Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	**TEST REPORT**	Reference No.: A09070209 Report No.:FCCA09070209 FCC ID:XLLW-DBB11 Page:1 of 59 Date: July 23, 2009

Product Name:	2.4GHz Digital Wireless Transmitter
Model No.:	W-DBB11
Serial No.:	W-QBB41
Applicant:	INNOTECH SECURITY INC. 3784 SW 30th Avenue, Fort Lauderdale, FLORIDA 33312, U.S.A.
Date of Receipt:	July 02, 2009
Finished date of Test:	July 22, 2009
Applicable Standards:	47 CFR Part 15, Subpart C ANSI C63.4: 2003

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 : Shunm Wang , Date: July 23, 2009
(Shunm Wang)

Approved By : , Date: 7/23/2009
(Johnson Ho, Director)

NVLAP®
Lab Code: 200099-0

Table of Contents

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.
- The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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.
- AC power source, 120 Vac/60 Hz, was used during the test.

1.3 EUT MODIFICATION

Radiation :

- Add a core KCF-50-B at power cable 1 turn.
- Connect Antenna ground to chassis ground.
- Bypass 1uF capacitor at DC input.
- Improve case shielding.

Conduction :

- Series Common Mode Choke ASC-1401V(4mH) at AC input.

-

2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	2.4GHz Digital Wireless Transmitter
MODEL NO.	W-DBB11
SERIAL NO.	W-QBB41
POWER SUPPLY	DC power source from an external adapter Input: AC 100V ~ 240V , 47~63Hz , 0.35A Output: DC 12V , 1A
CABLE	N/A
FREQUENCY BAND	2400MHz ~ 2483.5MHz
CARRIER FREQUENCY	2412MHz ~ 2462MHz
NUMBER OF CHANNEL	11
CHANNEL SPACING	5 MHz
RATED RF OUTPUT POWER	10 dBm
MODULATION TYPE	QPSK
MODE OF OPERATION	Half duplex
BIT RATE OF TRANSMISSION	5 Mbps
ANTENNA TYPE	Dipole
ANTENNA GAIN	2 dBi
CHANNEL BANDWIDTH	20 MHz
EMISSION DESIGNATOR	2G40F7D

NOTE :

1. 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

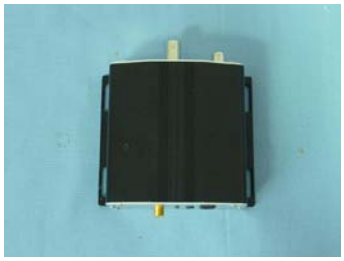
DEVICE	BRAND / MAKER	MODEL	FCC ID/DOC	REMARK
N/A				

2.3 DESCRIPTION OF TEST MODE

The axis X,Y and Z we evaluate in chamber, the X axis is worst case.
11 channels are provided by EUT of wireless. The 3 channels of lower, medium and higher were chosen for test, the modulation signal used is QPSK.
There are test modes for each test configuration as below:

Mode		Modulation Type	Channel	Frequency (MHz)
1	TX	QPSK	CH1	2412
2			CH7	2442
3			CH11	2462
4	Standby	N/A	N/A	N/A
5	Link	N/A	N/A	N/A

X axis:



Y axis:

Z axis:

2.4 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	DVD Player	LG	DK4941N	N/A	1.5m unshielded power cable.
2	Speaker	JS	J-205A	N/A	1.5m unshielded power cable. 1.8m unshielded data cable.
3	Monitor	TAYAMA	TM-1043-05M	DOC	1.5m unshielded power cable.

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

2.5 EUT OPERATING CONDITION

1.Setup the EUT and all peripheral devices .

2.Turn on the power of all equipment and EUT.

3.TX Mode : Set the EUT under continuous transmission condition, the bit rate of 5Mbps set by test software.

2.6 DESCRIPTION OF MODEL DIFFERENCE

	Original Model W-DBB11	Serial No. W-QBB41
1	○	○
2	○	○
3	○	○
4	○	○
5	○	○
6	○	╳
7	○	○

NOTE : 1. Exterior , 2.RF Module, 3. Lay out , 4. External Antenna , 5.I/O Port , 6. Software , 7. Main Board , 9. ○ is same , ╳ is different

3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of 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

ANSI C63.4: 2003

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

4 . TECHNICAL CHARACTERISTICS TEST

4.1 CONDUCTED EMISSION TEST

4.1.1 LIMIT

Frequency (MHz)	Class A (dBμV)		Class B (dBμV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE :

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

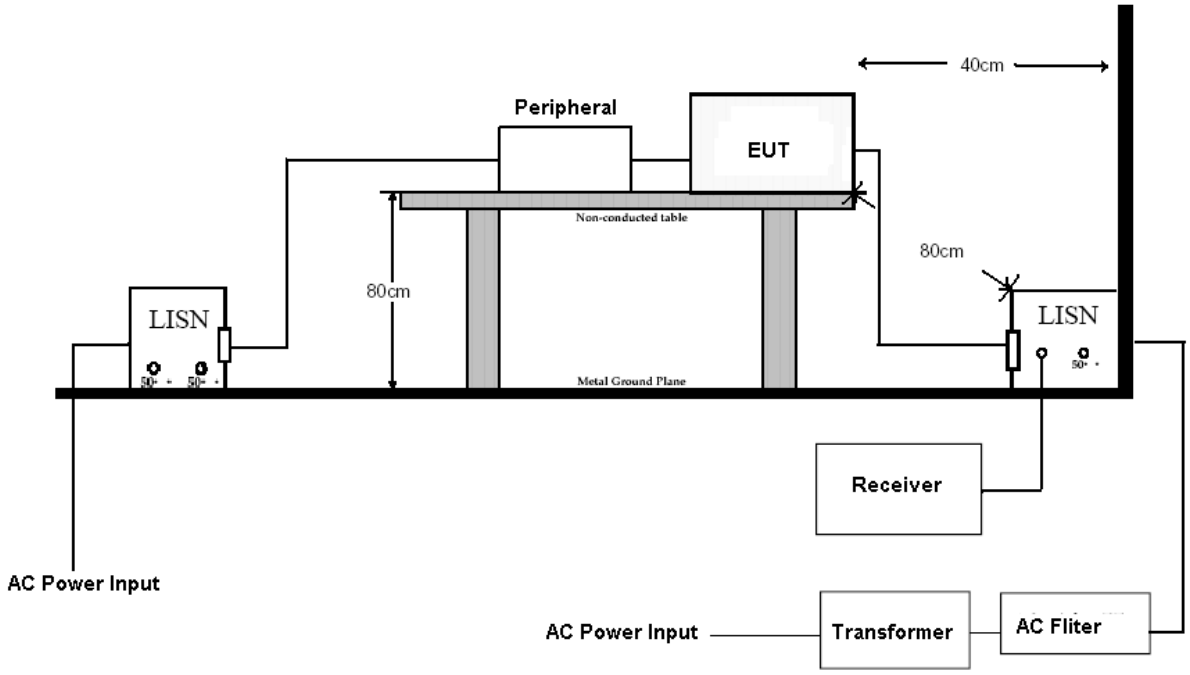
4.1.2 TEST EQUIPMENT

The following test equipment was used for the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9kHz TO 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	NOV.2009 ETC
LISN	50 μH, 50 ohm	FCC	FCC-LISN-50-25-2 / 01017	OCT. 2009 ETC
LISN	50μH, 50 ohm	SOLAR	9252-50-R24-BNC / 951315	JUN. 2010 ETC
50 OHM TERMINATOR	50 ohm	HP	11593A / #2	MAY 2010 ETC
COAXIAL CABLE	5M	TIMES	LMR-400 / #5M(L3TCAB003)	MAY. 2010 ETC
Filter	2 LINE, 30A	FIL.COIL	FC-943 / 771	NCR
GROUND PLANE	2M (H) x 3M (W)	SRT	N/A	NCR
GROUND PLANE	2.5M (H) x 3M (W)	SRT	N/A	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 SETUP



NOTE :

1. The EUT was put on a wooden table with 0.8m heights above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. 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 CISPR22:2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50μH as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and 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.

4.1.5 TEST RESULT

Temperature:	27 °C	Humidity:	54 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	1
Receiver Detector:	Q.P. and AV.	Modulation Type:	QPSK
Tested By:	Shunm Wang	Tested Channel:	2412MHz
		Tested Date:	July 04, 2009

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.192	0.20	49.89	37.30	50.09	37.50	63.95	53.95	-13.86	-16.45
0.195	0.20	50.72	33.98	50.92	34.18	63.82	53.82	-12.90	-19.64
0.543	0.14	46.29	31.04	46.43	31.18	56.00	46.00	-9.57	-14.82
4.982	0.12	36.60	30.04	36.72	30.16	56.00	46.00	-19.28	-15.84
5.376	0.12	38.51	31.97	38.63	32.09	60.00	50.00	-21.37	-17.91
5.913	0.13	39.51	32.88	39.64	33.01	60.00	50.00	-20.36	-16.99

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.498	0.16	42.21	28.71	42.37	28.87	56.04	46.04	-13.67	-17.17
0.501	0.14	41.78	29.07	41.92	29.21	56.00	46.00	-14.08	-16.79
0.581	0.14	46.03	32.70	46.17	32.84	56.00	46.00	-9.83	-13.16
4.922	0.16	37.65	31.08	37.81	31.24	56.00	46.00	-18.19	-14.76
5.132	0.16	38.31	31.99	38.47	32.15	60.00	50.00	-21.53	-17.85
5.680	0.17	38.09	32.00	38.26	32.17	60.00	50.00	-21.74	-17.83

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

Temperature:	27 °C	Humidity:	54 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	2
Receiver Detector:	Q.P. and AV.	Modulation Type:	QPSK
Tested By:	Shunm Wang	Tested Channel:	2442MHz
		Tested Date:	July 04, 2009

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.384	0.17	46.23	29.19	46.40	29.36	58.19	48.19	-11.79	-18.83
0.390	0.17	45.57	24.49	45.74	24.66	58.07	48.07	-12.33	-23.41
0.552	0.14	47.36	32.19	47.50	32.33	56.00	46.00	-8.50	-13.67
4.992	0.12	37.18	30.16	37.30	30.28	56.00	46.00	-18.70	-15.72
5.913	0.13	39.67	32.07	39.80	32.20	60.00	50.00	-20.20	-17.80
6.167	0.14	37.32	29.85	37.46	29.99	60.00	50.00	-22.54	-20.01

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.498	0.16	42.05	28.63	42.21	28.79	56.04	46.04	-13.83	-17.25
0.501	0.14	41.88	29.07	42.02	29.21	56.00	46.00	-13.98	-16.79
0.557	0.14	45.38	32.44	45.52	32.58	56.00	46.00	-10.48	-13.42
4.507	0.15	36.29	27.54	36.44	27.69	56.00	46.00	-19.56	-18.31
5.741	0.17	37.09	30.51	37.26	30.68	60.00	50.00	-22.74	-19.32
5.903	0.17	38.65	31.02	38.82	31.19	60.00	50.00	-21.18	-18.81

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

Temperature:	28 °C	Humidity:	53 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	3
Receiver Detector:	Q.P. and AV.	Modulation Type:	QPSK
Tested By:	Shunm Wang	Tested Channel:	2462MHz
		Tested Date:	July 22, 2009

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.378	0.17	43.37	29.93	43.54	30.10	58.33	48.33	-14.79	-18.23
0.384	0.17	45.99	29.69	46.16	29.86	58.19	48.19	-12.03	-18.33
0.543	0.14	46.31	31.74	46.45	31.88	56.00	46.00	-9.55	-14.12
4.982	0.12	36.92	29.88	37.04	30.00	56.00	46.00	-18.96	-16.00
5.426	0.13	39.37	32.14	39.50	32.27	60.00	50.00	-20.50	-17.73
5.731	0.13	38.76	32.91	38.89	33.04	60.00	50.00	-21.11	-16.96

