



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

TEST REPORT

Reference No.: A13020702
Report No.: FCCA13020702
FCC ID : PADWF107
Page: 1 of 68
Date: Mar. 02, 2013

Product Name: RFLKT + Bike Computer
Model No.: WFBKCOMP2
Applicant: Wahoo Fitness
141 West Wieuca Road # 104B, Atlanta, GA 30342
Date of Receipt: Feb. 07, 2013
Finished date of Test: Feb. 27, 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 :

Jeff Lo , Date: 03/02/2013
(Jeff Lo)

Approved By :

Johnson Ho , Date: 3/2/2013
(Johnson Ho, Director)



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Revisions History

Report No.	Issue Date	Revisions
FCCA13020702	Mar. 02, 2013	Initial issue
FCCA13011003	Apr. 10, 2013	Remove DSSS Test Item

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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	RFLKT + Bike Computer
MODEL NO.	WFBKCOMP2
POWER SUPPLY	DC power source battery : DC 3.0V
CABLE	NA
FREQUENCY BAND	2.4GHz ~ 2.483.5GHz For ANT 2.4 GHz (Bluetooth V4.0 Low Energy, no BR/EDR)
CARRIER FREQUENCY	2.457 GHz For ANT 2.402 GHz ~ 2.480 GHz For BLE
NUMBER OF CHANNEL	1 Channel For ANT 40 Channel For BLE
RATED RF OUTPUT POWER	-30.46 dBm For ANT -14.93 dBm For BLE
MODULATION TYPE	GFSK
MODE OF OPERATION	Simplex For ANT Duplex For BLE
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

1. Setup the EUT and all peripheral devices .
2. Turn on the power of all equipment and EUT.
3. Set the EUT under continuous transmission condition, standby and link mode.
4. The EUT was set to the highest available power level.

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2.4 DESCRIPTION OF TEST MODE

Mode		Frequency
1	CH00 (Tx-1)	2402 MHz
2	CH20 (Tx-2)	2440 MHz
3	CH40 (Tx-3)	2480 MHz
4	Standby	NA
5	Link	NA
6	ANT_TX	2457 MHz
7	ANT_Link	N/A

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
2	ANT Dongle	Wahoo	AP201	O4GIPDWAP2	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 For BLE

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

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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

Public Notice DA 00-705 (March 2000)

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
15.203	Antenna requirement Limit : max. 6dBi	PASS
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit : min. 500kHz	PASS
15.247(b)	Maximum Peak Conducted Output Power Limit: max. 30dBm	PASS
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS

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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)	DISTANCE (m)	FIELD STRENGTH (dBmV/m)
0.009 - 0.490	300	2400/F(KHz)
0.490 - 1.705	30	24000/F(KHz)
1.705 - 30	30	30
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
Above 960	3	54.0

NOTE:

- 30 dBuV (in 30m) = 70 dBuV (in 3m).
- 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:

- In the emission tables above , the tighter limit applies at the band edges.
- Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
- 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:

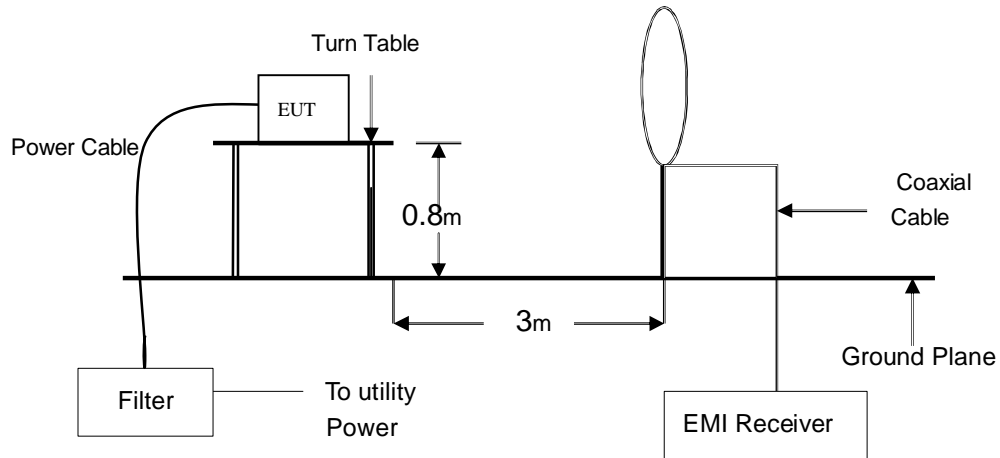
EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	DEC. 2013 ETC
EMI TEST RECEIVER	20 MHz ~ 1000 MHz	ROHDE & SCHWARZ	ESVS30 / 841977/003	DEC. 2013 ETC
SPECTRUM ANALYZER	9 kHz ~ 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	APR. 2013 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC. 2013 ETC
LOOP ANTENNA	9 kHz ~ 30 MHz	ETS.LINDGREN	HFH2-Z2/ 860605/002 (1162 1/2)	MAR. 2013 ETC
BI-LOG ANTENNA	30 MHz ~ 2 GHz	SCHAFFNER	CBL6141A / 4181	JUN. 2013 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	DEC. 2013 ETC
HORN ANTENNA	18 GHz ~ 40 GHz	ETS-LINDGREN	3116/ 00032255	JUN. 2014 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 2013 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	APR. 2013 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	MAY. 2013 SRT
COAXIAL CABLE	30 M	TIMES	LMR-400 / #30M (L1TCAB014)	MAY. 2013 ETC
RF CABLE	UP TO 18 GHz	JYEBAO	A30A30-L 142 / EQF-0035(001)	DEC. 2013 ETC
RF CABLE	UP TO 18 GHz	JYEBAO	A30A30-L 142 / EQF-0036(002)	DEC. 2013 ETC
K-TYPE CABLE	UP TO 40 GHz	HUBER+SUHNER	SF 102-40/2*11/ 23934/2	OCT. 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.

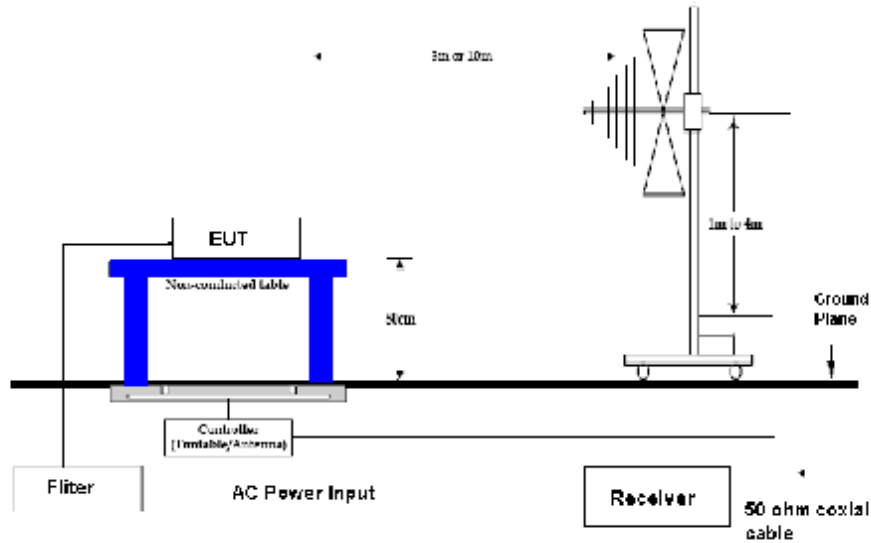


4.1.3 TEST SET-UP

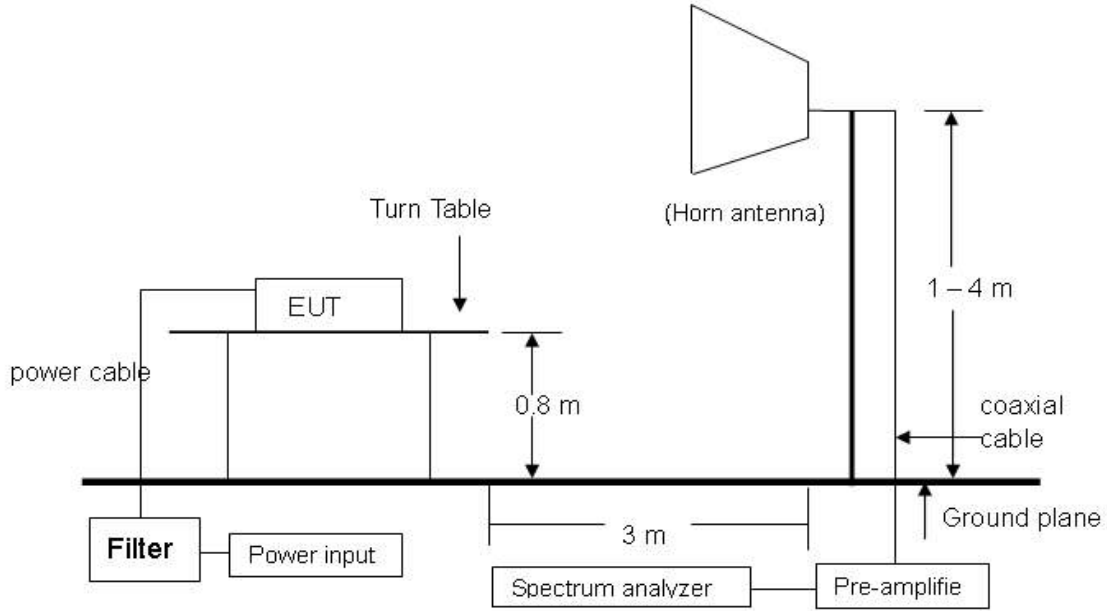
9KHz ~ 30MHz



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.

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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.

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4.1.5 TEST RESULT

Temperature:	<u>24 °C</u>	Humidity:	<u>59 %RH</u>
Frequency Range:	<u>9KHz – 30 MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>Q.P.</u>	Tested Mode:	<u>Tx-1</u>
Tested By:	<u>Jeff Lo</u>	Tested Date:	<u>Feb. 27, 2013</u>

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
2.94	0.31	20.20	36.12	56.63	70.00	-13.37
8.25	0.51	20.43	36.70	57.64	70.00	-12.36
19.11	0.74	20.95	26.84	48.54	70.00	-21.46
22.11	0.79	21.11	26.58	48.48	70.00	-21.52
24.57	0.83	21.23	26.56	48.62	70.00	-21.38
28.65	0.89	21.43	33.96	56.28	70.00	-13.72

Temperature:	<u>24 °C</u>	Humidity:	<u>59 %RH</u>
Frequency Range:	<u>9KHz – 30 MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>Q.P.</u>	Tested Mode:	<u>Tx-2</u>
Tested By:	<u>Jeff Lo</u>	Tested Date:	<u>Feb. 27, 2013</u>

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
3.64	0.34	20.23	28.19	48.76	70.00	-21.24
5.41	0.42	20.32	32.08	52.82	70.00	-17.18
8.17	0.50	20.43	38.62	59.55	70.00	-10.45
10.99	0.58	20.55	32.25	53.38	70.00	-16.62
13.24	0.63	20.66	27.24	48.53	70.00	-21.47
28.66	0.89	21.43	34.06	56.38	70.00	-13.62

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Temperature:	24 °C	Humidity:	59 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	Q.P.	Tested Mode:	Tx-3
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
5.11	0.41	20.30	29.82	50.54	70.00	-19.46
8.02	0.50	20.42	36.23	57.15	70.00	-12.85
8.65	0.52	20.45	34.04	55.00	70.00	-15.00
9.65	0.55	20.49	30.13	51.16	70.00	-18.84
21.09	0.78	21.05	28.82	50.65	70.00	-19.35
28.65	0.89	21.43	33.77	56.09	70.00	-13.91

Temperature:	24 °C	Humidity:	59%RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	Q.P.	Tested Mode:	Standby
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
4.33	0.38	20.27	28.30	48.94	70.00	-21.06
6.10	0.44	20.34	32.07	52.86	70.00	-17.14
8.57	0.52	20.44	32.43	53.39	70.00	-16.61
9.58	0.55	20.48	28.90	49.93	70.00	-20.07
13.42	0.64	20.67	26.48	47.79	70.00	-22.21
28.68	0.89	21.43	33.04	55.37	70.00	-14.63

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Temperature:	24 °C	Humidity:	59 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	Q.P.	Tested Mode:	Link
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
4.30	0.37	20.26	28.16	48.80	70.00	-21.20
5.77	0.43	20.33	31.47	52.23	70.00	-17.77
8.05	0.50	20.42	38.52	59.44	70.00	-10.56
22.20	0.80	21.11	27.63	49.54	70.00	-20.46
27.48	0.87	21.37	26.58	48.83	70.00	-21.17
28.66	0.89	21.43	34.31	56.63	70.00	-13.37

Temperature:	24 °C	Humidity:	59 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	Q.P.	Tested Mode:	ANT_TX
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
4.06	0.36	20.25	27.49	48.10	70.00	-21.90
5.26	0.42	20.31	29.61	50.34	70.00	-19.66
6.79	0.46	20.37	30.68	51.51	70.00	-18.49
8.26	0.51	20.43	35.64	56.58	70.00	-13.42
12.43	0.61	20.62	28.36	49.59	70.00	-20.41
28.62	0.89	21.43	34.45	56.77	70.00	-13.23



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Temperature:	24 °C	Humidity:	59 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	Q.P.	Tested Mode:	ANT_Link
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dB μ V)	Emission (dB μ V/m)	Limit Line (dB μ V/m)	Margin (dB)
3.16	0.32	20.21	27.98	48.51	70.00	-21.50
4.69	0.39	20.28	27.72	48.40	70.00	-21.60
6.43	0.45	20.36	31.71	52.52	70.00	-17.48
8.17	0.50	20.43	39.21	60.14	70.00	-9.86
21.81	0.79	21.09	27.12	49.00	70.00	-21.00
28.62	0.89	21.43	34.23	56.55	70.00	-13.45

 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.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 19 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Tested By:	Jeff Lo	Tested Mode:	Tx-1
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Feb. 27, 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(°)	EL(m)
580.39	4.06	19.44	2.61	26.11	46.0	-19.89	188	2.30
602.24	4.14	19.82	2.92	26.88	46.0	-19.12	243	2.23
697.73	4.54	20.78	2.40	27.71	46.0	-18.29	135	1.93
802.14	5.00	22.34	3.01	30.34	46.0	-15.66	208	1.61
892.59	5.31	23.28	2.63	31.22	46.0	-14.78	177	1.33
928.32	5.44	23.92	3.75	33.11	46.0	-12.89	301	1.22

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(°)	EL(m)
56.61	1.18	11.70	7.95	20.83	40.0	-19.17	25	1.08
90.19	1.45	8.90	15.37	25.72	43.5	-17.78	153	1.19
719.56	4.64	21.22	2.79	28.65	46.0	-17.35	274	3.13
792.39	4.96	22.24	2.35	29.54	46.0	-16.46	191	3.36
864.27	5.22	23.23	2.89	31.34	46.0	-14.66	230	3.58
973.78	5.61	24.58	4.07	34.26	54.0	-19.74	227	3.92

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. No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 20 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Tested By:	Jeff Lo	Tested Mode:	Tx-2
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Feb. 27, 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(°)	EL(m)
56.61	1.18	11.70	3.78	16.66	40.0	-23.34	114	3.92
608.13	4.17	19.90	2.24	26.30	46.0	-19.70	336	2.21
713.24	4.61	21.09	2.57	28.27	46.0	-17.73	259	1.89
755.48	4.80	21.94	2.35	29.09	46.0	-16.91	137	1.76
841.92	5.15	23.04	3.76	31.94	46.0	-14.06	301	1.49
958.27	5.56	24.46	4.22	34.24	46.0	-11.76	11	1.13

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(°)	EL(m)
56.65	1.18	11.70	5.90	18.78	40.0	-21.22	42	1.08
92.05	1.46	9.10	11.95	22.51	43.5	-20.99	231	1.19
710.11	4.60	21.02	2.50	28.12	46.0	-17.88	177	3.10
809.85	5.02	22.46	3.03	30.52	46.0	-15.48	263	3.41
874.84	5.25	23.25	3.46	31.96	46.0	-14.04	259	3.61
948.03	5.52	24.36	3.92	33.80	46.0	-12.20	110	3.84

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. No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 21 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Tested By:	Jeff Lo	Tested Mode:	Tx-3
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Feb. 27, 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(°)	EL(m)
562.55	4.00	19.12	2.21	25.33	46.0	-20.67	117	2.35
611.38	4.18	19.93	2.34	26.45	46.0	-19.55	314	2.20
720.14	4.64	21.24	2.88	28.76	46.0	-17.24	259	1.87
768.77	4.86	22.04	2.82	29.72	46.0	-16.28	188	1.72
848.69	5.17	23.16	2.78	31.12	46.0	-14.88	203	1.47
934.23	5.47	24.05	2.69	32.20	46.0	-13.80	322	1.20

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(°)	EL(m)
56.76	1.18	11.70	5.91	18.79	40.0	-21.21	87	1.08
90.11	1.45	8.90	14.40	24.75	43.5	-18.75	92	1.19
654.29	4.38	20.43	2.80	27.61	46.0	-18.39	137	2.93
712.83	4.61	21.06	2.49	28.16	46.0	-17.84	355	3.11
775.48	4.89	22.10	3.47	30.46	46.0	-15.55	241	3.31
825.52	5.09	22.75	2.79	30.63	46.0	-15.38	89	3.46

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. No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 22 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Tested By:	Jeff Lo	Tested Mode:	Standby
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Feb. 27, 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(°)	EL(m)
514.38	3.78	18.40	2.64	24.82	46.0	-21.18	169	2.50
600.26	4.13	19.80	2.70	26.63	46.0	-19.37	176	2.24
695.39	4.53	20.76	2.86	28.15	46.0	-17.85	184	1.94
790.45	4.95	22.22	2.86	30.03	46.0	-15.97	102	1.65
861.26	5.21	23.22	3.19	31.63	46.0	-14.38	108	1.43
934.13	5.47	24.05	3.37	32.88	46.0	-13.12	114	1.20

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(°)	EL(m)
56.31	1.18	11.70	5.85	18.73	40.0	-21.27	244	1.08
90.71	1.45	8.90	14.07	24.42	43.5	-19.08	54	1.19
607.14	4.16	19.88	2.45	26.50	46.0	-19.50	276	2.78
740.59	4.73	21.68	2.38	28.79	46.0	-17.21	287	3.20
844.91	5.16	23.09	3.03	31.28	46.0	-14.72	139	3.52
930.45	5.45	23.96	3.93	33.34	46.0	-12.66	40	3.78

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. No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 23 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Tested By:	Jeff Lo	Tested Mode:	Link
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Feb. 27, 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(°)	EL(m)
220.03	2.25	13.10	6.88	22.23	46.0	-23.77	132	3.41
571.28	4.03	19.28	2.32	25.63	46.0	-20.37	177	2.33
680.84	4.47	20.64	2.91	28.02	46.0	-17.98	314	1.99
739.04	4.73	21.66	3.07	29.46	46.0	-16.54	259	1.81
827.31	5.09	22.79	3.56	31.44	46.0	-14.56	23	1.53
919.19	5.41	23.72	4.24	33.36	46.0	-12.64	222	1.25

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(°)	EL(m)
38.77	1.01	20.28	3.87	25.16	40.0	-14.84	310	1.03
56.13	1.18	11.70	5.72	18.60	40.0	-21.40	152	1.08
90.91	1.45	8.90	13.26	23.61	43.5	-19.89	351	1.19
837.01	5.13	22.97	3.37	31.47	46.0	-14.53	266	3.50
901.24	5.33	23.32	4.01	32.67	46.0	-13.33	35	3.69
981.54	5.64	24.65	2.57	32.85	54.0	-21.15	198	3.94

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. No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 24 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Tested By:	Jeff Lo	Tested Mode:	ANT_TX
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Feb. 27, 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(°)	EL(m)
582.68	4.07	19.48	3.02	26.56	46.0	-19.44	92	2.29
659.69	4.39	20.47	2.35	27.22	46.0	-18.78	156	2.05
715.44	4.62	21.13	2.69	28.44	46.0	-17.56	123	1.88
795.30	4.97	22.26	3.57	30.80	46.0	-15.20	324	1.63
835.18	5.12	22.93	2.92	30.97	46.0	-15.03	178	1.51
927.48	5.44	23.89	4.50	33.83	46.0	-12.17	301	1.22

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(°)	EL(m)
56.39	1.18	11.70	6.15	19.03	40.0	-20.97	255	1.08
90.17	1.45	8.90	13.95	24.30	43.5	-19.20	263	1.19
678.90	4.47	20.62	2.26	27.35	46.0	-18.65	269	3.01
772.62	4.87	22.08	2.81	29.76	46.0	-16.24	145	3.30
854.47	5.19	23.21	3.93	32.33	46.0	-13.67	78	3.55
968.93	5.59	24.54	3.24	33.38	54.0	-20.62	95	3.90

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. No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 25 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Tested By:	Jeff Lo	Tested Mode:	ANT_Link
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Feb. 27, 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(°)	EL(m)
222.03	2.26	13.04	7.12	22.42	46.0	-23.58	259	3.41
642.19	4.32	20.30	2.49	27.12	46.0	-18.88	314	2.11
721.13	4.65	21.26	2.52	28.43	46.0	-17.57	266	1.86
821.59	5.07	22.68	3.56	31.31	46.0	-14.69	222	1.55
882.19	5.28	23.26	3.63	32.17	46.0	-13.83	173	1.36
935.59	5.47	24.07	4.19	33.73	46.0	-12.27	163	1.20

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(°)	EL(m)
56.46	1.18	11.70	6.10	18.98	40.0	-21.02	111	1.08
90.31	1.45	8.90	13.76	24.11	43.5	-19.39	302	1.19
741.95	4.74	21.70	2.60	29.04	46.0	-16.96	15	3.20
798.27	4.98	22.28	3.79	31.06	46.0	-14.94	308	3.38
864.17	5.22	23.23	3.41	31.86	46.0	-14.14	267	3.58
989.30	5.66	24.71	3.58	33.95	54.0	-20.05	355	3.97

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. No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 26 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-1
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1455.38	-32.55	25.33	46.54	35.85	39.32	28.63	74.00	54.00	-34.68	-25.37	51	2.36
2595.14	-30.97	28.98	45.87	34.63	43.88	32.64	74.00	54.00	-30.12	-21.36	341	2.02
3235.19	-30.25	31.07	43.78	32.91	44.60	33.73	74.00	54.00	-29.40	-20.27	122	1.83
3875.66	-29.42	32.50	42.64	31.44	45.73	34.53	74.00	54.00	-28.28	-19.48	307	1.64
4320.55	-28.93	32.80	42.27	31.59	46.14	35.46	74.00	54.00	-27.86	-18.54	36	1.50
5465.87	-26.92	34.65	41.43	30.85	49.17	38.59	74.00	54.00	-24.83	-15.41	269	1.16

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1750.48	-32.01	26.30	46.40	35.64	40.69	29.93	74.00	54.00	-33.31	-24.07	55	1.23
3020.91	-30.65	30.64	43.47	32.73	43.46	32.72	74.00	54.00	-30.54	-21.28	139	1.61
3815.44	-29.47	32.36	43.63	32.15	46.52	35.04	74.00	54.00	-27.48	-18.96	287	1.84
4335.37	-28.91	32.80	43.32	31.97	47.21	35.86	74.00	54.00	-26.79	-18.14	185	2.00
5165.19	-27.82	34.23	42.59	31.95	49.00	38.36	74.00	54.00	-25.00	-15.64	140	2.25
5410.92	-27.08	34.57	41.41	30.82	48.90	38.31	74.00	54.00	-25.10	-15.69	94	2.32

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 27 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-1(Fundamental)
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-31.15	28.33	84.11	71.29	81.29	68.47	114.0	94.00	-32.71	-25.53	213	2.08
4804.00	-28.48	33.53	39.62	28.37	44.67	33.42	74.00	54.00	-29.33	-20.58	159	1.97
7206.00	-27.05	36.59	38.94	27.64	48.48	37.18	74.00	54.00	-25.52	-16.82	244	1.86
9608.00	-25.66	38.21	37.55	26.59	50.09	39.13	74.00	54.00	-23.91	-14.87	319	1.73
12010.00	-23.89	39.30	36.86	25.53	52.27	40.94	74.00	54.00	-21.73	-13.06	252	1.59
14412.00	-21.16	40.91	41.24	30.41	60.99	50.16	74.00	54.00	-13.01	-3.84	166	1.44

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-31.15	28.33	79.05	67.17	76.23	64.35	114.0	94.00	-37.77	-29.65	308	1.42
4804.00	-28.48	33.53	41.58	31.49	46.63	36.54	74.00	54.00	-27.37	-17.46	27	1.61
7206.00	-27.05	36.59	40.82	30.88	50.36	40.42	74.00	54.00	-23.64	-13.58	156	1.72
9608.00	-25.66	38.21	38.99	28.59	51.53	41.13	74.00	54.00	-22.47	-12.87	132	1.85
12010.00	-23.89	39.30	37.64	26.51	53.05	41.92	74.00	54.00	-20.95	-12.08	148	1.96
14412.00	-21.16	40.91	42.00	31.37	61.75	51.12	74.00	54.00	-12.25	-2.88	99	2.03

NOTE:

1. Measurement uncertainty is +/- 4.73dB.
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.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 28 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-2
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2999.78	-30.69	30.60	43.16	32.28	43.07	32.19	74.00	54.00	-30.93	-21.81	322	1.90
3495.44	-29.77	31.59	44.64	33.57	46.46	35.39	74.00	54.00	-27.54	-18.61	87	1.75
3845.43	-29.44	32.43	43.15	32.16	46.14	35.15	74.00	54.00	-27.86	-18.85	92	1.65
4200.97	-29.07	32.80	42.47	31.74	46.20	35.47	74.00	54.00	-27.80	-18.53	137	1.54
4530.12	-28.70	32.87	43.21	32.16	47.39	36.34	74.00	54.00	-26.61	-17.66	197	1.44
5580.57	-26.98	34.68	40.24	30.42	47.94	38.12	74.00	54.00	-26.06	-15.88	152	1.13

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1590.48	-32.25	25.72	47.17	36.55	40.64	30.02	74.00	54.00	-33.36	-23.98	24	1.18
2895.61	-30.76	30.18	43.12	32.21	42.54	31.63	74.00	54.00	-31.46	-22.37	305	1.57
3345.15	-30.05	31.29	43.34	33.49	44.58	34.73	74.00	54.00	-29.42	-19.27	144	1.70
3570.79	-29.70	31.77	43.94	32.13	46.01	34.20	74.00	54.00	-27.99	-19.80	269	1.77
4185.85	-29.09	32.80	43.46	33.82	47.17	37.53	74.00	54.00	-26.83	-16.47	316	1.96
4585.37	-28.65	33.00	42.95	31.51	47.30	35.86	74.00	54.00	-26.70	-18.14	201	2.08

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 29 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-2(Fundamental)
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2440.00	-31.10	28.43	81.31	69.98	78.64	67.31	114.0	94.00	-35.36	-26.69	320	2.05
4880.00	-28.42	33.71	40.64	30.13	45.94	35.43	74.00	54.00	-28.06	-18.57	268	1.91
7320.00	-26.98	36.87	39.85	29.85	49.74	39.74	74.00	54.00	-24.26	-14.26	156	1.84
9760.00	-25.43	38.36	38.74	27.41	51.67	40.34	74.00	54.00	-22.33	-13.66	123	1.75
12200.00	-23.39	39.30	36.64	25.96	52.55	41.87	74.00	54.00	-21.45	-12.13	324	1.69
14640.00	-21.26	40.36	39.39	28.77	58.49	47.87	74.00	54.00	-15.51	-6.13	159	1.55

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2440.00	-31.10	28.43	81.46	68.84	78.79	66.17	114.0	94.00	-35.21	-27.83	27	1.45
4880.00	-28.42	33.71	41.50	31.51	46.80	36.81	74.00	54.00	-27.20	-17.19	193	1.51
7320.00	-26.98	36.87	39.77	29.88	49.66	39.77	74.00	54.00	-24.34	-14.23	152	1.63
9760.00	-25.43	38.36	38.41	27.66	51.34	40.59	74.00	54.00	-22.66	-13.41	141	1.78
12200.00	-23.39	39.30	37.58	26.06	53.49	41.97	74.00	54.00	-20.51	-12.03	318	1.82
14640.00	-21.26	40.36	39.39	28.17	58.49	47.27	74.00	54.00	-15.51	-6.73	64	1.99

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 30 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-3
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3020.49	-30.65	30.64	42.89	31.51	42.88	31.50	74.00	54.00	-31.12	-22.50	13	1.89
3420.18	-29.91	31.44	43.61	32.23	45.14	33.76	74.00	54.00	-28.86	-20.24	244	1.77
3890.14	-29.40	32.54	43.09	33.88	46.22	37.01	74.00	54.00	-27.78	-16.99	325	1.63
4320.77	-28.93	32.80	42.73	31.46	46.60	35.33	74.00	54.00	-27.40	-18.67	159	1.50
4865.93	-28.43	33.68	41.29	30.85	46.54	36.10	74.00	54.00	-27.46	-17.90	244	1.34
5285.11	-27.46	34.40	41.84	31.13	48.78	38.07	74.00	54.00	-25.22	-15.93	123	1.21

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1575.66	-32.28	25.67	47.38	36.62	40.77	30.01	74.00	54.00	-33.23	-23.99	320	1.17
2940.93	-30.73	30.36	41.61	31.22	41.24	30.85	74.00	54.00	-32.76	-23.15	169	1.58
3305.24	-30.12	31.21	42.92	31.41	44.01	32.50	74.00	54.00	-29.99	-21.50	273	1.69
3785.62	-29.50	32.28	42.51	31.59	45.30	34.38	74.00	54.00	-28.70	-19.62	198	1.84
4100.99	-29.18	32.80	41.59	31.88	45.21	35.50	74.00	54.00	-28.79	-18.50	186	1.93
4490.23	-28.73	32.80	42.54	31.27	46.61	35.34	74.00	54.00	-27.39	-18.66	117	2.05

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 31 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-3(Fundamental)
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00	-31.05	28.54	80.44	69.88	77.93	67.37	114.0	94.00	-36.07	-26.63	162	2.03
4960.00	-28.35	33.90	40.91	30.12	46.46	35.67	74.00	54.00	-27.54	-18.33	137	1.92
7440.00	-26.90	37.16	39.71	29.88	49.97	40.14	74.00	54.00	-24.03	-13.86	144	1.85
9920.00	-25.18	38.52	38.07	27.61	51.41	40.95	74.00	54.00	-22.59	-13.05	311	1.77
12400.00	-22.86	39.30	37.24	26.53	53.68	42.97	74.00	54.00	-20.32	-11.03	205	1.62
14880.00	-21.45	39.79	40.68	30.86	59.01	49.19	74.00	54.00	-14.99	-4.81	10	1.59

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00	-31.05	28.54	87.28	75.39	84.77	72.88	114.0	94.00	-29.23	-21.12	238	1.43
4960.00	-28.35	33.90	39.48	28.91	45.03	34.46	74.00	54.00	-28.97	-19.54	97	1.57
7440.00	-26.90	37.16	39.45	28.64	49.71	38.90	74.00	54.00	-24.29	-15.10	133	1.69
9920.00	-25.18	38.52	39.93	29.11	53.27	42.45	74.00	54.00	-20.73	-11.55	159	1.77
12400.00	-22.86	39.30	36.94	25.37	53.38	41.81	74.00	54.00	-20.62	-12.19	281	1.84
14880.00	-21.45	39.79	39.93	28.83	58.26	47.16	74.00	54.00	-15.74	-6.84	45	1.93

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 32 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Standby
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2590.13	-30.97	28.96	44.81	32.91	42.80	30.90	74.00	54.00	-31.20	-23.10	166	2.02
3130.24	-30.45	30.86	43.74	33.24	44.15	33.65	74.00	54.00	-29.85	-20.35	238	1.86
3645.88	-29.63	31.95	44.59	33.15	46.91	35.47	74.00	54.00	-27.09	-18.53	197	1.71
4170.79	-29.10	32.80	42.36	31.59	46.06	35.29	74.00	54.00	-27.94	-18.71	261	1.55
4975.25	-28.34	33.94	41.45	30.38	47.05	35.98	74.00	54.00	-26.95	-18.02	245	1.31
5230.22	-27.63	34.32	40.79	30.97	47.49	37.67	74.00	54.00	-26.51	-16.33	301	1.23

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3255.64	-30.22	31.11	43.83	32.38	44.72	33.27	74.00	54.00	-29.28	-20.73	26	1.68
3545.13	-29.72	31.71	43.72	33.29	45.71	35.28	74.00	54.00	-28.29	-18.72	308	1.76
4015.91	-29.28	32.80	41.36	31.51	44.88	35.03	74.00	54.00	-29.12	-18.97	222	1.90
4340.11	-28.91	32.80	42.32	31.23	46.21	35.12	74.00	54.00	-27.79	-18.88	215	2.00
5040.75	-28.20	34.06	41.03	30.09	46.89	35.95	74.00	54.00	-27.11	-18.05	60	2.21
5440.83	-26.99	34.62	40.64	29.97	48.26	37.59	74.00	54.00	-25.74	-16.41	239	2.33

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 33 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Link
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3100.04	-30.50	30.80	43.85	32.86	44.15	33.16	74.00	54.00	-29.85	-20.84	213	1.87
3530.13	-29.73	31.67	44.27	33.27	46.21	35.21	74.00	54.00	-27.79	-18.79	248	1.74
3860.44	-29.43	32.46	42.70	31.73	45.74	34.77	74.00	54.00	-28.26	-19.23	255	1.64
4195.91	-29.07	32.80	43.34	32.87	47.07	36.60	74.00	54.00	-26.93	-17.40	146	1.54
4745.59	-28.52	33.39	41.02	30.53	45.88	35.39	74.00	54.00	-28.12	-18.61	132	1.38
5285.27	-27.46	34.40	41.68	31.21	48.62	38.15	74.00	54.00	-25.38	-15.85	12	1.21

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3280.24	-30.17	31.16	44.17	33.23	45.16	34.22	74.00	54.00	-28.84	-19.78	101	1.68
3775.75	-29.51	32.26	43.16	32.12	45.91	34.87	74.00	54.00	-28.09	-19.13	304	1.83
4110.28	-29.17	32.80	42.21	31.03	45.84	34.66	74.00	54.00	-28.16	-19.34	117	1.93
4485.69	-28.74	32.80	43.48	32.59	47.54	36.65	74.00	54.00	-26.46	-17.35	60	2.05
4870.78	-28.42	33.69	41.78	30.89	47.04	36.15	74.00	54.00	-26.96	-17.85	259	2.16
5330.15	-27.32	34.46	41.58	31.51	48.72	38.65	74.00	54.00	-25.28	-15.35	273	2.30

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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.)	<h1>TEST REPORT</h1>	Reference No.:A13020702
		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 34 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	ANT_TX
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2780.66	-30.84	29.72	43.62	32.28	42.50	31.16	74.00	54.00	-31.50	-22.84	109	1.97
3115.18	-30.48	30.83	43.50	31.54	43.85	31.89	74.00	54.00	-30.15	-22.11	137	1.87
3535.39	-29.73	31.68	44.95	33.81	46.91	35.77	74.00	54.00	-27.09	-18.23	144	1.74
3955.13	-29.34	32.69	42.05	31.25	45.40	34.60	74.00	54.00	-28.60	-19.40	256	1.61
4500.07	-28.72	32.80	42.35	32.93	46.43	37.01	74.00	54.00	-27.57	-16.99	132	1.45
5245.92	-27.58	34.34	42.78	31.71	49.54	38.47	74.00	54.00	-24.46	-15.53	155	1.23

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1675.44	-32.12	26.03	47.86	36.54	41.77	30.45	74.00	54.00	-32.23	-23.55	244	1.20
2695.38	-30.90	29.38	43.80	32.81	42.28	31.29	74.00	54.00	-31.72	-22.71	355	1.51
3175.81	-30.36	30.95	43.58	32.27	44.17	32.86	74.00	54.00	-29.83	-21.14	145	1.65
3790.24	-29.49	32.30	43.97	32.79	46.77	35.59	74.00	54.00	-27.23	-18.41	156	1.84
4155.23	-29.12	32.80	43.40	32.13	47.08	35.81	74.00	54.00	-26.92	-18.19	23	1.95
4345.83	-28.90	32.80	43.06	32.12	46.96	36.02	74.00	54.00	-27.04	-17.98	27	2.00

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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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		Report No.: FCCA13020702 FCC ID : PADWF107 Page: 35 of 68 Date: Mar. 02, 2013

Temperature:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	ANT_TX(Fundamental)
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2457.00	-31.08	28.48	79.13	68.28	76.53	65.68	114.0	94.00	-37.47	-28.32	159	2.01
4914.00	-28.39	33.79	42.33	31.51	47.73	36.91	74.00	54.00	-26.27	-17.09	266	1.94
7371.00	-26.95	36.99	38.82	27.65	48.87	37.70	74.00	54.00	-25.13	-16.30	308	1.86
9828.00	-25.32	38.43	38.24	28.39	51.34	41.49	74.00	54.00	-22.66	-12.51	318	1.73
12285.00	-23.16	39.30	36.82	25.44	52.96	41.58	74.00	54.00	-21.04	-12.42	222	1.65
14742.00	-21.34	40.12	40.01	29.40	58.79	48.18	74.00	54.00	-15.21	-5.82	141	1.44

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2457.00	-31.08	28.48	78.99	65.45	76.39	62.85	114.0	94.00	-37.61	-31.15	39	1.53
4914.00	-28.39	33.79	42.58	31.81	47.98	37.21	74.00	54.00	-26.02	-16.79	288	1.69
7371.00	-26.95	36.99	39.24	28.11	49.29	38.16	74.00	54.00	-24.71	-15.84	147	1.74
9828.00	-25.32	38.43	39.83	29.86	52.93	42.96	74.00	54.00	-21.07	-11.04	263	1.83
12285.00	-23.16	39.30	37.88	26.53	54.02	42.67	74.00	54.00	-19.98	-11.33	69	1.97
14742.00	-21.34	40.12	39.67	28.09	58.45	46.87	74.00	54.00	-15.55	-7.13	260	2.06

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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:	24 °C	Humidity:	59 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	ANT_Link
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3535.64	-29.73	31.68	43.35	32.28	45.31	34.24	74.00	54.00	-28.69	-19.76	203	1.74
3890.17	-29.40	32.54	42.56	31.57	45.69	34.70	74.00	54.00	-28.31	-19.30	144	1.63
4430.29	-28.80	32.80	42.69	31.96	46.69	35.96	74.00	54.00	-27.31	-18.04	256	1.47
4825.91	-28.46	33.58	41.60	30.38	46.72	35.50	74.00	54.00	-27.28	-18.50	159	1.35
5145.82	-27.88	34.20	41.48	31.22	47.80	37.54	74.00	54.00	-26.20	-16.46	318	1.26
5495.38	-26.83	34.69	39.71	28.63	47.58	36.50	74.00	54.00	-26.42	-17.50	52	1.15

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2995.27	-30.69	30.58	42.79	31.18	42.68	31.07	74.00	54.00	-31.32	-22.93	177	1.60
3285.72	-30.16	31.17	43.78	32.54	44.79	33.55	74.00	54.00	-29.21	-20.45	310	1.69
3845.38	-29.44	32.43	42.30	31.55	45.29	34.54	74.00	54.00	-28.71	-19.46	157	1.85
4390.11	-28.85	32.80	43.18	32.19	47.13	36.14	74.00	54.00	-26.87	-17.86	320	2.02
5110.29	-27.99	34.15	41.37	30.38	47.54	36.55	74.00	54.00	-26.46	-17.45	233	2.23
5280.67	-27.47	34.39	41.07	31.79	47.99	38.71	74.00	54.00	-26.01	-15.29	149	2.28

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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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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.

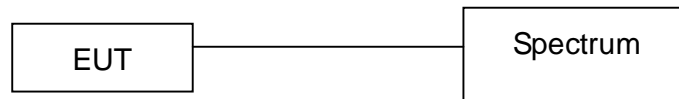
4.2.2 TEST EQUIPMENT

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. 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

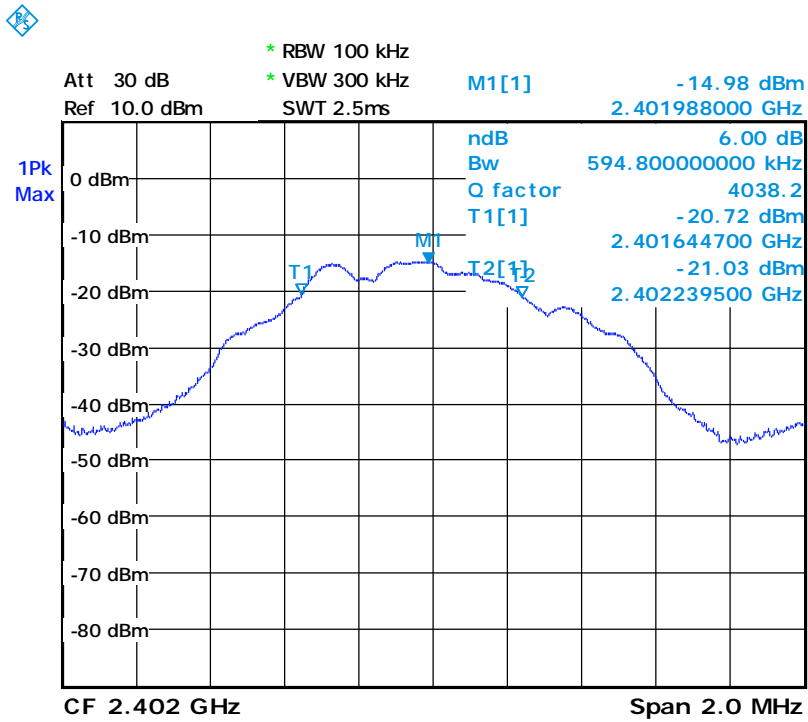
1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

4.2.6 TEST RESULT

Temperature:	<u>25°C</u>	Humidity:	<u>57%RH</u>
Spectrum Detector:	<u>PK</u>	Tested by:	<u>Jeff Lo</u>
Test Result:	<u>PASS</u>	Tested Date:	<u>Feb. 26, 2013</u>

Channel Number	Channel Frequency (MHz)	6dB Down Bandwidth (KHz)	Limit	Pass/Fail
CH01	2402	594.8	>500	Pass
CH20	2440	530.9	>500	Pass
CH40	2480	650.7	>500	Pass

CH01 :





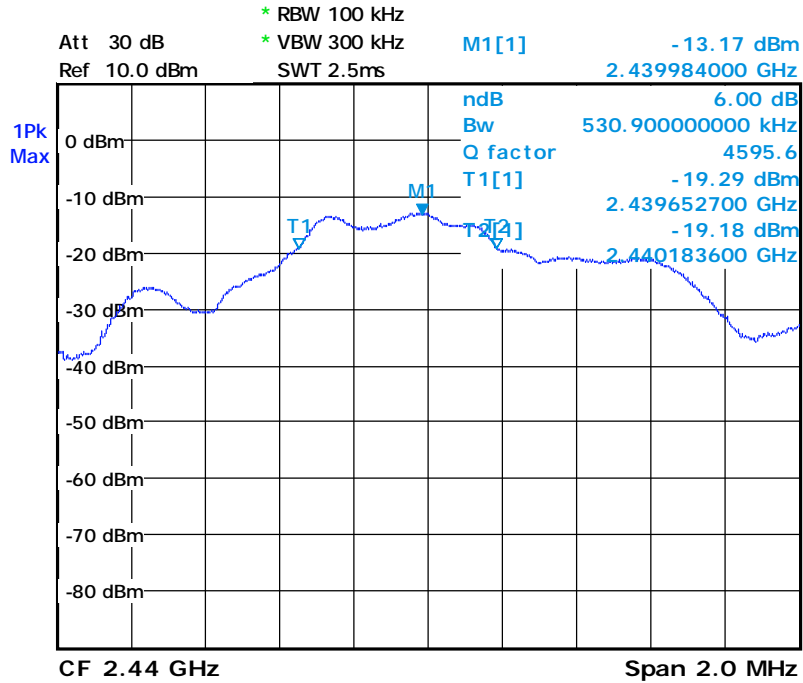
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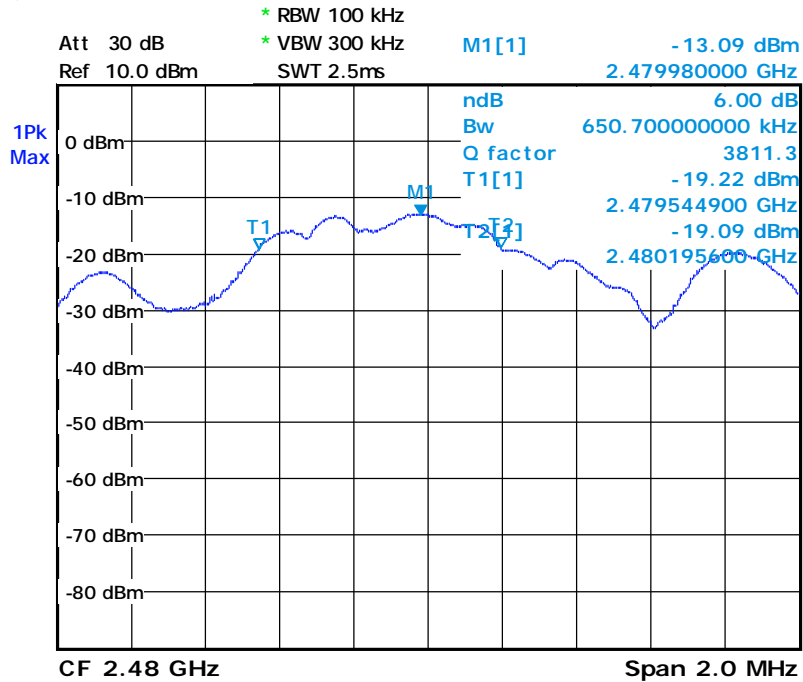
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CH20 :



CH40 :



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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

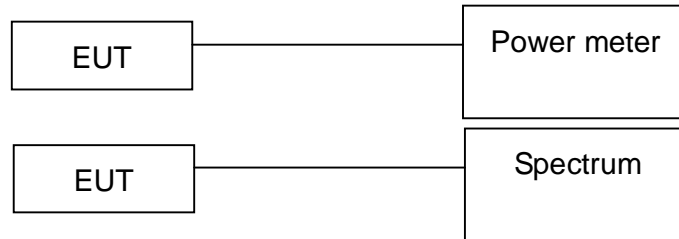
The following test equipment was used during the test :

Equipment/ Facilities	Specifications	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM ANALYZER	9 kHz ~ 40 GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC. 2013 ETC
POWER SENSOR	100 kHz ~ 18 GHz	BOONTON	51015(5E) / 32966	MAR. 2014 ETC
POWER METER	10 kHz ~ 100 GHz	BOONTON	4232A / 115702	NOV. 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.

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4.3.3 TEST SET-UP



The EUT was connected to a spectrum through a 50Ω 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

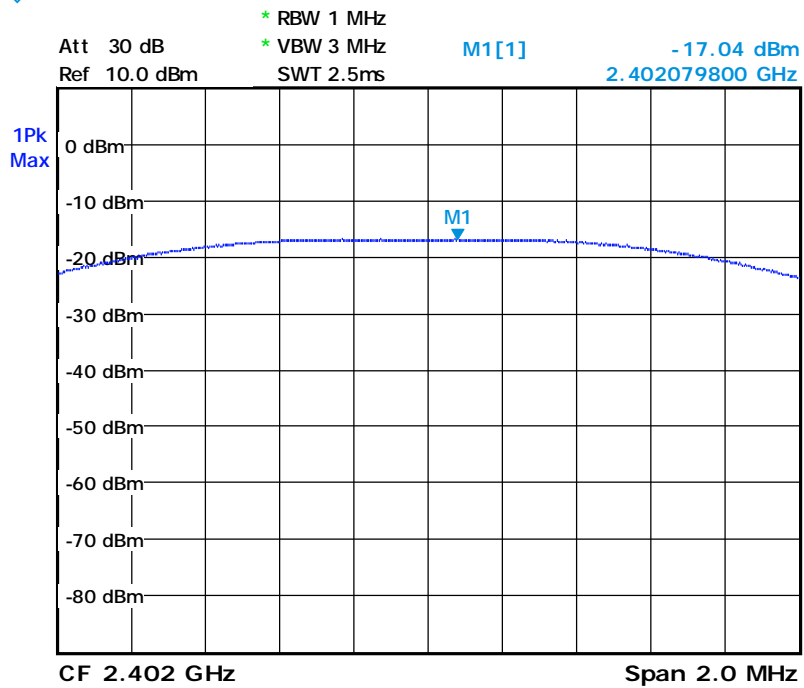
1. Set the EUT under frequency hopping transmission condition.
2. The EUT was set to the highest available power level.

4.3.6 TEST RESULT

Temperature:	<u>25°C</u>	Humidity:	<u>57%RH</u>
Spectrum Detector:	<u>PK</u>	Tested by:	<u>Jeff Lo</u>
Test Result:	<u>PASS</u>	Tested Date:	<u>Feb. 26, 2013</u>

Channel Number	Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Power Limit (dBm)
CH01	2402	-17.04	21
CH20	2440	-14.93	21
CH40	2480	-14.93	21

CH01 :





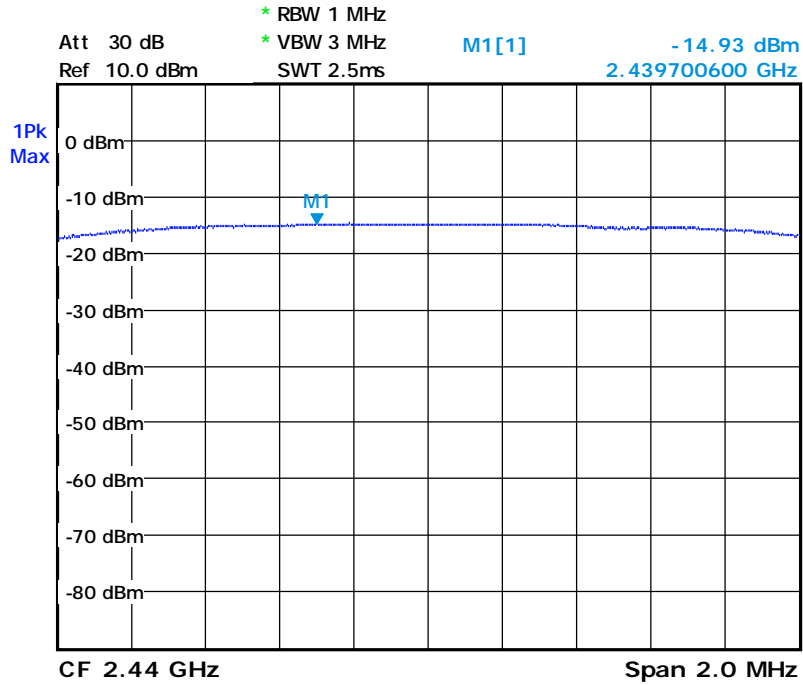
Spectrum Research & Testing Lab., Inc.

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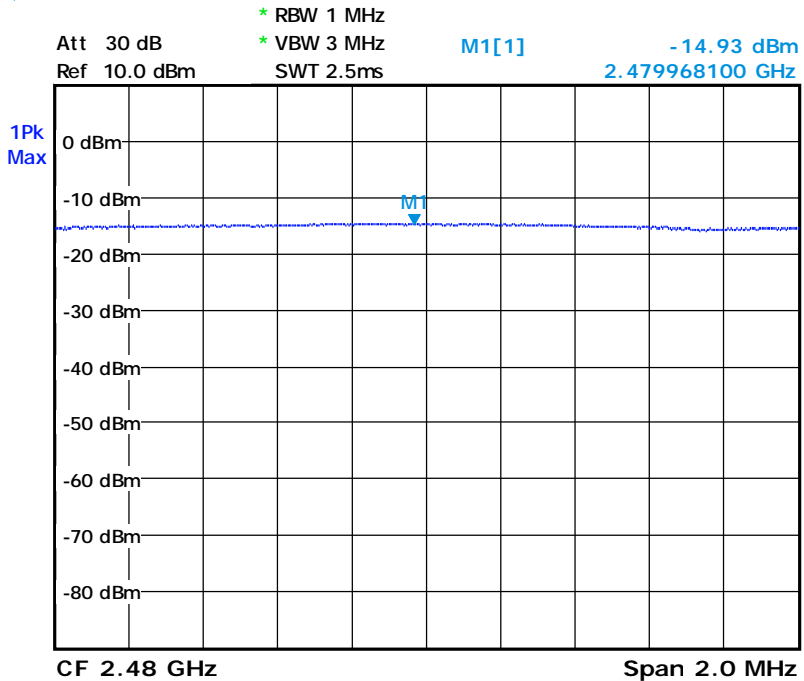
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CH20 :



CH40 :



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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

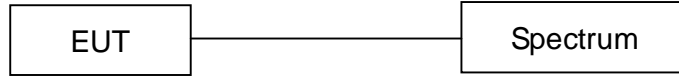
The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM ANALYZER	9 kHz ~ 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	APR. 2013 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC. 2013 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	DEC. 2013 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 2013 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	APR. 2013 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	MAY. 2013 SRT
RF CABLE	UP TO 18 GHz	JYEBAO	A30A30-L 142 / EQF-0035(001)	DEC. 2013 ETC
RF CABLE	UP TO 18 GHz	JYEBAO	A30A30-L 142 / EQF-0036(002)	DEC. 2013 ETC
K-TYPE CABLE	UP TO 40 GHz	HUBER+SUHNER	SF 102-40/2*11/ 23934/2	OCT. 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.

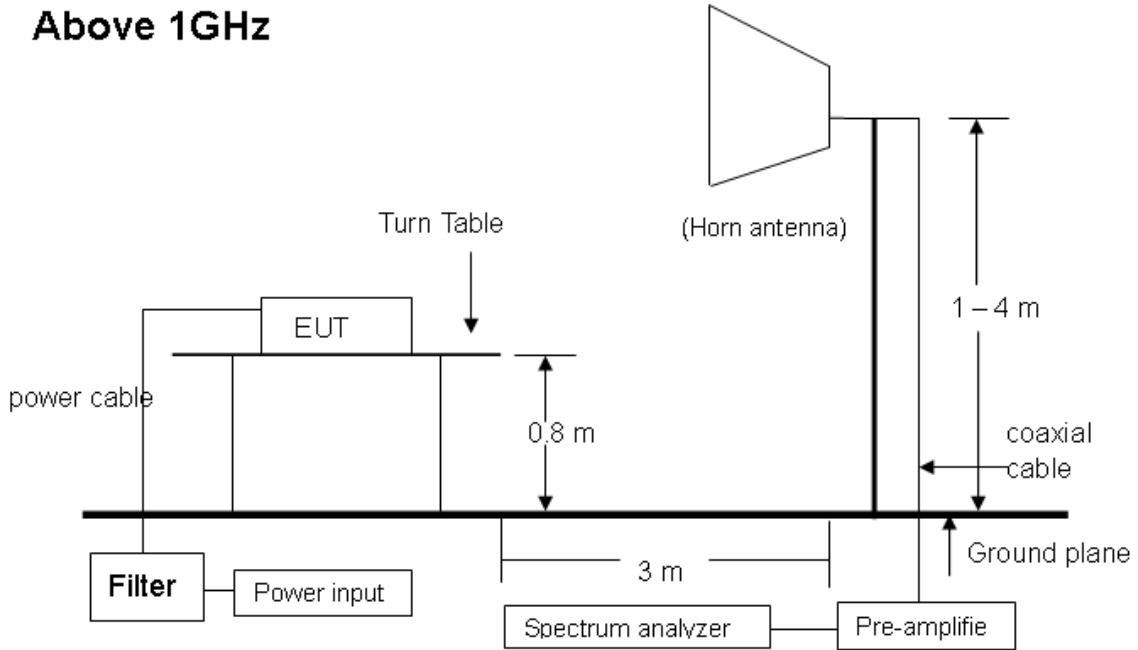
4.4.3 TEST SETUP

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.

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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.

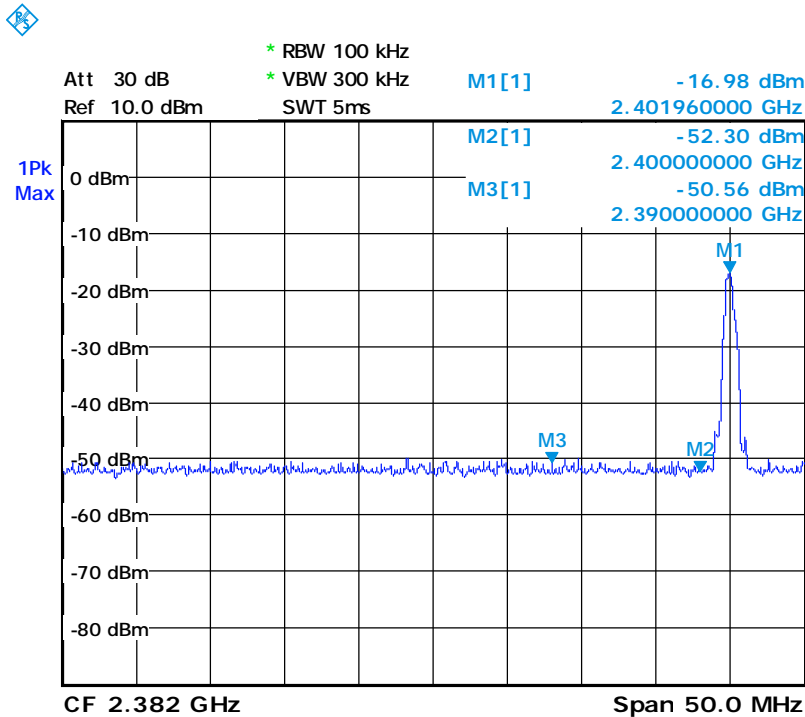
4.4.6 TEST RESULT

Temperature:	25 °C	Humidity:	57 %RH
Receiver Detector:	PK.	Tested Mode:	Tx-1, Tx-3
Frequency Range:	2.3 GHz – 2.5 GHz	Modulation Type:	GFSK
Tested By:	Jeff Lo	Tested Date:	Feb. 27, 2013

1. Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	-16.98	-50.56	33.58	>20dBc
>2483.5	-14.31	-50.71	36.40	>20dBc

Below 2400MHz :





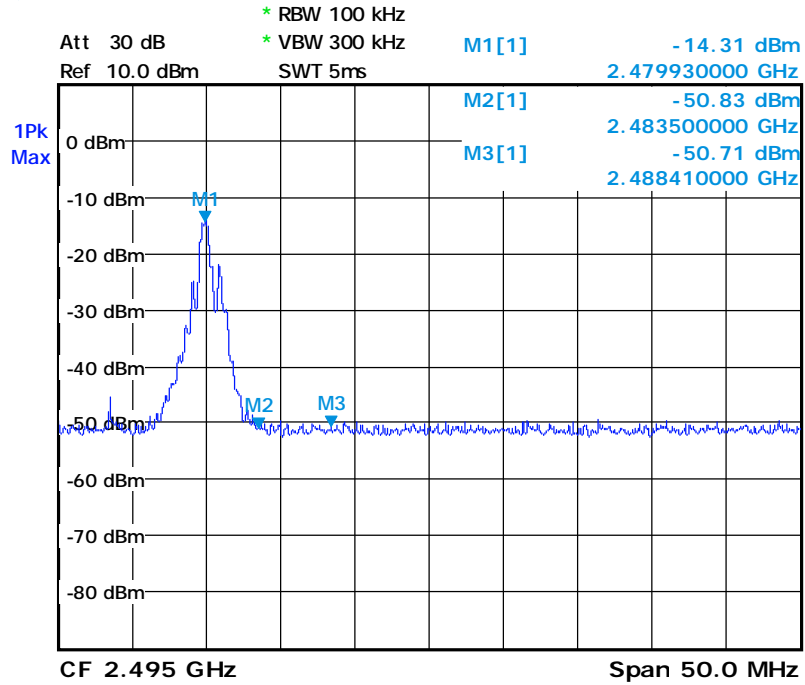
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Above 2483.5 MHz :





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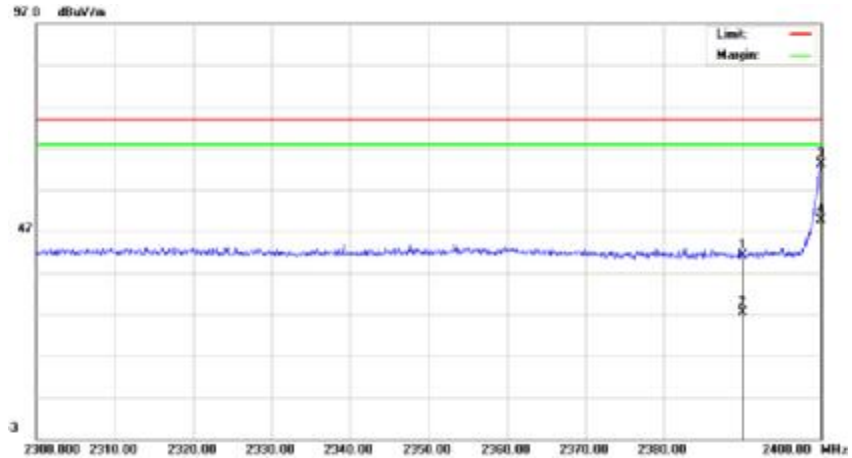
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2. Radiated emission test :

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
2402.00	-31.15	28.33	H	84.11	71.29	81.29	68.47	114.00	94.00	-32.71	-25.53
2402.00	-31.15	28.33	V	79.05	67.17	76.23	64.35	114.00	94.00	-37.77	-29.65
2400.00	-31.15	28.32	H	65.82	52.28	62.99	49.45	74.00	54.00	-11.01	-4.55
2400.00	-31.15	28.32	V	64.40	49.96	61.57	47.13	74.00	54.00	-12.43	-6.87
2390.00	-31.16	28.29	H	43.75	30.09	40.88	27.22	74.00	54.00	-33.12	-26.78
2390.00	-31.16	28.29	V	44.12	30.11	41.25	27.24	74.00	54.00	-32.75	-26.76

Horizontal :



Vertical :





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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
2480.00	-31.05	28.54	H	80.44	69.88	77.93	67.37	114.00	94.00	-36.07	-26.63
2480.00	-31.05	28.54	V	87.28	75.39	84.77	72.88	114.00	94.00	-29.23	-21.12
2483.50	-31.05	28.55	H	59.50	46.24	57.00	43.74	74.00	54.00	-17.00	-10.26
2483.50	-31.05	28.55	V	59.08	44.38	56.58	41.88	74.00	54.00	-17.42	-12.12
2499.34	-31.03	28.60	H	46.16	33.41	43.73	30.98	74.00	54.00	-30.27	-23.02
2493.17	-31.04	28.58	V	45.30	32.16	42.84	29.70	74.00	54.00	-31.16	-24.30

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	

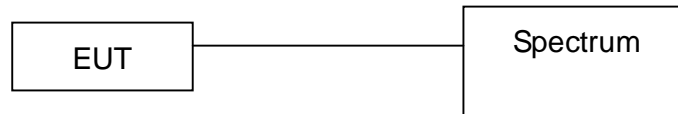
4.5.2 TEST EQUIPMENT

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. 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

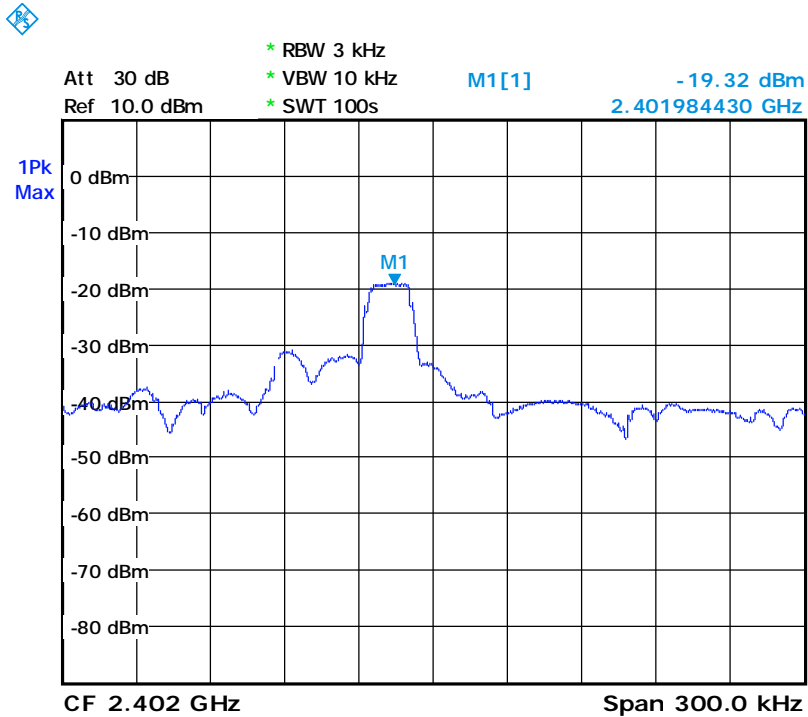
1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

4.5.6 TEST RESULT

Temperature:	25°C	Humidity:	57%RH
Spectrum Detector:	PK.	Test Mode:	Tx-1, Tx-2, Tx-3
Tested By:	Jeff Lo	Modulation Type:	GFSK
Test Result:	PASS	Tested Date:	Feb. 26, 2013

Channel Number	Channel Frequency (MHz)	RF Power Level in 3 KHz BW (dBm/3kHz)	Maximum Limit (dBm/3kHz)
CH01	2402	-19.32	8
CH20	2440	-16.99	8
CH40	2480	-13.68	8

CH01 :





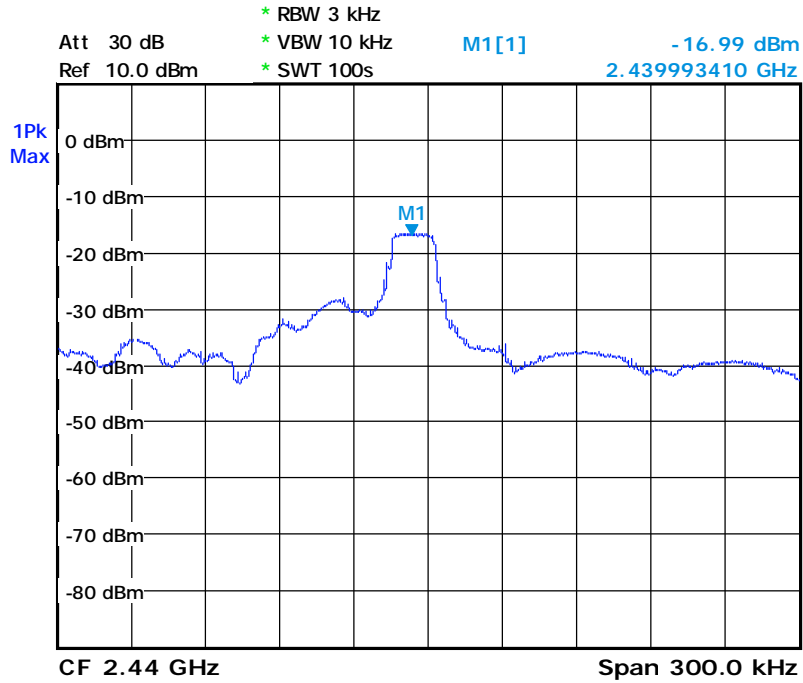
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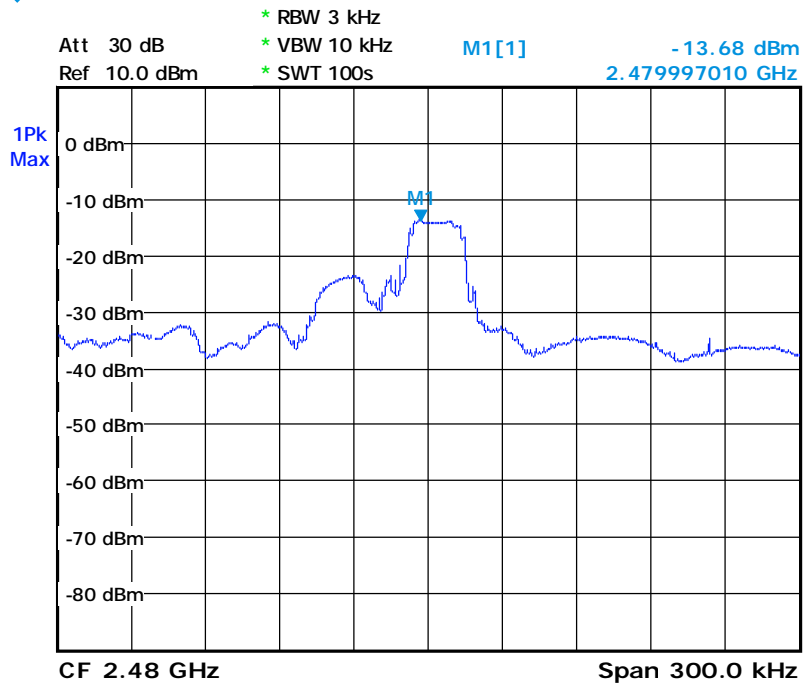
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CH20 :



CH40 :



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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 For BLE)





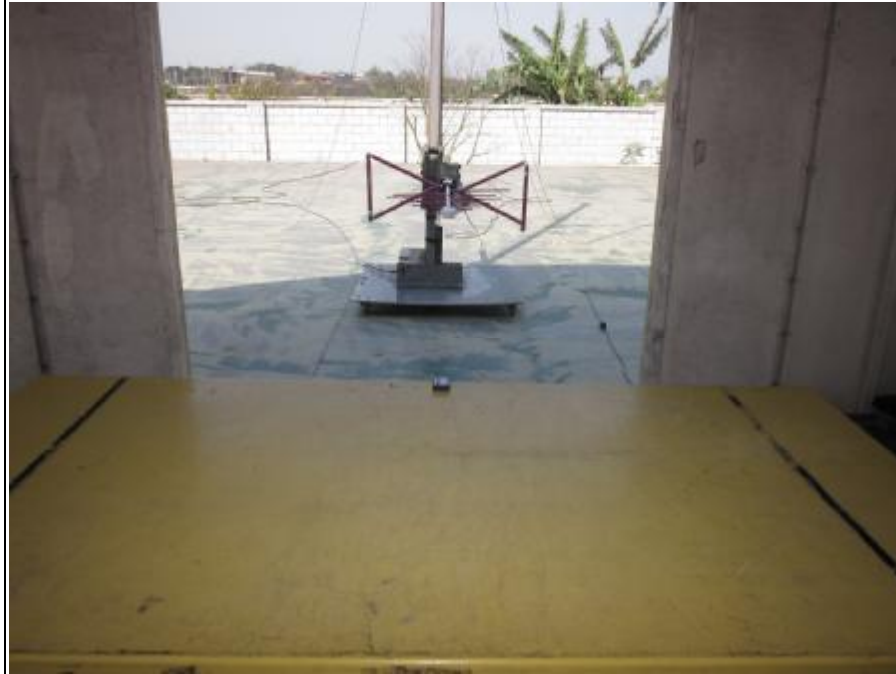
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- Radiated test (below 1G, TX & Standby For BLE)





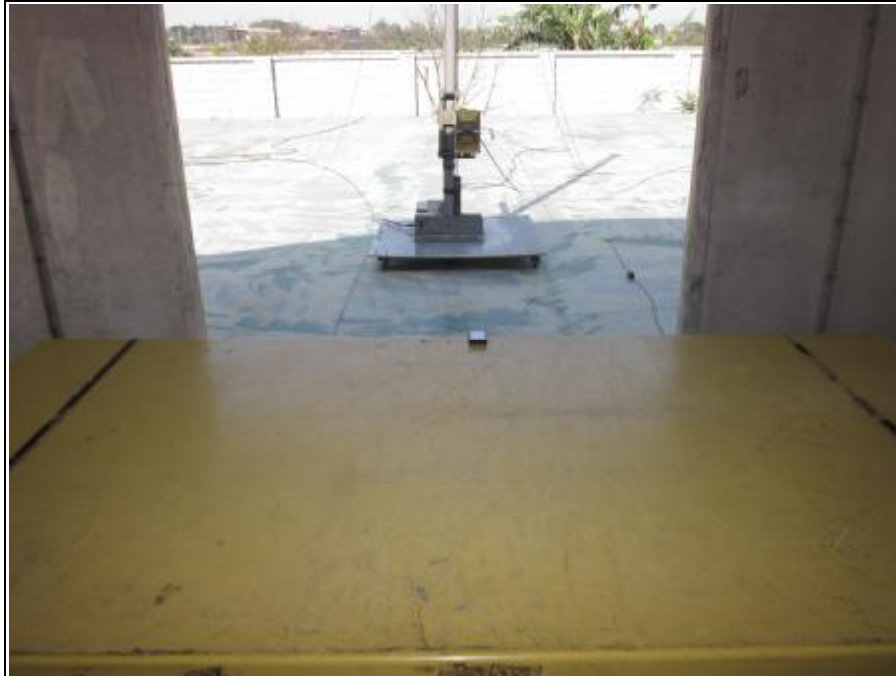
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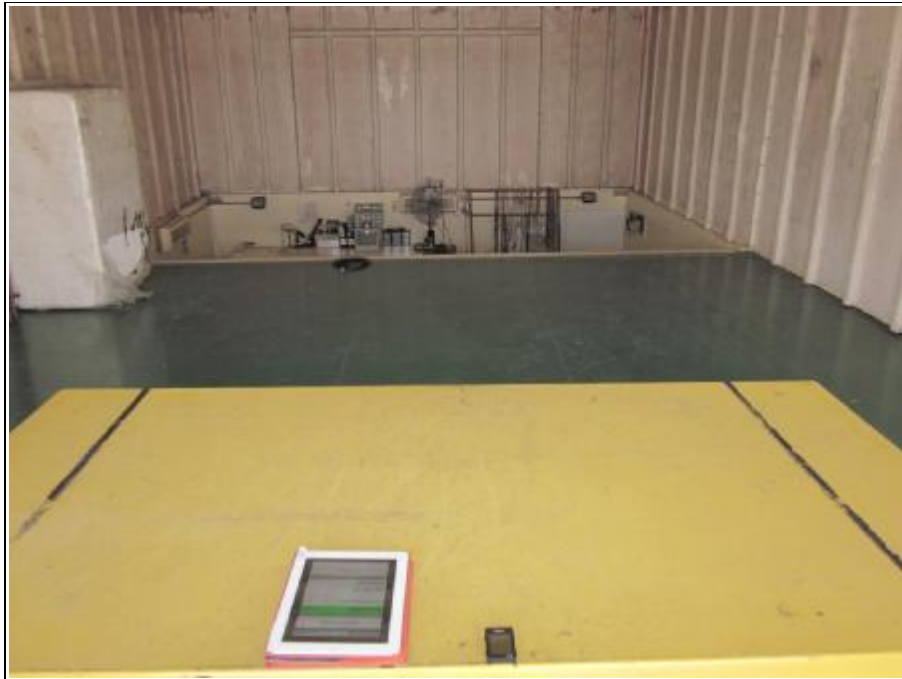
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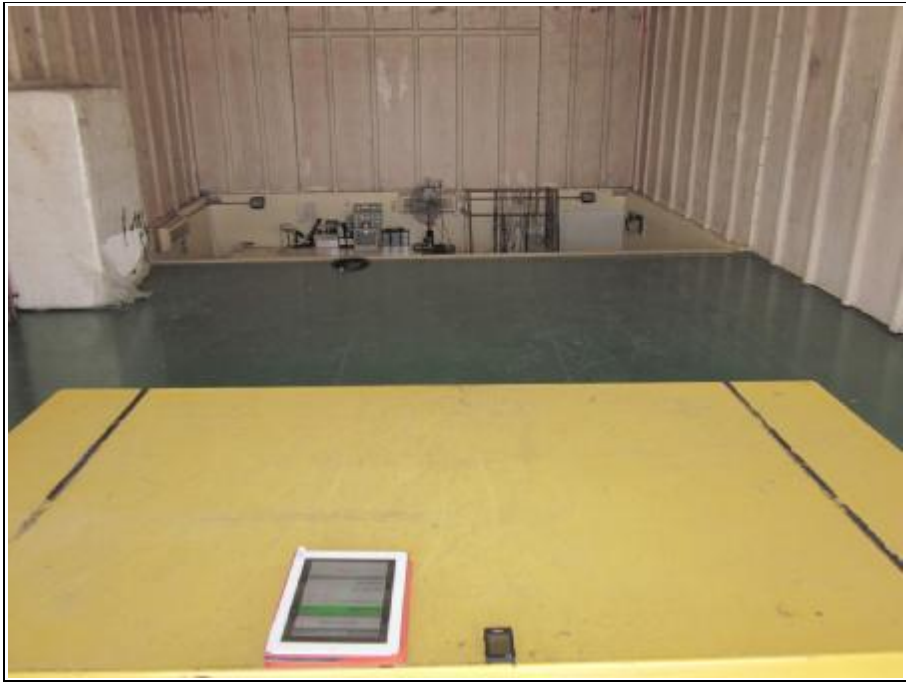
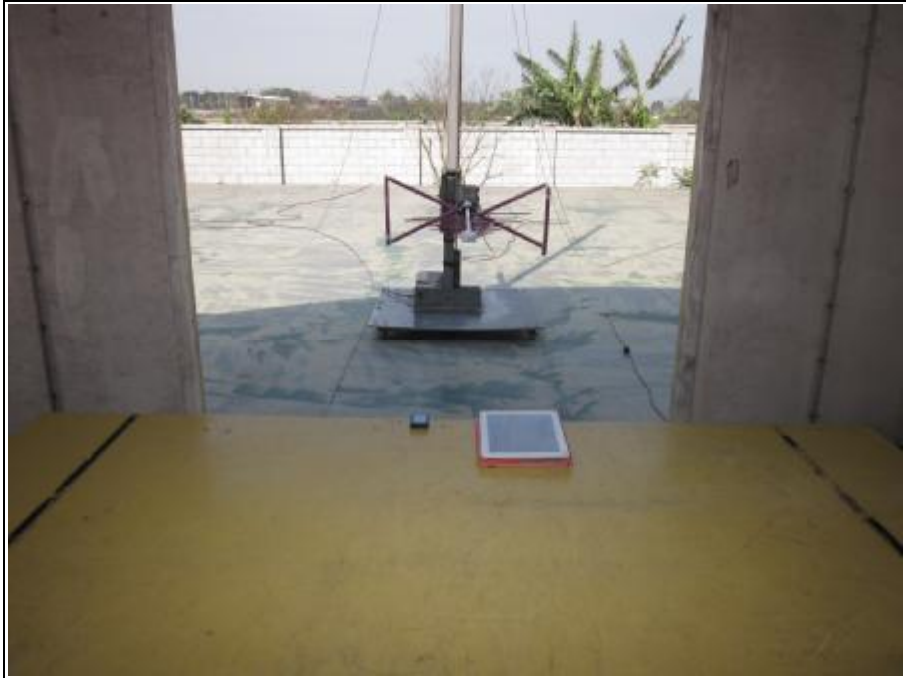
- Radiated test (above 1G, TX & Standby For BLE)



- Radiated test (below 30M, Link For BLE)



- Radiated test (below 1G, Link For BLE)





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- Radiated test (above 1G, Link For BLE)





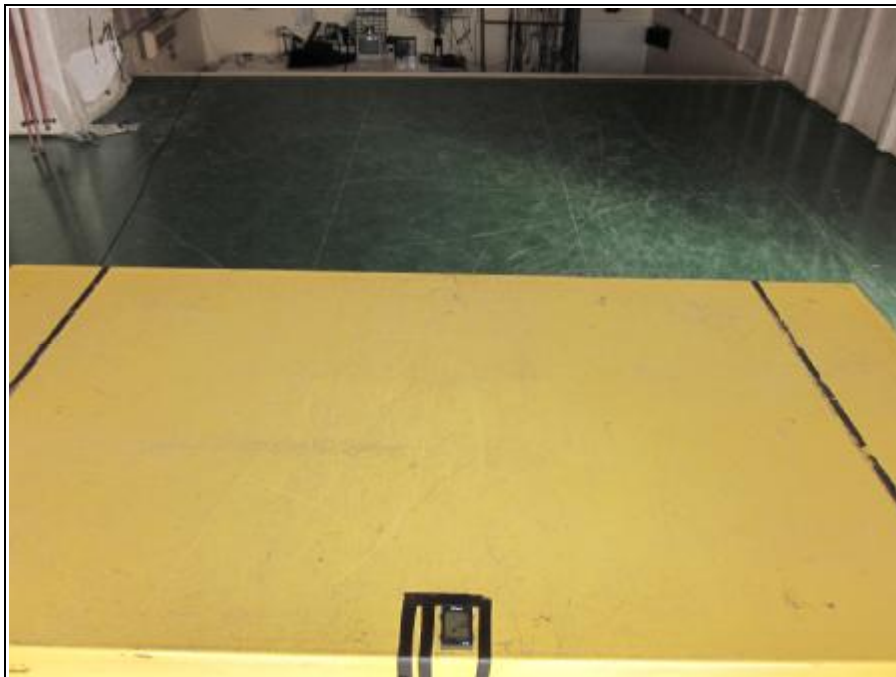
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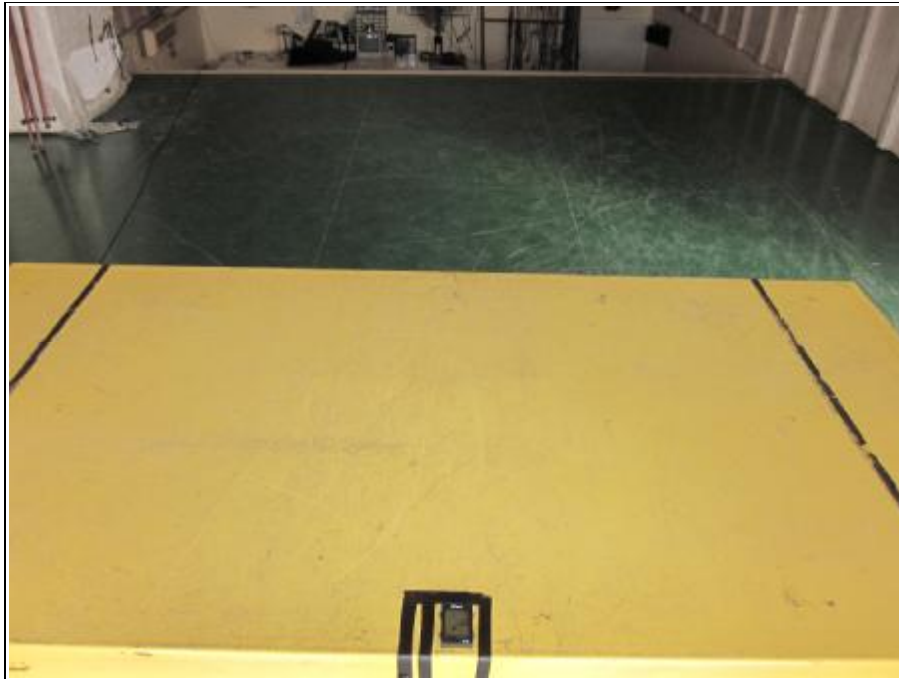
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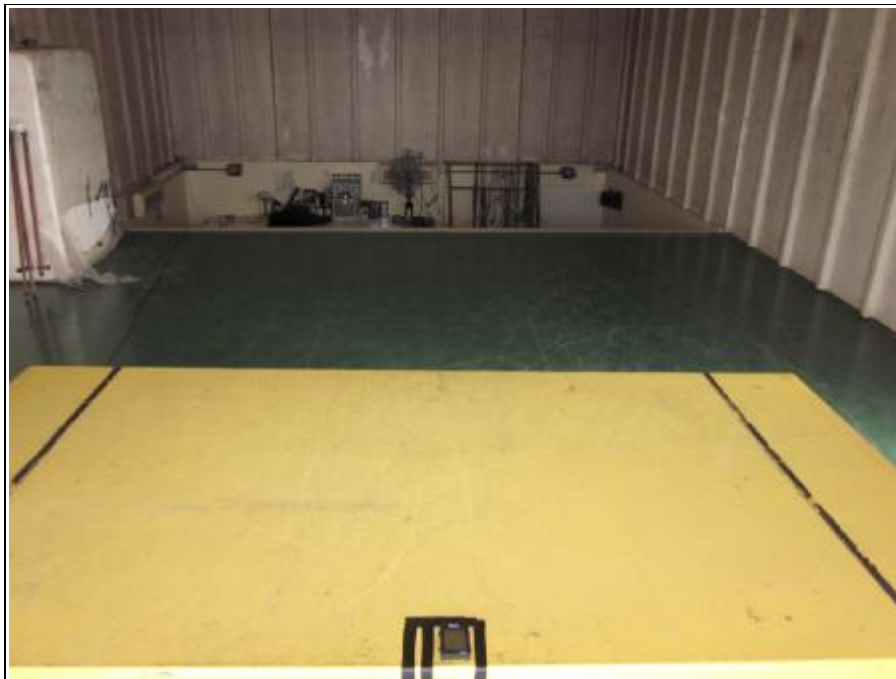
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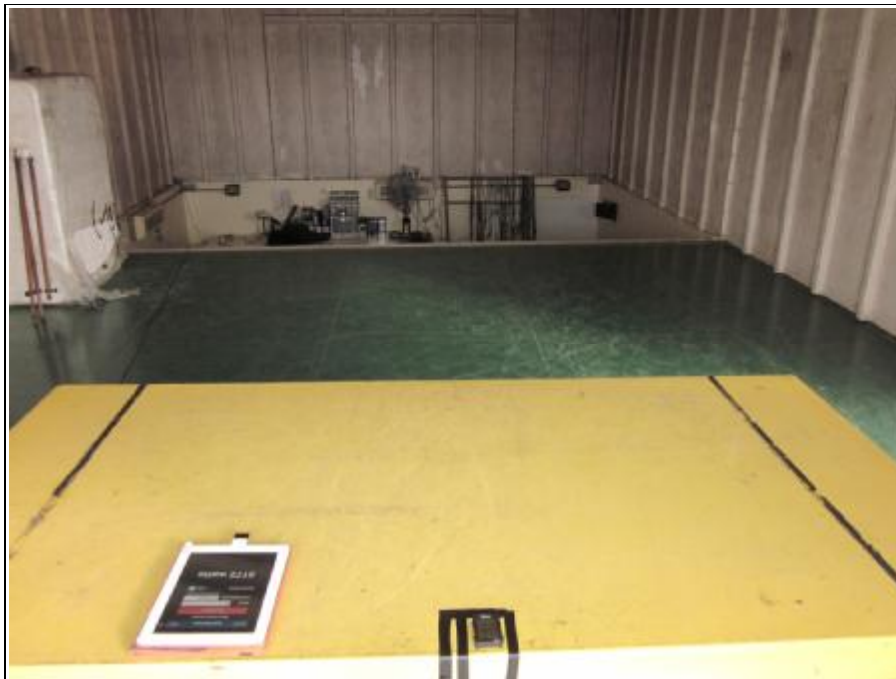
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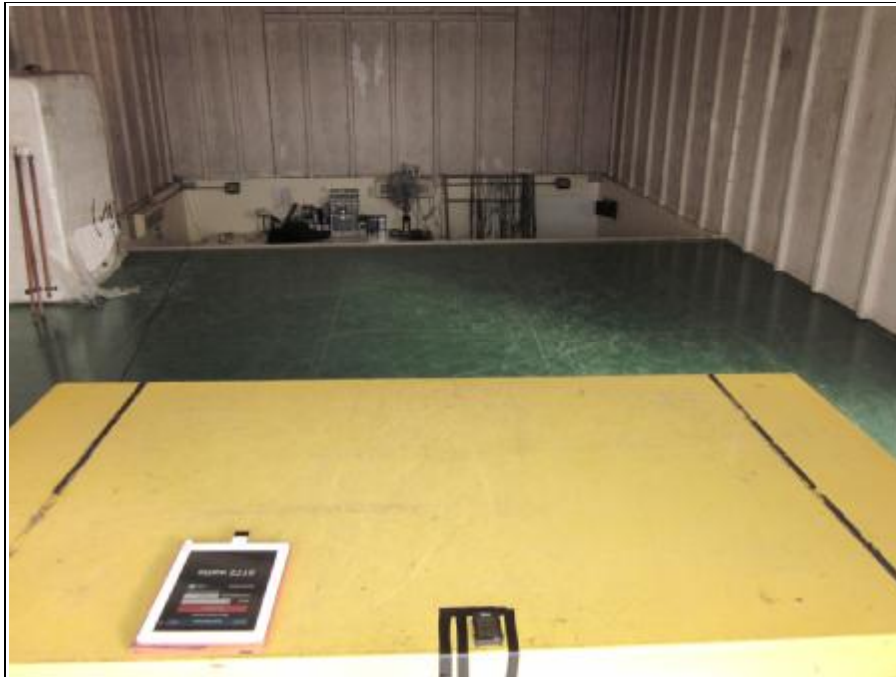
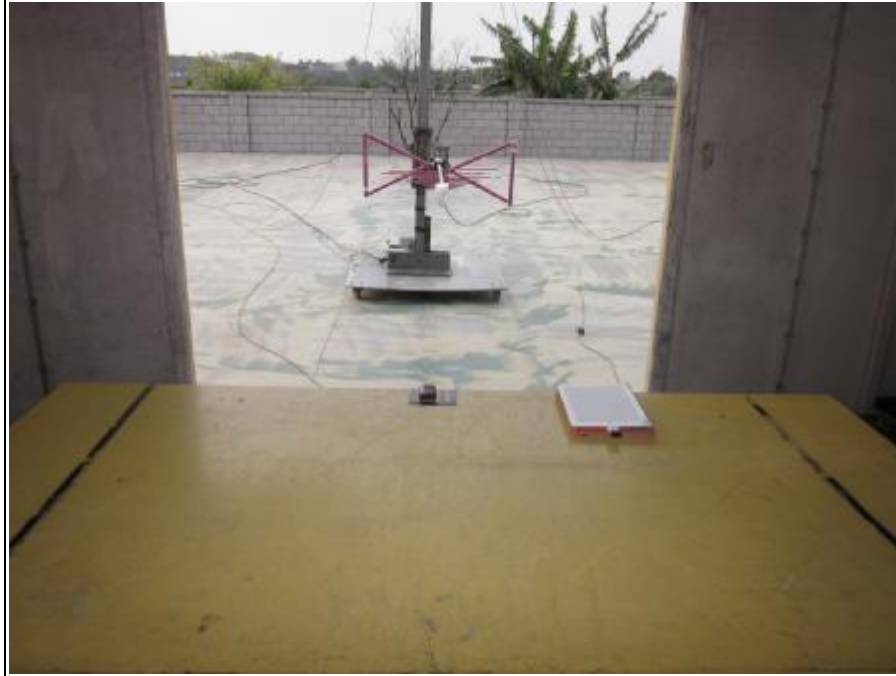
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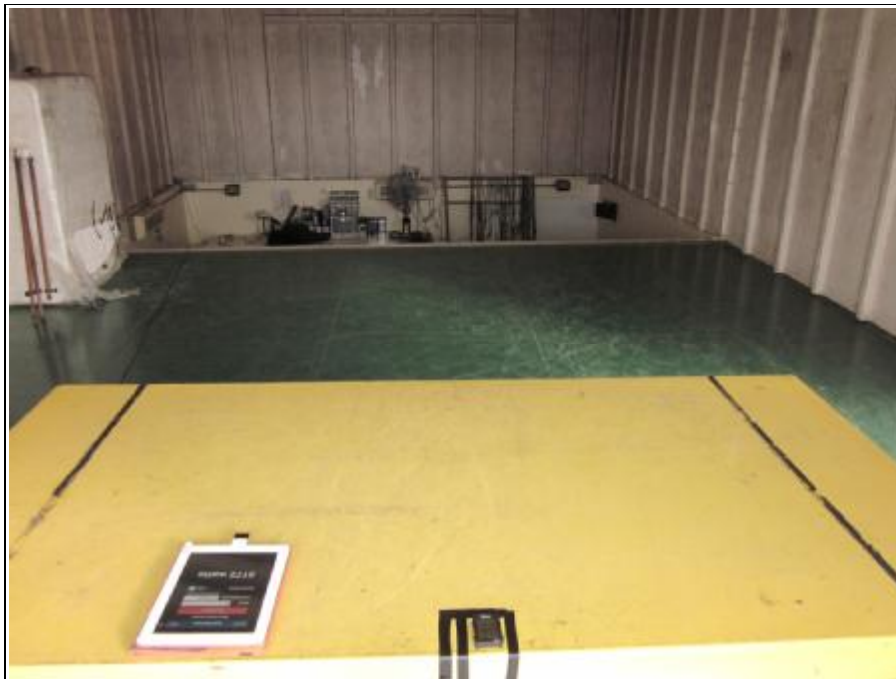
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7. TERMS OF ABBREVIATION

AV.	Average detection
AZ(°)	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