Application for FCC Certification
On behalf of

Mettler Toledo(Changzhou) Measurement Technology Ltd.

Product Name: Bluetooth Adaptor

Model No.: ACM360-B0

FCC ID: 2ALAI17MT101

Prepared For: Mettler Toledo(Changzhou) Measurement Technology Ltd.
111 West Taihu Road, Changzhou, Jiang, China

Prepared By: Audix Technology (Shanghai) Co., Ltd.
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Report No. : ACI-F17099
Date of Test : Apr. 21-22, 2017
Date of Report : Apr. 24, 2017

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TEST REPORT FOR FCC CERTIFICATE

Applicant	:	Mettler Toledo(Changzhou) Measurement Technology Ltd.
EUT Description	:	Bluetooth Adaptor
	(A) Model No.	: ACM360-B0
	(B) Power Supply	: DC 5-9V
	(C) Test Voltage	: DC 5V

Test Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART C
AND ANSI C63.10-2013

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT (M/N: Refer to Sec2.1), which was tested on Apr. 21-22, 2017 is technically compliance with the FCC limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Apr. 21-22, 2017 Date of Report : Apr. 24, 2017

Producer : Alan He
ALAN HE / Assistant

Review : Byron Wu
BYRON WU / Deputy Assistant Manager

AUDIX® For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory :
Authorized Signature(s) BYRON KWO/Assistant General Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Results	Meets Limit
EMISSION			
Conducted Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	N/A	15.207
Radiated Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.209(a) 15.205(a)(c)
6 dB Bandwidth Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(a)(2)
Maximum Peak Output Power Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(b)(3)
Emission Limitations Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(d)
Band Edge Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(d)
Power Spectral Density Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(e)
N/A is an abbreviation for Not Applicable.			

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description	:	Bluetooth Adaptor
Type of EUT		☑ Production ☐ Pre-product ☐ Pro-type
Model Number	:	ACM360-B0
Radio Tech	:	Bluetooth v4.1 BLE
Channel Freq.	:	2402MHz-2480MHz
Tested Freq.	:	2402MHz, 2440MHz, 2480MHz
Modulation	:	GFSK
Antenna Gain	:	PCB antenna 3 dBi
Test Mode	:	The EUT was set at continuous TX with duty cycle 100% during all the test in the report
Applicant	:	Mettler Toledo(Changzhou) Measurement Technology Ltd. 111 West Taihu Road, Changzhou, Jiang, China

2.2 Description of Test Facility

Site Description (Semi-Anechoic Chamber)	: Sept. 17, 1998 file on Jan. 15, 2015 Renewed Federal Communications Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, USA
Name of Firm	: Audix Technology (Shanghai) Co., Ltd.
Site Location	: 3F 34 Bldg 680 Guiping Rd., Caohejing Hi-Tech Park, Shanghai 200233, China
FCC registration Number	: 91789
Accredited by NVLAP, Lab Code	: 200371-0

2.3 Measurement Uncertainty

Radiated Emission Expanded Uncertainty (30-200MHz):
U = 4.3dB (Horizontal)
U = 4.6dB (Vertical)

Radiated Emission Expanded Uncertainty (200M-1GHz):
U = 4.5dB (Horizontal)
U = 5.4dB (Vertical)

Radiated Emission Expanded Uncertainty (Above 1GHz):
U = 5.1 dB

6 dB Bandwidth Expanded Uncertainty	: U = $\pm 1 \times 10^{-8}$ MHz
Maximum Peak Output Power Expanded Uncertainty	: U = ±1.56 dB
Emission Limitations Expanded Uncertainty	: U = ±1.20 dB
Band Edge Expanded Uncertainty	: U = ±1.20 dB
Power Spectral Density Expanded Uncertainty	: U = ±1.20 dB

3 RADIATED EMISSION TEST

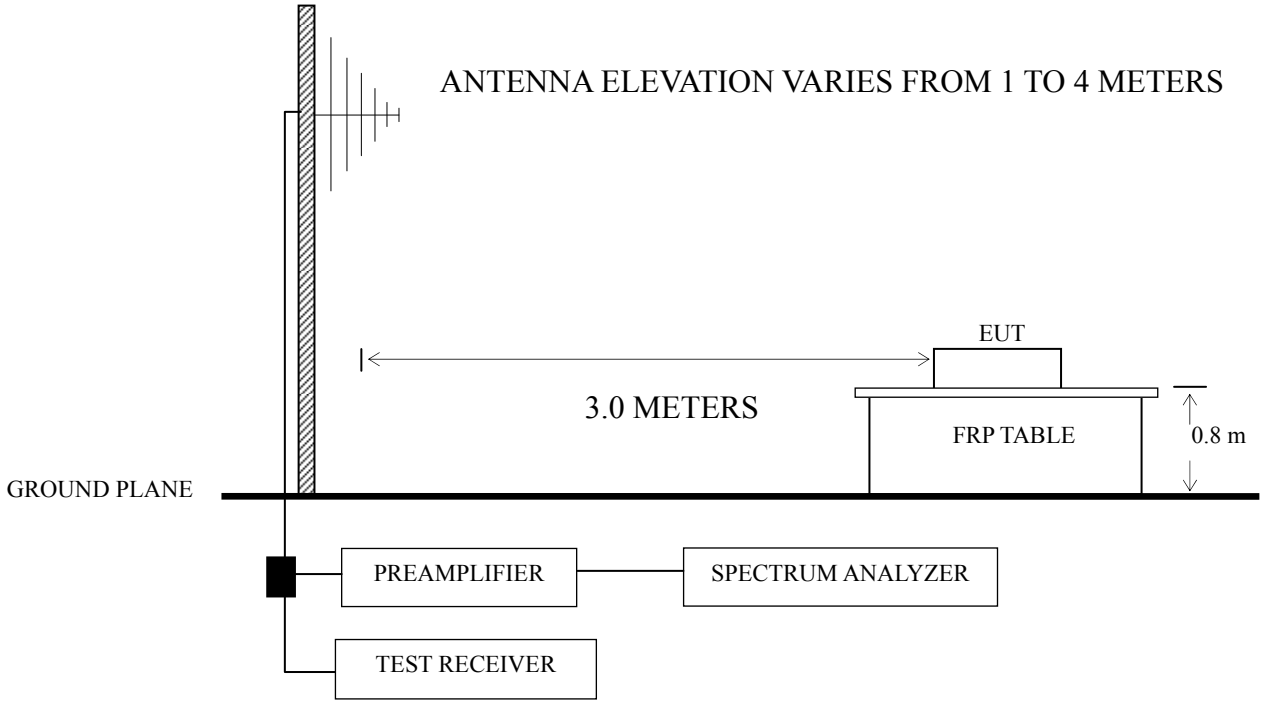
3.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Pre-Amplifier	Agilent	8447D	2944A10548	Mar 18, 2017	Sep 17, 2017
2.	Pre-Amplifier	HP	8449B	3008A00864	Mar 17, 2017	Mar 16, 2018
3.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2016	Jun 11, 2017
4.	Test Receiver	R&S	ESCI	101302	Apr 27, 2016	Apr 26, 2017
5.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 15, 2016	May 14, 2017
6.	Horn Antenna	EMCO	3115	9607-4878	Jun 03, 2016	Jun 02, 2017
7.	Horn Antenna	EMCO	3116	00062643	Sep 08, 2015	Sep 08, 2017
8.	50Ω Coaxial Switch	Anritsu	MP59B	6200426390	Mar 18, 2017	Sep 17, 2017
9.	Software	Audix	E3	SET00200 9912M295-2	--	--

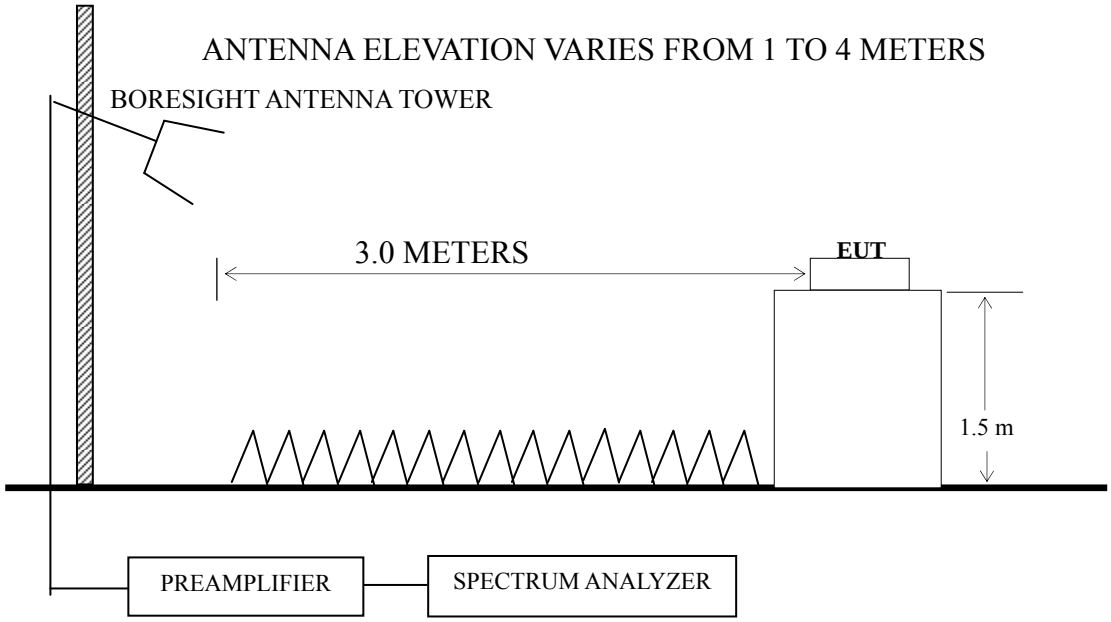
3.2 Block Diagram of Test Setup

3.2.1 Below 1GHz



■ : 50 ohm Coaxial Switch

3.2.2 Above 1GHz



3.3 Radiated Emission Limit [FCC Part 15 Subpart C 15.209]

Frequency (MHz)	Distance (m)	Field strength limits (μV/m)	
		(μV/m)	dB(μV/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

NOTE 1 - Emission Level dB (μV/m) = 20 log Emission Level (μV/m)
NOTE 2 - The tighter limit applies at the band edges.
NOTE 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.
NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.
NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

3.4 Test Configuration

The EUT (listed in Sec.2.1) and the simulators (listed in Sec.2.2) were installed as shown on Sec.3.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

3.5 Operating Condition of EUT

3.5.1 Setup the EUT as shown in Sec. 3.2.

3.5.2 Turn on the power of all equipment.

3.5.3 Turn the EUT on the test mode, and then test.

3.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable. Below 1 GHz, the table height is 80 cm above the reference ground plane. Above 1 GHz, the table height is 1.5 m. The turntable rotated 360 degrees to determine the position of the maximum emission level. The 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 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.10: 2013 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESCI was set at 120 kHz from 30MHz to 1000MHz.

The bandwidth of the VBW was set at 1MHz and RBW was set at 1MHz for peak emission measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emission above 1GHz for Spectrum Agilent N9010A.

The frequency range from 30 MHz to 25 GHz (Up to 10^{th} harmonics from fundamental frequency) was checked.

All the test results are listed in Sec.3.7.

3.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

No.	Operation	Channel	Frequency	Data Page	
1.	Transmitting	Worst case emission < 1GHz		P12	
2.		00	2402 MHz	P13-14	
3.		13	2440 MHz		
4.		27	2480 MHz		
5.	Receiving	--		P17	
6.	Transmitting	Cabinet Emission		P18	
7.		00	2402 MHz	Restricted Frequency bands	P20
8.		27	2480 MHz		P21

NOTE 1 – Level = Read Level + Antenna Factor + Cable Loss (<1GHz)
NOTE 2 – Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor (>1GHz)
NOTE 3 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.
For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

Worst case emission < 1GHz

EUT	:	Bluetooth Adaptor	Temperature :	22℃
Model No.	:	ACM360-B0	Humidity :	51%RH
Test Mode	:	Transmitting	Date of Test :	Apr. 22, 2017

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	30.317	3.1	18.14	0.56	21.8	40	18.2	QP
	115.726	10.75	12.37	1.1	24.22	43.5	19.28	
	159.784	15.09	11.32	1.32	27.73	43.5	15.77	
	253.56	16.7	12.9	1.64	31.24	46	14.76	
	300.37	17.3	13.64	1.76	32.7	46	13.3	
	459.114	11	16.9	2.17	30.07	46	15.93	
Vertical	33.328	13.12	16.57	0.59	30.28	40	9.72	QP
	98.142	12.87	12.09	0.99	25.95	43.5	17.55	
	160.1	18.1	11.3	1.33	30.73	43.5	12.77	
	226.81	21.7	11.38	1.57	34.65	46	11.35	
	300.37	20.1	13.64	1.76	35.5	46	10.5	
	758.041	4.21	19.65	2.83	26.69	46	19.31	

TEST ENGINEER: BYRON WU

Radiated Emission > 1GHz

EUT	:	Bluetooth Adaptor	Temperature :	22℃
Model No.	:	ACM360-B0	Humidity :	51%RH
Test Mode	:	Transmitting	Date of Test :	Apr. 22, 2017

Ch00 (2402MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1109.66	45.95	24.04	3.46	36.3	37.15	74	36.85	Peak
	1224.247	45.73	24.55	3.67	36.12	37.83	74	36.17	Peak
	1525	45	25.71	4.11	35.71	39.11	74	34.89	Peak
	1682.477	44.71	26.36	4.32	35.53	39.86	74	34.14	Peak
	2157.26	43.97	27.8	4.89	35.2	41.46	74	32.54	Peak
	2580.652	43.71	28.77	5.4	35.2	42.68	74	31.32	Peak
Vertical	1378.273	46.59	25.17	3.91	35.9	39.77	74	34.23	Peak
	1995.309	44.49	27.48	4.65	35.21	41.41	74	32.59	Peak
	2325.624	44.61	28.11	5.1	35.2	42.62	74	31.38	Peak
	2947.623	43.83	30.3	5.78	35.2	44.71	74	29.29	Peak
	3790.361	42.8	32.27	6.71	34.38	47.4	74	26.6	Peak
	4495.125	43.23	33.6	7.38	34.04	50.17	74	23.83	Peak

Ch13 (2440MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1068.738	46.05	23.84	3.37	36.38	36.88	74	37.12	Peak
	1271.123	46.07	24.75	3.73	36.05	38.5	74	35.5	Peak
	1485.841	44.73	25.56	4.05	35.76	38.58	74	35.42	Peak
	1560.673	46.09	25.87	4.14	35.67	40.43	74	33.57	Peak
	2318.912	46.27	28.1	5.1	35.2	44.27	74	29.73	Peak
	3270.858	42.23	31.07	6.13	34.89	44.54	74	29.46	Peak
Vertical	1162.182	45.36	24.28	3.55	36.22	36.97	74	37.03	Peak
	1271.123	45.06	24.75	3.73	36.05	37.49	74	36.51	Peak
	1560.673	45.55	25.87	4.14	35.67	39.89	74	34.11	Peak
	2176.047	44.12	27.84	4.89	35.2	41.65	74	32.35	Peak
	2790.113	44.28	29.67	5.65	35.2	44.4	74	29.6	Peak
	4193.872	42.14	33.12	7.12	34.14	48.24	74	25.76	Peak

Ch27 (2480MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1071.832	45.99	23.86	3.4	36.37	36.88	74	37.12	Peak
	1199.726	45.83	24.44	3.61	36.16	37.72	74	36.28	Peak
	1312.187	45.63	24.91	3.82	35.99	38.37	74	35.63	Peak
	2012.686	44.16	27.52	4.68	35.2	41.16	74	32.84	Peak
	2603.126	44.33	28.87	5.44	35.2	43.44	74	30.56	Peak
	3357.061	40.68	31.24	6.23	34.8	43.35	74	30.65	Peak
Vertical	1074.934	44.95	23.88	3.4	36.37	35.86	74	38.14	Peak
	1606.441	44.68	26.06	4.2	35.61	39.33	74	34.67	Peak
	2214.114	46.12	27.91	4.97	35.2	43.8	74	30.2	Peak
	2449.822	43.74	28.32	5.27	35.2	42.13	74	31.87	Peak
	3159.355	42.1	30.84	6.02	35.02	43.94	74	30.06	Peak
	4586.999	41.81	33.69	7.5	34.01	48.99	74	25.01	Peak

TEST ENGINEER: BYRON WU

EUT	:	Bluetooth Adaptor	Temperature :	22℃
Model No.	:	ACM360-B0	Humidity :	51%RH
Test Mode	:	Receiving	Date of Test :	Apr. 22, 2017

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	30.745	3.21	17.88	0.57	--	21.66	40	18.34	QP
	104.17	4.38	12.32	1.03	--	17.73	43.5	25.77	
	204.955	13.72	10.3	1.5	--	25.52	43.5	17.98	
	372.005	8.83	15.63	1.97	--	26.43	46	19.57	
	603.539	4.12	18.5	2.52	--	25.14	46	20.86	
	948.761	4.69	21.67	3.16	--	29.52	46	16.48	
	1047.332	45.74	23.74	3.34	36.41	36.41	74	37.59	PK
	1106.457	45.59	24.02	3.46	36.31	36.76	74	37.24	
	1331.288	44.84	24.99	3.85	35.97	37.71	74	36.29	
	1439.343	45.15	25.39	3.99	35.82	38.71	74	35.29	
	1634.543	45.04	26.17	4.26	35.58	39.89	74	34.11	
	1845.516	44.6	26.97	4.5	35.35	40.72	74	33.28	
Vertical	30.638	6.26	17.97	0.57	--	24.8	40	15.2	QP
	97.798	11.23	12.03	0.99	--	24.25	43.5	19.25	
	146.888	5.06	12.41	1.27	--	18.74	43.5	24.76	
	210.786	11	10.65	1.51	--	23.16	43.5	20.34	
	260.144	9.69	13.4	1.66	--	24.75	46	21.25	
	562.662	3.28	18.12	2.42	--	23.82	46	22.18	
	1050.364	45.2	23.75	3.34	36.41	35.88	74	38.12	PK
	1312.187	44.98	24.91	3.82	35.99	37.72	74	36.28	
	1511.833	44.88	25.66	4.08	35.73	38.89	74	35.11	
	1829.582	44.79	26.91	4.47	35.37	40.8	74	33.2	
	2359.478	44.5	28.17	5.14	35.2	42.61	74	31.39	
	2442.751	43.79	28.31	5.23	35.2	42.13	74	31.87	

TEST ENGINEER: BYRON WU

Emissions in restricted frequency bands
Using Antenna-port conducted measurements:

According to the ANSI C63.10-2013 Sec. 11.12.2, antenna-port conducted measurements is also be permitted as an alternative to radiated measurements in the restricted frequency bands.

The transmitter output was connected to the Test Receiver. The EUT was set to transmit continuously (≥ 98% duty cycle).

The test procedure is defined in ANSI C63.10-2013
(11.12.2.4 Peak power measurement procedure & the 11.12.2.5 Average power measurement procedures (11.12.2.5.1 Trace averaging with continuous EUT transmission at full power)):

Note1 – The additional radiated test was performed to prove that the cabinet emissions (transmit antenna be replaced with a termination matching the impedance of the antenna) also comply with the applicable limits.

Cabinet Emission (Radiated with antenna terminated):

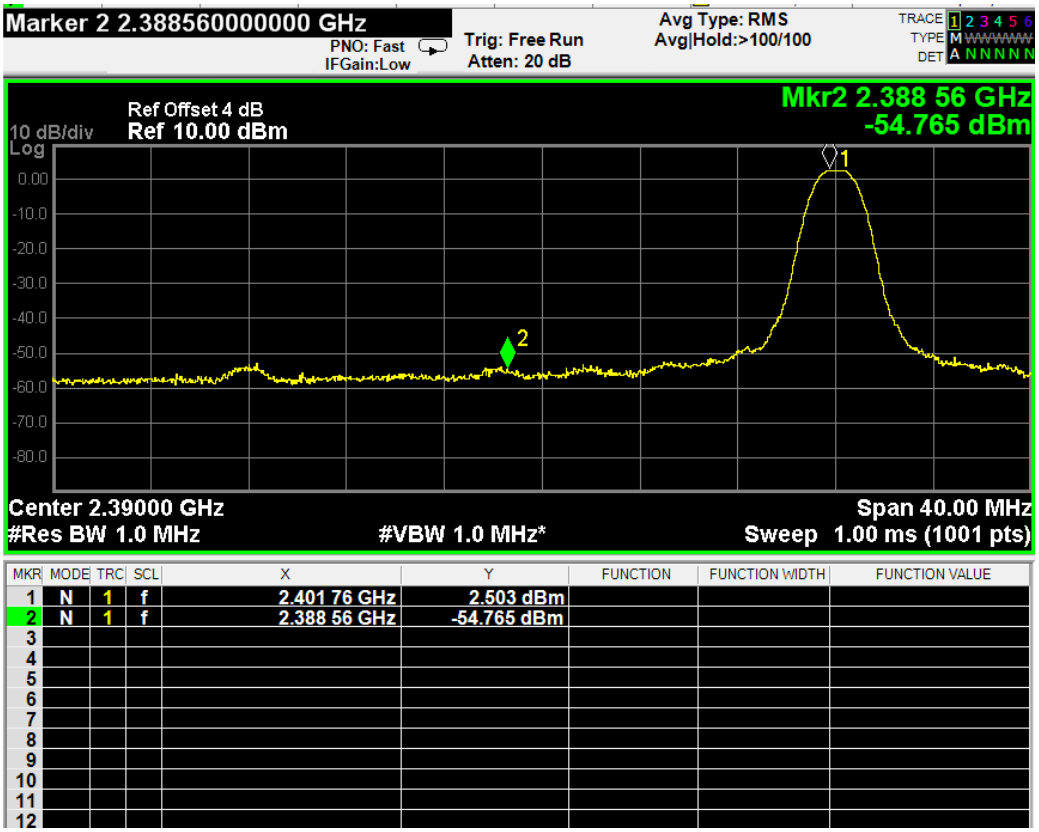
Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2379.828	44.18	28.2	5.19	35.2	42.37	74	31.63	Peak
	2389.136	45.77	28.21	5.19	35.2	43.97	74	30.03	Peak
	2483.71	51.06	28.38	5.27	35.2	49.51	74	24.49	Peak
	2488.93	49.96	28.38	5.31	35.2	48.45	74	25.55	Peak
Vertical	2377.748	45.34	28.2	5.14	35.2	43.48	74	30.52	Peak
	2387.94	44.98	28.21	5.19	35.2	43.18	74	30.82	Peak
	2483.74	51.06	28.38	5.27	35.2	49.51	74	24.49	Peak
	2488.24	50.29	28.38	5.31	35.2	48.78	74	25.22	Peak

The frequency range 2310-2390MHz & 2483.5-2500MHz were tested, and the maximum emission frequency was recorded above.

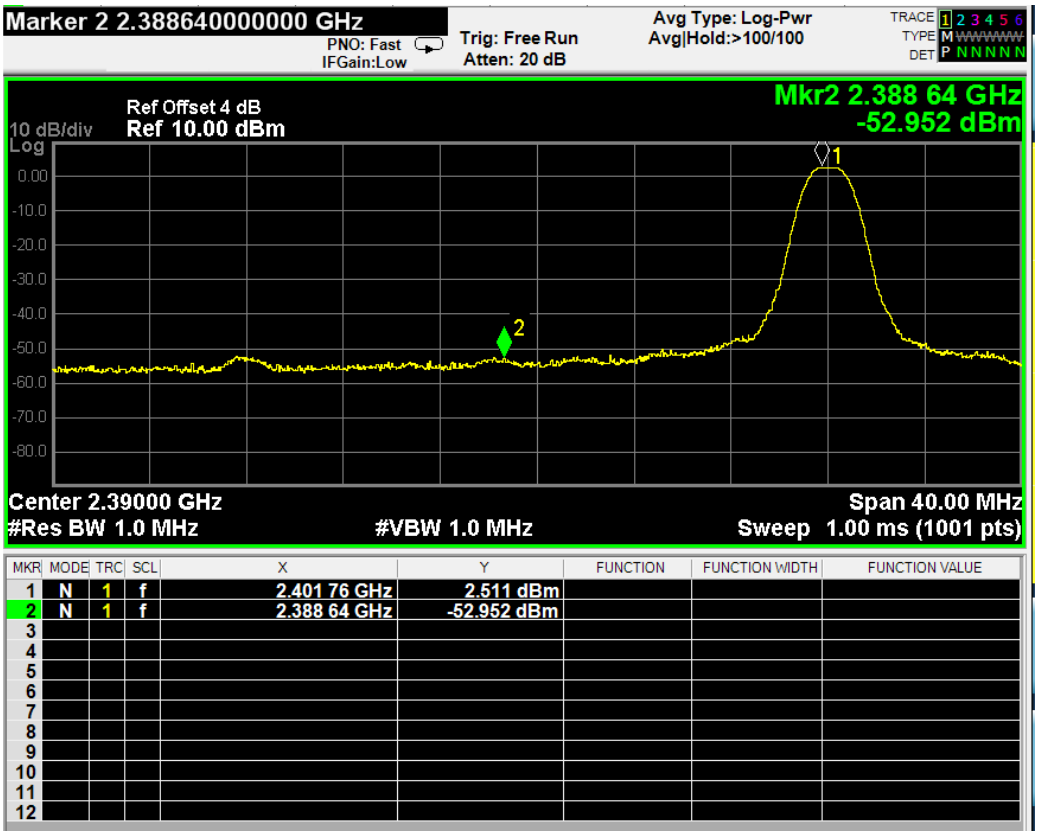
Note2 – The antenna gain (0dBi, as 2dBi) and cable loss (2dB) were set as offset (4dB) in the spectrum.
(According to ANSI C63.10-2013 Sec. 11.12.2.6, when determining the EIRP from the measured conducted power, the upper bound on antenna gain for a device with a signal RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater.)

Note3 – EIRP = E + 20logD – 104.8
Where: EIRP = equivalent isotropic radiated power in dBm,
E = electric field strength in dBμV/m,
D = specified measurement distance in meters.
The Average Power limit = -41.2 dBm
The Peak Power limit = -21.2 dBm

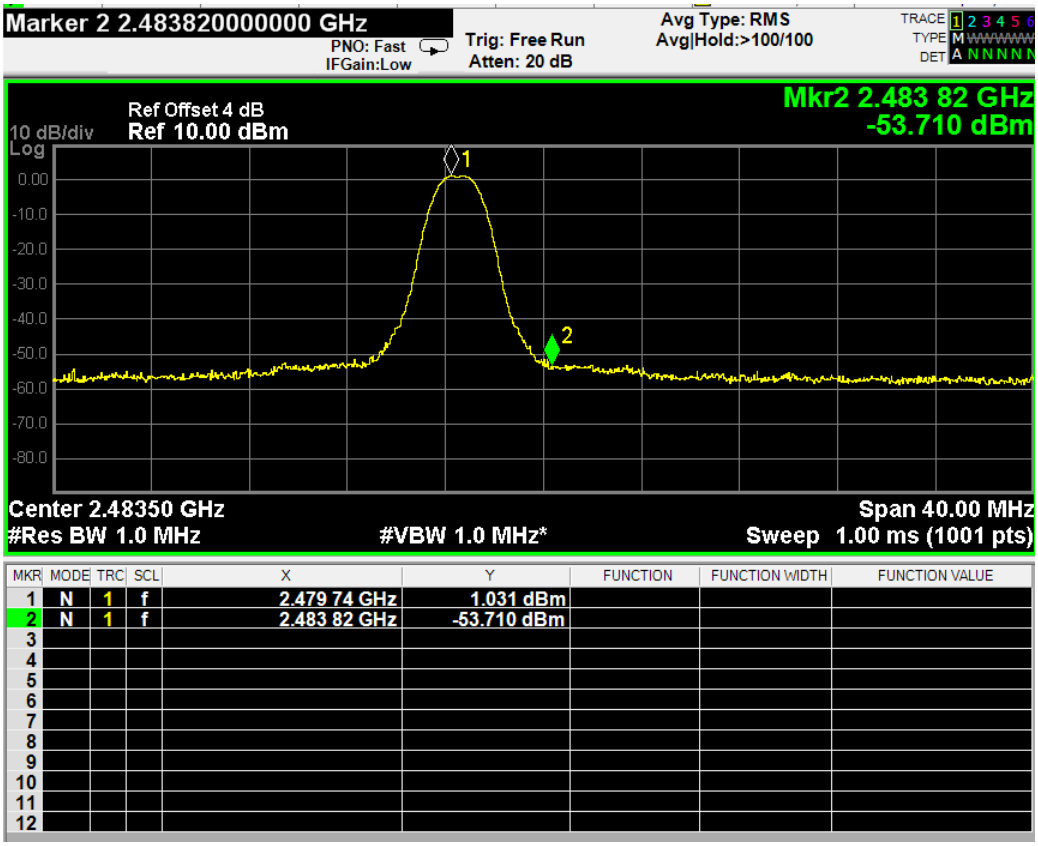
AV Result on Ch 00



PK Result on Ch 00

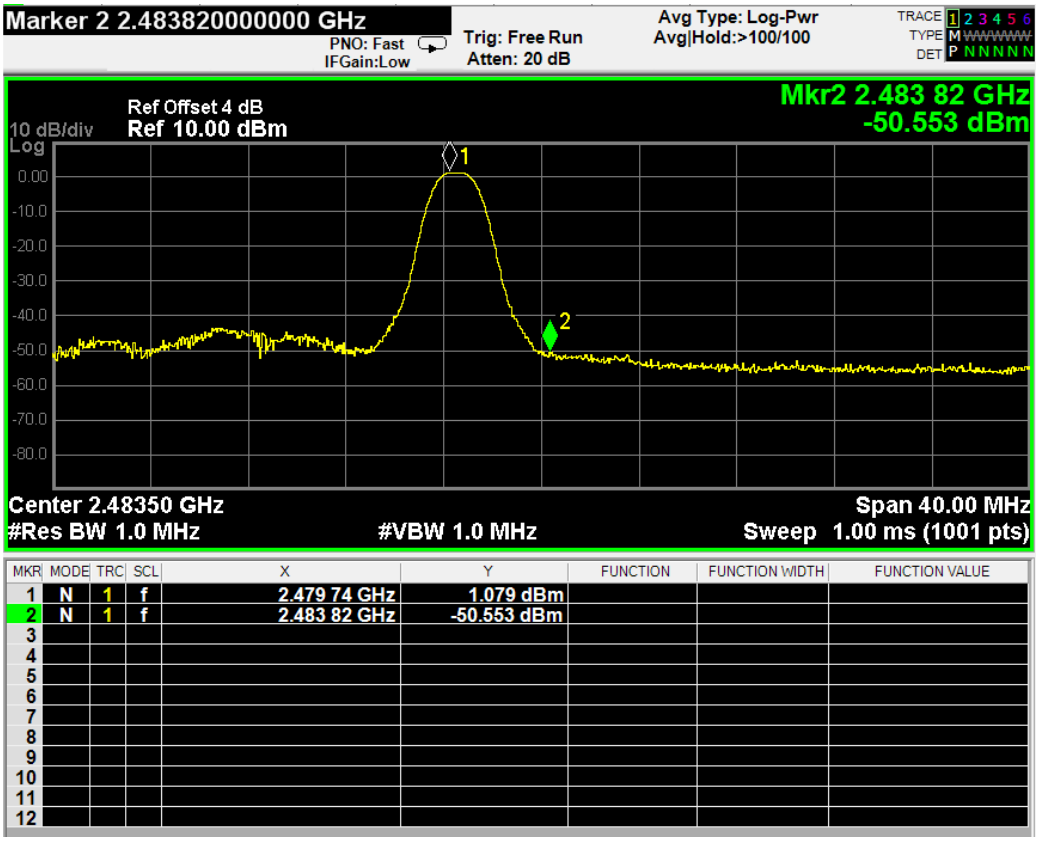


AV Result on Ch 27



MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.479 74 GHz	1.031 dBm			
2	N	1	f	2.483 82 GHz	-53.710 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

PK Result on Ch 27



MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.479 74 GHz	1.079 dBm			
2	N	1	f	2.483 82 GHz	-50.553 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

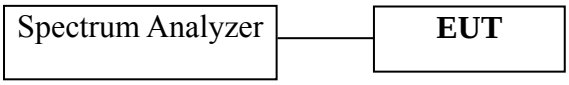
4 6 dB BANDWIDTH MEASUREMENT

4.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2016	Jun 11, 2017

4.2 Block Diagram of Test Setup



4.3 Specification Limits (§15.247(a)(2))

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

4.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

4.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100 kHz RBW / 300 kHz VBW.

The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

The test procedure is defined in ANSI C63.10-2013 (the 11.8.2 Measurement Procedure "Option 2" was used).

4.6 Test Results

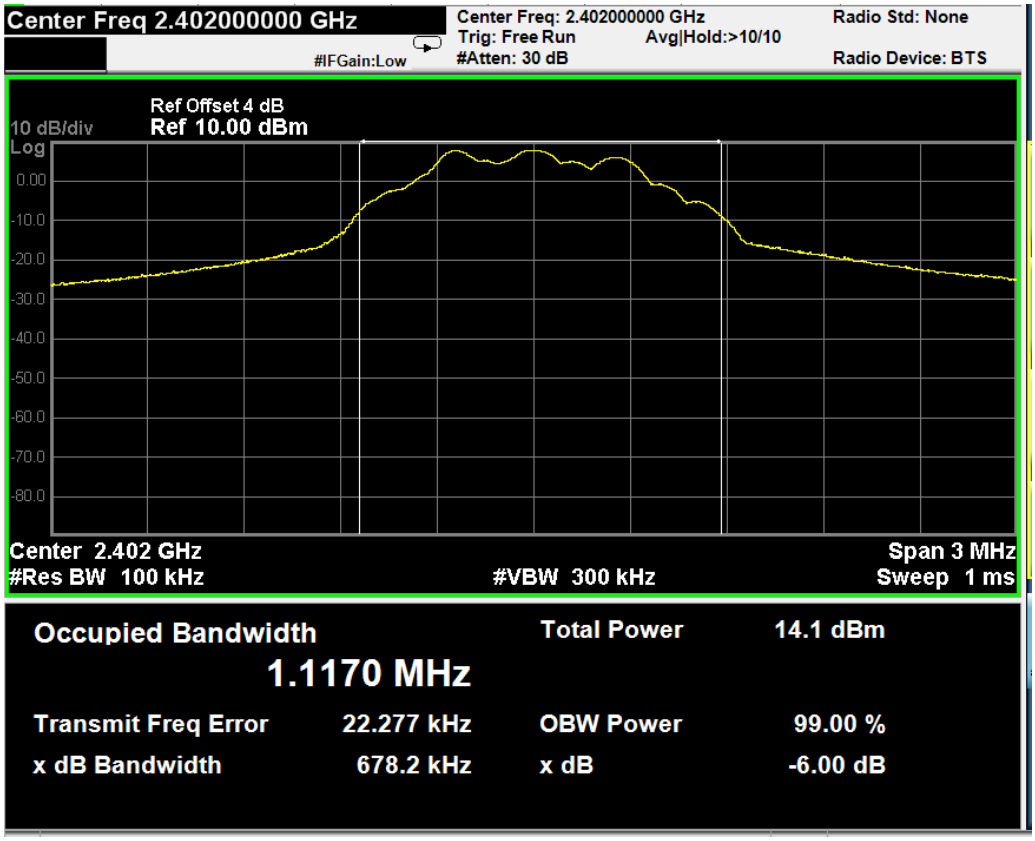
PASSED.

All the test results are attached in next pages.

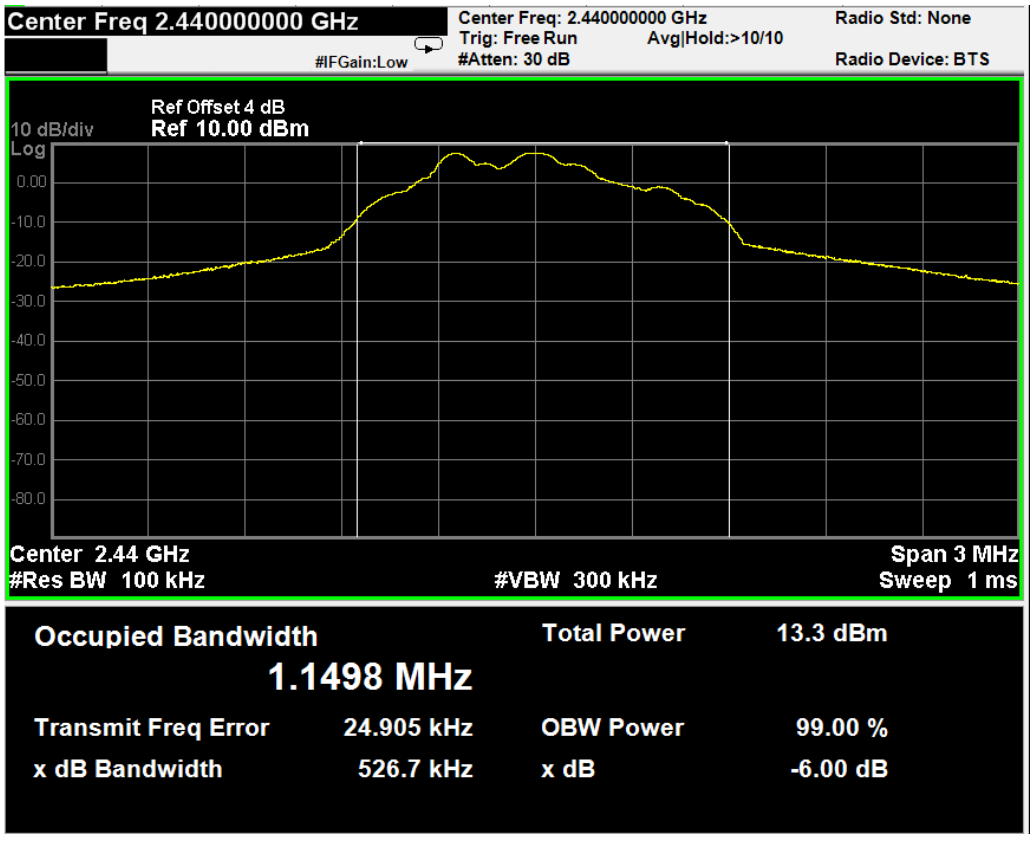
(Test Date: Apr. 21, 2017 Temperature: 23℃ Humidity: 51 %)

Channel	Frequency	**6dB Bandwidth**
00	2402 MHz	**1.1170 MHz**
13	2440 MHz	**1.1498 MHz**
27	2480 MHz	**1.1509 MHz**

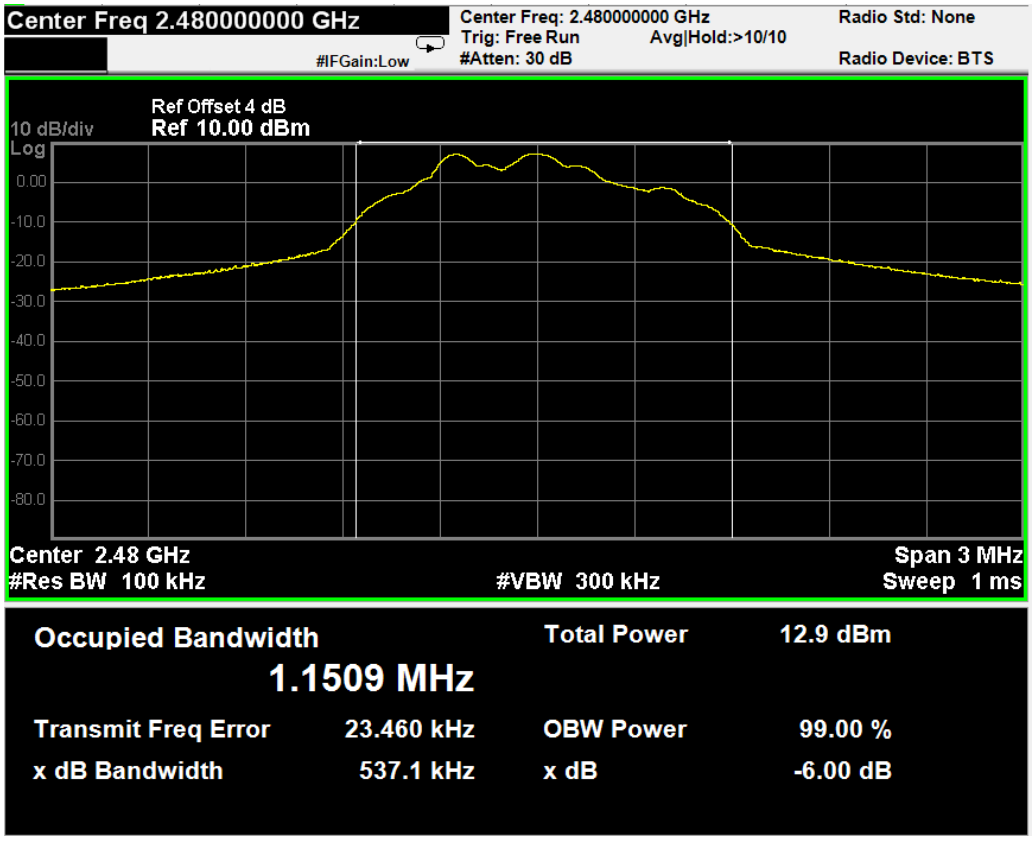
Ch 00 (2402 MHz)



Ch 13 (2440 MHz)



Ch 27 (2480 MHz)



5 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

5.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2016	Jun 11, 2017

5.2 Block Diagram of Test Setup

The same as Section. 4.2.

5.3 Specification Limits ((§15.247(b)(3))

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

5.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

5.5 Test Procedure

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ [3 × RBW].
c) Set span ≥ [3 × RBW].
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

The test procedure is defined in ANSI C63.10-2013 (11.9.1.1 Measurement Procedure "RBW ≥ DTS bandwidth" was used).

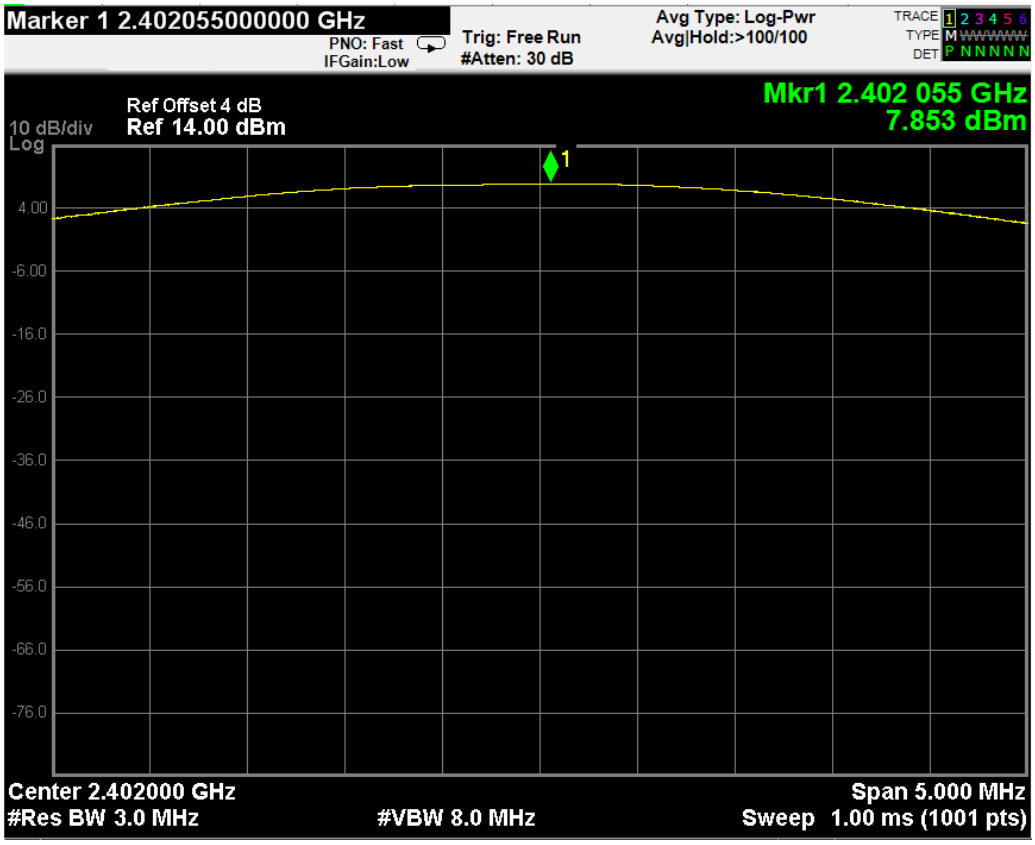
5.6 Test Results

PASSED. All the test results are listed below.

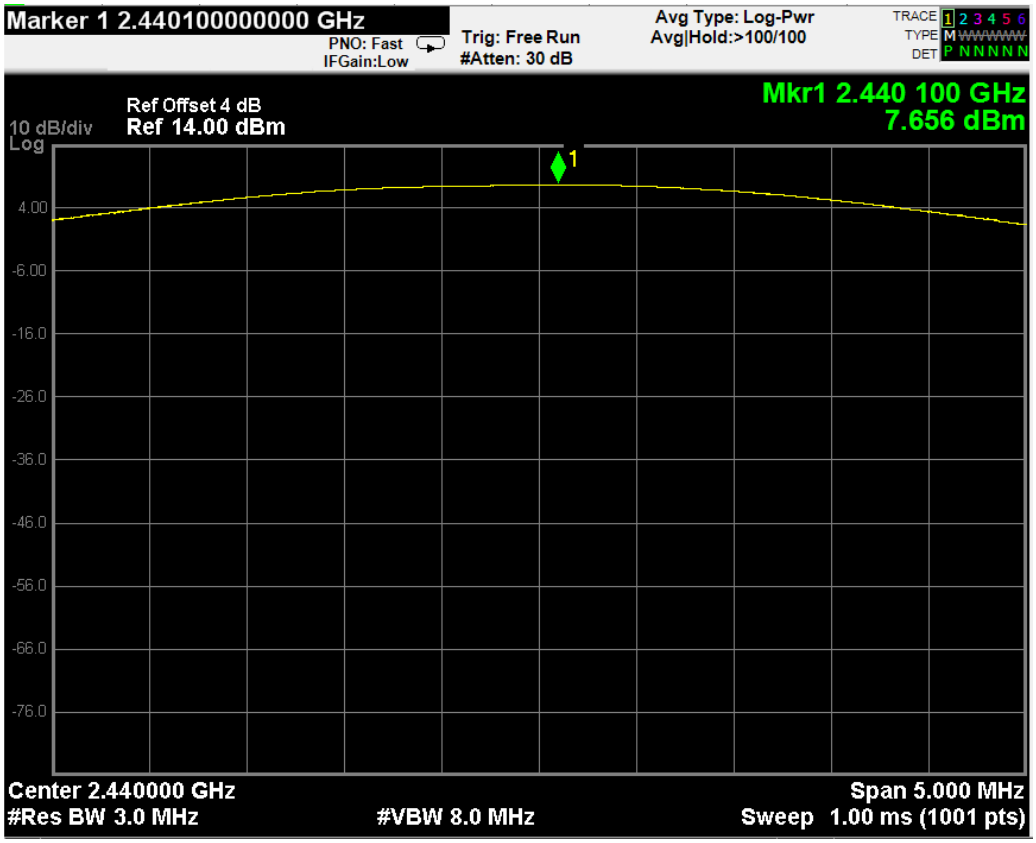
(Test Date: Apr. 21, 2017 Temperature: 23℃ Humidity: 51 %)

Channel	Frequency	**Peak Output Power**	Limit
00	2402 MHz	**7.853 dBm**	30 dBm
13	2440 MHz	**7.656 dBm**	30 dBm
27	2480 MHz	**7.268 dBm**	30 dBm

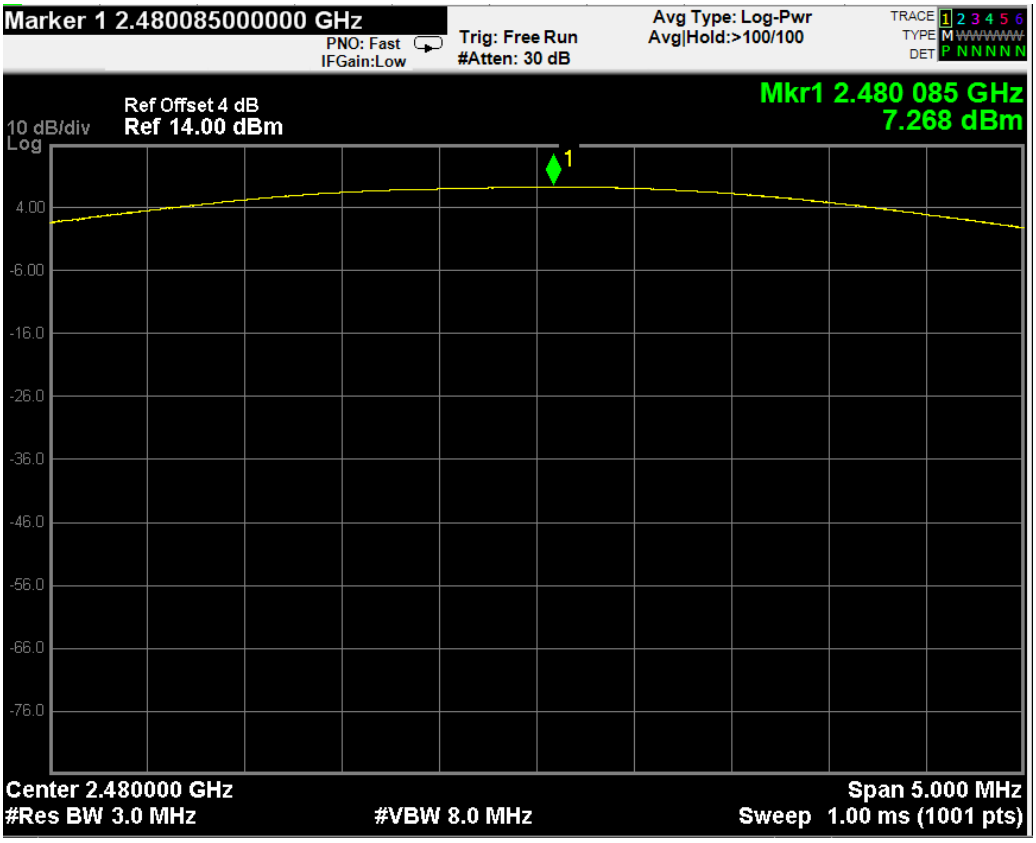
Ch 00 (2402 MHz)



Ch 13 (2440 MHz)



Ch 27 (2480 MHz)



6 EMISSION LIMITATIONS MEASUREMENT

6.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2016	Jun 11, 2017

6.2 Block Diagram of Test Setup

The same as Section. 4.2.

6.3 Specification Limits (§15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. 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 Section. 4.7)

6.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

6.5 Test Procedure

The transmitter output was connected to the Test Receiver. Set RBW = 100 kHz, VBW ≥ 300 kHz, scan up through 10^{th} harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
The test procedure is defined in ANSI C63.10-2013 (11.11.2 Reference level measurement and 11.11.3 Emission level measurement was used).

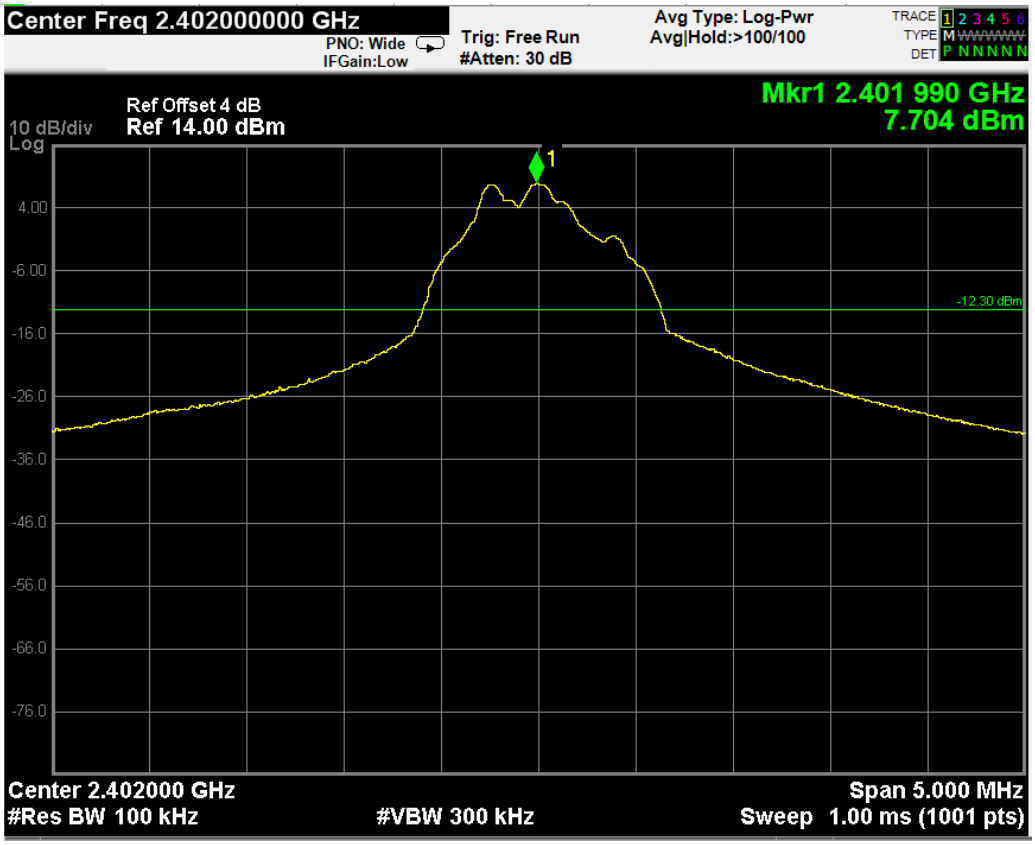
6.6 Test Results

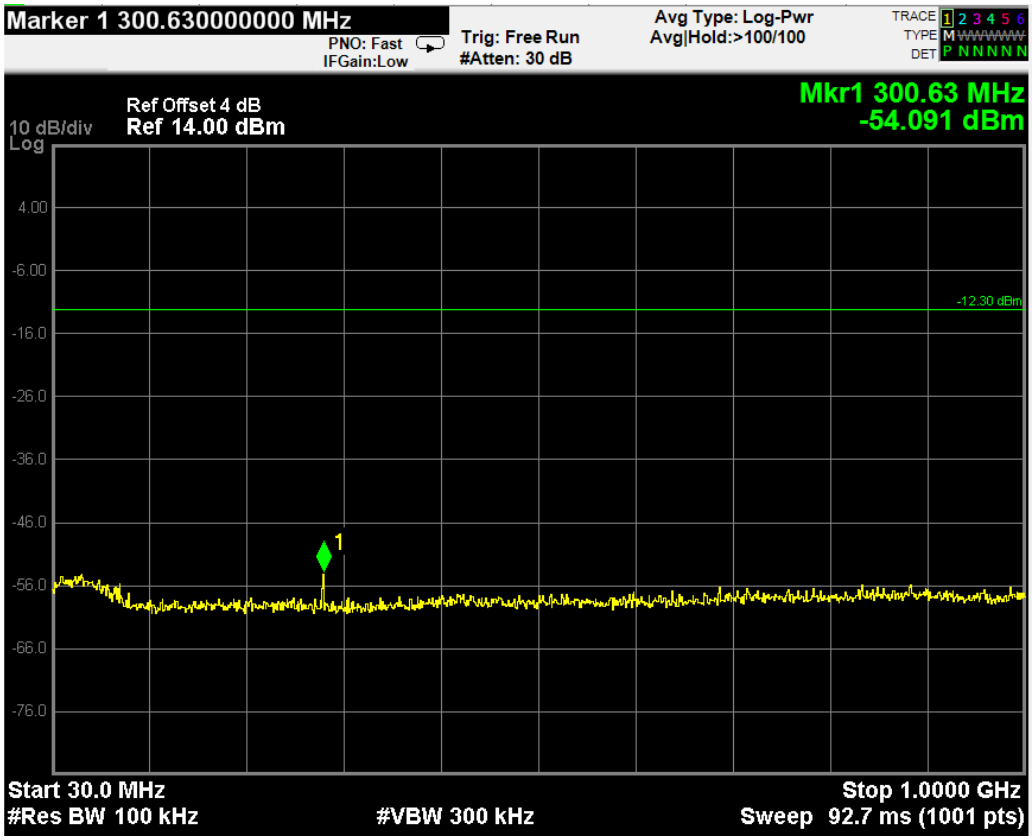
PASSED.
The test data was attached in the next pages.
(Test Date: Apr. 21, 2017 Temperature: 23℃ Humidity: 51 %)

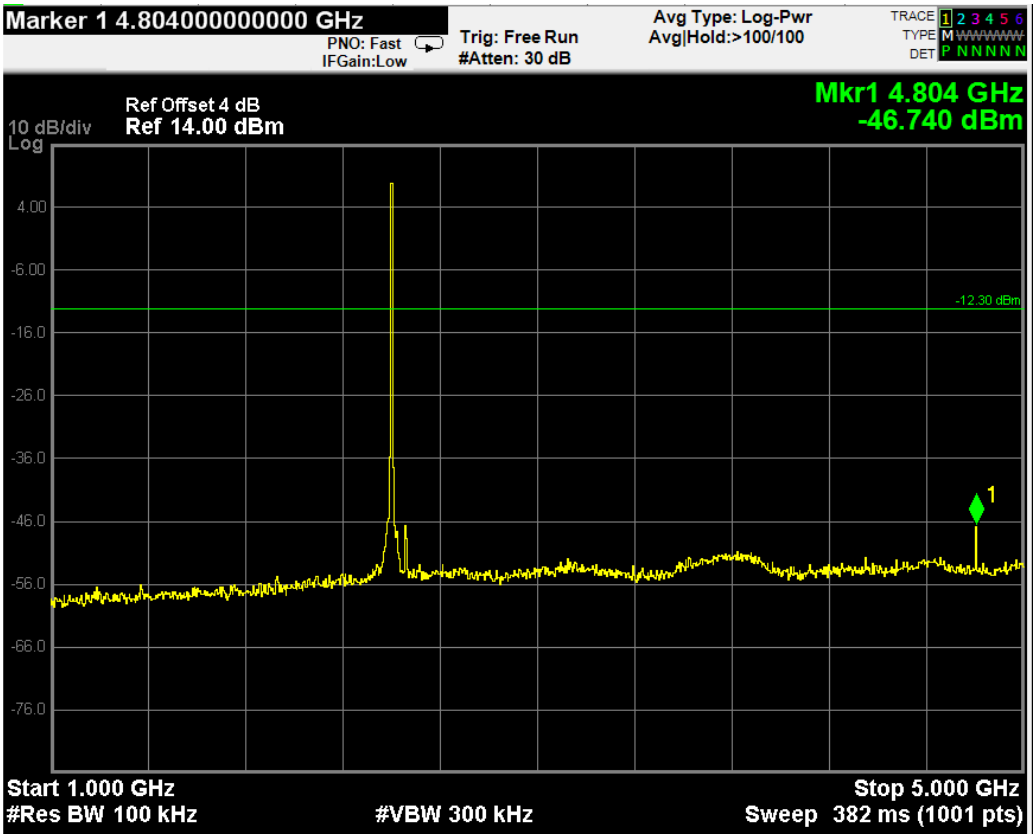
Channel	Data Page
00	P27-29
13	P30-32
27	P33-35

