

# Measurement and Test Report

According to

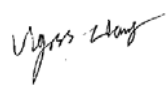
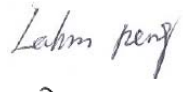

## MIC Public Notice 88:2004 Annex 43

For


**Shenzhen Soundsoul Information Technology Co., Ltd**

**Room 601 Building A4, ZhongYuGuan Ind Zone, Zhongyuguan road, longhua**

**New District, Shenzhen, CHINA**

<b>Test Standards:</b>	<u>Item 19 of Article 2 Paragraph 1</u>
<b>Product Description:</b>	<u>Bluetooth Headset</u>
<b>Tested Model:</b>	<u>QY7</u>
<b>Report No.:</b>	<u>STR15038250E</u>
<b>Tested Date:</b>	<u>2015-03-26 to 2015-03-30</u>
<b>Issued Date:</b>	<u>2015-03-31</u>
<b>Tested By:</b>	<u>Vigoss Liang / Engineer</u> 
<b>Reviewed By:</b>	<u>Lahm Peng / EMC Manager</u> 
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: Shenzhen Soundsoul Information Technology Co., Ltd  
 Address of applicant: Room 601 Building A4, ZhongYuGuan Ind Zone,  
 Zhongyuguan road, longhua New District, Shenzhen,  
 CHINA

Manufacturer: Dongguan Hele Electronics Co., Ltd.  
 Address of manufacturer: Dalingya Industrial Zone, Daojiao Town, DongGuan City,  
 GuangDong, China

General Description of EUT	
Product Name:	Bluetooth Headset
Brand Name:	 SoundPEATS
Model No.:	QY7
Adding Model(s):	Q2,QY5,Q6,Q7,Q8
Rated Voltage:	Lithium-ion Polymer Battery: DC 3.7V
<p><i>The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model QY7, but the circuit and the electronic construction do not change, declared by the manufacturer.</i></p>	

Technical Characteristics of EUT	
<b>Bluetooth</b>	
Bluetooth Version:	V4.1
Frequency Range:	2402~2480MHz
Rated Output Power:	0.10mW/MHz for EDR 5mW for BLE
Type of Modulation:	GFSK, Pi/4 DQPSK, 8DPSK
Data Rate:	1Mbps, 2Mbps, 3Mbps
Quantity of Channels	EDR:79 BLE:40
Channel Separation:	EDR:1MHz BLE: 2MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	1.15dBi
Software Version:	QY7-v4.0
Hardware Version:	QY7-V1

## Center Frequency of Each of Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2402MHz	Channel 21:	2422MHz	Channel 41:	2442MHz	Channel 61:	2462MHz
Channel 02:	2403MHz	Channel 22:	2423MHz	Channel 42:	2443MHz	Channel 62:	2463MHz
Channel 03:	2404MHz	Channel 23:	2424MHz	Channel 43:	2444MHz	Channel 63:	2464MHz
Channel 04:	2405MHz	Channel 24:	2425MHz	Channel 44:	2445MHz	Channel 64:	2465MHz
Channel 05:	2406MHz	Channel 25:	2426MHz	Channel 45:	2446MHz	Channel 65:	2466MHz
Channel 06:	2407MHz	Channel 26:	2427MHz	Channel 46:	2447MHz	Channel 66:	2467MHz
Channel 07:	2408MHz	Channel 27:	2428MHz	Channel 47:	2448MHz	Channel 67:	2468MHz
Channel 08:	2409MHz	Channel 28:	2429MHz	Channel 48:	2449MHz	Channel 68:	2469MHz
Channel 09:	2410MHz	Channel 29:	2430MHz	Channel 49:	2450MHz	Channel 69:	2470MHz
Channel 10:	2411MHz	Channel 30:	2431MHz	Channel 50:	2451MHz	Channel 70:	2471MHz
Channel 11:	2412MHz	Channel 31:	2432MHz	Channel 51:	2452MHz	Channel 71:	2472MHz
Channel 12:	2413MHz	Channel 32:	2433MHz	Channel 52:	2453MHz	Channel72:	2473MHz
Channel 13:	2414MHz	Channel 33:	2434MHz	Channel 53:	2454MHz	Channel 73:	2474MHz
Channel 14:	2415MHz	Channel 34:	2435MHz	Channel 54:	2455MHz	Channel74:	2475MHz
Channel 15:	2416MHz	Channel 35:	2436MHz	Channel 55:	2456MHz	Channel 75:	2476MHz
Channel 16:	2417MHz	Channel 36:	2437MHz	Channel 56:	2457MHz	Channel76:	2477MHz
Channel 17:	2418MHz	Channel 37:	2438MHz	Channel 57:	2458MHz	Channel 77:	2478MHz
Channel 18:	2419MHz	Channel 38:	2439MHz	Channel 58:	2459MHz	Channel78:	2479MHz
Channel 19:	2420MHz	Channel 39:	2440MHz	Channel 59:	2460MHz	Channel 79:	2480MHz
Channel 20:	2421MHz	Channel 40:	2441MHz	Channel 60:	2461MHz		

## Center Frequency of Each of Channel for BLE mode:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2402MHz	Channel 11:	2422MHz	Channel 21:	2442MHz	Channel 31:	2462MHz
Channel 02:	2404MHz	Channel 12:	2424MHz	Channel 22:	2444MHz	Channel 32:	2464MHz
Channel 03:	2406MHz	Channel 13:	2426MHz	Channel 23:	2446MHz	Channel 33:	2466MHz
Channel 04:	2408MHz	Channel 14:	2428MHz	Channel 24:	2448MHz	Channel 34:	2468MHz
Channel 05:	2410MHz	Channel 15:	2430MHz	Channel 25:	2450MHz	Channel 35:	2470MHz
Channel 06:	2412MHz	Channel 16:	2432MHz	Channel 26:	2452MHz	Channel 36:	2472MHz
Channel 07:	2414MHz	Channel 17:	2434MHz	Channel 27:	2454MHz	Channel 37:	2474MHz
Channel 08:	2416MHz	Channel 18:	2436MHz	Channel 28:	2456MHz	Channel 38:	2476MHz
Channel 09:	2418MHz	Channel 19:	2438MHz	Channel 29:	2458MHz	Channel 39:	2478MHz
Channel 10:	2420MHz	Channel 20:	2440MHz	Channel 30:	2460MHz	Channel 40:	2480MHz

## 1.2 Test Standards

The following report is prepared on behalf of the Shenzhen Soundsoul Information Technology Co., Ltd in accordance with "Certification Ordinance, Art. 49.20" and MIC public notice 88:2004, annex 43 or relevant ARIB STD-T66 or relevant AIR STD and MIC Public Notice 127.

The objective is to determine compliance with Item 19 of Article 2 Paragraph 1 of the MIC rules for 2.4GHz band wide-band low-power data communication system. Item 2 of Article 6.

*Maintenance of compliance* is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with test method for radio equipment specified in MIC public notice 88:2004, annex 43 for certification.

## 1.4 Test Facility

- **FCC – Registration No.: 934118**  
Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.
- **Industry Canada (IC) Registration No.: 11464A**  
The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.
- **CNAS Registration No.: L4062**  
Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101)

## 1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Low Channel	2402MHz
TM2	Middle Channel	2441MHz
TM3	High Channel	2480MHz
TM4	Hopping	2402-2480MHz
TM5	BLE	2402/2442/2480MHz

Modulation Configure			
Modulation	Packet	Packet Type	Packet Size
GFSK	DH1	4	27
	DH3	11	183
	DH5	15	339
Pi/4 DQPSK	2DH1	20	54
	2DH3	26	367
	2DH5	30	679
8DPSK	3DH1	24	83
	3DH3	27	552
	3DH5	31	1021

Note: The Bluetooth has been tested on the modulation of GFSK, (Pi/4)DQPSK and 8DPSK, all modulation modes complied with the requirements and record the worst case. BLE mode has no such data.

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

## 1.6 Test Conditions

### TM1-Battery

Supply Voltage			
	DC Input Voltage V	DC Voltage V	Percent
Normal	3.7	1.8	
+10%	3.3	1.8	0%
-10%	4.2	1.8	0%

Note 1: When the input voltage is reduced or increased by 10%, the regulator voltage changes of less than 1%. So the following test items are conducted in the normal voltage.

Note 2: The regulator voltage is integral within IC U1.

### TM2-USB

Supply Voltage			
	DC Input Voltage V	DC Voltage V	Percent
Normal	5.0	1.8	
+10%	5.5	1.8	0%
-10%	4.5	1.8	0%

Note 1: When the input voltage is reduced or increased by 10%, the regulator voltage changes of less than 1%. So the following test items are conducted in the normal voltage.

Note 2: The regulator voltage is integral within IC U1.

Test is carryout on test mode 1 which is the worst case.

## 1.7 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	9kHz-6GHz	$\pm 0.42\text{dB}$
Frequency Tolerance	9kHz-6GHz	$\pm 1 \times 10^{-7}$
Occupied Bandwidth	9kHz-6GHz	$\pm 3\%$
Dwell Time	9kHz-6GHz	$\pm 1\%$
Transmitter Spurious Emissions	9kHz-25GHz	$\pm 2.76\text{dB}$
Receiver Spurious Emissions	9kHz-25GHz	$\pm 2.76\text{dB}$

## 1.8 Calibration Information

Calibration lab: GUANGZHOU GRG METROLOGY&TEST CO., LTD.

Calibrated by: zhangjie, zhangguobo



## 2. SUMMARY OF TEST RESULTS

MIC RULES	DESCRIPTION OF TEST	RESULT
Item 19	RF Output Power	Compliant
Item 19	Frequency Tolerance	Compliant
Item 19	Occupied Bandwidth /Spreading Bandwidth/Spread Factor	Compliant
Item 19	Holding time of hopping frequency	Compliant
Item 19	Transmitter Spurious Emissions	Compliant
Item 19	Receiver Spurious Emissions	Compliant
Item 19	Interference Prevention Function	Compliant
Item 19	Carrier Sending Function	N/A

### 3. RF OUTPUT POWER

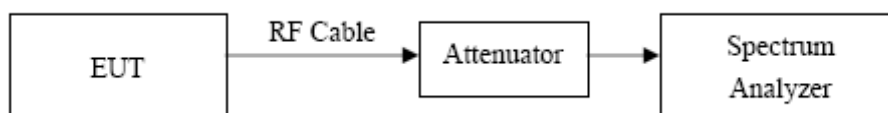
#### 3.1 Standard Applicable

According to Item 19 of Article 2 Paragraph 1, the maximum permit antenna power is 3mW/MHz for DSSS the maximum permit antenna power is 10mW, and the maximum permit tolerance is +20% or -80%.

#### 3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27
All test equipments were calibrated by South China National Center of Metrology GuangDong Institute of Metrology					

#### 3.3 Test Setup Block Diagram



#### 3.4 Test Procedure

A spectrum analyzer or similar device shall be used to observe a sample of the modulated transmitter's radio frequency power output.

- A sample detector function must be used.
- A measurement instrument with an integrated 1MHz power bandwidth function may be used to automate the test process.
- Connect the EUT to the RF input of the spectrum analyzer via a 50ohm attenuator.
- Set the RBW = 1MHz, VBW = 3MHz, center of frequency = operating frequency, Sweep = Auto.
- 'Maximum Hold' mode may be used to accumulate the measurement result over several scans provided emission is repetitive in nature.
- Repeat above procedures until all frequency measured was complete.

#### 3.5 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

### 3.6 Summary of Test Results/Plots

Frequency MHz	Average Burst power (dBm)	Average Burst power (mW/MHz)	SBW (MHz)	Antenna Power (mW/MHz)	Antenna Power Limit (mW/MHz)
GFSK (1Mbps)					
2402	7.45	5.5590	69.9417	0.0795	3
2441	8.78	7.5509	69.9417	0.1080	3
2480	8.83	7.6384	69.9417	0.1092	3
8DPSK (3Mbps)					
2402	5.49	3.5400	69.7189	0.0506	3
2441	7.68	5.8614	69.7189	0.0838	3
2480	7.63	5.7943	69.7189	0.0828	3

Note: for FHSS Antenna Power(mW/MHz)=Average Burst Power(mW) / Spread Bandwidth(MHz)

Frequency MHz	Average Burst power (dBm)	Average Burst power (mW)	Antenna Power (mW)	Antenna Power Limit (mW)
BLE				
2402	4.82	3.0339	3.0339	10
2442	7.27	5.3333	5.3333	10
2480	7.18	5.2240	5.2240	10

Note: for DSSS Antenna Power(mW/MHz)=Average Burst Power(mW)

## GFSK RF Output Power Tolerance

Frequency (MHz)	Output Power (mW/MHz)	Rated Output Power (mW/MHz)	Tolerance (%)	Limit (%)
2402	0.0795	0.100	-20.52	+20% to -80%
2441	0.1080	0.100	+8.00	+20% to -80%
2480	0.1092	0.100	+9.20	+20% to -80%

Note: Tolerance = (Output Power – Rated Output Power) / Rated Output Power \* 100%

## 8DPSK RF Output Power Tolerance

Frequency (MHz)	Output Power (mW/MHz)	Rated Output Power (mW/MHz)	Tolerance (%)	Limit (%)
2402	0.0506	0.100	-49.40	+20% to -80%
2441	0.0838	0.100	-16.20	+20% to -80%
2480	0.0828	0.100	-17.20	+20% to -80%

Note: Tolerance = (Output Power – Rated Output Power) / Rated Output Power \* 100%

## BLE RF Output Power Tolerance

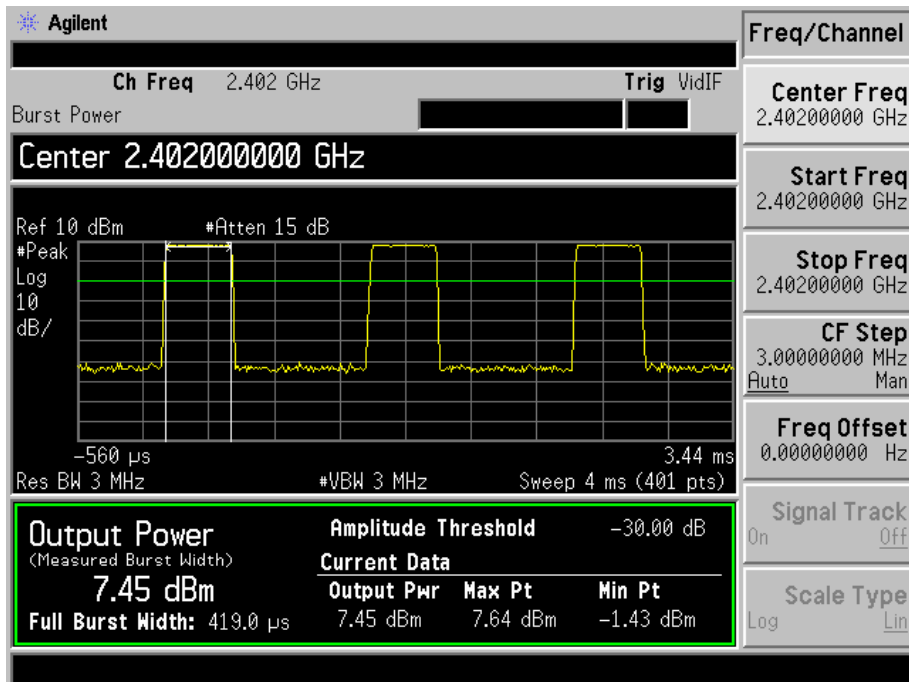
Frequency (MHz)	Output Power (mW)	Rated Output Power (mW)	Tolerance (%)	Limit (%)
2402	3.0339	5.0	-39.32	+20% to -80%
2442	5.3333	5.0	+6.67	+20% to -80%
2480	5.2240	5.0	+4.48	+20% to -80%

Note: Tolerance = (Output Power – Rated Output Power) / Rated Output Power \* 100%

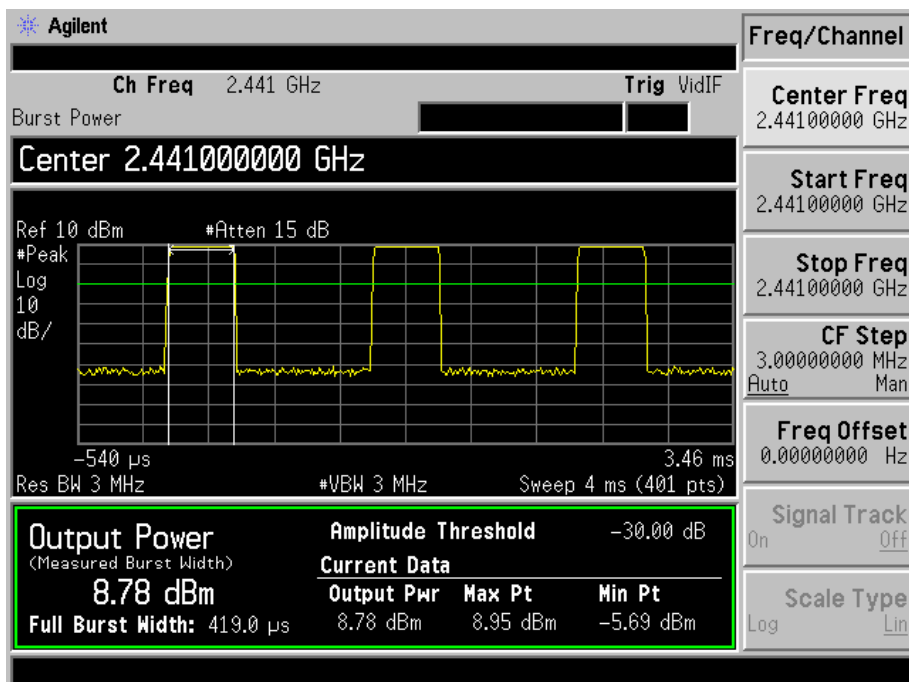
Please refer to the test plots

GFSK:

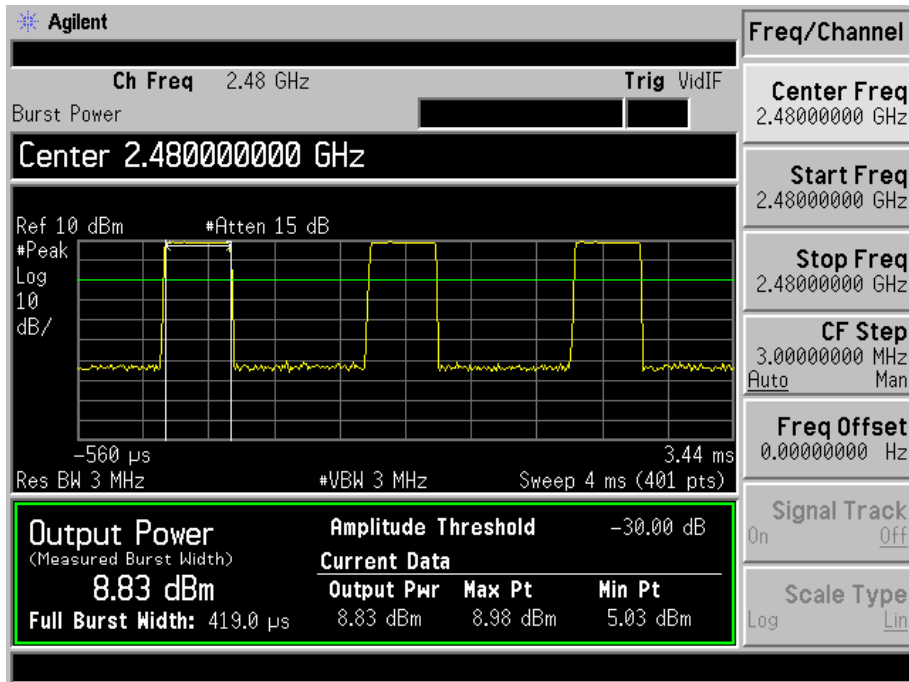
Low Channel:



Middle Channel:

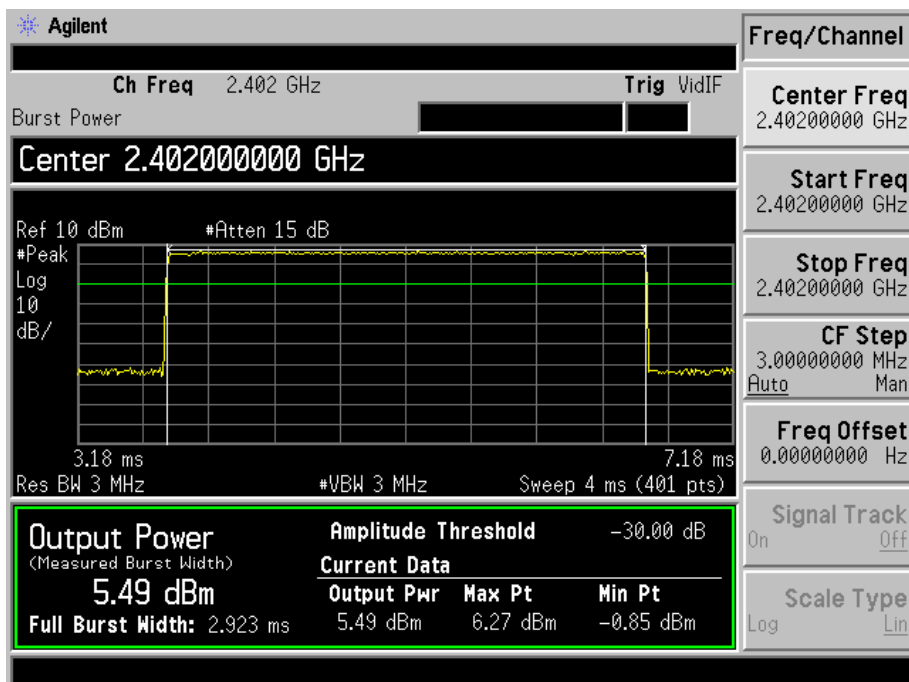


High Channel:

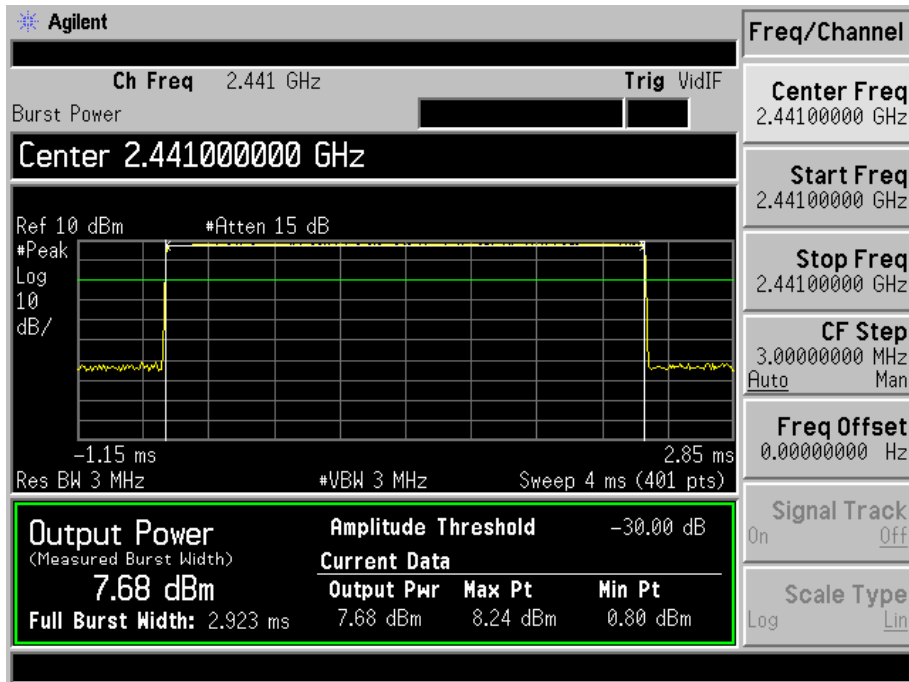


8DPSK:

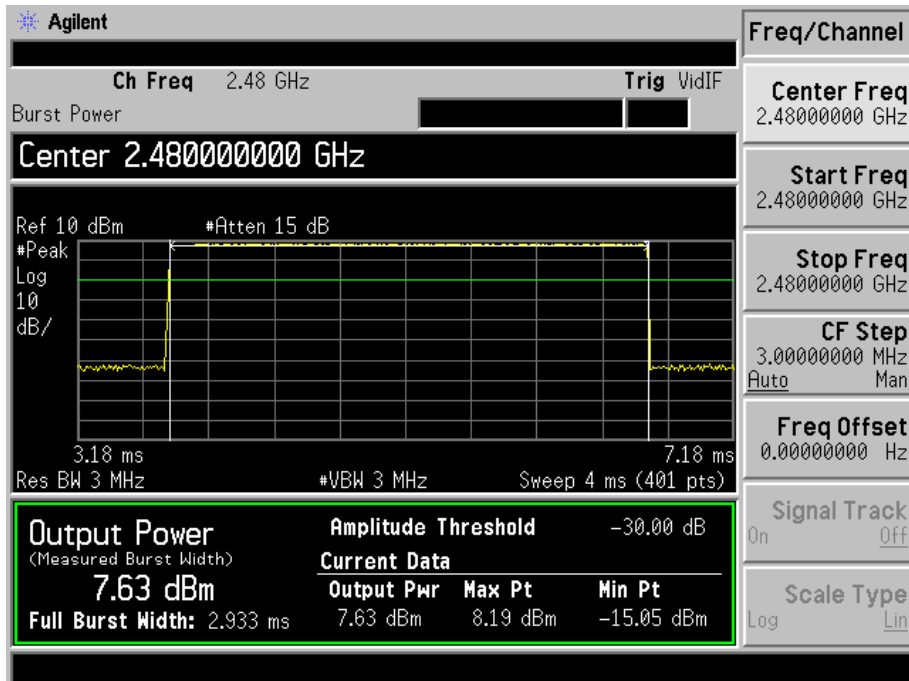
Low Channel:



Middle Channel:

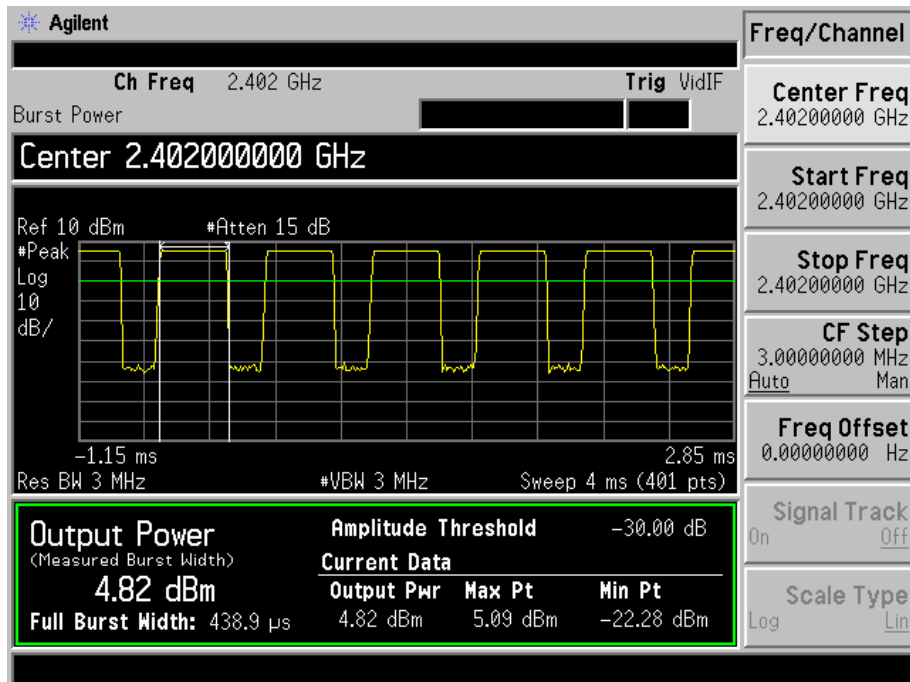


High Channel:

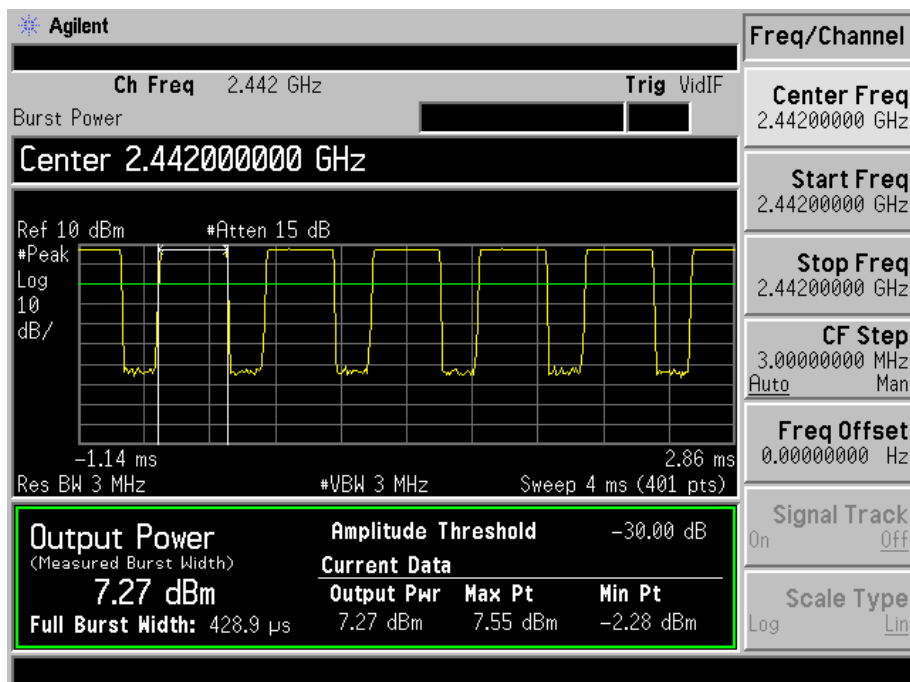


BLE

Low Channel:

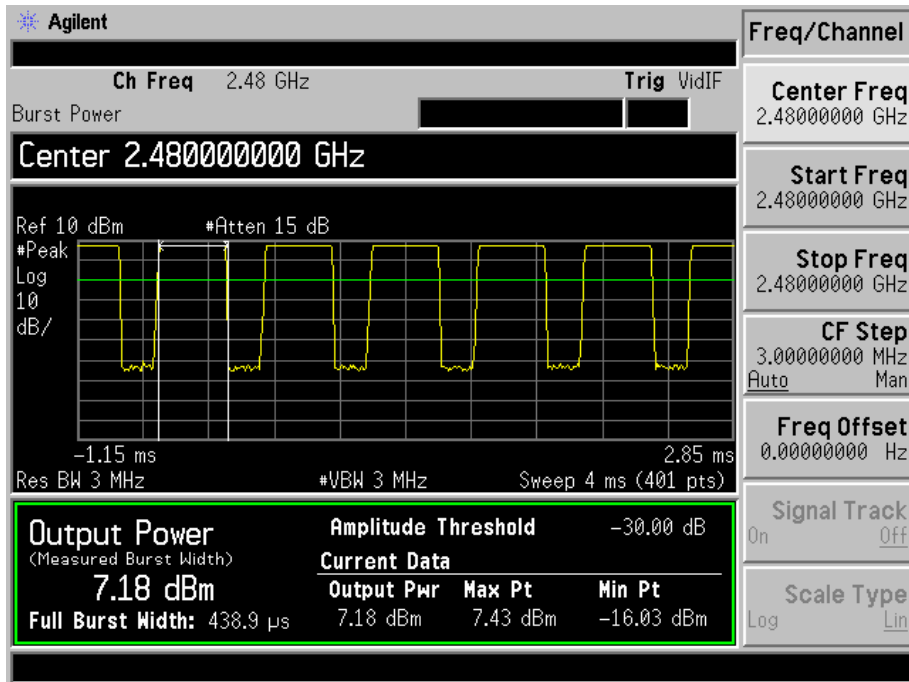


Middle Channel:





High Channel:



## 4. FREQUENCY TOLERANCE

### 4.1 Standard Applicable

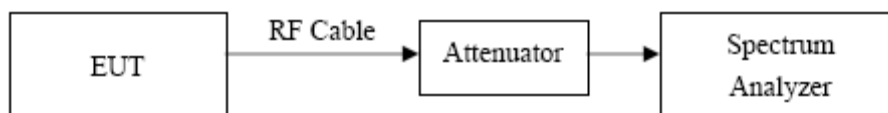
According to Item 19 of Article 2 Paragraph 1, the maximum permit tolerance of frequency is 50ppm.

### 4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

All test equipments were calibrated by South China National Center of Metrology GuangDong Institute of Metrology

### 4.3 Test Setup Block Diagram



### 4.4 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW, VBW=10KHz, Span = 1MHz.
- 4 'Maximum Hold' mode may be used to accumulate the measurement result over several scans provided emission is repetitive in nature.
5. Repeat above procedures until all frequency measured was complete.

### 4.5 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

#### 4.6 Summary of Test Results/Plots

EDR:

Tx Frequency (MHz)	Reading Value (MHz)	Tolerance (ppm)	Limit (ppm)
2402	2401.997500	-1.04	$\pm 50$
2441	2440.999500	-0.20	$\pm 50$
2480	2479.999500	-0.20	$\pm 50$

BLE:

Tx Frequency (MHz)	Reading Value (MHz)	Tolerance (ppm)	Limit (ppm)
2402	2401.997500	-1.04	$\pm 50$
2442	2441.997500	-1.02	$\pm 50$
2480	2479.999500	-0.20	$\pm 50$

## 5. OCCUPIED BANDWIDTH/SPREAD BANDWIDTH/SPREAD FACTOR

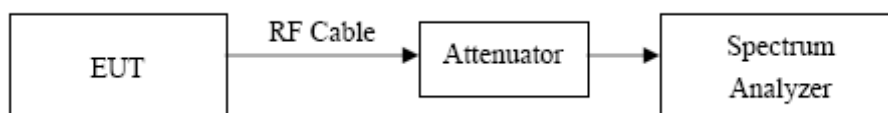
### 5.1 Standard Applicable

According to Item 19 of Article 2 Paragraph 1. The occupied bandwidth shall not exceed 83.5MHz, the spreading bandwidth no less than 500kHz, and the operating frequency range lies within the band 2400MHz to 2483.5 MHz.

### 5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27
All test equipments were calibrated by South China National Center of Metrology GuangDong Institute of Metrology					

### 5.3 Test Setup Block Diagram



### 5.4 Test Procedure

(1) Set up the spectrum analyzer as the follows:

Center frequency: Test frequency

Sweep bandwidth: 2 to 3.5 times of allowance

Resoluble bandwidth: less than 3% of allowance

Video bandwidth: Equivalent to resolvable bandwidth

Sweep time: Minimum time by which measuring accuracy is assured (In case of burst wave, 1 burst shall be contained per 1 sample)

Sampling points: More than 400 points

Sweep mode : Continuous sweeping

Detection mode: Positive peak

Display mode: Maximum holding

(2) Repeat the sweeping till no change was observed on the display and enter all values of data point to the computer as array variable.

(3) About all data, convert dB value to antilogarithm of electric power dimension.

(4) Add up the electric power of all data and record it as "Sum total of electric power".

(5) Adding up data in order from the lowest frequency to upper frequencies, look for a limit point where the value reaches to 0.5% (5% in case of diffusion bandwidth) of "Sum total of electric

power”. Convert the limit point to frequency and record as “Lowest limit frequency”.

(6) Adding up data in order from the highest frequency to lower frequencies, look for a limit point where the value reaches to 0.5% (5% in case of diffusion bandwidth) of “Sum total of electric power”. Convert the limit point to frequency and record as “Highest limit frequency”.

(7) Repeat above procedures until all frequency measured was complete.

## 5.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

## 5.6 Summary of Test Results/Plots

GFSK:

Occupied Bandwidth (99% Emission bandwidth)

Tx Frequency (MHz)	Reading Value (MHz)	Limit (MHz)
2402-2480	77.7913	<83.5

Diffusion Bandwidth (90% Emission bandwidth)

Tx Frequency (MHz)	Reading Value (MHz)	Limit (kHz)
2402-2480	69.9417	≥500

8DPSK:

Occupied Bandwidth (99% Emission bandwidth)

Tx Frequency (MHz)	Reading Value (MHz)	Limit (MHz)
2402-2480	77.9876	<83.5

Diffusion Bandwidth (90% Emission bandwidth)

Tx Frequency (MHz)	Reading Value (MHz)	Limit (kHz)
2402-2480	69.7189	≥500

BLE:

Occupied Bandwidth (99% Emission bandwidth)

Tx Frequency (MHz)	Reading Value (MHz)	Limit (MHz)
2402	1.0234	<83.5
2442	1.0203	<83.5
2480	1.0214	<83.5

Diffusion Bandwidth (90% Emission bandwidth)

Tx Frequency (MHz)	Reading Value (kHz)	Limit (kHz)
2402	672.0019	$\geq 500$
2442	670.0817	$\geq 500$
2480	669.8115	$\geq 500$

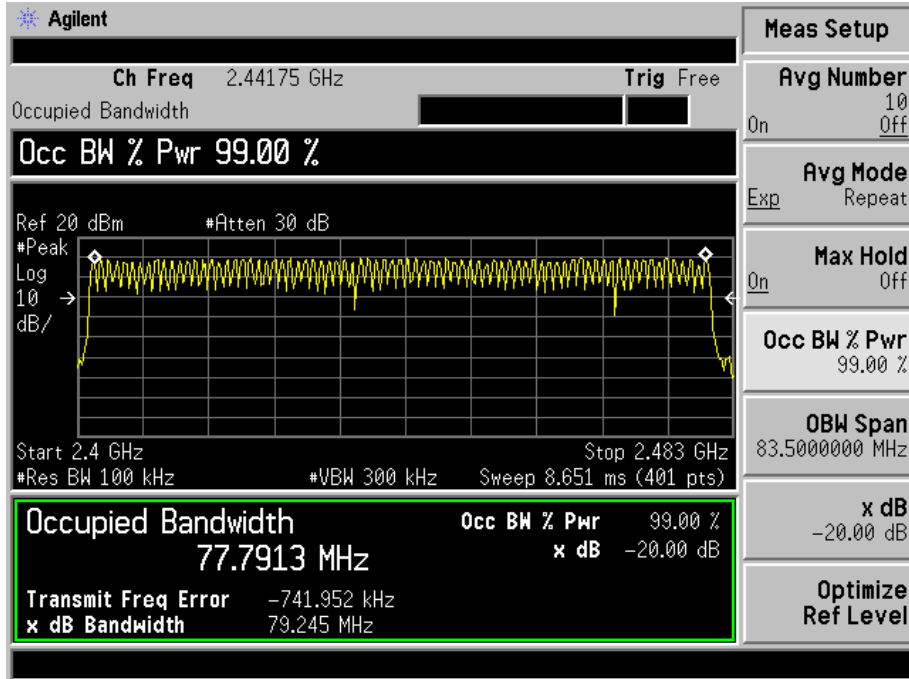
Spread Factor

Test mode	Diffusion Bandwidth	Modulation Data Rate (M)	Spread Factor	Limit
GFSK	69.9417	1.0	69.9417	$\geq 5$
8DPSK	69.7189	2.7	25.8218	$\geq 5$

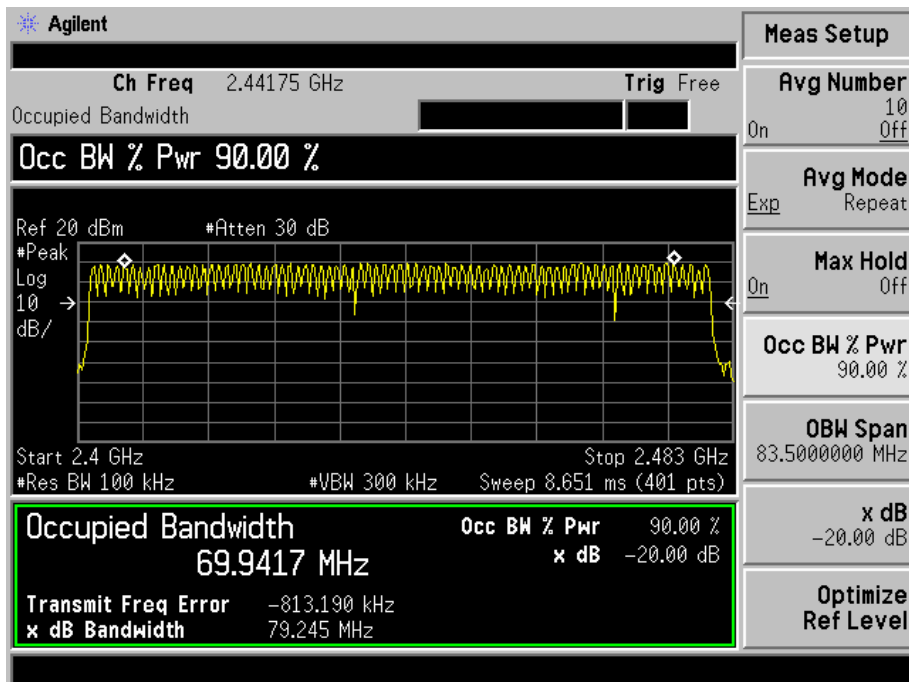
Please refer to the following test plots

GFSK:

99% Occupied Bandwidth

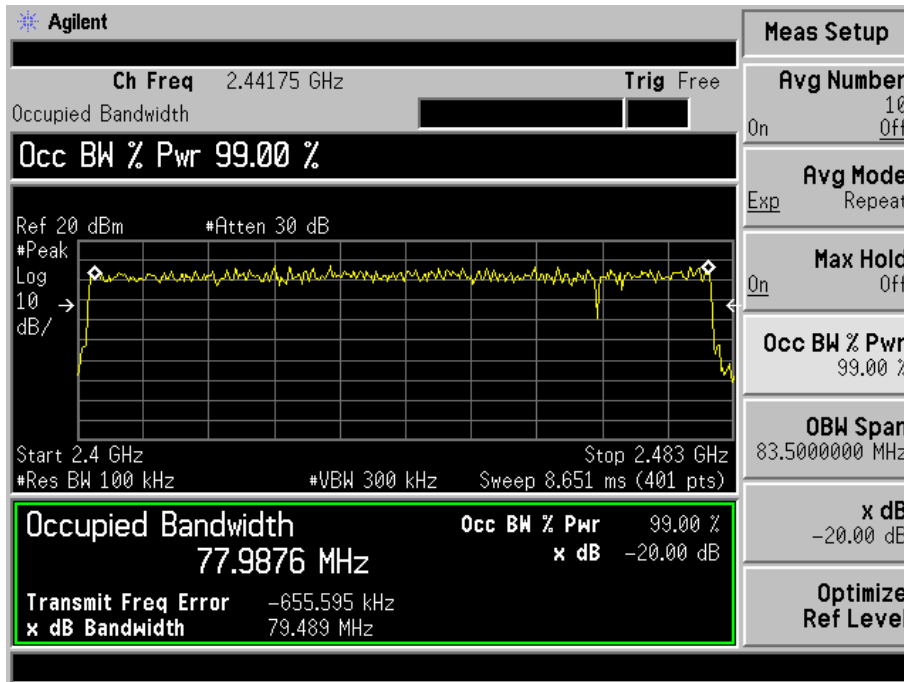


90% Diffusion Bandwidth

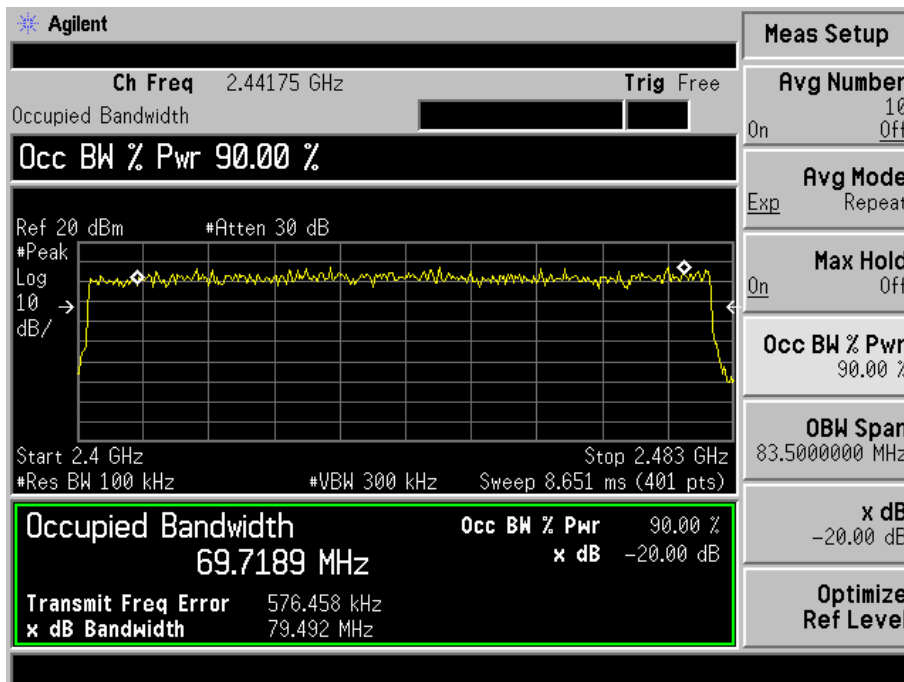


8DPSK:

99% Occupied Bandwidth



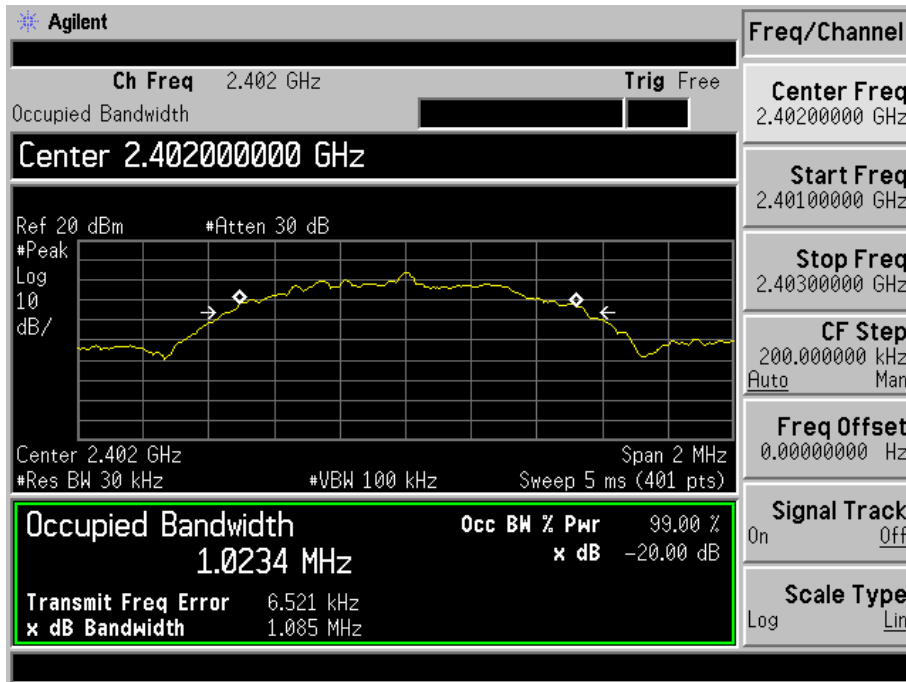
90% Diffusion Bandwidth



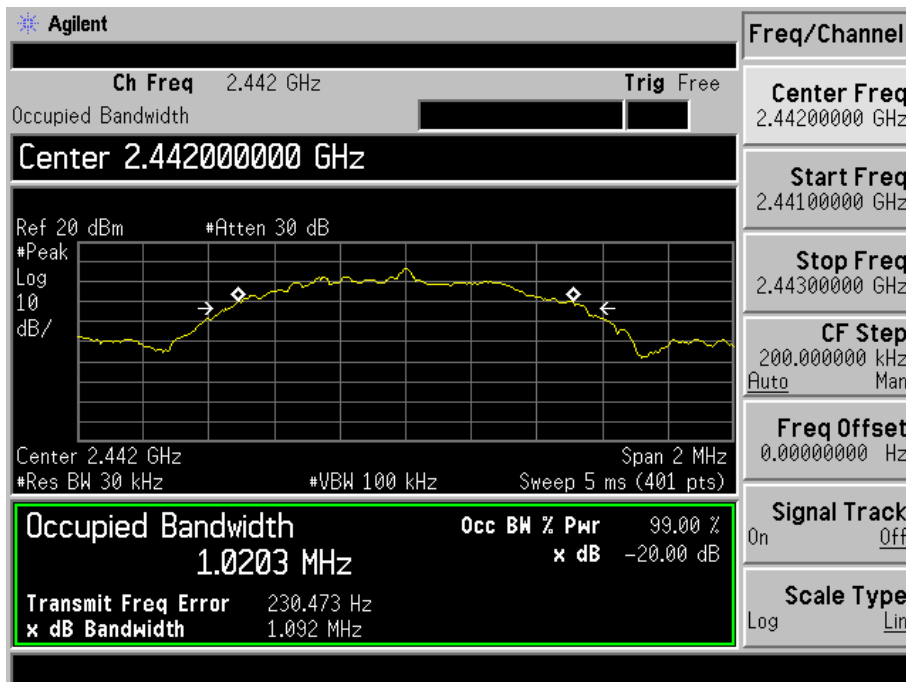


BLE:

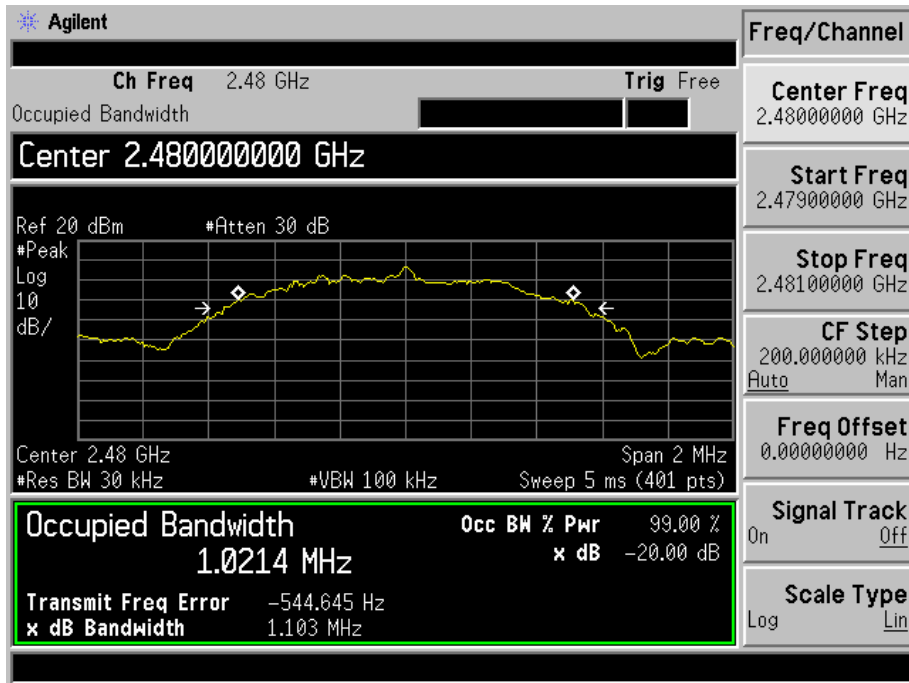
99% Occupied Bandwidth (Low Channel)



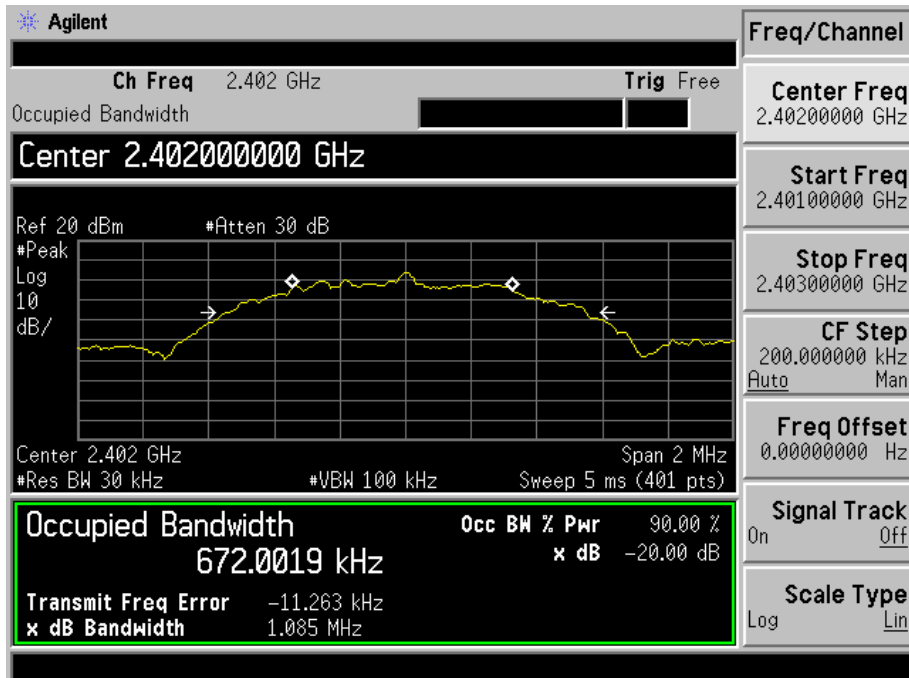
99% Occupied Bandwidth (Middle Channel)



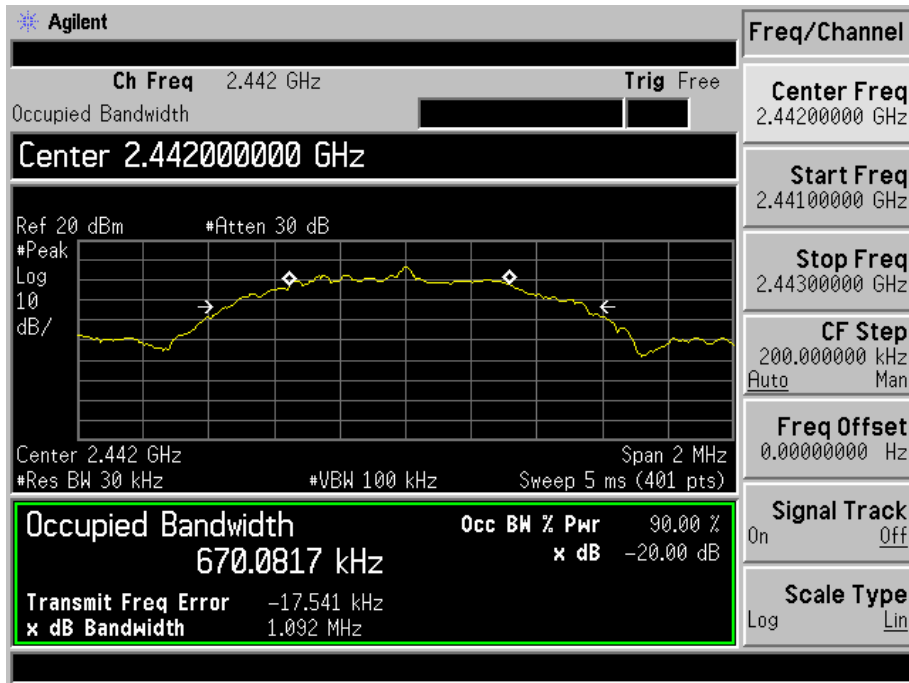
99% Occupied Bandwidth (High Channel)



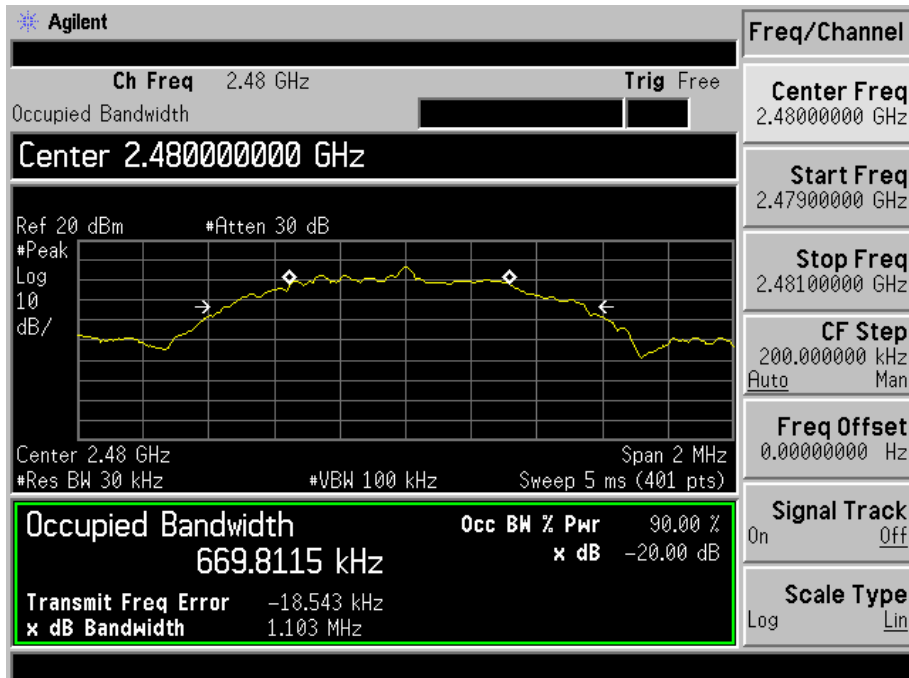
90% Diffusion Bandwidth (Low Channel)



90% Diffusion Bandwidth (Middle Channel)



90% Diffusion Bandwidth (High Channel)



## 6. HOLDING TIME OF HOPPING FREQUENCY

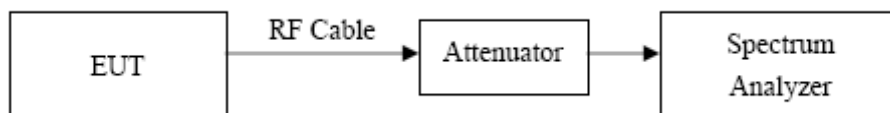
### 6.1 Standard Application

According to Item 19 of Article 2 Paragraph 1. The Holding Time shall not exceed 0.4sec or less , The Total Sum of Holding Time at arbitrary Frequencies Within the Time Multiplied 0.4 sec By the Spreading Ratio Shall be 0.4sec or Less.

### 6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27
All test equipments were calibrated by South China National Center of Metrology GuangDong Institute of Metrology					

### 6.3 Test Setup Block Diagram



### 6.4 Test procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW,VBW=1MHz, Span = 0Hz, Sweep time = 3.16s
4. Recode the quantity of pulse in a test period.
5. Set the spectrum analyzer as RBW,VBW=1MHz, Span = 0Hz, Sweep time = 4ms
6. Mark the time slot length.
7. Repeat above procedures until all frequency measured was complete.

### 6.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

## 6.6 Summary of Test Results/Plots

The dwell time within a 31.6 second period in data mode is independent from the packet type (packet length). The calculation for a 31.6 second period is as follows:

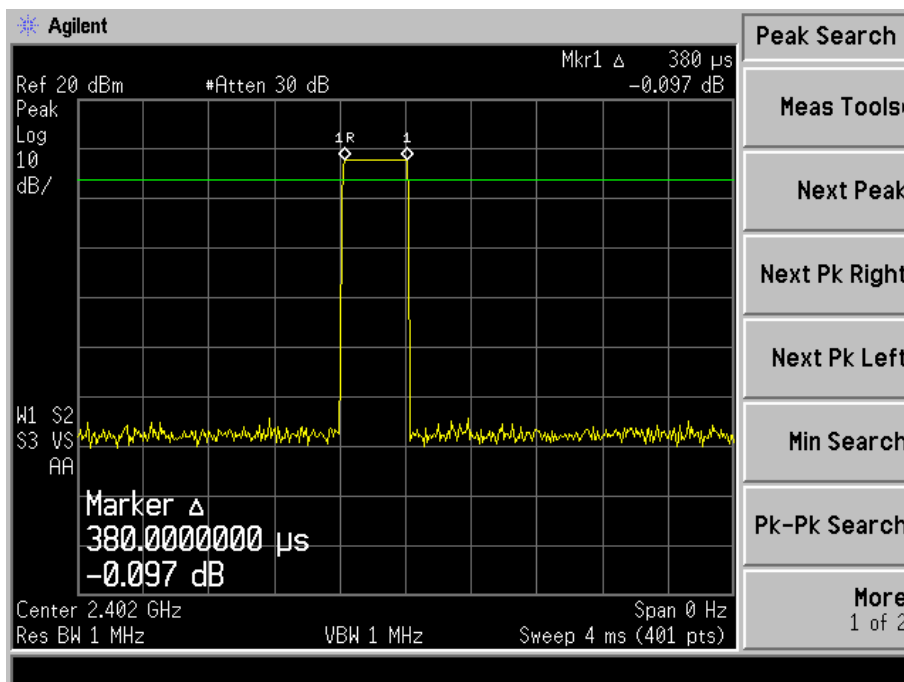
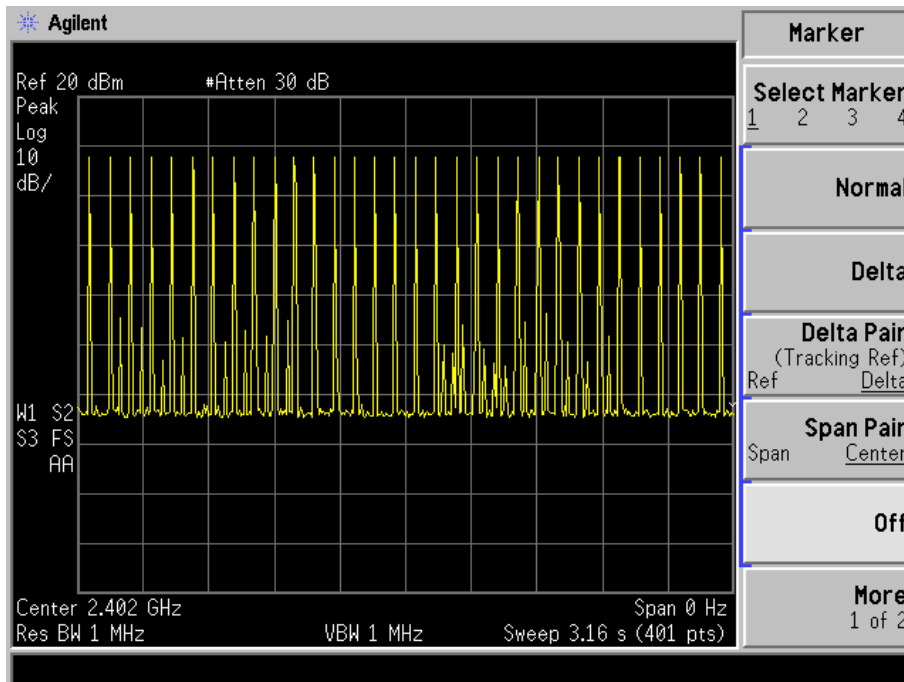
$$\text{Dwell time} = \text{time slot length} * \text{quantity of pulse} / \text{test period} * 31.6\text{s}$$

Test data is corrected with the worse case, which the packet length is GFSK and 8DPSK Mode.

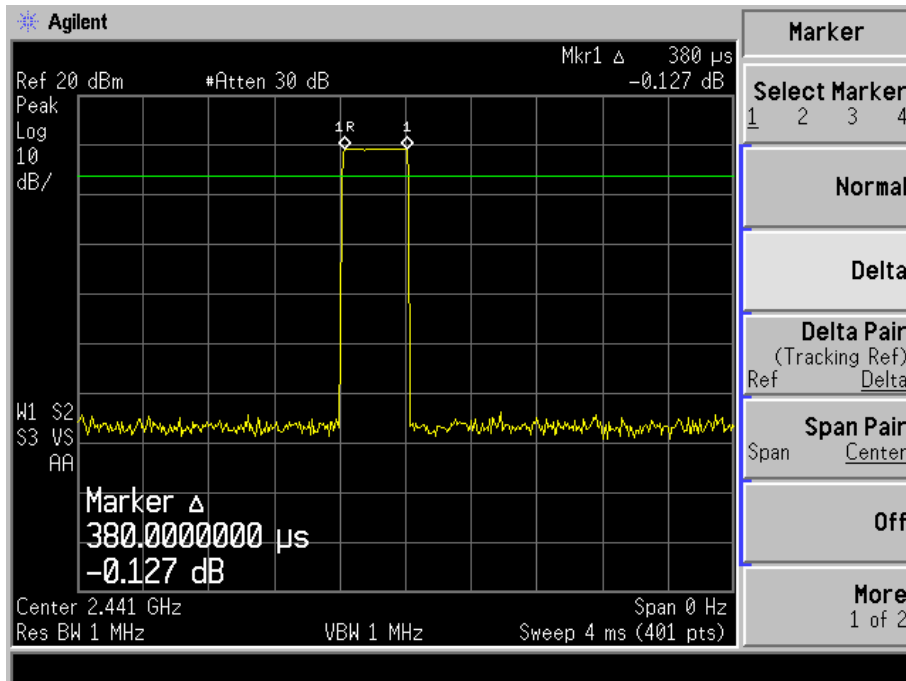
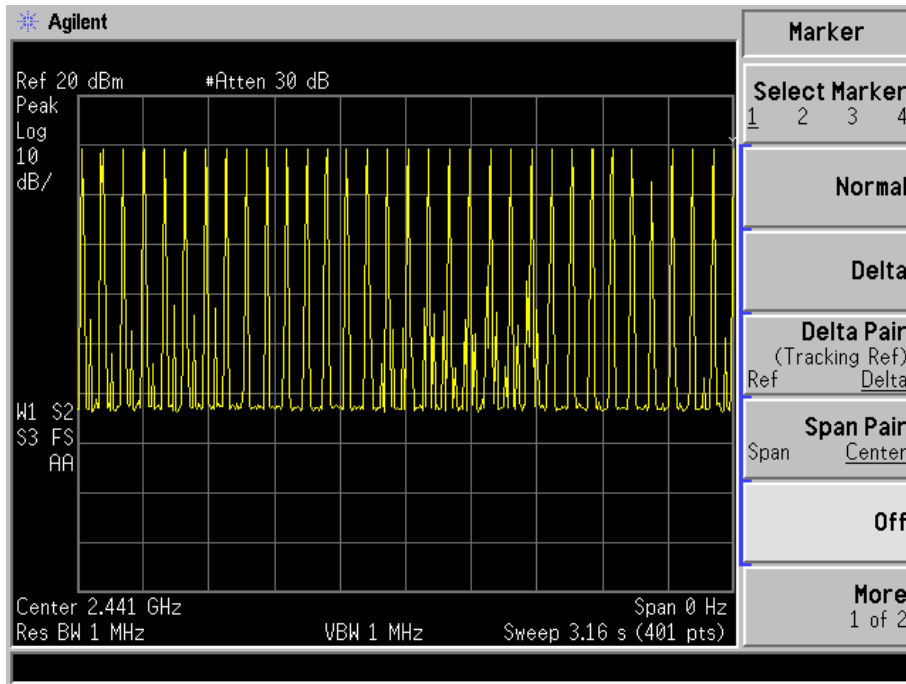
Modulation	Test Channel	Packet	Time Slot Length	Dwell Time	Limit
			ms	ms	ms
GFSK	2402MHz	DH1	0.38	121.600	400
		DH3	1.64	278.800	400
		DH5	2.89	317.900	400
	2441MHz	DH1	0.38	125.400	400
		DH3	1.63	277.100	400
		DH5	2.89	317.900	400
	2480MHz	DH1	0.39	128.700	400
		DH3	1.63	260.800	400
		DH5	2.89	317.900	400
8DPSK	2402MHz	3DH1	0.40	128.000	400
		3DH3	1.64	262.400	400
		3DH5	2.89	317.900	400
	2441MHz	3DH1	0.40	128.000	400
		3DH3	1.64	262.400	400
		3DH5	2.90	319.000	400
	2480MHz	3DH1	0.40	128.000	400
		3DH3	1.65	264.000	400
		3DH5	2.91	320.100	400

GFSK:

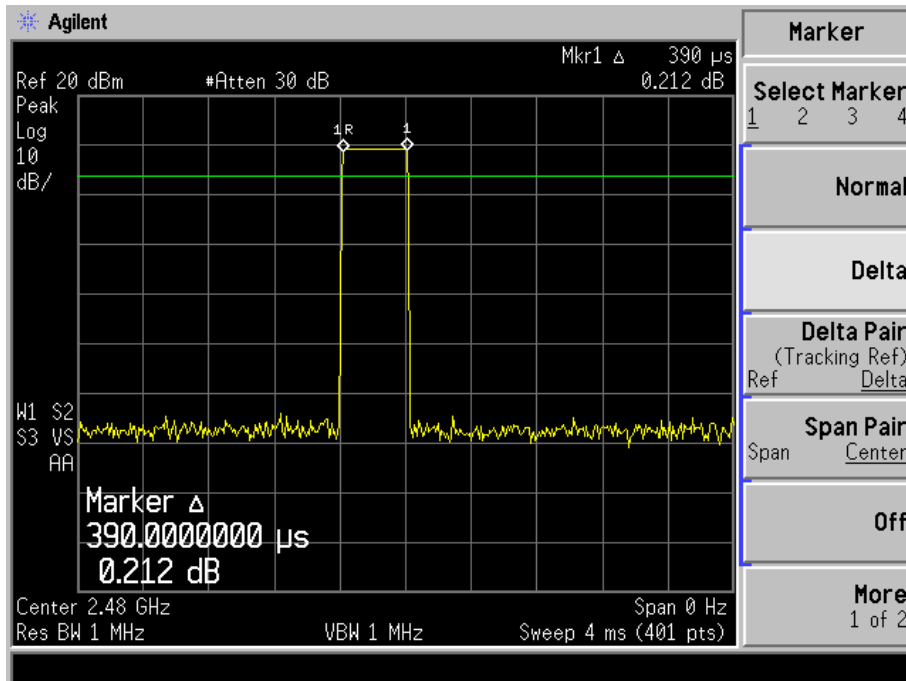
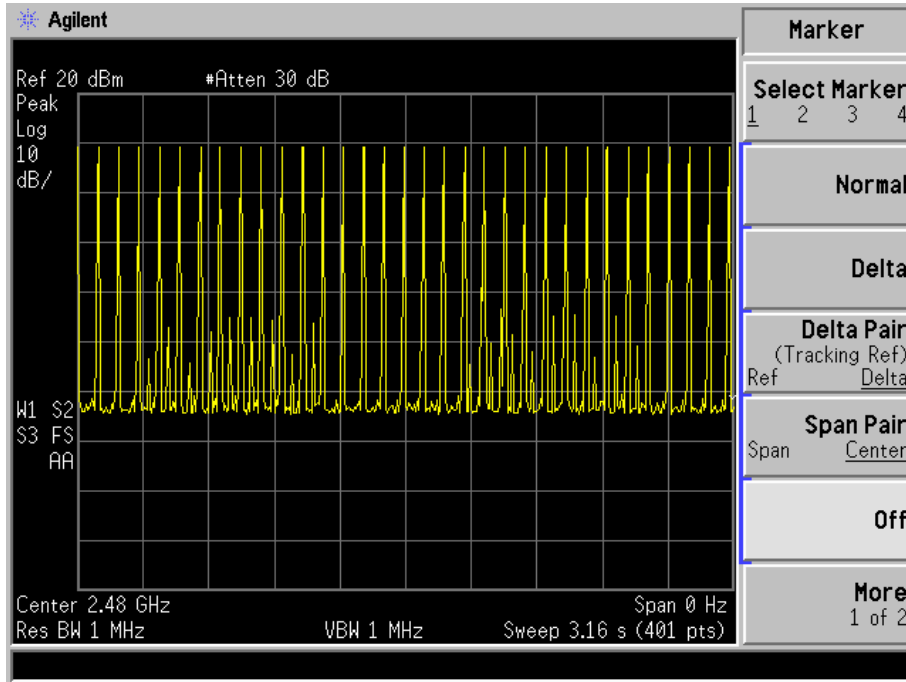
DH1 CH Low:



DH1 CH Middle:

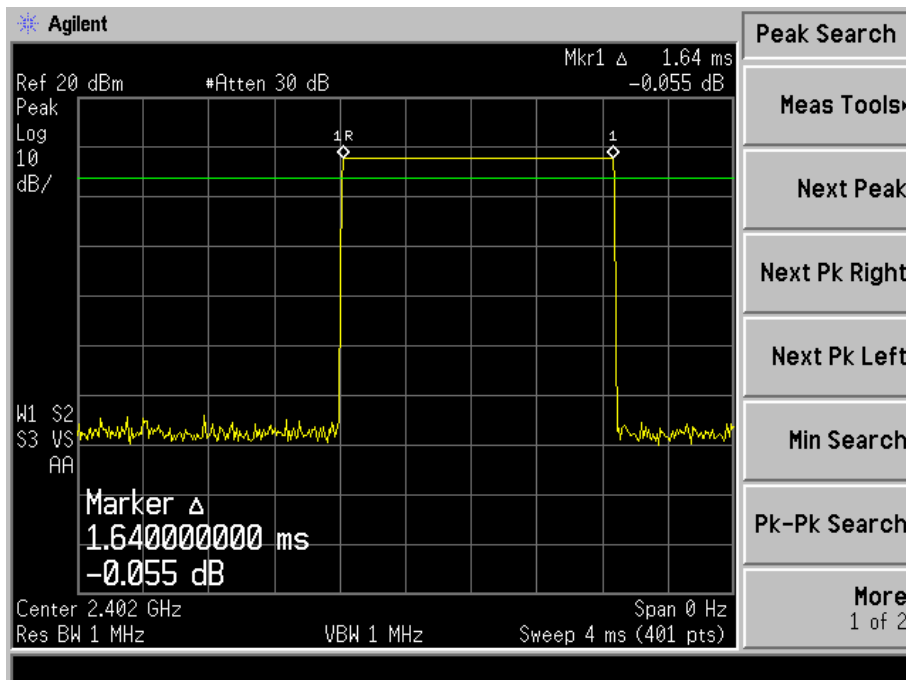
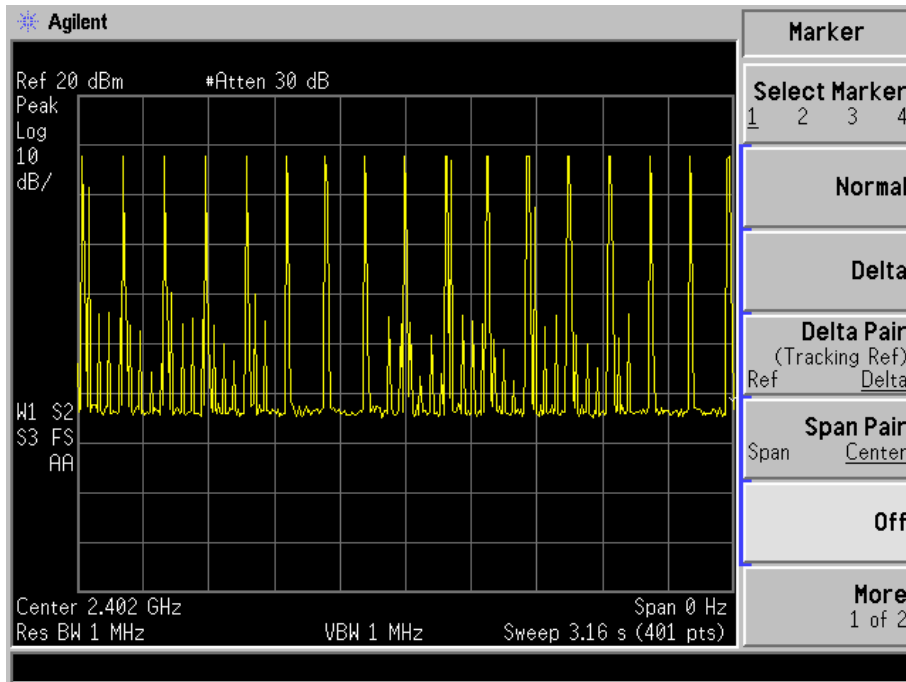


DH1 CH High:

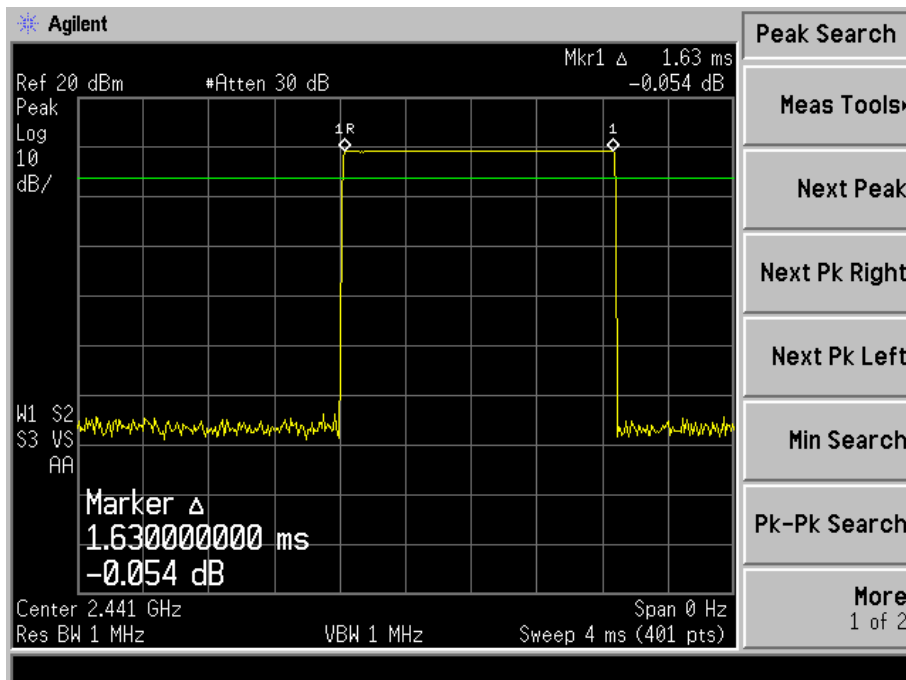
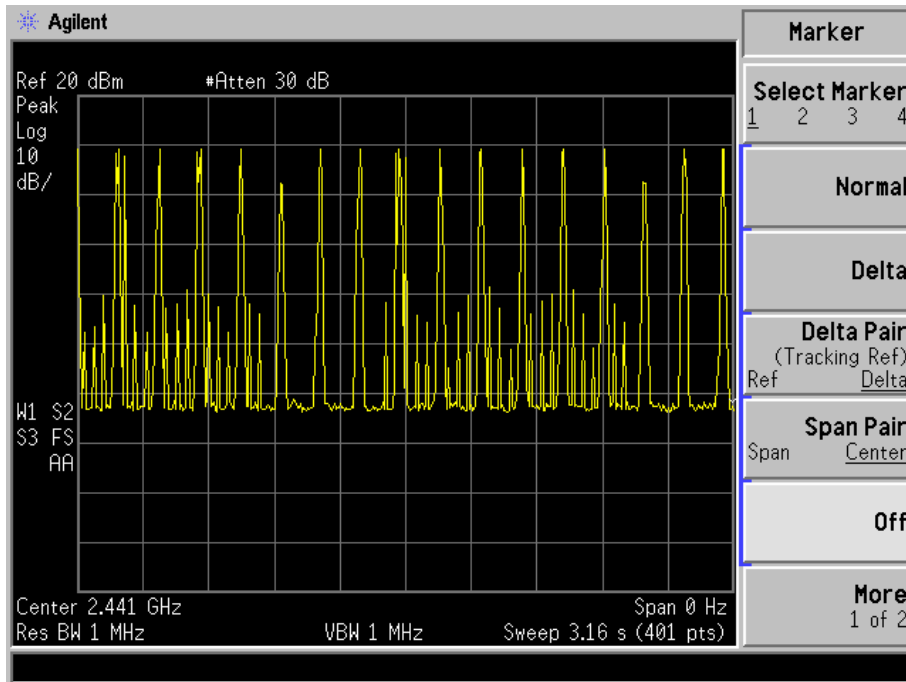




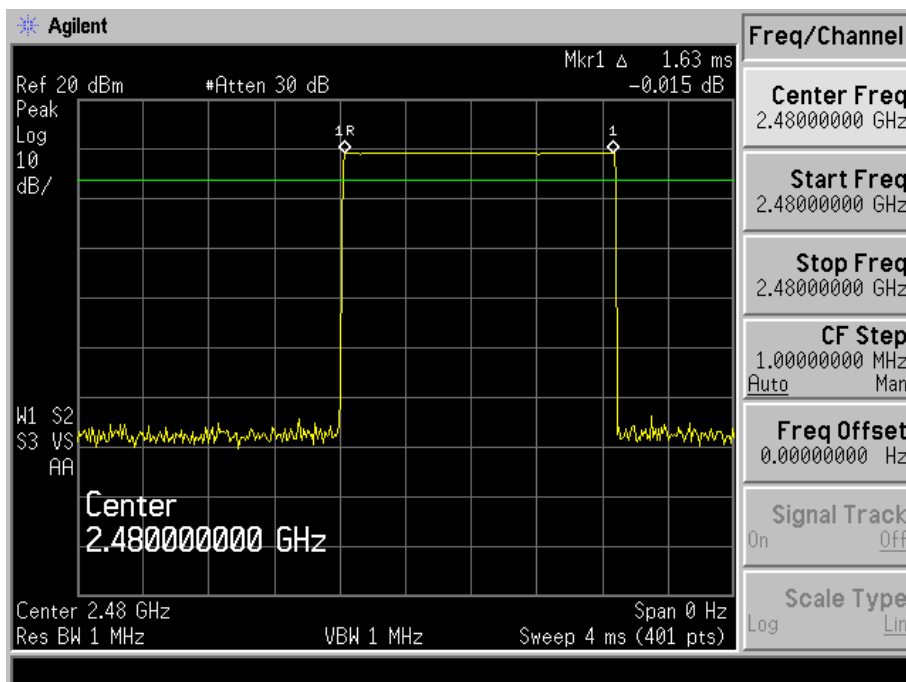
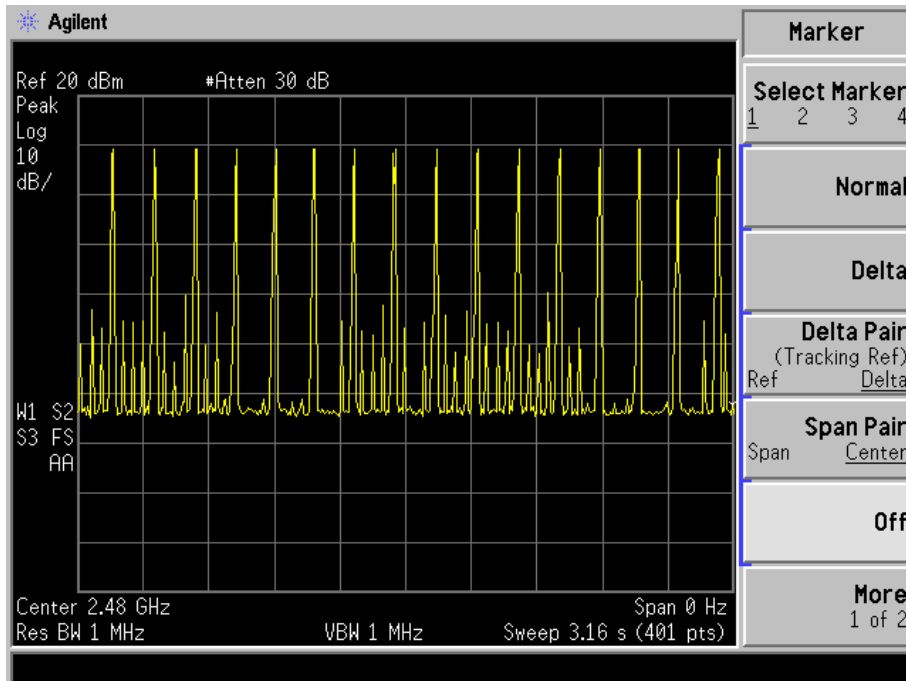
DH3 CH Low:



