

## **FCC TEST REPORT**

### **No. 170900370SHA-001**

Applicant : Chanje Energy, Inc.  
1025 Rollins Rd, Burlingame CA 94010

Manufacturing site : Jiangsu AZX Electronic Technology Co., Ltd.  
Danyang City, Jiangsu Province, Huang Town,  
Jiangshu Economic Development Zone

Product Name : media unit

Type/Model : P6D047910110

**TEST RESULT : PASS**

### **SUMMARY**

The equipment complies with the requirements according to the following standard(s) or specification:

**47 CFR FCC Part 15 Subpart C (2016):** Radio Frequency Devices

**ANSI C63.10 (2013):** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

Date of issue: August 24, 2017

Prepared by:



Nemo Li (*Project Engineer*)

Reviewed by:



Daniel Zhao (*Reviewer*)

## Description of Test Facility

Name: Intertek Testing Services Shanghai  
Address: Bl. No.86, 1198 Qinzhou Road(North), Shanghai 200233, P.R. China

FCC Designation Number: CN1175  
IC Assigned Code: 2402B-1

Name of contact: Jonny Jing  
Tel: 86 21 61278271  
Fax: 86 21 54262353

## Content

<b>SUMMARY.....</b>	<b>1</b>
<b>1 GENERAL INFORMATION .....</b>	<b>5</b>
1.1 Description of Client.....	5
1.2 Identification of the EUT .....	5
1.3 Technical Specification.....	6
<b>2 TEST SPECIFICATIONS.....</b>	<b>7</b>
2.1 Standards or specification .....	7
2.2 Mode of operation during the test.....	7
2.3 Test software list .....	7
2.4 Instrument list .....	8
2.5 Test Summary .....	9
2.6 Measurement uncertainty.....	10
<b>3 20 DB BANDWIDTH.....</b>	<b>11</b>
3.1 Limit.....	11
3.2 Test Configuration .....	11
3.3 Test Procedure and test setup.....	11
3.4 Test Protocol .....	12
<b>4 CARRIER FREQUENCY SEPARATION .....</b>	<b>18</b>
4.1 Test limit .....	18
4.2 Test Configuration .....	18
4.3 Test procedure and test setup.....	18
4.4 Test protocol .....	19
<b>5 MAXIMUM PEAK OUTPUT POWER .....</b>	<b>25</b>
5.1 Test limit .....	25
5.2 Test Configuration .....	25
5.3 Test procedure and test setup.....	25
5.4 Test Protocol .....	26
<b>6 EMISSION OUTSIDE THE FREQUENCY BAND.....</b>	<b>27</b>
6.1 Test limit .....	27
6.2 Test Configuration .....	27
6.3 Test procedure and test setup.....	27
6.4 Test Protocol .....	28
<b>7 NUMBER OF HOPPING FREQUENCIES.....</b>	<b>46</b>
7.1 Test limit .....	46
7.2 Test Configuration .....	46
7.3 Test procedure and test setup.....	46
7.4 Test Protocol .....	47
<b>8 DWELL TIME .....</b>	<b>48</b>
8.1 Test limit .....	48
8.2 Test Configuration .....	48
8.3 Test procedure and test setup.....	48
8.4 Test Protocol .....	49
<b>9 RADIATED EMISSIONS IN RESTRICTED FREQUENCY BANDS.....</b>	<b>53</b>
9.1 Test limit .....	53
9.2 Test Configuration .....	53
9.3 Test procedure and test setup.....	54

Total Quality. Assured.

9.4	Test Protocol .....	55
<b>10</b>	<b>POWER LINE CONDUCTED EMISSION .....</b>	<b>59</b>
10.1	Limit.....	59
10.2	Test configuration .....	59
10.3	Test procedure and test set up .....	60
10.4	Test protocol .....	61
<b>11</b>	<b>OCCUPIED BANDWIDTH .....</b>	<b>62</b>
11.1	Test limit .....	62
11.2	Test Configuration .....	62
11.3	Test procedure and test setup .....	62
11.4	Test protocol .....	63

## **1 GENERAL INFORMATION**

### **1.1 Description of Client**

Applicant : Chanje Energy, Inc.

1025 Rollins Rd, Burlingame CA 94010

Manufacturing site : Jiangsu AZX Electronic Technology Co., Ltd.

Danyang City, Jiangsu Province, Huang Town, Jiangshu  
Economic Development Zone

### **1.2 Identification of the EUT**

Product Name : media unit

Type/model : P6D047910110

FCC ID : 2AM7KP6D047910110

**1.3 Technical Specification**

Operation Frequency : 2400 – 2483.5 MHz  
Band  
Protocol : Bluetooth Base Rate + EDR  
Type of Modulation : GFSK,  $\pi/4$ -DQPSK, 8DPSK  
Channel Number : 79 channels  
Description of EUT : EUT is a media unit with Bluetooth and WiFi function.  
Antenna : PCB antenna, 0.6dBi  
Rating : 12V DC  
EUT type : ☒ Table top  
☐ Floor standing  
Sample received date : July 23, 2017  
Date of test : July 23, 2017 ~ August 18, 2017

## 2 TEST SPECIFICATIONS

### 2.1 Standards or specification

47 CFR FCC Part 15 Subpart C (2016)

ANSI C63.10 (2013)

FCC Public Notice DA 00-705

### 2.2 Mode of operation during the test

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

The EUT is used for floating on the water, so only one installation was used to do the radiated emission.

The lowest, middle and highest channel were tested as representatives.

Freq. Band (MHz)	Modulation	Lowest (MHz)	Middle (MHz)	Highest (MHz)
2400-2483.5	GFSK	2402	2441	2480
	$\pi/4$ -DQPSK	2402	2441	2480
	8DPSK	2402	2441	2480

### 2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

## 2.4 Instrument list

Selected	Instrument	EC no.	Model	Valid until date
<input type="checkbox"/>	Shielded room	EC 2838	GB88	2018-1-8
<input type="checkbox"/>	EMI test receiver	EC 2107	ESCS 30	2017-10-19
<input type="checkbox"/>	A.M.N.	EC 3119	ESH2-Z5	2017-12-01
<input checked="" type="checkbox"/>	Semi anechoic chamber	EC 3048	-	2017-9-9
<input checked="" type="checkbox"/>	EMI test receiver	EC 3045	ESIB26	2017-10-19
<input checked="" type="checkbox"/>	Broadband antenna	EC 4206	CBL 6112D	2018-6-1
<input checked="" type="checkbox"/>	Horn antenna	EC 3049	HF906	2017-9-23
<input type="checkbox"/>	Horn antenna	EC 4792-1	3117	2017-8-24
<input checked="" type="checkbox"/>	Horn antenna	EC 4792-3	HAP18-26W	2018-6-11
<input checked="" type="checkbox"/>	Pre-amplifier	EC 5262	pre-amp 18	2018-6-20
<input type="checkbox"/>	Test Receiver	EC 4501	ESCI 7	2018-2-23
<input checked="" type="checkbox"/>	PXA Signal Analyzer	EC5338	N9030A	2018-3-3
<input checked="" type="checkbox"/>	Power sensor/Power meter	EC4318	N1911A/N1921A	2018-5-12
<input type="checkbox"/>	Power sensor	EC5338-1	U2021XA	2017-12-29
<input type="checkbox"/>	MXG Analog Signal Generator	EC5338-2	N5181A	2017-8-29
<input type="checkbox"/>	MXG Vector Signal Generator	EC5175	N51812B	2018-3-3



## 2.5 Test Summary

**This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.**

TEST ITEM	FCC REFERANCE	RESULT
20 dB Bandwidth	15.247(a)(1)	Tested
Carrier Frequency Separation	15.247(a)(1)	Pass
Maximum peak output power	15.247(b)(1)	Pass
Radiated Emissions in restricted frequency bands	15.205 & 15.209	Pass
Emission outside the frequency band	15.247(d)	Pass
Number of Hopping Frequencies	15.247(a)(1)(iii)	Pass
Dwell time	15.247(a)(1)(iii)	Pass
Power line conducted emission	15.207	NA
Occupied bandwidth	-	Tested

Notes: 1: NA =Not Applicable

2: This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

## 2.6 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

TEST ITEM	MEASUREMENT UNCERTAINTY
Maximum peak output power	$\pm 0.74\text{dB}$
Radiated Emissions in restricted frequency bands below 1GHz	$\pm 4.90\text{dB}$
Radiated Emissions in restricted frequency bands above 1GHz	$\pm 5.02\text{dB}$
Power line conducted emission	$\pm 3.19\text{dB}$

### 3 20 dB Bandwidth

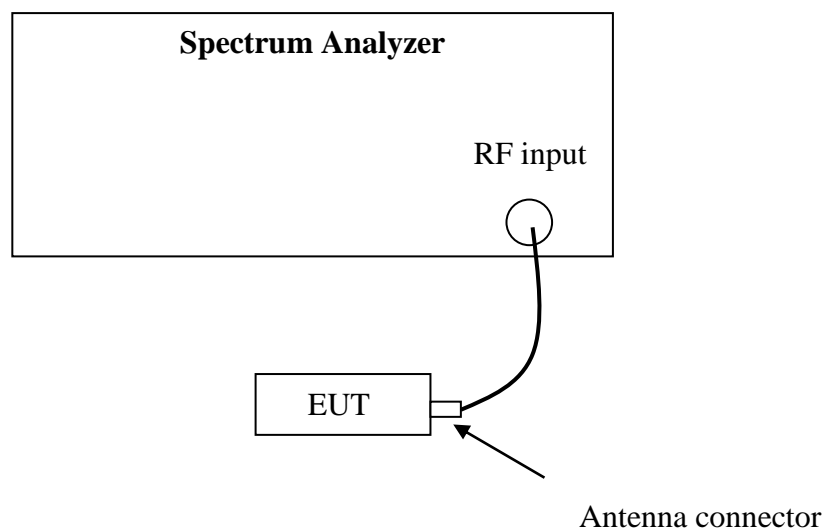
**Test result: Pass**

#### 3.1 Limit

☐ Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

☒ Frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

#### 3.2 Test Configuration



#### 3.3 Test Procedure and test setup

The 20 bandwidth per FCC § 15.247(a)(1) is measured using the Spectrum Analyzer with Span = 2 to 3 times the 20 dB bandwidth,  $RBW \geq 1\%$  of the 20 dB bandwidth,  $VBW \geq RBW$ , Sweep = auto, Detector = peak, Trace = max hold.

The test was performed at 3 channels (lowest, middle and highest channel).

The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

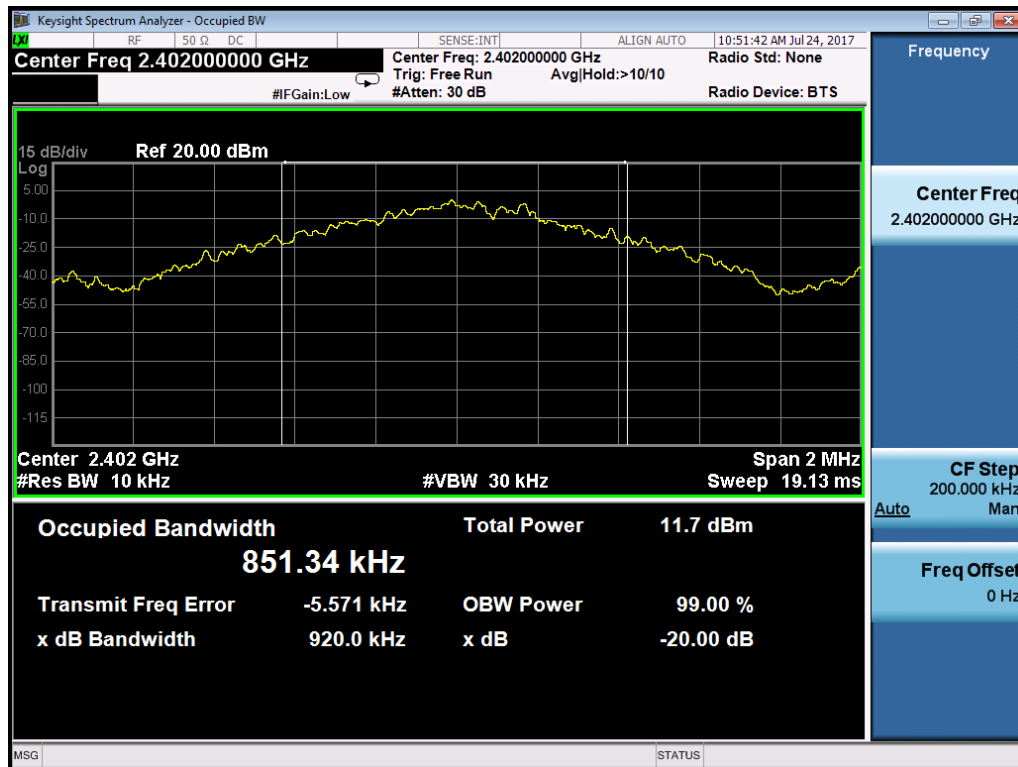
### 3.4 Test Protocol

Temperature: 22°C

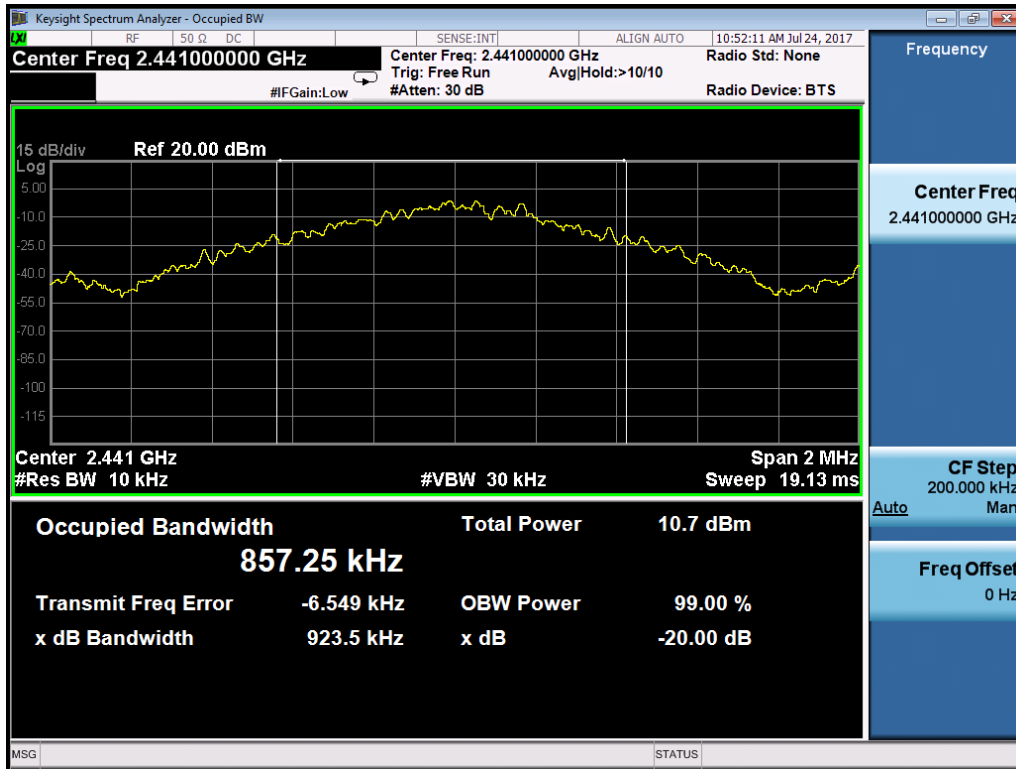
Relative Humidity: 54%

Modulation	Channel	20dB Bandwidth (kHz)	Two-thirds of Bandwidth (kHz)
GFSK	L	920.0	613.33
	M	923.5	615.67
	H	930.0	620.00

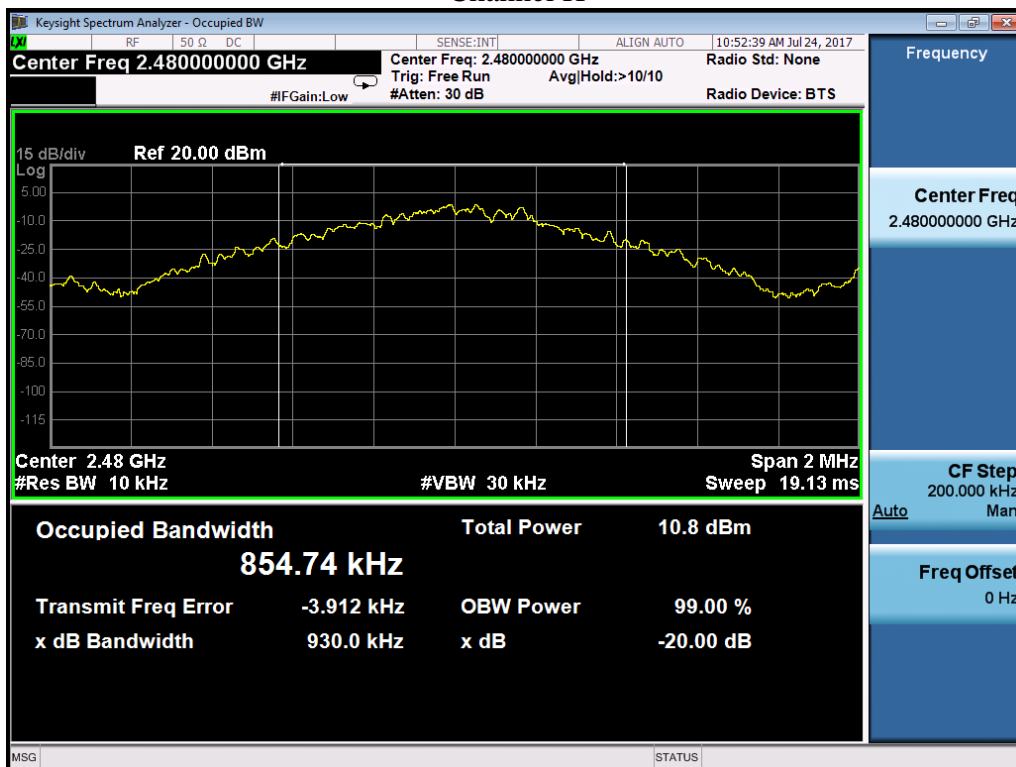
Channel L



### Channel M

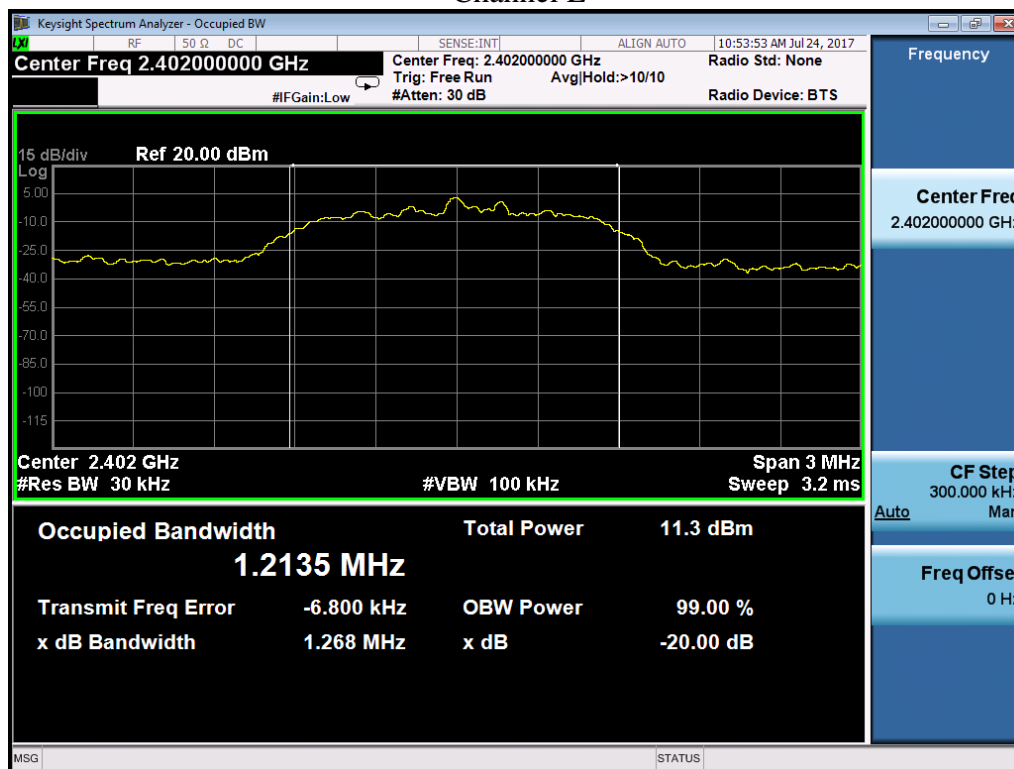


### Channel H

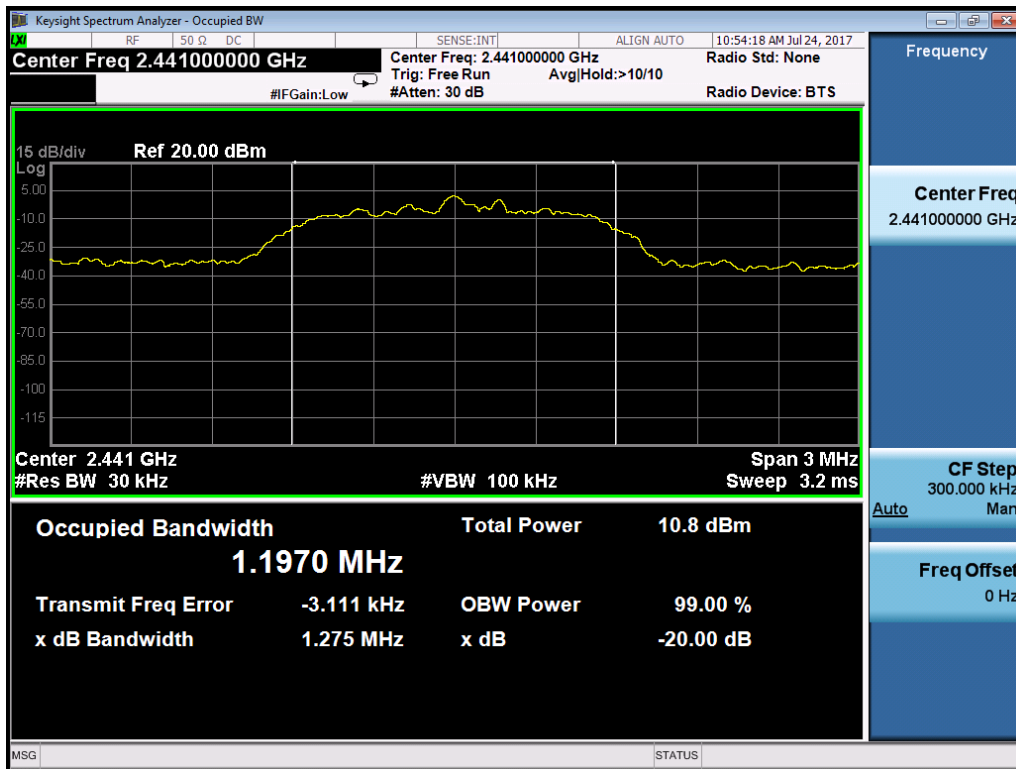


Modulation	Channel	20dB Bandwidth (kHz)	Two-thirds of Bandwidth (kHz)
$\pi/4$ -DQPSK	L	1268	845.33
	M	1275	850.00
	H	1281	854.00

