



FCC PART 15.247 TEST REPORT

For

Skyrocket Toys LLC

12910 Culver Blvd, Suite F, Los Angeles, CA 90066, U.S.A

FCC ID: O5301731RX24G

Report Type: Original Report	Product Name: Nano Drone
Test Engineer: <u>Kevin Hu</u>	<i>Kevin Hu</i>
Report Number: <u>RDG170414005A</u>	
Report Date: <u>2017-05-08</u>	
Reviewed By: <u>EMC Leader</u>	<i>Henry Ding</i>
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) No.5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, ChengDu, Sichuan China Tel: 028-65523123, Fax: 028-65525125 www.baclcorp.com

Note: This test report was 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. (Chengdu). Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. This report was valid only with a valid digital signature.

TABLE OF CONTENTS

GENERAL INFORMATION	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	4
TEST FACILITY.....	5
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EQUIPMENT MODIFICATIONS	6
EUT EXERCISE SOFTWARE.....	6
BLOCK DIAGRAM OF TEST SETUP	6
SUMMARY OF TEST RESULTS.....	8
FCC §15.247 (i) & §1.1307 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE).....	9
APPLICABLE STANDARD.....	9
FCC §15.203 - ANTENNA REQUIREMENT	10
APPLICABLE STANDARD.....	10
ANTENNA CONNECTOR CONSTRUCTION	10
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	11
APPLICABLE STANDARD.....	11
EUT SETUP.....	11
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	12
TEST PROCEDURE	12
TEST EQUIPMENT LIST AND DETAILS	12
CORRECTED AMPLITUDE & MARGIN CALCULATION	13
TEST DATA	13
FCC §15.247(a) (1) - CHANNEL SEPARATION TEST	15
APPLICABLE STANDARD.....	15
TEST EQUIPMENT LIST AND DETAILS	15
TEST PROCEDURE	15
TEST DATA	15
FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING	17
APPLICABLE STANDARD.....	17
TEST PROCEDURE	17
TEST EQUIPMENT LIST AND DETAILS	17
TEST DATA	17
FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST	20
APPLICABLE STANDARD.....	20
TEST PROCEDURE	20
TEST EQUIPMENT LIST AND DETAILS	20
TEST DATA	20
FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME).....	22
APPLICABLE STANDARD.....	22
TEST PROCEDURE	22
TEST EQUIPMENT LIST AND DETAILS	22

TEST DATA22

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT24

APPLICABLE STANDARD24

TEST PROCEDURE24

TEST EQUIPMENT LIST AND DETAILS24

TEST DATA24

FCC §15.247(d) - BAND EDGES TESTING27

APPLICABLE STANDARD27

TEST PROCEDURE27

TEST EQUIPMENT LIST AND DETAILS27

TEST DATA28

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **Skyrocket Toys LLC**'s product, model number: **01731 (FCC ID: O5301731RX24G)** (the "EUT") in this report was a **Nano Drone**, which was measured approximately: 7 cm (L) x 7 cm (W) x 3 cm (H), rated input voltage: DC3.7V from battery and the battery can be removed and charged by using USB charger cable.

**All measurement and test data in this report was gathered from final production sample, serial number: 170414005 (assigned by the BAACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-04-14, and EUT conformed to test requirement.*

Objective

This report is prepared on behalf of **Skyrocket Toys LLC** in accordance with Part 2, Subpart J, Part 15, Subparts A, and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the EUT compliance with FCC Rules 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: O5301731TX24G.

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".

All of the measurements detailed in this Test Report were performed by Bay Area Compliance Laboratories Corp. (Chengdu).

The Bay Area Compliance Laboratories Corp. Chengdu's measurement Uncertainties (calculated for a k=2 Coverage Factor corresponding to approximately 95% Coverage) were as follows:

-For all of the AC Line Conducted Emissions Tests reported herein: ± 3.17 dB.
-For of all of the Direct Antenna Conducted Emissions Tests reported herein: ± 0.56 dB.

-For of all of the direct Radiated Emissions Tests reported herein are:
30 MHz to 200 MHz: ± 4.7 dB;
200 MHz to 1 GHz: ± 6.0 dB;
1 GHz to 6 GHz: ± 5.13 dB; and,
6 GHz to 40 GHz: ± 5.47 dB.

And the uncertainty will not be taken into consideration for all test data recorded in the report.

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a testing mode provided by manufacturer.

The device employed 15 channels as below list:

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
2410	2431	2456
2413	2436	2461
2416	2441	2466
2421	2446	2469
2426	2452	2472

3channels were tested: 2410MHz, 2441MHz and 2472MHz

Equipment Modifications

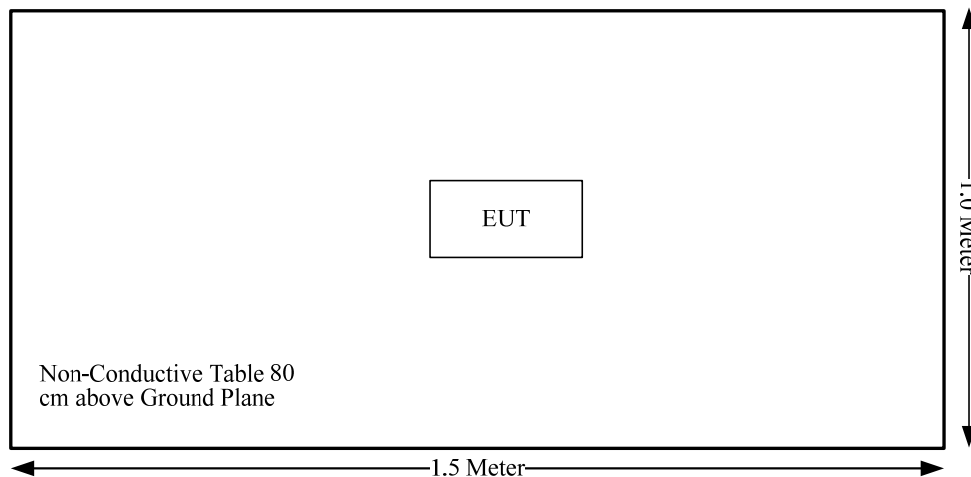
No modification was made to the EUT.

EUT Exercise Software

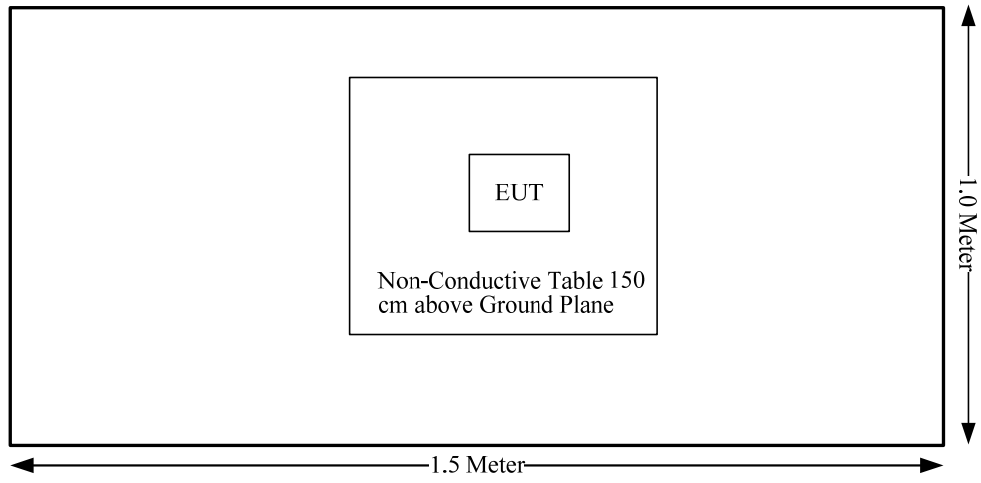
No software was used during testing. The maximum power was configured as default setting.

Block Diagram of Test Setup

Radiation test below 1GHz:



Radiation test above 1GHz:



SUMMARY OF TEST RESULTS

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

Note: Not Applicable: the device was powered by battery.

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

Applicable Standard

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

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

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	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.

calculation formula:

Prediction of power density at the distance of the applicable MPE limit

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

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:

Mode	Frequency (MHz)	Antenna Gain		Maximum Power including tolerance		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
FHSS	2410-2472	0	1.00	6	3.98	20.00	0.0008	1.0

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

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

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to 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 internal antenna arrangement and the antenna gain is 0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

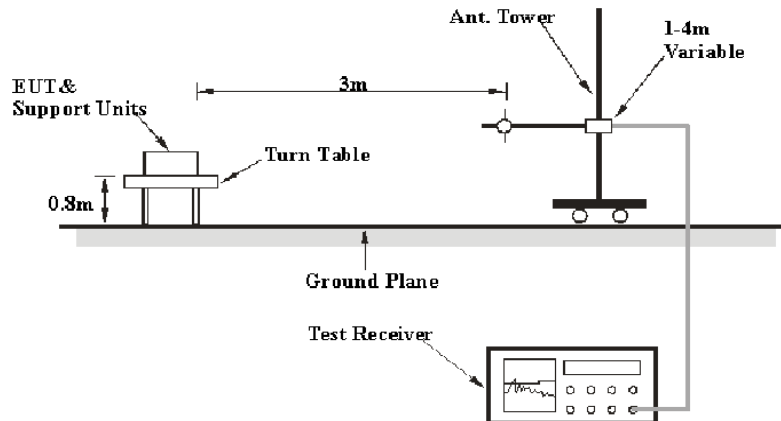
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

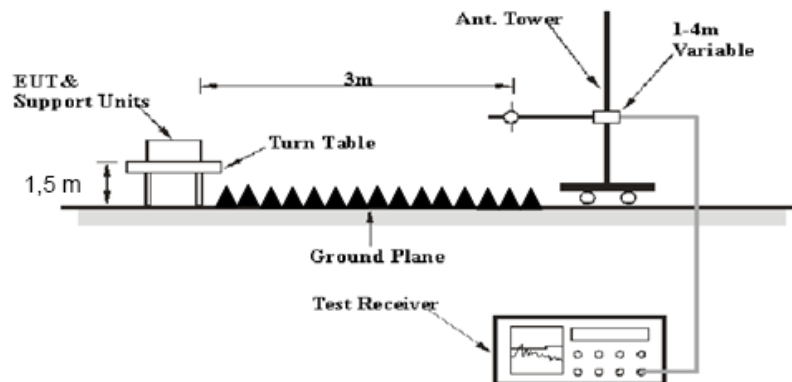
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1GHz:



Above 1GHz:



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

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

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

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

Test Procedure

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2016-12-02	2017-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Sunol Sciences	Broadband Antenna	JB3	A121808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
ETS	Horn Antenna	3115	003-6076	2016-12-02	2017-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2016-05-20	2017-05-19
EMCT	Semi-Anechoic Chamber	966	966-1	2015-04-24	2018-04-23
Unknown	RF Cable (below 1GHz)	Unknown	NO.1	2016-11-10	2017-11-09
Unknown	RF Cable (below 1GHz)	Unknown	NO.4	2016-11-10	2017-11-09
Unknown	RF Cable (above 1GHz)	Unknown	NO.2	2016-11-10	2017-11-09
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-01 1312	2016-08-18	2017-08-18

* **Statement of Traceability:** BAACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

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:	22.3 °C
Relative Humidity:	58 %
ATM Pressure:	98.2 kPa

* The testing was performed by Kevin Hu on 2017-04-28.

Test Mode: Transmitting

30MHz to 25 GHz:

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: 2410 MHz									
2410	72.73	PK	H	23.51	3.00	0.00	99.24	N/A	N/A
2410	67.18	AV	H	23.51	3.00	0.00	93.69	N/A	N/A
2410	55.66	PK	V	23.51	3.00	0.00	82.17	N/A	N/A
2410	50.94	AV	V	23.51	3.00	0.00	77.45	N/A	N/A
2390	29.57	PK	H	23.57	3.00	0.00	56.14	74.00	17.86
2390	17.11	AV	H	23.57	3.00	0.00	43.68	54.00	10.32
4820	37.12	PK	H	30.82	5.12	26.87	46.19	74.00	27.81
4820	23.89	AV	H	30.82	5.12	26.87	32.96	54.00	21.04
7230	34.13	PK	H	34.76	6.18	26.36	48.71	74.00	25.29
7230	21.22	AV	H	34.76	6.18	26.36	35.80	54.00	18.20
3028	38.27	PK	H	24.36	3.47	26.42	39.68	74.00	34.32
3028	25.09	AV	H	24.36	3.47	26.42	26.50	54.00	27.50
36.79	31.9	QP	H	17.90	0.38	28.53	21.60	40.00	18.40
163.86	36.7	QP	H	12.19	0.96	28.00	21.80	43.50	21.70
Middle Channel: 2441 MHz									
2441	71.59	PK	H	23.40	3.00	0.00	97.99	N/A	N/A
2441	65.82	AV	H	23.40	3.00	0.00	92.22	N/A	N/A
2441	56.93	PK	V	23.40	3.00	0.00	83.33	N/A	N/A
2441	51.54	AV	V	23.40	3.00	0.00	77.94	N/A	N/A
4882	40.82	PK	H	31.02	5.09	26.87	50.06	74.00	23.94
4882	26.46	AV	H	31.02	5.09	26.87	35.70	54.00	18.30
7323	34.12	PK	H	34.95	6.22	26.40	48.89	74.00	25.11
7323	21.71	AV	H	34.95	6.22	26.40	36.48	54.00	17.52
2757	36.83	PK	H	23.71	3.22	26.64	37.12	74.00	36.88
2757	23.52	AV	H	23.71	3.22	26.64	23.81	54.00	30.19
3231	40.04	PK	H	25.49	3.78	26.49	42.82	74.00	31.18
3231	27.87	AV	H	25.49	3.78	26.49	30.65	54.00	23.35
36.79	31.8	QP	H	17.90	0.38	28.53	21.55	40.00	18.45
163.86	36.8	QP	H	12.19	0.96	28.00	21.95	43.50	21.55
High Channel: 2472 MHz									
2472	71.22	PK	H	23.30	2.99	0.00	97.51	N/A	N/A
2472	65.6	AV	H	23.30	2.99	0.00	91.89	N/A	N/A
2472	55.79	PK	V	23.30	2.99	0.00	82.08	N/A	N/A
2472	50.88	AV	V	23.30	2.99	0.00	77.17	N/A	N/A
2483.5	30.14	PK	H	23.26	2.99	0.00	56.39	74.00	17.61
2483.5	17.38	AV	H	23.26	2.99	0.00	43.63	54.00	10.37
4944	46.58	PK	H	31.22	5.06	26.88	55.98	74.00	18.02
4944	30.71	AV	H	31.22	5.06	26.88	40.11	54.00	13.89
7416	34.55	PK	H	35.13	6.26	26.44	49.50	74.00	24.50
7416	21.67	AV	H	35.13	6.26	26.44	36.62	54.00	17.38
3420	38.31	PK	H	26.55	4.06	26.56	42.36	74.00	31.64
3420	26.4	AV	H	26.55	4.06	26.56	30.45	54.00	23.55
36.79	32.1	QP	H	17.90	0.38	28.53	21.85	40.00	18.15
163.86	36.8	QP	H	12.19	0.96	28.00	21.95	43.50	21.55

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
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-3	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

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:	23.3 °C
Relative Humidity:	38 %
ATM Pressure:	95.4 kPa

* The testing was performed by Kevin Hu on 2017-04-26.

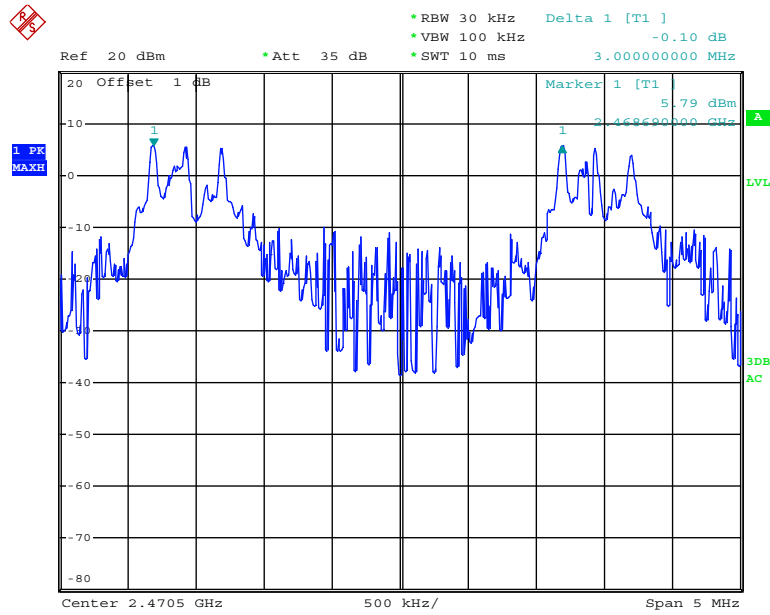
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
High	2472	3	0.55
Adjacent	2469		

Note: Limit= (2/3)x 20dB bandwidth



Date: 26.APR.2017 10:52:13

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

Applicable Standard

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-3	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Data

Environmental Conditions

Temperature:	23.3 °C
Relative Humidity:	38 %
ATM Pressure:	95.4 kPa

* *The testing was performed by Kevin Hu on 2017-04-26.*

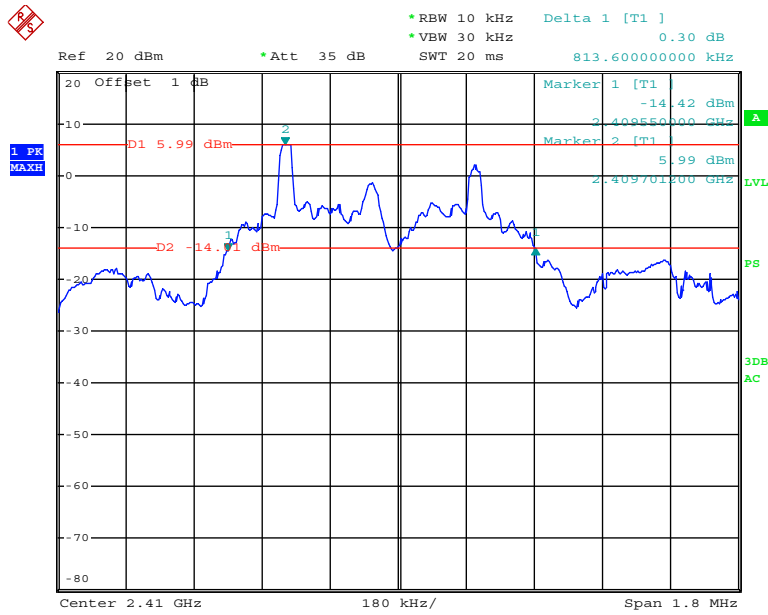
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

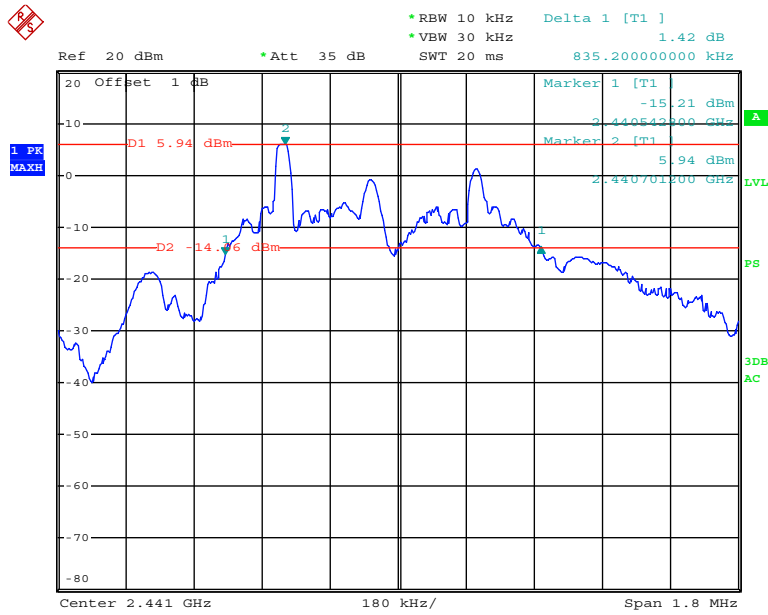
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2410	0.814
Middle	2441	0.835
High	2472	0.832

Low Channel



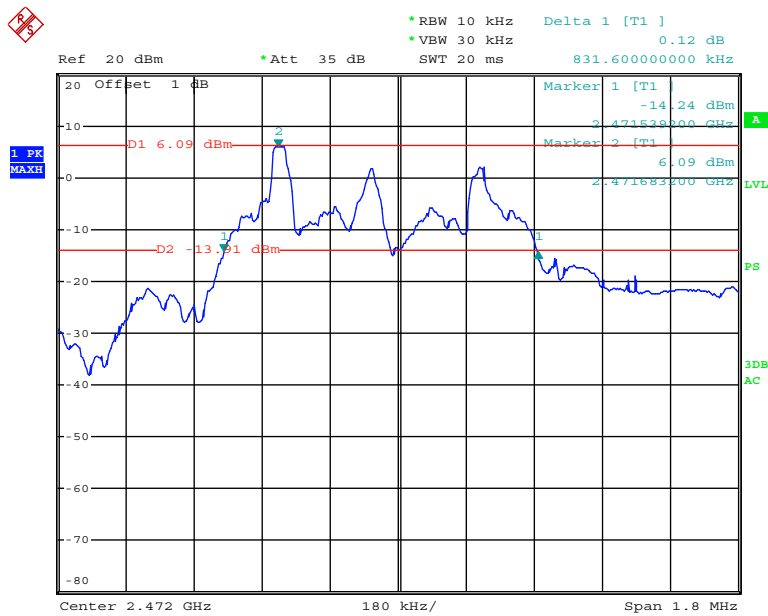
Date: 26.APR.2017 09:16:30

Middle Channel



Date: 26.APR.2017 09:20:55

High Channel



Date: 26.APR.2017 09:02:33

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

Applicable Standard

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-3	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	23.3 °C
Relative Humidity:	38 %
ATM Pressure:	95.4 kPa

* *The testing was performed by Kevin Hu on 2017-04-26.*

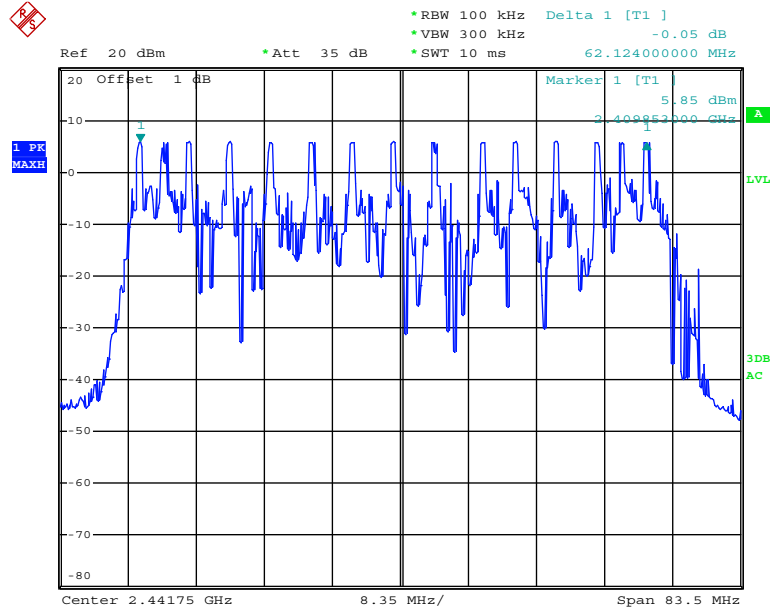
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

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

Number of Hopping Channels



Date: 26.APR.2017 10:58:30

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

Applicable Standard

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

Test Procedure

The EUT was worked in channel hopping; 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
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-3	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	23.3 °C
Relative Humidity:	38 %
ATM Pressure:	95.4 kPa

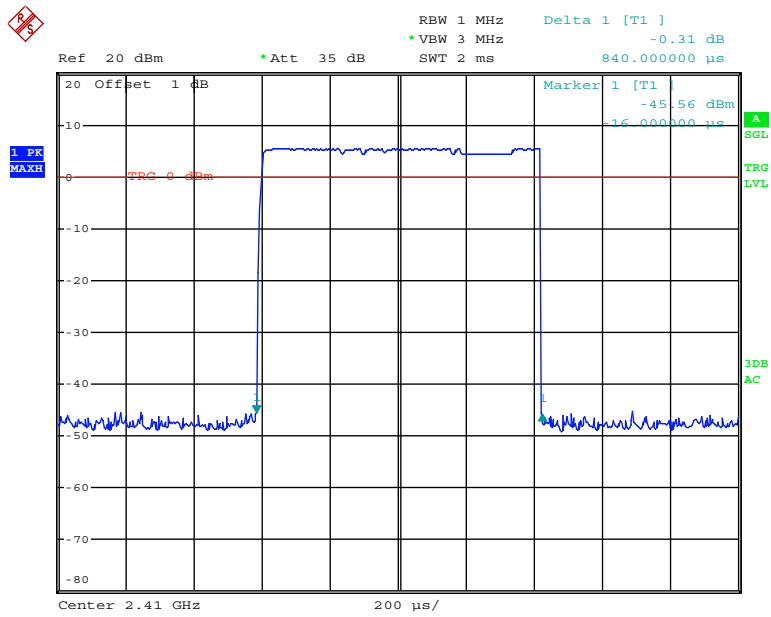
* The testing was performed by Kevin Hu on 2017-04-26.

Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
Middle	0.840	0.067	0.4	Compliance
Note: Dwell time=Pulse width*200*15/15*0.4 The hopping rate is 200/s, that was declared by manufacturer				



Date: 26.APR.2017 11:01:17

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

Applicable Standard

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

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-3	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	23.3 °C
Relative Humidity:	38 %
ATM Pressure:	95.4 kPa

* The testing was performed by Kevin Hu on 2017-04-26.

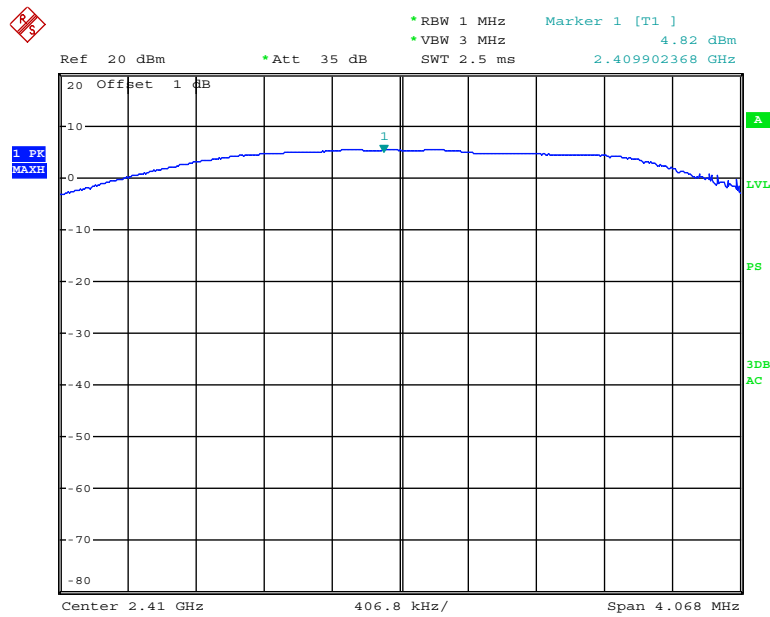
Test Result: Compliance.

Test Mode: Transmitting

Channel	Frequency (MHz)	Output power (dBm)	Limit (dBm)
Low	2410	4.82	21
Middle	2441	5.37	21
High	2472	5.38	21

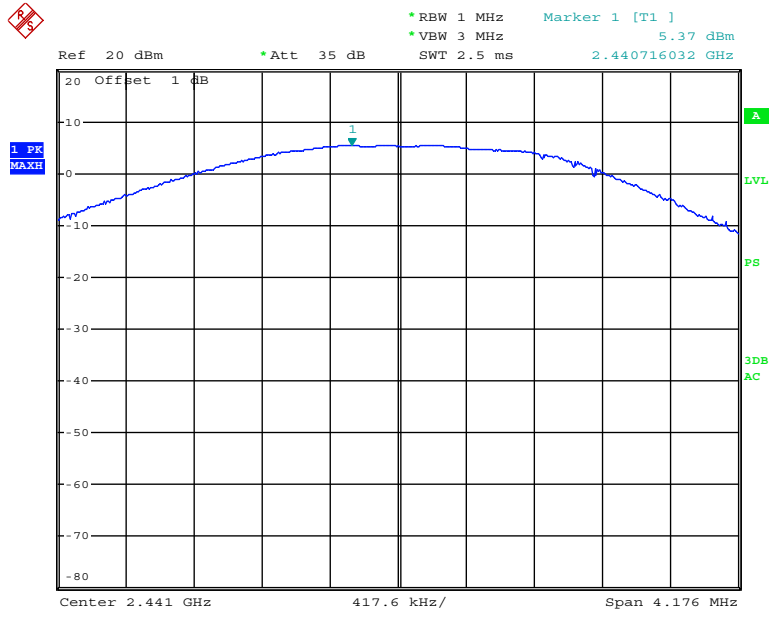
Note: The data above was tested in conducted mode.

Output Power, Low Channel



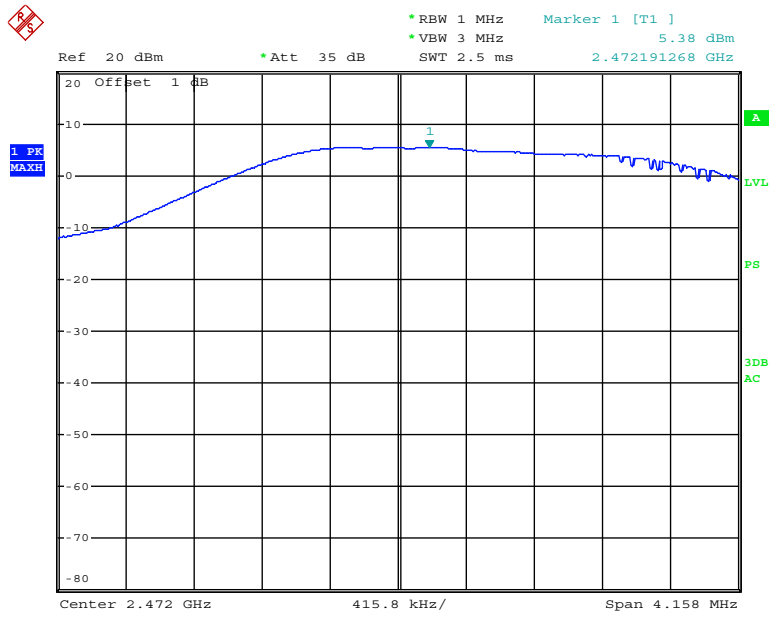
Date: 26.APR.2017 09:40:26

Output Power, Middle Channel



Date: 26.APR.2017 09:42:11

Output Power, High Channel



Date: 26.APR.2017 09:38:07

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 RBW /VBW=100/300kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-3	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

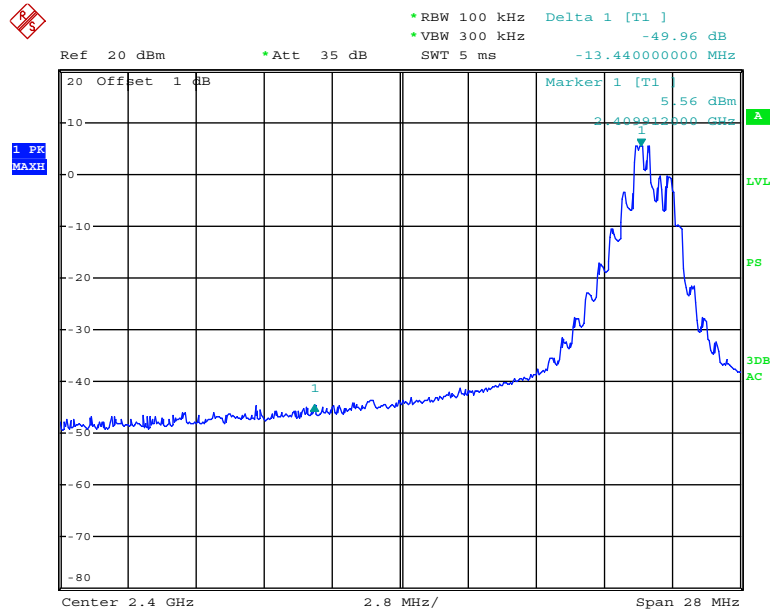
Environmental Conditions

Temperature:	23.3 °C
Relative Humidity:	38 %
ATM Pressure:	95.4 kPa

* The testing was performed by Kevin Hu on 2017-04-26.

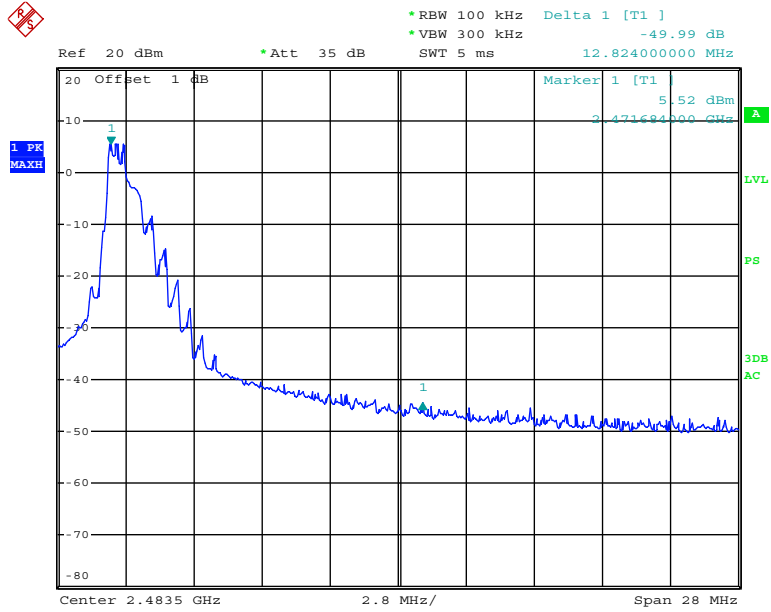
Test Result: Compliance(the emissions out of the operation band are more 20dB below than the highest level of the desired power)

Band Edge, Left Side



Date: 26.APR.2017 09:48:52

Band Edge, Right Side



Date: 26.APR.2017 09:50:41

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