Prüfbericht-Nr.: *Test Report No.*:	**15079432 001**	**Auftrags-Nr.:** *Order No.*:	154087730	Seite 1 von 46 *Page 1 of 46*
Kunden-Referenz-Nr.: *Client Reference No.*:	450786	**Auftragsdatum:** *Order date*:	30.10.2014	
Auftraggeber: *Client*:	Alcatel-Lucent Enterprise 1 Route du Dr A.Schweitzer, ILLKIRCH, 67408, France			
Prüfgegenstand: *Test item*:	Bluetooth Daughter Board			
Bezeichnung / Typ-Nr.: *Identification / Type No.*:	BTDB01 FCC ID: OL3BTMOD01 IC: 1737D-BTMOD01			
Auftrags-Inhalt: *Order content*:	Complete test			
Prüfgrundlage: *Test specification*:	FCC CFR47 Part 15, Subpart C Section 15.247 ANSI C63.10-2009 Public Notice DA 00-705: Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems (March 30, 2000) RSS-Gen Issue 4, November 2014 RSS-210 Issue 8, December 2010			

Wareneingangsdatum: *Date of receipt*:	30.10.2014
Prüfmuster-Nr.: *Test sample No.*:	A000123003-001 A000123003-002
Prüfzeitraum: *Testing period*:	26.11.2014 - 10.12.2014
Ort der Prüfung: *Place of testing*:	MRT Technology (Suzhou) Co., Ltd
Prüflaboratorium: *Testing laboratory*:	TÜV Rheinland (Shanghai) Co., Ltd.
Prüfergebnis*: *Test result**:	Pass



geprüft von / *tested by*:			**kontrolliert von /** *reviewed by*:		
20.01.2015	Adrian Shi / PE	Adrian Shi	20.01.2015	Shi Li / Reviewer	Shi Li
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other*:

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery*:	Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	1 = sehr gut P(ass) = entspricht o.g.	2 = gut Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g.	4 = ausreichend N/A = nicht anwendbar	5 = mangelhaft N/T = nicht getestet
Legend:	*1 = very good* *P(ass) = passed a.m.*	*2 = good* *test specification(s)*	*3 = satisfactory* *F(ail) = failed a.m.*	*4 = sufficient* *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.
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.

V04

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT
RESULT: *Pass*

5.1.2 PEAK OUTPUT POWER
RESULT: *Pass*

5.1.3 20DB BANDWIDTH AND 99% BANDWIDTH
RESULT: *Pass*

5.1.4 CONDUCTED SPURIOUS EMISSIONS MEASURED
RESULT: *Pass*

5.1.5 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*

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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

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	101209	1 year	2015/11/07
Two-Line V-Network	R&S	ENV216	101683	1 year	2015/11/07
Two-Line V-Network	R&S	ENV216	101684	1 year	2015/11/07
Temperature/ Meter Humidity	Anymetre	TH101B	SR2-01	1 year	2015/11/15

Radiated Emission

Spectrum Analyzer	Agilent	N9010A	MY5144016A	1 year	2015/01/04
Preamplifier	MRT	AP01G18	1310002	1 year	2015/10/06
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	1 year	2015/11/08
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	1 year	2015/11/08
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	1 year	2015/11/08
Broadband Horn Antenna	Schwarzbeck	BBHA9170	9170-549	1 year	2014/12/11
Temperature/Humidity Meter	Anymetre	TH101B	AC1-01	1 year	2015/11/15

Conducted Test Equipment

Spectrum Analyzer	Agilent	N9010A	MY5144016A	1 year	2015/01/04
Power Sensor	Agilent	U2021XA	MY52450003	1 year	2014/12/14
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	1 year	2015/11/15

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 basics 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 Daughter Board which supports Bluetooth 2.1+EDR.

For details refer to the User Manual and Circuit Diagram.

3.2 Ratings and System Details

Kind of Equipment	Bluetooth Daughter Board
Type Designation	BTDB01
Bluetooth version	2.1+EDR
Operating Frequency band	2402 – 2480MHz
Channel separation	BDR/EDR: 1MHz
Modulation	BDR/EDR: GFSK, 8DPSK, π /4DQPSK
Antenna Type	PCB antenna
Antenna Gain	5.1dBi
Extreme Temperature Range	-5~+45℃
Operation Voltage	DC 3.3V

3.3 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

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

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

4.3 Special Accessories and Auxiliary Equipment

The EUT was tested together with the following accessories:

Description	Manufacturer	Part No.	S/N
Laptop	DELL	PP11L	QDS-BRCM1017

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**

Test standard	:	FCC Part 15.247(b)(4) and Part 15.203 RSS-Gen 2.3.3
Limit		The use of antennas with directional gains that do not exceed 6dBi

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

5.1.2 Peak Output Power

RESULT: **Pass**

Test date	:	2014-12-07
Test standard	:	FCC Part 15.247(b)(1) RSS-210 A8.4(2)
Basic standard	:	Public Notice DA 00-705
Limit	:	125mW, 1W
Kind of test site	:	Shielded room

Test setup

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

Table 3: Test result of Peak Output Power of Bluetooth (BDR mode)

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)
Low Channel	2402	2.503	30
Middle Channel	2441	1.754	30
High Channel	2480	0.277	30

Table 4: Test result of Peak Output Power of Bluetooth (EDR mode)

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)
Low Channel	2402	5.316	21
Middle Channel	2441	4.905	21
High Channel	2480	3.509	21

5.1.3 20dB Bandwidth and 99% Bandwidth

RESULT: **Pass**

Date of testing	:	2014-12-07
Test standard	:	FCC Part 15.247(a)(1) RSS-210 A8.1(a)
Basic standard	:	Public Notice DA 00-705 RSS-Gen
Kind of test site	:	Shielded room

Test setup

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

Table 5: Test result of 20dB & 99% Bandwidth (BDR mode)

Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	2402	0.920	0.815
Mid Channel	2441	0.883	0.812
High Channel	2480	0.916	0.821

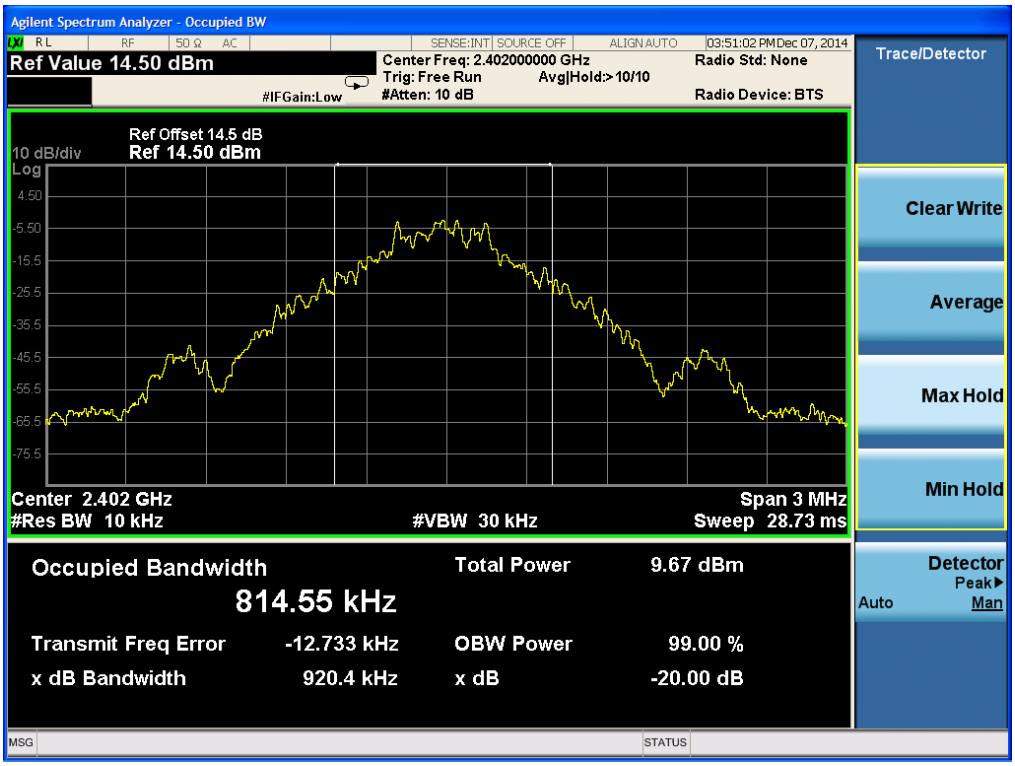
Table 6: Test result of 20dB & 99% Bandwidth (EDR mode)

Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low Channel	2402	1.280	1.194
Mid Channel	2441	1.296	1.190
High Channel	2480	1.280	1.197

For details refer to following test plot.

Test Plot of 20dB & 99% Bandwidth measured in 10kHz Bandwidth of BDR mode

Low Channel



Middle Channel

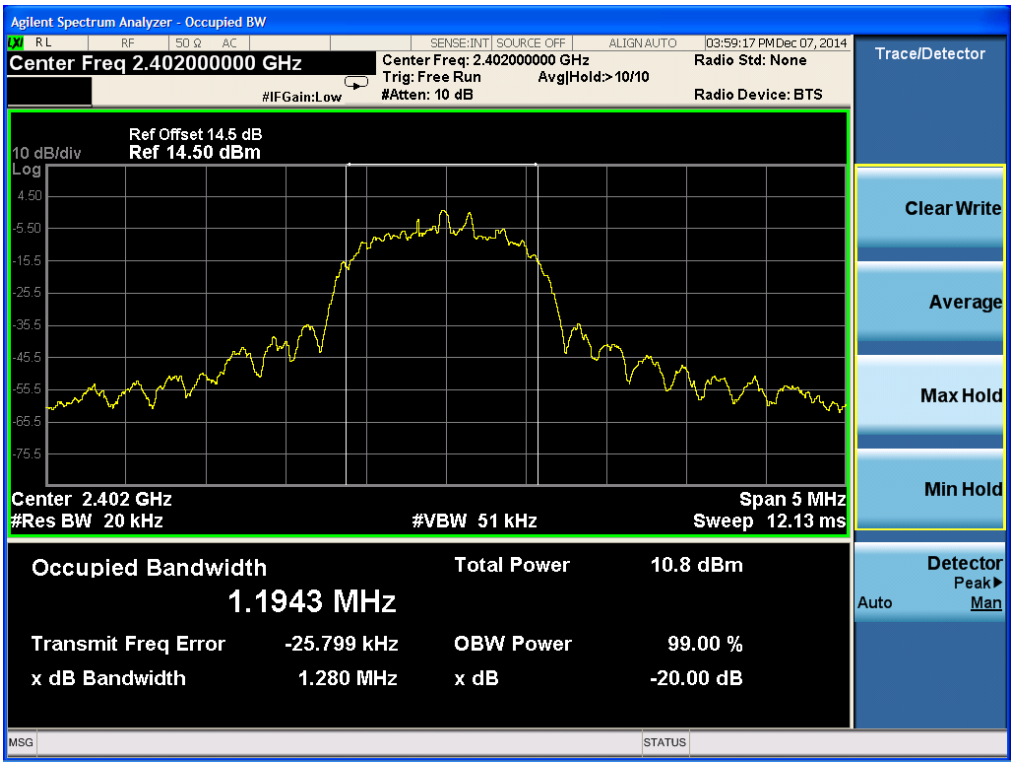


High Channel

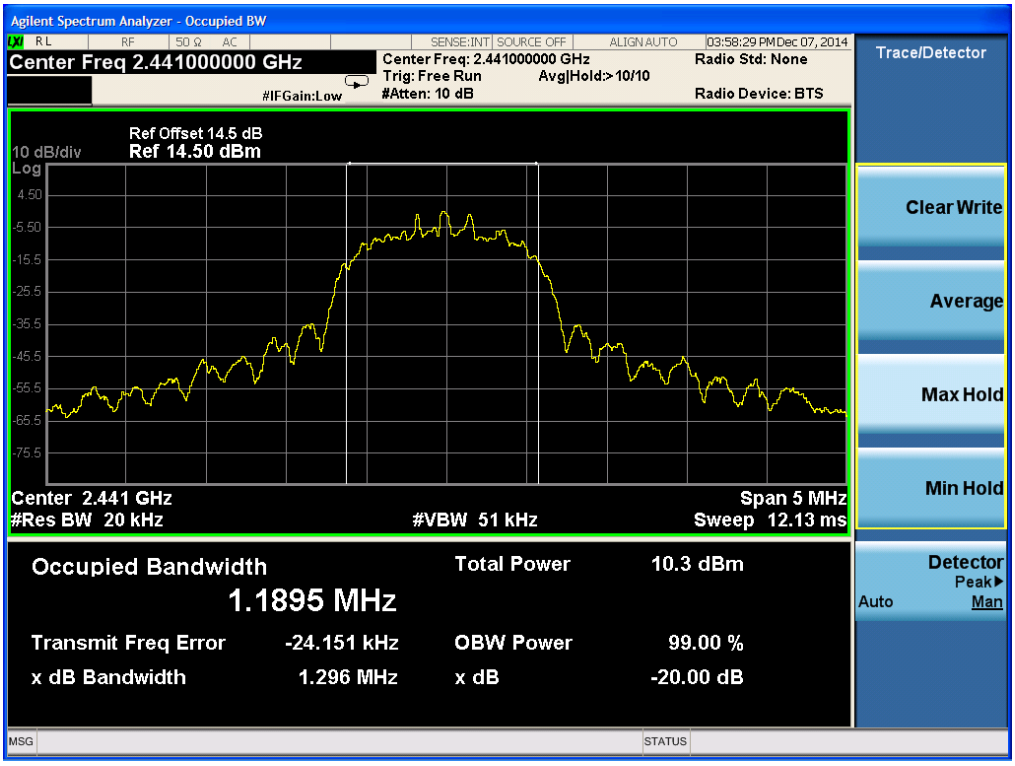


Test Plot of 20dB & 99% Bandwidth measured in 20kHz Bandwidth of EDR mode

Low Channel



Middle Channel



High Channel



5.1.4 Conducted Spurious Emissions measured

RESULT: **Pass**

Date of testing	:	2014-12-07
Test standard	:	FCC part 15.247(d) RSS-210 A8.5
Basic standard	:	Public Notice DA 00-705
Limit	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power);
Kind of test site	:	Shield room

Test setup

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

For details refer to following test plot.

Test Plot of Conducted spurious emissions measured in 100kHz Bandwidth of BDR mode

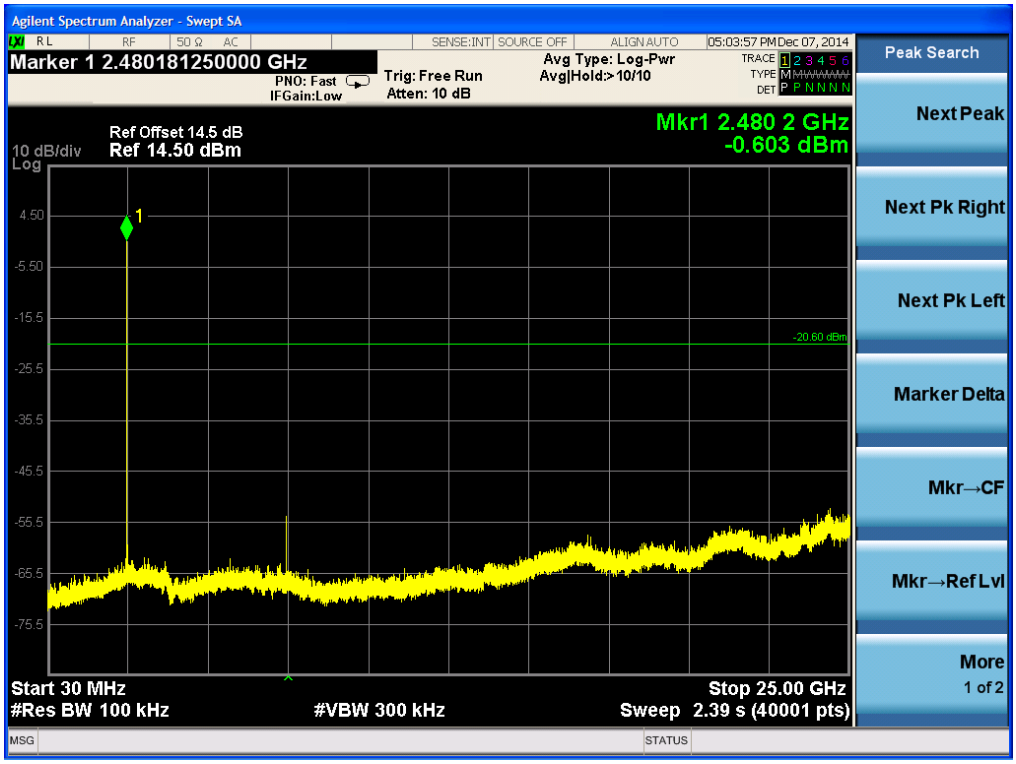
Low Channel



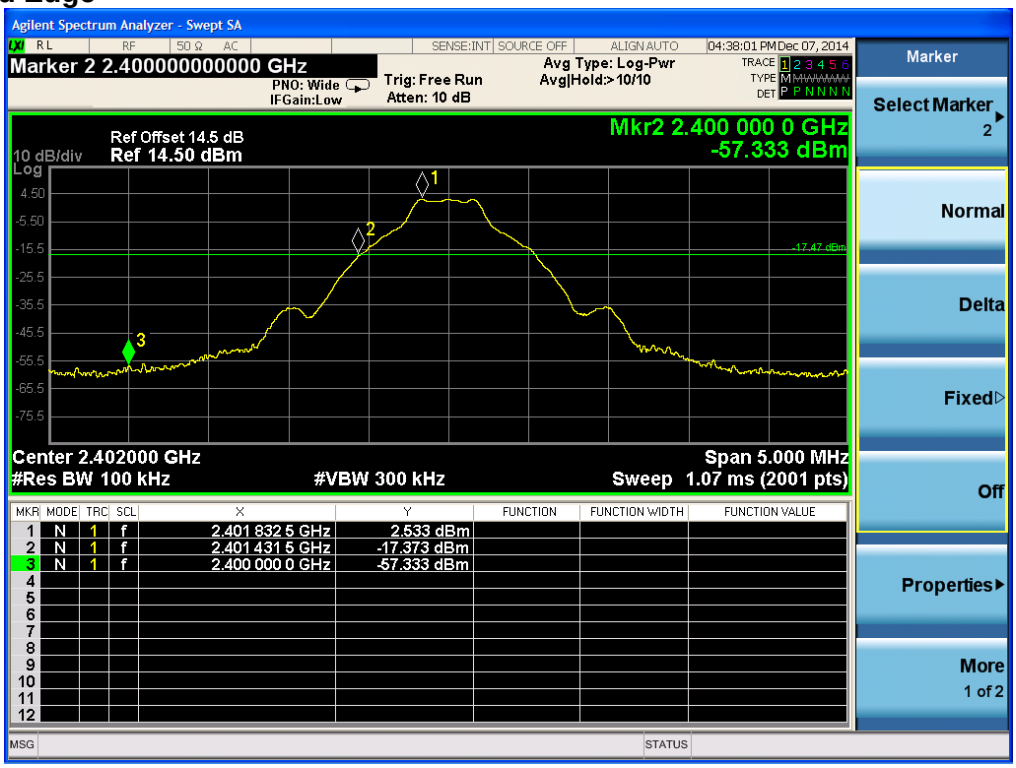
Middle Channel

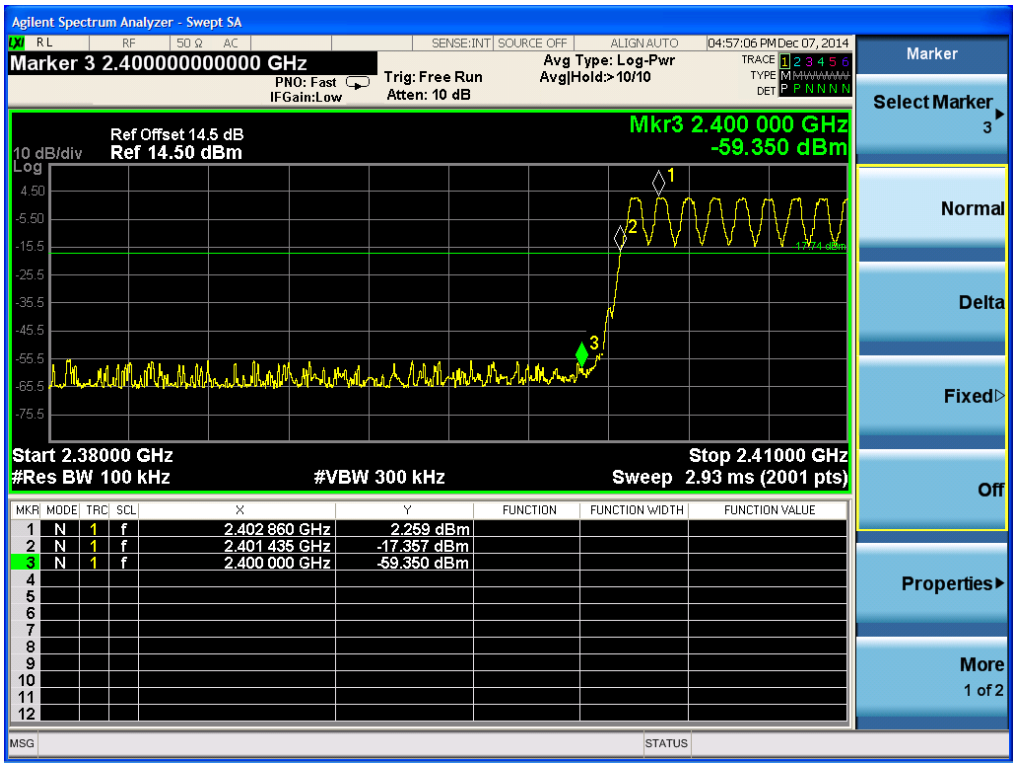


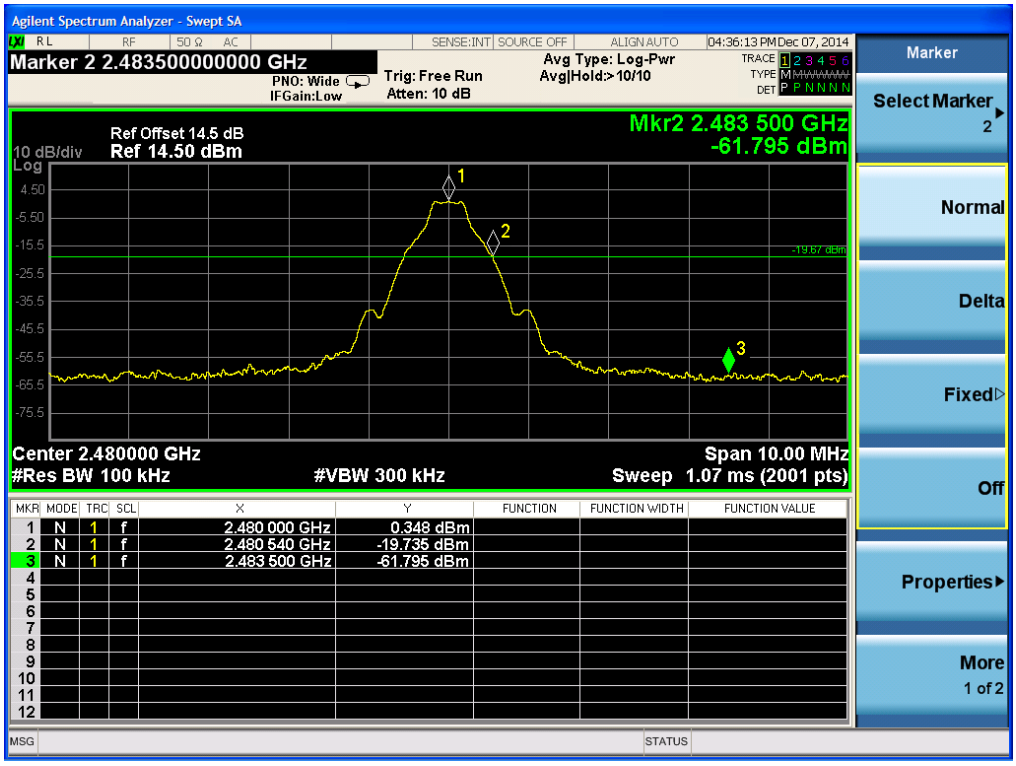
High Channel

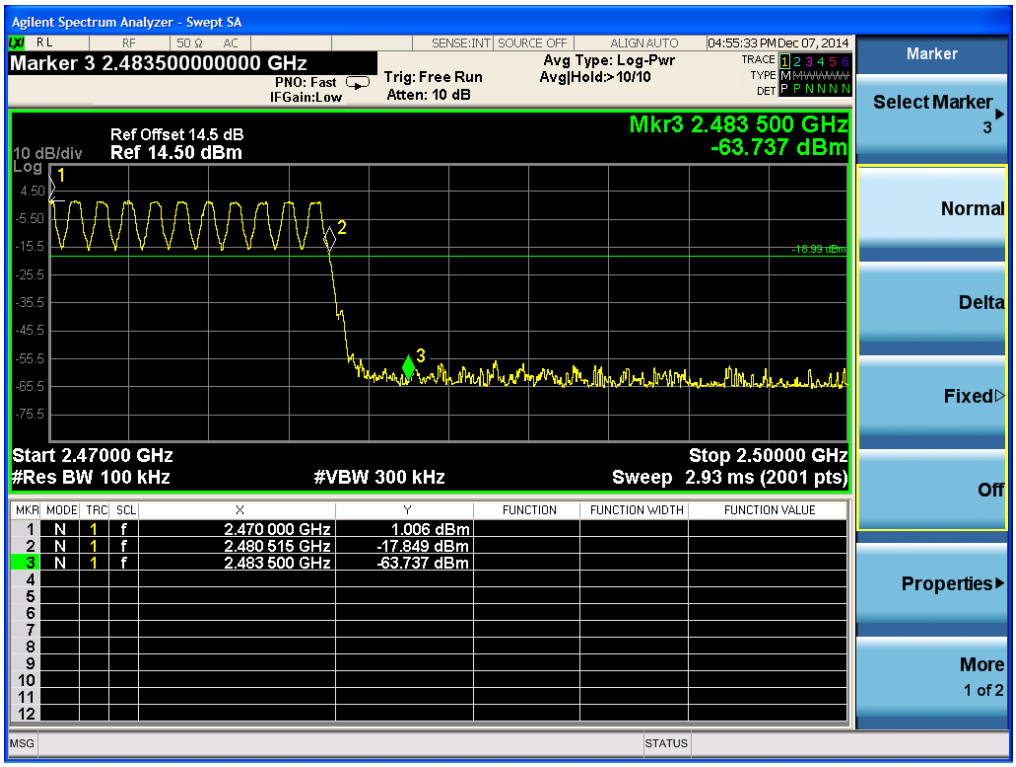


Band Edge


Agilent Spectrum Analyzer - Swept SA
Marker 2 2.400000000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>10/10
04:38:01 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Ref 14.50 dBm
Mkr2 2.400 000 0 GHz
-57.333 dBm
Center 2.402000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 5.000 MHz
Sweep 1.07 ms (2001 pts)
1 N 1 f 2.401 832 5 GHz 2.533 dBm
2 N 1 f 2.401 431 5 GHz -17.373 dBm
3 N 1 f 2.400 000 0 GHz -57.333 dBm
Marker
Select Marker 2
Normal
Delta
Fixed
Off
Properties
More 1 of 2

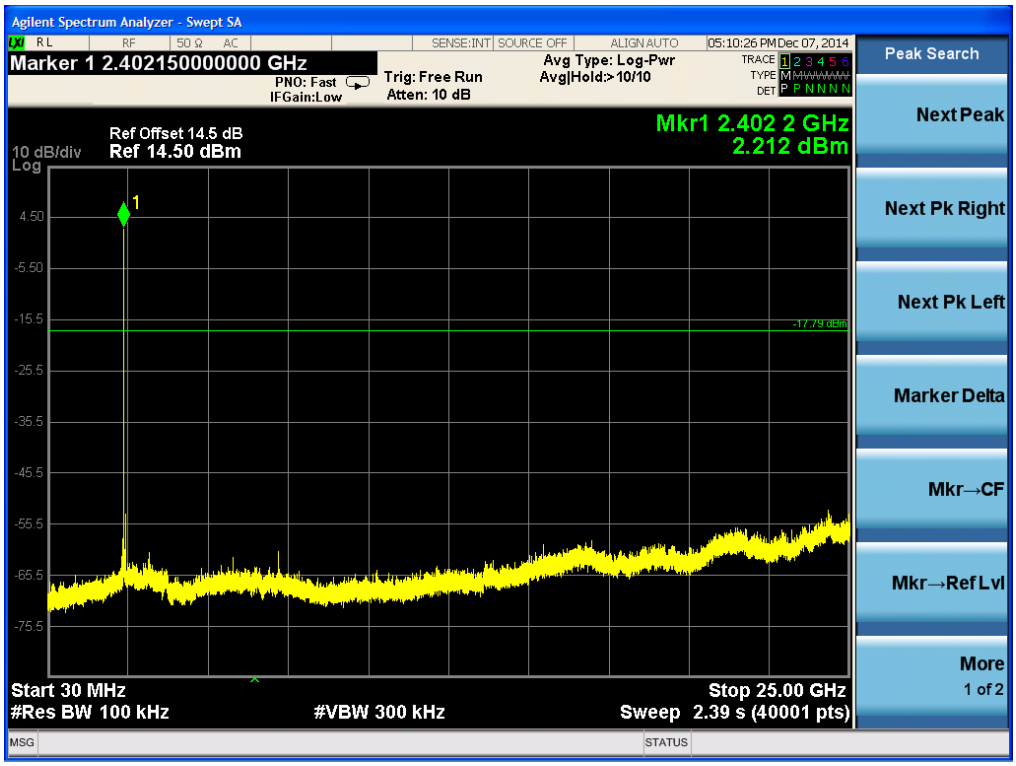

Agilent Spectrum Analyzer - Swept SA
Marker 3 2.400000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>10/10
04:57:06 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Ref 14.50 dBm
Mkr3 2.400 000 GHz
-59.350 dBm
Start 2.38000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.41000 GHz
Sweep 2.93 ms (2001 pts)
1 N 1 f 2.402 860 GHz 2.259 dBm
2 N 1 f 2.401 435 GHz -17.357 dBm
3 N 1 f 2.400 000 GHz -59.350 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 2 2.483500000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>10/10
04:36:13 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Ref 14.50 dBm
Log
Mkr2 2.483 500 GHz
-61.795 dBm
-19.67 dBm
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 10.00 MHz
Sweep 1.07 ms (2001 pts)
1 N 1 f 2.480 000 GHz 0.348 dBm
2 N 1 f 2.480 540 GHz -19.735 dBm
3 N 1 f 2.483 500 GHz -61.795 dBm
Marker
Select Marker 2
Normal
Delta
Fixed
Off
Properties
More 1 of 2
MSG
STATUS

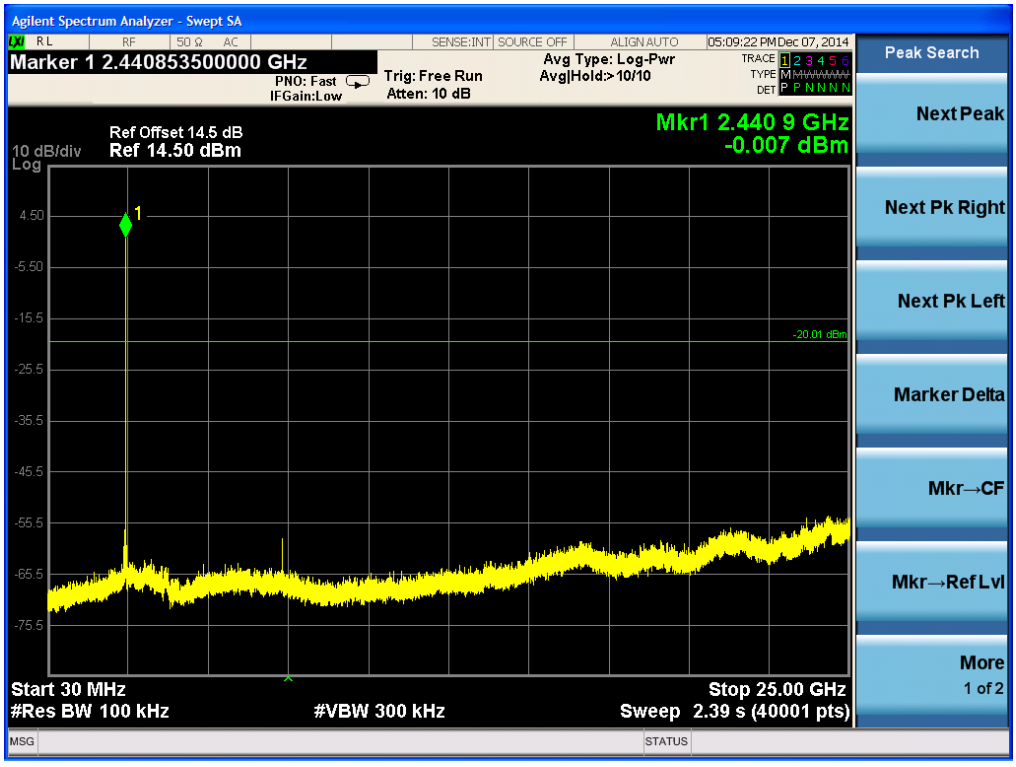

Agilent Spectrum Analyzer - Swept SA
Marker 3 2.483500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>10/10
04:55:33 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Ref 14.50 dBm
Log
Mkr3 2.483 500 GHz
-63.737 dBm
-18.99 dBm
Start 2.47000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.93 ms (2001 pts)
1 N 1 f 2.470 000 GHz 1.006 dBm
2 N 1 f 2.480 515 GHz -17.849 dBm
3 N 1 f 2.483 500 GHz -63.737 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2
MSG
STATUS

Test Plot of Conducted spurious emissions measured in 100kHz Bandwidth of EDR mode

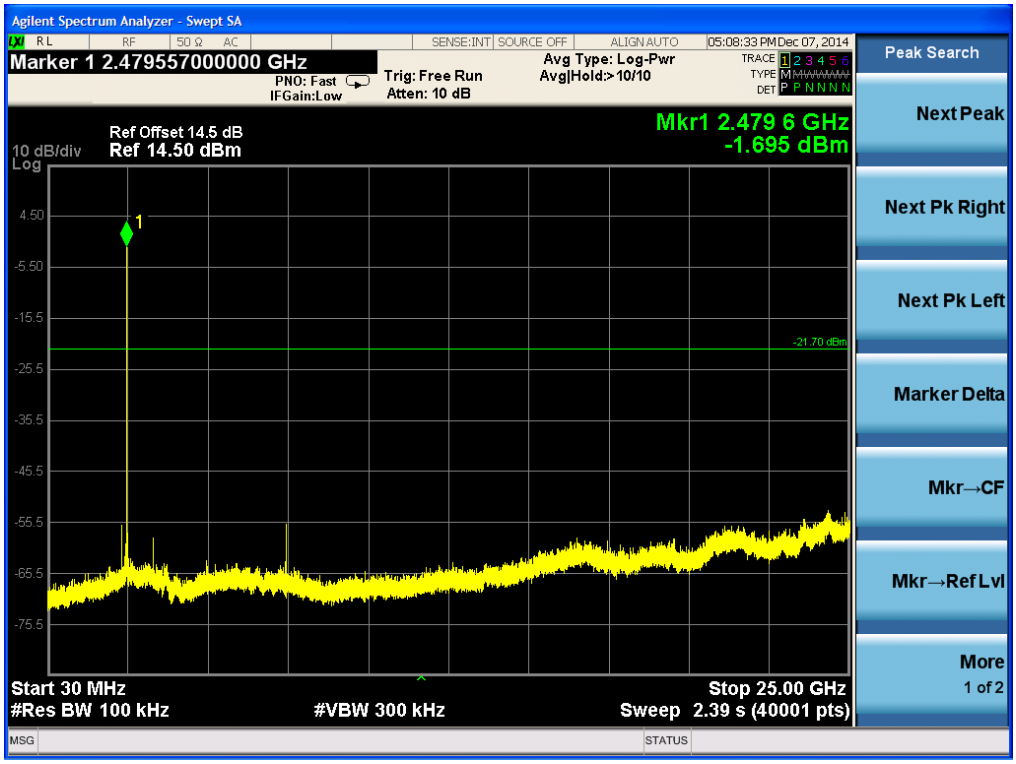
Low Channel



Middle Channel

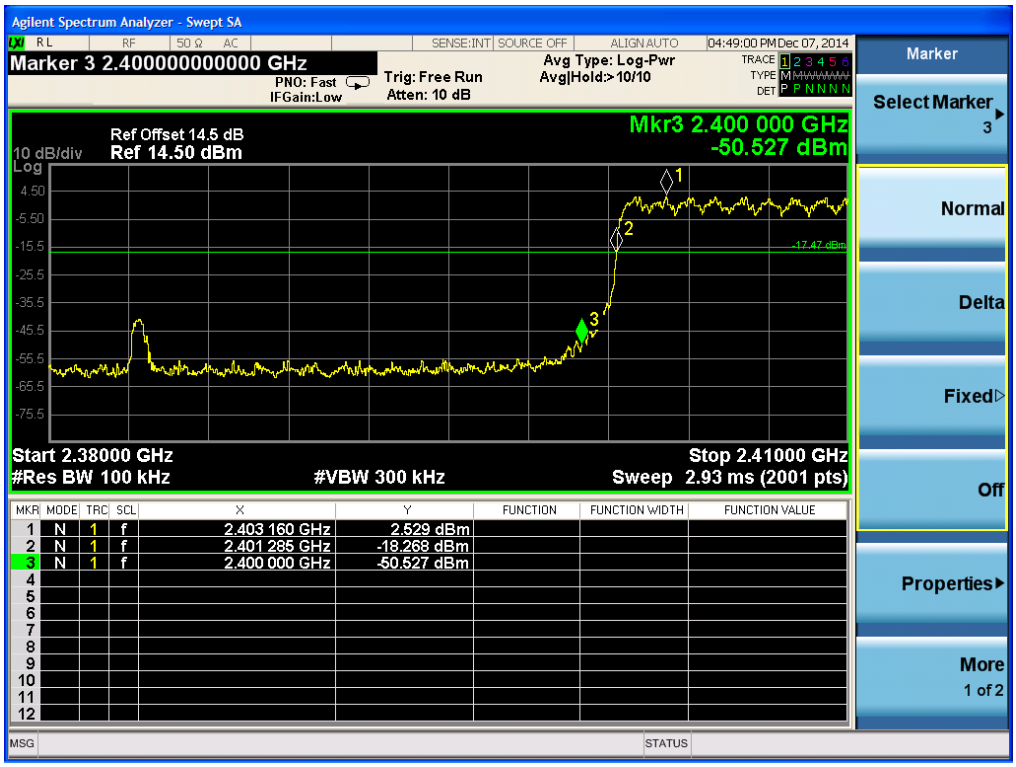


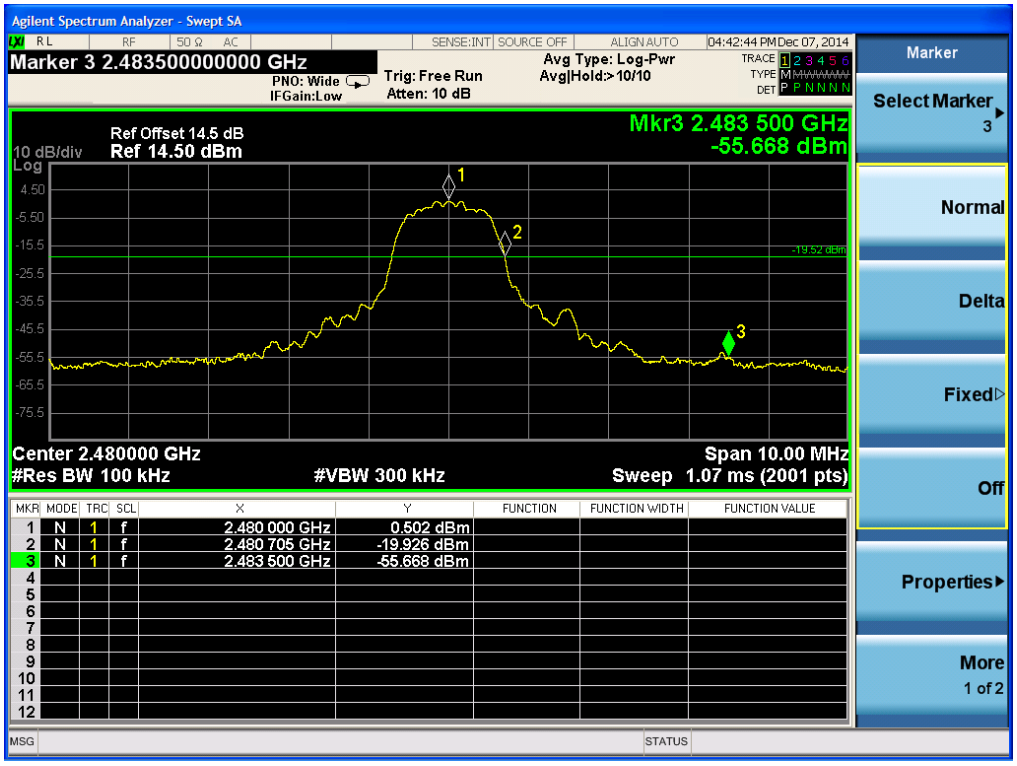
High Channel

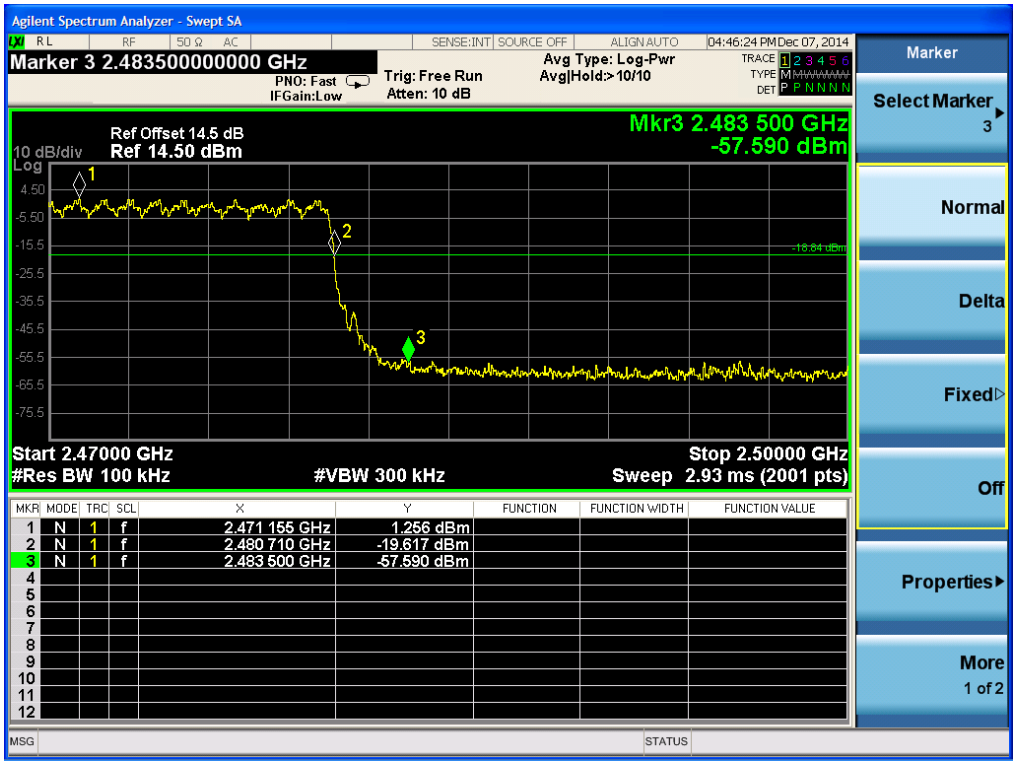


Band Edge


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.400000000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>10/10
04:43:46 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Ref 14.50 dBm
Mkr3 2.400 000 0 GHz
-48.832 dBm
-17.35 dBm
Center 2.402000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 5.000 MHz
Sweep 1.07 ms (2001 pts)
1 N 1 f 2.402 150 0 GHz 2.652 dBm
2 N 1 f 2.401 292 5 GHz -17.339 dBm
3 N 1 f 2.400 000 0 GHz -48.832 dBm
Marker
Select Marker
3
Normal
Delta
Fixed
Off
Properties
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.400000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>10/10
04:49:00 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Ref 14.50 dBm
Mkr3 2.400 000 GHz
-50.527 dBm
-17.47 dBm
Start 2.38000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.41000 GHz
Sweep 2.93 ms (2001 pts)
1 N 1 f 2.403 160 GHz 2.529 dBm
2 N 1 f 2.401 285 GHz -18.268 dBm
3 N 1 f 2.400 000 GHz -50.527 dBm
Marker
Select Marker
3
Normal
Delta
Fixed
Off
Properties
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.483500000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>10/10
04:42:44 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Ref 14.50 dBm
Log
Mkr3 2.483 500 GHz
-55.668 dBm
-19.52 dBm
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 10.00 MHz
Sweep 1.07 ms (2001 pts)
1 N 1 f 2.480 000 GHz 0.502 dBm
2 N 1 f 2.480 705 GHz -19.926 dBm
3 N 1 f 2.483 500 GHz -55.668 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2
MSG
STATUS


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.483500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>10/10
04:46:24 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Ref 14.50 dBm
Log
Mkr3 2.483 500 GHz
-57.590 dBm
-18.84 dBm
Start 2.47000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.93 ms (2001 pts)
1 N 1 f 2.471 155 GHz 1.256 dBm
2 N 1 f 2.480 710 GHz -19.617 dBm
3 N 1 f 2.483 500 GHz -57.590 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2
MSG
STATUS

5.1.5 Spurious Emission

RESULT: **Pass**

Date of testing	:	2014-11-26
Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209 RSS-210 2.2, RSS-210 A8.5 and RSS-Gen 8.1
Basic standard	:	ANSI C63.10: 2009 and ANSI C63.10: 2013
Limits	:	FCC part 15.209(a)
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

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

Table 7: Test result of Spurious Emission of transmitting of Bluetooth (BDR mode)

Channel	Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
Low	51.825	13.752	30.134	-26.248	40.000	-16.382	PEAK	H
	721.125	19.730	29.517	-26.270	46.000	-9.788	PEAK	
	3513.000	40.170	36.263	-33.830	74.000	3.908	PEAK	
	4426.000	41.055	35.549	-32.945	74.000	5.505	PEAK	
	4804.000	42.280	35.924	-31.720	74.000	6.356	PEAK	
	7458.000	50.004	35.842	-23.996	74.000	14.163	PEAK	
	50.855	13.584	29.949	-26.416	40.000	-16.365	PEAK	V
	131.365	15.550	36.999	-27.950	43.500	-21.449	PEAK	
	4437.000	41.057	35.550	-32.943	74.000	5.506	PEAK	
	4804.000	41.520	35.164	-32.480	74.000	6.356	PEAK	
	7205.000	50.986	37.353	-23.014	74.000	13.633	PEAK	
	7415.000	49.204	35.040	-24.796	74.000	14.163	PEAK	
Middle	52.310	13.913	30.302	-26.087	40.000	-16.390	PEAK	H
	110.510	11.997	30.601	-31.503	43.500	-18.603	PEAK	
	4416.000	40.775	35.266	-33.225	74.000	5.508	PEAK	
	4469.000	40.415	34.852	-33.585	74.000	5.564	PEAK	
	4882.000	42.134	35.493	-31.866	74.000	6.641	PEAK	
	7323.000	49.903	35.889	-24.097	74.000	14.014	PEAK	
	57.645	13.114	30.134	-26.886	40.000	-17.019	PEAK	V
	133.305	13.462	35.084	-30.038	43.500	-21.622	PEAK	
	4436.000	41.601	36.096	-32.399	74.000	5.505	PEAK	
	4496.000	41.787	36.191	-32.213	74.000	5.596	PEAK	
	4882.000	43.201	36.560	-30.799	74.000	6.641	PEAK	
	7323.000	50.160	36.146	-23.840	74.000	14.014	PEAK	
High	51.340	13.311	29.685	-26.689	40.000	-16.374	PEAK	H
	337.490	15.854	31.842	-30.146	46.000	-15.989	PEAK	
	4419.000	41.256	35.748	-32.744	74.000	5.508	PEAK	
	4467.000	40.938	35.378	-33.062	74.000	5.560	PEAK	
	4944.000	47.520	40.764	-26.480	74.000	6.756	PEAK	
	7440.000	49.796	35.628	-24.204	74.000	14.168	PEAK	
	52.795	14.841	31.233	-25.159	40.000	-16.391	PEAK	V
	131.850	14.682	36.178	-28.818	43.500	-21.496	PEAK	
	4416.000	41.024	35.515	-32.976	74.000	5.508	PEAK	
	4467.000	40.668	35.108	-33.332	74.000	5.560	PEAK	
	4944.000	44.932	38.176	-29.068	74.000	6.756	PEAK	
	7440.000	49.515	35.347	-24.485	74.000	14.168	PEAK	

Notes:
1. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported.
2. Due to the peak measure values also meet the average limit (54dBm), the average measurement is not tested based on technical judgment.
3. During the testing, the EUT was both placed on 0.8m and 1.5m high to measure above 1 GHz frequencies. But only the worse case (0.8m) was shown.