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.498	0.16	42.03	28.63	42.19	28.79	56.04	46.04	-13.85	-17.25
0.501	0.14	41.98	29.07	42.12	29.21	56.00	46.00	-13.88	-16.79
0.581	0.14	46.05	32.44	46.19	32.58	56.00	46.00	-9.81	-13.42
4.982	0.16	37.99	27.54	38.15	27.70	56.00	46.00	-17.85	-18.30
5.274	0.16	38.60	30.51	38.76	30.67	60.00	50.00	-21.24	-19.33
5.639	0.17	38.75	31.02	38.92	31.19	60.00	50.00	-21.08	-18.81

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

Temperature:	27 °C	Humidity:	54 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	4
Receiver Detector:	Q.P. and AV.	Modulation Type:	N/A
Tested By:	Shunm Wang	Tested Channel:	N/A
		Tested Date:	July 04, 2009

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.498	0.16	42.85	29.37	43.01	29.53	56.04	46.04	-13.03	-16.51
0.501	0.14	42.58	29.94	42.72	30.08	56.00	46.00	-13.28	-15.92
0.581	0.14	47.03	33.77	47.17	33.91	56.00	46.00	-8.83	-12.09
4.912	0.12	37.33	30.40	37.45	30.52	56.00	46.00	-18.55	-15.48
5.447	0.13	40.33	33.57	40.46	33.70	60.00	50.00	-19.54	-16.30
5.568	0.13	39.25	32.50	39.38	32.63	60.00	50.00	-20.62	-17.37

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.372	0.17	46.19	31.22	46.36	31.39	58.46	48.46	-12.10	-17.07
0.378	0.17	46.51	30.30	46.68	30.47	58.33	48.33	-11.65	-17.86
0.538	0.14	47.58	31.38	47.72	31.52	56.00	46.00	-8.28	-14.48
4.982	0.16	36.68	30.48	36.84	30.64	56.00	46.00	-19.16	-15.36
4.992	0.16	36.95	30.76	37.11	30.92	56.00	46.00	-18.89	-15.08
9.872	0.24	35.26	28.12	35.50	28.36	60.00	50.00	-24.50	-21.64

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

Temperature:	27 °C	Humidity:	54 %RH
Frequency Range:	0.15 – 30 MHz	Tested Mode:	5
Receiver Detector:	Q.P. and AV.	Modulation Type:	N/A
Tested By:	Shunm Wang	Tested Channel:	N/A
		Tested Date:	July 04, 2009

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.363	0.17	45.65	30.51	45.82	30.68	58.66	48.66	-12.84	-17.98
0.447	0.16	40.10	22.18	40.26	22.34	56.93	46.93	-16.68	-24.60
0.552	0.14	47.96	32.95	48.10	33.09	56.00	46.00	-7.90	-12.91
4.883	0.11	35.82	27.15	35.93	27.26	56.00	46.00	-20.07	-18.74
4.992	0.12	36.63	30.86	36.75	30.98	56.00	46.00	-19.25	-15.02
5.680	0.13	39.48	31.74	39.61	31.87	60.00	50.00	-20.39	-18.13

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.498	0.16	43.38	33.32	43.54	33.48	56.04	46.04	-12.50	-12.56
0.501	0.14	43.35	33.30	43.49	33.44	56.00	46.00	-12.51	-12.56
0.538	0.14	46.49	31.36	46.63	31.50	56.00	46.00	-9.37	-14.50
1.220	0.09	33.24	25.51	33.33	25.60	56.00	46.00	-22.67	-20.40
1.309	0.10	36.02	25.66	36.12	25.76	56.00	46.00	-19.88	-20.24
11.212	0.25	33.10	20.87	33.35	21.12	60.00	50.00	-26.65	-28.88

NOTE :

1. Measurement uncertainty is +/-2dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

4.2 RADIATED EMISSION TEST

4.2.1 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 (dBμV/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 :

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

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

4.2.2 TEST EQUIPMENT

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

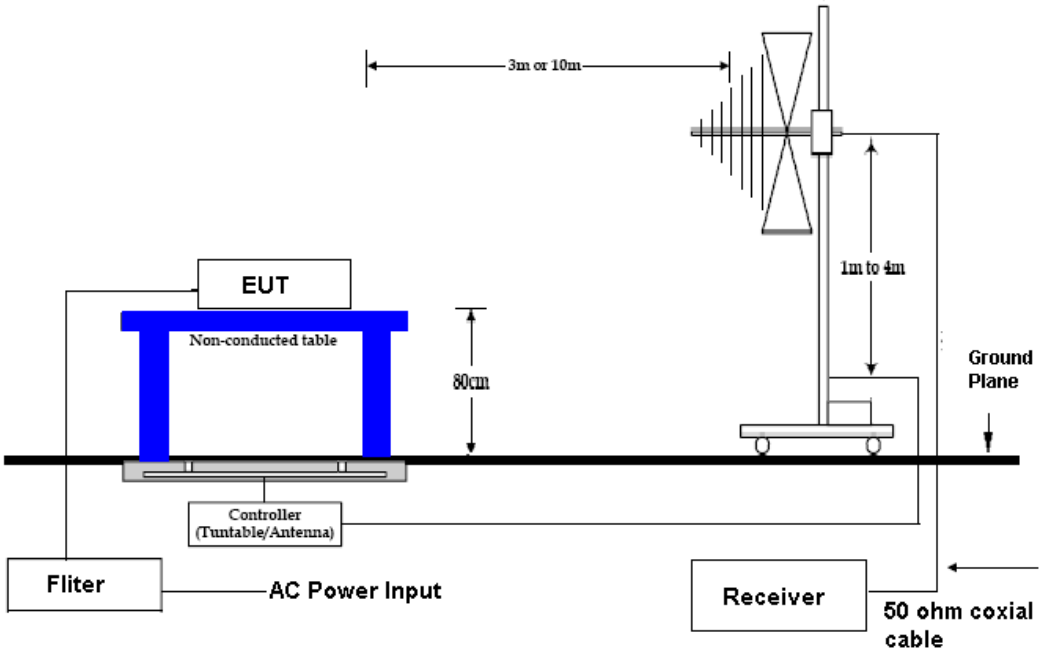
EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	20 MHz TO 1000 MHz	ROHDE & SCHWARZ	ESVS30 / 841977/003	DEC. 2009 ETC
BI-LOG ANTENNA	30MHz to 2GHz	SCHFFNER	CBL6141A / 4128	MAY 2010 ETC
COAXIAL CABLE	30M	TIMES	LMR-400 / #30M	MAY 2010 ETC
FILTER	2 LINE, 30A	FIL.COIL	FC-943 / 869	NRC
OATS	3 – 10 M MEASUREMENT	SRT	SRT-1	MAY 2010 SRT
SPECTRUM ANALYZER	9K-40GHz	ROHDE & SCHWARZ	FSP40 / 100093	SEP. 2009 ETC
PRE-AMPLIFIER	1 GHz TO 26.5 GHz	AGILENT	8449B/ 3008A01019	NOV. 2009 ETC
HORN ANTENNA	1 GHz TO 18 GHz	EMCO	3115/ 9602-4681	FEB. 2010 ETC
K-TYPE CABLE	15M	HUBER SUHNER	SF102-40/2*11 / 23932/2	MAY 2010 ETC
K-TYPE CABLE	1M	HUBER SUHNER	SF102-40/2*11 / 28934/2	NOV. 2010 ETC

NOTE:

1. 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

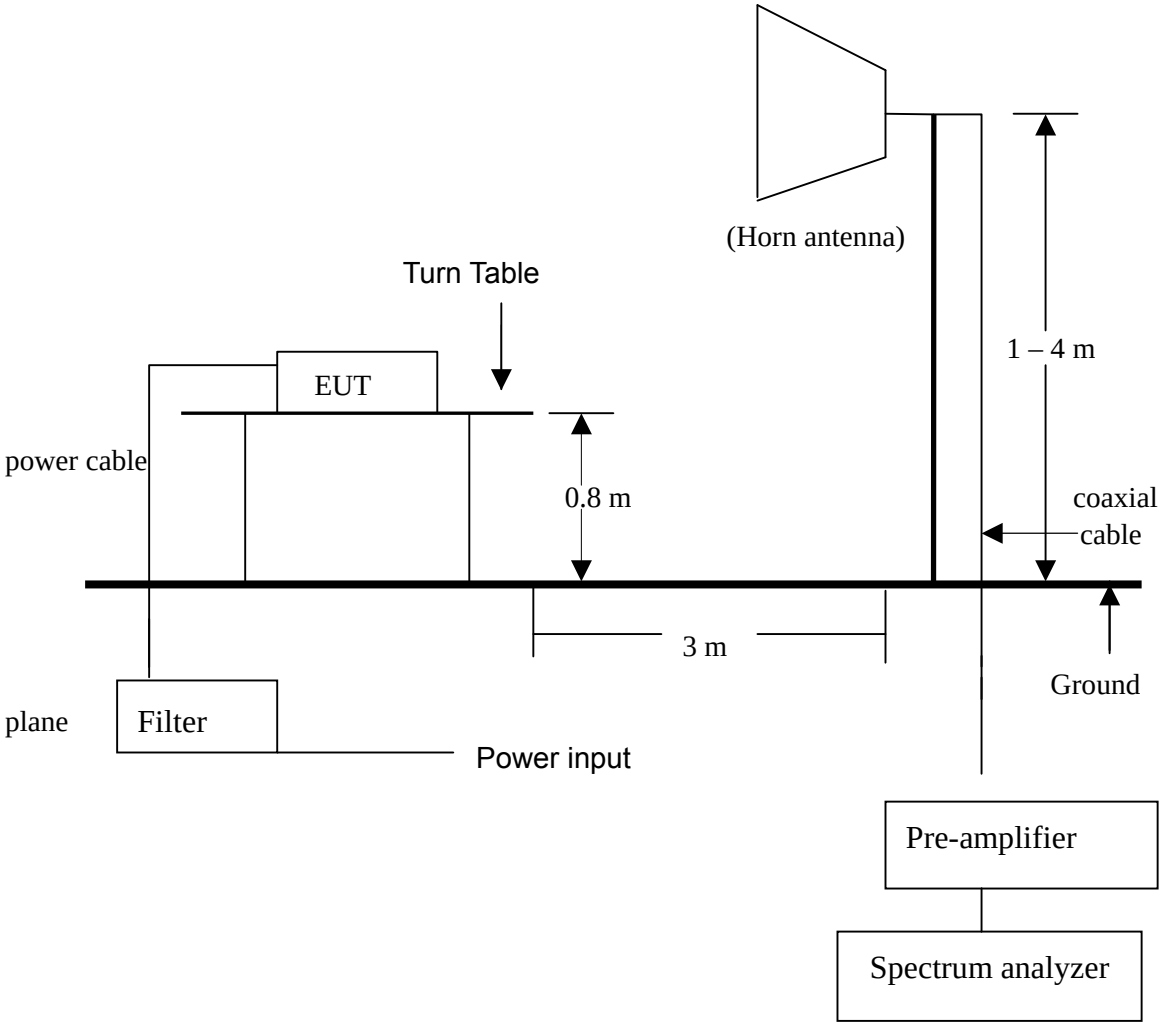
(30MHz~1000MHz)



NOTE :

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

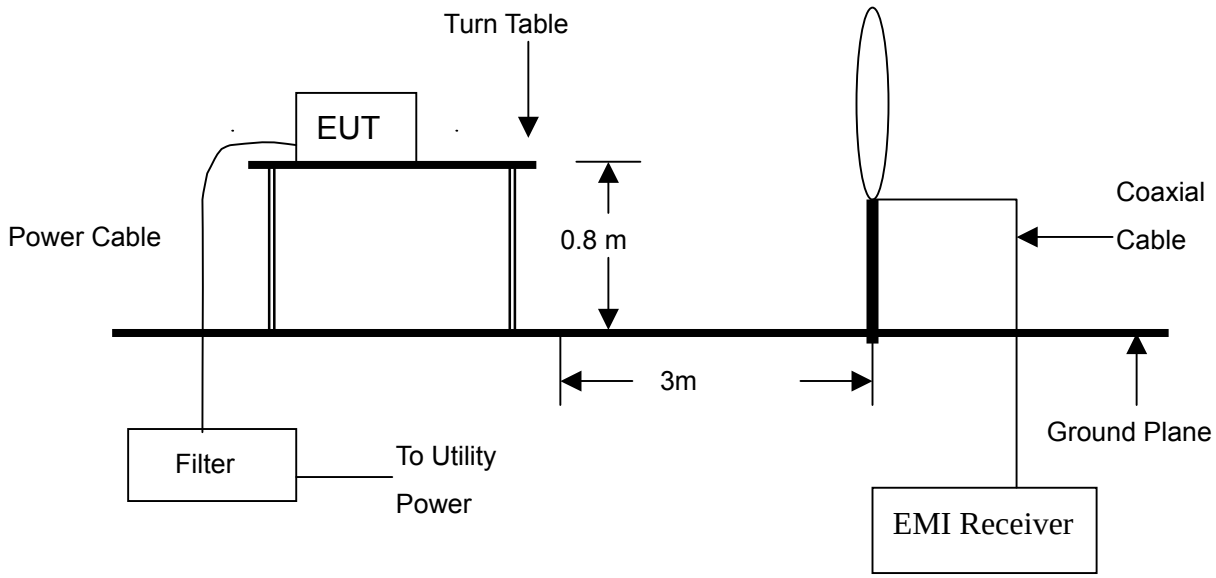
TEST SET- UP (1GHz - 25GHz)



NOTE :

1.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.

TEST SET- UP (9KHz – 30MHz)



NOTE :

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

4.2.4 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 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 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.

4.2.5 TEST RESULT

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	0.009 – 30 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	1
Tested By:	Shunm Wang	Tested Date:	July 10, 2009

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)
1.2680	0.295	20.2	31.8	52.30	85.54	-33.25	176	1
3.7878	0.488	20.18	24.8	45.47	76.04	-30.57	215	1
5.6473	0.634	20.13	26.6	47.36	72.57	-25.20	304	1
8.2865	0.738	20.15	25.9	46.79	69.24	-22.45	96	1
9.7260	0.859	20.16	28.1	49.12	67.85	-18.73	113	1
13.7448	0.703	20.17	25.2	46.07	64.84	-18.77	259	1

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)
1.2678	0.295	20.2	27.3	47.80	85.54	-37.75	119	1
2.7879	0.446	20.2	22.5	43.15	78.70	-35.55	151	1
5.6470	0.634	20.13	24.1	44.86	72.57	-27.70	206	1
8.2863	0.738	20.15	23.4	44.29	69.24	-24.95	196	1
9.7263	0.859	20.16	25.6	46.62	67.85	-21.23	15	1
13.7450	0.703	20.17	24.4	45.27	64.84	-19.57	339	1

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	0.009 – 30 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	2
Tested By:	Shunm Wang	Tested Date:	July 10, 2009

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)
1.2680	0.295	20.2	31.7	52.20	85.54	-33.35	174	1
3.7878	0.488	20.18	24.7	45.37	76.04	-30.67	216	1
5.6473	0.634	20.13	26.5	47.26	72.57	-25.30	306	1
8.2865	0.738	20.15	25.8	46.69	69.24	-22.55	99	1
9.7260	0.859	20.16	28	49.02	67.85	-18.83	111	1
13.7448	0.703	20.17	25.3	46.17	64.84	-18.67	257	1

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)
1.2678	0.295	20.2	27.2	47.70	85.54	-37.85	116	1
2.7879	0.446	20.2	22.6	43.25	78.70	-35.45	153	1
5.6470	0.634	20.13	24.2	44.96	72.57	-27.60	204	1
8.2863	0.738	20.15	23.3	44.19	69.24	-25.05	198	1
9.7263	0.859	20.16	25.5	46.52	67.85	-21.33	16	1
13.7450	0.703	20.17	24.3	45.17	64.84	-19.67	341	1

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	32 °C	Humidity:	58 %RH
Frequency Range:	0.009 – 30 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	3
Tested By:	Shunm Wang	Tested Date:	July 22, 2009

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)
1.2684	0.295	20.2	32.2	52.70	85.54	-32.84	173	1
3.7872	0.488	20.18	24.5	45.17	76.04	-30.87	212	1
5.6478	0.634	20.13	26.7	47.46	72.57	-25.10	301	1
8.2861	0.738	20.15	26.1	46.99	69.24	-22.25	99	1
9.7259	0.859	20.16	28.3	49.32	67.85	-18.53	115	1
13.7451	0.703	20.17	25.2	46.07	64.84	-18.77	262	1

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)
1.2672	0.295	20.2	27.5	48.00	85.55	-37.55	117	1
2.7875	0.446	20.2	22.4	43.05	78.70	-35.65	150	1
5.6470	0.634	20.13	24.2	44.96	72.57	-27.60	203	1
8.2865	0.738	20.15	23.1	43.99	69.24	-25.25	199	1
9.7261	0.859	20.16	25.6	46.62	67.85	-21.23	14	1
13.7451	0.703	20.17	24.4	45.27	64.84	-19.57	335	1

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	0.009 – 30 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	4
Tested By:	Shunm Wang	Tested Date:	July 10, 2009

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)
0.7887	0.252	20.25	30.6	51.10	89.67	-38.56	244	1
1.0886	0.295	20.2	31.8	52.30	86.87	-34.57	159	1
6.1276	0.663	20.14	21.7	42.50	71.86	-29.36	204	1
8.2265	0.738	20.15	25.9	46.79	69.30	-22.51	261	1
9.9060	0.859	20.16	21.7	42.72	67.69	-24.97	155	1
10.3259	0.660	20.17	22.6	43.43	67.33	-23.90	174	1

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)
0.7886	0.252	20.25	27.1	47.60	89.67	-42.07	46	1
1.0888	0.295	20.2	28.4	48.90	86.87	-37.97	15	1
6.1275	0.663	20.14	22.3	43.10	71.86	-28.76	355	1
8.2262	0.738	20.15	24.1	44.99	69.30	-24.31	39	1
9.9058	0.859	20.16	23.5	44.52	67.69	-23.17	166	1
10.3262	0.660	20.17	20.2	41.03	67.33	-26.30	27	1

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	0.009 – 30 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	5
Tested By:	Shunm Wang	Tested Date:	July 10, 2009

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)
1.2680	0.295	20.2	30.2	50.70	34.02	16.68	170	1
3.7878	0.488	20.18	23.4	44.07	24.51	19.56	211	1
5.6473	0.634	20.13	25.1	45.86	21.04	24.82	309	1
8.2865	0.738	20.15	24.8	45.69	17.71	27.98	110	1
9.7260	0.859	20.16	27.5	48.52	16.32	32.20	108	1
13.7448	0.703	20.17	24.3	45.17	13.31	31.86	254	1

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)
1.2678	0.295	20.2	26.4	46.90	34.02	12.88	123	1
2.7879	0.446	20.2	23.1	43.75	27.17	16.57	147	1
5.6470	0.634	20.13	22.9	43.66	21.04	22.62	202	1
8.2863	0.738	20.15	21.5	42.39	17.71	24.68	199	1
9.7263	0.859	20.16	24.2	45.22	16.32	28.90	20	1
13.7450	0.703	20.17	22.8	43.67	13.31	30.36	335	1

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	1
Tested By:	Shunm Wang	Tested Date:	July 10, 2009

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)
64.9656	1.07	8.74	20.2	30.0	40.0	-10.0	152	2.43
120.2710	1.44	12.00	16.6	30.0	43.5	-13.5	275	2.32
172.3368	1.70	11.00	17.3	30.0	43.5	-13.5	34	2.14
397.9565	2.75	16.41	21.1	40.3	46.0	-5.7	278	1.67
527.9986	3.18	18.64	20.4	42.2	46.0	-3.8	352	1.32
659.9929	3.57	20.74	17.3	41.6	46.0	-4.4	193	1.21

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)
64.9651	1.07	8.74	22.2	32.0	40.0	-8.0	48	1.52
399.5168	2.76	16.47	17.5	36.7	46.0	-9.3	281	1.43
440.2150	2.88	17.10	15.2	35.2	46.0	-10.8	133	1.17
527.9990	3.18	18.64	18.2	40.0	46.0	-6.0	345	1.26
659.9930	3.57	20.74	15.1	39.4	46.0	-6.6	118	1.35
922.9515	4.25	23.81	10.2	38.3	46.0	-7.7	94	1.02

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	2
Tested By:	Shunm Wang	Tested Date:	July 10, 2009

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)
64.9662	1.07	8.74	20.0	29.8	40.0	-10.2	151	2.42
120.2723	1.44	12.00	16.5	29.9	43.5	-13.6	273	2.31
172.3371	1.70	11.00	17.4	30.1	43.5	-13.4	36	2.13
397.9559	2.75	16.41	21.0	40.2	46.0	-5.8	274	1.65
527.9982	3.18	18.64	20.3	42.1	46.0	-3.9	355	1.30
659.9921	3.57	20.74	17.2	41.5	46.0	-4.5	195	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)
64.9655	1.07	8.74	22.0	31.8	40.0	-8.2	50	1.51
399.5167	2.76	16.47	17.3	36.5	46.0	-9.5	284	1.41
440.2159	2.88	17.10	15.0	35.0	46.0	-11.0	130	1.15
527.9983	3.18	18.64	18.4	40.2	46.0	-5.8	342	1.27
659.9927	3.57	20.74	15.7	40.0	46.0	-6.0	114	1.34
922.9519	4.25	23.81	10.4	38.5	46.0	-7.5	94	1.00

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	32 °C	Humidity:	58 %RH
Frequency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	3
Tested By:	Shunm Wang	Tested Date:	July 22, 2009

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)
64.9666	1.07	8.74	20.2	30.0	40.0	-10.0	156	2.4
120.2720	1.44	12.00	16.7	30.1	43.5	-13.4	274	2.33
172.3370	1.70	11.00	17.2	29.9	43.5	-13.6	36	2.13
397.9559	2.75	16.41	21.2	40.4	46.0	-5.6	274	1.63
527.9972	3.18	18.64	20.3	42.1	46.0	-3.9	355	1.3
659.9939	3.57	20.74	17.4	41.7	46.0	-4.3	199	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)
64.9649	1.07	8.74	22.0	31.8	40.0	-8.2	50	1.53
399.5167	2.76	16.47	17.3	36.5	46.0	-9.5	284	1.43
440.2159	2.88	17.10	15.2	35.2	46.0	-10.8	134	1.13
527.9981	3.18	18.64	18.4	40.2	46.0	-5.8	344	1.25
659.9929	3.57	20.74	15.5	39.8	46.0	-6.2	118	1.37
922.9526	4.25	23.81	10.4	38.5	46.0	-7.5	92	1.03

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	4
Tested By:	Shunm Wang	Tested Date:	July 10, 2009

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)
33.2700	0.81	22.22	12.2	35.2	40.0	-4.8	27	2.84
172.6500	1.70	11.00	15.9	28.6	43.5	-14.9	40	2.12
259.9950	2.12	13.28	16.0	31.4	46.0	-14.6	176	1.98
397.9560	2.75	16.41	16.9	36.1	46.0	-9.9	269	1.64
527.9983	3.18	18.64	16.8	38.6	46.0	-7.4	349	1.29
700.1560	3.69	20.90	10.5	35.1	46.0	-10.9	196	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(°)	EL(m)
120.2740	1.44	12.00	14.6	28.0	43.5	-15.5	96	1.35
259.9951	2.12	13.28	13.9	29.3	46.0	-16.7	155	1.28
527.9979	3.18	18.64	15.1	36.9	46.0	-9.1	347	1.24
700.1540	3.69	20.90	9.5	34.1	46.0	-11.9	74	1.10
792.1500	3.92	22.57	8.2	34.7	46.0	-11.3	168	1.05
922.9530	4.25	23.81	7.7	35.8	46.0	-10.2	156	1.16

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	5
Tested By:	Shunm Wang	Tested Date:	July 10, 2009

