Product Service

FCC - TEST REPORT

Report Number	:	708881503690-00	Date of Issue:	April 12, 2016

Model	:	U3
Product Type	:	BCT-GLASS
Applicant	:	Suzhou YOKO BCT Electronic Corporation
Address	:	P-48, No.666 Jianlin Road, High tech Zone, Suzhou Jiangsu, People's Republic of China
Production Facility	:	Suzhou YOKO BCT Electronic Corporation
Address	:	P-48, No.666 Jianlin Road, High tech Zone, Suzhou Jiangsu, People's Republic of China

Test Result	:	■ **Positive**	☐ **Negative**
Total pages including Appendices	:	43	

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1 Table of Contents

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2 Details about the Test Laboratory

Details about the Test Laboratory
Test Site 1

Company name:	MRT Technology (Suzhou) Co., Ltd
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
FCC Registration Number:	809388
Telephone:	+86-512-66308358
Fax:	+86-512-66308368

Test Site 2

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch No.16 Lane, 1951 Du Hui Road, Shanghai 201108, P.R. China
FCC Registration Number:	904822
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3 Description of the Equipment under Test

Description of the Equipment Under Test

Product:	BCT-GLASS
Model no.:	U3
FCC ID:	2AG8AYKU3A
Options and accessories:	
Rating:	5V, 150mA DC battery
RF Transmission Frequency:	2402~2480MHz
No. of Operated Channel:	40
Modulation:	GFSK
Duty Cycle:	24%
Antenna Type:	PCB
Antenna Gain:	0dBi
Description of the EUT:	Bluetooth Headset

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2014 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB558074 D01 DTS Meas Guidance v03r04 and ANSI C63.10 (2013).

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5 Summary of Test Results

Technical Requirements						
FCC Part 15 Subpart C,						
Test Condition		Pages	Test Site	Test Result		
				Pass	Fail	N/A
§15.207	Conducted emission AC power port	12	Site 1	☒	☐	☐
§15.247 (b) (1)	Conducted peak output power	15	Site 1	☒	☐	☐
§15.247(a)(1)	20dB bandwidth	---	---	☐	☐	☒
§15.247(a)(1)	Carrier frequency separation	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Number of hopping frequencies	---	---	☐	☐	☒
§15.247(a)(1)(iii)	Dwell Time	---	---	☐	☐	☒
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	16	Site 1	☒	☐	☐
§15.247(e)	Power spectral density	18	Site 1	☒	☐	☐
§15.247(d)	Spurious RF conducted emissions	21	Site 1	☒	☐	☐
§15.247(d)	Band edge	26	Site 1	☒	☐	☐
§15.247(d) & §15.209	Spurious radiated emissions for transmitter	32	Site 1	☒	☐	☐
§15.203	Antenna requirement	See note 1		☒	☐	☐

Remark 1: N/A – Not Applicable.
Note 1: The EUT uses a permanently PCB Antenna, which gain is 0dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AG8AYKU3A complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules.

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SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date:	November 18, 2015
Testing Start Date:	December 19, 2015
Testing End Date:	January 28, 2016

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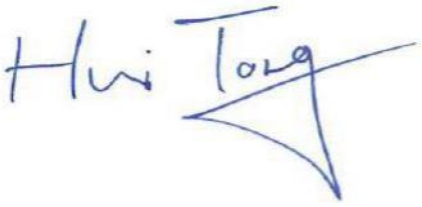
Reviewed by: Prepared by:



Hui TONG
Review Engineer

Wenwen CHEN
Project Engineer

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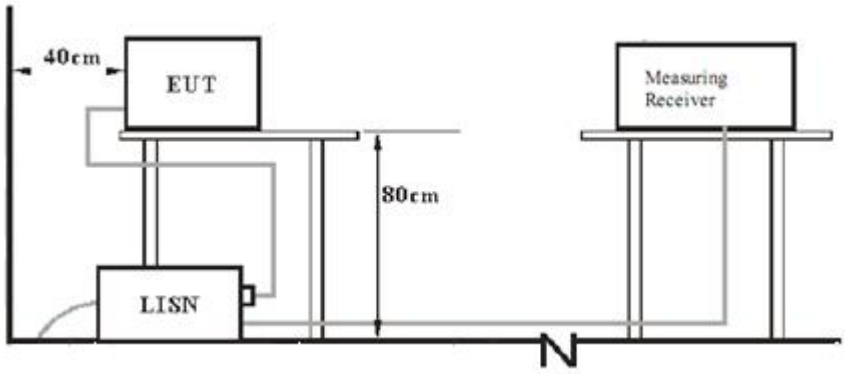
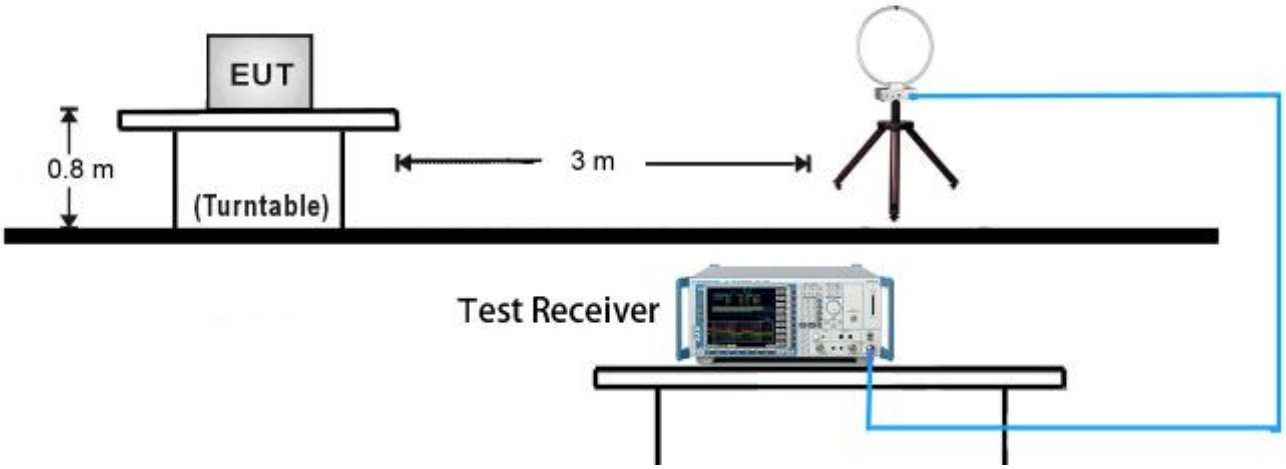
7 Test Setups

7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups

9kHz ~ 30MHz Test Setup:



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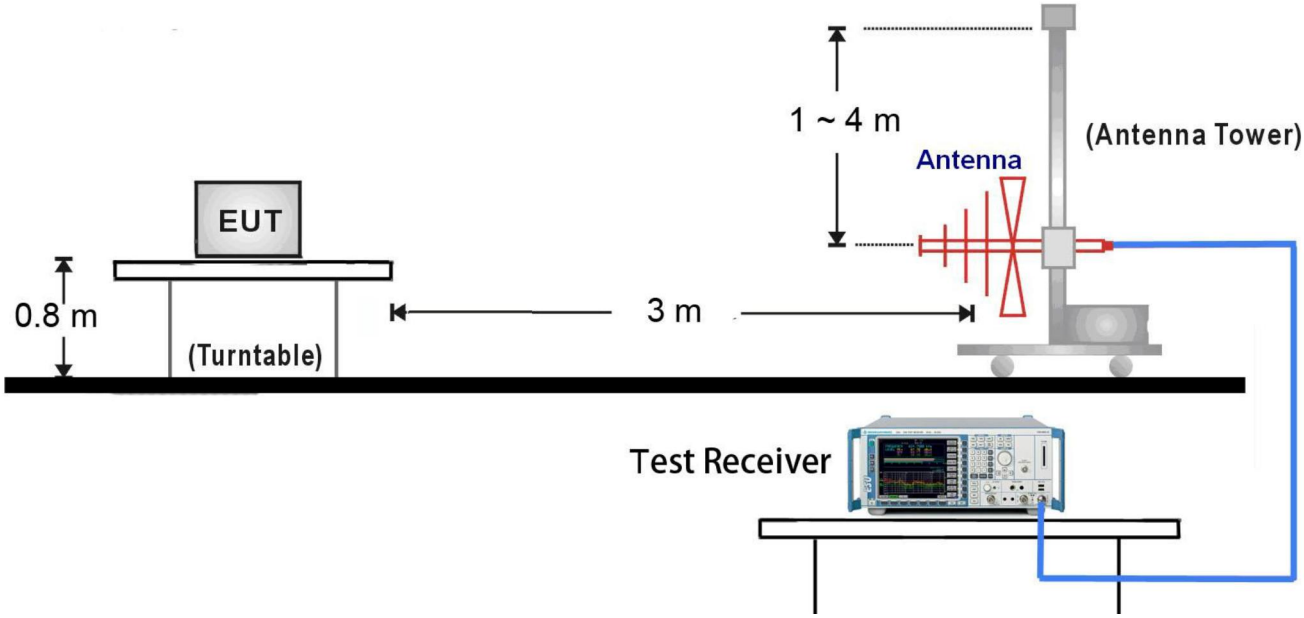
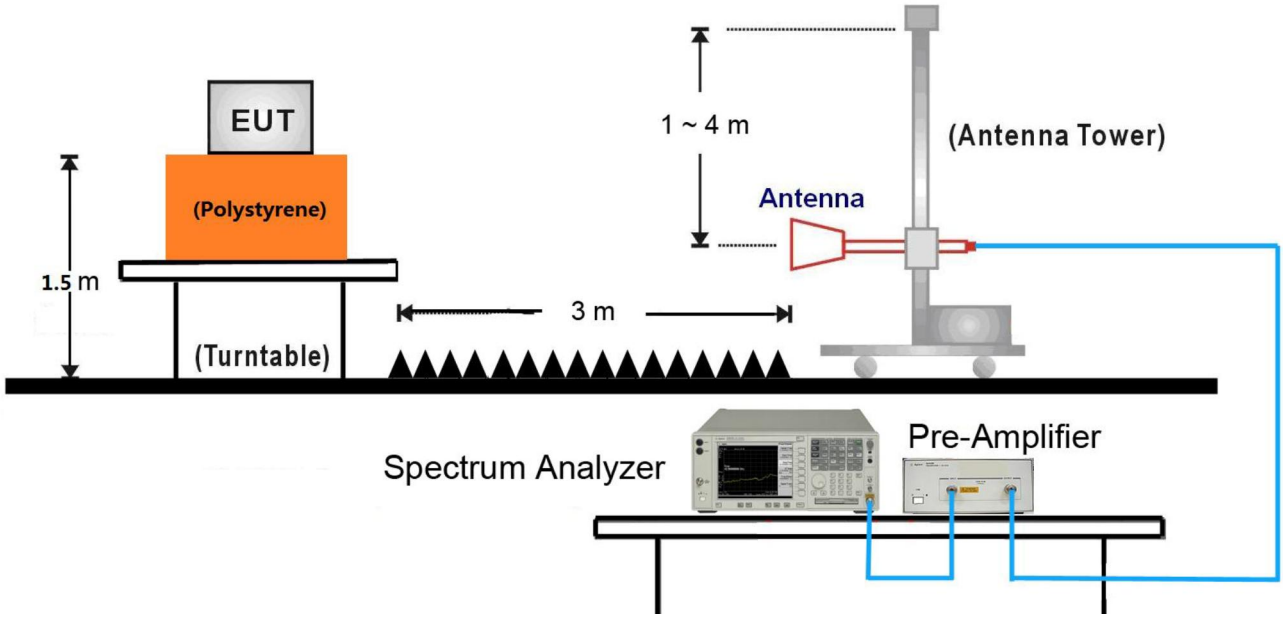
30MHz ~ 1GHz Test Setup:



1GHz ~ 18GHz Test Setup:



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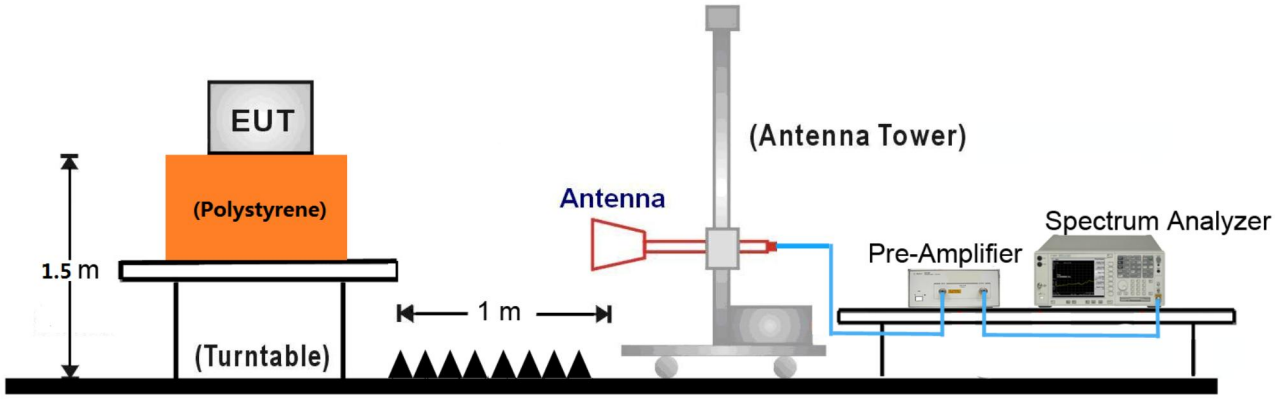
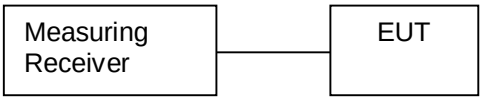
18GHz ~25GHz Test Setup:



7.3 Conducted RF test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Laptop	Lenovo	X230	---

Test software: BlueTest 3, which used to control the EUT in continues transmitting mode

The system was configured to channel 0, 19, and 39 for the test.

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9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

Frequency MHz	QP Limit dBµV	AV Limit dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

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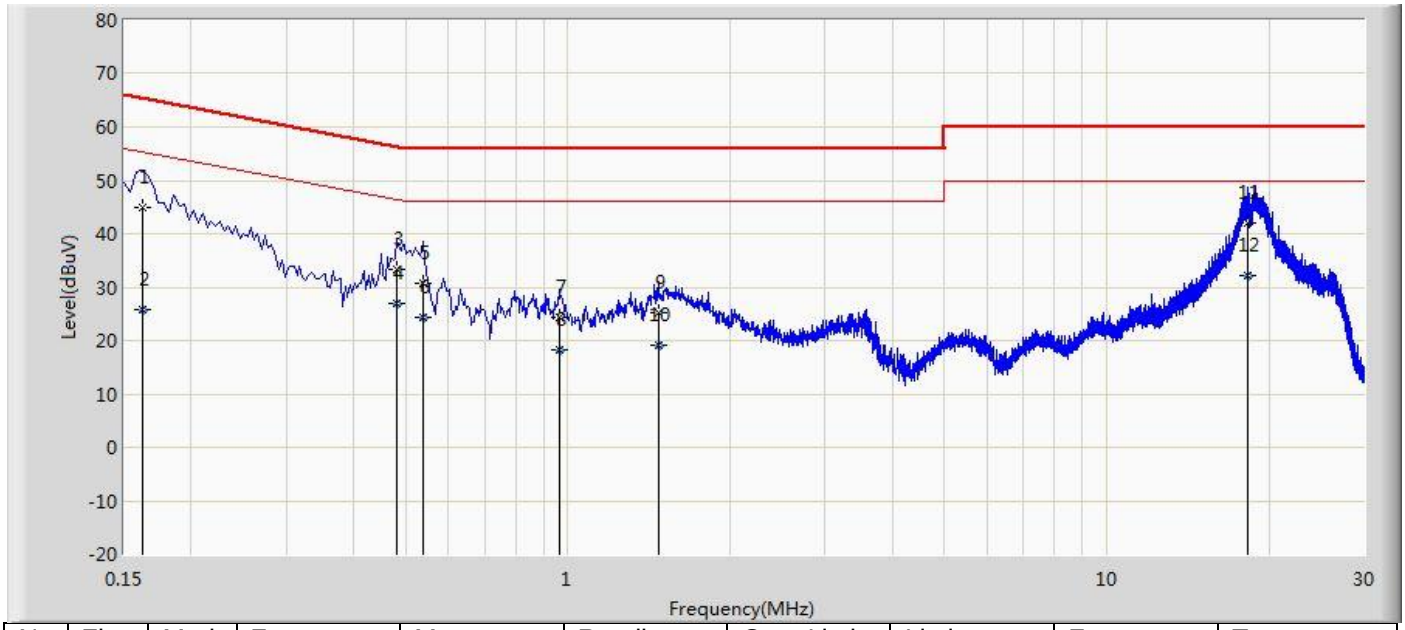
Product Service

Product Type	:	BCT-GLASS
M/N	:	U3
Operating Condition	:	Transmit at channel 2480MHz by BLE
Test Specification	:	Power: AC 120V/60Hz
Comment	:	Line



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.162	44.897	34.800	-20.464	65.361	10.097	QP
2			0.162	25.897	15.800	-29.464	55.361	10.097	AV
3			0.482	33.366	23.214	-22.939	56.305	10.152	QP
4			0.482	26.941	16.790	-19.363	46.305	10.152	AV
5			0.538	30.691	20.544	-25.309	56.000	10.147	QP
6			0.538	24.241	14.094	-21.759	46.000	10.147	AV
7			0.962	24.239	14.311	-31.761	56.000	9.928	QP
8			0.962	18.244	8.317	-27.756	46.000	9.928	AV
9			1.470	25.307	15.417	-30.693	56.000	9.890	QP
10			1.470	19.248	9.357	-26.752	46.000	9.890	AV
11			18.226	42.054	31.953	-17.946	60.000	10.102	QP
12		*	18.226	32.139	22.038	-17.861	50.000	10.102	AV

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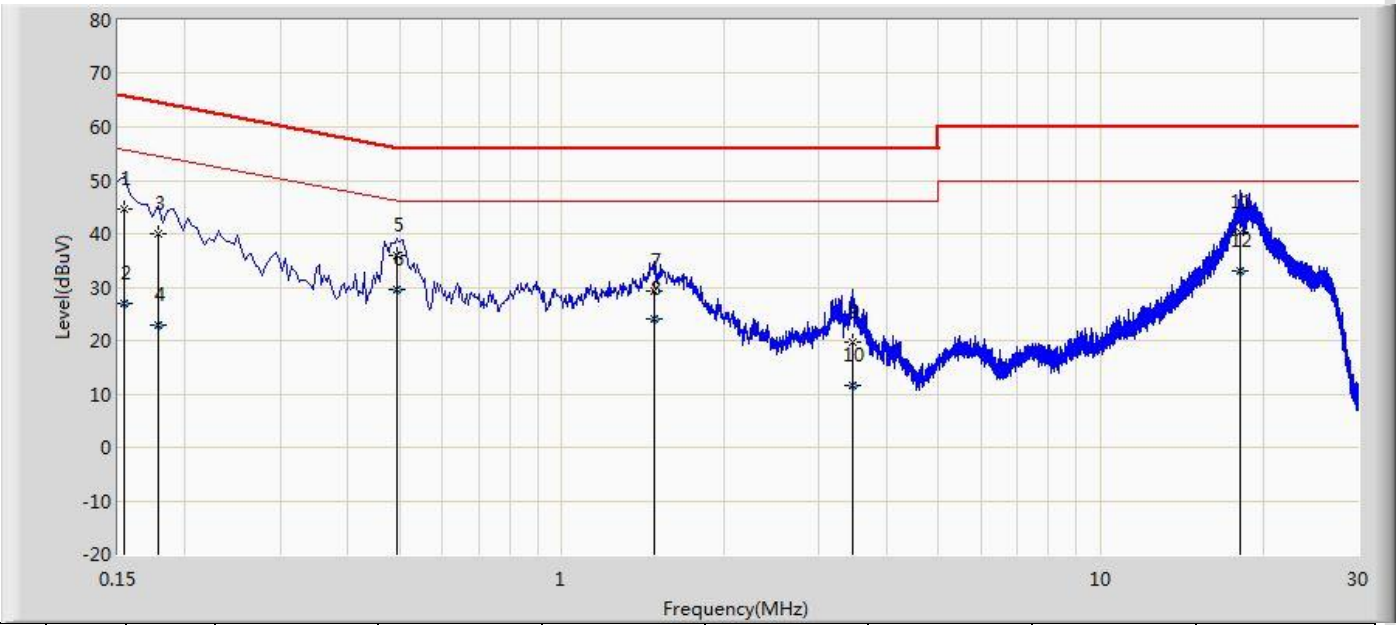
Product Service

Product Type	:	BCT-GLASS
M/N	:	U3
Operating Condition	:	Transmit at channel 2480MHz by BLE
Test Specification	:	Power: AC 120V/60Hz
Comment	:	Neutral



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.154	44.697	33.981	-21.084	65.781	10.716	QP
2			0.154	26.954	16.238	-28.827	55.781	10.716	AV
3			0.178	40.080	30.031	-24.498	64.578	10.049	QP
4			0.178	22.986	12.937	-31.592	54.578	10.049	AV
5			0.494	35.992	25.813	-20.108	56.100	10.178	QP
6		*	0.494	29.611	19.432	-16.490	46.100	10.178	AV
7			1.482	29.340	19.449	-26.660	56.000	9.891	QP
8			1.482	23.944	14.054	-22.056	46.000	9.891	AV
9			3.474	19.616	9.704	-36.384	56.000	9.912	QP
10			3.474	11.635	1.723	-34.365	46.000	9.912	AV
11			18.150	40.352	30.213	-19.648	60.000	10.139	QP
12			18.150	33.103	22.964	-16.897	50.000	10.139	AV

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9.2 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
   RBW > the 6 dB bandwidth of the emission being measured, VBW≥3RBW, Span≥3RBW
   Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

Limits

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤1	≤30

Test result as below table

Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	3.01	Pass
Middle channel 2440MHz	3.42	Pass
High channel 2480MHz	3.49	Pass

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9.3 6dB bandwidth and 99% Occupied Bandwidth

Test Method

1. Use the following spectrum analyzer settings:
   RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

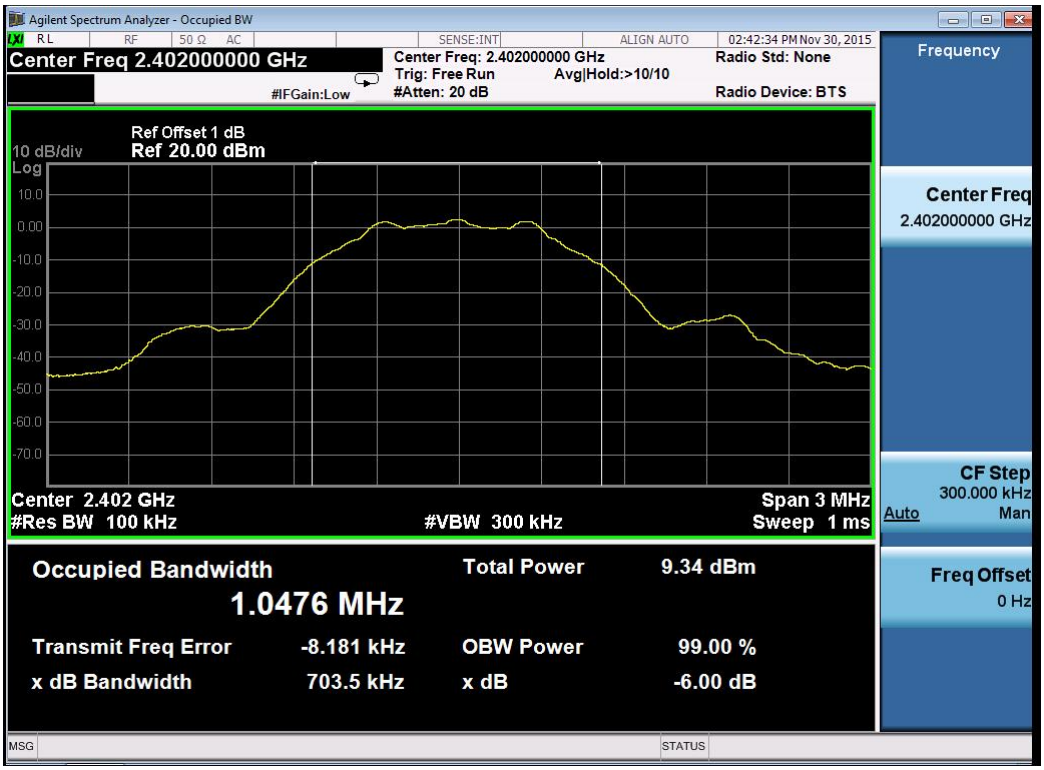
Limit

Limit [kHz]
≥500

Test result

Frequency MHz	6dB bandwidth kHz	**99% Bandwidth kHz**	Result
Top channel 2402MHz	703.5	1047.6	Pass
Middle channel 2440MHz	699.9	1044.4	Pass
Bottom channel 2480MHz	697.7	1044.8	Pass

2402MHz



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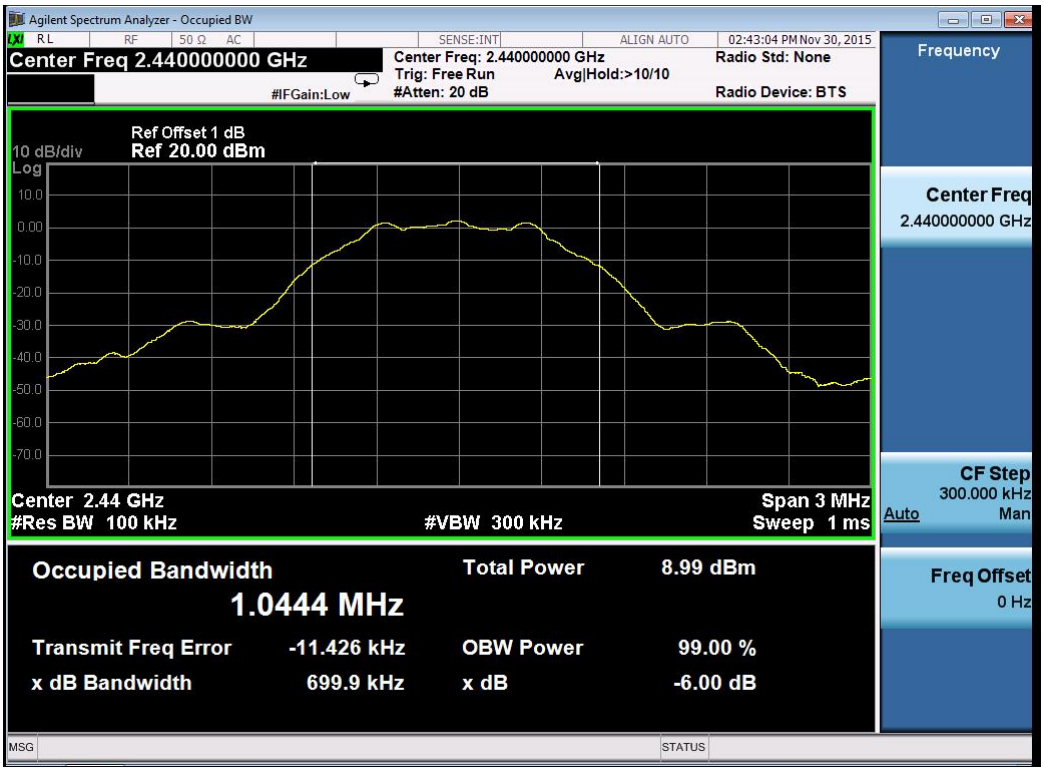
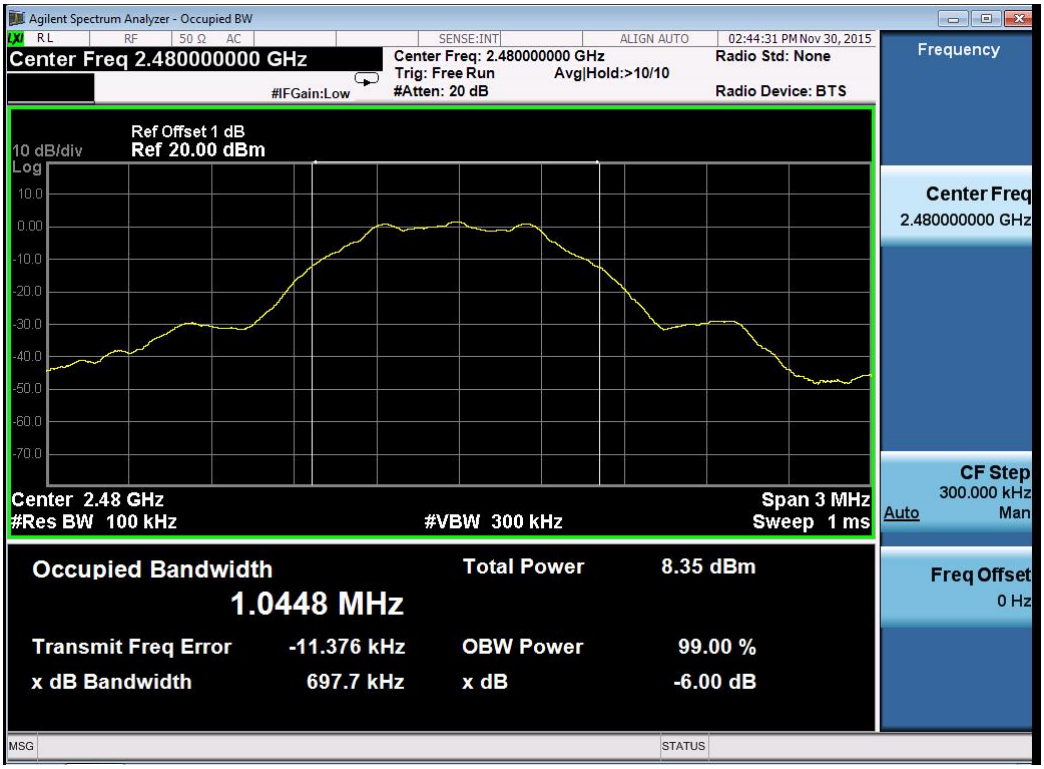
2440MHz



2480MHz



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9.4 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz,VBW≥3RBW,Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

Limit

Limit [dBm]
≤8

Test result

Frequency **MHz**	Power spectral density **dBm**	Result
Top channel 2402MHz	-12.697	Pass
Middle channel 2440MHz	-12.777	Pass
Bottom channel 2480MHz	-13.397	Pass

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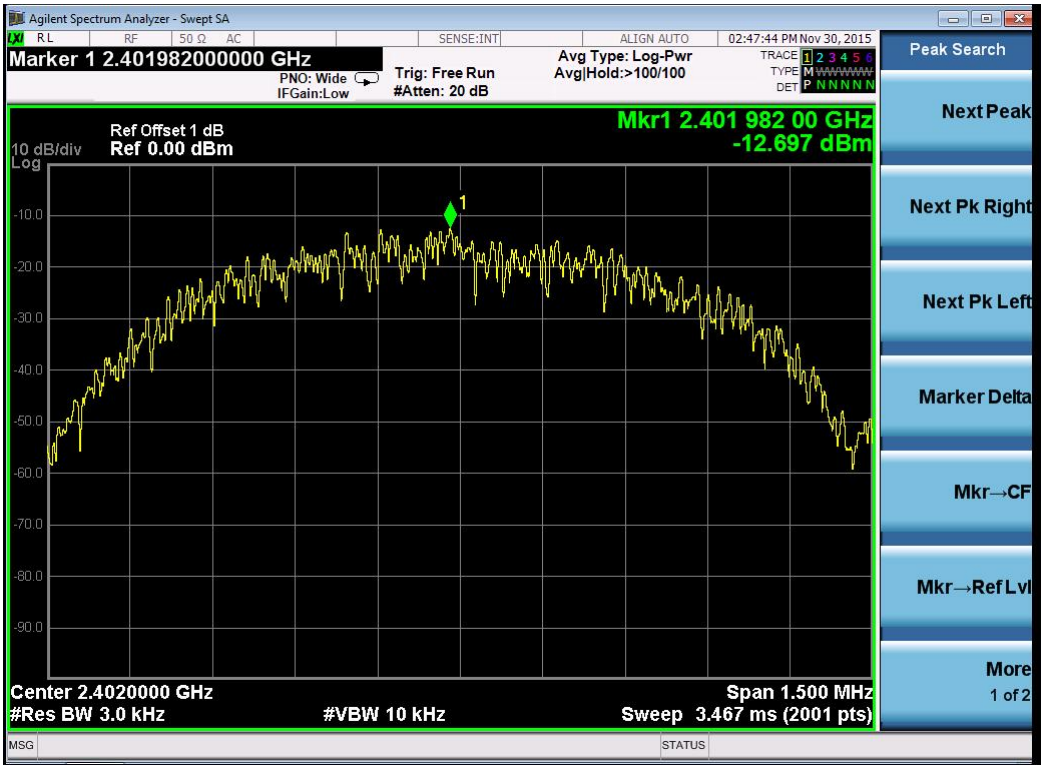

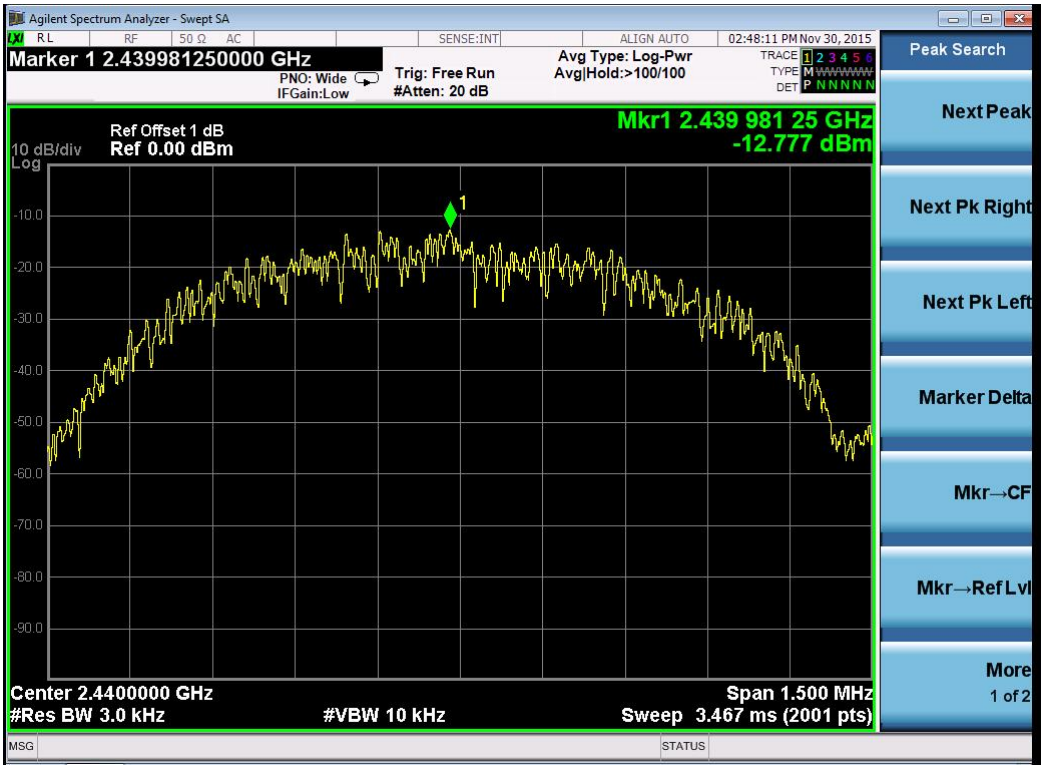

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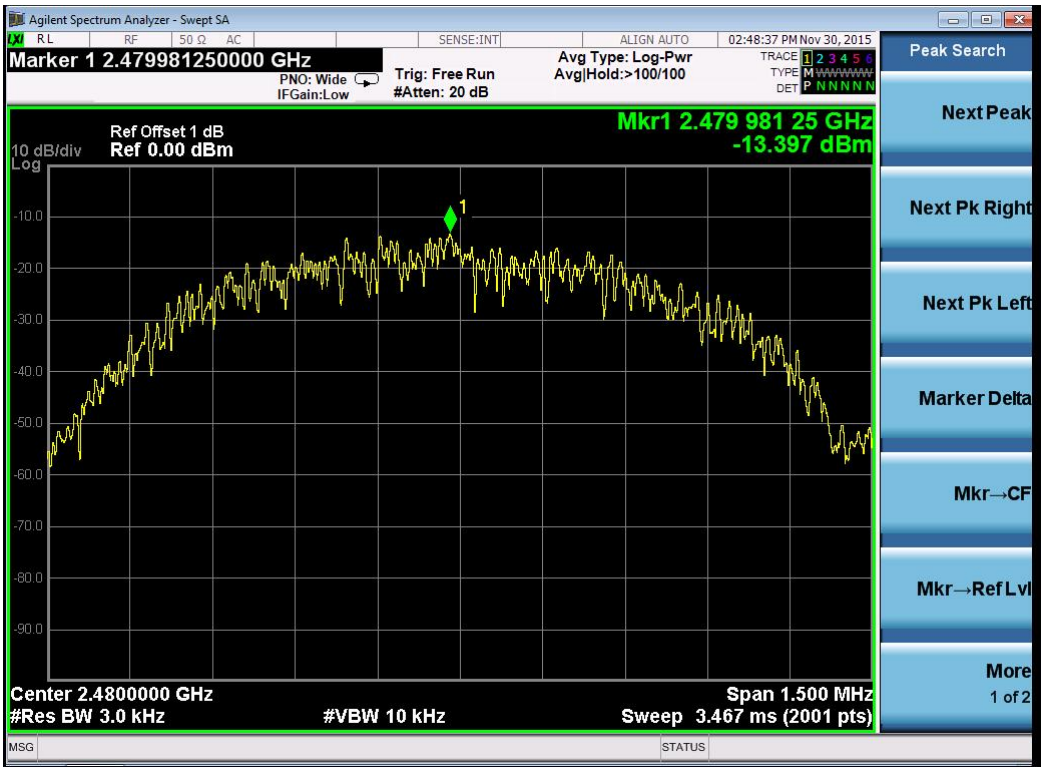

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9.5 Spurious RF conducted emissions

Test Method

1. Establish a reference level by using the following procedure:
   a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
   b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
2. Use the maximum PSD level to establish the reference level.
   a. Set the center frequency and span to encompass frequency range to be measured.
   b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
3. Repeat above procedures until other frequencies measured were completed.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

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100kHz PSD reference Level

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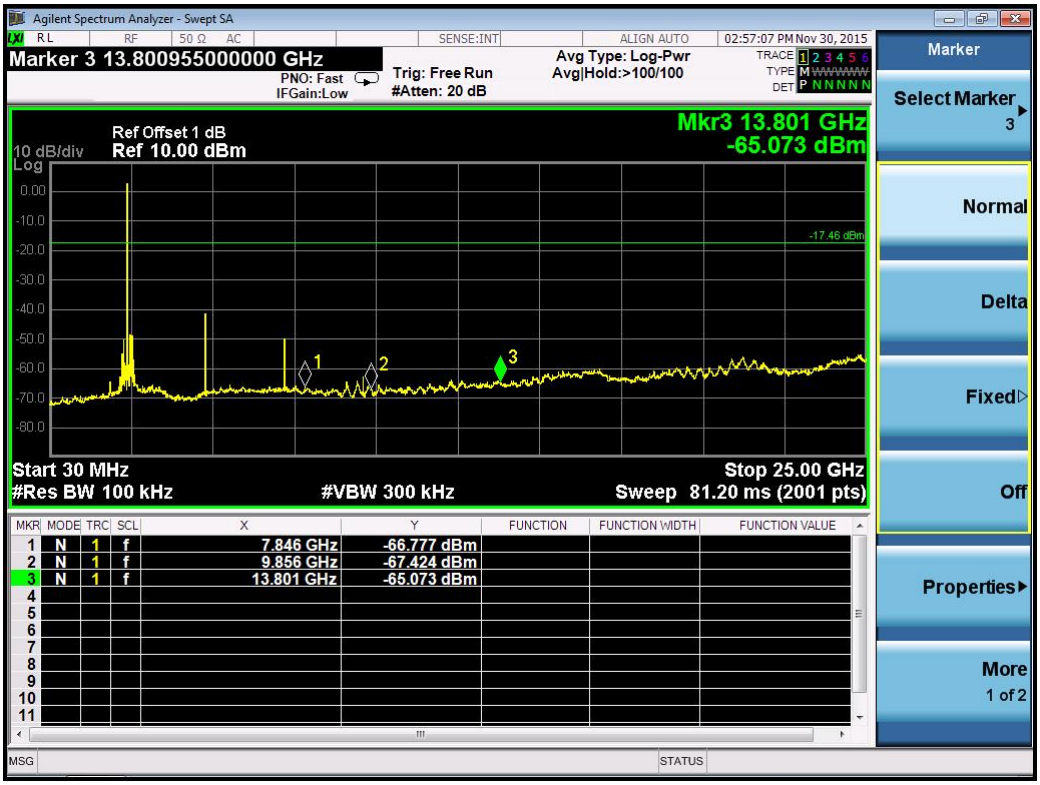
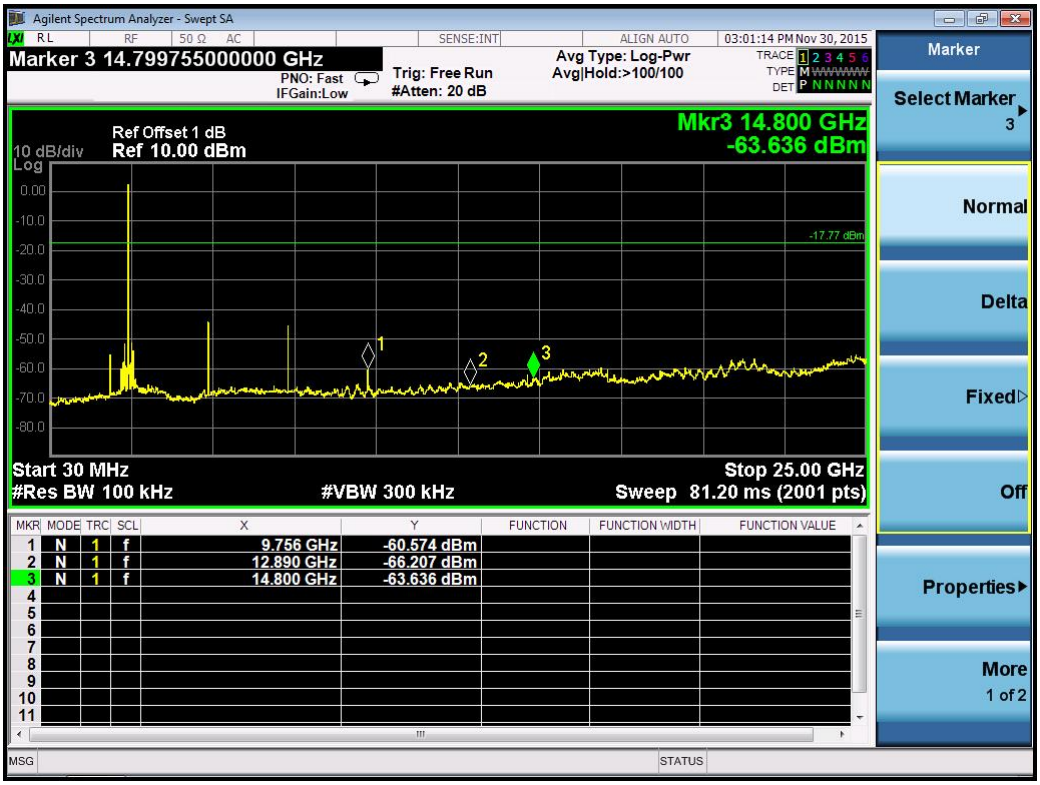
Spurious RF conducted emissions

2402MHz



2440MHz



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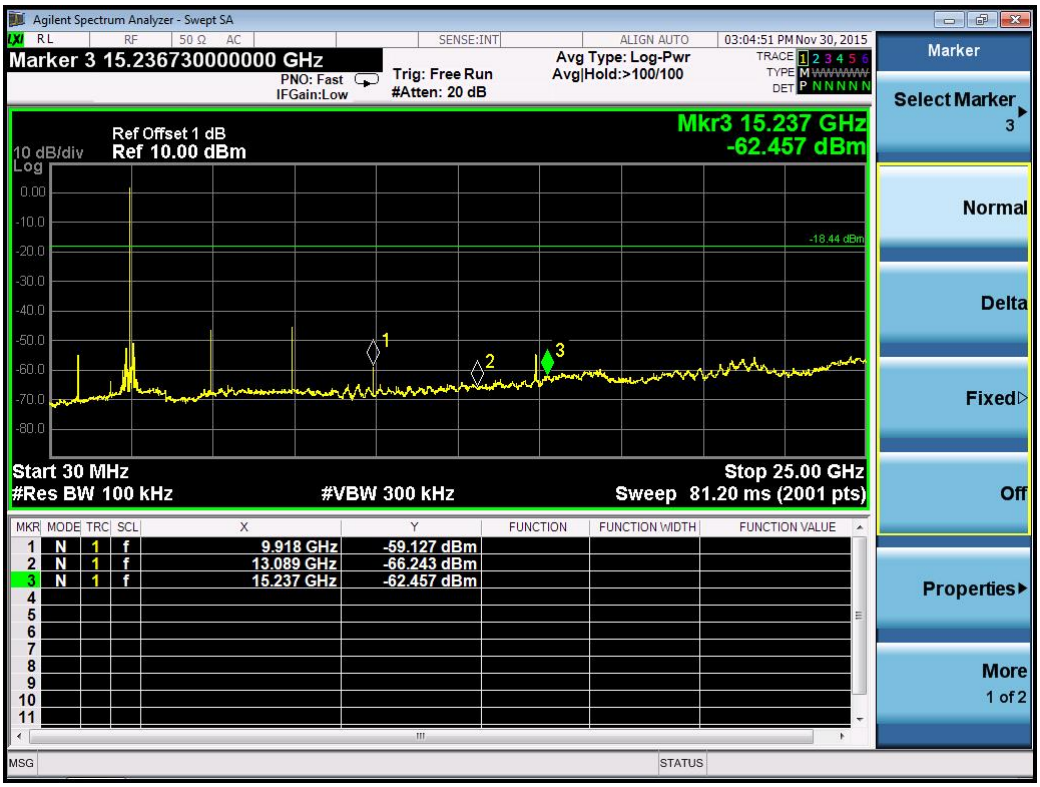
2480MHz



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9.6 Band edge

Test Method

1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold.
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
3 The level displayed must comply with the limit specified in this Section.

Limit

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) and RSS-Gen8.10, must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)) and RSS-Gen.

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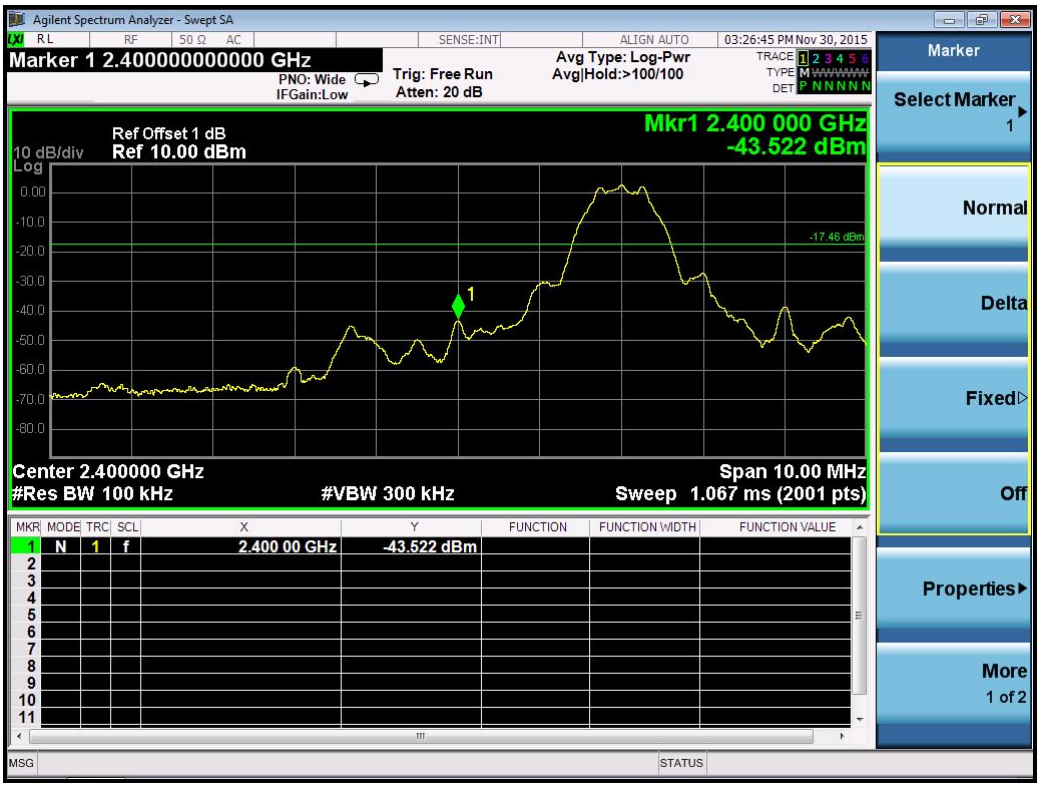
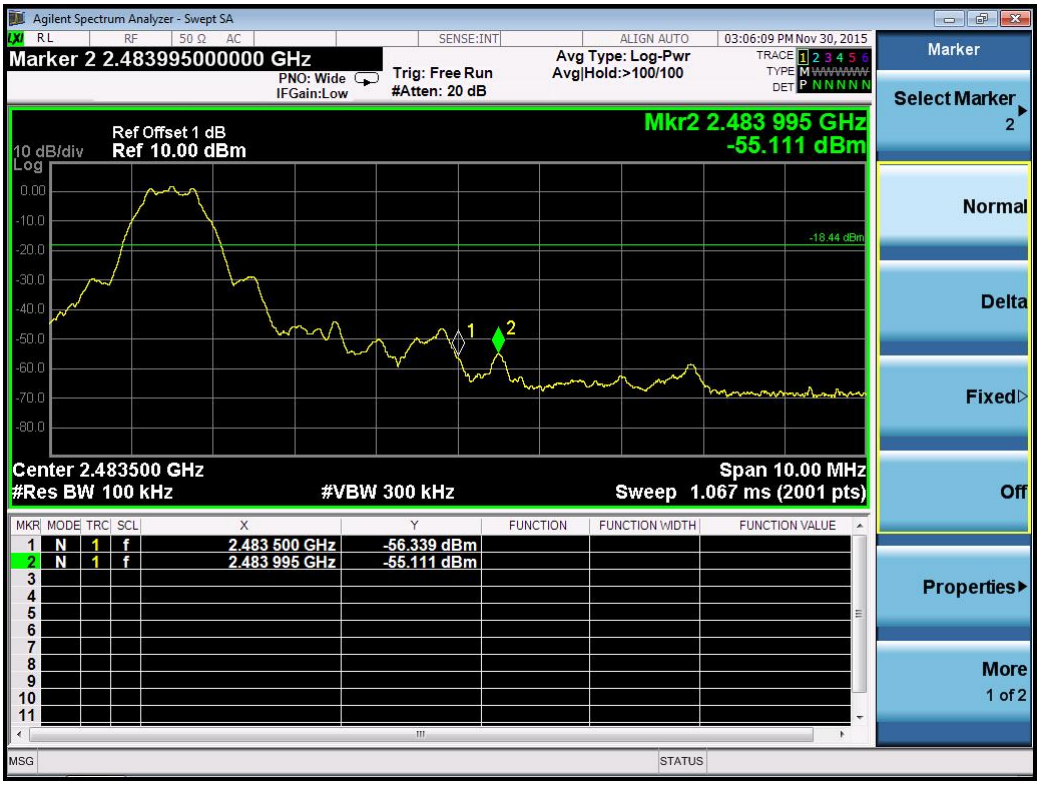
Product Service

Test result





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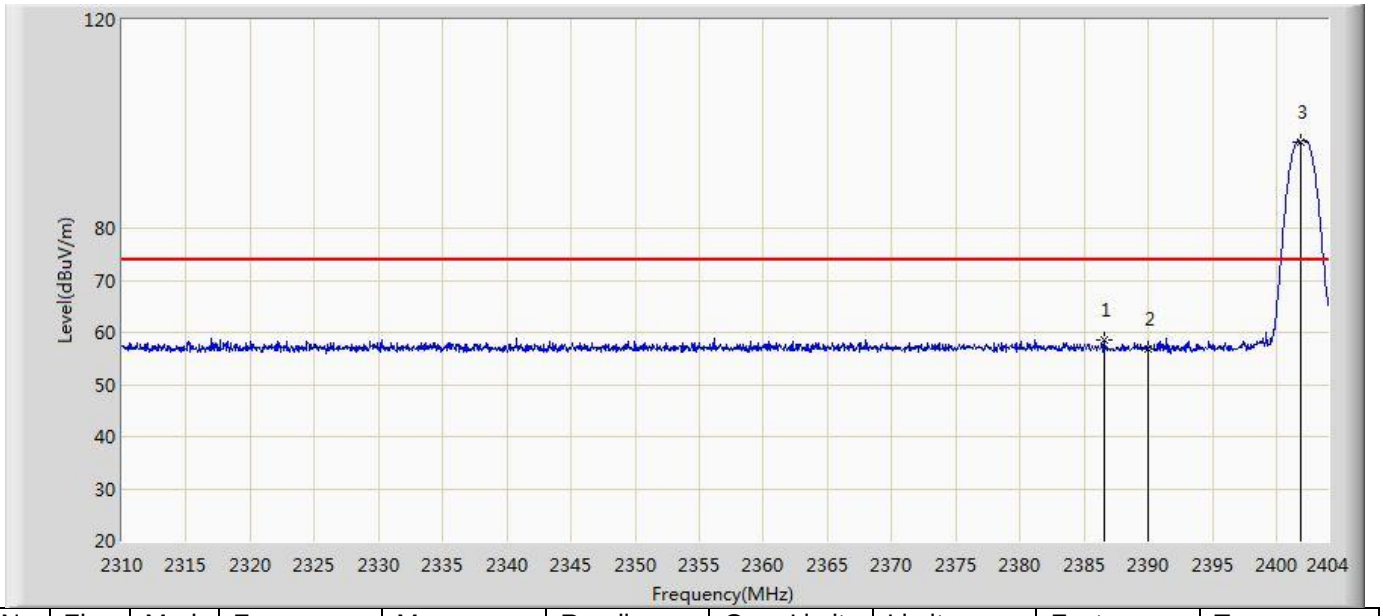
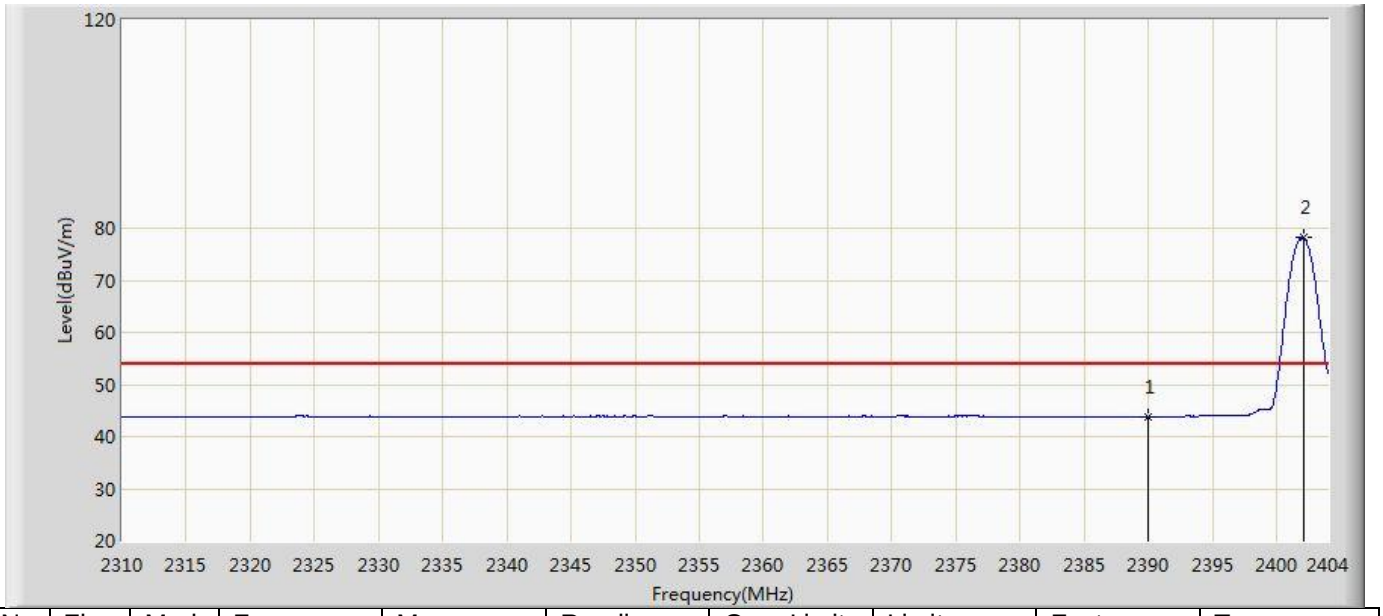
Transmit at Channel 2402MHz Horizontal



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2386.516	58.567	27.358	-15.433	74.000	31.209	PK
2			2390.000	56.923	25.720	-17.077	74.000	31.203	PK
3		*	2401.885	96.661	65.477	N/A	N/A	31.184	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	43.803	12.600	-10.197	54.000	31.203	AV
2		*	2402.073	78.185	47.001	N/A	N/A	31.184	AV

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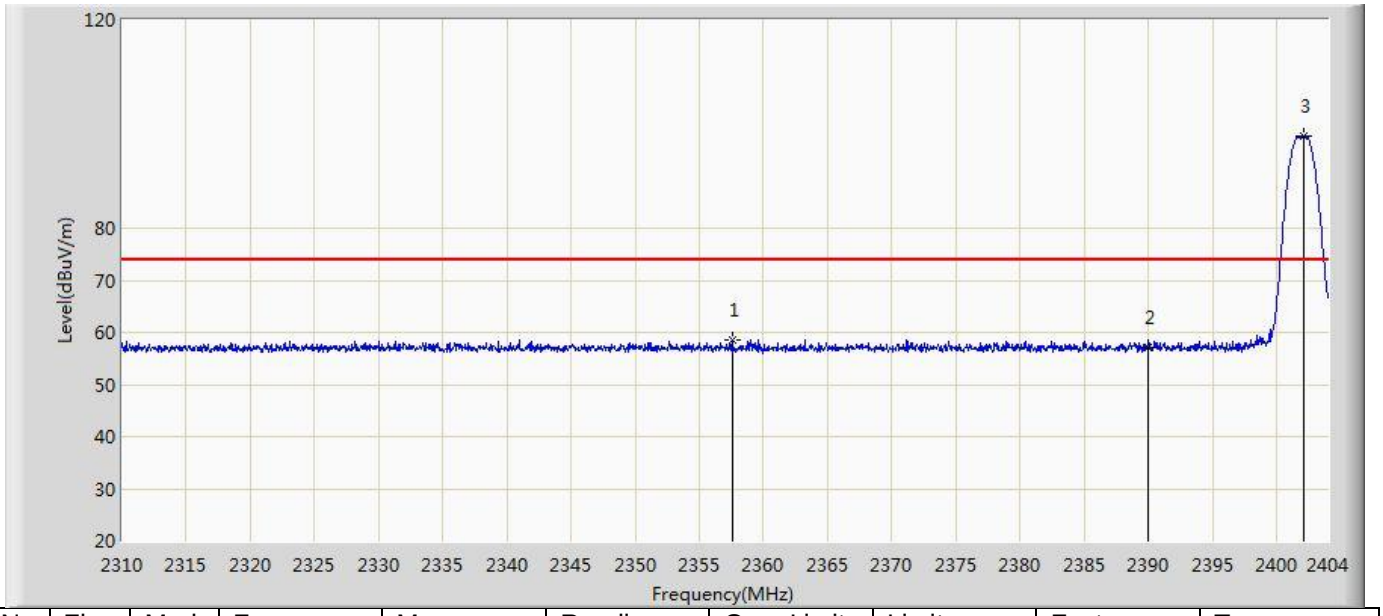
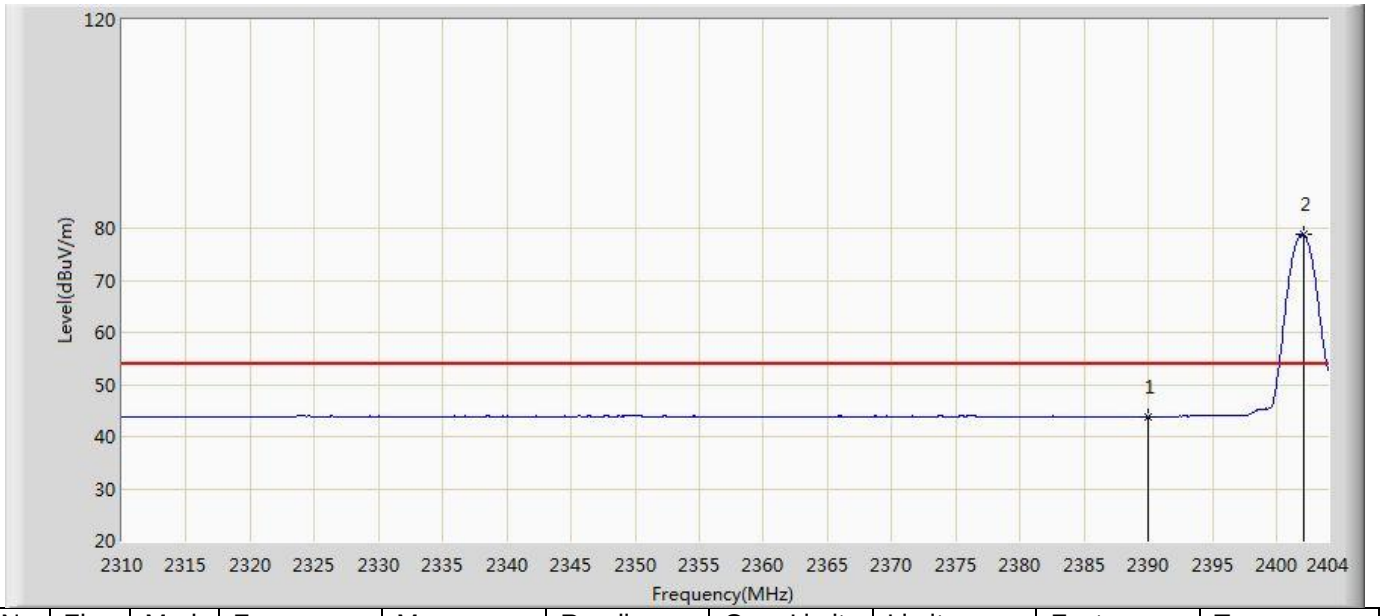
Transmit at Channel 2402MHz Vertical



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2357.564	58.676	27.412	-15.324	74.000	31.264	PK
2			2390.000	57.099	25.896	-16.901	74.000	31.203	PK
3		*	2402.073	97.588	66.404	N/A	N/A	31.184	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	43.837	12.634	-10.163	54.000	31.203	AV
2		*	2402.073	78.742	47.558	N/A	N/A	31.184	AV

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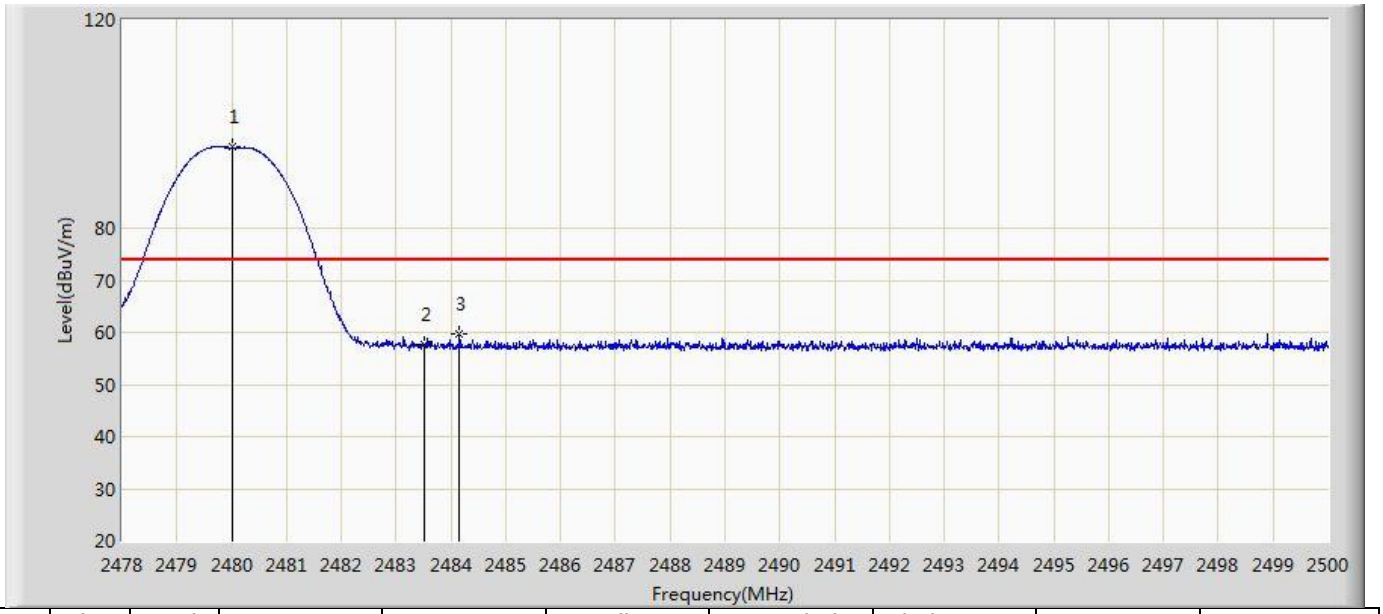
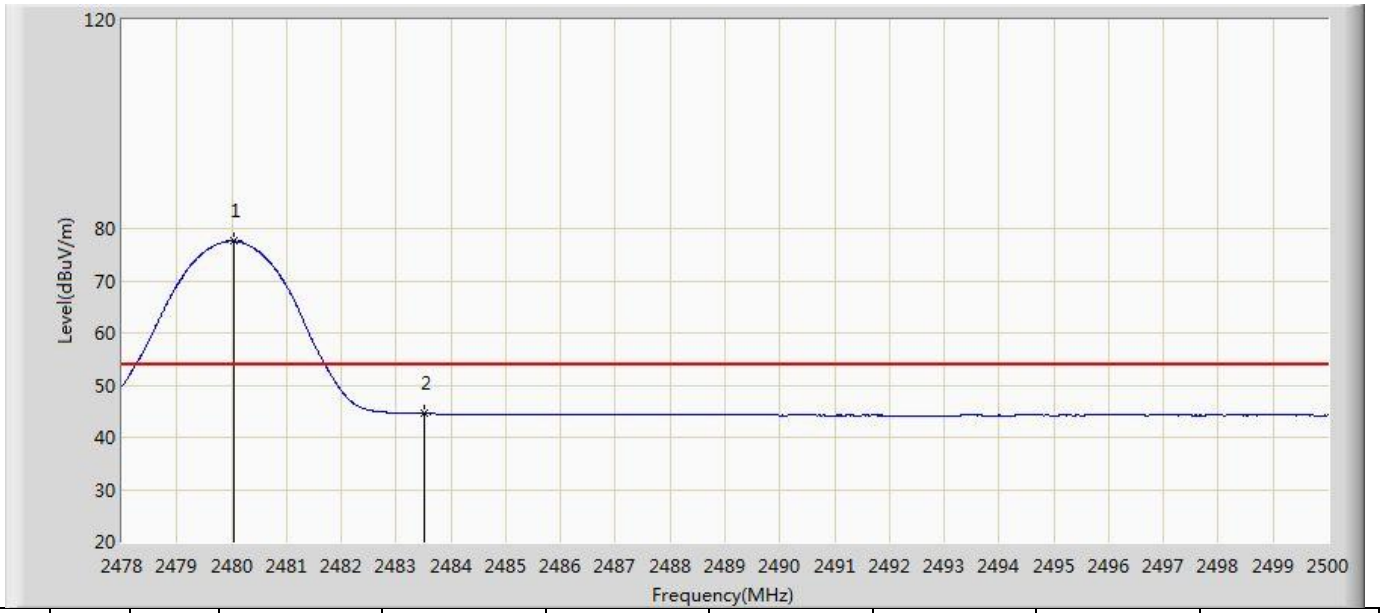
Transmit at Channel 2480MHz Horizontal



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.002	95.513	64.329	N/A	N/A	31.184	PK
2			2483.500	57.600	26.407	-16.400	74.000	31.194	PK
3			2484.160	59.574	28.379	-14.426	74.000	31.195	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.046	77.542	46.358	N/A	N/A	31.184	AV
2			2483.500	44.563	13.370	-9.437	54.000	31.194	AV

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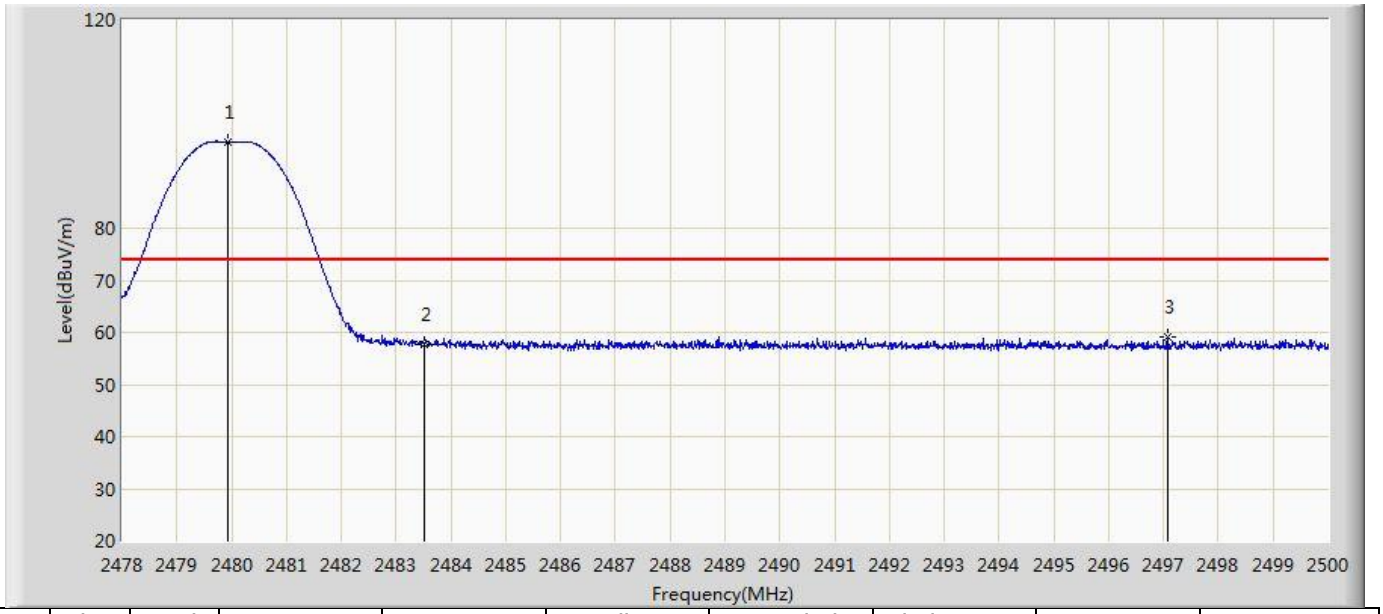
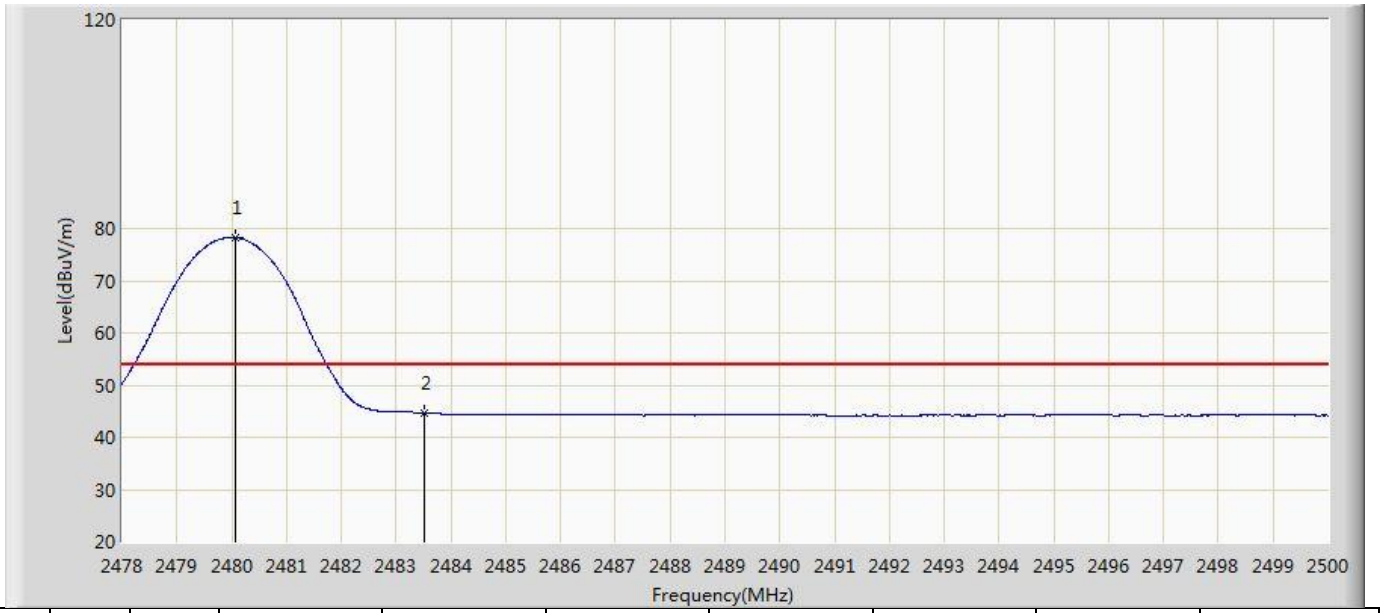
Transmit at Channel 2480MHz Vertical



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.936	96.590	65.406	N/A	N/A	31.184	PK
2			2483.500	57.760	26.567	-16.240	74.000	31.194	PK
3			2497.074	59.203	27.974	-14.797	74.000	31.229	PK



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.079	78.244	47.060	N/A	N/A	31.184	AV
2			2483.500	44.678	13.485	-9.322	54.000	31.194	AV

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9.7 Spurious radiated emissions for transmitter

Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:
   Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-1992 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.
   The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(duty cycle/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limit

The radio emission outside the operating frequency band 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. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

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Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Transmitting spurious emission test result as below:

2402MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4808	50.037	H	74	PK	-23.963	Pass
7205	46.287	H	74	PK	-27.713	Pass
9364	45.453	H	74	PK	-28.547	Pass
4799.5	51.102	V	74	PK	-22.898	Pass
7205	48.015	V	74	PK	-25.985	Pass
9610.5	46.587	V	74	PK	-27.413	Pass

2440MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4876	51.511	H	74	PK	-22.489	Pass
7315.5	48.927	H	74	PK	-25.073	Pass
9763.5	48.605	H	74	PK	-25.395	Pass
4876	51.764	V	74	PK	-22.236	Pass
7315.5	49.515	V	74	PK	-24.485	Pass
9763.5	49.247	V	74	PK	-24.753	Pass

2480MHz

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBµV/m	
4961	51.909	H	74	PK	-22.091	Pass
7443	50.705	H	74	PK	-23.295	Pass
9925	48.559	H	74	PK	-25.441	Pass
4961	49.796	V	74	PK	-24.204	Pass
7443	48.945	V	74	PK	-25.055	Pass
9916.5	49.747	V	74	PK	-24.253	Pass

Remark:

(1) AV Emission Level= PK Emission Level+20log (dutycycle)

(2) Data of measurement within 30-1000MHz frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.

(3) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

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Product Service

10 Test Equipment List

List of Test Instruments

Conducted Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2016/11/03
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2016/11/03
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2016/11/03
Temperature/Humidity Meter	Ouleinuo	N/A	MRTSUE06114	1 year	2016/11/20

Radiated Emission

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	MRTSUE06028	1 year	2016/12/08
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2016/11/03
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2016/04/16
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2016/03/29
Loop Antenna	Schwarzbeck	FMZB1519	MRTSUE06025	1 year	2016/12/14
TRILOG Antenna	Schwarzbeck	VULB9162	MRTSUE06022	1 year	2016/11/07
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2016/11/07
Broadband Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06024	1 year	2016/01/05
Temperature/Humidity Meter	Ouleinuo	N/A	MRTSUE06115	1 year	2016/11/20

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2016/05/08
USB Wideband Power Sensor	Boonton	55006	MRTSUE06109	1 year	2016/05/08
Temperature/Humidity Meter	Ouleinuo	N/A	MRTSUE06112	1 year	2016/11/20

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth
- 20dB bandwidth and 99% Occupied Bandwidth
- Carrier frequency separation
- Number of hopping frequencies
- Dwell Time
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

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Product Service

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber 9kHz-1000MHz	4.18dB
Uncertainty for Radiated Emission in 3m chamber 1000MHz-40000MHz	4.76dB
Uncertainty for Conducted Emission 150KHz-30MHz	3.46dB

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Product Service

12 Photographs of Test Set-ups

Conducted Emission Setup

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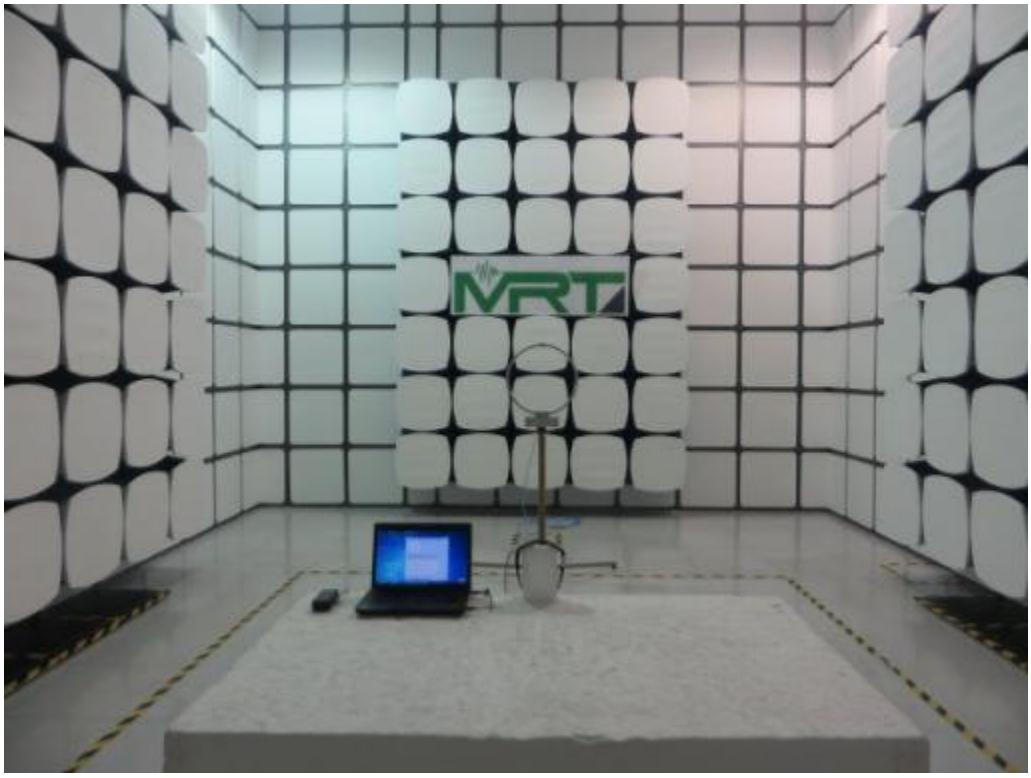
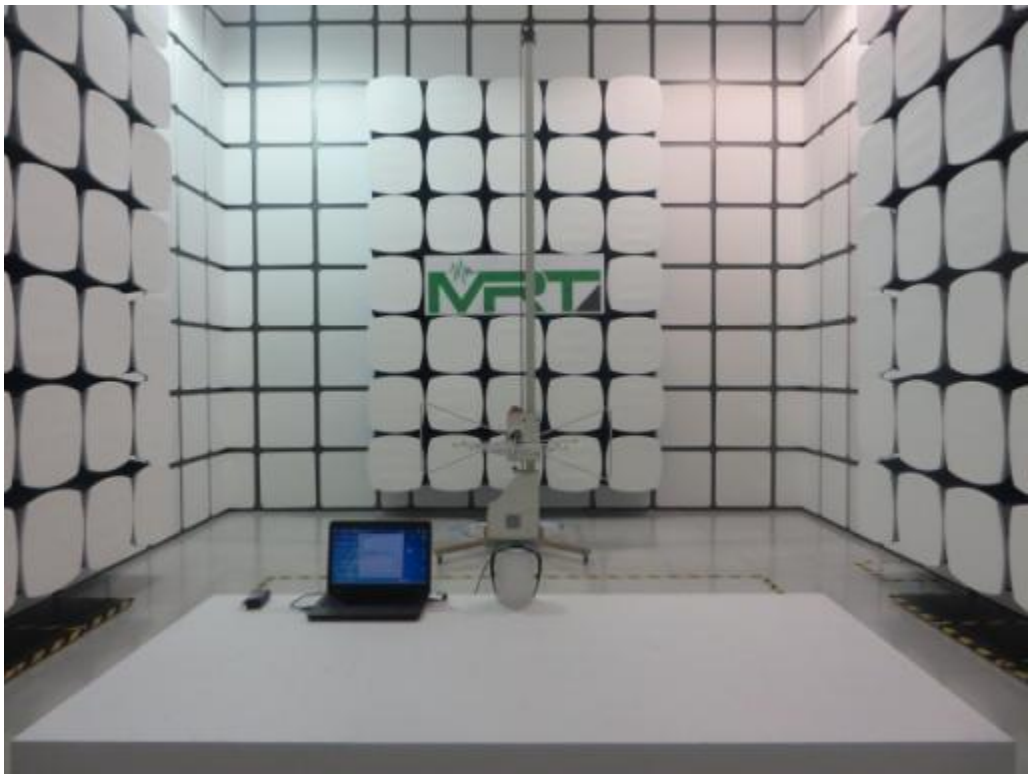
Radiated Emission Setup
9k~30MHz



30MHz~1GHz



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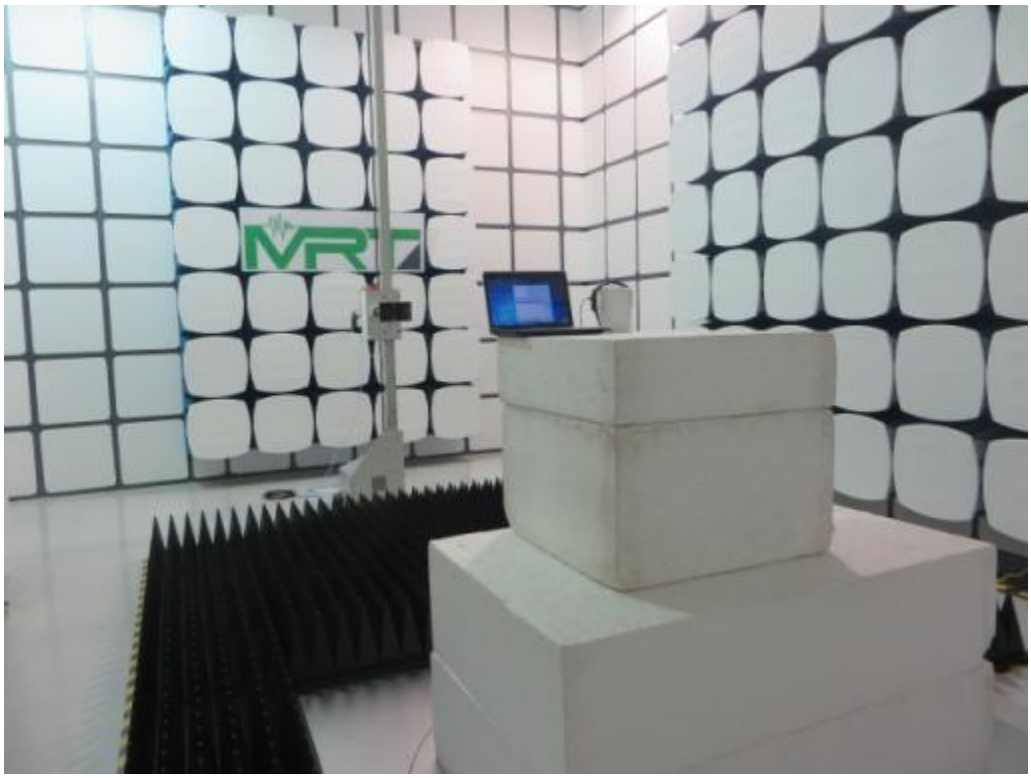
1GHz~18GHz



18GHz~40GHz

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Product Service

13 Photographs of EUT

External Photographs

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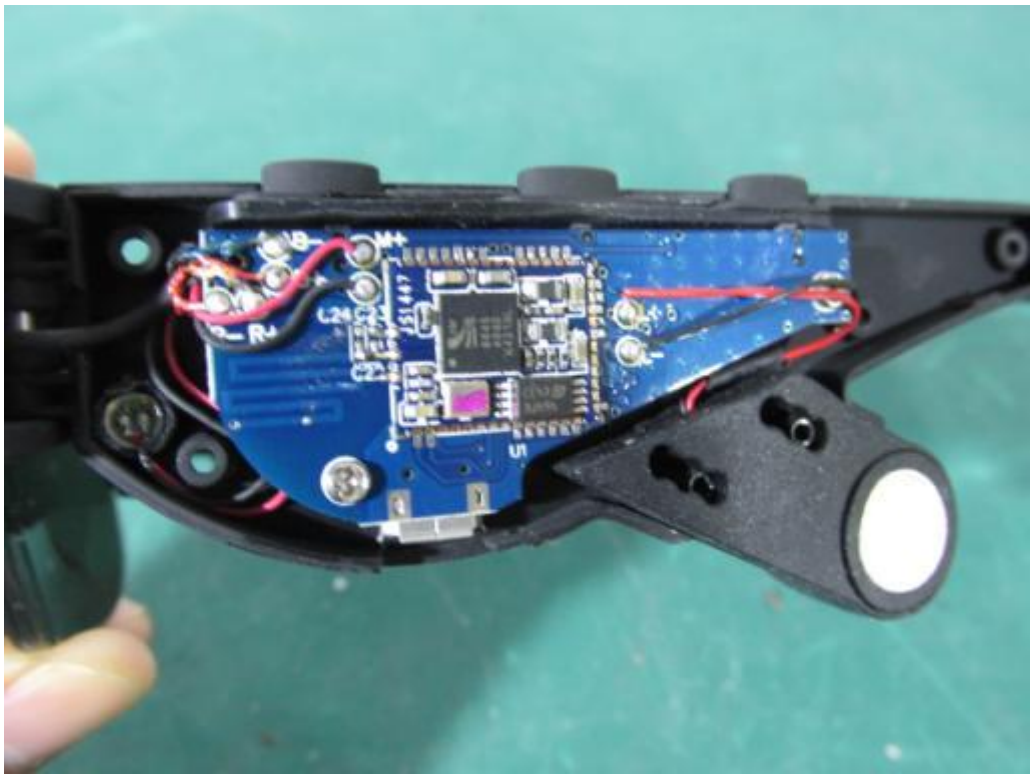
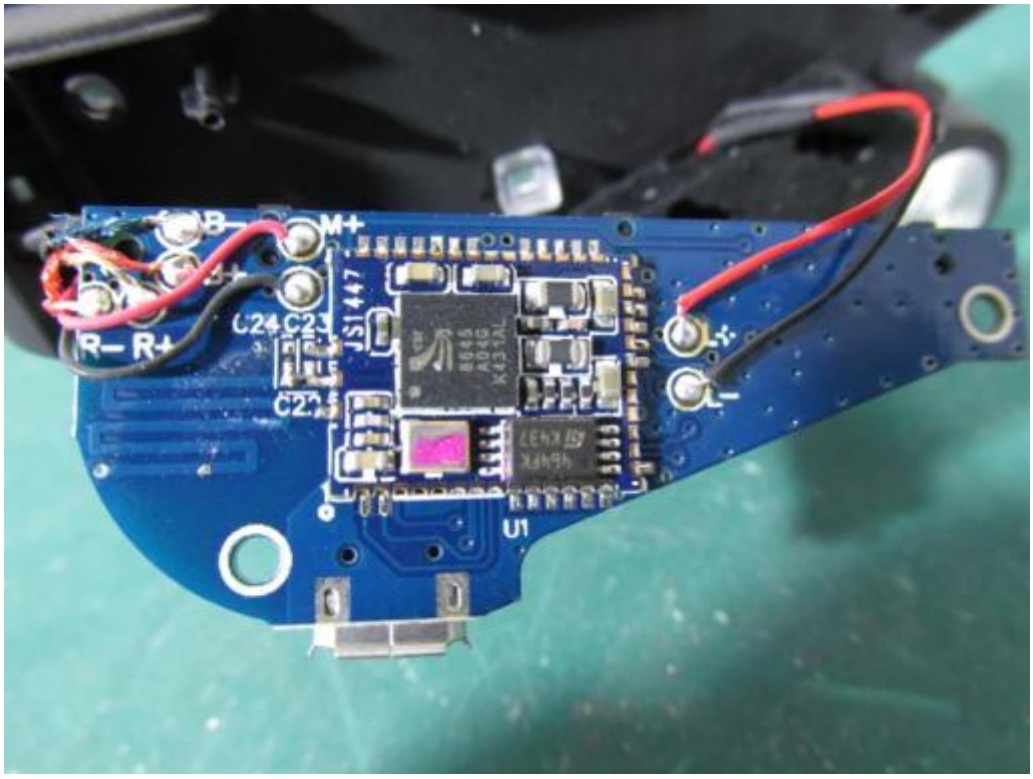
Product Service

Internal Photographs





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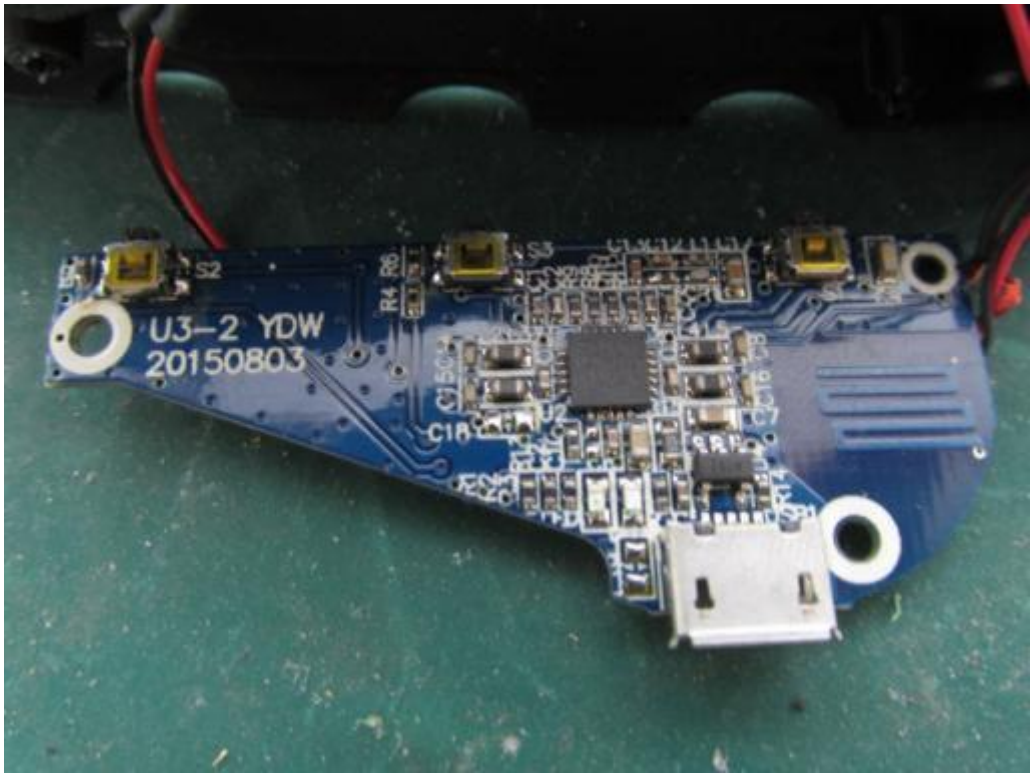

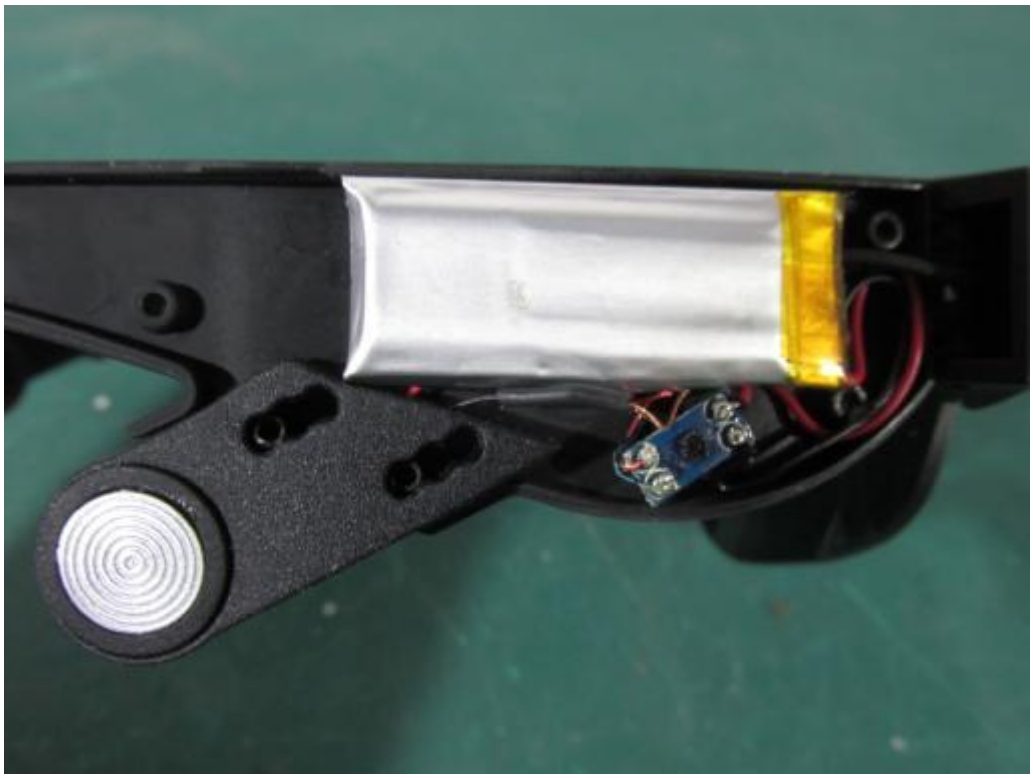

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