

FCC- TEST REPORT

Report Number : **68.920.16.021.01** Date of Issue: 14 January 2016

Model : **W800BTL, W800BT/XX, W800BTYY/XX, (X=0 to 9 for marketing purpose representing different counties, Y=A to Z or Blank for different color).**

Product Type : True Wireless Headphones and Charging Case

Applicant : Gibson Innovations Limited

Address : 5/F Philips Electronics Building, 5 Science Park East Ave,
HK Science Park, Shatin, NT, Hong Kong

Production Facility : Sheng Hai Electronics (Shenzhen) Ltd.

Address : Block 17-19, Hui Ming Ying Industry, Yan Chuan, Song Gang
Bao'an District, 518105 Shenzhen,
PEOPLE'S REPUBLIC OF CHINA

Test Result : Positive Negative

Total pages including Appendices : 24

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
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P. R. China

FCC Registration
Number: 502708

Telephone: 86 755 8828 6998
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3 Description of the Equipment under Test

Description of the Equipment Under Test

Product:	True Wireless Headphones and Charging Case
Model no.:	W800BTL
FCC ID:	2AANUW800BTL
Options and accessories:	NIL
Rating:	3.7VDC (Supplied by the internal Li-ion rechargeable battery) 5.0VDC, 0.5A (Charging by USB Port from PC)
RF Transmission Frequency:	2402-2480MHz
No. of Operated Channel:	40
Modulation:	GFSK
Duty Cycle:	62%
Antenna Type:	Integrated Antenna
Antenna Gain:	-1.0dBi
Description of the EUT:	The Equipment Under Test (EUT) is a True Wireless Headphones and Charging Case with Bluetooth function operating at 2.4GHz

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 v03r02 issued by FCC on July 05, 2014 and ANSI C63.10 (2009).

5 Summary of Test Results

Technical Requirements			
FCC Part 15 Subpart C			
Test Condition		Pages	Test Result
§15.207	Conducted emission AC power port	--	N/A
§15.247(b)(1)	Conducted peak output power	10	Pass
§15.247(a)(2)	6dB bandwidth	11	Pass
§15.247(e)	Power spectral density*	13	Pass
§15.247(a)(1)	20dB bandwidth and 99% Occupied Bandwidth	--	N/A
§15.247(a)(1)	Carrier frequency separation	--	N/A
§15.247(a)(1)(iii)	Number of hopping frequencies	--	N/A
§15.247(a)(1)(iii)	Dwell Time	--	N/A
§15.247(d)	Spurious RF conducted emissions	14	Pass
§15.247(d)	Band edge	18	Pass
§15.247(d) & §15.209 &	Spurious radiated emissions for transmitter and receiver	20	Pass
§15.203	Antenna requirement	See note 1	Pass

Remark 1: N/A – Not Applicable.

Note 1: The EUT uses an Integrated Antenna, which gain is -1.0dBi. According to §15.203, it is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AANUW800BTL complies with Section 15.209, 15.247 of the FCC Part 15, Subpart C.

All models are identical with W800BTL except model name, so full testing was applied on W800BTL, the other models were deemed to fulfill the EMC test requirement without further testing.

This report is for the BT 4.1 part.

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: 10 December 2015

Testing Start Date: 04 January 2016

Testing End Date: 07 January 2016

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:

Prepared by:

Tested by:



Phoebe Hu
EMC Project Manager



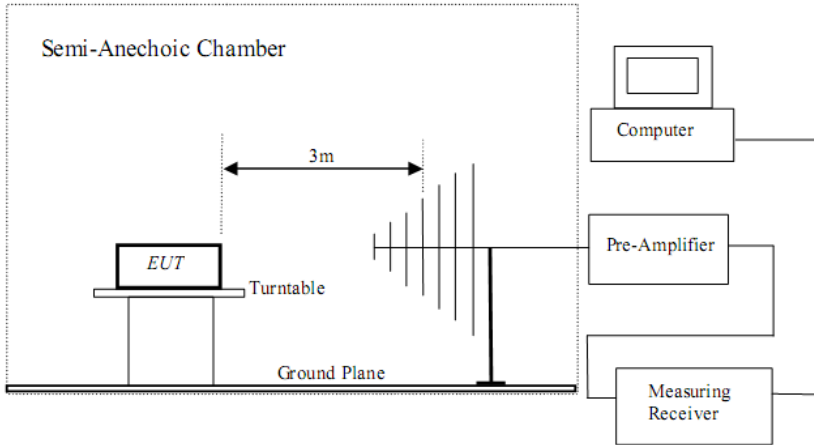
Aaron Lai
EMC Project Engineer



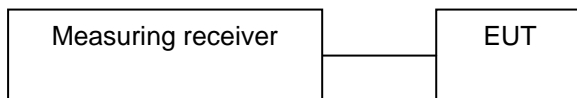
Leon Zhang
EMC Test Engineer

7 Test Setups

7.1 Radiated test setups



7.2 Conducted RF test setups



8 Systems test configuration

Auxiliary Equipment Used during Test:

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

Test software: Blue test 3.0, which used to control the EUT in continues transmitting mode.

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

9 Technical Requirement

9.1 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
RBW > the 6 dB bandwidth of the emission being measured, VBW \geq 3RBW, Span \geq 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

According to §15.247 (b) (1), conducted peak output power limit as below:

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
Top channel 2402MHz	8.34	Pass
Middle channel 2440MHz	8.85	Pass
Bottom channel 2480MHz	8.47	Pass

9.2 6dB 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.

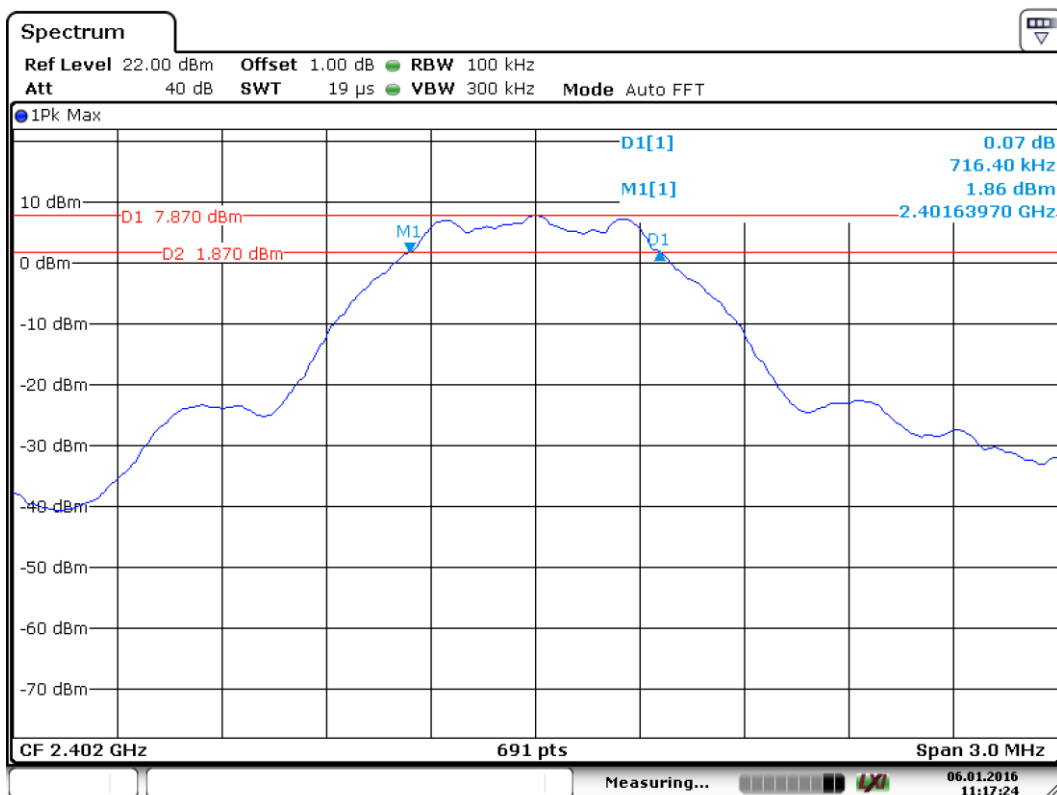
Limit

Limit [kHz]

≥500

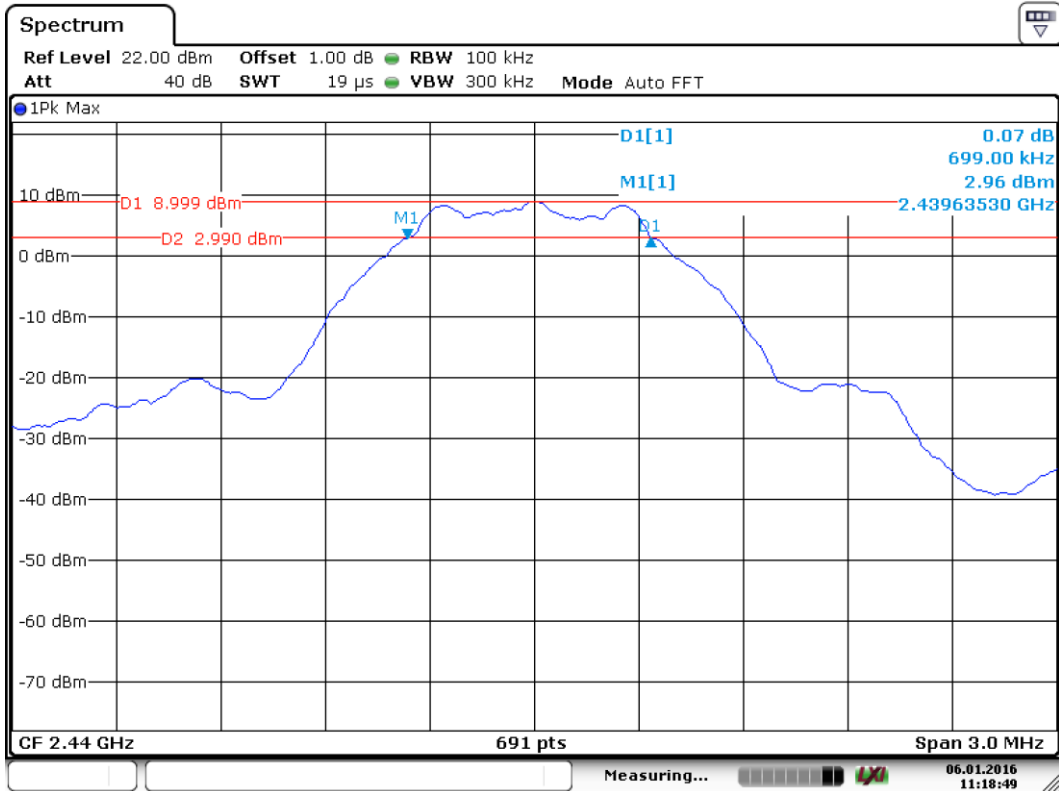
Test result

Frequency MHz	6dB bandwidth kHz	Result
Top channel 2402MHz	716.40	Pass
Middle channel 2440MHz	699.00	Pass
Bottom channel 2480MHz	716.40	Pass

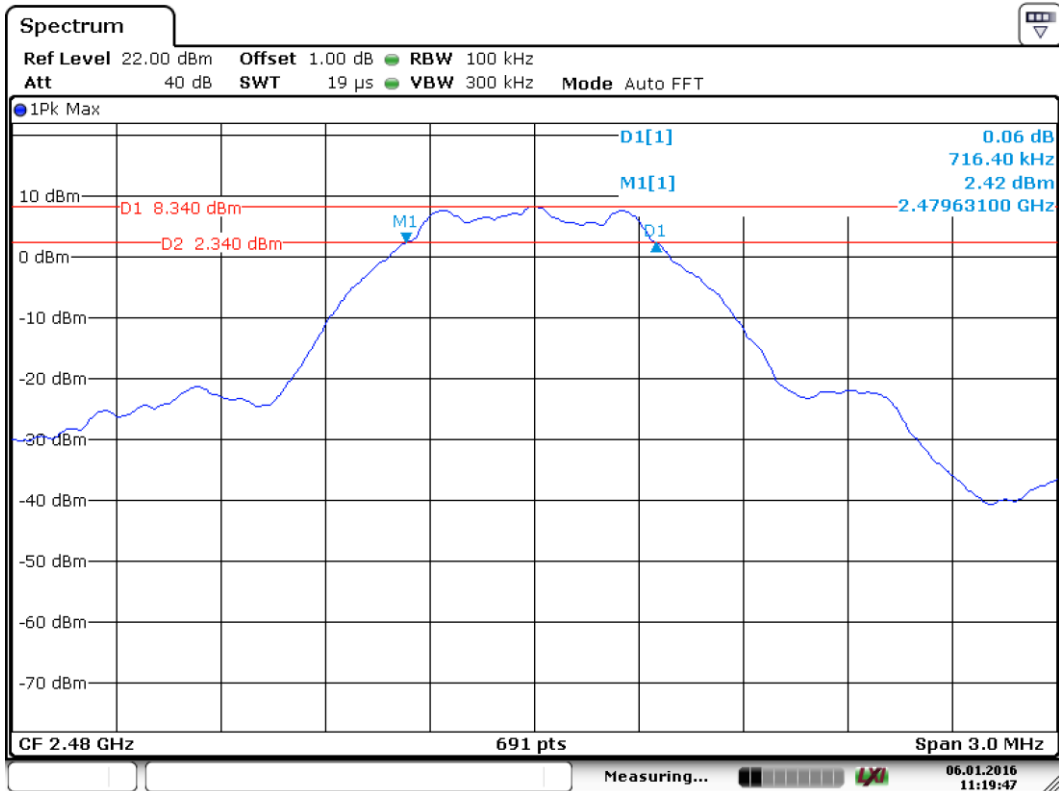


2402MHz

6 dB Bandwidth



2440MHz



2480MHz

9.3 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	-7.64	Pass
Middle channel 2440MHz	-6.93	Pass
Bottom channel 2480MHz	-7.51	Pass

9.4 Spurious RF conducted emissions

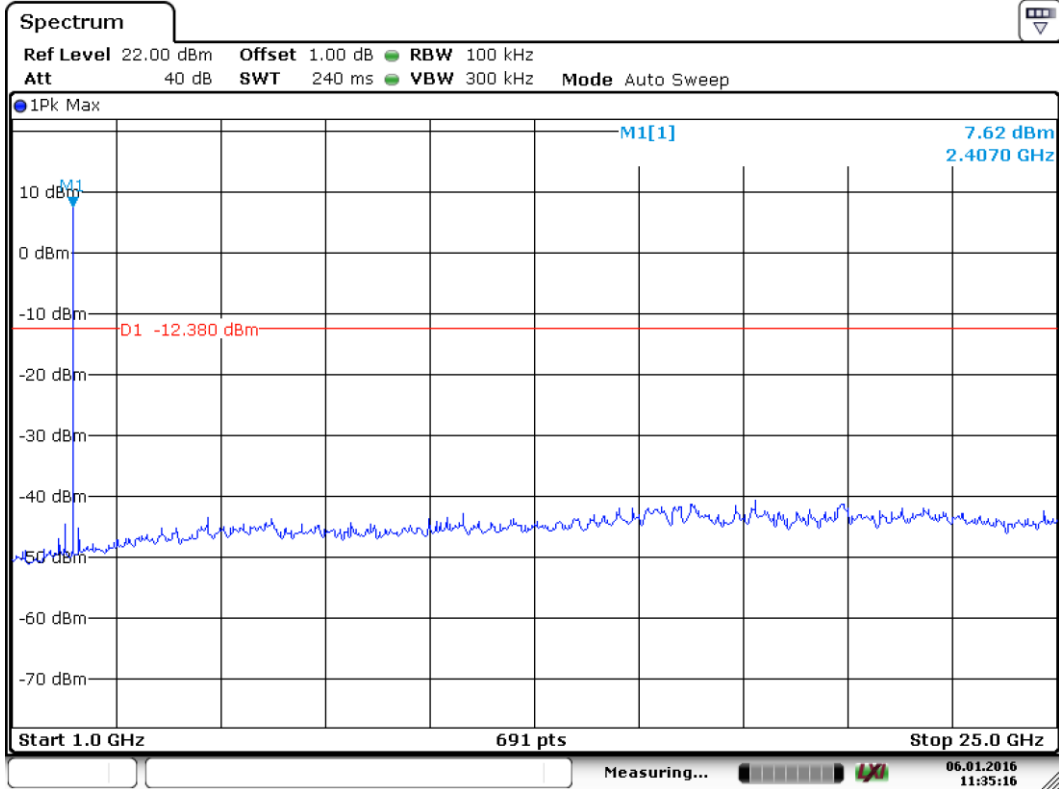
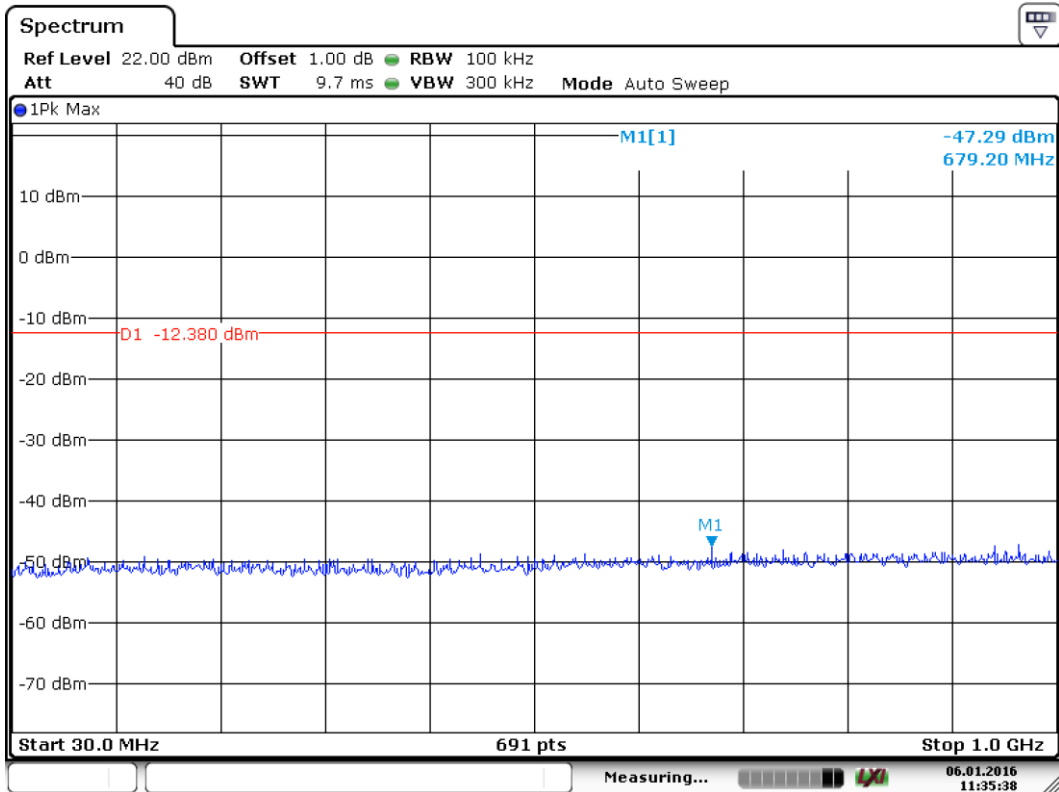
Test Method

1. Establish a reference level by using the following procedure:
 - a. Set RBW=100 kHz. VBW \geq 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

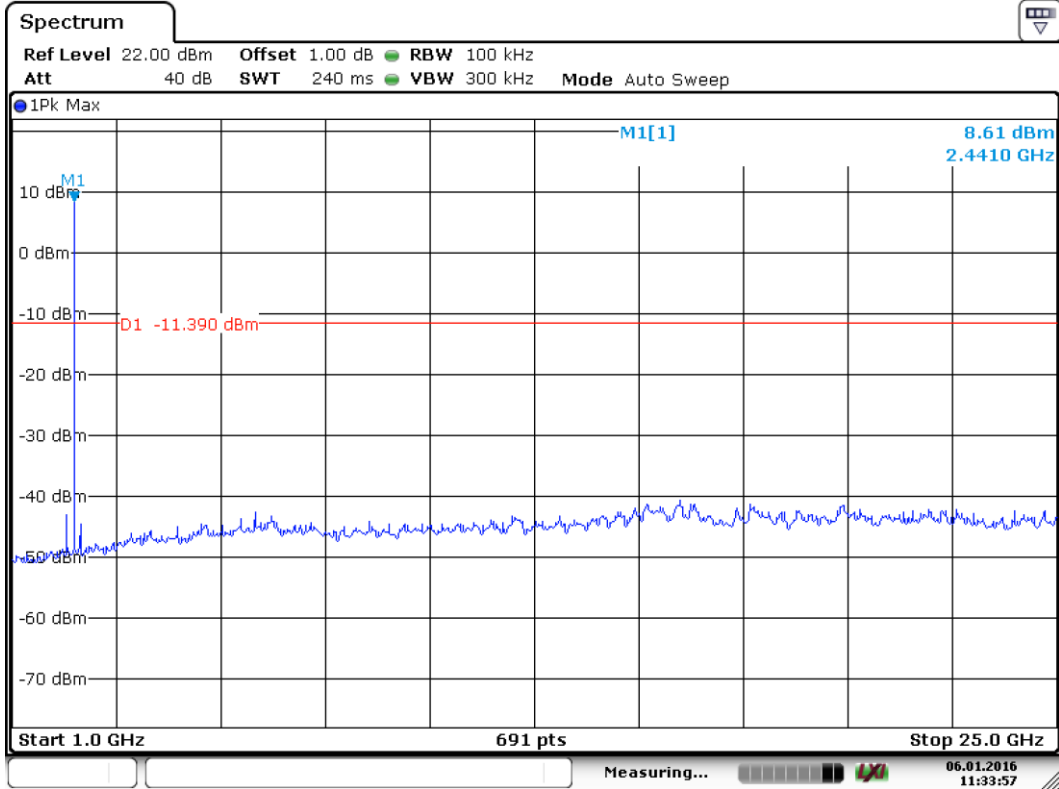
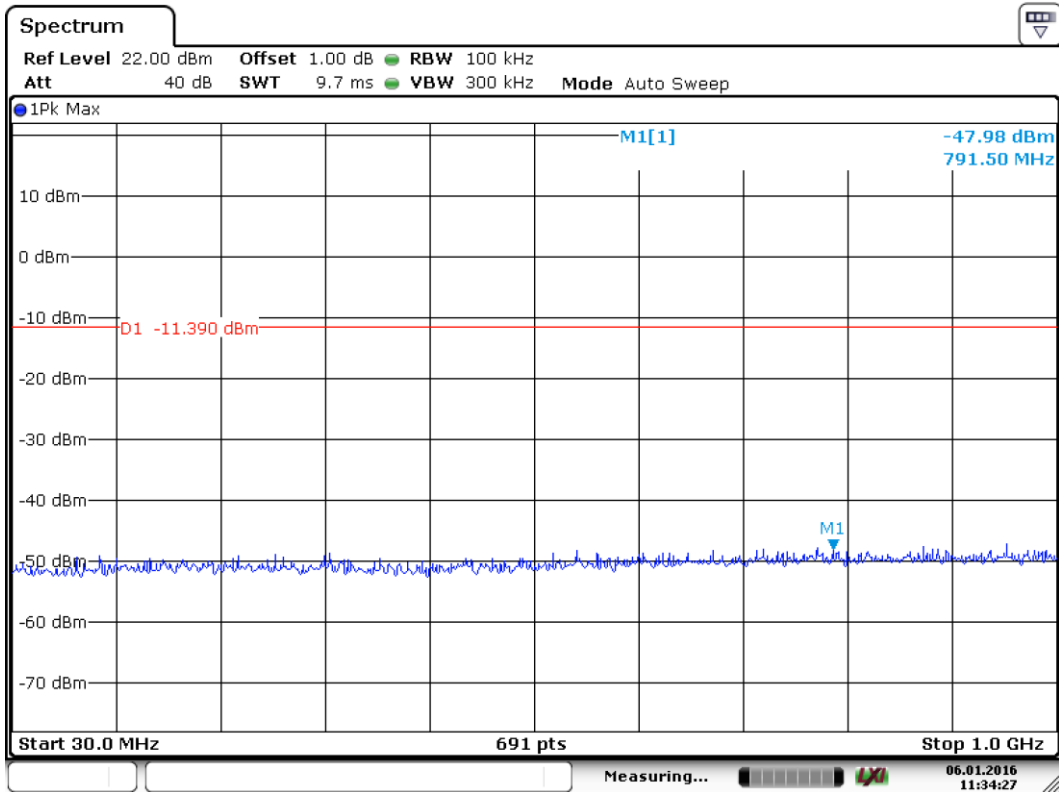
Frequency Range MHz	Limit (dBc)
30-25000	-20

Spurious RF conducted emissions



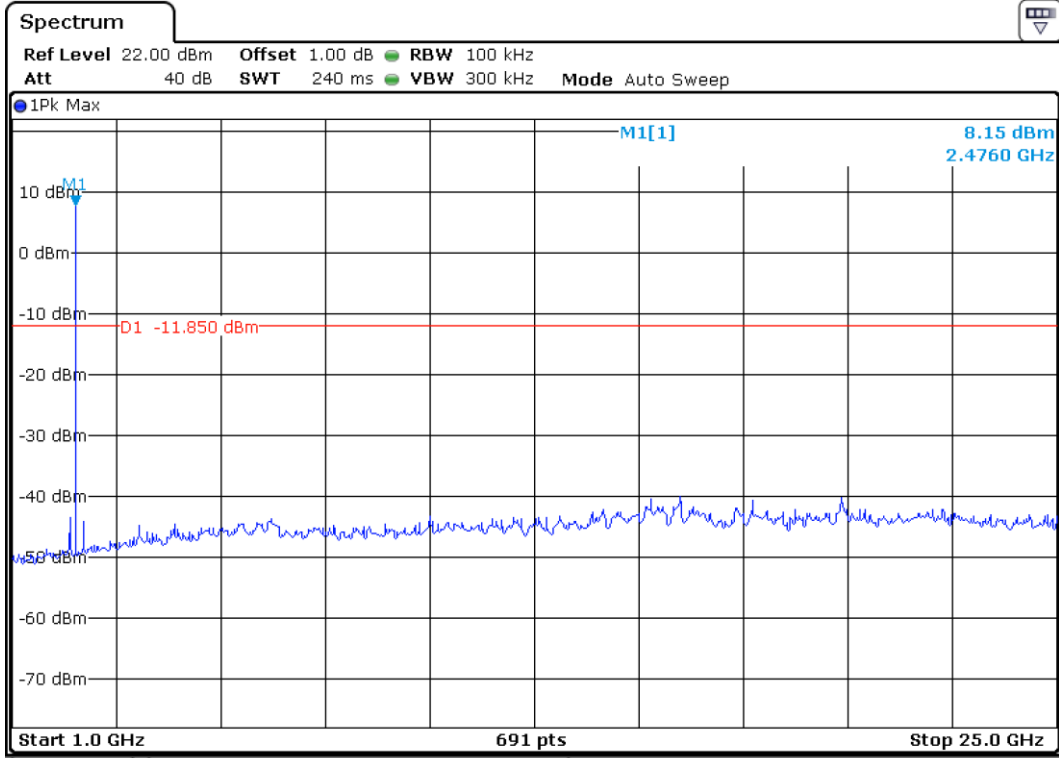
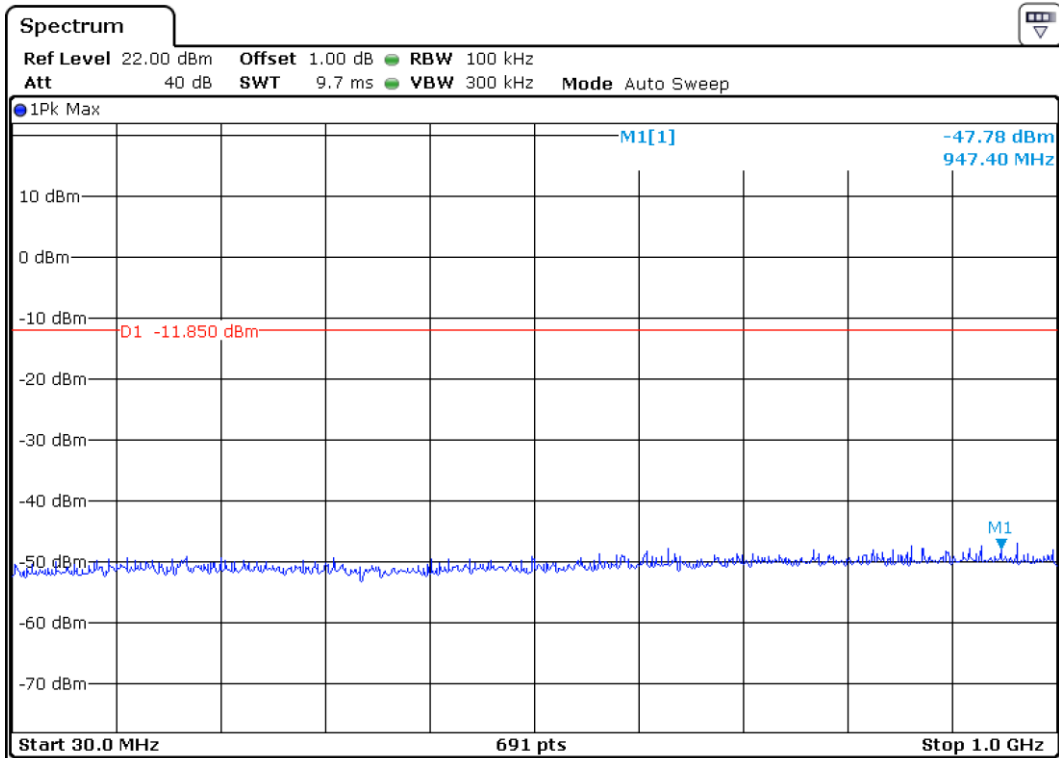
2402MHz

Spurious RF conducted emissions



2440MHz

Spurious RF conducted emissions



2480MHz

9.5 Band edge

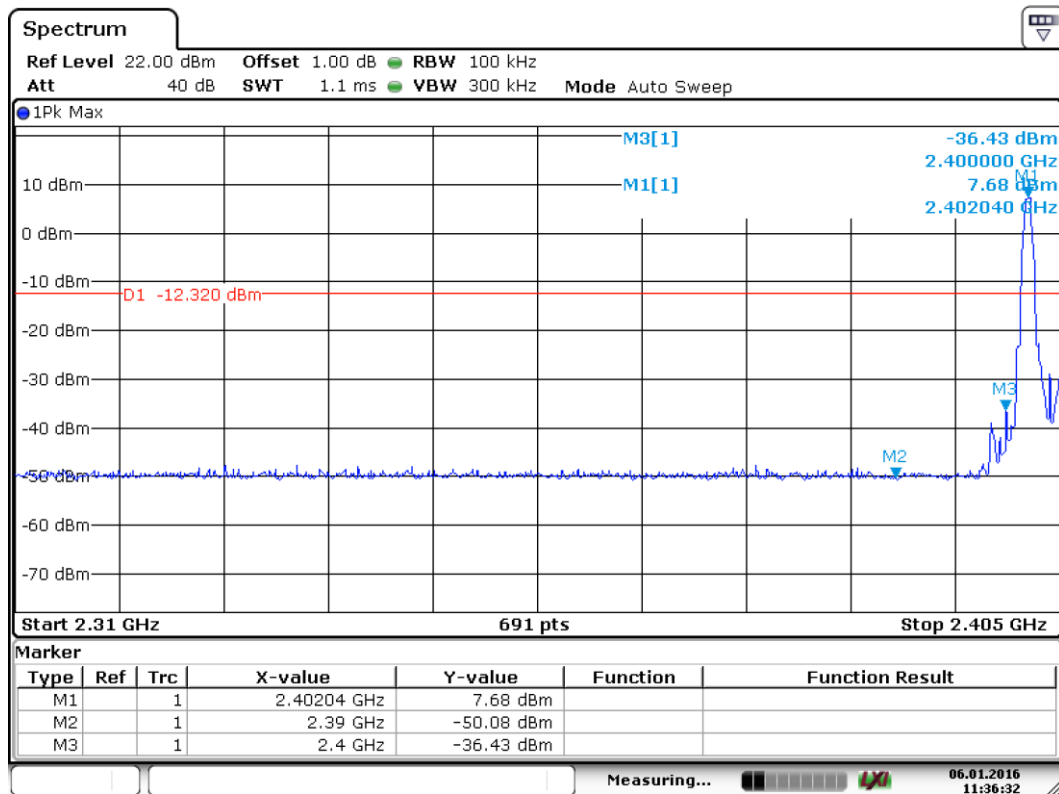
Test Method

- 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

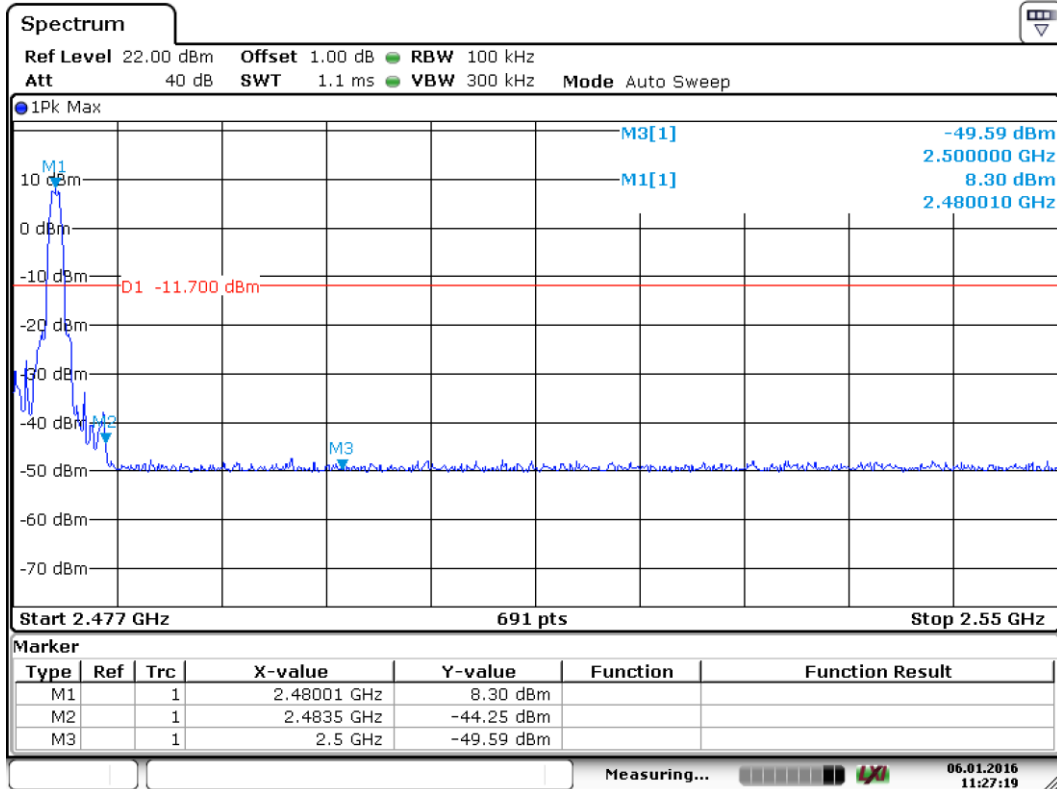
Frequency Range MHz	Limit (dBc)
30-25000	-20

Test result



2402MHz

Band edge



2480MHz

9.6 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 $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-2009 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 $20\log(\text{duty cycle}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limit

According to part 15.247(d), 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 section 15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dB μ V/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

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 (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
870.289	31.50	Horizontal	46.00	QP	Pass
884.246	34.34	Vertical	46.00	QP	Pass

2402MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
2245.93	46.42	Horizontal	74.00	PK	Pass
2558.06	47.79	Vertical	74.00	PK	Pass
7206.00	48.36	Horizontal	74.00	PK	Pass
7205.00	48.39	Vertical	74.00	PK	Pass

2440MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
--	--	Horizontal	--	QP	Pass
--	--	Vertical	--	QP	Pass

2440MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBuV/m	Detector	Result
2284.26	43.69	Horizontal	74.00	PK	Pass
2596.26	41.97	Vertical	74.00	PK	Pass
7319.00	50.08	Horizontal	74.00	PK	Pass
7319.50	45.43	Vertical	74.00	PK	Pass

Remark:

- (1) QP Emission Level= Antenna Factor +Cable Loss + Reading
PK Emission Level= Antenna Factor +Cable Loss - Amp. Factor + Reading
AV Emission Level= PK Emission Level+20log (duty cycle) or set the RBW/VBW to be 1MHz/10Hz to read the level.
- (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.

2480MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBμV/m	Detector	Result
--	--	Horizontal	--	QP	Pass
--	--	Vertical	--	QP	Pass

2480MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBμV/m	Detector	Result
2324.13	46.63	Horizontal	74.00	PK	Pass
2635.93	47.95	Vertical	74.00	PK	Pass
7440.50	48.01	Horizontal	74.00	PK	Pass
7440.00	50.52	Vertical	74.00	PK	Pass

Remark:

- (4) QP Emission Level= Antenna Factor +Cable Loss + Reading
PK Emission Level= Antenna Factor +Cable Loss - Amp. Factor + Reading
AV Emission Level= PK Emission Level+20log (dutycycle) or set the RBW/VBW to be 1MHz/10Hz to read the level.
- (5) 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.
- (6) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

10 Test Equipment List

List of Test Instruments

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101031	2016-7-24
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	708	2016-7-31
Horn Antenna	Rohde & Schwarz	HF907	102295	2016-7-24
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2017-10-21
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2016-7-24
Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2016-7-24
Fully Anechoic Chamber	TDK	8X4X4	--	2019-5-29

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

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 Spurious Emission 25MHz-3000MHz	Horizontal: 4.95dB; Vertical: 5.02dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.89dB; Vertical: 4.88dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 4.93dB; Vertical: 4.92dB;
Uncertainty for Conducted RF test with TS 8997	2.04dB