SGS-CSTC Standards Technical Services Ltd.

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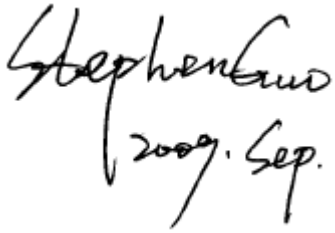
FEDERAL COMMUNICATIONS COMMISSION
Registration number: 282399

TEST REPORT

Application No.:	GLEMO090802590RF
Applicant:	National Electronics & Watch Co., Ltd.
Address of Applicant:	15/F, Shing Dao Ind. Bldg., 232, Aberdeen Main Road., Aberdeen, HongKong
Equipment under Test (EUT)	
Name:	Cadence Transmitter
Model No.:	M08-351
FCC ID:	UH5M08-351
Function:	Wireless transmitter
Standards:	FCC PART 15:2008, SUBPART C
Date of test:	03 September to 18 September 2009
Date of Issue:	21 September 2009
Test Result :	**PASS ***

In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Stephen Guo
Manager

2 Version

Version No.	Date	Description
01	21 September 2009	Original

Prepared By:	***Celia Xiang***	***Date***	***2009-09-21***
	Project Engineer		
Checked By:	***Strong Yao***	***Date***	***2009-09-21***
	Reviewer		

3 Test Summary

Test	Test Requirement	Stanadard Paragraph	Result
Field Strength of Fundamental	FCC PART 15 :2008	Section 15.249 (a)	PASS
Field Strength of Unwanted Emissions	FCC PART 15 :2008	Section 15.249 (a) Section 15.249 (d)	PASS
Occupied Bandwidth	FCC PART 15 :2008	Section 15.215 (c)	PASS
Band Edges	FCC PART 15 :2008	Section 15.249 (d)	PASS

Remark:

Tx: In this whole report Tx (or tx) means Transmitter.

4 Contents

5 General Information

5.1 General Description of E.U.T.

Product Name:	Cadence Transmitter
Model:	M08-351
Power Supply:	DC 3V (button cell “CR2032”)
Power Cord:	N/A

5.2 Description of EUT operation

Operating Frequency	2410MHz to 2475MHz
Modulation type:	GFSK
Channel number:	65
Channel sepearation :	1MHz
Antenna Gain:	0dBi
Antenna Type:	PCB layout

5.3 Standards Applicable for Testing

The standard used was FCC PART 15, SUBPART C (2008) section 15.249.

5.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,

198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,

Guangzhou, China 510663

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

No tests were sub-contracted.

5.5 Other Information Requested by the Customer

None.

5.6 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.

- **ACMA**

  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.

- **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.

- **CNAS (Lab Code: L0167)**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 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.

- **Industry Canada (Registration No.: 4620B-1)**

  The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

  Date of Registration: February 18, 2009.Valid until February 18, 2011.

- **VCCI (Registration No.: R-2460 and C-2584)**

  The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2460 and C-2584 respectively.

- **CBTL (Lab Code: TL129)**

  SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01:2006-10 and Rules of procedure IECEE 02:2006-10, and the relevant IECEE CB-Scheme Operational documents.

  This certificate was issued Aug.6.2009 and valid until May.19.2012.

6 Equipments Used during Test

	RE in Chamber					
No:	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	N/A	N/A
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	28-01-2009	28-01-2010
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	10036	14-07-2009	14-07-2010
N/A	EMI Test Software	Audix	E3	N/A	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	04-12-2009	04-12-2010
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	08-10-2009	08-10-2010
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	08-10-2009	08-10-2010
EMC0517	Horn Antenna	Rohde & Schwarz	HF906	100095	09-09-2009	09-09-2010
EMC0040	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	05-12-2009	05-12-2010
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	11-03-2009	11-03-2010
EMC0075	310N Amplifier	Sonama	310N	272683	26-10-2009	26-10-2010
EMC0523	Active Loop Antenna	EMCO	6502	00042963	08-10-2009	08-10-2010
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	02-06-2009	02-06-2010

	General used equipment					
No:	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
EMC0006	DMM	Fluke	73	70681569	23-12-2008	23-12-2009
EMC0007	DMM	Fluke	73	70671122	23-12-2008	23-12-2009

7 Test Result

7.1 E.U.T. Operation

Power supply:	DC 3V (button cell "CR2032" new battery)
Operating Environment:	
Temperature:	26°C
Humidity:	56% RH
Atmospheric Pressure:	1005mbar
EUT Operation:	Test the EUT in continue transmitting mode at the lowest (2410MHz), middle (2445MHz) and the highest (2475MHz) channel.

7.2 Test Procedure & Measurement Data

7.2.1 Field Strength of Fundamental& Field Strength of Unwanted Emissions

Test Requirement:	FCC Part15 C Section 15.249(a) & (d)
Test Method:	Based on FCC Part15 C Section 15.249 & ANSI C63.4
Measurement Distance:	3m (Semi-Anechoic Chamber)
Frequency range	30 MHz – 25GHz for transmitting mode.
Detector:	Test instrumentation resolution bandwidth 120 kHz (30 MHz - 1000 MHz), 1 MHz (1000 MHz – 25GHz) For PK value: RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz VBW ≥ RBW; Sweep = auto Detector function = peak Trace = max hold For AV value: RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz VBW =10Hz; Sweep = auto Detector function = peak Trace = max hold
Operation:	Receive antenna scan height 1 - 4 m, polarization Vertical/ Horizontal, a turntable rotate through 360^0 in the horizontal plane and it is used to support the test sample at 0.8m above the ground plane.

Requirements:

FCC Part 15.249(a)

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m @ 3m)	Field Strength of Harmonics (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

FCC Part 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.

Remark:

The fundamental frequency rang of the EUT is 2410MHz to 2475MHz.

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

The limit for Peak field strength dBuv/m for the fundamental frequency = 114.0 dBμV/m.

No fundamental is allowed in the restricted bands.

The limit for average field strength dBμV/m for the harmonics = 54.0 dBμV/m.

The limit for peak field strength dBμV/m for the harmonics = 74.0 dBμV/m.

Emission radiated outside of the specified frequency bands,except for harmonics,shall be attenuated by at least 50dB below the level of the fundamental or the limit in 15.209.

Test Procedure:

1)30MHz to 1GHz emissions:

For testing perfomed with the bi-log type antenna, testing was perfomed in accordance to ANSI C63.4:2003. The measurement is performed with the EUT rotated 360º, the antenna height scaned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

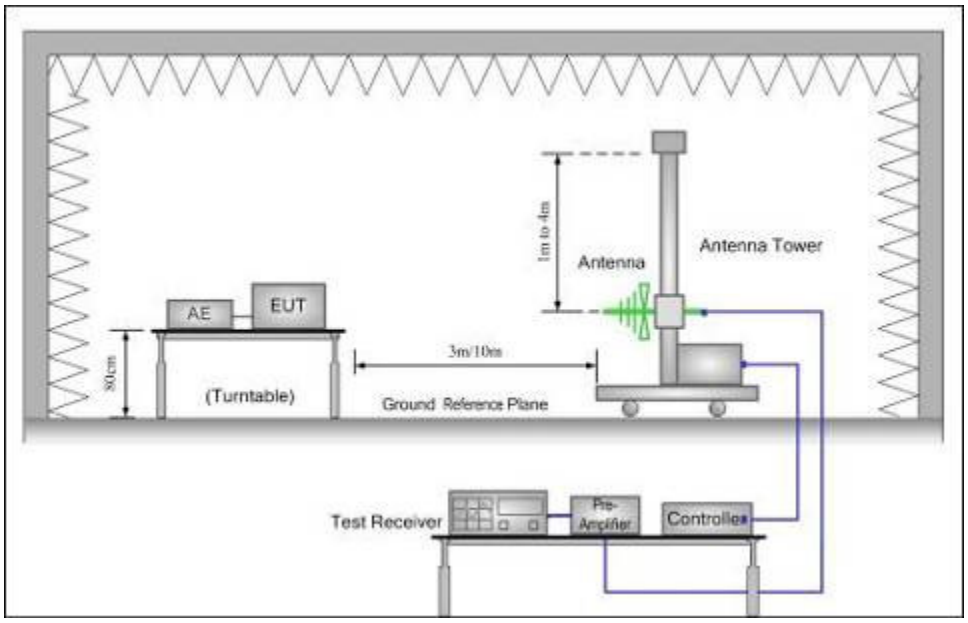
2)1GHz to 40GHz emissions:

For testing perfomed with the horn antenna, testing was perfomed in accordance to ANSI C63.4:2003. The measurement is performed with the EUT rotated 360º, the antenna height scaned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

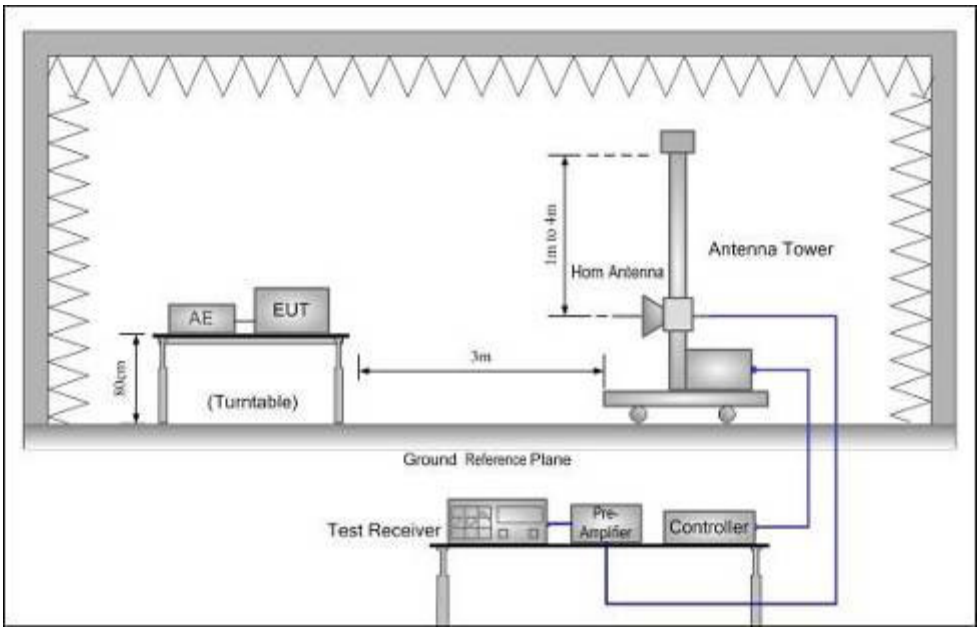
The procedure uesd was ANSI Standard C63.4-2003. The receive was scanned from 30MHz to 25GHz.When an emission was found,the table was roated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal 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. For battery operated equipment,the equipment tests shall be performed using a new battery. Pretest the equipment on 3 axis ,the worst case emissions were reported.

Test Configuration:

1) 30MHz to 1GHz emissions:



2) 1GHz to 40GHz emissions:



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 – Peramlifer Factor

The following test results were performed on the transmitting mode:

1.Test in Channel lowest (2410MHz), keep in continuously transmitting status.
(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
128.94	50.71	12.26	1.00	24.40	39.57	43.50	-3.93	QP
230.79	48.07	11.70	1.30	24.10	36.97	46.00	-9.03	QP
2410	93.42	28.60	4.30	36.97	89.35	114.00	-24.65	Peak
2410	72.57	28.60	4.30	36.97	68.50	94.00	-25.50	Average
4820	47.26	33.21	6.30	36.35	50.42	74.00	-23.58	Peak
4820	40.32	33.21	6.30	36.35	43.48	54.00	-10.52	Average

(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
128.94	43.96	12.26	1.00	24.40	32.82	43.50	-10.68	QP
230.79	53.42	11.70	1.30	24.10	42.32	46.00	-3.68	QP
2410	89.34	28.60	4.30	36.97	85.27	114.00	-28.73	Peak
2410	67.24	28.60	4.30	36.97	63.17	94.00	-30.83	Average
4820	46.87	33.21	6.30	36.35	50.03	74.00	-23.97	Peak
4820	39.46	33.21	6.30	36.35	42.62	54.00	-11.38	Average

2. Test in Channel middle (2445MHz), keep in continuously transmitting status.

(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
269.59	50.39	12.30	1.50	24.00	40.19	46.00	-5.81	QP
296.75	47.15	12.42	1.60	24.07	37.10	46.00	-8.90	QP
2445	94.41	28.69	4.37	37.10	90.37	114.00	-23.63	Peak
2445	73.64	28.69	4.37	37.10	69.60	94.00	-24.40	Average
4890	48.75	33.29	6.27	36.20	52.11	74.00	-21.89	Peak
4890	40.38	33.29	6.27	36.20	43.74	54.00	-10.26	Average

(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
299.66	50.44	12.60	1.60	24.10	40.54	46.00	-5.46	QP
365.62	52.07	14.77	1.70	24.65	43.89	46.00	-2.11	QP
2445	90.96	28.69	4.37	37.10	86.92	114.00	-27.08	Peak
2445	68.13	28.69	4.37	37.10	64.09	94.00	-29.91	Average
4890	46.25	33.29	6.27	36.20	49.61	74.00	-24.39	Peak
4890	39.97	33.29	6.27	36.20	43.33	54.00	-10.67	Average

3.Test in Channel highest (2475MHz), keep in continuously transmitting status.

(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
327.79	43.29	14.00	1.60	24.30	34.59	46.00	-11.41	QP
365.62	48.18	14.77	1.70	24.65	40.00	46.00	-6.00	QP
2475	94.37	28.78	4.40	37.03	90.52	114.00	-23.48	Peak
2475	70.36	28.78	4.40	37.03	66.51	94.00	-27.49	Average
4950	46.01	33.34	6.20	36.20	49.35	74.00	-24.65	Peak
4950	39.76	33.34	6.20	36.20	43.10	54.00	-10.9	Average

(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
382.11	44.97	15.18	1.70	24.82	37.03	46.00	-8.97	QP
428.67	45.93	15.72	1.80	25.19	38.26	46.00	-7.74	QP
2475	79.16	28.78	4.40	37.03	75.31	114.00	-38.69	Peak
2475	58.46	28.78	4.40	37.03	54.61	94.00	-39.39	Average
4950	45.97	33.34	6.20	36.20	49.31	74.00	-24.69	Peak
4950	40.16	33.34	6.20	36.20	43.50	54.00	-10.5	Average

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.

2）Sweep from 30MHz to 25GHz, find the max radiated emissions and record it, when the emissions are too weak to be detected, it will not be reported.

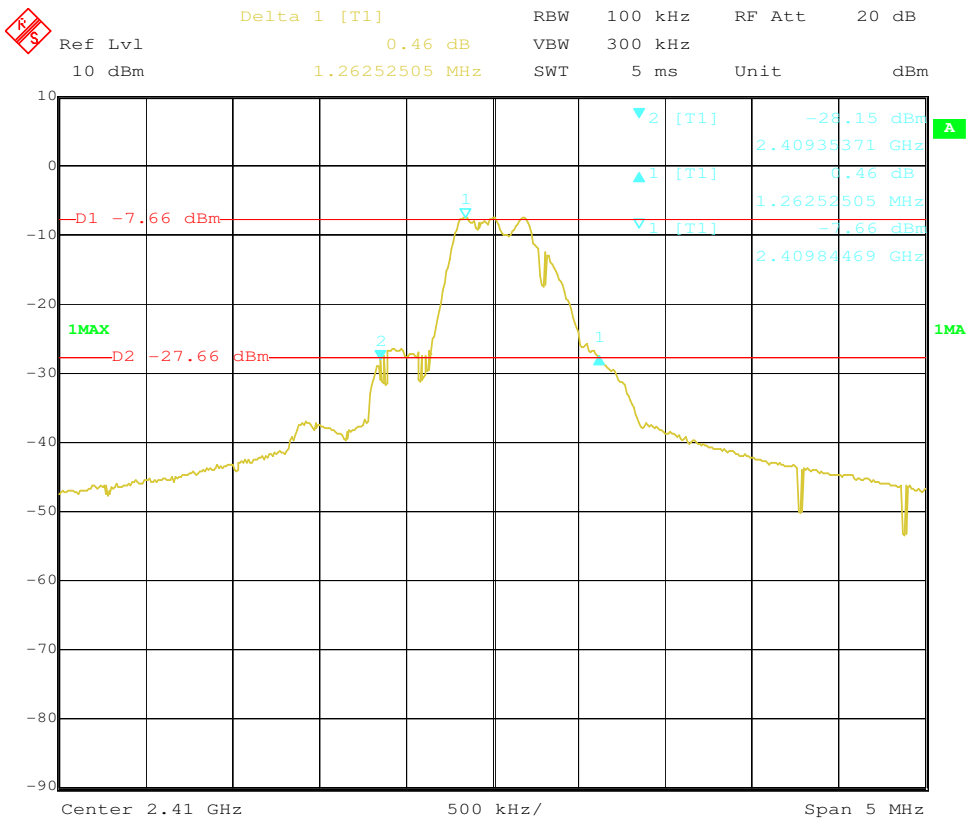
TEST RESULTS: The unit does meet the FCC requirements.

7.2.2 Occupied Bandwidth & Band Edge

Test Requirement:	FCC Part 15 C Section 15.215 & 15.249
Test Method:	ANSI C63.4 and FCC Part 2.1049
	Operation within the band 2400-2483.5MHz
Requirements:	15.215(c) Intentional radiators operating under the alternative provisions to the general emission limits,as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that, the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. 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.

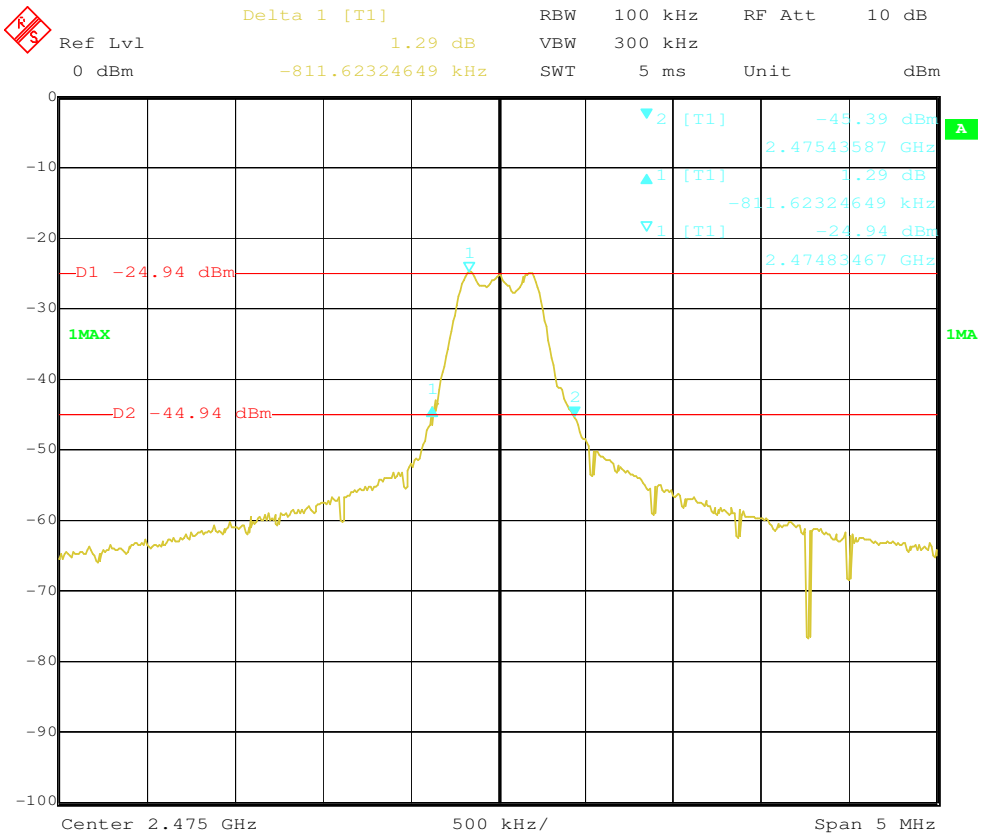
The occupied bandwidth as below:

Lowest Channel:2410MHz:



The lowest frequency is: 2.40935371GHz.

Highest Channel 2475MHz:

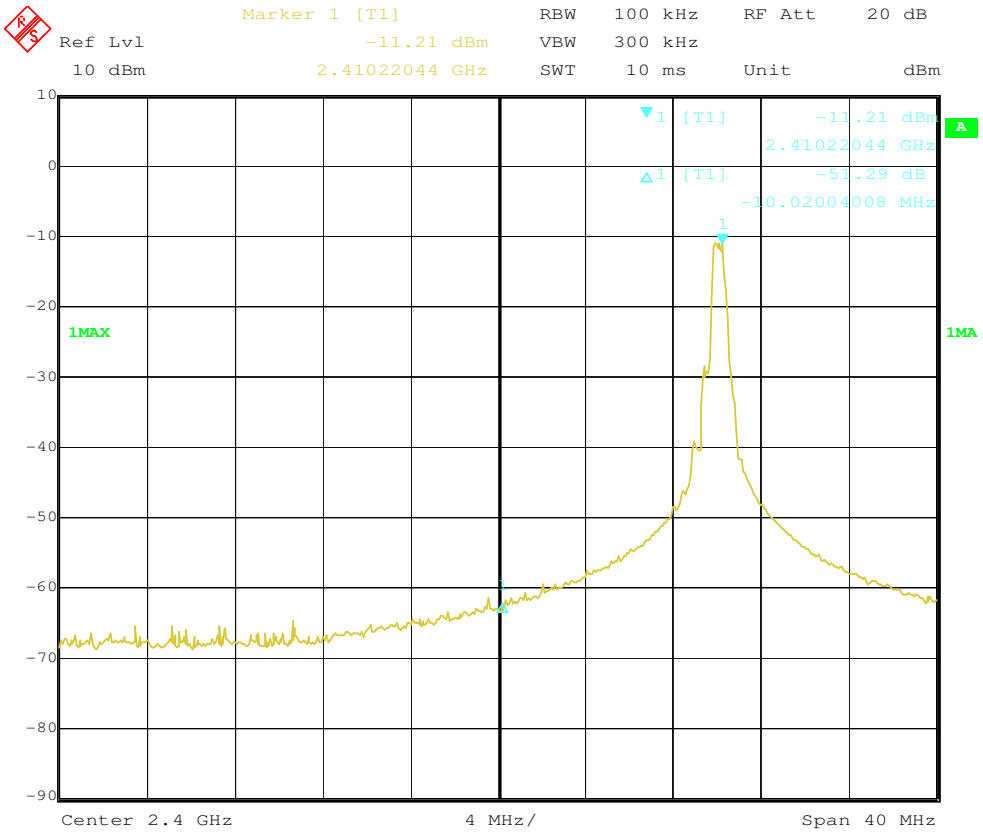


The highest frequency is: 2.47543587GHz.

The Band Edge Emission as below:

Lowest Band Edage 2400MHz

Detector mode:Peak



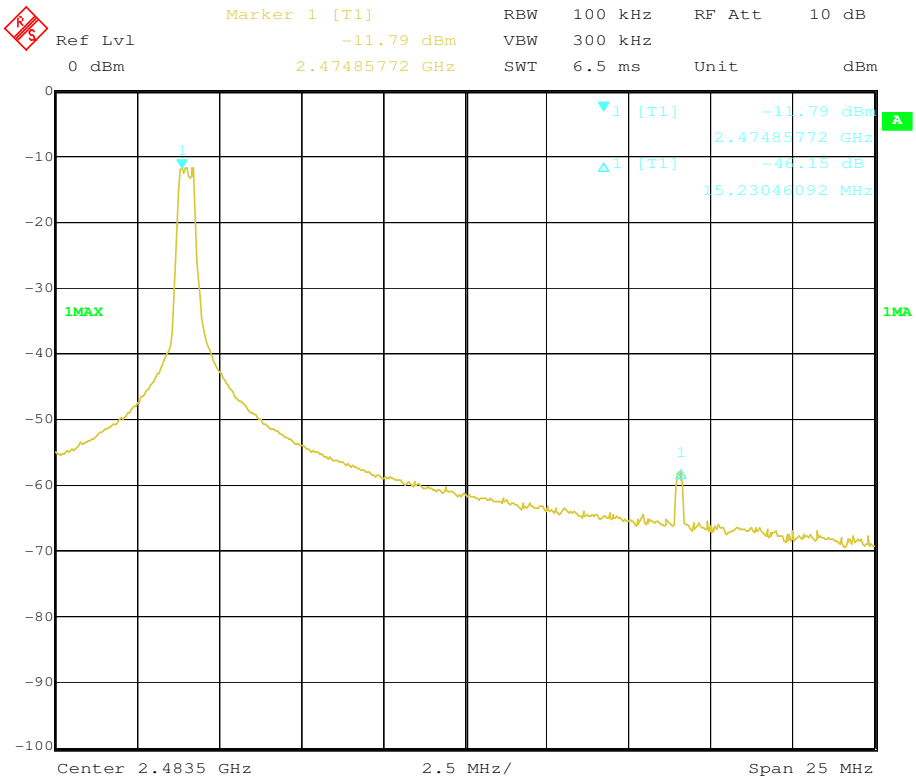
For 2400MHz bandedge checked with 2410MHz frequency operated, the delta shown at the plots are 51.29 dB for peak detector mode.

The fundamental emission at the frequency of 2410MHz is 89.35dBuV/m for peak detector mode, so the badge emission is 38.06dBuV/m for peak detector mode.

Here the limit for the emission is 54.0 dBμV/m for average detector. Since the Peak value at 2400MHz is lower than the average limit, the average measument is not needed.

Highest Band Edge 2483.5MHz

Detector mode:Peak



For 2483.5MHz bandedge checked with 2475MHz frequency operated, the delta shown at the plots are 46.15dB for peak detector mode.

The fundamental emission at the frequency of 2475MHz is 94.37dBuV/m for peak detector mode, so the badge emission is 48.22dBuV/m for peak detector mode.

Here the limit for the emission is 54.0 dBμV/m for average detector. Since the Peak value at 2483.5MHz is lower than the average limit, the average measument is not needed.

The test result for the Emissions radiated outside of the specified frequency bands , please refer to the section 7.2.1 of this report.

The results: The unit does meet the FCC requirements.

--End of the Report--