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

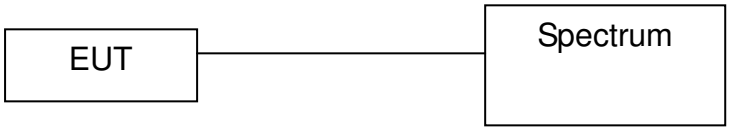
The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-40GHz	ROHDE & SCHWARZ	FSP40/ 100093	Dec. 2011 ETC
EMI Test Receiver	9kHz-6GHz	ROHDE & SCHWARZ	ESL/ 100176	Mar. 2012 R&S
SPECTRUM	9KHz-26.5GHz	HP	8953E/ 3710A03220	Nov. 2011 ETC
PRE-AMPLIFIER	1GHz-26.5GHz Gain:30dB	HP	8449B/ 3008A01019	Nov. 2011 ETC
HORN ANTENNA	1GHz to 18GHz	EMCO	3115/ 6881	Nov. 2011 ETC
K-TYPE CABLE	15M	HUBER SUHNER	SF102-40/2*11 / 23932/2	Feb. 2012 ETC
K-TYPE CABLE	1M	HUBER SUHNER	SF102-40/2*11 / 28934/2	May. 2012 ETC
RF CABLE	1.5M	JYEBAO	A30A30-L 142 / EQF-0035	Dec. 2011 ETC
RF CABLE	3.5M	JYEBAO	A30A30-L 142 (G3.5M)/ EQF-0036(002)	Dec. 2011 ETC

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

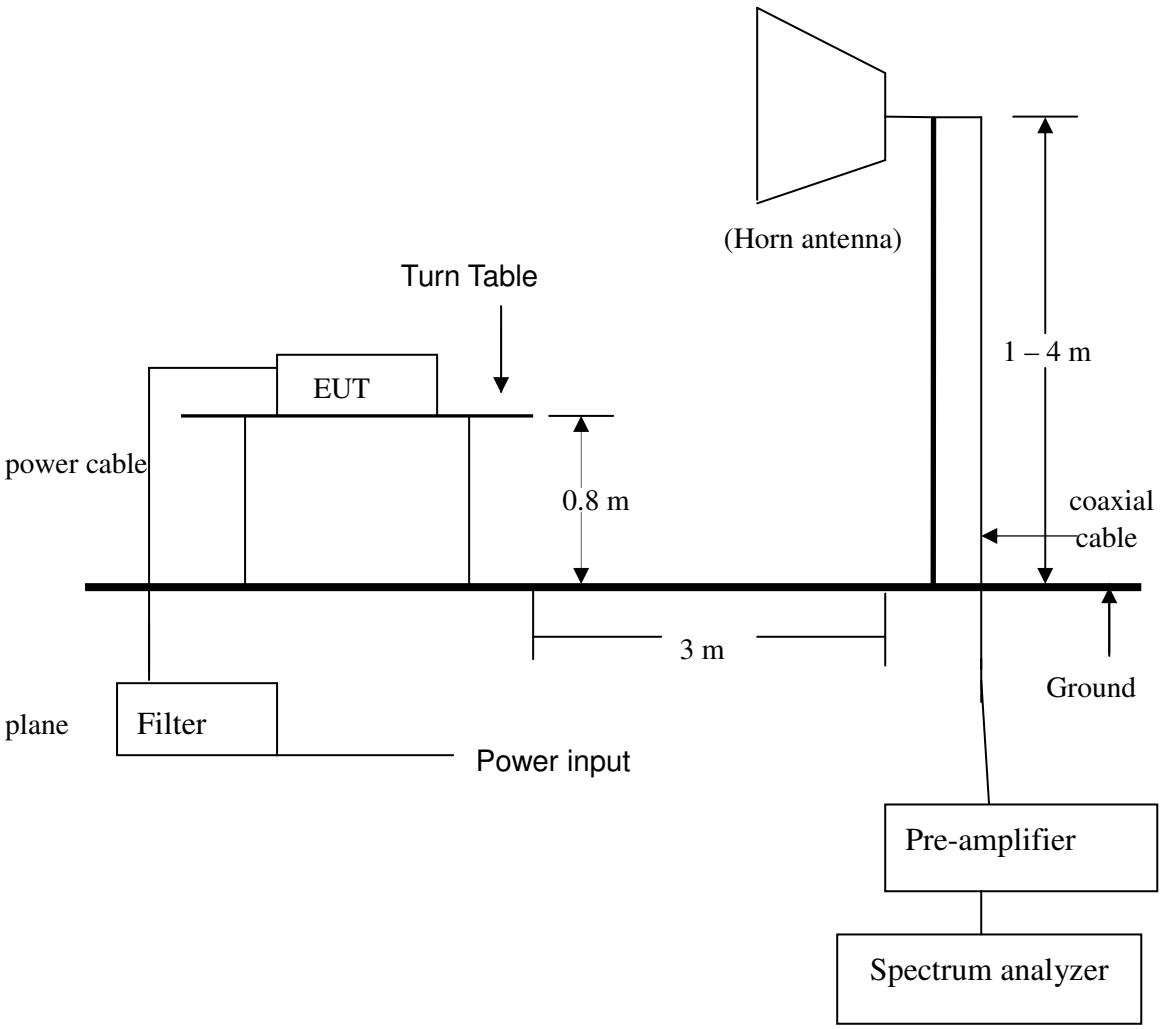
4.5.3 TEST SET-UP

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.

