



# FCC PART 15.247

## TEST REPORT

For

### SZ DJI TECHNOLOGY CO., LTD

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Nanshan, Shenzhen, Guangdong, China

**FCC ID: SS3-ZT300G1604**

<b>Report Type:</b> Original Report	<b>Product Type:</b> DATALINK PRO 900
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<b>Report Number:</b> <u>RDG160406008-00</u>	
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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

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### Product Description for Equipment under Test (EUT)

The *SZ DJI TECHNOLOGY CO., LTD*'s product, model number: *DL900GNA (FCC ID: SS3-ZT300G1604)* (the "EUT") in this report was a *DATALINK PRO 900*, which was measured approximately: 8.3cm (L) x 5.1cm (W) x 1.45cm (H), DC 9 V from CAN port, or DC 5V from USB port.

*All measurement and test data in this report was gathered from production sample serial number: 160406008 (Assigned by BACL, Dongguan). The EUT was received on 2016-04-06.*

### 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, 15.207, 15.209 and 15.247 rules.

### Related Submittal(s)/Grant(s)

Submitted with the part of a system with FCC ID: SS3-ZT300A1604.

### 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 system employed 51 channels as below table:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	903	27	914.7
2	903.45	28	915.15
3	903.9	29	915.6
~	~	~	~
~	~	50	925.05
25	913.8	51	925.5
26	914.25	/	/

3channels were tested: 903 MHz, 914.25MHz and 925.5 MHz

### EUT Exercise Software

Test Software: 'DJI-RF-Certification', was used in test. The maximum power was configured by system as default setting.

### Equipment Modifications

No modification was made to the EUT.

### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	G510	HY1482

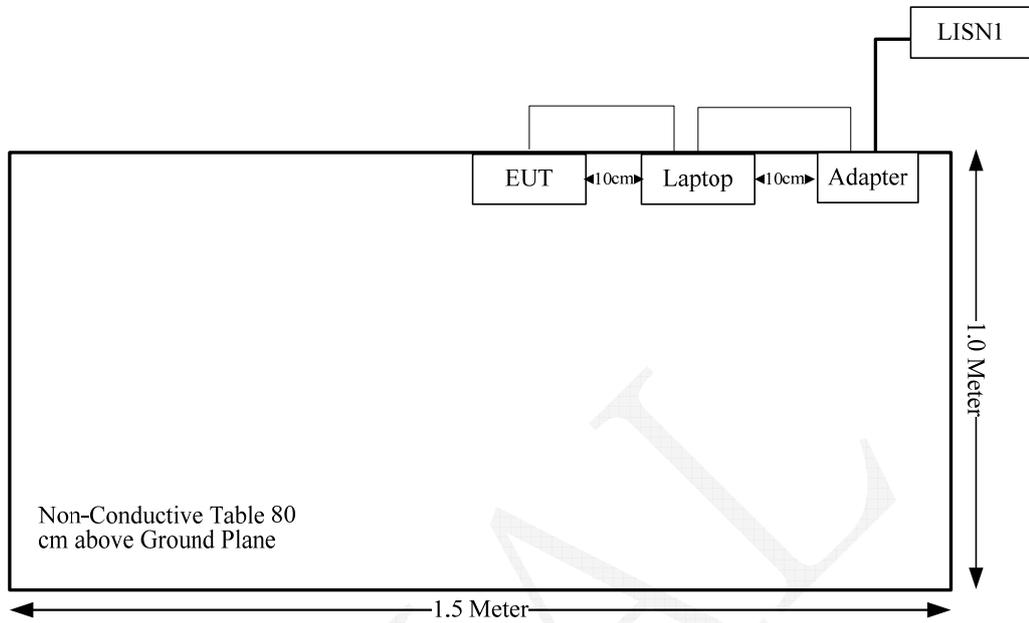
### External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
DC Cable	Yes	yes	1.0	adapter	Laptop
USB Cable	yes	no	1.0	Laptop	EUT

### Block Diagram of Test Setup

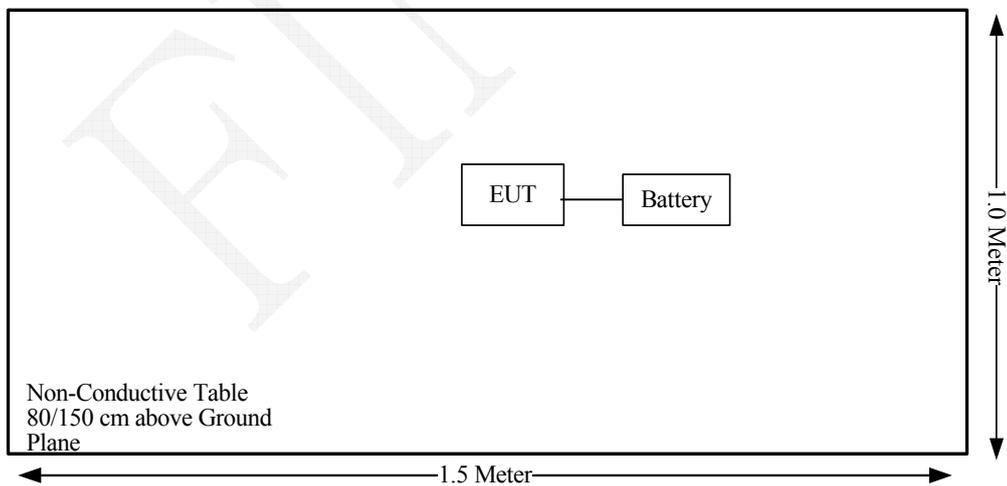
Conduction:

USB Mode:

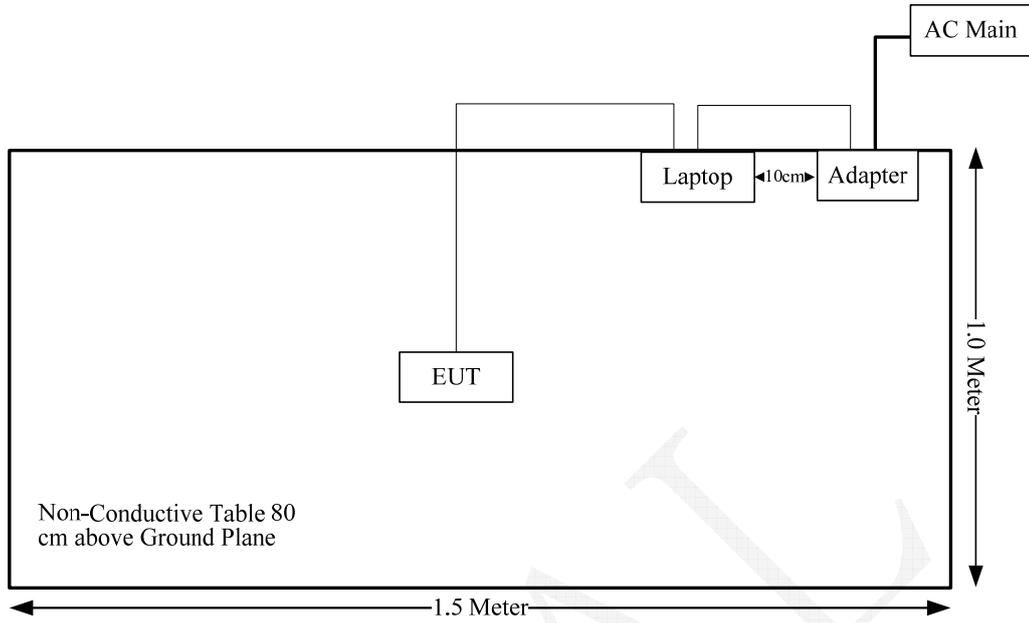


Radiation:

Battery Mode:



USB Mode:



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
FCC §15.247 (i) & §1.1310 & §2.1091	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§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)(i)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(i)	Quantity of hopping channel Test	Compliance
§15.247(b)(2)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

**FCC§1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to subpart §1.1310, 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>(B) Limits for General Population/Uncontrolled Exposure</b>				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f <sup>2</sup> )	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<sup>2</sup>);

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);

**Calculated Data:**

Frequency (MHz)	Antenna Gain		Max. Target Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
	(dBi)	(numeric)	(dBm)	(mW)			
903-925.5	-0.28	0.94	27	501.19	20.00	0.09	0.6

Note: The tune-up conducted power is 25+/-2dBm, which declared by the manufacturer.

**Result:** The device meet FCC MPE at 20 cm distance

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## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to FCC § 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 use of a standard antenna jack or electrical connector is prohibited.

### **Antenna Connector Construction**

The EUT has one detachable antenna uses a unique coupling to the EUT, and the antenna gain is -0.28 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

**Result:** Compliance.

**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:

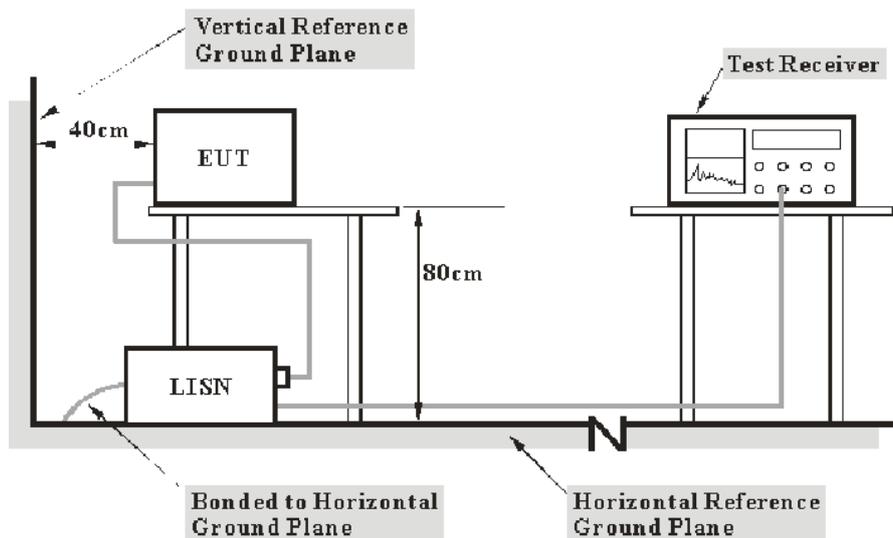
- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

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 3.12 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.

The adapter was connected to a 120 VAC/60 Hz 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 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:

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

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2015-10-20	2016-10-20
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	2015-11-26	2016-11-25
N/A	Coaxial Cable	1.8m	N/A	2015-05-06	2016-05-06
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:

**5.3 dB at 0.307284 MHz** in the **Line** conducted mode

### Test Data

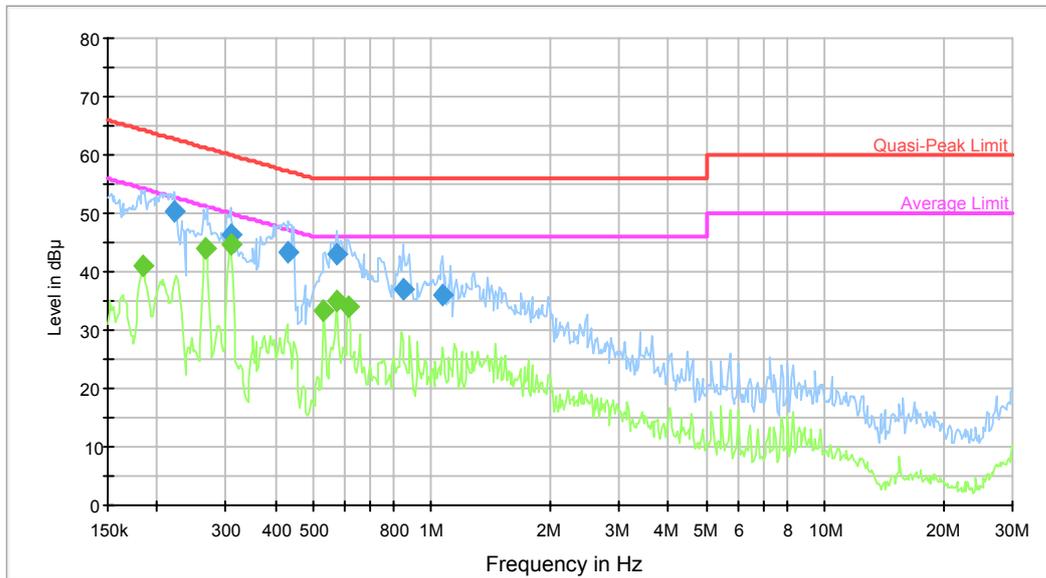
#### Environmental Conditions

<b>Temperature:</b>	27.9°C
<b>Relative Humidity:</b>	61 %
<b>ATM Pressure:</b>	100.3 kPa

*The testing was performed by Dean Liu on 2016-05-05*

Test Mode: Transmitting

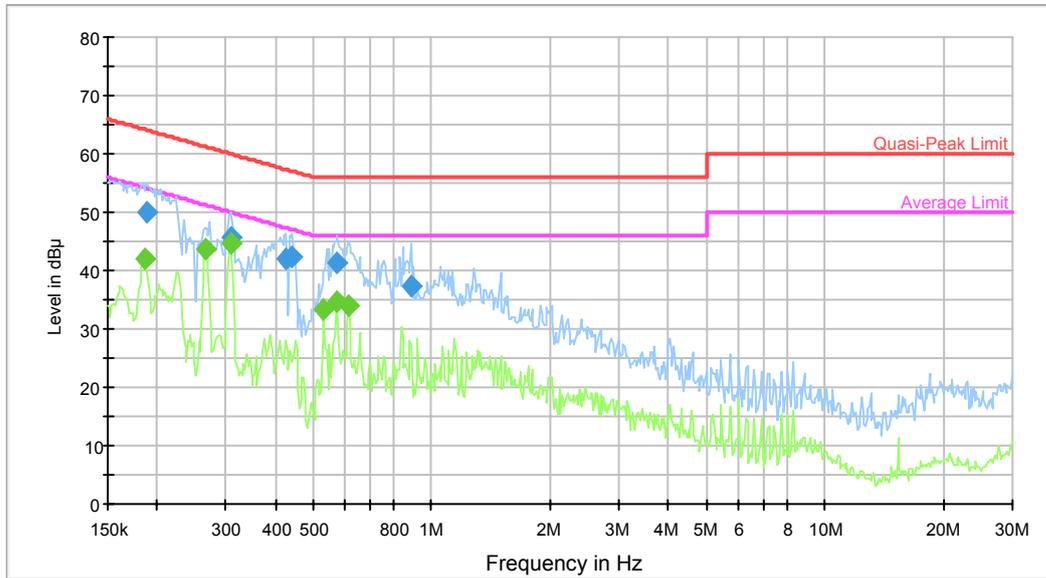
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.221645	50.2	9.000	L1	10.2	12.6	62.8	Compliance
0.307284	46.4	9.000	L1	10.3	13.6	60.0	Compliance
0.432855	43.2	9.000	L1	10.2	14.0	57.2	Compliance
0.572086	43.1	9.000	L1	10.2	12.9	56.0	Compliance
0.845331	37.1	9.000	L1	10.4	18.9	56.0	Compliance
1.065081	36.0	9.000	L1	10.4	20.0	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.184529	41.1	9.000	L1	10.2	13.2	54.3	Compliance
0.266226	44.1	9.000	L1	10.2	7.1	51.2	Compliance
0.307284	44.7	9.000	L1	10.3	5.3	50.0	Compliance
0.532496	33.4	9.000	L1	10.1	12.6	46.0	Compliance
0.572086	35.2	9.000	L1	10.2	10.8	46.0	Compliance
0.614619	34.0	9.000	L1	10.3	12.0	46.0	Compliance

