FCC PART 15.247

TEST REPORT

For

Nowall Technology Co.,Ltd

Floor 2-3, Chuangke Space,No.109 Bocai Road, Gaoxin District, Changchun City, Jilin Province, China

FCC ID: 2AHSYNOWALL-CH1

Report Type:	**Product Type:**
Original Report	Dynamic & Balanced Armature & Bluetooth Earphone

Test Engineer:	Lion Xiao
Report Number:	RDG160121006-00B
Report Date:	2016-01-28
Reviewed By:	Sula Huang RF Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Nowall Technology Co.,Ltd*'s product, model number: *Nowall CH1 (FCC ID: 2AHSYNOWALL-CH1*) in this report was *Dynamic & Balanced Armature & Bluetooth Earphone,* which was measured pproximately: 32.4cm (L) x 2.2 cm (W) x 1.4cm (H), rated input voltage: DC3.8V from battery or DC5V charging from USB port.

All measurement and test data in this report was gathered from production sample serial number: 160121006 (Assigned by BACL Dongguan). The EUT was received on 2016-01-21.

Objective

This report is prepared on behalf of *Nowall Technology Co.,Ltd* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communications Commission's rules

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

Related Submittal(s)/Grant(s)

FCC Part 15C DSS submissions with FCC ID: 2AHSYNOWALL-CH1

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 testing mode, which was provided by manufacturer.

For Bluetooth LE mode, 40 channels are provided for testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	…	…
…	…	…	…
…	…	…	…
..	…	38	2478
19	2440	39	2480

EUT was tested with channel 0, 19 and 39.

The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

The worst condition (maximum power with 100% duty cycle) was setting by the software as following table:

Test Mode	Test Software Version	CSR Bluesuite 2.5.0		
BLE	Test Frequency	2402MHz	2440MHz	2480MHz
	BLE	N/A	N/A	N/A

Support Equipment List and Details

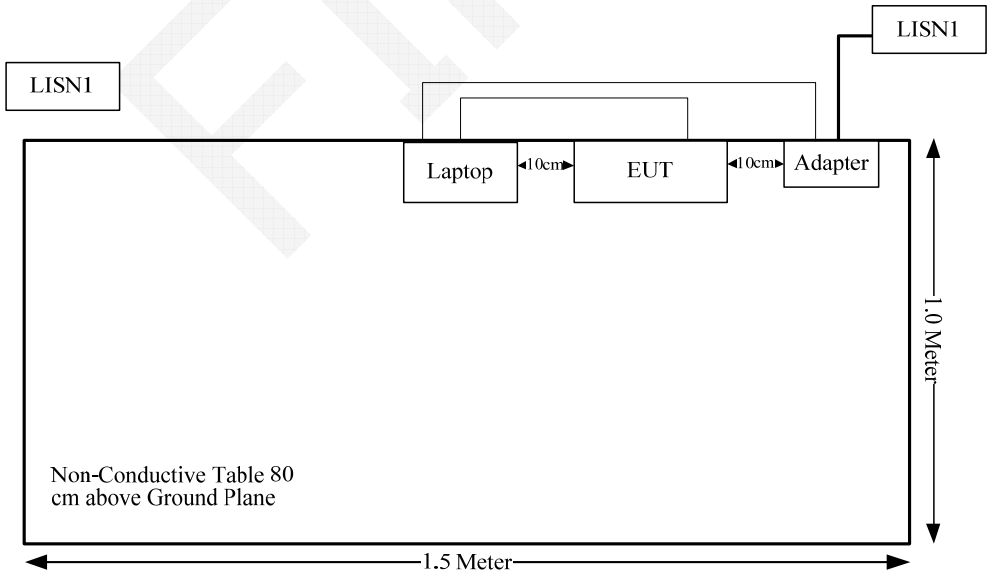
Manufacturer	Description	Model	Serial Number
DELL	Laptop	PP11L	QDS-BRCM1017

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	No	No	0.32	USB Port of Laptop	EUT
Audio Cable	No	No	0.85	Audio Port of Laptop	EUT

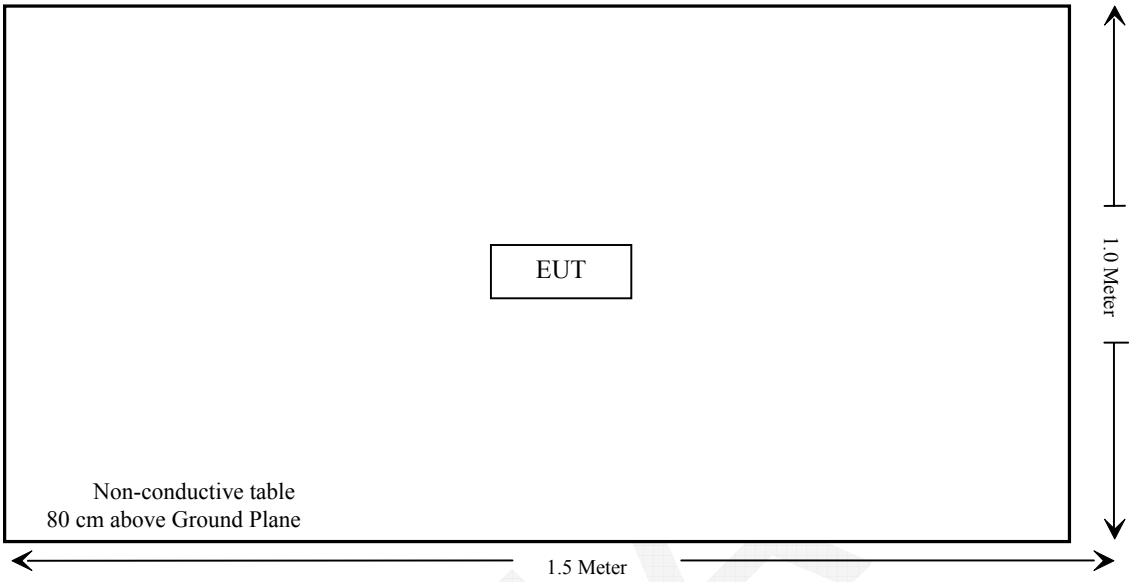
Block Diagram of Test Setup

AC power-line conducted eissions:

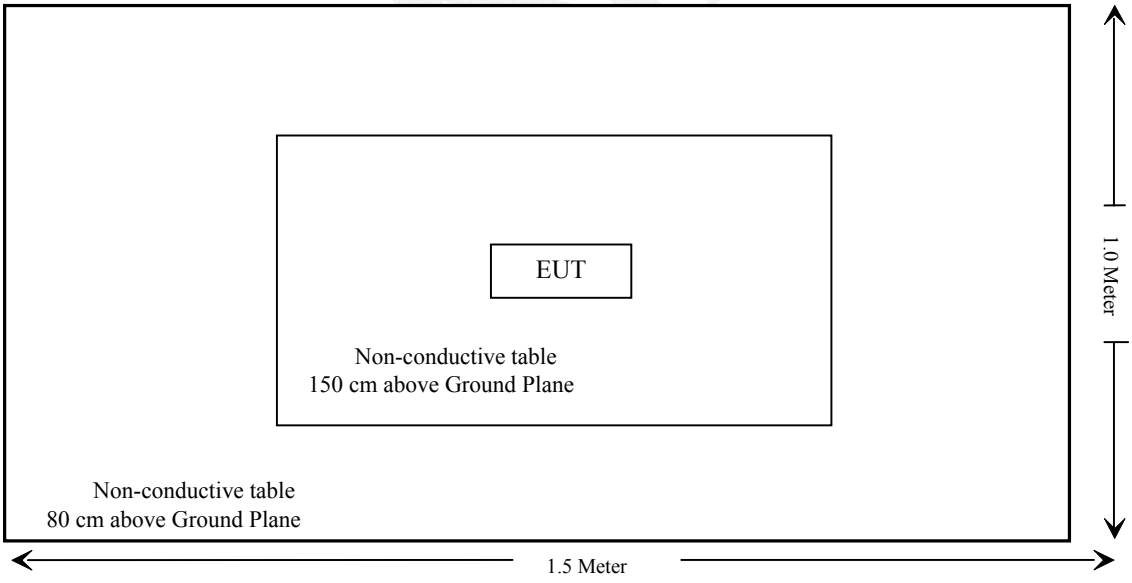


Radiated Emissions:

Below 1 G



Above 1 G



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum conducted output power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

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

Applicable Standard

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

According to KDB447498 D01 General RF Exposure Guidance v06:

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

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

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

Measurement Result

The tune-up power is 6.0 dBm (3.98mW).
[(max. power of channel, mW)/(min. test separation distance, mm)][√f(GHz)]
= 8.91/5*(√2.48) = 1.25 < 3.0

So the stand-alone SAR evaluation is not necessary.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

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

Antenna Connector Construction

The EUT has one integral antenna arrangement for BT, and the antenna gain is 2 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：

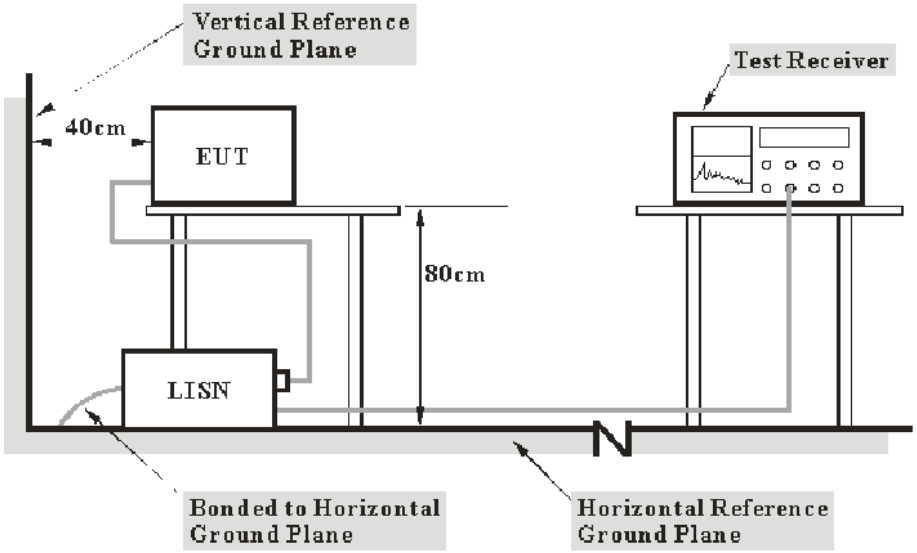
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of 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 first LISN.

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

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$
$C_f = A_C + VDF$

Herein,
V_C (cord. Reading): corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN
C_f: Correction Factor

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

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	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
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:

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

Test Data

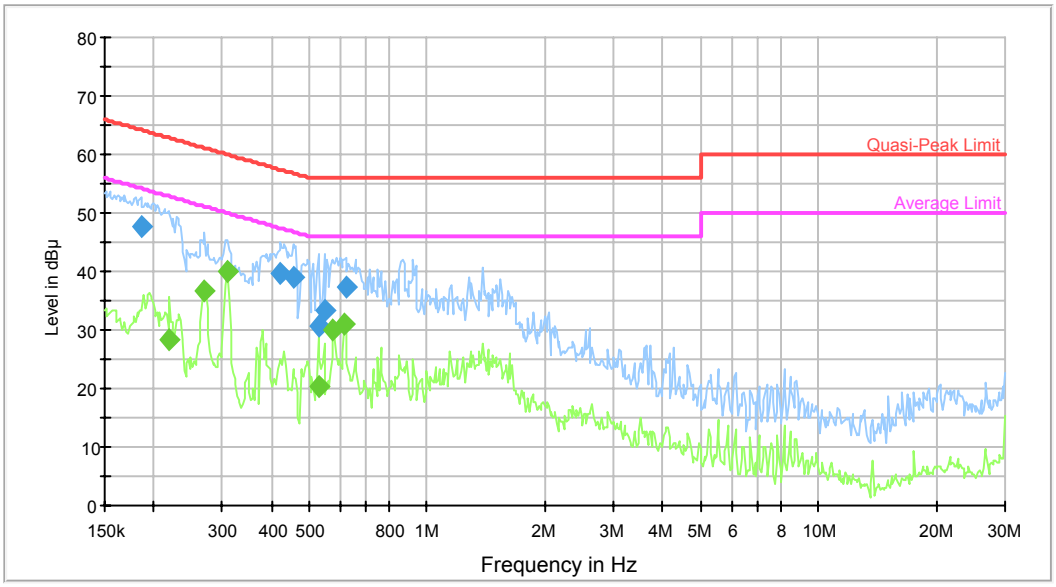
Environmental Conditions

Temperature:	16.6°C
Relative Humidity:	27 %
ATM Pressure:	102.8 kPa

The testing was performed by Lion Xiao on 2016-01-25

Test Mode: Transmitting

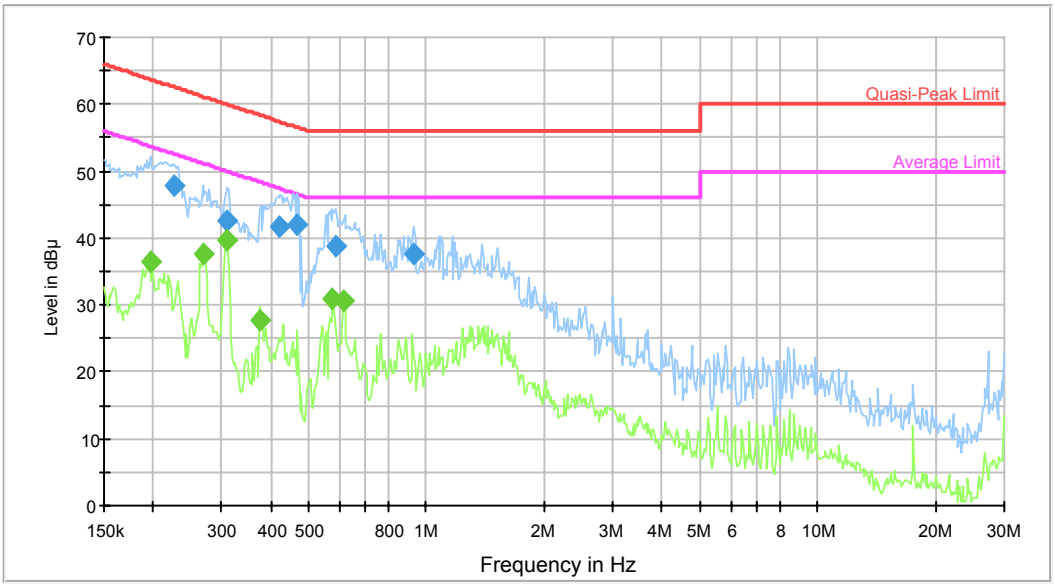
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.186006	47.7	9.000	L1	9.7	16.5	64.2	Compliance
0.422630	39.7	9.000	L1	9.8	17.7	57.4	Compliance
0.454052	38.9	9.000	L1	9.8	17.9	56.8	Compliance
0.528270	30.5	9.000	L1	9.8	25.5	56.0	Compliance
0.545378	33.5	9.000	L1	9.8	22.5	56.0	Compliance
0.619536	37.5	9.000	L1	9.8	18.5	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.219886	28.3	9.000	L1	9.7	24.5	52.8	Compliance
0.270502	36.5	9.000	L1	9.7	14.6	51.1	Compliance
0.307284	40.1	9.000	L1	9.7	9.9	50.0	Compliance
0.528270	20.4	9.000	L1	9.8	25.6	46.0	Compliance
0.576662	29.9	9.000	L1	9.8	16.1	46.0	Compliance
0.614619	31.0	9.000	L1	9.8	15.0	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.227007	47.7	9.000	N	9.7	14.9	62.6	Compliance
0.309742	42.5	9.000	N	9.7	17.5	60.0	Compliance
0.422630	41.8	9.000	N	9.7	15.6	57.4	Compliance
0.468757	42.0	9.000	N	9.7	14.5	56.5	Compliance
0.585926	38.8	9.000	N	9.7	17.2	56.0	Compliance
0.930151	37.6	9.000	N	9.8	18.4	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.196675	36.4	9.000	N	9.7	17.3	53.7	Compliance
0.270502	37.7	9.000	N	9.7	13.4	51.1	Compliance
0.307284	39.8	9.000	N	9.7	10.2	50.0	Compliance
0.375019	27.8	9.000	N	9.7	20.6	48.4	Compliance
0.576662	30.9	9.000	N	9.7	15.1	46.0	Compliance
0.614619	30.6	9.000	N	9.7	15.4	46.0	Compliance

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

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

If U_{lab} is less than or equal to U_{cispr} of Table 2, then:
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 2, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

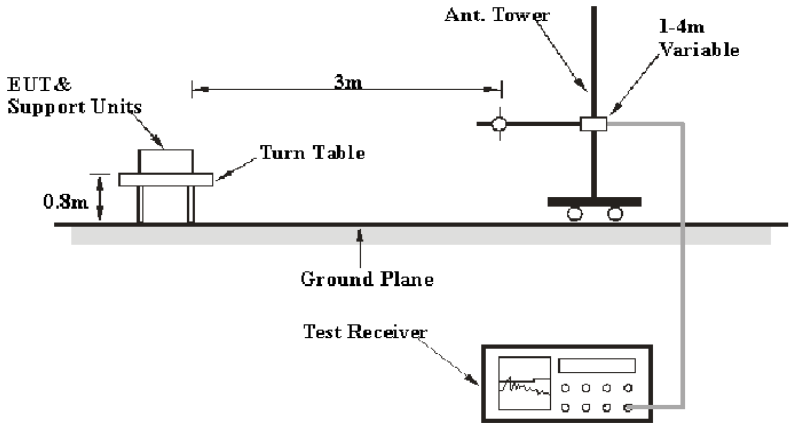
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

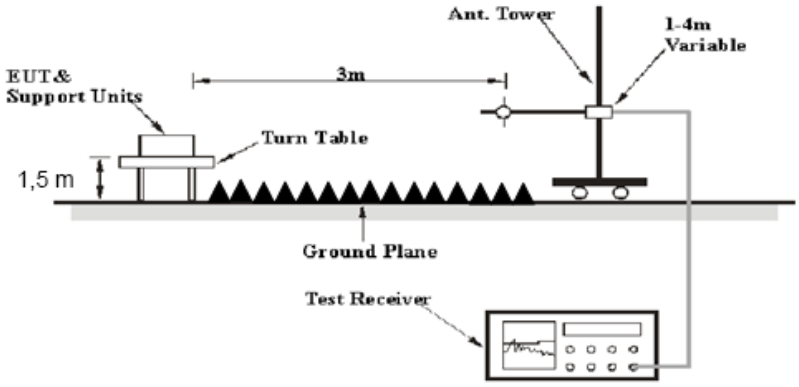
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



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

During the radiated emission test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

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

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

Corrected Amplitude & Margin Calculation

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

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

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

Margin = Limit –Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2015-08-03	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	2015-02-19	2016-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2015-05-09	2016-05-09
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2015-09-06	2016-09-06

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

Test Results Summary

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

4.31 dB at **7440 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

Temperature:	18 °C
Relative Humidity:	31 %
ATM Pressure:	102.2 kPa

** The testing was performed by Lion Xiao on 2016-01-26.*

Test Mode: Transmitting

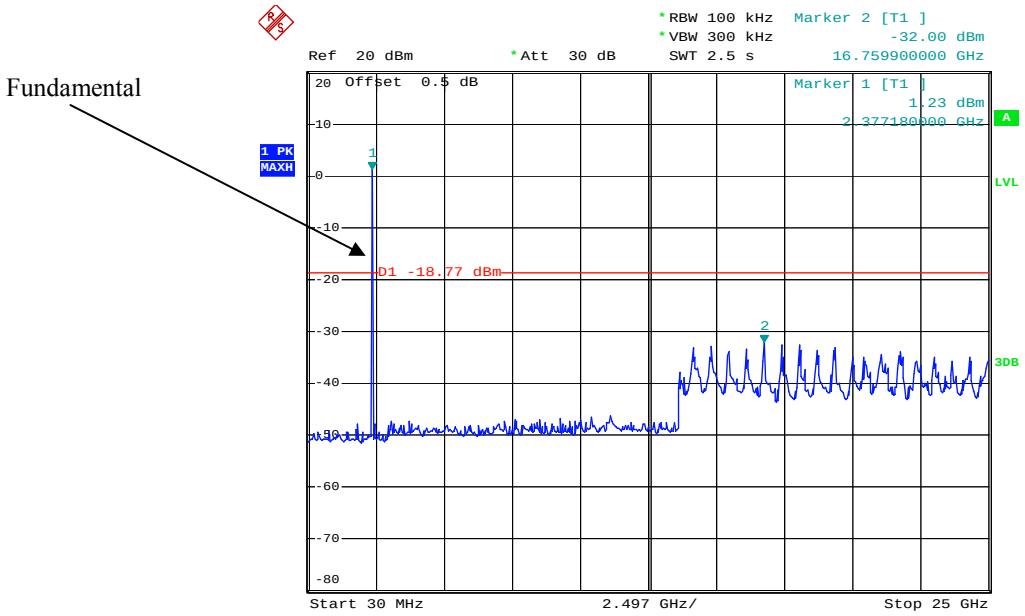
BLE Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2402 MHz									
2402	68.2	PK	H	24.82	3.66	0.00	96.68	N/A	N/A
2402	63.61	AV	H	24.82	3.66	0.00	92.09	N/A	N/A
2402	59.47	PK	V	24.82	3.66	0.00	87.95	N/A	N/A
2402	54.85	AV	V	24.82	3.66	0.00	83.33	N/A	N/A
2390	26.25	PK	H	24.80	3.63	0.00	54.68	74.00	19.32
2390	13.27	AV	H	24.80	3.63	0.00	41.70	54.00	12.30
4804	44.05	PK	H	29.71	5.06	27.41	51.41	74.00	22.59
4804	36.68	AV	H	29.71	5.06	27.41	44.04	54.00	9.96
7206	41.91	PK	H	33.93	6.61	25.91	56.54	74.00	17.46
7206	32.11	AV	H	33.93	6.61	25.91	46.74	54.00	7.26
9608	29.35	PK	H	36.36	8.53	27.55	46.69	74.00	27.31
9608	16.47	AV	H	36.36	8.53	27.55	33.81	54.00	20.19
4000	32.39	PK	H	28.20	4.84	27.20	38.23	74.00	35.77
4000	19.75	AV	H	28.20	4.84	27.20	25.59	54.00	28.41
244.7	35.5	QP	H	12.25	1.88	21.49	28.14	46.00	17.86
Middle Channel: 2440 MHz									
2440	70.55	PK	H	24.89	3.76	0.00	99.20	N/A	N/A
2440	65.76	AV	H	24.89	3.76	0.00	94.41	N/A	N/A
2440	61.61	PK	V	24.89	3.76	0.00	90.26	N/A	N/A
2440	55.07	AV	V	24.89	3.76	0.00	83.72	N/A	N/A
4880	44.5	PK	H	29.86	5.18	27.42	52.12	74.00	21.88
4880	36.84	AV	H	29.86	5.18	27.42	44.46	54.00	9.54
7320	42.09	PK	H	34.11	6.75	25.88	57.07	74.00	16.93
7320	32.25	AV	H	34.11	6.75	25.88	47.23	54.00	6.77
9760	29.58	PK	H	36.46	8.62	27.21	47.45	74.00	26.55
9760	16.6	AV	H	36.46	8.62	27.21	34.47	54.00	19.53
4000	32.56	PK	H	28.20	4.84	27.20	38.40	74.00	35.60
4000	20.04	AV	H	28.20	4.84	27.20	25.88	54.00	28.12
3805	32.37	PK	H	27.81	4.66	27.38	37.46	74.00	36.54
3805	19.74	AV	H	27.81	4.66	27.38	24.83	54.00	29.17
244.7	35.2	QP	H	12.25	1.88	21.49	27.84	46.00	18.16
High Channel: 2480 MHz									
2480	70.38	PK	H	24.96	3.68	0.00	99.02	N/A	N/A
2480	65.97	AV	H	24.96	3.68	0.00	94.61	N/A	N/A
2480	61.57	PK	V	24.96	3.68	0.00	90.21	N/A	N/A
2480	56.14	AV	V	24.96	3.68	0.00	84.78	N/A	N/A
2483.5	30	PK	H	24.97	3.67	0.00	58.64	74.00	15.36
2483.5	17.51	AV	H	24.97	3.67	0.00	46.15	54.00	7.85
4960	46.74	PK	H	30.02	5.34	27.43	54.67	74.00	19.33
4960	39.92	AV	H	30.02	5.34	27.43	47.85	54.00	6.15
7440	43.54	PK	H	34.30	6.89	25.97	58.76	74.00	15.24
7440	34.47	AV	H	34.30	6.89	25.97	49.69	54.00	4.31*
9920	30.19	PK	H	36.55	8.71	26.66	48.79	74.00	25.21
9920	16.75	AV	H	36.55	8.71	26.66	35.35	54.00	18.65
4000	32.82	PK	H	28.20	4.84	27.20	38.66	74.00	35.34
4000	20.26	AV	H	28.20	4.84	27.20	26.10	54.00	27.90
244.7	35.9	QP	H	12.25	1.88	21.49	28.54	46.00	17.46

**within measurement uncertainty*

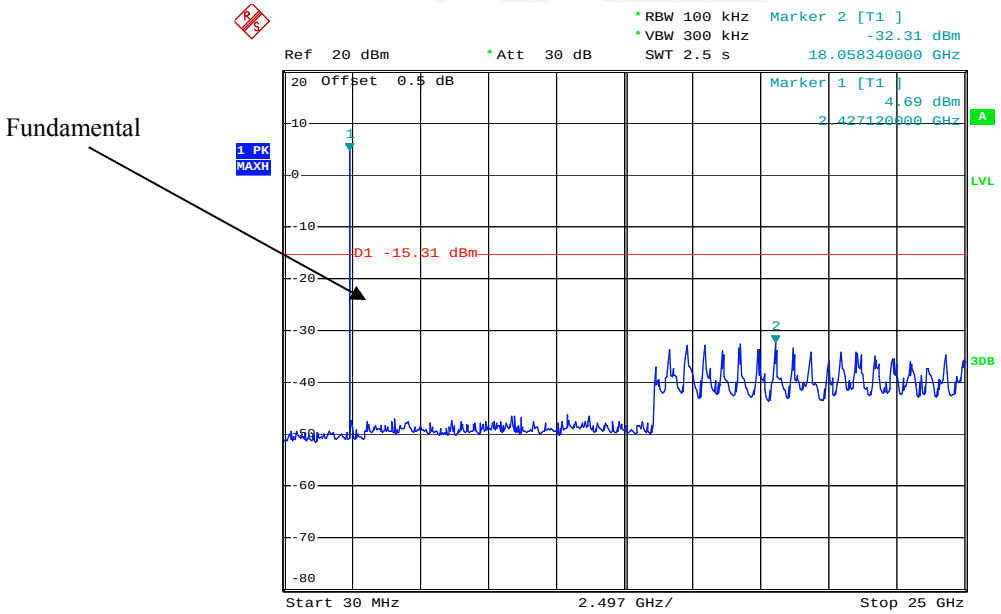
Conducted Spurious Emissions at Antenna Port

BLE Low Channel



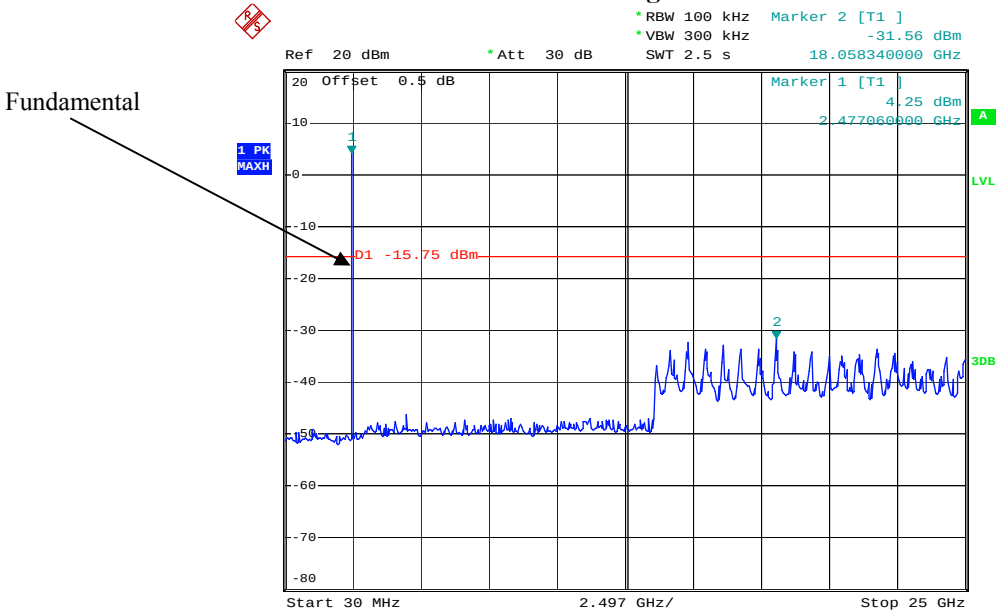
Date: 26.JAN.2016 21:34:46

BLE Middle Channel



Date: 26.JAN.2016 21:36:26

BLE High Channel



Date: 26.JAN.2016 21:42:00

FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

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

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r04
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3×RBW
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09

*** 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:	18 °C
Relative Humidity:	31 %
ATM Pressure:	102.2 kPa

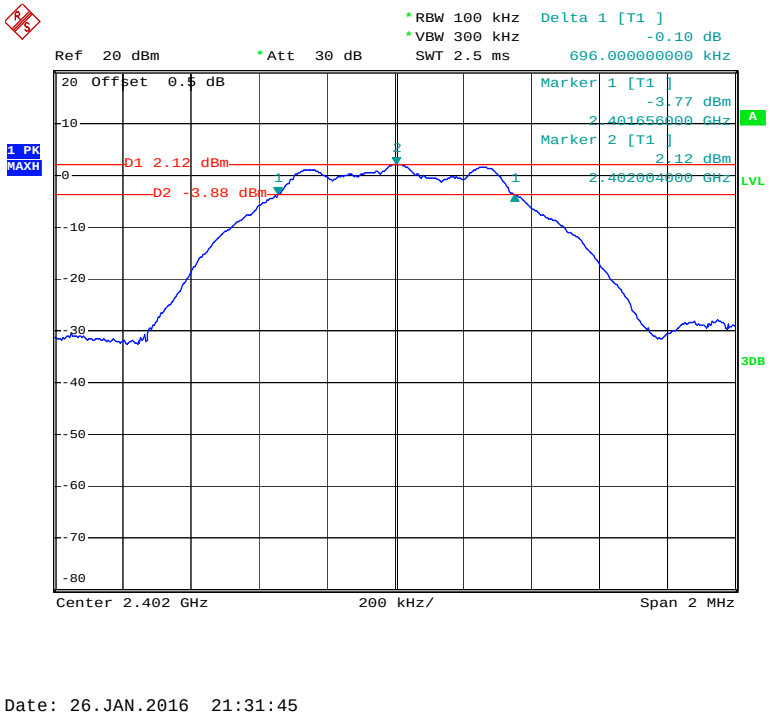
** The testing was performed by Lion Xiao on 2016-01-26*

Test Mode: Transmitting

Test Result: Compliant. Please refer to the following table and plots.

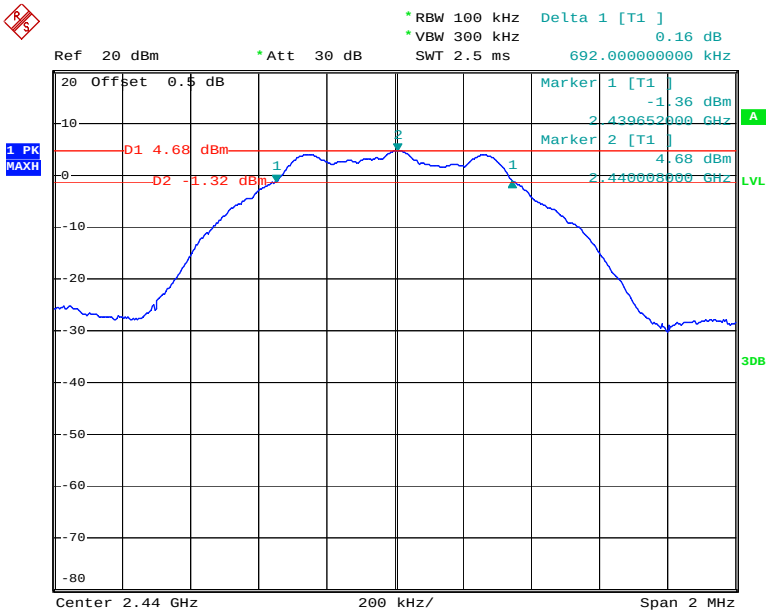
Test mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)
BLE	Low	2402	0.70	≥0.5
	Middle	2440	0.69	≥0.5
	High	2480	0.70	≥0.5

BLE Low Channel



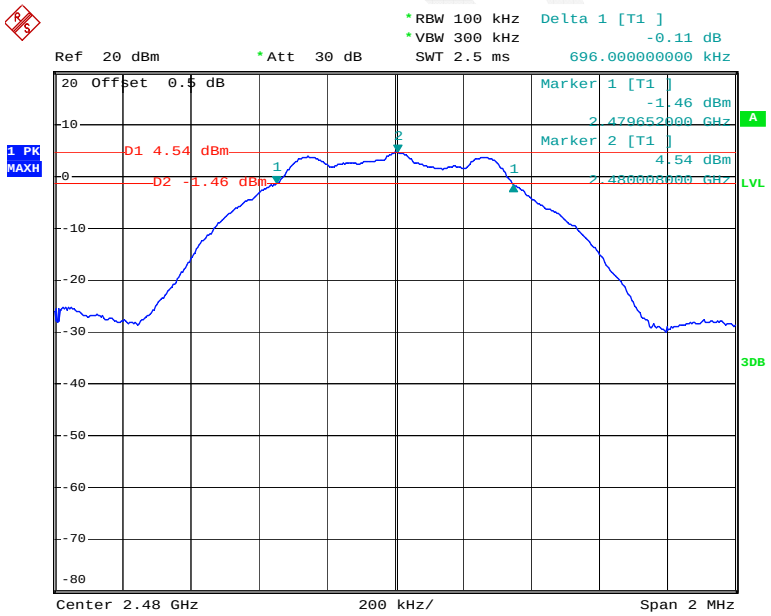
Date: 26.JAN.2016 21:31:45

BLE Middle Channel



Date: 26.JAN.2016 21:42:36

BLE High Channel



Date: 26.JAN.2016 21:38:39

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

Applicable Standard

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

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r04

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 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
Agilent	Wideband Power Sensor	N1921A	MY54210016	2015-11-03	2016-11-03
Agilent	Wideband Power Sensor	N1921A	MY54170013	2015-11-03	2016-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2015-11-03	2016-11-03

*** 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:	18 °C
Relative Humidity:	31 %
ATM Pressure:	102.2 kPa

** The testing was performed by Lion Xiao on 2016-01-26*

Test Mode: Transmitting

Test Result: Compliant. Please refer to the following table.

Test mode	Channel	Frequency (MHz)	Max Peak Conducted Output Power (dBm)	Limit (dBm)	Result
BLE	Low	2402	2.79	30	Compliance
	Middle	2440	5.38	30	Compliance
	High	2480	5.23	30	Compliance

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

Applicable Standard

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09

*** 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

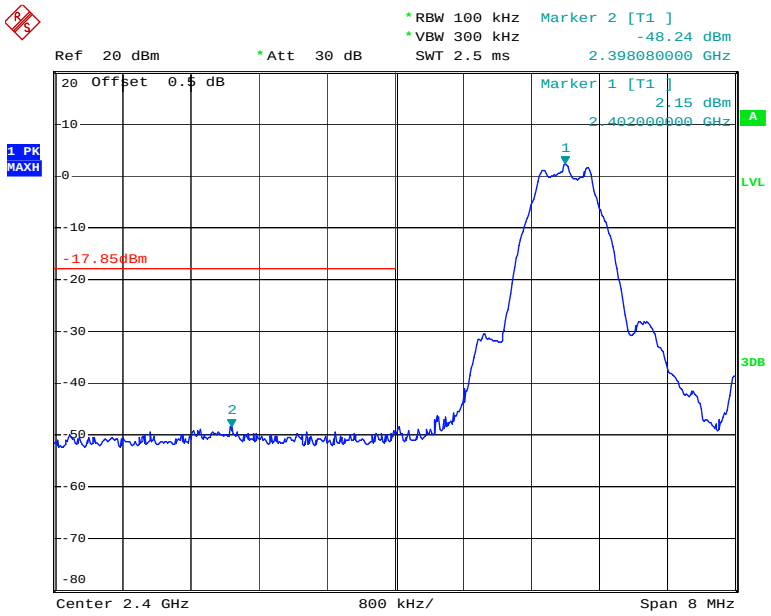
Temperature:	18 °C
Relative Humidity:	31%
ATM Pressure:	102.2 kPa

** The testing was performed by Lion Xiao on 2016-01-26.*

Test mode: Transmitting

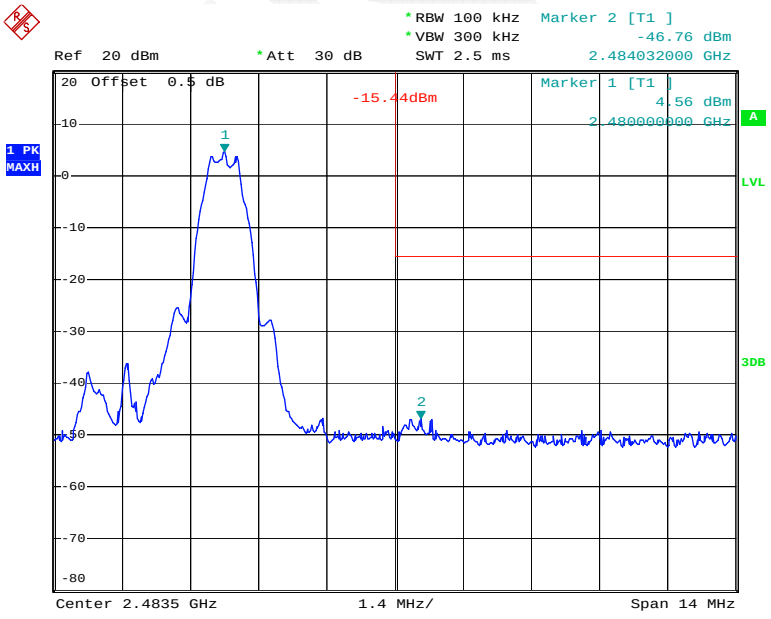
Test Result: Compliant. Please refer to following plots.