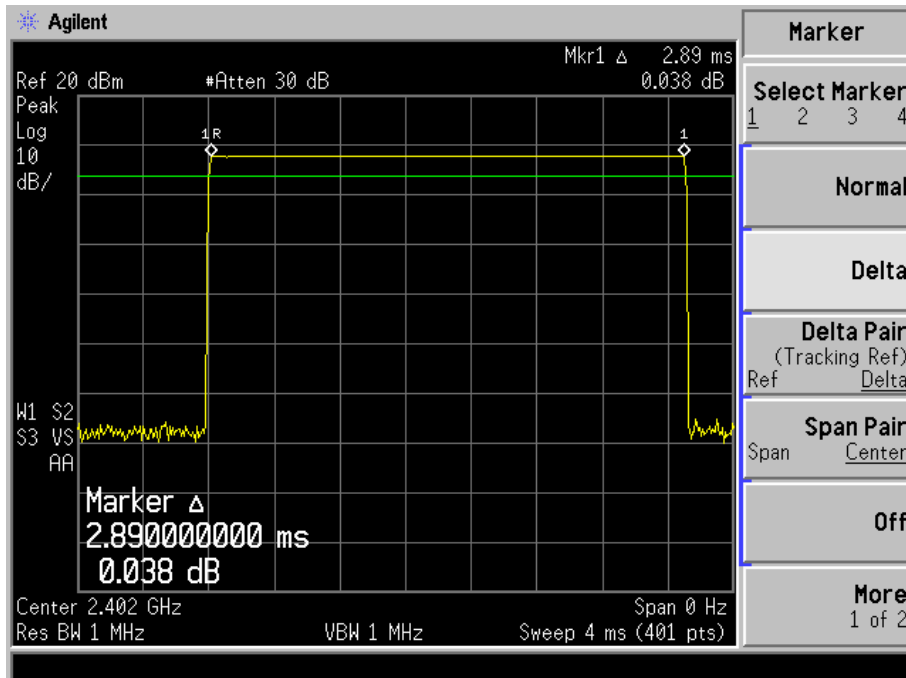
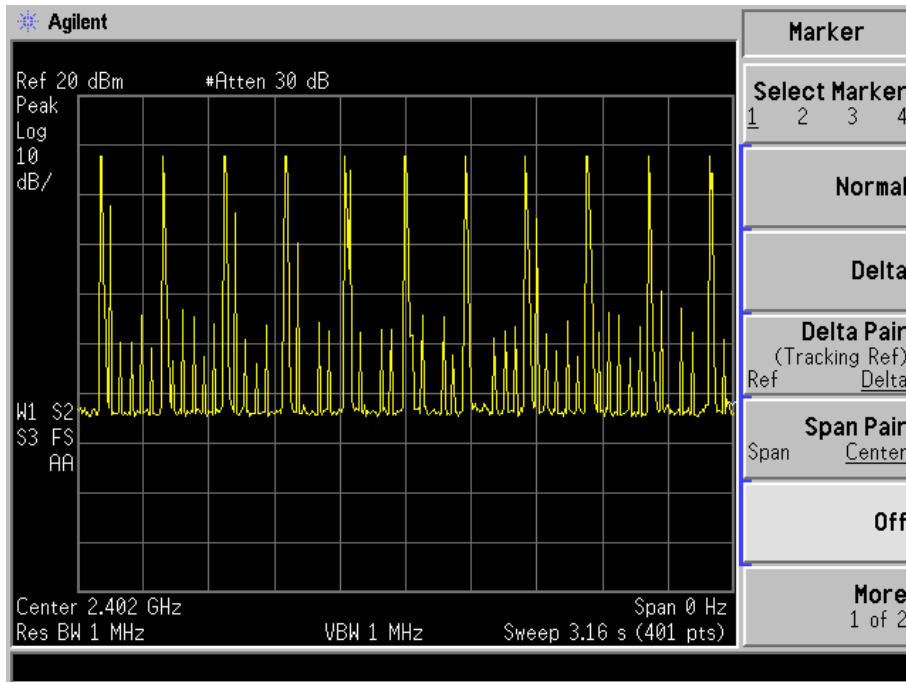
DH3 CH Middle:



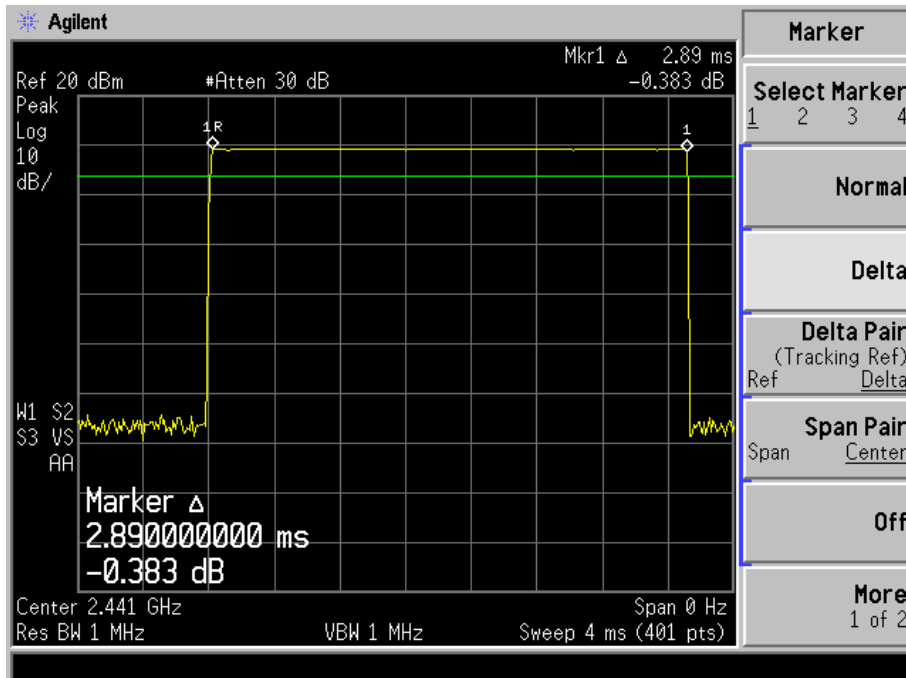
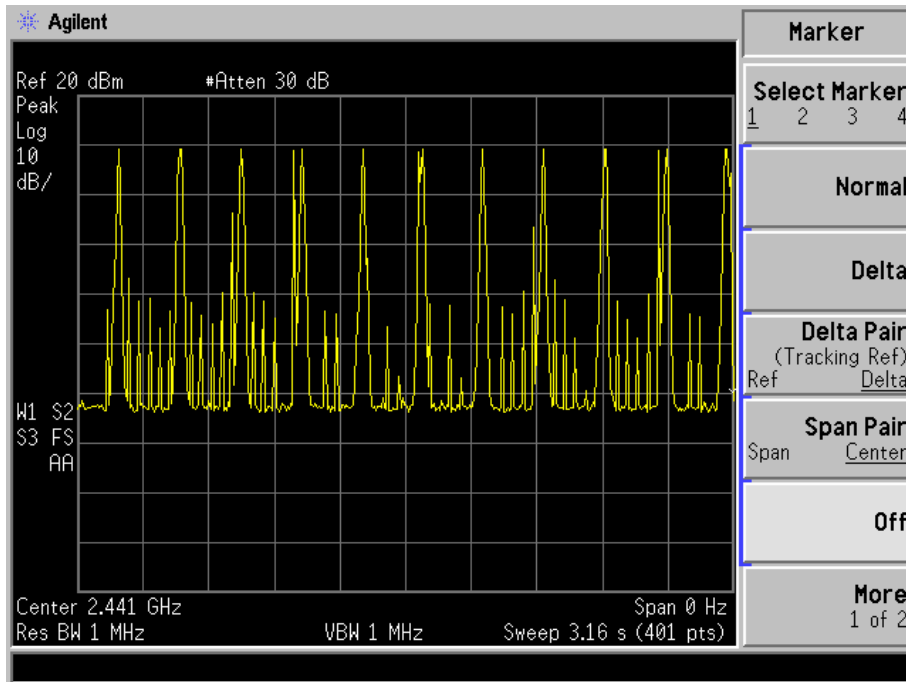
DH3 CH High:



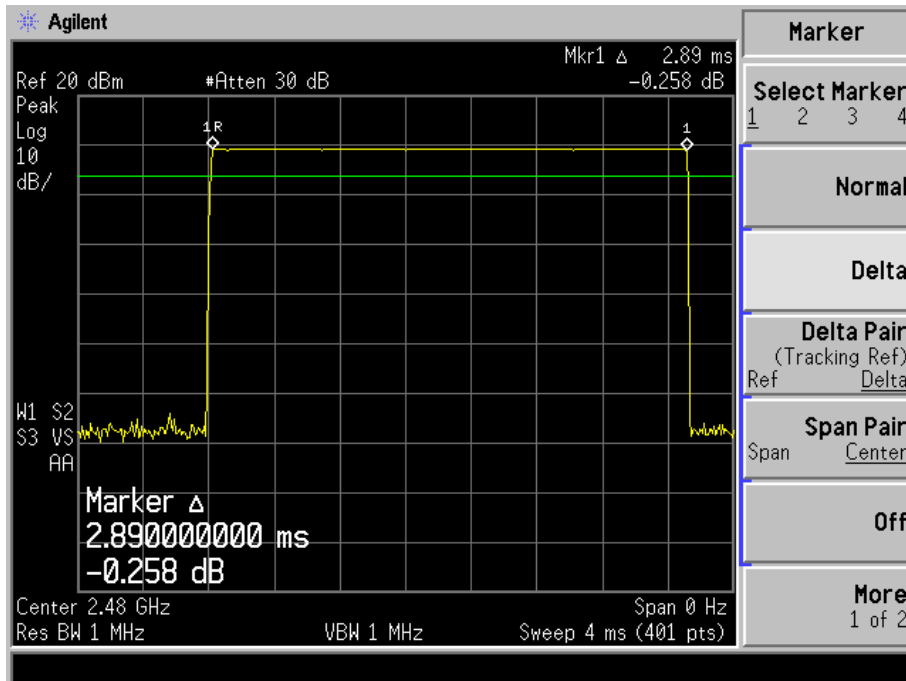
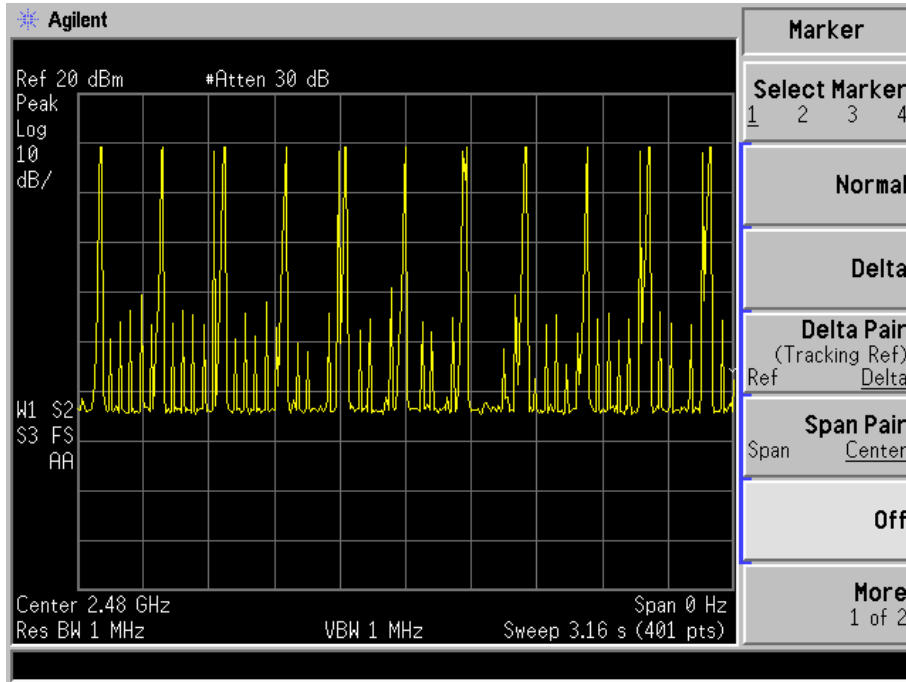
DH5 CH Low:



DH5 CH Middle:

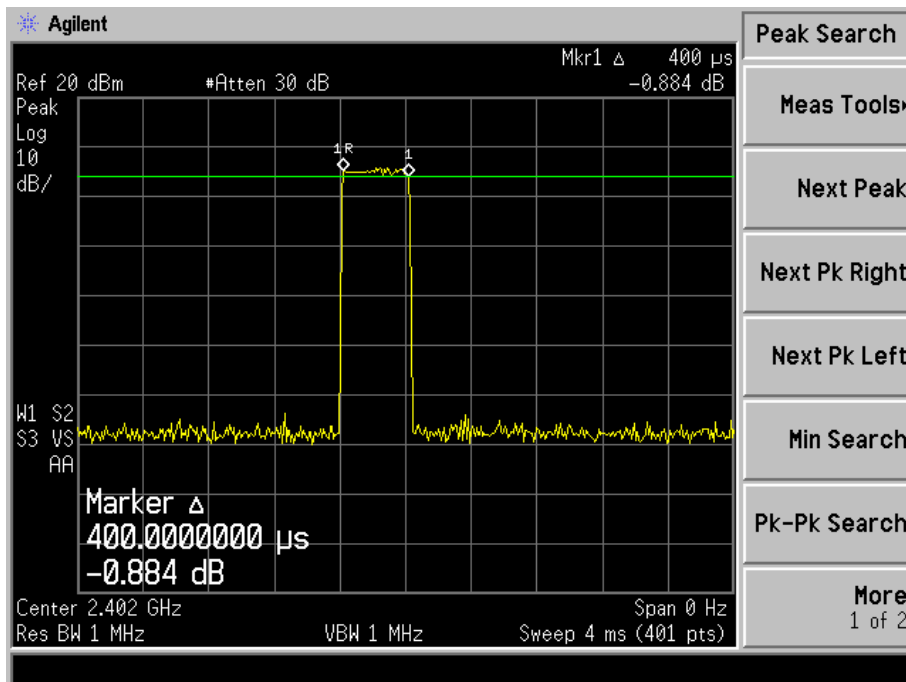
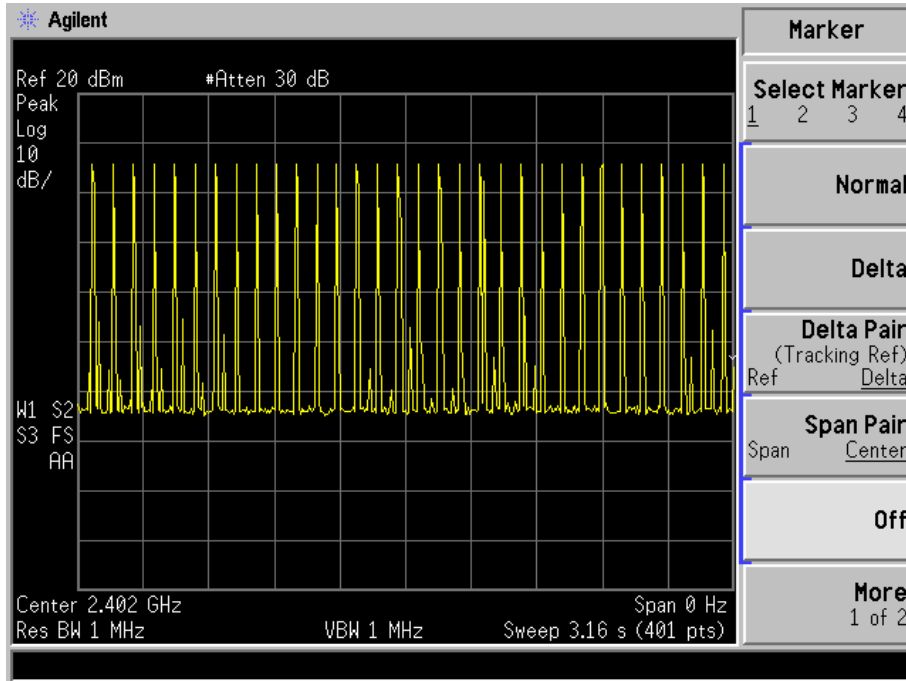


DH5 CH High:

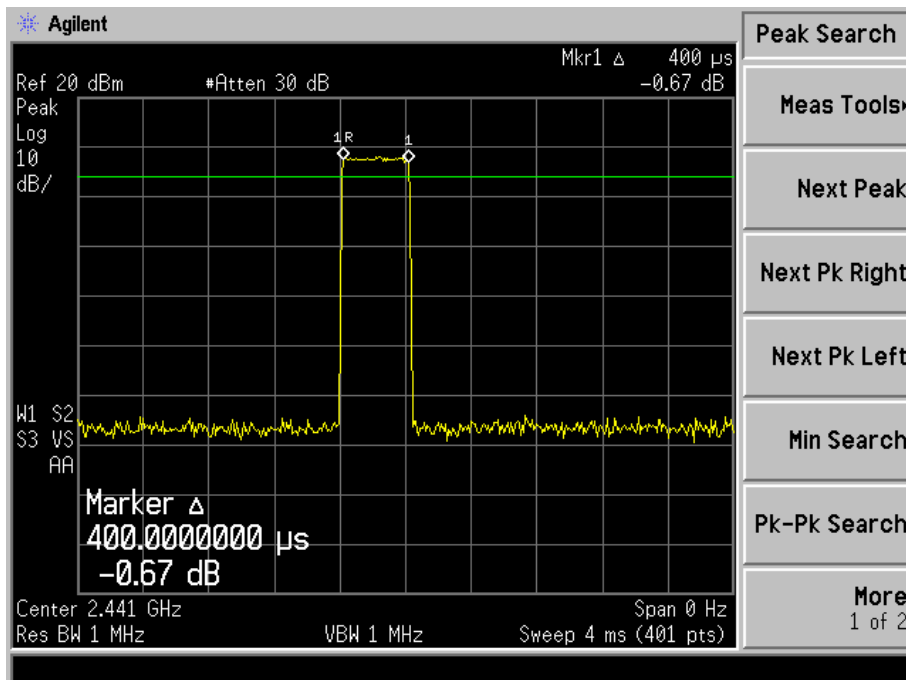
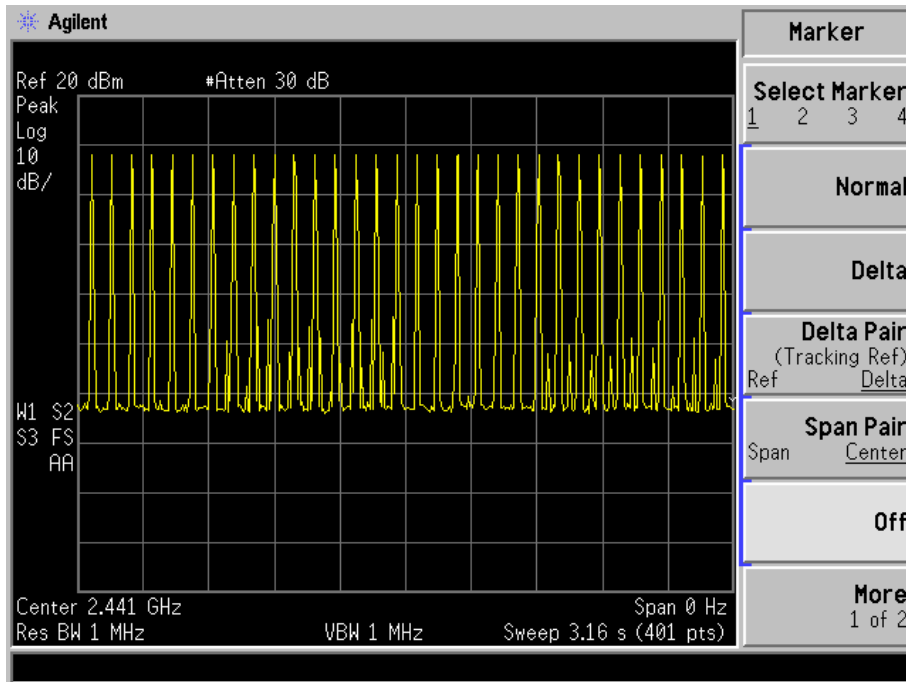


8DPSK:

3DH1 CH Low:

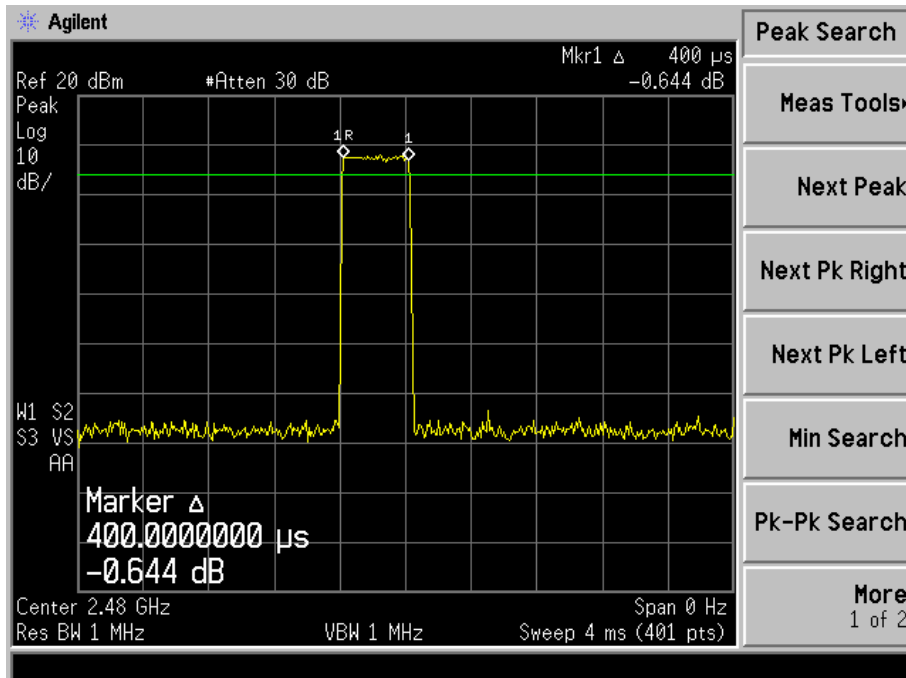
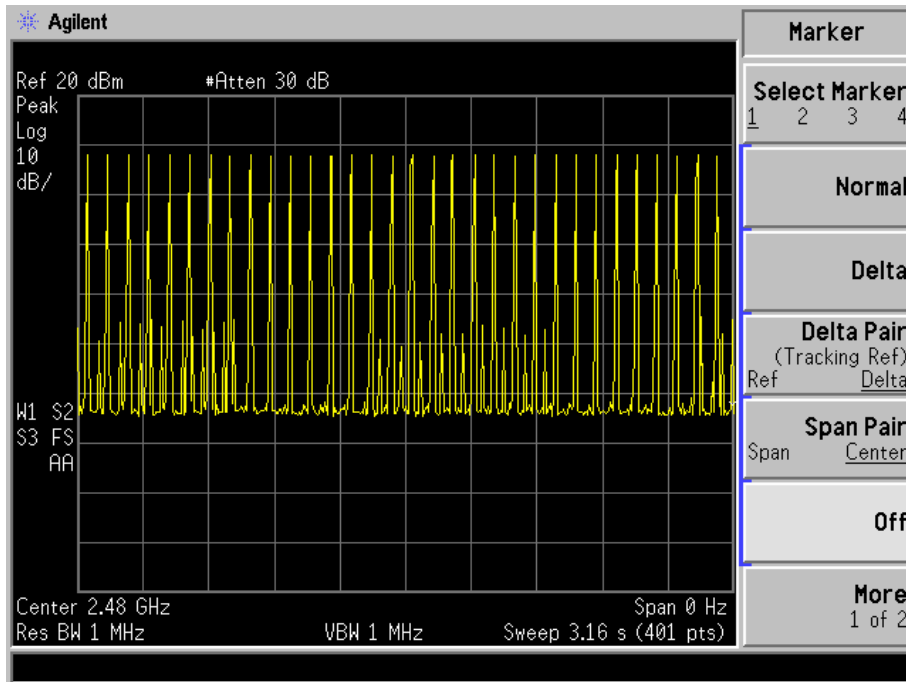


3DH1 CH Middle:

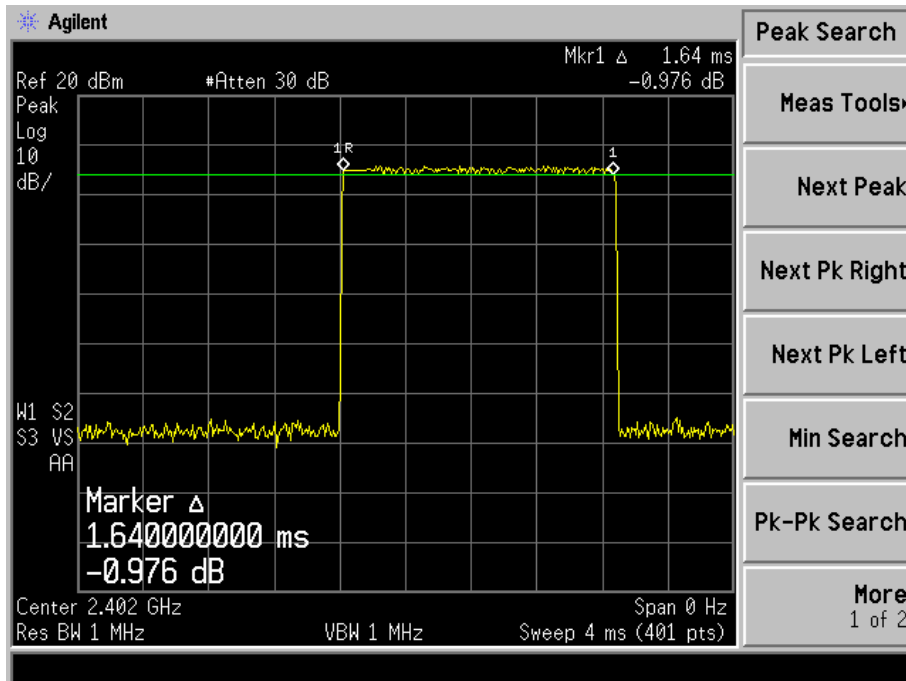
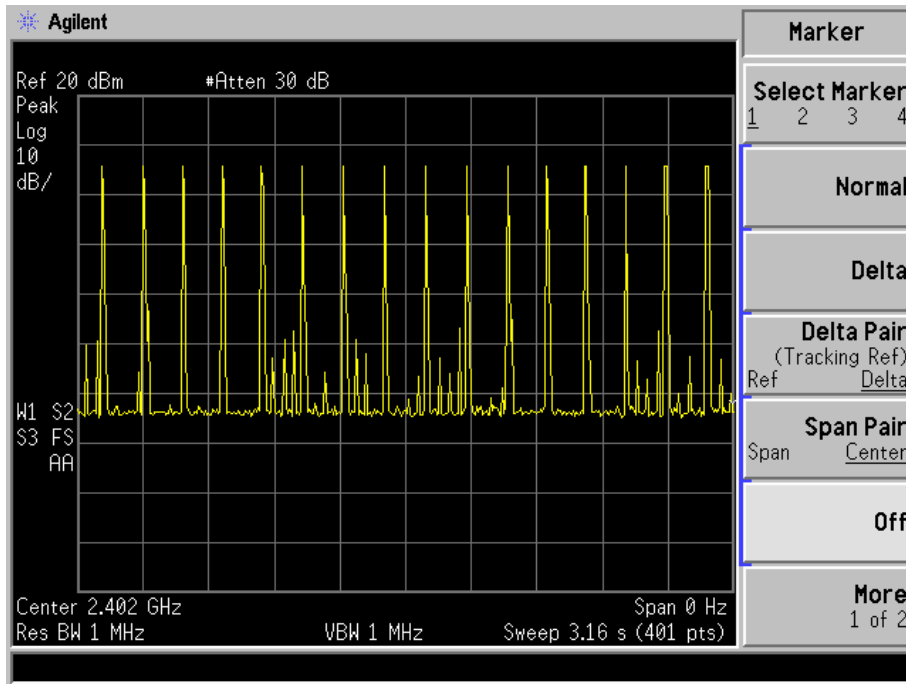




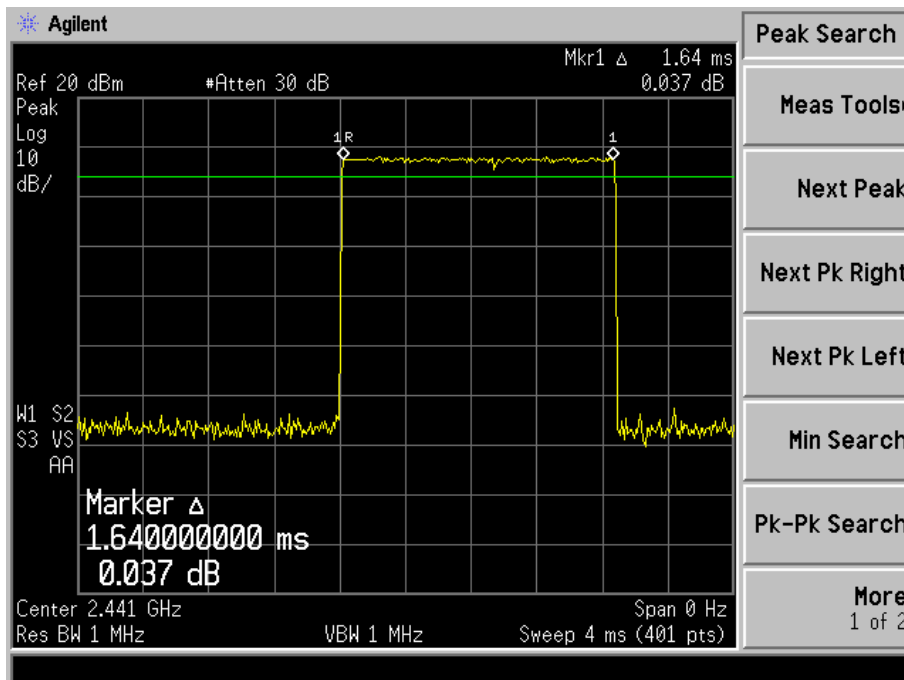
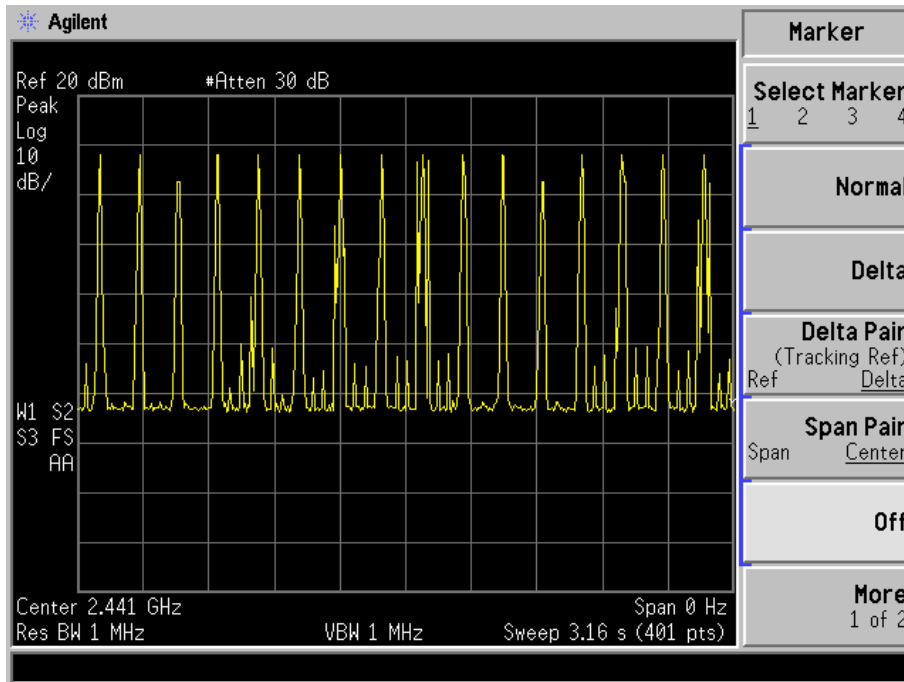
3DH1 CH High:



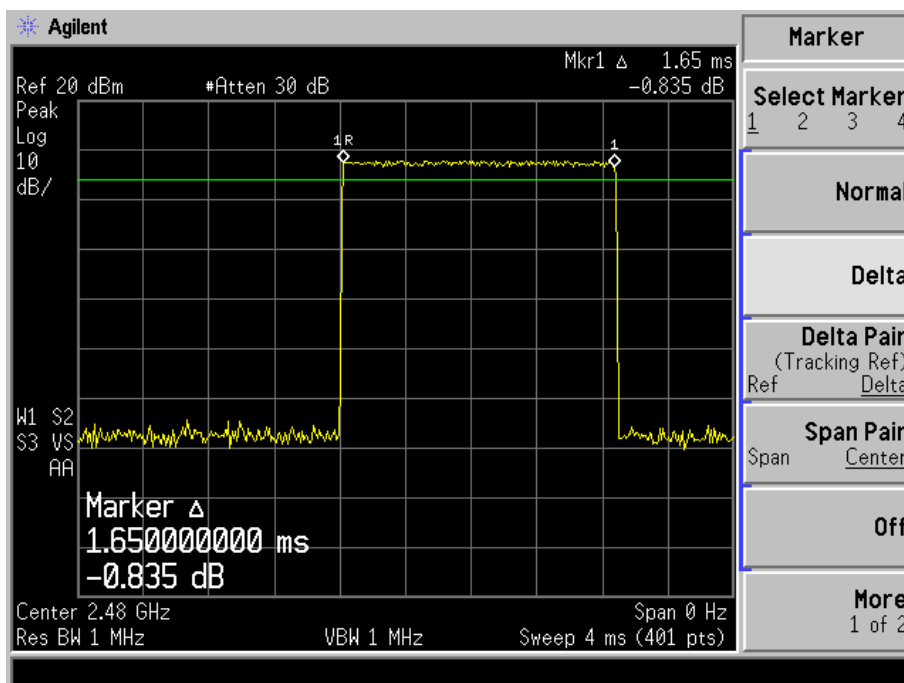
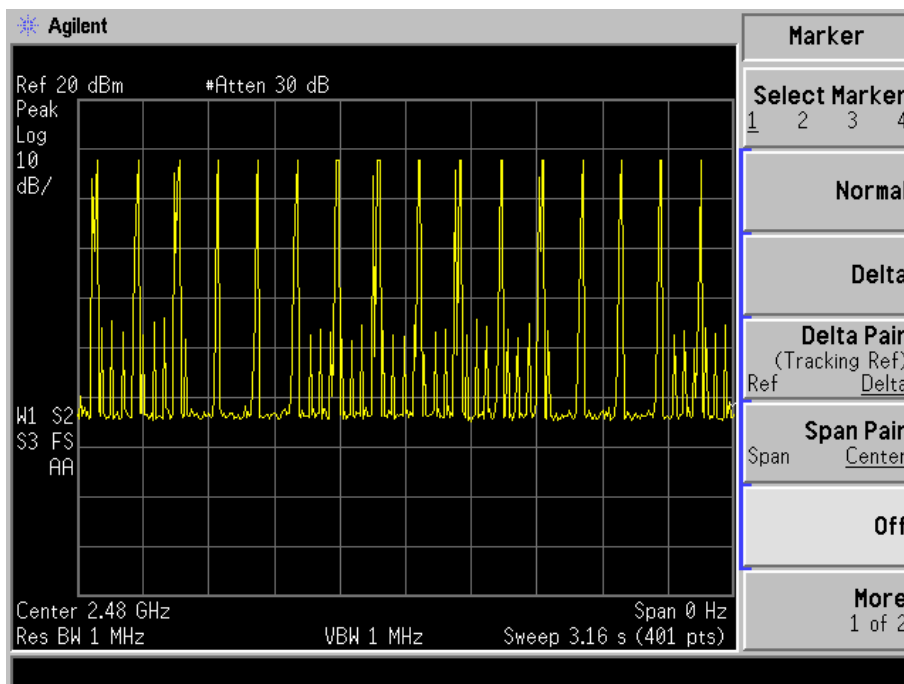
3DH3 CH Low:



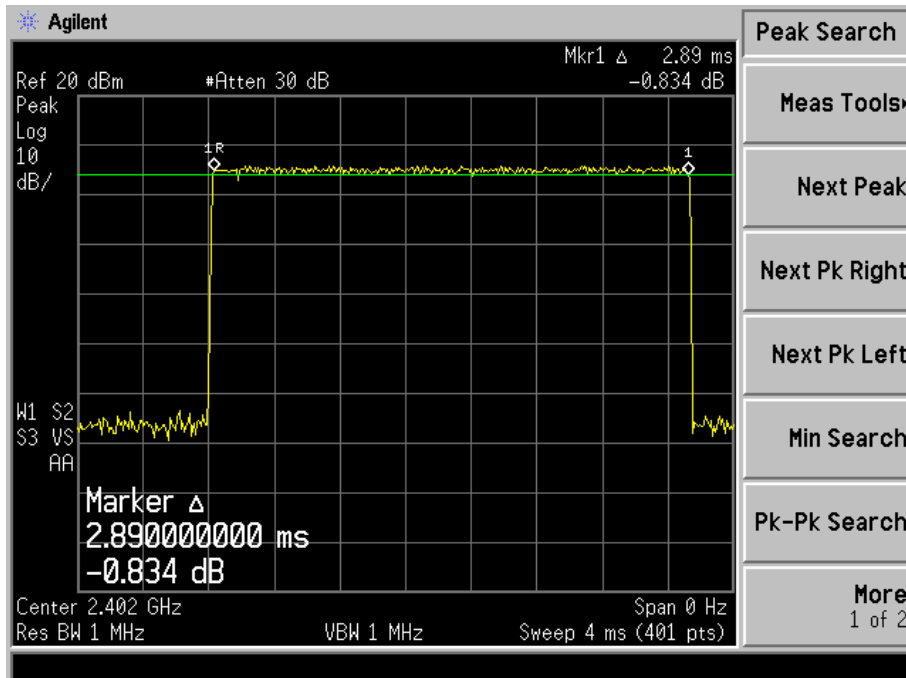
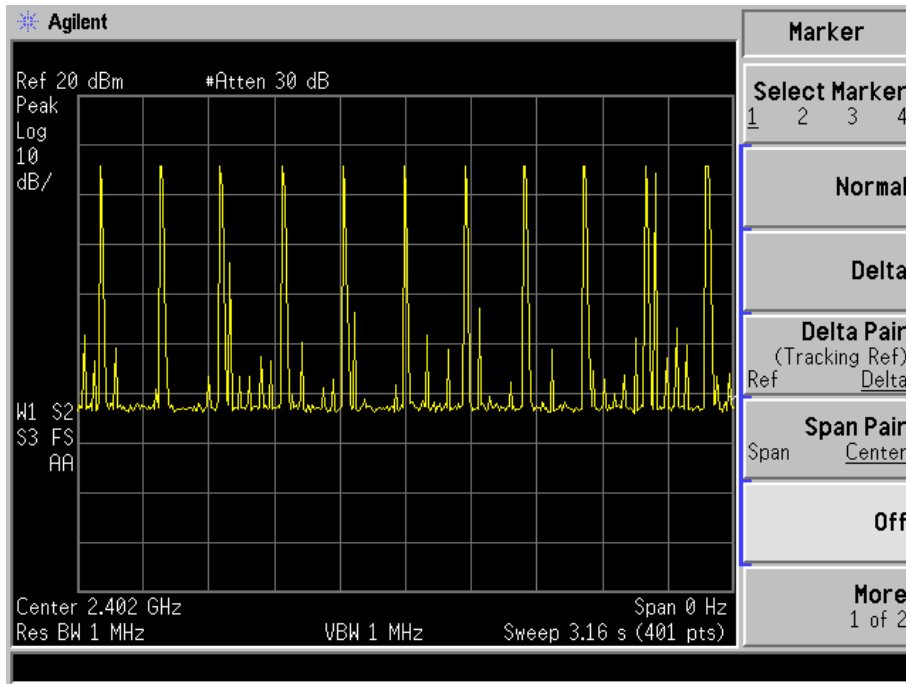
3DH3 CH Middle:



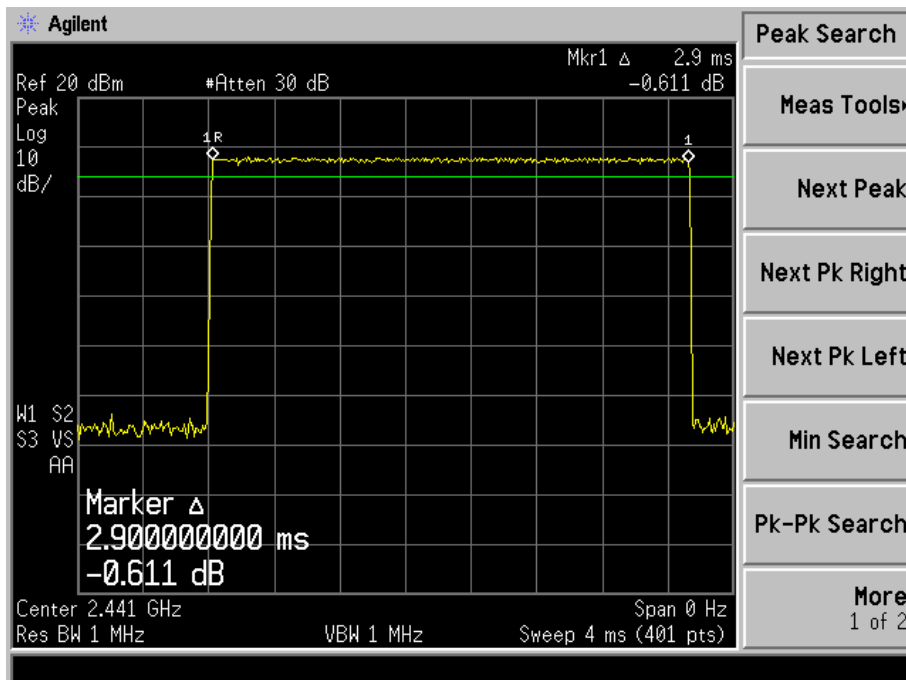
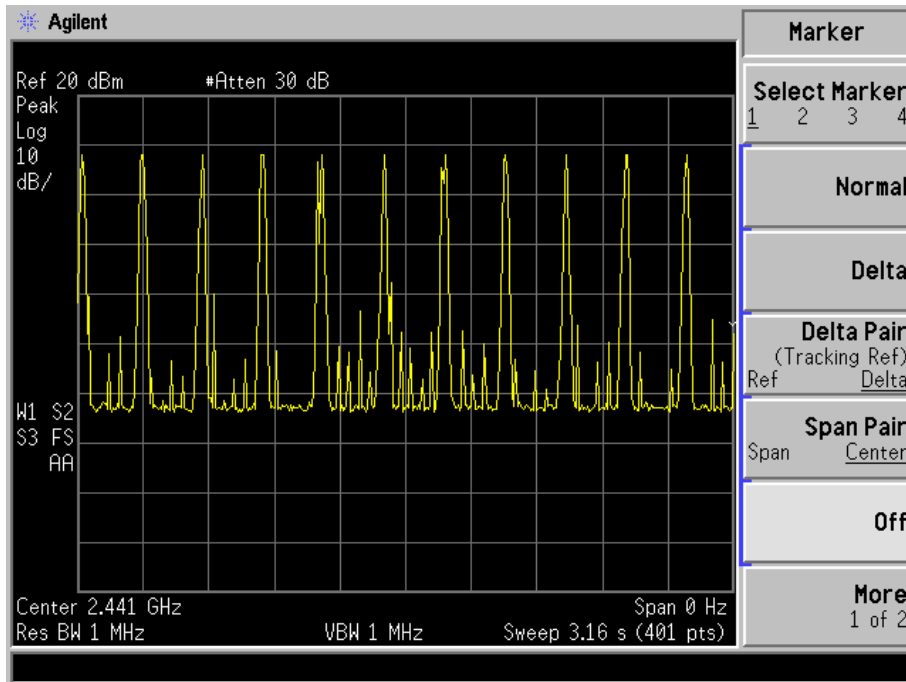
3DH3 CH High:



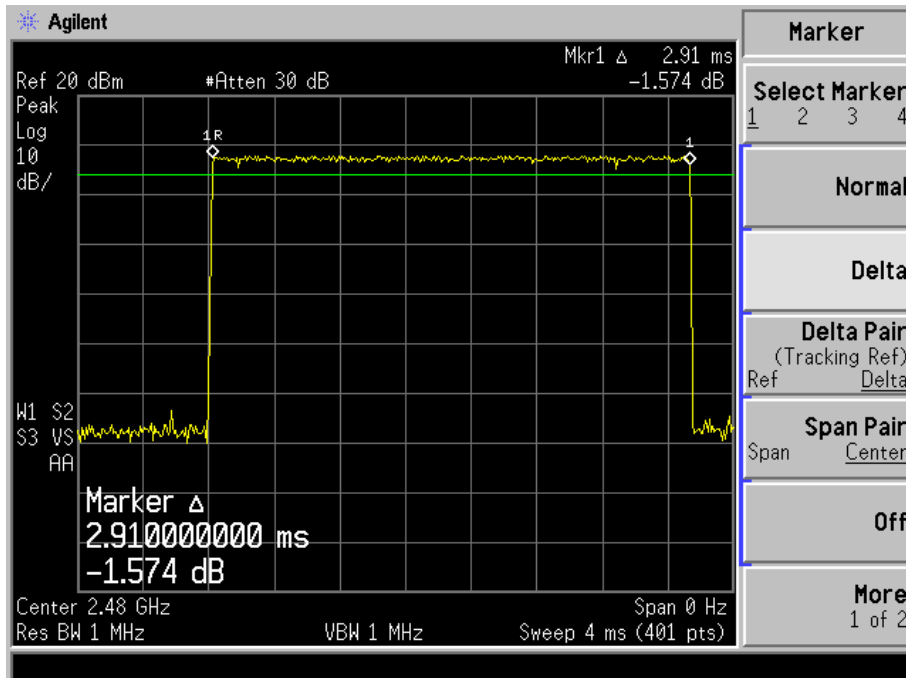
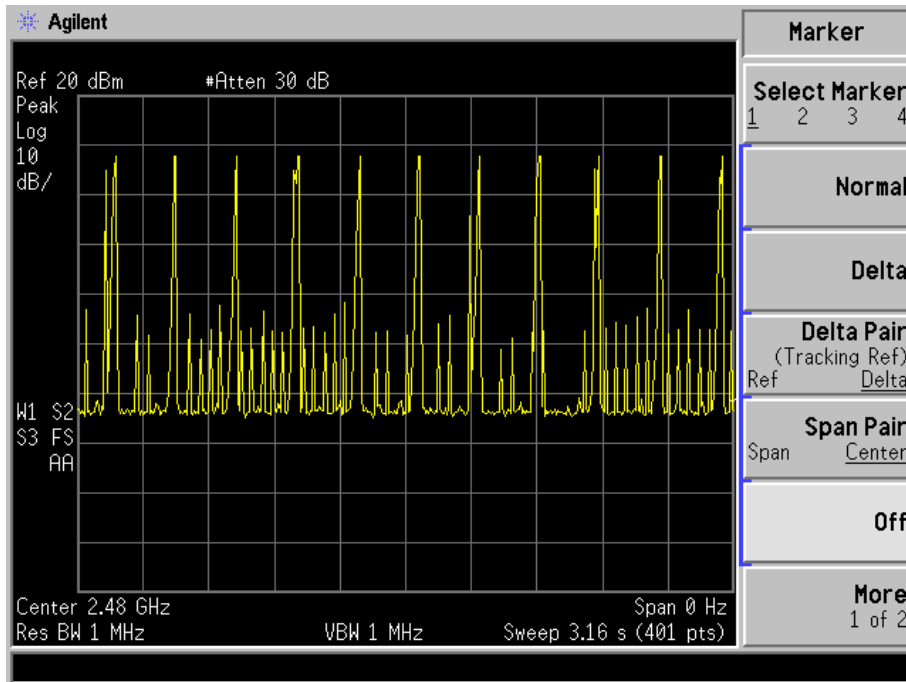
3DH5 CH Low:



3DH5 CH Middle:



3DH5 CH High:



## 7. TRANSMITTER SPURIOUS EMISSIONS

### 7.1 Standard Applicable

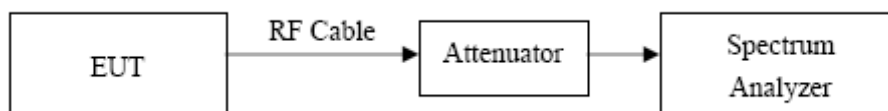
According to Item 19 of Article 2 Paragraph 1. The transmitter spurious emissions shall not exceeded the following limit:

- (1) Below 2387MHz : 2.5 $\mu$ W/MHz
- (2) 2387 to 2400MHz : 25 $\mu$ W/MHz
- (3) 2483.5 through 2496.5MHz : 25 $\mu$ W/MHz
- (4) Over 2496.5MHz : 2.5 $\mu$ W/MHz

### 7.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27
All test equipments were calibrated by South China National Center of Metrology GuangDong Institute of Metrology					

### 7.3 Test Setup Block Diagram



### 7.4 Test Procedure

- (1) A spectrumIn case of conducted measurements, the radio device shall be connected to the measuring equipment via a suitable attenuator.
- (2) The measurement equipment shall be set for peak hold mode of operation.
- (3) the transmitter shall be operated at the highest output power, or, in the case of equipment able to operate at more than one power level, at the lowest and highest output powers;
- (4) The resolution bandwidth shall be set to 100kHz from 10MHz to 1GHz, the resolution bandwidth shall be set to 1MHz above 1GHz , and the sweep time shall be set to auto mode, to ensure all major modulation products are captured.
- (5) When the searched result is less than the specified limit, the maximum one shall be recorded, when the result is more than the specified limit, all measured values shall be recorded.
- (5) This measurement shall be repeated with the transmitter in standby mode where applicable.



(6) Repeat above procedures until all frequency measured was complete.

## 7.5 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

## 7.6 Summary of Test Results/Plots

*Transmitter Spurious Emissions*

*For GFSK:*

Frequency Range (MHz)	Maximum Spurious Emission Value (dBm)	Limit (dBm)
Test Mode: Low Channel (2402MHz)		
30-1000	-59.13	-36
1000-2387	-45.91	-26 (2.5uW)
2387-2400	-18.94	-16 (25uW)
2483.5-2496.5	-50.24	-16 (25uW)
2496.5-127500	-28.22	-26 (2.5uW)
Test Mode: Middle Channel (2441MHz)		
30-1000	-58.11	-36
1000-2387	-45.10	-26 (2.5uW)
2387-2400	-46.72	-16 (25uW)
2483.5-2496.5	-45.80	-16 (25uW)
2496.5-127500	-30.04	-26 (2.5uW)
Test Mode: High Channel (2480MHz)		
30-1000	-58.94	-36
1000-2387	-44.19	-26 (2.5uW)
2387-2400	-51.10	-16 (25uW)
2483.5-2496.5	-26.62	-16 (25uW)
2496.5-127500	-29.24	-26 (2.5uW)

For BLE:

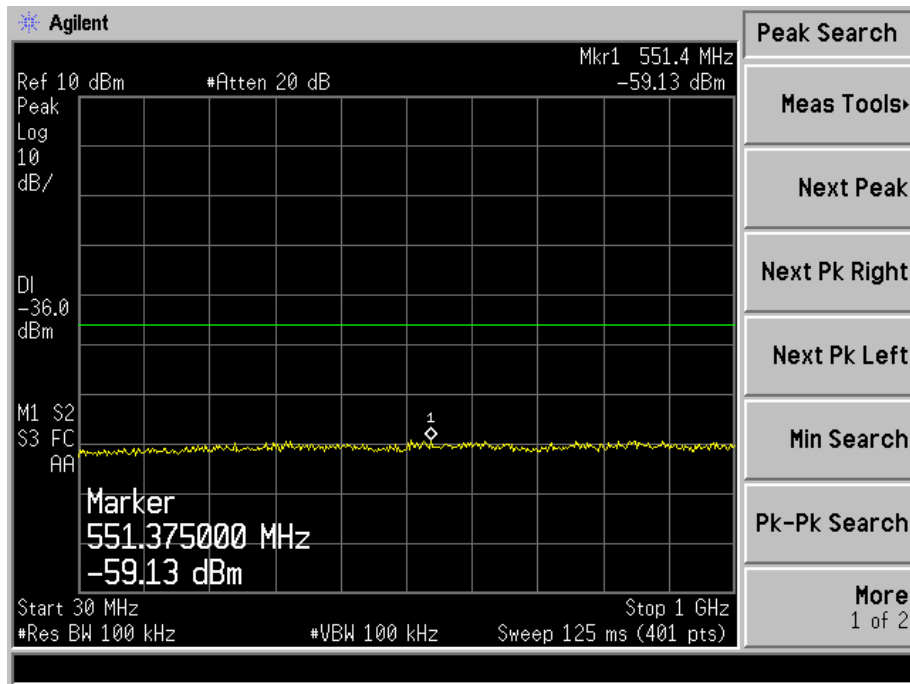
Test Mode: BLE-Low Channel(2402)		
30-1000	-59.13	-36
1000-2387	-48.56	-26 (2.5uW)
2387-2400	-17.28	-16 (25uW)
2483.5-2496.5	-51.45	-16 (25uW)
2496.5-127500	-35.35	-26 (2.5uW)
Test Mode: BLE-Middle Channel(2442)		
30-1000	-59.04	-36
1000-2387	-47.98	-26 (2.5uW)
2387-2400	-48.69	-16 (25uW)
2483.5-2496.5	-46.38	-16 (25uW)
2496.5-127500	-35.02	-26 (2.5uW)
Test Mode: BLE-Low Channel(2480)		
30-1000	-59.33	-36
1000-2387	-47.80	-26 (2.5uW)
2387-2400	-50.62	-16 (25uW)
2483.5-2496.5	-27.65	-16 (25uW)
2496.5-127500	-35.51	-26 (2.5uW)

Please refer to the following test plots

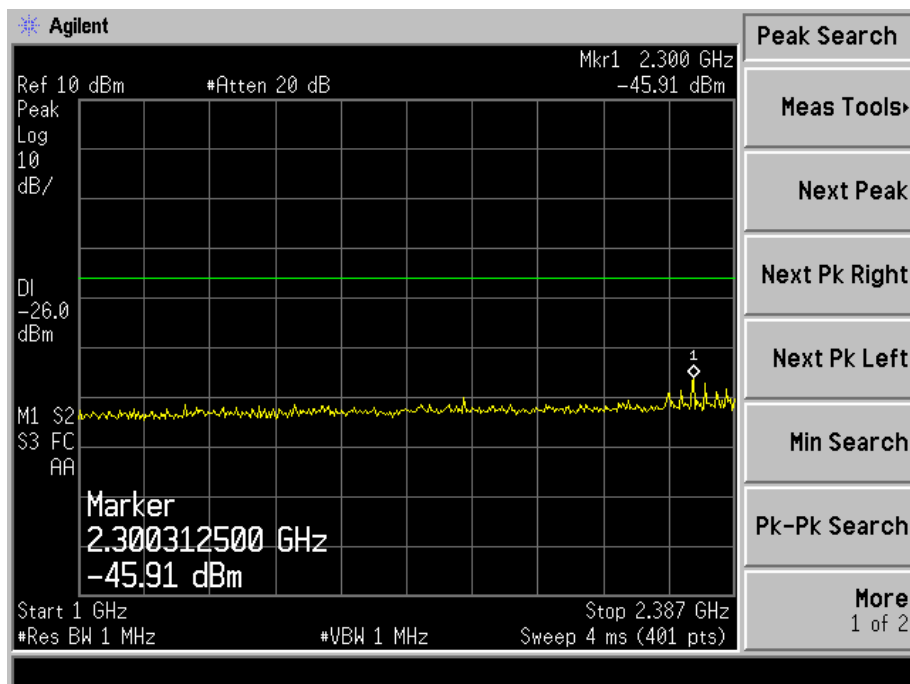
For GFSK

Low Channel (2402MHz):

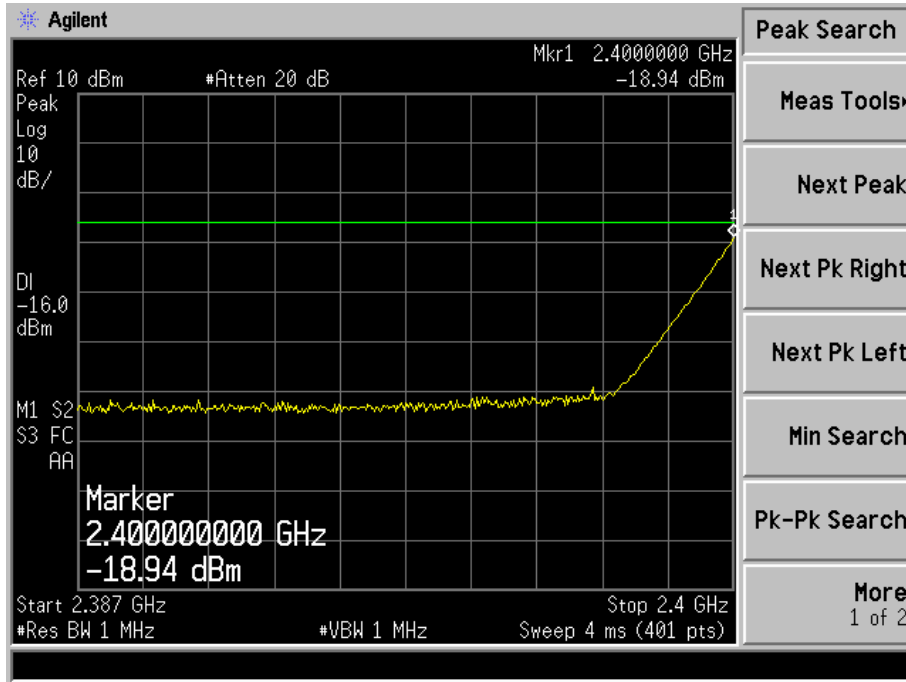
30-1000MHz



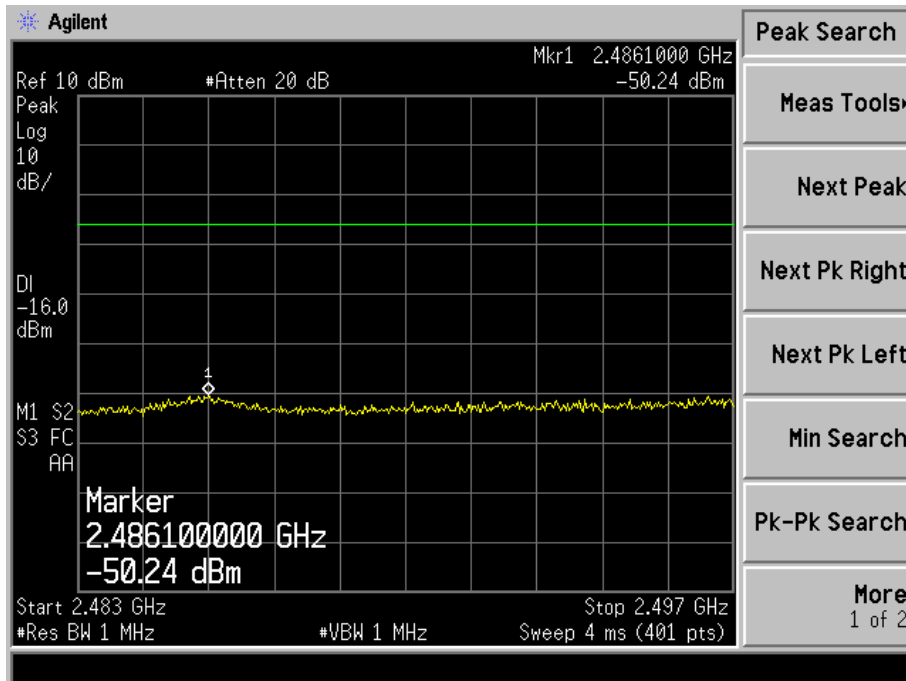
1000-2387MHz



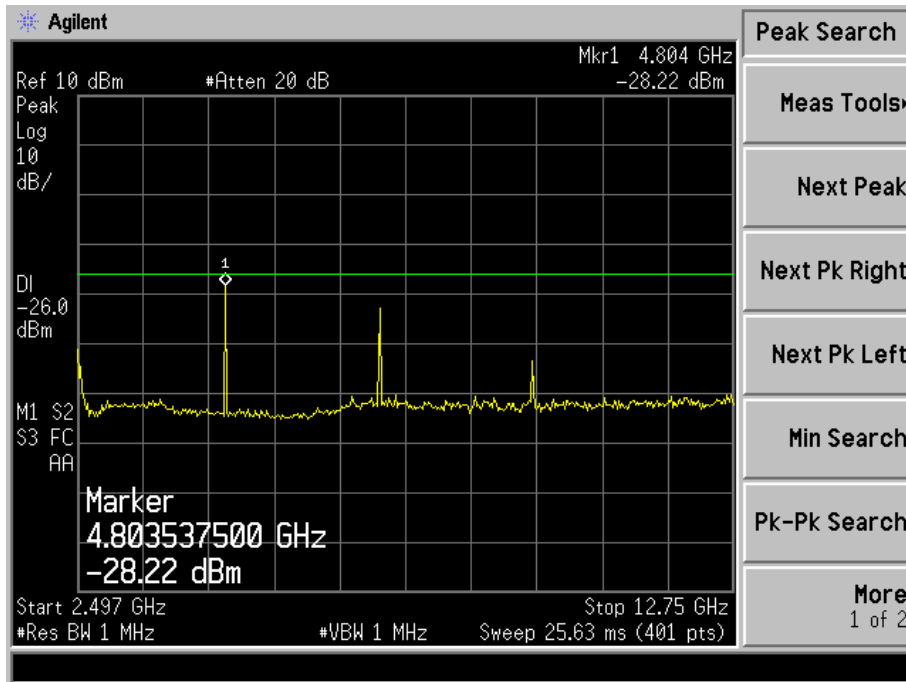
2387-2400MHz



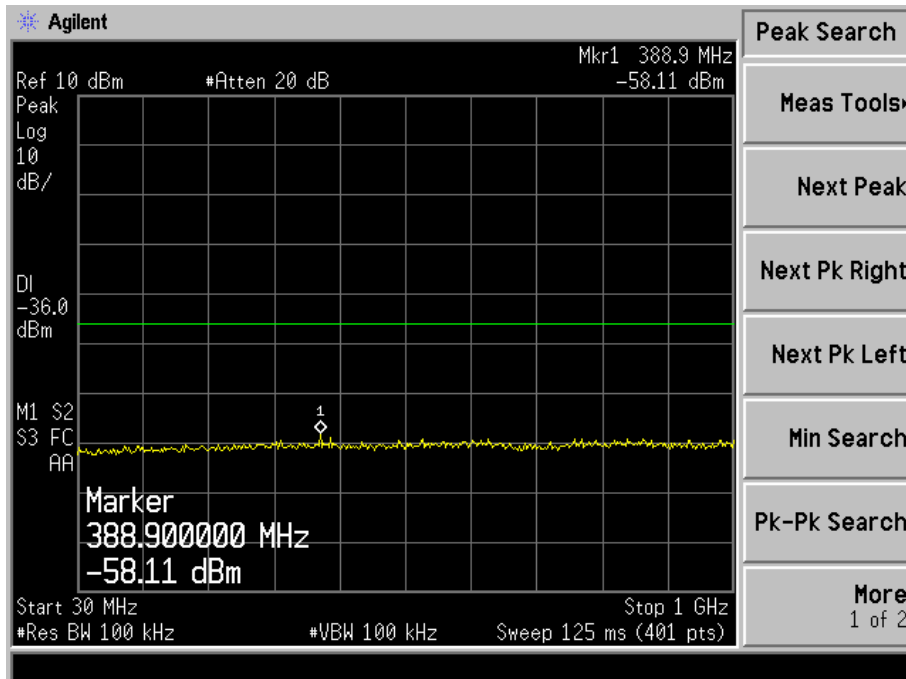
2483.5-2496.5MHz



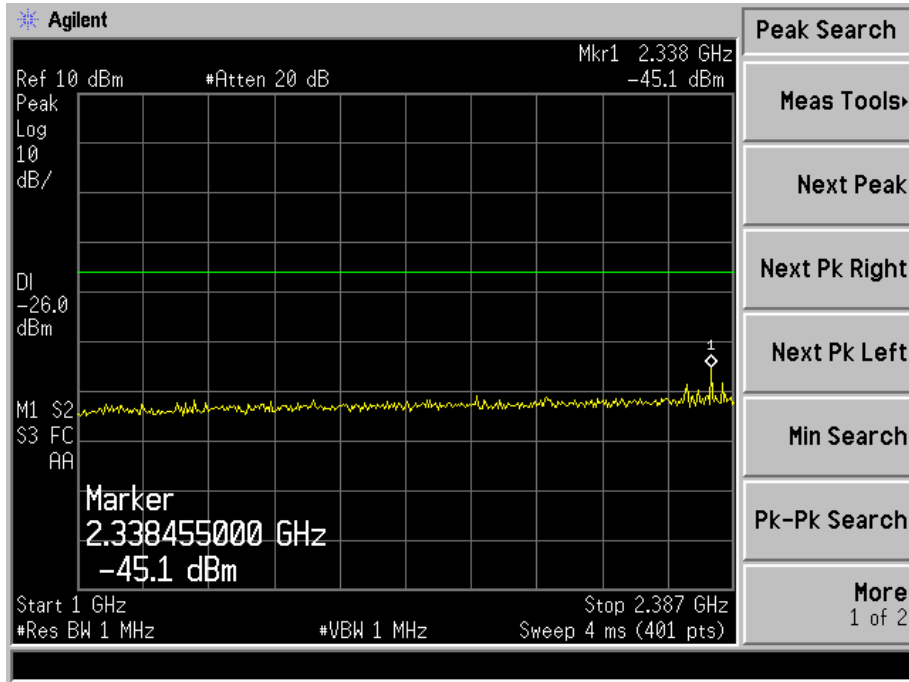
2496.5-12750MHz



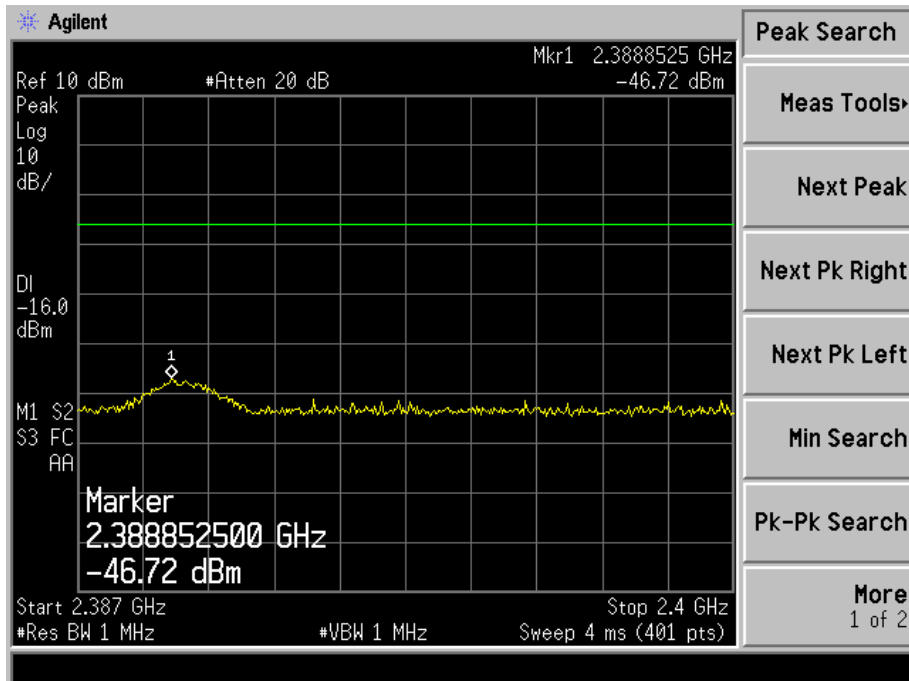
Middle Channel (2441MHz):  
30-1000MHz



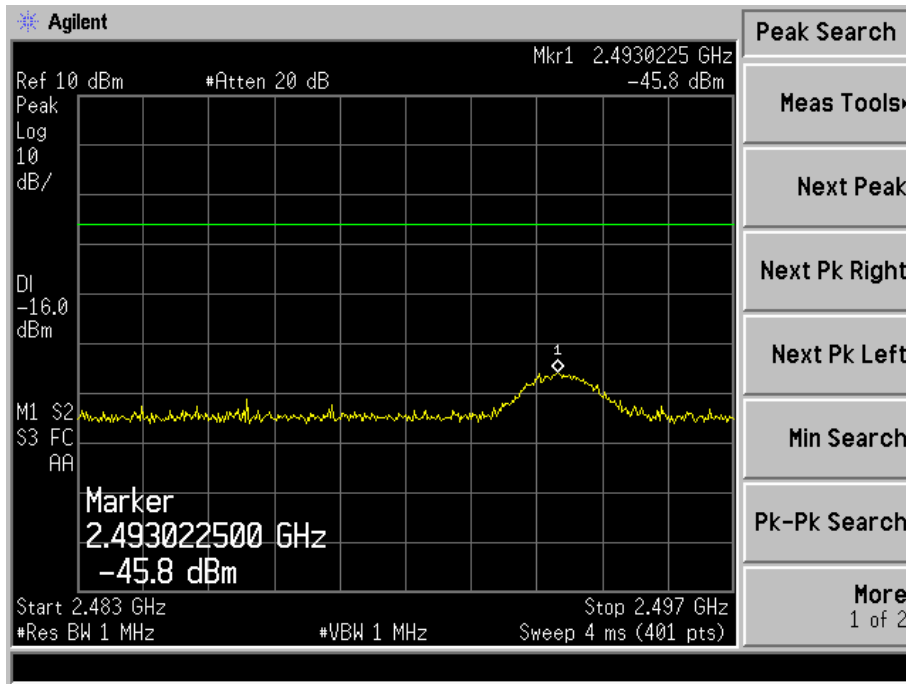
1000-2387MHz



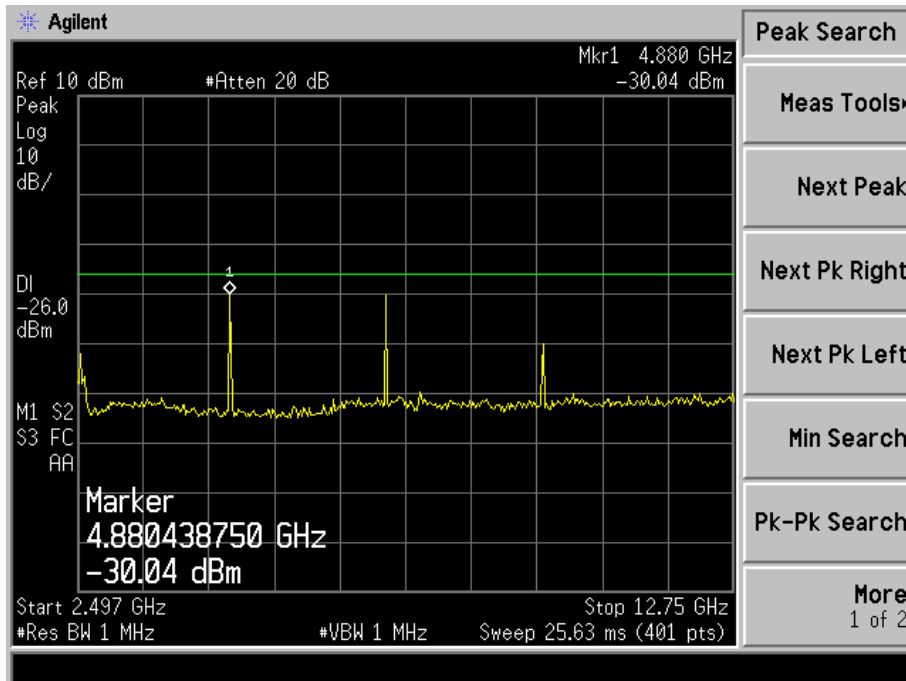
2387-2400MHz



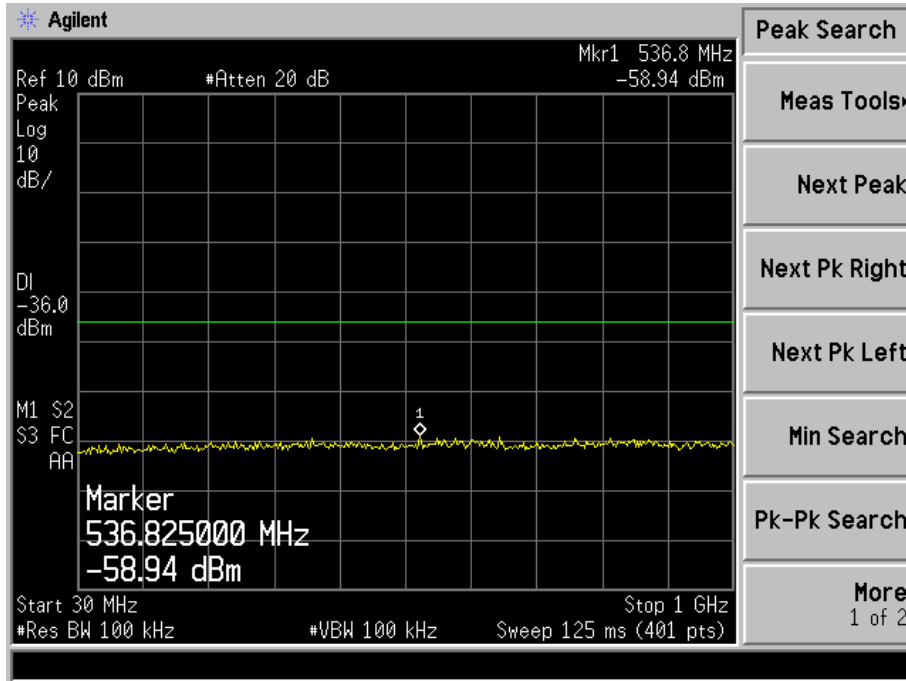
2483.5-2496.5MHz



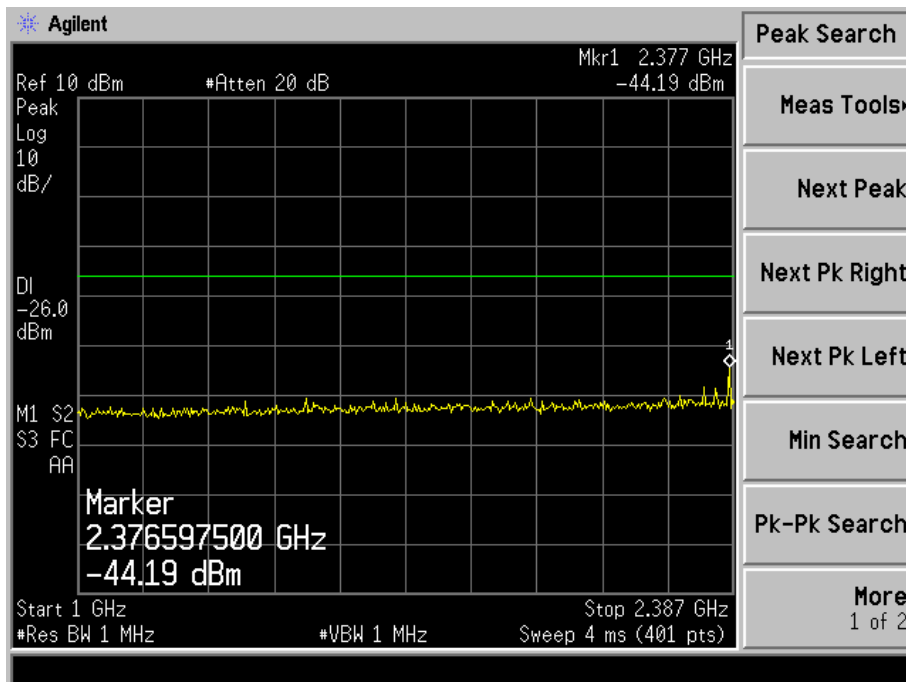
2496.5-12750MHz



High Channel (2480MHz):  
30-1000MHz

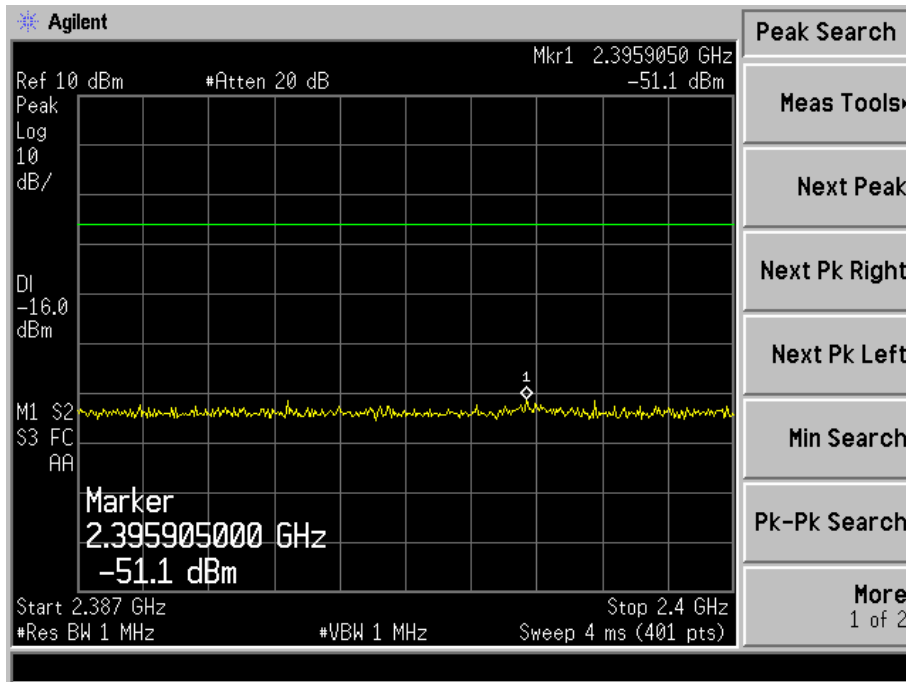


1000-2387MHz

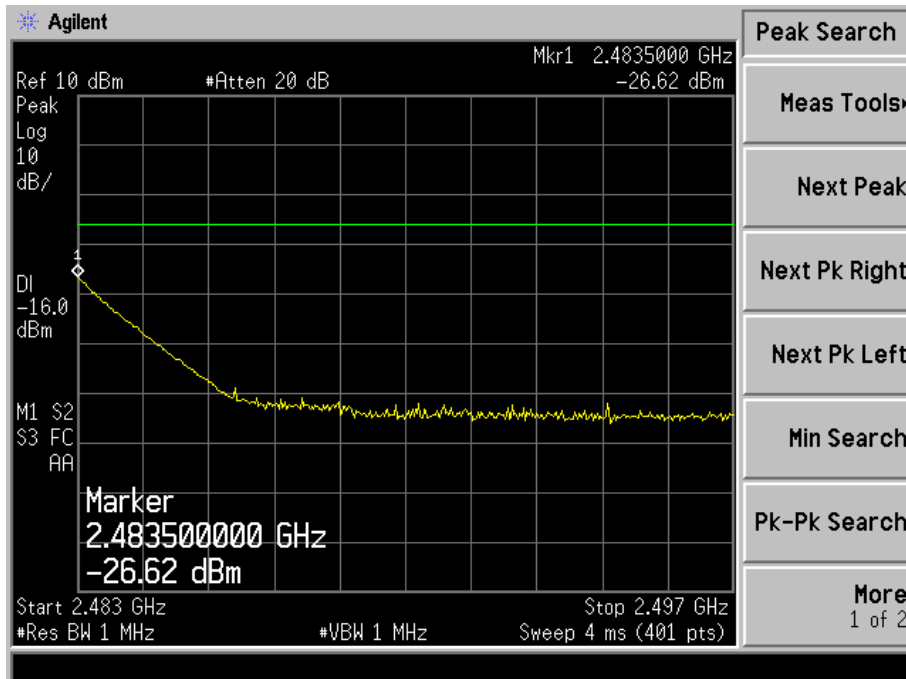




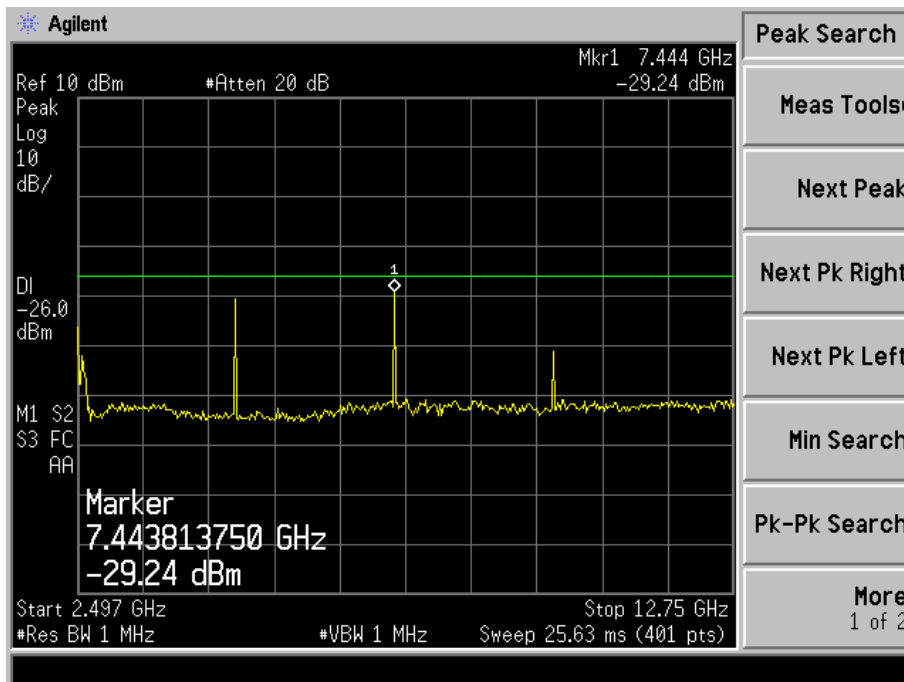
2387-2400MHz



2483.5-2496.5MHz



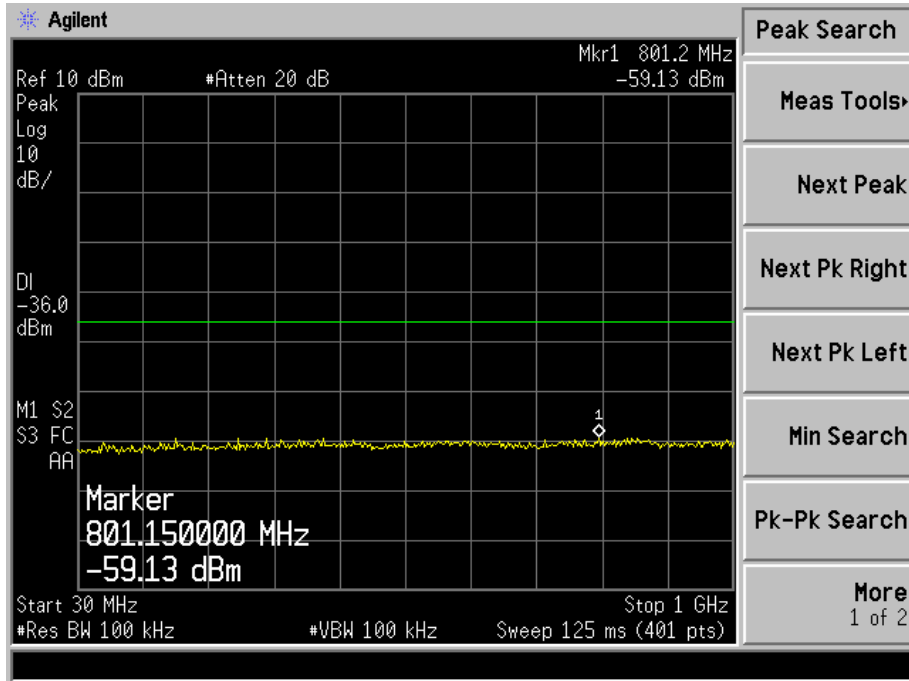
2496.5-12750MHz



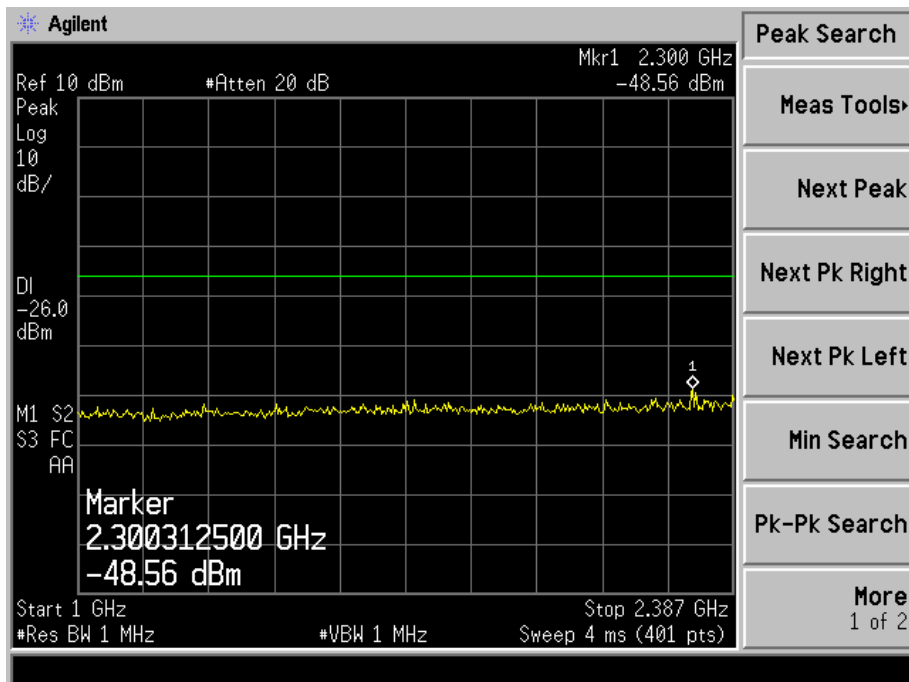
For BLE

Low Channel (2402MHz):

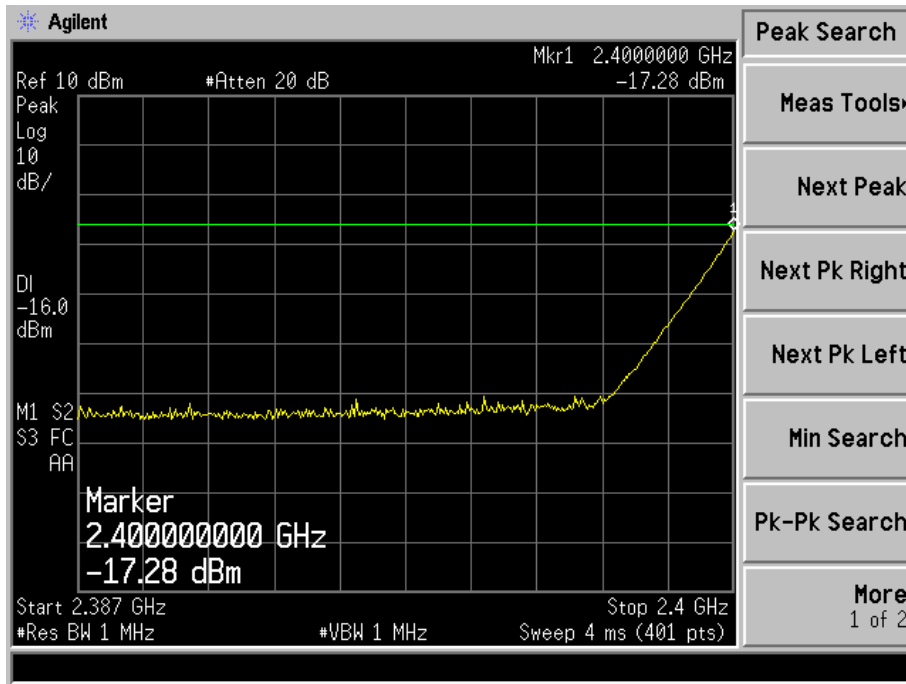
30-1000MHz



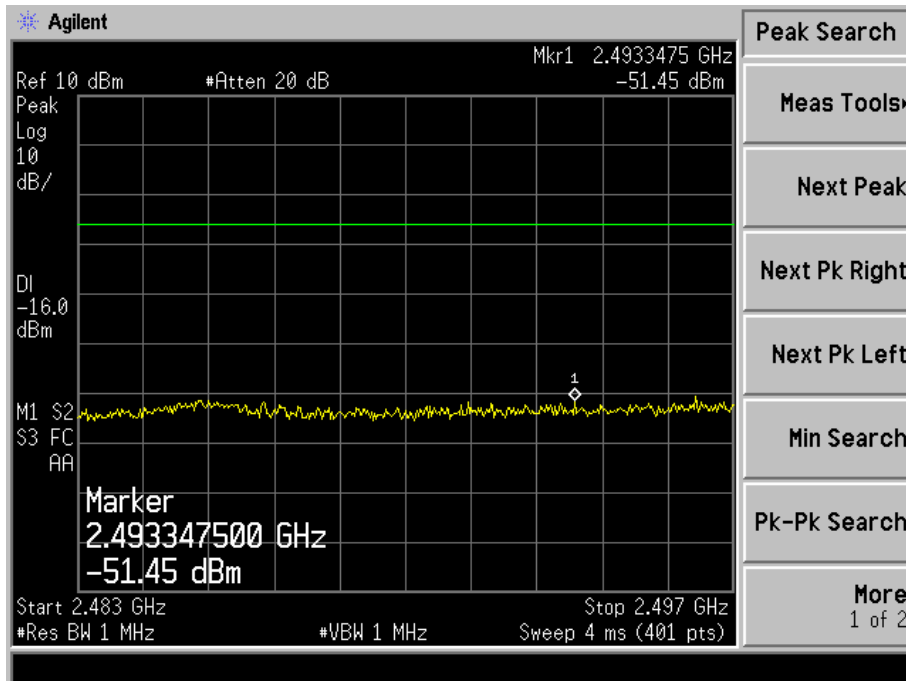
1000-2387MHz



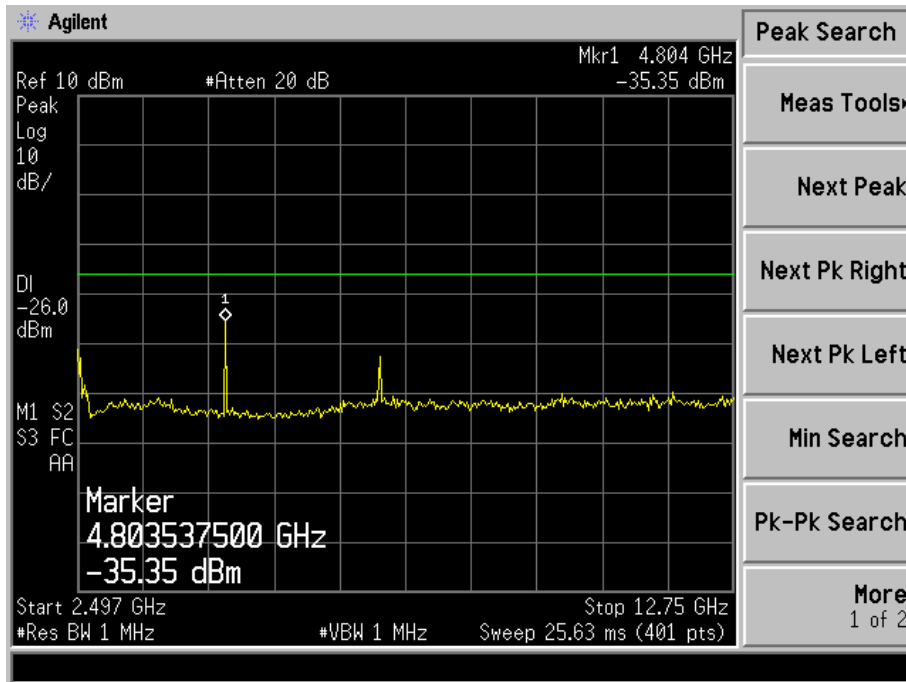
2387-2400MHz



2483.5-2496.5MHz

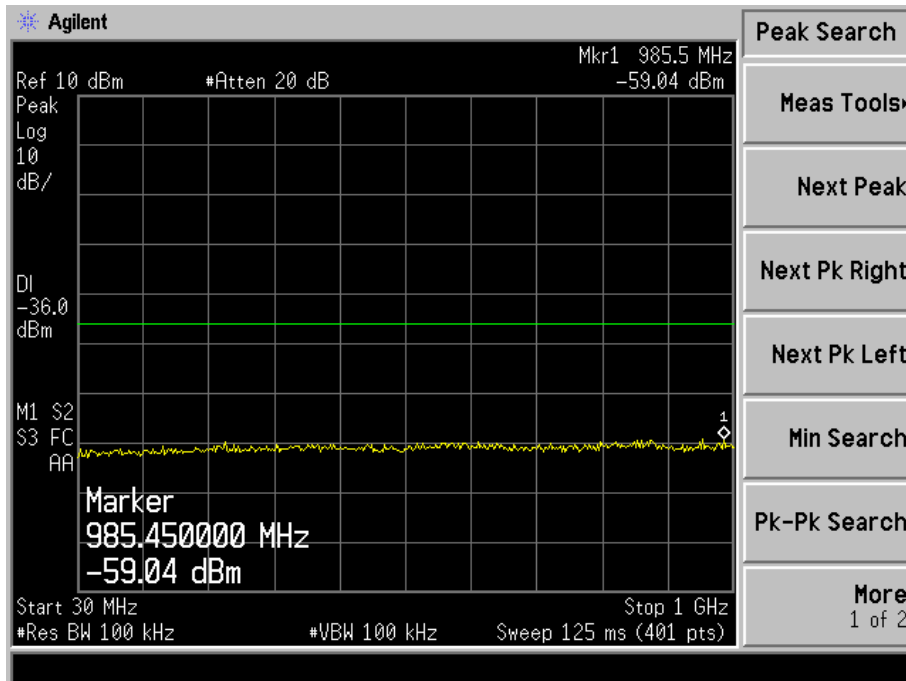


2496.5-12750MHz

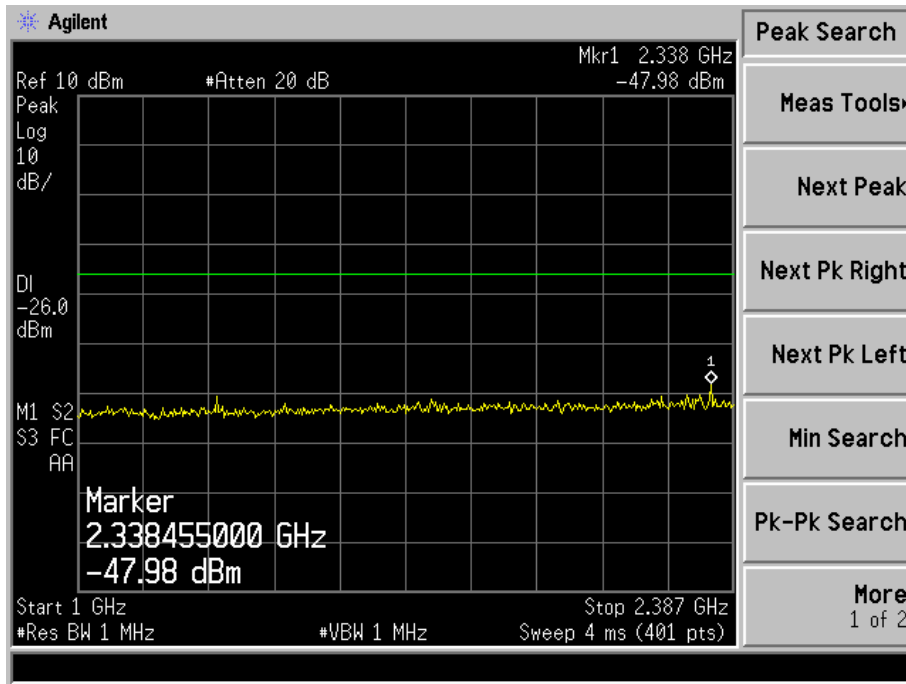


Middle Channel (2442MHz):

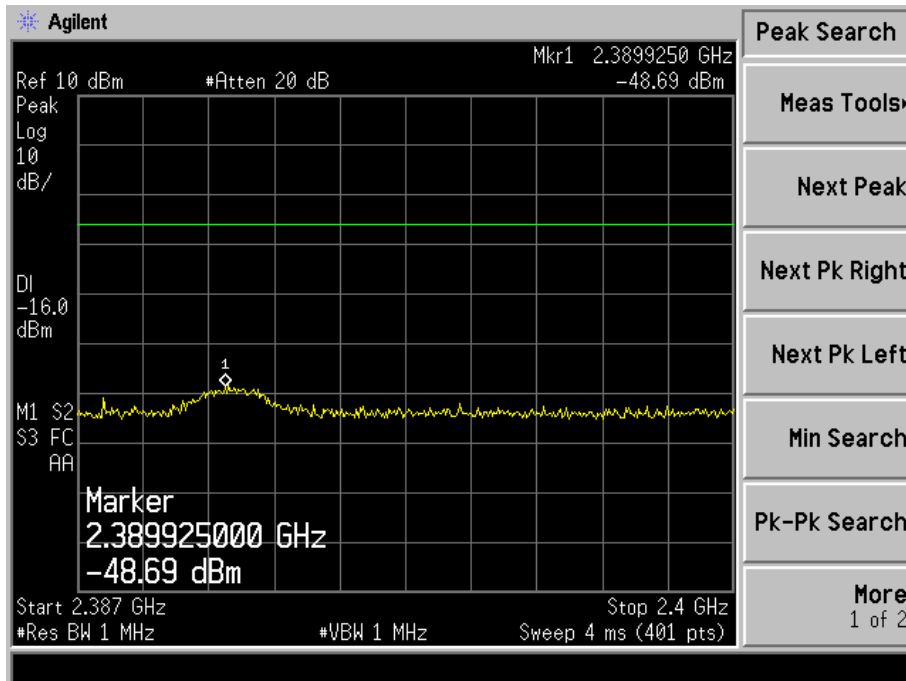
30-1000MHz



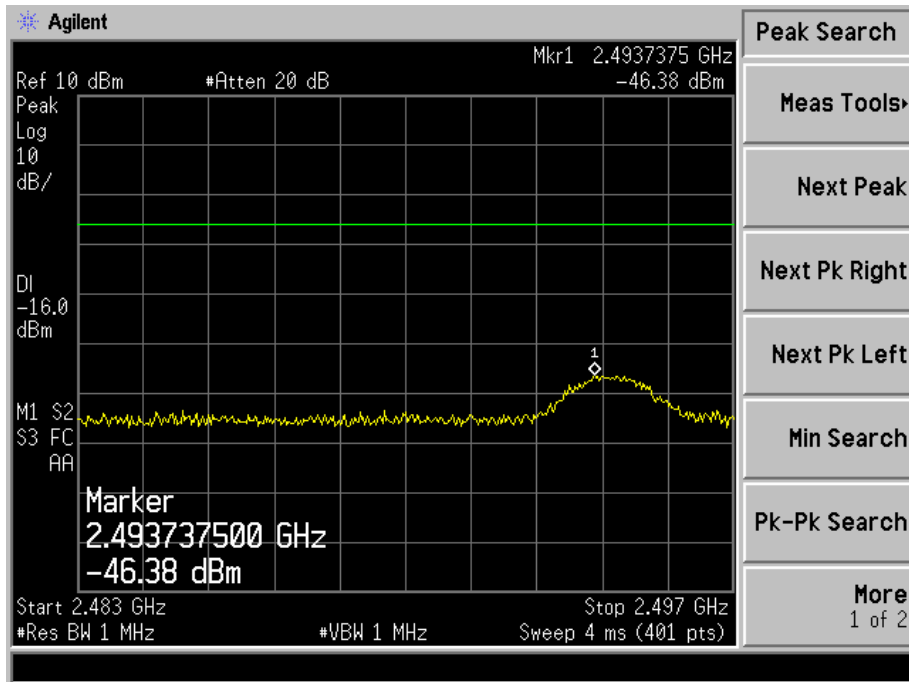
1000-2387MHz



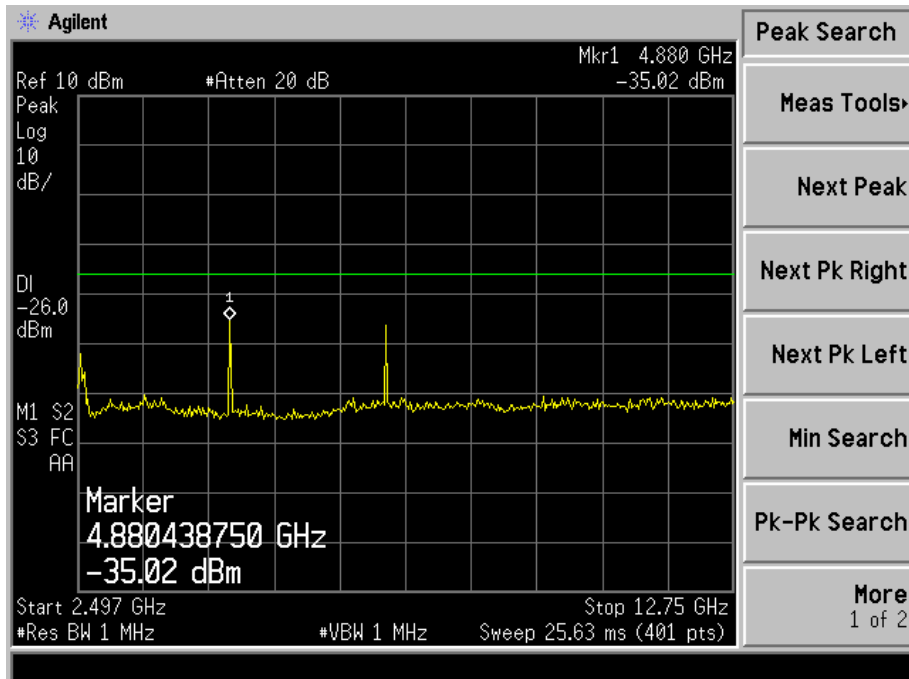
2387-2400MHz



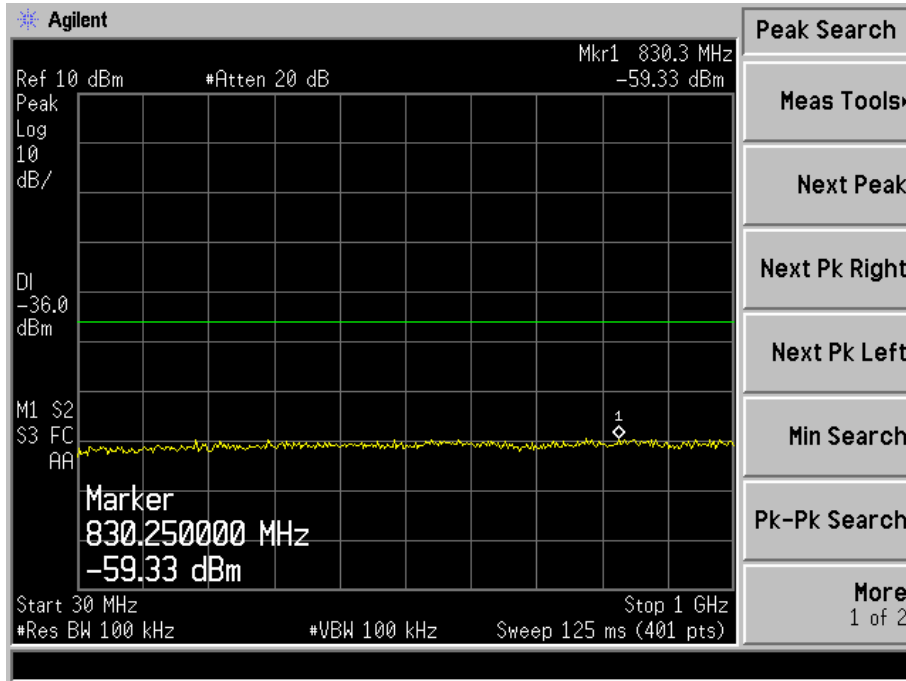
2483.5-2496.5MHz



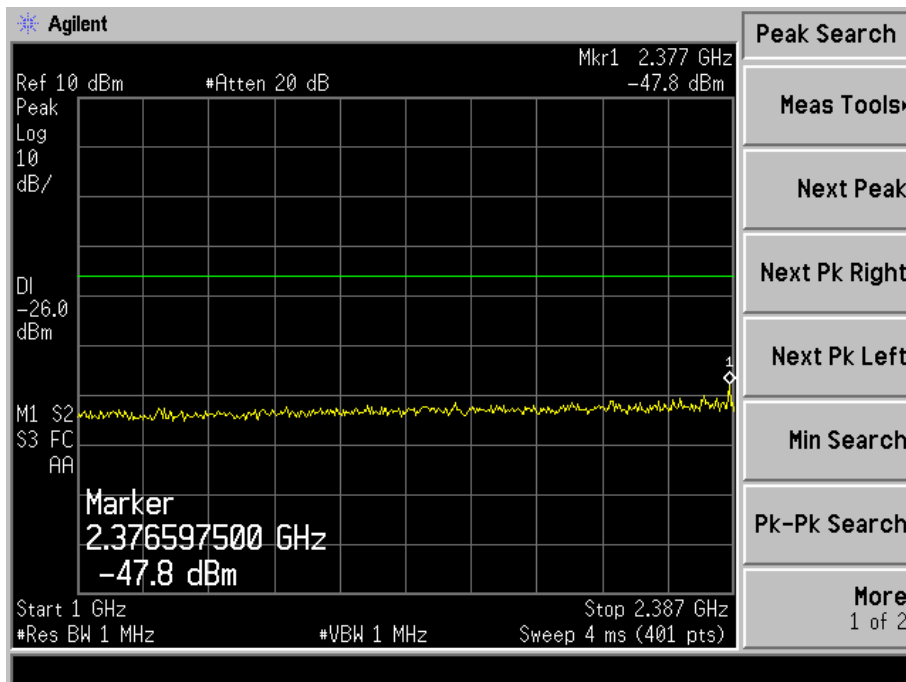
2496.5-12750MHz



High Channel (2480MHz):  
30-1000MHz

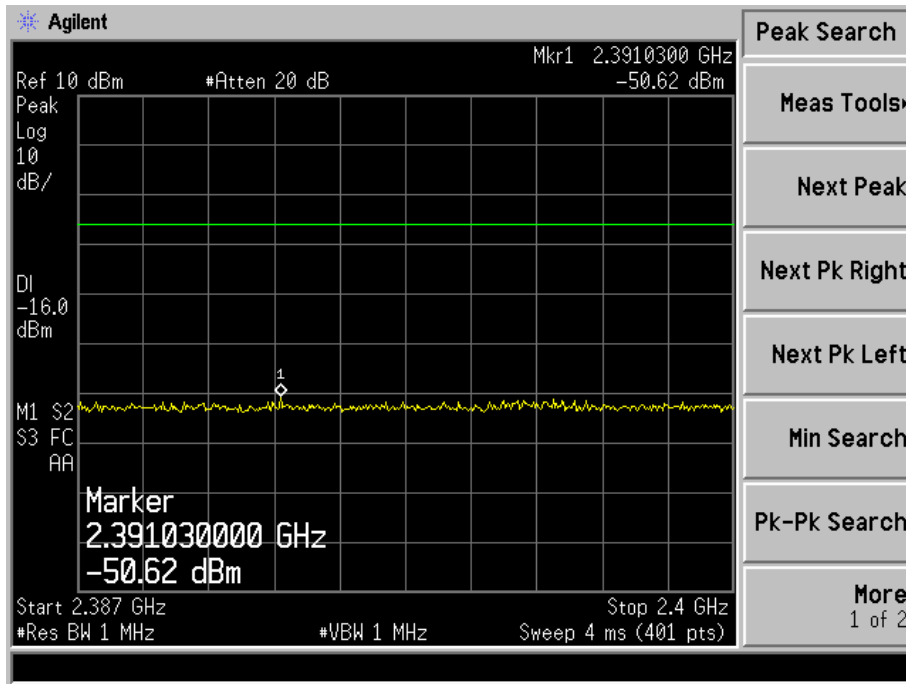


1000-2387MHz

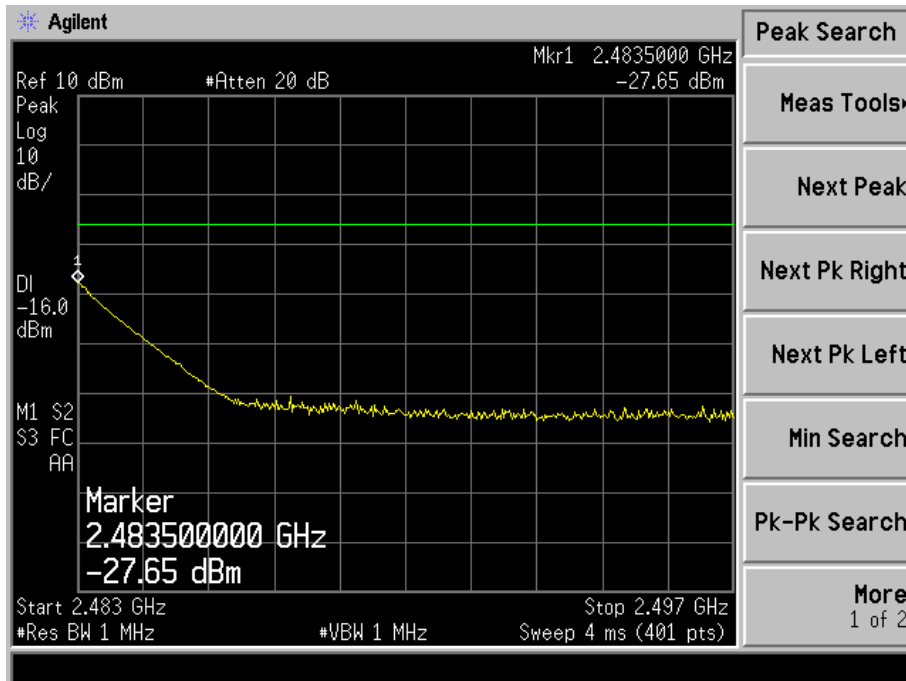




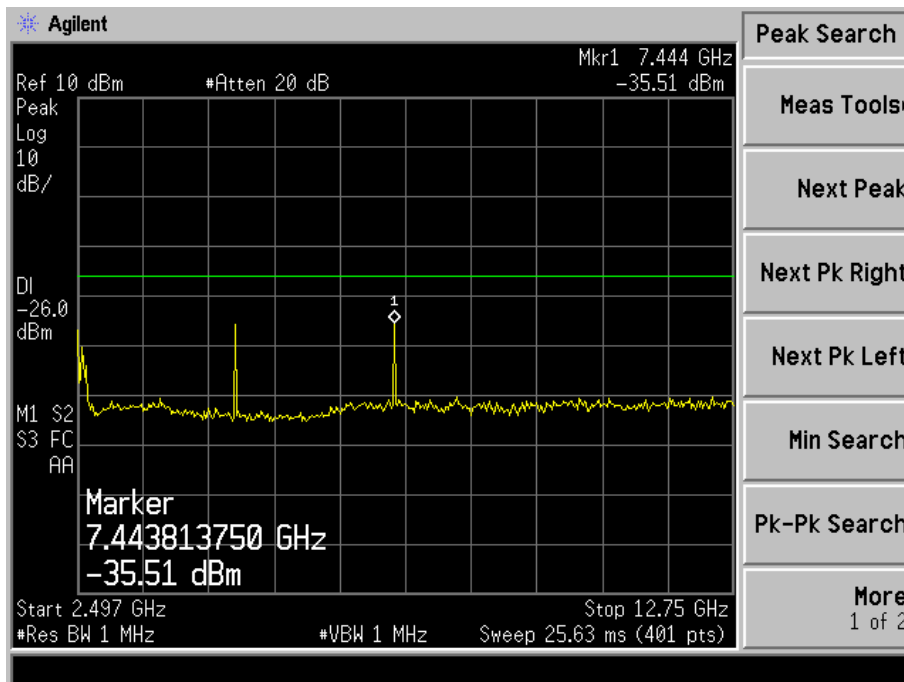
2387-2400MHz



2483.5-2496.5MHz



2496.5-12750MHz



## 8. RECEIVER SPURIOUS EMISSIONS

### 8.1 Standard Applicable

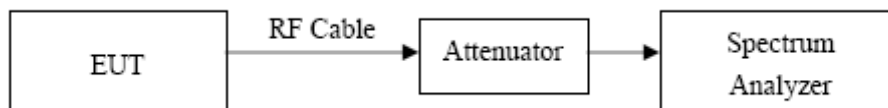
According to Item 19 of Article 2 Paragraph 1. The receiver spurious emissions shall not exceeded the following limit:

- (1) Below 1GHz : 4nW
- (2) 1GHz or higher : 20nW

### 8.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27
All test equipments were calibrated by South China National Center of Metrology GuangDong Institute of Metrology					

### 8.3 Test Setup Block Diagram



### 8.4 Test Procedure

- (1) A spectrumIn case of conducted measurements, the radio device shall be connected to the measuring equipment via a suitable attenuator.
- (2) The measurement equipment shall be set for peak hold mode of operation.
- (3) the transmitter shall be operated at the receiving mode.
- (4) The resolution bandwidth shall be set to 100kHz from 10MHz to 1GHz, the resolution bandwidth shall be set to 1MHz above 1GHz , and the sweep time shall be set to auto mode, to ensure all major modulation products are captured.
- (5) When the searched result is less than the specified limit, the maximum one shall be recorded, when the result is more than the specified limit, all measured values shall be recorded.
- (5) This measurement shall be repeated with the transmitter in standby mode where applicable.
- (6) Repeat above procedures until all frequency measured was complete.

### 8.5 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

## 8.6 Summary of Test Results/Plots

For GFSK

*Receiver Spurious Emissions:*

Frequency Range (MHz)	Maximum Spurious Emission Value (dBm)	Limit (dBm)
Test Mode: Low Channel (2402MHz)		
30-1000	-68.00	-54 (4nW)
1000-12750	-53.58	-47 (20nW)
Test Mode: Middle Channel (2441MHz)		
30-1000	-67.81	-54 (4nW)
1000-12750	-53.81	-47 (20nW)
Test Mode: High Channel (2480MHz)		
30-1000	-68.26	-54 (4nW)
1000-12750	-53.56	-47 (20nW)

For BLE

*Receiver Spurious Emissions:*

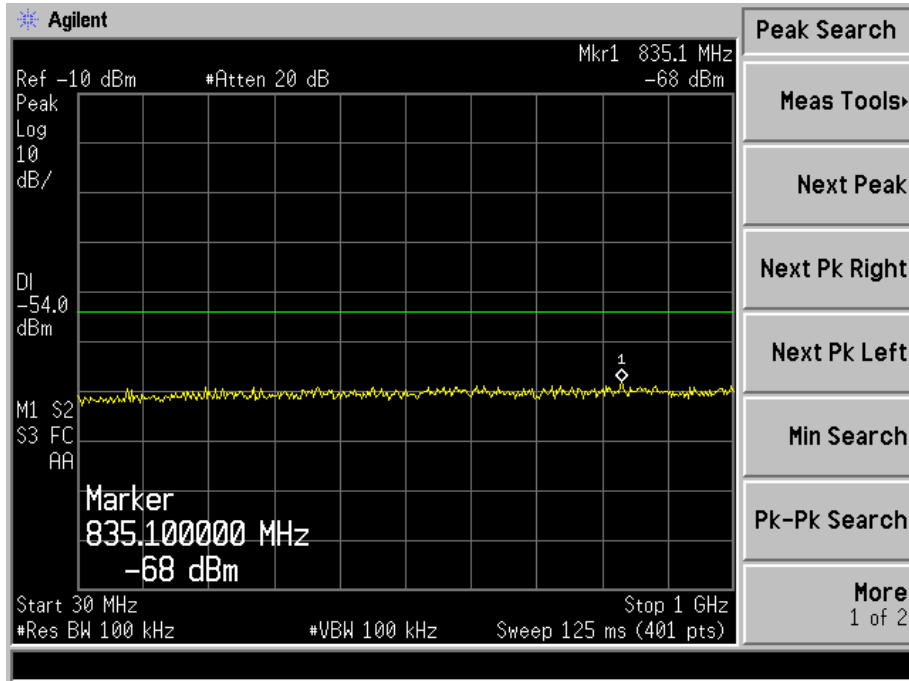
Frequency Range (MHz)	Maximum Spurious Emission Value (dBm)	Limit (dBm)
Test Mode: Low Channel (2402MHz)		
30-1000	-68.14	-54 (4nW)
1000-12750	-54.05	-47 (20nW)
Test Mode: Middle Channel (2442MHz)		
30-1000	-67.34	-54 (4nW)
1000-12750	-51.85	-47 (20nW)
Test Mode: High Channel (2480MHz)		
30-1000	-67.90	-54 (4nW)
1000-12750	-53.70	-47 (20nW)

*Please refer to the following test plots*

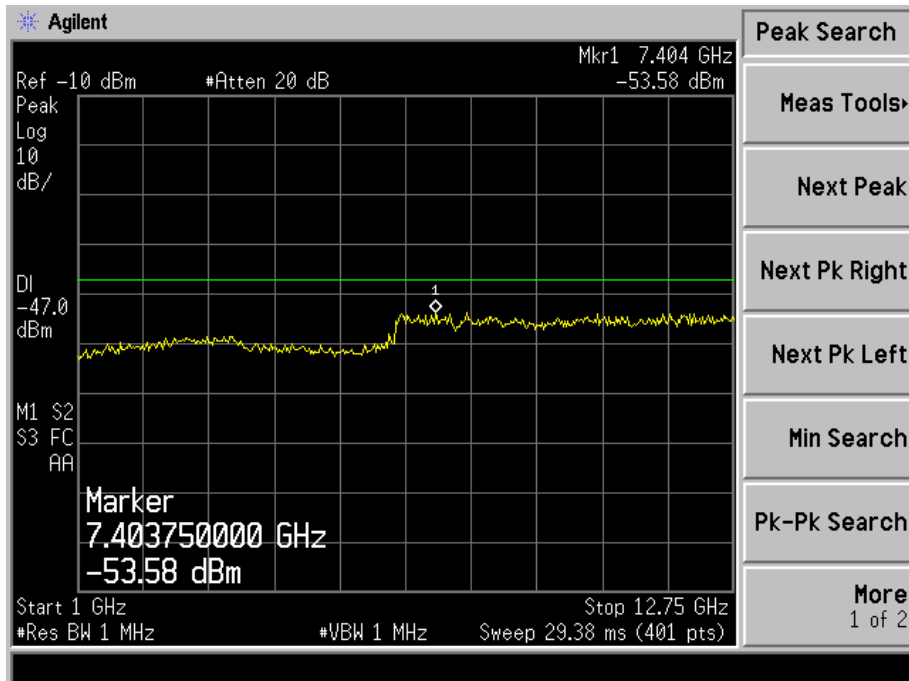
For GFSK

Low Channel (2402MHz)

30-1000MHz

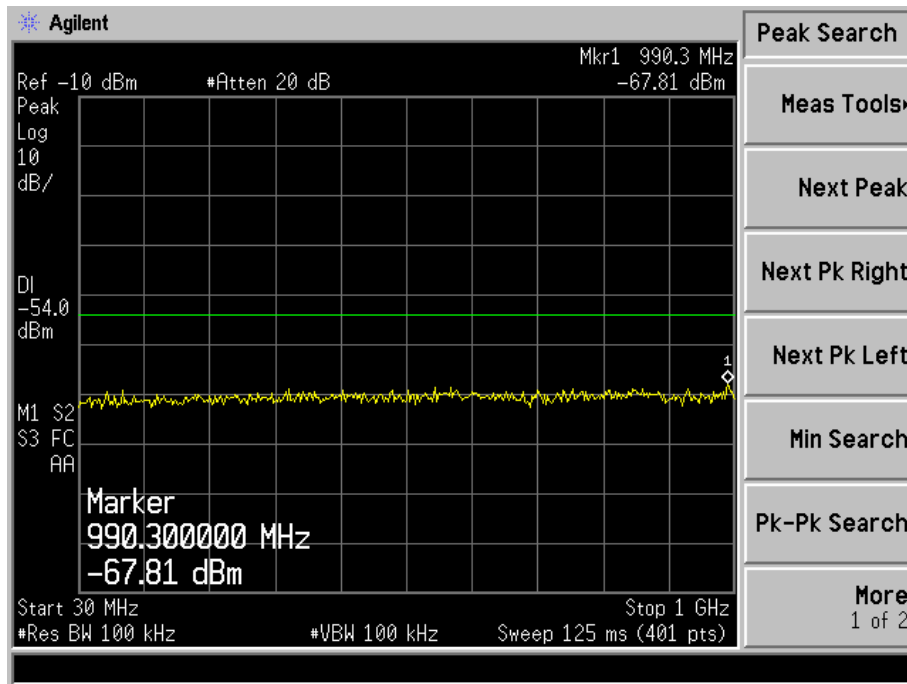


1-12.75GHz

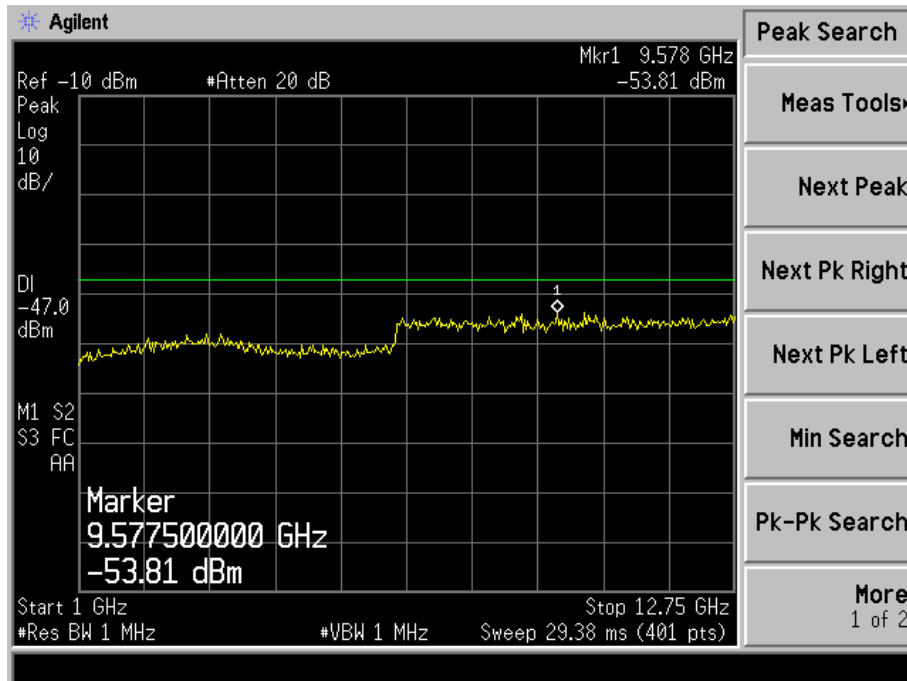


Middle Channel (2442MHz)

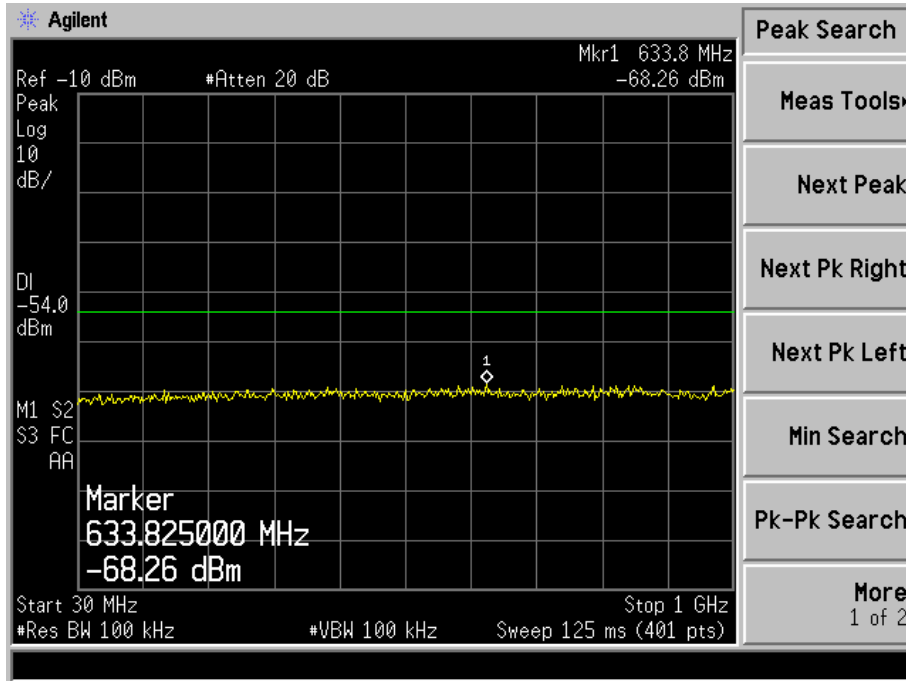
30-1000MHz



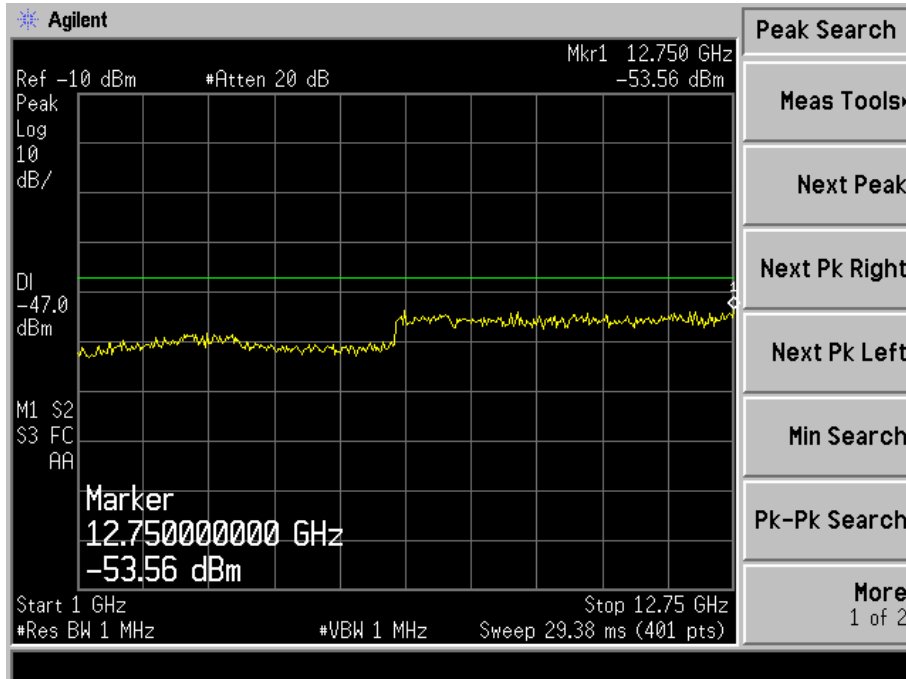
1-12.75GHz



High Channel (2480MHz)  
30-1000MHz



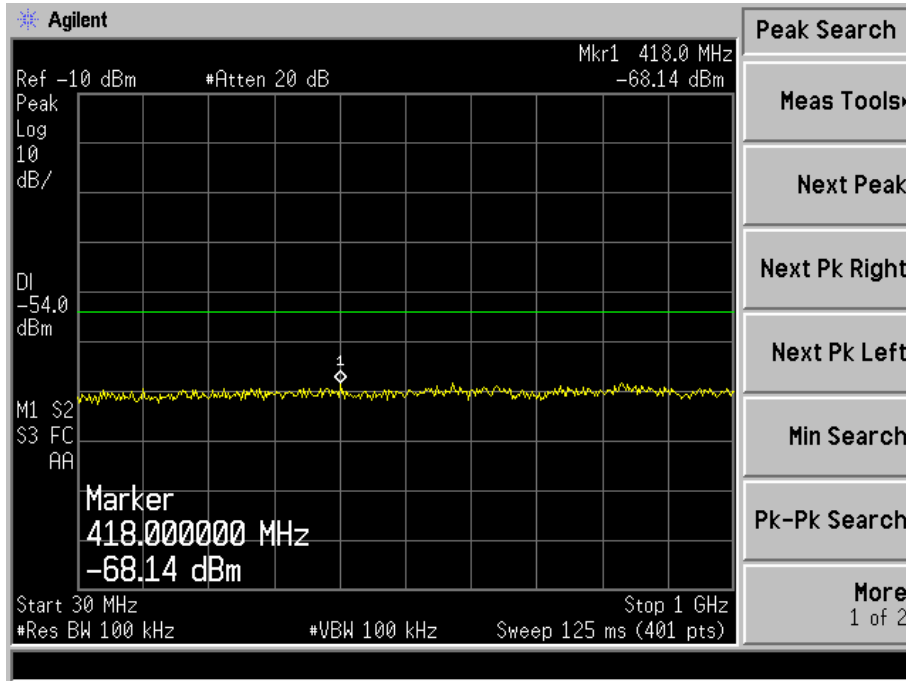
1-12.75GHz



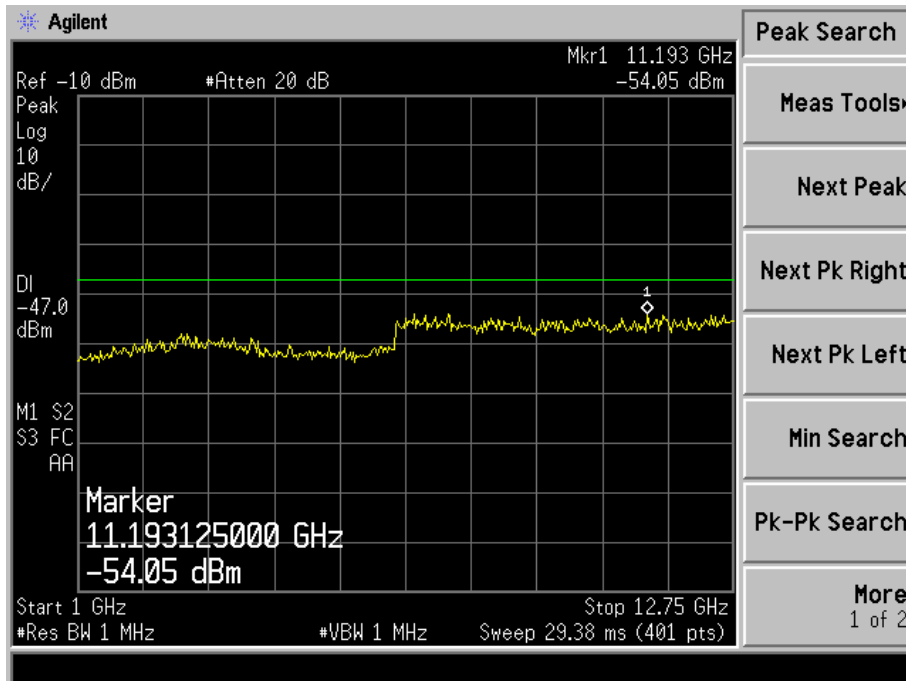
For BLE

Low Channel (2402MHz)

30-1000MHz



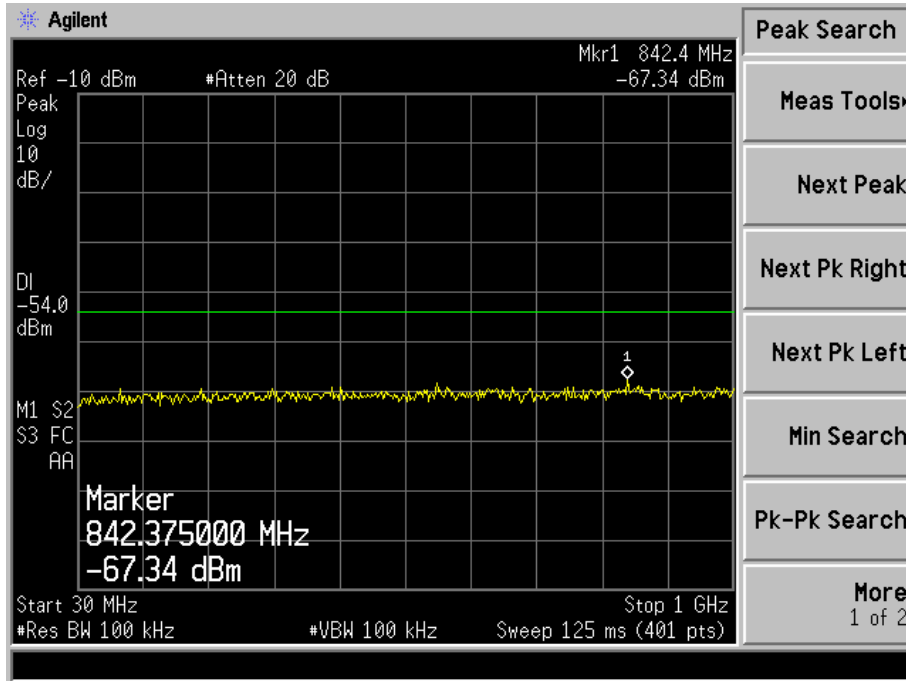
1-12.75GHz



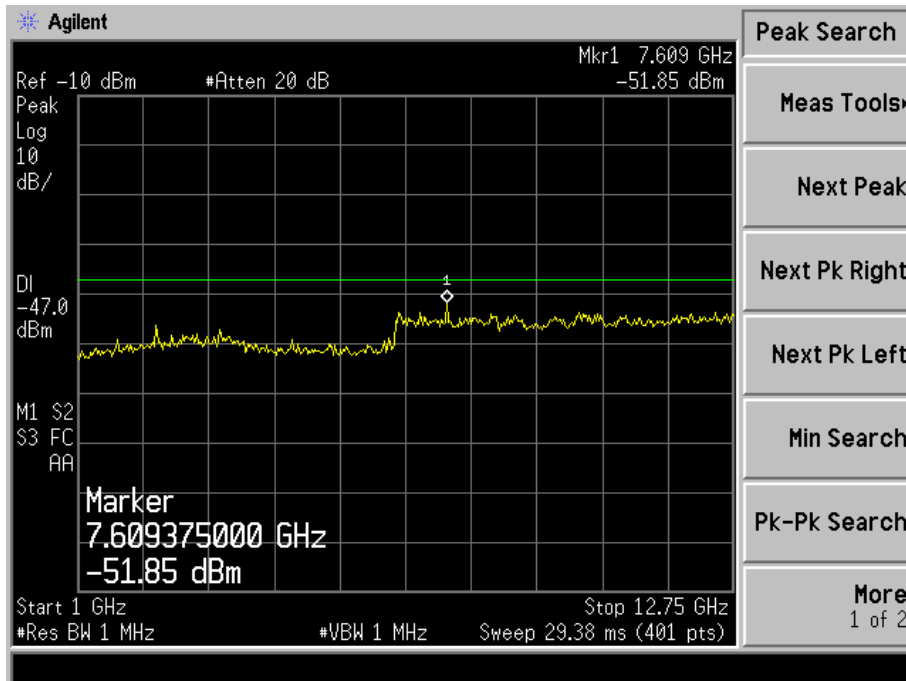


Middle Channel (2442MHz)

30-1000MHz

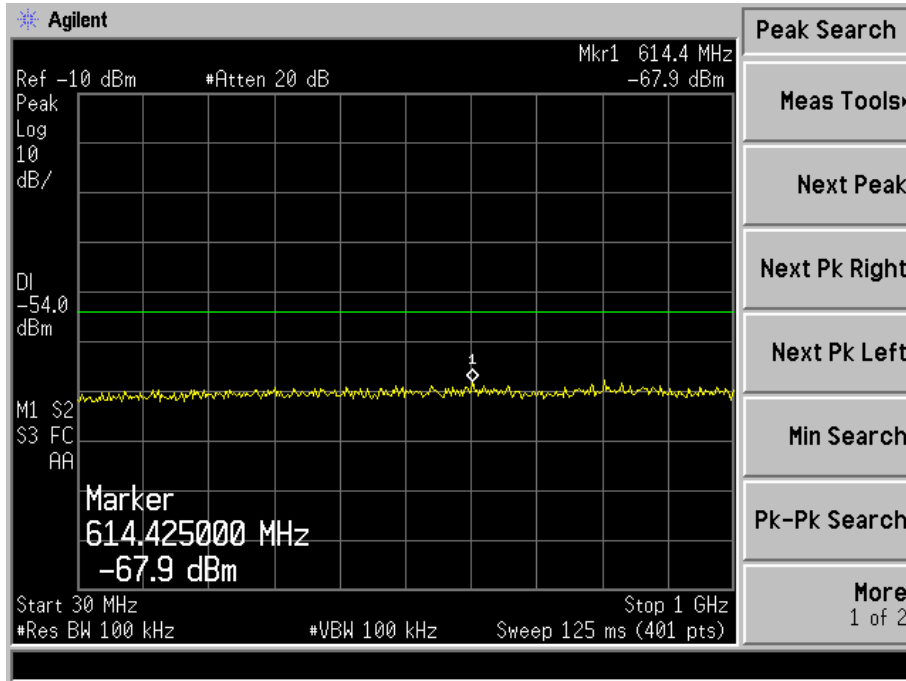


1-12.75GHz

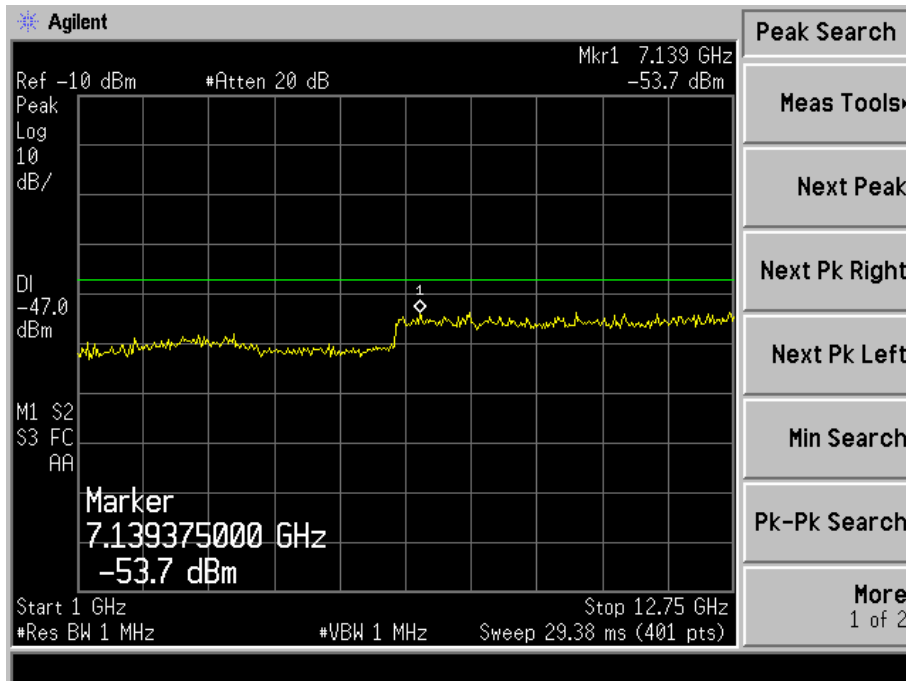


High Channel (2480MHz)

30-1000MHz



1-12.75GHz

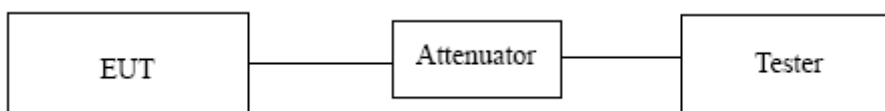


## 9. INTERFERENCE PREVENTION FUNCTION

### 9.1 Standard Applicable

According to Item 19 of Article 2 Paragraph 1. The device shall have the function of automatic transmission or reception of identification code.

### 9.2 Test Setup Block Diagram



### 9.3 Test Procedure

1. Set the EUT in the usual operation condition
2. The radio equipment with automatic transmitting function of identification code
  - A. Transmit the assigned identification code from the radio equipment.
  - B. Confirm the identification code received by the demodulator.
3. The radio equipment with automatic receiving function of identification code
  - A. Transmit the assigned identification code from the opposite equipment.
  - B. Confirm that the usual communication is available.
  - C. Transmit the identification code distinct from the assigned one from the opposite equipment.
  - D. Confirm that the radio equipment is stopped or an indication is displayed as the identification code is different.
4. The identification function shall be recorded.

### 9.4 Summary of Test Results/Plots

Test Item	Test Result
Transmitting Function of Identification Code	>48 bits
Receiving Function of Identification Code	>48 bits

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