



**FCC 47 CFR PART 15 SUBPART E AND ANSI C63.4:2003
TEST REPORT**

For

PCI-RF module

Model : MB92-EKI6340

Trade Name : ADVANTECH

Issued for

Advantech Co., Ltd.

**No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.**

Issued by

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	04/20/2012	Initial Issue	All Page 71	Winnie Chen
01	05/07/2012	Revised Maximum Conducted Output Power.	Page 24 All Page 72	Winnie Chen



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1. TEST REPORT CERTIFICATION

Applicant : Advantech Co., Ltd.
Address : No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
 Taipei 114, Taiwan, R.O.C.
Equipment Under Test : PCI-RF module
Model : MB92-EKI6340
Trade Name : ADVANTECH
Tested Date : March 15 ~ April 18, 2012

APPLICABLE STANDARD	
Standard	Test Result
FCC Part 15 Subpart E AND ANSI C63.4:2003	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

 Rex Liao
 Deputy Section Manager

Reviewed by:

 Sb Lu
 Sr. Engineer



2. EUT DESCRIPTION

Product Name	PCI-RF module
Model Number	MB92-EKI6340
Identify Number	T120315033
Received Date	March 15, 2012
Frequency Range	IEEE 802.11a, 802.11an HT20 : 5180MHz ~ 5240Hz IEEE 802.11an HT40 : 5190MHz ~ 5230MHz
Transmit Power	Average Power IEEE 802.11a : 14.37dBm (0.0274W) IEEE 802.11n HT20 : 15.21dBm (0.0332W) IEEE 802.11n HT40 : 16.65dBm (0.0462W) Peak Power IEEE 802.11a : 23.05dBm (0.2018W) IEEE 802.11n HT20 : 25.07dBm (0.3214W) IEEE 802.11n HT40 : 25.68dBm (0.3702W)
Channel Spacing	IEEE 802.11a, 802.11n HT20 : 20MHz IEEE 802.11n HT40 : 40MHz
Channel Number	IEEE 802.11a, 802.11n HT20 : 4 Channels IEEE 802.11n HT40 : 2 Channels
Transmit Data Rate	IEEE 802.11a : 54, 48, 36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT20 : 144.444, 130, 117, 115.556, 104, 86.667, 78, 72.2, 65, 58.5, 57.778, 52, 43.333, 39, 28.889, 26, 21.7, 19.5, 14.444, 13, 7.2, 6.5 Mbps IEEE 802.11n HT40 : 300, 270, 243, 240, 216, 180, 162, 150, 135, 121.5, 120, 108, 90, 81, 60, 54, 45, 40.5, 30, 27, 15, 13.5 Mbps
Type of Modulation	IEEE 802.11a : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK)
Power Rating	3.3Vdc
Test Voltage	120Vac, 60Hz



Antenna List :

No.	Model	Type	2.4G Gain (dBi)	5G Gain (dBi)
1	AN2450-57B01RS	Dipole	2	1
2	SAA04-050280		8	
3	SAA04-22008A		4	7

Antenna Operation Frequency :

No.	Model	Type	2400~2483.5 (MHz)	5150~5250 (MHz)	5725~5850 (MHz)
1	AN2450-57B01RS	Dipole	O	O	O
2	SAA04-050280		O	X	X
3	SAA04-22008A		O	X	O

Operation Frequency :

Unlicensed National Information Infrastructure (U-NII)					
Channel	MHz	Channel	MHz	Channel	MHz
36	5180	40	5200	46	5230
38	5190	44	5220	48	5240

Remark :

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. For more details, please refer to the User's manual of the EUT.
3. This submittal(s) (test report) is intended for FCC ID: M82-EKI6340 filing to comply with Section 15.207, 15.209 and 15.407 of the FCC Part 15, Subpart E Rules.



3. DESCRIPTION OF TEST MODES

The EUT is an 802.11n MIMO transceiver in PCI-RF module form factor. It has two transmitter chains and two receive chains (2 x 2 configurations).
IEEE 802.11a, mode, Chain 0 transmitter.

Conducted Emission / Radiated Emission Test (Below 1 GHz)

1. The following test modes were scanned during the preliminary test:

No.	Pre-Test Mode
1	TX Mode

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode		
Emission	Radiated Emission	TX Mode
	Conducted Emission	TX Mode

Remark : Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

Conducted / Radiated Emission Test (Above 1 GHz)

IEEE 802.11a, 802.11n HT20 mode

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	5180
Middle	5220
High	5240

IEEE 802.11a mode : 6Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT20 mode : 13Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT40 mode

The EUT had been tested under operating condition.

There are two channels have been tested as following :

Channel	Frequency (MHz)
Low	5190
High	5230

IEEE 802.11n HT40 mode : 27Mbps data rate (worst case) were chosen for full testing.



4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2003 and FCC CFR 47, 15.207, 15.209 and 15. 407.

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.4:2003 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Taiwan	TAF
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The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	INDUSTRY CANADA
Japan	VCCI
Taiwan	BSMI
USA	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>



5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.5189
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 2.5164
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 2.4967
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 2.7655
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 1.5923

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Consistent with industry standard (e.g. CISPR 22: 2006, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.



6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID
1	Notebook PC	IBM (Lenovo)	ThinkPad T61 7663-AS6	L3F3864	DoC
2	Notebook PC	HP	ProBook 4421s	CNF03242PM	DoC

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

1. Set up all computers like the setup diagram.
2. The “Atheros Radio Test <ART> Devilib Revision 0.9 BUILD #27 ART_11n” software was used for testing.

The EUT driver software installed in the host support equipment during testing was Atheros AR5002, ANWI Diagnostic Kernel Drive.

⇒ Tx Antenna: ANT_A, [TX99]

⇒ Tx Data Rate: 6Mbps (IEEE 802.11a mode , chain 0 TX)
13Mbps (IEEE 802.11an HT20 mode , chain 0/1TX)
27Mbps (IEEE 802.11an HT40 mode, chain 0/1TX)

⇒ Power control mode

Output Power: IEEE 802.11a Channel Low (5180MHz) = 14
IEEE 802.11a Channel Middle (5220MHz) = 14
IEEE 802.11a Channel High (5240MHz) = 14

Output Power: IEEE 802.11an HT20 Channel Low (5180MHz) = 12
IEEE 802.11an HT20 Channel Middle (5220MHz) = 12
IEEE 802.11an HT20 Channel High (5240MHz) = 12

Output Power: IEEE 802.11an HT40 Channel Low (5190MHz) = 10.5
IEEE 802.11an HT40 Channel High (5230MHz) = 14

3. All of the functions are under run.
4. Start test.



7. FCC PART 15.407 REQUIREMENTS

7.1 26dB BANDWIDTH

LIMITS

§ 15.303 (c) (2), For purposes of this subpart, the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4407B	US41443108	08/09/2012

Remark: Each piece of equipment is scheduled for calibration once a year.

TEST SETUP



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low-loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW > 1%EBW, VBW > RBW, Span = 50MHz and Sweep = auto.
4. Mark the -26dBc (upper and lower) frequency of the peak value.
5. Repeat until all the rest channels were investigated.



TEST RESULTS

IEEE 802.11a Mode

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)
Low	5180	25.47
Middle	5220	25.60
High	5240	26.33

IEEE 802.11n HT20 Mode (Two TX)

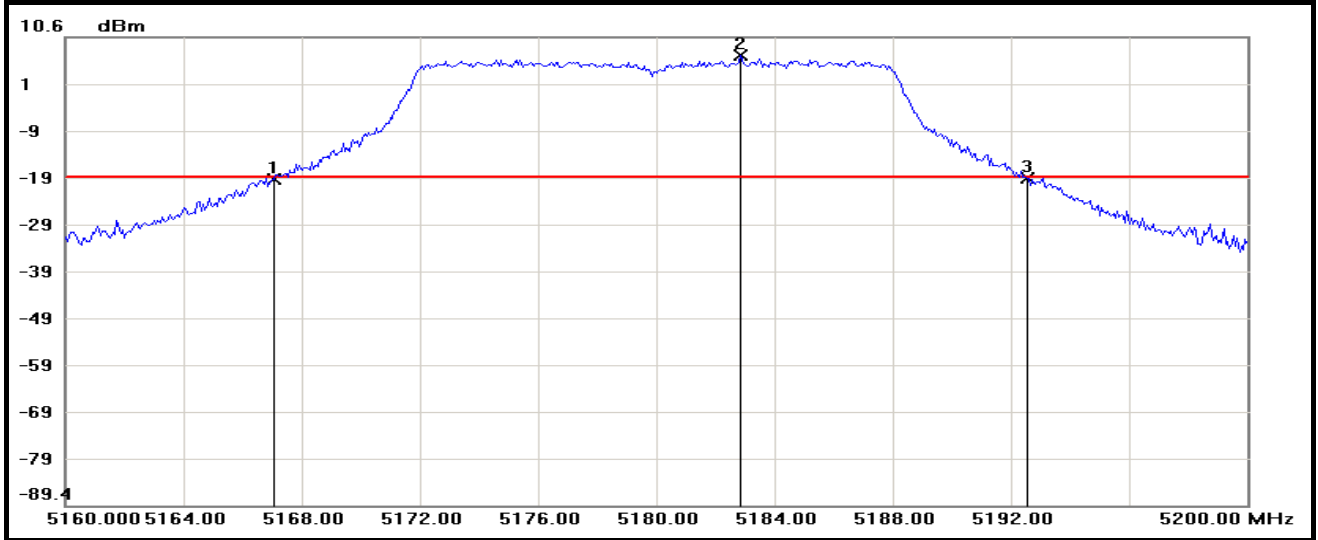
Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	
		Chain 0	Chain 1
Low	5180	25.33	25.40
Middle	5220	25.47	25.13
High	5240	25.53	24.67

IEEE 802.11n HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	
		Chain 0	Chain 1
Low	5190	47.33	45.92
High	5230	47.75	46.33

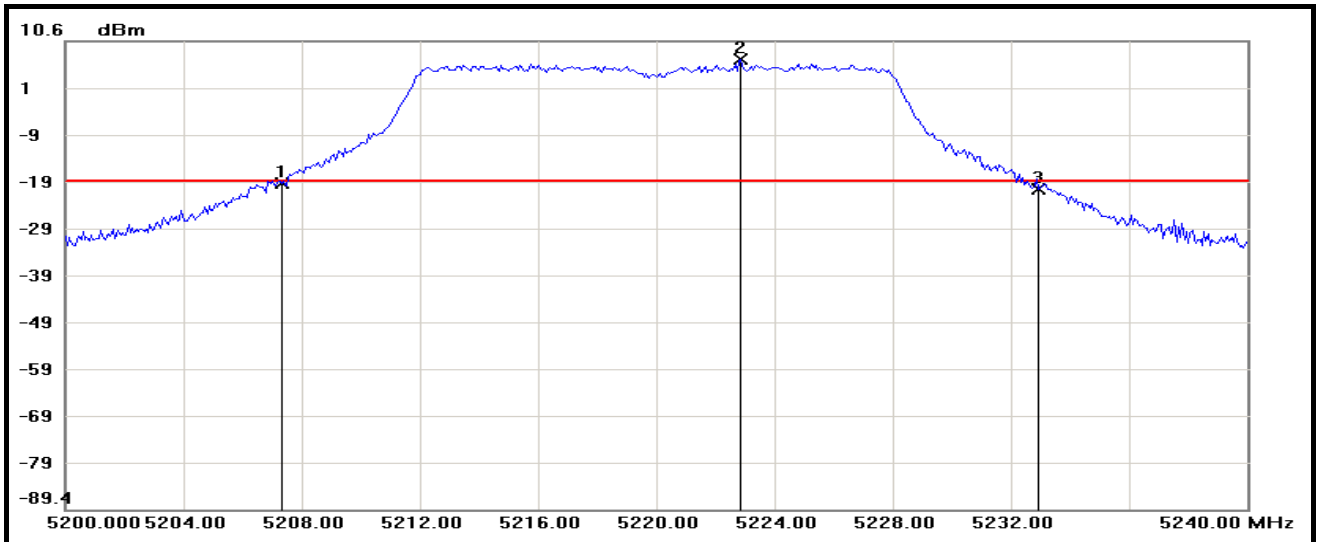


IEEE 802.11a Mode / CH Low



No.	Frequency(MHz)	Level(dBm)
1	5167.0667	-19.72
2	5182.8667	6.81
3	5192.5333	-19.42

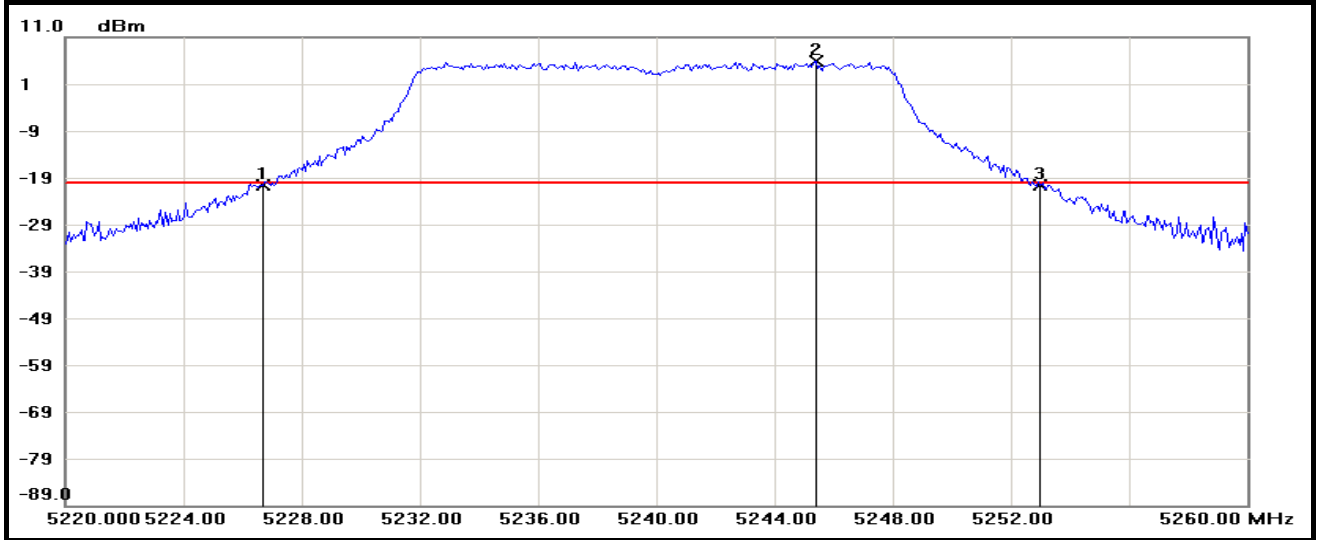
IEEE 802.11a Mode / CH Middle



No.	Frequency(MHz)	Level(dBm)
1	5207.3333	-19.70
2	5222.8667	6.79
3	5232.9333	-21.04



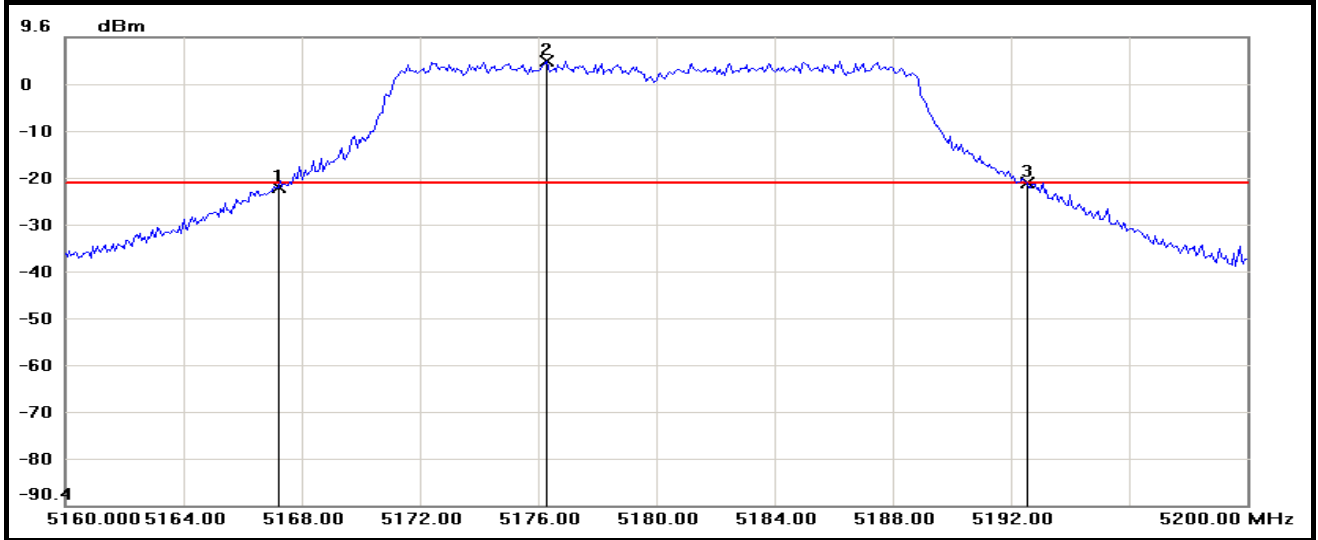
IEEE 802.11a Mode / CH High



No.	Frequency(MHz)	Level(dBm)
1	5226.6667	-20.57
2	5245.4000	5.78
3	5253.0000	-20.52

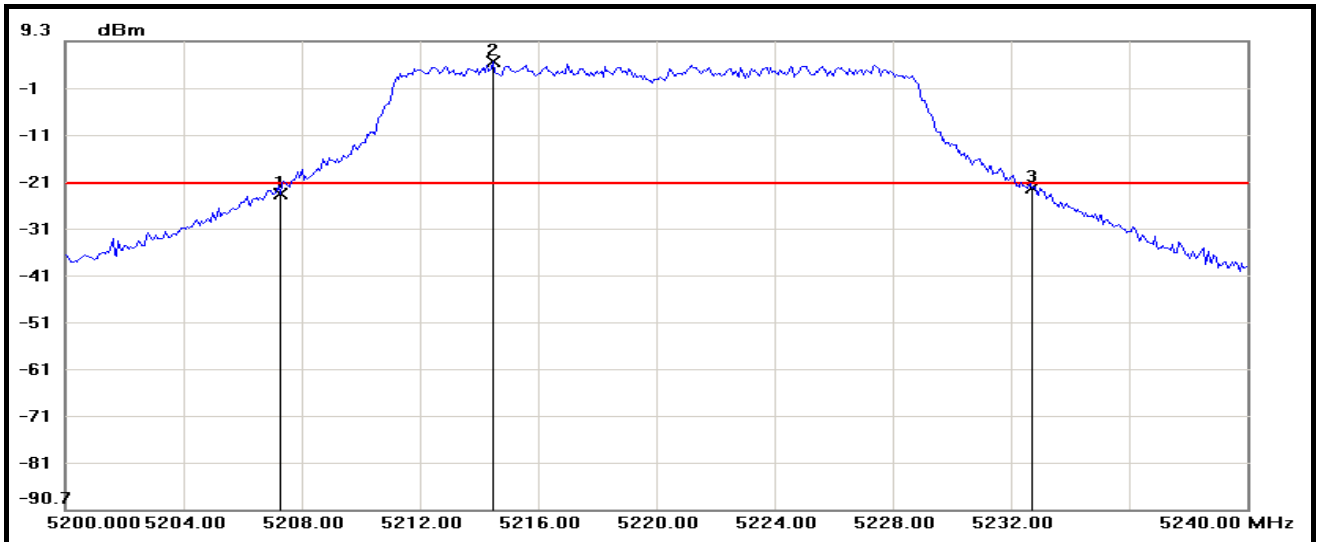


IEEE 802.11n HT20 Mode / Chain 0 / CH Low



No.	Frequency(MHz)	Level(dBm)
1	5167.2000	-22.48
2	5176.2667	4.58
3	5192.5333	-21.44

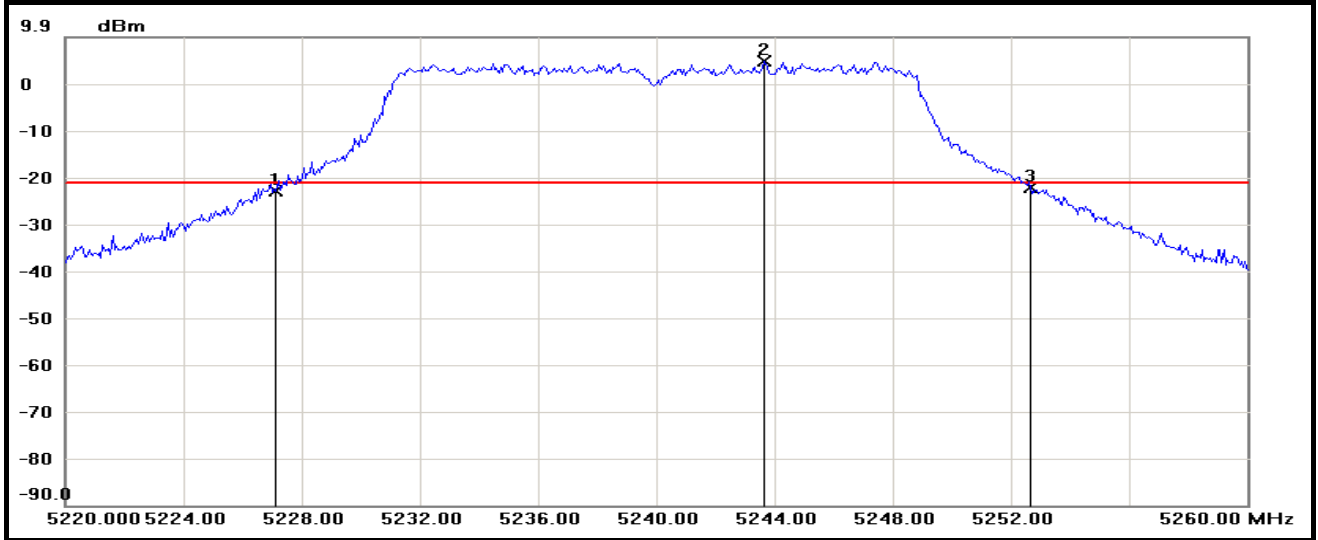
IEEE 802.11n HT20 Mode / Chain 0 / CH Middle



No.	Frequency(MHz)	Level(dBm)
1	5207.2667	-23.27
2	5214.4667	4.87
3	5232.7333	-22.09



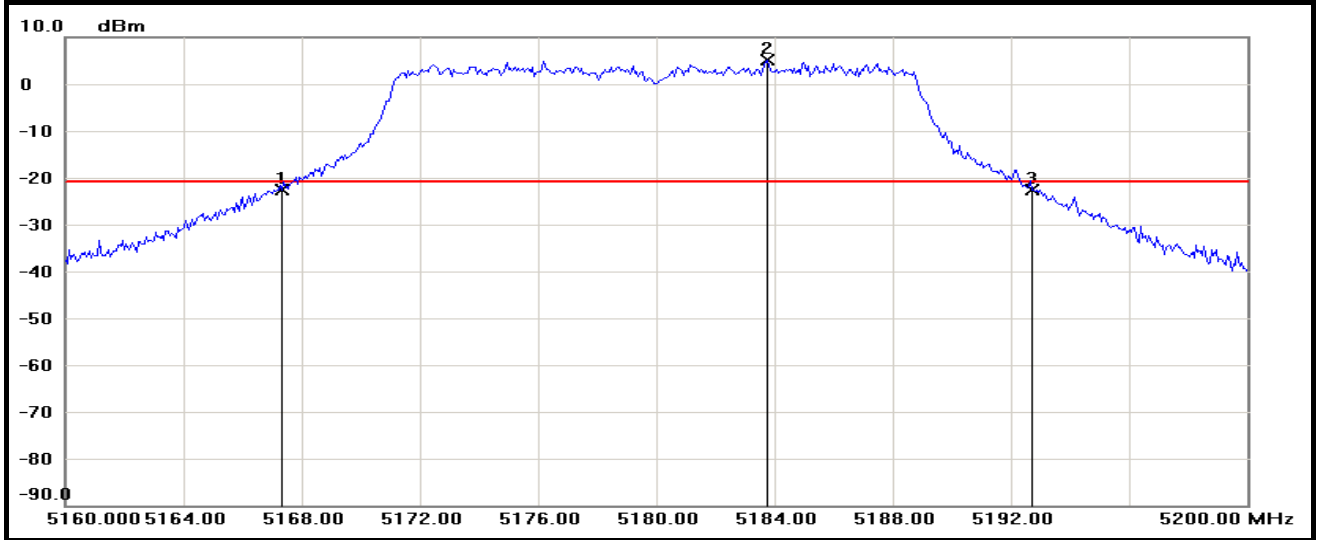
IEEE 802.11n HT20 Mode / Chain 0 / CH High



No.	Frequency(MHz)	Level(dBm)
1	5227.1333	-22.93
2	5243.6667	4.85
3	5252.6667	-22.19

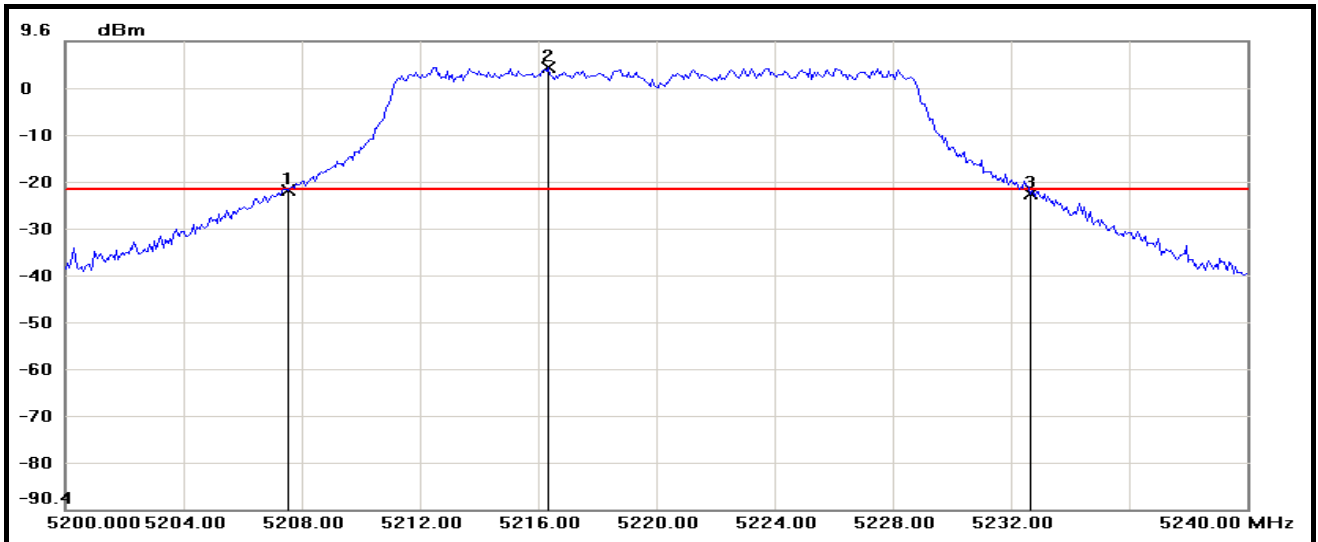


IEEE 802.11n HT20 Mode / Chain 1 / CH Low



No.	Frequency(MHz)	Level(dBm)
1	5167.3333	-22.58
2	5183.7333	5.08
3	5192.7333	-22.60

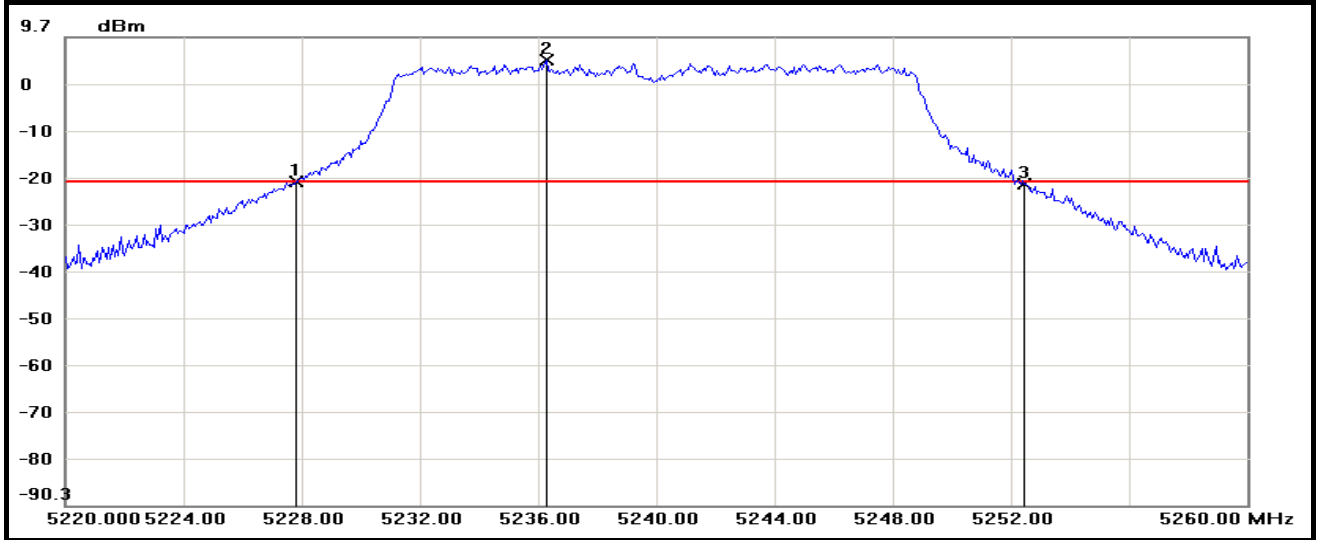
IEEE 802.11n HT20 Mode / Chain 1 / CH Middle



No.	Frequency(MHz)	Level(dBm)
1	5207.5333	-22.32
2	5216.3333	4.12
3	5232.6667	-23.06



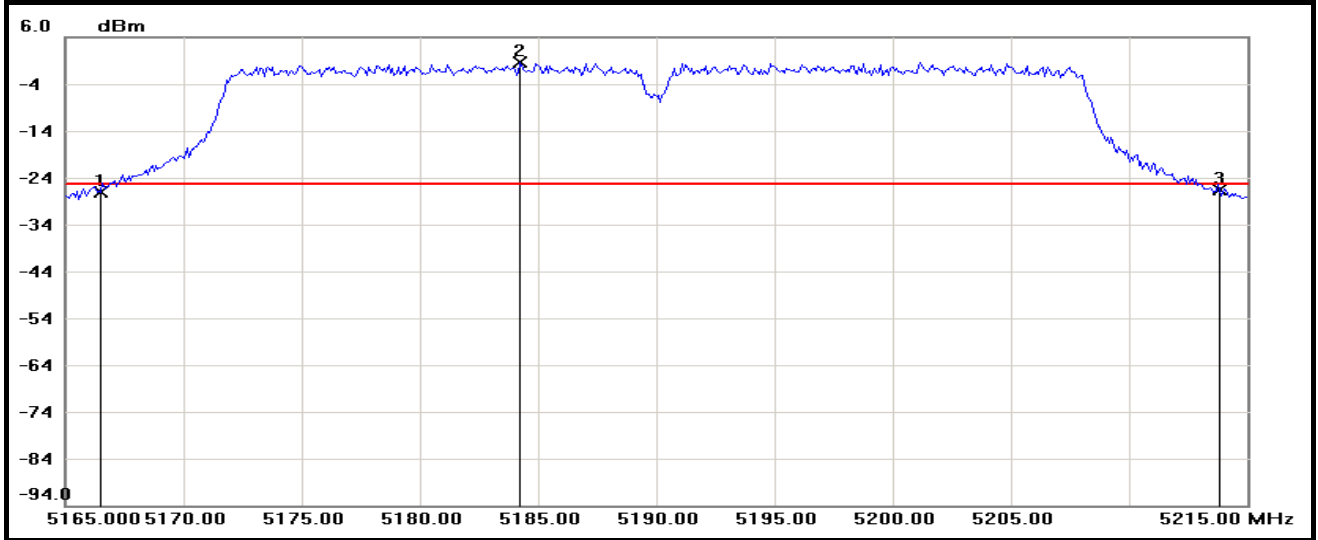
IEEE 802.11n HT20 Mode / Chain 1 / CH High



No.	Frequency(MHz)	Level(dBm)
1	5227.8000	-21.25
2	5236.2667	4.79
3	5252.4667	-21.58

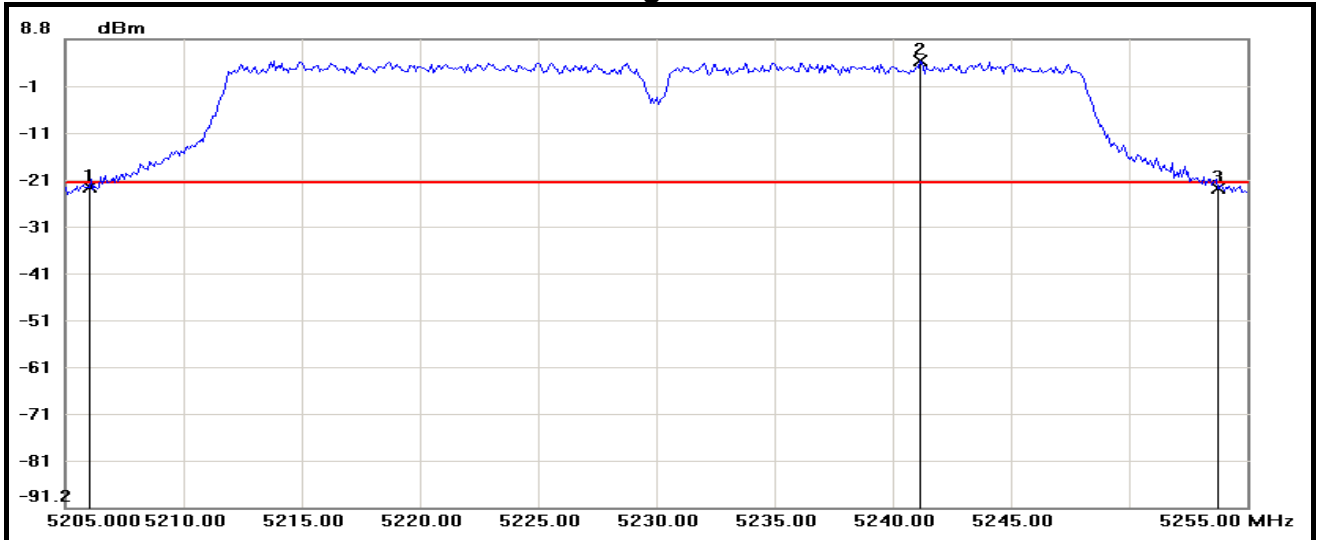


IEEE 802.11n HT40 Mode / Chain 0 / CH Low



No.	Frequency(MHz)	Level(dBm)
1	5166.5000	-27.20
2	5184.2500	0.71
3	5213.8333	-26.66

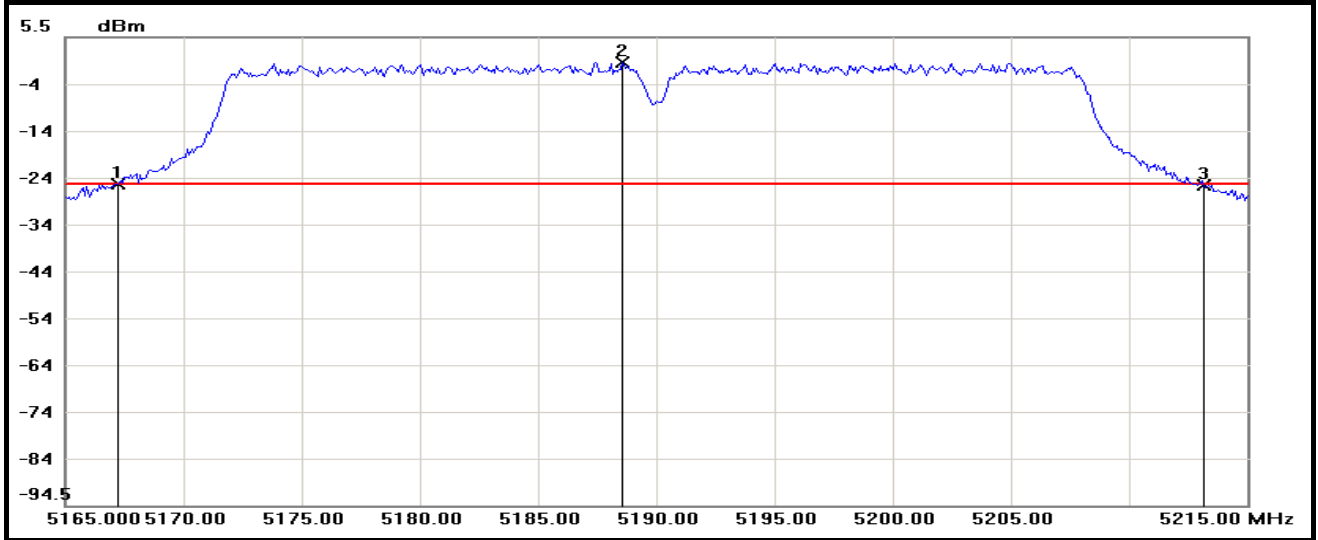
IEEE 802.11n HT40 Mode / Chain 0 / CH High



No.	Frequency(MHz)	Level(dBm)
1	5206.0000	-22.81
2	5241.1667	4.28
3	5253.7500	-23.15

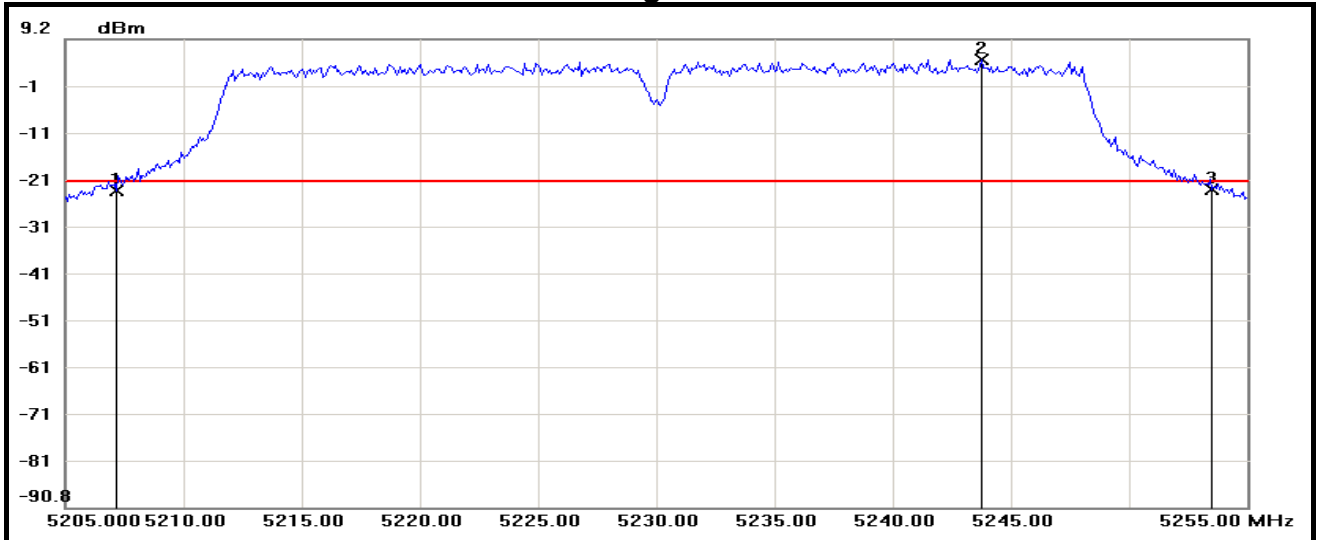


IEEE 802.11n HT40 Mode / Chain 1 / CH Low



No.	Frequency(MHz)	Level(dBm)
1	5167.2500	-25.91
2	5188.5833	0.24
3	5213.1667	-26.19

IEEE 802.11n HT40 Mode / Chain 1 / CH High



No.	Frequency(MHz)	Level(dBm)
1	5207.1667	-23.05
2	5243.7500	4.83
3	5253.5000	-22.81



7.2 MAXIMUM CONDUCTED OUTPUT POWER

LIMITS

§ 15.407(a)

(1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50mW (17dBm) or 4dBm + 10log B, where B is the 26dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4dBm in any 1 MHz band.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26 dB emission bandwidth in MHz.

If transmitting antennas of directional gain greater than 6dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

The peak power shall not exceeded the limit as follows:

IEEE 802.11a Mode

Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log B (dB)	4dBm + 10 Log B (dBm)	Maximum Conducted Output Power Limit (dBm)
Low	5180	25.47	14.06029	18.06029	17
Middle	5220	25.60	14.08240	18.08240	17
High	5240	26.33	14.20451	18.20451	17

IEEE 802.11n HT20 Mode

Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log B (dB)	4dBm + 10 Log B (dBm)	Maximum Conducted Output Power Limit (dBm)
Low	5180	25.33	14.03635	18.03635	17
Middle	5220	25.47	14.06029	18.06029	17
High	5240	25.53	14.07051	18.07051	17



IEEE 802.11n HT40 Mode

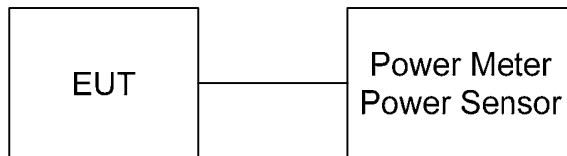
Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log B (dB)	4dBm + 10 Log B (dBm)	Maximum Conducted Output Power Limit (dBm)
Low	5190	47.33	16.75137	20.75137	17
High	5230	47.75	16.78973	20.78973	17

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	ANRITSU	ML2495A	1149001	12/07/2012
Power Sensor	ANRITSU	MA2411B	1126148	12/14/2012

Remark: Each piece of equipment is scheduled for calibration once a year.

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the power detection.



TEST RESULTS

Average Power

IEEE 802.11a Mode

Channel	Channel Frequency (MHz)	Power		Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	5180	14.08	0.0256	17	0.05	PASS
Middle	5220	14.26	0.0267	17	0.05	PASS
High	5240	14.37	0.0274	17	0.05	PASS

Remark:

1. At final test to get the worst-case emission at 6Mbps.
2. Duty cycle 99%.

IEEE 802.11n HT20 Mode (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Total Power		Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	5180	12.25	11.95	15.11	0.0325	17	0.05	PASS
Middle	5220	12.16	11.63	14.91	0.0310	17	0.05	PASS
High	5240	12.35	12.05	15.21	0.0332	17	0.05	PASS

Remark:

1. At final test to get the worst-case emission at 13Mbps.
2. Total power = Chain 0 + Chain 1.
3. Duty cycle 99%.

IEEE 802.11n HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Total Power		Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	5190	10.52	9.98	13.27	0.0212	17	0.05	PASS
High	5230	13.58	13.69	16.65	0.0462	17	0.05	PASS

Remark:

1. At final test to get the worst-case emission at 27Mbps.
2. Total power = Chain 0 + Chain 1.
3. Duty cycle 99%.



Peak Power

IEEE 802.11a Mode

Channel	Channel Frequency (MHz)	Power		Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	5180	23.05	0.2018	N/A	N/A	N/A
Middle	5220	22.92	0.1959	N/A	N/A	N/A
High	5240	22.90	0.1950	N/A	N/A	N/A

Remark:

1. At final test to get the worst-case emission at 6Mbps.

IEEE 802.11n HT20 Mode (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Total Power		Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	5180	22.14	21.98	25.07	0.3214	N/A	N/A	N/A
Middle	5220	21.77	21.67	24.73	0.2972	N/A	N/A	N/A
High	5240	21.78	21.92	24.86	0.3063	N/A	N/A	N/A

Remark:

1. At final test to get the worst-case emission at 13Mbps.
2. Total power = Chain 0 + Chain 1.

IEEE 802.11n HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Total Power		Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	5190	21.05	20.67	23.87	0.2440	N/A	N/A	N/A
High	5230	22.49	22.85	25.68	0.3702	N/A	N/A	N/A

Remark:

1. At final test to get the worst-case emission at 27Mbps.
2. Total power = Chain 0 + Chain 1.



7.3 PEAK POWER SPECTRAL DENSITY

LIMITS

§ 15.407 (a)

- (1) For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4dBm in any 1MHz band.
- (2) For the band 5.25-5.35 GHz and 5.47-5.725 GHz, the peak power spectral density shall not exceed 11dBm in any 1MHz band.

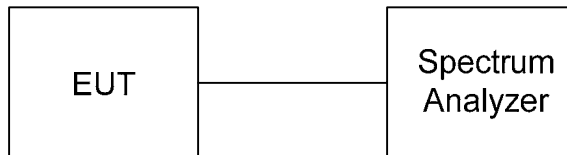
If transmitting antennas of directional gain greater than 6dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4407B	US41443108	08/09/2012

Remark: Each piece of equipment is scheduled for calibration once a year.

TEST SETUP



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 1MHz, VBW = 3MHz, Span = Sweep= AUTO
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.



TEST RESULTS

IEEE 802.11a Mode

Channel	Channel Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	5180	3.16	4	-0.84	PASS
Middle	5220	2.78	4	-1.22	PASS
High	5240	2.55	4	-1.45	PASS

Remark: At final test to get the worst-case emission at 6Mbps.

IEEE 802.11n HT20 Mode (Two TX)

Channel	Channel Frequency (MHz)	PPSD (dBm)		Total PPSSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
		Chain 0	Chain 1				
Low	5180	0.15	0.55	3.37	4	-0.63	PASS
Middle	5220	0.22	-0.20	3.03	4	-0.97	PASS
High	5240	0.47	-0.08	3.21	4	-0.79	PASS

Remark:

1. At final test to get the worst-case emission at 13Mbps.
2. Total peak power spectral density = Chain 0 + Chain 1.

IEEE 802.11n HT40 Mode (Two TX)

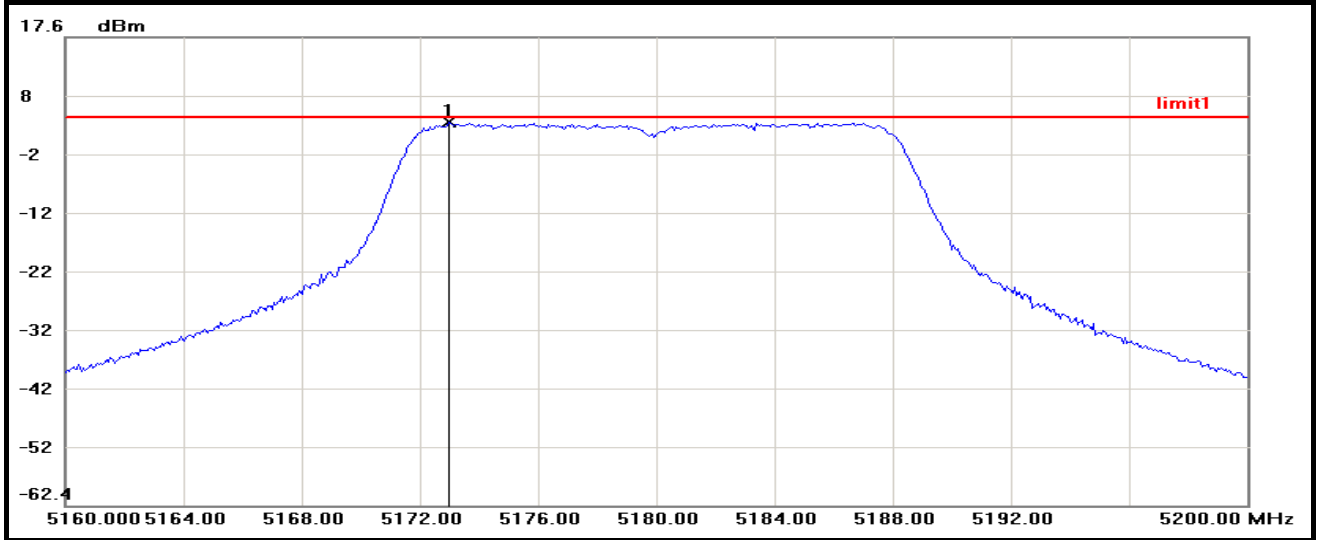
Channel	Channel Frequency (MHz)	PPSD (dBm)		Total PPSSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
		Chain 0	Chain 1				
Low	5190	-4.22	-4.47	-1.33	4	-5.33	PASS
High	5230	-0.88	-0.76	2.19	4	-1.81	PASS

Remark:

1. At final test to get the worst-case emission at 27Mbps.
2. Total peak power spectral density = Chain 0 + Chain 1.

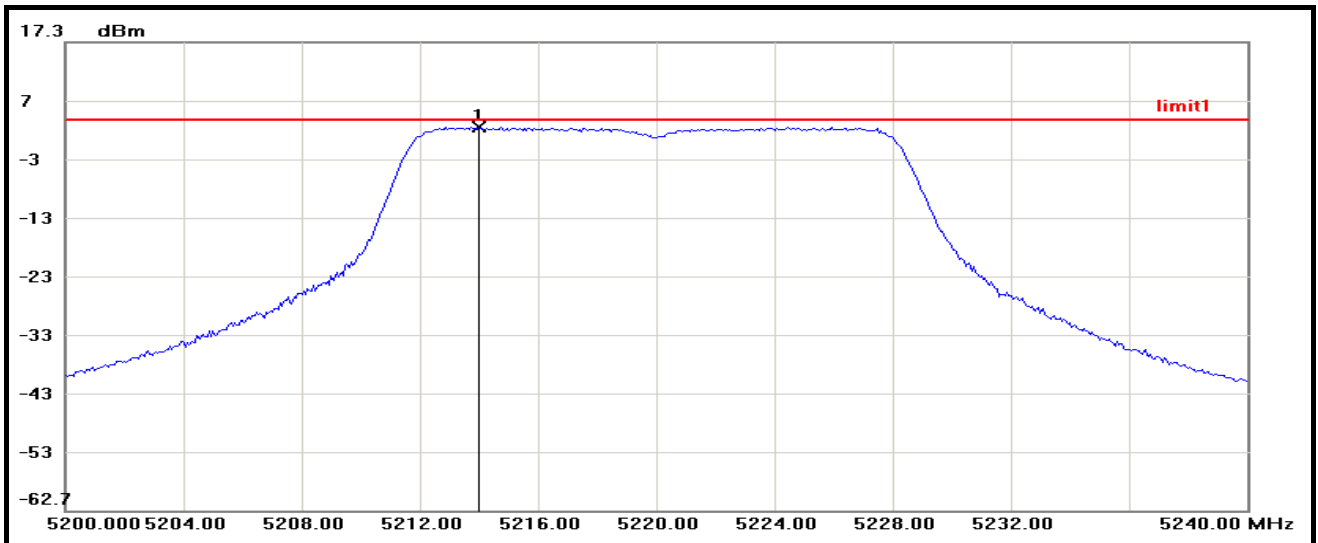


IEEE 802.11a Mode / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5173.0000	3.16	4.00	-0.84

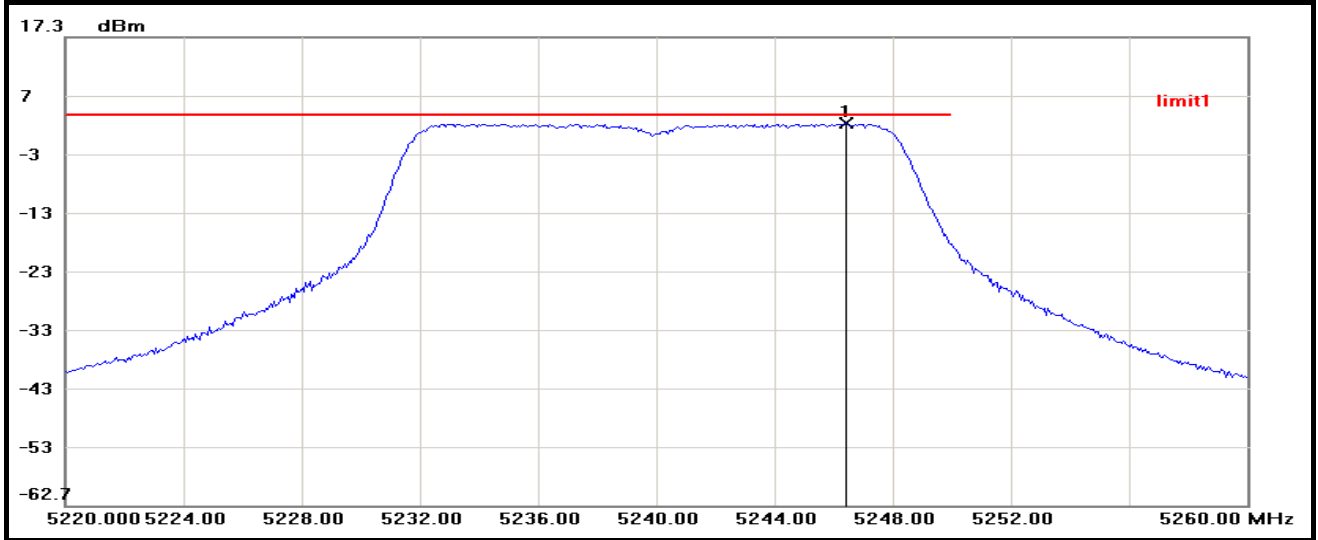
IEEE 802.11a Mode / CH Middle



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5214.0000	2.78	4.00	-1.22



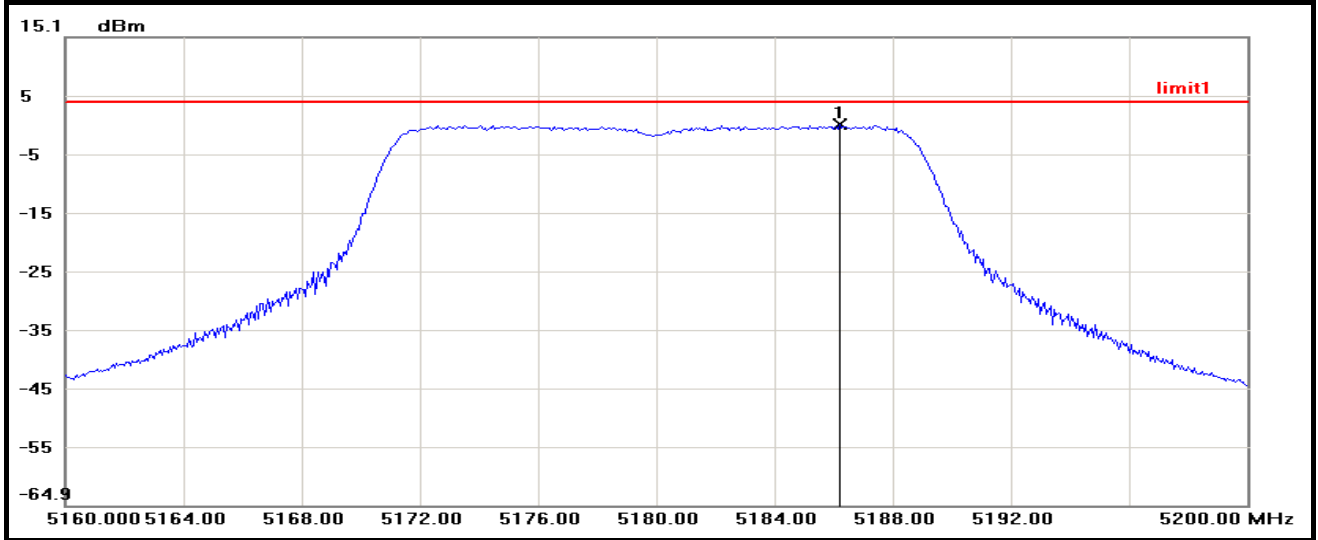
IEEE 802.11a Mode / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5246.4000	2.55	4.00	-1.45

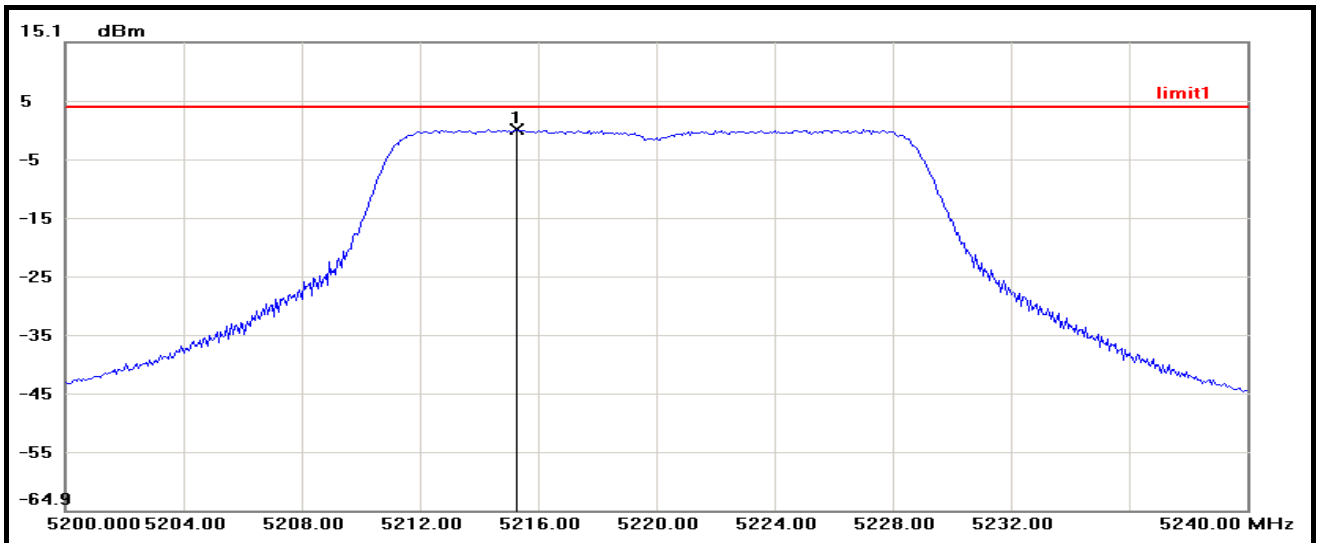


IEEE 802.11n HT20 Mode / Chain 0 / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5186.2000	0.15	4.00	-3.85

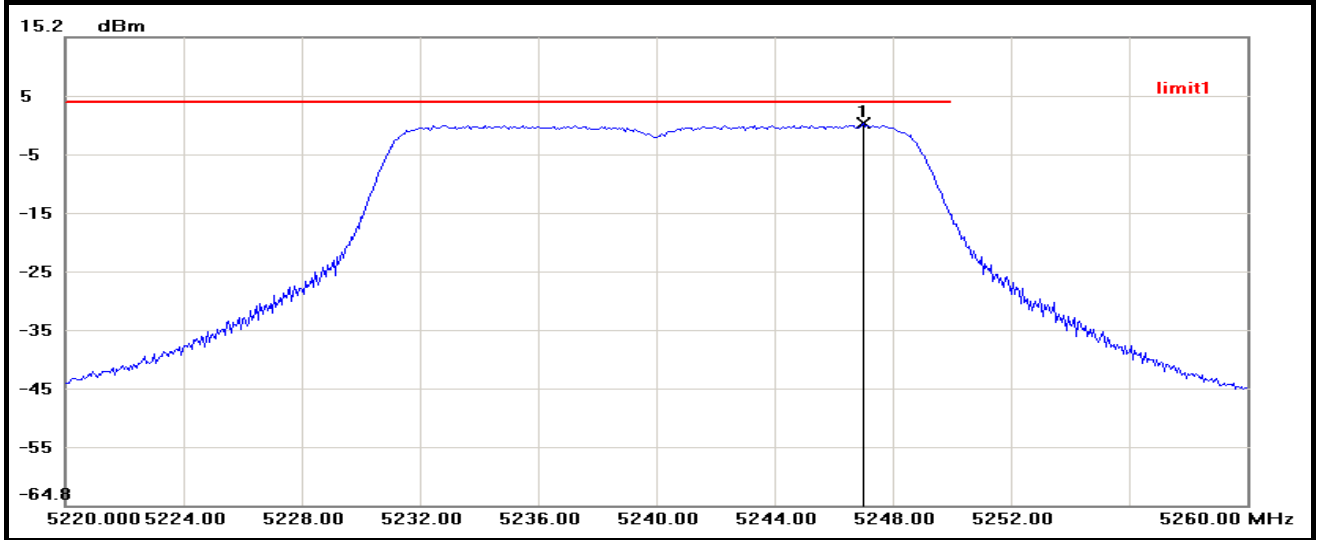
IEEE 802.11n HT20 Mode / Chain 0 / CH Middle



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5215.2667	0.22	4.00	-3.78



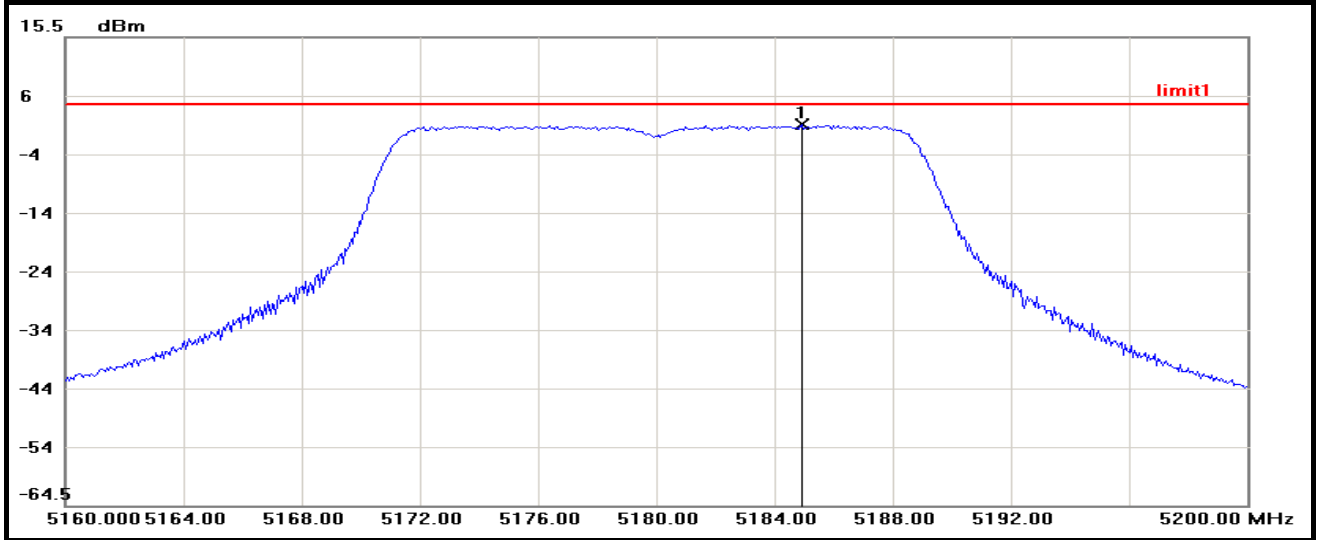
IEEE 802.11n HT20 Mode / Chain 0 / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5247.0000	0.47	4.00	-3.53

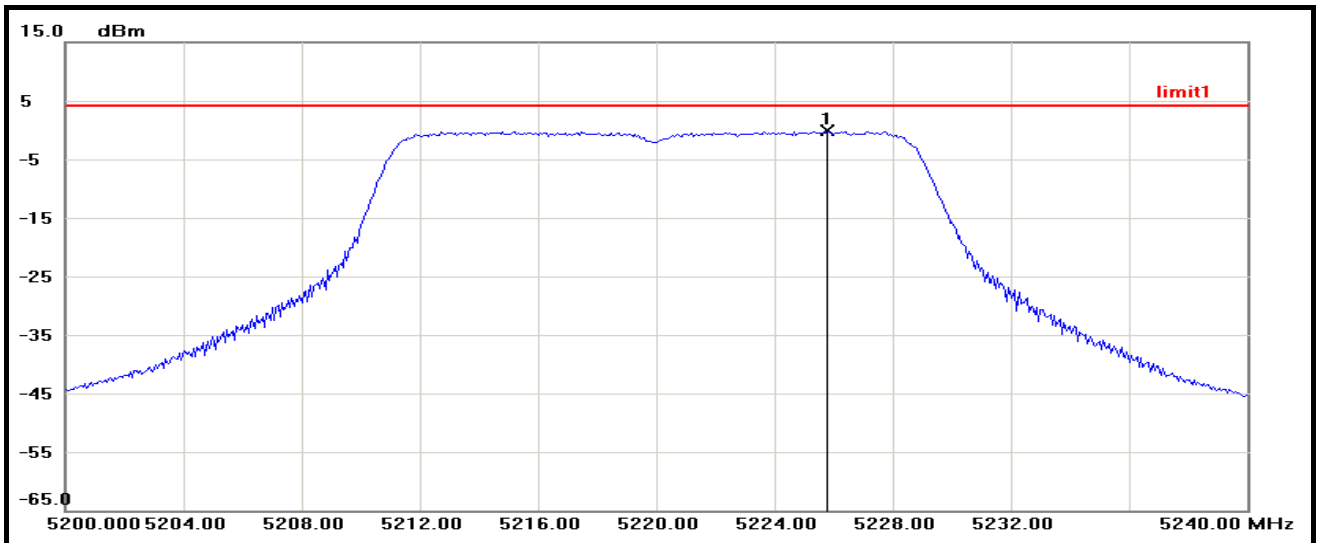


IEEE 802.11n HT20 Mode / Chain 1 / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5184.9333	0.55	4.00	-3.45

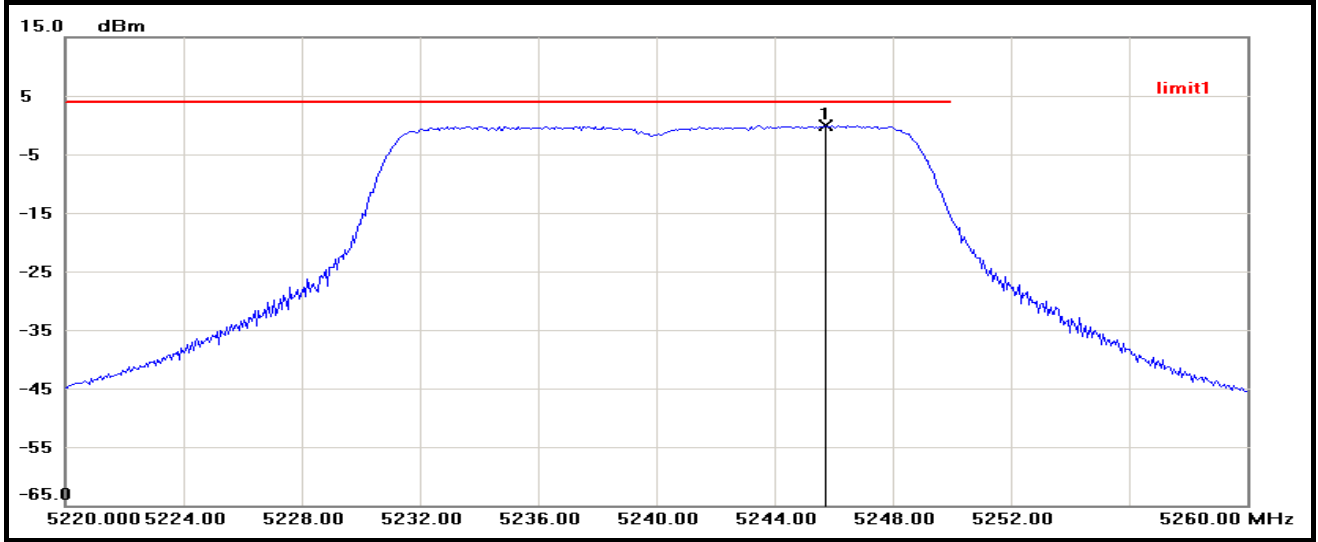
IEEE 802.11n HT20 Mode / Chain 1 / CH Middle



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5225.8000	-0.20	4.00	-4.20



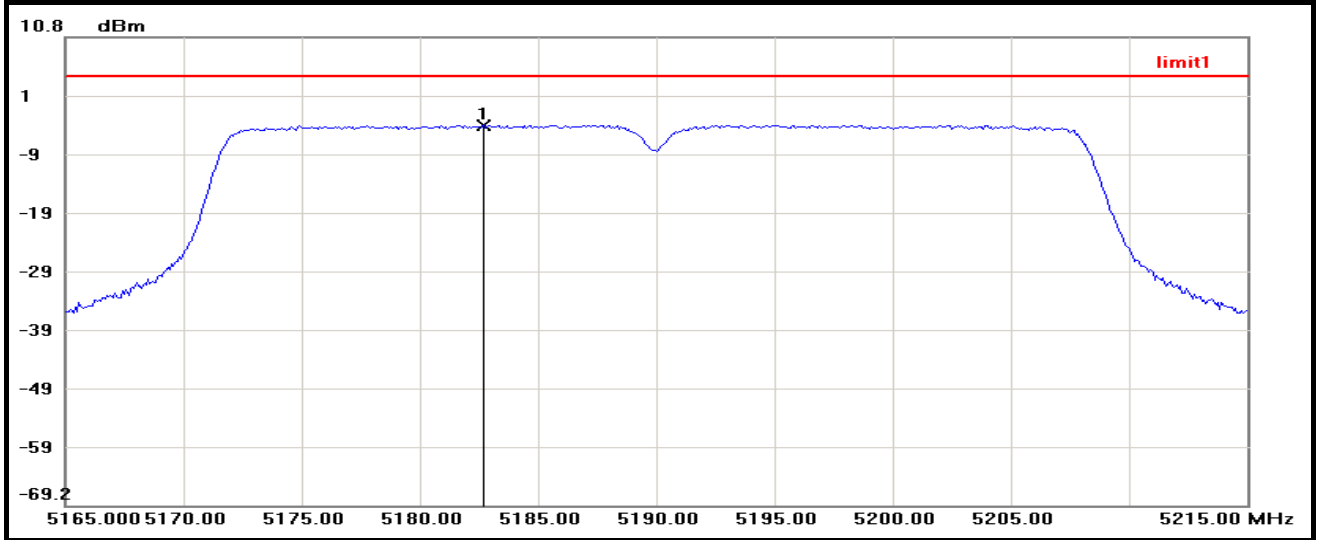
IEEE 802.11n HT20 Mode / Chain 1 / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5245.7333	-0.08	4.00	-4.08

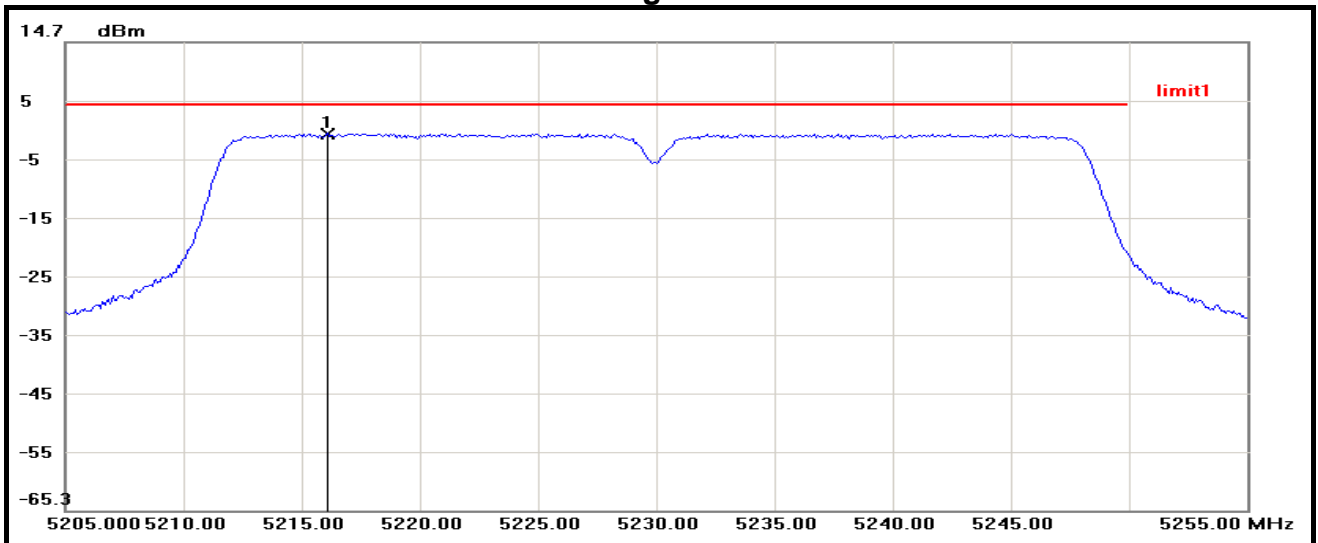


IEEE 802.11n HT40 Mode / Chain 0 / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5182.6667	-4.22	4.00	-8.22

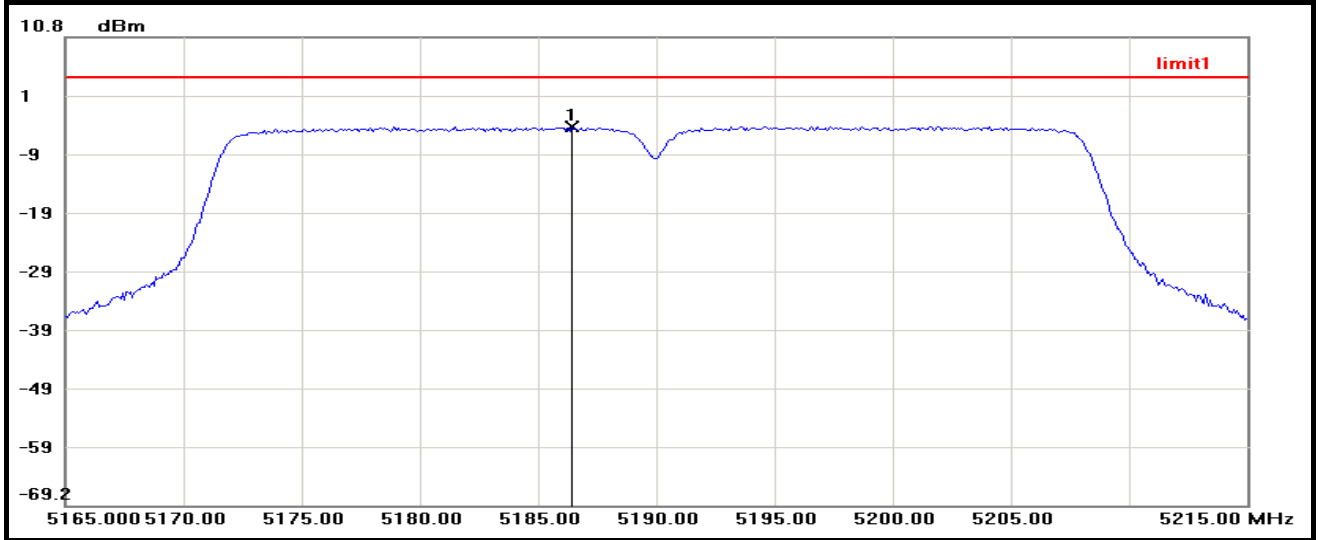
IEEE 802.11n HT40 Mode / Chain 0 / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5216.0833	-0.88	4.00	-4.88

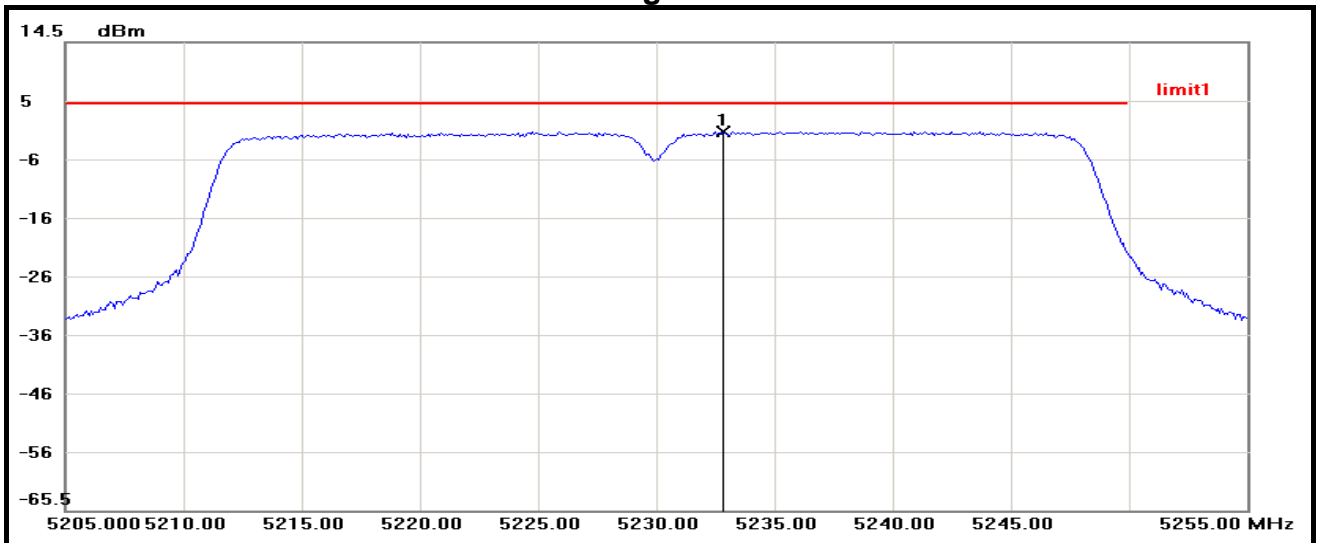


IEEE 802.11n HT40 Mode / Chain 1 / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5186.4167	-4.47	4.00	-8.47

IEEE 802.11n HT40 Mode / Chain 1 / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	5232.8333	-0.76	4.00	-4.76



7.4 PEAK EXCURSION

LIMITS

§ 15.407 (a) (6), the ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/19/2012

Remark: Each piece of equipment is scheduled for calibration once a year.

TEST SETUP



TEST PROCEDURE

The test is performed in accordance with <FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices> – Part 15, Subpart E, August 2002.

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to spectrum.
3. Trace A, Set RBW =1MHz, VBW = 3MHz, Span > 26dB Bandwidth, Max. hold.
Trace B, Set RBW =1MHz, VBW = 3MHz, Span > 26dB Bandwidth, Setup sample detector and power average mode, to scan 100 times with average.
4. Delta Mark trace A Maximum frequency and trace B same frequency.
5. Repeat the above procedure until measurements for all frequencies were complete.



TEST RESULTS

IEEE 802.11a Mode

Channel	Channel Frequency (MHz)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	5180	9.004	13	-3.996	PASS
Middle	5220	9.149	13	-3.851	PASS
High	5240	9.162	13	-3.838	PASS

Remark:

1. At final test to get the worst-case emission at 6Mbps.

IEEE 802.11n HT20 Mode (Two TX) / Chain 0

Channel	Channel Frequency (MHz)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	5180	10.620	13	-2.380	PASS
Middle	5220	10.360	13	-2.640	PASS
High	5240	10.370	13	-2.630	PASS

Remark:

1. At final test to get the worst-case emission at 13Mbps.

IEEE 802.11n HT20 Mode (Two TX) / Chain 1

Channel	Channel Frequency (MHz)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	5180	10.710	13	-2.290	PASS
Middle	5220	10.710	13	-2.290	PASS
High	5240	10.510	13	-2.490	PASS

Remark:

1. At final test to get the worst-case emission at 13Mbps.



IEEE 802.11n HT40 Mode (Two TX) / Chain 0

Channel	Channel Frequency (MHz)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	5190	10.790	13	-2.210	PASS
High	5230	10.890	13	-2.110	PASS

Remark:

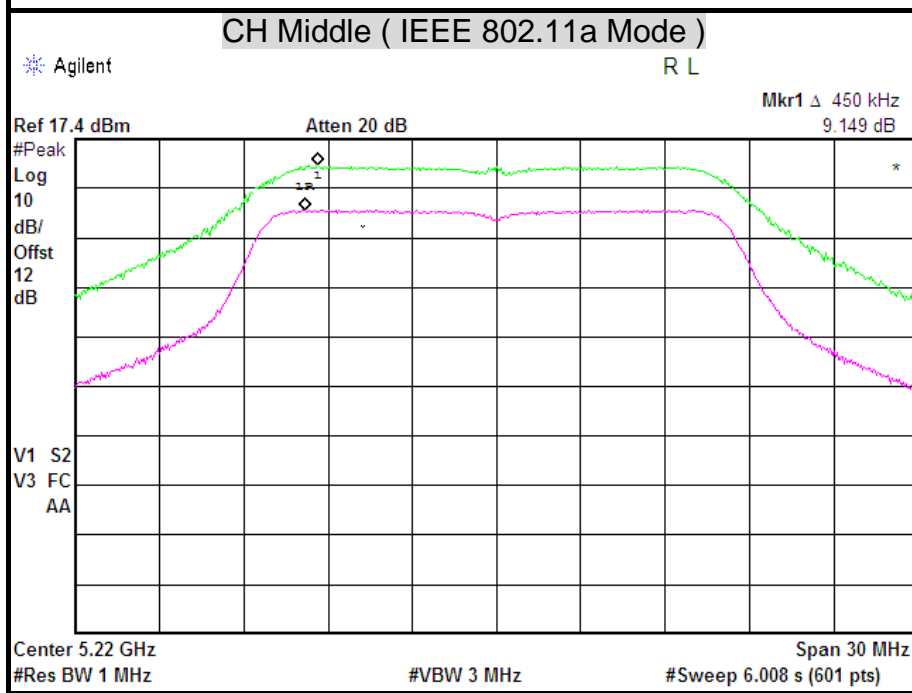
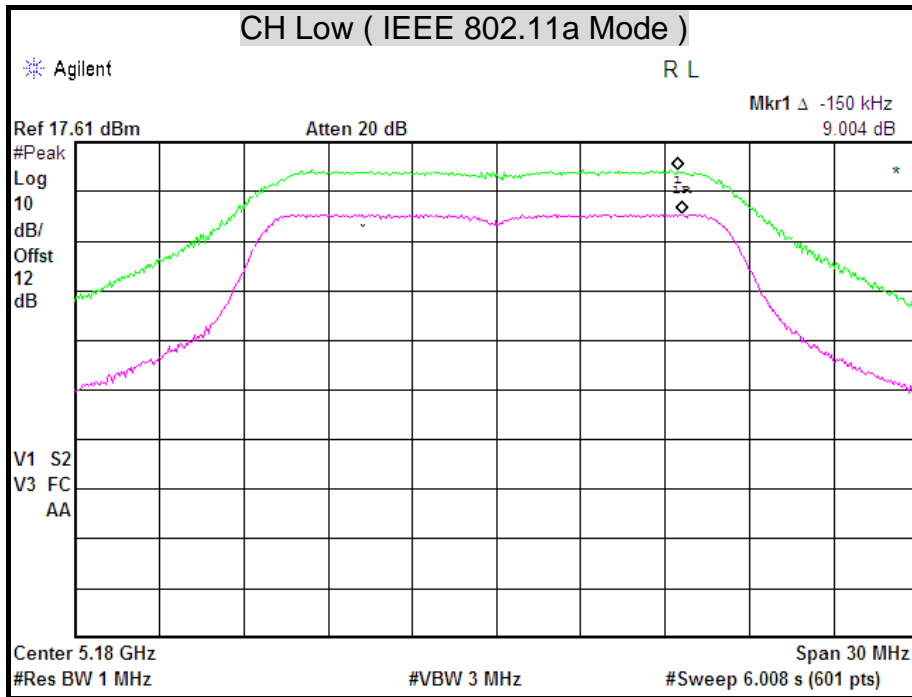
1. At final test to get the worst-case emission at 27Mbps.

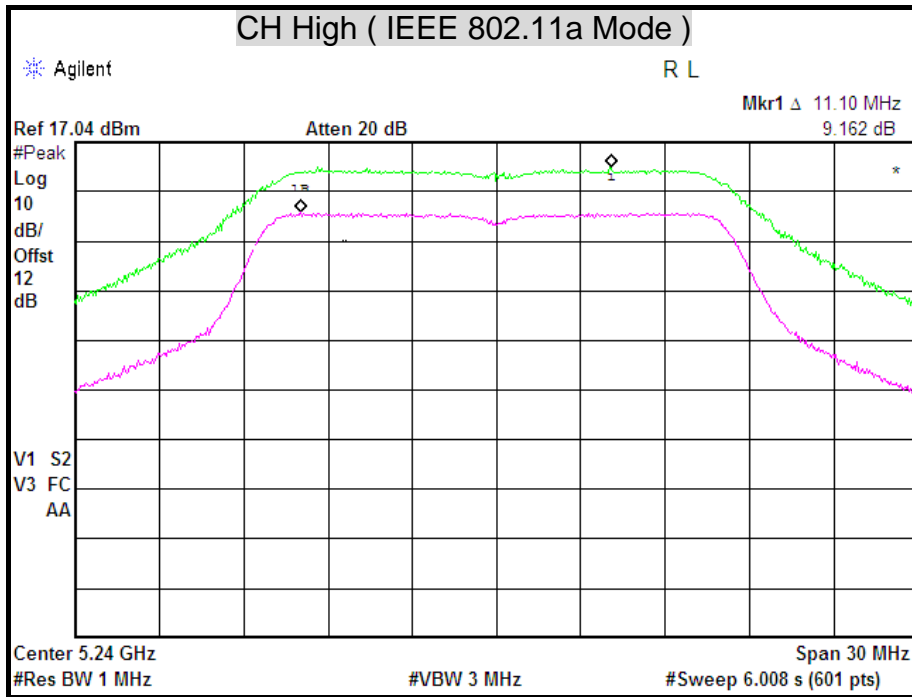
IEEE 802.11n HT40 Mode (Two TX) / Chain 1

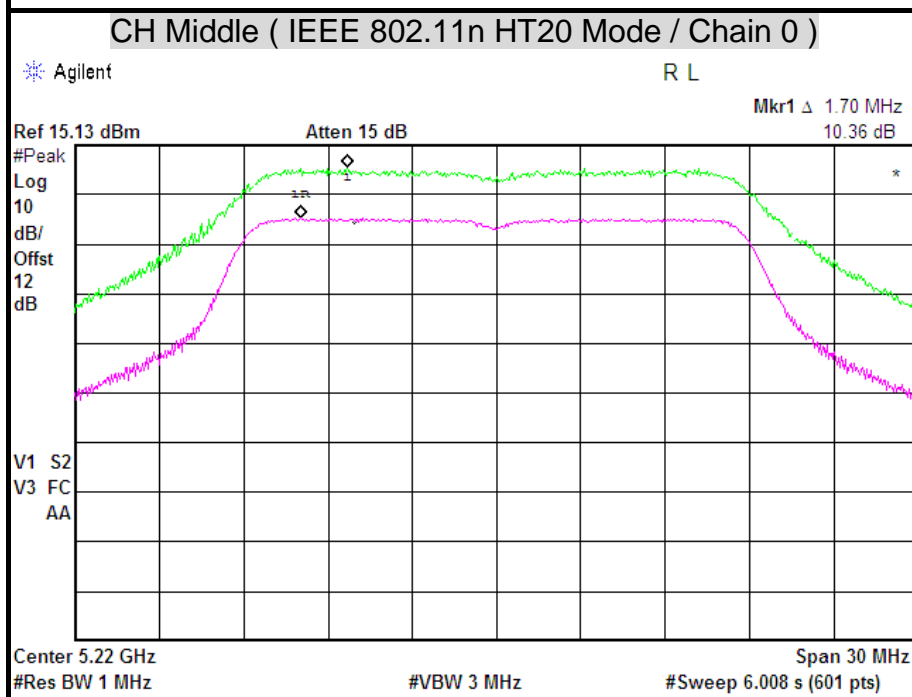
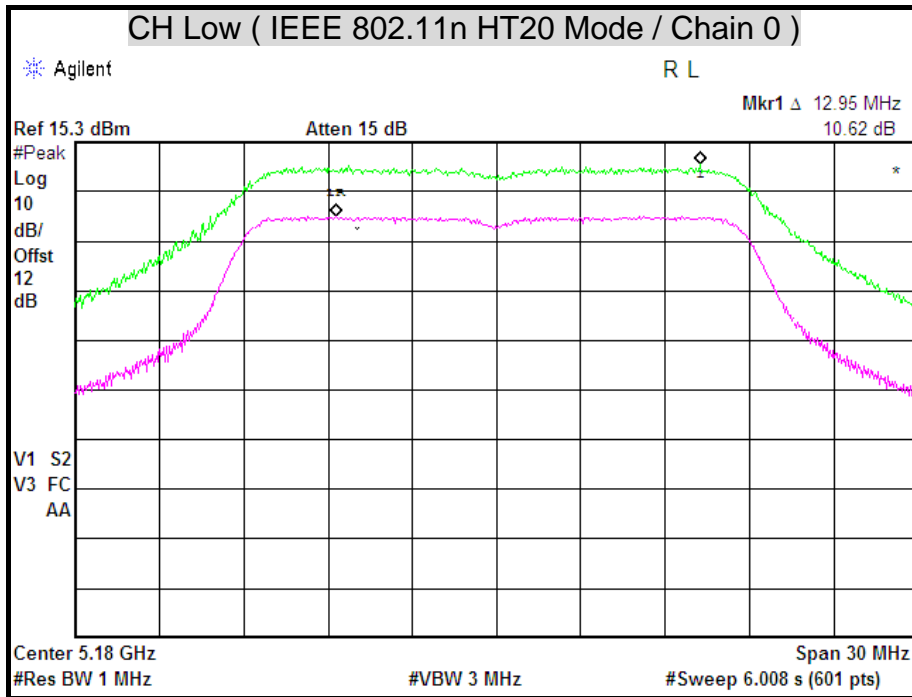
Channel	Channel Frequency (MHz)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	5190	10.530	13	-2.470	PASS
High	5230	11.140	13	-1.860	PASS

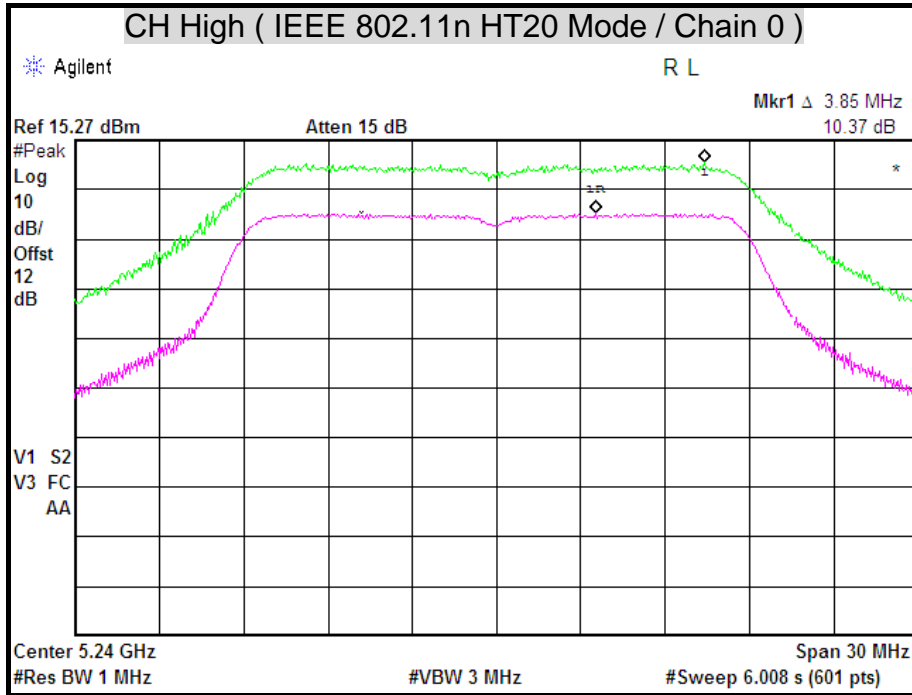
Remark:

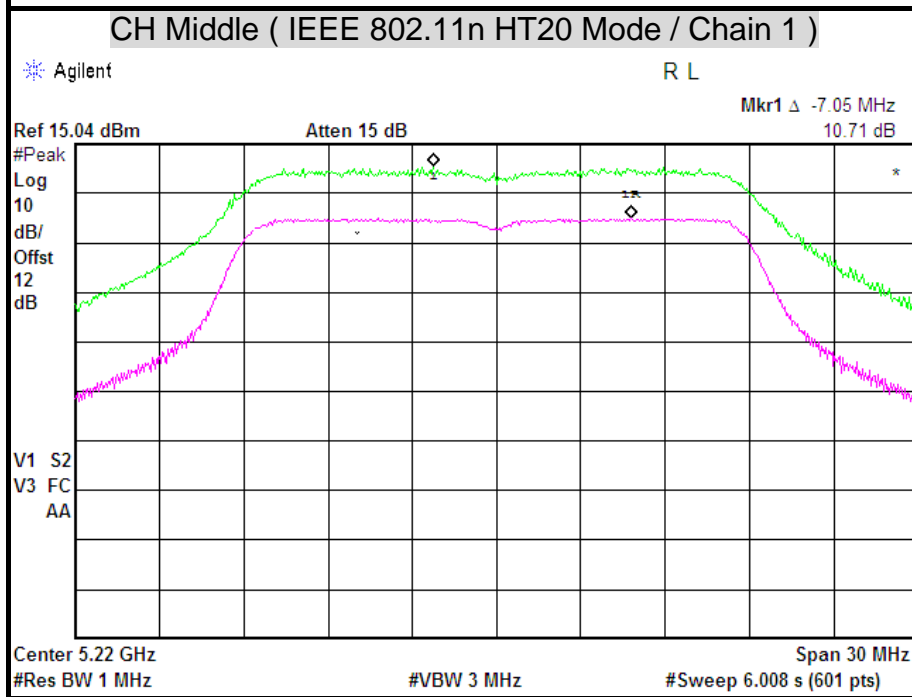
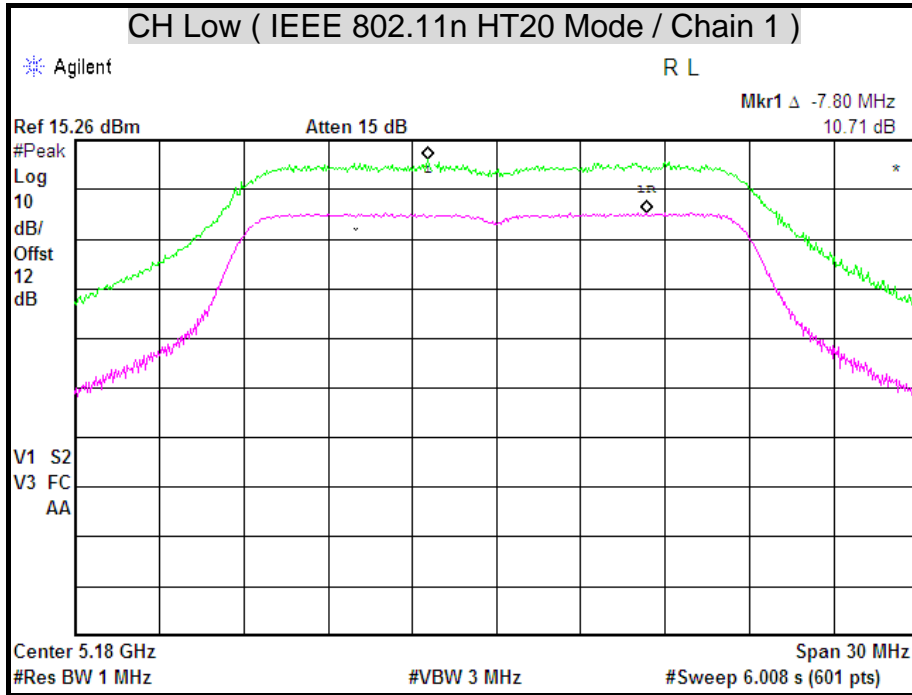
1. At final test to get the worst-case emission at 27Mbps.

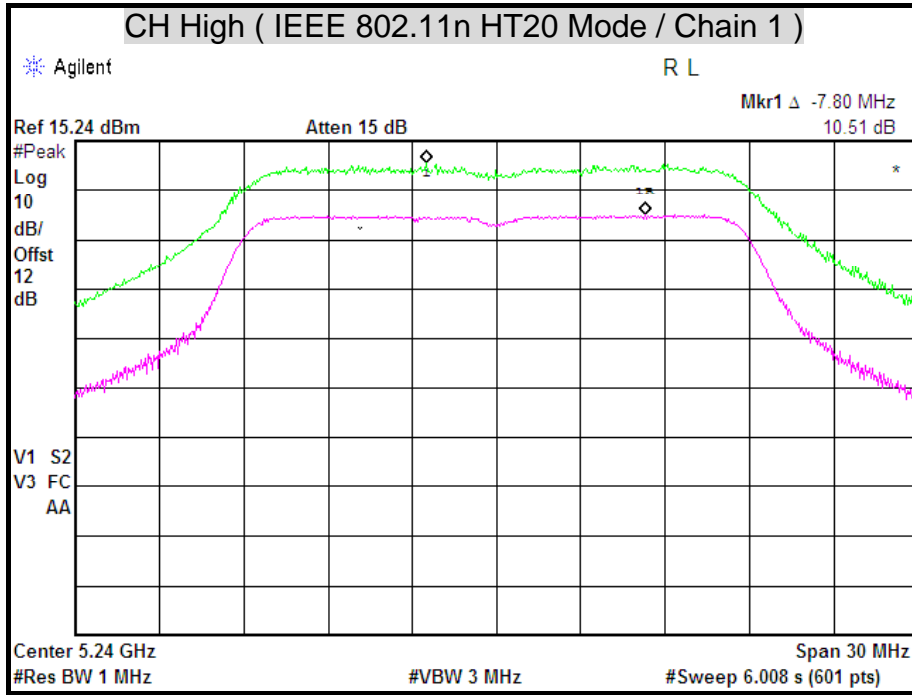


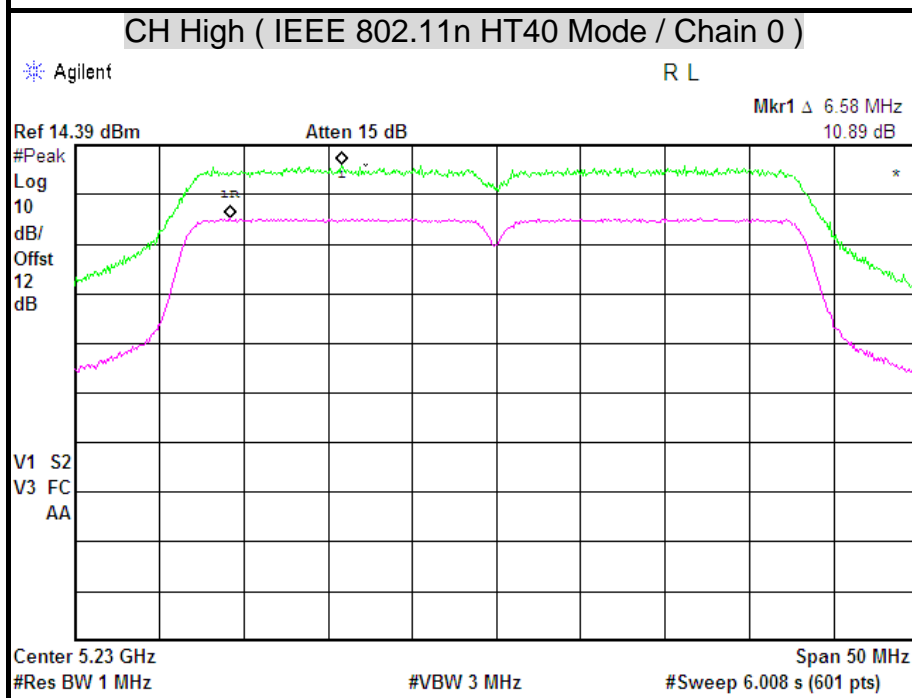
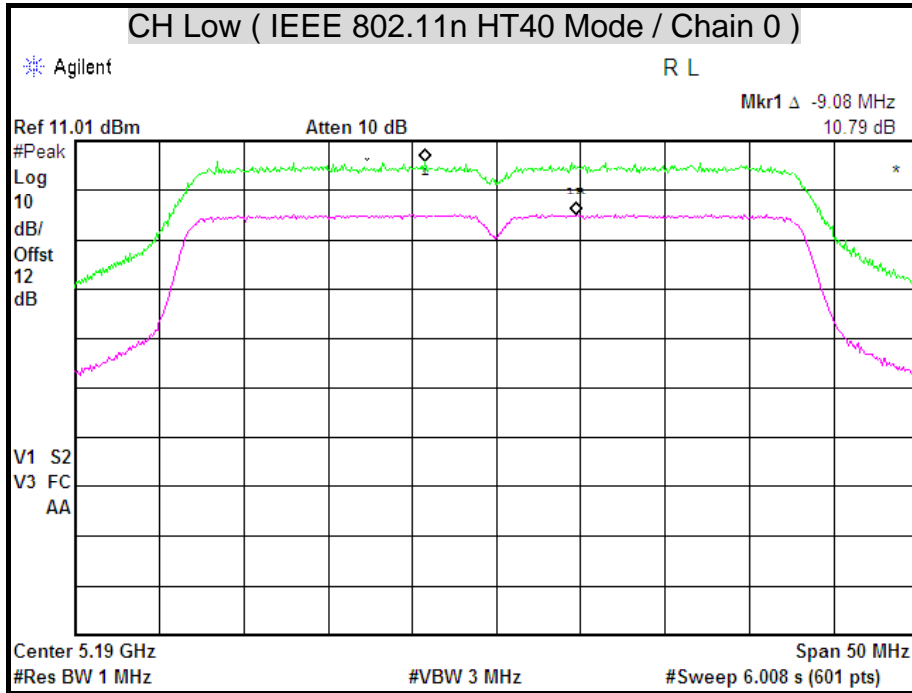


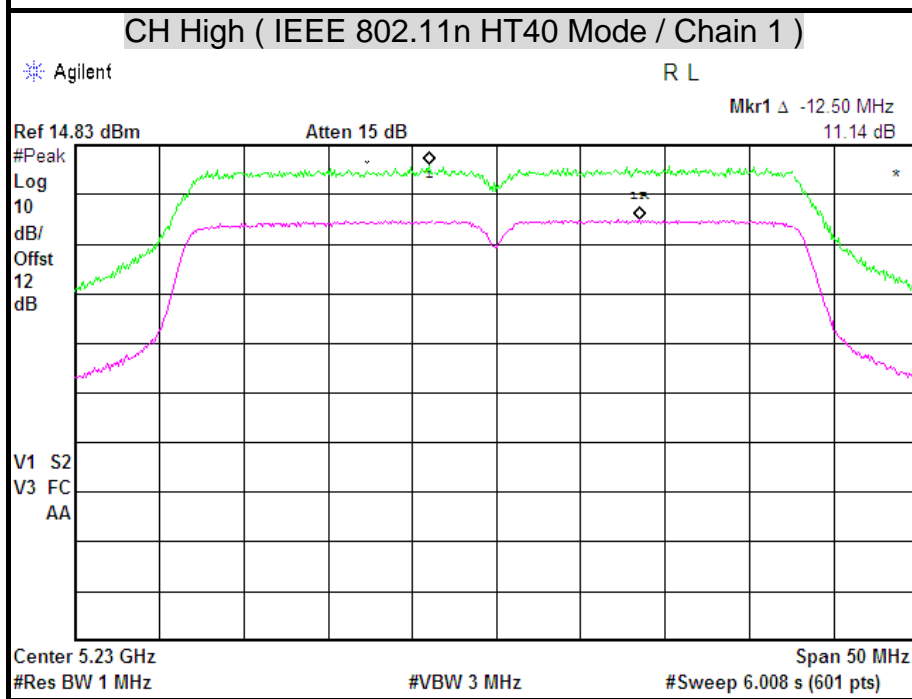
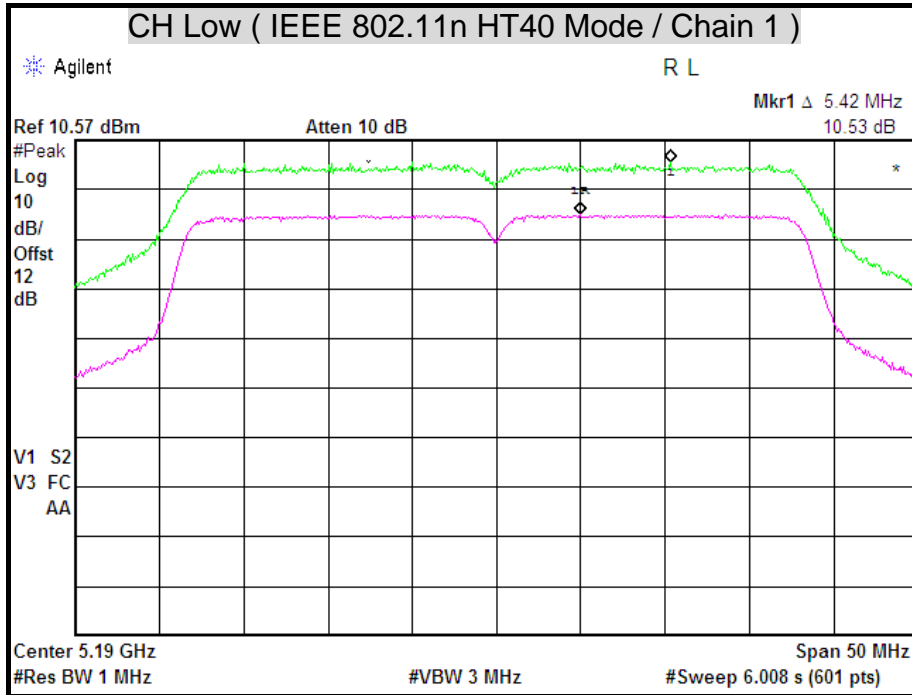














7.5 RADIATED EMISSION

LIMITS

(1) According to § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

Remark:

1. ¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2. ² Above 38.6

(2) According to § 15.205 (b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.



(3) According to § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

Remark: **Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST EQUIPMENT

Radiated Emission / 966Chamber_B

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/19/2012
EMI Receiver	ROHDE & SCHWARZ	ESCS 30	826547/004	10/27/2012
Broadband Hybrid Bi-Log Antenna	Sunol Sciences	JB1	A100209-4	10/05/2012
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/06/2012
Horn Antenna	COM-POWER	AH-840	03077	12/06/2012
Pre-Amplifier	Agilent	8447D	2944A10052	07/19/2012
Pre-Amplifier	EMCI	EMC012645	980060	08/29/2012
LOOP Antenna	EMCO	6502	8905-2356	06/10/2012
Band Reject Notch Filter	Micro-Tronics	BRM05702-01	009	N.C.R

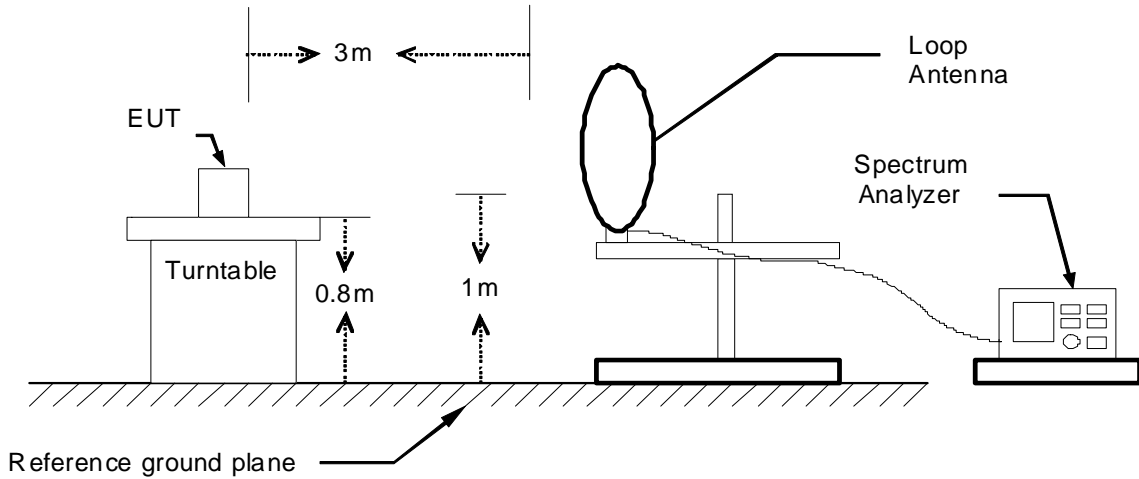
Remark: 1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R = No Calibration Request.



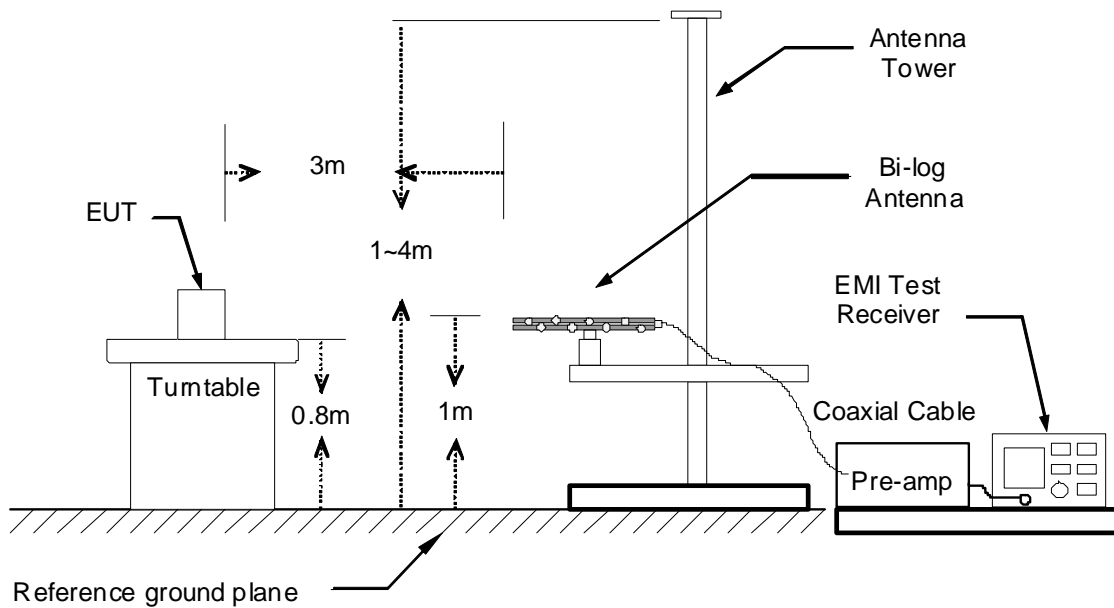
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

9kHz ~ 30MHz

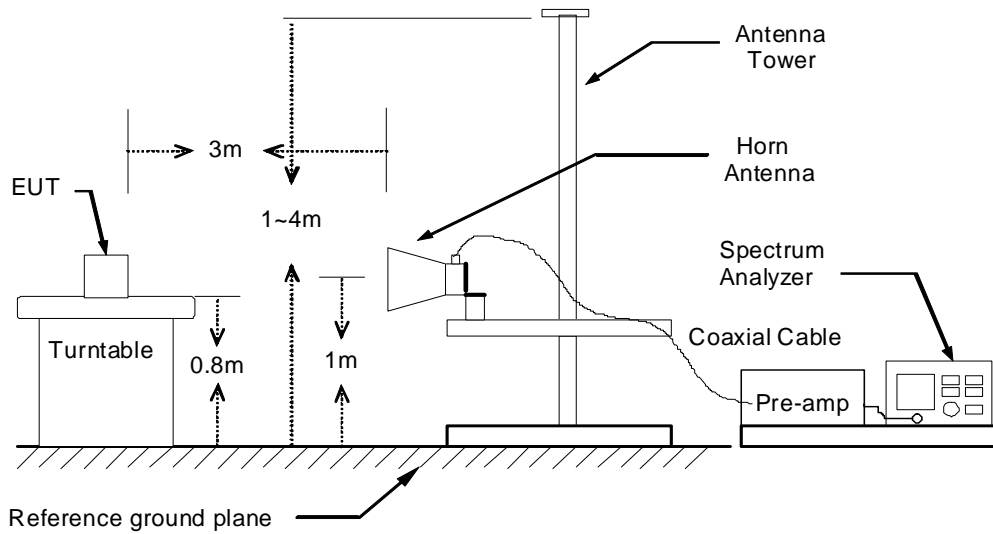


30MHz ~ 1GHz





The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Remark :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.



TEST RESULTS

Below 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

Below 1 GHz (30MHz ~ 1GHz)

Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/04/14
Test Mode	TX Mode / Antenna (1)	Temp. & Humidity	22°C, 56%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
107.60	56.63	-15.92	40.71	43.50	-2.79	Peak
140.58	53.78	-13.48	40.30	43.50	-3.20	Peak
232.73	58.18	-14.29	43.89	46.00	-2.11	Peak
270.56	56.19	-12.56	43.63	46.00	-2.37	Peak
339.43	55.60	-11.05	44.55	46.00	-1.45	Peak
372.41	53.10	-10.45	42.65	46.00	-3.35	QP
405.39	54.49	-9.89	44.60	46.00	-1.40	Peak
663.41	47.83	-5.80	42.03	46.00	-3.97	Peak

966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
32.91	46.57	-8.20	38.37	40.00	-1.63	Peak
145.43	50.38	-13.76	36.62	43.50	-6.88	Peak
339.43	54.17	-11.05	43.12	46.00	-2.88	Peak
407.33	50.26	-9.86	40.40	46.00	-5.60	Peak
436.43	48.84	-9.40	39.44	46.00	-6.56	Peak
663.41	43.66	-5.80	37.86	46.00	-8.14	Peak
967.02	37.26	-1.42	35.84	54.00	-18.16	Peak

Remark:

1. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.
2. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)
4. Result (dBµV/m) = Reading (dBµV) + Correction Factor (dB/m)
5. Margin (dB) = Remark result (dBµV/m) - Quasi-peak limit (dBµV/m).



Above 1 GHz

Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/04/12
Test Mode	IEEE 802.11a TX / CH Low / Antenna (1)	Temp. & Humidity	22°C, 60%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1095.00	68.88	---	-16.80	52.07	---	74.00	54.00	-1.93	Peak
1365.00	67.19	---	-16.42	50.77	---	74.00	54.00	-3.23	Peak
1710.00	66.62	---	-14.42	52.20	---	74.00	54.00	-1.80	Peak
6048.00	53.68	---	-2.47	51.21	---	74.00	54.00	-2.79	Peak
6648.00	52.89	---	-1.95	50.94	---	74.00	54.00	-3.06	Peak
7596.00	52.31	---	-0.18	52.13	---	74.00	54.00	-1.87	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1110.00	68.04	---	-16.78	51.26	---	74.00	54.00	-2.74	Peak
1335.00	66.52	---	-16.46	50.06	---	74.00	54.00	-3.94	Peak
1690.00	66.96	---	-14.59	52.36	---	74.00	54.00	-1.64	Peak
6000.00	53.22	---	-2.51	50.71	---	74.00	54.00	-3.29	Peak
6660.00	52.40	---	-1.94	50.46	---	74.00	54.00	-3.54	Peak
7632.00	52.03	---	-0.15	51.88	---	74.00	54.00	-2.12	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor
Margin = Result - Limit
Remark Peak = Result(PK) - Limit(AV)
Remark AVG = Result(AV) - Limit(AV)



Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/04/12
Test Mode	IEEE 802.11a TX / CH Middle / Antenna (1)	Temp. & Humidity	22°C, 60%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1085.00	67.49	---	-16.82	50.67	---	74.00	54.00	-3.33	Peak
1260.00	67.30	---	-16.57	50.74	---	74.00	54.00	-3.26	Peak
1730.00	66.64	---	-14.25	52.39	---	74.00	54.00	-1.61	Peak
6240.00	53.28	---	-2.31	50.97	---	74.00	54.00	-3.03	Peak
6648.00	52.89	---	-1.95	50.94	---	74.00	54.00	-3.06	Peak
7620.00	51.99	---	-0.16	51.84	---	74.00	54.00	-2.16	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1010.00	67.53	---	-16.92	50.61	---	74.00	54.00	-3.39	Peak
1245.00	67.08	---	-16.59	50.50	---	74.00	54.00	-3.50	Peak
1560.00	66.88	---	-15.71	51.17	---	74.00	54.00	-2.83	Peak
6132.00	53.13	---	-2.40	50.73	---	74.00	54.00	-3.27	Peak
6648.00	52.46	---	-1.95	50.51	---	74.00	54.00	-3.49	Peak
7464.00	51.89	---	-0.37	51.52	---	74.00	54.00	-2.48	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor
Margin = Result - Limit
Remark Peak = Result(PK) - Limit(AV)
Remark AVG = Result(AV) - Limit(AV)



Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/04/12
Test Mode	IEEE 802.11a TX / CH High / Antenna (1)	Temp. & Humidity	22°C, 60%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1045.00	67.54	---	-16.87	50.66	---	74.00	54.00	-3.34	Peak
1170.00	67.40	---	-16.70	50.70	---	74.00	54.00	-3.30	Peak
1690.00	65.87	---	-14.59	51.28	---	74.00	54.00	-2.72	Peak
6108.00	52.24	---	-2.42	49.82	---	74.00	54.00	-4.18	Peak
6660.00	52.86	---	-1.94	50.92	---	74.00	54.00	-3.08	Peak
7428.00	52.68	---	-0.46	52.22	---	74.00	54.00	-1.78	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1025.00	66.97	---	-16.90	50.07	---	74.00	54.00	-3.93	Peak
1200.00	67.96	---	-16.65	51.30	---	74.00	54.00	-2.70	Peak
1510.00	66.68	---	-16.14	50.54	---	74.00	54.00	-3.46	Peak
6048.00	53.25	---	-2.47	50.78	---	74.00	54.00	-3.22	Peak
6684.00	52.14	---	-1.91	50.23	---	74.00	54.00	-3.77	Peak
7776.00	52.91	---	-0.01	52.90	---	74.00	54.00	-1.10	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor
Margin = Result - Limit
Remark Peak = Result(PK) - Limit(AV)
Remark AVG = Result(AV) - Limit(AV)



Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/04/12
Test Mode	IEEE 802.11n HT20 TX / CH Low / Antenna (1)	Temp. & Humidity	22°C, 60%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1125.00	68.48	---	-16.76	51.73	---	74.00	54.00	-2.27	Peak
1295.00	68.52	---	-16.52	52.00	---	74.00	54.00	-2.00	Peak
1730.00	66.36	---	-14.25	52.11	---	74.00	54.00	-1.89	Peak
6648.00	53.46	---	-1.95	51.51	---	74.00	54.00	-2.49	Peak
7596.00	52.15	---	-0.18	51.97	---	74.00	54.00	-2.03	Peak
8124.00	51.97	---	0.16	52.12	---	74.00	54.00	-1.88	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1100.00	67.46	---	-16.80	50.67	---	74.00	54.00	-3.33	Peak
1280.00	66.66	---	-16.54	50.12	---	74.00	54.00	-3.88	Peak
1520.00	66.77	---	-16.05	50.72	---	74.00	54.00	-3.28	Peak
5395.00	70.53	56.70	-4.55	65.98	52.15	74.00	54.00	-1.85	AVG
6000.00	55.27	---	-2.51	52.77	---	74.00	54.00	-1.23	Peak
6816.00	52.65	---	-1.77	50.88	---	74.00	54.00	-3.12	Peak
7560.00	52.45	---	-0.22	52.23	---	74.00	54.00	-1.77	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor
Margin = Result - Limit
Remark Peak = Result(PK) - Limit(AV)
Remark AVG = Result(AV) - Limit(AV)



Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/04/12
Test Mode	IEEE 802.11n HT20 TX / CH Middle / Antenna (1)	Temp. & Humidity	22°C, 60%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1040.00	67.70	---	-16.88	50.82	---	74.00	54.00	-3.18	Peak
1295.00	66.27	---	-16.52	49.75	---	74.00	54.00	-4.25	Peak
1535.00	66.64	---	-15.92	50.71	---	74.00	54.00	-3.29	Peak
6012.00	51.43	---	-2.50	48.93	---	74.00	54.00	-5.07	Peak
6648.00	52.71	---	-1.95	50.76	---	74.00	54.00	-3.24	Peak
7716.00	52.03	---	-0.07	51.97	---	74.00	54.00	-2.03	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1130.00	66.89	---	-16.75	50.14	---	74.00	54.00	-3.86	Peak
1355.00	66.83	---	-16.43	50.40	---	74.00	54.00	-3.60	Peak
5450.00	72.15	58.02	-4.42	67.73	53.60	74.00	54.00	-0.40	AVG
6000.00	59.23	51.54	-2.51	56.72	49.03	74.00	54.00	-4.97	AVG
6660.00	52.65	---	-1.94	50.72	---	74.00	54.00	-3.28	AVG
7740.00	52.06	---	-0.04	52.02	---	74.00	54.00	-1.98	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor
Margin = Result - Limit
Remark Peak = Result(PK) - Limit(AV)
Remark AVG = Result(AV) - Limit(AV)



Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/04/12
Test Mode	IEEE 802.11n HT20 TX / CH High / Antenna (1)	Temp. & Humidity	22°C, 60%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1110.00	67.46	---	-16.78	50.68	---	74.00	54.00	-3.32	Peak
1290.00	67.40	---	-16.52	50.87	---	74.00	54.00	-3.13	Peak
1600.00	66.67	---	-15.37	51.31	---	74.00	54.00	-2.69	Peak
6072.00	52.57	---	-2.45	50.12	---	74.00	54.00	-3.88	Peak
6636.00	52.06	---	-1.96	50.10	---	74.00	54.00	-3.90	Peak
7548.00	52.50	---	-0.23	52.27	---	74.00	54.00	-1.73	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1130.00	66.10	---	-16.75	49.35	---	74.00	54.00	-4.65	Peak
1345.00	66.72	---	-16.45	50.27	---	74.00	54.00	-3.73	Peak
1515.00	66.56	---	-16.10	50.47	---	74.00	54.00	-3.53	Peak
5410.00	71.99	58.39	-4.52	67.47	53.87	74.00	54.00	-0.13	AVG
6012.00	58.81	51.33	-2.50	56.31	48.83	74.00	54.00	-5.17	AVG
6876.00	52.85	---	-1.71	51.14	---	74.00	54.00	-2.86	Peak
7656.00	52.49	---	-0.12	52.37	---	74.00	54.00	-1.63	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor
Margin = Result - Limit
Remark Peak = Result(PK) - Limit(AV)
Remark AVG = Result(AV) - Limit(AV)



Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/04/12
Test Mode	IEEE 802.11n HT40 TX / CH Low / Antenna (1)	Temp. & Humidity	22°C, 60%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1200.00	67.92	---	-16.65	51.27	---	74.00	54.00	-2.73	Peak
1460.00	68.39	---	-16.28	52.10	---	74.00	54.00	-1.90	Peak
1670.00	65.87	---	-14.77	51.10	---	74.00	54.00	-2.90	Peak
6060.00	52.24	---	-2.46	49.79	---	74.00	54.00	-4.21	Peak
6684.00	52.03	---	-1.91	50.12	---	74.00	54.00	-3.88	Peak
7764.00	52.00	---	-0.02	51.98	---	74.00	54.00	-2.02	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1055.00	67.25	---	-16.86	50.39	---	74.00	54.00	-3.61	Peak
1230.00	67.49	---	-16.61	50.88	---	74.00	54.00	-3.12	Peak
1435.00	66.93	---	-16.32	50.61	---	74.00	54.00	-3.39	Peak
6048.00	53.46	---	-2.47	50.99	---	74.00	54.00	-3.01	Peak
6540.00	53.32	---	-2.06	51.26	---	74.00	54.00	-2.74	Peak
7764.00	51.73	---	-0.02	51.71	---	74.00	54.00	-2.29	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor
Margin = Result - Limit
Remark Peak = Result(PK) - Limit(AV)
Remark AVG = Result(AV) - Limit(AV)



Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/04/12
Test Mode	IEEE 802.11n HT40 TX / CH High / Antenna (1)	Temp. & Humidity	22°C, 60%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1125.00	67.44	---	-16.76	50.68	---	74.00	54.00	-3.32	Peak
1345.00	67.19	---	-16.45	50.75	---	74.00	54.00	-3.25	Peak
1730.00	66.35	---	-14.25	52.10	---	74.00	54.00	-1.90	Peak
6024.00	53.26	---	-2.49	50.77	---	74.00	54.00	-3.23	Peak
6540.00	53.99	---	-2.06	51.93	---	74.00	54.00	-2.07	Peak
7608.00	52.06	---	-0.17	51.89	---	74.00	54.00	-2.11	Peak

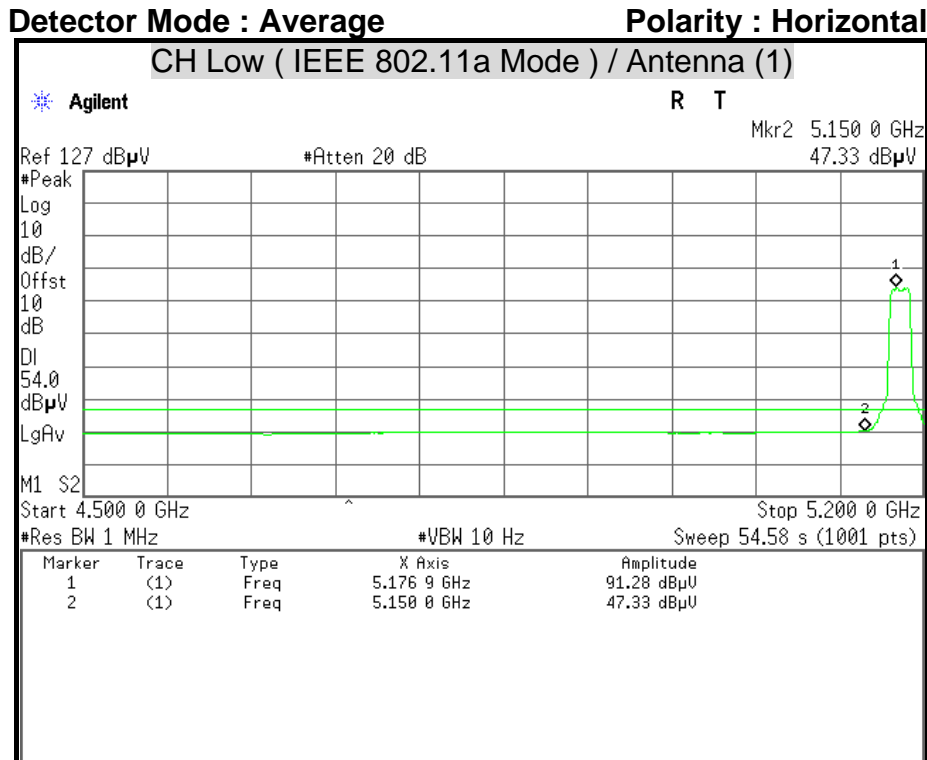
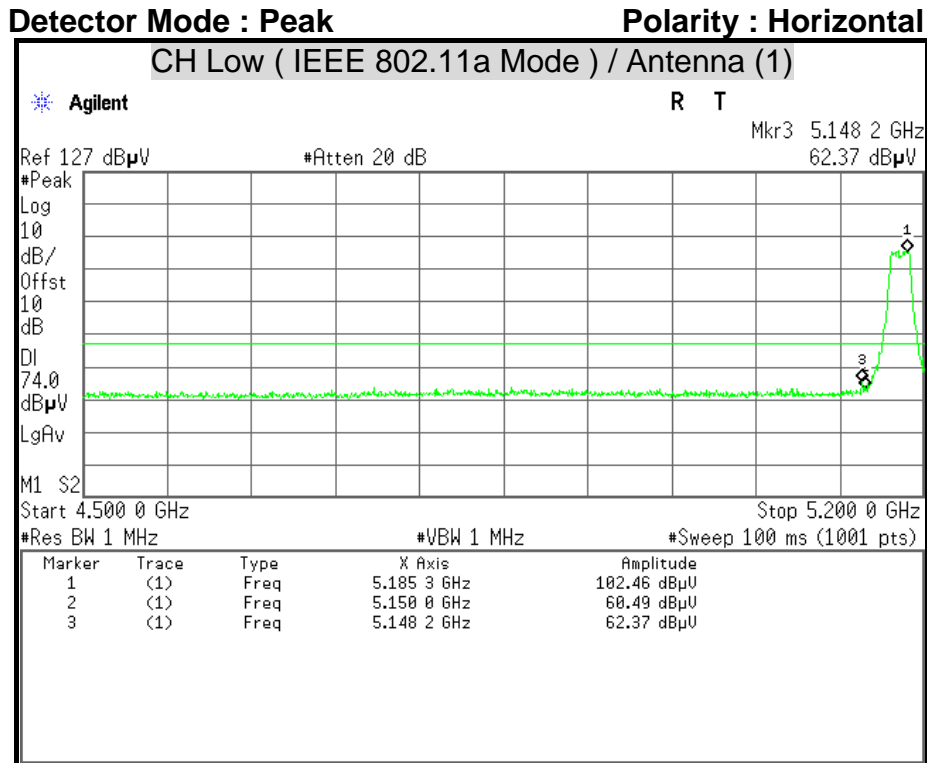
966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1070.00	67.65	---	-16.84	50.81	---	74.00	54.00	-3.19	Peak
1255.00	66.60	---	-16.57	50.03	---	74.00	54.00	-3.97	Peak
1535.00	66.27	---	-15.92	50.34	---	74.00	54.00	-3.66	Peak
5410.00	69.74	56.66	-4.52	65.22	52.14	74.00	54.00	-1.86	AVG
6048.00	54.63	---	-2.47	52.16	---	74.00	54.00	-1.84	Peak
6696.00	52.26	---	-1.90	50.36	---	74.00	54.00	-3.64	Peak
7608.00	51.92	---	-0.17	51.75	---	74.00	54.00	-2.25	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Result = Reading + Correction Factor
Margin = Result - Limit
Remark Peak = Result(PK) - Limit(AV)
Remark AVG = Result(AV) - Limit(AV)



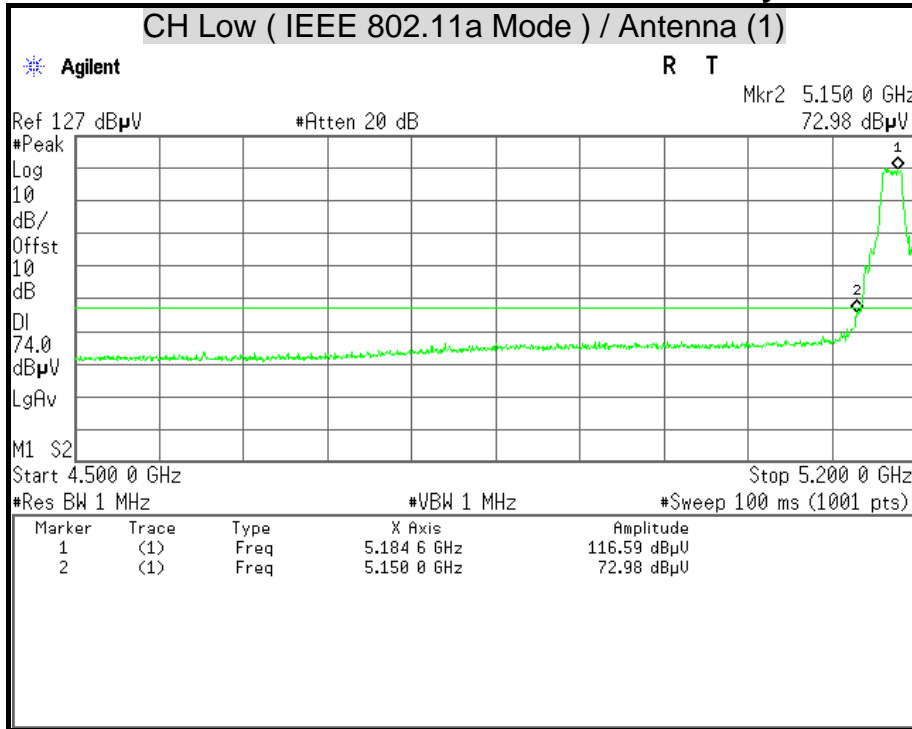
Restricted Band Edges





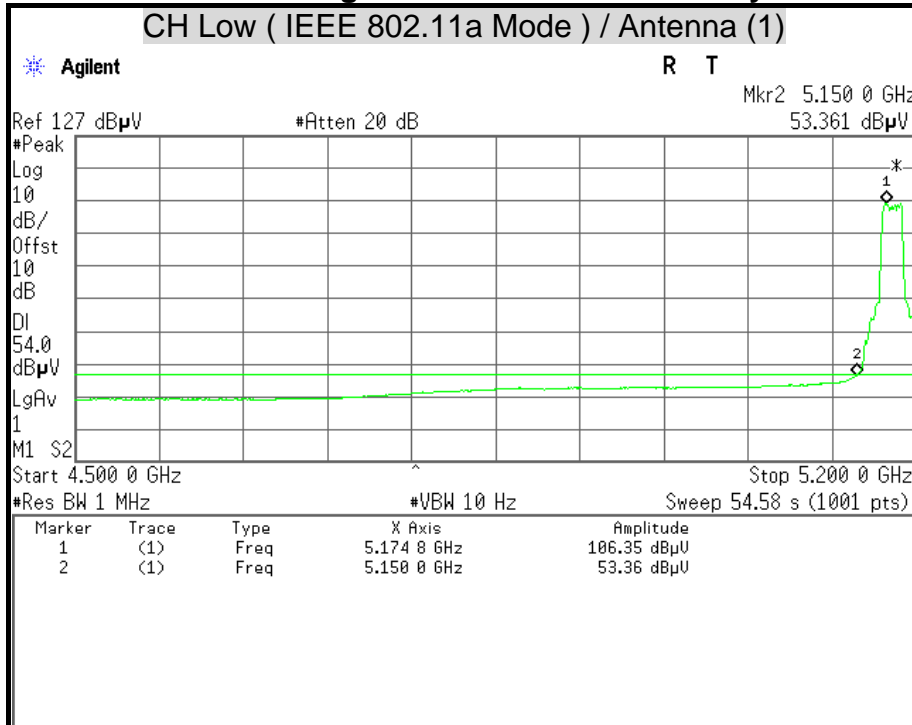
Detector Mode : Peak

Polarity : Vertical



Detector Mode : Average

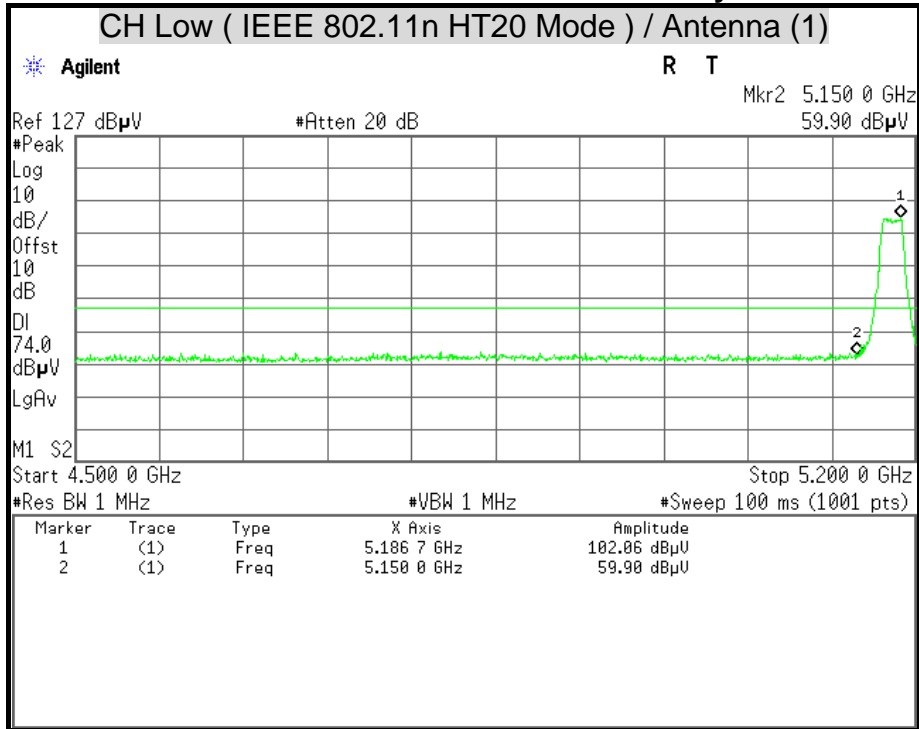
Polarity : Vertical





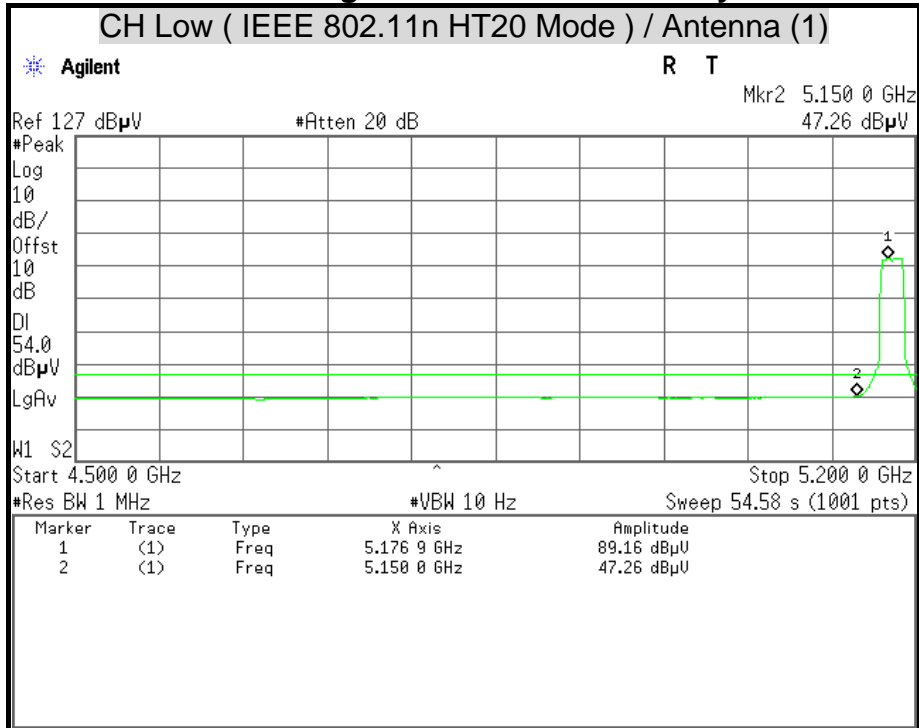
Detector Mode : Peak

Polarity : Horizontal



Detector Mode : Average

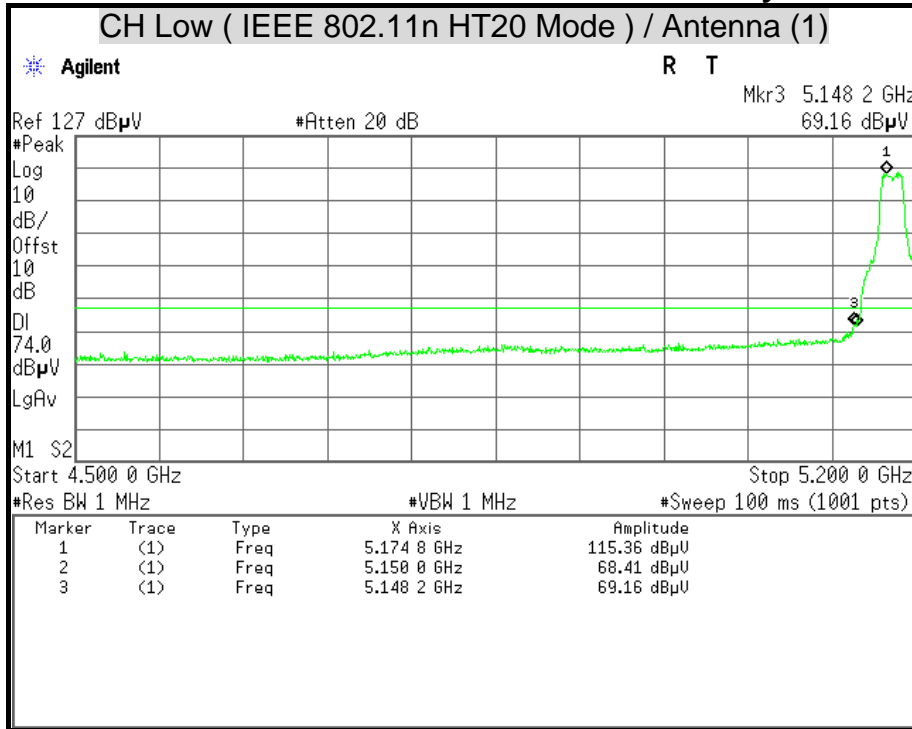
Polarity : Horizontal





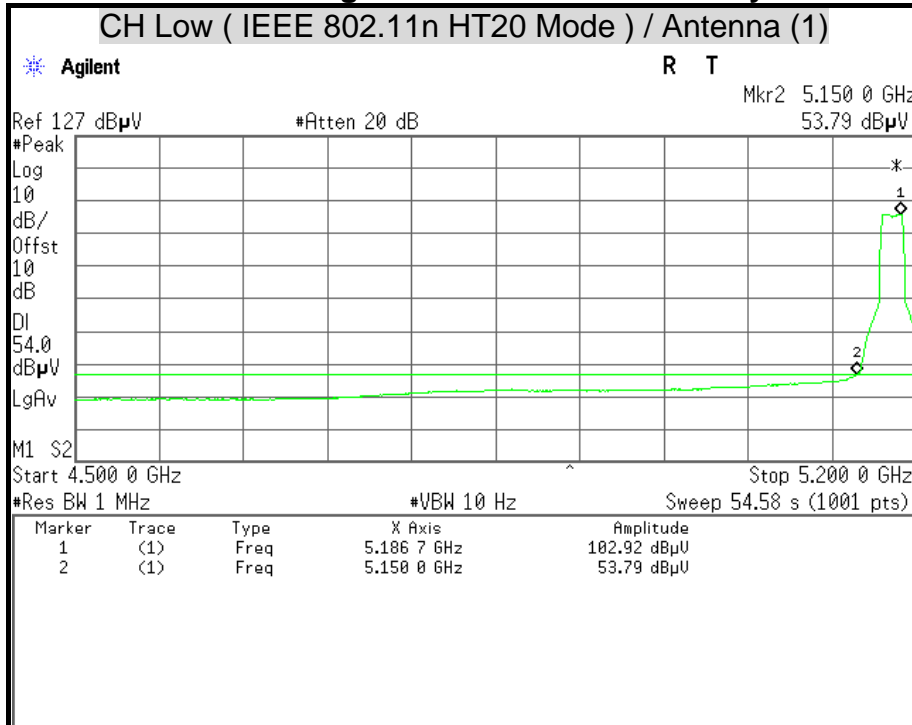
Detector Mode : Peak

Polarity : Vertical



Detector Mode : Average

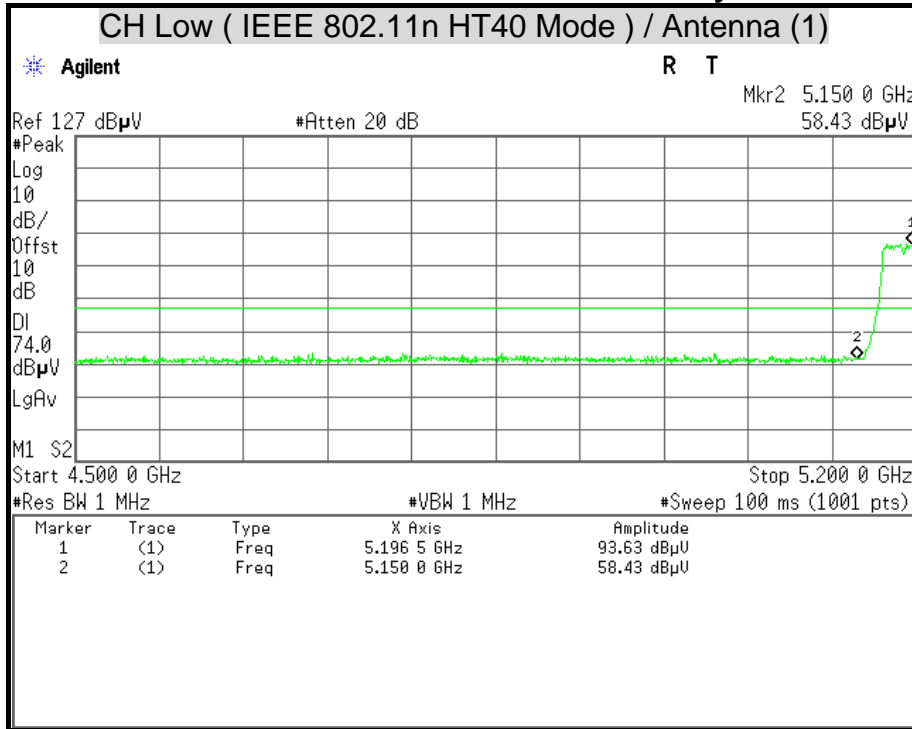
Polarity : Vertical





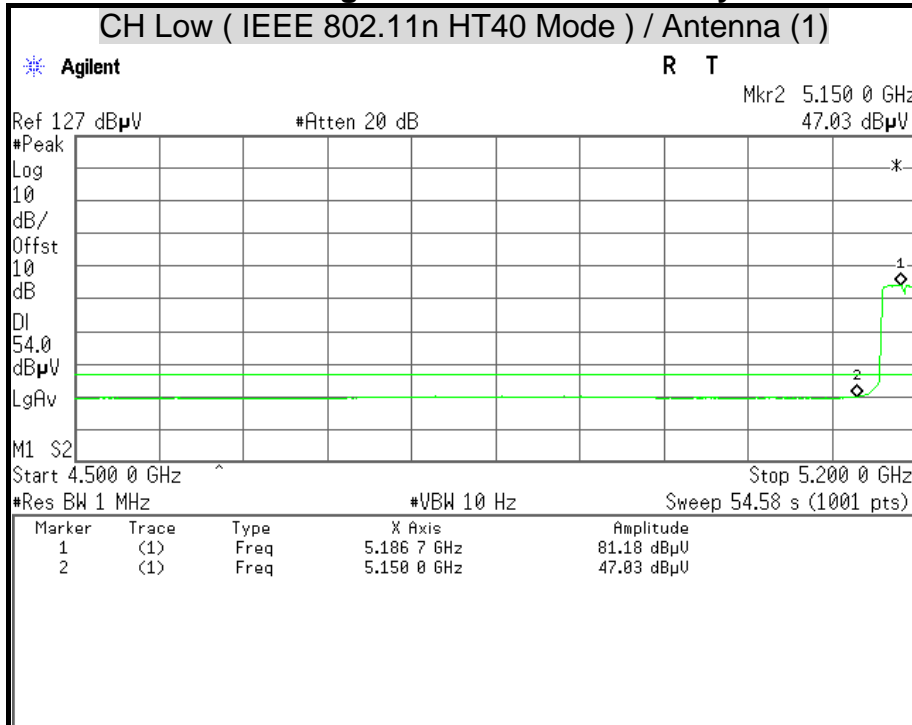
Detector Mode : Peak

Polarity : Horizontal



Detector Mode : Average

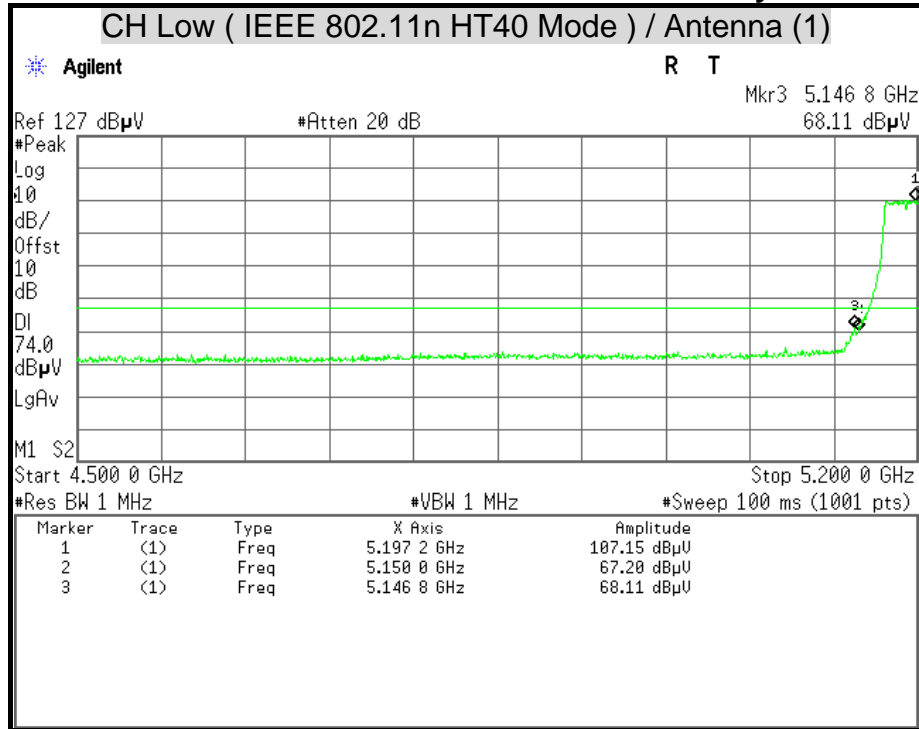
Polarity : Horizontal





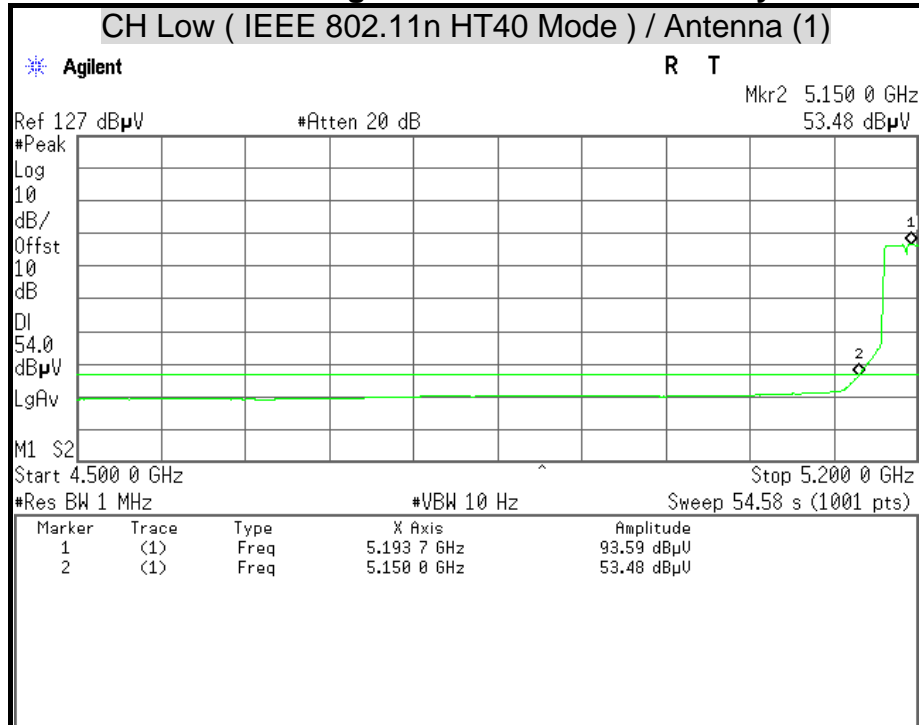
Detector Mode : Peak

Polarity : Vertical



Detector Mode : Average

Polarity : Vertical





7.6 CONDUCTED EMISSION

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Conducted Limit (dB μ v)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

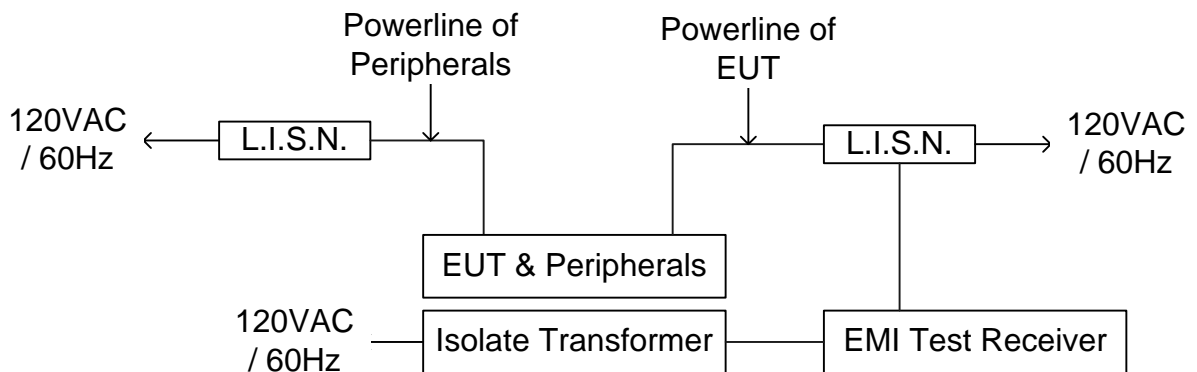
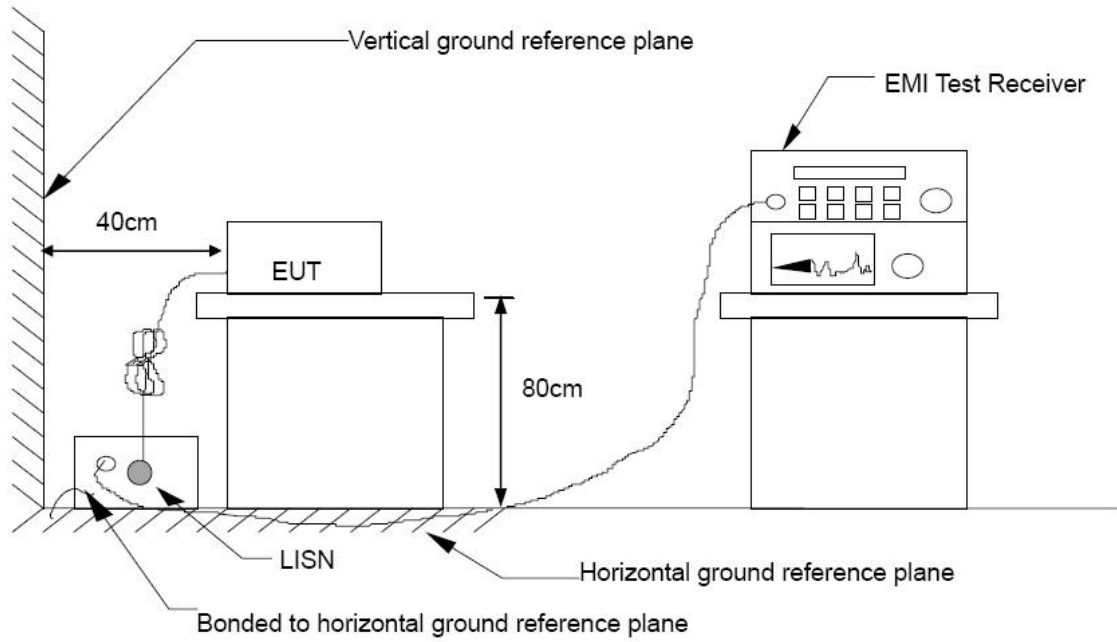
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/09/2012
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/12/2013
EMI Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/20/2012
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	100117	09/14/2012

Remark: Each piece of equipment is scheduled for calibration once a year.



TEST SETUP





TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2003.

The test procedure is performed in a 4m x 3m x 2.4m (LxWxH) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) x 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

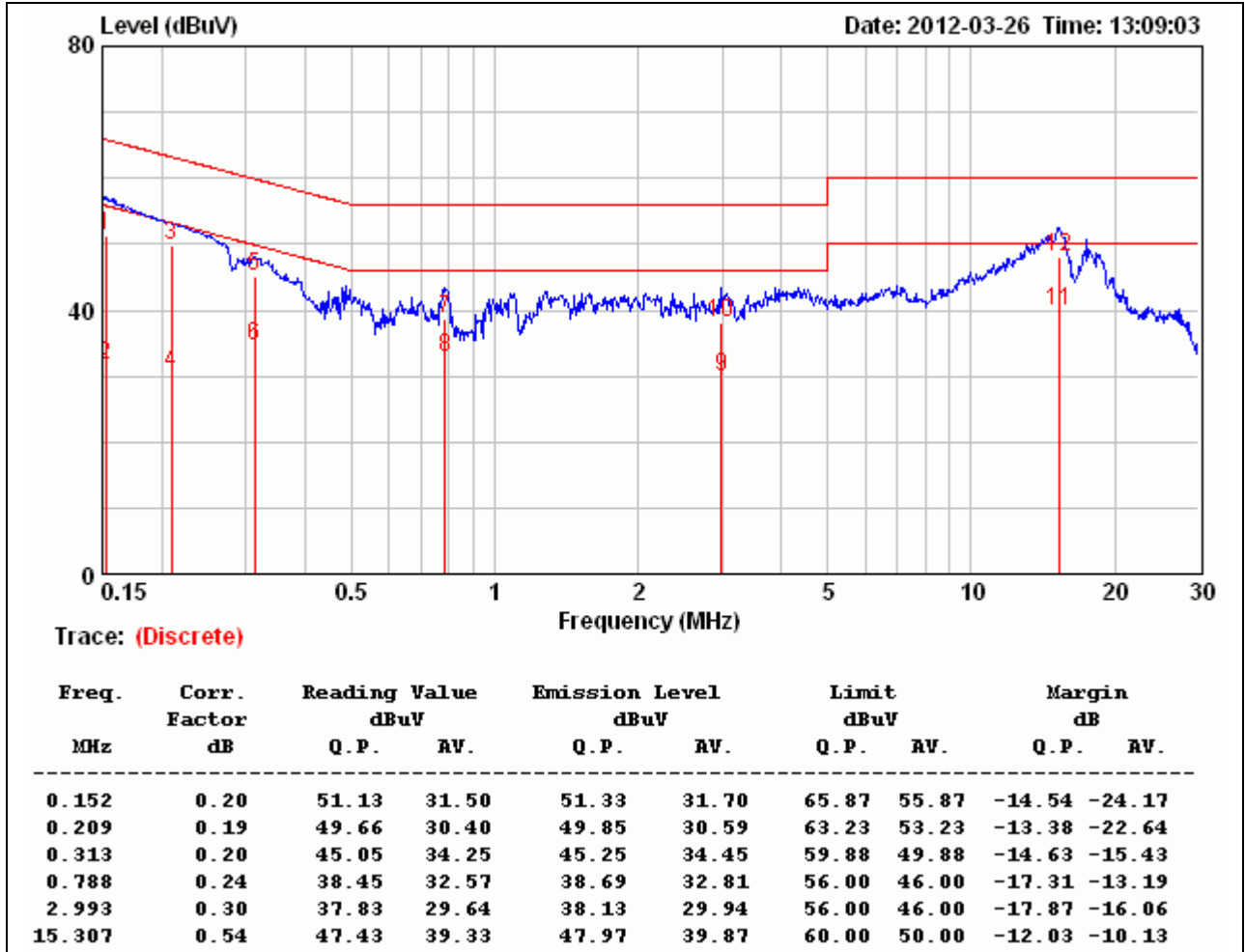
The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.



TEST RESULTS

Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/03/26
Test Mode	TX Mode	Temp. & Humidity	22°C, 62%

LINE



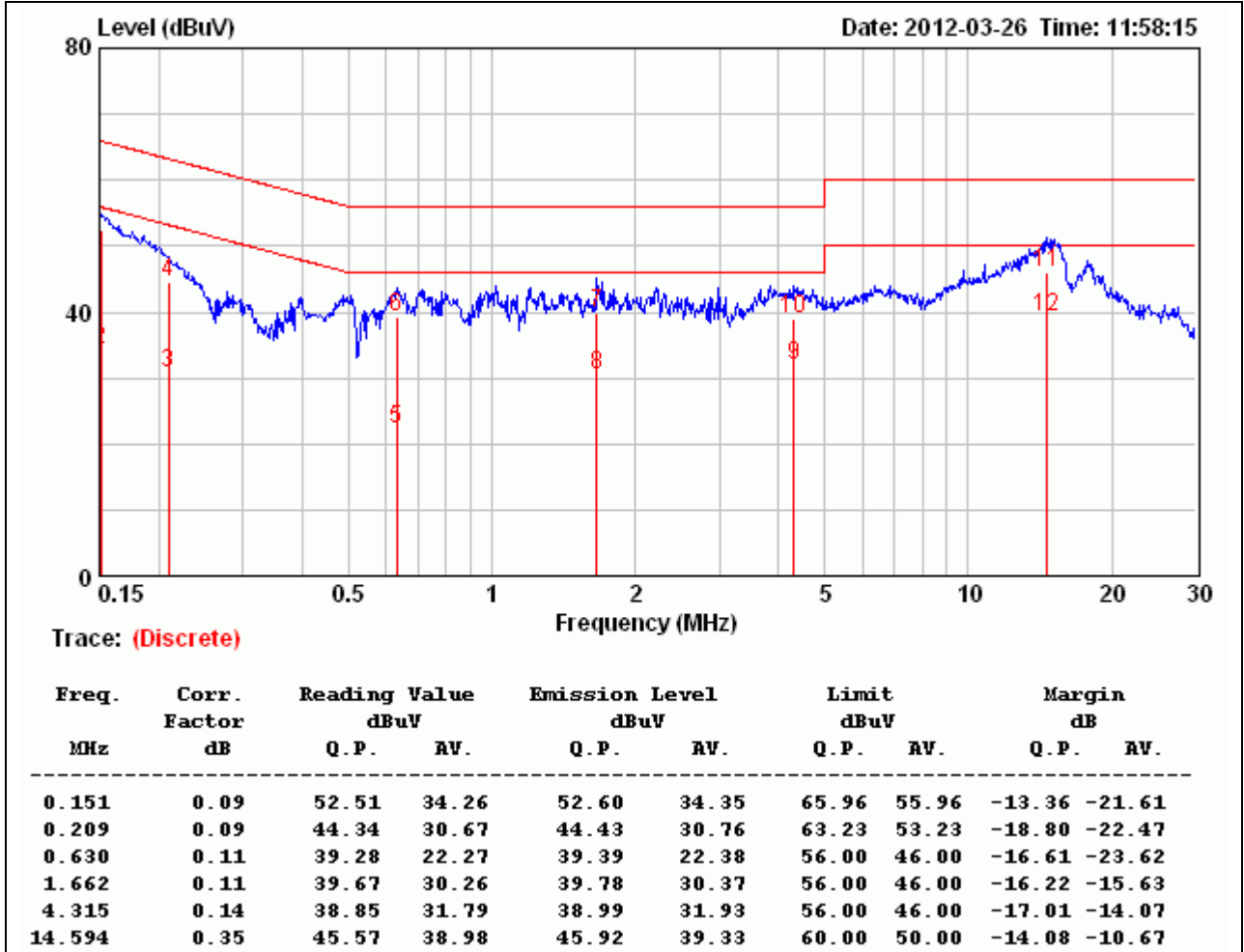
Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level - Limit value



Product Name	PCI-RF module	Test By	Rueyyan Lin
Test Model	MB92-EKI6340	Test Date	2012/03/26
Test Mode	TX Mode	Temp. & Humidity	22°C, 62%

NEUTRAL



Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value