

FCC Test Report

Equipment : 300N Wireless LAN Concurrent Dual Band Router
Brand Name : EDIMAX
Model No. : BR-6435ND, GR-435ND, BR-6435nD, BR-6435nD V2
FCC ID : NDD9564351207
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

The product sample received on Jul. 02, 2012 and completely tested on Aug. 30, 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.

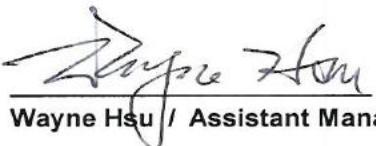

Wayne Hsu / Assistant Manager



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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	0.25MHz: 41.09dBuV (10.61dB) - AV 53.94dBuV (7.76dB) - QP	FCC 15.207	Complied
3.2	15.247(a)	6dB Bandwidth	6dB Bandwidth Unit [MHz] 11B-20M: 11.84 11G-20M: 14.16 11N2.4G-20M: 14.78 11N2.4G-40M: 28.44	≥500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm] 11B-20M: 22.60 11G-20M: 21.98 11N2.4G-20M: 19.45 11N2.4G-40M: 19.48	Power [dBm] 2412-2462MHz: 30 2422-2452MHz: 30	Complied
3.4	15.247(d)	Power Spectral Density	PSD [dBm/3kHz] 11B-20M: -9.76 11G-20M: -14.93 11N2.4G-20M: -18.42 11N2.4G-40M: -21.54	PSD [dBm/3kHz] 2412-2462MHz: 8 2422-2452MHz: 8	Complied
3.5	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2397.38MHz: 31.10dB Restricted Bands [dBuV/m at 3m]: 2389.63MHz: 67.23 (Margin 6.77dB) - PK 52.57 (Margin 1.43dB) - 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]: 4874MHz: 50.72 (Margin 3.28dB) - PK	Non-Restricted Bands: > 20 dB Restricted Bands: FCC 15.209	Complied

Revision History

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]	22.60
2400-2483.5	g	2412-2462	1-11 [11]	21.98
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	19.45
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	19.48

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	14.71	Yes
g	1	1	N/A	16.07	Yes
n (HT20)	2	2	N/A	16.89	Yes
n (HT40)	2	2	N/A	34.54	Yes

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"/>	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 checked="" type="checkbox"/> RF connector provided
	<input checked="" 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				Antenna General Information		
Ant. No.	Ant. Port [Ant No. X connect to Ant. Port Y]	Ant. Cat.	Ant. Type	G _{ANT} (dBi)	DG (dBi) [correlated] N _{TX} = 1	DG (dBi) [uncorrelated] N _{TX} = 2
1	1, 2	External	Dipole	5 (R SMA)		5
2	1, 2	External	Dipole	3 (R SMA)	-	3
3	1, 2	External	Dipole	3 (Fix)		3
<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. Then Ant. No. 1 shall be performed the radiated test.					

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}

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) =
 $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]$ dBi
 All transmit signals are completely uncorrelated, Directional Gain (DG) =
 $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N]$ dBi

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 Accessories

Accessories Information				
Switching Adapter	Brand Name	DVE	Model Name	DSA-12PFA-05 FUS 050200
	Power Rating	I/P: 100-240V ~ 50/60Hz 0.5A; O/P: +5V 2A		

1.3 Support Equipment

Support Equipment - Conducted Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	E5500	DoC
2	iPod nano	Apple	A1320	N/A
3	(USB) Mouse	Microsoft	1113	N/A
4	Dummy Load	--	--	--
5	Notebook (Remote Workstation)	DELL	INSPIRON 6400	E2KWM3945ABG

Support Equipment - Radiated Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	E5520	DoC
2	iPod nano	Apple	A1199	N/A
3	(USB) Mouse	Microsoft	1113	N/A
4	Dummy Load	--	--	--
5	Notebook (Remote Workstation)	DELL	E5520	DoC

1.4 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
- ◆ FCC KDB 662911
- ◆ FCC KDB 412172

1.5 Testing Location Information

Testing Location				
	HWA YA	ADD	:	
<input checked="" type="checkbox"/>		No. 52, Hwa Ya 1 st 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
Conducted Emission		CO04-HY	Alan	25.5°C / 53%
RF Conducted		TH01-HY	Ian	26.6°C / 60%
Radiated Emission		03CH02-HY	Hsiao	25.3°C / 65%
Test Date				
30-Aug-12				
20-Aug-12				
23-Aug-12				

1.6 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						
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	11 Mbps	11B-20M	22.60	-9.76
g	1	6-54 Mbps	6 Mbps	11G-20M	21.98	-14.93
n (HT20)	2	MCS 0-15	MCS 8	11N2.4G-20M	19.45	-18.42
n (HT40)	2	MCS 0-15	MCS 8	11N2.4G-40M	19.48	-21.54

Note 1: 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 2: 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 3: RF output power specifies that Maximum Peak Conducted Output Power.

Note 4: EUT operating mode that using same power level between 2 transmit chains and 1 transmit chain.
 Then EUT with 2 transmit chains which does not change its (per transmit chain) RF output power based on the number of active chains, need not undergo repeat testing for all the transmit chains.

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)

2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter					
Test Software Version		Ralink RT5x7x QA_1.0.4.8			
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	13	11 Mbps	22.34
11B-20M	1	2437	15	11 Mbps	22.57
11B-20M	1	2462	17	11 Mbps	22.60
11G-20M	1	2412	18	6 Mbps	21.92
11G-20M	1	2437	1A	6 Mbps	21.98
11G-20M	1	2462	1B	6 Mbps	21.78
11N2.4G-20M	2	2412	0F ; 1F	MCS 8	19.45
11N2.4G-20M	2	2437	10 ; 1F	MCS 8	19.20
11N2.4G-20M	2	2462	11 ; 1F	MCS 8	18.94
11N2.4G-40M	2	2422	0F ; 1F	MCS 8	19.48
11N2.4G-40M	2	2437	10 ; 1F	MCS 8	19.11
11N2.4G-40M	2	2452	11 ; 1F	MCS 8	18.85

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.

2.4 The Worst Case Measurement Configuration

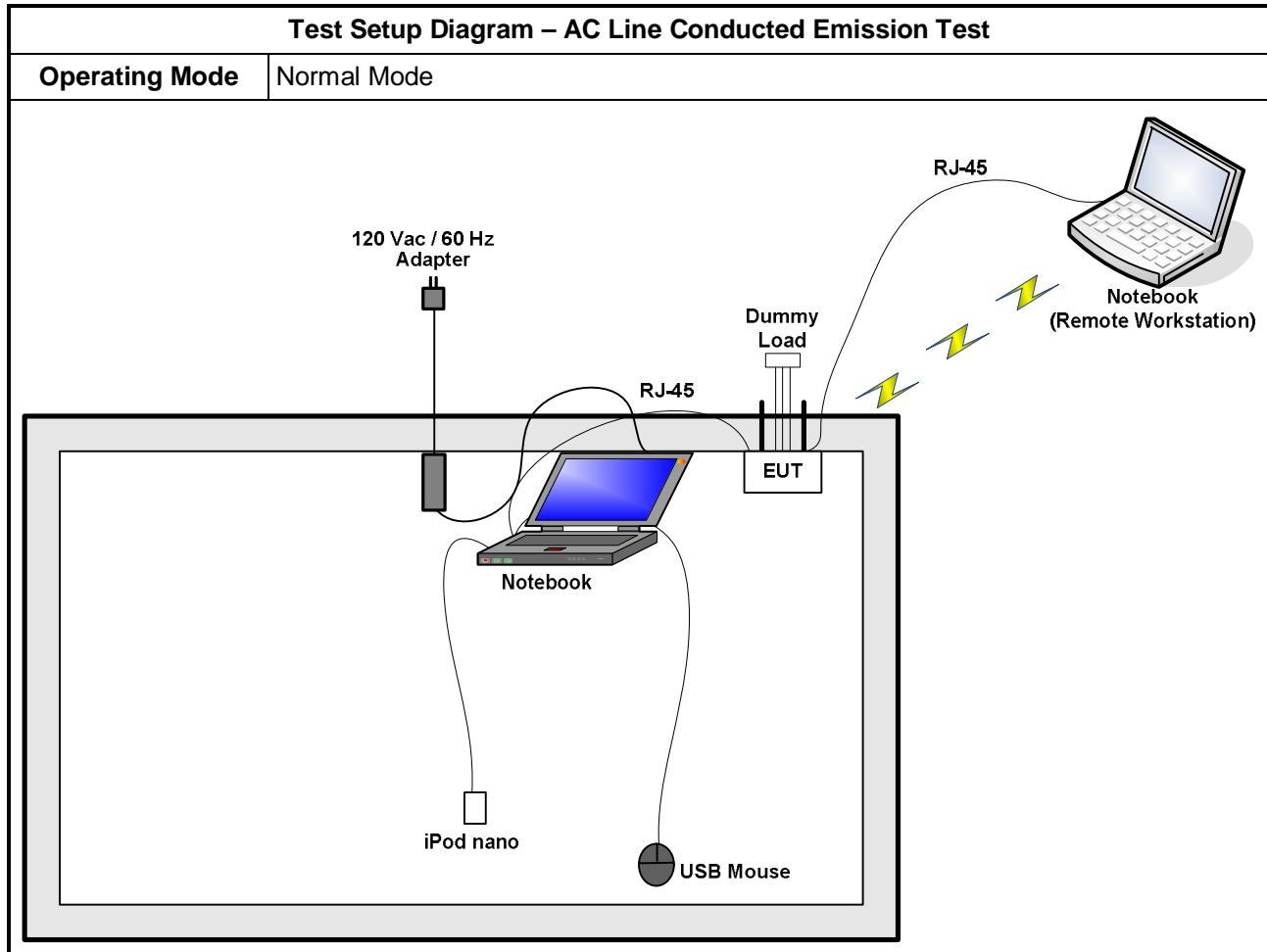
The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	Normal Mode

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
11B-20M	1	11 Mbps	F1, F2, F3
11G-20M	1	6 Mbps	F1, F2, F3
11N2.4G-20M	2	MCS 8	F1, F2, F3
11N2.4G-40M	2	MCS 8	F4, F5, F6

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
11B-20M	1	11 Mbps	F1, F3
11G-20M	1	6 Mbps	F1, F3
11N2.4G-20M	2	MCS 8	F1, F3
11N2.4G-40M	2	MCS 8	F4, F6

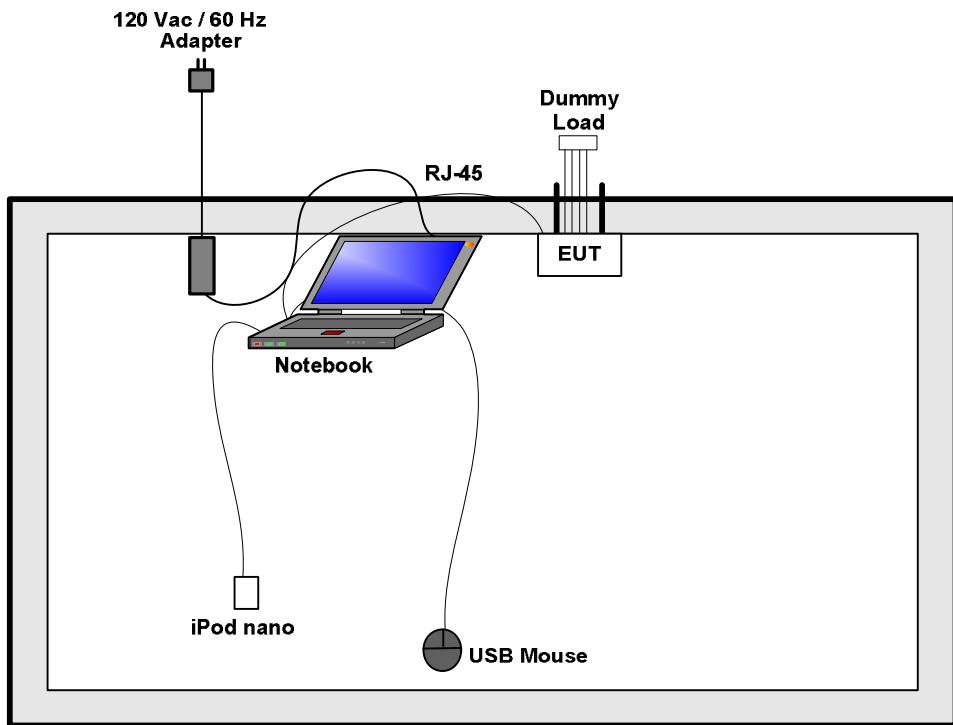
The Worst Case Mode for Following Conformance Tests				
Tests Item	Transmitter Radiated Unwanted Emissions			
Test Condition	Radiated measurement			
User Position	<input checked="" type="checkbox"/> EUT will be placed in fixed position. <input type="checkbox"/> EUT will be placed in mobile position and 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.			
	<input checked="" type="checkbox"/> 1. Normal Mode			
	Worst Modulation Mode	Number of Transmit Chains (N_{TX})	Worst Data Rate / MCS	Test Frequency
11B-20M	1	11 Mbps	F1, F2, F3	X
11G-20M	1	6 Mbps	F1, F2, F3	X
11N2.4G-20M	2	MCS 8	F1, F2, F3	X
11N2.4G-40M	2	MCS 8	F4, F5, F6	X
Orthogonal Planes of EUT	X Plane			
				

2.5 Test Setup Diagram

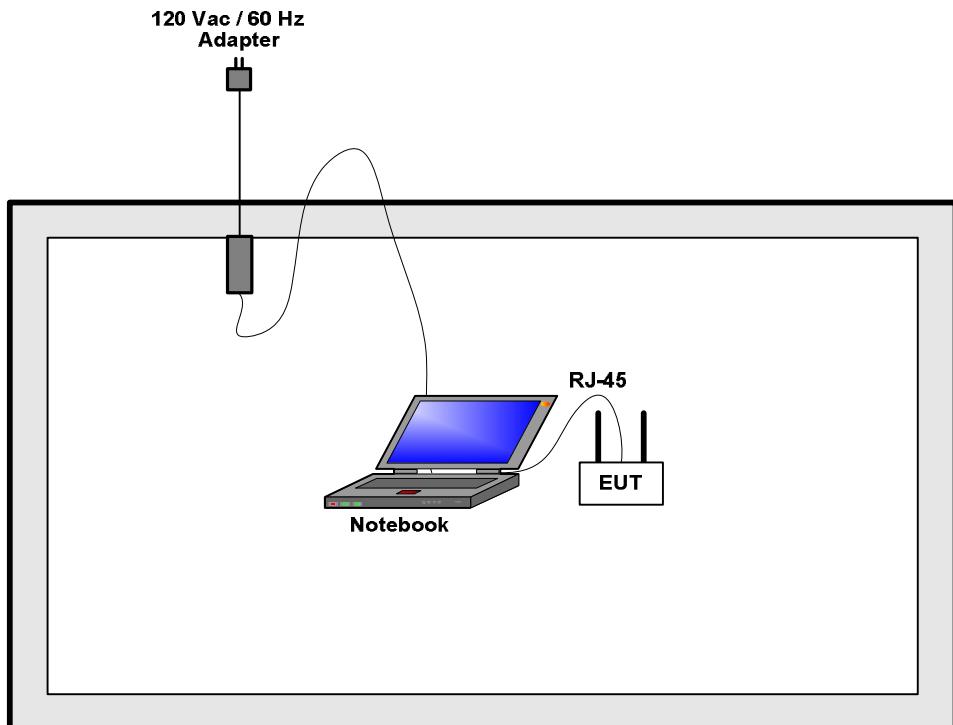


Test Setup Diagram - Radiated Test**Operating Mode**

Normal Mode (Below 1GHz)

**Operating Mode**

Transmitter Mode (Above 1GHz)



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.

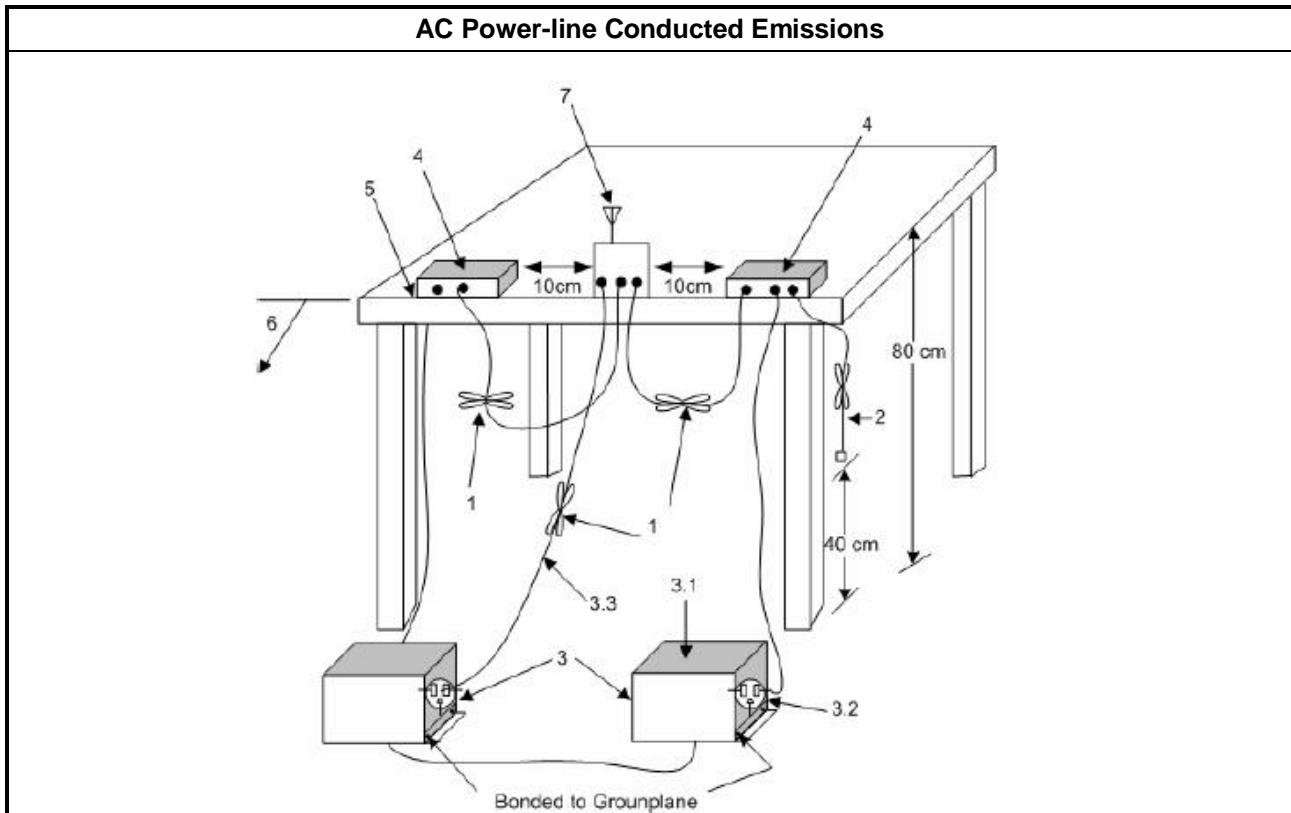
3.1.2 Measuring Instruments

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

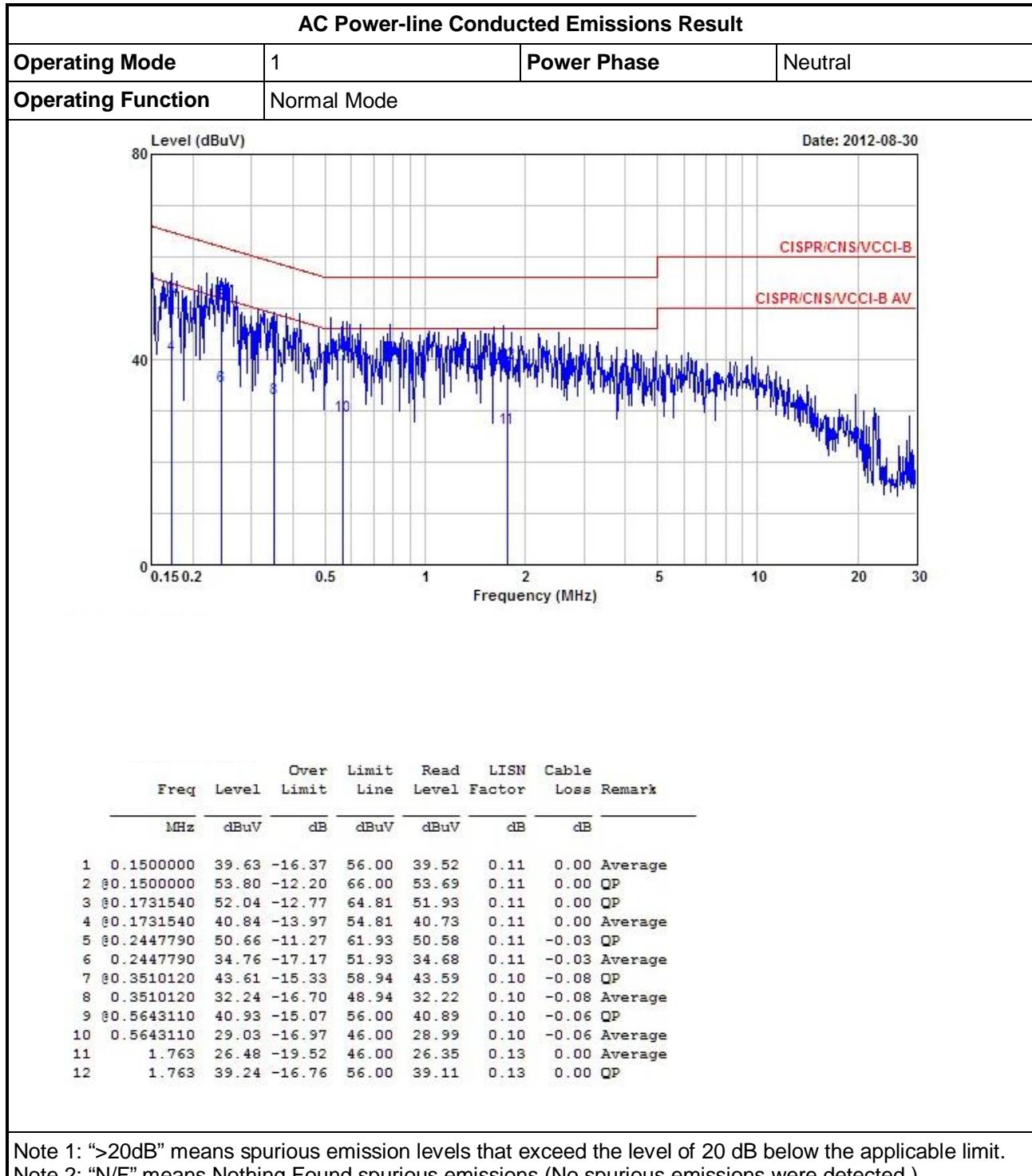
3.1.3 Test Procedures

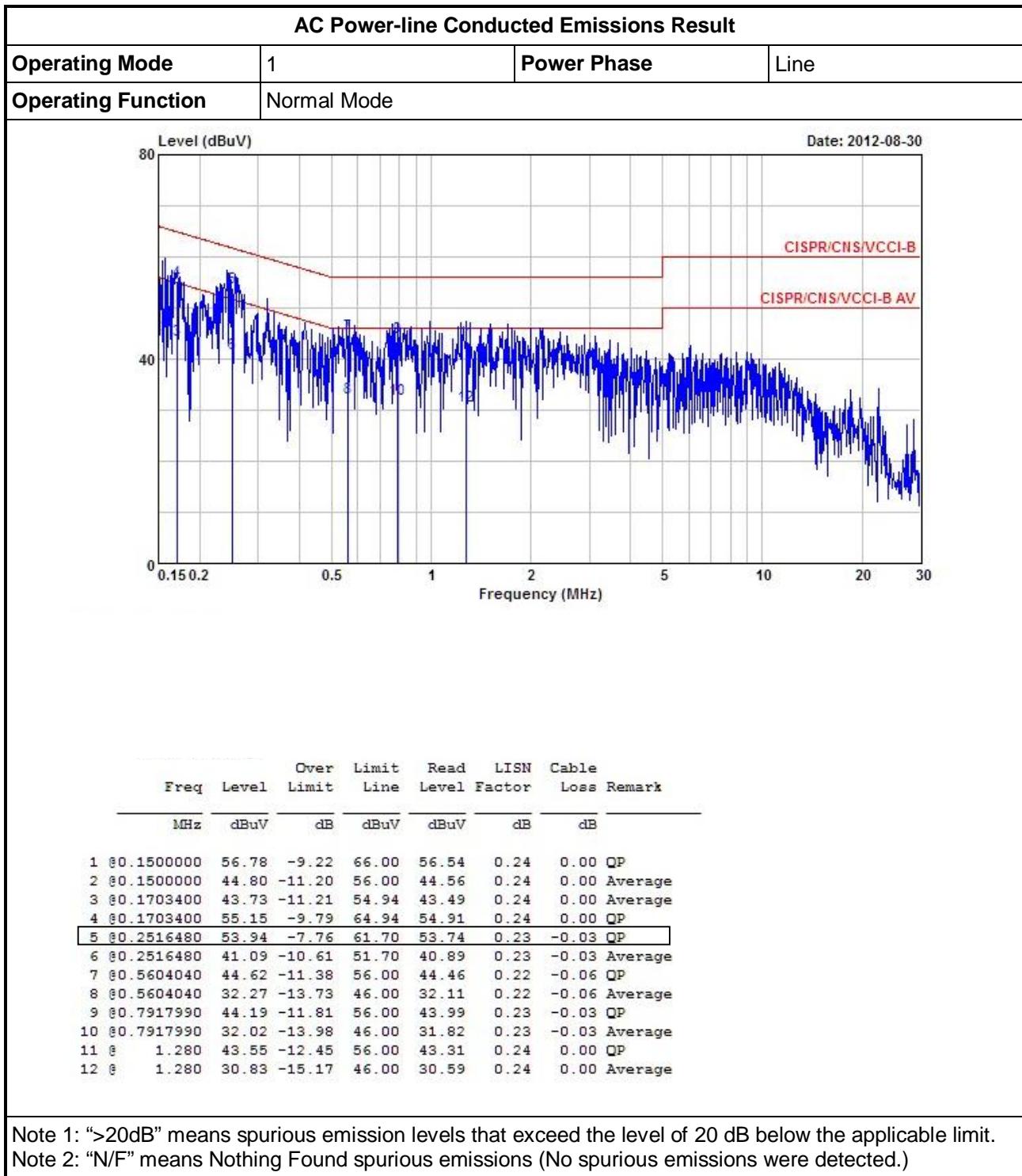
Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

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.	

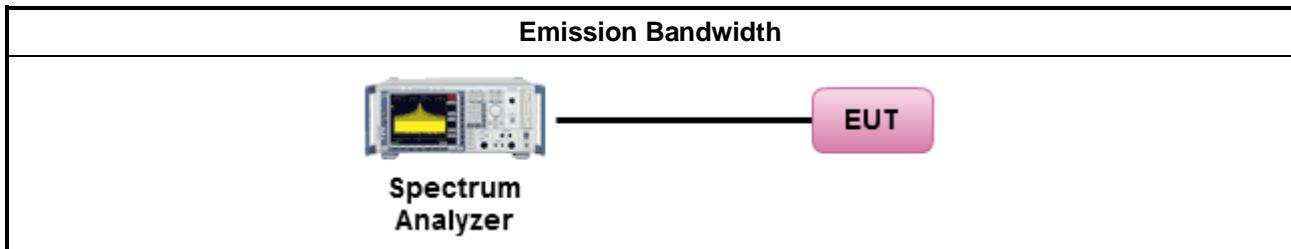
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

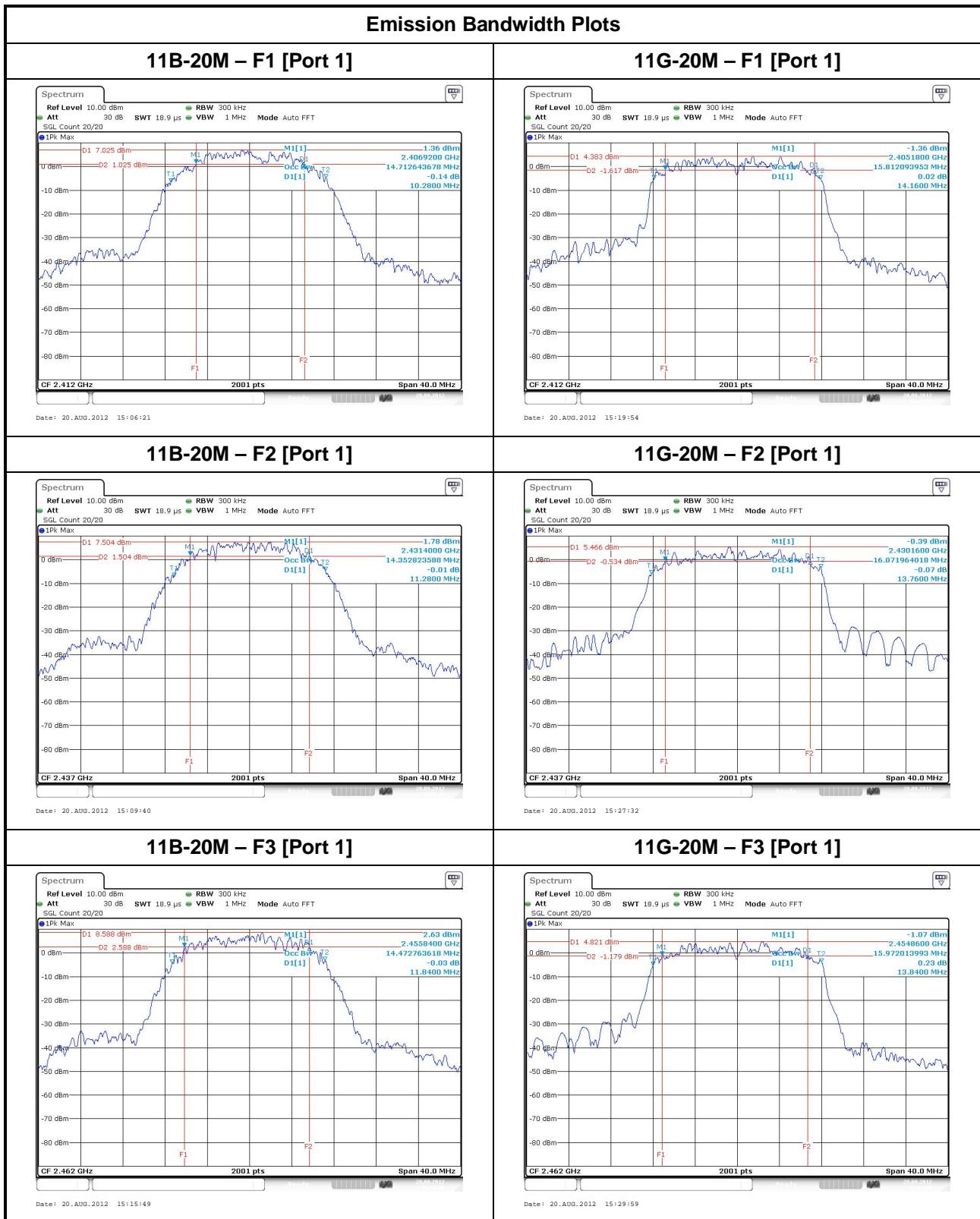
Test Method	
<input checked="" type="checkbox"/>	For the emission bandwidth shall be measured using one of the options below:
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 5.1.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.1.2 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 type="checkbox"/>	The EUT supports single transmit chain and measurements performed on this transmit chain.
<input checked="" type="checkbox"/>	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
<input checked="" type="checkbox"/>	The EUT supports 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.

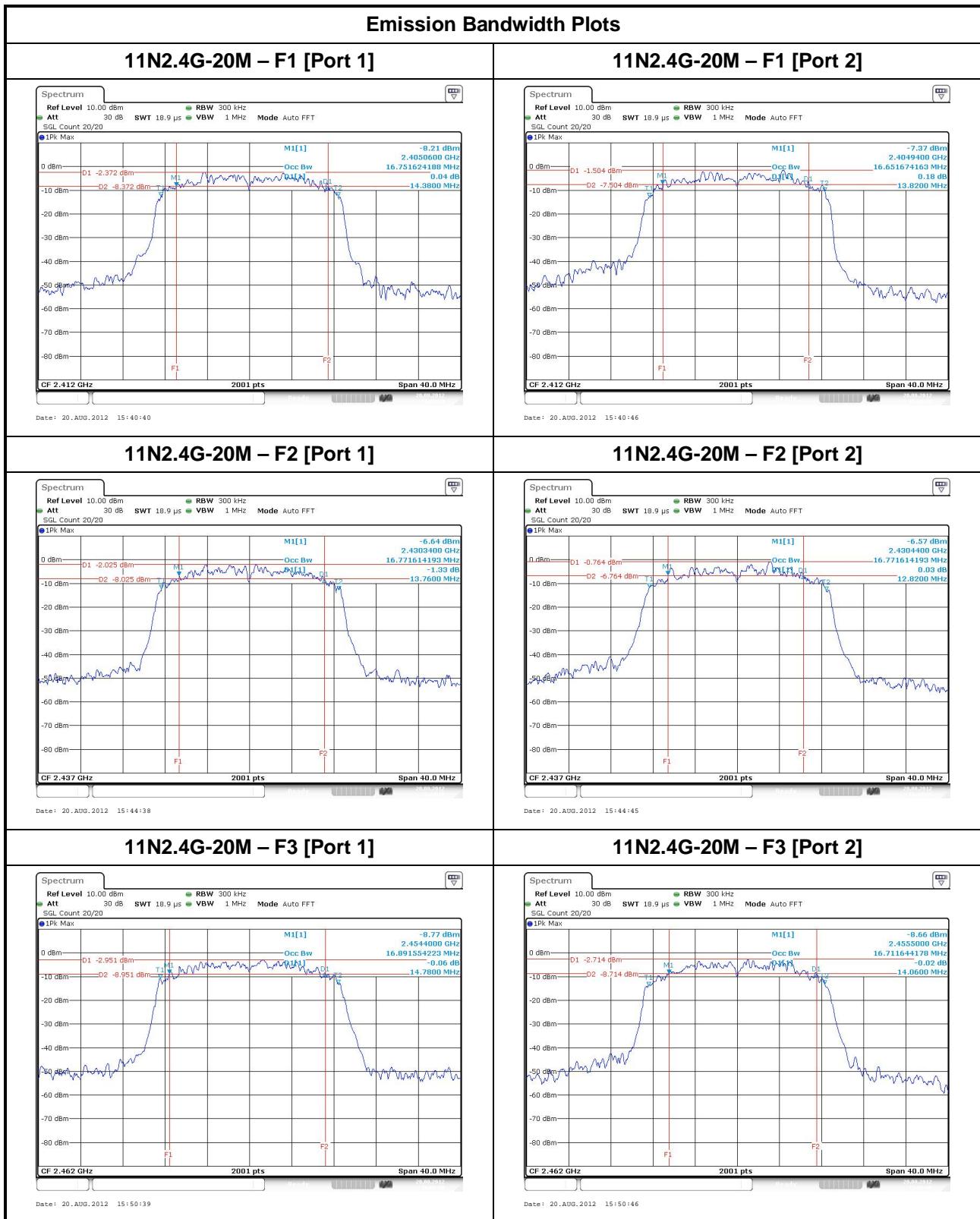
3.2.4 Test Setup

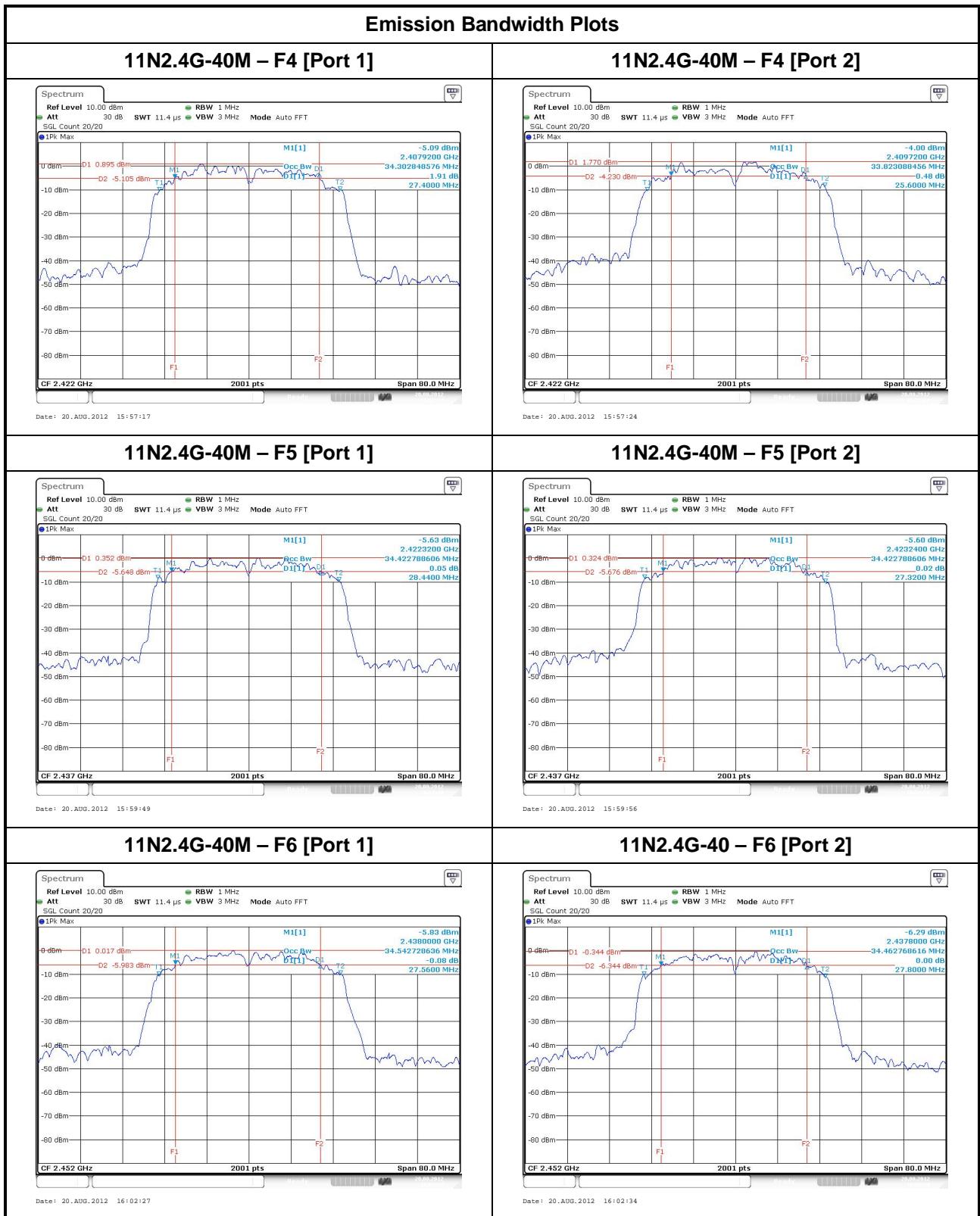


3.2.5 Test Result of Emission Bandwidth

Emission Bandwidth Result														
Modulation Mode	N _{TX}	Freq. (MHz)	Emission Bandwidth (MHz)											
			99% Bandwidth				6dB Bandwidth							
			Chain-Port 1	Chain-Port 2	-	-	Chain-Port 1	Chain-Port 2	-	-				
11B-20M	1	2412	14.71	-	-	-	10.28	-	-	-				
11B-20M	1	2437	14.35	-	-	-	11.28	-	-	-				
11B-20M	1	2462	14.47	-	-	-	11.84	-	-	-				
11G-20M	1	2412	15.81	-	-	-	14.16	-	-	-				
11G-20M	1	2437	16.07	-	-	-	13.76	-	-	-				
11G-20M	1	2462	15.97	-	-	-	13.84	-	-	-				
11N2.4G-20M	2	2412	16.75	16.65	-	-	14.38	13.82	-	-				
11N2.4G-20M	2	2437	16.77	16.77	-	-	13.76	12.82	-	-				
11N2.4G-20M	2	2462	16.89	16.71	-	-	14.78	14.06	-	-				
11N2.4G-40M	2	2412	34.30	33.82	-	-	27.40	25.60	-	-				
11N2.4G-40M	2	2437	34.42	34.42	-	-	28.44	27.32	-	-				
11N2.4G-40M	2	2462	34.54	34.46	-	-	27.56	27.80	-	-				
Limit			N/A				≥500 kHz							
Result			Complied											
Note 1: N _{TX} = Number of Transmit Chains														







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 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 $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dB 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.	

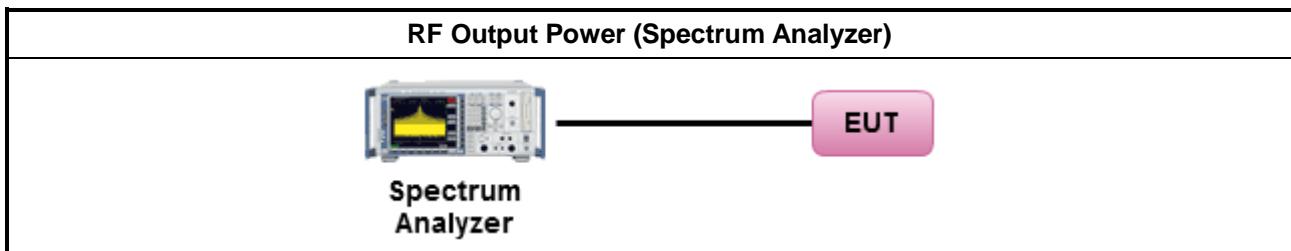
3.3.2 Measuring Instruments

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 5.2.1.1 Option 1 (RBW \geq EBW method). <input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 5.2.1.2 Option 2 (integrated band power 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 \geq 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 (Average) Output Power	<input type="checkbox"/> Refer as FCC KDB 558074, clause 5.2.2.1 Option 1 (RMS detection with slow sweep speed). <input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 5.2.2.2 Option 2 (spectral trace averaging). <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 2 for conducted measurement.	<input type="checkbox"/> The EUT supports single transmit chain and measurements performed on this transmit chain. <input checked="" type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case. <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 2 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										
Directional Gain (dBi)		5	RF Output Power (dBm)							
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11B-20M	1	2412	22.34	-	-	-	22.34	30.0	27.34	36.0
11B-20M	1	2437	22.57	-	-	-	22.57	30.0	27.57	36.0
11B-20M	1	2462	22.60	-	-	-	22.60	30.0	27.60	36.0
Result		Complied								

Note 1: N_{TX} = Number of Transmit Chains

Maximum Peak Conducted Output Power Result										
Directional Gain (dBi)		5	RF Output Power (dBm)							
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11G-20M	1	2412	21.92	-	-	-	21.92	30.0	26.92	36.0
11G-20M	1	2437	21.98	-	-	-	21.98	30.0	26.98	36.0
11G-20M	1	2462	21.78	-	-	-	21.78	30.0	26.78	36.0
Result		Complied								

Note 1: N_{TX} = Number of Transmit Chains

Maximum Peak Conducted Output Power Result										
Directional Gain (dBi)		5	RF Output Power (dBm)							
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	Chain-Port 2	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-20M	2	2412	16.38	16.49	-	-	19.45	30.0	24.45	36.0
11N2.4G-20M	2	2437	16.26	16.11	-	-	19.20	30.0	24.20	36.0
11N2.4G-20M	2	2462	16.05	15.80	-	-	18.94	30.0	23.94	36.0
Result		Complied								

Note 1: N_{TX} = Number of Transmit Chains

Maximum Peak Conducted Output Power Result										
Directional Gain (dBi)		5	RF Output Power (dBm)							
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	Chain-Port 2	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-40M	2	2422	16.19	16.73	-	-	19.48	30.0	24.48	36.0
11N2.4G-40M	2	2437	16.11	16.09	-	-	19.11	30.0	24.11	36.0
11N2.4G-40M	2	2452	16.01	15.66	-	-	18.85	30.0	23.85	36.0
Result		Complied								

Note 1: N_{TX} = Number of Transmit Chains

3.3.6 Test Result of Maximum Conducted (Average) Output Power

Maximum Conducted (Average) Output Power Result										
Directional Gain (dBi)		5	RF Output Power (dBm)							
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11B-20M	1	2412	16.50	-	-	-	16.50	30.0	21.50	36.0
11B-20M	1	2437	16.76	-	-	-	16.76	30.0	21.76	36.0
11B-20M	1	2462	16.75	-	-	-	16.75	30.0	21.75	36.0
Result		Complied								

Note 1: N_{TX} = Number of Transmit Chains

Maximum Conducted (Average) Output Power Result										
Directional Gain (dBi)		5	RF Output Power (dBm)							
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11G-20M	1	2412	14.72	-	-	-	14.72	30.0	19.72	36.0
11G-20M	1	2437	14.85	-	-	-	14.85	30.0	19.85	36.0
11G-20M	1	2462	14.63	-	-	-	14.63	30.0	19.63	36.0
Result		Complied								

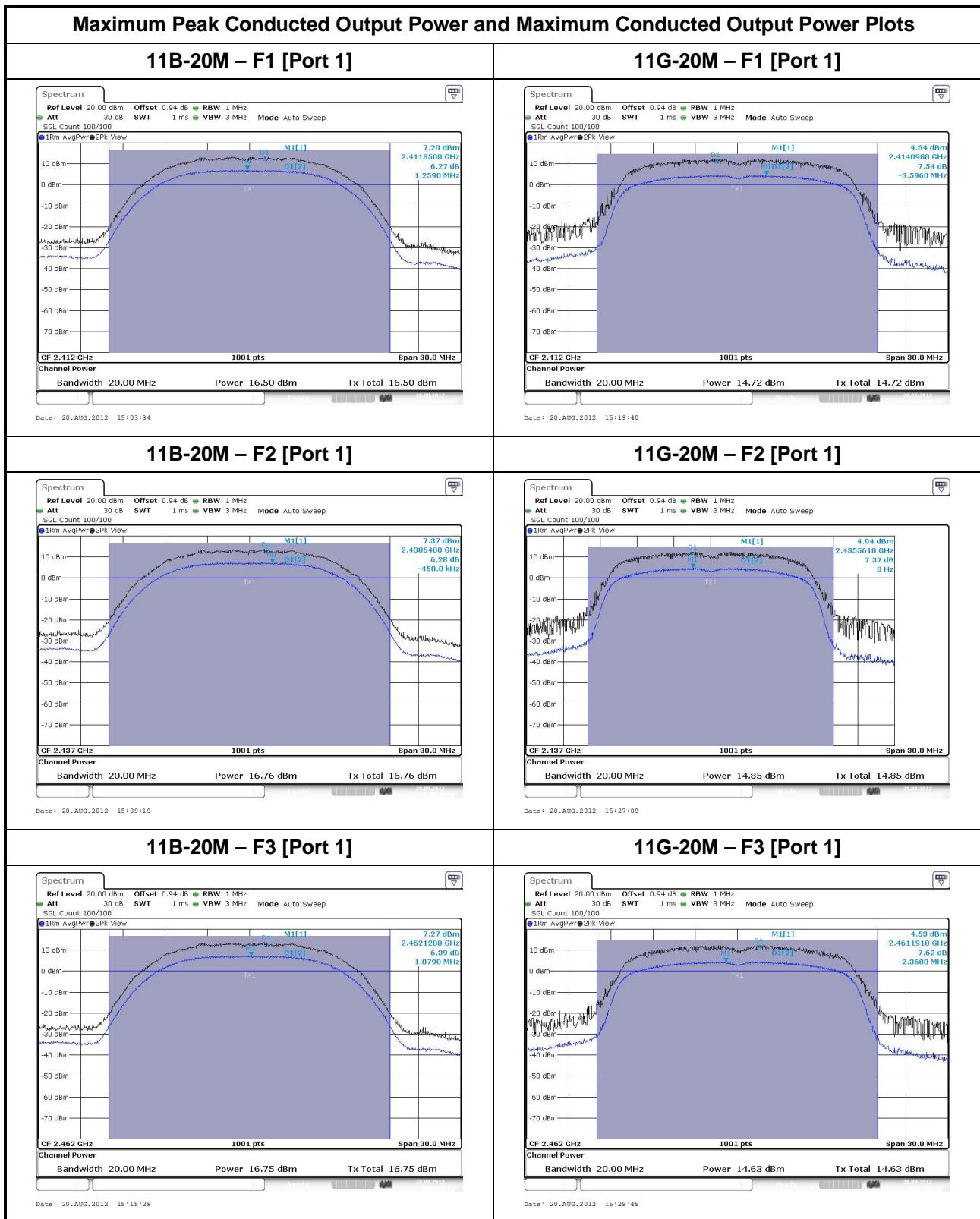
Note 1: N_{TX} = Number of Transmit Chains

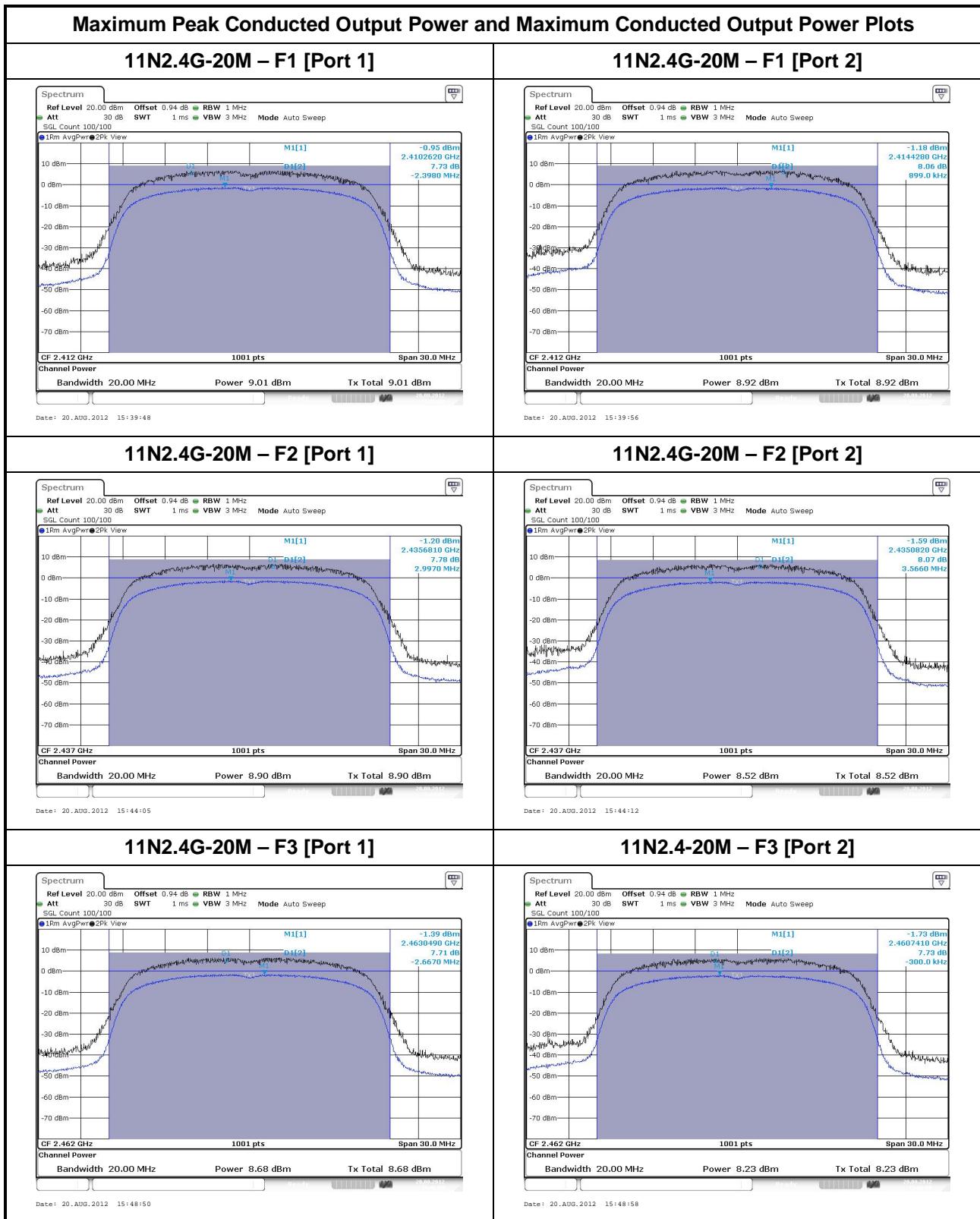
Maximum Conducted (Average) Output Power Result										
Directional Gain (dBi)		5	RF Output Power (dBm)							
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	Chain-Port 2	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-20M	2	2412	9.01	8.92	-	-	11.98	30.0	16.98	36.0
11N2.4G-20M	2	2437	8.90	8.52	-	-	11.72	30.0	16.72	36.0
11N2.4G-20M	2	2462	8.68	8.23	-	-	11.47	30.0	16.47	36.0
Result		Complied								

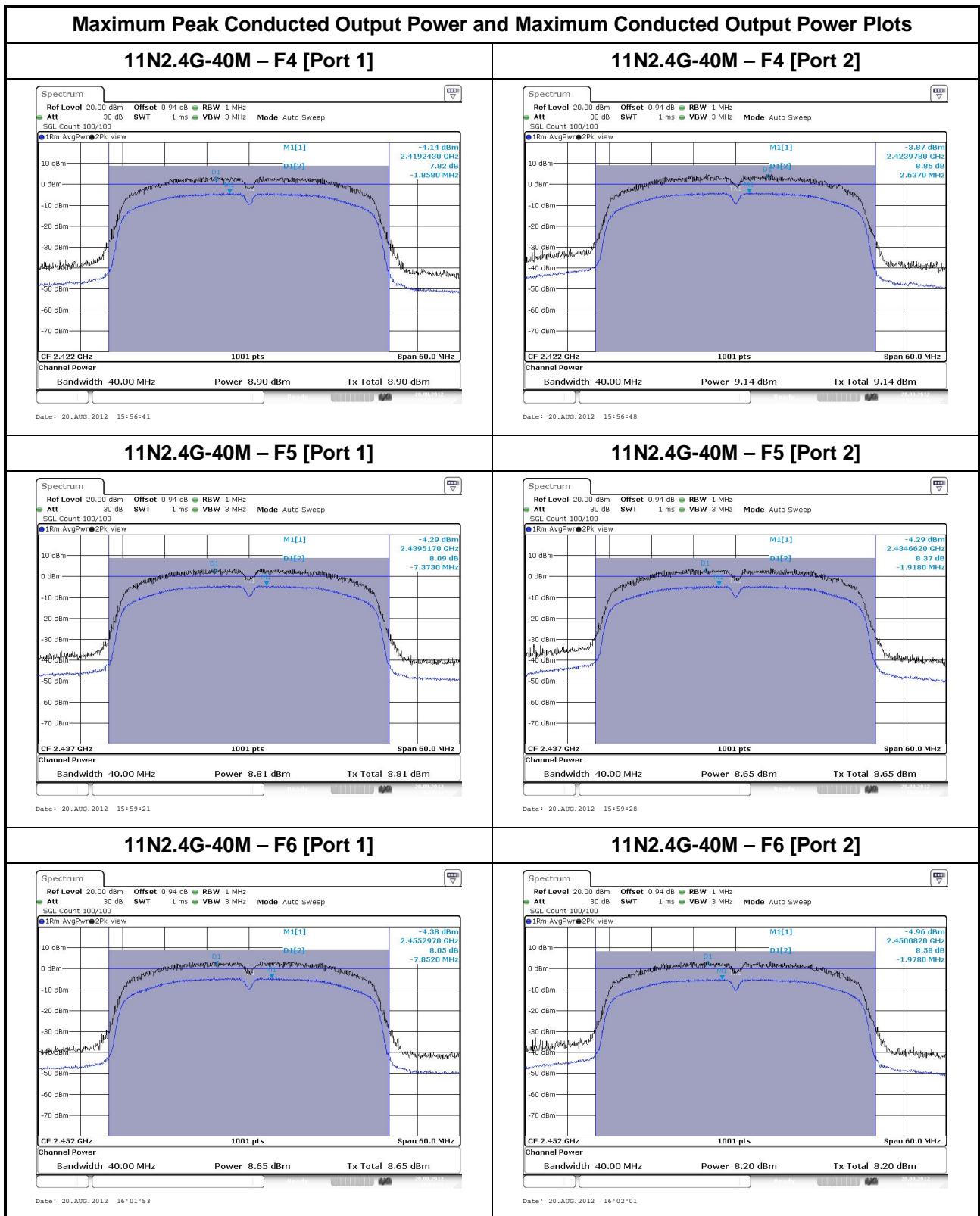
Note 1: N_{TX} = Number of Transmit Chains

Maximum Conducted (Average) Output Power Result										
Directional Gain (dBi)		5	RF Output Power (dBm)							
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	Chain-Port 2	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-40M	2	2422	8.90	9.14	-	-	12.03	30.0	17.03	36.0
11N2.4G-40M	2	2437	8.81	8.65	-	-	11.74	30.0	16.74	36.0
11N2.4G-40M	2	2452	8.65	8.20	-	-	11.44	30.0	16.44	36.0
Result		Complied								

Note 1: N_{TX} = 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) $\leq 8 \text{ dBm}/3\text{kHz}$	

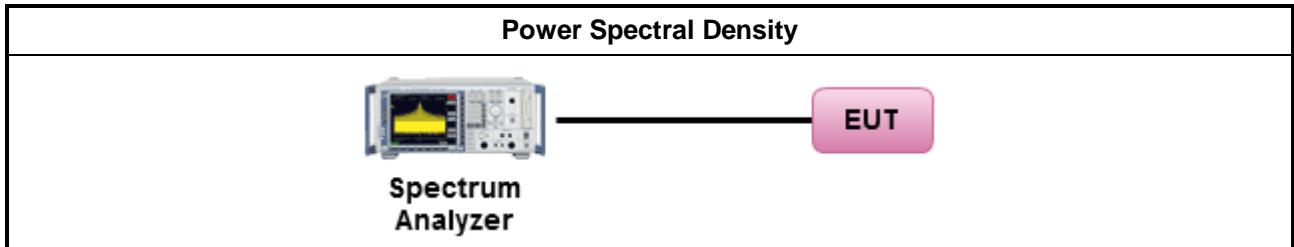
3.4.2 Measuring Instruments

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 5.3.1 Option 1 (peak PSD; BWCF=-15.2dB).	
<input type="checkbox"/> Refer as FCC KDB 558074, clause 5.3.2 Option 2 (average PSD; BWCF=-15.2dB).	
<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 2 for conducted measurement.	
<input type="checkbox"/> The EUT supports single transmit chain and measurements performed on this transmit chain.	
<input checked="" type="checkbox"/> The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.	
<input checked="" type="checkbox"/> The EUT supports 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 2 for radiated measurement.	

3.4.4 Test Setup



3.4.5 Test Result of Power Spectral Density

Power Spectral Density Result							
Directional Gain (dBi)		5	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	PSD Limit
11B-20M	1	2412	-11.20	-	-	-	8
11B-20M	1	2437	-10.81	-	-	-	8
11B-20M	1	2462	-9.76	-	-	-	8
Result			Complied				

Note 1: N_{TX} = Number of Transmit Chains

Power Spectral Density Result							
Directional Gain (dBi)		5	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	PSD Limit
11G-20M	1	2412	-14.93	-	-	-	8
11G-20M	1	2437	-15.25	-	-	-	8
11G-20M	1	2462	-15.38	-	-	-	8
Result			Complied				

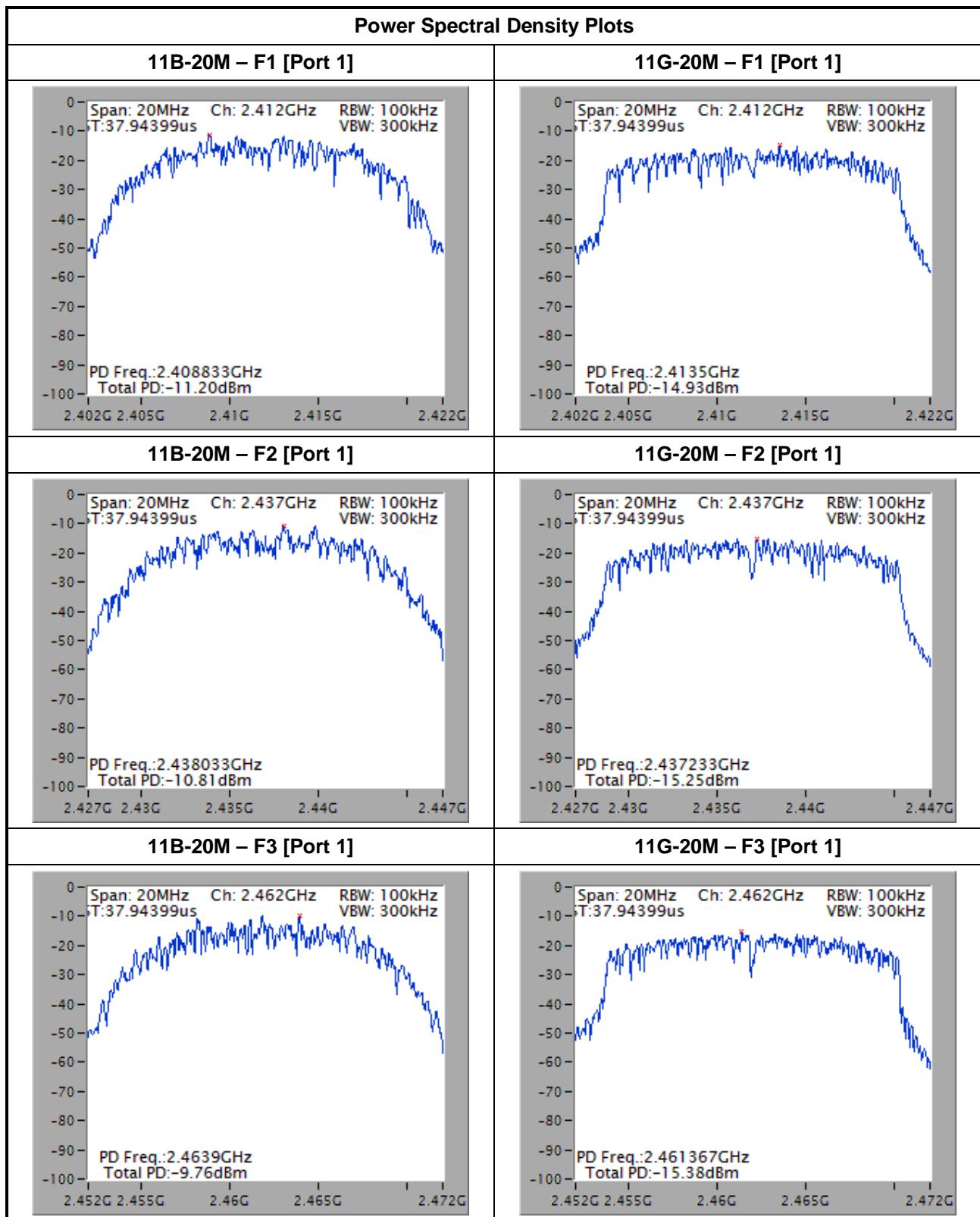
Note 1: N_{TX} = Number of Transmit Chains]

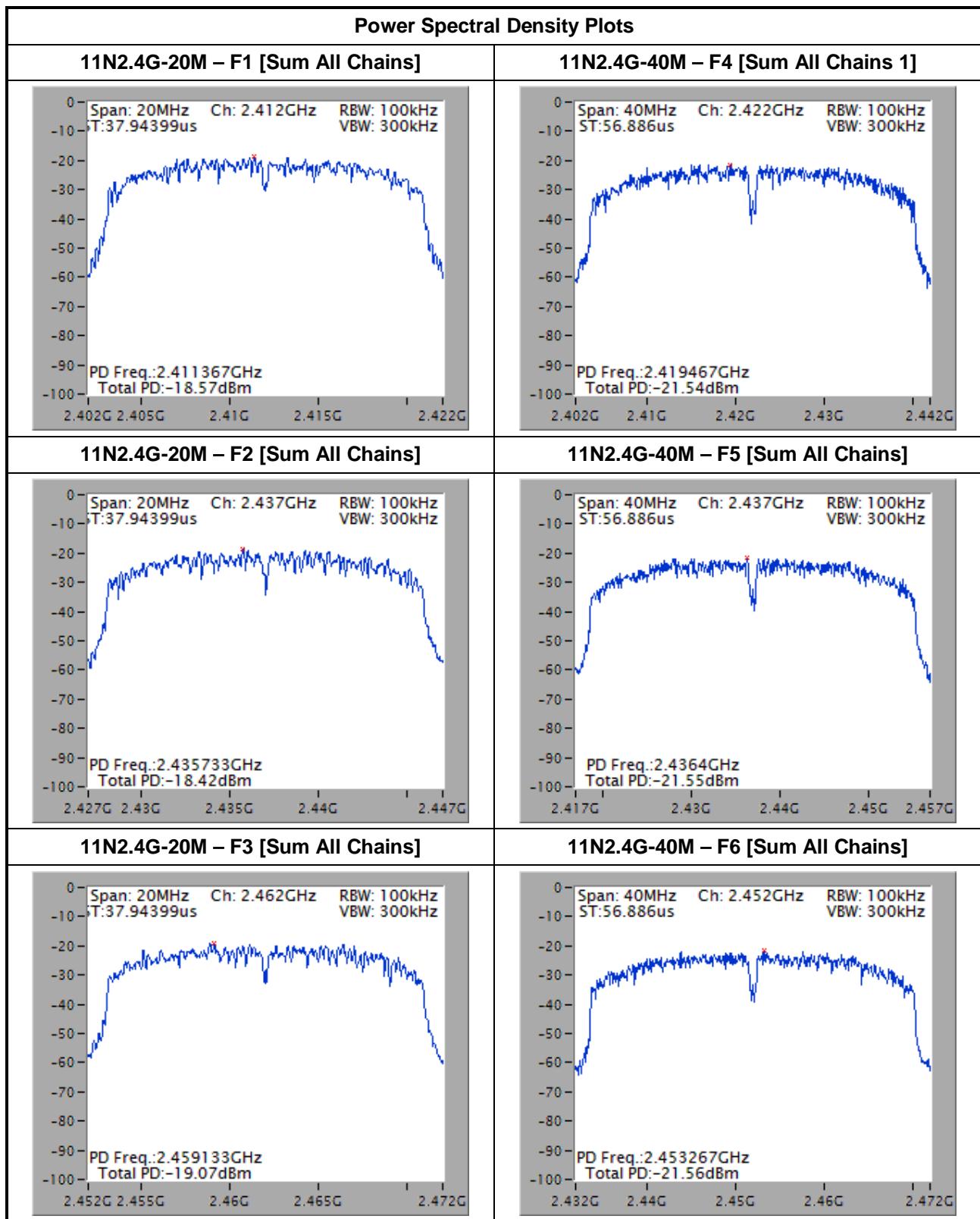
Power Spectral Density Result							
Directional Gain (dBi)		5	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N _{TX}	Freq. (MHz)	Sum All Chains	-	-	-	PSD Limit
11N2.4G-20M	2	2412	-18.57	-	-	-	8
11N2.4G-20M	2	2437	-18.42	-	-	-	8
11N2.4G-20M	2	2462	-19.07	-	-	-	8
Result		Complied					

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							
Directional Gain (dBi)		5	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N _{TX}	Freq. (MHz)	Sum All Chains	-	-	-	PSD Limit
11N2.4G-40M	2	2422	-21.54	-	-	-	8
11N2.4G-40M	2	2437	-21.55	-	-	-	8
11N2.4G-40M	2	2452	-21.56	-	-	-	8
Result		Complied					

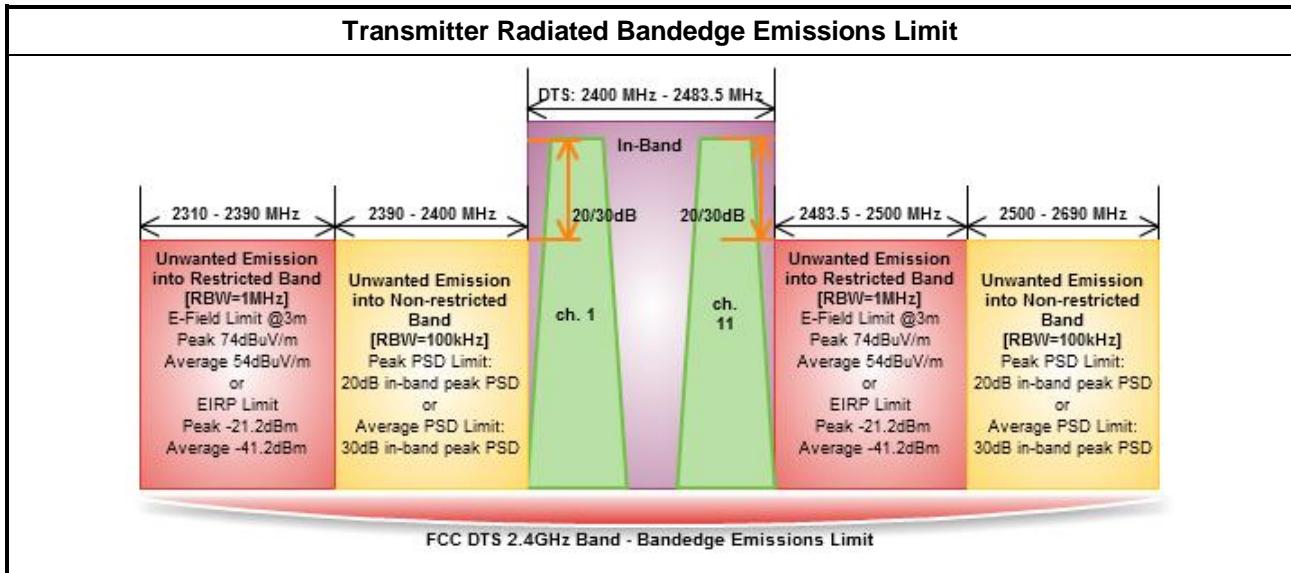
Note 1: N_{TX} = Number of Transmit Chains
 Note 2: PSD [dBm/3kHz] = sum each transmit chains by bin-to-bin PSD [dBm/100kHz] + BWFC [-15.2 dB]





3.5 Transmitter Radiated Bandedge Emissions

3.5.1 Transmitter Radiated Bandedge Emissions Limit



3.5.2 Measuring Instruments

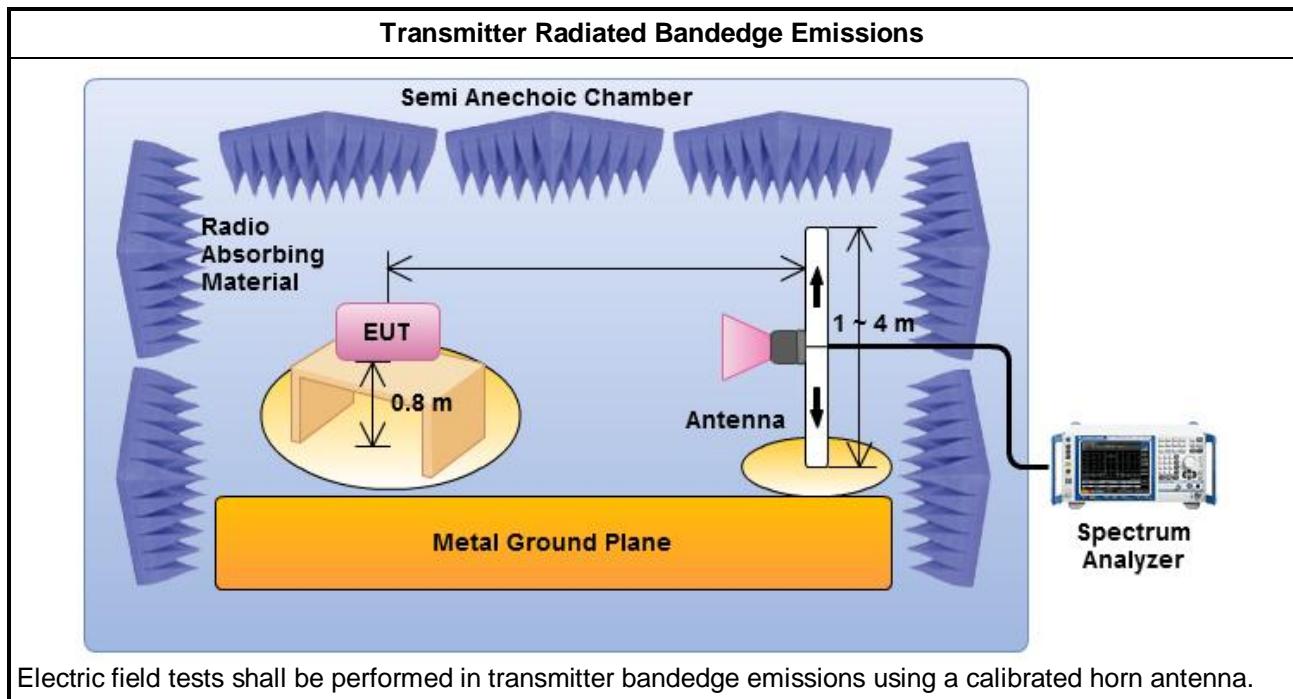
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

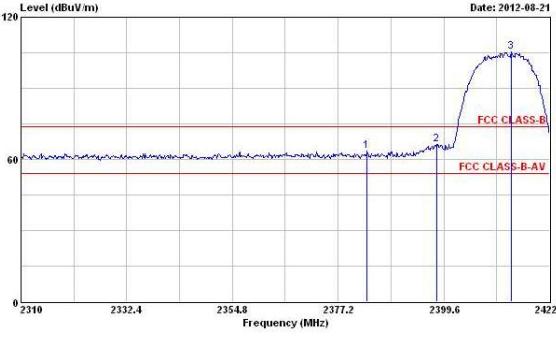
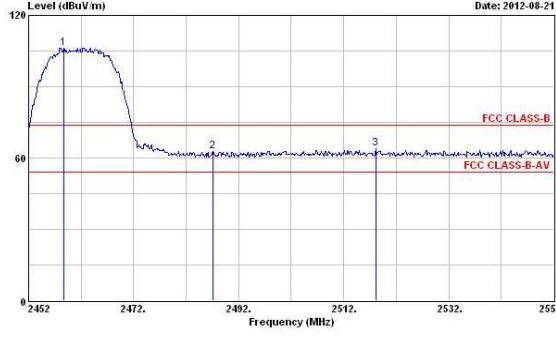
Test Method – General Information	
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and 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 5.4.1 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2 for unwanted emissions into restricted bands.
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 5.4.2.2.1 Option 1 (Power Averaging).
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 5.4.2.2.2 Option 2 (Trace Averaging).
	<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 5.4.2.2.1.1 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 5.4.2.2.4 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 2 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 5.4.2.2.1 unwanted emissions in restricted bands on frequencies \leq 1000 MHz
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 5.4.2.2.2 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 2 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.

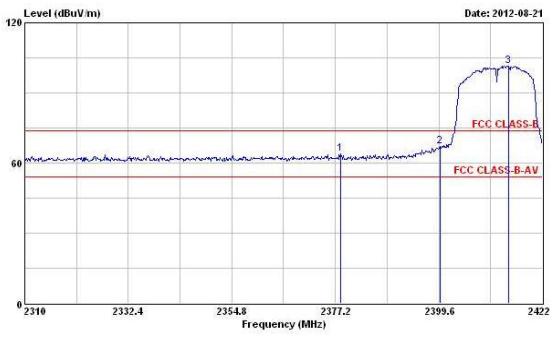
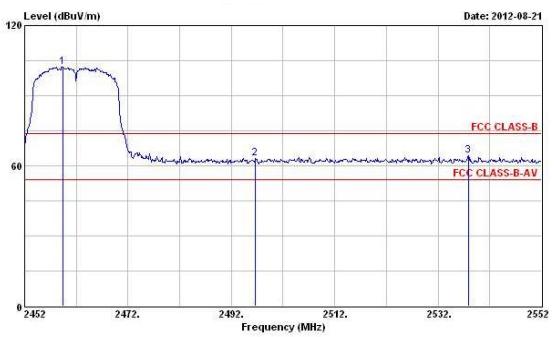
3.5.4 Test Setup



3.5.5 Test Result of Transmitter Radiated Bandedge Emissions

Transmitter Radiated Bandedge Emissions Result									
Gain (dBi)		5		Non-restricted Band Emissions					
Modulation		11B-20M							
Non-restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dB _{uV} /100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dB _{uV} /100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	1	2412	105.25	2398.14	66.49	38.76	20	PK	V
2500-2690	1	2462	106.34	2518.20	63.99	42.35	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									
Gain (dBi)		5		Restricted Band Emissions					
Modulation		11B-20M							
Restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dB _{uV} /1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dB _{uV} /m)	Limit (dB _{uV} /m)	Level Type	Pol. note 1
2310-2390	1	2412	112.61	2389.97	3	64.81	74	PK	V
2310-2390	1	2412	103.93	2388.74	3	51.88	54	AV	V
2483.5-2500	1	2462	113.87	2499.10	3	63.09	74	PK	V
2483.5-2500	1	2462	104.87	2500.00	3	50.23	54	AV	V
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).									

Transmitter Radiated Bandedge Emissions Result									
Gain (dBi)		5		Non-restricted Band Emissions					
Modulation		11G-20M							
Non-restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dB _{uV} /100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dB _{uV} /100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	1	2412	101.53	2399.82	67.01	34.52	20	PK	V
2500-2690	1	2462	102.17	2537.90	64.39	37.78	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									
Gain (dBi)		5		Restricted Band Emissions					
Modulation		11G-20M							
Restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dB _{uV} /1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dB _{uV} /m)	Limit (dB _{uV} /m)	Level Type	Pol. note 1
2310-2390	1	2412	110.37	2388.74	3	67.23	74	PK	V
2310-2390	1	2412	100.98	2389.63	3	52.57	54	AV	V
2483.5-2500	1	2462	111.00	2483.50	3	62.23	74	PK	V
2483.5-2500	1	2462	101.52	2499.00	3	50.24	54	AV	V

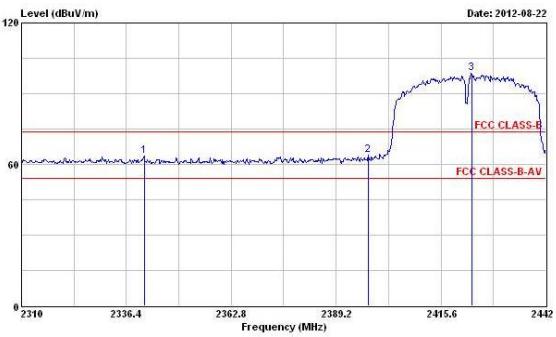
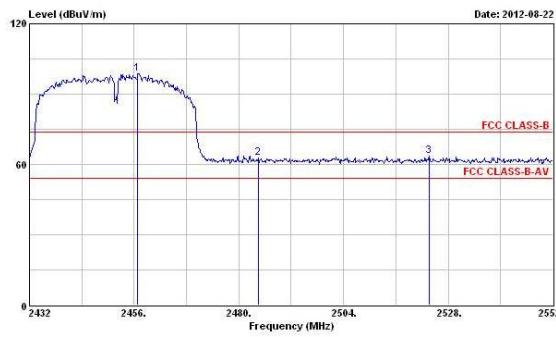
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).

Transmitter Radiated Bandedge Emissions Result									
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	2	2412	100.54	2398.93	65.91	37.11	20	PK	V
2500-2690	2	2462	101.01	2500.60	64.16	45.47	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									
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	2	2412	109.93	2390.00	3	64.19	74	PK	V
2310-2390	2	2412	98.13	2390.00	3	50.69	54	AV	V
2483.5-2500	2	2462	110.73	2495.80	3	63.41	74	PK	V
2483.5-2500	2	2462	98.55	2499.50	3	51.04	54	AV	V

Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).

Transmitter Radiated Bandedge Emissions Result									
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	2	2422	98.51	2397.38	63.81	31.10	20	PK	V
2500-2690	2	2452	98.66	2523.56	63.66	44.63	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									
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	2	2422	107.36	2388.94	3	64.23	74	PK	V
2310-2390	2	2422	95.61	2390.00	3	51.41	54	AV	V
2483.5-2500	2	2452	107.57	2493.20	3	63.70	74	PK	V
2483.5-2500	2	2452	95.87	2498.96	3	51.15	54	AV	V

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.

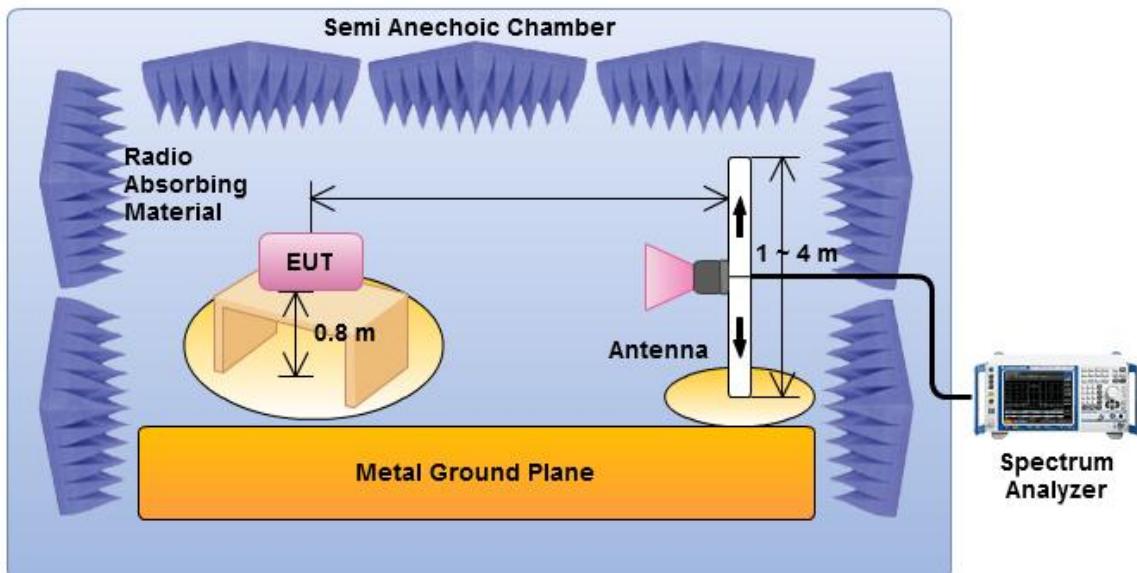
3.6.3 Test Procedures

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 10 GHz - 18GHz are typically made at a closer distance 1m, 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 - 25GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit.
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
<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 5.4.1 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2 for unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.1 Option 1 (Power Averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 5.4.2.2.2 Option 2 (Trace Averaging).
<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 5.4.2.2.1.1 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 2 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 5.4.2.2.1 unwanted emissions in restricted bands on frequencies \leq 1000 MHz
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 5.4.2.2.2 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.

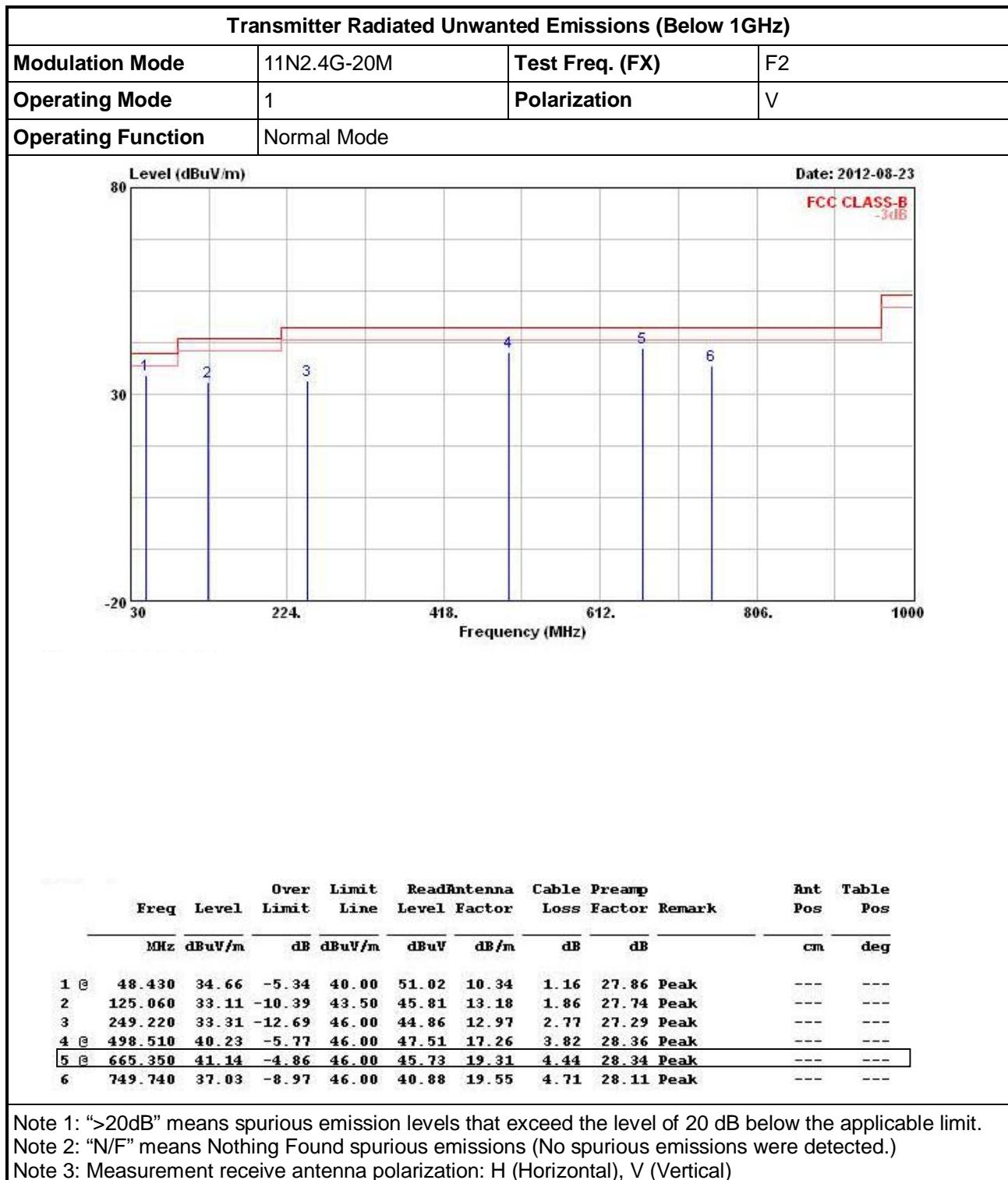
3.6.4 Test Setup

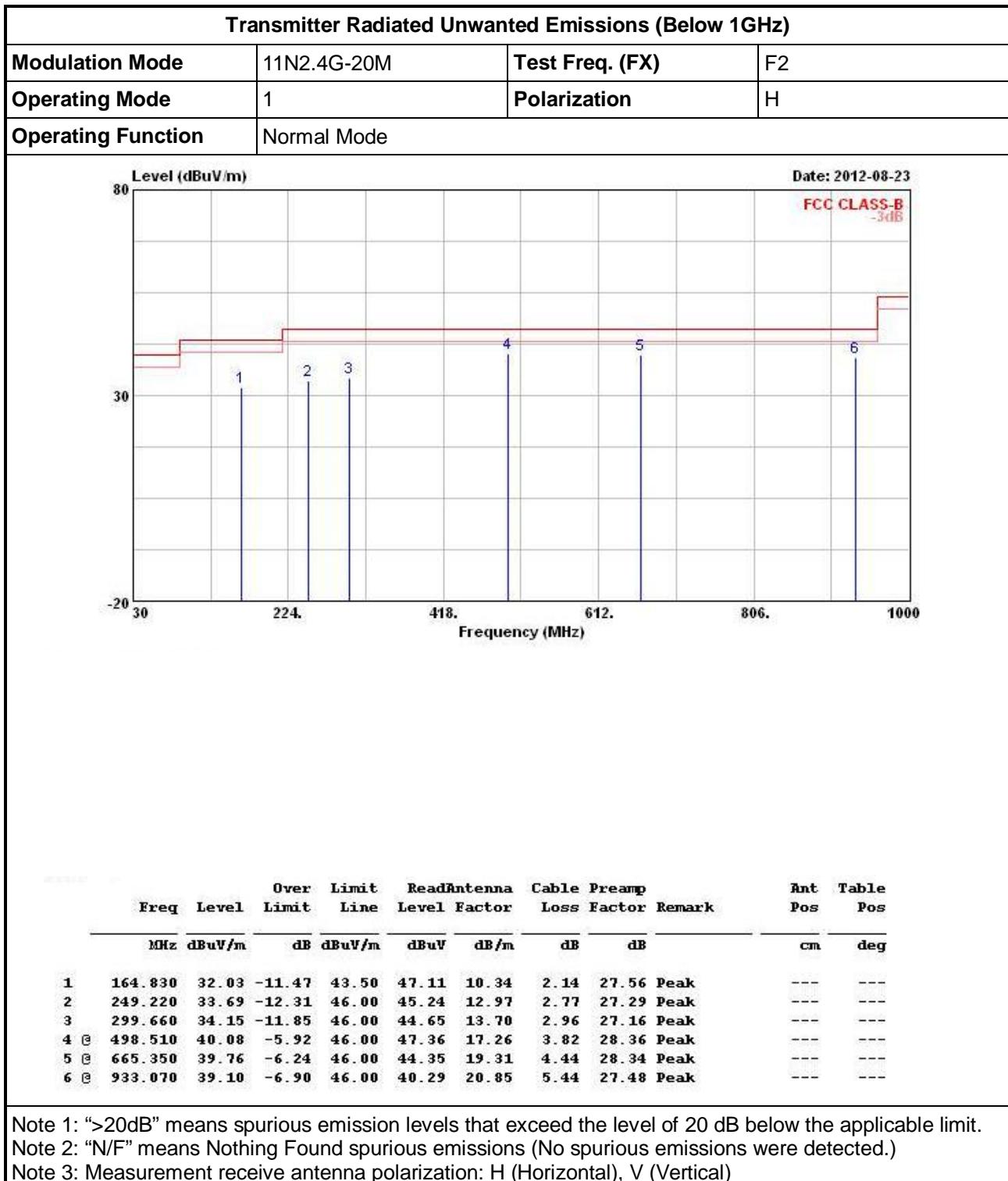
Transmitter Radiated Unwanted Emissions



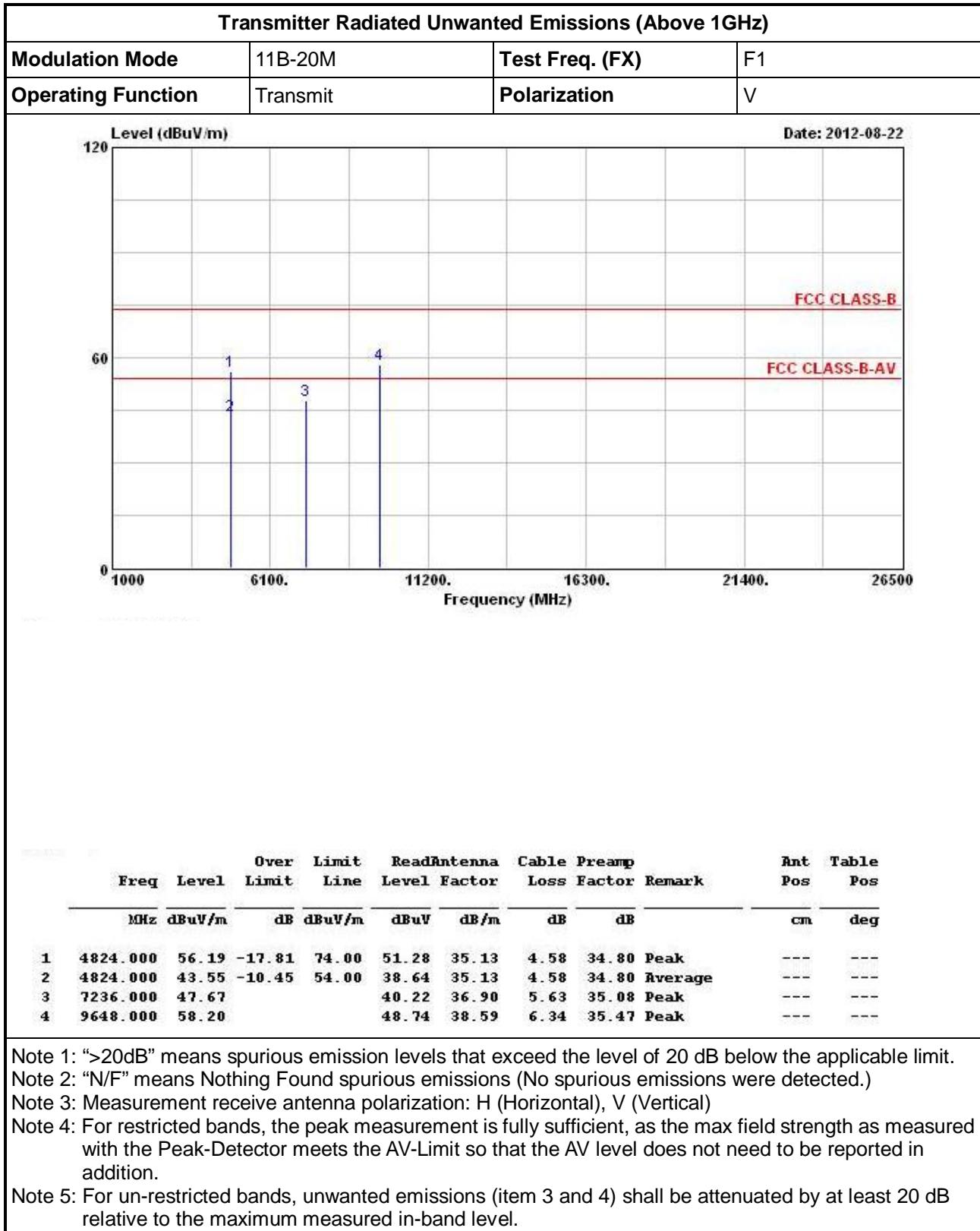
Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna and the frequency range of 1 GHz to 40 GHz using a calibrated horn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

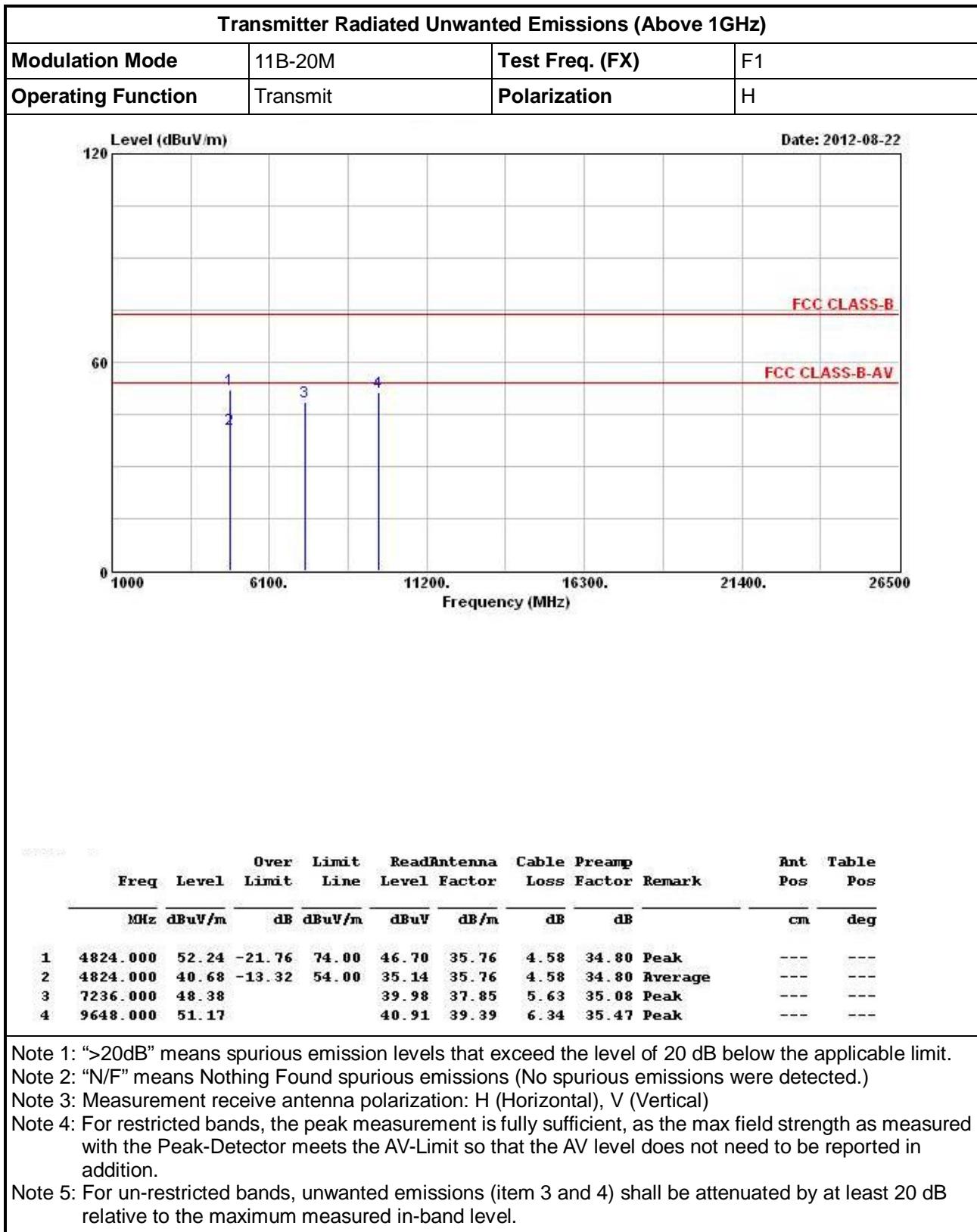
3.6.5 Test Result of Transmitter Radiated Unwanted Emissions (Below 1GHz)

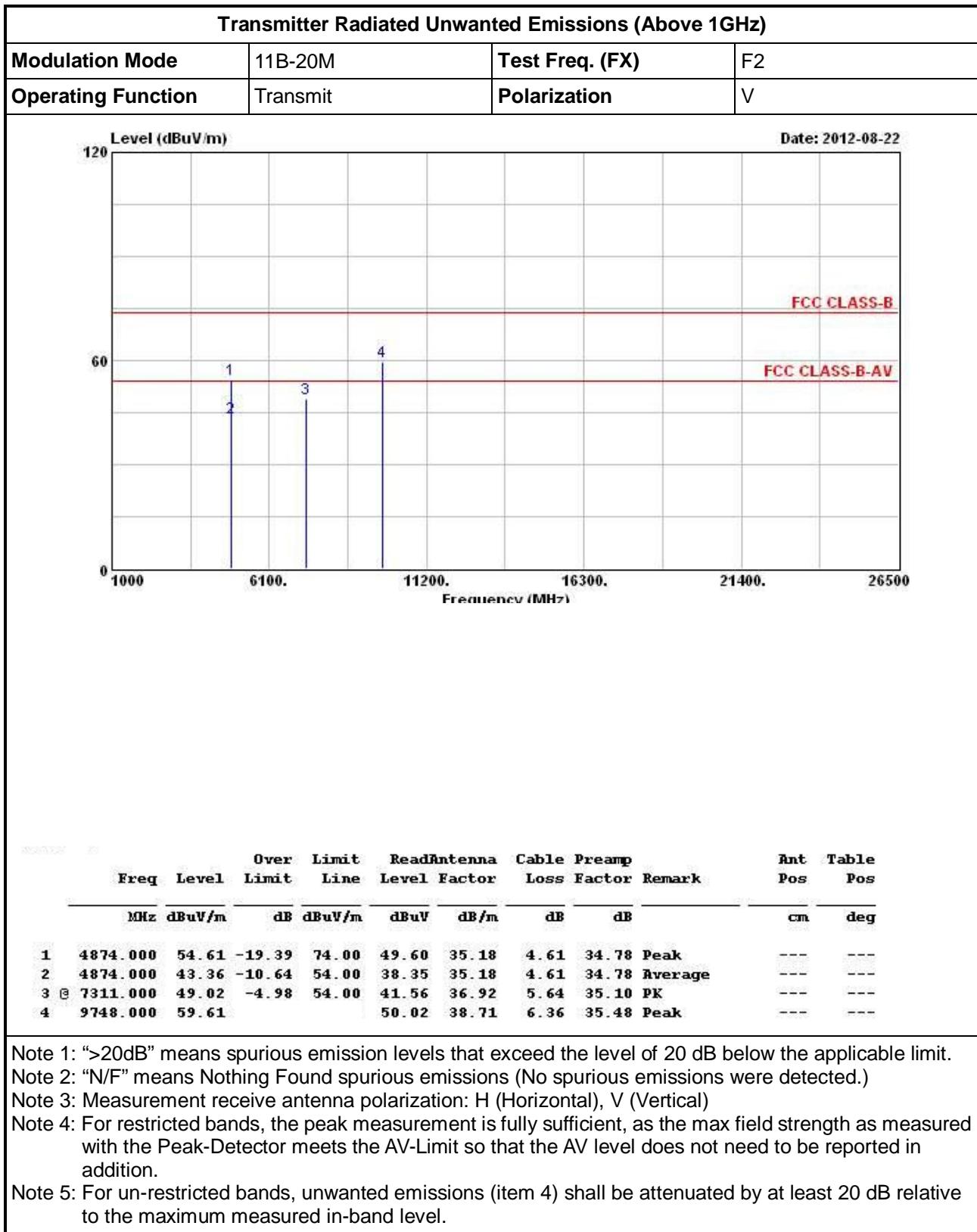


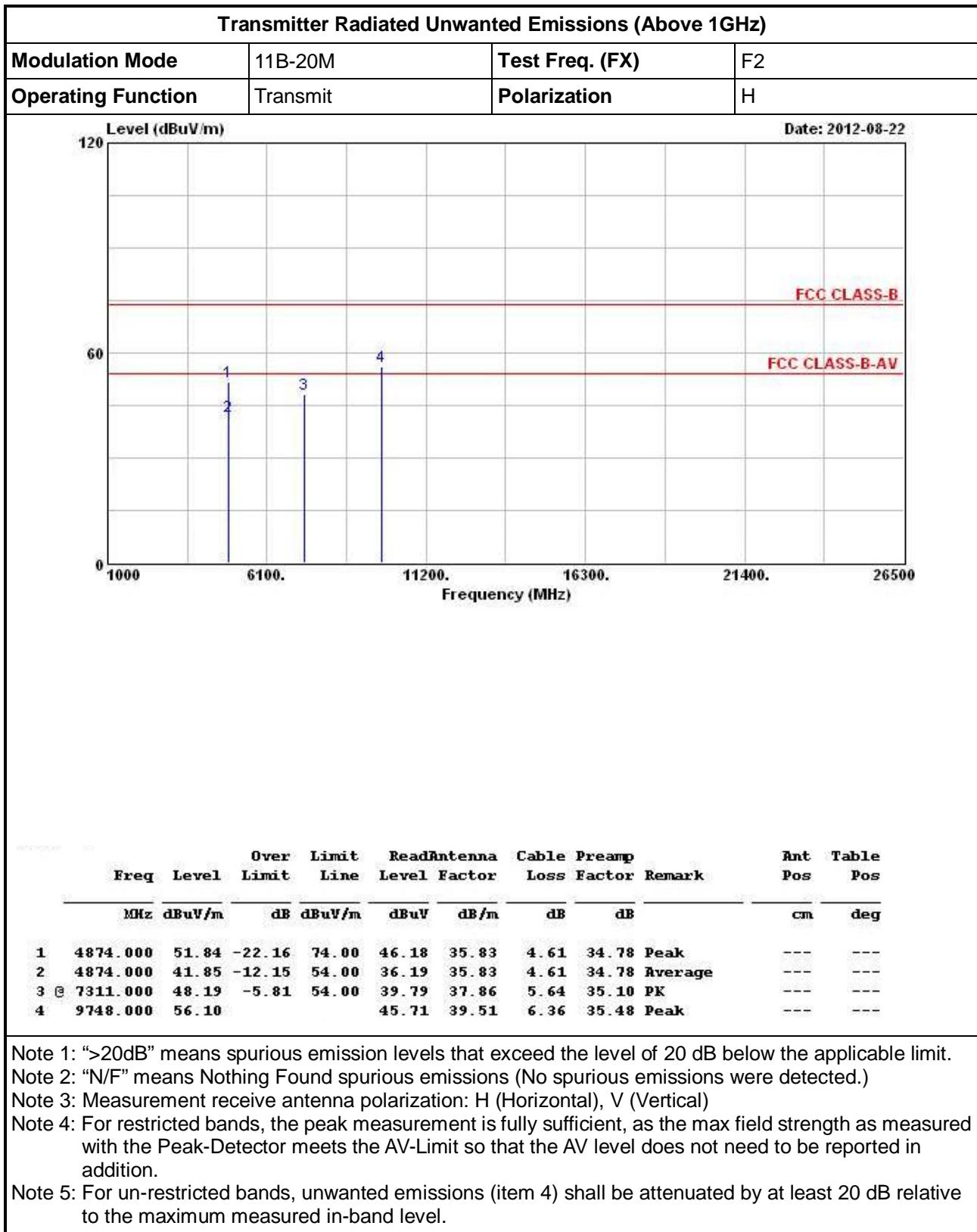


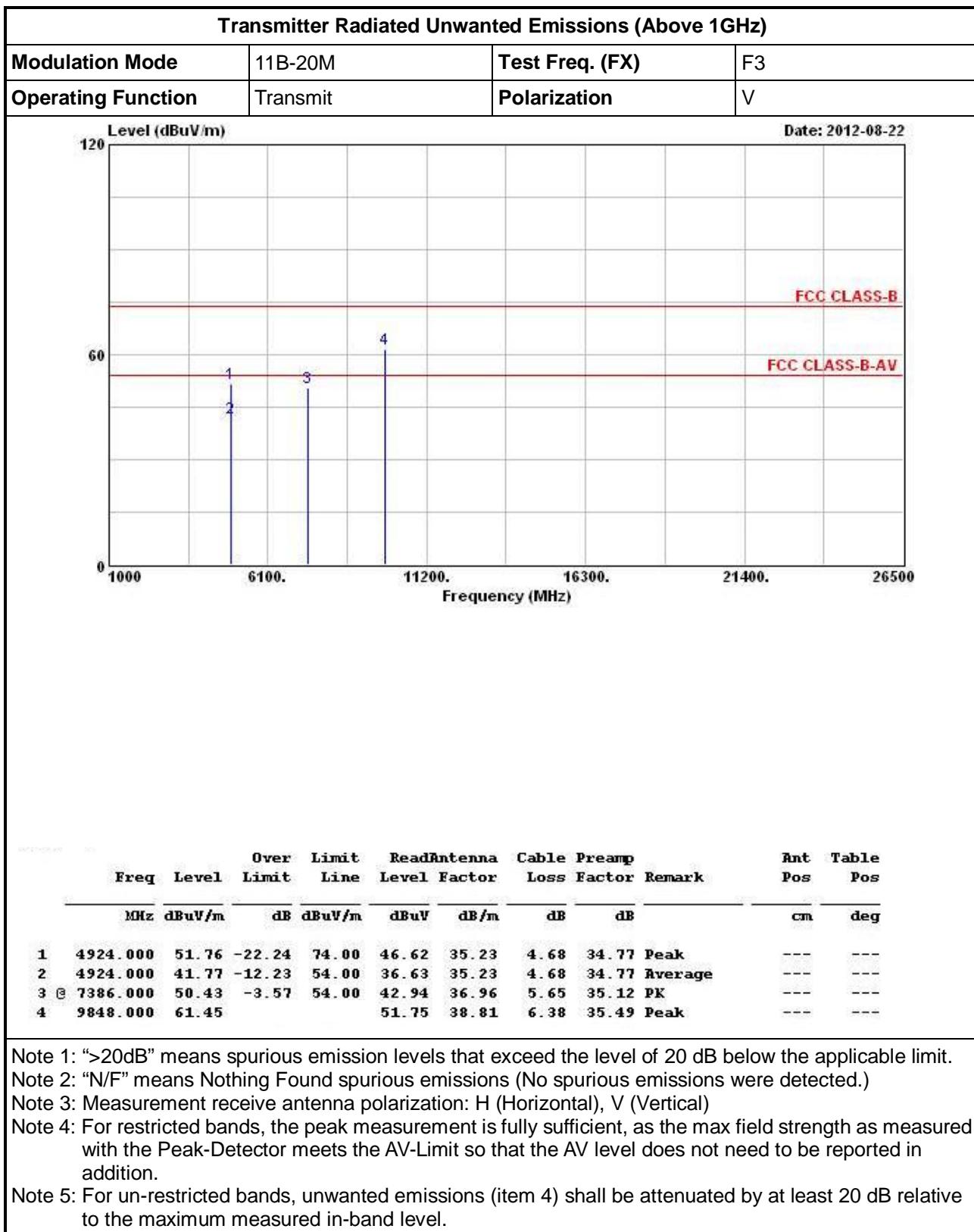
3.6.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11B-20M

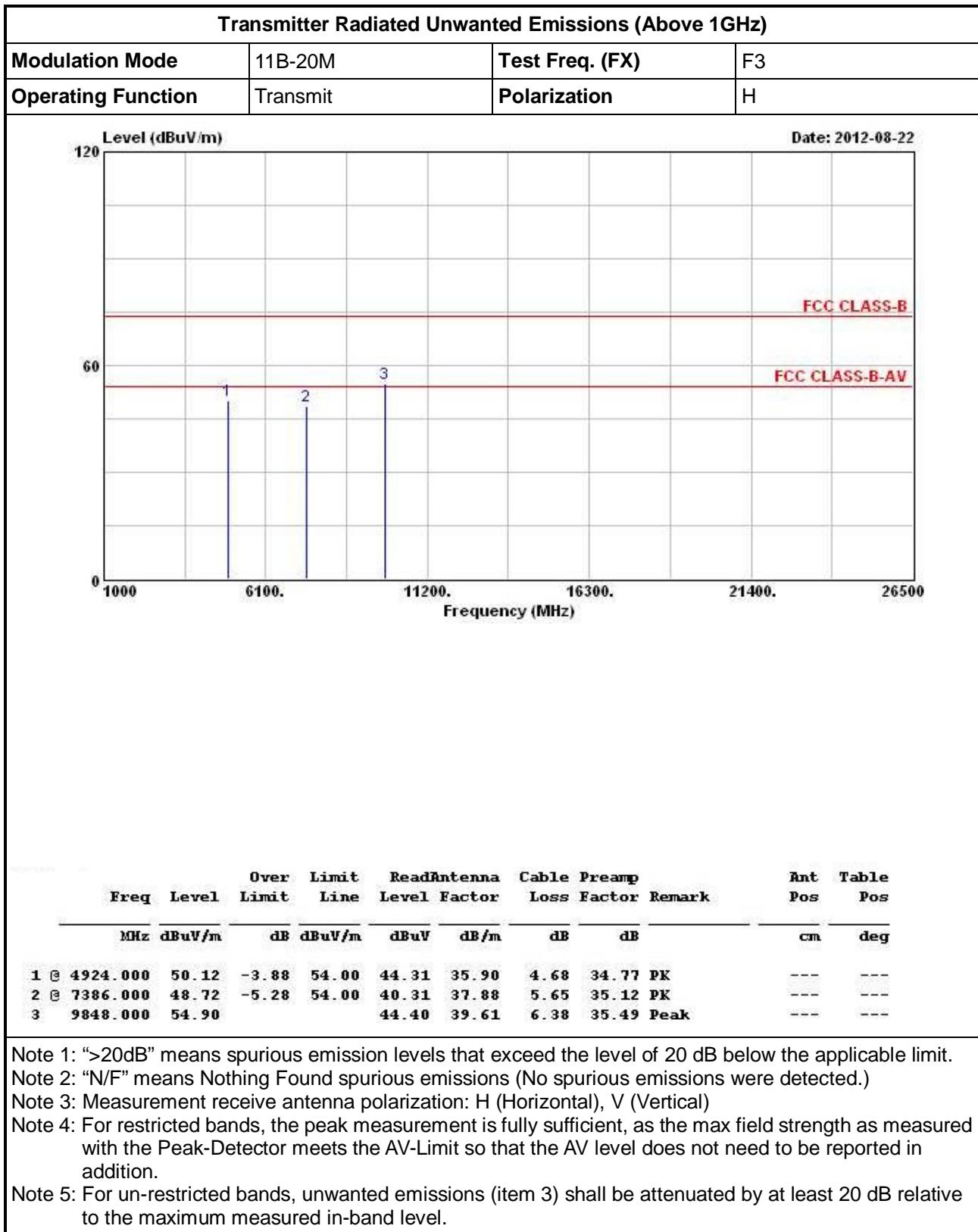




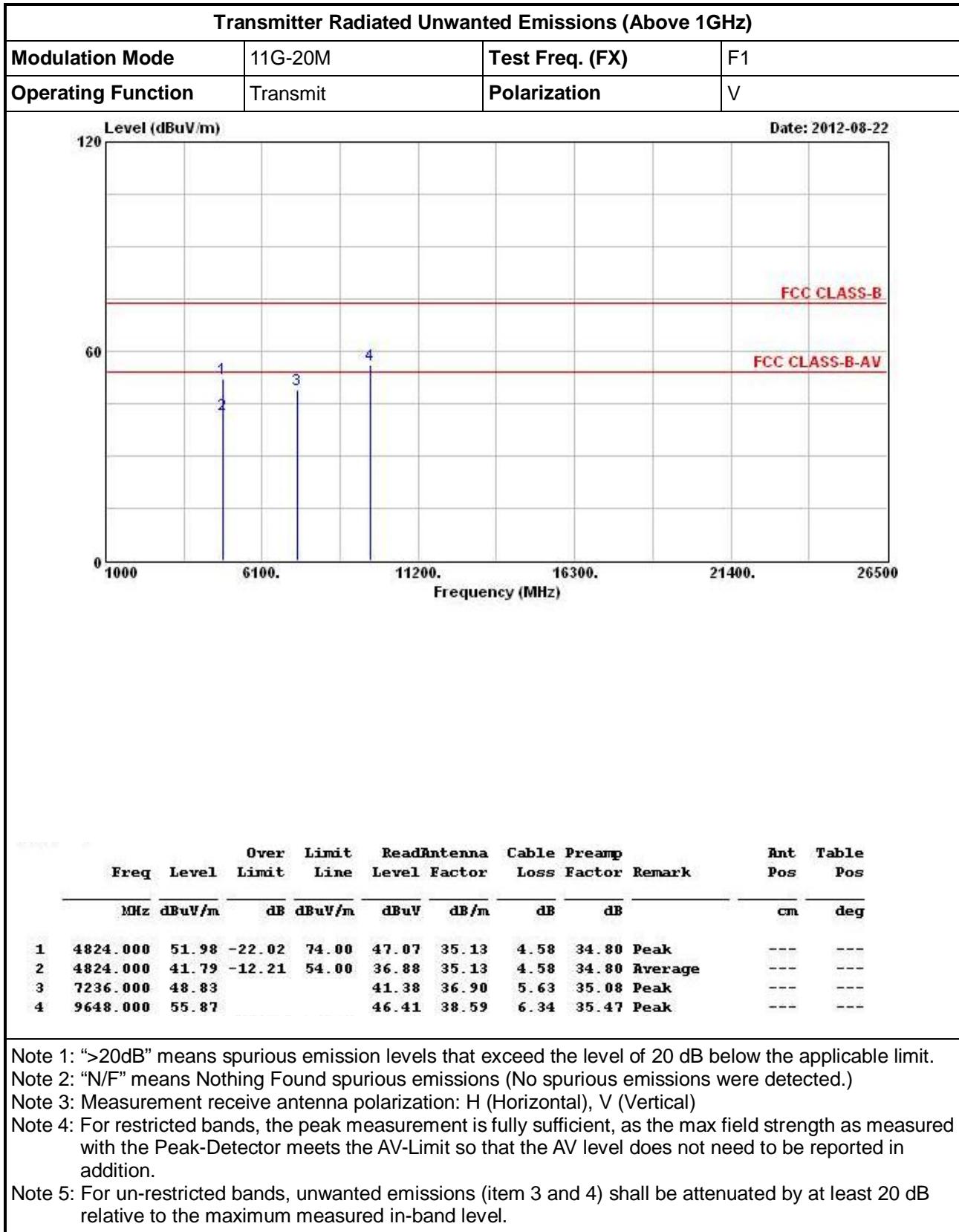


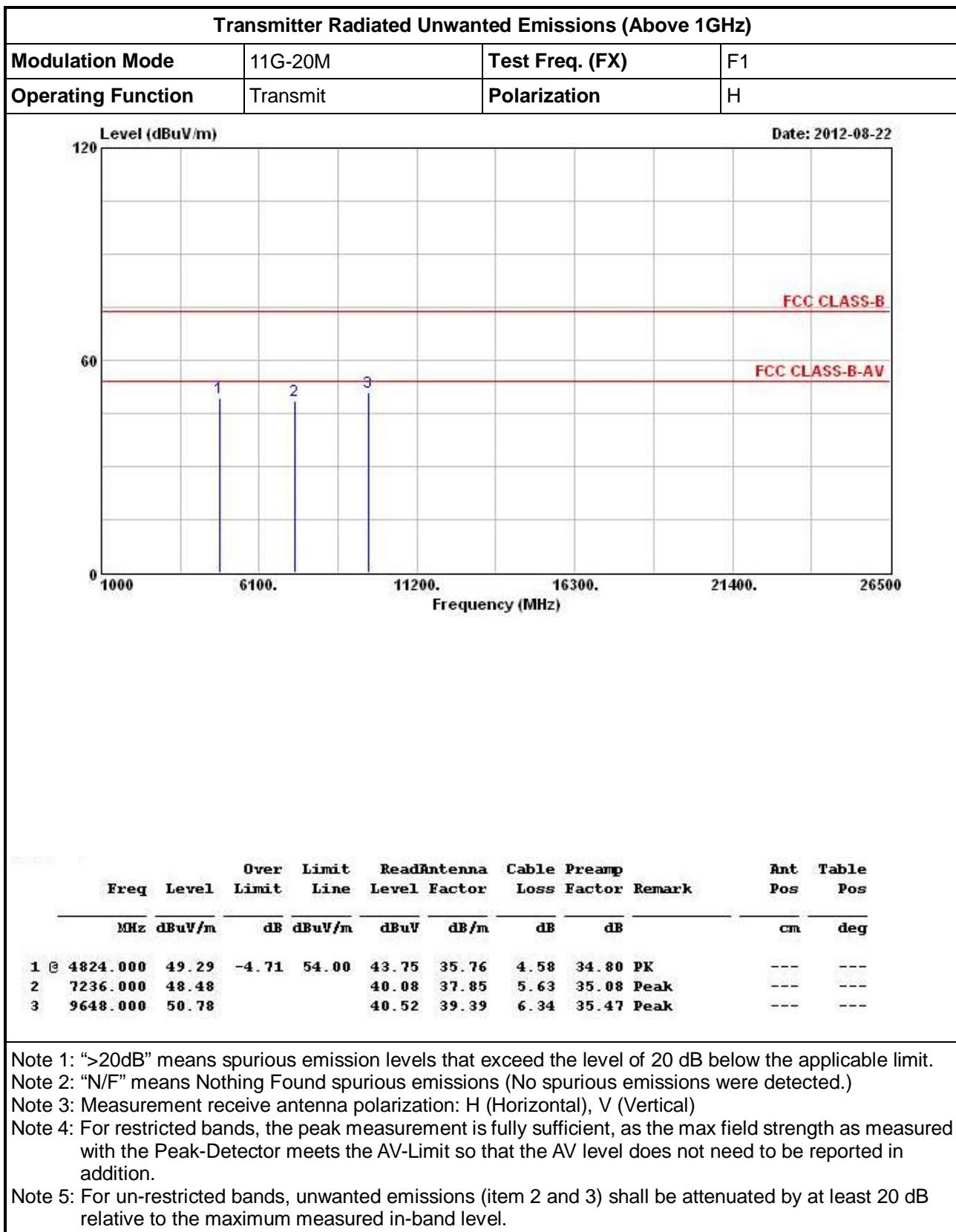


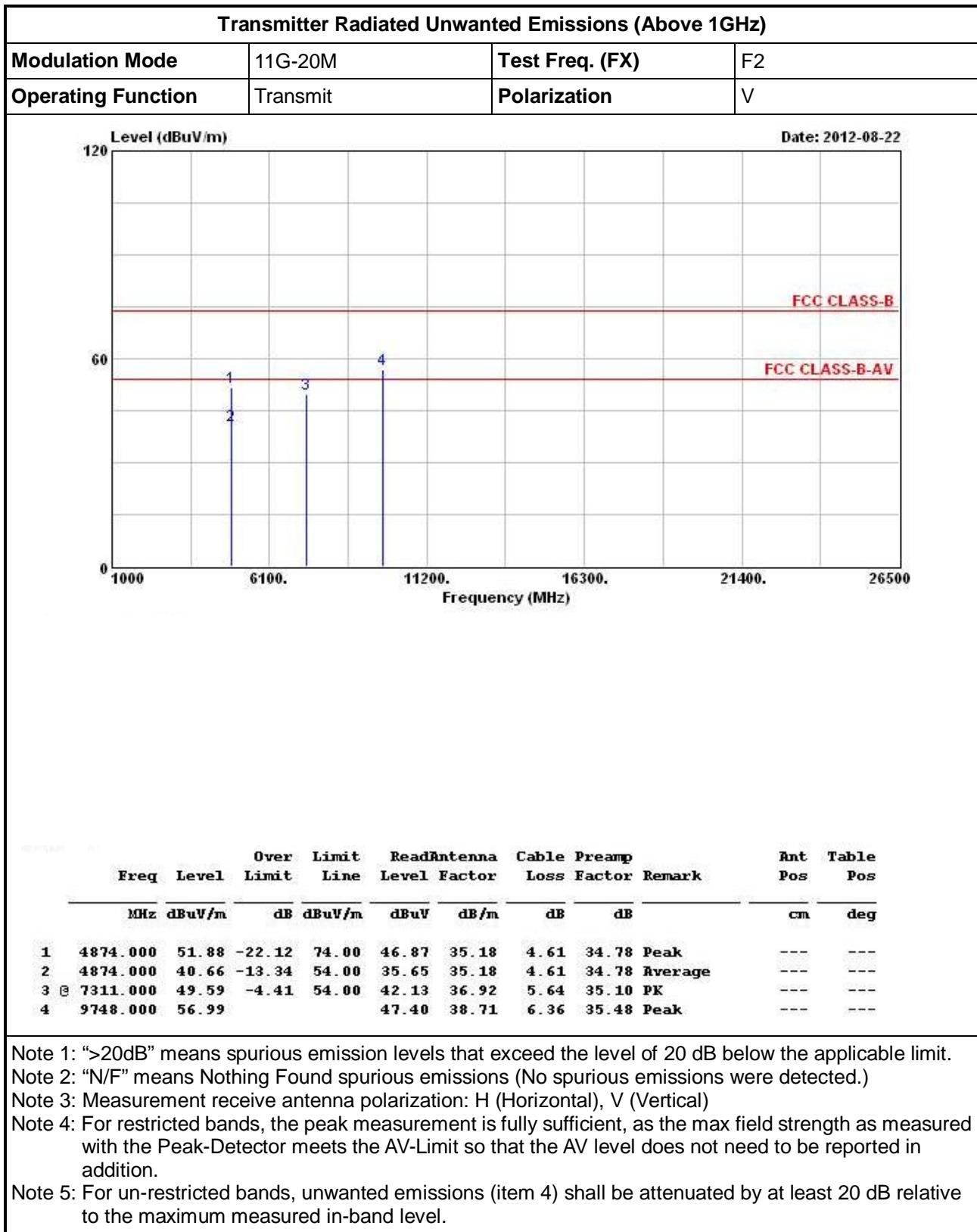


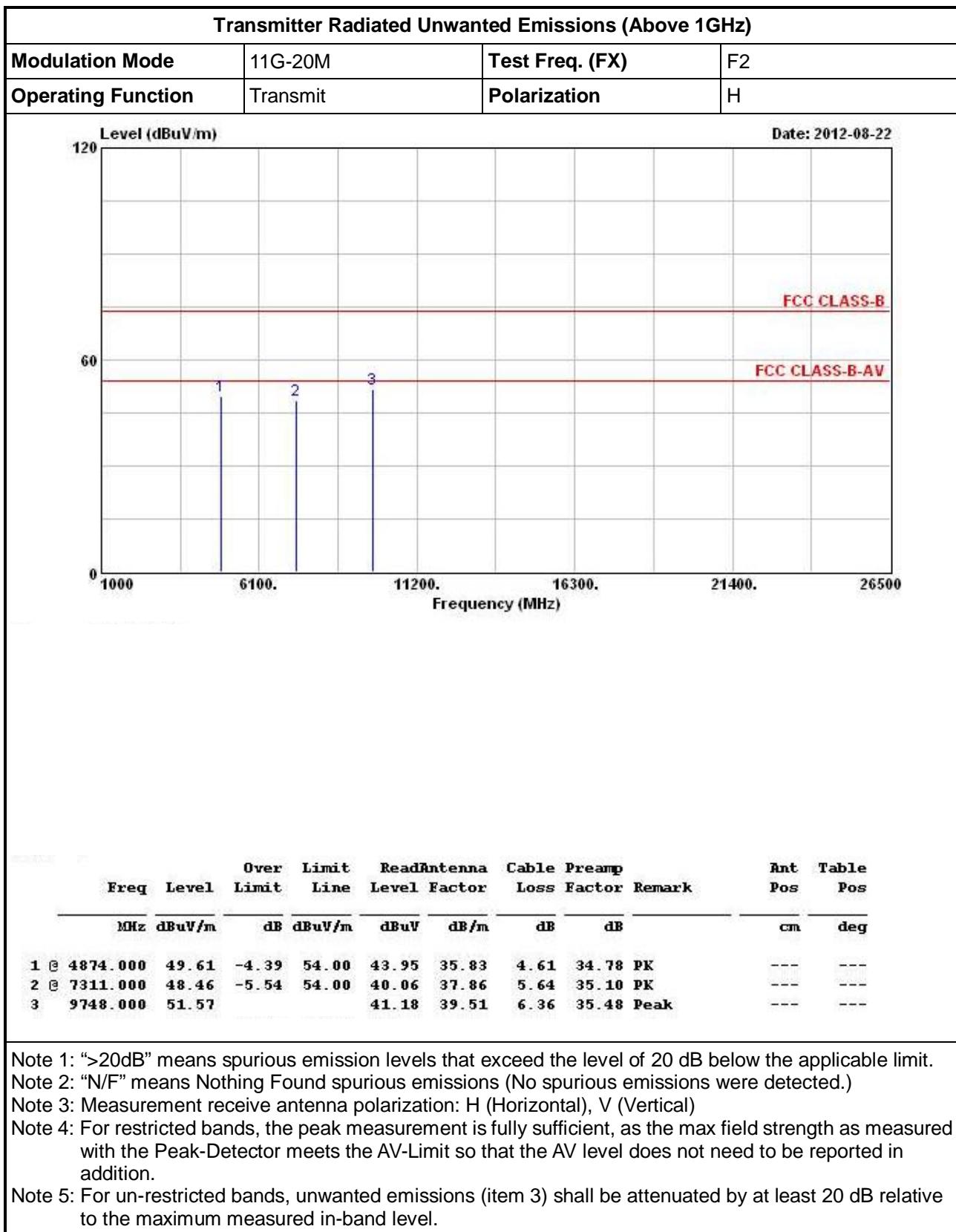


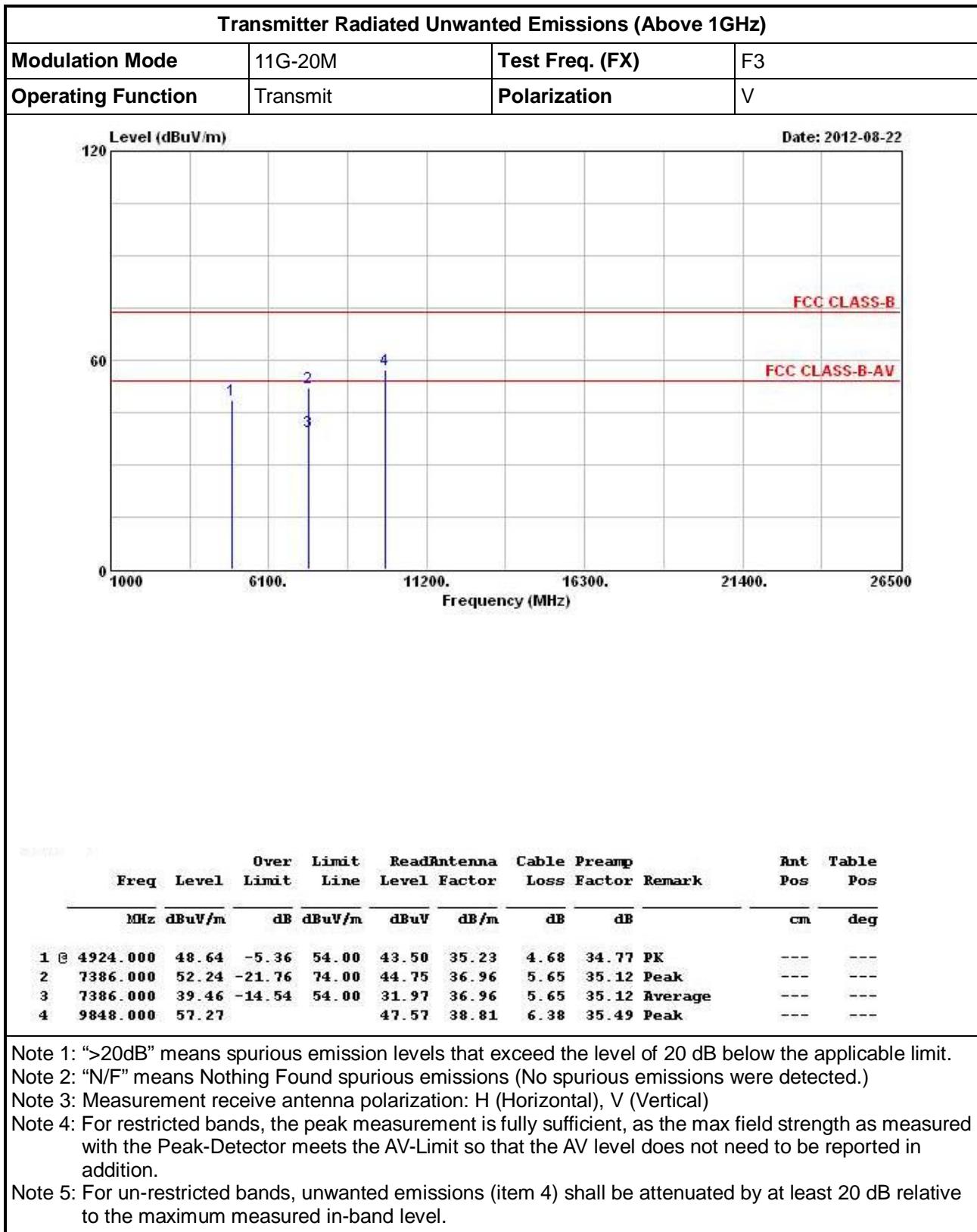
3.6.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11G-20M

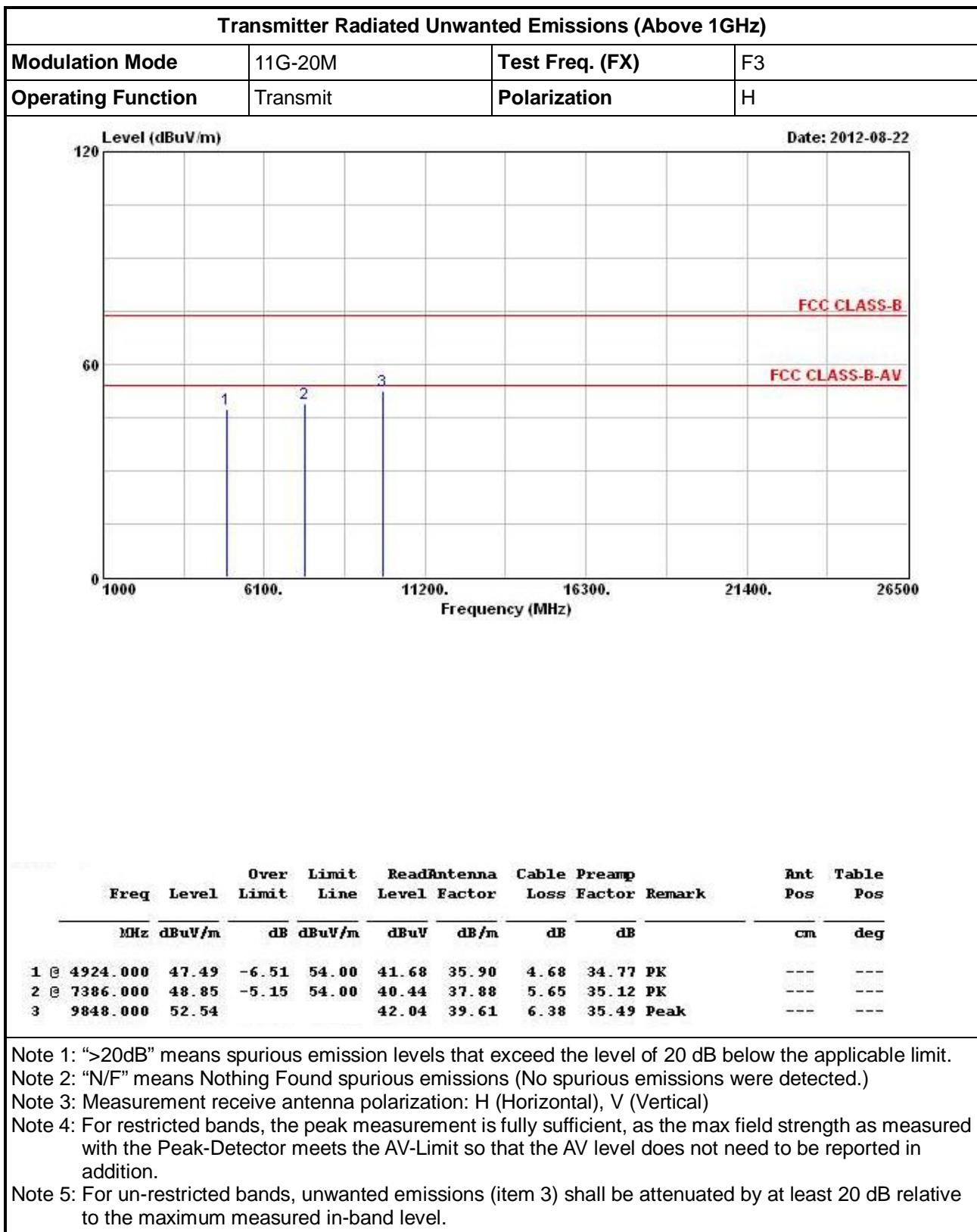




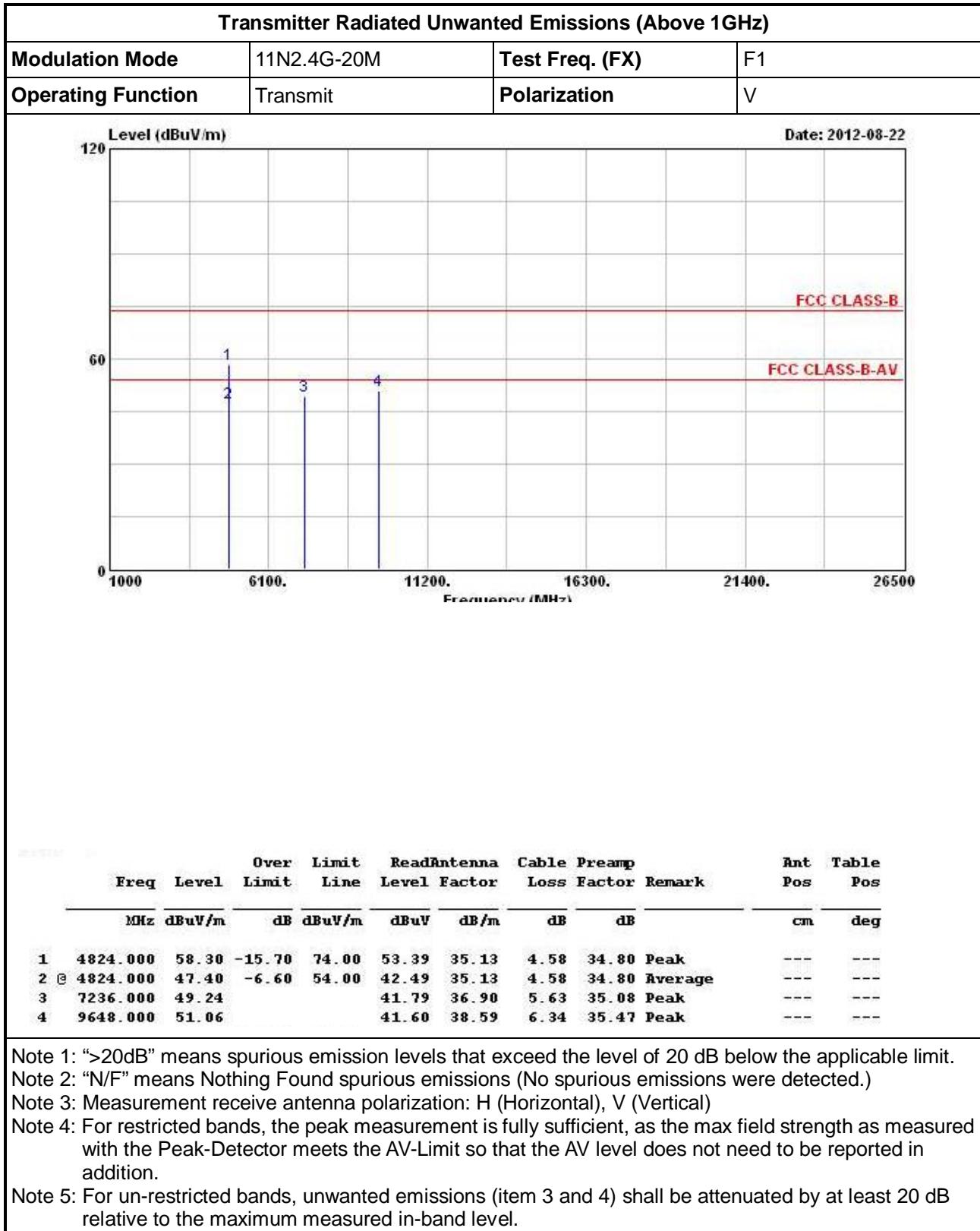


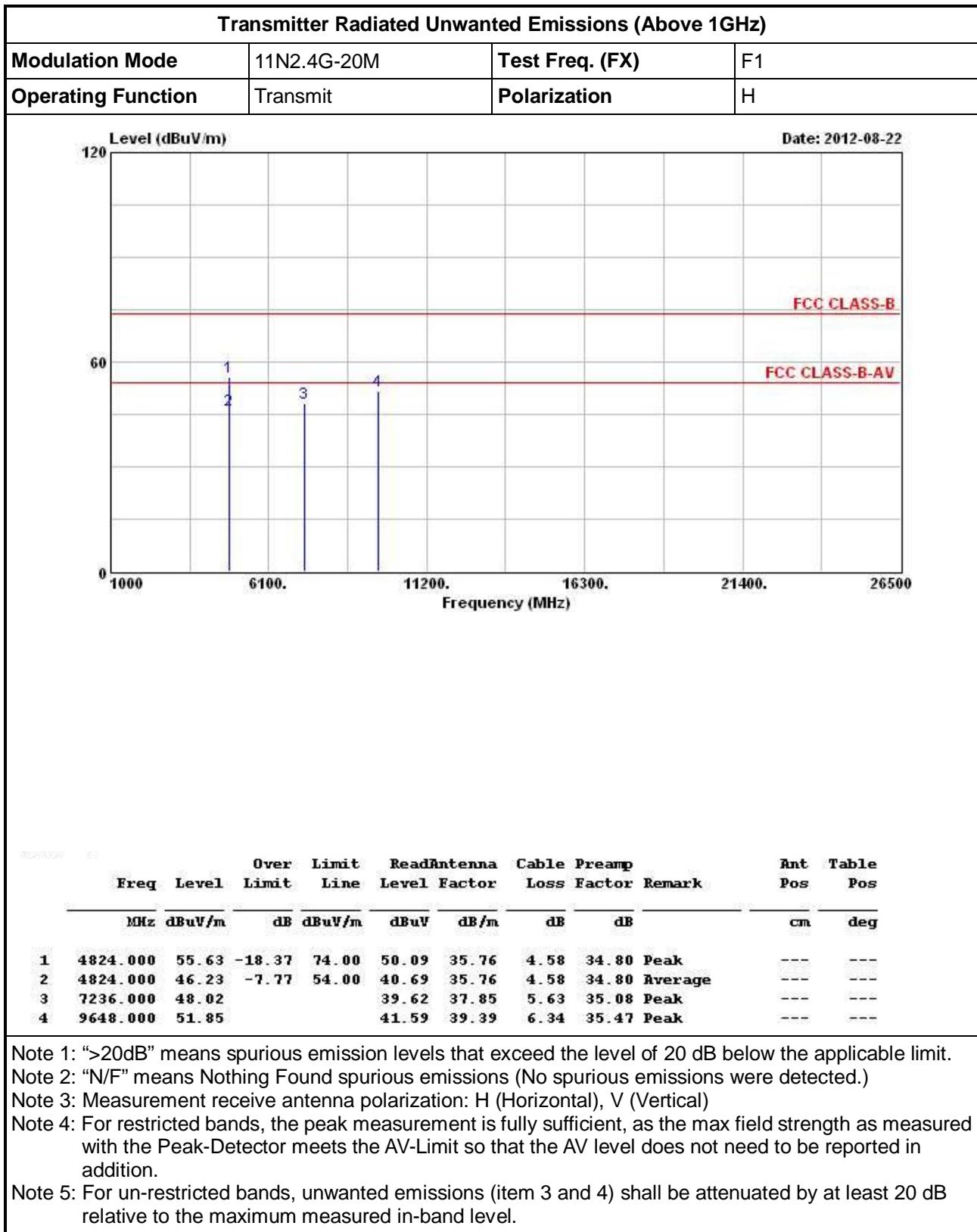


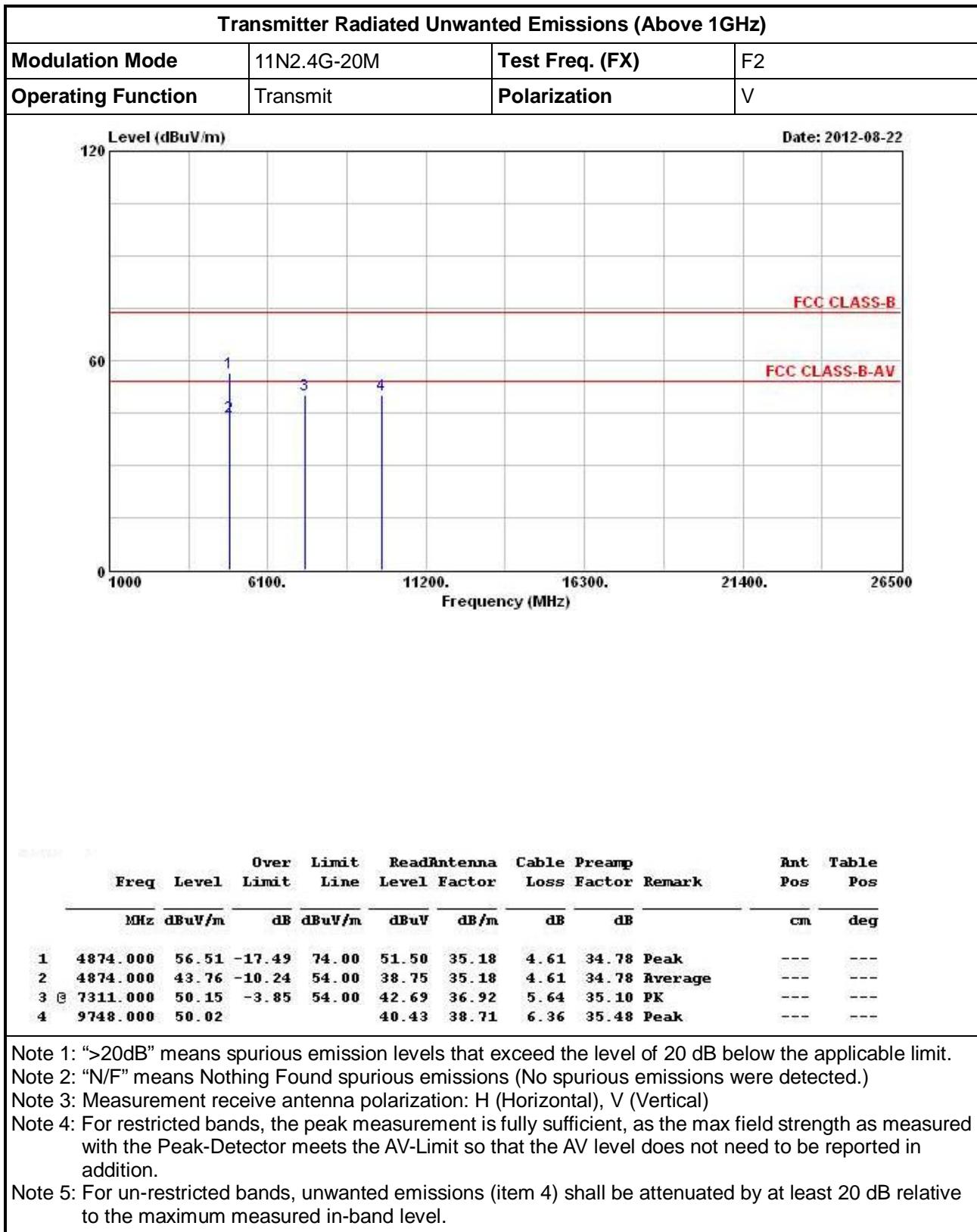


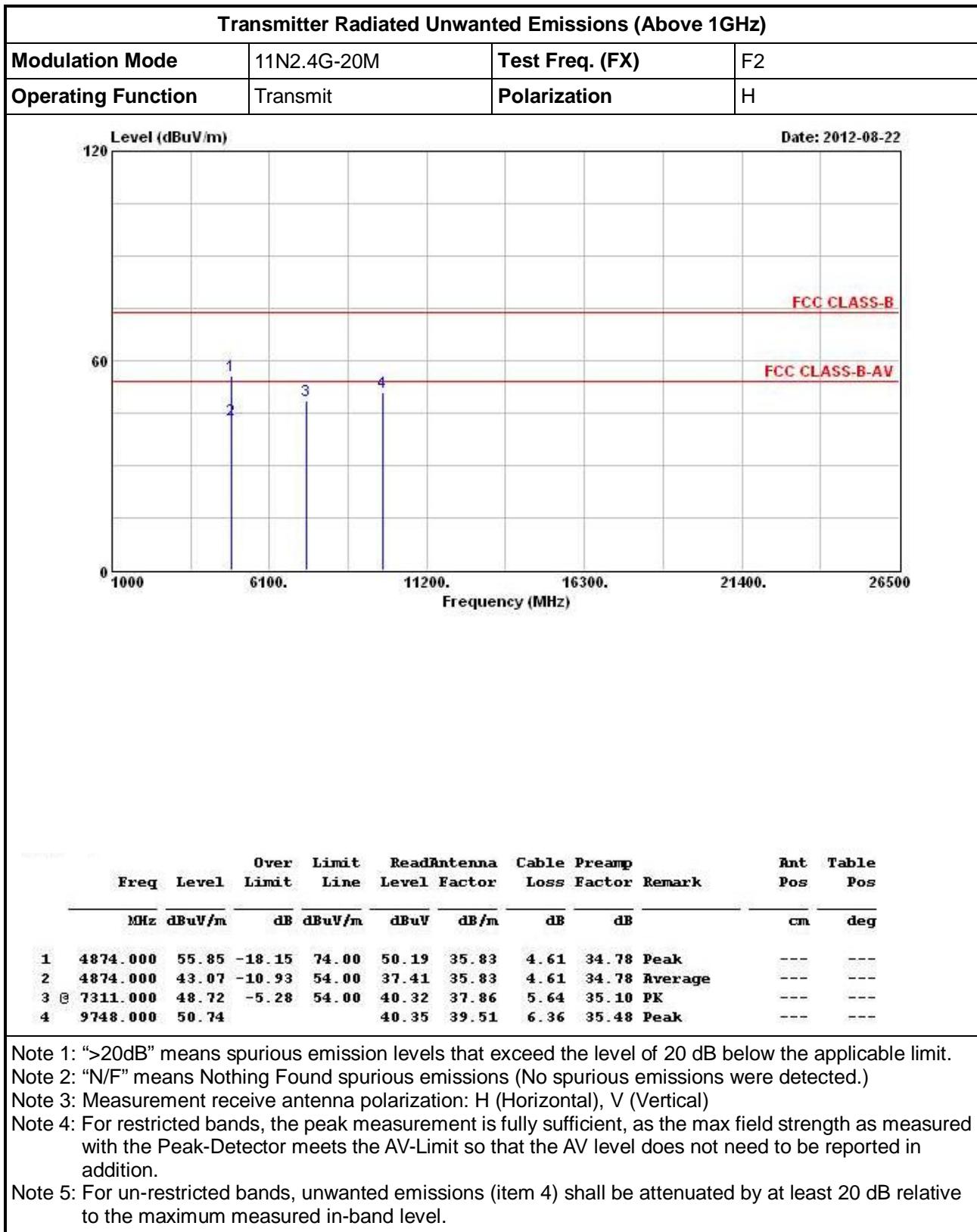


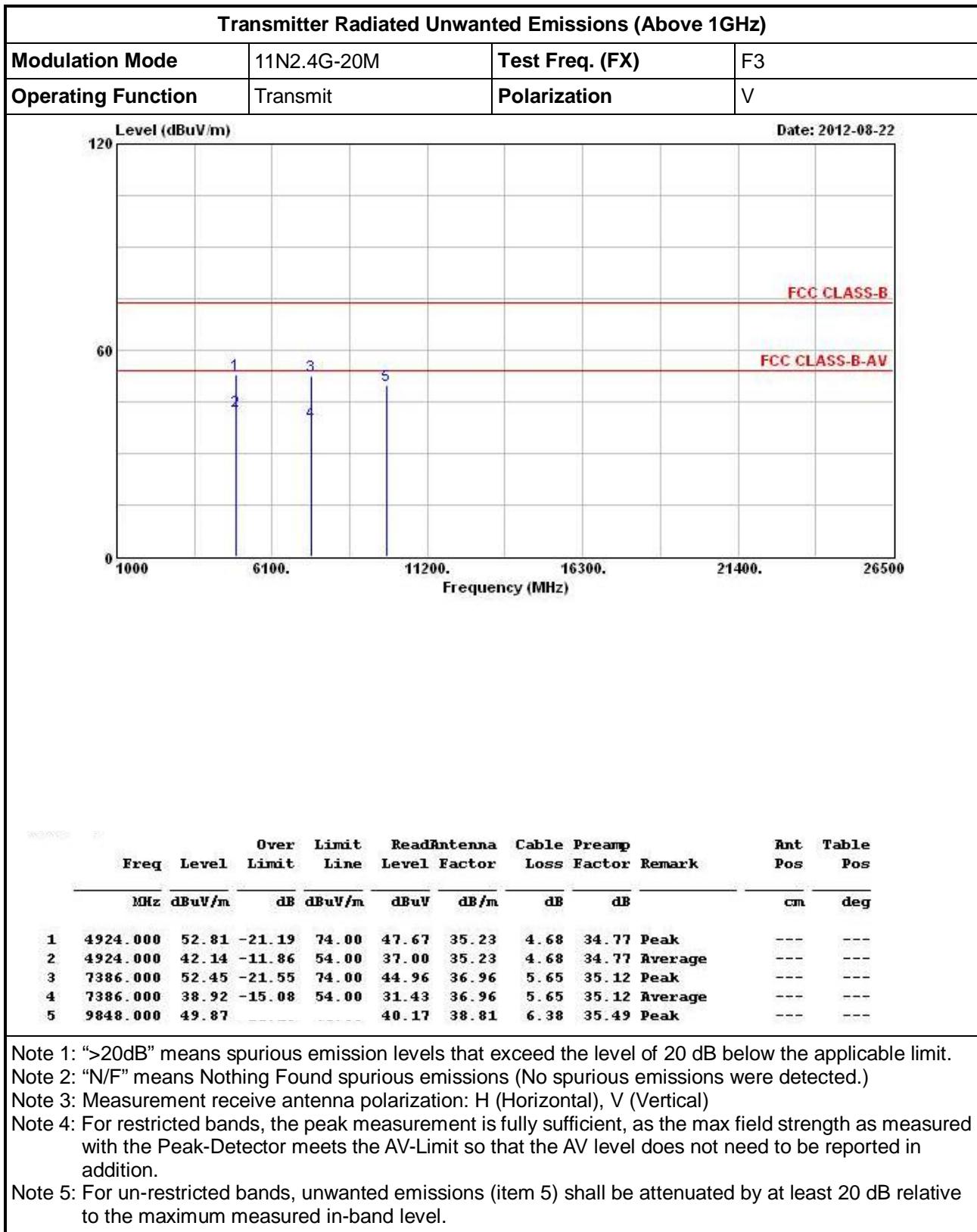
3.6.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11N2.4G-20M











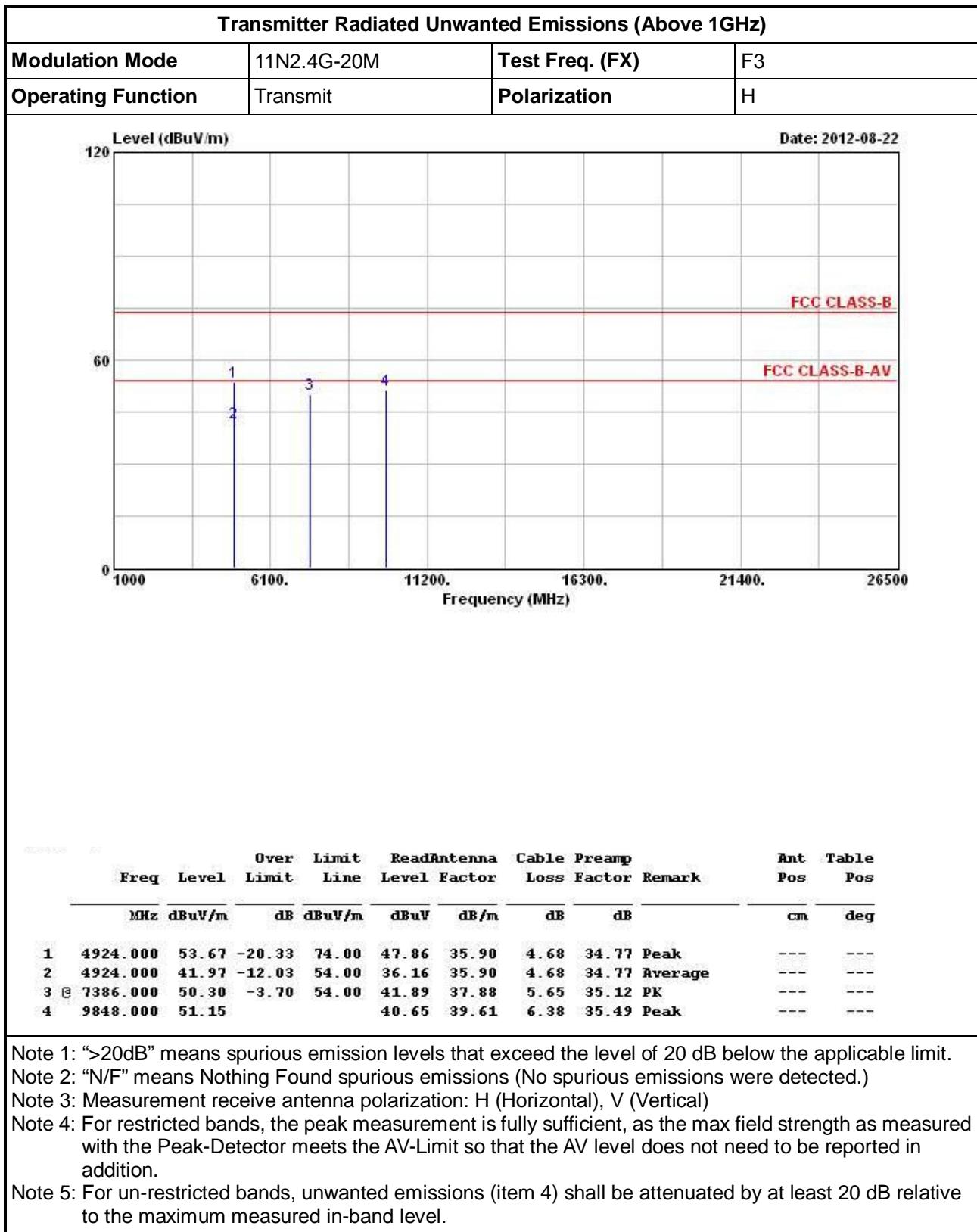
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

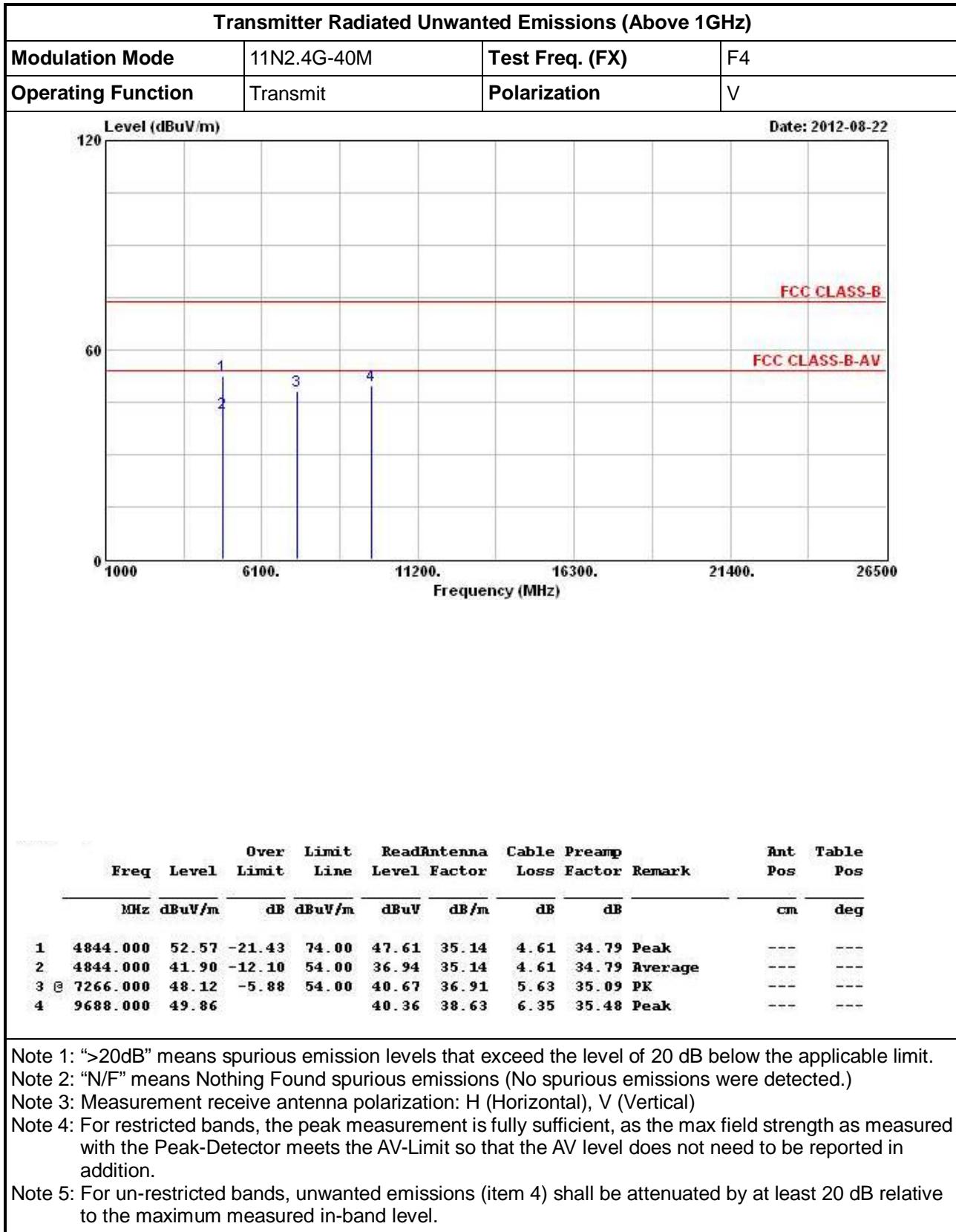
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

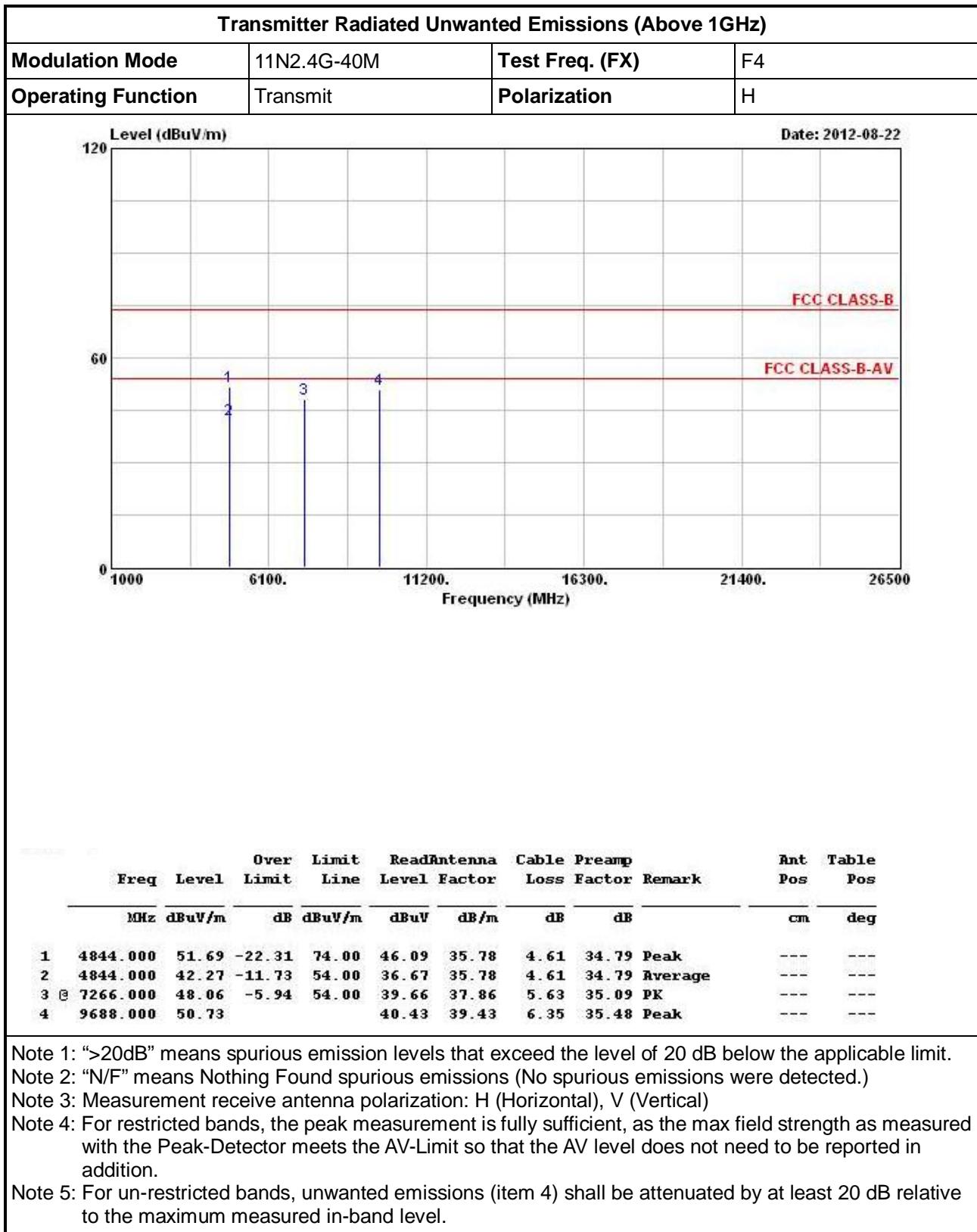
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

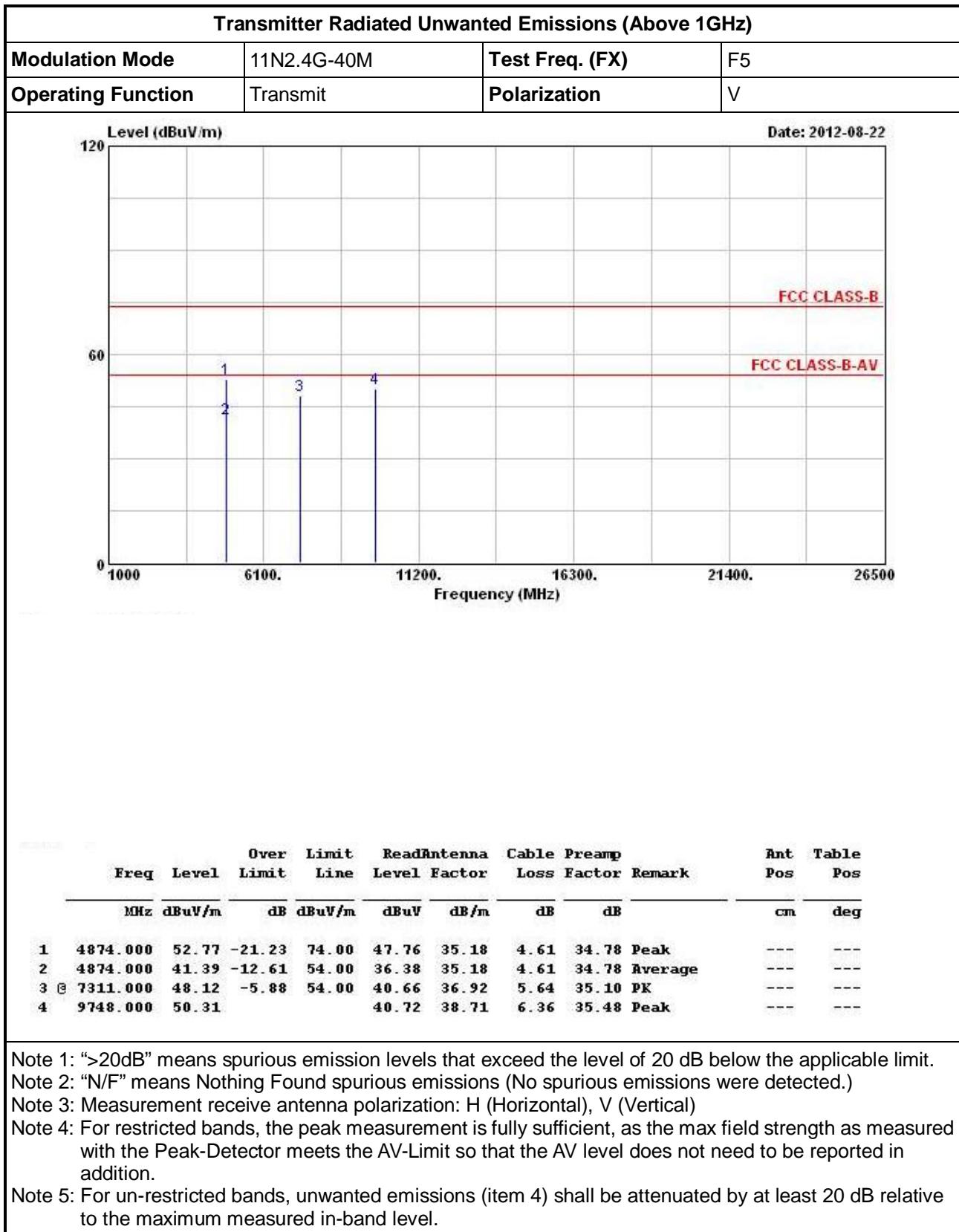
Note 5: For un-restricted bands, unwanted emissions (item 5) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

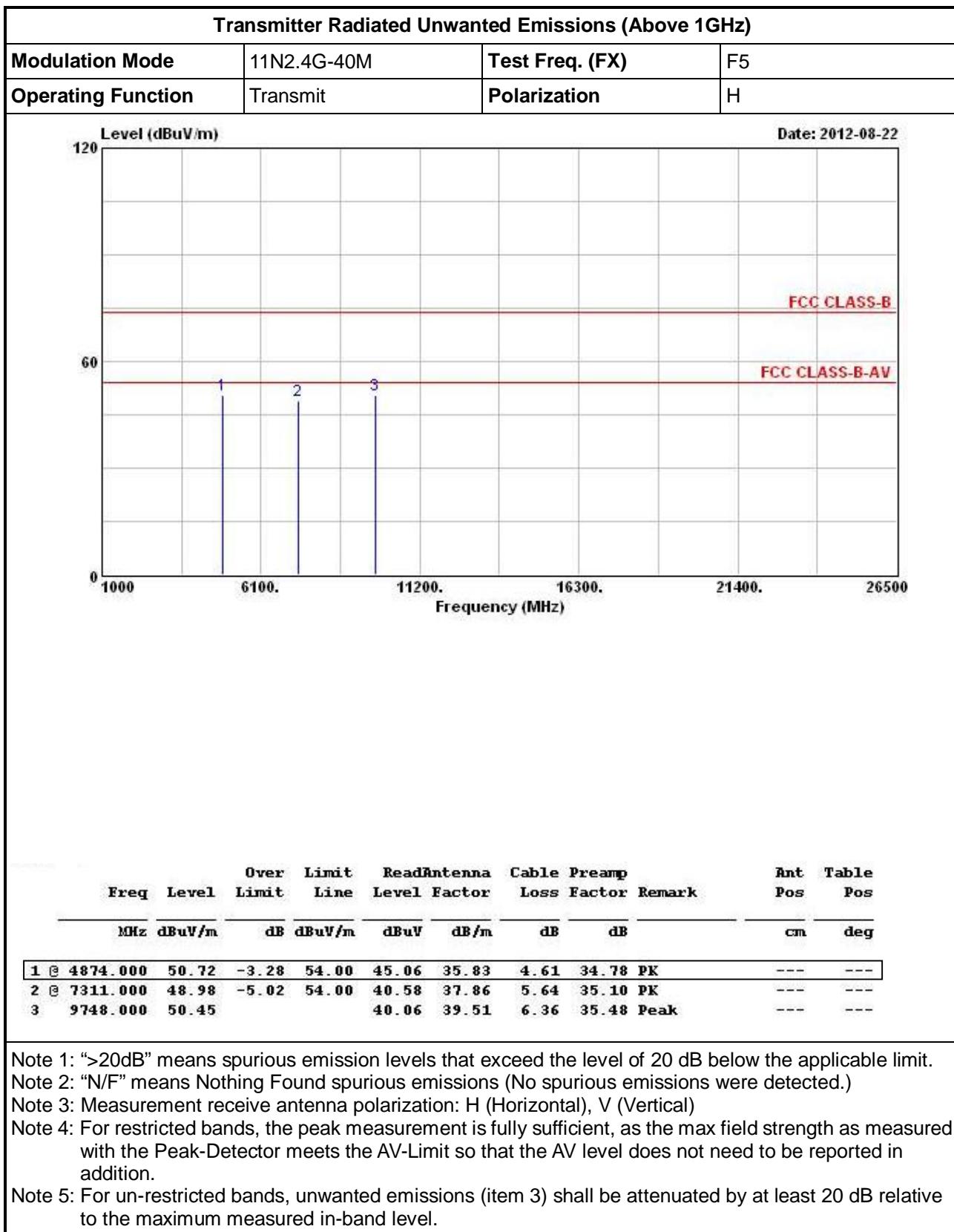


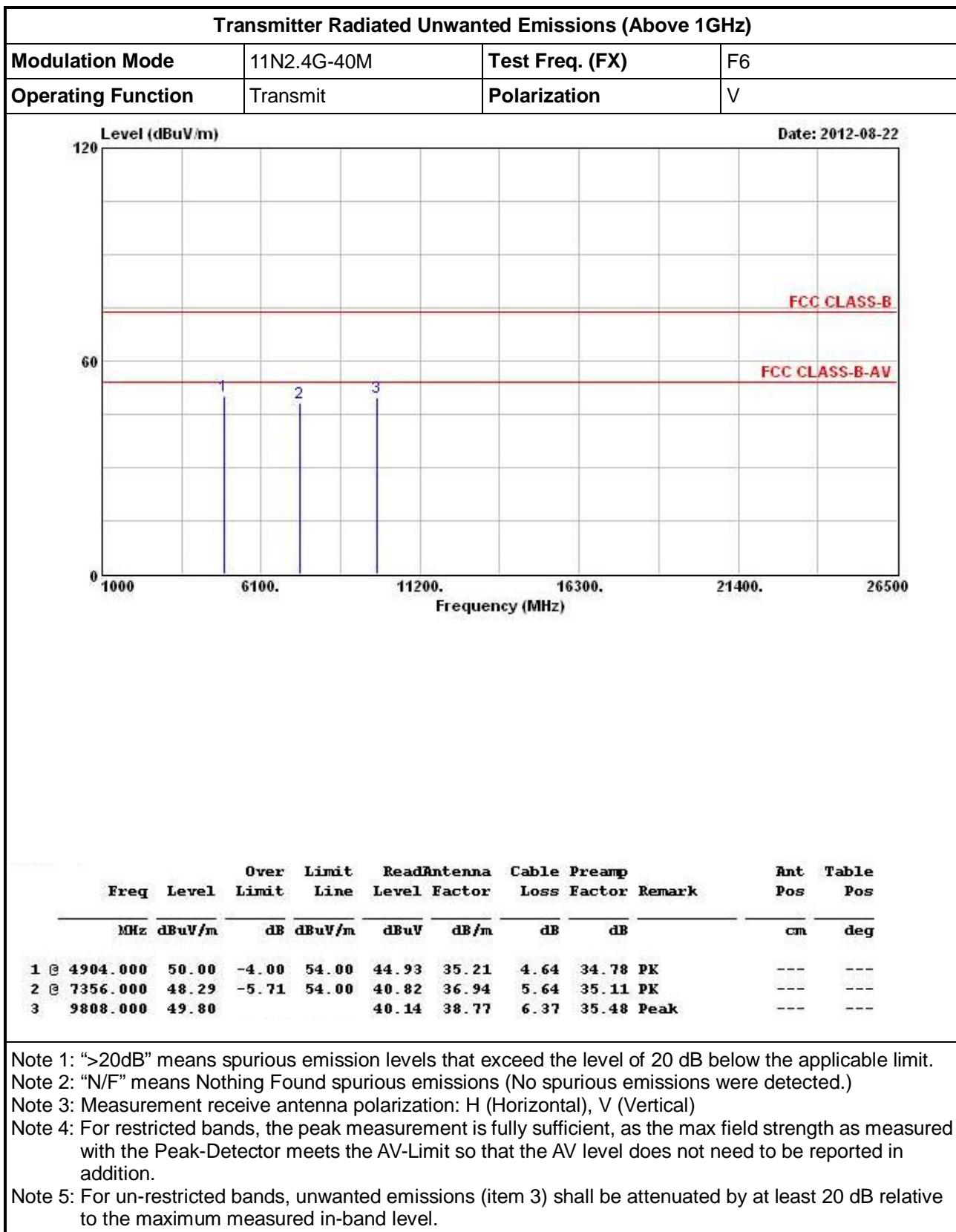
3.6.9 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11N2.4G-40M

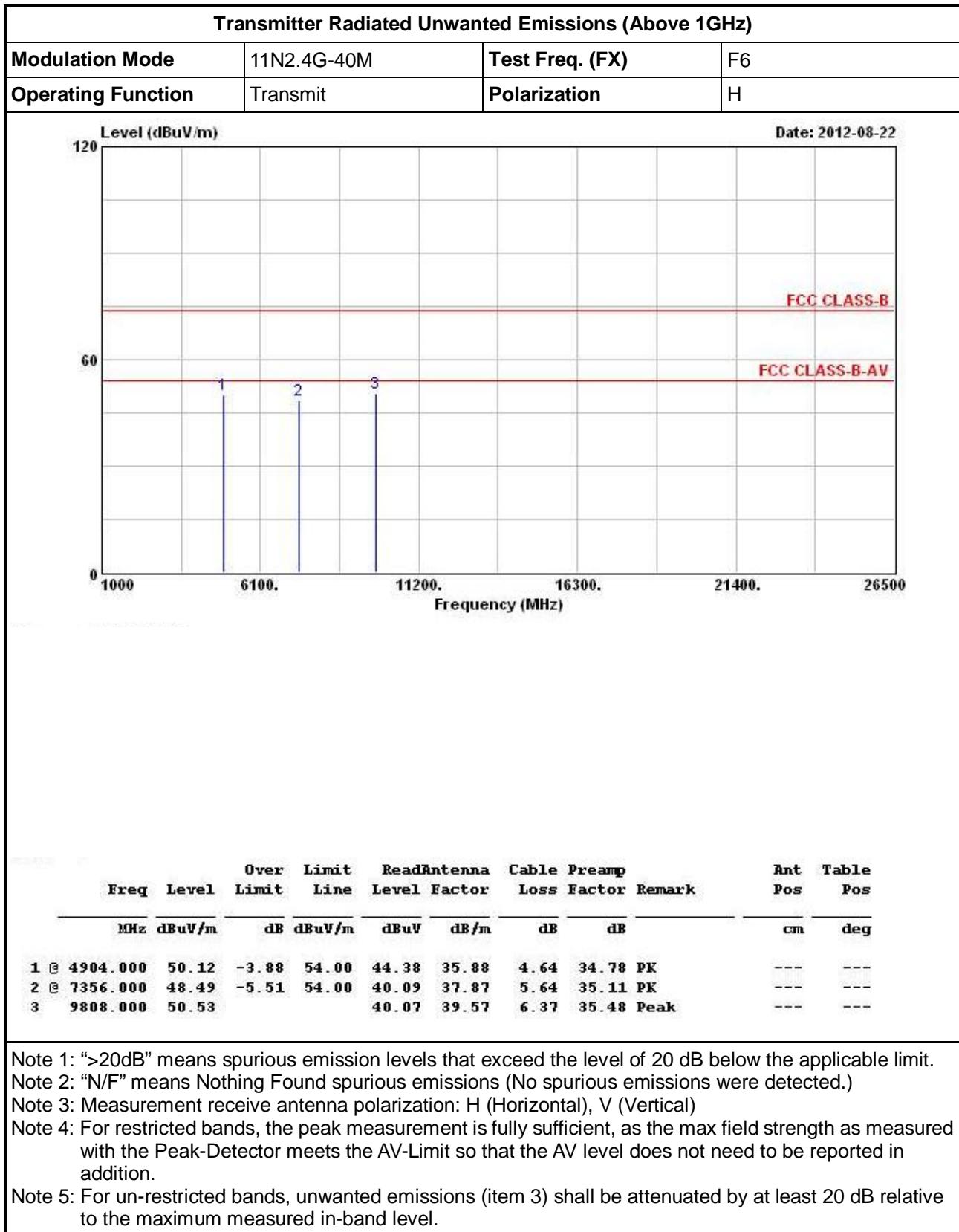












4 Test Equipment and Calibration Data

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-ELEKTRO NIK	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+SUHNE R	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
Spectrum Analyzer	R&S	FSP 40	100305	9KHz~40GHz	Feb. 21, 2012	Conducted (TH01-HY)
Spectrum Analyzer	R&S	FSV 40	15195-01-00	9KHz~40GHz	Jan. 06, 2012	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 19, 2012	Conducted (TH01-HY)
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 02, 2012	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100°C	Dec. 07, 2011	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100302	10MHz ~ 40GHz	Nov. 22, 2011	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	Jan. 12, 2012	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	Jan. 12, 2012	Conducted (TH01-HY)
RF Cable-2m	HUBER+SUHNE R	SUCOFLEX_104	SN 345672/4	1GHz ~ 26.5GHz	Dec. 03, 2011	Conducted (TH01-HY)
RF Cable-3m	HUBER+SUHNE R	SUCOFLEX_104	SN 345668/4	1GHz ~ 26.5GHz	Dec. 03, 2011	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jun. 09, 2011*	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Sep. 01, 2011	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 10, 2012	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100kHz ~ 1.3GHz	Jul. 23, 2012	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	Mar. 20, 2012	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 15, 2011	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Nov. 11, 2011	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 06, 2012	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	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 ~ 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. 03, 2012*	Radiation (03CH02-HY)

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

5 Certification of TAF Accreditation



Certificate No. : L1190-120405

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

Accreditation Criteria : ISO/IEC 17025:2005

Accreditation Number : 1190

Originally Accredited : December 15, 2003

Effective Period : January 10, 2010 to January 09, 2013

Accredited Scope : Testing Field, see described in the Appendix

Specific Accreditation Program : 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: April 05, 2012

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