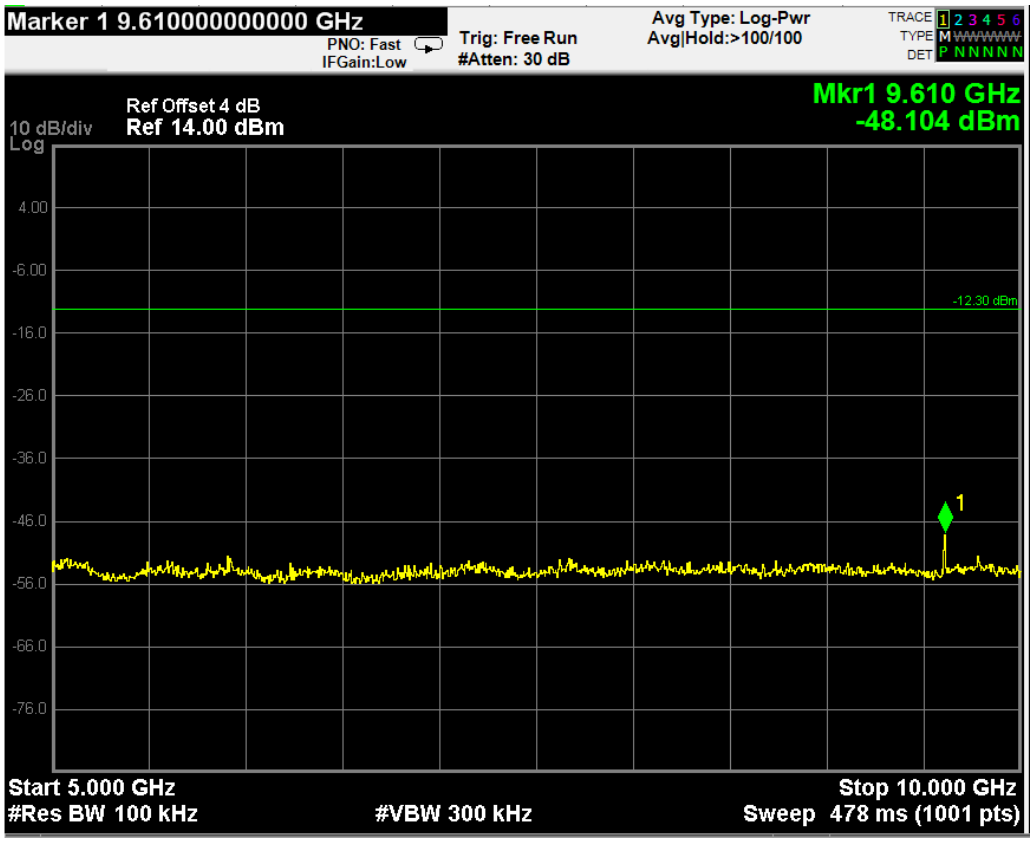
Ch 00 (2402 MHz)

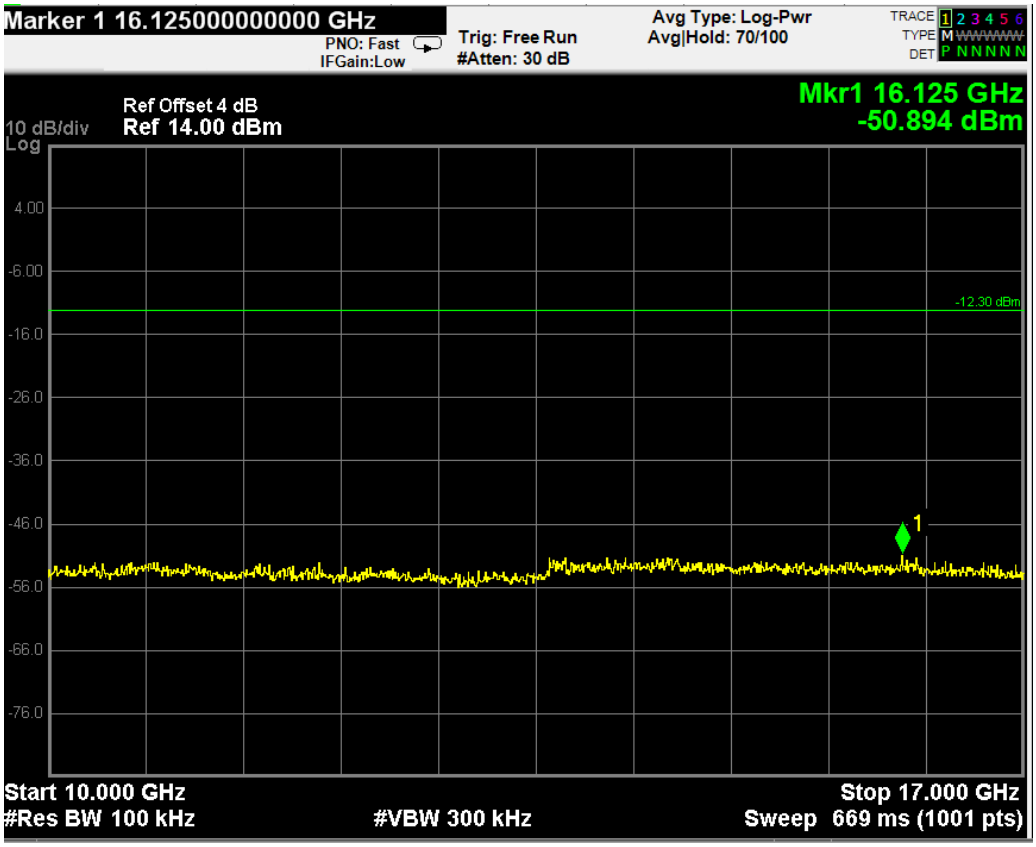
Reference level

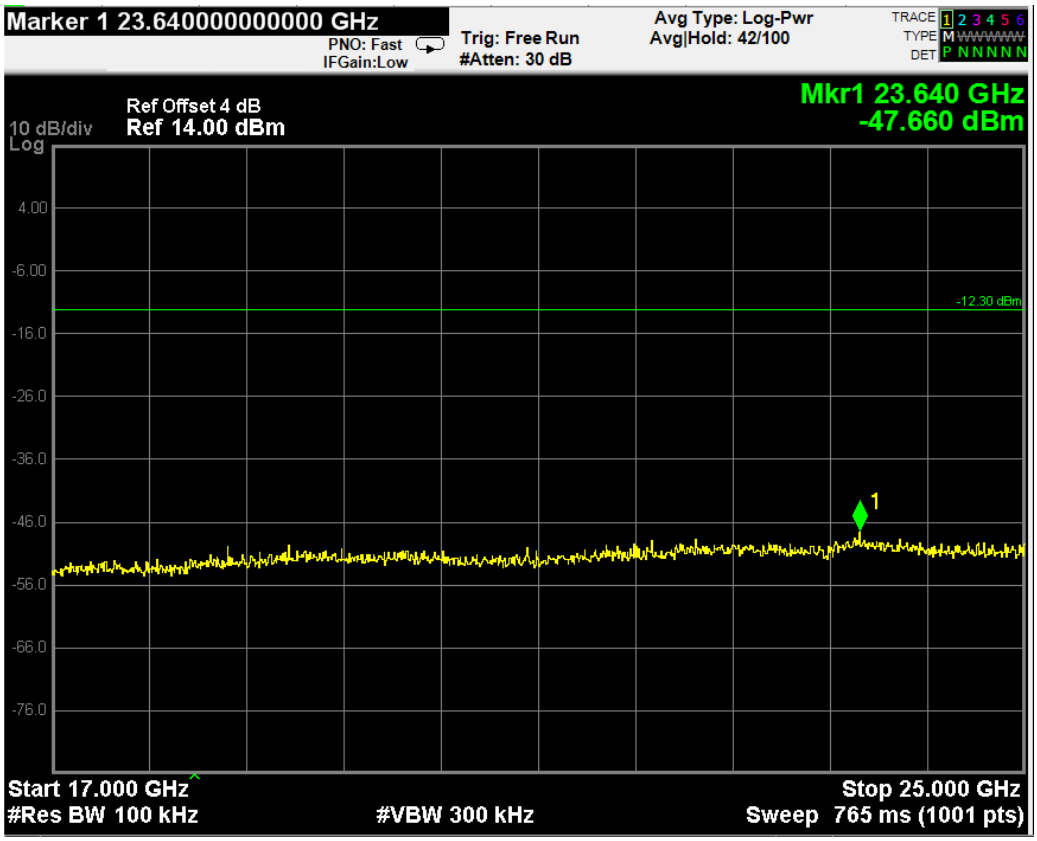





Marker 1 4.804000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Log
Ref 14.00 dBm
Mkr1 4.804 GHz
-46.740 dBm
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-12.30 dBm
1
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 5.000 GHz
Sweep 382 ms (1001 pts)

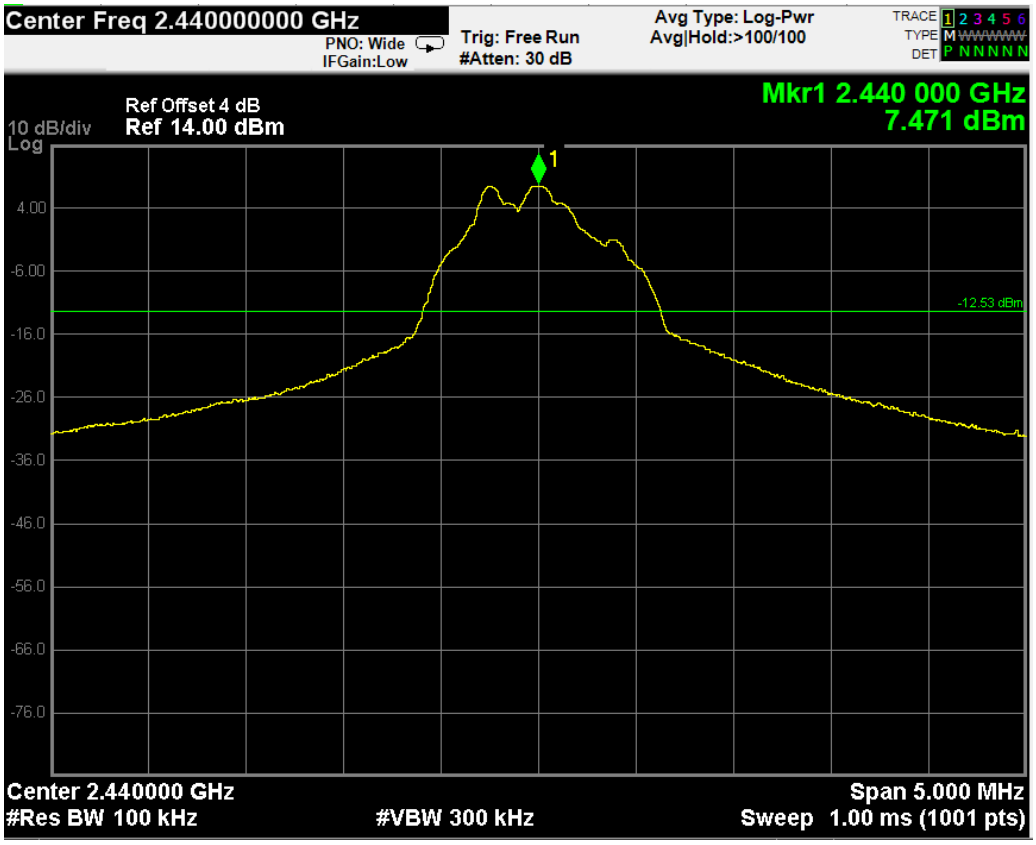

Marker 1 9.610000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Log
Ref 14.00 dBm
Mkr1 9.610 GHz
-48.104 dBm
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-12.30 dBm
1
Start 5.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 478 ms (1001 pts)

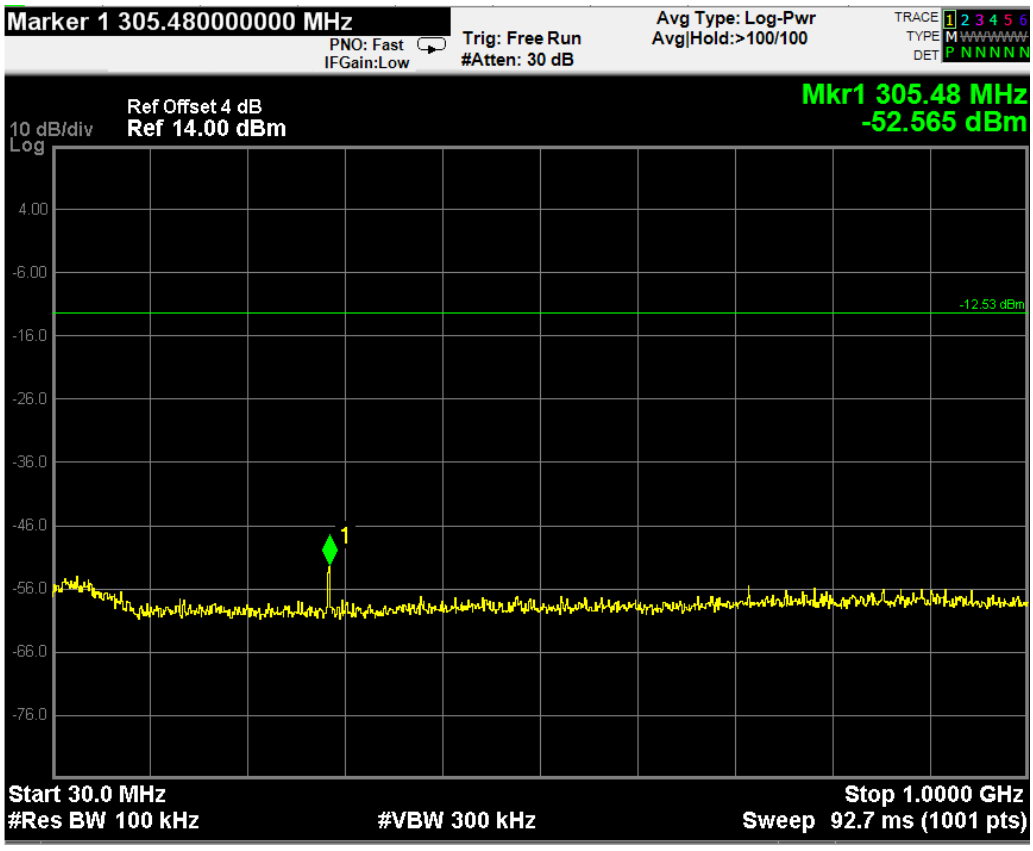

Marker 1 16.125000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 70/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Ref 14.00 dBm
Mkr1 16.125 GHz
-50.894 dBm
Log
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-12.30 dBm
1
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 17.000 GHz
Sweep 669 ms (1001 pts)

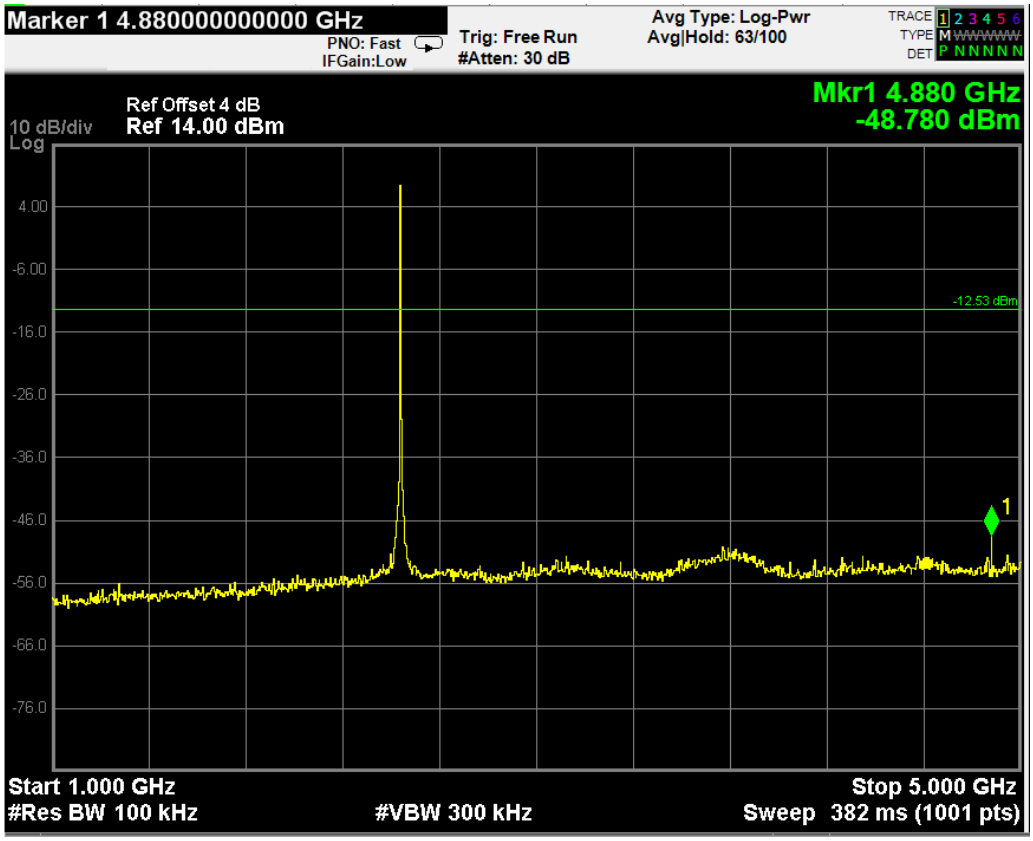

Marker 1 23.640000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 42/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Ref 14.00 dBm
Mkr1 23.640 GHz
-47.660 dBm
Log
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-12.30 dBm
1
Start 17.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 765 ms (1001 pts)

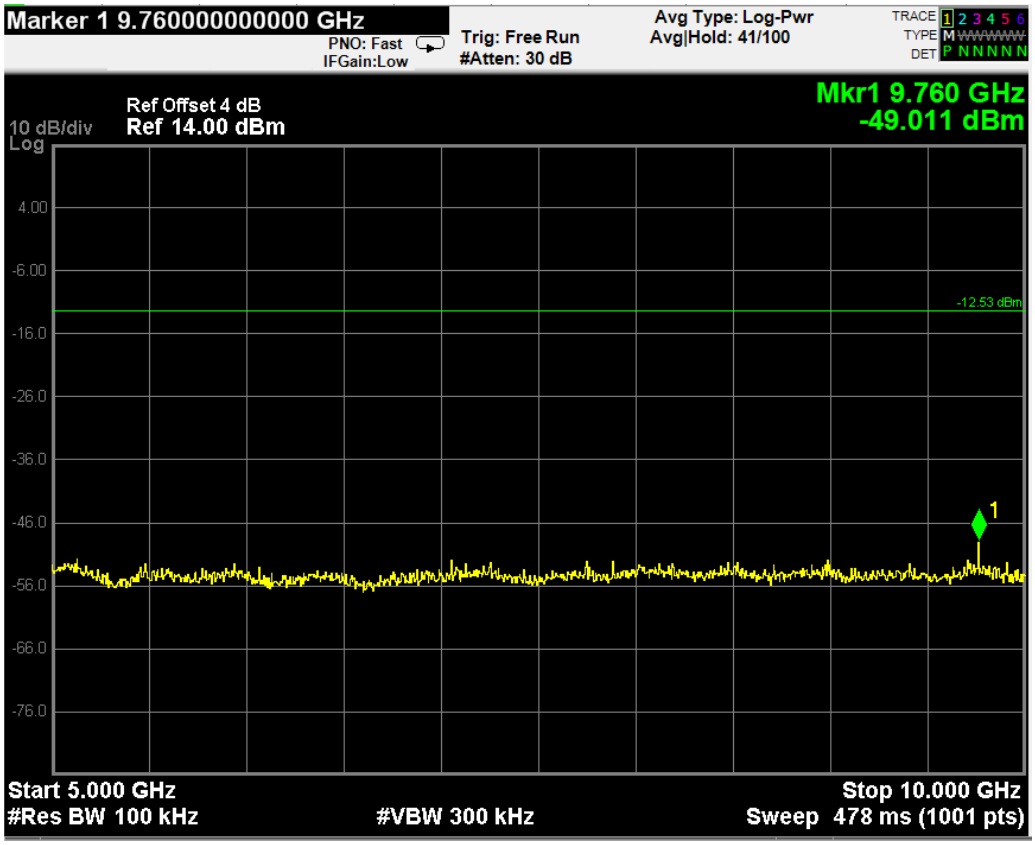
Ch 13 (2440 MHz)

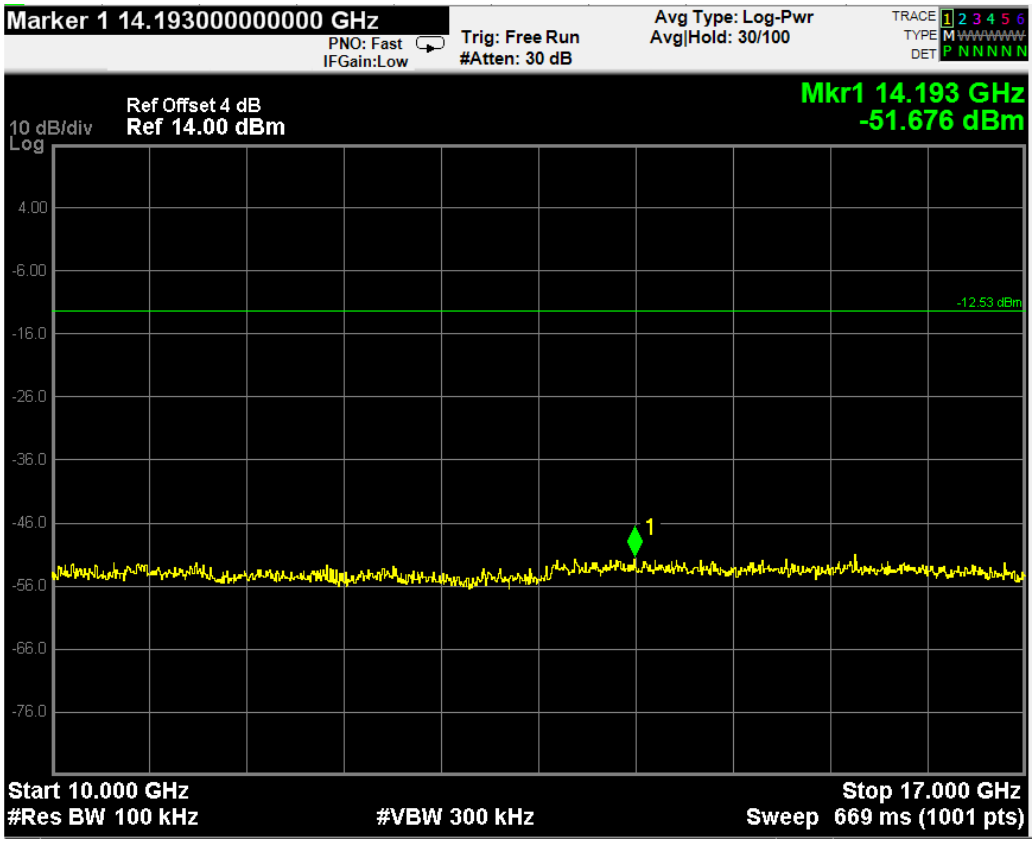
Reference level

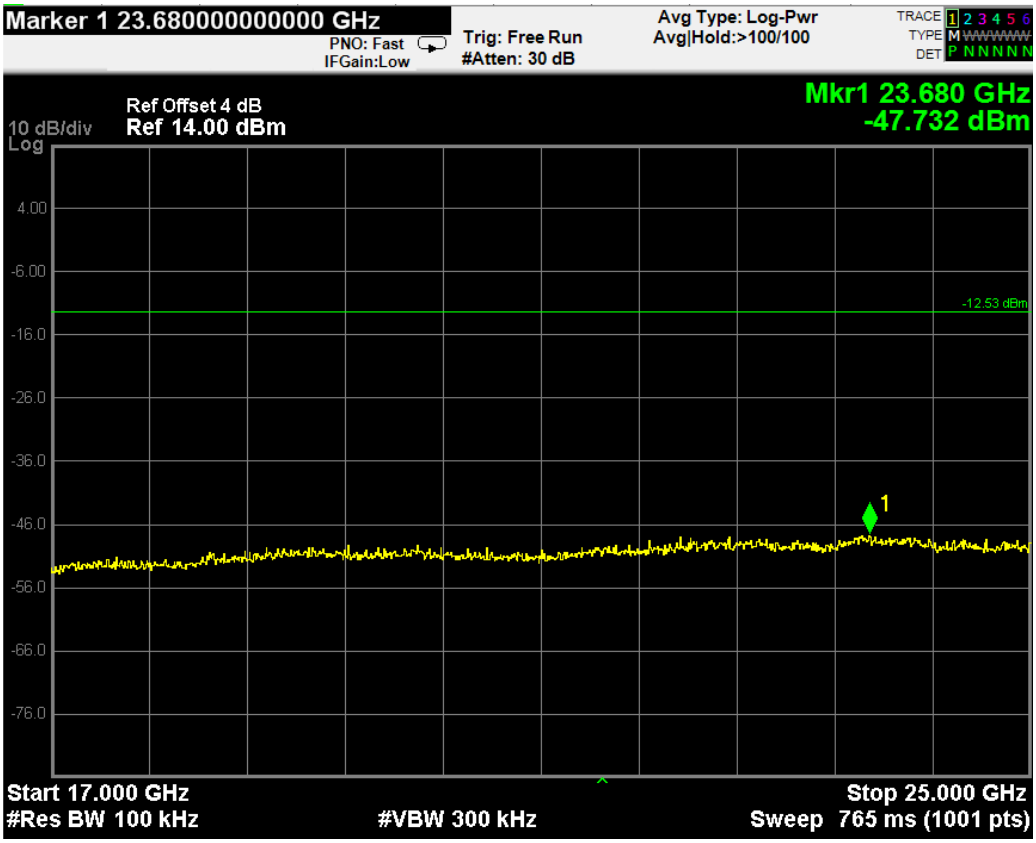





Marker 1 4.880000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 63/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Log
Ref 14.00 dBm
Mkr1 4.880 GHz
-48.780 dBm
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-12.53 dBm
1
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 5.000 GHz
Sweep 382 ms (1001 pts)

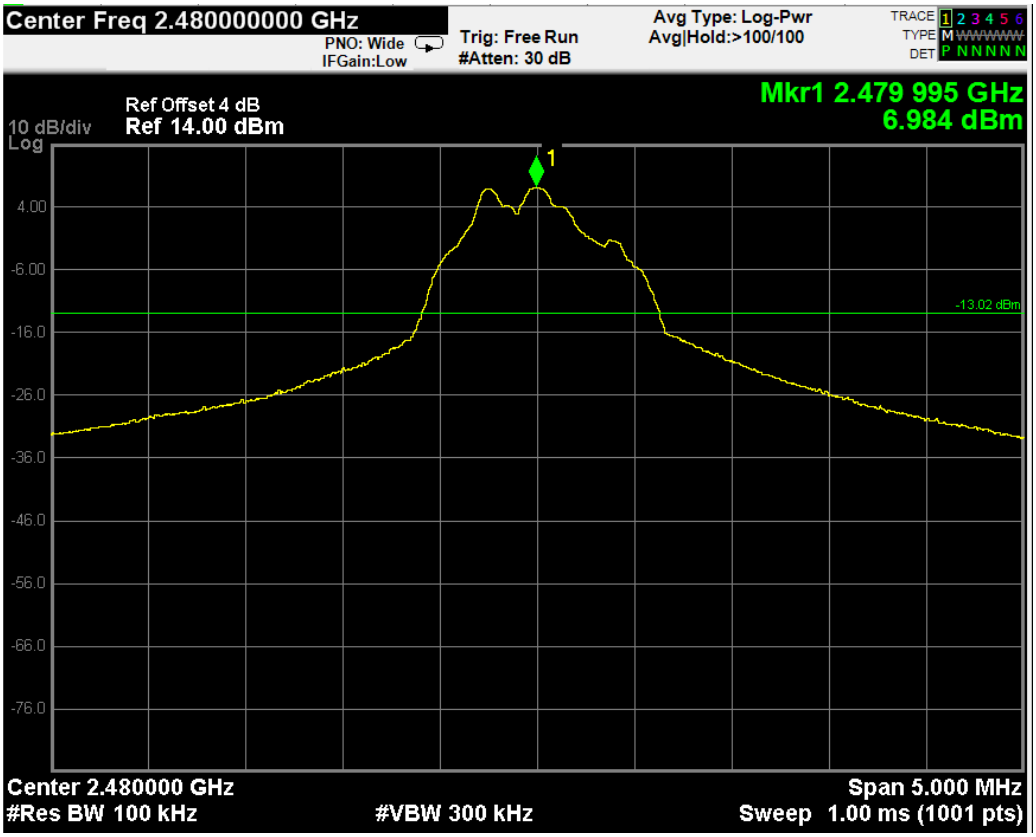

Marker 1 9.760000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 41/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Log
Ref 14.00 dBm
Mkr1 9.760 GHz
-49.011 dBm
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-12.53 dBm
1
Start 5.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 478 ms (1001 pts)

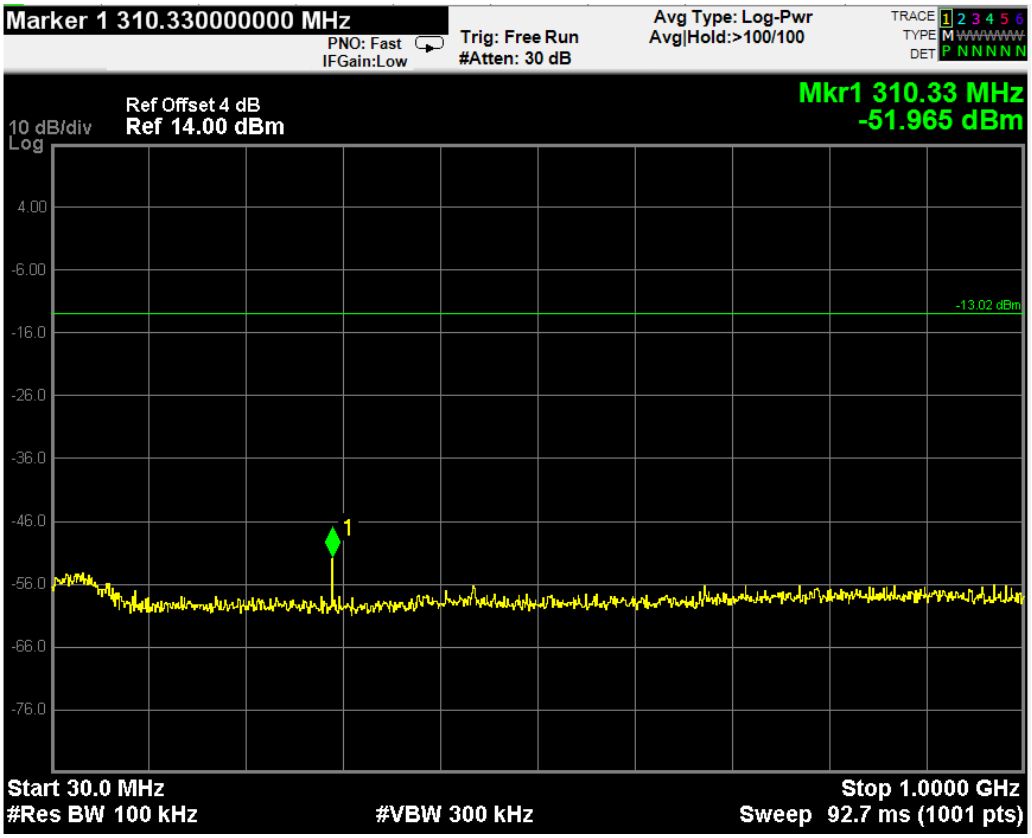

Marker 1 14.193000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 30/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Log
Ref 14.00 dBm
Mkr1 14.193 GHz
-51.676 dBm
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-12.53 dBm
1
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 17.000 GHz
Sweep 669 ms (1001 pts)

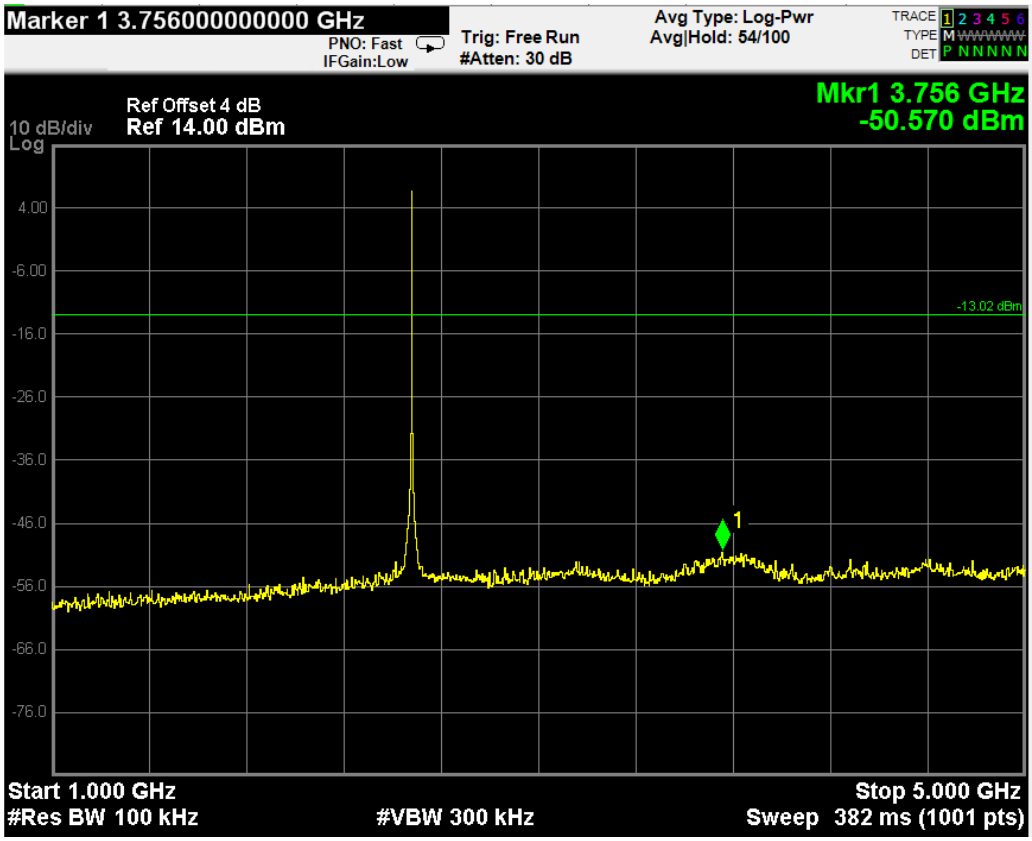

Marker 1 23.680000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Log
Ref 14.00 dBm
Mkr1 23.680 GHz
-47.732 dBm
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-12.53 dBm
1
Start 17.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 765 ms (1001 pts)

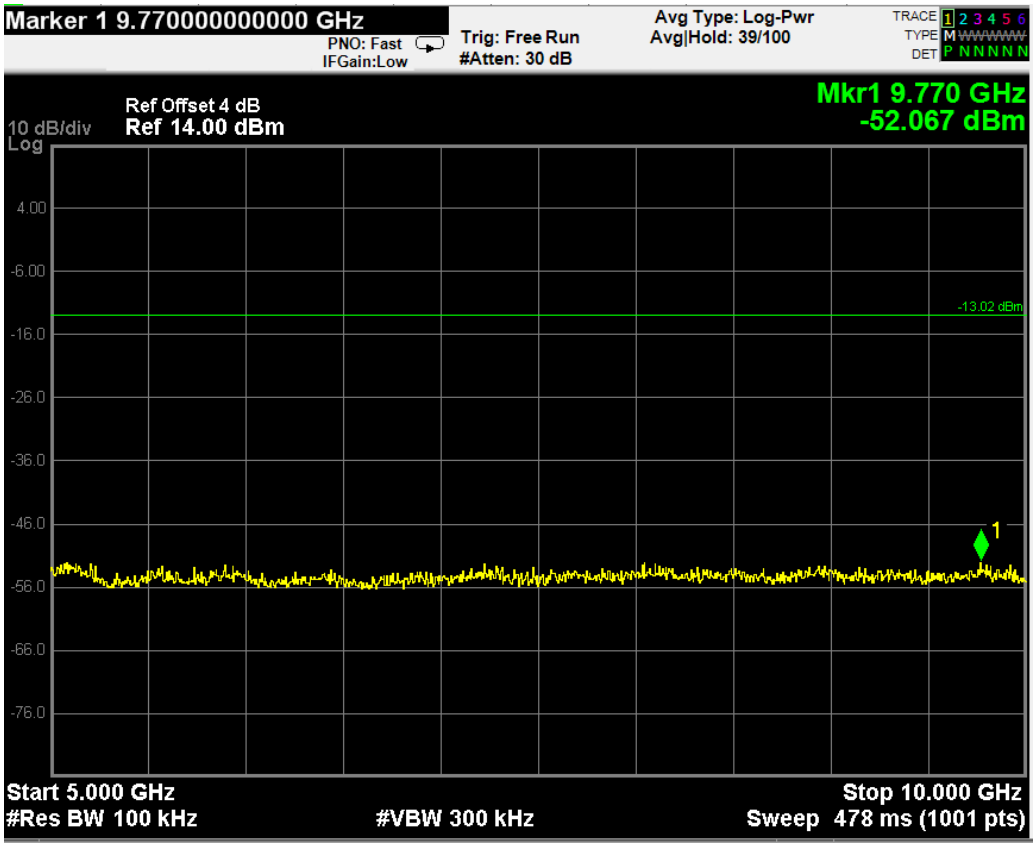
Ch 27 (2480 MHz)

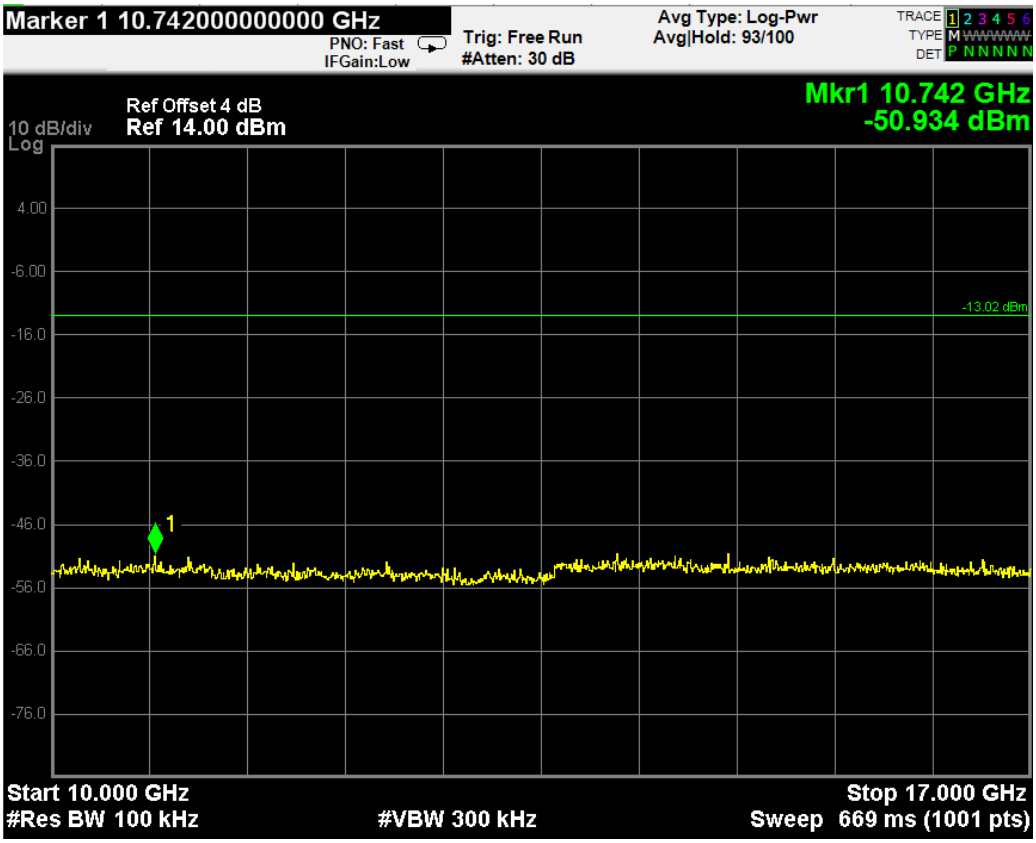
Reference level

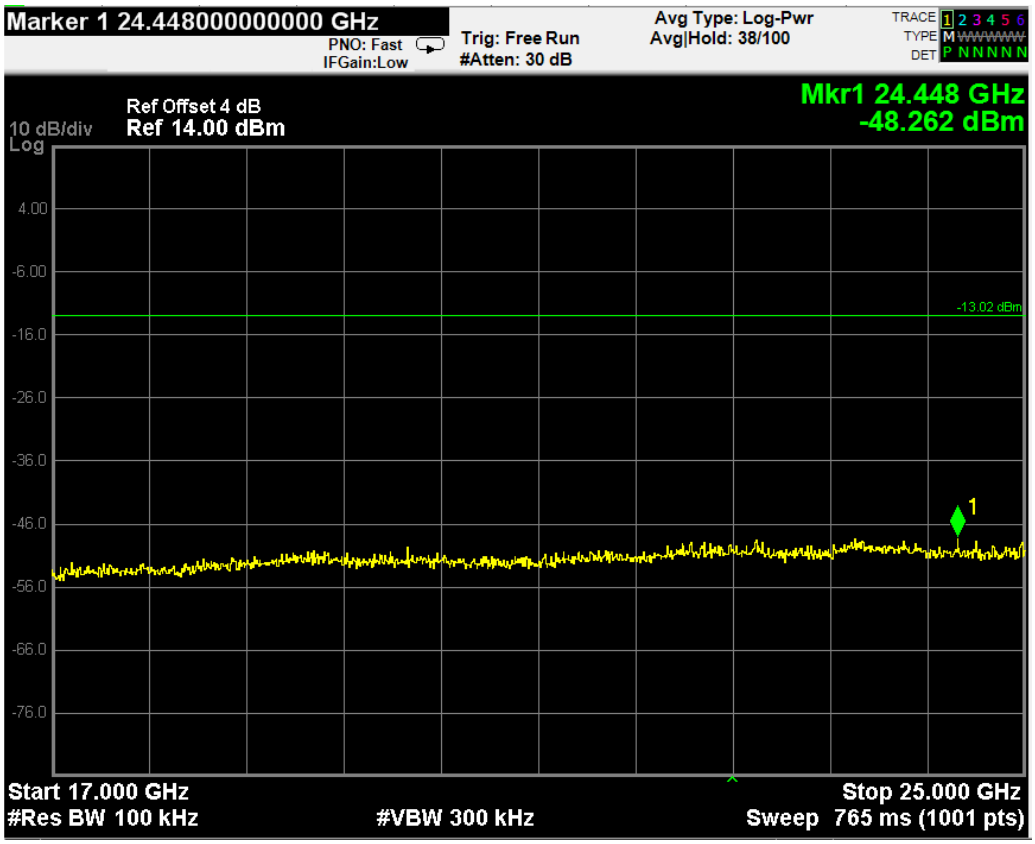





Marker 1 3.756000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 54/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Ref 14.00 dBm
Log
Mkr1 3.756 GHz
-50.570 dBm
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-13.02 dBm
1
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 5.000 GHz
Sweep 382 ms (1001 pts)


Marker 1 9.770000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 39/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Ref 14.00 dBm
Log
Mkr1 9.770 GHz
-52.067 dBm
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-13.02 dBm
1
Start 5.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 478 ms (1001 pts)


Marker 1 10.742000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 93/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Log
Ref 14.00 dBm
Mkr1 10.742 GHz
-50.934 dBm
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-13.02 dBm
1
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 17.000 GHz
Sweep 669 ms (1001 pts)


Marker 1 24.448000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 38/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 4 dB
10 dB/div
Log
Ref 14.00 dBm
Mkr1 24.448 GHz
-48.262 dBm
4.00
-6.00
-16.0
-26.0
-36.0
-46.0
-56.0
-66.0
-76.0
-13.02 dBm
1
Start 17.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 765 ms (1001 pts)

7 BAND EDGES MEASUREMENT

7.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2016	Jun 11, 2017

7.2 Block Diagram of Test Setup

The same as section.4.2.

7.3 Specification Limits (§15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

7.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

7.5 Test Procedure

The transmitter output was connected to the Test Receiver. Set RBW of Test Receiver to 100kHz and VBW to 300kHz with suitable frequency span including 100kHz bandwidth from band edge.
The test procedure is defined in ANSI C63.10-2013 (11.11.3 Emission level measurement was used).

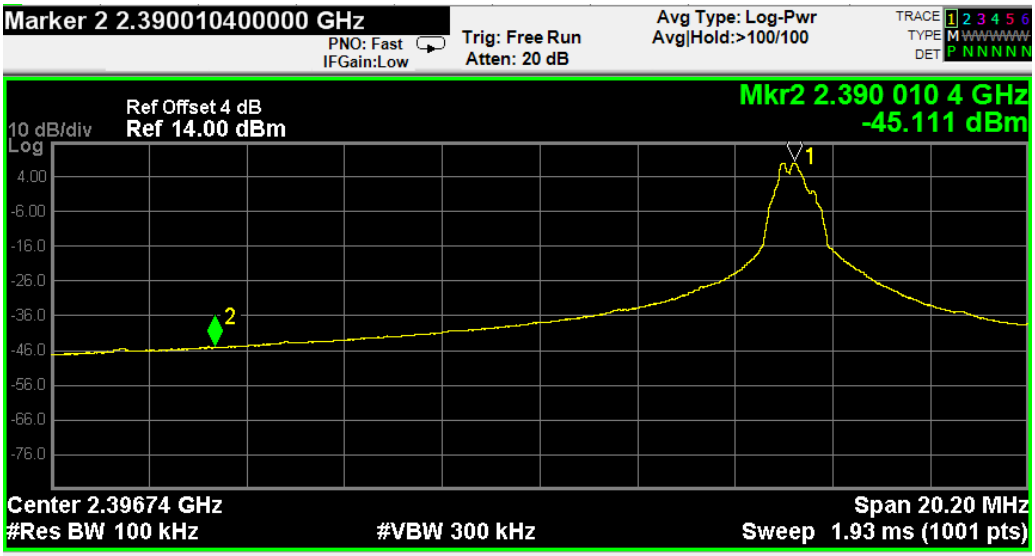
7.6 Test Results

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

(Test Date: Apr. 21, 2017 Temperature: 23℃ Humidity: 51 %)

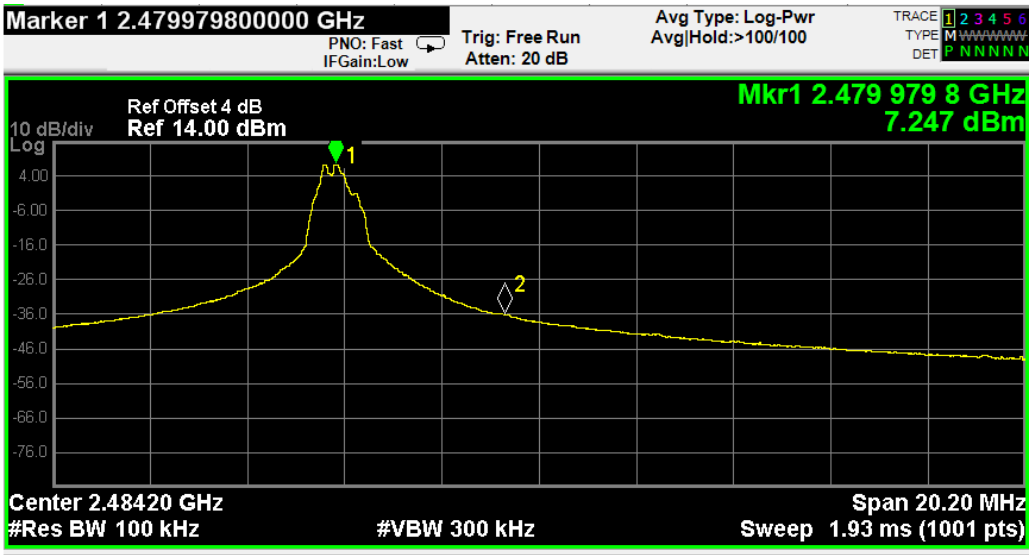
Location	Channel	Frequency	**Delta Marker**	Result
Below Band Edge	00	2402 MHz	**53.013 dB**	More than **20 dB** below the highest level of the desired power
Upper Band Edge	27	2480 MHz	**43.447 dB**	

Ch00 2402MHz (Below Edge 2390 MHz)



MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 009 2 GHz	7.902 dBm			
2	N	1	f	2.390 010 4 GHz	-45.111 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

Ch27 2480MHz (Upper Edge 2483.5 MHz



MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.479 979 8 GHz	7.247 dBm			
2	N	1	f	2.483 494 6 GHz	-36.200 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

8 POWER SPECTRAL DENSITY MEASUREMENT

8.1 Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2016	Jun 11, 2017

8.2 Block Diagram of Test Setup

The same as section.4.2.

8.3 Specification Limits (§15.247(e))

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

8.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

8.5 Test Procedure

The transmitter output was connected to the Test Receiver. The Test Receiver was set as 3kHz ≤ RBW ≤ 100kHz, VBW ≥ 3 x RBW, span = 1.5 times the DTS channel bandwidth.
The test procedure is defined in ANSI C63.10-2013 (11.10.2 Measurement Procedure "Method PKPSD (peak PSD)" was used).

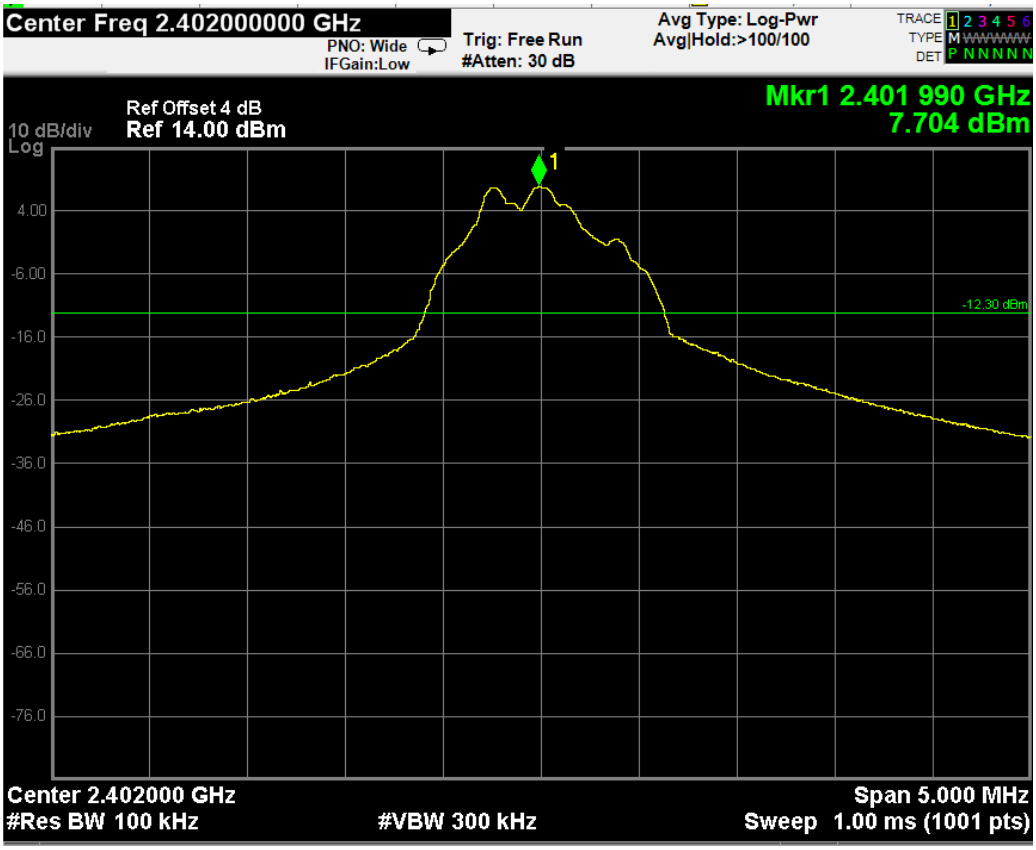
8.6 Test Results

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

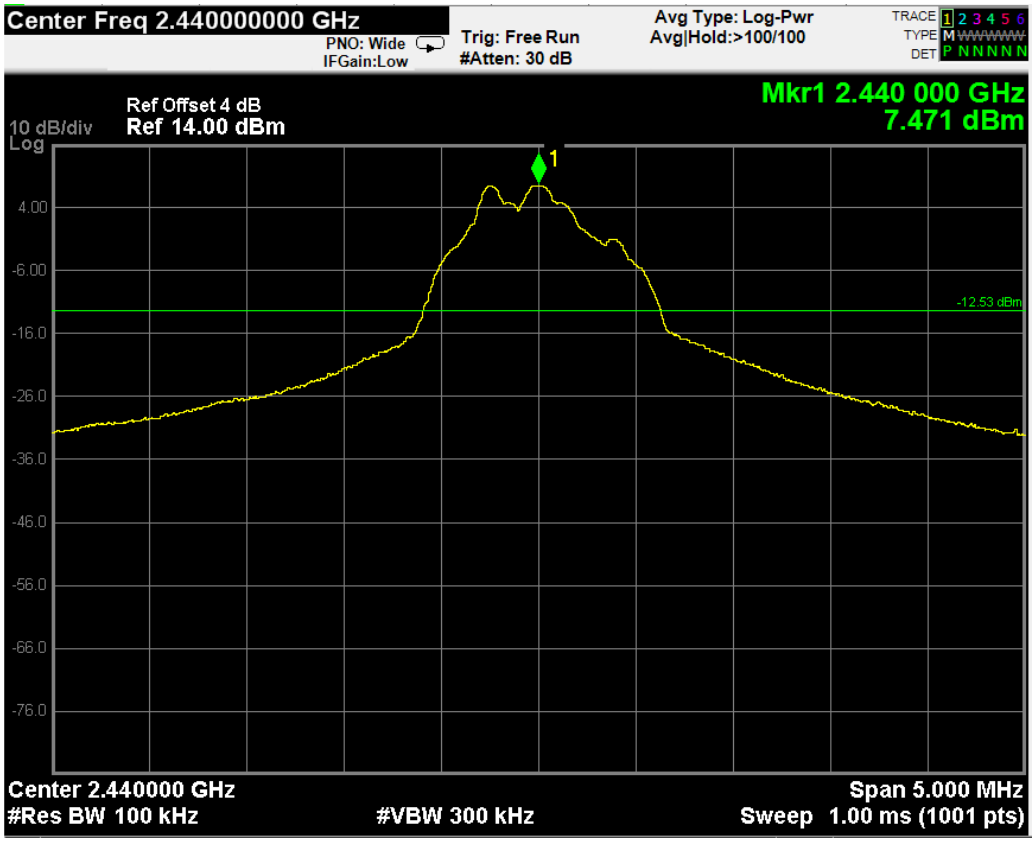
(Test Date: Apr. 21, 2017 Temperature: 23℃ Humidity: 51 %)

Channel	Frequency	Power Spectral Density	Limit
00	2402 MHz	7.704 dBm	8dBm
13	2440 MHz	7.471 dBm	8dBm
27	2480 MHz	6.984 dBm	8dBm

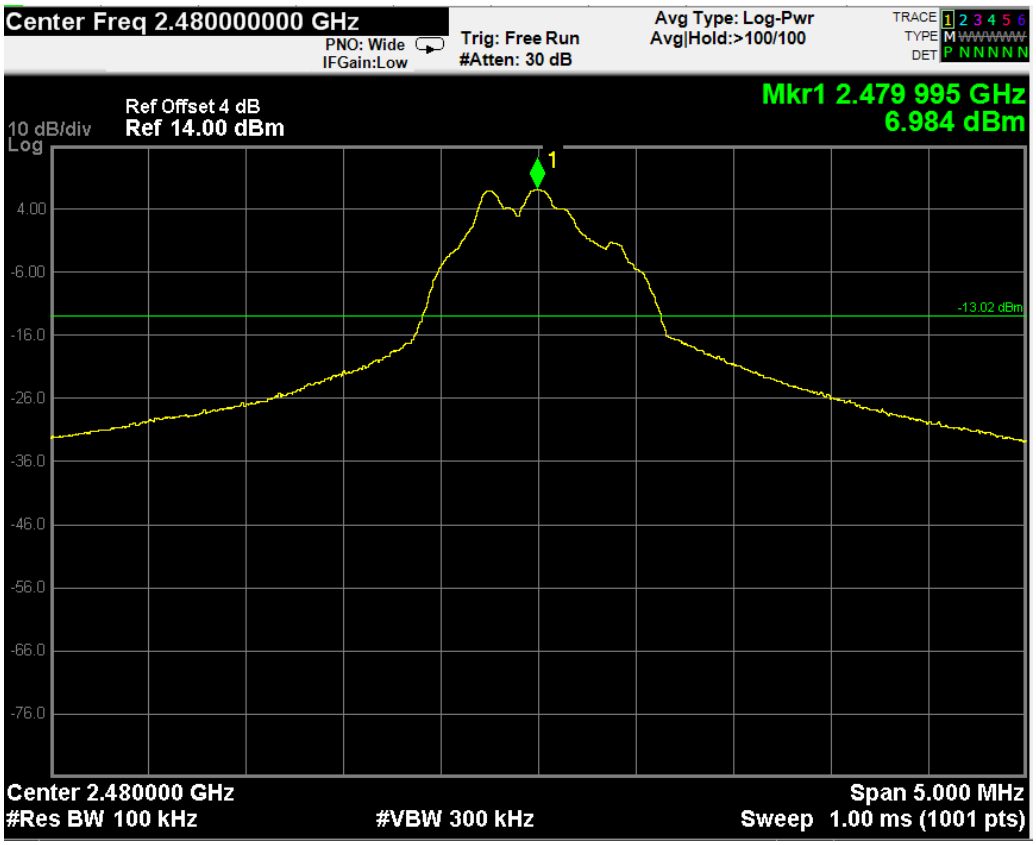
Ch11 2402 MHz



Ch20 2440 MHz



Ch26 2480 MHz



9 DEVIATION TO TEST SPECIFICATIONS

None.