

TEST REPORT

On behalf of

Hisense Electric Co., Ltd.

Product Name: BT Remote

Model No.: ERF6D60, ERF6*60

FCC ID: W9HBRCB0008

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

Prepared By: Audix Technology (Shanghai) Co., Ltd.
3F and 4F, 34Bldg, 680 Guiping Rd.,
Caohejing Hi-Tech Park,
Shanghai 200233, China

Tel: +86-21-64955500

Fax: +86-21-64955491



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Date of Test : 2018.01.26 - 30
Date of Report : 2018.02.01

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. : Refer to Sec.2.1
(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*

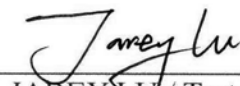
The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

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 2018.01.26 - 30 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.

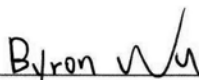
Date of Test : 2018.01.26 - 30 Date of Report : 2018.02.01

Producer :



JAREY LU / Test Engineer

Reviewer :



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 : BT Remote

Type of EUT : ☒ Production ☐ Pre-product ☐ Pro-type

Model Number : ERF6D60, ERF6*60

Note : The different of Models are as follows:

M/N	Difference	
ERF6D60	--	different printed word of keys
ERF6*60	“*” represents “0” ~ “9” or blank or “A” ~ “Z”, for different sales area and customer.	

Test Model : ERF6D60

Radio Tech : Bluetooth v4.1 BLE

Channel Freq. : 2402MHz-2480MHz

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

Modulation : GFSK

Antenna Gain : 3.5 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

Manufacturer : same as Applicant

Factory : same as Applicant

2.2 Description of Test Facility

Name of Firm : Audix Technology (Shanghai) Co., Ltd.

Site Location : 3F and 4F, 34Bldg, 680 Guiping Rd.,
Caohejing Hi-Tech Park,
Shanghai 200233, China.

Accredited by NVLAP, Lab Code : 200371-0

FCC Designation Number : CN5027

Test Firm Registration Number : 954668

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 = 6×10^{-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

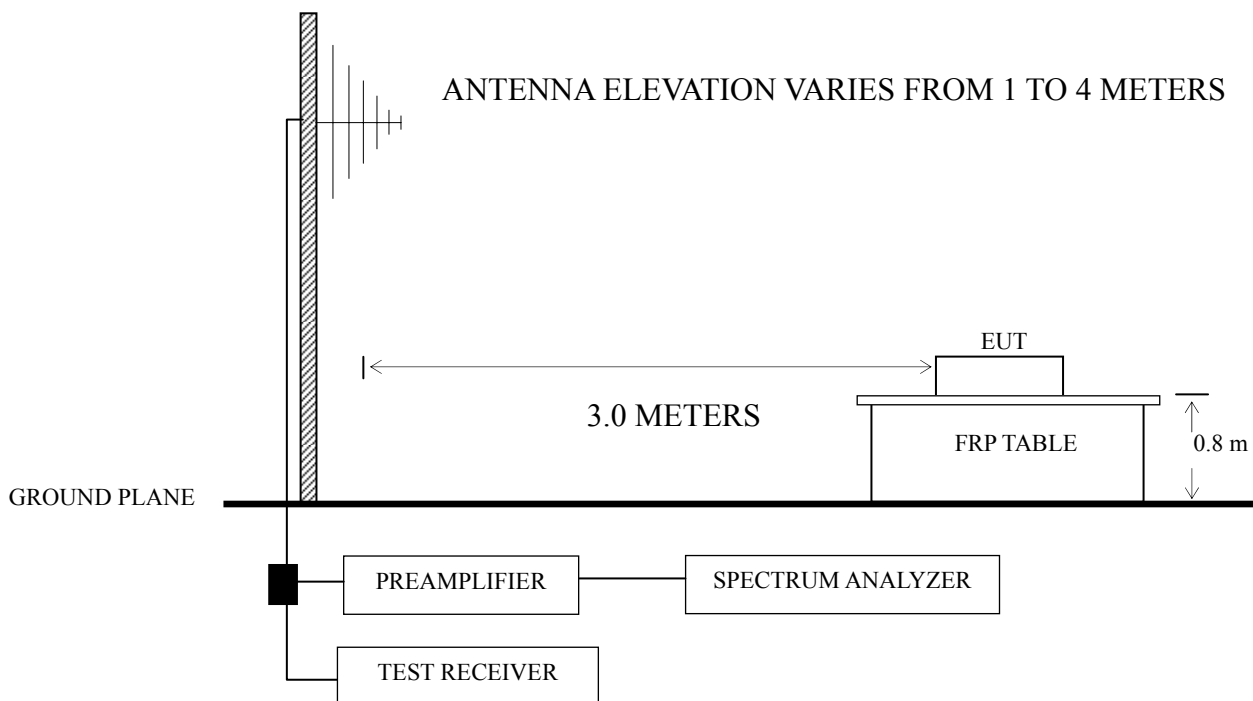
3.1 Test Equipment

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.	Preamplifier	Agilent	8447D	2944A06664	Apr 27, 2017	Apr 26, 2018
2.	Preamplifier	HP	8449B	3008A00864	Mar 20, 2017	Mar 19, 2018
3.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2017	Jun 11, 2018
4.	Test Receiver	R&S	ESCI	101303	May 07, 2017	May 06, 2018
5.	Bi-log Antenna	Schwarz beck	VULB 9168	708	Jul 20, 2017	Jul 19, 2018
6.	Horn Antenna	EMCO	3115	9607-4878	Jun 02, 2017	Jun 01, 2018
7.	Horn Antenna	EMCO	3116	00062643	Sep 08, 2017	Sep 08, 2019
8.	50Ω Coaxial Switch	Anritsu	MP59B	6200426390	Sep 17, 2017	Mar 17, 2018
9.	Software	Audix	E3	SET00200 9912M295-2	--	--

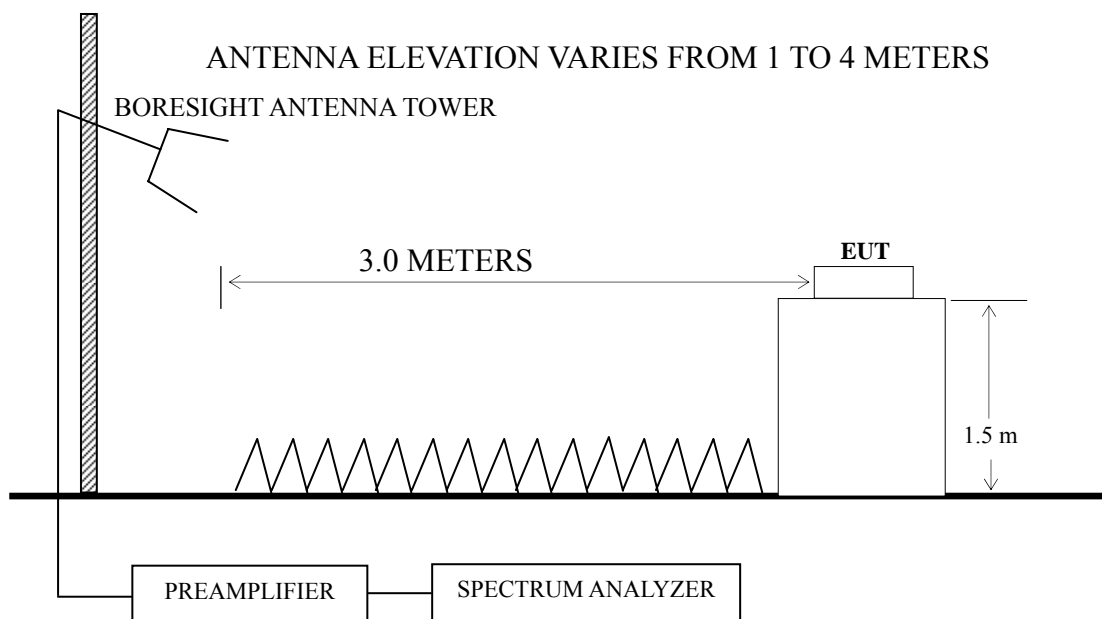
3.2 Block Diagram of Test Setup

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 10th 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 – 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

NOTE 4 – The emission levels which not reported are too low against the official limit.

NOTE 5 – The emission levels recorded below is data of EUT configured in Lying direction, for Lying direction was the maximum emission direction during the test. The data of Side & Standing direction are too low against the official limit to be reported.

NOTE 6 – 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°C

Model No. : ERF6D60 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2018.01.26

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	39.715	2.68	19.39	0.64	22.71	40	17.29	QP
	57.191	2.37	19.23	0.76	22.36	40	17.64	
	121.976	3.85	17.59	1.14	22.58	43.5	20.92	
	167.237	3.99	18.91	1.36	24.26	43.5	19.24	
	558.73	3.5	24.86	2.43	30.79	46	15.21	
	922.516	4.35	29.45	3.08	36.88	46	9.12	
Vertical	43.05	2.73	19.65	0.67	23.05	40	16.95	QP
	56.395	2.78	19.23	0.76	22.77	40	17.23	
	153.739	3.18	19.22	1.3	23.7	43.5	19.8	
	332.519	3.86	20.46	1.87	26.19	46	19.81	
	547.098	2.94	24.65	2.39	29.98	46	16.02	
	916.069	3.37	29.47	3.08	35.92	46	10.08	

TEST ENGINEER: Jarey

Radiated Emission > 1GHz

EUT : BT Remote Temperature : 22°C

Model No. : ERF6D60 Humidity : 51%RH

Test Mode : Transmitting Date of Test : 2018.01.26

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	1414.597	43.42	25.5	3.92	35.85	36.99	74	37.01	Peak
	2838.921	42.11	29.99	5.59	35.21	42.48	74	31.52	Peak
	4534.271	37.59	33.83	7.32	34.03	44.71	74	29.29	Peak
	5864.443	37.37	35.09	8.38	34.16	46.68	74	27.32	Peak
	11500.2	37.81	39.4	11.66	35.65	53.22	74	20.78	Peak
	16842.29	37.49	40.3	15.1	35.57	57.32	74	16.68	Peak
	16842.29	19.14	40.3	15.1	35.57	38.97	54	15.03	Average
Vertical	1721.834	42.35	26.81	4.31	35.54	37.93	74	36.07	Peak
	2871.934	41.56	30.1	5.59	35.21	42.04	74	31.96	Peak
	5002.497	37.11	34.2	7.79	33.9	45.2	74	28.8	Peak
	8059.475	38.01	38.57	9.69	35.87	50.4	74	23.6	Peak
	11044.13	37.63	39.21	11.25	35.6	52.49	74	21.51	Peak
	14660.48	39.03	40.63	13.79	35.73	57.72	74	16.28	Peak
	14660.48	20.06	40.63	13.79	35.73	38.75	54	15.25	Average

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	1529.414	44.07	26.03	4.07	35.73	38.44	74	35.56	Peak
	2625.796	41.94	29.26	5.35	35.23	41.32	74	32.68	Peak
	4721.515	37.9	33.98	7.52	33.98	45.42	74	28.58	Peak
	7242.052	39.38	37.45	9.14	35.45	50.52	74	23.48	Peak
	10484.23	37.6	38.98	10.96	35.44	52.1	74	21.9	Peak
	14366.84	37.71	41.3	13.53	35.33	57.21	74	16.79	Peak
	14366.84	17.94	41.3	13.53	35.33	38.44	54	15.56	Average
Vertical	1394.3	42.96	25.4	3.9	35.88	36.38	74	37.62	Peak
	2471.157	41.96	28.75	5.19	35.25	40.65	74	33.35	Peak
	4521.185	38.64	33.82	7.32	34.04	45.74	74	28.26	Peak
	6303.89	37.51	35.81	8.64	34.55	47.41	74	26.59	Peak
	9669.164	37.21	38.77	10.49	35.33	51.14	74	22.86	Peak
	16891.04	37.76	40.4	15.36	35.58	57.94	74	16.06	Peak
	16891.04	18.34	40.4	15.36	35.58	38.52	54	15.48	Average

CH39 (2480MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1503.119	43.38	25.92	4.04	35.76	37.58	74	36.42	Peak
	2790.113	41.09	29.83	5.55	35.22	41.25	74	32.75	Peak
	4640.339	37.95	33.92	7.46	34	45.33	74	28.67	Peak
	7650.888	37.92	38.09	9.41	35.7	49.72	74	24.28	Peak
	12219.85	37.94	39	12.17	35.46	53.65	74	20.35	Peak
	16174.37	38.6	39.47	14.6	35.43	57.24	74	16.76	Peak
	16174.37	19.16	39.47	14.6	35.43	37.81	54	16.19	Average
Vertical	1741.856	41.22	26.89	4.34	35.52	36.93	74	37.07	Peak
	2806.288	42.16	29.88	5.55	35.22	42.37	74	31.63	Peak
	5330.928	36.37	34.6	8	34.01	44.96	74	29.04	Peak
	8200.463	37.43	38.31	9.78	35.8	49.72	74	24.28	Peak
	11533.48	38.02	39.37	11.66	35.65	53.4	74	20.6	Peak
	17741.74	34.05	43.8	15.98	35.22	58.61	74	15.39	Peak
	17741.74	13.18	43.8	15.98	35.22	37.74	54	16.26	Average

TEST ENGINEER: Jarey

EUT : BT Remote Temperature : 22℃

Model No. : ERF6D60 Humidity : 51%RH

Test Mode : Receiving Date of Test : 2018.01.26

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	42.007	2.68	19.56	0.66	-	22.9	40	17.1	QP
	57.999	2.52	19.22	0.77	-	22.51	40	17.49	
	127.218	3.35	17.81	1.17	-	22.33	43.5	21.17	
	153.739	3.54	19.22	1.3	-	24.06	43.5	19.44	
	472.176	2.87	23.56	2.23	-	28.66	46	17.34	
	848.056	3.31	28.73	2.94	-	34.98	46	11.02	
	1481.553	43.15	25.82	4.01	35.78	37.2	74	36.8	PK
	2758.041	41.59	29.72	5.51	35.22	41.6	74	32.4	
	4469.214	38.18	33.74	7.26	34.05	45.13	74	28.87	
	6545.263	38.6	36.27	8.75	34.81	48.81	74	25.19	
	11269.86	37.5	39.31	11.52	35.63	52.7	74	21.3	
	15713.56	38.64	38.91	14.26	35.6	56.21	74	17.79	
	15713.56	19.63	38.91	14.26	35.6	37.2	54	16.8	AV
Vertical	40.702	2.78	19.46	0.65	-	22.89	40	17.11	QP
	57.191	2.89	19.23	0.76	-	22.88	40	17.12	
	160.909	2.92	19.49	1.33	-	23.74	43.5	19.76	
	323.32	3.36	20.42	1.84	-	25.62	46	20.38	
	601.427	2.93	25.69	2.52	-	31.14	46	14.86	
	890.728	3.34	28.95	3.03	-	35.32	46	10.68	
	1653.55	42.32	26.55	4.22	35.61	37.48	74	36.52	PK
	2702.799	42.33	29.53	5.43	35.23	42.06	74	31.94	
	4469.214	37.85	33.74	7.26	34.05	44.8	74	29.2	
	7852.524	38	38.45	9.54	35.81	50.18	74	23.82	
	11433.91	37.69	39.37	11.66	35.65	53.07	74	20.93	
	16174.37	38.48	39.47	14.6	35.43	57.12	74	16.88	
	16174.37	18.93	39.47	14.6	35.43	37.57	54	16.43	AV

TEST ENGINEER: Jarey

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 ($\geq 98\%$ 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 (μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)	Remark
Horizontal	2366.308	41.62	28.55	5.08	35.26	39.99	74	34.01	Peak
	2366.308	17.09	28.55	5.08	35.26	15.46	54	38.54	Average
	2390	41.74	28.59	5.12	35.26	40.19	74	33.81	Peak
	2390	17.14	28.59	5.12	35.26	15.59	54	38.41	Average
	2483.5	41.04	28.77	5.19	35.25	39.75	74	34.25	Peak
	2483.5	16.17	28.77	5.19	35.25	14.88	54	39.12	Average
	2493.252	41.39	28.79	5.23	35.25	40.16	74	33.84	Peak
	2493.252	16.04	28.79	5.23	35.25	14.81	54	39.19	Average
Vertical	2367.381	41.24	28.55	5.08	35.26	39.61	74	34.39	Peak
	2367.391	16.14	28.55	5.08	35.26	14.51	54	39.49	Average
	2390	41.01	28.59	5.12	35.26	39.46	74	34.54	Peak
	2390	16.16	28.59	5.12	35.26	14.61	54	39.39	Average
	2483.5	40.94	28.77	5.19	35.25	39.65	74	34.35	Peak
	2483.5	16.04	28.77	5.19	35.25	14.75	54	39.25	Average
	2495.777	41.67	28.79	5.23	35.25	40.44	74	33.56	Peak
	2495.777	16.47	28.79	5.23	35.25	15.24	54	38.76	Average

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

Note2 – The antenna gain (3.5dBi) and cable loss (0.5dB) were set as offset (3dB) 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 – $EIRP = E + 20\log D - 104.8$

Where: EIRP = equivalent isotropic radiated power in dBm,

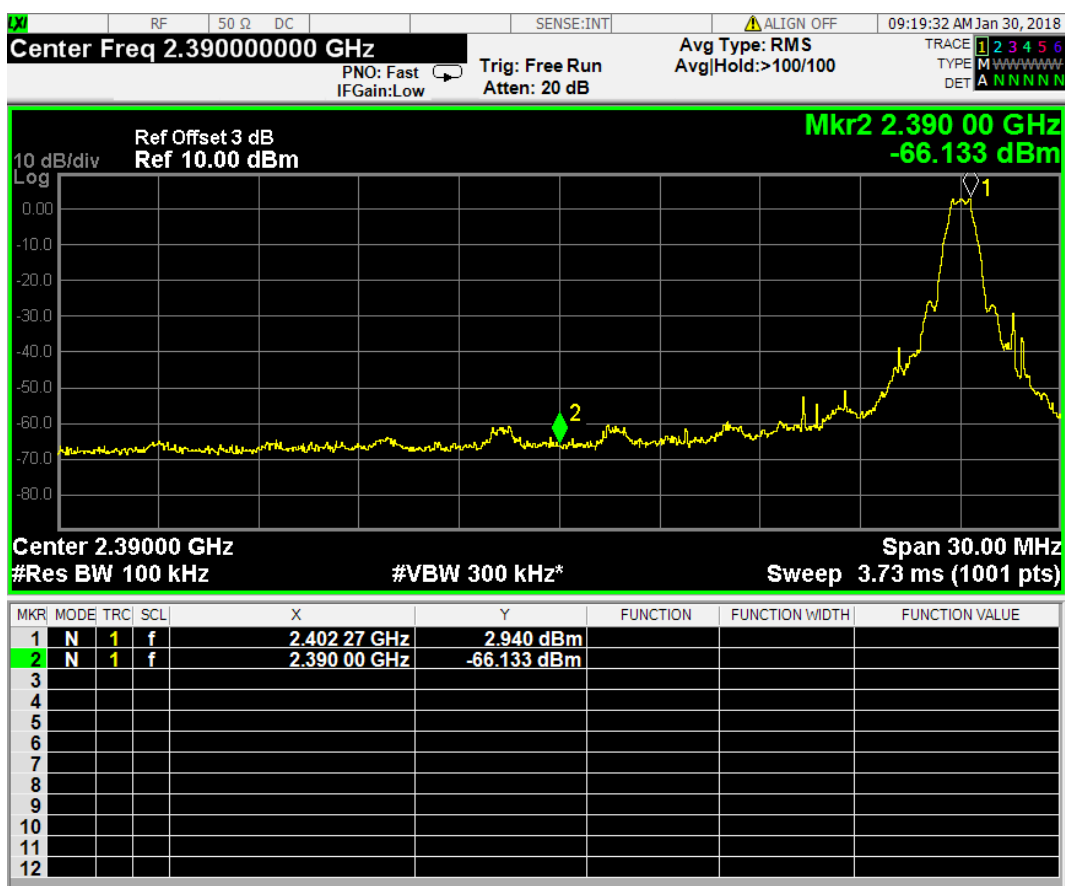
E = electric field strength in dBμV/m,

D = specified measurement distance in meters.

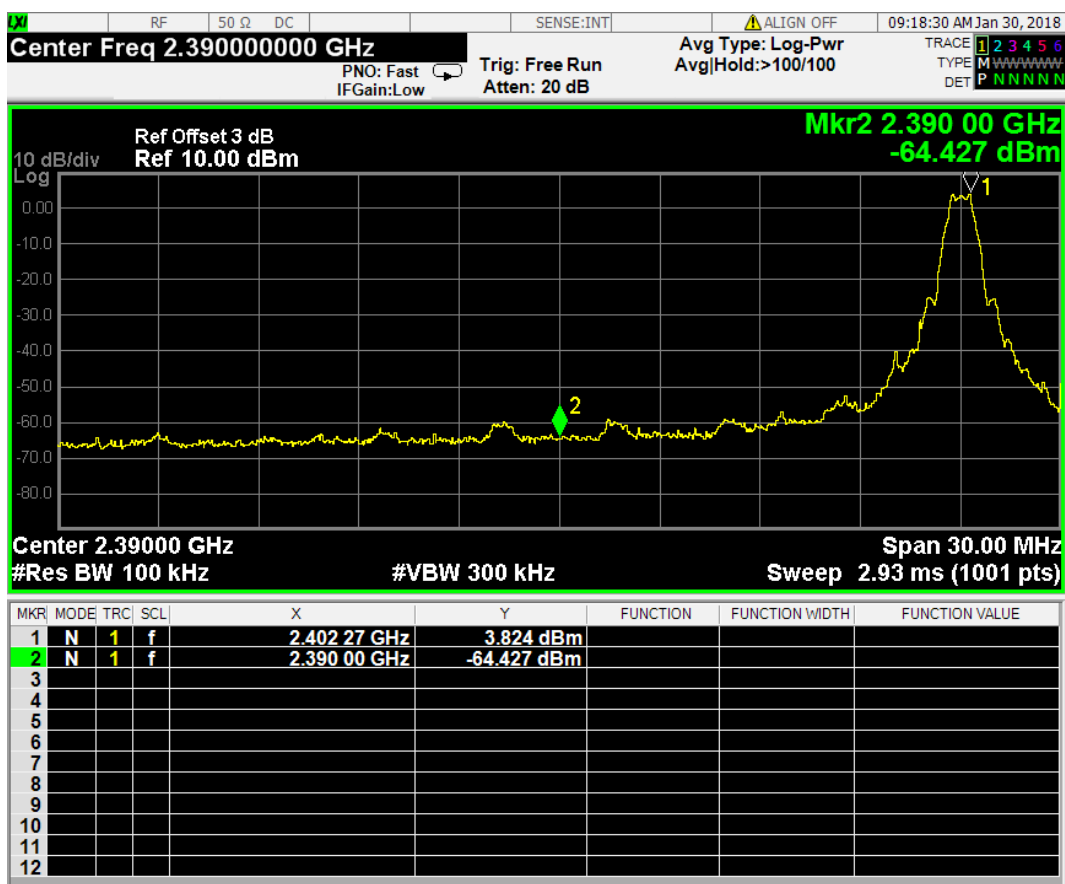
The Average Power limit = -41.2 dBm

The Peak Power limit = -21.2 dBm

AV Result on CH00



PK Result on CH00



[illegible][illegible]

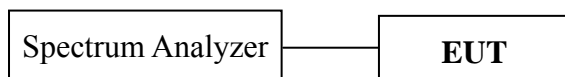
4 6 dB BANDWIDTH MEASUREMENT

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, 2017	Jun 11, 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 settings: RBW = 100kHz, VBW $\geq 3 \times$ RBW.

The 6 dB bandwidth is defined as the total spectrum the power of which is lower 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

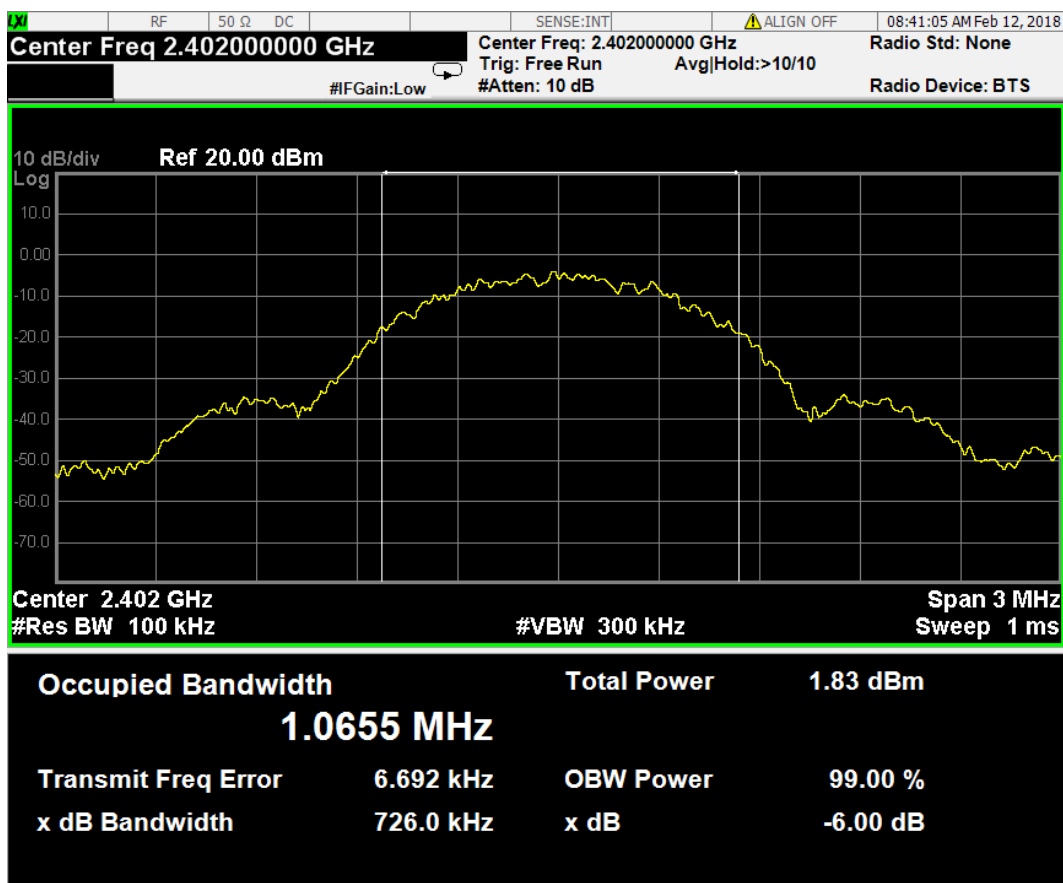
PASSED.

All the test results are attached in next pages.

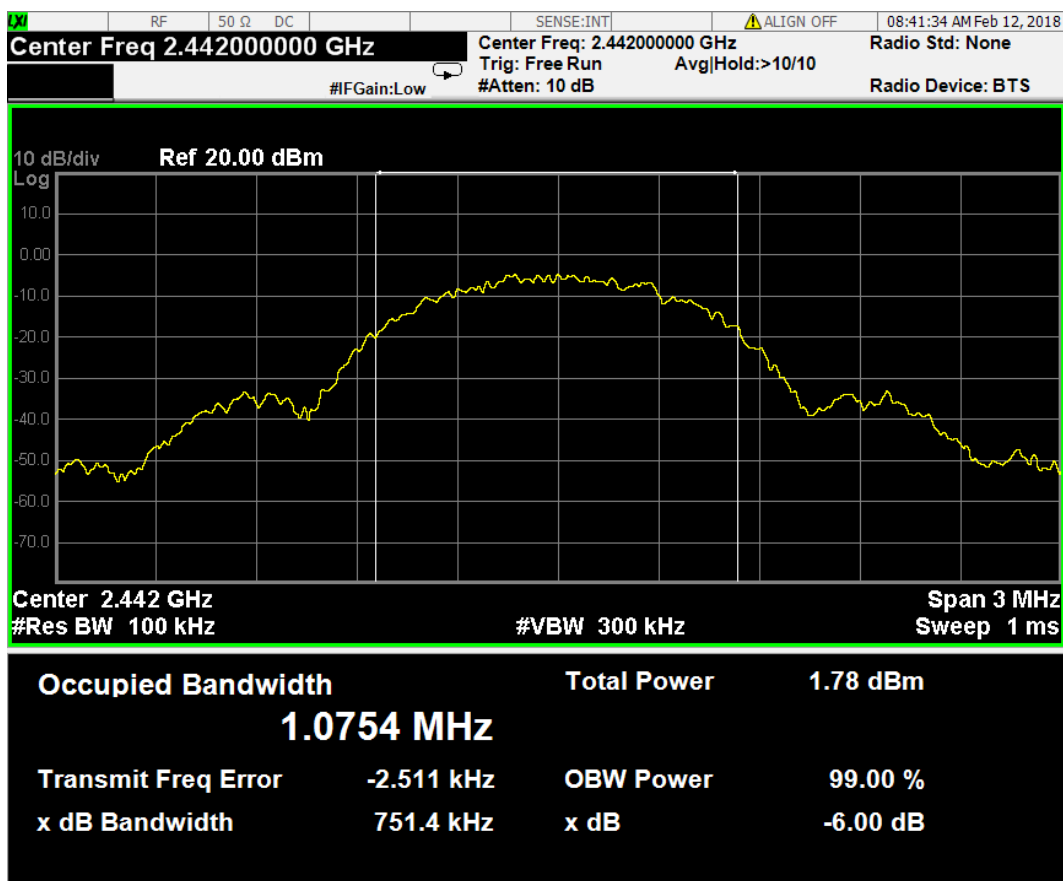
(Test Date: 2018.01.30 Temperature: 23℃ Humidity: 51 %)

Channel	Frequency	6dB Bandwidth
00	2402 MHz	726.0 kHz
20	2442 MHz	751.4 kHz
39	2480 MHz	783.9 kHz

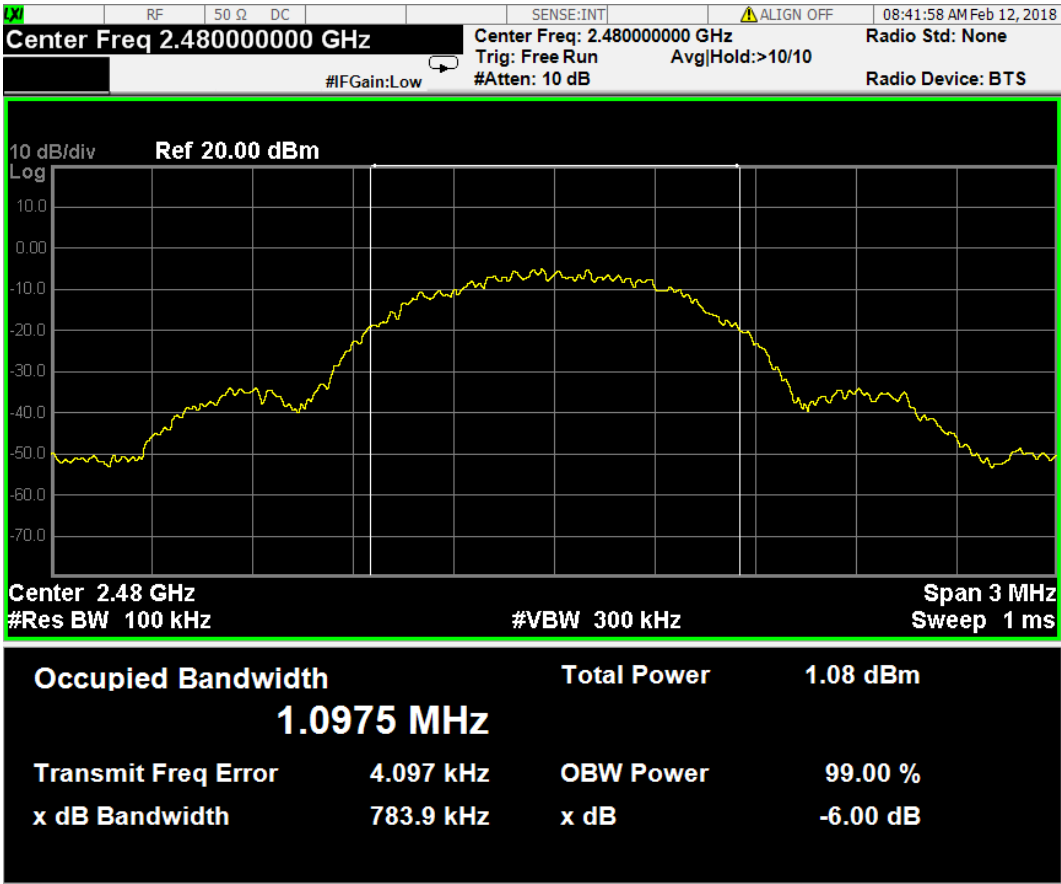
CH00 (2402 MHz)



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	N9010A	MY52221182	Jun 12, 2017	Jun 11, 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 transmitter output was connected to the spectrum analyzer with settings:

- a) Span $\geq 1.5 \times \text{OBW}$.
- b) RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
- c) VBW $\geq [3 \times \text{RBW}]$.
- d) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$.
- e) Sweep time = auto.
- f) Detector = RMS.
- g) The trigger set to “free run.”
- h) Band limits set great or equal to the OBW.

The test procedure is defined in ANSI C63.10-2013 (11.9.2.2.2 Measurement Procedure “Method AVGSA-1” was used).

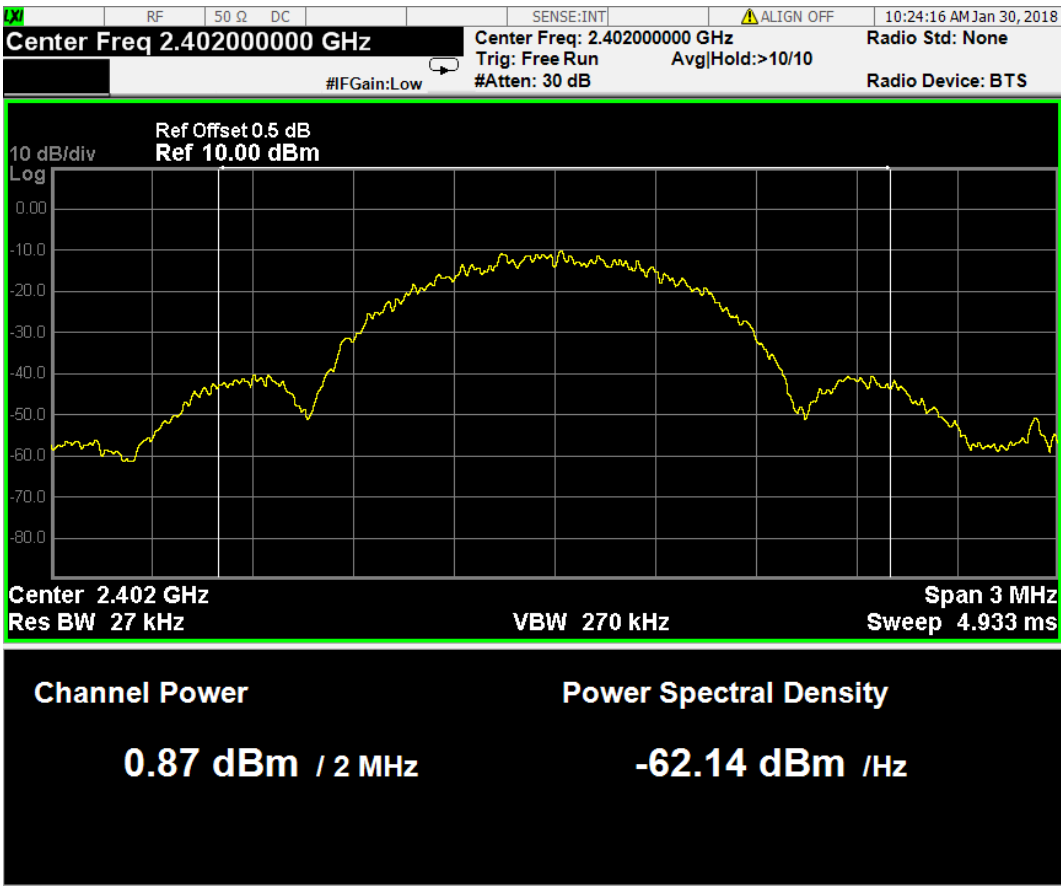
5.6 Test Results

PASSED. All the test results are listed below.

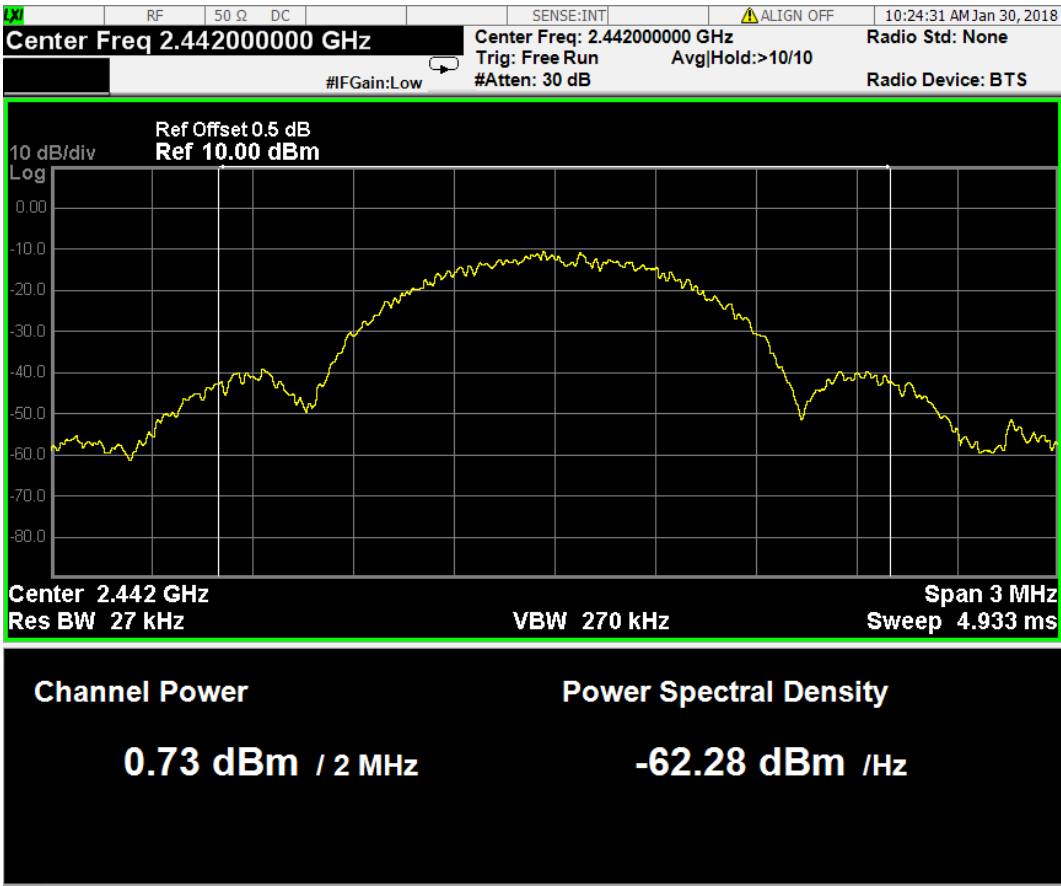
(Test Date: 2018.01.30 Temperature: 23°C Humidity: 51 %)

Channel	Frequency	Peak Output Power	Limit
00	2402 MHz	0.87 dBm	30 dBm
20	2442 MHz	0.73 dBm	30 dBm
39	2480 MHz	0.93 dBm	30 dBm

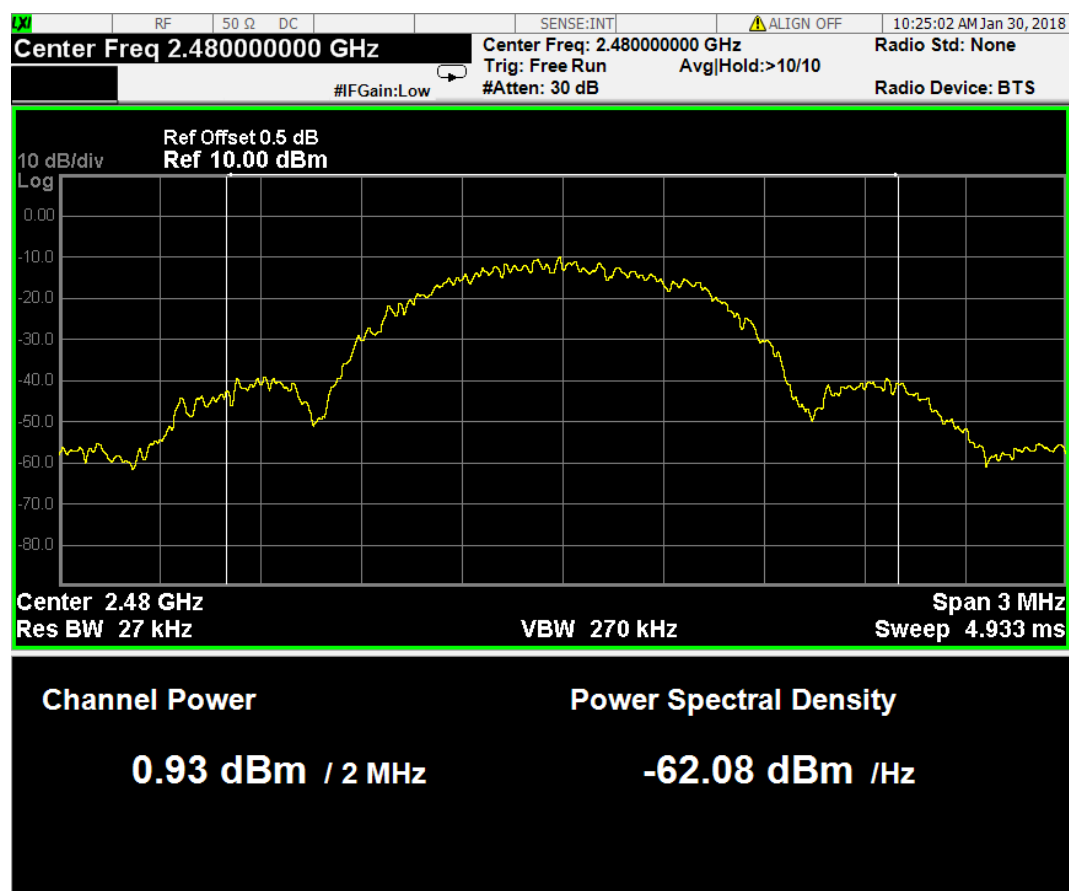
CH00 (2402 MHz)



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	N9010A	MY52221182	Jun 12, 2017	Jun 11, 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 spectrum analyzer. Set RBW = 100 kHz, VBW \geq 300 kHz, scan up through 10th harmonic.

When maximum conducted (average) output power was used to determine compliance as described in 11.9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz.

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: 2018.01.30 Temperature: 23℃ Humidity: 51 %)

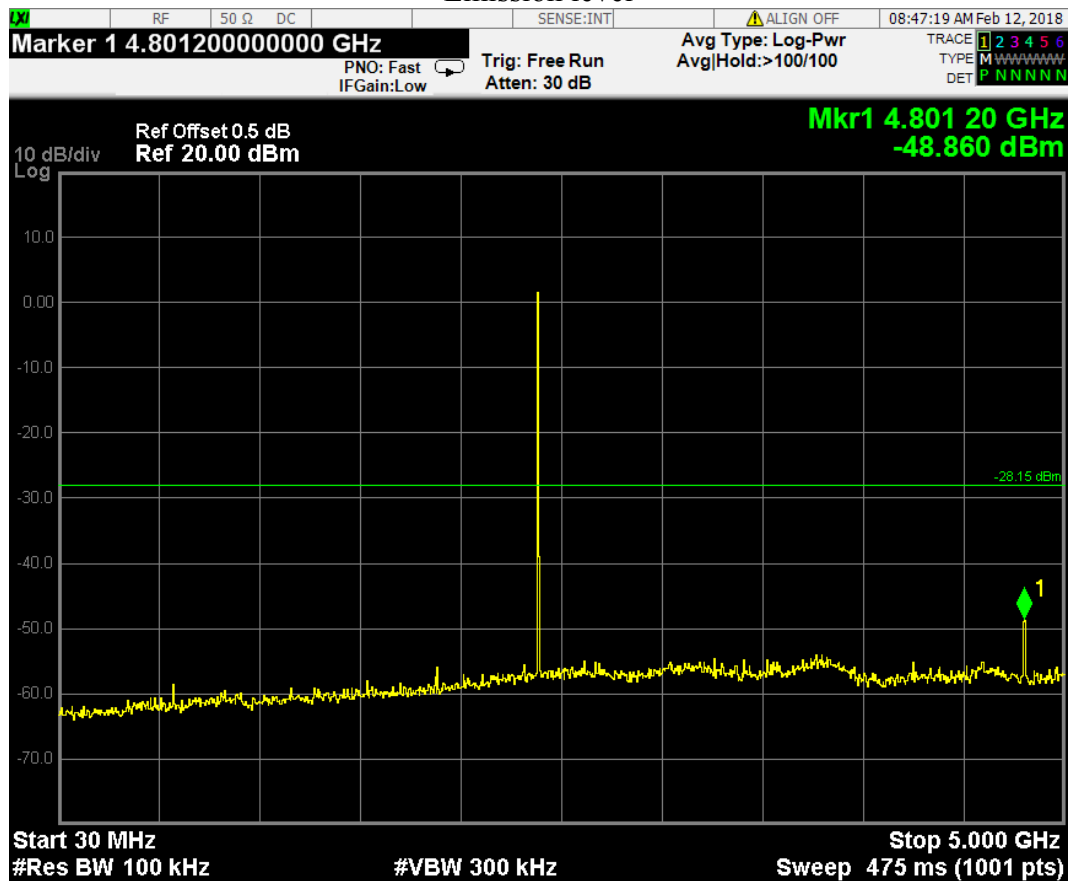
Channel	Data Page
00	P27-28
20	P29-30
39	P31-32

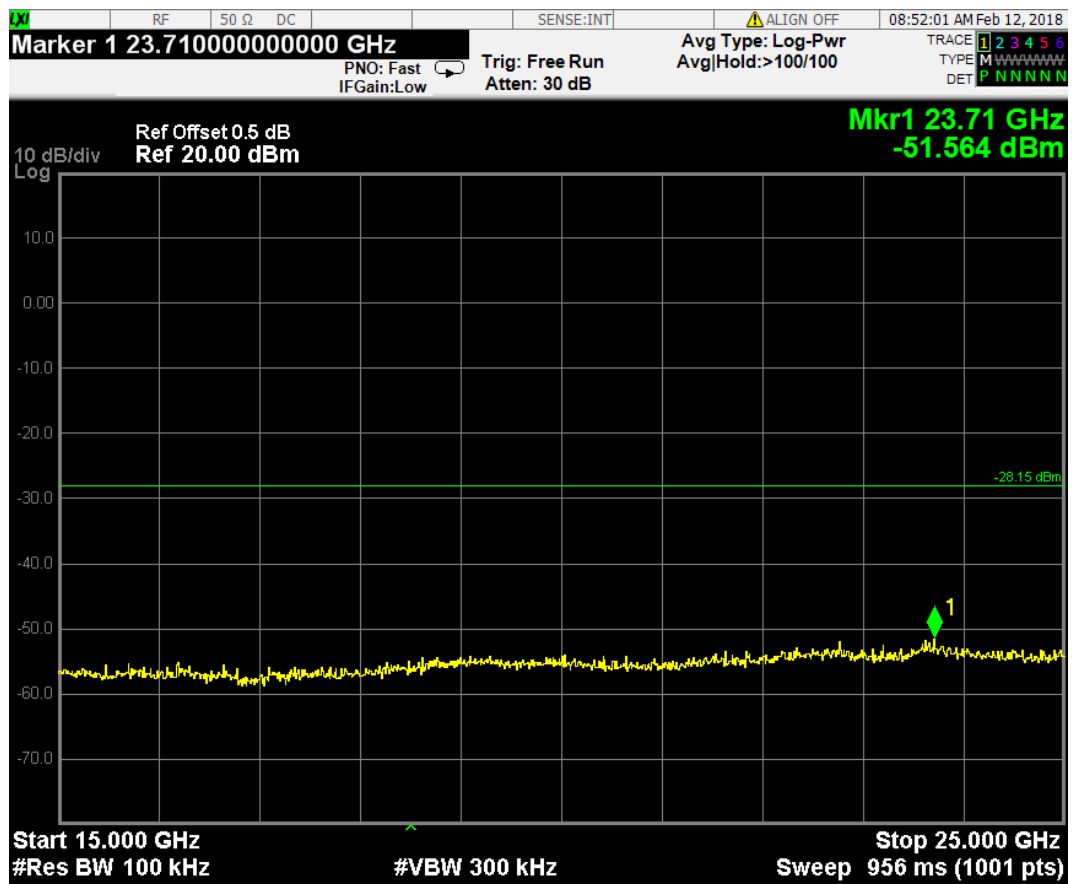
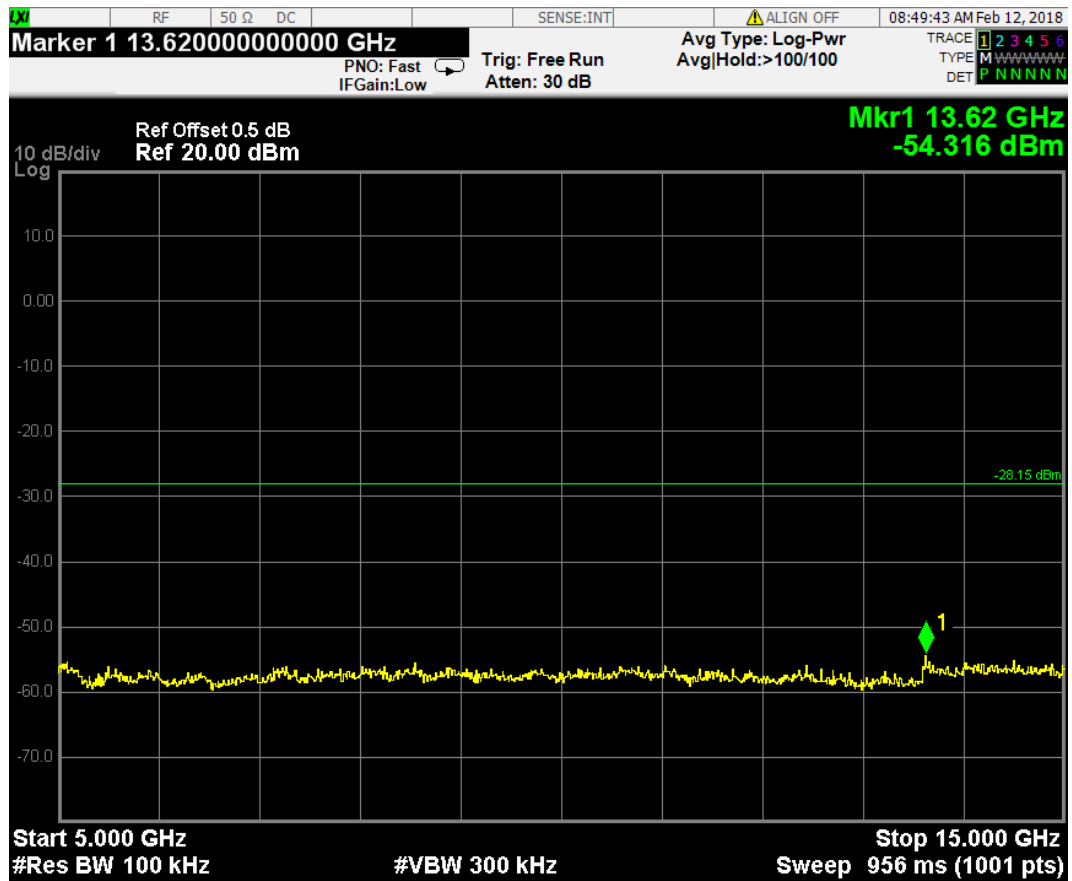
CH00 (2402 MHz)

Reference level



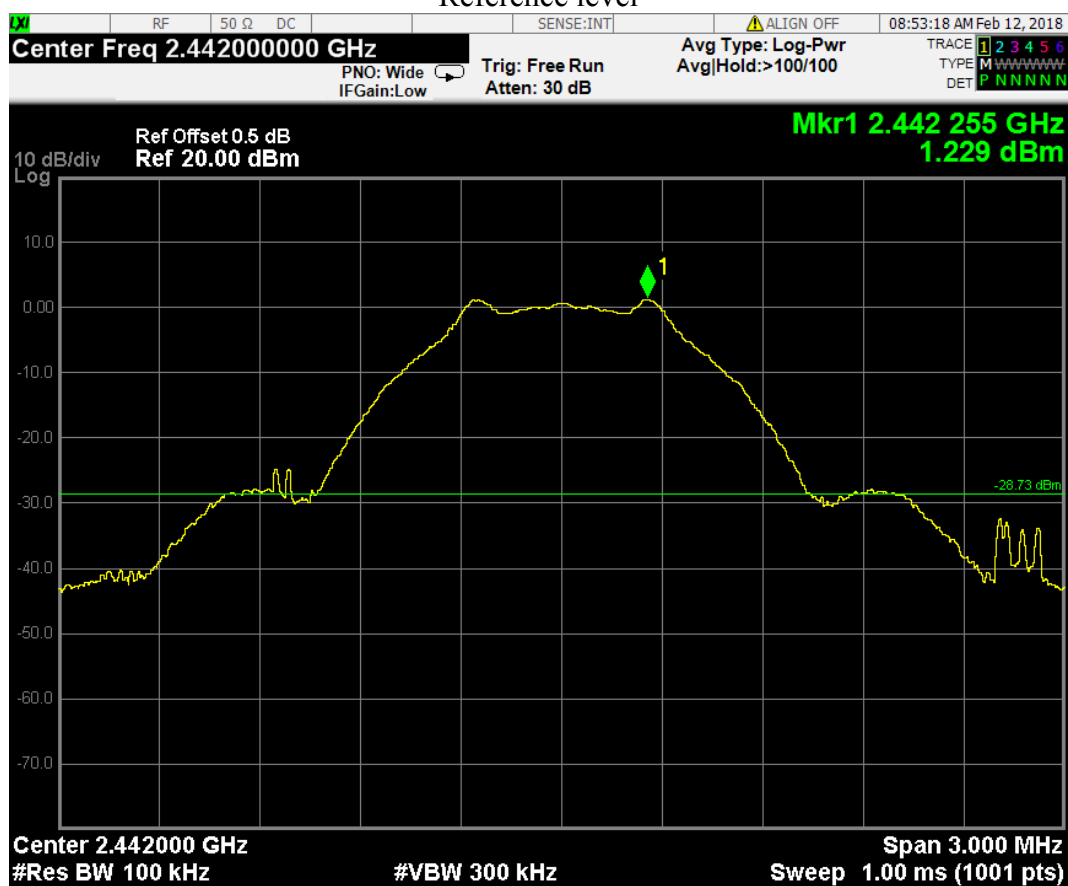
Emission level



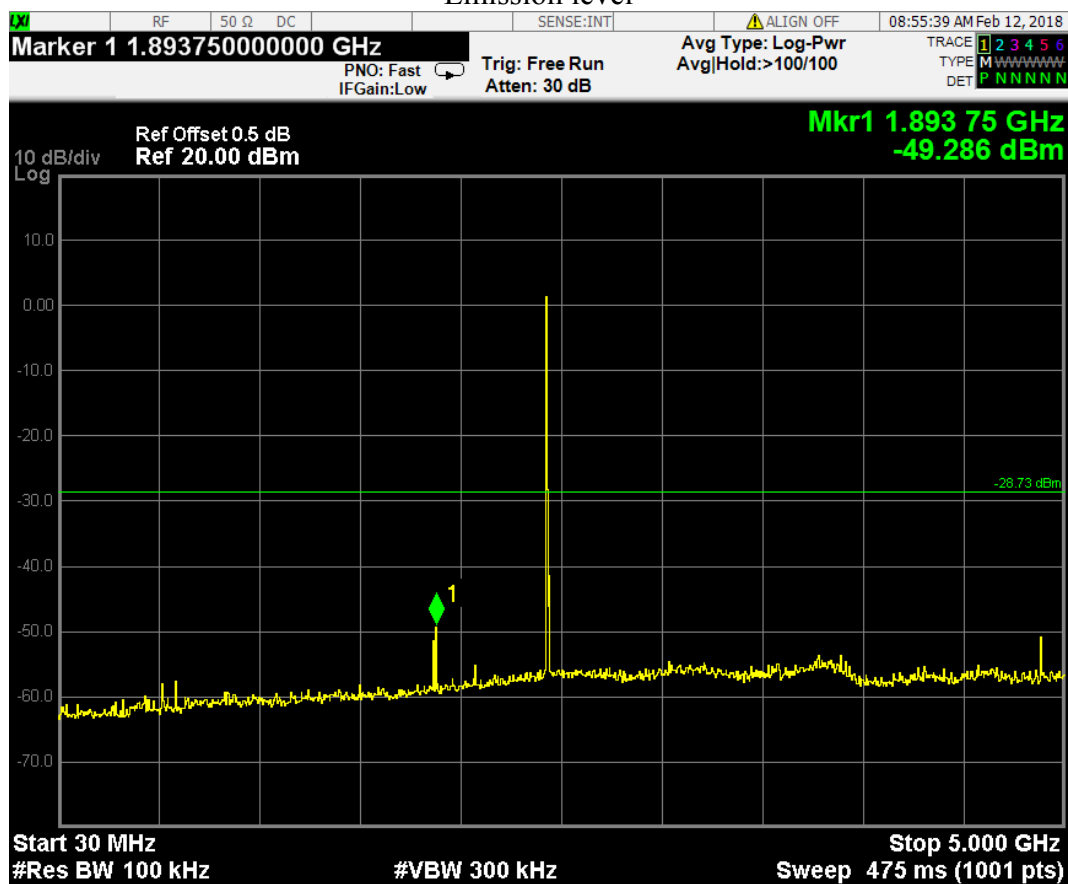


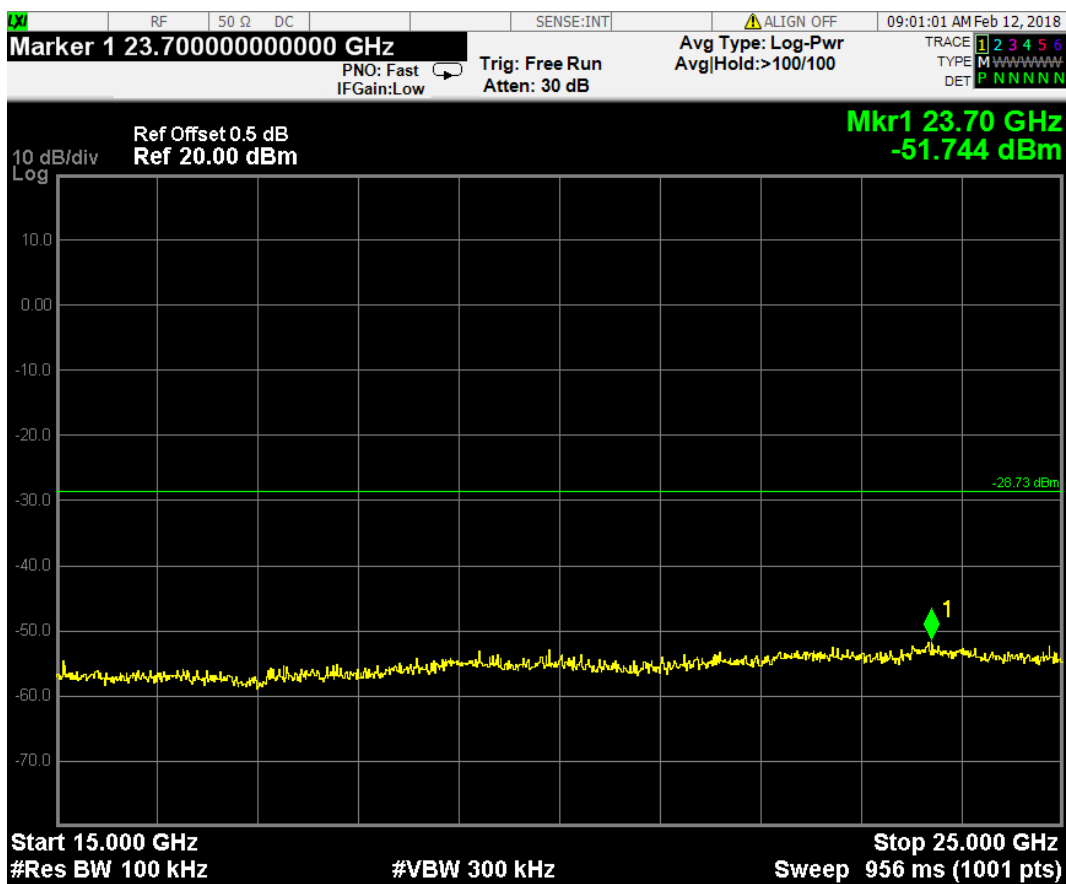
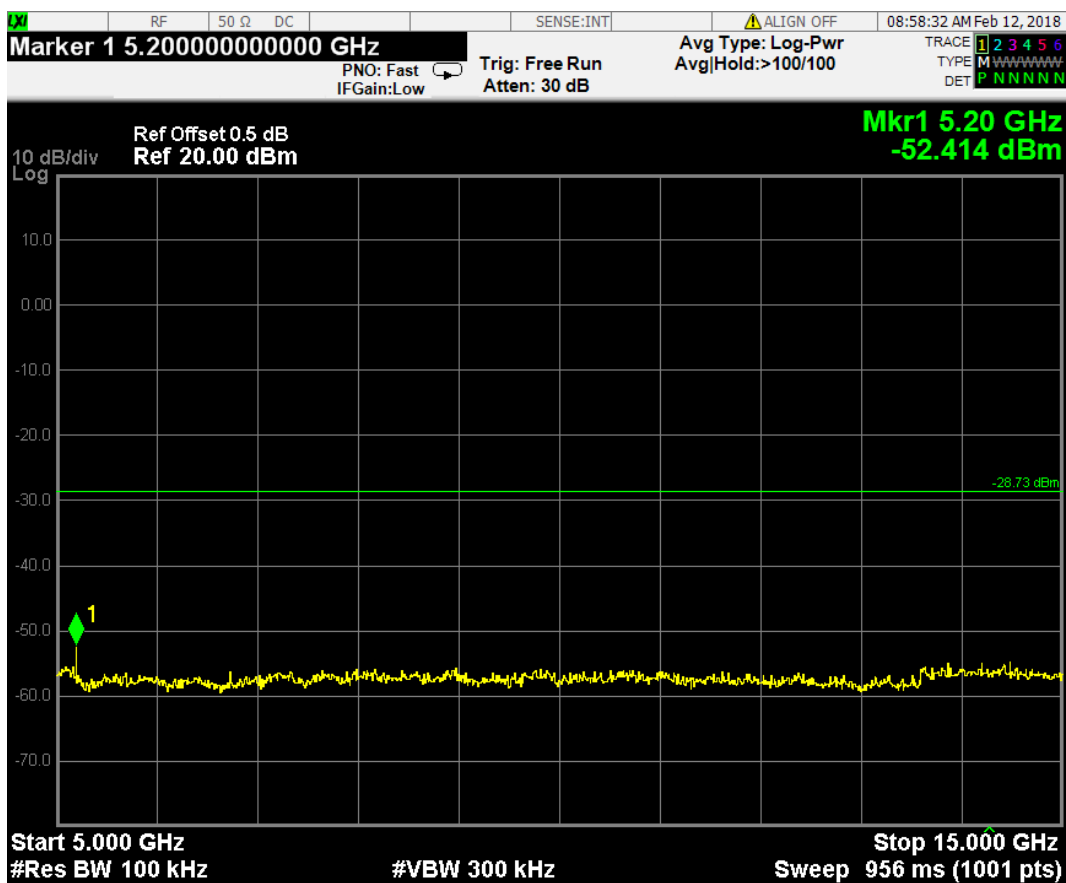
CH20 (2442 MHz)

Reference level



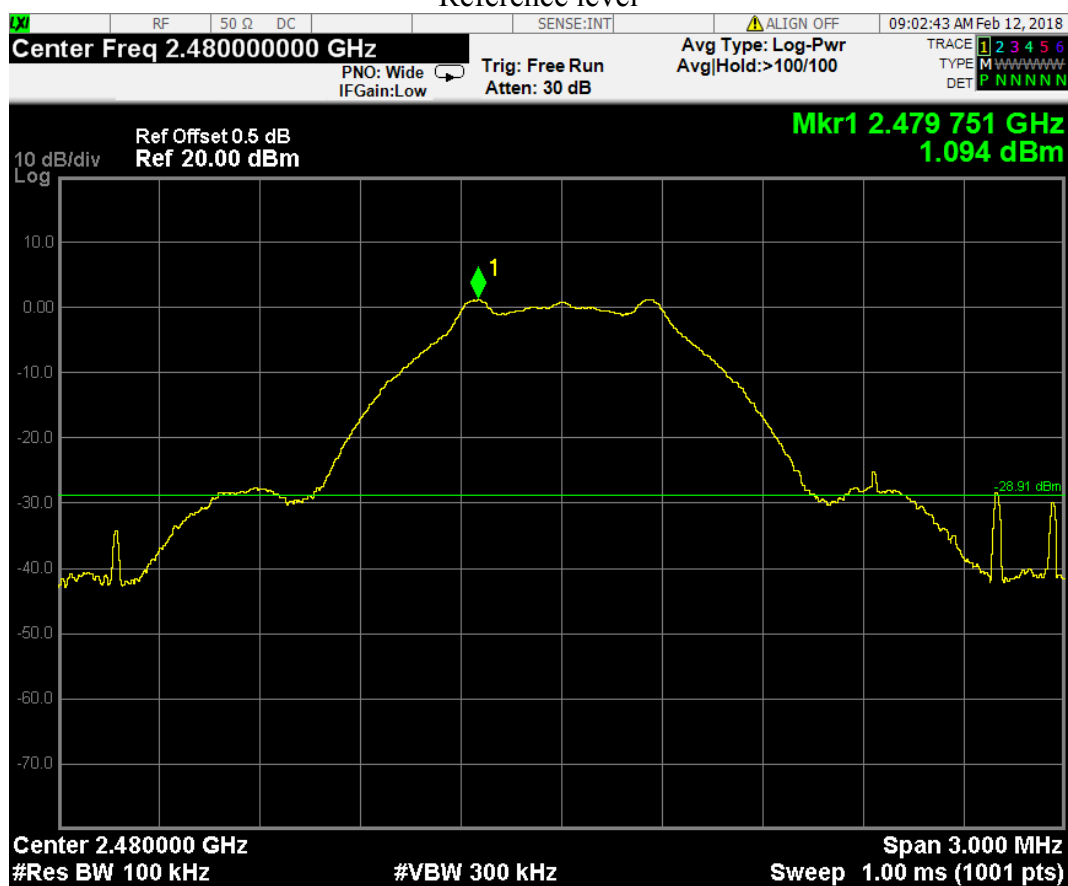
Emission level



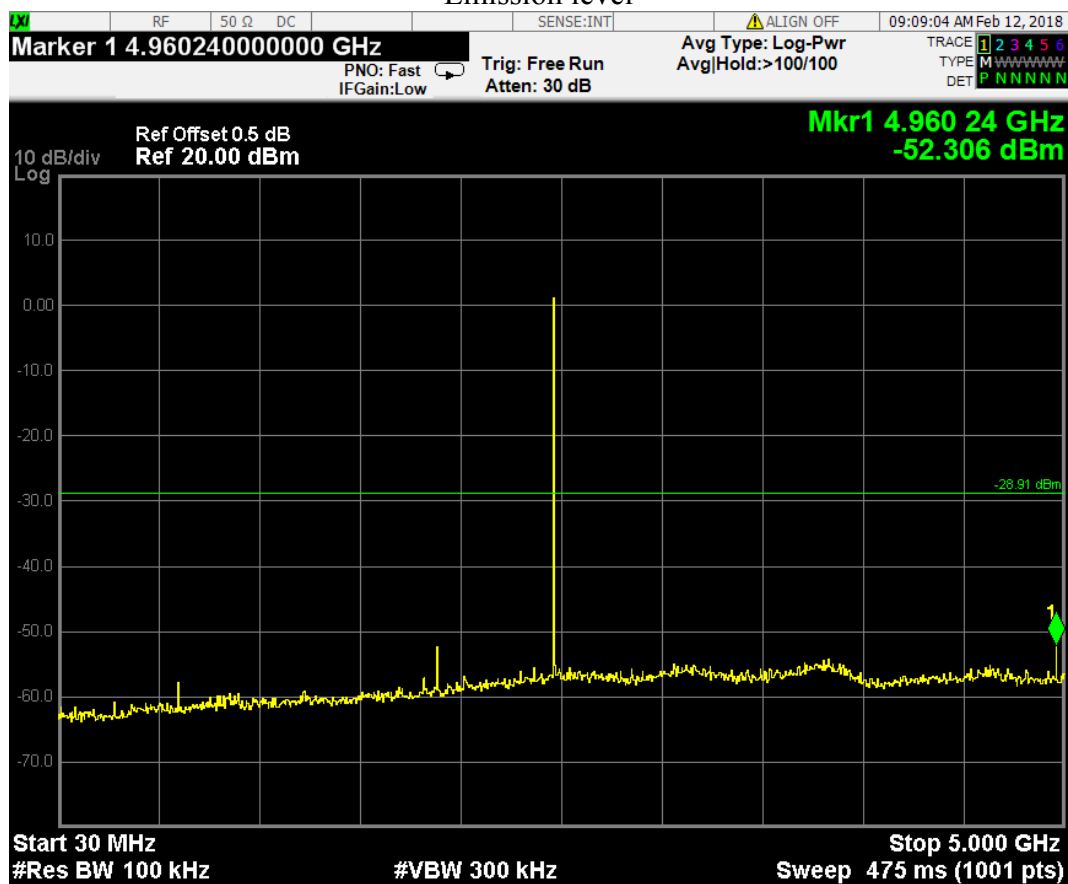


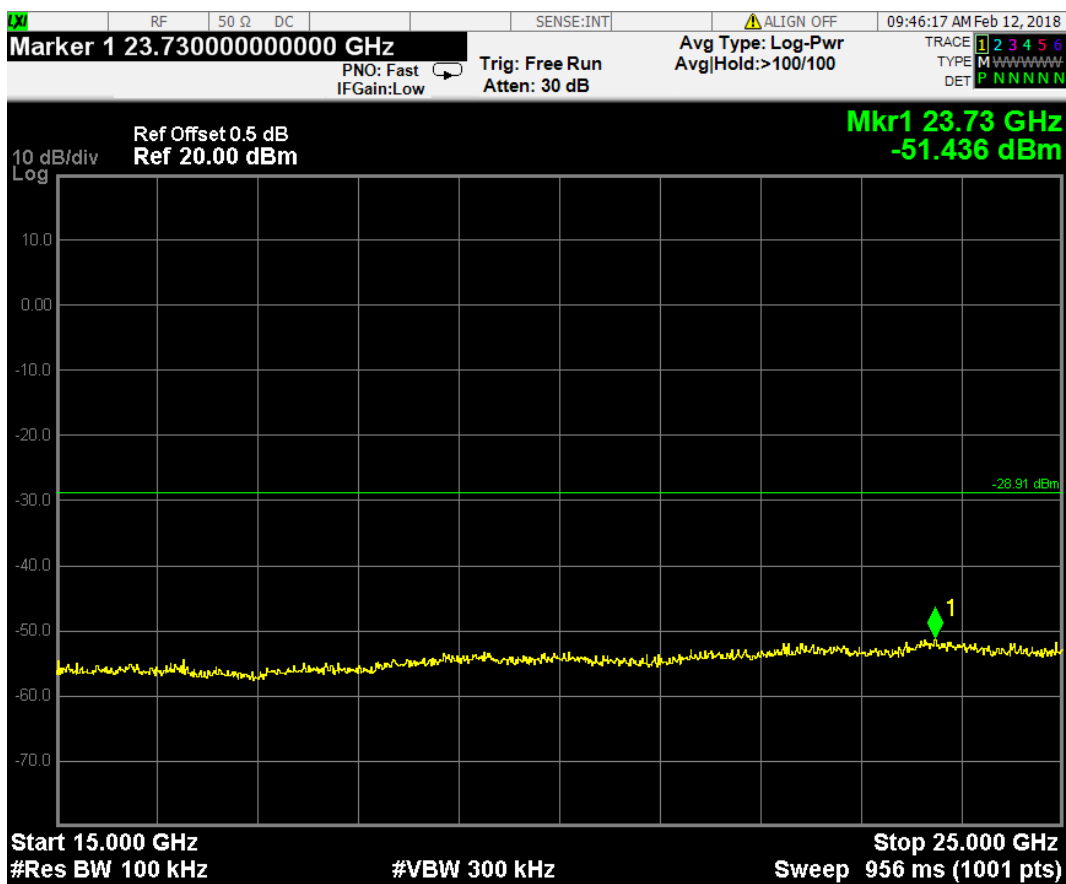
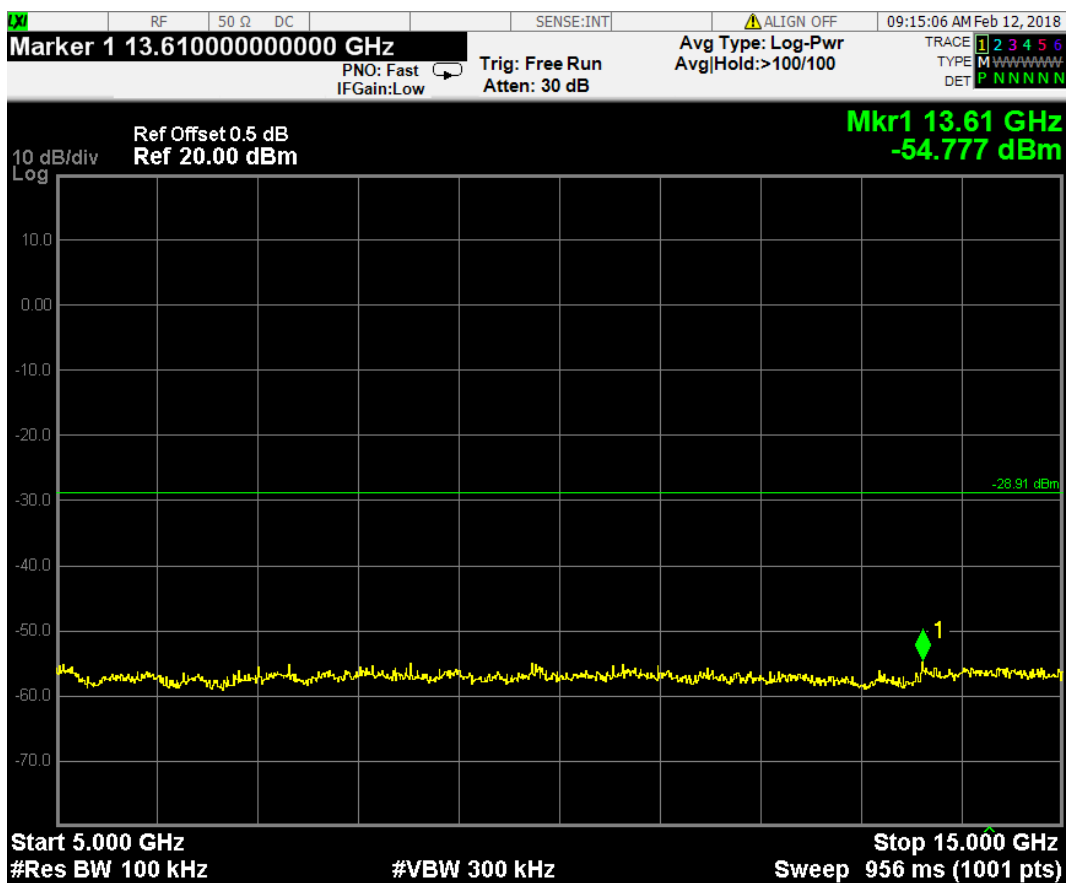
CH39 (2480 MHz)

Reference level



Emission level





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, 2017	Jun 11, 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 spectrum analyzer. 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).

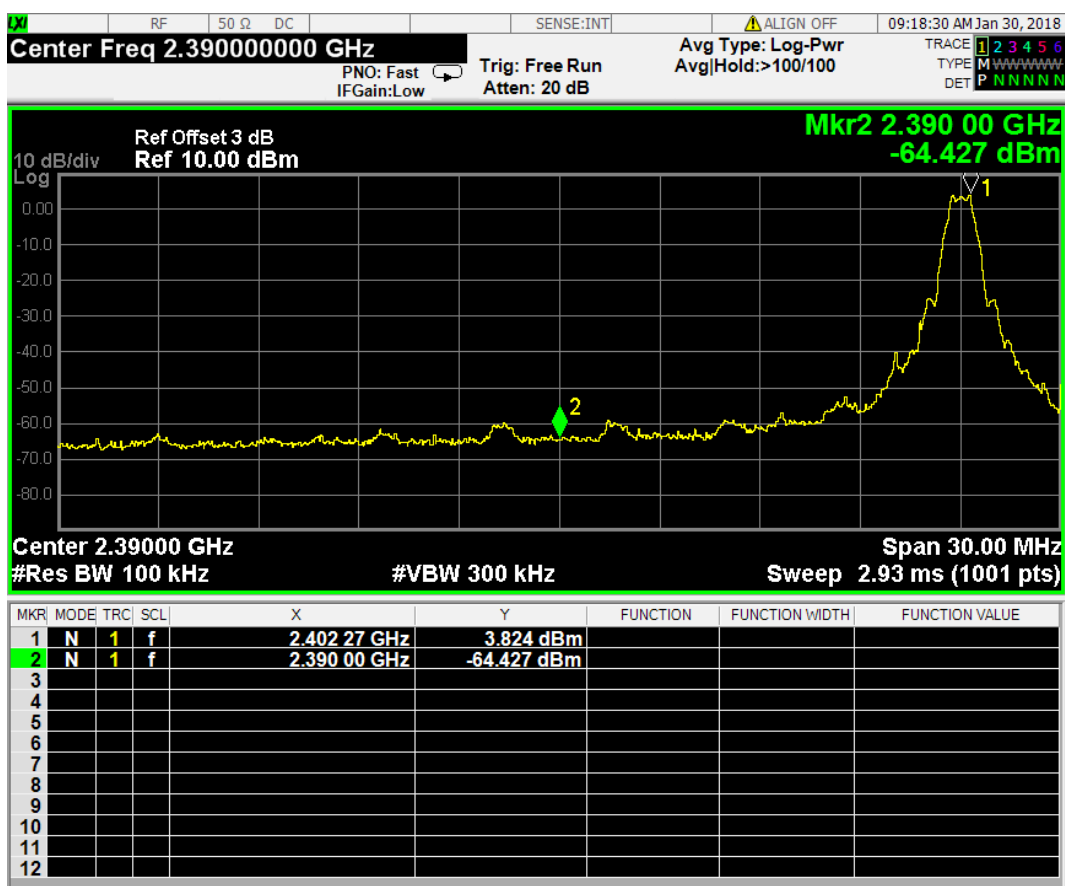
7.6 Test Results

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

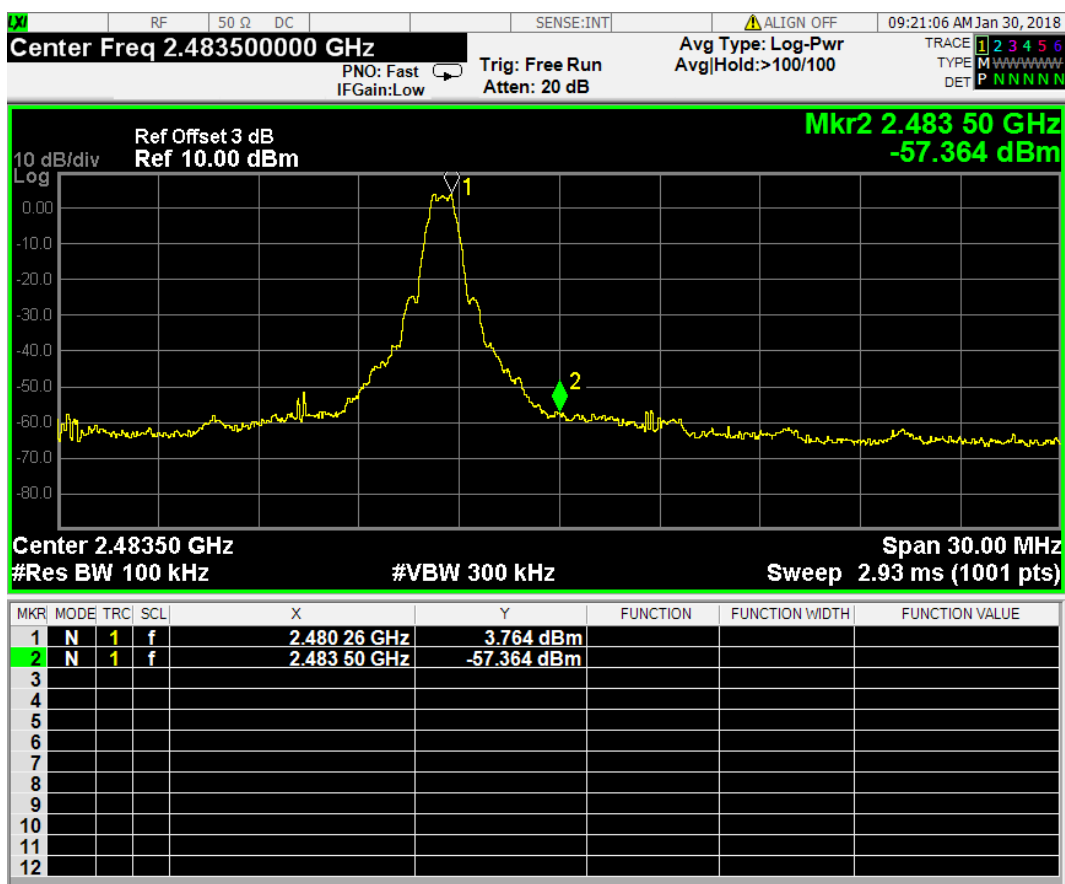
(Test Date: 2018.01.30 Temperature: 23℃ Humidity: 51 %)

Location	Channel	Frequency	Delta Marker	Result
Below Band Edge	00	2402 MHz	60.603 dB	More than 20 dB below the highest level of the desired power
Upper Band Edge	39	2480 MHz	53.600 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	N9010A	MY52221182	Jun 12, 2017	Jun 11, 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 spectrum analyzer. The Test Receiver was set as $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$, $\text{VBW} \geq 3 \times \text{RBW}$, 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.

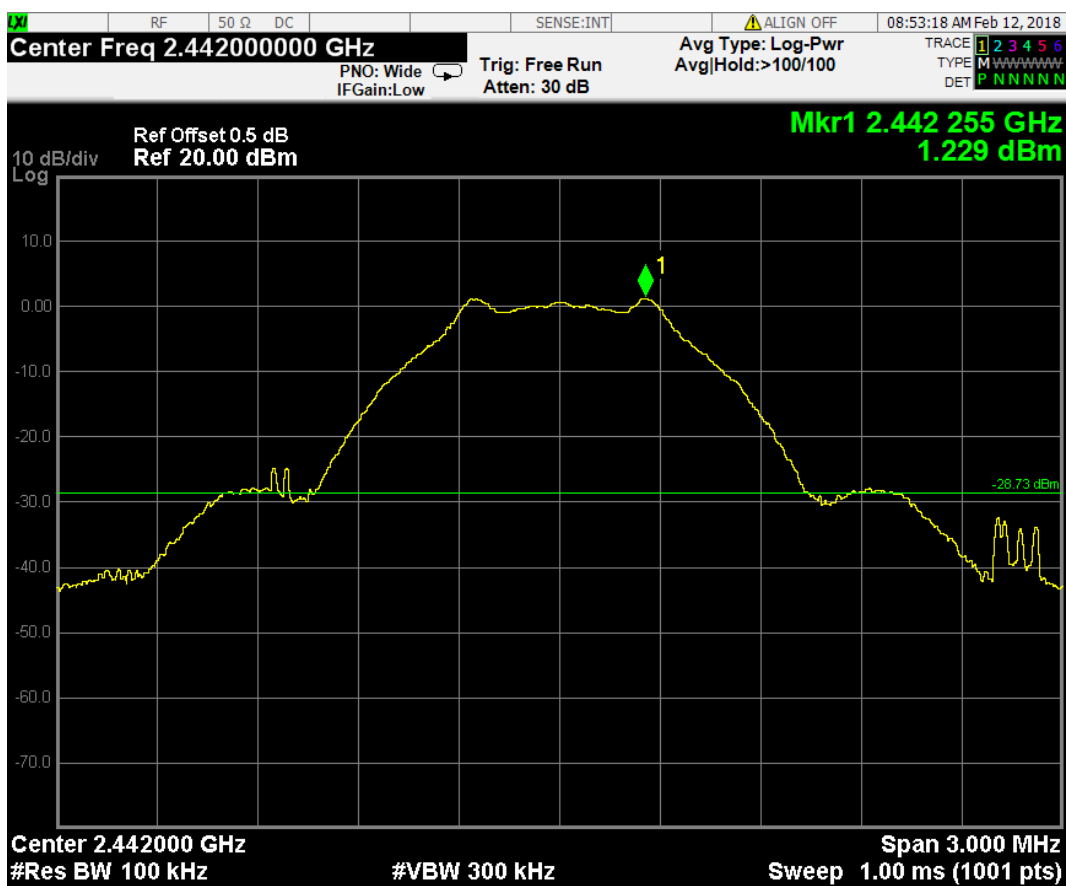
(Test Date: 2018.01.30 Temperature: 23°C Humidity: 51 %)

Channel	Frequency	Power Spectral Density	Limit
00	2402 MHz	1.846 dBm	8 dBm
20	2442 MHz	1.229 dBm	8 dBm
39	2480 MHz	1.094 dBm	8 dBm

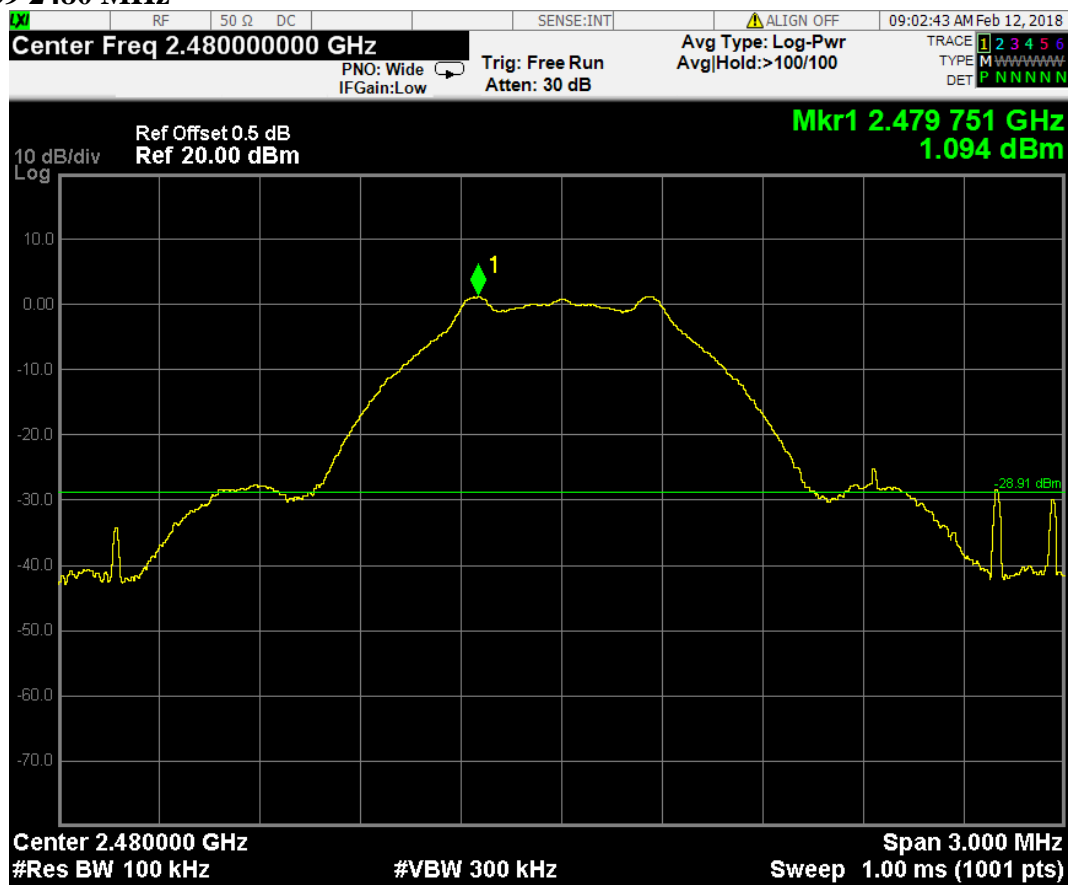
CH00 2402 MHz



CH20 2442 MHz



CH39 2480 MHz



9 DEVIATION TO TEST SPECIFICATIONS

None.