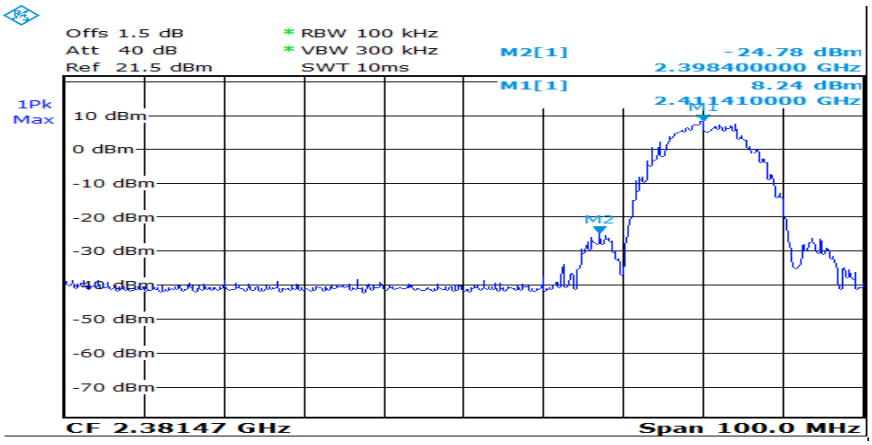
4.5.6 TEST RESULT

Temperature:	29℃	Humidity:	62%RH
Spectrum Detector:	PK. or AV.	Tested Mode:	802.11b
Tested By:	Jeff Lo	Modulation Type:	QPSK
Tested Date:	Jun 03, 2011		

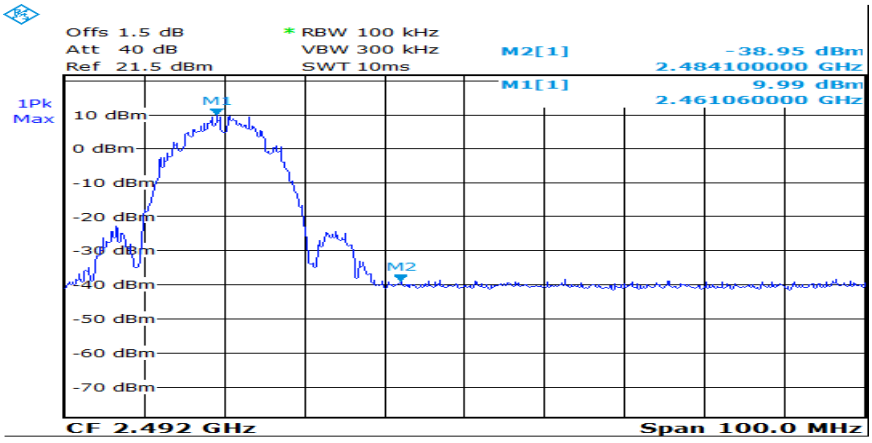
1.Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	8.24	-24.78	33.02	>20dBc
>2483.5	9.99	-38.95	48.94	>20dBc

Below 2400MHz (CH1):



Above 2483.5 MHz (CH11):

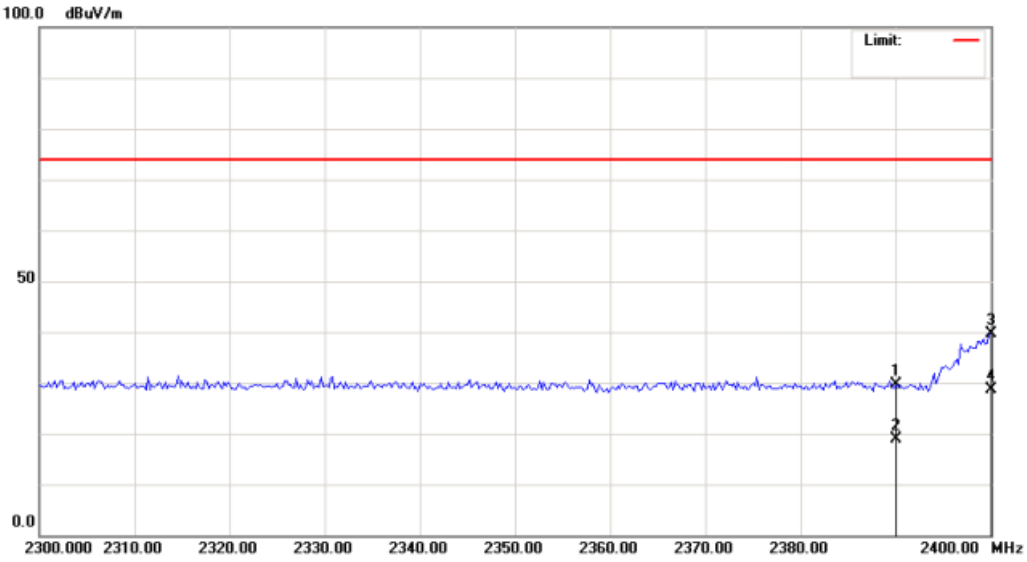


2.Radiated emission test:

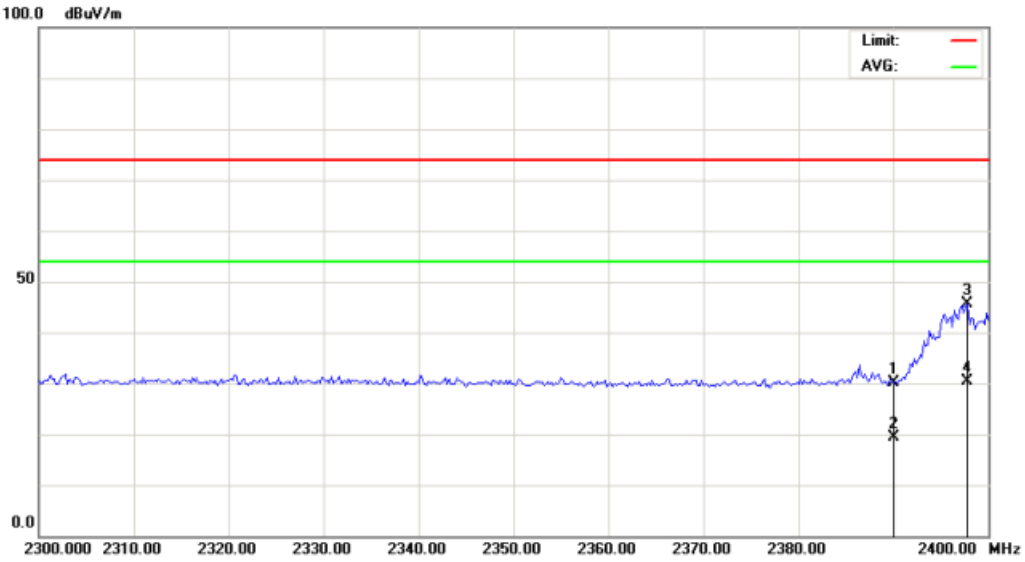
Below 2400MHz (CH1)

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
2412.00	-22.72	28.11	H	105.1	85.7	110.5	91.1	114.0	94.0	-3.5	-2.9
2412.00	-22.72	28.11	V	94.7	82.4	100.0	87.8	114.0	94.0	-14.0	-6.2
2400.00	-33.88	28.08	H	43.2	32.1	37.4	26.3	74.0	54.0	-36.6	-27.7
2397.80	-33.88	28.07	V	49.3	34.1	43.5	28.3	74.0	54.0	-30.5	-25.7
2390.00	-33.89	28.06	H	33.2	22.6	27.3	16.8	74.0	54.0	-46.7	-37.2
2390.00	-33.89	28.06	V	33.9	22.9	28.0	17.1	74.0	54.0	-46.0	-36.9

Horizontal:



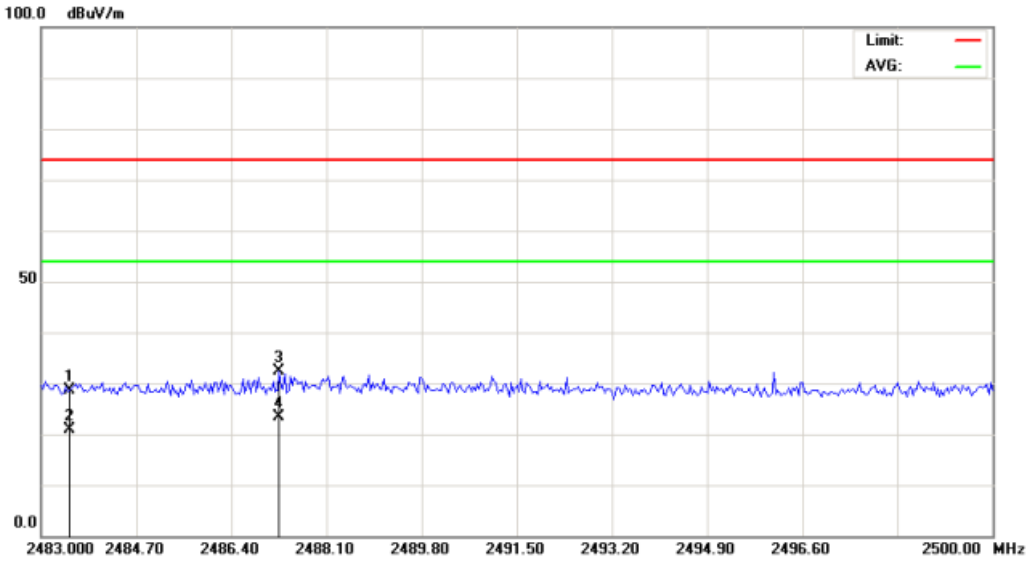
Vertical:



