TEST REPORT
On behalf of

Hisense Electric Co.,Ltd.

Product Name: BT remote

Model No.: ERF6A60 ERF6B60 EFR6C60 ERF6*60

FCC ID: W9HBRCB0007

Prepared For: Hisense Electric Co.,Ltd.
No.218 Qianwangang Road, Economy & Technology Development Zone, Qingdao, China

Prepared By: Audix Technology (Wujiang) Co., Ltd.
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TESTING
NVLAP LAB CODE 200786-0

Report No. : ACWE-F1712005
Date of Test : Dec. 20-21, 2017
Date of Report : Dec. 22, 2017

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.
The 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.

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TEST REPORT

Applicant	:	Hisense Electric Co.,Ltd.
EUT Description	:	BT remote
		(A) Model No.: ERF6A60 ERF6B60 EFR6C60 ERF6*60
		(B) Power Supply : DC 3V
		(C) Test Voltage : DC 3V

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 (Wujiang) 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 (Wujiang) 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 Dec. 20-21, 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 (Wujiang) Co., Ltd.

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Date of Test : Dec. 20-21, 2017 Date of Report : Dec. 22, 2017

Producer : Emma Hu
EMMA HU / Assistant Administrator

Signatory : Ken Lu
KEN LU / 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 : BT remote

Type of EUT ☑ Production ☐ Pre-product ☐ Pro-type

Model Number : ERF6A60 ERF6B60 EFR6C60 ERF6*60

Note : The modified histories of report are as follows:

M/N	Difference	
ERF6A60	--	different printed word of keys
ERF6B60	--	
ERF6C60	--	
ERF6*60	"*" represents "E" ~ "Z", for different sales area and customer.	

Radio Tech : Bluetooth v4.1 BLE

Channel Freq. : 2402MHz-2480MHz

Tested Freq. : 2402MHz, 2442MHz, 2480MHz

Modulation : GFSK

Antenna Gain : 2.5 dBi

Test Mode : The EUT was set at continuous TX with duty cycle 100% during all the test in the report

Applicant : Hisense Electric Co.,Ltd.
No.218 Qianwangang Road, Economy & Technology Development Zone, Qingdao, China

2.2 Description of Test Facility

Name of Firm	:	Audix Technology (Wujiang) Co., Ltd.
Site Location	:	No.1289, Jiangxing East Rd., The Eastern Part of Wujiang Economic Development Zone, JiangSu 215200, China
Accredited by NVLAP, Lab Code	:	200786-0
Test Firm Registration Number	:	897661

2.3 Measurement Uncertainty

Radiated Emission Expanded Uncertainty (30-1000MHz):

U = 3.99dB

Radiated Emission Expanded Uncertainty (1000M-26.5GHz):

U = 4.98dB

6 dB Bandwidth Expanded Uncertainty : U = $6x10^{-8}$ MHz

Maximum Peak Output Power Expanded Uncertainty : U = 0.84 dB

Power Spectral Density Expanded Uncertainty : U = 0.38 dB

3 RADIATED EMISSION TEST

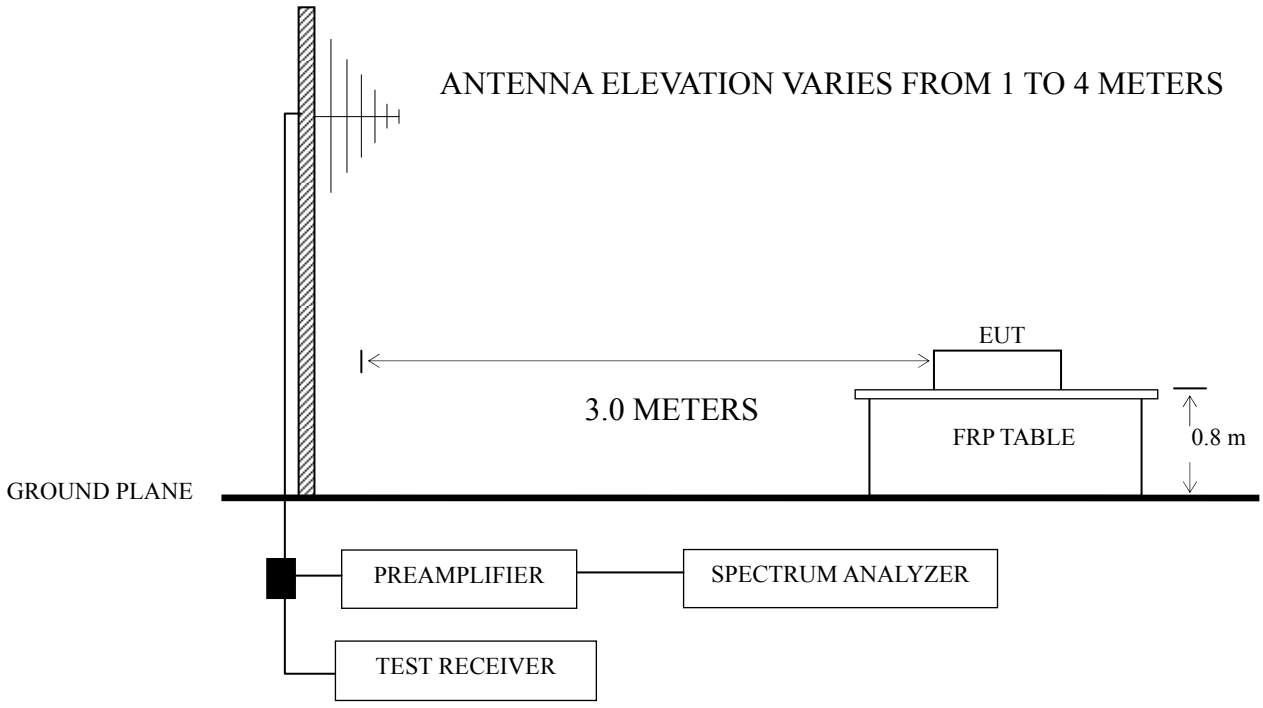
3.1 Test Equipment

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.	Spectrum Analyzer	Agilent	E7405A	MY45107028	Jan 06, 2017	Jan 05, 2018
2.	PSA signal analyzer	Agilent	N9030A	MY53120367	Jun 23, 2017	Jun 22, 2018
3.	Pre-Amplifier	Chengyi dianzi	EMC 9135	980374	Jan 03, 2017	Jan 02, 2018
4.	Pre-Amplifier	Chengyi dianzi	EMC 9135	980373	Jan 03, 2017	Jan 02, 2018
5.	Bi-log Antenna (Horizontal)	Schaffner	VULB 9168	704	Jul 20, 2017	Jul 19, 2018
6.	Bi-log Antenna (Vertical)	Schaffner	VULB 9168	706	May 14, 2017	May 13, 2018
7.	Microwave Preamplifier	Agilent	8449B	3008A02234	Jan 04,2017	Jan 03,2018
8.	Horn Antenna	ETS	3115	00062593	Aug 18 2017	Aug 17, 2018
9.	Horn Antenna	EMCO	3116	00062643	Oct 10, 2017	Oct 09, 2019
10.	Test Receiver	R&S	ESCI	100839	Jan 04, 2017	Jan 03, 2018
11.	Software	Audix	e3	6.2007-9-10	--	--

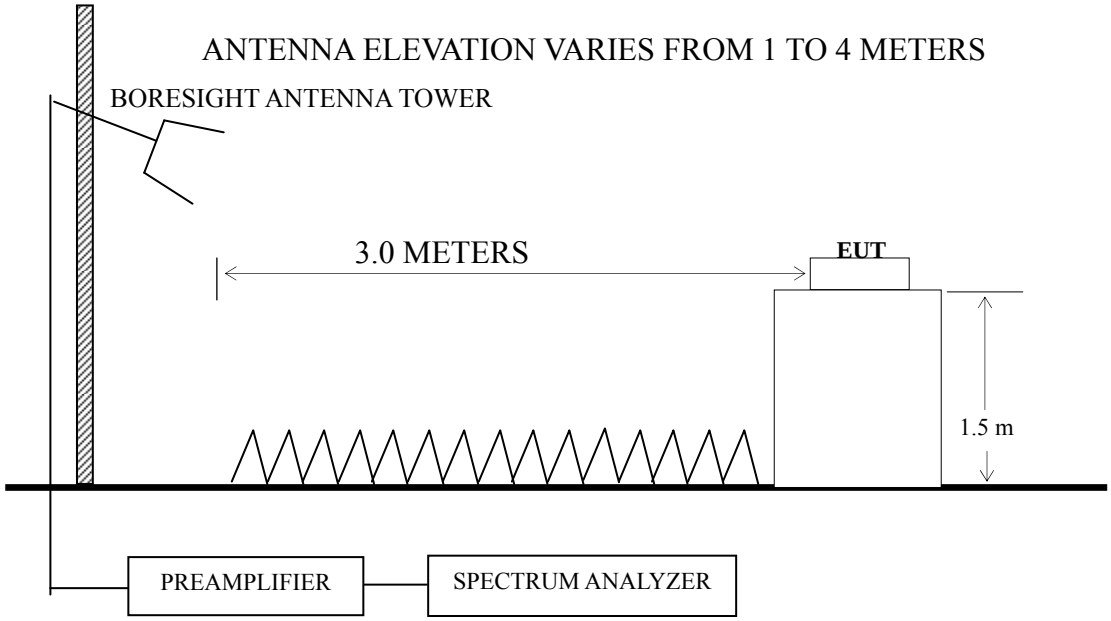
3.2 Block Diagram of Test Setup

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 N9030A.

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.		20	2442 MHz		
4.		39	2480 MHz		
5.	Receiving	--		P15	
6.	Transmitting	Cabinet Emission		P16	
7.		00	2402 MHz	Restricted Frequency bands	P18
8.		39	2480 MHz		P19

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	:	BT remote	Temperature :	22℃
Model No.	:	ERF6A60	Humidity :	51%RH
Test Mode	:	Transmitting	Date of Test :	Dec. 21, 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	44.587	3.75	19.76	0.68	24.19	40	15.81	QP
	75.182	8.04	15.96	0.84	24.84	40	15.16	
	133.619	11.72	18.06	1.2	30.98	43.5	12.52	
	387.992	6.33	21.16	2.04	29.53	46	16.47	
	547.098	4.37	24.65	2.39	31.41	46	14.59	
	854.025	5.46	28.61	2.96	37.03	46	8.97	
Vertical	39.299	3.95	19.39	0.64	23.98	40	16.02	QP
	74.657	11.07	16.14	0.84	28.05	40	11.95	
	153.2	11.35	19.19	1.29	31.83	43.5	11.67	
	393.472	4.89	21.4	2.04	28.33	46	17.67	
	545.183	5.28	24.61	2.39	32.28	46	13.72	
	857.025	6.73	28.56	2.96	38.25	46	7.75	

TEST ENGINEER: Sam

Radiated Emission > 1GHz

EUT	:	BT remote	Temperature :	22℃
Model No.	:	ERF6A60	Humidity :	51%RH
Test Mode	:	Transmitting	Date of Test :	Dec. 21, 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	1123.517	55.52	23.9	3.45	36.21	46.66	74	27.34	Peak
	1211.329	56.21	24.42	3.6	36.09	48.14	74	25.86	Peak
	1459.452	56.08	25.72	3.98	35.8	49.98	74	24.02	Peak
	2211.673	54.31	28.25	4.88	35.28	52.16	74	21.84	Peak
	3176.198	45.91	30.95	5.9	35	47.76	74	26.24	Peak
	3549.384	45.74	31.81	6.31	34.61	49.25	74	24.75	Peak
Vertical	1202.679	51.71	24.38	3.6	36.11	43.58	74	30.42	Peak
	1610.602	48.59	26.38	4.19	35.65	43.51	74	30.49	Peak
	1825.824	54.31	27.19	4.43	35.45	50.48	74	23.52	Peak
	2449.49	48.46	28.71	5.19	35.25	47.11	74	26.89	Peak
	2945.949	48.45	30.34	5.67	35.2	49.26	74	24.74	Peak
	3480.112	46.47	31.65	6.26	34.68	49.7	74	24.30	Peak

CH20 (2442MHz)

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	1032.777	51.99	23.32	3.27	36.35	42.23	74	31.77	Peak
	1418.207	54.2	25.52	3.92	35.84	47.8	74	26.20	Peak
	1678.362	50.54	26.64	4.25	35.58	45.85	74	28.15	Peak
	1889.051	50.54	27.42	4.52	35.39	47.09	74	26.91	Peak
	2304.722	50.65	28.44	5	35.27	48.82	74	25.18	Peak
	3058.908	45.65	30.66	5.8	35.13	46.98	74	27.02	Peak
Vertical	1032.777	51.99	23.32	3.27	36.35	42.23	74	31.77	Peak
	1418.207	54.2	25.52	3.92	35.84	47.8	74	26.20	Peak
	1678.362	50.54	26.64	4.25	35.58	45.85	74	28.15	Peak
	1889.051	50.54	27.42	4.52	35.39	47.09	74	26.91	Peak
	2304.722	50.65	28.44	5	35.27	48.82	74	25.18	Peak
	3058.908	45.65	30.66	5.8	35.13	46.98	74	27.02	Peak

CH39 (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	1093.724	52.38	23.72	3.39	36.26	43.23	74	30.77	Peak
	1183.44	52.58	24.26	3.54	36.14	44.24	74	29.76	Peak
	1222.23	52.66	24.48	3.63	36.08	44.69	74	29.31	Peak
	1405.558	49.78	25.46	3.9	35.86	43.28	74	30.72	Peak
	1940.51	52.28	27.59	4.55	35.35	49.07	74	24.93	Peak
	2329.632	51.62	28.49	5.04	35.26	49.89	74	24.11	Peak
Vertical	1091.766	50.93	23.7	3.39	36.26	41.76	74	32.24	Peak
	1228.818	51.38	24.52	3.63	36.07	43.46	74	30.54	Peak
	1324.859	52.13	25.04	3.78	35.95	45	74	29.00	Peak
	1675.358	48.93	26.64	4.25	35.59	44.23	74	29.77	Peak
	1885.669	50	27.4	4.52	35.39	46.53	74	27.47	Peak
	2337.996	49.71	28.5	5.04	35.26	47.99	74	26.01	Peak

TEST ENGINEER: Sam

EUT	:	BT remote	Temperature :	22℃
Model No.	:	ERF6A60	Humidity :	51%RH
Test Mode	:	Receiving	Date of Test :	Dec. 21, 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	38.212	4.92	19.37	0.63	--	24.92	40	15.08	QP
	74.396	11.59	16.23	0.84	--	28.66	40	11.34	
	152.13	11.29	19.12	1.29	--	31.7	43.5	11.80	
	372.005	6.13	20.6	1.99	--	28.72	46	17.28	
	547.098	4.7	24.65	2.39	--	31.74	46	14.26	
	790.619	4.84	28.39	2.85	--	36.08	46	9.92	
	1177.096	53.4	24.22	3.54	36.14	45.02	74	28.98	PK
	1413.134	49	25.5	3.92	35.85	42.57	74	31.43	
	1717.915	49.88	26.79	4.31	35.54	45.44	74	28.56	
	3080.91	45.92	30.7	5.8	35.11	47.31	74	26.69	
	3607.084	46.79	31.93	6.36	34.56	50.52	74	23.48	
	4330.397	45.54	33.44	7.12	34.09	52.01	74	21.99	
Vertical	41.132	2.75	19.49	0.66	--	22.9	40	17.10	QP
	97.798	12.44	14.14	0.99	--	27.57	43.5	15.93	
	171.393	10.81	18.54	1.37	--	30.72	43.5	12.78	
	354.183	5.18	20.36	1.93	--	27.47	46	18.53	
	513.633	4.35	24.07	2.33	--	30.75	46	15.25	
	945.44	5.39	29.37	3.12	--	37.88	46	8.12	
	1183.44	51.12	24.26	3.54	36.14	42.78	74	31.22	PK
	1327.235	51.35	25.06	3.78	35.95	44.24	74	29.76	
	1675.358	48.93	26.64	4.25	35.59	44.23	74	29.77	
	1989.803	49.02	27.76	4.61	35.31	46.08	74	27.92	
	2393.094	48.08	28.61	5.12	35.26	46.55	74	27.45	
	3164.836	45.12	30.93	5.9	35.01	46.94	74	27.06	

TEST ENGINEER: Sam

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	2354.812	50.48	28.53	5.08	35.26	48.83	74	25.17	Peak
	2393.094	49.71	28.61	5.12	35.26	48.18	74	25.82	Peak
	2484.854	50.48	28.77	5.23	35.25	49.23	74	24.77	Peak
	2493.774	51.43	28.79	5.23	35.25	50.2	74	23.80	Peak
Vertical	2376.003	48.62	28.57	5.08	35.26	47.01	74	26.99	Peak
	2390.202	48.08	28.59	5.12	35.26	46.53	74	27.47	Peak
	2483.5	49.01	28.77	5.19	35.25	47.72	74	26.28	Peak
	2490.123	48.79	28.79	5.23	35.25	47.56	74	26.44	Peak

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

Note2 – The antenna gain (2.5dBi) and cable loss (0.5dB) were set as offset (3B) 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,

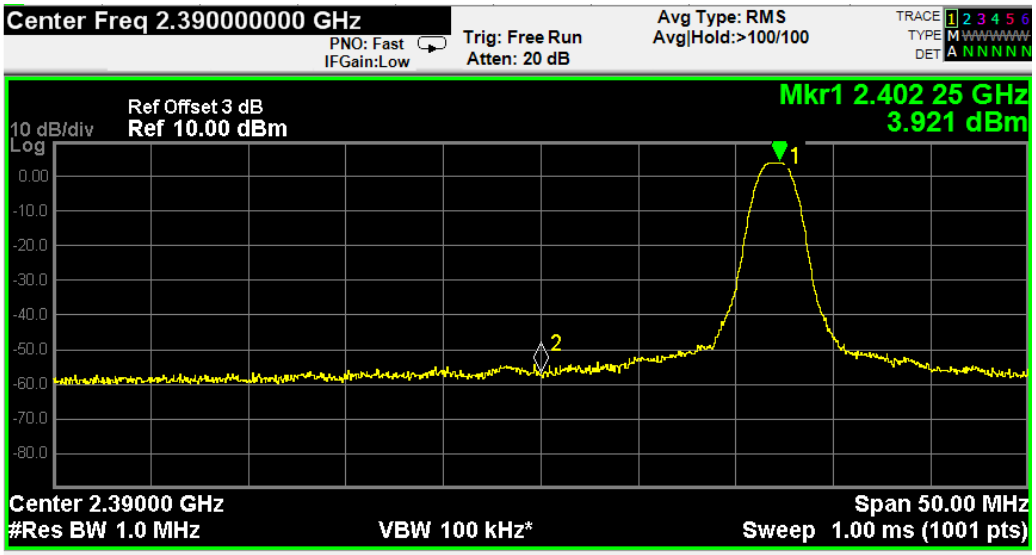
E = electric field strength in dBμV/m,

D = specified measurement distance in meters.

The Average Power limit = -41.2 dBm

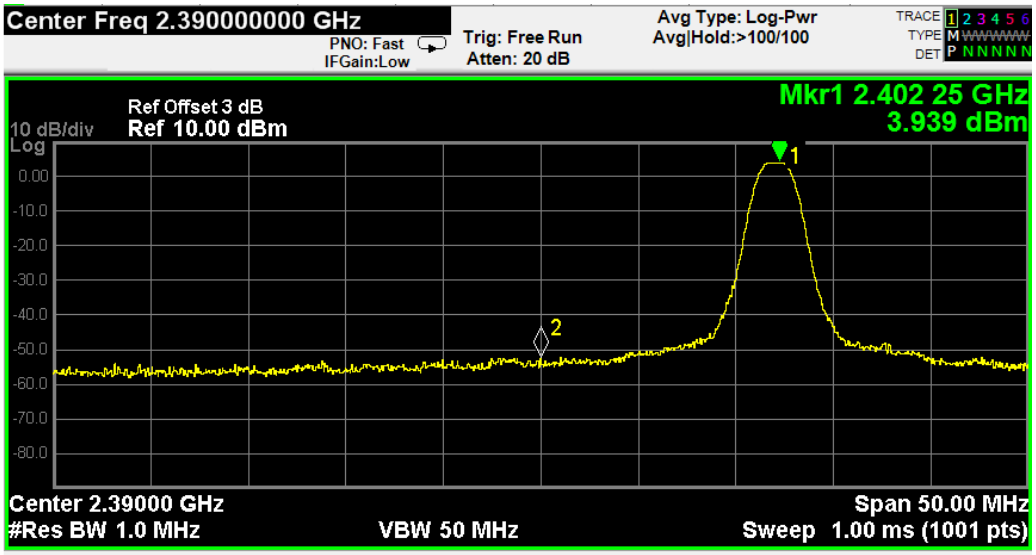
The Peak Power limit = -21.2 dBm

AV Result on CH00



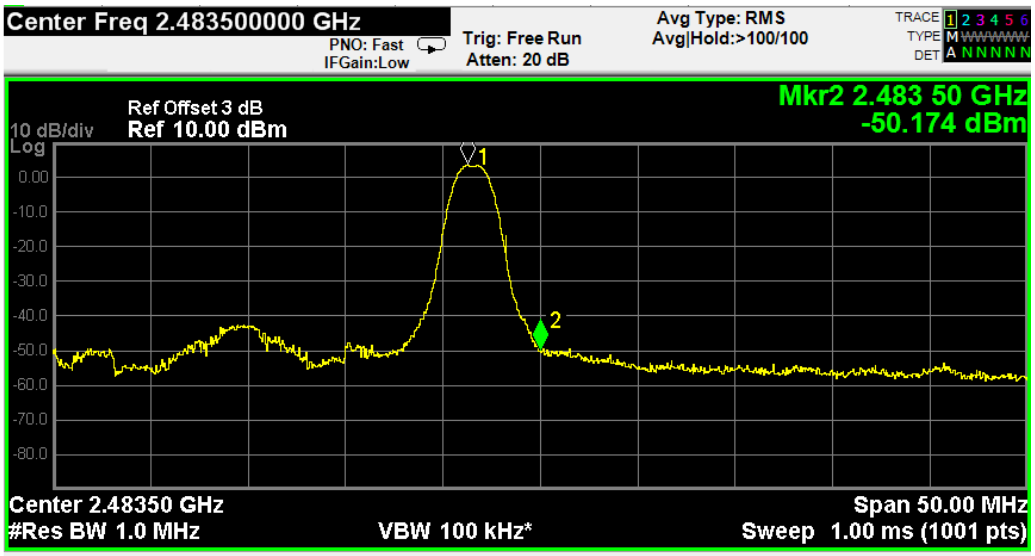
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 25 GHz	3.921 dBm			
2	N	1	f	2.390 00 GHz	-57.197 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

