TEST REPORT

Reference No.	:	WTS17S0886317-2E V1
FCC ID	:	2AOE2RG4100
Applicant	:	Zhejiang Raying IoT Technology Co., Ltd.
Address	:	10F, North of Bld. No.10, Wellong Park, No.88 Jiangling Road, Binjiang District, Hangzhou, Zhejiang, China
Manufacturer	:	The same as above
Address	:	The same as above
Product	:	ZigBee Router
Model(s)	:	RG4100+
Brand Name	:	REXENSE
Standards	:	FCC CFR47 Part 15.247:2016
Date of Receipt sample	:	2017-08-01
Date of Test	:	2017-11-17 to 2017-12-04
Date of Issue	:	2017-12-14
Test Result	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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2 Laboratories Introduction

Waltek Services Test Group Ltd. is one of the largest and the most comprehensive third party testing organizations in China, our headquarter located in Shenzhen (CNAS Registration No. L3110, A2LA Certificate Number: 4243.01) and have branches in Foshan (CNAS Registration No. L6478), Dongguan (CNAS Registration No. L9950), Zhongshan, Suzhou (CNAS Registration No. L7754), Ningbo and Hong Kong, Our test capability covered four large fields: safety test. Electronic Magnetic Compatibility(EMC), reliability and energy performance, Chemical test. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CPSC(Consumer Product Safety Commission), CEC(California energy efficiency), IC(Industry Canada) and ELI(Efficient Lighting Initiative). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as UL, Intertek(ETL-SEMKO), CSA, TÜV Rheinland, TÜV SÜD, etc. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

Waltek Services (Shenzhen) Co., Ltd.

A. Accreditations for Conformity Assessment (International)

Country/Region	Accreditation Body	Scope	Note
USA	**CNAS (Registration No.: L3110) A2LA (Certificate No.: 4243.01)**	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India	**International Services**	WPC	-
Thailand		NTC	-
Singapore		IDA	-
Note: 1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476. 2. IC Canada Registration No.: 7760A			

B. TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of …	Notify body number

TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

3 Contents

Page

4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS17S08863 17-2E	2017-08-01	2017-11-17 to 2017-11-25	2017-11-28	original	-	Replaced
WTS17S08863 17-2E V1	2017-08-01	2017-11-17 to 2017-12-04	2017-12-14	Version 1	Updated	Valid

5 General Information

5.1 General Description of E.U.T.

Product Name:	ZigBee Router
Model No.:	RG4100+
Model Difference:	NA
Operation Frequency:	2405MHz ~ 2480MHz
The Lowest Oscillator:	25MHz
Antenna Gain:	-1dBi for ZigBee
Type of modulation:	IEEE 802.15.4ZigBee (O-QPSK, 250Kbps max.)

5.2 Details of E.U.T.

Technical Data:	DC 5V, 1.0A

5.3 Channel List

ZigBee Mode

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2405	2	2410	3	2415	4	2420
5	2425	6	2430	7	2435	8	2440
9	2445	10	2450	11	2455	12	2460
13	2465	14	2470	15	2475	16	2480

5.4 Test Mode

Table 1 Tests Carried Out Under FCC part 15.247

Test Items	Mode	Data Rate	Channel	TX/RX
Maximum Peak Output Power	802.15.4 ZigBee	250Kbps	1/8/16	TX
Power Spectral Density	802.15.4 ZigBee	250Kbps	1/8/16	TX
Band Edge	802.15.4 ZigBee	250Kbps	1/8/16	TX
Bandwidth	802.15.4 ZigBee	250Kbps	1/8/16	TX
Transmitter Spurious Emissions	802.15.4 ZigBee	250Kbps	1/8/16	TX

Note :Parameters set by test software during channel & power tests, the software provided by the customer was used to set the operating channels as well as the output power level. The RF output power set is the power expected by the manufacturer and is going to be fixed on the firmware of the final product .

6 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207(a)	PASS
Conducted Spurious Emissions	15.247(d)	PASS
Radiated Emissions	15.247 15.205(a) 15.209(a)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(3),(4)	PASS
Power Spectral Density	15.247(e)	PASS
Band Edge	15.247(d)	PASS
Antenna Requirement	15.203	PASS

7 Equipment Used during Test

7.1 Equipments List

Conducted Emissions Test Site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	100947	2017-09-12	2018-09-11
2.	LISN	R&S	ENV216	101215	2017-09-12	2018-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2017-09-12	2018-09-11
Conducted Emissions Test Site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	101155	2017-09-12	2018-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2017-09-12	2018-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2017-09-12	2018-09-11
4.	Cable	LARGE	RF300	-	2017-09-12	2018-09-11
5	ISN	SCHWARZBECK	CAT5 8158	CAT5-8158-0051	2017-04-07	2018-04-06
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP	100091	2017-04-29	2018-04-28
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2017-04-09	2018-04-08
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2017-04-09	2018-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2017-09-12	2018-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2017-04-09	2018-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2017-04-09	2018-04-08
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2017-04-13	2018-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2017-04-13	2018-04-12
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	2017-04-13	2018-04-12
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2017-04-09	2018-04-08
3	Amplifier	Compliance pirection	PAP-0203	22024	2017-04-13	2018-04-12

		systems inc				
4	Cable	HUBER+SUHNER	CBL2	525178	2017-04-13	2018-04-12
5	Broad-band Horn Antenna(18-40G)	SCHWARZBECK	BBHA 9170	335	2017-10-25	2018-10-24
6	Amplifier	COM-MV	ZLNA-18-40G-021	1608001	2017-10-25	2018-10-24
RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2017-09-12	2018-09-11
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2017-09-12	2018-09-11
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2017-09-12	2018-09-11

7.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
Notebook	Acer	A1465	C17KTQDNF5N7

7.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-6}
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

7.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

8 Conducted Emission

Test Requirement: FCC CFR 47 Part 15 Section 15.207

Test Method: ANSI C63.10:2013

Test Result: PASS

Frequency Range: 150kHz to 30MHz

Class/Severity: Class B

Limit:

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

8.1 E.U.T. Operation

Operating Environment **:**

Temperature: 21.5 °C

Humidity: 51.9 % RH

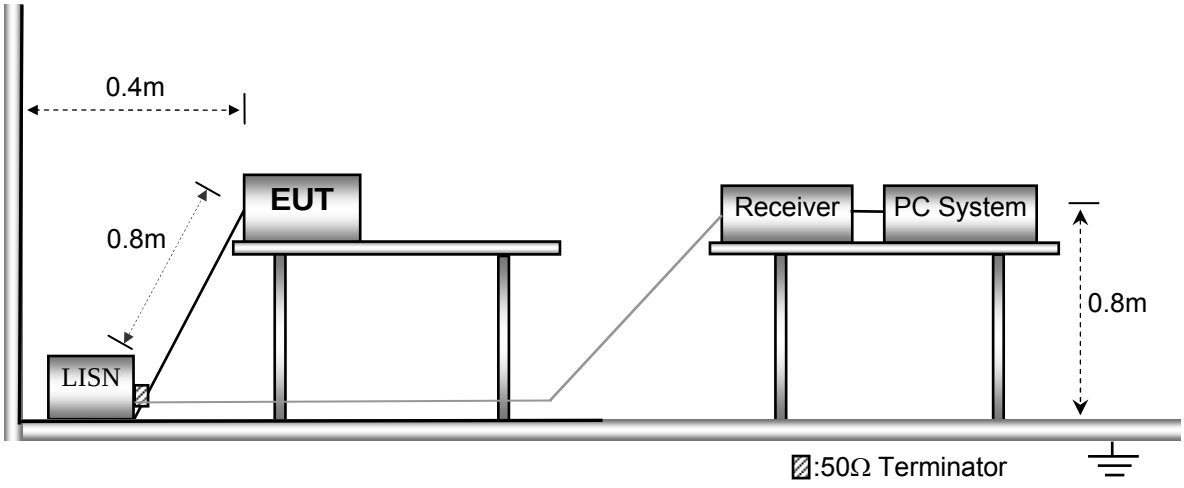
Atmospheric Pressure: 101.2kPa

EUT Operation **:**

The test was performed in TX transmitting mode, the worst data were shown in the report.

8.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10.



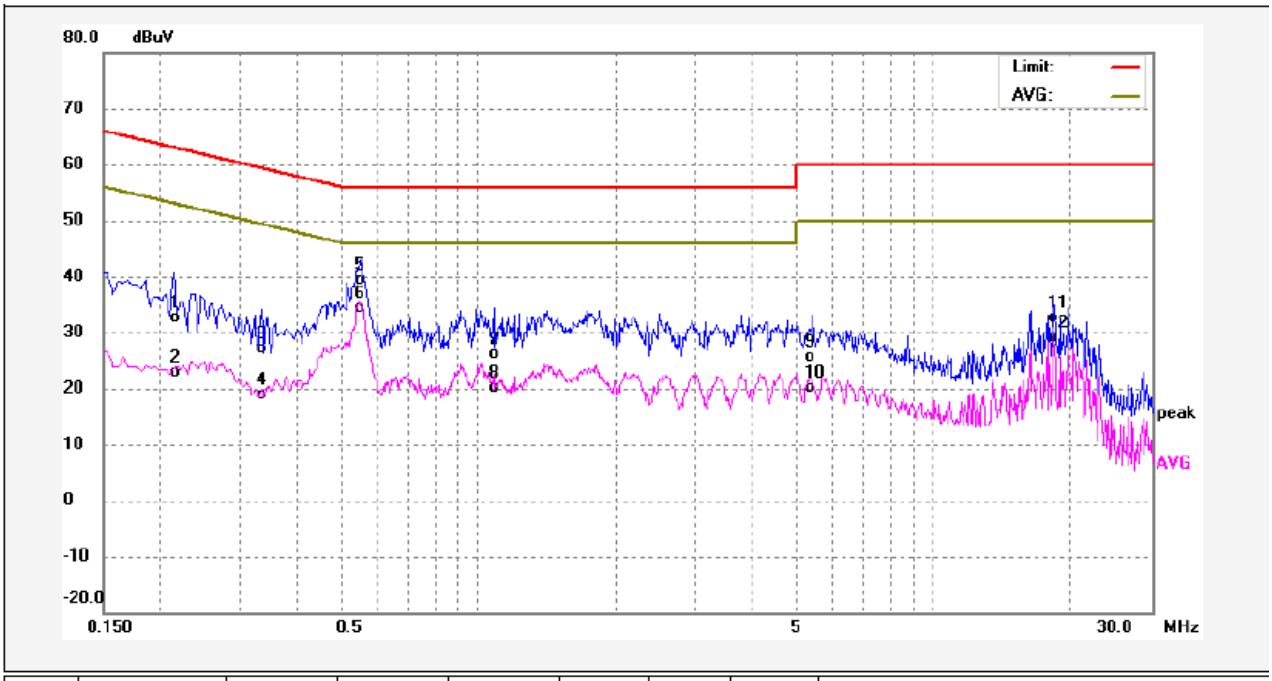
8.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

8.4 Conducted Emission Test Result

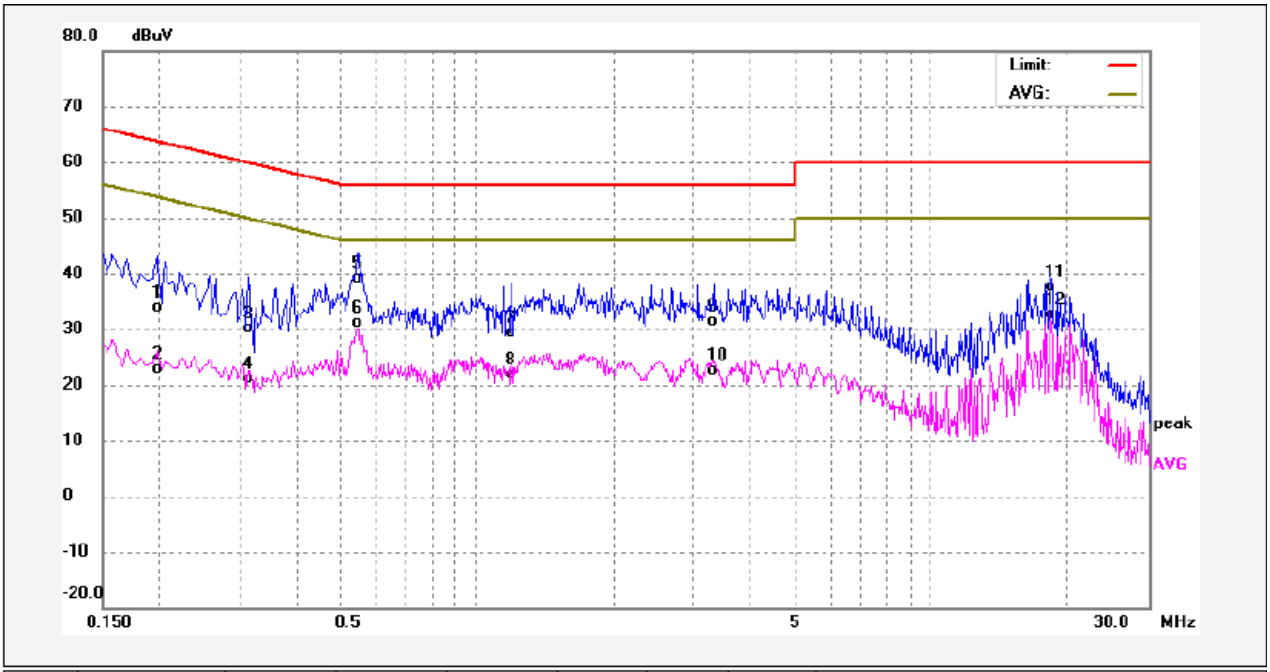
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2140	22.68	9.94	32.62	63.04	-30.42	QP	
2	0.2140	13.03	9.94	22.97	53.04	-30.07	AVG	
3	0.3339	17.20	10.03	27.23	59.35	-32.12	QP	
4	0.3339	8.83	10.03	18.86	49.35	-30.49	AVG	
5	0.5540	29.41	10.07	39.48	56.00	-16.52	QP	
6	0.5540	24.43	10.07	34.50	46.00	-11.50	AVG	
7	1.0780	16.00	10.22	26.22	56.00	-29.78	QP	
8	1.0780	9.98	10.22	20.20	46.00	-25.80	AVG	
9	5.4220	15.33	10.26	25.59	60.00	-34.41	QP	
10	5.4220	9.95	10.26	20.21	50.00	-29.79	AVG	
11	18.2420	22.11	10.44	32.55	60.00	-27.45	QP	
12	18.2420	18.80	10.44	29.24	50.00	-20.76	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1980	23.86	9.91	33.77	63.69	-29.92	QP	
2	0.1980	12.96	9.91	22.87	53.69	-30.82	AVG	
3	0.3140	20.01	10.00	30.01	59.86	-29.85	QP	
4	0.3140	11.12	10.00	21.12	49.86	-28.74	AVG	
5	0.5460	29.00	10.07	39.07	56.00	-16.93	QP	
6	0.5460	20.95	10.07	31.02	46.00	-14.98	AVG	
7	1.1860	18.92	10.39	29.31	56.00	-26.69	QP	
8	1.1860	11.59	10.39	21.98	46.00	-24.02	AVG	
9	3.3220	21.20	10.25	31.45	56.00	-24.55	QP	
10	3.3220	12.45	10.25	22.70	46.00	-23.30	AVG	
11	18.2419	27.31	10.44	37.75	60.00	-22.25	QP	
12	18.2419	22.07	10.44	32.51	50.00	-17.49	AVG	

9 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

9.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

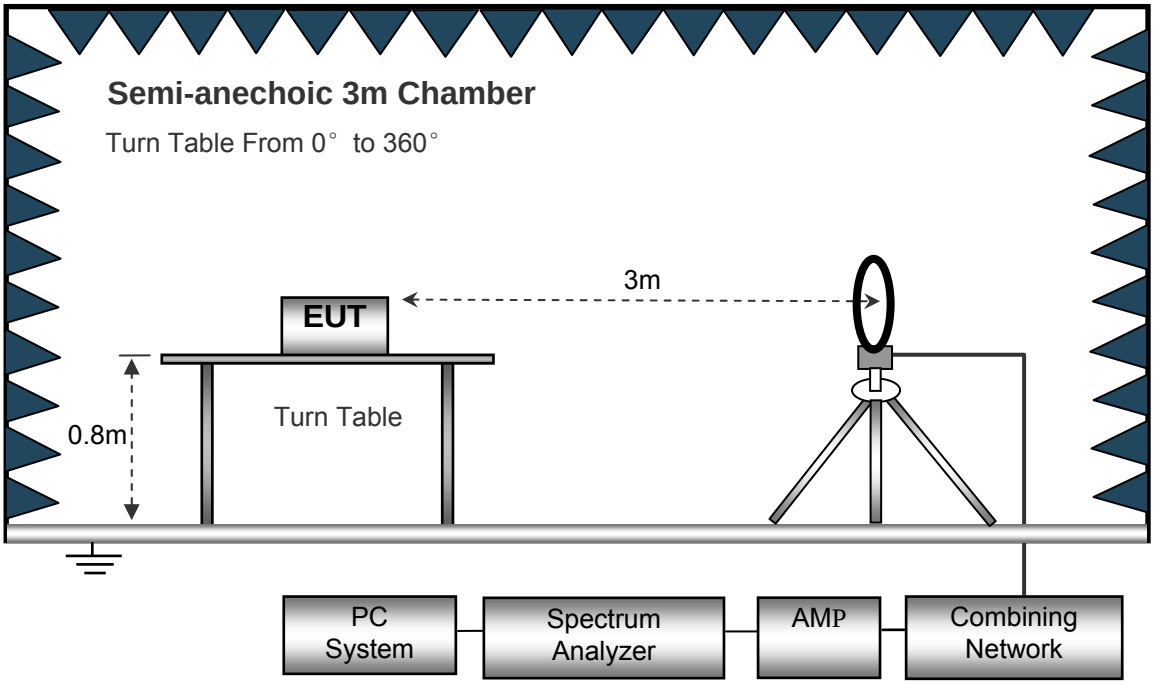
EUT Operation **:**

The test was performed in TX transmitting mode, the test data were shown in the report.

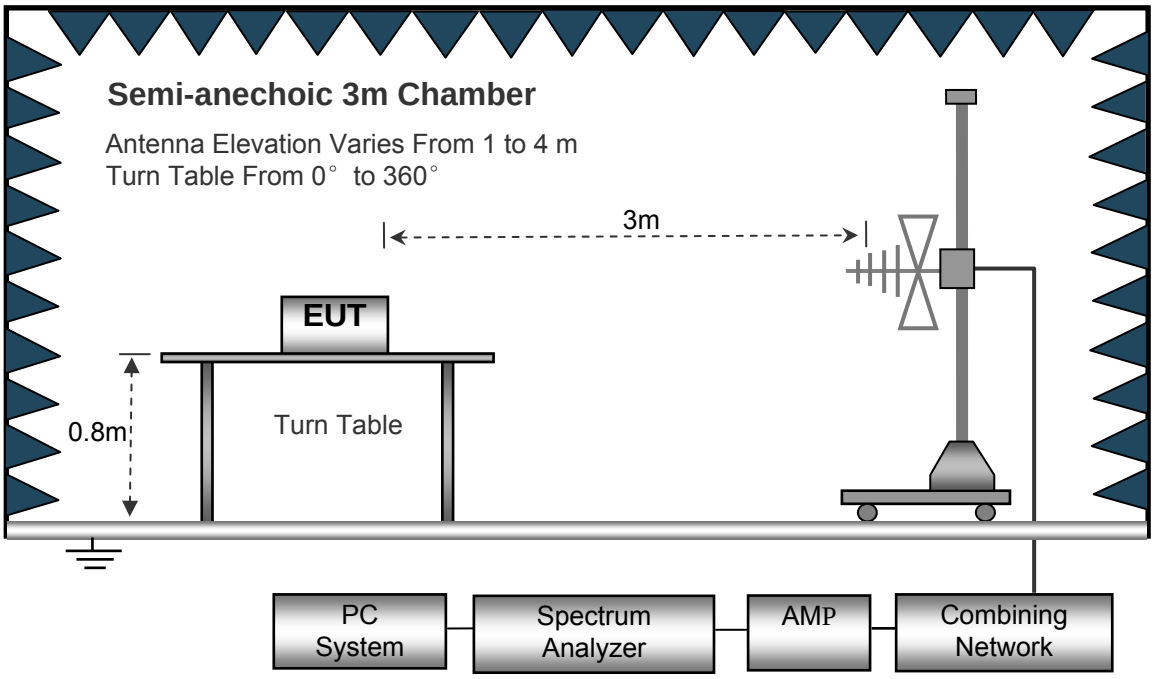
9.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

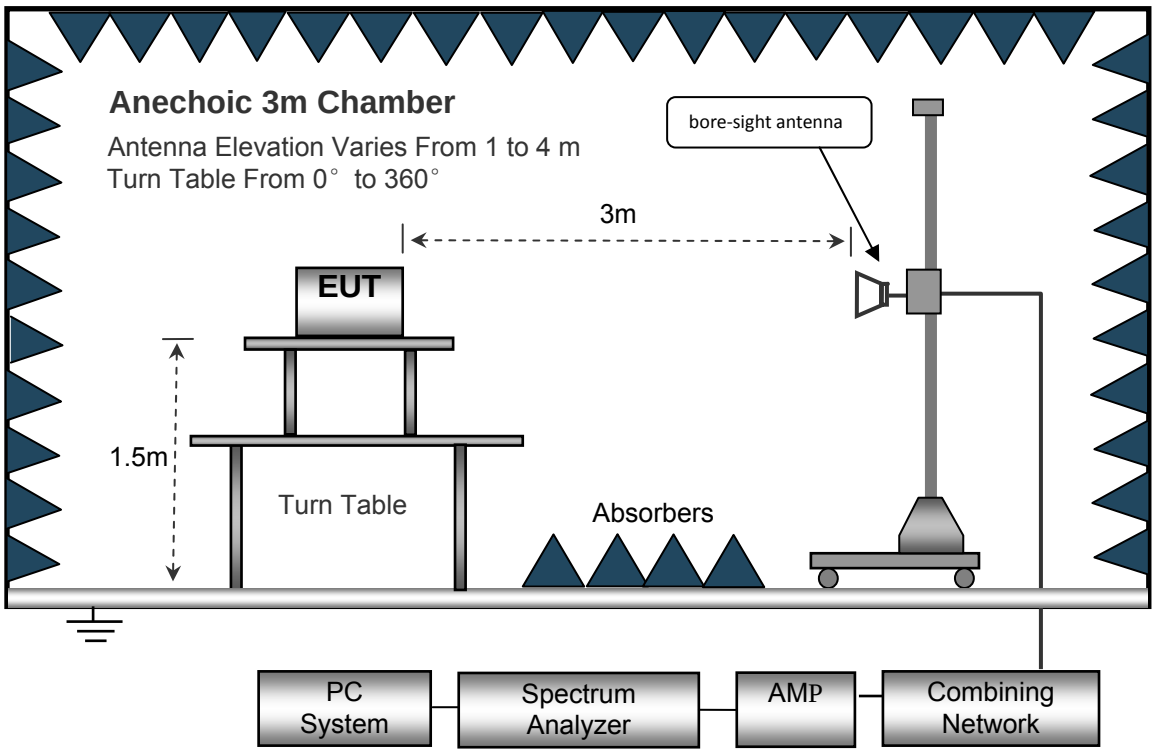
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



9.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed ..... Auto
IF Bandwidth..... 10kHz
Video Bandwidth..... 10kHz
Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 3MHz
Detector ..... Ave.
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 10Hz

9.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in Z axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used druing radiated emissions above 1GHz measurement.

9.5 Corrected Amplitude & Margin Calculation

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

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - 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 maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Limit

9.6 Summary of Test Results

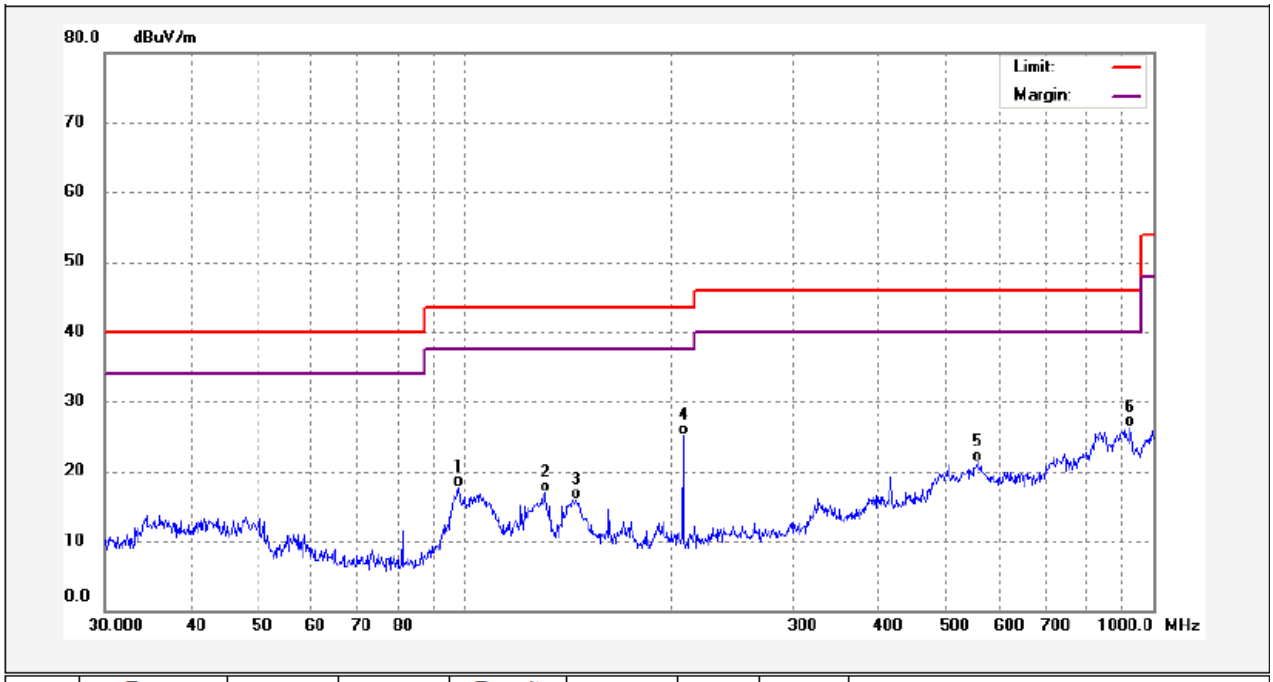
ZigBee Mode:
Test Frequency: 9KHz~30MHz

Frequency	Measurement results dBμV @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dBμV/m @30m	Limits dBμV/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
ZigBee							
6.025	24.63	QP	21.84	40.00	6.47	29.54	-23.07
8.368	25.31	QP	21.02	40.00	6.33	29.54	-23.21
25.639	25.04	QP	20.55	40.00	5.59	29.54	-23.95

Test Frequency : 30MHz ~ 1GHz

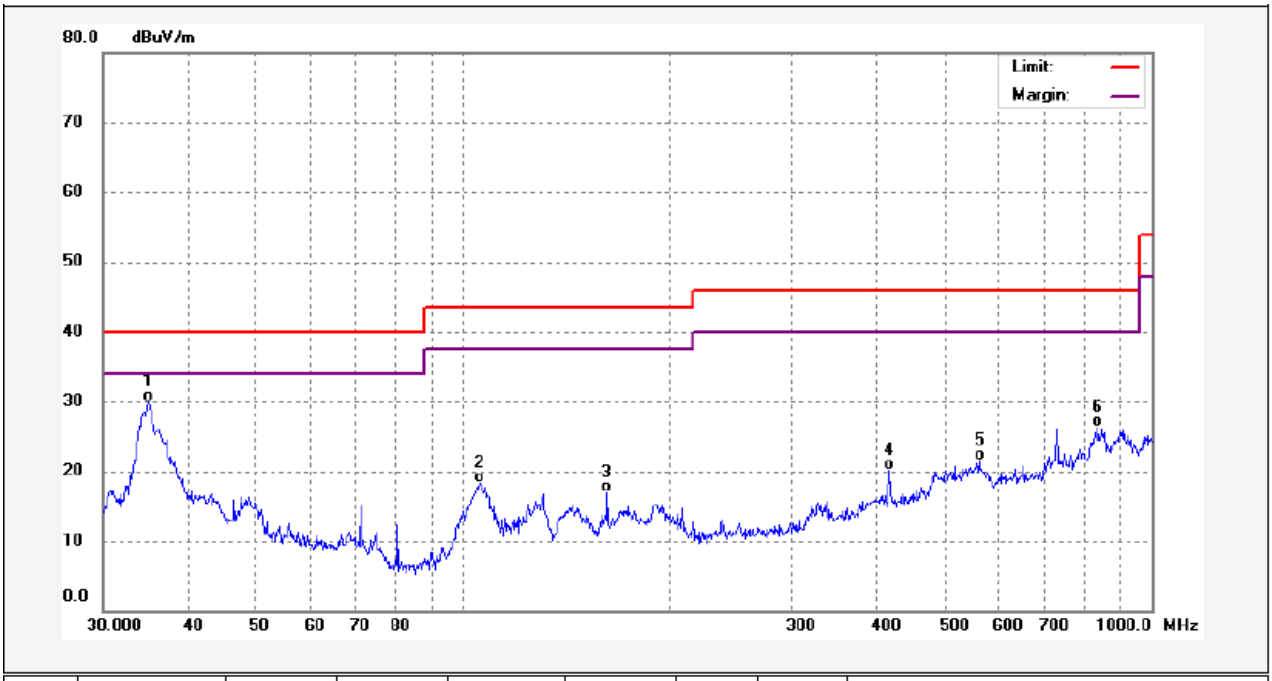
Remark: only the worst data (ZigBee Low Channel mode) were reported

Low Channel –Horizontal:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	98.1419	38.51	-20.78	17.73	43.50	-25.77	QP	
2	131.2965	31.32	-14.46	16.86	43.50	-26.64	QP	
3	145.3506	34.24	-18.26	15.98	43.50	-27.52	QP	
4	207.8501	42.63	-17.50	25.13	43.50	-18.37	QP	
5	554.8254	29.66	-8.45	21.21	46.00	-24.79	QP	
6	925.7563	30.02	-3.71	26.31	46.00	-19.69	QP	

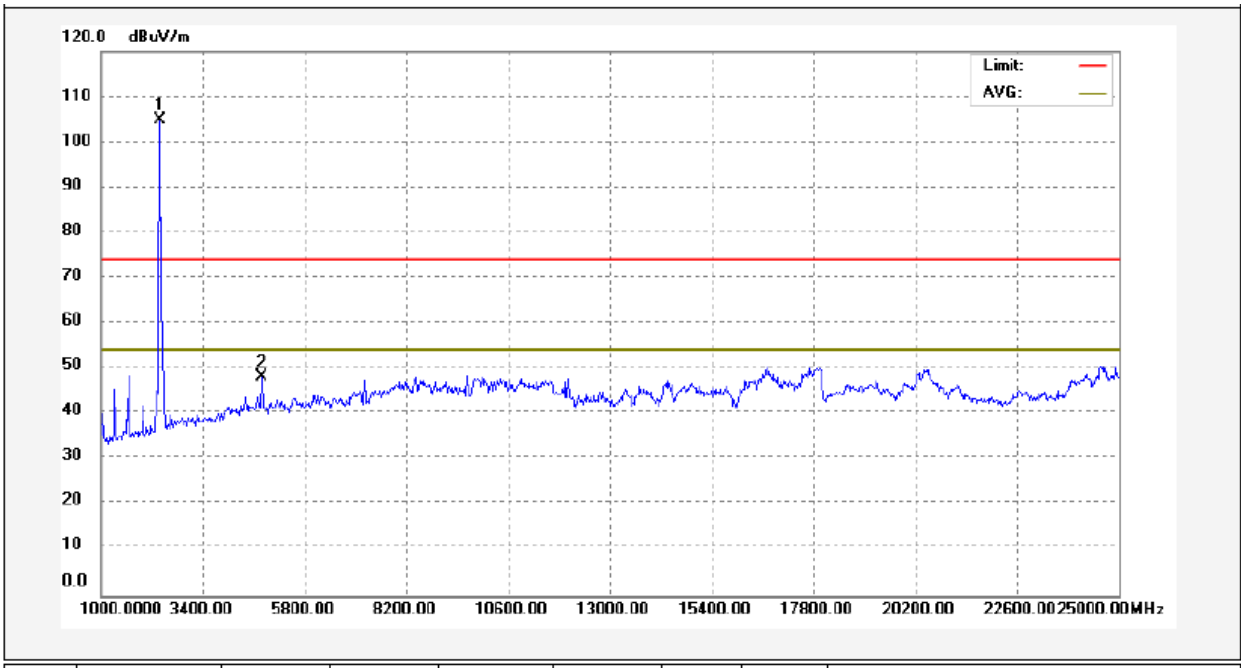
Low Channel –Vertical:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	34.8823	45.81	-15.99	29.82	40.00	-10.18	QP	
2	105.6415	37.98	-19.67	18.31	43.50	-25.19	QP	
3	162.0414	35.62	-18.67	16.95	43.50	-26.55	QP	
4	416.1791	32.39	-12.33	20.06	46.00	-25.94	QP	
5	562.6624	30.05	-8.51	21.54	46.00	-24.46	QP	
6	836.2443	29.33	-2.96	26.37	46.00	-19.63	QP	