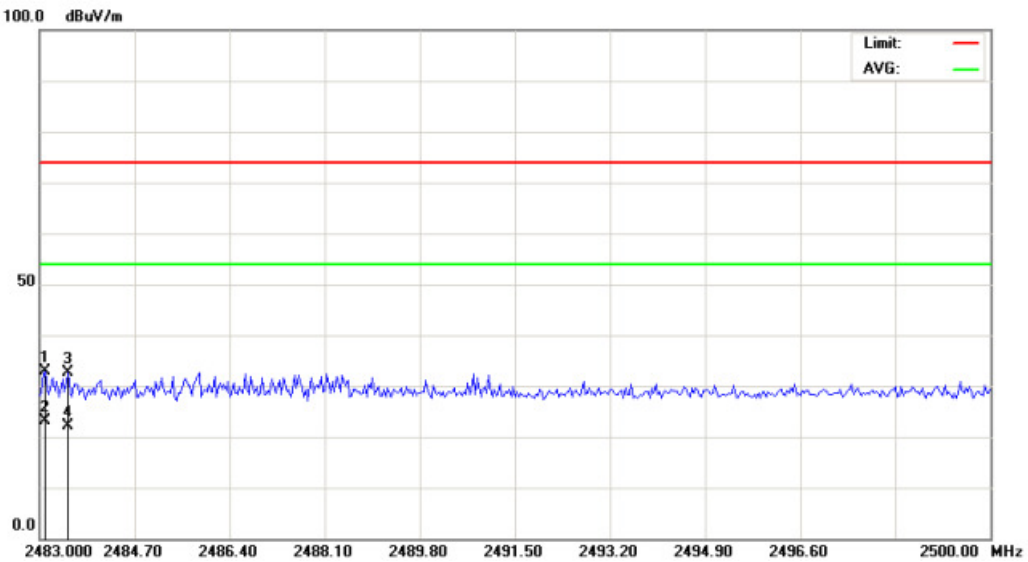
Above 2483.5MHz (CH11)

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
2462.00	-22.57	28.22	H	101.5	85.2	107.1	90.8	114.0	94.0	-6.9	-3.2
2462.00	-22.57	28.22	V	92.4	81.6	98.0	87.2	114.0	94.0	-16.0	-6.8
2487.25	-33.86	28.27	H	35.6	26.8	30.0	21.2	74.0	54.0	-44.0	-32.8
2483.10	-33.86	28.26	V	36.1	26.4	30.5	20.8	74.0	54.0	-43.5	-33.2
2483.50	-33.86	28.26	H	32.0	24.1	26.1	18.3	74.0	54.0	-47.9	-35.7
2483.50	-33.86	28.26	V	35.9	25.4	30.3	19.8	74.0	54.0	-43.7	-34.2

Horizontal:



Vertical:

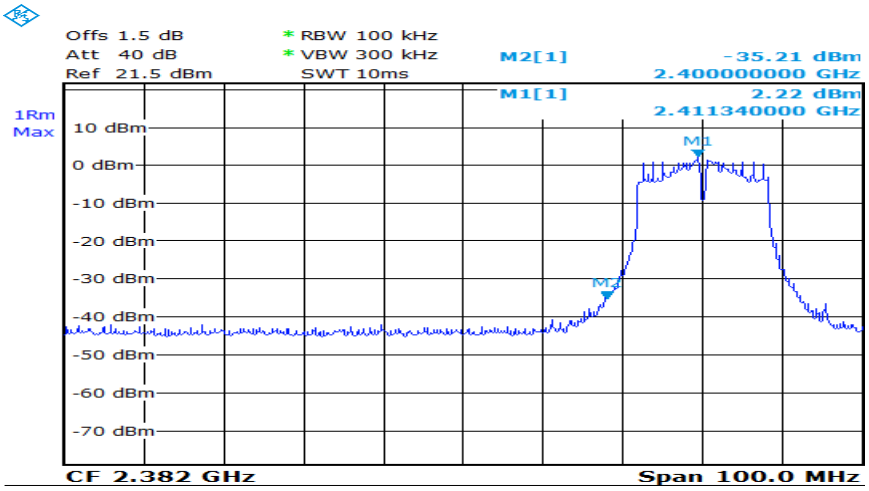


Temperature:	29℃	Humidity:	62%RH
Spectrum Detector:	PK. or AV.	Tested Mode:	802.11g
Tested By:	Jeff Lo	Modulation Type:	64QAM
Tested Date:	Jun 03, 2011		

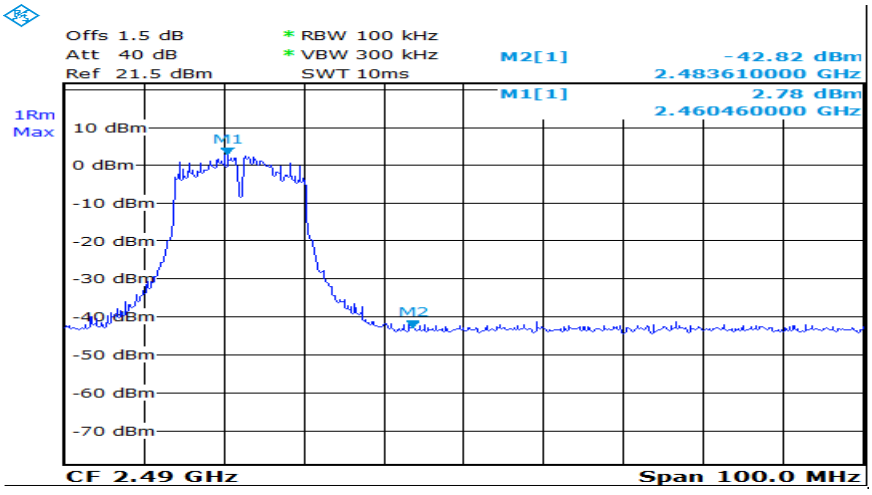
1.Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	2.22	-35.21	37.43	>20dBc
>2483.5	2.78	-42.82	45.6	>20dBc

