

FCC Test Report

Equipment : 150N Wireless LAN Broadband Router
Brand Name : EDIMAX
Model No. : BR-6228GNS, GR-228GNS, BR-6228nS,
BR-6228nC, BR-6228nS V2, BR-6228nC V2
FCC ID : NDD9562281205
Standard : 47 CFR FCC Part 15.247
Applicant : EDIMAX TECHNOLOGY CO., LTD.
Manufacturer : No. 3, Wu-Chuan 3rd Road, Wu-Ku Industrial Park,
New Taipei City, Taiwan
Multiple Listing : Please refer to section 1.3

The product sample received on May 10, 2012 and completely tested on Aug. 29, 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.

Reviewed by:

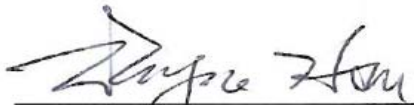

Wayne Hsu / Assistant Manager



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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	0.415495MHz: 32.47dBuV (15.07dB) - AV 38.30dBuV (27.44dB) - QP	FCC 15.207	Complied
3.2	15.247(a)	6dB Bandwidth	6dB Bandwidth Unit [MHz] 2412-2462MHz: 10.14-DSSS 2412-2462MHz: 17.56-OFDM 2422-2452MHz: 35.56-OFDM	≥500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm] 2412-2462MHz: 18.82-DSSS 2412-2462MHz: 20.74-OFDM 2422-2452MHz: 20.63-OFDM	Power [dBm] 2412-2462MHz: 30 2422-2452MHz: 30	Complied
3.4	15.247(d)	Power Spectral Density	PSD [dBm/3kHz] 2412-2462MHz: -10.62-DSSS 2412-2462MHz: -16.35-OFDM 2422-2452MHz: -19.59-OFDM	PSD [dBm/3kHz] 2412-2462MHz: 8 2422-2452MHz: 8	Complied
3.5	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2398.04MHz:32.42dB Restricted Bands [dBuV/m at 3m]: 2486.89MHz: 71.02 (Margin 2.98dB) - PK 52.99 (Margin 1.01dB) - AV	Non-Restricted Bands: > 20 dB Restricted Bands: FCC 15.209	Complied
3.6	15.247(c)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 7311MHz: 50.88 (Margin 3.12dB) - PK	Non-Restricted Bands: > 20 dB Restricted Bands: FCC 15.209	Complied

Revision History

Report No.	Version	Description	Issued Date
FR222343	Rev. 01	Initial issue of report	Sep. 17, 2012

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)
2400-2483.5	b	2412-2462	1-11 [11]	18.82
2400-2483.5	g	2412-2462	1-11 [11]	20.74
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	19.99
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	20.63

Note 1: IEEE Std. 802.11-2007 modulation consists of IEEE Std. 802.11g-2003 and IEEE Std. 802.11b-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 _{TX})	Number of Receive Chains (N _{RX})	Correlation Signals with Multiple N _{TX}	99% Emission Bandwidth (MHz)	Co-location
b	1	1	N/A	14.85	N/A
g	1	1	Correlated	16.75	N/A
n (HT20)	1	1	Uncorrelated	17.85	N/A
n (HT40)	1	1	Uncorrelated	35.90	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 checked="" type="checkbox"/>	External antenna (dedicated antennas)
<input checked="" 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						
Transmit Chains Power Distribution			<input checked="" type="checkbox"/> symmetrical distribution <input type="checkbox"/> asymmetrical distribution			
Model No.	Ant. No.	Ant. Port [Ant No. X connect to Ant. Port Y]	Ant. Cat.	Ant. Type	DG (dBi) [correlated] N _{TX} = 1	DG (dBi) [uncorrelated] N _{TX} = 2
BR-6228GNS	1	1,2	External	Dipole (Integral)	N/A	2
BR-6228nC V2 V2.0A	2	1,2	External	Dipole (Integral)		5
BR-6228nC V2 V2.0A	3	1,2	External	Dipole (detachable)		3
BR-6228nC V2 V2.0A	4	1,2	External	Dipole (detachable)		5
BR-6228nC V2 V2.0A	5	1,2	External	Dipole (detachable)		5
<input checked="" type="checkbox"/>	EUT is consist of multiple antenna models assembly (multiple antenna models are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.					
<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_{ANT} + 10 log(N) dBi All transmit signals are completely uncorrelated, Directional Gain (DG) = G_{ANT}</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^{G^{1/20}} + 10^{G^{2/20}} + ... + 10^{G^{N/20}})² / N] dBi All transmit signals are completely uncorrelated, Directional Gain (DG) = 10 log[(10^{G^{1/10}} + 10^{G^{2/10}} + ... + 10^{G^{N/10}}) / 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 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 802.11b	0	0
<input checked="" type="checkbox"/> 100% - IEEE 802.11g	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 type="checkbox"/> Internal DC supply	<input checked="" type="checkbox"/> External DC adapter	<input type="checkbox"/> Battery

1.2 Product Details

There are four types of the EUT. The differences between these EUTs are antenna type and LAN port. Both EUT may install the same WLAN module. In this report, we chose the full function type to test. For more detailed features description, please refer to the specifications or user's manual.

1.3 Table for Multiple Listing

The models are exactly same in both physical and electrical. The different in model number for marketing purpose.

No.	Brand Name	Model Name
1	EDIMAX	BR-6228GNS, GR-228GNS, BR-6228nS, BR-6228nC, BR-6228nS V2, BR-6228nC V2

1.4 Accessories

Accessories Information				
AC Adapter	Brand Name	DVE	Model Name	DSC-6PFA-05 FUS
	Power Rating	I/P: 100-240Vac ~50/60Hz 0.2A ; O/P: +5Vdc 1A		

Note: Regarding to more detail and other information, please refer to user manual.

1.5 Support Equipment

Support Equipment - Conducted Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	VOSTRO 3350	DoC
2	iPod Nano	Apple	A1320	DoC
3	(USB) Mouse	Microsoft	1004	DoC
4	Dummy Load	-	-	-
5	Notebook (Remote Workstation)	DELL	INSPIRON 6400	DoC

Support Equipment - Radiated Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	E5520	DoC
2	iPod Nano	Apple	A1051	DoC
3	(USB) Mouse	Microsoft	1004	DoC

1.6 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

1.7 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	HWA YA	ADD :	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C	
		TEL :	886-3-327-3456	FAX : 886-3-327-0973
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
Conducted Emission	CO04-HY	Sam	24.5°C / 48%	05-Jun-12
RF Conducted	TH01-HY	Ian	23.9°C / 36%	29-May-12~13-Jul-12
Radiated Emission	03CH02-HY	Streak	22.8°C / 62%	24-May-12~29-Aug-12

1.8 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			
Test Item		Uncertainty	Limit
AC power-line conducted emissions		±2.26 dB	N/A
Emission bandwidth, 6dB bandwidth		±1.42 %	N/A
RF output power, conducted		±0.63 dB	N/A
Power density, conducted		±0.81 dB	N/A
Unwanted emissions, conducted	30 – 1000 MHz	±0.51 dB	N/A
	1 – 18 GHz	±0.67 dB	N/A
	18 – 40 GHz	±0.83 dB	N/A
	40 – 200 GHz	N/A	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
Temperature		±0.8 °C	N/A
Humidity		±3 %	N/A
DC and low frequency voltages		±3 %	N/A
Time		±1.42 %	N/A
Duty Cycle		±1.42 %	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 _{TX})	Data Rate / MCS	Worst Data Rate / MCS	Worst Modulation Mode	RF Output Power (dBm)	Power Spectral Density (dBm/3kHz)
b	1	1-11 Mbps	11Mbps	11B-20M	18.82	-10.62
g	1	6-54 Mbps	6Mbps	11G-20M	20.74	-16.35
n (HT20)	1	MCS 0-15	MCS 0	11N2.4G-20M	19.99	-17.41
n (HT40)	1	MCS 0-15	MCS 0	11N2.4G-40M	20.63	-19.59

Note 1: IEEE Std. 802.11-2007 modulation consists of IEEE Std. 802.11g-2003 and IEEE Std. 802.11b-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 11B-20M, 11G-20M, 11N2.4G-20M, 11N2.4G-40M:
 11B: IEEE 802.11b, 11G: IEEE 802.11g, 11N2.4G: IEEE 802.11n (2.4GHz 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)
b	11B-20M	2412-(F1), 2437-(F2), 2462-(F3)
g	11G-20M	2412-(F1), 2437-(F2), 2462-(F3)
n (HT20)	11N2.4G-20M	2412-(F1), 2437-(F2), 2462-(F3)
n (HT40)	11N2.4G-40M	2422-(F4), 2437-(F5), 2452-(F6)

Note 1: Modulation modes consist of 11B-20M, 11G-20M, 11N2.4G-20M, 11N2.4G-40M:
 11B: IEEE 802.11b, 11G: IEEE 802.11g, 11N2.4G: IEEE 802.11n (2.4GHz Band)
 20M/40M: Channel Bandwidth 20M/40M

2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter					
Test Software Version		MP N Test*			
Worst Modulation Mode	Number of Transmit Chains (N_{TX})	Frequency (MHz)	Power Setting	Worst Data Rate / MCS	RF Output Power (dBm)
11B-20M	1	2412	42	11 Mbps	17.68
11B-20M	1	2437	45	11 Mbps	18.82
11B-20M	1	2462	40	11 Mbps	16.68
11G-20M	1	2412	48	6 Mbps	19.46
11G-20M	1	2437	51	6 Mbps	20.74
11G-20M	1	2462	46	6 Mbps	18.28
11N2.4G-20M	1	2412	46	MCS 0	18.88
11N2.4G-20M	1	2437	49	MCS 0	19.99
11N2.4G-20M	1	2462	46	MCS 0	18.54
11N2.4G-40M	1	2422	45	MCS 0	18.12
11N2.4G-40M	1	2437	50	MCS 0	20.63
11N2.4G-40M	1	2452	47	MCS 0	18.89

Note 1: Modulation modes consist of 11B-20M, 11G-20M, 11N2.4G-20M, 11N2.4G-40M:
 11B: IEEE 802.11b, 11G: IEEE 802.11g, 11N2.4G: IEEE 802.11n (2.4GHz 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

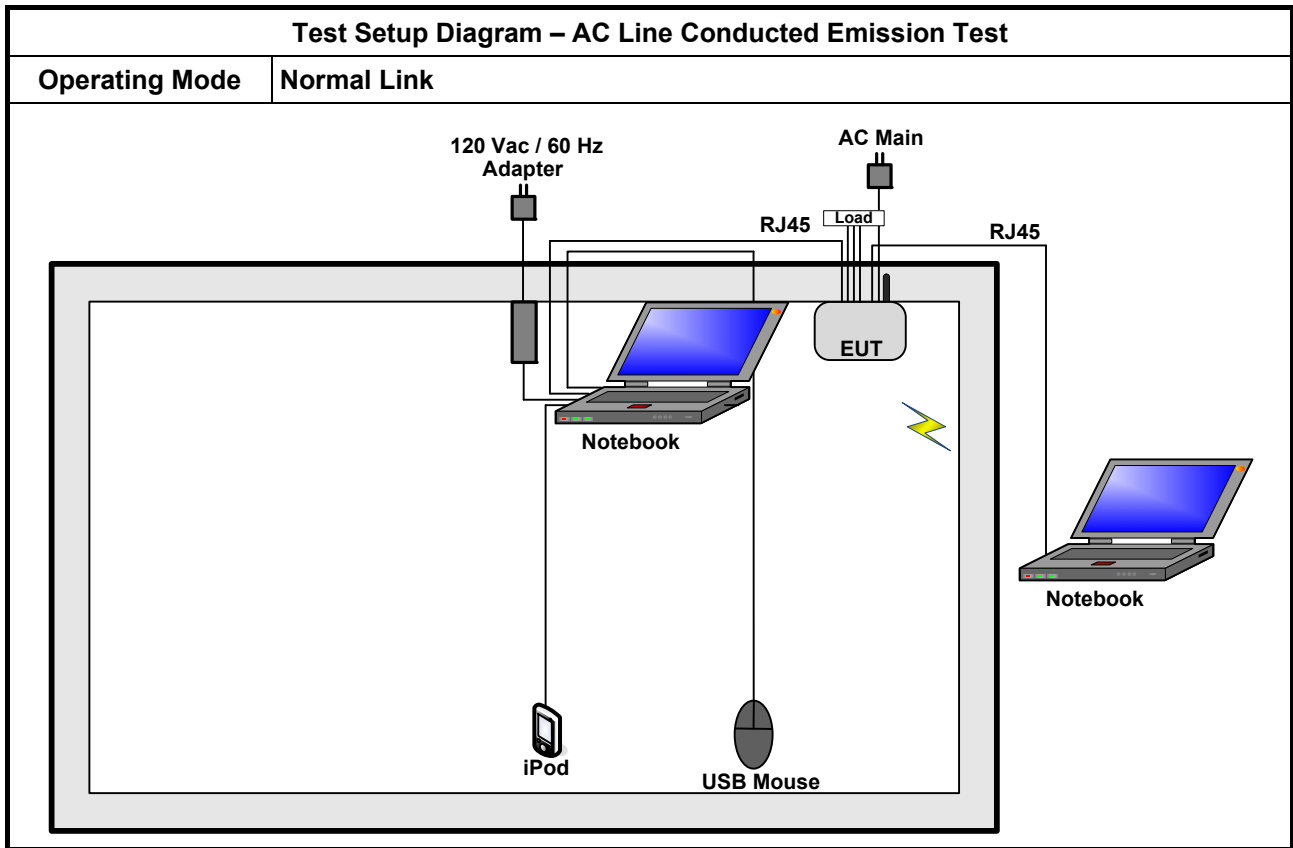
The Worst Case Mode for Following Conformance Tests				
Tests Item	AC power-line conducted emissions			
Condition	AC power-line conducted measurement for line and neutral			
Operating Mode	Operating Mode Description	Worst Modulation Mode	Test Freq.	Power Level
1	Normal Link	11N2.4G-20M	F2	1

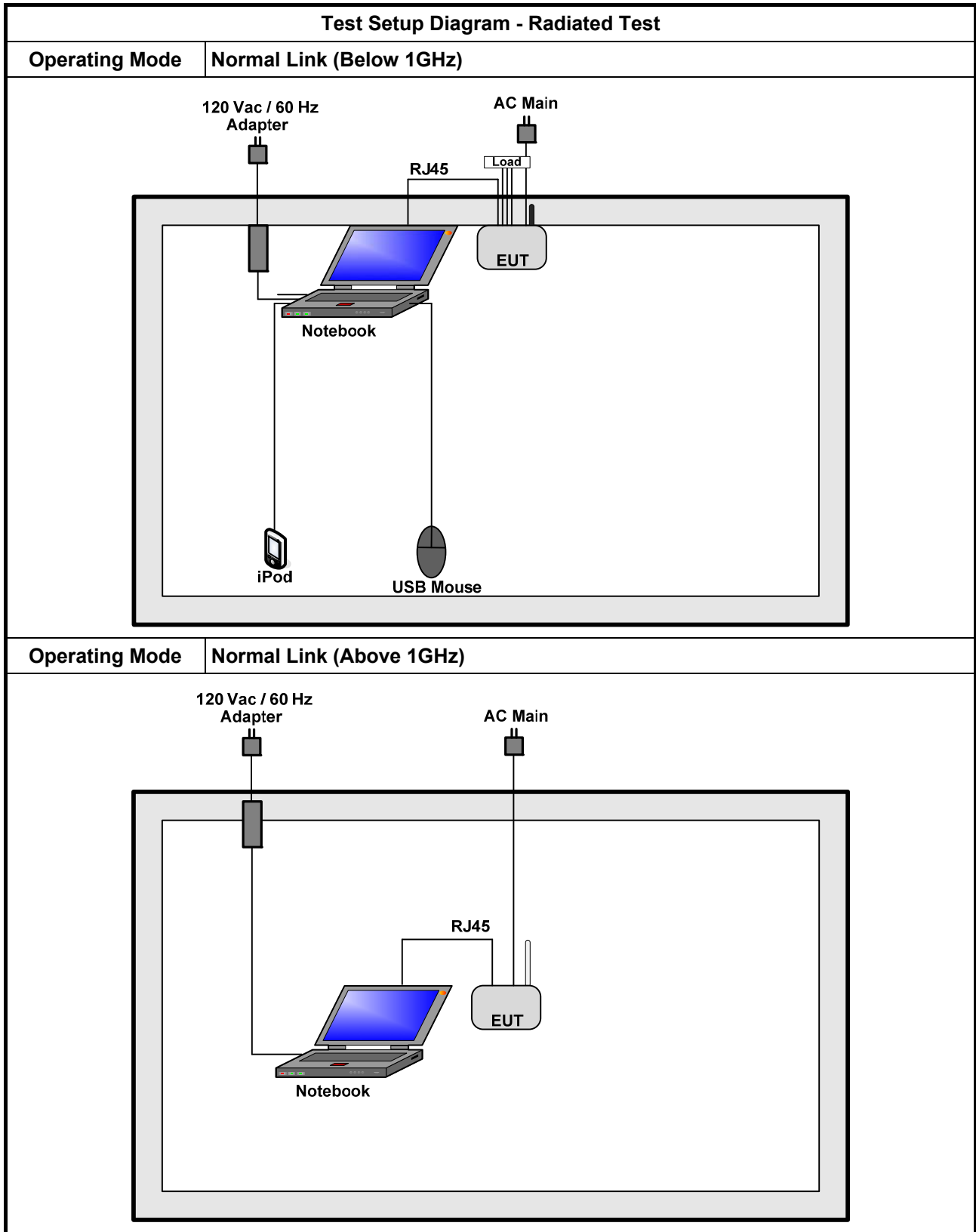
The Worst Case Mode for Following Conformance Tests				
Tests Item	RF Output Power Power Spectral Density 6 dB Bandwidth			
Test Condition	Conducted measurement at transmit chains			
Worst Modulation Mode	Number of Transmit Chains (N_{TX})	Worst Data Rate / MCS	Test Frequency	Power Level
11B-20M	1	11Mbps	F1, F2, F3	1
11G-20M	1	6Mbps	F1, F2, F3	1
11N2.4G-20M	1	MCS 0	F1, F2, F3	1
11N2.4G-40M	1	MCS 0	F4, F5, F6	1

The Worst Case Mode for Following Conformance Tests				
Tests Item	Transmitter Radiated Bandedge Emissions			
Test Condition	Radiated measurement			
Worst Modulation Mode	Number of Transmit Chains (N_{TX})	Worst Data Rate / MCS	Test Frequency	Power Level
11B-20M	1	11Mbps	F1, F3	1
11G-20M	1	6Mbps	F1, F3	1
11N2.4G-20M	1	MCS 0	F1, F3	1
11N2.4G-40M	1	MCS 0	F4, F6	1

The Worst Case Mode for Following Conformance Tests				
Tests Item	Transmitter Radiated Unwanted Emissions			
Test Condition	Radiated measurement			
User Position	<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.			
Operating Mode < 1GHz	<input checked="" type="checkbox"/> 1. Normal Link			
Worst Modulation Mode	Number of Transmit Chains (N_{TX})	Worst Data Rate / MCS	Test Frequency	Worst Orthogonal Planes of EUT
11B-20M	1	11Mbps	F1, F2, F3	X Plane
11G-20M	1	6Mbps	F1, F2, F3	X Plane
11N2.4G-20M	1	MCS 0	F1, F2, F3	X Plane
11N2.4G-40M	1	MCS 0	F4, F5, F6	X Plane
Orthogonal Planes of EUT	X Plane		Y Plane	
				
				Z Plane
				

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.

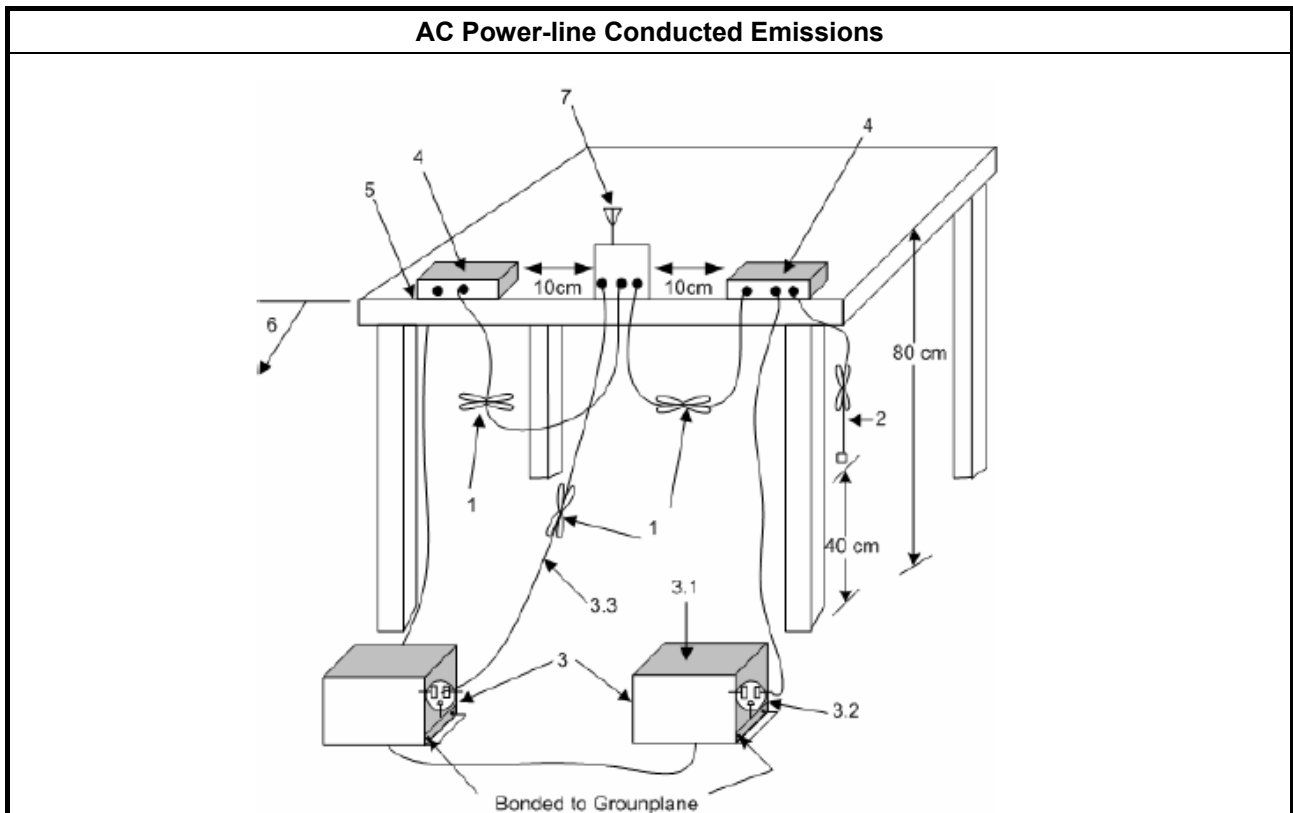
3.1.2 Measuring Instruments

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

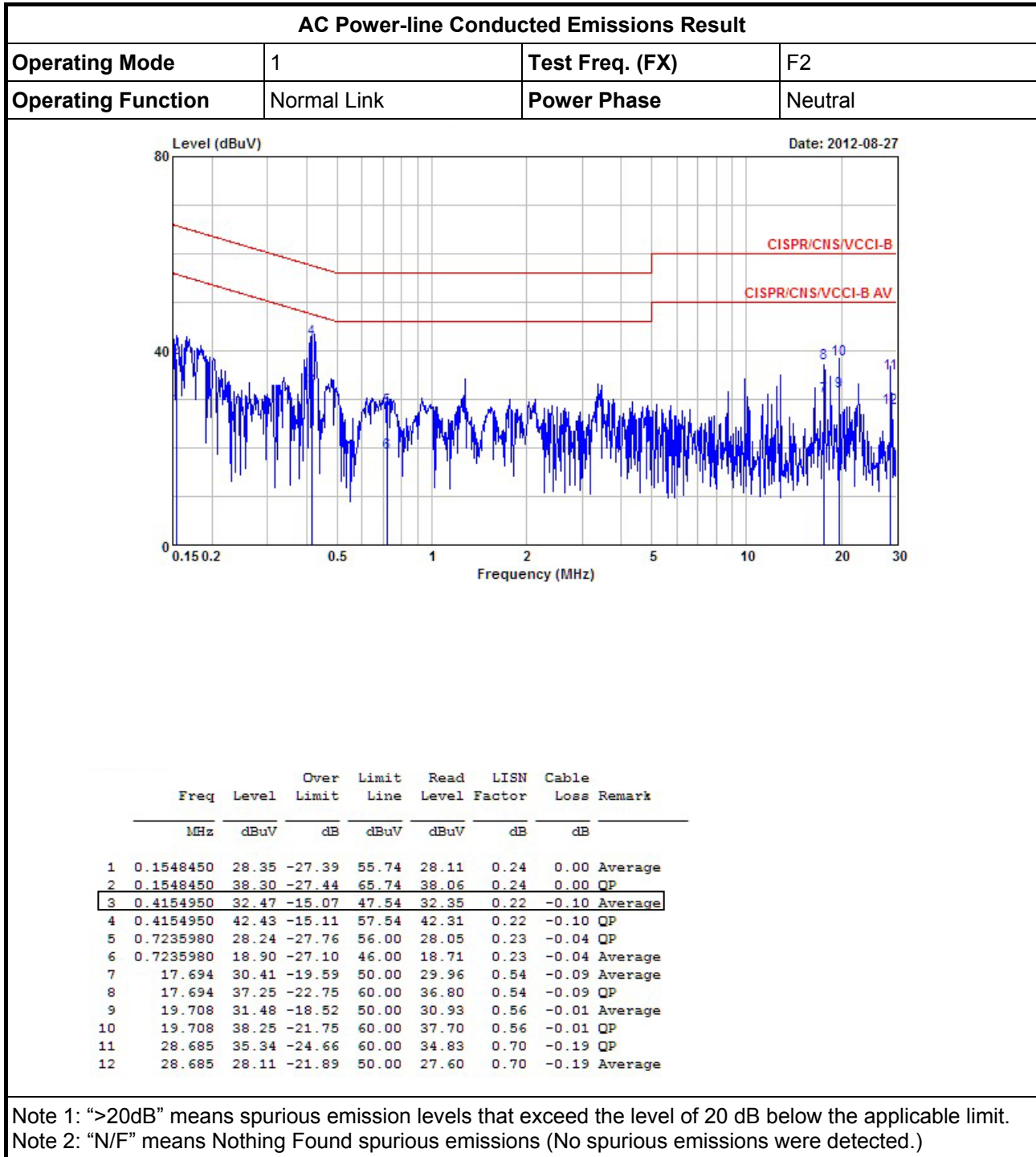
3.1.3 Test Procedures

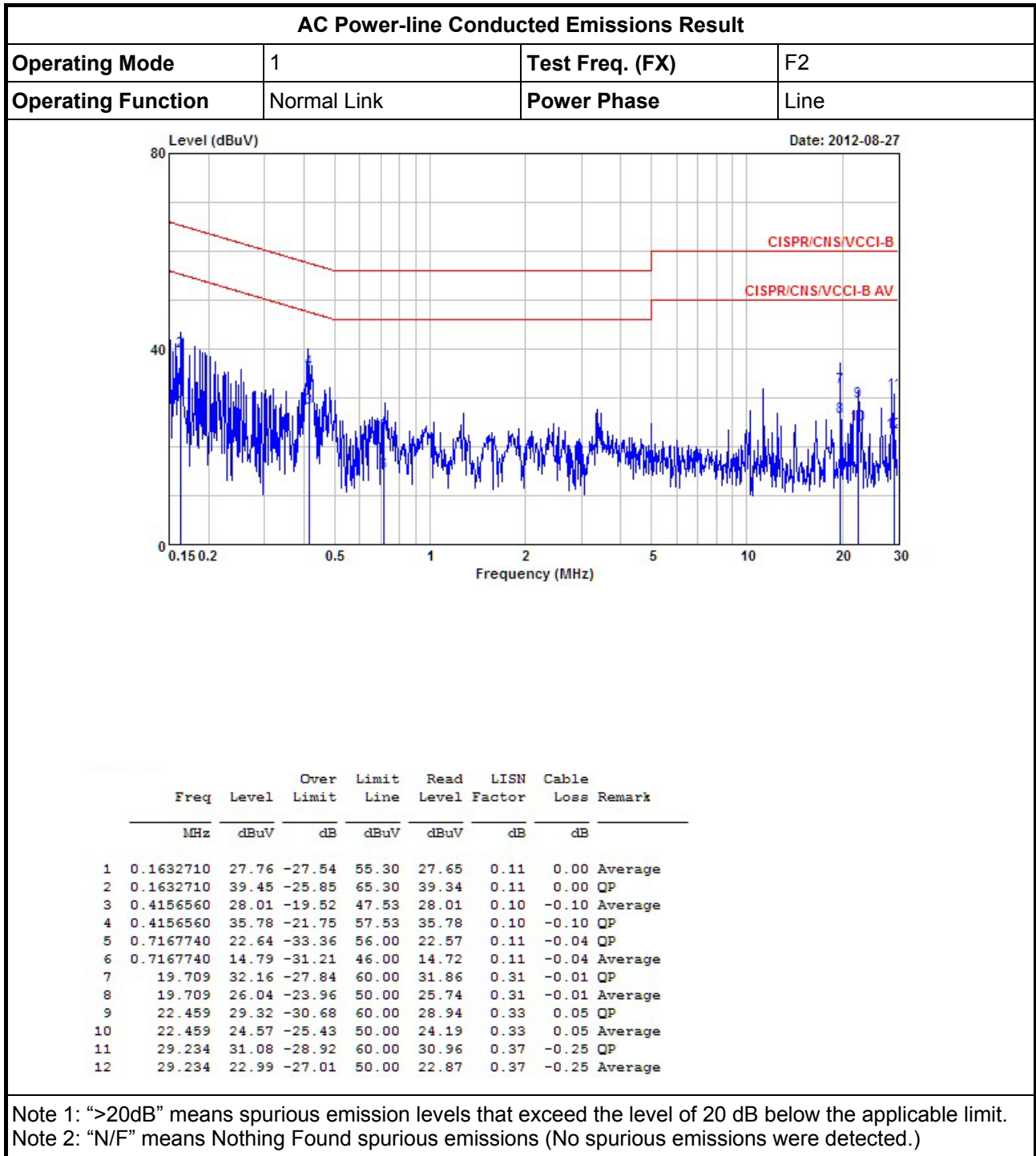
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

3.1.4 Test Setup



3.1.5 Test Result of AC Power-line Conducted Emissions





3.2 6dB Bandwidth

3.2.1 6dB Bandwidth Limit

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

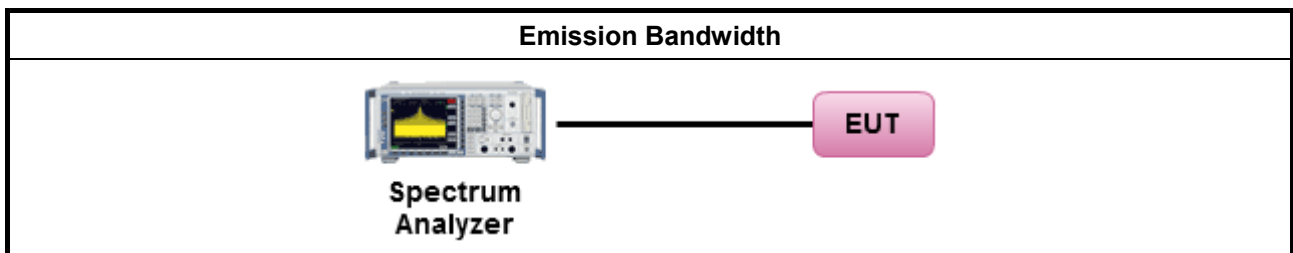
3.2.2 Measuring Instruments

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

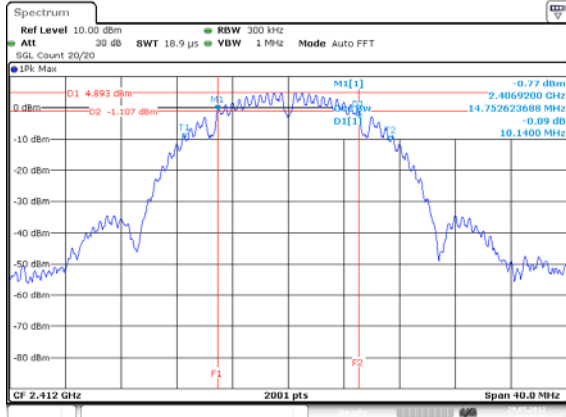


3.2.5 Test Result of Emission Bandwidth

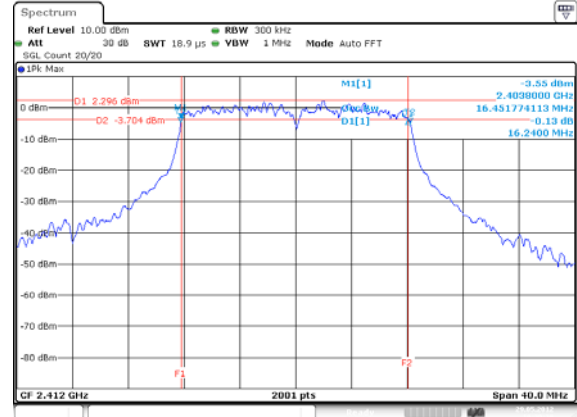
Emission Bandwidth Result										
Power Level	1		Emission Bandwidth (MHz)							
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth			6dB Bandwidth				
			Chain-Port 1	-	-	-	Chain-Port 1	-	-	-
11B-20M	1	2412	14.75	-	-	-	10.14	-	-	-
11B-20M	1	2437	14.85	-	-	-	9.30	-	-	-
11B-20M	1	2462	14.57	-	-	-	10.14	-	-	-
11G-20M	1	2412	16.45	-	-	-	16.24	-	-	-
11G-20M	1	2437	16.75	-	-	-	16.40	-	-	-
11G-20M	1	2462	16.43	-	-	-	16.28	-	-	-
11N2.4G-20M	1	2412	17.85	-	-	-	17.56	-	-	-
11N2.4G-20M	1	2437	17.57	-	-	-	17.16	-	-	-
11N2.4G-20M	1	2462	17.79	-	-	-	17.00	-	-	-
11N2.4G-40M	1	2412	35.78	-	-	-	34.96	-	-	-
11N2.4G-40M	1	2437	35.90	-	-	-	35.56	-	-	-
11N2.4G-40M	1	2462	35.66	-	-	-	35.28	-	-	-
Limit			N/A			≥500 kHz				
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Emission Bandwidth Plots

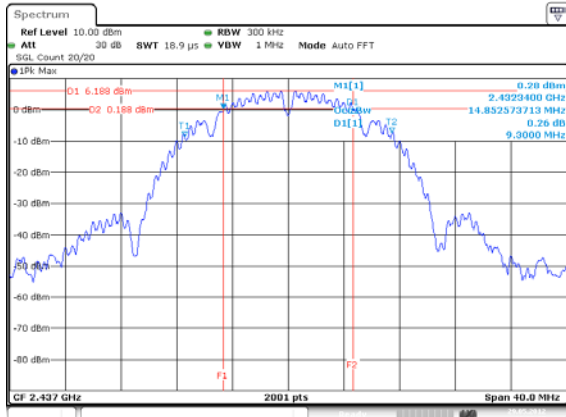
11B-20M – F1 [Port 1]



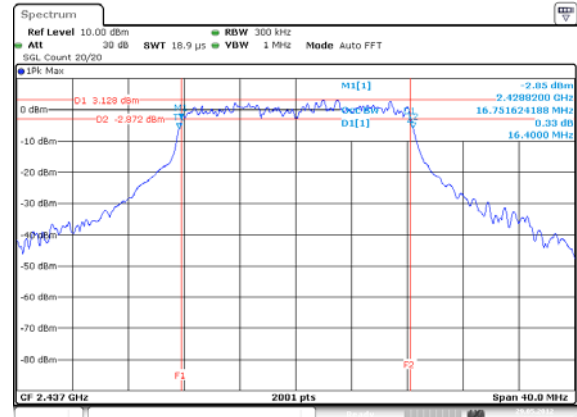
11G-20M – F1 [Port 1]



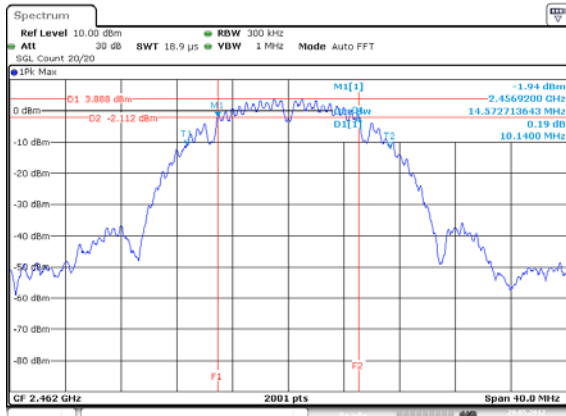
11B-20M – F2 [Port 1]



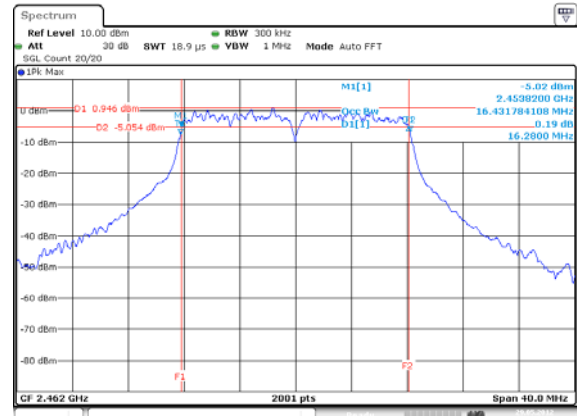
11G-20M – F2 [Port 1]



11B-20M – F3 [Port 1]

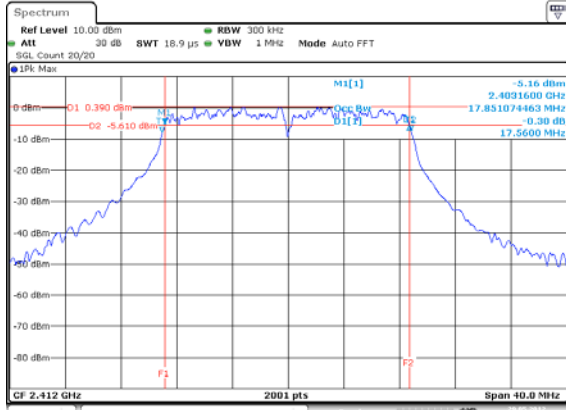


11G-20M – F3 [Port 1]



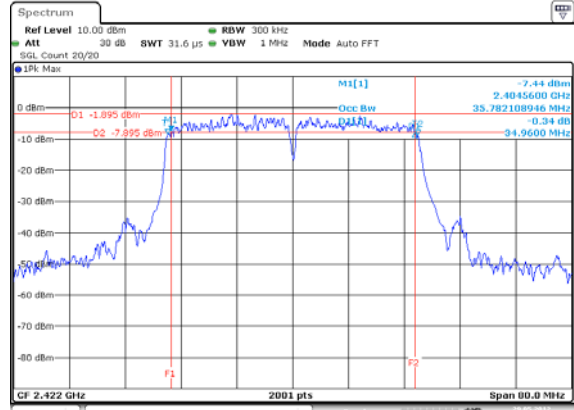
Emission Bandwidth Plots

11N2.4G-20M – F1 [Port 1]



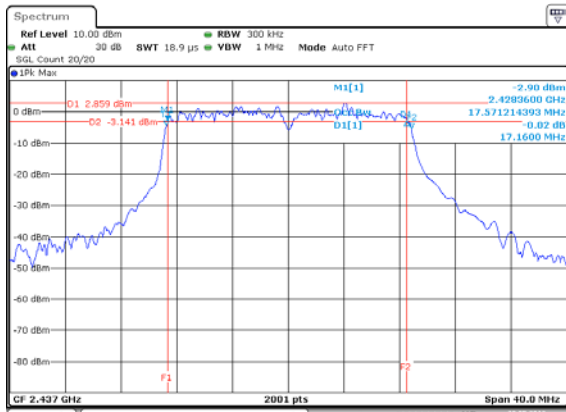
Date: 29.MAY.2012 11:57:42

11N2.4G-40M – F4 [Port 1]



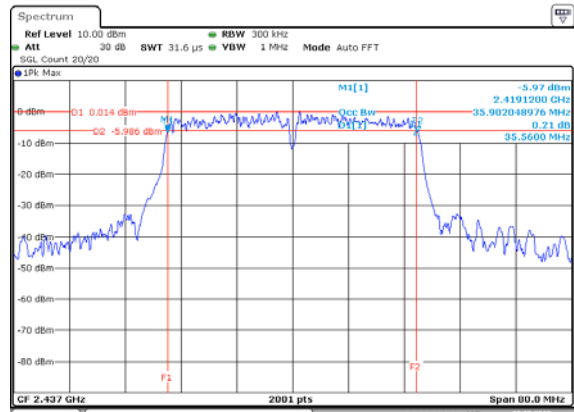
Date: 29.MAY.2012 12:09:09

11N2.4G-20M – F2 [Port 1]



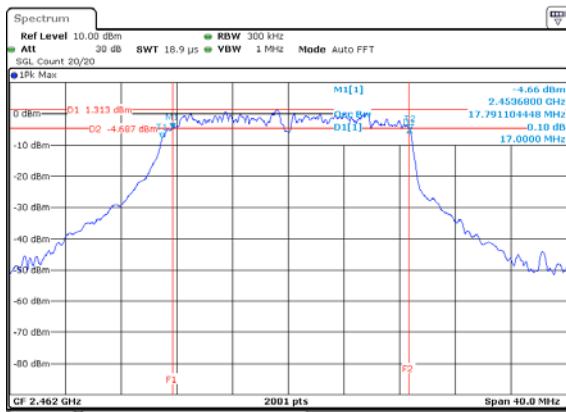
Date: 29.MAY.2012 11:58:32

11N2.4G-40M – F5 [Port 1]



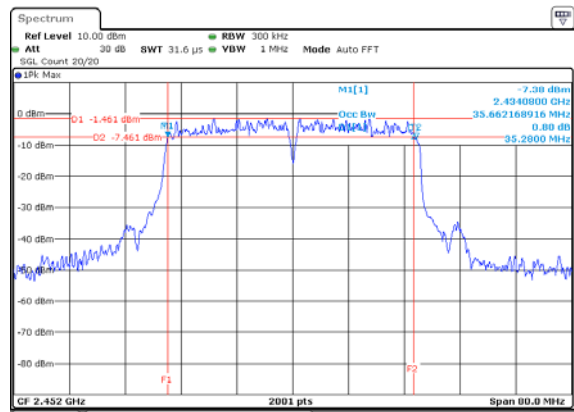
Date: 29.MAY.2012 12:13:47

11N2.4G-20M – F3 [Port 1]



Date: 29.MAY.2012 11:56:47

11N2.4G-40M – F6 [Port 1]



Date: 29.MAY.2012 12:16:51

3.3 RF Output Power

3.3.1 RF Output Power Limit

RF Output Power Limit	
Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit	
<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 checked="" type="checkbox"/> 2400-2483.5 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 $P_{Out} = 30 - (G_{TX} - 6)/3$ 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 type="checkbox"/> 5725-5850 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 $P_{Out} = 30$ dBm
e.i.r.p. Power Limit:	
<input type="checkbox"/> 902-928 MHz Band: $P_{eirp} \leq 36$ dBm (4 W)	
<input checked="" type="checkbox"/> 2400-2483.5 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): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ 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 type="checkbox"/> 5725-5850 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): 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.	

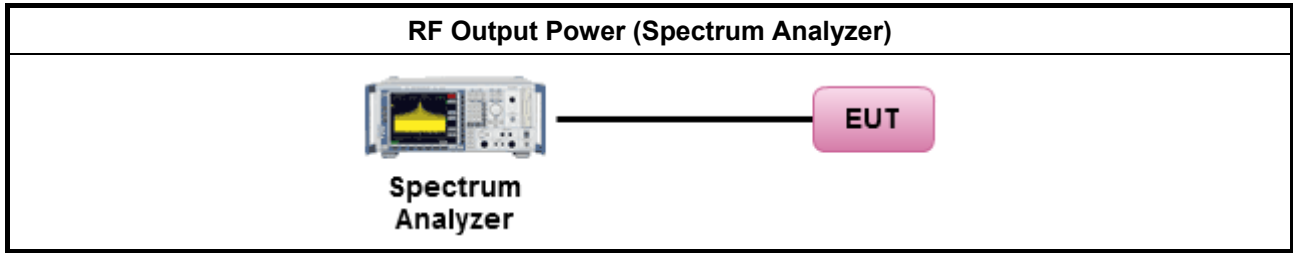
3.3.2 Measuring Instruments

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 checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 7.2.1.2 Option 2 (integrated band power method).
<input 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 checked="" 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 checked="" 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)		5								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11B-20M	1	2412	17.68				17.68	30.0	22.68	36.0
11B-20M	1	2437	18.82				18.82	30.0	23.82	36.0
11B-20M	1	2462	16.68				16.68	30.0	21.68	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Maximum Peak Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		5								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11G-20M	1	2412	19.46				19.46	30.0	24.46	36.0
11G-20M	1	2437	20.74				20.74	30.0	25.74	36.0
11G-20M	1	2462	18.28				18.28	30.0	23.28	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Maximum Peak Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		5								
Modulation Mode	N_{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-20M	1	2412	18.88				18.88	30.0	23.88	36.0
11N2.4G-20M	1	2437	19.99				19.99	30.0	24.99	36.0
11N2.4G-20M	1	2462	18.54				18.54	30.0	23.54	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Maximum Peak Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		5								
Modulation Mode	N_{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-40M	1	2422	18.12				18.12	30.0	23.12	36.0
11N2.4G-40M	1	2437	20.63				20.63	30.0	25.63	36.0
11N2.4G-40M	1	2452	18.89				18.89	30.0	23.89	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

3.3.6 Test Result of Maximum Conducted Output Power

Maximum Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		5								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11B-20M	1	2412	14.59				14.59	30.0	19.59	36.0
11B-20M	1	2437	15.71				15.71	30.0	20.71	36.0
11B-20M	1	2462	13.58				13.58	30.0	18.58	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

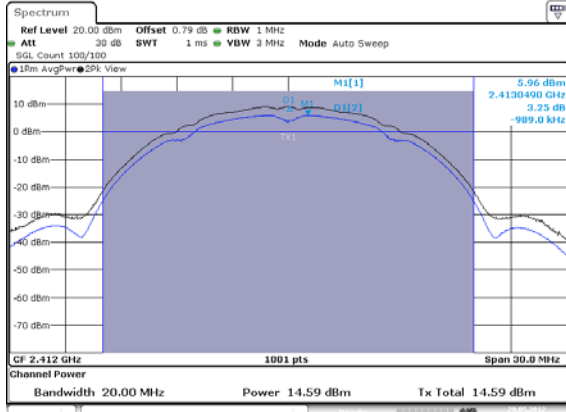
Maximum Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		5								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11G-20M	1	2412	12.33				12.33	30.0	17.33	36.0
11G-20M	1	2437	13.64				13.64	30.0	18.64	36.0
11G-20M	1	2462	11.10				11.10	30.0	16.10	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Maximum Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		5								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-20M	1	2412	11.41				11.41	30.0	16.41	36.0
11N2.4G-20M	1	2437	12.53				12.53	30.0	17.53	36.0
11N2.4G-20M	1	2462	11.08				11.08	30.0	16.08	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Maximum Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		5								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-40M	1	2422	10.97				10.97	30.0	15.97	36.0
11N2.4G-40M	1	2437	13.47				13.47	30.0	18.47	36.0
11N2.4G-40M	1	2452	11.70				11.70	30.0	16.70	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

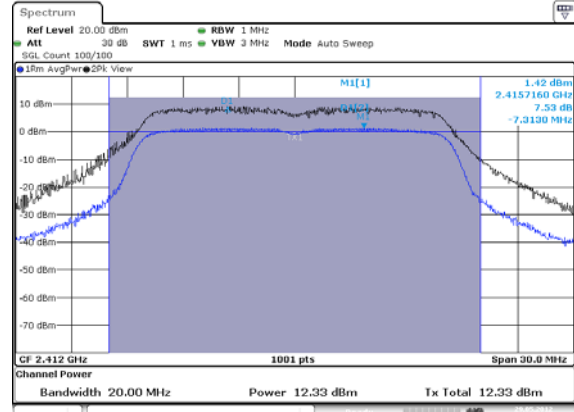
Maximum Peak Conducted Output Power Plots and Maximum Conducted Output Power

11B-20M – F1 [Port 1]



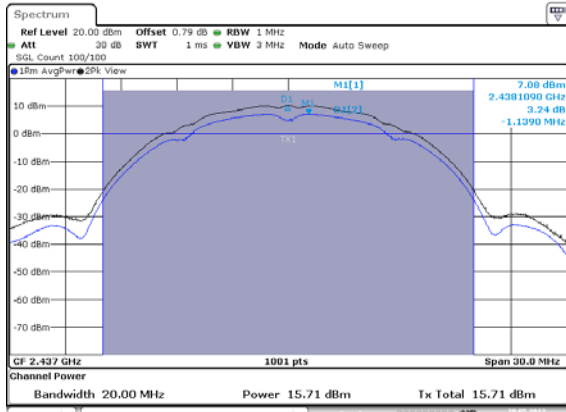
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11G-20M – F1 [Port 1]



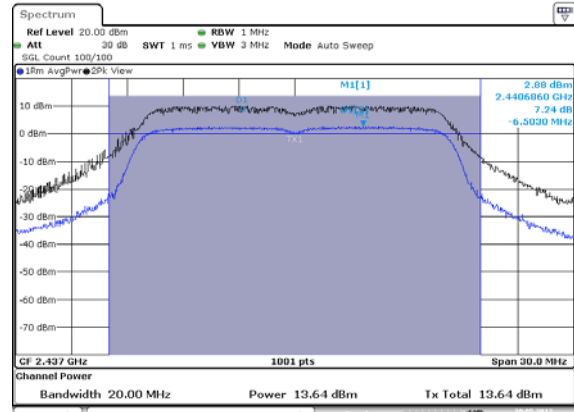
Date: 29.MAY.2012 10:35:33

11B-20M – F2 [Port 1]



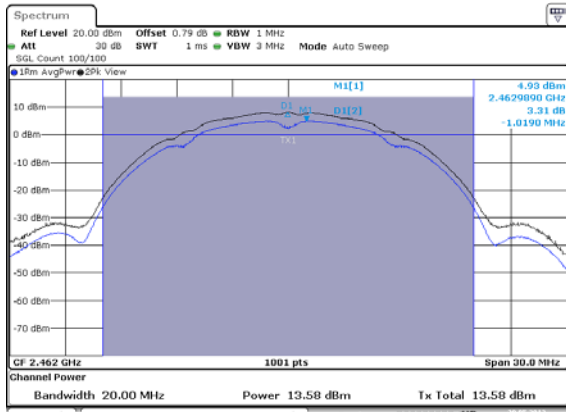
Date: 29.MAY.2012 09:55:44

11G-20M – F2 [Port 1]



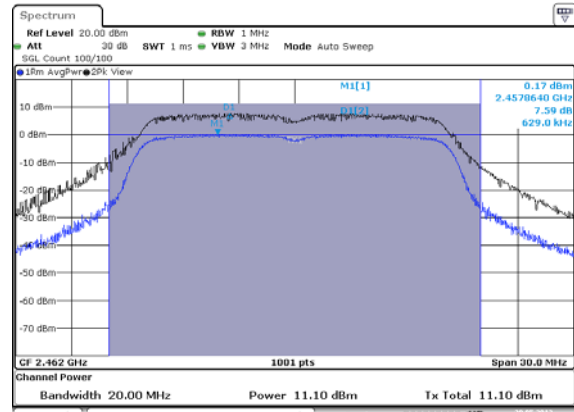
Date: 29.MAY.2012 10:40:47

11B-20M – F3 [Port 1]



Date: 29.MAY.2012 10:05:34

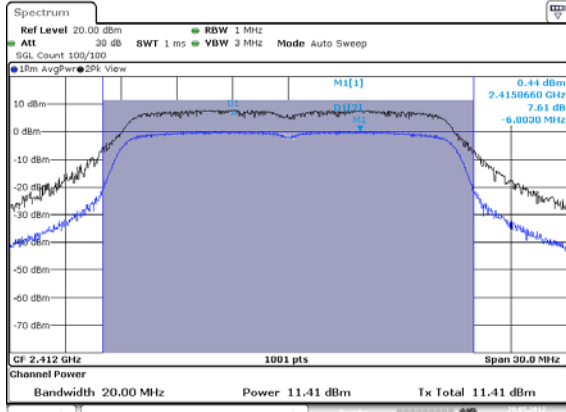
11G-20M – F3 [Port 1]



Date: 29.MAY.2012 10:43:31

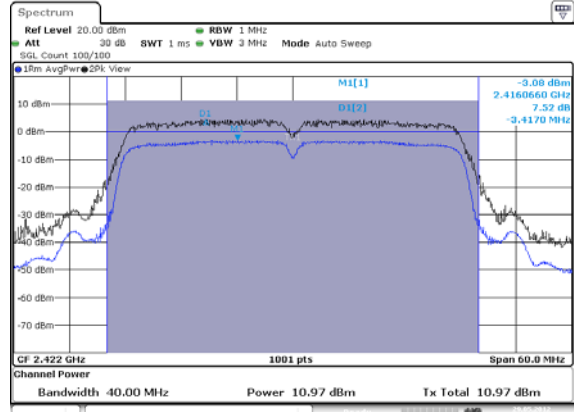
Maximum Peak Conducted Output Power Plots and Maximum Conducted Output Power

11N2.4G-20M – F1 [Port 1]



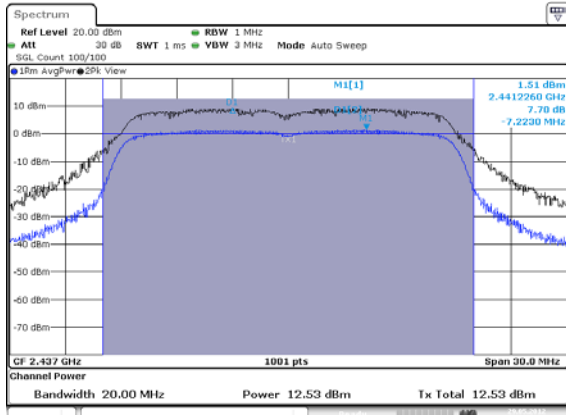
Date: 29.MAY.2012 11:41:37

11N2.4G-40M – F1 [Port 1]



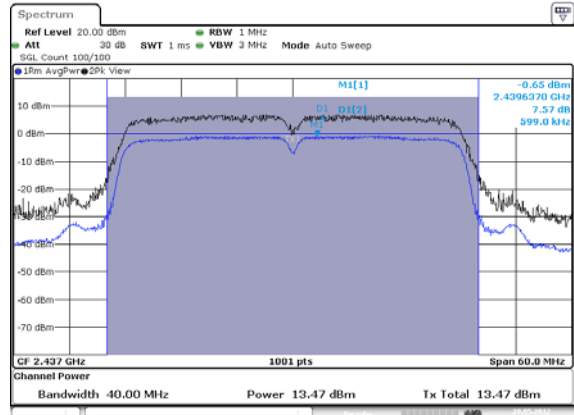
Date: 29.MAY.2012 12:06:33

11N2.4G-20M – F2 [Port 1]



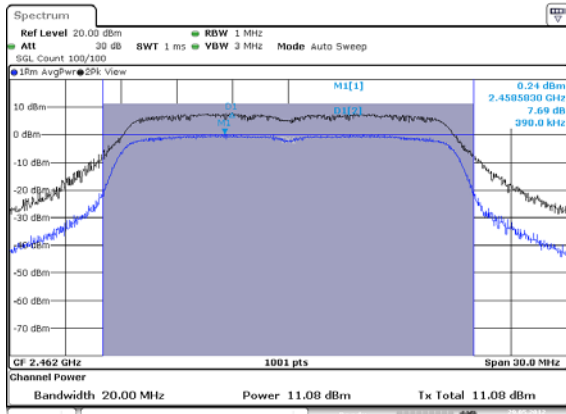
Date: 29.MAY.2012 11:53:23

11N2.4G-40M – F2 [Port 1]



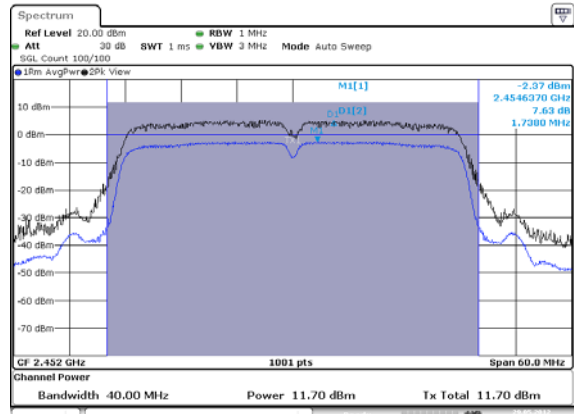
Date: 29.MAY.2012 12:12:29

11N2.4G-20M – F3 [Port 1]



Date: 29.MAY.2012 11:55:15

11N2.4G-40M – F3 [Port 1]



Date: 29.MAY.2012 12:15:40

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

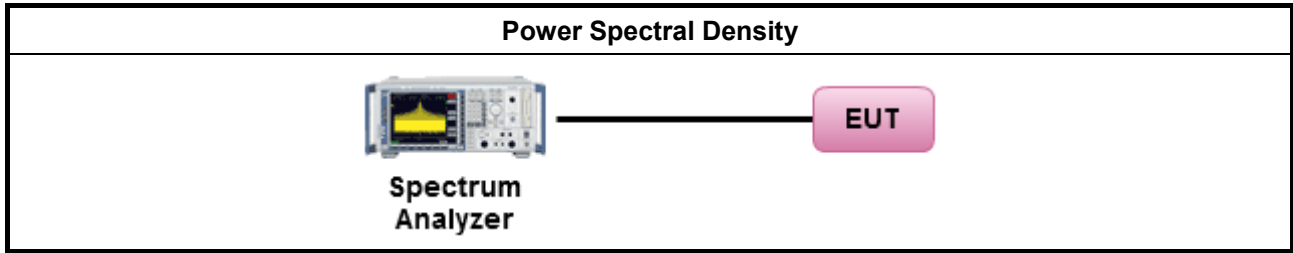
3.4.2 Measuring Instruments

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 checked="" 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 _{TX} 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) [-15.2 dB] adjusting in power spectral density per 3kHz.
<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 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)		5	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N _{TX}	Freq. (MHz)	Sum All Chains	-	-	-	PSD Limit
11B-20M	1	2412	-12.50				8.0
11B-20M	1	2437	-10.62				8.0
11B-20M	1	2462	-13.74				8.0
Result			Complied				

Note 1: N_{TX} = Number of Transmit Chains
 Note 2: PSD [dBm/3kHz] = sum each transmit chains by bin-to-bin PSD [dBm/100kHz] + BWFC [-15.2 dB]

Power Spectral Density Result							
Power Level		1	Power Spectral Density (dBm/3kHz)				
Directional Gain (dBi)		5	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N _{TX}	Freq. (MHz)	Sum All Chains	-	-	-	PSD Limit
11G-20M	1	2412	-17.15				8.0
11G-20M	1	2437	-16.35				8.0
11G-20M	1	2462	-18.30				8.0
Result			Complied				

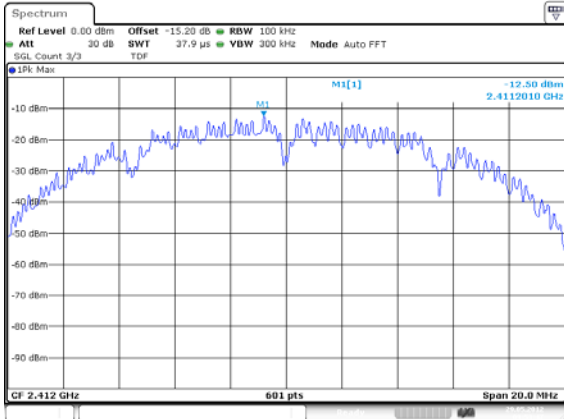
Note 1: N_{TX} = Number of Transmit Chains
 Note 2: PSD [dBm/3kHz] = sum each transmit chains by bin-to-bin PSD [dBm/100kHz] + BWFC [-15.2 dB]

Power Spectral Density Result							
Power Level		1	Power Spectral Density (dBm/3kHz)				
Directional Gain (dBi)		5	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N _{TX}	Freq. (MHz)	Sum All Chains	-	-	-	PSD Limit
11N2.4G-20M	1	2412	-17.41				8.0
11N2.4G-20M	1	2437	-17.57				8.0
11N2.4G-20M	1	2462	-17.64				8.0
Result			Complied				
Note 1: N _{TX} = Number of Transmit Chains							
Note 2: PSD [dBm/3kHz] = sum each transmit chains by bin-to-bin PSD [dBm/100kHz] + BWFC [-15.2 dB]							

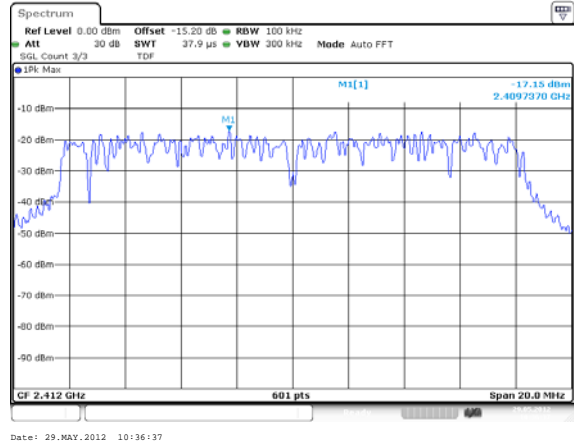
Power Spectral Density Result							
Power Level		1	Power Spectral Density (dBm/3kHz)				
Directional Gain (dBi)		5	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N _{TX}	Freq. (MHz)	Sum All Chains	-	-	-	PSD Limit
11N2.4G-40M	1	2422	-21.71				8.0
11N2.4G-40M	1	2437	-19.59				8.0
11N2.4G-40M	1	2452	-20.86				8.0
Result			Complied				
Note 1: N _{TX} = Number of Transmit Chains							
Note 2: PSD [dBm/3kHz] = sum each transmit chains by bin-to-bin PSD [dBm/100kHz] + BWFC [-15.2 dB]							

Power Spectral Density Plots

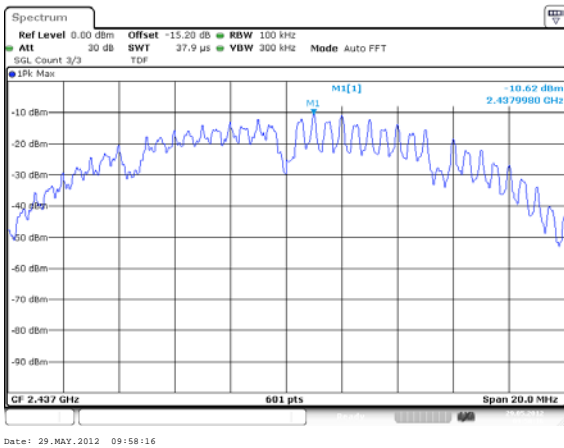
11B-20M – F1 [Sum All Chains]



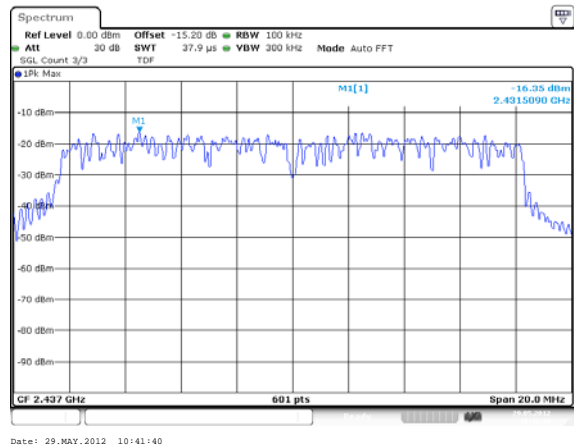
11G-20M – F1 [Sum All Chains]



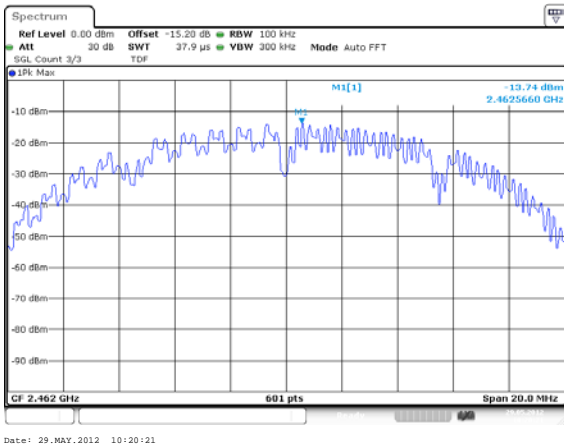
11B-20M – F2 [Sum All Chains]



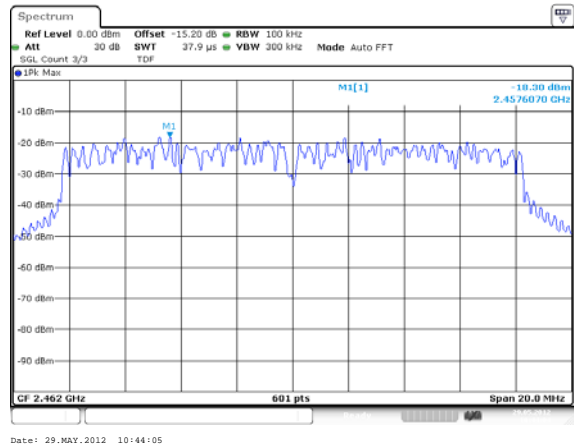
11G-20M – F2 [Sum All Chains]



11B-20M – F3 [Sum All Chains]

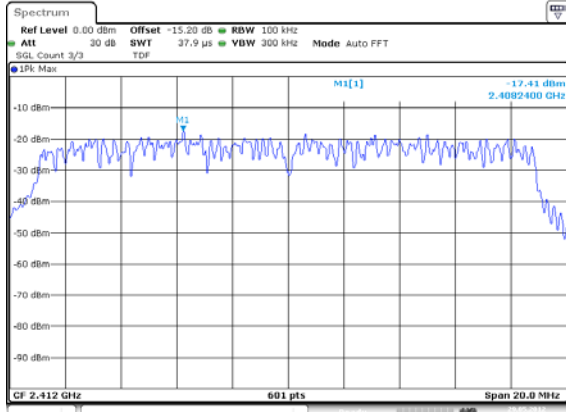


11G-20M – F3 [Sum All Chains]



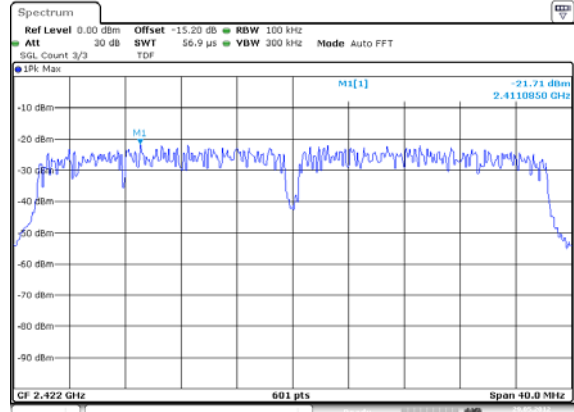
Power Spectral Density Plots

11N2.4G-20M – F1 [Sum All Chains]



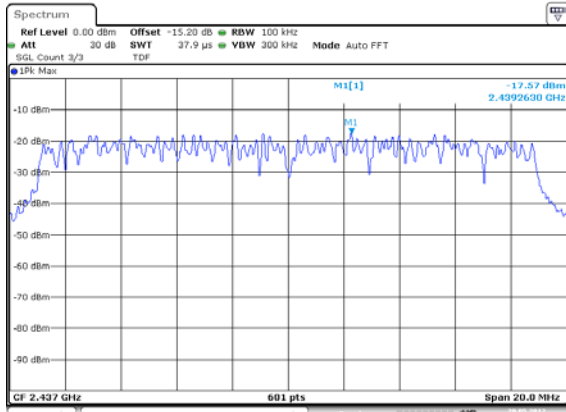
Date: 29.MAY.2012 11:42:40

11N2.4G-40M – F4 [Sum All Chains]



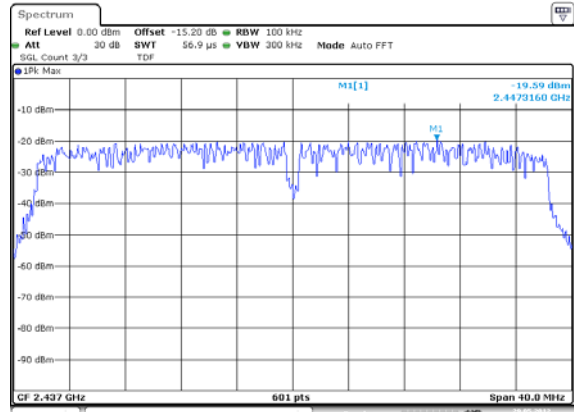
Date: 29.MAY.2012 12:07:14

11N2.4G-20M – F2 [Sum All Chains]



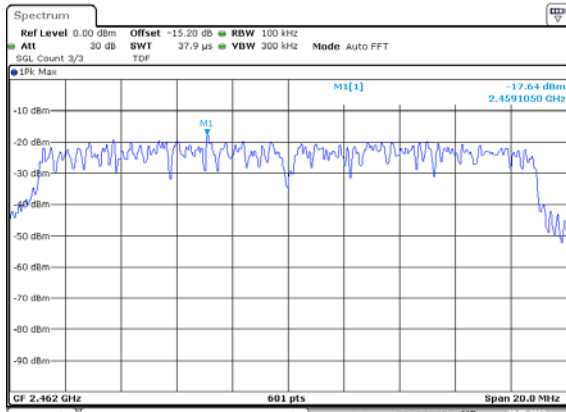
Date: 29.MAY.2012 11:53:59

11N2.4G-40M – F5 [Sum All Chains]



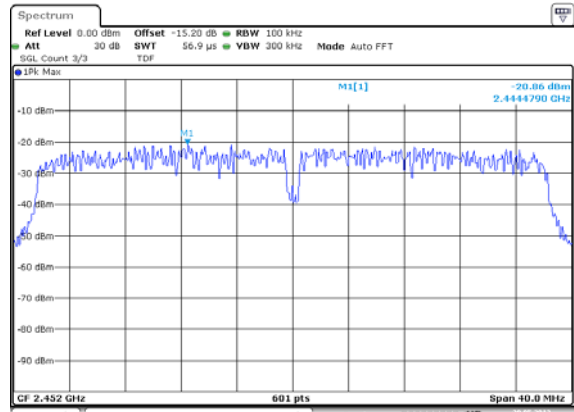
Date: 29.MAY.2012 12:13:05

11N2.4G-20M – F3 [Sum All Chains]



Date: 29.MAY.2012 11:55:54

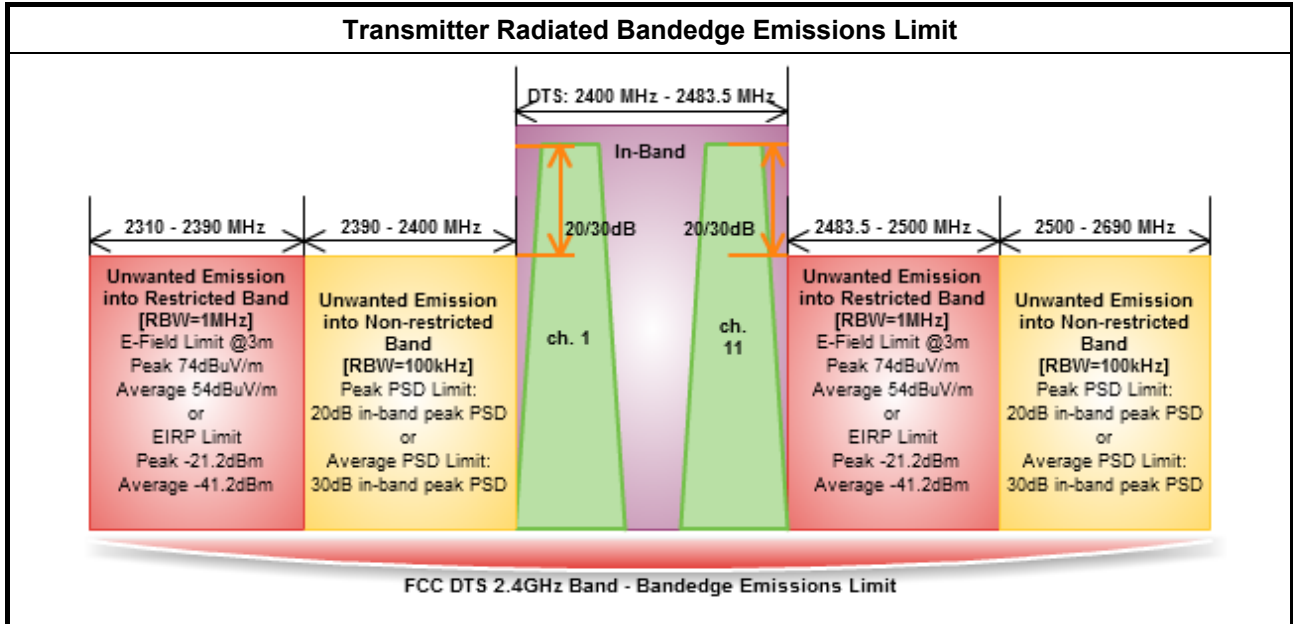
11N2.4G-40M – F6 [Sum All Chains]



Date: 29.MAY.2012 12:16:19

3.5 Transmitter Radiated Bandedge Emissions

3.5.1 Transmitter Radiated Bandedge Emissions Limit



3.5.2 Measuring Instruments

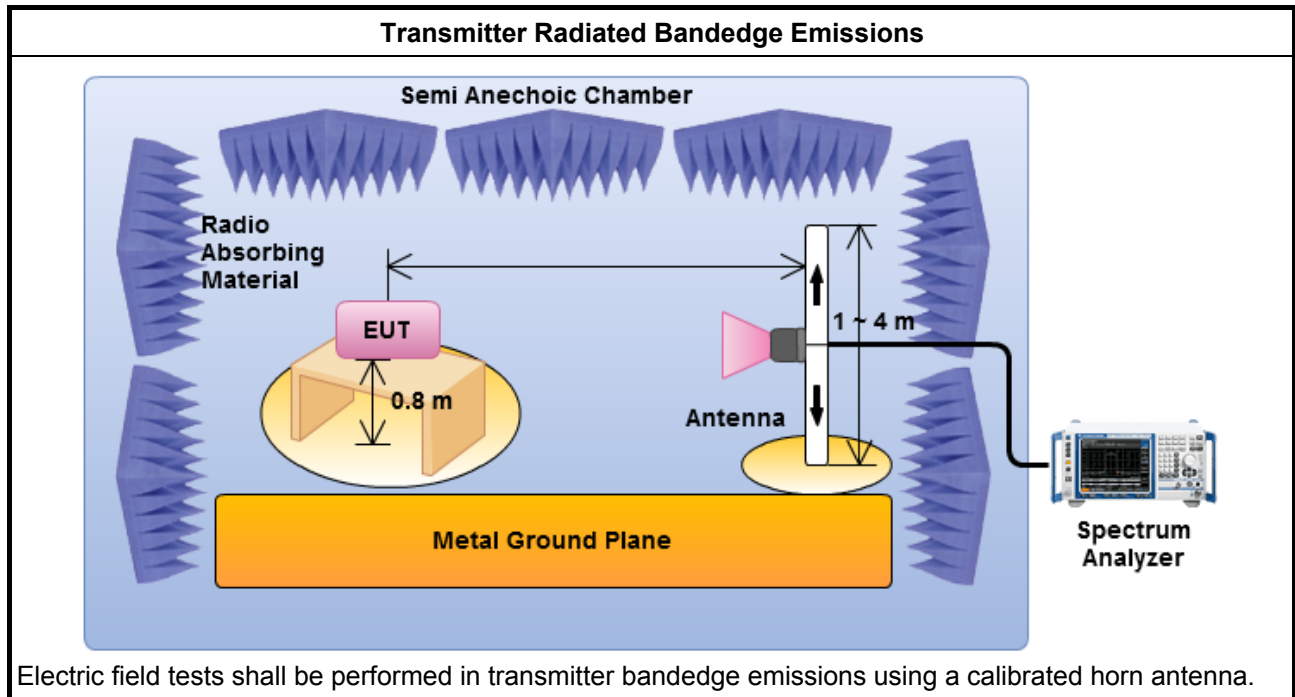
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \geq 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). – Duty cycle \geq 98%.
<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.
<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 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"/>	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



3.5.5 Test Result of Transmitter Radiated Bandedge Emissions

Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain (dBi)	5	Non-restricted Band Emissions					
Modulation	11B-20M								
Non-restricted Band (MHz)	N _{TX}	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
2390-2400	1	2412	109.60	2399.49	70.38	39.22	20	PK	V
2500-2690	1	2462	107.95	2544.20	64.07	43.88	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	Restricted Band Emissions					
Modulation	11B-20M								
Restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dBuV/m)	Level Type	Pol. note 1
2310-2390	1	2412	116.27	2368.14	3	63.79	74	PK	V
2310-2390	1	2412	111.60	2386.38	3	52.30	54	AV	V
2483.5-2500	1	2462	114.19	2483.85	3	63.27	74	PK	V
2483.5-2500	1	2462	109.67	2483.50	3	52.91	54	AV	V

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	Non-restricted Band Emissions					
Modulation	11G-20M								
Non-restricted Band (MHz)	N _{TX}	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
2390-2400	1	2412	103.92	2400.00	71.21	32.71	20	PK	V
2500-2690	1	2462	102.21	2517.80	64.15	38.06	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	Restricted Band Emissions					
Modulation	11G-20M								
Restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dBuV/m)	Level Type	Pol. note 1
2310-2390	1	2412	116.10	2389.42	3	69.78	74	PK	V
2310-2390	1	2412	105.69	2390.00	3	52.52	54	AV	V
2483.5-2500	1	2462	114.47	2483.50	3	68.98	74	PK	V
2483.5-2500	1	2462	103.89	2483.50	3	52.43	54	AV	V
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	Non-restricted Band Emissions					
Modulation	11N2.4G-20M								
Non-restricted Band (MHz)	N _{TX}	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
2390-2400	1	2412	103.40	2399.82	70.28	33.12	20	PK	V
2500-2690	1	2462	102.52	2509.10	63.89	38.63	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	Restricted Band Emissions					
Modulation	11N2.4G-20M								
Restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dBuV/m)	Level Type	Pol. note 1
2310-2390	1	2412	116.45	2390.00	3	72.57	74	PK	V
2310-2390	1	2412	104.71	2390.00	3	51.72	54	AV	V
2483.5-2500	1	2462	114.79	2483.66	3	72.03	74	PK	V
2483.5-2500	1	2462	103.31	2483.50	3	52.61	54	AV	V

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	Non-restricted Band Emissions					
Modulation	11N2.4G-40M								
Non-restricted Band (MHz)	N _{TX}	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
2390-2400	1	2422	99.35	2398.04	66.93	32.42	20	PK	V
2500-2690	1	2452	99.94	2539.28	64.81	35.13	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	Restricted Band Emissions					
Modulation	11N2.4G-40M								
Restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dBuV/m)	Level Type	Pol. note 1
2310-2390	1	2422	112.16	2388.09	3	70.45	74	PK	V
2310-2390	1	2422	101.07	2390.00	3	52.78	54	AV	V
2483.5-2500	1	2452	112.40	2488.41	3	71.02	74	PK	V
2483.5-2500	1	2452	101.30	2486.89	3	52.99	54	AV	V
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).									