PK Result on CH00



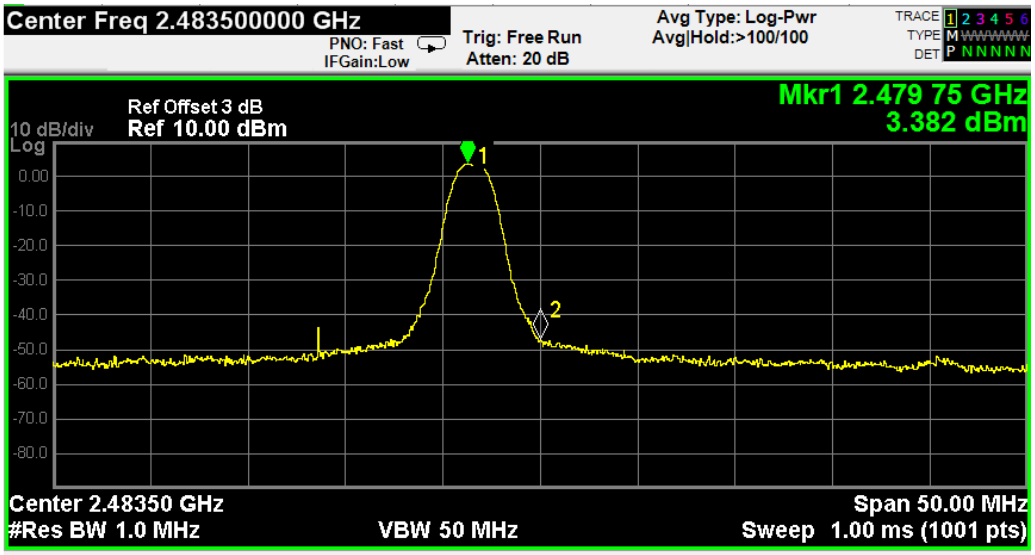
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 25 GHz	3.939 dBm			
2	N	1	f	2.390 00 GHz	-52.648 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

AV Result on CH39



MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.479 75 GHz	3.362 dBm			
2	N	1	f	2.483 50 GHz	-50.174 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

PK Result on CH39



MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.479 75 GHz	3.382 dBm			
2	N	1	f	2.483 50 GHz	-47.405 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

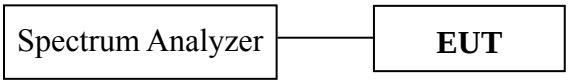
4 6 dB BANDWIDTH MEASUREMENT

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	N9030A	MY53120367	Jun 23, 2017	Jun 22, 2018

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

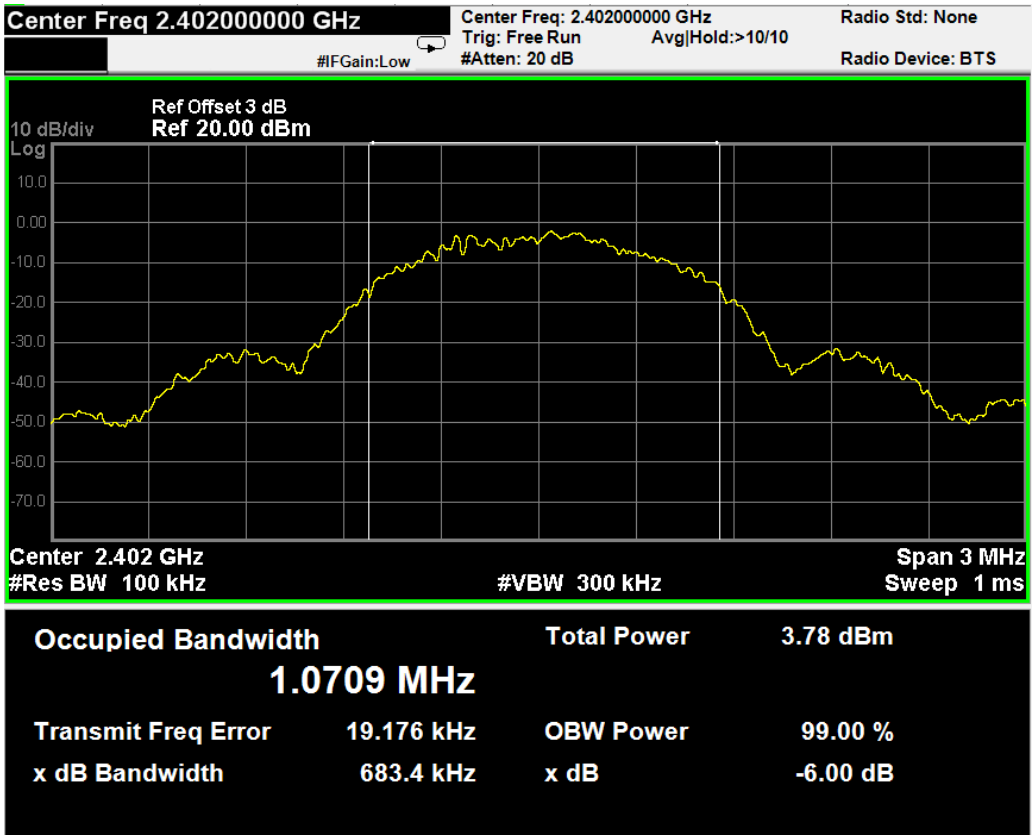
PASSED.

All the test results are attached in next pages.

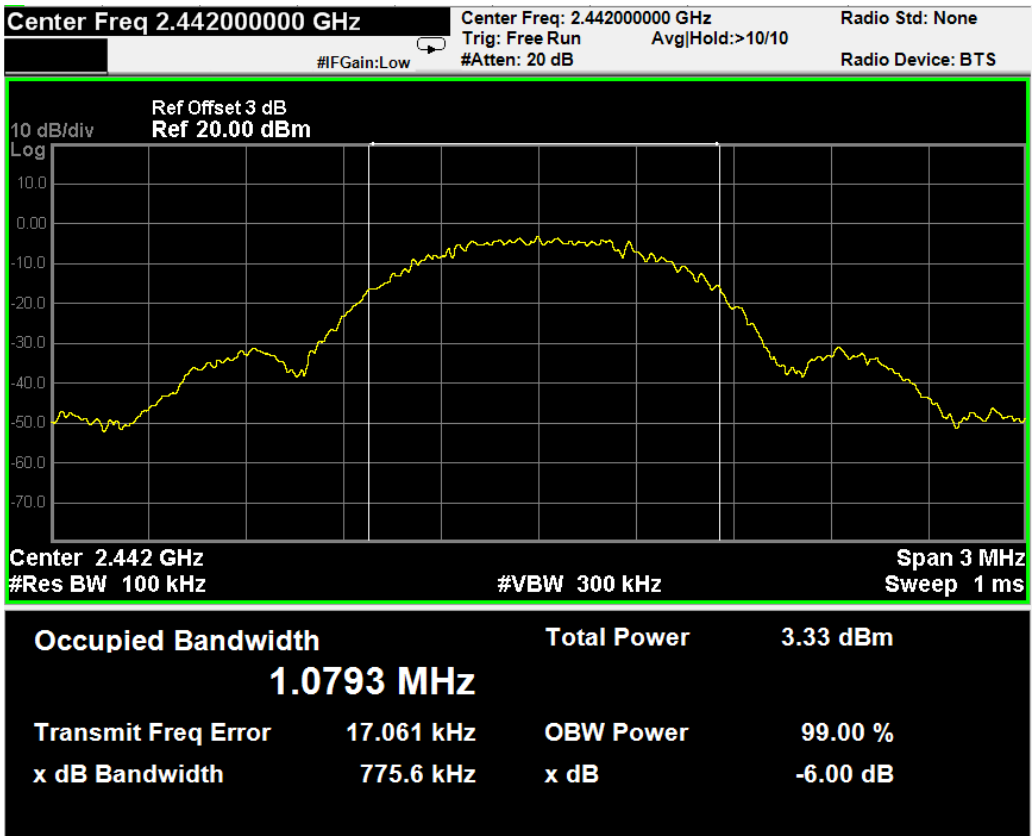
(Test Date: Dec. 20, 2017 Temperature: 23℃ Humidity: 51 %)

Channel	Frequency	**6dB Bandwidth**
00	2402 MHz	**683.4 kHz**
20	2442 MHz	**775.6 kHz**
39	2480 MHz	**771.0 kHz**

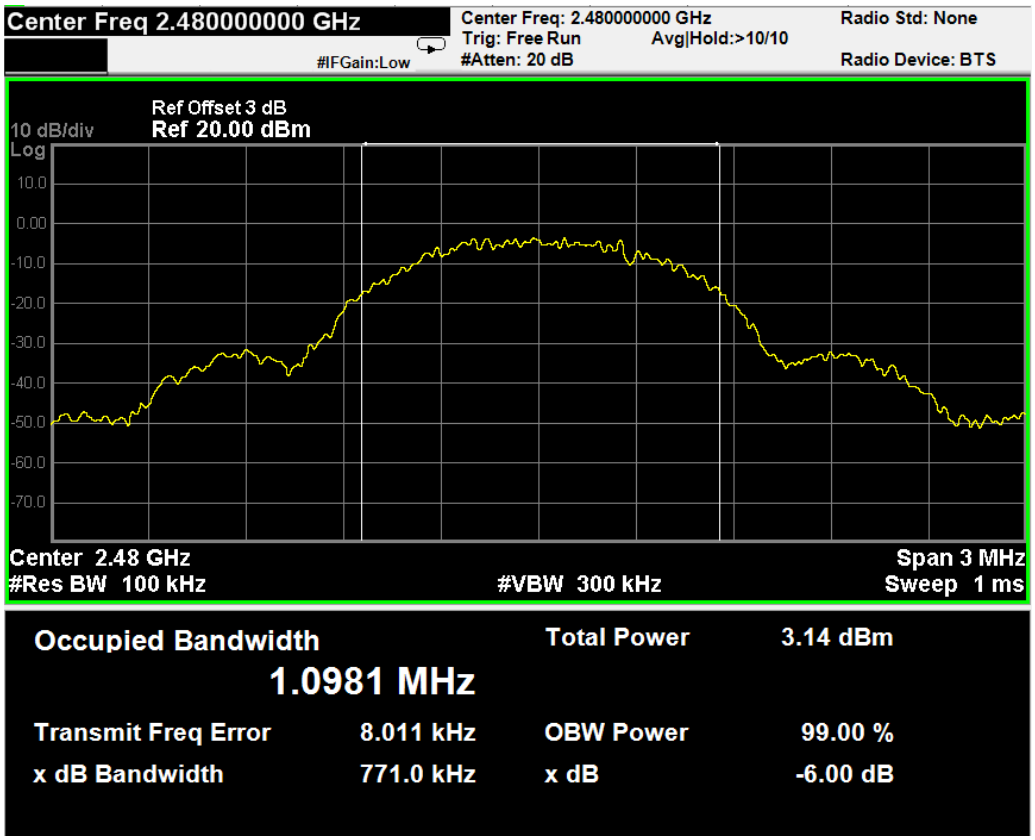
CH00 (2402 MHz)



CH20 (2442 MHz)



CH39 (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	N9030A	MY53120367	Jun 23, 2017	Jun 22, 2018

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).