Below 2400MHz (CH1):



Above 2483.5 MHz (Ch11):

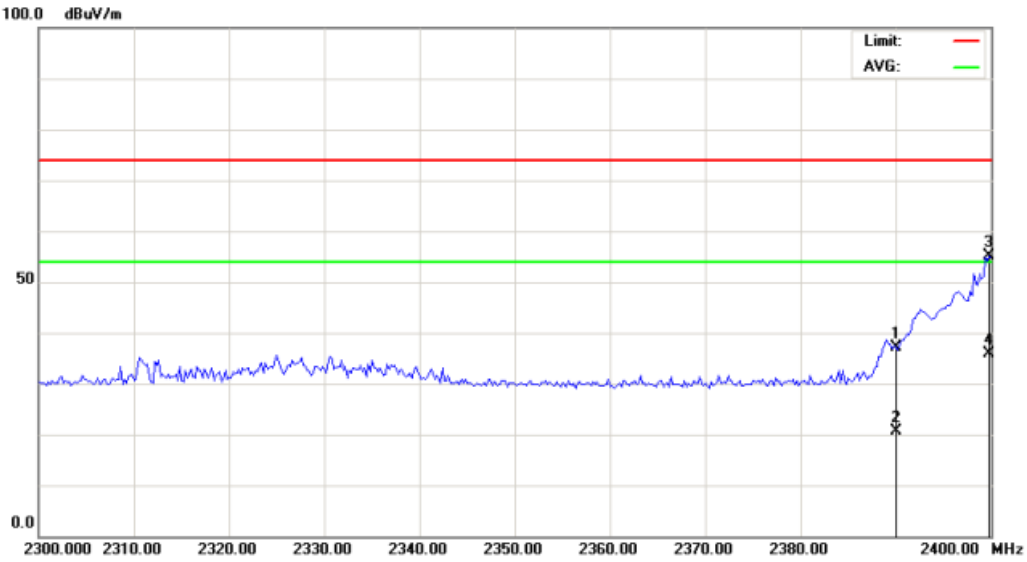


2.Radiated emission test

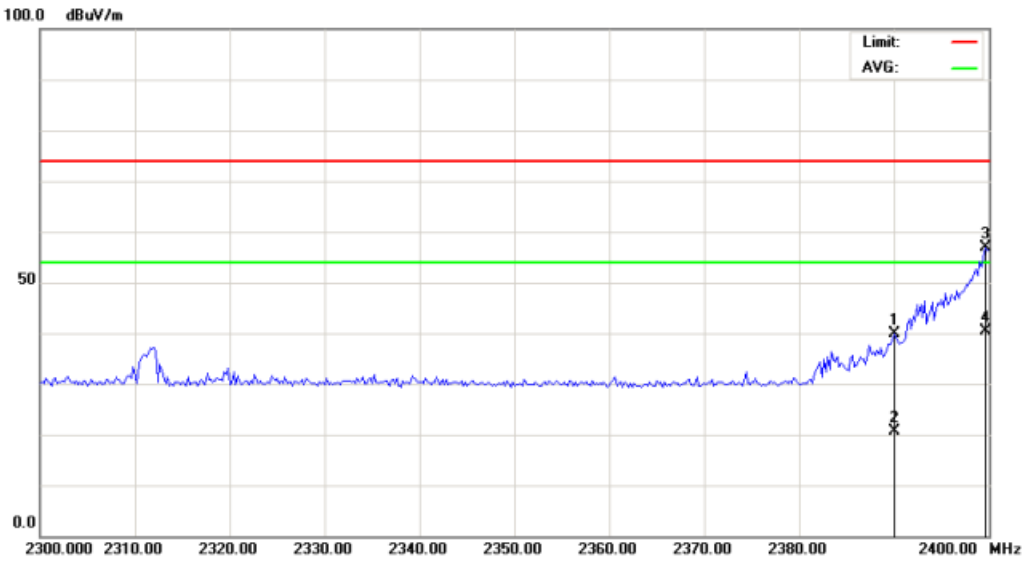
Below 2400MHz (CH1)

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
2412.00	-22.72	28.11	H	105.1	85.7	110.5	91.1	114.0	94.0	-3.5	-2.9
2412.00	-22.72	28.11	V	94.7	82.4	100.0	87.8	114.0	94.0	-14.0	-6.2
2399.80	-33.88	28.08	H	58.8	39.5	53.0	33.6	74.0	54.0	-21.0	-20.4
2399.60	-33.88	28.08	V	60.4	43.9	54.6	38.1	74.0	54.0	-19.4	-15.9
2390.00	-33.89	28.06	H	40.8	24.2	35.0	18.4	74.0	54.0	-39.0	-35.6
2390.00	-33.89	28.06	V	43.6	24.3	37.8	18.4	74.0	54.0	-36.2	-35.6

