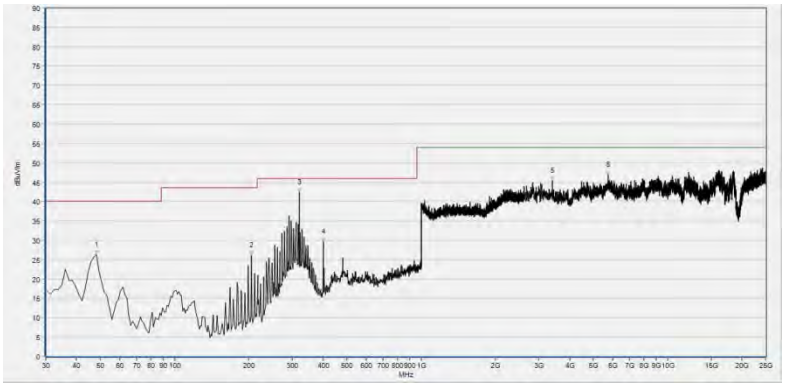
(30MHz to 25GHz, Antenna Vertical @8-DPSK, channel 39)

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
179.324	40.48	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
320.150	44.60	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
400.275	32.31	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2200.480	43.32	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
5614.366	45.89	N/A	N/A	74.0	N/A	54.00	Horizontal	PASS
15675.832	47.84	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
48.210	26.33	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
204.819	26.15	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
320.150	42.32	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
400.275	29.59	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
3402.473	45.35	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
5740.644	46.99	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

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

Annex A Test Uncertainty

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

Test items	Uncertainty
Number of Hopping Frequency	±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

Annex B Testing Laboratory Information

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

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

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.

4. Test Equipments Utilized

4.1 Conducted Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Spectrum Analyzer	MY45101810	E4407B	Agilent	2017.05.24	2018.05.23
Power Splitter	NW521	1506A	Weinschel	2017.05.24	2018.05.23
Attenuator 1	(N/A.)	10dB	Resnet	2017.05.24	2018.05.23
Attenuator 2	(N/A.)	3dB	Resnet	2017.05.24	2018.05.23
EXA Signal Analzyer	MY53470836	N9010A	Agilent	2016.12.07	2017.12.06
Bluetooth Test Set	6K00006210	MT8852B	Anritsu	2017.05.24	2018.05.23
USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2017.05.24	2018.05.23
RF cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
Coaxial cable	CB02	RF02	Morlab	N/A	N/A
SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

4.2 Conducted Emission Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	US44210471	E7405A	Agilent	2017.05.17	2018.05.16
LISN	812744	NSLK 8127	Schwarzbeck	2017.05.17	2018.05.16
Service Supplier	100448	CMU200	R&S	2017.05.17	2018.05.16
Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2017.05.17	2018.05.16
Coaxial cable(BNC) (30MHz-26GHz)	CB01	EMC01	Morlab	N/A	N/A

4.3Auxiliary Test Equipment

Equipment Name	Model No.	Brand Name	Manufacturer	Cal.Date	Cal.Due Date
Computer	T430i	Think Pad	Lenovo	N/A	N/A

4.4 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal.Due Date
System Simulator	GB45360846	8960-E5515C	Agilent	2017.05.17	2018.05.16
Receiver	MY54130016	N9038A	Agilent	2017.05.17	2018.05.16
Test Antenna - Bi-Log	N/A	VULB9163	Schwarzbeck	2016.12.09	2017.12.08
Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2017.03.30	2018.03.29
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2017.03.30	2018.03.29
Test Antenna - Horn	1774	BBHA 9120D	Schwarzbeck	2017.09.13	2018.09.12
Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
Coaxial cable(N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
1-18GHz pre-Amplifier	MA02	TS-PR18	Rohde& Schwarz	2017.05.17	2018.05.16
18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde& Schwarz	2017.05.17	2018.05.16
Climate Chamber	2004012	HL4003T	Yinhe	2017.01.11	2018.01.10
Vibration Table	N/A	ACT2000-S015L	CMI-COM	2017.01.11	2018.01.10
Anechoic Chamber	N/A	9m*6m*6m	Changning	2017.01.11	2018.01.10

END OF REPORT