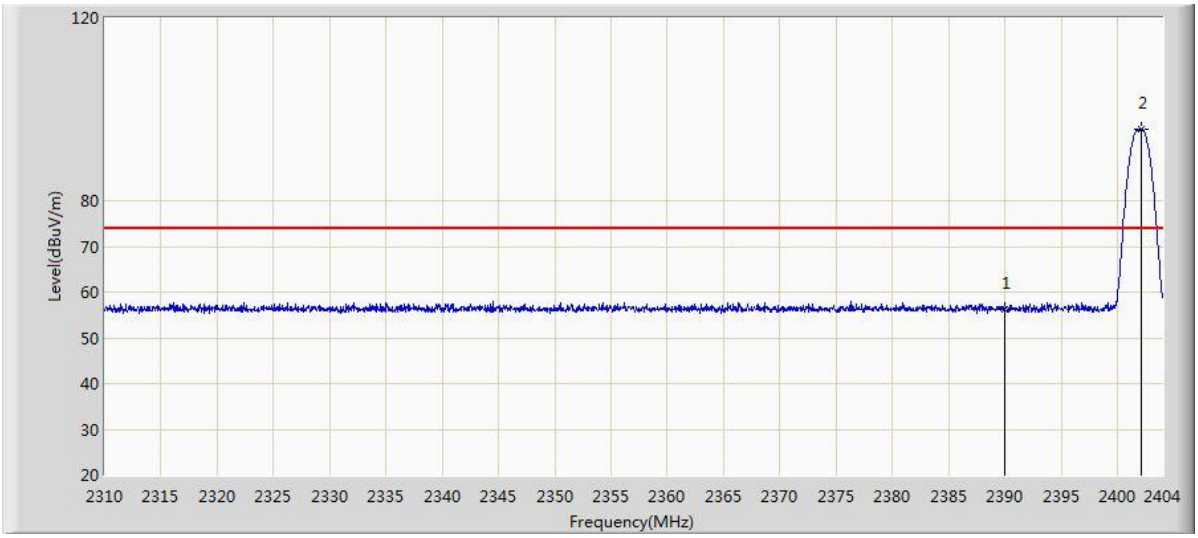
Table 8: Test result of Spurious Emission of transmitting of Bluetooth (EDR mode)

Channel	Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
Low	57.645	12.768	29.788	-27.232	40.000	-17.019	PEAK	H
	300.145	16.220	33.199	-29.780	46.000	-16.979	PEAK	
	4419.000	42.079	36.571	-31.921	74.000	5.508	PEAK	
	4804.000	43.622	37.266	-30.378	74.000	6.356	PEAK	
	5368.000	43.816	36.958	-30.184	74.000	6.858	PEAK	
	7205.000	50.556	36.923	-23.444	74.000	13.633	PEAK	
	50.370	13.601	29.957	-26.399	40.000	-16.356	PEAK	V
	132.820	13.906	35.489	-29.594	43.500	-21.583	PEAK	
	4436.000	42.188	36.683	-31.812	74.000	5.505	PEAK	
	4804.000	42.557	36.201	-31.443	74.000	6.356	PEAK	
	5362.000	42.862	36.022	-31.138	74.000	6.841	PEAK	
	7205.000	51.888	38.255	-22.112	74.000	13.633	PEAK	
Middle	51.825	14.266	30.648	-25.734	40.000	-16.382	PEAK	H
	59.100	12.684	29.942	-27.316	40.000	-17.258	PEAK	
	3168.000	39.959	36.348	-34.041	74.000	3.611	PEAK	
	4426.000	42.023	36.517	-31.977	74.000	5.505	PEAK	
	4882.000	43.999	37.358	-30.001	74.000	6.641	PEAK	
	7281.500	51.401	37.452	-22.599	74.000	13.949	PEAK	
	56.190	13.472	30.261	-26.528	40.000	-16.789	PEAK	V
	133.305	14.809	36.431	-28.691	43.500	-21.622	PEAK	
	3162.000	40.172	36.548	-33.828	74.000	3.625	PEAK	
	4416.000	42.520	37.011	-31.480	74.000	5.508	PEAK	
	4867.500	45.440	38.867	-28.560	74.000	6.573	PEAK	
	7323.000	49.550	35.536	-24.450	74.000	14.014	PEAK	
High	51.825	13.008	29.390	-26.992	40.000	-16.382	PEAK	H
	58.130	13.474	30.573	-26.526	40.000	-17.099	PEAK	
	3169.000	40.664	37.055	-33.336	74.000	3.609	PEAK	
	4418.000	42.135	36.626	-31.865	74.000	5.509	PEAK	
	4944.000	46.414	39.658	-27.586	74.000	6.756	PEAK	
	7440.000	49.402	35.234	-24.598	74.000	14.168	PEAK	
	50.370	12.888	29.244	-27.112	40.000	-16.356	PEAK	V
	58.615	13.704	30.883	-26.296	40.000	-17.178	PEAK	
	3162.000	40.394	36.770	-33.606	74.000	3.625	PEAK	
	4426.000	42.578	37.072	-31.422	74.000	5.505	PEAK	
	4960.000	44.779	37.992	-29.221	74.000	6.787	PEAK	
	7440.000	48.935	34.767	-25.065	74.000	14.168	PEAK	

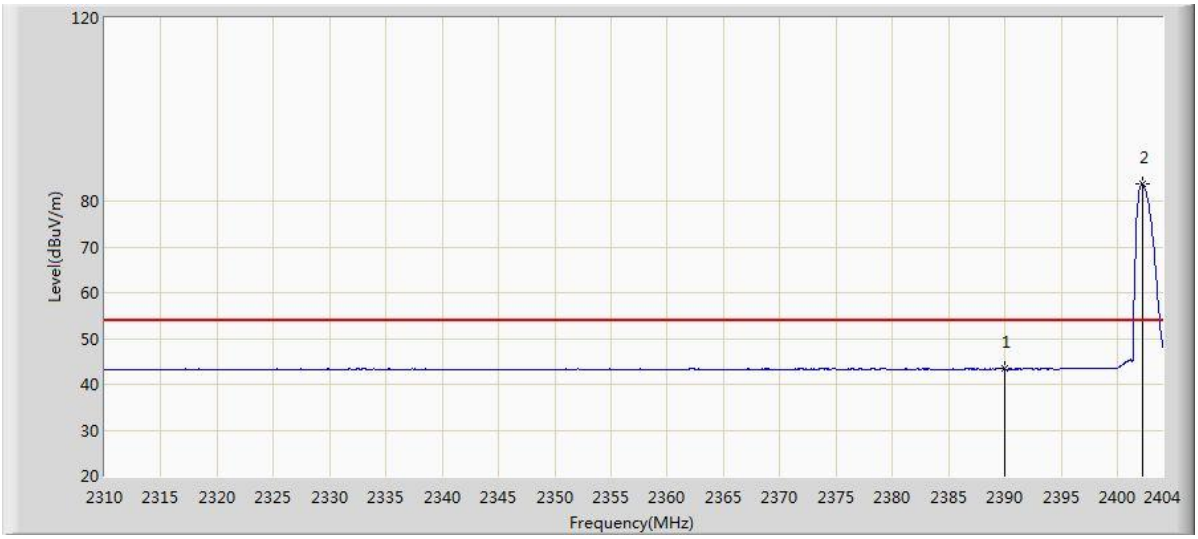
Notes:
1. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported.
2. Due to the peak measure values also meet the average limit (54dBm), the average measurement is not tested based on technical judgment.
3. During the testing, the EUT was both placed on 0.8m and 1.5m high to measure above 1 GHz frequencies. But only the worse case (0.8m) was shown.

Test Plot of Frequency Band Edge of Bluetooth BDR mode

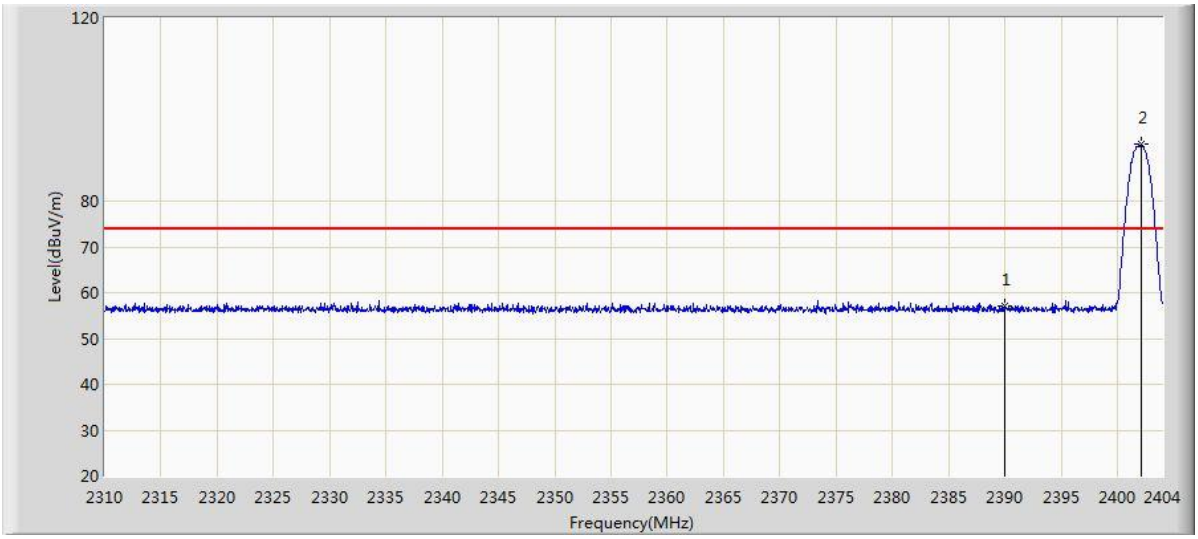
Low Channel



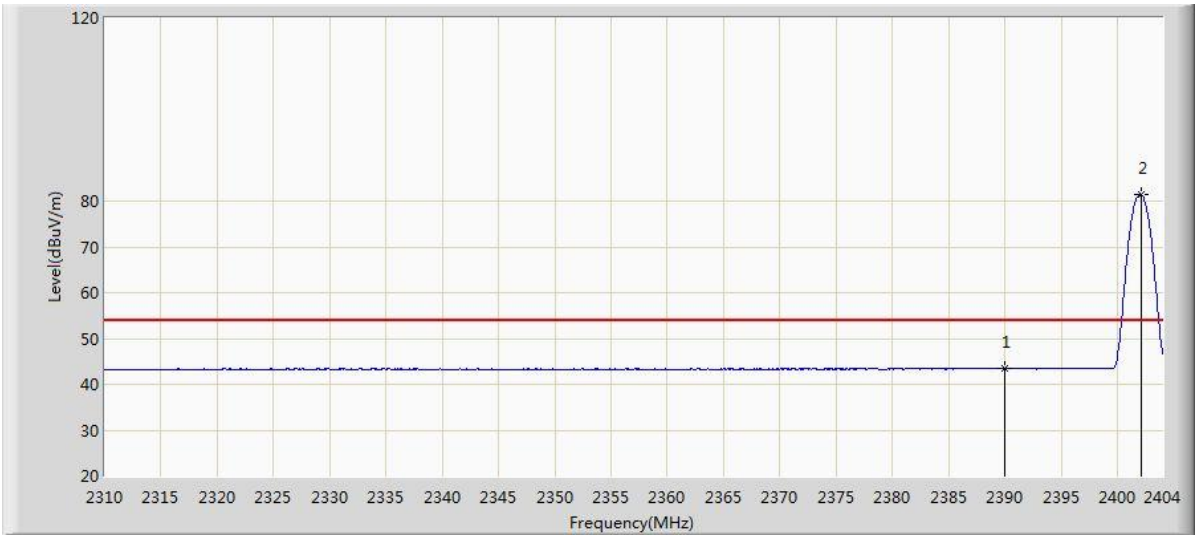
Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
2390.000	56.315	25.631	-17.685	74.000	30.684	PK	H
2402.073	95.531	64.870	21.531	74.000	30.661	PK	



Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
2390.000	43.348	12.664	-10.652	54.000	30.684	AV	H
2402.214	83.753	53.092	29.753	54.000	30.661	AV	

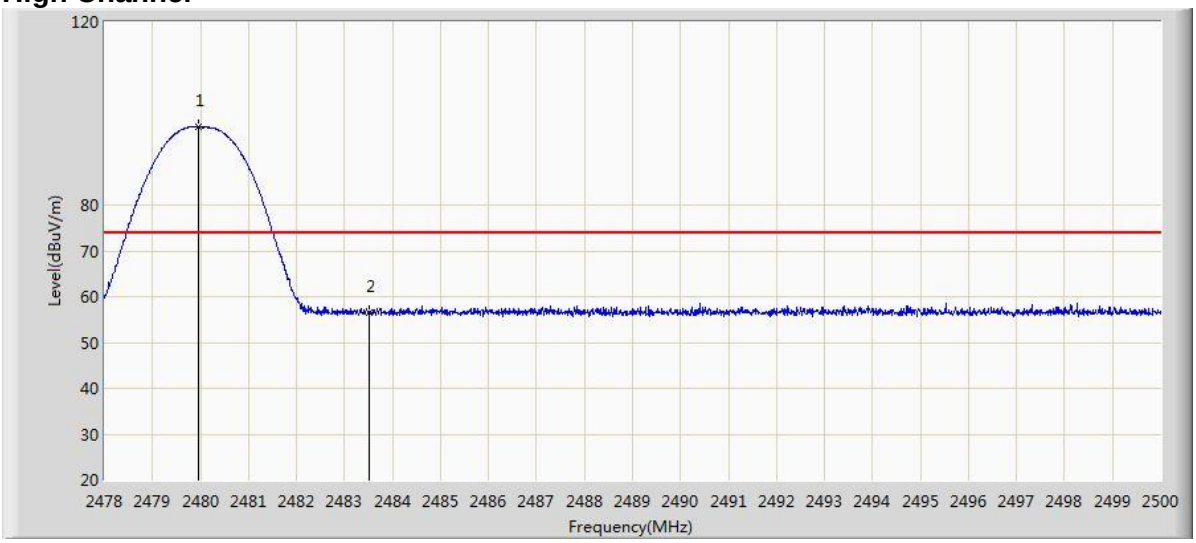


Freq. (MHz)	Measure Level (dB µ V/m)	Reading (dB µ V)	Margin (dB)	Limit (dB µ V/m)	Correct Factor (dB)	Detector	Polar
2390.000	57.040	26.356	-16.960	74.000	30.684	PK	V
2402.073	92.363	61.702	18.363	74.000	30.661	PK	

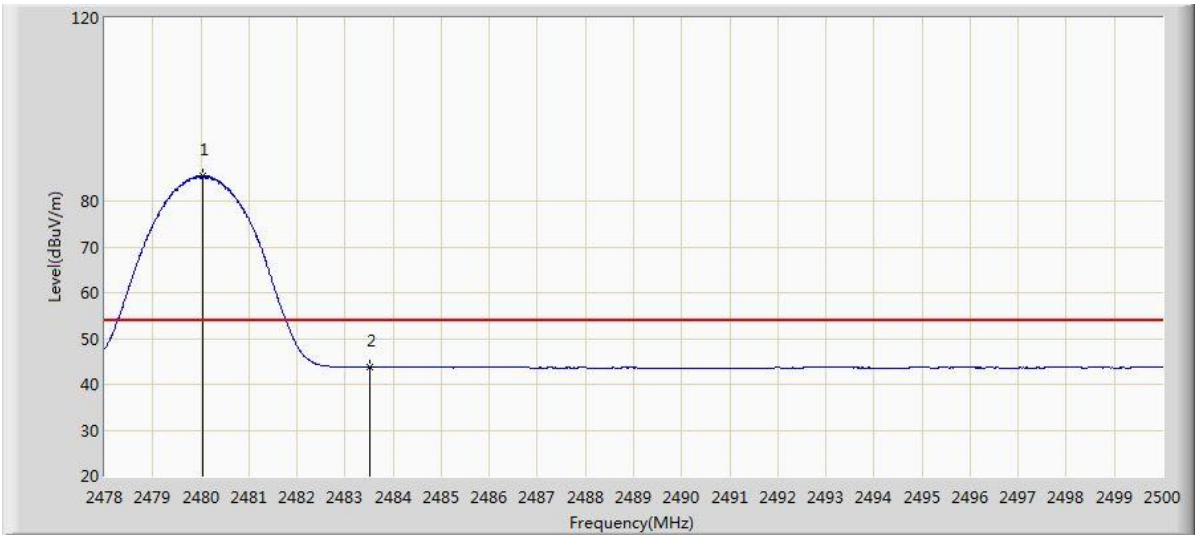


Freq. (MHz)	Measure Level (dB µ V/m)	Reading (dB µ V)	Margin (dB)	Limit (dB µ V/m)	Correct Factor (dB)	Detector	Polar
2390.000	43.351	12.667	-10.649	54.000	30.684	AV	V
2402.073	81.556	50.895	27.556	54.000	30.661	AV	

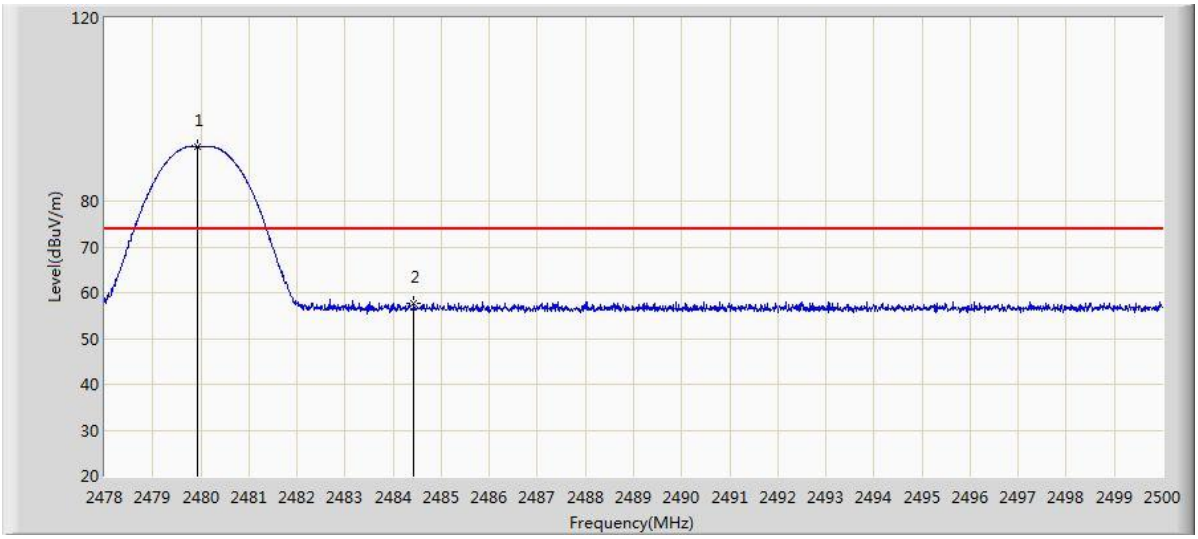
High Channel



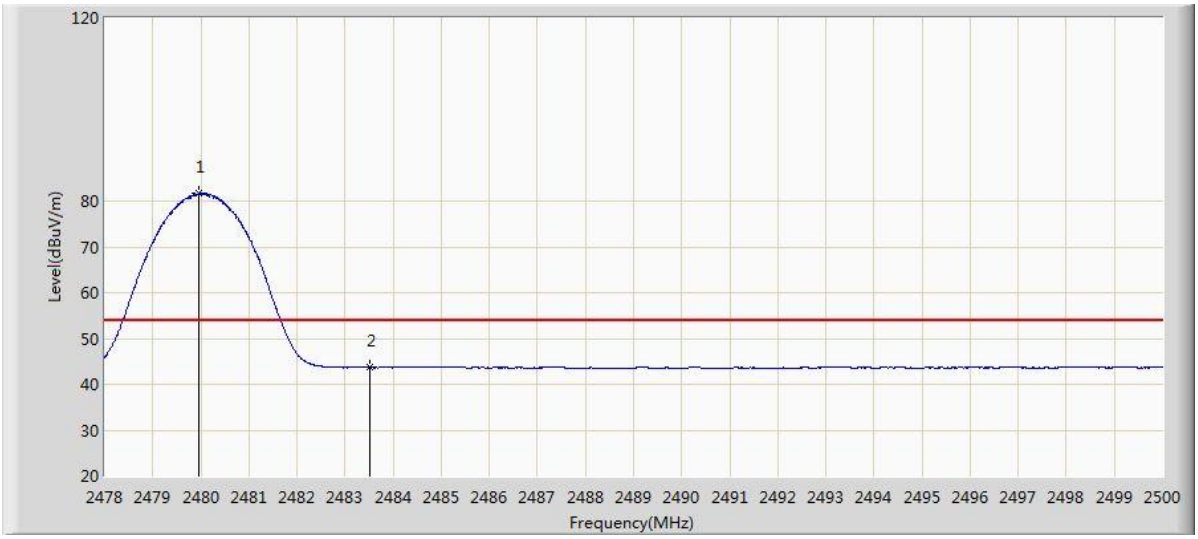
Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
2479.969	96.966	66.304	22.966	74.000	30.662	PK	H
2483.500	56.516	25.843	-17.484	74.000	30.673	PK	



Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
2480.046	85.474	54.811	31.474	54.000	30.662	AV	H
2483.500	43.678	13.005	-10.322	54.000	30.673	AV	



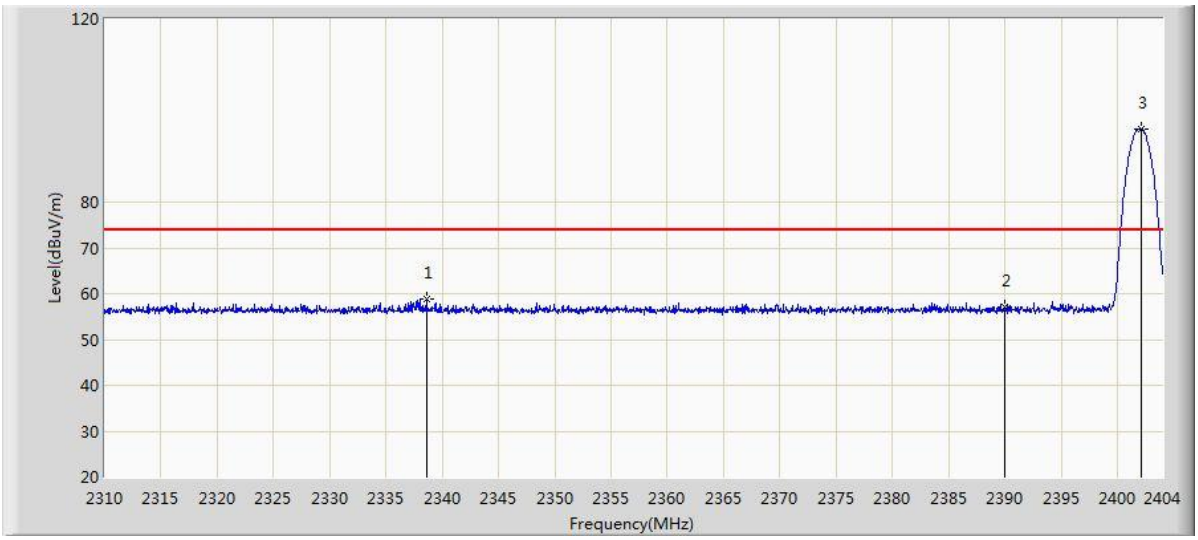
Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
2479.936	91.970	61.308	17.970	74.000	30.662	PK	V
2484.424	57.817	27.142	-16.183	74.000	30.675	PK	



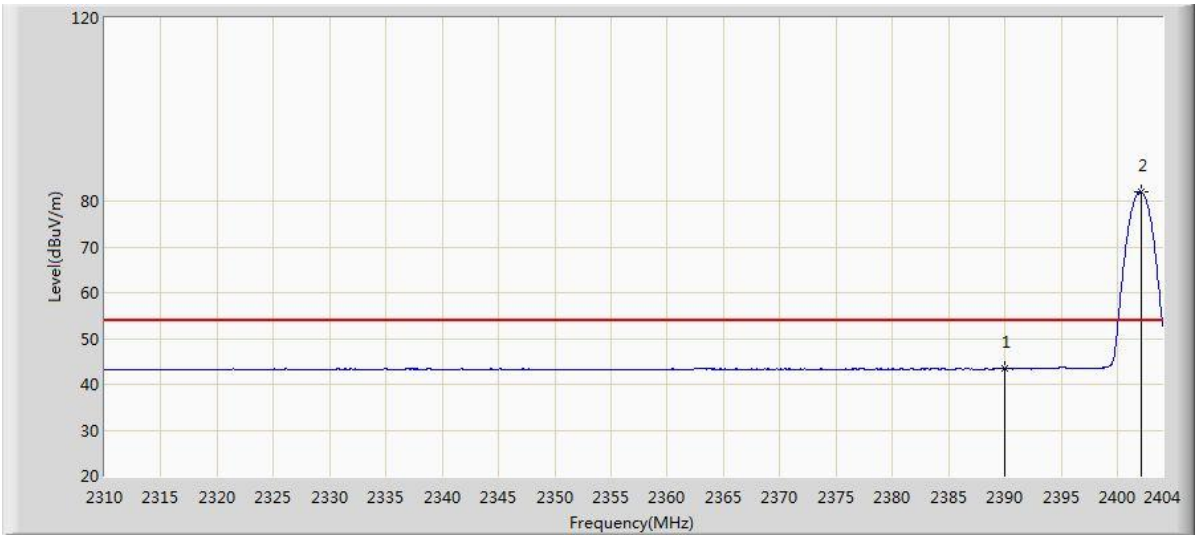
Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
2479.969	81.652	50.990	27.652	54.000	30.662	AV	V
2483.500	43.646	12.973	-10.354	54.000	30.673	AV	

Test Plot of Frequency Band Edge of Bluetooth EDR mode

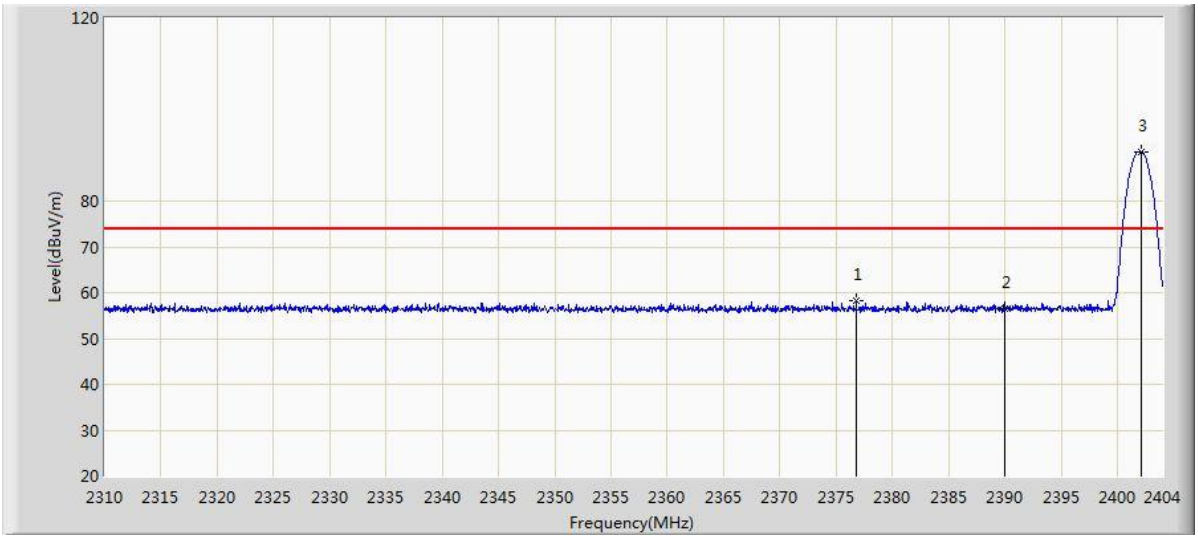
Low Channel



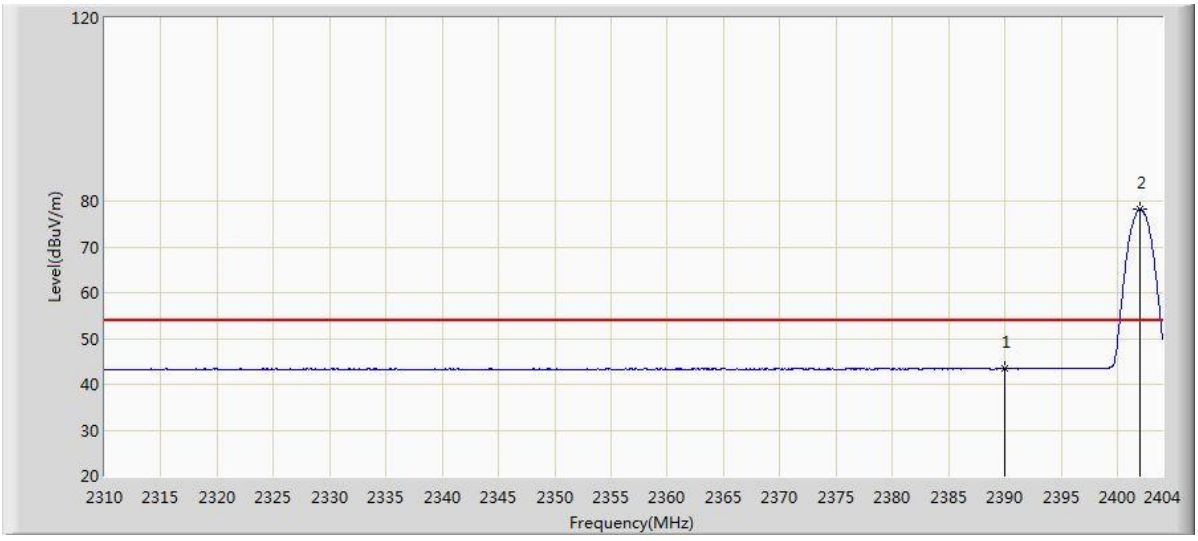
Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
2338.576	58.811	27.984	-15.189	74.000	30.827	PK	H
2390.000	56.975	26.291	-17.025	74.000	30.684	PK	
2402.073	95.853	65.192	21.853	74.000	30.661	PK	



Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
2390.000	43.372	12.688	-10.628	54.000	30.684	AV	H
2402.073	82.050	51.389	28.050	54.000	30.661	AV	

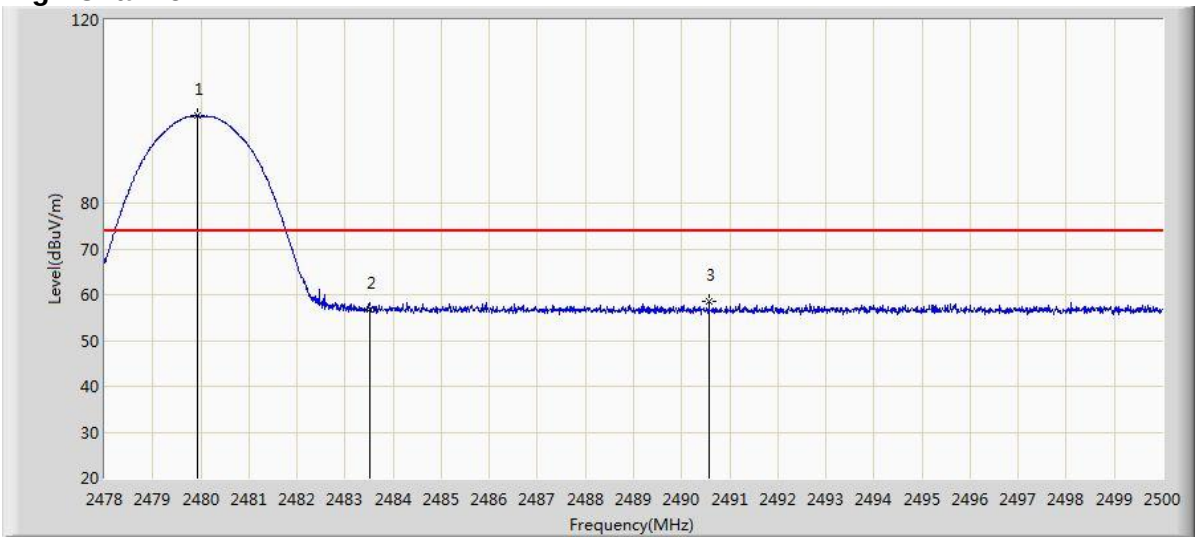


Freq. (MHz)	Measure Level (dB µ V/m)	Reading (dB µ V)	Margin (dB)	Limit (dB µ V/m)	Correct Factor (dB)	Detector	Polar
2376.787	58.222	27.508	-15.778	74.000	30.714	PK	V
2390.000	56.421	25.737	-17.579	74.000	30.684	PK	
2402.073	90.793	60.132	16.793	74.000	30.661	PK	

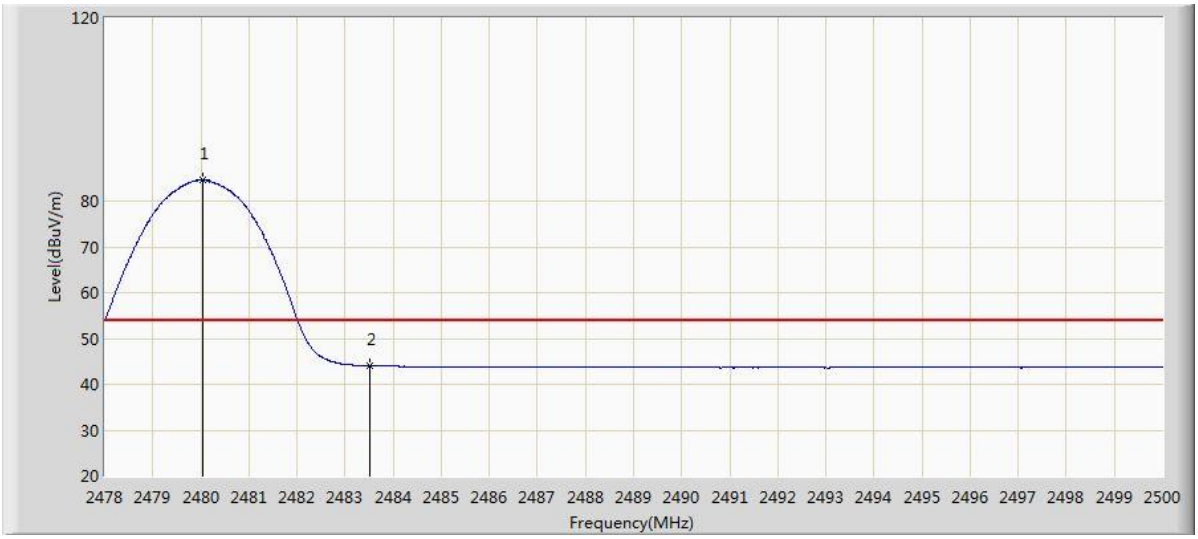


Freq. (MHz)	Measure Level (dB µ V/m)	Reading (dB µ V)	Margin (dB)	Limit (dB µ V/m)	Correct Factor (dB)	Detector	Polar
2390.000	43.358	12.674	-10.642	54.000	30.684	AV	V
2401.979	78.232	47.571	24.232	54.000	30.662	AV	

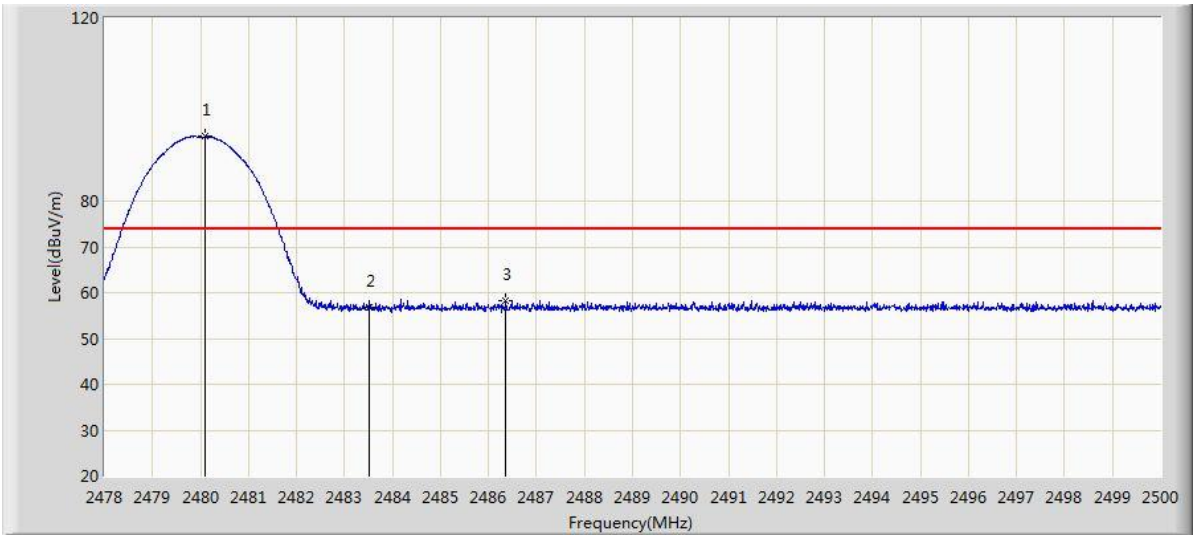
High Channel



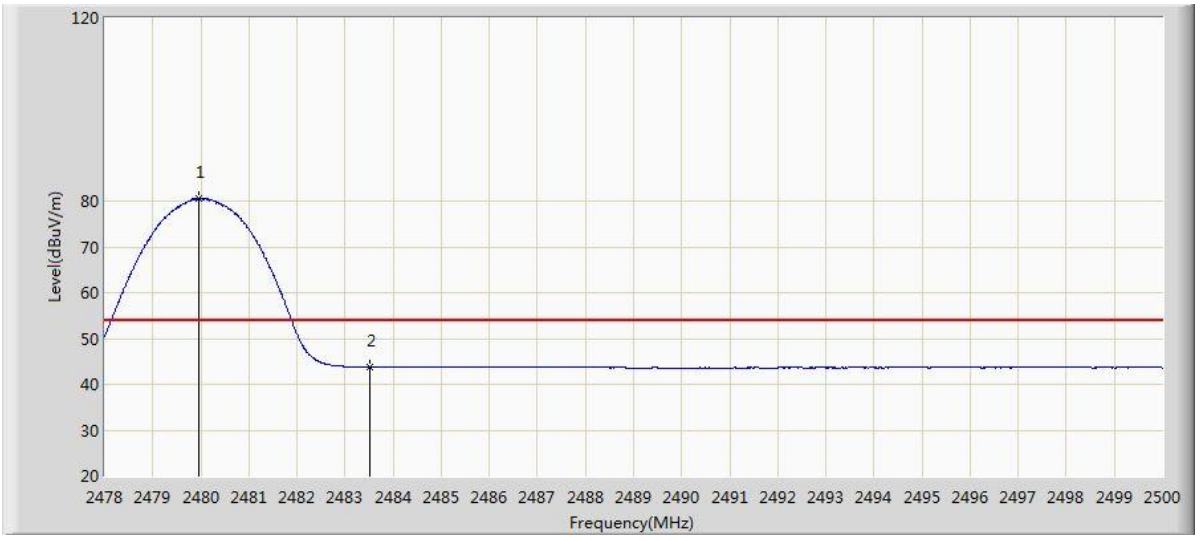
Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
2479.936	99.062	68.400	25.062	74.000	30.662	PK	H
2483.500	56.810	26.137	-17.190	74.000	30.673	PK	
2490.573	58.480	27.787	-15.520	74.000	30.693	PK	



Freq. (MHz)	Measure Level (dB μ V/m)	Reading (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Correct Factor (dB)	Detector	Polar
2480.046	84.558	53.895	30.558	54.000	30.662	AV	H
2483.500	44.031	13.358	-9.969	54.000	30.673	AV	



Freq. (MHz)	Measure Level (dB µ V/m)	Reading (dB µ V)	Margin (dB)	Limit (dB µ V/m)	Correct Factor (dB)	Detector	Polar
2480.090	94.092	63.429	20.092	74.000	30.662	PK	V
2483.500	56.775	26.102	-17.225	74.000	30.673	PK	
2486.360	58.124	27.443	-15.876	74.000	30.681	PK	



Freq. (MHz)	Measure Level (dB µ V/m)	Reading (dB µ V)	Margin (dB)	Limit (dB µ V/m)	Correct Factor (dB)	Detector	Polar
2479.969	80.562	49.900	26.562	54.000	30.662	AV	V
2483.500	43.785	13.112	-10.215	54.000	30.673	AV	

5.1.6 Frequency Separation

RESULT: **Pass**

Date of testing	:	2014-12-07
Test standard	:	FCC part 15.247(a)(1) RSS-210 A8.1(b)
Basic standard	:	Public Notice DA 00-705
Limit	:	≥ 25kHz or two-thirds of 20dB bandwidth, whichever is greater
Kind of test site	:	Shield room

Test setup

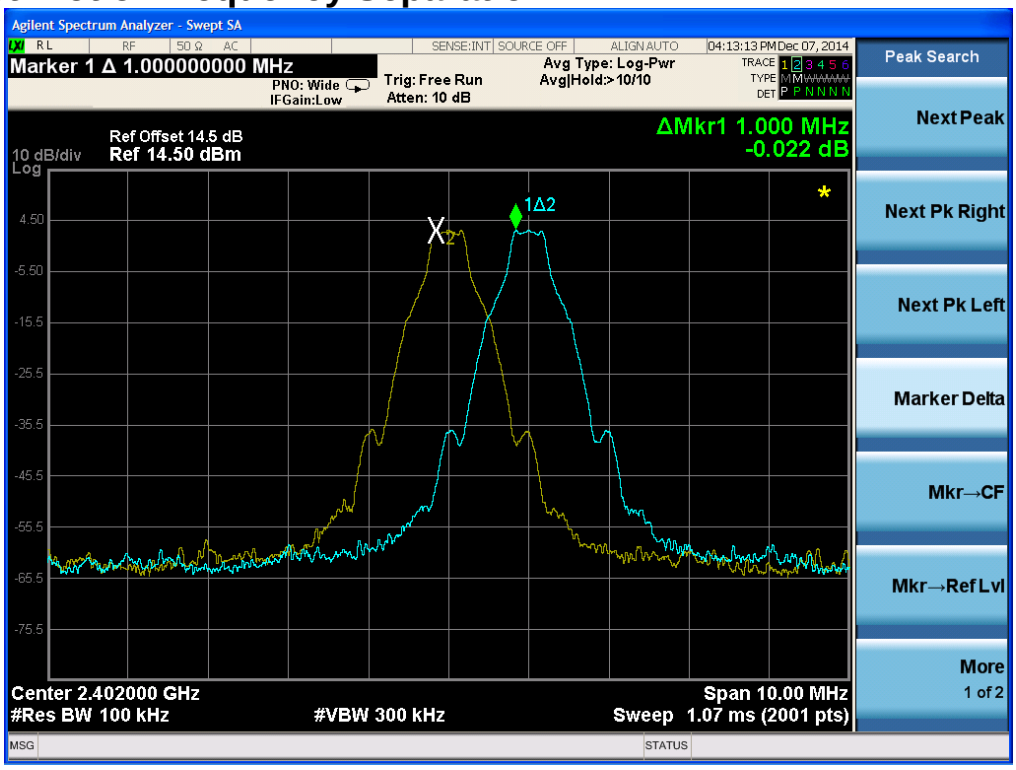
Test Channel	:	Low/ Middle/ High
Operation Mode	:	A.1.a
Ambient temperature	:	25℃
Relative humidity	:	52%
Atmospheric pressure	:	101kPa

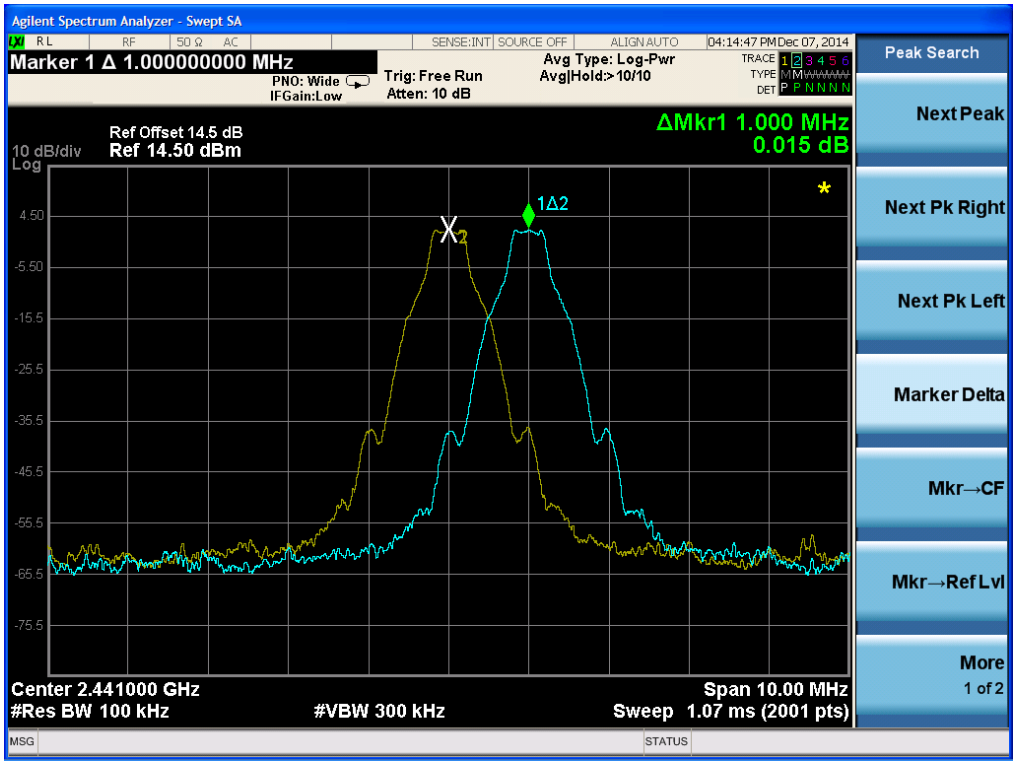
Table 9: Test result of Frequency Separation

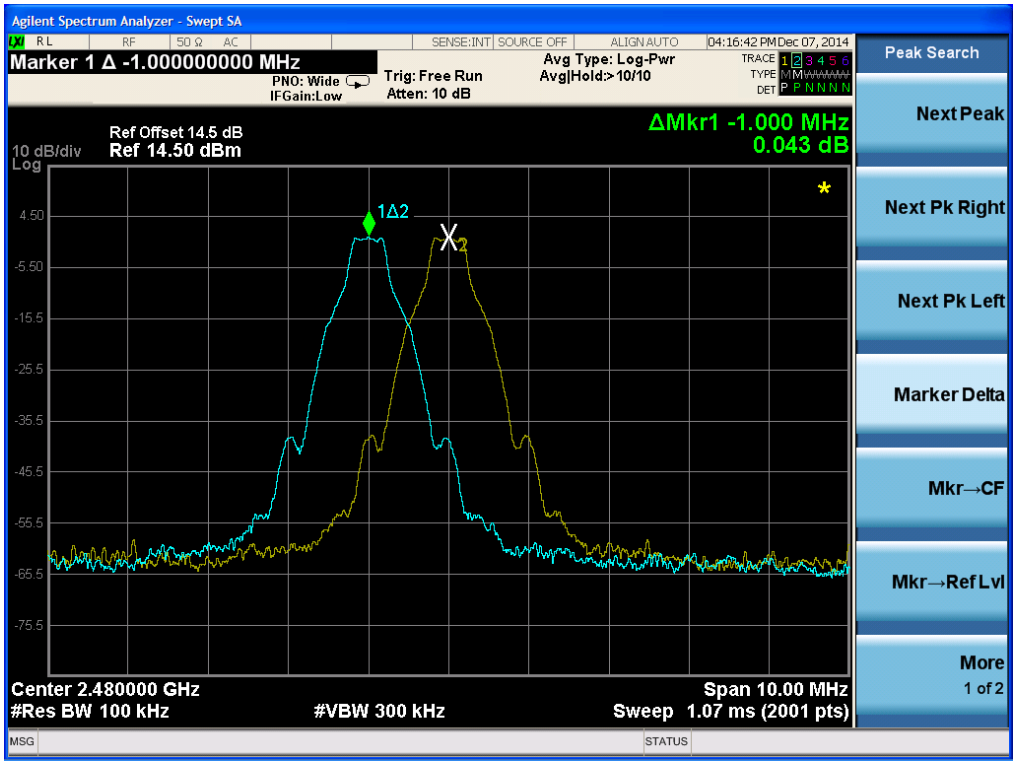
Channel	Channel Frequency (MHz)	Measured Channel Separation (MHz)	Limit (kHz)	Result
Low Channel	2402	1.000	≥ 25kHz or two-thirds of 20dB bandwidth	Pass
Adjacency Channel	2403			
Mid Channel	2441	1.000	≥ 25kHz or two-thirds of 20dB bandwidth	Pass
Adjacency Channel	2442			
High Channel	2479	1.000	≥ 25kHz or two-thirds of 20dB bandwidth	Pass
Adjacency Channel	2480			

For details refer to following test plot.

Test Plot of Frequency Separation






Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ -1.000000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>10/10
04:16:42 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Ref 14.50 dBm
ΔMkr1 -1.000 MHz
0.043 dB
1Δ2
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 10.00 MHz
Sweep 1.07 ms (2001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

5.1.7 Number of hopping frequency

RESULT: **Pass**

Date of testing	:	2014-12-07
Test standard	:	FCC part 15.247(a)(1)(iii) RSS-210 A8.1(d)
Basic standard	:	Public Notice DA 00-705
Limits	:	≥ 15 channels
Kind of test site	:	Shield room

Test setup

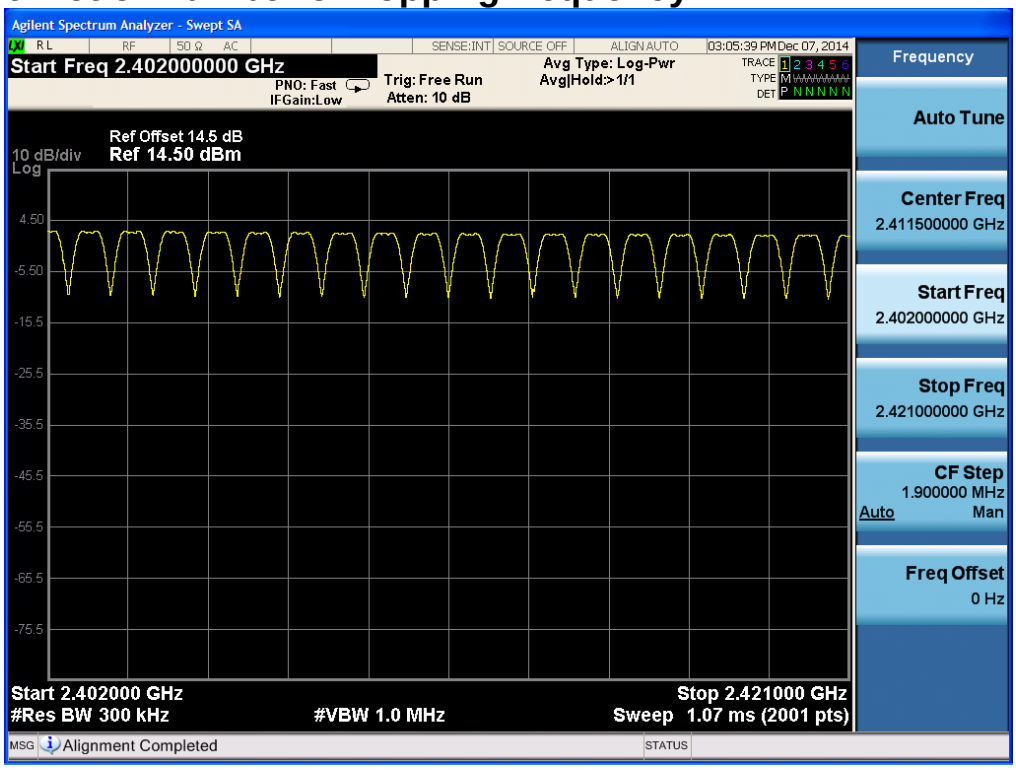
Test Channel	:	79
Operation Mode	:	A.1.a
Ambient temperature	:	25℃
Relative humidity	:	52%
Atmospheric pressure	:	101kPa

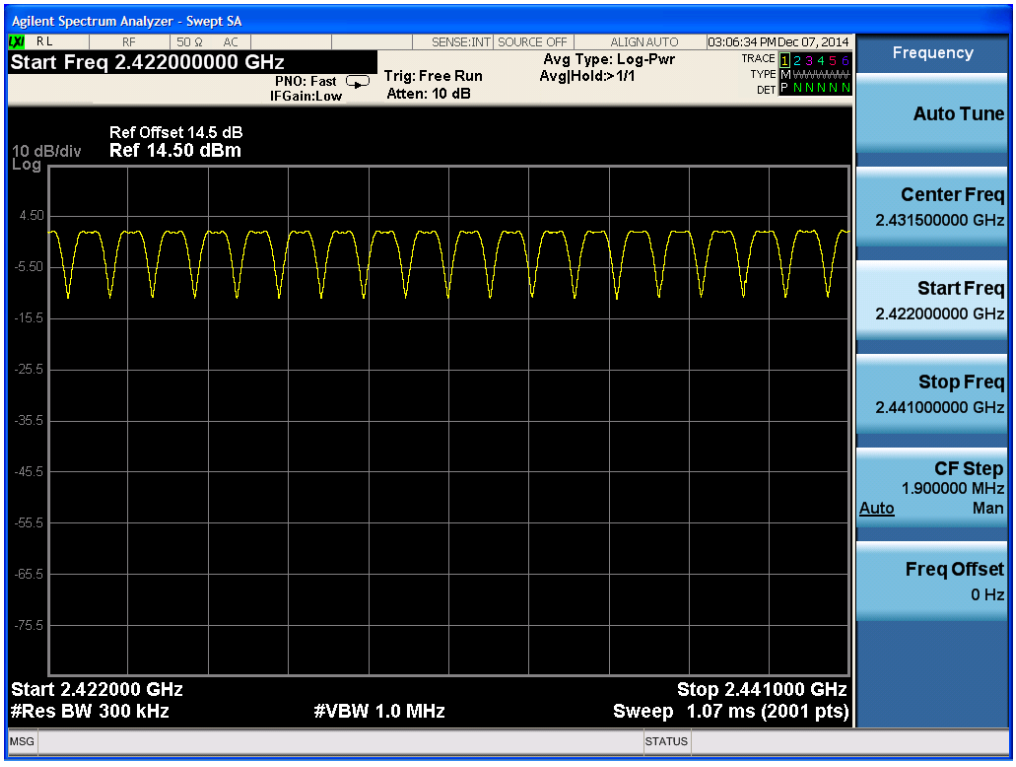
Table 10: Test result of Number of hopping frequency

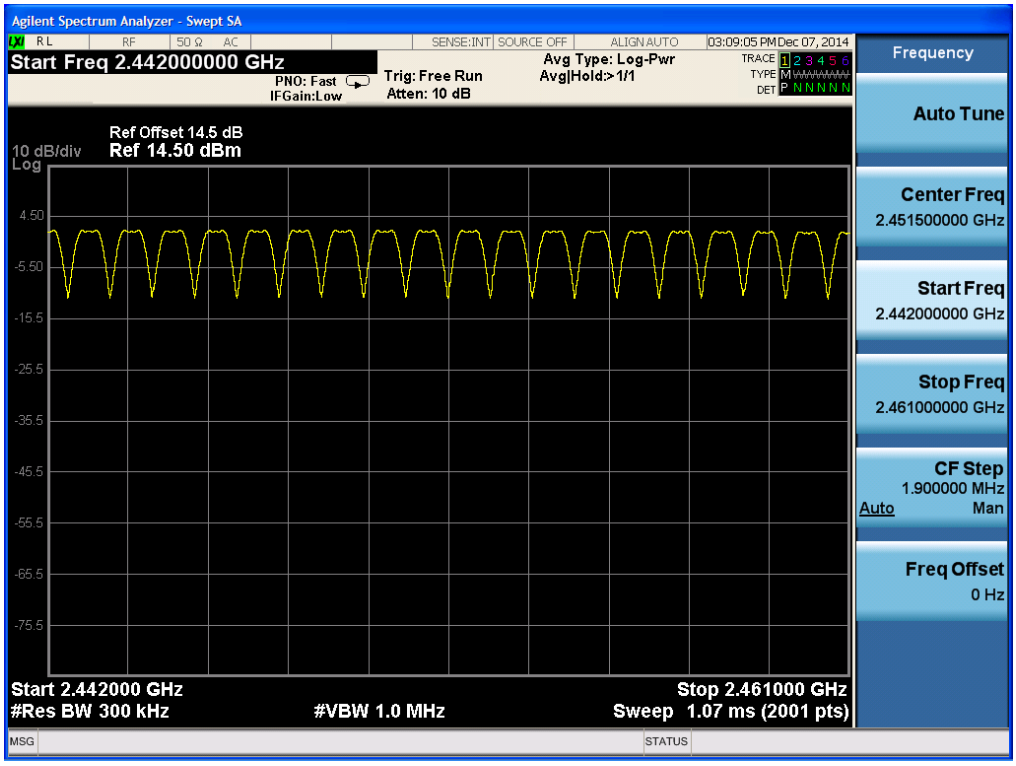
Frequency Range	Measured Quantity of Hopping Channel	Limit	Result
2402 to 2480MHz	79	≥15	Pass

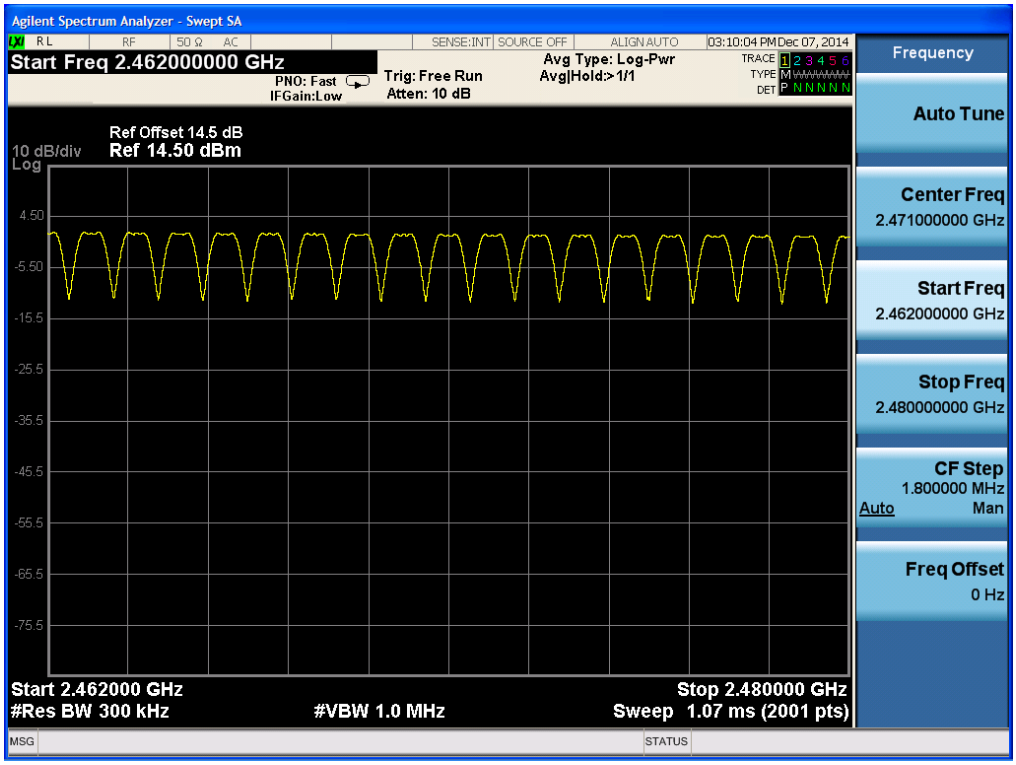
For details refer to following test plot.

Test Plot of Number of hopping frequency






Agilent Spectrum Analyzer - Swept SA
Start Freq 2.442000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
03:09:05 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Log
Ref 14.50 dBm
4.50
-5.50
-15.5
-25.5
-35.5
-45.5
-55.5
-65.5
-75.5
Start 2.442000 GHz
#Res BW 300 kHz
#VBW 1.0 MHz
Stop 2.461000 GHz
Sweep 1.07 ms (2001 pts)
Frequency
Auto Tune
Center Freq
2.451500000 GHz
Start Freq
2.442000000 GHz
Stop Freq
2.461000000 GHz
CF Step
1.900000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS


Agilent Spectrum Analyzer - Swept SA
Start Freq 2.462000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
03:10:04 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Log
Ref 14.50 dBm
4.50
-5.50
-15.5
-25.5
-35.5
-45.5
-55.5
-65.5
-75.5
Start 2.462000 GHz
#Res BW 300 kHz
#VBW 1.0 MHz
Stop 2.480000 GHz
Sweep 1.07 ms (2001 pts)
Frequency
Auto Tune
Center Freq
2.471000000 GHz
Start Freq
2.462000000 GHz
Stop Freq
2.480000000 GHz
CF Step
1.800000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

5.1.8 Time of Occupancy

RESULT: **Pass**

Date of testing	:	2014-12-07
Test standard	:	FCC part 15.247(a)(1)(iii) RSS-210 A8.1(d)
Basic standard	:	Public Notice DA 00-705
Limits	:	0.4s
Kind of test site	:	Shield room

Test setup

Test Channel	:	Middle
Operation Mode	:	A.1.a
Ambient temperature	:	25℃
Relative humidity	:	52%
Atmospheric pressure	:	101kPa

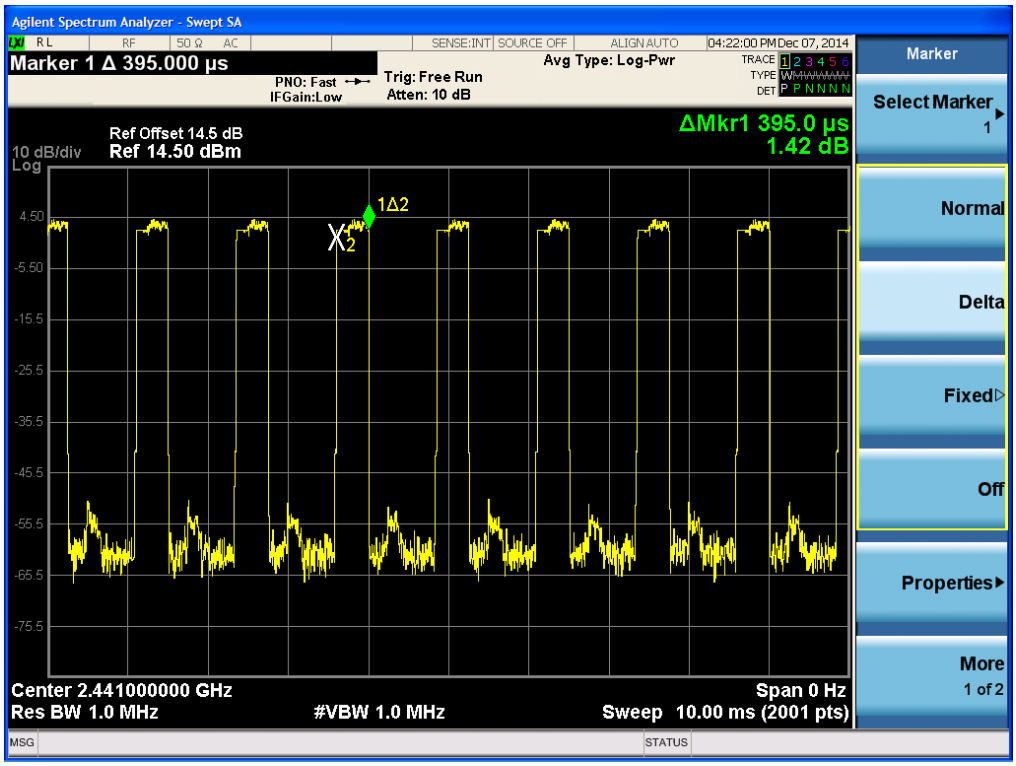
Table 11: Test result of Time of Occupancy

Mode	Packet Type	Channel Frequency (MHz)	Packet Duration [ms]	Number of Hops per Channel	Dwell Time (ms)	Limit (ms)
EDR	DH1	2441	0.395	320	126.40	400
	DH3	2441	1.645	160	263.50	400
	DH5	2441	2.890	104	300.56	400

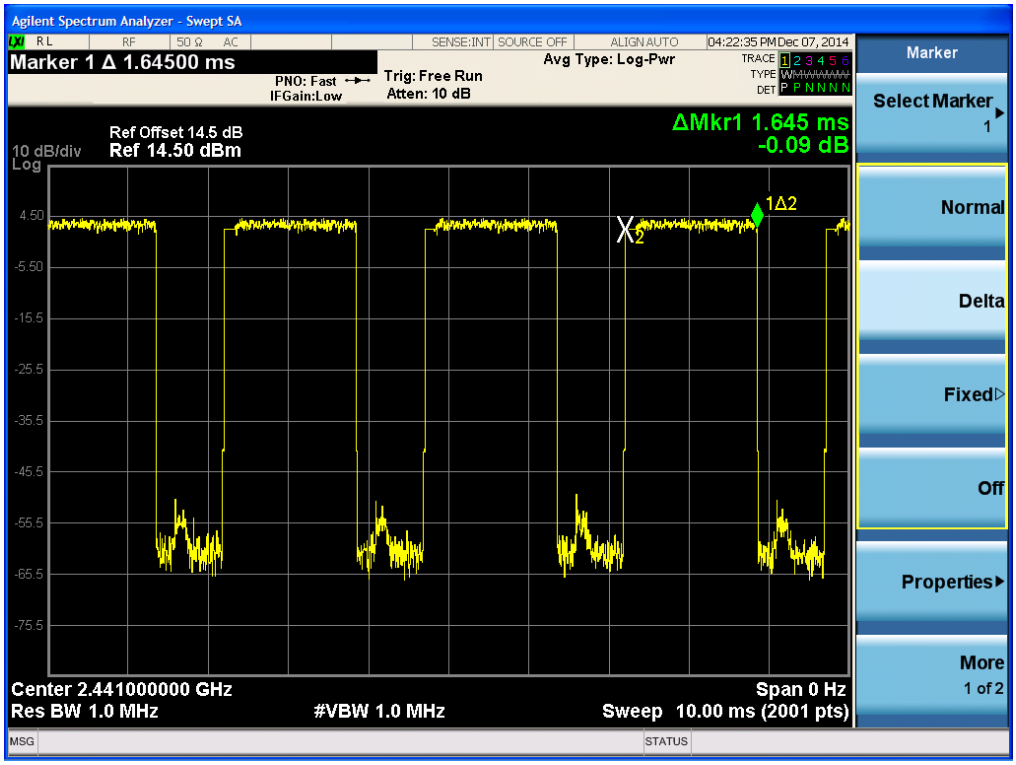
For details refer to following test plot.

Test Plot of Number of hopping frequency

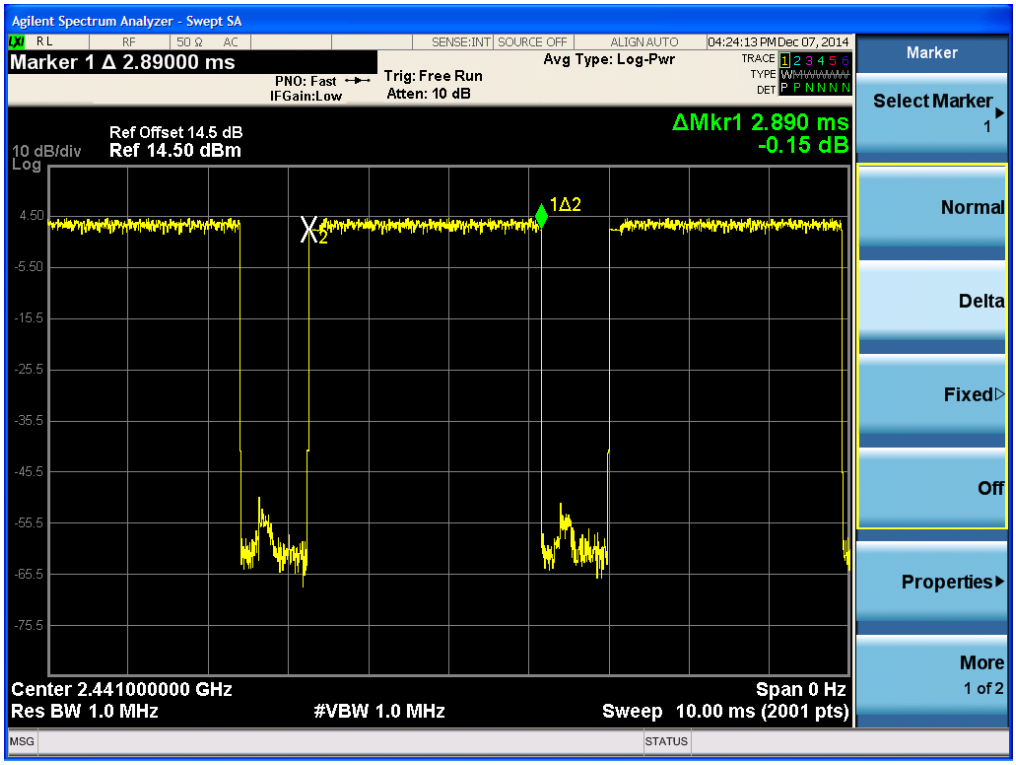
DH1



DH3



DH5


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 2.89000 ms
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 10 dB
Avg Type: Log-Pwr
04:24:13 PM Dec 07, 2014
Ref Offset 14.5 dB
10 dB/div
Log
Ref 14.50 dBm
ΔMkr1 2.890 ms
-0.15 dB
1Δ2
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 10.00 ms (2001 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

6. List of Tables

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Appendix I- RF Exposure statement

Exposure Requirements – FCC KDB # 447498 D01 and RSS-102 Issue 4

FCC KDB # 447498 DO1 V05r02 - Mobile and Portable Device RF Exposure and Procedures and Equipment, Appendix A shows that the SAR Text Exclusion Threshold for a device with a separation distance of 10 mm at 2450 MHz is 19 mW.

RSS-102 section 2.5.1 states that a device is exempt from SAR evaluation if the frequency is "above 2.2 GHz and up to 3 GHz inclusively, and with output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 20 mW for general public use…".

Calculated EIRP

The maximum measured transmitter power is the following:

Conducted Output Power P_{out} [dBm]	Conducted Output Power P_{out} [mW]	Maximum Antenna Gain [dBi]	P_{out} EIRP [mW]
5.32	3.40	5.1	11.01

Note:
Per the equation in section 1.3.1 of FCC Document # 412172 D01 Determining ERP and EIRP v01;

$$\mathbf{EIRP = p_t \times g_t}$$

where:
p_t = transmitter output power in watts
g_t = Numeric gain of transmitting antenna (unitless)

Evaluation for FCC

The maximum EIRP peak power output of the EUT is: 11.01 mW.
The EUT is well below the 19mW power level.

Evaluation for IC

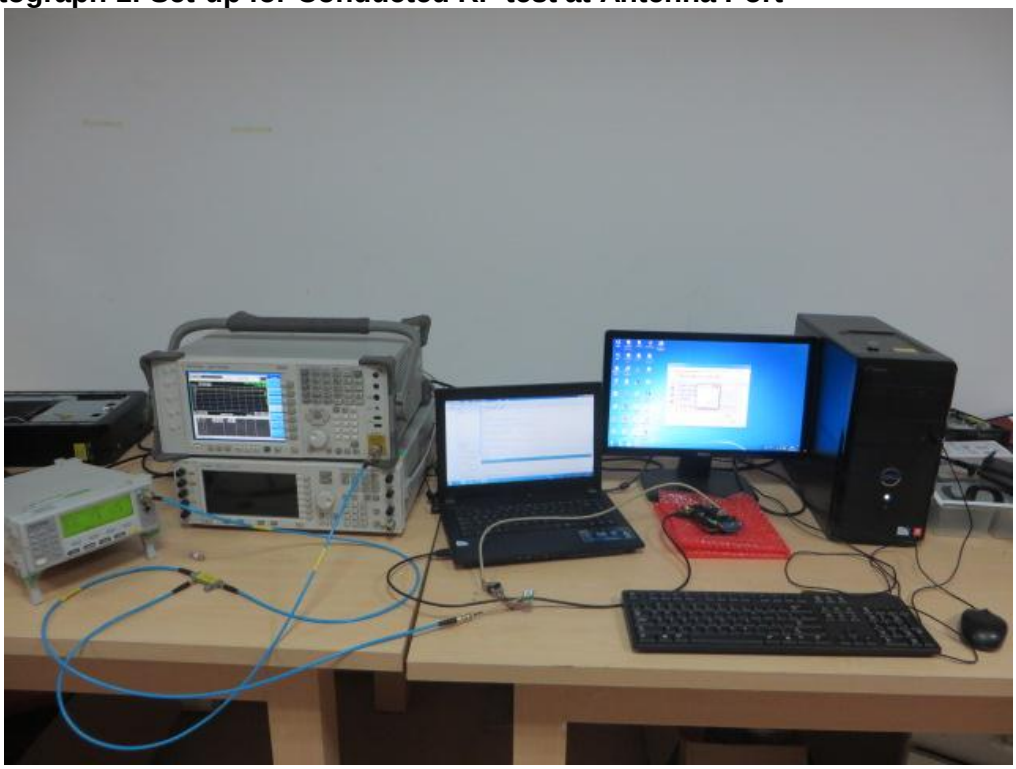
The maximum EIRP peak power output of the EUT is: 11.01 mW.
The EUT is well below the 20mW power level.

Conclusion

SAR data is not required for either FCC or IC.

Appendix II- Photographs of the Test Set-Up

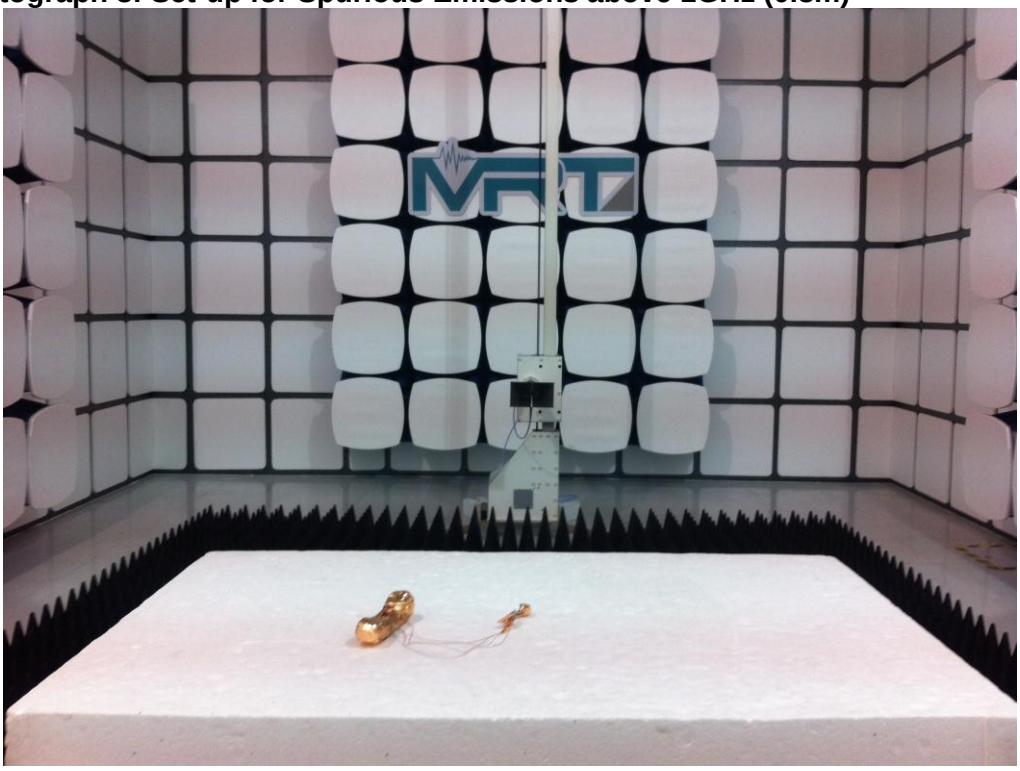
Photograph 1: Set-up for Conducted RF test at Antenna Port



Photograph 2: Set-up for Spurious Emissions below 1GHz



Photograph 3: Set-up for Spurious Emissions above 1GHz (0.8m)



Photograph 4: Set-up for Spurious Emissions above 1GHz (1.5m)

