FCC PART 15.247

TEST REPORT

For

Guilin Zhishen Information Technology Co.,Ltd.

Creative Industrial Park,GuiMo Road,QiXing District,Guilin, Guangxi,China.

FCC ID: 2AIHFZYSA4

Report Type:	**Product Name:**
Original Report	zhi yun 3-Axis Stabilizer

Report Number:	RSC180316001-0C
Report Date:	2018-05-04
Reviewed By:	Sula Huang Engineering Director
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TABLE OF CONTENTS

GENERAL INFORMATION **4**
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 4
MECHANICAL DESCRIPTION OF EUT 4
OBJECTIVE 4
RELATED SUBMITTAL(S)/GRANT(S) 4
MEASUREMENT UNCERTAINTY 4
TEST METHODOLOGY 5
TEST FACILITY 5
SYSTEM TEST CONFIGURATION **6**
DESCRIPTION OF TEST CONFIGURATION 6
EQUIPMENT MODIFICATIONS 6
EUT EXERCISE SOFTWARE 6
SUPPORT EQUIPMENT LIST AND DETAILS 8
EXTERNAL I/O CABLE 8
BLOCK DIAGRAM OF TEST SETUP 9
TEST EQUIPMENTS LIST 10
SUMMARY OF TEST RESULTS **11**
FCC §15.247 (i) & §1.1310 & §2.1093 - RF EXPOSURE **12**
APPLICABLE STANDARD 12
FCC §15.203 - ANTENNA REQUIREMENT **13**
APPLICABLE STANDARD 13
ANTENNA CONNECTOR CONSTRUCTION 13
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS **14**
APPLICABLE STANDARD 14
EUT SETUP 14
EMI TEST RECEIVER SETUP 14
TEST PROCEDURE 15
CORRECTED AMPLITUDE & MARGIN CALCULATION 15
TEST DATA 15
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS **18**
APPLICABLE STANDARD 18
EUT SETUP 18
EMI TEST RECEIVER SETUP 19
TEST PROCEDURE 19
CORRECTED AMPLITUDE & MARGIN CALCULATION 19
TEST DATA 20
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH **24**
APPLICABLE STANDARD 24
TEST PROCEDURE 24
TEST DATA 24
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER **27**
APPLICABLE STANDARD 27
TEST PROCEDURE 27
TEST DATA 27
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE **30**
APPLICABLE STANDARD 30
TEST PROCEDURE 30

TEST DATA 30
FCC §15.247(e) - POWER SPECTRAL DENSITY 32
APPLICABLE STANDARD 32
TEST PROCEDURE 32
TEST DATA 32

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **Guilin Zhishen Information Technology Co.,Ltd.**, model number: **SMA04 (FCC ID: 2AIHFZYSA4)** or the "EUT" as referred to in this report was the z**hi yun 3-Axis Stabilizer**.

Mechanical Description of EUT

The EUT was measured approximately 328mm(L)*123mm(W)*105mm(H).
Rated input voltage: DC 7.4V (Li-ion batteries)

**All measurement and test data in this report was gathered from final production sample, serial number: 180316001/01 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2018-03-09, and EUT conformed to test requirement.*

Objective

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

The tests were performed in order to determine the 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)

None

Measurement Uncertainty

Item			Uncertainty
AC power line conducted emission			2.71 dB
Radiated Emission(Field Strength)	30MHz-200MHz	H	4.57 dB
		V	4.81 dB
	200MHz-1GHz	H	5.69 dB
		V	6.07 dB
	1GHz-6GHz		5.49 dB
	6GHz-18GHz		5.57 dB
	18GHz-25GHz		5.48 dB
Conducted RF Power			±0.61dB
Power Spectrum Density			±0.61dB
Occupied Bandwidth			±5%
Humidity			±5%
Temperature			±1℃

Test Methodology

All measurements contained in this report were conducted with:

1. ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

2. KDB558074 D01 DTS Meas Guidance v04.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Chengdu) to collect test data is located No.5040, Huilongwan Plaza, No. 1, Shawan Road, Jinniu District, Chengdu, Sichuan, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 910975, the FCC Designation No. : CN1186.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062C-1.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured 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.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

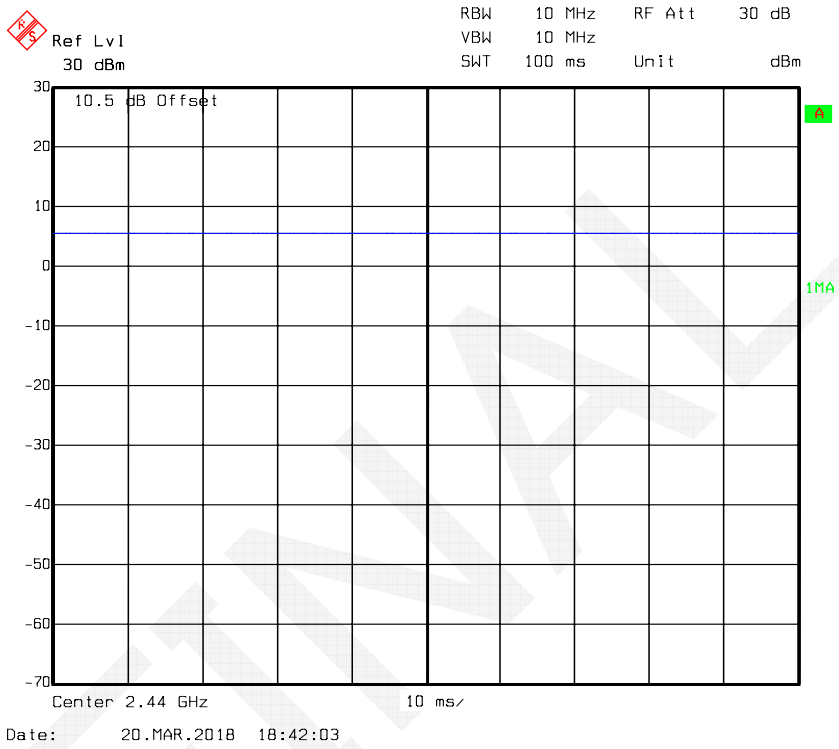
The condition was setting by the software as following table:

Test Software Version	SSCOM3.3		
Test Frequency	2402MHz	2440MHz	2480MHz
Power Level Setting	Default	Default	Default

Duty Cycle information is below:

T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
100	100	100

Duty Cycle



Support Equipment List and Details

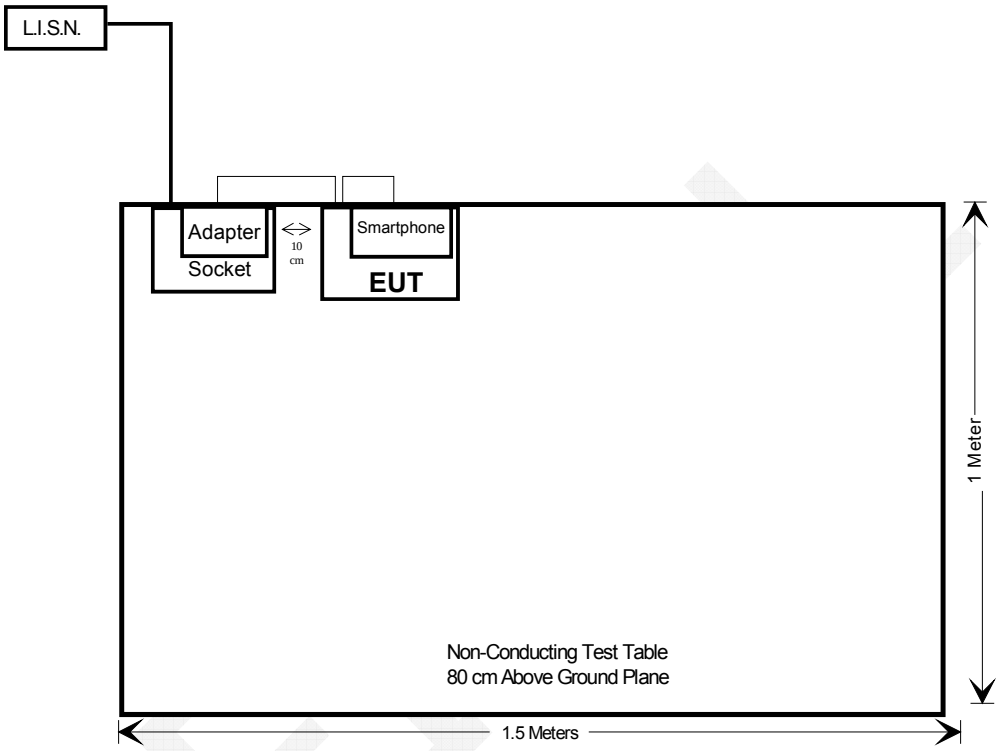
Manufacturer	Description	Model	Serial Number
Xiao Mi	Smartphone	MI5S	1b9a402d
Huntkey	Adapter	HW-050200C01	H785k3G5C31452

External I/O Cable

Cable Description	Length (m)	From	To
Unshielded USB Cable	0.80	Adapter	EUT
Unshielded USB Cable	0.35	EUT	Smartphone

Block Diagram of Test Setup

Conducted Emissions



Test Equipments List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2017-12-02	2018-12-01
Rohde & Schwarz	L.I.S.N.	ENV216	100018	2017-05-20	2018-05-19
Rohde & Schwarz	RF Limiter	ESH3Z2	DE14781	2017-11-10	2018-11-09
N/A	Conducted Cable	NO.5	N/A	2017-11-10	2018-11-09
Rohde & Schwarz	EMC32	N/A	V 8.52.0	N/A	N/A
Radiated Emissions Test					
Sonoma	Pre-Amplifier	310N	186684	2017-08-18	2018-08-17
Rohde & Schwarz	EMI Test Receiver	ESIB 40	100215	2017-09-12	2018-09-11
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2017-05-20	2018-05-19
Sunol Sciences	Broadband Antenna	JB3	A121808	2017-05-18	2020-05-17
ETS	Horn Antenna	3115	003-6076	2017-05-19	2020-05-18
A.H.Systems,inc	Horn Antenna	SAS-574	505	2017-12-02	2018-12-01
Mini-circuits	Pre-Amplifier	ZVA-183-S+	771001215	2017-05-20	2018-05-19
A.H. Systems, Inc	Amplifier	PAM-0118P	467	2017-08-10	2018-08-09
INMET	Attenuator	18N-6dB	64671	2017-11-10	2018-11-09
Sinoscite.,Co Ltd	Reject Band Filter	BSF 2402-2480MN	0898-005	2017-11-10	2018-11-09
EMCT	Semi-Anechoic Chamber	966	N/A	2017-05-18	2022-05-17
N/A	RF Cable (below 1GHz)	NO.1	N/A	2017-11-10	2018-11-09
N/A	RF Cable (below 1GHz)	NO.4	N/A	2017-11-10	2018-11-09
N/A	RF Cable (above 1GHz)	NO.2	N/A	2017-11-10	2018-11-09
Rohde & Schwarz	EMC32	N/A	V 8.52.0	N/A	N/A
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2017-05-18	2018-05-17
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

SUMMARY OF TEST RESULTS

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

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 max tune-up conducted power is 0.5 dBm (1.12 mW).
[(max. power of channel, mW)/(min. test separation distance, mm)][√f(GHz)]
= 1.12/5*(√2.48) = 0.4 < 7.5

So the stand-alone SAR evaluation is not necessary.

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 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 PCB 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.

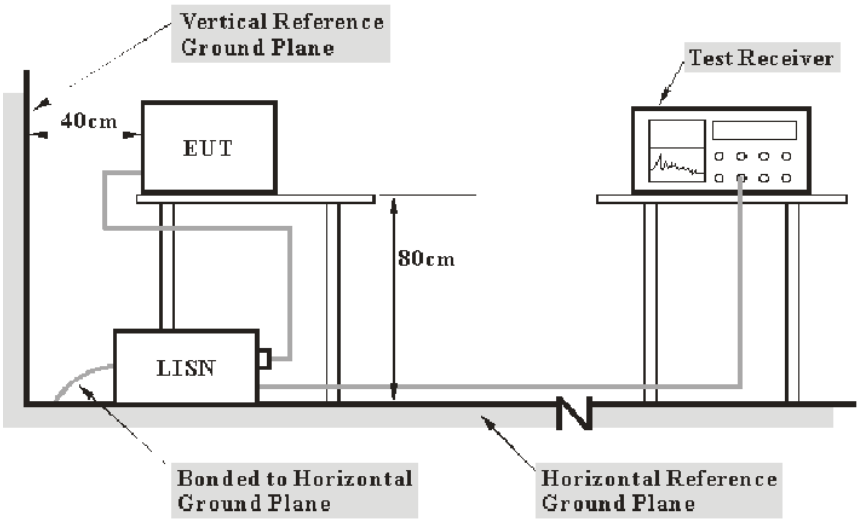
Result: Compliance.

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 AC 120V/60Hz.

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 L.I.S.N.

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 limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Data

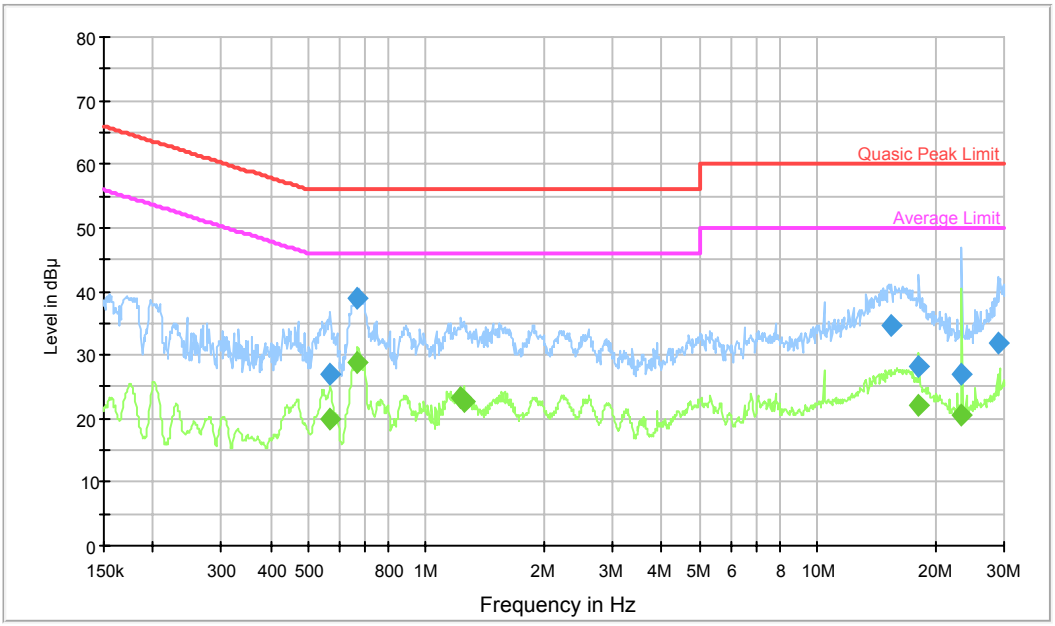
Environmental Conditions

Temperature:	20 °C
Relative Humidity:	55 %
ATM Pressure:	96.3 kPa

The testing was performed by Tom Tang on 2018-03-27.

Test Mode: Transmitting

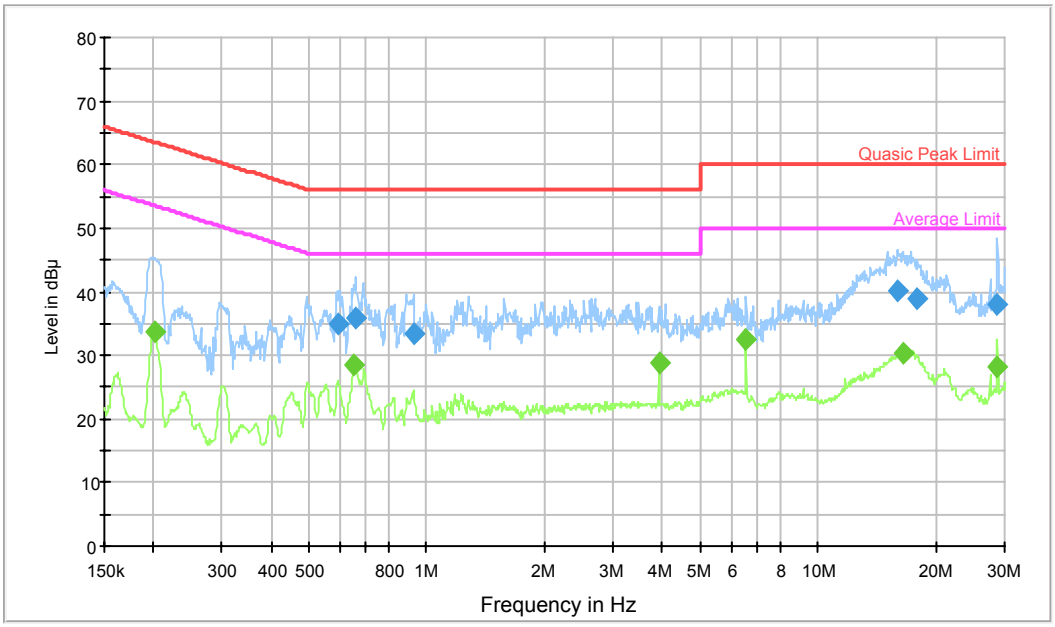
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBµV)
0.569052	26.9	200.0	9.000	L1	19.8	29.1	56.0
0.667575	39.0	200.0	9.000	L1	19.8	17.0	56.0
15.511930	34.5	200.0	9.000	L1	20.1	25.5	60.0
18.197610	28.3	200.0	9.000	L1	20.1	31.7	60.0
23.401207	26.9	200.0	9.000	L1	20.3	33.1	60.0
28.915122	31.8	200.0	9.000	L1	20.4	28.2	60.0

Frequency (MHz)	Average (dB µ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dB µ V)
0.569052	19.9	200.0	9.000	L1	19.8	26.1	46.0
0.667575	28.8	200.0	9.000	L1	19.8	17.2	46.0
1.224685	23.3	200.0	9.000	L1	19.7	22.7	46.0
1.249376	22.6	200.0	9.000	L1	19.7	23.4	46.0
18.197610	21.9	200.0	9.000	L1	20.1	28.1	50.0
23.401207	20.7	200.0	9.000	L1	20.3	29.3	50.0

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBµV)
0.592228	34.9	200.0	9.000	N	19.5	21.1	56.0
0.659628	35.9	200.0	9.000	N	19.5	20.1	56.0
0.926114	33.3	200.0	9.000	N	19.5	22.7	56.0
15.951511	40.0	200.0	9.000	N	19.9	20.0	60.0
17.980974	38.9	200.0	9.000	N	19.9	21.1	60.0
28.799922	37.9	200.0	9.000	N	20.1	22.1	60.0

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corrected Factor (dB)	Margin (dB)	Limit (dBµV)
0.202358	33.6	200.0	9.000	N	19.5	19.9	53.5
0.654382	28.6	200.0	9.000	N	19.5	17.4	46.0
3.928879	28.7	200.0	9.000	N	19.7	17.3	46.0
6.549134	32.6	200.0	9.000	N	19.7	17.4	50.0
16.469163	30.4	200.0	9.000	N	19.9	19.6	50.0
28.799922	28.2	200.0	9.000	N	20.1	21.8	50.0

Note:
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

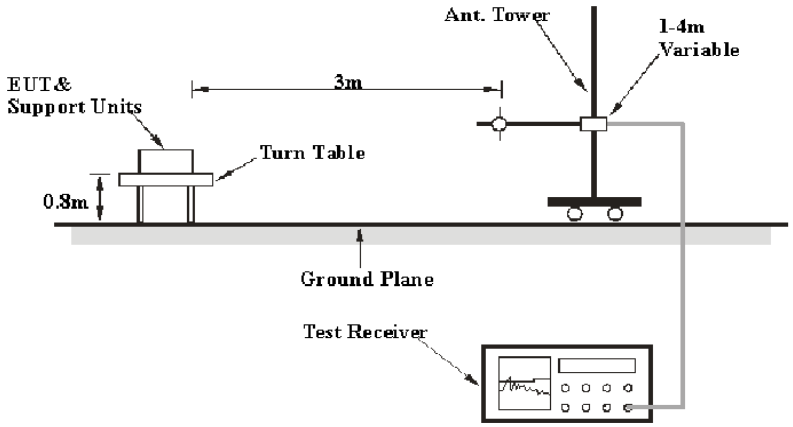
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

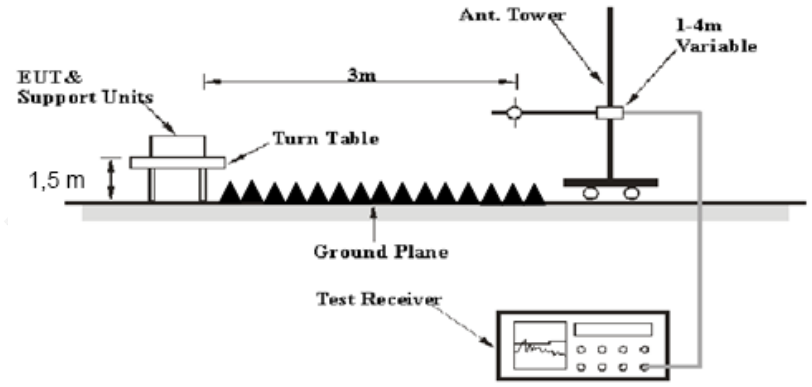
FCC §15.247 (d); §15.209; §15.205;

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 Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver was 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

Frequency Range	RBW	Video B/W	Duty Cycle	Measurement
Above 1 GHz	1MHz	3 MHz	Any	PK
	1MHz	10Hz	>98%	AV
	1MHz	1/T	<98%	AV

Note: T is Transmission Duration

Test Procedure

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

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

Scan with X-Axis, Y-Axis and Z-Axis position to explore the highest emission level and the worst case was recorded.

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 = Receiver 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 Data

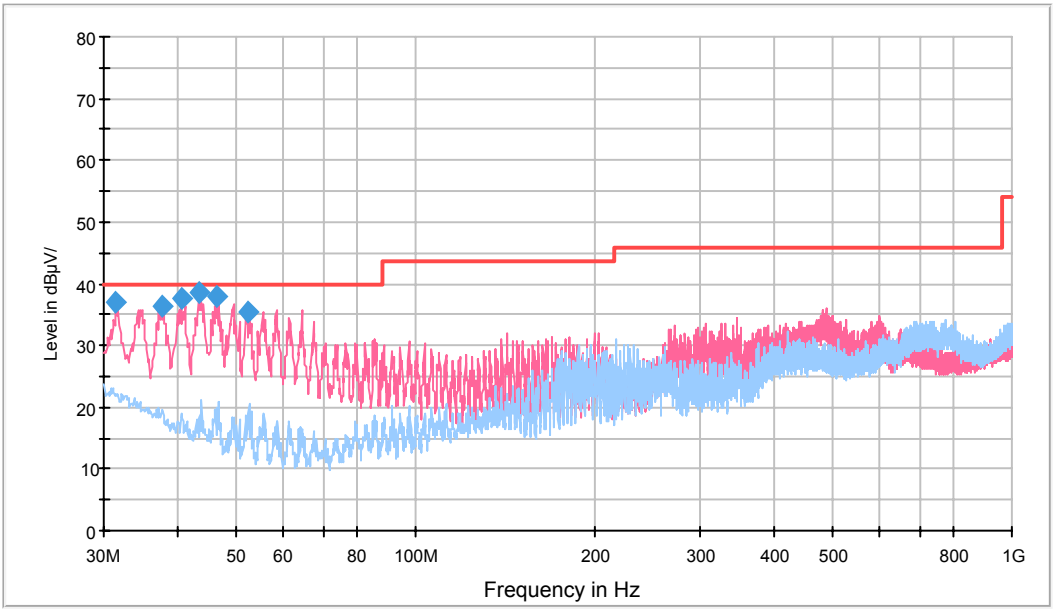
Environmental Conditions

Temperature:	22 °C
Relative Humidity:	60 %
ATM Pressure:	96.3 kPa

** The testing was performed by Tom Tang on 2018-04-27.*

Test Mode: Transmitting (Worst Case)

1) 30 MHz to 1 GHz_Low channel_Worst Case



Frequency (MHz)	QuasicPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corrected Factor (dB/m)	Margin (dB)	Limit (dBµV/m)
31.455000	37.0	100.0	V	142.0	-5.8	*3.0	40.0
37.517500	36.5	100.0	V	289.0	-9.7	*3.5	40.0
40.427500	37.6	110.0	V	83.0	-11.5	*2.4	40.0
43.458750	38.5	100.0	V	201.0	-13.4	*1.5	40.0
46.490000	38.0	100.0	V	267.0	-15.1	*2.0	40.0
52.431250	35.4	105.0	V	157.0	-17.2	*4.6	40.0

** Within Measurement Uncertainty.*

2) Above 1 GHz

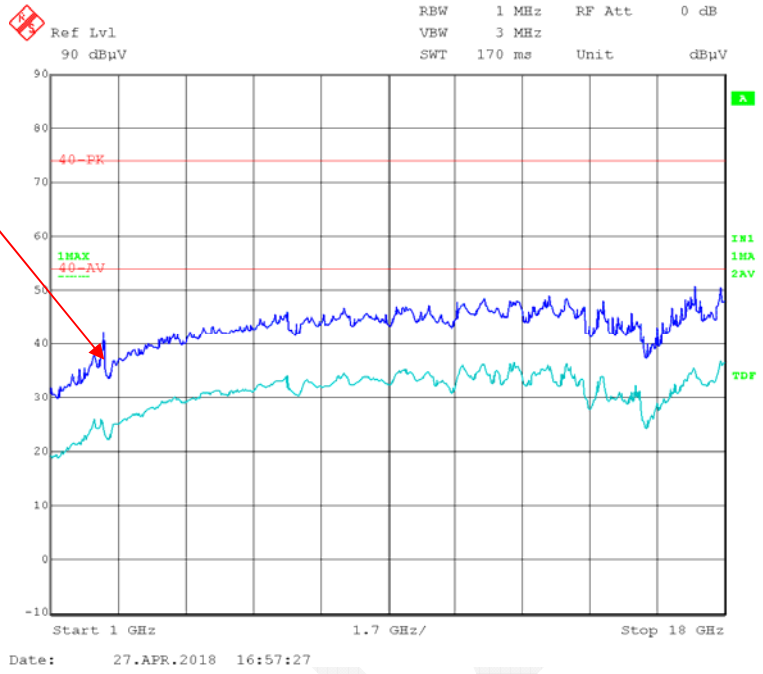
Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	Limit	Margin
	Reading	Measurement	Polar	Factor					
MHz	dBμV	PK/AV	H/V	dB(1/m)	dB	dB	dBμV/m	dBμV/m	dB
Frequency: 2402MHz									
2402	58.38	PK	H	28.71	3.06	0.00	90.15	N/A	N/A
2402	53.32	AV	H	28.71	3.06	0.00	85.09	N/A	N/A
2402	49.15	PK	V	28.71	3.06	0.00	80.92	N/A	N/A
2402	43.91	AV	V	28.71	3.06	0.00	75.68	N/A	N/A
2390	31.67	PK	H	28.67	3.06	0.00	63.40	74.00	10.60
2390	15.41	AV	H	28.67	3.06	0.00	47.14	54.00	6.86
4804	52.07	PK	H	33.85	4.35	44.73	45.54	74.00	28.46
4804	39.11	AV	H	33.85	4.35	44.73	32.58	54.00	21.42
7206	46.21	PK	H	36.39	5.41	43.92	44.09	74.00	29.91
7206	33.03	AV	H	36.39	5.41	43.92	30.91	54.00	23.09
Frequency: 2440MHz									
2440	55.87	PK	H	28.82	3.09	0.00	87.78	N/A	N/A
2440	50.86	AV	H	28.82	3.09	0.00	82.77	N/A	N/A
2440	47.47	PK	V	28.82	3.09	0.00	79.38	N/A	N/A
2440	42.06	AV	V	28.82	3.09	0.00	73.97	N/A	N/A
4880	51.40	PK	H	34.06	4.40	44.72	45.14	74.00	28.86
4880	38.30	AV	H	34.06	4.40	44.72	32.04	54.00	21.96
7320	46.10	PK	H	36.55	5.44	44.22	43.87	74.00	30.13
7320	32.96	AV	H	36.55	5.44	44.22	30.73	54.00	23.27
Frequency: 2480MHz									
2480	53.13	PK	H	28.94	3.12	0.00	85.19	N/A	N/A
2480	48.12	AV	H	28.94	3.12	0.00	80.18	N/A	N/A
2480	45.58	PK	V	28.94	3.12	0.00	77.64	N/A	N/A
2480	40.12	AV	V	28.94	3.12	0.00	72.18	N/A	N/A
2483.5	32.62	PK	H	28.95	3.12	0.00	64.69	74.00	9.31
2483.5	13.48	AV	H	28.95	3.12	0.00	45.55	54.00	8.45
4960	50.23	PK	H	34.29	4.44	44.71	44.25	74.00	29.75
4960	37.48	AV	H	34.29	4.44	44.71	31.50	54.00	22.50
7440	45.71	PK	H	36.72	5.48	44.54	43.37	74.00	30.63
7440	32.24	AV	H	36.72	5.48	44.54	29.90	54.00	24.10

Note:
Corrected Amplitude = Corrected Factor + Reading
Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor
Margin = Limit- Corr. Amplitude
Spurious emissions more than 20 dB below the limit were not reported.

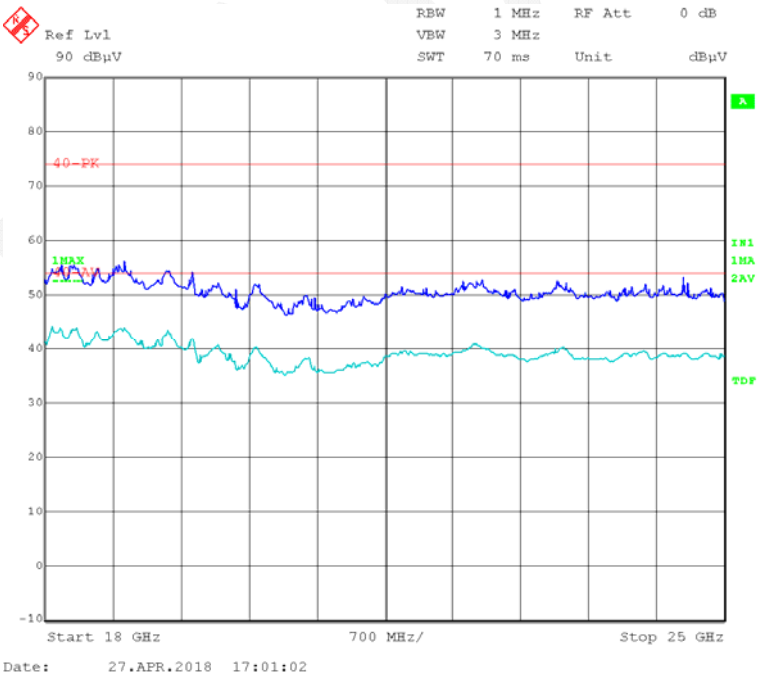
Please refer to the below pre-scan plot of worst case:

Low Channel_Horizontal_1GHz-18GHz

Fundamental with Reject Band Filter

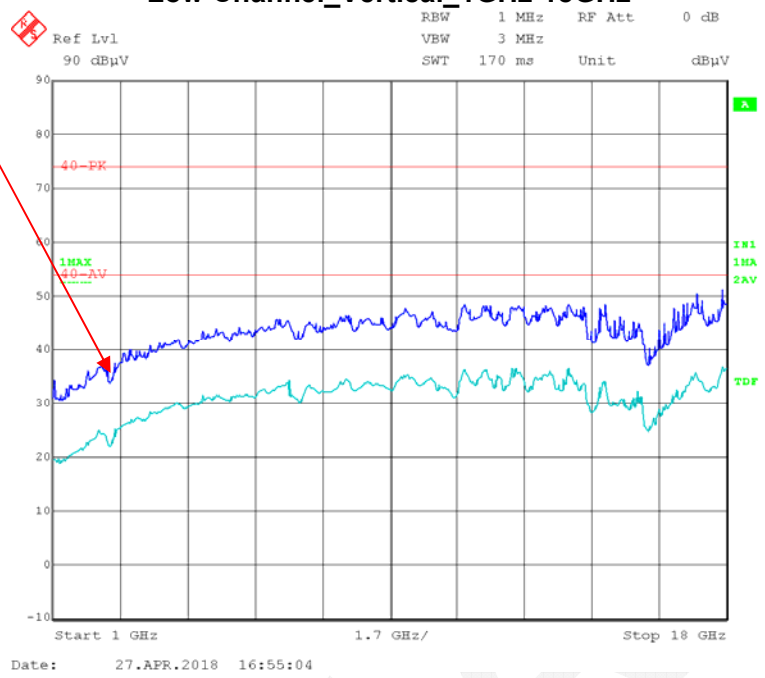


Low Channel_Horizontal_18GHz-25GHz

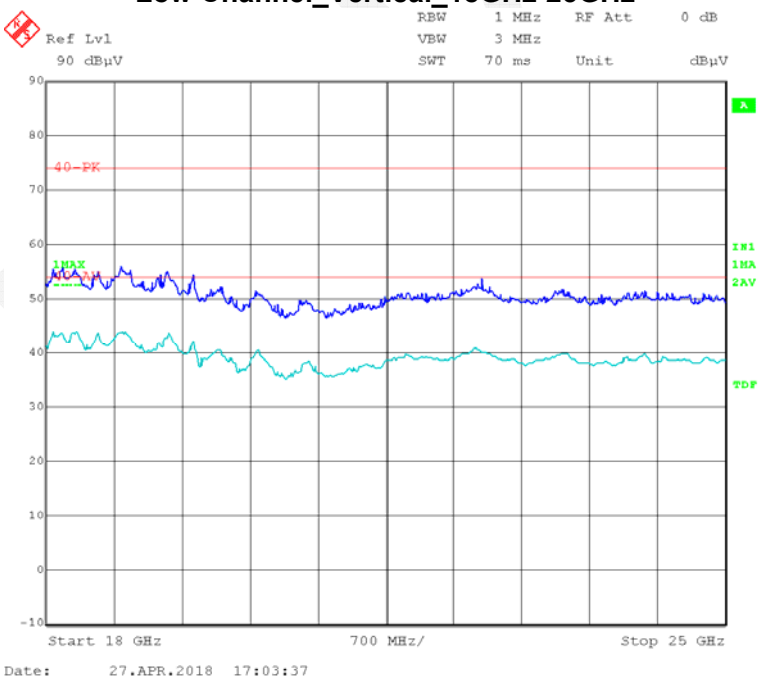


Low Channel_Vertical_1GHz-18GHz

Fundamental with Reject Band Filter



Low Channel_Vertical_18GHz-25GHz



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

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 Data

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	58 %
ATM Pressure:	95.4 kPa