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)
64.9650	1.07	8.74	20.1	29.9	40.0	-10.1	154	2.42
120.2700	1.44	12.00	16.7	30.1	43.5	-13.4	277	2.31
172.3360	1.70	11.00	17.4	30.1	43.5	-13.4	39	2.15
397.9560	2.75	16.41	21.2	40.4	46.0	-5.6	275	1.68
527.9981	3.18	18.64	20.5	42.3	46.0	-3.7	351	1.31
659.9920	3.57	20.74	17.4	41.7	46.0	-4.3	195	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)
64.9655	1.07	8.74	22.3	32.1	40.0	-7.9	46	1.53
399.5160	2.76	16.47	17.6	36.8	46.0	-9.2	283	1.42
440.2100	2.88	17.10	15.1	35.1	46.0	-10.9	130	1.18
527.9988	3.18	18.64	18.1	39.9	46.0	-6.1	342	1.27
659.9923	3.57	20.74	15.0	39.3	46.0	-6.7	116	1.36
922.9510	4.25	23.81	10.3	38.4	46.0	-7.6	97	1.01

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	1
Tested By:	Shunm Wang	Tested Channel:	CH1 : 2412MHz
Tested Date:	July 10, 2009	Modulation Type:	QPSK

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2412.00	-23.54	28.12	88.4	80.2	93.0	84.8	74.0	54.0	(F)	(F)	348	1.73
4824.00	-19.03	33.11	40.2	*	54.3	*	74.0	54.0	-19.7	*	173	1.25
7236.00	-14.99	35.57	35.1	*	55.7	*	74.0	54.0	-18.3	*	181	1.31
1190.50	-28.24	24.59	39.9	*	36.3	*	74.0	54.0	-37.7	*	51	1.45
1400.50	-25.18	25.14	37.8	*	37.8	*	74.0	54.0	-36.2	*	3	1.26
1828.00	-25.78	26.65	47.5	38.5	48.3	39.4	74.0	54.0	-25.7	-14.6	277	1.18

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2412.00	-23.54	28.12	98.9	95.9	103.5	100.5	74.0	54.0	(F)	(F)	166	1.15
4824.00	-19.03	33.11	43.9	34.8	58.0	48.9	74.0	54.0	-16.0	-5.1	351	1.25
7236.00	-14.99	35.57	35.1	*	55.7	*	74.0	54.0	-18.3	*	343	1.19
1066.00	-29.42	24.27	47.4	38.5	42.2	33.3	74.0	54.0	-31.8	-20.7	24	1.34
1408.00	-24.89	25.16	51.8	42.1	52.1	42.4	74.0	54.0	-21.9	-11.6	159	1.29
1658.50	-25.66	26.00	60.7	49.8	61.1	50.1	74.0	54.0	-12.9	-3.9	208	1.35

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom 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 stregth of fundamental frequency.

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	2
Tested By:	Shunm Wang	Tested Channel:	CH6 : 2442MHz
Tested Date:	July 10, 2009	Modulation Type:	QPSK

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2442.00	-23.50	28.18	92.3	89.5	97.0	94.2	74.0	54.0	(F)	(F)	355	1.72
4884.00	-19.01	33.24	45.9	35.9	60.1	50.1	74.0	54.0	-13.9	-3.9	179	1.24
7326.00	-14.98	35.75	37.2	*	58.0	*	74.0	54.0	-16.0	*	174	1.3
1066.00	-29.42	24.27	43.0	*	37.9	*	74.0	54.0	-36.1	*	83	1.35
1711.00	-26.00	26.20	43.1	*	43.3	*	74.0	54.0	-30.7	*	253	1.33
1823.50	-25.82	26.63	46.7	37.5	47.5	38.3	74.0	54.0	-26.5	-15.7	198	1.25

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2442.00	-23.50	28.18	101.2	97.9	105.9	102.6	74.0	54.0	(F)	(F)	172	1.16
4884.00	-19.01	33.24	46.2	36.1	60.4	50.3	74.0	54.0	-13.6	-3.7	346	1.24
7326.00	-14.98	35.75	40.2	*	61.0	*	74.0	54.0	-13.0	*	350	1.2
1333.00	-27.40	24.97	53.6	38.5	51.1	36.1	74.0	54.0	-22.9	-17.9	46	1.41
1453.00	-23.41	25.28	59.7	48.1	61.6	50.0	74.0	54.0	-12.4	-4.0	275	1.35
1711.00	-26.00	26.20	65.8	50.1	66.0	50.3	74.0	54.0	-8.0	-3.7	168	1.27

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom 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 stregth of fundamental frequency.

Temperature:	32 °C	Humidity:	58 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	3
Tested By:	Shunm Wang	Tested Channel:	CH11 : 2462MHz
Tested Date:	July 22, 2009	Modulation Type:	QPSK

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2462.00	-23.46	28.22	94.7	90.1	99.5	94.9	74.0	54.0	(F)	(F)	342	1.63
4924.00	-18.92	33.33	45.8	35.6	60.2	50.0	74.0	54.0	-13.8	-4.0	186	1.22
7386.00	-14.88	35.87	38.2	*	59.2	*	74.0	54.0	-14.8	*	174	1.14
1066.00	-29.42	24.27	44.9	*	39.7	*	74.0	54.0	-34.3	*	83	1.26
1745.00	-26.10	26.33	55.1	46.2	55.3	46.4	74.0	54.0	-18.7	-7.6	244	1.42
1823.50	-25.82	26.63	48.0	38.0	48.8	38.8	74.0	54.0	-25.2	-15.2	198	1.17
2483.50	-23.42	28.27	55.1	43.9	59.9	48.7	74.0	54.0	-14.1	-5.3	173	1.25
2492.00	-23.40	28.28	45.2	36.9	50.1	41.8	74.0	54.0	-23.9	-12.2	251	1.37
2499.40	-23.38	28.30	41.5	30.5	46.4	35.4	74.0	54.0	-27.6	-18.6	259	1.16

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2462.00	-23.46	28.22	99.1	96.2	103.9	101.0	74.0	54.0	(F)	(F)	189	1.2
4924.00	-18.92	33.33	45.8	35.4	60.2	49.8	74.0	54.0	-13.8	-4.2	342	1.18
7386.00	-14.88	35.87	39.4	*	60.4	*	74.0	54.0	-13.6	*	337	1.17
1388.00	-25.62	25.11	51.9	42.7	51.4	42.2	74.0	54.0	-22.6	-11.8	94	1.34
1505.50	-24.74	25.42	60.4	49.0	61.1	49.7	74.0	54.0	-12.9	-4.3	153	1.22
1745.50	-26.10	26.33	64.0	49.4	64.2	49.6	74.0	54.0	-9.8	-4.4	272	1.25
2483.50	-23.42	28.27	56.2	44.1	61.0	48.9	74.0	54.0	-13.0	-5.1	96	1.15
2492.00	-23.40	28.28	46.9	37.8	51.8	42.7	74.0	54.0	-22.2	-11.3	151	1.22
2499.40	-23.38	28.30	41.9	32.6	46.8	37.5	74.0	54.0	-27.2	-16.5	130	1.19

Temperature:	30 °C	Humidity:	60 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	4
Tested By:	Shunm Wang	Tested Channel:	N/A
Tested Date:	July 10, 2009	Modulation Type:	QPSK

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1066.00	-29.42	24.27	*	*	*	*	74.0	54.0	*	*	*	*
1193.50	-28.19	24.60	*	*	*	*	74.0	54.0	*	*	*	*
1243.00	-27.97	24.73	*	*	*	*	74.0	54.0	*	*	*	*
1333.00	-27.40	24.97	*	*	*	*	74.0	54.0	*	*	*	*
1828.00	-25.78	26.65	46.8	37.5	47.7	38.4	74.0	54.0	-26.3	-15.6	299	1.15
1910.50	-25.20	26.96	47.1	38.4	48.8	40.2	74.0	54.0	-25.2	-13.8	38	1.35

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 (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1066.00	-29.42	24.27	47.5	38.4	42.4	33.2	74.0	54.0	-31.6	-20.8	196	1.22
1163.50	-28.70	24.52	47.7	38.1	43.6	33.9	74.0	54.0	-30.4	-20.1	201	1.16
1190.50	-28.24	24.59	44.3	*	40.7	*	74.0	54.0	-33.3	*	184	1.37
1333.00	-27.40	24.97	45.7	*	43.3	*	74.0	54.0	-30.7	*	179	1.29
1820.50	-25.84	26.62	45.0	*	45.8	*	74.0	54.0	-28.2	*	166	1.18
1906.00	-25.20	26.94	44.2	*	45.9	*	74.0	54.0	-28.1	*	188	1.09

NOTE :

1. Measurement uncertainty is +/-3.7dB.
2. "*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emissiom 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 stregth of fundamental frequency.

4.3 BANDWIDTH TEST

4.3.1 LIMIT

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

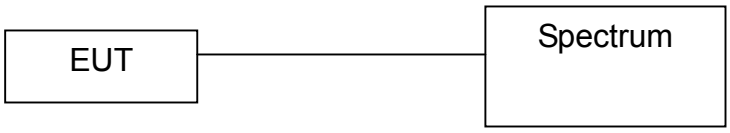
4.3.2 TEST EQUIPMENT

The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-40GHz	ROHDE & SCHWARZ	FSP40/ 100093	SEP. 2009 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 50Ω RF cable.

4.3.4 TEST PROCEDURE

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

4.3.5 EUT OPERATING CONDITION

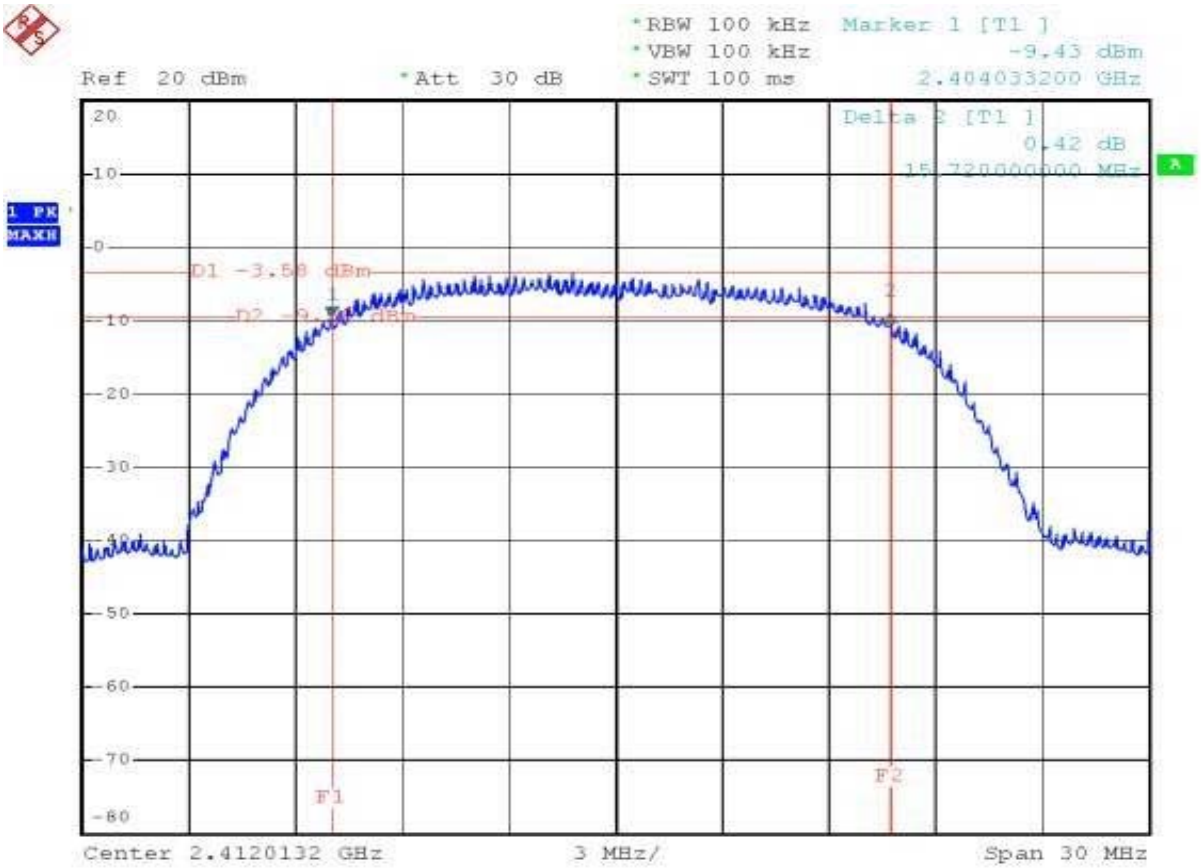
1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