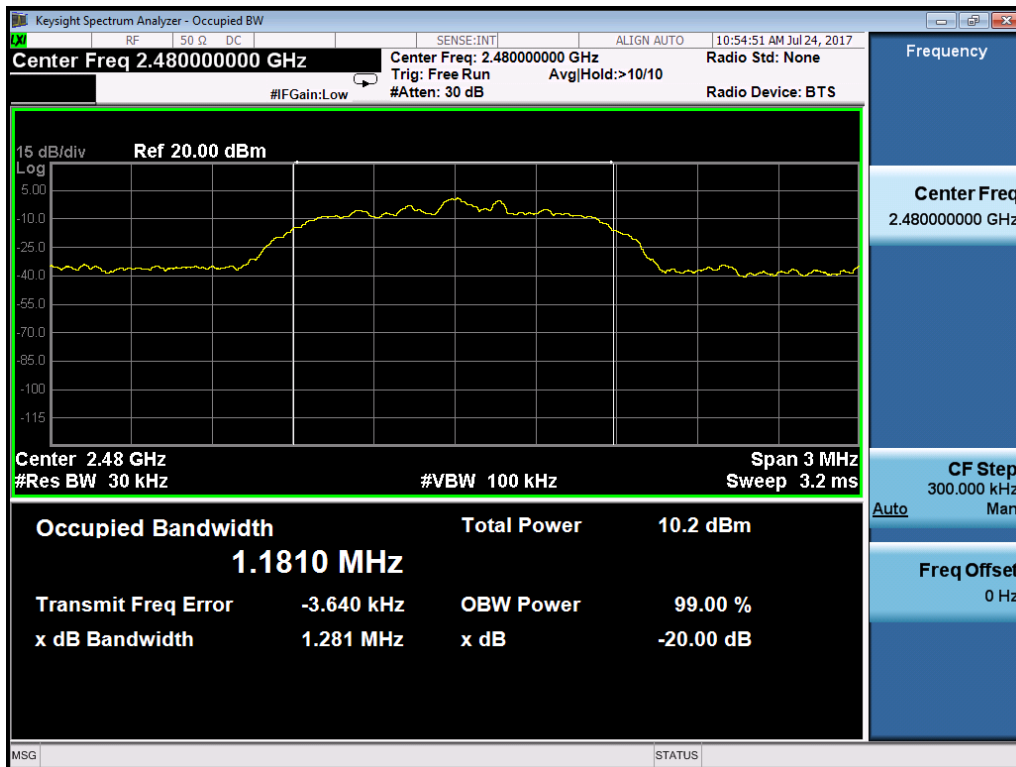
Channel L



### Channel M

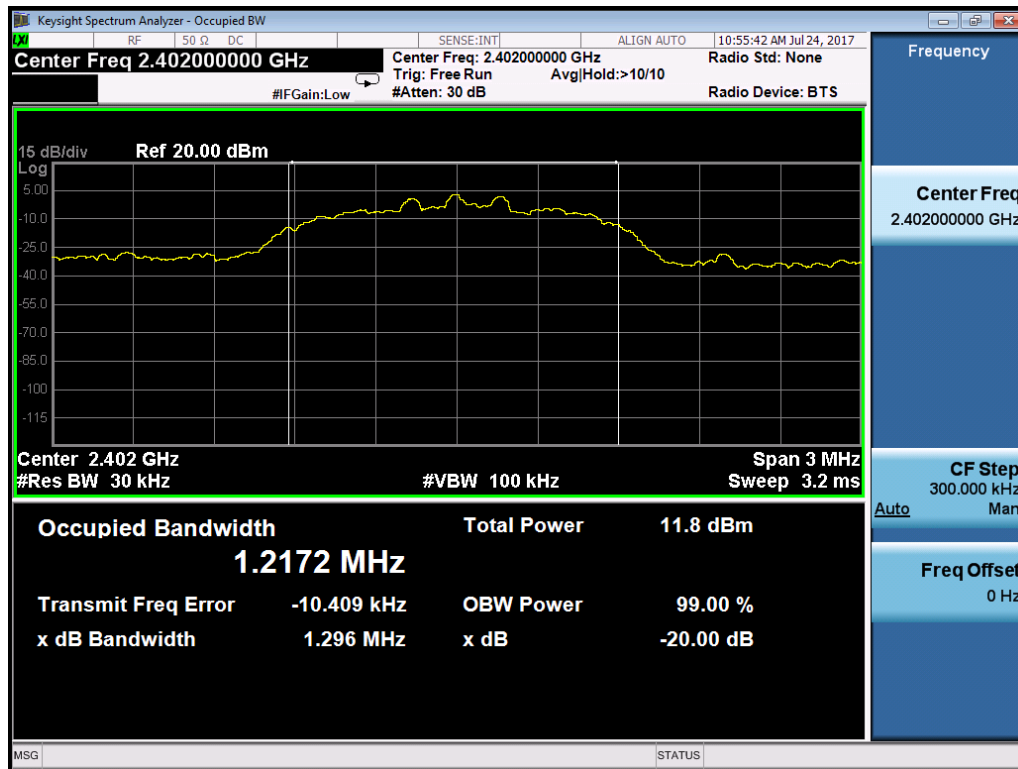


### Channel H



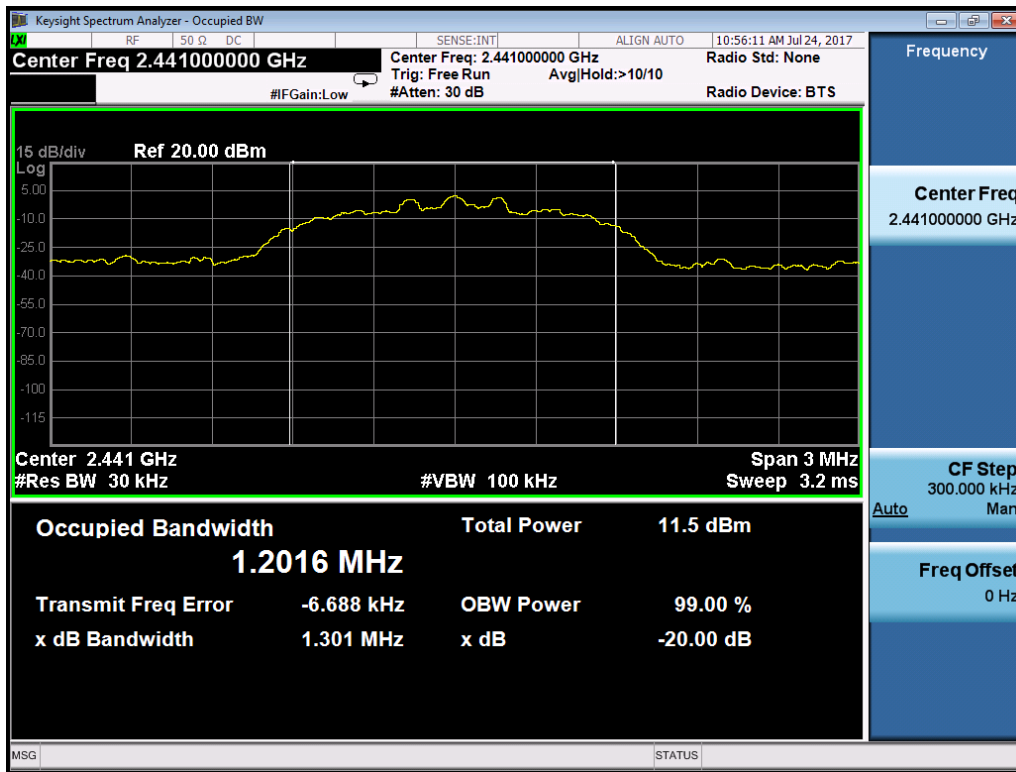
Modulation	Channel	20dB Bandwidth (kHz)	Two-thirds of Bandwidth (kHz)
8DPSK	L	1296	864.00
	M	1301	867.33
	H	1300	866.67

### Channel L

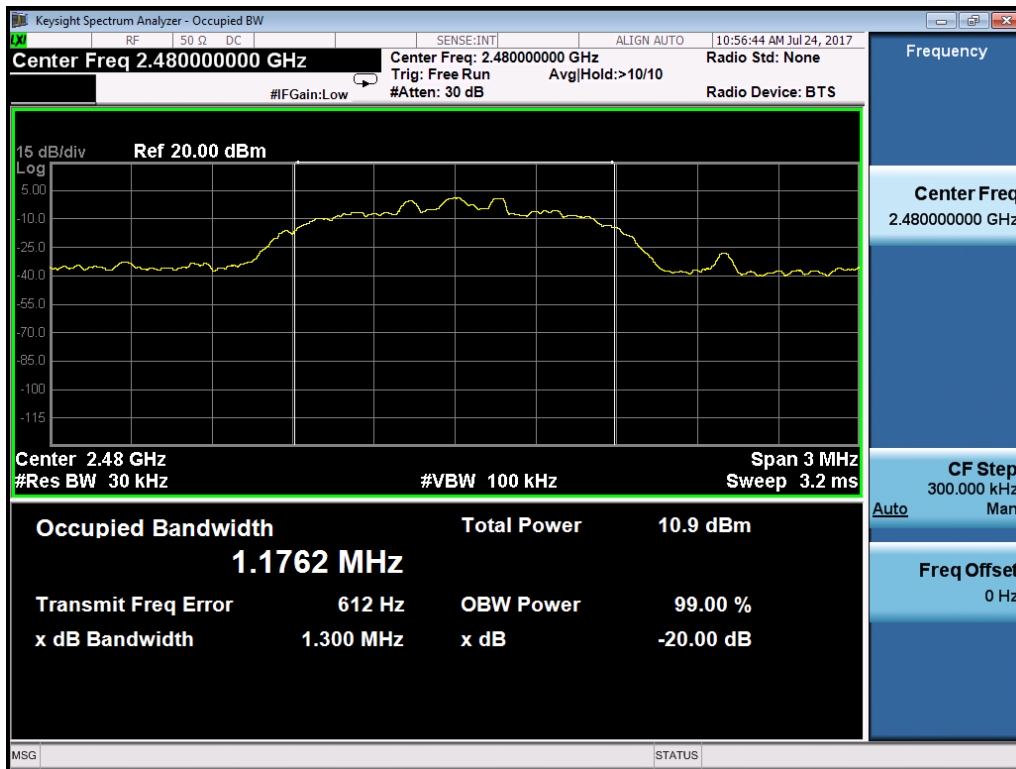




### Channel M



### Channel H



## 4 Carrier Frequency Separation

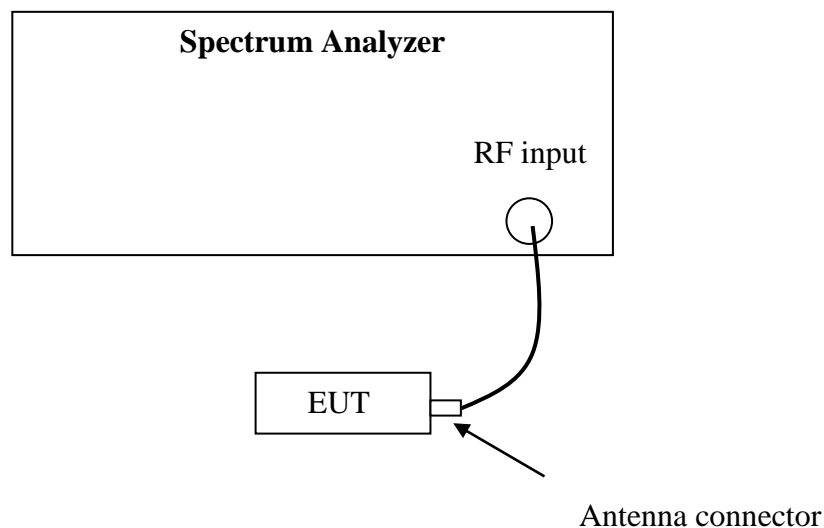
**Test result:** Pass

### 4.1 Test limit

☐ Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

☒ Frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

### 4.2 Test Configuration



### 4.3 Test procedure and test setup

The Carrier Frequency Separation per FCC § 15.247(a)(1) is measured using the Spectrum Analyzer with Span can capture two adjacent channels,  $RBW \geq 1\%$  of the span,  $VBW \geq RBW$ , Sweep = auto, Detector = peak, Trace = max hold.

The test was performed at 3 channels (lowest, middle and highest channel).

The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

#### 4.4 Test protocol

Temperature: 22 °C

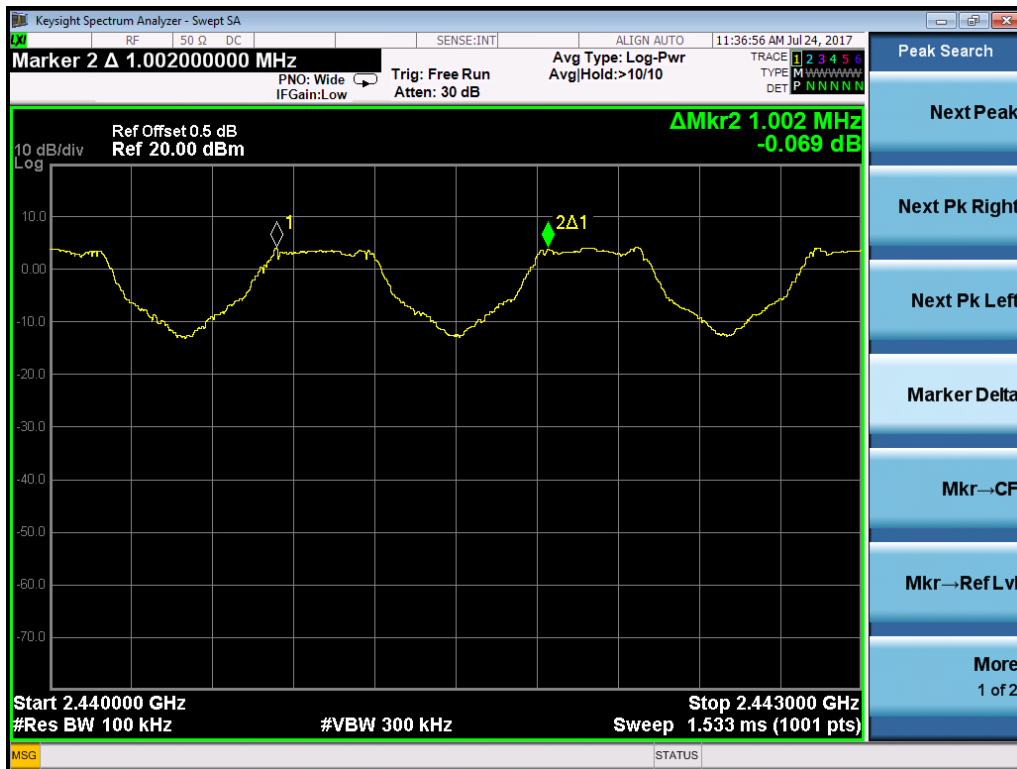
Relative Humidity: 54 %

Modulation	Channel	Frequency Separation (kHz)	Limit (kHz)
GFSK	L	960	$\geq 613.33$
	M	1002	$\geq 615.67$
	H	1002	$\geq 620.00$

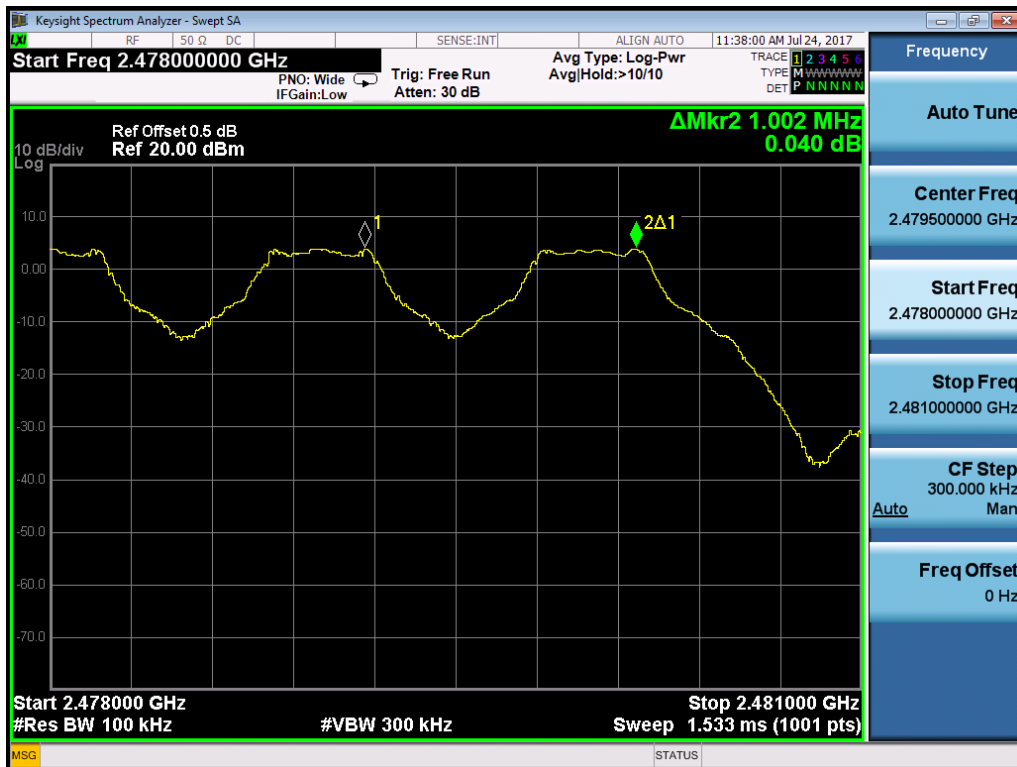
Channel L



### Channel M



### Channel H



Modulation	Channel	Frequency Separation (kHz)	Limit (kHz)
$\pi/4$ -DQPSK	L	1008	$\geq 845.33$
	M	1002	$\geq 850.00$
	H	1002	$\geq 854.00$

Channel L



### Channel M



### Channel H

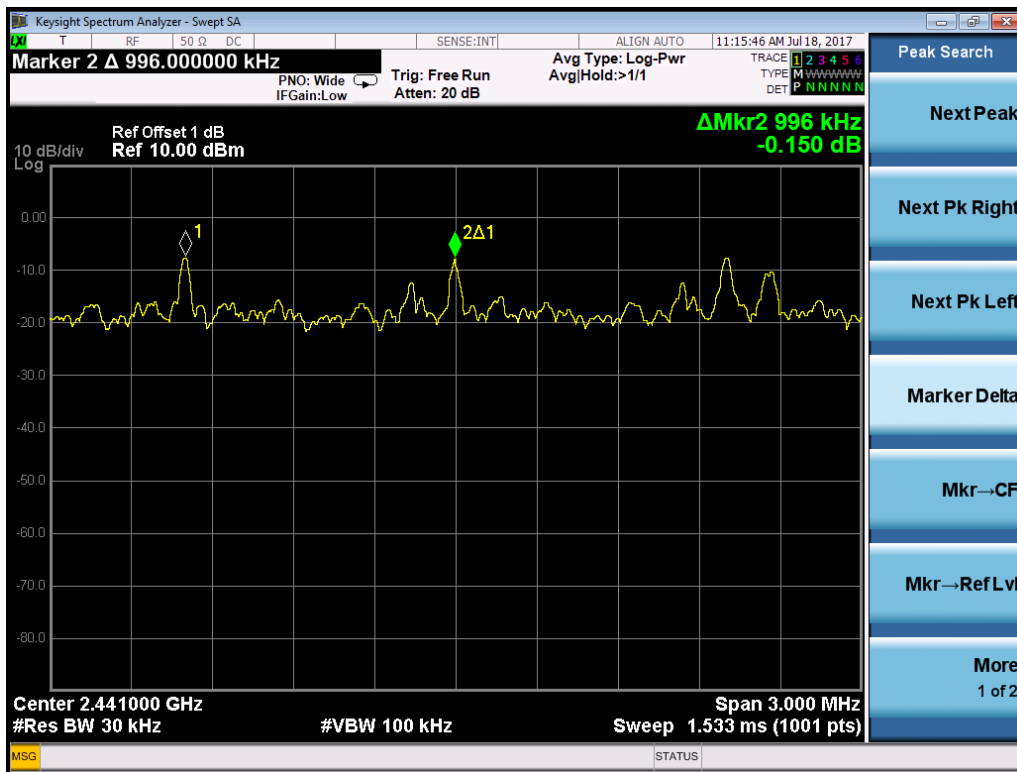


Modulation	Channel	Frequency Separation (kHz)	Limit (kHz)
8DPSK	L	996	864.00
	M	996	867.33
	H	1002	866.67

### Channel L



### Channel M



### Channel H





## 5 Maximum peak output power

**Test result:** Pass

### 5.1 Test limit

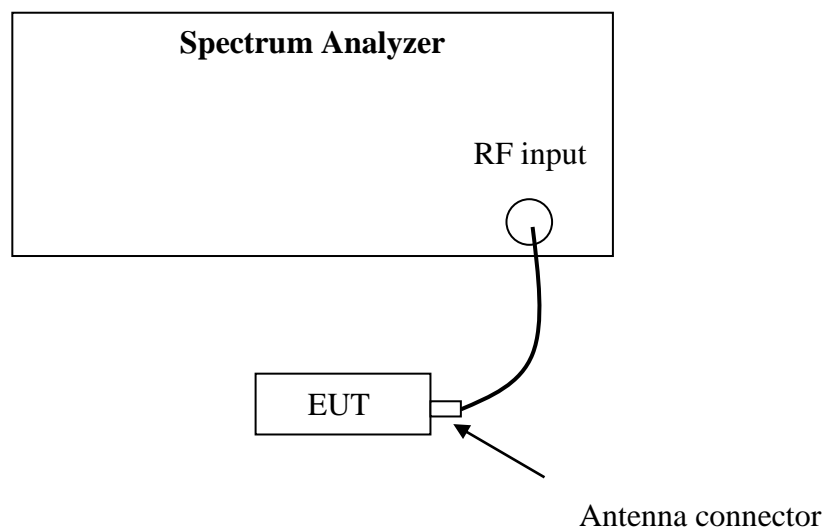
For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

### 5.2 Test Configuration



### 5.3 Test procedure and test setup

The Maximum peak output power per FCC § 15.247(b) is measured using the Spectrum Analyzer with Span = 5 times the 20 dB bandwidth,  $RBW \geq$  the 20 dB bandwidth,  $VBW \geq RBW$ , Sweep = auto, Detector = peak, Trace = max hold.

The test was performed at 3 channels (lowest, middle and highest channel).

The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

## 5.4 Test Protocol

Temperature: 22°C

Relative Humidity: 54%

Modulation	Channel	Conducted Power (dBm)	Limit (dBm)
GFSK	L	4.451	$\leq 21.00$
	M	4.164	$\leq 21.00$
	H	3.928	$\leq 21.00$

Modulation	Channel	Conducted Power (dBm)	Limit (dBm)
$\pi/4$ -DQPSK	L	4.014	$\leq 21.00$
	M	3.633	$\leq 21.00$
	H	3.111	$\leq 21.00$

Modulation	Channel	Conducted Power (dBm)	Limit (dBm)
8DPSK	L	4.118	$\leq 21.00$
	M	3.735	$\leq 21.00$
	H	3.327	$\leq 21.00$

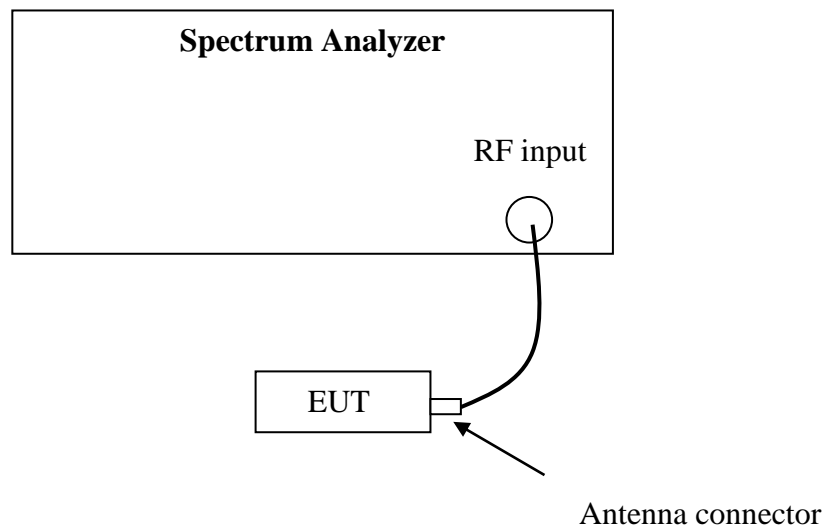
## 6 Emission outside the frequency band

**Test result:** Pass

### 6.1 Test limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

### 6.2 Test Configuration



### 6.3 Test procedure and test setup

The Emission outside the frequency band per FCC § 15.247(d) is measured using the Spectrum Analyzer with Span wide enough capturing all spurious from the lowest emission frequency of the EUT up to 10th harmonics, RBW = 100kHz, VBW ≥ RBW, Sweep = auto, Detector = peak, Trace = max hold. The test was performed at 3 channels (lowest, middle and highest channel). The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

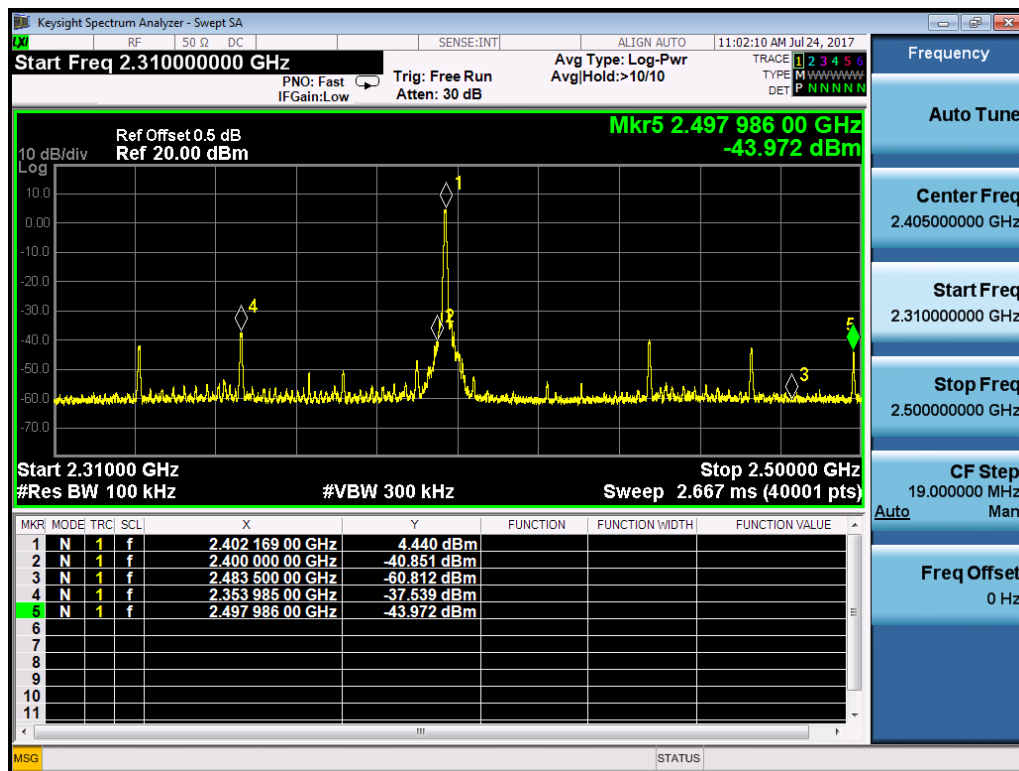
## 6.4 Test Protocol

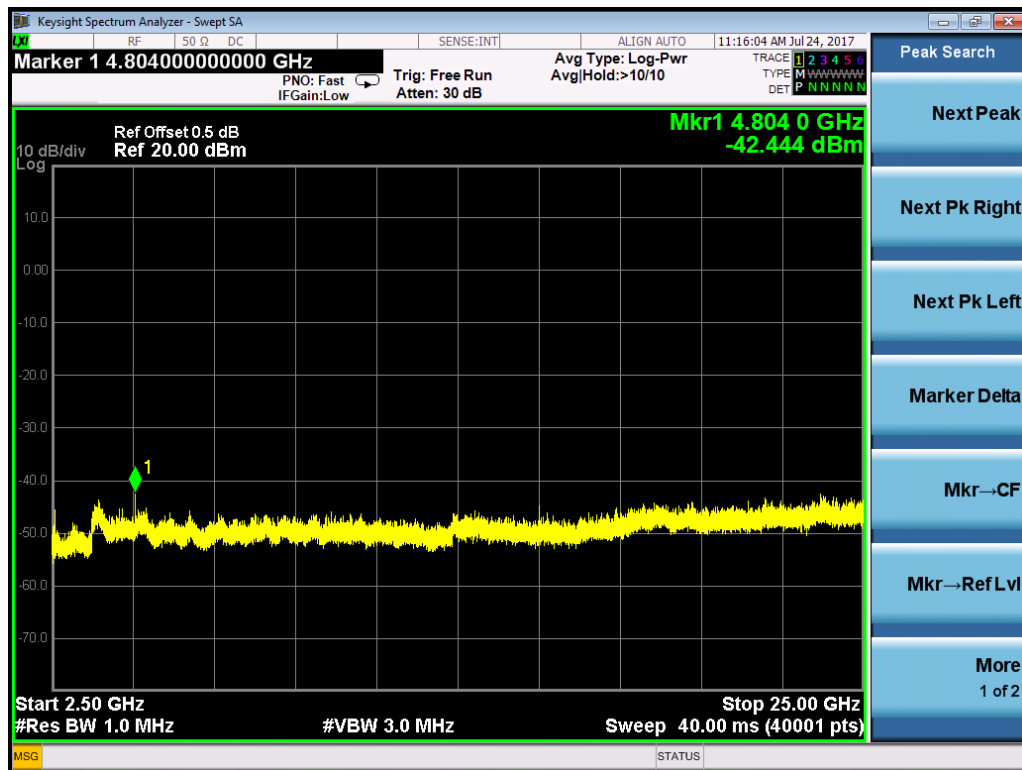
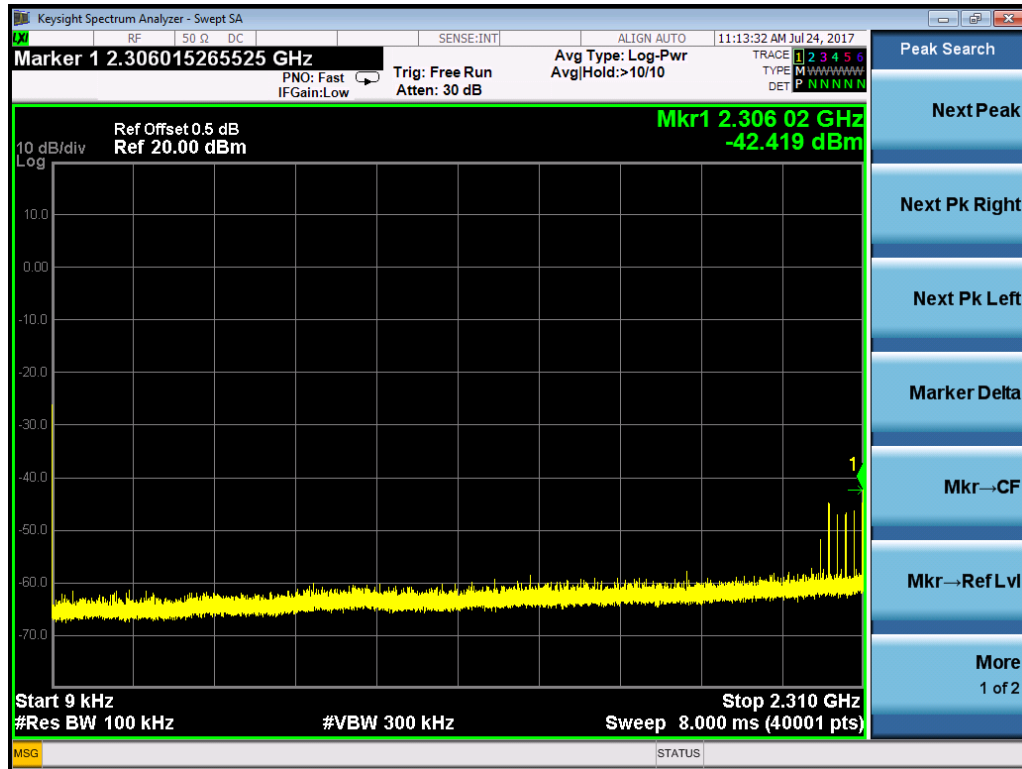
Temperature: 22°C

Relative Humidity: 54%

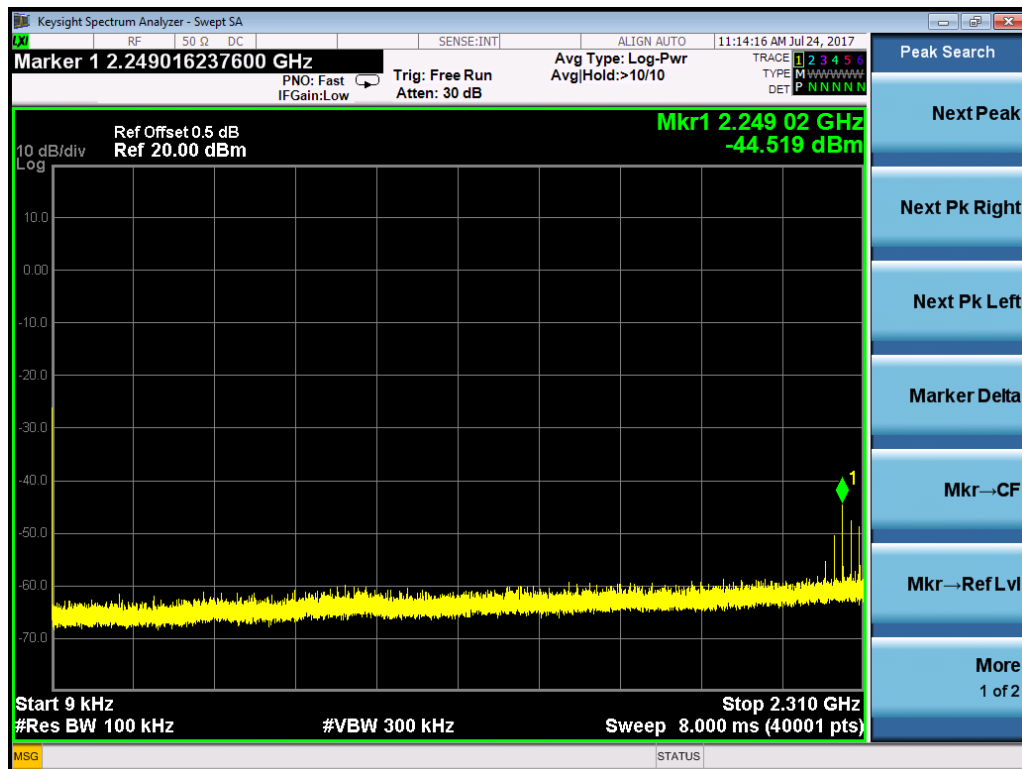
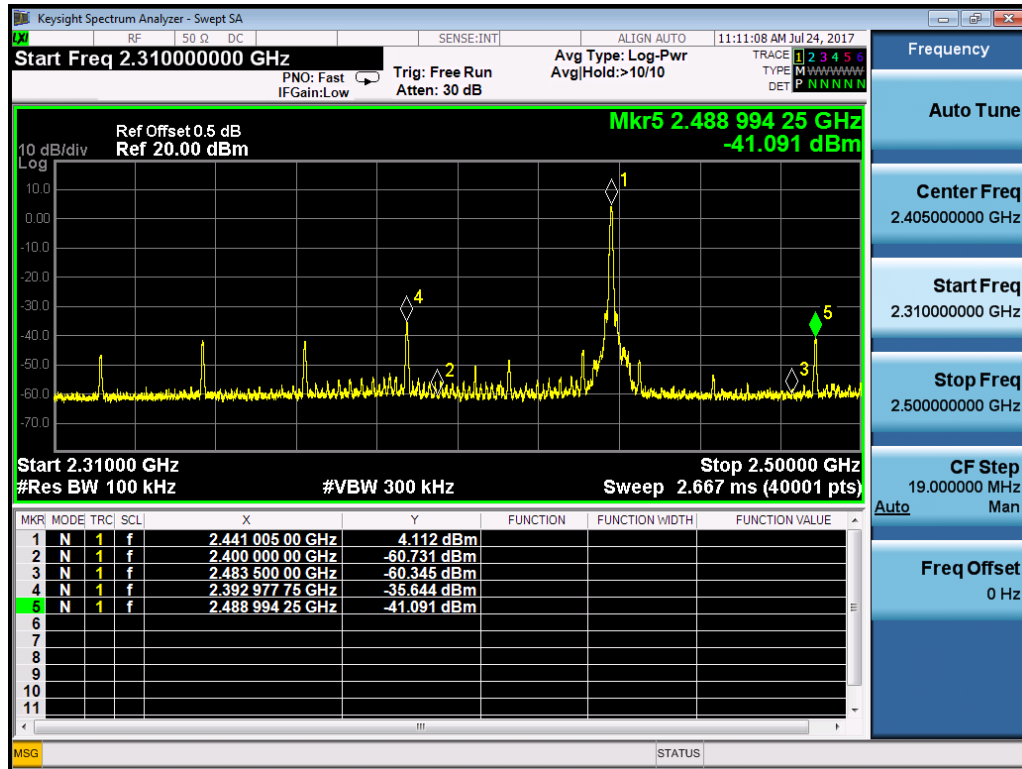
Modulation	Channel	Result	Limit (dBm)
GFSK	L	Pass	$\geq 20$
	M	Pass	$\geq 20$
	H	Pass	$\geq 20$
	Hopping	Pass	$\geq 20$

Channel L



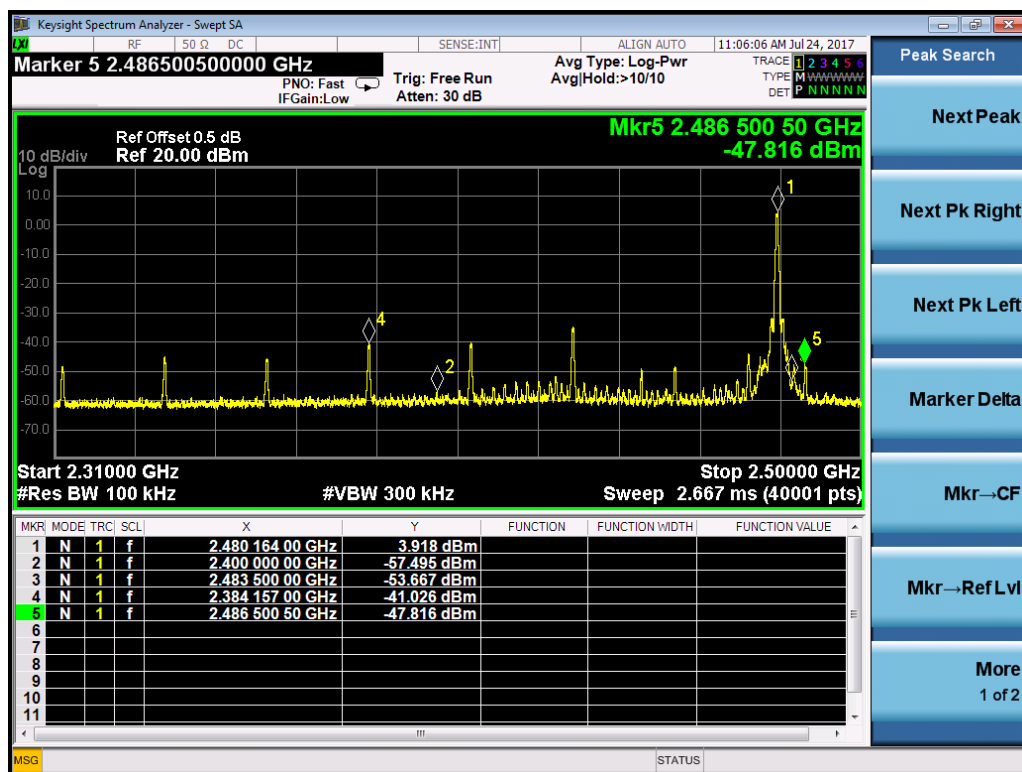


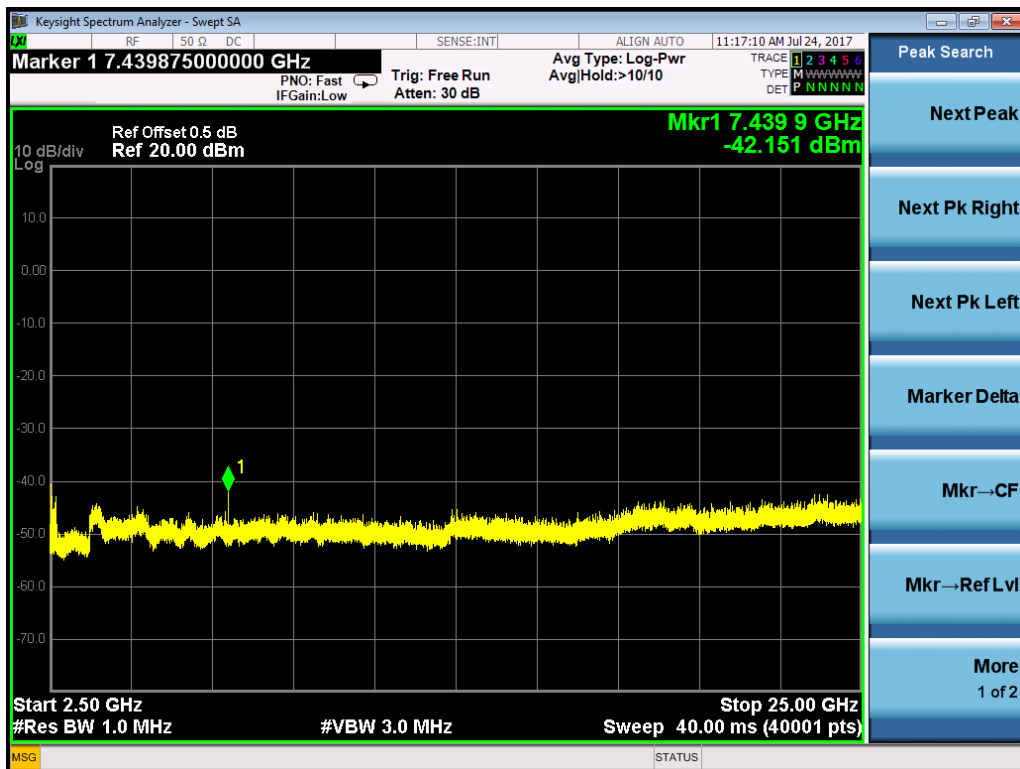
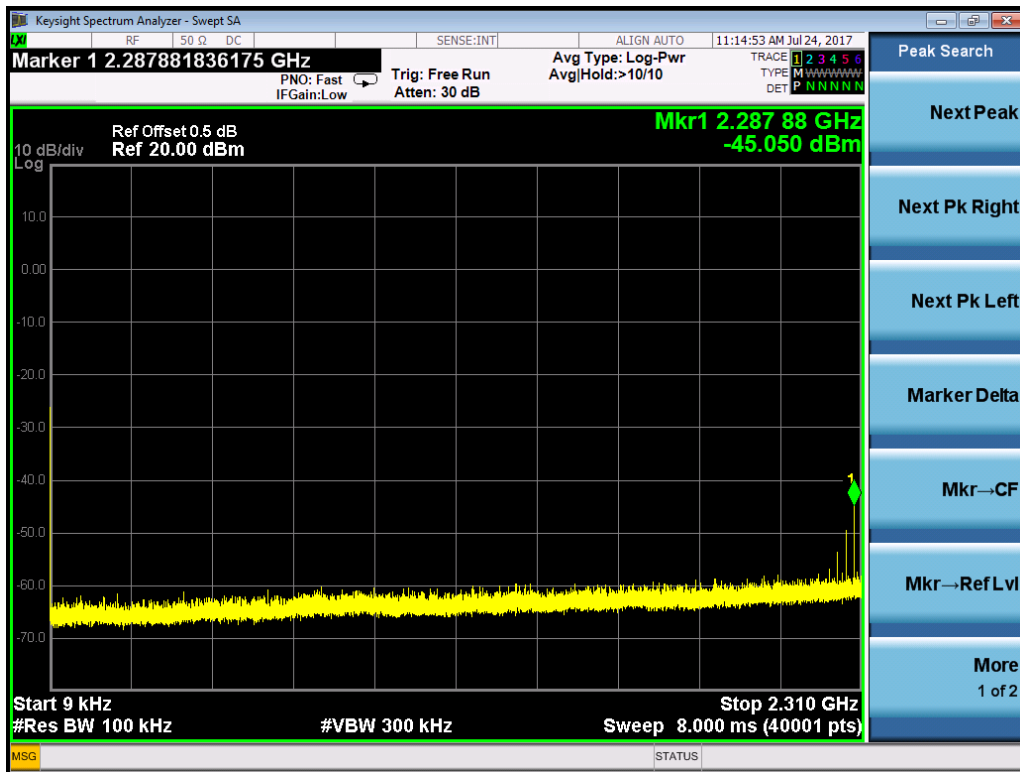
## Channel M





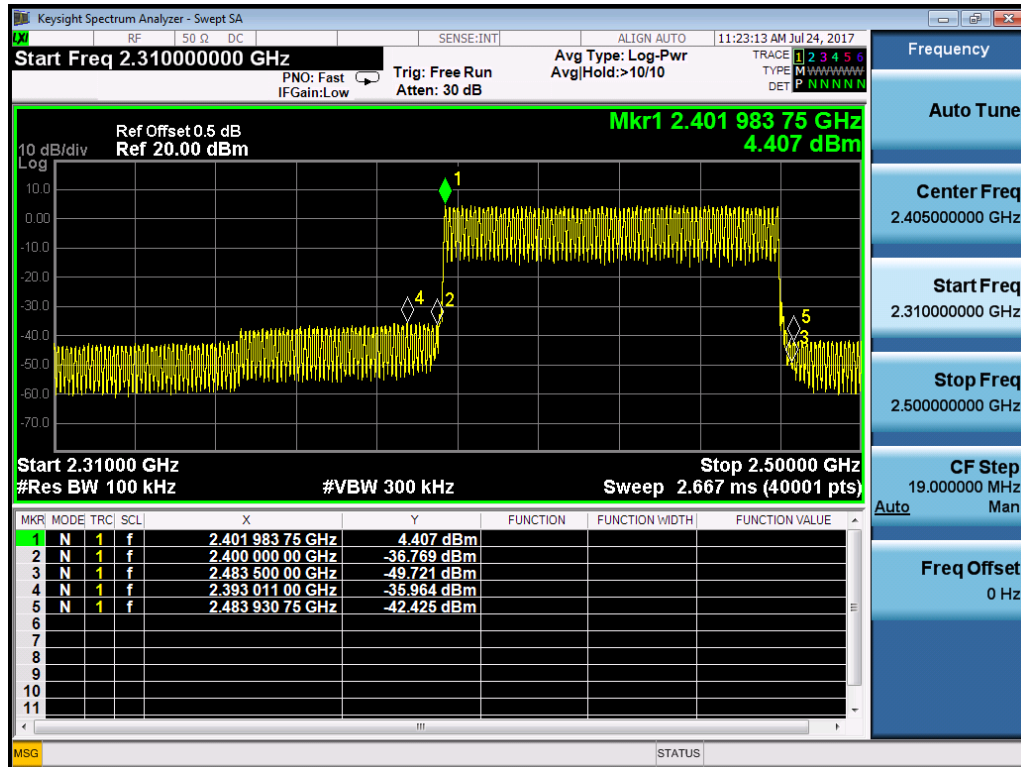
### Channel H





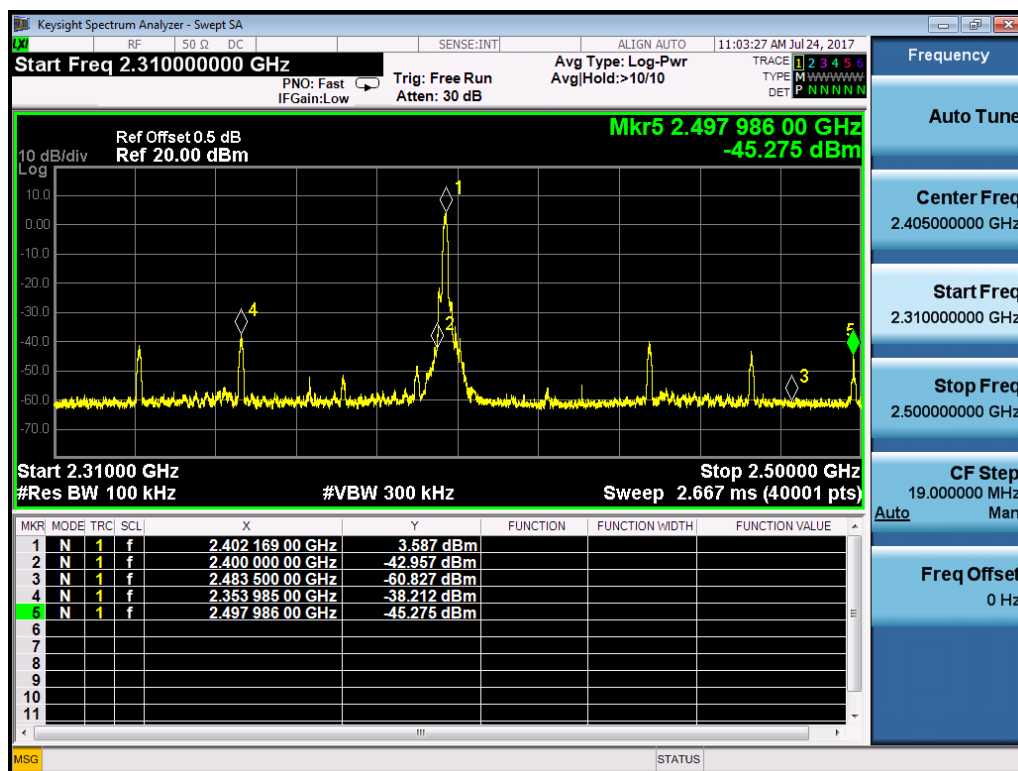


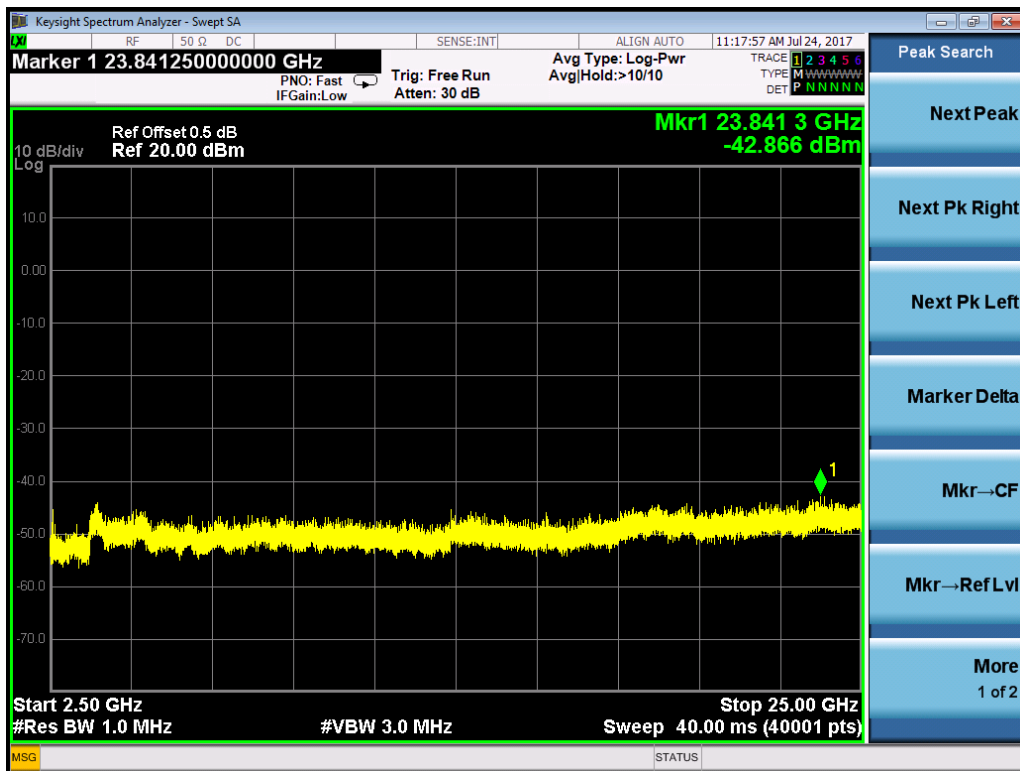
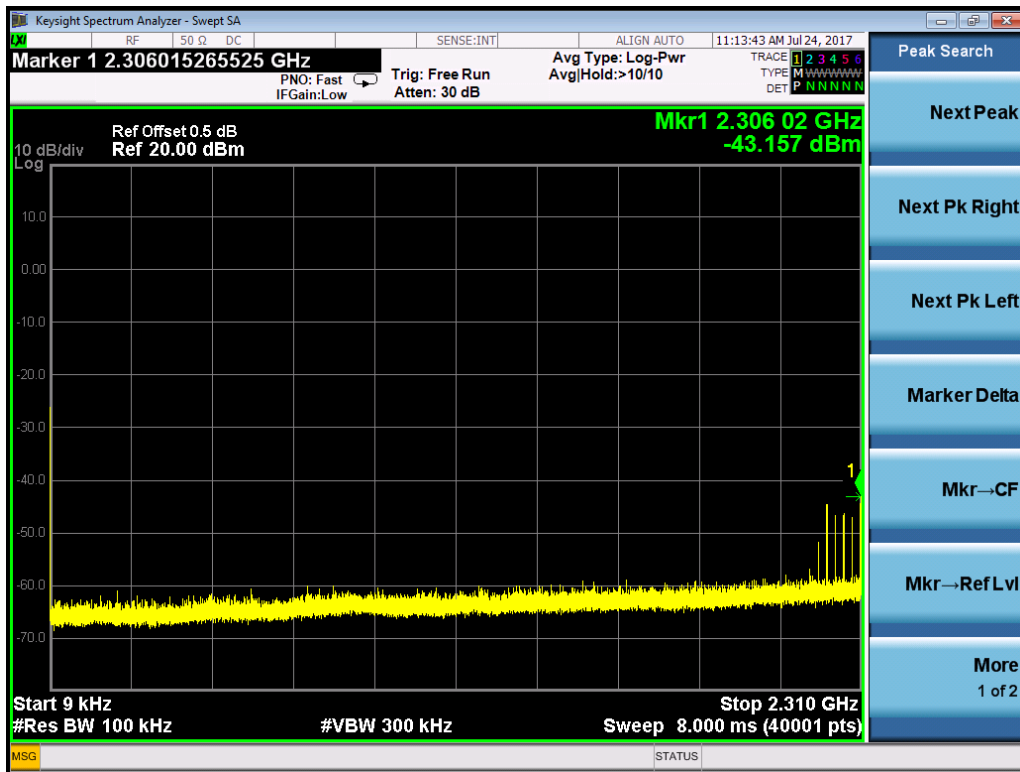
## Hopping



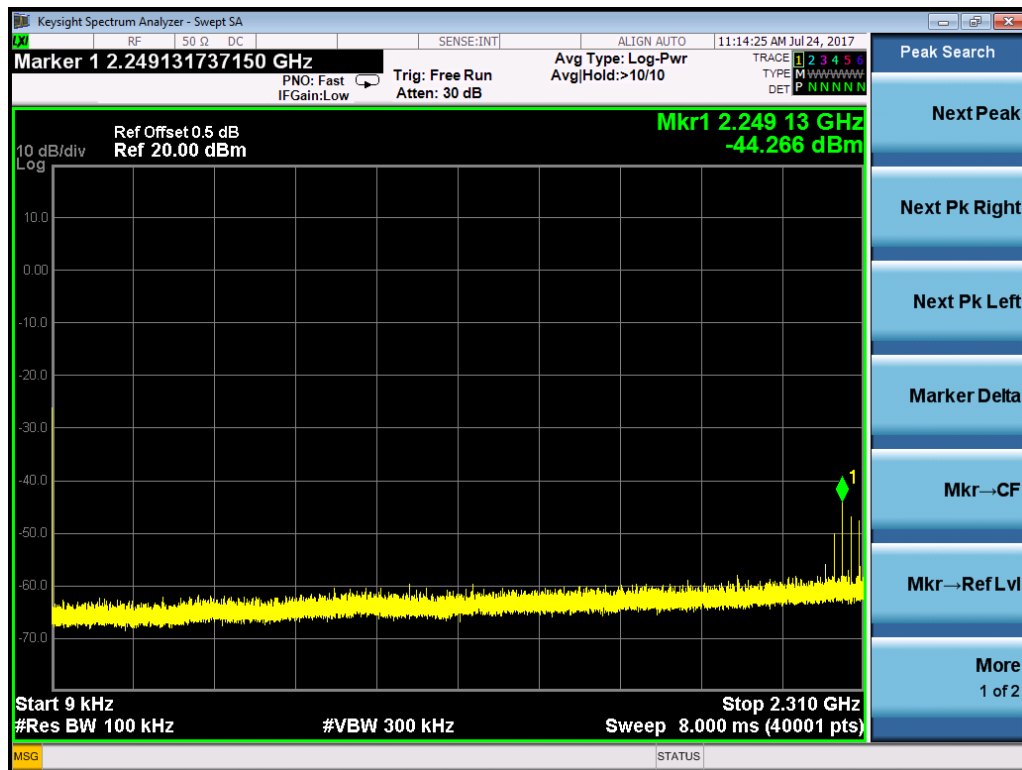
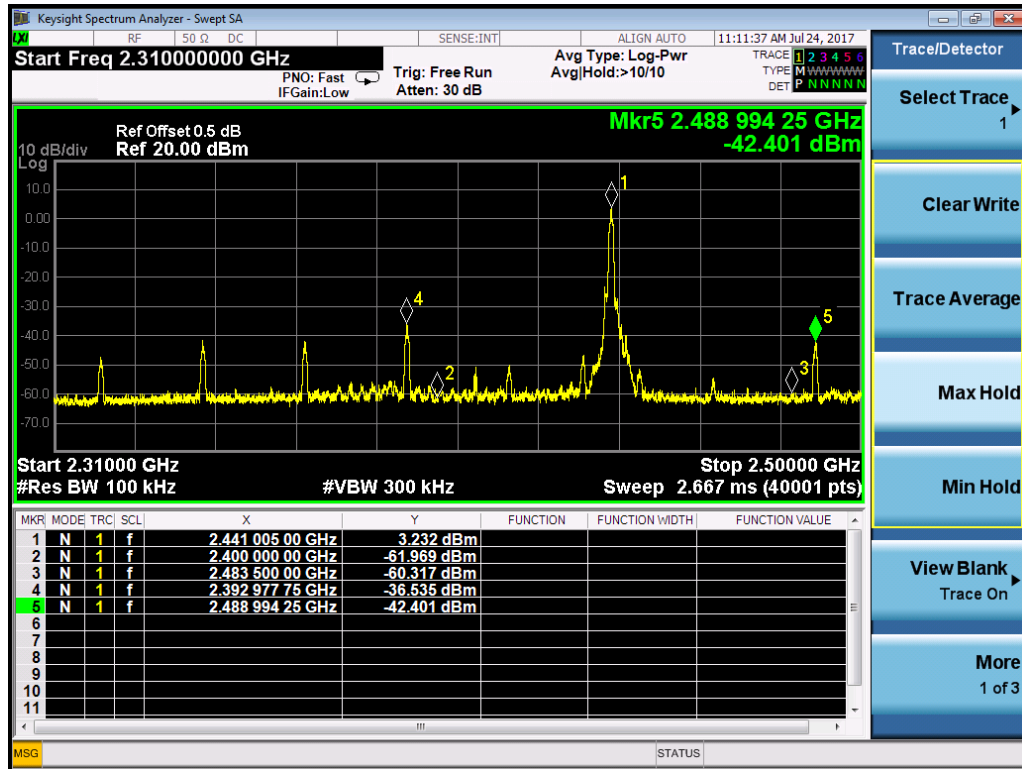
Modulation	Channel	Result	Limit (dBm)
$\pi/4$ -DQPSK	L	Pass	$\geq 20$
	M	Pass	$\geq 20$
	H	Pass	$\geq 20$
	Hopping	Pass	$\geq 20$

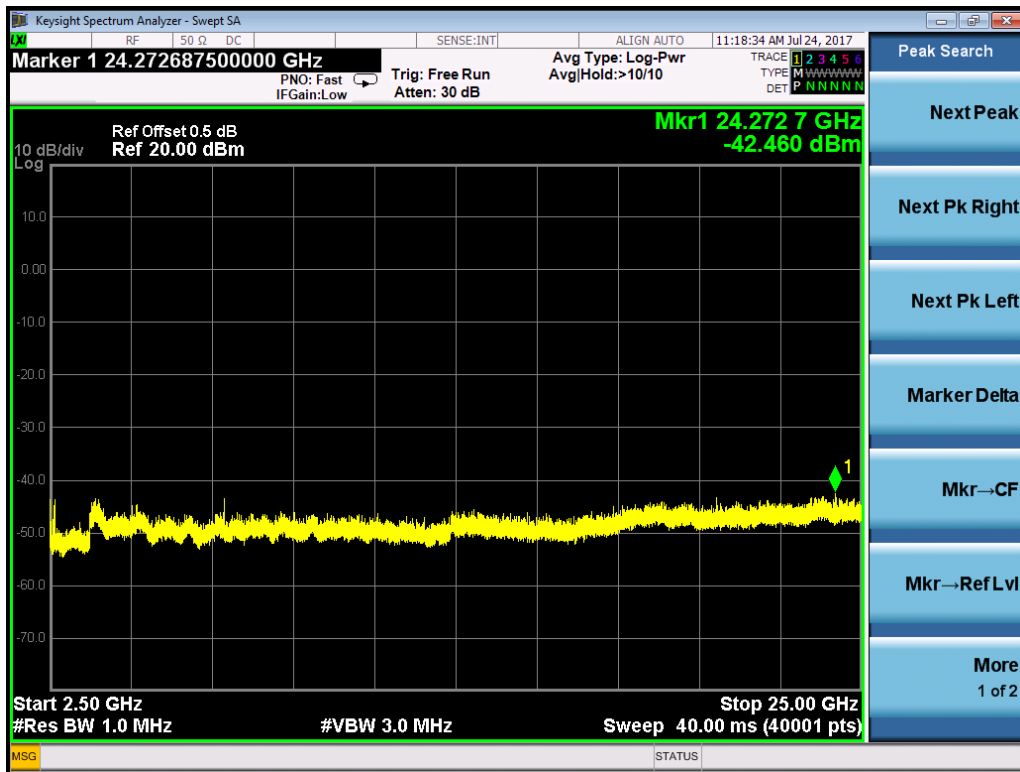
### Channel L



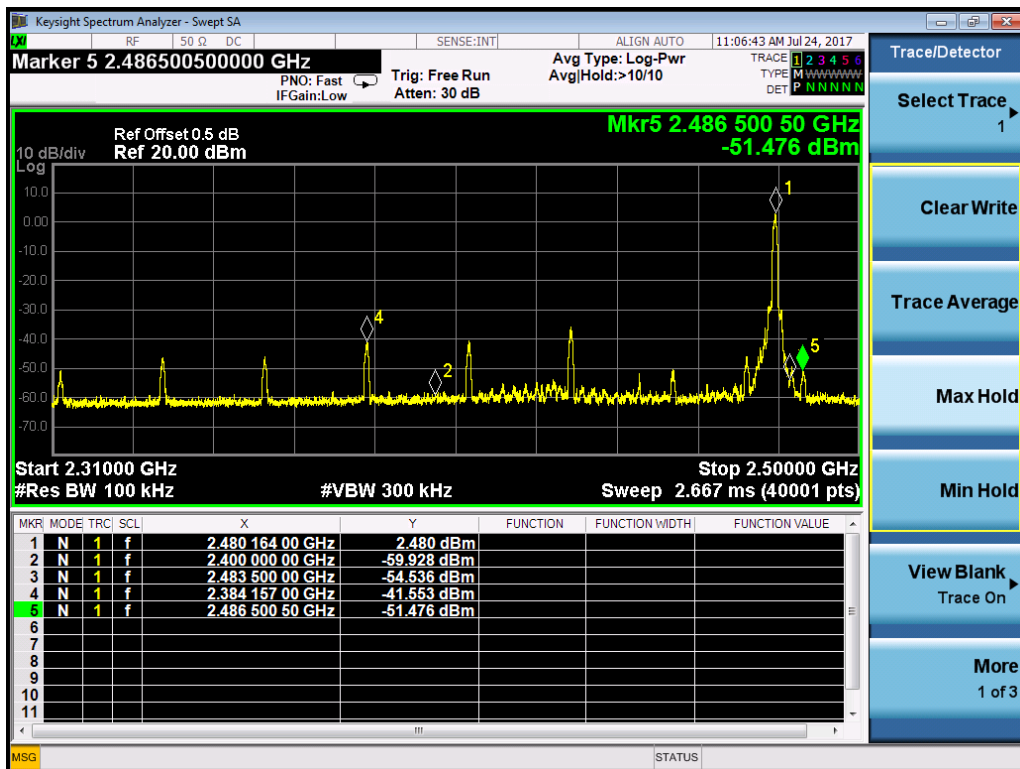


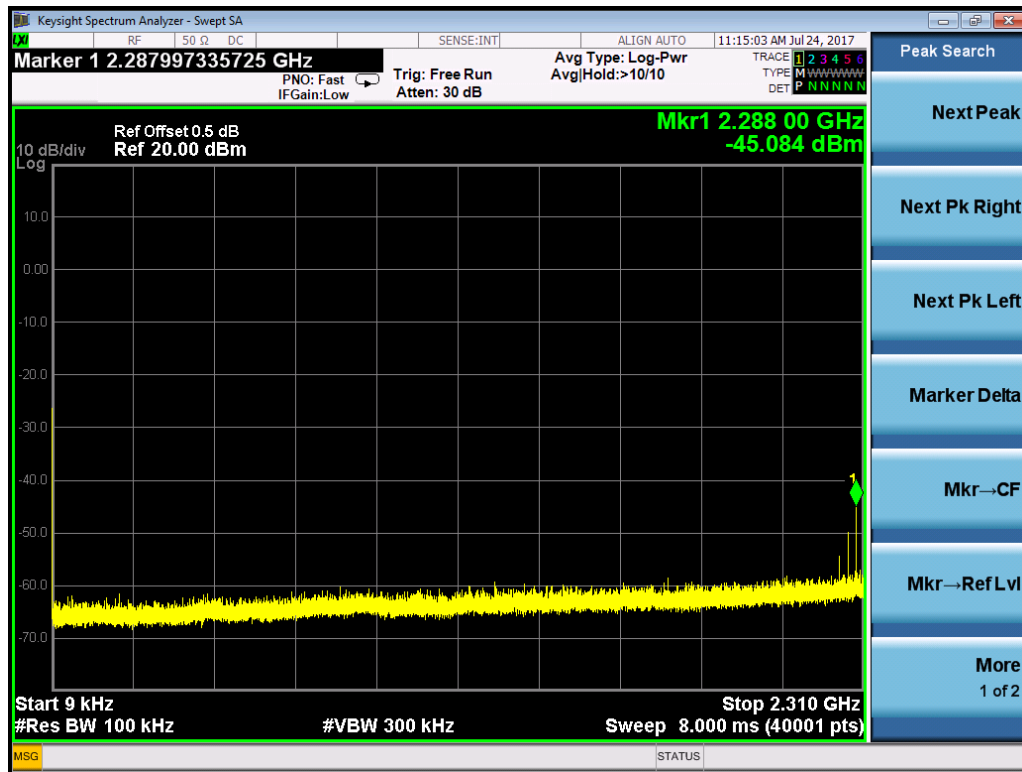
### Channel M



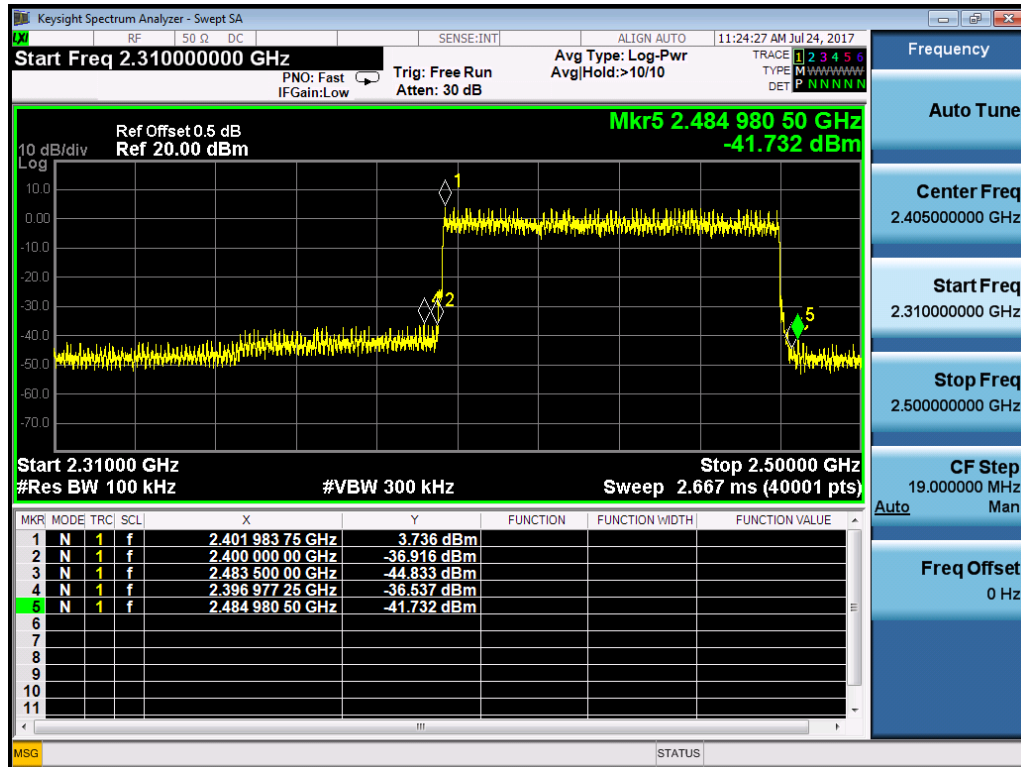


### Channel H



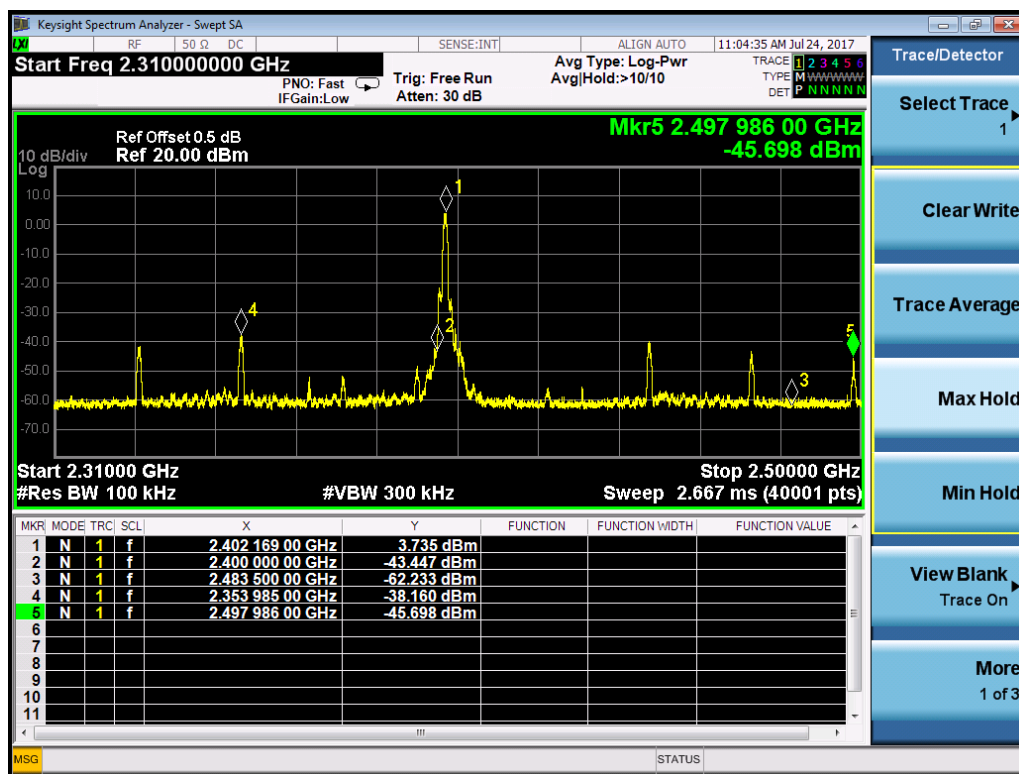


## Hopping

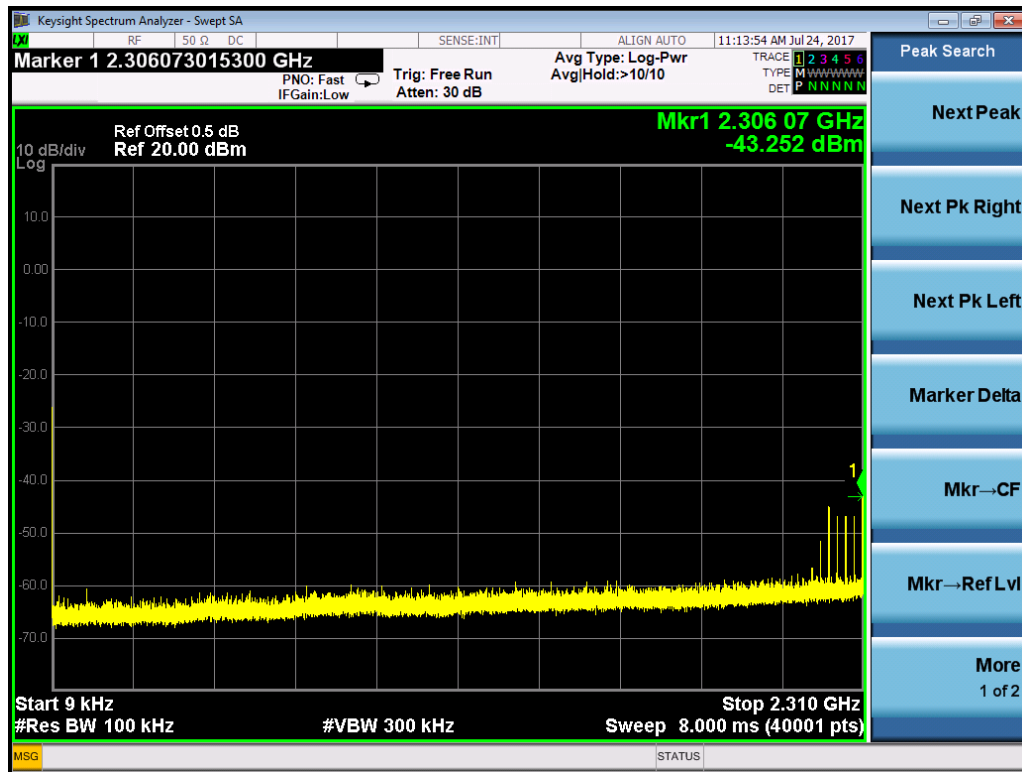


Modulation	Channel	Result	Limit (dBm)
8DPSK	L	Pass	$\geq 20$
	M	Pass	$\geq 20$
	H	Pass	$\geq 20$
	Hopping	Pass	$\geq 20$

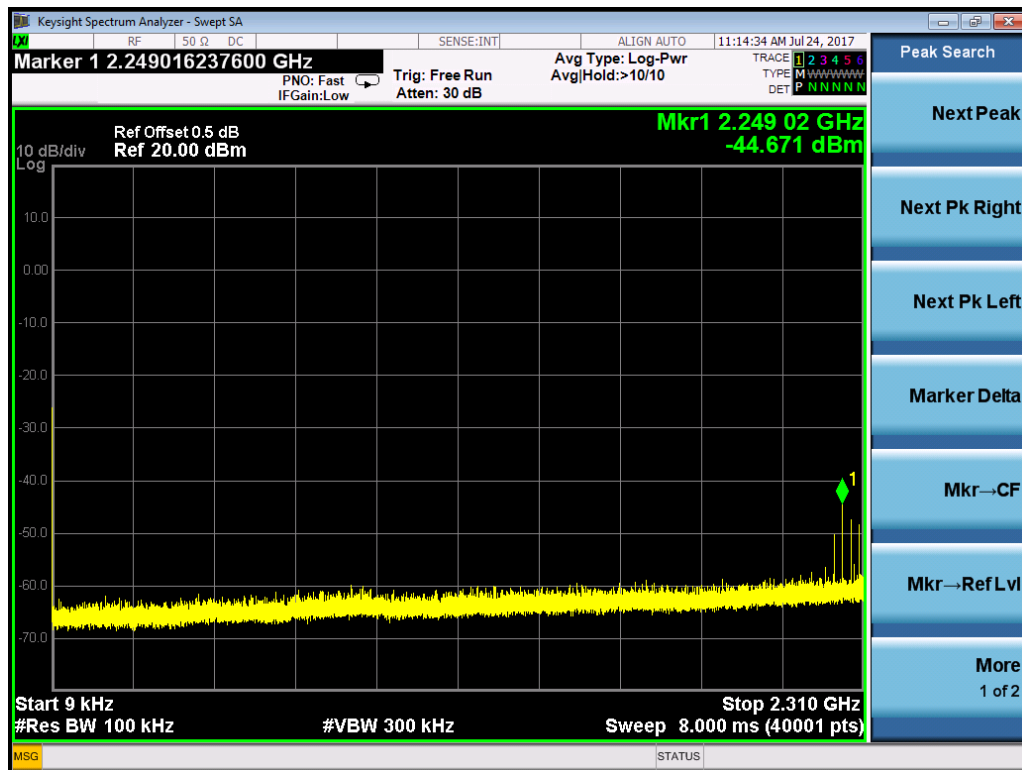
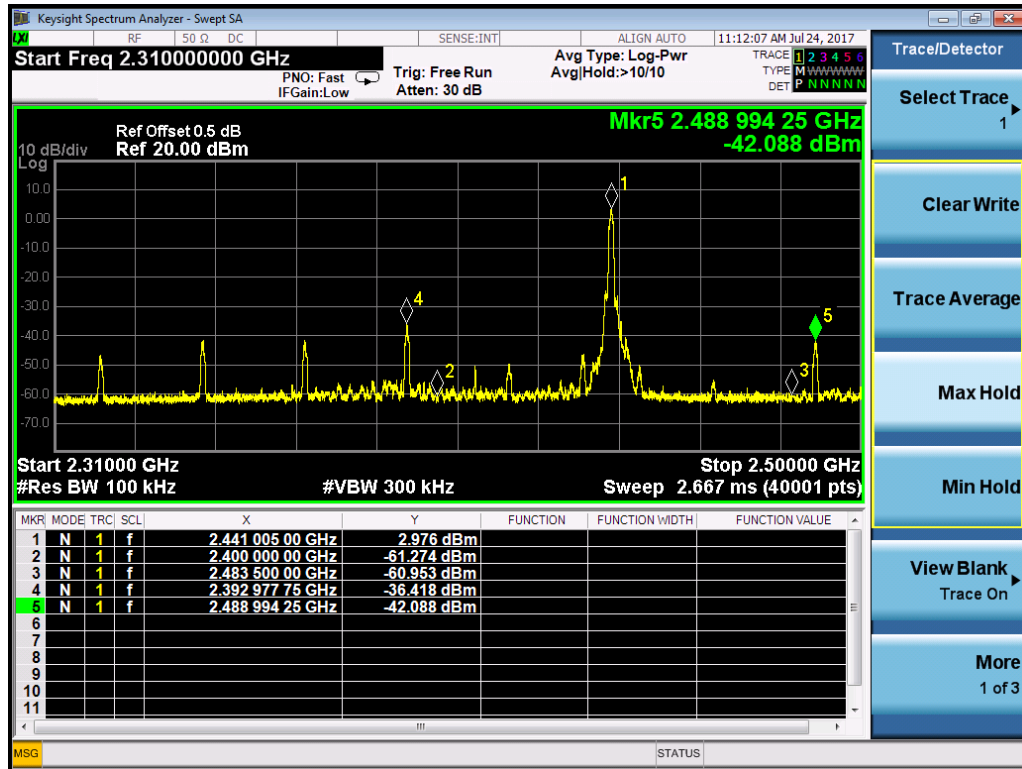
Channel L





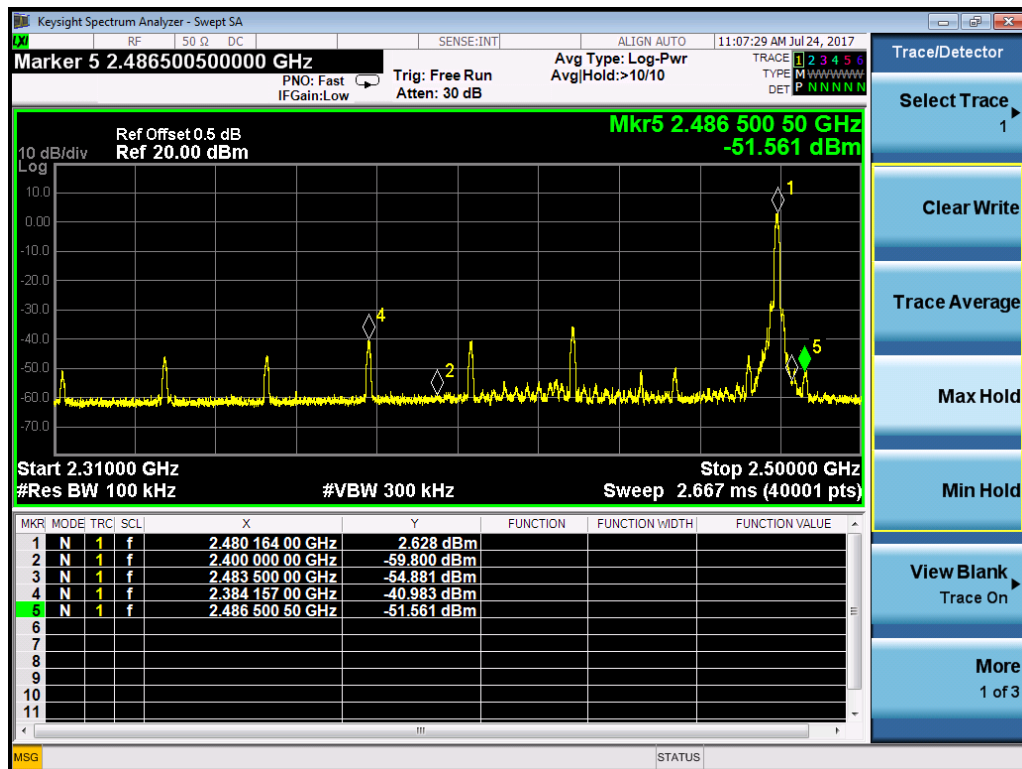


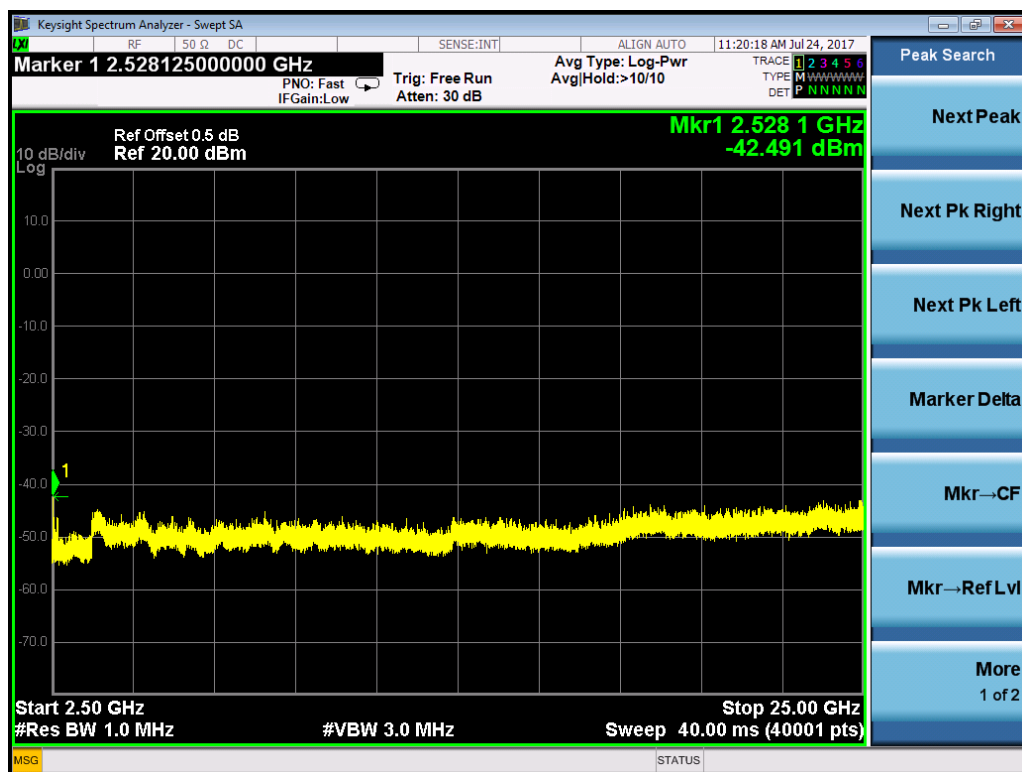
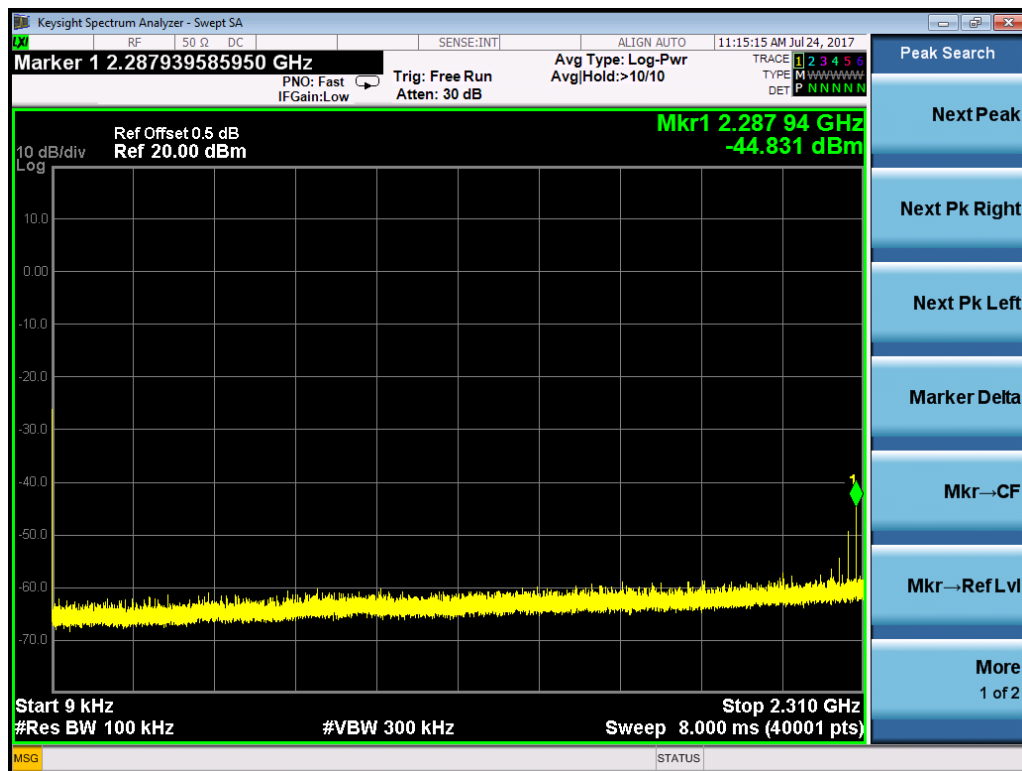
### Channel M



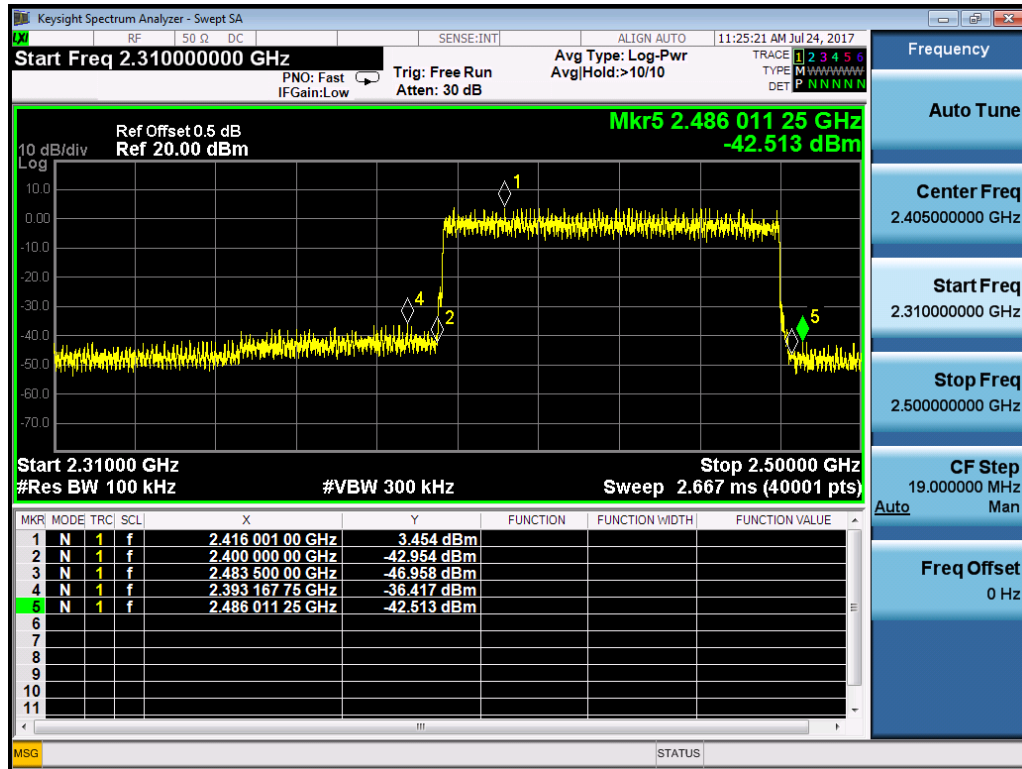


### Channel H





## Hopping



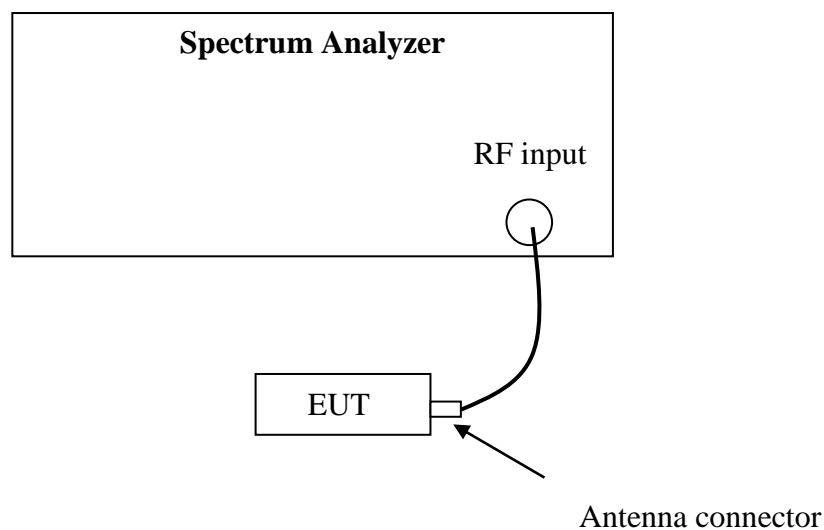
## 7 Number of Hopping Frequencies

**Test result:** Pass

### 7.1 Test limit

Number of Hopping Frequencies in the 2400-2483.5 MHz band shall use at least 15 channels.

### 7.2 Test Configuration



### 7.3 Test procedure and test setup

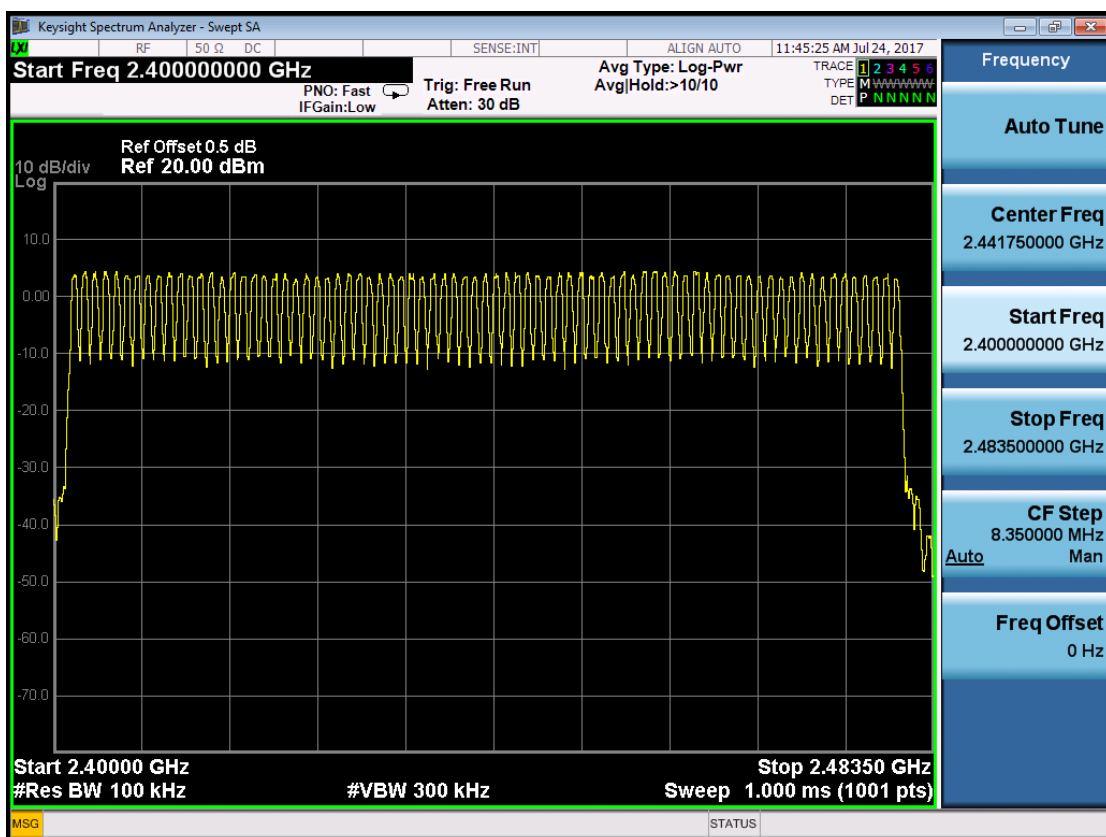
The Number of Hopping Frequencies per FCC § 15.247(a)(1)(iii) is measured using the Spectrum Analyzer with RBW=100kHz, VBW $\geq$ RBW, Sweep = auto, Detector = peak, Trace = max hold.  
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems).

## 7.4 Test Protocol

Temperature: 22°C

Relative Humidity: 54%

Number of Hopping Frequencies	Limit
79	≥15



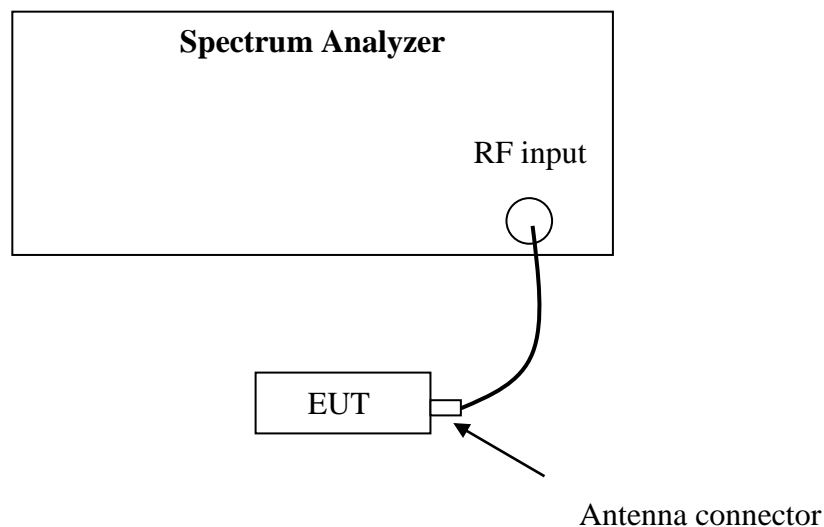
## 8 Dwell Time

**Test result:** Pass

### 8.1 Test limit

The dwell time 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.

### 8.2 Test Configuration



### 8.3 Test procedure and test setup

Dwell time per FCC § 15.247(a)(1)(iii) is measured using the Spectrum Analyzer with Span = 0, RBW=1MHz, VBW $\geq$ RBW, Sweep can capture the entire dwell time, Detector = peak, Trace = max hold.

The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems).

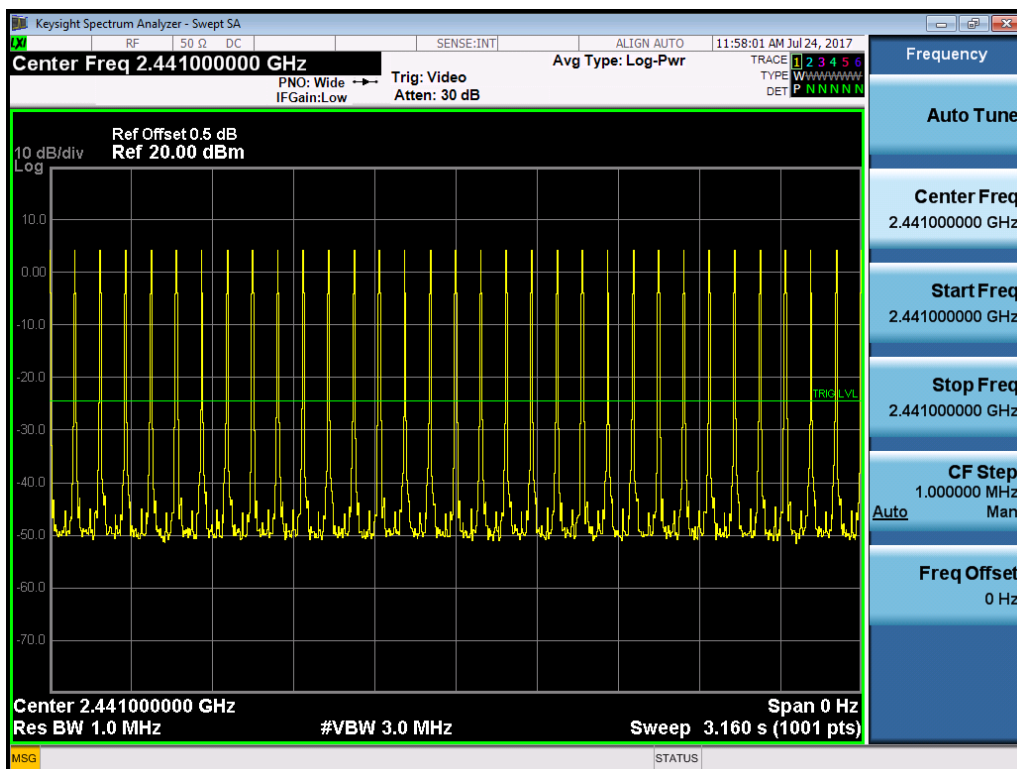
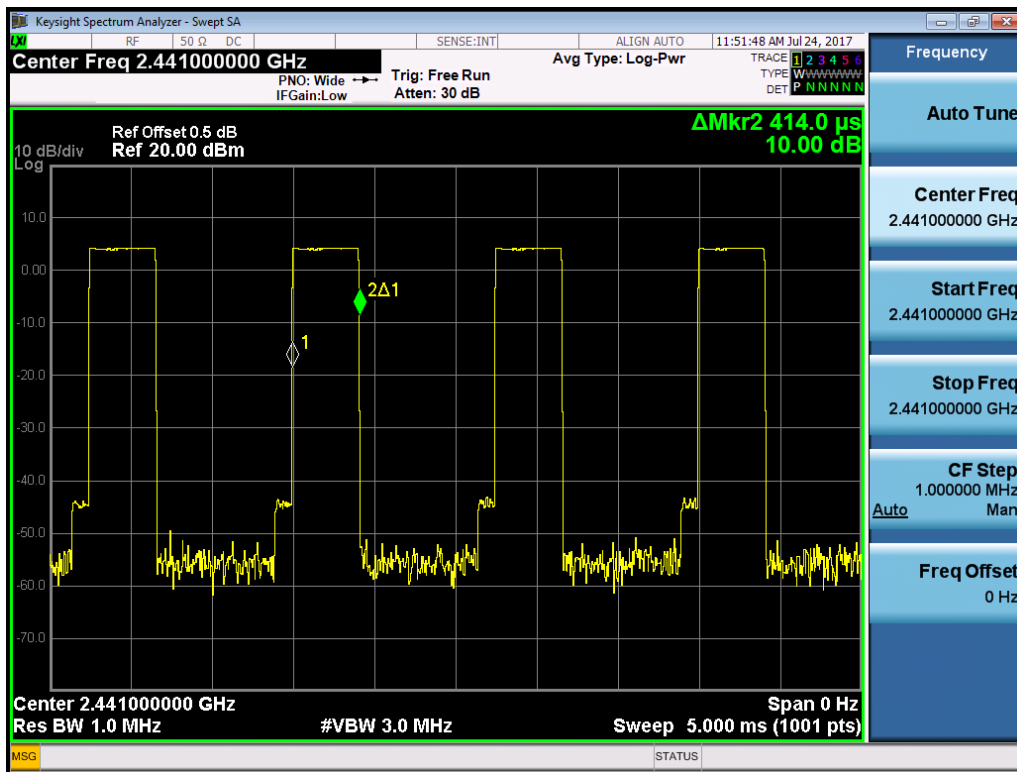


Temperature: 22°C  
Relative Humidity: 54%

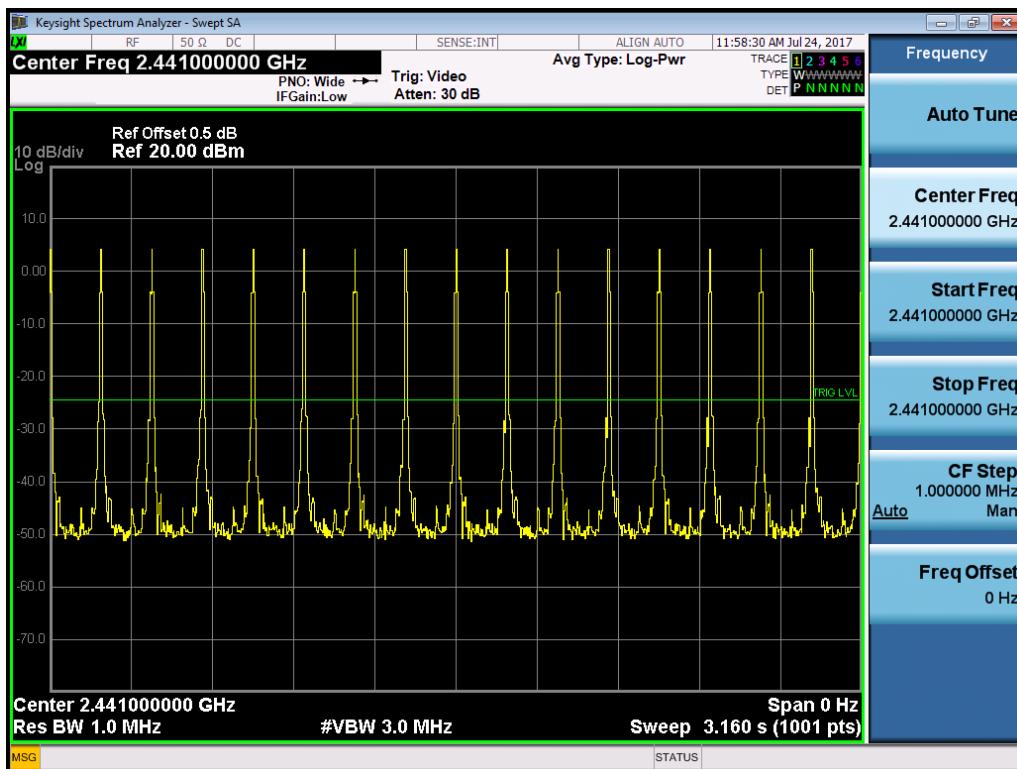
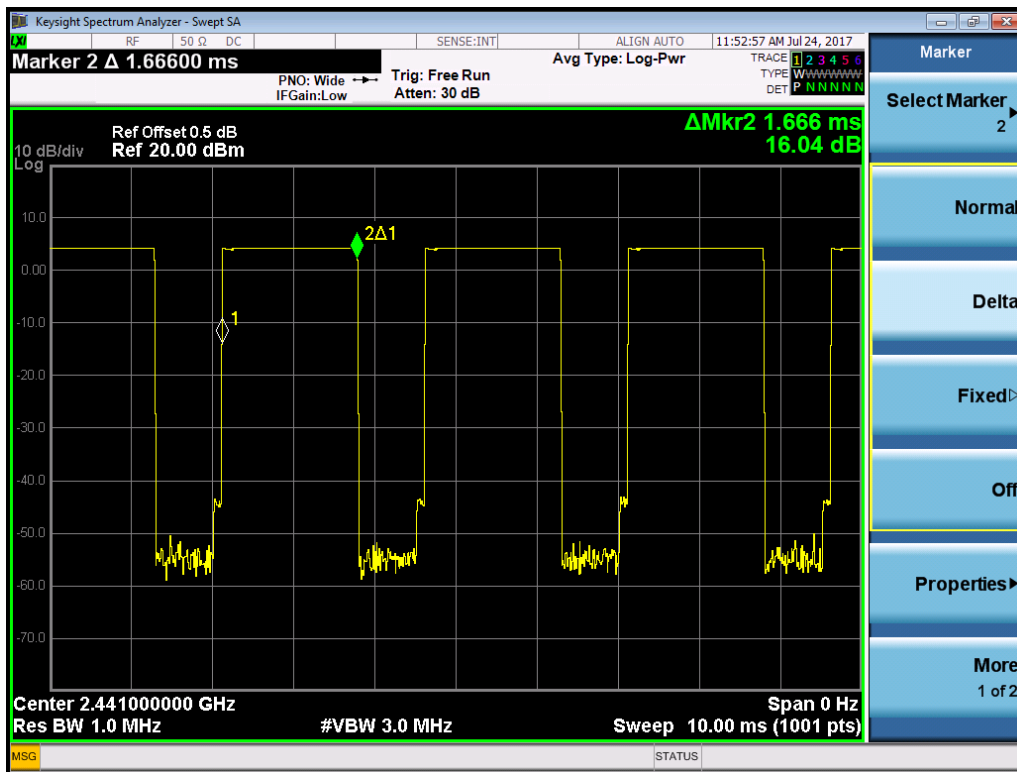
Packet	Occupancy time for single hop (ms) O	Channel	Real observed period (s) P	Hops among Observed period I	Dwell time (ms) T	Limit (s)
DH1	0.414	L	3.16	32	132.48	≤0.4
		M	3.16	32	132.48	
		H	3.16	32	132.48	
DH3	1.666	L	3.16	16	266.56	
		M	3.16	16	266.56	
		H	3.16	16	266.56	
DH5	2.926	L	3.16	11	347.60	
		M	3.16	11	347.60	
		H	3.16	11	347.60	

Remark: 1. There are 79 channels in all. So the complete observed period  $P = 0.4 * 79 = 31.6$  s.  
2. Average time of occupancy  $T = O * I * 31.6 / P$

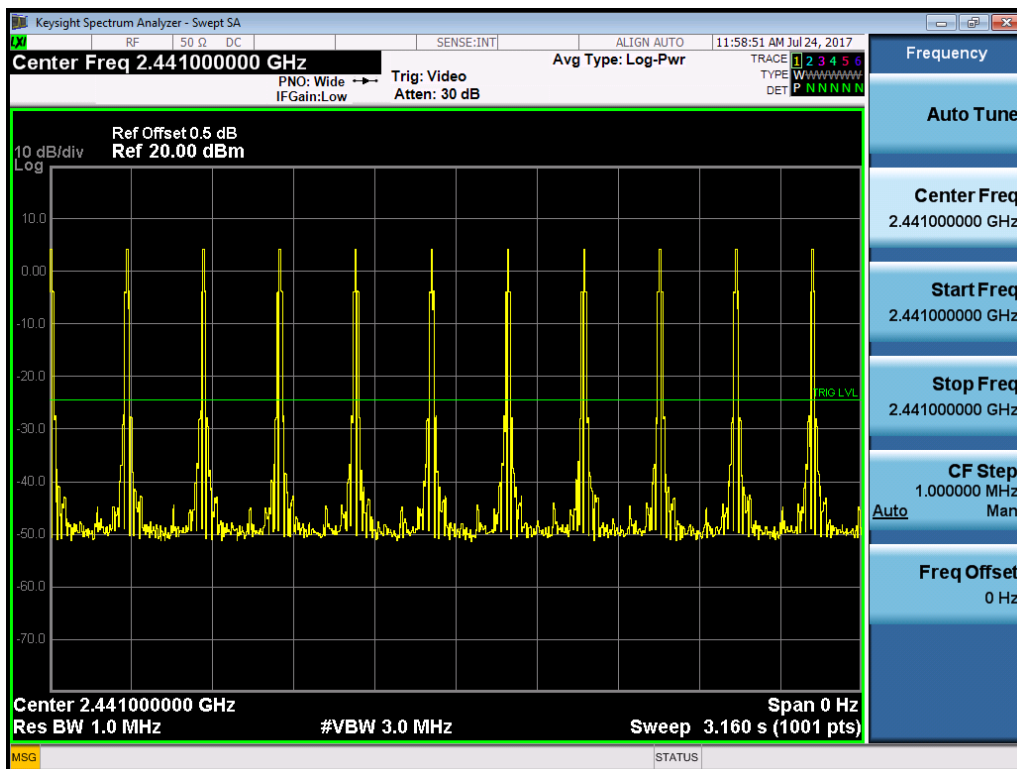
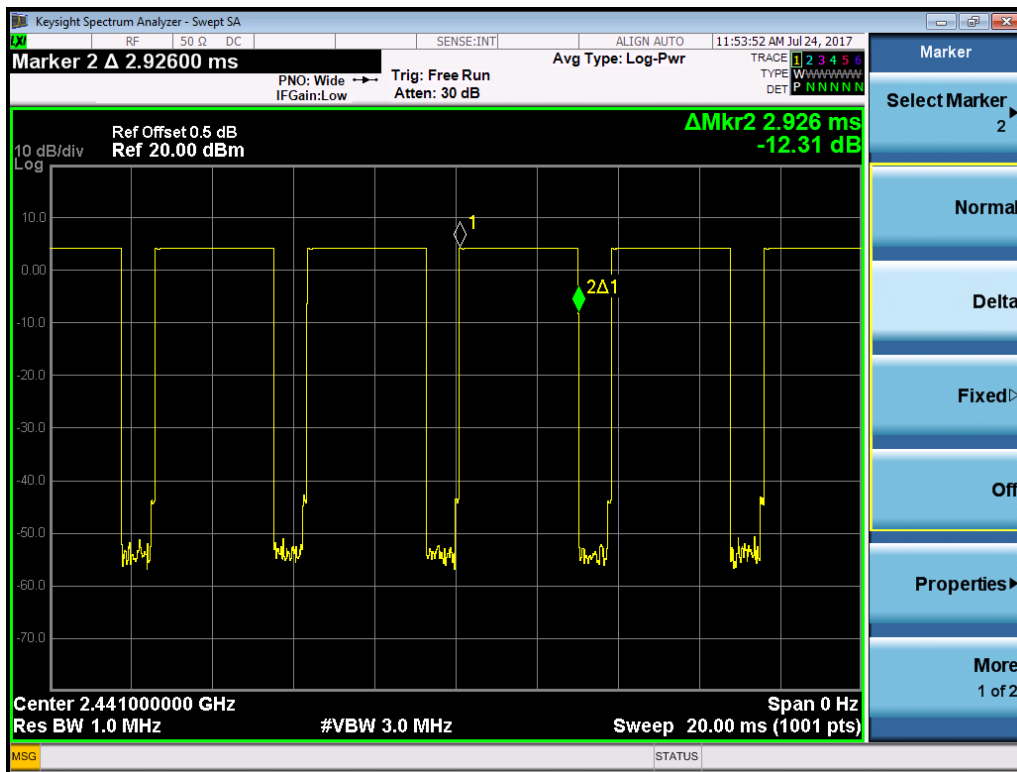
# DH1



### DH3



DH5



## 9 Radiated Emissions in restricted frequency bands

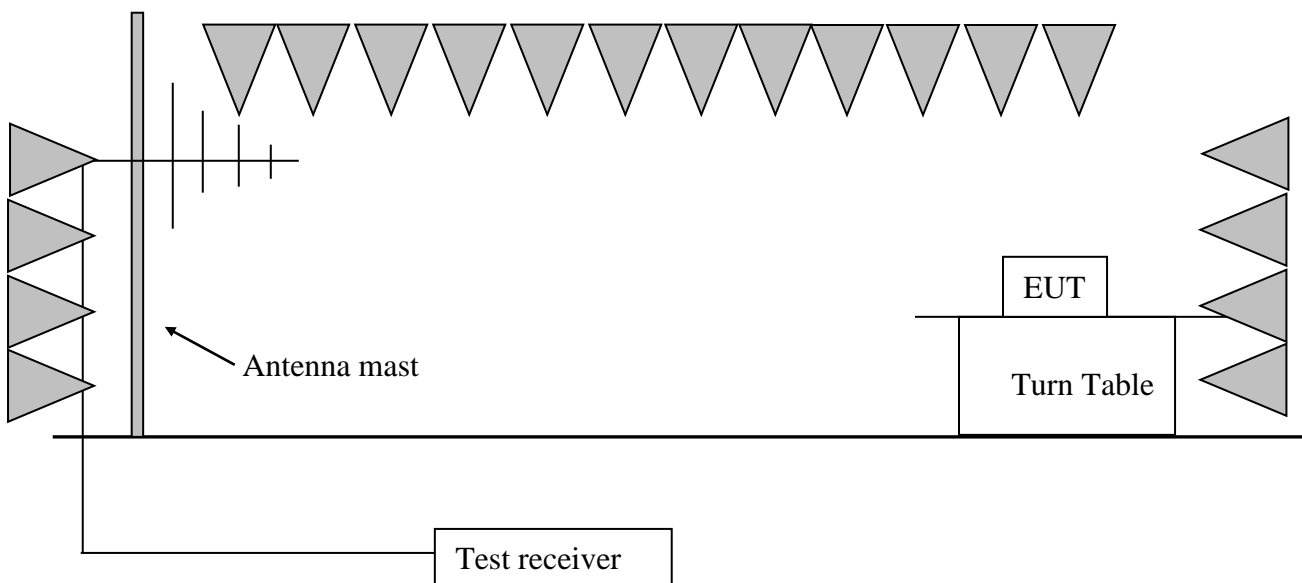
**Test result:** Pass

### 9.1 Test limit

The 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) showed as below:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
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

### 9.2 Test Configuration



### 9.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m.

The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1 meter to 4 meters to find out the maximum emission level.

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

RBW = 300 Hz, VBW = 1 kHz (9 kHz~150 kHz);  
RBW = 10 kHz, VBW = 30 kHz (150 kHz~30MHz);  
RBW = 100 kHz, VBW = 300 kHz (30MHz~1GHz for PK)  
RBW = 1MHz, VBW = 3MHz (>1GHz for PK);

Remark:

1. Factor= Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Measured level= Original Receiver Reading + Factor
3. Margin = Limit – Measured level
4. If the PK measured level is lower than AV limit, the AV test can be elided.

Example:

Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,  
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.  
Then Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;  
Measured level = 10dBuV + 0.20dB/m = 10.20dBuV/m  
Assuming limit = 54dBuV/m,  
Measured level = 10.20dBuV/m, then Margin = 54 - 10.20 = 43.80dBuV/m.

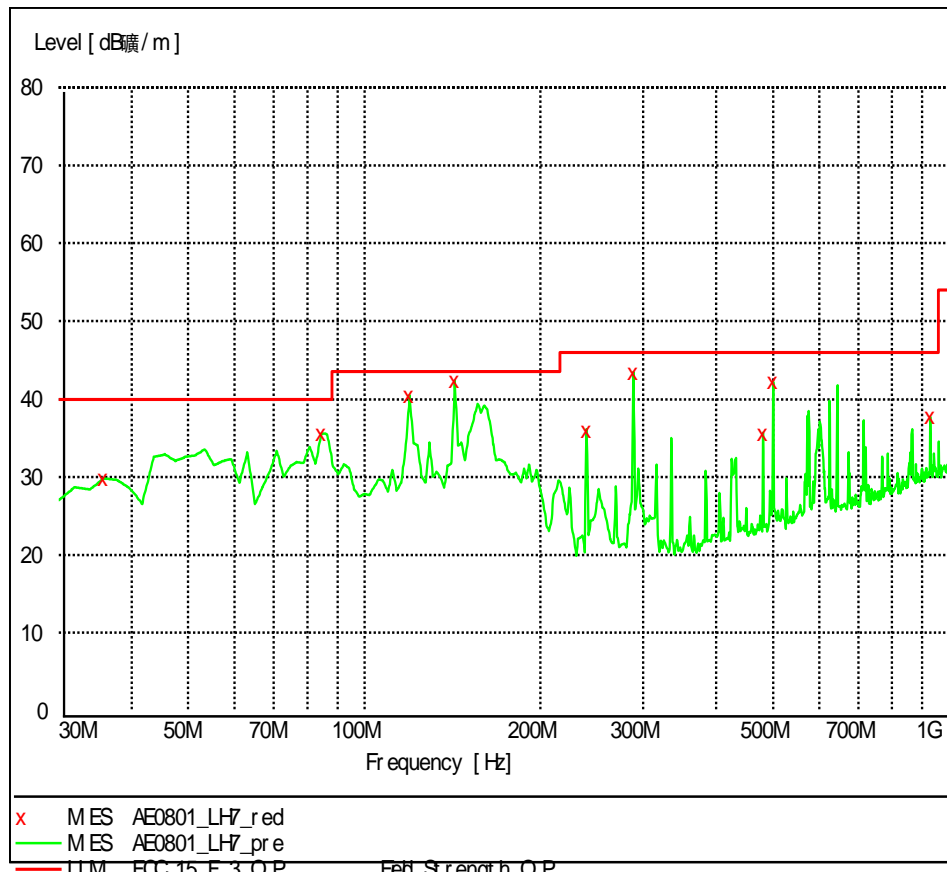
## 9.4 Test Protocol

Temperature: 22°C  
Relative Humidity: 54%

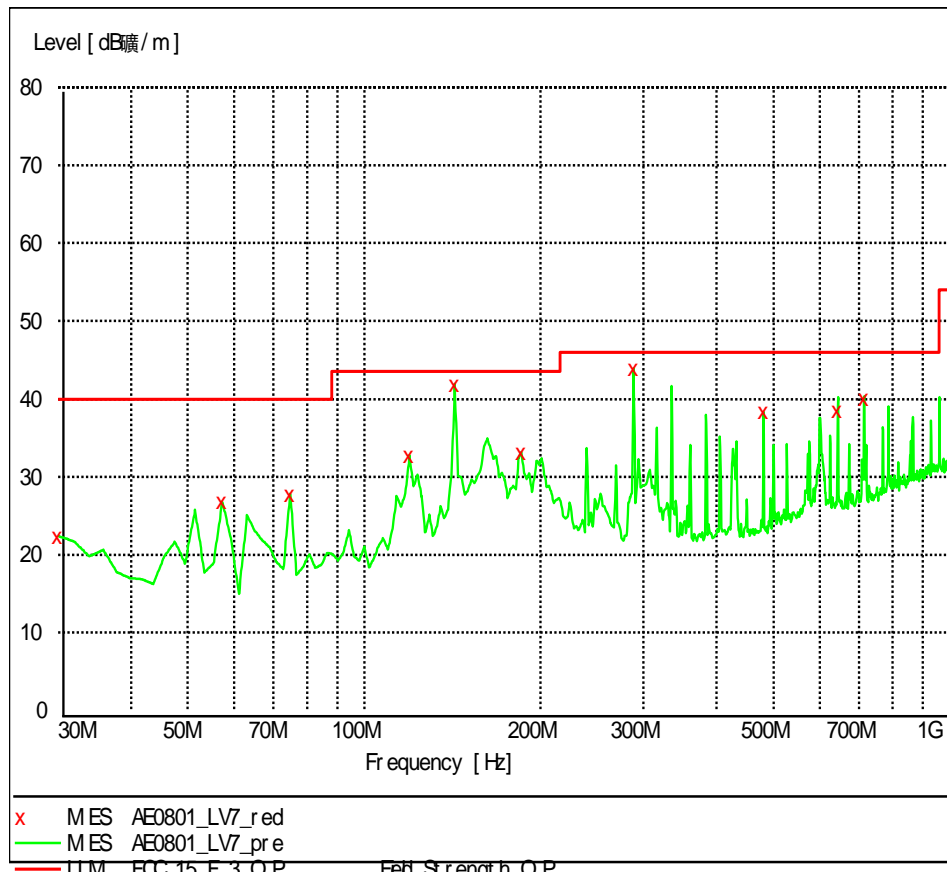
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

The worst waveform from 30MHz to 1000MHz is listed as below:

Horizontal



### Vertical



### Test result below 1GHz:

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	35.83	29.80	16.6	40.00	10.20	PK
H	84.43	35.60	9.3	40.00	4.40	PK
H	119.42	40.50	14.0	43.50	3.00	PK
H	142.75	42.40	12.8	43.50	1.10	PK
H	239.94	36.10	13.7	46.00	9.90	PK
H	288.54	43.40	15.3	46.00	2.60	PK
H	480.98	35.70	19.9	46.00	10.30	PK
H	500.42	42.30	20.2	46.00	3.70	PK
H	930.02	37.80	25.2	46.00	8.20	PK
V	30.00	22.40	21.0	40.00	17.60	PK
V	57.21	26.80	7.9	40.00	13.20	PK



V	74.71	27.80	8.6	40.00	12.20	PK
V	119.42	32.80	14.0	43.50	10.70	PK
V	142.75	41.90	12.8	43.50	1.60	PK
V	185.51	33.20	11.6	43.50	10.30	PK
V	288.54	43.90	15.3	46.00	2.10	PK
V	480.98	38.40	19.9	46.00	7.60	PK
V	644.27	38.60	22.0	46.00	7.40	PK
V	714.75	40.20	22.6	46.00	5.80	PK

**Test result above 1GHz (The Bluetooth was tested with and without WiFi connected, and the worst data was listed as below):**

The emission was conducted from 1GHz to 25GHz

GFSK:

Channel	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2401.96	99.90	34.34	Fundamental	/	PK
	V	2353.85	58.80	34.10	74.00	15.20	PK
	V	2353.85	28.70	34.10	54.00	25.30	AV
	V	4803.92	51.80	-3.55	74.00	22.20	PK
M	V	2440.94	97.90	34.60	Fundamental	/	PK
	V	2368.70	52.50	-3.35	74.00	26.80	PK
H	V	2479.90	98.30	34.62	Fundamental	/	PK
	V	2484.04	54.10	34.63	74.00	19.90	PK
	V	2484.04	24.10	34.63	54.00	29.90	AV
	V	4960.16	48.70	-3.16	74.00	25.30	PK

8DPSK

Channel	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
---------	---------	-----------------	----------------------------	-----------------------	----------------	-------------	----------

L	V	2401.82	95.30	34.30	Fundamental	/	PK
	V	2353.85	55.40	33.60	74.00	18.60	PK
	V	4803.95	48.50	-3.55	74.00	26.40	PK
M	V	2440.94	97.90	34.60	Fundamental	/	PK
H	V	2479.90	96.50	34.62	Fundamental	/	PK
	V	2383.81	52.00	34.63	74.00	22.00	PK

- Remark: 1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)  
2. Corrected Reading = Original Receiver Reading + Correct Factor  
3. Margin = limit – Corrected Reading  
7. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on  $0.625 * 5$  per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1 \text{ dB}$   
8. Average value = peak reading +  $20\log(\text{duty cycle})$ .

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,  
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.  
Then Correct Factor =  $30.20 + 2.00 - 32.00 = 0.20\text{dB/m}$ ; Corrected Reading =  $10\text{dBuV} + 0.20\text{dB/m} = 10.20\text{dBuV/m}$   
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then  
Margin =  $54 - 10.20 = 43.80\text{dBuV/m}$

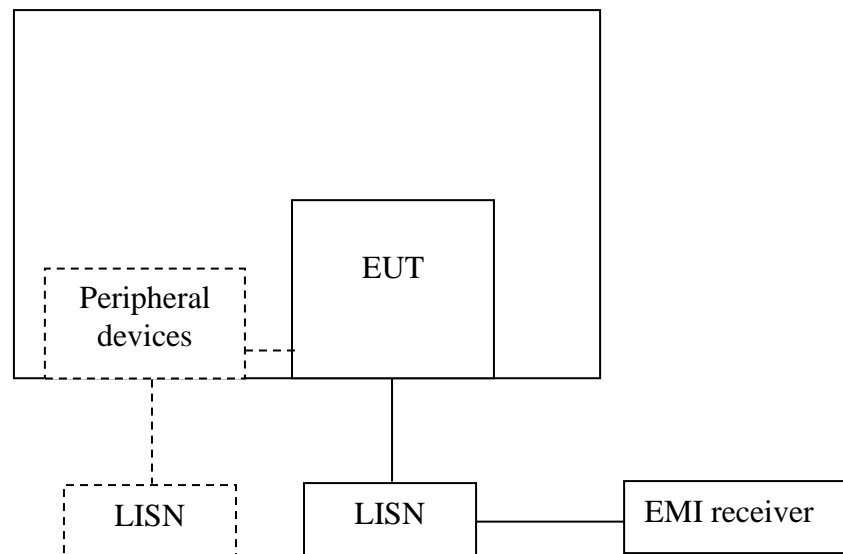
## 10 Power line conducted emission

**Test result:** NA

### 10.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
0.15-0.5	66 to 56*	56 to 46 *
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

### 10.2 Test configuration



- ☐ For table top equipment, wooden support is 0.8m height table
- ☐ For floor standing equipment, wooden support is 0.1m height rack.

### **10.3 Test procedure and test set up**

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50  $\Omega$  LISN port (to which the EUT is connected), where permitted, terminated into a 50  $\Omega$  measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50  $\Omega$  measuring port is terminated by a measuring instrument having 50  $\Omega$  input impedance. All other ports are terminated in 50  $\Omega$  loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.10. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

#### **10.4 Test protocol**

Temperature: °C  
Relative Humidity: %

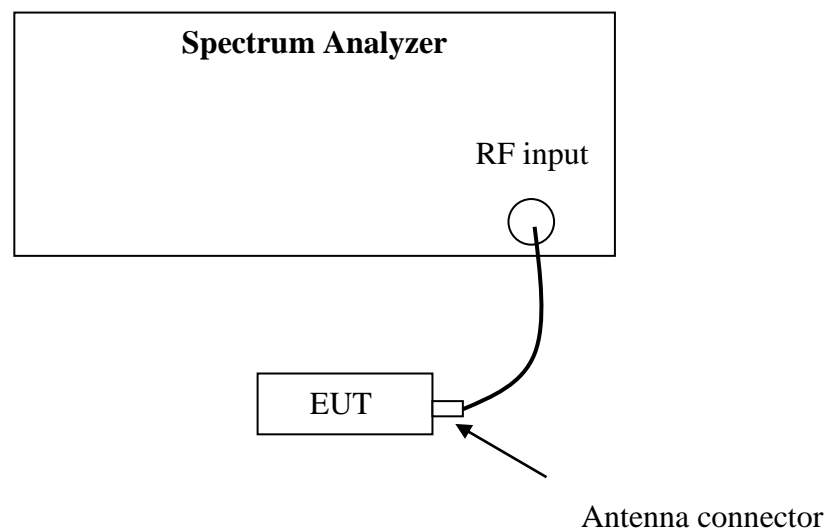
## 11 Occupied Bandwidth

**Test Status: Tested**

### 11.1 Test limit

None

### 11.2 Test Configuration



### 11.3 Test procedure and test setup

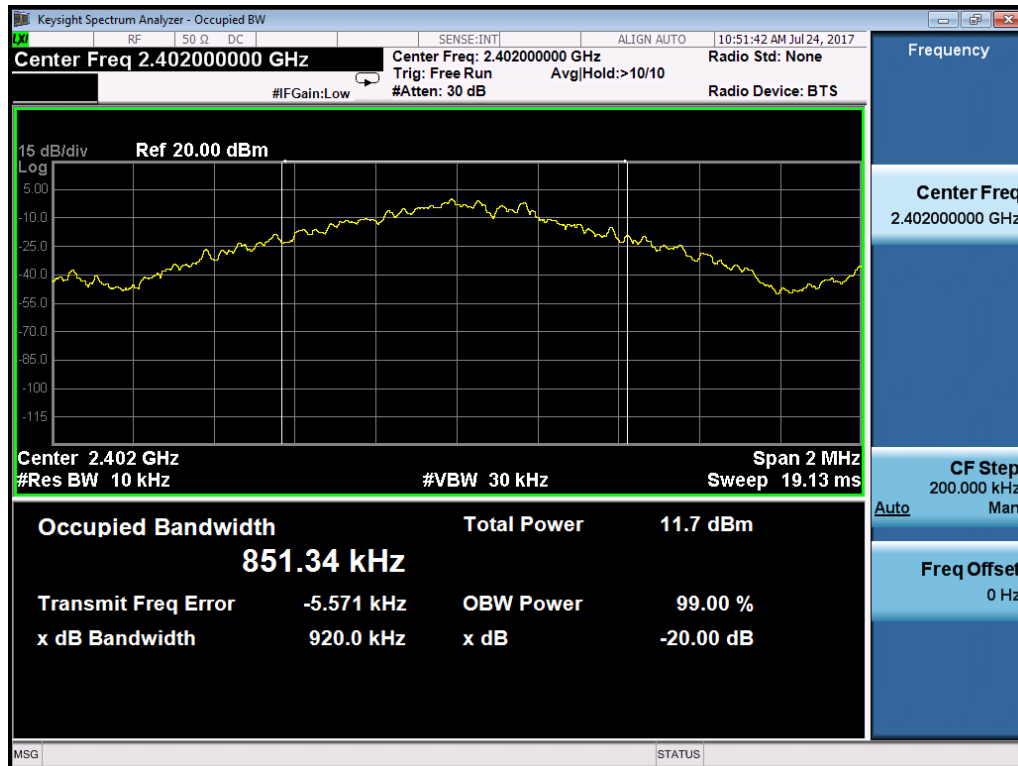
The occupied bandwidth per RSS-Gen Issue 4 Clause 6.6 was measured using the Spectrum Analyzer.

## 11.4 Test protocol

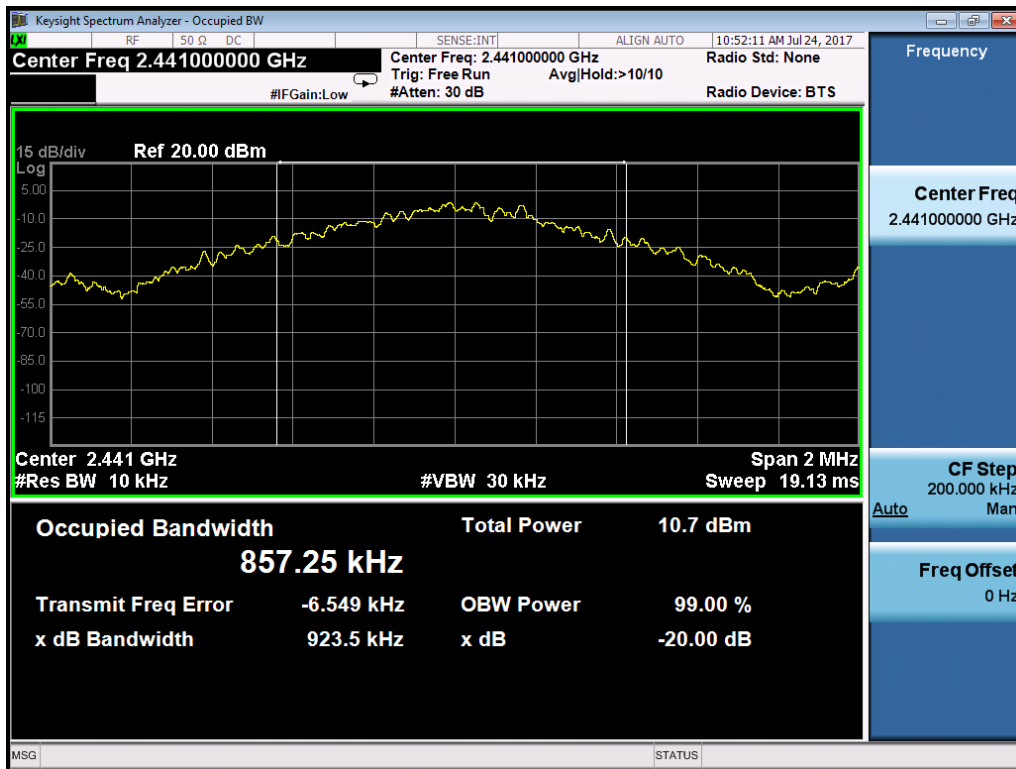
Temperature : 25 °C  
Relative Humidity : 55 %

Modulation	Mode	99% Bandwidth (MHz)
GFSK	L	851.34
	M	857.25
	H	854.74

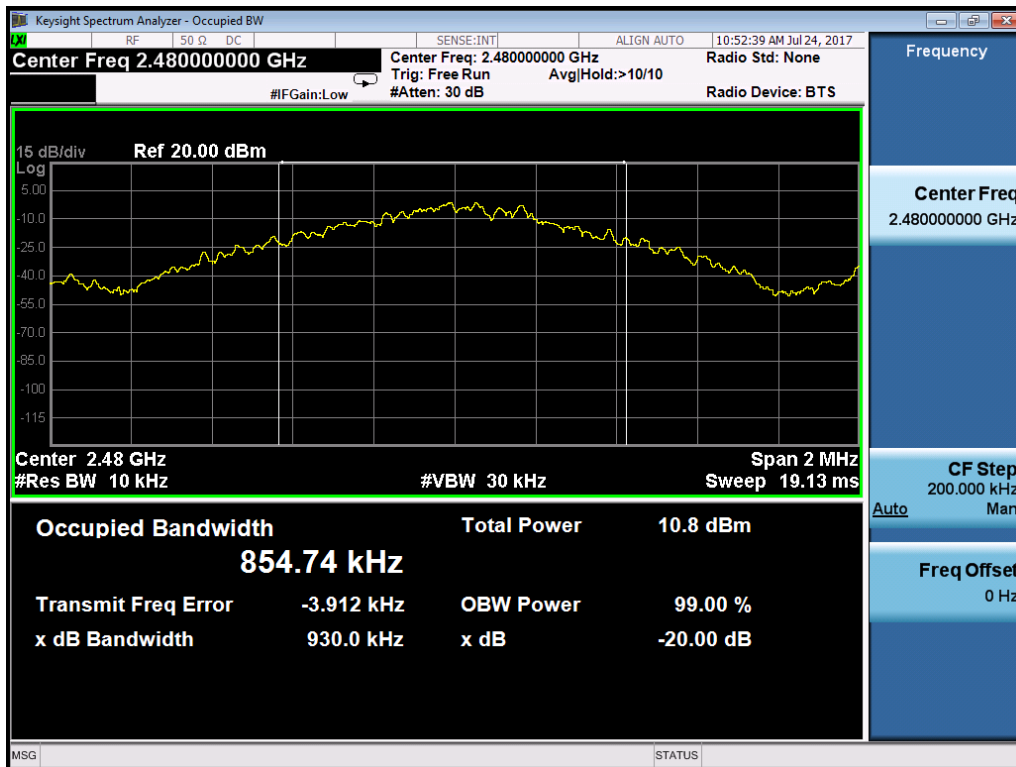
Channel L



### Channel M



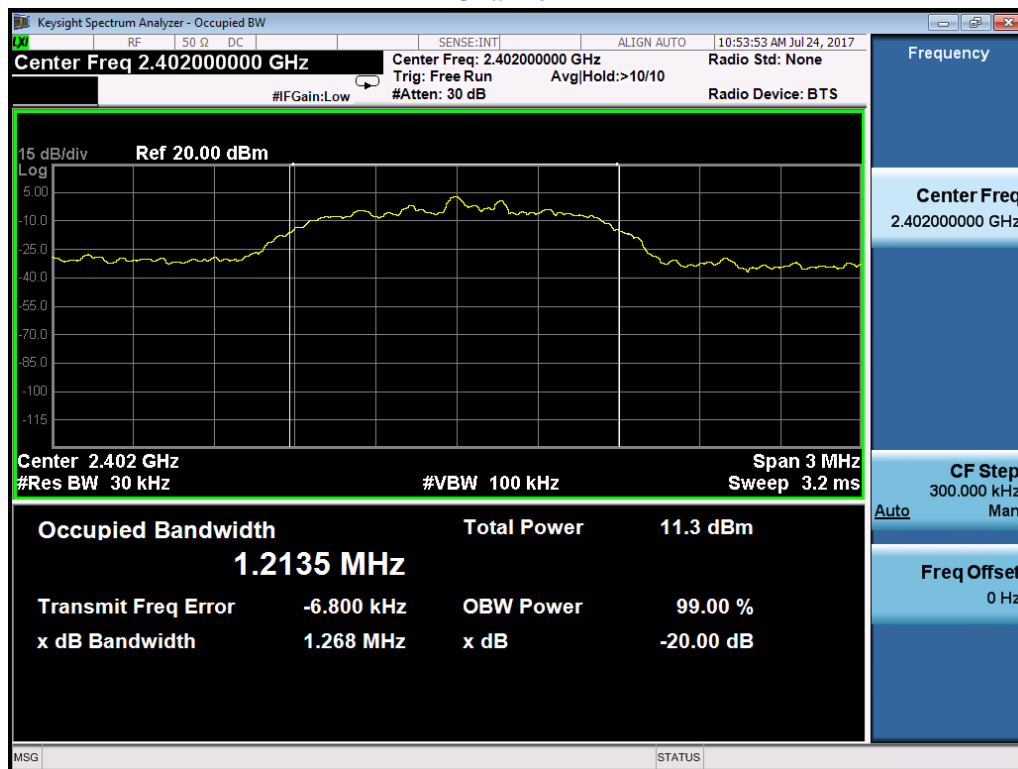
### Channel H



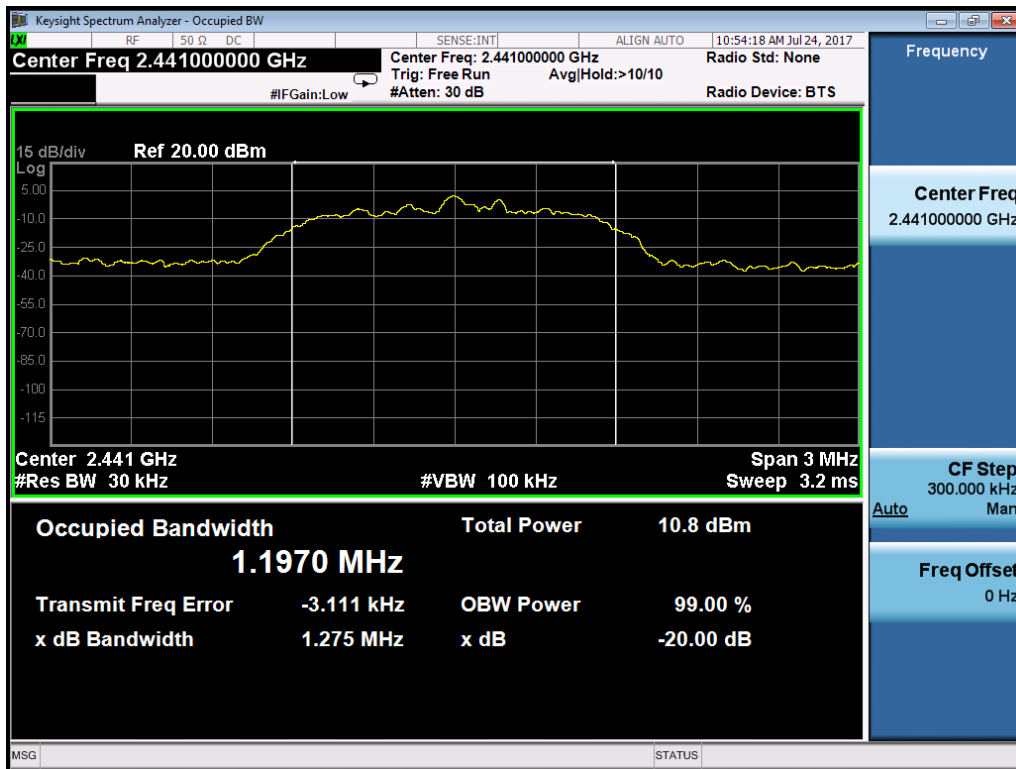


Modulation	Mode	99% Bandwidth (MHz)
$\pi/4$ -DQPSK	L	1.1235
	M	1.1970
	H	1.1810

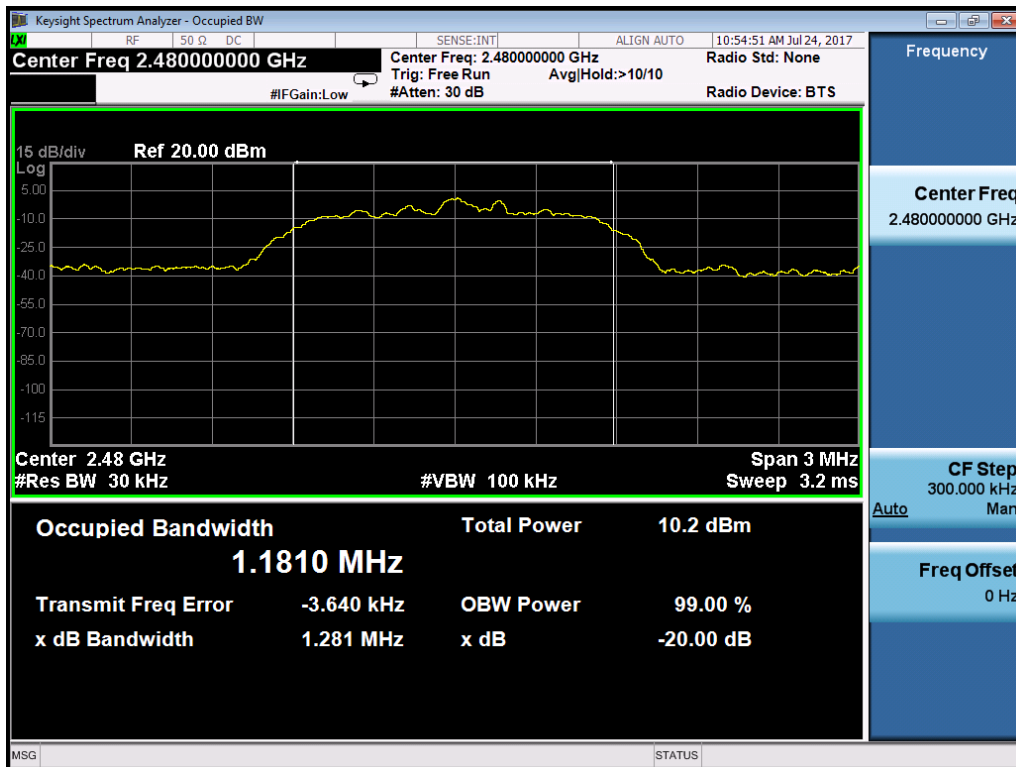
### Channel L



### Channel M

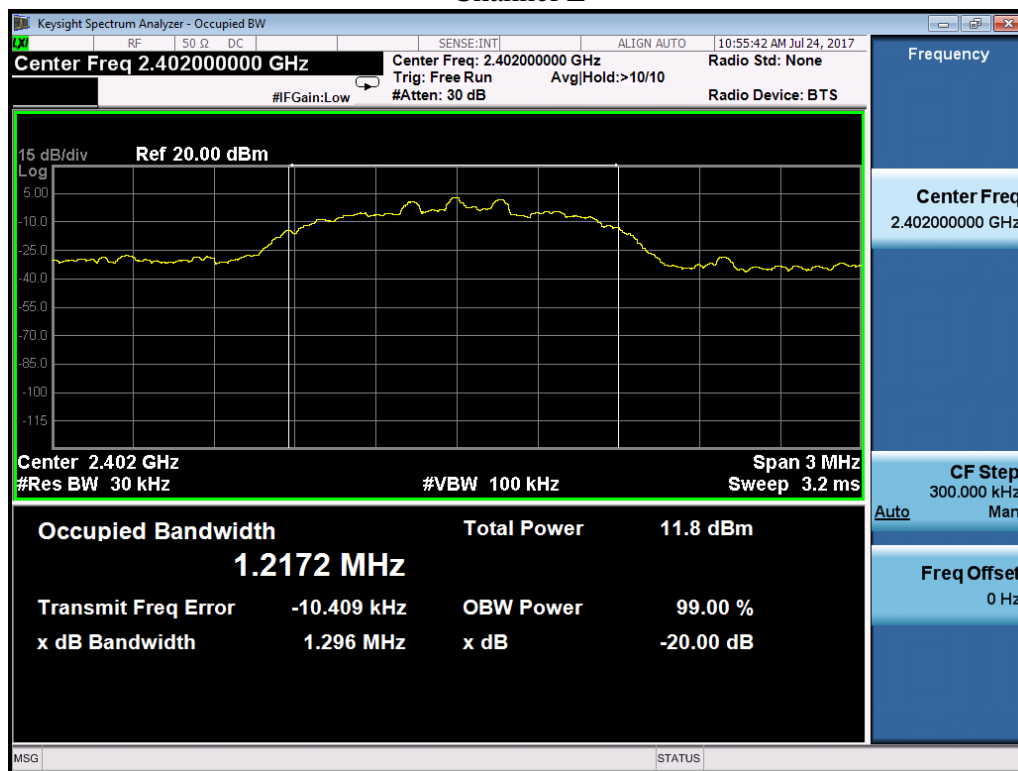


### Channel H

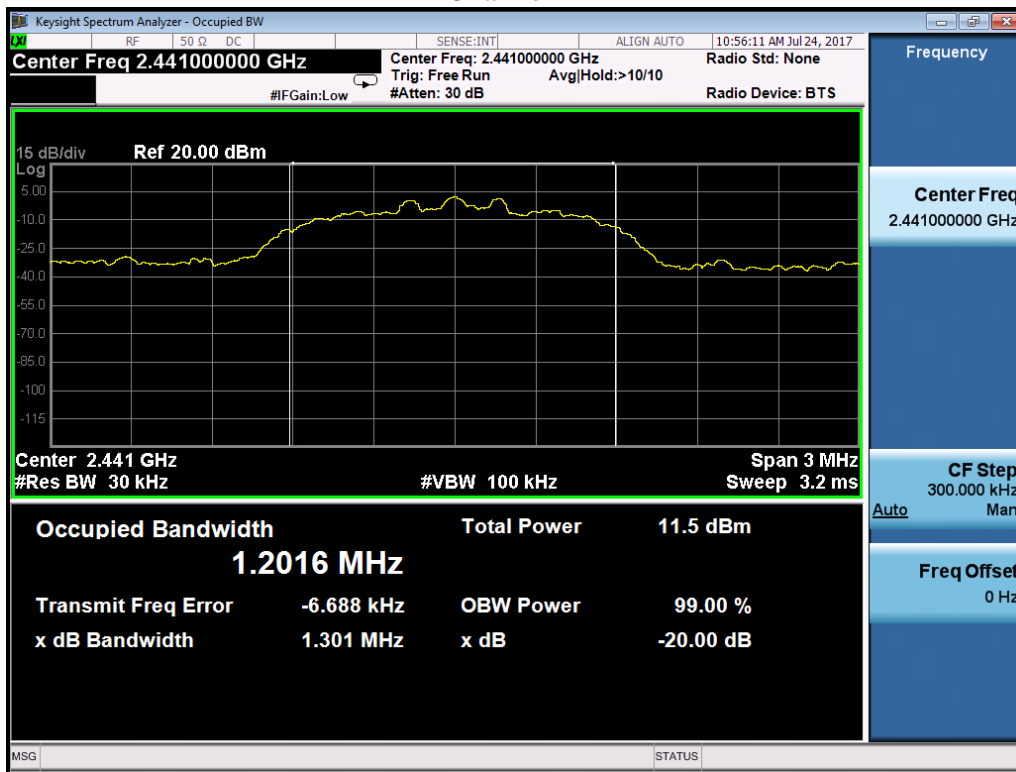


Modulation	Mode	99% Bandwidth (MHz)
8DPSK	L	1.2172
	M	1.2016
	H	1.1762

### Channel L



### Channel M



### Channel H