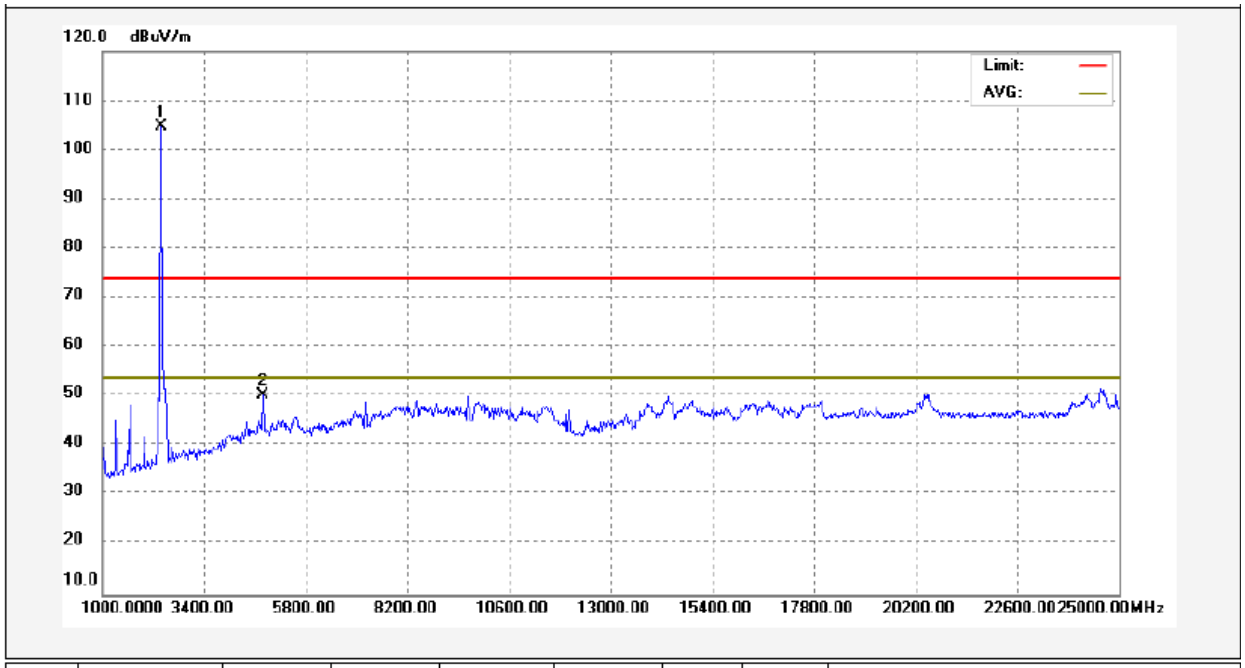
Test Frequency : 1~18GHz Remark: only the worst data (ZigBee Low Channel mode) were reported

Low Channel – Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2403.014	116.68	-11.87	104.81				
2	4792.000	53.49	-5.25	48.24	74.00	-25.76	peak	

Low Channel – Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2403.100	116.68	-11.87	104.81				
2	4792.000	55.49	-5.25	50.24	74.00	-23.76	peak	

10 Conducted Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v04 April 5, 2017

Test Result: PASS

Limit:

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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

10.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:

Blow 30MHz:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

Above 30MHz:

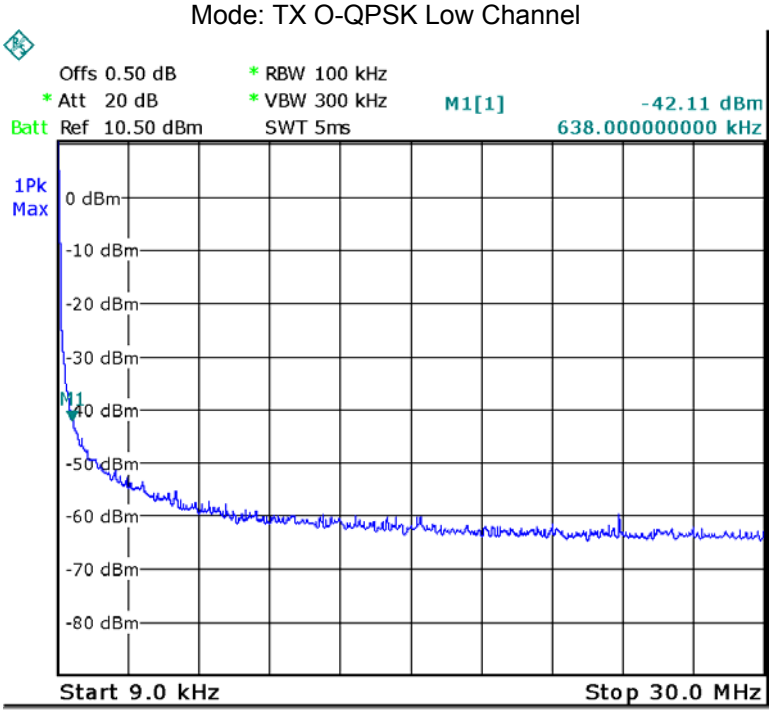
RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

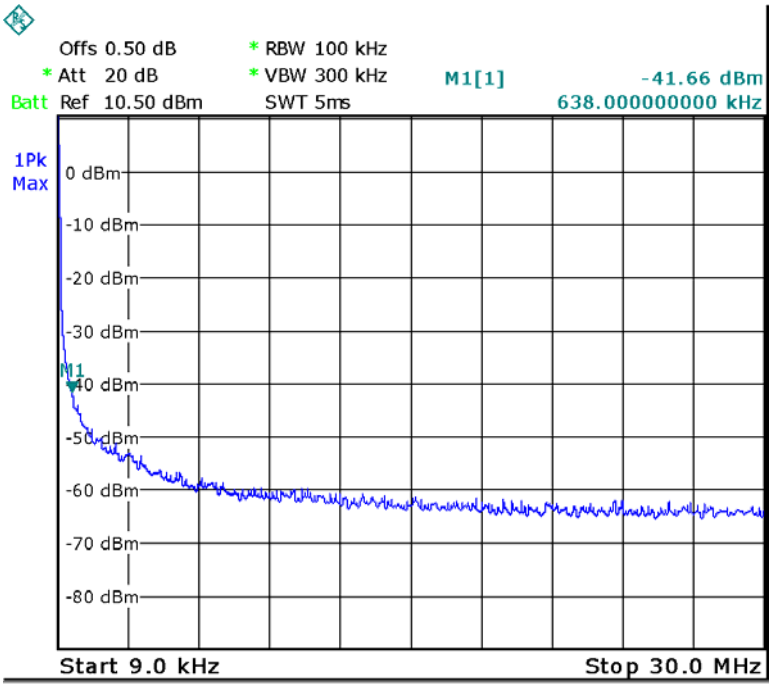
10.2 Test Result

9KHz – 30MHz

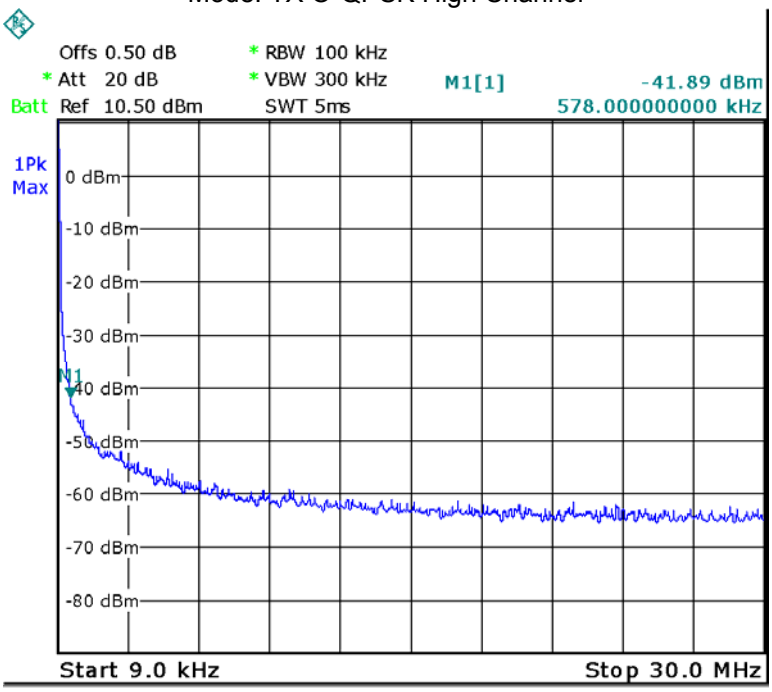
Mode: TX O-QPSK Low Channel



Mode: TX O-QPSK Middle Channel

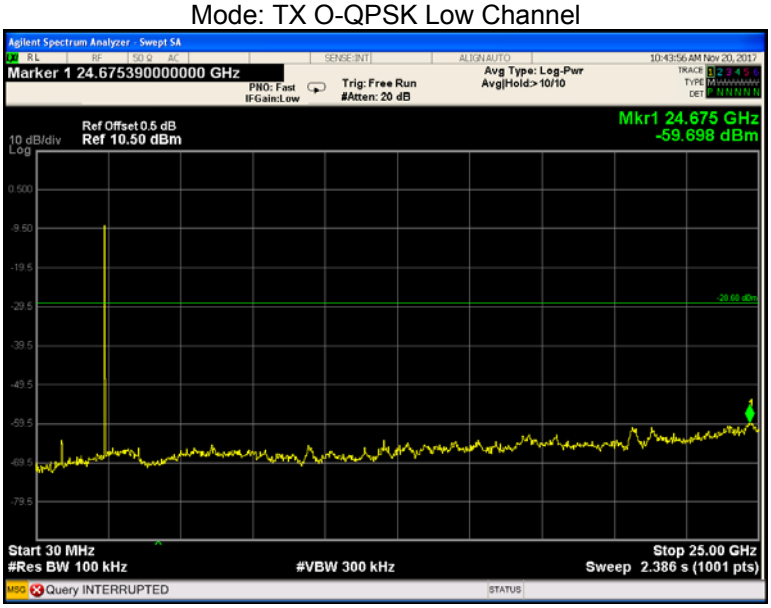


Mode: TX O-QPSK High Channel

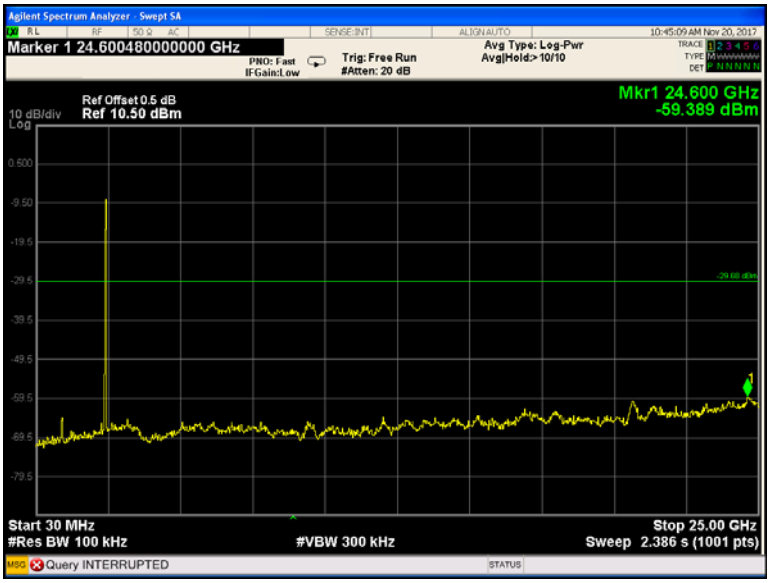


Above 30MHz

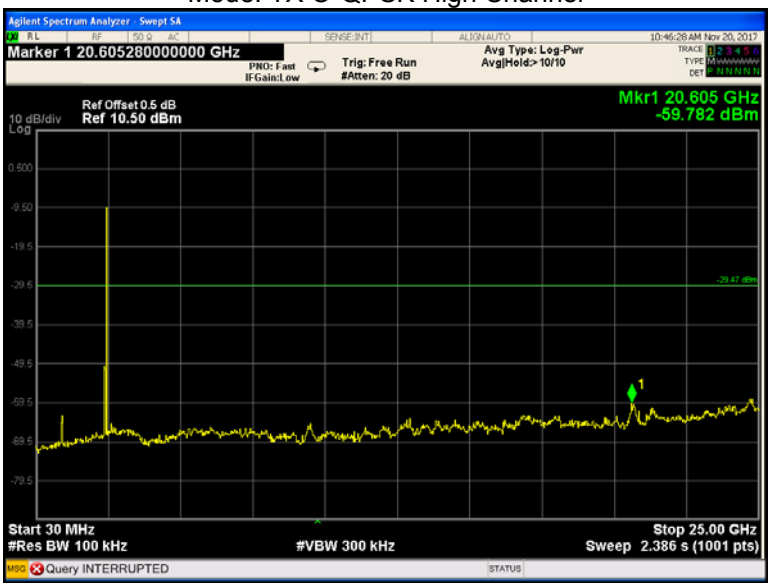
Mode: TX O-QPSK Low Channel



Mode: TX O-QPSK Middle Channel



Mode: TX O-QPSK High Channel



11 Band Edge Measurement

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	KDB 558074 D01 DTS Meas Guidance v04 April 5, 2017
Test Limit:	Regulation 15.247 (d),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 Mode:	Transmitting

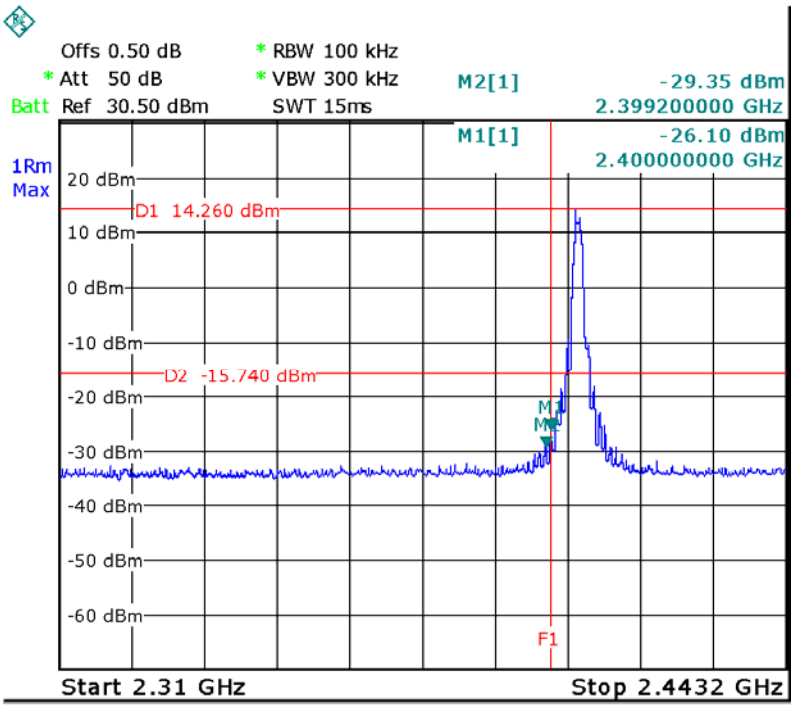
11.1 Test Produce

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.

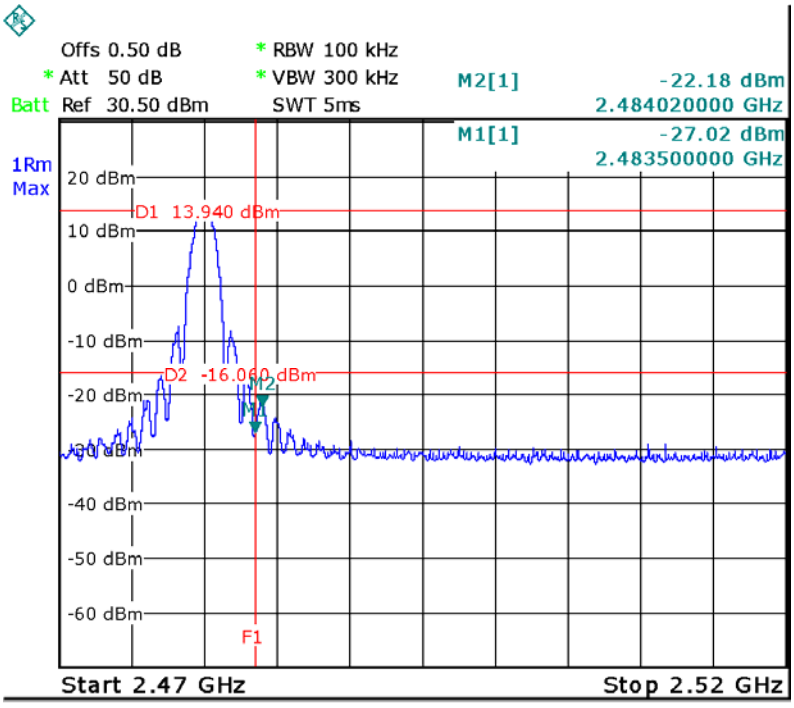
11.2 Test Result

Test result plots shown as follows:

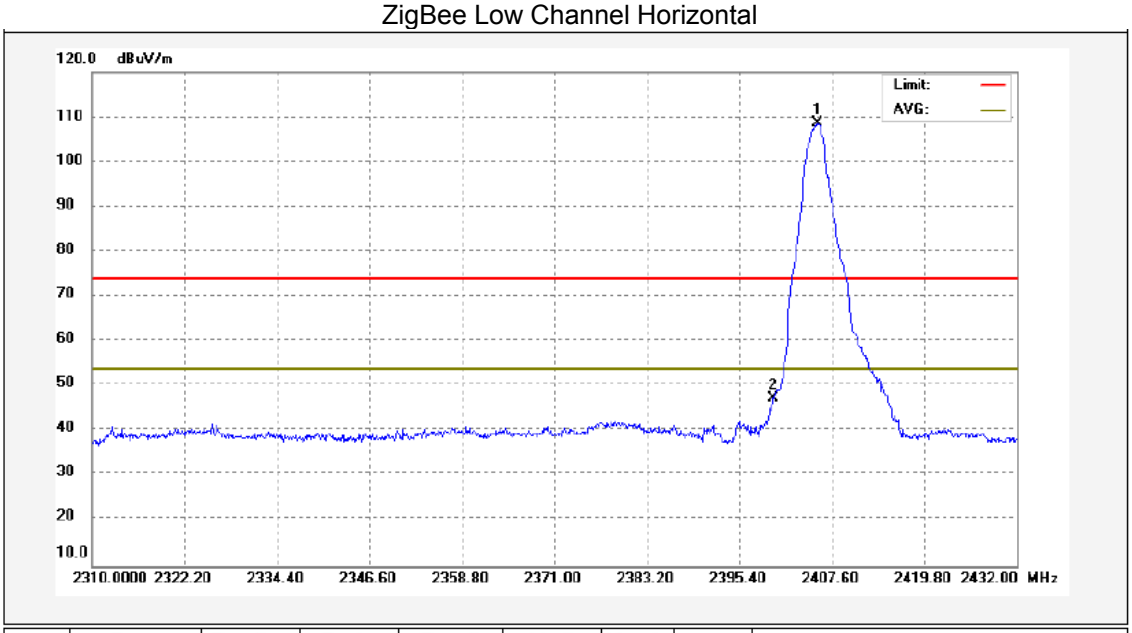
ZigBee left bandedge



ZigBee right bandedge

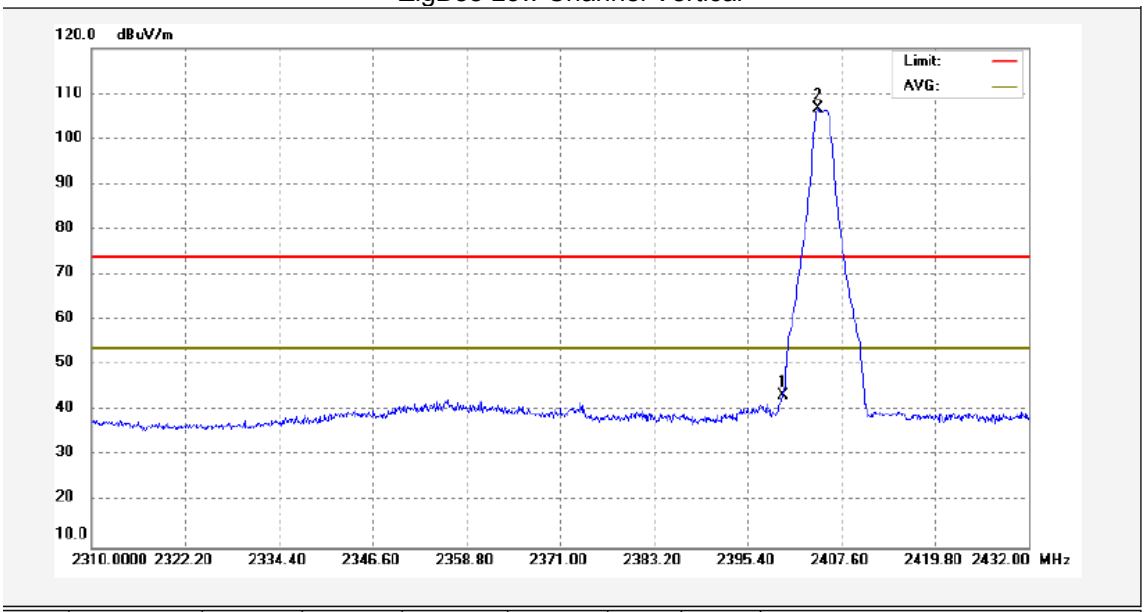


ZigBee Low Channel Horizontal



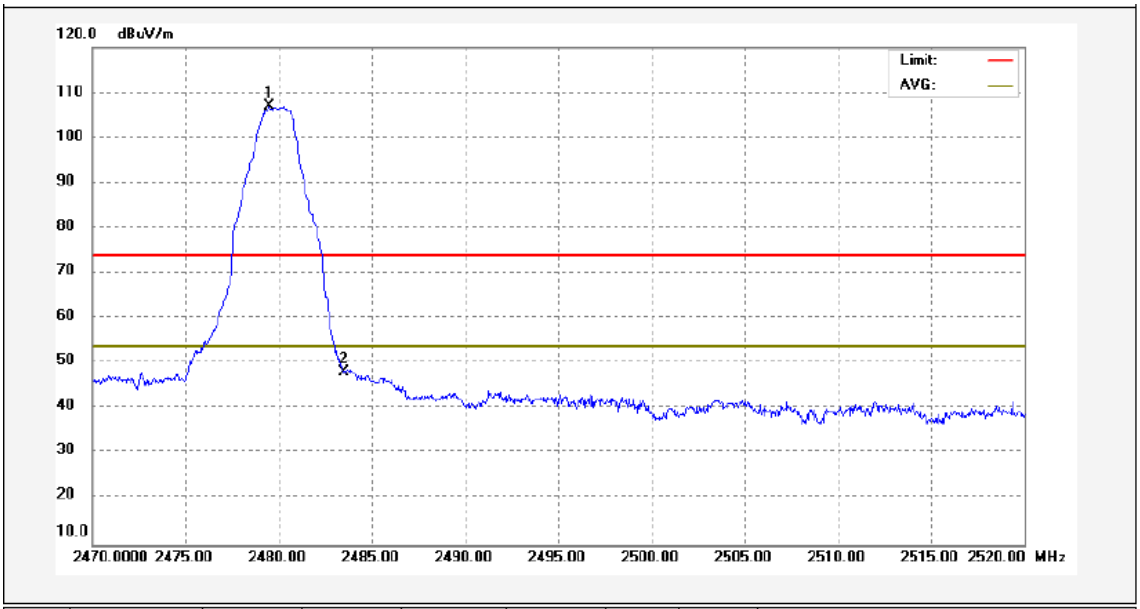
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2405.648	120.41	-11.86	108.55				
2	2400.000	59.03	-11.88	47.15	74.00	-26.85	peak	

ZigBee Low Channel Vertical



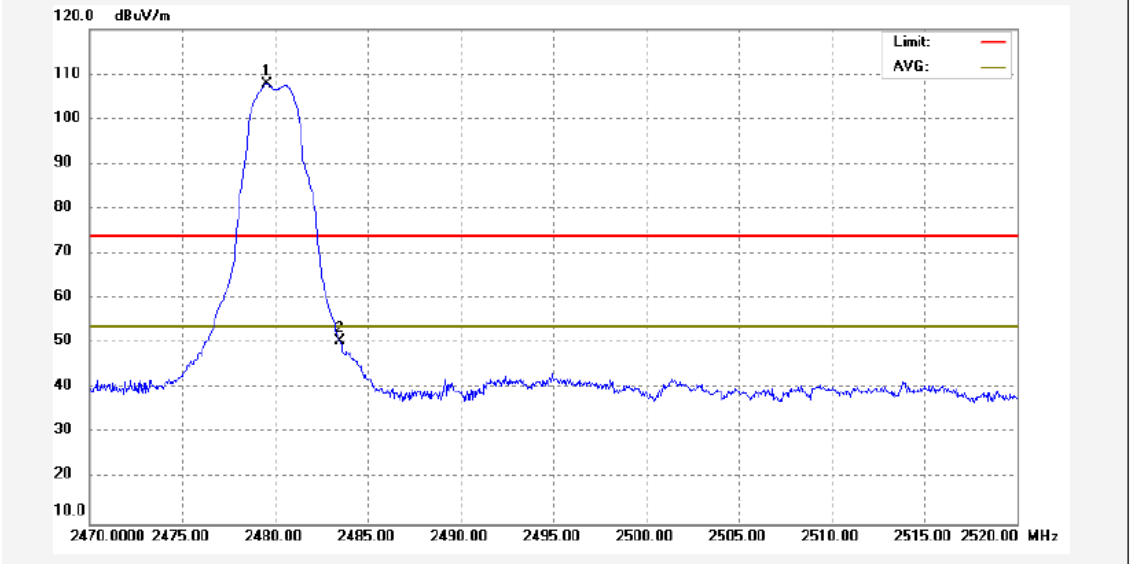
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2400.000	55.33	-11.88	43.45	74.00	-30.55	peak	
2	2404.550	118.45	-11.87	106.58				

ZigBee High Channel Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2479.500	118.47	-11.59	106.88				
2	2483.500	59.67	-11.56	48.11	74.00	-25.89	peak	

ZigBee High Channel Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2479.550	119.35	-11.59	107.76				
2	2483.500	62.03	-11.56	50.47	74.00	-23.53	peak	

12 6 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v04 April 5, 2017

12.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

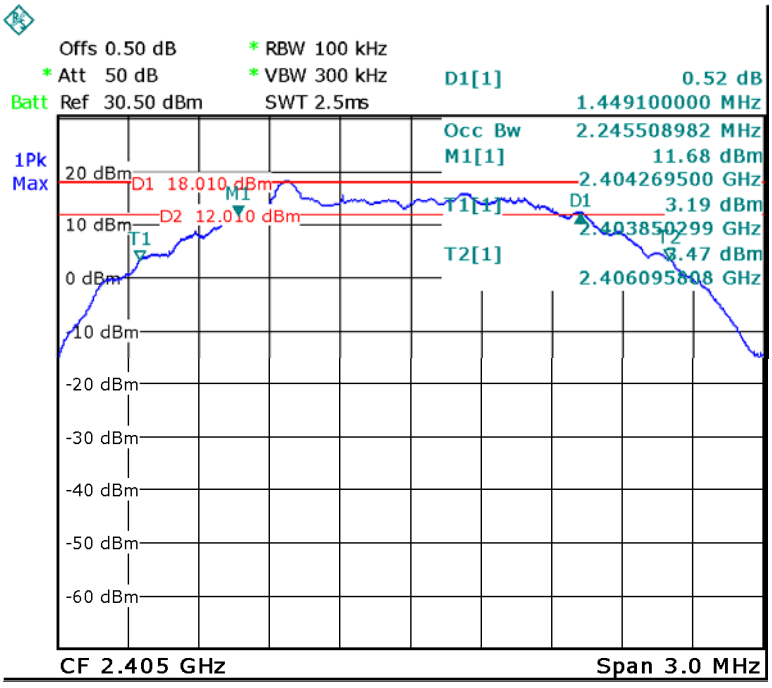
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

12.2 Test Result:

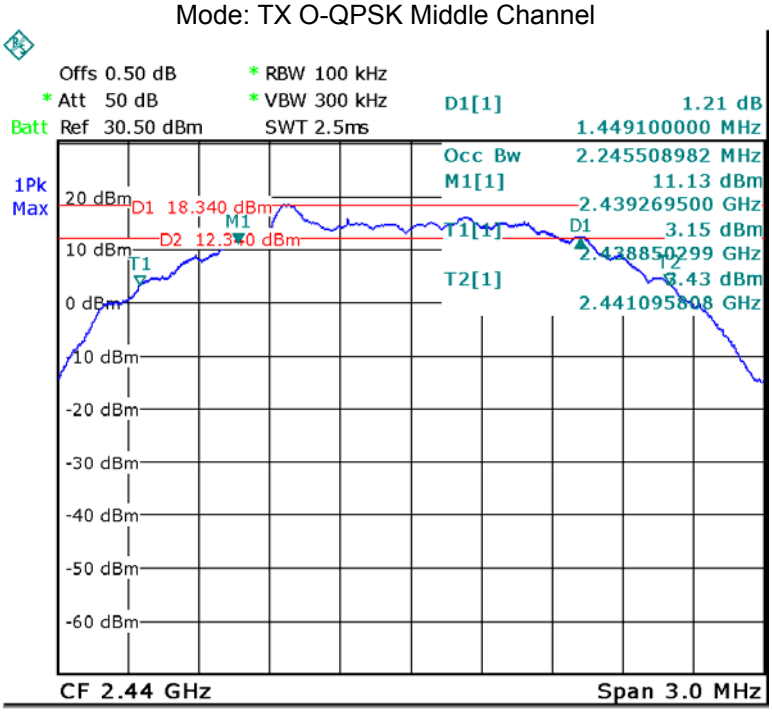
Operation mode	Bandwidth (MHz)		
TX O-QPSK	Low Channel	Middle Channel	High Channel
	1.449	1.449	1.413
	99% Bandwidth (MHz)		
	Low Channel	Middle Channel	High Channel
	2.246	2.246	2.389

Test result plot:

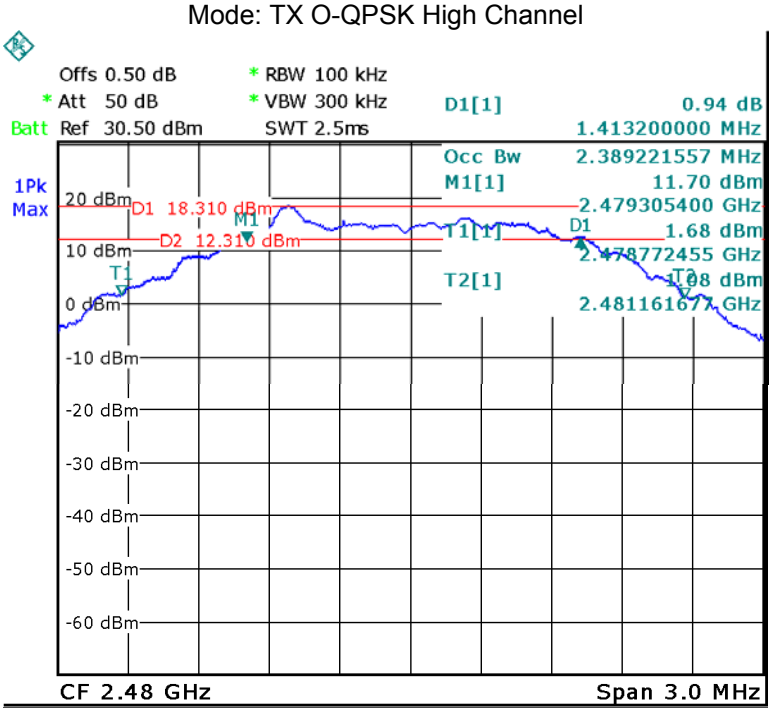
Mode: TX O-QPSK Low Channel



Mode: TX O-QPSK Middle Channel



Mode: TX O-QPSK High Channel



13 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v04 April 5, 2017

13.1 Test Procedure:

KDB 558074 D01 DTS Meas Guidance v04 April 5, 2017

section 9.1.1 (For BLE)

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

a)Set the RBW ≥ DTS bandwidth.

b)Set VBW ≥ 3 RBW.

c)Set span ≥ 3 x 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.

section 9.1.2 (For WIFI)

This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

a)Set the RBW = 1 MHz.

b)Set the VBW ≥ 3 RBW

c)Set the span ≥ 1.5 x DTS bandwidth.

d)Detector = peak.

e)Sweep time = auto couple.

f)Trace mode = max hold.

g)Allow trace to fully stabilize.

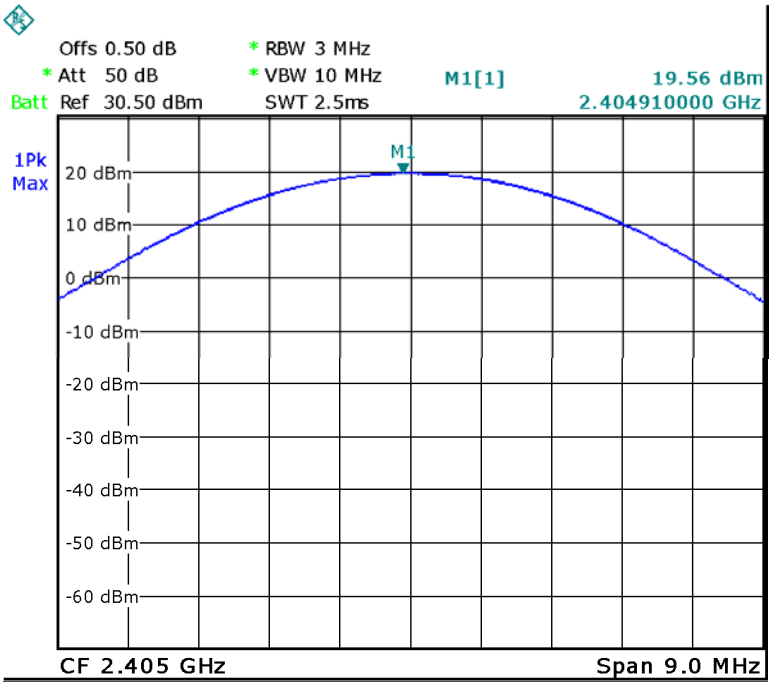
h)Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

13.2 Test Result:

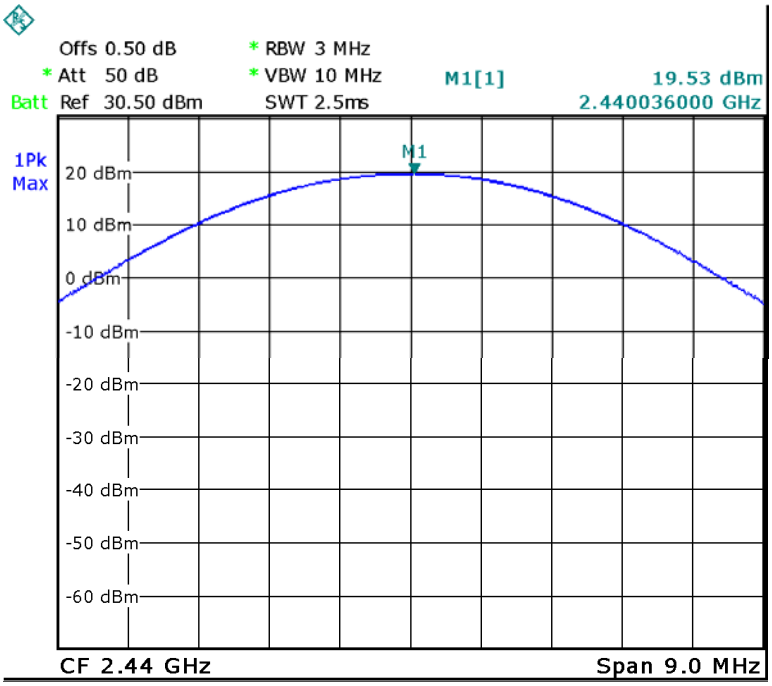
Test mode :TX O-QPSK		
Maximum Peak Output Power (dBm)		
2405MHz	2440MHz	2480MHz
19.56	19.53	19.04
Limit: 1W/30dBm		

Test Plot

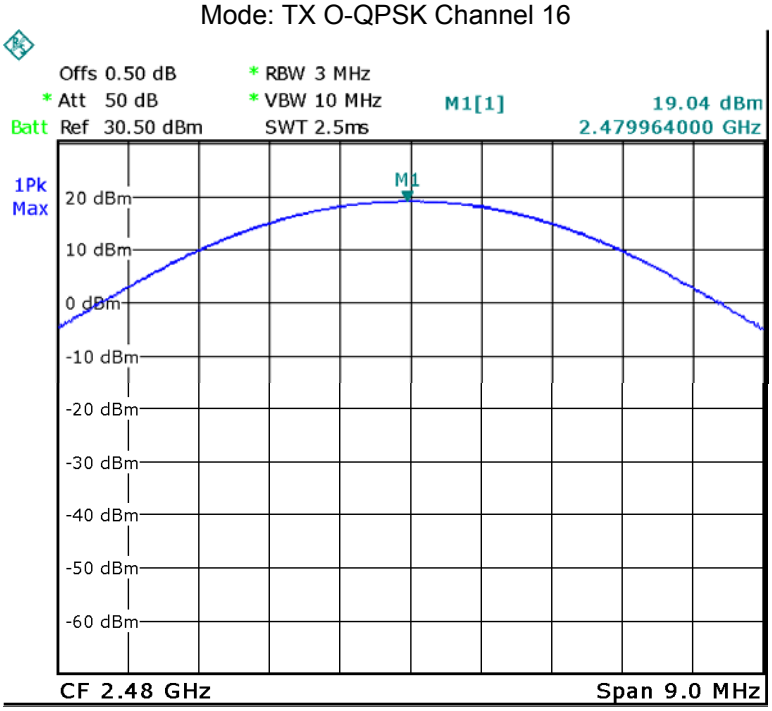
Mode: TX O-QPSK Channel 1



Mode: TX O-QPSK Channel 8



Mode: TX O-QPSK Channel 16



14 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v04 April 5, 2017

14.1 Test Procedure:

KDB 558074 D01 DTS Meas Guidance v04 April 5, 2017 section 10.2

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.

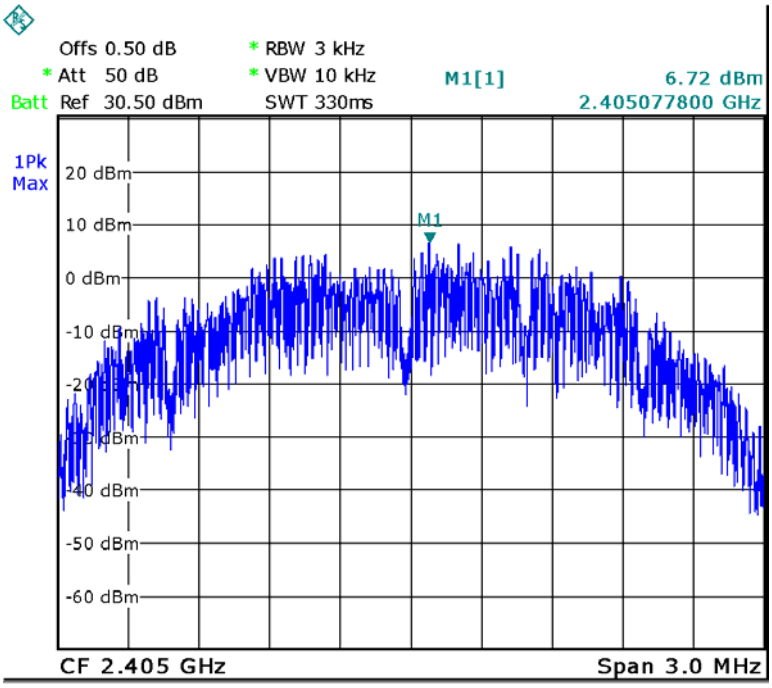
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

14.2 Test Result:

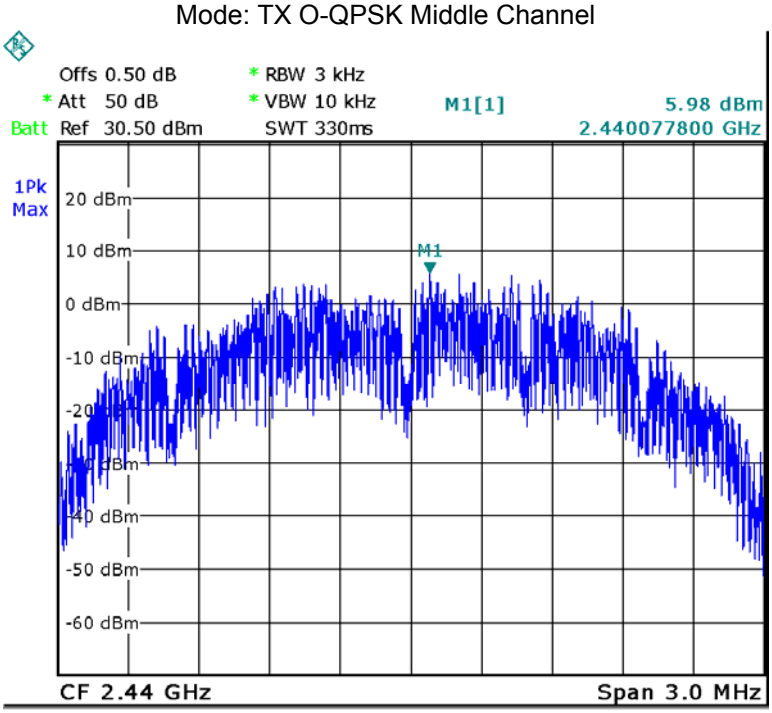
Test mode : TX O-QPSK		
Power Spectral (dBm per 3kHz)		
Low Channel	Middle Channel	High Channel
6.72	5.98	5.28
Limit: 8dBm per 3kHz		

Test Plot

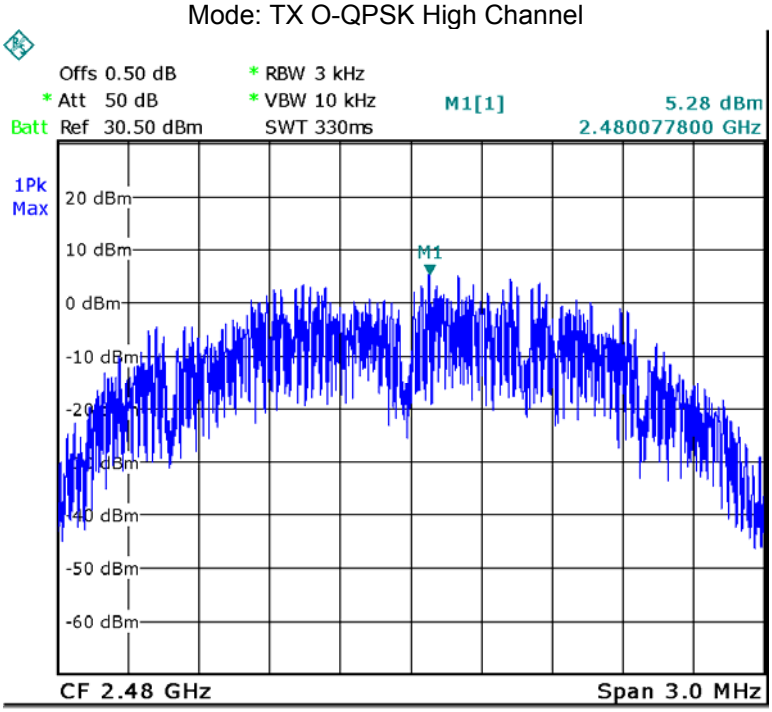
Mode: TX O-QPSK Low Channel



Mode: TX O-QPSK Middle Channel



Mode: TX O-QPSK High Channel



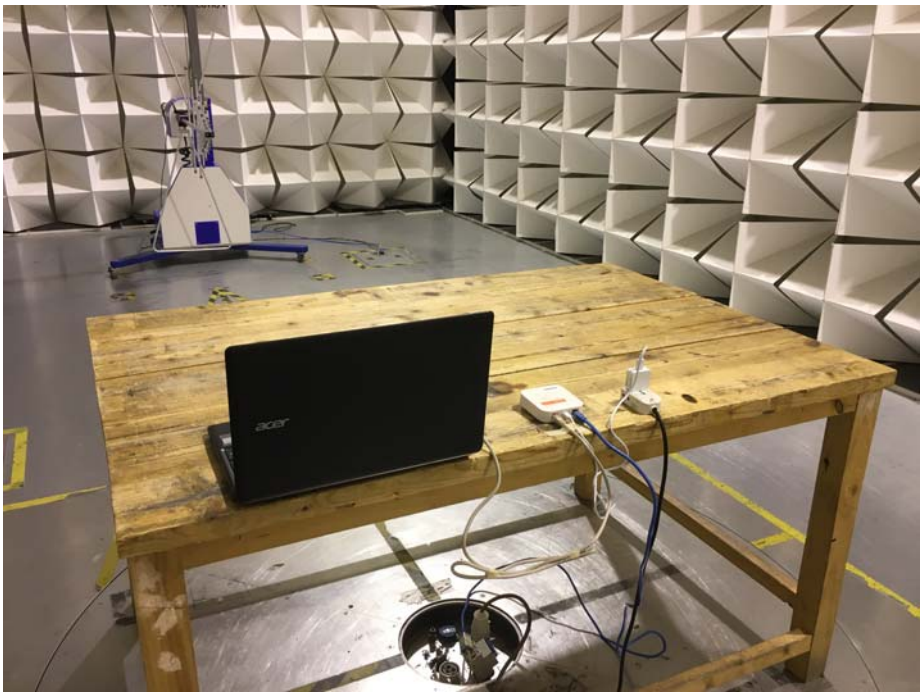
15 Antenna Requirement

According to the FCC Part 15 Paragraph 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. This product has an integrated antenna fulfill the requirement of this section.

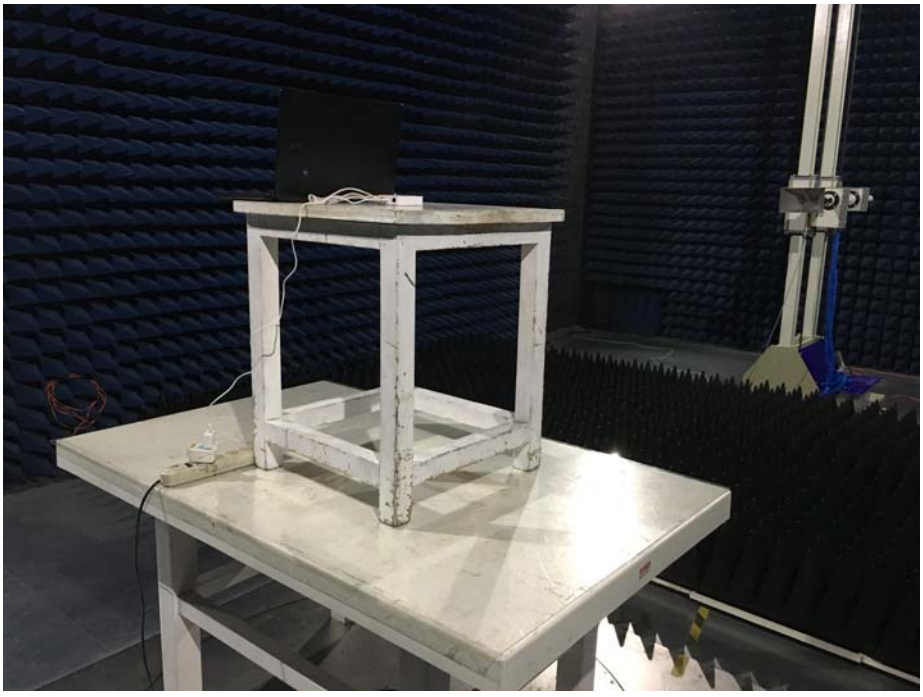
16 Photographs of Test Setup

16.1 Radiated Emissions Test Setup - Model RG4100+

Test frequency from 30MHz to 1GHz



Test frequency above 1GHz



16.2 Conducted Emission - Model RG4100+

17 Photographs - Constructional Details

17.1 External Photos - Model RG4100+

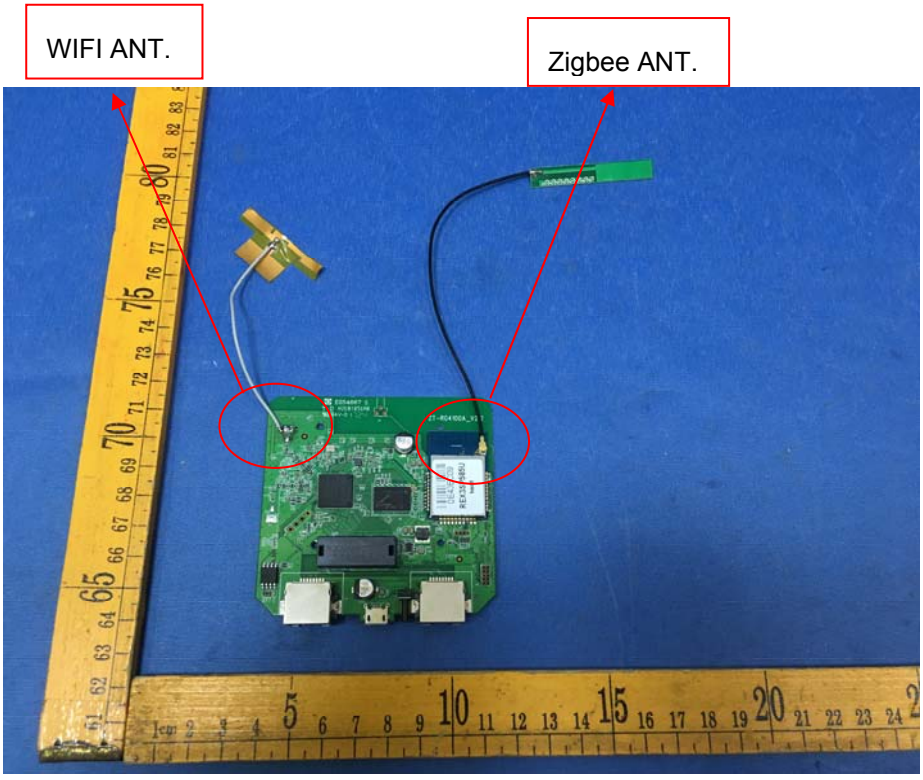

REXENSE

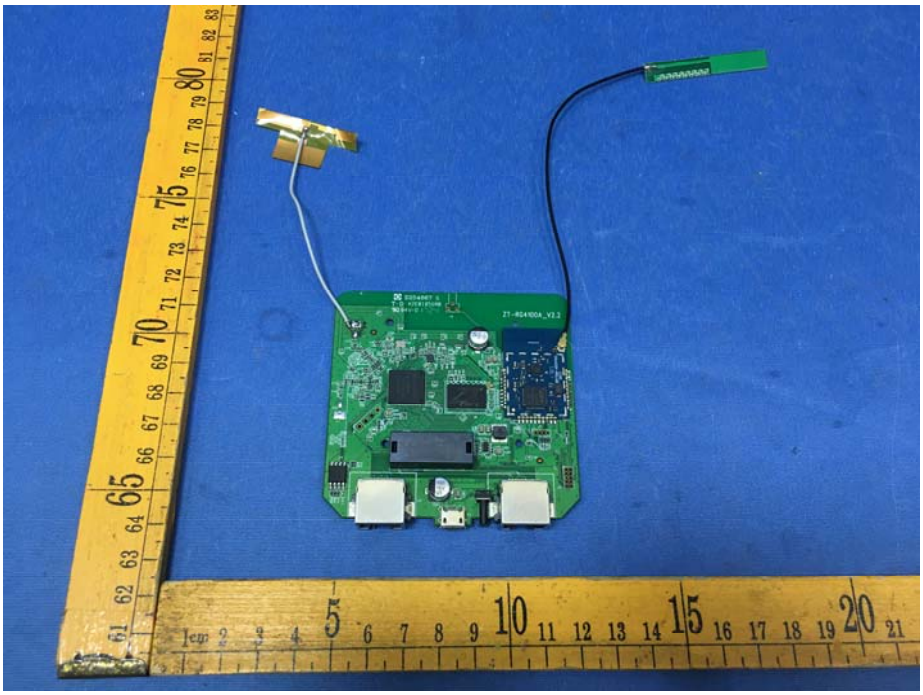

LAN
RESET
POWER
WAN

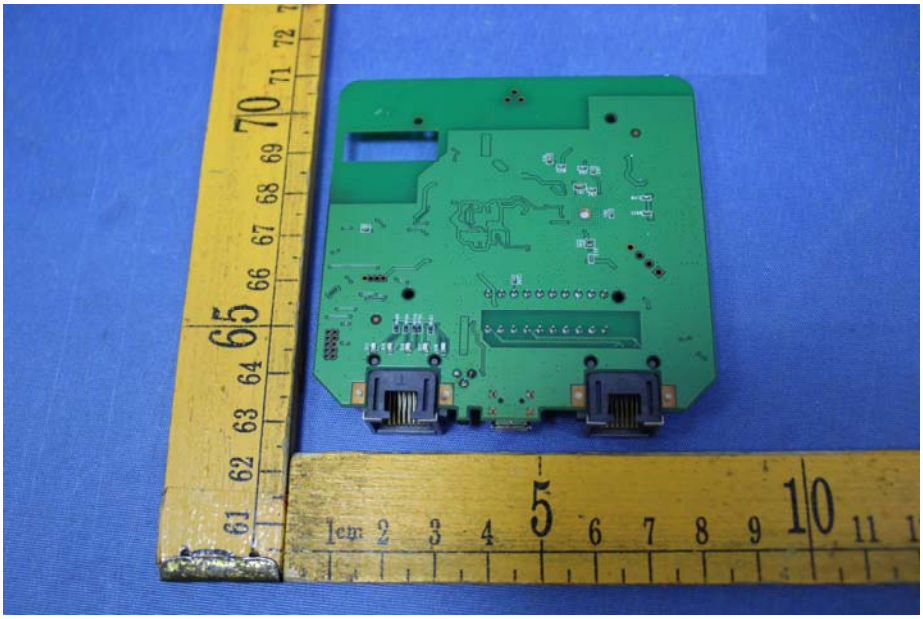

产品型号：RG4100+
默认网关：192.168.82.1
Web密码：admin
WIFI密码：87654321
SSID: WIFI-1FC0
ZigBee: 0E43EC09


电源适配器
型号：ED1-050100UC
输入：100-240V~,50/60Hz 最大0.2A
输出：5V⎓1.0A 能效等级：V级别
1701

17.2 Internal Photos - Model: RG4100+







======End of Report======