

Prüfbericht-Nr.: <i>Test Report No.:</i>	50072027 001	Auftrags-Nr.: <i>Order No.:</i>	154213766	Seite 1 von 62 <i>Page 1 of 62</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	615487	Auftragsdatum: <i>Order date:</i>	10.02.2016	
Auftraggeber: <i>Client:</i>	ALE International 32 avenue Kléber – 92700 Colombes - France			
Prüfgegenstand: <i>Test item:</i>	BTDB02			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	BTDB02 FCC ID: OL3BTMOD02 IC: 1737D-BTMOD02			
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 Public Notice DA 00-705 March 30, 2000 RSS-Gen Issue 4, November 2014 RSS-247 Issue 2, February 2017			
Wareneingangsdatum: <i>Date of receipt:</i>	11.17.2016			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000457947-001			
Prüfzeitraum: <i>Testing period:</i>	12.28.2016 to 02.23.2017			
Ort der Prüfung: <i>Place of testing:</i>	MRT Technology(Suzhou) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfresultat*: <i>Test result*:</i>	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
03.03.2017 <i>Date</i>	Elliot Zhang / Senior Project Engineer <i>Name / Stellung</i>	03.03.2017 <i>Date</i>	Shi Li / Section Manager <i>Name / Stellung</i>	
	Unterschrift <i>Signature</i>		Unterschrift <i>Signature</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 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable 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 FREQUENCY SEPARATION

RESULT: Pass

5.1.6 NUMBER OF HOPPING FREQUENCY

RESULT: Pass

5.1.7 TIME OF OCCUPANCY

RESULT: Pass

5.2.1 CONDUCTED EMISSION

RESULT: N/A

5.3.1 RADIATED SPURIOUS EMISSION

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	5
2.4	CALIBRATION	5
2.5	MEASUREMENT UNCERTAINTY	6
3.	GENERAL PRODUCT INFORMATION	7
3.1	PRODUCT FUNCTION AND INTENDED USE	7
3.2	RATINGS AND SYSTEM DETAILS	7
3.3	INDEPENDENT OPERATION MODES	8
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS	8
3.5	SUBMITTED DOCUMENTS	8
4.	TEST SET-UP AND OPERATION MODES	9
4.1	PRINCIPLE OF CONFIGURATION SELECTION	9
4.2	TEST OPERATION AND TEST SOFTWARE	9
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	9
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE	9
5.	TEST RESULTS	10
5.1	CONDUCTED TESTING AT ANTENNA PORT	10
5.1.1	<i>Antenna Requirement</i>	<i>10</i>
5.1.2	<i>Peak Output Power</i>	<i>12</i>
5.1.3	<i>20dB Bandwidth</i>	<i>13</i>
5.1.4	<i>Conducted Spurious Emissions</i>	<i>19</i>
5.1.5	<i>Frequency Separation</i>	<i>28</i>
5.1.6	<i>Number of Hopping Frequency</i>	<i>34</i>
5.1.7	<i>Time of Occupancy</i>	<i>41</i>
5.2	EMISSION IN THE FREQUENCY RANGE UP TO 30MHZ	44
5.2.1	<i>Conducted Emission</i>	<i>44</i>
5.3	EMISSION IN THE FREQUENCY RANGE ABOVE 30MHZ	45
5.3.1	<i>Radiated Spurious Emission</i>	<i>45</i>
6.	LIST OF TABLES	61
7.	LIST OF FIGURES	61

1. General Remarks

1.1 Complementary Materials

Null.

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**Radiated Test Equipments**

Instrument	Manufacturer	Type No.	Asset No.	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	MY45300136	12.08.2017
EMI Test Receiver	R&S	ESR7	101209	11.03.2017
Preamplifier	Schwarzbeck	BBV 9721	9721-008	04.16.2017
Preamplifier	Agilent	83017A	MY53270040	03.29.2017
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	12.14.2017
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	11.07.2017
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	11.07.2017
Broadband Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170549	01.04.2018
Digital Thermometer & Hygrometer	Minggao	N/A	N/A	11.30.2017

Conducted Test Equipments

Instrument	Manufacturer	Type No.	Asset No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	05.08.2017
USB Wideband Power Sensor	Boonton	55006	8911	05.08.2017
Temperature/Humidity Meter	Yuhua	N/A	N/A	12.20.2017

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 Bluetooth 4.2 dual-mode module using on telephone.

The aim of this report is to evaluate the RF characteristic of the Bluetooth Classical Part of this module.

For details refer to the User Manual and Circuit Diagram.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Description of EUT	
Product Name:	BTDB02
Brand Name:	Alcatel-Lucent
Model No.:	BTDB02
Rated Voltage:	DC 3.3V
Type of Product:	Portable Device
Bluetooth Classical	
Frequency Range:	2402 – 2480MHz
Modulation Type:	BR: GFSK EDR: $\pi/4$ -DQPSK; 8DPSK
Antenna Type:	PCB Antenna
Antenna Gain:	5.1dBi
Bluetooth Low Energy	
Frequency Range:	2402 – 2480MHz
Modulation Type:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	5.1dBi

3.3 Independent Operation Modes

Test Mode	Data Rate	Channel
TM1	1-DH5	00
TM2	1-DH5	39
TM3	1-DH5	78
TM4	2-DH5	00
TM5	2-DH5	39
TM6	2-DH5	78
TM7	3-DH5	00
TM8	3-DH5	39
TM9	3-DH5	78
TM10	1-DH5	Hopping
TM11	2-DH5	Hopping
TM12	3-DH5	Hopping
TM13	3-DH3	Hopping
TM14	3-DH1	Hopping

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 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.

4.3 Special Accessories and Auxiliary Equipment

Null.

4.4 Countermeasures to achieve EMC Compliance

Null.

5. Test Results

5.1 Conducted Testing at Antenna Port

5.1.1 Antenna Requirement

RESULT:**Pass**

According to the manufacturer declared, the EUT has one PCB antenna, the directional gain of antenna is 5.1 dBi and the antenna is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Table 4: 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 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 integral antenna can be used
Verdict:	PASS

RSS-Gen 6.3 – External Control	
Requirement:	The device shall not have any external controls accessible to the user that enable it to be adjusted, selected or programmed to operate in violation of the limits prescribed in the applicable RSS.
Results:	The device does not have any transmitter external controls accessible to the user that can be adjusted and operated in violation of the limits of this standard.
Verdict:	PASS

RSS-Gen 8.3 – Antenna Requirement

Requirement: When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacture.

Results:

a) Antenna Type:	PCB antenna
b) Manufacture:	N/A
c) Model No.:	N/A
d) Gain with reference to an isotropic radiator:	5.1dBi

Verdict: PASS

5.1.2 Peak Output Power

RESULT:
Pass

Date of testing : 12.28.2016
 Test standard : FCC Part 15.247(b)(1)
 Clause 5.4(b) of RSS-247 Issue 2 February 2017
 Test procedure : ANSI C63.10: 2013
 Public Notice DA 00-705 March 30, 2000
 Limit : FCC Part 15.247(b)(1)
 Clause 5.4(b) of RSS-247 Issue 2 February 2017
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : TM1 to TM9
 Ambient temperature : 25°C
 Relative humidity : 52%
 Atmospheric pressure : 101kPa

Table 5: Peak Output Power, TM1 to TM9

Mode	Antenna Gain [dBi]	CH.	Freq. [MHz]	Maximum Peak Conducted Output Power [dBm]	Peak Conducted Output Power Limit [dBm]	Maximum EIRP [dBm]	RSS-247 EIRP Limit [dBm]
TM1	5.1	00	2402	2.49	30	7.59	36
TM2		39	2441	1.18	30	6.28	36
TM3		78	2480	1.65	30	6.75	36
TM4		00	2402	5.13	30	10.23	36
TM5		39	2441	-0.92	30	4.18	36
TM6		78	2480	2.35	30	7.45	36
TM7		00	2402	3.48	30	8.58	36
TM8		39	2441	2.42	30	7.52	36
TM9		78	2480	2.84	30	7.94	36

Note:

EIRP=Peak Conducted Output Power + Antenna Gain

5.1.3 20dB Bandwidth

RESULT:**Pass**

Date of testing : 12.28.2016
Test standard : FCC Part 15.247(a)(1)
Clause 5.1(a) of RSS-247 Issue 2 February 2017
Test procedure : ANSI C63.10: 2013
Public Notice DA 00-705 March 30, 2000
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : TM1 to TM9
Ambient temperature : 25°C
Relative humidity : 52%
Atmospheric pressure : 101kPa

Table 6: 20dB Bandwidth, TM1 to TM9

Mode	Frequency [MHz]	20dB Bandwidth [kHz]	99% Bandwidth [kHz]
TM1	2402	921.0	845.18
TM2	2441	920.4	843.82
TM3	2480	920.1	834.92
TM4	2402	1316.0	1188.1
TM5	2441	1317.0	1188.8
TM6	2480	1317.0	1190.9
TM7	2402	1284.0	1197.2
TM8	2441	1284.0	1195.9
TM9	2480	1283.0	1195.3

Note:

For frequency hopping systems operating in the 2400 – 2483.5MHz band, no bandwidth limit is specified. The test data is provide 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, TM1

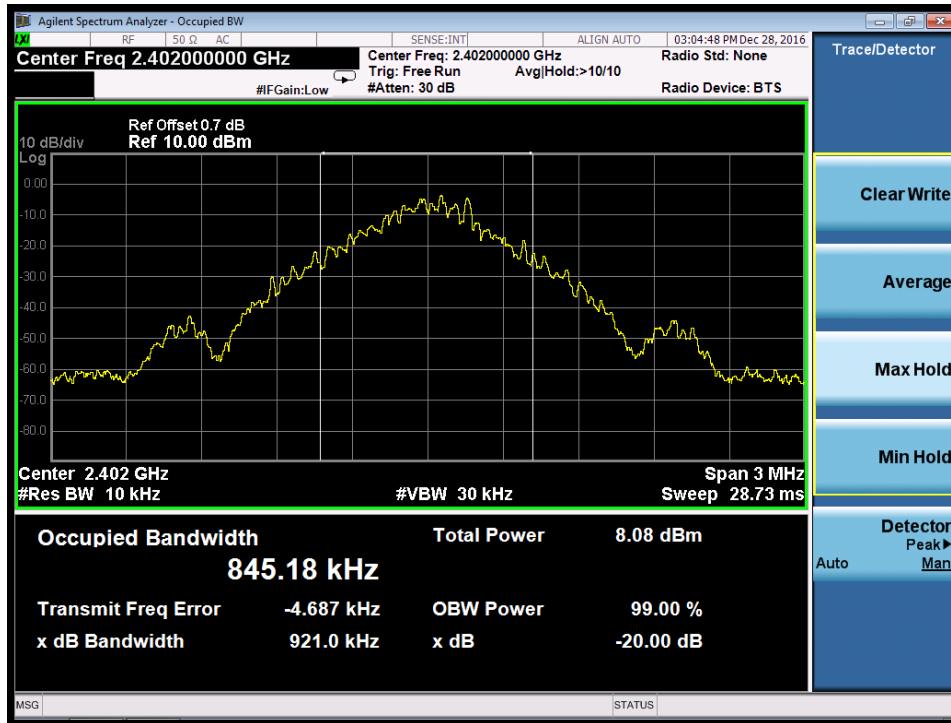


Figure 2: 20dB Bandwidth, TM2

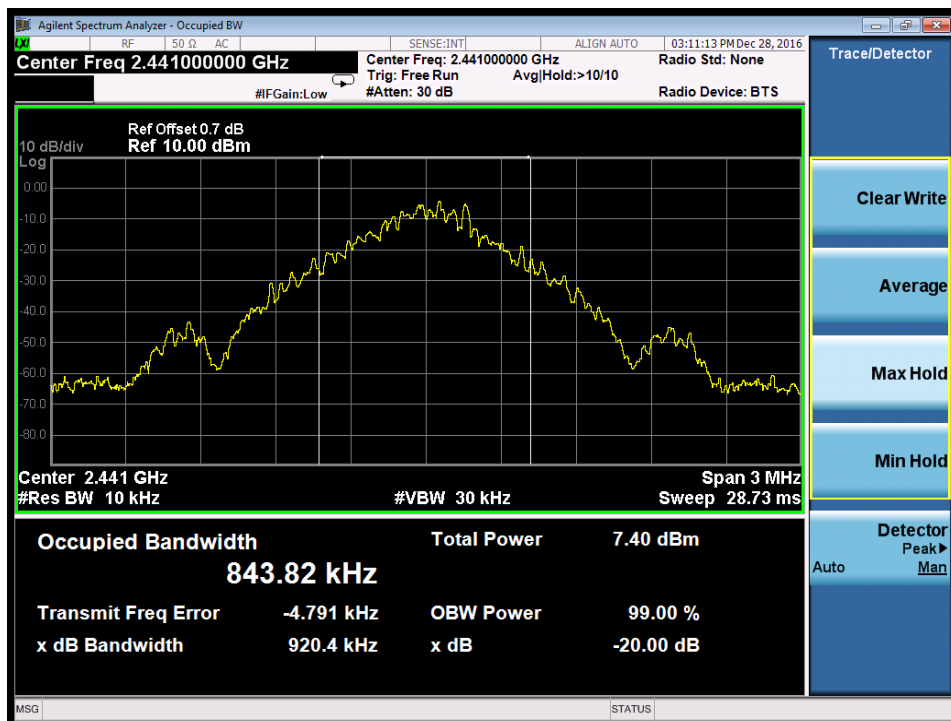


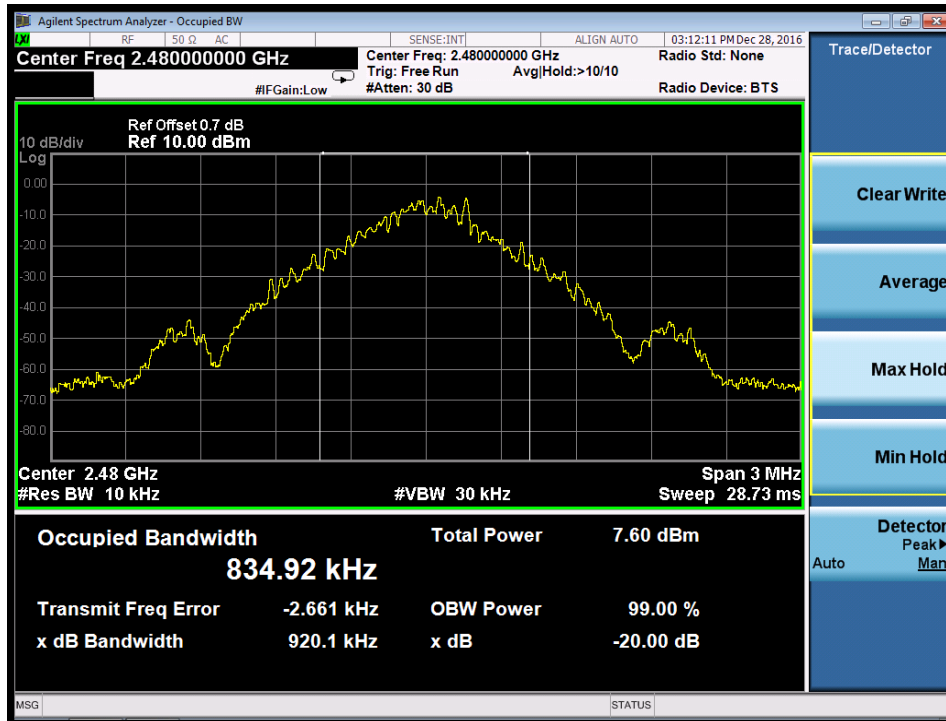
Figure 3: 20dB Bandwidth, TM3

Figure 4: 20dB Bandwidth, TM4


Figure 5: 20dB Bandwidth, TM5

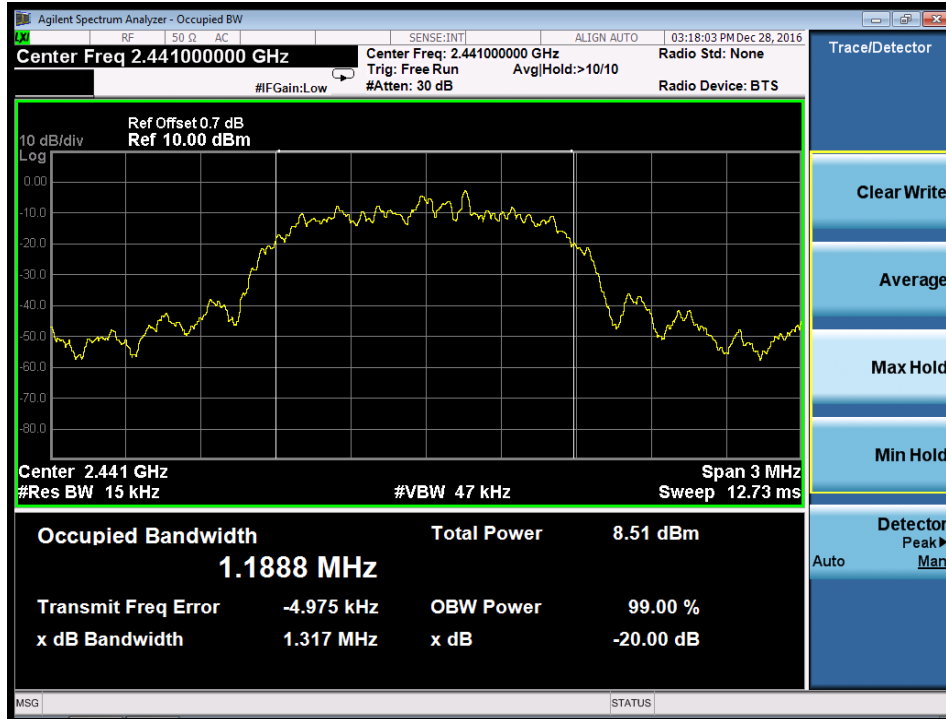


Figure 6: 20dB Bandwidth, TM6



Figure 7: 20dB Bandwidth, TM7

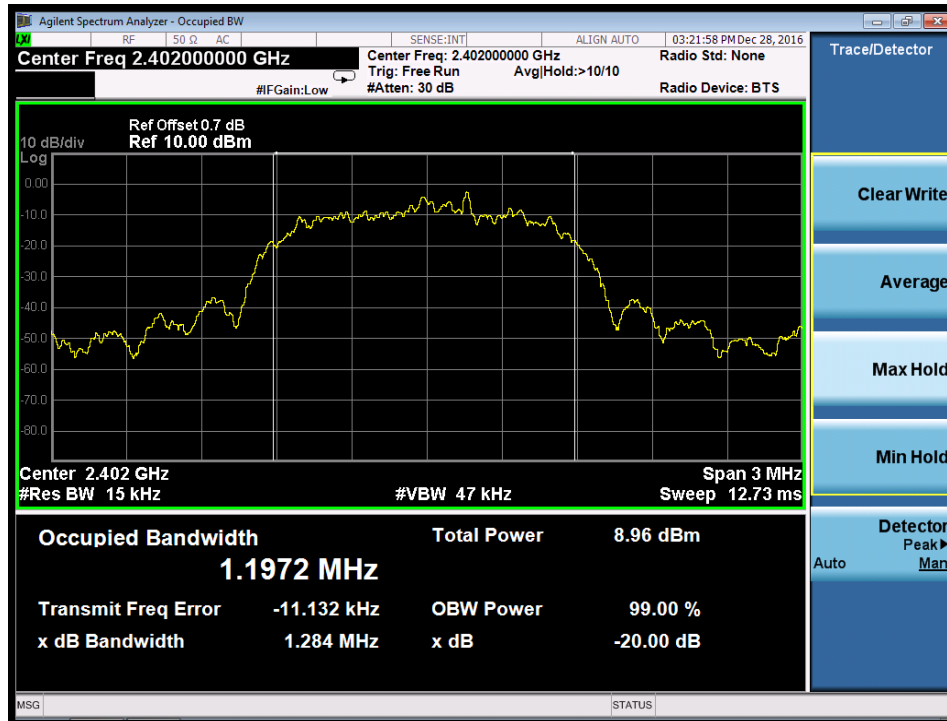


Figure 8: 20dB Bandwidth, TM8

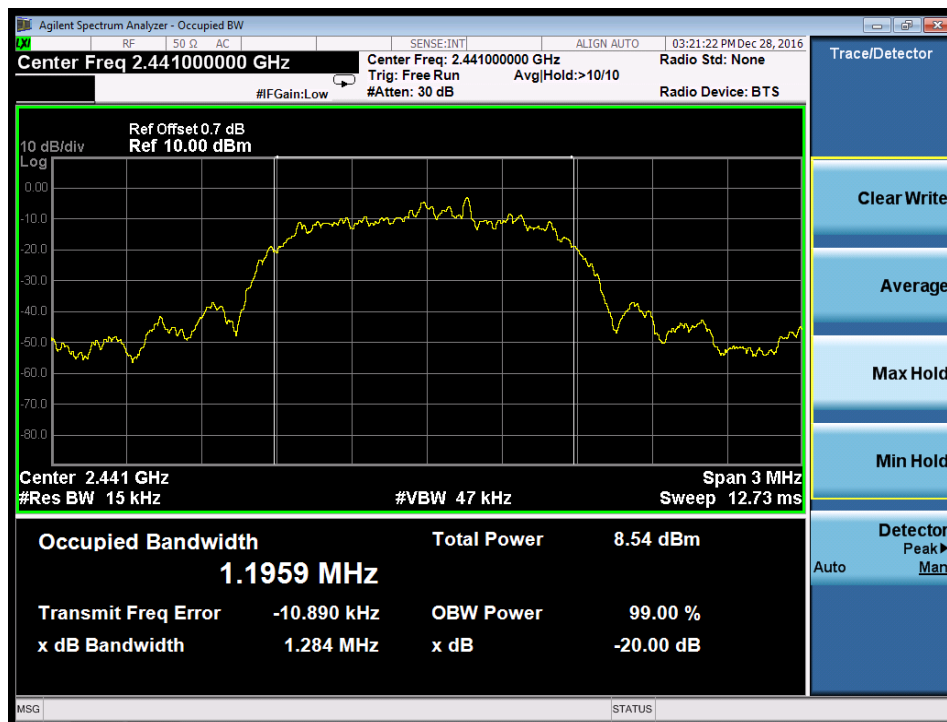
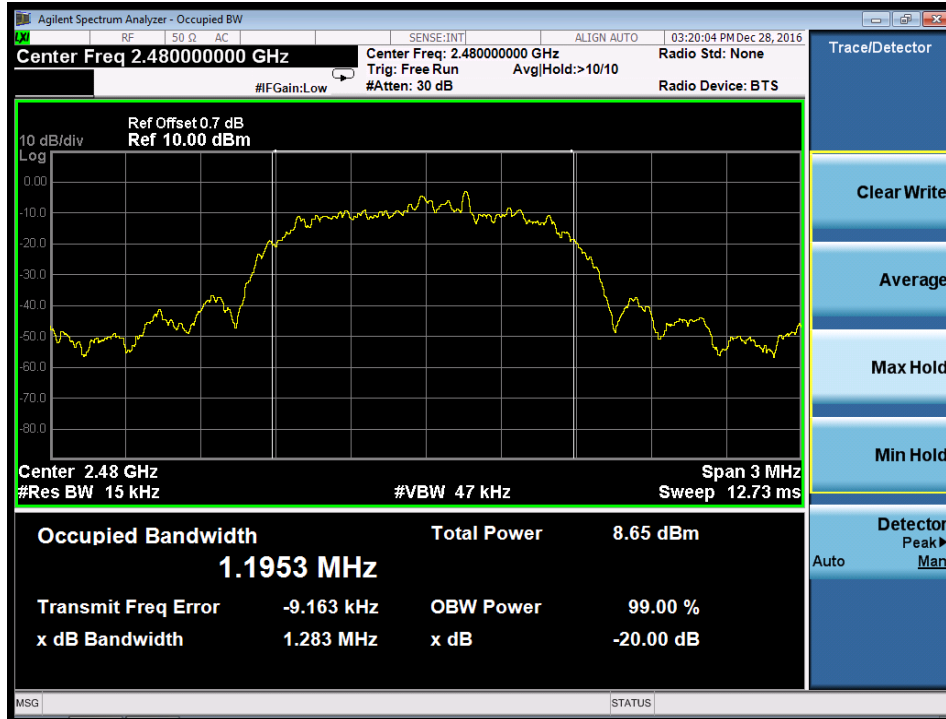


Figure 9: 20dB Bandwidth, TM9



5.1.4 Conducted Spurious Emissions

RESULT:**Pass**

Date of testing	: 12.28.2016
Test standard	: FCC Part 15.247(d) Clause 5.5 of RSS-247 Issue 2 February 2017
Test procedure	: ANSI C63.10: 2013 Public Notice DA 00-705 March 30, 2000
Limit	: FCC Part 15.247(d) Clause 5.5 of RSS-247 Issue 2 February 2017
Kind of test site	: Shielded room

Test setup

Test Channel	: Low/ Middle/ High
Operation Mode	: TM1 to TM9
Ambient temperature	: 25°C
Relative humidity	: 52%
Atmospheric pressure	: 101kPa

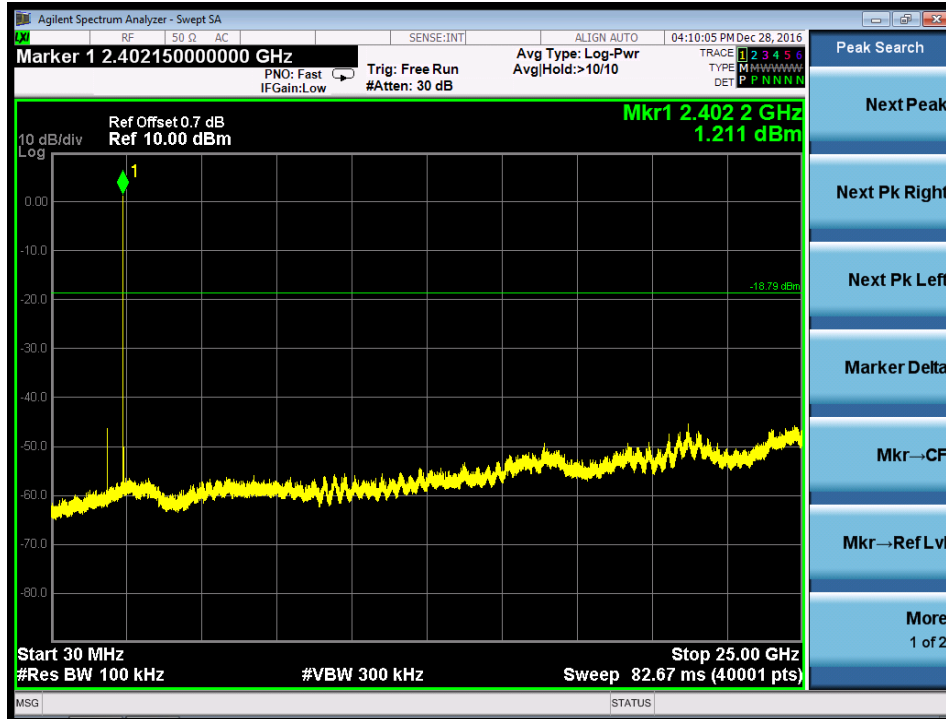
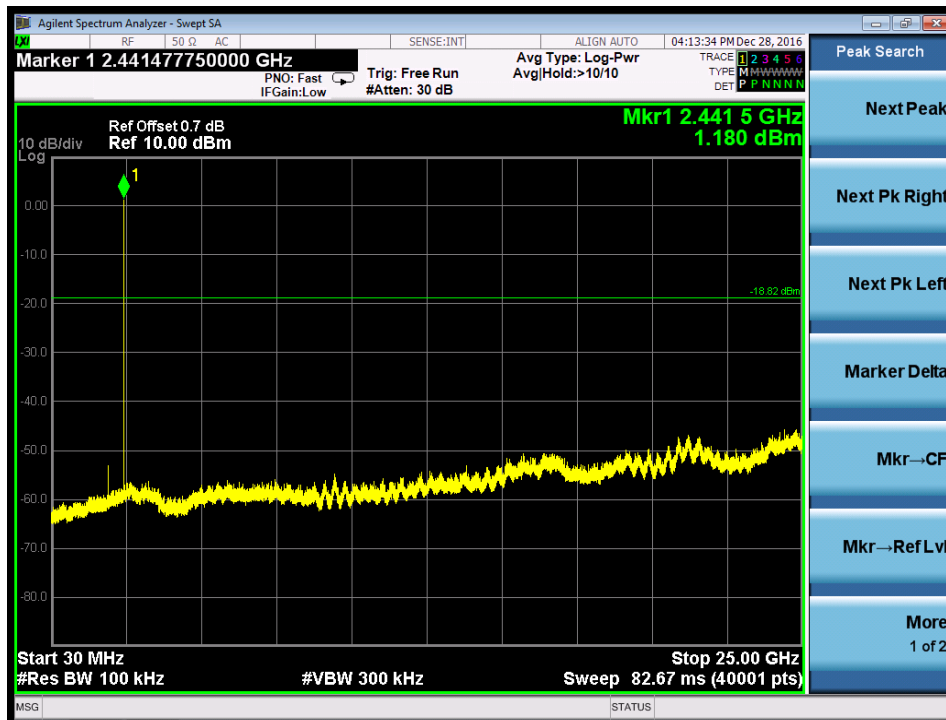
Figure 10: Conducted Spurious Emission, TM1

Figure 11: Conducted Spurious Emission, TM2


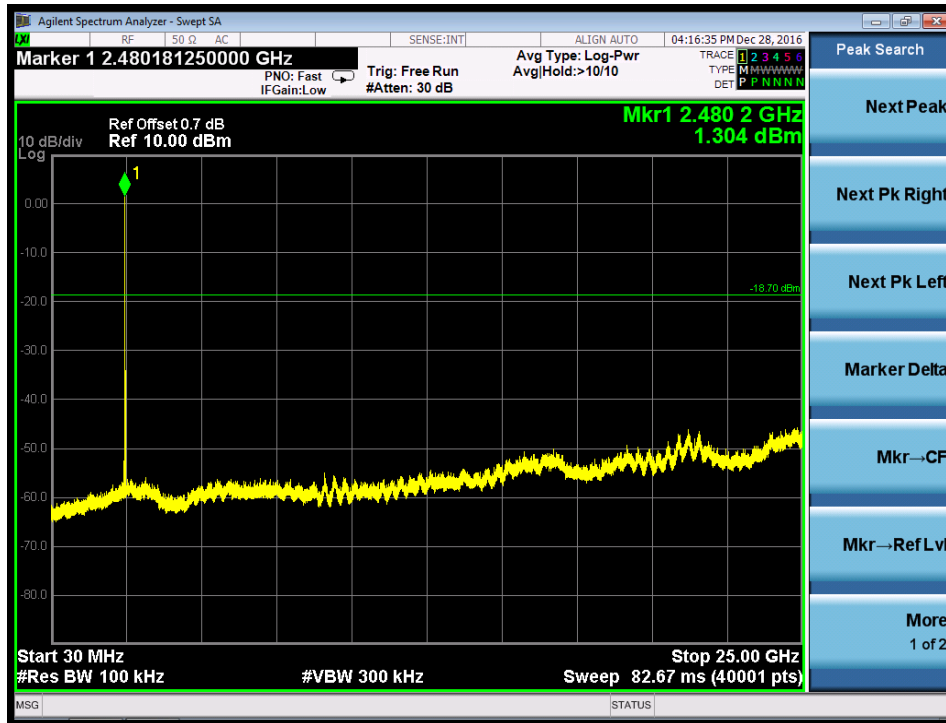
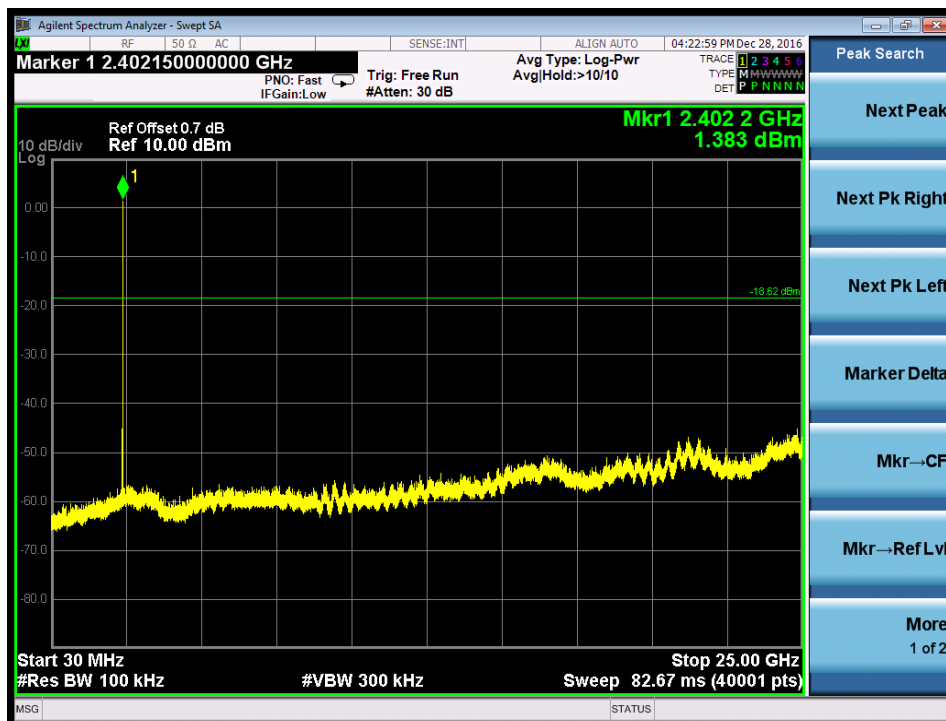
Figure 12: Conducted Spurious Emission, TM3

Figure 13: Conducted Spurious Emission, TM4


Figure 14: Conducted Spurious Emission, TM5

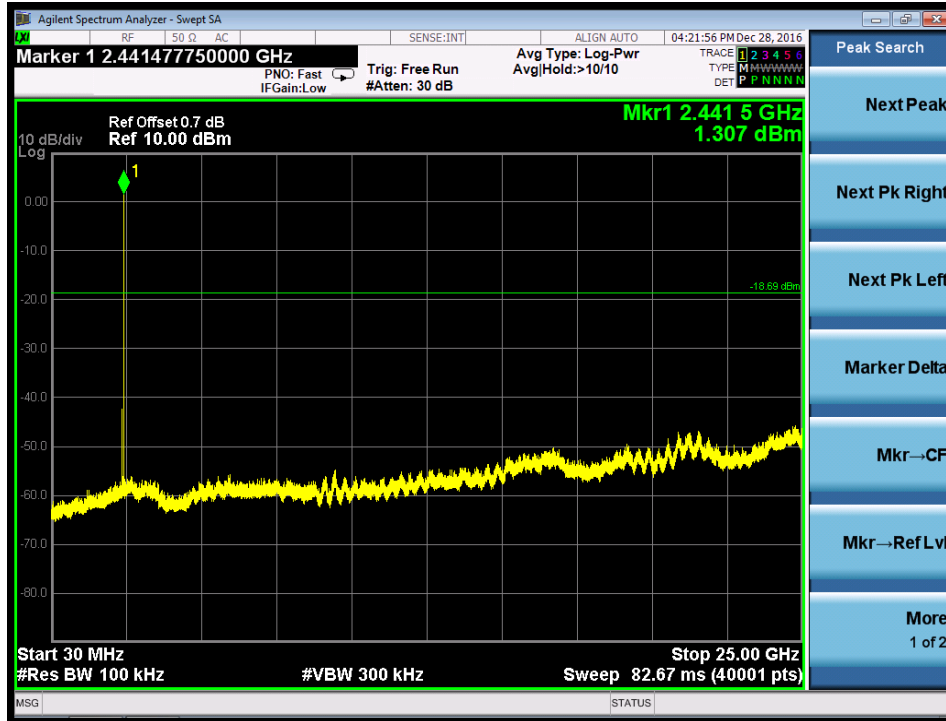


Figure 15: Conducted Spurious Emission, TM6

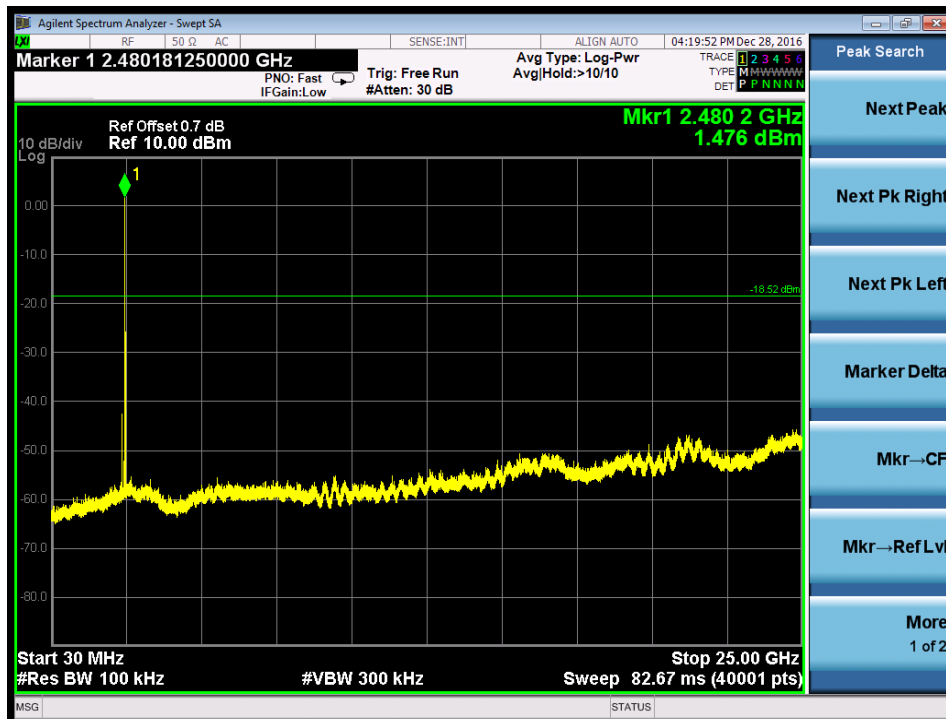


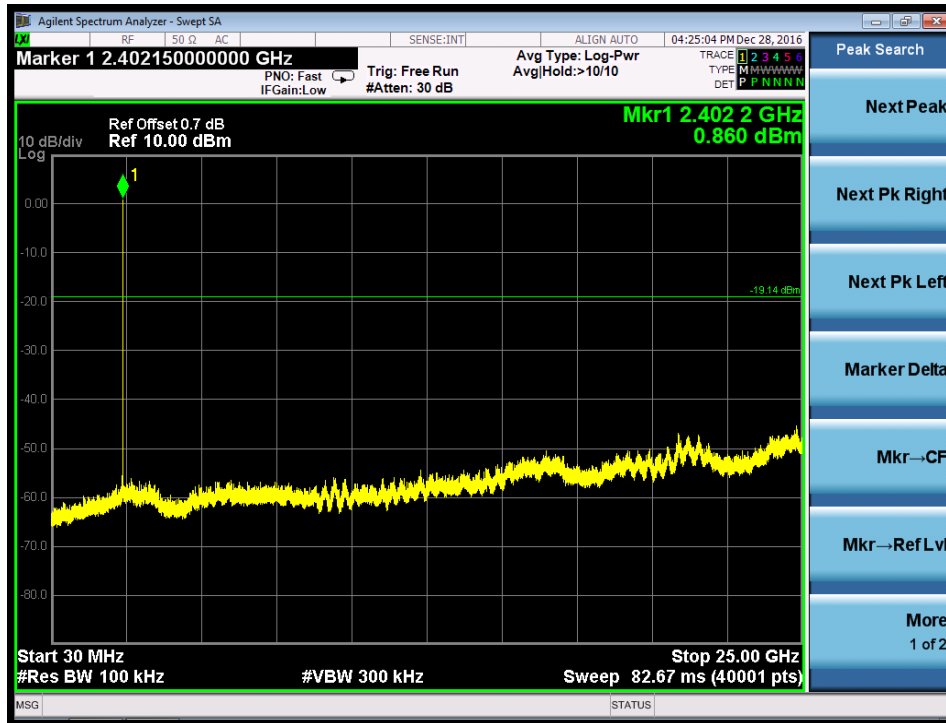
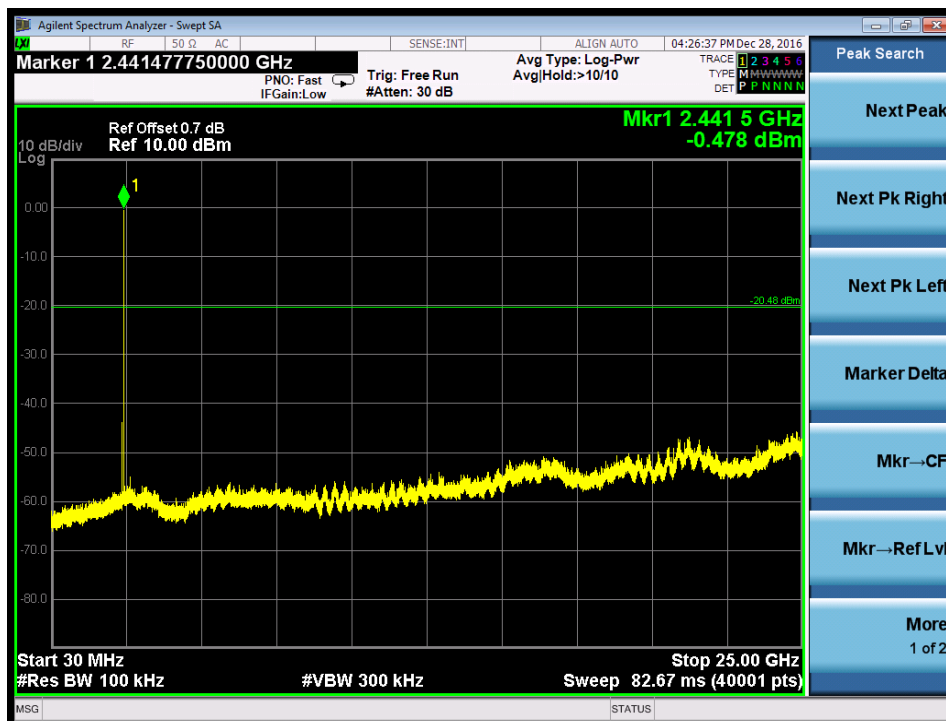
Figure 16: Conducted Spurious Emission, TM7

Figure 17: Conducted Spurious Emission, TM8


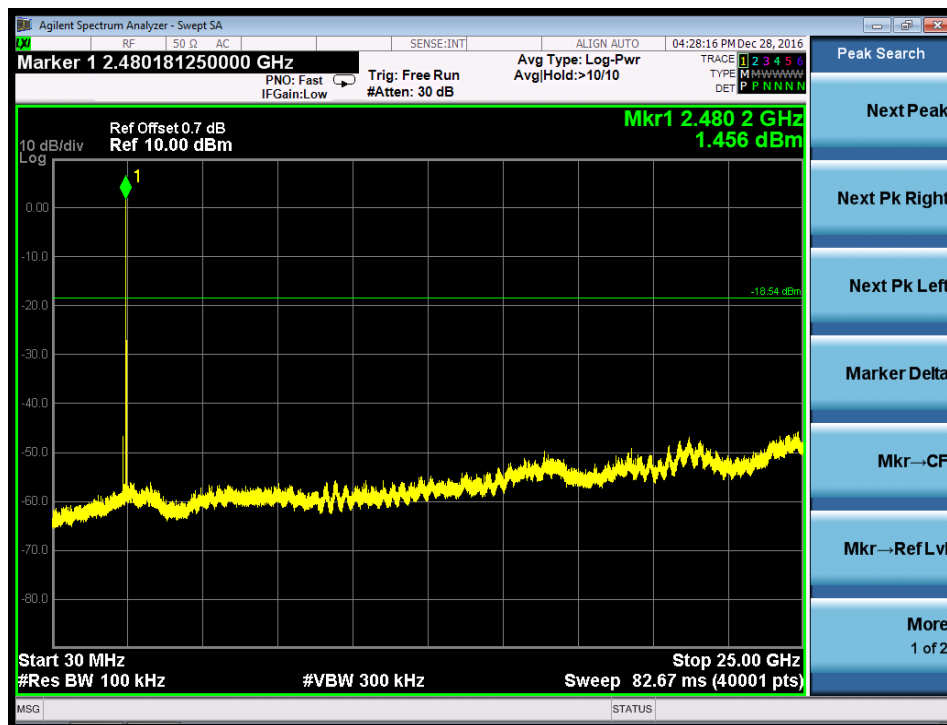
Figure 18: Conducted Spurious Emission, TM9

Figure 19: Band Edge, TM1

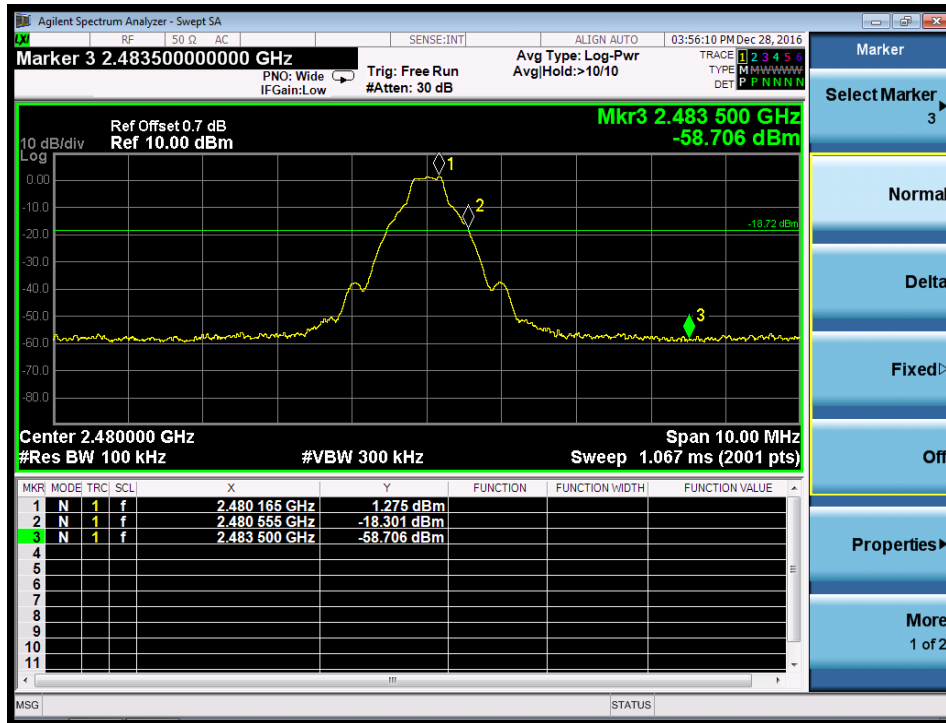
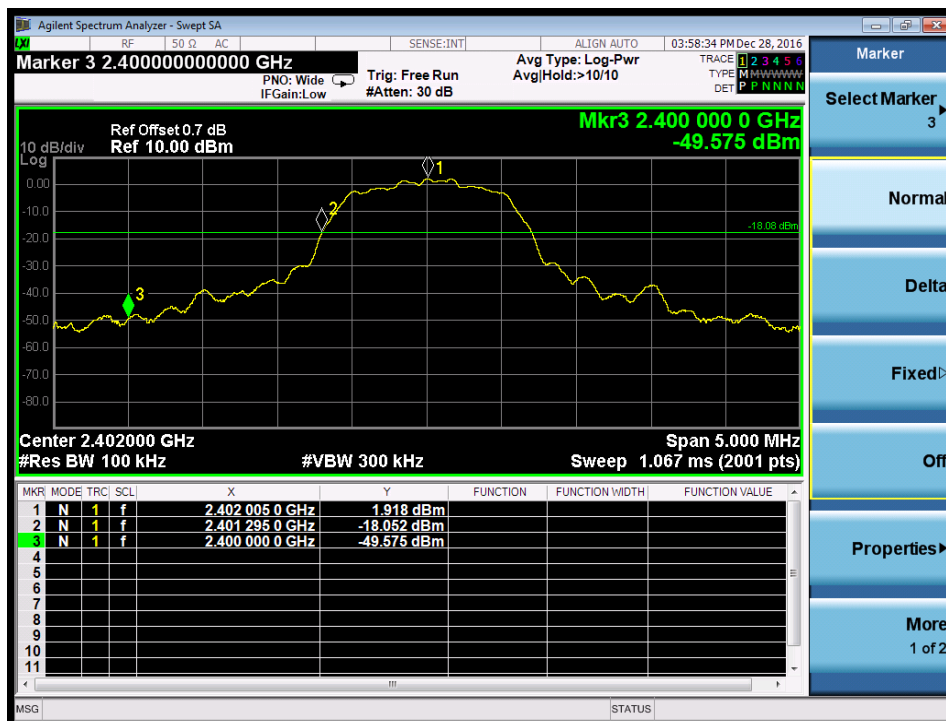

Figure 20: Band Edge, TM3

Figure 21: Band Edge, TM4


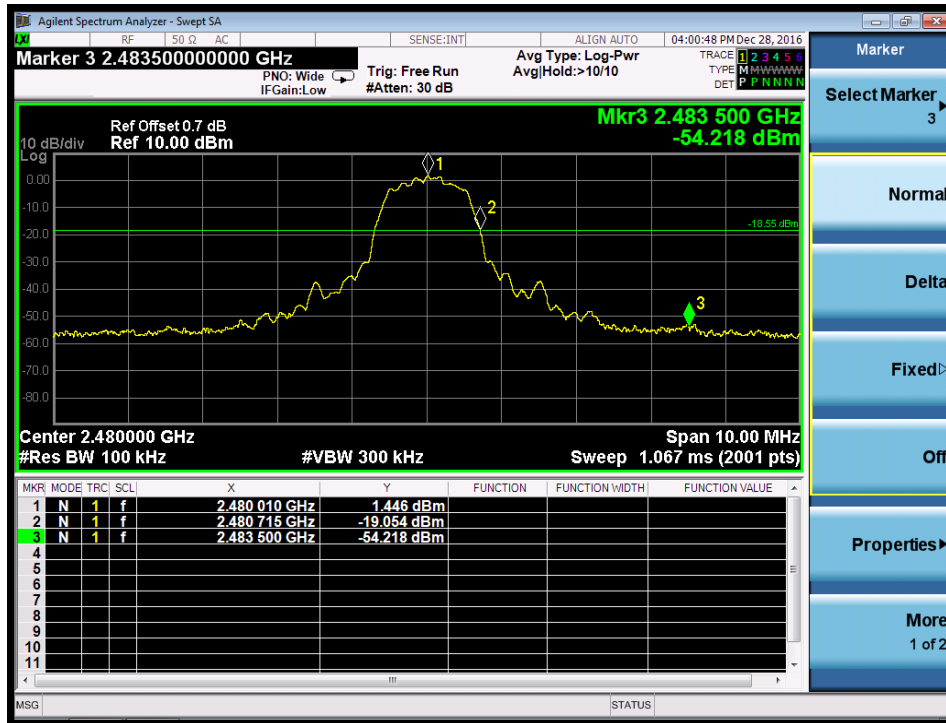
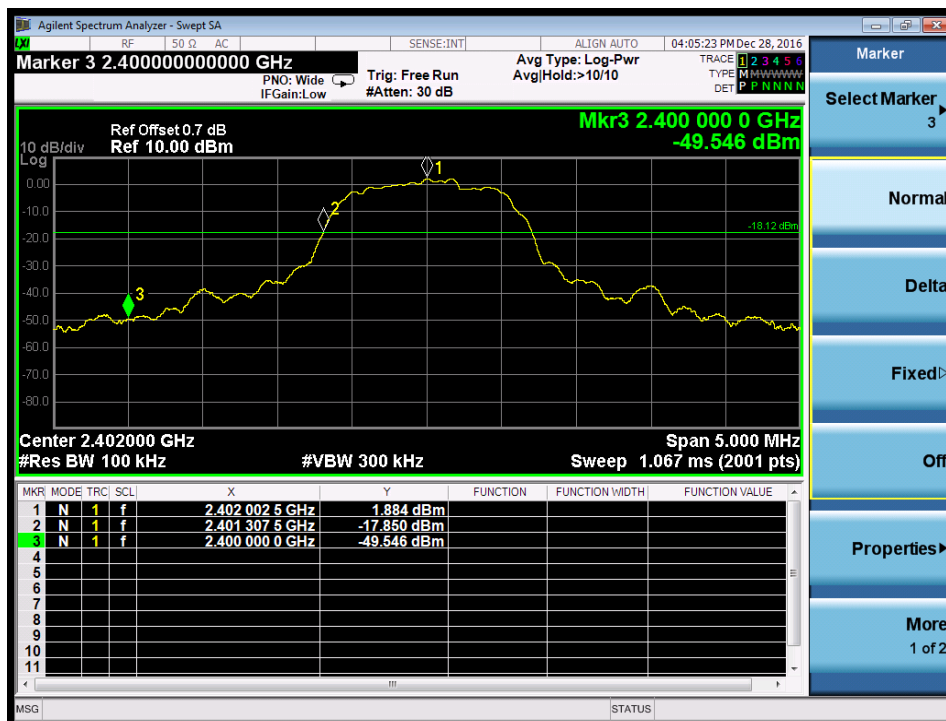
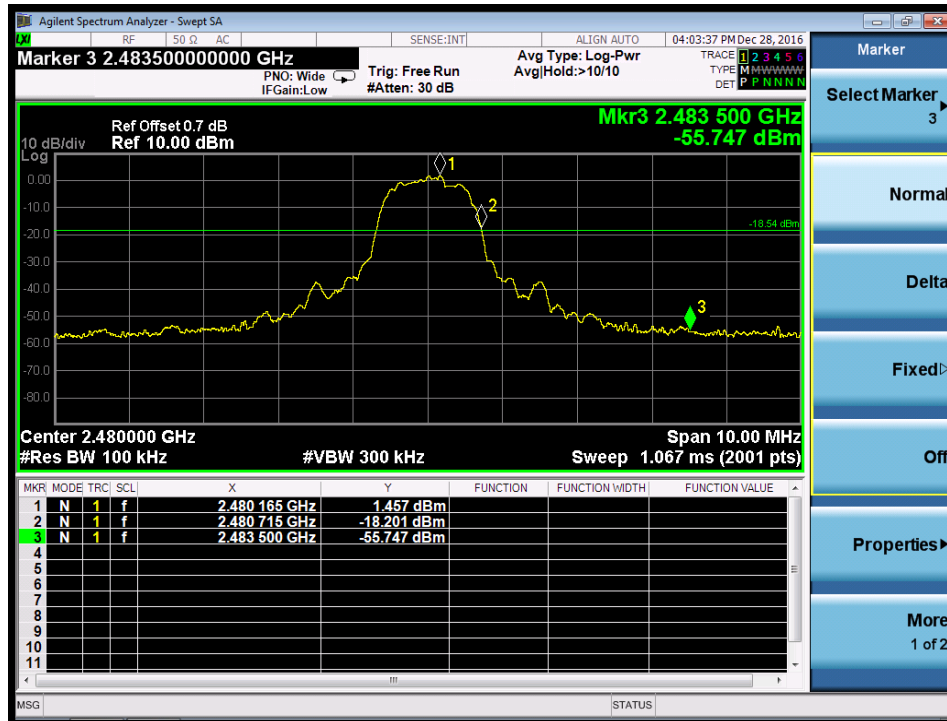
Figure 22: Band Edge, TM6

Figure 23: Band Edge, TM7


Figure 24: Band Edge, TM9


5.1.5 Frequency Separation

RESULT:**Pass**

Date of testing : 12.28.2016
Test standard : FCC Part 15.247(a)(1)
Clause 5.1(b) of RSS-247 Issue 2 February 2017
Test procedure : ANSI C63.10: 2013
Public Notice DA 00-705 March 30, 2000
Limit : FCC Part 15.247(a)(1)
Clause 5.1(b) of RSS-247 Issue 2 February 2017
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : TM10 to TM12
Ambient temperature : 25°C
Relative humidity : 52%
Atmospheric pressure : 101kPa

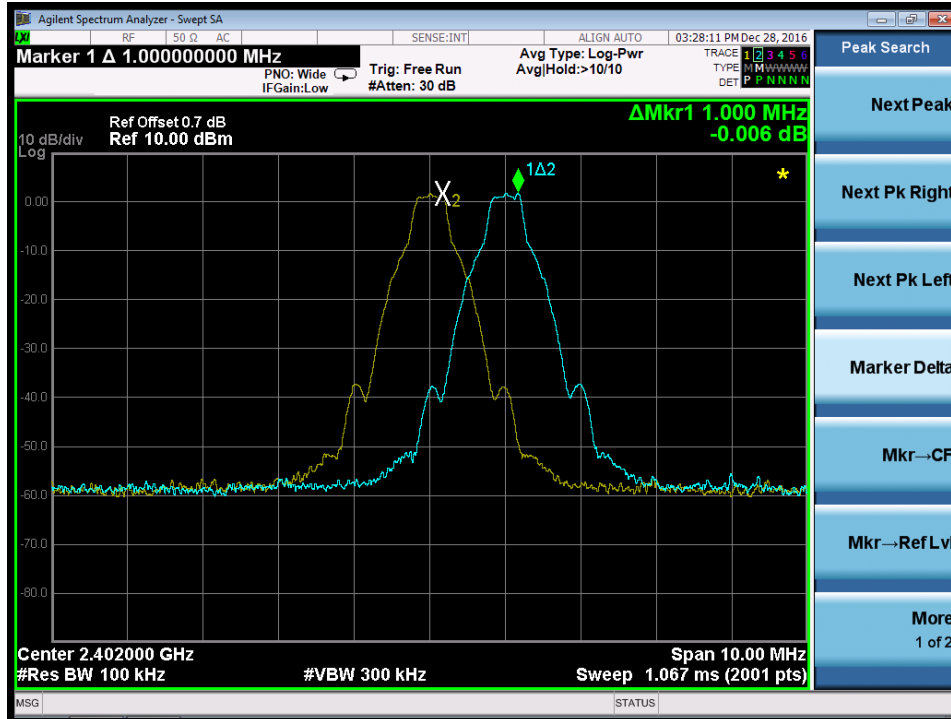
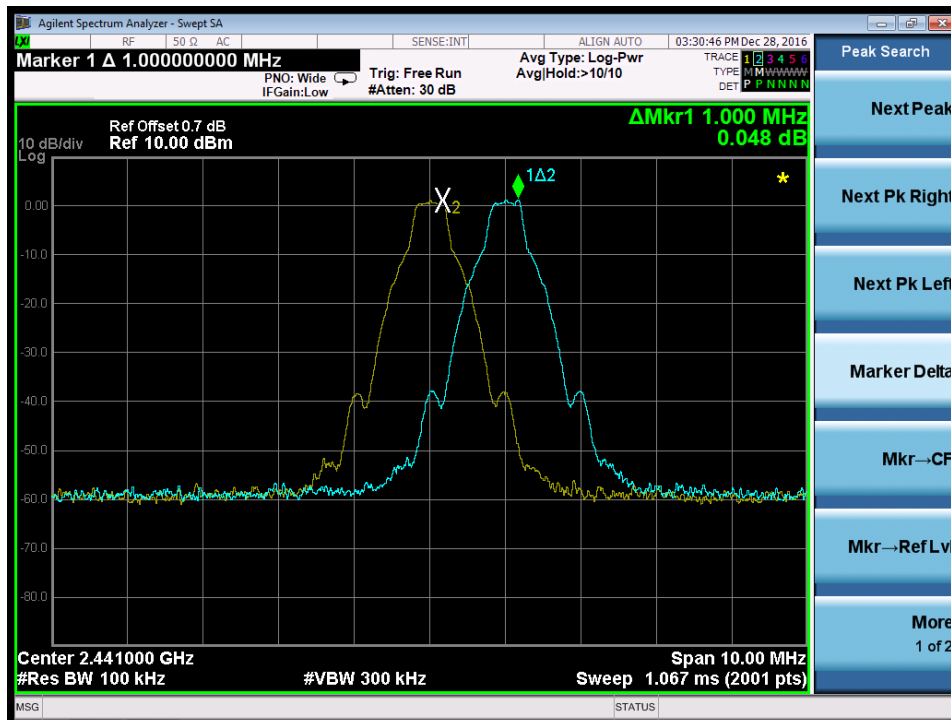
Figure 25: Frequency Separation, TM10, observation Frequency 2402MHz

Figure 26: Frequency Separation, TM10, observation Frequency 2441MHz


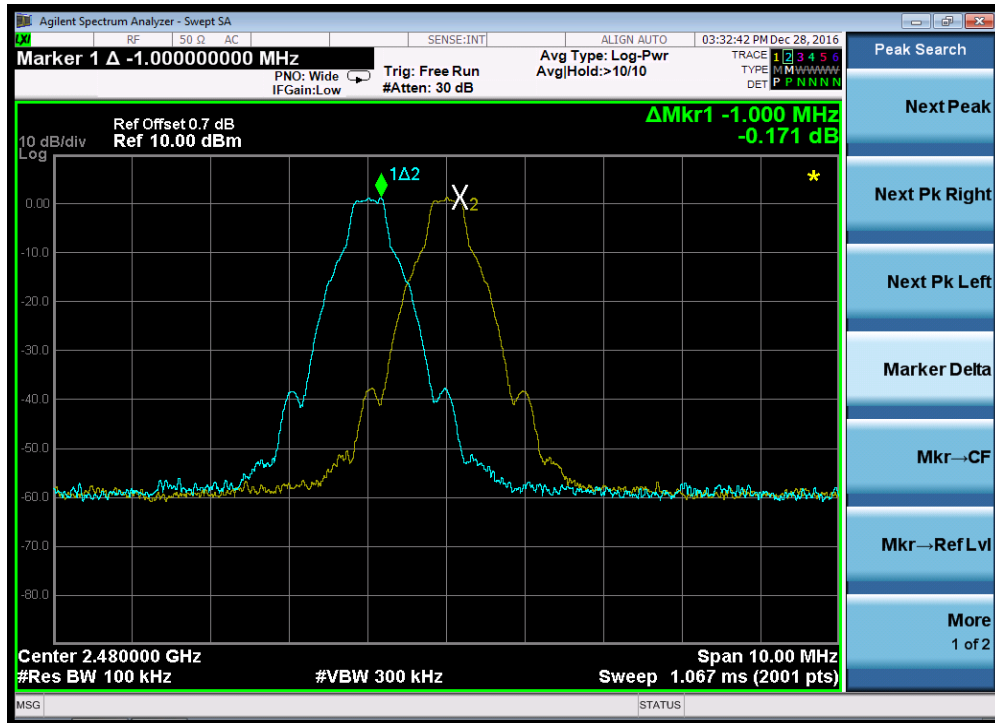
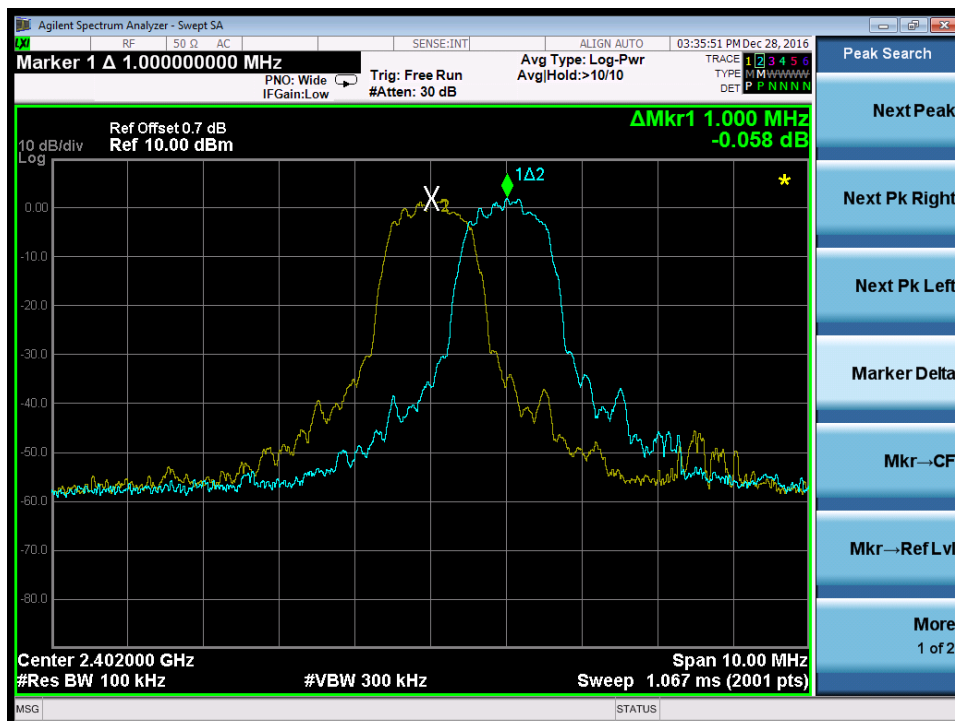
Figure 27: Frequency Separation, TM10, observation Frequency 2480MHz

Figure 28: Frequency Separation, TM11, observation Frequency 2402MHz


Figure 29: Frequency Separation, TM11, observation Frequency 2441MHz

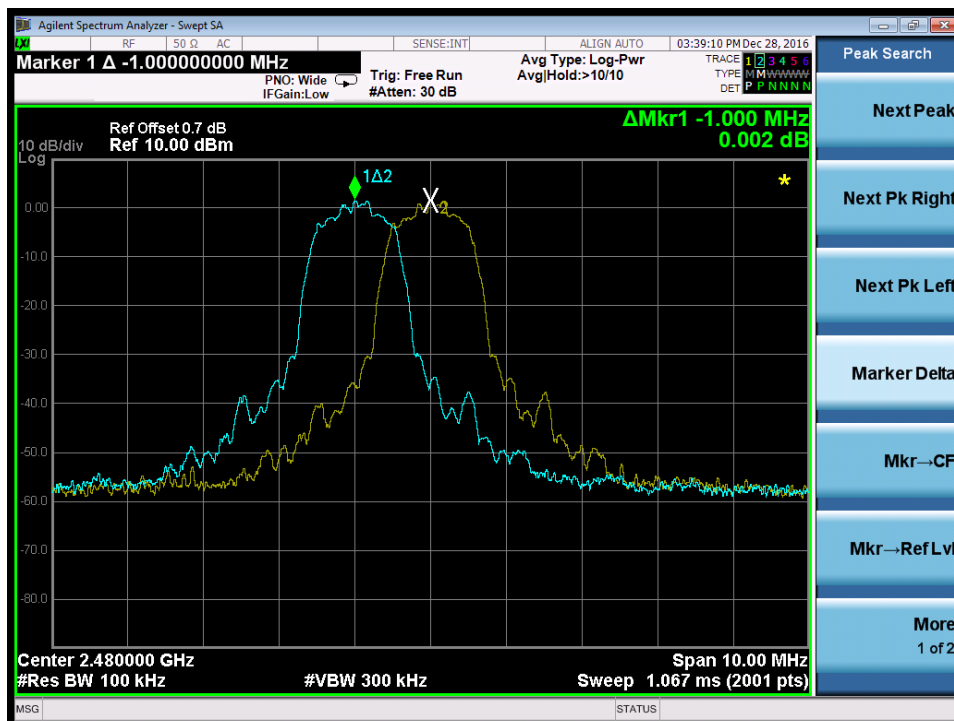
Figure 30: Frequency Separation, TM11, observation Frequency 2480MHz


Figure 31: Frequency Separation, TM12, observation Frequency 2402MHz

Figure 32: Frequency Separation, TM12, observation Frequency 2441MHz


Figure 33: Frequency Separation, TM12, observation Frequency 2480MHz



5.1.6 Number of Hopping Frequency

RESULT:**Pass**

Date of testing : 12.28.2016
Test standard : FCC 15.247(a)(1)(iii)
Clause 5.1(d) of RSS-247 Issue 2 February 2017
Test procedure : ANSI C63.10: 2013
Public Notice DA 00-705 March 30, 2000
Limit : FCC 15.247(a)(1)(iii)
Clause 5.1(d) of RSS-247 Issue 2 February 2017
Kind of test site : Shielded room

Test setup

Operation Mode : TM10 to TM12
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 34: Number of Hopping Frequency, TM10, part 1

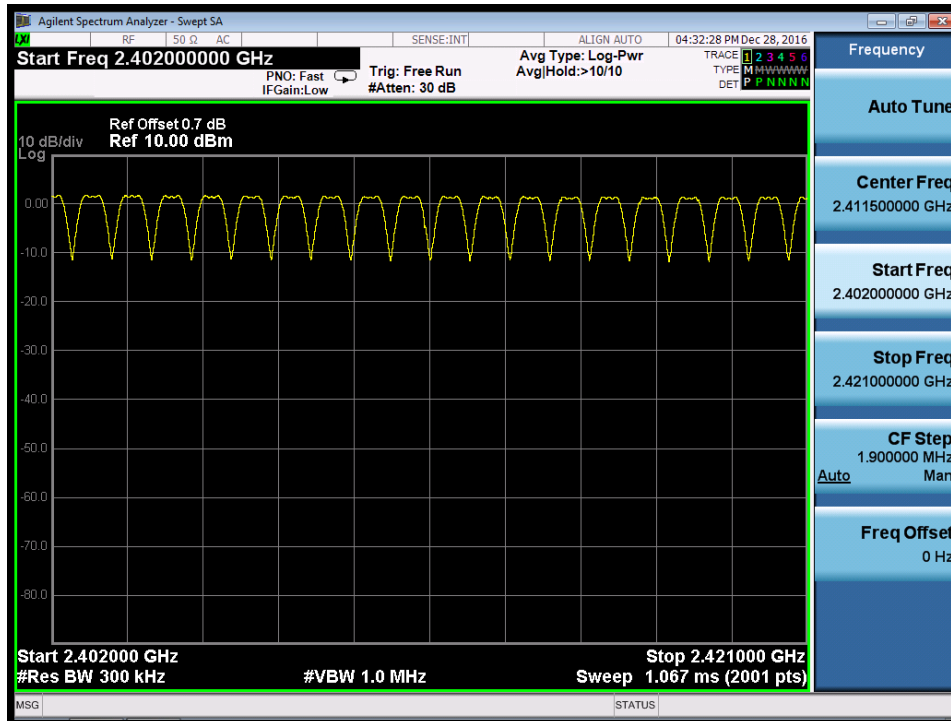


Figure 35: Number of Hopping Frequency, TM10, part 2

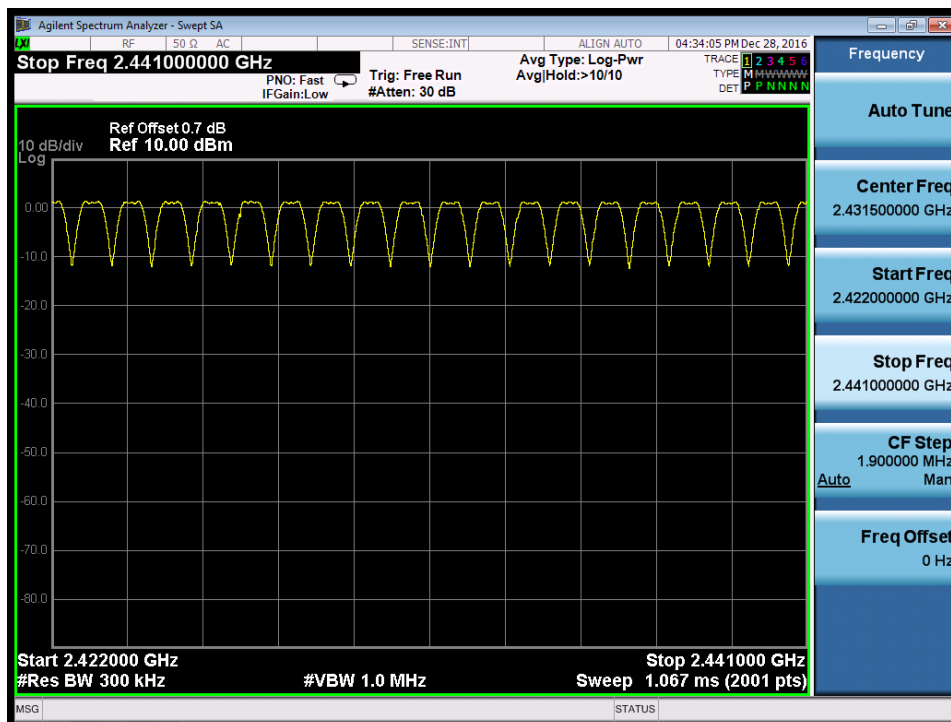


Figure 36: Number of Hopping Frequency, TM10, part 3

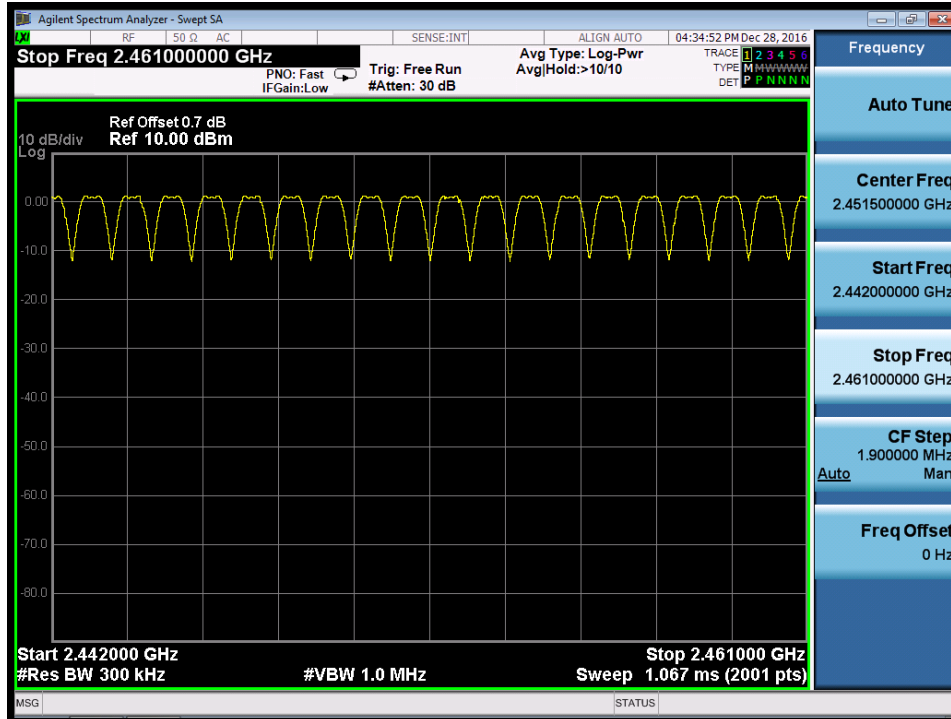


Figure 37: Number of Hopping Frequency, TM10, part 4

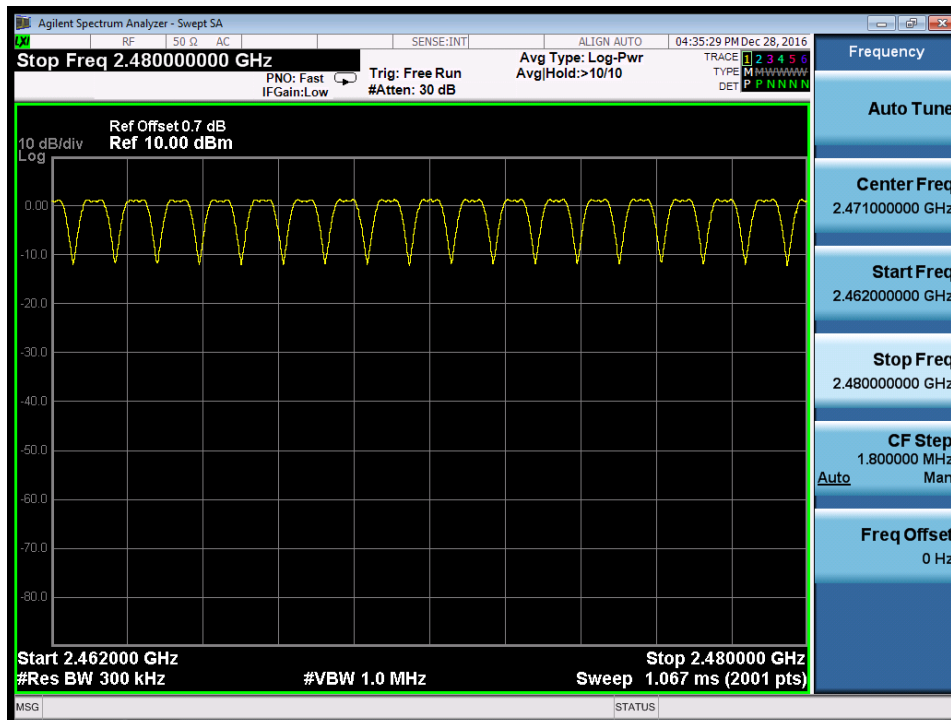


Figure 38: Number of Hopping Frequency, TM11, part 1

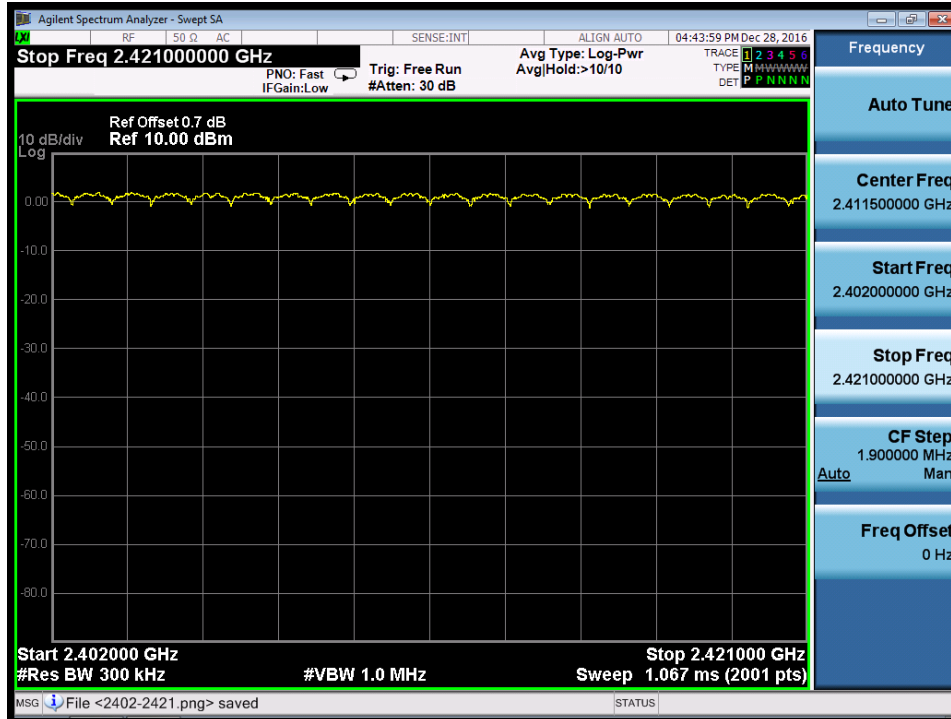


Figure 39: Number of Hopping Frequency, TM11, part 2

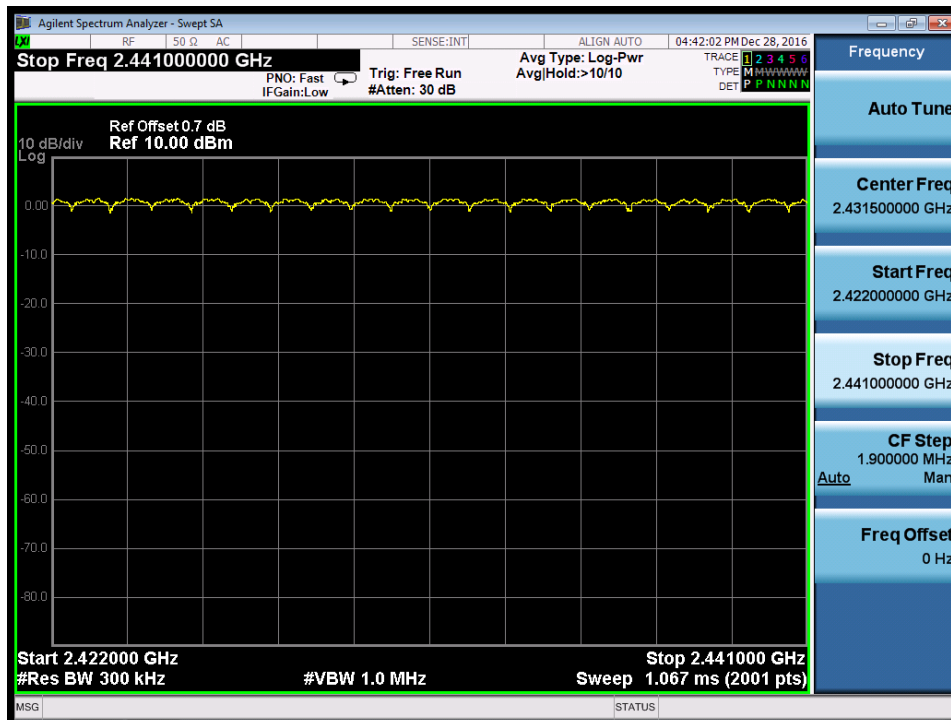


Figure 40: Number of Hopping Frequency, TM11, part 3

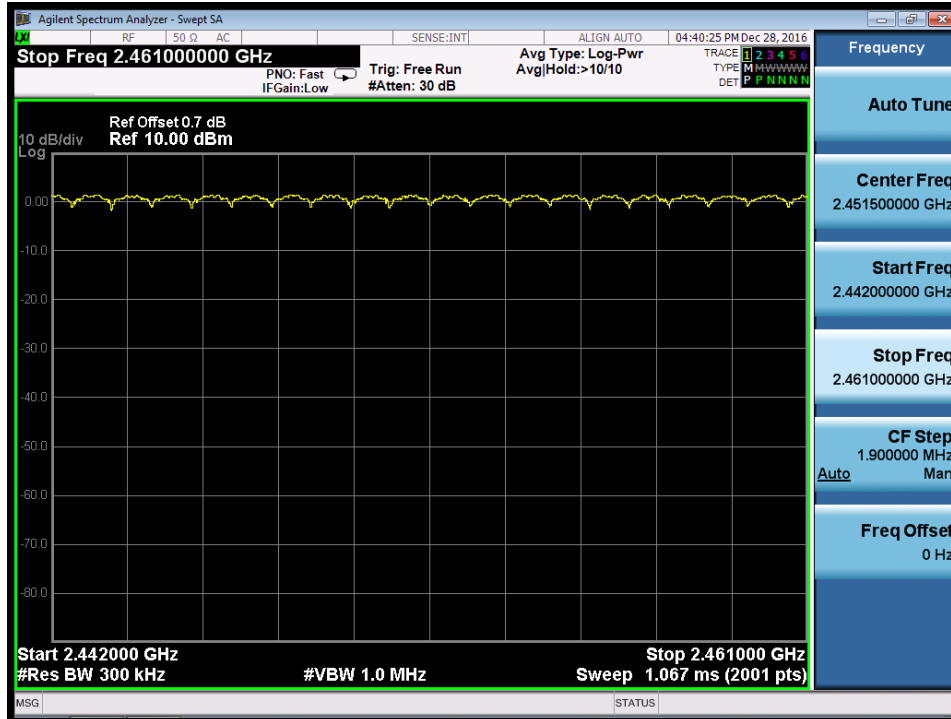


Figure 41: Number of Hopping Frequency, TM11, part 4

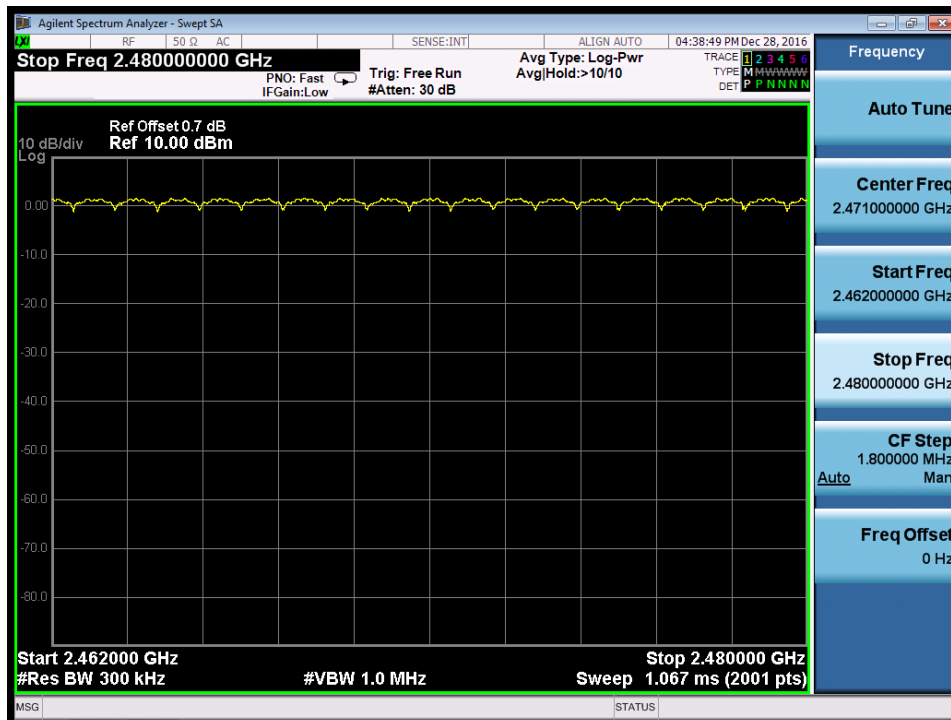


Figure 42: Number of Hopping Frequency, TM12, part 1

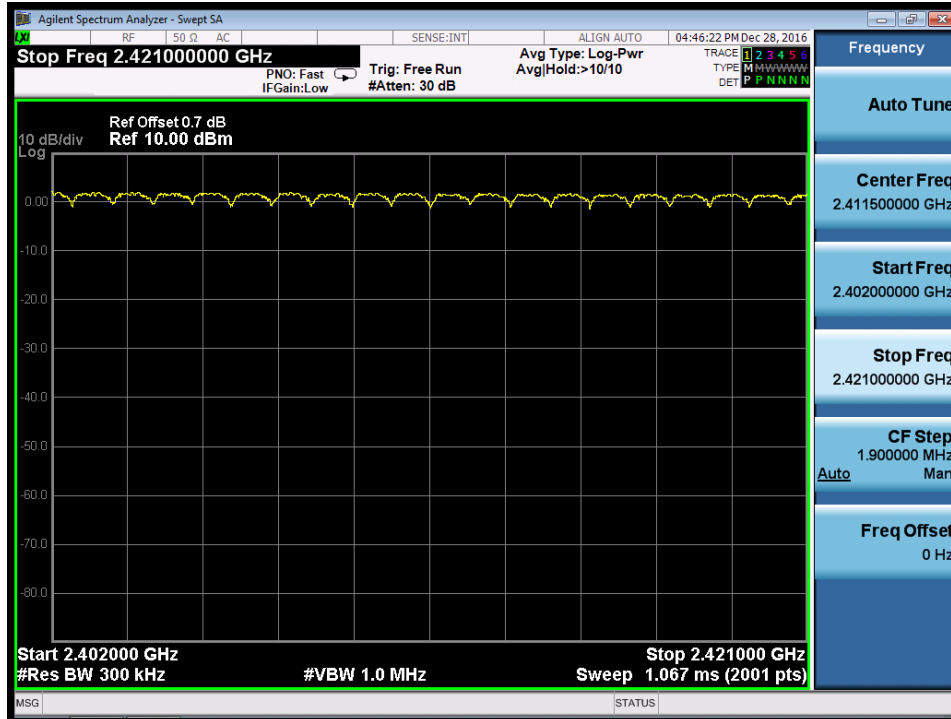


Figure 43: Number of Hopping Frequency, TM12, part 2

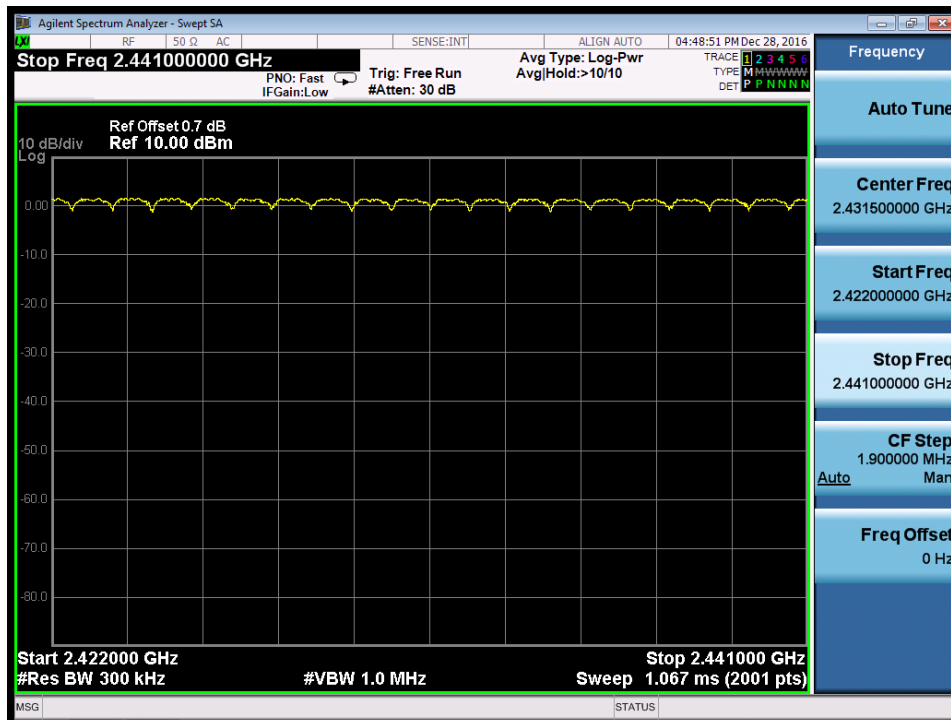


Figure 44: Number of Hopping Frequency, TM12, part 3

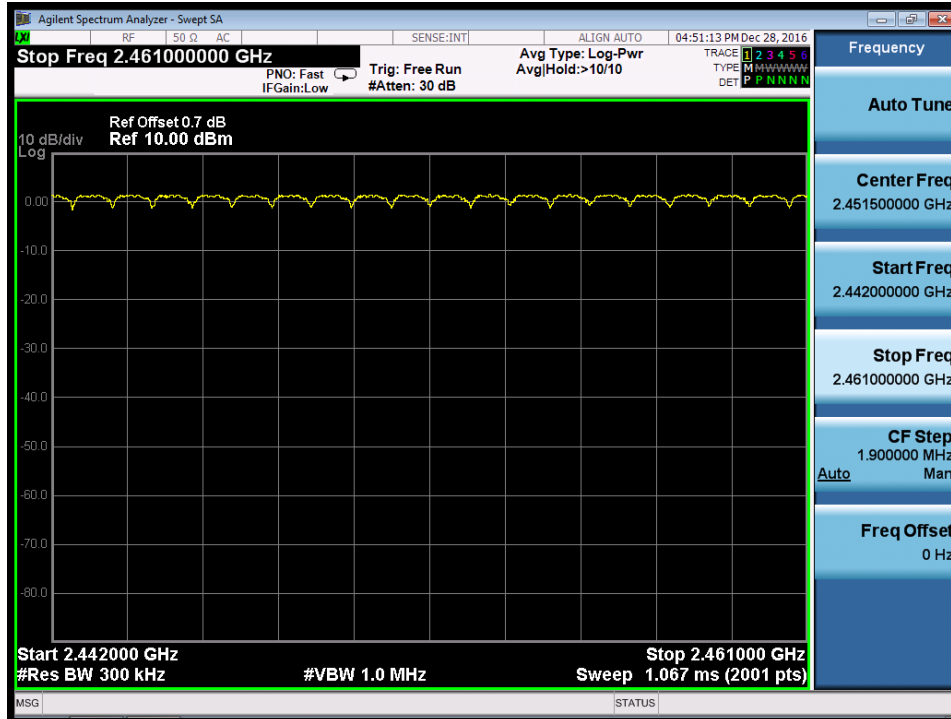
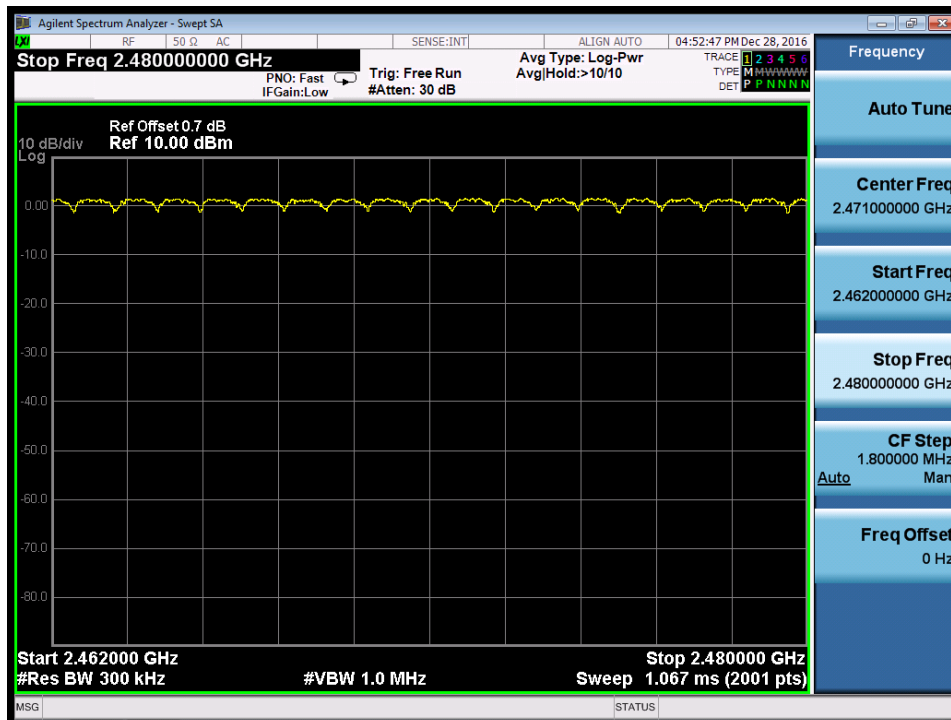


Figure 45: Number of Hopping Frequency, TM12, part 4



5.1.7 Time of Occupancy

RESULT:**Pass**

Date of testing : 12.28.2016
Test standard : FCC 15.247(a)(1)(iii)
Clause 5.1(d) of RSS-247 Issue 2 February 2017
Test procedure : ANSI C63.10: 2013
Public Notice DA 00-705 March 30, 2000
Limit : FCC 15.247(a)(1)(iii)
Clause 5.1(d) of RSS-247 Issue 2 February 2017
Kind of test site : Shielded room

Test setup

Operation Mode : TM12 to TM14
Ambient temperature : 25°C
Relative humidity : 52%
Atmospheric pressure : 101kPa

Table 8: Time of Occupancy, TM12 to TM14

Mode	Frequency [MHz]	Packet Duration [ms]	Average Time of Occupancy [ms]	Limit [ms]
TM14	2441	0.385	123.20	400
TM13	2441	1.640	262.40	400
TM12	2441	2.895	301.08	400

Note:Test Time Period: $0.4s \cdot 79 = 31.6s$ Hopping Times within 1s: $100 \cdot \text{Hopping Times within 10ms}$ The Maximum Occupancy Time within 31.6s: $[(\text{Packet Duration} \cdot \text{Hopping Time within 1s}) / 79] \cdot 31.6$

Figure 46: Time of Occupancy, TM14, observation Frequency 2441MHz

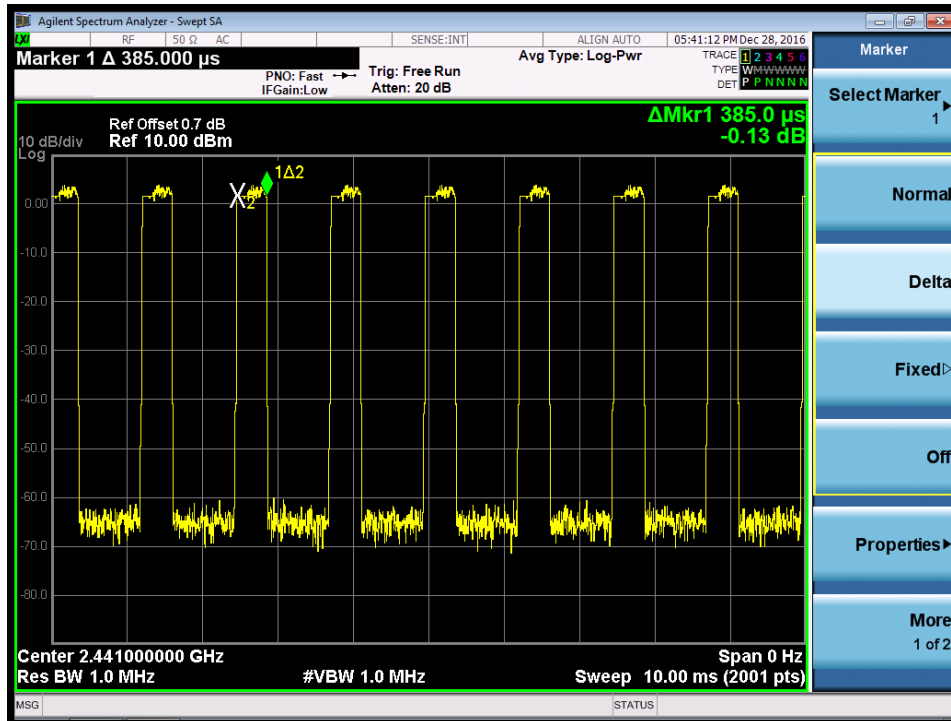


Figure 47: Time of Occupancy, TM13, observation Frequency 2441MHz

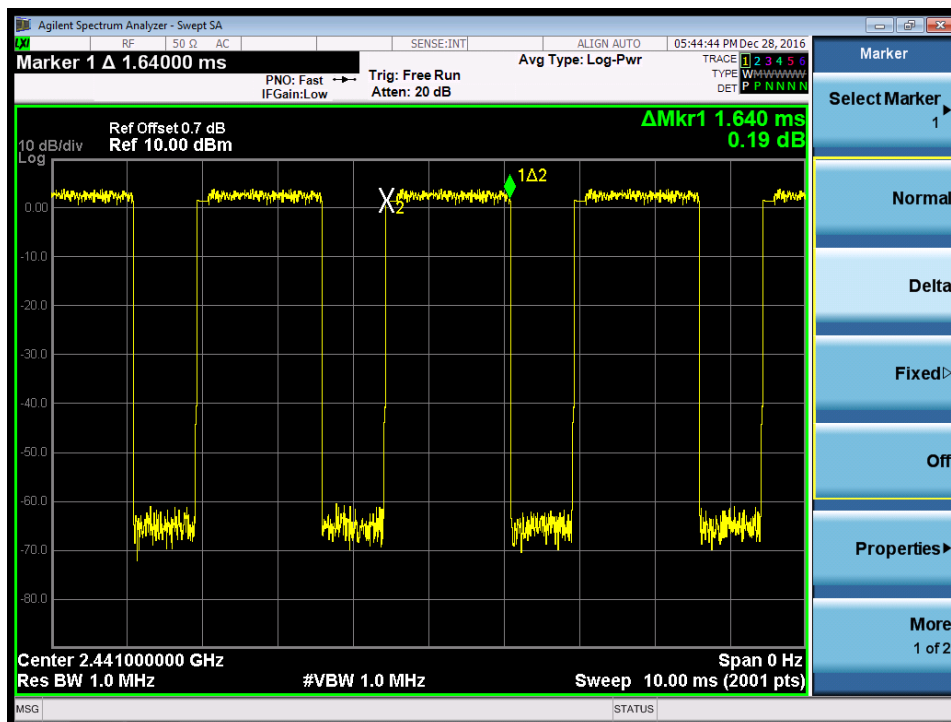
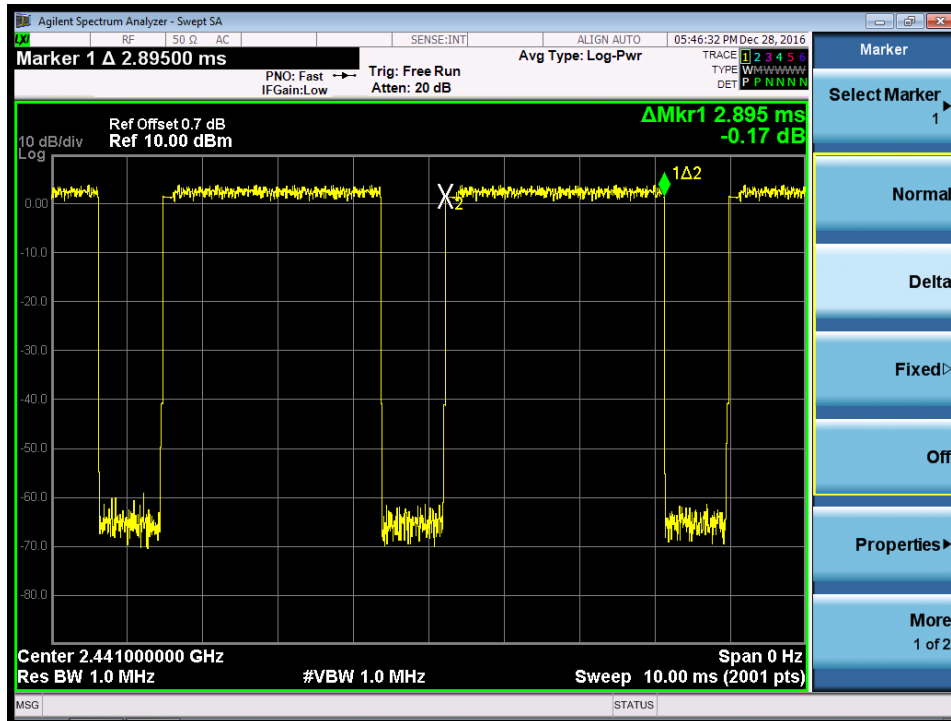


Figure 48: Time of Occupancy, TM12, observation Frequency 2441MHz



5.2 Emission in the Frequency Range up to 30MHz

5.2.1 Conducted Emission

RESULT:**N/A**

Date of testing	: N/A
Test standard	: FCC Part 15.207 (a) Clause 8.8 of RSS-Gen Issue 4, November 2014
Test procedure	: ANSI C63.10: 2013
Limit	: FCC Part 15.207 (a) Clause 8.8 of RSS-Gen Issue 4, November 2014
Kind of test site	: Shielded room

Note:

This test was not performed since the EUT is a build-in module which powered by the host equipment.

5.3 Emission in the Frequency Range above 30MHz

5.3.1 Radiated Spurious Emission

RESULT:
Pass

Date of testing : 12.28.2016 - 02.23.2017
 Test standard : FCC 15.247(d)
 Clause 5.5 of RSS-247 Issue 2 February 2017
 Test procedure : ANSI C63.10: 2013
 Public Notice DA 00-705 March 30, 2000
 Limit : FCC 15.247(d)
 FCC 15.209(a)
 Clause 5.5 of RSS-247 Issue 2 February 2017
 Clause 8.9 of RSS-Gen Issue 4 November 2014
 Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : TM1 to TM9
 Ambient temperature : 25°C
 Relative humidity : 52%
 Atmospheric pressure : 101kPa

Table 9: Radiated Spurious Emission, below 1GHz, TM1

Mode	Freq. [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [Db]	Limit [dBuV/m]	Factor [dB]	Type	Ant. Pol.
TM1	51.825	28.013	14.617	-11.987	40.000	13.396	QP	H
	90.140	31.114	21.642	-12.386	43.500	9.472	QP	
	110.025	28.508	17.369	-14.992	43.500	11.139	QP	
	123.605	28.821	16.382	-14.679	43.500	12.439	QP	
	178.410	28.447	16.528	-15.053	43.500	11.919	QP	
	248.735	33.972	22.417	-12.028	46.000	11.555	QP	
	52.310	27.512	14.155	-12.488	40.000	13.357	QP	V
	71.710	21.415	10.856	-18.585	40.000	10.559	QP	
	232.730	31.732	20.456	-14.268	46.000	11.276	QP	
	256.980	31.122	19.413	-14.878	46.000	11.709	QP	
	316.150	29.188	15.981	-16.812	46.000	13.207	QP	
	386.475	28.749	14.236	-17.251	46.000	14.513	QP	

Note:

All the modes were performed, only the worst case was listed in the table above.

Table 10: Radiated Spurious Emission, above 1GHz, TM1 to TM3

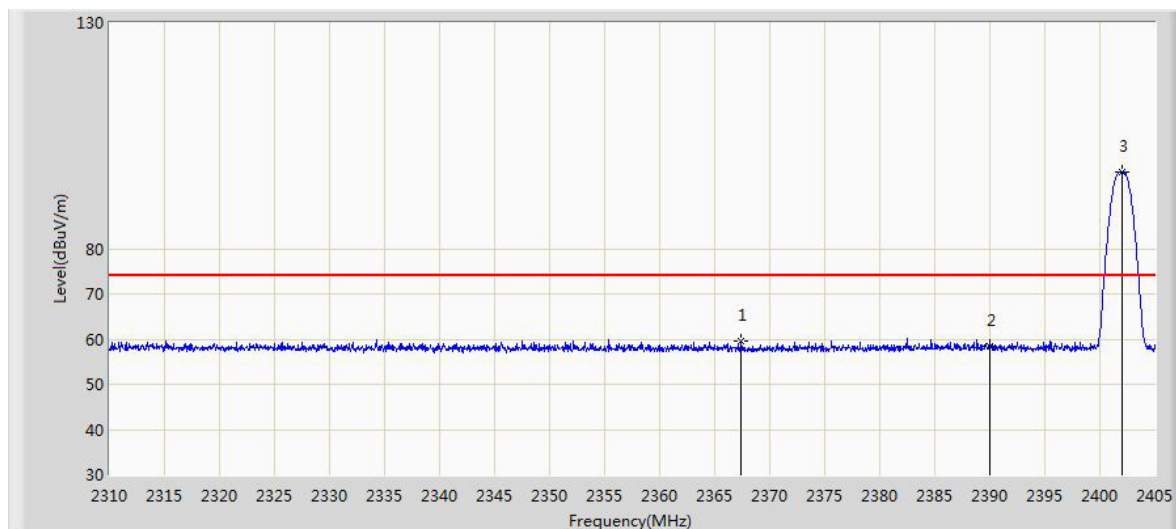
Mode	Freq. [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [Db]	Limit [dBuV/m]	Factor [dB]	Type	Ant. Pol.
TM1	5930.000	39.812	35.545	-34.188	74.000	4.267	PK	H
	7205.000	53.631	45.826	-20.369	74.000	7.805	PK	
	8089.000	44.698	36.084	-29.302	74.000	8.614	PK	
	9457.500	45.823	35.310	-28.177	74.000	10.513	PK	
	5913.000	40.368	36.148	-33.632	74.000	4.220	PK	V
	9185.500	45.558	35.518	-28.442	74.000	10.039	PK	
	10613.500	48.231	35.816	-25.769	74.000	12.415	PK	
TM2	5505.000	39.766	36.245	-34.234	74.000	3.521	PK	H
	6567.500	42.297	36.313	-31.703	74.000	5.984	PK	
	7324.000	51.098	43.055	-22.902	74.000	8.043	PK	
	11132.000	48.286	35.617	-25.714	74.000	12.669	PK	
	3558.500	36.241	37.089	-37.759	74.000	-0.848	PK	V
	5760.000	40.102	36.196	-33.898	74.000	3.906	PK	
	7322.975	53.650	45.610	-0.350	54.000	8.040	AV	
	7324.000	55.899	47.856	-18.101	74.000	8.043	PK	
TM3	11030.000	47.717	34.750	-26.283	74.000	12.967	PK	H
	5182.000	38.096	34.825	-35.904	74.000	3.271	PK	
	6448.500	40.589	34.857	-33.411	74.000	5.732	PK	
	11013.000	47.994	35.005	-26.006	74.000	12.989	PK	
	5182.000	38.096	34.825	-35.904	74.000	3.271	PK	V
	6550.500	40.865	34.920	-33.135	74.000	5.945	PK	
	7442.500	52.991	45.000	-1.009	54.000	7.992	AV	
	7443.000	55.213	47.221	-18.787	74.000	7.992	PK	
	9755.000	47.317	35.927	-26.683	74.000	11.390	PK	

Table 11: Radiated Spurious Emission, above 1GHz, TM4 to TM6

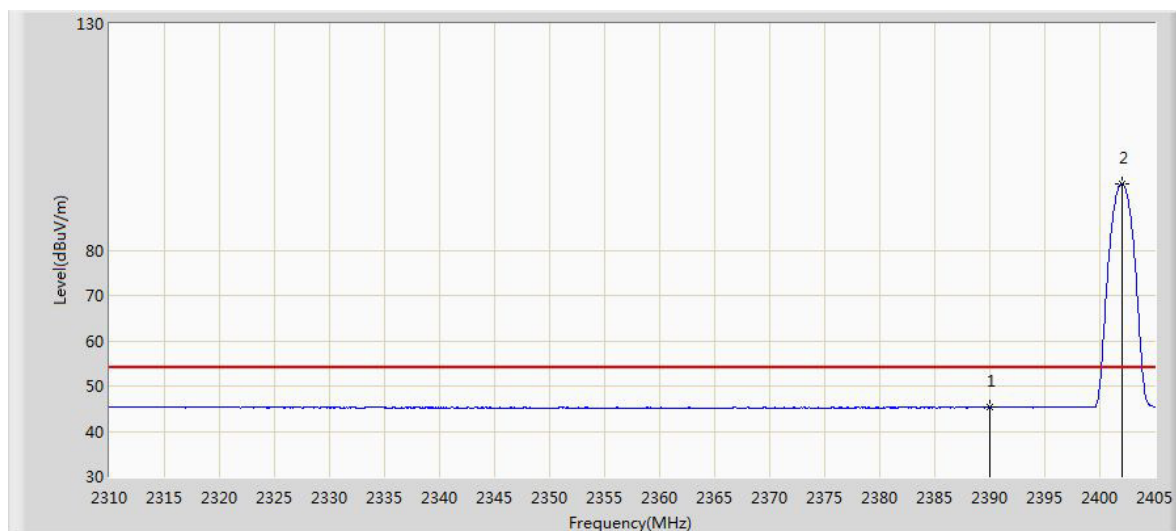
Mode	Freq. [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type	Ant. Pol.
TM4	5938.500	38.963	34.693	-35.037	74.000	4.270	PK	H
	7205.000	52.957	45.152	-21.043	74.000	7.805	PK	
	9423.500	45.482	34.920	-28.518	74.000	10.562	PK	
	11021.500	47.454	34.476	-26.546	74.000	12.978	PK	
	5760.000	40.662	36.756	-33.338	74.000	3.906	PK	V
	7205.000	57.082	49.277	-16.918	74.000	7.805	PK	
	9168.500	45.585	35.716	-28.415	74.000	9.870	PK	
	10885.500	47.754	34.848	-26.246	74.000	12.906	PK	
TM5	3176.000	36.079	37.639	-37.921	74.000	-1.560	PK	H
	4429.384	34.773	33.315	-39.227	74.000	1.458	PK	
	4884.500	42.472	39.787	-31.528	74.000	2.684	PK	
	7324.000	52.791	44.748	-21.209	74.000	8.043	PK	
	3558.500	36.515	37.363	-37.485	74.000	-0.848	PK	V
	4484.274	35.182	33.585	-38.818	74.000	1.597	PK	
	4884.500	41.772	39.087	-32.228	74.000	2.684	PK	
	7322.930	50.566	42.526	-3.434	54.000	8.040	AV	
TM6	7324.000	55.501	47.458	-18.499	74.000	8.043	PK	H
	3329.483	34.376	36.218	-39.624	74.000	-1.842	PK	
	4482.283	34.635	33.042	-39.365	74.000	1.593	PK	
	4961.000	47.126	44.214	-26.874	74.000	2.912	PK	
	7439.940	50.968	42.980	-3.032	54.000	7.989	AV	
	7443.000	54.501	46.509	-19.499	74.000	7.992	PK	
	3524.500	36.221	37.235	-37.779	74.000	-1.013	PK	V
	4961.000	42.470	39.558	-31.530	74.000	2.912	PK	
	5760.000	41.565	37.659	-32.435	74.000	3.906	PK	
	7442.500	53.165	45.174	-0.835	54.000	7.992	AV	
	7443.000	54.166	46.174	-19.834	74.000	7.992	PK	

Table 12: Radiated Spurious Emission, above 1GHz, TM7 to TM9

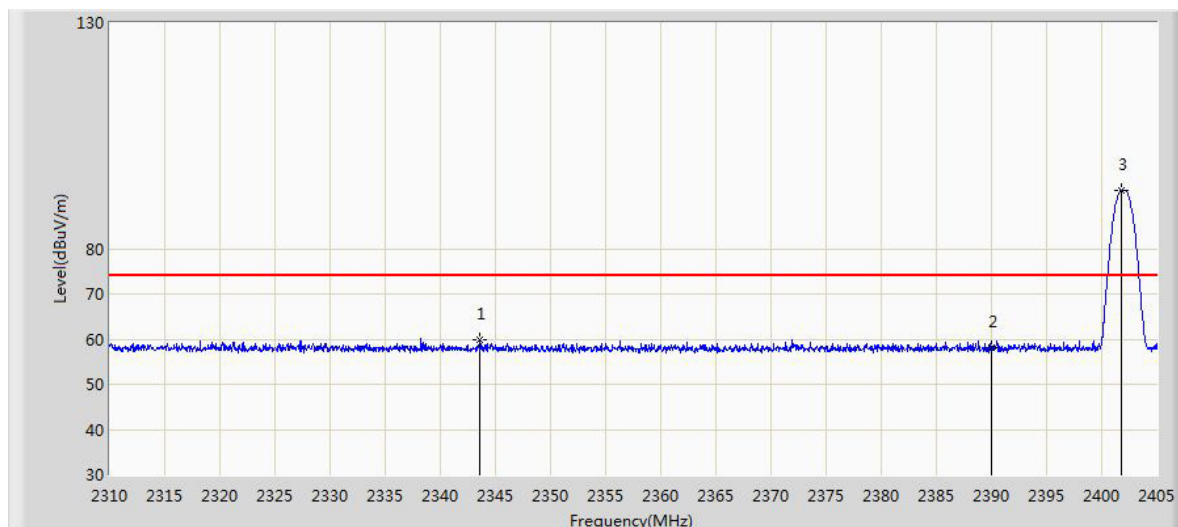
Mode	Freq. [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type	Ant. Pol.
TM7	4808.000	42.451	39.757	-31.549	74.000	2.694	PK	H
	6074.500	39.994	35.836	-34.006	74.000	4.159	PK	
	7205.000	53.613	45.808	-20.387	74.000	7.805	PK	
	9491.500	46.151	35.576	-27.849	74.000	10.575	PK	
	4799.500	42.715	40.017	-31.285	74.000	2.698	PK	V
	5760.000	41.035	37.129	-32.965	74.000	3.906	PK	
	9449.000	45.651	35.161	-28.349	74.000	10.490	PK	
TM8	3592.500	36.345	37.069	-37.655	74.000	-0.724	PK	H
	4425.500	37.283	35.833	-36.717	74.000	1.451	PK	
	4884.500	42.316	39.631	-31.684	74.000	2.684	PK	
	7323.010	49.820	41.780	-4.180	54.000	8.040	AV	
	7324.000	54.399	46.356	-19.601	74.000	8.043	PK	V
	4884.500	42.643	39.958	-31.357	74.000	2.684	PK	
	5760.000	41.132	37.226	-32.868	74.000	3.906	PK	
	7324.000	55.312	47.269	-18.688	74.000	8.043	PK	
TM9	7324.000	50.733	42.690	-3.267	54.000	8.043	AV	H
	8650.000	44.753	35.964	-29.247	74.000	8.789	PK	
	3082.500	36.379	38.231	-37.621	74.000	-1.852	PK	
	3567.000	36.317	37.130	-37.683	74.000	-0.813	PK	
	4961.000	47.191	44.279	-26.809	74.000	2.912	PK	
	7442.500	53.191	45.200	-0.809	54.000	7.992	AV	
	7443.000	55.226	47.234	-18.774	74.000	7.992	PK	
	4961.000	42.370	39.458	-31.630	74.000	2.912	PK	V
	5760.000	40.162	36.256	-33.838	74.000	3.906	PK	
	7439.930	49.608	41.620	-4.392	54.000	7.989	AV	
	7443.000	55.202	47.210	-18.798	74.000	7.992	PK	

Figure 49: Band Edge, TM1, Horizontal, PK


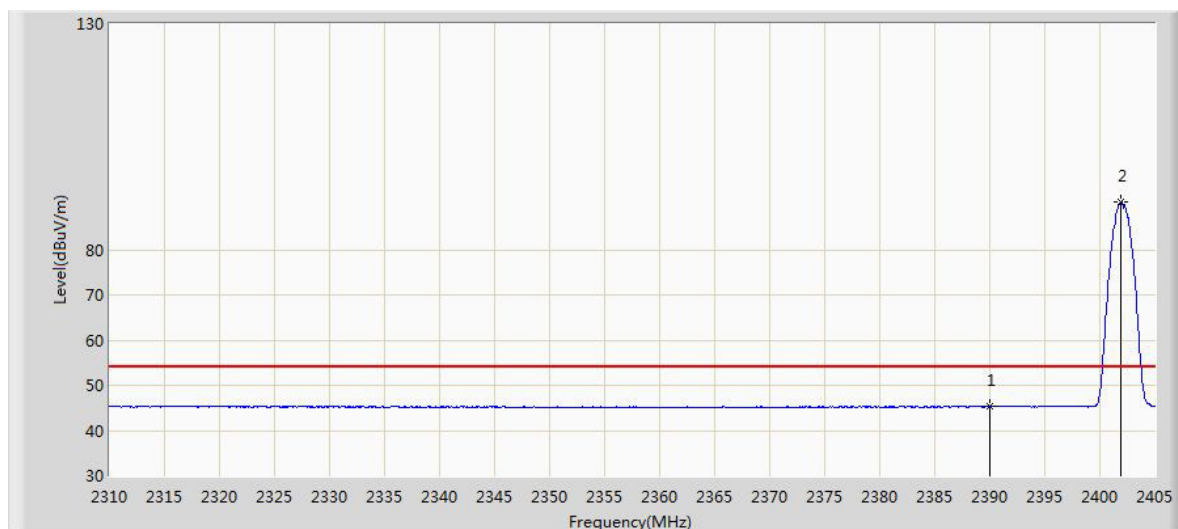
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2367.427	59.458	28.213	-14.542	74.000	31.244	PK
2390.000	58.289	27.086	-15.711	74.000	31.203	PK
2402.008	97.026	65.842	N/A	N/A	31.184	PK

Figure 50: Band Edge, TM1, Horizontal, AV


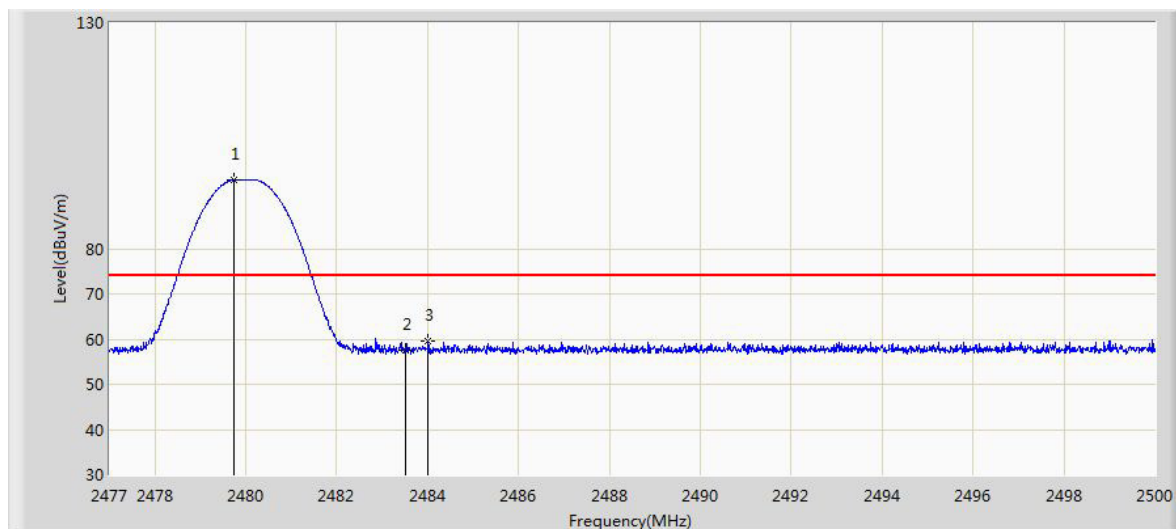
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.291	14.088	-8.709	54.000	31.203	AV
2402.008	94.755	63.571	N/A	N/A	31.184	AV

Figure 51: Band Edge, TM1, Vertical, PK


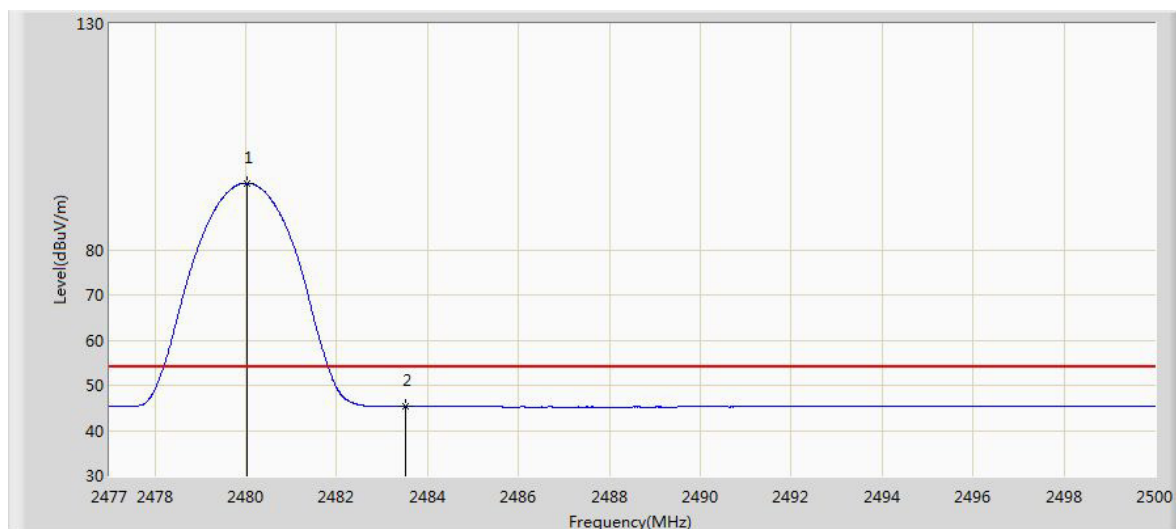
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2343.630	59.735	28.419	-14.265	74.000	31.316	PK
2390.000	58.132	26.929	-15.868	74.000	31.203	PK
2401.817	92.892	61.708	N/A	N/A	31.184	PK

Figure 52: Band Edge, TM1, Vertical, AV


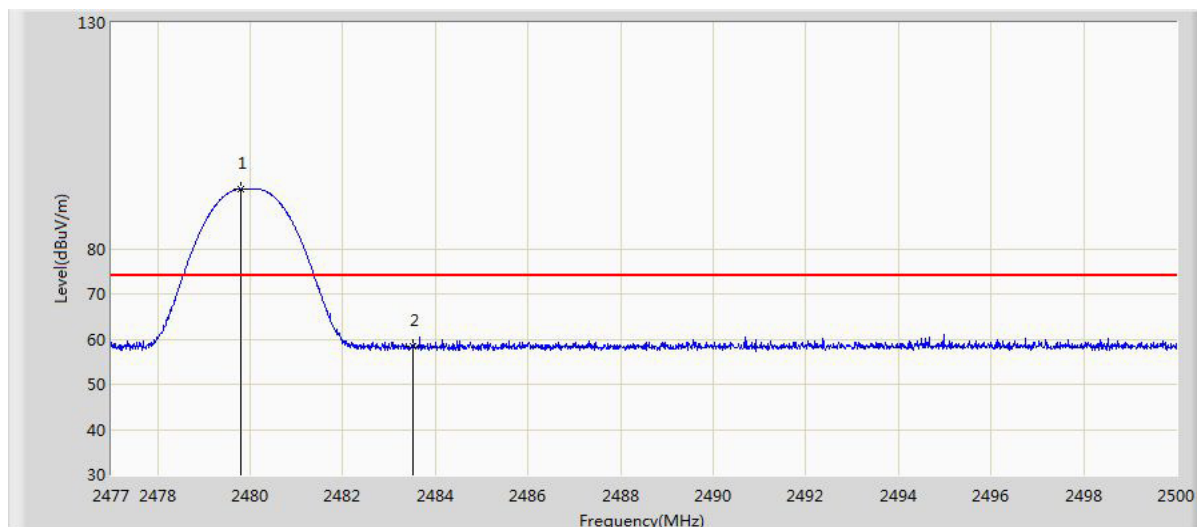
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.225	14.022	-8.775	54.000	31.203	AV
2401.865	90.500	59.316	N/A	N/A	31.184	AV

Figure 53: Band Edge, TM3, Horizontal, PK


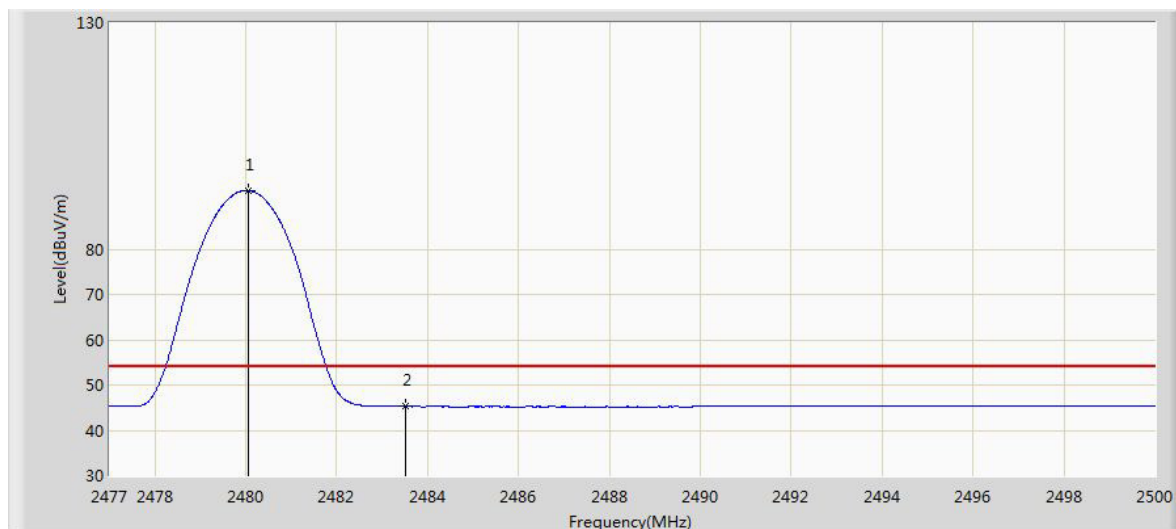
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.737	95.251	64.068	N/A	N/A	31.184	PK
2483.500	57.418	26.225	-16.582	74.000	31.194	PK
2484.015	59.635	28.440	-14.365	74.000	31.195	PK

Figure 54: Band Edge, TM3, Horizontal, AV


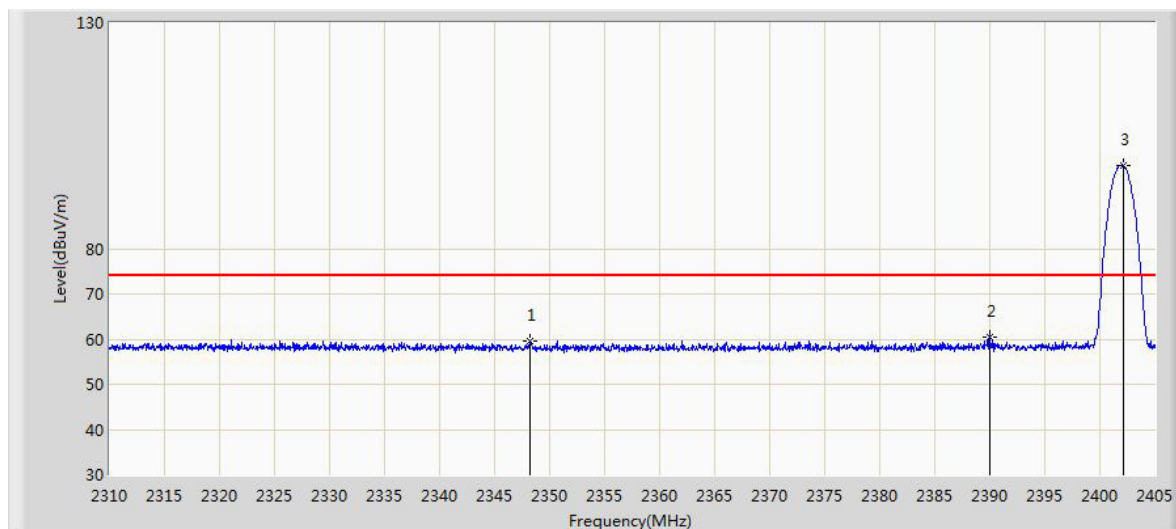
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2480.024	94.739	63.555	N/A	N/A	31.184	AV
2483.500	45.243	14.050	-8.757	54.000	31.194	AV

Figure 55: Band Edge, TM3, Vertical, PK


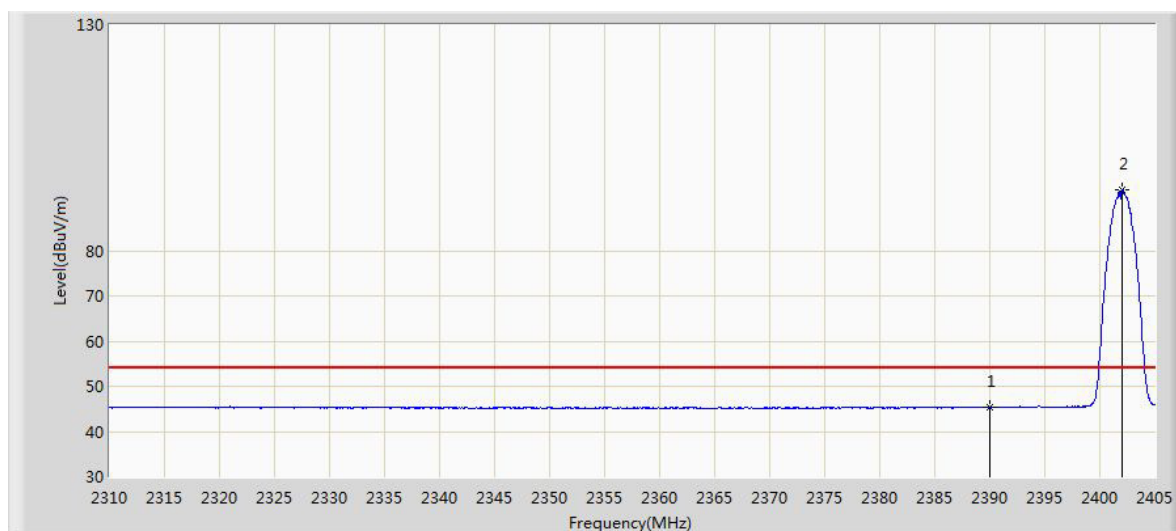
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.783	93.231	62.047	N/A	N/A	31.184	PK
2483.500	58.349	27.156	-15.651	74.000	31.194	PK

Figure 56: Band Edge, TM3, Vertical, AV


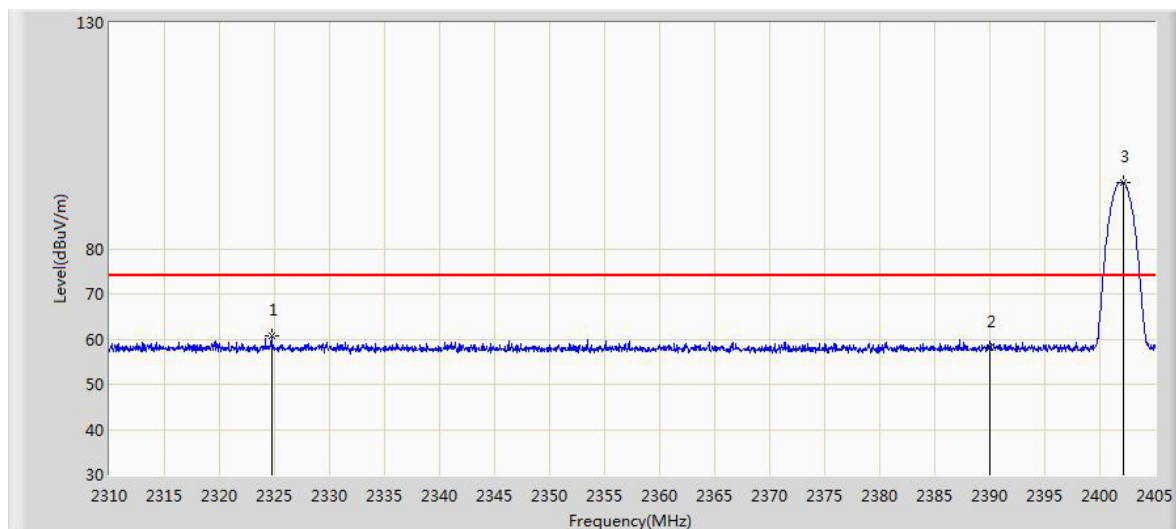
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2480.059	92.922	61.738	N/A	N/A	31.184	AV
2483.500	45.236	14.043	-8.764	54.000	31.194	AV

Figure 57: Band Edge, TM4, Horizontal, PK


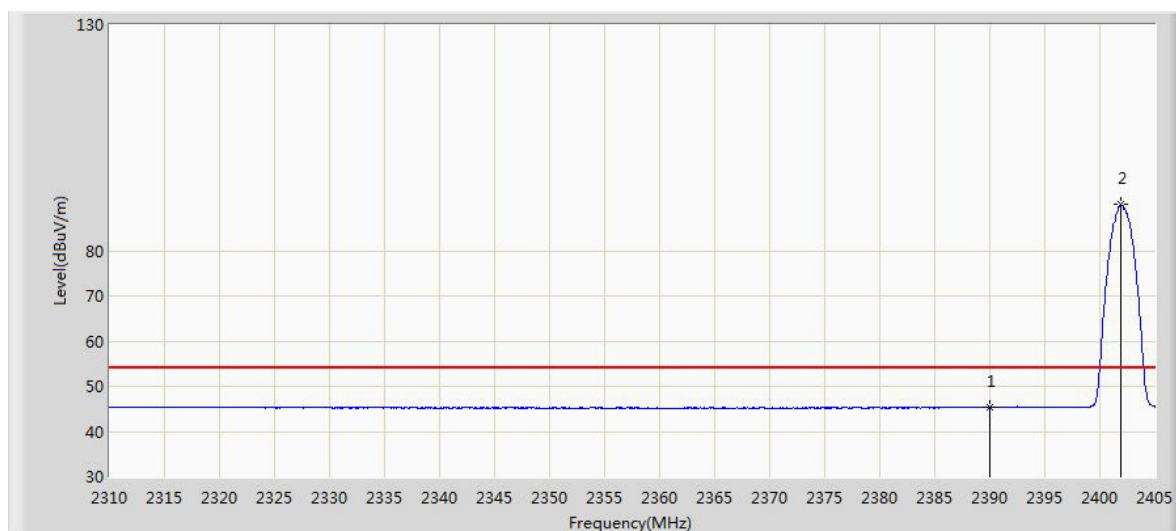
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2348.238	59.435	28.136	-14.565	74.000	31.299	PK
2390.000	60.576	29.373	-13.424	74.000	31.203	PK
2402.150	98.382	67.198	N/A	N/A	31.184	PK

Figure 58: Band Edge, TM4, Horizontal, AV


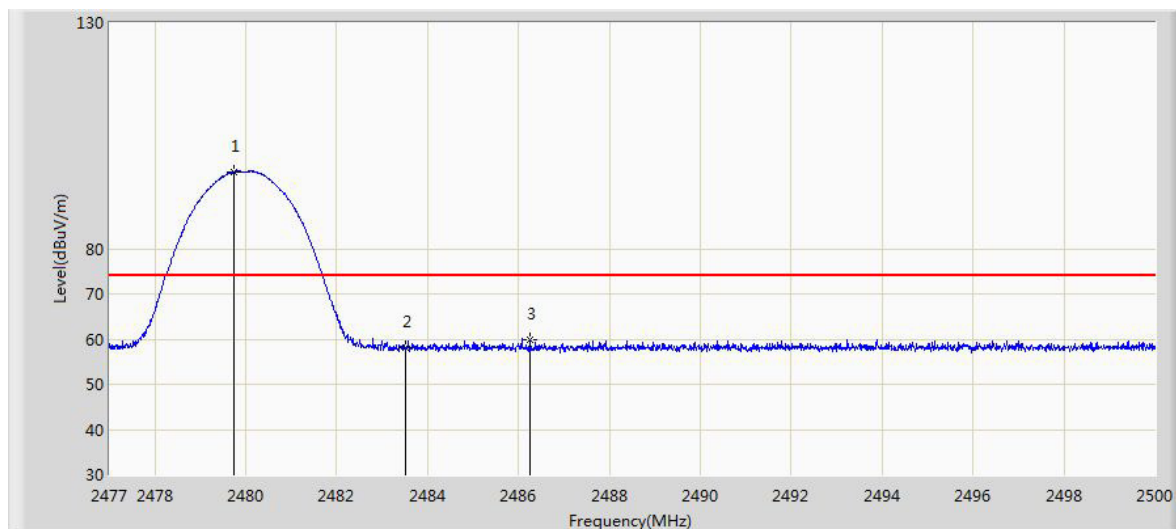
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.430	14.227	-8.570	54.000	31.203	AV
2402.055	93.353	62.169	N/A	N/A	31.184	AV

Figure 59: Band Edge, TM4, Vertical, PK


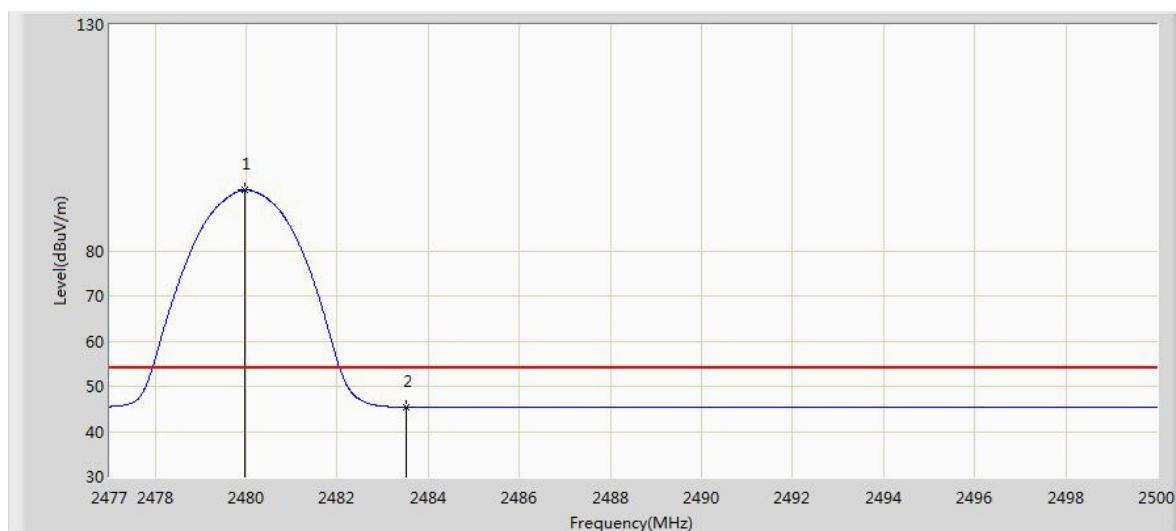
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2324.725	60.732	29.332	-13.268	74.000	31.399	PK
2390.000	58.079	26.876	-15.921	74.000	31.203	PK
2402.150	94.672	63.488	N/A	N/A	31.184	PK

Figure 60: Band Edge, TM4, Vertical, AV


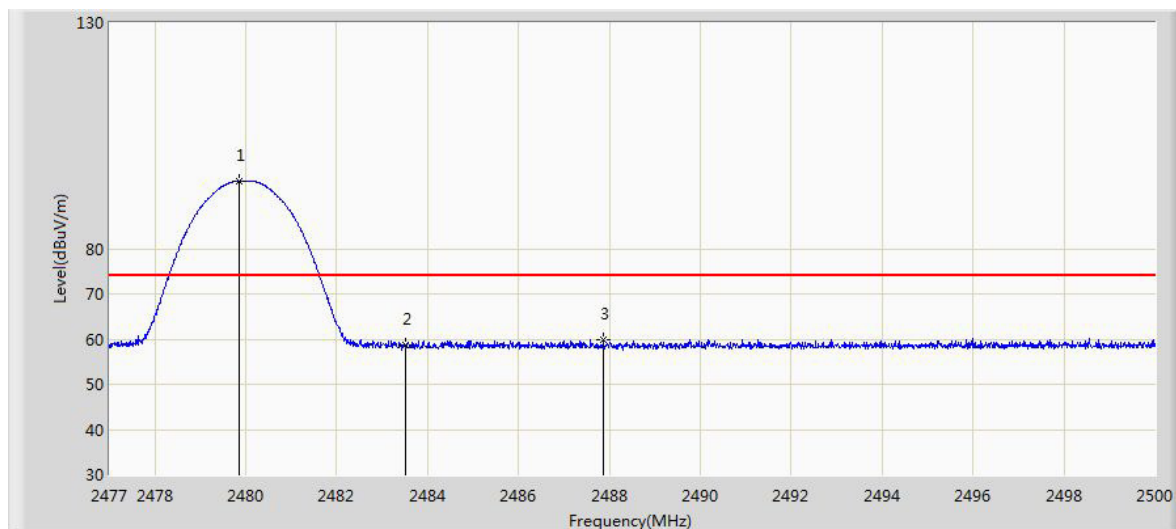
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.360	14.157	-8.640	54.000	31.203	AV
2401.960	90.165	58.981	N/A	N/A	31.184	AV

Figure 61: Band Edge, TM6, Horizontal, PK


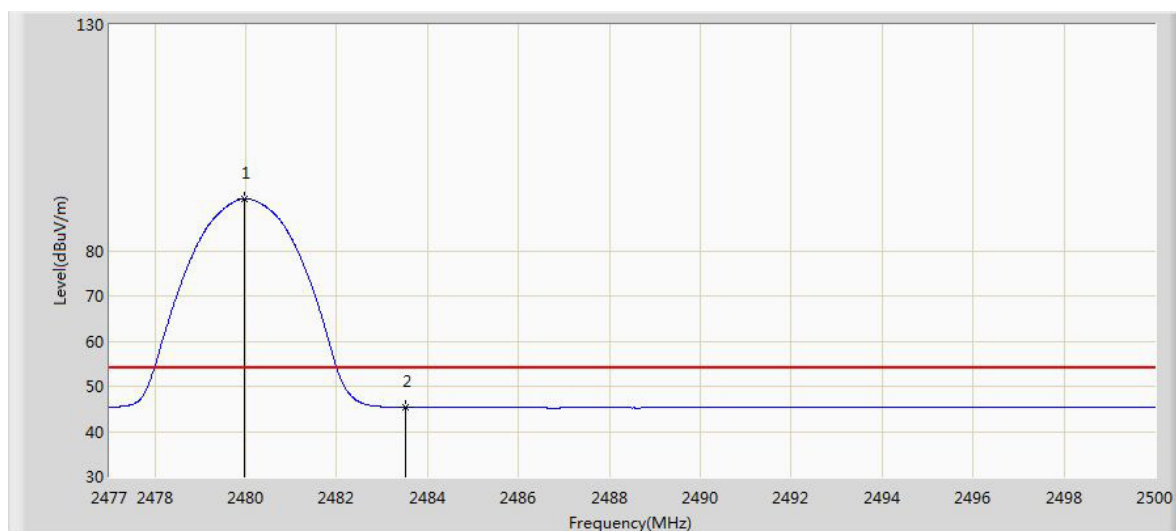
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.737	96.971	65.788	N/A	N/A	31.184	PK
2483.500	58.174	26.981	-15.826	74.000	31.194	PK
2486.246	59.771	28.570	-14.229	74.000	31.201	PK

Figure 62: Band Edge, TM6, Horizontal, AV


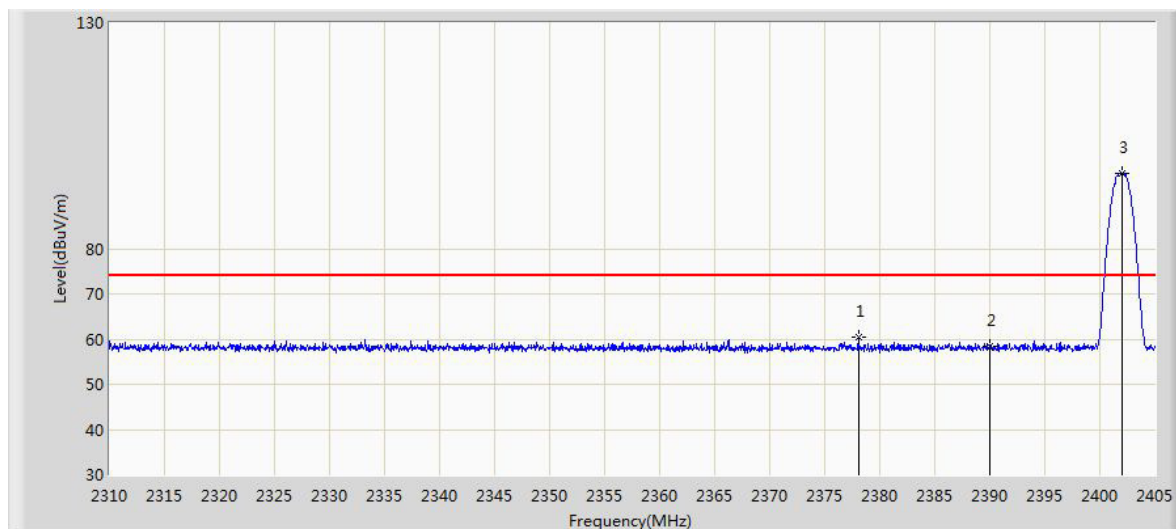
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.956	93.384	62.200	N/A	N/A	31.184	AV
2483.500	45.389	14.196	-8.611	54.000	31.194	AV

Figure 63: Band Edge, TM6, Vertical, PK


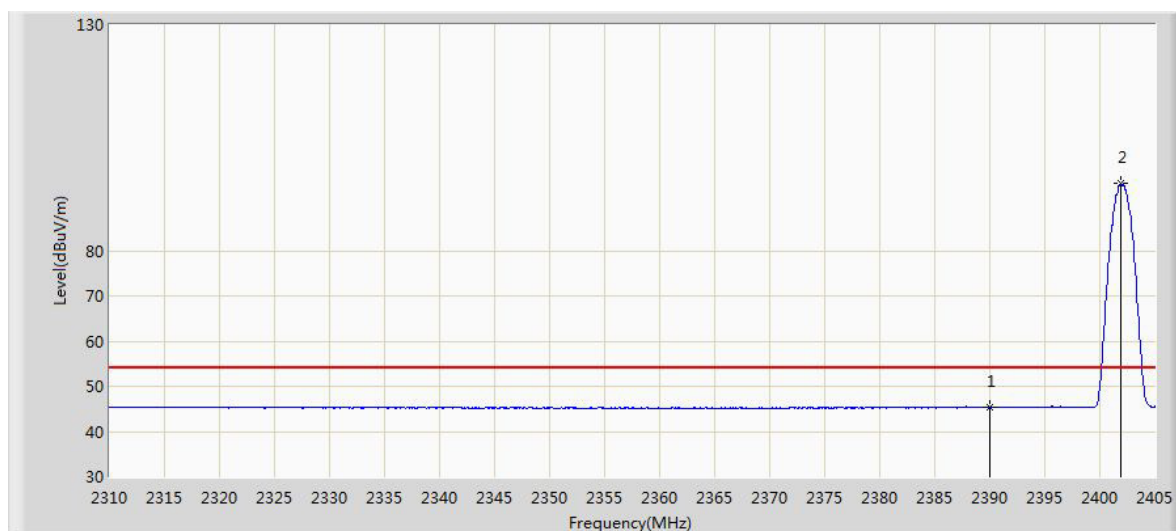
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.852	95.005	63.821	N/A	N/A	31.184	PK
2483.500	58.588	27.395	-15.412	74.000	31.194	PK
2487.867	59.717	28.512	-14.283	74.000	31.205	PK

Figure 64: Band Edge, TM6, Vertical, AV


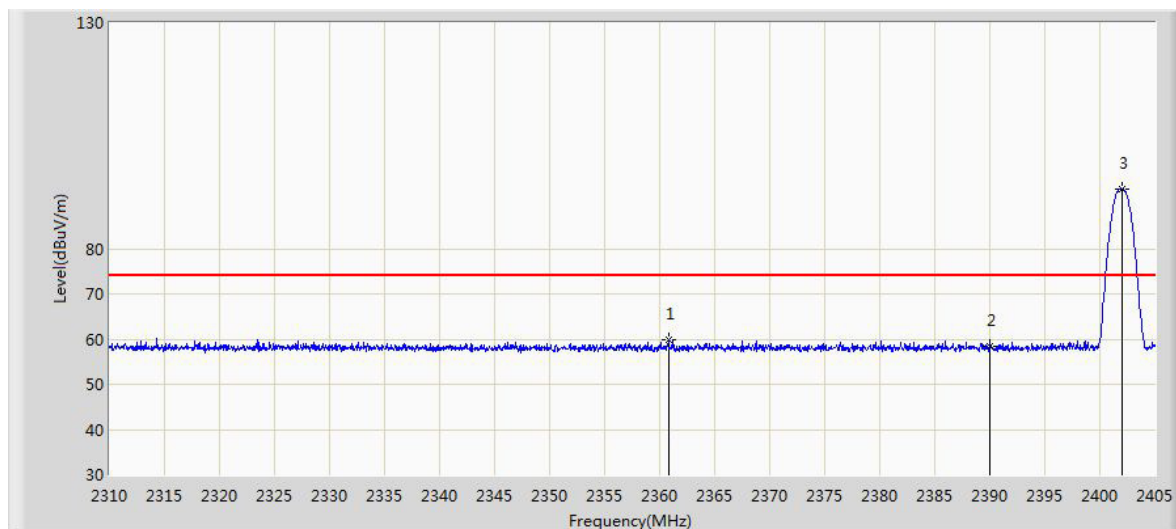
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.956	91.462	60.278	N/A	N/A	31.184	AV
2483.500	45.298	14.105	-8.702	54.000	31.194	AV

Figure 65: Band Edge, TM7, Horizontal, PK


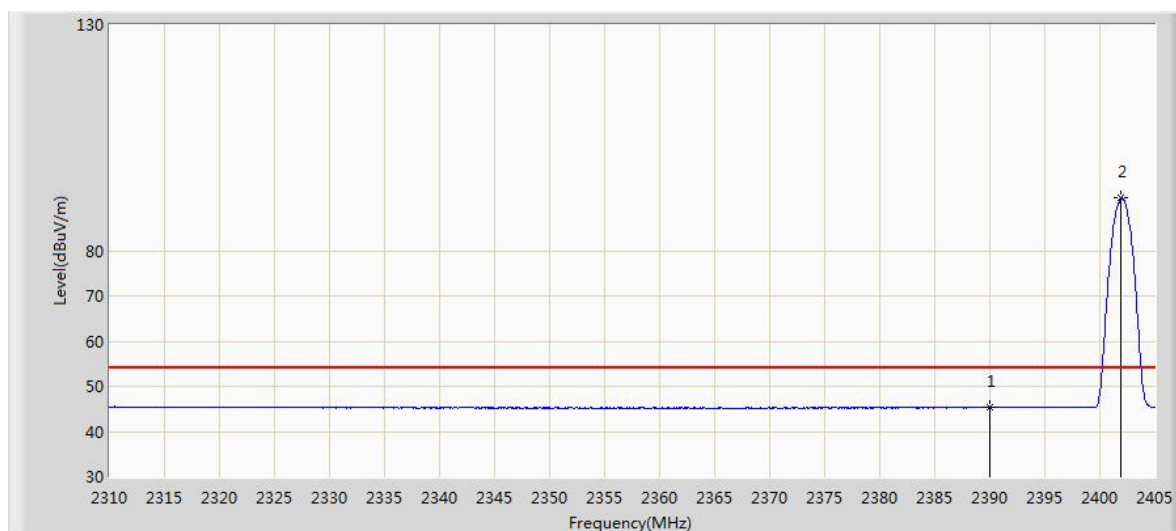
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2378.067	60.307	29.082	-13.693	74.000	31.225	PK
2390.000	58.320	27.117	-15.680	74.000	31.203	PK
2402.008	96.766	65.582	N/A	N/A	31.184	PK

Figure 66: Band Edge, TM7, Horizontal, AV


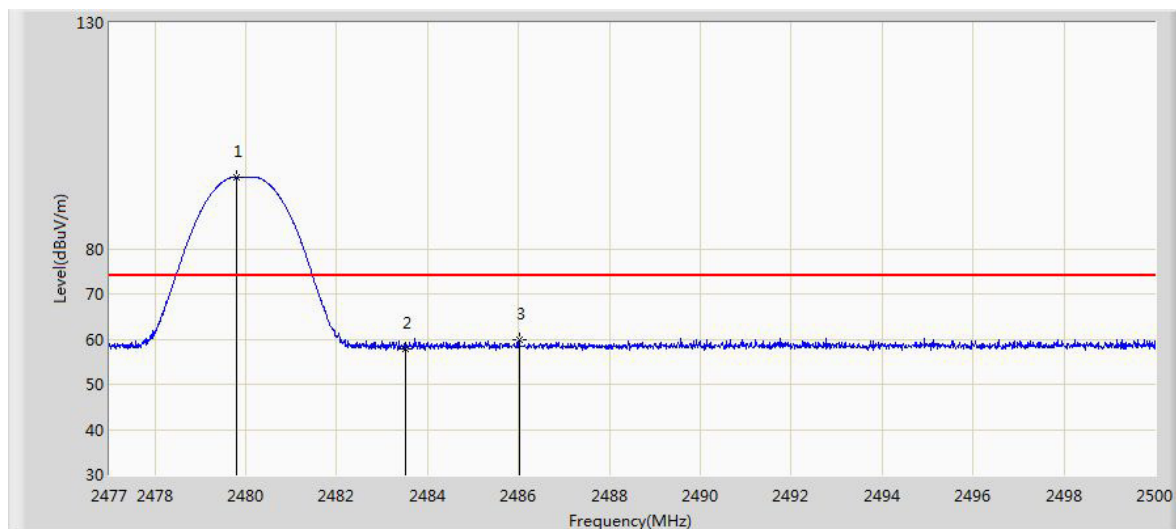
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.370	14.167	-8.630	54.000	31.203	AV
2401.865	94.823	63.639	N/A	N/A	31.184	AV

Figure 67: Band Edge, TM7, Vertical, PK


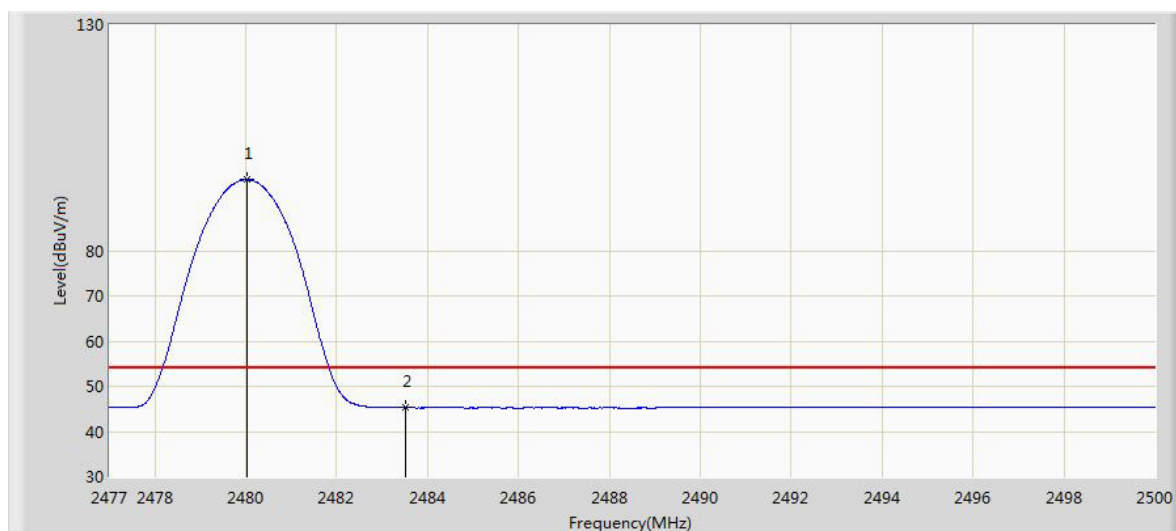
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2360.778	59.836	28.579	-14.164	74.000	31.258	PK
2390.000	58.281	27.078	-15.719	74.000	31.203	PK
2402.008	93.055	61.871	N/A	N/A	31.184	PK

Figure 68: Band Edge, TM7, Vertical, AV


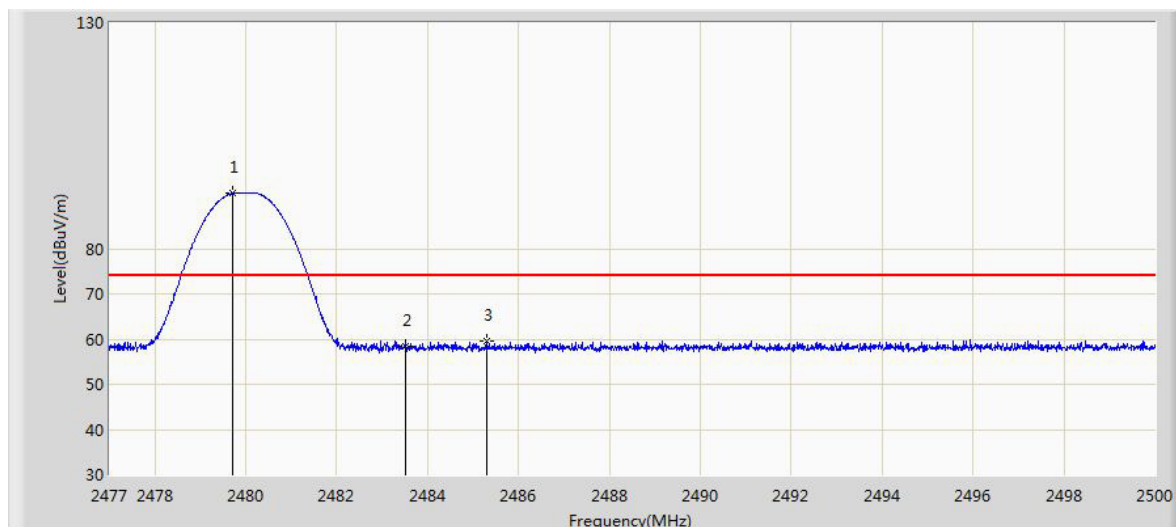
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.313	14.110	-8.687	54.000	31.203	AV
2401.913	91.681	60.497	N/A	N/A	31.184	AV

Figure 69: Band Edge, TM9, Horizontal, PK


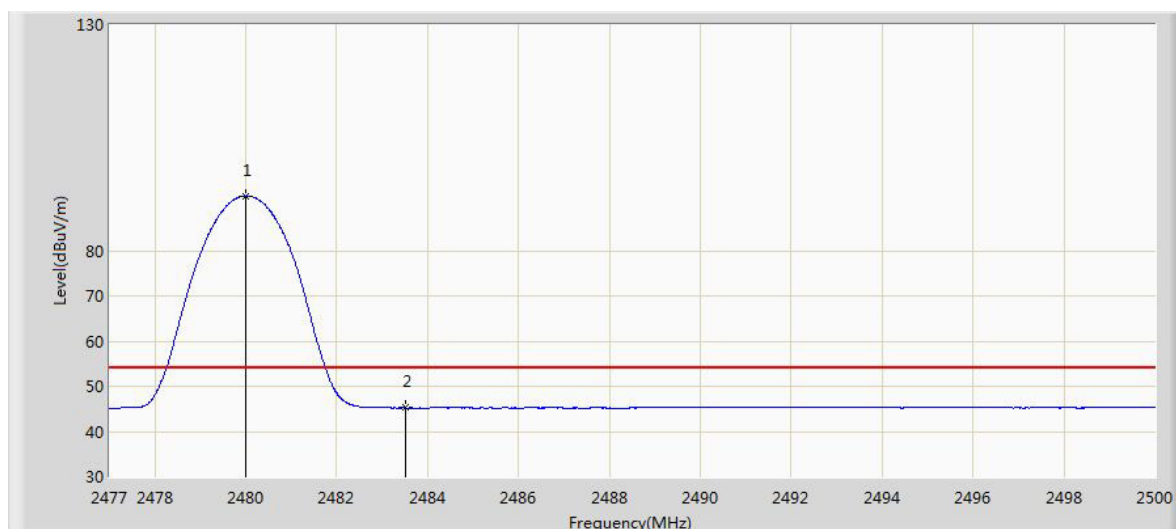
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.783	95.933	64.749	N/A	N/A	31.184	PK
2483.500	57.916	26.723	-16.084	74.000	31.194	PK
2486.016	59.757	28.557	-14.243	74.000	31.200	PK

Figure 70: Band Edge, TM9, Horizontal, AV


Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2480.024	95.708	64.524	N/A	N/A	31.184	AV
2483.500	45.271	14.078	-8.729	54.000	31.194	AV

Figure 71: Band Edge, TM9, Vertical, PK


Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.702	92.299	61.116	N/A	N/A	31.184	PK
2483.500	58.312	27.119	-15.688	74.000	31.194	PK
2485.314	59.560	28.362	-14.440	74.000	31.198	PK

Figure 72: Band Edge, TM9, Vertical, AV


Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.990	92.134	60.950	N/A	N/A	31.184	AV
2483.500	45.229	14.036	-8.771	54.000	31.194	AV

6. List of Tables

Table 1: List of Test and Measurement Equipment	5
Table 2: Measurement Uncertainty	6
Table 3: Technical Specification of EUT	7
Table 4: Antenna Requirement	10
Table 5: Peak Output Power, TM1 to TM9	12
Table 6: 20dB Bandwidth, TM1 to TM9	13
Table 7: Number of Hopping Frequency	34
Table 8: Time of Occupancy, TM12 to TM14	41
Table 9: Radiated Spurious Emission, below 1GHz, TM1	45
Table 10: Radiated Spurious Emission, above 1GHz, TM1 to TM3	46
Table 11: Radiated Spurious Emission, above 1GHz, TM4 to TM6	47
Table 12: Radiated Spurious Emission, above 1GHz, TM7 to TM9	48

7. List of Figures

Figure 1: 20dB Bandwidth, TM1	14
Figure 2: 20dB Bandwidth, TM2	14
Figure 3: 20dB Bandwidth, TM3	15
Figure 4: 20dB Bandwidth, TM4	15
Figure 5: 20dB Bandwidth, TM5	16
Figure 6: 20dB Bandwidth, TM6	16
Figure 7: 20dB Bandwidth, TM7	17
Figure 8: 20dB Bandwidth, TM8	17
Figure 9: 20dB Bandwidth, TM9	18
Figure 10: Conducted Spurious Emission, TM1	20
Figure 11: Conducted Spurious Emission, TM2	20
Figure 12: Conducted Spurious Emission, TM3	21
Figure 13: Conducted Spurious Emission, TM4	21
Figure 14: Conducted Spurious Emission, TM5	22
Figure 15: Conducted Spurious Emission, TM6	22
Figure 16: Conducted Spurious Emission, TM7	23
Figure 17: Conducted Spurious Emission, TM8	23
Figure 18: Conducted Spurious Emission, TM9	24
Figure 19: Band Edge, TM1	24
Figure 20: Band Edge, TM3	25
Figure 21: Band Edge, TM4	25
Figure 22: Band Edge, TM6	26
Figure 23: Band Edge, TM7	26
Figure 24: Band Edge, TM9	27
Figure 25: Frequency Separation, TM10, observation Frequency 2402MHz	29
Figure 26: Frequency Separation, TM10, observation Frequency 2441MHz	29
Figure 27: Frequency Separation, TM10, observation Frequency 2480MHz	30
Figure 28: Frequency Separation, TM11, observation Frequency 2402MHz	30
Figure 29: Frequency Separation, TM11, observation Frequency 2441MHz	31
Figure 30: Frequency Separation, TM11, observation Frequency 2480MHz	31

Prüfbericht - Nr.: 50072027 001
Test Report No.
Seite 62 von 62
Page 62 of 62

Figure 31: Frequency Separation, TM12, observation Frequency 2402MHz	32
Figure 32: Frequency Separation, TM12, observation Frequency 2441MHz	32
Figure 33: Frequency Separation, TM12, observation Frequency 2480MHz	33
Figure 34: Number of Hopping Frequency, TM10, part 1	35
Figure 35: Number of Hopping Frequency, TM10, part 2	35
Figure 36: Number of Hopping Frequency, TM10, part 3	36
Figure 37: Number of Hopping Frequency, TM10, part 4	36
Figure 38: Number of Hopping Frequency, TM11, part 1	37
Figure 39: Number of Hopping Frequency, TM11, part 2	37
Figure 40: Number of Hopping Frequency, TM11, part 3	38
Figure 41: Number of Hopping Frequency, TM11, part 4	38
Figure 42: Number of Hopping Frequency, TM12, part 1	39
Figure 43: Number of Hopping Frequency, TM12, part 2	39
Figure 44: Number of Hopping Frequency, TM12, part 3	40
Figure 45: Number of Hopping Frequency, TM12, part 4	40
Figure 46: Time of Occupancy, TM14, observation Frequency 2441MHz	42
Figure 47: Time of Occupancy, TM13, observation Frequency 2441MHz	42
Figure 48: Time of Occupancy, TM12, observation Frequency 2441MHz	43
Figure 49: Band Edge, TM1, Horizontal, PK	49
Figure 50: Band Edge, TM1, Horizontal, AV	49
Figure 51: Band Edge, TM1, Vertical, PK	50
Figure 52: Band Edge, TM1, Vertical, AV	50
Figure 53: Band Edge, TM3, Horizontal, PK	51
Figure 54: Band Edge, TM3, Horizontal, AV	51
Figure 55: Band Edge, TM3, Vertical, PK	52
Figure 56: Band Edge, TM3, Vertical, AV	52
Figure 57: Band Edge, TM4, Horizontal, PK	53
Figure 58: Band Edge, TM4, Horizontal, AV	53
Figure 59: Band Edge, TM4, Vertical, PK	54
Figure 60: Band Edge, TM4, Vertical, AV	54
Figure 61: Band Edge, TM6, Horizontal, PK	55
Figure 62: Band Edge, TM6, Horizontal, AV	55
Figure 63: Band Edge, TM6, Vertical, PK	56
Figure 64: Band Edge, TM6, Vertical, AV	56
Figure 65: Band Edge, TM7, Horizontal, PK	57
Figure 66: Band Edge, TM7, Horizontal, AV	57
Figure 67: Band Edge, TM7, Vertical, PK	58
Figure 68: Band Edge, TM7, Vertical, AV	58
Figure 69: Band Edge, TM9, Horizontal, PK	59
Figure 70: Band Edge, TM9, Horizontal, AV	59
Figure 71: Band Edge, TM9, Vertical, PK	60
Figure 72: Band Edge, TM9, Vertical, AV	60