

## TEST REPORT

**Product** : Lightify Switch  
**Trade mark** : **Greeble**  
**Model/Type reference** : JZSW-LSA-PL50  
**Serial Number** : N/A  
**Report Number** : EED32I00158501  
**FCC ID** : 2AJRH-LDV74099  
**Date of Issue** : Sep. 21, 2016  
**Test Standards** : 47 CFR Part 15Subpart C (2015)  
**Test result** : PASS

Prepared for:

**OSRAM SYLVANIA**

**200 Ballardvale Street, Wilmington, MA 01887**

Prepared by:

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Date:

Sep. 21, 2016

Check No.: 2402649079

## 2 Version

Version No.	Date	Description
00	Sep. 21, 2016	Original

### 3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15Subpart C Section 15.207	ANSI C63.10-2013	N/A
Conducted Peak Output Power	47 CFR Part 15Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013/ KDB 558074 D01v03r05	PASS
6dB Occupied Bandwidth	47 CFR Part 15Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013/ KDB 558074 D01v03r05	PASS
Power Spectral Density	47 CFR Part 15Subpart C Section 15.247 (e)	ANSI C63.10-2013/ KDB 558074 D01v03r05	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15Subpart C Section 15.247(d)	ANSI C63.10-2013/ KDB 558074 D01v03r05	PASS
RF Conducted Spurious Emissions	47 CFR Part 15Subpart C Section 15.247(d)	ANSI C63.10-2013/ KDB 558074 D01v03r05	PASS
Radiated Spurious Emissions	47 CFR Part 15Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

The tested sample and the sample information are provided by the client.

N/A: Not applicable for test device.

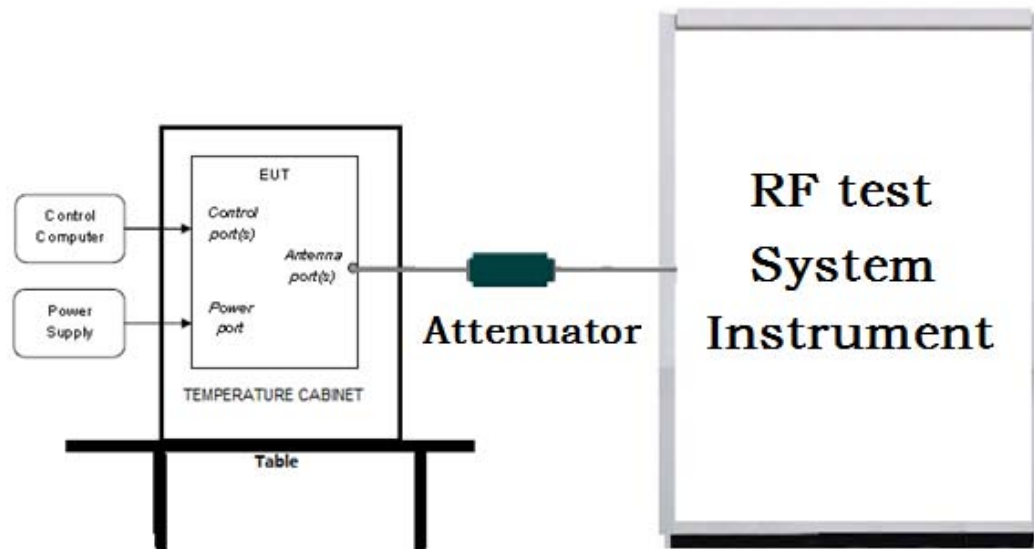
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## 5 Test Requirement

### 5.1 Test setup

#### 5.1.1 For Conducted test setup



#### 5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

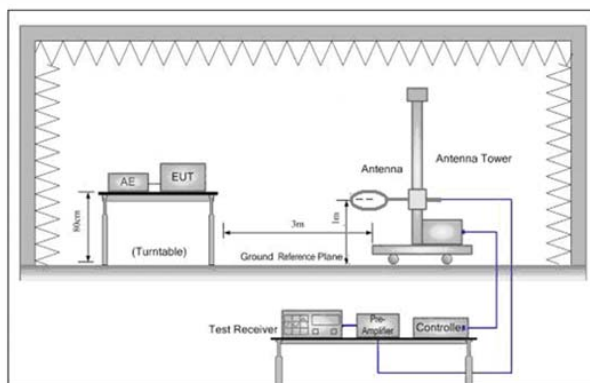


Figure 1. Below 30MHz

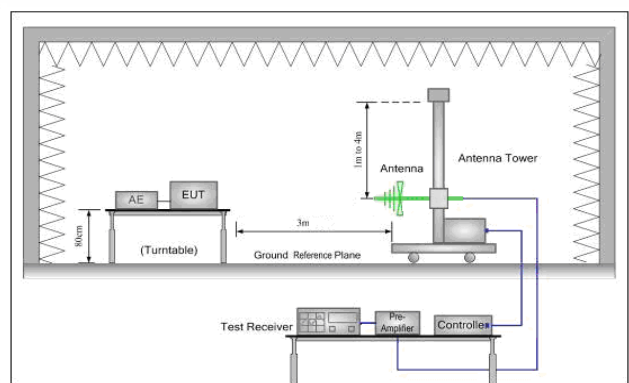


Figure 2. 30MHz to 1GHz

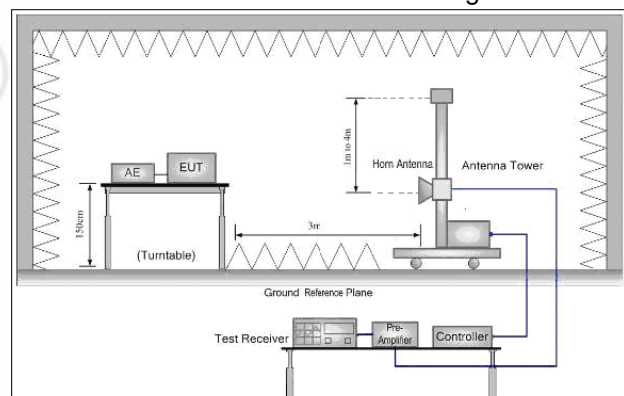
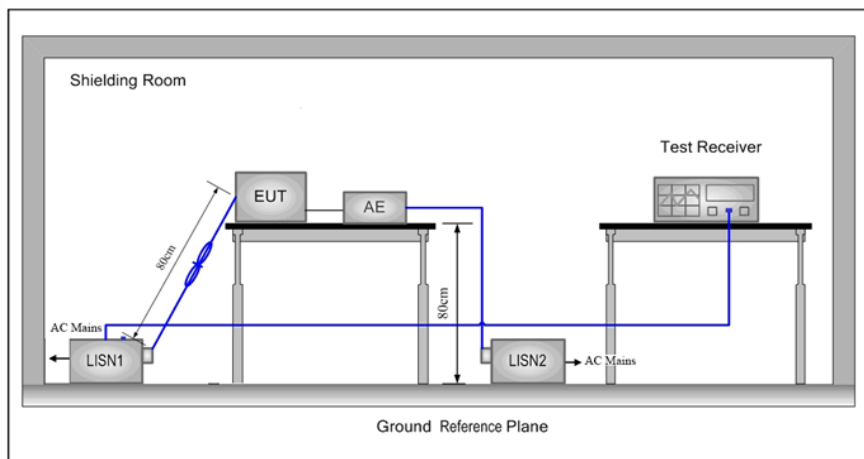


Figure 3. Above 1GHz



### 5.1.3 For Conducted Emissions test setup

#### Conducted Emissions setup



## 5.2 Test Environment

Operating Environment:	
Temperature:	21°C
Humidity:	54% RH
Atmospheric Pressure:	1010mbar

## 5.3 Test Condition

Test channel:


Test Mode	Tx	RF Channel		
		Low(L)	Middle(M)	High(H)
O-QPSK	2405MHz ~2480 MHz	Channel 11	Channel 18	Channel 26
		2405MHz	2440MHz	2480MHz
Transmitting mode:	The EUT transmitted the continuous modulation test signal at the specific channel(s).			

## 6 General Information

### 6.1 Client Information

Applicant:	OSRAM SYLVANIA
Address of Applicant:	200 Ballardvale Street, Wilmington, MA 01887
Manufacturer:	JIUZHOU GREEBLE
Address of Manufacturer:	Floor 1-4 of Building 1#, Jiuzhou Industrial Park, East of Songbai Road, Gongming Office, Guangming New District, Shenzhen China
Factory:	JIUZHOU GREEBLE
Address of Factory:	Floor 1-4 of Building 1#, Jiuzhou Industrial Park, East of Songbai Road, Gongming Office, Guangming New District, Shenzhen China

### 6.2 General Description of EUT

Product Name:	Lightify Switch
Model No.(EUT):	JZSW-LSA-PL50
Trade mark:	
Power Supply:	DC 3V, 35mA
Sample Received Date:	Aug. 25, 2016
Sample tested Date:	Aug. 25, 2016 to Sep. 01, 2016

### 6.3 Product Specification subjective to this standard

Operation Frequency:	2405-2480MHz
EUT Function::	ZigBee
Modulation Type:	O-QPSK
Number of Channel:	16
Sample Type:	Portable production
Test Power Grade:	N/A
Test Software of EUT:	N/A
Antenna Type:	Integral
Antenna Gain:	0dBi
Test Voltage:	DC 3V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
11	2405MHz	15	2425MHz	19	2445MHz	23	2465MHz
12	2410MHz	16	2430MHz	20	2450MHz	24	2470MHz
13	2415MHz	17	2435MHz	21	2455MHz	25	2475MHz
14	2420MHz	18	2440MHz	22	2460MHz	26	2480MHz

### 6.4 Description of Support Units

The EUT has been tested independently.

## 6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China 518101

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

## 6.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### **CNAS-Lab Code: L1910**

Centre Testing International Group Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories..

### **A2LA-Lab Cert. No. 3061.01**

Centre Testing International Group Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### **FCC-Registration No.: 886427**

Centre Testing International Group Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 886427.

### **IC-Registration No.: 7408A-2**

The 3m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A-2 .

### **IC-Registration No.: 7408B-1**

The 10m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B-1.

### **NEMKO-Aut. No.: ELA503**

Centre Testing International Group Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

### **VCCI**

The Radiation 3 & 10 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096.



