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-FTX11509

Report Type:	Product Type:
Original Report	DJI FOCUS REMOTE

Test Engineer:	Allen Qiao
Report Number:	RDG150825008-00A
Report Date:	2015-09-10
Reviewed By:	Sula Huang RF Leader
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SZ DJI TECHNOLOGY CO., LTD*'s product, model number: *FTX1 (FCC ID: SS3-FTX11509)* (the "EUT") in this report was a *DJI FOCUS REMOTE,* which was measured approximately: 18cm (L) x 9.5 cm (W) x 8.5 cm(H), rated input voltage: DC 3.7V from lithium battery or DC 5V from adapter. The device employs hybrid system, which combined DSSS and FHSS modulation techniques.

** All measurement and test data in this report was gathered from production sample serial number: 150825008. (Assigned by BACL.Dongguan). The EUT was received on 2015-08-27.*

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 compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

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. (Dongguan).

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 Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications 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 February 06, 2015.

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.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in Engineering Mode, which was provided by the manufacturer. The engineering mode was configured as maximum power and maximum duty cycle by default setting and switched the channel by keys.

30 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2415	16	2445
2	2417	17	2447
3	2419	18	2449
4	2421	19	2451
5	2423	20	2453
6	2425	21	2455
7	2427	22	2457
8	2429	23	2459
9	2431	24	2461
10	2433	25	2463
11	2435	26	2465
12	2437	27	2467
13	2439	28	2469
14	2441	29	2471
15	2443	30	2473

3channels were tested: 2415MHz, 2443MHz and 2473MHz.

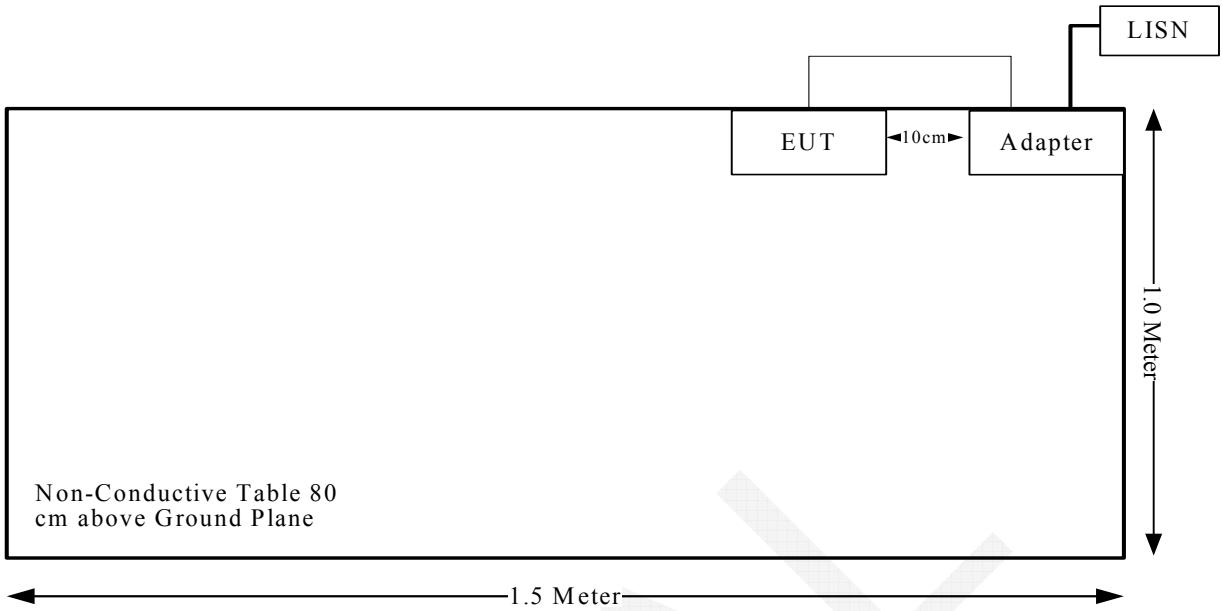
EUT Exercise Software

No exercise software was used.

Equipment Modifications

No modification was made to the EUT.

Block Diagram of Test Setup



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SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 & §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Conducted Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(f)	Power Spectral Density and Dwell Time	Compliance

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FCC §15.247 (i) & §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

According to§15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB447498 D01 General RF Exposure Guidance v05r02:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Measurement Result

The maximum Peak output power= 11.23dBm (13.27mW) at 2415 MHz
The maximum duty cycle = 7.86%,
So the time-average is 13.27mW * 7.86%=1.04mW
[(max. power of channel, mW)/(min. test separation distance, mm)][√f(GHz)]
= 1.04/5*(√2.415) = 0.32 < 3.0

So the stand-alone SAR evaluation is not necessary.

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 one external detachable antenna and with RP-SMA female connector, the antenna gain are 2.2dBi, fulfill the requirement of the item. Please refer to the internal photos.

Result: Compliance.

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FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

Measurement Uncertainty

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

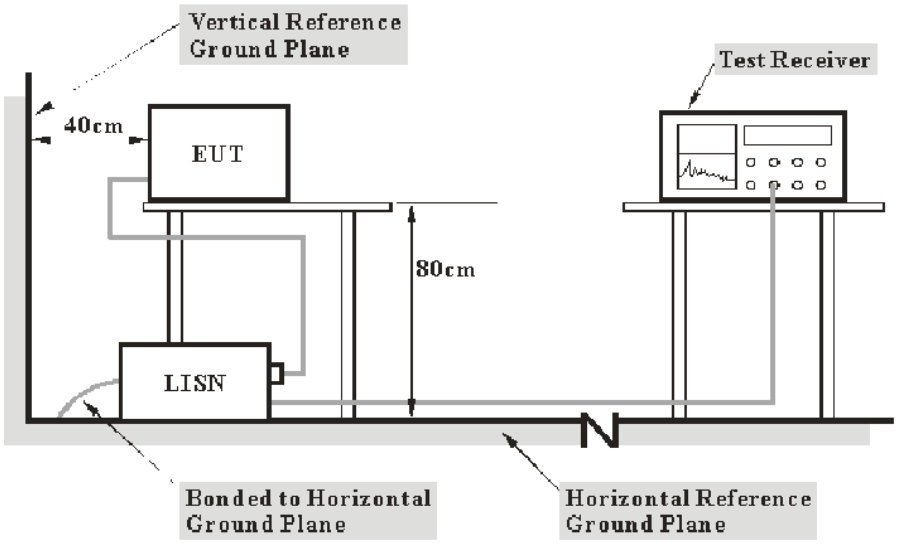
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of 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 conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

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 limits.

The spacing between the peripherals was 10 cm.

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 outlet of 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:

$V_C = V_R + A_C + VDF$

Herein,
V_C: corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN or ISN

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 maximum limit. The equation for margin calculation is as follows:

Margin = Limit – 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	2014-10-20	2015-10-20
R&S	L.I.S.N	ESH2-Z5	892107/021	2015-06-09	2016-06-09
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-12-11	2015-12-11
R&S	Test Software	EMC32	Version8.53.0	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).

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

15.9 dB at **0.468757 MHz** in the **Neutral** conducted mode

Test Data

Environmental Conditions

Temperature:	27.4 °C
Relative Humidity:	59 %
ATM Pressure:	100.1kPa

The testing was performed by Allen Qiao on 2015-08-28.

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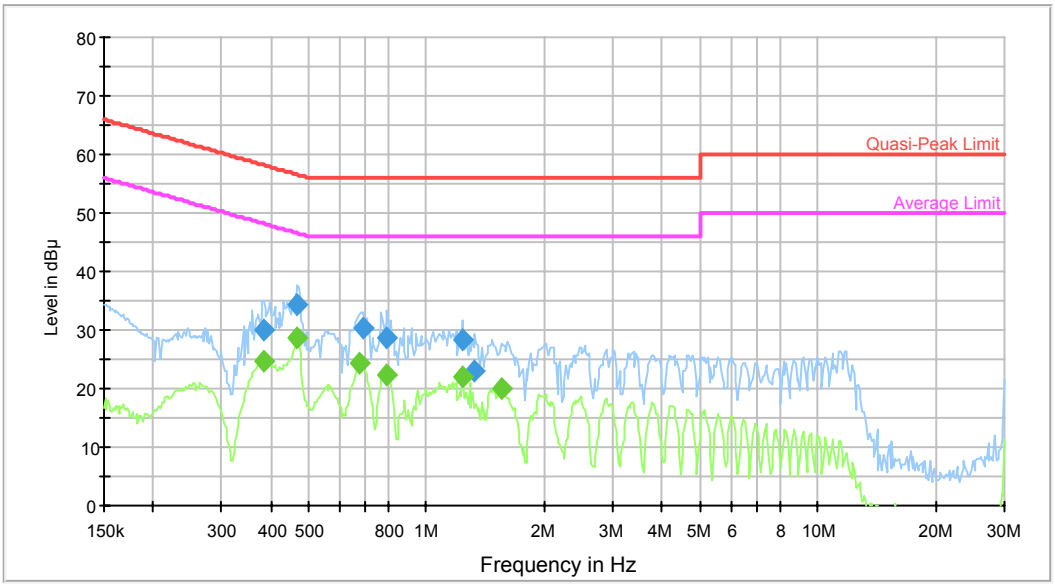
Test Mode: Transmitting

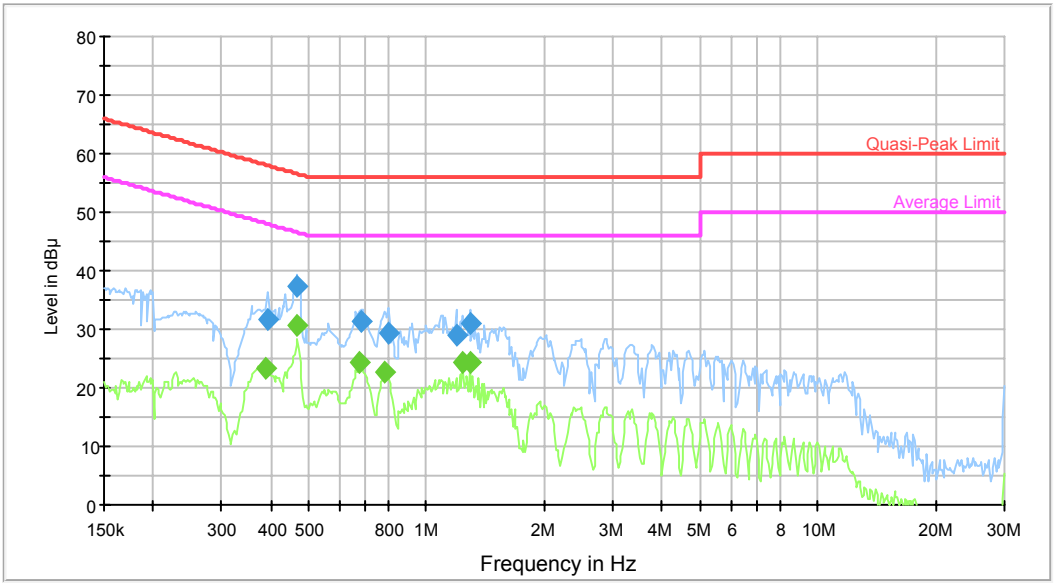
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.384091	30.1	9.000	L1	9.8	28.1	58.2	Compliance
0.468757	34.3	9.000	L1	9.8	22.2	56.5	Compliance
0.687153	30.5	9.000	L1	9.8	25.5	56.0	Compliance
0.793127	28.6	9.000	L1	9.8	27.4	56.0	Compliance
1.239175	28.3	9.000	L1	9.8	27.7	56.0	Compliance
1.331304	22.9	9.000	L1	9.8	33.1	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.384091	24.5	9.000	L1	9.8	23.7	48.2	Compliance
0.468757	28.5	9.000	L1	9.8	18.0	46.5	Compliance
0.676289	24.2	9.000	L1	9.8	21.8	46.0	Compliance
0.793127	22.3	9.000	L1	9.8	23.7	46.0	Compliance
1.239175	21.9	9.000	L1	9.8	24.1	46.0	Compliance
1.561306	19.9	9.000	L1	9.8	26.1	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.393383	31.6	9.000	N	9.8	26.4	58.0	Compliance
0.468757	37.3	9.000	N	9.8	19.2	56.5	Compliance
0.681699	31.3	9.000	N	9.8	24.7	56.0	Compliance
0.799472	29.4	9.000	N	9.8	26.6	56.0	Compliance
1.190776	29.1	9.000	N	9.8	26.9	56.0	Compliance
1.289541	30.9	9.000	N	9.8	25.1	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.387164	23.2	9.000	N	9.8	24.9	48.1	Compliance
0.468757	30.6	9.000	N	9.8	15.9	46.5	Compliance
0.676289	24.3	9.000	N	9.8	21.7	46.0	Compliance
0.780588	22.5	9.000	N	9.8	23.5	46.0	Compliance
1.239175	24.3	9.000	N	9.8	21.7	46.0	Compliance
1.289541	24.4	9.000	N	9.8	21.6	46.0	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 2, 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 2, 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.

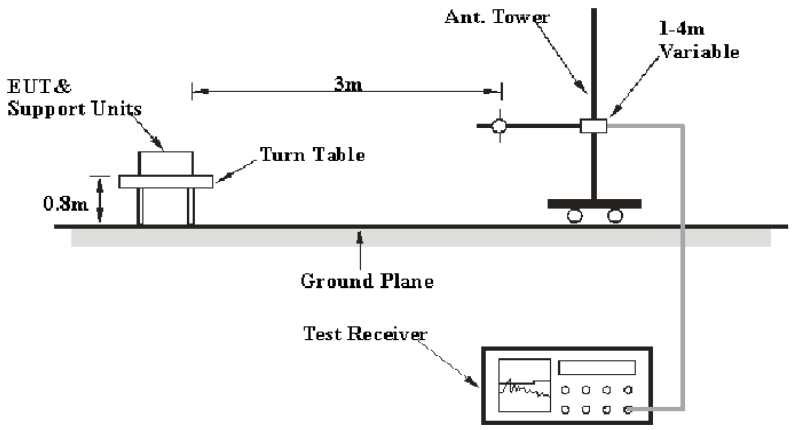
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

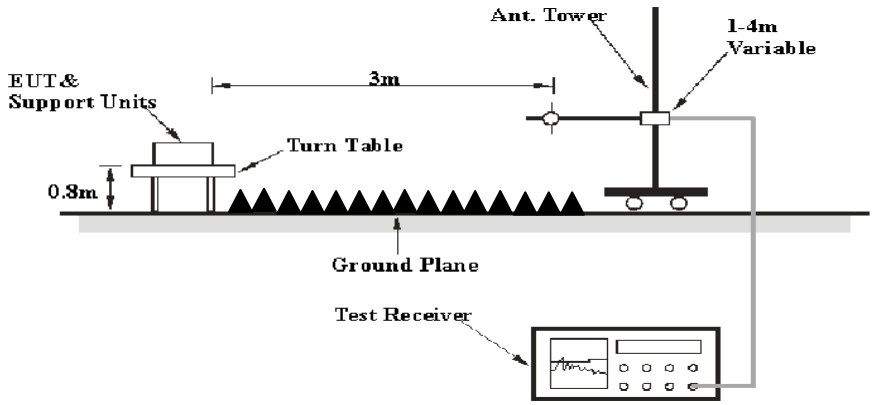
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber 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 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
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

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.

Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Meter Reading + Antenna Loss + 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-05-09	2016-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2015-02-19	2016-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2014-09-06	2015-09-06
N/A	Coaxial Cable	14m	N/A	2015-05-06	2016-05-06
N/A	Coaxial Cable	8m	N/A	2015-05-06	2016-05-06
Mini-circuits	High Pass Filter	VHF-3100+	31251	2015-05-06	2016-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06

*** 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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Section 15.205, 15.209 and 15.247, with the worst margin reading of:

17.43 dB at **322.94 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

Temperature:	28.9 °C
Relative Humidity:	45 %
ATM Pressure:	100 kPa

The testing was performed by Allen Qiao on 2015-09-02 and 2015-09-05.

Mode: Transmitting

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/m)					
Low Channel: 2415 MHz									
2415	72.42	PK	H	25.68	3.69	0.00	101.79	N/A	N/A
2415	74.25	PK	V	25.68	3.69	0.00	103.62	N/A	N/A
2390	26.39	PK	V	25.61	3.63	0.00	55.63	74.00	18.37
4830	31.09	PK	V	30.66	5.02	27.41	39.36	74.00	34.64
7245	30.55	PK	V	34.19	6.66	25.90	45.50	74.00	28.50
9660	30.38	PK	V	36.08	8.56	27.44	47.58	74.00	26.42
3131	32.43	PK	V	27.62	6.93	27.43	39.55	74.00	34.45
3131	20.07	AV	V	27.62	6.93	27.43	27.19	54.00	26.81
322.94	33.2	QP	H	14.59	2.16	21.58	28.37	46.00	17.63
Middle Channel: 2443 MHz									
2443	70.59	PK	H	25.75	3.77	0.00	100.11	N/A	N/A
2443	74.88	PK	V	25.75	3.77	0.00	104.40	N/A	N/A
4886	31.23	PK	V	30.80	5.22	27.42	39.83	74.00	34.17
7329	30.64	PK	V	34.39	6.76	25.88	45.91	74.00	28.09
9772	30.43	PK	V	36.35	8.62	27.18	48.22	74.00	25.78
3131	32.54	PK	V	27.62	6.93	27.43	39.66	74.00	34.34
3131	20.13	AV	V	27.62	6.93	27.43	27.25	54.00	26.75
3190	32.48	PK	V	27.81	6.26	27.38	39.17	74.00	34.83
3190	20.1	AV	V	27.81	6.26	27.38	26.79	54.00	27.21
322.94	33.4	QP	H	14.59	2.16	21.58	28.57	46.00	17.43
High Channel: 2473 MHz									
2473	69.71	PK	H	25.83	3.71	0.00	99.25	N/A	N/A
2473	70.82	PK	V	25.83	3.71	0.00	100.36	N/A	N/A
2483.5	25.66	PK	V	25.86	3.67	0.00	55.19	74.00	18.81
4946	30.76	PK	V	30.96	5.37	27.43	39.66	74.00	34.34
7419	30.25	PK	V	34.61	6.86	25.91	45.81	74.00	28.19
9892	30.11	PK	V	36.64	8.69	26.77	48.67	74.00	25.33
3131	32.29	PK	V	27.62	6.93	27.43	39.41	74.00	34.59
3131	19.81	AV	V	27.62	6.93	27.43	26.93	54.00	27.07
322.94	33.2	QP	H	14.59	2.16	21.58	28.37	46.00	17.63

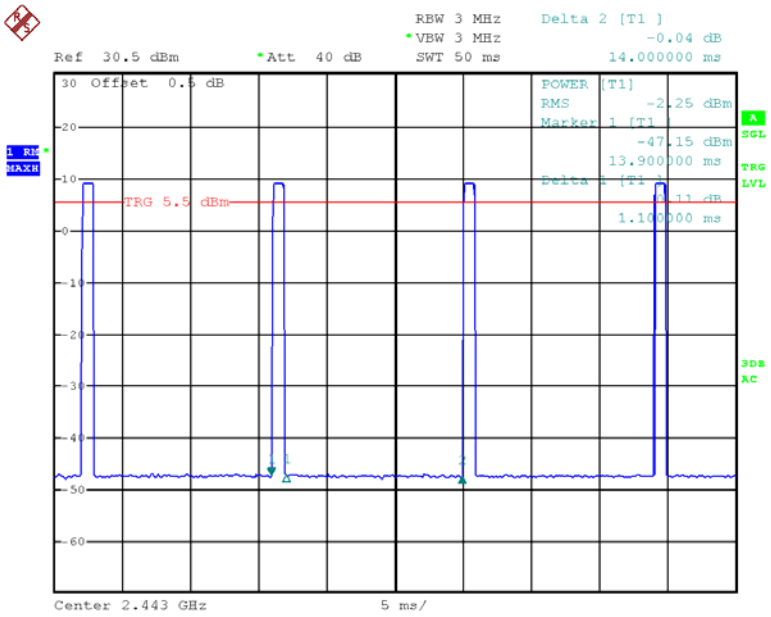
Field Strength (Average)

Frequency (MHz)	Peak Measurement @ 3m (dBµV/m)	Polar (H/V)	Duty Cycle Correction Factor (dB)	Average Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Operating Frequency:2415 MHz						
2415	101.79	H	-22.09	79.7	/	/
2415	103.62	V	-22.09	81.53	/	/
2390	55.63	V	-22.09	33.54	54	20.46
4830	39.36	V	-22.09	17.27	54	36.73
7245	45.5	V	-22.09	23.41	54	30.59
9660	47.58	V	-22.09	25.49	54	28.51
Operating Frequency:2443 MHz						
2443	100.11	H	-22.09	78.02	/	/
2443	104.4	V	-22.09	82.31	/	/
4886	39.83	V	-22.09	17.74	54	36.26
7329	45.91	V	-22.09	23.82	54	30.18
9772	48.22	V	-22.09	26.13	54	27.87
Operating Frequency:2473 MHz						
2473	99.25	H	-22.09	77.16	/	/
2473	100.36	V	-22.09	78.27	/	/
2483.5	55.19	V	-22.09	33.1	54	20.9
4946	39.66	V	-22.09	17.57	54	36.43
7419	45.81	V	-22.09	23.72	54	30.28
9892	48.67	V	-22.09	26.58	54	27.42

Note:
Calculate Average value based on duty cycle correction factor:
Duty cycle correction factor= 20*log(duty cycle)

Ton	$T_{on} + T_{off}$	Duty Cycle	Duty Cycle Factor
ms	ms	%	dB
1.1	14	7.86	-22.09

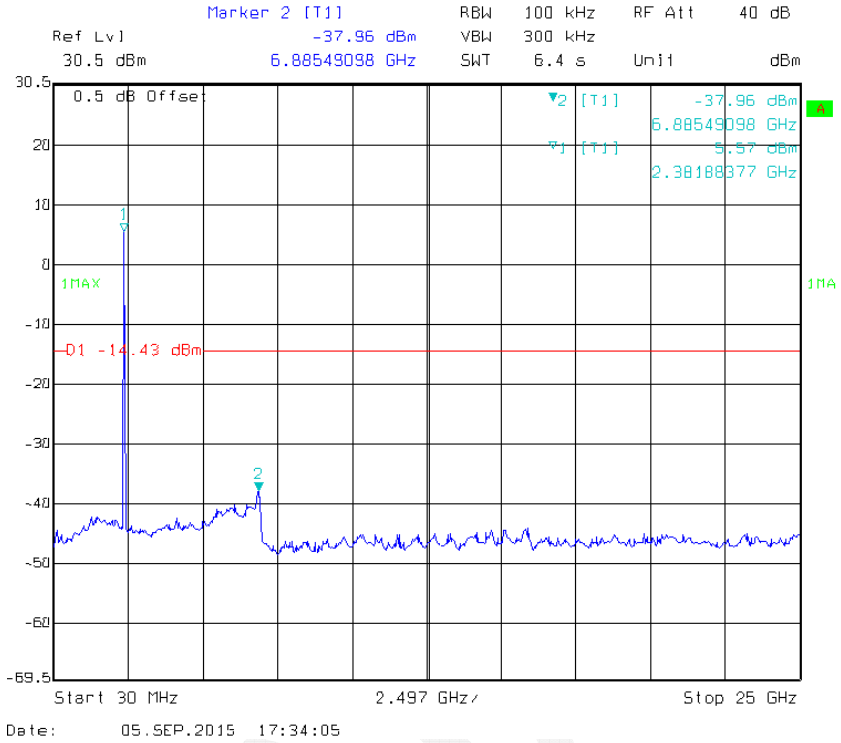
Duty Cycle



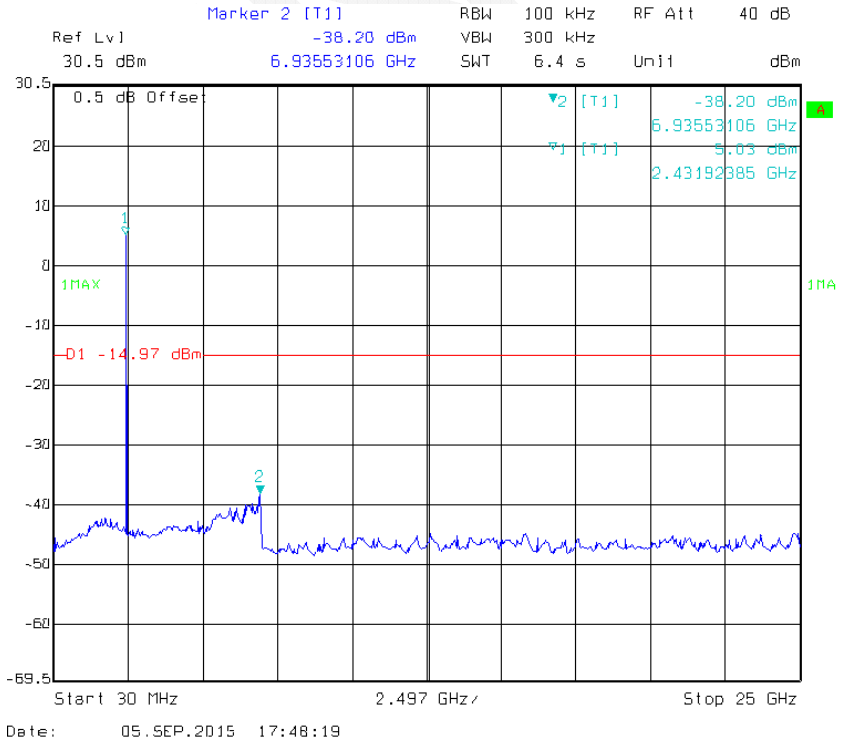
Date: 2.SEP.2015 11:06:23

Conducted Spurious Emissions at Antenna Port

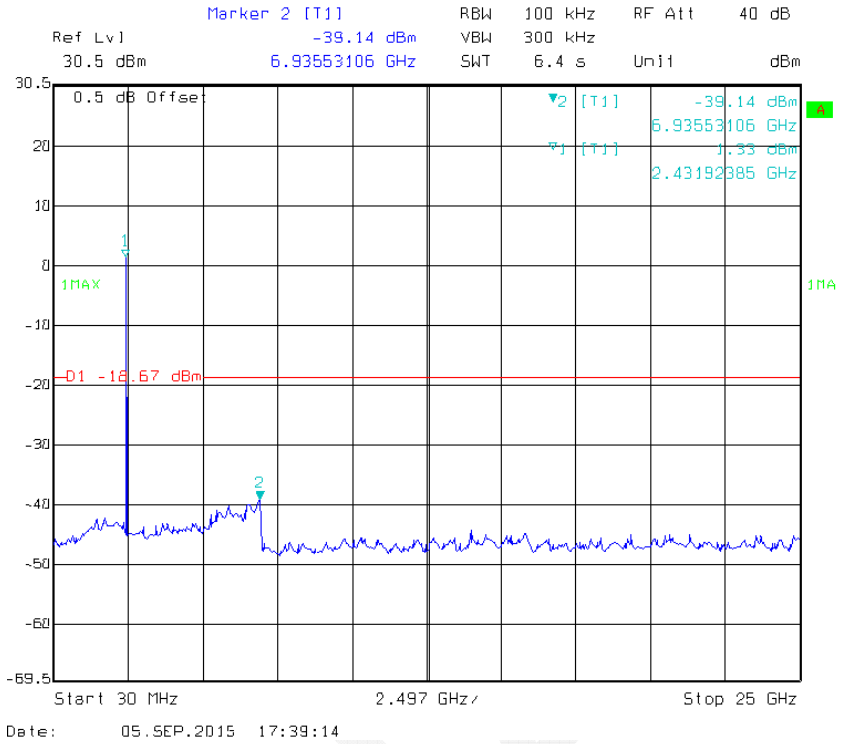
Low Channel



Middle Channel



High Channel



FCC §15.247(a) (2) – 6dB BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

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 without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. 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 6 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
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06

*** 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:	26.1 °C
Relative Humidity:	58 %
ATM Pressure:	100 kPa

The testing was performed by Allen Qiao on 2015-09-06.

Test Result: Compliance.

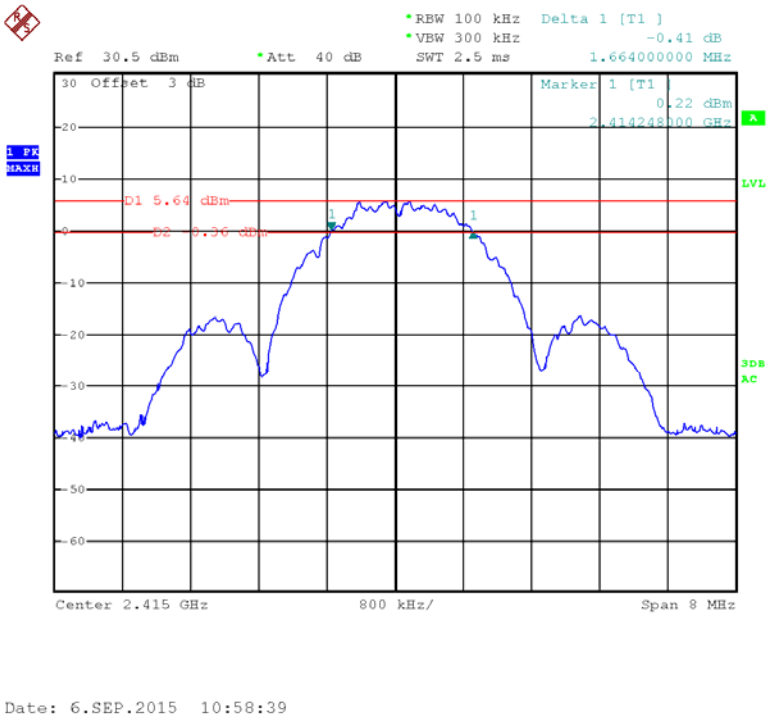
Please refer to the following tables and plots.

Test Mode: Transmitting

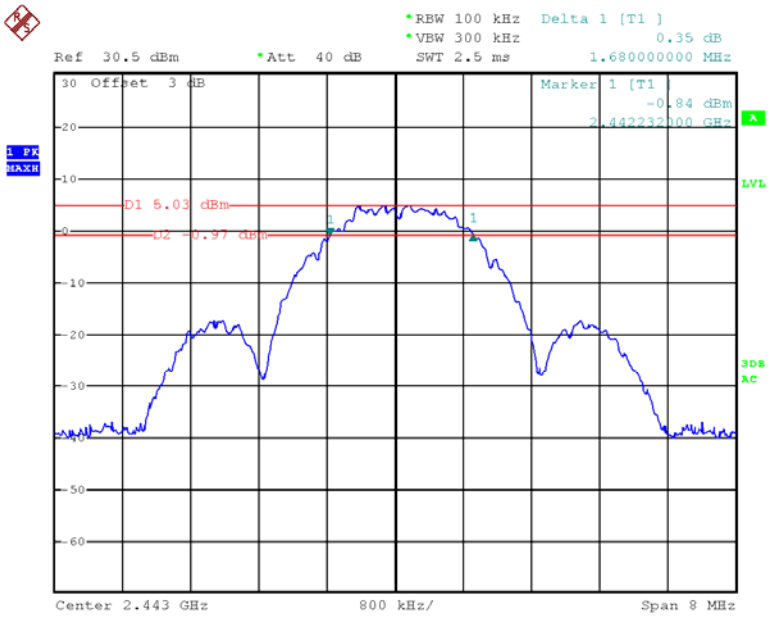
Channel	Frequency	6 dB Bandwidth	Limit
	(MHz)	(MHz)	(MHz)
Low	2415	1.664	0.5
Middle	2443	1.68	0.5
High	2473	1.648	0.5

6 dB Bandwidth:

Low Channel

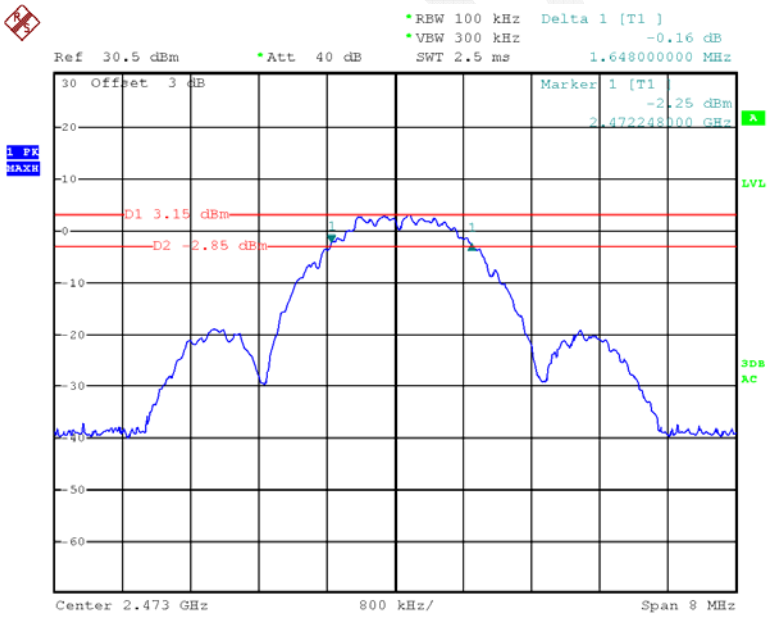


Middle Channel



Date: 6.SEP.2015 11:00:32

High Channel



Date: 6.SEP.2015 11:03:01

FCC §15.247(b) (3) - MAXIMUM PEAK CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

1. According to KDB 558074 D01 DTS Meas Guidance v03r02, place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a Test Equipment.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Wideband Power Sensor	N1921A	MY54210016	2014-11-03	2015-11-03
Agilent	Wideband Power Sensor	N1921A	MY54170013	2014-11-03	2015-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2014-11-03	2015-11-03
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06

*** 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:	26.3 °C
Relative Humidity:	57 %
ATM Pressure:	100.2 kPa

The testing was performed by Allen Qiao on 2015-09-02.

Test Mode: Transmitting

Channel	Frequency	Conducted Peak Output Power	Limit
	MHz	(dBm)	(dBm)
Low	2415	11.23	30
Middle	2443	10.43	30
High	2473	8.55	30

FINAL

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

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. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 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
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06

*** 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

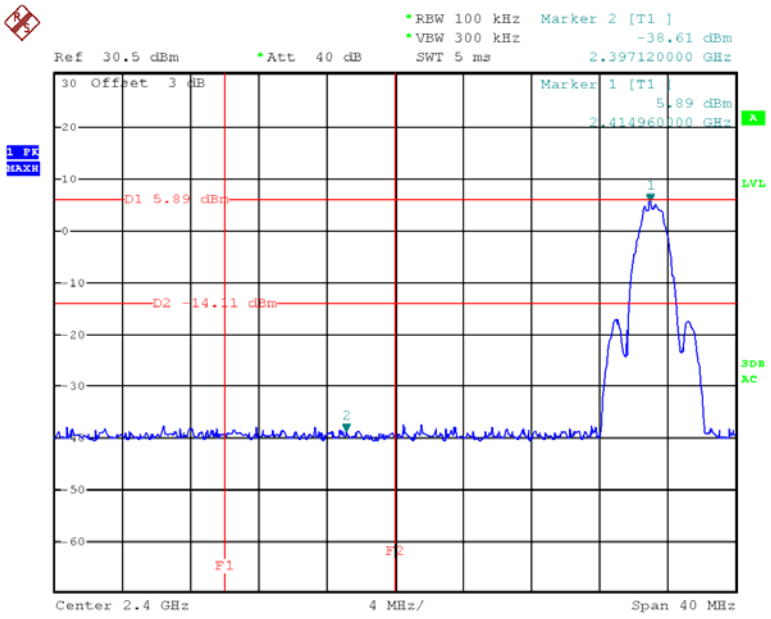
Temperature:	23.8 °C
Relative Humidity:	53 %
ATM Pressure:	100.2kPa

The testing was performed by Allen Qiao on 2015-09-06.

Test Result: *Compliance*

Please refer to following plots.

Band Edge, Left Side



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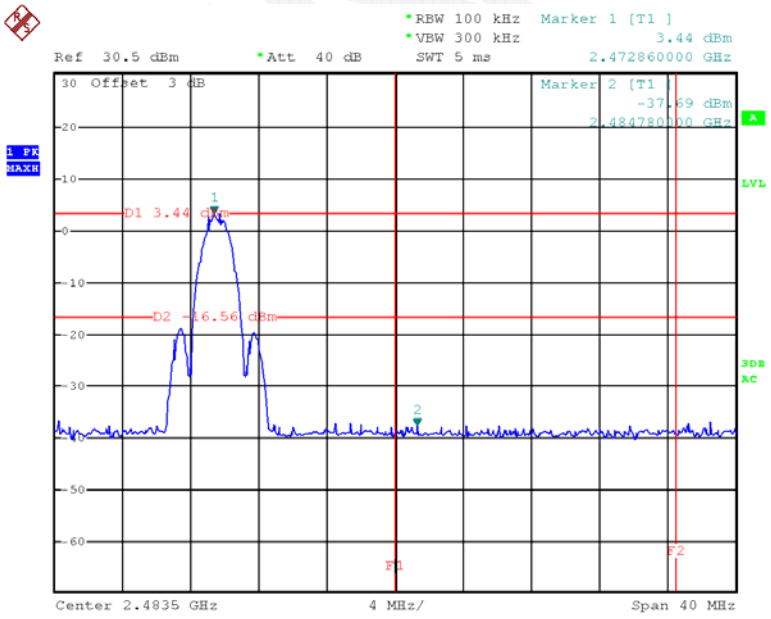
Band Edge, Right Side



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FCC §15.247(f) - POWER SPECTRAL DENSITY AND DWELL TIME

Applicable Standard

For the purposes of this section, hybrid systems are those that employ a combination of both frequency hopping and digital modulation techniques. The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned-off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4. The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

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 was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the RBW = 3 kHz, VBW = 10 kHz, Set the span to 1.5 times the DTS bandwidth.
4. Use the peak marker function to determine the maximum amplitude level.

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 * channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested. Dwell Time= time slot length * hope rate*0.4s

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2015-05-06	2016-05-06

*** 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:	53 %
ATM Pressure:	100.2 kPa

The testing was performed by Allen Qiao on 2015-09-06.

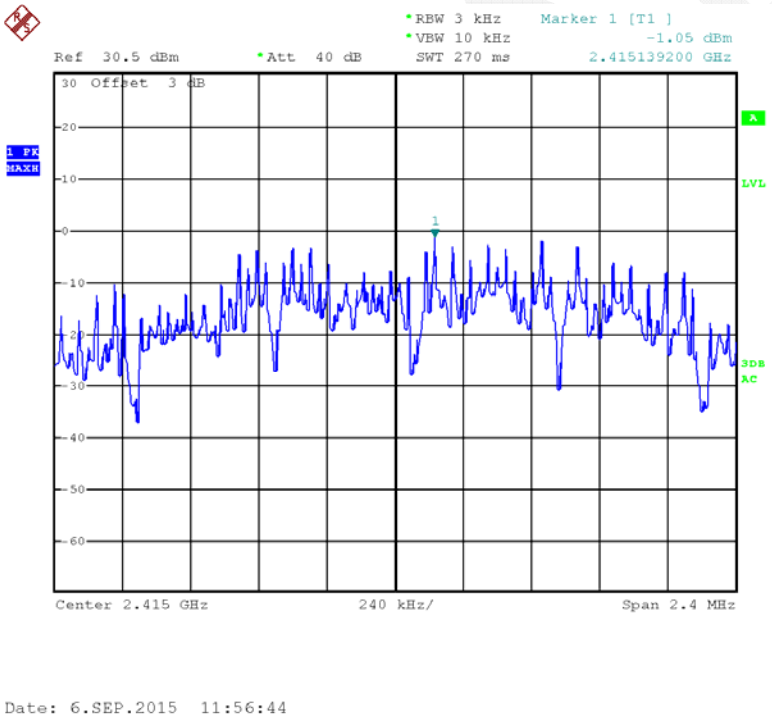
Test Result: Compliance

Test Mode: Transmitting

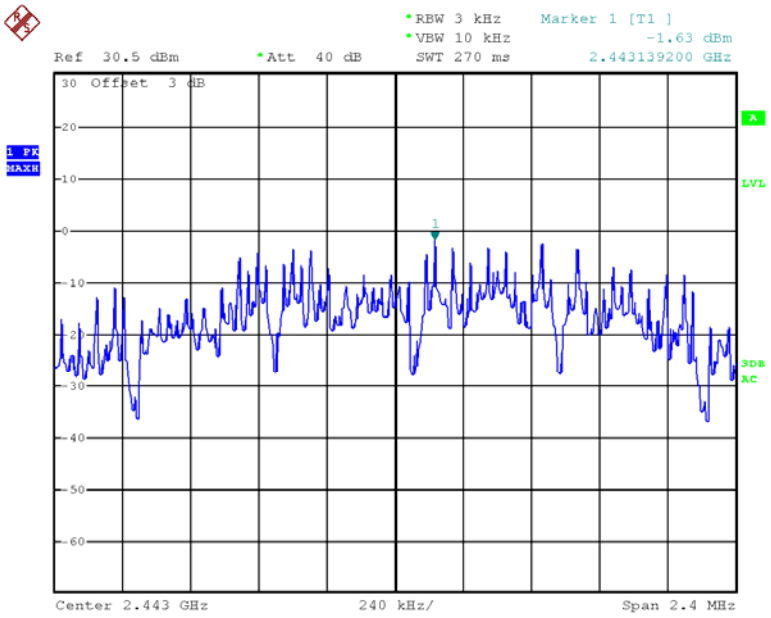
Channel	Frequency	Power Spectral Density	Limits	Result
	MHz	(dBm/3kHz)	dBm/3kHz	
Low	2415	-1.05	8	Compliance
Middle	2443	-1.63	8	Compliance
High	2473	-3.66	8	Compliance

Please refer to the following plots

Power Spectral Density, Low Channel



Power Spectral Density, Middle Channel



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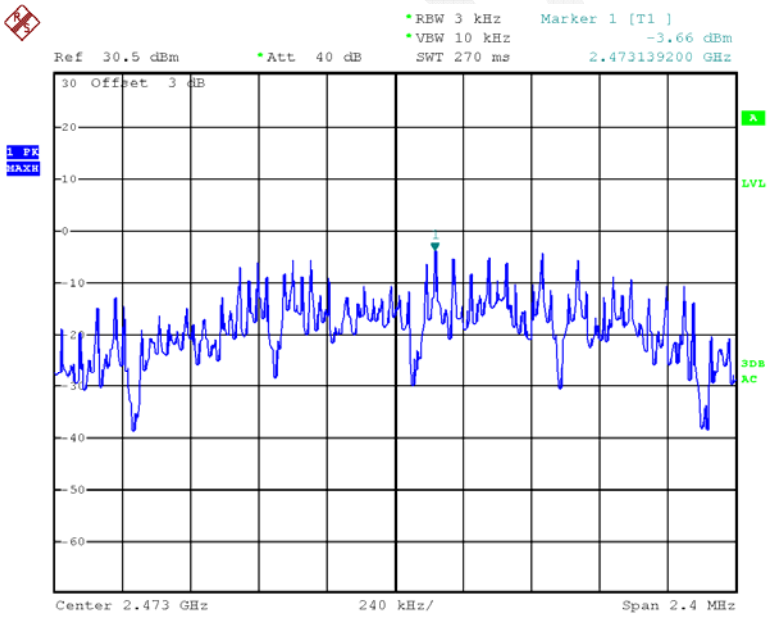
Power Spectral Density, High Channel



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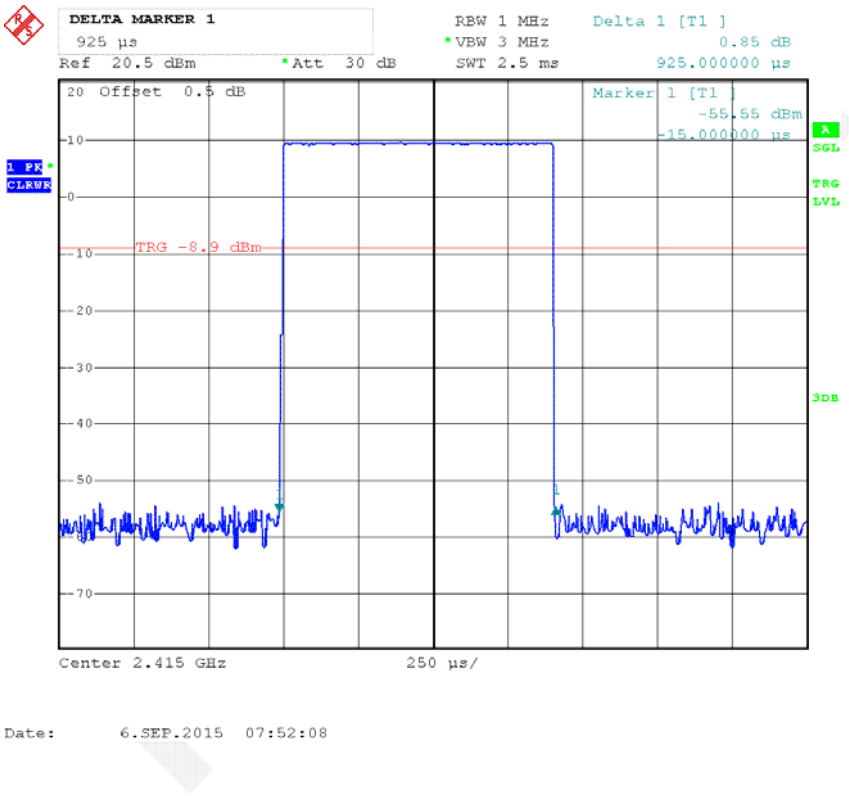
Dwell Time:

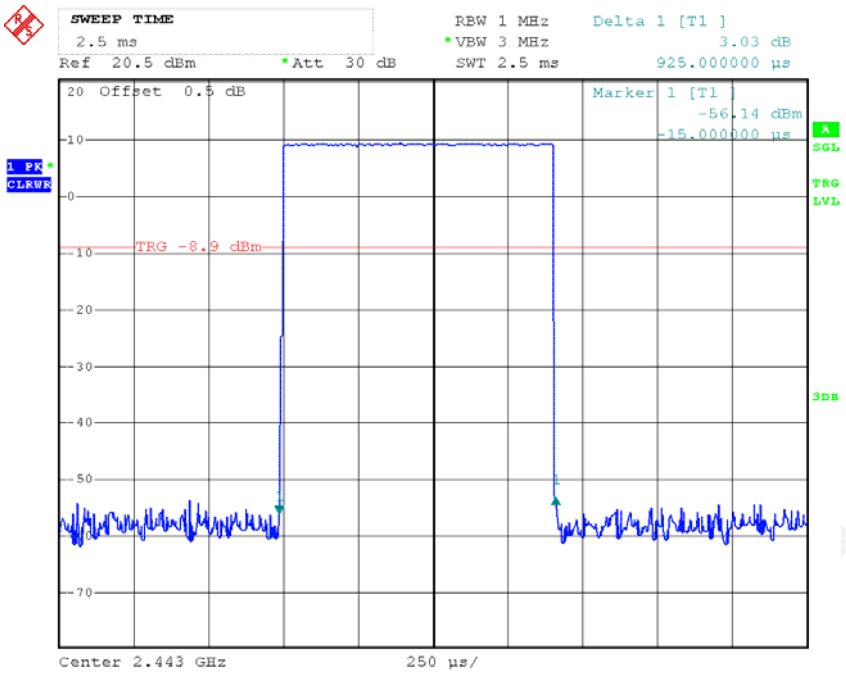
Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
Low	0.925	0.026	0.4	Pass
Middle	0.925	0.026	0.4	Pass
High	0.925	0.026	0.4	Pass

Note: Dwell Time=Pulse time (ms)/1000 × hope rate × 0.4s
The Hopping rate is 71pulse per second, which was provided by manufacture

Low Channel



Middle Channel



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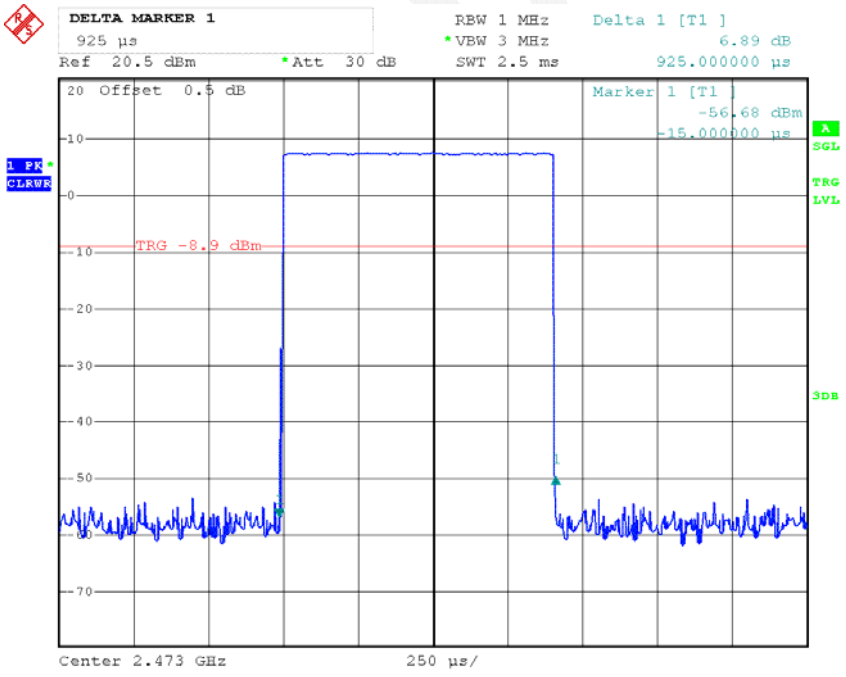
High Channel



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