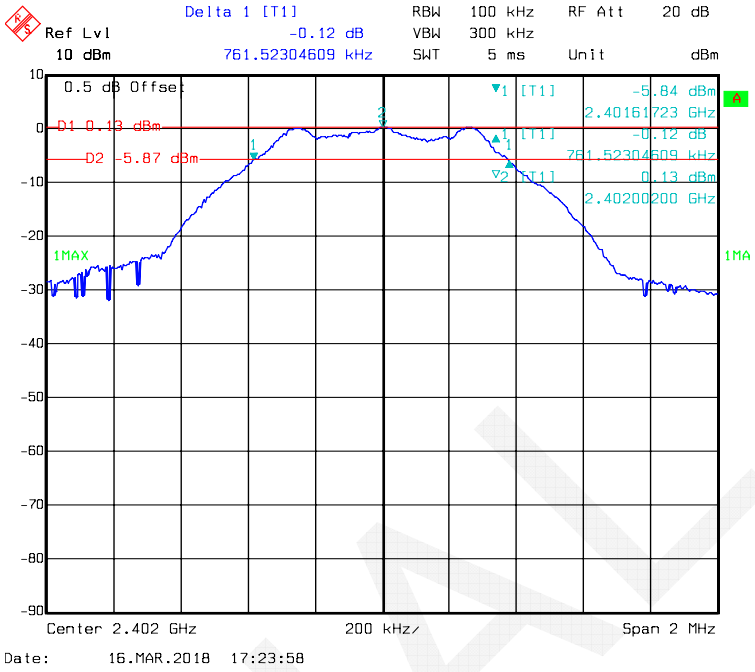
** The testing was performed by Tom Tang on 2018-03-16.*

Test Mode: Transmitting

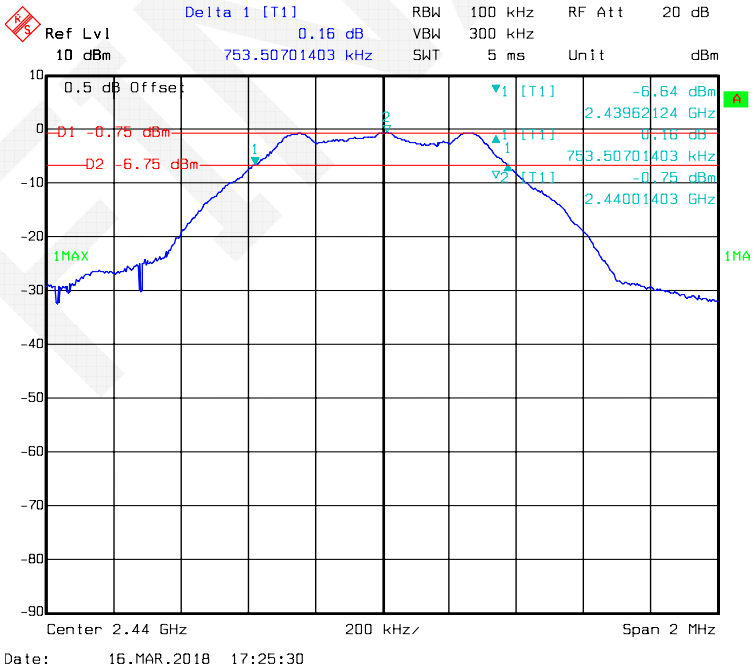
Test Result: Compliance. Please refer to the following table and plots.

Mode	Channel	Frequency (MHz)	6dB OBW (MHz)	Limit (MHz)
BLE	Low	2402	0.76	≥0.50
	Middle	2440	0.75	≥0.50
	High	2480	0.76	≥0.50

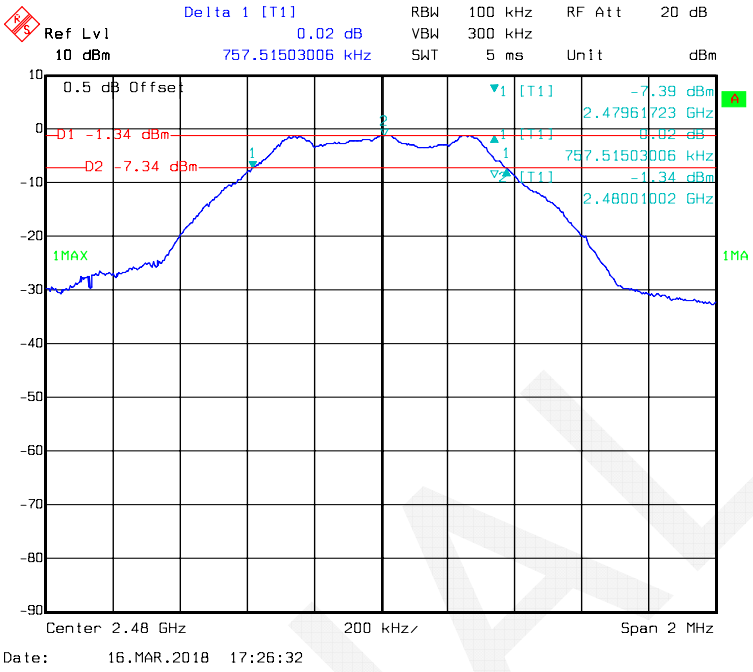
Low Channel



Middle Channel



High Channel



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

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

a) Set the RBW ≥ DTS bandwidth.

b) Set VBW ≥ [3 · RBW].

c) Set span ≥ [3 · RBW].

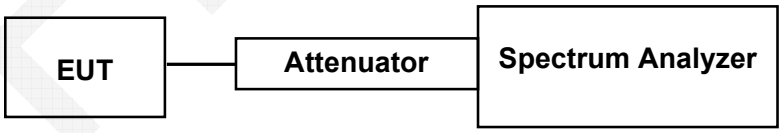
d) Sweep time = auto couple.

e) Detector = peak.

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

h) Use peak marker function to determine the peak amplitude level.



Test Data

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	58 %
ATM Pressure:	95.4 kPa

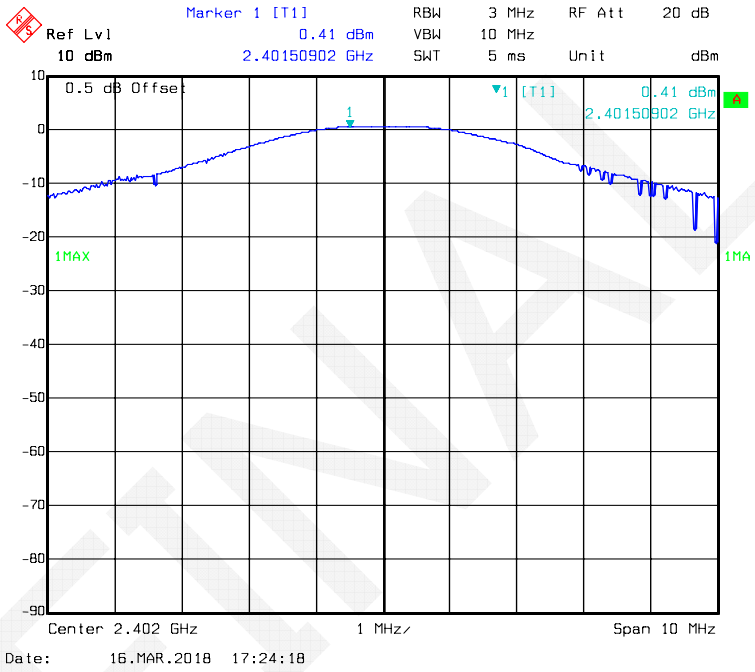
** The testing was performed by Tom Tang on 2018-03-16.*

Test Mode: Transmitting

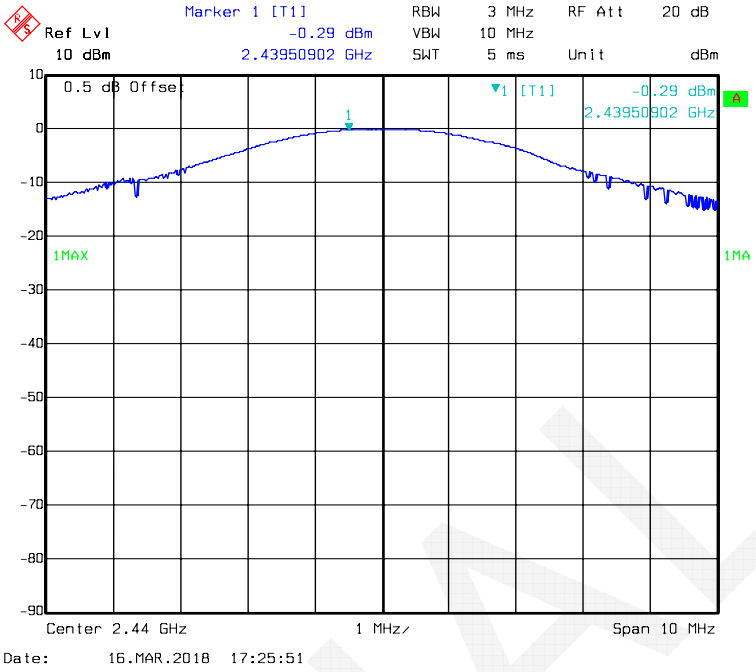
Test Result: Compliance. Please refer to the following table.

Channel	Frequency (MHz)	Max Peak Conducted Output Power (dBm)	Limit (dBm)
Low	2402	0.41	30
Middle	2440	-0.29	30
High	2480	-0.91	30

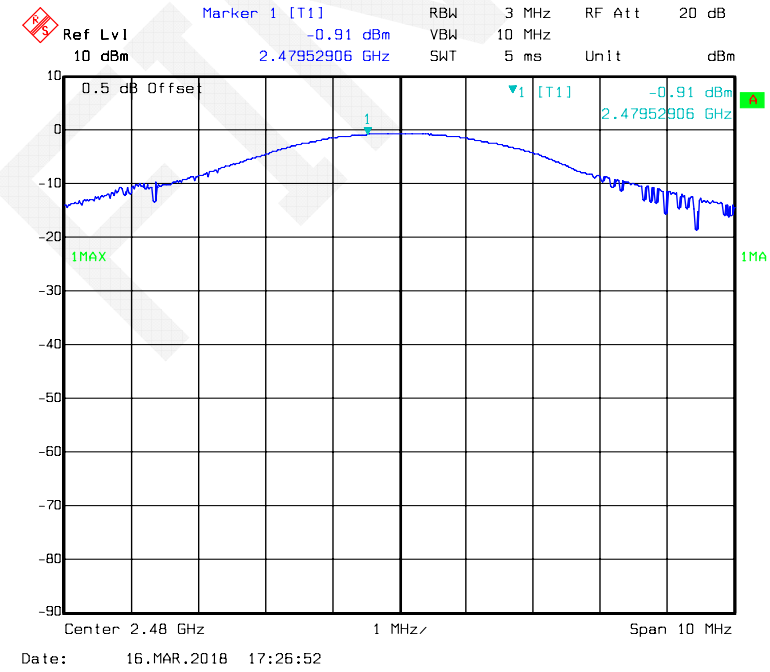
Low Channel



Middle Channel



High Channel



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 Data

Environmental Conditions

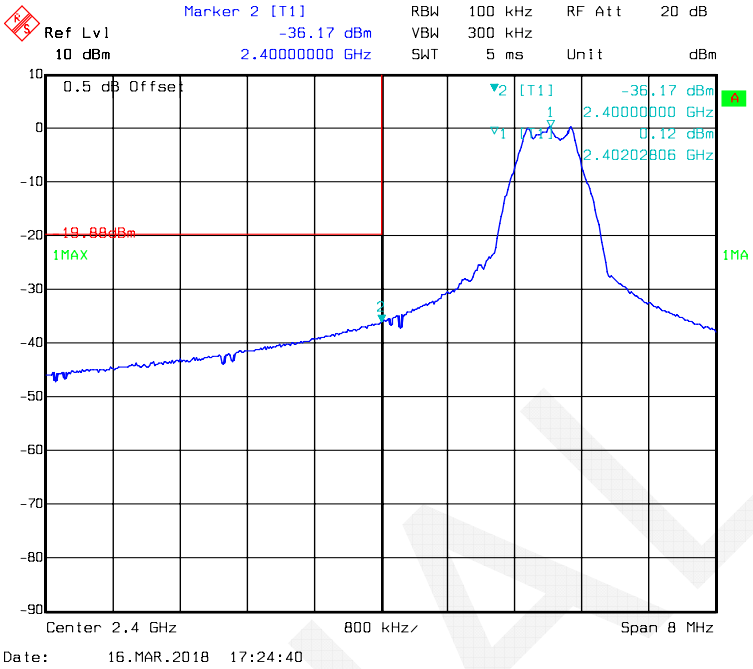
Temperature:	22 °C
Relative Humidity:	58 %
ATM Pressure:	95.4 kPa