Main Ports Conducted Interference Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.

The Radiation 3 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-758

## 6.7 Deviation from Standards

None.

## 6.8 Abnormalities from Standard Conditions

None.

## 6.9 Other Information Requested by the Customer

None.

## 6.10 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	$7.9 \times 10^{-8}$
2	RF power, conducted	0.31dB (30MHz-1GHz)
		0.57dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-12.75GHz)
4	Conduction emission	3.6dB (9kHz to 150kHz)
		3.2dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	2.8%
7	DC power voltages	0.025%

## 7 Equipment List

RF test system					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Signal Generator	Keysight	E8257D	MY53401106	04-01-2016	03-31-2017
Communication test set test set	Agilent	N4010A	MY51400230	04-01-2016	03-31-2017
Spectrum Analyzer	Keysight	N9010A	MY54510339	04-01-2016	03-31-2017
Signal Generator	Keysight	N5182B	MY53051549	04-01-2016	03-31-2017
High-pass filter	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-12-2016	01-11-2017
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
DC Power	Keysight	E3642A	MY54436035	04-01-2016	03-31-2017
PC-1	Lenovo	R4960d	---	04-01-2016	03-31-2017
BT&Wi-Fi Automatic control	R&S	OSP120	101374	04-01-2016	03-31-2017
RF control unit	JS Tonscend	JS0806-2	158060006	04-01-2016	03-31-2017
BT&Wi-Fi Automatic test software	JS Tonscend	JS1120-2	---	04-01-2016	03-31-2017

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-05-2016	06-05-2019
TRILOG Broadband Antenna	SCHWARZBEC K	VULB9163	9163-484	05-23-2016	05-22-2017
Microwave Preamplifier	Agilent	8449B	3008A02425	02-04-2016	02-03-2017
Horn Antenna	ETS-LINDGREN	3117	00057410	06-30-2015	06-28-2018
Horn Antenna	A.H.SYSTEMS	SAS-574	374	06-30-2015	06-28-2018
Loop Antenna	ETS	6502	00071730	07-30-2015	07-28-2017
Spectrum Analyzer	R&S	FSP40	100416	06-16-2016	06-15-2017
Receiver	R&S	ESCI	100435	06-16-2016	06-15-2017
Multi device Controller	maturo	NCD/070/10711 112	---	01-12-2016	01-11-2017
LISN	schwarzbeck	NNBM8125	81251547	06-16-2016	06-15-2017
LISN	schwarzbeck	NNBM8125	81251548	06-16-2016	06-15-2017
Signal Generator	Agilent	E4438C	MY45095744	04-01-2016	03-31-2017
Signal Generator	Keysight	E8257D	MY53401106	04-01-2016	03-31-2017
Temperature/ Humidity Indicator	TAYLOR	1451	1905	04-27-2016	04-26-2017
Communication test set	Agilent	E5515C	GB47050534	04-01-2016	03-31-2017
Cable line	Fulai(7M)	SF106	5219/6A	01-12-2016	01-11-2017
Cable line	Fulai(6M)	SF106	5220/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5216/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5217/6A	01-12-2016	01-11-2017
Communication test set	R&S	CMW500	152394	04-01-2016	03-31-2017
High-pass filter	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-12-2016	01-11-2017
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA09 CL12-0395-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA08 CL12-0393-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA04 CL12-0396-002	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA03 CL12-0394-001	---	01-12-2016	01-11-2017

## 8 Radio Technical Requirements Specification

### Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C (2015)	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

### Test Results List:

Test Requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (a)(2)	ANSI C63.10/KDB 558074	6dB Occupied Bandwidth	PASS	Appendix A)
Part15C Section 15.247 (b)(3)	ANSI C63.10/KDB 558074	Conducted Peak Output Power	PASS	Appendix B)
Part15C Section 15.247(d)	ANSI C63.10/KDB 558074	Band-edge for RF Conducted Emissions	PASS	Appendix C)
Part15C Section 15.247(d)	ANSI C63.10/KDB 558074	RF Conducted Spurious Emissions	PASS	Appendix D)
Part15C Section 15.247 (e)	ANSI C63.10/KDB 558074	Power Spectral Density	PASS	Appendix E)
Part15C Section 15.203/15.247 (c)	ANSI C63.10	Antenna Requirement	PASS	Appendix F)
Part15C Section 15.207	ANSI C63.10	AC Power Line Conducted Emission	N/A	N/A
Part15C Section 15.205/15.209	ANSI C63.10	Restricted bands around fundamental frequency (Radiated Emission)	PASS	Appendix G)
Part15C Section 15.205/15.209	ANSI C63.10	Radiated Spurious Emissions	PASS	Appendix H)

## Appendix A): 6dB Occupied Bandwidth

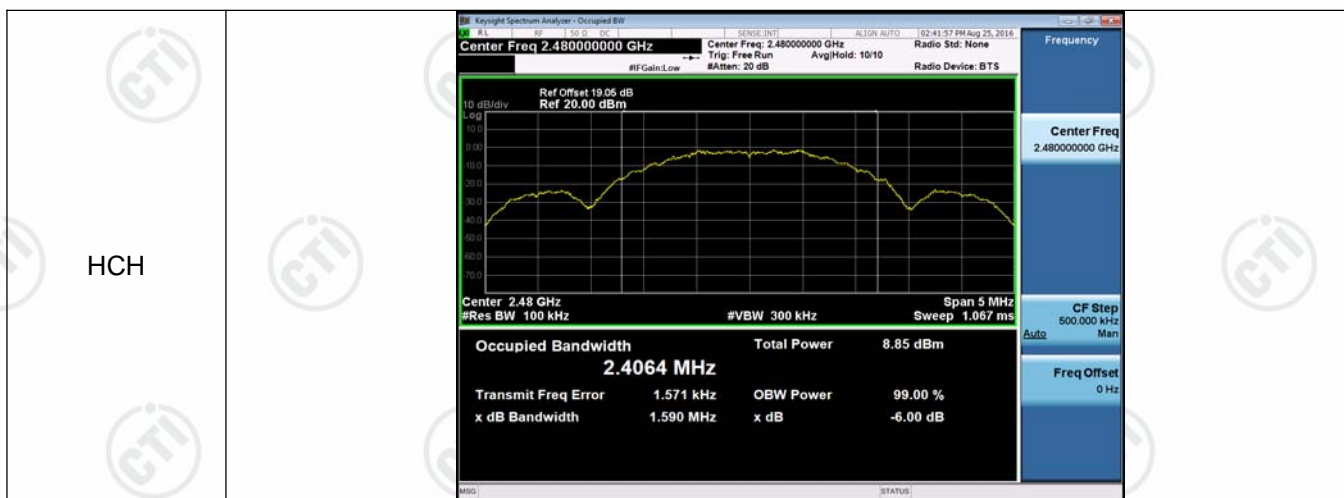
### Test Result

Mode	Channel	6dB Bandwidth [MHz]	99% OBW[MHz]	Verdict	Remark
O-QPSK	LCH	1.601	2.4266	PASS	Peak detector
O-QPSK	MCH	1.614	2.4333	PASS	
O-QPSK	HCH	1.590	2.4064	PASS	

### Test Graphs







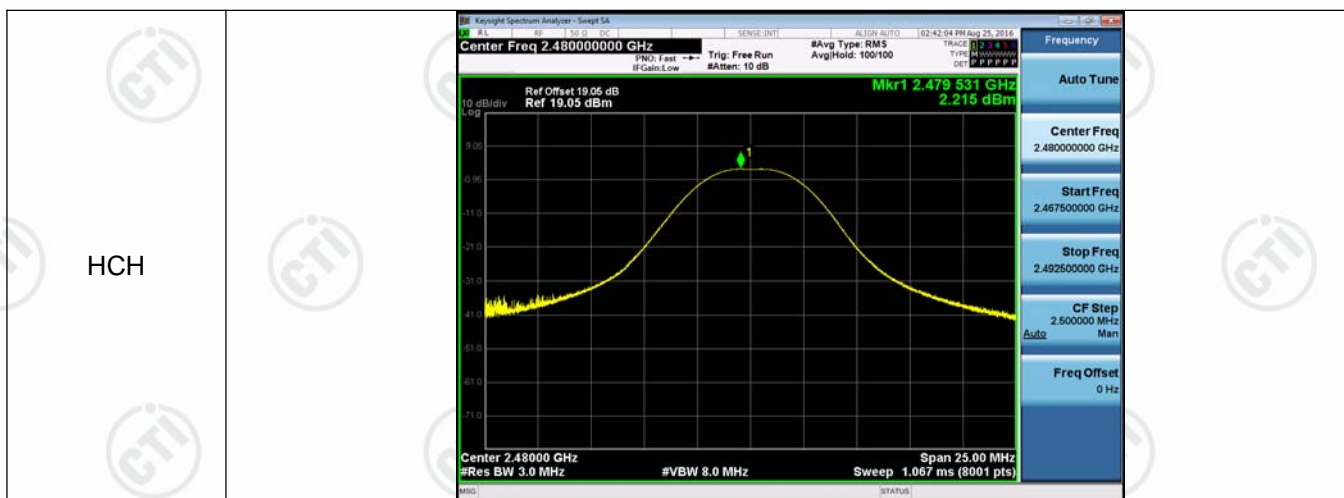
## Appendix B): Conducted Peak Output Power

### Test Result

Mode	Channel	Conduct Peak Power[dBm]	Verdict
O-QPSK	LCH	2.081	PASS
O-QPSK	MCH	2.533	PASS
O-QPSK	HCH	2.215	PASS

### Test Graphs



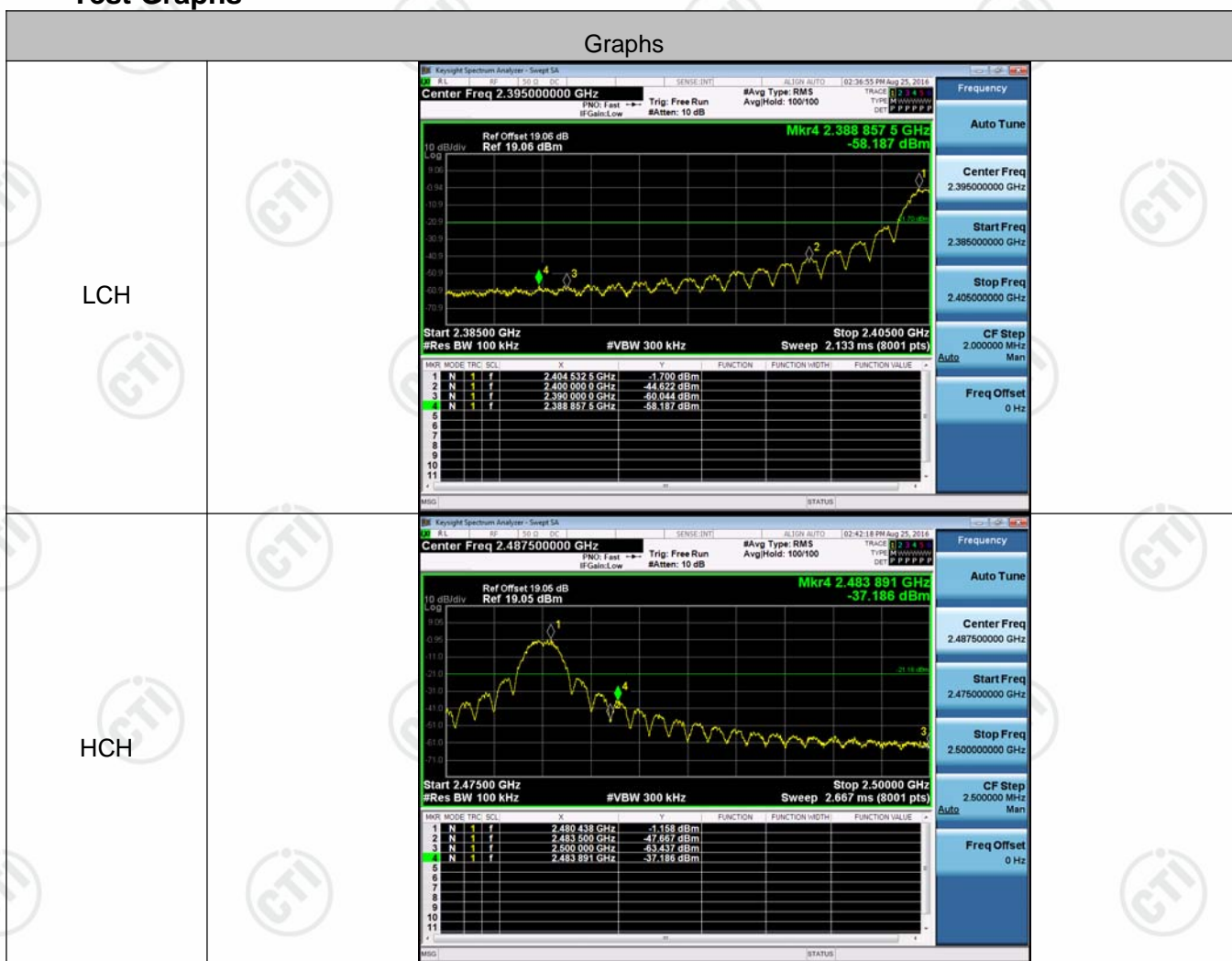


## Appendix C): Band-edge for RF Conducted Emissions

Result Table

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
O-QPSK	LCH	-1.700	-58.187	-21.7	PASS
O-QPSK	HCH	-1.158	-37.186	-21.16	PASS

Test Graphs

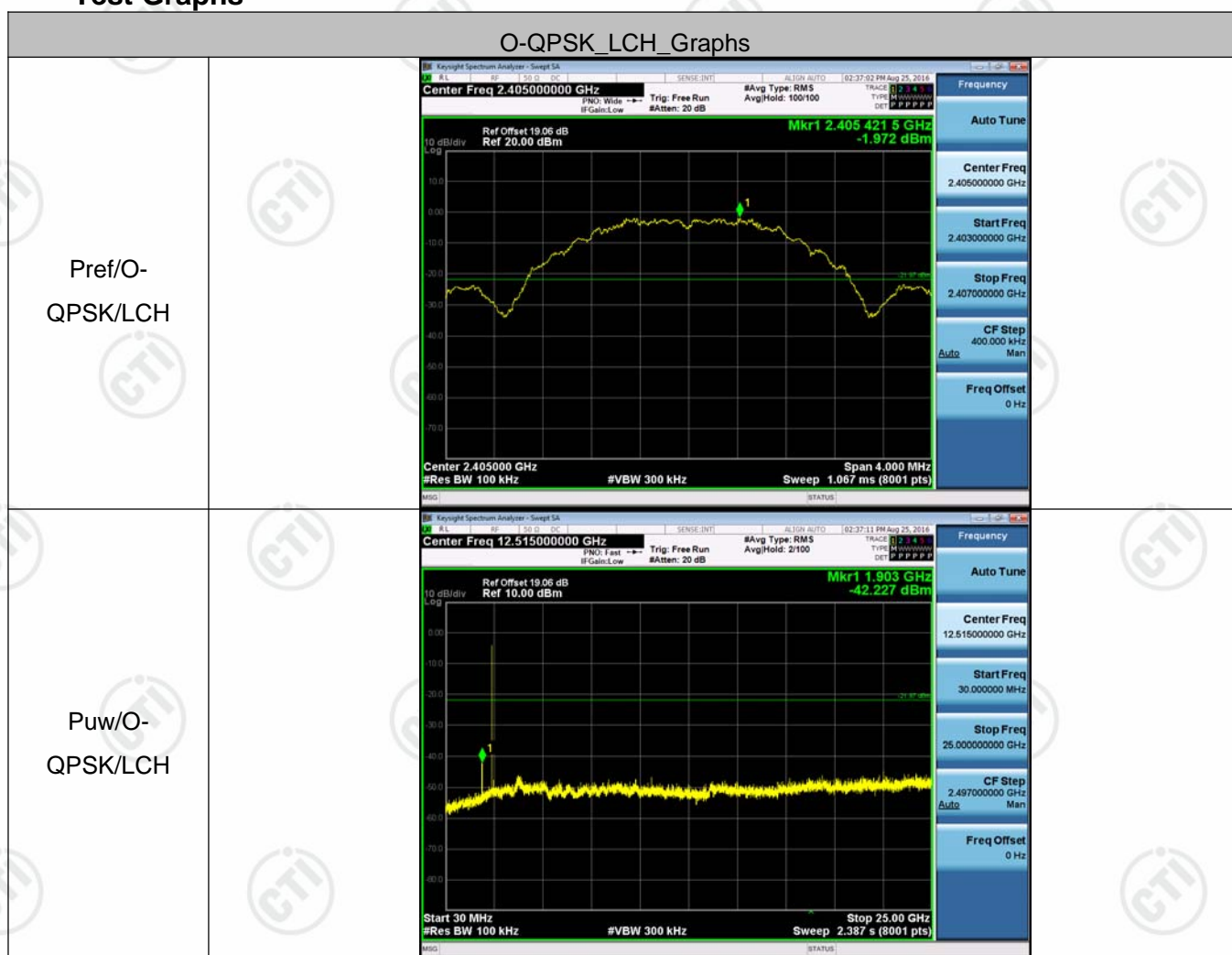


## Appendix D): RF Conducted Spurious Emissions

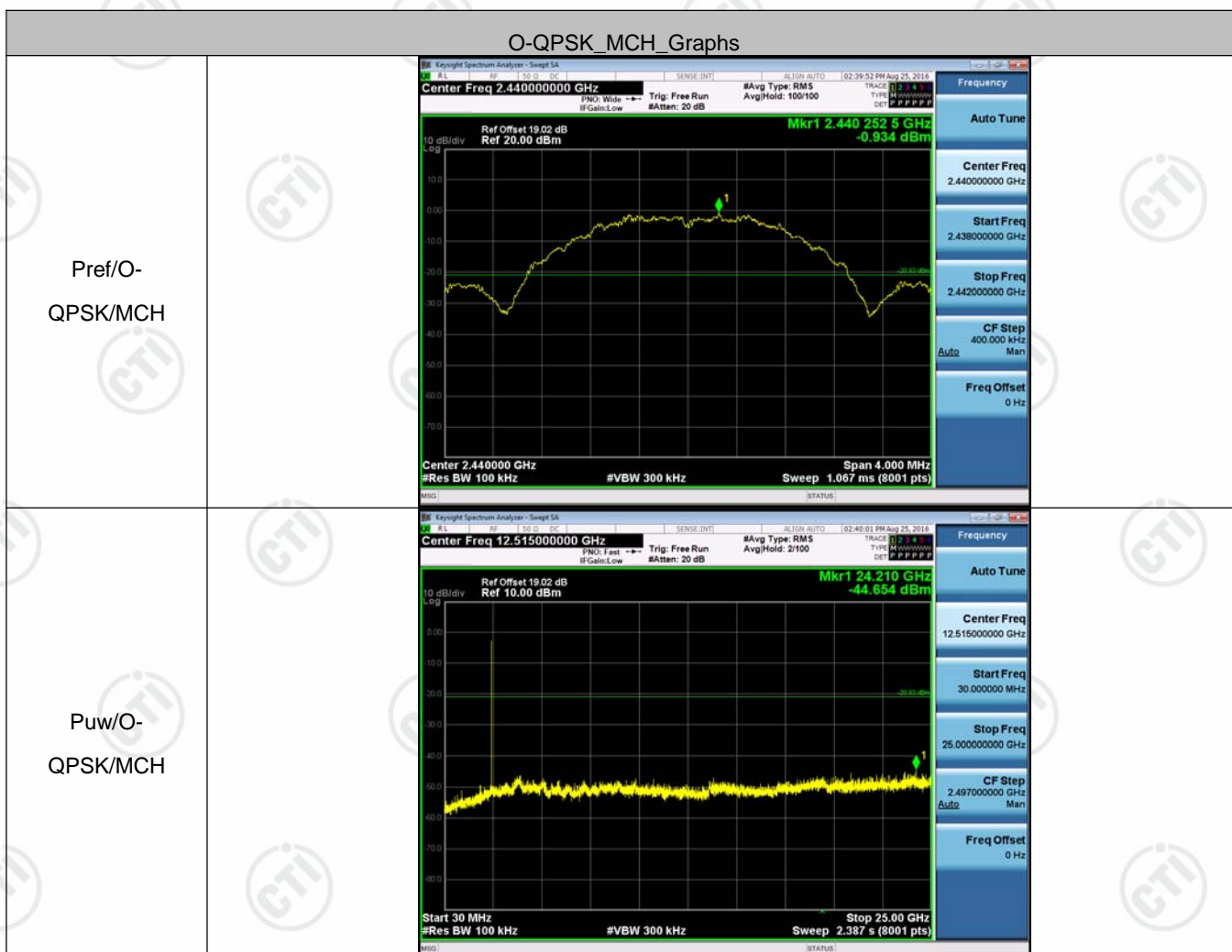
Result Table

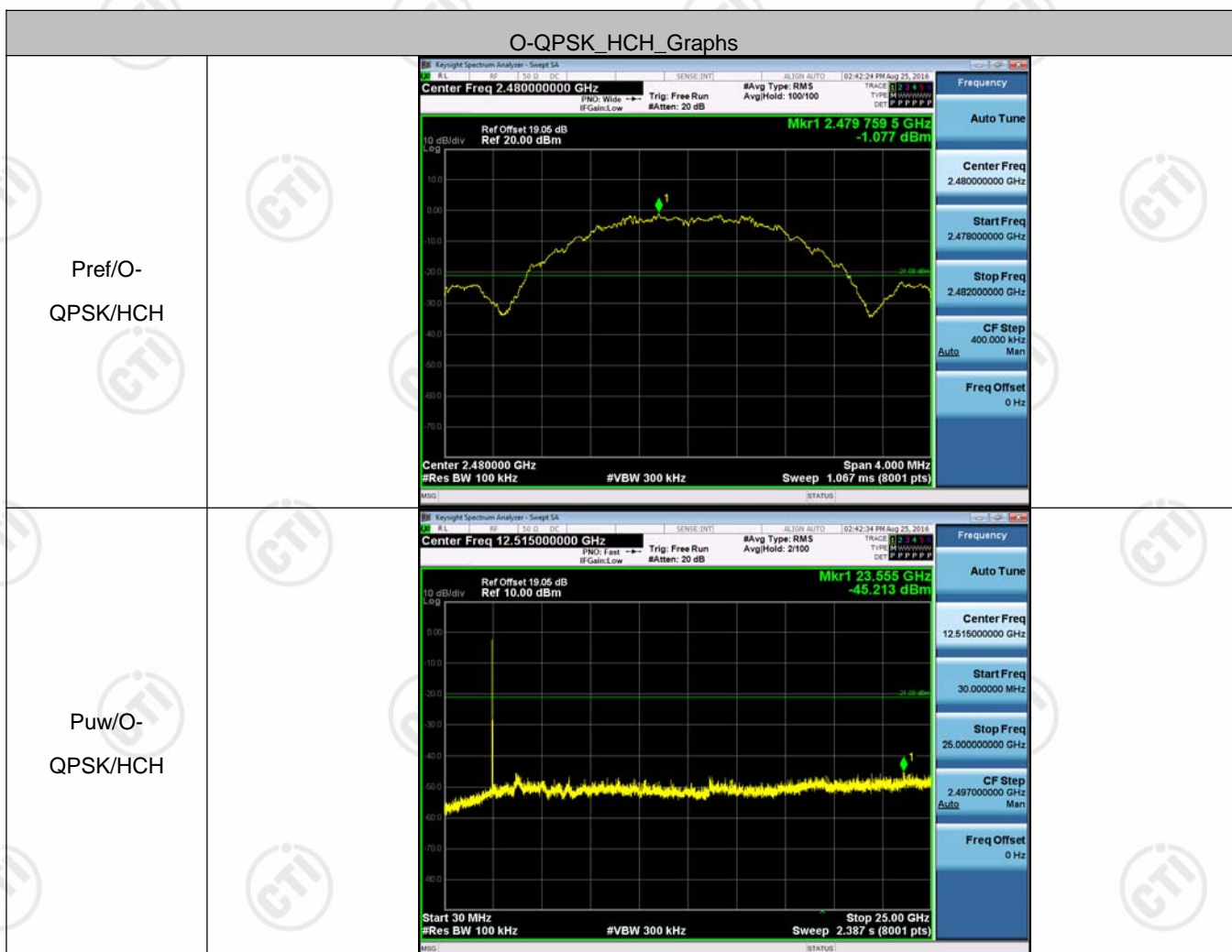
Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
O-QPSK	LCH	-1.972	<Limit	PASS
O-QPSK	MCH	-0.934	<Limit	PASS
O-QPSK	HCH	-1.077	<Limit	PASS

Test Graphs







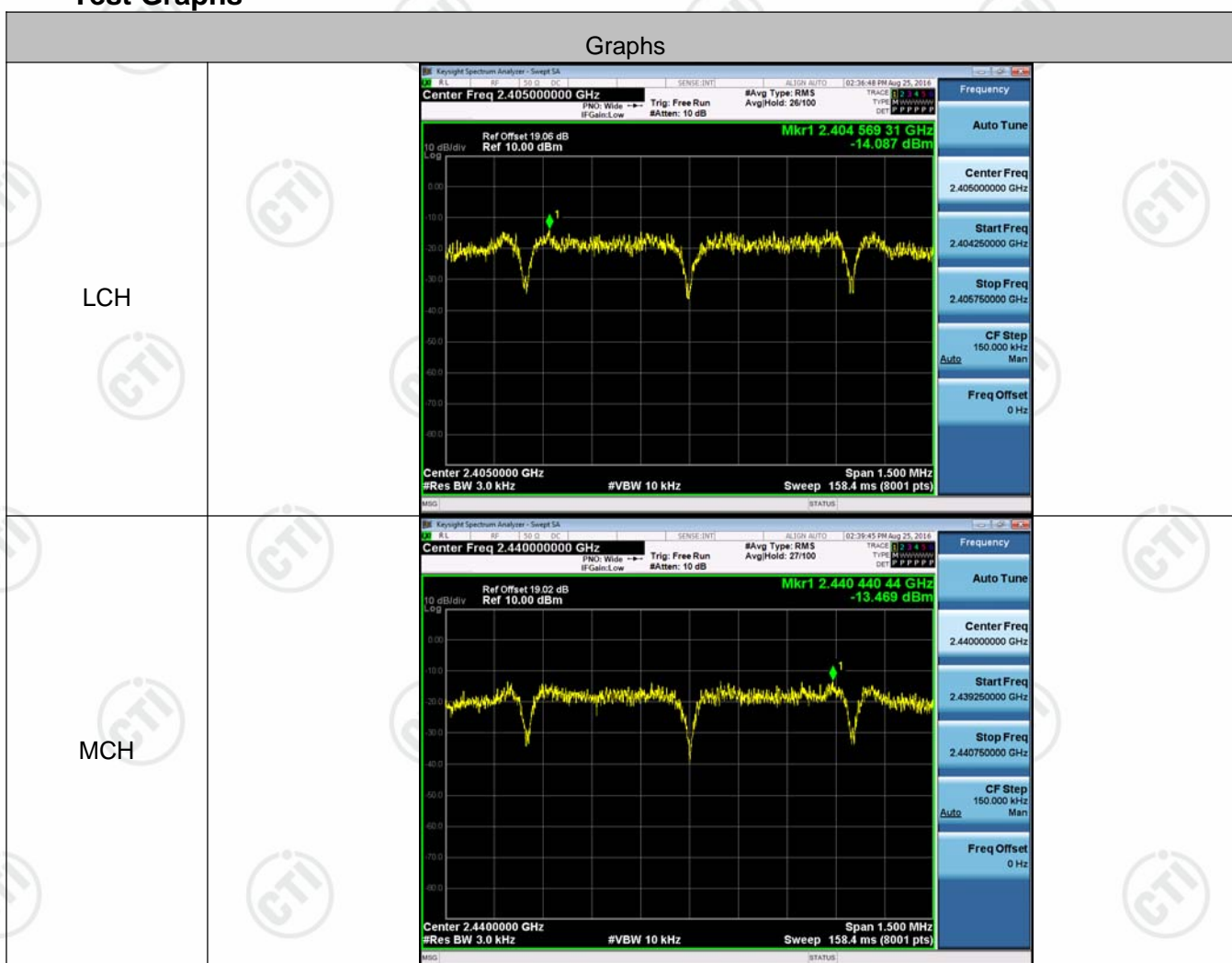


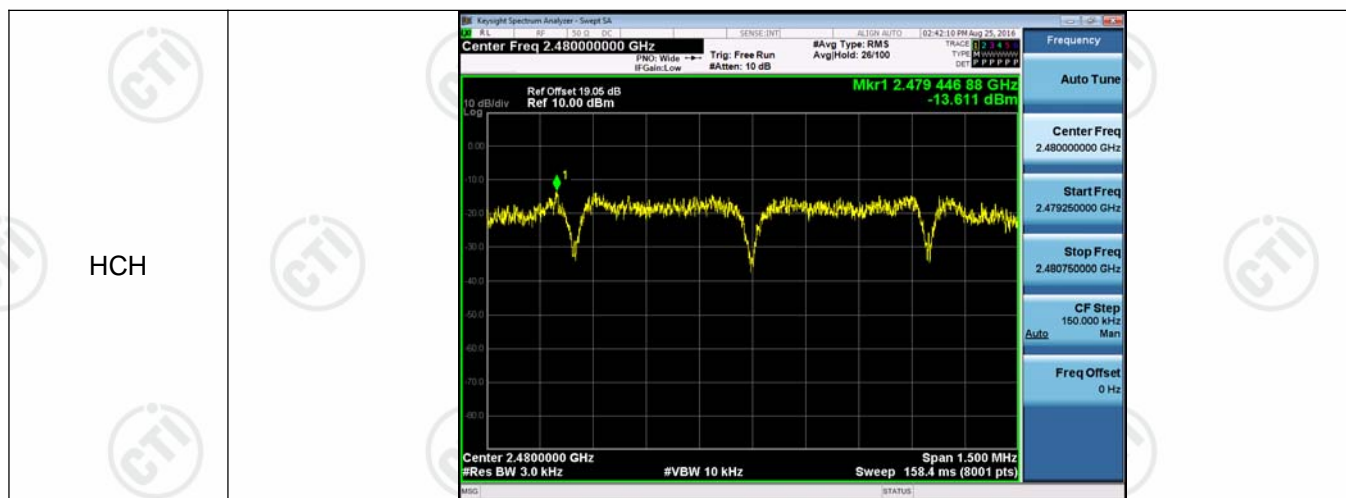
## Appendix E): Power Spectral Density

Result Table

Mode	Channel	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
O-QPSK	LCH	-14.087	8	PASS
O-QPSK	MCH	-13.469	8	PASS
O-QPSK	HCH	-13.611	8	PASS

Test Graphs







## Appendix F): Antenna Requirement

### 15.203 requirement:

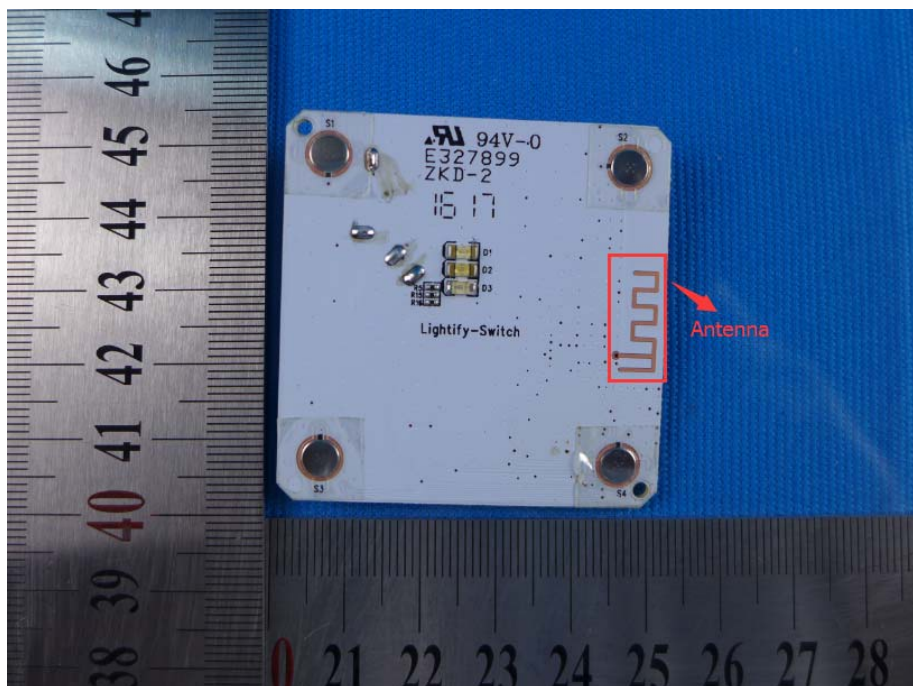
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### 15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.



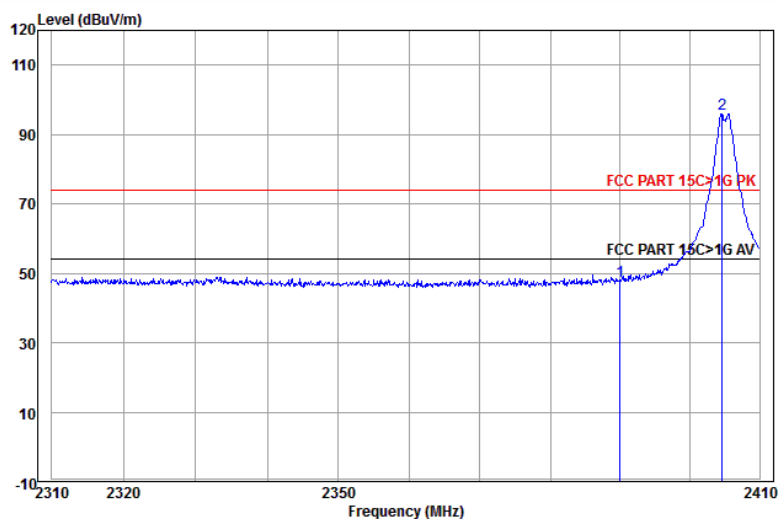


## Appendix G): Restricted bands around fundamental frequency (Radiated)

Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Test Procedure:	<p><b>Below 1GHz test procedure as below:</b></p> <ol style="list-style-type: none"> <li>The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel</li> </ol> <p><b>Above 1GHz test procedure as below:</b></p> <ol style="list-style-type: none"> <li>Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter).</li> <li>. Test the EUT in the lowest channel , the Highest channel</li> <li>The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.</li> <li>Repeat above procedures until all frequencies measured was complete.</li> </ol>				
Limit:	Frequency	Limit (dBμV/m @3m)		Remark	
	30MHz-88MHz	40.0		Quasi-peak Value	
	88MHz-216MHz	43.5		Quasi-peak Value	
	216MHz-960MHz	46.0		Quasi-peak Value	
	960MHz-1GHz	54.0		Quasi-peak Value	
	Above 1GHz	54.0		Average Value	
		74.0		Peak Value	

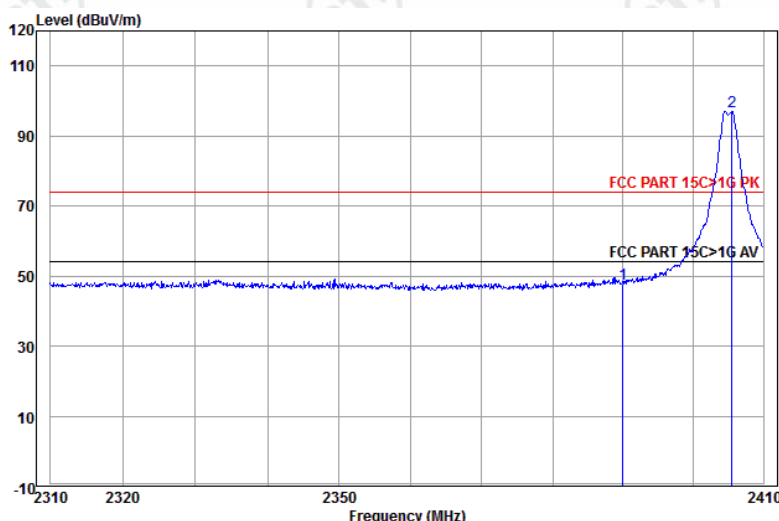
**Test plot as follows:**

Worse case mode:	O-QPSK		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Horizontal	Remark: Peak



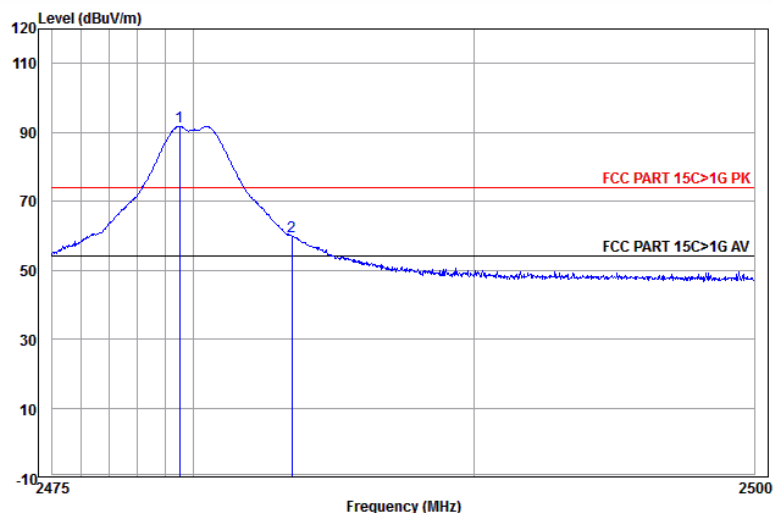
	Ant Freq	Cable Factor	Preamp Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	45.28	47.70	74.00	-26.30	Horizontal	
2 pp	2404.593	32.56	4.32	34.39	93.47	95.96	74.00	21.96	Horizontal	

Worse case mode:	O-QPSK		
Frequency: 2390.0MHz	Test channel: Lowest	Polarization: Vertical	Remark: Peak



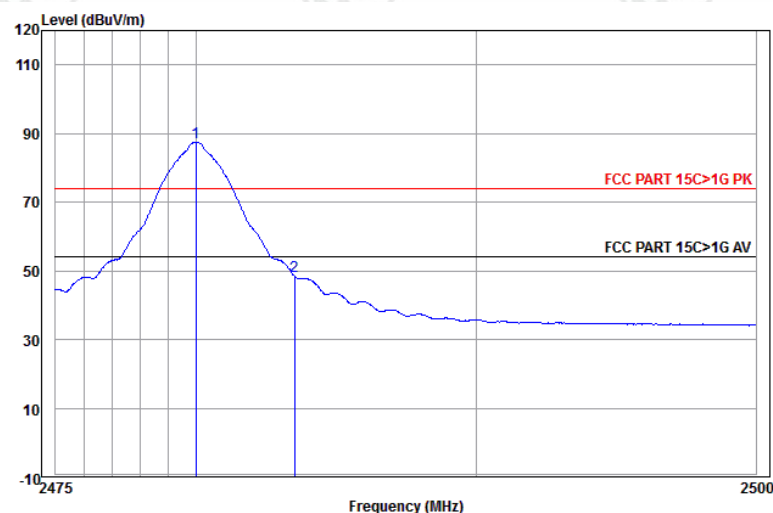
	Ant Freq	Cable Factor	Preamp Loss	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB		
1	2390.000	32.53	4.28	34.39	45.37	47.79	74.00	-26.21	Vertical	
2 pp	2405.510	32.57	4.32	34.39	94.51	97.01	74.00	23.01	Vertical	

Worse case mode:	O-QPSK		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Horizontal	Remark: Peak



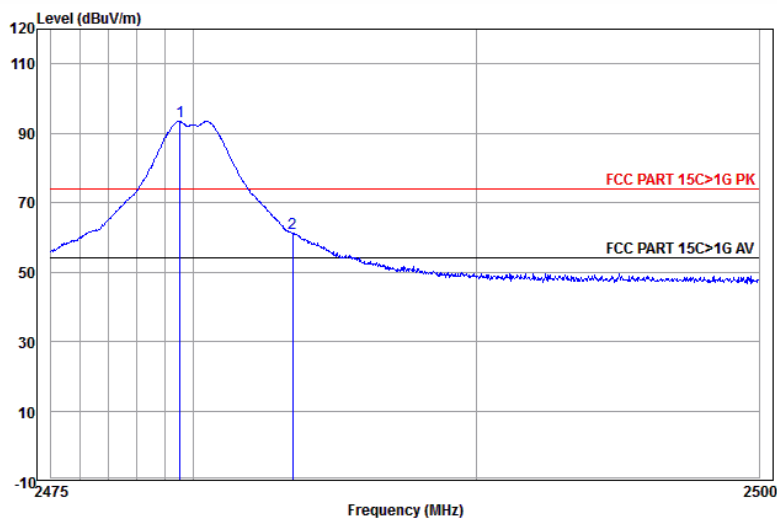
	Ant Freq	Cable Factor	Preamp Loss	Read Level	Read Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2479.506	32.71	4.50	34.41	88.98	91.78	74.00	17.78	Horizontal
2	2483.500	32.71	4.51	34.41	56.92	59.73	74.00	-14.27	Horizontal

Worse case mode:	O-QPSK		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Horizontal	Remark: Average



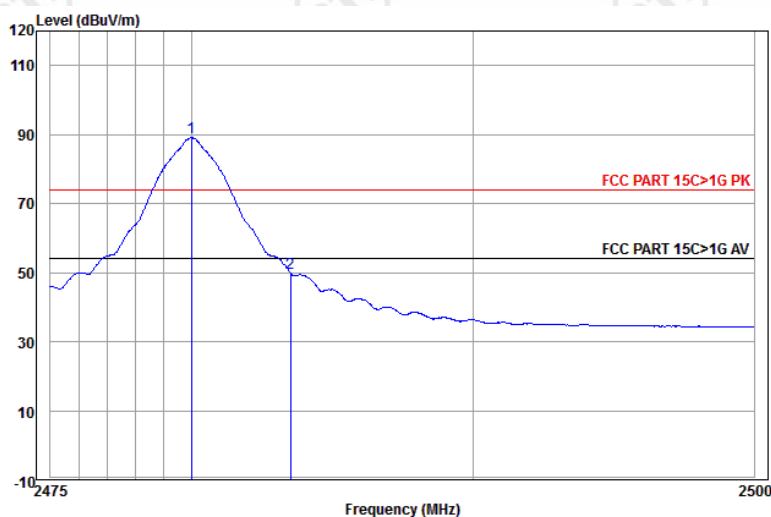
	Ant Freq	Cable Factor	Preamp Loss	Read Level	Read Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2479.980	32.71	4.50	34.41	84.75	87.55	54.00	33.55	Horizontal Average
2	2483.500	32.71	4.51	34.41	45.75	48.56	54.00	-5.44	Horizontal Average

Worse case mode:	O-QPSK		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Vertical	Remark: Peak



	Ant Freq	Cable Factor	Preamp Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2479.531	32.71	4.50	34.41	90.61	93.41	74.00	19.41	Vertical
2	2483.500	32.71	4.51	34.41	58.36	61.17	74.00	-12.83	Vertical

Worse case mode:	O-QPSK		
Frequency: 2483.5MHz	Test channel: Highest	Polarization: Vertical	Remark: Average



	Ant Freq	Cable Factor	Preamp Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2479.980	32.71	4.50	34.41	86.29	89.09	54.00	35.09	Vertical Average
2	2483.500	32.71	4.51	34.41	47.12	49.93	54.00	-4.07	Vertical Average

**Note:**

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading - Correct Factor

Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor

## Appendix H): Radiated Spurious Emissions

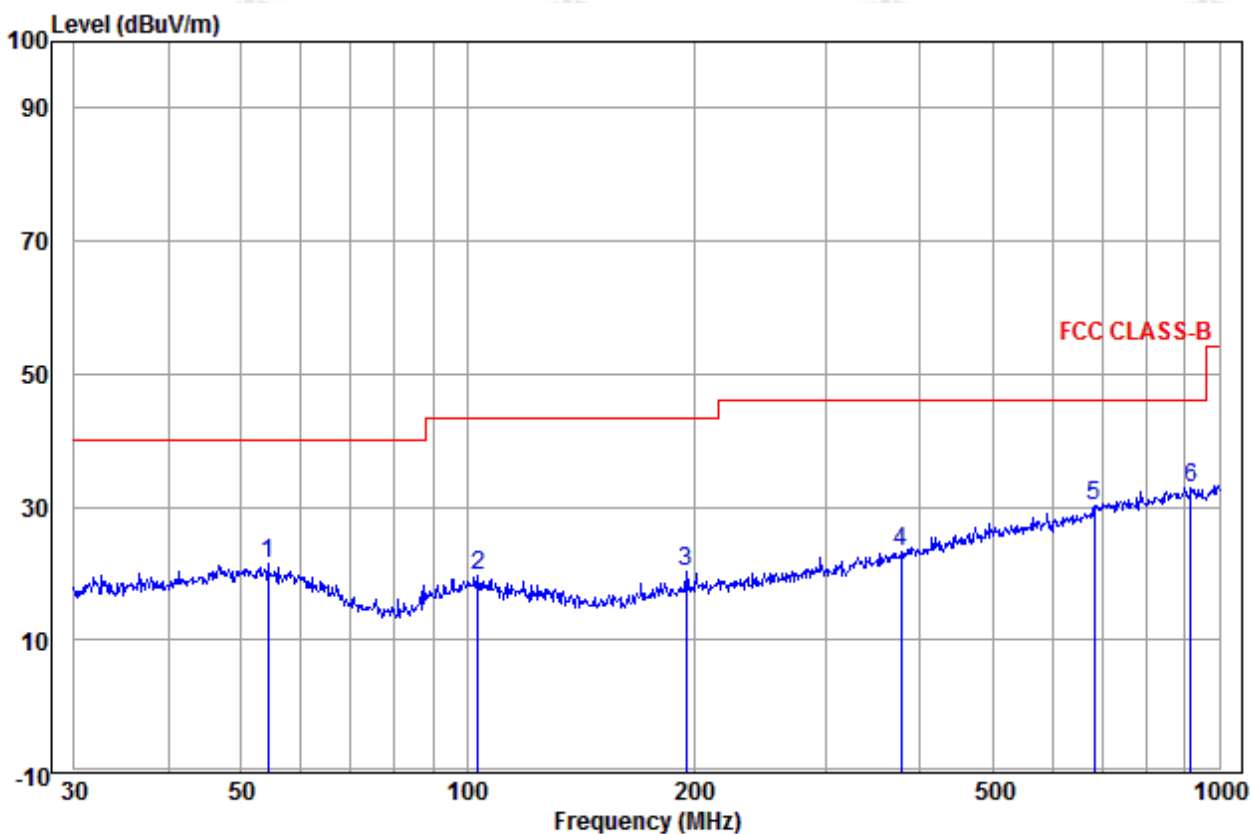
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
Peak		1MHz	10Hz	Average	
Test Procedure:					
Below 1GHz test procedure as below:					
<p>a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</p> <p>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p>					
Above 1GHz test procedure as below:					
<p>g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter).</p> <p>h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel</p> <p>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.</p> <p>j. Repeat above procedures until all frequencies measured was complete.</p>					
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
	Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.				



**Radiated Spurious Emissions test Data:**  
**Radiated Emission below 1GHz**

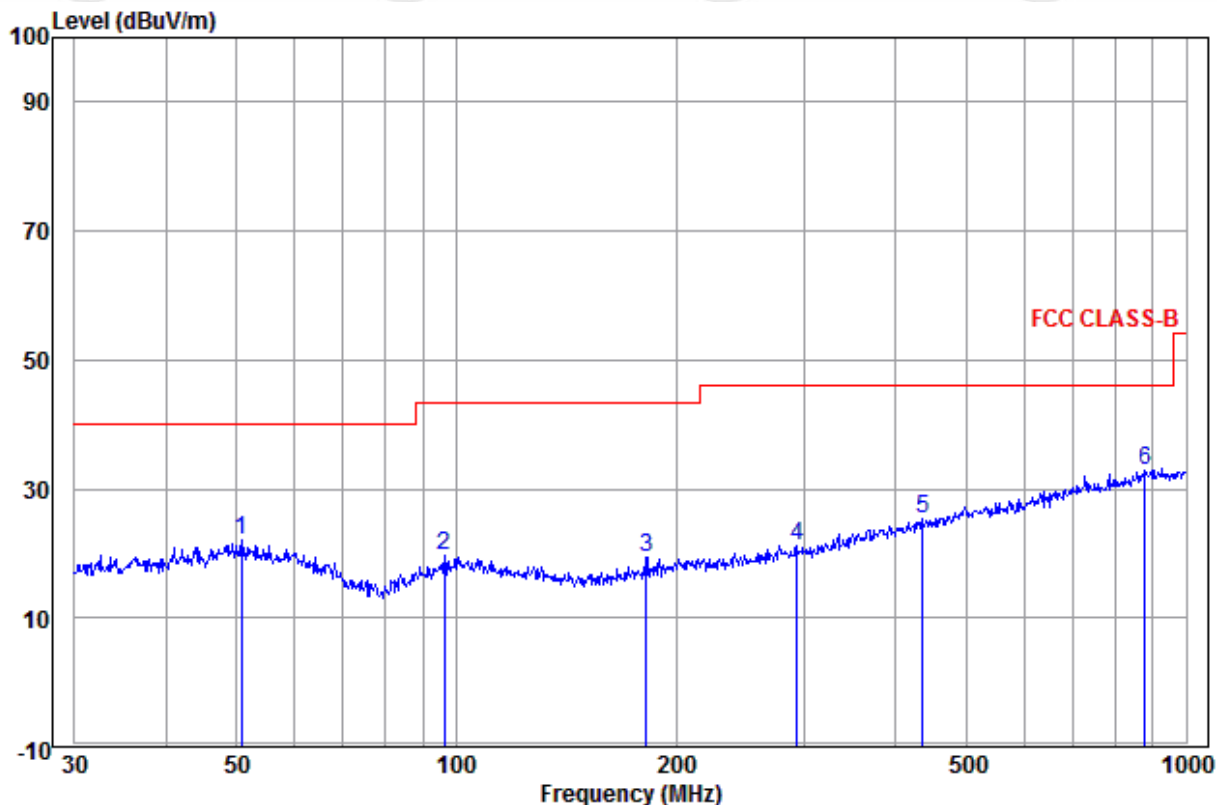
30MHz~1GHz (QP)

Test mode:	Transmitting	Horizontal
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	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	54.261	14.52	1.41	5.41	21.34	40.00	-18.66	Horizontal	
2	103.442	12.91	1.57	5.11	19.59	43.50	-23.91	Horizontal	
3	195.137	11.44	2.16	6.60	20.20	43.50	-23.30	Horizontal	
4	377.259	15.64	2.76	4.88	23.28	46.00	-22.72	Horizontal	
5	682.348	20.32	3.78	6.06	30.16	46.00	-15.84	Horizontal	
6 pp	916.069	22.40	4.33	6.13	32.86	46.00	-13.14	Horizontal	

Test mode:	Transmitting	Vertical
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	Ant Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	50.764	14.99	1.40	5.63	22.02	40.00	-17.98	Vertical	
2	96.436	12.51	1.58	5.48	19.57	43.50	-23.93	Vertical	
3	181.920	10.97	2.00	6.48	19.45	43.50	-24.05	Vertical	
4	293.084	13.36	2.38	5.35	21.09	46.00	-24.91	Vertical	
5	435.590	16.88	2.94	5.40	25.22	46.00	-20.78	Vertical	
6 pp	878.322	22.19	4.27	6.42	32.88	46.00	-13.12	Vertical	

**Transmitter Emission above 1GHz**

Worse case mode:		O-QPSK		Test channel:		Lowest	Remark:	Peak	
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1201.149	30.23	2.52	34.96	46.57	44.36	74	-29.64	Pass	Horizontal
1759.638	31.33	3.05	34.47	45.54	45.45	74	-28.55	Pass	Horizontal
3096.325	33.51	5.60	34.51	43.48	48.08	74	-25.92	Pass	Horizontal
4810.000	34.70	5.11	34.35	47.22	52.68	74	-21.32	Pass	Horizontal
7215.000	36.42	6.67	34.90	39.13	47.32	74	-26.68	Pass	Horizontal
9620.000	37.90	7.72	35.07	37.31	47.86	74	-26.14	Pass	Horizontal
1204.210	30.24	2.52	34.96	47.68	45.48	74	-28.52	Pass	Vertical
1823.477	31.43	3.10	34.42	44.88	44.99	74	-29.01	Pass	Vertical
3570.714	33.12	5.51	34.56	42.33	46.40	74	-27.60	Pass	Vertical
4810.000	34.70	5.11	34.35	46.59	52.05	74	-21.95	Pass	Vertical
7215.000	36.42	6.67	34.90	40.18	48.37	74	-25.63	Pass	Vertical
9620.000	37.90	7.72	35.07	39.77	50.32	74	-23.68	Pass	Vertical

Worse case mode:		O-QPSK		Test channel:		Middle	Remark:	Peak	
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1263.883	30.38	2.59	34.90	46.20	44.27	74	-29.73	Pass	Horizontal
1777.646	31.36	3.07	34.45	44.41	44.39	74	-29.61	Pass	Horizontal
3498.735	33.17	5.52	34.55	43.53	47.67	74	-26.33	Pass	Horizontal
4880.000	34.85	5.08	34.33	44.51	50.11	74	-23.89	Pass	Horizontal
7320.000	36.43	6.77	34.90	40.39	48.69	74	-25.31	Pass	Horizontal
9760.000	38.05	7.60	35.05	38.37	48.97	74	-25.03	Pass	Horizontal
1276.818	30.41	2.60	34.88	47.24	45.37	74	-28.63	Pass	Vertical
1711.050	31.25	3.01	34.50	48.73	48.49	74	-25.51	Pass	Vertical
3208.660	33.41	5.58	34.52	45.42	49.89	74	-24.11	Pass	Vertical
4880.000	34.85	5.08	34.33	46.20	51.80	74	-22.20	Pass	Vertical
7320.000	36.43	6.77	34.90	38.24	46.54	74	-27.46	Pass	Vertical
9760.000	38.05	7.60	35.05	37.83	48.43	74	-25.57	Pass	Vertical

Worse case mode:		O-QPSK		Test channel:		Highest	Remark:	Peak	
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1257.465	30.36	2.58	34.90	46.80	44.84	74	-29.16	Pass	Horizontal
1923.606	31.59	3.18	34.35	43.79	44.21	74	-29.79	Pass	Horizontal
3795.660	32.95	5.47	34.58	43.79	47.63	74	-26.37	Pass	Horizontal
4960.000	35.02	5.05	34.31	46.21	51.97	74	-22.03	Pass	Horizontal
7440.000	36.45	6.88	34.90	39.90	48.33	74	-25.67	Pass	Horizontal
9920.000	38.22	7.47	35.02	37.88	48.55	74	-25.45	Pass	Horizontal
1254.268	30.35	2.58	34.91	47.67	45.69	74	-28.31	Pass	Vertical
1715.411	31.26	3.02	34.50	46.42	46.20	74	-27.80	Pass	Vertical
3258.042	33.37	5.57	34.53	44.94	49.35	74	-24.65	Pass	Vertical
4960.000	35.02	5.05	34.31	44.37	50.13	74	-23.87	Pass	Vertical
7440.000	36.45	6.88	34.90	39.84	48.27	74	-25.73	Pass	Vertical
9920.000	38.22	7.47	35.02	38.16	48.83	74	-25.17	Pass	Vertical

**Note:**

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading - Correct Factor

Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor

2) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak values are measured.



## PHOTOGRAPHS OF TEST SETUP

Test model No.: JZSW-LSA-PL50

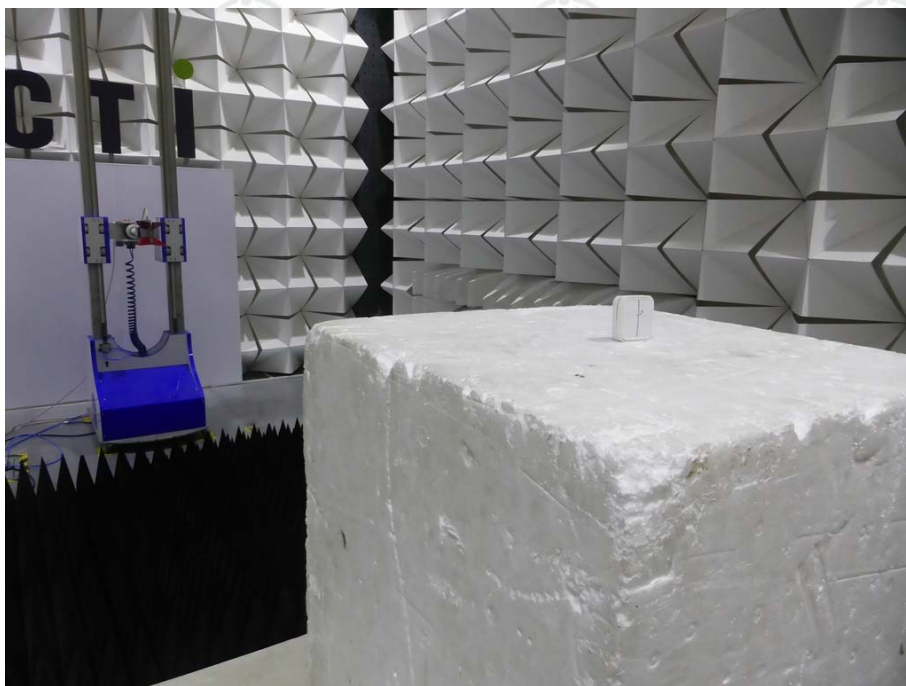


**Radiated spurious emission Test Setup-1(Below 30MHz)**



**Radiated spurious emission Test Setup-2(30-1000MHz)**





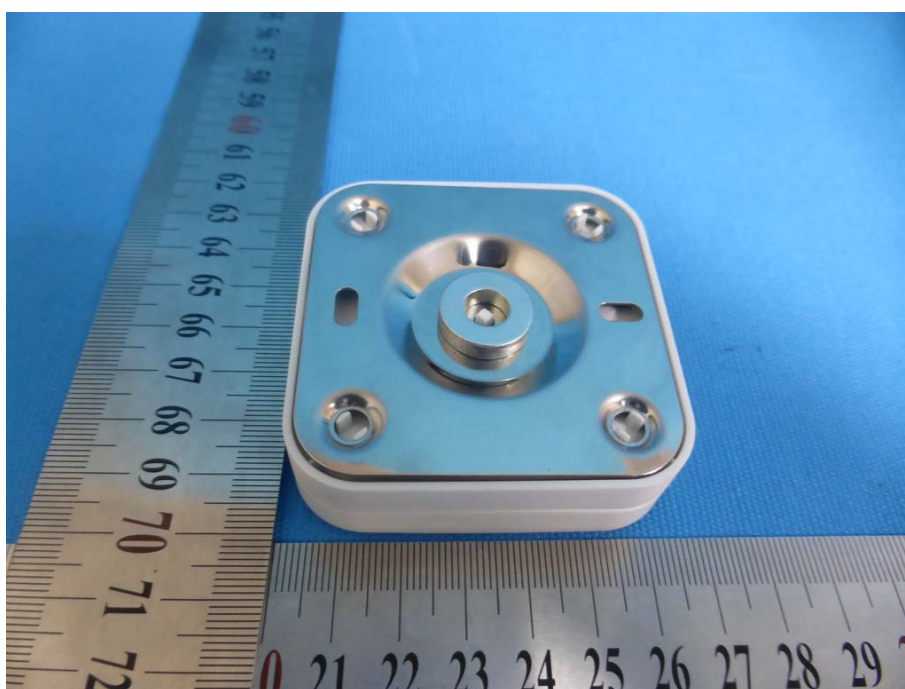
**Radiated spurious emission Test Setup-3(Above 1GHz)**

## PHOTOGRAPHS OF EUT Constructional Details

Test model No.: JZSW-LSA-PL50



View of Product-1



View of Product-2



View of Product-3

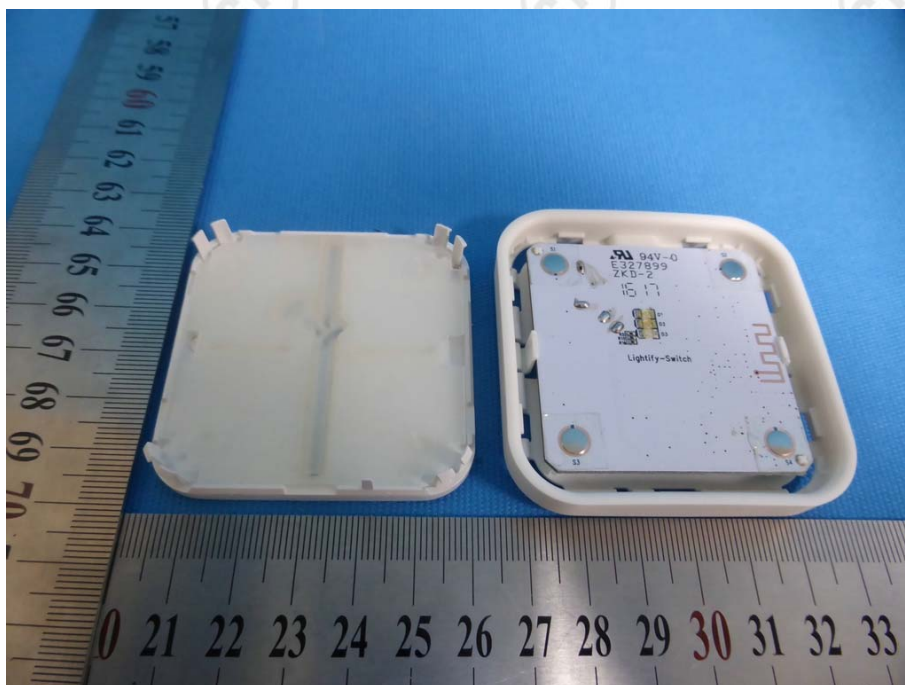


View of Product-4





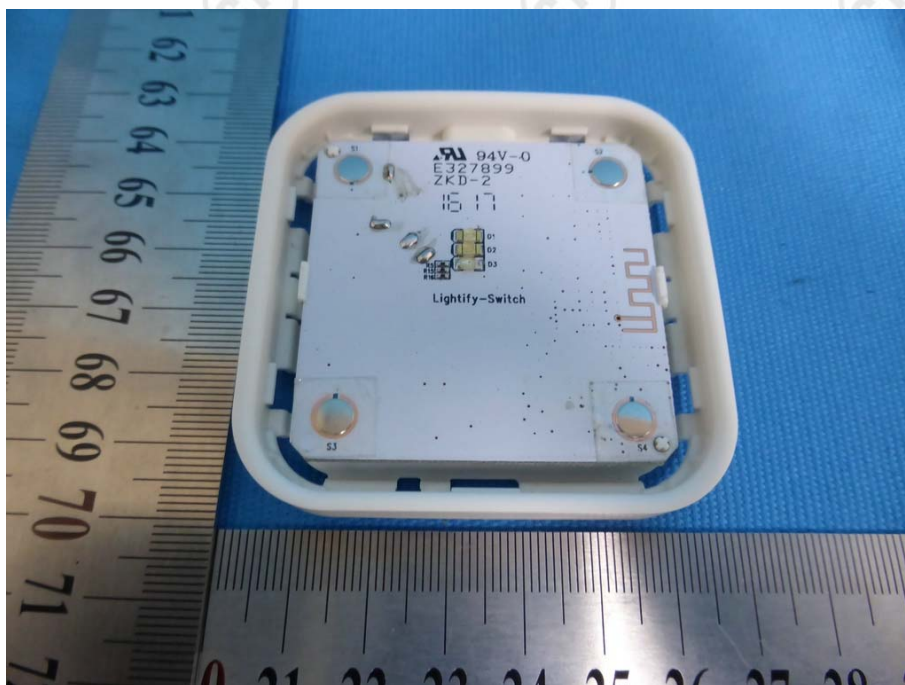
View of Product-5



View of Product-6

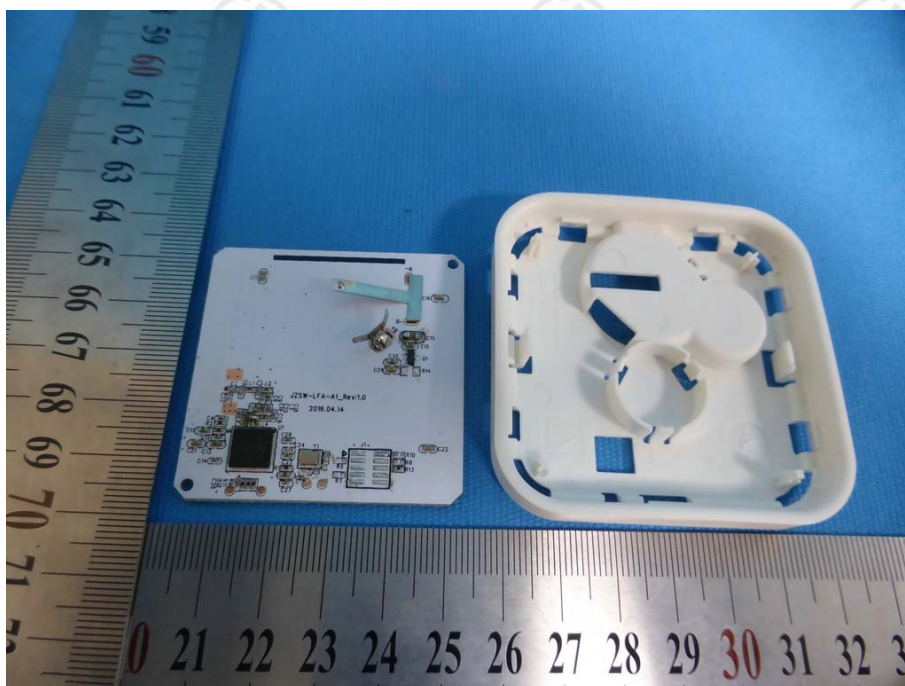


View of Product-7

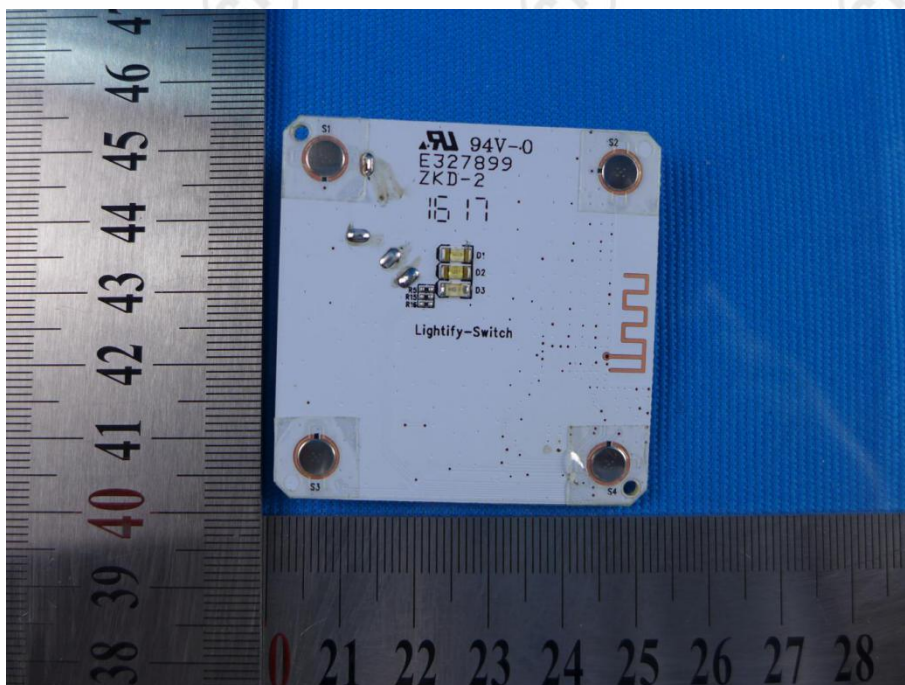


View of Product-8

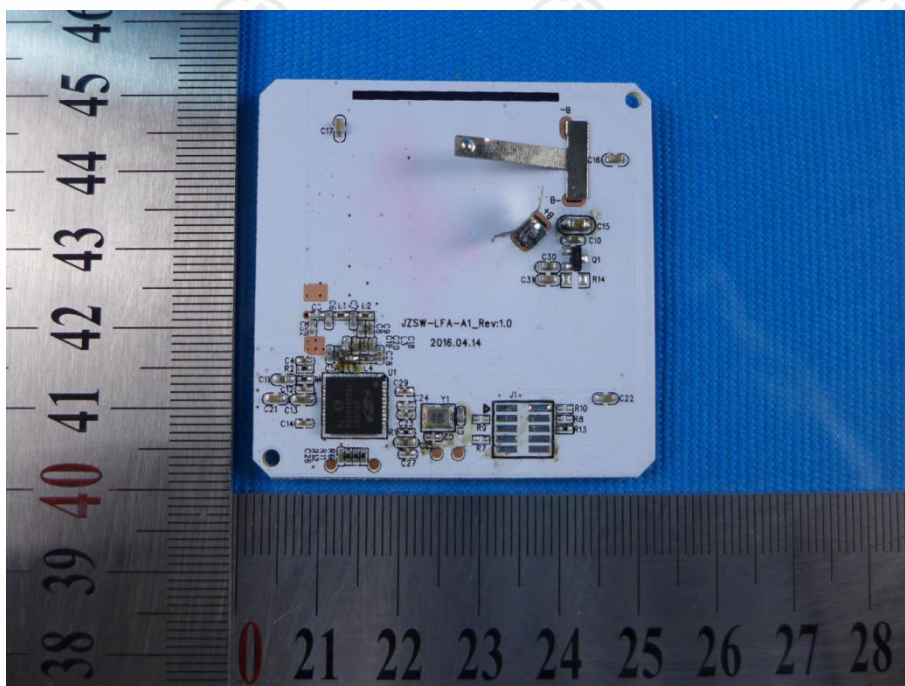




View of Product-9



View of Product-10



View of Product-11

\*\*\* End of Report \*\*\*

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