4.3.6 TEST RESULT

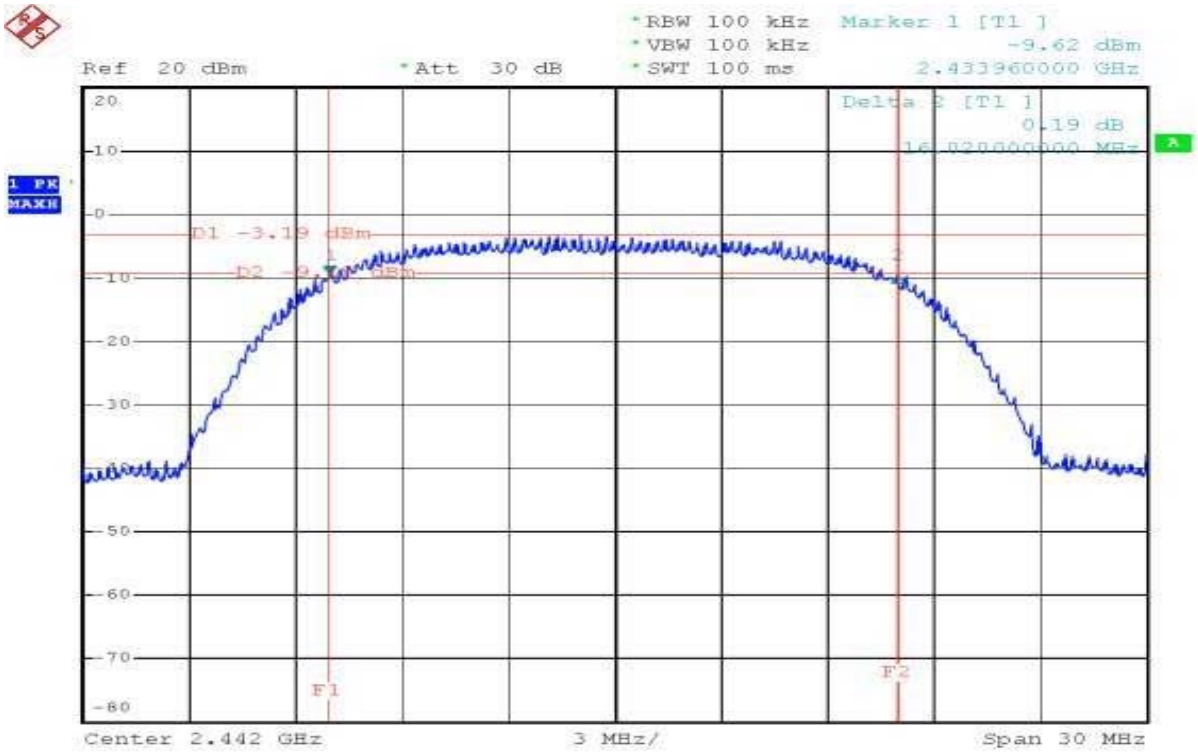
Temperature:	26°C	Humidity:	62%RH
Spectrum Detector:	PK.	Tested Mode:	TX
Tested By:	Shunm Wang	Modulation Type:	QPSK
Tested Date:	July 08, 2009		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	6dB DOWN BW (MHz)
1	2412	15.72
7	2442	16.02
11	2462	15.78

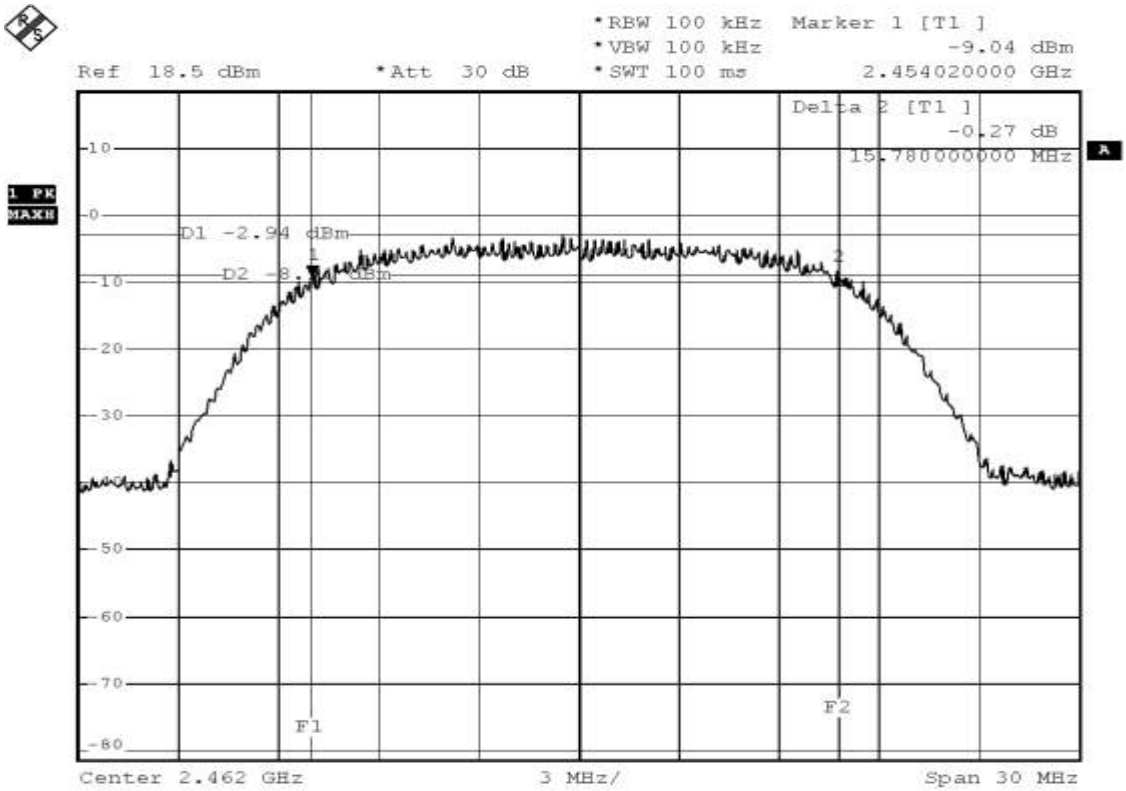
CH1:



CH 7:


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Marker 1 [T1]
-9.62 dBm
2.433960000 GHz
Ref 20 dBm
*Att 30 dB
Delta 2 [T1]
0.19 dB
16.020000000 MHz
1 PK MAXH
D1 -3.19 dBm
F1
F2
Center 2.442 GHz
3 MHz/
Span 30 MHz

CH 11:


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Marker 1 [T1]
-9.04 dBm
2.454020000 GHz
Ref 18.5 dBm
*Att 30 dB
Delta 2 [T1]
-0.27 dB
15.780000000 MHz
1 PK MAXH
D1 -2.94 dBm
F1
F2
Center 2.462 GHz
3 MHz/
Span 30 MHz

4.4 PEAK POWER TEST

4.4.1 LIMIT

FCC Part15, Subpart C Section 15.247.

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

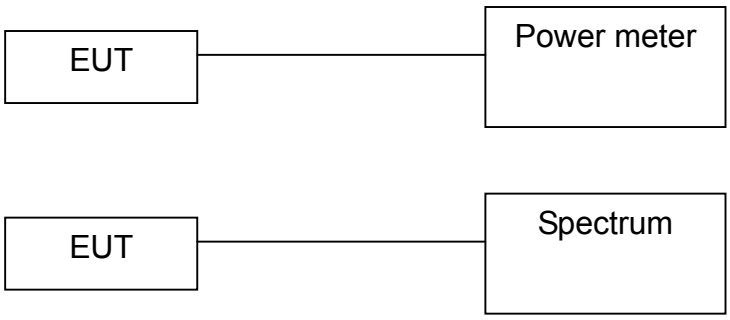
4.4.2 TEST EQUIPMENT

The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-40GHz	ROHDE & SCHWARZ	FSP40/ 100093	SEP. 2009 ETC
POWER METER	N/A	BOONTON	4532 / 77601	NOV. 2009 ETC
POWER SENSOR	DC-18GHz 0.3μW-100mW 50Ω	BOONTON	51011-EMC/ 31184	NOV. 2009 ETC

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

4.4.3 TEST SET-UP



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

4.4.4 TEST PROCEDURE

The EUT was operating in continuous transmission 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.

4.4.5 EUT OPERATING CONDITION

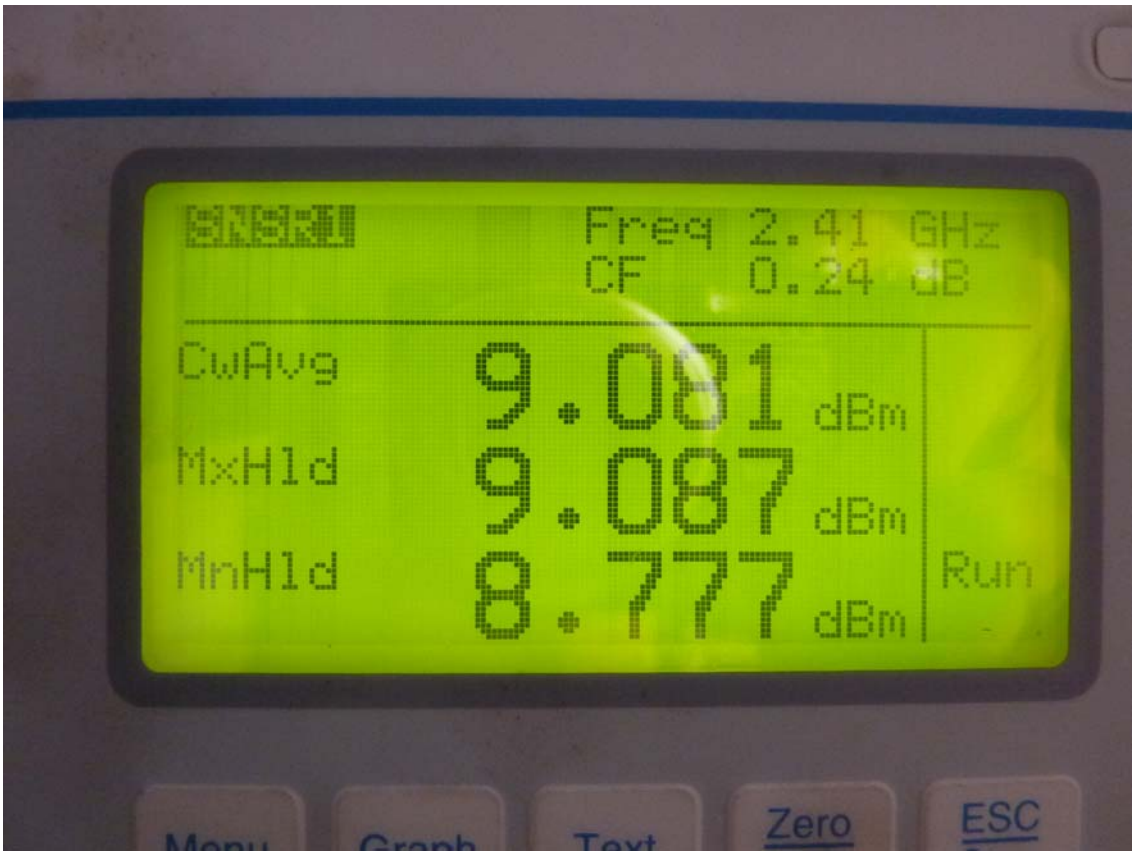
1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

4.4.6 TEST RESULT

Temperature:	26°C	Humidity:	62%RH
Spectrum Detector:	PK.	Tested Mode:	TX
Tested By:	Shunm Wang	Modulation Type:	QPSK
Tested Date:	July 08, 2009		

Channel Number	Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Power Limit (dBm)
1	2412	9.087	30
7	2442	9.126	30
11	2462	9.038	30

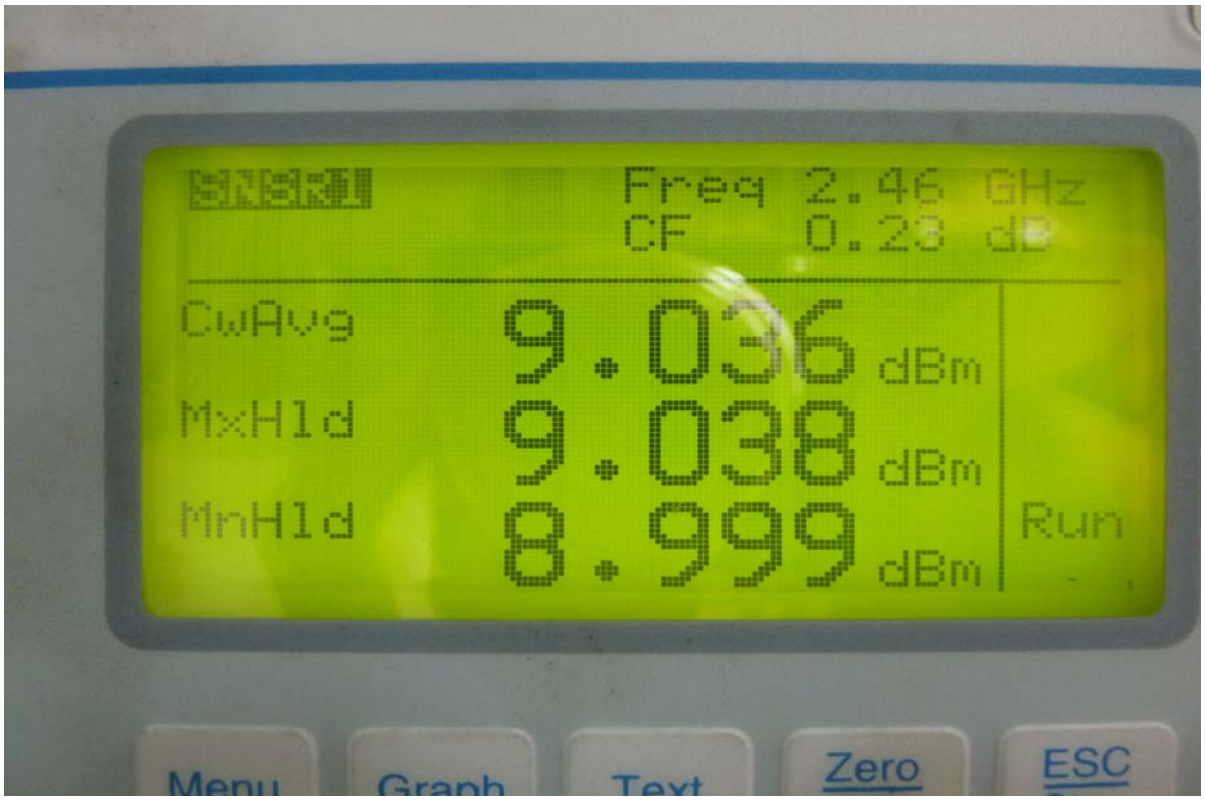
CH1 :



CH7 :


Freq 2.44 GHz
CF 0.23 dB
CwAvg 9.071 dBm
MxHld 9.126 dBm
MnHld 9.065 dBm
Run

CH11 :


Freq 2.46 GHz
CF 0.23 dB
CwAvg 9.036 dBm
MxHld 9.038 dBm
MnHld 8.999 dBm
Run
Menu
Graph
Text
Zero
ESC

4.5 BAND EDGE TEST

4.5.1 LIMIT

FCC Part15, Subpart C Section 15.247. 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

4.5.2 TEST EQUIPMENT

The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-40GHz	ROHDE & SCHWARZ	FSP40/ 100093	SEP. 2009 ETC
SPECTRUM	9KHz-26.5GHz	HP	8953E/ 3710A03220	MAY 2010 ETC
PRE-AMPLIFIER	1GHz-26.5GHz Gain:30dB	HP	8449B/ 3008A01019	NOV. 2009 ETC
HORN ANTENNA	1GHz to 18GHz	EMCO	3115/ 6881	NOV. 2009 ETC
K-TYPE CABLE	15M	HUBER SUHNER	SF102-40/2*11 / 23932/2	MAY 2010 ETC
K-TYPE CABLE	1M	HUBER SUHNER	SF102-40/2*11 / 28934/2	NOV. 2010 ETC

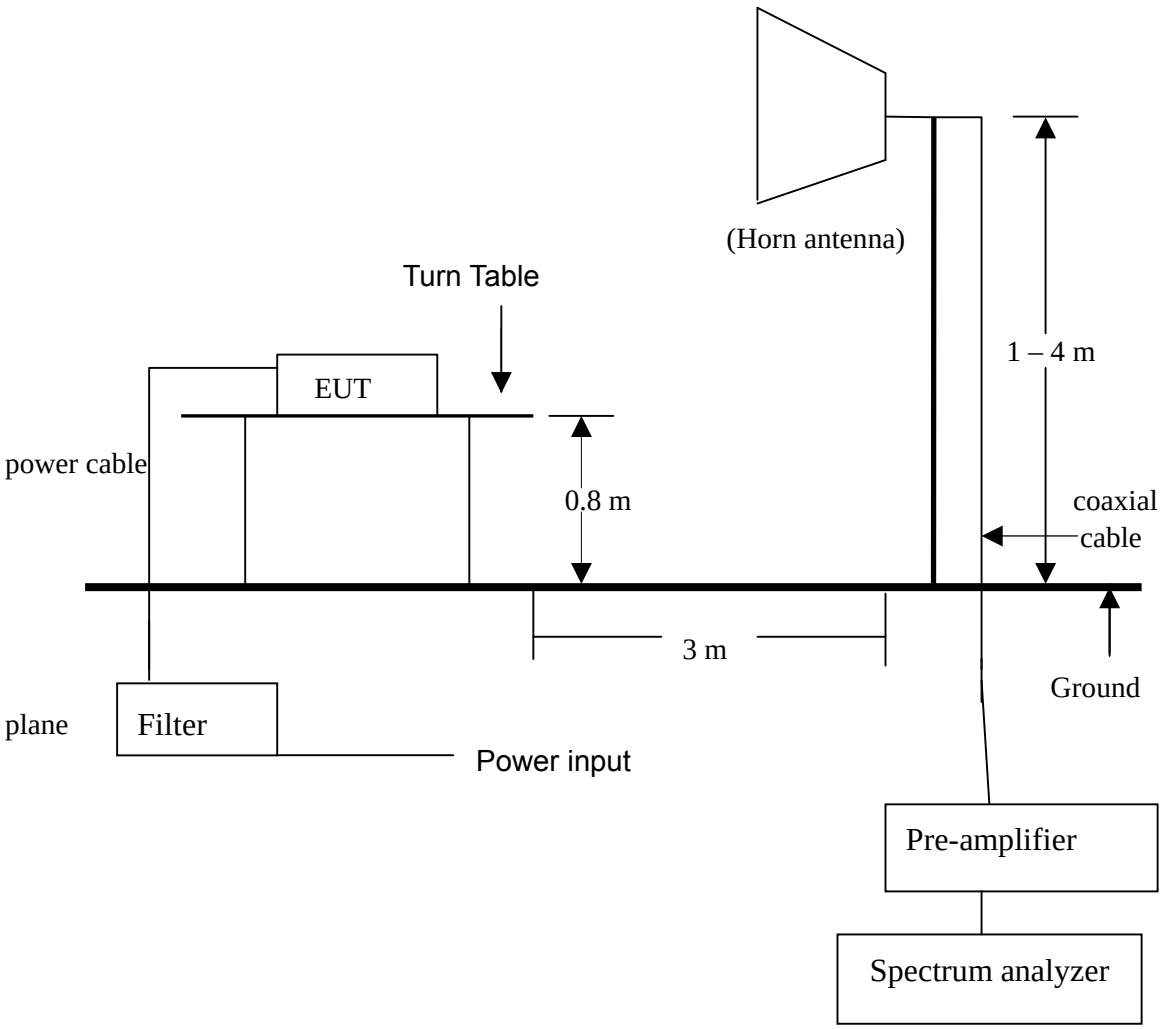
NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 TEST SET-UP

FOR RF CONDUCTED TEST (dBc)

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

FOR RADIATED EMISSION TEST



NOTE :

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

4.5.4 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.

4.5.5 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:	26°C	Humidity:	62%RH
Spectrum Detector:	PK. or AV.	Tested Mode:	TX
Tested By:	Shunm Wang	Modulation Type:	QPSK
Tested Date:	July 08, 2009		

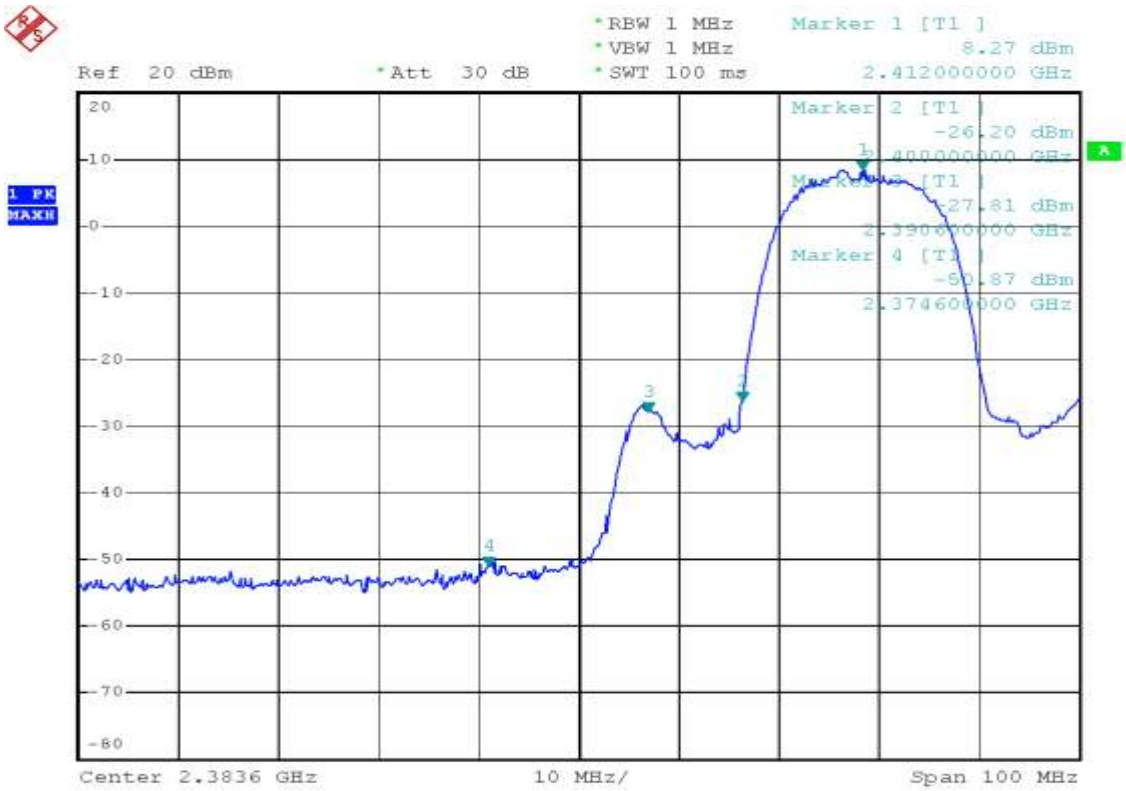
1.Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	8.27	-26.2	34.47	>20dBc
>2483.5	8.57	-17.55	26.12	>20dBc

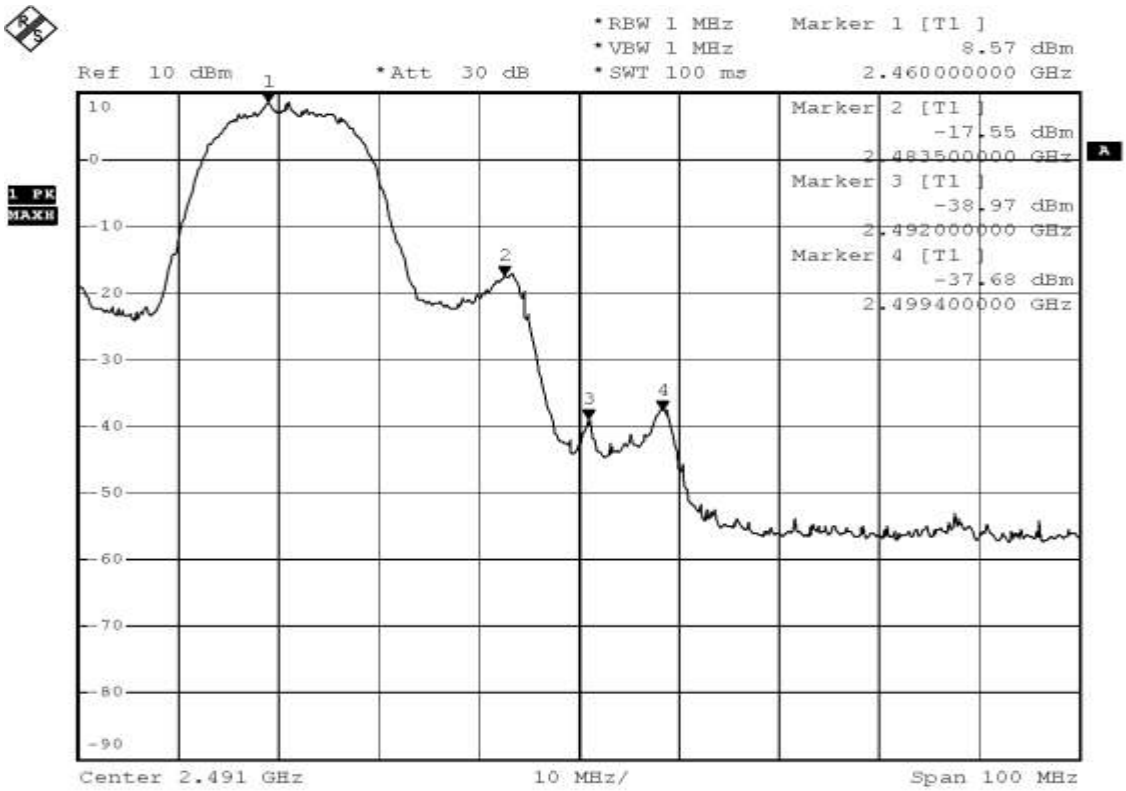
2.Radiated emission test

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
2390.00	-23.63	28.08	H	55.9	45.1	60.3	49.5	74.0	54.0	-13.7	-4.5
2390.00	-23.63	28.08	V	57.2	45.8	61.6	50.2	74.0	54.0	-12.4	-3.8
2483.50	-23.42	28.27	H	55.1	43.9	59.9	48.7	74.0	54.0	-14.1	-5.3
2483.50	-23.42	28.27	V	56.2	44.1	61.0	48.9	74.0	54.0	-13.0	-5.1

CH1 :


*RBW 1 MHz
*VBW 1 MHz
*SWT 100 ms
Marker 1 [T1]
8.27 dBm
2.412000000 GHz
Ref 20 dBm
*Att 30 dB
Marker 2 [T1]
-26.20 dBm
Marker 3 [T1]
-27.81 dBm
Marker 4 [T1]
-50.87 dBm
1 PK
MAXH
Center 2.3836 GHz
10 MHz/
Span 100 MHz

CH114 :


*RBW 1 MHz
*VBW 1 MHz
*SWT 100 ms
Marker 1 [T1]
8.57 dBm
2.460000000 GHz
Ref 10 dBm
*Att 30 dB
Marker 2 [T1]
-17.55 dBm
2.483500000 GHz
Marker 3 [T1]
-38.97 dBm
2.492000000 GHz
Marker 4 [T1]
-37.68 dBm
2.499400000 GHz
1 PK
MAXH
Center 2.491 GHz
10 MHz/
Span 100 MHz

4.6 POWER DENSITY TEST

4.6.1 LIMIT

FCC Part15, Subpart C Section 15.247

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

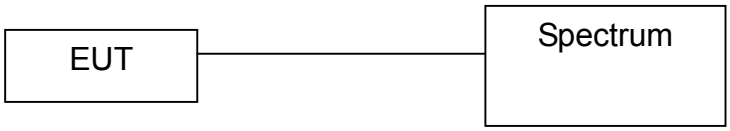
4.6.2 TEST EQUIPMENT

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

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-40GHz	ROHDE & SCHWARZ	FSP40/ 100093	SEP. 2009 ETC

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

4.6.3 TEST SET-UP



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

4.6.4 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.

4.6.5 EUT OPERATING CONDITION

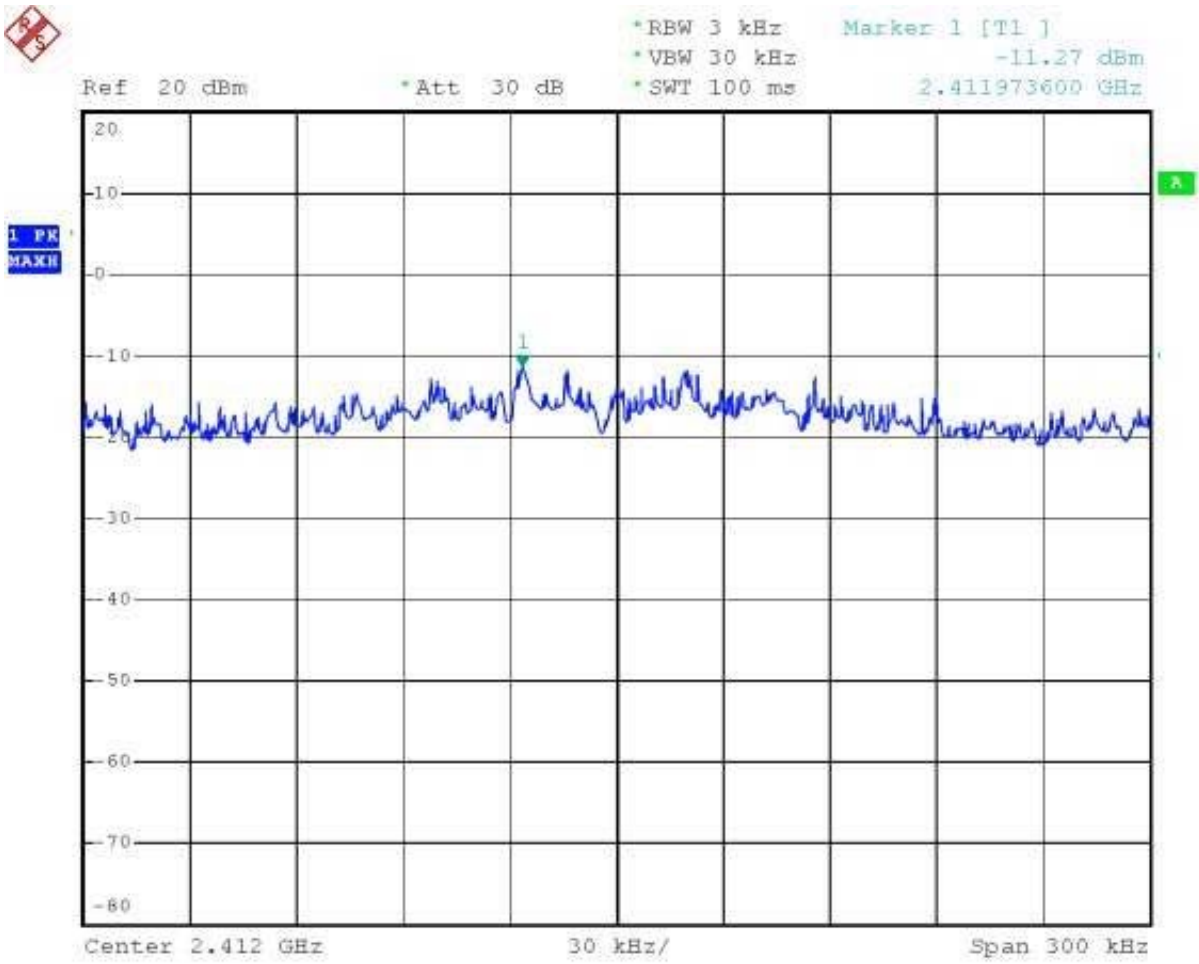
1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

4.6.6 TEST RESULT

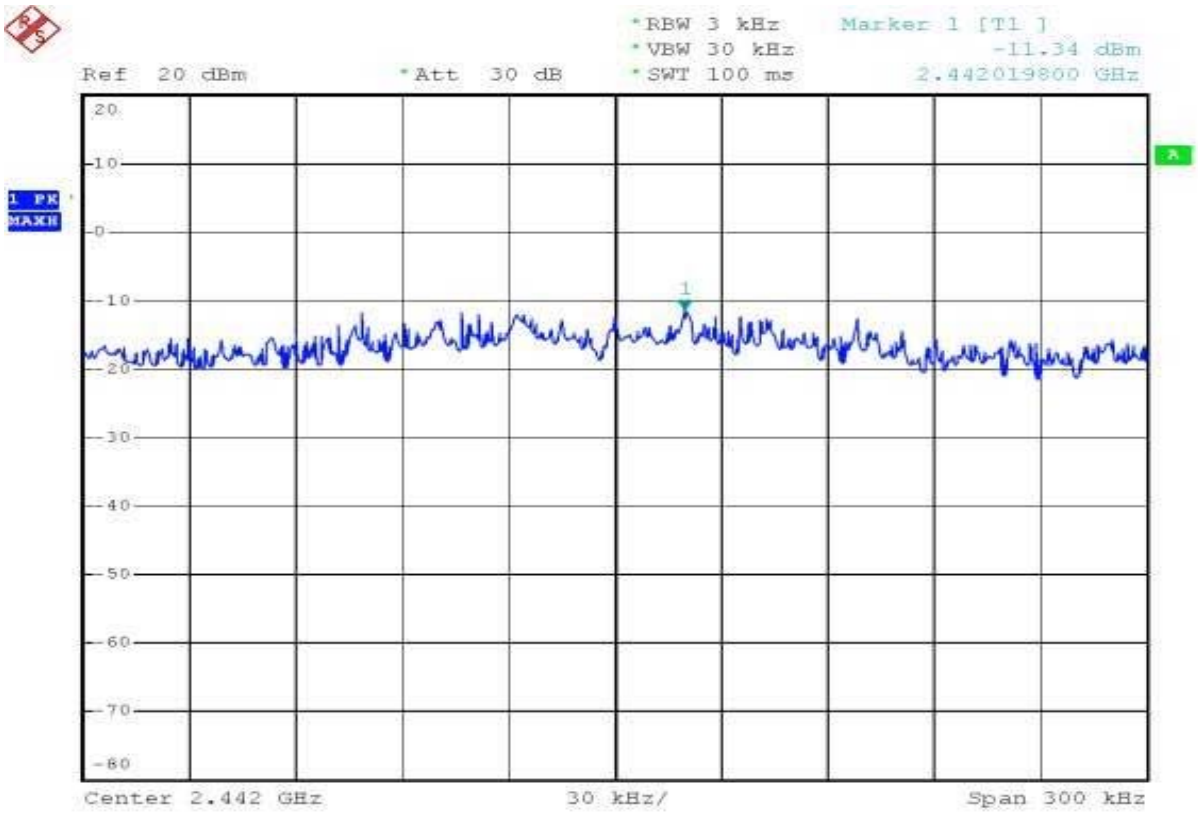
Temperature:	26°C	Humidity:	62%RH
Spectrum Detector:	PK.	Tested Mode:	TX
Tested By:	Shunm Wang	Modulation Type:	QPSK
Tested Date:	July 08, 2009		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3KHz BW (dBm/3kHz)	MAXIMUM LIMIT (dBm/3kHz)
1	2412.0000	-11.27	8
7	2442.0000	-11.34	8
11	2462.0000	-7.54	8

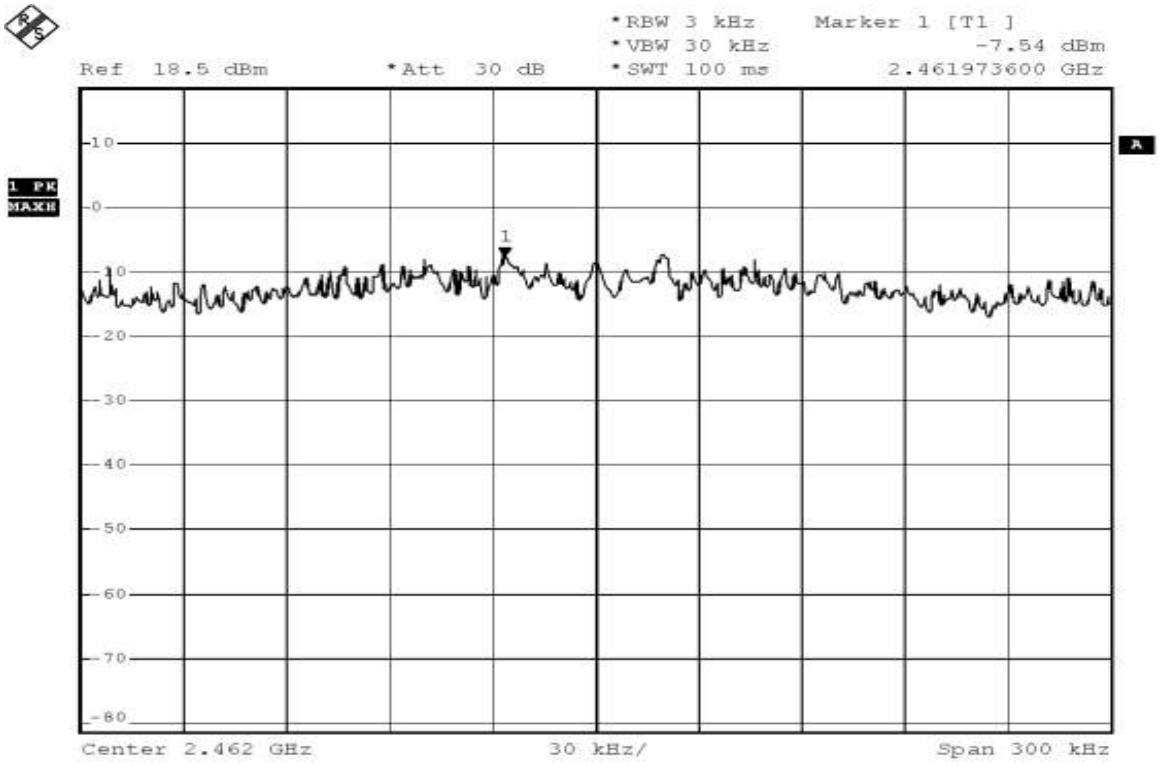
CH 1:



CH 7:


*RBW 3 kHz
*VBW 30 kHz
*SWT 100 ms
Marker 1 [T1]
-11.34 dBm
2.442019800 GHz
Ref 20 dBm
*Att 30 dB
1 PK MAXH
A
Center 2.442 GHz
30 kHz/
Span 300 kHz

CH 11:


*RBW 3 kHz
*VBW 30 kHz
*SWT 100 ms
Marker 1 [T1]
-7.54 dBm
2.461973600 GHz
Ref 18.5 dBm
*Att 30 dB
1 PK MAXH
A
Center 2.462 GHz
30 kHz/
Span 300 kHz

4.7 10th HARMONIC TEST

4.7.1 LIMIT

FCC Part15, Subpart C Section 15.247(d), the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below

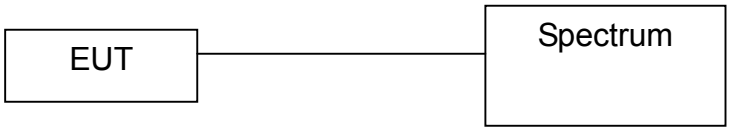
4.7.2 TEST EQUIPMENT

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

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-40GHz	ROHDE & SCHWARZ	FSP40/ 100093	SEP. 2009 ETC

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

4.7.3 TEST SET-UP



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

4.7.4 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.

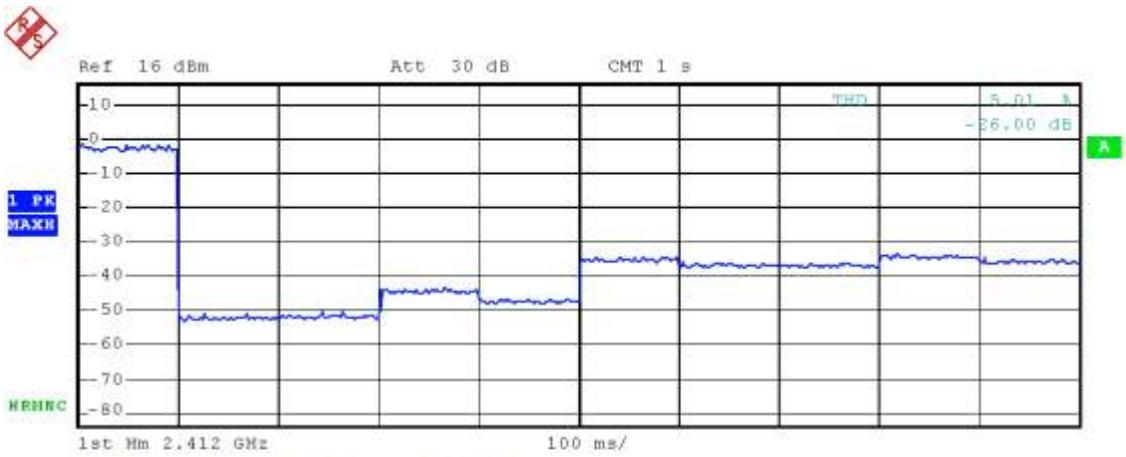
4.7.5 EUT OPERATING CONDITION

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

4.7.6 TEST RESULT

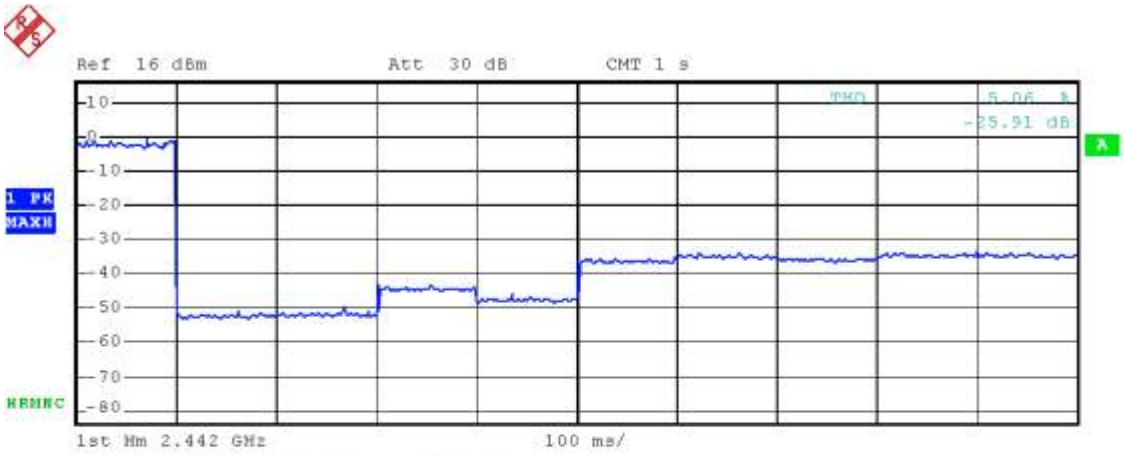
Temperature:	26°C	Humidity:	62%RH
Spectrum Detector:	PK.	Tested Mode:	TX
Tested By:	Shunm Wang	Modulation Type:	QPSK
Tested Date:	July 08, 2009	Test Result	Pass

CH 1:



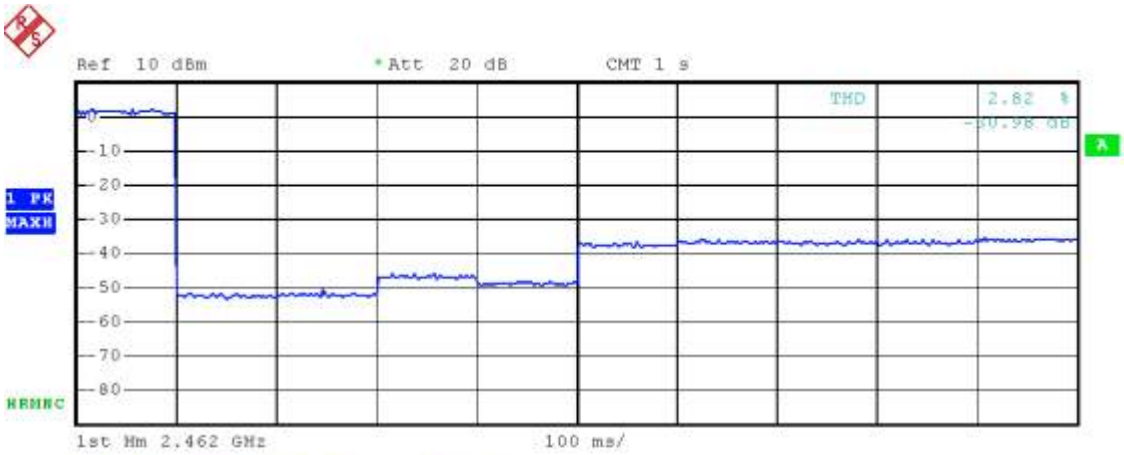
No	Frequency	RBW	Power
1	2.41 GHz	100 kHz	-2.61 dBm
2	4.82 GHz	300 kHz	-49.66 dBc
3	7.24 GHz	300 kHz	-49.24 dBc
4	9.65 GHz	1 MHz	-41.76 dBc
5	12.06 GHz	1 MHz	-44.79 dBc
6	14.47 GHz	1 MHz	-32.75 dBc
7	16.88 GHz	1 MHz	-34.30 dBc
8	19.30 GHz	1 MHz	-34.39 dBc
9	21.71 GHz	1 MHz	-31.81 dBc
10	24.12 GHz	1 MHz	-33.27 dBc

CH 7:



No	Frequency	RBW	Power
1	2.44 GHz	100 kHz	-2.28 dBm
2	4.88 GHz	300 kHz	-50.06 dBc
3	7.33 GHz	300 kHz	-49.69 dBc
4	9.77 GHz	1 MHz	-42.20 dBc
5	12.21 GHz	1 MHz	-45.33 dBc
6	14.65 GHz	1 MHz	-34.21 dBc
7	17.09 GHz	1 MHz	-32.72 dBc
8	19.54 GHz	1 MHz	-33.74 dBc
9	21.98 GHz	1 MHz	-32.45 dBc
10	24.42 GHz	1 MHz	-32.55 dBc

CH 11:



No	Frequency	RBW	Power
1	2.46 GHz	1 MHz	1.32 dBm
2	4.92 GHz	3 MHz	-53.79 dBc
3	7.39 GHz	3 MHz	-53.34 dBc
4	9.85 GHz	10 MHz	-48.09 dBc
5	12.31 GHz	10 MHz	-50.13 dBc
6	14.77 GHz	10 MHz	-38.97 dBc
7	17.23 GHz	10 MHz	-38.09 dBc
8	19.70 GHz	10 MHz	-38.22 dBc
9	22.16 GHz	10 MHz	-38.25 dBc
10	24.62 GHz	10 MHz	-37.40 dBc

5. Antenna application

5.1 Antenna requirement

The EUT's antenna is met the requirement of FCC part15C section15.203 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 Dipole Antenna. Gain of antenna types is 2 dBi that meet the requirement.

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