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TEST REPORT

For

SZ DJI Osmo Technology Co.,Ltd.

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Nanshan District, Shenzhen, China

FCC ID: 2ANDR-P1F11803
IC: 23060-P1F11803

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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	Force Pro
EUT Model:	P1F1
FCC ID:	2ANDR-P1F11803
IC:	23060-P1F11803
Rated Input Voltage:	3.85Vdc from battery 5Vdc from USB port 9-26Vdc form DC power port
External Dimension:	73.5 mm (L) x 42 mm (W) x 288.7 mm (H)
Serial Number:	180325002
EUT Received Date:	2018-03-25

Objective

This report is prepared on behalf of **SZ DJI Osmo Technology Co.,Ltd.** in accordance with Part 2, Subpart J, Part 15, Subparts A, and C of the Federal Communications Commission's rules and RSS-247, Issue 2, February 2017 of the Innovation, Science and Economic Development Canada, RSS-Gen Issue 4, November 2014 of the Innovation, Science and Economic Development Canada.

The tests were performed in order to determine the compliance of the EUT with FCC Rules Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209, 15.247 rules and RSS-247, Issue 2, February 2017, RSS-Gen Issue 4, November 2014 of the Innovation, Science and Economic Development Canada.

Related Submittal(s)/Grant(s)

FCC submissions with Part 15B JAB, FCC ID: 2ANDR-P1F11803.
FCC submissions with Part 15E NII, FCC ID: 2ANDR-P1F11803.
ISED submissions with RSS-247 LE-LAN, IC: 23060-P1F11803.
Part of system submissions with FCC ID: 2ANDR-R21708, IC: 23060-R21708.

Test Methodology

All measurements detailed in this Test Report were performed in accordance with ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices". And RSS-247, Issue 2, February 2017 of the Innovation, Science and Economic Development Canada, RSS-Gen Issue 4, November 2014 of the Innovation, Science and Economic Development Canada.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~26.5GHz: 5.23 dB
Unwanted Emissions	±1.5 dB
Temperature	±1 °C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China

Bay Area Compliance Laboratories Corp. (Dongguan) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L5662). And accredited to ISO/IEC 17025 by NVLAP(Test Laboratory Accreditation Certificate Number 500069-0), the FCC Designation No. CN5002 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Dongguan) was registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode, which was provided by manufacuter.

The system employed FHSS technology in 2.4GHz band, total 46 channels was used:

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

EUT Exercise Software

The software “Certification_HG330.exe” was used for testing, which was provided by manufacturer. The maximum power level was configured as below table:

Test Software Version	Certification_HG330.exe		
Test Frequency	2408MHz	2442.5MHz	2475.5MHz
Power Level Setting	45	45	45

Equipment Modifications

No modification was made to the EUT.

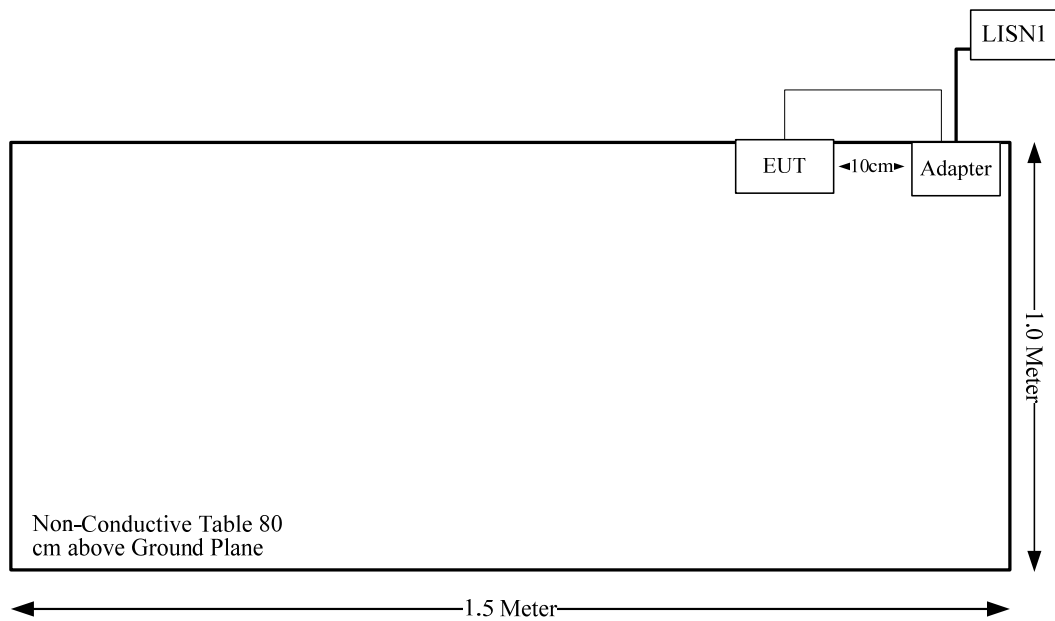
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
HUAWEI	Adapter	HW-050000C01	N/A

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	Yes	No	1.2	Adapter	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1093 RSS-102 §4	RF Exposure	Compliance
FCC§15.203 RSS-Gen Clause 8.3	Antenna Requirement	Compliance
FCC§15.207 (a) RSS-Gen Clause 8.8	Conducted Emissions	Compliance
FCC§15.205, §15.209, FCC §15.247(d) RSS-247 Clause 5.5, RSS-Gen Clause 8.10	Spurious Emissions	Compliance
FCC§15.247 (a)(1) RSS-247 Clause 5.1 b) RSS-Gen Clause 6.6	Emission Bandwidth	Compliance
FCC§15.247(a)(1) RSS-247 Clause 5.1 b)	Channel Separation Test	Compliance
FCC§15.247(a)(1)(iii) RSS-247 Clause 5.1 d)	Time of Occupancy (Dwell Time)	Compliance
FCC§15.247(a)(1)(iii) RSS-247 Clause 5.1 d)	Quantity of hopping channel Test	Compliance
FCC§15.247(b)(1) RSS-247 Clause 5.4 b)	Peak Output Power Measurement	Compliance
FCC§15.247(d) RSS-247 Clause 5.5	Band Edges	Compliance

FCC §15.247 (i) & §1.1310 & §2.1093, RSS-102 §4- RF EXPOSURE**Applicable Standard**

According to §15.247(i), §1.1310 and §2.1093.

According to RSS-102 §4 Table 3, SAR limits for device used by the general public

Body Region	Average SAR (W/Kg)	Averaging Time (minutes)	Mass Average (g)
Whole Body	0.08	6	Whole Body
Localized Head, Neck and Trunk	1.6	6	1
Localized Limbs	4	6	10

Test Result

Compliant, please refer to the SAR report: RDG180325002-20.

FCC §15.203& RSS-GEN CLAUSE 8.3 - 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.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

According to RSS-Gen §8.3, The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.⁹ When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

Antenna Connector Construction

The EUT has a external antenna arrangement use a unique type of connector to attach to the unit, the antenna gain is 2.18 dBi in 2.4GHz band and 4.5 dBi in 5.8GHz band, fulfill the requirement of this section. Please refer to the EUT photos.

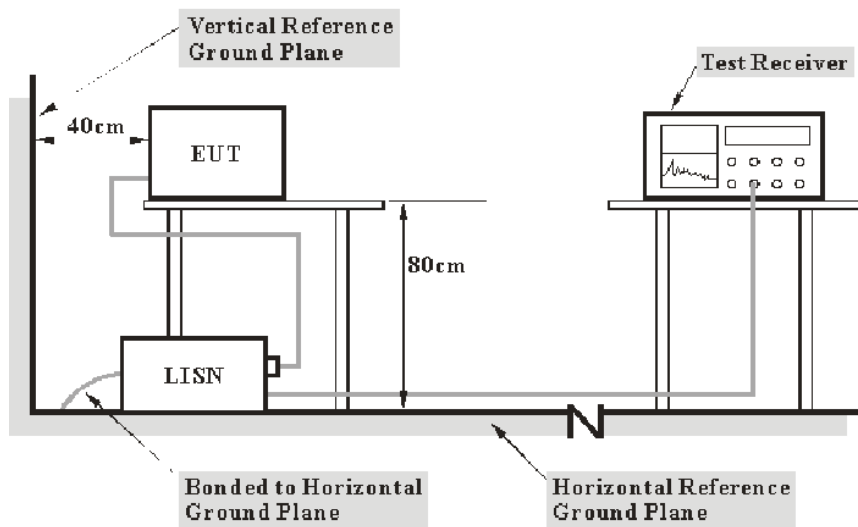
Result: Compliance.

FCC §15.207 (a) & RSS-Gen CLAUSE 8.8– AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207(a) and RSS-Gen§8.8.

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 and RSS-Gen limits

The spacing between the peripherals was 10 cm.

The adapter was connected to the main lisn with a 120 V/60 Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

V_C (cord. Reading): corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN

C_f : Correction Factor

The “**Margin**” column of the following data tables indicates the degree of compliance within 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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-11	2018-12-11
N/A	Coaxial Cable	C-NJNJ-50	C-0200-01	2017-09-05	2018-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

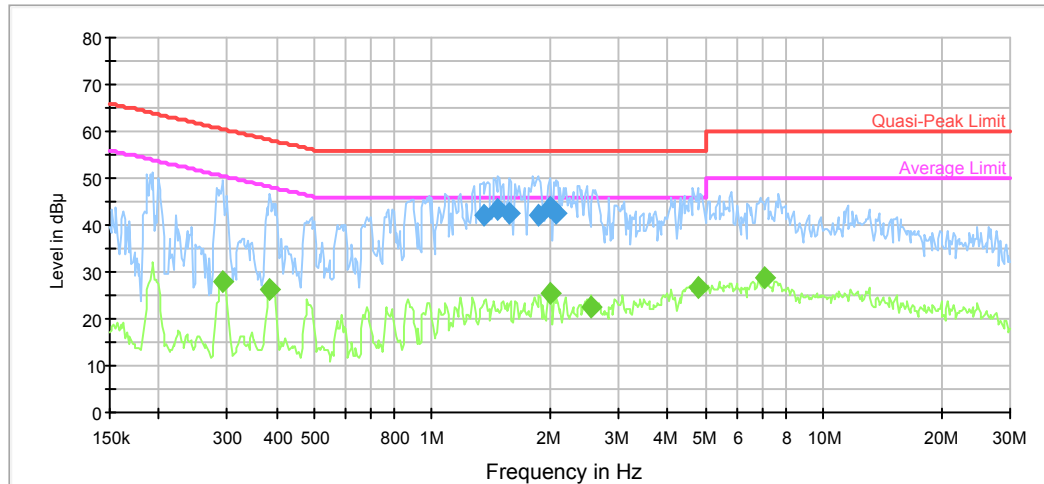
Environmental Conditions

Temperature:	26.8 °C
Relative Humidity:	47%
ATM Pressure:	101.1 kPa

The testing was performed by Jim Zhang on 2018-04-03.

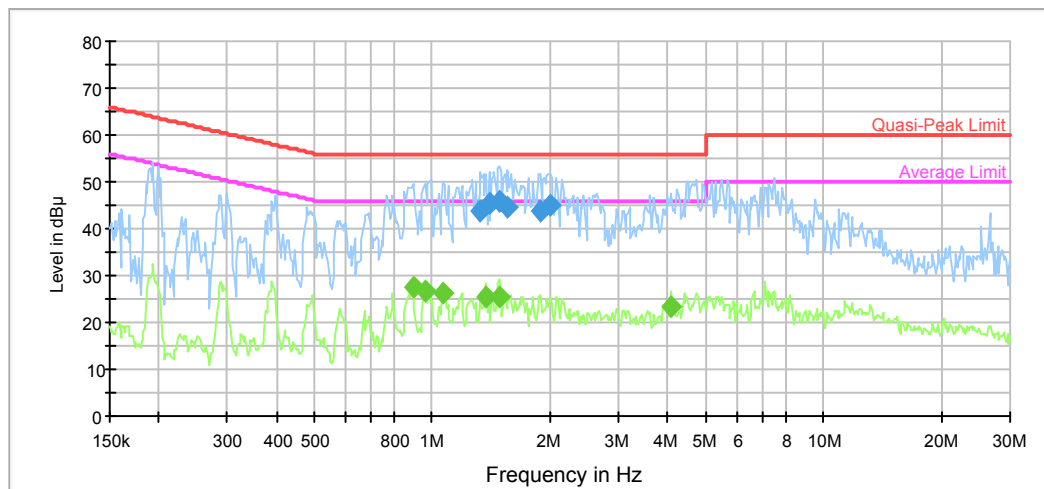
Test Mode: Transmitting

AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
1.352690	42.0	9.000	L1	9.7	14.0	56.0	Compliance
1.476605	43.3	9.000	L1	9.7	12.7	56.0	Compliance
1.573796	42.3	9.000	L1	9.7	13.7	56.0	Compliance
1.860457	42.0	9.000	L1	9.7	14.0	56.0	Compliance
1.998778	43.7	9.000	L1	9.7	12.3	56.0	Compliance
2.080018	42.4	9.000	L1	9.7	13.6	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.290613	27.8	9.000	L1	10.2	22.7	50.5	Compliance
0.384091	26.1	9.000	L1	10.0	22.1	48.2	Compliance
1.998778	25.5	9.000	L1	9.7	20.5	46.0	Compliance
2.558827	22.5	9.000	L1	9.8	23.5	46.0	Compliance
4.763898	26.5	9.000	L1	9.8	19.5	46.0	Compliance
7.095599	28.9	9.000	L1	9.8	21.1	50.0	Compliance

AC120 V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
1.331304	43.6	9.000	N	9.7	12.4	56.0	Compliance
1.396499	45.4	9.000	N	9.7	10.6	56.0	Compliance
1.488418	45.8	9.000	N	9.7	10.2	56.0	Compliance
1.561306	44.6	9.000	N	9.7	11.4	56.0	Compliance
1.890344	43.7	9.000	N	9.7	12.3	56.0	Compliance
1.998778	45.0	9.000	N	9.7	11.0	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.893821	27.6	9.000	N	9.8	18.4	46.0	Compliance
0.960275	26.5	9.000	N	9.8	19.5	46.0	Compliance
1.065081	26.2	9.000	N	9.8	19.8	46.0	Compliance
1.374420	25.5	9.000	N	9.7	20.5	46.0	Compliance
1.488418	25.5	9.000	N	9.7	20.5	46.0	Compliance
4.094608	23.3	9.000	N	9.8	22.7	46.0	Compliance

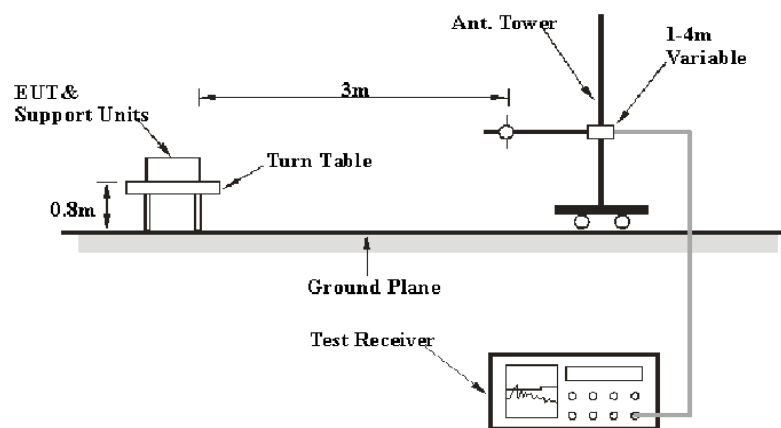
FCC §15.209, §15.205 & §15.247(d) & RSS-247 CLAUSE 5.5, RSS-GEN CLAUSE 8.10- SPURIOUS EMISSIONS

Applicable Standard

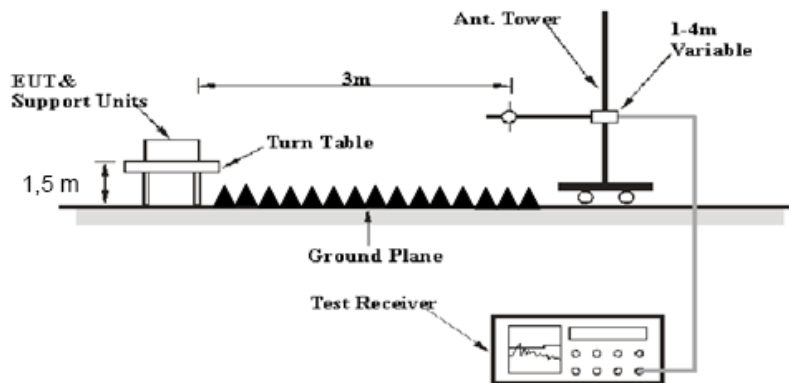
FCC §15.247 (d); §15.209; §15.205; RSS-247 Clause 5.5, RSS-GEN Clause 8.10

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters distance, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, 15.247 and RSS-247 Clause 5.5, RSS-GEN Clause 8.10 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	Measurement
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
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	2018-09-01
Sunol Sciences	Antenna	JB3	A060611-2	2017-08-25	2020-08-25
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
unknown	Coaxial Cable	4m	C0400/01	2017-09-05	2018-09-05
unknown	Coaxial Cable	0.75m	C0075/01	2017-09-05	2018-09-05
unknown	Coaxial Cable	10m	C1000/01	2017-09-05	2018-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-05
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2017-06-27	2018-06-27
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-06-16	2020-06-15
unknown	Coaxial Cable	8m	C0800/01	2017-09-05	2018-09-05
Chengdu OuLi	Bandrejector Filter	2400-2483.5	001	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests 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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data

Environmental Conditions

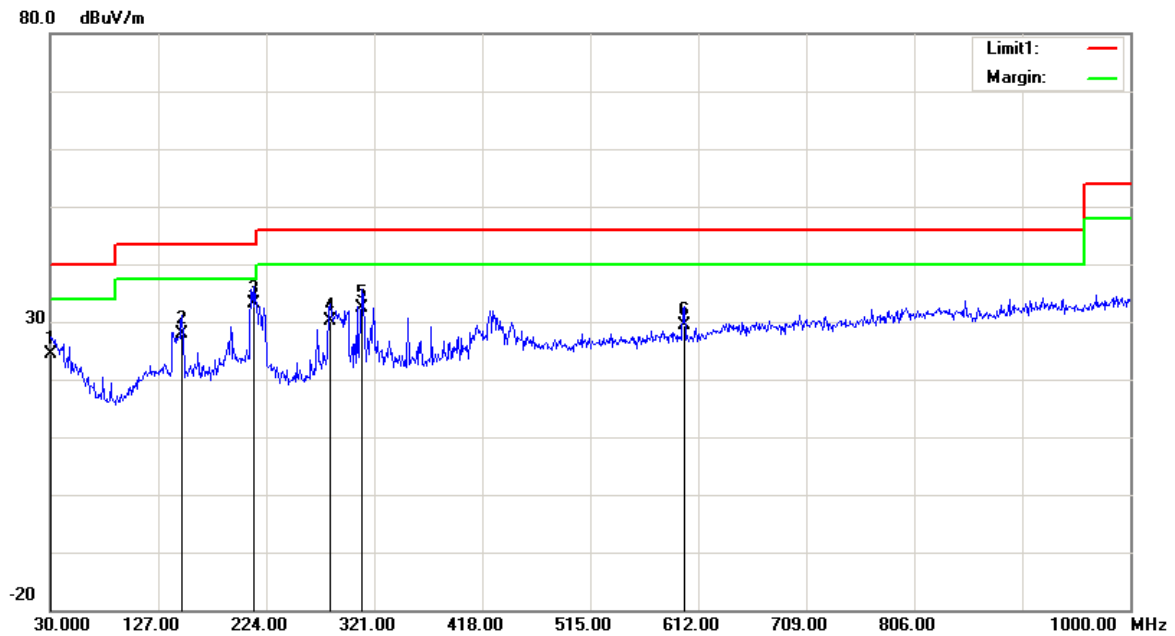
Temperature:	25.1 °C
Relative Humidity:	42 %
ATM Pressure:	100.8 kPa

* The testing was performed by Steve Zuo on 2018-03-29.

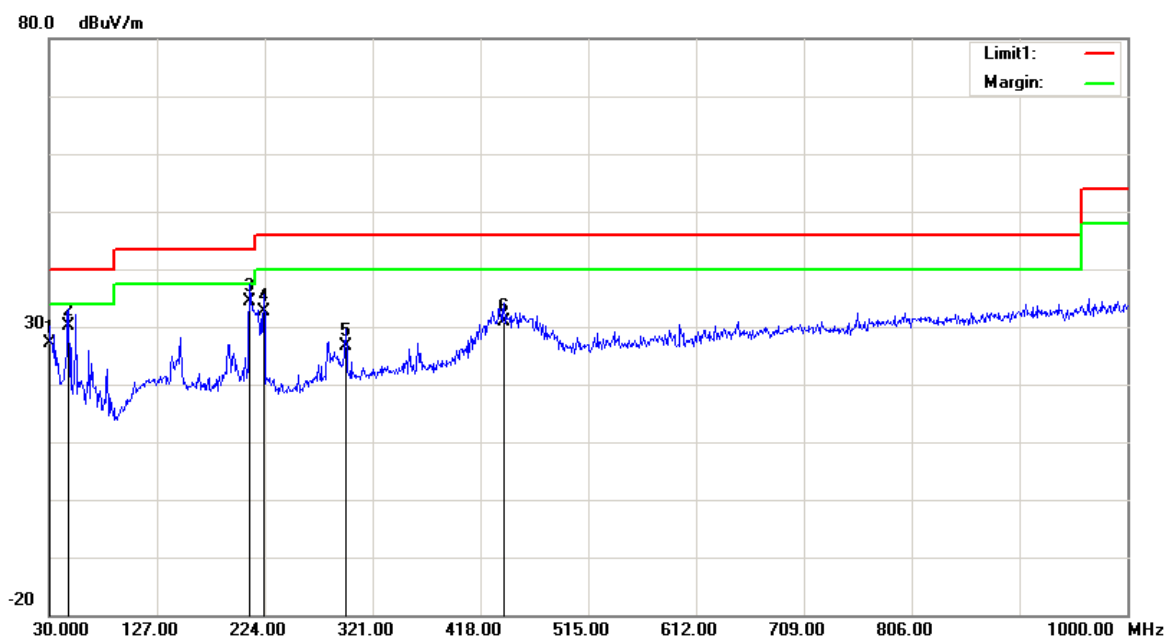
Test Mode: Transmitting

1) 30MHz-1GHz(Middle Channel was the worst):

Horizontal:



Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.0000	22.86	QP	1.54	24.40	40.00	15.60
148.3400	34.04	QP	-6.04	28.00	43.50	15.50
213.3300	40.34	QP	-7.24	33.10	43.50	10.40
281.2300	34.20	QP	-4.10	30.10	46.00	15.90
310.3300	36.34	QP	-3.84	32.50	46.00	13.50
599.3900	28.65	QP	0.85	29.50	46.00	16.50

Vertical:

Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.0000	25.66	QP	1.54	27.20	40.00	12.80
47.4600	40.50	QP	-10.40	30.10	40.00	9.90
210.4200	41.83	QP	-7.43	34.40	43.50	9.10
223.0300	39.46	QP	-6.86	32.60	46.00	13.40
296.7500	30.69	QP	-4.09	26.60	46.00	19.40
439.3400	32.26	QP	-1.26	31.00	46.00	15.00

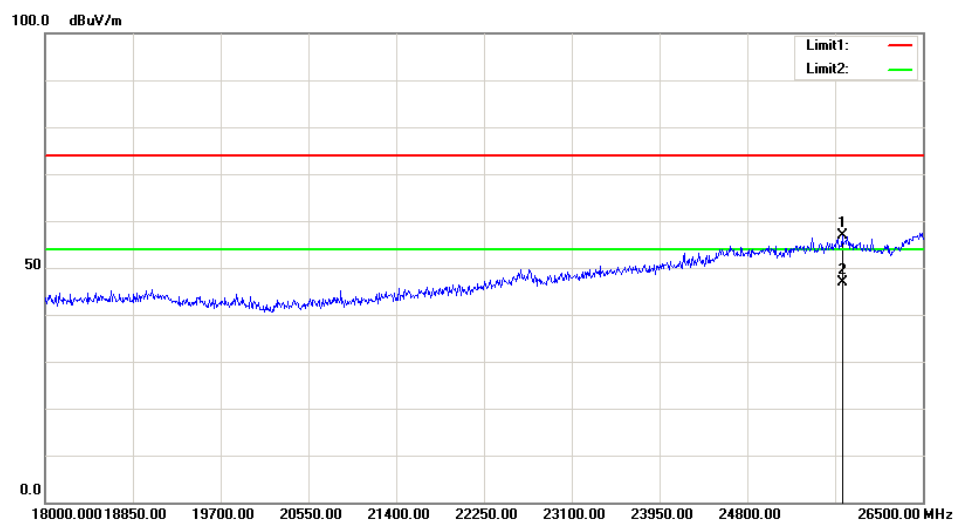
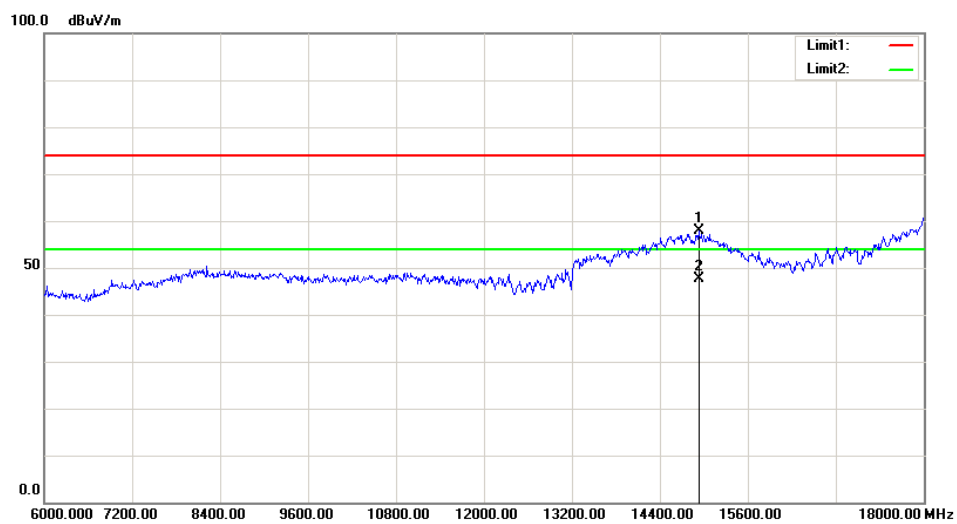
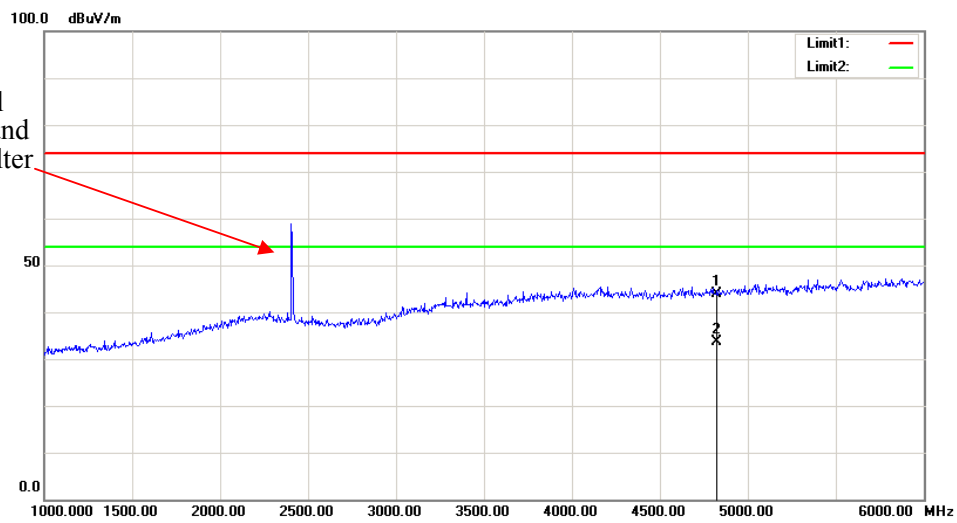
2) 1-25GHz:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2408 MHz									
2408.00	81.56	PK	H	28.12	1.80	0.00	111.48	N/A	N/A
2408.00	66.39	AV	H	28.12	1.80	0.00	96.31	N/A	N/A
2408.00	92.35	PK	V	28.12	1.80	0.00	122.27	N/A	N/A
2408.00	77.86	AV	V	28.12	1.80	0.00	107.78	N/A	N/A
2390.00	26.79	PK	V	28.08	1.80	0.00	56.67	74.00	17.33
2390.00	14.83	AV	V	28.08	1.80	0.00	44.71	54.00	9.29
4816.00	50.75	PK	V	32.93	3.18	37.20	49.66	74.00	24.34
4816.00	39.56	AV	V	32.93	3.18	37.20	38.47	54.00	15.53
7224.00	46.79	PK	V	35.78	4.79	37.25	50.11	74.00	23.89
7224.00	34.46	AV	V	35.78	4.79	37.25	37.78	54.00	16.22
Middle Channel: 2442.5 MHz									
2442.50	82.89	PK	H	28.19	1.82	0.00	112.90	N/A	N/A
2442.50	67.57	AV	H	28.19	1.82	0.00	97.58	N/A	N/A
2442.50	93.62	PK	V	28.19	1.82	0.00	123.63	N/A	N/A
2442.50	78.56	AV	V	28.19	1.82	0.00	108.57	N/A	N/A
4885.00	50.27	PK	V	33.07	3.28	37.21	49.41	74.00	24.59
4885.00	39.15	AV	V	33.07	3.28	37.21	38.29	54.00	15.71
7327.50	46.53	PK	V	36.05	4.61	37.38	49.81	74.00	24.19
7327.50	35.48	AV	V	36.05	4.61	37.38	38.76	54.00	15.24
High Channel: 2475.5 MHz									
2475.50	82.67	PK	H	28.25	1.84	0.00	112.76	N/A	N/A
2475.50	67.54	AV	H	28.25	1.84	0.00	97.63	N/A	N/A
2475.50	92.39	PK	V	28.25	1.84	0.00	122.48	N/A	N/A
2475.50	77.43	AV	V	28.25	1.84	0.00	107.52	N/A	N/A
2483.50	31.48	PK	V	28.27	1.84	0.00	61.59	74.00	12.41
2483.50	16.79	AV	V	28.27	1.84	0.00	46.90	54.00	7.10
4951.00	50.37	PK	V	33.20	3.24	37.24	49.57	74.00	24.43
4951.00	39.23	AV	V	33.20	3.24	37.24	38.43	54.00	15.57
7426.50	46.67	PK	V	36.31	4.44	37.51	49.91	74.00	24.09
7426.50	35.45	AV	V	36.31	4.44	37.51	38.69	54.00	15.31

Worst mode Plots(Middle channel)

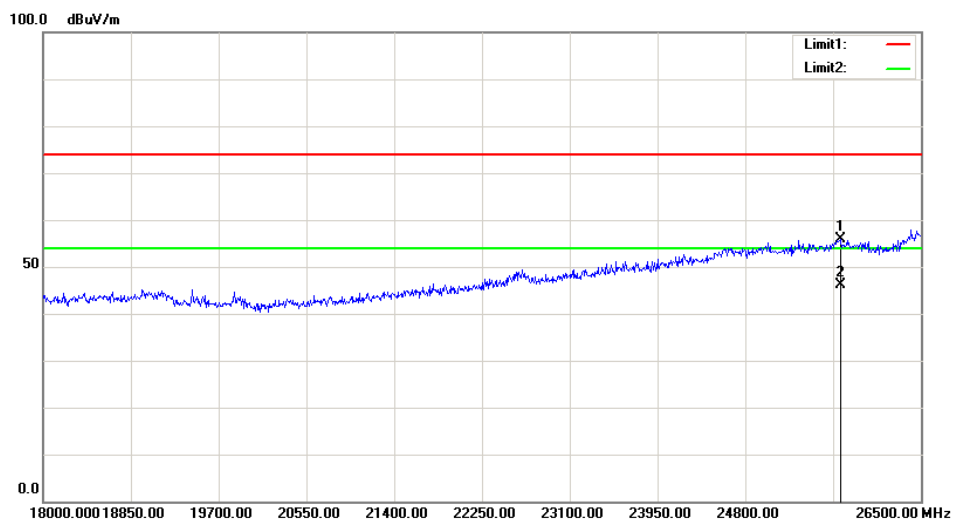
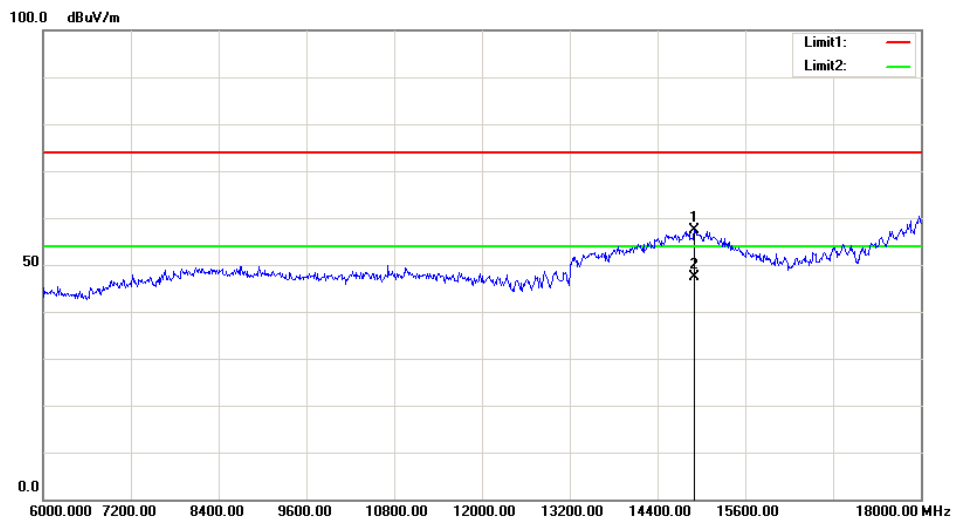
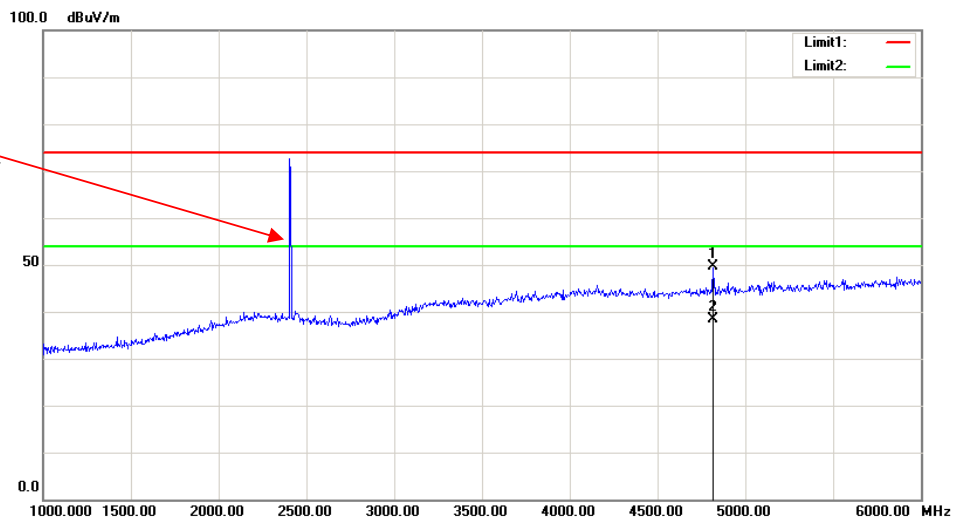
Horizontal:

Fundamental
Test with Band
Rejection Filter



Vertical:

Fundamental
Test with Band
Rejection Filter



FCC §15.247(a) (1)& RSS-247 CLAUSE 5.1 b) - CHANNEL SEPARATION**Applicable Standard**

According to FCC §15.247(a) (1)

Frequency hopping systems shall have hopping 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.

According to RSS-247 Clause 5.1 b)

- b) FHSs shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-2483.5 MHz 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 that the systems operate with an output power no greater than 0.125 W.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
Unknown	Coaxial Cable	C-SJ00-0010	C0010/05	Each Time	/

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests 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, spectrum Bandwidth was set at 30 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace.
3. Measure the channel separation.

Test Data

Environmental Conditions

Temperature:	25.6 °C
Relative Humidity:	51 %
ATM Pressure:	100.8 kPa

* The testing was performed by Swim Lv on 2018-03-27.

Test Result: Compliance.

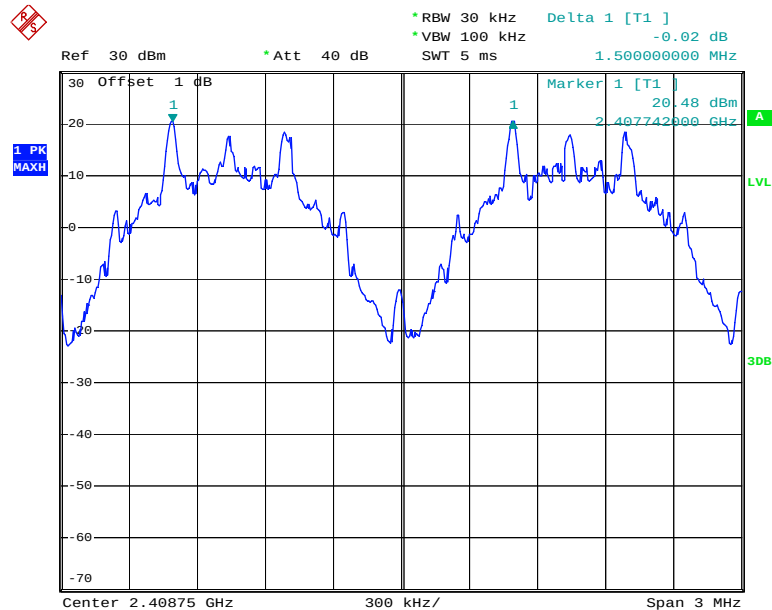
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency	Channel Separation	Limit
	MHz	MHz	MHz
Low	2408	1.500	0.69
Middle	2442.5	1.500	0.69
High	2475.5	1.506	0.69

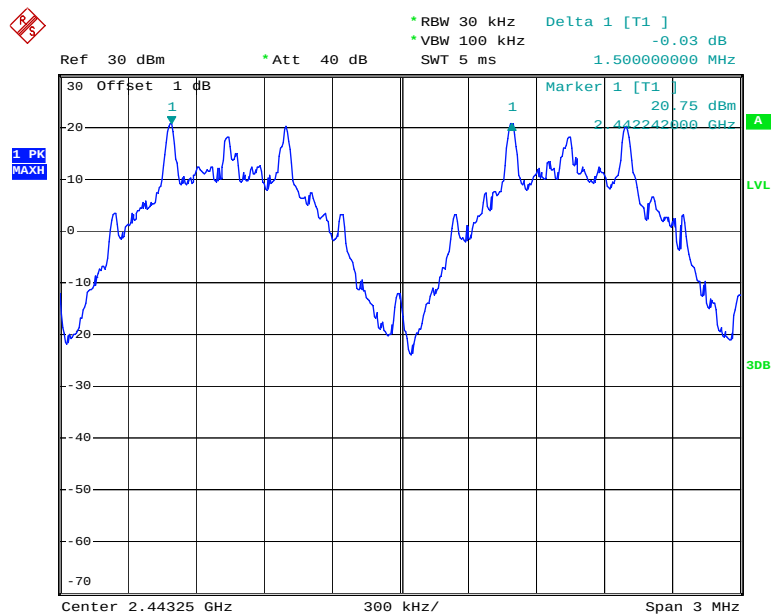
Note: channel separation is more than two-thirds of the 20dB bandwidth

Low Channel



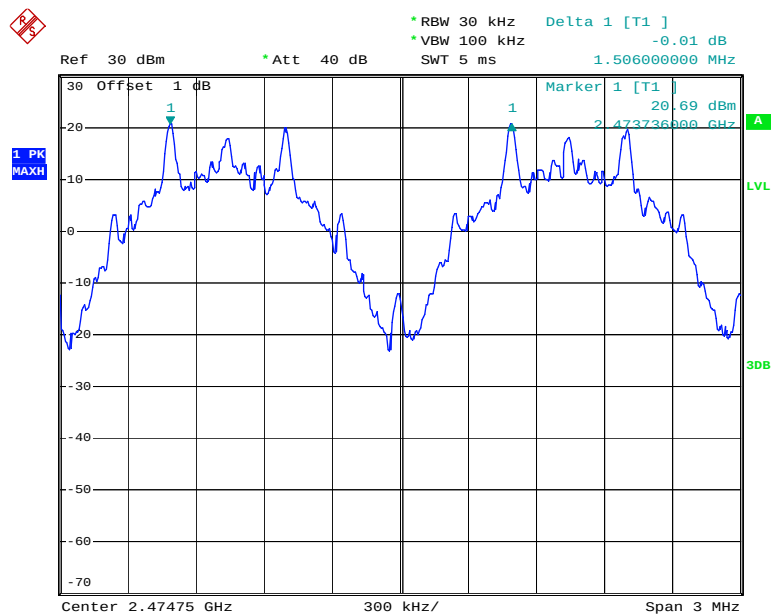
Date: 27.MAR.2018 12:58:35

Middle Channel



Date: 27.MAR.2018 14:03:33

High Channel



Date: 27.MAR.2018 12:56:01

**FCC §15.247(a) (1)& RSS-247 CLAUSE 5.1 b) ,RSS-GEN CLAUSE 6.6 –
EMISSION BANDWIDTH****Applicable Standard**

According to FCC §15.247(a) (1)

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.

According to RSS-247 Clause 5.1 b)

- b) FHSs shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-2483.5 MHz 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 that the systems operate with an output power no greater than 0.125 W.

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. Use Occupied bandwidth test function, measure the 99% Occupied bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
Unknown	Coaxial Cable	C-SJ00-0010	C0010/05	Each Time	/

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	27.6°C
Relative Humidity:	47.5 %
ATM Pressure:	100.1kPa

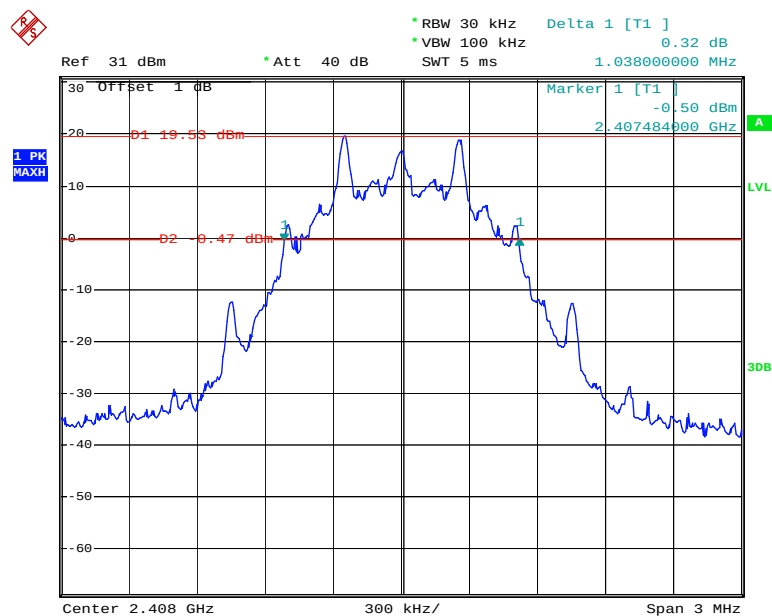
* The testing was performed by Harry Yang on 2018-04-03.

Test Result: Compliance.

Please refer to following tables and plots

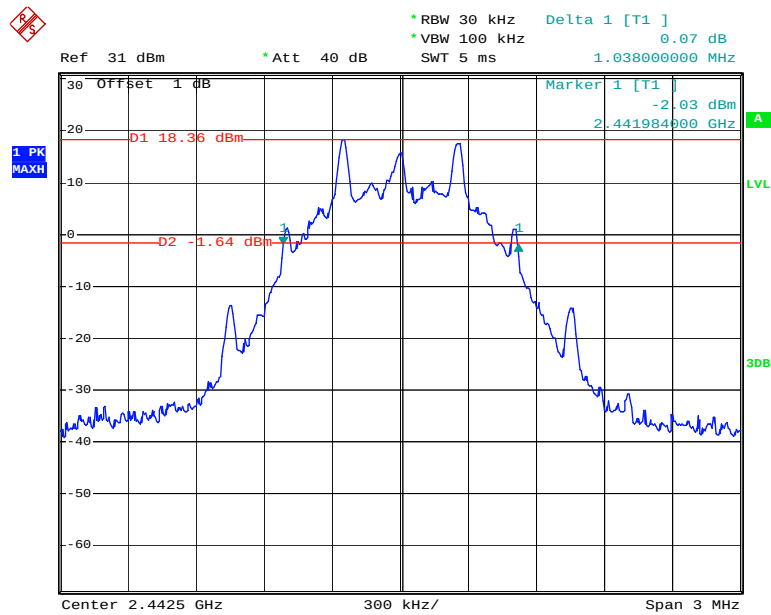
Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% occupied Bandwidth (MHz)
Low	2408	1.04	0.99
Middle	2442.5	1.04	1.00
High	2475.5	1.04	0.98

20dB Bandwidth:**Low Channel**

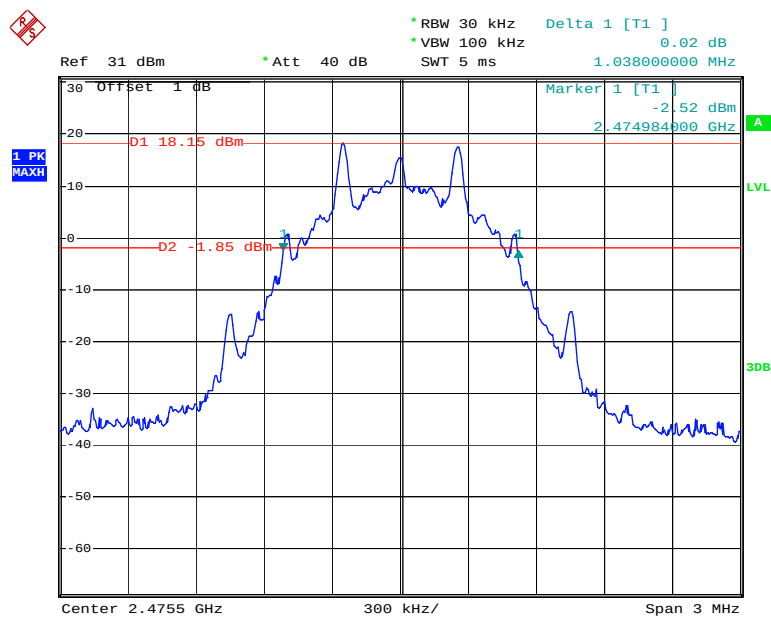
Date: 3.APR.2018 18:19:56

Middle Channel



Date: 3.APR.2018 18:21:03

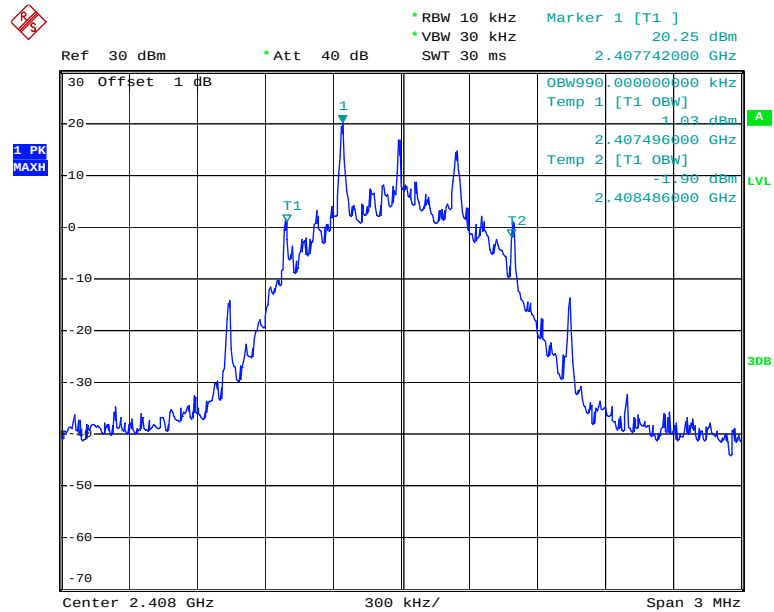
High Channel



Date: 3.APR.2018 18:21:51

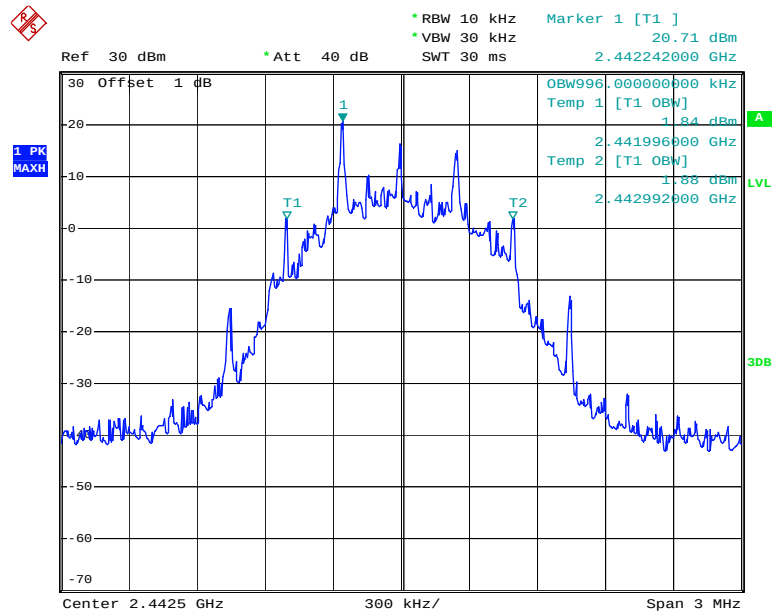
99% Occupied Bandwidth:

Low Channel



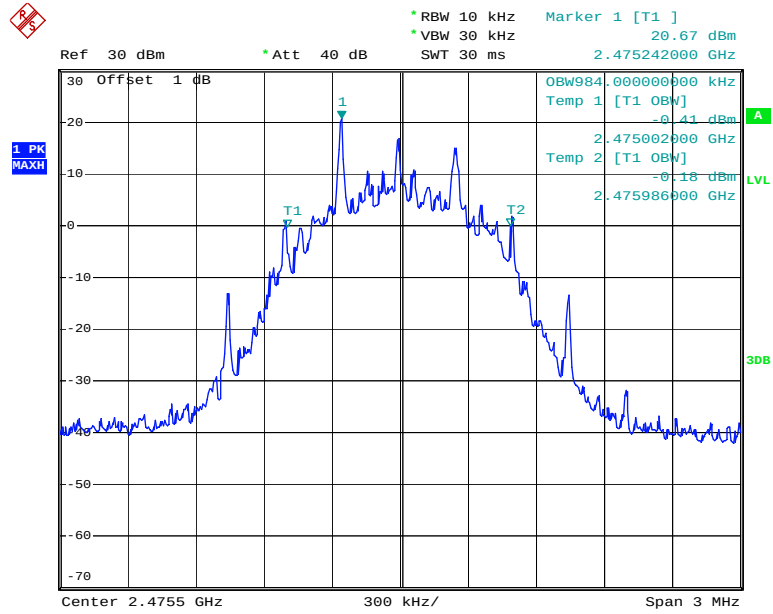
Date: 27.MAR.2018 12:13:34

Middle Channel



Date: 27.MAR.2018 12:14:21

High Channel



Date: 27.MAR.2018 12:15:39

FCC §15.247(a) (1) (iii)& RSS-247 CLAUSE 5.1 d) - QUANTITY OF HOPPING CHANNEL

Applicable Standard

According to FCC §15.247(a) (1) (iii)

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.

According to RSS-247 Clause 5.1 d)

- d) FHSs operating in the band 2400-2483.5 MHz shall use at least 15 hopping 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. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping 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
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	25.8°C
Relative Humidity:	51 %
ATM Pressure:	101.1kPa

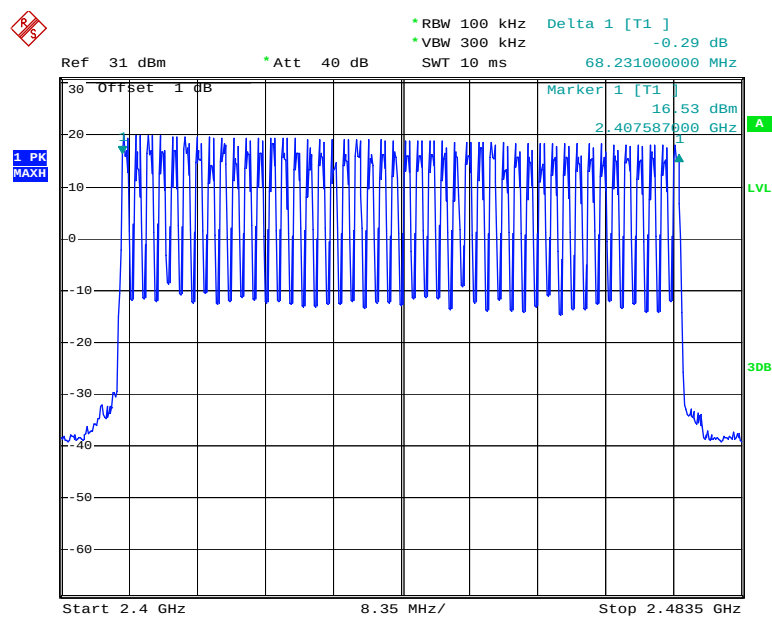
* The testing was performed by Harry Yang on 2018-03-30.

Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

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

Number of Hopping Channels

Date: 30.MAR.2018 09:42:51

FCC §15.247(a) (1) (iii)&RSS-247 CLAUSE 5.1 d) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

According to FCC §15.247(a) (1) (iii)

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.

According to RSS-247 Clause 5.1 d)

- d) FHSs operating in the band 2400-2483.5 MHz shall use at least 15 hopping 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. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. The time of single pulses was tested.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
Unknown	Coaxial Cable	C-SJ00-0010	C0010/05	Each Time	/

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25.8°C
Relative Humidity:	51 %
ATM Pressure:	101.1kPa

* The testing was performed by Harry Yang on 2018-03-30.

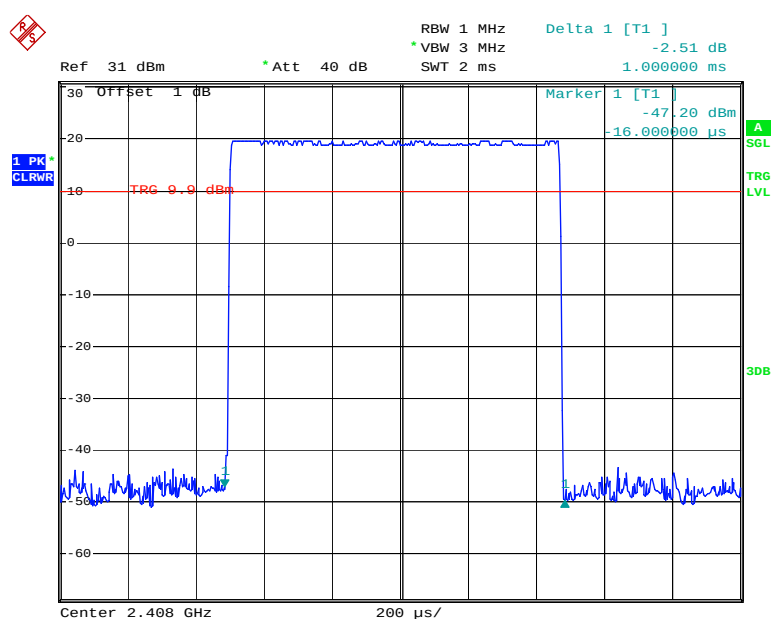
Test Result: Compliance.

Please refer to following tables and plots

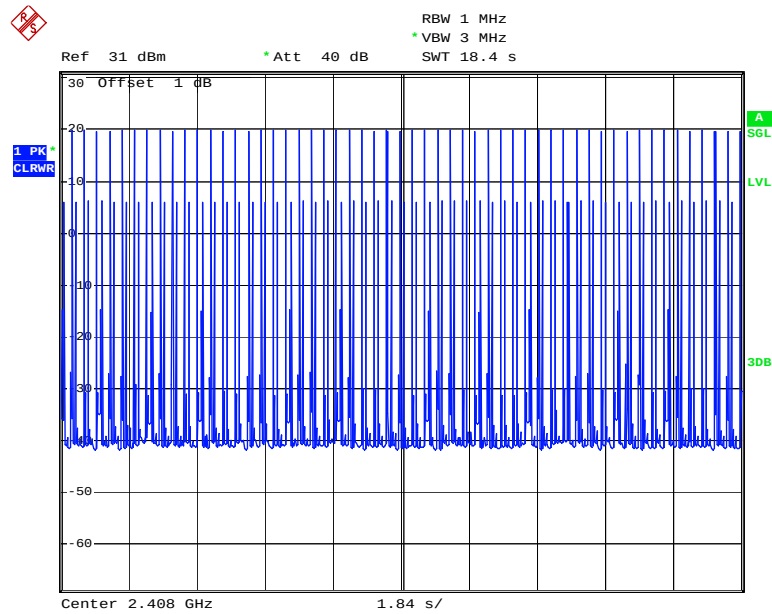
Test Mode: Transmitting

Channel	Pulse Width (ms)	Hopping numbers in during (Hopping channel number*0.4)	Dwell Time (s)	Limit (s)	Result
Low	1.000	54	0.054	0.4	Compliance
Middle	1.000	54	0.054	0.4	Compliance
High	0.996	54	0.054	0.4	Compliance
Note: Dwell time=Pulse time (ms) × hopping numbers in during During=Hopping channel number*0.4=46*0.4=18.4s					

Low Channel

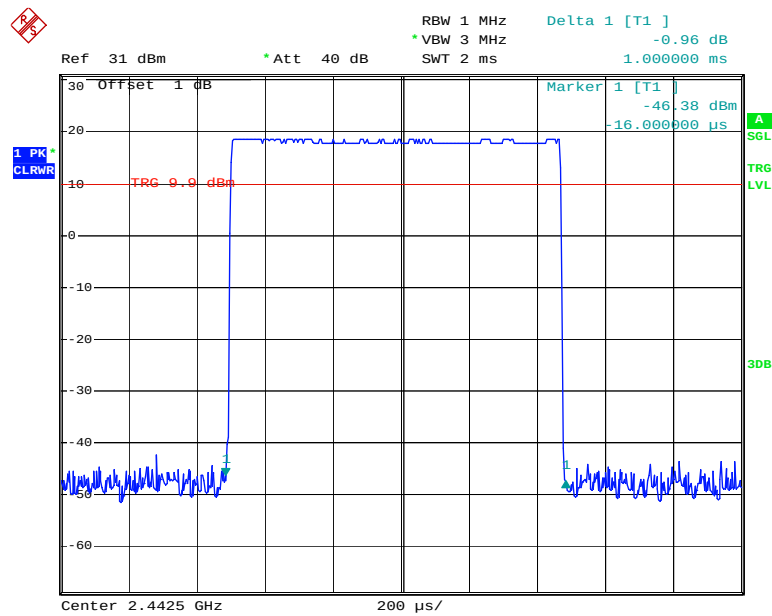


Date: 30.MAR.2018 09:48:19

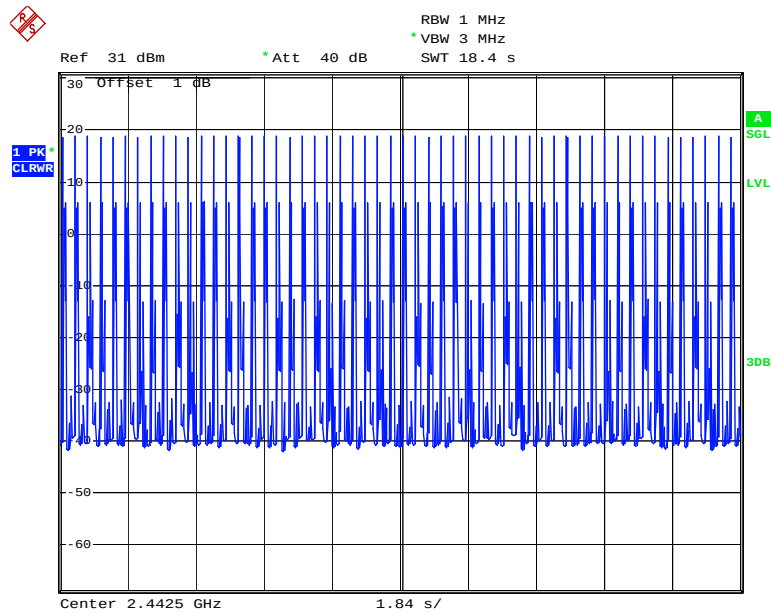


Date: 30.MAR.2018 09:44:56

Middle Channel

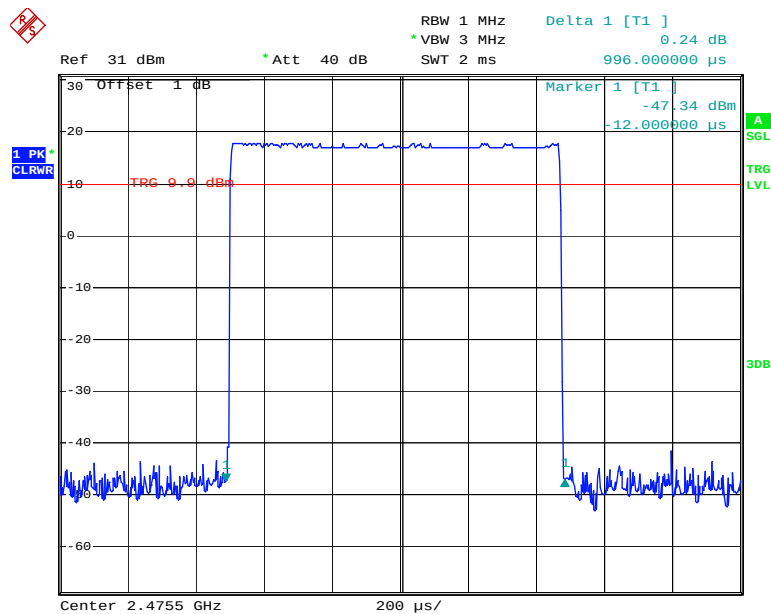


Date: 30.MAR.2018 09:48:01

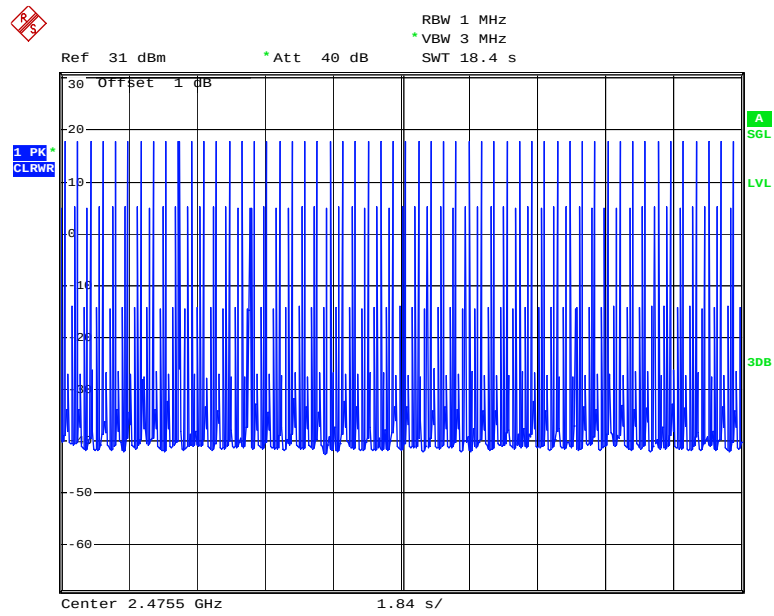


Date: 30.MAR.2018 09:45:38

High Channel



Date: 30.MAR.2018 09:47:42



Date: 30.MAR.2018 09:46:14

FCC §15.247(b) (1)& RSS-247 CLAUSE 5.4 b) - 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

According to RSS-247 Clause 5.4 b)

- b) For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

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
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
Unknown	Coaxial Cable	C-SJ00-0010	C0010/05	Each Time	/

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25.6°C
Relative Humidity:	51 %
ATM Pressure:	100.8kPa

* The testing was performed by Harry Yang on 2018-03-27.

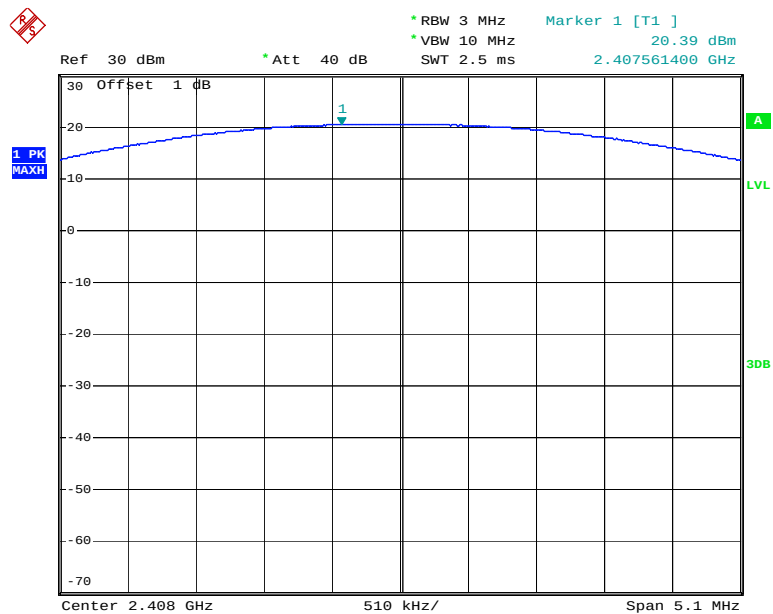
Test Result: Compliance.

Test Mode: Transmitting

Frequency (MHz)	Conducted Peak Output power (dBm)	Limit (dBm)
2408	20.39	21
2442.5	20.60	21
2475.5	20.60	21

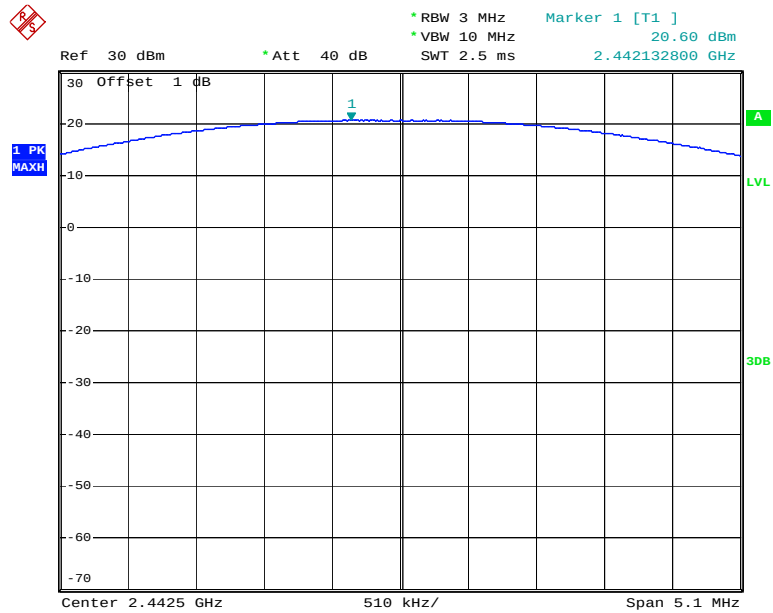
Note: the anten gain is 2.18dBi in 2.4GHz band.

Low Channel



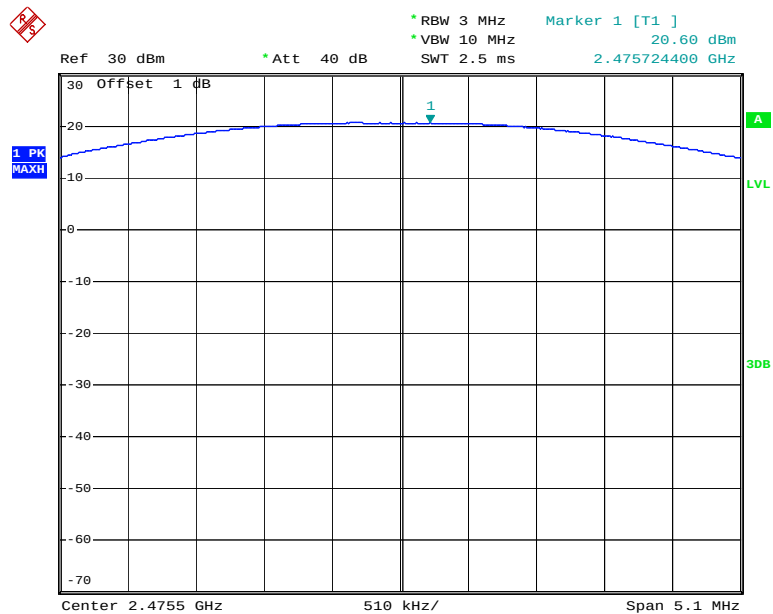
Date: 27.MAR.2018 12:19:01

Middle Channel



Date: 27.MAR.2018 12:18:30

High Channel



Date: 27.MAR.2018 12:17:52

FCC §15.247(d)& RSS-247 CLAUSE 5.5 - BAND EDGES TESTING

Applicable Standard

According to FCC §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. 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)).

According to RSS-247 Clause 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

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 RBW/VBW=100/300kHz of spectrum analyze 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
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
Unknown	Coaxial Cable	C-SJ00-0010	C0010/05	Each Time	/

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

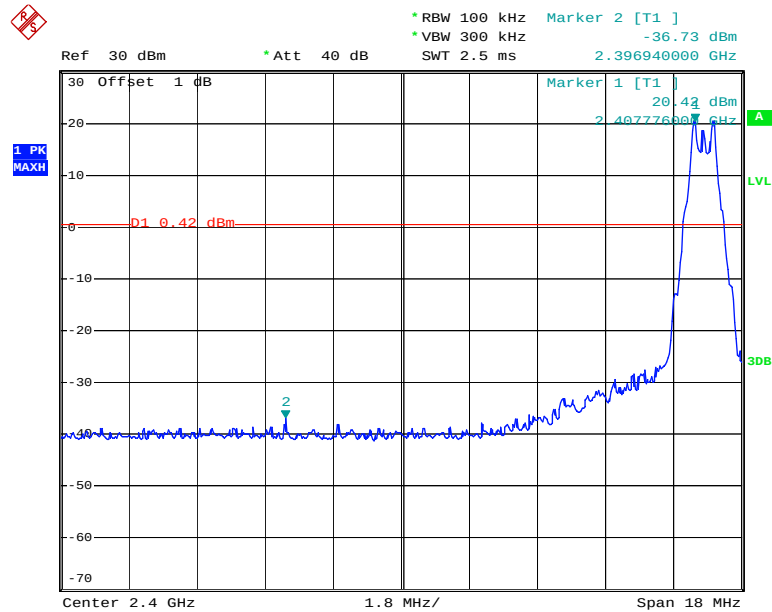
Temperature:	25.6 ~ 26.1°C
Relative Humidity:	51 ~ 52 %
ATM Pressure:	100.8 ~101.1kPa

* The testing was performed by Harry Yang from 2018-03-27 to 2018-03-30.

Test Result: Compliance

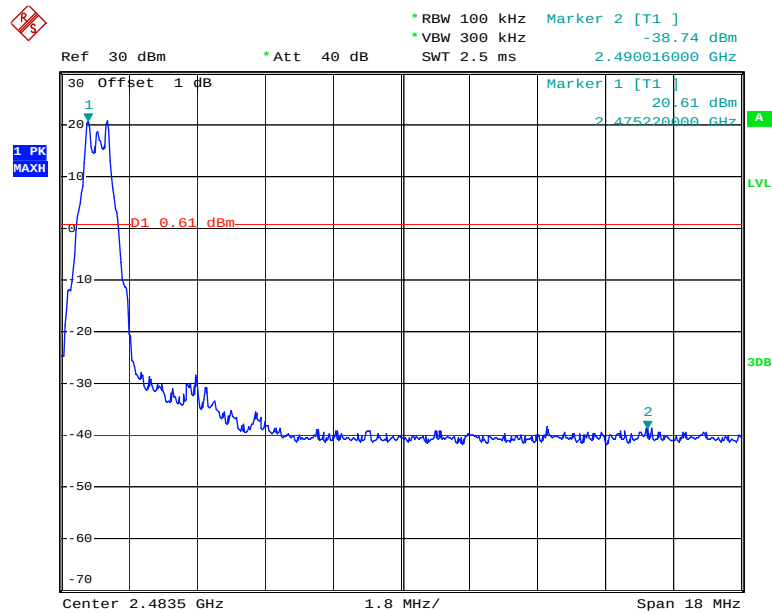
Single:

Band Edge, Left Side



Date: 27.MAR.2018 12:20:52

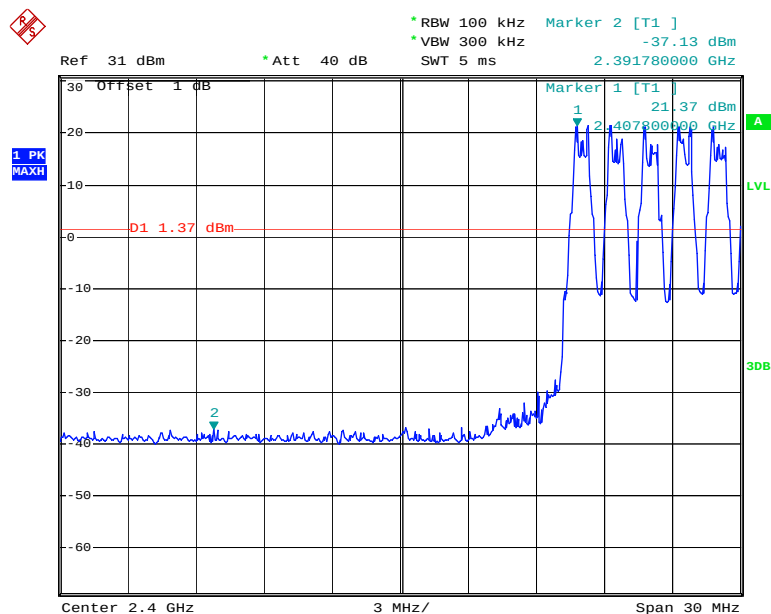
Band Edge, Right Side



Date: 27.MAR.2018 12:22:04

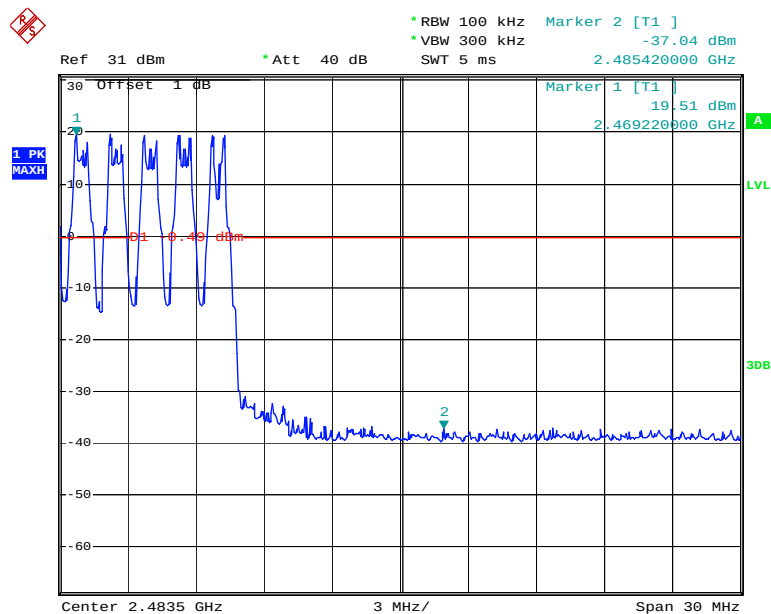
Hopping

Band Edge, Left Side



Date: 30.MAR.2018 17:54:54

Band Edge, Right Side



Date: 30.MAR.2018 17:57:43

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