**AC120 V, 60 Hz, Neutral:**



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.188994	49.8	9.000	N	10.2	14.3	64.1	Compliance
0.307284	45.8	9.000	N	10.3	14.2	60.0	Compliance
0.426011	42.0	9.000	N	10.2	15.3	57.3	Compliance
0.443327	42.2	9.000	N	10.1	14.8	57.0	Compliance
0.576662	41.4	9.000	N	10.2	14.6	56.0	Compliance
0.886728	37.5	9.000	N	10.4	18.5	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.186006	41.9	9.000	N	10.2	12.3	54.2	Compliance
0.266226	43.6	9.000	N	10.2	7.6	51.2	Compliance
0.307284	44.6	9.000	N	10.3	5.4	50.0	Compliance
0.532496	33.3	9.000	N	10.1	12.7	46.0	Compliance
0.572086	34.8	9.000	N	10.1	11.2	46.0	Compliance
0.614619	34.1	9.000	N	10.3	11.9	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 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.

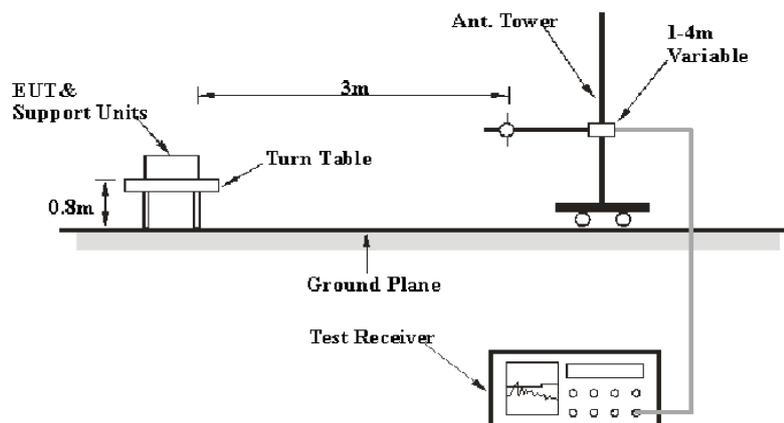
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is: 30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 1 – Values of  $U_{cispr}$

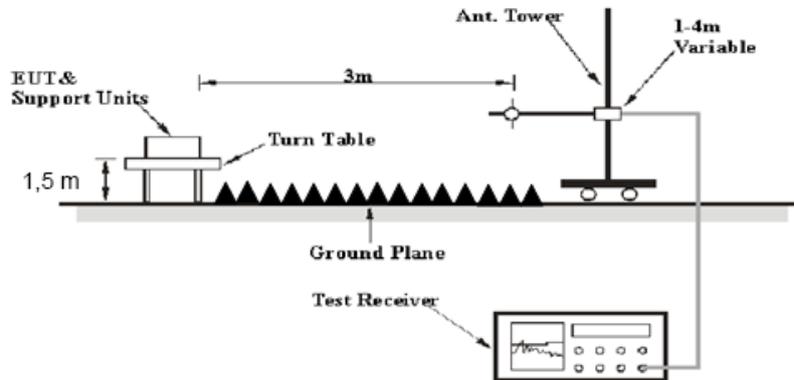
Measurement	$U_{cispr}$
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

### 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 10 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
R&S	EMI Test Receiver	ESCI	100224	2015-08-03	2016-08-02
Sunol Sciences	Antenna	JB3	A060611-3	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
Agilent	Spectrum Analyzer	E4440A	SG43360054	2015-11-23	2016-11-22
ETS-Lindgren	Horn Antenna	3115	9808-5557	2015-09-06	2018-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2016-02-19	2017-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2015-09-06	2016-09-06
N/A	Coaxial Cable	14m	N/A	2016-05-06	2017-05-06
N/A	Coaxial Cable	8m	N/A	2016-05-06	2017-05-06
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

\* **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).

**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**

<b>Temperature:</b>	25.8°C
<b>Relative Humidity:</b>	54 %
<b>ATM Pressure:</b>	100.4 kPa

\* The testing was performed by Dean Liu on 2016-05-06

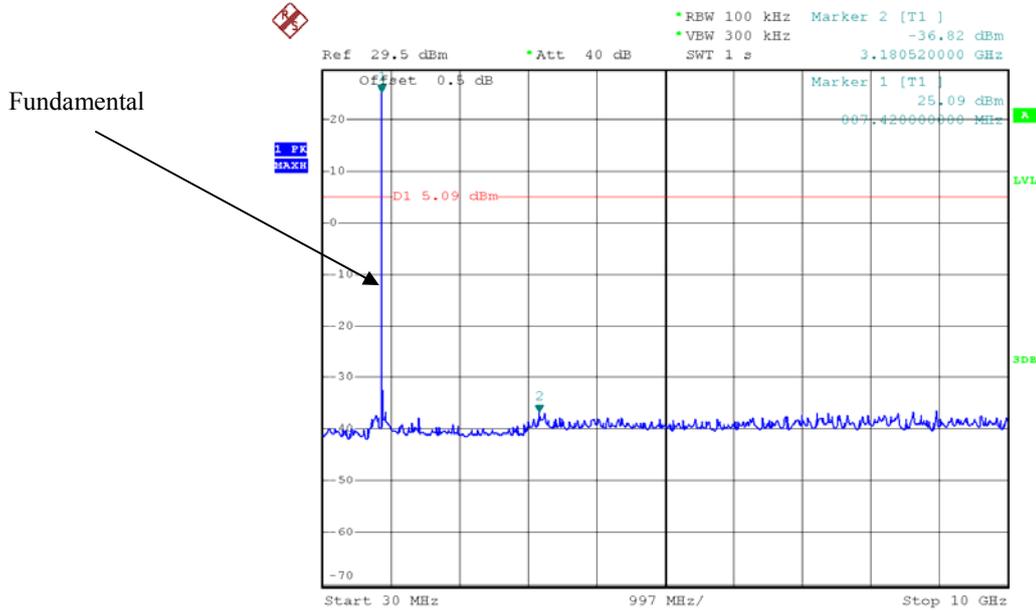
Test Mode: Transmitting (pretest battery mode and USB mode, the USB mode was the worst and record below:)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	FCC 15.247	
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBµV/m)	Margin (dB)
Low Channel									
903	90.6	QP	V	22.95	3.70	0.00	117.25	/	/
903	88.1	QP	H	22.95	3.70	0.00	114.75	/	/
902	34.9	QP	V	22.94	3.71	0.00	61.55	97.25	35.7
1806	37.6	PK	H	24.21	2.66	27.53	36.94	74.00	37.06
1806	27.88	AV	H	24.21	2.66	27.53	27.22	54.00	26.78
1806	38.39	PK	V	24.21	2.66	27.53	37.73	74.00	36.27
1806	28.28	AV	V	24.21	2.66	27.53	27.62	54.00	26.38
2709	41.03	PK	H	26.44	4.48	27.50	44.45	74.00	29.55
2709	33.48	AV	H	26.44	4.48	27.50	36.90	54.00	17.10
2709	39.79	PK	V	26.44	4.48	27.50	43.21	74.00	30.79
2709	32.32	AV	V	26.44	4.48	27.50	35.74	54.00	18.26
3612	39.9	PK	H	29.05	4.61	27.28	46.28	74.00	27.72
3612	32.06	AV	H	29.05	4.61	27.28	38.44	54.00	15.56
3612	39	PK	V	29.05	4.61	27.28	45.38	74.00	28.62
3612	30.38	AV	V	29.05	4.61	27.28	36.76	54.00	17.24
4515	33.07	PK	H	29.84	5.06	27.14	40.83	74.00	33.17
4515	20.98	AV	H	29.84	5.06	27.14	28.74	54.00	25.26
4515	33.18	PK	V	29.84	5.06	27.14	40.94	74.00	33.06
4515	21.03	AV	V	29.84	5.06	27.14	28.79	54.00	25.21
5418	40.62	PK	H	31.94	5.50	26.97	51.09	74.00	22.91
5418	31.26	AV	H	31.94	5.50	26.97	41.73	54.00	12.27
5418	38.45	PK	V	31.94	5.50	26.97	48.92	74.00	25.08
5418	27.46	AV	V	31.94	5.50	26.97	37.93	54.00	16.07
360.12	36.3	QP	H	15.59	2.31	21.67	32.53	46.0	13.47
Middle Channel									
914.25	90.9	QP	V	22.91	3.68	0.00	117.49	/	/
914.25	88.6	QP	H	22.91	3.68	0.00	115.19	/	/
1828.5	38.54	PK	H	24.26	2.87	27.52	38.15	74.00	35.85
1828.5	29.04	AV	H	24.26	2.87	27.52	28.65	54.00	25.35
1828.5	40.27	PK	V	24.26	2.87	27.52	39.88	74.00	34.12
1828.5	31.54	AV	V	24.26	2.87	27.52	31.15	54.00	22.85
2742.75	42.29	PK	H	26.53	4.37	27.52	45.67	74.00	28.33
2742.75	35.41	AV	H	26.53	4.37	27.52	38.79	54.00	15.21
2742.75	40.29	PK	V	26.53	4.37	27.52	43.67	74.00	30.33
2742.75	33.26	AV	V	26.53	4.37	27.52	36.64	54.00	17.36
3657	39	PK	H	29.15	4.55	27.30	45.40	74.00	28.60
3657	31.26	AV	H	29.15	4.55	27.30	37.66	54.00	16.34
3657	39.61	PK	V	29.15	4.55	27.30	46.01	74.00	27.99
3657	31.8	AV	V	29.15	4.55	27.30	38.20	54.00	15.80
4571.25	32.91	PK	H	29.99	5.13	27.27	40.76	74.00	33.24
4571.25	21.46	AV	H	29.99	5.13	27.27	29.31	54.00	24.69
4571.25	32.89	PK	V	29.99	5.13	27.27	40.74	74.00	33.26
4571.25	20.38	AV	V	29.99	5.13	27.27	28.23	54.00	25.77
5485.5	37.28	PK	H	32.07	5.49	26.90	47.94	74.00	26.06
5485.5	26.54	AV	H	32.07	5.49	26.90	37.20	54.00	16.80
5485.5	36.01	PK	V	32.07	5.49	26.90	46.67	74.00	27.33
5485.5	24.96	AV	V	32.07	5.49	26.90	35.62	54.00	18.38
360.12	36.4	QP	H	15.59	2.31	21.67	32.63	46.00	13.37

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	FCC 15.247	
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBµV/m)	Margin (dB)
High Channel									
925.5	90.8	QP	V	22.94	3.69	0.00	117.43	/	/
925.5	87.2	QP	H	22.94	3.69	0.00	113.83	/	/
928	26.9	QP	V	23.00	3.70	0.00	53.60	97.00	43.40
1851	39.39	PK	H	24.30	3.07	27.52	39.24	74.00	34.76
1851	30.68	AV	H	24.30	3.07	27.52	30.53	54.00	23.47
1851	41.33	PK	V	24.30	3.07	27.52	41.18	74.00	32.82
1851	33.9	AV	V	24.30	3.07	27.52	33.75	54.00	20.25
2776.5	41.17	PK	H	26.62	4.42	27.54	44.67	74.00	29.33
2776.5	33.69	AV	H	26.62	4.42	27.54	37.19	54.00	16.81
2776.5	39.74	PK	V	26.62	4.42	27.54	43.24	74.00	30.76
2776.5	32.8	AV	V	26.62	4.42	27.54	36.30	54.00	17.70
3702	38.39	PK	H	29.24	4.64	27.33	44.94	74.00	29.06
3702	30.06	AV	H	29.24	4.64	27.33	36.61	54.00	17.39
3702	36.42	PK	V	29.24	4.64	27.33	42.97	74.00	31.03
3702	26.54	AV	V	29.24	4.64	27.33	33.09	54.00	20.91
4627.5	33.32	PK	H	30.13	5.19	27.34	41.30	74.00	32.70
4627.5	21.09	AV	H	30.13	5.19	27.34	29.07	54.00	24.93
4627.5	33.82	PK	V	30.13	5.19	27.34	41.80	74.00	32.20
4627.5	21.34	AV	V	30.13	5.19	27.34	29.32	54.00	24.68
5553	36.58	PK	H	32.11	5.37	26.82	47.24	74.00	26.76
5553	26.54	AV	H	32.11	5.37	26.82	37.20	54.00	16.80
5553	34.51	PK	V	32.11	5.37	26.82	45.17	74.00	28.83
5553	21.43	AV	V	32.11	5.37	26.82	32.09	54.00	21.91
360.12	36.5	QP	H	15.59	2.31	21.67	32.73	46.00	13.27

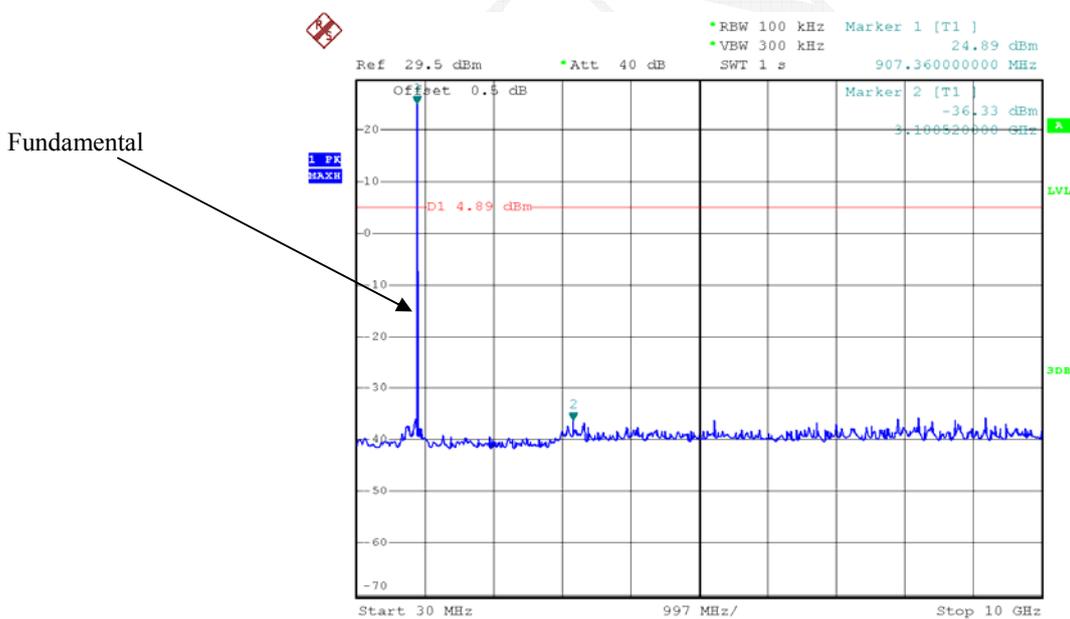
### Conducted Spurious Emissions at Antenna Port

#### Low Channel



Date: 6.MAY.2016 15:35:34

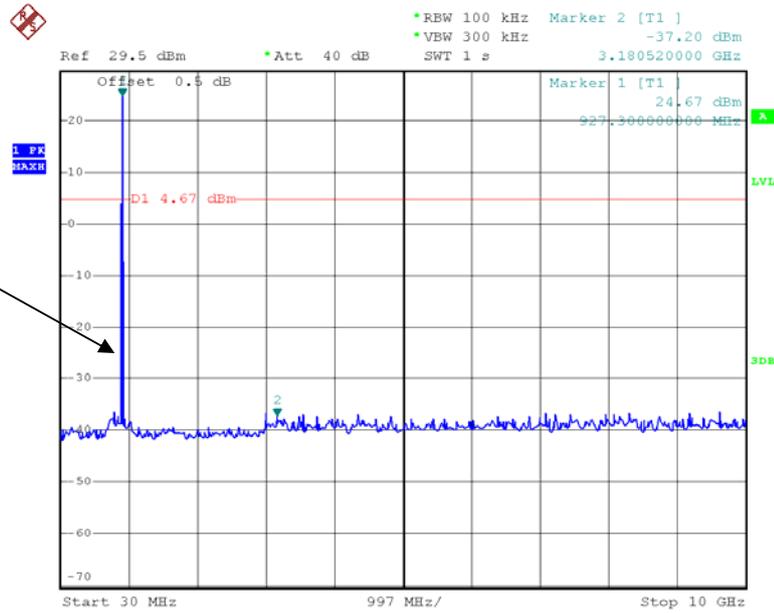
#### Middle Channel



Date: 6.MAY.2016 15:36:04

### High Channel

Fundamental



Date: 6.MAY.2016 15:36:39

FULL

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

### Applicable Standard

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.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	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 Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 10 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace.
3. Measure the channel separation.

### Test Data

#### Environmental Conditions

<b>Temperature:</b>	25.6 °C
<b>Relative Humidity:</b>	54 %
<b>ATM Pressure:</b>	100.4 kPa

\* The testing was performed by Dean Liu on 2016-05-06.

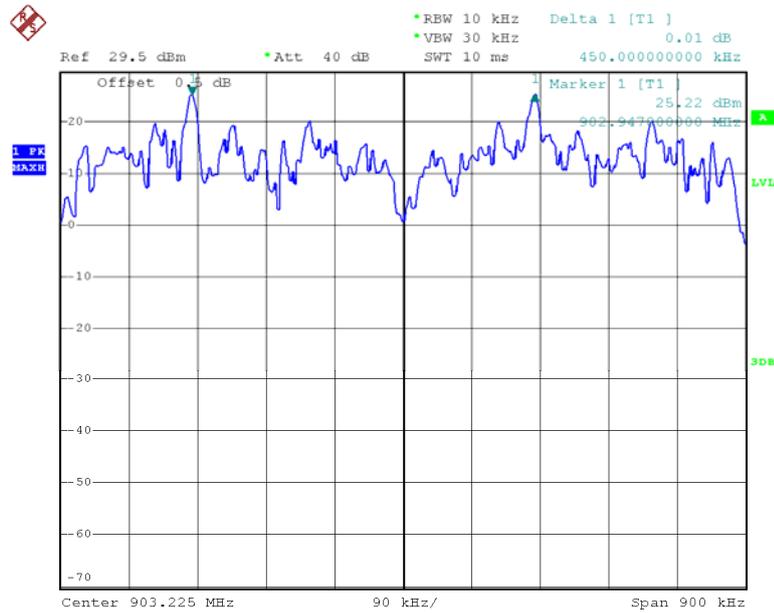
**Test Result:** Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

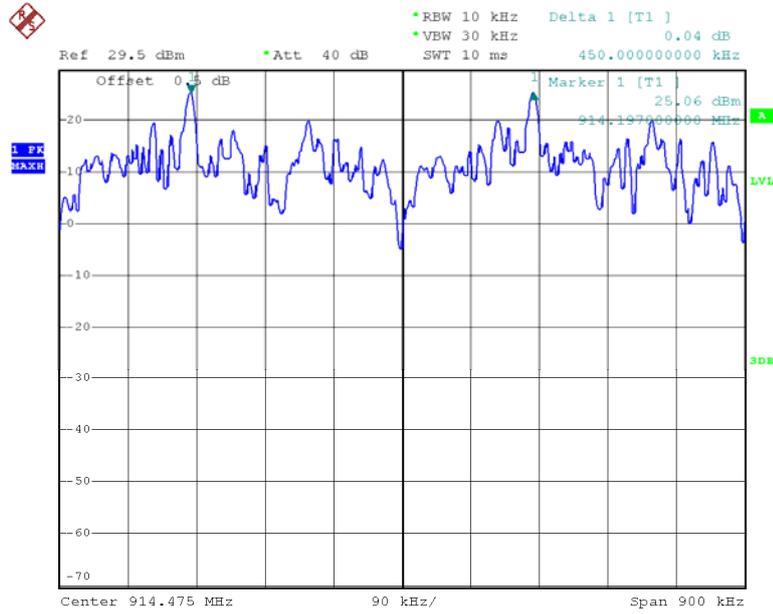
Channel	Frequency	Channel Separation	Limit	Result
	MHz	MHz	MHz	
Low	903	0.450	0.428	Compliance
Middle	914.25	0.450	0.428	
High	925.5	0.450	0.428	

Low Channel



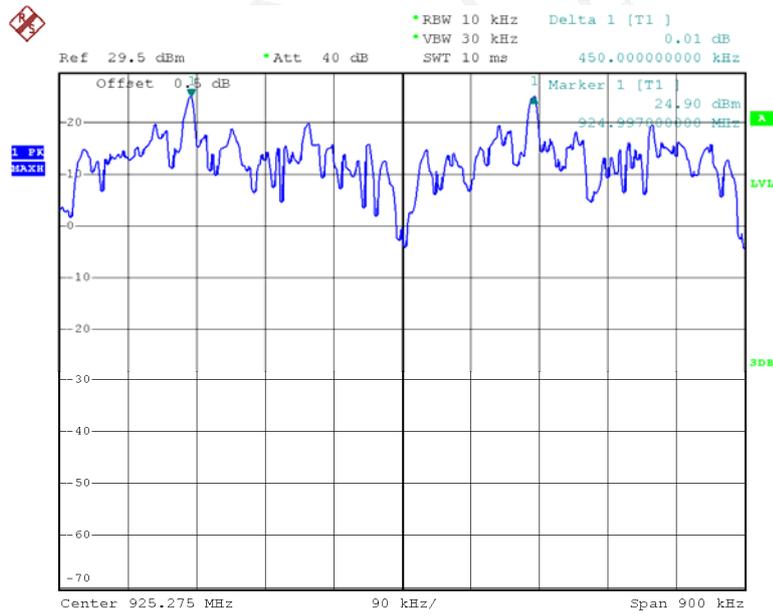
Date: 6.MAY.2016 15:13:34

### Middle Channel



Date: 6.MAY.2016 15:15:18

### High Channel



Date: 6.MAY.2016 15:10:48

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

### Applicable Standard

(1) Frequency hopping systems 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, 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 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 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
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	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 Data**

**Environmental Conditions**

<b>Temperature:</b>	25.8 °C
<b>Relative Humidity:</b>	54 %
<b>ATM Pressure:</b>	100.4 kPa

\* The testing was performed by Dean Liu on 2016-05-06

**Test Result:** Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	903	0.428
Middle	914.25	0.428
High	925.5	0.428

**Low Channel**



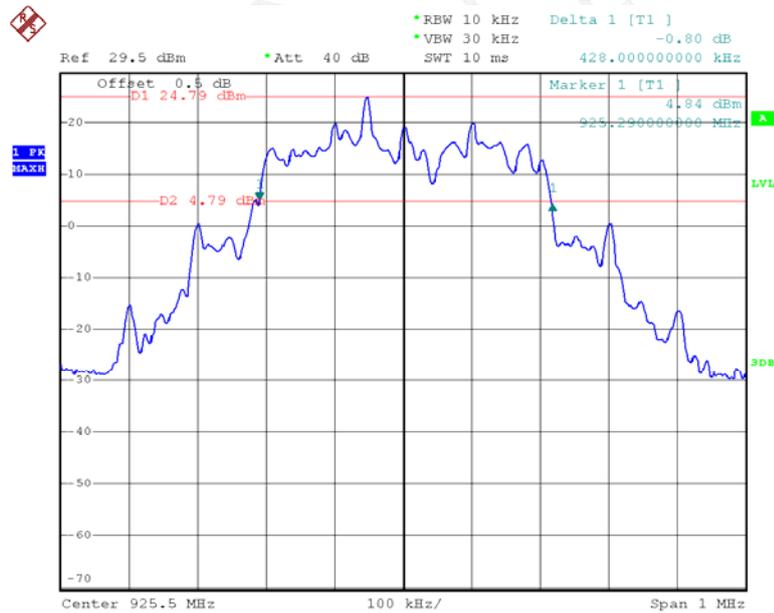
Date: 6.MAY.2016 15:30:11

### Middle Channel



Date: 6.MAY.2016 15:29:24

### High Channel



Date: 6.MAY.2016 15:28:40

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

### **Applicable Standard**

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

### **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	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	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 Data**

#### **Environmental Conditions**

<b>Temperature:</b>	25.8 °C
<b>Relative Humidity:</b>	54 %
<b>ATM Pressure:</b>	100.4 kPa

\* The testing was performed by Dean Liu on 2016-05-06

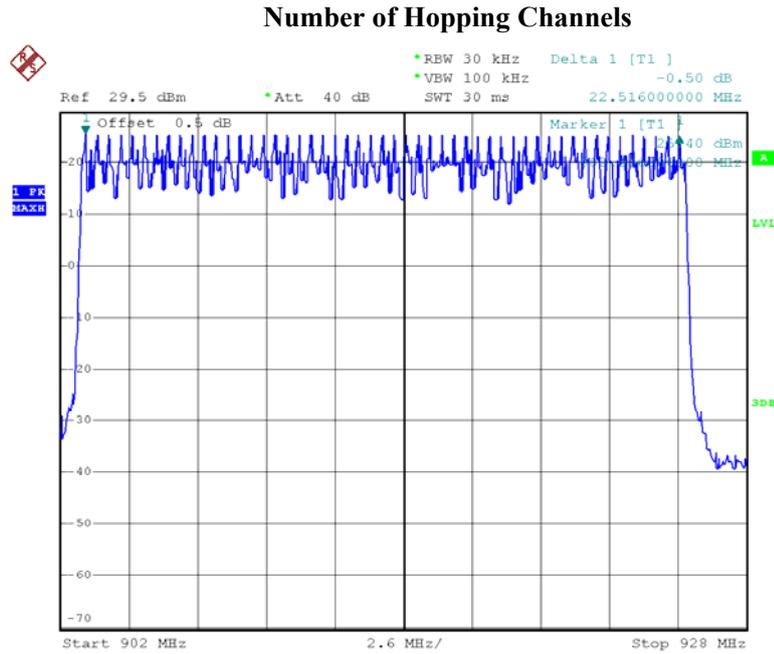
**Test Result:** Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

BDR Mode (GFSK):

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	51	≥25



Date: 6.MAY.2016 15:19:31

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

**Applicable Standard**

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

**Test Procedure**

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 10s, 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
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	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 Data**

**Environmental Conditions**

<b>Temperature:</b>	25.8 °C
<b>Relative Humidity:</b>	54 %
<b>ATM Pressure:</b>	100.4 kPa

\* The testing was performed by Dean Liu on 2016-05-06

**Test Result:** Compliance.

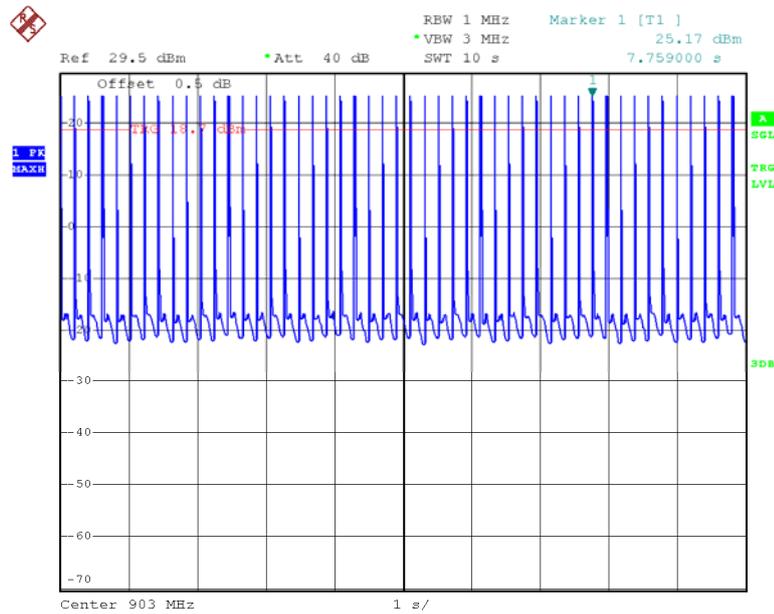
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	Occupancy Time For Single Hop (ms)	Real Observed Period(s)	Hops in Observed Period	Dwell Time (s)	Limit (s)	Result
Low	903	2.61	10	50	0.131	0.4	Compliance
Middle	914.25	2.61	10	50	0.131	0.4	Compliance
High	925.5	2.6	10	50	0.130	0.4	Compliance

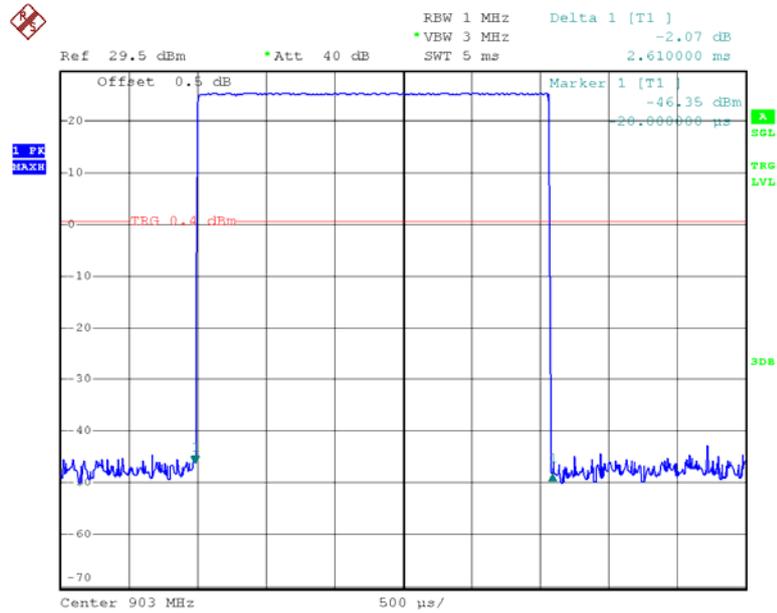
Note: Dwell time= Occupancy Time For Single Hop (ms) ×Hops in Observed Period

Low Channel, Hops in Observed Period



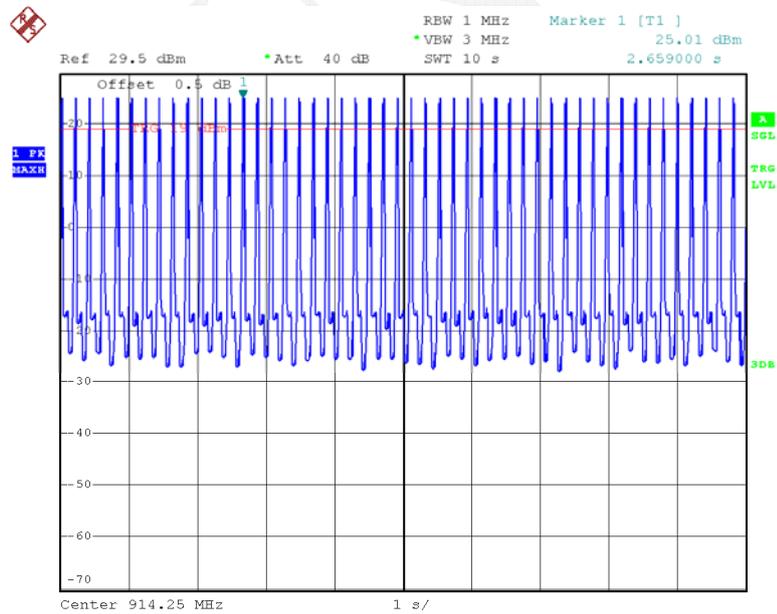
Date: 6.MAY.2016 15:42:28

### Low Channel, Occupancy Time For Single Hop



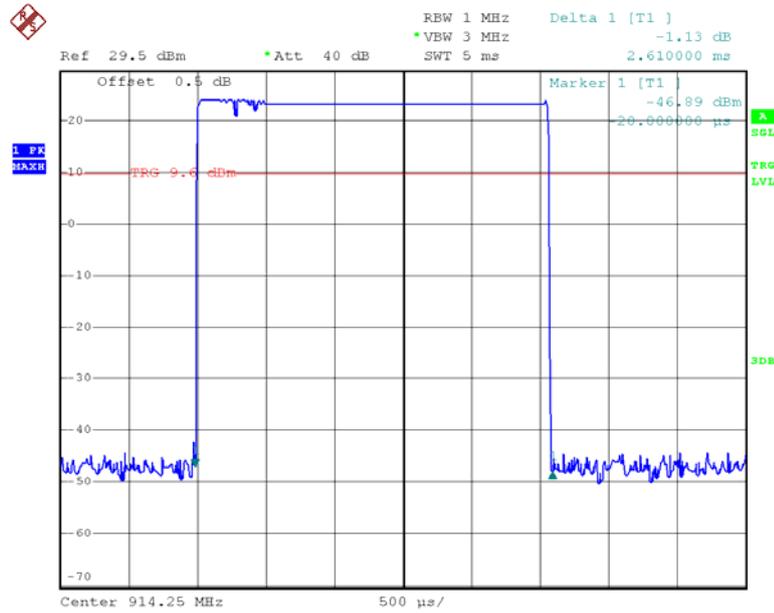
Date: 6.MAY.2016 15:40:01

### Middle Channel, Hops in Observed Period



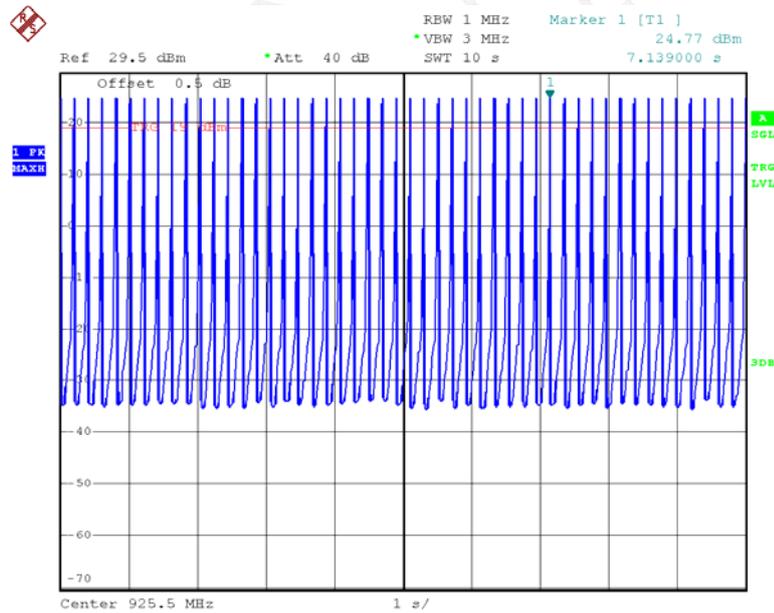
Date: 6.MAY.2016 15:45:37

### Middle Channel, Occupancy Time For Single Hop



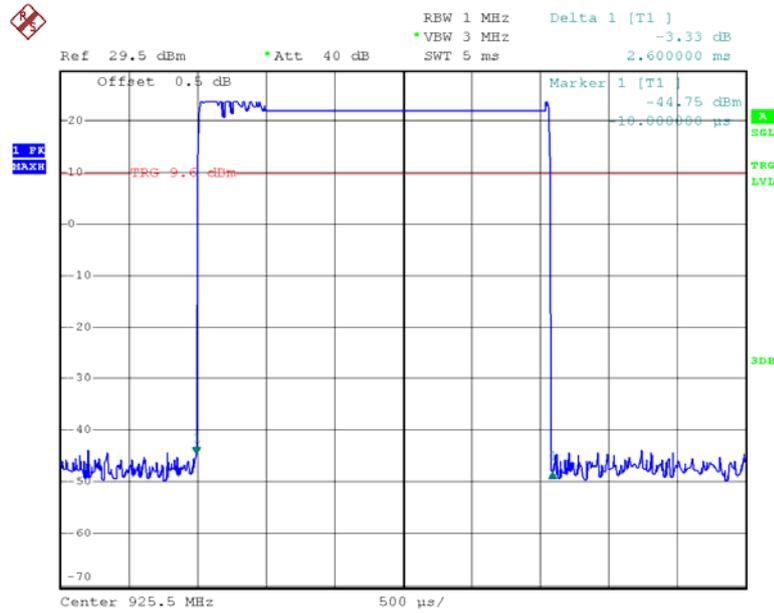
Date: 6.MAY.2016 15:47:38

### High Channel, Hops in Observed Period



Date: 6.MAY.2016 15:46:14

### High Channel, Occupancy Time For Single Hop



Date: 6.MAY.2016 15:48:04

## **FCC §15.247(b) (2) - PEAK OUTPUT POWER MEASUREMENT**

### **Applicable Standard**

(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and. 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

### **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	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	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 Data**

#### **Environmental Conditions**

<b>Temperature:</b>	25.8 °C
<b>Relative Humidity:</b>	54 %
<b>ATM Pressure:</b>	100.4 kPa

\* *The testing was performed by Dean Liu on 2016-05-06*

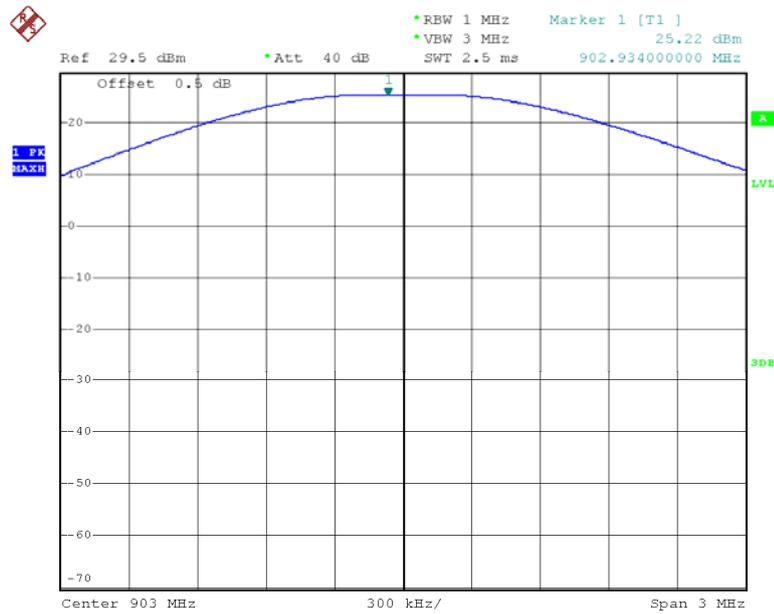
**Test Result:** Compliance.

Test Mode: Transmitting

Channel	Frequency (MHz)	Output power (dBm)	Limit (dBm)
Low	903	25.22	30
Middle	914.25	25.09	30
High	925.5	24.84	30

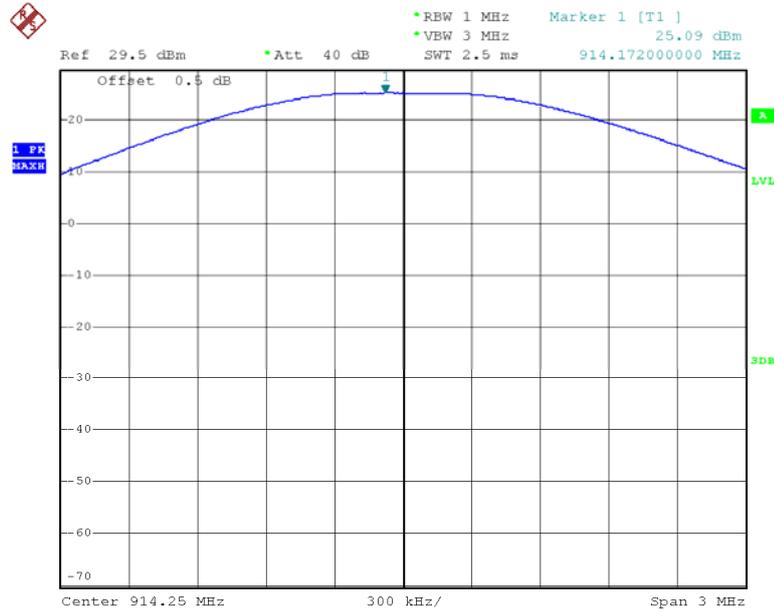
Note: The data above was tested in conducted mode.

Output Power, Low Channel



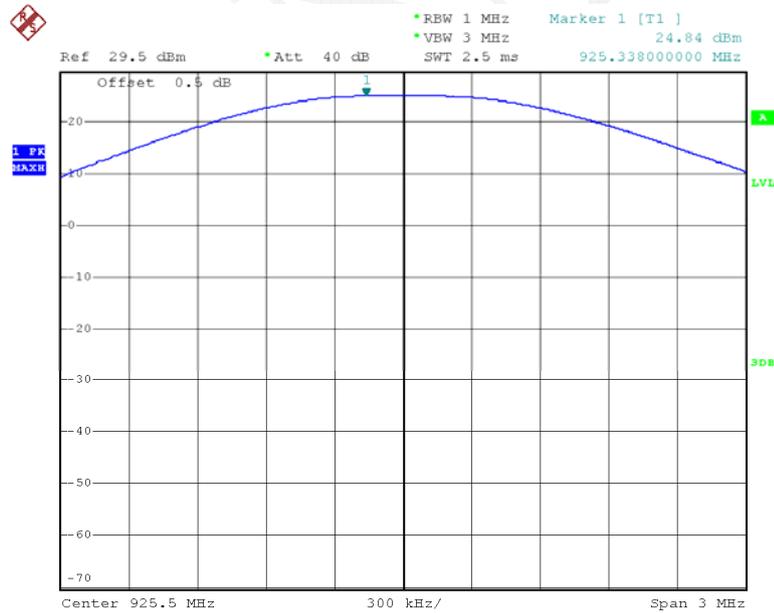
Date: 6.MAY.2016 15:21:36

### Output Power, Middle Channel



Date: 6.MAY.2016 15:22:04

### Output Power, High Channel



Date: 6.MAY.2016 15:22:48

## 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
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	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 Data

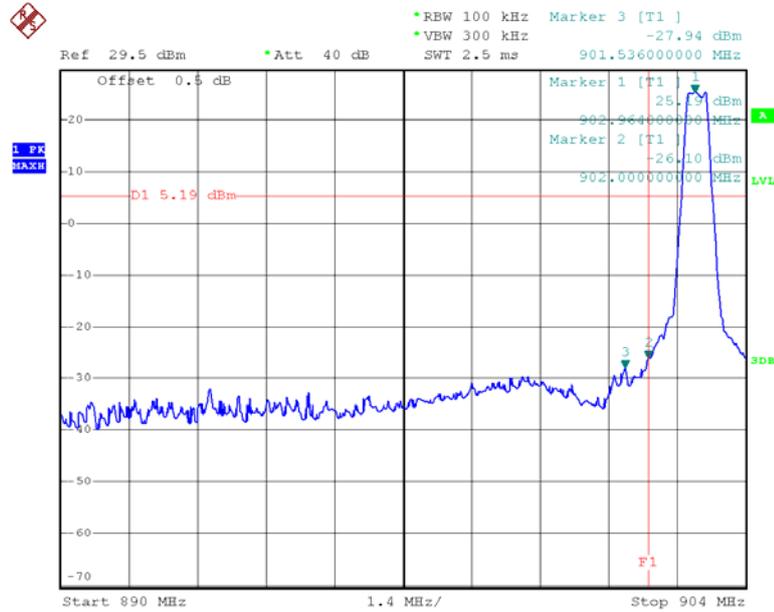
#### Environmental Conditions

Temperature:	25.8 °C
Relative Humidity:	54 %
ATM Pressure:	100.4 kPa

\* The testing was performed by Dean Liu on 2016-05-06

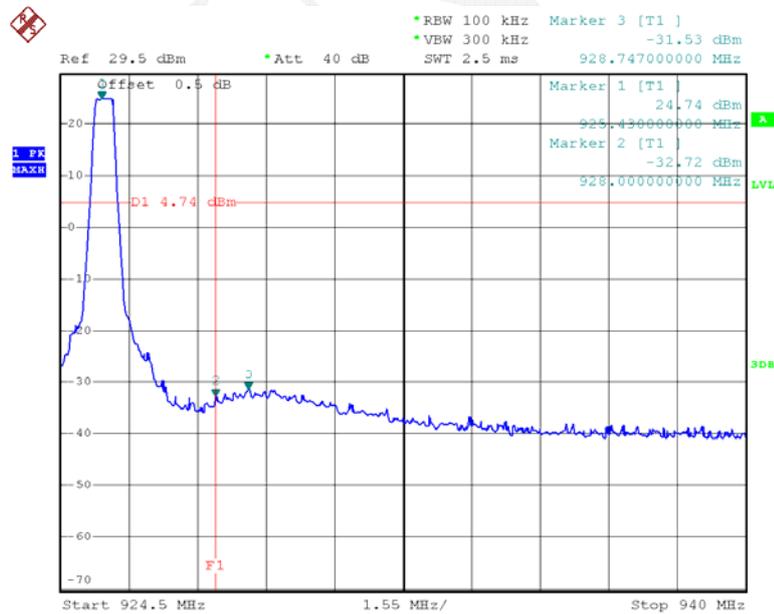
**Test Result: Compliance**

**Band Edge, Left Side**



Date: 6.MAY.2016 15:32:40

**Band Edge, Right Side**



Date: 6.MAY.2016 15:34:02

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