FCC PART 15.247

TEST REPORT

For

Macari Baby, Inc.

30 Martin Street Cumberland, RI 02864

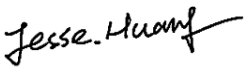
FCC ID: 2AJEY-402R

Report Type:	Product Type:
Original Report	Baby Monitor

Report Number: RSZ160805003-00A

Report Date: 2016-10-26

Reviewed By: Jesse Huang
Manager



Prepared By:
Bay Area Compliance Laboratories Corp. (Kunshan)
Chenghu Road,Kunshan Development Zone
No.248,Kunshan, Jiangsu, China
Tel: +86-0512-86175000
Fax: +86-0512-88934268
www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Macari Baby, Inc.'s* product, model number: *BD04020(FCC ID: 2AJEY-402R)* in this report is a *Baby Monitor*, which includes a Baby Monitor, The unit was measured approximately: 14.0 cm (L) x 9.3cm (W) x 1.3 cm (H), rated with input voltage: DC4.8V Ni-MH battery or 7.5V from adapter.

Adapter Information:
Model: P5 0750500
Input: AC 100~240V, 50~ 60 Hz, 250 mA
Output: DC 7.5V, 500 mA

** All measurement and test data in this report was gathered from production sample serial number: 1602917. (Assigned by BACL,* Kunshan*). The EUT supplied by the applicant was received on 2016-08-05.*

Objective

This report is prepared on behalf of *Macari Baby, Inc.* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS submissions with FCC ID: 2AJEY-401T and 2AJEY-401M.

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 at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		±3.26 dB
RF conducted test with spectrum		±0.9dB
RF Output Power with Power meter		±0.5dB
Radiated emission	30MHz~1GHz	±5.91dB
	Above 1G	±4.92dB
Occupied Bandwidth		±0.5kHz
Temperature		±1.0℃
Humidity		±6%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the Chenghu Lake Road, Kunshan Development Zone No.248,Kunshan, Jiangsu, China

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) 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 November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. 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 an engineering mode which was selected by manufacturer.

EUT Exercise Software

No exercise software was used.

Equipment Modifications

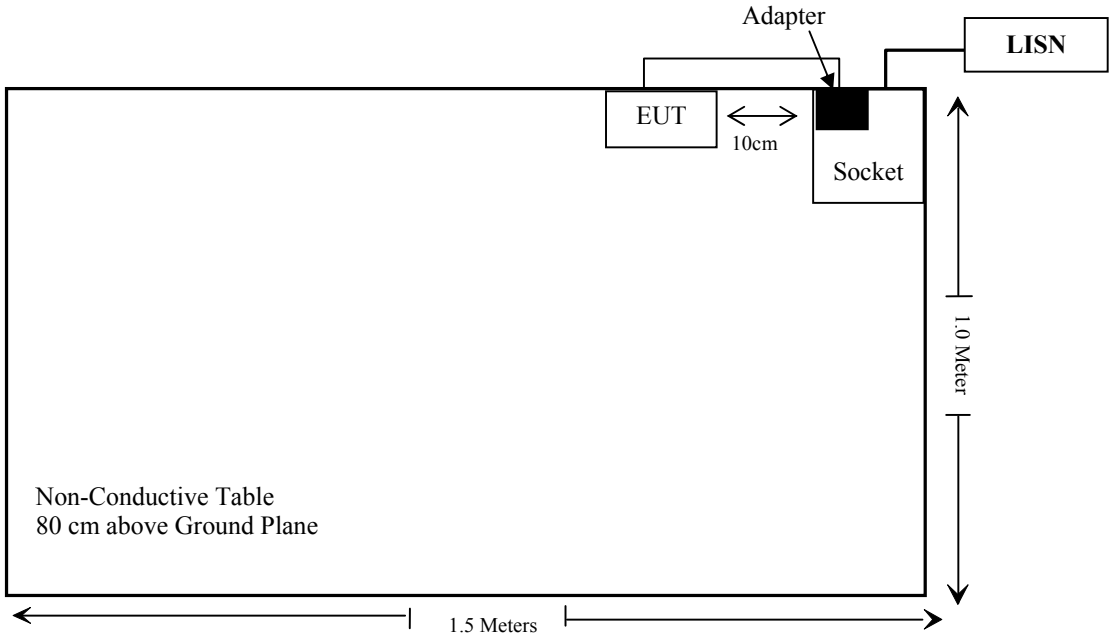
No modification was made to the EUT tested.

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Un-detachable DC Power Cable	1.9	EUT	Adapter

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b) (1)& §2.1091	Maximum Permissible Exposure(MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliance
§15.247 (a)(1)	20 dB Emission Bandwidth	Compliance
§15.247(a)(1)	Channel Separation	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	934115/007	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2015-11-12	2016-11-11
Rohde & Schwarz	Pulse limiter	ESH3-Z2	879940/0058	2016-06-19	2017-06-18
MICRO-COAX	Coaxial line	UFB-293B-1-0480-50X50	97F0173	2016-09-01	2017-09-01
Rohde & Schwarz	CE Test software	EMC 32	V 09.10.0	NCR	NCR
Radiation test					
Sonoma Instrunent	Amplifier	330	171377	2016-09-16	2017-09-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-07	2016-11-06
Mini	Pre-amplifier	ZVA-183-S+	857001418	2016-09-16	2017-09-15
DUCOMMUN	Pre-amplifier	ALN-22093530-01	990147	2016-09-16	2017-09-15
EMCO	Horn Antenna	3116	9510-2384	2015-11-07	2016-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2016-07-04	2017-07-03
ETS	Horn Antenna	3115	6229	2015-11-07	2016-11-06
R&S	Auto test Software	EMC32	V 09.10.0	NCR	NCR
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
BACL	RF cable	KS-LAB-010	KS-LAB-010	2015-12-16	2016-12-15
RF Conducted test					
BACL	TS 8997 Cable-01	T-KS-EMC086	T-KS-EMC086	2015-12-10	2016-12-09
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
WEINSCHEL	3dB Attenuator	5326	N/A	2016-06-18	2017-06-18
Rohde & Schwarz	OSP120 BASE UNIT	OSP120	101247	2016-07-04	2017-07-03
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131	2016-09-21	2017-09-21

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

FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

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

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = 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)

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
2417-2468	0	1	19.5	89.13	20	0.018	1

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliance

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 which was permanently attached and the antenna gain is 0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

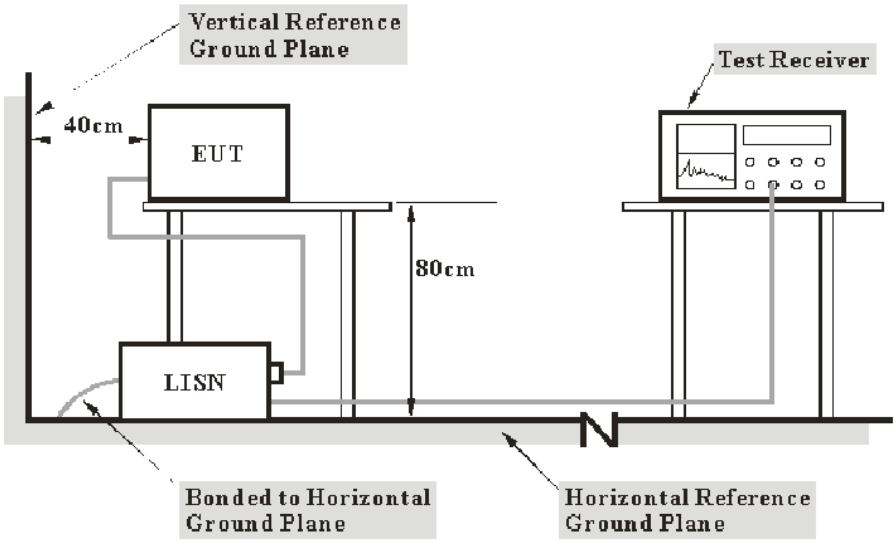
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207

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

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

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

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

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

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

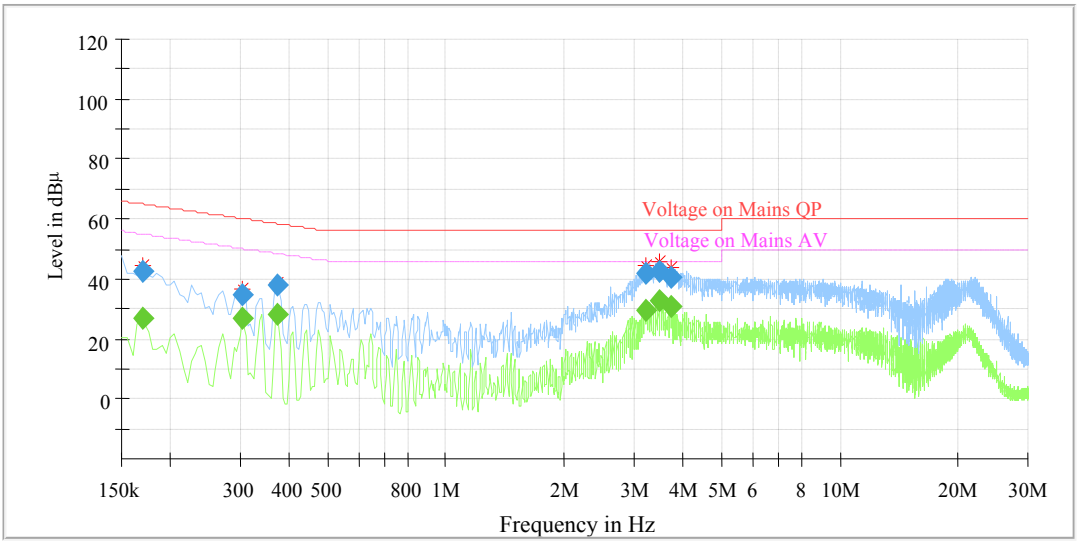
Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Peter Jiang on 2016-10-24.

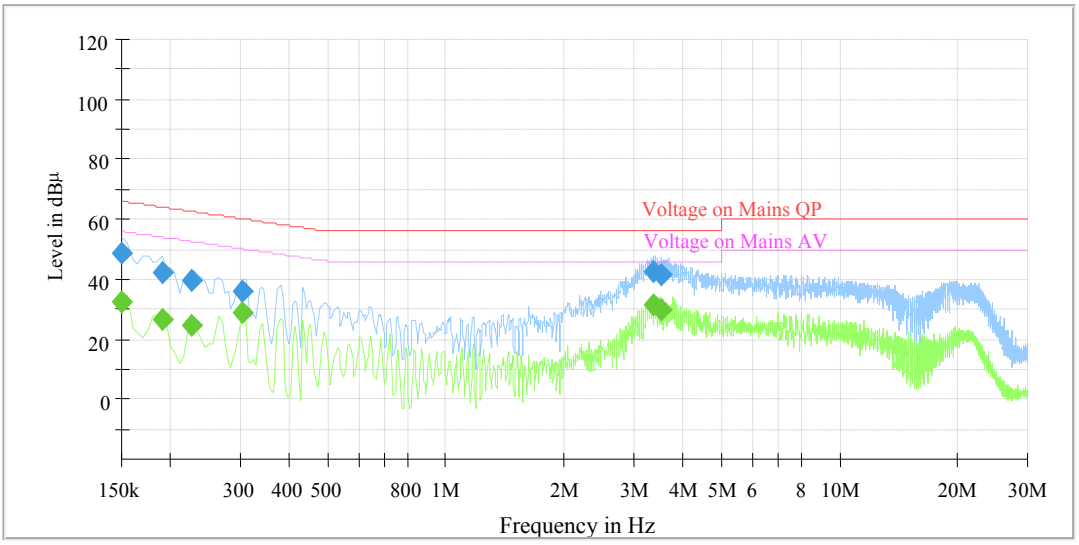
Test Mode: Transmitting

AC 120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.170000	---	26.65	9.000	L1	10.3	28.31	54.96	Compliance
0.170000	42.33	---	9.000	L1	10.3	22.63	64.96	Compliance
0.305000	---	27.19	9.000	L1	10.3	22.92	50.11	Compliance
0.305000	34.86	---	9.000	L1	10.3	25.25	60.11	Compliance
0.375000	---	27.97	9.000	L1	10.3	20.42	48.39	Compliance
0.375000	37.78	---	9.000	L1	10.3	20.61	58.39	Compliance
3.200000	---	29.77	9.000	L1	10.5	16.23	46.00	Compliance
3.200000	41.85	---	9.000	L1	10.5	14.15	56.00	Compliance
3.470000	---	32.84	9.000	L1	10.5	13.16	46.00	Compliance
3.470000	42.70	---	9.000	L1	10.5	13.30	56.00	Compliance
3.735000	---	30.85	9.000	L1	10.5	15.15	46.00	Compliance
3.735000	40.52	---	9.000	L1	10.5	15.48	56.00	Compliance

AC 120V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	---	33.00	9.000	N	10.3	23.00	56.00	Compliance
0.150000	48.95	---	9.000	N	10.3	17.05	66.00	Compliance
0.190000	---	26.93	9.000	N	10.3	27.11	54.04	Compliance
0.190000	42.49	---	9.000	N	10.3	21.55	64.04	Compliance
0.225000	---	24.99	9.000	N	10.3	27.64	52.63	Compliance
0.225000	39.84	---	9.000	N	10.3	22.79	62.63	Compliance
0.305000	---	29.10	9.000	N	10.3	21.01	50.11	Compliance
0.305000	35.70	---	9.000	N	10.3	24.41	60.11	Compliance
3.370000	---	31.76	9.000	N	10.5	14.24	46.00	Compliance
3.370000	42.32	---	9.000	N	10.5	13.68	56.00	Compliance
3.530000	---	29.75	9.000	N	10.5	16.25	46.00	Compliance
3.530000	41.22	---	9.000	N	10.5	14.78	56.00	Compliance

Note:
1) Corrected Amplitude = Reading + Correction Factor
2) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss
3) Margin = Limit – Corrected Amplitude

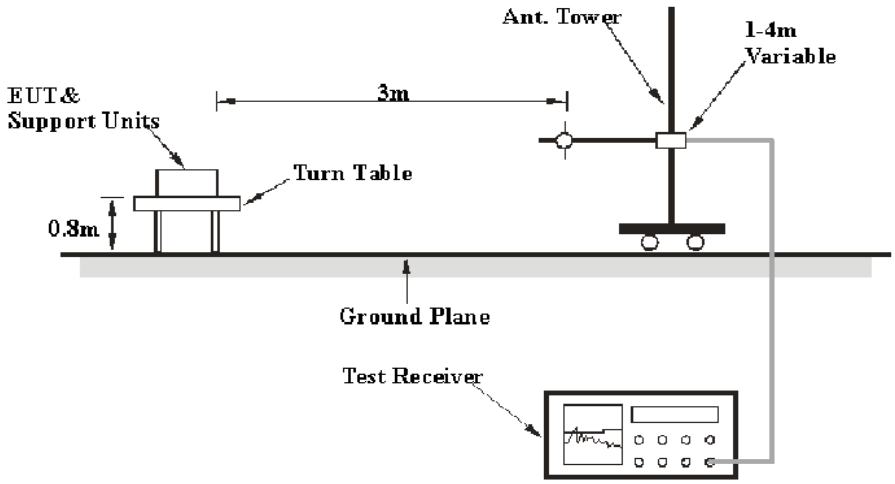
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

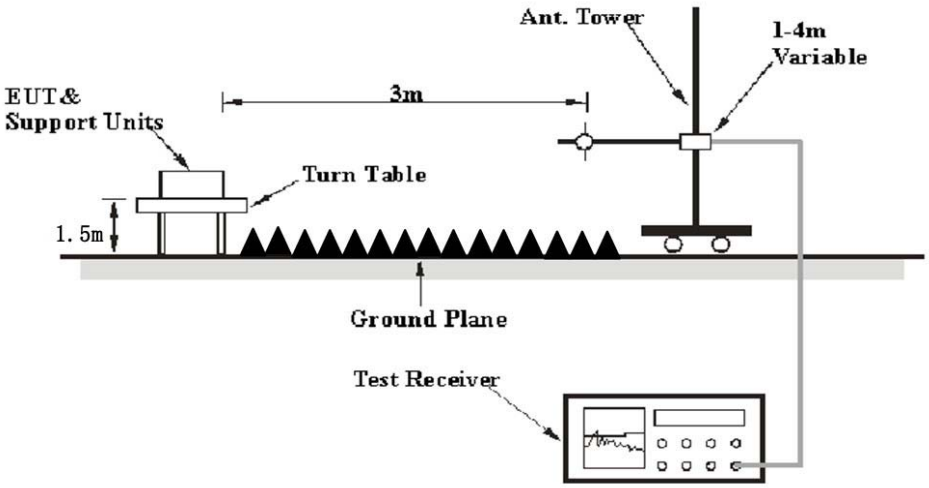
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1 GHz:



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.

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	100 kHz	300 kHz	120 kHz	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.

All final data was recorded in Quasi-peak detection mode for frequency range of 30 MHz to 1GHz and peak and Average detection modes for frequencies above 1GHz.

Corrected Amplitude & Margin Calculation

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

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

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

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL., $U_{(Lm)}$ is less than + U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Peter Jiang on 2016-10-23.

30 MHz -25 GHz:

Test Mode: Transmitting

Frequency (MHz)	Receiver		Turn table Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel(2417MHz)									
184.01	48.95	QP	270	1.9	H	-12.00	36.95	43.5	6.55
2417.00	108.55	PK	232	2.4	H	-3.03	105.52	/	/
2417.00	81.15	Ave.	232	2.4	H	-3.03	78.12	/	/
2417.00	109.51	PK	226	1.1	V	-3.03	106.48	/	/
2417.00	82.35	Ave.	226	1.1	V	-3.03	79.32	/	/
2380.06	54.15	PK	250	2.3	H	-3.06	51.09	74	22.91
2380.06	31.51	Ave.	250	2.3	H	-3.06	28.45	54	25.55
2389.83	57.28	PK	251	1.8	H	-3.05	54.23	74	19.77
2389.83	31.50	Ave.	251	1.8	H	-3.05	28.45	54	25.55
2484.16	62.86	PK	11	1.6	H	-2.99	59.87	74	14.13
2484.16	34.69	Ave.	11	1.6	H	-2.99	31.70	54	22.30
4834.00	60.26	PK	256	2.5	V	7.21	67.47	74	6.53
4834.00	31.14	Ave.	256	2.5	V	7.21	38.35	54	15.65

Frequency (MHz)	Receiver		Turn table Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel(2444.5MHz)									
184.01	49.98	QP	71	1.5	H	-12.00	37.98	43.5	5.52
2444.50	109.57	PK	83	1.6	H	-3.02	106.55	/	/
2444.50	81.11	AV	83	1.6	H	-3.02	78.09	/	/
2444.50	110.34	PK	308	2.2	V	-3.02	107.32	/	/
2444.50	83.56	AV	308	2.2	V	-3.02	80.54	/	/
2379.73	52.82	PK	75	1.5	H	-3.06	49.76	74	24.24
2379.73	31.51	AV	75	1.5	H	-3.06	28.45	54	25.55
2387.43	56.95	PK	161	2.3	V	-3.05	53.90	74	20.10
2387.43	31.50	AV	161	2.3	V	-3.05	28.45	54	25.55
2483.92	62.57	PK	305	1.8	H	-2.99	59.58	74	14.42
2483.92	34.69	AV	305	1.8	H	-2.99	31.70	54	22.30
4889.00	59.36	PK	71	2.0	V	7.29	66.65	74	7.35
4889.00	30.14	AV	71	2.0	V	7.29	37.43	54	16.57
High Channel(2468MHz)									
184.01	50.37	QP	207	2.5	H	-12.00	38.37	43.5	**5.13**
2468.00	111.32	PK	76	2.3	H	-3.00	108.32	/	/
2468.00	81.13	AV	76	2.3	H	-3.00	78.13	/	/
2468.00	111.38	PK	198	2.4	V	-3.00	108.38	/	/
2468.00	84.59	AV	198	2.4	V	-3.00	81.59	/	/
2384.71	54.75	PK	37	1.6	H	-3.05	51.70	74	22.30
2384.71	31.50	AV	37	1.6	H	-3.05	28.45	54	25.55
2483.79	62.40	PK	191	2.5	H	-2.99	59.41	74	14.59
2483.79	32.76	AV	191	2.5	H	-2.99	29.77	54	24.23
2485.84	59.85	PK	324	1.1	V	-2.99	56.86	74	17.14
2485.84	32.76	AV	324	1.1	V	-2.99	29.77	54	24.23
4936.00	58.13	PK	295	1.4	V	7.36	65.49	74	8.51
4936.00	31.81	AV	295	1.4	V	7.36	39.17	54	14.83

Note:
1. Corrected Factor=Antenna factor (RX) +cable loss – amplifier factor
2. Corrected Amplitude = Corrected Factor + Receiver Reading
3. Margin = Limit- Corrected Amplitude

FCC §15.247(a) (1)-CHANNEL SEPARATION

Applicable Standard

Frequency hopping systems shall have hoping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 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 Procedure

1. Set the EUT in operating mode, RBW was set at 100 kHz,VBW≥ 3RBW maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace
3. Measure the channel separation.

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Peter Jiang on 2016-09-23.

Test Result: Compliance.

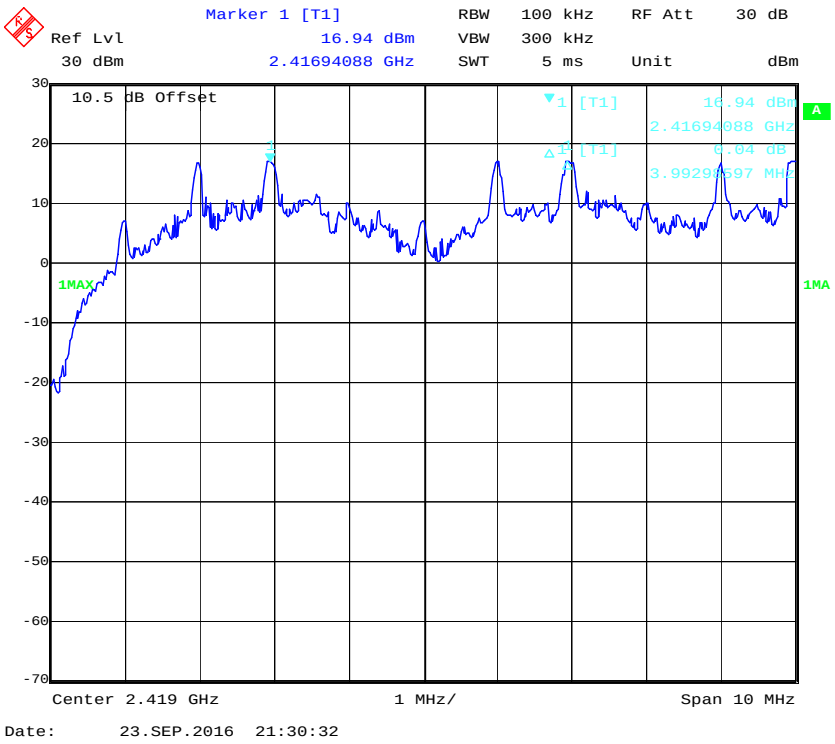
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	≥ Limit (MHz)
Channel 1	2417	3.993	3.046
Channel 2	2421		
Channel 8	2441	3.507	3.006
Channel 9	2444.5		
Channel 15	2465	3.006	2.993
Channel 16	2468		

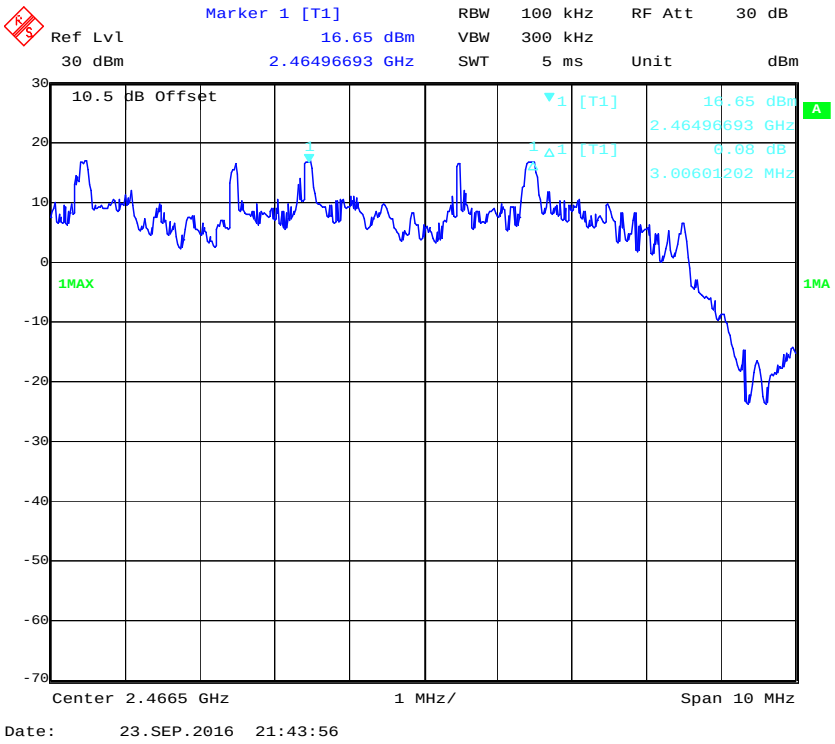
Note: limit =2/3 of 20 dB bandwidth

Low Channel



Middle Channel

High Channel



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

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 125mW.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
3. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	24~27 ℃
Relative Humidity:	50~54 %
ATM Pressure:	100.0~101.0 kPa

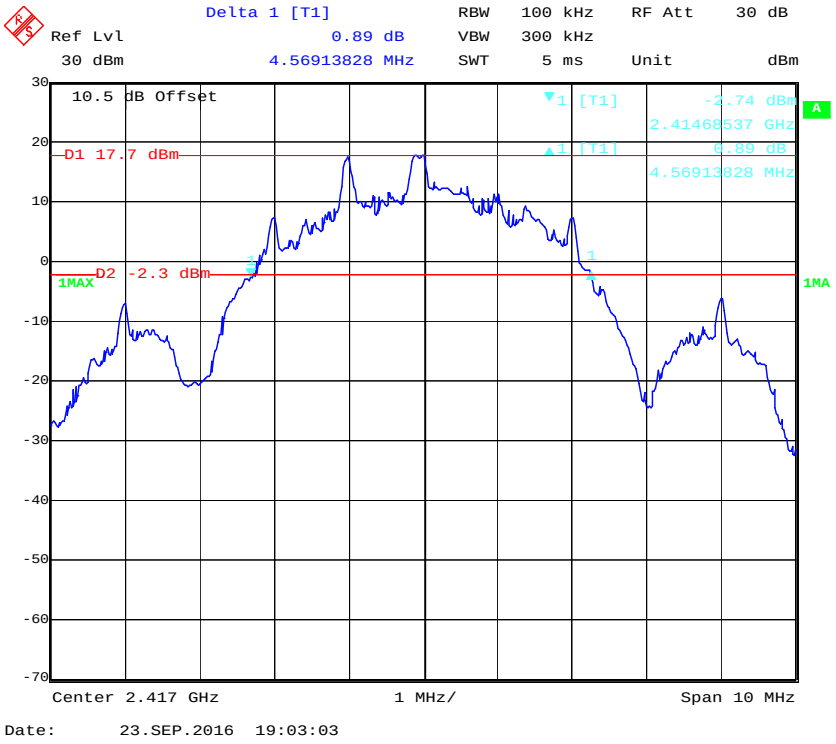
The testing was performed by Peter Jiang on 2016-09-23 and 2016-10-24.

Test Result: Compliance.

Please refer to following tables and plots

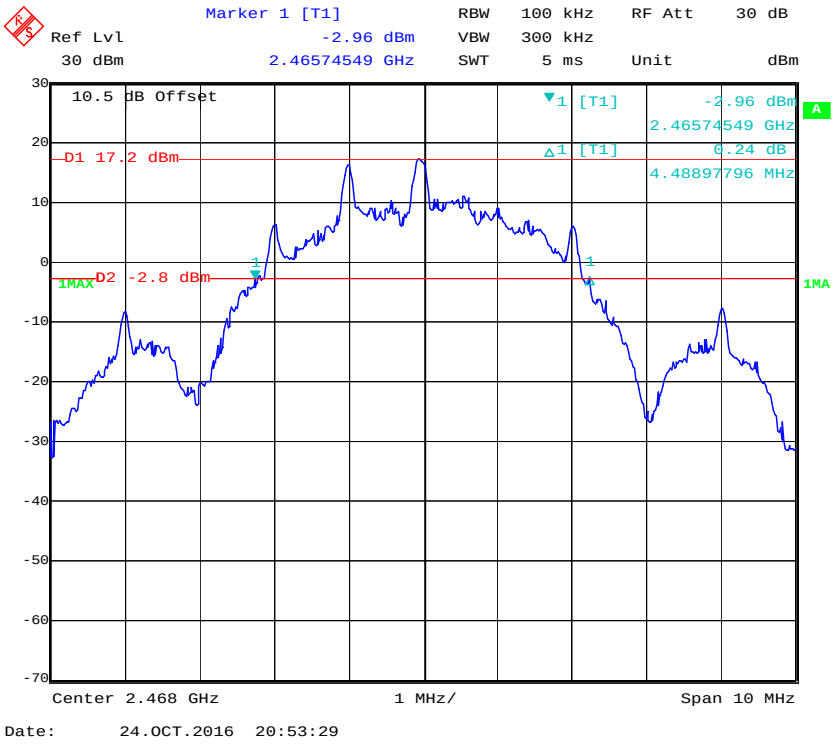
Channel	Frequency (MHz)	20 dB Emission Bandwidth (MHz)
Low	2417	4.569
Middle	2444.5	4.509
High	2468	4.489

Low Channel



Middle Channel

High Channel



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

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 Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Peter Jiang on 2016-09-23.

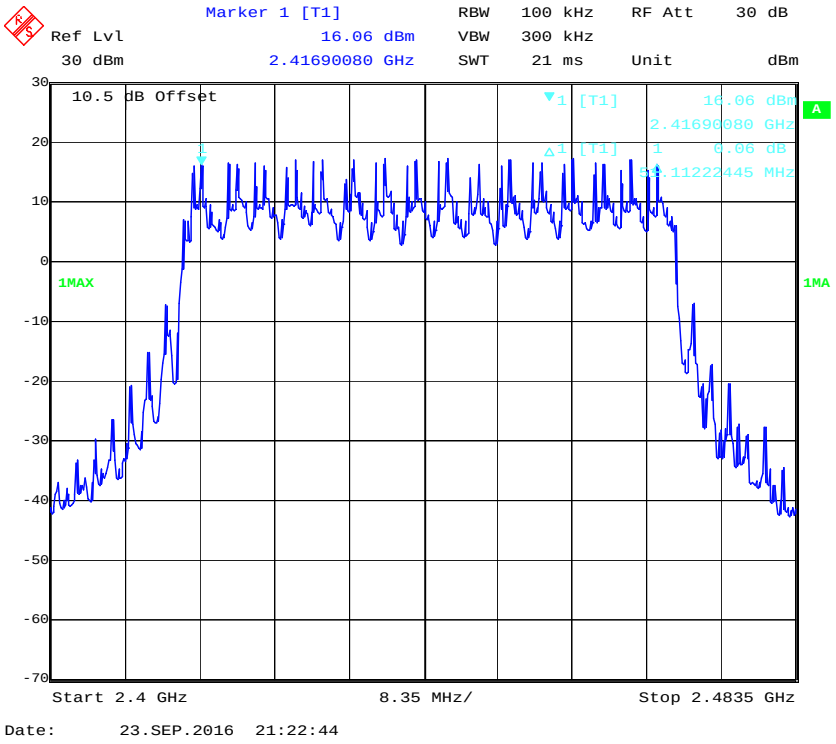
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400 ~ 2483.50	16	≥ 15

Number of Hopping Channels



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

Applicable Standard

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

Test Procedure

The EUT was worked in channel hopping; spectrum span was set as 0. Sweep was set as 0.4 X channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= Pulse time (ms) * hope rate/ number of hopping channels * hopping No.*0.4 s

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Peter Jiang on 2016-09-23.

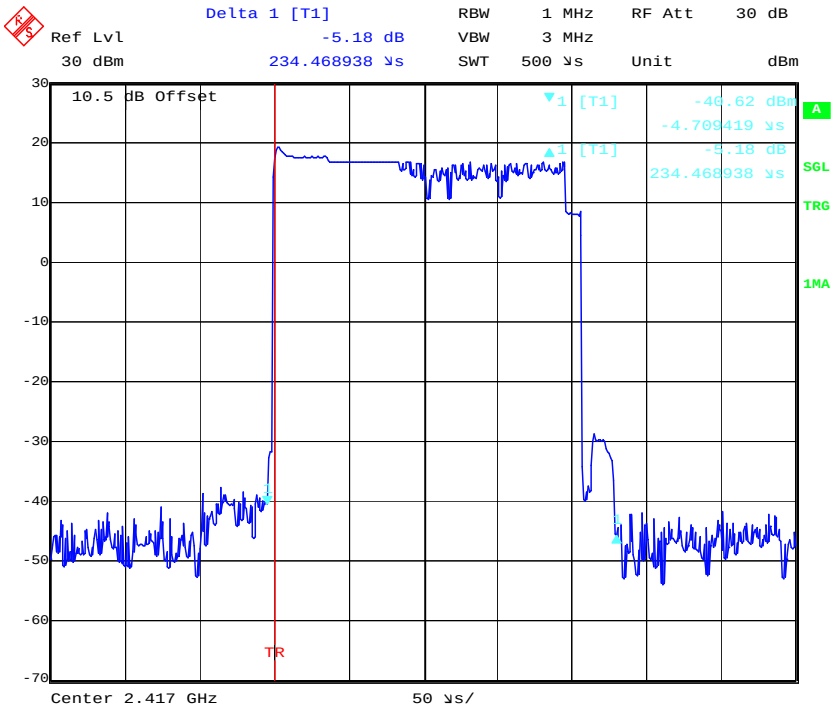
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

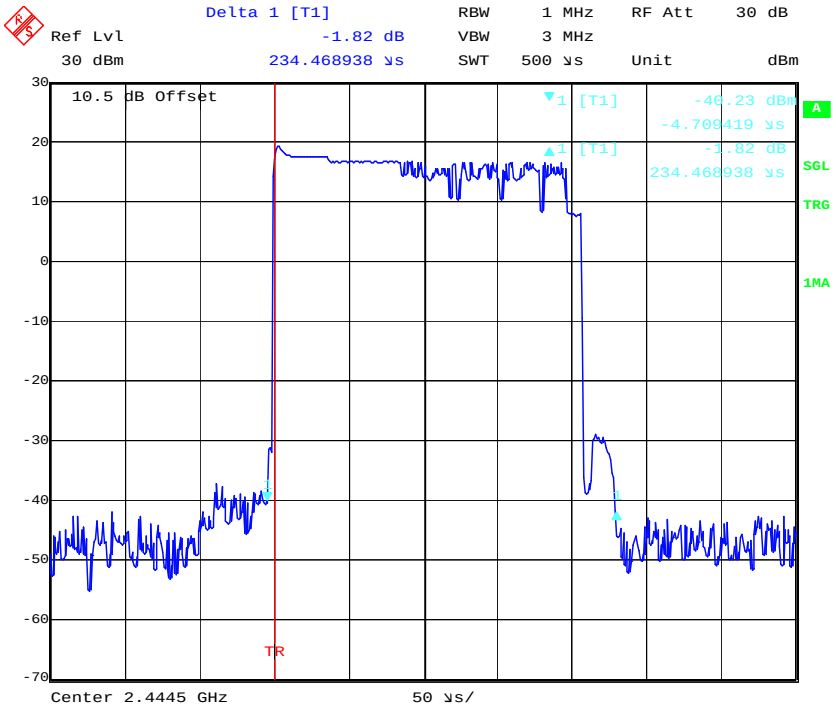
Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
GFSK	Low	0.234	0.014	0.4	Pass
	Middle	0.234	0.014	0.4	Pass
	High	0.234	0.014	0.4	Pass
	Note: Dwell time = Pulse time*(150/16)*16*0.4s Hopping rate =150 times per second				

Pulse time, Low Channel



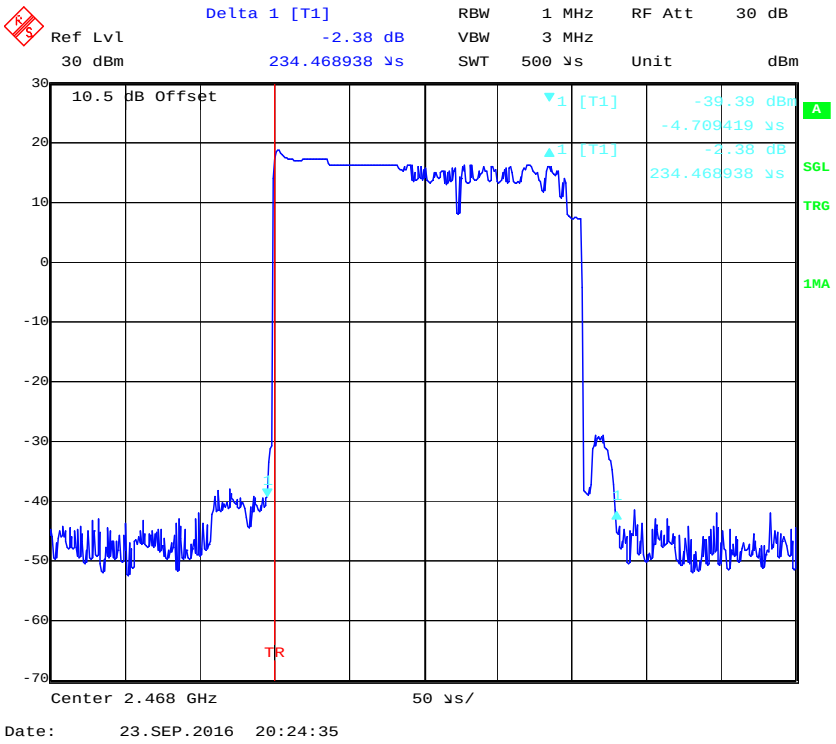
Date: 23.SEP.2016 20:23:33

Pulse time, Middle Channel



Date: 23.SEP.2016 20:24:02

Pulse time, High Channel



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 it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. Add a correction factor to the display.

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Peter Jiang on 2016-09-23.

Test Result: Compliance.

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)
Low	2417	19.40	21
Middle	2444.5	19.40	21
High	2468	19.01	21

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW 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 Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

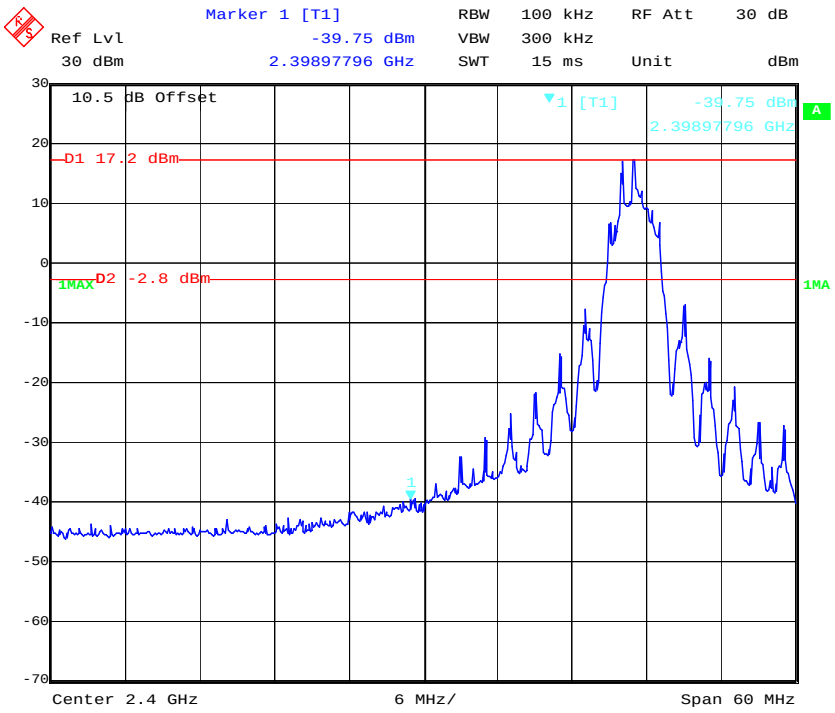
The testing was performed by Peter Jiang on 2016-09-23.

Test Result: Compliance.

Test Mode: Transmitting

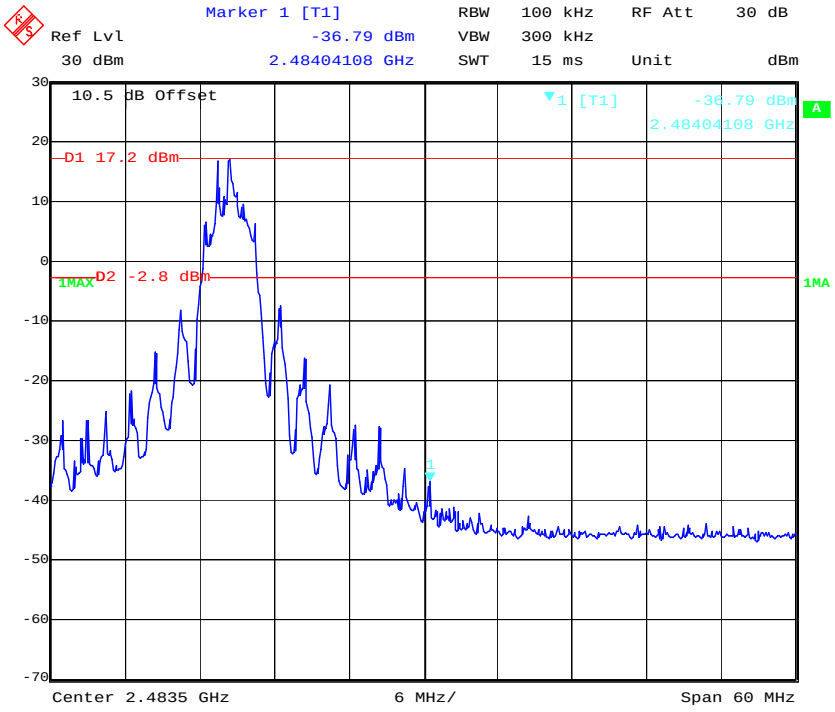
Please refer to follow plots:

Band Edge-Left Side



Date: 23.SEP.2016 19:33:28

Band Edge-Right Side



Date: 23.SEP.2016 19:36:29

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