APPLICATION FOR CERTIFICATION
On Behalf of
Health & Life Co., Ltd.
Automatic Wrist Blood Pressure Monitor
Model No.: HL158HD
FCC ID: 2ABTAHNL15HD

Prepared for : Health & Life Co., Ltd.
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District, New Taipei City, Taiwan

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TEST REPORT CERTIFICATION

Applicant	:	Health & Life Co., Ltd.
Manufacturer	:	Health & Life Co., Ltd.
EUT Description	:	Automatic Wrist Blood Pressure Monitor
FCC ID	:	2ABTAHNL15HD
		(A) Model No. : HL158HD
		(B) Serial No. : N/A
		(C) Power Supply : DC 3V
		(D) Test Voltage : DC 3V (Via Batteries)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C, Oct. 2013
(FCC CFR 47 Part 15C, §15.205, §15.207, §15.209 and §15.247)
AND ANSI C63.4:2003

The device described above was tested by AUDIX Technology Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C limits.

The measurement results are contained in this test report and AUDIX Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the requirements of FCC standards.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX Technology Corporation.

Date of Test: 2014. 12. 16 ~ 31 Date of Report: 2015. 01. 05

Producer: Annie Yu
(Annie Yu/Administrator)

Signatory: Ben Cheng
(Ben Cheng/Manager)

1. DESCRIPTION OF REVISION HISTORY

Edition No.	Date of Rev.	Revision Summary	Report No.
0	2015. 01. 05	Original Report	EM-F150003

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Product	Automatic Wrist Blood Pressure Monitor
Model Number	HL158HD
Serial Number	N/A
Applicant	Health & Life Co., Ltd. 9F, No.186, Jian Yi Road, Zhonghe District, New Taipei City, Taiwan
Manufacturer	Health & Life Co., Ltd. 9F, No.186, Jian Yi Road, Zhonghe District, New Taipei City, Taiwan
FCC ID	2ABTAHNL15HD
Fundamental Range	Bluetooth Low Energy: 2402MHz ~ 2480MHz
Frequency Channel	40 channels
Radio Technology	GFSK
Data Transfer Rate	1Mbps
Antenna Type	PCB Antenna, -2.44177dBi(Peak)
Date of Receipt of Sample	2014. 12. 12
Date of Test	2014. 12. 16 ~ 31

2.2. Description of Test Facility

Name of Firm	:	**AUDIX Technology Corporation** EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Site (Semi-AC)	:	**Semi-Anechoic Chamber** No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan May 11, 2012 Renewal on Federal Communication Commission Registration Number: 90993
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724

2.3. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Radiation Test (Distance: 3m)	30MHz~300MHz	± 2.91dB
	300MHz~1000MHz	± 2.74dB
	Above 1GHz	± 5.02dB

Test Item	Uncertainty
6dB Bandwidth	± 0.05kHz
Maximum peak output power	± 0.33dBm
Emission Limitations	± 0.13dB
Band edges	± 0.13dB
Power spectral density	± 0.13dB

3. CONDUCTED EMISSION MEASUREMENT

【The EUT only employs battery power for operation, no conductive emission limits are required according to FCC Part 15 Section §15.207】

4. RADIATED EMISSION MEASUREMENT

4.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

4.1.1.For Frequency Range 30MHz~1000MHz (at Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9010A-503	MY52220119	2014. 06. 25	1 Year
2	Test Receiver	R & S	ESCS30	100338	2014. 06. 24	1 Year
3	Amplifier	HP	8447D	2944A06305	2014. 02. 19	1 Year
4	Bilog Antenna	TESEQ	CBL6112D	33821	2014. 08. 02	1 Year

4.1.2.For Frequency Above 1GHz (at Semi-Anechoic Chamber)

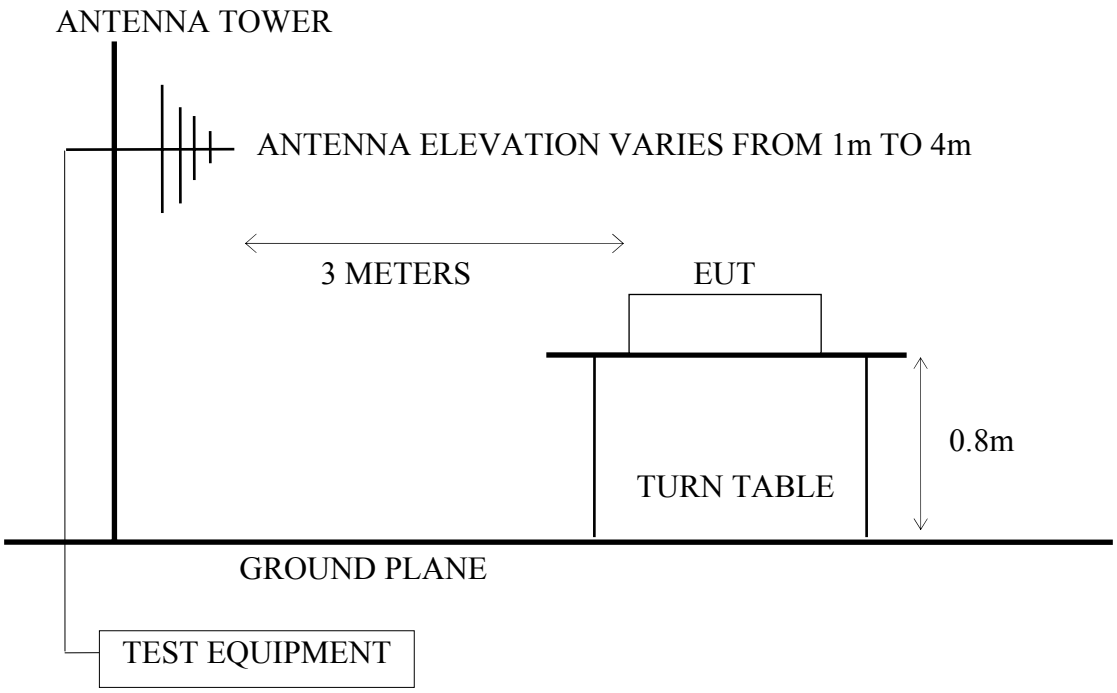
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-544	US51350140	2014. 06. 25	1 Year
2	Test Receiver	R & S	ESCS30	100338	2014. 06. 24	1 Year
3	Amplifier	Agilent	8449B	3008A02676	2014. 02. 21	1 Year
4	2.4GHz Notch Filter	K&L	7NSL10-2441 .5E130.5-00	1	2014. 06. 12	1 Year
5	3G High Pass Filter	Microware Circuits	H3G018G1	484796	2014. 06. 12	1 Year
6	Horn Antenna	EMCO	3115	9609-4927	2014. 06. 17	1 Year
7	Horn Antenna	EMCO	3116	2653	2014. 10. 10	1 Year

4.2. Test Setup

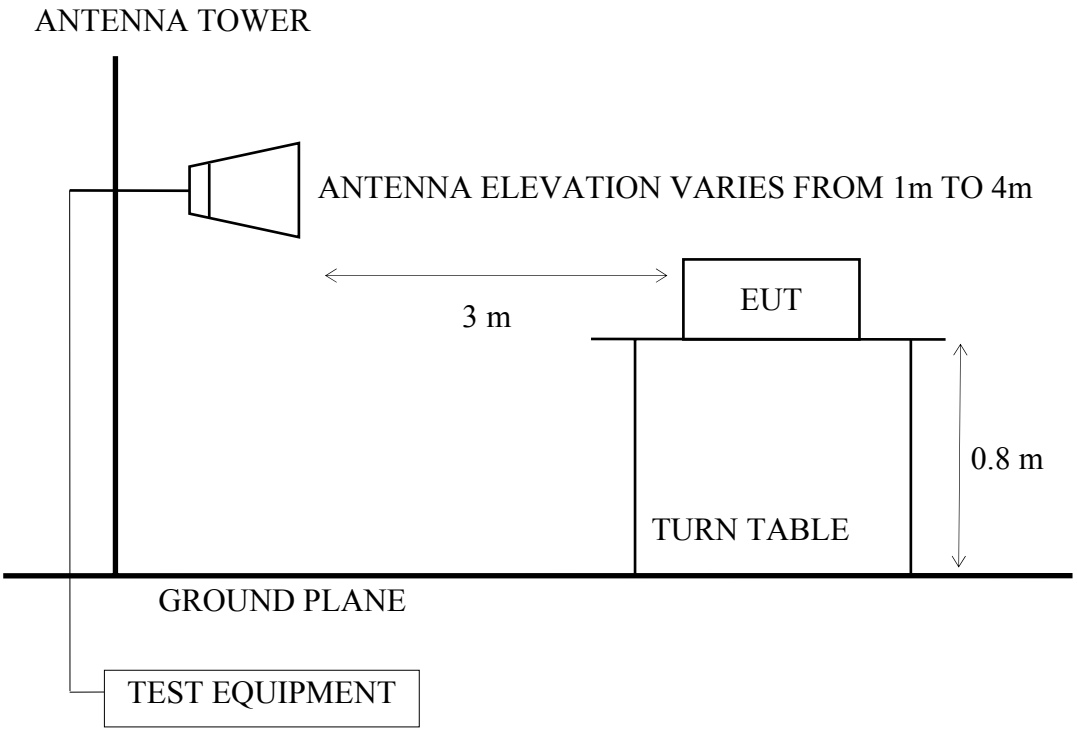
4.2.1.Block Diagram of connection between EUT and simulators

AUTOMATIC WRIST BLOOD PRESSURE MONITOR (EUT)

4.2.2.Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000MHz



4.2.3.Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz



4.3. Radiated Emission Limits (§15.209)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		μV/m	dBμV/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark：(1) Emission level (dBμV/m) = 20 log Emission level (μV/m)
(2) The tighter limit applies at the edge between two frequency bands.
(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
(4) The limits in this table are based on CFR 47 Part 15.205(a)(b) and Part 15.209 (a).
(5) The over 1GHz limit, FCC limit is used based on CFR 47 Part 15.35(b) and Part 15.205(b) & Part 15.209(e) and Part 15.207(c).

4.4. Operating Condition of EUT

4.4.1. Set up the EUT and simulator as shown on 4.2.

4.4.2. The EUT was set to continuously transmit signals at 2402MHz, 2440MHz and 2480MHz and receiving signal at 2440MHz during all test time.

4.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as bilog antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-2003 regulation.

The bandwidth of the R&S Test Receiver ESCS30 was set at 120kHz. (For 30MHz to 1000MHz)

The resolution bandwidth and video bandwidth of test spectrum analyzer is 1MHz for peak detection (PK) at frequency above 1GHz.

The resolution bandwidth of test spectrum analyzer is 1MHz and the video bandwidth is 10Hz for average detection (AV) at frequency above 1GHz.

The frequency range from 30MHz to 25GHz (Up to 10th harmonics from fundamental frequency) was checked. 30MHz to 1000MHz was measured with Quasi-Peak detector.

Pursuant to ANSI C63.4 8.3.1.2, when peak value complies with the average limit, we didn't perform measurement in average detector.

4.6. Test Results

PASSED.
(All emissions not reported for there is no emission be found.)

EUT: Automatic Wrist Blood Pressure Monitor M/N: HL158HD

Test Date: 2014. 12. 31 Temperature: 26℃ Humidity: 43%

For Frequency Range 30MHz~1000MHz:

The EUT with following test modes was performed during this section testing and all the test results are listed in section 4.6.1.

Mode	Channel	Frequency	Test Mode	Reference Test Data	
				Horizontal	Vertical
1.	CH 0	2402MHz	Transmit	# 1	# 5
2.	CH 19	2440MHz		# 2	# 6
3.	CH 39	2480MHz		# 3	# 7

* Above all final readings were measured with Quasi-Peak detector.

For Frequency above 1GHz:
The EUT with following test modes was performed during this section testing and all the test results are listed in section 4.6.2.

Mode	Chnnel	Frequency	Test Mode	Test Frequency Range
1.	CH 0	2402MHz	Transmit	1000-2680MHz
2.				2680-4000MHz
3.				**4000-5500MHz***
4.				5500-7500MHz
5.				7500-18000MHz
6.				18000-25000MHz
7.	CH 19	2440MHz	Transmit	1000-2680MHz
8.				2680-4000MHz
9.				**4000-5500MHz***
10.				5500-7500MHz
11.				7500-18000MHz
12.				18000-25000MHz
13.	CH 39	2480MHz	Transmit	1000-2680MHz
14.				2680-4000MHz
15.				**4000-5500MHz***
16.				5500-7500MHz
17.				7500-18000MHz
18.				18000-25000MHz

Note: 1. Above all final readings were measured with Peak and Average detector.
2. The emissions (up to 25GHz) not reported are too low to be measured.
3.”*” means there is spurious emission falling the frequency band and be measures.

For Restricted Bands:

The EUT was tested in restricted bands and all the test results are listed in section 4.6.3. (The restricted bands defined in part 15.205(a))

Mode	Channel	Frequency	Test Mode	Reference Test Data No.	
				Horizontal	Vertical
1	CH 0	2402MHz	Transmit	# 1, # 2	# 3, # 4
2	CH 39	2480MHz		# 5, # 6	# 7, # 8

4.6.1.For 30-1000MHz Frequency Range Measurement Results

Transmit, Frequency: 2402MHz

Site no. : Audix NO.1 Chamber Data no. : 1
Dis. / Ant. : 3m CBL6112D 33821 Ant. pol. : HORIZONTAL
Limit : 30M-1G
Env. / Ins. : 26*C / 43% N9010A Engineer : Jerome_Chang
EUT : HL158HD
Power Rating : DC 3V
Test Mode : TX 2402MHz_BLE

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	30.97	18.07	2.34	0.84	21.25	40.00	18.75	Peak
2	101.78	11.03	3.23	8.93	23.19	43.50	20.31	Peak
3	405.39	15.65	5.71	8.76	30.12	46.00	15.88	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
2. The emission levels that are 20dB below the official limit are not reported.

Site no. : Audix NO.1 Chamber Data no. : 5
Dis. / Ant. : 3m CBL6112D 33821 Ant. pol. : VERTICAL
Limit : 30M-1G
Env. / Ins. : 26*C / 43% N9010A Engineer : Jerome_Chang
EUT : HL158HD
Power Rating : DC 3V
Test Mode : TX 2402MHz_BLE

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	30.97	18.07	2.34	1.79	22.20	40.00	17.80	Peak
2	93.05	9.67	3.17	8.25	21.09	43.50	22.41	Peak
3	580.96	18.08	6.49	4.79	29.36	46.00	16.64	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
2. The emission levels that are 20dB below the official limit are not reported.

Transmit, Frequency: 2440MHz

Site no. : Audix NO.1 Chamber
Dis. / Ant. : 3m CBL6112D 33821
Limit : 30M-1G
Env. / Ins. : 26*C / 43% N9010A
EUT : HL158HD
Power Rating : DC 3V
Test Mode : TX 2440MHz_BLE

Data no. : 2
Ant. pol. : HORIZONTAL
Engineer : Jerome_Chang

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	30.97	18.07	2.34	0.71	21.12	40.00	18.88	Peak
2	101.78	11.03	3.23	8.64	22.90	43.50	20.60	Peak
3	406.36	15.65	5.71	8.14	29.50	46.00	16.50	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
2. The emission levels that are 20dB below the official limit are not reported.

Site no. : Audix NO.1 Chamber
Dis. / Ant. : 3m CBL6112D 33821
Limit : 30M-1G
Env. / Ins. : 26*C / 43% N9010A
EUT : HL158HD
Power Rating : DC 3V
Test Mode : TX 2440MHz_BLE

Data no. : 6
Ant. pol. : VERTICAL
Engineer : Jerome_Chang

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	30.00	18.62	2.32	0.12	21.06	40.00	18.94	Peak
2	93.05	9.67	3.17	7.43	20.27	43.50	23.23	Peak
3	580.96	18.08	6.49	5.12	29.69	46.00	16.31	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
2. The emission levels that are 20dB below the official limit are not reported.

Transmit, Frequency: 2480MHz

Site no. : Audix NO.1 Chamber
Dis. / Ant. : 3m CBL6112D 33821
Limit : 30M-1G
Env. / Ins. : 26*C / 43% N9010A
EUT : HL158HD
Power Rating : DC 3V
Test Mode : TX 2480MHz_BLE

Data no. : 3
Ant. pol. : HORIZONTAL
Engineer : Jerome_Chang

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	30.97	18.07	2.34	0.92	21.33	40.00	18.67	Peak
2	101.78	11.03	3.23	8.94	23.20	43.50	20.30	Peak
3	407.33	15.67	5.72	7.93	29.32	46.00	16.68	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
2. The emission levels that are 20dB below the official limit are not reported.

Site no. : Audix NO.1 Chamber
Dis. / Ant. : 3m CBL6112D 33821
Limit : 30M-1G
Env. / Ins. : 26*C / 43% N9010A
EUT : HL158HD
Power Rating : DC 3V
Test Mode : TX 2480MHz_BLE

Data no. : 7
Ant. pol. : VERTICAL
Engineer : Jerome_Chang

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	33.88	16.49	2.41	2.81	21.71	40.00	18.29	Peak
2	93.05	9.67	3.17	7.32	20.16	43.50	23.34	Peak
3	752.65	19.44	6.96	3.02	29.42	46.00	16.58	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
2. The emission levels that are 20dB below the official limit are not reported.

4.6.2.Above 1GHz Frequency Range Measurement Results

Date of Test：2014. 12. 31 Temperature：26℃

EUT：Automatic Wrist Blood Pressure Monitor Humidity：43%

Test Mode：Transmit, Frequency: 2402MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4804.00	32.76	8.09	25.37	66.22	74.00	7.78

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4804.00	66.22	-14.74	51.49	54.00	2.52

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) = (0.605ms/3.3ms)=-14.74
"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
2. Average value=Peak value+ Duty Cycle Correction Factor

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4804.00	32.76	8.09	18.11	58.96	74.00	15.04

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4804.00	58.96	-14.74	44.23	54.00	9.78

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) = (0.605ms/3.3ms)=-14.74
"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
2. Average value=Peak value+ Duty Cycle Correction Factor

Date of Test：	2014. 12. 31	Temperature：	26℃
EUT：	Automatic Wrist Blood Pressure Monitor	Humidity：	43%
Test Mode：	Transmit, Frequency: 2440MHz		

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4880.50	32.88	8.17	20.74	61.79	74.00	12.21

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4880.5	61.79	-14.74	47.06	54.00	6.95

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) = (0.605ms/3.3ms)=-14.74
"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
2. Average value=Peak value+ Duty Cycle Correction Factor

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4880.50	32.88	8.17	22.27	63.32	74.00	10.68

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4880.50	63.32	-14.74	48.59	54.00	5.42

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) = (0.605ms/3.3ms)=-14.74
"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
2. Average value=Peak value+ Duty Cycle Correction Factor

Date of Test： 2014. 12. 31 Temperature： 26℃

EUT： Automatic Wrist Blood Pressure Monitor Humidity： 43%

Test Mode： Transmit, Frequency: 2480MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4960.00	33.03	8.26	21.11	62.40	74.00	11.60

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4960.00	62.40	-14.74	47.67	54.00	6.34

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) = (0.605ms/3.3ms)=-14.74
"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
2. Average value=Peak value+ Duty Cycle Correction Factor

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4961.50	33.03	8.26	24.53	65.82	74.00	8.18

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4961.50	65.82	-14.74	51.09	54.00	2.92

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) = (0.605ms/3.3ms)=-14.74
"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
2. Average value=Peak value+ Duty Cycle Correction Factor

4.6.3.Restricted Bands Measurement Results

Date of Test：2014. 12. 31 Temperature：26℃

EUT：Automatic Wrist Blood Pressure Monitor Humidity：43%

Test Mode：Transmit, Frequency: 2402MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2386.44	28.20	5.23	26.94	60.37	74.00	13.63
2390.04	28.20	5.24	16.87	50.31	74.00	23.69
2402.28	28.21	5.26	63.70	97.17	74.00	-23.17

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2386.44	60.37	-14.74	45.64	54.00	8.37
2390.04	50.31	-14.74	35.58	54.00	18.43

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) = (0.605ms/3.3ms)=-14.74
"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
2. Low frequency section (spurious in the restricted band 2310-2430MHz).
3. Average value=Peak value+ Duty Cycle Correction Factor
4. The pre-amplifier factor has been subtracted by test program actively.

Date of Test：2014. 12. 31 Temperature：26℃

EUT：Automatic Wrist Blood Pressure Monitor Humidity：43%

Test Mode：Transmit, Frequency: 2402MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2370.00	28.18	5.21	21.09	54.48	74.00	19.52
2390.04	28.20	5.24	16.63	50.07	74.00	23.93
2402.28	28.21	5.26	58.44	91.91	74.00	-17.91

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2370.00	54.48	-14.74	39.75	54.00	14.26
2390.04	50.07	-14.74	35.34	54.00	18.67

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) = (0.605ms/3.3ms)=-14.74
"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
2. Low frequency section (spurious in the restricted band 2310-2430MHz).
3. Average value=Peak value+ Duty Cycle Correction Factor
4. The pre-amplifier factor has been subtracted by test program actively.

Date of Test：	2014. 12. 31	Temperature：	26℃
EUT：	Automatic Wrist Blood Pressure Monitor	Humidity：	43%
Test Mode：	Transmit, Frequency: 2480MHz		

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2480.24	28.28	5.36	60.04	93.68	74.00	-19.68
2483.52	28.29	5.37	29.31	62.97	74.00	11.03
2483.68	28.29	5.37	28.79	62.45	74.00	11.55

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2483.52	62.97	-14.74	48.24	54.00	5.77
2483.68	62.45	-14.74	47.72	54.00	6.29

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) = (0.605ms/3.3ms)=-14.74
"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
2. High frequency section (spurious in the restricted band 2450-2530MHz).
3. Average value=Peak value+ Duty Cycle Correction Factor
4. The pre-amplifier factor has been subtracted by test program actively.

Date of Test：2014. 12. 31 Temperature：26℃

EUT：Automatic Wrist Blood Pressure Monitor Humidity：43%

Test Mode：Transmit, Frequency: 2480MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2480.32	28.28	5.36	58.92	92.56	74.00	-18.56
2483.52	28.29	5.37	28.63	62.29	74.00	11.71
2483.76	28.29	5.37	26.66	60.32	74.00	13.68

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2480.52	62.29	-14.74	47.56	54.00	6.45
2483.76	60.32	-14.74	45.59	54.00	8.42

Remarks: 1. Duty Cycle Correction Factor =20log (cumulative on/T) = (0.605ms/3.3ms)=-14.74
"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
2. High frequency section (spurious in the restricted band 2450-2530MHz).
3. Average value=Peak value+ Duty Cycle Correction Factor
4. The pre-amplifier factor has been subtracted by test program actively.

5. DUTY CYCLE CORRECTION FACTOR

5.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2013. 11. 08	1 Year

5.2. Test Setup

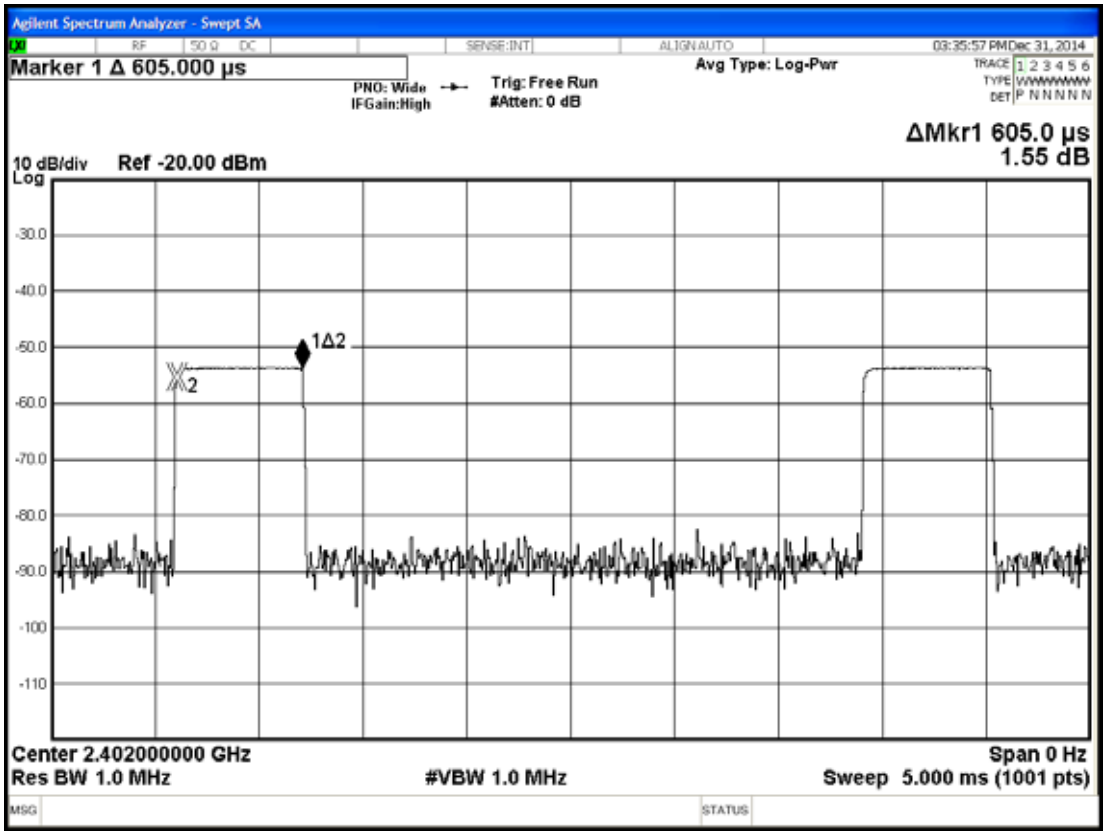
AUTOMATIC WRIST BLOOD PRESSURE MONITOR (EUT)

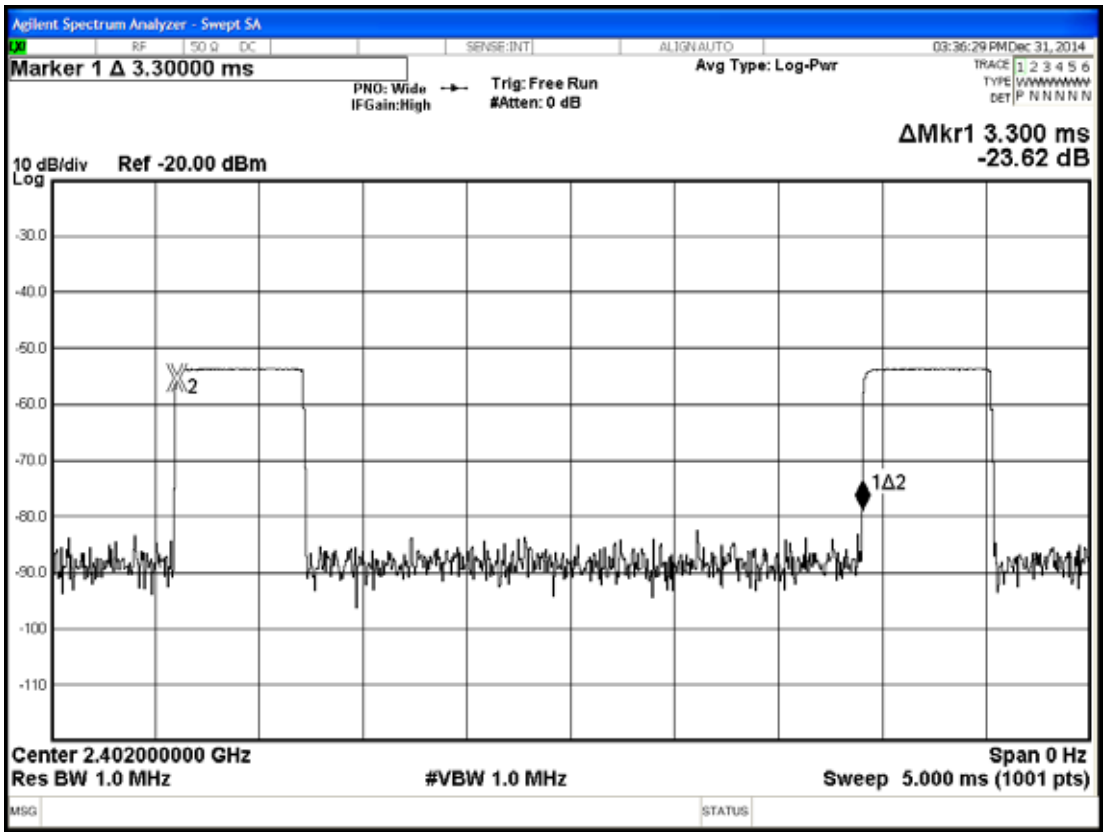
SPECTRUM ANALYZER

5.3. Test Results

PASSED.

Test Date: 2014. 12. 31 Temperature : 25℃ Humidity : 50%





Duty Cycle Factor=20log(cumulative on/T)=20log (0.605/3.3)= -14.74

T: The period of the pulse train or 100ms if the pulse train length is greater than 100ms

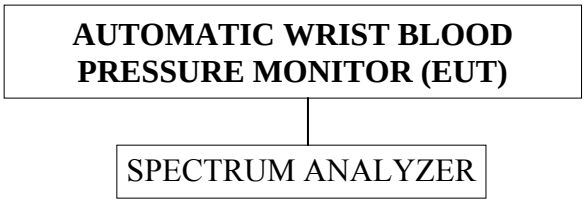
6. 6dB BANDWIDTH MEASUREMENT

6.1. Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

6.2. Block Diagram of Test Setup



6.3. Specification Limits [§15.247(a)(2)]

The minimum 6dB bandwidth shall be at least 500kHz.

6.4. Operating Condition of EUT

6.4.1. Set up the EUT and simulator as shown on 6.2.

6.4.2. The EUT was on transmitting frequency function during the testing.

6.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 1.5% EBW, VBW≥3xRBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.
The measurement guideline was according to 558074 D01 v03r02.

6.6. Test Results

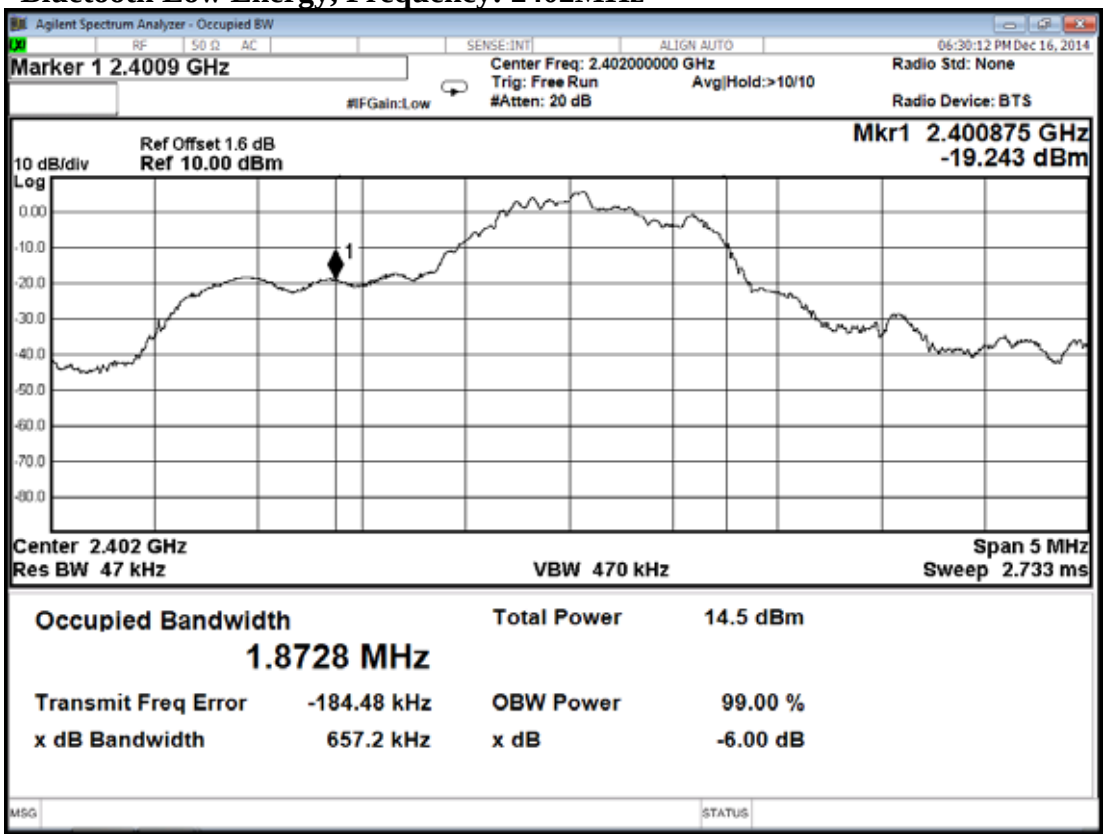
PASSED. All the test results are attached in next pages.

Test Date: 2014. 12. 16 Temperature: 25℃ Humidity: 55%

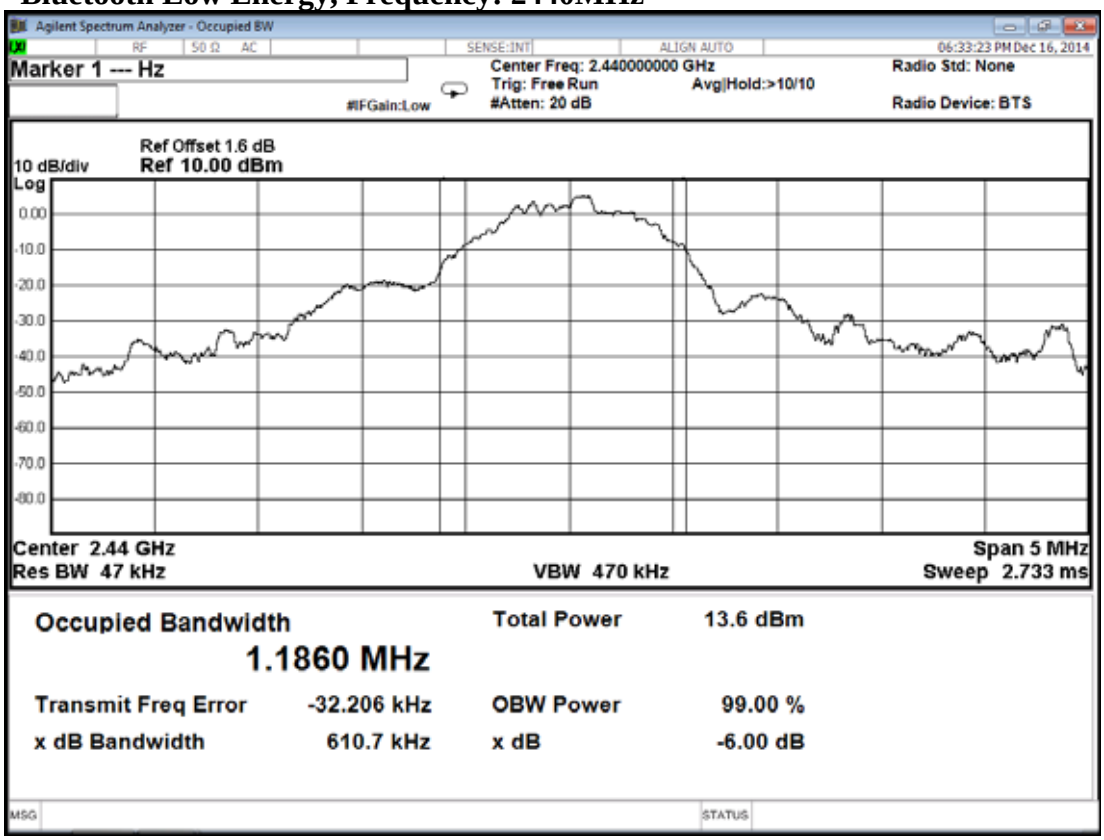
Mode	Type of Network	Channel	Frequency	**6dB Bandwidth**
1	Bluetooth Low Energy	CH0	2402MHz	**0.6572 MHz**
2		CH19	2440MHz	**0.6107 MHz**
3		CH39	2480MHz	**0.5621 MHz**

[Limit: least 500kHz]

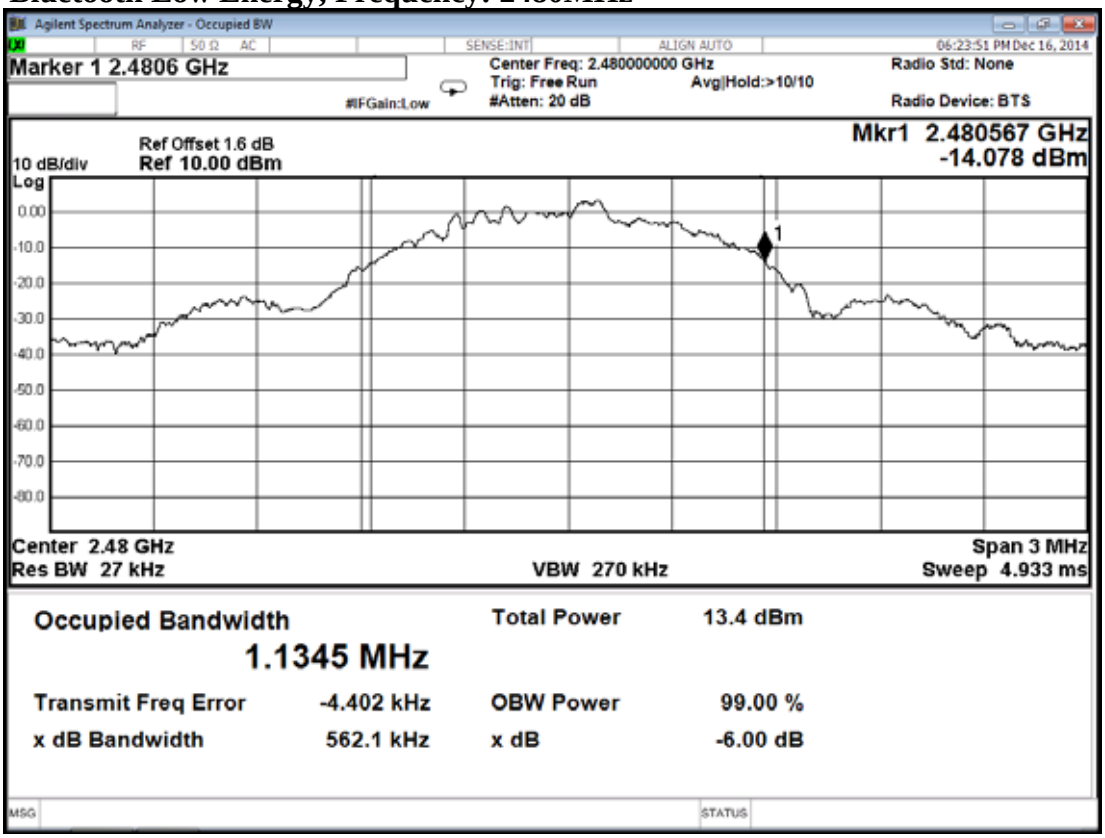
Bluetooth Low Energy, Frequency: 2402MHz



Bluetooth Low Energy, Frequency: 2440MHz



Bluetooth Low Energy, Frequency: 2480MHz



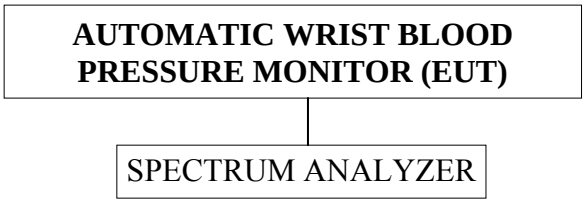
7. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

7.1. Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

7.2. Block Diagram of Test Setup



7.3. Specification Limits [§15.247(b)-(3)]

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is: 1Watt. (30dBm)

7.4. Operating Condition of EUT

7.4.1. Set up the EUT and simulator as shown on 7.2.

7.4.2. The EUT was on transmitting frequency function during the testing.

7.5. Test Procedure

The transmitter output was connected to the power sensor and record the reading of power meter.

The measurement guideline was according to 558074 D01 v03r02.

7.6. Test Results

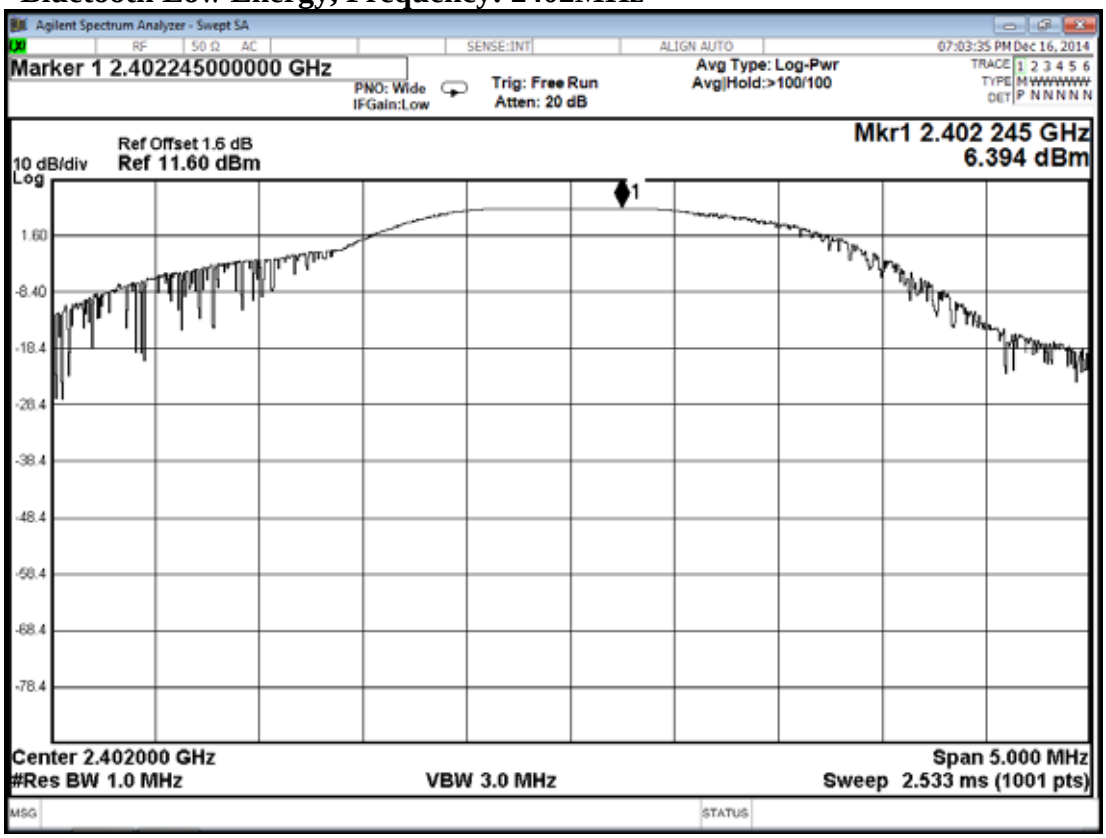
PASSED. All the test results are listed below.

Test Date: 2014. 12. 16 Temperature: 25℃ Humidity: 55%

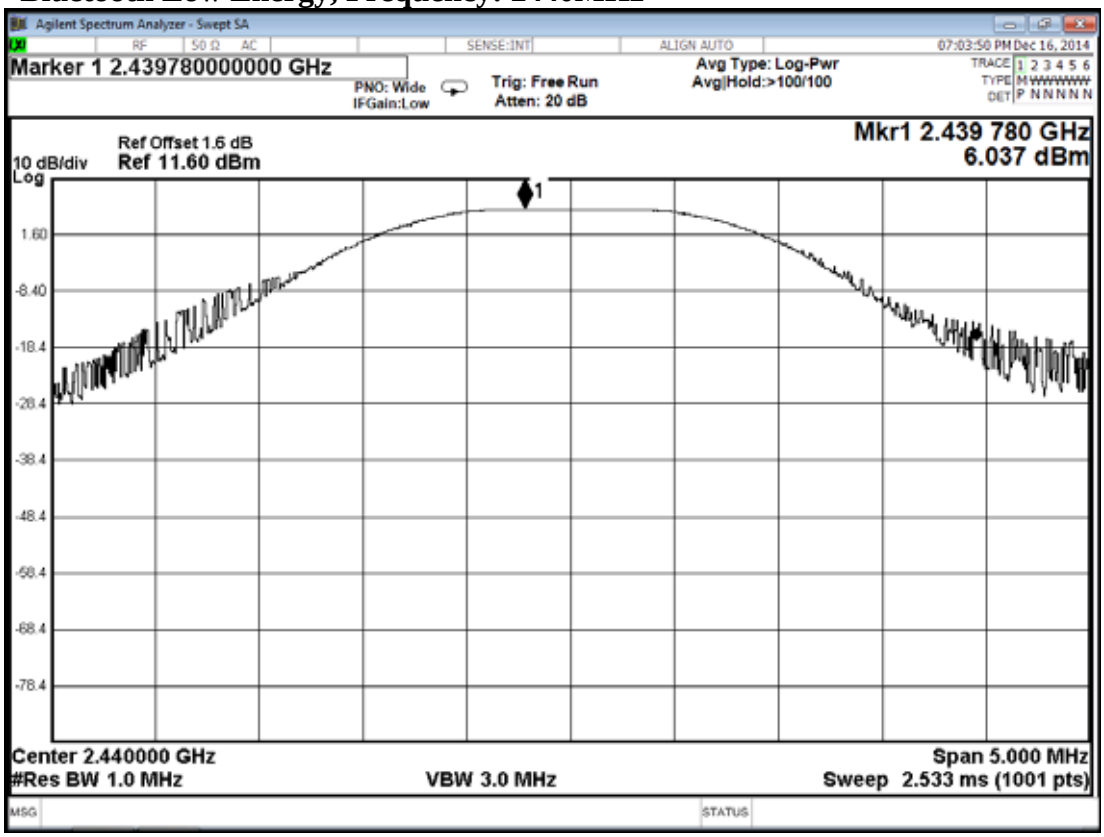
Mode	Type of Network	Channel	Test Frequency	**Output Power(dBm)**
1	Bluetooth Low Energy	CH0	2402MHz	**6.394**
2		CH19	2440MHz	**6.037**
3		CH39	2480MHz	**5.742**

[Limit: 1Watt. (30dBm)]

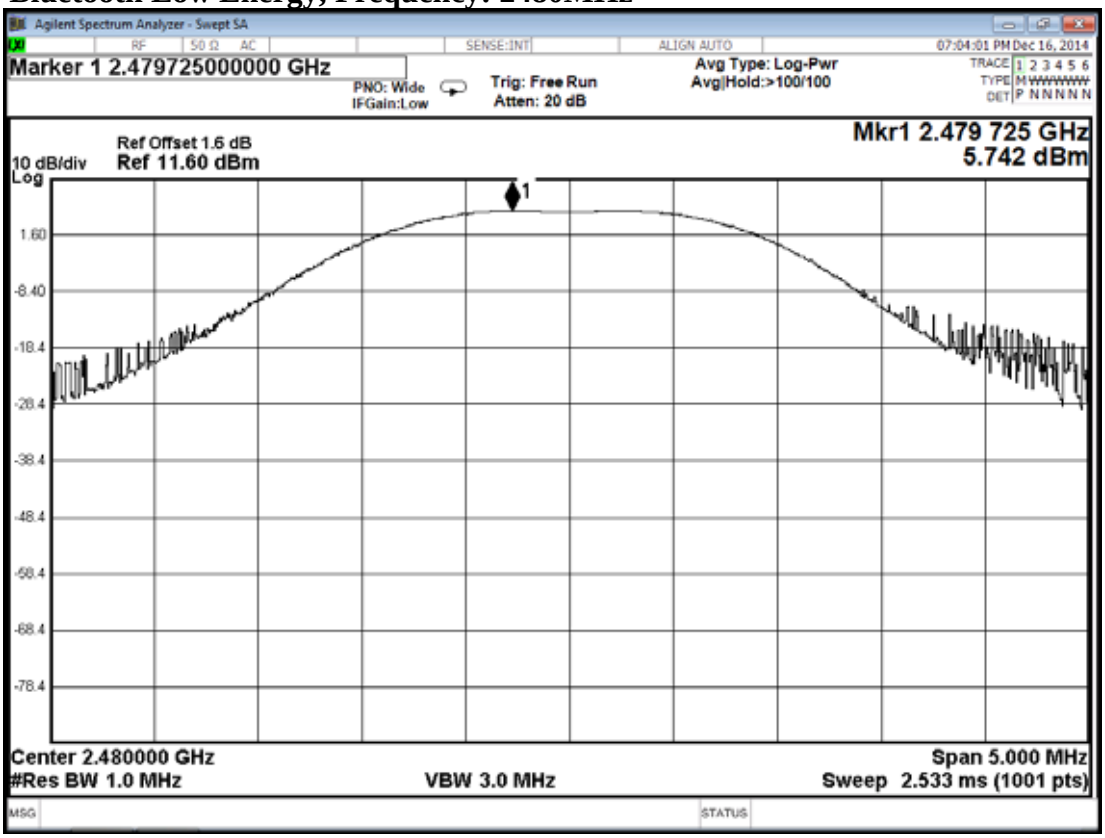
Bluetooth Low Energy, Frequency: 2402MHz



Bluetooth Low Energy, Frequency: 2440MHz



Bluetooth Low Energy, Frequency: 2480MHz



8. EMISSION LIMITATIONS MEASUREMENT

8.1. Test Equipment

The following test equipment was used during the emission limitations test:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

8.2. Block Diagram of Test Setup

The same as section.6.2

8.3. Specification Limits (§15.247(c))

8.3.1. In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).(※This test result attaching to §4.6.3)

8.3.2. The reference level for determining limit of emission limitations is according to the value measured indicated in plots at section 8.6.

8.4. Operating Condition of EUT

8.4.1. Set up the EUT and simulator as shown on 8.2.

8.4.2. The EUT was on transmitting frequency function during the testing.

8.5. Test Procedure

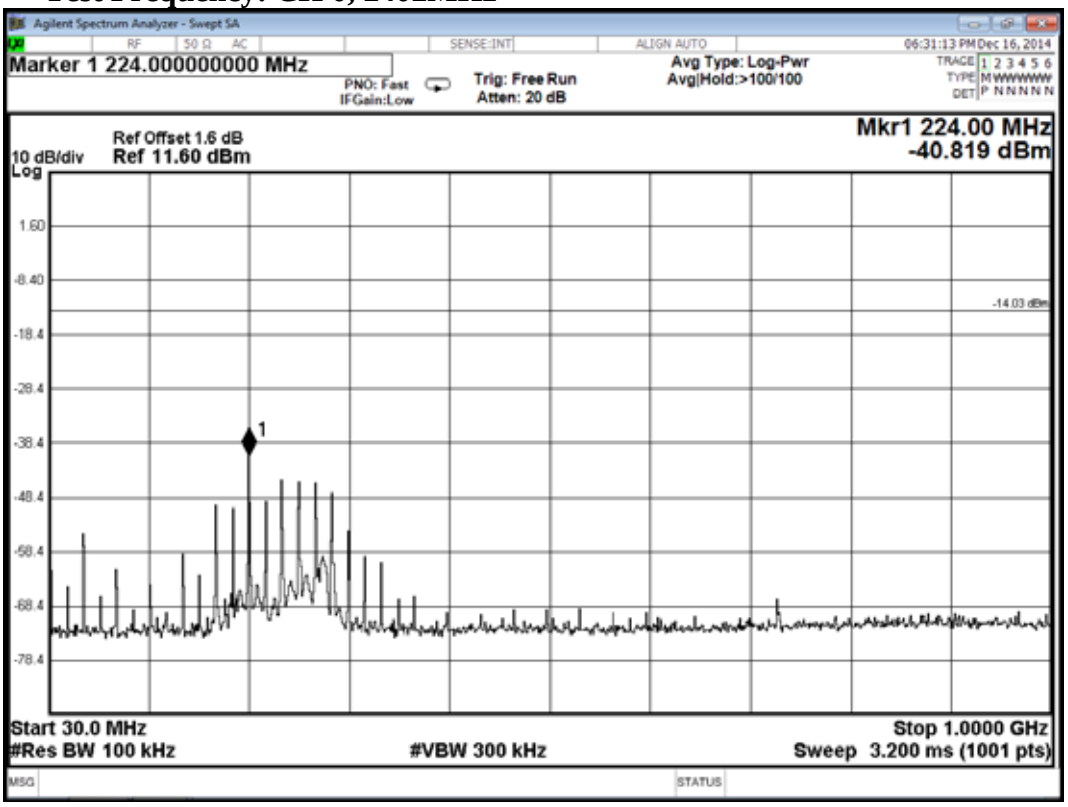
The RF output of EUT was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100kHz RBW and 300kHz VBW.
The measurement guideline was according to 558074 D01 v03r02.

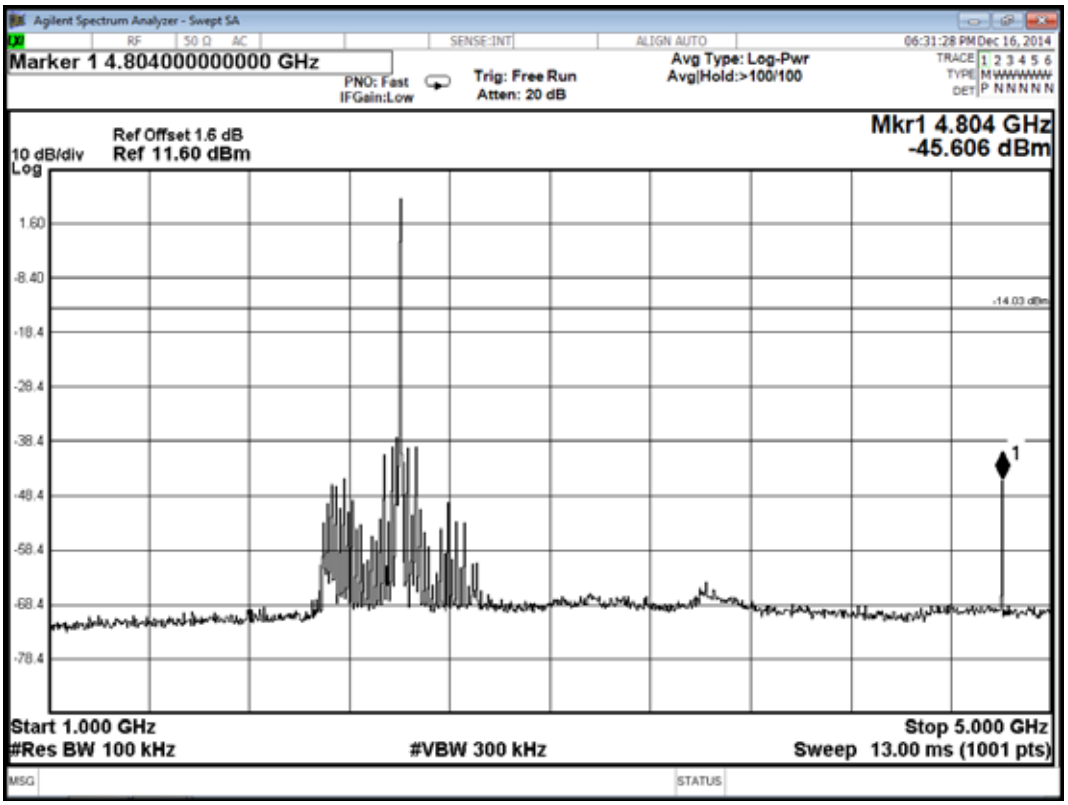
8.6. Test Results

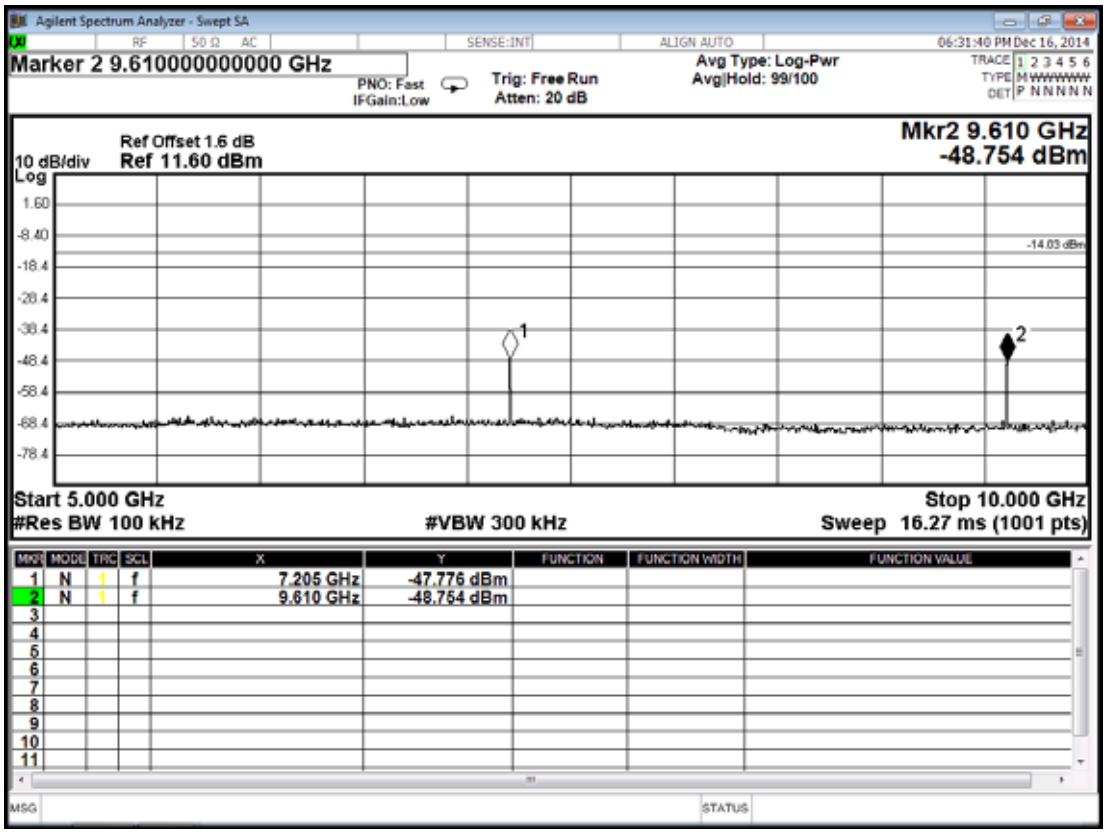
PASSED. The testing data was attached in the next pages.

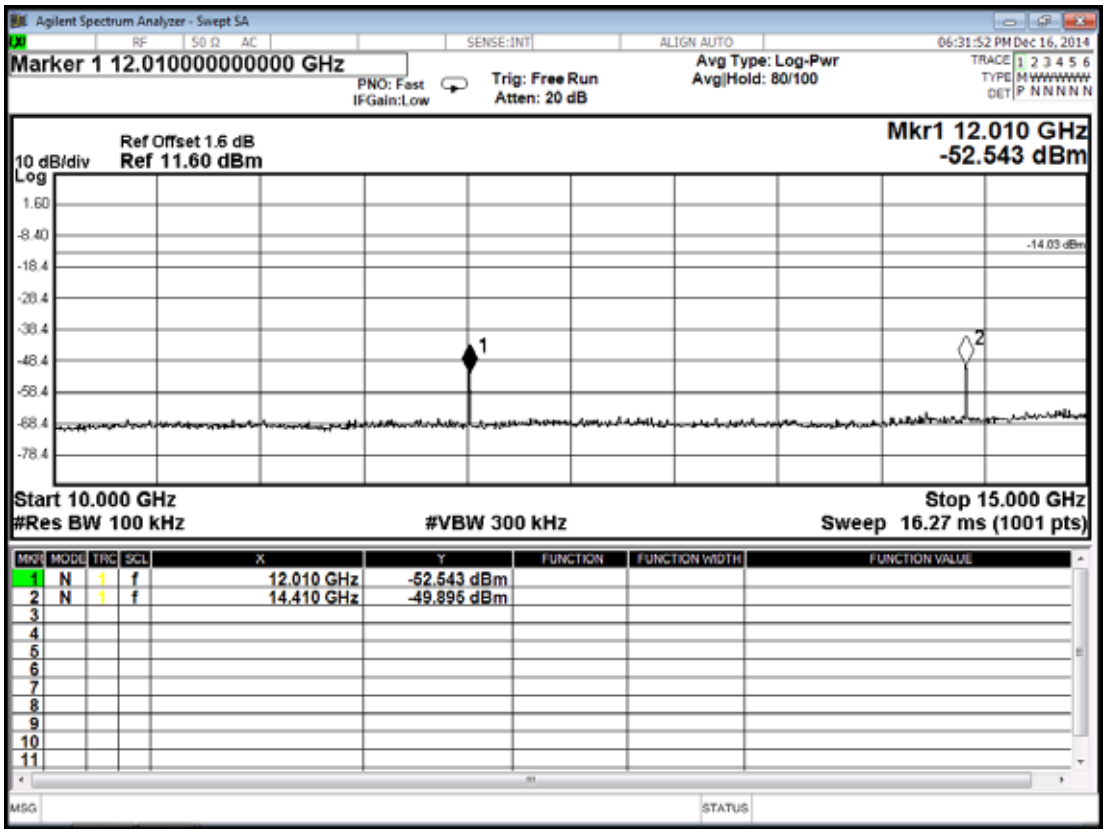
Test Date: 2014. 12. 16 Temperature: 25℃ Humidity: 55%

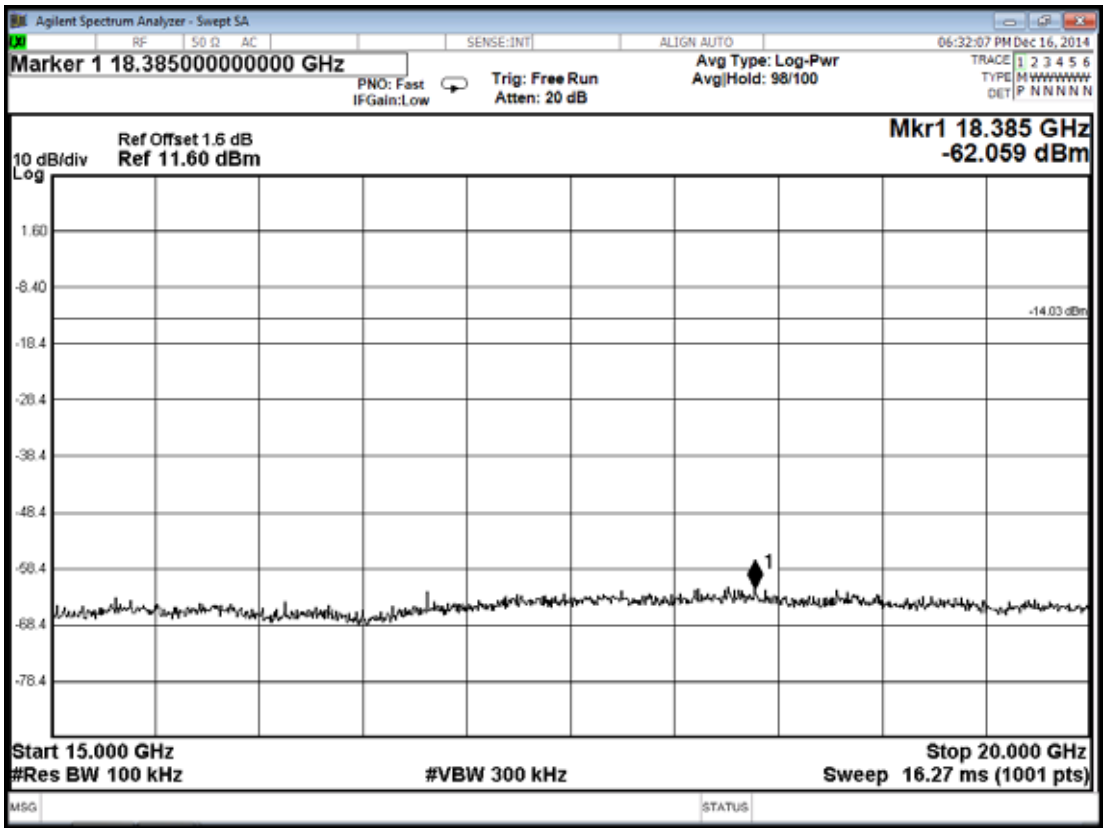
Test Frequency: CH 0, 2402MHz

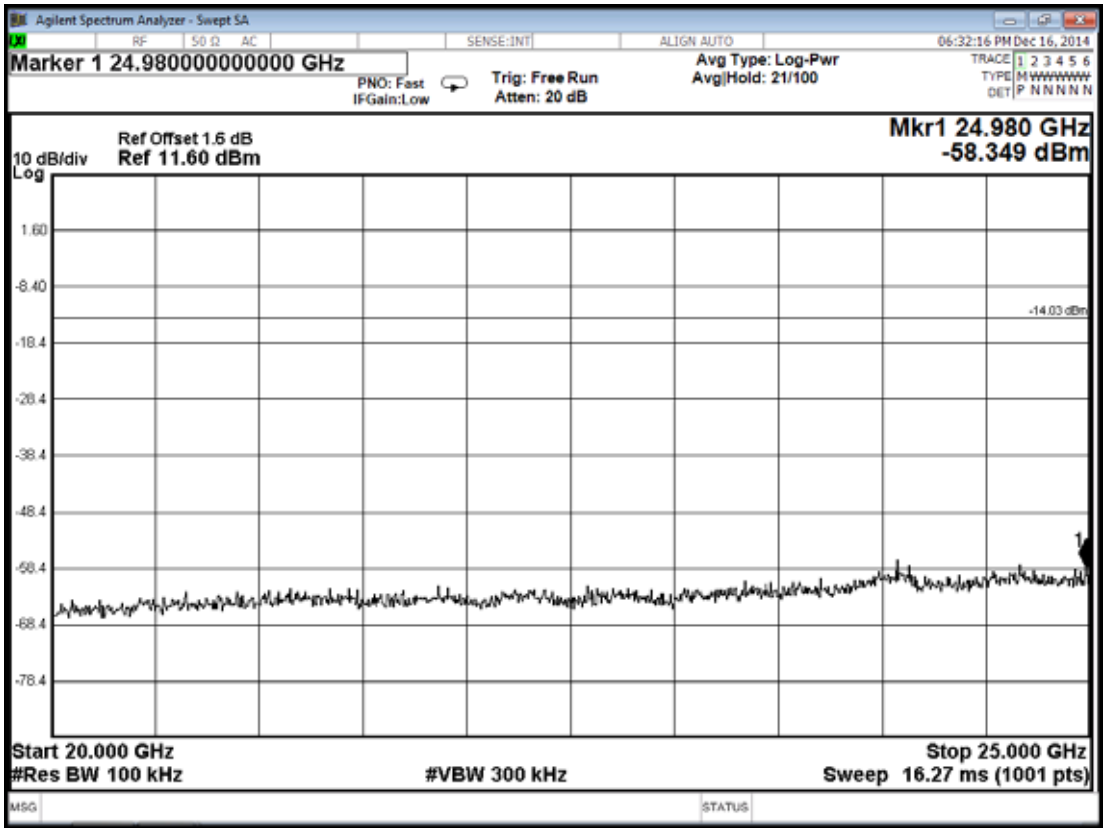




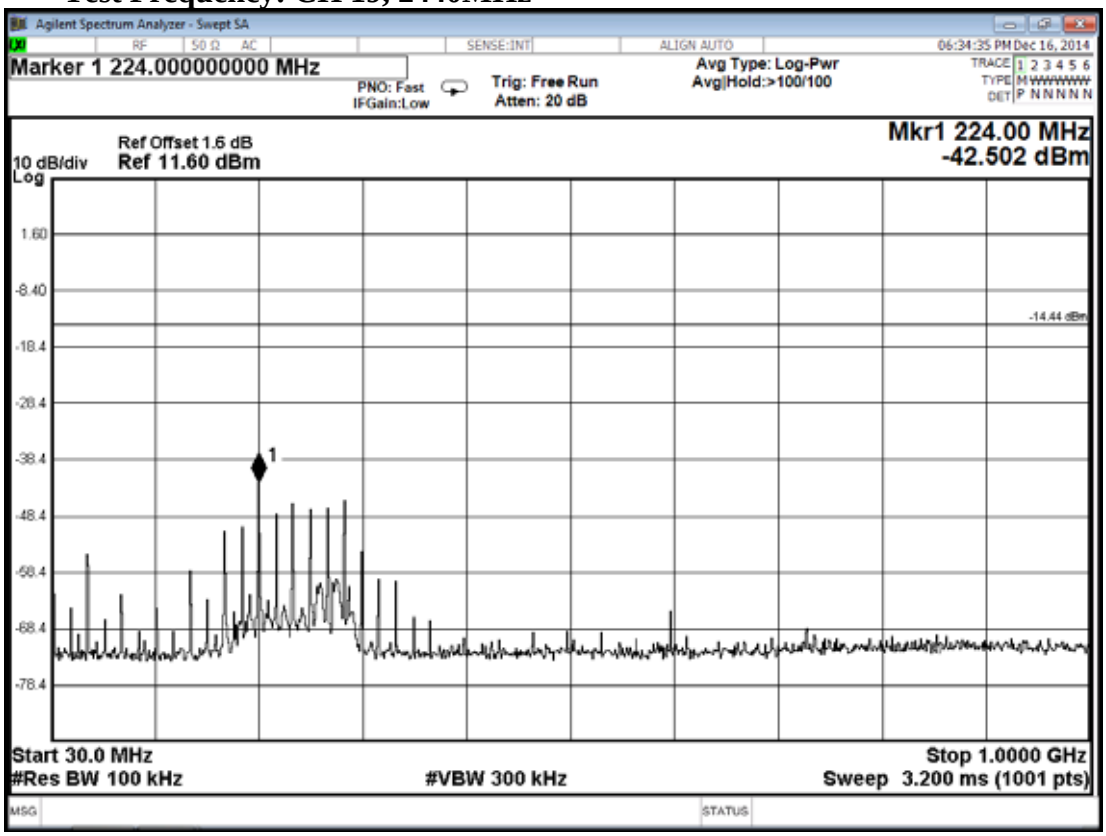

Agilent Spectrum Analyzer - Swept SA
Marker 2 9.610000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 99/100
06:31:40 PM Dec 16, 2014
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr2 9.610 GHz
-48.754 dBm
-14.03 dBm
Start 5.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 16.27 ms (1001 pts)
1 N 1 f 7.205 GHz -47.776 dBm
2 N 1 f 9.610 GHz -48.754 dBm

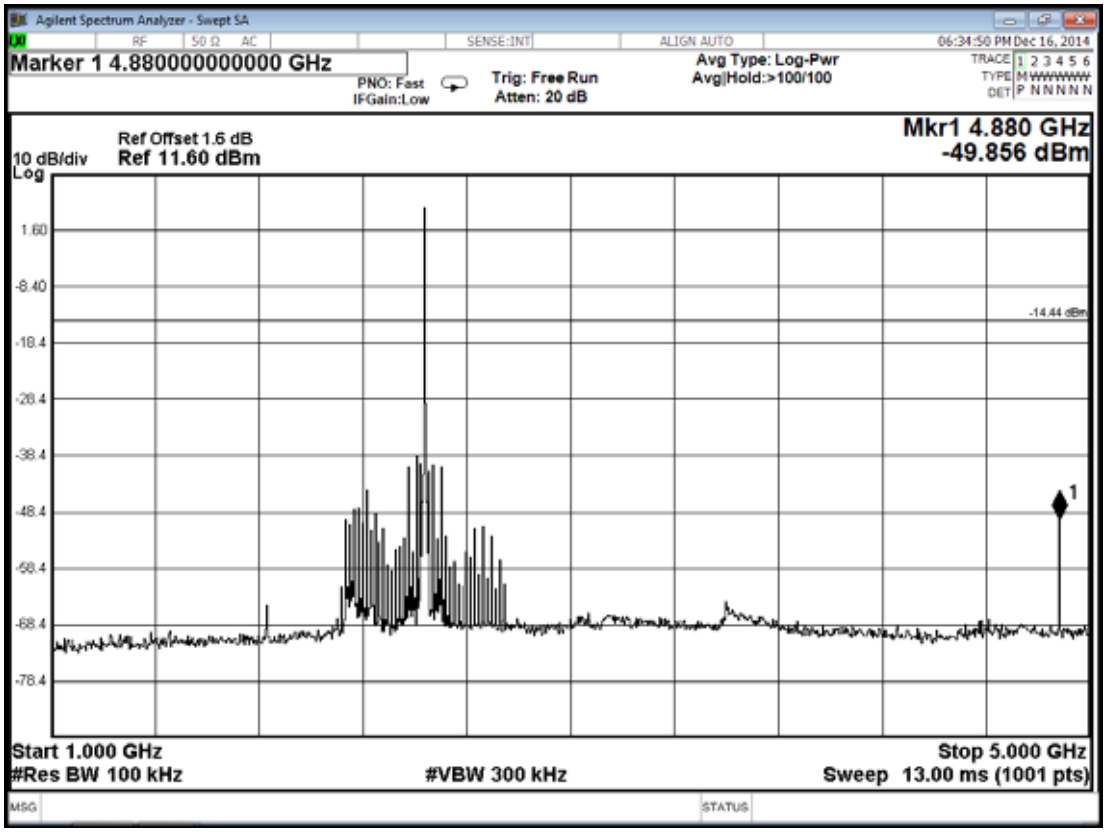

Agilent Spectrum Analyzer - Swept SA
Marker 1 12.010000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 80/100
06:31:52 PM Dec 16, 2014
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr1 12.010 GHz
-52.543 dBm
-14.03 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 15.000 GHz
Sweep 16.27 ms (1001 pts)
1 N 1 f 12.010 GHz -52.543 dBm
2 N 1 f 14.410 GHz -49.895 dBm

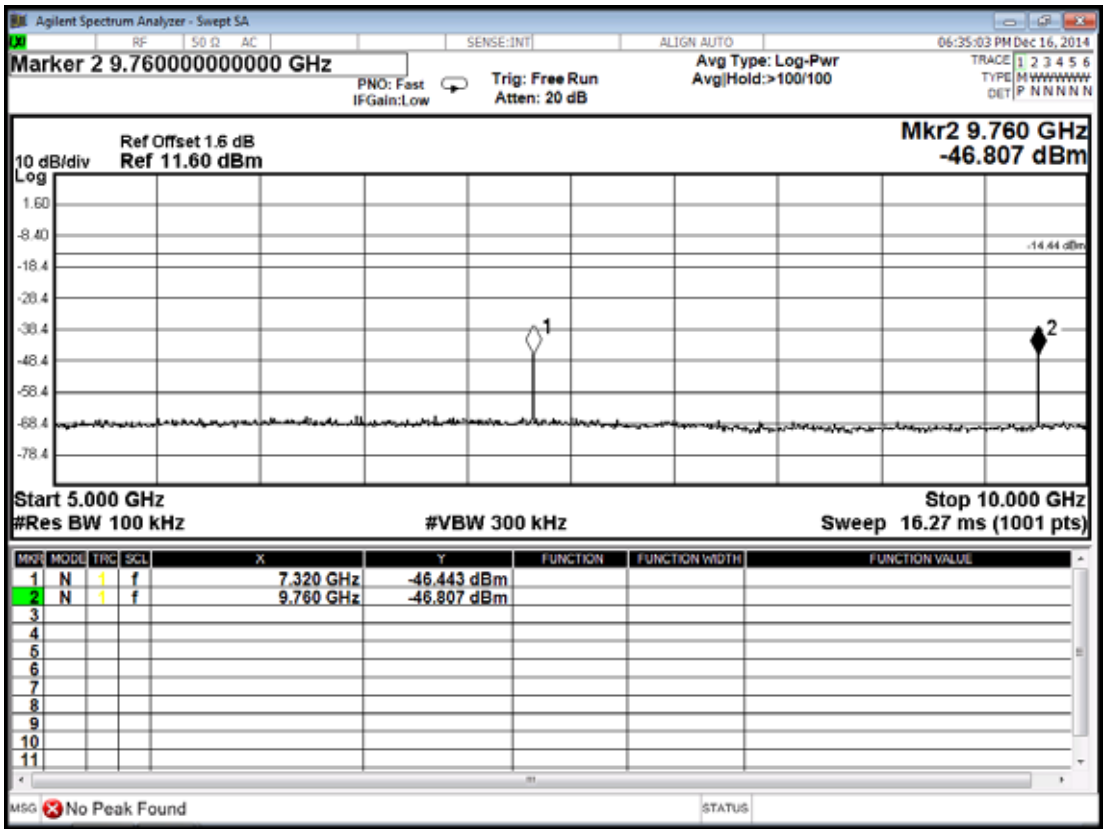

Agilent Spectrum Analyzer - Swept SA
06:32:07 PM Dec 16, 2014
Marker 1 18.385000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 98/100
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr1 18.385 GHz
-62.059 dBm
-14.03 dBm
Start 15.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 20.000 GHz
Sweep 16.27 ms (1001 pts)

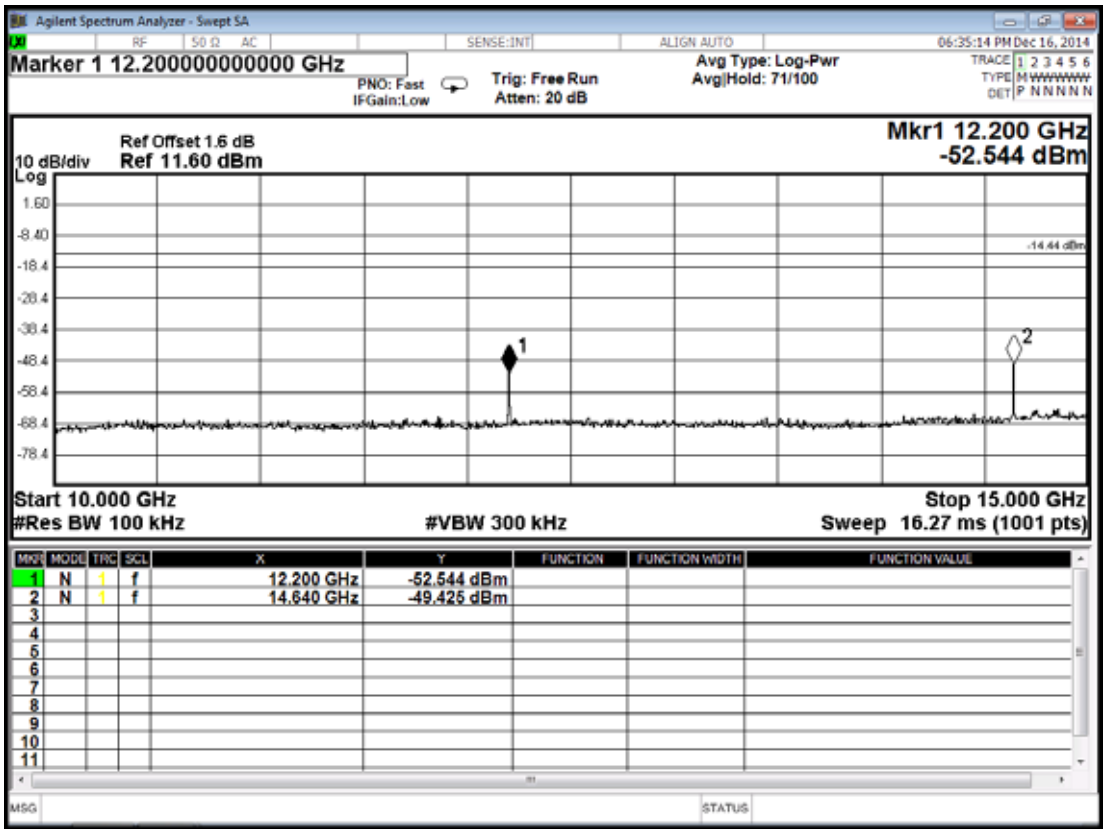

Agilent Spectrum Analyzer - Swept SA
06:32:16 PM Dec 16, 2014
Marker 1 24.980000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 21/100
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr1 24.980 GHz
-58.349 dBm
-14.03 dBm
Start 20.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 16.27 ms (1001 pts)

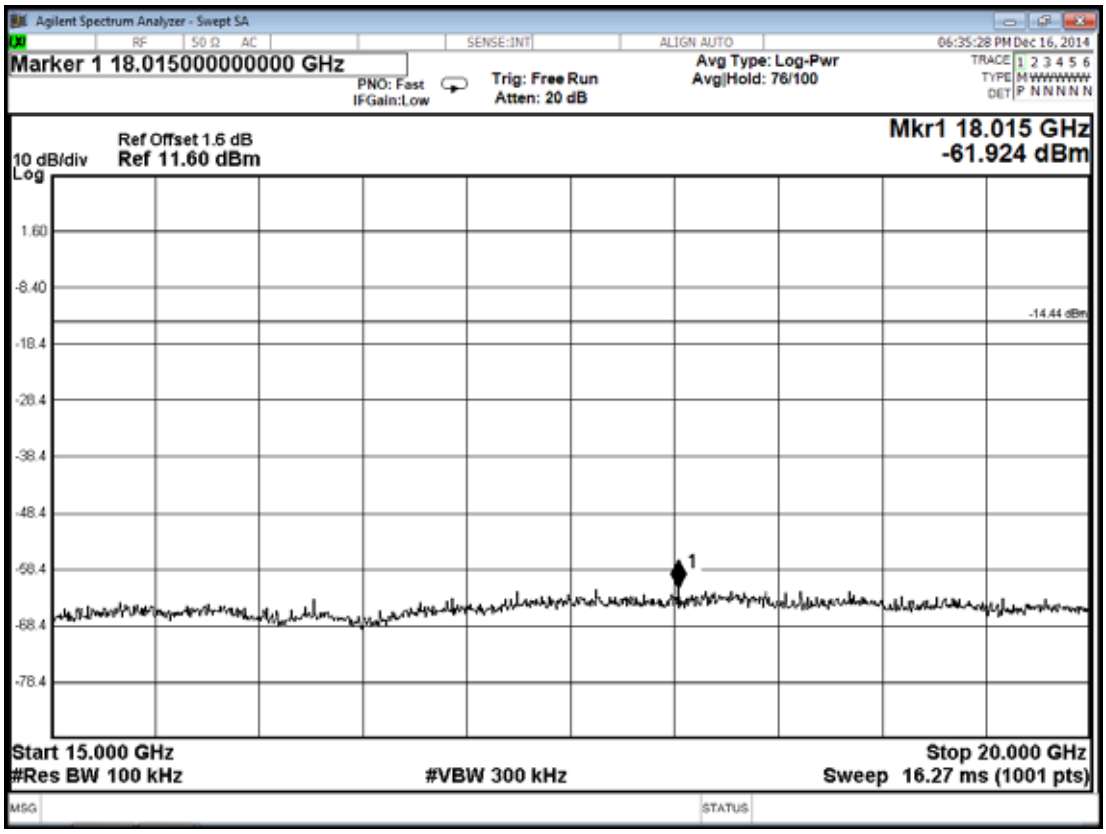
Test Frequency: CH 19, 2440MHz

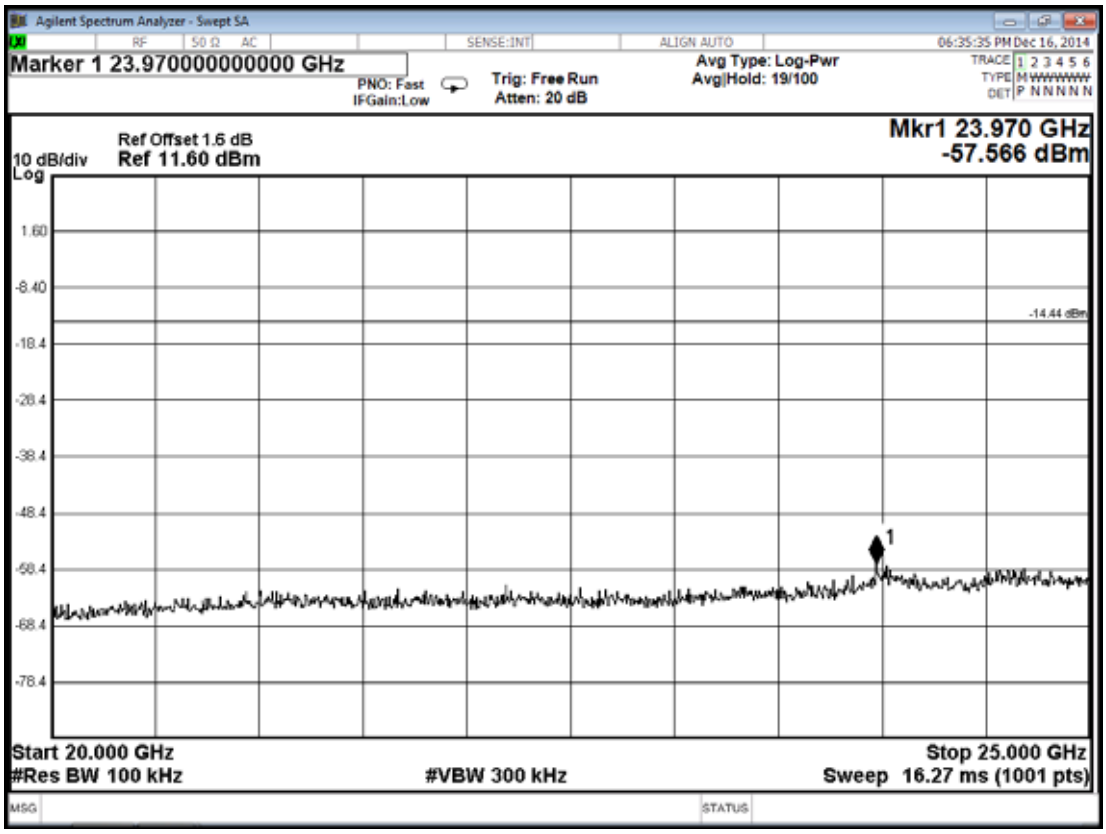




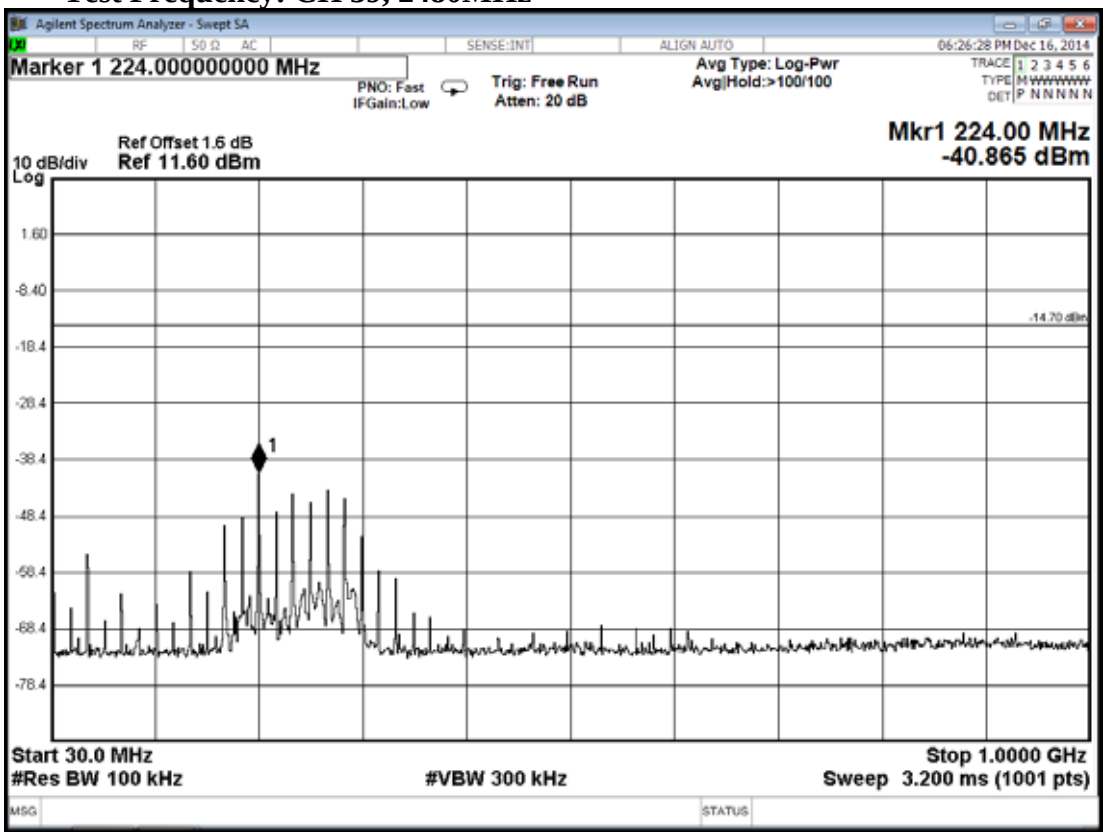

Agilent Spectrum Analyzer - Swept SA
06:35:03 PM Dec 16, 2014
Marker 2 9.760000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr2 9.760 GHz
-46.807 dBm
Start 5.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 16.27 ms (1001 pts)
1 N 1 f 7.320 GHz -46.443 dBm
2 N 1 f 9.760 GHz -46.807 dBm
No Peak Found

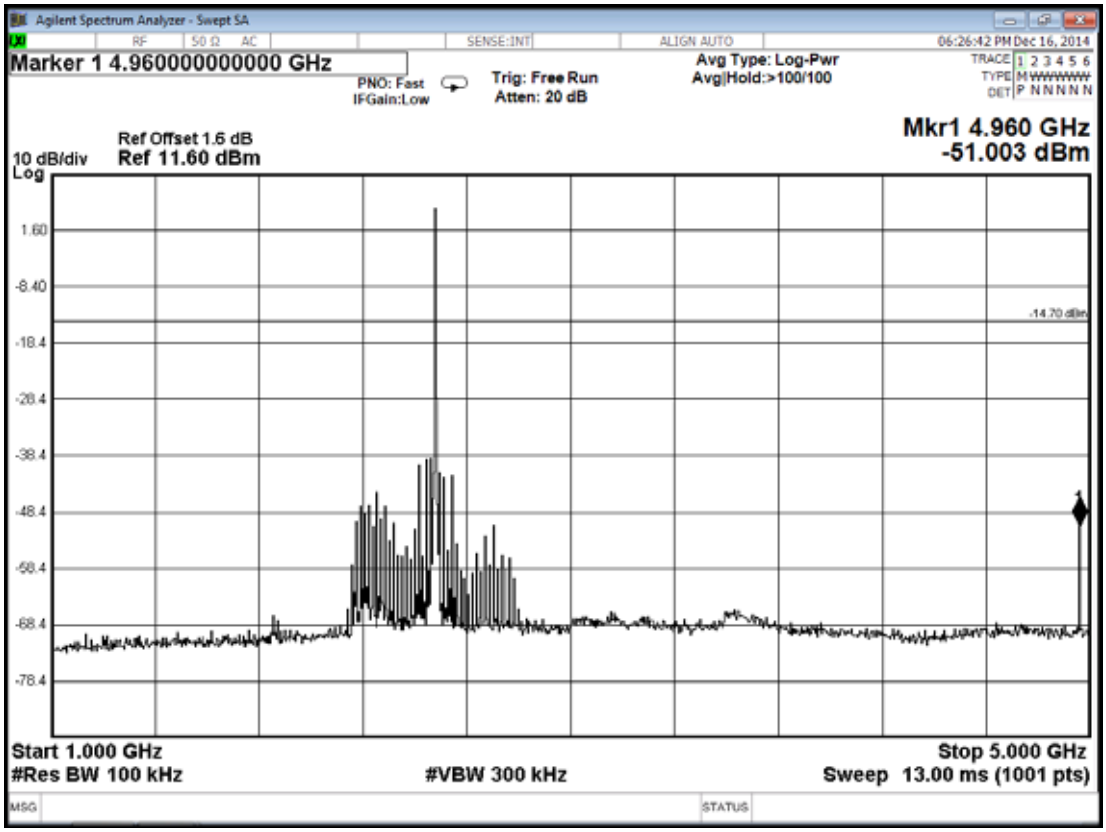

Agilent Spectrum Analyzer - Swept SA
06:35:14 PM Dec 16, 2014
Marker 1 12.200000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 71/100
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr1 12.200 GHz
-52.544 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 15.000 GHz
Sweep 16.27 ms (1001 pts)
1 N 1 f 12.200 GHz -52.544 dBm
2 N 1 f 14.640 GHz -49.425 dBm

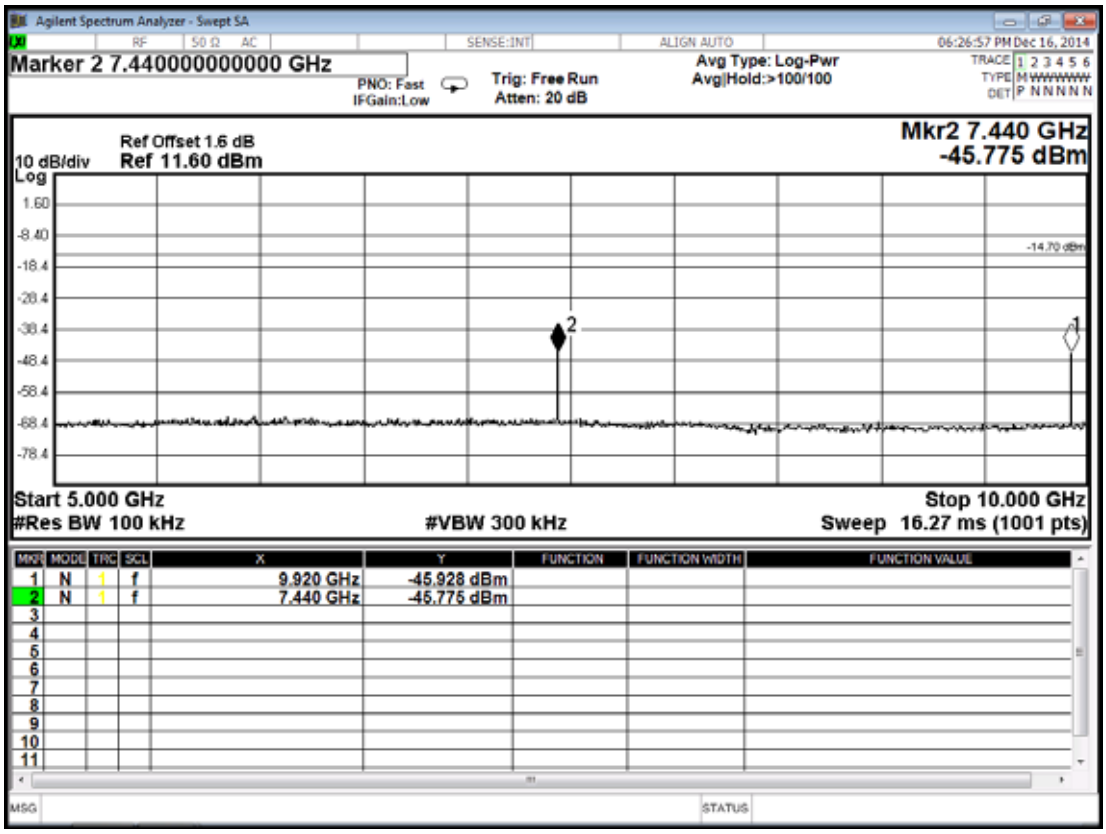

Agilent Spectrum Analyzer - Swept SA
06:35:28 PM Dec 16, 2014
Marker 1 18.015000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 76/100
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr1 18.015 GHz
-61.924 dBm
-14.44 dBm
Start 15.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 20.000 GHz
Sweep 16.27 ms (1001 pts)

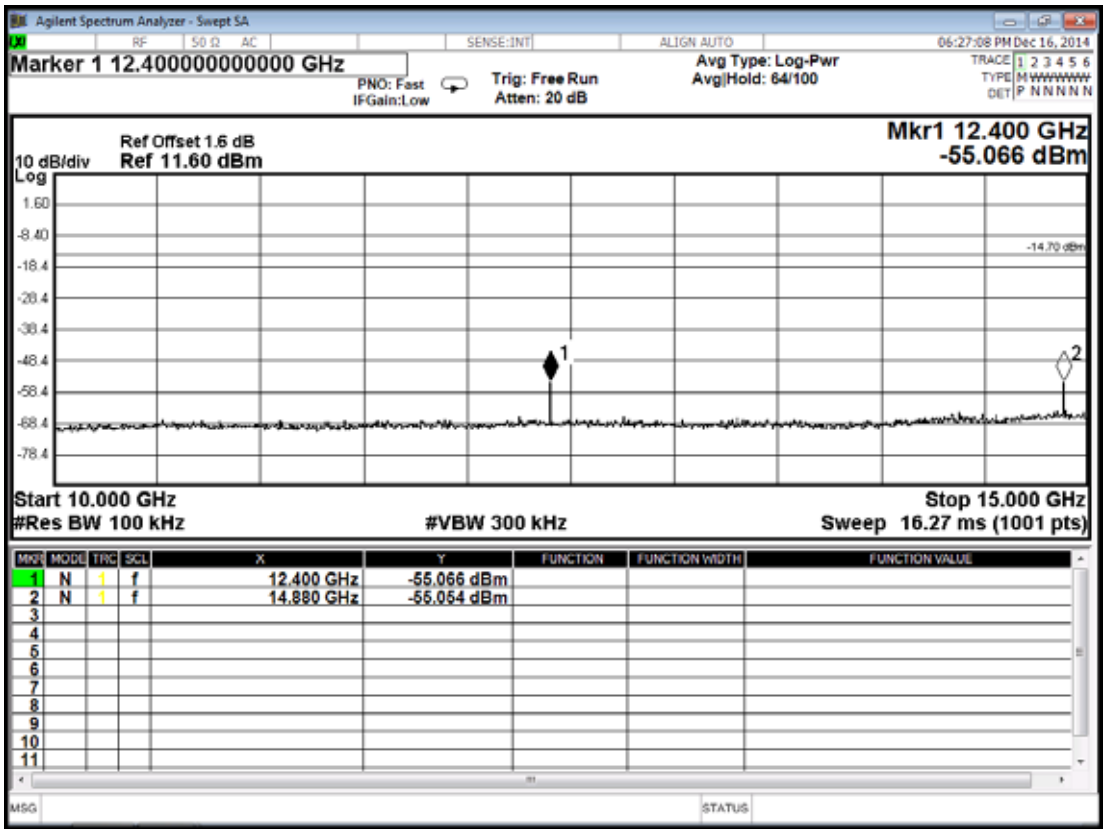

Agilent Spectrum Analyzer - Swept SA
06:35:35 PM Dec 16, 2014
Marker 1 23.970000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 19/100
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr1 23.970 GHz
-57.566 dBm
-14.44 dBm
Start 20.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 16.27 ms (1001 pts)

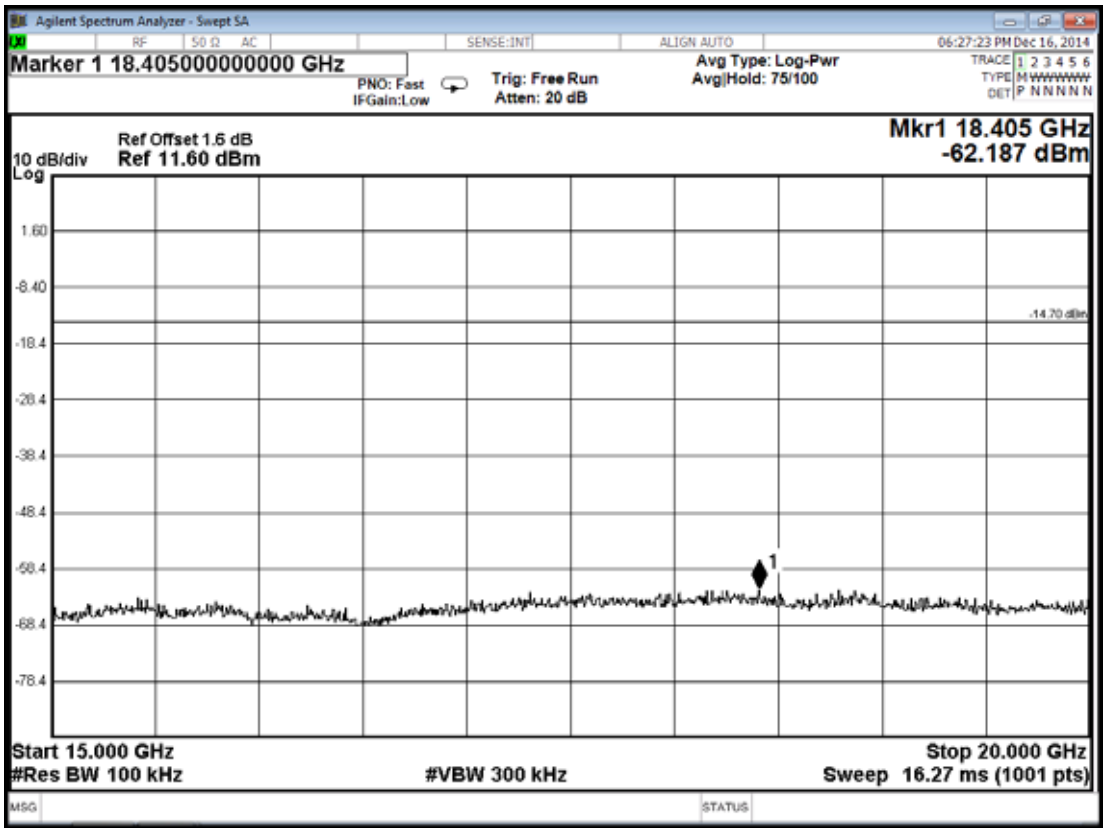
Test Frequency: CH 39, 2480MHz

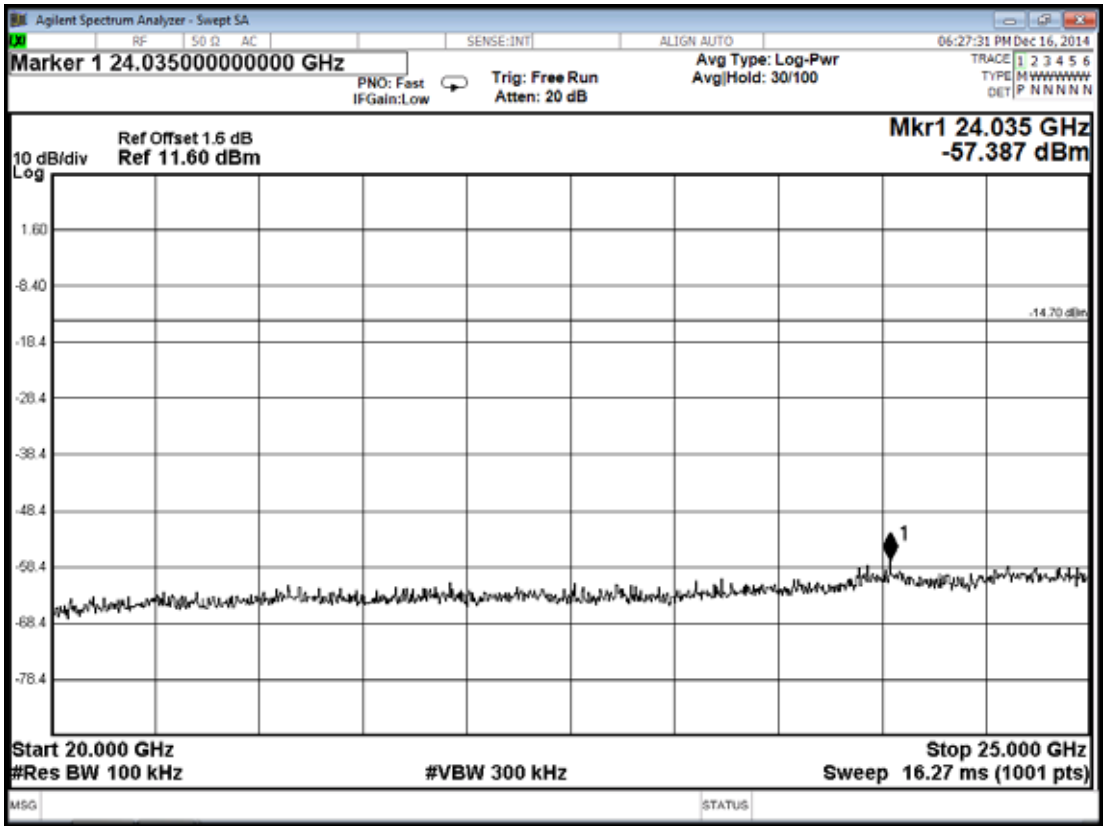





Agilent Spectrum Analyzer - Swept SA
Marker 2 7.440000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
06:26:57 PM Dec 16, 2014
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr2 7.440 GHz
-45.775 dBm
Start 5.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 16.27 ms (1001 pts)
1 N f 9.920 GHz -45.928 dBm
2 N f 7.440 GHz -45.775 dBm


Agilent Spectrum Analyzer - Swept SA
Marker 1 12.400000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 64/100
06:27:08 PM Dec 16, 2014
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr1 12.400 GHz
-55.066 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 15.000 GHz
Sweep 16.27 ms (1001 pts)
1 N f 12.400 GHz -55.066 dBm
2 N f 14.880 GHz -55.054 dBm


Agilent Spectrum Analyzer - Swept SA
06:27:23 PM Dec 16, 2014
Marker 1 18.405000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 75/100
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr1 18.405 GHz
-62.187 dBm
Start 15.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 20.000 GHz
Sweep 16.27 ms (1001 pts)


Agilent Spectrum Analyzer - Swept SA
06:27:31 PM Dec 16, 2014
Marker 1 24.035000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 30/100
Ref Offset 1.6 dB
10 dB/div
Ref 11.60 dBm
Mkr1 24.035 GHz
-57.387 dBm
Start 20.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 16.27 ms (1001 pts)

9. BAND EDGES MEASUREMENT

9.1. Test Equipment

The following test equipment was used during the band edges measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

9.2. Block Diagram of Test Setup

The same as section.6.2.

9.3. Specification Limits [§15.247(c)]

9.3.1. In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).(※This test result attaching to §4.6.3)

9.3.2. The reference level for determining limit of emission limitations is according to the value measured indicated in plots at section 9.6.

9.4. Operating Condition of EUT

9.4.1. Set up the EUT and simulator as shown on 9.2.

9.4.2. The EUT was on transmitting frequency function during the testing.

9.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. Set both RBW=100 kHz and VBW to 300kHz with suitable frequency span including 100kHz bandwidth from band edge.

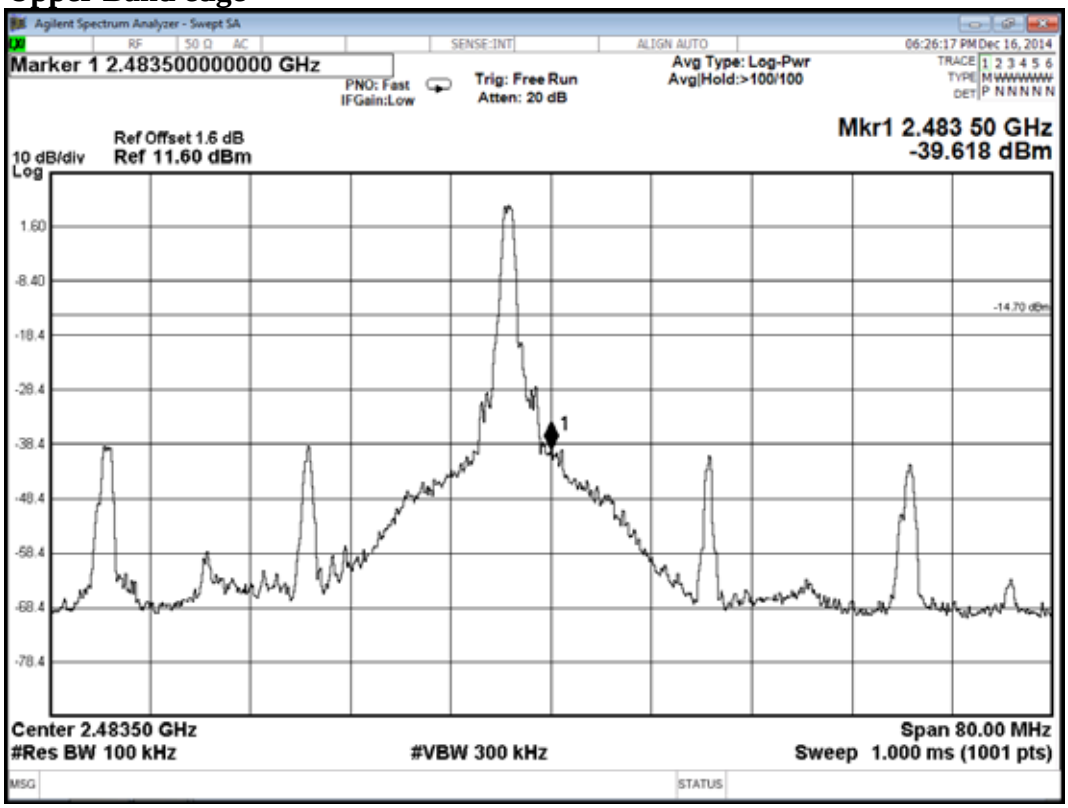
The measurement guideline was according to 558074 D01 v03r02.

9.6. Test Results

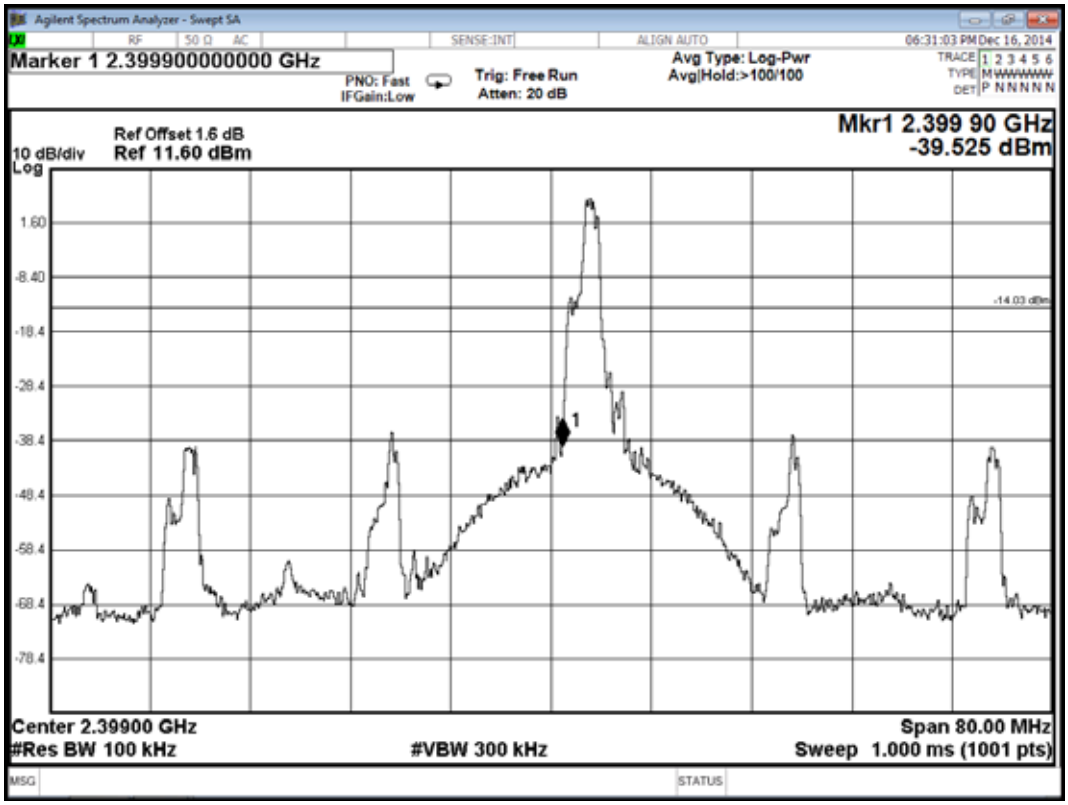
PASSED. All the test results are attached in next pages.

Test Date: 2014. 12. 16 Temperature: 25℃ Humidity: 55%

Bluetooth Low Energy,
Upper Band edge



Below Band edge



10. POWER SPECTRAL DENSITY MEASUREMENT

10.1. Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

10.2. Block Diagram of Test Setup

The same as section.6.2.

10.3. Specification Limits [§15.247(d)]

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

10.4. Operating Condition of EUT

10.4.1. Set up the EUT and simulator as shown on 10.2.

10.4.2. The EUT was on transmitting frequency function during the testing.

10.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 100kHz RBW and ≥300kHz VBW, set sweep time = Auto.

The measurement guideline was according to 558074 D01 v03r02.

10.6. Test Results

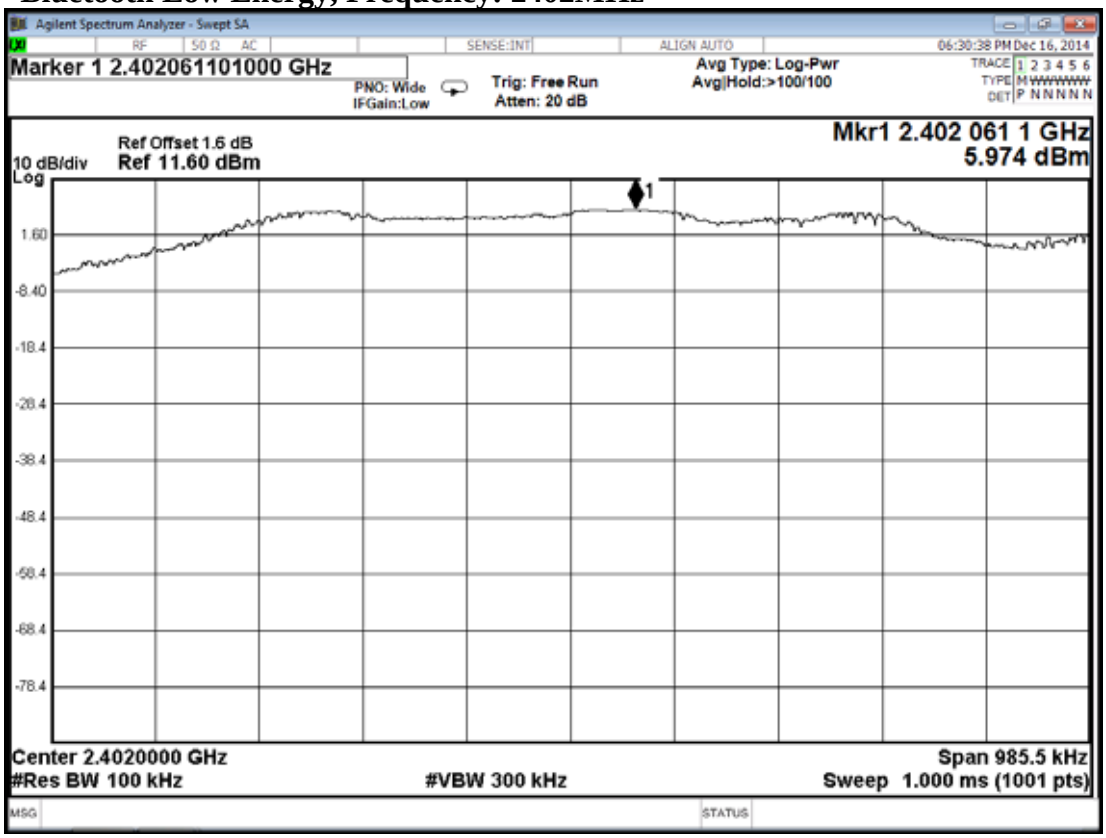
PASSED. All the test results are attached in next pages.

Test Date: 2014. 12. 16 Temperature: 25℃ Humidity: 55%

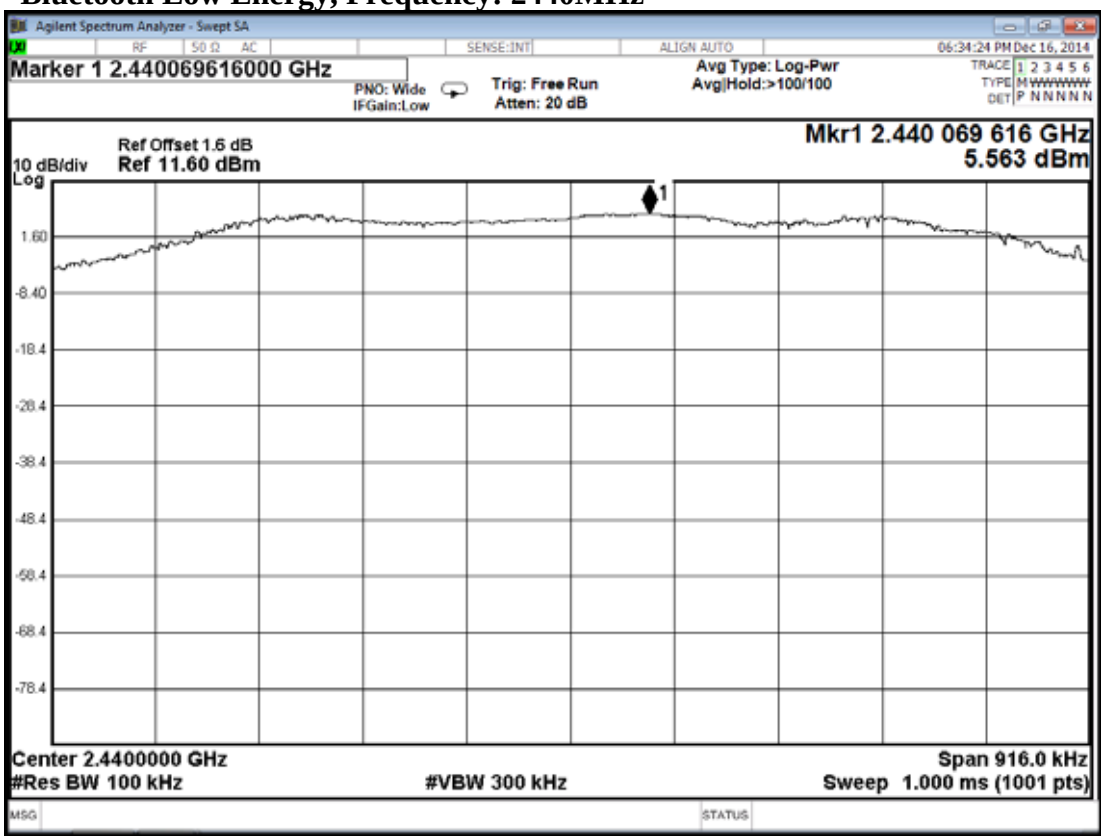
Mode	Type of Network	Channel	Frequency	**Power Spectral Density**
1	Bluetooth Low Energy	CH0	2402MHz	**5.974 dBm**
2		CH19	2440MHz	**5.563 dBm**
3		CH39	2480MHz	**5.258 dBm**

[Limit: 8dBm]

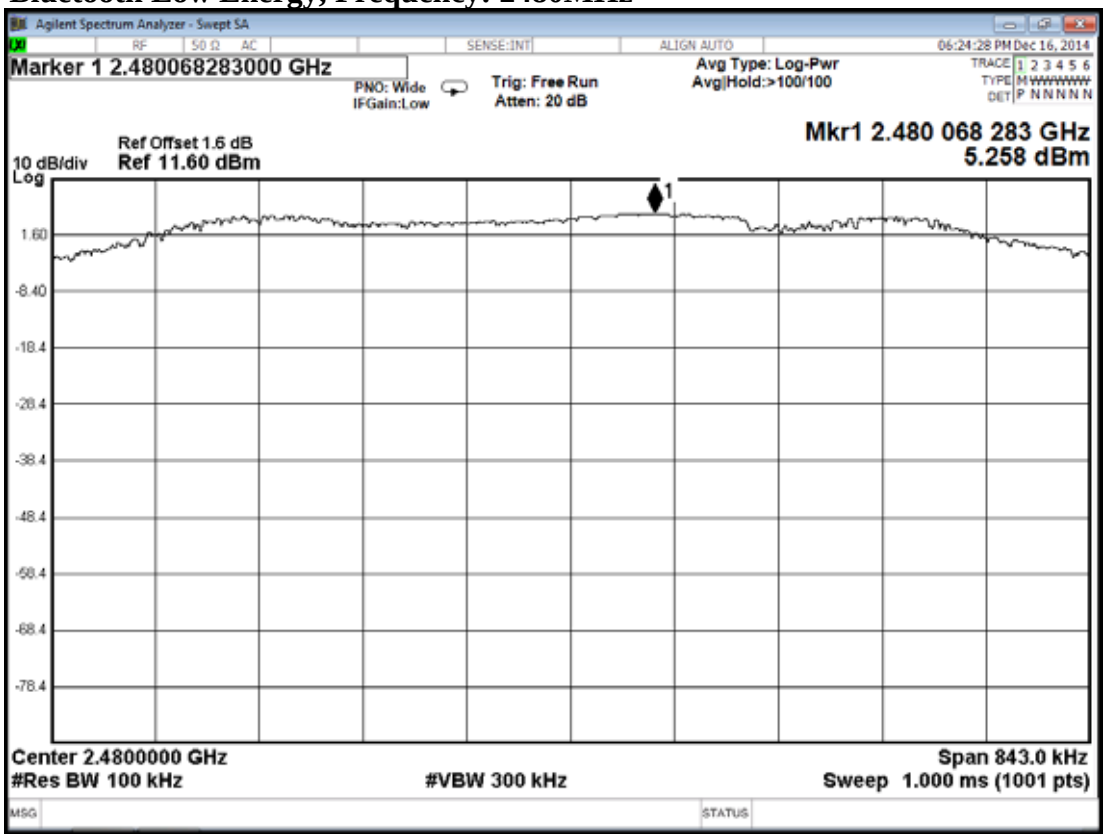
Bluetooth Low Energy, Frequency: 2402MHz



Bluetooth Low Energy, Frequency: 2440MHz



Bluetooth Low Energy, Frequency: 2480MHz



11. DEVIATION TO TEST SPECIFICATIONS

【NONE】