

Prüfbericht-Nr.: <i>Test Report No.:</i>	50067849 001	Auftrags-Nr.: <i>Order No.:</i>	154212707	Seite 1 von 60 <i>Page 1 of 60</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	349471	Auftragsdatum: <i>Order date:</i>	09.11.2016	
Auftraggeber: <i>Client:</i>	Jiangsu Toppower Automotive Electronics Co.,Ltd. No.2,Tuolanshan Road,Section Area 4,Jinshanjiao Economic Development Zone,Xuzhou City,Jiangsu Province 22100 P.R.China			
Prüfgegenstand: <i>Test item:</i>	Vehicular audio system			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	K216 FCC ID: 2AFIXTP9186C07			
Auftrags-Inhalt: <i>Order content:</i>	Complete test			
Prüfgrundlage: <i>Test specification:</i>	FCC CFR47 Part 15, Subpart C Section 15.247 ANSI C63.10: 2013 KDB 558074 D01 DTS Meas Guidance v03r05 KDB 447498 D01 General RF Exposure Guidance V06			
Wareneingangsdatum: <i>Date of receipt:</i>	09.19.2016			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000457947-001 A000457947-003			
Prüfzeitraum: <i>Testing period:</i>	12.11.2016 to 12.13.2016			
Ort der Prüfung: <i>Place of testing:</i>	MRT Technology(Suzhou) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
01.04.2017 Shi Li/Section Manager <i>shi li</i>		01.04.2017 Elliot zhang/Senior Project Engineer <i>Elliot zhang</i>		
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>
Sonstiges / Other				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>				
Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>				
* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend
	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	5 = mangelhaft
Legend:	1 = very good	2 = good	3 = satisfactory	4 = sufficient
	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	5 = poor
				N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 PEAK OUTPUT POWER

RESULT: Pass

5.1.3 20dB BANDWIDTH

RESULT: Pass

5.1.4 CONDUCTED SPURIOUS EMISSIONS

RESULT: Pass

5.1.5 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.6 FREQUENCY SEPARATION

RESULT: Pass

5.1.7 NUMBER OF HOPPING FREQUENCY

RESULT: Pass

5.1.8 TIME OF OCCUPANCY

RESULT: Pass

Contents

1.	GENERAL REMARKS	4
1.1	COMPLEMENTARY MATERIALS	4
2.	TEST SITES	4
2.1	TEST FACILITIES	4
2.2	LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	5
2.3	TRACEABILITY	6
2.4	CALIBRATION	6
2.5	MEASUREMENT UNCERTAINTY.....	6
3.	GENERAL PRODUCT INFORMATION	7
3.1	PRODUCT FUNCTION AND INTENDED USE	7
3.2	INDEPENDENT OPERATION MODES	7
3.3	NOISE GENERATING AND NOISE SUPPRESSING PARTS	7
3.4	SUBMITTED DOCUMENTS	8
4.	TEST SET-UP AND OPERATION MODES	8
4.1	PRINCIPLE OF CONFIGURATION SELECTION.....	8
4.2	TEST OPERATION AND TEST SOFTWARE	8
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	8
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	8
5.	TEST RESULTS	9
5.1	TRANSMITTER REQUIREMENT & TEST SUITES	9
5.1.1	<i>Antenna Requirement</i>	<i>9</i>
5.1.2	<i>Peak Output Power</i>	<i>10</i>
5.1.3	<i>20dB Bandwidth</i>	<i>11</i>
5.1.4	<i>Conducted Spurious Emissions</i>	<i>17</i>
5.1.5	<i>Radiated Spurious Emission</i>	<i>29</i>
5.1.6	<i>Frequency Separation</i>	<i>44</i>
5.1.7	<i>Number of Hopping Frequency</i>	<i>49</i>
5.1.8	<i>Time of Occupancy</i>	<i>56</i>
6.	LIST OF TABLES	59
7.	LIST OF FIGURES	59

1. General Remarks

1.1 Complementary Materials

None.

2. Test Sites

2.1 Test Facilities

MRT Technology (Suzhou) Co., Ltd.

D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

The used test equipment is in accordance with CISPR 16 for measurement of radio interference.

The Federal Communications Commission has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance with the requirements of section 2.948 of the FCC rules. The description of the test facility is listed under FCC registration number 809388.

The Industry Canada has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance. The description of the test facility is listed under chambers filing number 11384A.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Conducted Emissions-SR2

No.	Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
1	EMI Test Receiver	R&S	ESR7	102030	1 year	05.08.2017
2	Two-Line V-Network	R&S	ENV216	101683	1 year	06.21.2017
3	Two-Line V-Network	R&S	ENV216	101684	1 year	06.21.2017
4	Temperature/Humidity Meter	Yuhuaze	HTC-2	N/A	1 year	12.20.2017
5	Shielding Anechoic Chamber	MIX-BEP	Chamber-SR2	N/A	1 year	05.10.2017

Radiated Spurious Emission and Radiated Restricted Band Edge - AC1

No.	Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
1	Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	05.07.2017
2	Microwave System Amplifier	Agilent	83017A	MY53270040	1 year	03.28.2017
3	Preamplifier	Schwarzbeck	BBV 9721	9721-008	1 year	04.16.2017
4	Loop Antenna	Schwarzbeck	FMZB1519	100982	1 year	12.21.2017
5	Bilog Period Antenna	Schwarzbeck	VULB 9168	662	1 year	11.19.2017
6	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	1 year	10.22.2017
7	Broadband Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170549	1 year	01.05.2017
8	Temperature/Humidity Meter	Yuhuaze	HTC-2	N/A	1 year	12.20.2017
9	Anechoic Chamber	TDK	Chamber-AC1	N/A	1 year	05.10.2017

Conducted Test Equipment - TR3

No.	Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
1	Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
2	USB wideband power sensor	Boonton	55006	8911	1 year	2017/05/08
3	Temperature/Humidity Meter	Yuhuaize	HTC-2	N/A	1 year	2017/12/20

2.3 Traceability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

Table 2: Measurement Uncertainty

Measurement Type	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	±0.39dB
	> 1GHz	±0.68dB
Radiated Emission	30MHz - 1GHz	±5.34dB
	> 1GHz	±5.40dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT (Equipment Under Test) is a Vehicular audio system with bluetooth V3.0 function.

For details refer to the User Manual and Circuit Diagram.

Ratings and System Details:

Kind of Equipment	:	Vehicular audio system
Type Designation	:	K216
Operating Frequency band	:	2402 – 2480MHz
Modulation	:	GFSK; $\pi/4$ -DQPSK ;8DPSK
Antenna	:	PCB Trace antenna 0dbi Gain
Test Voltage	:	DC 12V

3.2 Independent Operation Modes

The basic operation modes are:

- A. On
 - 1. Bluetooth mode (BDR & EDR mode)
 - a. Transmitting
 - i. Low Channel
 - ii. Middle Channel
 - iii. High Channel
 - b. Receiving
- B. Standby
- C. Off

3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.4 Submitted Documents

- Bill of Material
- PCB Layout
- Photo Document
- Circuit Diagram
- Instruction Manual
- Rating Label

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

Software used for testing: "Blue Test3.exe"

4.3 Special Accessories and Auxiliary Equipment

Null.

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Pass**

According to the manufacturer declared, the EUT has one PCB Trace antenna, the directional gain of antenna is 0dBi and the PCB antenna is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Table 3: Antenna Requirement

FCC 15.203 – Antenna Requirement 1		
Requirement:	No antenna other than that furnished by the responsible party shall be used with the device.	
Results:	Antenna type:	PCB Trace Antenna
Verdict:	PASS	

FCC 15.204 – Antenna Requirement 2		
Requirement:	An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.	
Results:	Only one internal antenna can be used	
Verdict:	PASS	

Prüfbericht - Nr.: 50067849 001
Test Report No.
Seite 10 von 60
Page 10 of 60

5.1.2 Peak Output Power

RESULT:
Pass

Test date : 12.11.2016
 Test standard : FCC 15.247(b)(1)
 Basic standard : ANSI C63.10: 2013
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A.1.a
 Ambient temperature : 25°C
 Relative humidity : 54%
 Atmospheric pressure : 101kPa

Table 4: Peak Output Power

Mode	Freq. (MHz)	Antenna Gain(dbi)	Maximum Peak Conducted Output Power (dBm)	Limit (dBm)
DH5	2402	0	2.699	30
DH5	2441	0	2.765	30
DH5	2480	0	3.216	30
2DH5	2402	0	1.574	30
2DH5	2441	0	1.500	30
2DH5	2480	0	1.941	30
3DH5	2402	0	1.850	30
3DH5	2441	0	1.795	30
3DH5	2480	0	2.253	30

Note: E.I.R.P= Maximum Peak Conducted Output Power + Antenna Gain

5.1.3 20dB Bandwidth

RESULT:
Pass

Date of testing : 12.11.2016
 Test standard : FCC 15.247(a)(1)
 Basic standard : ANSI C63.10: 2013
 Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High
 Operation Mode : A.1.a
 Ambient temperature : 25°C
 Relative humidity : 54%
 Atmospheric pressure : 101kPa

Table 5: 20dB Bandwidth

Mode	Freq. (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
DH5	2402	924.1	854.44
DH5	2441	923.7	857.73
DH5	2480	923.1	867.79
2DH5	2402	1275.0	1185.5
2DH5	2441	1251.0	1186.2
2DH5	2480	1284.0	1188.5
3DH5	2402	1246.0	1179.5
3DH5	2441	1268.0	1186.8
3DH5	2480	1262.0	1193.5

Note: For frequency hopping systems operating in the 2400-2483.5MHz band, no bandwidth limit is specified. Test data is provided for reference. And according to FCC, when the occupied bandwidth limit is not stated in the applicable FCC or reference measurement method, the transmitted signal band width shall be reported as the 99% emission bandwidth.

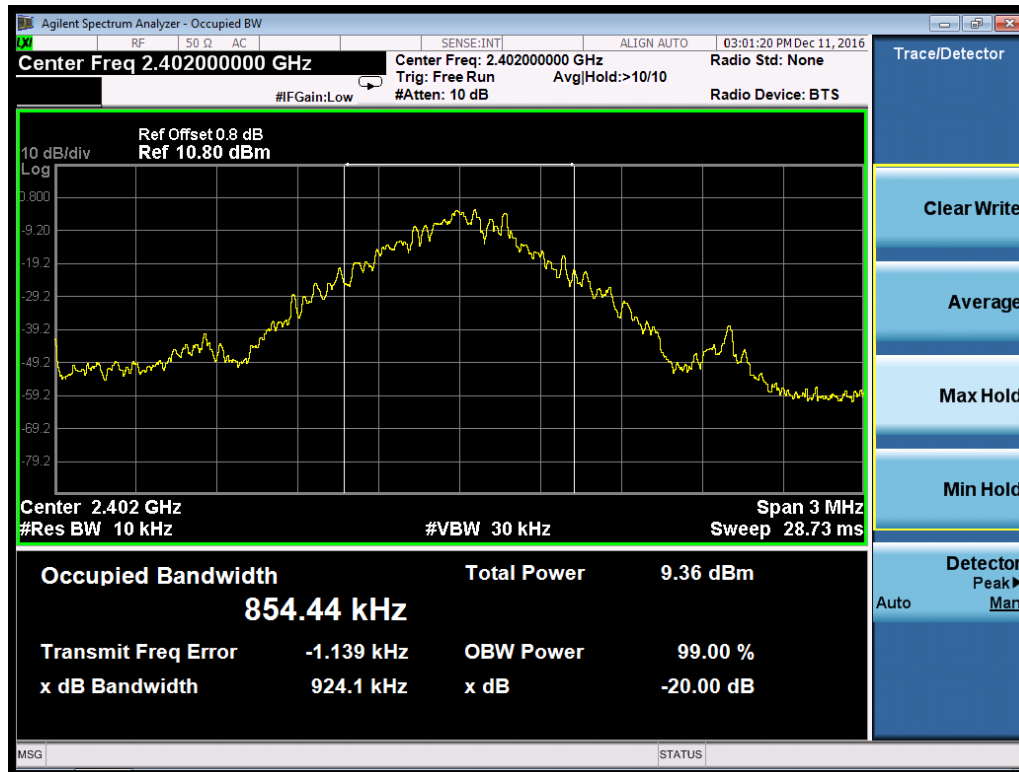
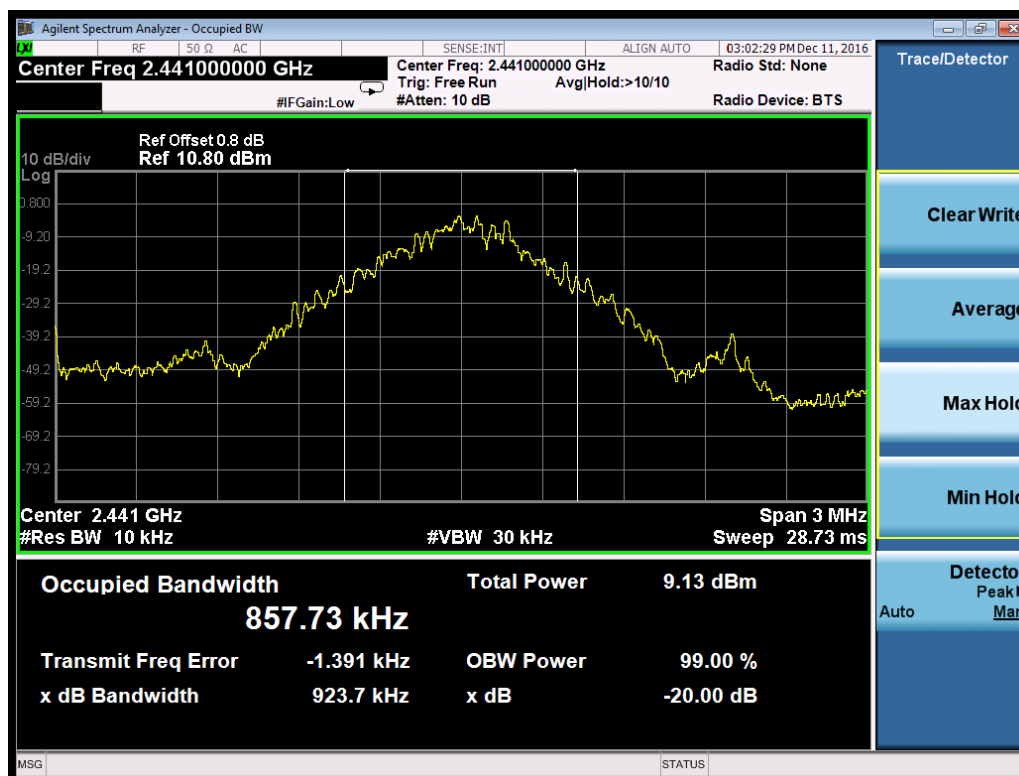
Figure 1: 20dB Bandwidth, DH5, 2402MHz

Figure 2: 20dB Bandwidth, DH5, 2441MHz


Figure 3: 20dB Bandwidth, DH5, 2480MHz

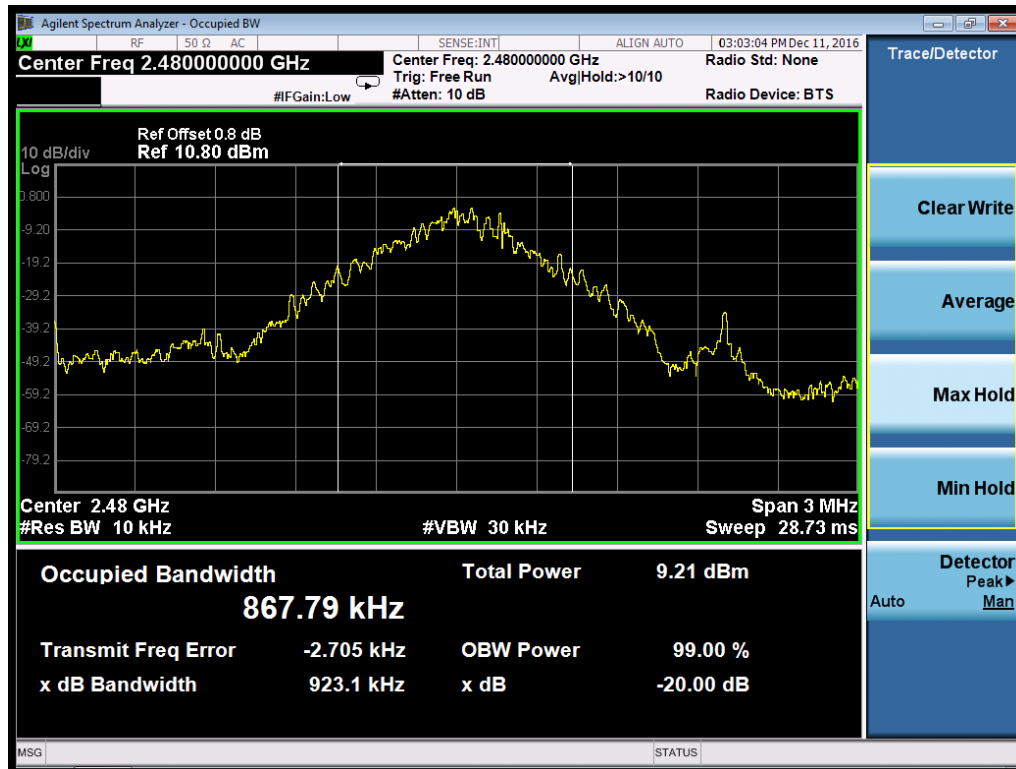


Figure 4: 20dB Bandwidth, 2-DH5, 2402MHz

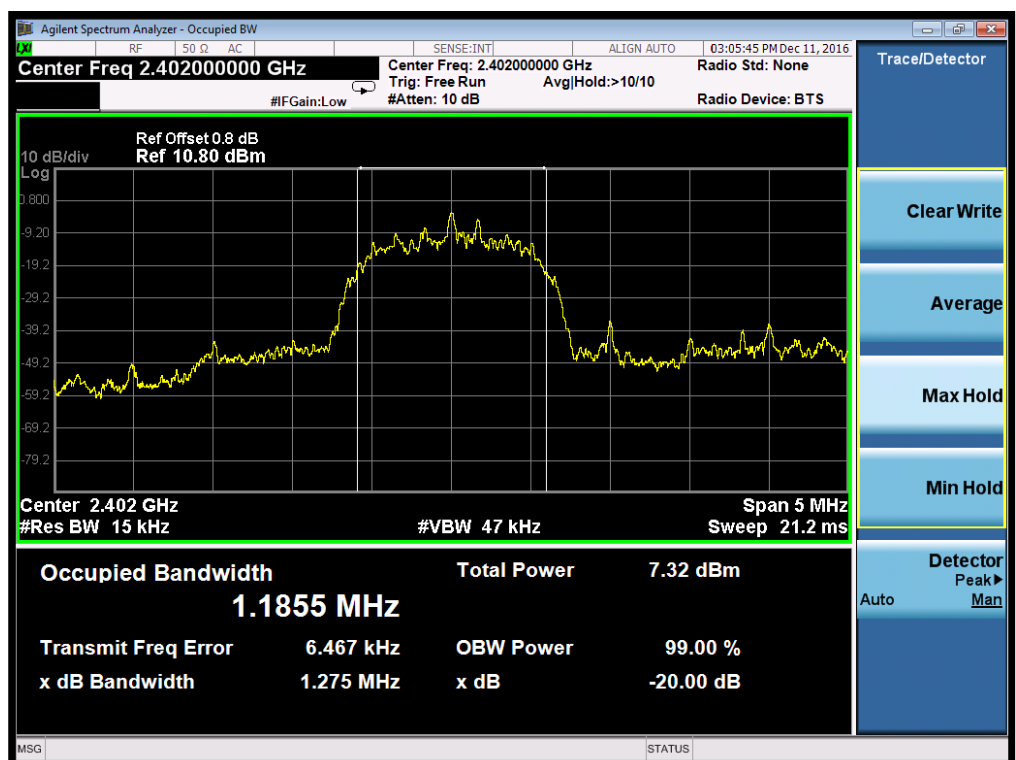


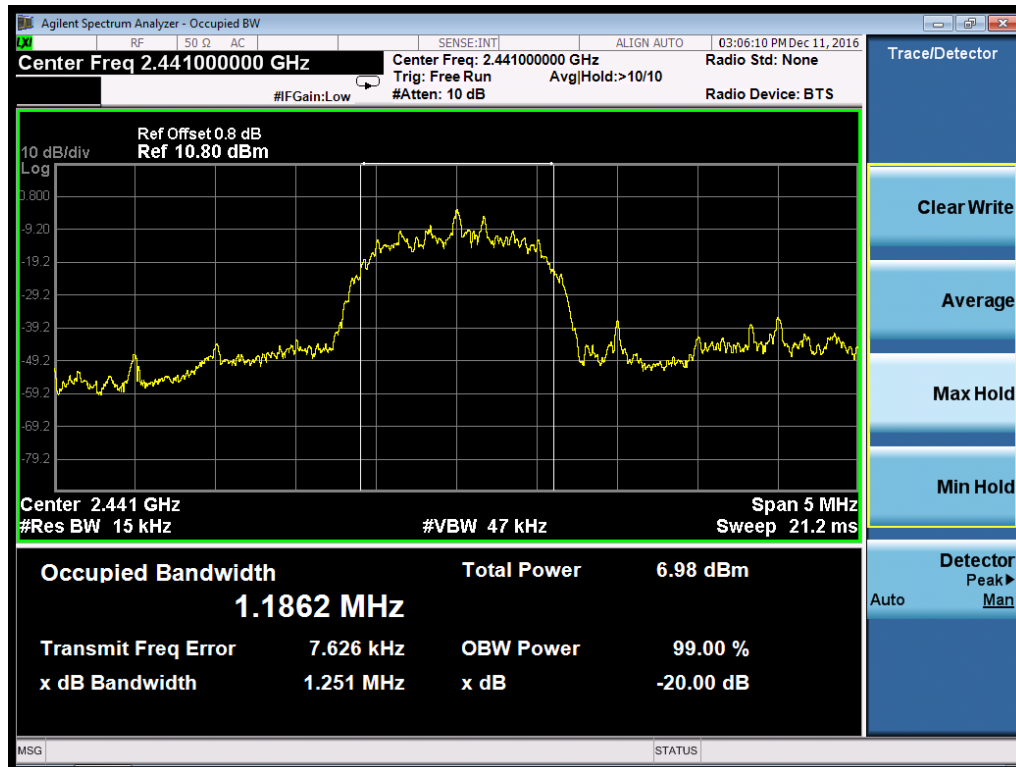
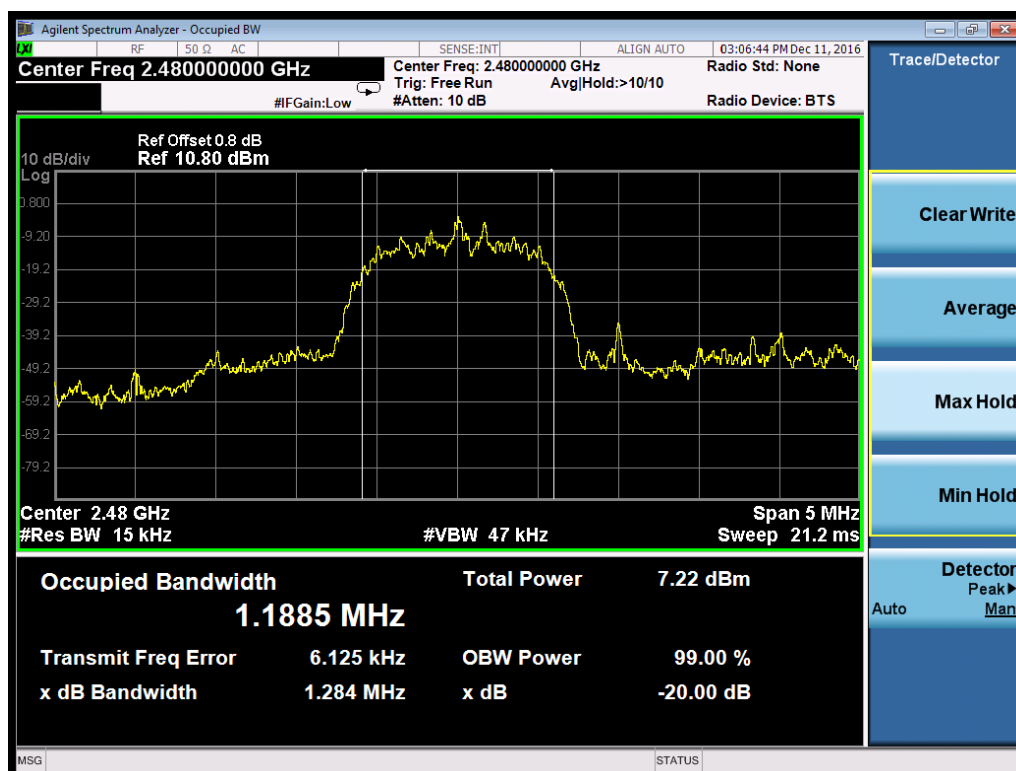
Figure 5: 20dB Bandwidth, 2-DH5, 2441MHz

Figure 6: 20dB Bandwidth, 2-DH5, 2480MHz


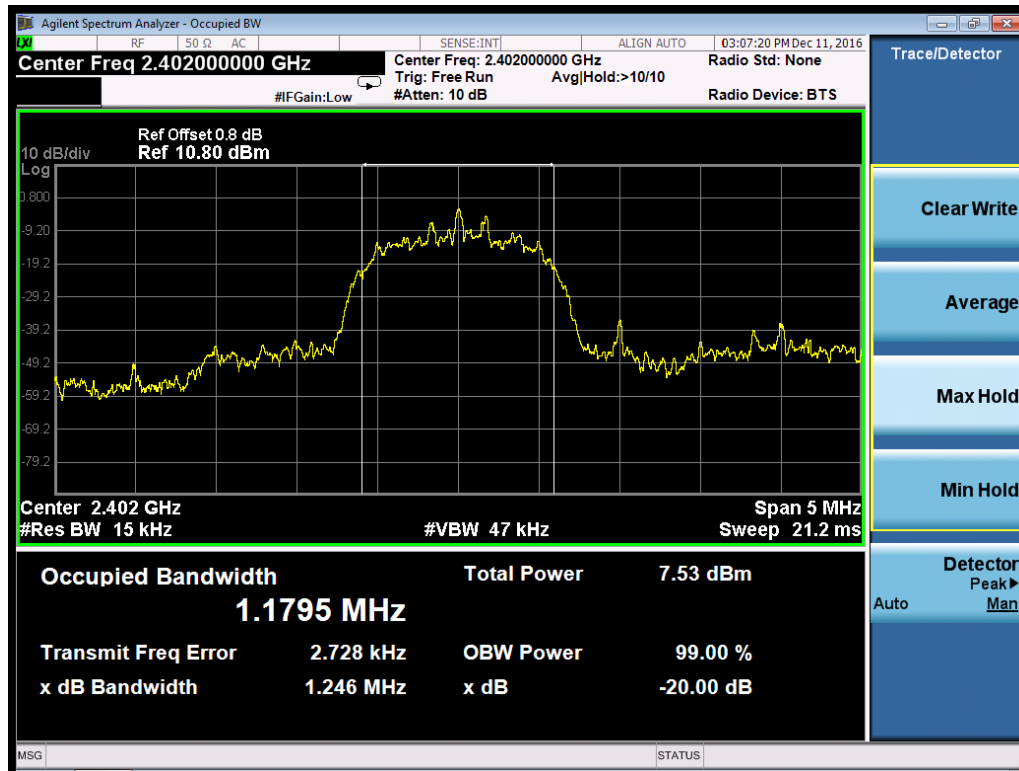
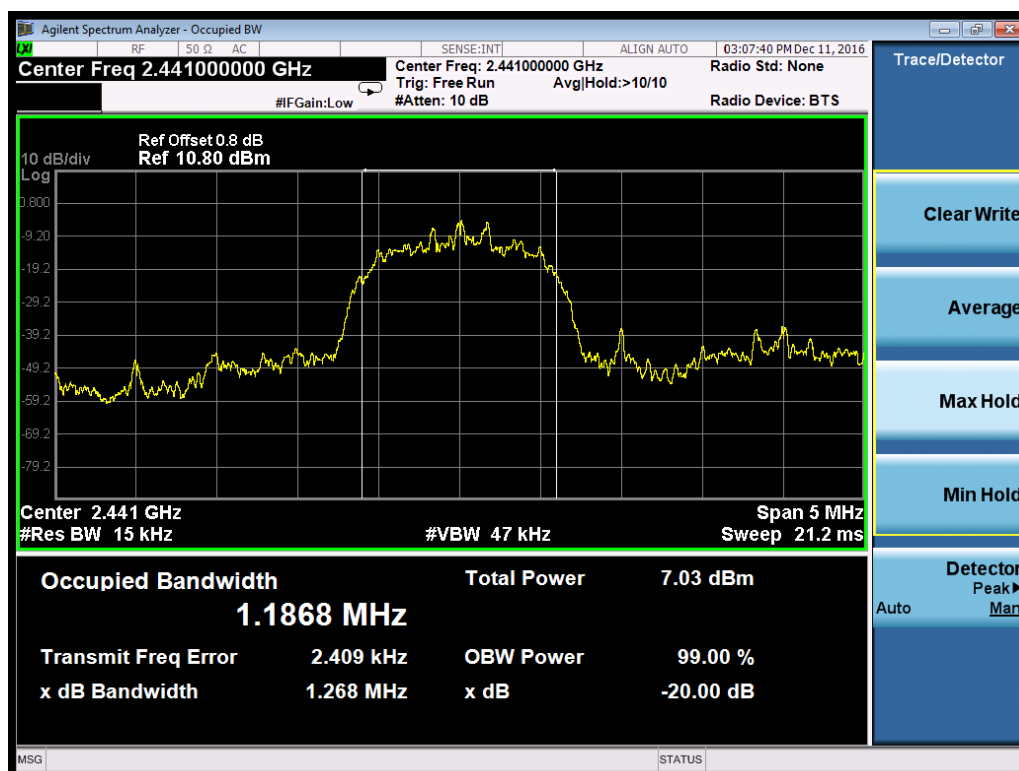
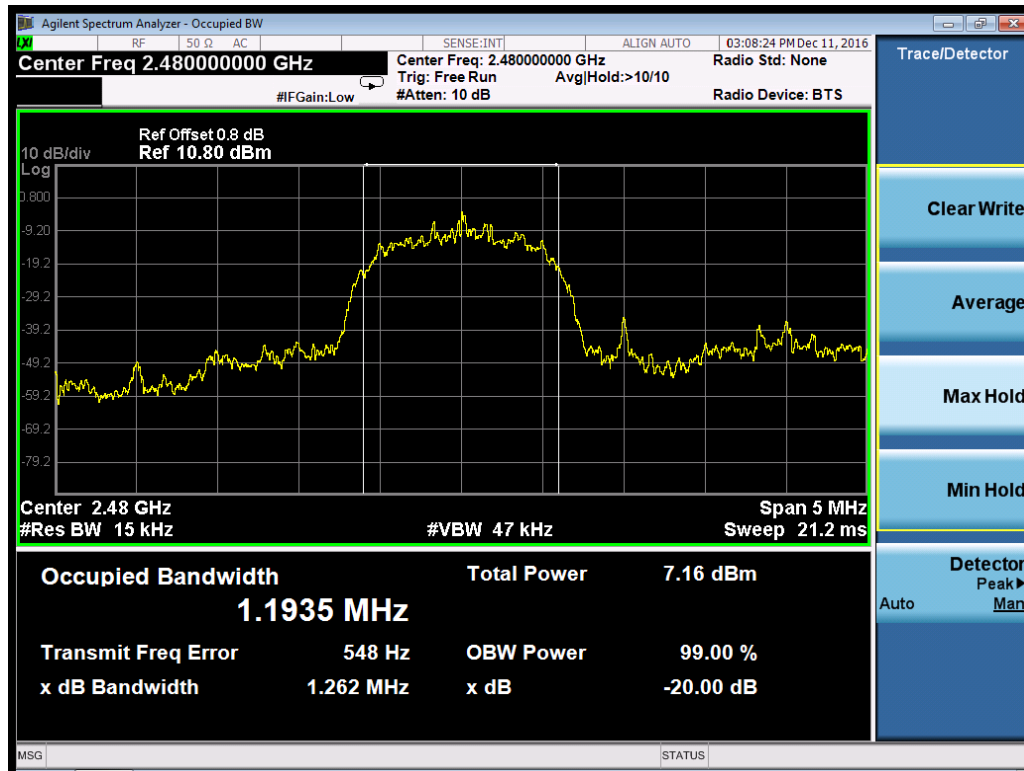
Figure 7: 20dB Bandwidth, 3-DH5, 2402MHz

Figure 8: 20dB Bandwidth, 3-DH5, 2441MHz


Figure 9: 20dB Bandwidth, 3-DH5, 2480MHz


Prüfbericht - Nr.: 50067849 001*Test Report No.***Seite 17 von 60***Page 17 of 60***5.1.4 Conducted Spurious Emissions****RESULT:****Pass**

Date of testing : 12.11.2016
Test standard : FCC 15.247(d)
Basic standard : ANSI C63.10: 2013
Kind of test site : Shield room

Test setup

Test Channel : Low/ Middle/ High
Operation mode : A.1.a
Ambient temperature : 25°C
Relative humidity : 54%
Atmospheric pressure : 101kPa

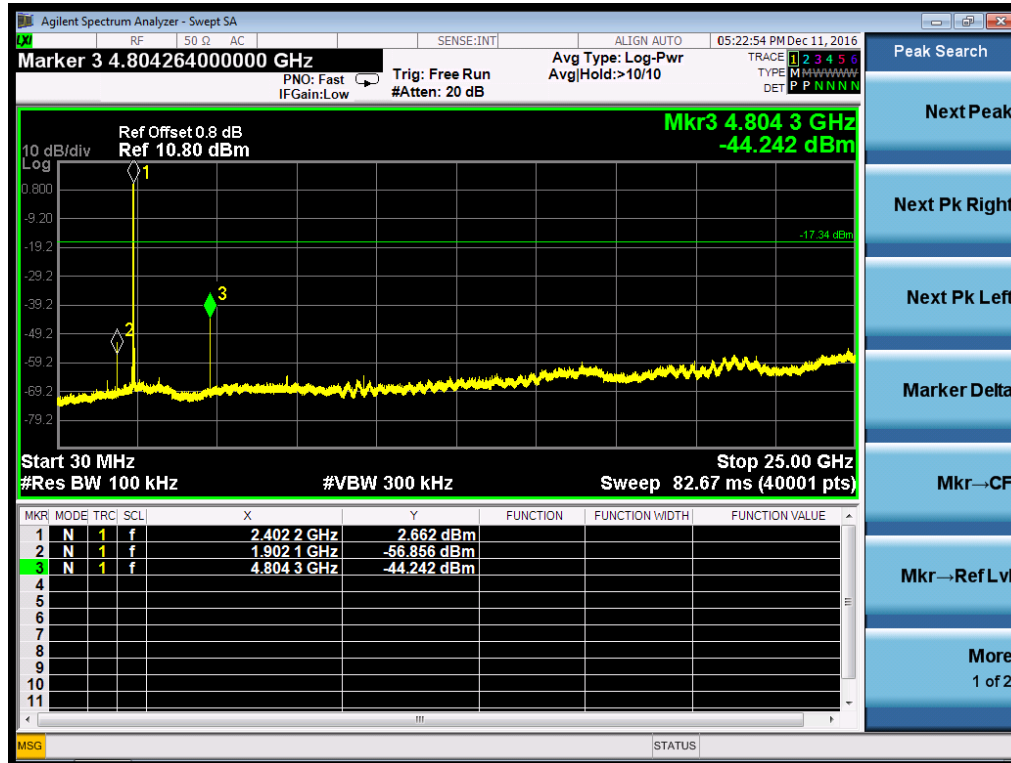
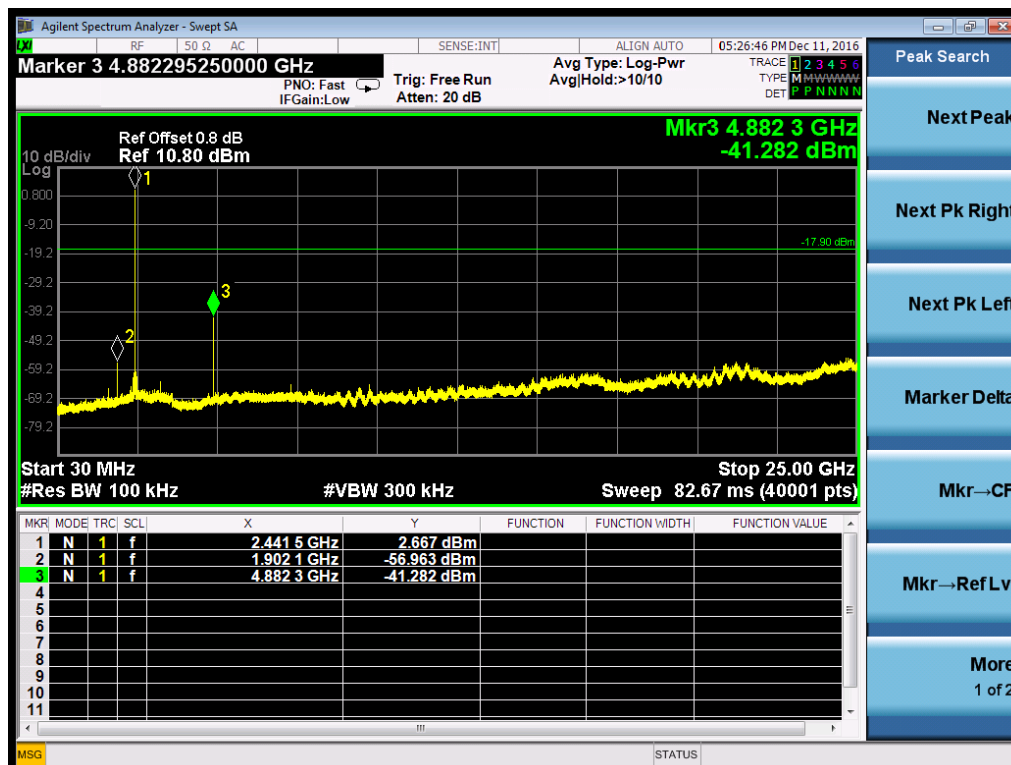
Figure 10: Conducted Spurious Emission, DH5, 2402MHz

Figure 11: Conducted Spurious Emission, DH5, 2441MHz


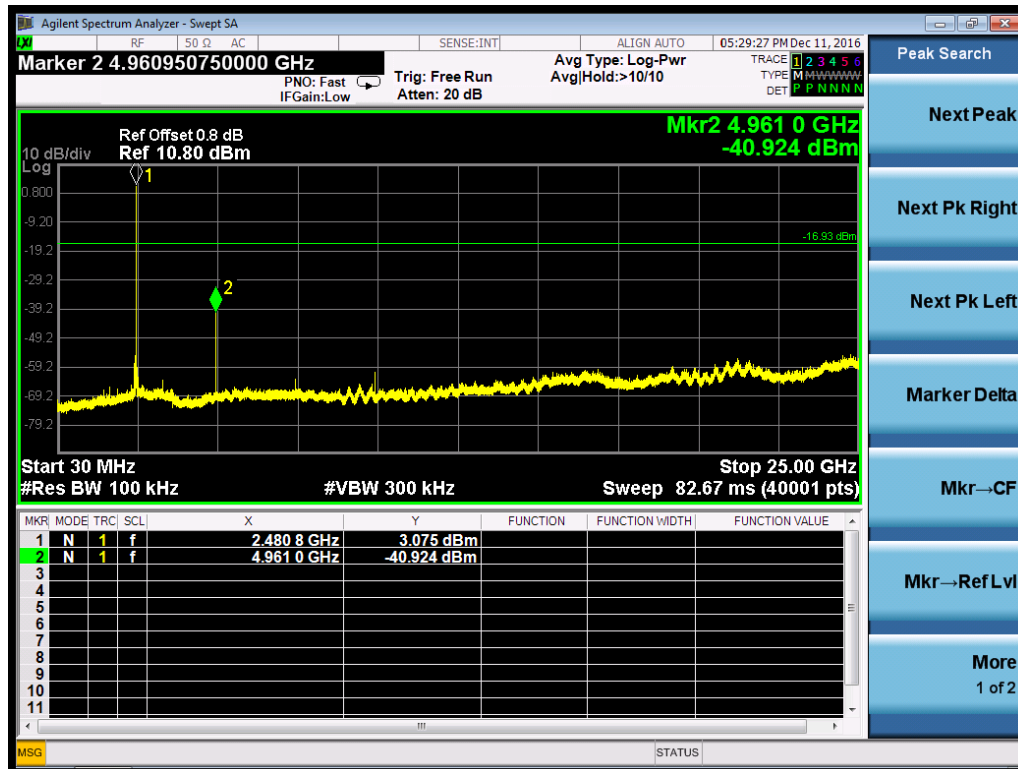
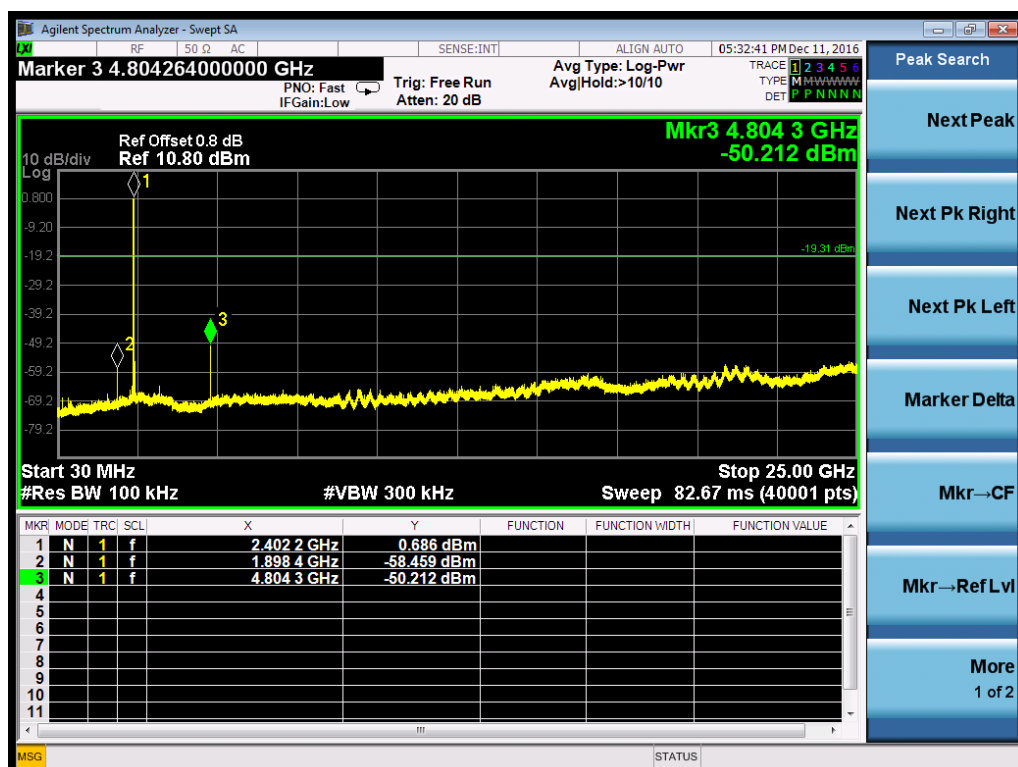
Figure 12: Conducted Spurious Emission, DH5, 2480MHz

Figure 13: Conducted Spurious Emission, 2-DH5, 2402MHz


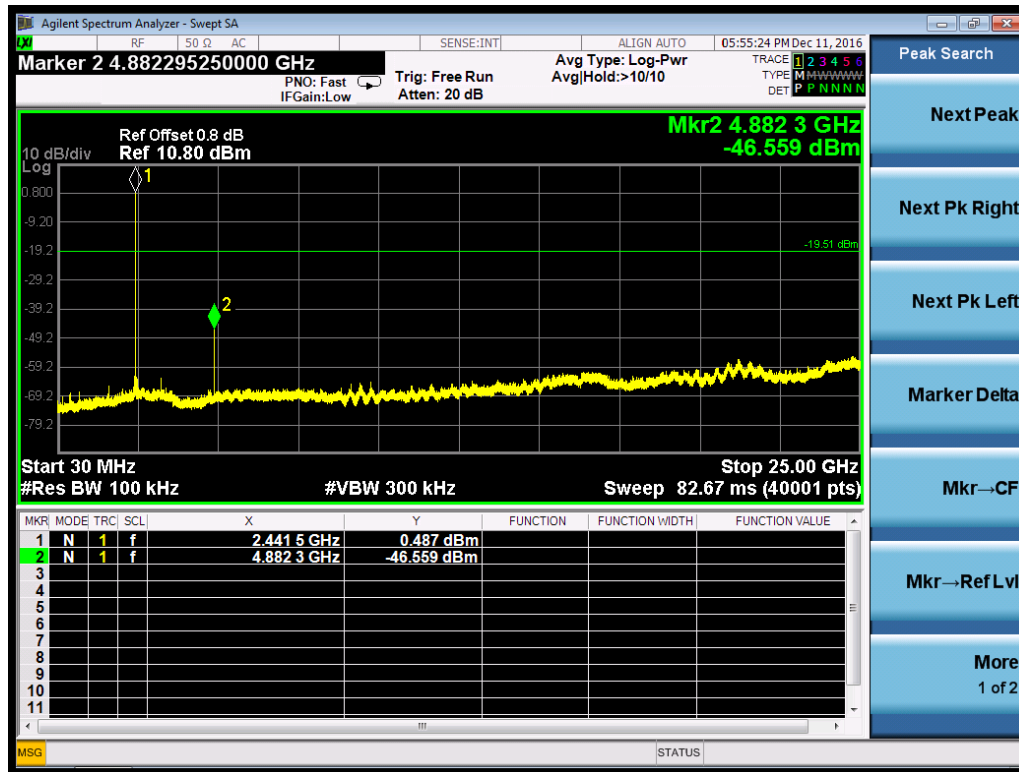
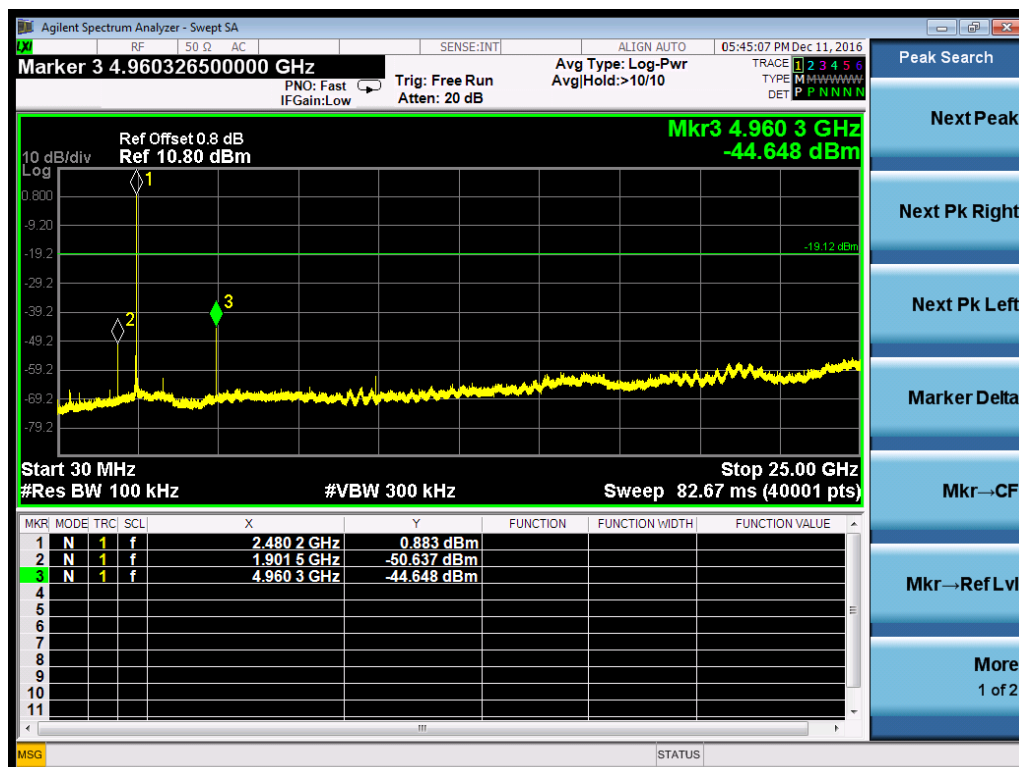
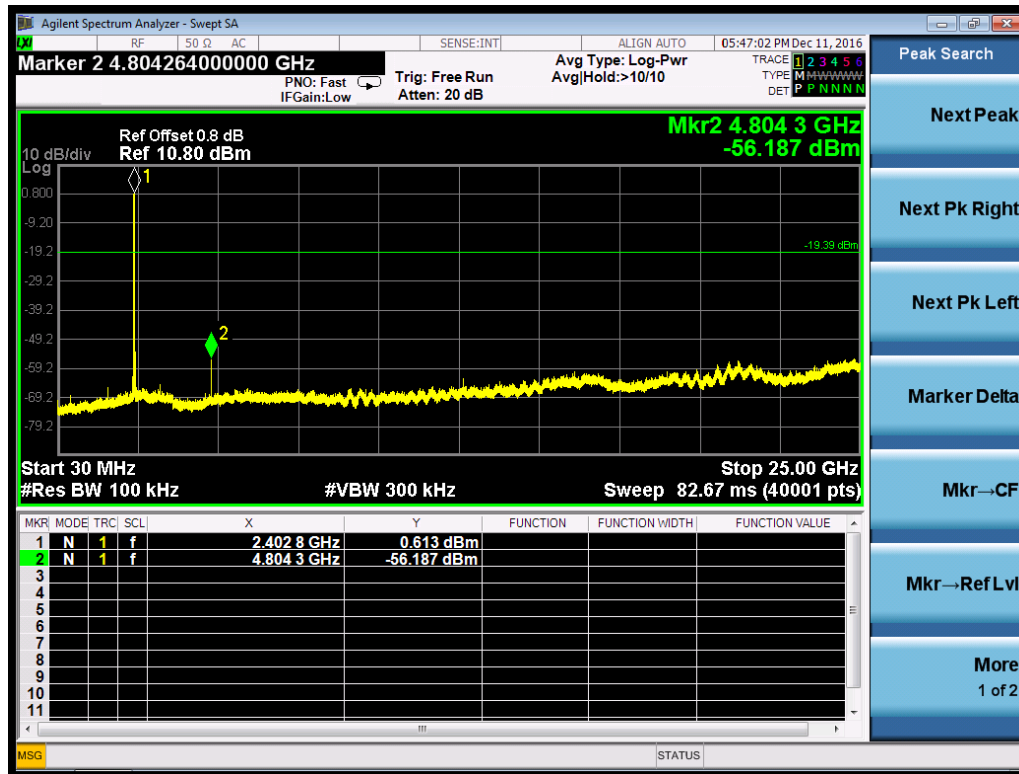
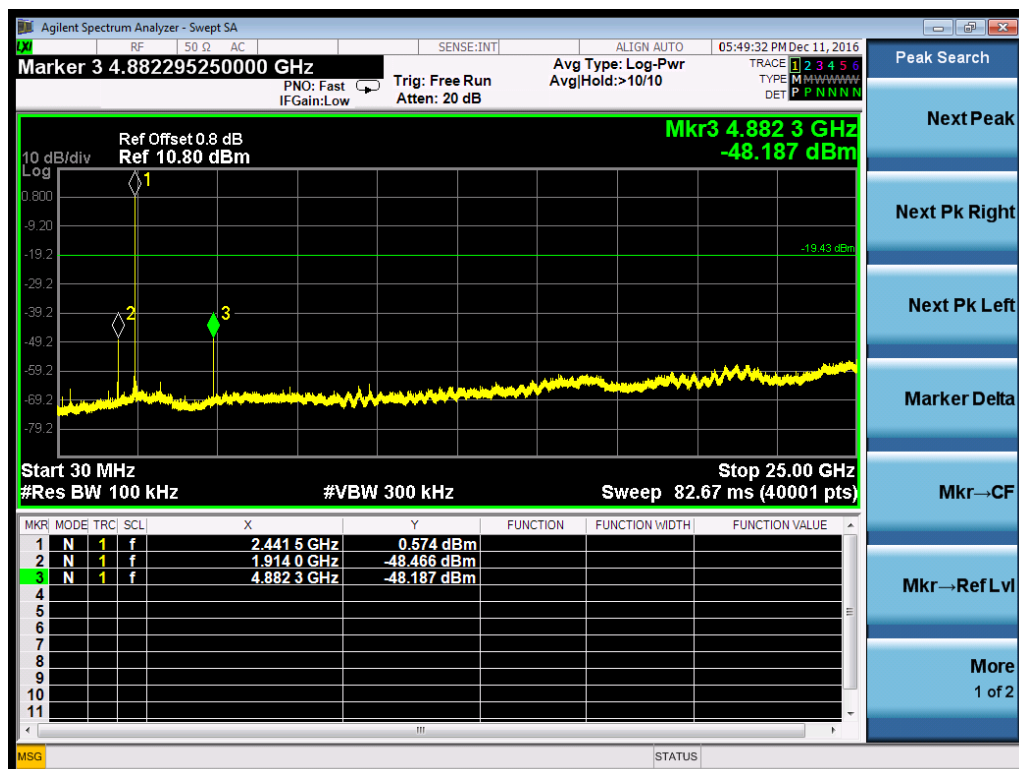
Figure 14: Conducted Spurious Emission, 2-DH5, 2441MHz

Figure 15: Conducted Spurious Emission, 2-DH5, 2480MHz


Figure 16: Conducted Spurious Emission, 3-DH5, 2402MHz

Figure 17: Conducted Spurious Emission, 3-DH5, 2441MHz


[illegible]

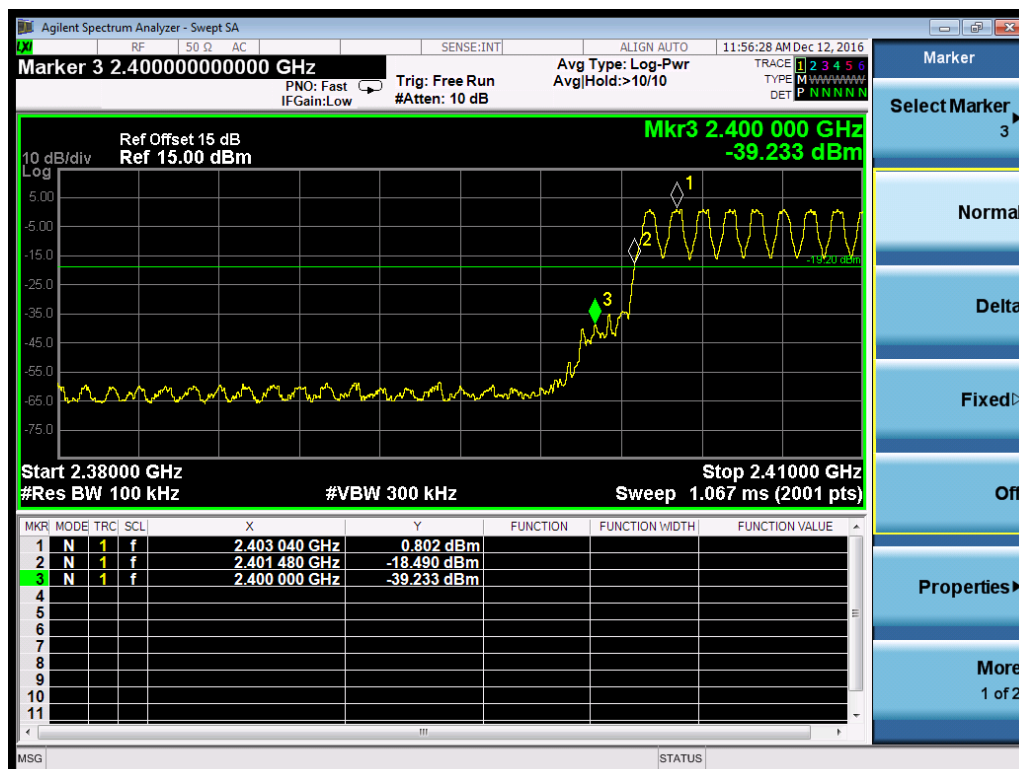
Figure 19: Band Edge, DH5, 2402MHz


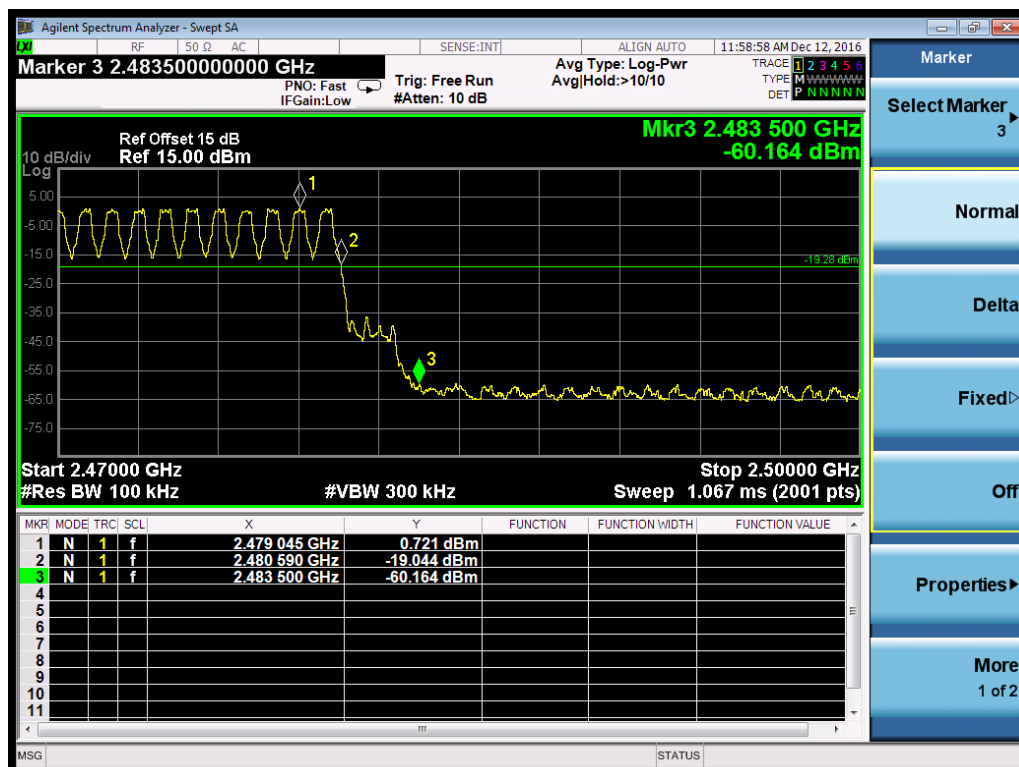
Figure 20: Band Edge, DH5, 2480MHz


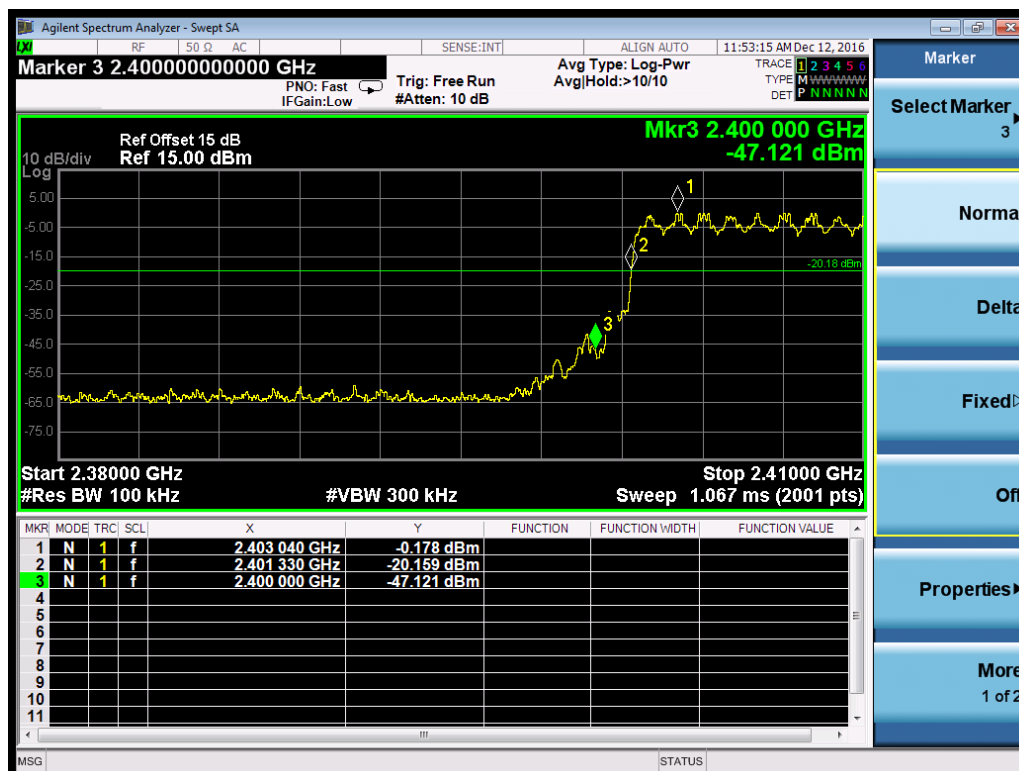
Figure 21: Band Edge, 2-DH5, 2402MHz


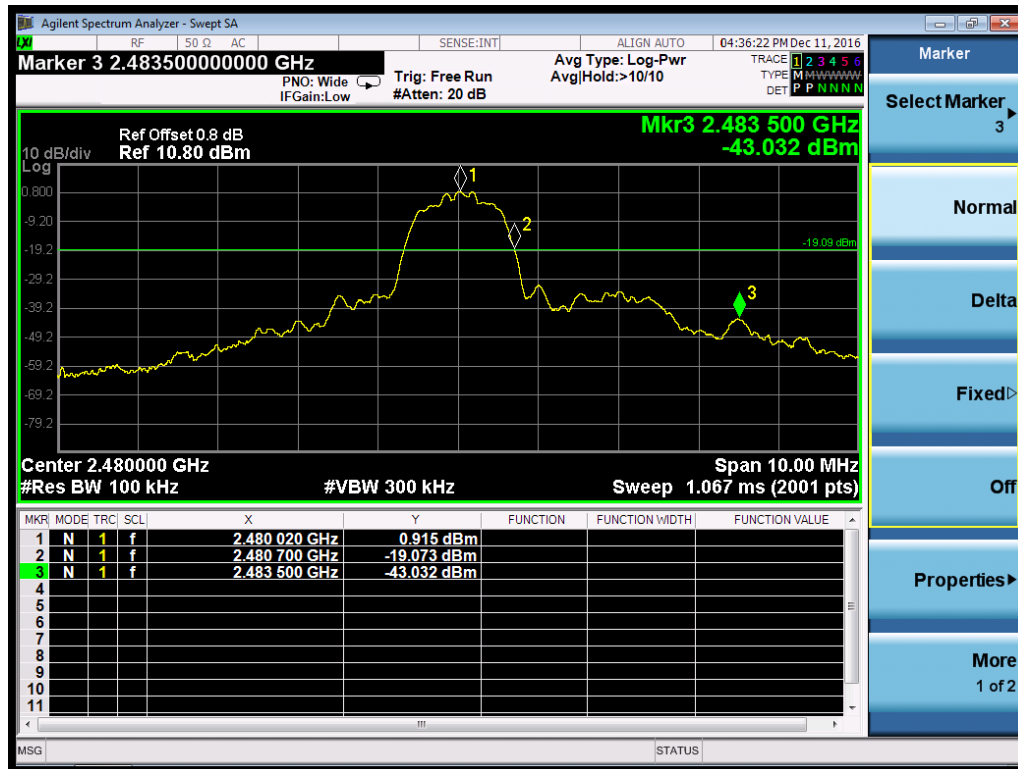
Figure 22: Band Edge, 2-DH5, 2480MHz


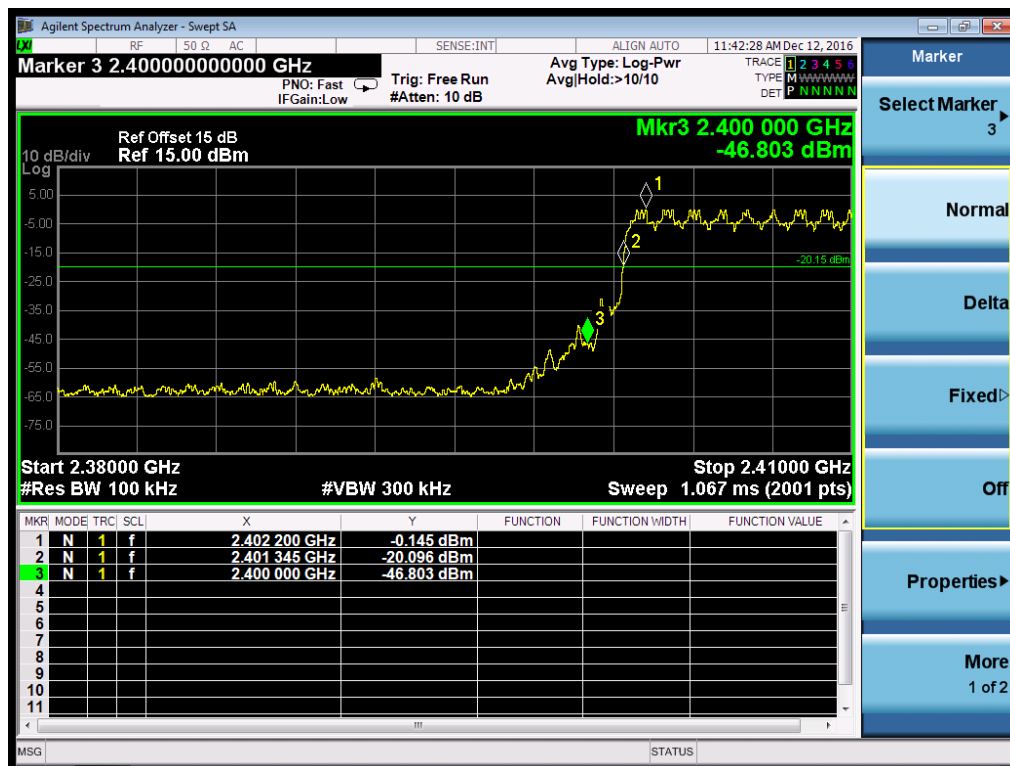
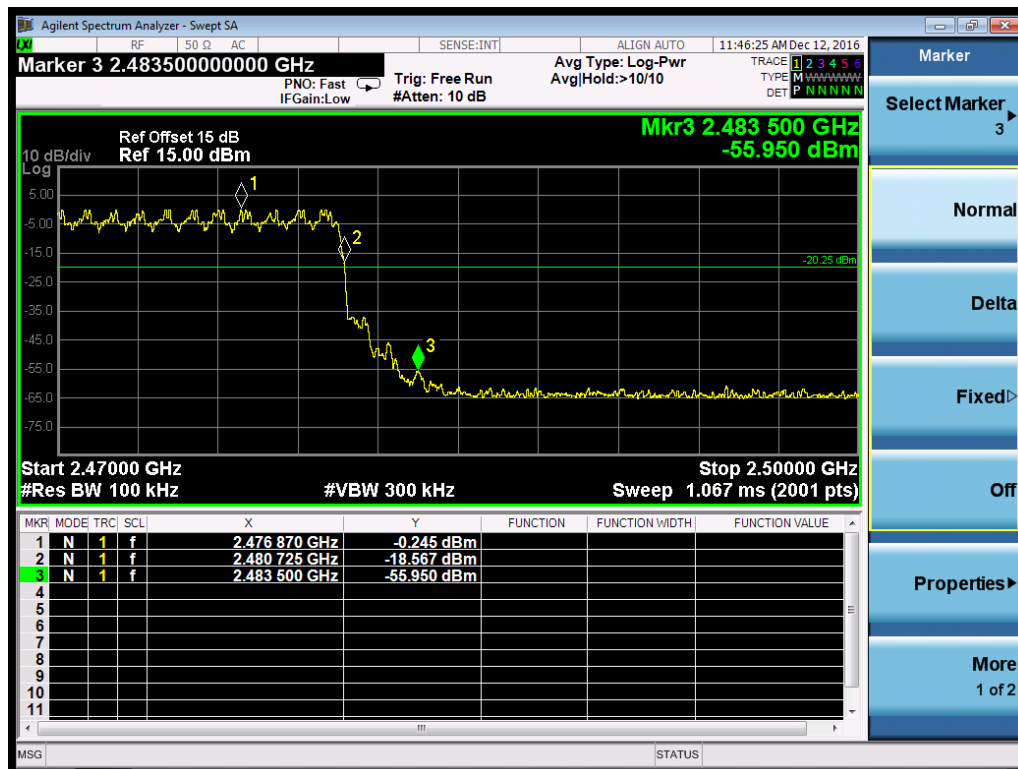
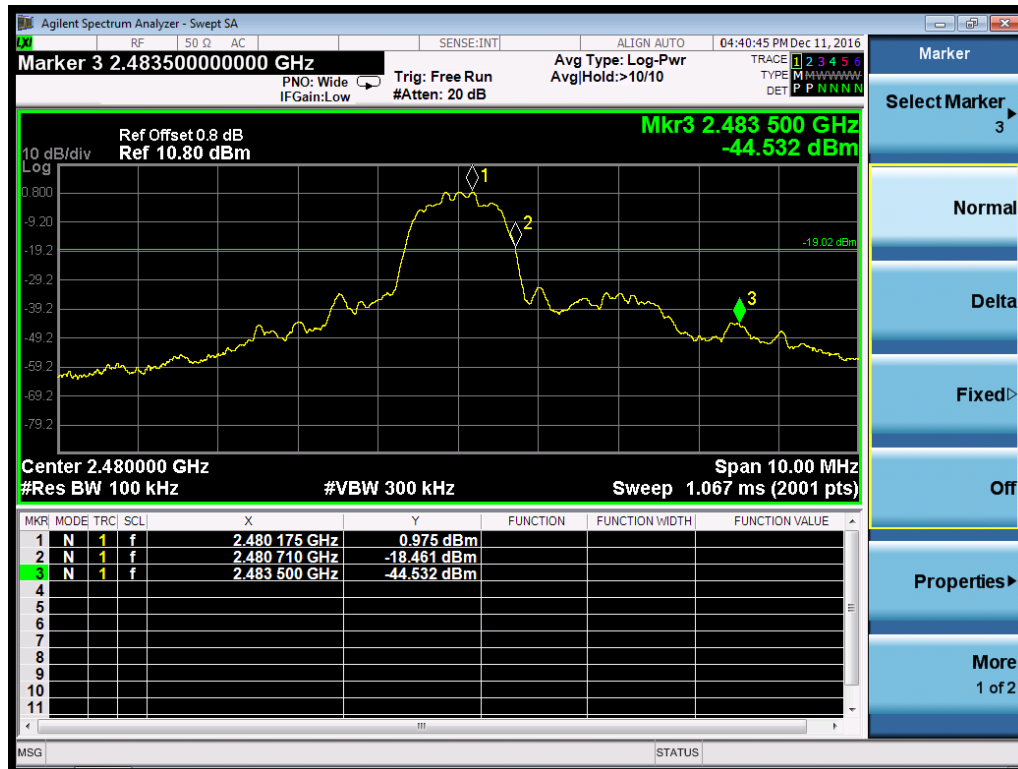
Figure 23: Band Edge, 3-DH5, 2402MHz


Figure 24: Band Edge, 3-DH5, 2480MHz


5.1.5 Radiated Spurious Emission

RESULT:
Pass

Date of testing : 12.13.2016
 Test standard : FCC 15.247(d)
 Basic standard : ANSI C63.10: 2013
 Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Test Channel : Low/ Middle/ High
 Operation mode : A.1
 Ambient temperature : 25°C
 Relative humidity : 54%
 Atmospheric pressure : 101kPa

Table 6: Spurious Emission

DH5

Channel	Freq. (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type	Ant. Pol.
Low	4804.070	45.286	42.590	-8.714	54.000	2.696	AV	H
	4808.000	57.266	54.572	-16.734	74.000	2.694	PK	
	7851.000	44.640	36.230	-29.360	74.000	8.410	PK	
	8650.000	46.127	37.338	-27.873	74.000	8.789	PK	
	10205.500	47.024	35.241	-26.976	74.000	11.783	PK	
	4799.500	54.406	51.708	-19.594	74.000	2.698	PK	V
	4804.030	49.996	47.300	-4.004	54.000	2.696	AV	
	7315.500	44.405	36.388	-29.595	74.000	8.018	PK	
	8590.500	45.827	37.143	-28.173	74.000	8.685	PK	
	10027.000	46.693	35.214	-27.307	74.000	11.479	PK	
Middle	4882.090	48.562	45.880	-5.438	54.000	2.681	AV	H
	4884.500	58.848	56.163	-15.152	74.000	2.684	PK	
	7315.500	44.405	36.388	-29.595	74.000	8.018	PK	
	8650.000	45.217	36.428	-28.783	74.000	8.789	PK	
	10392.500	47.325	35.002	-26.675	74.000	12.323	PK	
	4882.100	48.212	45.530	-5.788	54.000	2.681	AV	V
	4884.500	56.784	54.099	-17.216	74.000	2.684	PK	
	7613.000	44.435	36.375	-29.565	74.000	8.060	PK	
	8692.500	45.497	36.500	-28.503	74.000	8.996	PK	
	10392.500	47.325	35.002	-26.675	74.000	12.323	PK	
High	4960.090	50.315	47.410	-3.685	54.000	2.906	AV	H
	4961.000	61.612	58.700	-12.388	74.000	2.912	PK	
	7613.000	44.435	36.375	-29.565	74.000	8.060	PK	
	8777.500	45.156	36.247	-28.844	74.000	8.909	PK	
	10350.000	45.879	33.699	-28.121	74.000	12.180	PK	
	4960.080	50.745	47.840	-3.255	54.000	2.906	AV	V
	4961.000	60.354	57.442	-13.646	74.000	2.912	PK	
	7604.500	43.589	35.504	-30.411	74.000	8.085	PK	
	8777.500	45.156	36.247	-28.844	74.000	8.909	PK	

	10367.000	46.700	34.522	-27.300	74.000	12.178	PK	
--	-----------	--------	--------	---------	--------	--------	----	--

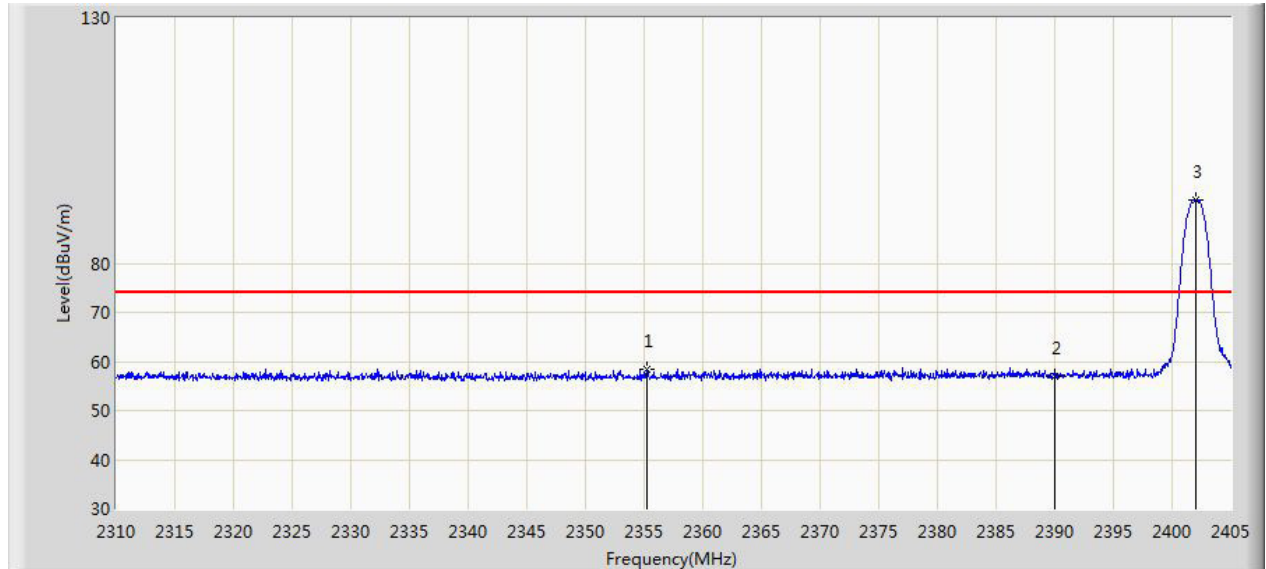
2-DH5

Channel	Freq. (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type	Ant. Pol.
Low	4804.090	41.296	38.600	-12.704	54.000	2.696	AV	H
	4808.000	50.889	48.195	-23.111	74.000	2.694	PK	
	7604.500	43.589	35.504	-30.411	74.000	8.085	PK	
	8599.000	45.179	36.462	-28.821	74.000	8.717	PK	
	10171.500	46.672	34.964	-27.328	74.000	11.707	PK	
	4804.090	41.756	39.060	-12.244	54.000	2.696	AV	V
	4808.000	51.725	49.031	-22.275	74.000	2.694	PK	
	7630.000	44.745	36.706	-29.255	74.000	8.039	PK	
	8624.500	44.964	36.184	-29.036	74.000	8.780	PK	
	10171.500	46.672	34.964	-27.328	74.000	11.707	PK	
Middle	4882.050	39.532	36.850	-14.468	54.000	2.681	AV	H
	4884.500	51.109	48.424	-22.891	74.000	2.684	PK	
	7630.000	44.745	36.706	-29.255	74.000	8.039	PK	
	8624.500	45.018	36.238	-28.982	74.000	8.780	PK	
	10358.500	46.894	34.715	-27.106	74.000	12.179	PK	
	4882.060	40.222	37.540	-13.778	54.000	2.681	AV	V
	4884.500	50.587	47.902	-23.413	74.000	2.684	PK	
	7392.000	43.547	35.619	-30.453	74.000	7.928	PK	
	8624.500	45.215	36.435	-28.785	74.000	8.780	PK	
	10358.500	46.894	34.715	-27.106	74.000	12.179	PK	
High	4960.070	40.745	37.840	-13.255	54.000	2.906	AV	H
	4961.000	51.394	48.482	-22.606	74.000	2.912	PK	
	7460.000	43.718	35.620	-30.282	74.000	8.098	PK	
	8718.000	45.309	36.335	-28.691	74.000	8.974	PK	
	10231.000	46.536	34.679	-27.464	74.000	11.857	PK	
	4960.070	40.465	37.560	-13.535	54.000	2.906	AV	V
	4961.000	53.061	50.149	-20.939	74.000	2.912	PK	
	7570.500	44.084	35.867	-29.916	74.000	8.217	PK	
	8616.000	44.939	36.148	-29.061	74.000	8.791	PK	
	10231.000	46.536	34.679	-27.464	74.000	11.857	PK	

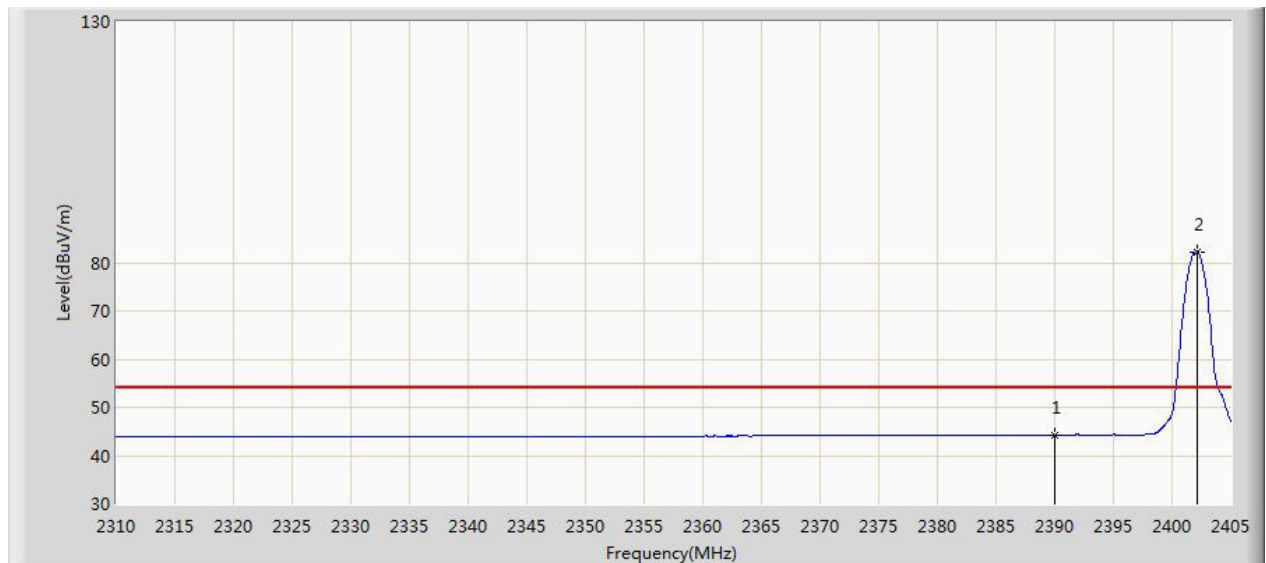
3-DH5

Channel	Freq. (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type	Ant. Pol.
Low	4804.080	40.596	37.900	-13.404	54.000	2.696	AV	H
	4808.000	50.835	48.141	-23.165	74.000	2.694	PK	
	7570.500	44.084	35.867	-29.916	74.000	8.217	PK	
	8684.000	45.757	36.755	-28.243	74.000	9.002	PK	
	10443.500	46.078	34.091	-27.922	74.000	11.986	PK	
	4804.110	40.966	38.270	-13.034	54.000	2.696	AV	V
	4808.000	51.932	49.238	-22.068	74.000	2.694	PK	
	7519.500	42.510	34.215	-31.490	74.000	8.295	PK	
	8650.000	44.908	36.119	-29.092	74.000	8.789	PK	

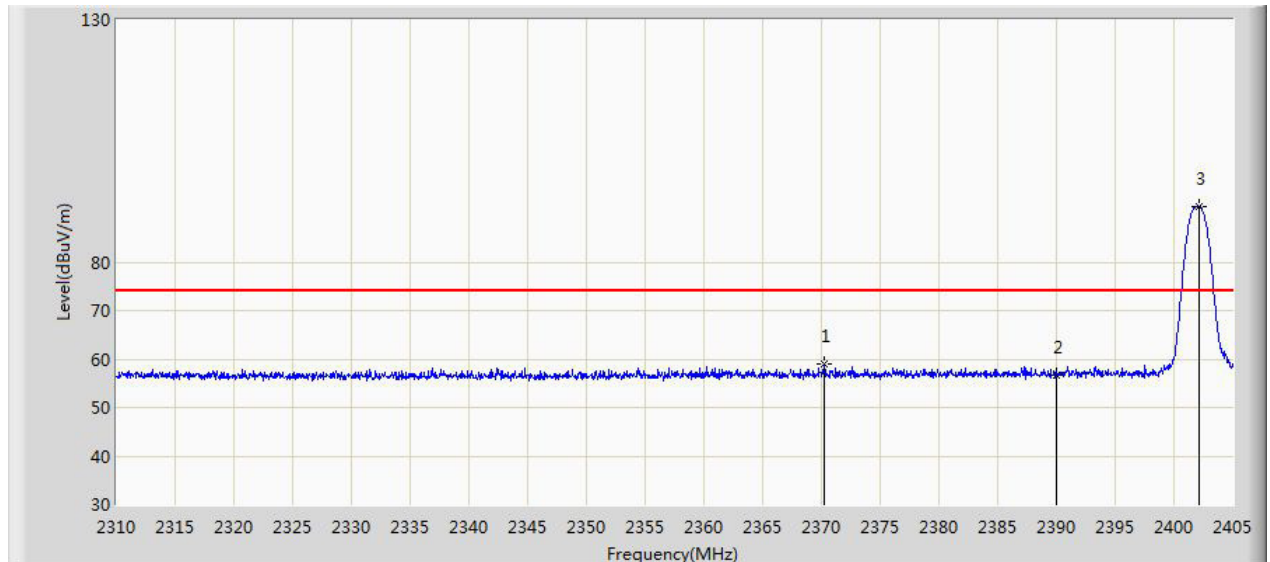
	10443.500	46.078	34.091	-27.922	74.000	11.986	PK	
Middle	4882.050	39.132	36.450	-14.868	54.000	2.681	AV	H
	4884.500	51.748	49.063	-22.252	74.000	2.684	PK	
	7519.500	42.510	34.215	-31.490	74.000	8.295	PK	
	8684.000	45.076	36.074	-28.924	74.000	9.002	PK	
	10290.500	46.993	34.979	-27.007	74.000	12.014	PK	
	4882.090	39.242	36.560	-14.758	54.000	2.681	AV	V
	4884.500	50.265	47.580	-23.735	74.000	2.684	PK	
	7536.500	43.166	34.871	-30.834	74.000	8.296	PK	
	8650.000	45.022	36.233	-28.978	74.000	8.789	PK	
	10358.500	47.003	34.824	-26.997	74.000	12.179	PK	
High	4960.090	41.525	38.620	-12.475	54.000	2.906	AV	H
	4961.000	53.187	50.275	-20.813	74.000	2.912	PK	
	7604.500	43.360	35.275	-30.640	74.000	8.085	PK	
	8641.500	44.698	35.919	-29.302	74.000	8.779	PK	
	10214.000	47.032	35.221	-26.968	74.000	11.811	PK	
	4960.090	40.605	37.700	-13.395	54.000	2.906	AV	V
	4961.000	53.290	50.378	-20.710	74.000	2.912	PK	
	7519.500	43.544	35.249	-30.456	74.000	8.295	PK	
	8650.000	44.983	36.194	-29.017	74.000	8.789	PK	
	10307.500	46.794	34.750	-27.206	74.000	12.044	PK	

Figure 25: Band Edge, DH5, 2402MHz, Horizontal, PK


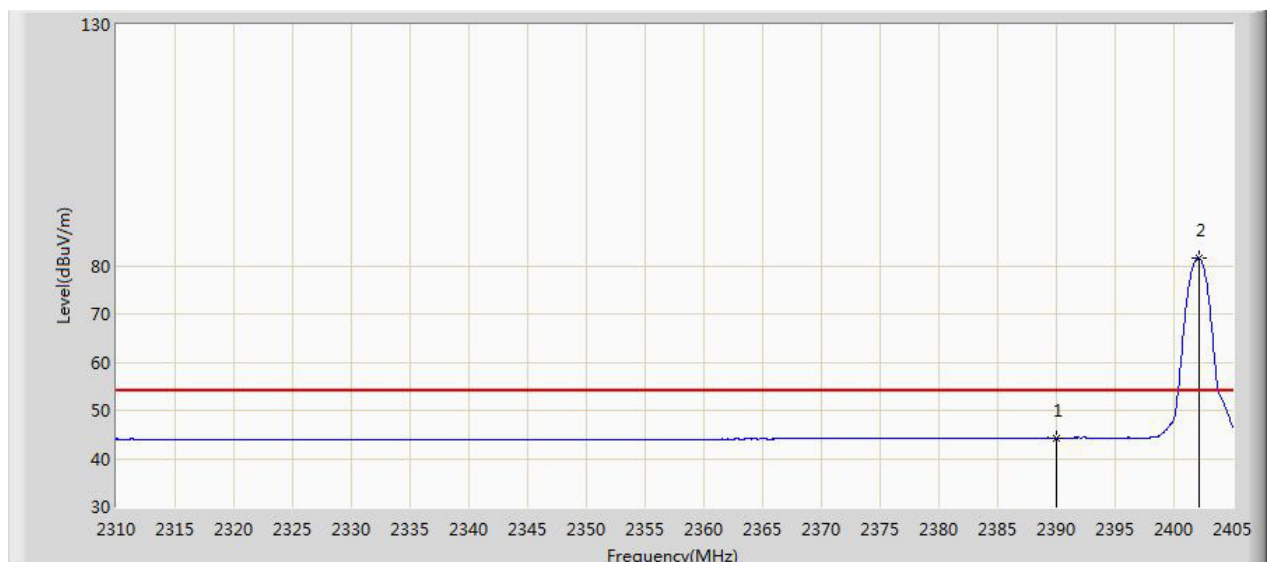
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2355.220	58.268	26.995	-15.732	74.000	31.273	PK
2390.000	56.946	25.743	-17.054	74.000	31.203	PK
2402.008	92.813	61.629	N/A	N/A	31.184	PK

Figure 26: Band Edge, DH5, 2402MHz, Horizontal, AV


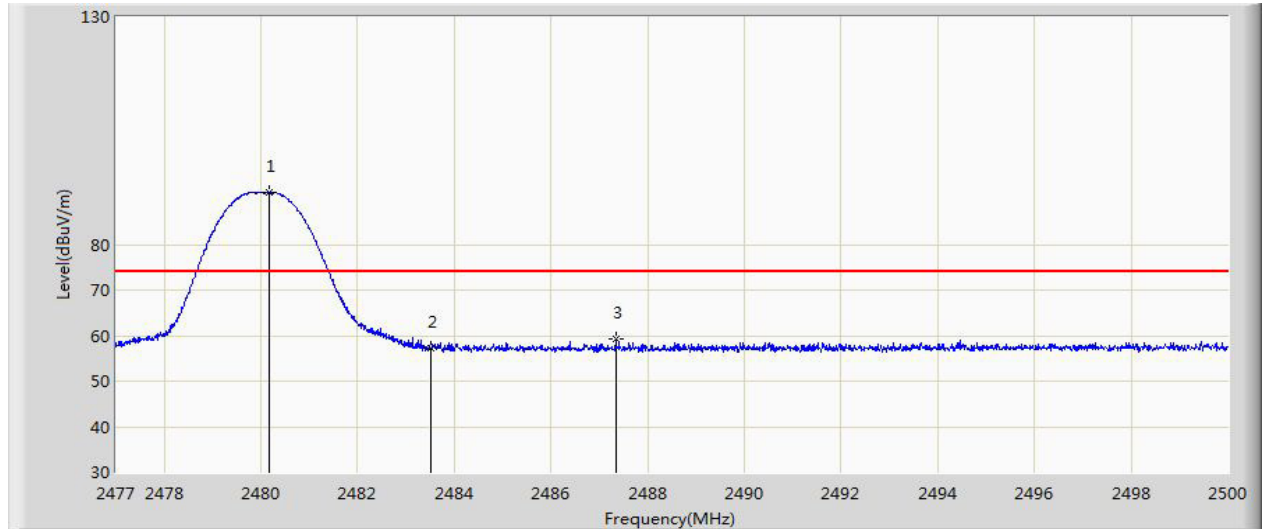
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2390.000	44.302	13.099	-9.698	54.000	31.203	AV
2402.150	82.269	51.085	N/A	N/A	31.184	AV

Figure 27: Band Edge, DH5, 2402MHz, Vertical, PK


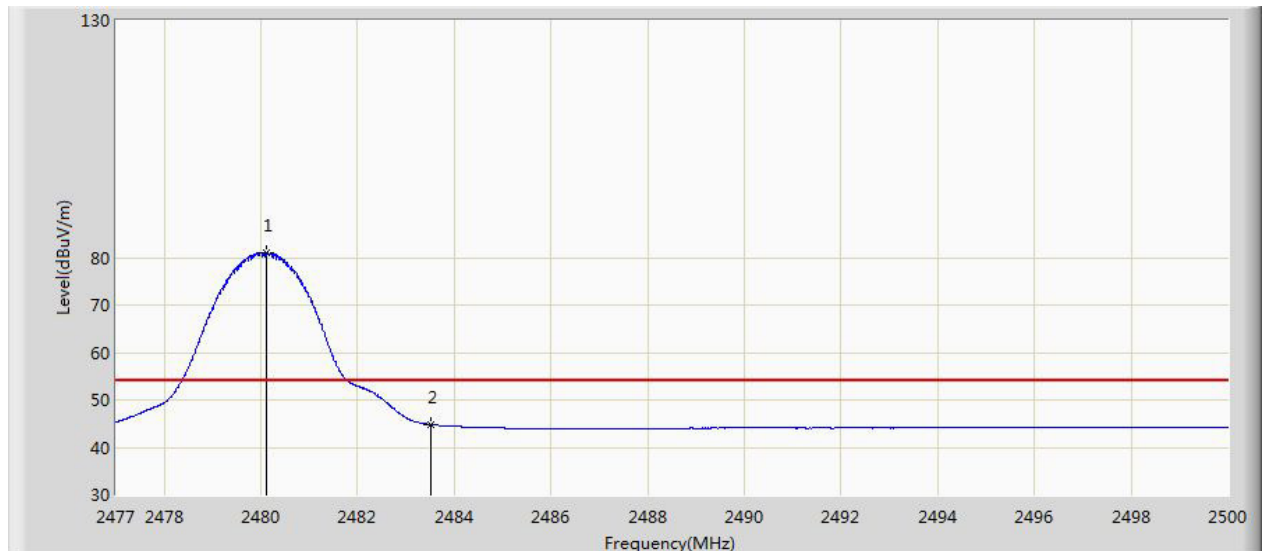
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2370.278	59.084	27.845	-14.916	74.000	31.239	PK
2390.000	56.584	25.381	-17.416	74.000	31.203	PK
2402.150	91.385	60.201	N/A	N/A	31.184	PK

Figure 28: Band Edge, DH5, 2402MHz, Vertical, AV


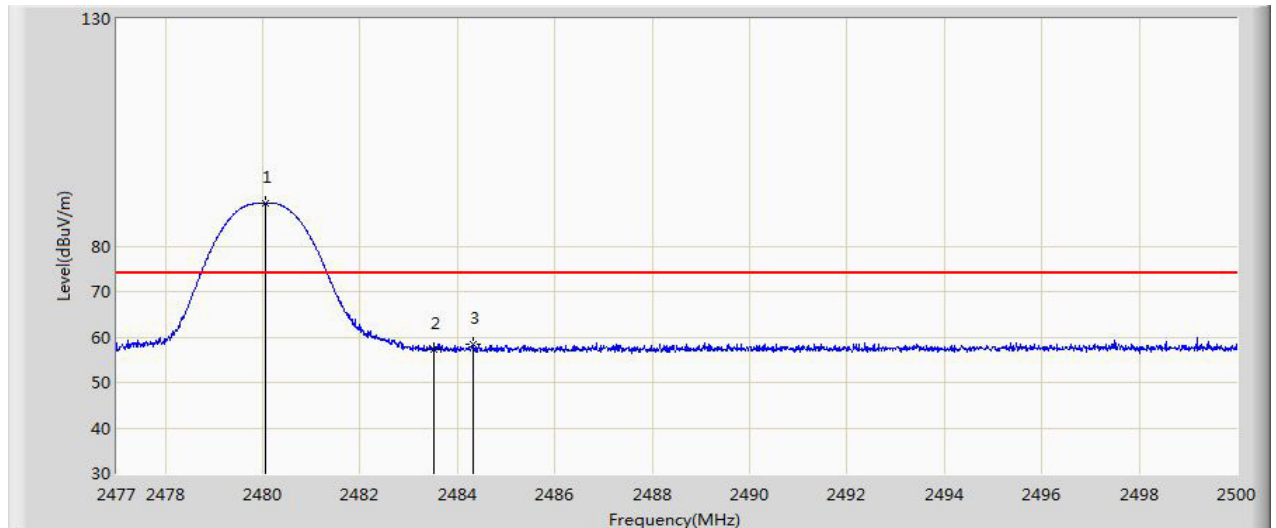
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2390.000	44.335	13.132	-9.665	54.000	31.203	AV
2402.150	81.619	50.435	N/A	N/A	31.184	AV

Figure 29: Band Edge, DH5, 2480MHz, Horizontal, PK


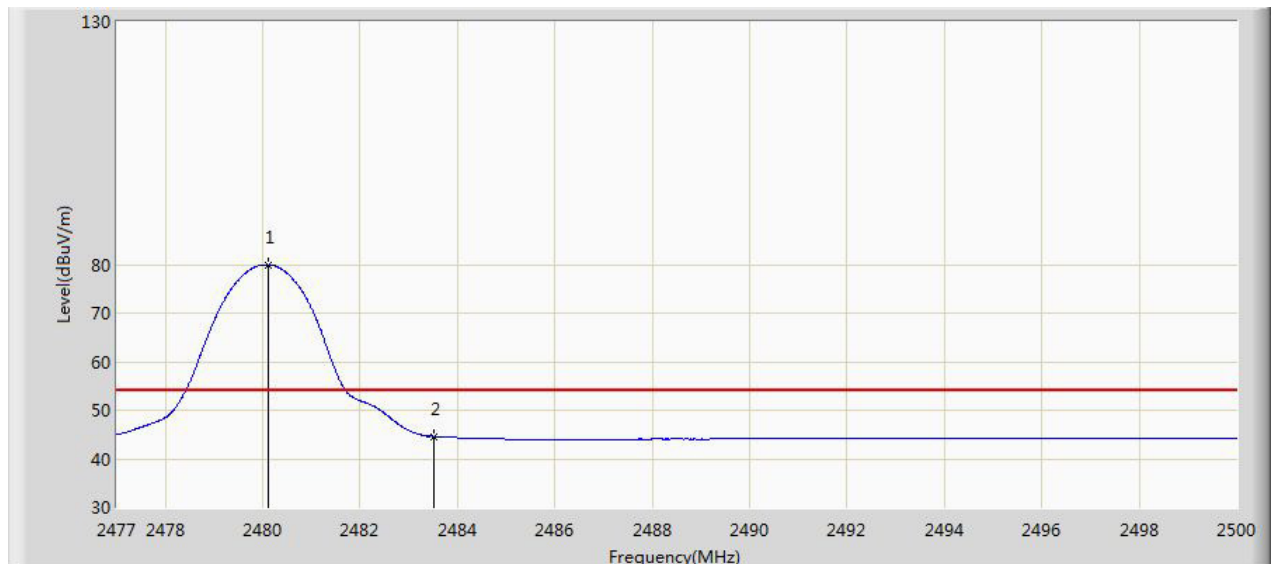
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.174	91.544	60.359	N/A	N/A	31.185	PK
2483.500	57.142	25.949	-16.858	74.000	31.194	PK
2487.338	59.273	28.070	-14.727	74.000	31.204	PK

Figure 30: Band Edge, DH5, 2480MHz, Horizontal, AV


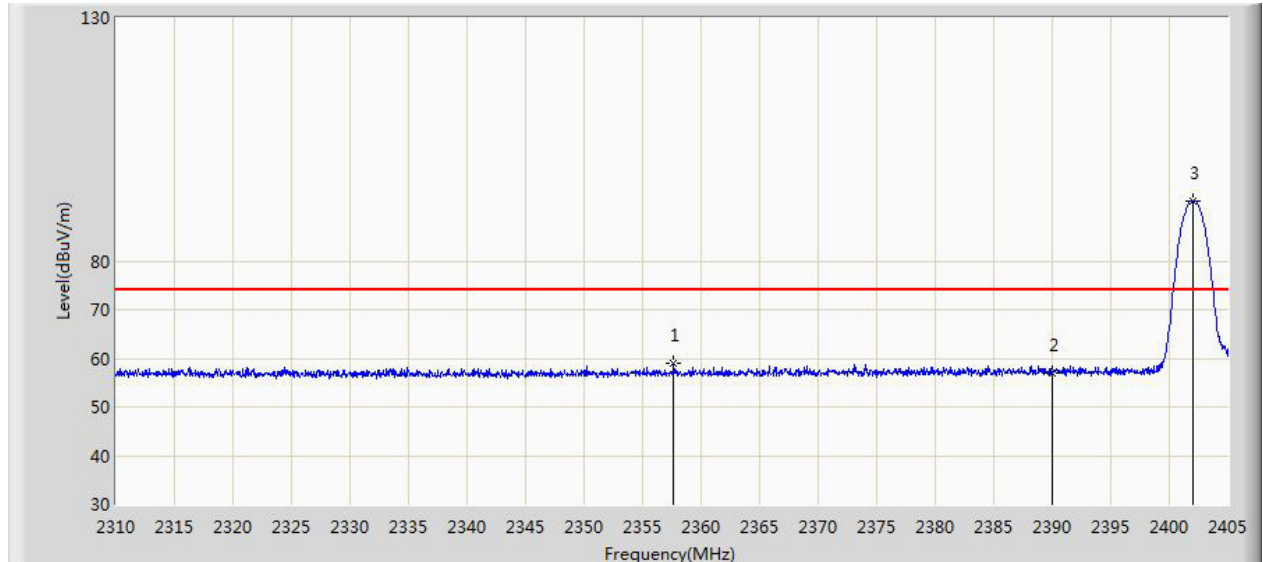
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.105	81.120	49.936	N/A	N/A	31.184	AV
2483.500	44.805	13.612	-9.195	54.000	31.194	AV

Figure 31: Band Edge, DH5, 2480MHz, Vertical, PK


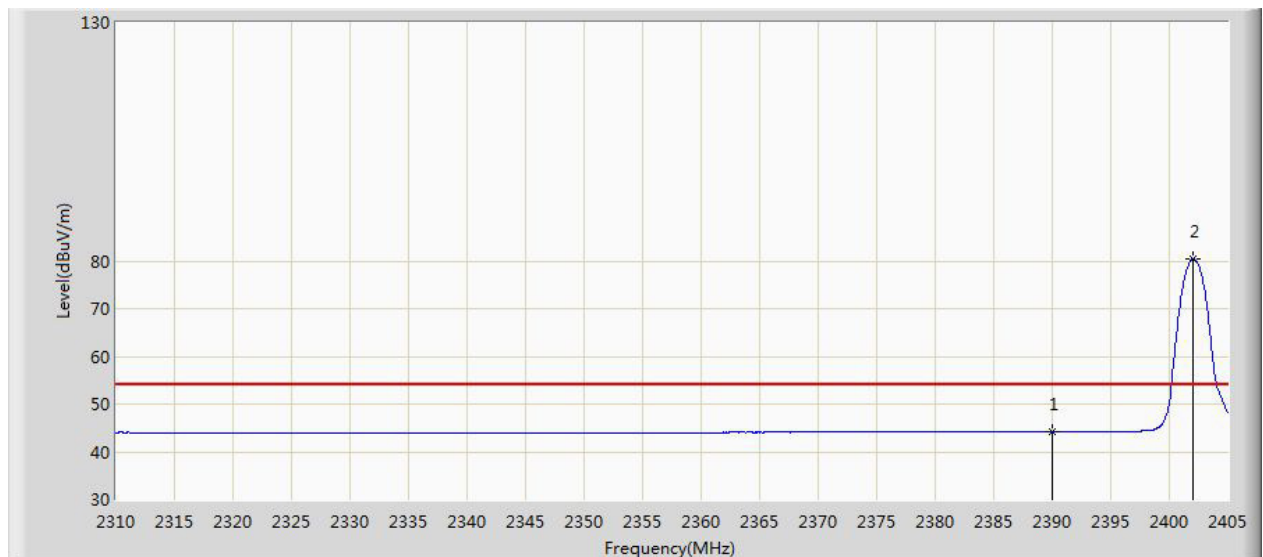
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.059	89.345	58.161	N/A	N/A	31.184	PK
2483.500	57.194	26.001	-16.806	74.000	31.194	PK
2484.314	58.433	27.238	-15.567	74.000	31.195	PK

Figure 32: Band Edge, DH5, 2480MHz, Vertical, AV


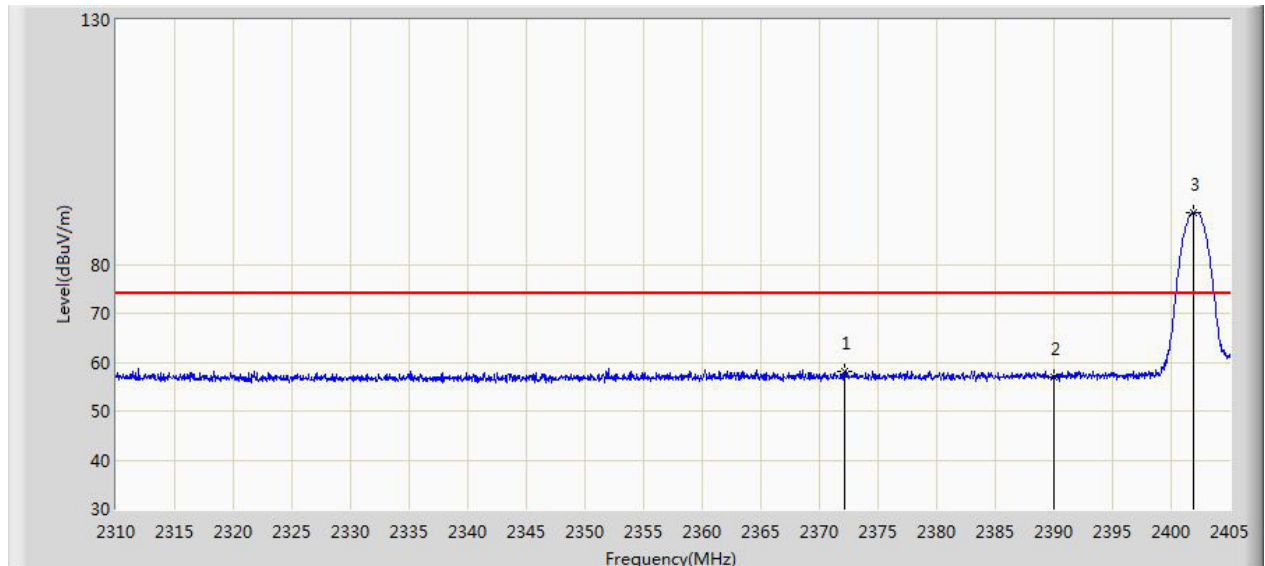
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.105	79.977	48.793	N/A	N/A	31.184	AV
2483.500	44.602	13.409	-9.398	54.000	31.194	AV

Figure 33: Band Edge, 2-DH5, 2402MHz, Horizontal, PK


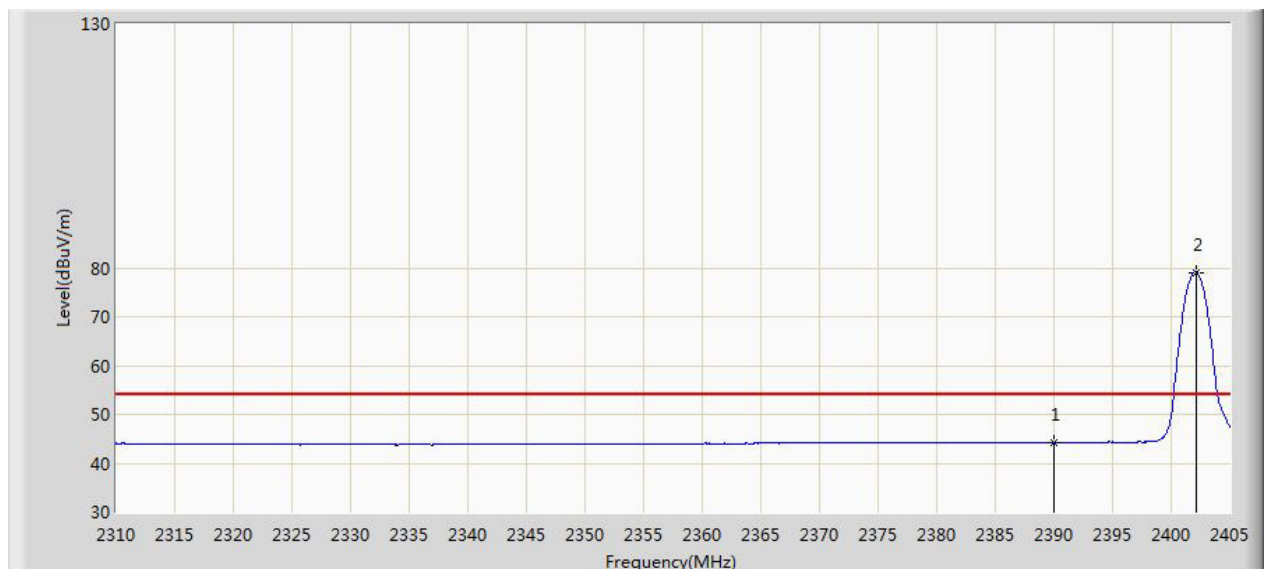
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2357.643	58.865	27.601	-15.135	74.000	31.264	PK
2390.000	56.896	25.693	-17.104	74.000	31.203	PK
2402.008	92.315	61.131	N/A	N/A	31.184	PK

Figure 34: Band Edge, 2-DH5, 2402MHz, Horizontal, AV


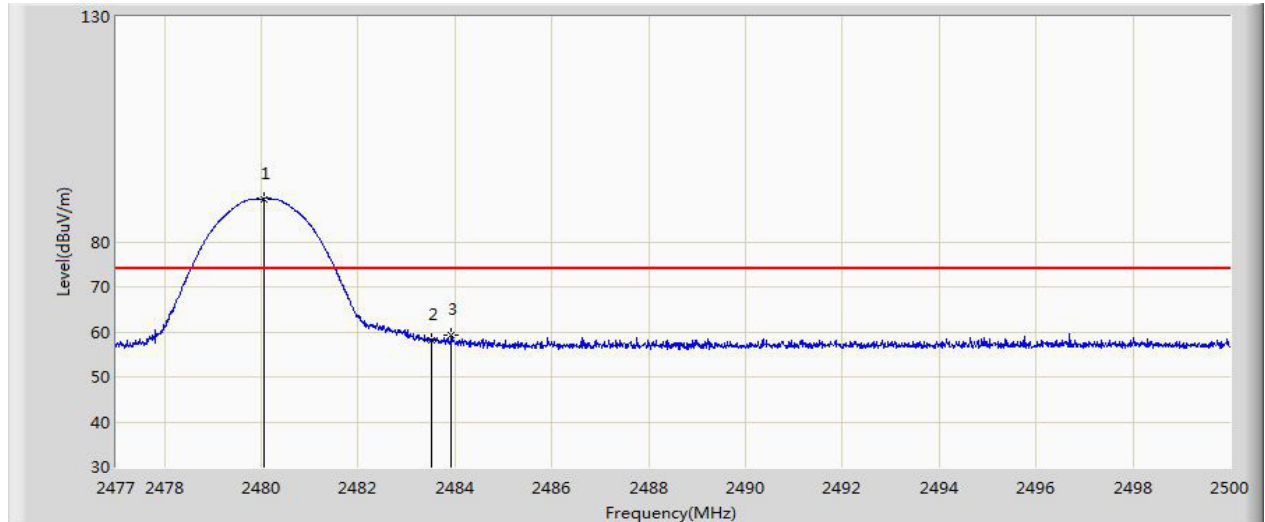
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2390.000	44.274	13.071	-9.726	54.000	31.203	AV
2402.008	80.506	49.322	N/A	N/A	31.184	AV

Figure 35: Band Edge, 2-DH5, 2402MHz, Vertical, PK


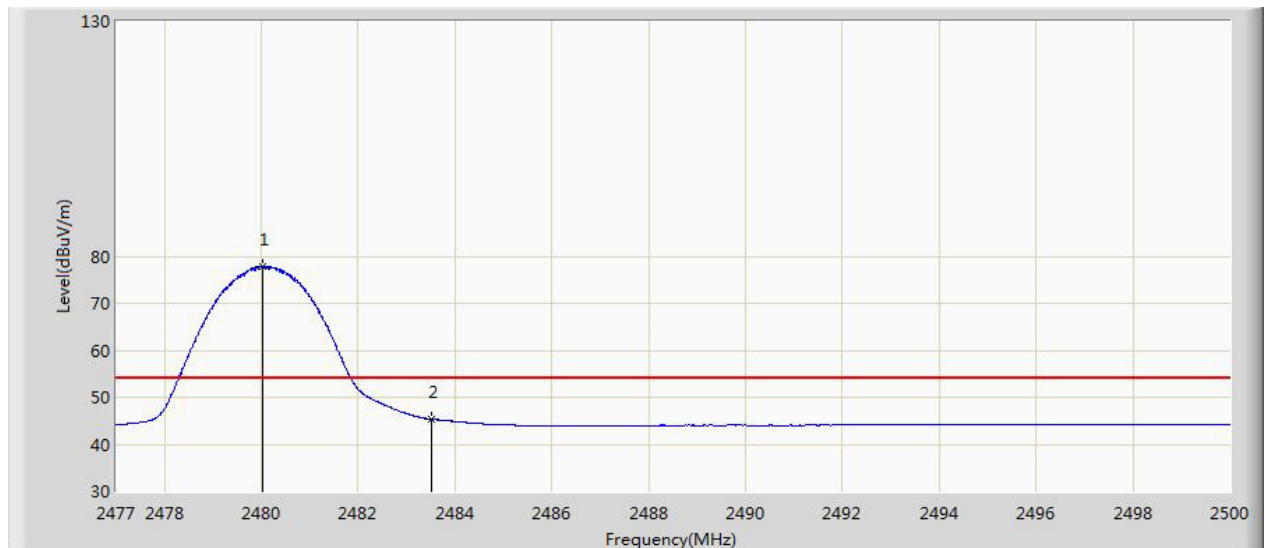
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2372.130	58.230	26.994	-15.770	74.000	31.236	PK
2390.000	57.019	25.816	-16.981	74.000	31.203	PK
2401.913	90.723	59.539	N/A	N/A	31.184	PK

Figure 36: Band Edge, 2-DH5, 2402MHz, Vertical, AV


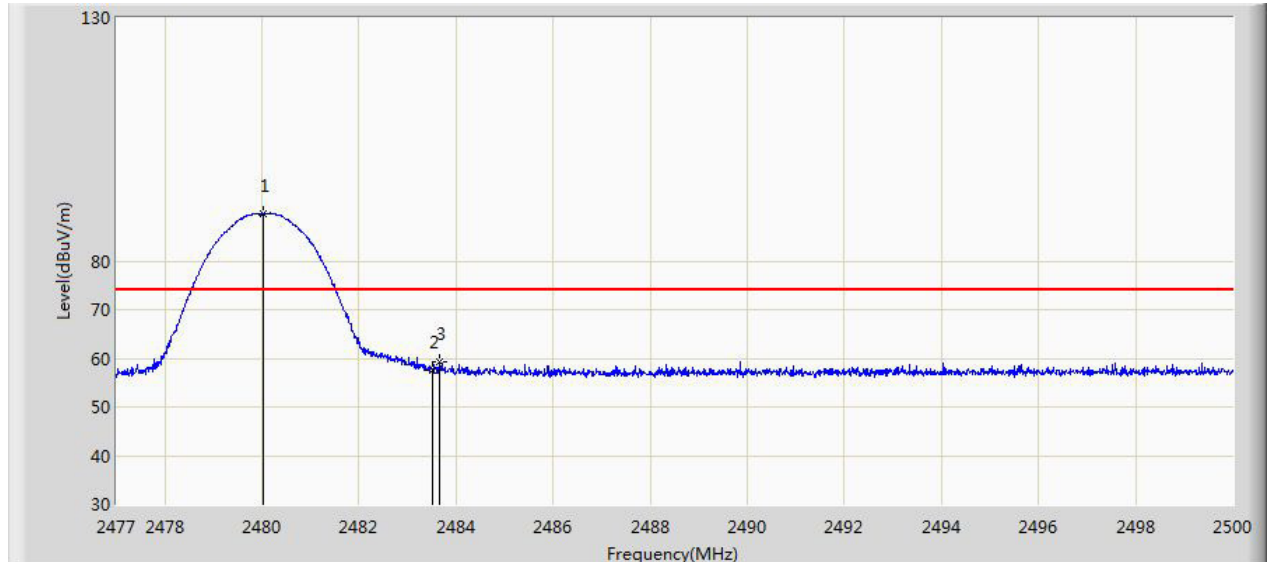
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2390.000	44.314	13.111	-9.686	54.000	31.203	AV
2402.150	79.080	47.896	N/A	N/A	31.184	AV

Figure 37: Band Edge, 2-DH5, 2480MHz, Horizontal, PK


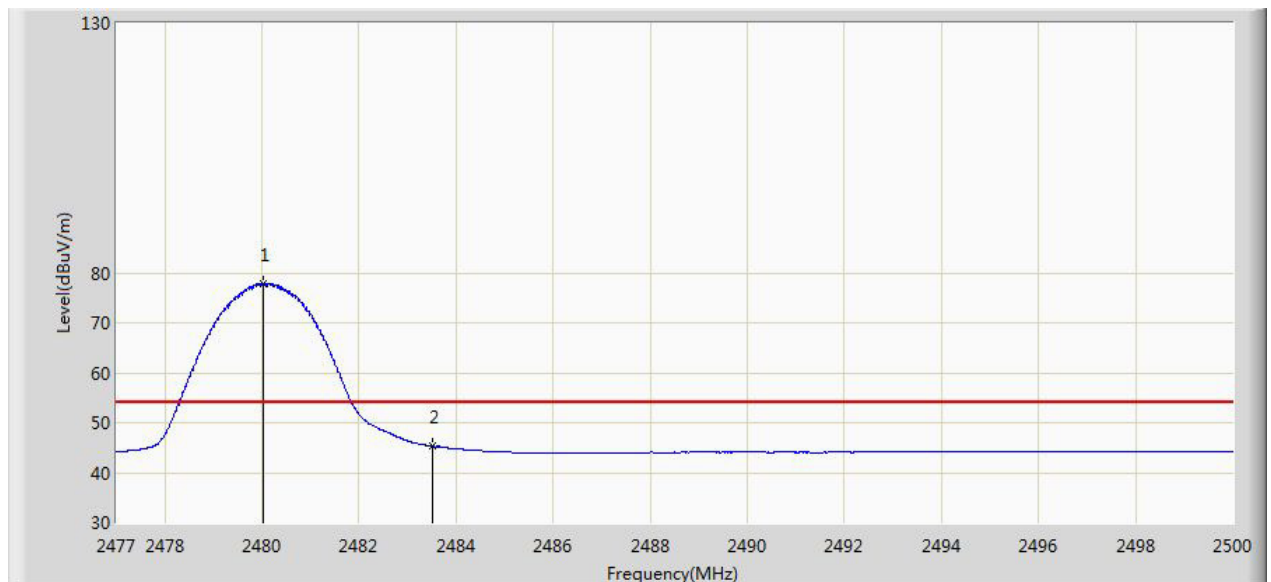
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.048	89.530	58.346	N/A	N/A	31.184	PK
2483.500	57.987	26.794	-16.013	74.000	31.194	PK
2483.923	59.352	28.158	-14.648	74.000	31.194	PK

Figure 38: Band Edge, 2-DH5, 2480MHz, Horizontal, AV


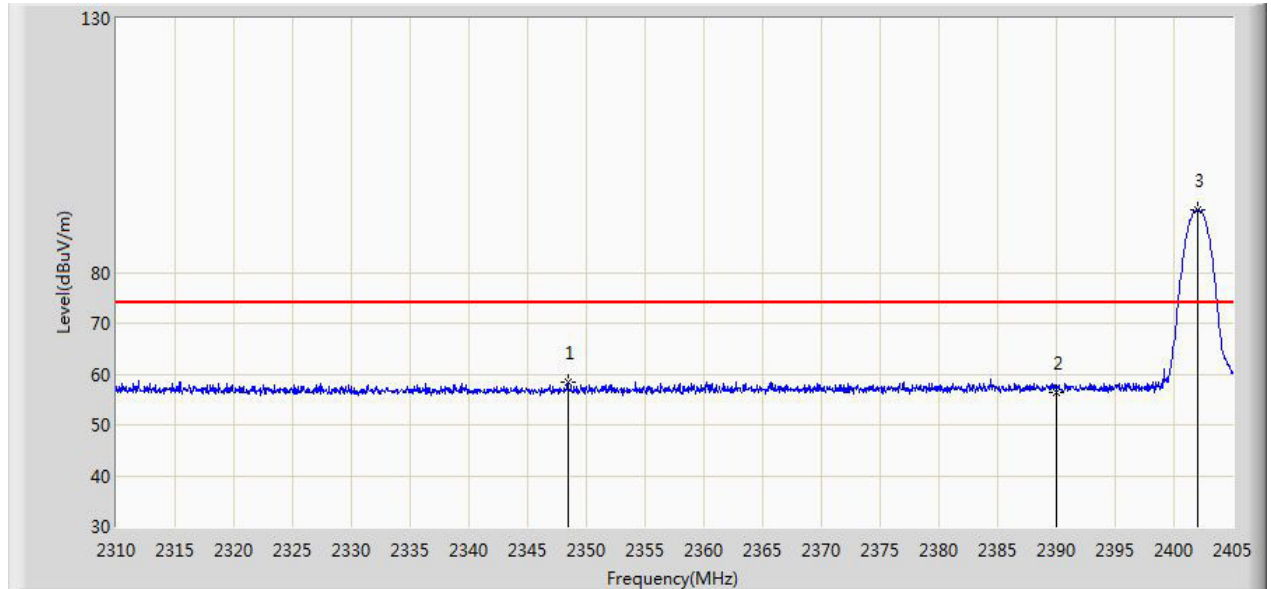
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.024	77.927	46.743	N/A	N/A	31.184	AV
2483.500	45.368	14.175	-8.632	54.000	31.194	AV

Figure 39: Band Edge, 2-DH5, 2480MHz, Vertical, PK


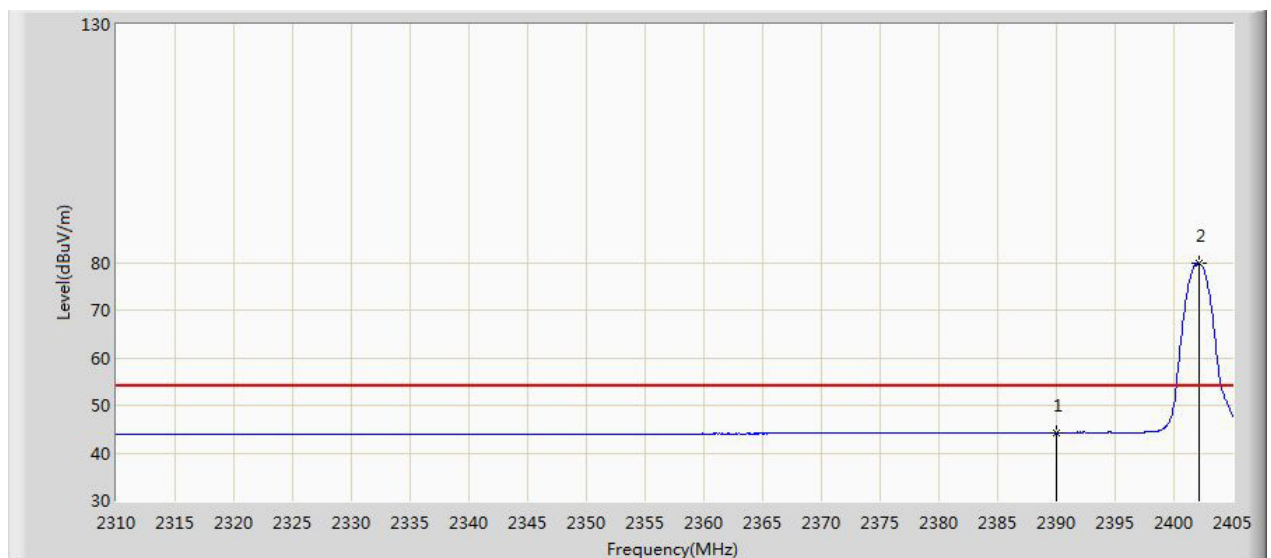
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.024	89.570	58.386	N/A	N/A	31.184	PK
2483.500	57.672	26.479	-16.328	74.000	31.194	PK
2483.647	59.134	27.940	-14.866	74.000	31.194	PK

Figure 40: Band Edge, 2-DH5, 2480MHz, Vertical, AV


Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.036	77.932	46.748	N/A	N/A	31.184	AV
2483.500	45.265	14.072	-8.735	54.000	31.194	AV

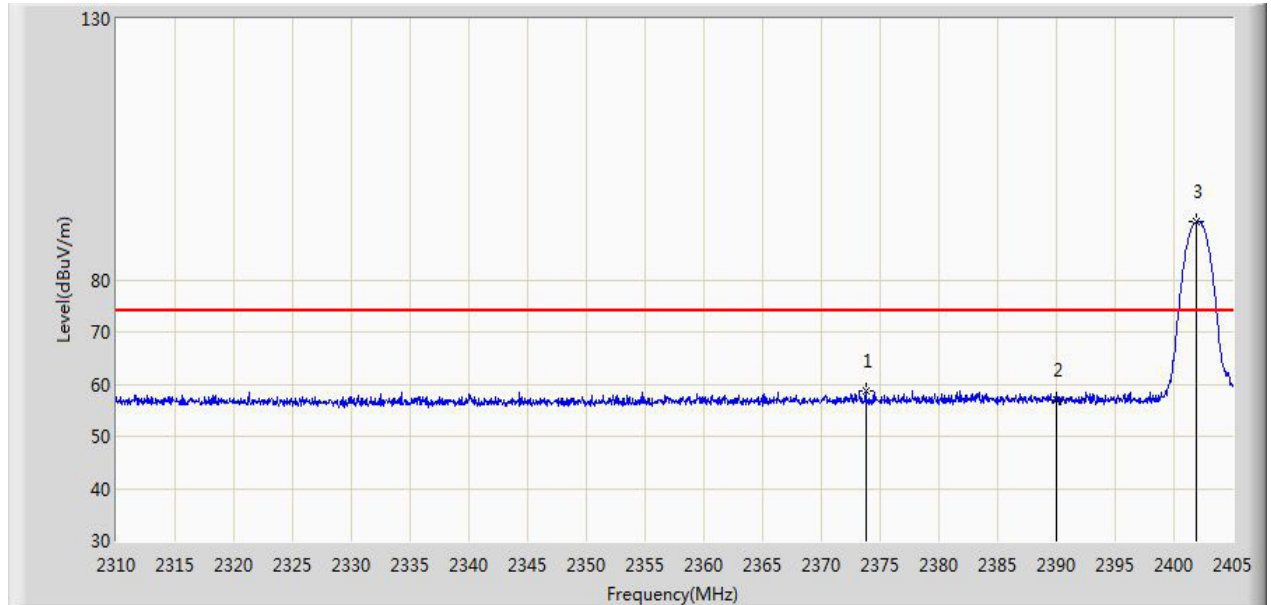
Figure 41: Band Edge, 3-DH5, 2402MHz, Horizontal, PK


Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2348.427	58.351	27.053	-15.649	74.000	31.299	PK
2390.000	56.497	25.294	-17.503	74.000	31.203	PK
2402.055	92.450	61.266	N/A	N/A	31.184	PK

Figure 42: Band Edge, 3-DH5, 2402MHz, Horizontal, AV


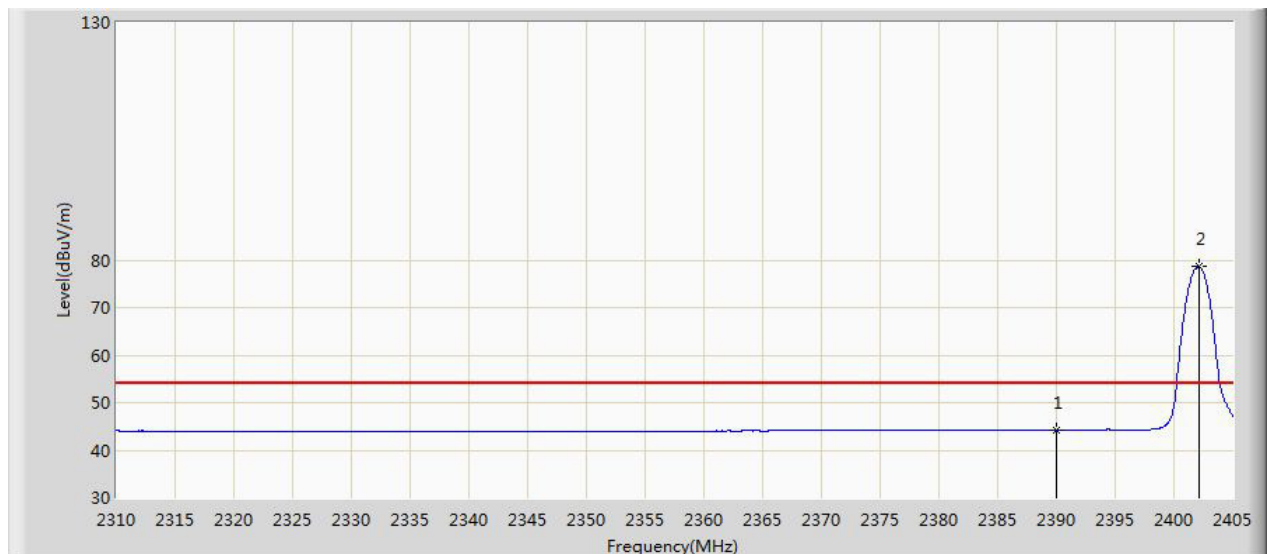
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2390.000	44.291	13.088	-9.709	54.000	31.203	AV
2402.150	79.897	48.713	N/A	N/A	31.184	AV

Figure 43: Band Edge, 3-DH5, 2402MHz, Vertical, PK

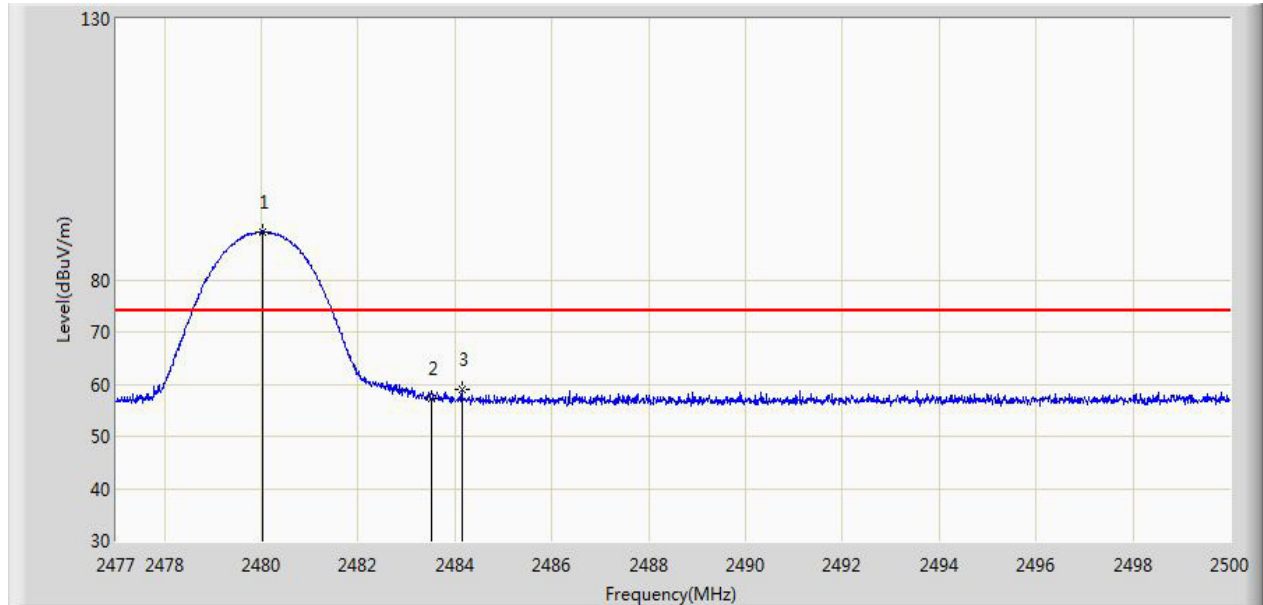


Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2373.792	58.838	27.605	-15.162	74.000	31.233	PK
2390.000	57.085	25.882	-16.915	74.000	31.203	PK
2401.913	91.088	59.904	N/A	N/A	31.184	PK

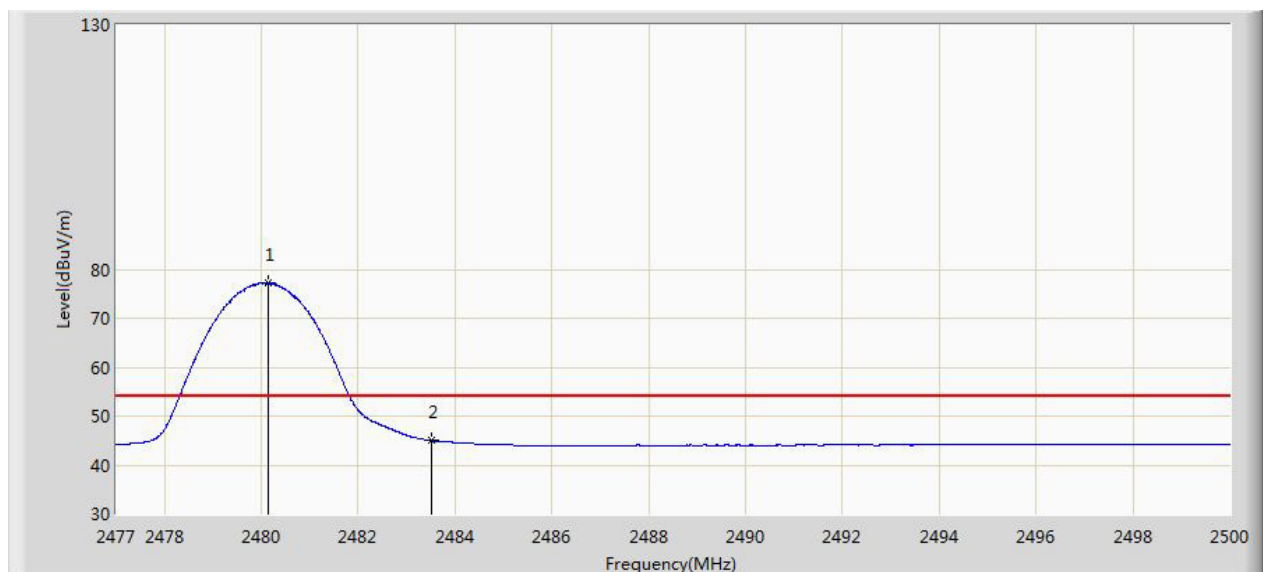
Figure 44: Band Edge, 3-DH5, 2402MHz, Vertical, AV



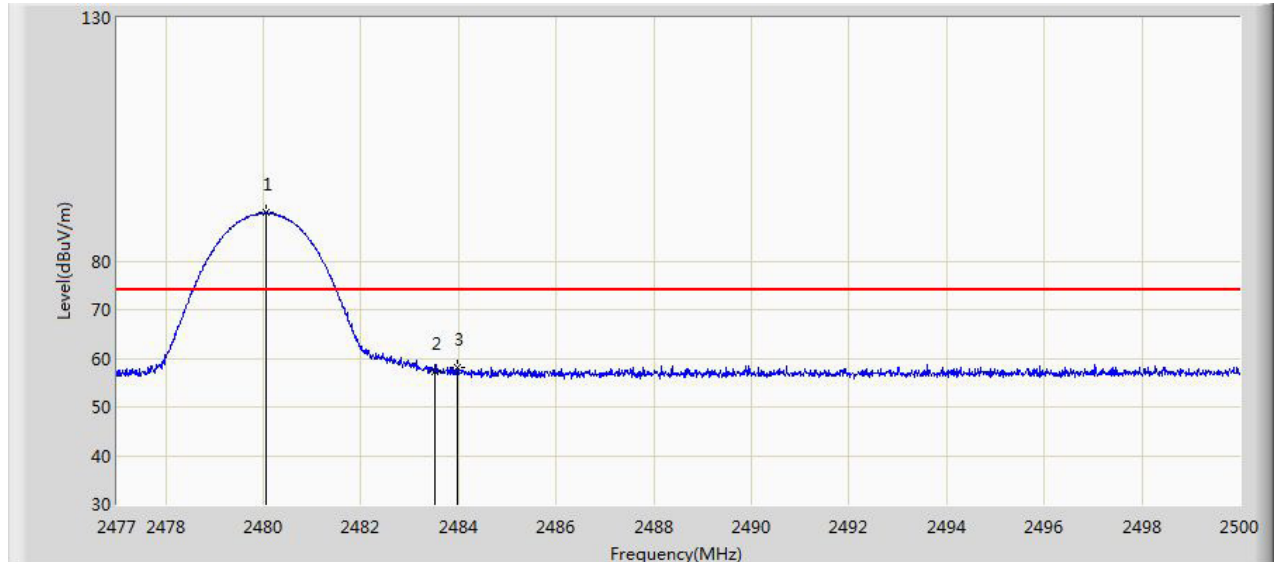
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2390.000	44.292	13.089	-9.708	54.000	31.203	AV
2402.150	78.701	47.517	N/A	N/A	31.184	AV

Figure 45: Band Edge, 3-DH5, 2480MHz, Horizontal, PK


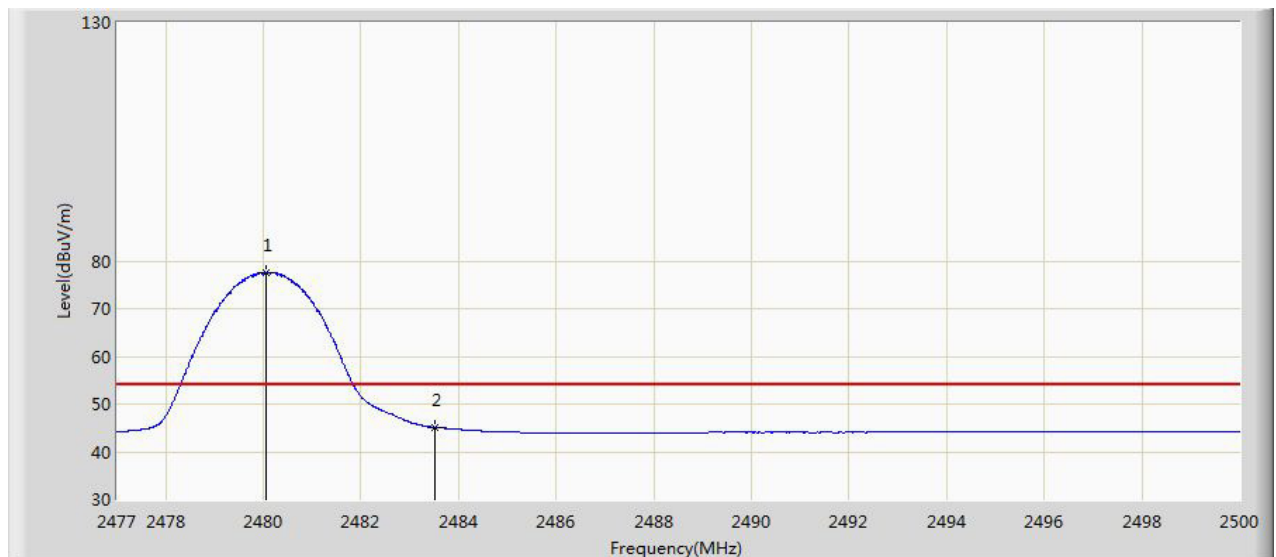
Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.024	89.189	58.005	N/A	N/A	31.184	PK
2483.500	57.391	26.198	-16.609	74.000	31.194	PK
2484.142	59.037	27.842	-14.963	74.000	31.195	PK

Figure 46: Band Edge, 3-DH5, 2480MHz, Horizontal, AV


Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.139	77.192	46.008	N/A	N/A	31.185	AV
2483.500	45.027	13.834	-8.973	54.000	31.194	AV

Figure 47: Band Edge, 3-DH5, 2480MHz, Vertical, PK


Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.059	89.872	58.688	N/A	N/A	31.184	PK
2483.500	57.251	26.058	-16.749	74.000	31.194	PK
2483.980	58.115	26.920	-15.885	74.000	31.194	PK

Figure 48: Band Edge, 3-DH5, 2480MHz, Vertical, AV


Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
2480.059	77.676	46.492	N/A	N/A	31.184	AV
2483.500	45.156	13.963	-8.844	54.000	31.194	AV

5.1.6 Frequency Separation

RESULT:

Pass

Date of testing : 12.11.2016
 Test standard : FCC 15.247(a)(1)
 Basic standard : ANSI C63.10: 2013
 Kind of test site : Shield room

Test setup

Test Channel : Low/ Middle/ High
 Operation mode : A.1.a
 Ambient temperature : 25°C
 Relative humidity : 52%
 Atmospheric pressure : 101kPa

Figure 49: Frequency Separation, DH5, 2402MHz

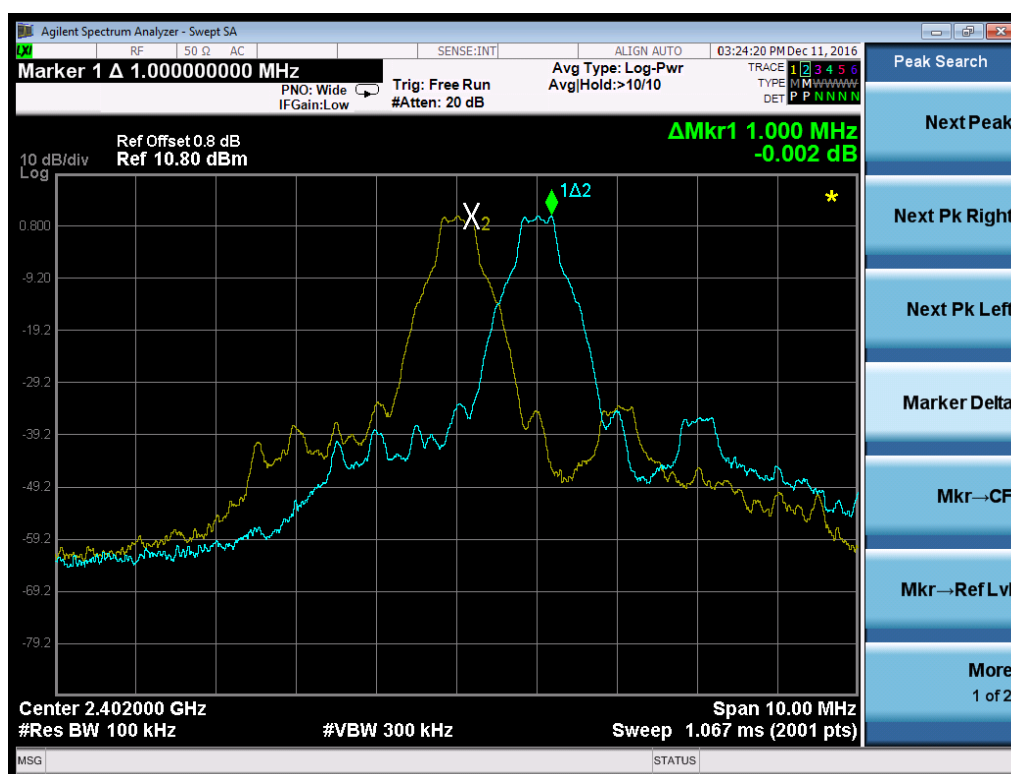


Figure 50: Frequency Separation, DH5, 2441MHz



Figure 51: Frequency Separation, DH5, 2480MHz



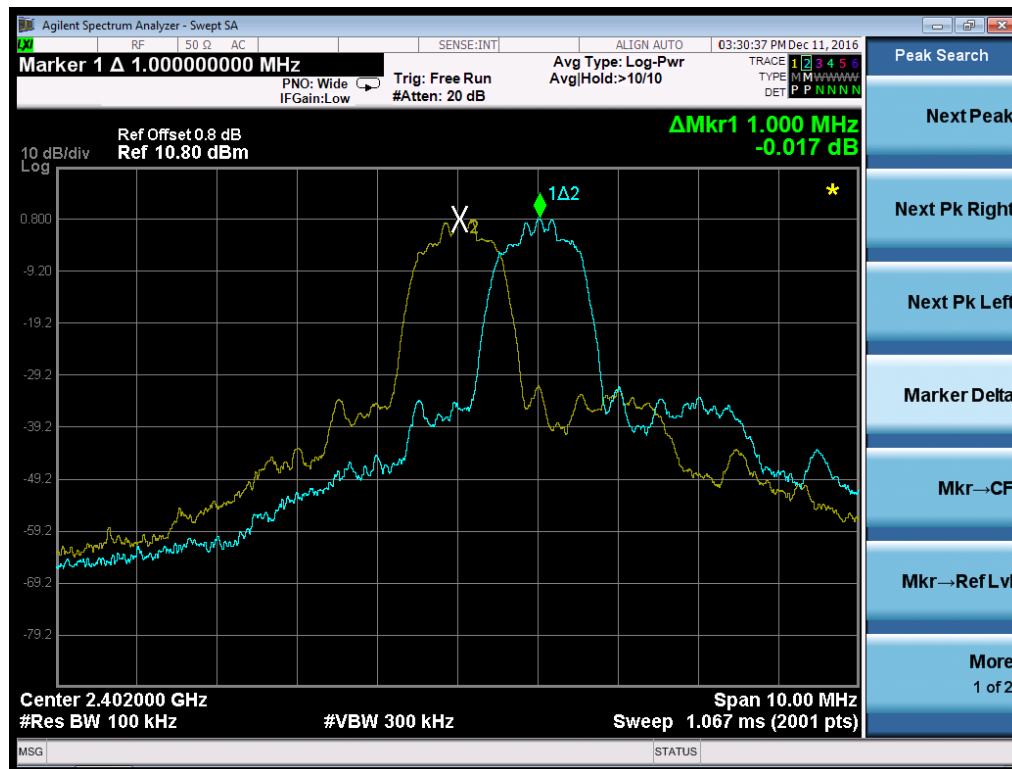
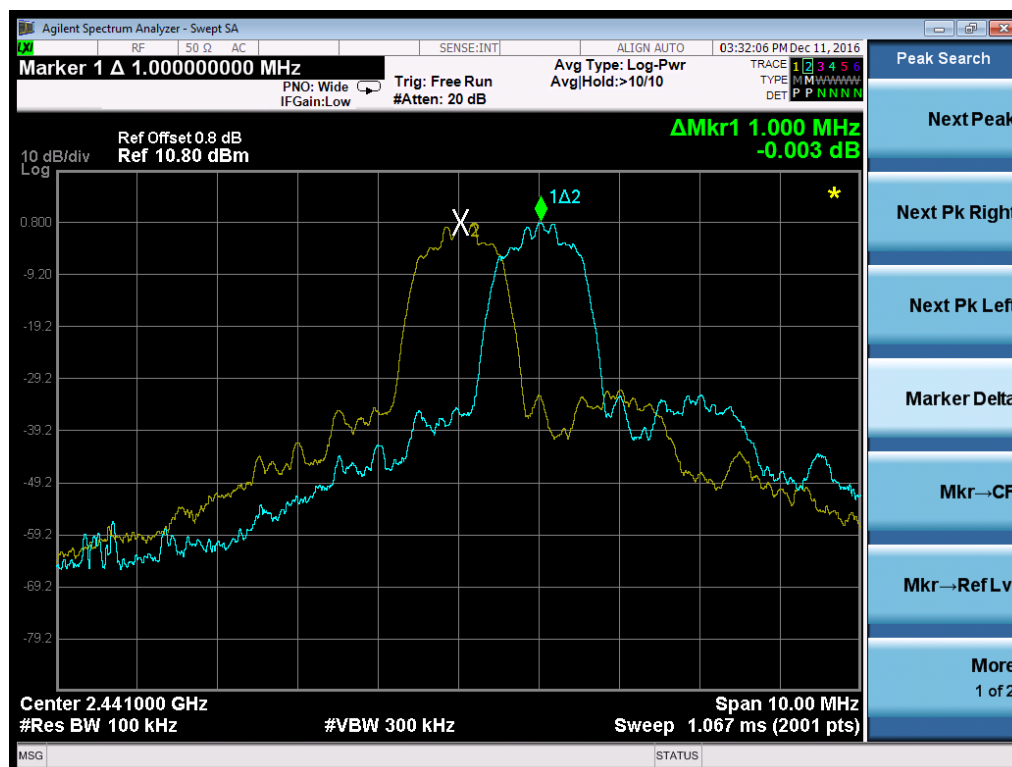
Figure 52: Frequency Separation, 2-DH5, 2402MHz

Figure 53: Frequency Separation, 2-DH5, 2441MHz


Figure 54: Frequency Separation, 2-DH5, 2480MHz

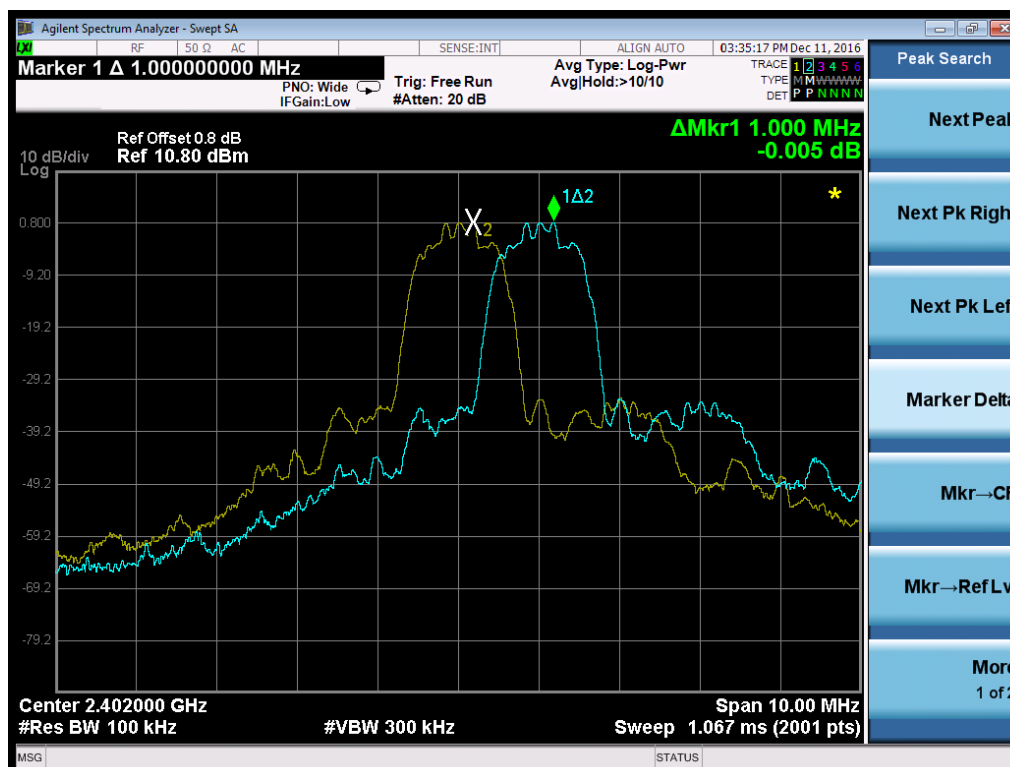
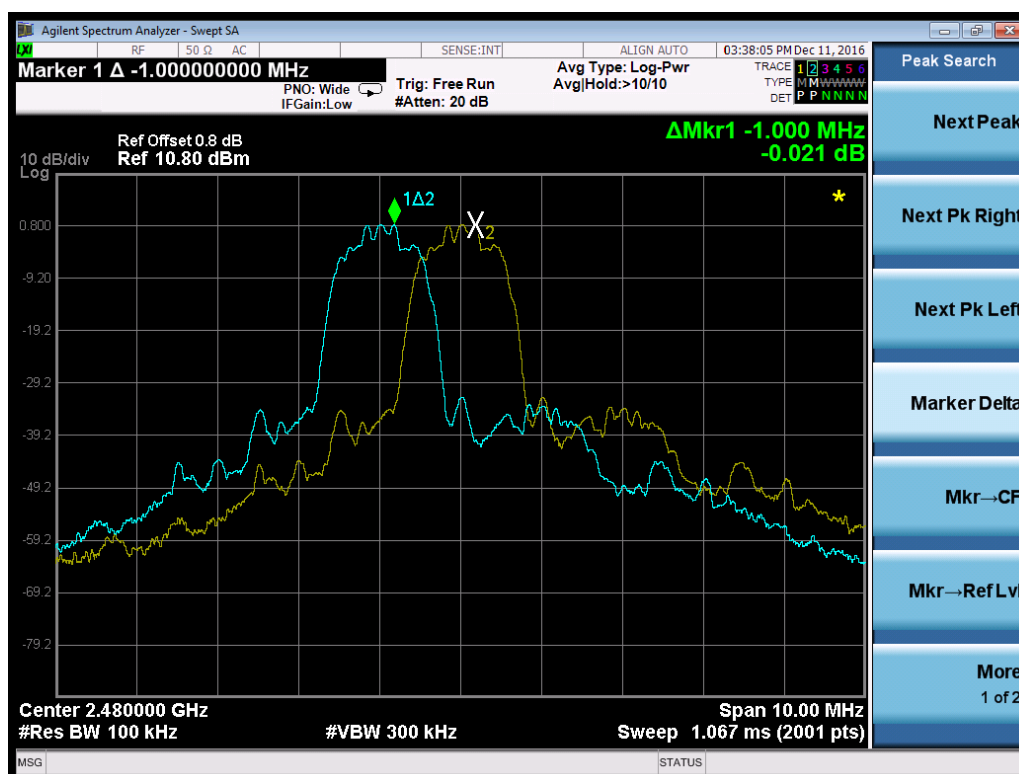
Figure 55: Frequency Separation, 3-DH5, 2402MHz


Figure 56: Frequency Separation, 3-DH5, 2441MHz

Figure 57: Frequency Separation, 3-DH5, 2480MHz


Prüfbericht - Nr.: 50067849 001

Test Report No.

Seite 49 von 60

Page 49 of 60

5.1.7 Number of Hopping Frequency**RESULT:****Pass**

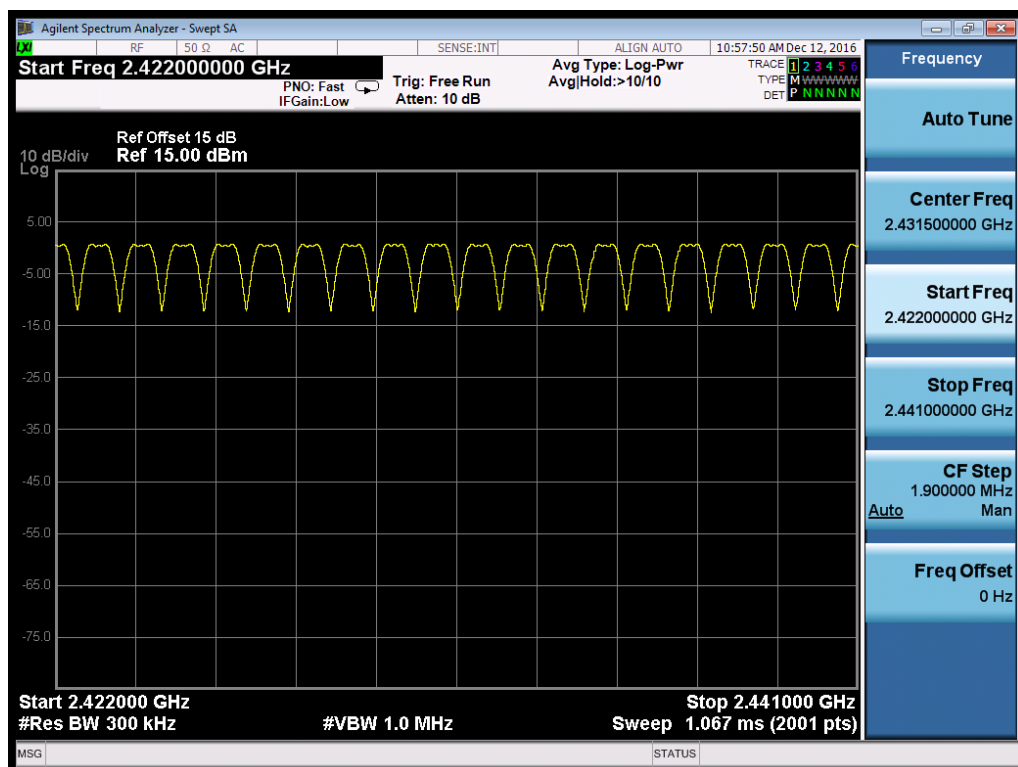
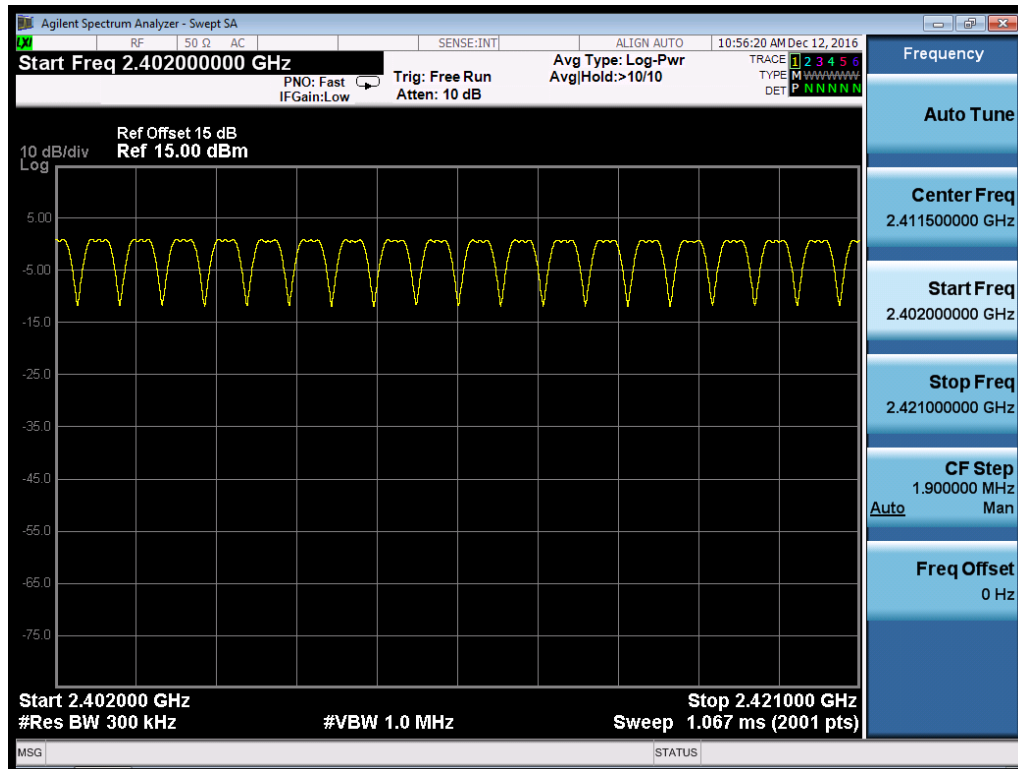
Date of testing : 12.12.2016
Test standard : FCC 15.247(a)(1)(iii)
Basic standard : ANSI C63.10: 2013
Kind of test site : Shield room

Test setup

Test Channel : Low/ Middle/ High
Operation mode : A.1.a
Ambient temperature : 25°C
Relative humidity : 52%
Atmospheric pressure : 101kPa

Table 7: Number of Hopping Frequency

Frequency Range	Measured Quantity of Hopping Channel	Limit
2402 to 2480	79	≥15

Figure 58: Number of Hopping Frequency, DH5


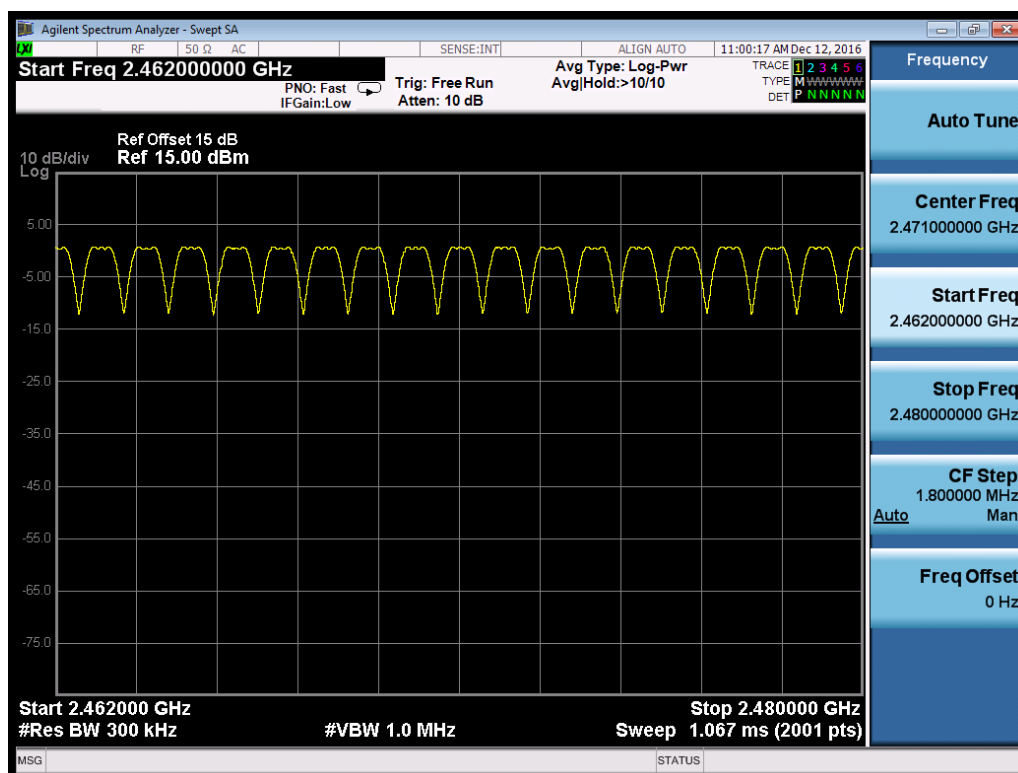
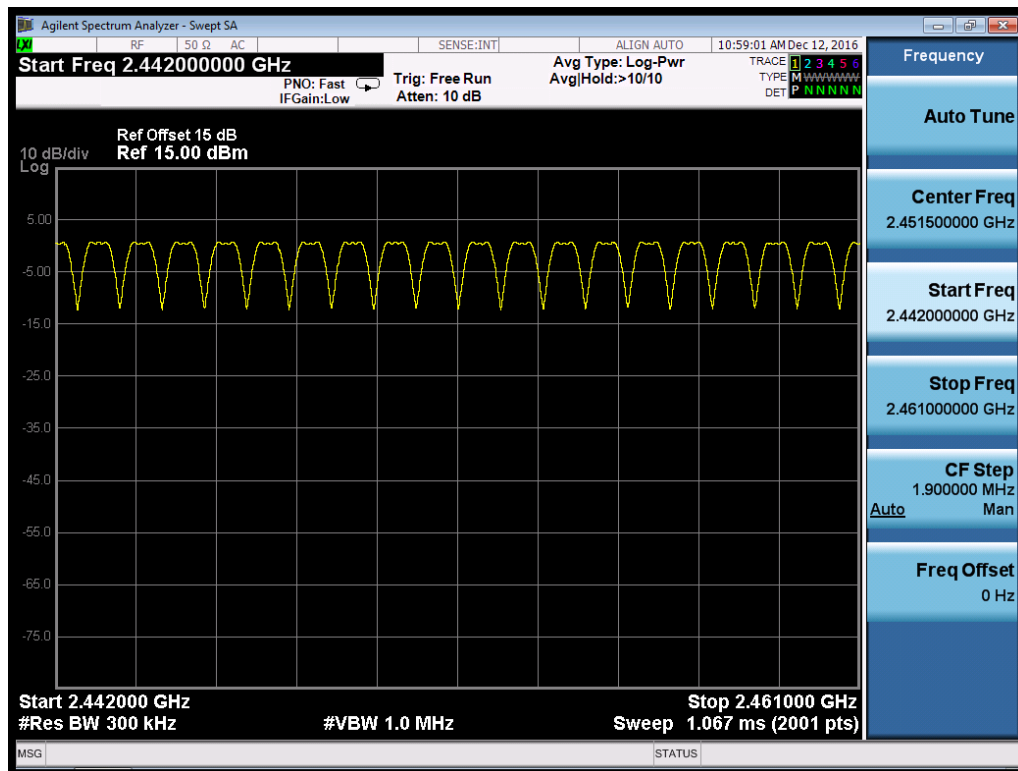
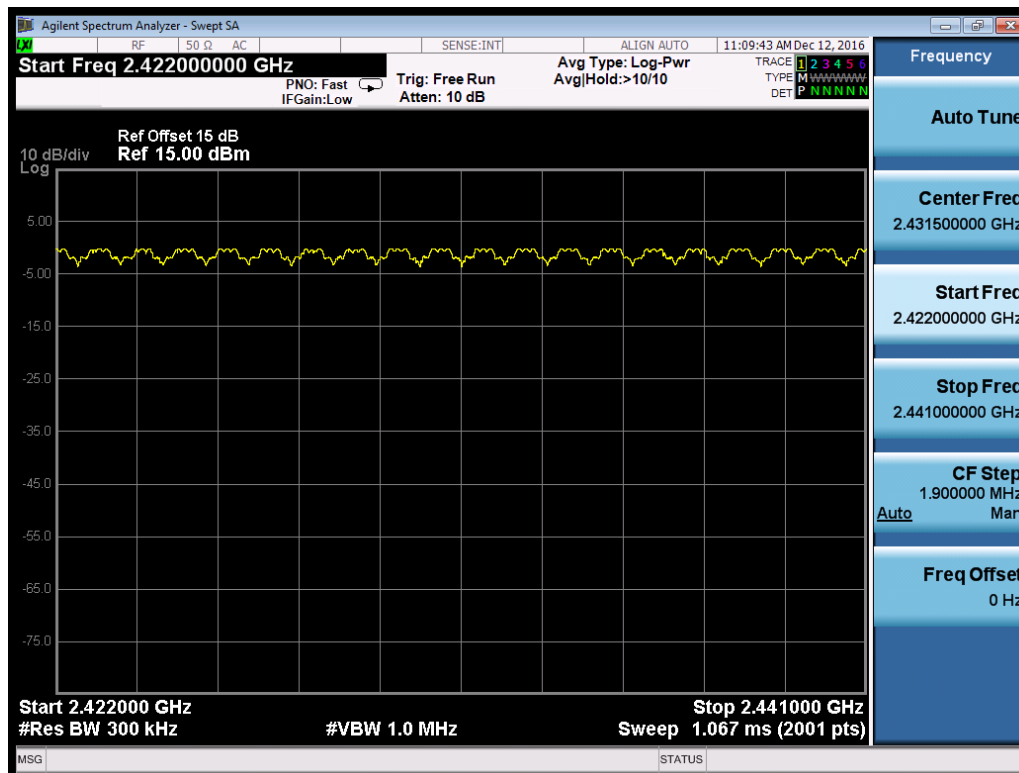
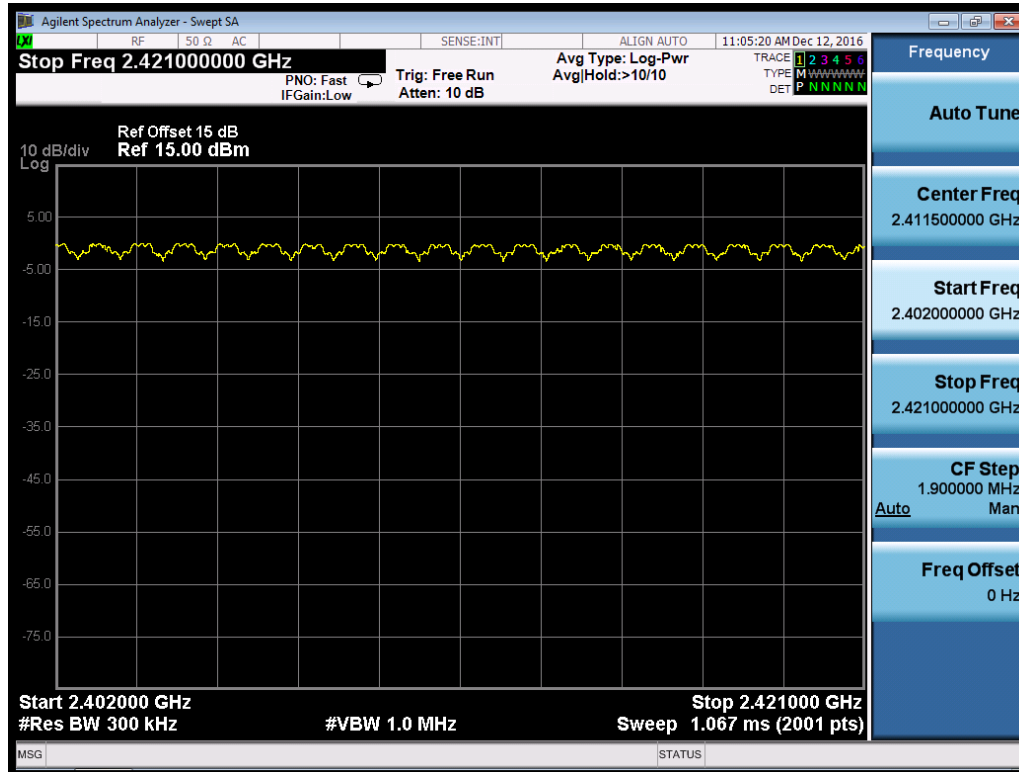


Figure 59: Number of Hopping Frequency, 2-DH5


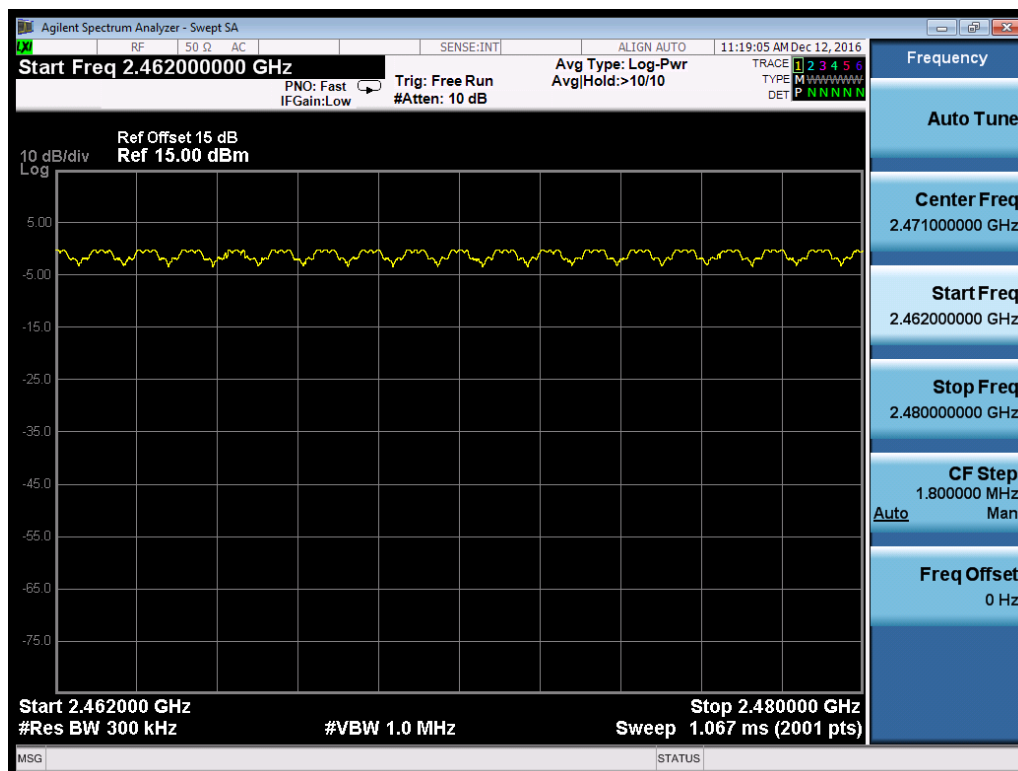
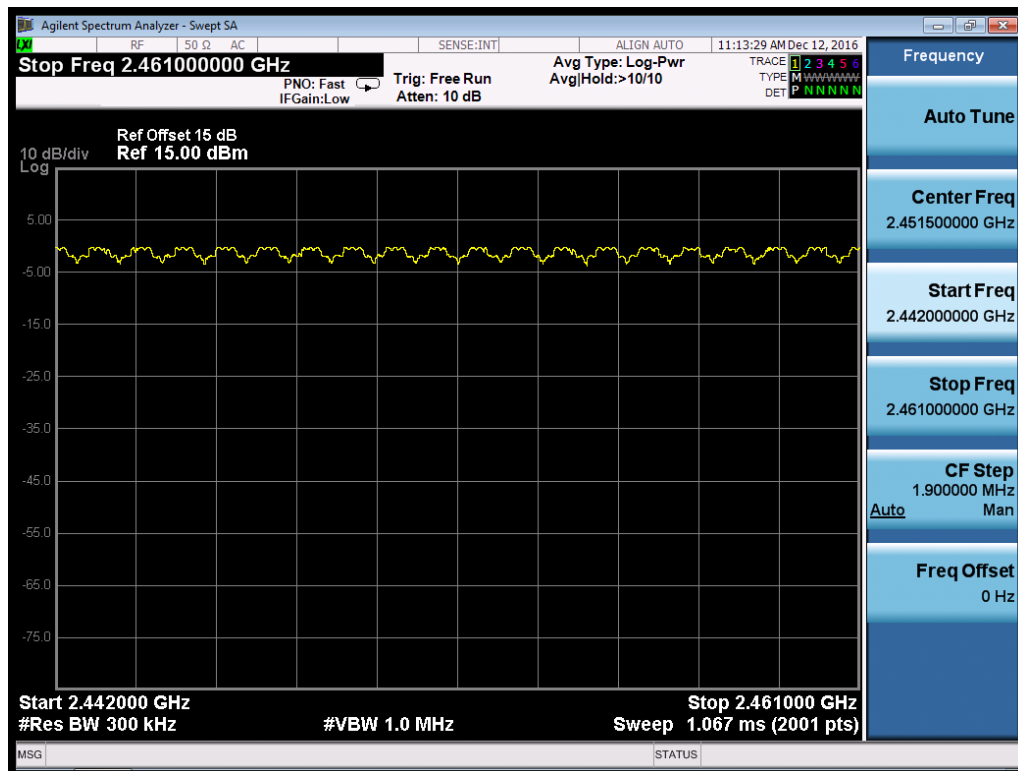
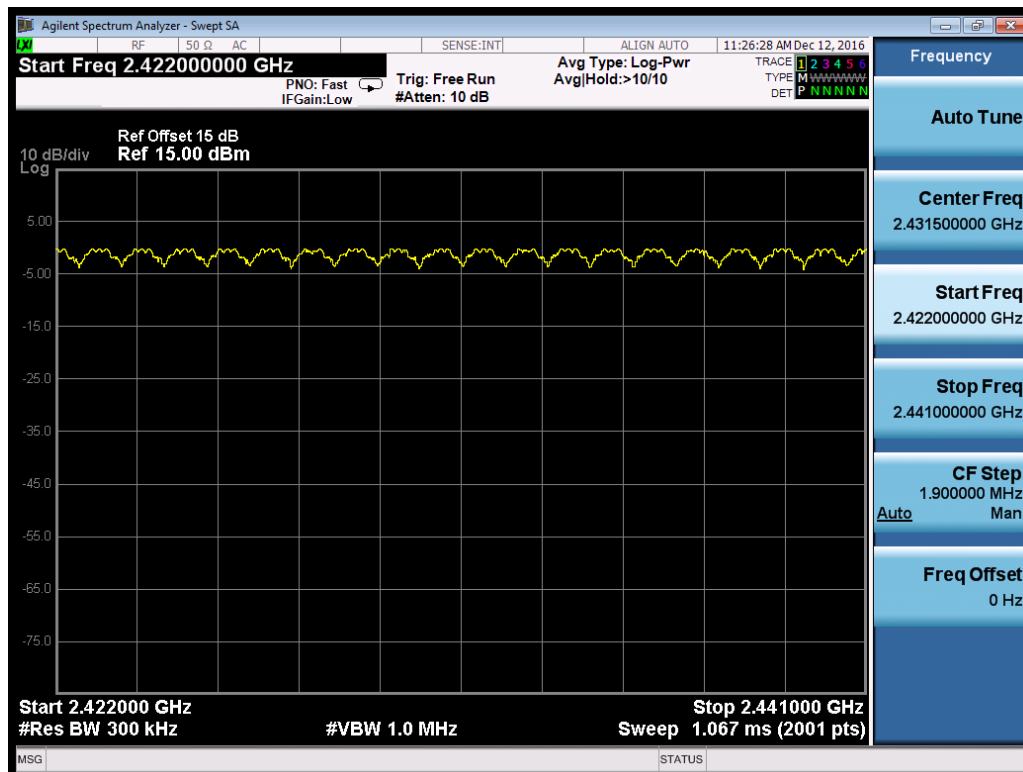
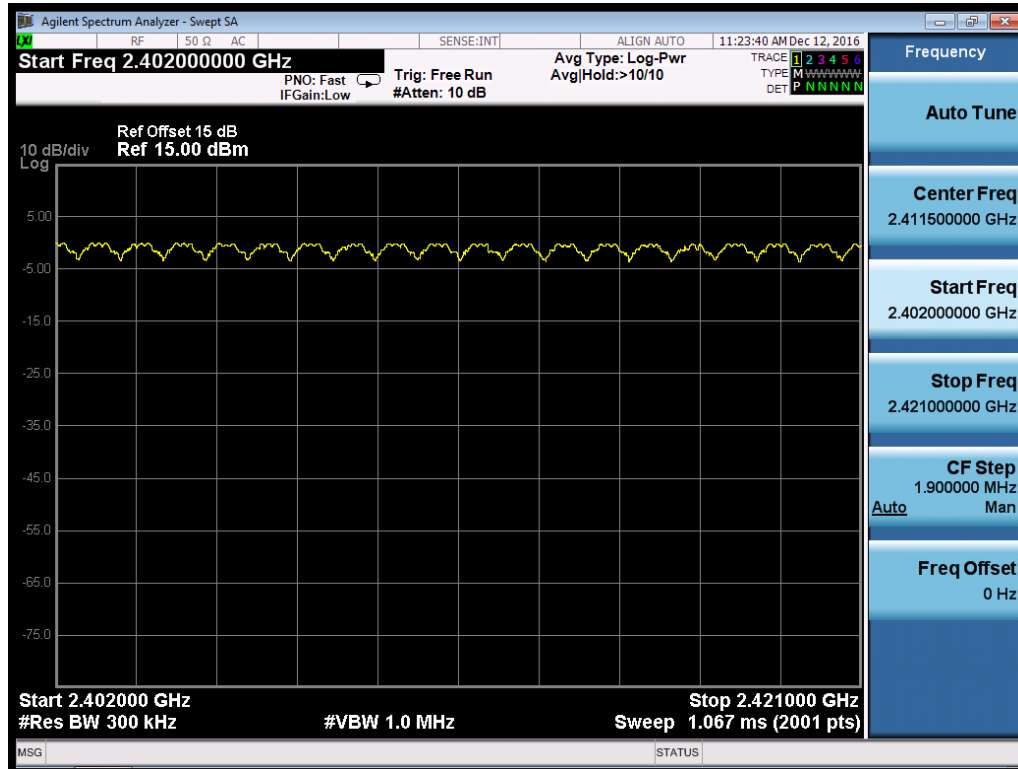
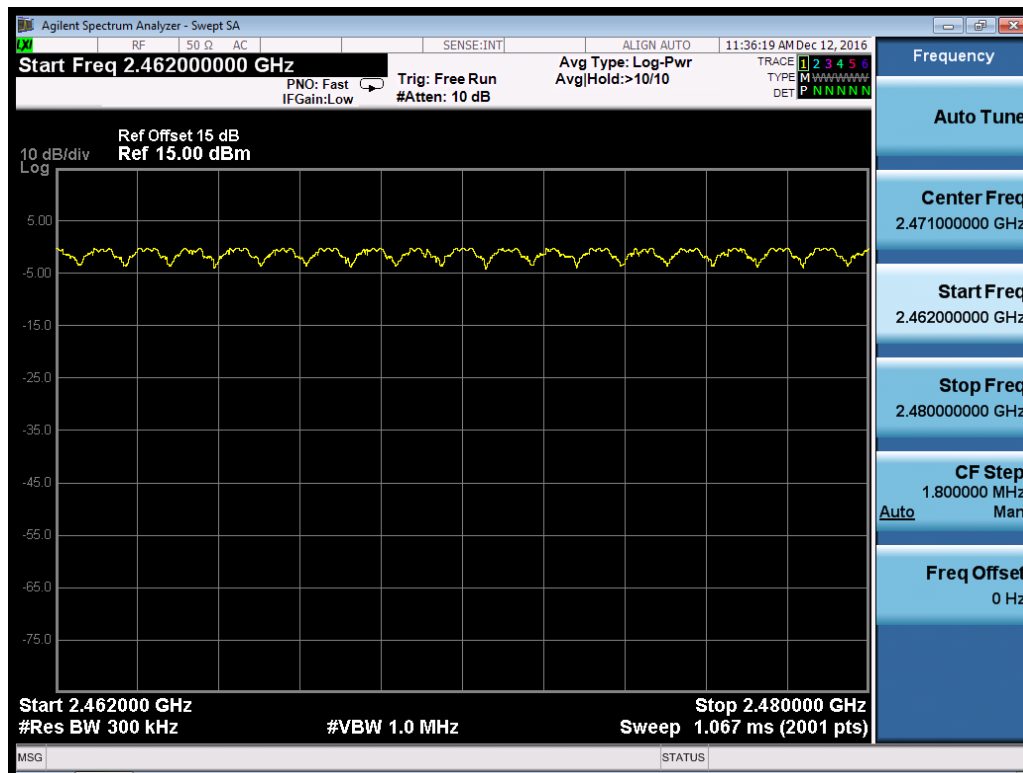
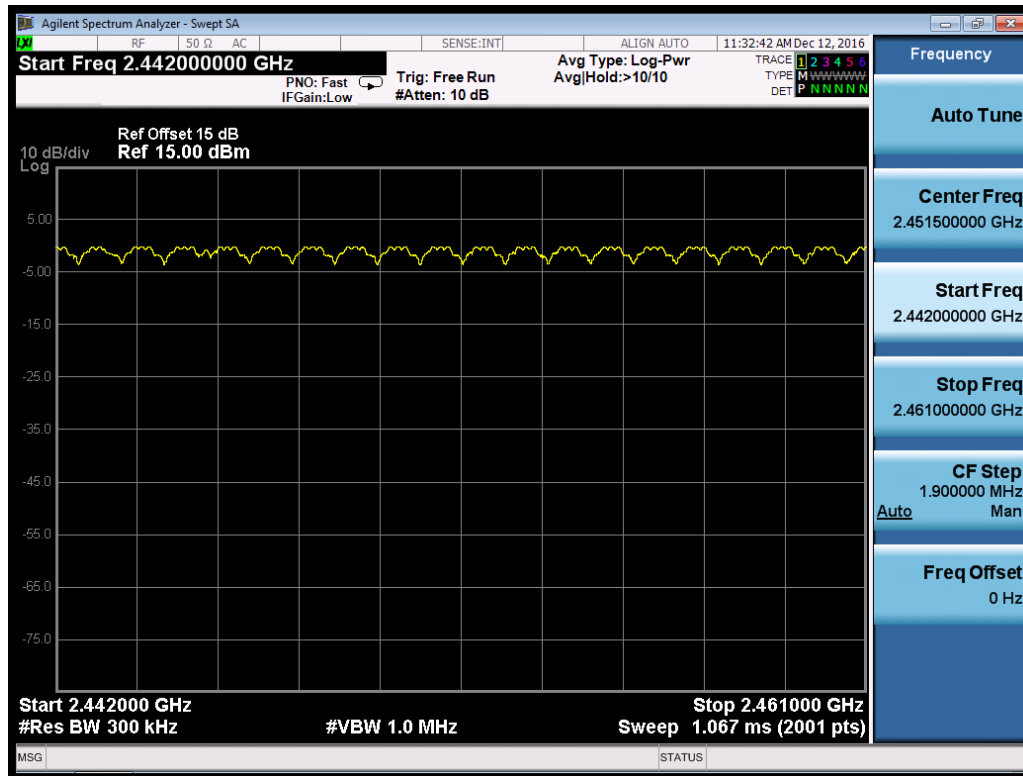


Figure 60: Number of Hopping Frequency, 3-DH5




5.1.8 Time of Occupancy

RESULT:**Pass**

Date of testing : 12.11.2016
Test standard : FCC 15.247(a)(1)(iii)
Basic standard : ANSI C63.10: 2013
Kind of test site : Shield room

Test setup

Test Channel : Middle
Operation mode : A.1.a.ii
Ambient temperature : 25°C
Relative humidity : 52%
Atmospheric pressure : 101kPa

Table 8: Time of Occupancy

Mode	Frequency (MHz)	Packet Duration (ms)	Number of Hops per Channel in a 31.6s Period	Average Time of Occupancy (ms)	Limit (ms)
3-DH1	2441	0.410	320	131.20	400
3-DH3	2441	1.657	160	265.60	400
3-DH5	2441	2.910	104	302.64	400

Note: Average time of occupancy = Packet duration * Number of hops per channel in a 31.6s period.

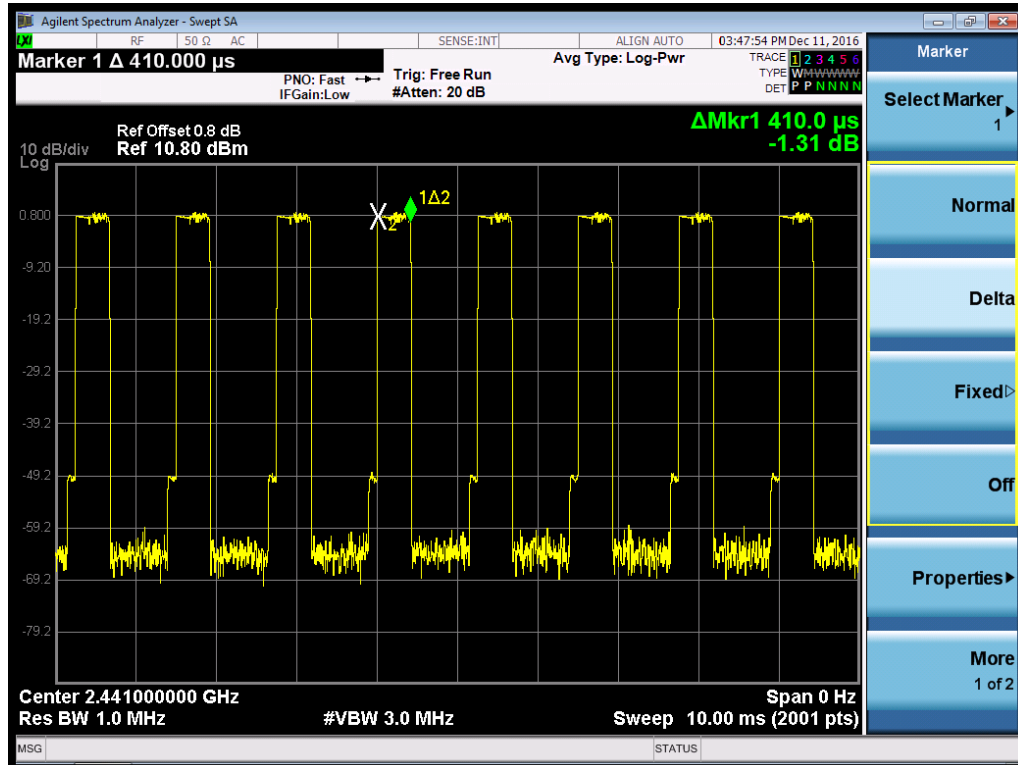
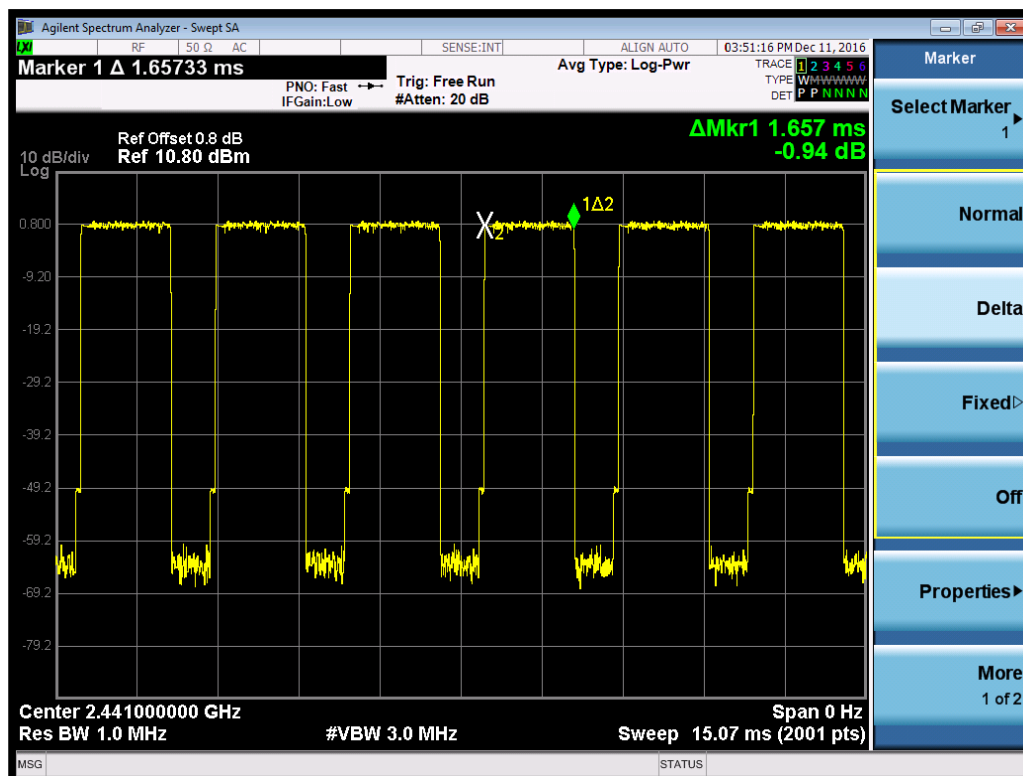
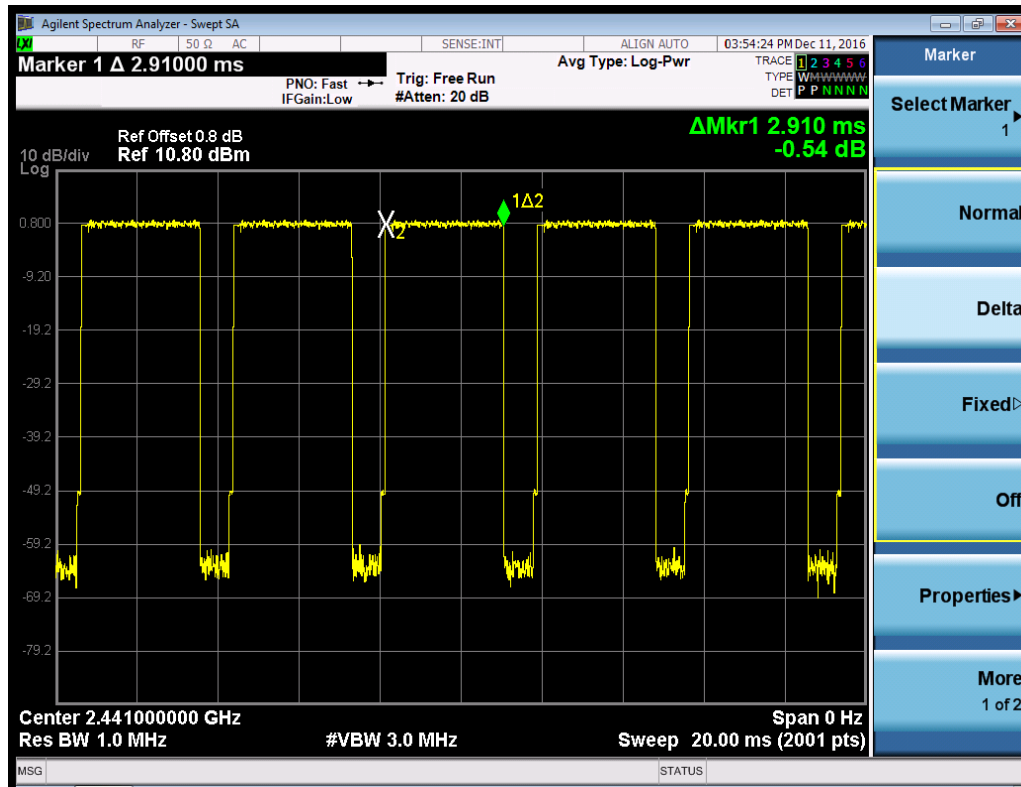
Figure 61: Time of Occupancy, 3-DH1, 2441MHz

Figure 62: Time of Occupancy, 3-DH3, 2441MHz


Figure 63: Time of Occupancy, 3-DH5, 2441MHz



6. List of Tables

Table 1: List of Test and Measurement Equipment	5
Table 2: Measurement Uncertainty	6
Table 3: Antenna Requirement	9
Table 3: Peak Output Power	10
Table 4: 20dB Bandwidth	11
Table 5: Spurious Emission.....	29
Table 6: Number of Hopping Frequency	49
Table 7: Time of Occupancy.....	56

7. List of Figures

Figure 1: 20dB Bandwidth, DH5, 2402MHz	12
Figure 2: 20dB Bandwidth, DH5, 2441MHz	12
Figure 3: 20dB Bandwidth, DH5, 2480MHz	13
Figure 4: 20dB Bandwidth, 2-DH5, 2402MHz	13
Figure 5: 20dB Bandwidth, 2-DH5, 2441MHz	14
Figure 6: 20dB Bandwidth, 2-DH5, 2480MHz	14
Figure 7: 20dB Bandwidth, 3-DH5, 2402MHz	15
Figure 8: 20dB Bandwidth, 3-DH5, 2441MHz	15
Figure 9: 20dB Bandwidth, 3-DH5, 2480MHz	16
Figure 10: Conducted Spurious Emission, DH5, 2402MHz	18
Figure 11: Conducted Spurious Emission, DH5, 2441MHz	18
Figure 12: Conducted Spurious Emission, DH5, 2480MHz	19
Figure 13: Conducted Spurious Emission, 2-DH5, 2402MHz	19
Figure 14: Conducted Spurious Emission, 2-DH5, 2441MHz	20
Figure 15: Conducted Spurious Emission, 2-DH5, 2480MHz	20
Figure 16: Conducted Spurious Emission, 3-DH5, 2402MHz	21
Figure 17: Conducted Spurious Emission, 3-DH5, 2441MHz	21
Figure 18: Conducted Spurious Emission, 3-DH5, 2480MHz	22
Figure 19: Band Edge, DH5, 2402MHz	23
Figure 20: Band Edge, DH5, 2480MHz	24
Figure 21: Band Edge, 2-DH5, 2402MHz	25
Figure 22: Band Edge, 2-DH5, 2480MHz	26
Figure 23: Band Edge, 3-DH5, 2402MHz	27
Figure 24: Band Edge, 3-DH5, 2480MHz	28
Figure 25: Band Edge, DH5, 2402MHz, Horizontal, PK	32
Figure 26: Band Edge, DH5, 2402MHz, Horizontal, AV	32
Figure 27: Band Edge, DH5, 2402MHz, Vertical, PK	33
Figure 28: Band Edge, DH5, 2402MHz, Vertical, AV	33
Figure 29: Band Edge, DH5, 2480MHz, Horizontal, PK	34