ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT AND INDUSTRY CANADA RSS 210

OF

Product Name:	**PeopleNet Connected Tablet**
Brand Name:	**PeopleNet**
Model No.:	**MS5**
Model Difference:	**N/A**
FCC ID:	**NKS-MS5N**
Report No.:	**E2/2015/10033-01**
Issue Date:	**Jan. 04, 2017**
FCC Rule Part:	**§15.247, Cat: DSS**
Prepared for:	**PEOPLENET 4400 Baker Road, Minnetonka, MN 55343, USA**
Prepared by:	**SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333**

VERIFICATION OF COMPLIANCE

Applicant:	PEOPLENET 4400 Baker Road, Minnetonka, MN 55343, USA
Product Name:	PeopleNet Connected Tablet
Brand Name:	PeopleNet
Model No.:	MS5
Model Difference:	N/A
FCC ID:	NKS-MS5N
File Number:	E2/2015/10033-01
Date of test:	Jan. 30, 2015 ~ Mar. 11, 2015
Date of EUT Received:	Jan. 30, 2015

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4:2014 the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247.

The test results of this report relate only to the tested sample identified in this report.

Test By:	Marcus Tseng	***Date:***	Jan. 04, 2017
	Marcus Tseng / Engineer		
Prepared By:	Allen Tsai	***Date:***	Jan. 04, 2017
	Allen Tsai /Engineer		
Approved By:	Jim Chang	***Date:***	Jan. 04, 2017
	Jim Chang / Supervisor		

Version

Version No.	Date	Description
00	Jan. 04, 2017	Initial creation of document

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1. GENERAL INFORMATION

1.1. Product description

General:

Product Name:	PeopleNet Connected Tablet	
Brand Name:	PeopleNet	
Model No.:	MS5	
Model Difference:	N/A	
Hardware Version:	N/A	
Software Version:	N/A	
Tablet Docking Station	Model No.: MS-57602, Supplier: MSI	
Power Cable	P/N: L016-0576, Supplier: ELECTRI-CORD MFG.CO.	
Power Supply:	7.4Vdc from LITHIUM-ION rechargeable battery or 12/24Vdc from DC Car battery	
	Battery:	Model No.: MS5760 , Supplier: Getac

Bluetooth:

Bluetooth Version:	Bluetooth V4.0 (dual mode) + HS
Channel number:	79 channels
Modulation type:	GFSK +π/4DQPSK+8DPSK
Transmit Power:	2 dBm (Peak)
Frequency Range:	2.402GHz – 2.480GHz
Dwell Time:	<= 0.4s
Antenna Designation:	PIFA Antenna, Gain: 0.76dBi

The report applied for Bluetooth BR+EDR.

1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: NKS-MS5N** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with FCC part 15; Subpart B is authorized under a Doc procedure.

1.3. Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4:2014 and ANSI C63.10:2013. Radiated testing was performed at an antenna to EUT distance 3 meters. Tested in accordance with FCC Public Notice DA 00-705 – Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan, which is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2014 & ANSI C63.10:2013. FCC Registration Numbers are: 628985, Canada Registration Number: 4620A-4.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Township, Taoyuan County, Taiwan, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 455997.

1.5. Special Accessories

There is no special accessory used while test was conducted.

1.6. Equipment Modifications

There was no modification incorporated into the EUT.

2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3. Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the general criterion in Section 7.1 of ANSI C63.4:2014 & 6.2 ANSI C63.10:2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz, and the measurement procedure 7.3 in ANSI C63.4:2014 & 6.2.2, and 6.2.3 in ANSI C63.10:2013 is followed to carry out the test. The CISPR Quasi-Peak and Average detector mode is employed according to §15.107

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13 and of ANSI C63.4:2014, & Section 6.3, 6.4, 6.5, and 6.6 of ANSI C63.10:2013.

2.4. Configuration of Tested System

Fig. 2-1 Radiated & Conducted Emission

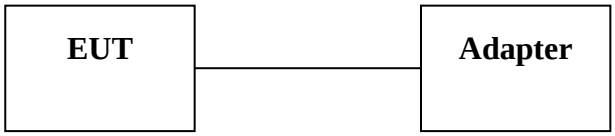


Fig. 2-2 Conducted (Antenna Port)

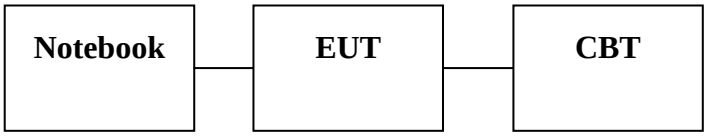


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	Bluetooth Test Software	Tera Term	N/A	N/A	N/A	N/A
2.	Bluetooth Test Set	R&S	CBT	101140	N/A	unshielded
3.	Notebook	Lenovo	L430	R9-YYG88	N/A	Unshielded

3. SUMMARY OF TEST RESULTS

FCC/IC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b)(1)	Peak Output Power	Compliant
§15.247(a)(1)	20dB Bandwidth	Compliant
§15.247(d)	100 kHz Bandwidth Of Frequency Band Edges	Compliant
$15.247(d) §15.209(a) (f)	Spurious Emission	Compliant
§15.247(a)(1)	Frequency Separation	Compliant
§15.247(a)(1)(iii)	Number of hopping frequency	Compliant
§15.247(a)(1)(iii)	Time of Occupancy	Compliant
§15.203	Antenna Requirement	Compliant

4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel Low, Mid and High with highest rated data rate were chosen as worst case for full testing. The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for Bluetooth Transmitter for channel Low, Mid and High the worst case E2 position was reported.

Channel Low: channel 0 at 2402MHz
Channel Mid: channel 39 at 2441MHz
Channel High: channel 78 at 2480MHz

In comparison with BR and EDR mode, emission carried out by EDR is chosen as the most representative measurement to perform measurement of radiated spurious emission pursuant to Part 15C.Modulation, EDR, is selected to be performed for 100 kHz Bandwidth Band Edge, Conducted Spurious Emission, Frequency Separation, Number of hopping frequency due to its characteristics of wider bandwidth.

Data type being used to conduct the measurement:
DH1/DH3/DH5 (GFSK) with 1Mbps
2DH1/2DH3/2DH5 ($\Pi/4$ DQPSK) with 2Mbps
3DH1/3DH3/3DH5 (8DPSK) with 3Mbps

5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 1.55 dB
20dB Bandwidth & 99% Power Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Frequency Separation	+/- 123.36 Hz
Number of hopping frequency	+/- 123.36 Hz
Time of Occupancy	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : **Vertical**)	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : **Horizontal**)	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

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

6. CONDUCTED EMISSION TEST

6.1. Standard Applicable

According to §15.207, frequency within 150 kHz to 30MHz shall not exceed the limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

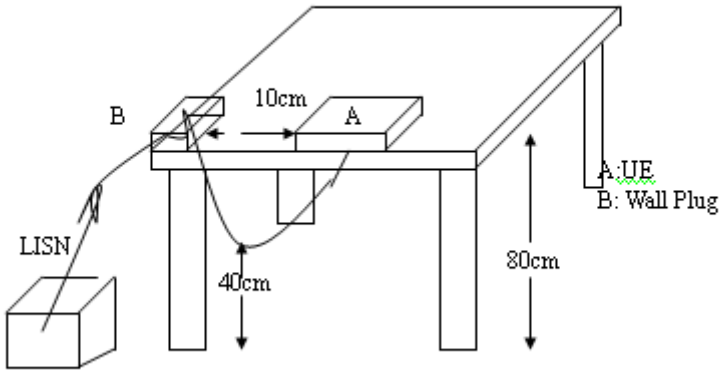
6.2. Measurement Equipment Used:

SGS Conducted Emission Test Site No.A					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EMI Test Receiver	R&S	ESCI 3	101311	06/20/2014	06/19/2015
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	01/06/2015	01/07/2016
LISN	Schwarzbeck	NSLK 8127	8127-648	06/10/2014	06/09/2015
LISN	Rolf-Heine	NNB-2/16Z	99012	03/26/2014	03/25/2015
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

6.3. EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4:2014.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

6.4. Test SET-UP (Block Diagram of Configuration)



6.5. Measurement Procedure

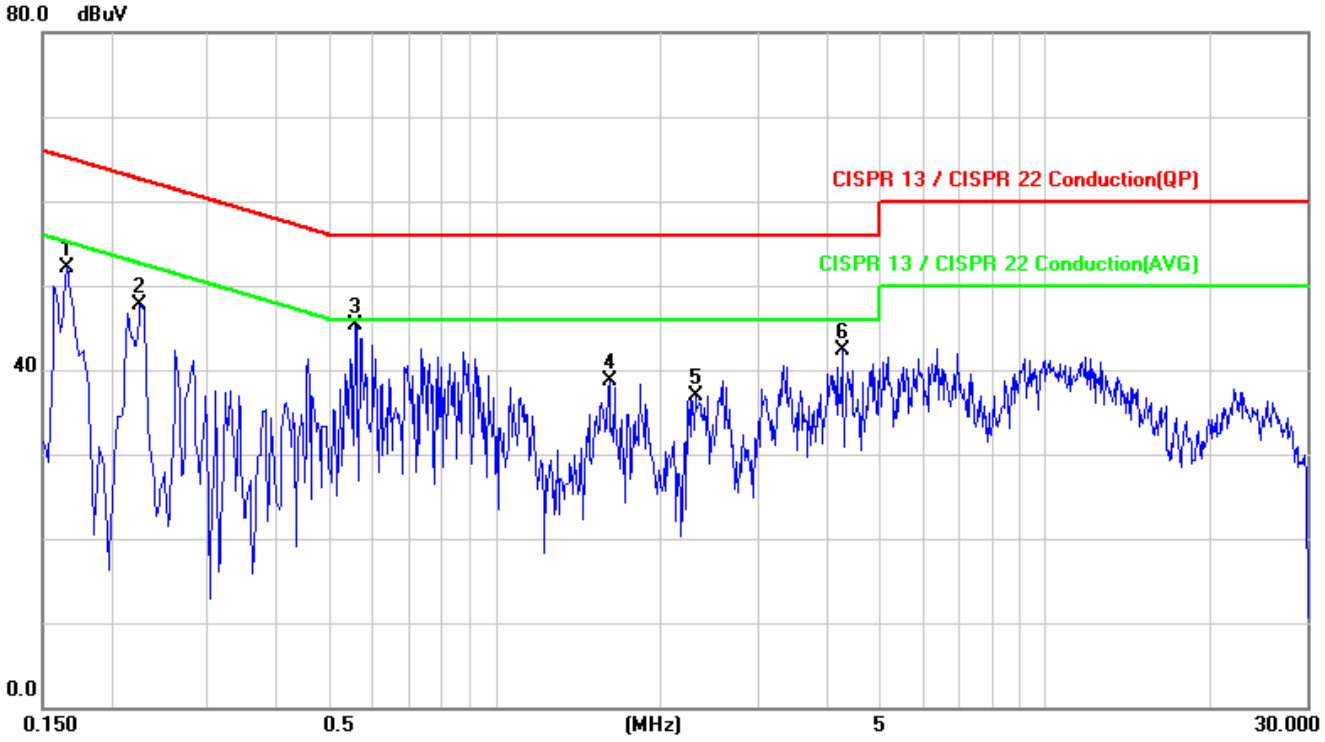
1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

6.6. Measurement Result

Note: Refer to next page for measurement data and plots.
Note2: The * reveals the worst-case results that closet to the limit

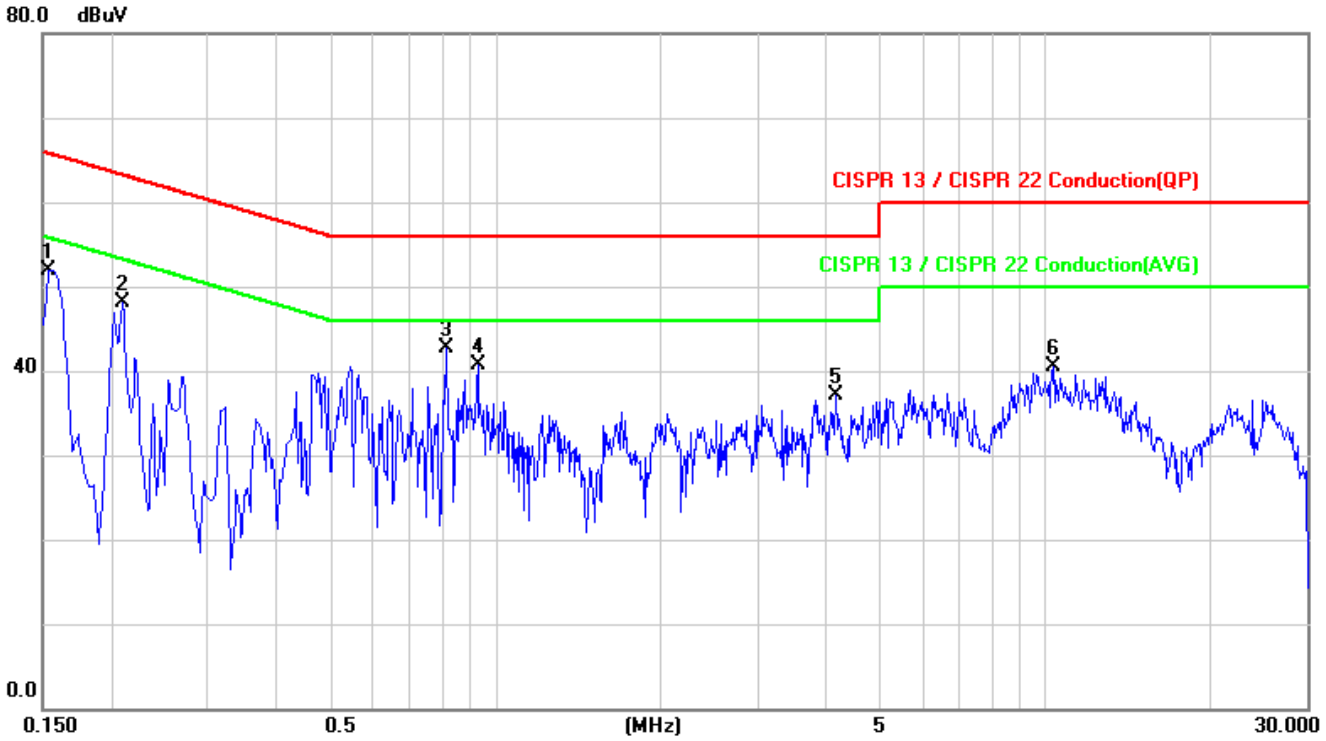
AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation Mode			Test Date:	Feb. 26, 2015
Temperature:	23 ℃	Humidity:	58 %	Test By:	Vito
Probe:	L1				



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
		(MHz)	dBuV	(dB)	(dBuV)	(dBuV)	(dB)		
1		0.1660	52.15	0.05	52.20	65.16	-12.96	peak	
2		0.2260	47.72	0.05	47.77	62.60	-14.83	peak	
3	*	0.5580	45.17	0.20	45.37	56.00	-10.63	peak	
4		1.6140	38.24	0.45	38.69	56.00	-17.31	peak	
5		2.3180	36.43	0.51	36.94	56.00	-19.06	peak	
6		4.2860	41.89	0.50	42.39	56.00	-13.61	peak	

Operation Mode:	Operation Mode			Test Date:	Feb. 26, 2015
Temperature:	23 ℃	Humidity:	58 %	Test By:	Vito
Probe:	N				



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
		(MHz)	dBuV	(dB)	(dBuV)	(dBuV)	(dB)		
1		0.1540	51.84	0.05	51.89	65.78	-13.89	peak	
2		0.2100	48.04	0.04	48.08	63.21	-15.13	peak	
3	*	0.8140	42.47	0.30	42.77	56.00	-13.23	peak	
4		0.9300	40.35	0.34	40.69	56.00	-15.31	peak	
5		4.1660	36.51	0.51	37.02	56.00	-18.98	peak	
6		10.3620	39.97	0.47	40.44	60.00	-19.56	peak	

7. PEAK OUTPUT POWER MEASUREMENT

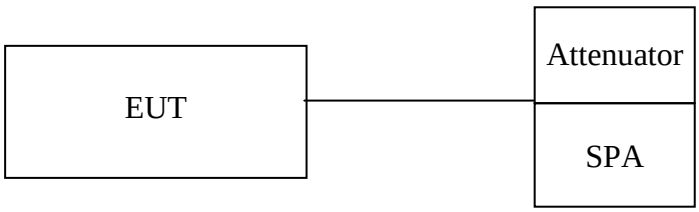
7.1. Standard Applicable

According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, The Limit: 1Watt. For all other frequency hopping systems in the 2400 – 2483.5MHz band: The Limit: 0.125 Watts.

7.2. Measurement Equipment Used

SGS Conducted Room(ALL)					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	N9010A	MY53400256	10/15/2014	10/14/2015
Power Meter	Anritsu	ML2496A	1326001	06/21/2014	06/20/2015
Power Sensor	Anritsu	MA2411B	1315048	06/21/2014	06/20/2015
Power Sensor	Anritsu	MA2411B	1315049	06/21/2014	06/20/2015
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/19/2014	12/18/2015
DC Block	PASTERNACK	PE8210	RF29	12/19/2014	12/18/2015
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/19/2014	12/18/2015
Attenuator	WOKEN	218FS-10	RF23	12/19/2014	12/18/2015
DC Power Supply	Agilent	E3640A	MY53140006	05/31/2014	05/30/2015

7.3. Test Set-up:



7.4. Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (Max Hold, Detector = Peak, RBW >=20dB bandwidth)
3. Record the max. reading.
4. Repeat above procedures until all default test channel is completed.

NOTE: cable loss as 4.43dB that offsets in the spectrum

7.5. Measurement Result

1M BR mode (GFSK):

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
2402.00	-2.63	0.00055	1
2441.00	-0.64	0.00086	1
2480.00	-1.22	0.00075	1

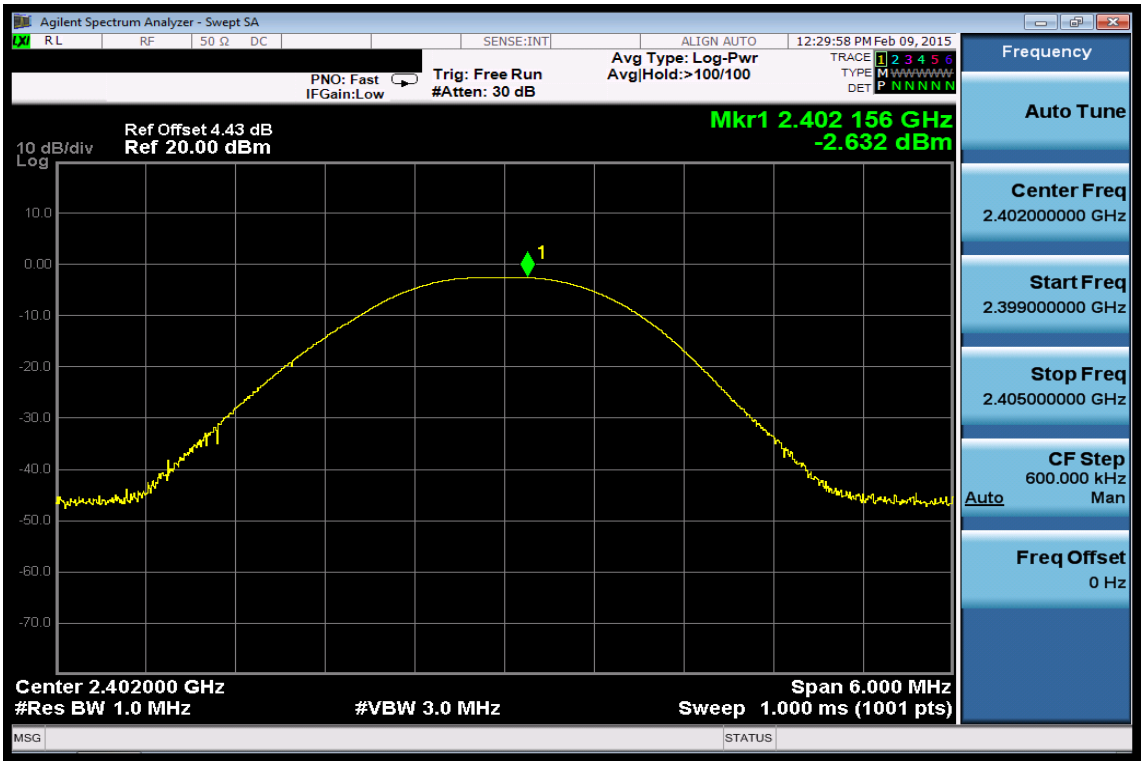
2M EDR mode (π/4DQPSK):

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
2402.00	-0.27	0.00094	0.125
2441.00	1.44	0.00139	0.125
2480.00	0.97	0.00125	0.125

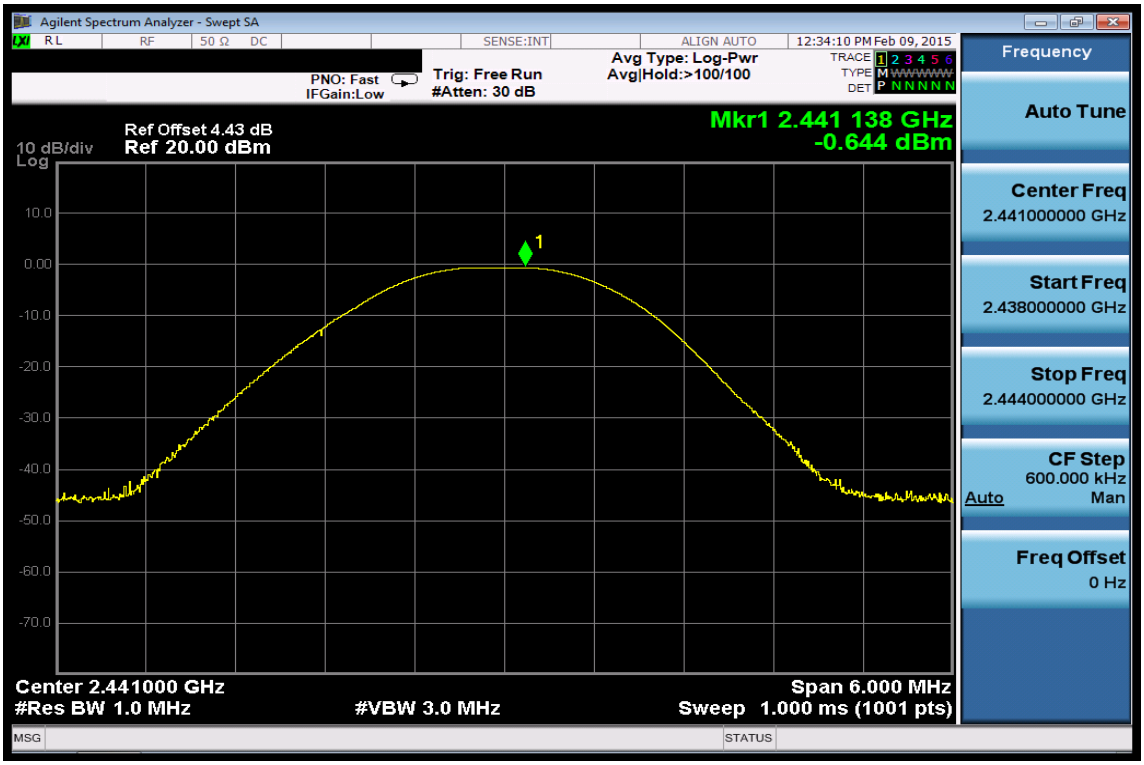
3M EDR mode (8DPSK):

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
2402.00	0.32	0.00108	0.125
2441.00	**2.00**	0.00159	0.125
2480.00	1.53	0.00142	0.125

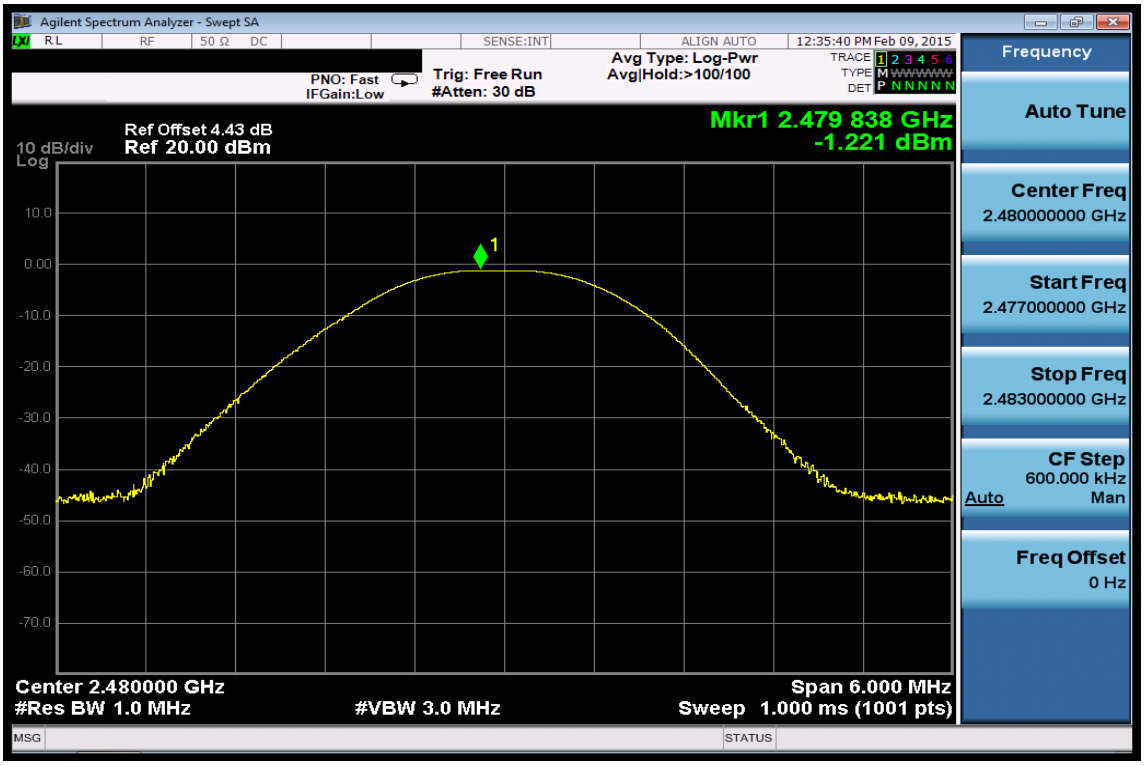
Peak Power Output Data Plot (CH Low) (1M BR mode)



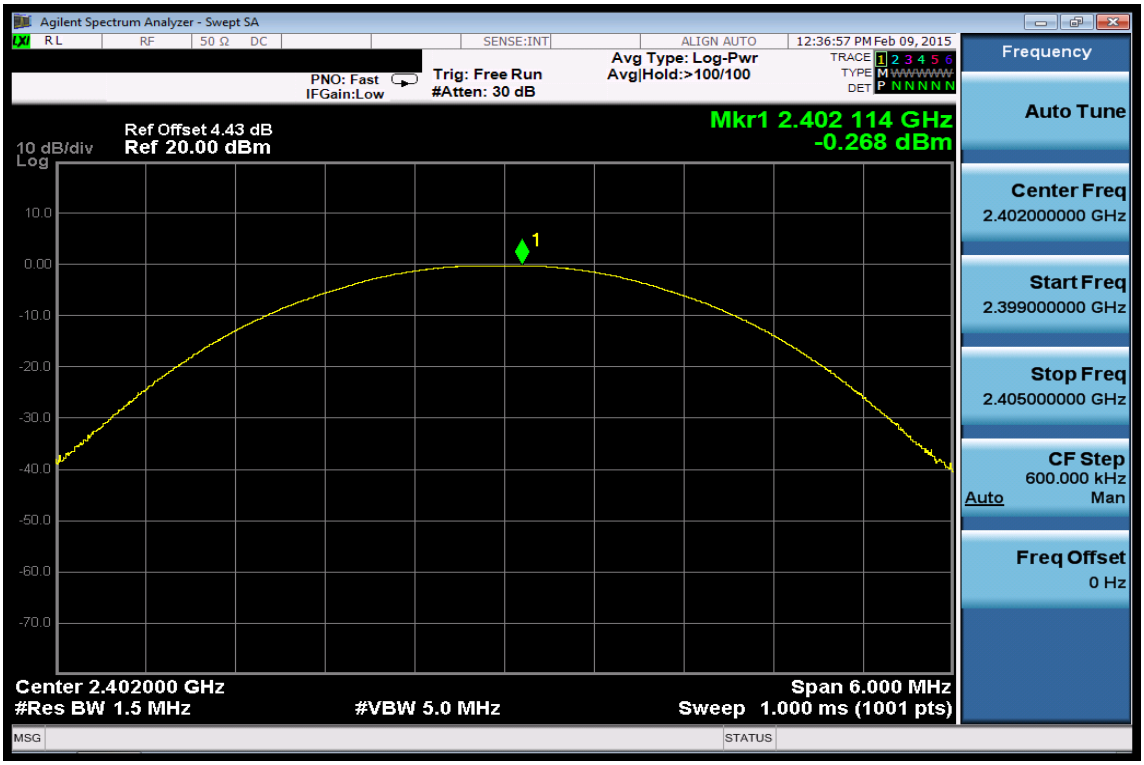
Peak Power Output Data Plot (CH Mid) (1M BR mode)



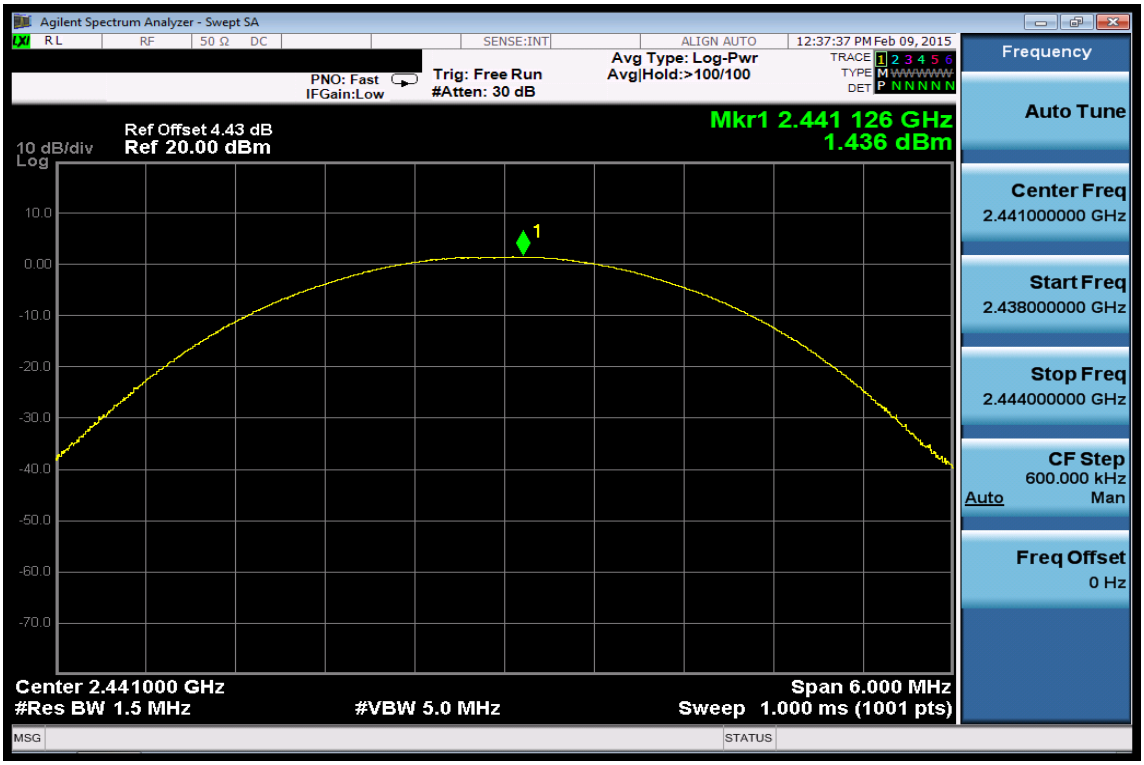
Peak Power Output Data Plot (CH High) (1M BR mode)



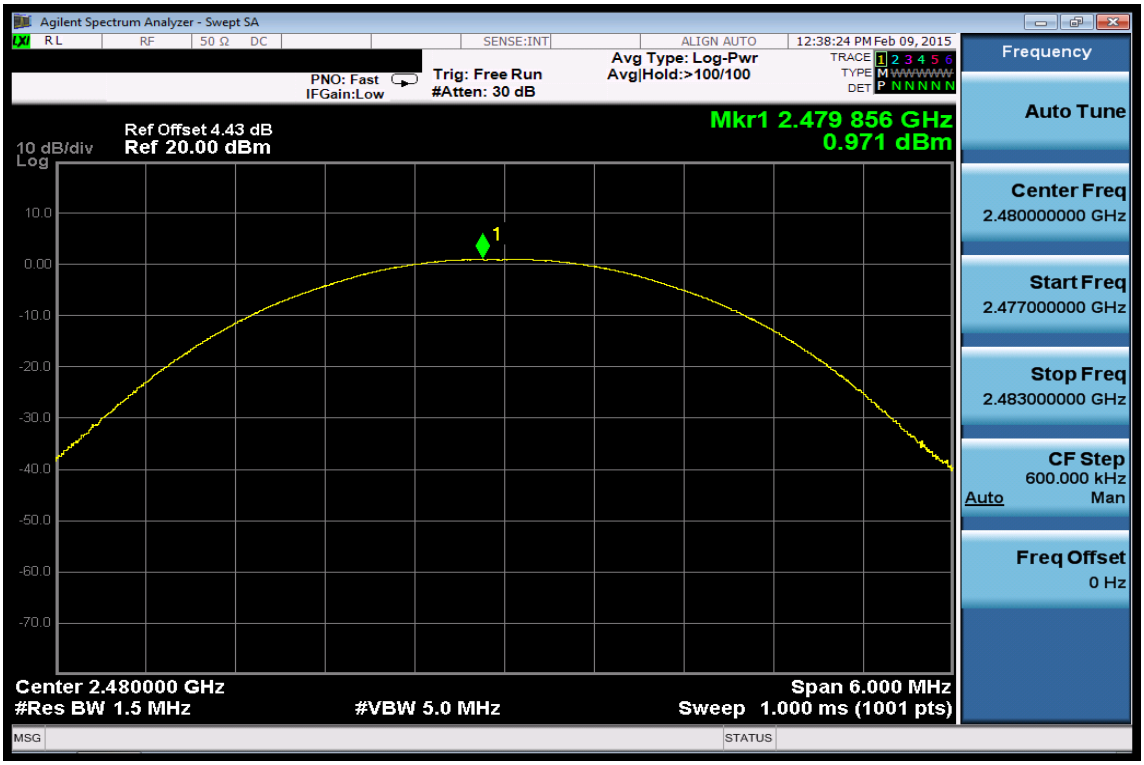
Peak Power Output Data Plot (CH Low) (2M EDR mode)



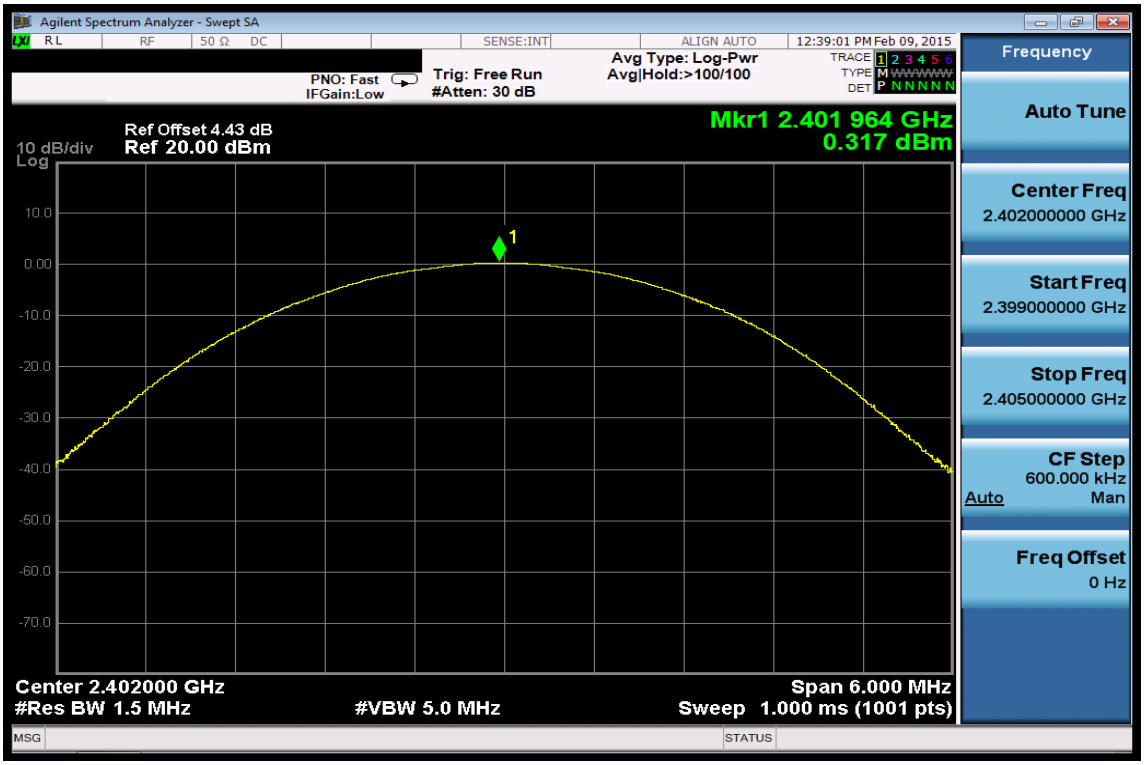
Peak Power Output Data Plot (CH Mid) (2M EDR mode)



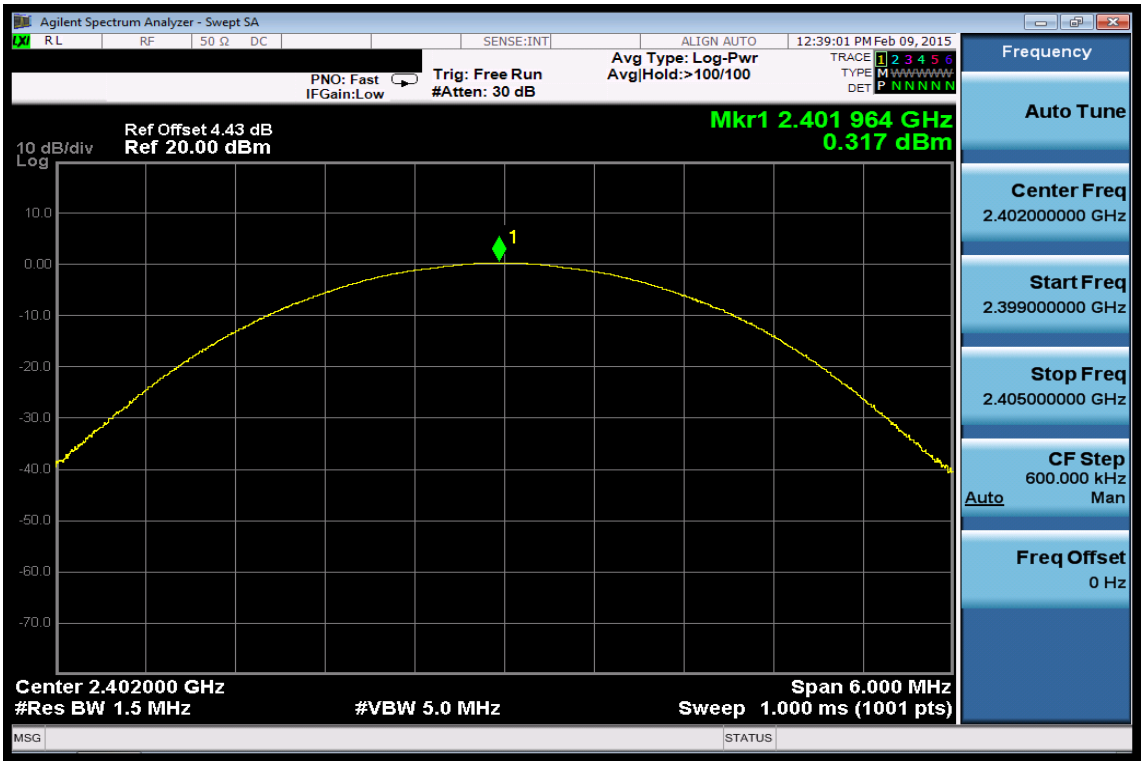
Peak Power Output Data Plot (CH High) (2M EDR mode)



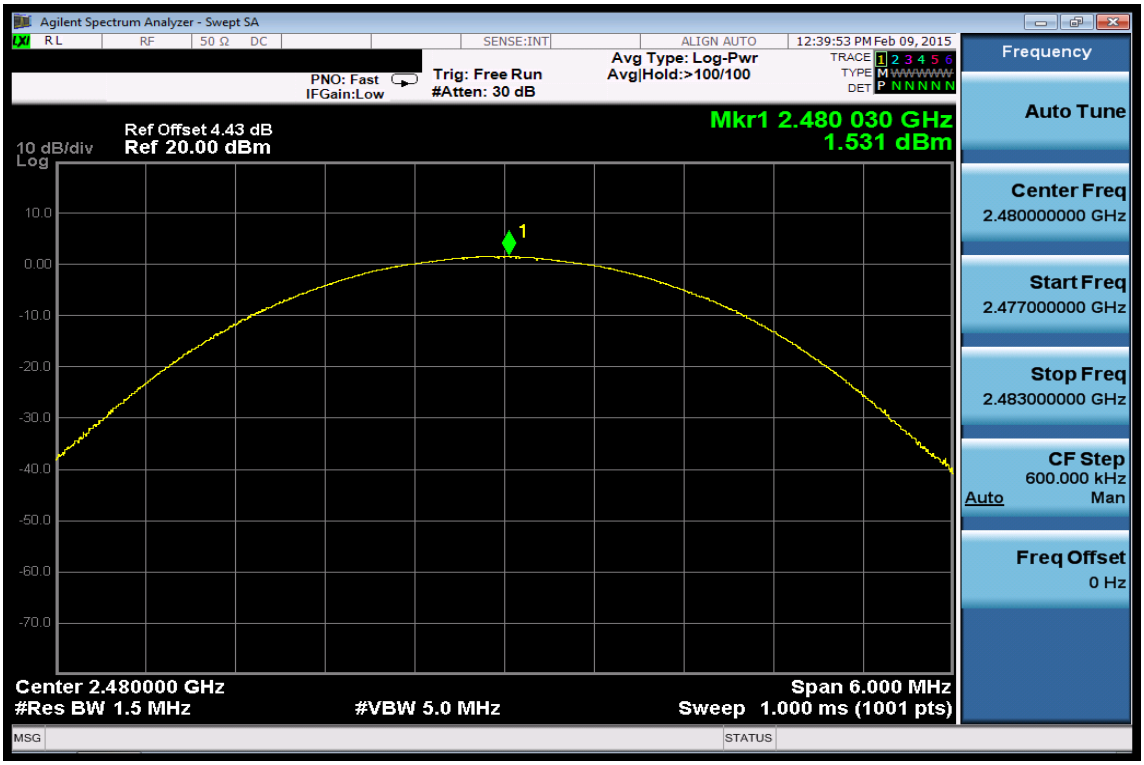
Peak Power Output Data Plot (CH Low) (3M EDR mode)



Peak Power Output Data Plot (CH Mid) (3M EDR mode)



Peak Power Output Data Plot (CH High) (3M EDR mode)



8. 20dB BANDWIDTH

8.1. Standard Applicable

For 20dB Bandwidth

According to §15.247(a)(1) for frequency hopping systems operating in the 2400MHz-2483.5 MHz no limit for 20dB bandwidth.

8.2. Measurement Equipment Used

Refer to section 7.2 for details.

8.3. Test Set-up

Refer to section 7.3 for details.

8.4. Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=10 kHz (1 % of 20 dB Bandwidth.), VBW = 30 kHz, Span= 3MHz, Sweep=auto, Detector = Peak, and Max hold for 20dB Bandwidth test.
4. Mark the peak frequency and –20dB (upper and lower) frequency
5. Repeat above procedures until all test default channel is completed

NOTE: cable loss as 4.43dB that offsets in the spectrum

8.5. Measurement Result:

1M BR mode:

CH	Bandwidth (MHz)
Low	0.92
Mid	0.92
High	0.92

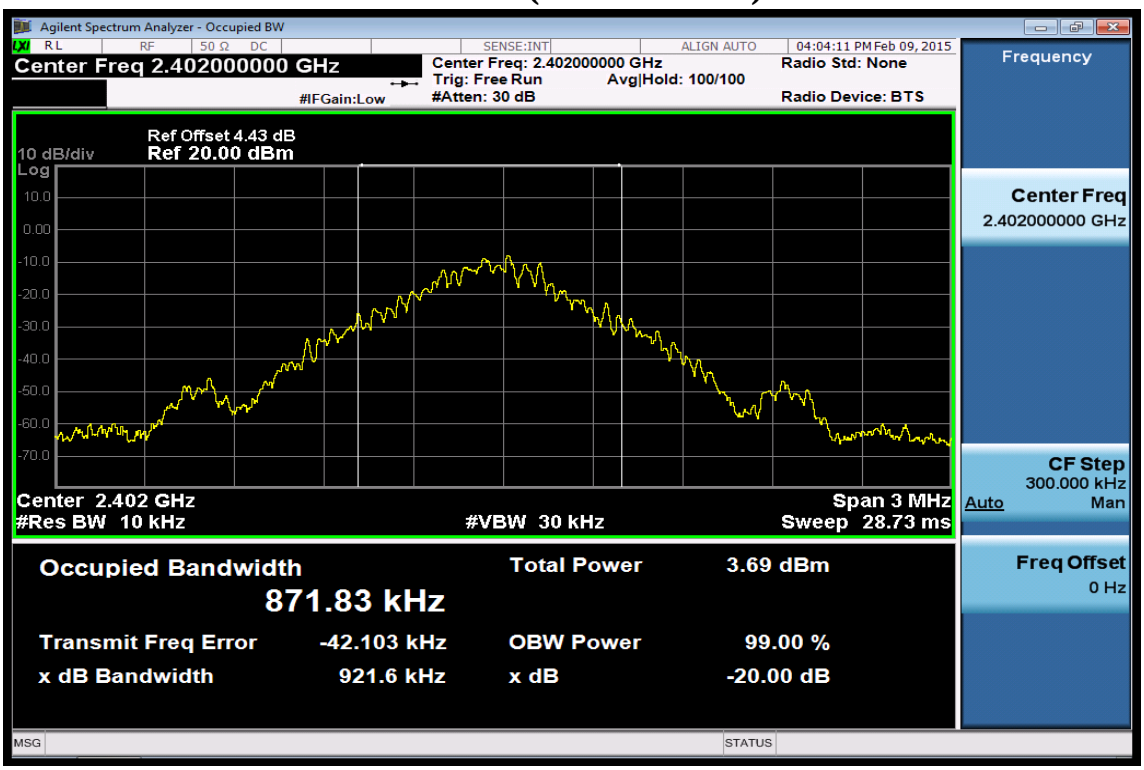
2M EDR mode:

CH	Bandwidth (MHz)	2/3 Bandwidth (MHz)
Low	1.32	0.88
Mid	1.33	0.89
High	1.33	0.89

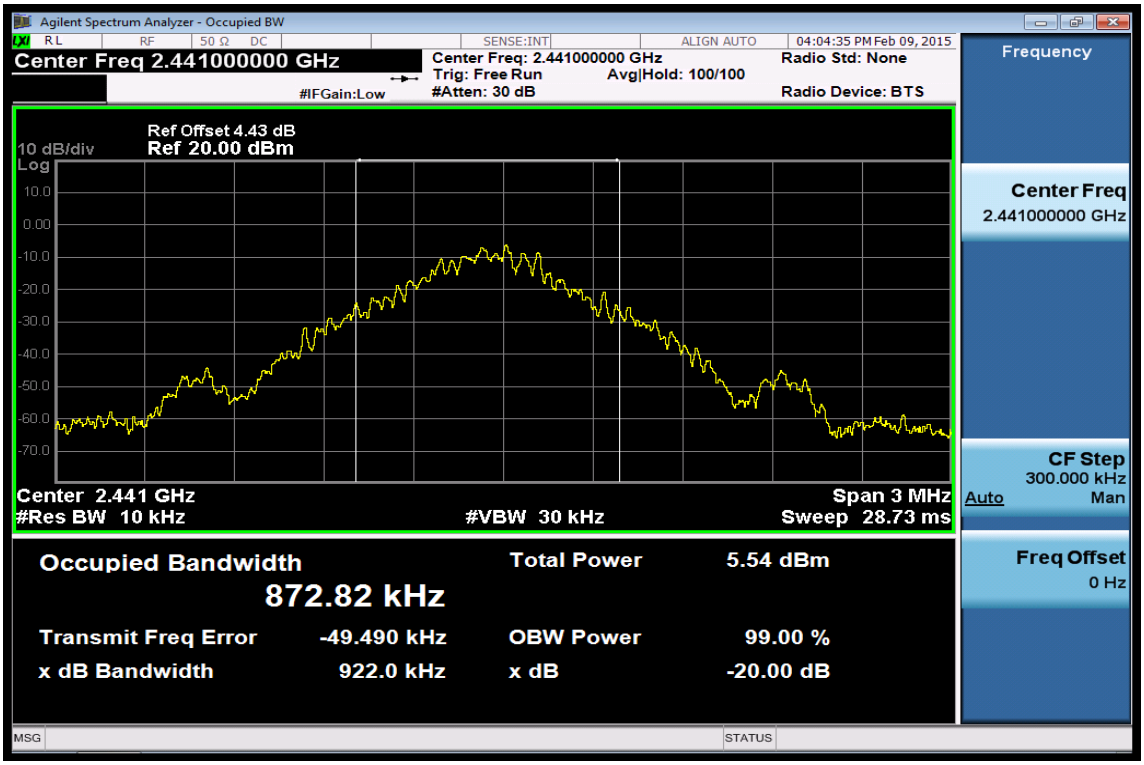
3M EDR mode:

CH	Bandwidth (MHz)	2/3 Bandwidth (MHz)
Lower	1.34	0.89
Mid	1.31	0.87
High	1.31	0.87

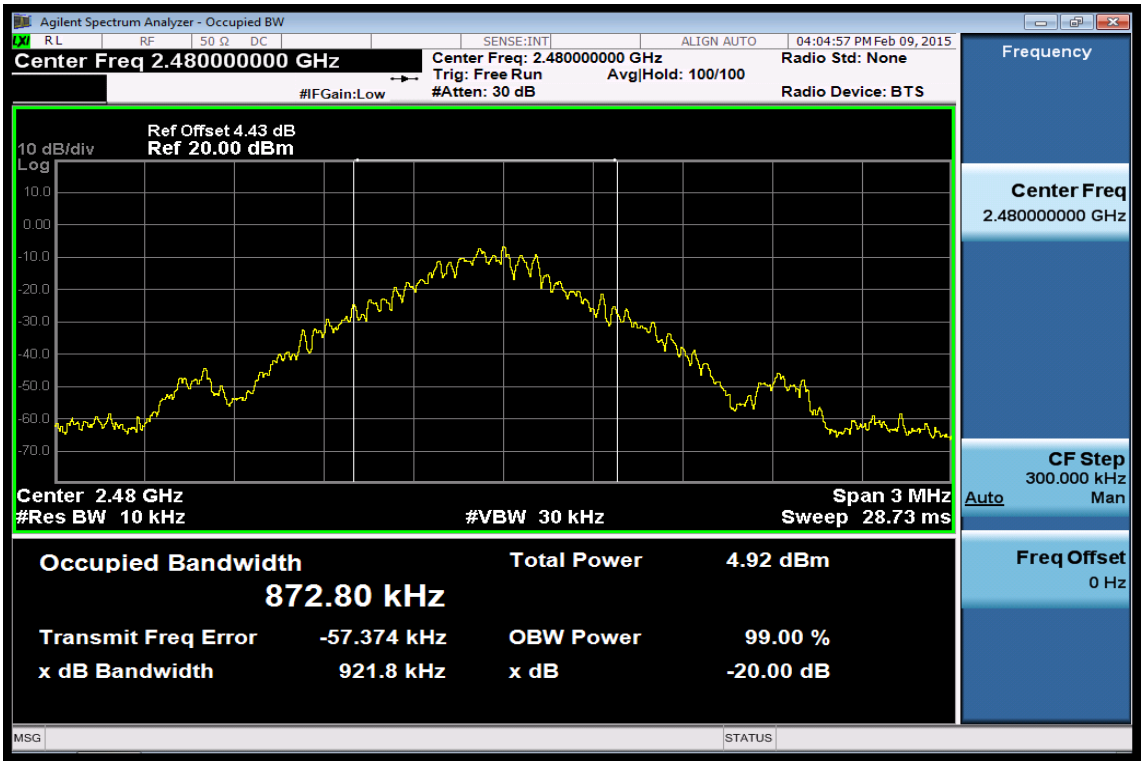
20dB Band Width Test Data CH-Low (1M BR mode)



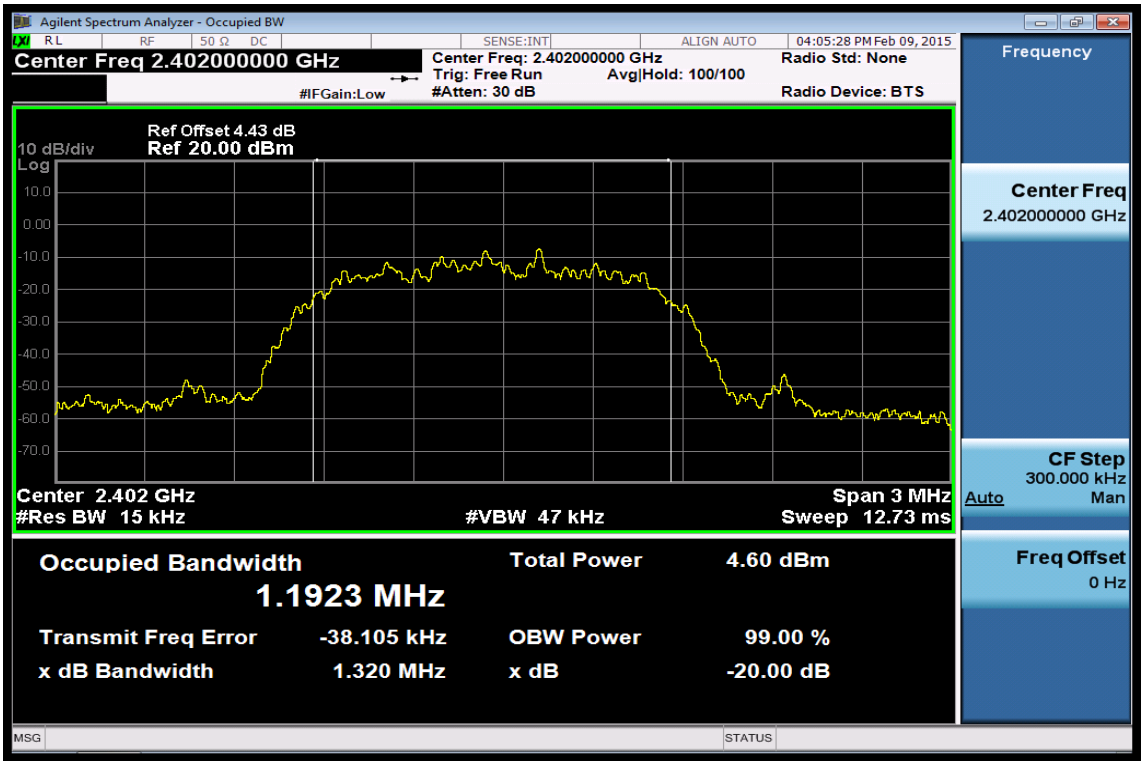
20dB Band Width Test Data CH-Mid (1M BR mode)



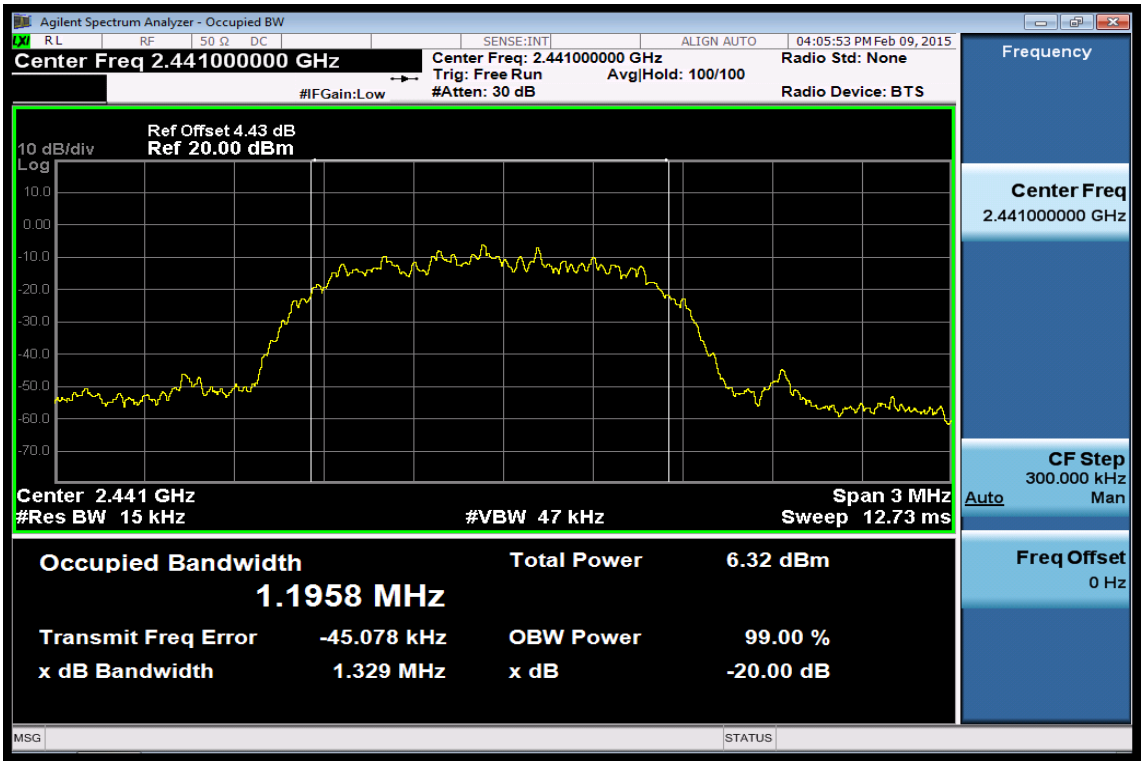
20dB Width Test Data CH-High (1M BR mode)



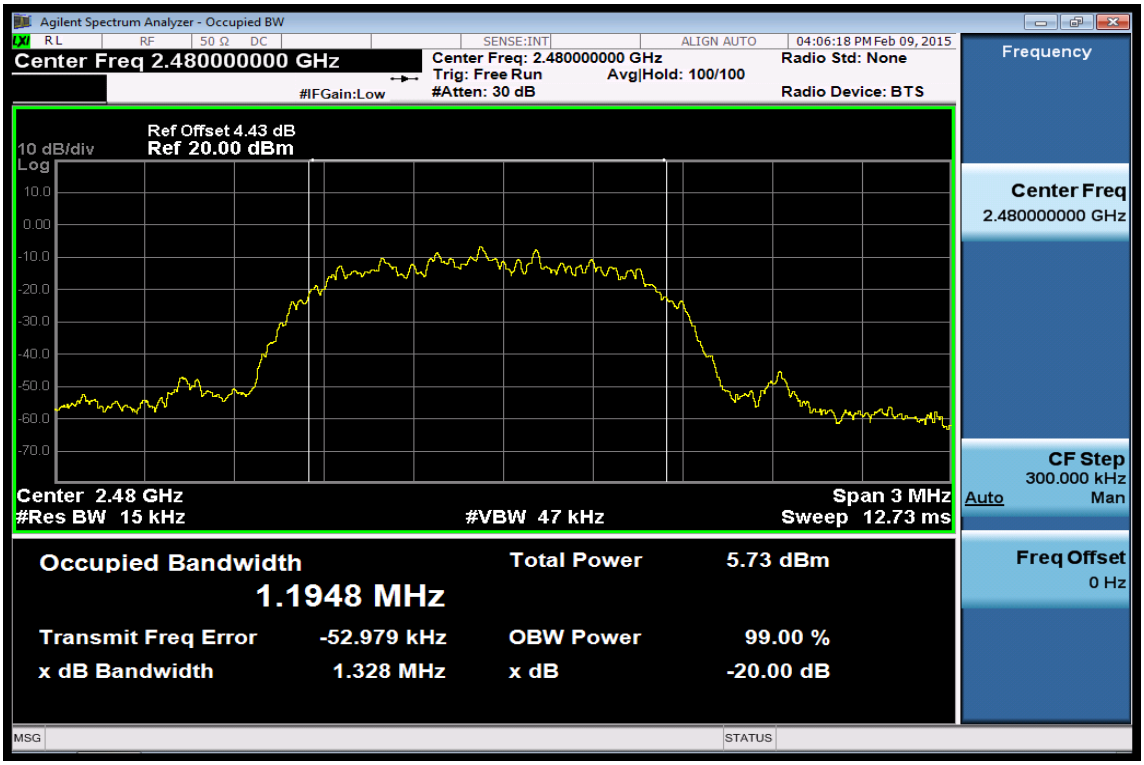
20dB Band Width Test Data CH-Low (2M EDR mode)



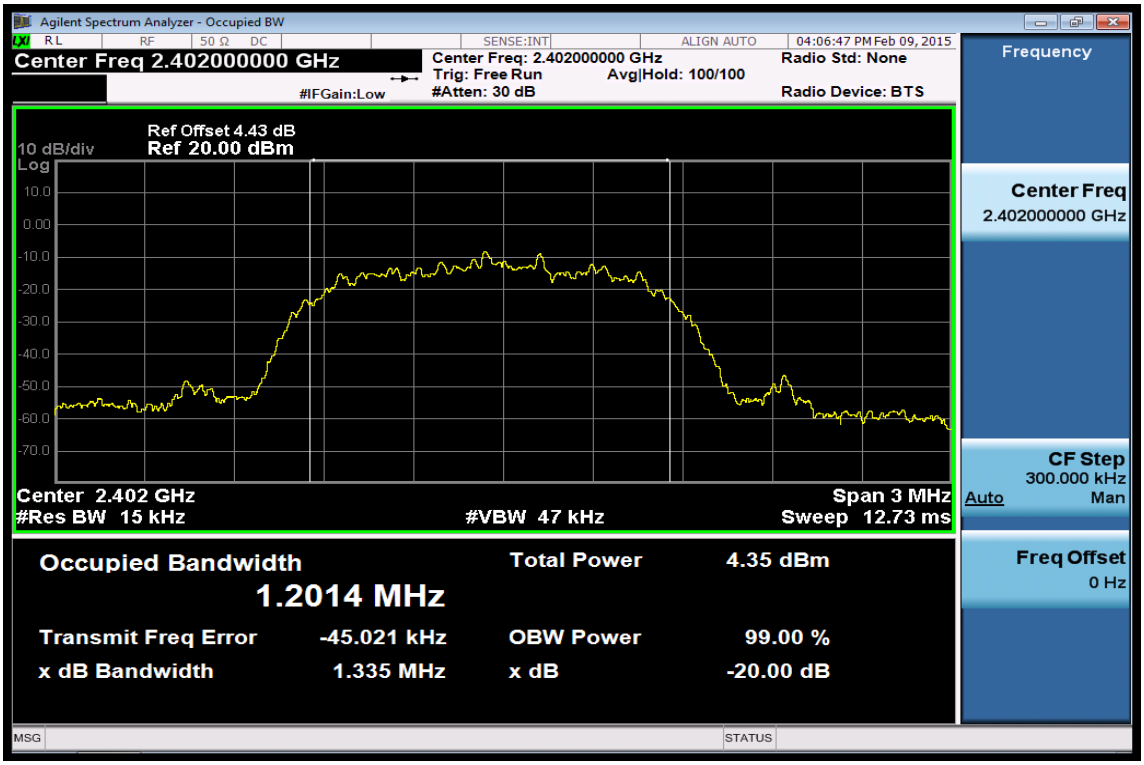
20dB Band Width Test Data CH-Mid (2M EDR mode)



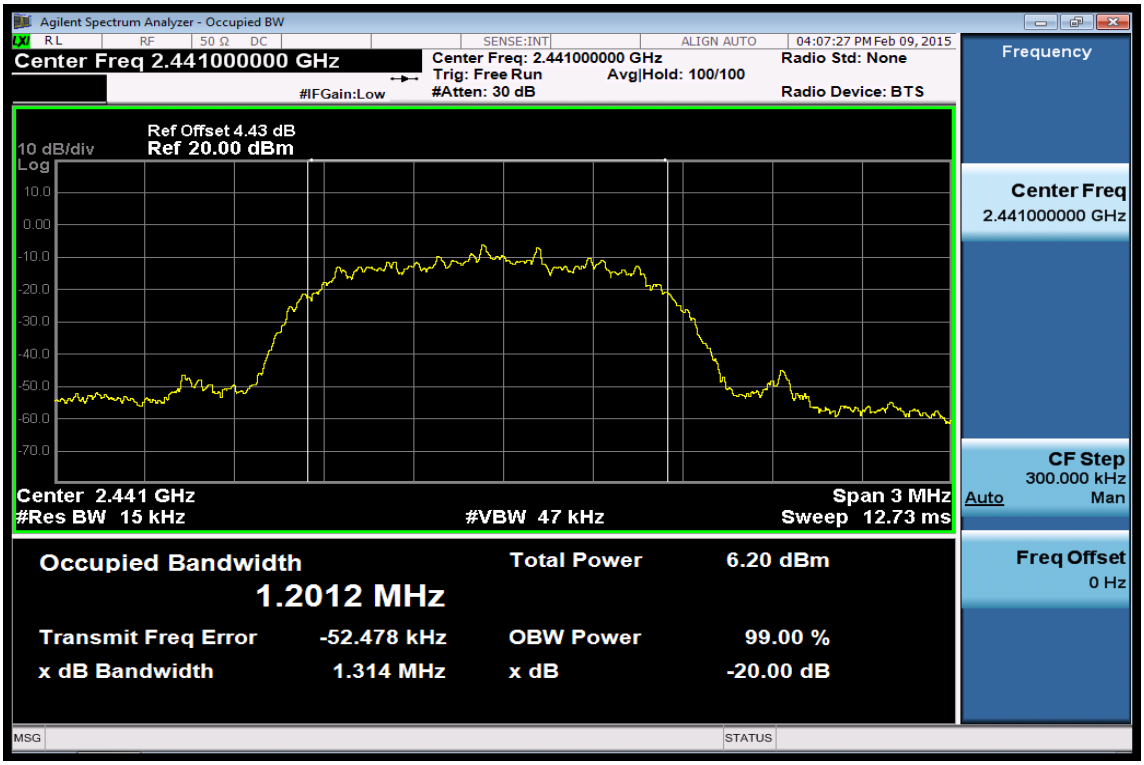
20dB Band Width Test Data CH-High (2M EDR mode)



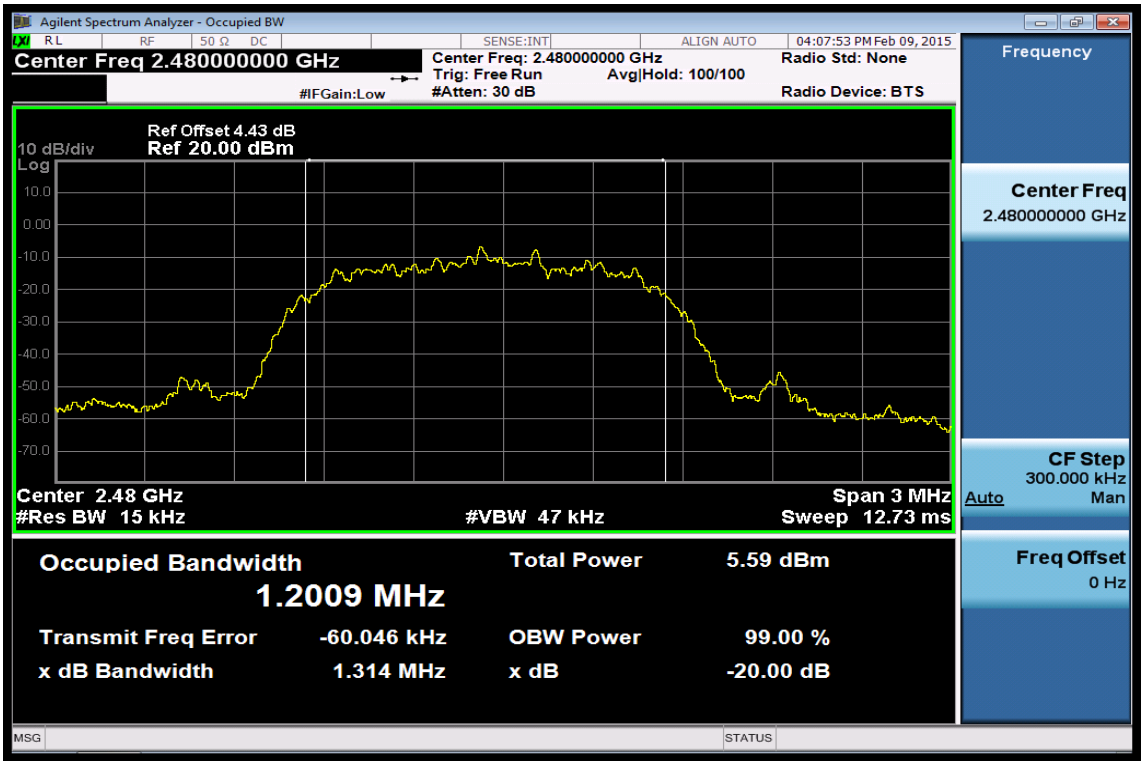
20dB Band Width Test Data CH-Low (3M EDR mode)



20dB Band Width Test Data CH-Mid (3M EDR mode)



20dB Width Test Data CH-High (3M EDR mode)



9. BAND EDGES EMISSION MEASUREMENT

9.1. Standard Applicable

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

9.2. Measurement Equipment Used

9.2.1. Conducted Emission at antenna port:

Refer to section 7.2 for details.

9.3. Test SET-UP:

9.3.1. Conducted Emission at antenna port:

Refer to section 7.3 for details.

9.4. Measurement Procedure

100 kHz BANDWIDTH OF BAND EDGES:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=300 kHz, Sweep = auto
5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

Out-Of-Band EMISSION

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 100K & VBW = 300K on Spectrum.
3. Sweep the frequency to determine spurious emission as seen on spectrum from span of 30MHz to 3G, 3G to 8G, 8G to 13G, 13G to 18G and 18G to 26.5GHz
4. Via Software, combine 5 spans of frequency range into two plots containing the range of 30MHz to 3GHz, and 3GHz to 26.5GHz.

9.5. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.6. Measurement Result -1 Out-Of-Band EMISSION:

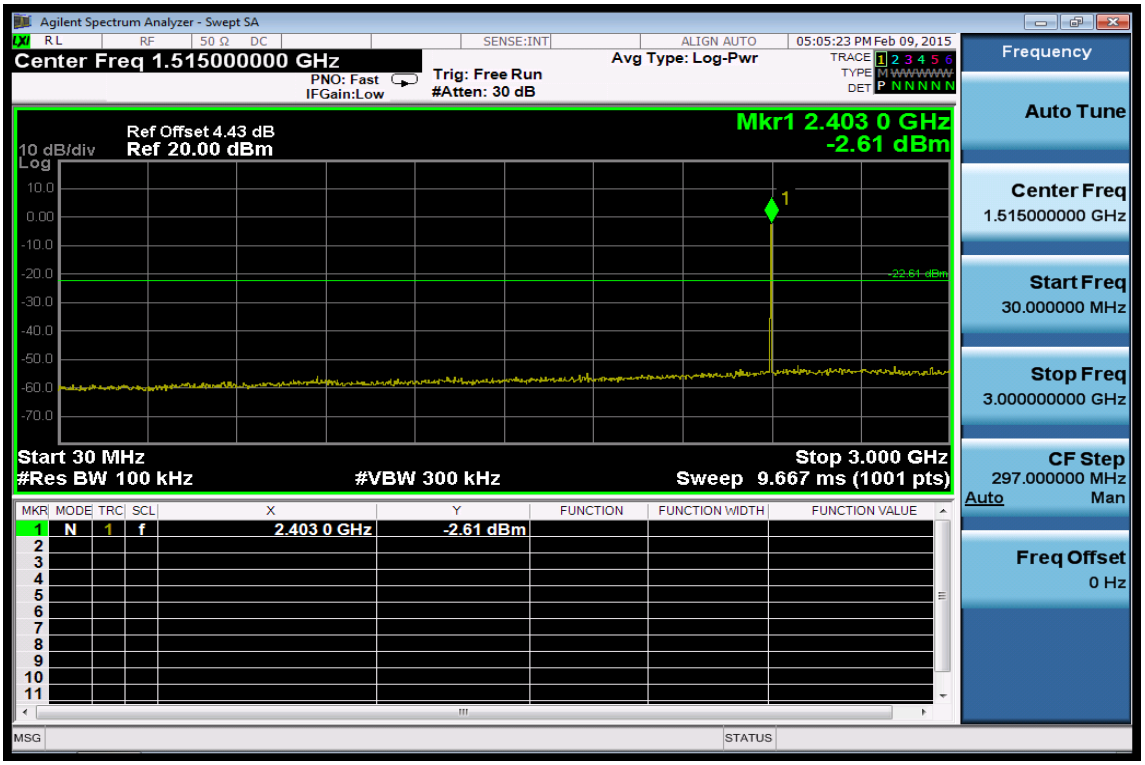
Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

NOTE: cable loss as 4.43dB that offsets in the spectrum

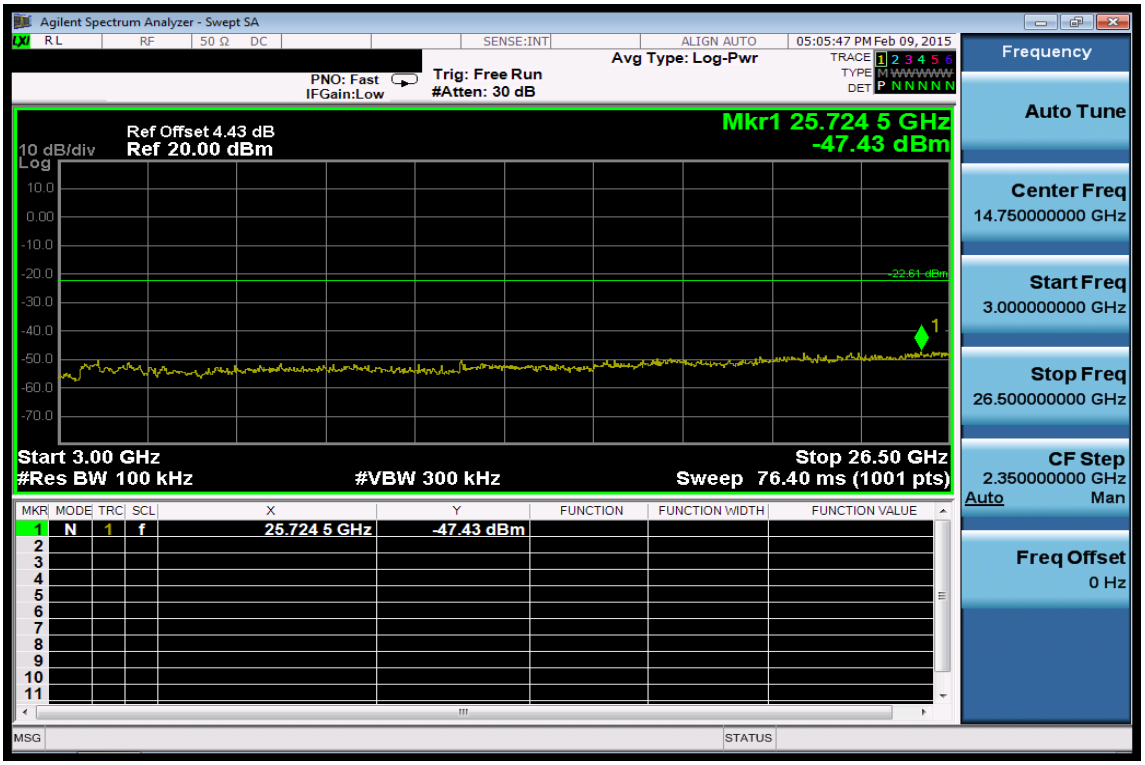
NOTE: the occurrence of the spike on the conducted emission is the signal of the fundamental emission.

9.7 Measurement Result -1 Conducted Spurious Emission Measurement Result (Worst: EDR mode)

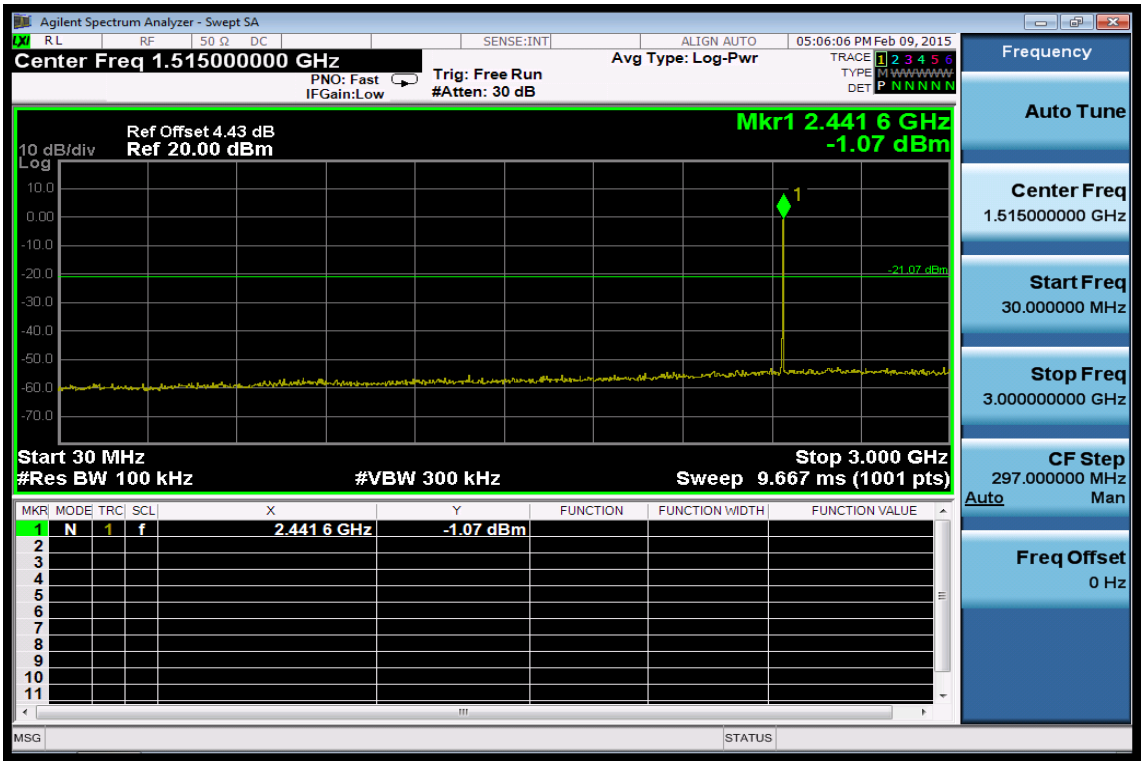
Ch Low 30MHz – 3GHz



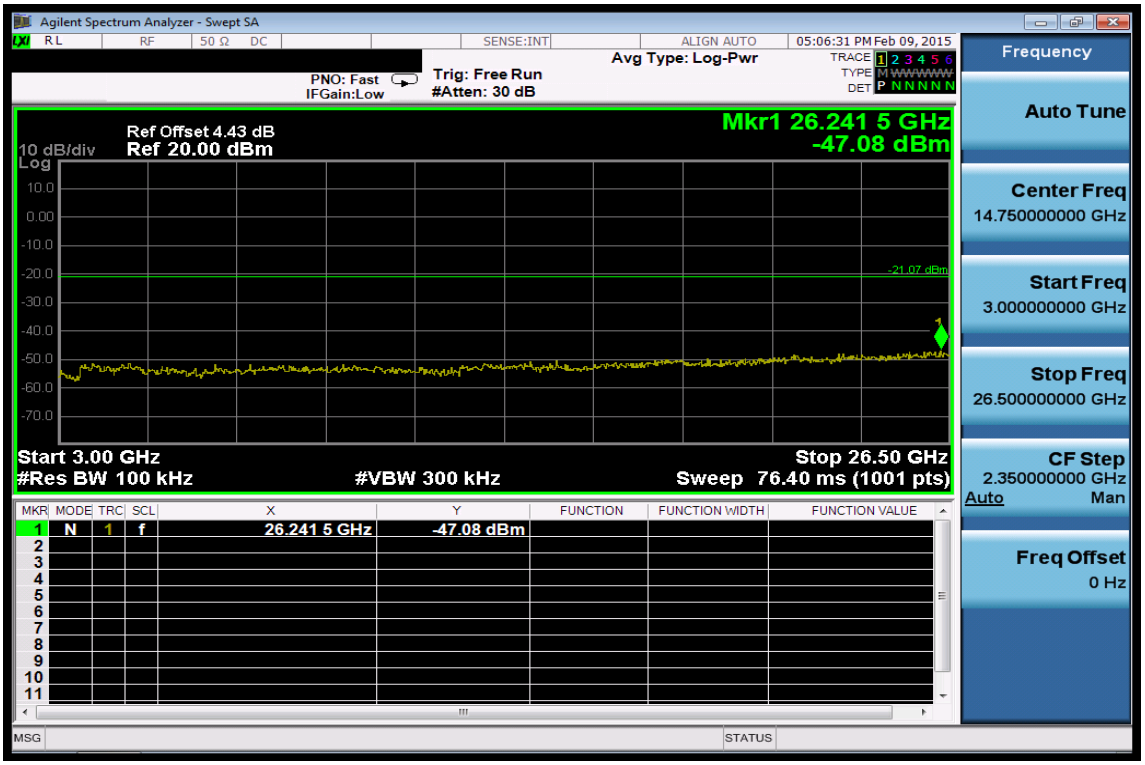
Ch Low 3GHz – 26.5GHz



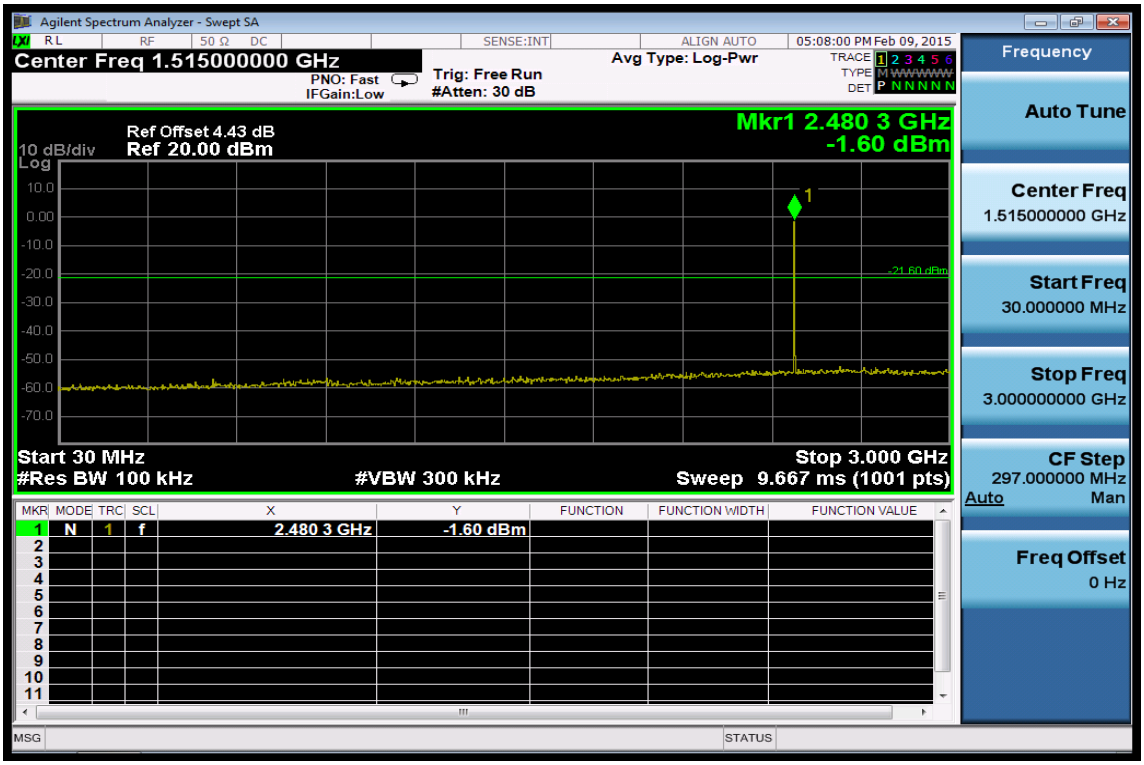
Ch Mid 30MHz – 3GHz



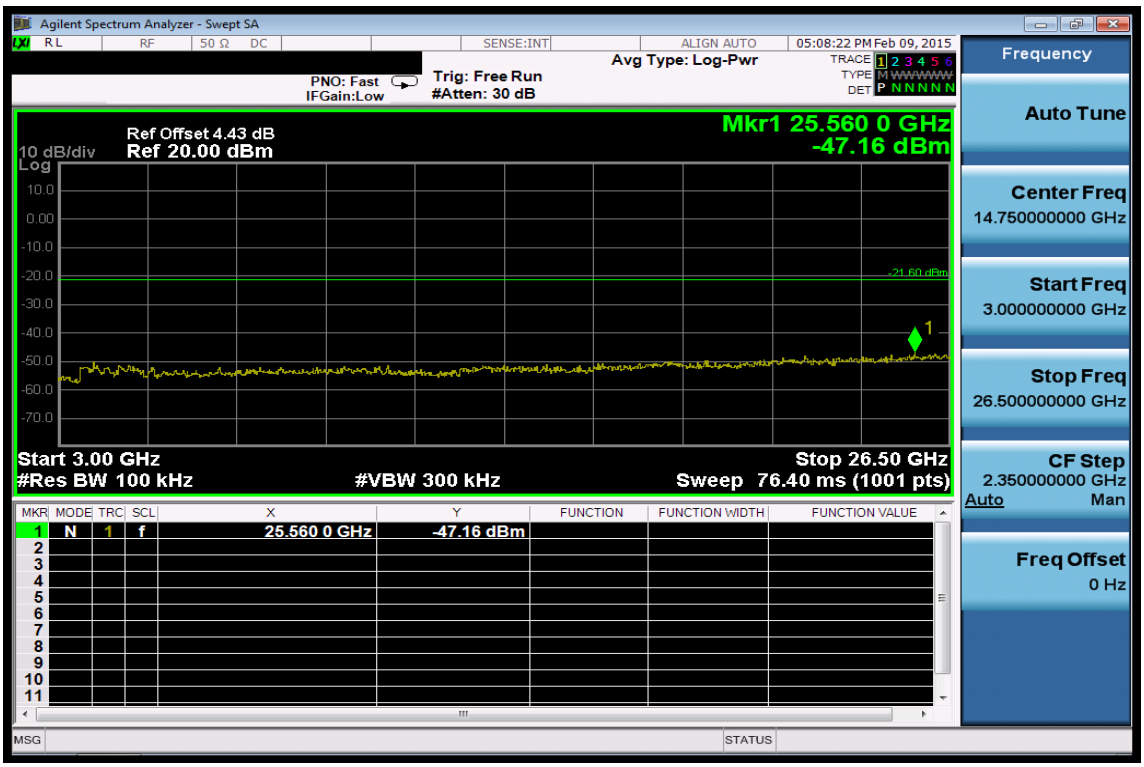
Ch Mid 3GHz – 26.5GHz



Ch High 30MHz – 3GHz

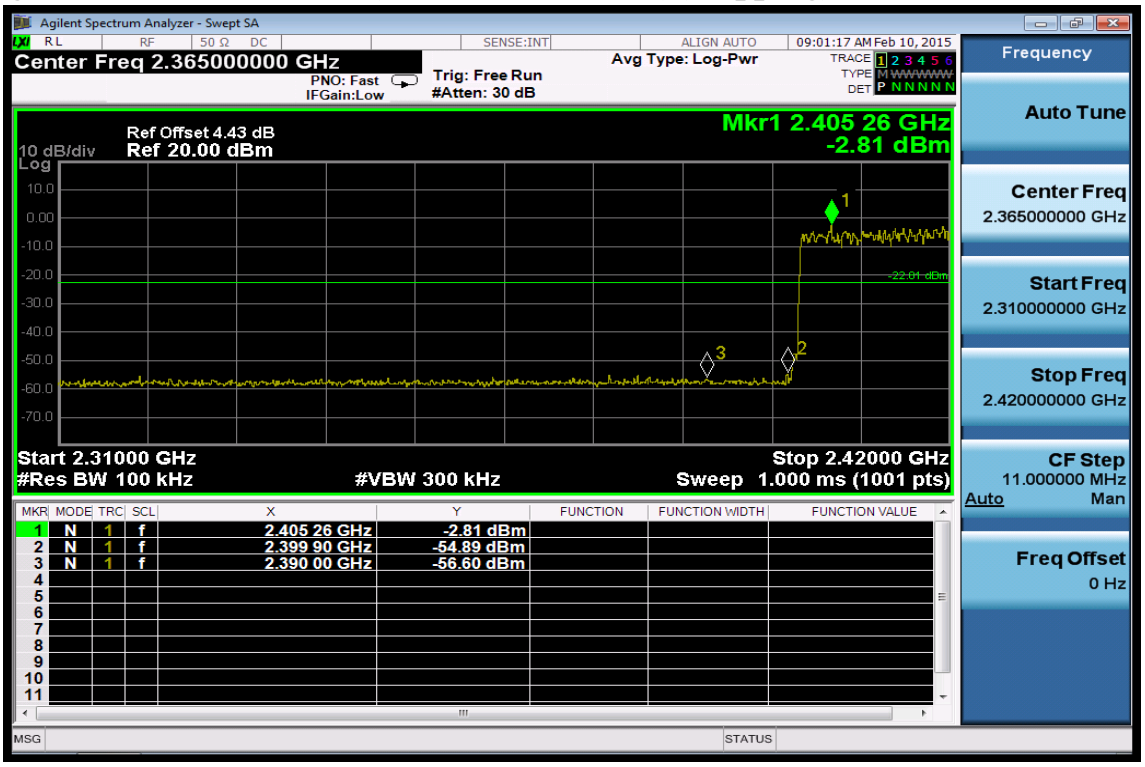


Ch High 3GHz – 26.5GHz

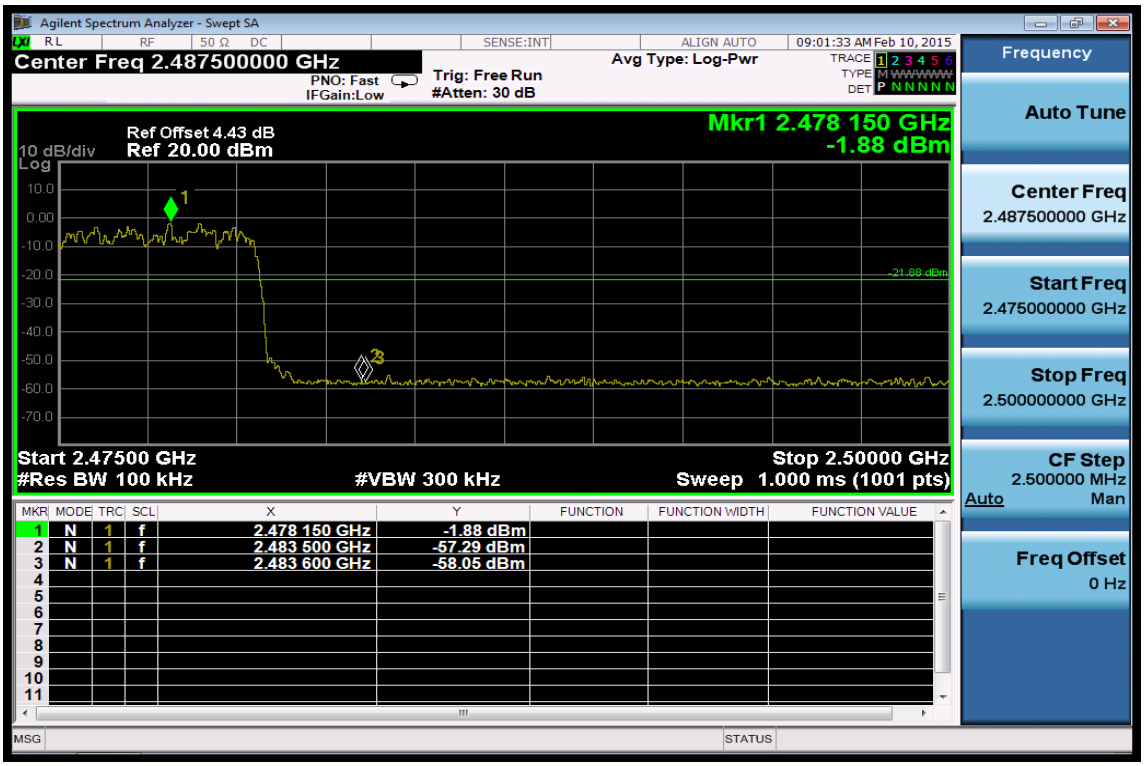


9.7 Measurement Result -2 100 kHz BANDWIDTH OF BNAD EDGE:

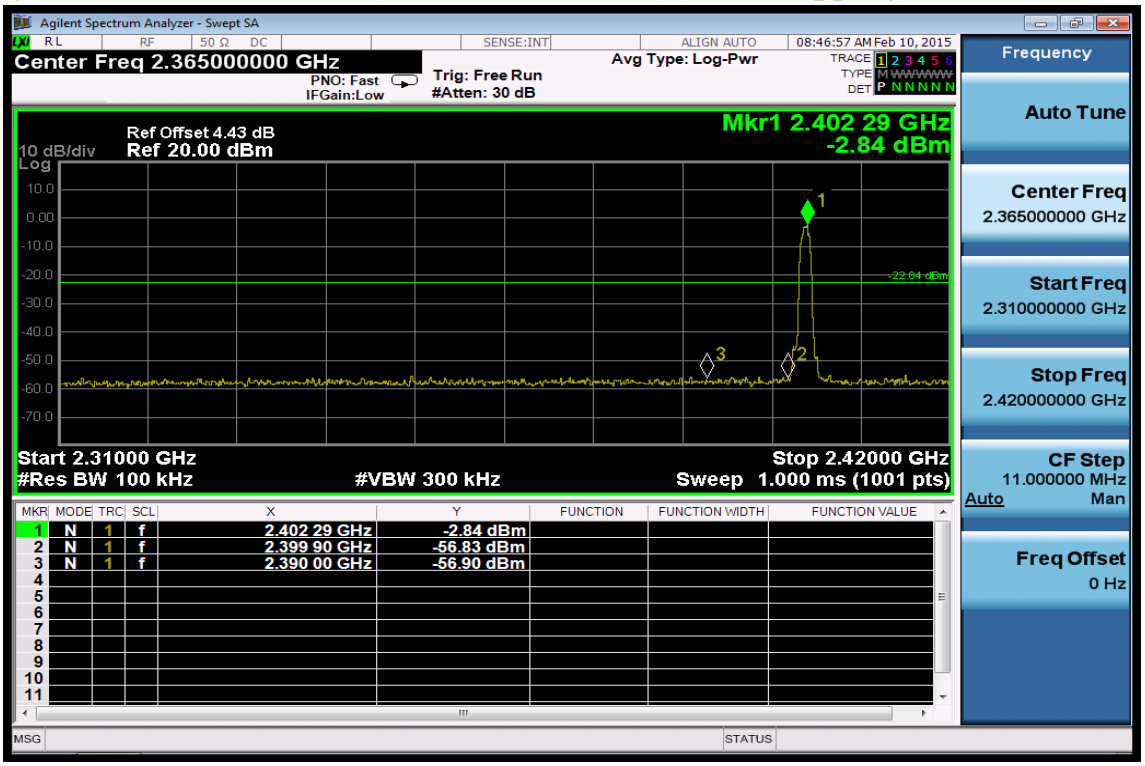
Band Edges Test Data CH-Low (Worst: EDR mode)(Hopping)



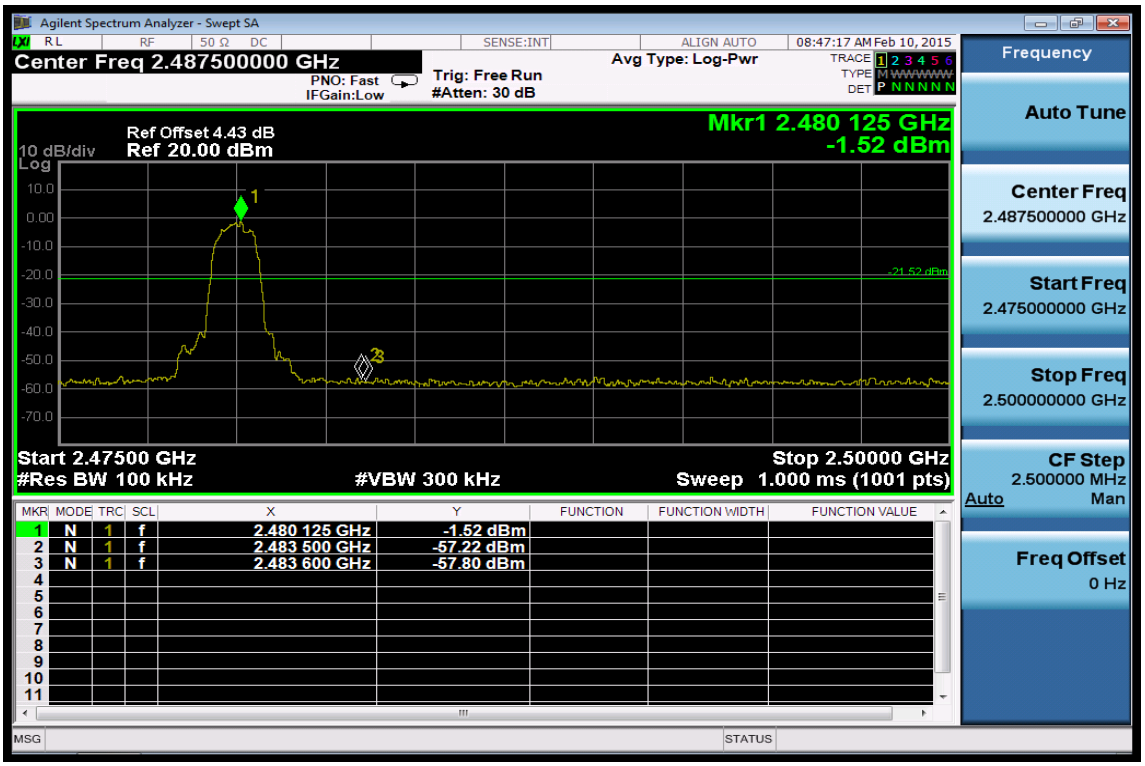
Band Edges Test Data CH-High



Band Edges Test Data CH-Low (Worst: EDR mode)(Non-Hopping)



Band Edges Test Data CH-High



10. SPURIOUS RADIATED EMISSION TEST

10.1. Standard Applicable

According to §15.247(d),

Emission at antenna port:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Radiated Spurious Emission

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

10.2. Measurement Equipment Used:

10.2.1. Radiated emission:

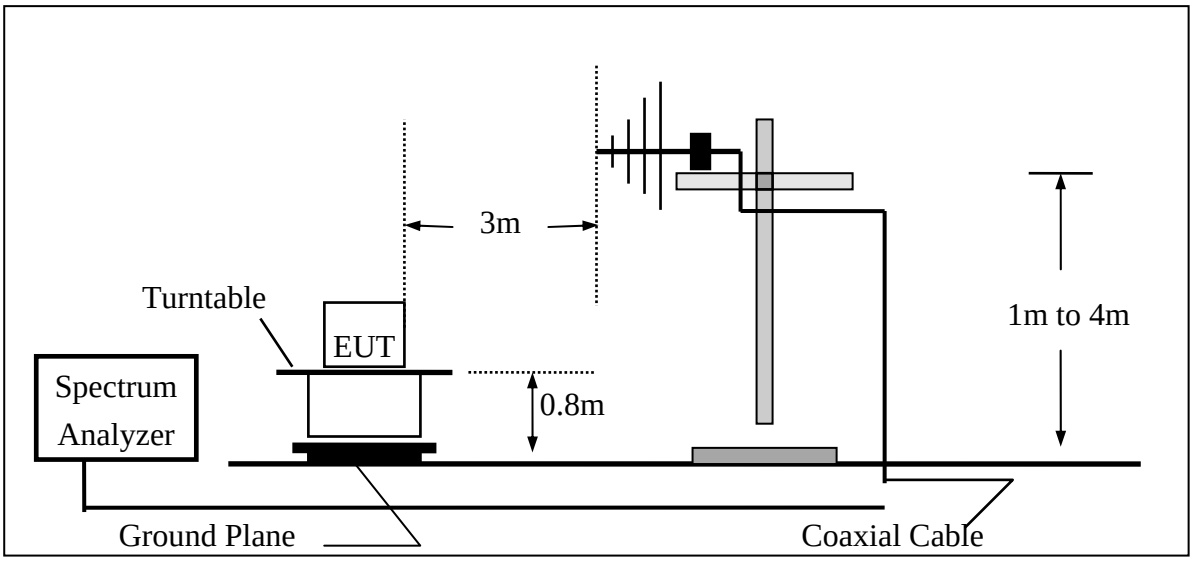
SGS 966 Chamber No.C					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EMI Test Receiver	R&S	ESU 40	100363	04/12/2014	04/11/2015
Loop Antenna	ETS-Lindgren	6502	00143303	12/09/2014	12/08/2015
Broadband Antenna	TESEQ	CBL 6112D	35240	12/05/2014	12/04/2015
Horn Antenna	ETS-Lindgren	3117	00143272	12/08/2014	12/07/2015
Horn Antenna	ETS-Lindgren	3160-09	00117911	11/13/2014	11/12/2015
Horn Antenna	ETS-Lindgren	3160-10	00117783	11/13/2014	11/12/2015
Pre Amplifier	EMC Instruments	EMC330	980096	12/19/2014	12/18/2015
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/19/2014	12/18/2015
Pre Amplifier	R&S	SCU-18	10204	12/19/2014	12/18/2015
Pre Amplifier	R&S	SCU-26	100780	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/19/2014	12/18/2015
Attenuator	WOKEN	218FS-10	RF27	12/19/2014	12/18/2015
Site NSA	SGS	966 Chamber C	SAC-C	03/05/2014	03/05/2015
Site VSWR	SGS	966 Chamber C	SAC-C	04/10/2014	04/09/2015
DC Power Supply	HOLA	DP-3003	D7070035	05/31/2014	05/30/2015
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

NOTE: N.C.R refers to Not Calibrated Required.

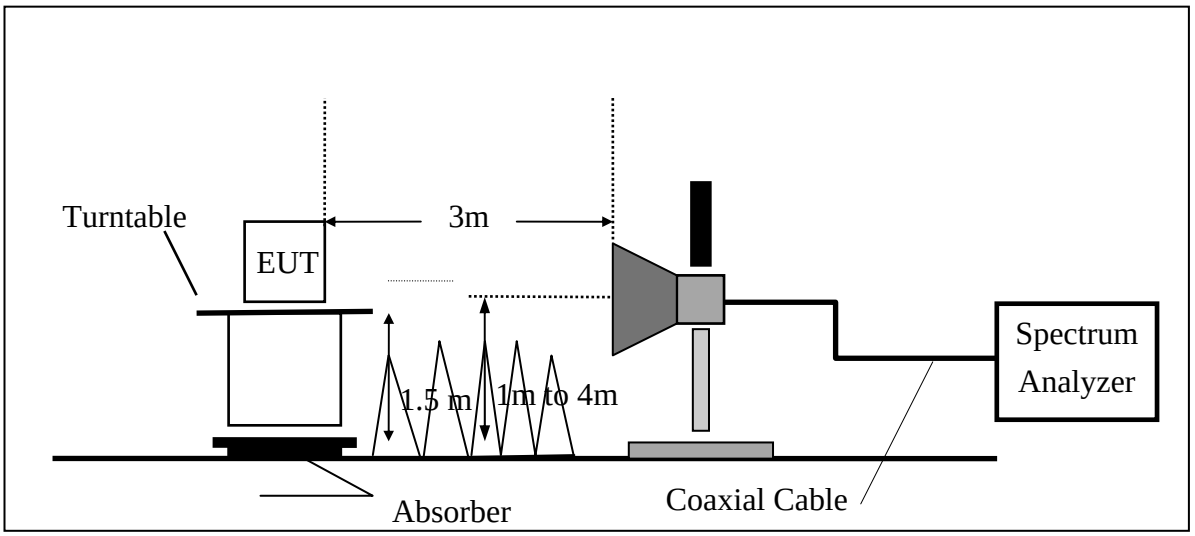
10.3. Test SET-UP:

10.3.1. Radiated emission:

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



10.4. Measurement Procedure:

Radiated Emission:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency of the interest measured were complete.

Auxiliary Procedure (Setting on Spectrum to capture the reading of emission level):

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

10.5. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Remark:

1. The limit of the emission level is expressed in dBuV/m, which converts 20*log(uV/m)
2. Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

10.6. Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

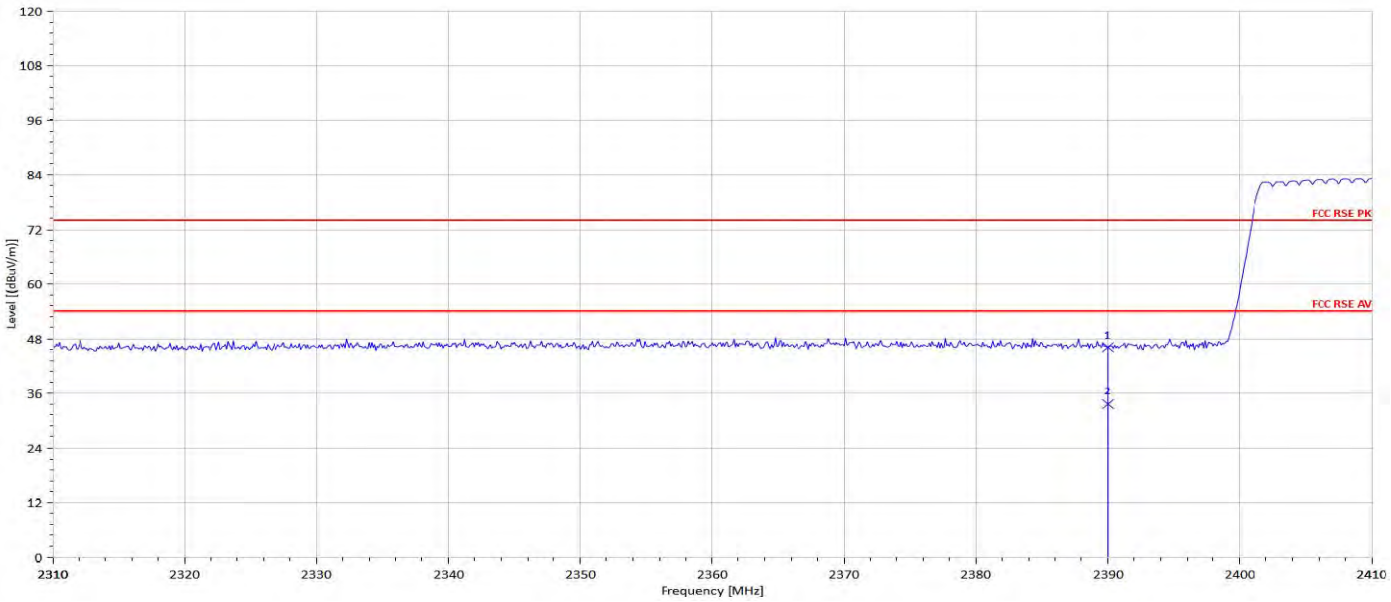
Note: For measurement plot of radiation revealing the compliance of 15.209, please refer to Appendix I.

Note: For the tabular table as presents below, “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency. “E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.
“---“ : denotes Noise Floor

10.6.1 Radiated Emission

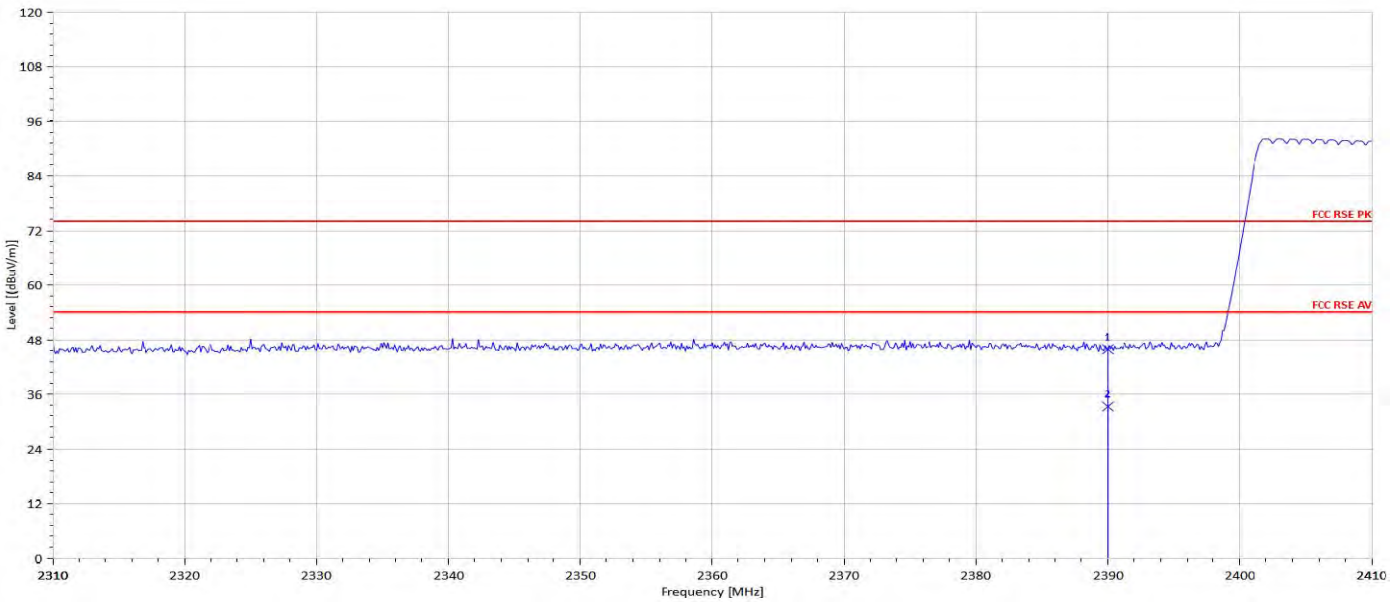
Band Edge: (Worst: EDR mode)(Hopping)

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2402 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:BANDEDGE LOW	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



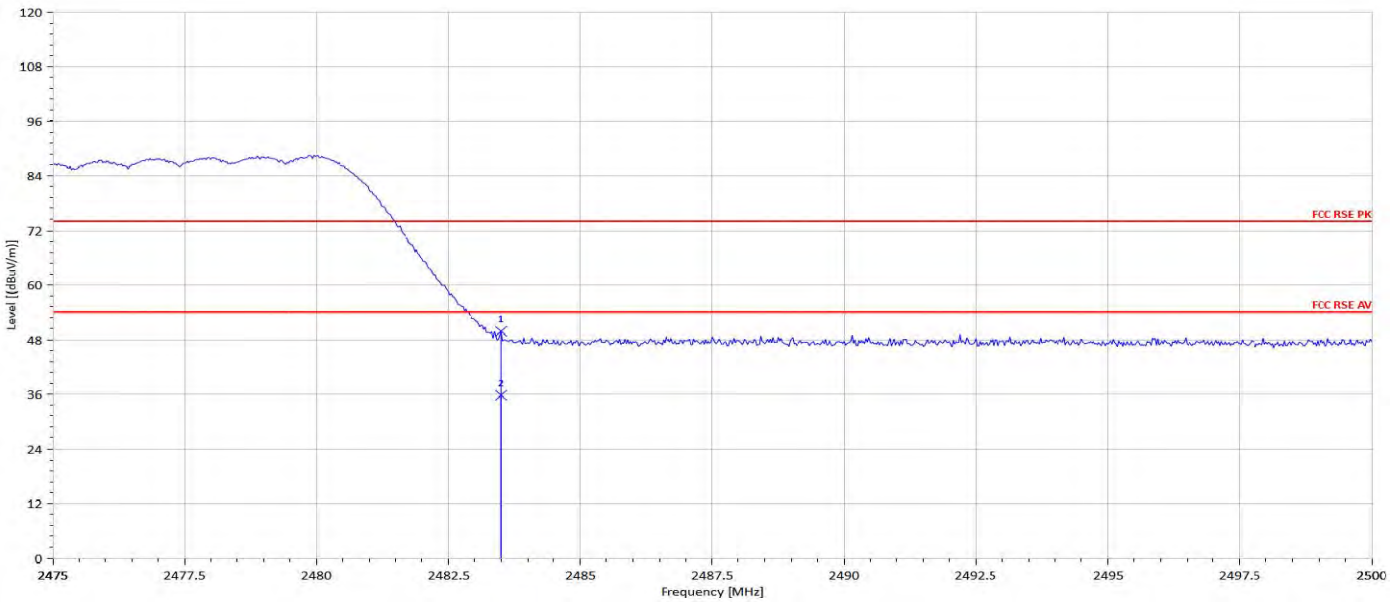
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
2390.00	E	Peak	39.82	6.36	46.18	74	-27.82
2390.00	E	Average	26.99	6.36	33.35	54	-20.65

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2402 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:BANDEDGE LOW	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



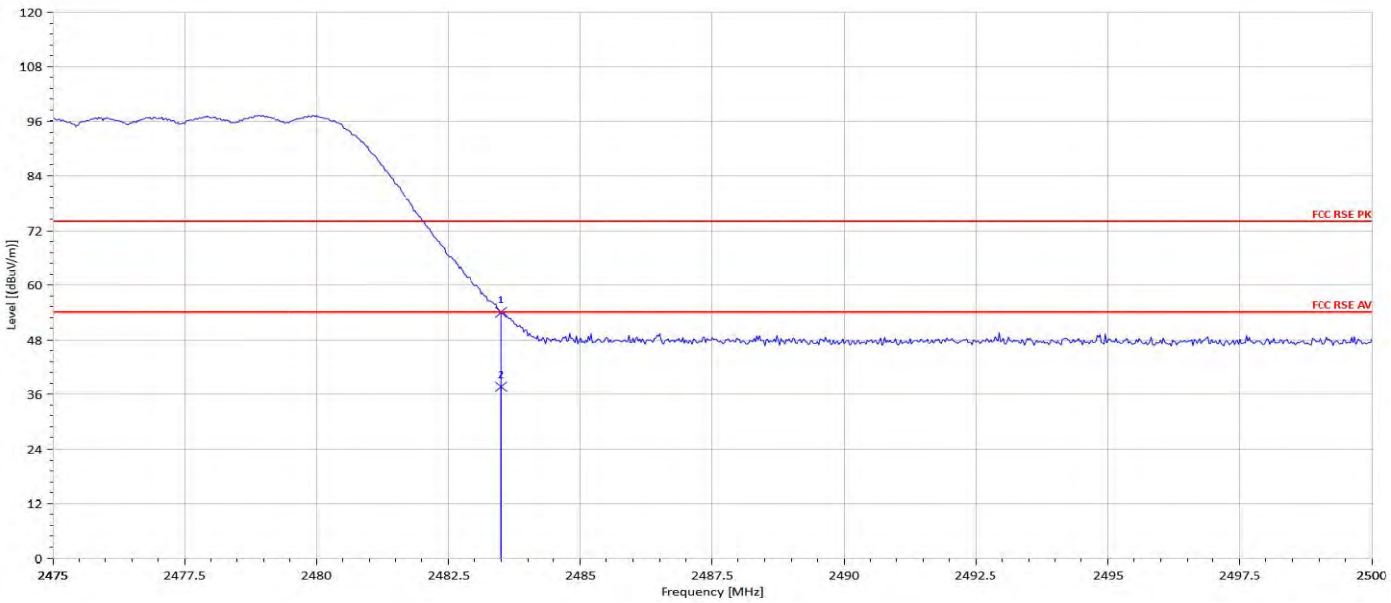
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
2390.00	E	Peak	39.80	6.36	46.16	74	-27.84
2390.00	E	Average	26.96	6.36	33.32	54	-20.68

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2480 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:BANDEDGE HIGH	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
2483.50	E	Peak	42.70	7.14	49.83	74	-24.17
2483.50	E	Average	28.65	7.14	35.79	54	-18.21

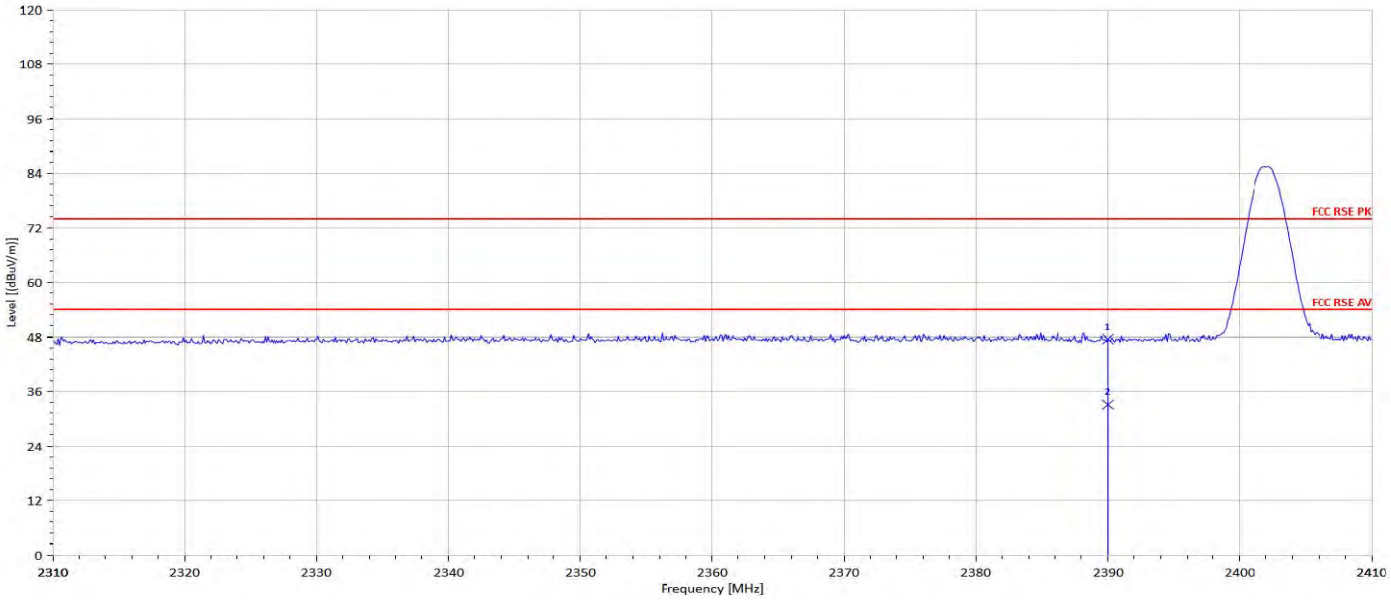
Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2480 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:BANDEDGE HIGH	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
2483.50	E	Peak	46.89	7.14	54.03	74	-19.97
2483.50	E	Average	30.51	7.14	37.65	54	-16.35

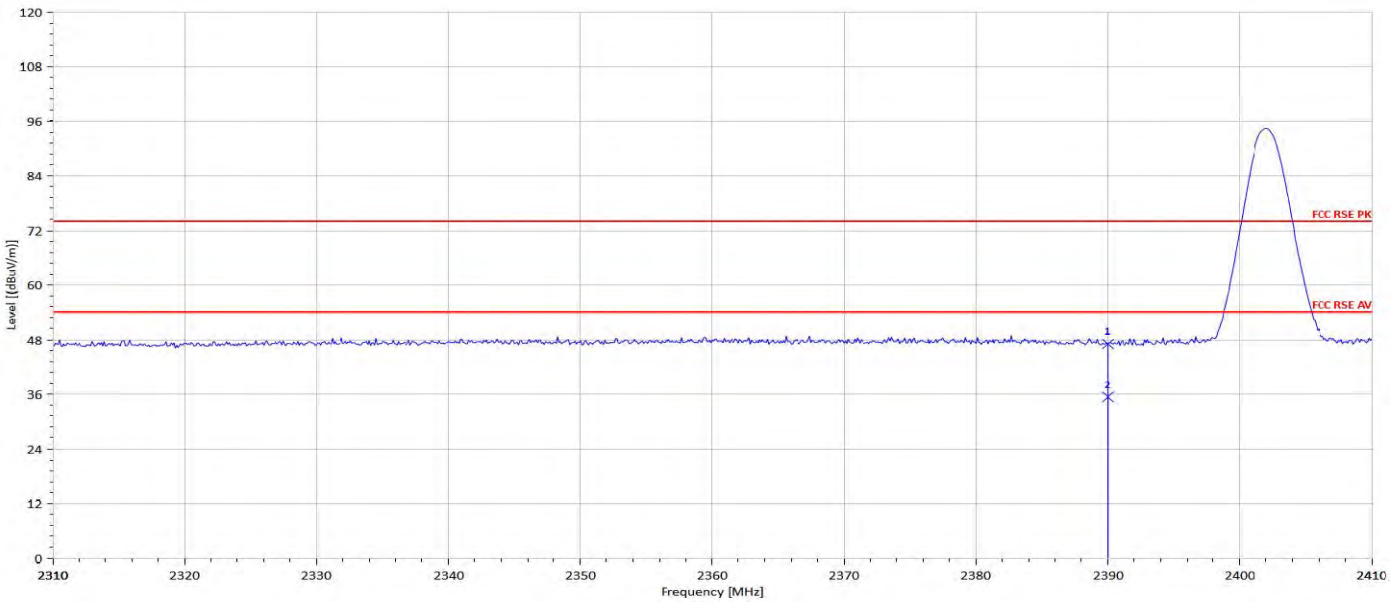
Band Edge: (Worst: EDR mode)(Non-Hopping)

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2402 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:BANDEDGE LOW	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	: VERTICAL



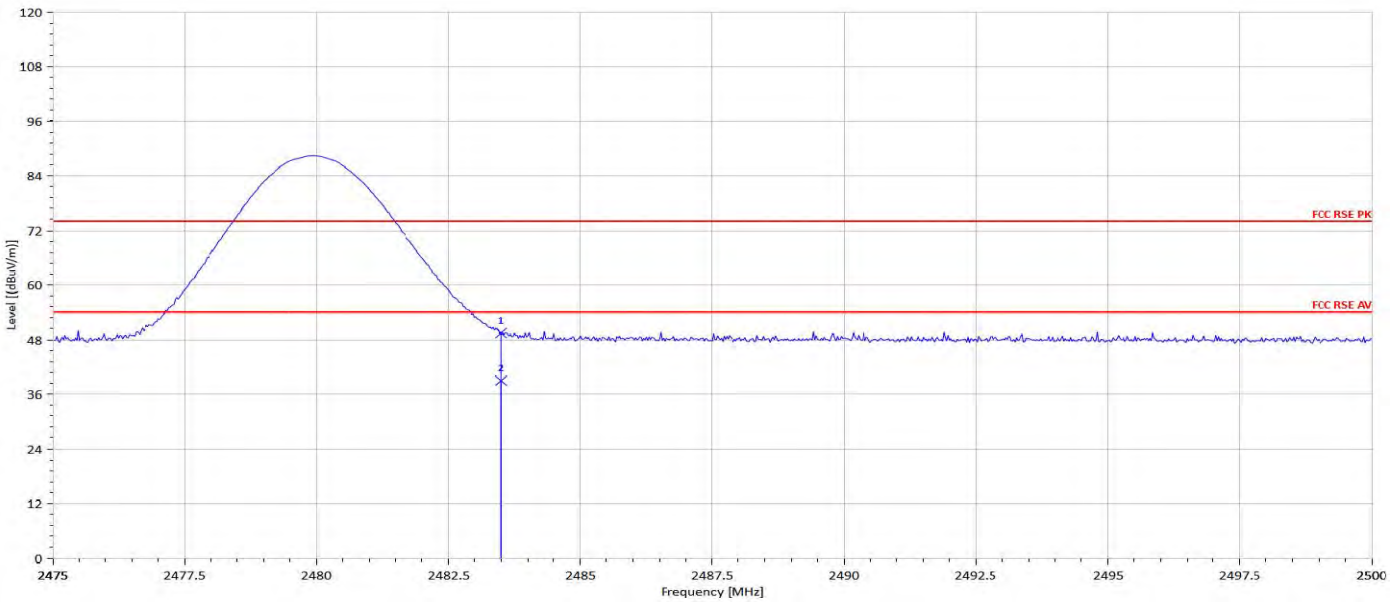
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
2390.00	E	Peak	41.13	6.36	47.49	74	-26.51
2390.00	E	Average	26.76	6.36	33.12	54	-20.88

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2402 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:BANDEDGE LOW	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



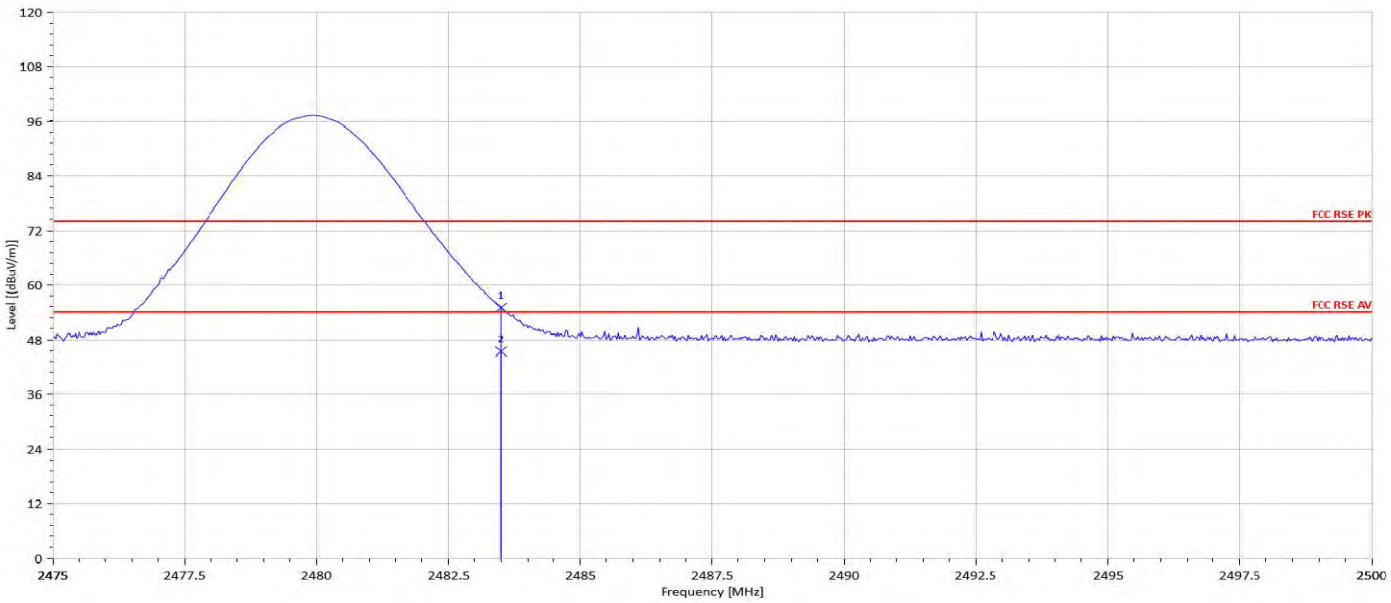
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
2390.00	E	Peak	40.69	6.36	47.05	74	-26.95
2390.00	E	Average	29.06	6.36	35.42	54	-18.58

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2480 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:BANDEDGE HIGH	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
2483.50	E	Peak	42.33	7.14	49.46	74	-24.54
2483.50	E	Average	31.85	7.14	38.99	54	-15.01

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2480 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:BANDEDGE HIGH	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
2483.50	E	Peak	47.84	7.14	54.98	74	-19.02
2483.50	E	Average	38.27	7.14	45.41	54	-8.59

10.6.2 Radiated Spurious Emission Measurement Result (worst case EDR mode)

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2402 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
33.88	S	Peak	48.15	-15.22	32.93	40	-7.07
47.46	S	Peak	49.41	-23.95	25.46	40	-14.54
100.81	S	Peak	52.76	-23.69	29.08	43.5	-14.42
352.04	S	Peak	39.27	-17.31	21.96	46	-24.04
452.92	S	Peak	39.10	-14.83	24.27	46	-21.73
503.36	S	Peak	38.99	-14.15	24.85	46	-21.15
4804.00	H	Peak	37.47	10.98	48.45	74	-25.55
4804.00	H	Average	25.72	10.98	36.70	54	-17.30
7206.00	H	Peak	-	-	-	-	-
9608.00	H	Peak	-	-	-	-	-
12010.00	H	Peak	-	-	-	-	-
14412.00	H	Peak	-	-	-	-	-
16814.00	H	Peak	-	-	-	-	-
19216.00	H	Peak	-	-	-	-	-
21618.00	H	Peak	-	-	-	-	-
24020.00	H	Peak	-	-	-	-	-

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2402 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
101.78	S	Peak	54.26	-23.54	30.72	43.5	-12.78
172.59	S	Peak	52.55	-23.96	28.59	43.5	-14.91
503.36	S	Peak	43.61	-14.15	29.46	46	-16.54
576.11	S	Peak	41.93	-12.45	29.48	46	-16.52
672.14	S	Peak	40.40	-11.68	28.71	46	-17.29
720.64	S	Peak	38.80	-10.77	28.03	46	-17.97
4804.00	H	Peak	36.52	10.98	47.50	74	-26.50
4804.00	H	Average	26.30	10.98	37.28	54	-16.72
7206.00	H	Peak	-	-	-	-	-
9608.00	H	Peak	-	-	-	-	-
12010.00	H	Peak	-	-	-	-	-
14412.00	H	Peak	-	-	-	-	-
16814.00	H	Peak	-	-	-	-	-
19216.00	H	Peak	-	-	-	-	-
21618.00	H	Peak	-	-	-	-	-
24020.00	H	Peak	-	-	-	-	-

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2441 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
50.37	S	Peak	59.60	-25.65	33.95	40	-6.05
103.72	S	Peak	53.36	-23.24	30.12	43.5	-13.38
352.04	S	Peak	42.38	-17.31	25.07	46	-20.93
503.36	S	Peak	39.51	-14.15	25.36	46	-20.64
576.11	S	Peak	37.10	-12.45	24.64	46	-21.36
720.64	S	Peak	35.06	-10.77	24.29	46	-21.71
4882.00	H	Peak	36.65	10.91	47.56	74	-26.44
4882.00	H	Average	26.31	10.91	37.22	54	-16.78
7323.00	S	Peak	-	-	-	-	-
9764.00	H	Peak	-	-	-	-	-
12205.00	H	Peak	-	-	-	-	-
14646.00	H	Peak	-	-	-	-	-
17087.00	H	Peak	-	-	-	-	-
19528.00	H	Peak	-	-	-	-	-
21969.00	H	Peak	-	-	-	-	-
24410.00	H	Peak	-	-	-	-	-

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2441 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
33.88	S	Peak	39.64	-15.22	24.42	40	-15.58
100.81	S	Peak	55.71	-23.69	32.02	43.5	-11.48
172.59	S	Peak	52.29	-23.96	28.33	43.5	-15.17
503.36	S	Peak	42.71	-14.15	28.56	46	-17.44
576.11	S	Peak	41.71	-12.45	29.25	46	-16.75
720.64	S	Peak	39.16	-10.77	28.38	46	-17.62
4882.00	H	Peak	37.45	10.91	48.36	74	-25.64
4882.00	H	Average	26.83	10.91	37.74	54	-16.26
7323.00	H	Peak	-	-	-	-	-
9764.00	H	Peak	-	-	-	-	-
12205.00	H	Peak	-	-	-	-	-
14646.00	H	Peak	-	-	-	-	-
17087.00	H	Peak	-	-	-	-	-
19528.00	H	Peak	-	-	-	-	-
21969.00	H	Peak	-	-	-	-	-
24410.00	H	Peak	-	-	-	-	-

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2480 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
61.04	S	Peak	64.19	-28.42	35.77	40	-4.23
96.93	S	Peak	54.30	-24.36	29.94	43.5	-13.56
352.04	S	Peak	42.81	-17.31	25.50	46	-20.50
503.36	S	Peak	40.06	-14.15	25.91	46	-20.09
576.11	S	Peak	38.21	-12.45	25.75	46	-20.25
672.14	S	Peak	36.33	-11.68	24.65	46	-21.35
4960.00	H	Peak	36.91	10.99	47.90	74	-26.10
4960.00	H	Average	26.62	10.99	37.61	54	-16.39
7440.00	S	Peak	-	-	-	-	-
9920.00	H	Peak	-	-	-	-	-
12400.00	H	Peak	-	-	-	-	-
14880.00	H	Peak	-	-	-	-	-
17360.00	H	Peak	-	-	-	-	-
19840.00	H	Peak	-	-	-	-	-
22320.00	H	Peak	-	-	-	-	-
24800.00	H	Peak	-	-	-	-	-

Operation Band	:EDR	Test Date	:2015-02-22
Fundamental Frequency	:2480 MHz	Temp./Humi.	:18.5 deg_C/ 56 RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV / m	dBµV / m	dB
100.81	S	Peak	54.18	-23.69	30.49	43.5	-13.01
166.77	S	Peak	51.17	-23.63	27.53	43.5	-15.97
352.04	S	Peak	42.60	-17.31	25.29	46	-20.71
503.36	S	Peak	42.30	-14.15	28.15	46	-17.85
576.11	S	Peak	40.98	-12.45	28.53	46	-17.47
672.14	S	Peak	41.07	-11.68	29.39	46	-16.61
4960.00	H	Peak	36.96	10.99	47.96	74	-26.04
4960.00	H	Average	26.06	10.99	37.05	54	-16.95
7440.00	H	Peak	-	-	-	-	-
9920.00	H	Peak	-	-	-	-	-
12400.00	H	Peak	-	-	-	-	-
14880.00	H	Peak	-	-	-	-	-
17360.00	H	Peak	-	-	-	-	-
19840.00	H	Peak	-	-	-	-	-
22320.00	H	Peak	-	-	-	-	-
24800.00	H	Peak	-	-	-	-	-

11. FREQUENCY SEPARATION

11.1. Standard Applicable

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 kHz or the 2/3*20dB bandwidth of the hopping channel, whichever is greater.

11.2. Measurement Equipment Used:

Refer to section 7.2 for details.

11.3. Test Set-up:

Refer to section 7.3 for details.

11.4. Measurement Procedure:

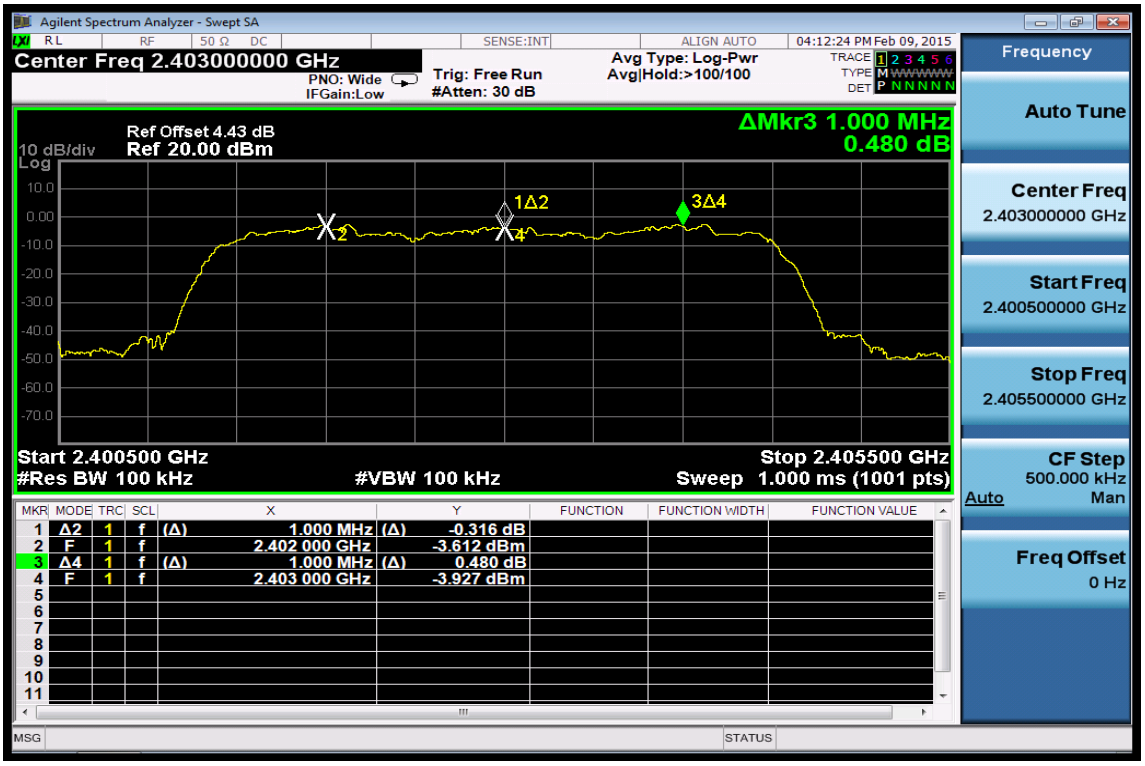
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel.
4. Set the spectrum analyzer as RBW, VBW=100 kHz, Adjust Span to 5MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

11.5. Measurement Result:

Channel separation (MHz)	Limit	Result
1	>=25 kHz or 2/3 times 20dB bandwidth	PASS

Note: Refer to next page for plots.

Frequency Separation Test Data



12. NUMBER OF HOPPING FREQUENCY

12.1. Standard Applicable

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

12.2. Measurement Equipment Used:

Refer to section 7.2 for details.

12.3. Test Set-up:

Refer to section 7.3 for details.

12.4. Measurement Procedure:

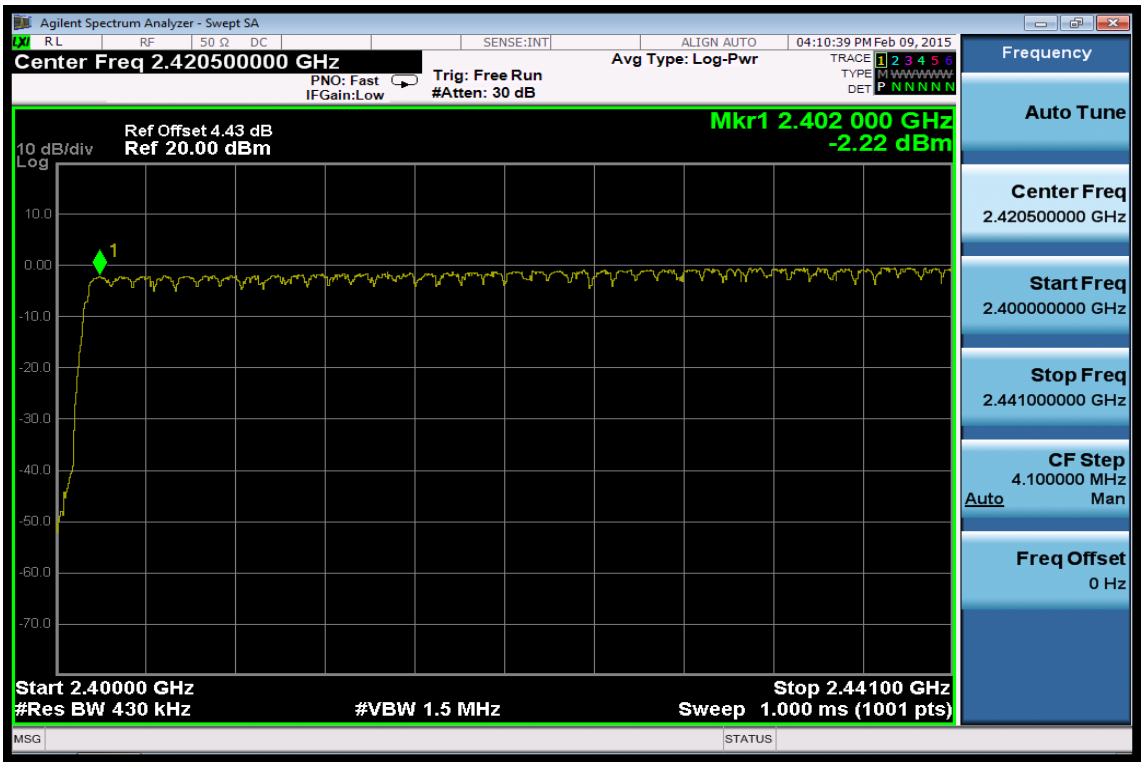
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set spectrum analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
4. Set the spectrum analyzer as RBW=430 kHz, VBW=1.5MHz., Detector = Peak
5. Max hold, view and count how many channel in the band.

12.5. Measurement Result:

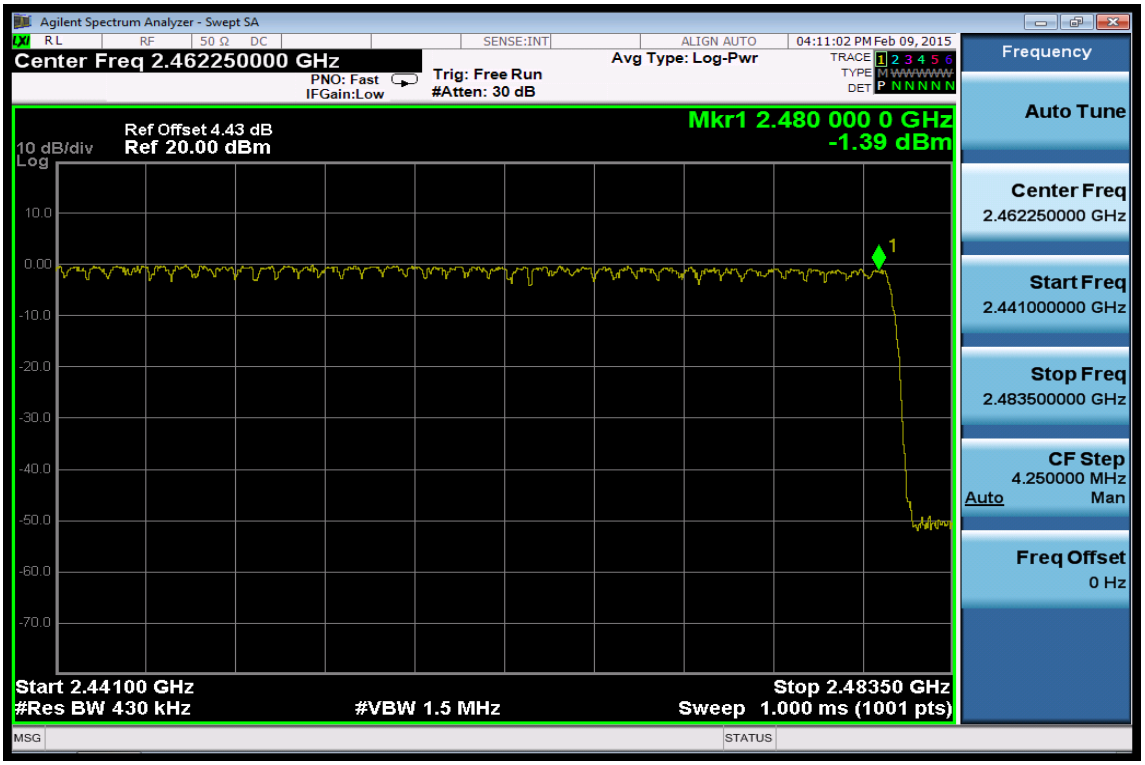
Note: Refer to next page for plots.

Channel Number

2.4 GHz – 2.441GHz



2.441 GHz – 2.4835GHz



13. TIME OF OCCUPANCY (DWELL TIME)

13.1. Standard Applicable

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

13.2. Measurement Equipment Used:

Refer to section 7.2 for details.

13.3. Test Set-up:

Refer to section 7.3 for details.

13.4. Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, 3MHz, Span = 0Hz , Detector = Peak, Adjust Sweep = 2~7ms.
5. Repeat above procedures until all frequency of the interest measured were complete.

Formula Deduced: time occupancy of one time slot X Hopping rate / total slot in one channel / total channel that hops X period of working channels.
Where, standard hopping rate is 1600 hops/s, slot in one channel for DH1, DH3, and DH5 is 2, 4, and 6, respectively.
DH1 consists of single time slot of the uplink, and one slot of the downlink Total Slot: 2
DH3 consists of three time slot of the uplink, and one slot of the downlink. Total Slot: 4
DH5 consists of five time slot of the uplink, and one slot of the downlink. Total Slot: 6

Note: the result of the complete test default channel at 1Mbps is recorded on the test report, 2Mbps, and 3Mbps only records the measurement result at middle channel that reveals no much deviation.

13.5. Tabular Result of the Measurement:

1Mbps (GFSK):

Test Channel:	Mode:	Measurement Result (ms):	Limit (ms):
Low:	DH1	0.382	400ms
	DH3	1.64	400ms
	DH5	2.885	400ms
Middle:	DH1	0.382	400ms
	DH3	1.64	400ms
	DH5	2.885	400ms
High:	DH1	0.382	400ms
	DH3	1.64	400ms
	DH5	2.885	400ms

2Mbps (Π/4 DQPSK):

Test Channel:	Mode:	Measurement Result (ms):	Limit (ms):
Middle:	2DH1	0.382	400ms
	2DH3	1.64	400ms
	2DH5	2.885	400ms

3Mbps (8DPSK):

Test Channel:	Mode:	Measurement Result (ms):	Limit (ms):
Middle:	3DH1	0.382	400
	3DH3	1.64	400
	3DH5	2.885	400

A period time = 0.4 (s) * 79 = 31.6 (s)

1Mbps:

CH Low	DH1 time slot	=	0.382	(ms) * (1600/2/79)	* 31.6 =	122.24	(ms)
	DH3 time slot	=	1.64	(ms) * (1600/4/79)	* 31.6 =	262.40	(ms)
	DH5 time slot	=	2.885	(ms) * (1600/6/79)	* 31.6 =	307.73	(ms)
CH Mid	DH1 time slot	=	0.382	(ms) * (1600/2/79)	* 31.6 =	122.24	(ms)
	DH3 time slot	=	1.64	(ms) * (1600/4/79)	* 31.6 =	262.40	(ms)
	DH5 time slot	=	2.885	(ms) * (1600/6/79)	* 31.6 =	307.73	(ms)
CH High	DH1 time slot	=	0.382	(ms) * (1600/2/79)	* 31.6 =	122.24	(ms)
	DH3 time slot	=	1.64	(ms) * (1600/4/79)	* 31.6 =	262.40	(ms)
	DH5 time slot	=	2.885	(ms) * (1600/6/79)	* 31.6 =	307.73	(ms)

2Mbps:

CH Mid	2DH1 time slot	=	0.382	(ms) * (1600/2/79)	* 31.6 =	122.24	(ms)
	2DH3 time slot	=	1.64	(ms) * (1600/4/79)	* 31.6 =	262.40	(ms)
	2DH5 time slot	=	2.885	(ms) * (1600/6/79)	* 31.6 =	307.73	(ms)

3Mbps:

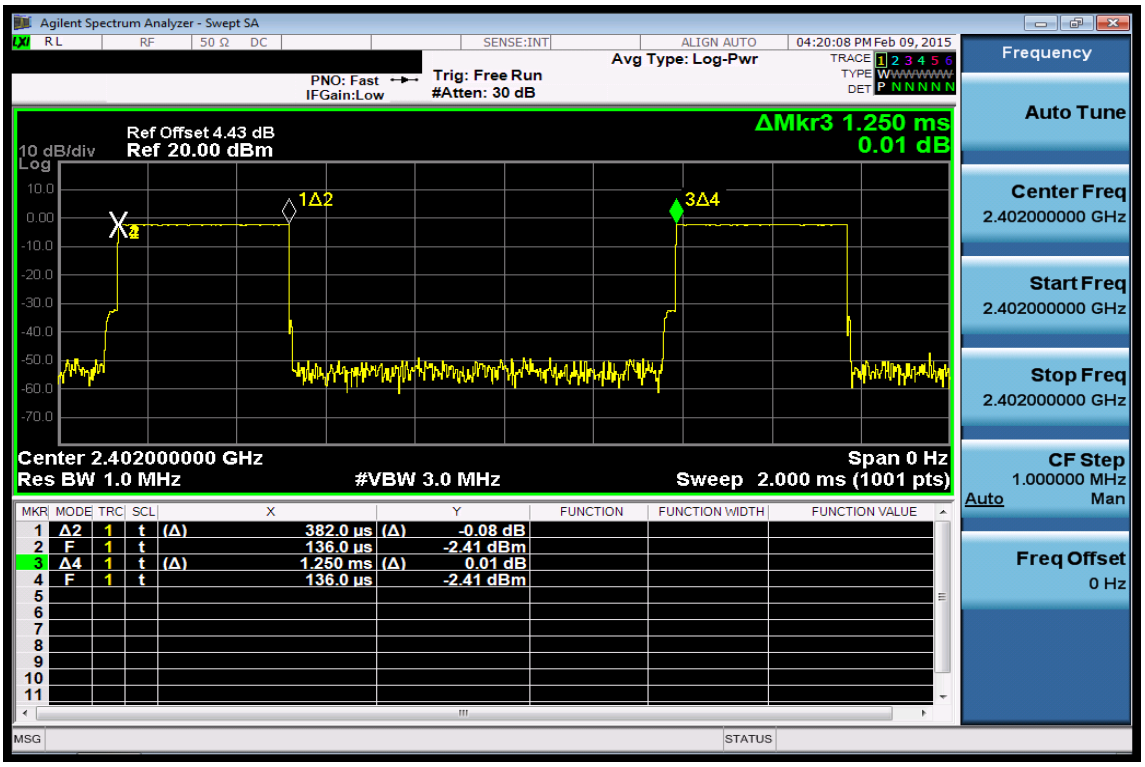
CH Mid	3DH1 time slot	=	0.382	(ms) * (1600/2/79)	* 31.6 =	122.24	(ms)
	3DH3 time slot	=	1.64	(ms) * (1600/4/79)	* 31.6 =	262.40	(ms)
	3DH5 time slot	=	2.885	(ms) * (1600/6/79)	* 31.6 =	307.73	(ms)

13.6. Measurement Result:

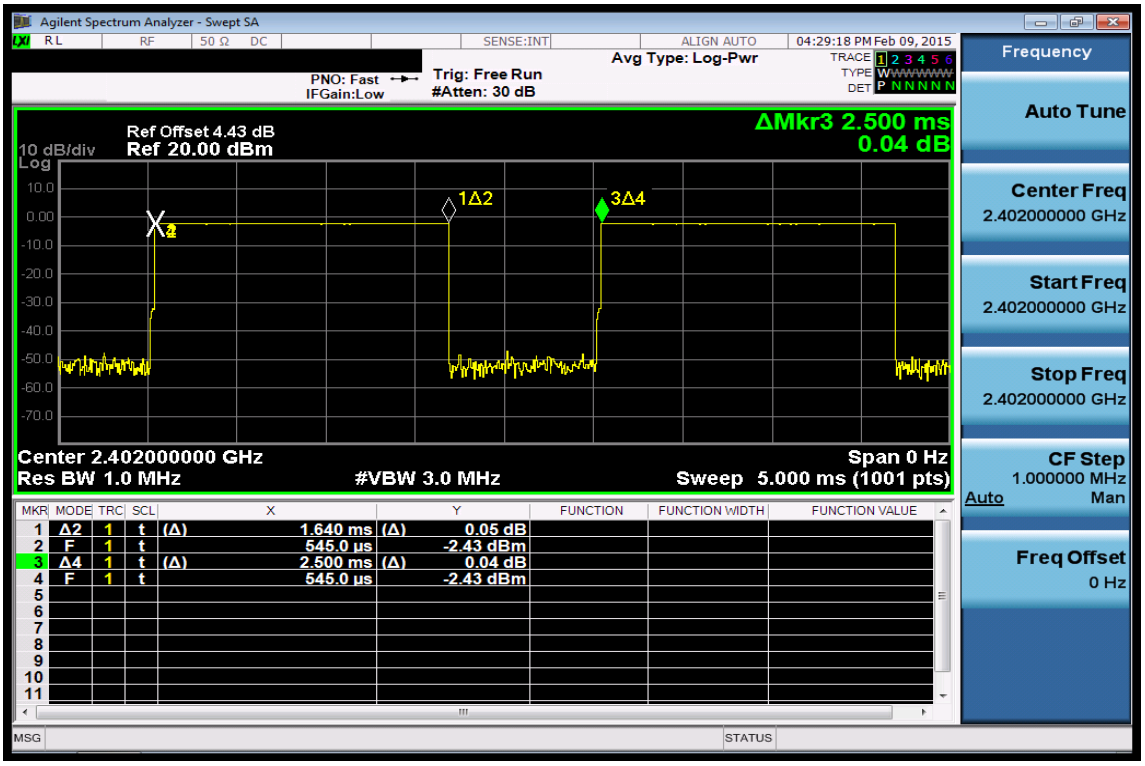
Note: Refer to next page for plots.

CH-Low

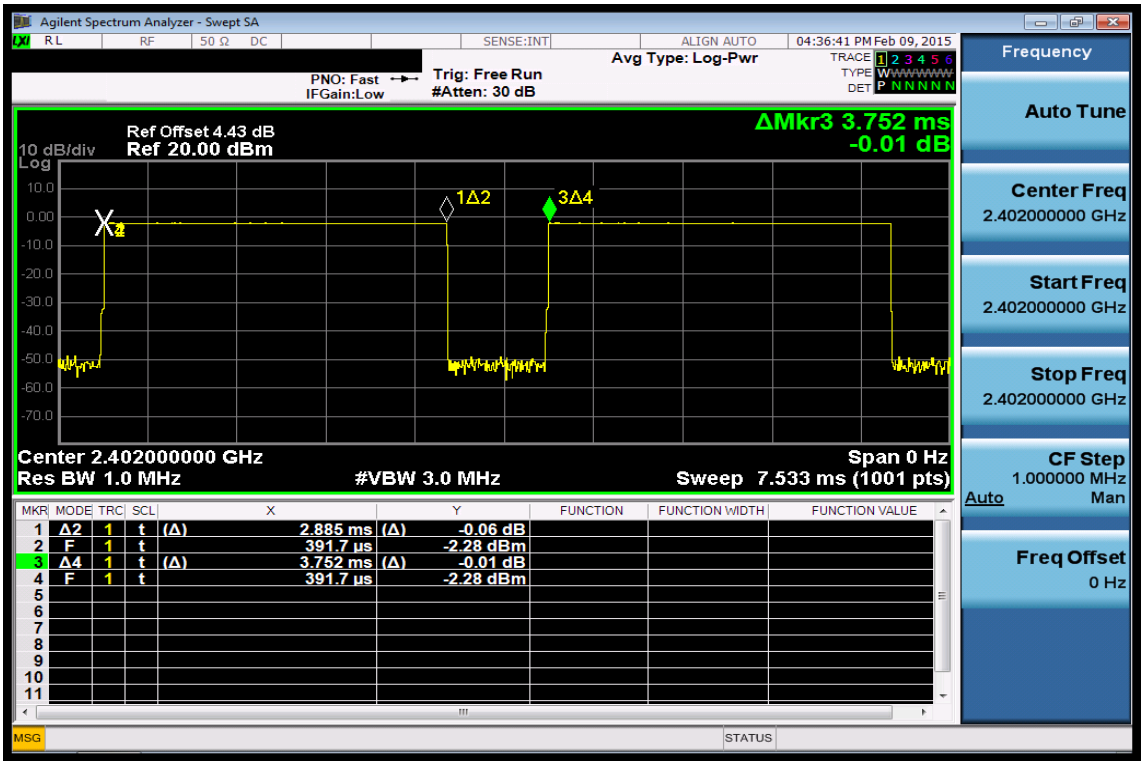
DH1



DH3

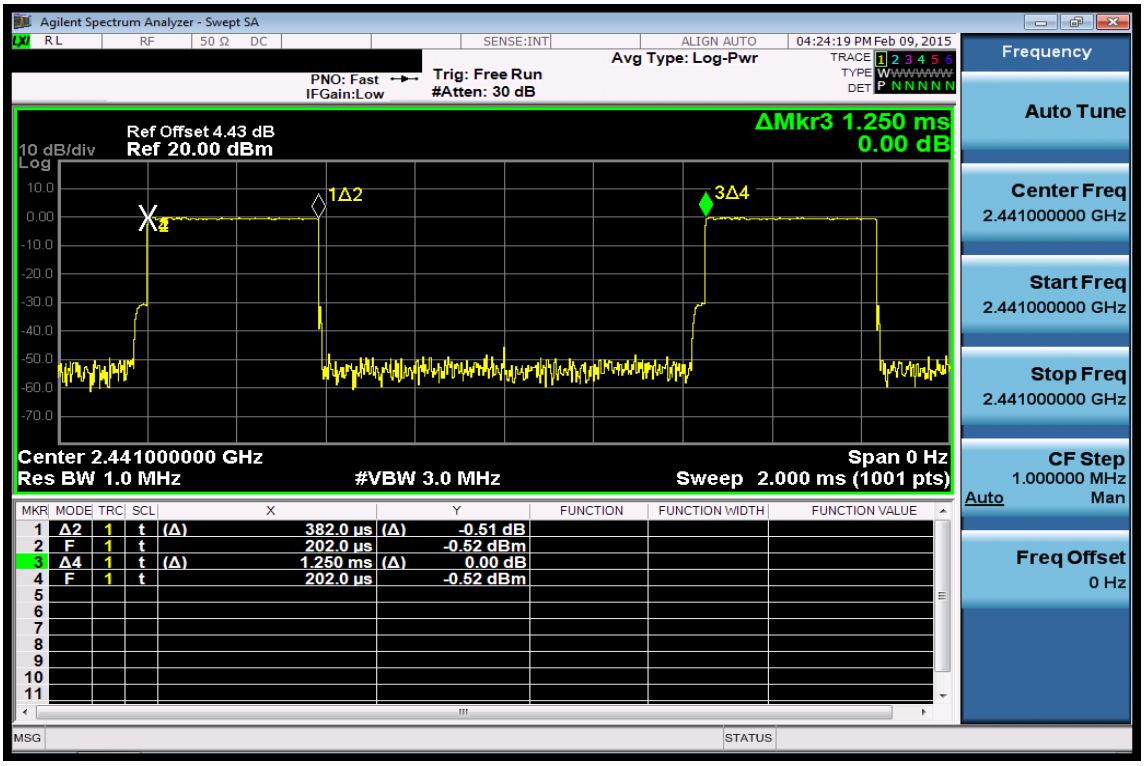


DH5



CH-Mid

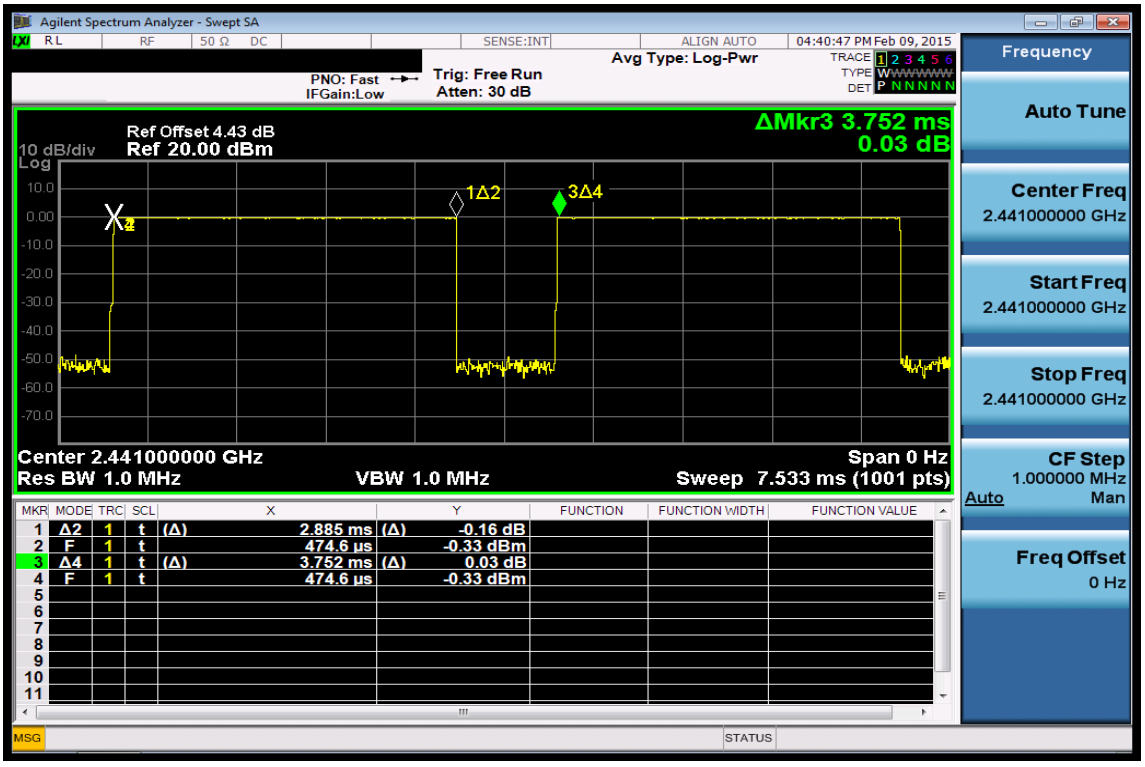
DH1



DH3

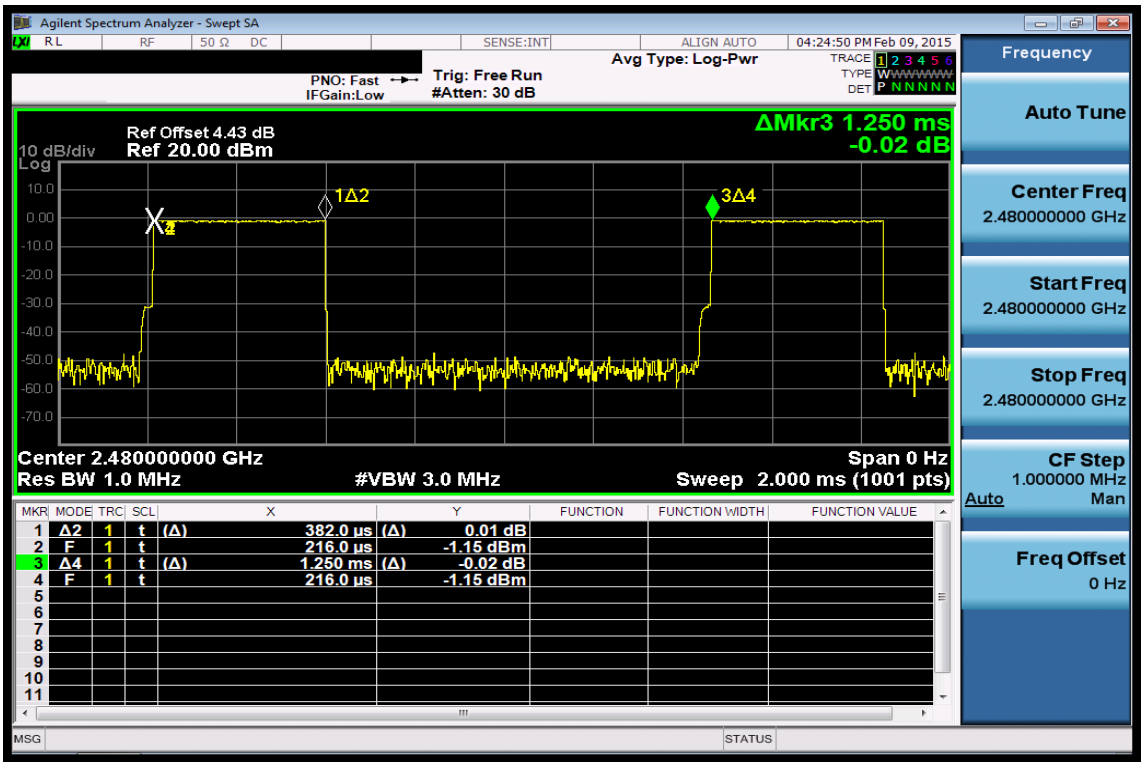

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
04:32:57 PM Feb 09, 2015
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE WWWWW
DET P N N N N N
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Ref Offset 4.43 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr3 2.500 ms
0.00 dB
1Δ2
3Δ4
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 Δ2 1 t (Δ) 1.640 ms (Δ) 0.01 dB
2 F 1 t 670.0 µs -0.47 dBm
3 Δ4 1 t (Δ) 2.500 ms (Δ) 0.00 dB
4 F 1 t 670.0 µs -0.47 dBm
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

DH5

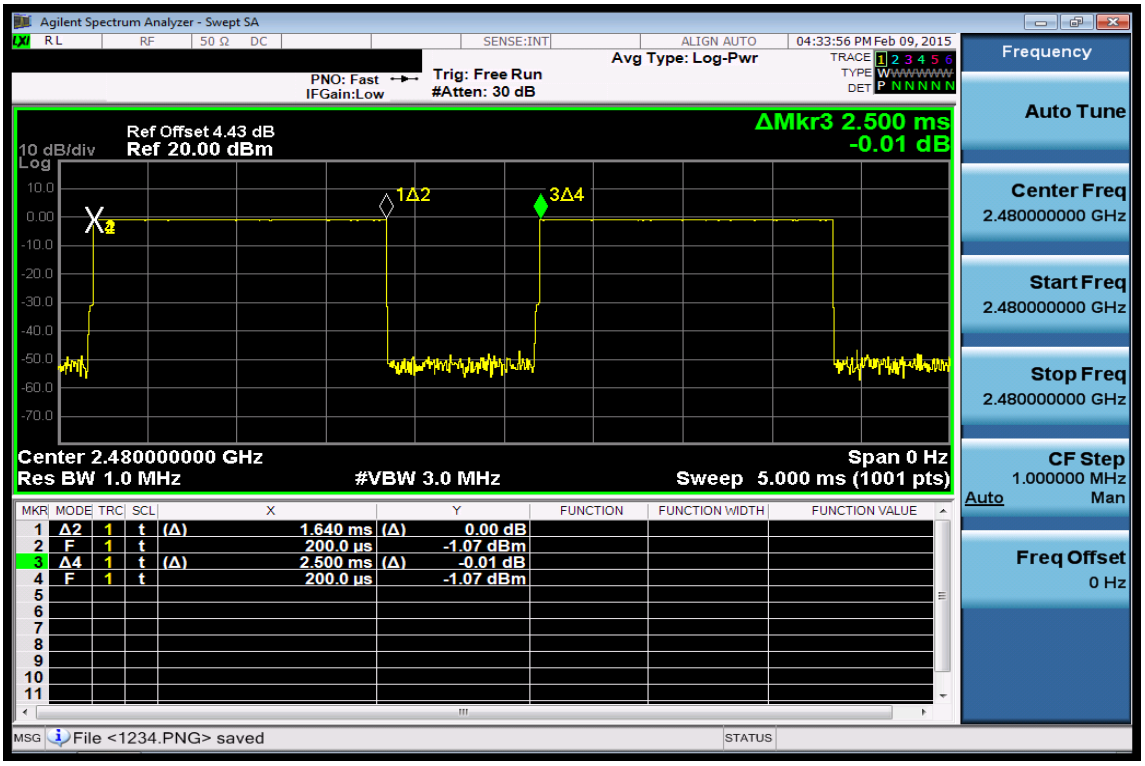

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
04:40:47 PM Feb 09, 2015
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE WWWWW
DET P N N N N N
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Ref Offset 4.43 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr3 3.752 ms
0.03 dB
1Δ2
3Δ4
Center 2.441000000 GHz
Res BW 1.0 MHz
VBW 1.0 MHz
Span 0 Hz
Sweep 7.533 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 Δ2 1 t (Δ) 2.885 ms (Δ) -0.16 dB
2 F 1 t 474.6 µs -0.33 dBm
3 Δ4 1 t (Δ) 3.752 ms (Δ) 0.03 dB
4 F 1 t 474.6 µs -0.33 dBm
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

CH-High

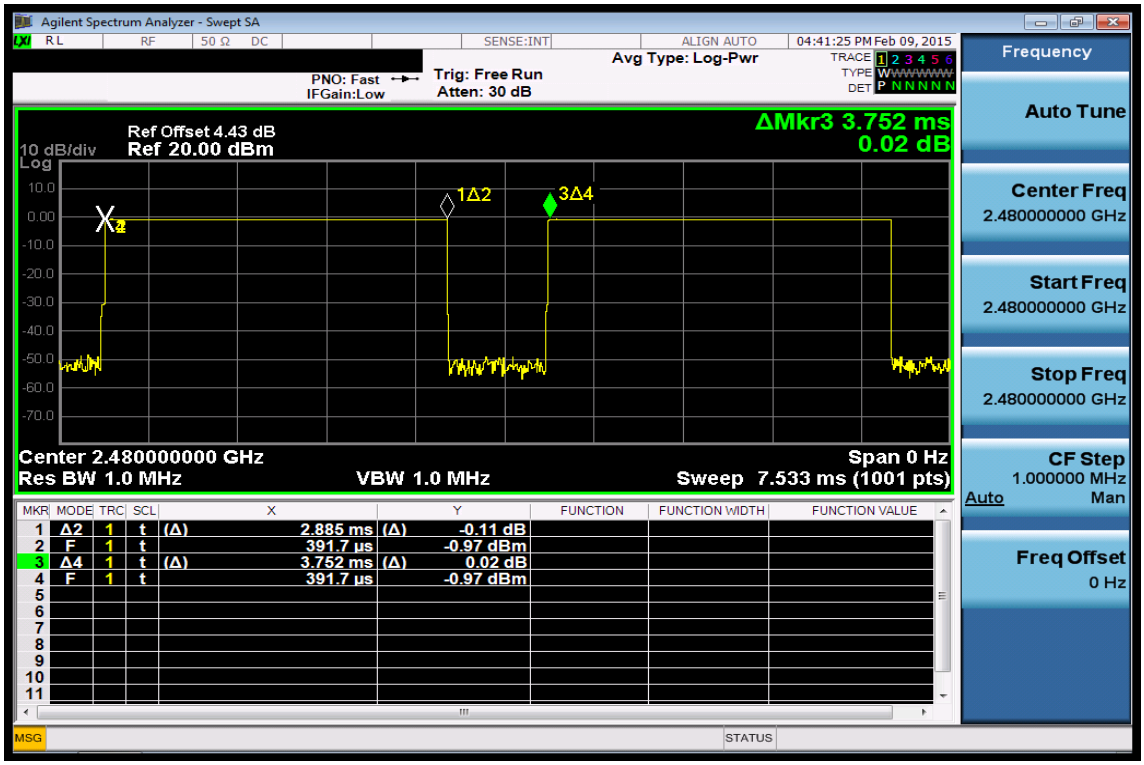
DH1



DH3

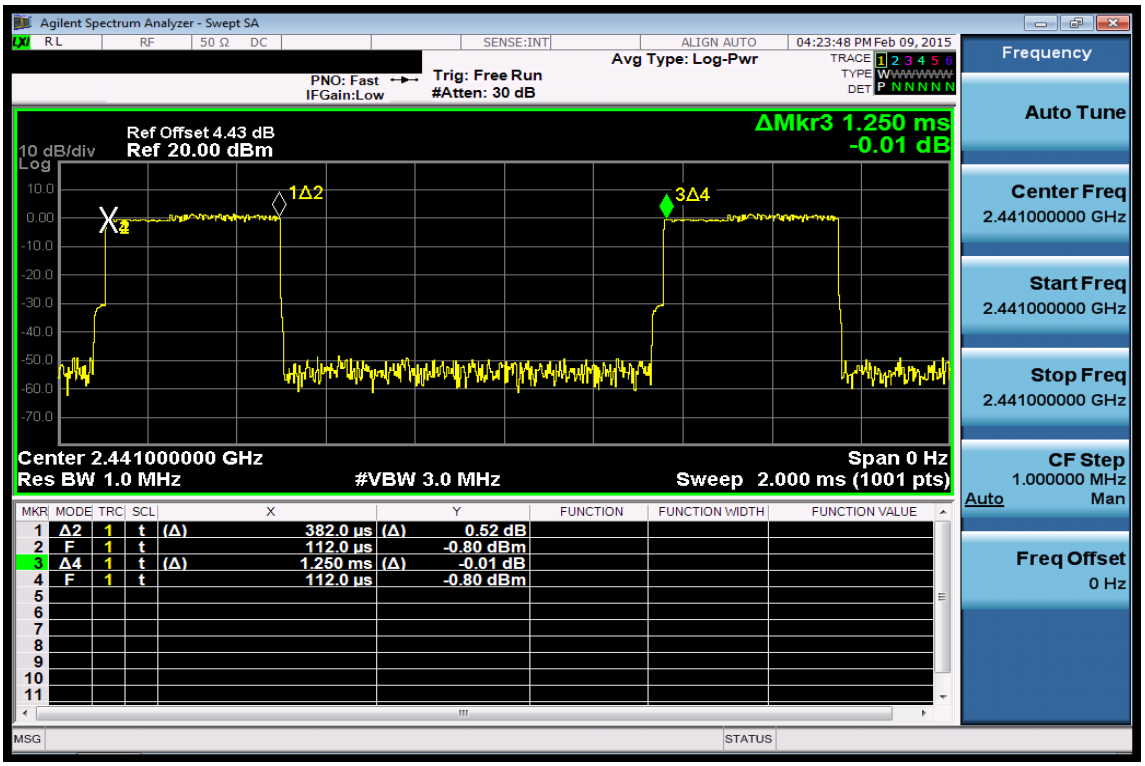


DH5


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
04:41:25 PM Feb 09, 2015
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE WWWWW
DET P N N N N N
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Ref Offset 4.43 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr3 3.752 ms
0.02 dB
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1Δ2
3Δ4
Center 2.480000000 GHz
Res BW 1.0 MHz
VBW 1.0 MHz
Span 0 Hz
Sweep 7.533 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 Δ2 1 t (Δ) 2.885 ms (Δ) -0.11 dB
2 F 1 t 391.7 µs -0.97 dBm
3 Δ4 1 t (Δ) 3.752 ms (Δ) 0.02 dB
4 F 1 t 391.7 µs -0.97 dBm
5
6
7
8
9
10
11
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.480000000 GHz
Stop Freq
2.480000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

CH-Mid

2DH1



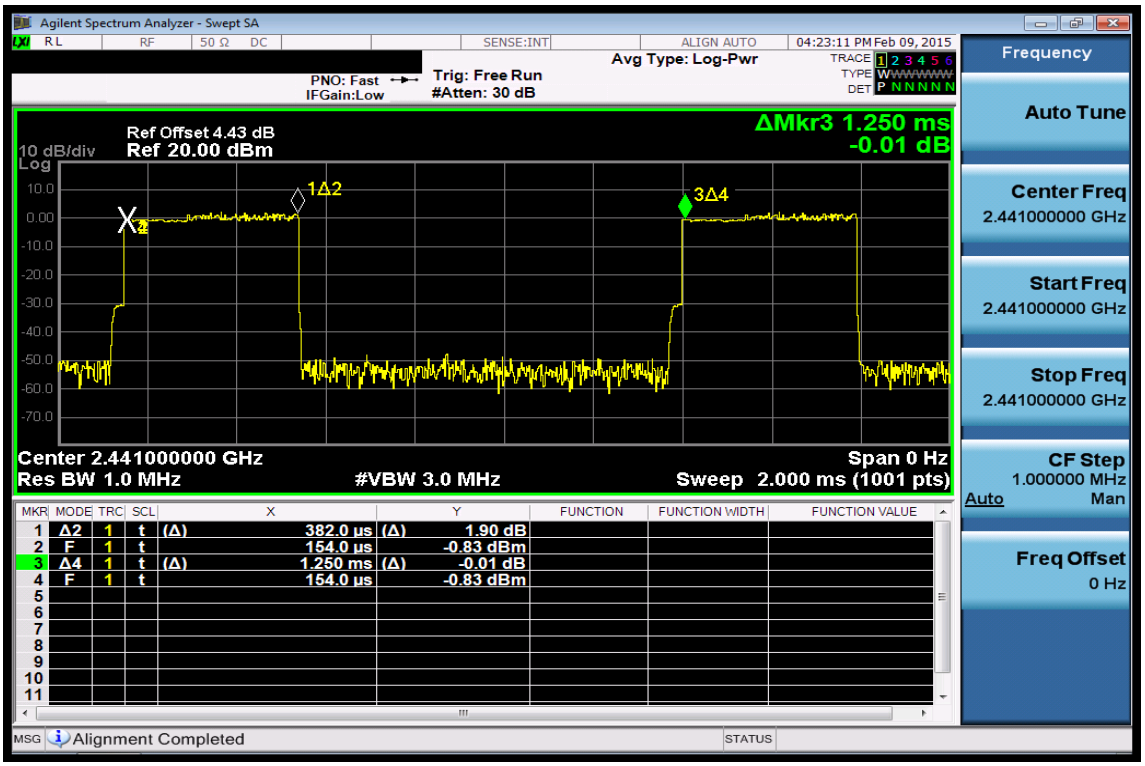
2DH3

2DH5


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
04:39:50 PM Feb 09, 2015
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE W
DET P N N N N N
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Ref Offset 4.43 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr3 3.752 ms
0.04 dB
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1Δ2
3Δ4
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 7.533 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 Δ2 1 t (Δ) 2.885 ms (Δ) 0.69 dB
2 F 1 t 391.7 µs -0.68 dBm
3 Δ4 1 t (Δ) 3.752 ms (Δ) 0.04 dB
4 F 1 t 391.7 µs -0.68 dBm
5
6
7
8
9
10
11
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

CH-Mid

3DH1



3DH3

3DH5


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
04:38:29 PM Feb 09, 2015
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE W
DET P N N N N N
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Ref Offset 4.43 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr3 3.752 ms
0.02 dB
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1Δ2
3Δ4
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 7.533 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 Δ2 1 t (Δ) 2.885 ms (Δ) 1.11 dB
2 F 1 t 685.5 µs -0.66 dBm
3 Δ4 1 t (Δ) 3.752 ms (Δ) 0.02 dB
4 F 1 t 685.5 µs -0.66 dBm
5
6
7
8
9
10
11
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

14. ANTENNA REQUIREMENT

14.1. Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

14.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 0.76 dBi, and the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

~ End of Report ~