** The testing was performed by Tom Tang on 2018-03-16.*

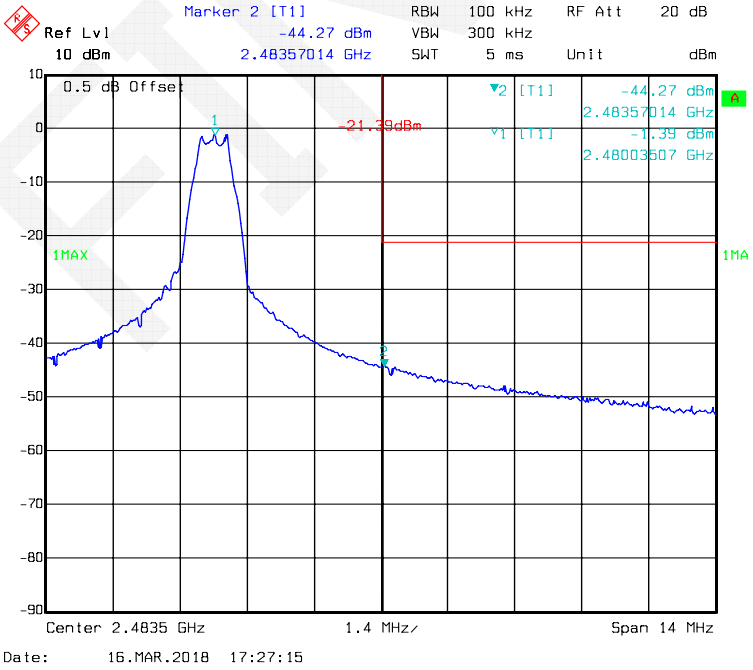
Test mode: Transmitting

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

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 Data

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	58 %
ATM Pressure:	95.4 kPa

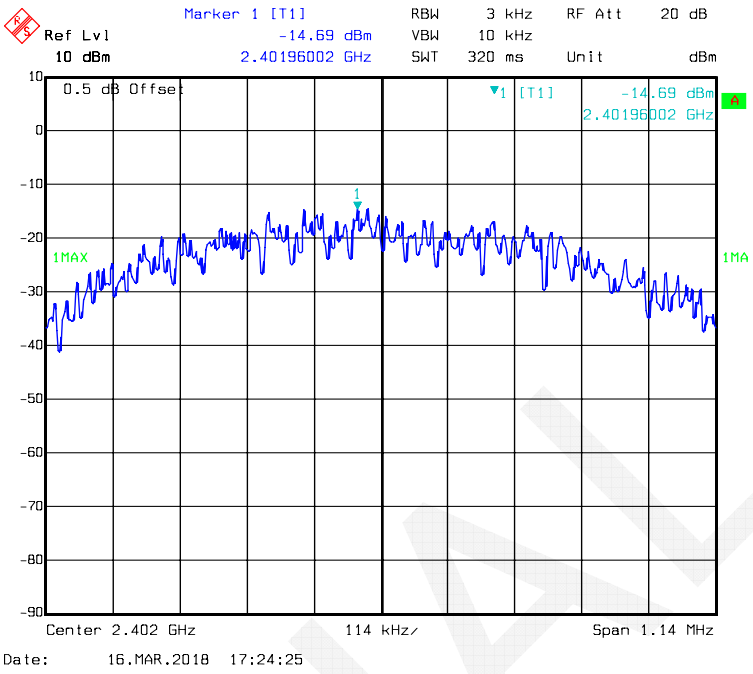
** The testing was performed by Tom Tang on 2018-03-16.*

Test Mode: Transmitting

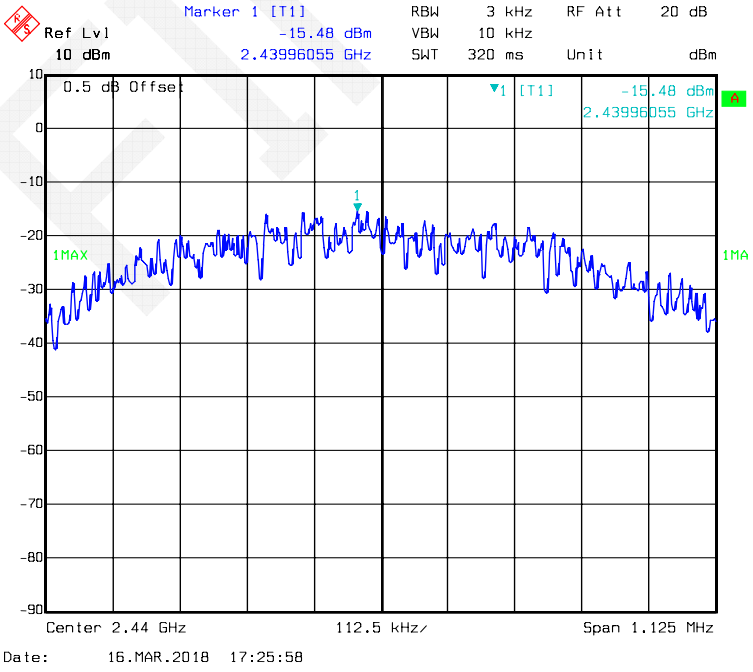
Test Result: Compliance. Please refer to the following table and plots

Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
Low	2402	-14.69	≤ 8
Middle	2440	-15.48	≤ 8
High	2480	-16.11	≤ 8

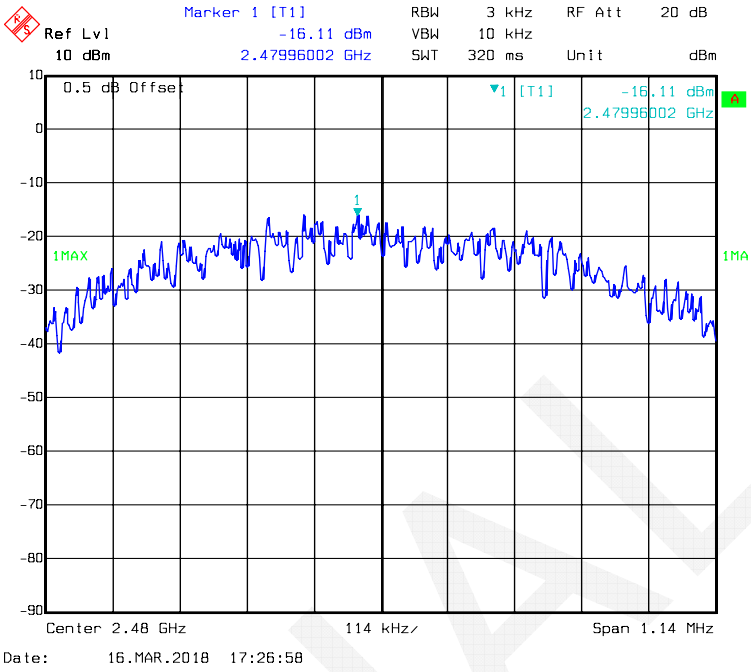
Power Spectral Density, Low Channel



Power Spectral Density, Middle Channel



Power Spectral Density, High Channel



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