BLE Band Edge , Left Side



Date: 26.JAN.2016 21:34:15

BLE Band Edge, Right Side



Date: 26.JAN.2016 21:38:12

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r04

a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3×RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	DE31388	2015-05-09	2016-05-09

*** 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:	18°C
Relative Humidity:	31 %
ATM Pressure:	102.2 kPa

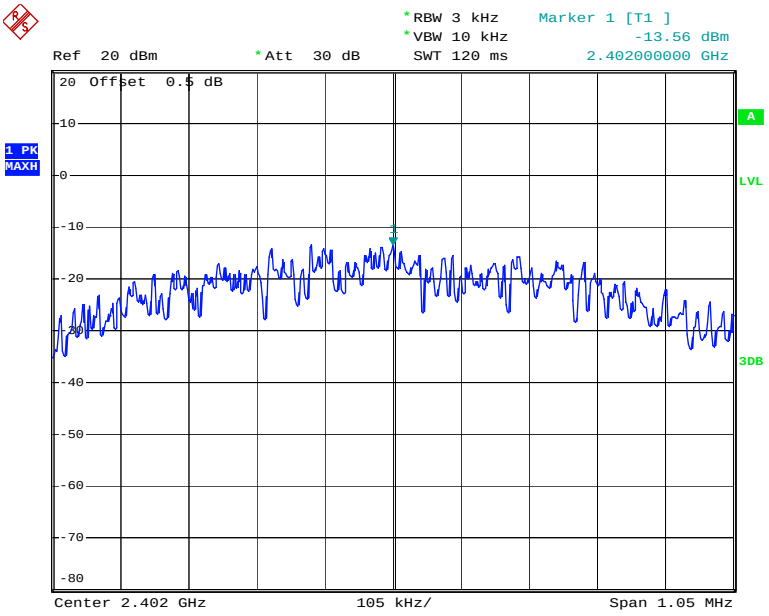
** The testing was performed by Lion Xiao on 2016-01-26*

Test Mode: Transmitting

Test Result: Compliant. Please refer to the following table and plots

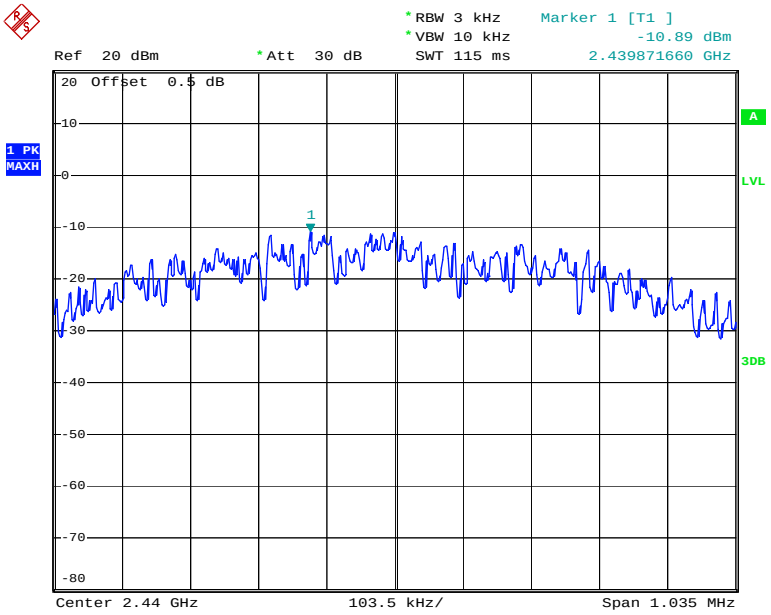
Test mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
BLE	Low	2402	-13.56	≤8
	Middle	2440	-10.89	≤8
	High	2480	-10.95	≤8

Power Spectral Density, BLE Low Channel



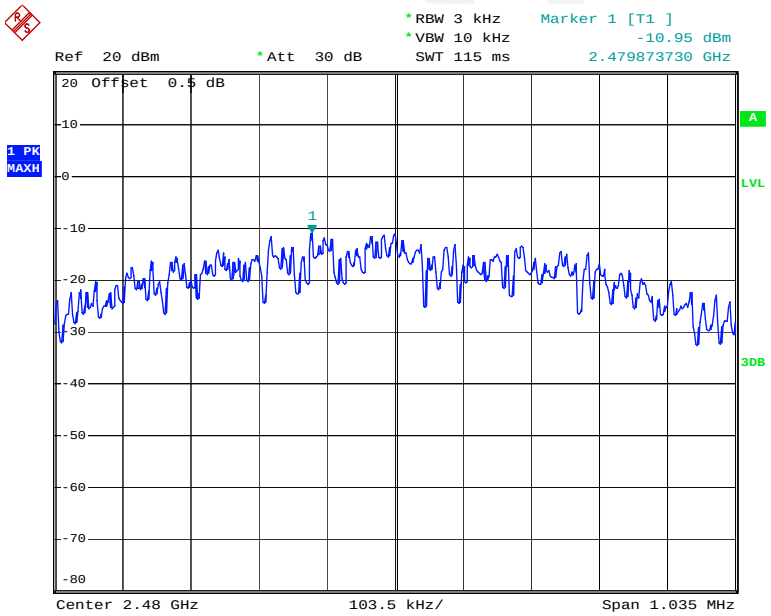
Date: 26.JAN.2016 21:32:20

Power Spectral Density, BLE Middle Channel



Date: 26.JAN.2016 21:45:13

Power Spectral Density, BLE High Channel



Date: 26.JAN.2016 21:47:42

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