SGS-CSTC Standards Technical Services Co., Ltd.

198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663
Tel: +86 20 82155555 Fax: +86 20 82075059
Email: sgs_internet_operations@sgs.com
FEDERAL COMMUNICATIONS COMMISSION
Registration number: 282399

TEST REPORT

Application No.:	GZEM1105001762RF
Applicant:	NOMENTA INDUSTRIES (HK) LTD.
FCC ID:	ZP3WIPROPK
Product Name:	Battery pack system
Product Description:	Wireless Transmission for Data (Pack)
Model No.:	WiPRO
Trade Mark:	Conform'able
Standards:	FCC PART 15 Subpart C: 2010 section 15.249
Date of Receipt:	2011-05-30
Date of Test:	2011-06-01 to 2011-06-13
Date of Issue:	2011-06-29
Test Result :	**Pass***

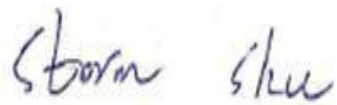
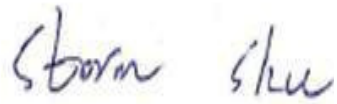
* In the configuration tested, the EUT complied with the standards specified above.

Strong Yao
2011 June

Strong Yao
Manager

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2011-06-29		Original

Authorized for issue by:				
Tested By		 **(Storm Shu) / Project Engineer**		2011-06-01 to 2011-06-13 **Date**
Prepared By		 **(Storm Shu) / Project Engineer**		2011-06-14 Date
Checked By		 **Strong Yao/ Reviewer**		2011-06-29 **Date**

3 Test Summary

Test	Test Requirement	Test method	Result
Field Strength of Fundamental	FCC PART 15 C section 15.249 (a)	ANSI C63.10: Clause 6.6	PASS
Field Strength of Unwanted Emissions	FCC PART 15 C section 15.249 (a) section 15.249 (d)	ANSI C63.10: Clause 6.4, 6.6 and 6.7	PASS
Occupied Bandwidth	FCC PART 15 C section 15.215(c)	ANSI C63.10: Clause 6.9	PASS
Band Edges	FCC PART 15 C section 15.249 (d)	ANSI C63.10: Clause 6.9	PASS
Conducted Emissions at Mains Terminals	FCC PART 15 C section 15.207	ANSI C63.10: Clause 6.2	N/A

Remark:

N/A: not applicable. Refer to the relevant section for the details.
EUT: In this whole report EUT means Equipment Under Test.
Tx: In this whole report Tx (or tx) means Transmitter.
Rx: In this whole report Rx (or rx) means Receiver.
RF: In this whole report RF means Radio Frequency.
ANSI C63.10: the detail version is ANSI C63.10:2009 in the whole report.

4 Contents

5 General Information

5.1 Client Information

Applicant:	NOMENTA INDUSTRIES (HK) LTD.
Address of Applicant:	Bldg.2, Rm, 207, Tian'an Hi-Tech Industrial Plaza, 730 Yingbin Lu, Panyu District, 511400 Guangzhou, P.R.C.

5.2 General Description of E.U.T.

Product Name:	Battery pack system
Model No.:	WiPRO

5.3 Details of E.U.T.

Operating Frequency	2.433GHz
Type of Modulation:	2-FSK
Number of Channels	1
Antenna Type	Integral antenna
Antenna gain:	0 dBi
Function:	The EUT was a set of equipment: 2.433GHz is used for common channel for data transfer, between battery pack and remote control.
Power Supply:	DC 7.4V = 7.4V size "Lithium battery" battery x1 for Tx DC 3.0V = 3.0V size "CR2032" battery x1 for Rx
Adapter detail:	Tx: Model:MTP151BX-084080 Input: AC100~240V 50/60Hz 0.5A Output: DC8.4V 0.8A Power cable: 1.5m x 2wires unscreened DC mains cable

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Other Information Requested by the Customer

None.

5.6 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

5.7 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.

5.8 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.

- **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.

6 Equipment Used during Test

RE in Chamber					
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date (YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2011-09-06
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2012-01-17
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	10036	2012-06-01
N/A	EMI Test Software	Audix	E3	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	2011-12-08
EMC2025	Trilog Broadband Antenna 30-3000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9163	9163-450	2011-10-28
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2011-12-20
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2011-12-20
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2011-09-11
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2012-01-17
EMC0049	Amplifier	Agilent	8447D	2944A10862	2012-04-21
EMC0075	310N Amplifier	Sonama	310N	272683	2011-10-25
EMC0523	Active Loop Antenna	EMCO	6502	42963	2011-11-17
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	2012-05-10

Conducted Emission					
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date (YYYY-MM-DD)
EMC0306	Shielding Room	Zhong Yu	8 x 3 x 3.8 m^3	N/A	N/A
EMC0118	Two-line v-netwok	R&S	ENV216	100359	2011-09-25
EMC0102	LISN	SCHAFFNER CHASE	MN2050D/1	1421	2011-11-23
EMC0506	EMI Test Receiver	Rohde & Schwarz	ESCS30	100085	2011-11-24
EMC0107	Coaxial Cable	SGS	2m	N/A	2011-07-18
EMC0106	Voltage Probe	SGS	N/A	N/A	N/A
EMC0120	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	20550	2012-01-17
EMC0121	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	20549	2012-01-17
EMC0122	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	20548	2012-01-17

General used equipment					
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date (YYYY-MM-DD)
EMC0006	DMM	Fluke	73	70681569	2011-12-16
EMC0007	DMM	Fluke	73	70671122	2011-12-16

7 Test Results

7.1 E.U.T. Operation

Power supply: DC 7.4V

Temperature: 20.0 -25.0 °C

Humidity: 38-50 % RH

Atmospheric Pressure: 1000 -1010 mbar

Test frequencies and frequency range: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

EUT channel and frequency list:

Channel	1	Frequency (MHz)	2433

7.2 Antenna Requirement

7.2.1 Standard requirement

15.203 requirement:

For intentional device. According to 15.203. 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.

EUT Antenna

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

Test result: The unit does meet the FCC requirements.

7.3 Field Strength of Fundamental& Field Strength of Unwanted Emissions

Test Requirement: FCC Part15 C section 15.249

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

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

(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.

Limits: The fundamental frequency is 2433MHz.

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

The limit for Peak field strength dBμV/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 54.0 dBμV/m in 15.209. Here the limit for the other emission is 54.0 dBμV/m.

Test Method: ANSI C63.10: Clause 6.4, 6.6 and 6.7

Status: Pre-test the EUT in continuous transmitting mode with setup as stand-alone in X, Y, Z threes axes, found the worst case is X axes and report the data.

Measurement Distance: 3m (Semi-Anechoic Chamber)

Frequency range: 30 MHz – 25 GHz for transmitting mode.

Test instrumentation resolution bandwidth
120 kHz (30 MHz - 1000 MHz), 1 MHz (1000 MHz – 25 GHz)

Test Procedure:

1)9 kHz to 30 MHz emissions:

For testing performed with the loop antenna, testing was performed in accordance to ANSI C63.10. The centre of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT, During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2)30 MHz to 1 GHz emissions:

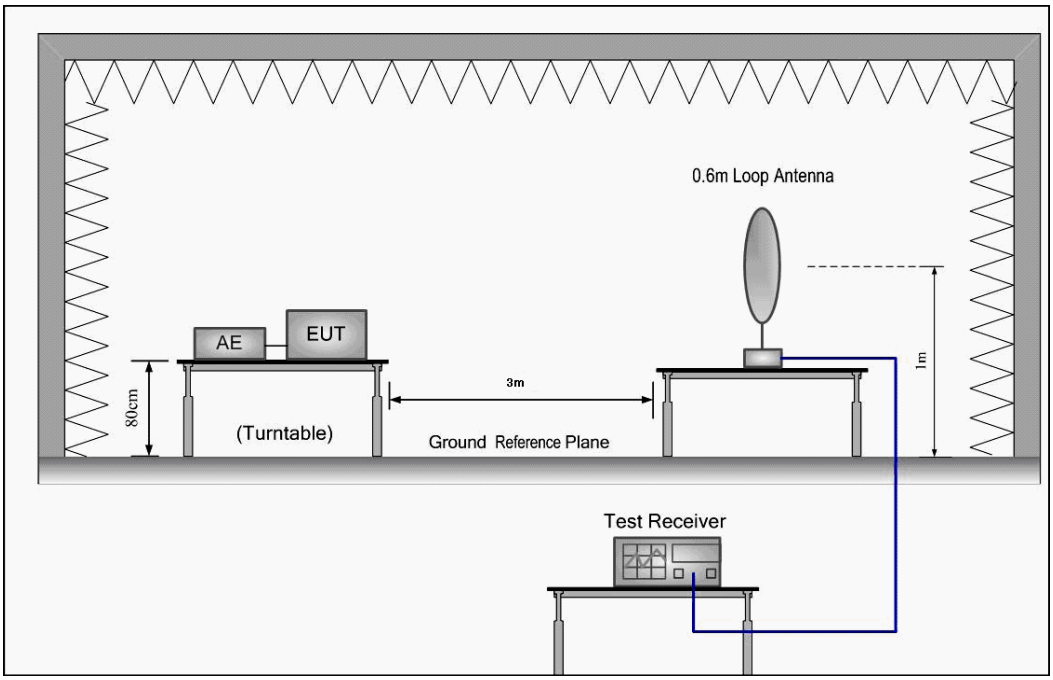
For testing performed with the bi-log type antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360º, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

3)1 GHz to 25 GHz emissions:

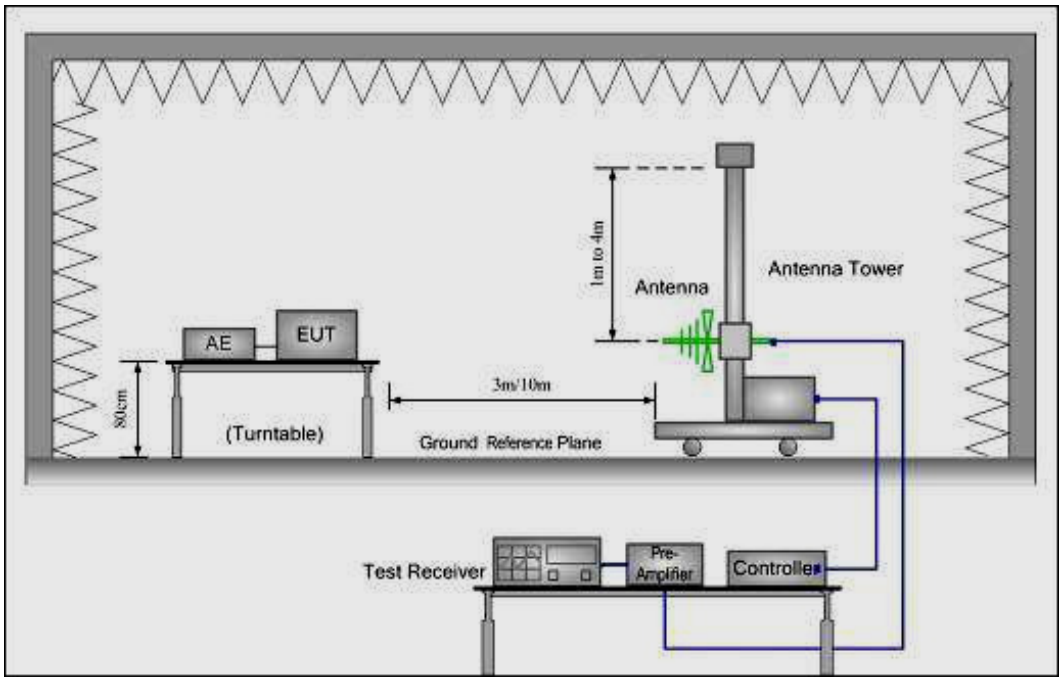
For testing performed with the horn antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360º, the antenna height scan between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

Test Configuration:

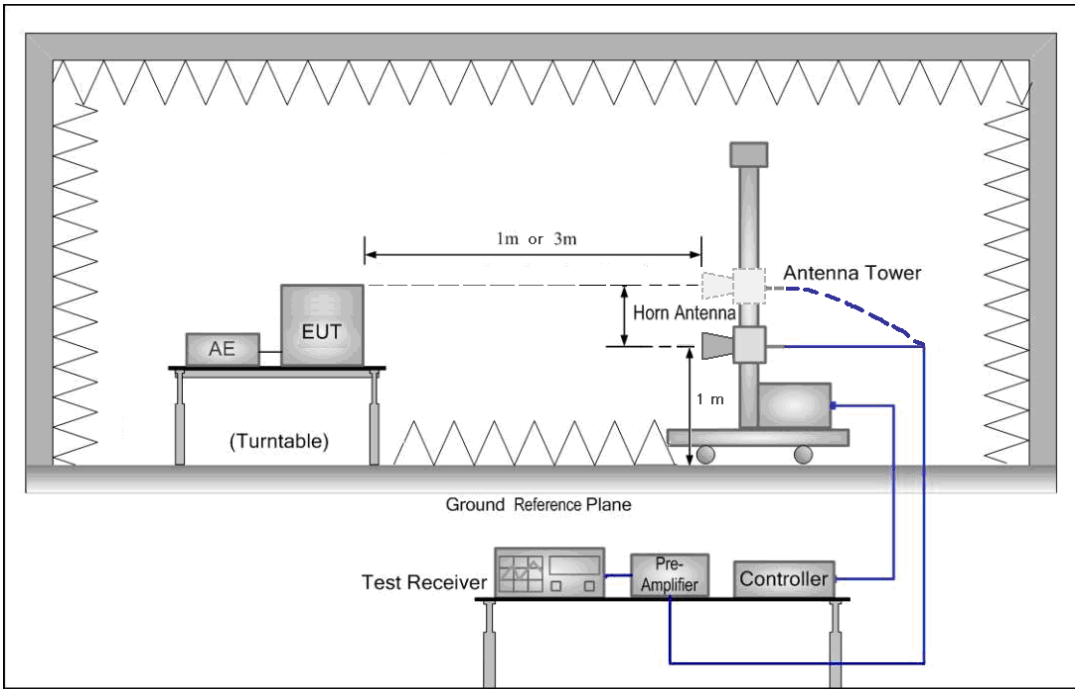
1) 9 kHz to 30 MHz emissions:



2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 25 GHz emissions:



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

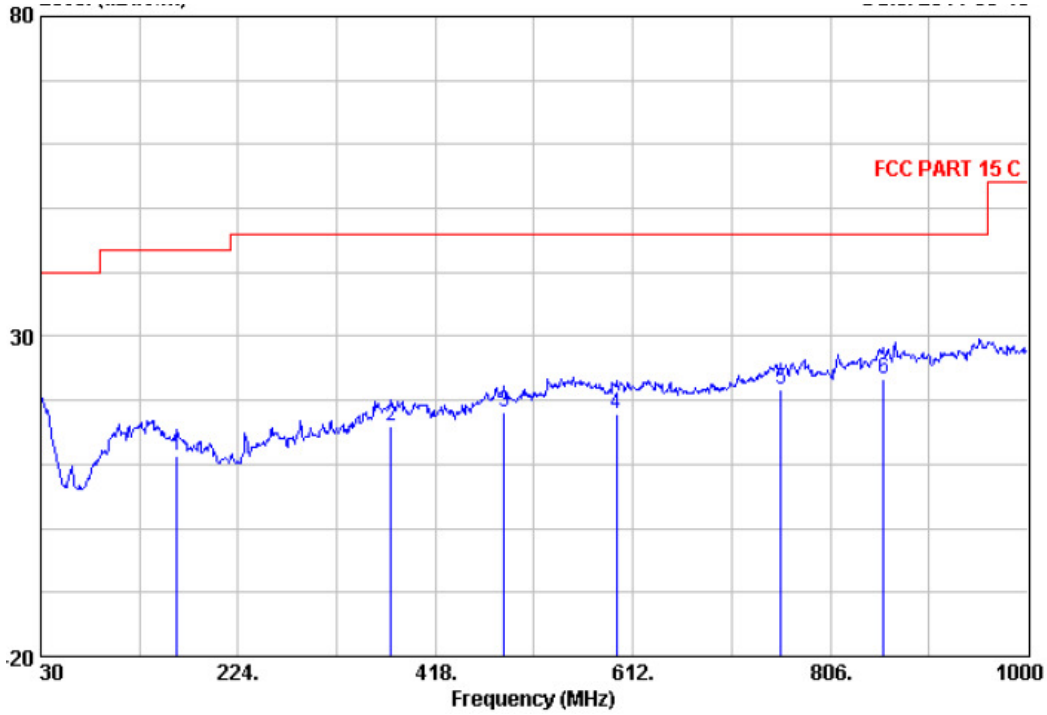
Final Test Level =Receiver Reading + Antenna Factor + Cable Loss – Preamplifier Factor

30 MHz~1 GHz Field Strength of Unwanted Emissions.Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBµV/m)



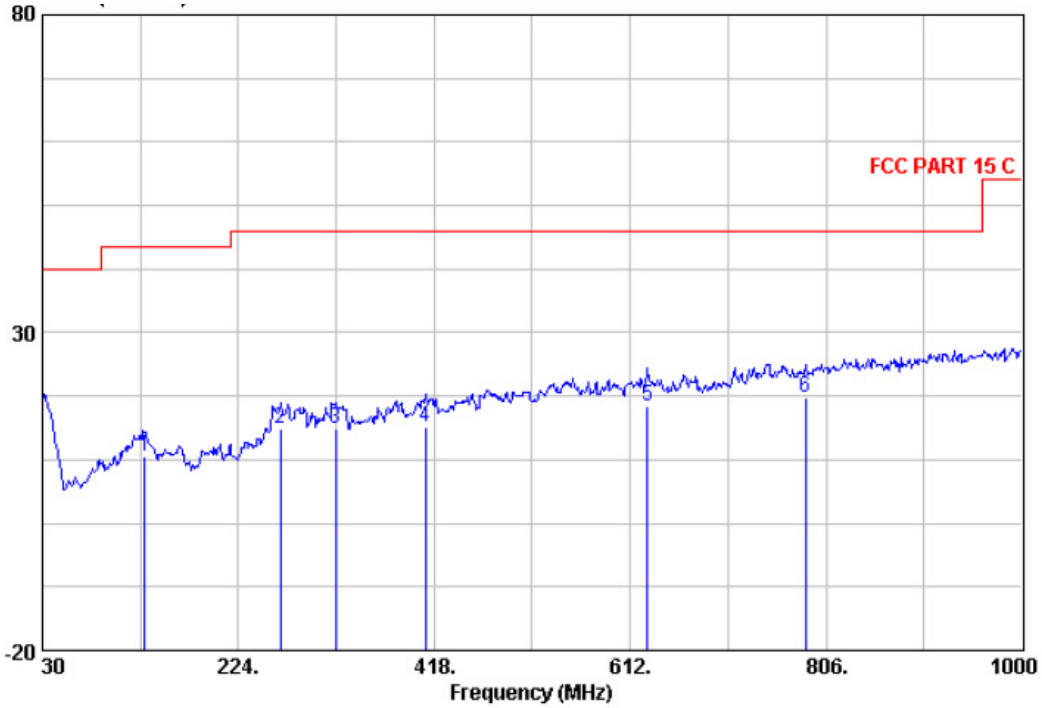
Quasi-peak measurement

Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
163.860	28.66	8.90	1.10	27.37	11.29	43.50	-32.21	QP
374.350	26.58	15.32	1.70	27.61	15.99	46.00	-30.01	QP
485.900	26.86	17.35	1.90	28.01	18.11	46.00	-27.89	QP
595.510	25.52	18.72	2.10	28.37	17.96	46.00	-28.04	QP
757.500	26.83	20.17	2.40	27.73	21.66	46.00	-24.34	QP
858.380	27.23	20.50	2.60	27.09	23.24	46.00	-22.76	QP

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
131.260	24.98	12.00	1.00	27.51	10.47	43.50	-33.03	QP
265.710	28.31	12.30	1.50	27.12	14.99	46.00	-31.01	QP
320.030	27.07	13.50	1.60	27.23	14.94	46.00	-31.06	QP
409.270	24.81	16.40	1.80	27.80	15.21	46.00	-30.79	QP
629.460	25.51	18.75	2.30	28.22	18.35	46.00	-27.65	QP
785.630	25.14	19.86	2.50	27.67	19.84	46.00	-26.16	QP

1~25 GHz Field Strength of Fundamental & Field Strength of Unwanted Emissions.

Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
1423.000	25.51	3.62	35.96	53.93	47.10	74.00	V
2433.000	27.17	4.04	35.74	72.86	68.33	114.00	V
4339.000	32.86	7.10	34.09	48.90	54.77	74.00	V
1720.000	27.10	4.02	35.76	54.10	49.46	74.00	H
2433.000	27.17	4.04	35.74	87.78	83.25	114.00	H
4015.000	32.99	7.00	34.65	45.17	50.51	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
1423.000	25.51	3.62	35.96	30.00	23.17	54.00	V
2433.000	27.17	4.04	35.74	68.39	63.86	94.00	V
4339.000	32.86	7.10	34.09	29.64	35.51	54.00	V
1720.000	27.10	4.02	35.76	31.27	26.63	54.00	H
2433.000	27.17	4.04	35.74	81.80	77.27	94.00	H
4015.000	32.99	7.00	34.65	19.52	24.86	54.00	H

Remark:

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 + Antenna Factor + Cable Loss –Preamplifier Factor.

2). As shown in Section, 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.

3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

Test result: The unit does meet the FCC requirements.

7.4 Occupied Bandwidth & Band Edge

Test Requirement: FCC Part 15 C section 15.249

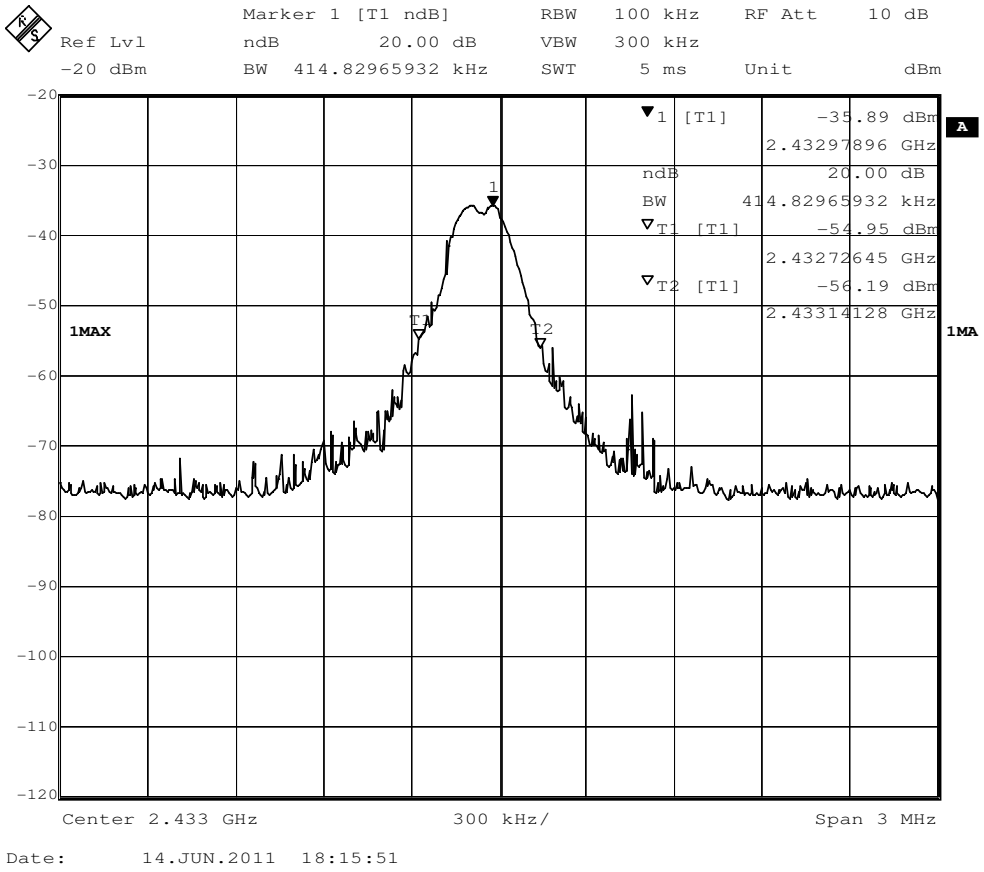
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Test Method: ANSI C63.10: Clause 6.9

Operation within the band 2.400 to 2.4835 GHz

Method of measurement: A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken.

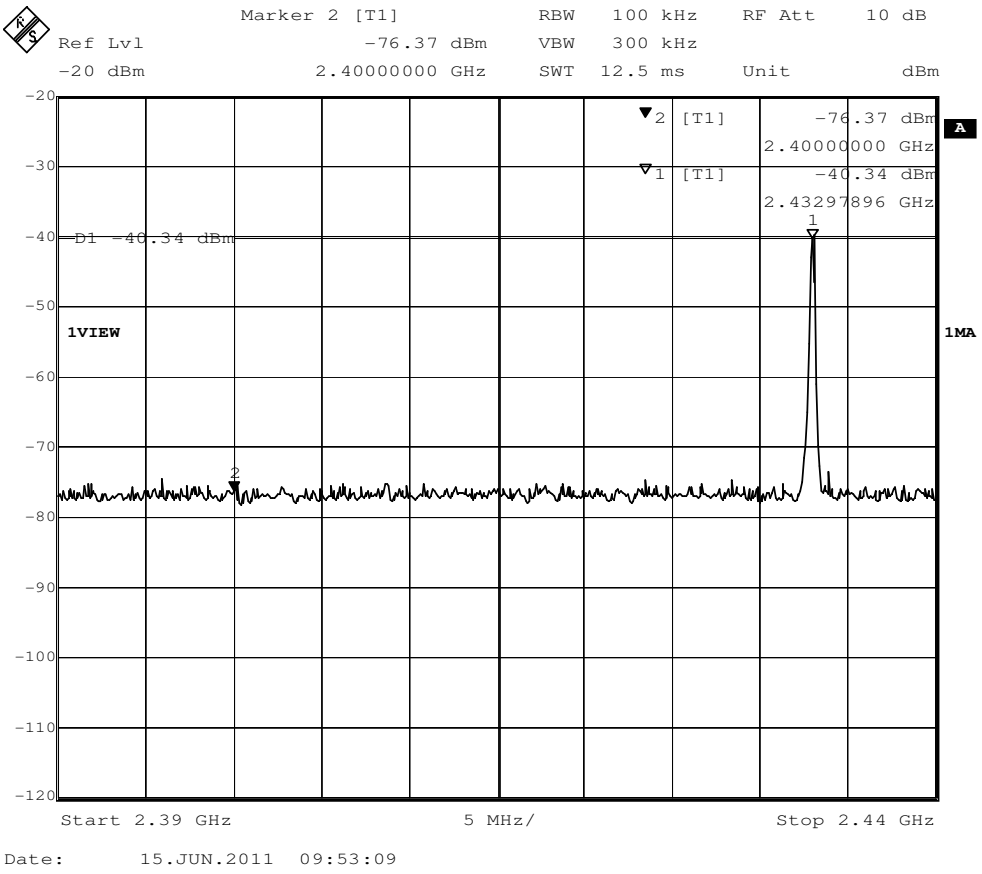
1.Test in the frequency 2.433 GHz



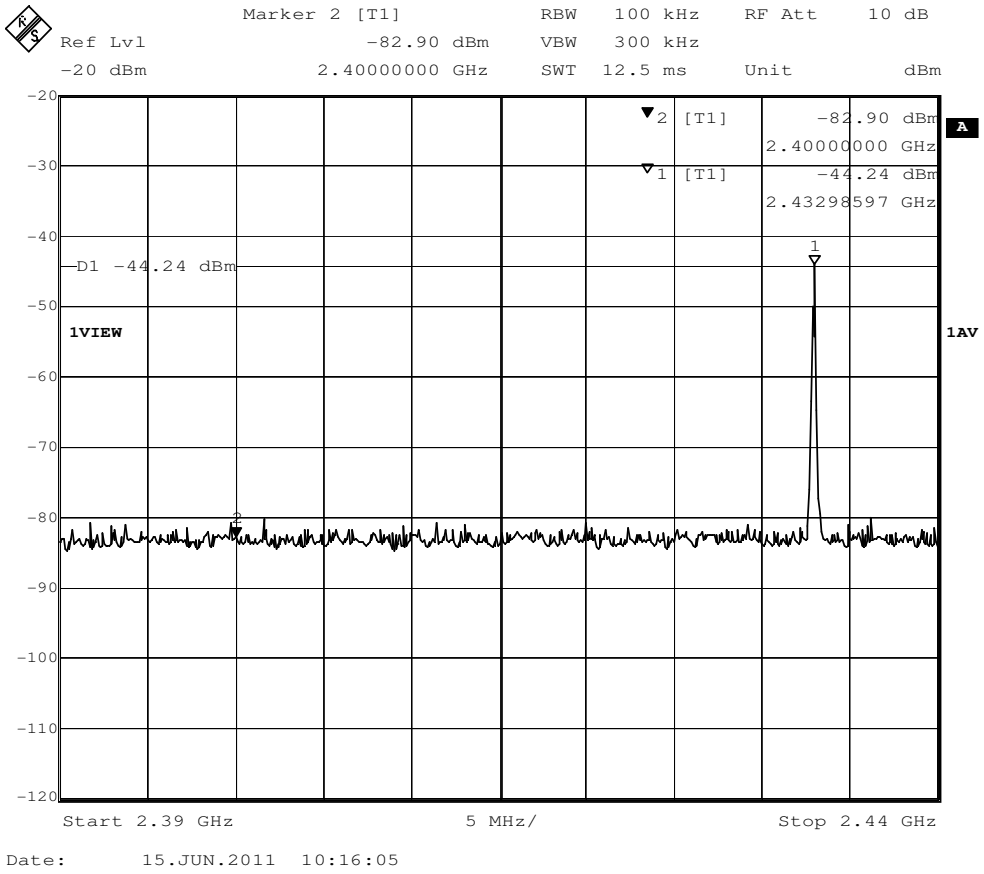
The Band Edge Emission as below:

Band Edge 2.4 GHz

Detector mode: Peak



Detector mode: Average

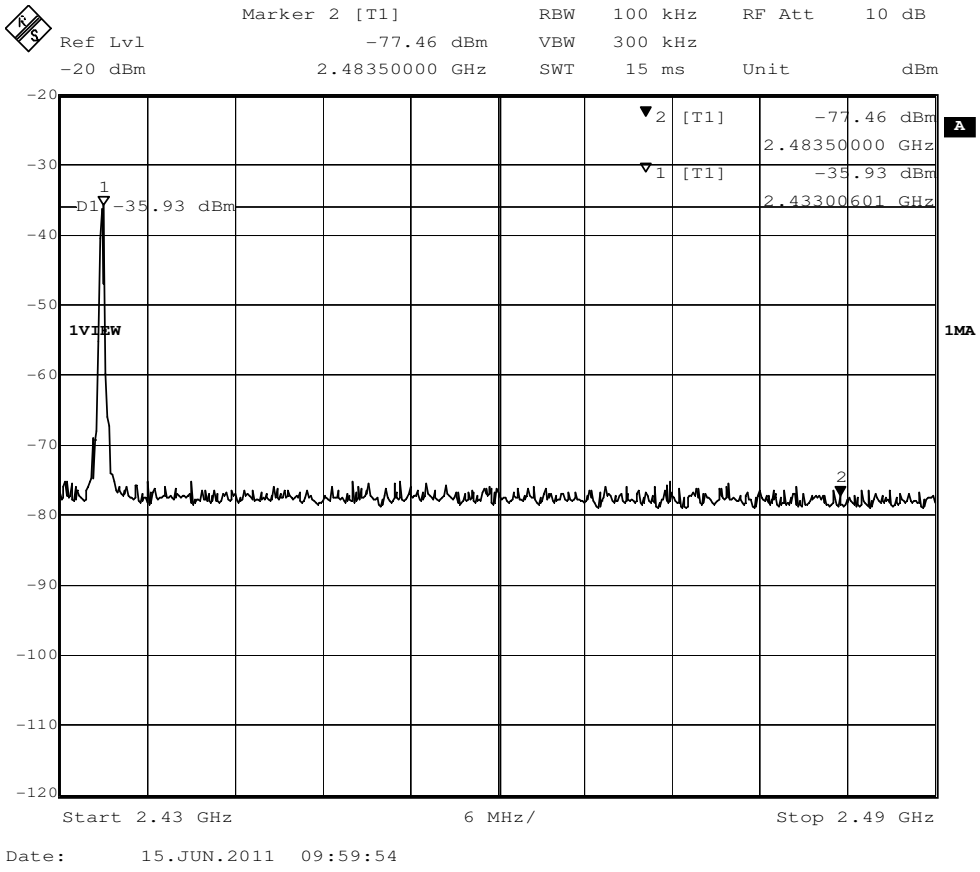


For 2.40 GHz band edge checked with 2.433 GHz frequency operated, the delta shown at the plots are -36.03 dB for peak detector mode and -38.66 dB for Average detector mode.

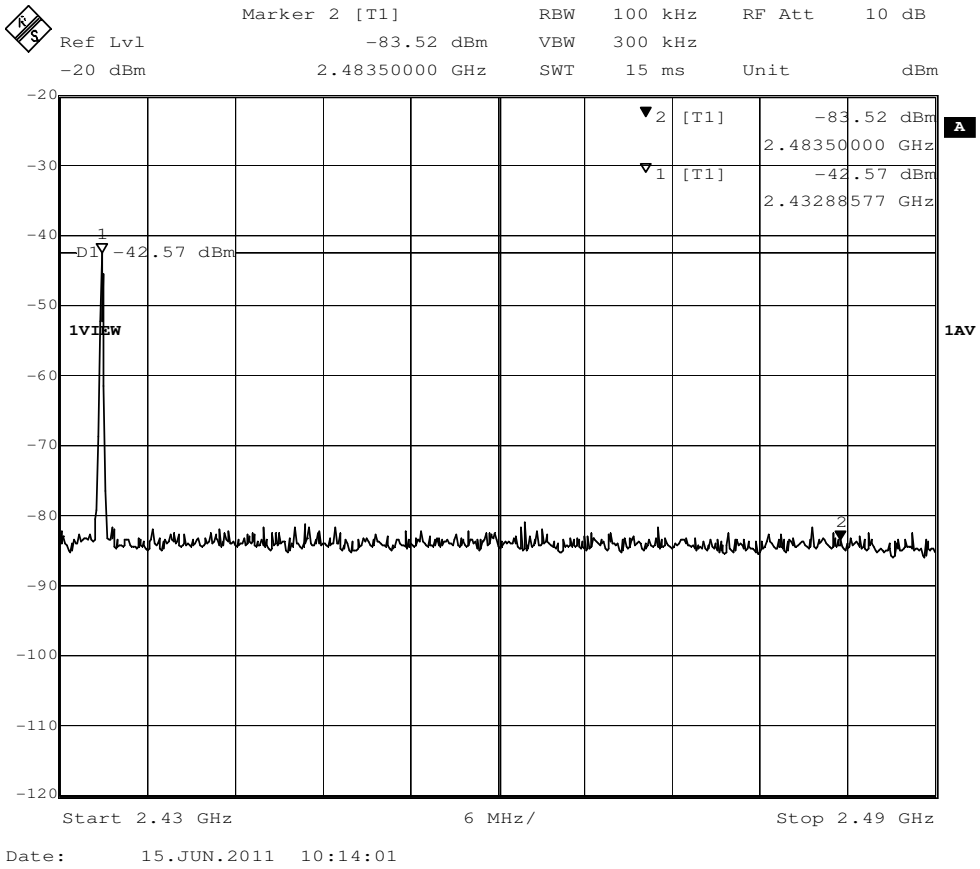
With the peak value 83.25 dBμV/m and average value at 77.27 dBμV/m for the fundamental, the spurious emission level at 2.400 GHz were 47.22dBμV/m for peak and 38.61 dBμV/m for average which is below the limit 74.0 dBμV/m for peak and 54.0 dBμV/m for average.

Highest Band Edge 2.4835GHz

Detector mode: Peak



Detector mode: Average



For 2.4835 GHz bandage checked with 2.433 GHz frequency operated, the delta shown at the plots are -41.53 dB for peak detector mode and -40.95 dB for Average detector mode.

With the peak value 83.25 dBμV/m and average value at 77.27 dBμV/m for the fundamental, the spurious emission level at 2.4835 GHz were 41.72 dBμV/m for peak and 36.32 dBμV/m for average which is below the limit 74.0 dBμV/m for peak and 54.0 dBμV/m for average.

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.

7.5 Conducted Emissions at Mains Terminals 150 kHz to 30 MHz

Not applicable, since the test applies to equipment with AC or DC mains supply only.

End of the report