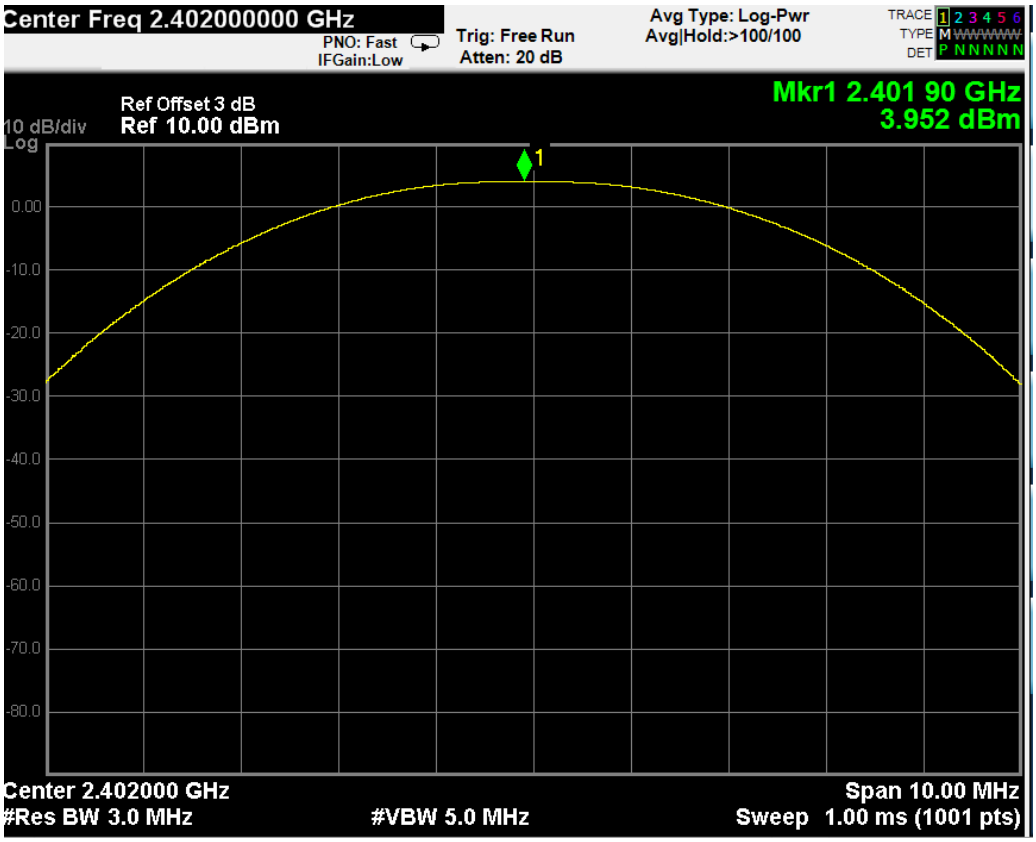
5.6 Test Results

PASSED. All the test results are listed below.

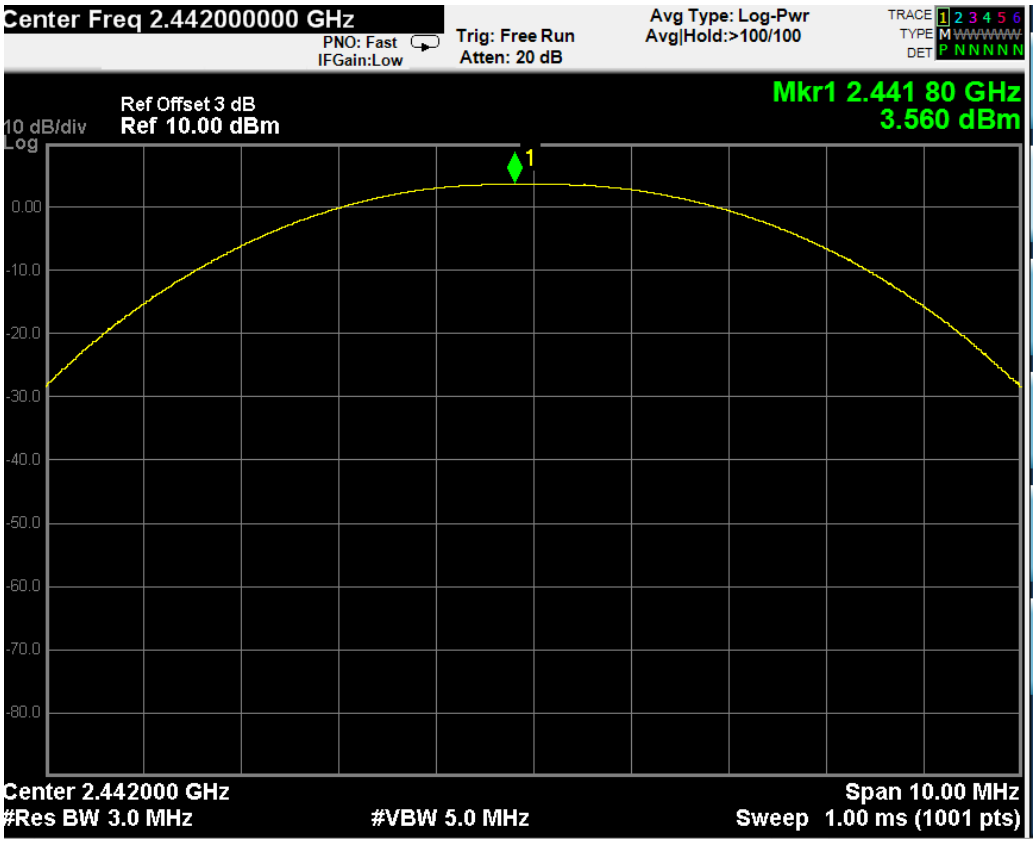
(Test Date: Dec. 20, 2017 Temperature: 23℃ Humidity: 51 %)

Channel	Frequency	**Peak Output Power**	Limit
00	2402 MHz	**3.95 dBm**	30 dBm
20	2442 MHz	**3.56 dBm**	30 dBm
39	2480 MHz	**3.26 dBm**	30 dBm

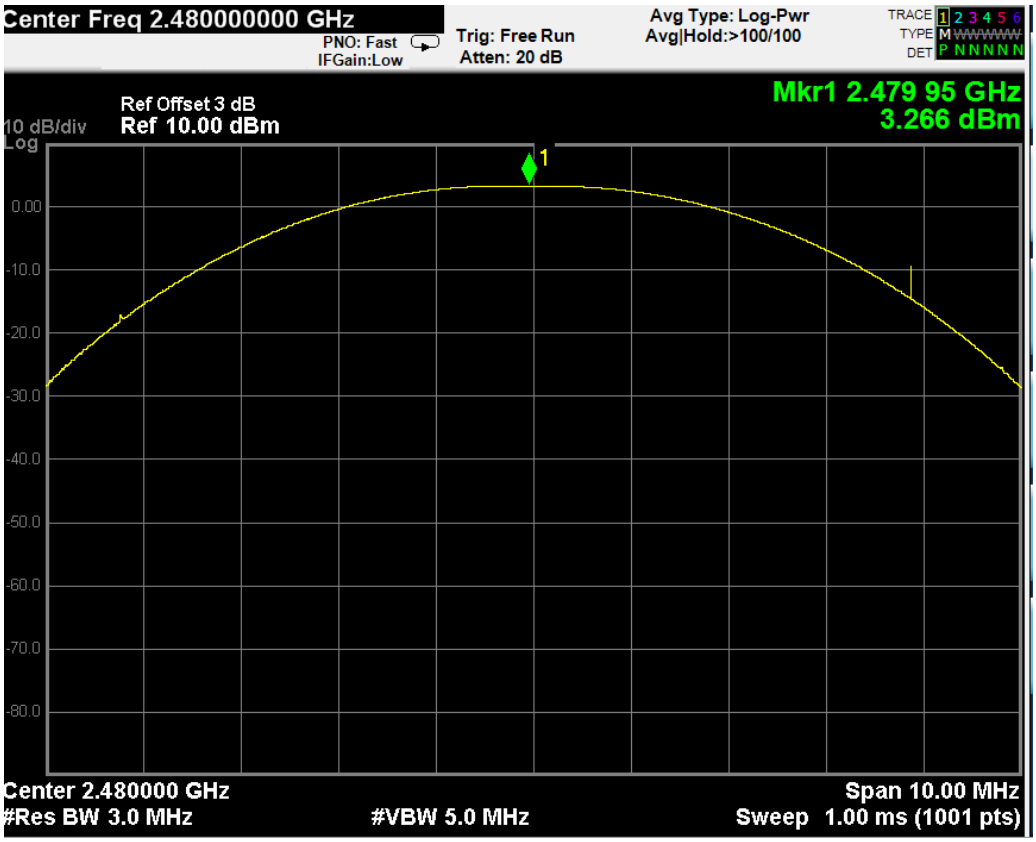
CH00 (2402 MHz)



CH20 (2442 MHz)



CH39 (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	N9030A	MY53120367	Jun 23, 2017	Jun 22, 2018

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).

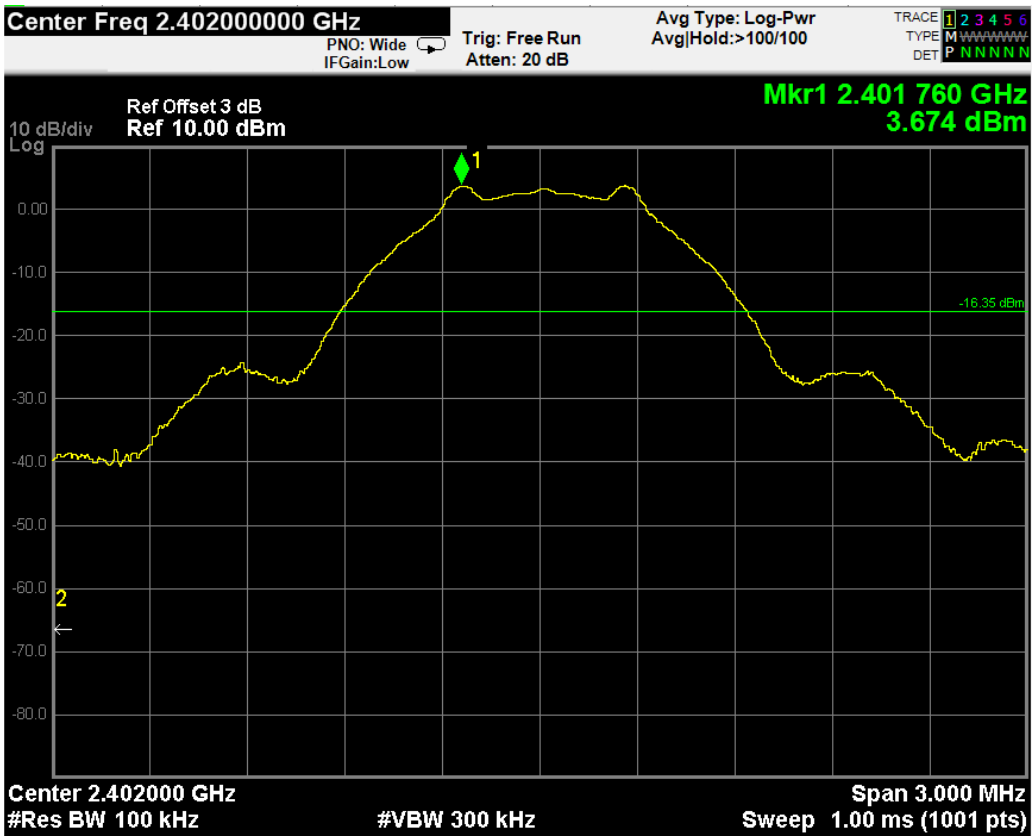
6.6 Test Results

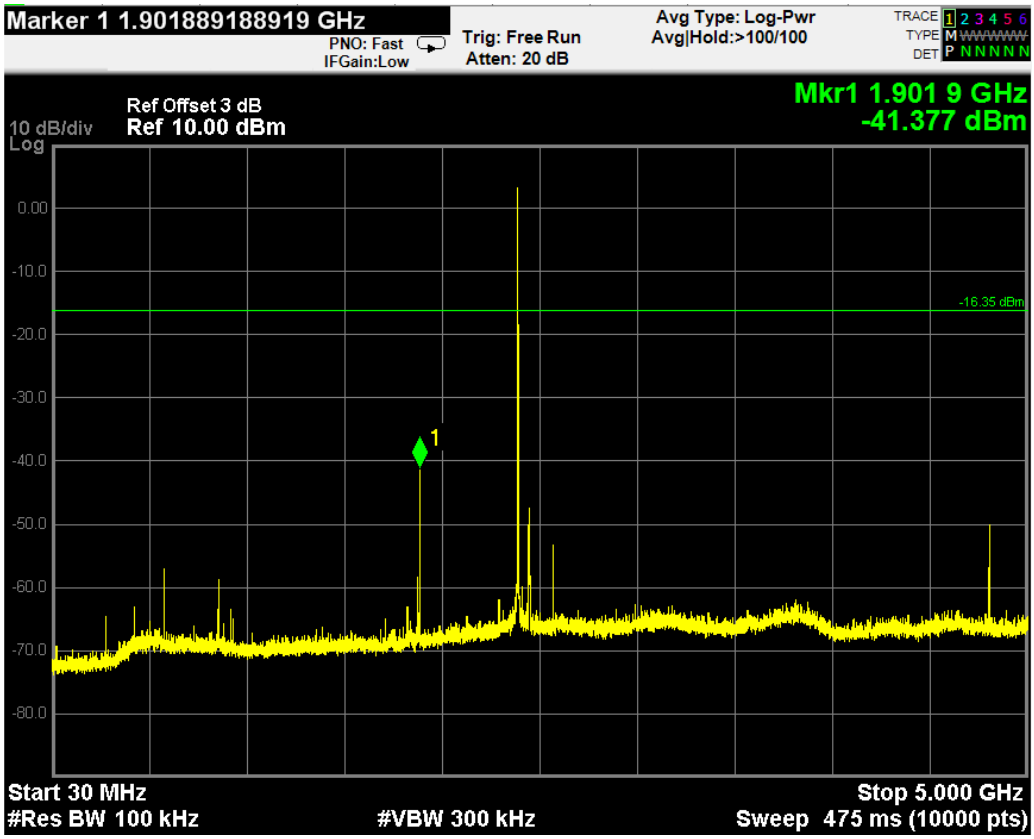
PASSED.
The test data was attached in the next pages.
(Test Date: Dec. 20, 2017 Temperature: 23℃ Humidity: 51 %)

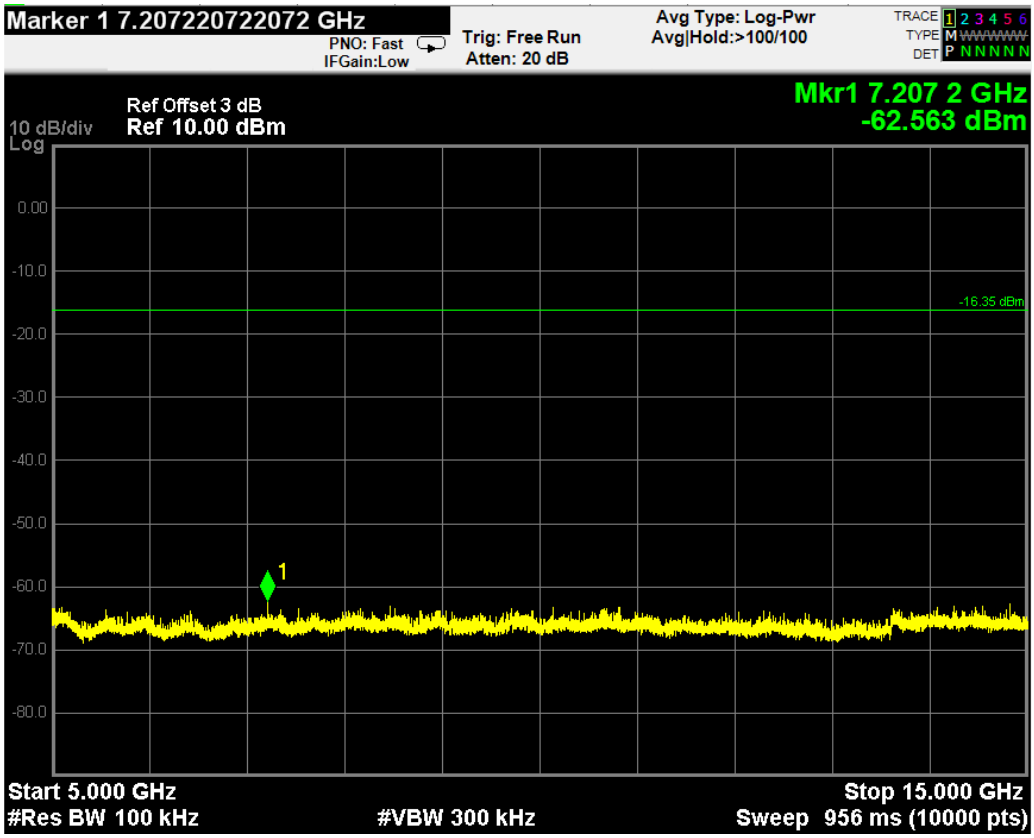
Channel	Data Page
00	P27-28
20	P29-30
39	P31-32

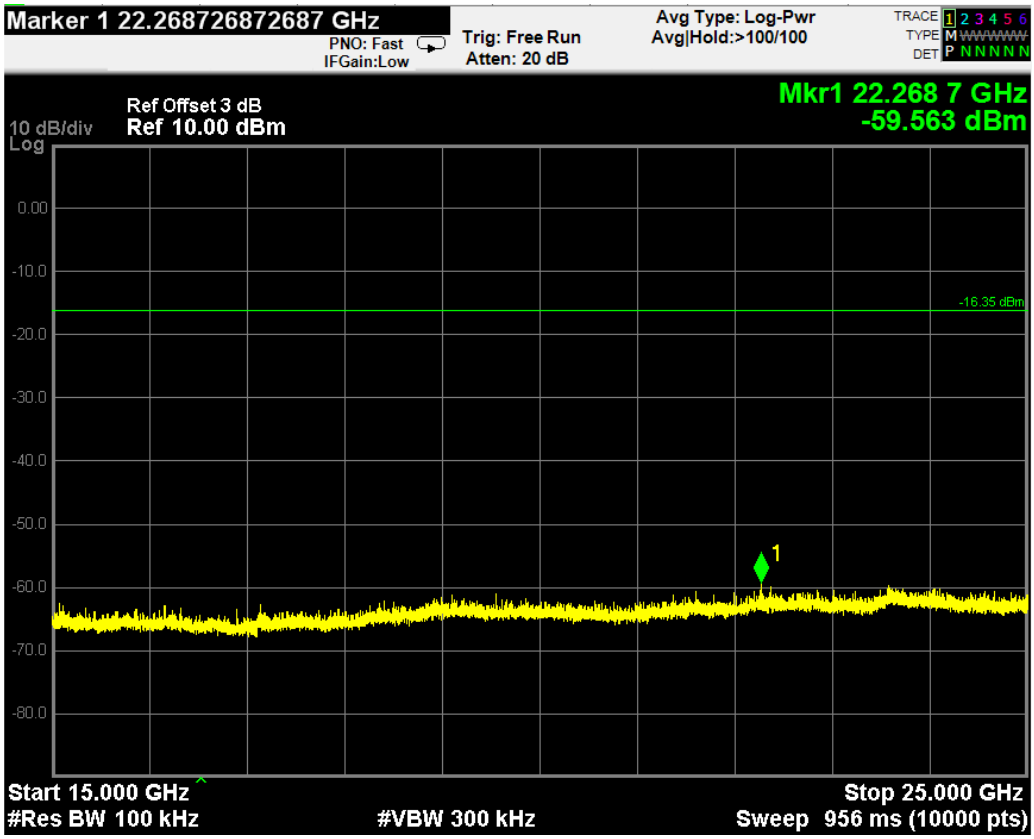
CH00 (2402 MHz)

Reference level



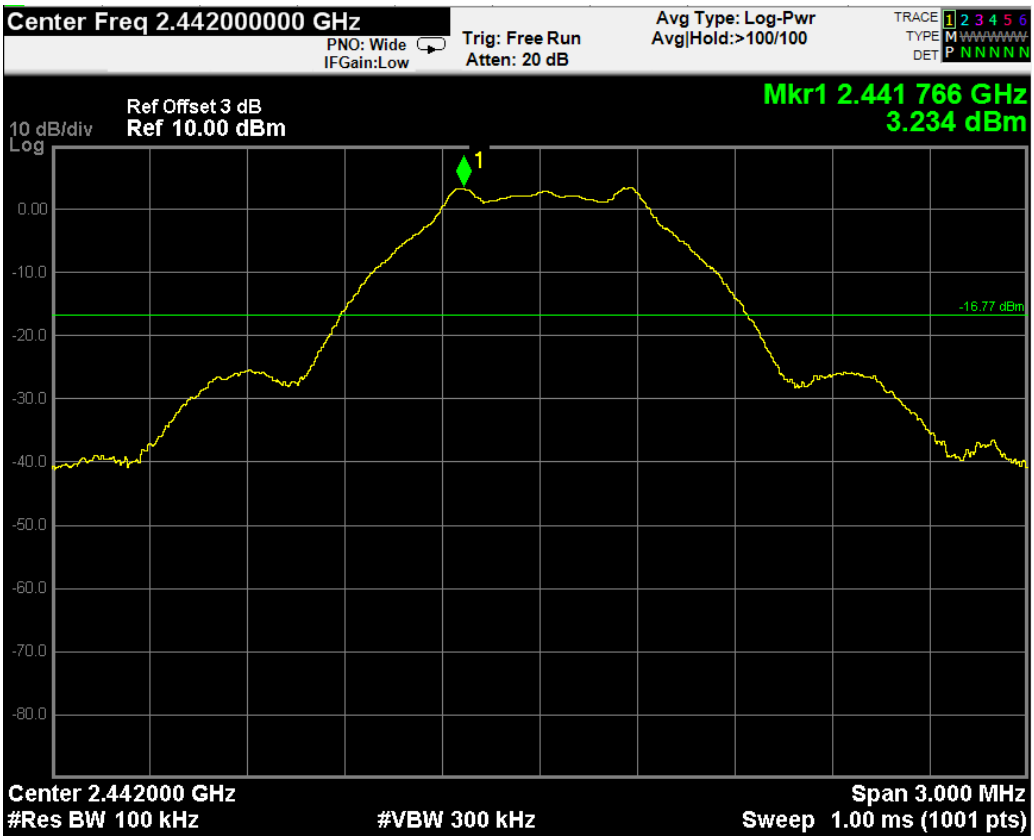


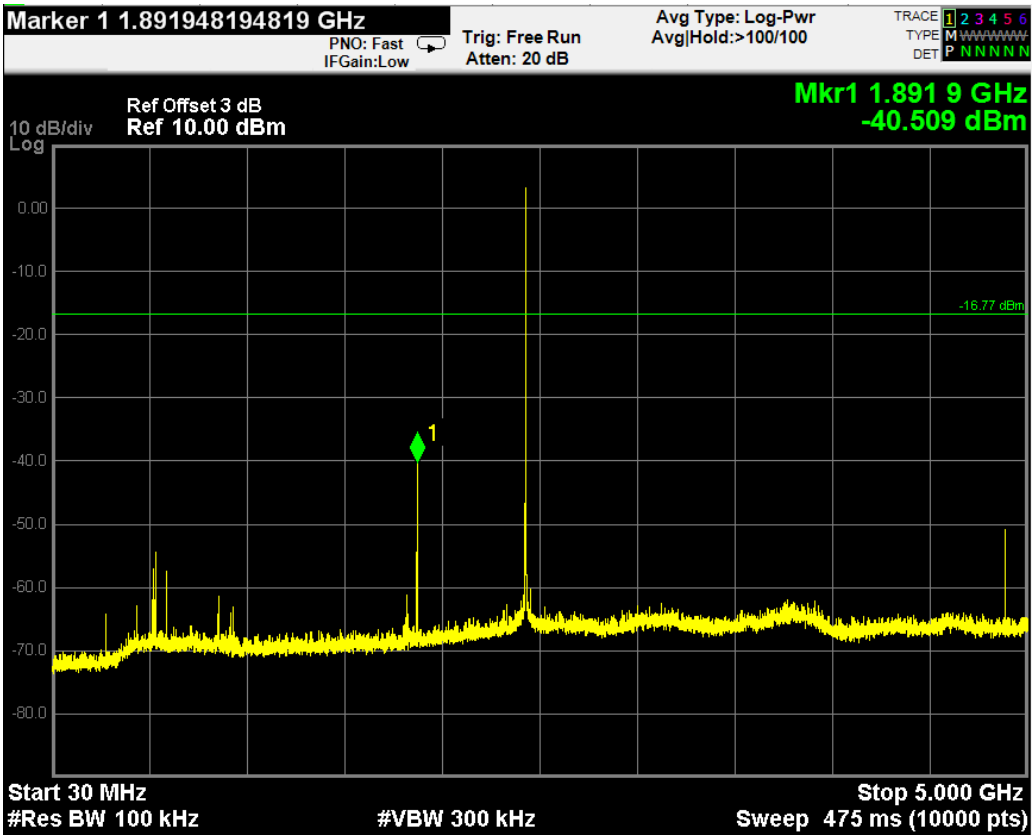

Marker 1 7.207220722072 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 3 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 7.207 2 GHz
-62.563 dBm
0.00
-10.0
-16.35 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1
Start 5.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 15.000 GHz
Sweep 956 ms (10000 pts)

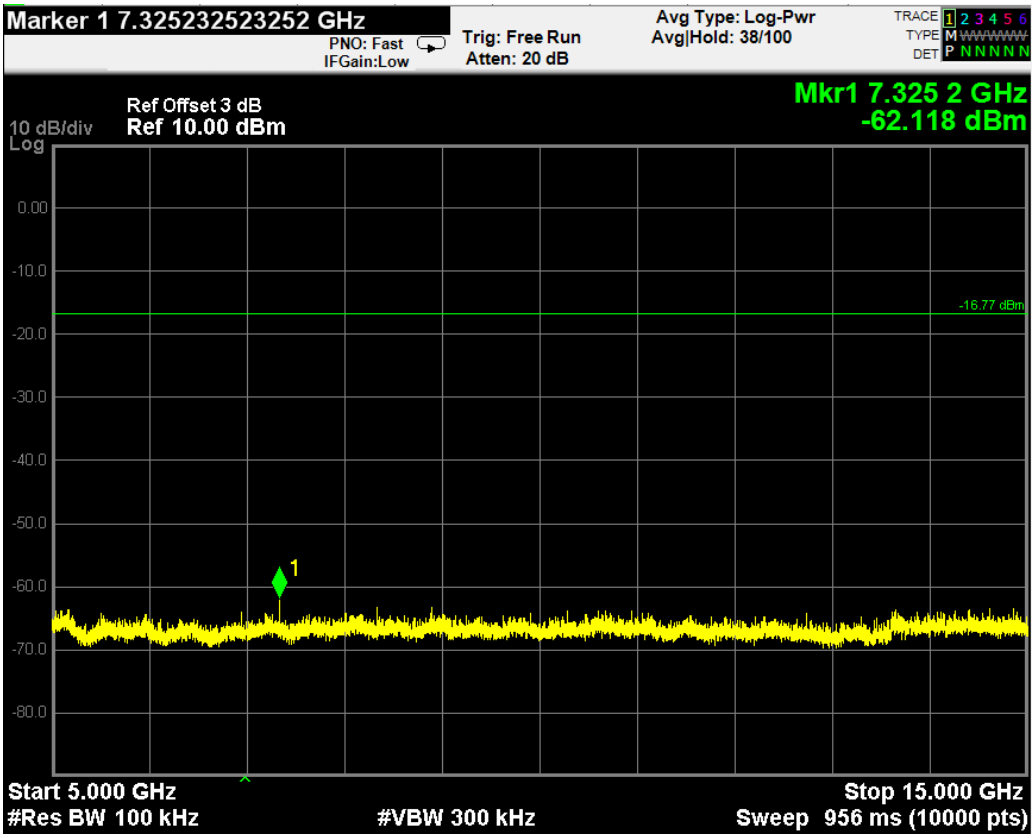

Marker 1 22.268726872687 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 3 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 22.268 7 GHz
-59.563 dBm
0.00
-10.0
-16.35 dBm
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1
Start 15.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 956 ms (10000 pts)

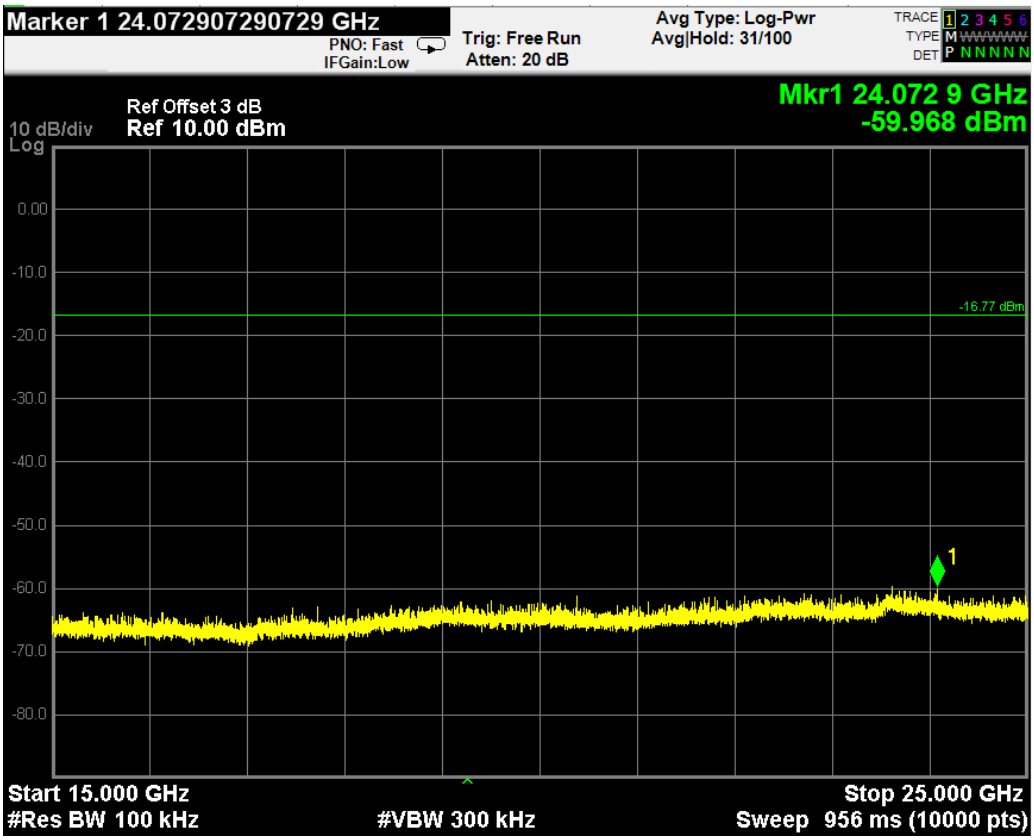
CH20 (2442 MHz)

Reference level



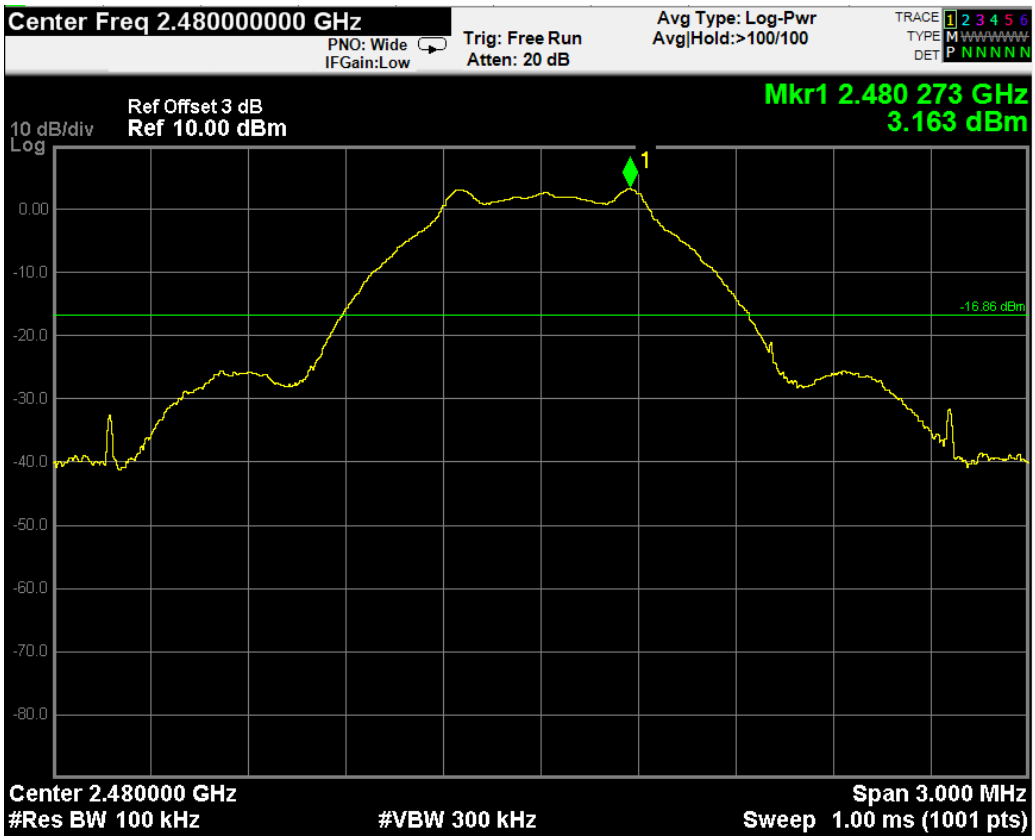


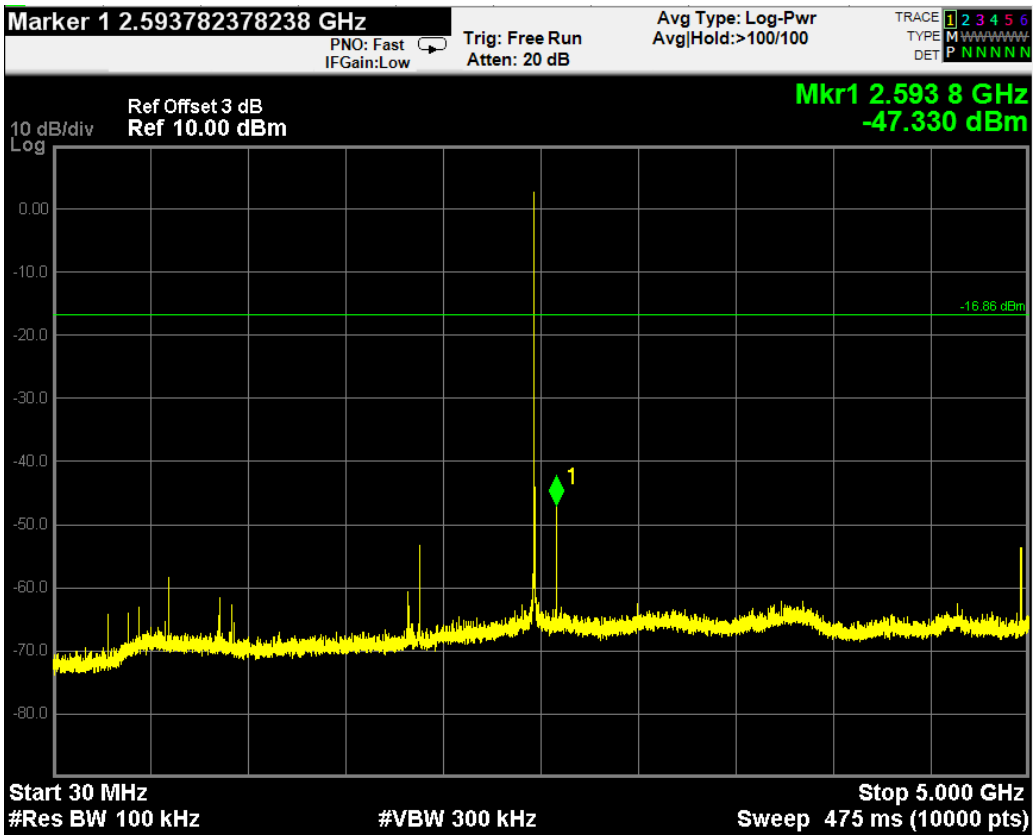

Marker 1 7.325232523252 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 38/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 3 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 7.325 2 GHz
-62.118 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-16.77 dBm
1
Start 5.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 15.000 GHz
Sweep 956 ms (10000 pts)

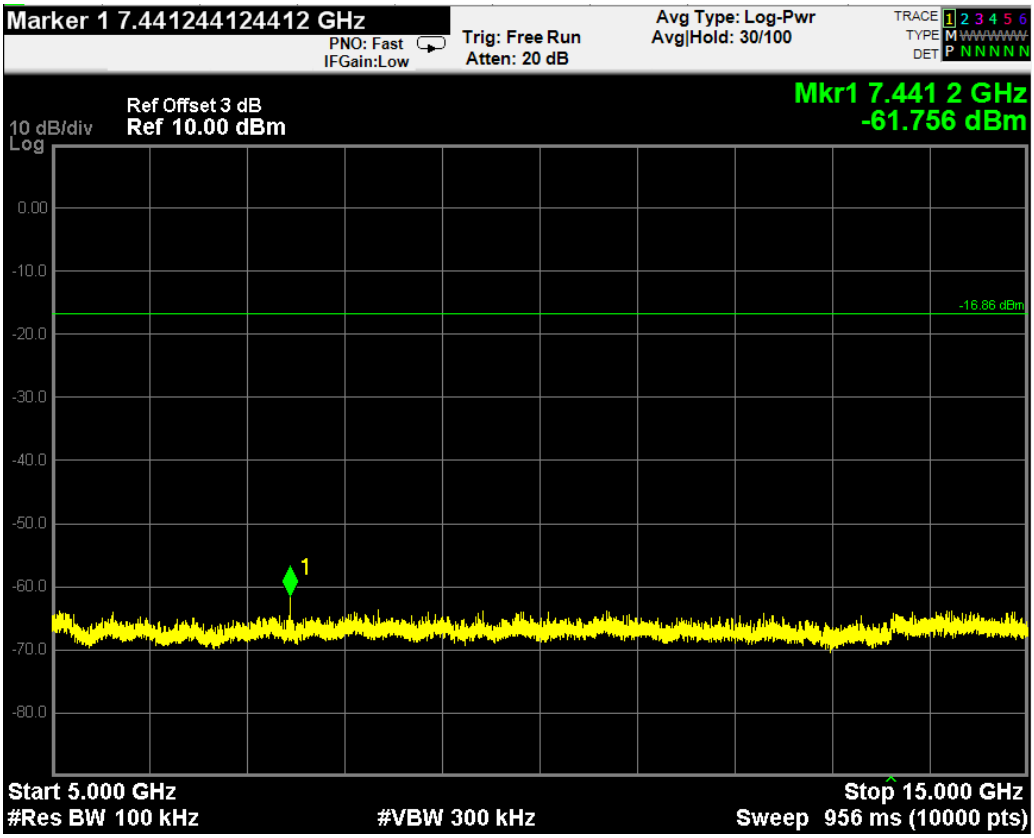

Marker 1 24.072907290729 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 31/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 3 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 24.072 9 GHz
-59.968 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-16.77 dBm
1
Start 15.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 956 ms (10000 pts)

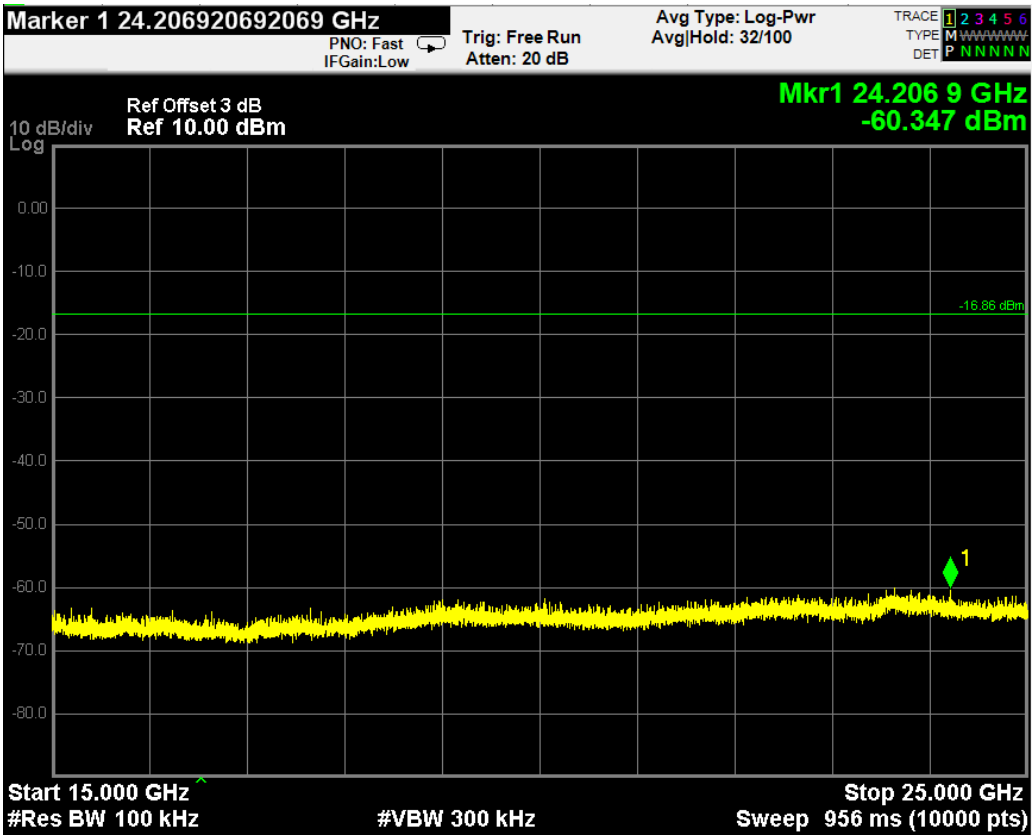
CH39 (2480 MHz)

Reference level






Marker 1 7.441244124412 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 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 3 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 7.441 2 GHz
-61.756 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-16.86 dBm
1
Start 5.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 15.000 GHz
Sweep 956 ms (10000 pts)


Marker 1 24.206920692069 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 32/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Ref Offset 3 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 24.206 9 GHz
-60.347 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-16.86 dBm
1
Start 15.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 956 ms (10000 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	N9030A	MY53120367	Jun 23, 2017	Jun 22, 2018

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).

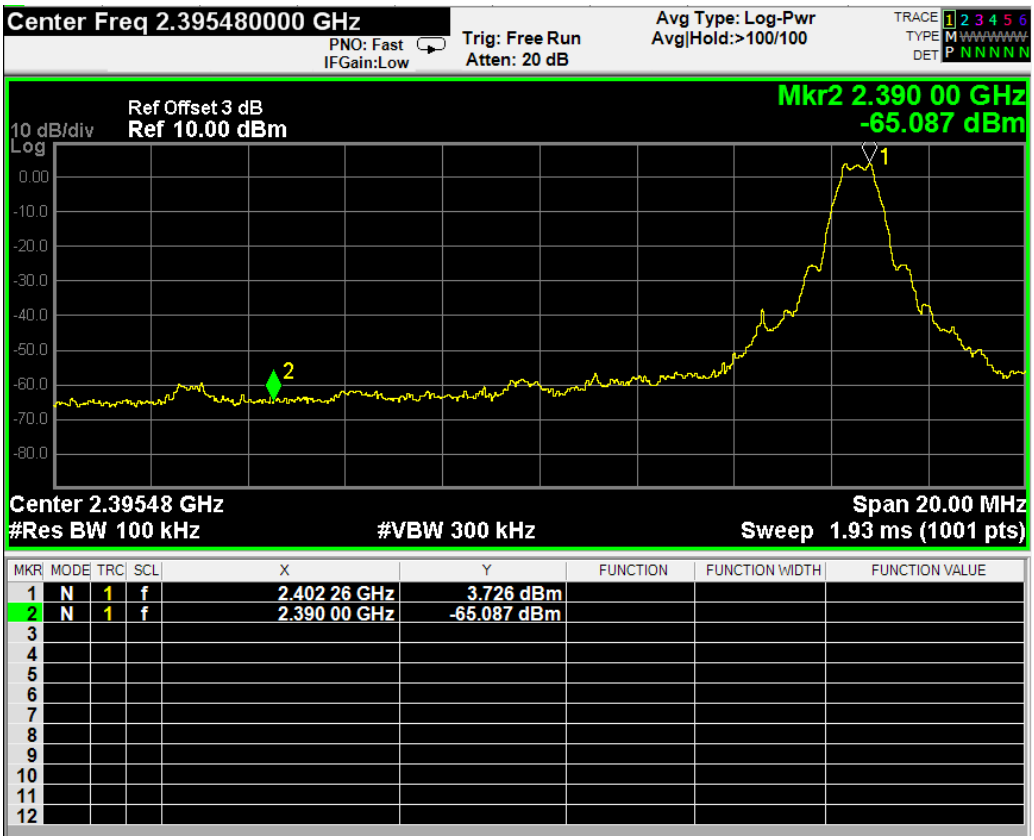
7.6 Test Results

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

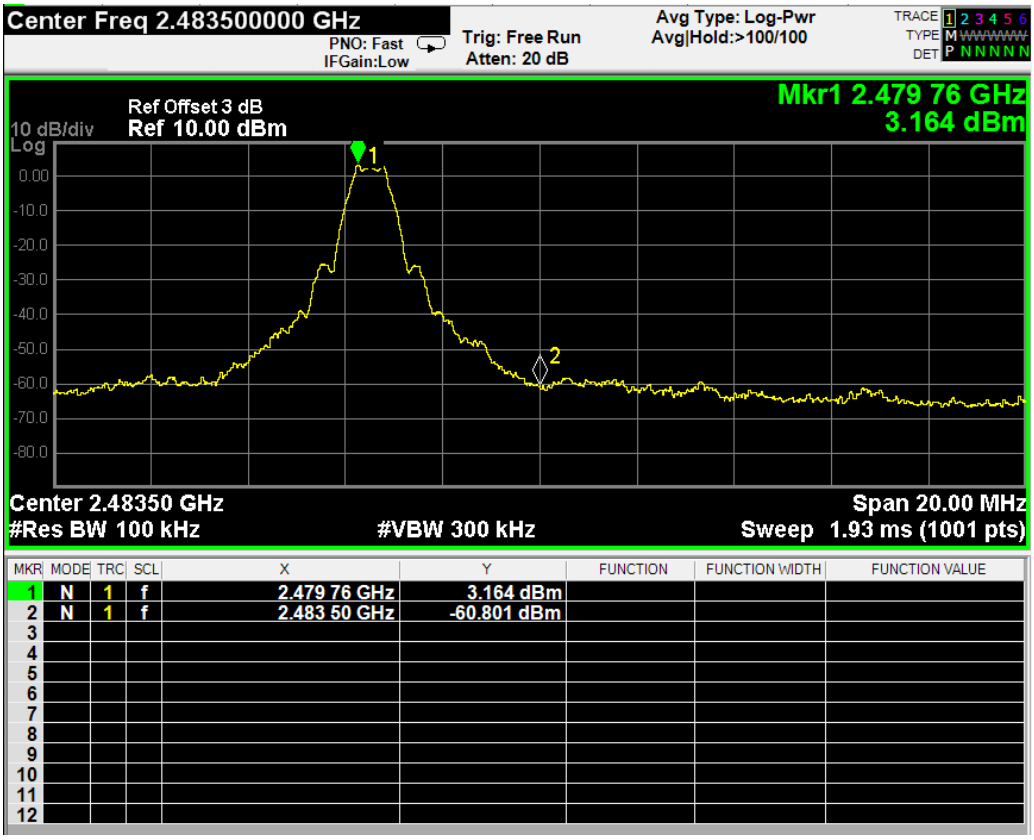
(Test Date: Dec. 20, 2017 Temperature: 23℃ Humidity: 51 %)

Location	Channel	Frequency	**Delta Marker**	Result
Below Band Edge	00	2402 MHz	**68.813 dB**	More than **20 dB** below the highest level of the desired power
Upper Band Edge	39	2480 MHz	**63.965 dB**	

CH00 2402MHz (Below Edge 2390 MHz)



CH39 2480MHz (Upper Edge 2483.5 MHz)



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	N9030A	MY53120367	Jun 23, 2017	Jun 22, 2018

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).

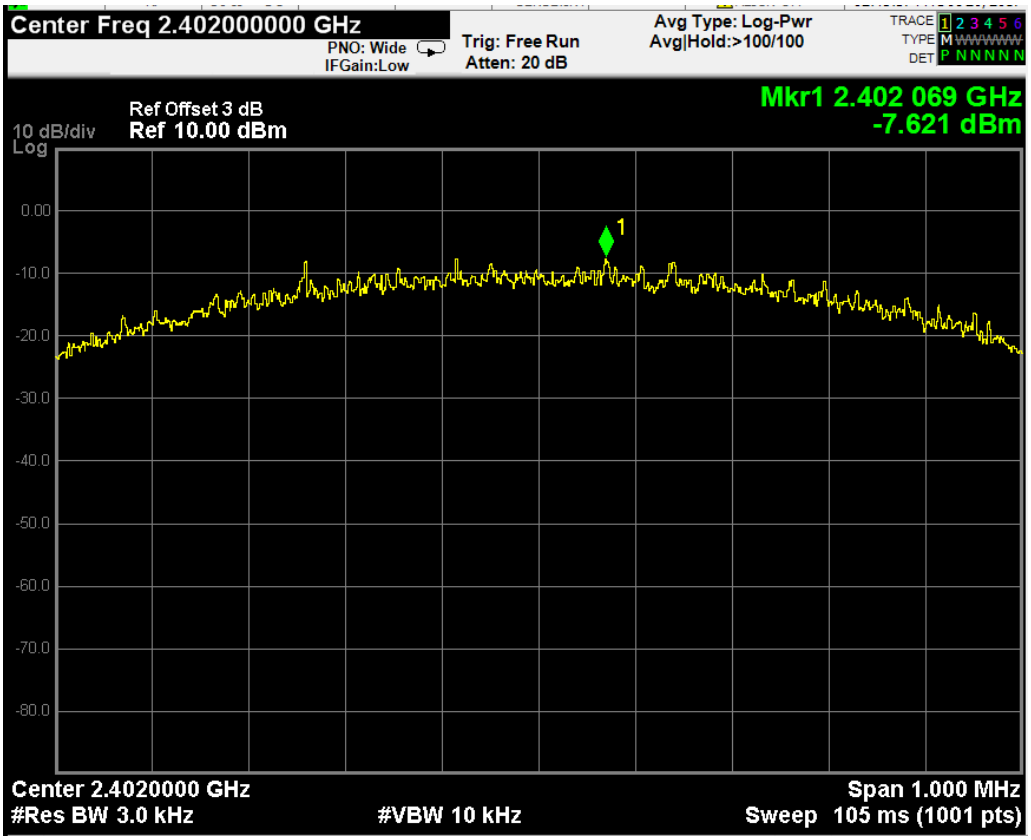
8.6 Test Results

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

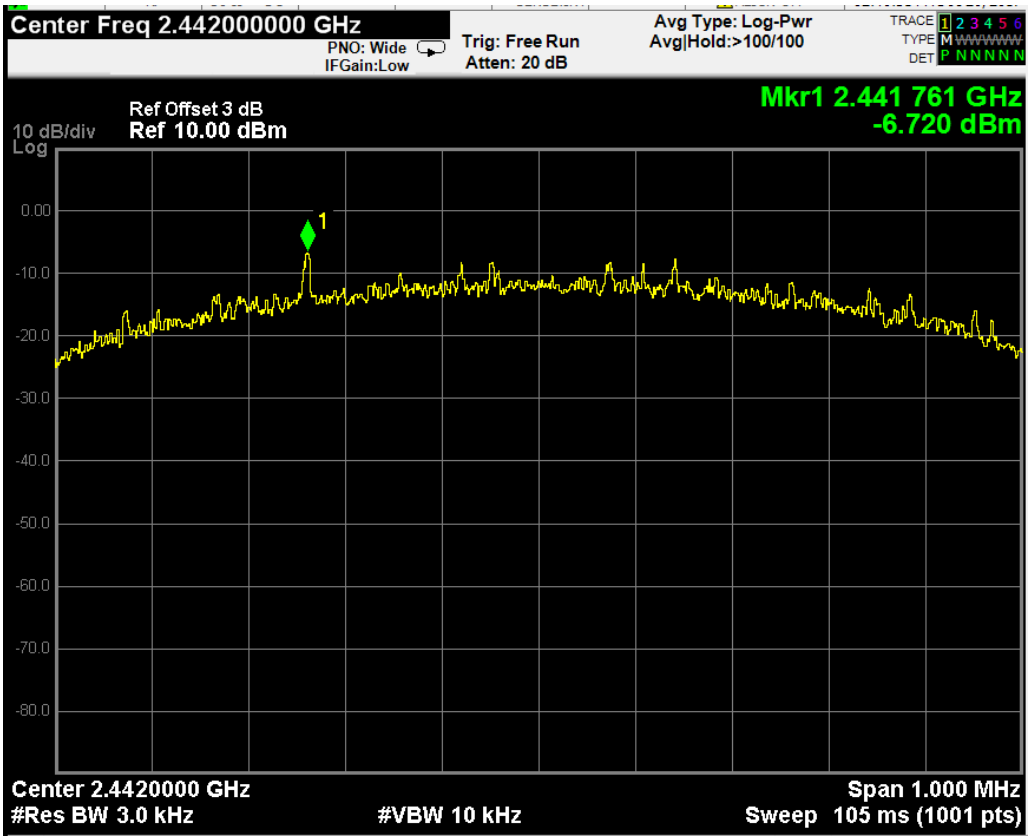
(Test Date: Dec. 20, 2017 Temperature: 23℃ Humidity: 51 %)

Channel	Frequency	Power Spectral Density	Limit
00	2402 MHz	-7.621 dBm	8dBm
20	2442 MHz	-6.720 dBm	8dBm
39	2480 MHz	-7.000 dBm	8dBm

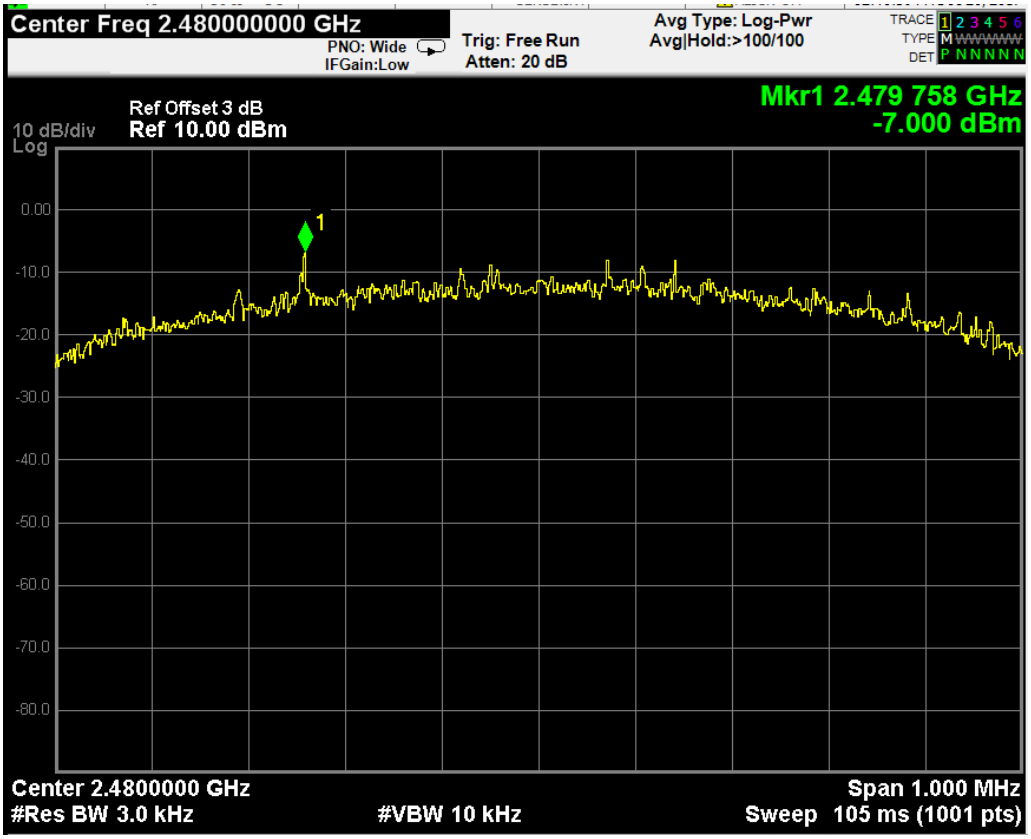
CH00 2402 MHz



CH20 2442 MHz



CH39 2480 MHz



9 DEVIATION TO TEST SPECIFICATIONS

None.