FCC PART 15.247

TEST REPORT

For

Latitude Limited

7/F, Southeast Industrial Building, 611-619 Castle Peak Road, Tsuen Wan, N, T., Hong Kong

FCC ID: WM4745

Report Type:	Product Type:
Original Report	Bluetooth GPS watch

Test Engineer:	Mike Hu
Report Number:	RSZ150205012-00B
Report Date:	2015-02-16
Reviewed By:	Jimmy Xiao RF Engineer
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Latitude Limited's product, model number: *D92J63 (FCC ID: WM4745)* or the "EUT" in this report is a *Bluetooth GPS watch,* which was measured approximately: 12.0 cm (L) x 8.0 cm (W) x 5.0 cm (H), rated with input voltage: DC 3.7 V battery.

** All measurement and test data in this report was gathered from production sample serial number: 1502058 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2015-02-05.*

Objective

This report is prepared on behalf of *Latitude Limited* 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, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

N/A

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz, and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) 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 December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. 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 EUT supports BT 4.0 low energy, and which was configured for testing in an engineering mode.

EUT Exercise Software

No exercise software was used.

Special Accessories

No special accessory.

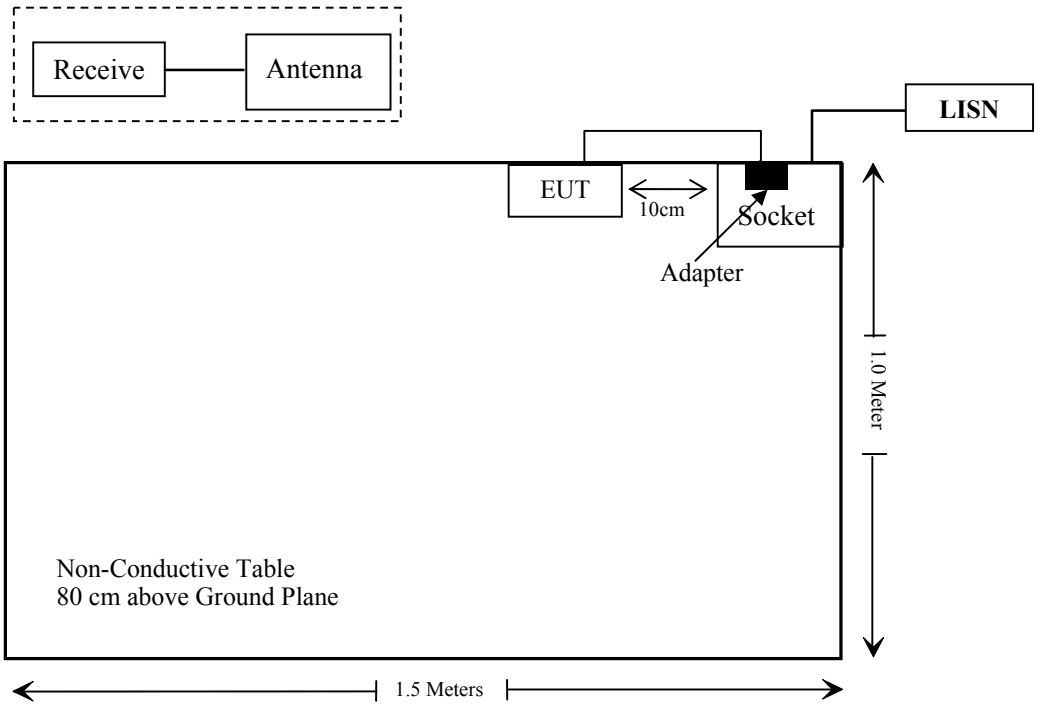
Equipment Modifications

No modification was made to the EUT tested.

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Detachable USB Cable	1.0	EUT	Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b) (1)& §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 Peak 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), §1.1307 (b) (1) &§2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), 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 KDB 447498 D01 General RF Exposure Guidance

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
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

The Max Peak Output Power: -4.20dBm=0.38mW
(0.38/5)* √2.480=0.12<3.0

Result: No need SAR test

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 an internal antenna arrangement for BT, which was permanently attached and the gain was 0 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliant.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

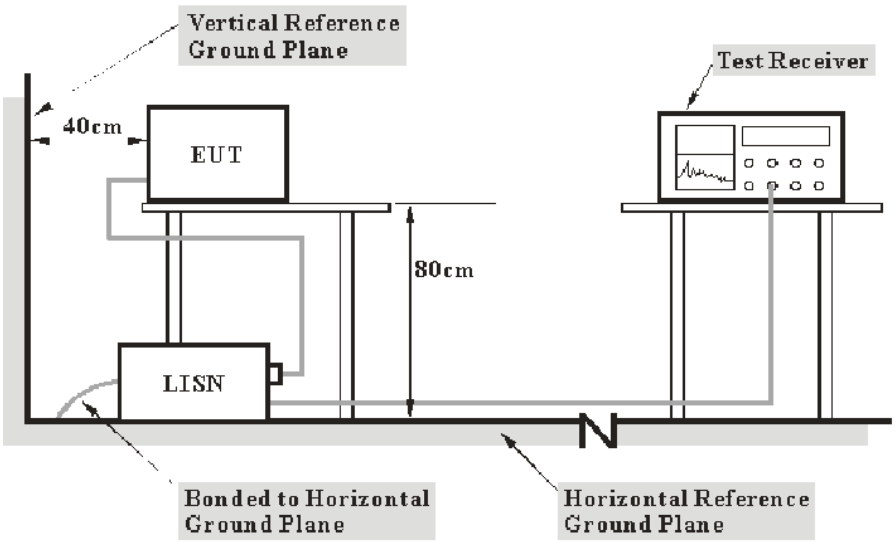
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Expanded Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

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 measurement procedure of EUT setup is according with per ANSI C63.4-2009. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

The Adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the Adapter was connected to the outlet of the LISN.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2014-06-09	2015-06-09
Rohde & Schwarz	LISN 1	ENV216	3560.6650.12-101613-Yb	2014-05-07	2015-05-07
Rohde & Schwarz	LISN 2	ESH2-Z5	892107/021	2014-06-09	2015-06-09
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2014-05-14	2015-05-14
Rohde & Schwarz	CE Test software	EMC 32	V8.53	-	-

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, 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, the worst margin reading as below:

16.7 dB at **0.427670 MHz** in the **Line** conducted mode

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

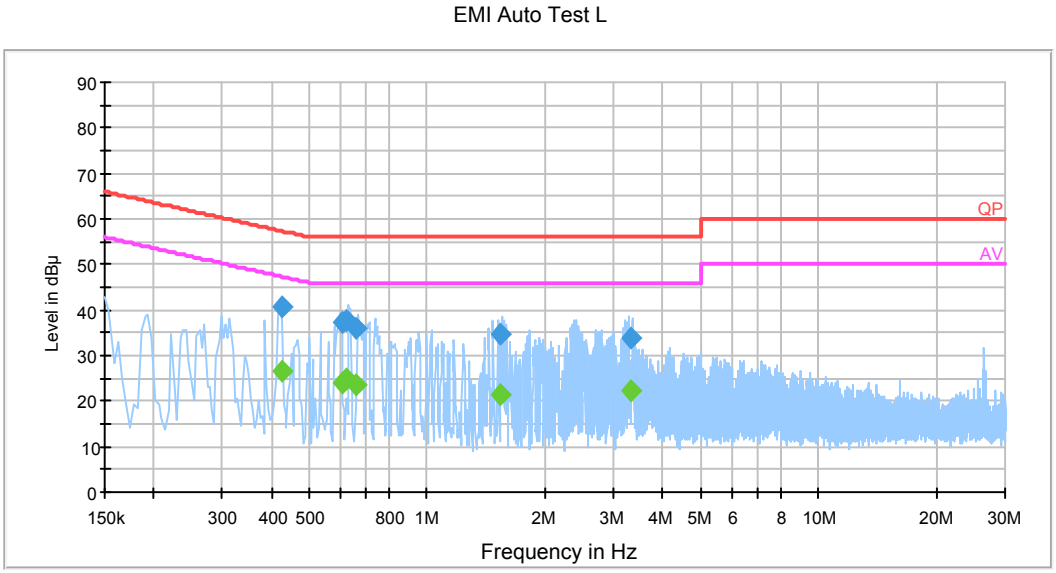
Environmental Conditions

Temperature:	20 ℃
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu on 2015-02-15.

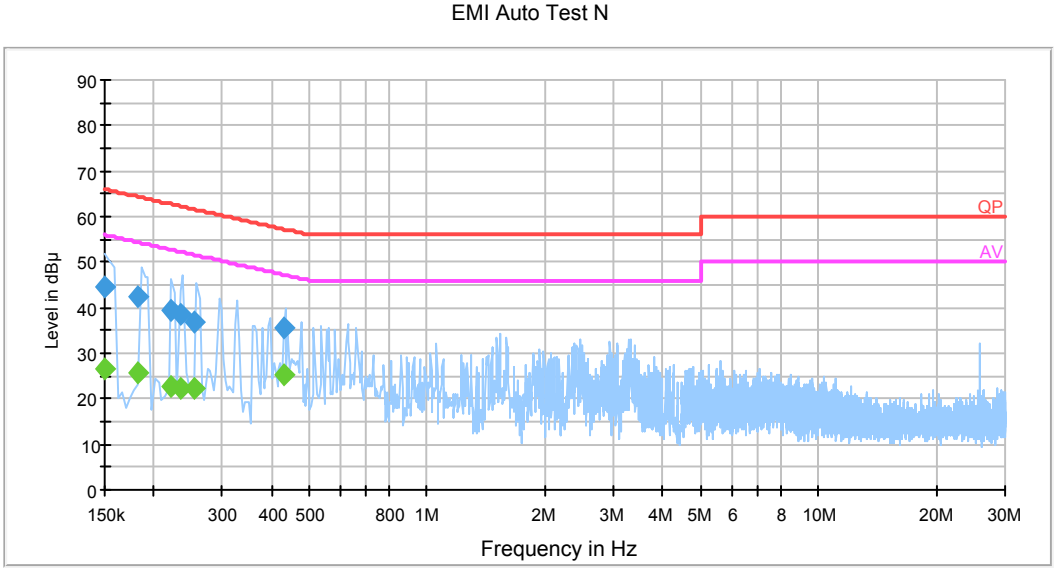
EUT operation mode: Charging & Transmitting

AC 120 V, 60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.427670	40.6	19.2	57.3	16.7	QP
0.427670	26.6	19.2	47.3	20.7	Ave.
0.611030	37.1	19.3	56.0	18.9	QP
0.611030	24.2	19.3	46.0	21.8	Ave.
0.624550	37.6	19.3	56.0	18.4	QP
0.624550	24.7	19.3	46.0	21.3	Ave.
0.656010	35.8	19.3	56.0	20.2	QP
0.656010	23.7	19.3	46.0	22.3	Ave.
1.534750	34.9	19.4	56.0	21.1	QP
1.534750	21.3	19.4	46.0	24.7	Ave.
3.316770	33.9	19.4	56.0	22.1	QP
3.316770	22.4	19.4	46.0	23.6	Ave.

AC 120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.150000	44.4	19.2	66.0	21.6	QP
0.150000	26.4	19.2	56.0	29.6	Ave.
0.181500	42.6	19.2	64.4	21.8	QP
0.181500	25.8	19.2	54.4	28.6	Ave.
0.221500	39.6	19.3	62.8	23.2	QP
0.221500	22.9	19.3	52.8	29.9	Ave.
0.233500	38.7	19.2	62.3	23.6	QP
0.233500	22.1	19.2	52.3	30.2	Ave.
0.253500	36.9	19.2	61.6	24.7	QP
0.253500	22.3	19.2	51.6	29.3	Ave.
0.431490	35.5	19.2	57.2	21.7	QP
0.431490	25.2	19.2	47.2	22.0	Ave.

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

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

Applicable Standard

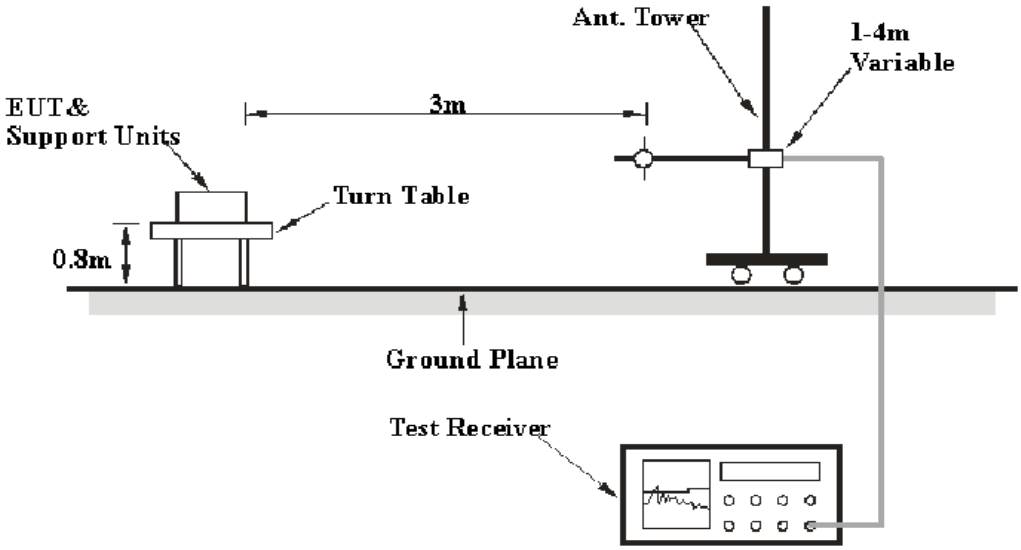
FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is 5.91 dB for 30MHz-1GHz, and 4.92 dB for above 1GHz. And this uncertainty will not be taken into consideration for the test data recorded in the report.

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. 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	1 MHz	3 MHz	/	PK
	1 MHz	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 30 MHz-1GHz, peak and average detection modes for above 1 GHz.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2014-05-06	2015-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2014-11-03	2015-11-03
Sunol Sciences	Broadband Antenna	JB3	A111513	2014-06-18	2017-06-17
Mini	Amplifier	ZVA-183-S+	5969001149	2014-04-23	2015-04-23
DUCOMMUN	Pre-amplifier	ALN-22093530-01	991373-01	2014-08-03	2015-08-03
A.H. System	Horn Antenna	SAS-200/571	135	2015-02-10	2016-02-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2014-12-11	2015-12-11
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13
TDK	Chamber	Chamber A	2#	2012-10-15	2015-10-15
TDK	Chamber	Chamber B	1#	2014-07-23	2015-07-23
R&S	Auto test Software	EMC32	V9.10	--	--

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, 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-Subpart C, section 15.205, 15.209 and 15.247, the worst margin reading as below:

4.58 dB at **4804.0 MHz** in the **Vertical** polarization for middle channel

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

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

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:	22 ℃
Relative Humidity:	42 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu on 2015-02-13.

EUT operation mode: Transmitting

30 MHz-25 GHz

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(2402 MHz)									
102.2	35.34	QP	152	1.5	H	-10.9	24.44	43.5	19.06
2402.0	80.32	PK	330	2.5	H	4.27	84.59	/	/
2402.0	72.23	Ave.	330	2.5	H	4.27	76.50	/	/
2402.0	75.31	PK	294	1.2	V	4.17	79.48	/	/
2402.0	68.23	Ave.	294	1.2	V	4.17	72.40	/	/
2374.2	39.20	PK	358	2.5	H	4.27	43.47	74	30.53
2374.2	26.66	Ave.	358	2.5	H	4.27	30.93	54	23.07
2388.3	45.32	PK	239	1.7	H	4.27	49.59	74	24.41
2388.3	29.23	Ave.	239	1.7	H	4.27	33.50	54	20.50
2485.0	36.34	PK	254	1.1	H	7.99	44.33	74	29.67
2485.0	23.13	Ave.	254	1.1	H	7.99	31.12	54	22.88
4804.0	39.32	PK	144	2.2	V	25.01	64.33	74	9.67
4804.0	24.41	Ave.	144	2.2	V	25.01	49.42	54	4.58
7206.0	35.31	PK	121	1.4	H	22.28	57.59	74	16.41
7206.0	22.20	Ave.	121	1.4	H	22.28	44.48	54	9.52
9608.0	35.14	PK	63	1.6	H	25.02	60.16	74	13.84
9608.0	22.30	Ave.	63	1.6	H	25.02	47.32	54	6.68
Middle Channel(2440 MHz)									
102.2	35.15	QP	36	1.5	H	-10.9	24.25	43.5	19.25
2440.0	81.03	PK	295	1.3	H	4.27	85.30	/	/
2440.0	73.01	Ave.	295	1.3	H	4.27	77.28	/	/
2440.0	75.23	PK	333	1.6	V	4.17	79.40	/	/
2440.0	69.22	Ave.	333	1.6	V	4.17	73.39	/	/
2388.3	36.25	PK	138	2.1	H	4.27	40.52	74	33.48
2388.3	23.40	Ave.	138	2.1	H	4.27	27.67	54	26.33
2484.2	36.61	PK	245	1.7	H	7.99	44.60	74	29.40
2484.2	22.67	Ave.	245	1.7	H	7.99	30.66	54	23.34
2486.8	36.44	PK	68	1.7	H	7.99	44.43	74	29.57
2486.8	22.33	Ave.	68	1.7	H	7.99	30.32	54	23.68
4880.0	39.32	PK	215	1.5	V	22.91	62.23	74	11.77
4880.0	25.25	Ave.	215	1.5	V	22.91	48.16	54	5.84
7320.0	36.64	PK	87	1.9	H	22.60	59.24	74	14.76
7320.0	23.20	Ave.	87	1.9	H	22.60	45.80	54	8.20
9760.0	35.41	PK	335	1.2	H	26.09	61.50	74	12.50
9760.0	23.27	Ave.	335	1.2	H	26.09	49.36	54	4.64

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)
High Channel(2480 MHz)									
102.2	36.00	QP	108	1.3	H	-10.9	25.10	43.5	18.40
2480.0	79.21	PK	262	1.7	H	7.99	87.20	/	/
2480.0	73.65	Ave.	262	1.7	H	7.99	81.64	/	/
2480.0	74.32	PK	80	1.7	V	7.59	81.91	/	/
2480.0	68.15	Ave.	80	1.7	V	7.59	75.74	/	/
2389.0	36.88	PK	11	1.8	H	4.27	41.15	74	32.85
2389.0	24.26	Ave.	11	1.8	H	4.27	28.53	54	25.47
2484.4	49.32	PK	234	2.4	H	7.99	57.31	74	16.69
2484.4	29.42	Ave.	234	2.4	H	7.99	37.41	54	16.59
2488.1	47.11	PK	158	1.4	H	7.99	55.10	74	18.90
2488.1	28.83	Ave.	158	1.4	H	7.99	36.82	54	17.18
4960.0	40.32	PK	25	1.3	V	22.01	62.33	74	11.67
4960.0	24.64	Ave.	25	1.3	V	22.01	47.65	54	7.35
7440.0	35.54	PK	347	2.1	V	21.54	57.08	74	16.92
7440.0	22.55	Ave.	347	2.1	V	21.54	44.09	54	9.91
9920.0	35.42	PK	283	1.4	V	26.29	61.71	74	12.29
9920.0	22.11	Ave.	283	1.4	V	26.29	48.40	54	5.60

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

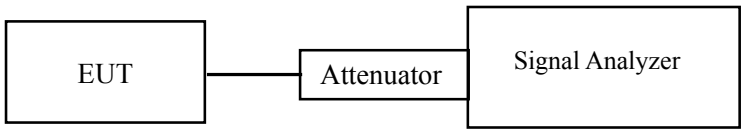
Applicable Standard

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 v03r02

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2014-06-13	2015-06-13

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

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu on 2015-02-09.

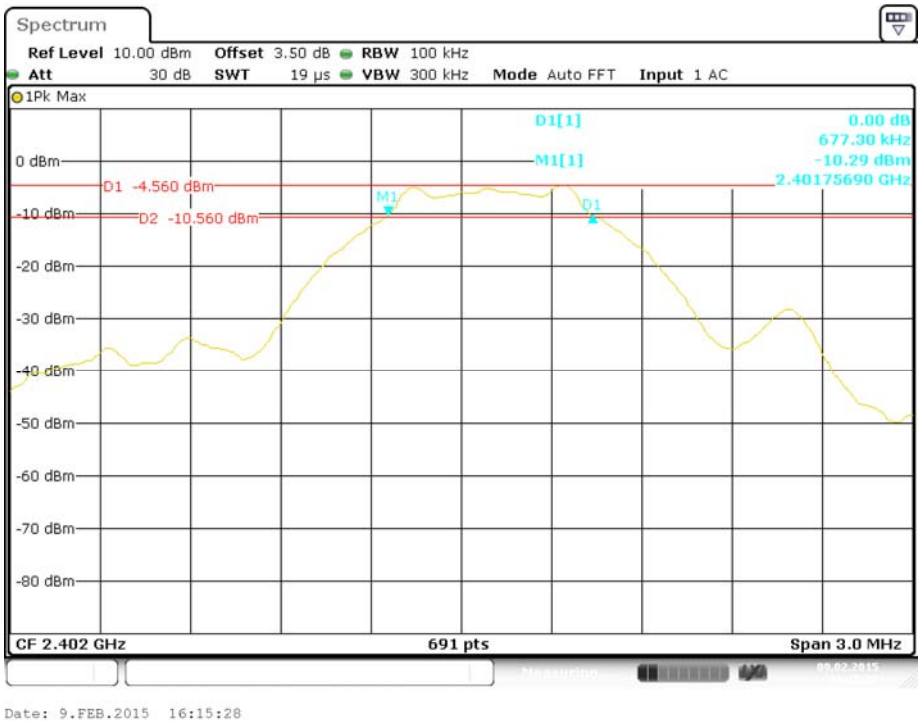
EUT operation mode: Transmitting

Test Result: Compliance

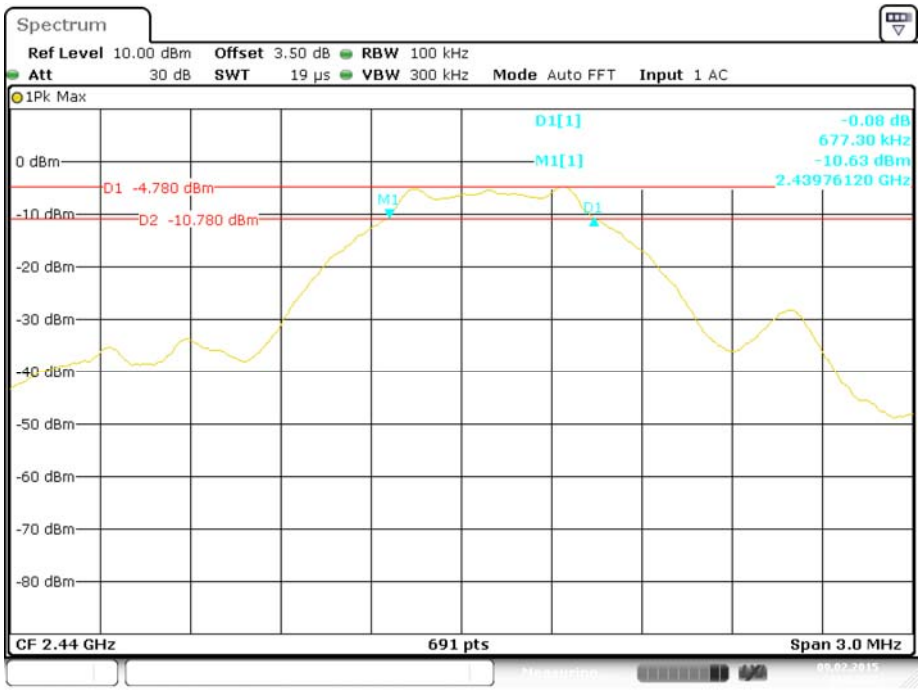
Please refer to the following tables and plots.

Mode	Channel	Channel Frequency (MHz)	6 dB Emission Bandwidth (kHz)	Limit (kHz)
BLE 4.0	Low	2402	677	≥500
	Middle	2440	677	≥500
	High	2480	686	≥500

Low Channel



Middle Channel



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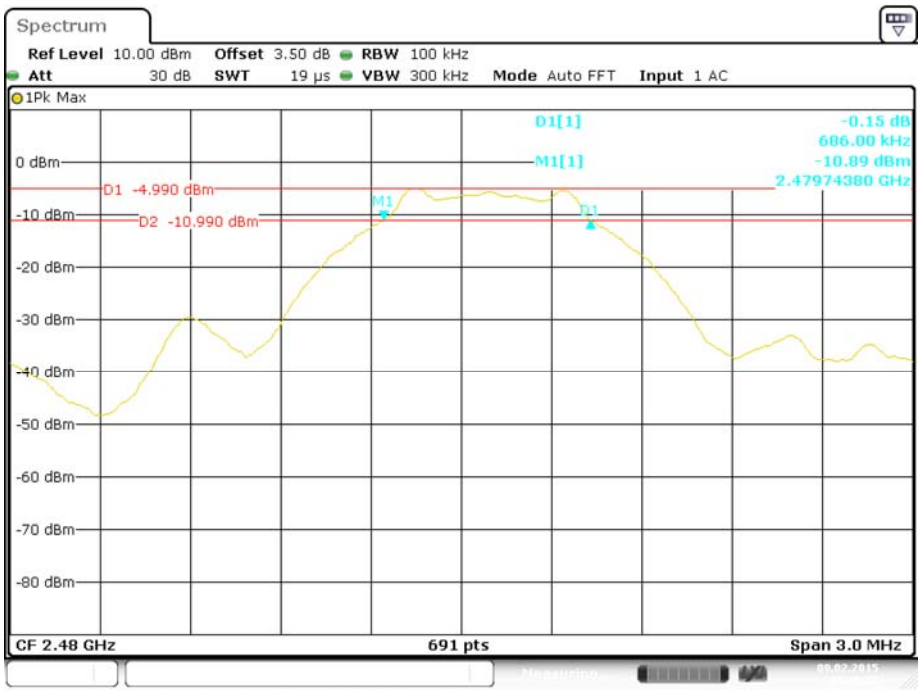
High Channel



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

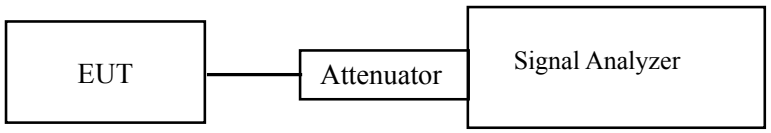
Applicable Standard

According to §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 v03r02

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 a 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	ESR	1316.3003K03-101746-zn	2014-06-13	2015-06-13

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

Test Data

Environmental Conditions

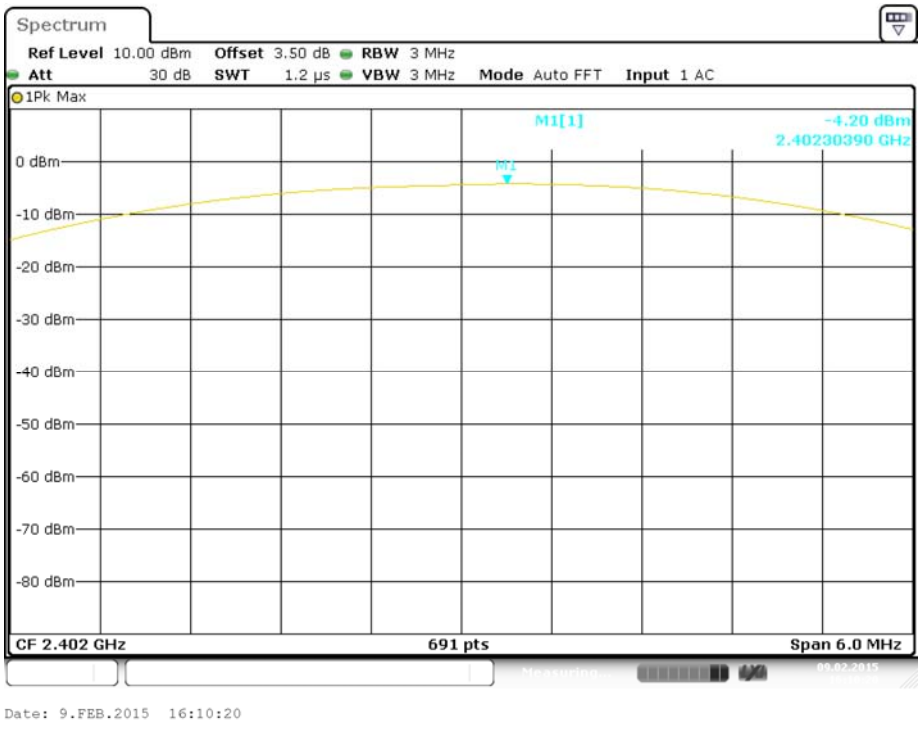
Temperature:	25 ℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu on 2015-02-09.

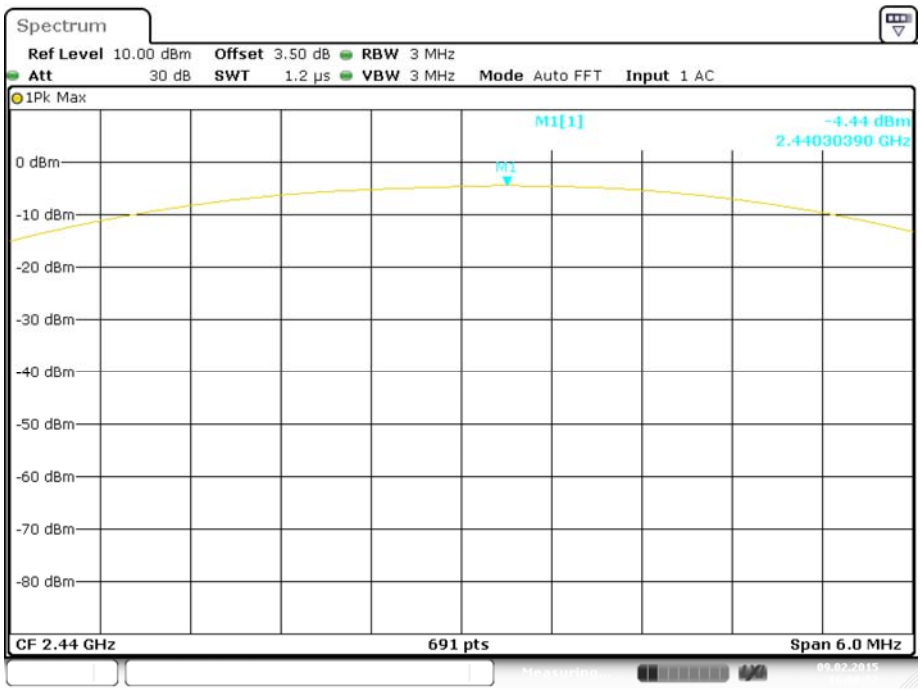
EUT operation mode: Transmitting

Mode	Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Result
BLE 4.0	Low	2402	-4.20	30	Pass
	Middle	2440	-4.44	30	Pass
	High	2480	-4.63	30	Pass

RF Output Power, Low Channel



RF Output Power, Middle Channel



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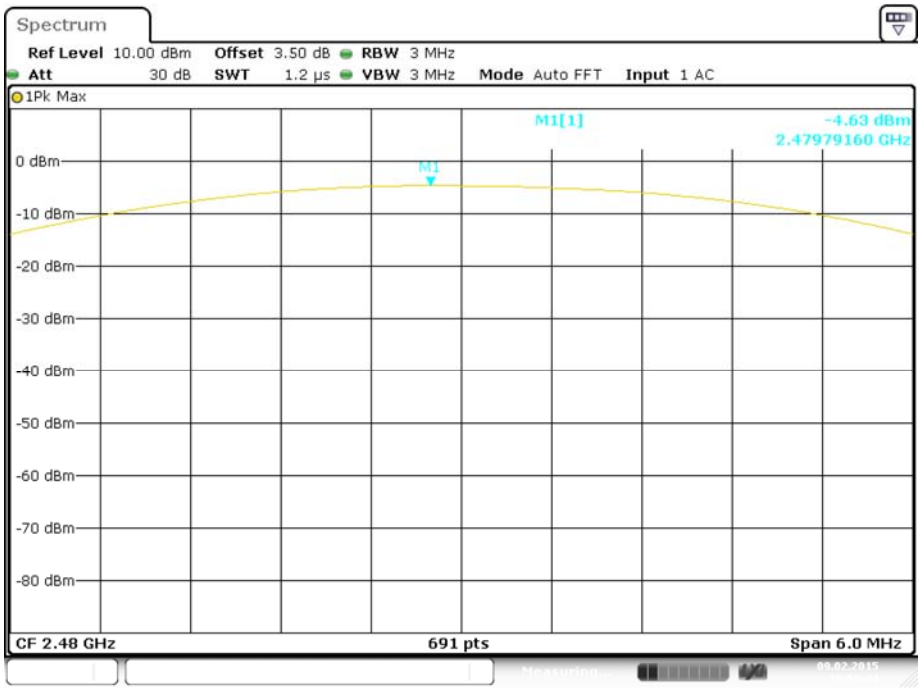
RF Output Power, High Channel



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

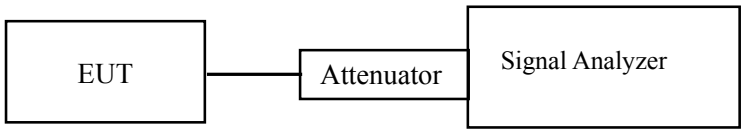
Applicable Standard

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

According to KDB 558074 D01 DTS Meas Guidance v03r02

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
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2014-06-13	2015-06-13

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

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

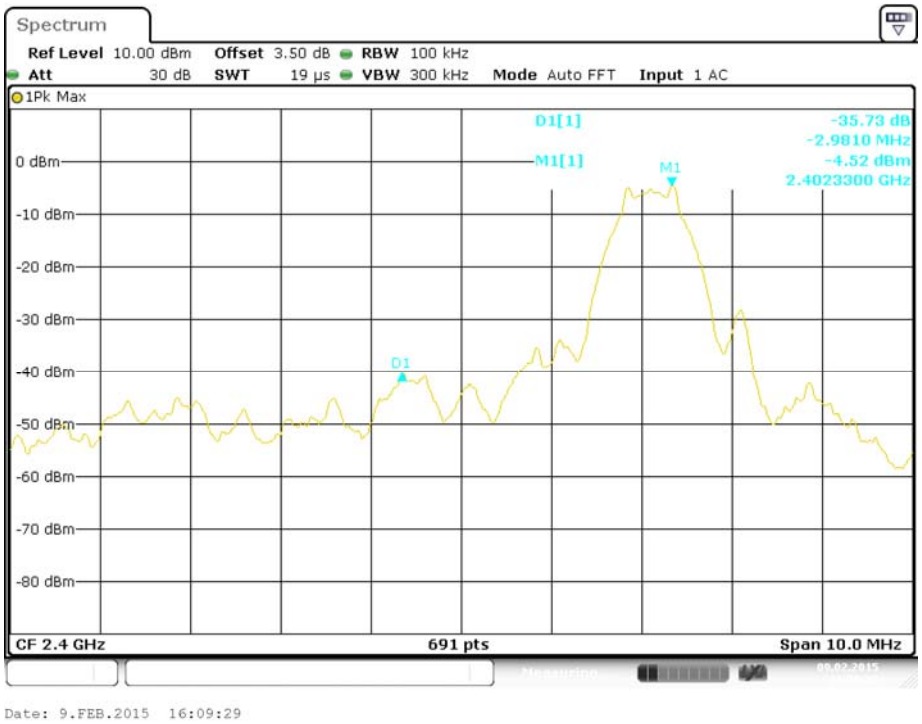
The testing was performed by Mike Hu on 2015-02-09.

EUT operation mode: Transmitting

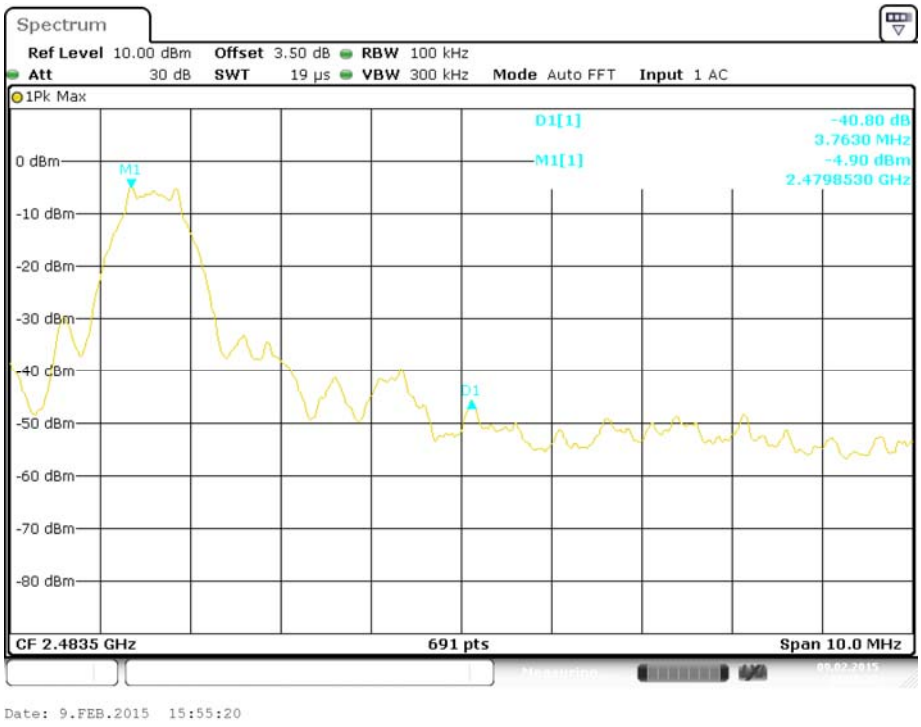
Mode	Band edges	Delta Peak to band emission (dBc)	⩾Limit (dBc)
BLE 4.0	Left Side	35.73	20
	Right Side	40.80	20

Test Result: Compliance. Please refer to following plots.

Band Edge, Left Side



Band Edge, Right Side



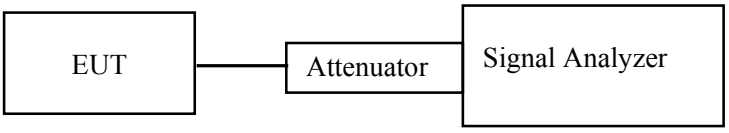
FCC §15.247(e) - POWER SPECTRAL DENSITY

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 v03r02
1. Set analy center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measurement 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
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2014-06-13	2015-06-13

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

Test Data

Environmental Conditions

Temperature:	22~25 ℃
Relative Humidity:	45~51 %
ATM Pressure:	101.0 kPa

The testing was performed by Mike Hu from 2015-02-09 to 2015-02-13.

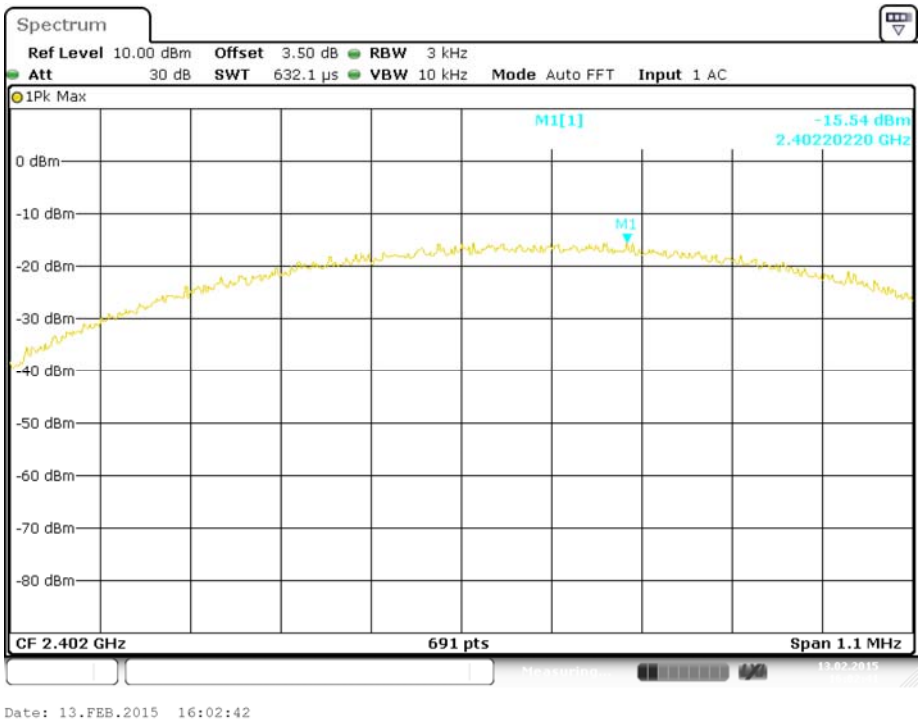
EUT operation mode: Transmitting

Test Result: Pass.

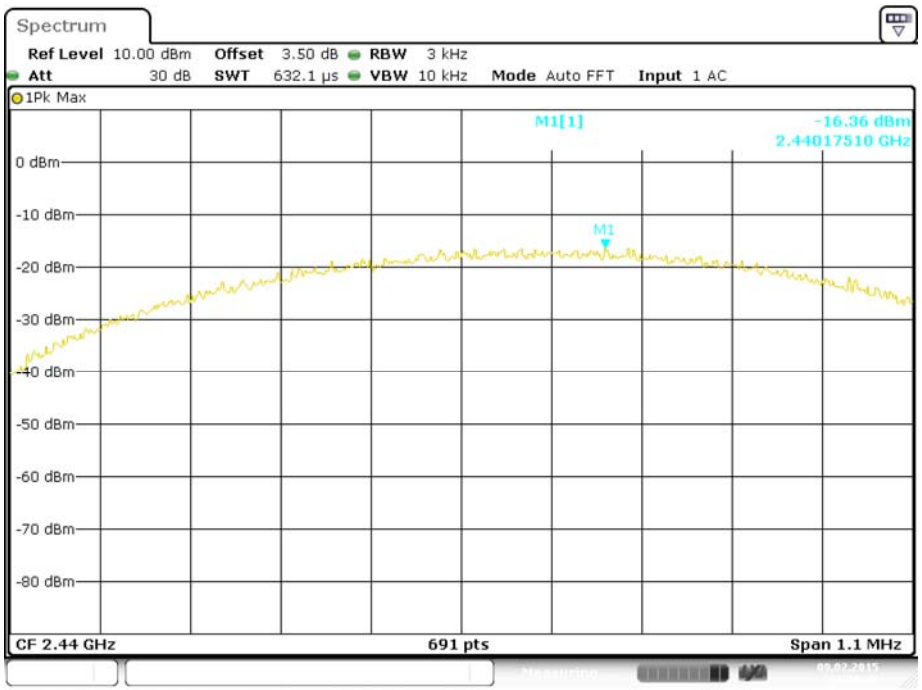
Please refer to following table and plots.

Mode	Channel	Frequency (MHz)	Power spectral density (dBm/3kHz)	Limit (dBm/3kHz)
BLE 4.0	Low	2402	-15.54	≤8
	Middle	2440	-16.36	≤8
	High	2480	-16.58	≤8

Low Channel



Middle Channel



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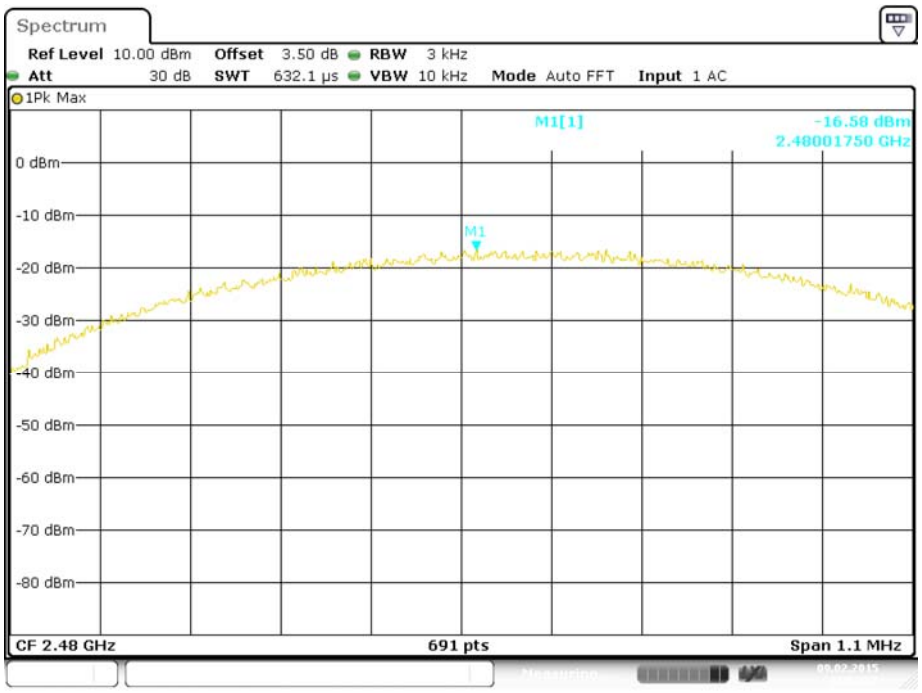
High Channel



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