Horizontal:



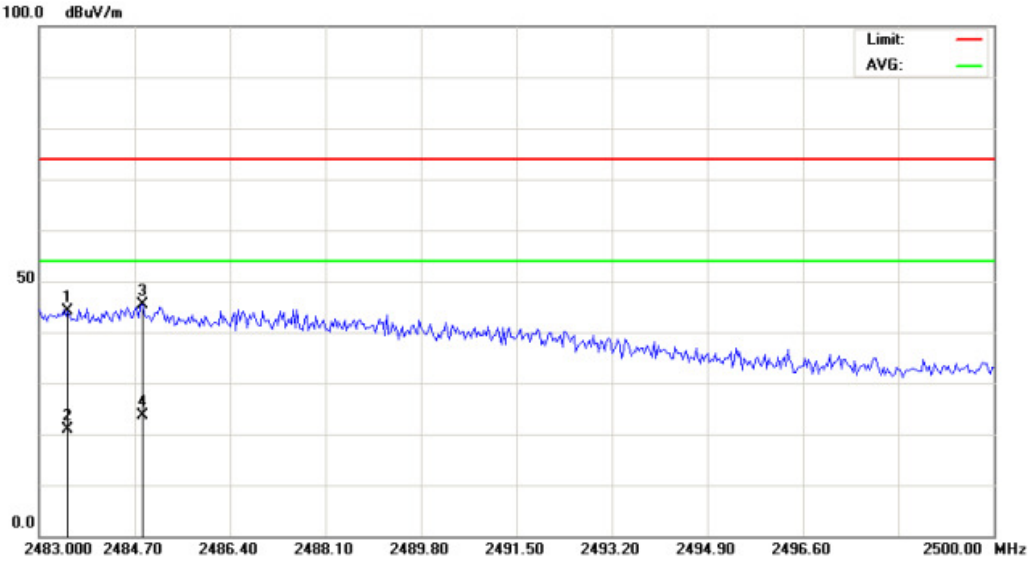
Vertical:



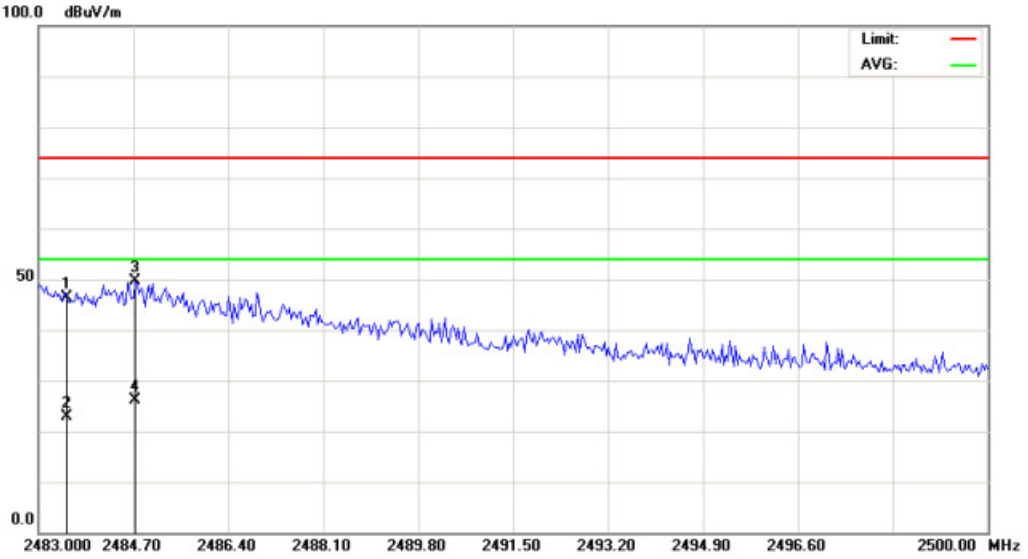
Above 2483.5MHz (CH11)

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
2462.00	-22.57	28.22	H	101.5	85.2	107.1	90.8	114.0	94.0	-6.9	-3.2
2462.00	-22.57	28.22	V	92.4	81.6	98.0	87.2	114.0	94.0	-16.0	-6.8
2484.836	-33.86	28.26	H	48.6	26.8	43.0	21.2	74.0	54.0	-31.0	-32.8
2484.734	-33.86	28.26	V	50.0	29.4	44.4	23.8	74.0	54.0	-29.6	-30.2
2483.5	-33.86	28.26	H	47.3	24.2	41.7	18.6	74.0	54.0	-32.3	-35.4
2483.5	-33.86	28.26	V	49.8	26.3	44.2	20.7	74.0	54.0	-29.8	-33.3

Horizontal:



Vertical:

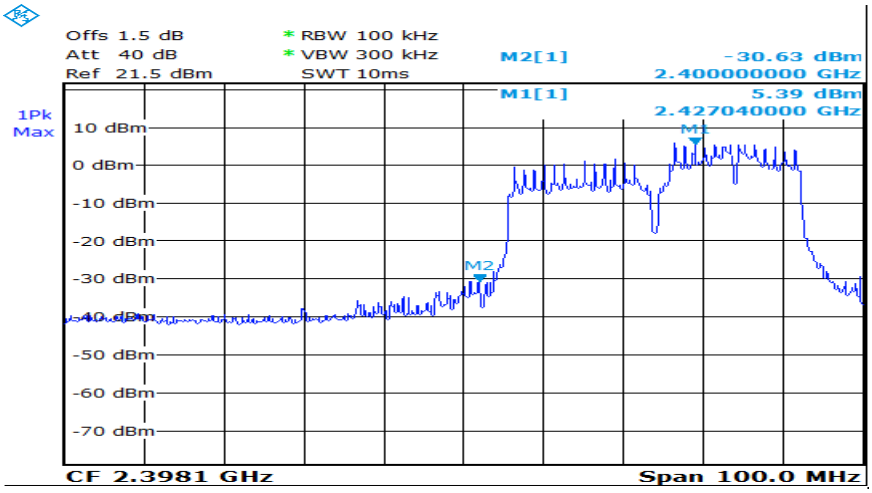


Temperature:	29℃	Humidity:	62%RH
Spectrum Detector:	PK. or AV.	Tested Mode:	802.11n
Tested By:	Jeff Lo	Modulation Type:	64QAM
Tested Date:	Jun 03, 2011		

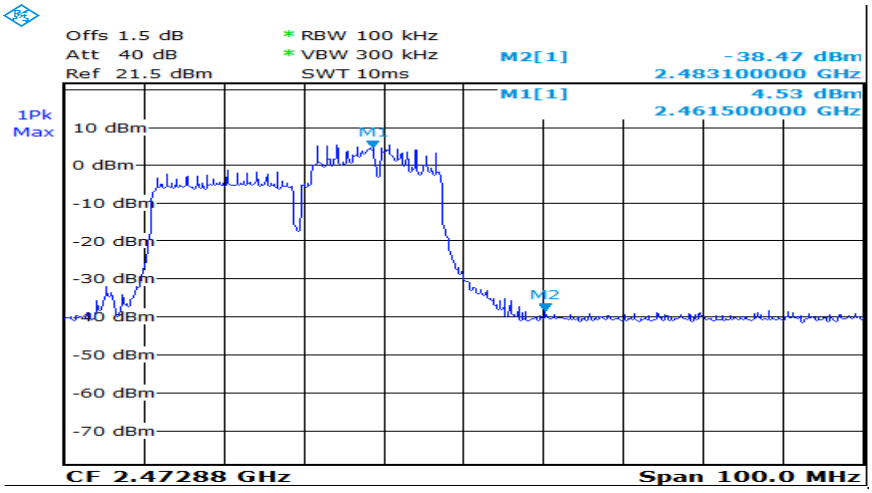
1.Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	5.39	-30.63	36.02	>20dBc
>2483.5	4.53	-38.47	43.0	>20dBc

Below 2400MHz (CH5):



Above 2483.5 MHz (Ch11):

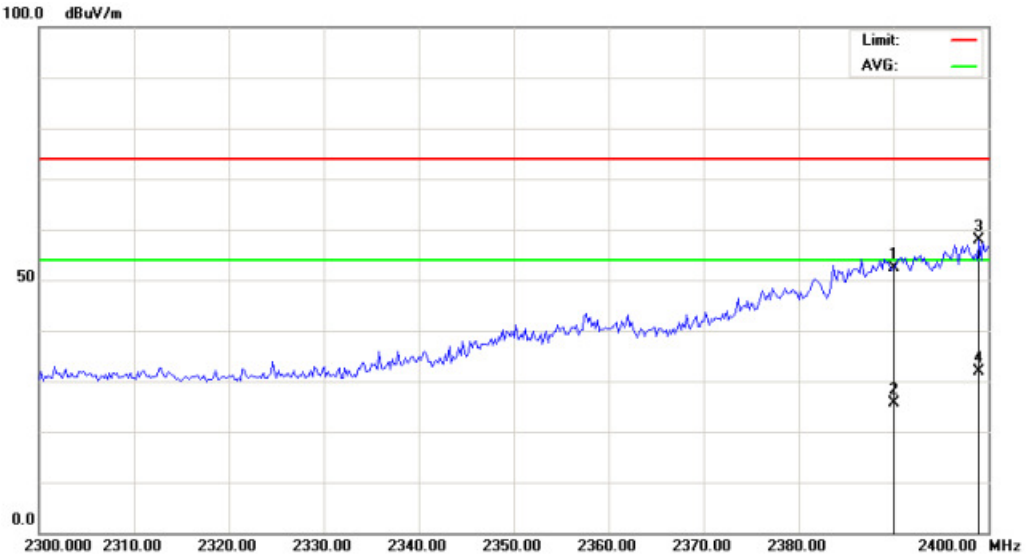


2.Radiated emission test

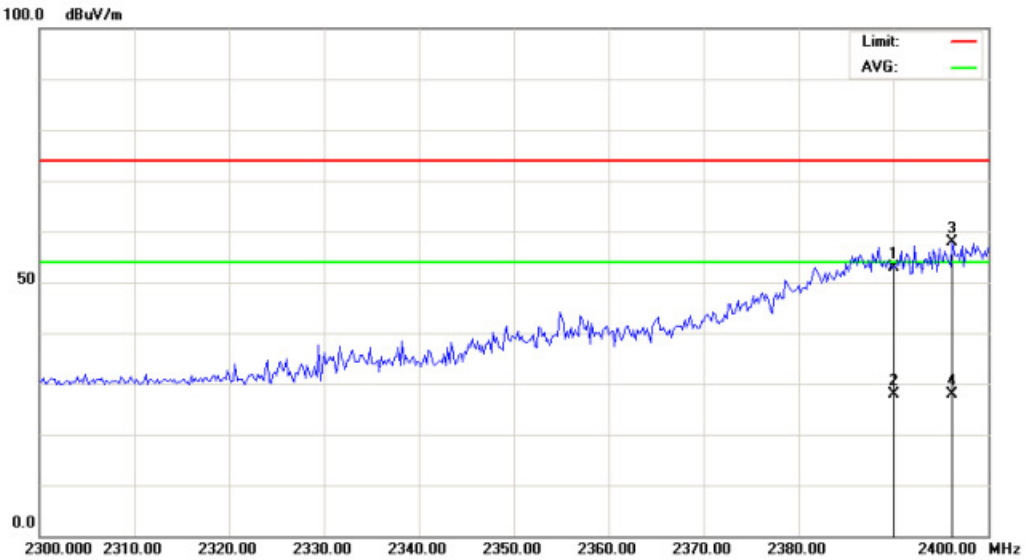
Below 2400MHz (CH5)

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
2422.00	-22.66	28.15	H	104.5	85.4	110.0	90.9	114.0	94.0	-4.0	-3.1
2422.00	-22.66	28.15	V	94.7	82.4	100.1	87.9	114.0	94.0	-13.9	-6.1
2399.00	-33.88	28.08	H	61.5	35.4	55.7	29.6	74.0	54.0	-18.3	-24.4
2396.20	-33.88	28.07	V	61.5	31.4	55.6	25.6	74.0	54.0	-18.4	-28.4
2390.00	-33.89	28.06	H	56.0	29.3	50.2	23.5	74.0	54.0	-23.8	-30.5
2390.00	-33.89	28.06	V	56.6	31.4	50.8	25.6	74.0	54.0	-23.2	-28.4

Horizontal:



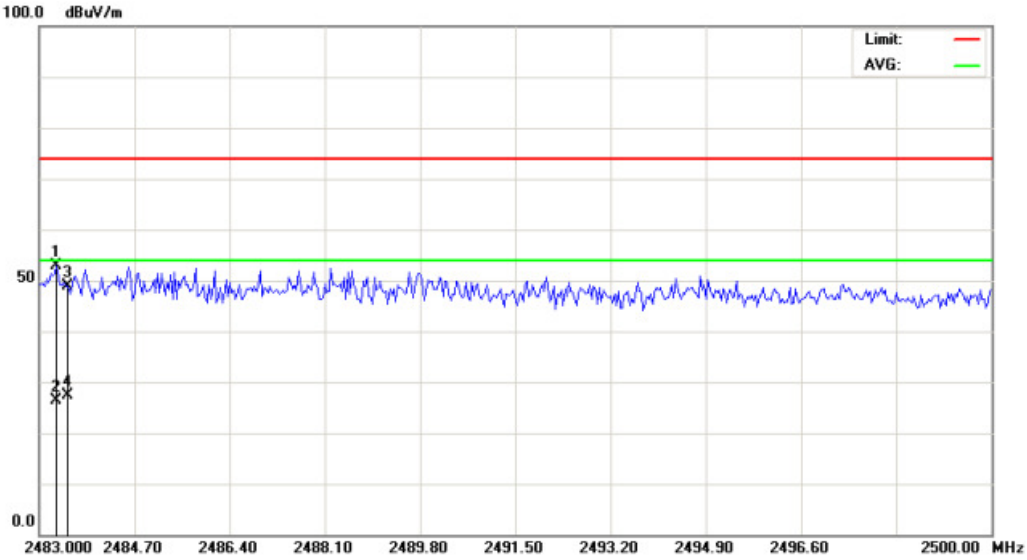
Vertical:



Above 2483.5MHz (CH11)

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
2452.00	-22.57	28.22	H	101.5	85.2	107.1	90.8	114.0	94.0	-6.9	-3.2
2452.00	-22.57	28.22	V	92.4	81.7	98.0	87.3	114.0	94.0	-16.0	-6.7
2483.30	-33.86	28.26	H	56.3	29.8	50.7	24.2	74.0	54.0	-23.3	-29.8
2485.00	-33.86	28.27	V	61.7	32.5	56.1	26.9	74.0	54.0	-17.9	-27.1
2483.50	-33.86	28.26	H	52.2	30.6	46.6	25.0	74.0	54.0	-27.4	-29.0
2483.50	-33.86	28.26	V	57.3	32.4	51.7	26.8	74.0	54.0	-22.3	-27.2

Horizontal:



Vertical: