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Report No.: SZEMO070902561RF
Page: 1 of 19
FCC ID: G95EPW001

FEDERAL COMMUNICATIONS COMMISSION
Registration number: 282399

TEST REPORT

Application No. : SZEMO070802148RF
Applicant: Thomson Industry (Shenzhen) CO., Ltd
Manufacturer Fujikon Industrial Co., Ltd
FCC ID: G95EPW001
Fundamental Carrier Frequency : 2.404GHz to 2.478GHz
Equipment Under Test (EUT):
Name: Wireless headphone
Model EPW001A
Standards: FCC PART 15: 2007 Section 15.249
Date of Receipt 19 September 2007
Date of Test 20 September 2007
Date of Issue 21 September 2007

Test Result :	PASS *
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Conduct Emission	FCC PART 15 2007	Section 15.207	PASS
Field Strength of Fundamental	FCC PART 15 : 2007	Section 15.249 (a)	PASS
Field Strength of Harmonics or other Frequency	FCC PART 15 : 2007	Section 15.249 (a) Section 15.209	PASS
Occupied Bandwidth	FCC PART 15 : 2007	Section 15.249	PASS
Band Edges Measurement	FCC PART 15 : 2007	Section 15.249 (d)	PASS

The test result is only about the USB dongle of the audio system with 2.4G wireless.



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4 General Information

4.1 Client Information

Applicant Name: Thomson Industry (Shenzhen) CO., Ltd

Manufacturer Fujikon Industrial Co., Ltd

Applicant Address: 2/F, Block B, Shen Fu Bao Science & Technology

Address of Manufacturer Dabandi Industrial Zone, Daning District, Humen Town

4.2 General Description of E.U.T.

Product Name: Wireless headphone

Model: EPW001A

Power Supply: 5V DC for USB of PC (PC for 120Vac / 60Hz AC supplied)

4.3 Description of Support Units

The EUT was tested as an independent unit: Wireless headphone.

4.4 Standards Applicable for Testing

The customer requested FCC tests for Wireless headphone

The standard used was FCC PART 15, SUBPART C (2007) section 15.249.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory, No.198 Kezhu Road, Science Town Economic & Technology Development District Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

4.6 Other Information Requested by the Customer

None.



4.7 Test Facility

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

- **NVLAP – Lab Code: 200611-0**
SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0. Effective through December 31, 2006.
- **ACA**
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.
- **VCCI**
The 3m Semi-anechoic chamber and Shielded Room (11.5m x 4m x 4m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1599 and C-1706 respectively.
Date of Registration: June 01, 2005. Valid until February 22, 2008
- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**
Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.
- **CNAL – LAB Code: L0141**
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAL/AC01: 2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of Testing Laboratories.
- **FCC – Registration No.: 282399**
SGS-CSTC Standards Technical Services 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 282399, May 31, 2002. With the above and NVLAP's accreditation, SGS-CSTC is an authorised test laboratory for the DoC process.
- **Industry Canada (IC)**
The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5169.



5 Test Results

5.1 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	16-06-2007	15-06-2008
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	14-12-2006	13-12-2007
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	01-06-2007	31-05-2008
5	Coaxial cable	SGS	N/A	SEL0027	01-06-2007	31-05-2008
6	BiConiLog Antenna	ETS-LINDGREN	3142C	00042673	03-03-2007	02-03-2008
7	EMI Test Receiver	Rohde & Schwarz	ESCI	100119	27-06-2007	26-06-2008
8	Loop Antenna	Emco	6502	00042963	30-05-2006	29-05-2008

5.2 E.U.T. Operation

Input voltage: 5V DC for USB of PC (PC for 120Vac / 60Hz AC supplied)

Operating Environment:

Temperature: 24.0 °C

Humidity: 52 % RH

Atmospheric Pressure: 1012 mbar

EUT Operation: Test in transmitting mode:

1. All frequencies are in 2.403GHz to 2.478GHz.
2. Section 15.31(m): Measurements on intentional radiators or receivers shall be performed at three frequencies for operating frequency range over 10 MHz.(The locations of these frequencies one near the top, one near the middle and one near the bottom.)
3. So all the items as followed in testing report are need to test these three frequencies:
Top: Channel – 1; Middle: Channel – 8; Bottom: Channel – 16.



5.3 Test Procedure & Measurement Data

5.3.1 Conducted Emissions

Test Requirement: FCC Part15 B
Test Method: ANSI C63.4
Test Date: 20 September 2007
Frequency Range: 150KHz to 30MHz
Class / Severity: Class B
Detector: Peak for pre-scan (9kHz Resolution Bandwidth)
Test Procedure:

- a. The EUT was placed 0.8 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power port of a line impedance stabilization network(LISN)
- c. All the support units are connected to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150kHz to 30MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and specified bandwidth with maximum Hold Mode

Operating Environment:

Temperature: 24.0 °C Humidity: 52% RH Atmospheric Pressure: 1012 Mbar

EUT Operation: Test the EUT in all normal operation mode. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate.

5.3.1.1 Measurement Data

An initial pre-scan was performed on the live and neutral lines under COMMUNICATING with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with worst case peak emission were detected.

The following Quasi-Peak and Average measurements were performed on the EUT.:



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Live

Frequency (MHz)	Cable Loss (dB)	LISN Factor (dB)	Read Level (dBuV)	Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.182	-0.07	-0.05	40.36	40.24	64.39	-24.15	QP
0.182	-0.07	-0.05	39.97	39.85	54.39	-14.54	Average
0.246	-0.05	-0.04	37.92	37.83	61.89	-24.06	QP
0.246	-0.05	-0.04	36.28	36.19	51.89	-15.70	Average
0.73	0.01	-0.05	34.23	34.19	56	-21.81	QP
0.73	0.01	-0.05	32.57	32.53	46	-13.47	Average
1.034	0.1	-0.05	30.77	30.82	46	-15.18	Average
1.034	0.1	-0.05	31.48	31.53	56	-24.47	QP
1.278	0.1	-0.05	35.34	35.39	56	-20.61	QP
1.278	0.1	-0.05	35.24	35.29	46	-10.71	Average
1.522	0.1	-0.06	32.37	32.41	46	-13.59	Average
1.522	0.1	-0.06	33.41	33.45	56	-22.55	QP

Neutral

Frequency (MHz)	Cable Loss (dB)	LISN Factor (dB)	Read Level (dBuV)	Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.182	-0.07	-0.04	37.03	36.92	54.39	-17.47	Average
0.182	-0.07	-0.04	37.43	37.32	64.39	-27.07	QP
0.246	-0.05	-0.04	38.18	38.09	51.89	-13.80	Average
0.246	-0.05	-0.04	38.71	38.62	61.89	-23.27	QP
0.306	0	-0.04	38.99	38.95	60.08	-21.13	QP
0.306	0	-0.04	38.93	38.89	50.08	-11.19	Average
0.49	0	-0.04	39.34	39.3	56.17	-16.87	QP
0.49	0	-0.04	36.05	36.01	46.17	-10.16	Average
0.55	0	-0.04	34.77	34.73	56	-21.27	QP
0.55	0	-0.04	34.19	34.15	46	-11.85	Average
4.65	0.1	-0.11	31.97	31.96	46	-14.04	Average
4.65	0.1	-0.11	33.37	33.36	56	-22.64	QP



5.3.2 Radiated Emissions

Test Requirement: FCC Part15 C
 Test Method: Based on FCC Part15 C Section 15.249
 Test Date: 20 September 2007
 Measurement Distance: 3m (Semi-Anechoic Chamber)
 Frequency range: 30 MHz – 10GHz for transmitting mode.
 Test instrumentation resolution bandwidth
 120 kHz (30 MHz - 1000 MHz), 1 MHz (1000 M – 25GHz)
 Operation: Receive antenna scan height 1 - 4 m, polarization Vertical/
 Horizontal

Requirements:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m @ 3m)	Field Strength of Harmonics and Spurious Emissions (dBuV/m @ 3m)
902 to 928	94.0	54.0
2400 to 2483.5	94.0	54.0
5725 to 5875	94.0	54.0
24000 to 24250	108.0	68.0

The fundamental frequency of the EUT is 2.4 to 2.4835GHz

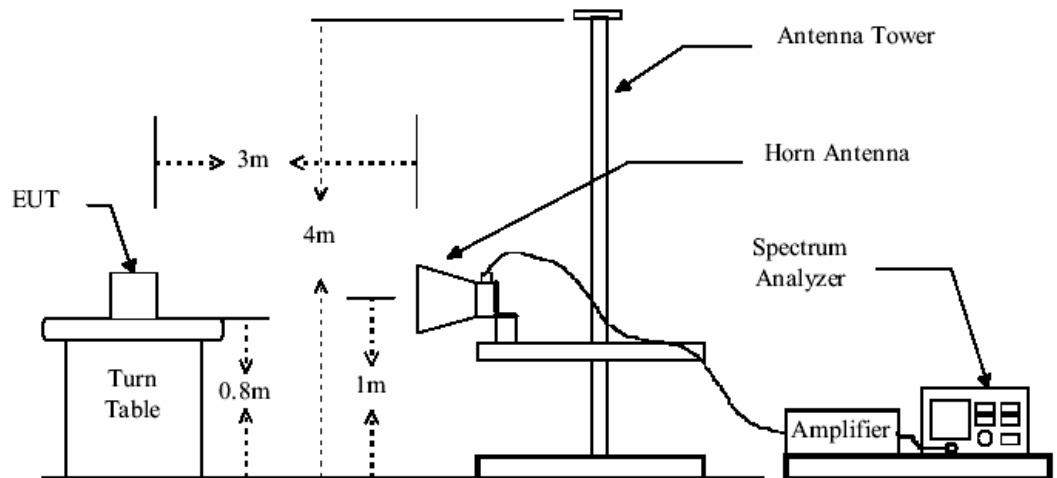
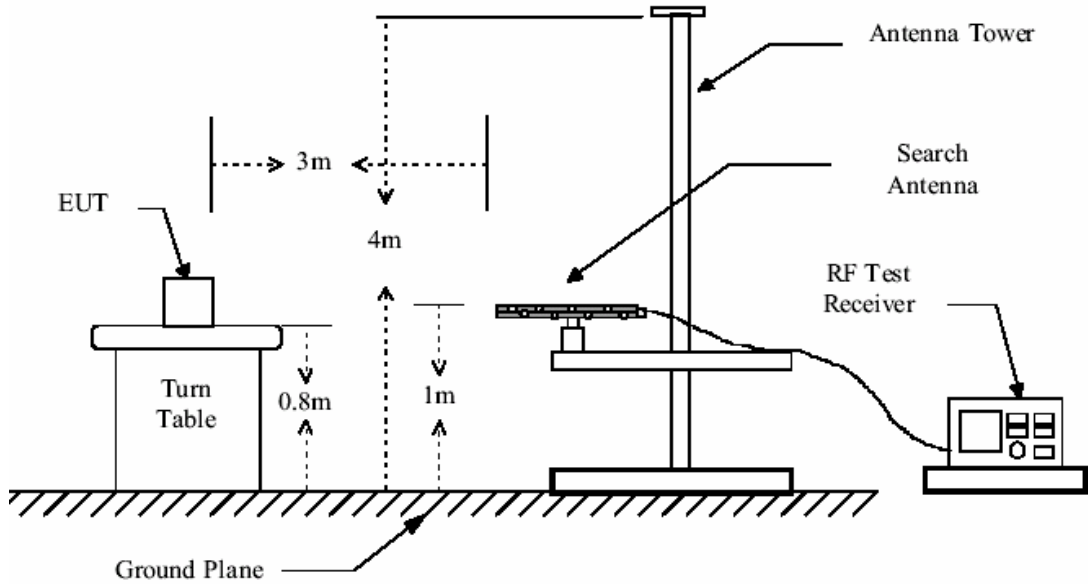
The limit for average field strength dBuV/m for the fundamental frequency = 94.0 dBuV/m.

No fundamental is allowed in the restricted bands.

The limit for average field strength dBuV/m for the harmonics and spurious frequencies = 54.0 dBuV/m. Spurious in the restricted bands must be less than 54.0 dBuV/m or 15.209.

Test Procedure: The procedure used was ANSI Standard C63.4-2003. The receive was scanned from 30MHz to 25GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

Test Configuration:





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

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Peramplifier Factor

The following test results were performed on the EUT:

. Fundamental emission .

Peak Measurement			
Test Frequency (GHz)	Measuring Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
2.403	88.6	114.0	25.4
2.438	85.9	114.0	28.1
2.478	87.4	114.0	26.6
Average Measurement			
2.403	59.0	94.0	35.0
2.438	56.3	94.0	37.7
2.478	57.8	94.0	36.2

Radiated Emission, 30MHz—25GHz

30MHz—18GHz measured at a distance of 3m, 18-25GHz measured by conducted.

*Antenna factor, amplifier gain and cable loss are included in spectrum analyzer.

The following test results were performed on the complete system at 30MHz-1000MHz. .

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
44.55	0.70	10.21	28.10	26.17	8.98	40.00	-31.02
98.87	1.19	9.06	27.89	28.56	10.92	43.50	-32.58
232.73	1.59	11.76	26.99	28.08	14.44	46.00	-31.56
375.32	2.13	16.00	27.25	26.58	17.46	46.00	-28.54
599.39	2.70	19.74	27.62	26.81	21.63	46.00	-24.37
833.16	3.34	22.40	26.77	25.45	24.42	46.00	-21.58

Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
44.55	0.70	9.61	28.10	33.66	15.87	40.00	-24.13
93.05	1.13	8.82	27.93	33.12	15.14	43.50	-28.36
98.87	1.19	9.06	27.89	33.73	16.09	43.50	-27.41
117.30	1.25	8.08	27.71	30.37	11.99	43.50	-31.51
299.66	1.90	13.85	26.72	24.30	13.33	46.00	-32.67
517.91	2.62	18.34	27.69	25.34	18.61	46.00	-27.39



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The following test results were performed at above 1 GHz
the Lowest Channel (2.403GHz)

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
4757.00	2.69	34.05	45.38	48.01	39.37	54.00	-14.63
7154.00	3.14	36.40	44.57	46.59	41.56	54.00	-12.44
9772.00	3.47	37.12	42.06	41.94	40.47	54.00	-13.53
12050.00	3.82	38.82	43.37	43.53	42.80	54.00	-11.20

the Middle Channel (2.438GHz)

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
4774.00	2.70	34.04	45.39	47.32	38.67	54.00	-15.33
7256.00	3.15	36.21	44.46	44.97	39.87	54.00	-14.13
9653.00	3.46	37.01	42.17	42.08	40.38	54.00	-13.62
12866.00	3.93	39.18	44.40	44.99	43.70	54.00	-10.30

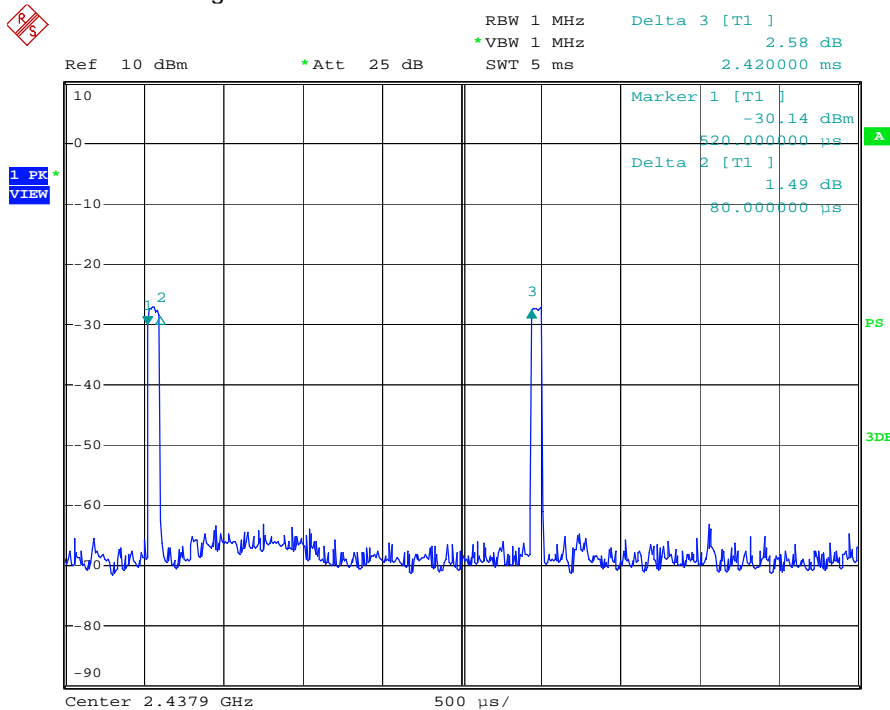
the Highest Channel (2.478GHz)

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
4871.00	2.72	34.02	45.42	49.74	41.06	54.00	-12.94
7300.00	3.16	36.14	44.41	46.42	41.31	54.00	-12.69
9660.00	3.46	37.03	42.17	43.14	41.46	54.00	-12.54
12180.00	3.83	38.91	43.55	44.50	43.69	54.00	-10.31

5.3.3 Duty Cycle Calculation

$$20\log\left[\frac{TX_{on}}{TX_{on}+TX_{off}}\right]=20\log\left(\frac{0.08\text{msec}}{2.42\text{msec}}\right)=-29.6\text{dB}$$

See below fig.



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Remark:

- 1). According to 15.249 (e) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above 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.

TEST RESULTS: The unit does meet the FCC requirements.



5.3.3 Occupied Bandwidth & Band Edge

Test Requirement: FCC Part 15 C

Test Method: Based on FCC Part15 C Section 15.249:
Operation within the band 2.4000 – 2.4835GHz

Test Date: 20 September 2007

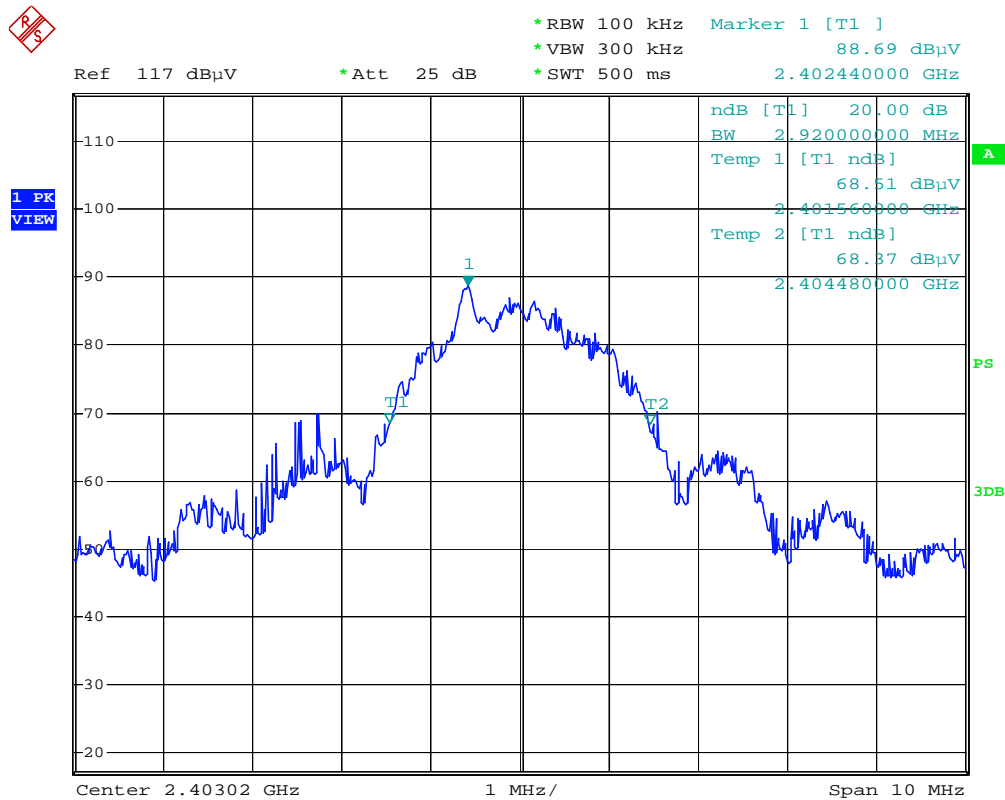
Requirements: 15.249 (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Method of measurement: A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken. The vertical is set to 10dB per division. The horizontal scale is set to 2MHz per division.



The occupied bandwidth as below:

20dB bandwidth 2.403GHz



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20dB bandwidth 2.438GHz

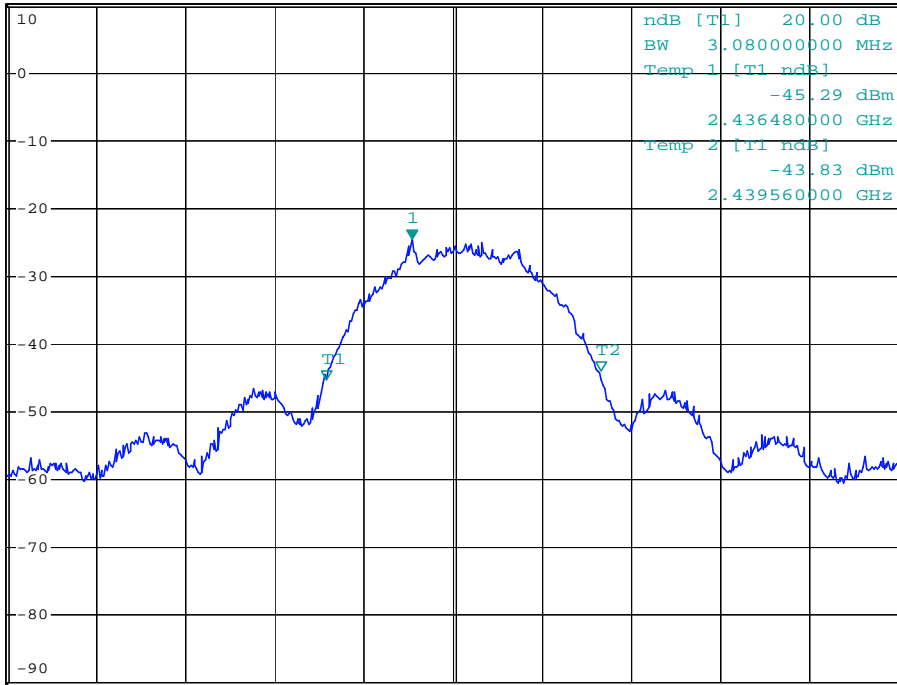


*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz -24.47 dBm
*SWT 500 ms 2.437440000 GHz

Ref 10 dBm

*Att 25 dB

1 PK
VIEW



Center 2.4379 GHz

1 MHz/

Span 10 MHz

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20dB bandwidth 2.478GHz

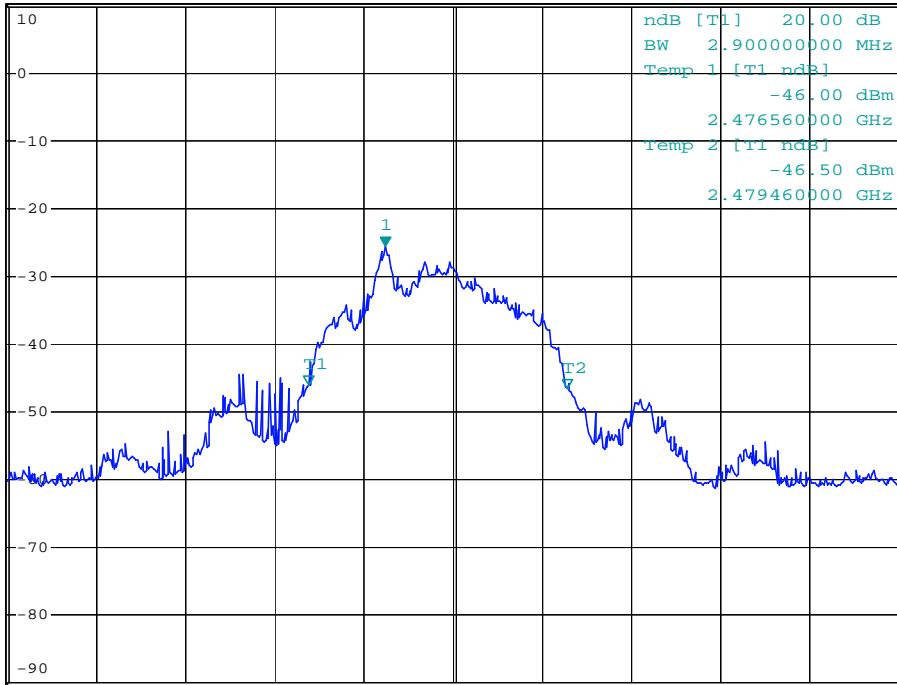


*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz -25.60 dBm
*SWT 500 ms 2.477420000 GHz

Ref 10 dBm

*Att 25 dB

1 PK
VIEW



Center 2.47818 GHz

1 MHz/

Span 10 MHz

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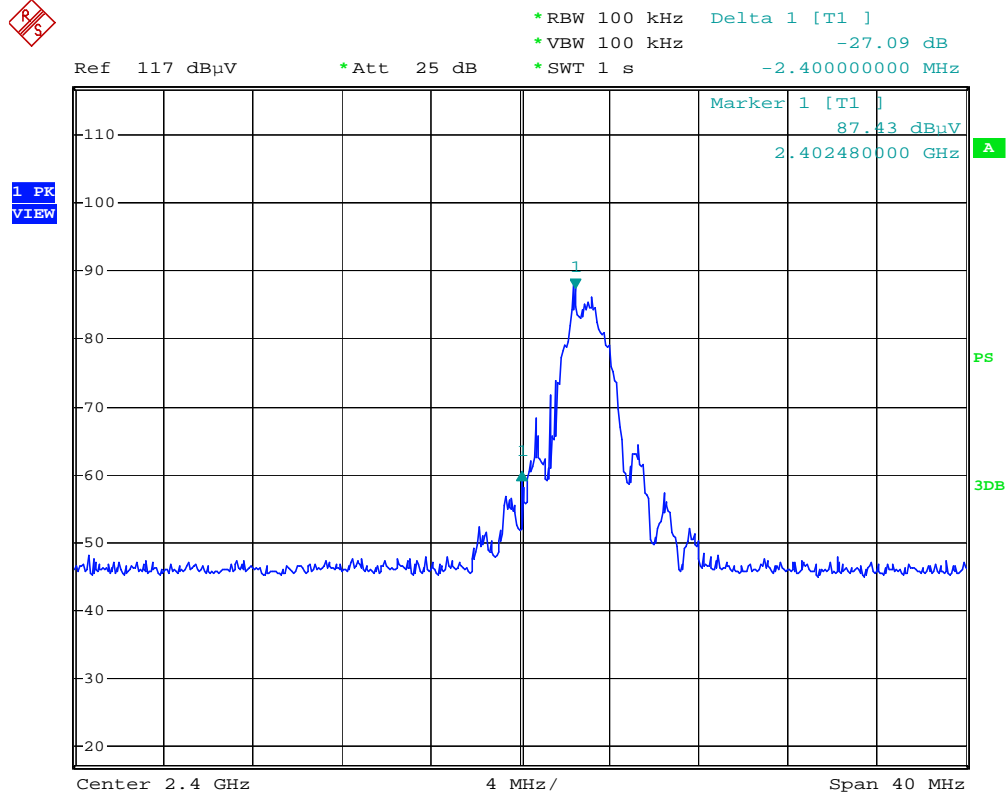
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Bandwidth of Frequency Band Edges

Frequency GHz	Power below nearest channel, dB RF channel 2403/2478MHz, Frequencyhopping		Limit dB	Margin dB
2.4	Peak	60.34	74	13.66
	Average	30.74	54	23.26
2.4835	Peak	47.09	74	26.91
	Average	17.49	54	36.51

Band-edge field strength 2.4GHz

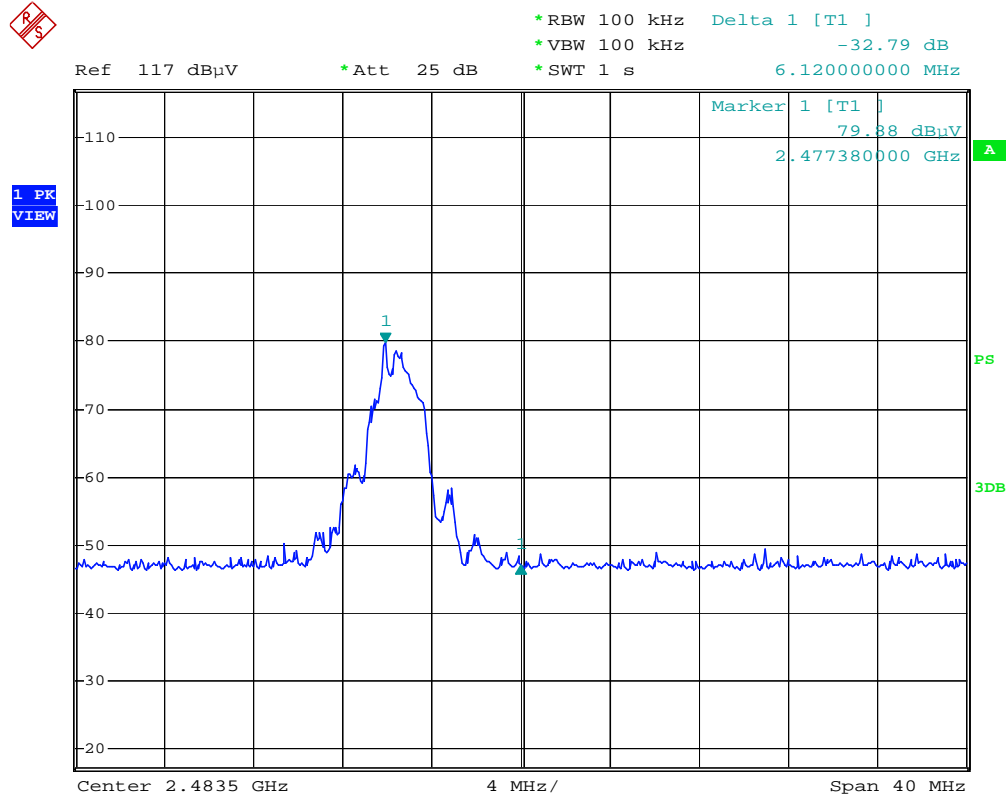


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(2). Band-edge field strength 2.4835GHz:



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The results: The unit does meet the FCC requirements.