FCC PART 15.247

TEST REPORT

For

SZ DJI TECHNOLOGY CO., LTD

14th floor, West Wing, Skyworth Semiconductor Design Building NO.18 Gaoxin South 4th Ave, Nanshan, Shenzhen, Guangdong, China

FCC ID: SS3-DLA30A1702

Report Type:	Product Name:
Original Report	DATALINK 3

Test Engineer:	*Lorin Bian*
Report Number:	RDG170308002
Report Date:	2017-04-15
Reviewed By:	Henry Ding EMC Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) No.5040, Huilongwan Plaza, No.1, Shawan Road, Jinniu District, Ch engdu, Sichuan, China Tel: 028-65523123, Fax: 028-65525125 www.baclcorp.com

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***SZ DJI TECHNOLOGY CO., LTD***'s product, model number: ***DLA30A (FCC ID: SS3-DLA30A1702)*** (the "EUT") in this report was a ***DATALINK 3,*** which was measured approximately: 5.06 cm (L) x 3.5 cm (W) x 1.07 cm (H), rated input voltage: DC8V～30V from power port.

**All measurement and test data in this report was gathered from final production sample, serial number: 170308002 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-03-08, and EUT conformed to test requirement.*

Objective

This report is prepared on behalf of ***SZ DJI TECHNOLOGY CO., LTD*** in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the EUT compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

Part of system submissions with FCC ID: SS3-DLG30A1702.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Chengdu). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.62dB
Power Spectral Density, conducted	±0.62 dB
Unwanted Emissions, radiated	30M~200MHz: 4.7 dB for Horizontal, 4.7 dB for Vertical 200M~1GHz:6.0 dB for Horizontal, 6.0 for Vertical 1G~6GHz: 5.13 dB, 6G~18GHz: 5.47 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.17 dB (150 kHz to 30 MHz)

Test Facility

The test site used by BACL to collect test data is located in the No.5040, Huilongwan Plaza, No.1, Shawan Road, Jinniu District, Chengdu, Sichuan, China

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on April 24, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 560332. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a testing mode by test software. The device has two antennas, EUT employed a RF switch for selecting one antenna to transmit and receive depend on good performance.

The device employed 3 modes as below:

Mode 1, FSK, 250kbps data rate, 46 channels:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2408	24	2442.5
2	2409.5	…	…
…	…	…	…
…	…	…	…
…	…	45	2474
23	2441	46	2475.5

3 channels were tested: 2408MHz, 2442.5MHz and 2475.5MHz

Mode 2, FSK, 500kbps data rate, 46 channels:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2408	24	2442.5
2	2409.5	…	…
…	…	…	…
…	…	…	…
…	…	45	2474
23	2441	46	2475.5

3 channels were tested: 2408MHz, 2442.5MHz and 2475.5MHz

Mode 3, FSK, 1Mbps data rate, 34 channels:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2408	18	2442
2	2410	…	…
…	…	…	…
…	…	…	…
…	…	33	2472
17	2440	34	2474

3 channels were tested: 2408MHz, 2442MHz and 2474MHz

Equipment Modifications

No modification was made to the EUT.

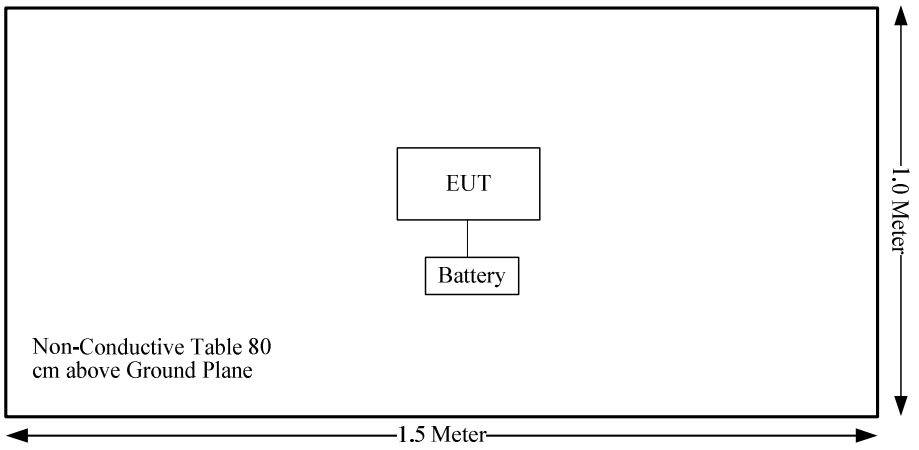
EUT Exercise Software

The software“wireless_authority-v3.2.10.8-beta11 - special- baudrate256000” was used during testing. The maximum power was configured as below table:

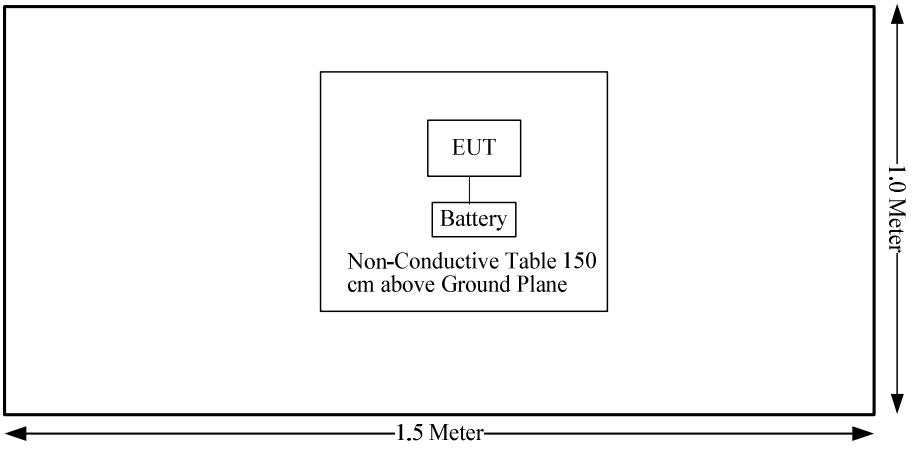
Test Mode	Test Software Version	wireless_authority-v3.2.10.8-beta11 - special-baudrate256000		
Mode 1	Frequency (MHz)	2408	2442.5	2475.5
	Power Level Setting Chain 0	40	50	50
	Power Level Setting Chain 1	45	50	50
Mode 2	Frequency (MHz)	2408	2442.5	2475.5
	Power Level Setting Chain 0	40	50	50
	Power Level Setting Chain 1	45	50	50
Mode 3	Frequency (MHz)	2408	2442	2474
	Power Level Setting Chain 0	40	50	50
	Power Level Setting Chain 1	45	50	50

Block Diagram of Test Setup

Radiation test below 1GHz:



Radiation test above 1GHz:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissible exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Not Applicable
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(1)	20 dB Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

Not Applicable: the device was powered by battery.

FCC §15.247 (i) & §1.1307 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §1.1307, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Mode	Frequency (MHz)	Antenna Gain		Maximum Power including tolerance		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
Mode 1	2408-2475.5	2	1.58	20	100.00	20.00	0.0315	1.0
Mode 2	2408-2475.5	2	1.58	20	100.00	20.00	0.0315	1.0
Mode 3	2408-2474	2	1.58	20	100.00	20.00	0.0315	1.0

Note: The tune-up power including tolerance is declared by manufacturer.

Result: Compliance, The device meets MPE requirement for Devices Used by the General Public (Uncontrolled Environment) at distance ≥20 cm.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connector Construction

The EUT has two antenna with unique type of connector to attach to the EUT, the antenna gains are 2.0 dBi, that fulfill the requirement of the item. Please refer to the EUT photos.

Result: Compliance.

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

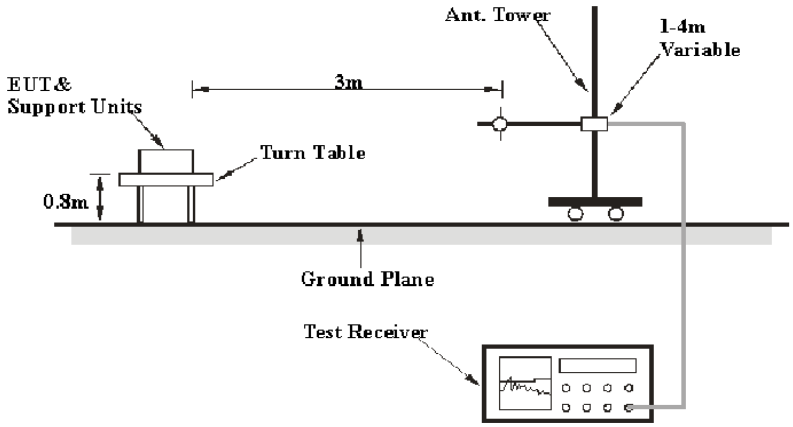
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Chengdu) is:
30M~200MHz: ±4.7 dB;
200M~1GHz: ±6.0 dB;
1G~6GHz: ±5.13dB;
6G~25GHz: ±5.47 dB;

Table 1 – Values of U_{cispr}

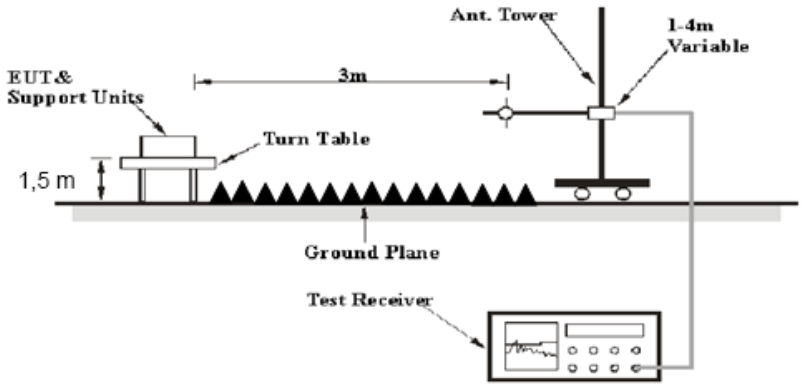
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	AV

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz - 1 GHz, peak and average detection modes for frequencies above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2016-12-02	2017-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Sunol Sciences	Broadband Antenna	JB3	A101808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
ETS	Horn Antenna	3115	003-6076	2016-12-02	2017-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2016-05-20	2017-05-19
HP	Amplifier	8449B	3008A00277	2016-12-02	2017-12-01
EMCT	Semi-Anechoic Chamber	966	N/A	2015-04-24	2018-04-23
N/A	RF Cable (below 1GHz)	NO.1	N/A	2016-11-10	2017-11-09
N/A	RF Cable (below 1GHz)	NO.4	N/A	2016-11-10	2017-11-09
N/A	RF Cable (above 1GHz)	NO.2	N/A	2016-11-10	2017-11-09

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Data

Environmental Conditions

Temperature:	18~19 °C
Relative Humidity:	54~56 %
ATM Pressure:	95.5 kPa

** The testing was performed by Lorin Bian on 2017-03-15&2017-03-20.*

Test Mode: Transmitting

30MHz to 25 GHz:

Mode 1(Chain 0 was the worst):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2408 MHz									
2408	78.50	PK	H	23.51	3.00	0.00	105.01	N/A	N/A
2408	76.12	AV	H	23.51	3.00	0.00	102.63	N/A	N/A
2408	89.99	PK	V	23.51	3.00	0.00	116.5	N/A	N/A
2408	87.61	AV	V	23.51	3.00	0.00	114.12	N/A	N/A
2390	27.91	PK	V	23.57	3.00	0.00	54.48	74	19.52
2390	19.41	AV	V	23.57	3.00	0.00	45.98	54	8.02
4816	33.52	PK	V	30.81	5.12	26.87	42.58	74	31.42
4816	21.95	AV	V	30.81	5.12	26.87	31.01	54	22.99
7224	31.69	PK	V	34.75	6.17	26.36	46.25	74	27.75
7224	20.58	AV	V	34.75	6.17	26.36	35.14	54	18.86
3025	37.08	PK	V	24.34	3.47	26.42	38.47	74	35.53
3025	25.12	AV	V	24.34	3.47	26.42	26.51	54	27.49
79.47	48.24	QP	H	8.05	0.45	28.40	28.34	40.00	11.66
139.61	41.63	QP	H	13.24	0.66	28.12	27.41	43.50	16.09
Middle Channel: 2442.5 MHz									
2442.5	78.87	PK	H	23.40	3.00	0.00	105.27	N/A	N/A
2442.5	76.22	AV	H	23.40	3.00	0.00	102.62	N/A	N/A
2442.5	89.91	PK	V	23.40	3.00	0.00	116.31	N/A	N/A
2442.5	86.66	AV	V	23.40	3.00	0.00	113.06	N/A	N/A
4885	33.72	PK	V	31.03	5.09	26.87	42.97	74	31.03
4885	22.69	AV	V	31.03	5.09	26.87	31.94	54	22.06
7327.5	32.18	PK	V	34.96	6.22	26.40	46.96	74	27.04
7327.5	21.41	AV	V	34.96	6.22	26.40	36.19	54	17.81
3227	40.73	PK	V	25.47	3.77	26.49	43.48	74	30.52
3227	28.96	AV	V	25.47	3.77	26.49	31.71	54	22.29
3108	40.68	PK	V	24.80	3.59	26.45	42.62	74	31.38
3108	28.23	AV	V	24.80	3.59	26.45	30.17	54	23.83
79.47	48.51	QP	H	8.05	0.45	28.40	28.61	40.00	11.39
139.61	41.77	QP	H	13.24	0.66	28.12	27.55	43.50	15.95
High Channel: 2475.5 MHz									
2475.5	78.72	PK	H	23.28	2.99	0.00	104.99	N/A	N/A
2475.5	76.24	AV	H	23.28	2.99	0.00	102.51	N/A	N/A
2475.5	89.64	PK	V	23.28	2.99	0.00	115.91	N/A	N/A
2475.5	87.09	AV	V	23.28	2.99	0.00	113.36	N/A	N/A
2483.5	31.96	PK	V	23.26	2.99	0.00	58.21	74	15.79
2483.5	20.57	AV	V	23.26	2.99	0.00	46.82	54	7.18
4951	34.09	PK	V	31.24	5.05	26.88	43.5	74	30.5
4951	22.22	AV	V	31.24	5.05	26.88	31.63	54	22.37
7426.5	32.55	PK	V	35.15	6.27	26.45	47.52	74	26.48
7426.5	21.02	AV	V	35.15	6.27	26.45	35.99	54	18.01
3153	40.78	PK	V	25.06	3.66	26.47	43.03	74	30.97
3153	28.62	AV	V	25.06	3.66	26.47	30.87	54	23.13
79.47	49.35	QP	H	8.05	0.45	28.40	29.45	40.00	10.55
139.61	42.19	QP	H	13.24	0.66	28.12	27.97	43.50	15.53

Mode 2(Chain 0 was the worst):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2408 MHz									
2408	78.51	PK	H	23.51	3.00	0.00	105.02	N/A	N/A
2408	75.02	AV	H	23.51	3.00	0.00	101.53	N/A	N/A
2408	88.60	PK	V	23.51	3.00	0.00	115.11	N/A	N/A
2408	85.93	AV	V	23.51	3.00	0.00	112.44	N/A	N/A
2390	28.48	PK	V	23.57	3.00	0.00	55.05	74	18.95
2390	15.99	AV	V	23.57	3.00	0.00	42.56	54	11.44
4816	33.25	PK	V	30.81	5.12	26.87	42.31	74	31.69
4816	22.29	AV	V	30.81	5.12	26.87	31.35	54	22.65
7224	31.82	PK	V	34.75	6.17	26.36	46.38	74	27.62
7224	20.31	AV	V	34.75	6.17	26.36	34.87	54	19.13
1516	32.63	PK	V	24.13	2.68	26.35	33.09	74	40.91
1516	20.18	AV	V	24.13	2.68	26.35	20.64	54	33.36
79.47	48.88	QP	H	8.05	0.45	28.40	28.98	40.00	11.02
139.61	42.63	QP	H	13.24	0.66	28.12	28.41	43.50	15.09
Middle Channel: 2442.5 MHz									
2442.5	78.57	PK	H	23.40	3.00	0.00	104.97	N/A	N/A
2442.5	74.82	AV	H	23.40	3.00	0.00	101.22	N/A	N/A
2442.5	88.03	PK	V	23.40	3.00	0.00	114.43	N/A	N/A
2442.5	83.69	AV	V	23.40	3.00	0.00	110.09	N/A	N/A
4885	33.25	PK	V	31.03	5.09	26.87	42.5	74	31.5
4885	22.11	AV	V	31.03	5.09	26.87	31.36	54	22.64
7327.5	32.35	PK	V	34.96	6.22	26.40	47.13	74	26.87
7327.5	21.20	AV	V	34.96	6.22	26.40	35.98	54	18.02
2249	35.02	PK	V	24.05	3.02	26.85	35.24	74	38.76
2249	23.10	AV	V	24.05	3.02	26.85	23.32	54	30.68
3152	40.81	PK	V	25.05	3.66	26.46	43.06	74	30.94
3152	28.58	AV	V	25.05	3.66	26.46	30.83	54	23.17
79.47	48.41	QP	H	8.05	0.45	28.40	28.51	40.00	11.49
139.61	43.07	QP	H	13.24	0.66	28.12	28.85	43.50	14.65
High Channel: 2475.5 MHz									
2475.5	78.34	PK	H	23.28	2.99	0.00	104.61	N/A	N/A
2475.5	74.82	AV	H	23.28	2.99	0.00	101.09	N/A	N/A
2475.5	87.88	PK	V	23.28	2.99	0.00	114.15	N/A	N/A
2475.5	83.93	AV	V	23.28	2.99	0.00	110.2	N/A	N/A
2483.5	32.94	PK	V	23.26	2.99	0.00	59.19	74	14.81
2483.5	19.43	AV	V	23.26	2.99	0.00	45.68	54	8.32
4951	34.27	PK	V	31.24	5.05	26.88	43.68	74	30.32
4951	22.72	AV	V	31.24	5.05	26.88	32.13	54	21.87
7426.5	31.86	PK	V	35.15	6.27	26.45	46.83	74	27.17
7426.5	21.48	AV	V	35.15	6.27	26.45	36.45	54	17.55
2285	35.10	PK	V	23.93	3.02	26.86	35.19	74	38.81
2285	23.76	AV	V	23.93	3.02	26.86	23.85	54	30.15
79.47	49.75	QP	H	8.05	0.45	28.40	29.85	40.00	10.15
139.61	42.34	QP	H	13.24	0.66	28.12	28.12	43.50	15.38

Mode 3 (Chain 0 was the worst):

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2408 MHz									
2408	78.51	PK	H	23.51	3.00	0.00	105.02	N/A	N/A
2408	73.85	AV	H	23.51	3.00	0.00	100.36	N/A	N/A
2408	87.93	PK	V	23.51	3.00	0.00	114.44	N/A	N/A
2408	82.49	AV	V	23.51	3.00	0.00	109	N/A	N/A
2390	29.16	PK	V	23.57	3.00	0.00	55.73	74	18.27
2390	16.78	AV	V	23.57	3.00	0.00	43.35	54	10.65
4816	34.18	PK	V	30.81	5.12	26.87	43.24	74	30.76
4816	22.15	AV	V	30.81	5.12	26.87	31.21	54	22.79
7224	32.38	PK	V	34.75	6.17	26.36	46.94	74	27.06
7224	20.95	AV	V	34.75	6.17	26.36	35.51	54	18.49
1411	32.04	PK	V	23.87	2.55	26.42	32.04	74	41.96
1411	18.20	AV	V	23.87	2.55	26.42	18.2	54	35.8
79.47	50.02	QP	H	8.05	0.45	28.40	30.12	40.00	9.88
139.61	42.48	QP	H	13.24	0.66	28.12	28.26	43.50	15.24
Middle Channel: 2442 MHz									
2442	79.20	PK	H	23.40	3.00	0.00	105.6	N/A	N/A
2442	74.29	AV	H	23.40	3.00	0.00	100.69	N/A	N/A
2442	87.94	PK	V	23.40	3.00	0.00	114.34	N/A	N/A
2442	82.52	AV	V	23.40	3.00	0.00	108.92	N/A	N/A
4884	33.42	PK	V	31.03	5.09	26.87	42.67	74	31.33
4884	21.93	AV	V	31.03	5.09	26.87	31.18	54	22.82
7326	32.14	PK	V	34.95	6.22	26.40	46.91	74	27.09
7326	20.75	AV	V	34.95	6.22	26.40	35.52	54	18.48
1448	31.47	PK	V	23.96	2.60	26.38	31.65	74	42.35
1448	20.05	AV	V	23.96	2.60	26.38	20.23	54	33.77
3352	38.96	PK	V	26.17	3.96	26.54	42.55	74	31.45
3352	28.49	AV	V	26.17	3.96	26.54	32.08	54	21.92
79.47	50.86	QP	H	8.05	0.45	28.40	30.96	40.00	9.04
139.61	42.9	QP	H	13.24	0.66	28.12	28.68	43.50	14.82
High Channel: 2474 MHz									
2474	78.29	PK	H	23.29	2.99	0.00	104.57	N/A	N/A
2474	73.38	AV	H	23.29	2.99	0.00	99.66	N/A	N/A
2474	87.23	PK	V	23.29	2.99	0.00	113.51	N/A	N/A
2474	81.97	AV	V	23.29	2.99	0.00	108.25	N/A	N/A
2483.5	38.00	PK	V	23.26	2.99	0.00	64.25	74	9.75
2483.5	23.58	AV	V	23.26	2.99	0.00	49.83	54	4.17
4948	33.97	PK	V	31.23	5.05	26.88	43.37	74	30.63
4948	22.14	AV	V	31.23	5.05	26.88	31.54	54	22.46
7422	32.85	PK	V	35.14	6.26	26.45	47.8	74	26.2
7422	21.23	AV	V	35.14	6.26	26.45	36.18	54	17.82
1493	32.33	PK	V	24.08	2.66	26.34	32.73	74	41.27
1493	17.91	AV	V	24.08	2.66	26.34	18.31	54	35.69
79.47	50.39	QP	H	8.05	0.45	28.40	30.49	40.00	9.51
139.61	43.34	QP	H	13.24	0.66	28.12	29.12	43.50	14.38

FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems shall have hoping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.50 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

1. Set the EUT in transmitting mode, RBW was set at 1% of the Span, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace.
3. Measure the channel separation.

Test Data

Environmental Conditions

Temperature:	23.8 °C
Relative Humidity:	52 %
ATM Pressure:	95.2 kPa

** The testing was performed by Lorin Bian on2017-03-21.*

Test Result: Compliance.

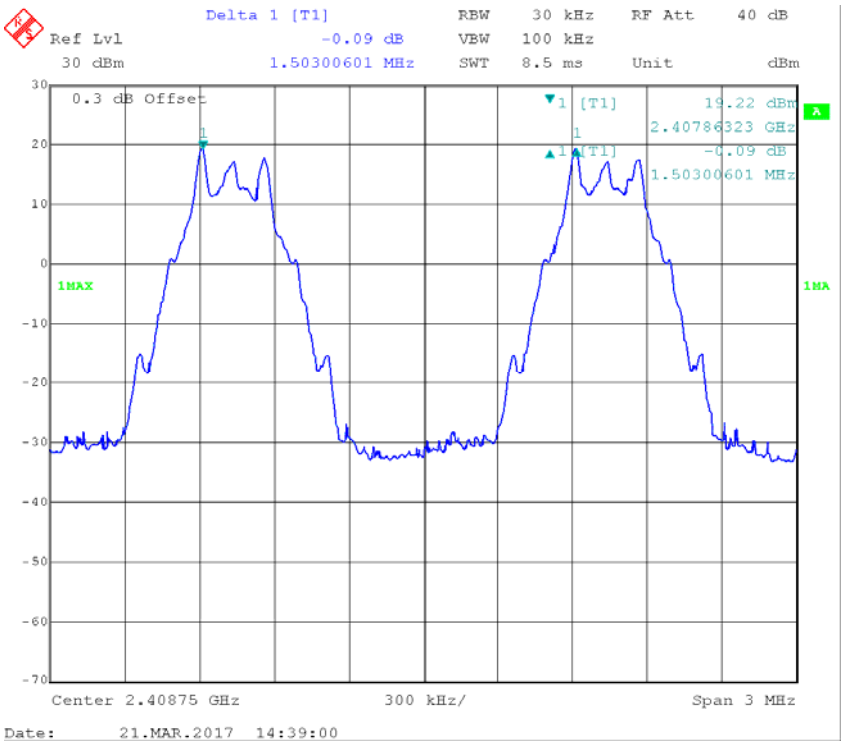
Please refer to following tables and plots

Test Mode: Transmitting (Test was performed at chain 0)

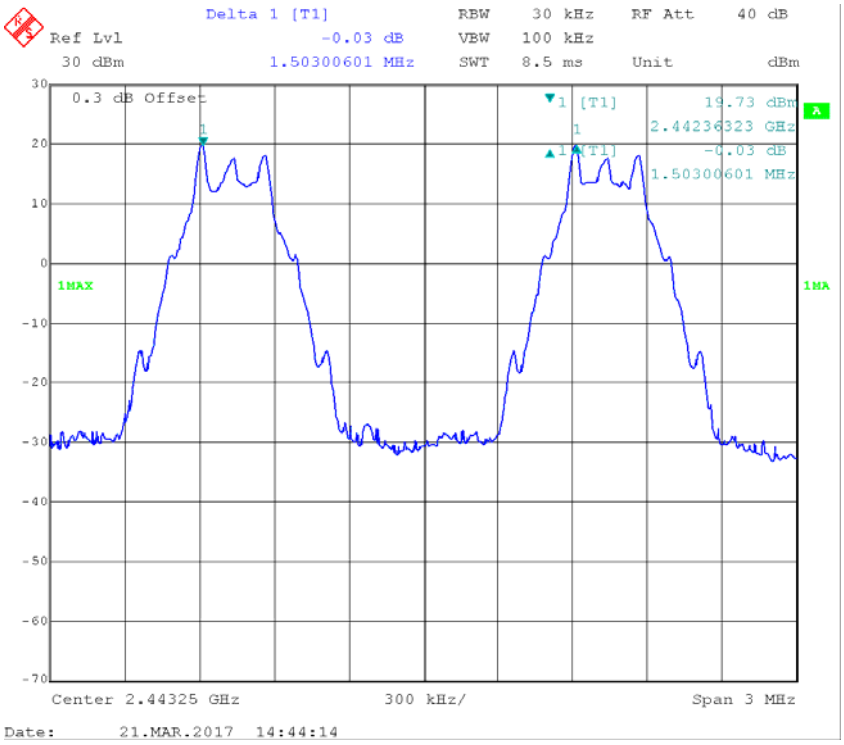
Test Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
Mode 1	Low	2408	1.503	0.342
	Middle	2442.5	1.503	0.342
	High	2475.5	1.503	0.342
Mode 2	Low	2408	1.503	0.692
	Middle	2442.5	1.503	0.692
	High	2475.5	1.503	0.692
Mode 3	Low	2408	2.004	1.367
	Middle	2442	2.004	1.367
	High	2474	2.004	1.367

Note: Limit= (2/3) × 20dB bandwidth

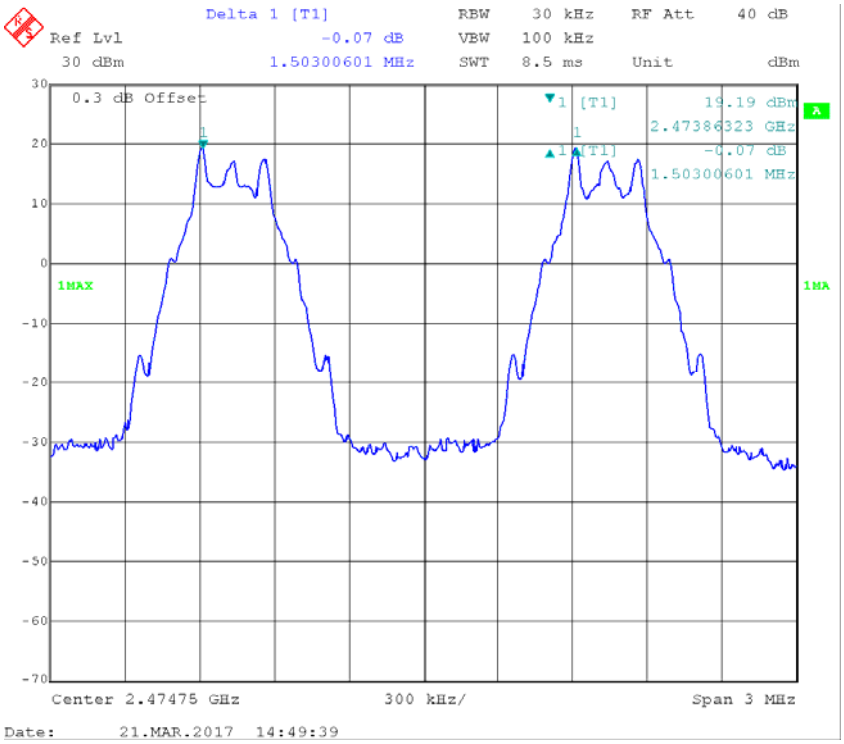
Mode 1, Low Channel



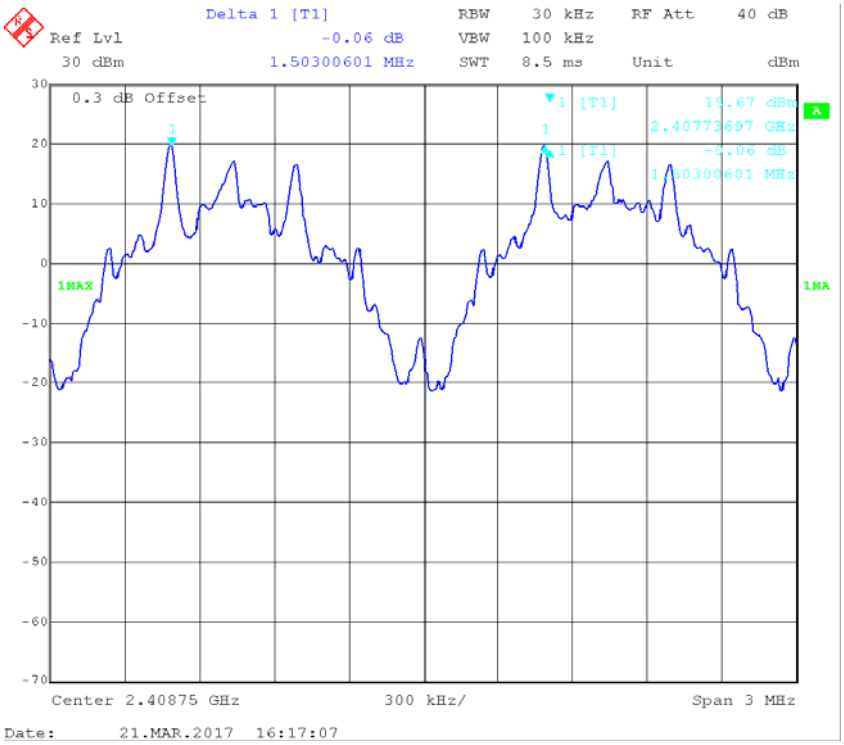
Mode 1, Middle Channel



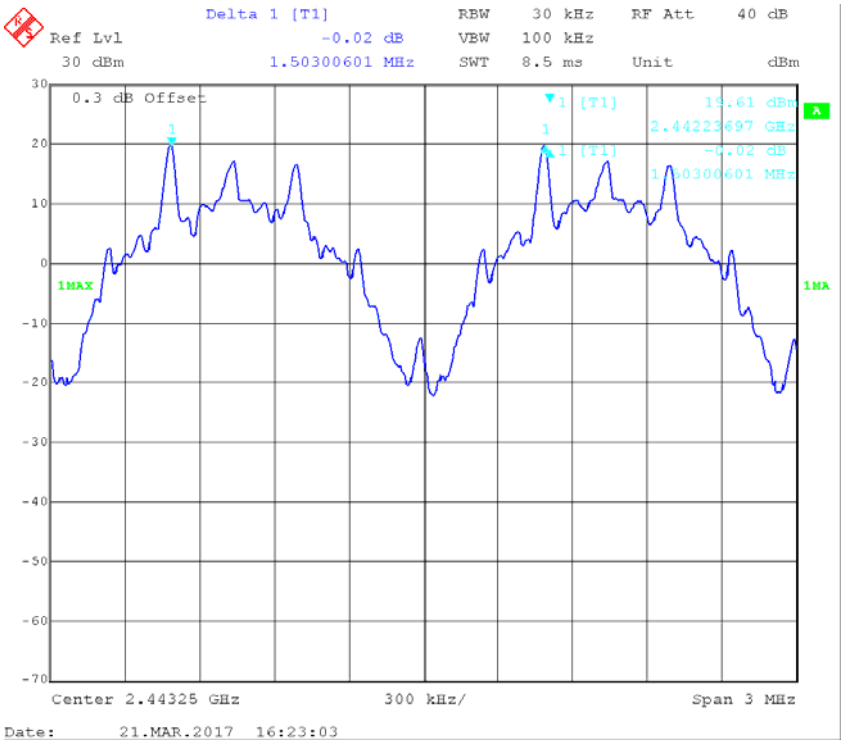
Mode 1, High Channel



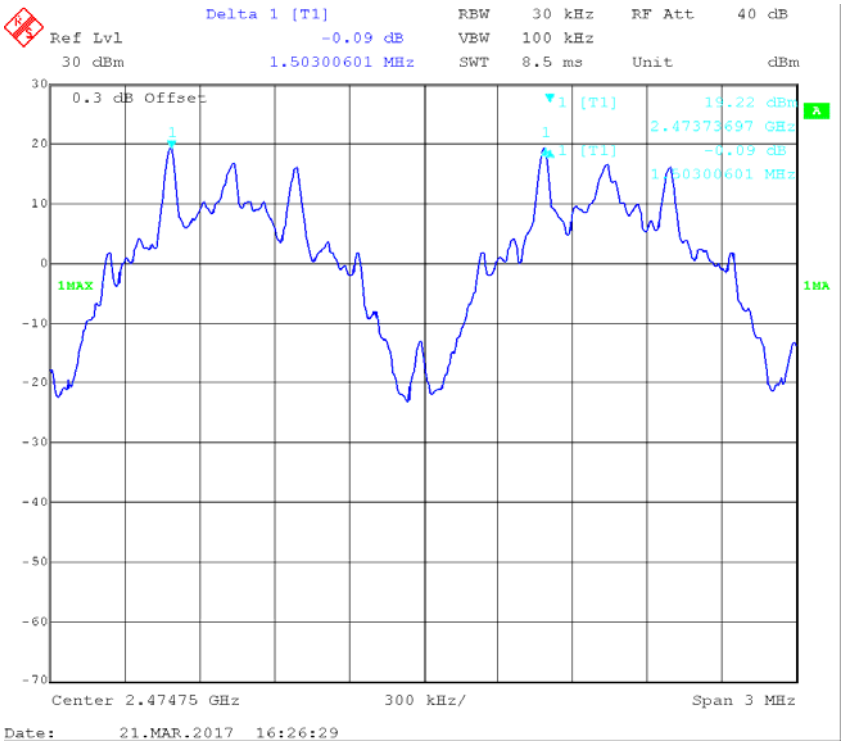
Mode 2, Low Channel



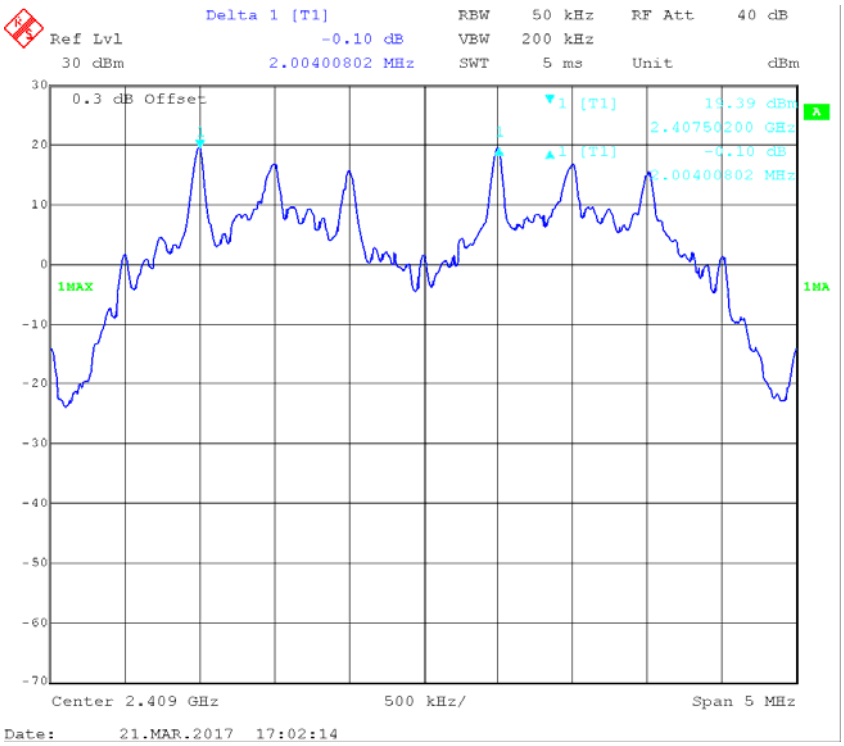
Mode 2, Middle Channel



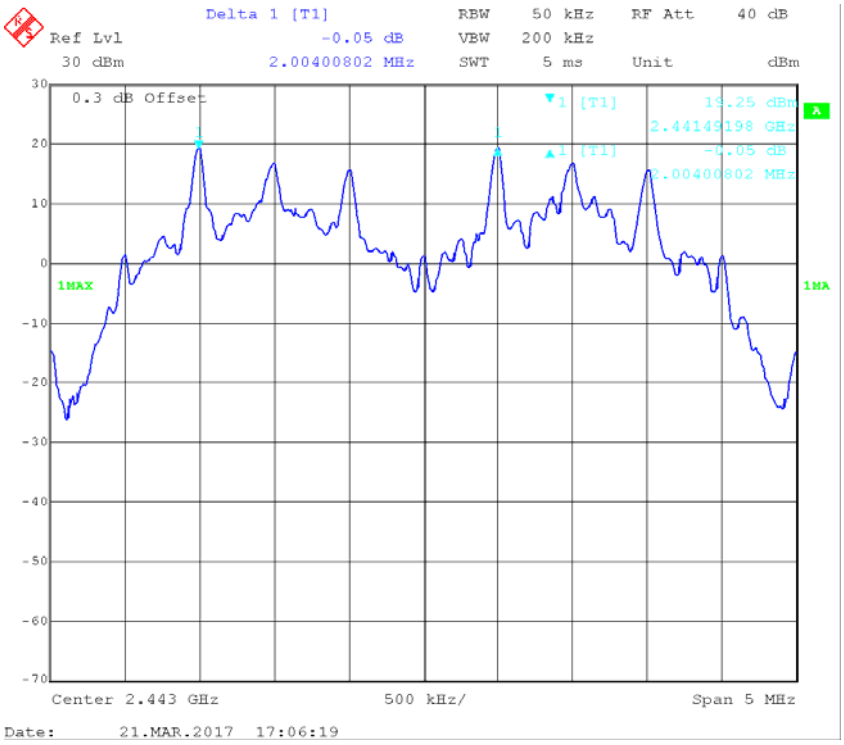
Mode 2, High Channel



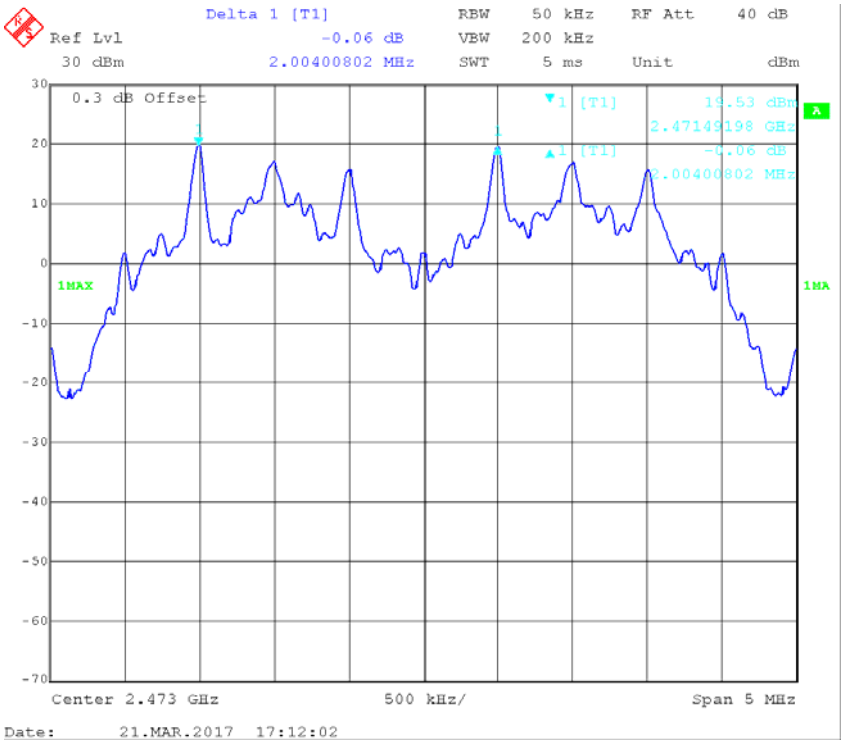
Mode 3, Low Channel



Mode 3, Middle Channel



Mode 3, High Channel



FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING

Applicable Standard

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	23.8 °C
Relative Humidity:	52 %
ATM Pressure:	95.2 kPa

** The testing was performed by Lorin Bian on 2017-03-21.*

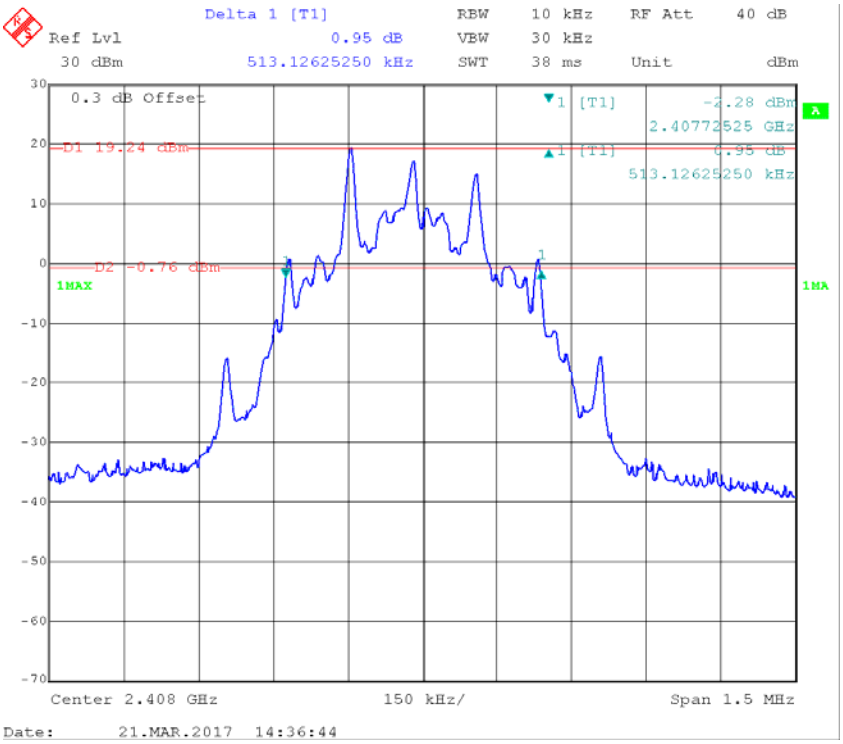
Test Result: Compliance.

Please refer to following tables and plots

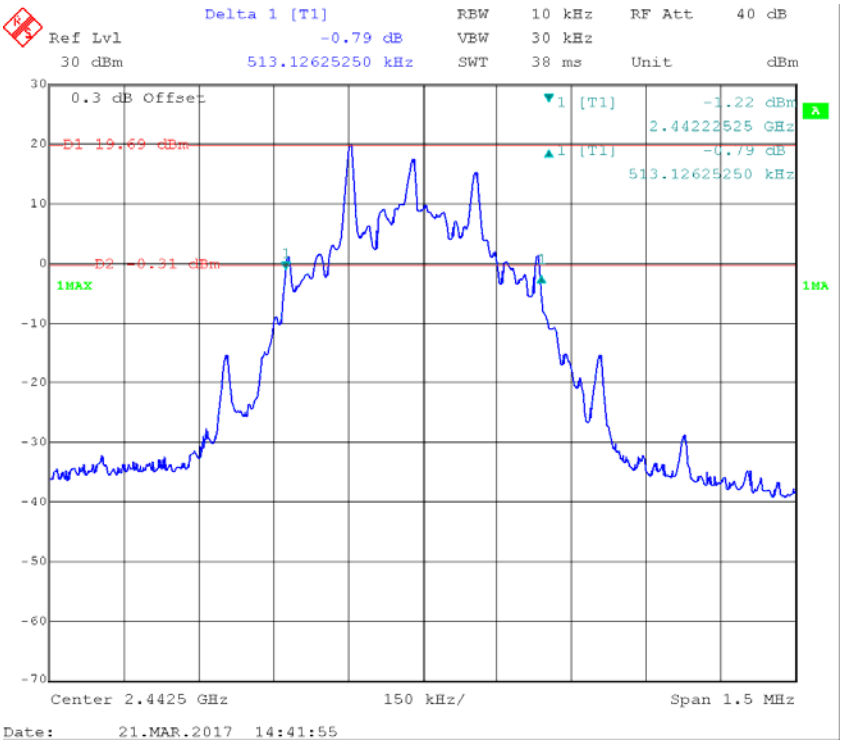
Test Mode: Transmitting(Test was performed at chain 0)

Test Mode	Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Mode 1	Low	2408	0.513
	Middle	2442.5	0.513
	High	2475.5	0.513
Mode 2	Low	2408	1.038
	Middle	2442.5	1.038
	High	2475.5	1.038
Mode 3	Low	2408	2.05
	Middle	2442	2.05
	High	2474	2.05

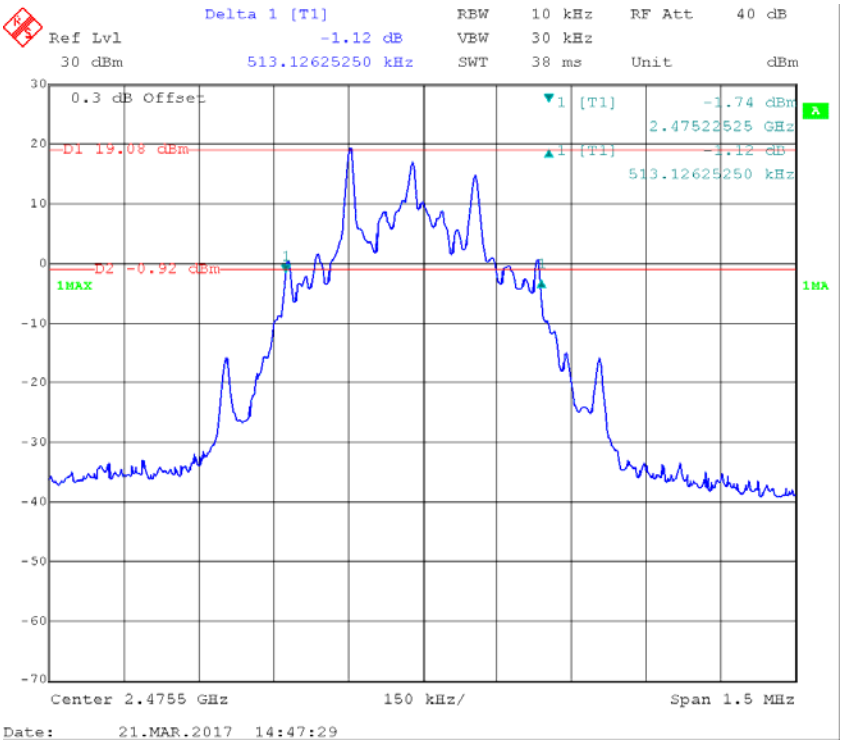
Mode 1, Low Channel



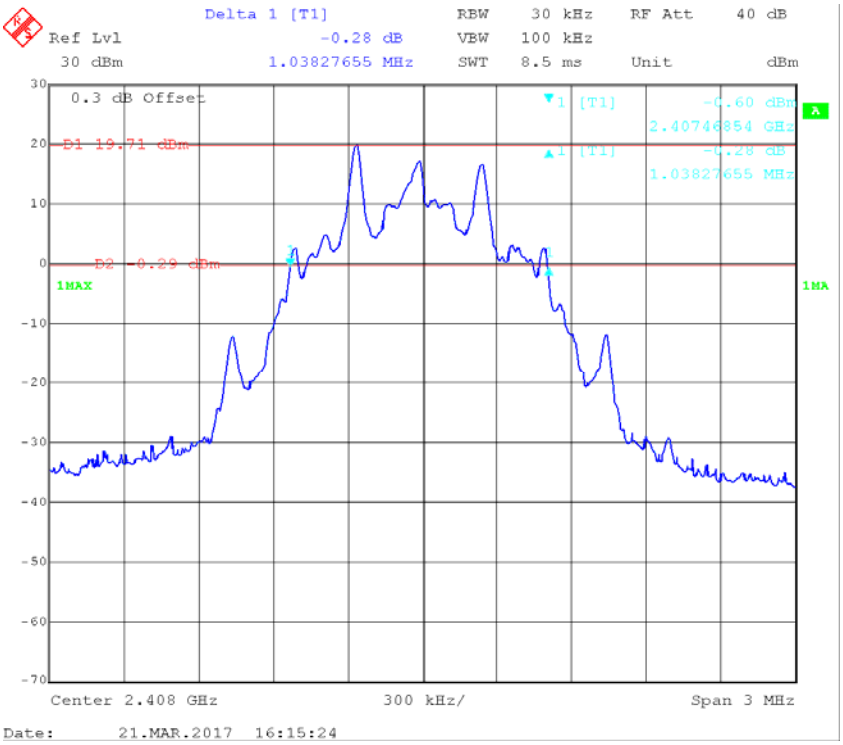
Mode 1, Middle Channel



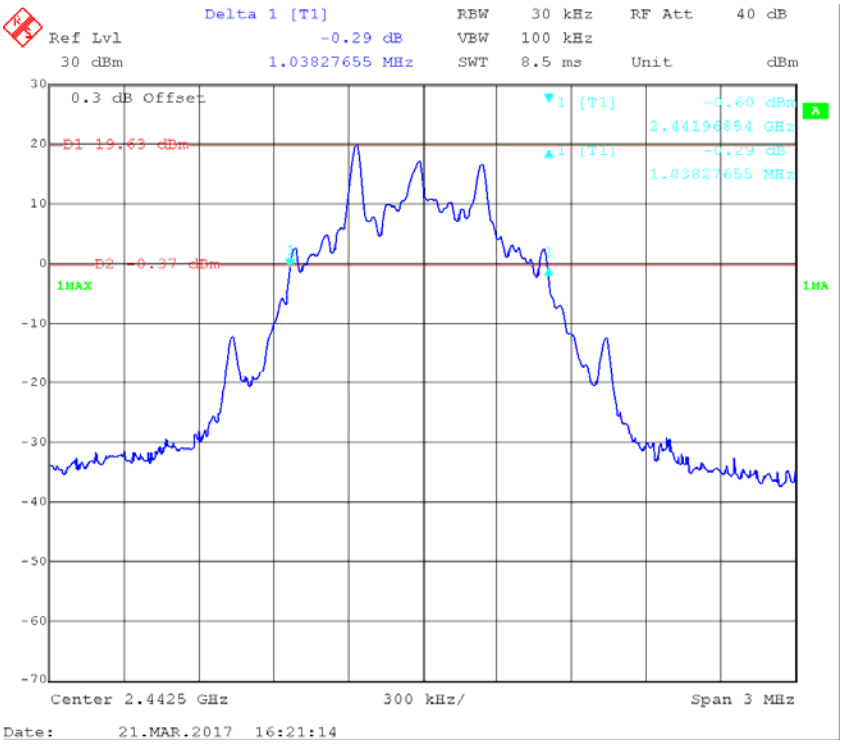
Mode 1, High Channel



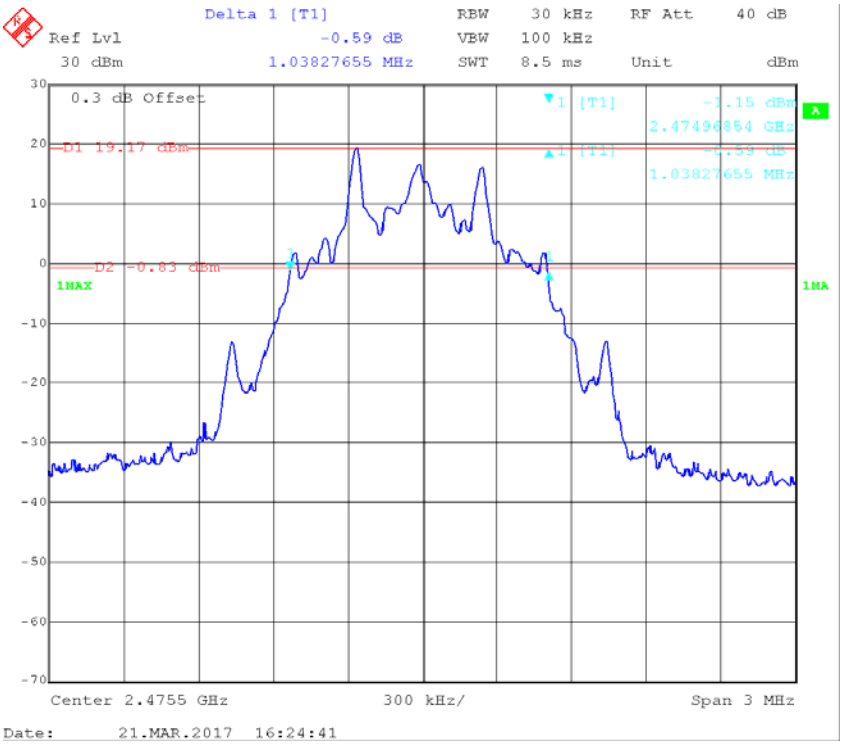
Mode 2, Low Channel



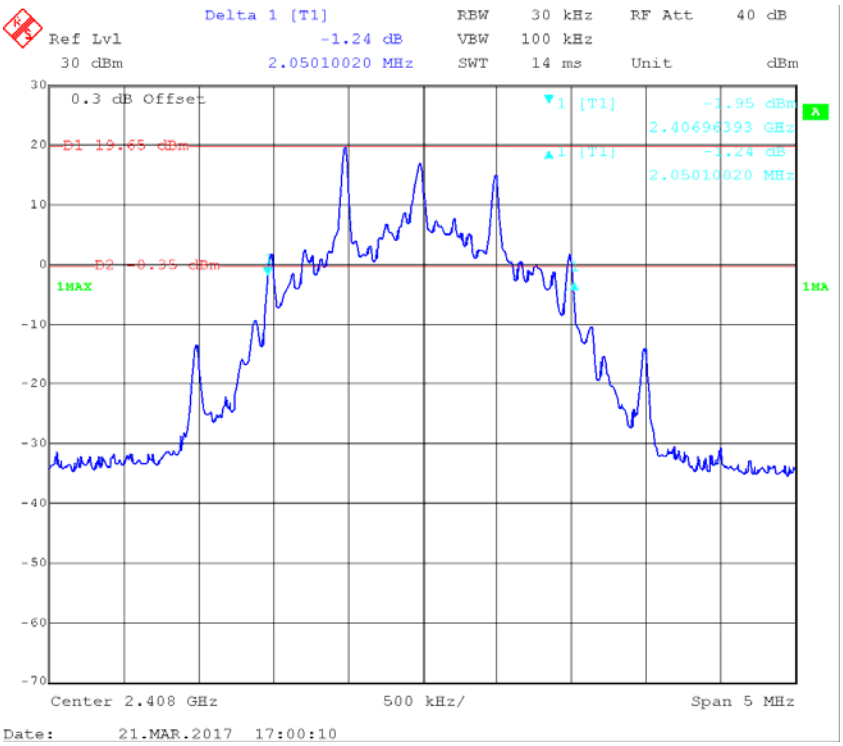
Mode 2, Middle Channel



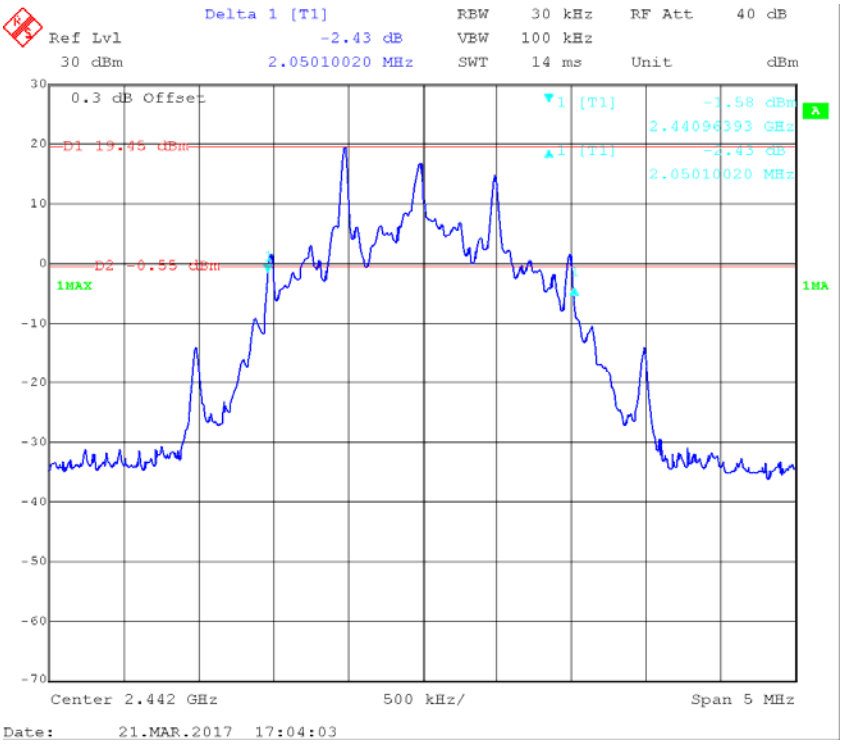
Mode 2, High Channel



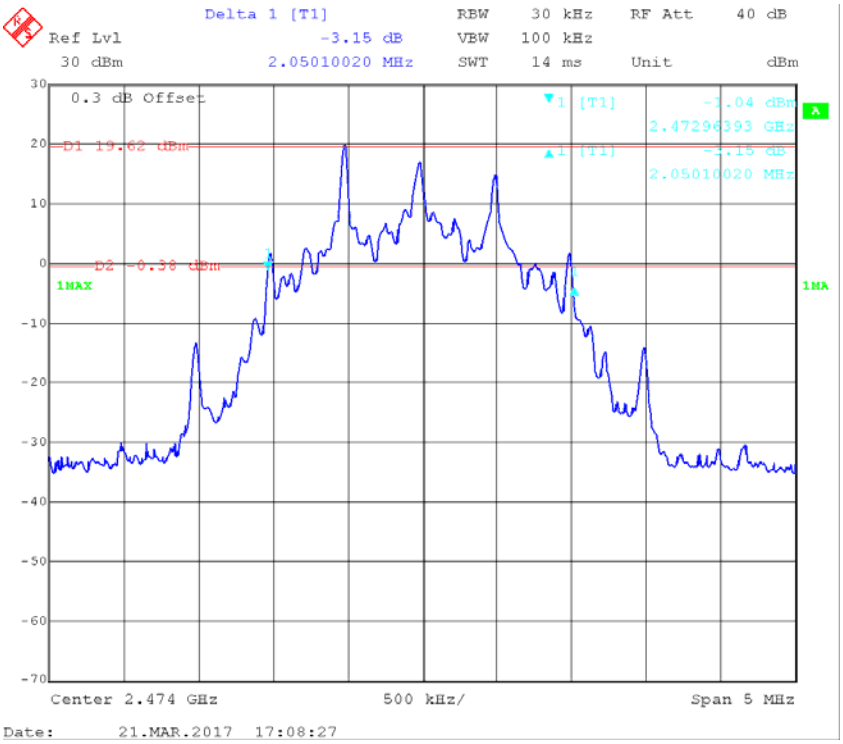
Mode 3, Low Channel



Mode 3, Middle Channel



Mode 3, High Channel



FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	23.8 °C
Relative Humidity:	52 %
ATM Pressure:	95.2 kPa

** The testing was performed by Lorin Bian on 2017-03-21.*

Test Result: Compliance.

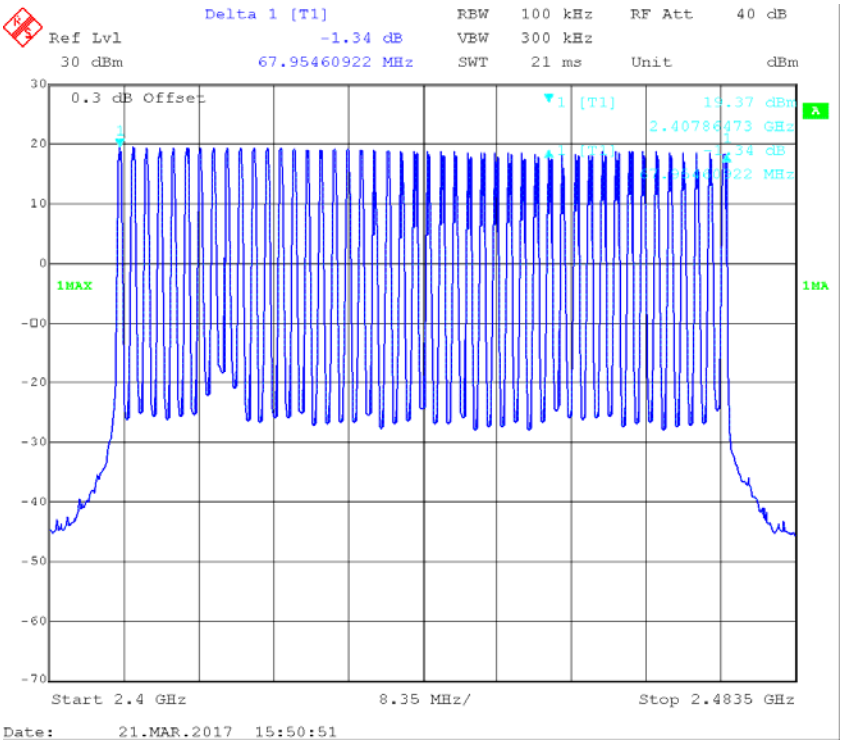
Please refer to following tables and plots

Test Mode: Transmitting(Test was performed at chain 0)

Mode 1:

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	46	≥15

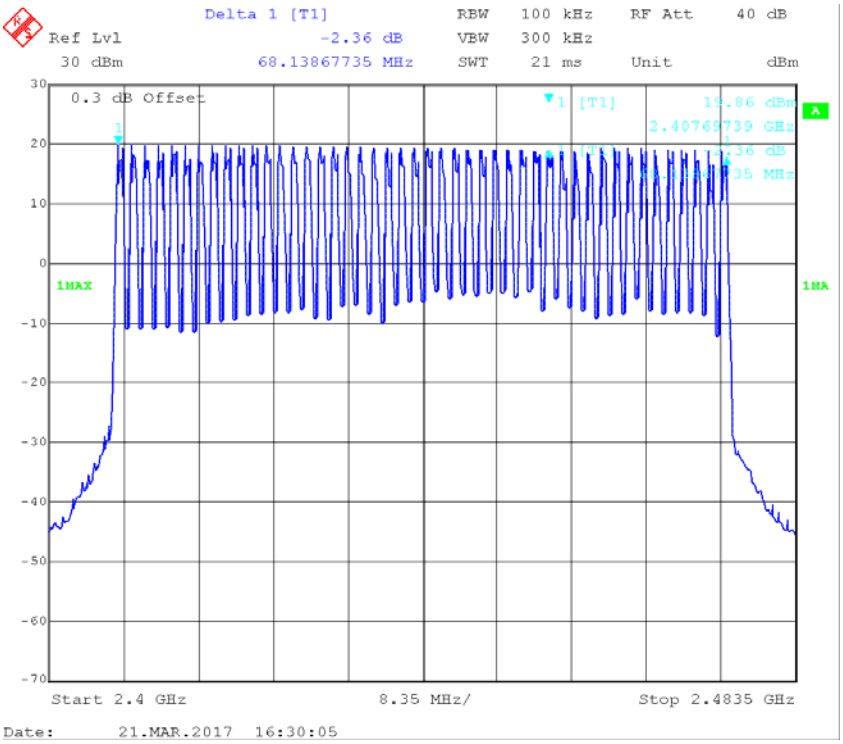
Number of Hopping Channels



Mode 2:

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	46	≥15

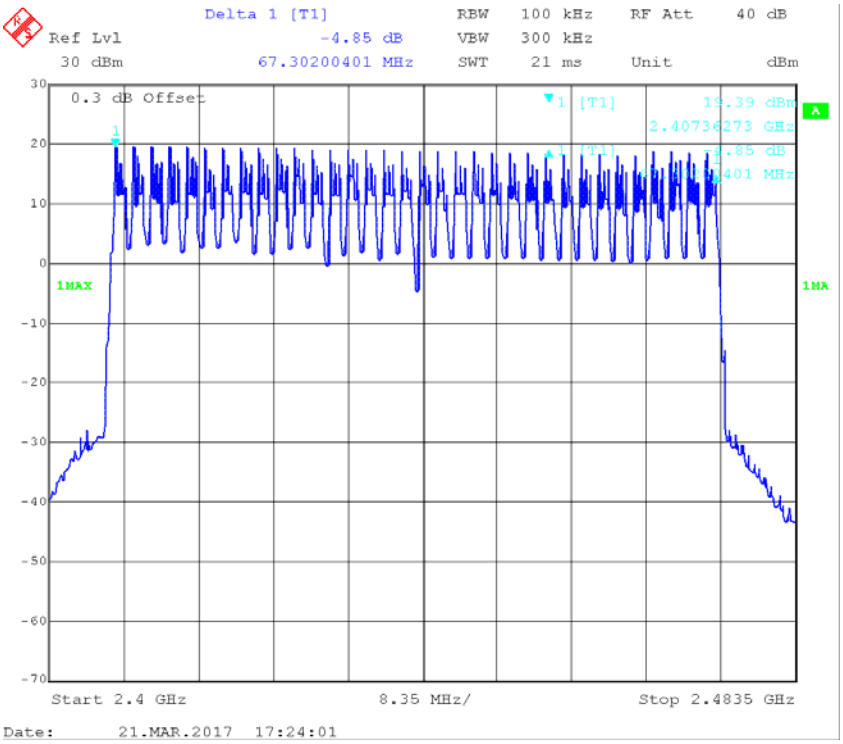
Number of Hopping Channels



Mode 3:

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	34	≥15

Number of Hopping Channels



FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Procedure

The EUT was worked in channel hopping; the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	23.8~24.0 °C
Relative Humidity:	52~55 %
ATM Pressure:	95.2~95.6 kPa

** The testing was performed by Lorin Bian on 2017-03-21 and 2017-04-15.*

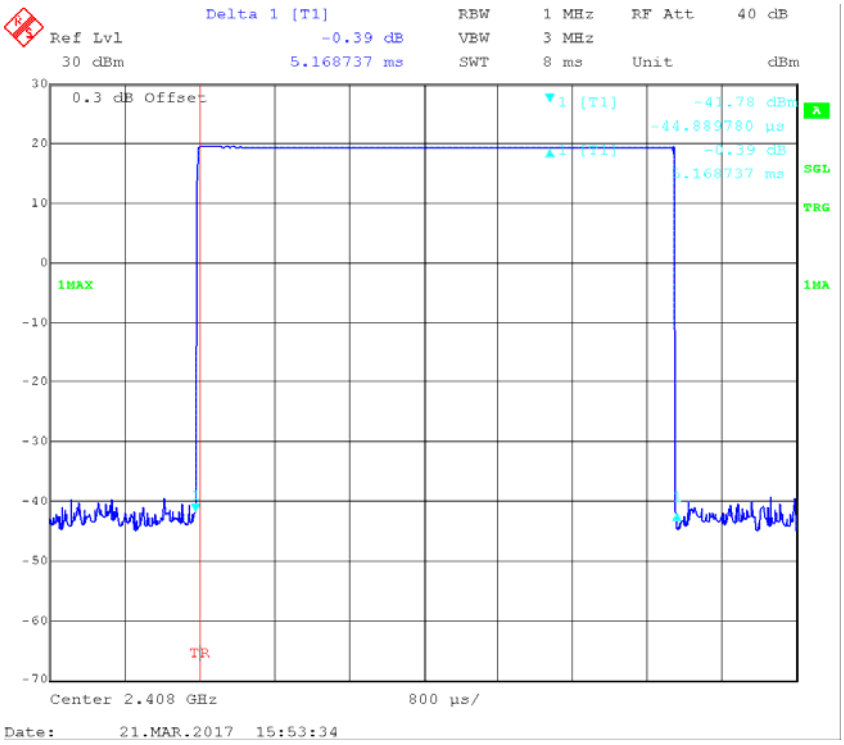
Test Result: Compliance.

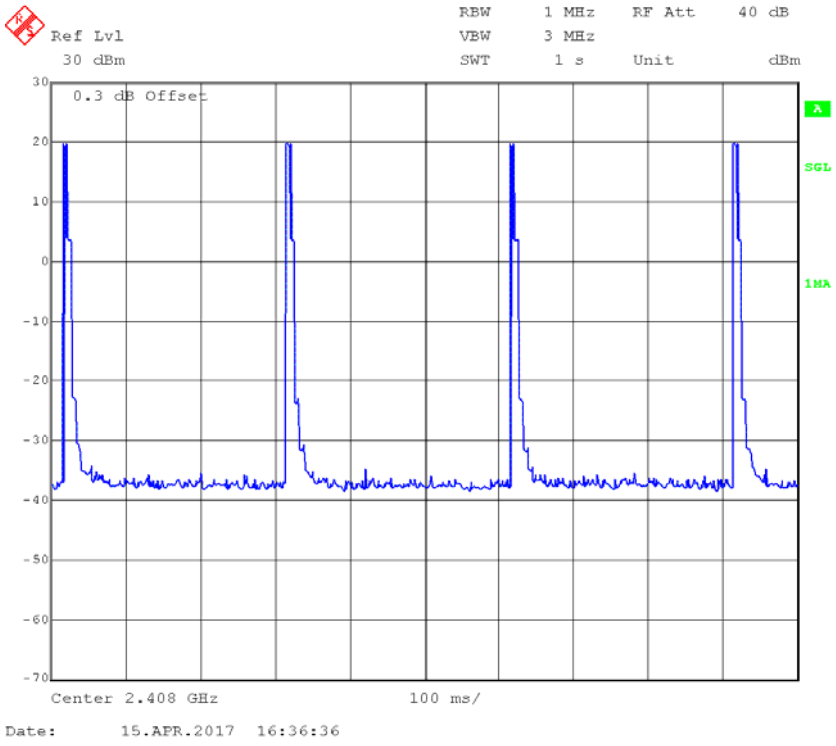
Please refer to following tables and plots

Test Mode: Transmitting(Test was performed at chain 0)

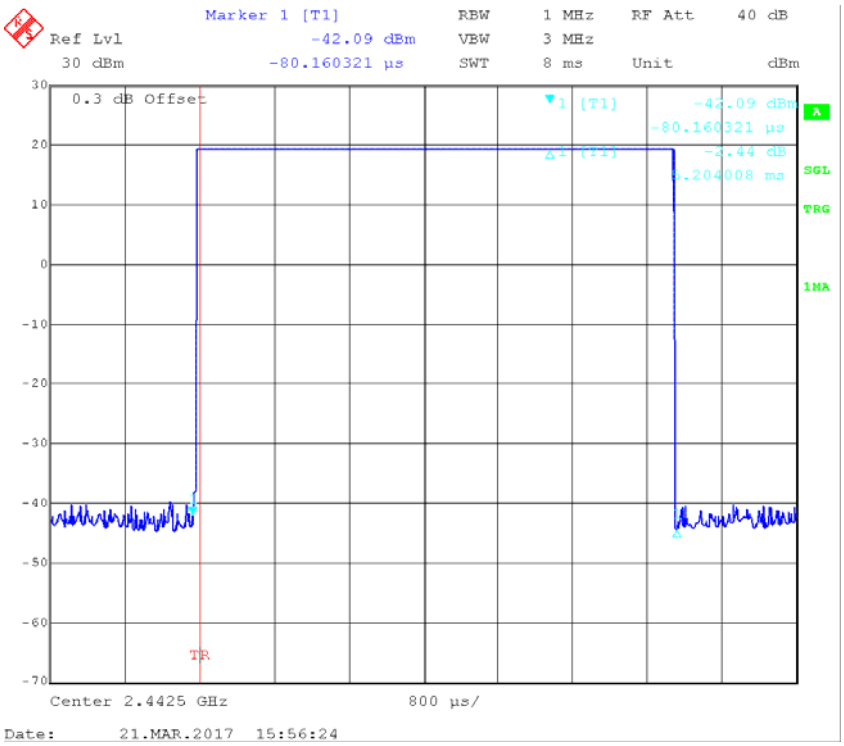
Mode	Channel	Occupancy Time For Single Hop (ms)	Real Observed Period (s)	Hops in Observed Period	Dwell time(s)	Limit (s)	Result
Mode 1	Low	5.169	1	4	0.380	0.4	Compliance
	Middle	5.204	1	4	0.383	0.4	Compliance
	High	5.185	1	4	0.382	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × hopping number per second×hopping channels× 0.4						
Mode 2	Low	2.600	1	6	0.287	0.4	Compliance
	Middle	2.607	1	6	0.288	0.4	Compliance
	High	2.600	1	6	0.287	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × hopping number per second×hopping channels× 0.4						
Mode 3	Low	1.326	1	12	0.216	0.4	Compliance
	Middle	1.326	1	12	0.216	0.4	Compliance
	High	1.326	1	12	0.216	0.4	Compliance
	Note: Dwell time=Pulse time (ms) × hopping number per second×hopping channels× 0.4						

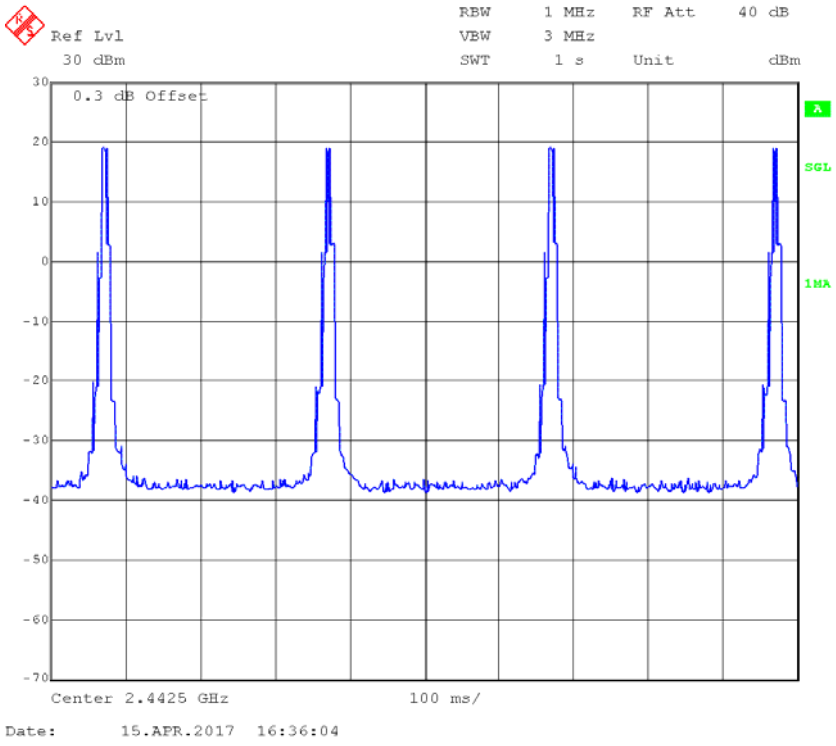
Mode 1, Low Channel



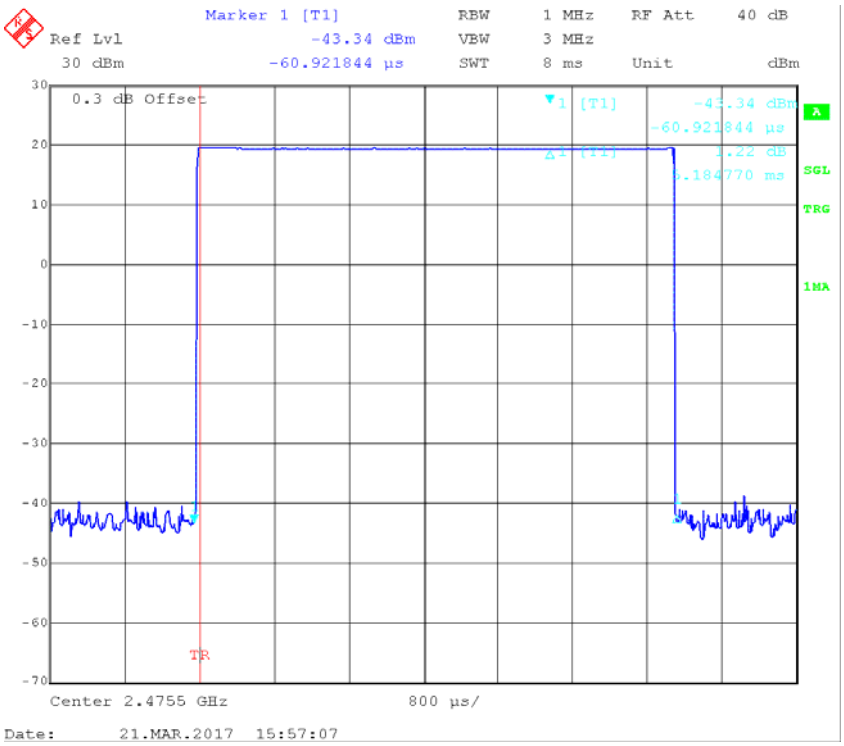


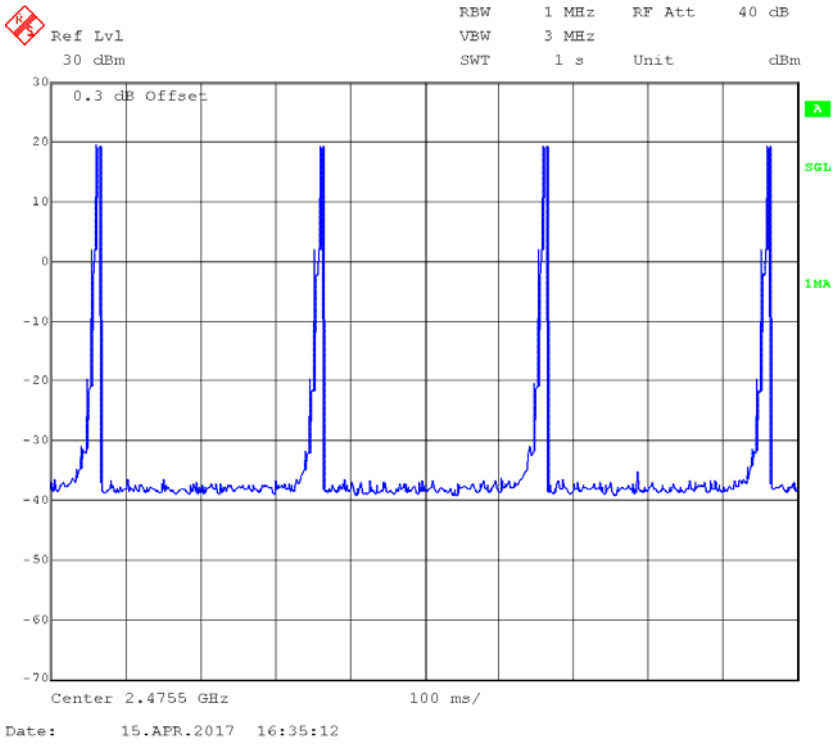
Mode 1, Middle Channel



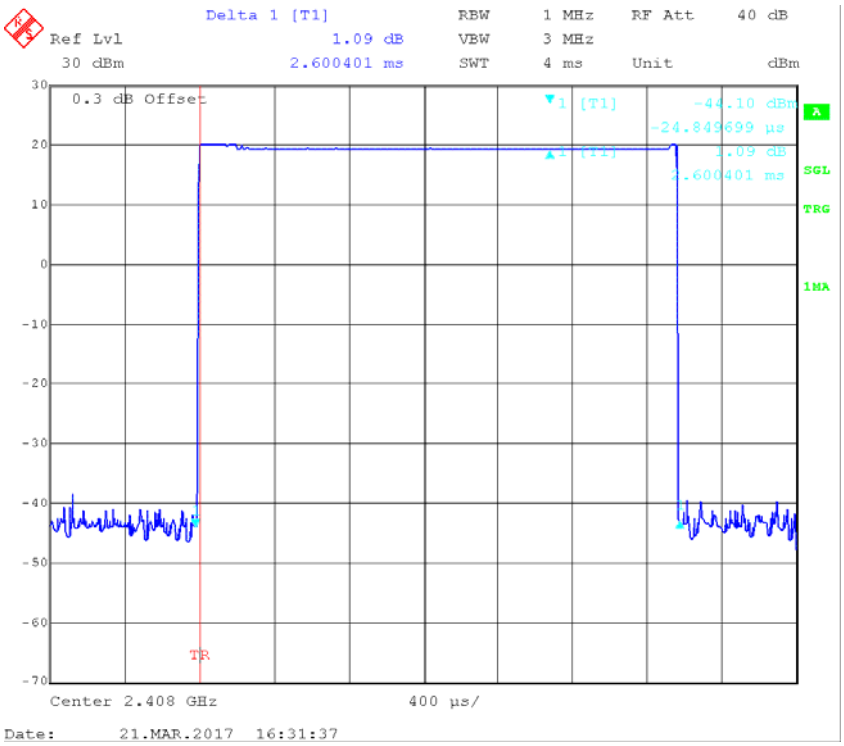


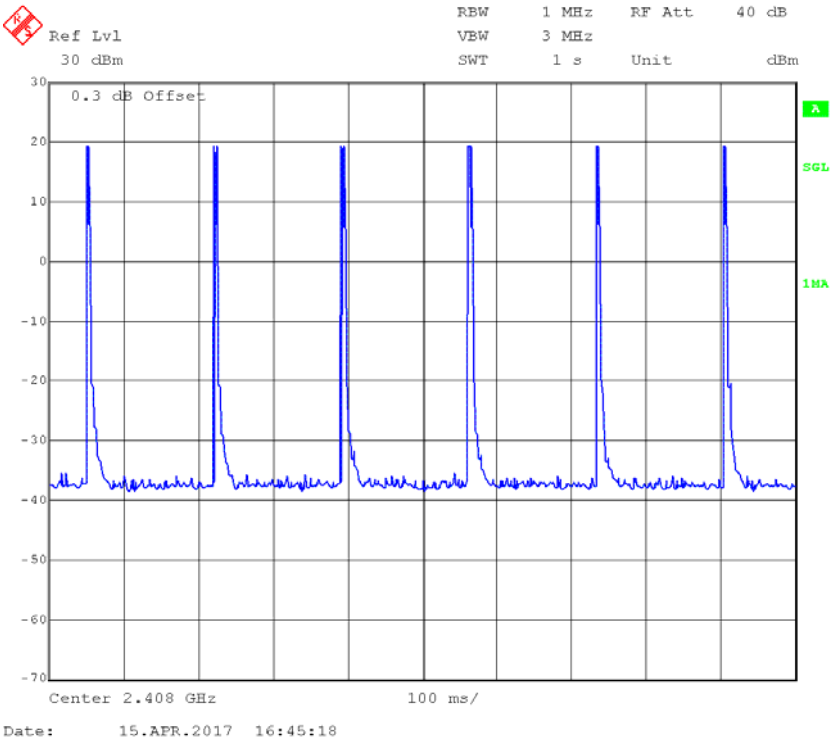
Mode 1, High Channel



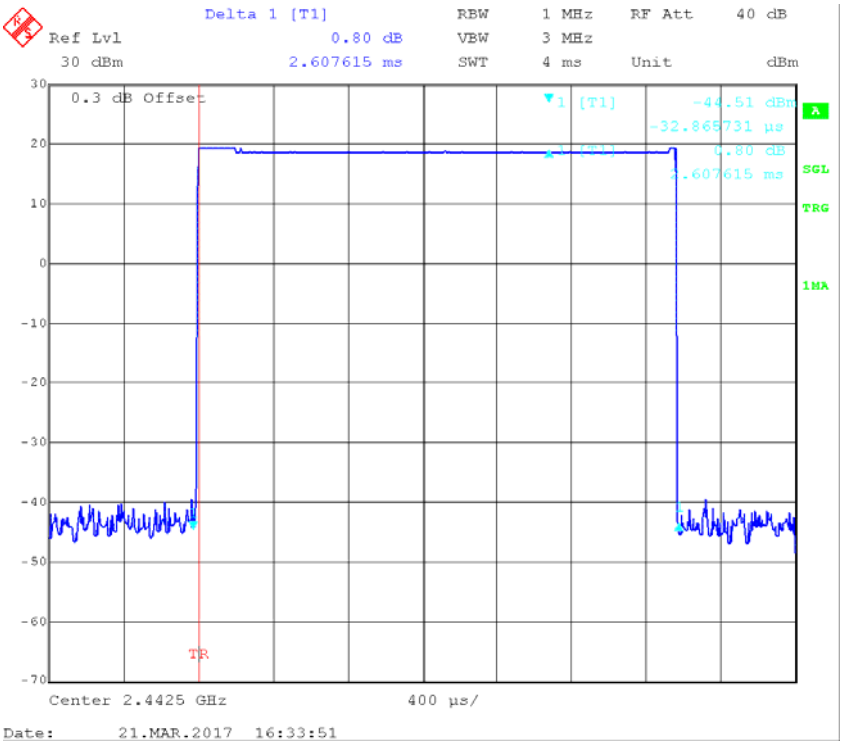


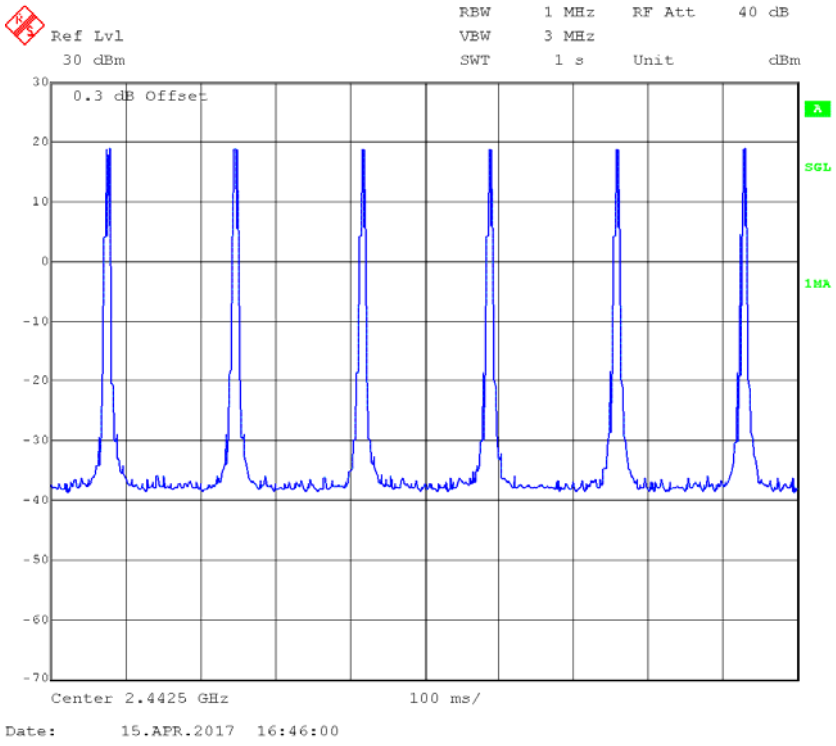
Mode 2, Low Channel



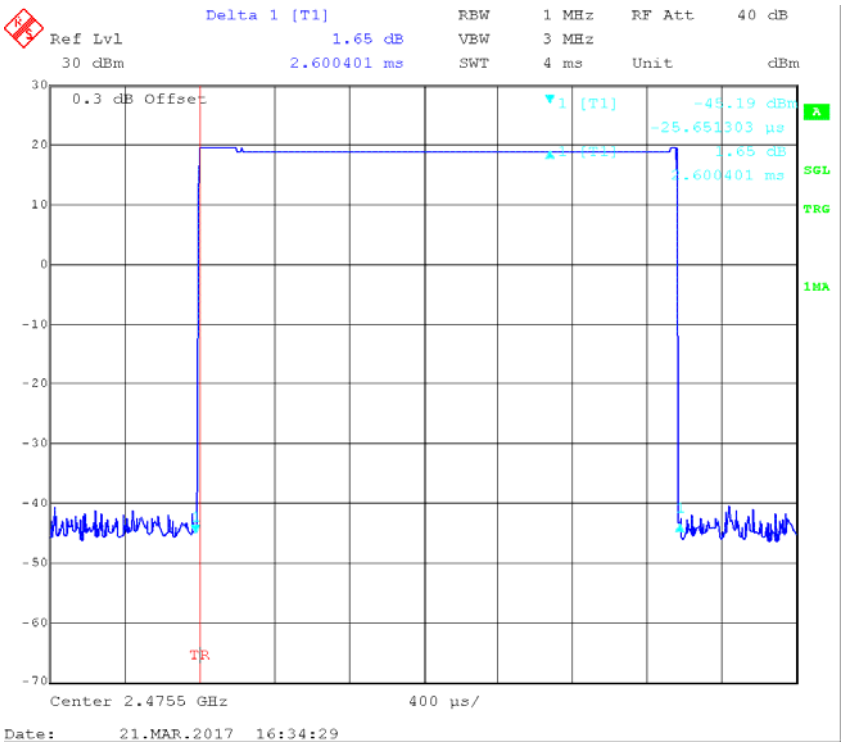


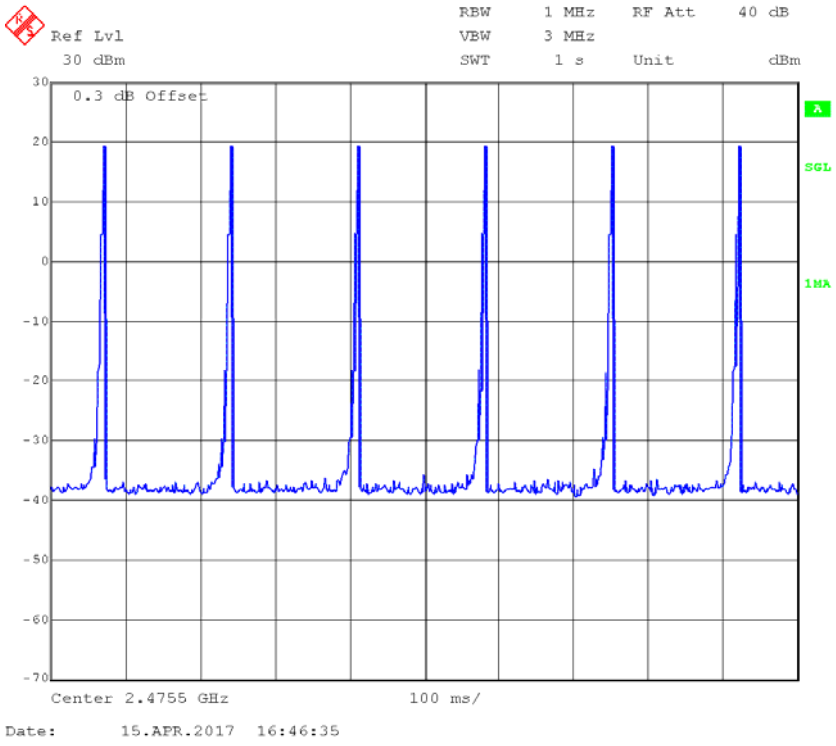
Mode 2, Middle Channel



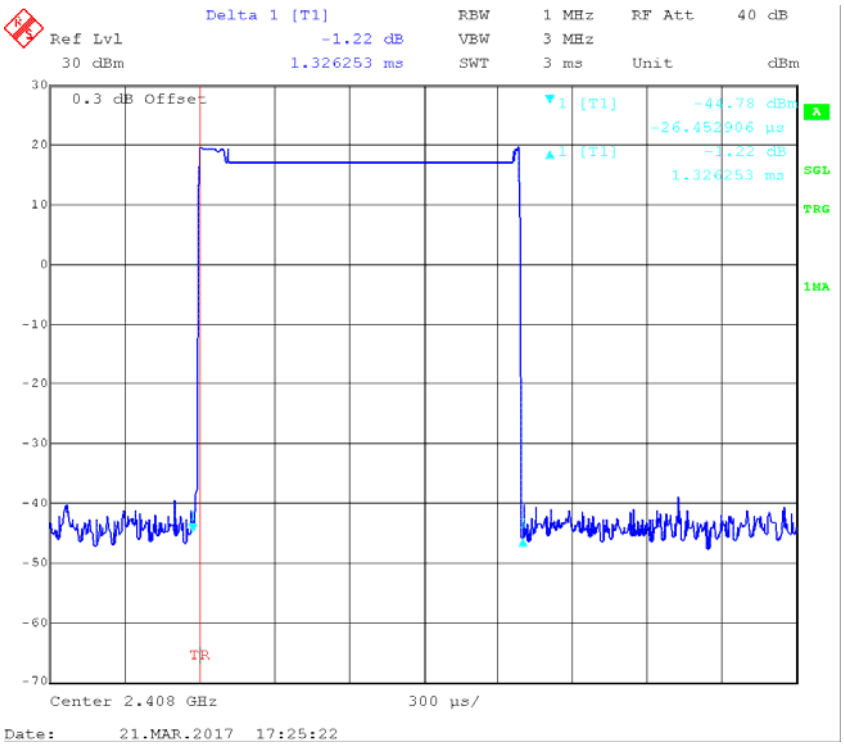


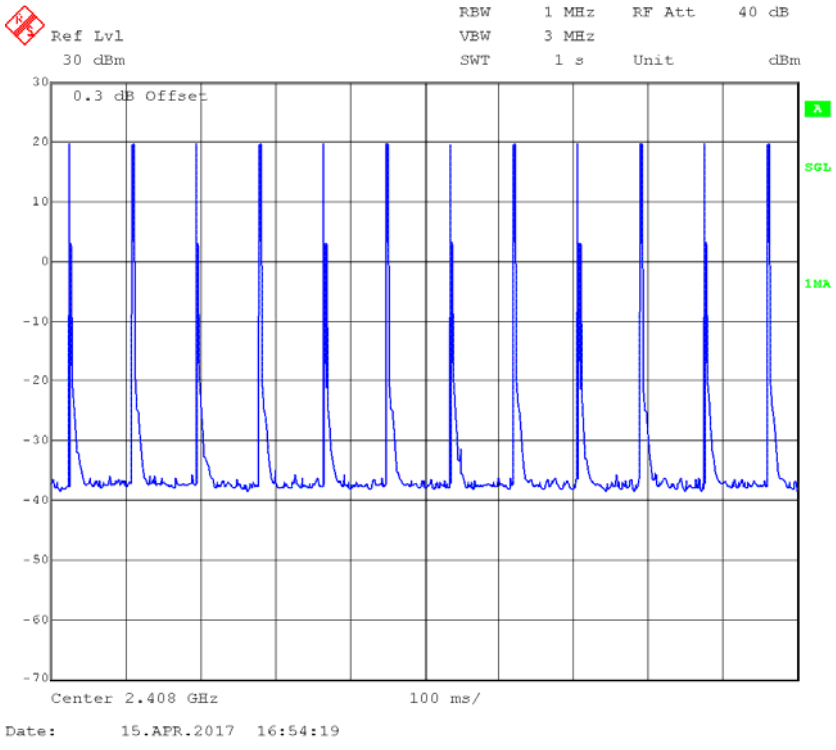
Mode 2, High Channel



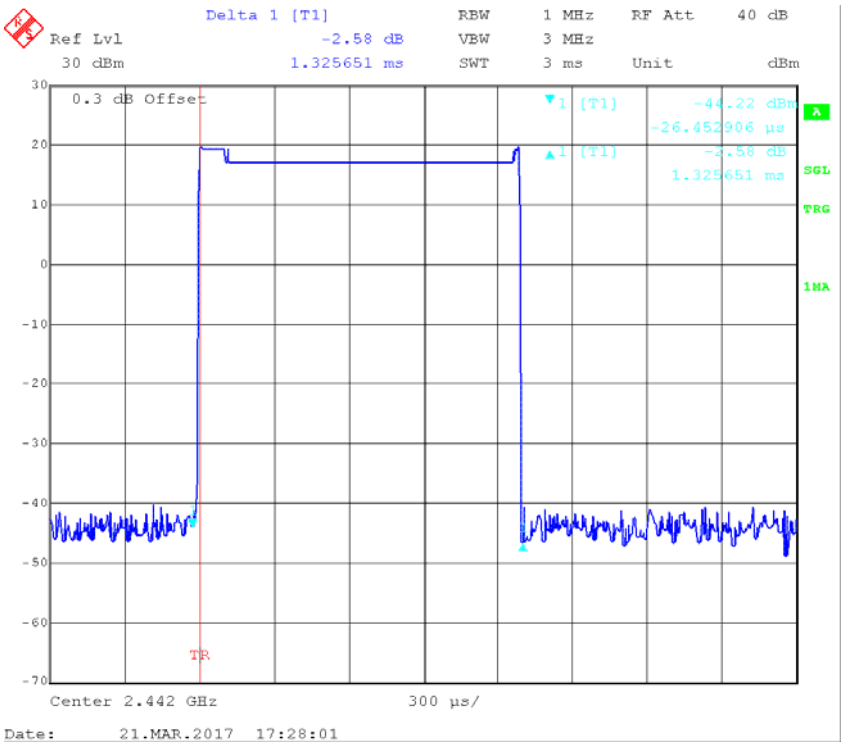


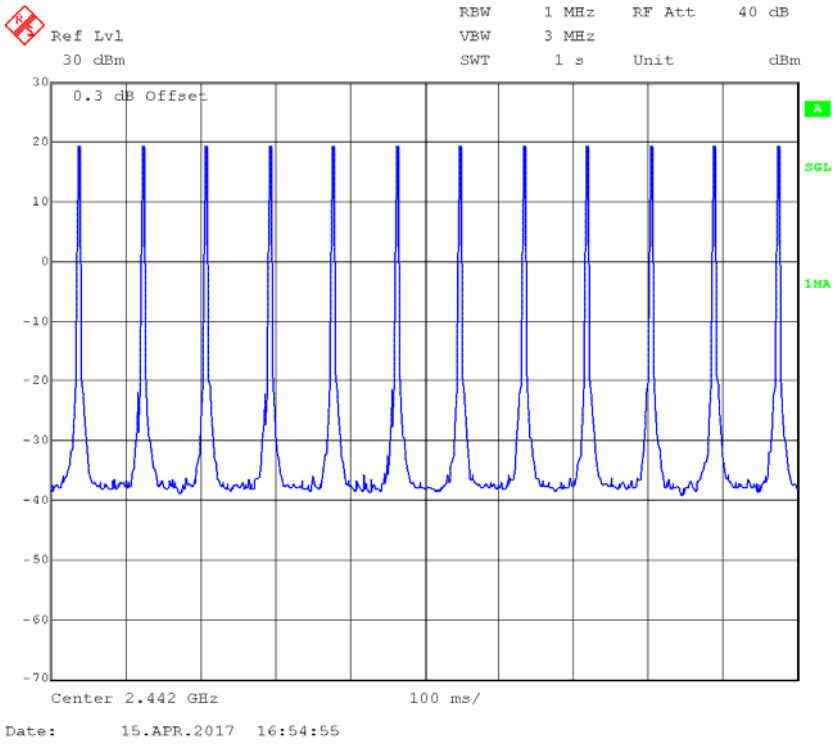
Mode 3, Low Channel



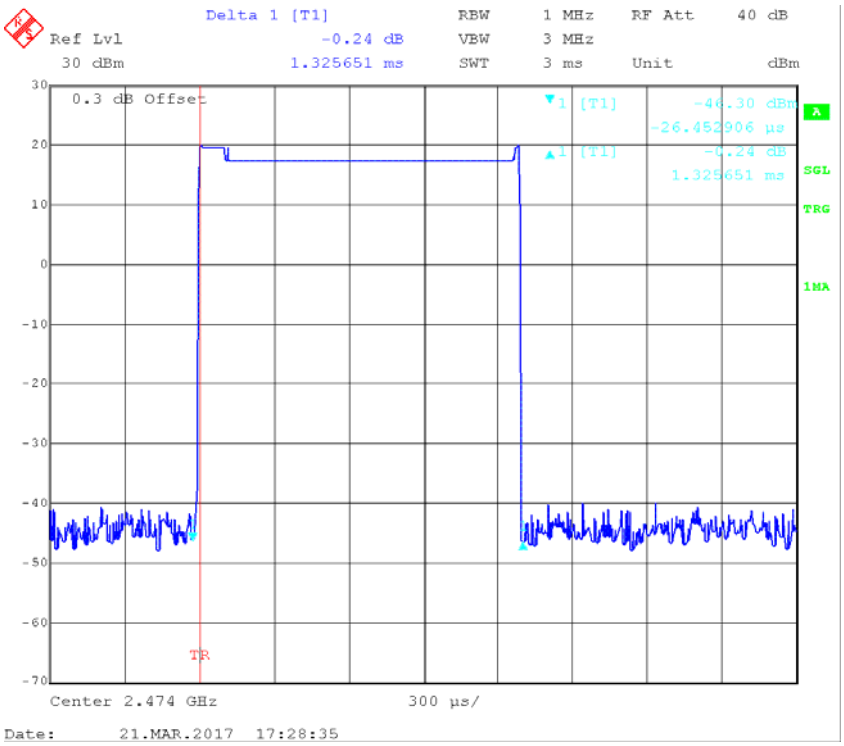


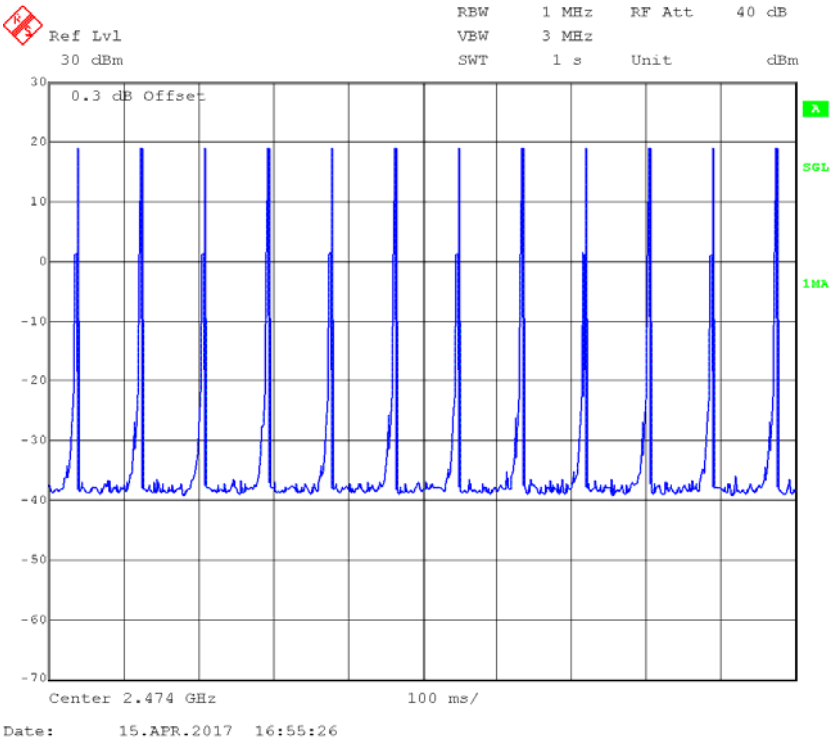
Mode 3, Middle Channel





Mode 3, High Channel




Ref Lvl
30 dBm
RBW 1 MHz
VBW 3 MHz
SWT 1 s
RF Att 40 dB
Unit dBm
0.3 dB Offset
A
SGL
1MA
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.474 GHz
100 ms/
Date: 15.APR.2017 16:55:26

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts

Test Procedure

1. Place the EUT on a bench and set in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Wideband Power Sensor	N1921A	MY54170074	2017-01-03	2018-01-02
Agilent	P-Series Power Meter	N1912A	MY5000798	2017-01-03	2018-01-02
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	23.8 °C
Relative Humidity:	52 %
ATM Pressure:	95.2 kPa

** The testing was performed by Lorin Bian on 2017-03-21.*

Test Result: Compliance.

Test Mode: Transmitting

Mode	Channel	Frequency (MHz)	Conducted Peak Output power (dBm)		Limit (dBm)
			Chain 0	Chain 1	
Mode 1	Low	2408	19.61	19.21	21
	Middle	2442.5	19.37	19.06	21
	High	2475.5	19.13	18.97	21
Mode 2	Low	2408	19.51	19.17	21
	Middle	2442.5	19.33	19.11	21
	High	2475.5	19.06	19.05	21
Mode 3	Low	2408	19.41	19.41	21
	Middle	2442	19.28	19.16	21
	High	2474	19.12	19.03	21

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	23.8 °C
Relative Humidity:	52 %
ATM Pressure:	95.2 kPa

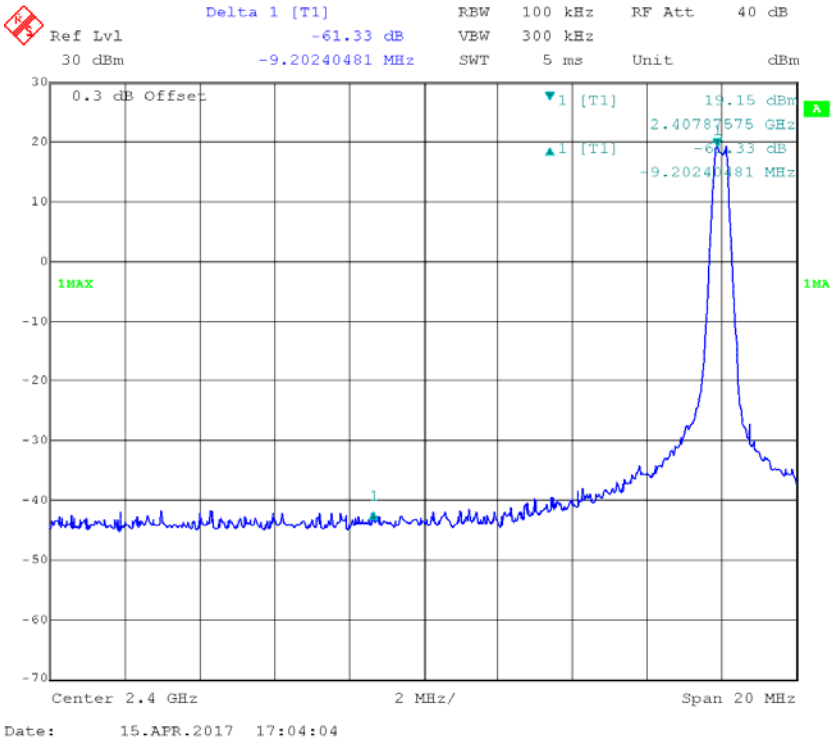
** The testing was performed by Lorin Bian on 2017-04-15.*

Test Result: Compliance

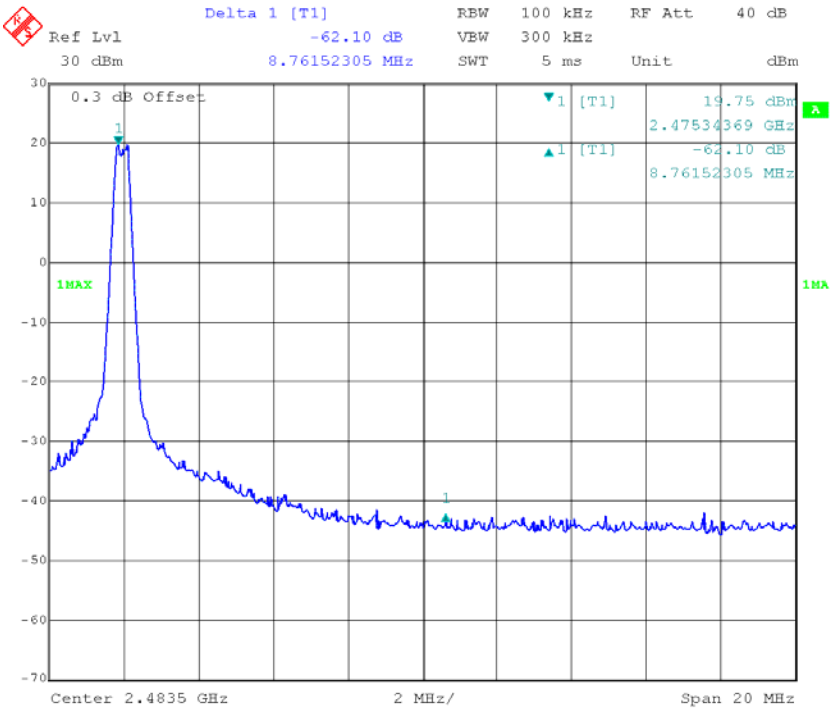
the emissions out of band is more than 20dB from the desired power, please refer to the below plots.

Mode 1:

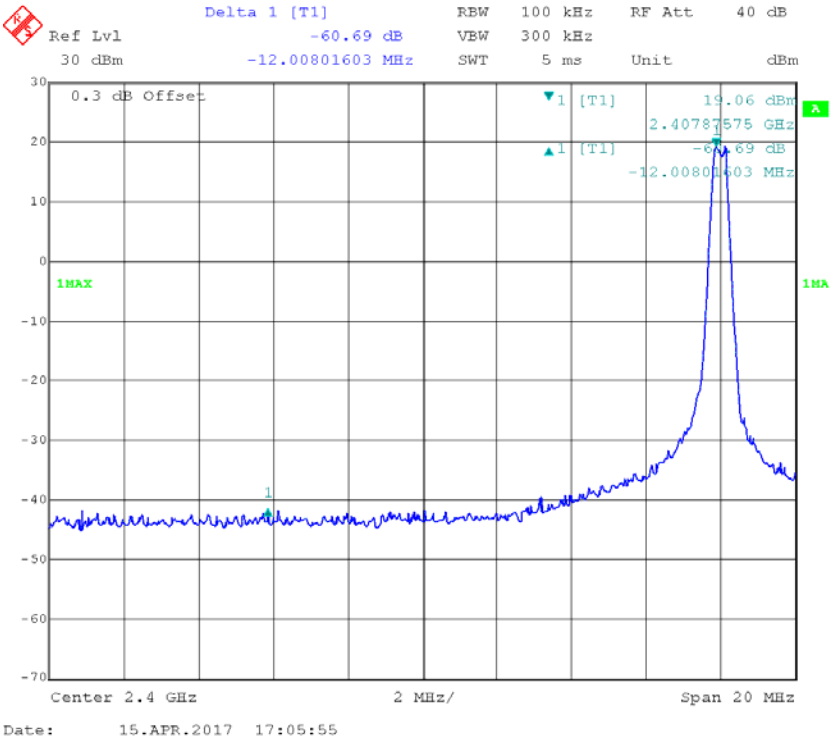
Chain 0, Band Edge, Left Side



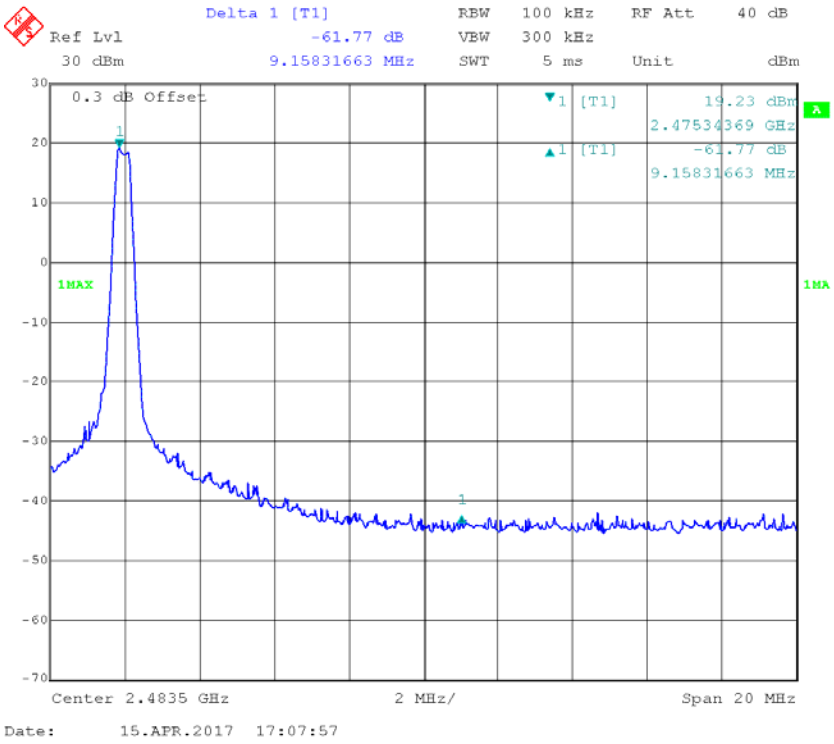
Chain 0, Band Edge, Right Side



Chain 1, Band Edge, Left Side

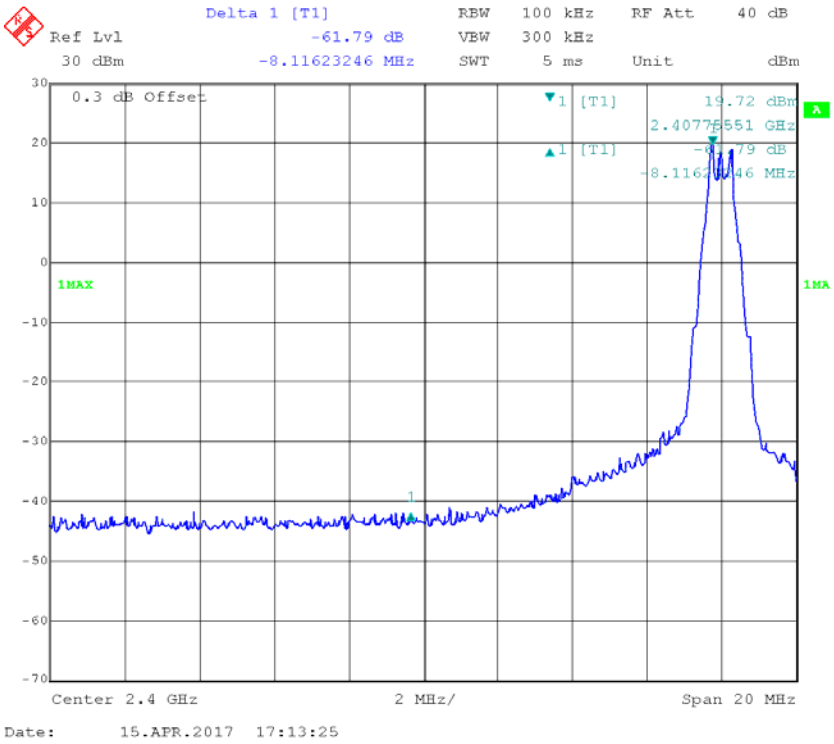


Chain 1, Band Edge, Right Side

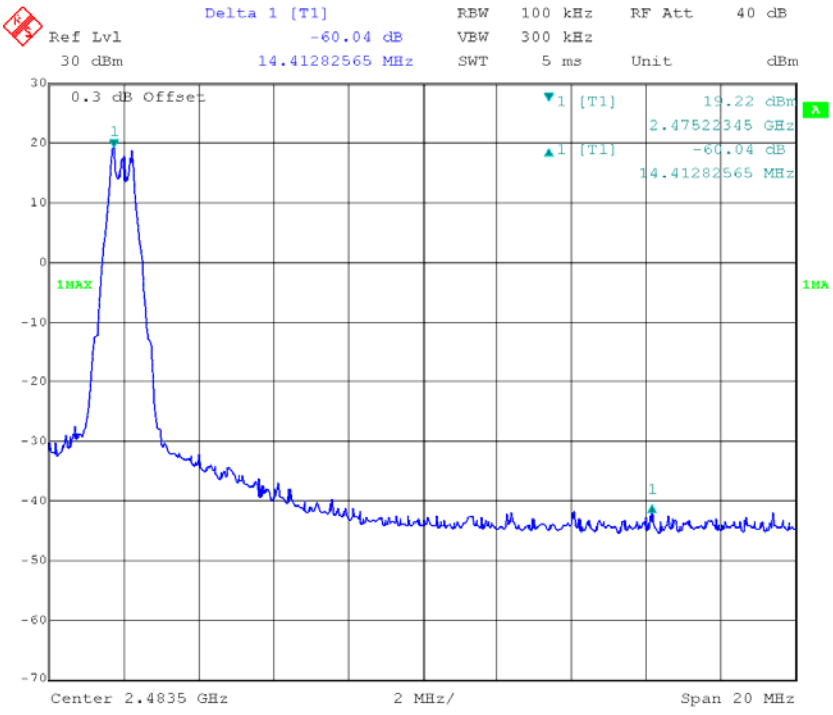


Mode 2:

Chain 0, Band Edge, Left Side



Chain 0, Band Edge, Right Side



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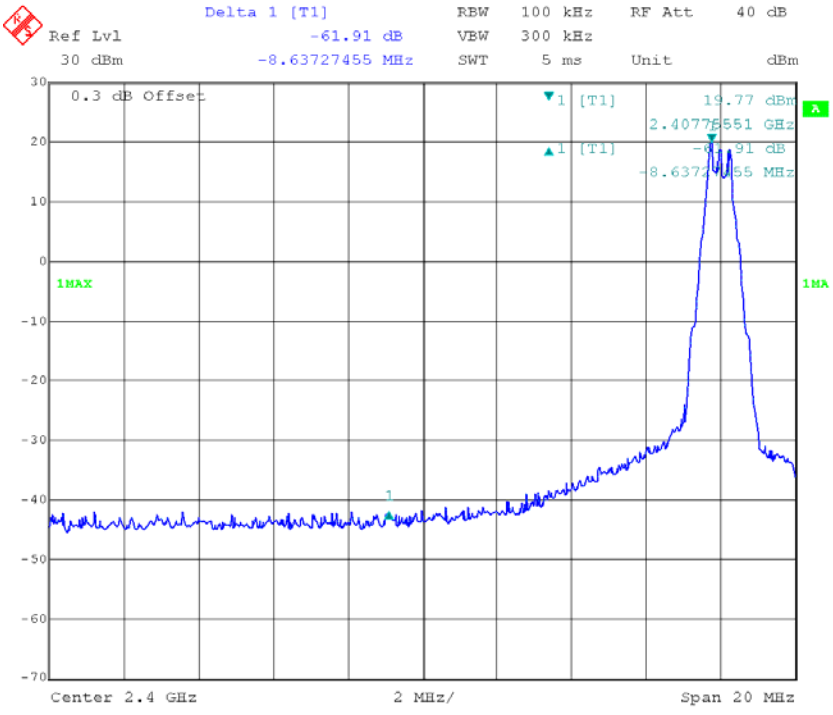
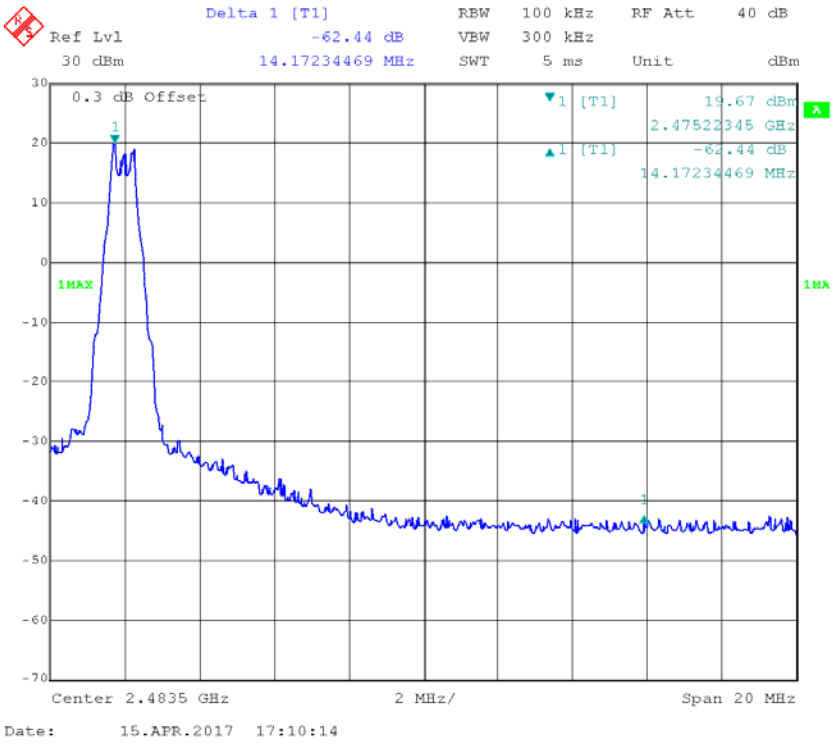
Chain 1, Band Edge, Left Side



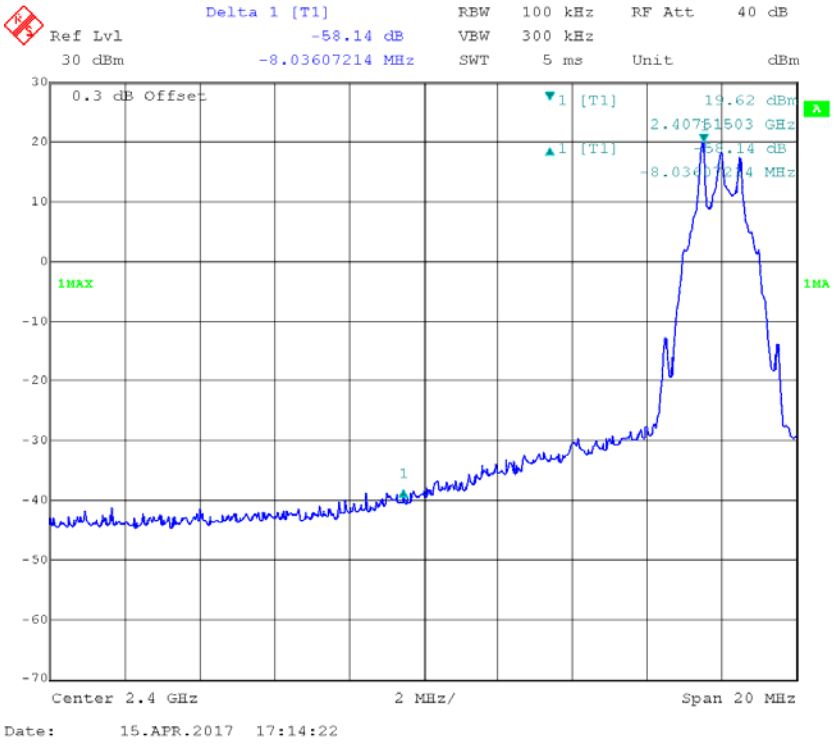
Date: 15.APR.2017 17:11:18

Chain 1, Band Edge, Right Side

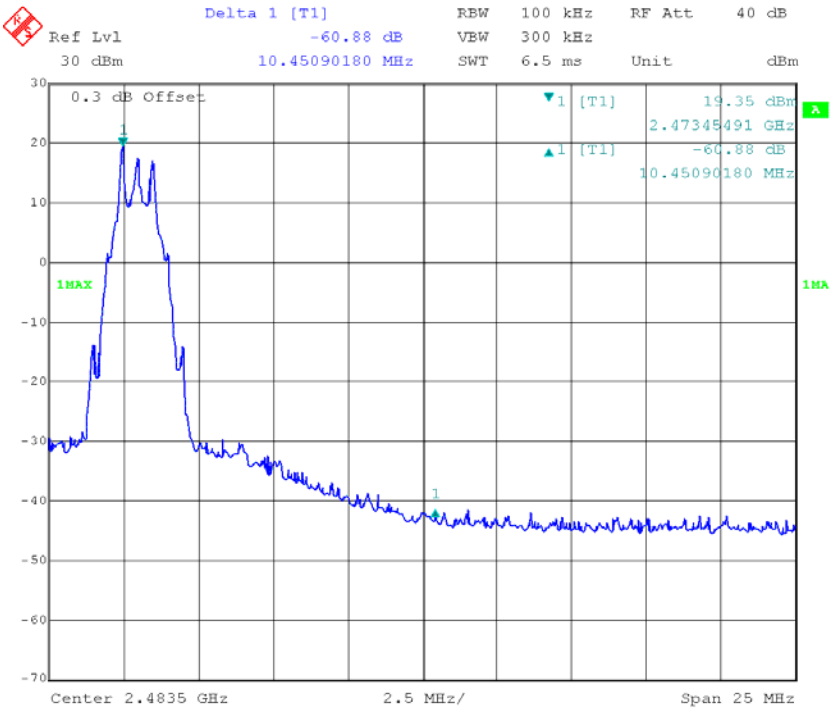


Mode 3:

Chain 0, Band Edge, Left Side

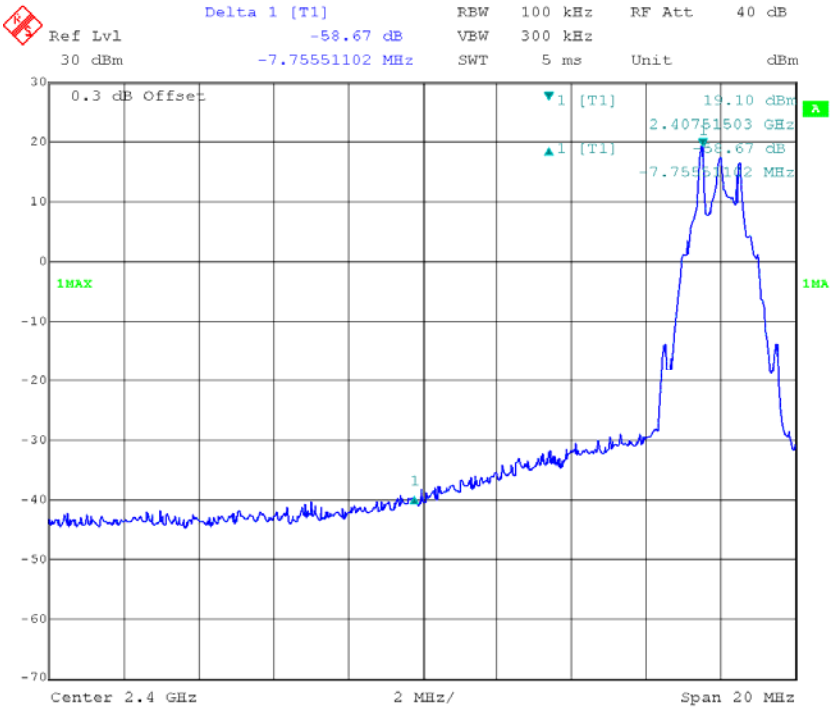


Chain 0, Band Edge, Right Side



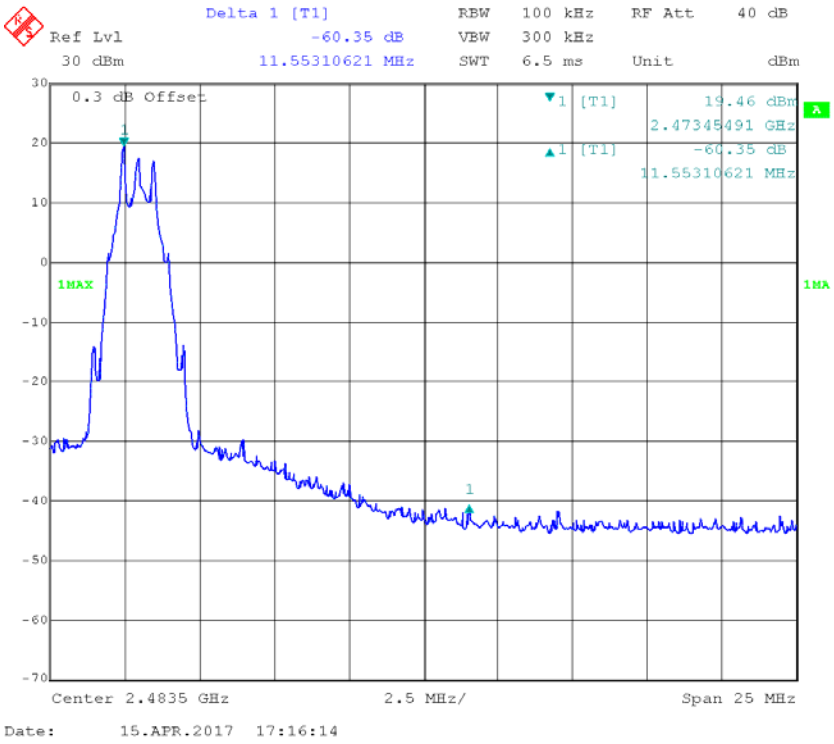
Date: 15.APR.2017 17:16:34

Chain 1, Band Edge, Left Side



Date: 15.APR.2017 17:15:11

Chain 1, Band Edge, Right Side



********END OF REPORT********