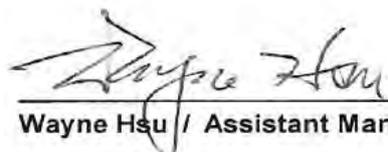


# FCC Test Report

**Equipment** : N600 DB Wireless N+ Router  
**Brand Name** : Belkin  
**Model No.** : F9K1102V2  
**FCC ID** : K7SF9K1102V2  
**Standard** : 47 CFR FCC Part 15.247  
**Applicant** : Belkin International Inc.  
**Manufacturer** : 12045 E. Waterfront Drive Playa Viste,  
CA 90094, USA

The product sample received on Apr. 18, 2012 and completely tested on Jun. 21, 2012. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

  
Wayne Hsu / Assistant Manager



## Table of Contents

<b>1</b>	<b>GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1	Information.....	5
1.2	Accessories and Support Equipment .....	8
1.3	Testing Applied Standards .....	8
1.4	Testing Location Information .....	8
1.5	Measurement Uncertainty .....	9
<b>2</b>	<b>TEST CONFIGURATION OF EUT.....</b>	<b>10</b>
2.1	The Worst Case Modulation Configuration .....	10
2.2	Test Channel Frequencies Configuration.....	10
2.3	The Worst Case Power Setting Parameter .....	11
2.4	The Worst Case Measurement Configuration.....	12
2.5	Test Setup Diagram .....	14
<b>3</b>	<b>TRANSMITTER TEST RESULT .....</b>	<b>16</b>
3.1	AC Power-line Conducted Emissions .....	16
3.2	6dB Bandwidth .....	19
3.3	RF Output Power.....	23
3.4	Power Spectral Density .....	27
3.5	Transmitter Radiated Bandedge Emissions .....	33
3.6	Transmitter Radiated Unwanted Emissions .....	39
<b>4</b>	<b>MAXIMUM PERMISSIBLE EXPOSURE .....</b>	<b>65</b>
4.1	Maximum Permissible Exposure .....	65
<b>5</b>	<b>TEST EQUIPMENT AND CALIBRATION DATA .....</b>	<b>68</b>
<b>6</b>	<b>CERTIFICATION OF TAF ACCREDITATION.....</b>	<b>70</b>
<b>APPENDIX A. TEST PHOTOS .....</b>		<b>A1 ~ A6</b>
<b>APPENDIX B. PHOTOGRAPHS OF EUT .....</b>		<b>B1 ~ B19</b>

## Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
1.1.2	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	0.3715MHz: 40.04 (8.35 dB) - AV 42.74 (15.65dB) - QP [Ref. page 17]	FCC 15.207	Complied
3.2	15.247(a)	6dB Bandwidth	6dB Bandwidth [MHz] 5745-5825MHz(20M): 16.48 5755-5795MHz(40M): 36.48	≥500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm] 5745-5825MHz: 23.47 5755-5795MHz: 24.16	Power [dBm] 5745-5825MHz: 30 5755-5795MHz: 30	Complied
3.4	15.247(d)	Power Spectral Density	PSD [dBm/3kHz] 5745-5825MHz: -12.83 5755-5795MHz: -15.65	PSD [dBm/3kHz] 5745-5825MHz: 8 5755-5795MHz: 8	Complied
3.5	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 5722.30MHz: 34.58dB [Ref. page 38] Bandedge emissions not fall in restricted bands.	Non-Restricted Bands: > 20 dBc  Restricted Bands: FCC 15.209	Complied
3.6	15.247(c)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 1m]: 7656MHz 62.82 (Margin 20.72dB) - PK 61.96 (Margin 1.58dB) - AV [Ref. page 50]	Non-Restricted Bands: > 20 dBc  Restricted Bands: FCC 15.209	Complied
4.1	2.1091	Maximum Permissible Exposure	0.1841 mW/cm <sup>2</sup>	1 mW/cm <sup>2</sup>	Complied



# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	RF Output Power (dBm)	Designation of Emission
5725-5850	a	5745-5825	149-165 [5]	20.72	16M9D1D
5725-5850	n (HT20)	5745-5825	149-165 [5]	23.47	16M0D1D
5725-5850	n (HT40)	5755-5795	151-159 [2]	24.16	36M6D1D

Note 1: IEEE Std. 802.11-2007 modulation consists of IEEE Std. 802.11a-1999.  
 Note 2: IEEE Std. 802.11n-2009 modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40.  
 Note 3: RF output power specifies that Maximum Peak Conducted Output Power.

Transmitter Chains & Receiver Chains Information					
IEEE Std. 802.11 Protocol	Number of Transmit Chains (N <sub>TX</sub> )	Number of Receive Chains (N <sub>RX</sub> )	Correlation Signals with Multiple N <sub>TX</sub>	99% Emission Bandwidth (MHz)	Co-location
a	1	1	Correlated	16.88	N/A
n (HT20)	2	2	Uncorrelated	17.92	N/A
n (HT40)	2	2	Uncorrelated	36.56	N/A

Note 1: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)

1.1.2 Antenna Information

Antenna Category	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
	<input checked="" type="checkbox"/> Temporary RF connector provided
	<input type="checkbox"/> No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
<input type="checkbox"/>	External antenna (dedicated antennas)
	<input type="checkbox"/> Single power level with corresponding antenna(s). Power Level (PL): 1
	<input type="checkbox"/> Multiple power level and corresponding antenna(s). Power Level (PL): 1~...
	<input type="checkbox"/> No RF connector provided
	<input type="checkbox"/> Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
	<input type="checkbox"/> RF connector provided
	<input type="checkbox"/> Unique antenna connector. (e.g., MMCX, U.FL, IPX, and RP-SMA, RP-N type...)
	<input type="checkbox"/> Standard antenna connector. (e.g., SMA, N, BNC, and TNC type...)

Antenna General Information									
<b>Antenna Port (Total 2 Port)</b>				1(TX/RX), 2(TX/RX)					
<b>Maximum RF Output Power Level (PL)</b>				1					
<b>Transmit Chains Power Distribution</b>				<input checked="" type="checkbox"/> symmetrical distribution <input type="checkbox"/> asymmetrical distribution					
Ant. No.	PL	Ant. Port [Ant No. X connect to Ant. Port Y]	Ant. Cat.	Ant. Type	Brand	Model	G <sub>ANT</sub> (dBi)	DG (dBi) [correlated] N <sub>TX</sub> = 1	DG (dBi) [uncorrelated] N <sub>TX</sub> = 2
1	1	1	Integral	PIFA	-	-	6.27	N/A	5.5
2	1	2	Integral	PIFA	-	-	4.51		
<input checked="" type="checkbox"/> The equipment is normally installed and point-to-point or point-to-multipoint systems: Ant. No. <u>1,2</u>									
<p>Note 1: For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows:                      Any transmit signals are correlated, Directional Gain (DG) = G<sub>ANT</sub> + 10 log(N) dBi                      All transmit signals are completely uncorrelated, Directional Gain (DG) = G<sub>ANT</sub></p> <p>Note 2: For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:                      Any transmit signals are correlated, Directional Gain (DG) = 10 log[(10<sup>G<sub>1</sub>/20</sup> + 10<sup>G<sub>2</sub>/20</sup> + ... + 10<sup>G<sub>N</sub>/20</sup>)<sup>2</sup> / N] dBi                      All transmit signals are completely uncorrelated, Directional Gain (DG) = 10 log[(10<sup>G<sub>1</sub>/10</sup> + 10<sup>G<sub>2</sub>/10</sup> + ... + 10<sup>G<sub>N</sub>/10</sup>) / N] dBi</p>									

1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	<input type="checkbox"/> Production ; <input checked="" type="checkbox"/> Pre-Production ; <input checked="" type="checkbox"/> Prototype
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ...
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
<input type="checkbox"/>	Other:

1.1.4 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle		
<input type="checkbox"/> Operated normally mode for worst duty cycle		
<input checked="" type="checkbox"/> Operated test mode for worst duty cycle		
Test Signal Duty Cycle (x)	Power Duty Factor [dB] – (10 log 1/x)	Voltage Duty Factor [dB] – (20 log 1/x)
<input checked="" type="checkbox"/> 100% - IEEE 802.11a	0	0
<input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT20)	0	0
<input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT40)	0	0

1.1.5 EUT Operational Condition

Supply Voltage	<input checked="" type="checkbox"/> AC mains	<input type="checkbox"/> DC	
Type of DC Source	<input checked="" type="checkbox"/> Internal DC supply	<input type="checkbox"/> External DC adapter	<input type="checkbox"/> Battery
Operational Voltage	<input checked="" type="checkbox"/> Vnom (110 V)	<input checked="" type="checkbox"/> Vmax (126.5 V)	<input checked="" type="checkbox"/> Vmin (93.5 V)
Operational Climatic	<input checked="" type="checkbox"/> Tnom (20°C)	<input checked="" type="checkbox"/> Tmax (50°C)	<input checked="" type="checkbox"/> Tmin (-30°C)

## 1.2 Accessories and Support Equipment

Accessories				
No.	Equipment	Brand Name	Model Name	Serial No.
1	AC Adapter 1	Belkin	DSA-12PFE-12 BUS 120100	-
2	AC Adapter 2	Sunny	SYS1381-1212-W2	-

Support Equipment				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	E5520	-

## 1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ◆ 47 CFR FCC Part 15
- ◆ ANSI C63.10-2009
- ◆ FCC KDB 558074 - Guidance for Performing Compliance Measurements on DTS
- ◆ FCC KDB 662911 - Emissions Testing of Transmitters with Multiple Outputs
- ◆ FCC KDB 412172 - Guidelines for Determining the ERP and EIRP

## 1.4 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973		
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085		
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
Conducted Emission	CO04-HY	Sam	23°C / 47%	22-May-12
RF Conducted	TH02-CB	Denis	23°C / 63%	15-Jun-12 ~ 21-Jun-12
Radiated Emission	03CH02-HY	Streak	26.3°C / 68%	20-May-12 ~ 31-May-12

### 1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Uncertainty - HWA YA			
Test Item		Uncertainty	Limit
AC power-line conducted emissions		± 2.26 dB	N/A
All emissions, radiated	30 – 1000 MHz	± 2.54 dB	N/A
	1 – 18 GHz	±3.59 dB	N/A
	18 – 40 GHz	±3.82 dB	N/A
	40 – 200 GHz	N/A	N/A

Measurement Uncertainty - JHUBEI		
Test Item	Uncertainty	Limit
Emission bandwidth, 6dB bandwidth	±1.32 %	N/A
RF output power, conducted	±0.72 dB	N/A
Power density, conducted	±0.61 dB	N/A
Temperature	±0.7 °C	N/A
Humidity	±2.6 %	N/A
DC and low frequency voltages	±3.4 %	N/A
Time	±1.82 %	N/A
Duty Cycle	±1.69 %	N/A

## 2 Test Configuration of EUT

### 2.1 The Worst Case Modulation Configuration

Worst Modulation Used for Conformance Testing						
Power Level		1				
IEEE 802.11 Protocol	Number of Transmit Chains (N <sub>TX</sub> )	Data Rate / MCS	Worst Data Rate / MCS	Worst Modulation Mode	RF Output Power (dBm)	Power Spectral Density (dBm/3kHz)
a	1	6-54 Mbps	6Mbps	11A5.8G-20M	<b>20.72</b>	<b>-17.74</b>
n (HT20)	2	MCS 0-15	MCS 8	11N5.8G-20M	<b>23.47</b>	<b>-12.83</b>
n (HT40)	2	MCS 0-15	MCS 8	11N5.8G-40M	<b>24.16</b>	<b>-15.65</b>

Note 1: IEEE Std. 802.11-2007 modulation consists of IEEE Std. 802.11a-1999.  
 Note 2: IEEE Std. 802.11n-2009 modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. Worst modulation mode of Guard Interval (GI) is 400ns.  
 Note 3: Modulation modes consist of 11A5.8-G-20M, 11N5.8G-20M, 11N5.8G-40M:  
 11A5.8G: IEEE 802.11a (5.8GHz Band), 11N5.8G: IEEE 802.11n (5.8GHz Band)  
 20M/40M: Channel Bandwidth 20MHz/40MHz  
 Note 4: RF output power specifies that Maximum Peak Conducted Output Power.

### 2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration		
IEEE 802.11 Protocol	Worst Modulation Mode	Test Channel Frequencies (MHz) – FX (Frequencies Abbreviations)
a	11A5.8G-20M	5745-(F1), 5785-(F2), 5825-(F3)
n (HT20)	11N5.8G-20M	5745-(F1), 5785-(F2), 5825-(F3)
n (HT40)	11N5.8G-40M	5755-(F4), 5795-(F5)

Note 1: Modulation modes consist of 11A5.8-G-20M, 11N5.8G-20M, 11N5.8G-40M:  
 11A5.8G: IEEE 802.11a (5.8GHz Band), 11N5.8G: IEEE 802.11n (5.8GHz Band)  
 20M/40M: Channel Bandwidth 20MHz/40MHz

### 2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter					
Power Level		1			
Test Software Version		RTL819x2.2.4_11/11/01			
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Frequency (MHz)	Power Setting	Worst Data Rate / MCS	RF Output Power (dBm)
11A5.8G-20M	1	5745	49	6 Mbps	19.41
11A5.8G-20M	1	5785	52	6 Mbps	20.28
11A5.8G-20M	1	5825	55	6 Mbps	20.72
11N5.8G-20M	2	5745	51/54	MCS 8	22.79
11N5.8G-20M	2	5785	54/56	MCS 8	23.20
11N5.8G-20M	2	5825	57/59	MCS 8	23.47
11N5.8G-40M	2	5755	52/56	MCS 8	24.16
11N5.8G-40M	2	5795	56/58	MCS 8	23.76

Note 1: Modulation modes consist of 11A5.8-G-20M, 11N5.8G-20M, 11N5.8G-40M:  
 11A5.8G: IEEE 802.11a (5.8GHz Band), 11N5.8G: IEEE 802.11n (5.8GHz Band)  
 20M/40M: Channel Bandwidth 20MHz/40MHz  
 Note 2: RF output power specifies that Maximum Peak Conducted Output Power.

## 2.4 The Worst Case Measurement Configuration

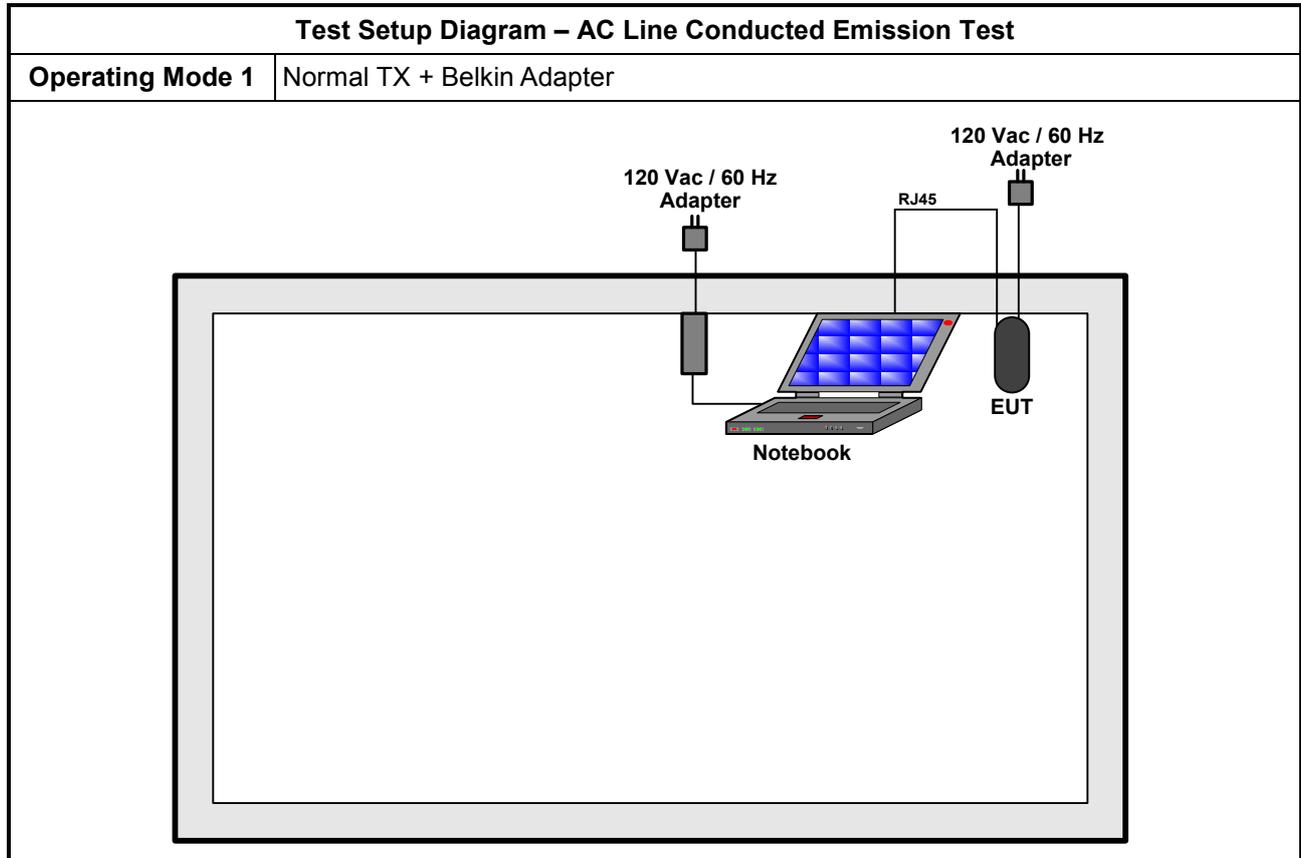
The Worst Case Mode for Following Conformance Tests				
<b>Tests Item</b>	AC power-line conducted emissions			
<b>Condition</b>	AC power-line conducted measurement for line and neutral			
Operating Mode	Operating Mode Description	Worst Modulation Mode	Test Freq.	Power Level
1	Normal TX + Belkin Adapter	11N5.8G-20M	F2	1
2	Normal TX + Sunny Adapter	11N5.8G-40M	F5	1
For operating mode 1 is the worst case and it was record in this test report.				

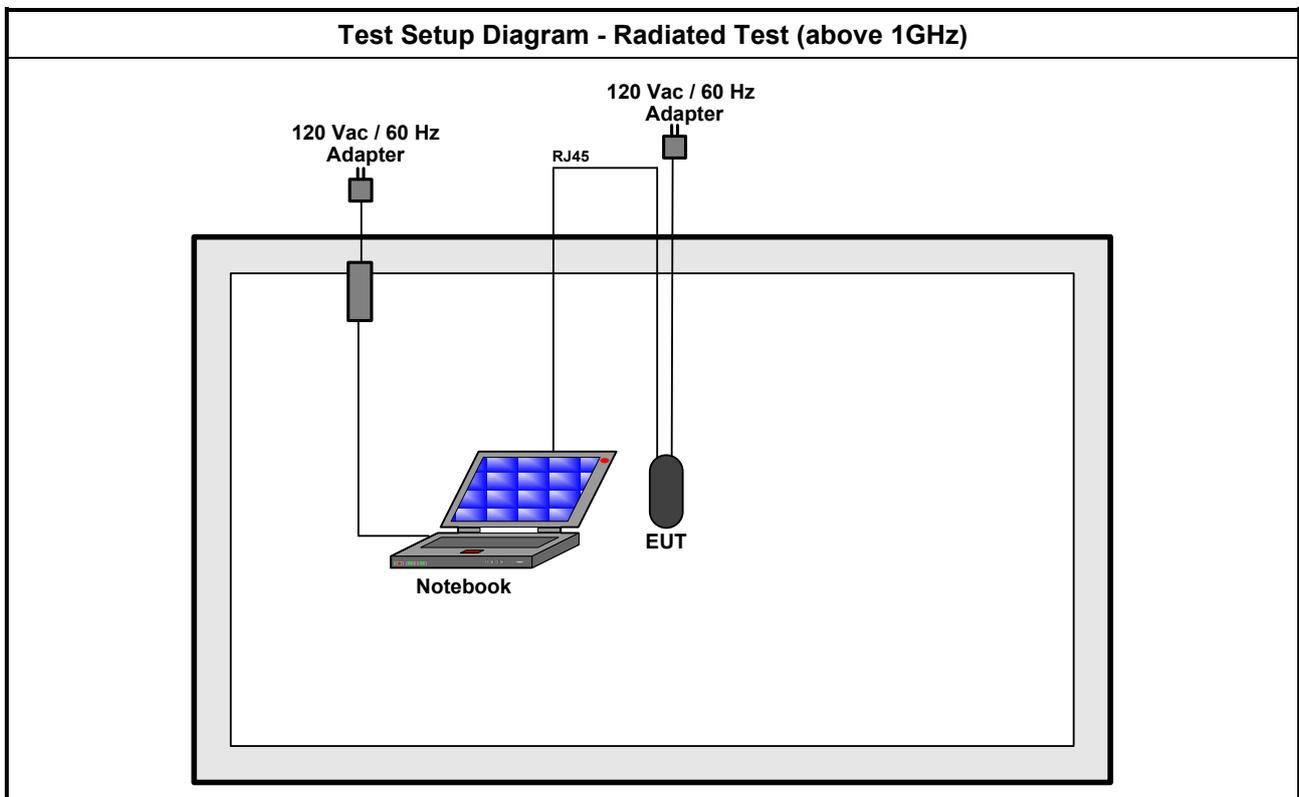
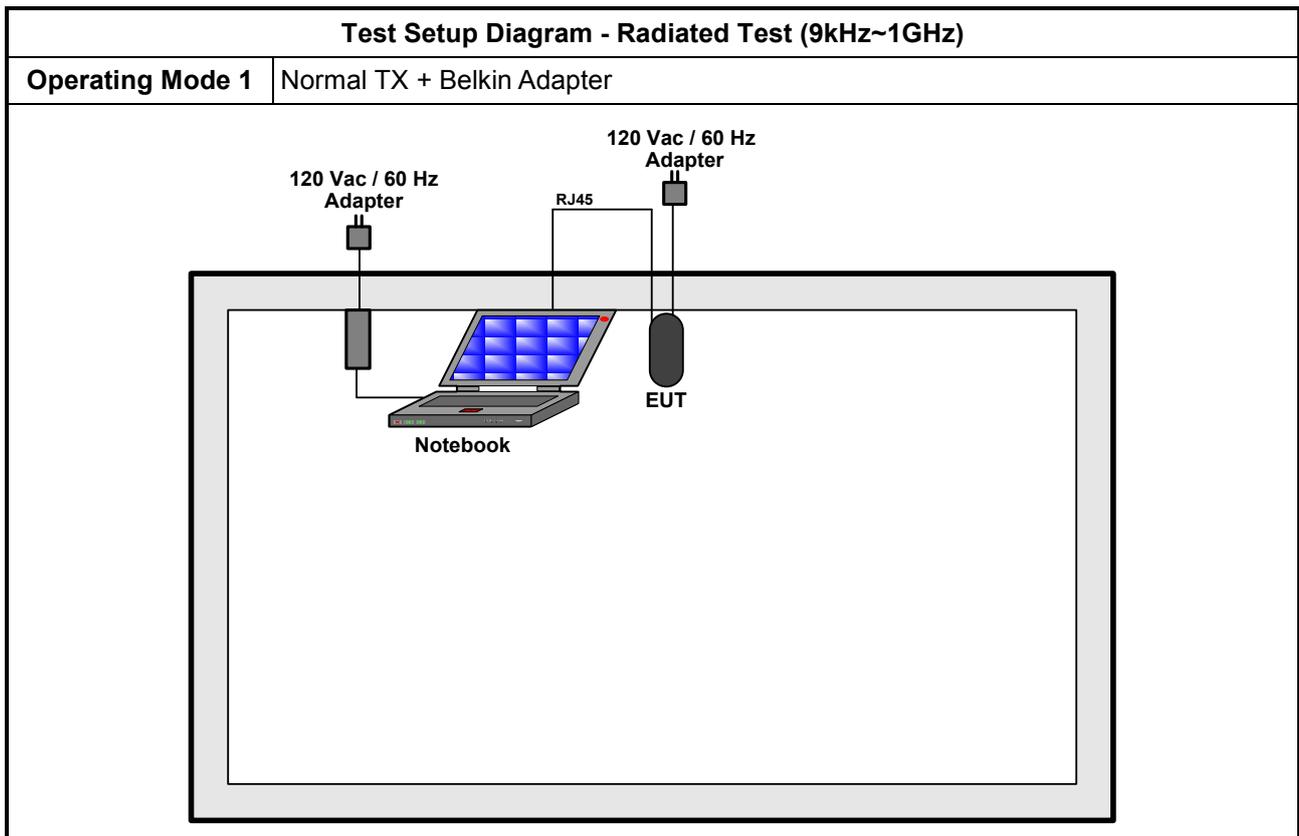
The Worst Case Mode for Following Conformance Tests				
<b>Tests Item</b>	RF Output Power Power Spectral Density 6dB Bandwidth			
<b>Test Condition</b>	Conducted measurement at transmit chains			
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Worst Data Rate / MCS	Test Frequency	Power Level
11A5.8G-20M	1	6Mbps	F1, F2, F3	1
11N5.8G-20M	2	MCS 8	F1, F2, F3	1
11N5.8G-40M	2	MCS 8	F4, F5	1

The Worst Case Mode for Following Conformance Tests				
<b>Tests Item</b>	Transmitter Radiated Bandedge Emissions			
<b>Test Condition</b>	Radiated measurement			
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Worst Data Rate / MCS	Test Frequency	Power Level
11A5.8G-20M	1	6Mbps	F1, F3	1
11N5.8G-20M	2	MCS 8	F1, F3	1
11N5.8G-40M	2	MCS 8	F4, F5	1

The Worst Case Mode for Following Conformance Tests						
<b>Tests Item</b>	Transmitter Radiated Unwanted Emissions					
<b>Test Condition</b>	Radiated measurement					
<b>User Position</b>	<input checked="" type="checkbox"/> EUT will be placed in fixed position.					
	<input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two or three orthogonal planes.					
	<input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes.					
<b>Operating Mode &lt; 1GHz</b>	<input checked="" type="checkbox"/> 1. Normal TX + Belkin Adapter					
	<input checked="" type="checkbox"/> 2. Normal TX + Sunny Adapter					
<b>Worst Modulation Mode</b>	<b>Number of Transmit Chains (N<sub>TX</sub>)</b>	<b>Worst Data Rate / MCS</b>	<b>Test Frequency</b>	<b>Power Level</b>	<b>Ant No.</b>	<b>Worst Orthogonal Planes of EUT</b>
11A5.8G-20M	1	6Mbps	F1, F2, F3	1	1	Y Plane
11N5.8G-20M	2	MCS 8	F1, F2,F3	1	1	Y Plane
11N5.8G-40M	2	MCS 8	F4, F5	1	1,2	Y Plane
<b>Orthogonal Planes of EUT</b>	<b>X Plane</b>		<b>Y Plane</b>		<b>Z Plane</b>	
						
For operating mode 1 is the worst case and it was record in this test report.						

## 2.5 Test Setup Diagram





### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

##### 3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: \* Decreases with the logarithm of the frequency.

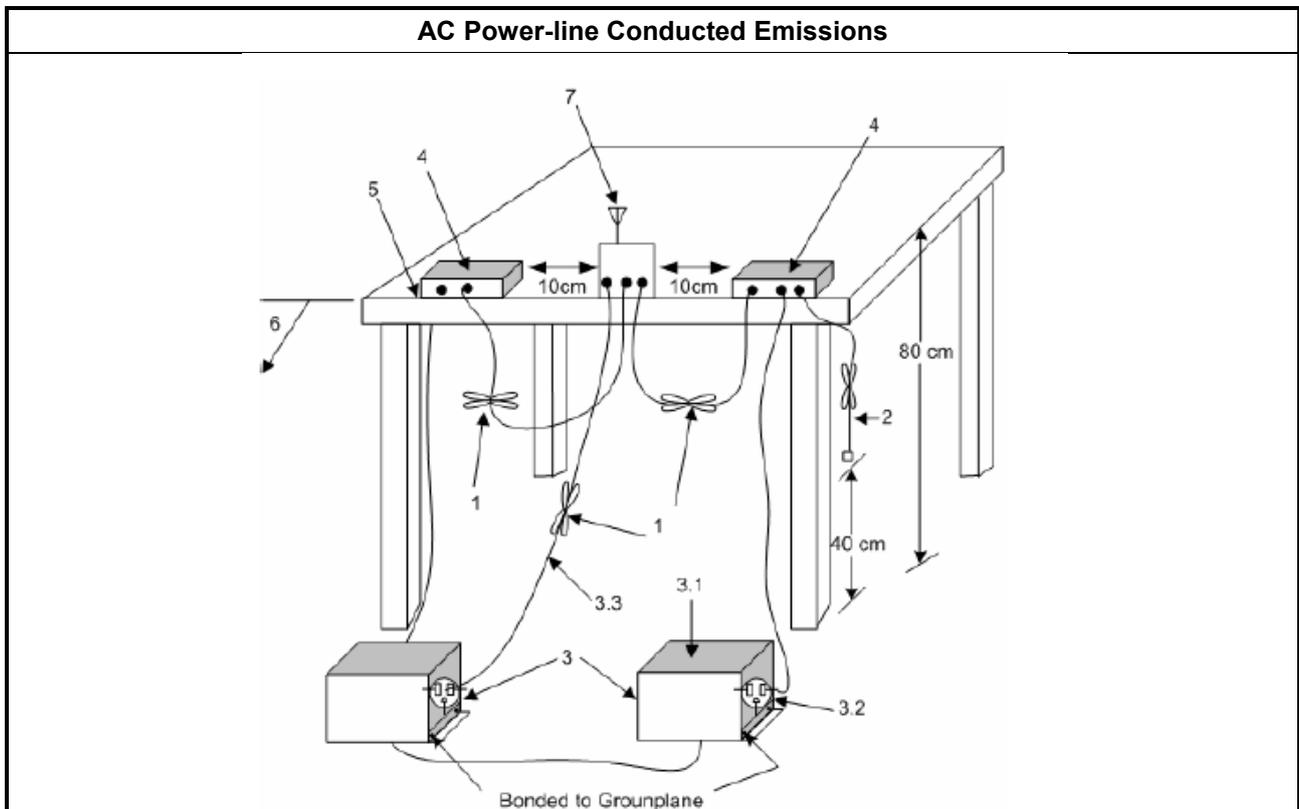
##### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

##### 3.1.3 Test Procedures

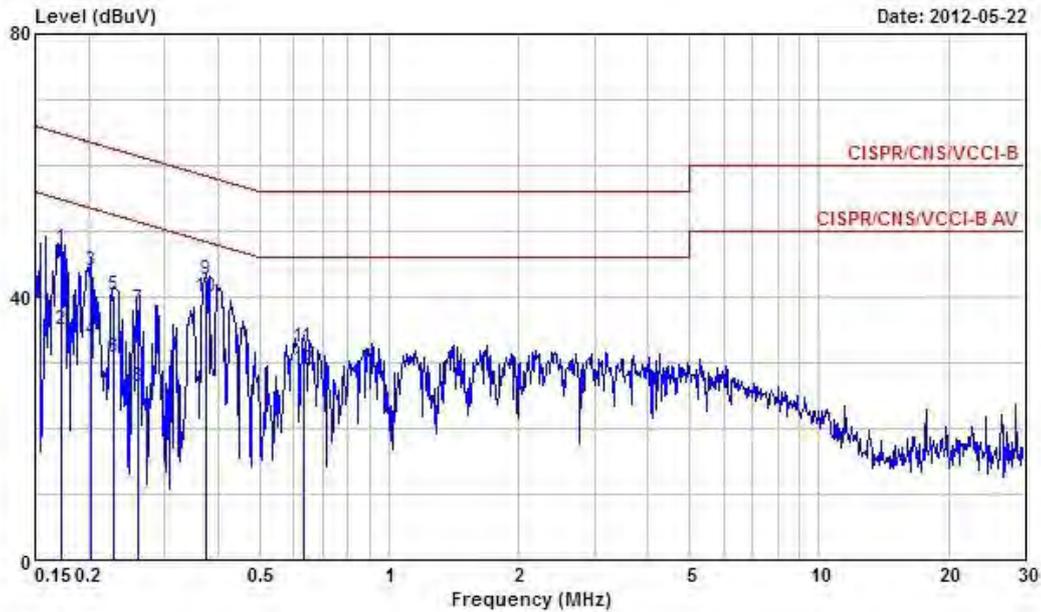
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

##### 3.1.4 Test Setup



3.1.5 Test Result of AC Power-line Conducted Emissions

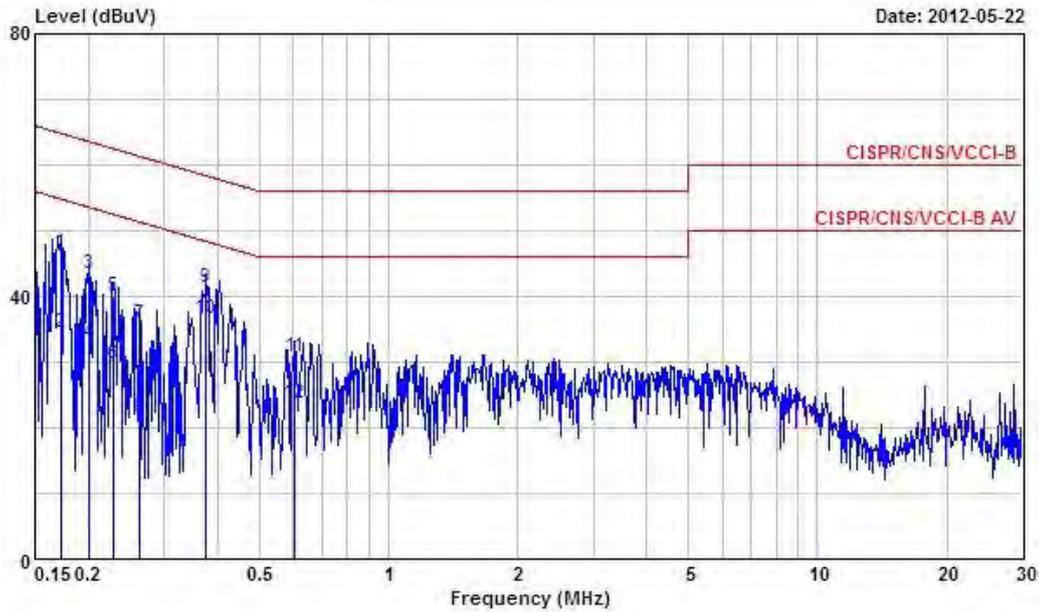
AC Power-line Conducted Emissions Result					
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Mode	1	Ant. No.	1+2	Power Phase	Neutral
Operating Function	Normal TX + Belkin Adapter				



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1721540	47.31	-17.55	64.86	46.95	0.26	0.10	QP
2	0.1721540	35.01	-19.85	54.86	34.65	0.26	0.10	Average
3	0.2018130	43.91	-19.63	63.54	43.56	0.25	0.10	QP
4	0.2018130	33.55	-19.99	53.54	33.20	0.25	0.10	Average
5	0.2292570	40.23	-22.25	62.48	39.88	0.25	0.10	QP
6	0.2292570	30.83	-21.65	52.48	30.48	0.25	0.10	Average
7	0.2603570	38.19	-23.23	61.42	37.84	0.25	0.10	QP
8	0.2603570	26.30	-25.12	51.42	25.95	0.25	0.10	Average
9	0.3751190	42.74	-15.65	58.39	42.40	0.24	0.10	QP
10	0.3751190	40.04	-8.35	48.39	39.70	0.24	0.10	Average
11	0.6304790	32.46	-23.54	56.00	32.12	0.24	0.10	QP
12	0.6304790	28.87	-17.13	46.00	28.53	0.24	0.10	Average

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

AC Power-line Conducted Emissions Result					
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Mode	1	Ant. No.	1+2	Power Phase	Line
Operating Function	Normal TX + Belkin Adapter				



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1732800	46.69	-18.11	64.80	46.29	0.30	0.10	QP
2	0.1732800	34.39	-20.41	54.80	33.99	0.30	0.10	Average
3	0.2009660	43.50	-20.07	63.57	43.10	0.30	0.10	QP
4	0.2009660	32.97	-20.60	53.57	32.57	0.30	0.10	Average
5	0.2294330	39.98	-22.49	62.47	39.58	0.30	0.10	QP
6	0.2294330	29.62	-22.85	52.47	29.22	0.30	0.10	Average
7	0.2616370	35.80	-25.58	61.38	35.40	0.30	0.10	QP
8	0.2616370	21.66	-29.72	51.38	21.26	0.30	0.10	Average
9	0.3751190	41.28	-17.11	58.39	40.88	0.30	0.10	QP
10	0.3751190	36.48	-11.91	48.39	36.08	0.30	0.10	Average
11	0.6055930	30.83	-25.17	56.00	30.44	0.29	0.10	QP
12	0.6055930	23.65	-22.35	46.00	23.26	0.29	0.10	Average

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

### 3.2 6dB Bandwidth

#### 3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
<b>Systems using digital modulation techniques:</b>
<input checked="" type="checkbox"/> 6 dB bandwidth $\geq$ 500 kHz.

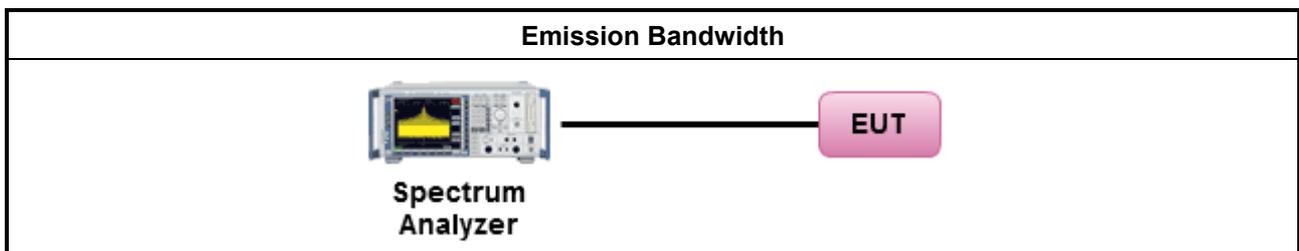
#### 3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.2.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> For the emission bandwidth shall be measured using one of the options below:
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 5.1.1 Option 1 for 6 dB bandwidth measurement. <input type="checkbox"/> Refer as FCC KDB 558074, clause 5.1.2 Option 2 for 6 dB bandwidth measurement. <input type="checkbox"/> Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
<input checked="" type="checkbox"/> For conducted measurement.
<input checked="" type="checkbox"/> For conducted measurements on devices with multiple transmit chains using options given below:
<input type="checkbox"/> Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1. <input checked="" type="checkbox"/> Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains. <input type="checkbox"/> Option 3: A power splitter/combiner shall be used to combine all the transmit chains (antenna outputs) into a single test point and record a single test point EBW.
<input type="checkbox"/> For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

#### 3.2.4 Test Setup

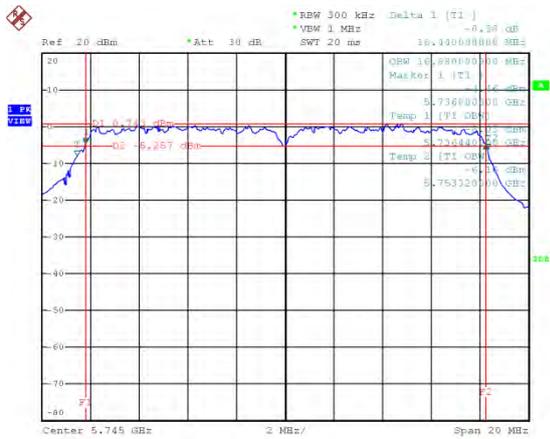


3.2.5 Test Result of Emission Bandwidth

Emission Bandwidth Result				
Power Level	1		Emission Bandwidth (MHz)	
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	99% Bandwidth	6dB Bandwidth
11A5.8G-20M	1	5745	16.88	16.44
11A5.8G-20M	1	5785	16.84	16.48
11A5.8G-20M	1	5825	16.88	16.48
11N5.8G-20M	2	5745	17.84	17.80
11N5.8G-20M	2	5785	17.84	17.76
11N5.8G-20M	2	5825	17.92	17.68
11N5.8G-40M	2	5755	36.40	36.32
11N5.8G-40M	2	5795	36.56	36.48
<b>Limit</b>			<b>N/A</b>	<b>≥500 kHz</b>
<b>Result</b>			<b>Complied</b>	
Note 1: N <sub>TX</sub> = Number of Transmit Chains				

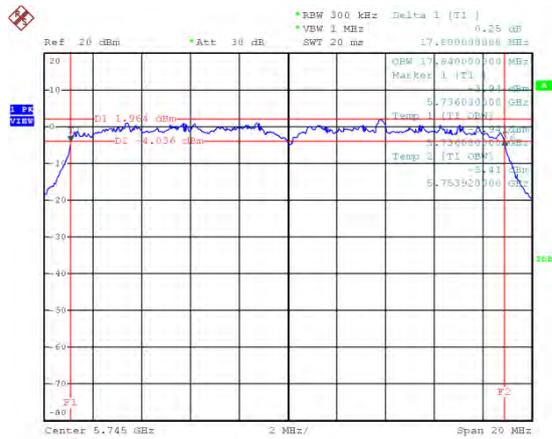
Emission Bandwidth Plots

11A5.8G-20M – F1 [Port 1]



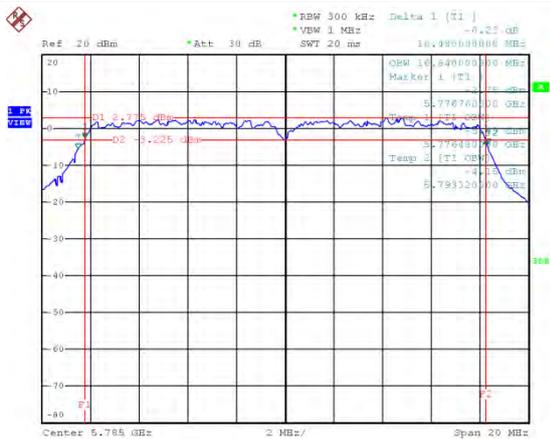
Date: 21.JUN.2012 17:58:06

11N5.8G-20M – F1 [Port 1]



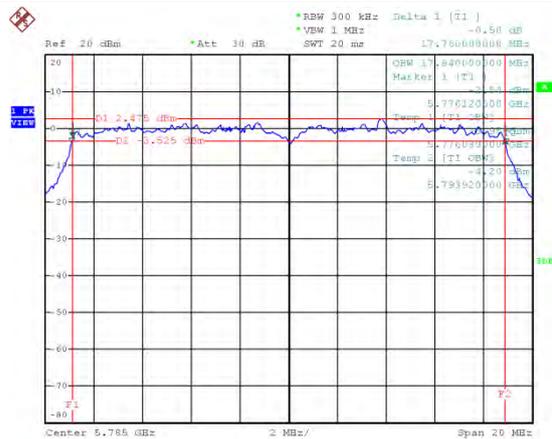
Date: 21.JUN.2012 18:05:45

11A5.8G-20M – F2 [Port 1]



Date: 21.JUN.2012 17:59:41

11N5.8G-20M – F2 [Port 1]



Date: 21.JUN.2012 18:04:34

11A5.8G-20M – F3 [Port 1]



Date: 21.JUN.2012 18:00:38

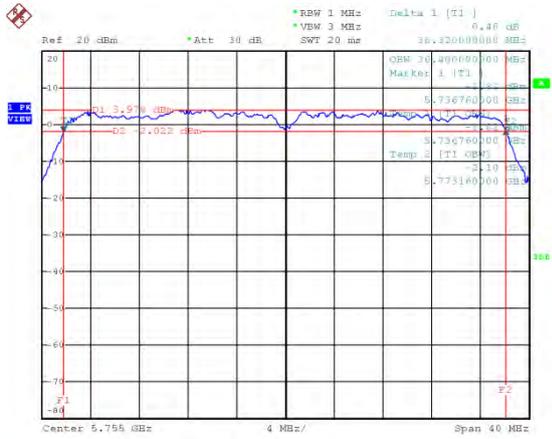
11N5.8G-20M – F3 [Port 1]



Date: 21.JUN.2012 18:03:21

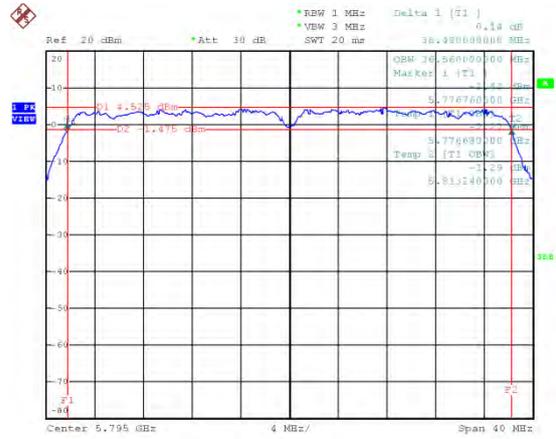
Emission Bandwidth Plots

11N5.8G-40M – F4 [Port 1]



Date: 21.JUN.2012 18:07:16

11N5.8G-40M – F5 [Port 1]



Date: 21.JUN.2012 18:08:16

### 3.3 RF Output Power

#### 3.3.1 RF Output Power Limit

RF Output Power Limit	
<b>Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit</b>	
<input type="checkbox"/> 902-928 MHz Band:	
<input type="checkbox"/>	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
<input type="checkbox"/>	If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
<input type="checkbox"/> 2400-2483.5 MHz Band:	
<input type="checkbox"/>	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
<input type="checkbox"/>	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
<input type="checkbox"/>	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
<input type="checkbox"/>	Smart antenna system (SAS):
<input type="checkbox"/>	Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
<input type="checkbox"/>	Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
<input type="checkbox"/>	Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dBm
<input checked="" type="checkbox"/> 5725-5850 MHz Band:	
<input checked="" type="checkbox"/>	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
<input checked="" type="checkbox"/>	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
<input type="checkbox"/>	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30$ dBm
<b>e.i.r.p. Power Limit:</b>	
<input type="checkbox"/> 902-928 MHz Band: $P_{eirp} \leq 36$ dBm (4 W)	
<input type="checkbox"/> 2400-2483.5 MHz Band	
<input type="checkbox"/>	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
<input type="checkbox"/>	Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
<input type="checkbox"/>	Smart antenna system (SAS)
<input type="checkbox"/>	Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
<input type="checkbox"/>	Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
<input type="checkbox"/>	Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm
<input checked="" type="checkbox"/> 5725-5850 MHz Band	
<input checked="" type="checkbox"/>	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
<input type="checkbox"/>	Point-to-point systems (P2P): N/A
$P_{Out}$ = maximum peak conducted output power or maximum conducted output power in dBm, $G_{TX}$ = the maximum transmitting antenna directional gain in dBi. $P_{eirp}$ = e.i.r.p. Power in dBm.	

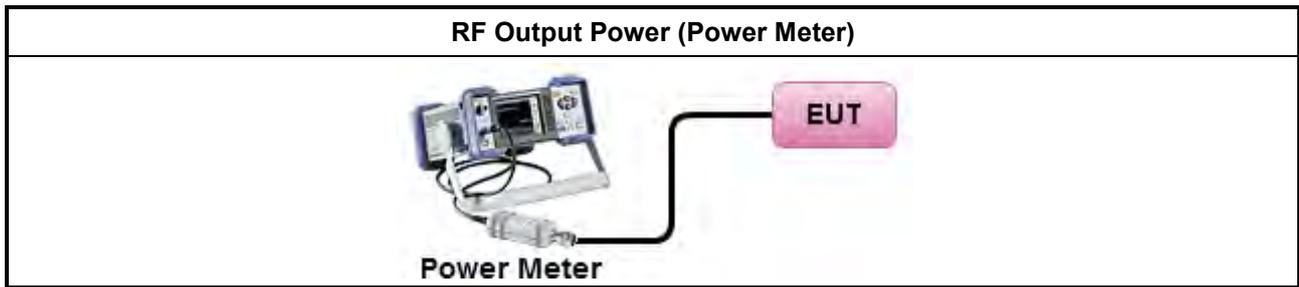
#### 3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Maximum Peak Conducted Output Power
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.1.1 Option 1 (zero-span method).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.1.2 Option 2 (integrated band power method).
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.1.3 Option 3 (peak power meter method).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.1.4 Alternative 1 (bandwidth correction method).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.2.1 a) for peak power meter.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.2.1 a) for spectrum analyzer - (RBW ≥ EBW).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.2.1 b) for spectrum analyzer - BW correction factor.
<input type="checkbox"/>	Maximum Conducted Output Power
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.2.1 Option 1 (RMS detection with slow sweep speed).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.2.2 Option 2 (spectral trace averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.2.3 Option 3 (average power meter method).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.2.4 Alternative 1 (reduced VBW with max hold)
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.2.5 Alternative 2 (zero-span with trace averaging)
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.2.6 Alternative 3 (average on/off duty) - refer clause 1.1.4
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.3.1 for spectrum analyzer - Method 1 (trace averaging).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.3.2 for spectrum analyzer - Method 2 (zero-span averaging).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.10.3.2 for spectrum analyzer - Method 3 (band power max-hold).
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 3 for conducted measurement.
<input checked="" type="checkbox"/>	For conducted measurements on devices with multiple transmit chains: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
<input checked="" type="checkbox"/>	If multiple transmit chains, EIRP calculation could be following as methods:
<input type="checkbox"/>	Method 1: $EIRP_1 = P_1 + G_{ANT1}$ ; $EIRP_2 = P_2 + G_{ANT2}$ ; ... $EIRP_n = P_n + G_{ANTn}$ $EIRP_{total} = EIRP_1 + EIRP_2 + \dots + EIRP_n$ (calculated in linear unit [mW] and transfer to log unit [dBm])
<input checked="" type="checkbox"/>	Method 2: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 3 for radiated measurement.

3.3.4 Test Setup



3.3.5 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result											
Power Level		1		RF Output Power (dBm)							
Directional Gain (dBi)		6.27									
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	Chain-Port 2	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit	
11A5.8G-20M	1	5745	19.41	-	-	-	19.41	30	25.68	36	
11A5.8G-20M	1	5785	20.28	-	-	-	20.28	30	26.55	36	
11A5.8G-20M	1	5825	20.72	-	-	-	20.72	30	26.99	36	
<b>Result</b>			<b>Complied</b>								
Note 1: N <sub>TX</sub> = Number of Transmit Chains											
Note 2: EUT support diversity transmit and transmit chains port 1 is the worst than other transmit chains.											

Maximum Peak Conducted Output Power Result											
Power Level		1		RF Output Power (dBm)							
Directional Gain (dBi)		5.5									
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	Chain-Port 2	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit	
11N5.8G-20M	2	5745	19.51	20.03	-	-	22.79	30	28.29	36	
11N5.8G-20M	2	5785	20.77	19.53	-	-	23.20	30	28.70	36	
11N5.8G-20M	2	5825	20.61	20.3	-	-	23.47	30	28.97	36	
<b>Result</b>			<b>Complied</b>								
Note 1: N <sub>TX</sub> = Number of Transmit Chains											

Maximum Peak Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		5.5								
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	Chain-Port 2	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N5.8G-40M	2	5755	20.32	21.85	-	-	24.16	30	29.66	36
11N5.8G-40M	2	5825	20.95	20.53	-	-	23.76	30	29.26	36
<b>Result</b>			<b>Complied</b>							
Note 1: N <sub>TX</sub> = Number of Transmit Chains										

### 3.4 Power Spectral Density

#### 3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
<input checked="" type="checkbox"/> Power Spectral Density (PSD) $\leq$ 8 dBm/3kHz

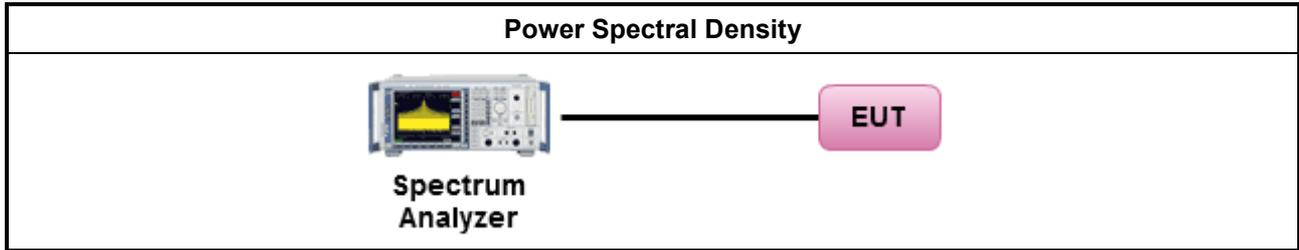
#### 3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.4.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> Power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the power spectral density. In addition, the use of a peak PSD procedure will always result in a "worst-case" measured level for comparison to the limit. Therefore, whenever the DTS bandwidth exceeds 500 kHz, it is acceptable to utilize the peak PSD procedure to demonstrate compliance to the PSD limit, regardless of how the fundamental output power was measured. For the power spectral density shall be measured using below options:
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 7.3.1 Option 1 (peak PSD; BWCF=-15.2dB).
<input type="checkbox"/> Refer as FCC KDB 558074, clause 7.3.2 Option 2 (average PSD; BWCF=-15.2dB).
<input type="checkbox"/> Refer as FCC KDB 558074, clause 7.3.3 Alternative 1 (peak PSD; RBW=3kHz; sweep=100s).
<input type="checkbox"/> Refer as FCC KDB 558074, clause 7.3.4 Alternative 2 (average PSD; RBW=3kHz; average=100).
<input type="checkbox"/> Refer as ANSI C63.10, clause 6.11.2.3 for PSD for DTS - (RBW=3kHz; sweep=100s).
<input type="checkbox"/> Refer as ANSI C63.10, clause 6.11.2.4 for Alternative PSD for DTS - (RBW=3kHz; average=100)
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 3 for conducted measurement.
<input checked="" type="checkbox"/> For conducted measurements on devices with multiple transmit chains using options given below:
<input type="checkbox"/> Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the N <sub>TX</sub> output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace. The new data trace samples added 100 kHz segment and found the highest value of each 100 kHz segments. Add the bandwidth correction factor (BWCF) adjusting in power spectral density per 3kHz.
<input checked="" type="checkbox"/> Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.
<input type="checkbox"/> Refer as FCC KDB 558074, clause 3 for radiated measurement.

3.4.4 Test Setup



3.4.5 Test Result of Power Spectral Density

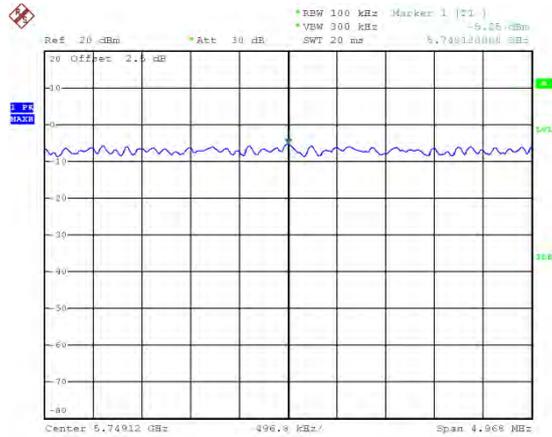
Power Spectral Density Result							
Power Level		1	Power Spectral Density (dBm/3kHz)				
Directional Gain (dBi)		6.27					
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	Chain-Port 2	-	-	PSD Limit
11A5.8G-20M	1	5745	-20.48	-	-	-	8
11A5.8G-20M	1	5785	-18.61	-	-	-	8
11A5.8G-20M	1	5825	-17.74	-	-	-	8
<b>Result</b>			<b>Complied</b>				
Note 1: N <sub>TX</sub> = Number of Transmit Chains Note 2: PSD [dBm/3kHz] = each transmit chains PSD [dBm/100kHz] + BWFC [-15.2 dB] + 10logN <sub>TX</sub>							

Power Spectral Density Result							
Power Level		1	Power Spectral Density (dBm/3kHz)				
Directional Gain (dBi)		5.5					
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	Chain-Port 2	-	-	PSD Limit
11N5.8G-20M	2	5745	-15.86	-14.74	-	-	8
11N5.8G-20M	2	5785	-15.15	-14.02	-	-	8
11N5.8G-20M	2	5825	-12.97	-12.83	-	-	8
<b>Result</b>			<b>Complied</b>				
Note 1: N <sub>TX</sub> = Number of Transmit Chains Note 2: PSD [dBm/3kHz] = each transmit chains PSD [dBm/100kHz] + BWFC [-15.2 dB] + 10logN <sub>TX</sub>							

Power Spectral Density Result							
Power Level		1	Power Spectral Density (dBm/3kHz)				
Directional Gain (dBi)		5.5					
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	Chain-Port 2	-	-	PSD Limit
11N5.8G-40M	2	5755	-17.98	-16.97	-	-	8
11N5.8G-40M	2	5795	-15.97	-15.65	-	-	8
<b>Result</b>			<b>Complied</b>				
Note 1: N <sub>TX</sub> = Number of Transmit Chains Note 2: PSD [dBm/3kHz] = each transmit chains PSD [dBm/100kHz] + BWFC [-15.2 dB] + 10logN <sub>TX</sub>							

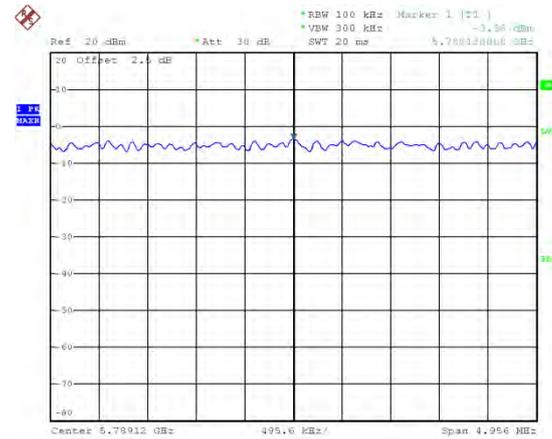
Power Spectral Density Plots - w/o BWFC

11A5.8G-20M – F1 [Chain-Port 1]



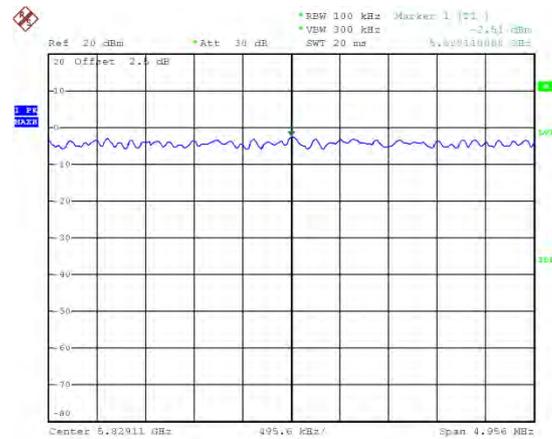
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11A5.8G-20M – F2 [Chain-Port 1]



Date: 15 JUN 2012 15:44:21

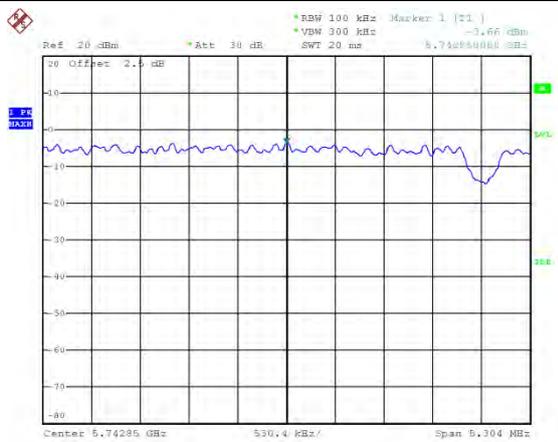
11A5.8G-20M – F3 [Chain-Port 1]



Date: 15 JUN 2012 15:45:09

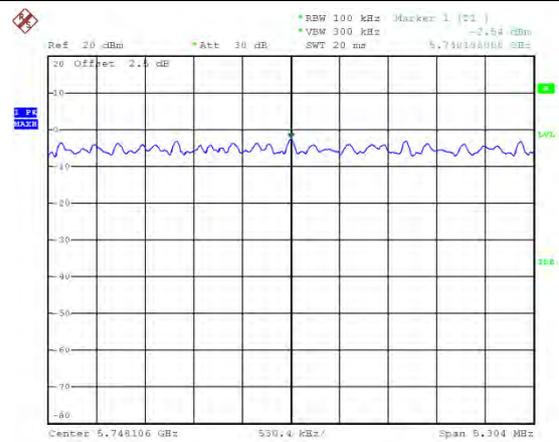
Power Spectral Density Plots - w/o BWFC and 10 x log 2

11N5.8G-20M – F1 [Chain-Port 1]



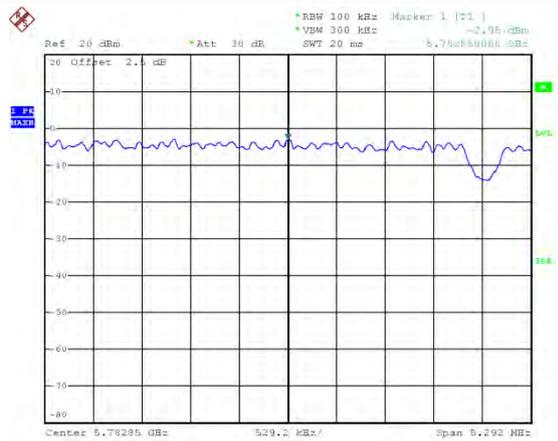
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11N5.8G-20M – F1 [Chain-Port 2]



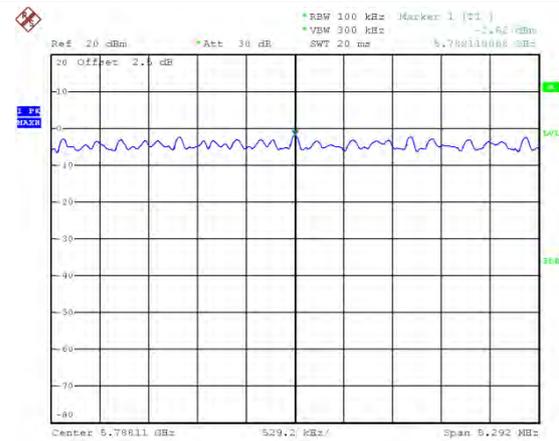
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11N5.8G-20M – F2 [Chain-Port 1]



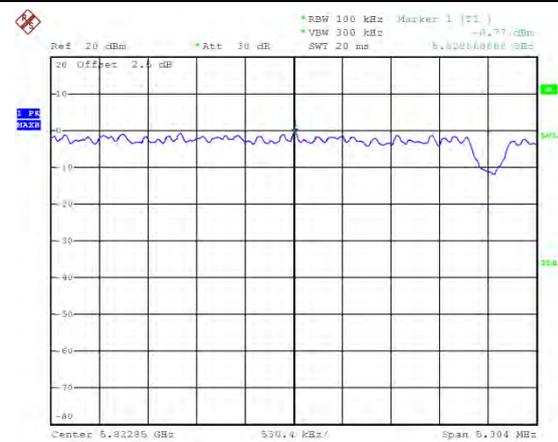
Date: 15 JUN.2012 15:28:43

11N5.8G-20M – F2 [Chain-Port 2]



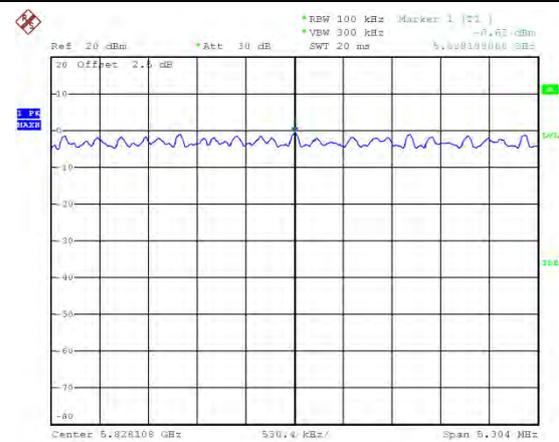
Date: 15 JUN.2012 15:27:18

11N5.8G-20M – F3 [Chain-Port 1]



Date: 15 JUN.2012 15:33:22

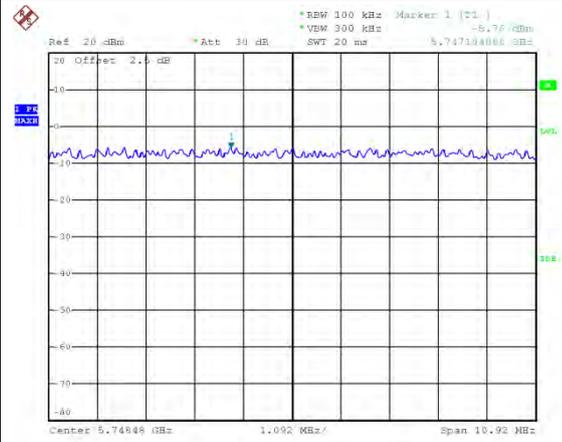
11N5.8G-20M – F3 [Chain-Port 2]



Date: 15 JUN.2012 15:34:24

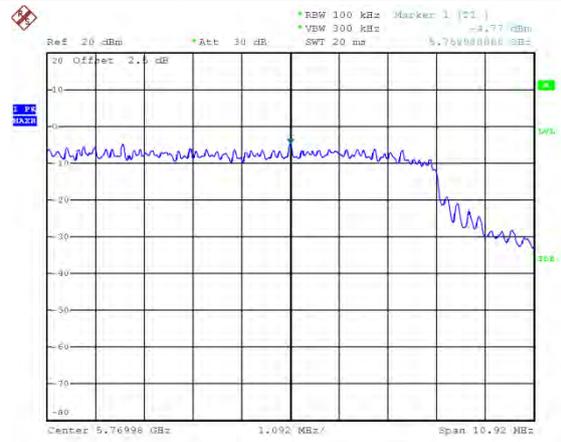
Power Spectral Density Plots - w/o BWFC and 10 x log 2

11N5.8G-40M – F4 [Chain-Port 1]



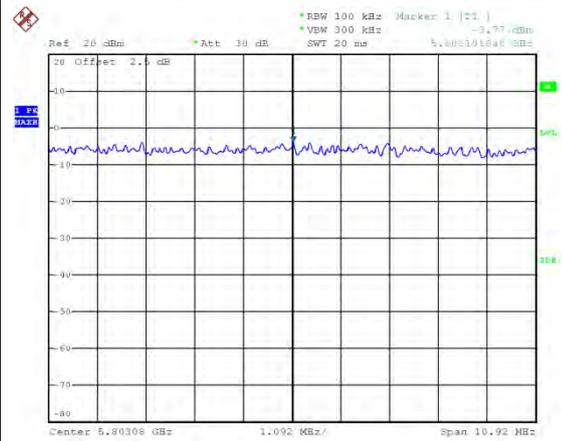
Date: 15.JUN.2012 15:38:55

11N5.8G-40M – F4 [Chain-Port 2]



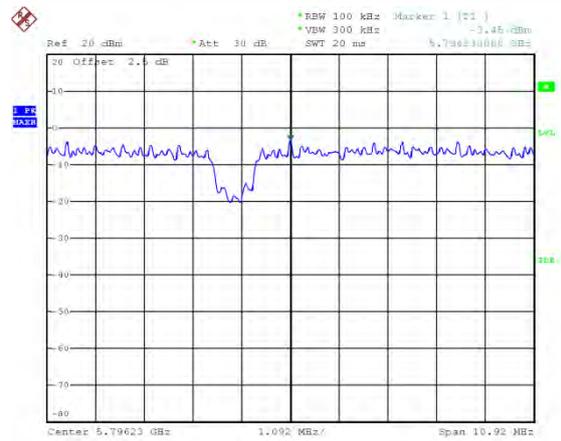
Date: 15.JUN.2012 15:39:38

11N5.8G-40M – F5 [Chain-Port 1]



Date: 15.JUN.2012 15:41:41

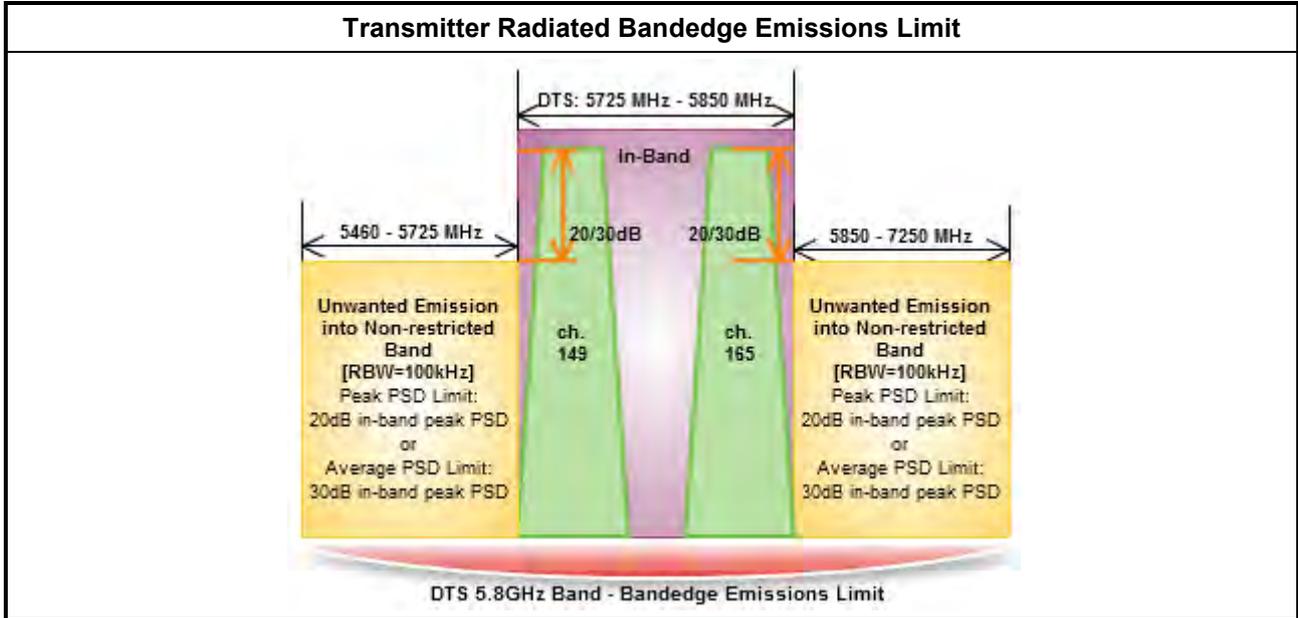
11N5.8G-40M – F5 [Chain-Port 2]



Date: 15.JUN.2012 15:40:48

### 3.5 Transmitter Radiated Bandedge Emissions

#### 3.5.1 Transmitter Radiated Bandedge Emissions Limit



#### 3.5.2 Measuring Instruments

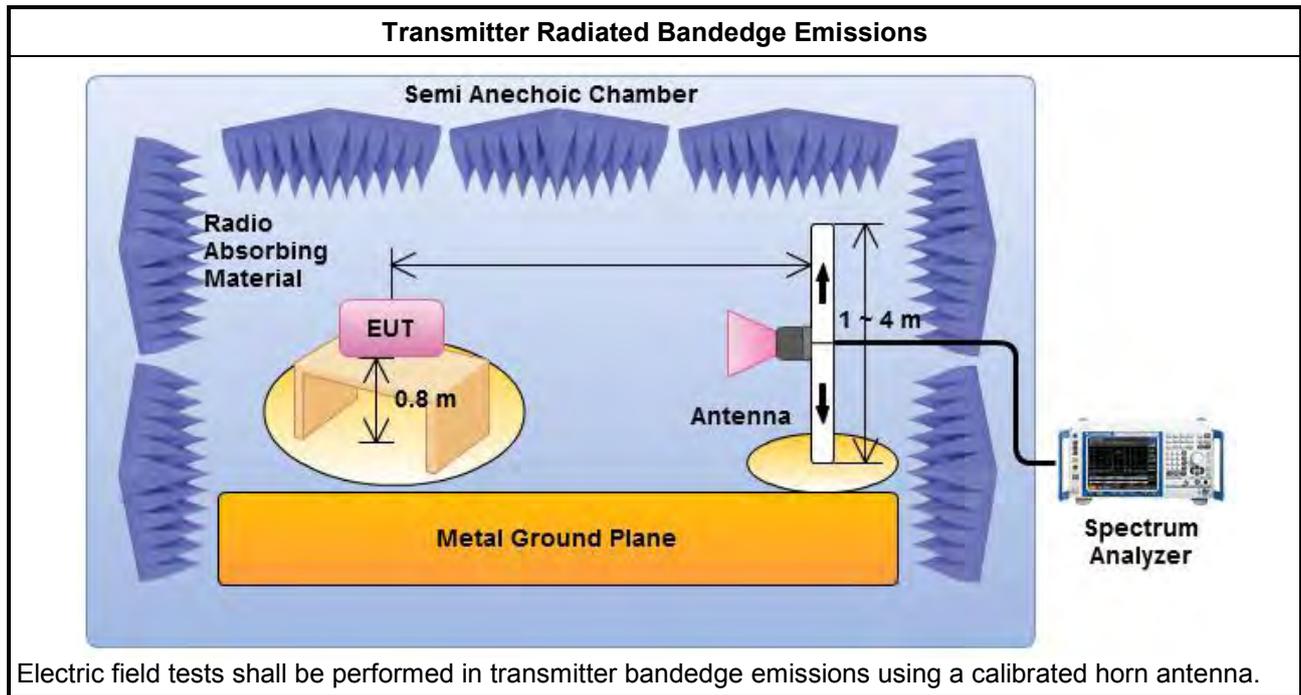
Refer a test equipment and calibration data table in this test report.

#### 3.5.3 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.1 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2 for unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.2.1 Option 1 (Power Averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.2.2 Option 2 (Trace Averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.2.2 Option 3 (Reduced VBW).
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.3 measurement procedure peak limit.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
<input checked="" type="checkbox"/>	For the transmitter bandedge emissions shall be measured using following options below:
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.4 for narrower resolution bandwidth using the band power and summing the spectral levels (i.e., 100 kHz or 1 MHz).
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2 for band-edge testing.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.

Test Method	
<input checked="" type="checkbox"/>	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements). Measurements in the bandedge are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 3 for conducted measurement.
<input type="checkbox"/>	For unwanted emissions into non-restricted bands (relative emission limits).
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N) if the measurements are made relative to the in-band emissions on the individual outputs.
<input type="checkbox"/>	For unwanted emissions into restricted bands. Test conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.1 unwanted emissions in restricted bands on frequencies $\leq 1000$ MHz
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.2 unwanted emissions in restricted bands on frequencies $> 1000$ MHz
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains using options given below:
<input type="checkbox"/>	Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, out-of-band and spurious emission measurement. The trace data for each transmit chain has to be individually recorded and each transmit chain trace data shall be added and compared with the limit.
<input type="checkbox"/>	Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 3 for radiated measurement.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.

3.5.4 Test Setup



Electric field tests shall be performed in transmitter bandedge emissions using a calibrated horn antenna.

3.5.5 Test Result of Transmitter Radiated Bandedge Emissions

Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain (dBi)	6.27	Non-restricted Band Emissions					
Modulation	11A5.8G-20M								
Non-restricted Band (MHz)	N <sub>TX</sub>	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
5460-5725	1	5745	106.97	5721.61	69.68	37.29	20	PK	V
5850-7250	1	5825	109.39	5868.35	69.88	39.51	20	PK	V
Low Band					Up Band				
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)									

Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain (dBi)	5.5	Non-restricted Band Emissions					
Modulation	11N5.8G-20M								
Non-restricted Band (MHz)	N <sub>TX</sub>	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV /100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV /100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
5460-5725	2	5745	109.51	5725.00	71.76	37.75	20	PK	V
5850-7250	2	5825	111.24	5850.09	69.63	41.61	20	PK	V
Low Band					Up Band				
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)									

Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain (dBi)	5.5	Non-restricted Band Emissions					
Modulation	11N5.8G-40M								
Non-restricted Band (MHz)	N <sub>TX</sub>	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV /100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV /100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
5460-5725	2	5755	106.85	5722.30	72.27	34.58	20	PK	V
5850-7250	2	5795	108.85	5860.70	68.85	40.00	20	PK	V
Low Band					Up Band				
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)									

### 3.6 Transmitter Radiated Unwanted Emissions

#### 3.6.1 Transmitter Radiated Unwanted Emissions Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

#### 3.6.2 Measuring Instruments

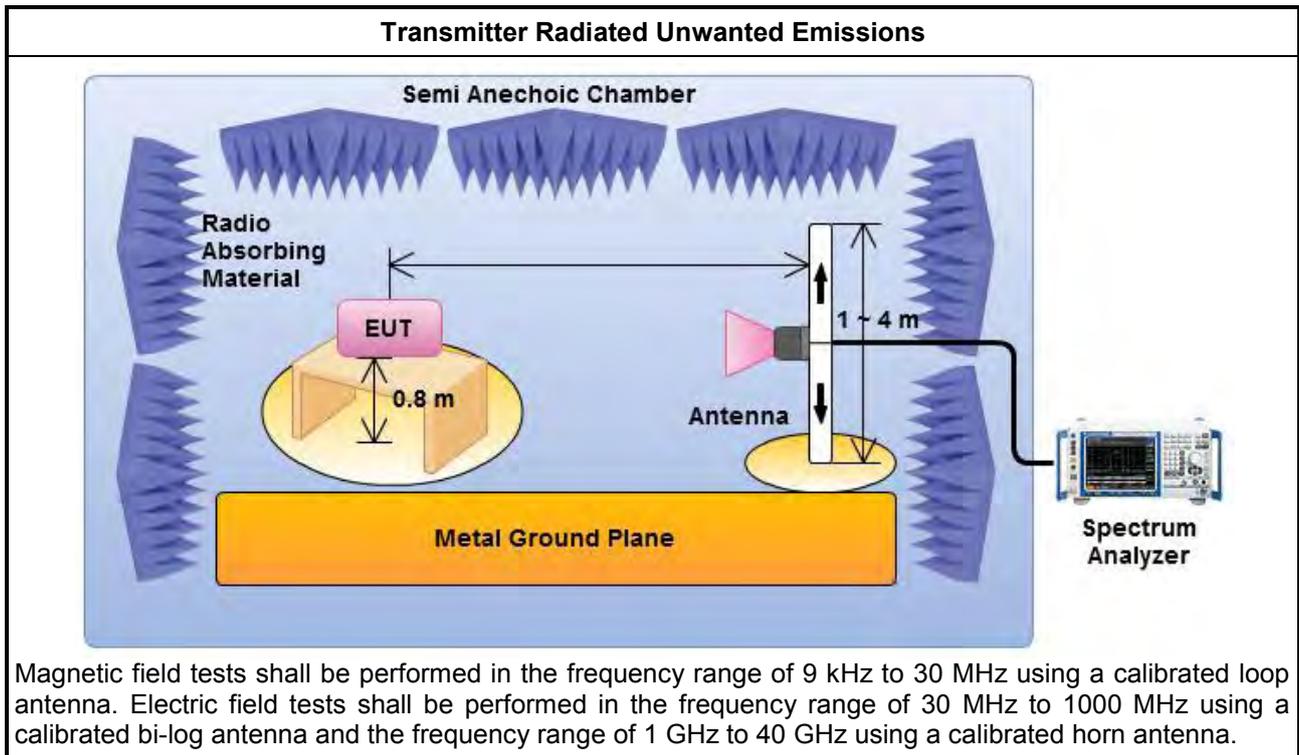
Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
<input checked="" type="checkbox"/>	Measurements in the frequency range 5 GHz - 10GHz are typically made at a closer distance 1.0m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input checked="" type="checkbox"/>	Measurements in the frequency range 10 GHz - 18GHz are typically made at a closer distance 1.0m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input checked="" type="checkbox"/>	Measurements in the frequency range above 18 GHz - 40GHz are typically made at a closer distance 1.0m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.1 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2 for unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.1 Option 1 (Power Averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.2 Option 2 (Trace Averaging).
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.2 Option 3 (Reduced VBW).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.3 measurement procedure peak limit.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.

Test Method	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 3 for conducted measurement.
<input type="checkbox"/>	For unwanted emissions into non-restricted bands (relative emission limits).
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains: Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N) if the measurements are made relative to the in-band emissions on the individual outputs.
<input type="checkbox"/>	For unwanted emissions into restricted bands. Test conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.1 unwanted emissions in restricted bands on frequencies ≤ 1000 MHz
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 7.4.2.2.2 unwanted emissions in restricted bands on frequencies > 1000 MHz
<input type="checkbox"/>	For conducted measurements on devices with multiple transmit chains using options given below:
<input type="checkbox"/>	Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, out-of-band and spurious emission measurement. The trace data for each transmit chain has to be individually recorded and each transmit chain trace data shall be added and compared with the limit.
<input type="checkbox"/>	Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.
<input checked="" type="checkbox"/>	For radiated measurement.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.

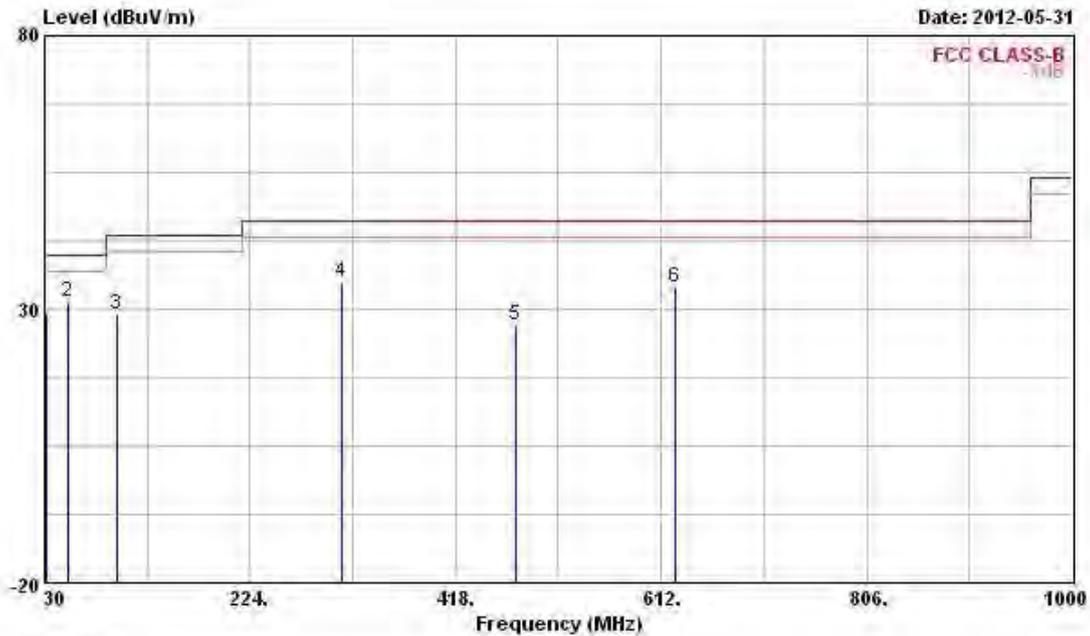
3.6.4 Test Setup



Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna and the frequency range of 1 GHz to 40 GHz using a calibrated horn antenna.

3.6.5 Test Result of Transmitter Radiated Unwanted Emissions (Below 1GHz)

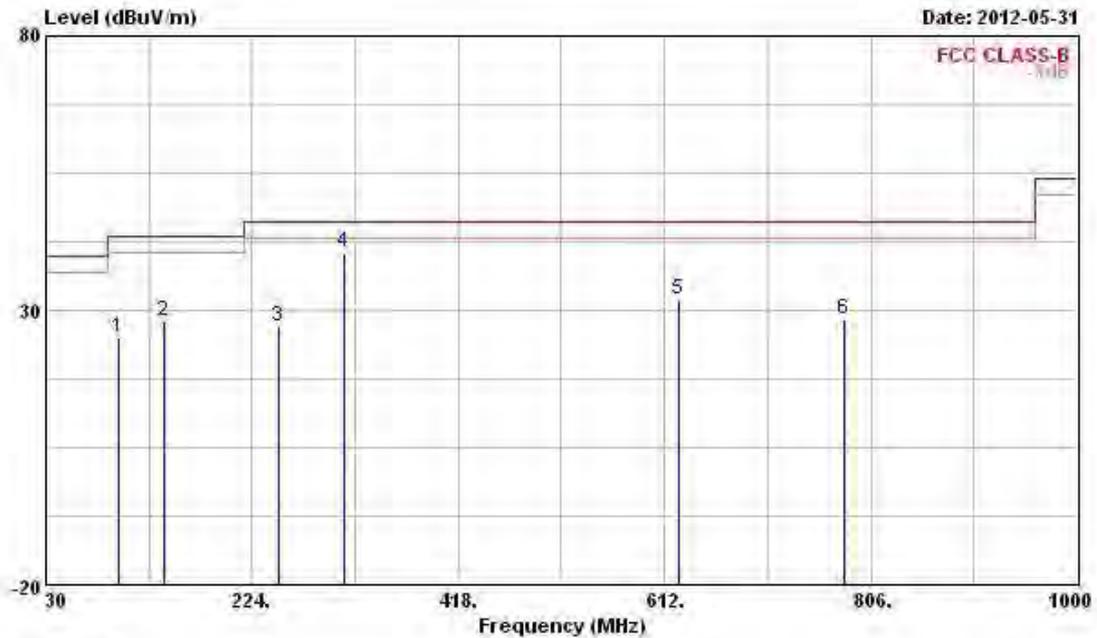
Transmitter Radiated Unwanted Emissions (Below 1GHz)					
Modulation Mode	11A5.8G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Mode	1	Ant. No.	1	Polarization	V
Operating Function	Normal TX + Belkin Adapter				



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	31.940	29.45	-10.55	40.00	40.99	15.48	0.92	27.94	Peak	---	---
2	52.310	31.45	-8.55	40.00	49.14	8.94	1.22	27.85	Peak	---	---
3	97.900	29.17	-14.33	43.50	44.54	10.84	1.64	27.85	Peak	---	---
4	311.300	34.97	-11.03	46.00	45.32	13.88	3.01	27.24	Peak	---	---
5	475.230	27.07	-18.93	46.00	34.83	16.79	3.70	28.25	Peak	---	---
6	625.580	33.99	-12.01	46.00	38.24	19.84	4.32	28.41	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

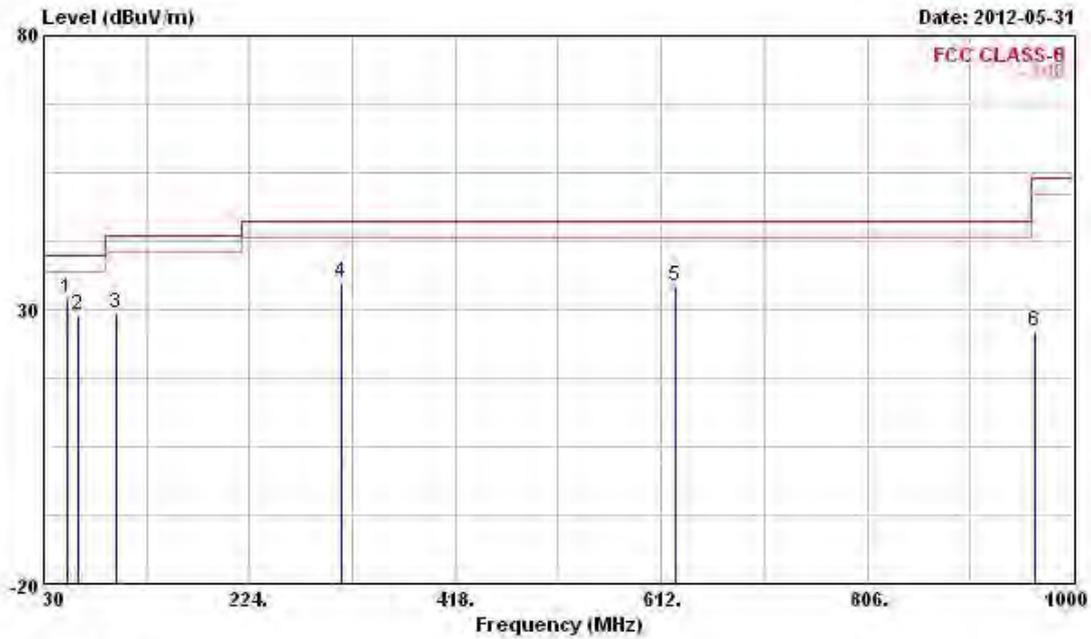
Transmitter Radiated Unwanted Emissions (Below 1GHz)					
Modulation Mode	11A5.8G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Mode	1	Ant. No.	1	Polarization	H
Operating Function	Normal TX + Belkin Adapter				



Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg
1	97.900	25.13	-18.37	43.50	40.50	10.84	1.64 27.85 Peak	---	---
2	141.550	27.88	-15.62	43.50	41.77	11.78	2.00 27.67 Peak	---	---
3	249.220	26.94	-19.06	46.00	38.49	12.97	2.77 27.29 Peak	---	---
4	311.300	40.69	-5.31	46.00	51.04	13.88	3.01 27.24 Peak	---	---
5	625.580	32.10	-13.90	46.00	36.35	19.84	4.32 28.41 Peak	---	---
6	781.750	28.44	-17.56	46.00	31.61	20.01	4.82 28.00 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

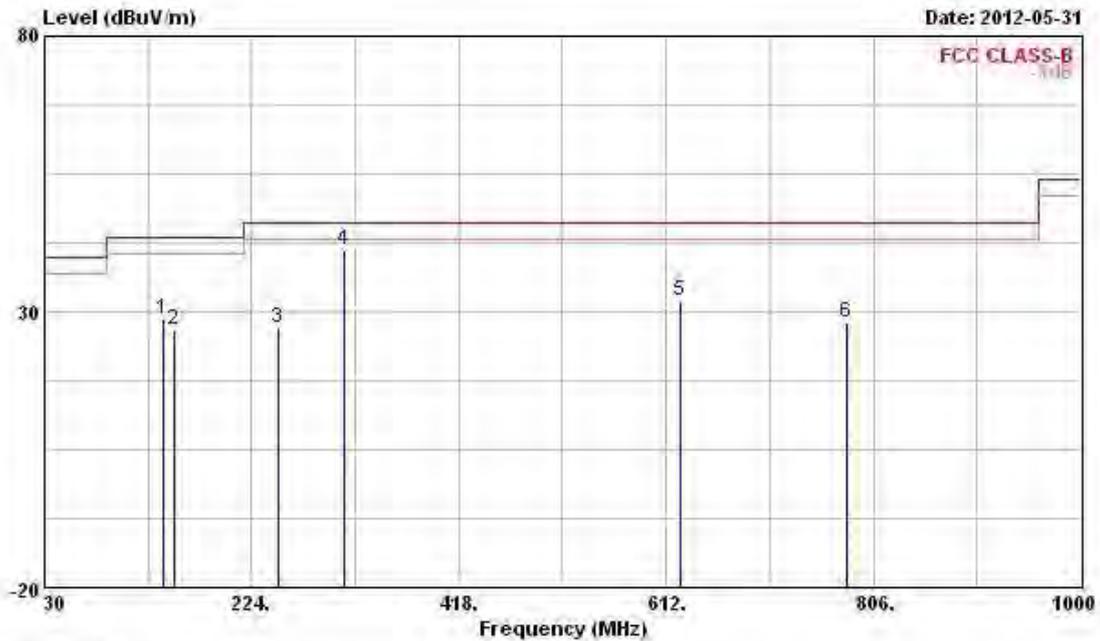
Transmitter Radiated Unwanted Emissions (Below 1GHz)					
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Mode	1	Ant. No.	1+2	Polarization	V
Operating Function	Normal TX + Belkin Adapter				



	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp		Ant	Table
	MHz	dBUV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg
1	52.310	31.98	-8.02	40.00	49.67	8.94	1.22	27.85	Peak	---	---
2	62.980	28.97	-11.03	40.00	48.45	7.03	1.34	27.85	Peak	---	---
3	97.900	29.23	-14.27	43.50	44.60	10.84	1.64	27.85	Peak	---	---
4	311.300	34.97	-11.03	46.00	45.32	13.88	3.01	27.24	Peak	---	---
5	625.580	34.34	-11.66	46.00	38.59	19.84	4.32	28.41	Peak	---	---
6	964.110	26.02	-27.98	54.00	26.20	21.61	5.57	27.36	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

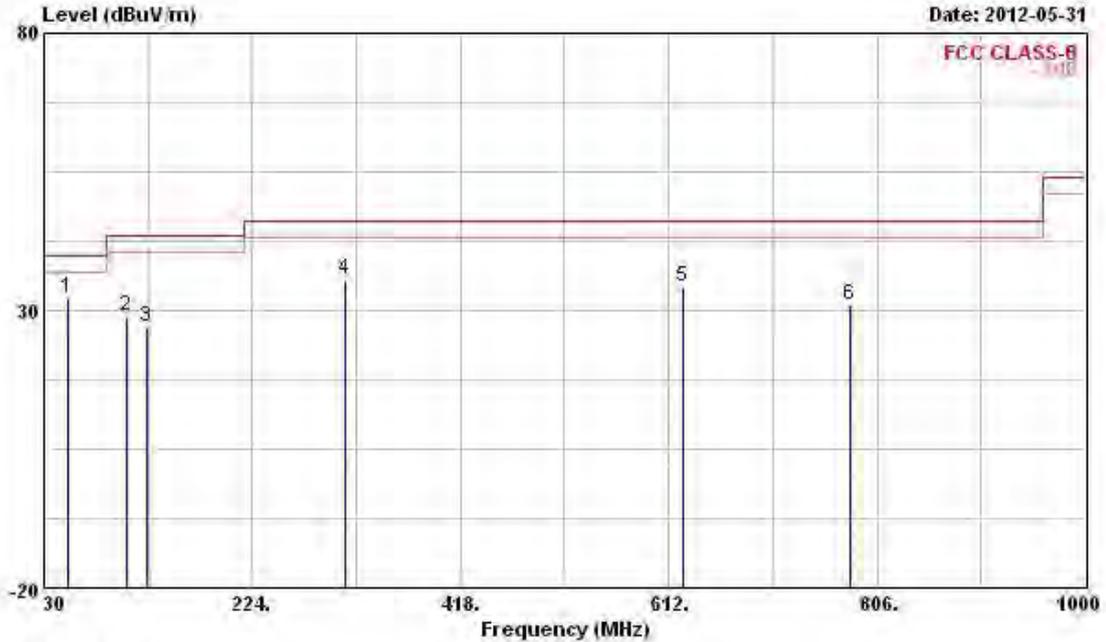
Transmitter Radiated Unwanted Emissions (Below 1GHz)					
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F1
Operating Mode	1	Ant. No.	1+2	Polarization	H
Operating Function	Normal TX + Belkin Adapter				



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	141.550	28.59	-14.91	43.50	42.48	11.78	2.00	27.67	Peak	---	---
2	152.220	26.59	-16.91	43.50	41.45	10.73	2.03	27.62	Peak	---	---
3	249.220	26.98	-19.02	46.00	38.53	12.97	2.77	27.29	Peak	---	---
4	311.300	41.21	-4.79	46.00	51.56	13.88	3.01	27.24	Peak	---	---
5	625.580	32.09	-13.91	46.00	36.34	19.84	4.32	28.41	Peak	---	---
6	781.750	27.93	-18.07	46.00	31.10	20.01	4.82	28.00	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

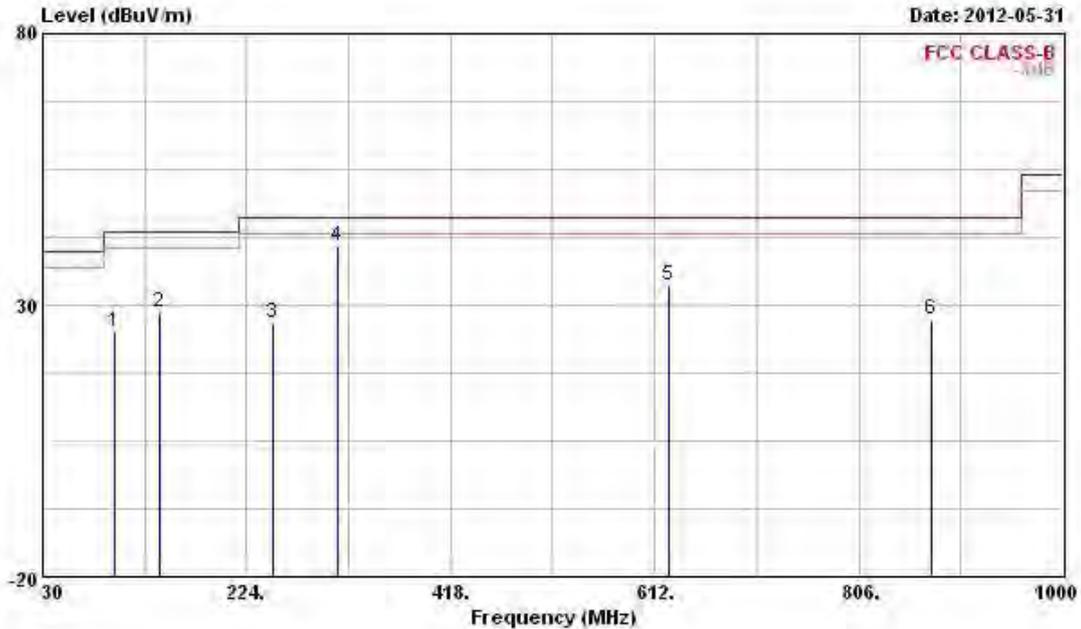
Transmitter Radiated Unwanted Emissions (Below 1GHz)					
Modulation Mode	11N5.8G-40M	Power Level	1	Test Freq. (FX)	F1
Operating Mode	1	Ant. No.	1+2	Polarization	V
Operating Function	Normal TX + Belkin Adapter				



Line	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	52.310	32.17	-7.83	40.00	49.86	8.94	1.22	27.85	Peak	---	---
2	106.630	29.14	-14.36	43.50	43.25	11.99	1.72	27.82	Peak	---	---
3	125.060	26.96	-16.54	43.50	39.66	13.18	1.86	27.74	Peak	---	---
4	311.300	35.61	-10.39	46.00	45.96	13.88	3.01	27.24	Peak	---	---
5	625.580	34.35	-11.65	46.00	38.60	19.84	4.32	28.41	Peak	---	---
6	781.750	31.07	-14.93	46.00	34.24	20.01	4.82	28.00	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

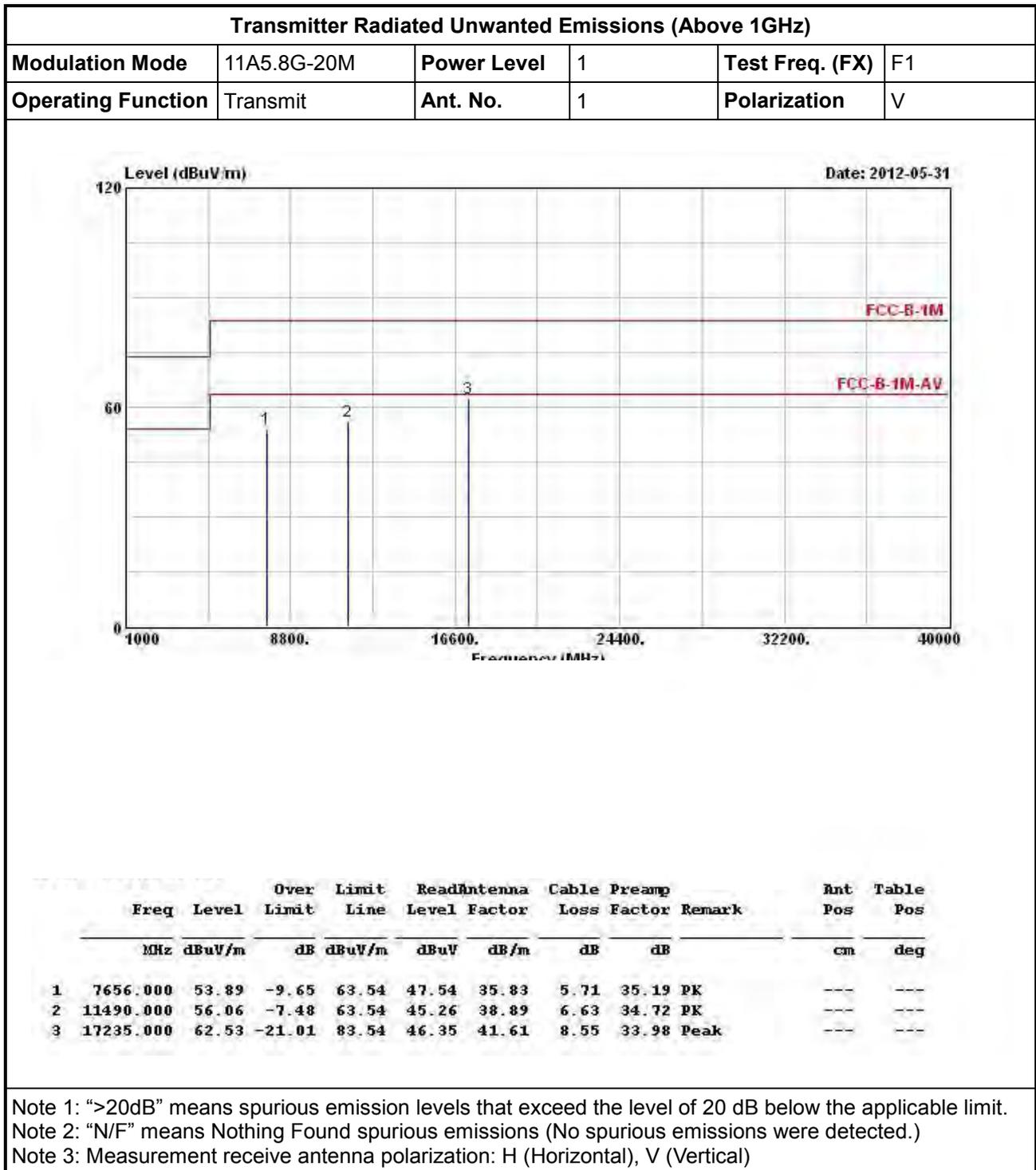
Transmitter Radiated Unwanted Emissions (Below 1GHz)					
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F1
Operating Mode	1	Ant. No.	1+2	Polarization	H
Operating Function	Normal TX + Belkin Adapter				



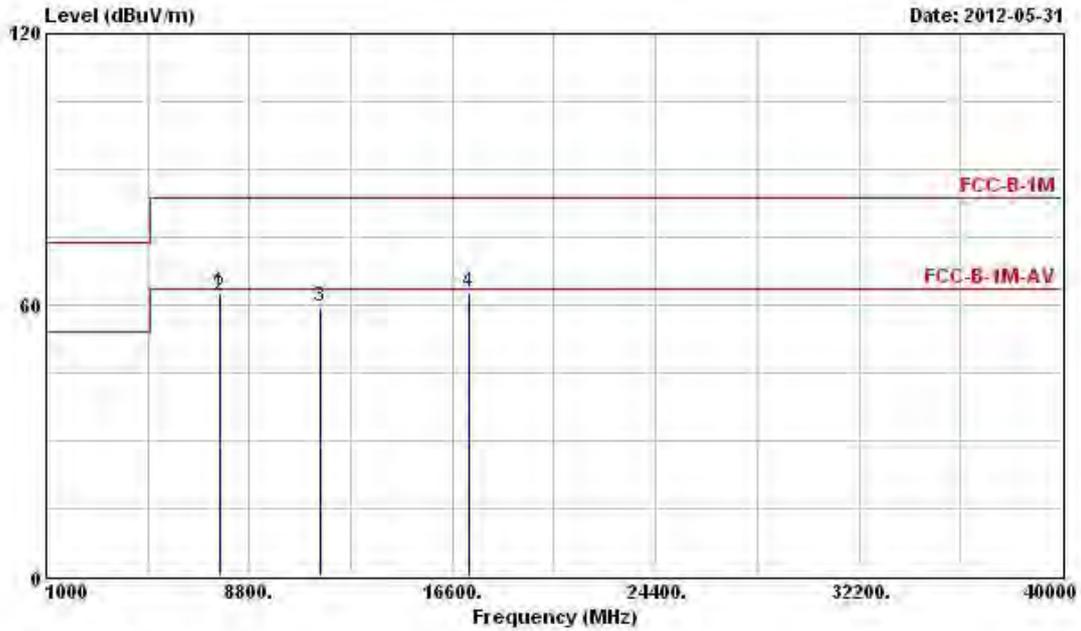
Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	97.900	24.94	-18.56	43.50	40.31	10.84	1.64	27.85 Peak	---	---
2	141.550	28.62	-14.88	43.50	42.51	11.78	2.00	27.67 Peak	---	---
3	249.220	26.76	-19.24	46.00	38.31	12.97	2.77	27.29 Peak	---	---
4	311.300	40.76	-5.24	46.00	51.11	13.88	3.01	27.24 Peak	---	---
5	625.580	33.47	-12.53	46.00	37.72	19.84	4.32	28.41 Peak	---	---
6	874.870	27.32	-18.68	46.00	29.77	20.09	5.15	27.69 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

3.6.6 Test Result of Transmitter Radiated Unwanted Emissions (Above 1GHz)



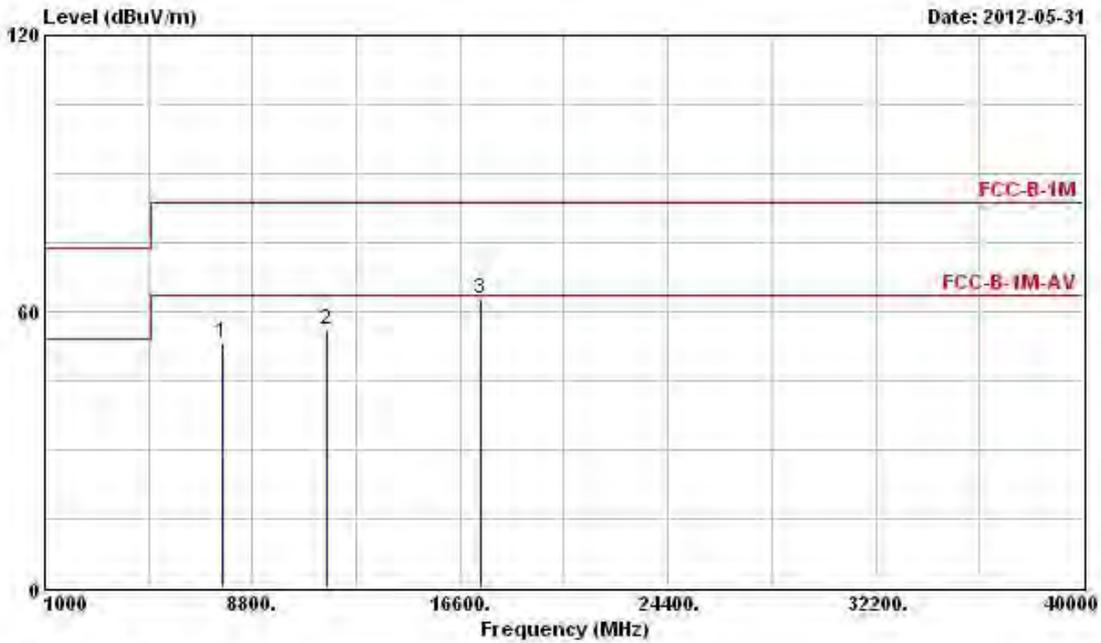
Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11A5.8G-20M	Power Level	1	Test Freq. (FX)	F1
Operating Function	Transmit	Ant. No.	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7656.000	62.82	-20.72	83.54	56.47	35.83	5.71	35.19	Peak	---	---
2	7656.000	61.96	-1.58	63.54	55.61	35.83	5.71	35.19	Average	---	---
3	11490.000	59.51	-4.03	63.54	48.71	38.89	6.63	34.72	PK	---	---
4	17235.000	62.61	-20.93	83.54	46.43	41.61	8.55	33.98	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11A5.8G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Function	Transmit	Ant. No.	1	Polarization	V

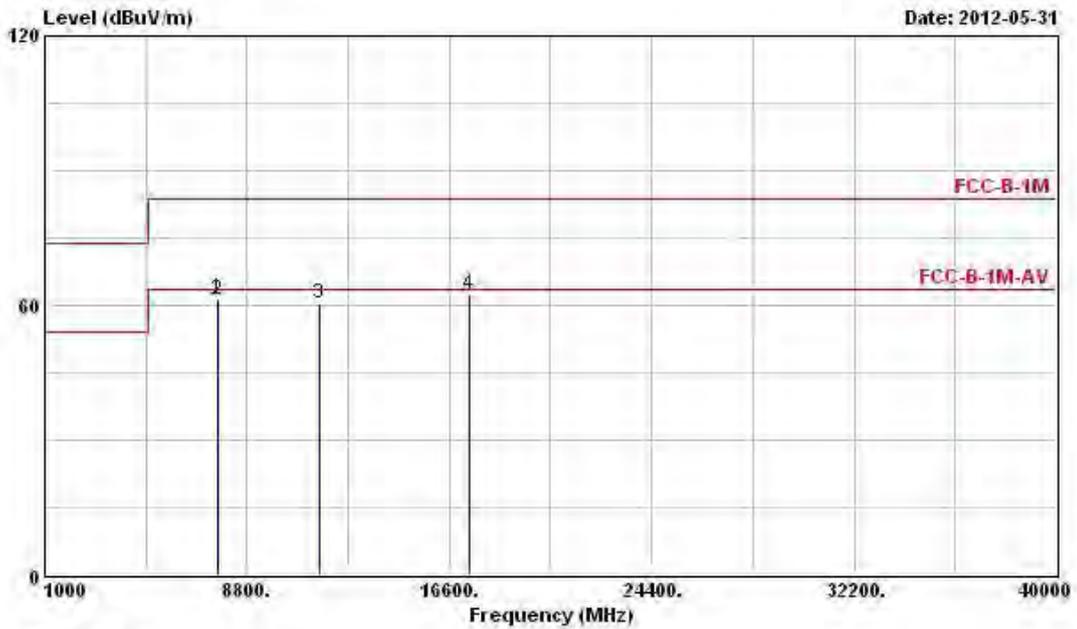


Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 7704.000	53.37	-10.17	63.54	47.01	35.84	5.72	35.20	PK	---	---
2 11570.000	56.08	-7.46	63.54	45.27	38.94	6.63	34.76	PK	---	---
3 17355.000	62.65	-20.89	83.54	46.57	41.56	8.50	33.98	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Unwanted Emissions (Above 1GHz)

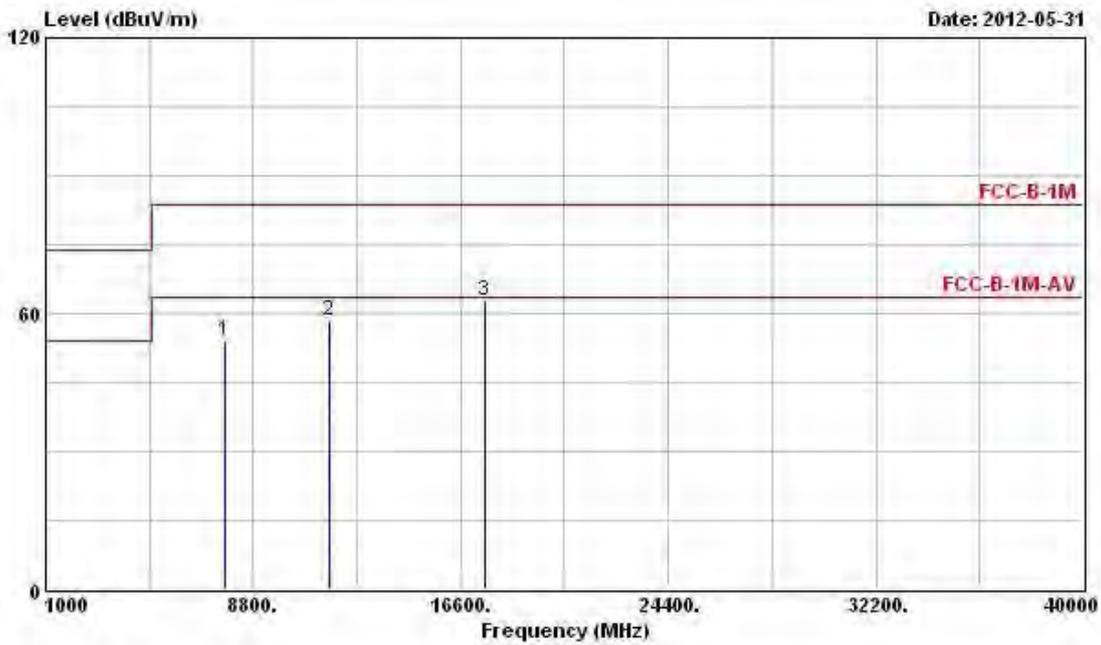
Modulation Mode	11A5.8G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Function	Transmit	Ant. No.	1	Polarization	H



Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7704.000	61.67	-21.87	83.54	55.31	35.84	5.72	35.20 Peak	---	---
2	7704.000	61.23	-2.31	63.54	54.87	35.84	5.72	35.20 Average	---	---
3	11570.000	60.34	-3.20	63.54	49.53	38.94	6.63	34.76 PK	---	---
4	17355.000	62.46	-21.08	83.54	46.38	41.56	8.50	33.98 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

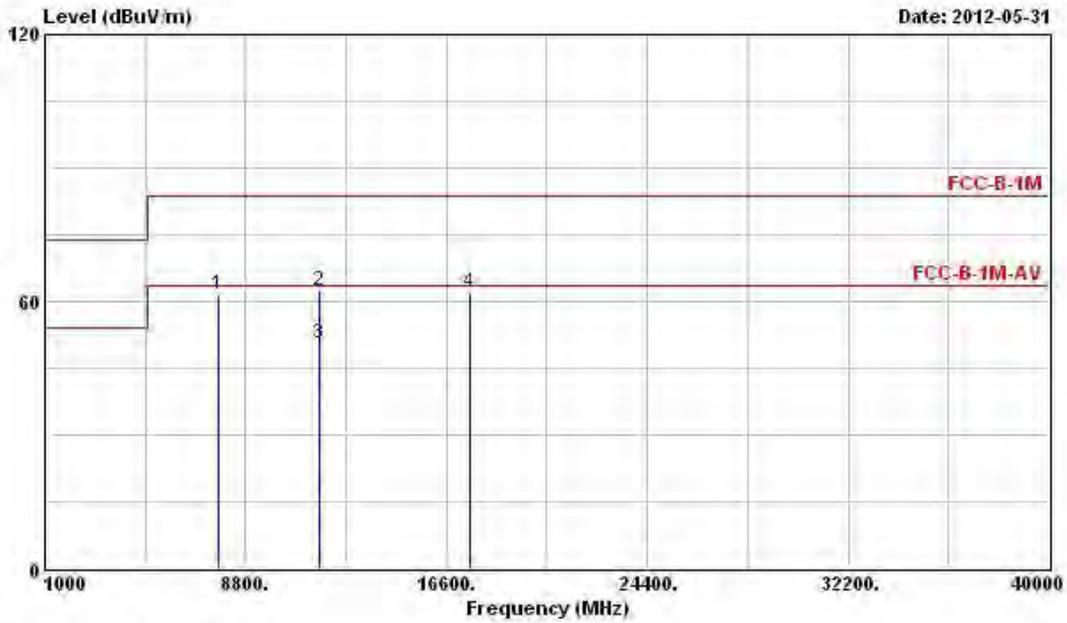
Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11A5.8G-20M	Power Level	1	Test Freq. (FX)	F3
Operating Function	Transmit	Ant. No.	1	Polarization	V



	Over	Limit	ReadAntenna	Cable	Preamp		Ant	Table			
Freq	Level	Limit	Level	Loss	Factor	Remark	Pos	Pos			
MHz	dBuV/m	dB	dBuV/m	dB	dB		cm	deg			
1	7752.000	53.95	-29.59	83.54	47.58	35.85	5.73	35.21	Peak	---	---
2	11650.000	58.38	-5.16	63.54	47.57	38.98	6.64	34.81	PK	---	---
3	17475.000	62.77	-20.77	83.54	46.80	41.51	8.44	33.98	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

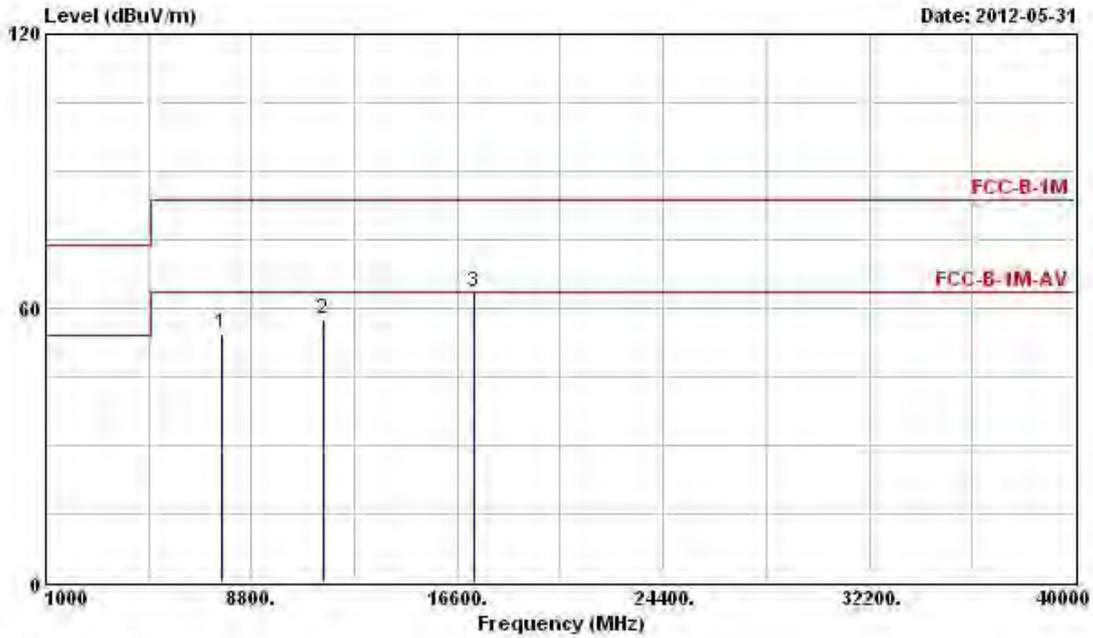
Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11A5.8G-20M	Power Level	1	Test Freq. (FX)	F3
Operating Function	Transmit	Ant. No.	1	Polarization	H



Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7752.000	61.77	-21.77	83.54	55.40	35.85	5.73	35.21 Peak	---	---
2	11650.000	62.20	-21.34	83.54	51.39	38.98	6.64	34.81 Peak	---	---
3	11650.000	50.67	-12.87	63.54	39.86	38.98	6.64	34.81 Average	---	---
4	17475.000	61.89	-21.65	83.54	45.92	41.51	8.44	33.98 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F1
Operating Function	Transmit	Ant. No.	1	Polarization	V

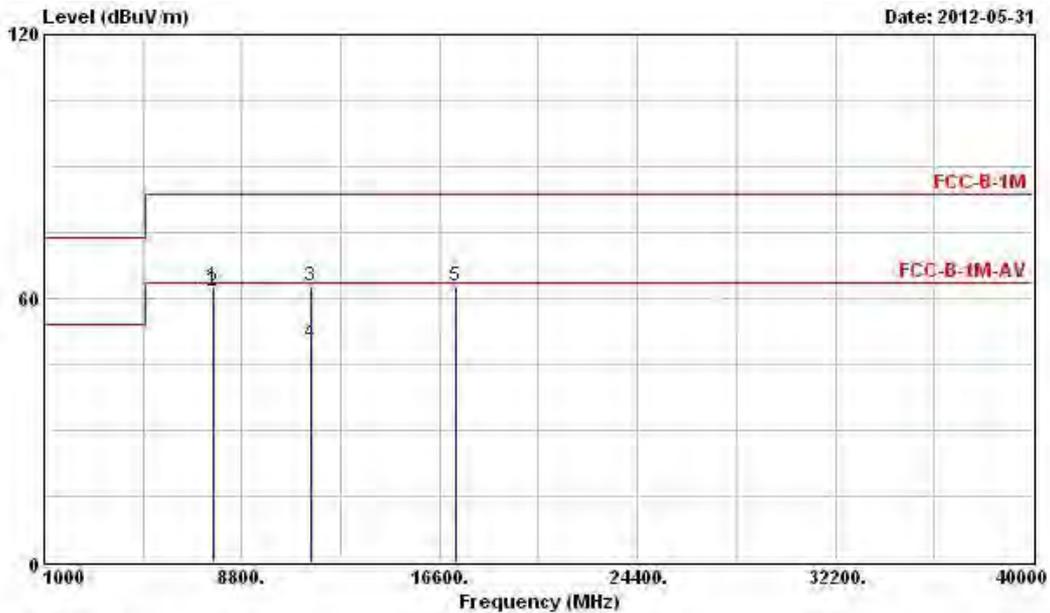


	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	7656.000	54.61	-28.93	83.54	48.26	35.83	5.71	35.19	PK	---
2	11490.000	57.52	-26.02	83.54	46.72	38.89	6.63	34.72	PK	---
3	17235.000	63.42	-20.12	83.54	47.24	41.61	8.55	33.98	Peak	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Unwanted Emissions (Above 1GHz)

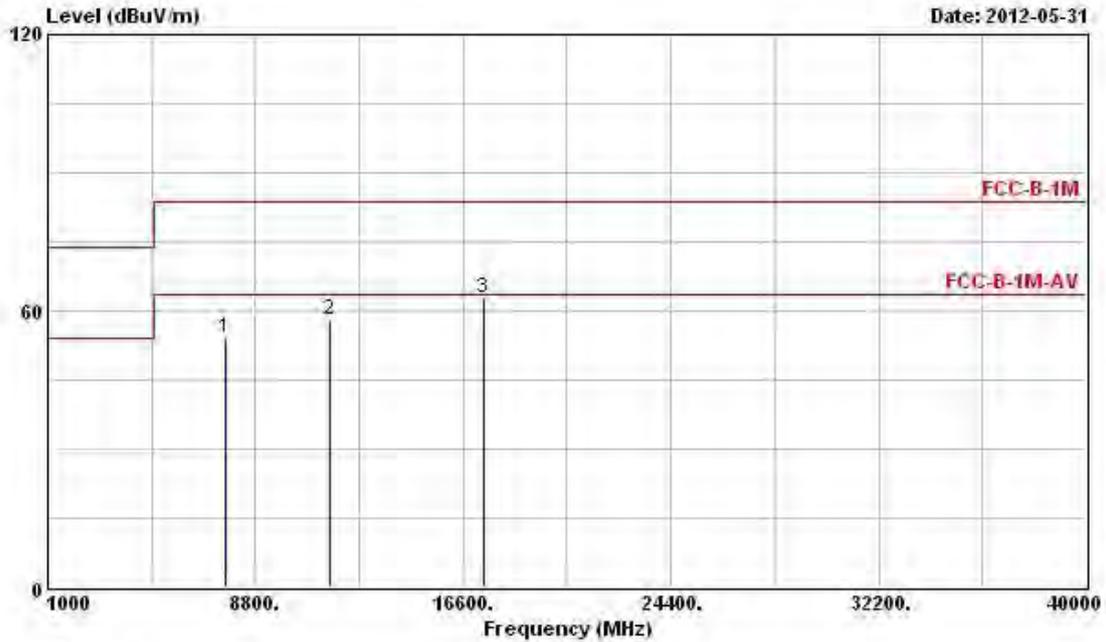
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F1
Operating Function	Transmit	Ant. No.	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7656.000	62.72	-20.82	83.54	56.37	35.83	5.71	35.19	Peak	---	---
2	7656.000	61.50	-2.04	63.54	55.15	35.83	5.71	35.19	Average	---	---
3	11490.000	62.78	-20.76	83.54	51.98	38.89	6.63	34.72	Peak	---	---
4	11490.000	49.83	-13.71	63.54	39.03	38.89	6.63	34.72	Average	---	---
5	17235.000	62.86	-20.68	83.54	46.68	41.61	8.55	33.98	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

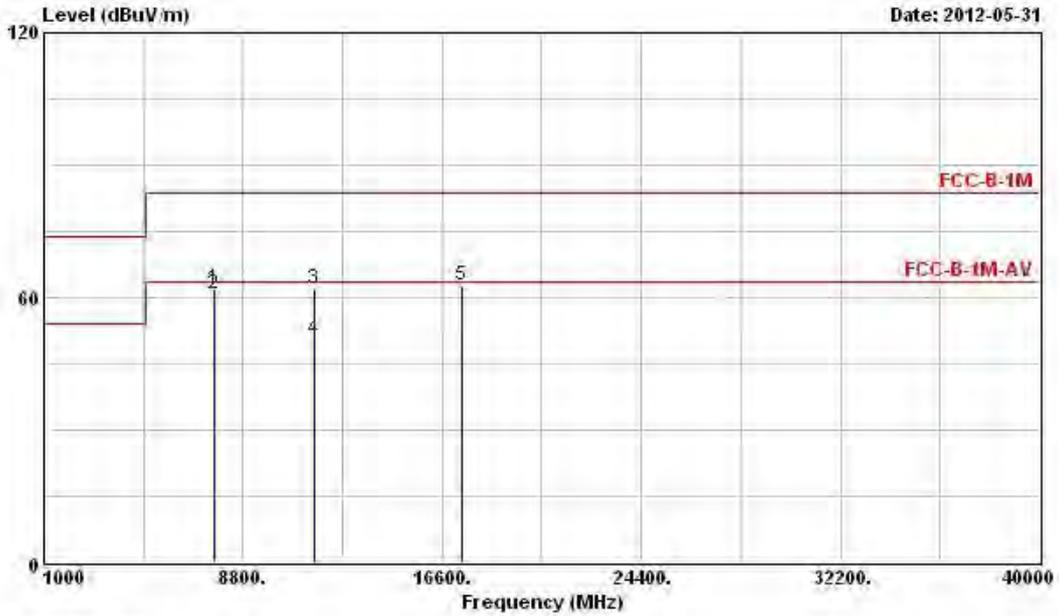
Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Function	Transmit	Ant. No.	1	Polarization	V



1	2	3	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	Remark	Ant Pos	Table Pos
Freq	Level	Limit	Line	Level	Factor	Loss	Factor		cm	deg
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			
7704.000	54.07	-29.47	83.54	47.71	35.84	5.72	35.20	PK	---	---
11570.000	58.16	-25.38	83.54	47.35	38.94	6.63	34.76	PK	---	---
17355.000	62.91	-20.63	83.54	46.83	41.56	8.50	33.98	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

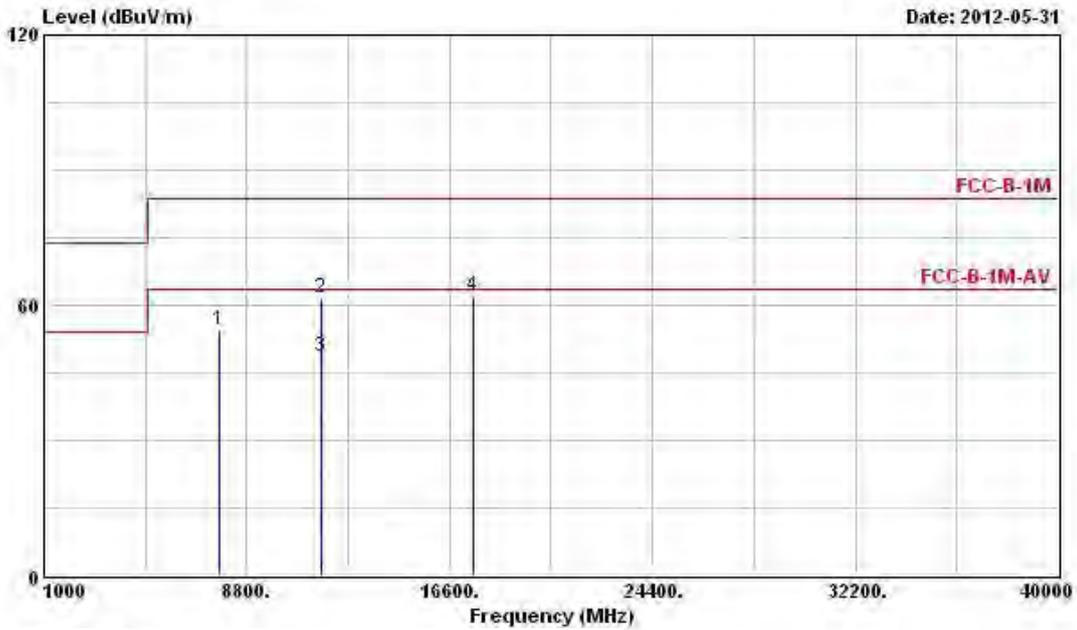
Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Function	Transmit	Ant. No.	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7704.000	61.80	-21.74	83.54	55.44	35.84	5.72	35.20	Peak	---	---
2	7704.000	60.85	-2.69	63.54	54.49	35.84	5.72	35.20	Average	---	---
3	11570.000	61.84	-21.70	83.54	51.03	38.94	6.63	34.76	Peak	---	---
4	11570.000	50.43	-13.11	63.54	39.62	38.94	6.63	34.76	Average	---	---
5	17355.000	62.95	-20.59	83.54	46.87	41.56	8.50	33.98	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

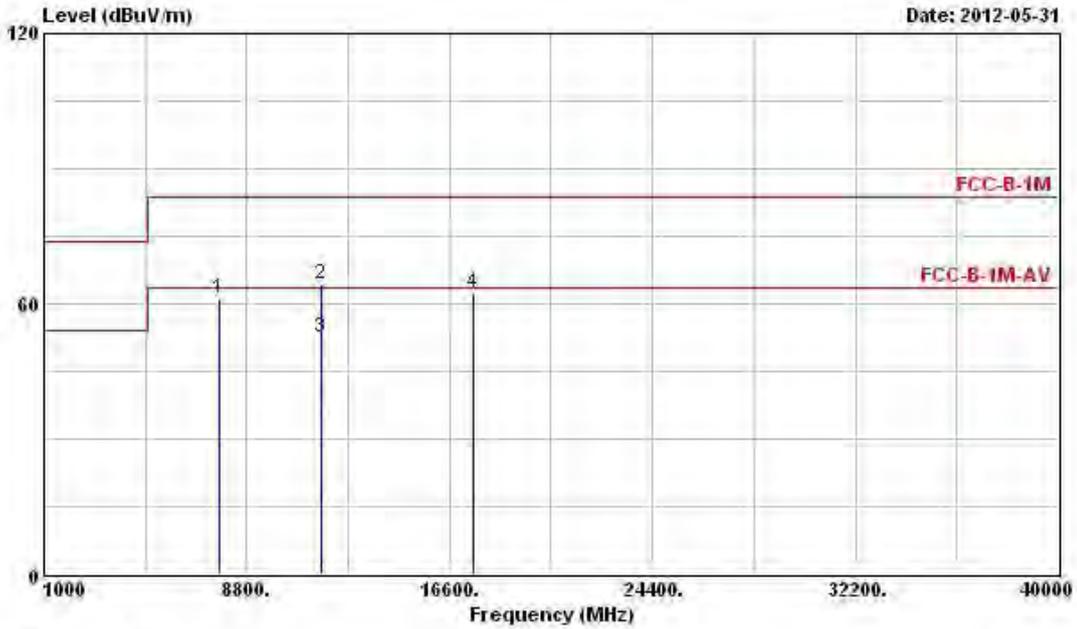
Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F3
Operating Function	Transmit	Ant. No.	1	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	7752.000	54.54	-29.00	83.54	48.17	35.85	5.73	35.21	Peak	---
2	11650.000	61.66	-21.88	83.54	50.85	38.98	6.64	34.81	Peak	---
3	11650.000	48.40	-15.14	63.54	37.59	38.98	6.64	34.81	Average	---
4	17475.000	61.92	-21.62	83.54	45.95	41.51	8.44	33.98	Peak	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

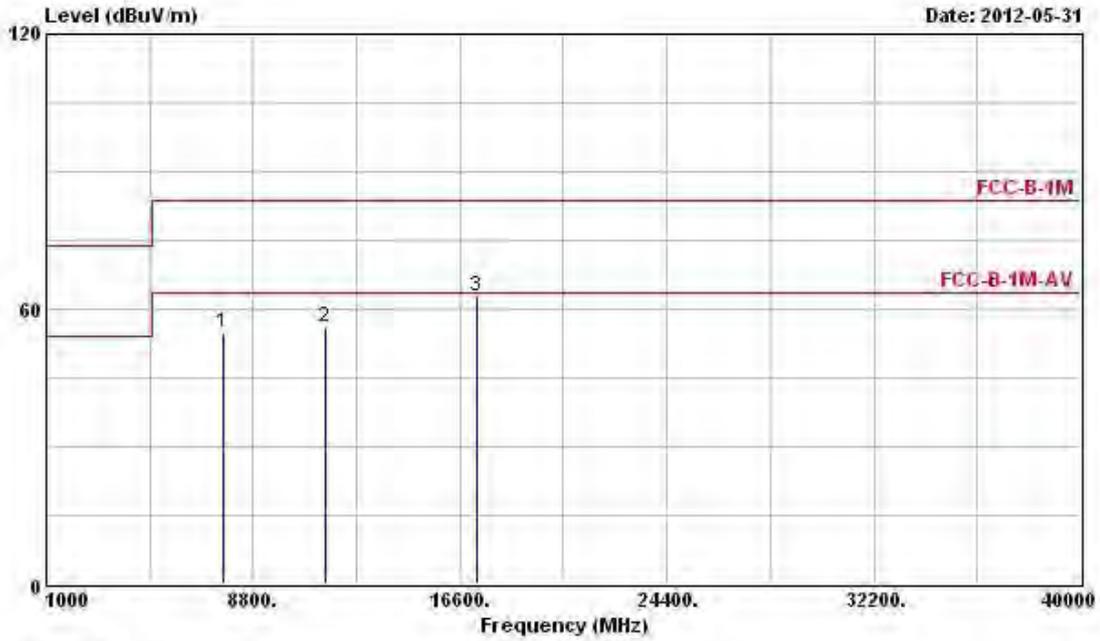
Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11N5.8G-20M	Power Level	1	Test Freq. (FX)	F3
Operating Function	Transmit	Ant. No.	1	Polarization	H



Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7752.000	61.20	-22.34	83.54	54.83	35.85	5.73	35.21 Peak	---	---
2	11650.000	64.29	-19.25	83.54	53.48	38.98	6.64	34.81 Peak	---	---
3	11650.000	52.57	-10.97	63.54	41.76	38.98	6.64	34.81 Average	---	---
4	17475.000	62.42	-21.12	83.54	46.45	41.51	8.44	33.98 Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11N5.8G-40M	Power Level	1	Test Freq. (FX)	F4
Operating Function	Transmit	Ant. No.	1	Polarization	V

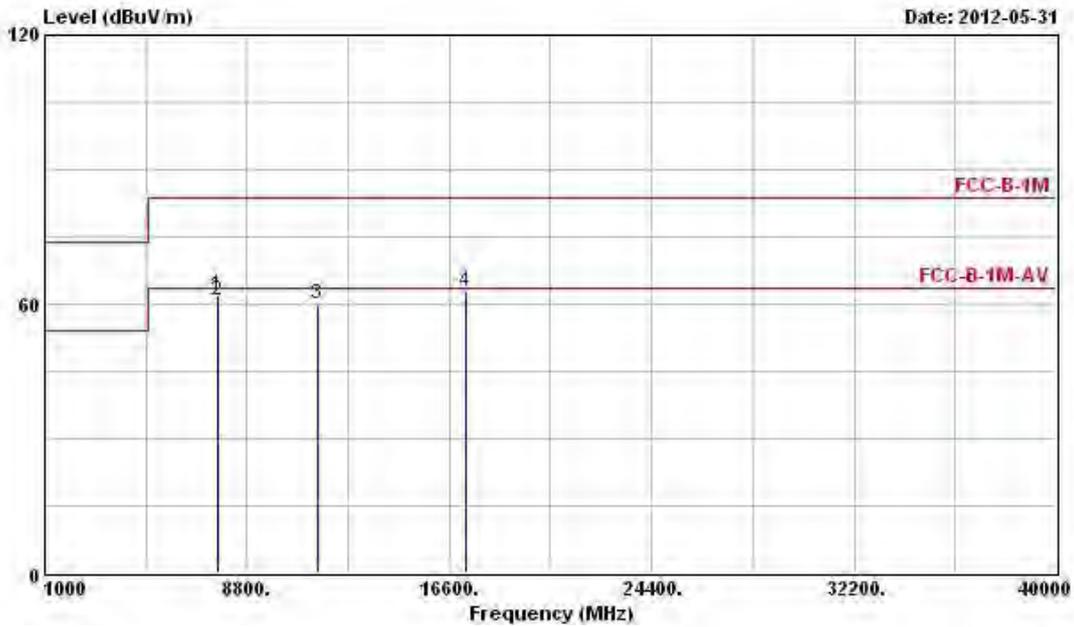


Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 7656.000	54.72	-8.82	63.54	48.37	35.83	5.71	35.19	PK	---	---
2 11510.000	55.93	-7.61	63.54	45.12	38.90	6.63	34.72	PK	---	---
3 17265.000	62.84	-20.70	83.54	46.69	41.59	8.54	33.98	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11N5.8G-40M	Power Level	1	Test Freq. (FX)	F4
Operating Function	Transmit	Ant. No.	1	Polarization	H

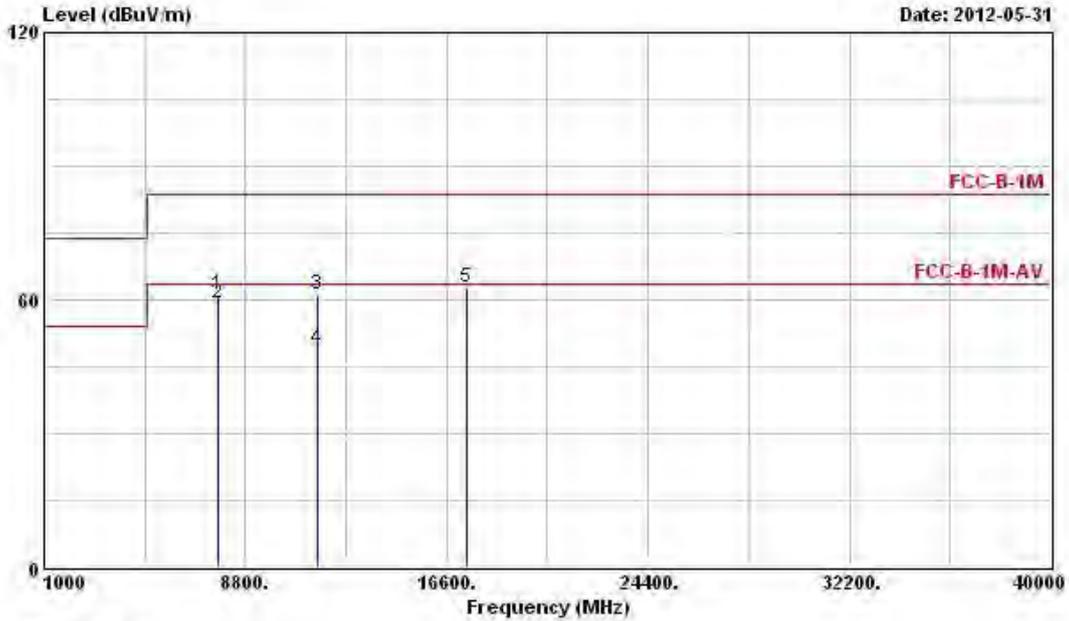


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7656.000	61.99	-21.55	83.54	55.64	35.83	5.71	35.19	Peak	---	---
2	7656.000	60.94	-2.60	63.54	54.59	35.83	5.71	35.19	Average	---	---
3	11510.000	59.84	-3.70	63.54	49.03	38.90	6.63	34.72	PK	---	---
4	17265.000	62.68	-20.86	83.54	46.53	41.59	8.54	33.98	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)



Transmitter Radiated Unwanted Emissions (Above 1GHz)					
Modulation Mode	11N5.8G-40M	Power Level	1	Test Freq. (FX)	F5
Operating Function	Transmit	Ant. No.	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	7716.000	61.26	-22.28	83.54	54.90	35.84	5.72	35.20	Peak	---	---
2	7716.000	59.26	-4.28	63.54	52.90	35.84	5.72	35.20	Average	---	---
3	11590.000	61.13	-22.41	83.54	50.31	38.95	6.63	34.76	Peak	---	---
4	11590.000	48.79	-14.75	63.54	37.97	38.95	6.63	34.76	Average	---	---
5	17385.000	62.62	-20.92	83.54	46.57	41.55	8.48	33.98	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## 4 Maximum Permissible Exposure

### 4.1 Maximum Permissible Exposure

#### 4.1.1 Limit of Maximum Permissible Exposure

Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6
Limits for General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30
Note 1: f = frequency in MHz ; *Plane-wave equivalent power density Note 2: For the applicable limit, see FCC 1.1310				

RF Field Strength Limits for Controlled Use Devices (Controlled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m <sup>2</sup> )	Averaging Time (minutes)
0.003-1	600	4.9	-	6
1-10	600/ <i>f</i>	4.9/ <i>f</i>	-	6
10-30	60	4.9/ <i>f</i>	-	6
30-300	60	0.163	10*	6
300-1500	3.54 <i>f</i> <sup>0.5</sup>	0.0094 <i>f</i> <sup>0.5</sup>	<i>f</i> /30	6
1500-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ <i>f</i> <sup>1.2</sup>
150000-300000	0.354 <i>f</i> <sup>0.5</sup>	9.4 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup>	3.33 x 10 <sup>-4</sup> <i>f</i>	616000/ <i>f</i> <sup>1.2</sup>
RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m <sup>2</sup> )	Averaging Time (minutes)
0.003-1	280	2.19	-	6
1-10	280/ <i>f</i>	2.19/ <i>f</i>	-	6
10-30	28	2.19/ <i>f</i>	-	6
30-300	28	0.073	2*	6
300-1500	1.585 <i>f</i> <sup>0.5</sup>	0.0042 <i>f</i> <sup>0.5</sup>	<i>f</i> /150	6
1500-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> <sup>1.2</sup>
150000-300000	0.158 <i>f</i> <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> <i>f</i>	616000/ <i>f</i> <sup>1.2</sup>
Note 1: <i>f</i> is frequency in MHz. Note 2: For the applicable limit, see IC RSS-102				

**4.1.2 MPE Calculation Method**

$$E (V/m) = \frac{\sqrt{30 \times P \times G}}{d}$$

**E** = Electric field (V/m)  
**G** = EUT Antenna numeric gain (numeric)  
 The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

$$\text{Power Density: } Pd (W/m^2) = \frac{E^2}{377}$$

**P** = RF output power (W)  
**d** = Separation distance between radiator and human body (m)

4.1.3 Result of Maximum Permissible Exposure

Transmitter Chains & Receiver Chains Information					
IEEE Std. 802.11 Protocol	Number of Transmit Chains (N <sub>TX</sub> )	Number of Receive Chains (N <sub>RX</sub> )	Correlation Signals with Multiple N <sub>TX</sub>	RF Output Power (dBm)	Co-location
a	1	1	Correlated	20.72	N/A
n (HT20)	2	2	Uncorrelated	23.47	N/A
n (HT40)	2	2	Uncorrelated	24.16	N/A

Note 1: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)

Worst Maximum RF Output Power Result									
Exposure Environment		General Population / Uncontrolled Exposure							
Separation Distance (cm)		20							
Power Level	1	RF Output Power (dBm)							
Modulation Mode	N <sub>TX</sub>	Chain-Port 1	Chain-Port 2	-	-	Sum Chain	Gain (dBi)	EIRP Power	PD (S) (mW/cm <sup>2</sup> )
11A5.8G-20M	1	20.72	-	-	-	20.72	6.27	26.99	0.0995
11N5.8G-20M	2	20.77	20.30	-	-	23.47	5.5	28.97	0.1570
11N5.8G-40M	2	20.95	21.85	-	-	24.16	5.5	29.66	0.1841
Maximum Permissible Exposure Limit (mW/cm <sup>2</sup> )									1

Note 1: N<sub>TX</sub> = Number of Transmit Chains

## 5 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9 kHz ~ 2.75 GHz	Mar. 23, 2012	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz – 30MHz	Feb. 08, 2012	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9 kHz ~ 30 MHz	Apr. 20, 2012	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	CB049	9 kHz ~ 30 MHz	Apr. 25, 2012	Conduction (CO04-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Signal analyzer	R&S	FSV40	100979	9KHz~40GHz	Sep. 26, 2011	Conducted (TH02-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	May. 20, 2012	Conducted (TH02-CB)
Signal Generator	R&S	SMR40	100302	10MHz-40GHz	Nov. 22, 2011	Conducted (TH02-CB)
RF Power Divider	HP	11636A	00306	2GHz ~ 18GHz	N/A	Conducted (TH02-CB)
RF Power Splitter	Anaren	44100	1839	2GHz ~ 18GHz	N/A	Conducted (TH02-CB)
RF Power Splitter	Anaren	42100	17930	2GHz ~ 18GHz	N/A	Conducted (TH02-CB)
Horn Antenna	COM-POWER	AH-118	071187	1GHz – 18GHz	May. 09, 2012	Conducted (TH02-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Nov. 01, 2011	Conducted (TH02-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Nov. 01, 2011	Conducted (TH02-CB)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100593	9 kHz ~ 40 GHz	Aug. 08, 2011	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30 MHz ~ 1 GHz 3m	May 10, 2012	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100 kHz ~ 1.3 GHz	Jul. 25, 2011	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1 GHz ~ 26.5 GHz	Jul. 25, 2011	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1 GHz ~ 18 GHz	Nov. 15, 2011	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz ~ 1 GHz	Nov. 11, 2011	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz ~ 40 GHz	Jan. 18, 2012	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30 MHz ~ 2 GHz	Oct. 22, 2011	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0 - 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 m - 4 m	N/A	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 29, 2010*	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is two year.

## 6 Certification of TAF Accreditation



Certificate No. : L1190-111208

**財團法人全國認證基金會**  
**Taiwan Accreditation Foundation**

### Certificate of Accreditation

This is to certify that

**Sporton International Inc.**  
**EMC & Wireless Communications Laboratory**  
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,  
Taiwan, R.O.C.

**is accredited in respect of laboratory**

<b>Accreditation Criteria</b>	: ISO/IEC 17025:2005
<b>Accreditation Number</b>	: 1190
<b>Originally Accredited</b>	: December 15, 2003
<b>Effective Period</b>	: January 10, 2010 to January 09, 2013
<b>Accredited Scope</b>	: Testing Field, see described in the Appendix
<b>Specific Accreditation Program</b>	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities



Jay-San Chen  
President, Taiwan Accreditation Foundation  
Date : December 08, 2011

P1, total 24 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix