



Spectrum Research & Testing Lab., Inc.
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

TEST REPORT

Reference No.: A13072401
Report No.: FCCA13072401
FCC ID : PADWF108
Page: 1 of 56
Date: Sep 11, 2013

Product Name: Cadence Pod
Model No.: WFPODCAD
Applicant: Wahoo Fitness
90 West Wieuca Road Suite 110
Atlanta Georgia 30342 United States
Date of Receipt: Jul. 24, 2013
Finished date of Test: Sep. 09, 2013
Applicable Standards: 47 CFR Part 15, Subpart C
47 CFR Part 15, Subpart B
ANSI C63.4: 2003
FCC publication KDB558074 Measurement of Digital Transmission Systems Operating under Section 15.247
March 23, 2005

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Tested By : Richard Lin , Date: 9/11/2013
(Richard Lin)

Approved By : J. Ho , Date: 9/11/2013
(Johnson Ho, Director)



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Revisions History

Report No.	Issue Date	Revisions
FCCA13072401	Sep. 11, 2013	Initial issue
FCCA13072401	Sep. 13, 2013	P6, carrier frequency change from 2404 to 2402
FCCA13072401	Sep. 13, 2013	P6, Correct 2.3 EUT OPERATING CONDITION



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1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- DC power source from battery: DC power source 3V, was used during the test.

1.3 EUT MODIFICATION

- No modification in SRT Lab.



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2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Cadence Pod
MODEL NO.	WFPODCAD
POWER SUPPLY	DC power source battery : DC 3.0V
CABLE	NA
FREQUENCY BAND	2.4 GHz (Bluetooth V4.0 Low Energy, no BR/EDR)
CARRIER FREQUENCY	2.402 GHz ~ 2.480 GHz
NUMBER OF CHANNEL	40
RATED RF OUTPUT POWER	-4.46 dBm
MODULATION TYPE	GFSK
MODE OF OPERATION	Duplex
ANTENNA TYPE	Chip Antenna
ANTENNA GAIN	2 dBi
OPERATING TEMPERATURE RANGE	-10 ~ 50°C

NOTE:

The EUT operates in single mode Bluetooth Low Energy, therefore, no BR/EDR tests were performed. For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

DEVICE	BRAND / MAKER	MODEL #	FCC ID / DOC	REMARK

2.3 EUT OPERATING CONDITION

Tx-1, Tx-2, Tx3, Standby :

1. For use customer provided continuous transmission EUT.
2. Setup 3V Battery to EUT. Turn on the power.
3. Into mode : Tx-1.
4. Wait 2min. Into mode : Tx-2.
5. Wait 4min. Into mode : Tx-3.
6. Wait 8min. Into mode : Standby.

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Link :

1. For use customer provided normal EUT.
2. Setup 3V Battery to EUT. Turn on the power.
3. Turn on peripheral devices (iPad) & open Cadence Pod App.
4. Connect & Pair the EUT to iPad App. Into mode : Link.

2.4 DESCRIPTION OF TEST MODE

	Mode	Frequency
1	CH01 (Tx-1)	2402 MHz
2	CH20 (Tx-2)	2440 MHz
3	CH40 (Tx-3)	2480 MHz
4	Standby	NA
5	Link	NA

NOTE: The axis X,Y and Z we evaluate in chamber, the X axis is worst case.

X axis:



Y axis:



Z axis:



2.5 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4:2003. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL #	FCC ID/DOC	CABLE
1	iPad Wi-Fi 16G	Apple	A1458	BCGA1458	N/A

NOTE: For the actual test configuration, please refer to the photos of testing.



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2.6 CHANNEL AND FREQUENCY TABLE

Channel	Frequency	Channel	Frequency
CH 01	2402 MHz	CH 21	2442 MHz
CH 02	2404 MHz	CH 22	2444 MHz
CH 03	2406 MHz	CH 23	2446 MHz
CH 04	2408 MHz	CH 24	2448 MHz
CH 05	2410 MHz	CH 25	2450 MHz
CH 06	2412 MHz	CH 26	2452 MHz
CH 07	2414 MHz	CH 27	2454 MHz
CH 08	2416 MHz	CH 28	2456 MHz
CH 09	2418 MHz	CH 29	2458 MHz
CH 10	2420 MHz	CH 30	2460 MHz
CH 11	2422 MHz	CH 31	2462 MHz
CH 12	2424 MHz	CH 32	2464 MHz
CH 13	2426 MHz	CH 33	2466 MHz
CH 14	2428 MHz	CH 34	2468 MHz
CH 15	2420 MHz	CH 35	2470 MHz
CH 16	2432 MHz	CH 36	2472 MHz
CH 17	2434 MHz	CH 37	2474 MHz
CH 18	2436 MHz	CH 38	2476 MHz
CH 19	2438 MHz	CH 39	2478 MHz
CH 20	2440 MHz	CH 40	2480 MHz



3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a wireless product. According to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C

47 CFR Part 15, Subpart B

ANSI C63.4: 2003

FCC publication KDB558074 Measurement of Digital Transmission Systems

Operating under Section 15.247 March 23, 2005

All tests have been performed and recorded as the above standards.

3.1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

STANDARD SECTION	TEST TYPE AND LIMIT RESULTS	RESULTS
15.247(a)(2)	6 dB Bandwidth Limit: minimum of 500 kHz	PASS
15.247(b)	Peak Power Test: Limit: 21 dBm	PASS
15.247(d)	Band Edge Measurement: Limit: 20dB less than the peak value of fundamental frequency	PASS
15.247(e)	Power Density: Limit: 8dBm/3kHz	PASS
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS
15.203	Antenna requirement Limit: max. 6dBi	PASS



4. TECHNICAL CHARACTERISTICS TEST

4.1 RADIATED EMISSION TEST

4.1.1 LIMIT

FCC Part15, Subpart C Section 15.209 limit of radiated emission for frequency below1000MHz. The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCY (MHz)	FIELD STRENGTH (microvolts/meter)	DISTANCE (m)	FIELD STRENGTH (dB μ V/m)
0.009 - 0.490	2400/F(kHz)	300	67.6-20log(kHz)
0.490 - 1.705	24000/F(kHz)	30	87.6-20log(kHz)
1.705 - 30	30	30	30
30 - 88	100	3	40.0
88 - 216	150	3	43.5
216 - 960	200	3	46.0
Above 960	500	3	54.0

NOTE:

1. 30 dBuV (in 30m) = 70 dBuV (in 3m).
2. Transmitters that require Crystal Controlled Oscillators with values below 30 MHz requires the Test Report to show "Spurious Radiated Emissions" results below 30 MHz per FCC Part 15.33(a).

FCC Part15, Subpart C Section 15.249 limit of radiated emission for frequency below1000MHz (Average).

FREQUENCY (MHz)	FIELD STRENGTH OF FUNDAMENTAL (millivolts/meter)	FIELD STRENGTH OF HARMONICS (millivolts/meter)
902 - 928	50	500
2400 - 2483.5	50	500
5725 - 5875	50	500
24000 - 24250	250	2500

NOTE:

1. In the emission tables above , the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
3. 50mV = 94dBuV

FCC Part 15, Section15.35(b) limit of radiated emission for frequency above 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0



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4.1.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test:

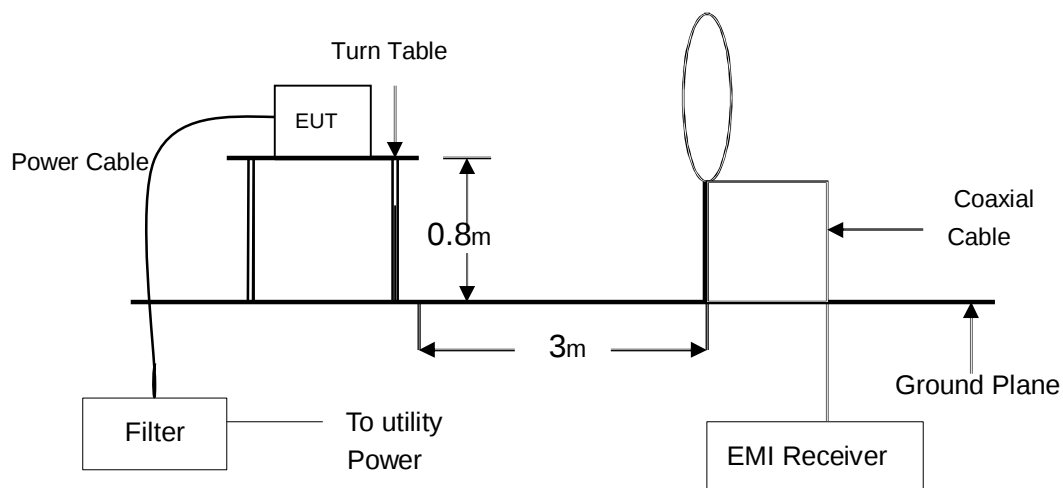
EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	DEC. 16, 2013 ETC
EMI TEST RECEIVER	20 MHz ~ 1000 MHz	ROHDE & SCHWARZ	ESVS30 / 841977/003	DEC. 02, 2013 ETC
SPECTRUM ANALYZER	9 kHz ~ 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	APR. 12, 2014 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC 12, 2013 ETC
LOOP ANTENNA	9 kHz ~ 30 MHz	ETS.LINDGREN	HFH2-Z2/ 860605/002 (1162 1/2)	MAR. 06, 2014 ETC
BI-LOG ANTENNA	30 MHz ~ 2 GHz	SCHAFFNER	CBL6141A / 4181	JUN. 25, 2014 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	DEC. 21, 2013 ETC
HORN ANTENNA	18 ~ 40 GHZ	ETS-LINDGREN	3116 /00032255	JAN. 07, 2014 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 18, 2013 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 09, 2014 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	MAY 13, 2014 SRT
RF CABLE	UP TO 18 GHz 1.5 m	JYEBAO	A30A30-L 142 / EQF-0035(001)	DEC. 19, 2013 ETC
RF CABLE	UP TO 18 GHz 3.5 m	JYEBAO	A30A30-L 142 / EQF-0036(002)	DEC. 19, 2013 ETC
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNER	SF102-46/2*11SK 252 /MY2611/2	MAR. 07, 2014 ETC
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNER	SF 102-40/2*11 /23934/2	OCT. 24, 2013 ETC
COAXIAL CABLE	30 M	TIMES	LMR-400 / #30M(L1TCAB014)	MAY. 21, 2014 ETC
FILTER	2 LINE, 30 A	FIL.COIL	FC-943 / 869	NCR
CDN	0.15 MHz ~ 300 MHz	LUTHI	CDN L-801 M2/M3 / 2790	MAY. 24, 2014 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

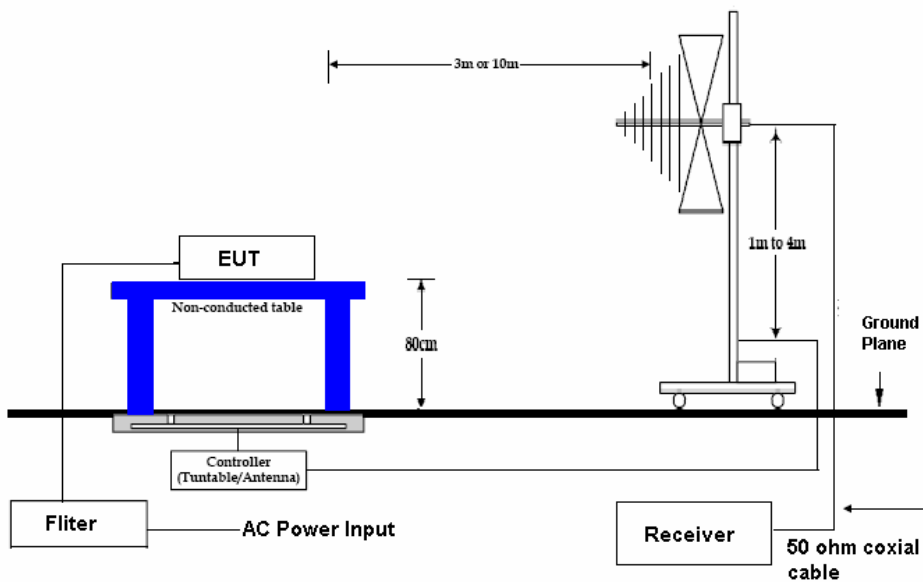


4.1.3 TEST SET-UP

9KHz ~ 30MHz

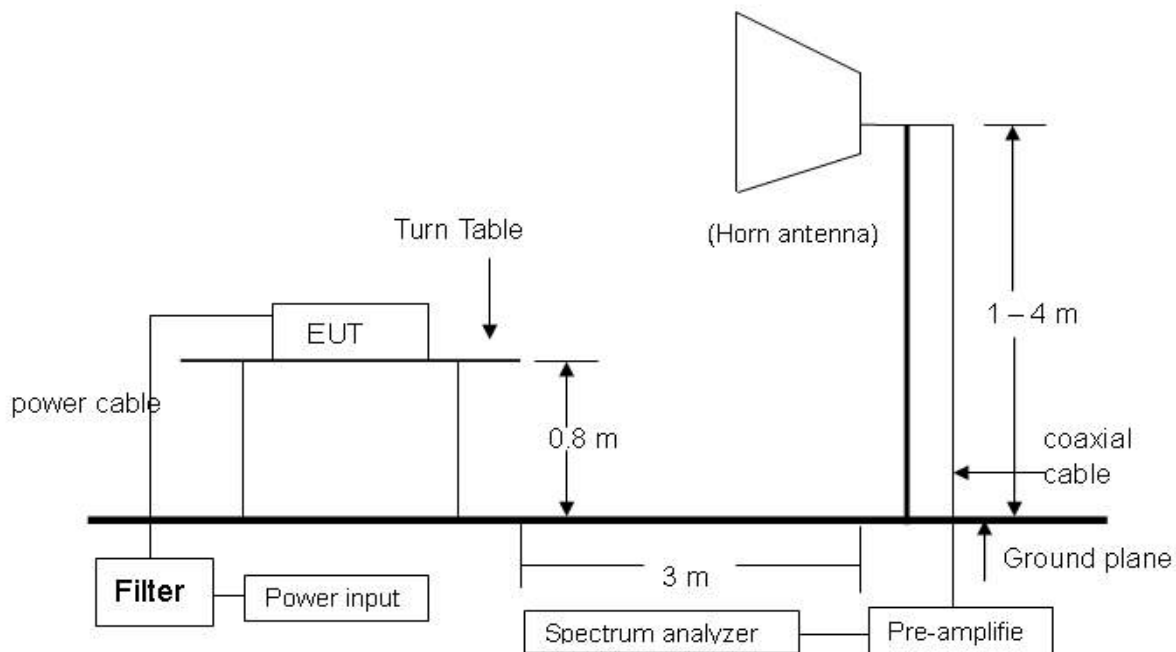


30 MHz ~ 1 GHz





Above 1 GHz



NOTE: The EUT system was put on a wooden table with 0.8m heights above a ground plane.
For the actual test configuration, please refer to the photos of testing.



4.1.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISPR 22:2003.

The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz.

The frequency spectrum measured started from 9kHz to 30MHz and 30 MHz to 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver.

Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver.

The EUT system was operated in all typical methods by users.

The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data.

The procedure is referred on the test procedure of SRT LAB.



TEST REPORT

4.1.5 TEST RESULT

Temperature:	23 °C	Humidity:	59 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	Q.P.	Tested Mode:	Tx-1
Tested By:	Richard Lin	Tested Date:	Sep. 09, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
2.46	0.27	20.20	16.95	37.42	70.00	-32.58
4.41	0.37	20.27	9.42	30.06	70.00	-39.94
16.18	0.69	20.81	3.65	25.15	70.00	-44.85
19.13	0.75	20.95	5.93	27.64	70.00	-42.36
19.51	0.76	20.97	6.45	28.18	70.00	-41.82
29.75	0.93	21.49	3.87	26.28	70.00	-43.72

Temperature:	23 °C	Humidity:	59 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	Q.P.	Tested Mode:	Tx-2
Tested By:	Richard Lin	Tested Date:	Sep. 09, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
2.46	0.27	20.20	19.27	39.74	70.00	-30.26
4.84	0.39	20.29	9.81	30.49	70.00	-39.51
18.85	0.75	20.94	5.14	26.83	70.00	-43.17
19.22	0.75	20.96	6.85	28.56	70.00	-41.44
21.40	0.79	21.07	4.52	26.38	70.00	-43.62
23.47	0.83	21.17	3.57	25.57	70.00	-44.43



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Temperature:	23 °C	Humidity:	59 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	Q.P.	Tested Mode:	Tx-3
Tested By:	Richard Lin	Tested Date:	Sep. 09, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
2.51	0.28	20.20	18.64	39.12	70.00	-30.89
5.16	0.41	20.31	10.51	31.22	70.00	-38.78
14.86	0.66	20.74	4.13	25.54	70.00	-44.46
18.43	0.74	20.92	3.56	25.22	70.00	-44.78
19.38	0.76	20.97	5.50	27.22	70.00	-42.78
22.09	0.80	21.10	4.53	26.44	70.00	-43.56

Temperature:	23 °C	Humidity:	59 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	Q.P.	Tested Mode:	Standby
Tested By:	Richard Lin	Tested Date:	Sep. 09, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
2.51	0.28	20.20	20.52	41.00	70.00	-29.00
4.97	0.40	20.30	8.15	28.85	70.00	-41.15
19.01	0.75	20.95	5.27	26.97	70.00	-43.03
19.63	0.76	20.98	5.41	27.15	70.00	-42.85
20.91	0.78	21.05	3.68	25.51	70.00	-44.49
22.58	0.81	21.13	4.43	26.37	70.00	-43.63



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Temperature:	23 °C	Humidity:	59 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	Q.P.	Tested Mode:	Link
Tested By:	Richard Lin	Tested Date:	Sep. 09, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
1.43	0.20	20.20	23.76	44.16	70.00	-25.84
2.31	0.27	20.20	17.95	38.42	70.00	-31.59
4.37	0.37	20.27	8.22	28.86	70.00	-41.14
17.68	0.72	20.88	4.51	26.11	70.00	-43.89
19.45	0.76	20.97	5.39	27.12	70.00	-42.88
23.09	0.82	21.15	4.32	26.29	70.00	-43.71



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Temperature:	22 °C	Humidity:	61 %RH
Tested By:	Richard Lin	Tested Mode:	Tx-1
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(o)	EL(m)
71.39	1.35	8.12	11.08	20.55	40.0	-19.45	115	3.57
154.60	1.95	12.30	11.39	25.64	43.5	-17.86	228	3.41
182.74	2.14	10.56	13.33	26.03	43.5	-17.47	102	3.27
553.24	4.26	18.75	3.62	26.64	46.0	-19.36	95	2.39
749.83	5.15	21.88	3.71	30.73	46.0	-15.27	148	1.78
855.07	5.62	23.01	4.29	32.92	46.0	-13.08	200	1.44

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(o)	EL(m)
80.60	1.42	8.30	17.91	27.63	40.0	-12.37	57	1.17
154.64	1.95	12.30	14.44	28.69	43.5	-14.81	169	1.36
182.72	2.14	10.56	13.25	25.95	43.5	-17.55	259	1.49
828.16	5.51	22.56	3.59	31.66	46.0	-14.34	44	3.36
869.38	5.68	23.04	3.68	32.40	46.0	-13.60	312	3.42
911.45	5.88	23.43	4.61	33.92	46.0	-12.09	335	3.49

NOTE :

1. Measurement uncertainty is 4.73dB.
2. "*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



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Temperature:	22 °C	Humidity:	61 %RH
Tested By:	Richard Lin	Tested Mode:	Tx-2
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(o)	EL(m)
72.62	1.36	8.14	11.57	21.07	40.0	-18.93	318	3.61
154.38	1.95	12.30	10.59	24.84	43.5	-18.66	106	3.54
180.15	2.13	10.50	12.84	25.47	43.5	-18.03	334	3.47
803.57	5.40	22.06	4.31	31.77	46.0	-14.23	75	1.88
835.27	5.54	22.70	3.77	32.01	46.0	-13.99	99	1.52
960.51	6.11	24.66	4.19	34.96	54.0	-19.04	112	1.14

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(o)	EL(m)
74.90	1.37	8.18	18.63	28.18	40.0	-11.82	235	1.19
154.33	1.95	12.30	14.29	28.54	43.5	-14.96	144	1.36
180.17	2.13	10.50	12.95	25.58	43.5	-17.92	43	1.47
739.55	5.10	21.66	3.84	30.60	46.0	-15.40	276	3.06
924.70	5.94	23.82	3.91	33.67	46.0	-12.33	182	3.34
939.32	6.02	24.27	3.83	34.12	46.0	-11.89	339	3.52

NOTE :

1. Measurement uncertainty is 4.73dB.
2. "*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



TEST REPORT

Temperature:	22 °C	Humidity:	61 %RH
Tested By:	Richard Lin	Tested Mode:	Tx-3
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(o)	EL(m)
70.64	1.34	8.10	11.61	21.05	40.0	-18.95	219	3.60
154.80	1.95	12.30	10.94	25.19	43.5	-18.31	335	3.52
179.45	2.12	10.56	13.02	25.70	43.5	-17.80	101	3.38
725.13	5.03	21.35	4.75	31.13	46.0	-14.87	172	1.92
788.23	5.33	21.98	3.44	30.75	46.0	-15.25	49	1.65
880.49	5.73	23.06	3.67	32.46	46.0	-13.54	103	1.42

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(o)	EL(m)
69.31	1.33	8.35	19.23	28.91	40.0	-11.09	38	1.28
154.85	1.95	12.30	14.74	28.99	43.5	-14.51	46	1.39
182.43	2.14	10.56	13.46	26.16	43.5	-17.34	59	1.45
689.75	4.86	20.73	4.12	29.71	46.0	-16.29	271	3.01
780.27	5.29	21.96	3.67	30.92	46.0	-15.08	188	3.35
860.39	5.64	23.02	4.08	32.74	46.0	-13.26	339	3.42

NOTE :

1. Measurement uncertainty is 4.73dB.
2. "*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



Spectrum Research & Testing Lab., Inc.
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TEST REPORT

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Temperature:	22 °C	Humidity:	61 %RH
Tested By:	Richard Lin	Tested Mode:	Standby
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(o)	EL(m)
69.52	1.33	8.35	10.73	20.41	40.0	-19.59	117	3.63
154.68	1.95	12.30	11.24	25.49	43.5	-18.01	324	3.52
180.28	2.13	10.50	12.67	25.30	43.5	-18.20	235	3.34
756.32	5.18	21.91	3.65	30.74	46.0	-15.26	86	1.74
813.62	5.44	22.26	4.35	32.05	46.0	-13.95	94	1.51
829.07	5.51	22.58	4.71	32.80	46.0	-13.20	192	1.48

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(o)	EL(m)
81.34	1.43	8.34	18.17	27.94	40.0	-12.06	235	1.17
154.62	1.95	12.30	14.25	28.50	43.5	-15.00	140	1.36
181.45	2.14	10.53	13.38	26.05	43.5	-17.45	246	1.45
641.18	4.64	20.34	4.82	29.79	46.0	-16.21	268	2.68
747.94	5.14	21.83	3.46	30.43	46.0	-15.57	173	3.17
855.70	5.62	23.01	3.67	32.30	46.0	-13.70	36	3.38

NOTE :

1. Measurement uncertainty is 4.73dB.
2. "*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



Spectrum Research & Testing Lab., Inc.
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Temperature:	22 °C	Humidity:	61 %RH
Tested By:	Richard Lin	Tested Mode:	Link
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(o)	EL(m)
72.70	1.36	8.14	10.58	20.08	40.0	-19.92	118	3.60
154.93	1.95	12.30	10.39	24.64	43.5	-18.86	325	3.48
179.43	2.12	10.56	12.84	25.52	43.5	-17.98	236	3.35
767.04	5.23	21.93	4.22	31.39	46.0	-14.61	79	1.96
842.40	5.57	22.84	3.57	31.98	46.0	-14.02	93	1.58
946.51	6.05	24.48	5.10	35.63	46.0	-10.37	115	1.24

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(o)	EL(m)
80.47	1.42	8.30	18.74	28.46	40.0	-11.54	274	1.19
154.95	1.95	12.30	15.36	29.61	43.5	-13.89	145	1.37
181.21	2.14	10.53	12.72	25.39	43.5	-18.11	289	1.46
722.83	5.02	21.28	3.47	29.77	46.0	-16.23	50	3.05
829.02	5.51	22.58	3.68	31.77	46.0	-14.23	340	3.34
912.57	5.88	23.46	4.70	34.04	46.0	-11.96	255	3.58

NOTE :

1. Measurement uncertainty is 4.73dB.
2. "*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



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TEST REPORT

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Temperature:	22 °C	Humidity:	61 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-1
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1648.33	-32.17	25.93	44.38	33.89	38.15	27.66	74.00	54.00	-35.85	-26.34	329	2.32
2576.16	-30.98	28.90	43.02	32.57	40.95	30.50	74.00	54.00	-33.05	-23.50	115	2.04
3112.84	-30.48	30.82	41.94	31.48	42.28	31.82	74.00	54.00	-31.72	-22.18	210	1.85
3804.68	-29.48	32.33	42.39	31.92	45.24	34.77	74.00	54.00	-28.76	-19.23	107	1.67
5389.24	-27.15	34.54	39.10	28.66	46.50	36.06	74.00	54.00	-27.50	-17.94	48	1.19
5867.50	-27.61	34.63	39.46	28.83	46.48	35.85	74.00	54.00	-27.52	-18.15	92	1.03

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1922.67	-31.75	26.92	46.27	35.71	41.44	30.88	74.00	54.00	-32.56	-23.12	35	1.27
2183.29	-31.41	27.71	44.09	33.53	40.39	29.83	74.00	54.00	-33.61	-24.17	137	1.34
3025.88	-30.64	30.65	42.07	31.69	42.08	31.70	74.00	54.00	-31.92	-22.30	213	1.62
3621.71	-29.65	31.89	41.36	30.74	43.60	32.98	74.00	54.00	-30.40	-21.02	101	1.78
3947.66	-29.35	32.67	41.85	31.46	45.17	34.78	74.00	54.00	-28.83	-19.22	224	1.89
5379.14	-27.18	34.53	39.71	29.23	47.07	36.59	74.00	54.00	-26.93	-17.41	265	2.27

NOTE :

1. Measurement uncertainty is 3.92dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.



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Temperature:	22 °C	Humidity:	61 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-1(Fundamental)
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-31.15	28.33	82.65	71.03	79.83	68.21	114	94	-34.17	-25.79	241	1.57
4804.00	-28.48	33.53	39.24	28.76	44.29	33.81	74.00	54.00	-29.71	-20.19	307	1.44
7206.00	-27.05	36.59	37.75	27.12	47.29	36.66	74.00	54.00	-26.71	-17.34	159	1.39
9608.00	-25.66	38.21	36.34	25.89	48.88	38.43	74.00	54.00	-25.12	-15.57	208	1.65
12010.00	-23.89	39.30	34.57	24.08	49.98	39.49	74.00	54.00	-24.02	-14.51	339	1.60
14412.00	-21.16	40.91	31.82	21.26	51.57	41.01	74.00	54.00	-22.43	-12.99	45	1.53

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-31.15	28.33	78.13	66.34	75.31	63.52	114	94	-38.69	-30.48	116	1.55
4804.00	-28.48	33.53	39.84	29.25	44.89	34.30	74.00	54.00	-29.11	-19.70	193	1.72
7206.00	-27.05	36.59	37.36	26.81	46.90	36.35	74.00	54.00	-27.10	-17.65	284	1.48
9608.00	-25.66	38.21	36.04	25.53	48.58	38.07	74.00	54.00	-25.42	-15.93	191	1.46
12010.00	-23.89	39.30	34.81	24.29	50.22	39.70	74.00	54.00	-23.78	-14.30	78	1.56
14412.00	-21.16	40.91	31.57	21.07	51.32	40.82	74.00	54.00	-22.68	-13.18	98	1.39

NOTE:

1. Measurement uncertainty is 3.92dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.



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Temperature:	22 °C	Humidity:	61 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-2
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1611.39	-32.22	25.80	44.13	33.67	37.71	27.25	74.00	54.00	-36.29	-26.75	108	2.37
2264.06	-31.31	27.94	43.51	33.02	40.14	29.65	74.00	54.00	-33.86	-24.35	245	2.14
2967.52	-30.71	30.47	42.59	31.14	42.35	30.90	74.00	54.00	-31.65	-23.10	217	1.95
3503.71	-29.76	31.61	41.42	30.96	43.27	32.81	74.00	54.00	-30.73	-21.19	109	1.74
3944.57	-29.35	32.67	41.17	30.68	44.48	33.99	74.00	54.00	-29.52	-20.01	146	1.65
5381.60	-27.17	34.53	38.96	28.49	46.32	35.85	74.00	54.00	-27.68	-18.15	290	1.17

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1573.62	-32.28	25.66	44.75	34.24	38.13	27.62	74.00	54.00	-35.87	-26.38	38	1.19
3262.97	-30.20	31.12	41.52	30.89	42.44	31.81	74.00	54.00	-31.56	-22.19	106	1.64
3924.11	-29.37	32.62	41.34	30.82	44.59	34.07	74.00	54.00	-29.41	-19.93	271	1.83
4159.75	-29.12	32.80	40.95	30.45	44.63	34.13	74.00	54.00	-29.37	-19.87	194	1.92
4591.23	-28.65	33.02	40.71	30.32	45.08	34.69	74.00	54.00	-28.92	-19.31	55	2.01
5343.81	-27.28	34.48	39.36	28.74	46.56	35.94	74.00	54.00	-27.44	-18.06	233	2.28

NOTE :

1. Measurement uncertainty is 3.92dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.



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Temperature:	22 °C	Humidity:	61 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-2(Fundamental)
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2440.00	-31.10	28.43	80.22	68.45	77.55	65.78	114	94	-36.45	-28.22	161	1.61
4880.00	-28.42	33.71	38.51	27.98	43.81	33.28	74.00	54.00	-30.19	-20.72	203	1.39
7320.00	-26.98	36.87	36.94	26.57	46.83	36.46	74.00	54.00	-27.17	-17.54	295	1.57
9760.00	-25.43	38.36	35.78	25.26	48.71	38.19	74.00	54.00	-25.29	-15.81	111	1.70
12200.00	-23.39	39.30	33.52	23.02	49.43	38.93	74.00	54.00	-24.57	-15.07	329	1.54
14640.00	-21.26	40.36	29.76	19.29	48.86	38.39	74.00	54.00	-25.14	-15.61	105	1.50

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2440.00	-31.10	28.43	74.15	62.81	71.48	60.14	114	94	-42.52	-33.86	78	1.67
4880.00	-28.42	33.71	38.36	27.84	43.66	33.14	74.00	54.00	-30.34	-20.86	247	1.69
7320.00	-26.98	36.87	36.96	26.41	46.85	36.30	74.00	54.00	-27.15	-17.70	183	1.45
9760.00	-25.43	38.36	35.81	25.38	48.74	38.31	74.00	54.00	-25.26	-15.69	91	1.48
12200.00	-23.39	39.30	33.67	23.15	49.58	39.06	74.00	54.00	-24.42	-14.94	64	1.42
14640.00	-21.26	40.36	29.85	19.47	48.95	38.57	74.00	54.00	-25.05	-15.43	123	1.56

NOTE :

1. Measurement uncertainty is 3.92dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.



TEST REPORT

Temperature:	22 °C	Humidity:	61 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-3
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1723.65	-32.05	26.20	43.74	33.32	37.89	27.47	74.00	54.00	-36.11	-26.53	306	2.25
2247.31	-31.33	27.89	43.86	33.44	40.42	30.00	74.00	54.00	-33.58	-24.00	214	2.11
2994.74	-30.69	30.58	41.84	31.37	41.72	31.25	74.00	54.00	-32.28	-22.75	315	1.93
3598.93	-29.67	31.84	41.55	31.02	43.72	33.19	74.00	54.00	-30.28	-20.81	107	1.75
4087.54	-29.20	32.80	41.72	31.38	45.32	34.98	74.00	54.00	-28.68	-19.02	192	1.58
5432.33	-27.02	34.60	38.61	28.19	46.20	35.78	74.00	54.00	-27.80	-18.22	63	1.24

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1671.35	-32.13	26.02	44.81	34.35	38.70	28.24	74.00	54.00	-35.30	-25.76	48	1.19
3018.59	-30.66	30.64	42.04	31.57	42.02	31.55	74.00	54.00	-31.98	-22.45	152	1.64
3672.78	-29.60	32.01	41.68	31.24	44.09	33.65	74.00	54.00	-29.91	-20.35	222	1.83
3874.02	-29.42	32.50	41.73	31.17	44.81	34.25	74.00	54.00	-29.19	-19.75	341	1.95
4370.81	-28.87	32.80	39.85	29.36	43.78	33.29	74.00	54.00	-30.22	-20.71	196	2.02
5396.52	-27.12	34.55	39.11	28.70	46.54	36.13	74.00	54.00	-27.46	-17.87	236	2.31

NOTE :

1. Measurement uncertainty is 3.92dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.



TEST REPORT

Temperature:	22 °C	Humidity:	61 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-3(Fundamental)
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00	-31.05	28.54	84.52	72.14	82.01	69.63	114	94	-31.99	-24.37	152	1.34
4960.00	-28.35	33.90	39.63	29.15	45.18	34.70	74.00	54.00	-28.82	-19.30	194	1.58
7440.00	-26.90	37.16	36.86	26.31	47.12	36.57	74.00	54.00	-26.88	-17.43	72	1.61
9920.00	-25.18	38.52	34.81	24.33	48.15	37.67	74.00	54.00	-25.85	-16.33	90	1.64
12400.00	-22.86	39.30	33.92	23.47	50.36	39.91	74.00	54.00	-23.64	-14.09	234	1.53
14880.00	-21.45	39.79	30.83	20.38	49.16	38.71	74.00	54.00	-24.84	-15.29	275	1.68

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00	-31.05	28.54	75.15	63.73	72.64	61.22	114	94	-41.36	-32.78	311	1.42
4960.00	-28.35	33.90	38.18	27.64	43.73	33.19	74.00	54.00	-30.27	-20.81	39	1.47
7440.00	-26.90	37.16	36.90	26.45	47.16	36.71	74.00	54.00	-26.84	-17.29	85	1.39
9920.00	-25.18	38.52	34.75	24.28	48.09	37.62	74.00	54.00	-25.91	-16.38	323	1.46
12400.00	-22.86	39.30	33.86	23.35	50.30	39.79	74.00	54.00	-23.70	-14.21	258	1.53
14880.00	-21.45	39.79	30.87	20.41	49.20	38.74	74.00	54.00	-24.80	-15.26	135	1.50

NOTE :

1. Measurement uncertainty is 3.92dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.



Spectrum Research & Testing Lab., Inc.
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

TEST REPORT

Reference No.: A13072401
Report No.: FCCA13072401
FCC ID : PADWF108
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Date: Sep. 11, 2013

Temperature:	22 °C	Humidity:	61 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Standby
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3487.15	-29.78	31.57	41.34	30.82	43.13	32.61	74.00	54.00	-30.87	-21.39	207	1.78
3923.69	-29.37	32.62	41.47	30.96	44.71	34.20	74.00	54.00	-29.29	-19.80	104	1.63
4124.37	-29.16	32.80	41.12	30.67	44.76	34.31	74.00	54.00	-29.24	-19.69	158	1.55
4749.03	-28.52	33.40	40.63	30.11	45.51	34.99	74.00	54.00	-28.49	-19.01	39	1.39
5375.26	-27.19	34.52	39.31	28.87	46.65	36.21	74.00	54.00	-27.35	-17.79	124	1.17
5838.70	-27.55	34.63	38.45	27.98	45.54	35.07	74.00	54.00	-28.46	-18.93	210	1.06

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2431.41	-31.11	28.41	44.61	34.13	41.90	31.42	74.00	54.00	-32.10	-22.58	320	1.44
3167.89	-30.38	30.93	41.83	31.42	42.38	31.97	74.00	54.00	-31.62	-22.03	115	1.64
3906.32	-29.39	32.57	42.17	31.68	45.36	34.87	74.00	54.00	-28.64	-19.13	268	1.83
4092.76	-29.19	32.80	42.39	31.88	46.00	35.49	74.00	54.00	-28.00	-18.51	202	1.95
4630.81	-28.62	33.11	40.53	30.02	45.03	34.52	74.00	54.00	-28.97	-19.48	193	2.07
5312.95	-27.38	34.44	39.58	29.14	46.64	36.20	74.00	54.00	-27.36	-17.80	281	2.26

NOTE :

1. Measurement uncertainty is 3.92dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.



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TEST REPORT

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Temperature:	22 °C	Humidity:	61 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Link
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Sep. 06, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2851.56	-30.79	30.00	41.09	30.57	40.30	29.78	74.00	54.00	-33.70	-24.22	215	2.04
3449.20	-29.85	31.50	41.65	31.13	43.29	32.77	74.00	54.00	-30.71	-21.23	109	1.88
3923.88	-29.37	32.62	42.31	31.84	45.55	35.08	74.00	54.00	-28.45	-18.92	224	1.67
4155.76	-29.12	32.80	41.97	31.38	45.65	35.06	74.00	54.00	-28.35	-18.94	157	1.53
4877.42	-28.42	33.70	45.04	34.50	50.33	39.79	74.00	54.00	-23.67	-14.21	75	1.35
5531.90	-26.88	34.69	38.56	28.05	46.38	35.87	74.00	54.00	-27.62	-18.13	178	1.17

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (o)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2857.05	-30.79	30.03	42.03	31.57	41.27	30.81	74.00	54.00	-32.73	-23.19	250	1.55
3354.31	-30.03	31.31	42.65	32.24	43.93	33.52	74.00	54.00	-30.07	-20.48	302	1.73
3890.74	-29.40	32.54	42.07	31.58	45.20	34.71	74.00	54.00	-28.80	-19.29	266	1.86
4572.80	-28.66	32.97	41.49	30.97	45.80	35.28	74.00	54.00	-28.20	-18.72	195	2.08
5244.68	-27.58	34.34	39.55	29.03	46.31	35.79	74.00	54.00	-27.69	-18.21	87	2.14
5408.13	-27.09	34.57	38.96	28.46	46.44	35.94	74.00	54.00	-27.56	-18.06	48	2.31

NOTE :

1. Measurement uncertainty is 3.92dB.
2. "****": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F): The field strength of fundamental frequency.



4.2 6dB Bandwidth

4.2.1 LIMIT

FCC Part15, Subpart C Section 15.247 (a)(2). The minimum 6dB bandwidth shall be at least 500 kHz.

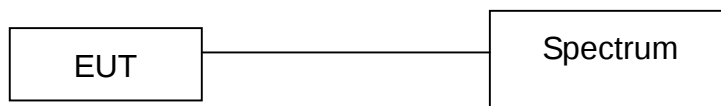
4.2.2 TEST EQUIPMENT

The following test equipment was used during the test :

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM ANALYZER	9 kHz ~ 40 GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC. 12, 2013 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.2.4 TEST PROCEDURE

The EUT was operated in hopping mode or any specific channel.
Printed out the test result from the spectrum by hard copy function.

4.2.5 EUT OPERATING CONDITION

1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.



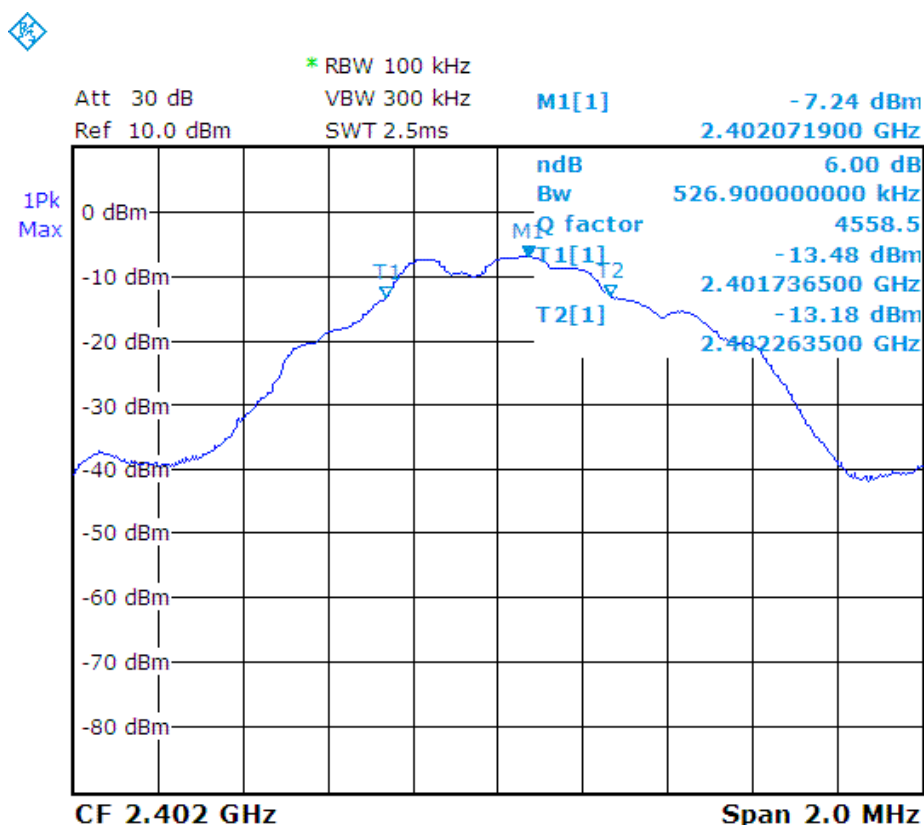
TEST REPORT

4.2.6 TEST RESULT

Temperature:	20°C	Humidity:	57%RH
Spectrum Detector:	PK	Tested by:	Richard Lin
Test Result:	PASS	Tested Date:	Sep. 05, 2013

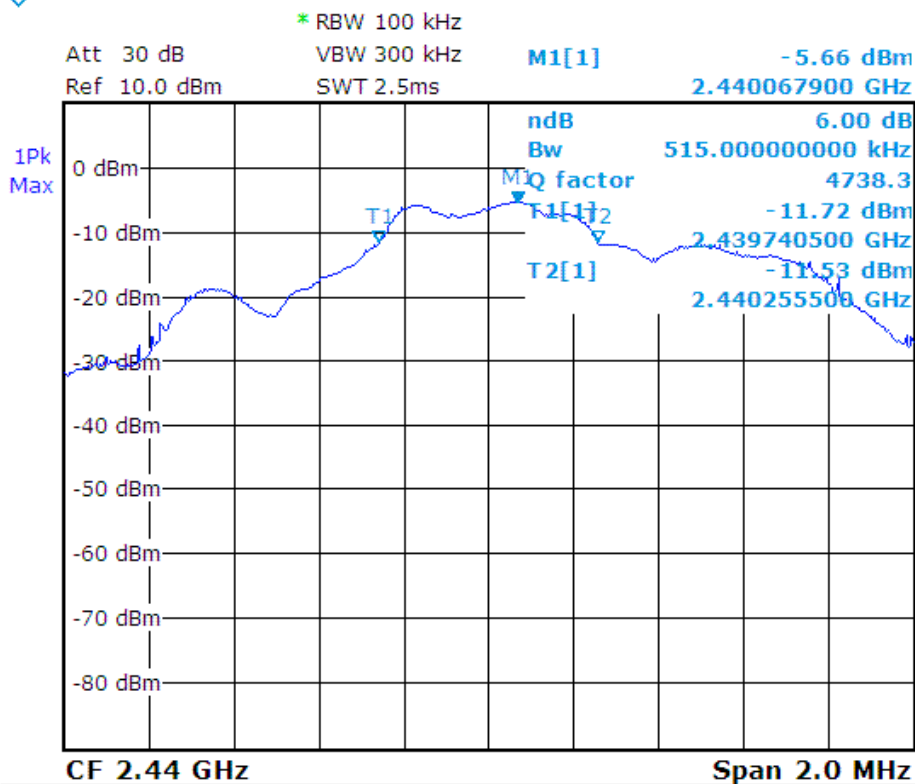
Channel Number	Channel Frequency (MHz)	6dB Down Bandwidth (KHz)	Limit	Pass/Fail
CH01	2402	526.9	>500	Pass
CH20	2440	515.0	>500	Pass
CH40	2480	722.6	>500	Pass

CH01 :

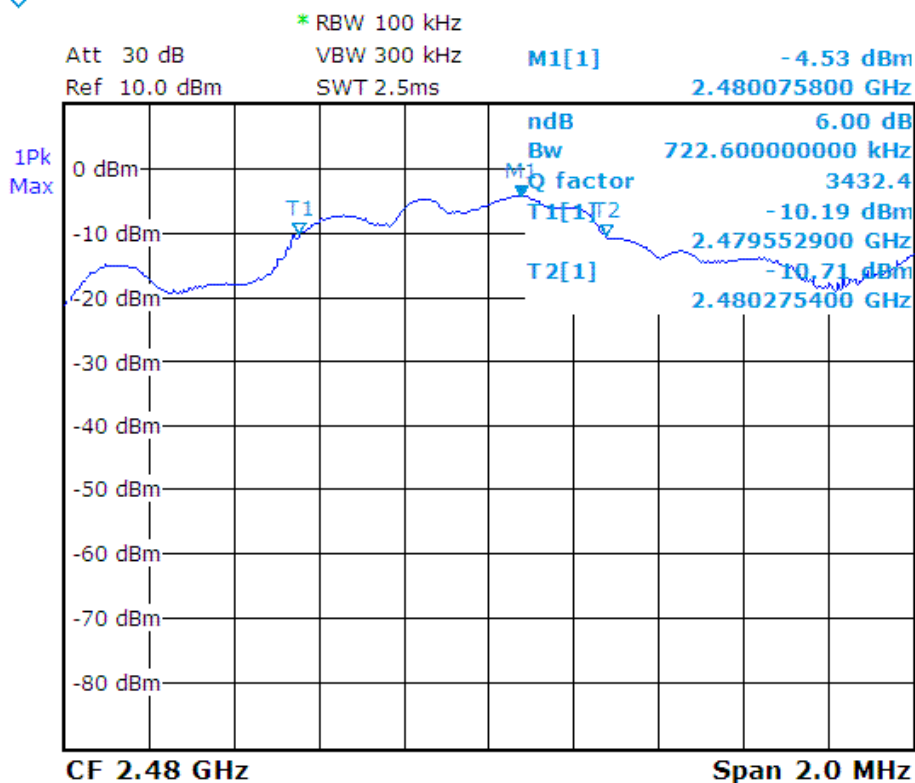




CH20 :



CH40 :



	Spectrum Research & Testing Lab., Inc. No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)	TEST REPORT	Reference No.: A13072401 Report No.: FCCA13072401 FCC ID : PADWF108 Page: 34 of 56 Date: Sep. 11, 2013
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4.3 PEAK POWER TEST

4.3.1 LIMIT

FCC Part15, Subpart C Section 15.247(b).

Frequency Range (MHz)	Limit(W)				
	Quantity of Hopping Channel	50	25	15	75
902-928		1(30 dBm)	0.125(21 dBm)	NA	NA
2400-2483.5		NA	NA	0.125(21dBm)	1(30 dBm)
5725-5850		NA	NA	NA	1(30 dBm)

4.3.2 TEST EQUIPMENT

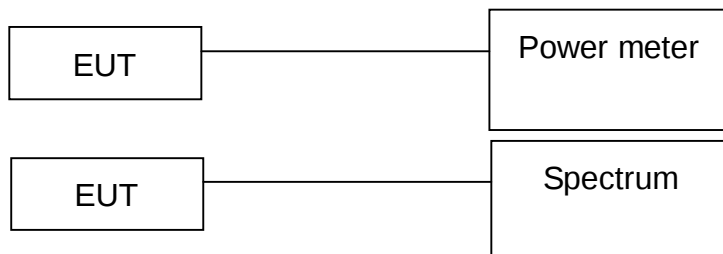
The following test equipment was used during the test :

Equipment/ Facilities	Specifications	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM ANALYZER	9 kHz ~ 40 GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC. 12, 2013 ETC
POWER SENSOR	100 kHz ~ 18 GHz	BOONTON	51015(5E) / 32966	MAR. 08, 2013 ETC
POWER METER	10 kHz ~ 100 GHz	BOONTON	4232A / 115702	NOV. 04, 2013 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.



4.3.3 TEST SET-UP



The EUT was connected to a spectrum through a 50 Ω RF cable.

4.3.4 TEST PROCEDURE

The EUT was operating in hopping mode or could control its channel.
Printed out the test result from the spectrum by hard copy function.
Recorded the read value of the power meter.

4.3.5 EUT OPERATING CONDITION

1. Set the EUT under frequency hopping transmission condition.
2. The EUT was set to the highest available power level.

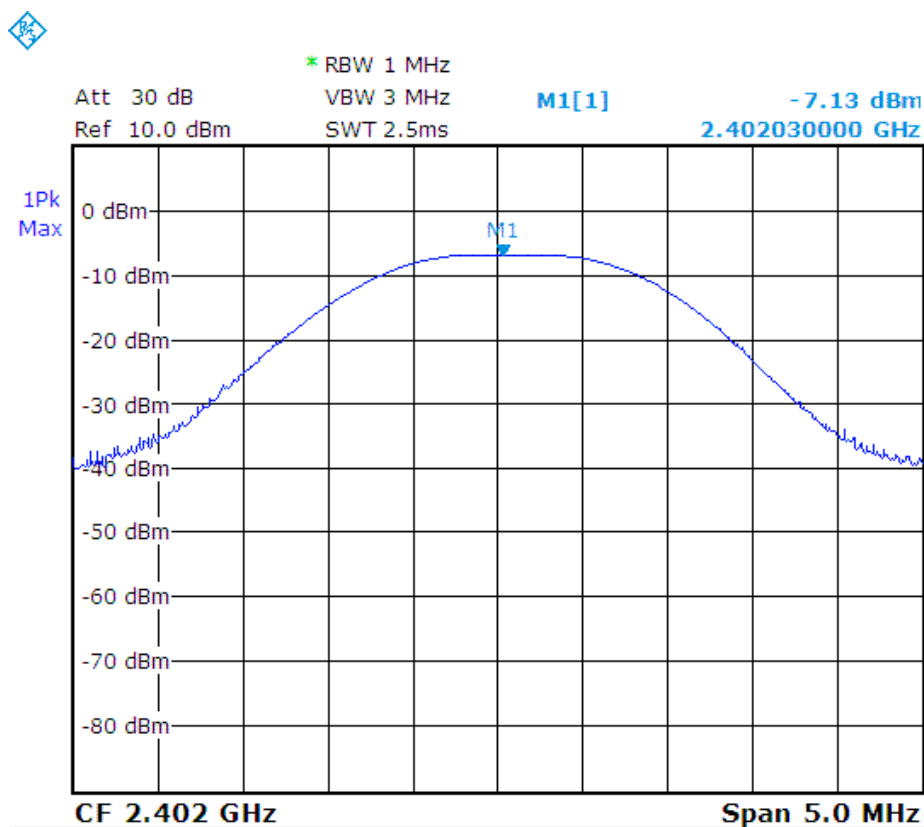


4.3.6 TEST RESULT

Temperature:	20°C	Humidity:	57%RH
Spectrum Detector:	PK	Tested by:	Richard Lin
Test Result:	PASS	Tested Date:	Sep. 05, 2013

Channel Number	Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Power Limit (dBm)
CH01	2402	-7.13	21
CH20	2440	-5.55	21
CH40	2480	-4.46	21

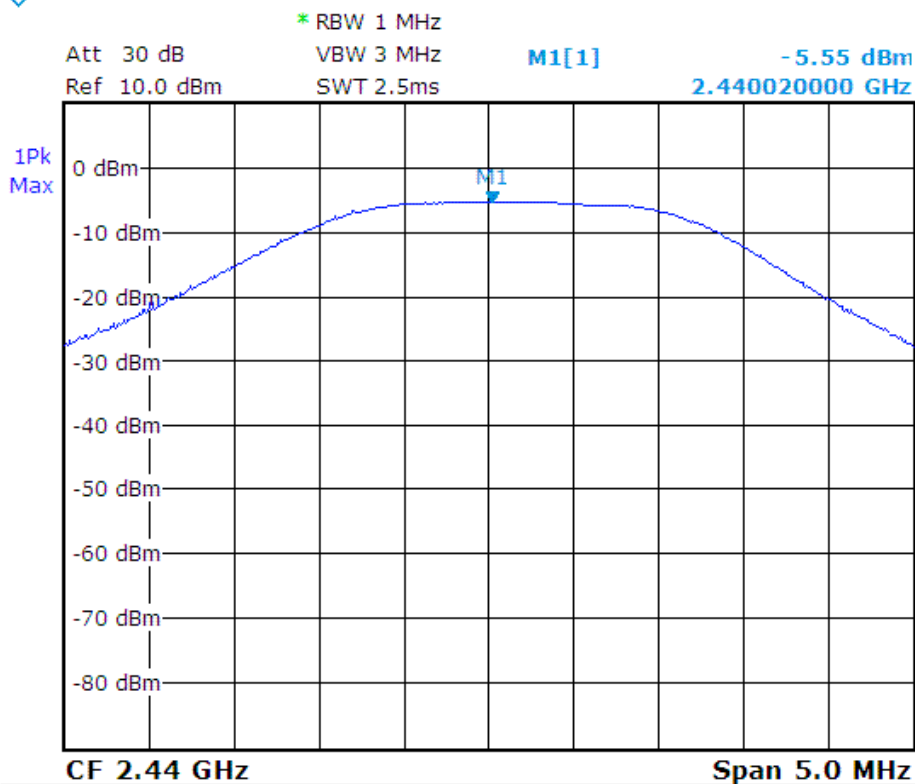
CH01 :



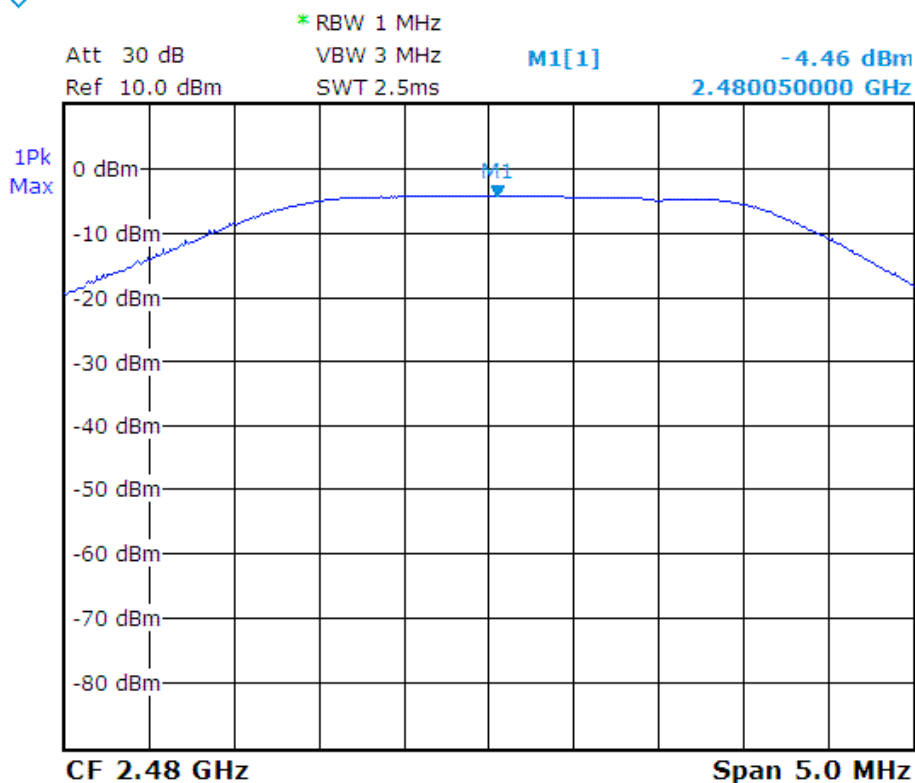


TEST REPORT

CH20 :



CH40 :





4.4 BAND EDGE TEST

4.4.1 LIMIT

FCC Part15, Subpart C Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

OPERATING FREQUENCY RANGE (MHz)	SPURIOUS EMISSION FREQUENCY (MHz)	LIMIT	
		Peak power ration to emission(dBc)	Emission level(dBuV/m)
902 - 928	<902	>20	NA
	>928	>20	NA
	960-1240	NA	54
2400 - 2483.5	<2400	>20	NA
	>2483.5-2500	NA	54
5725 - 5850	<5350-5460	NA	54
	<5725	>20	NA
	>5850	>20	NA

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4.4.2 TEST EQUIPMENT

The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM ANALYZER	9 kHz ~ 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	APR. 12, 2014 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC 12, 2013 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	DEC. 21, 2013 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 18, 2013 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 09, 2014 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	MAY 13, 2014 SRT
RF CABLE	UP TO 18 GHz 1.5 m	JYEBAO	A30A30-L 142 / EQF-0035(001)	DEC. 19, 2013 ETC
RF CABLE	UP TO 18 GHz 3.5 m	JYEBAO	A30A30-L 142 / EQF-0036(002)	DEC. 19, 2013 ETC
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNE R	SF102-46/2*11SK 252 /MY2611/2	MAR. 07, 2014 ETC
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNE R	SF 102-40/2*11 /23934/2	OCT. 24, 2013 ETC
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.



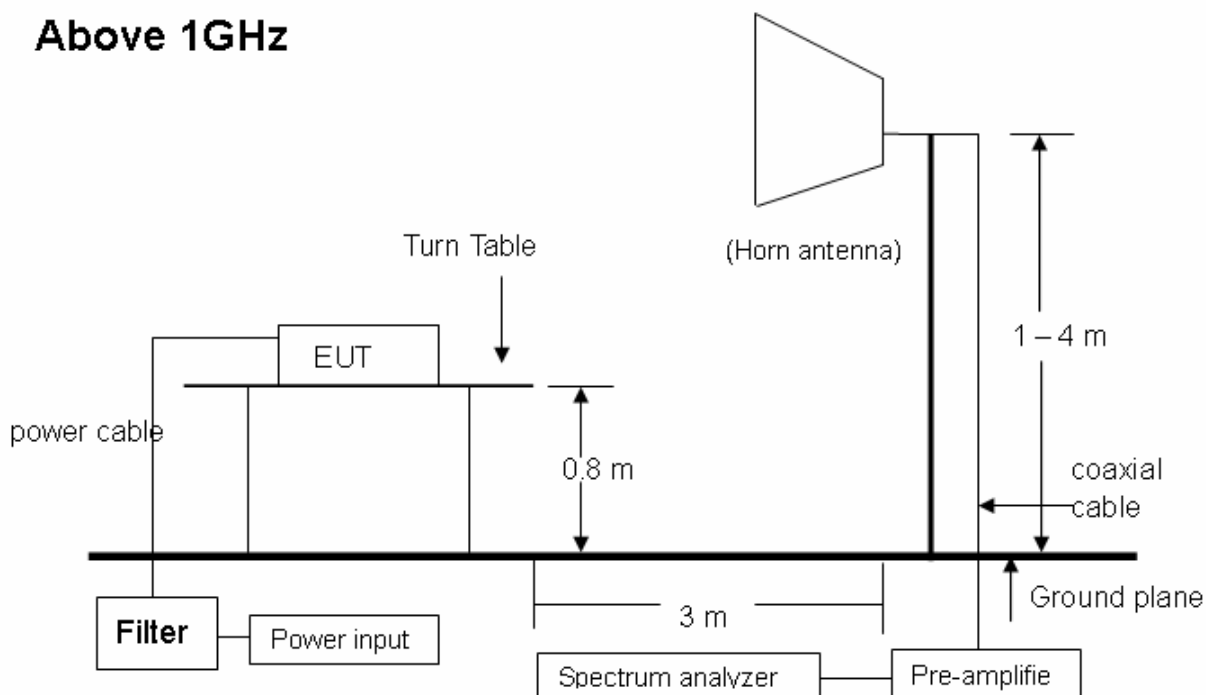
4.4.3 TEST SETUP

FOR RF CONDUCTED TEST (dBc)



The EUT was connected to a spectrum through a 50Ω RF cable.

Above 1GHz



NOTE: The EUT system was put on a wooden table with 0.8m heights above a ground plane. For the actual test configuration, please refer to the photos of testing.



4.4.4 TEST PROCEDURE

1. The EUT was operating in continuous transmission mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.
2. The EUT was tested according to the requirement of ANSI C63.4 and CISPR 22.
The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak and average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

4.4.5 EUT OPERATING CONDITION

1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.



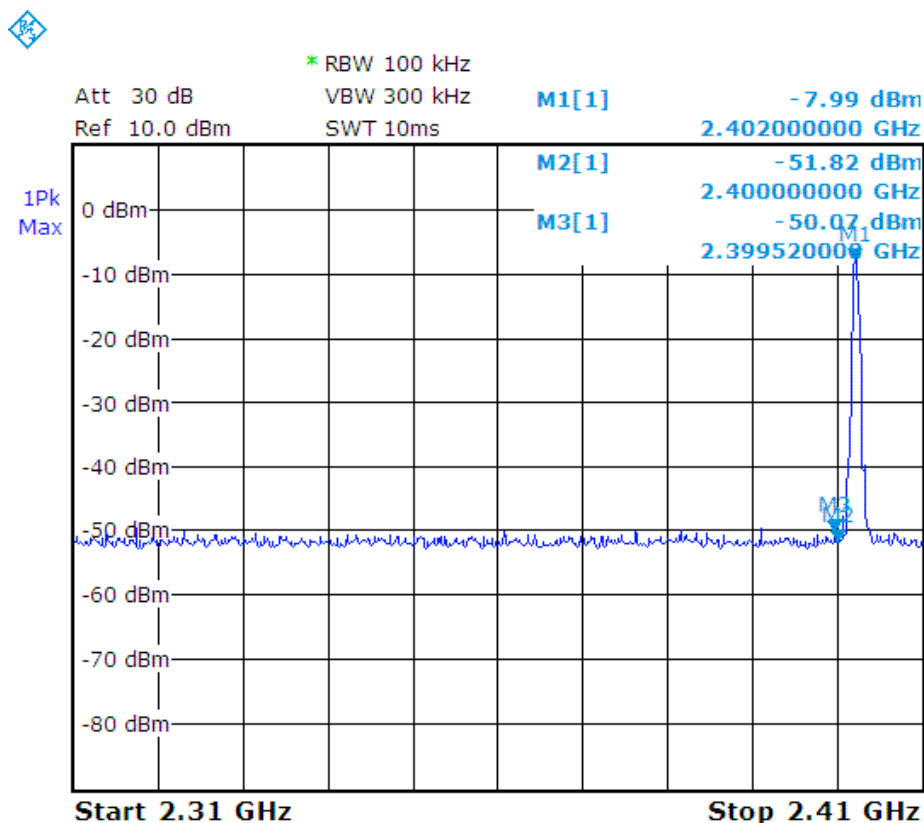
4.4.6 TEST RESULT

Temperature:	20 °C	Humidity:	57 %RH
Receiver Detector:	PK.	Tested Mode:	Tx-1, Tx-3
Frequency Range:	2.3GHz – 2.6GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Sep. 05, 2013

1. Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	-7.99	-50.07	42.08	>20dBc
>2483.5	-4.86	-45.23	40.37	>20dBc

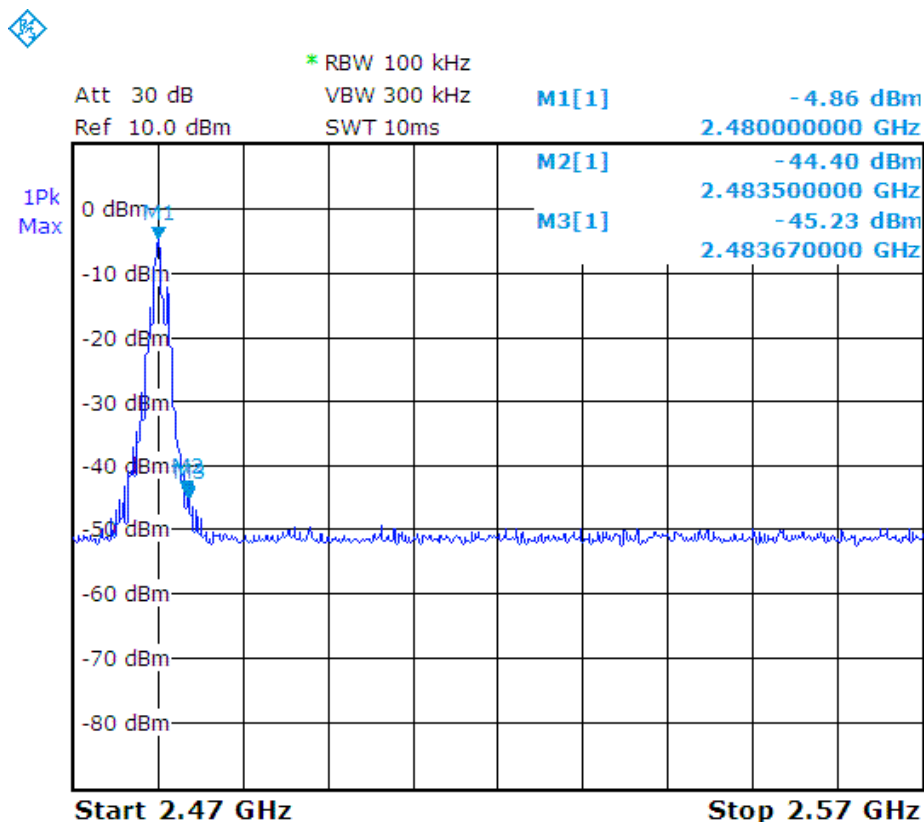
Below 2400MHz :





TEST REPORT

Above 2483.5 MHz :



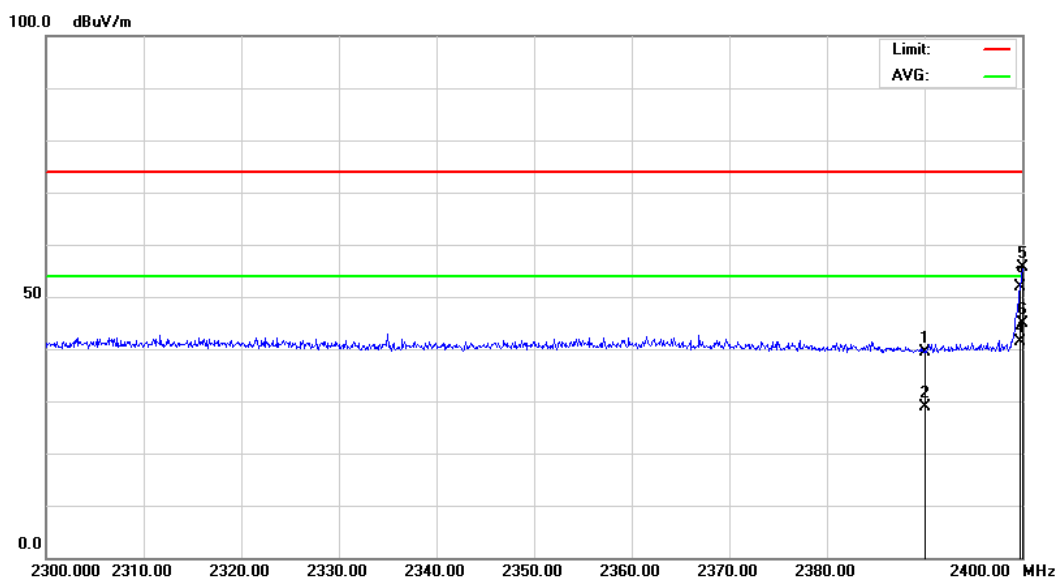


2. Radiated emission test :

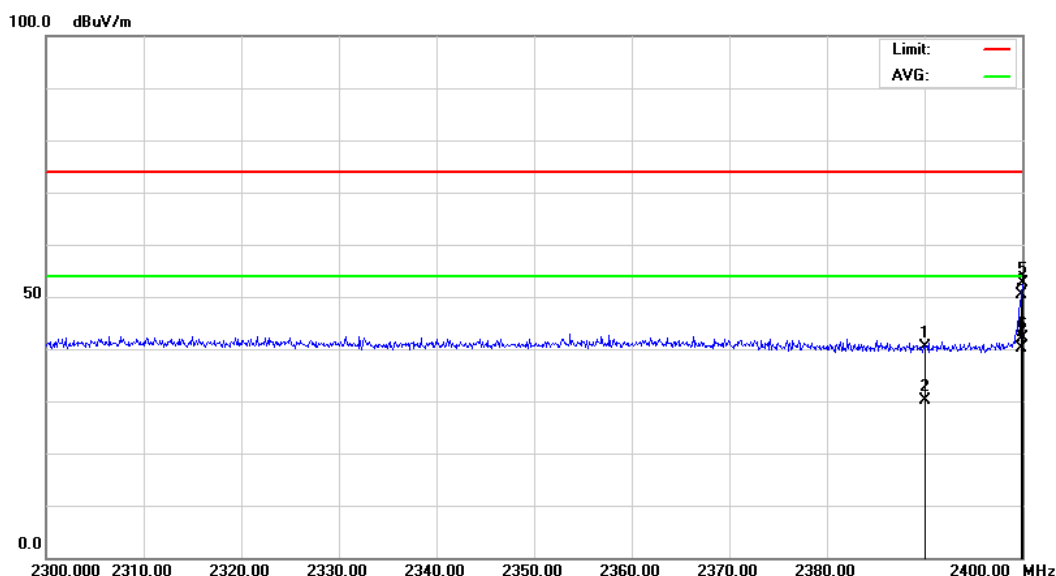
Below 2400MHz (mode 1 of 2402MHz emission)

Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dBuV/m)	
				PK	AV	PK	AV	PK	AV	PK	AV
2399.82	-31.15	28.32	H	52.72	42.24	49.89	39.41	74.00	54.00	-24.11	-14.59
2399.93	-31.15	28.32	V	51.28	40.76	48.45	37.93	74.00	54.00	-25.55	-16.07
2400.00	-31.15	28.32	H	56.37	45.81	53.54	42.98	74.00	54.00	-20.46	-11.02
2400.00	-31.15	28.32	V	53.41	42.95	50.58	40.12	74.00	54.00	-23.42	-13.88

Horizontal :



Vertical :



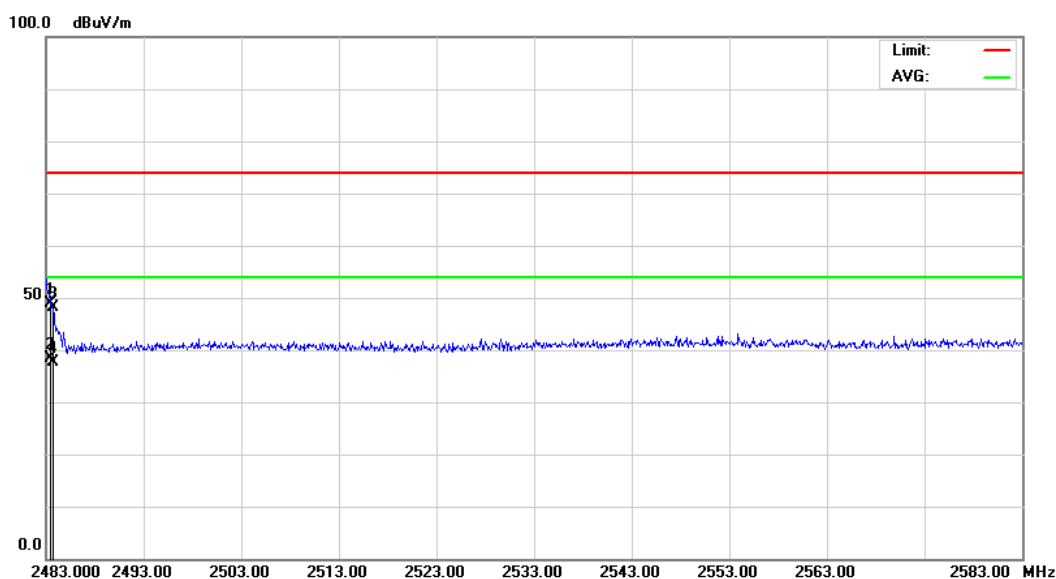


TEST REPORT

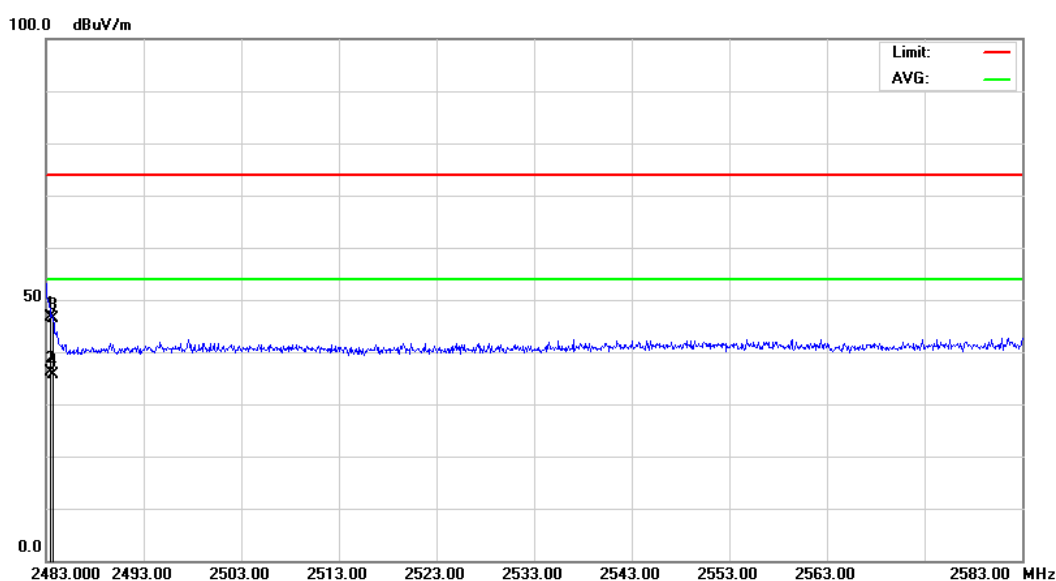
About 2483.5MHz (mode 3 of 2480MHz emission)

Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dBuV/m)	
				PK	AV	PK	AV	PK	AV	PK	AV
2483.50	-31.05	28.55	H	49.28	38.73	46.78	36.23	74.00	54.00	-27.22	-17.77
2483.50	-31.05	28.55	V	47.17	36.68	44.67	34.18	74.00	54.00	-29.33	-19.82
2483.74	-31.05	28.55	H	48.51	37.97	46.01	35.47	74.00	54.00	-27.99	-18.53
2483.72	-31.05	28.55	V	46.82	36.34	44.32	33.84	74.00	54.00	-29.68	-20.16

Horizontal :



Vertical :



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4.5 POWER DENSITY TEST

4.5.1 LIMIT

FCC Part15, Subpart C Section 15.247(e)

FREQUENCY RANGE (MHz)	Limit (dBm / kHz)
902-928	8 dBm / 3 kHz
2400-2483.5	
5725-5850	

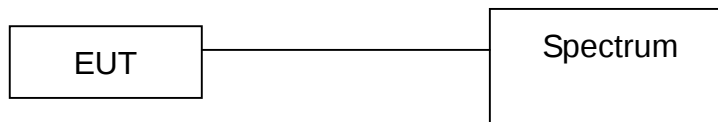
4.5.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM ANALYZER	9 kHz ~ 40 GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC. 12, 2013 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω RF cable.

4.5.4 TEST PROCEDURE

The EUT was operating in transmitter mode and could be controlled its channel.
 Printed out the test result from the spectrum by hard copy function.

4.5.5 EUT OPERATING CONDITION

1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.



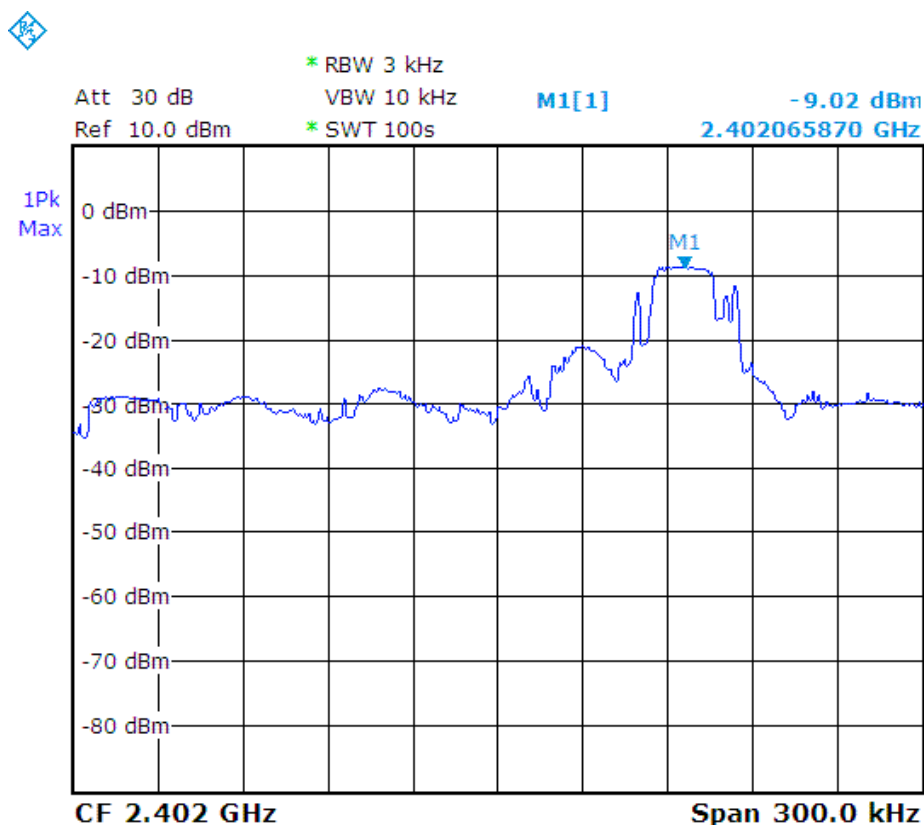
TEST REPORT

4.5.6 TEST RESULT

Temperature:	20°C	Humidity:	57%RH
Spectrum Detector:	PK.	Tesr Mode:	Tx-1, Tx-2, Tx-3
Tested By:	Richard	Modulation Type:	GFSK
Test Result:	PASS	Tested Date:	Sep. 05, 2013

Channel Number	Channel Frequency (MHz)	RF Power Level in 3 KHz BW (dBm/3kHz)	Maximum Limit (dBm/3kHz)
CH01	2402	-9.02	8
CH20	2440	-7.65	8
CH40	2480	-6.55	8

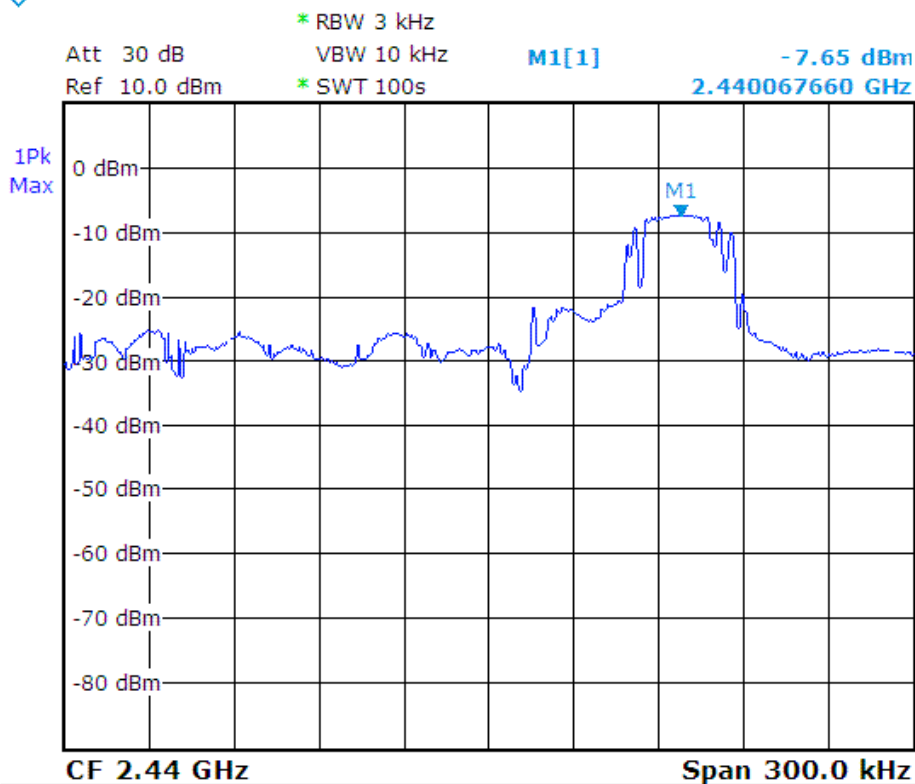
CH01 :



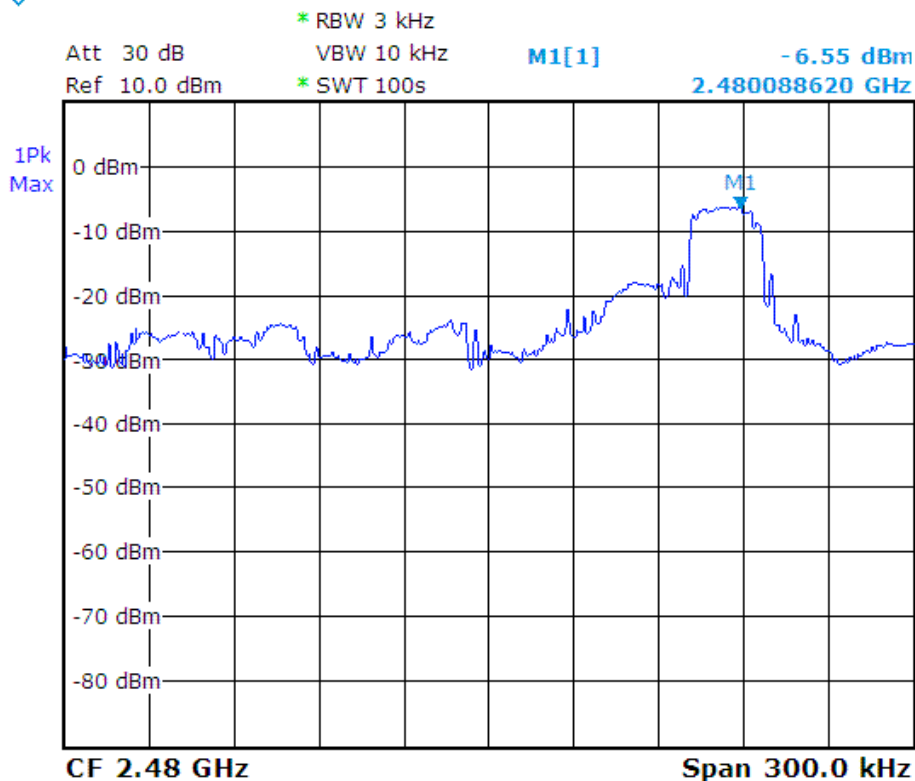


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CH20 :



CH40 :





5. Antenna application

5.1 Antenna requirement

The EUT's antenna is met the requirement of FCC Part 15C section 15.203 and 15.204.

FCC part15C section15.247 requirement:

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

5.2 Result

The EUT's antenna used a Chip antenna. Gain of antenna types is 2 dBi that meet the requirement.



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6. PHOTOS OF TESTING

- Radiated test (below 30M, TX & Standby)





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- Radiated test (below 1G, TX & Standby)





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- Radiated test (above 1G, TX & Standby)





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- Radiated test (below 30M, Link)





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- Radiated test (above 1G, Link)



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7. TERMS OF ABBREVIATION

AV.	Average detection
AZ(o)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction