

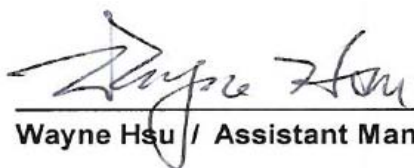
# FCC Test Report

**Equipment** : Tablet  
**Brand Name** : TOSHIBA  
**Model No.** : TOSHIBA AT300SE / TOSHIBA AT305SE ;  
Excite 10SE (For certification and marketing)  
/ REGZA Tablet AT300SE  
**FCC ID** : VUIPDA4331LB  
**Standard** : 47 CFR FCC Part 15.247  
**Applicant** : PEGATRON CORPORATION  
**Manufacturer** : No. 76, Ligong St., Beitou District, Taipei City 11261

The product sample received on Sep. 05, 2012 and completely tested on Sep. 16, 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	13.504MHz: 43.90dBuV (6.10dB) - AV 48.52dBuV (11.48dB) - QP	FCC 15.207	Complied
0	15.247(a)	6dB Bandwidth	6dB Bandwidth Unit [MHz] 11B-20M: 7.60 11G-20M: 16.02 11N2.4G-20M: 17.52	≥500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm] 11B-20M: 17.96 11G-20M: 22.92 11N2.4G-20M: 20.41	Power [dBm] 2412-2462MHz: 30 2422-2452MHz: 30	Complied
3.4	15.247(d)	Power Spectral Density	PSD [dBm/3kHz] 11B-20M: -8.39 11G-20M: -13.72 11N2.4G-20M: -15.43	PSD [dBm/3kHz] 2412-2462MHz: 8 2422-2452MHz: 8	Complied
3.5	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2399.82MHz: 32.96dB Restricted Bands [dBuV/m at 3m]: 2390.00MHz: 71.28 (Margin 2.72dB) - PK 52.82 (Margin 1.18dB) - 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]: 7386MHz: 50.68 (Margin 3.32dB) - PK	Non-Restricted Bands: > 20 dB  Restricted Bands: FCC 15.209	Complied



# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

RF General Information				
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	RF Output Power (dBm)
2400-2483.5	b	2412-2462	1-11 [11]	17.96
2400-2483.5	g	2412-2462	1-11 [11]	22.92
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	20.41

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

Transmitter Chains & Receiver Chains Information					
IEEE Std. 802.11 Protocol	Number of Transmit Chains (N <sub>TX</sub> )	Number of Receive Chains (N <sub>RX</sub> )	Correlation Signals with Multiple N <sub>TX</sub>	99% Emission Bandwidth (MHz)	Co-location
b	1	1	N/A	12.13	N/A
g	1	1	N/A	16.57	N/A
n (HT20)	1	1	N/A	17.59	N/A

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

1.1.2 Antenna Information

Antenna Category	
<input type="checkbox"/>	Equipment placed on the market without antennas
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input type="checkbox"/>	Temporary RF connector provided
<input checked="" type="checkbox"/>	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.

Antenna General Information					
Transmit Chains Power Distribution			<input checked="" type="checkbox"/> symmetrical distribution <input type="checkbox"/> asymmetrical distribution		
Ant. No.	PL	Ant. Port [Ant No. X connect to Ant. Port Y]	Ant. Cat.	Ant. Type	G <sub>ANT</sub> (dBi)
1	1	1	Integral	Chip	1.93
<p>Note 1: For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows:                      Any transmit signals are correlated, Directional Gain (DG) = G<sub>ANT</sub> + 10 log(N) dBi                      All transmit signals are completely uncorrelated, Directional Gain (DG) = G<sub>ANT</sub></p> <p>Note 2: For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:                      Any transmit signals are correlated, Directional Gain (DG) =  <math>10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]</math> dBi                      All transmit signals are completely uncorrelated, Directional Gain (DG) =  <math>10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N]</math> dBi</p>					

1.1.3 Type of EUT

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

1.1.4 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle		
<input type="checkbox"/> Operated normally mode for worst duty cycle		
<input checked="" type="checkbox"/> Operated test mode for worst duty cycle		
Test Signal Duty Cycle (x)	Power Duty Factor [dB] – (10 log 1/x)	Voltage Duty Factor [dB] – (20 log 1/x)
<input checked="" type="checkbox"/> 98.86% - IEEE 802.11b	0.05	0.10
<input checked="" type="checkbox"/> 88.96% - IEEE 802.11g	0.51	1.02
<input checked="" type="checkbox"/> 88.23% - IEEE 802.11n (HT20)	0.54	1.09

Note 1: Average Output Power Plots w/o Duty Factor

1.1.5 EUT Operational Condition

Supply Voltage	<input checked="" type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
Type of DC Source	<input type="checkbox"/> Internal DC supply	<input checked="" type="checkbox"/> External DC adapter	<input checked="" type="checkbox"/> Battery

### 1.2 Accessories

Accessories Information				
AC Adapter	Brand Name	Toshiba	Model Name	PA3996U-1ACA
	Power Rating	I/P: 100-240Vac, 50/60Hz, 0.4A ; O/P: 5Vdc 2A		
Battery	Brand Name	Toshiba	Model Name	PA5053U-1BRS
	Power Rating	3.7Vdc, 6600 mAh	Type	Li-ion
USB Cable	Brand Name	Chang Yang	Model Name	CY-AS-HS0067
	Signal Line	1.2 meter		

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

### 1.3 Support Equipment

Support Equipment - Conducted Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Personal Computer	HP	DC7700	DoC
2	LCD Monitor	DELL	U2410f	DoC
3	(PS2)Keyboard	HP	KB-0133	DoC
4	(PS2)Mouse	HP	M-S69	DoC
5	Printer	EPSON	LQ300+	DoC
6	Modem	ACEEX	DM1414	IFAXDM1414
7	Earphone	APPLE	MB770FE/B	-
8	Micro SD Card (Insert into EUT)	Transcend	2GB	DoC
9	Wireless AP (Remote Workstation)	D-LINK	DNS-G120	-
10	Bluetooth Headset (Remote Workstation)	Sony Ericsson	HBH-PV702	-
11	Simulator (Remote Workstation)	Welnav	GS50	-

Support Equipment - Radiated Emissions				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Notebook	DELL	E5520	DoC
2	(USB)Mouse	Microsoft	1004	DoC
3	iPod	APPLE	A1199	DoC
4	Mic + Earphone	PowerSync	MR-03	-
5	Micro SD Card (Insert into EUT)	Transcend	2GB	DoC
6	Wireless AP (Remote Workstation)	D-LINK	DNS-G120	-



### 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				
<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	CO01-HY	Bill	25.6°C / 49.2%	14-Sep-12
RF Conducted	TH01-HY	Cain	25.6°C / 68%	19-Sep-12
Radiated Emission	03CH02-HY	Daniel	25.8°C / 65%	16-Sep-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 <sub>TX</sub> )	Data Rate / MCS	Worst Data Rate / MCS	Worst Modulation Mode	RF Output Power (dBm)	Power Spectral Density (dBm/3kHz)
b	1	1-11 Mbps	1 Mbps	11B-20M	<b>17.96</b>	<b>-8.39</b>
g	1	6-54 Mbps	6 Mbps	11G-20M	<b>22.92</b>	<b>-13.72</b>
n (HT20)	1	MCS 0-15	MCS 0	11N2.4G-20M	<b>20.41</b>	<b>-15.43</b>

Note 1: IEEE Std. 802.11n-2009 modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20. Worst modulation mode of Guard Interval (GI) is 800ns.

Note 2: Modulation modes consist of 11B-20M, 11G-20M, 11N2.4G-20M:  
 11B: IEEE 802.11b, 11G: IEEE 802.11g, 11N2.4G: IEEE 802.11n (2.4GHz Band)  
 20M/40M: Channel Bandwidth 20MHz

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

Note 4: EUT operating mode that using same power level between 1 transmit chains and 1 transmit chain. Then EUT with 1 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)

### 2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter					
Test Software Version		Dos Command			
Worst Modulation Mode	Number of Transmit Chains (N <sub>TX</sub> )	Frequency (MHz)	Power Setting	Worst Data Rate / MCS	RF Output Power (dBm)
11B-20M	1	2412	15	1 Mbps	17.78
11B-20M	1	2437	15	1 Mbps	17.90
11B-20M	1	2462	15	1 Mbps	17.96
11G-20M	1	2412	13	6 Mbps	20.36
11G-20M	1	2437	15	6 Mbps	22.92
11G-20M	1	2462	13	6 Mbps	20.69
11N2.4G-20M	1	2412	13	MCS 0	20.22
11N2.4G-20M	1	2437	13	MCS 0	20.41
11N2.4G-20M	1	2462	10	MCS 0	17.71




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

## 2.4 The Worst Case Measurement Configuration

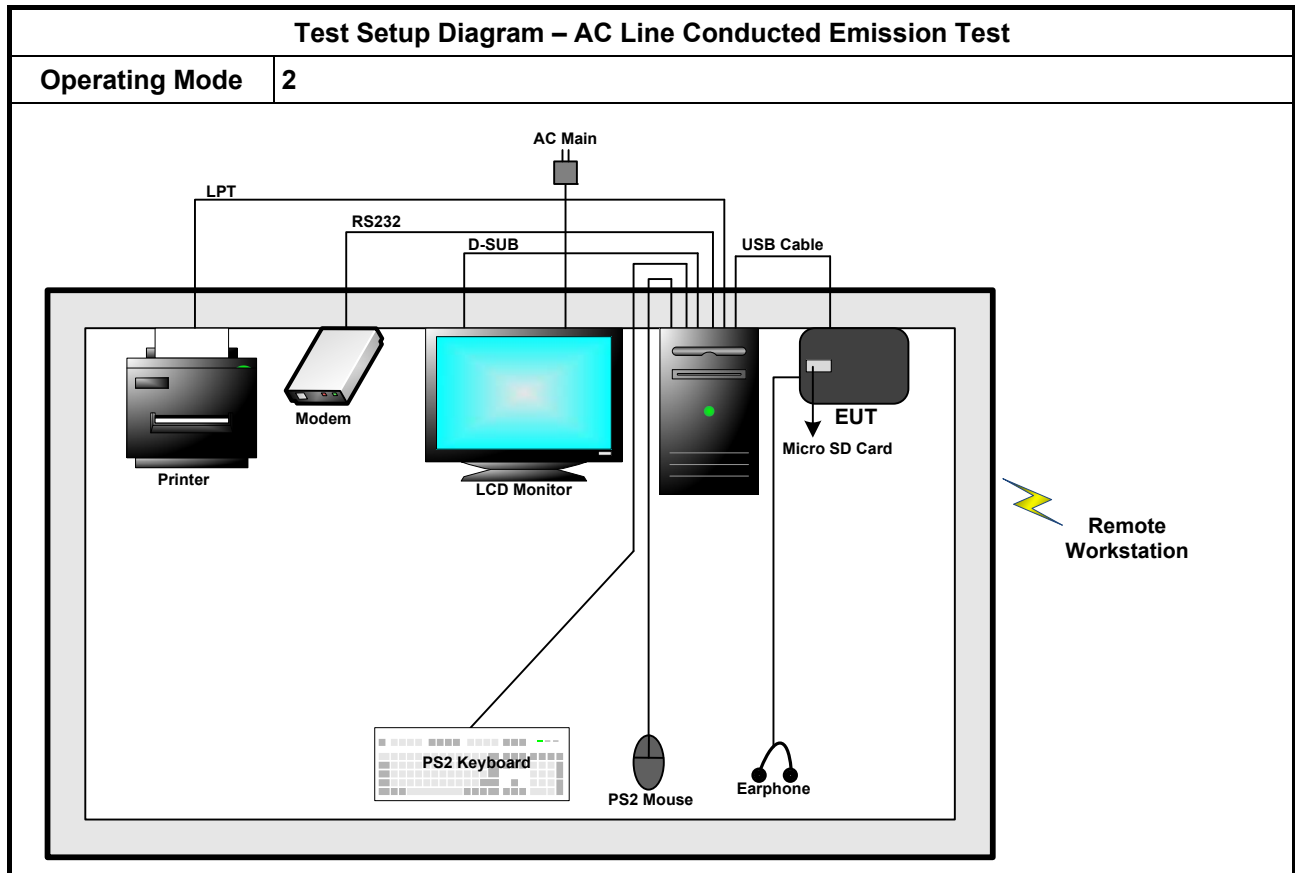
The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	AC power-line conducted emissions
<b>Condition</b>	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
<b>Operating Mode</b>	<b>Operating Mode Description</b>
1	Adapter Mode
2	USB Charger Mode
For operating mode 2 is the worst case and it was record in this test report.	

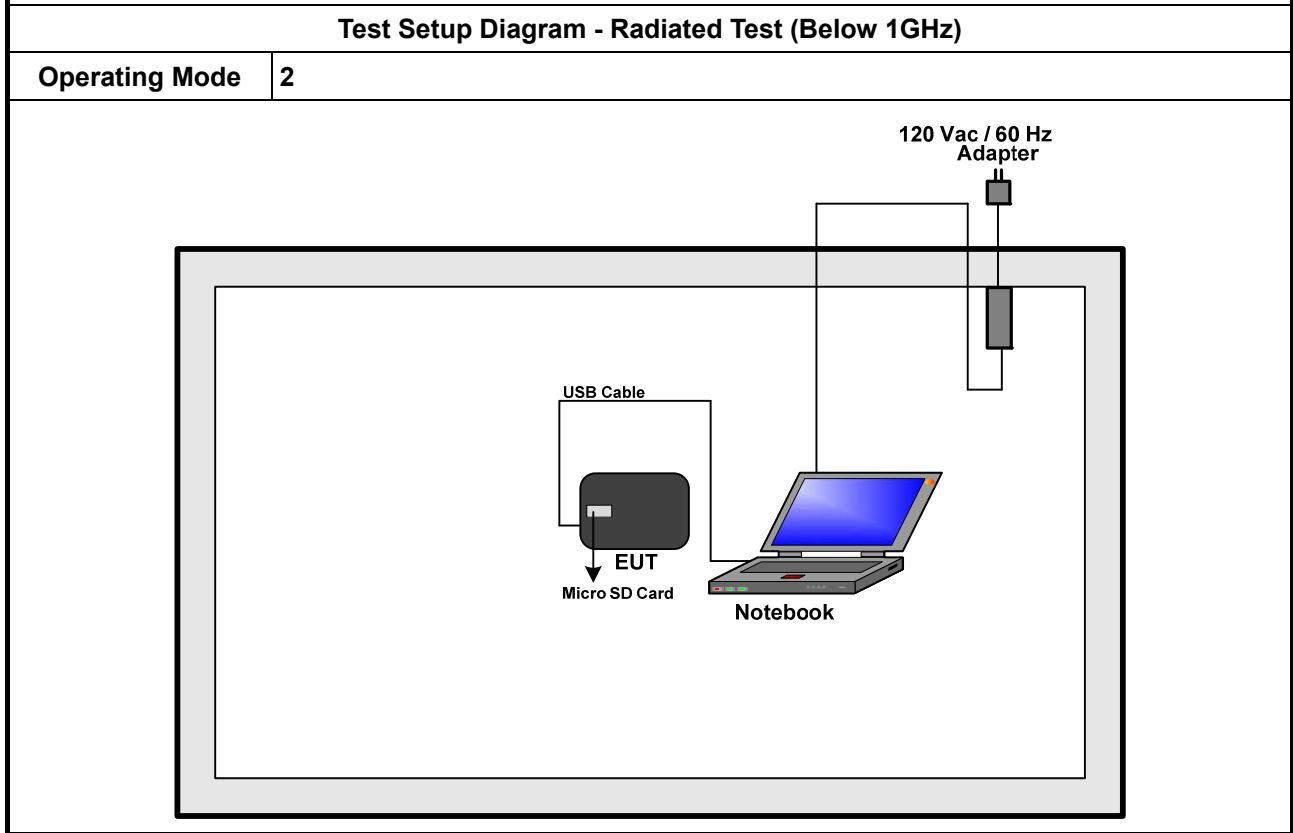
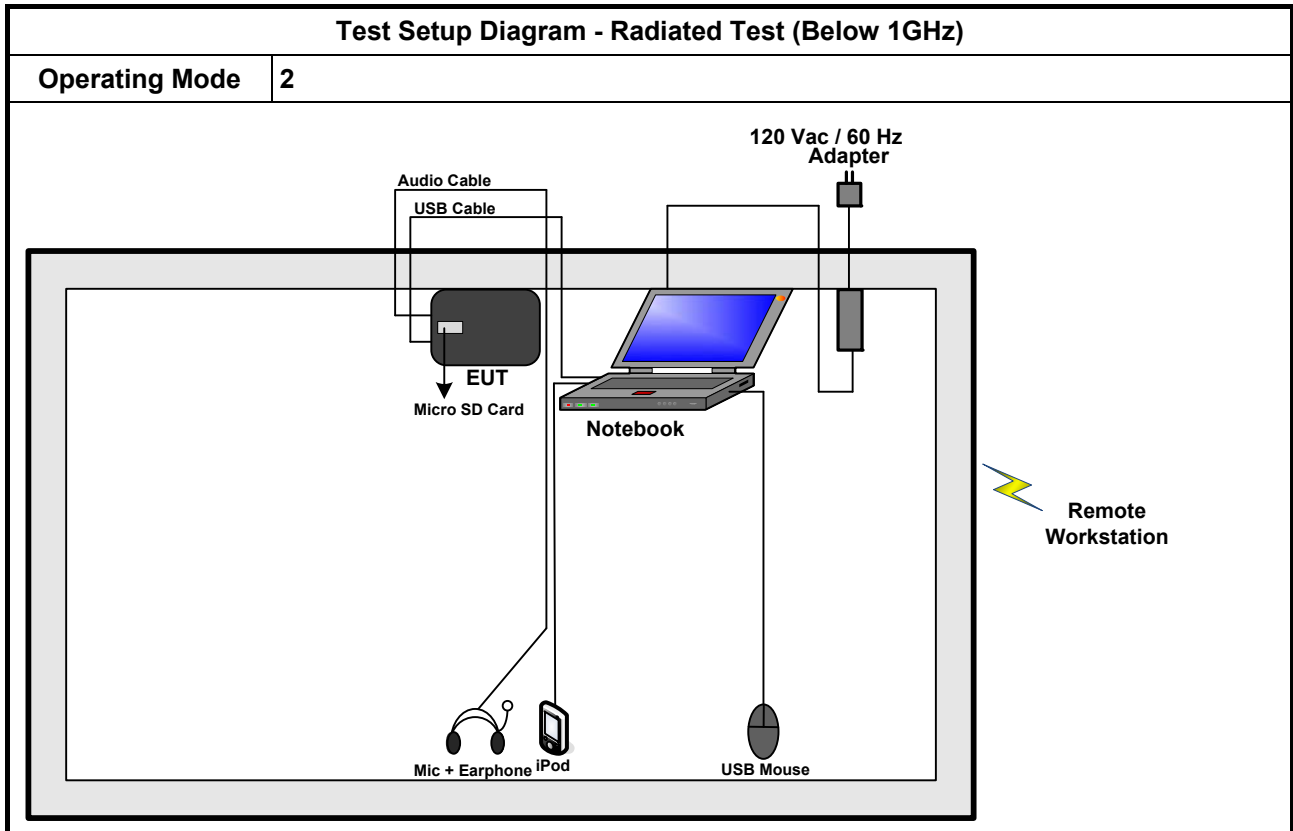
The Worst Case Mode for Following Conformance Tests			
<b>Tests Item</b>	RF Output Power Power Spectral Density 6 dB Bandwidth		
<b>Test Condition</b>	Conducted measurement at transmit chains		
<b>Worst Modulation Mode</b>	<b>Number of Transmit Chains (N<sub>TX</sub>)</b>	<b>Worst Data Rate / MCS</b>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

The Worst Case Mode for Following Conformance Tests			
<b>Tests Item</b>	Transmitter Radiated Bandedge Emissions		
<b>Test Condition</b>	Radiated measurement		
<b>Worst Modulation Mode</b>	<b>Number of Transmit Chains (N<sub>TX</sub>)</b>	<b>Worst Data Rate / MCS</b>	<b>Test Frequency</b>
11B-20M	1	1 Mbps	F1, F3
11G-20M	1	6 Mbps	F1, F3
11N2.4G-20M	1	MCS 0	F1, F3

The Worst Case Mode for Following Conformance Tests			
<b>Tests Item</b>	Transmitter Radiated Unwanted Emissions		
<b>Test Condition</b>	Radiated measurement		
<b>User Position</b>	<input 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 checked="" type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed three orthogonal planes. Worst orthogonal planes of EUT is Z plane.		
<b>Operating Mod</b>	<input checked="" type="checkbox"/> 1. Adapter Mode		
	<input checked="" type="checkbox"/> 2. USB Charger Mode		
<b>Worst Modulation Mode</b>	<b>Number of Transmit Chains (N<sub>TX</sub>)</b>	<b>Worst Data Rate / MCS</b>	<b>Test Frequency</b>
11B-20M	1	1 Mbps	F1, F2, F3
11G-20M	1	6 Mbps	F1, F2, F3
11N2.4G-20M	1	MCS 0	F1, F2, F3
<b>Orthogonal Planes of EUT</b>	<b>X Plane</b>	<b>Y Plane</b>	<b>Z Plane</b>
			
For operating mode 2 is the worst case and it was record in this test report.			

## 2.5 Test Setup Diagram







### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

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

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

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

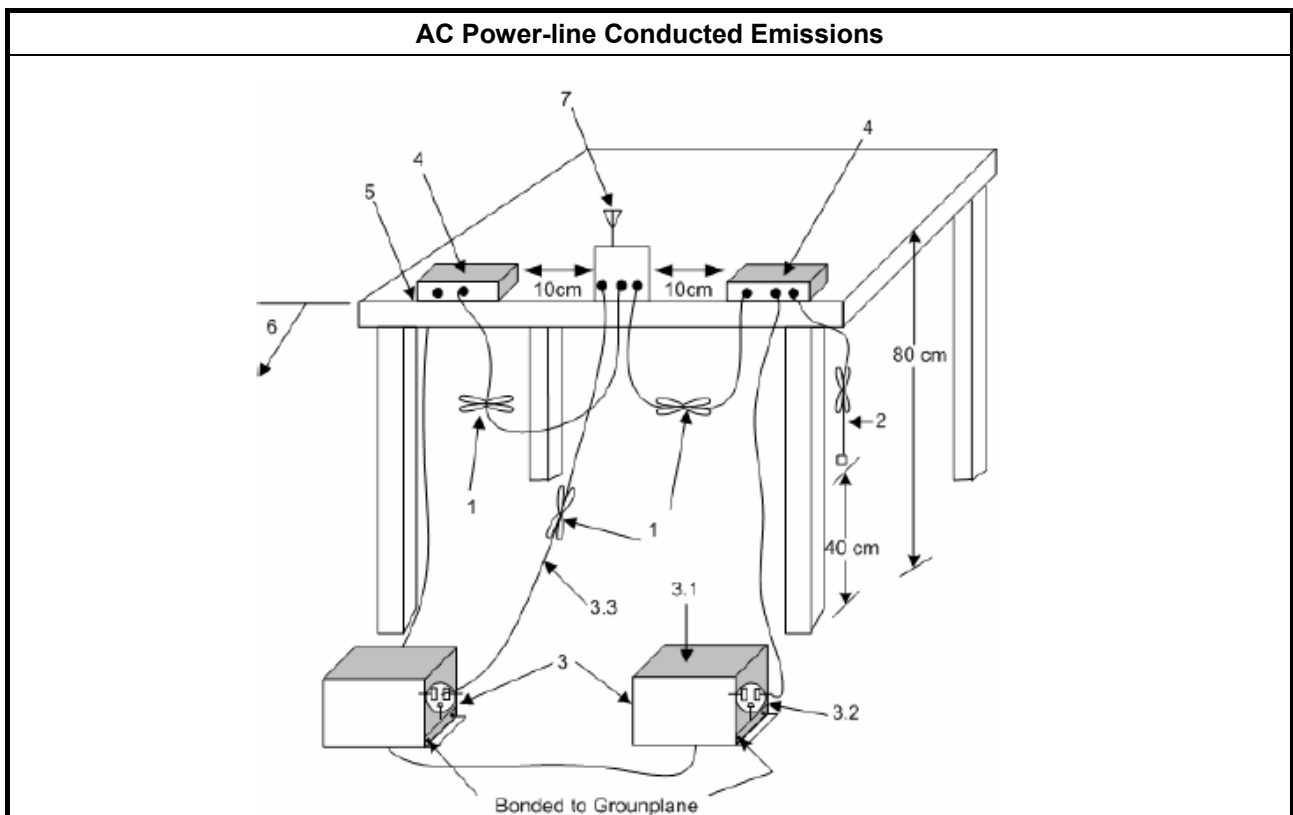
##### 3.1.2 Measuring Instruments

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

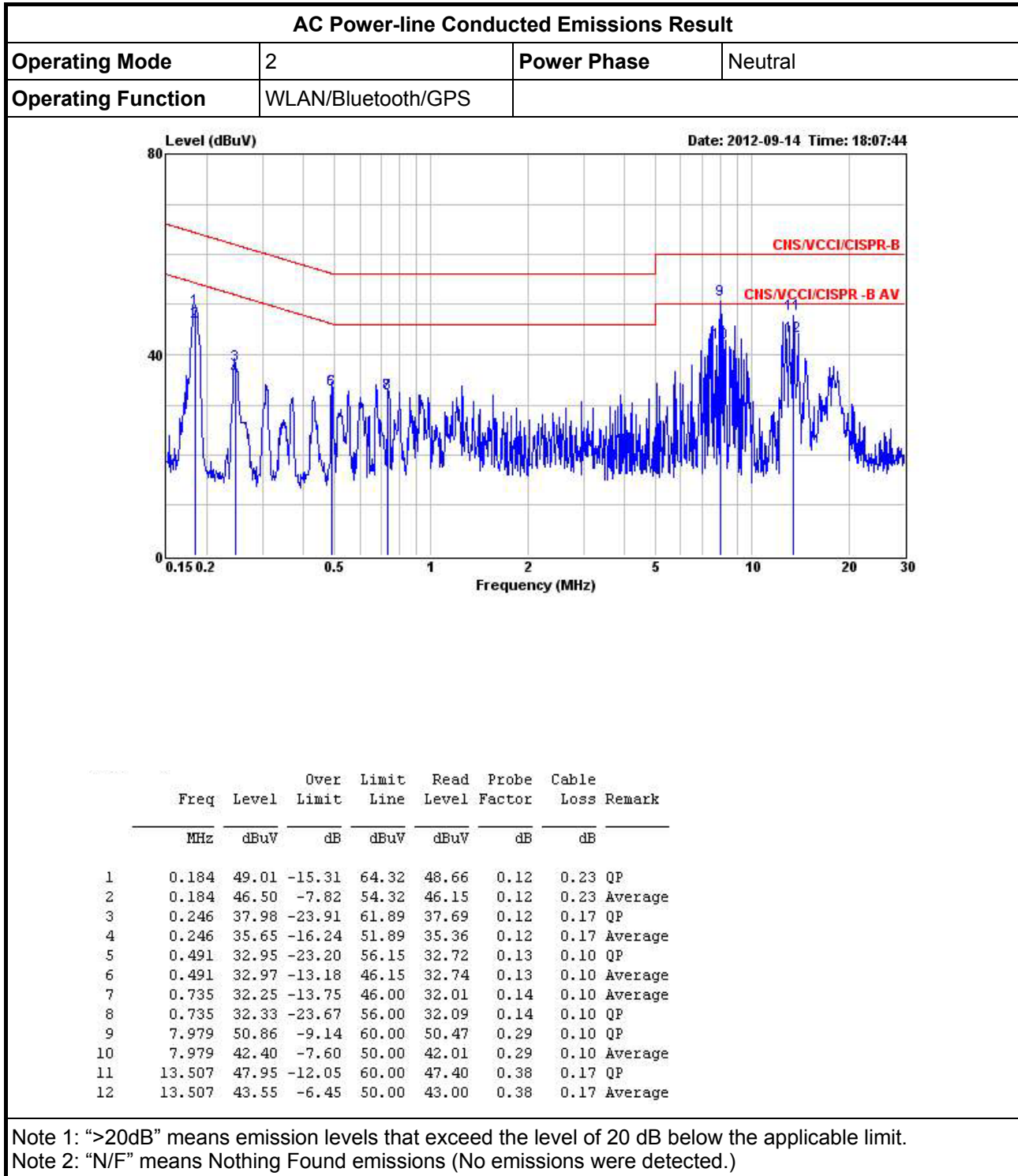
##### 3.1.3 Test Procedures

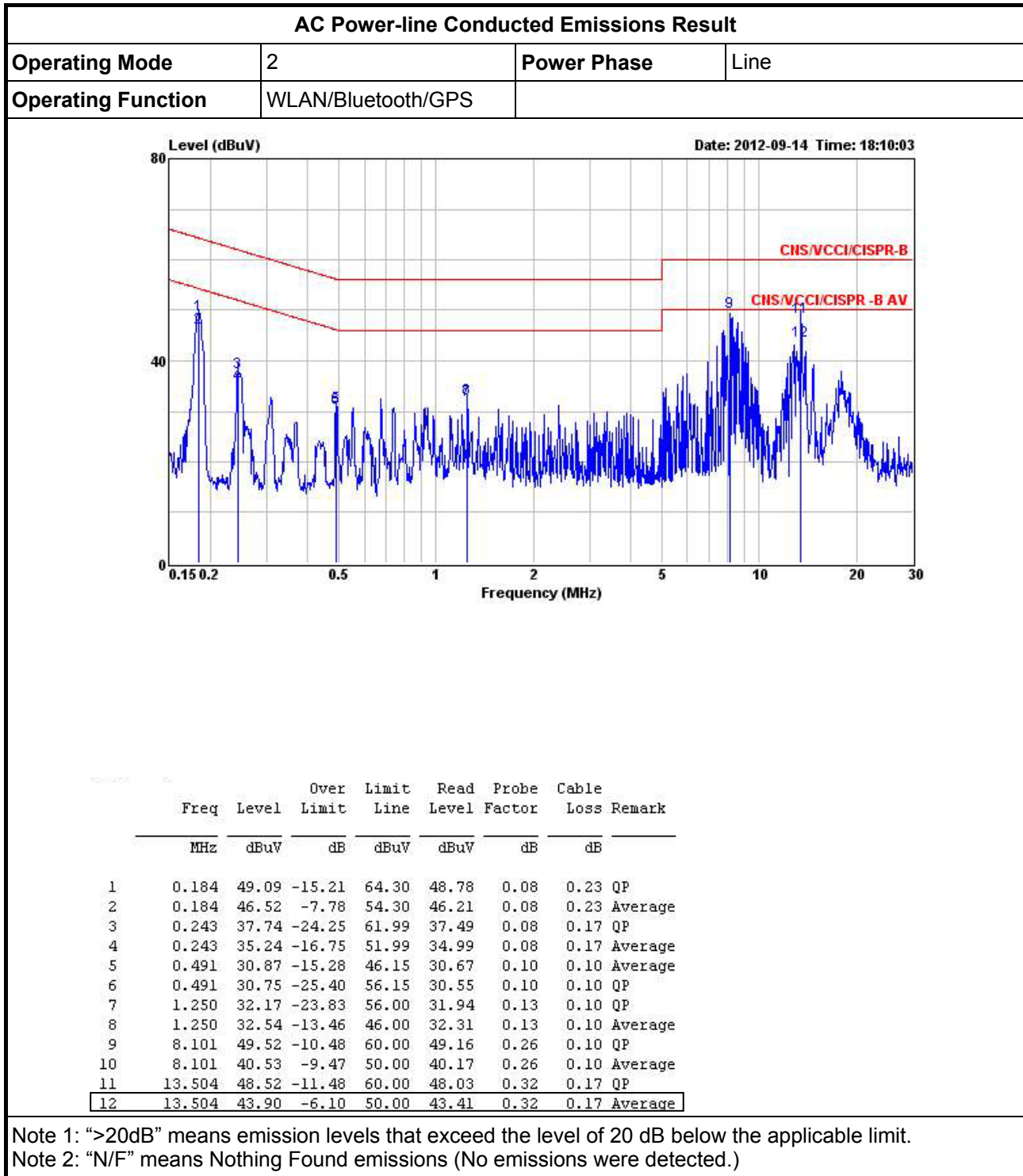
Test Method
<input checked="" type="checkbox"/> Refer as <b>ANSI C63.10-2009</b> , clause 6.2 for AC power-line conducted emissions.

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

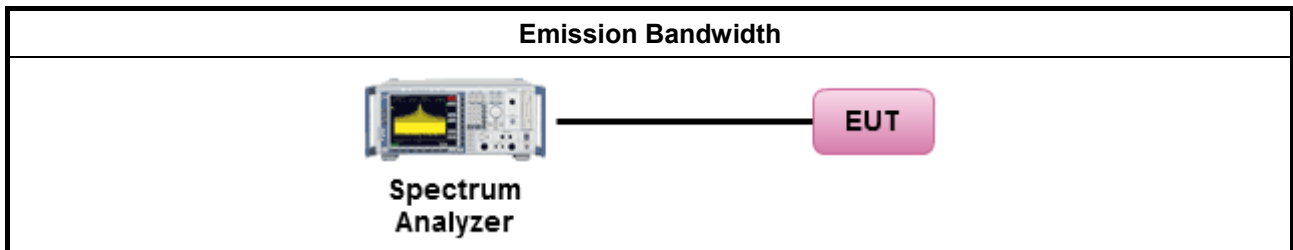
#### 3.2.2 Measuring Instruments

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

#### 3.2.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	For the emission bandwidth shall be measured using one of the options below:
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2009 FCC KDB 558074, clause 5.1.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/>	Refer as ANSI C63.10-2009 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



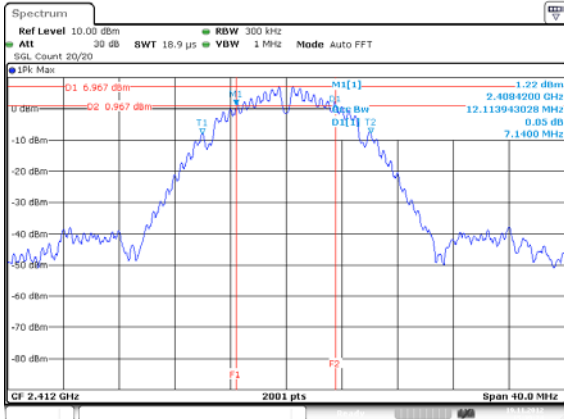
3.2.5 Test Result of Emission Bandwidth

Emission Bandwidth Result										
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Emission Bandwidth (MHz)							
			99% Bandwidth				6dB Bandwidth			
			Chain-Port 1	-	-	-	Chain-Port 1	-	-	-
11B-20M	1	2412	12.11	-	-	-	7.14	-	-	-
11B-20M	1	2437	12.13	-	-	-	7.60	-	-	-
11B-20M	1	2462	12.09	-	-	-	7.14	-	-	-
11G-20M	1	2412	16.57	-	-	-	16.02	-	-	-
11G-20M	1	2437	16.33	-	-	-	15.58	-	-	-
11G-20M	1	2462	16.35	-	-	-	15.52	-	-	-
11N2.4G-20M	1	2412	17.47	-	-	-	15.66	-	-	-
11N2.4G-20M	1	2437	17.55	-	-	-	16.28	-	-	-
11N2.4G-20M	1	2462	17.59	-	-	-	17.52	-	-	-
<b>Limit</b>			<b>N/A</b>				<b>≥500 kHz</b>			
<b>Result</b>			<b>Complied</b>							

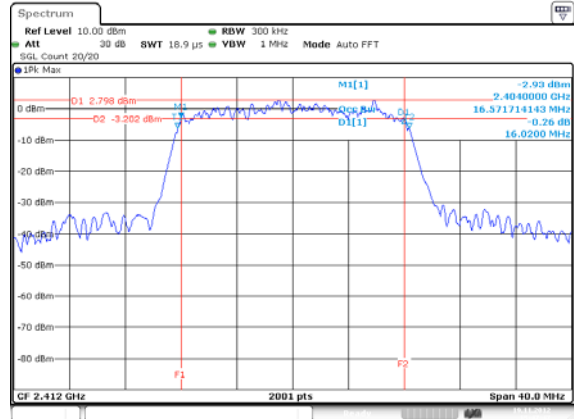
Note 1: N<sub>TX</sub> = Number of Transmit Chains

Emission Bandwidth Plots

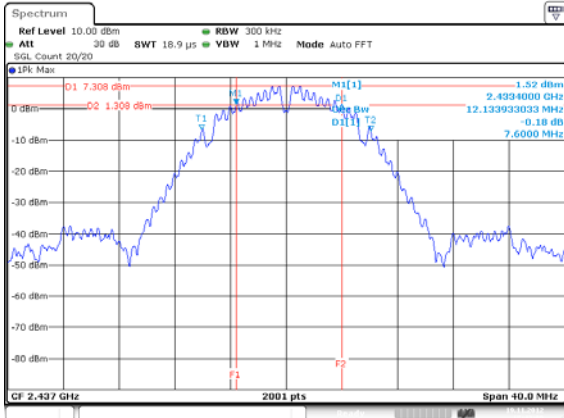
11B-20M – F1 [Port 1]



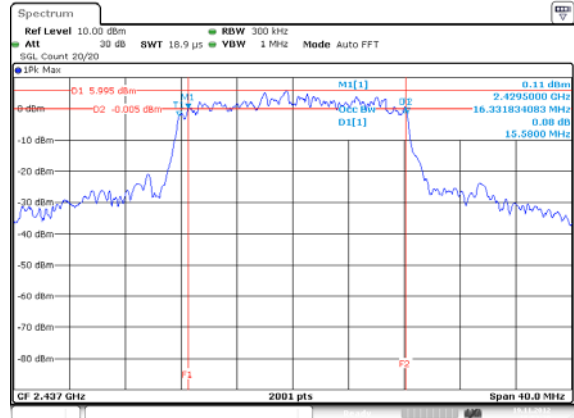
11G-20M – F1 [Port 1]



11B-20M – F2 [Port 1]



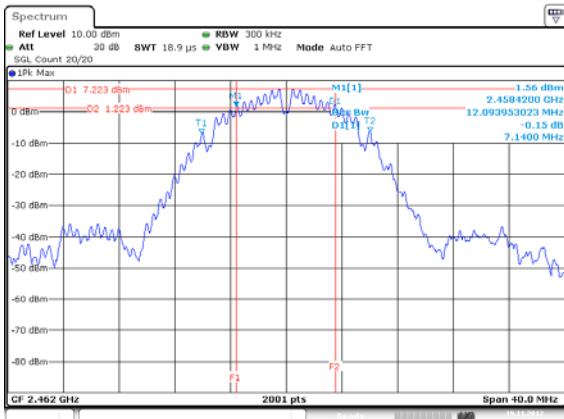
11G-20M – F2 [Port 1]



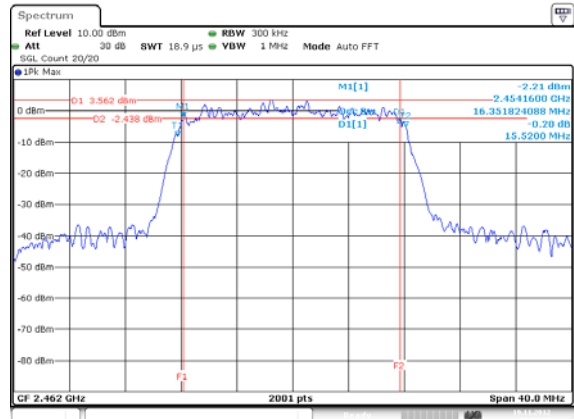
Date: 19.NOV.2012 15:43:09

Date: 19.NOV.2012 15:52:20

11B-20M – F3 [Port 1]

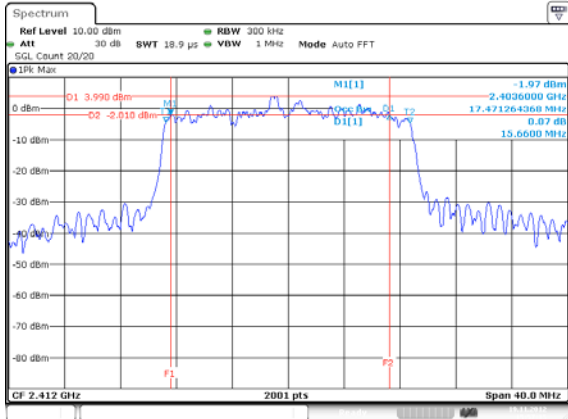


11G-20M – F3 [Port 1]

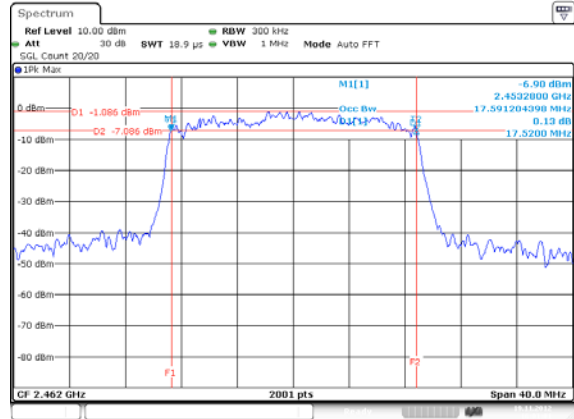


Emission Bandwidth Plots

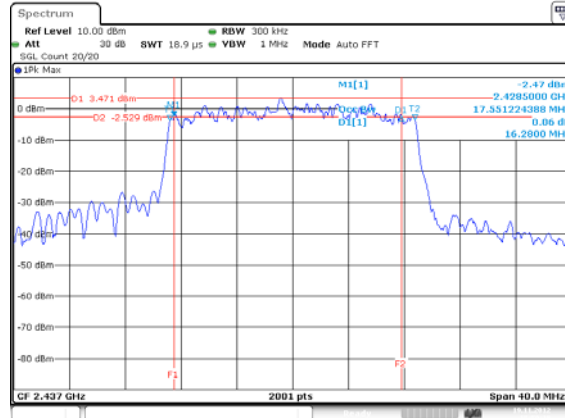
11N2.4G-20M – F1 [Port 1]



11N2.4G-20M – F3 [Port 1]



11N2.4G-20M – F2 [Port 1]



### 3.3 RF Output Power

#### 3.3.1 RF Output Power Limit

RF Output Power Limit	
<b>Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit</b>	
<input type="checkbox"/> 902-928 MHz Band:	
	<input type="checkbox"/> If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
	<input type="checkbox"/> If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
<input 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 $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ 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
<b>e.i.r.p. Power Limit:</b>	
<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 ANSI C63.10-2009 FCC KDB 558074, clause 5.2.1.1 Option 1 (RBW ≥ EBW method).
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2009 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 ≥ 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 ANSI C63.10-2009 FCC KDB 558074, clause 5.2.2.1 Option 1 (RMS detection with slow sweep speed).
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2009 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 ANSI C63.10-2009 FCC KDB 558074, clause 2 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 ANSI C63.10-2009 FCC KDB 558074, clause 2 for radiated measurement.

**3.3.4 Test Setup**

<b>RF Output Power (Spectrum Analyzer)</b>
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3.3.5 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result										
Directional Gain (dBi)		1.93	RF Output Power (dBm)							
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11B-20M	1	2412	17.78	-	-	-	17.78	30.0	19.71	36.0
11B-20M	1	2437	17.90	-	-	-	17.90	30.0	19.83	36.0
11B-20M	1	2462	17.96	-	-	-	17.96	30.0	19.89	36.0
<b>Result</b>			<b>Complied</b>							
Note 1: N <sub>TX</sub> = Number of Transmit Chains										
Note 2: The EUT supports diversity transmitting, and the results on antenna port 3 is the worst case.										

Maximum Peak Conducted Output Power Result										
Directional Gain (dBi)		1.93	RF Output Power (dBm)							
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11G-20M	1	2412	20.36	-	-	-	20.36	30.0	22.29	36.0
11G-20M	1	2437	22.92	-	-	-	22.92	30.0	24.85	36.0
11G-20M	1	2462	20.69	-	-	-	20.69	30.0	22.62	36.0
<b>Result</b>			<b>Complied</b>							
Note 1: N <sub>TX</sub> = Number of Transmit Chains										
Note 2: The EUT supports diversity transmitting, and the results on antenna port 3 is the worst case.										

Maximum Peak Conducted Output Power Result										
Directional Gain (dBi)		1.93	RF Output Power (dBm)							
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-20M	1	2412	20.22	-	-	-	20.22	30.0	22.15	36.0
11N2.4G-20M	1	2437	20.41	-	-	-	20.41	30.0	22.34	36.0
11N2.4G-20M	1	2462	17.71	-	-	-	17.71	30.0	19.64	36.0
<b>Result</b>			<b>Complied</b>							
Note 1: N <sub>TX</sub> = Number of Transmit Chains										

**3.3.6 Test Result of Maximum Conducted (Average) Output Power**

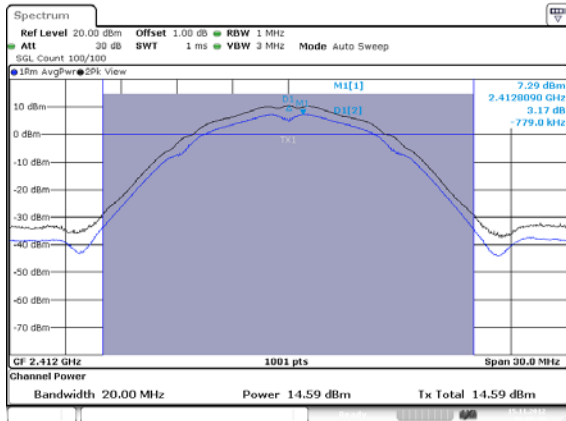
Maximum Conducted (Average) Output Power Result										
Directional Gain (dBi)		1.93	RF Output Power (dBm)							
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11B-20M	1	2412	14.64	-	-	-	14.64	30.0	16.57	36.0
11B-20M	1	2437	14.83	-	-	-	14.83	30.0	16.76	36.0
11B-20M	1	2462	14.96	-	-	-	14.96	30.0	16.89	36.0
<b>Result</b>			<b>Complied</b>							
Note 1: N <sub>TX</sub> = Number of Transmit Chains										
Note 2: EUT support diversity transmit and transmit chains port 1 is the worst than other transmit chains.										

Maximum Conducted (Average) Output Power Result										
Directional Gain (dBi)		1.93	RF Output Power (dBm)							
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11G-20M	1	2412	12.44	-	-	-	12.44	30.0	14.37	36.0
11G-20M	1	2437	15.04	-	-	-	15.04	30.0	16.97	36.0
11G-20M	1	2462	12.78	-	-	-	12.78	30.0	14.71	36.0
<b>Result</b>			<b>Complied</b>							
Note 1: N <sub>TX</sub> = Number of Transmit Chains										
Note 2: EUT support diversity transmit and transmit chains port 1 is the worst than other transmit chains.										

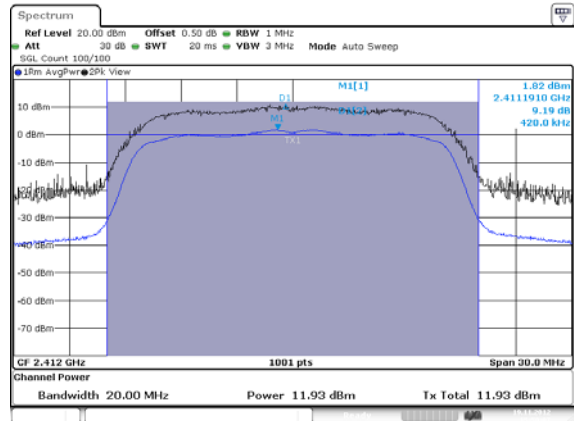
Maximum Conducted (Average) Output Power Result										
Directional Gain (dBi)		1.93	RF Output Power (dBm)							
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-20M	1	2412	12.32	-	-	-	12.32	30.0	14.26	36.0
11N2.4G-20M	1	2437	12.53	-	-	-	12.53	30.0	14.47	36.0
11N2.4G-20M	1	2462	9.78	-	-	-	9.78	30.0	11.72	36.0
<b>Result</b>			<b>Complied</b>							
Note 1: N <sub>TX</sub> = Number of Transmit Chains										
Note 2: EUT support diversity transmit and transmit chains port 1 is the worst than other transmit chains.										

Maximum Peak Conducted Output Power and Maximum Conducted Output Power Plots

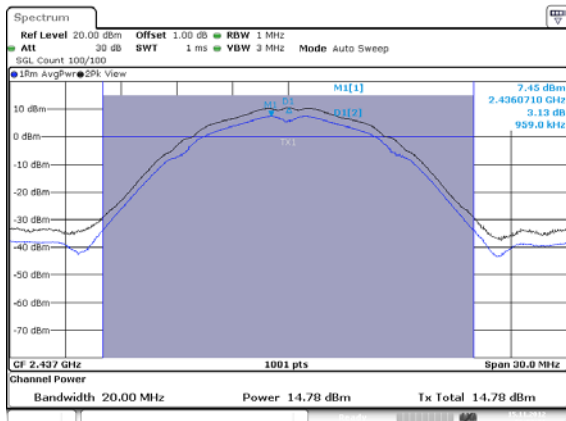
11B-20M – F1 [Port 1]



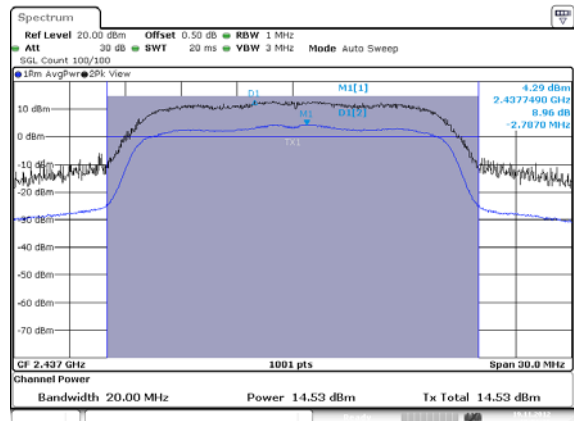
11G-20M – F1 [Port 1]



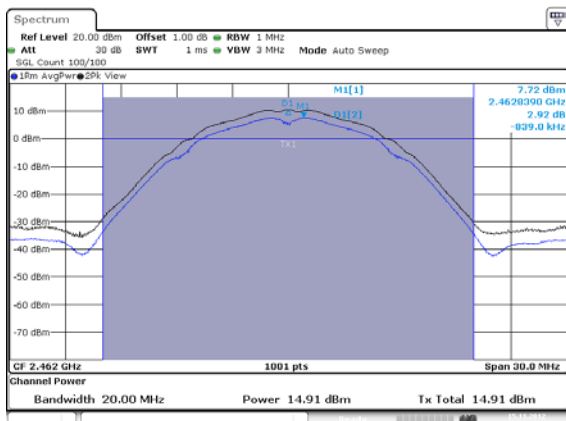
11B-20M – F2 [Port 1]



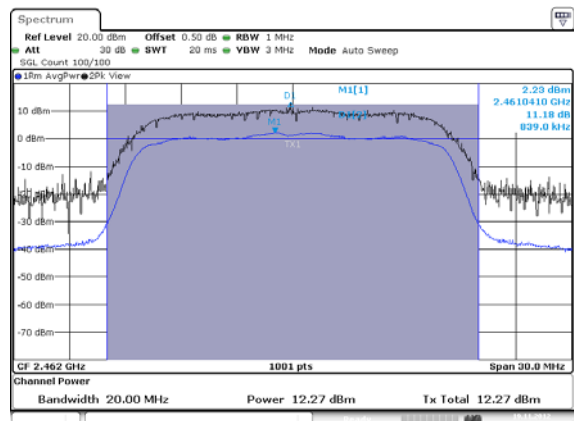
11G-20M – F2 [Port 1]



11B-20M – F3 [Port 1]



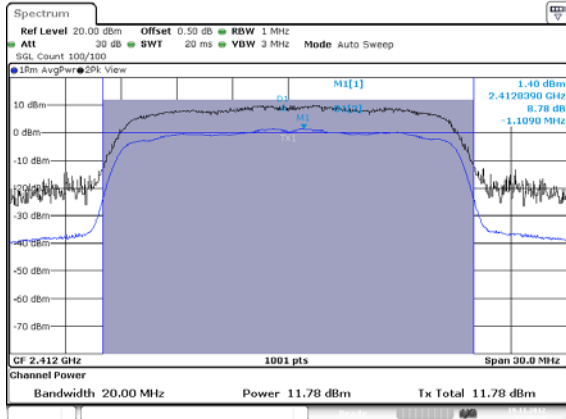
11G-20M – F3 [Port 1]



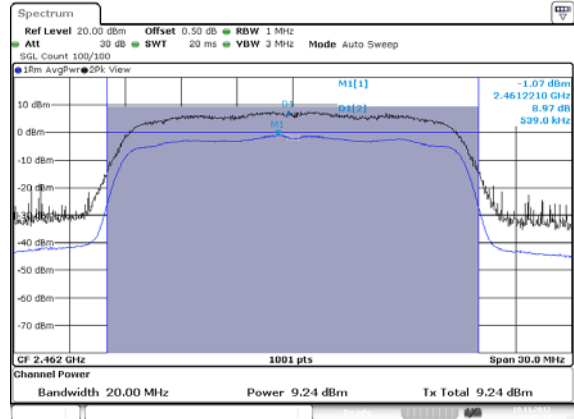
Note 1: Average Output Power Plots w/o Duty Factor

Maximum Peak Conducted Output Power and Maximum Conducted Output Power Plots

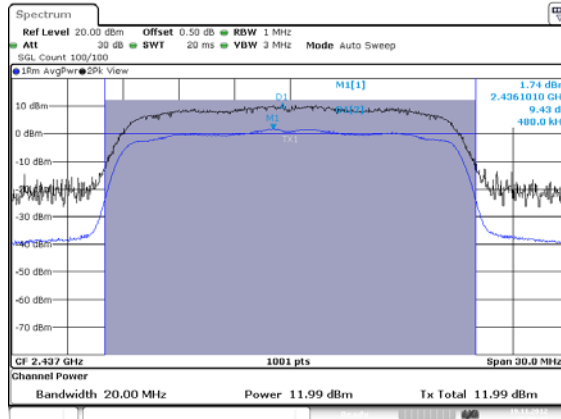
11N2.4G-20M – F1 [Port 1]



11N2.4G-20M – F3 [Port 1]



11N2.4G-20M – F2 [Port 1]



Note 1: Average Output Power Plots w/o Duty Factor

### 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

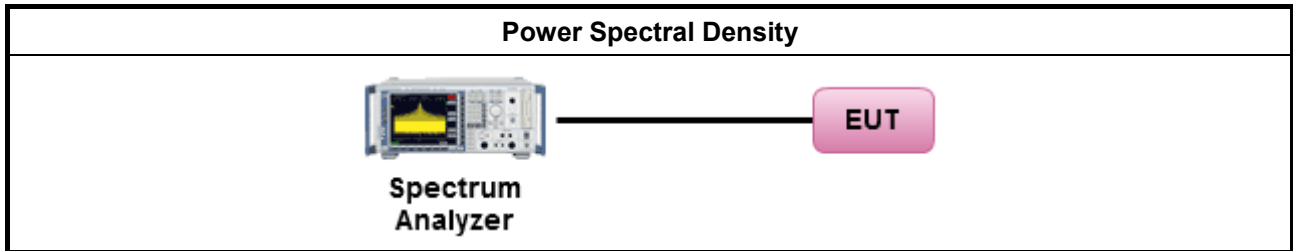
#### 3.4.2 Measuring Instruments

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 ANSI C63.10-2009 FCC KDB 558074, clause 5.3.1 Option 1 (peak PSD; BWCF=-15.2dB).
<input type="checkbox"/> Refer as ANSI C63.10-2009 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 ANSI C63.10-2009 FCC KDB 558074, clause 2 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 <sub>TX</sub> output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace. The new data trace samples added 100 kHz segment and found the highest value of each 100 kHz segments. Add the bandwidth correction factor (BWCF) [-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 ANSI C63.10-2009 FCC KDB 558074, clause 2 for radiated measurement.

3.4.4 Test Setup



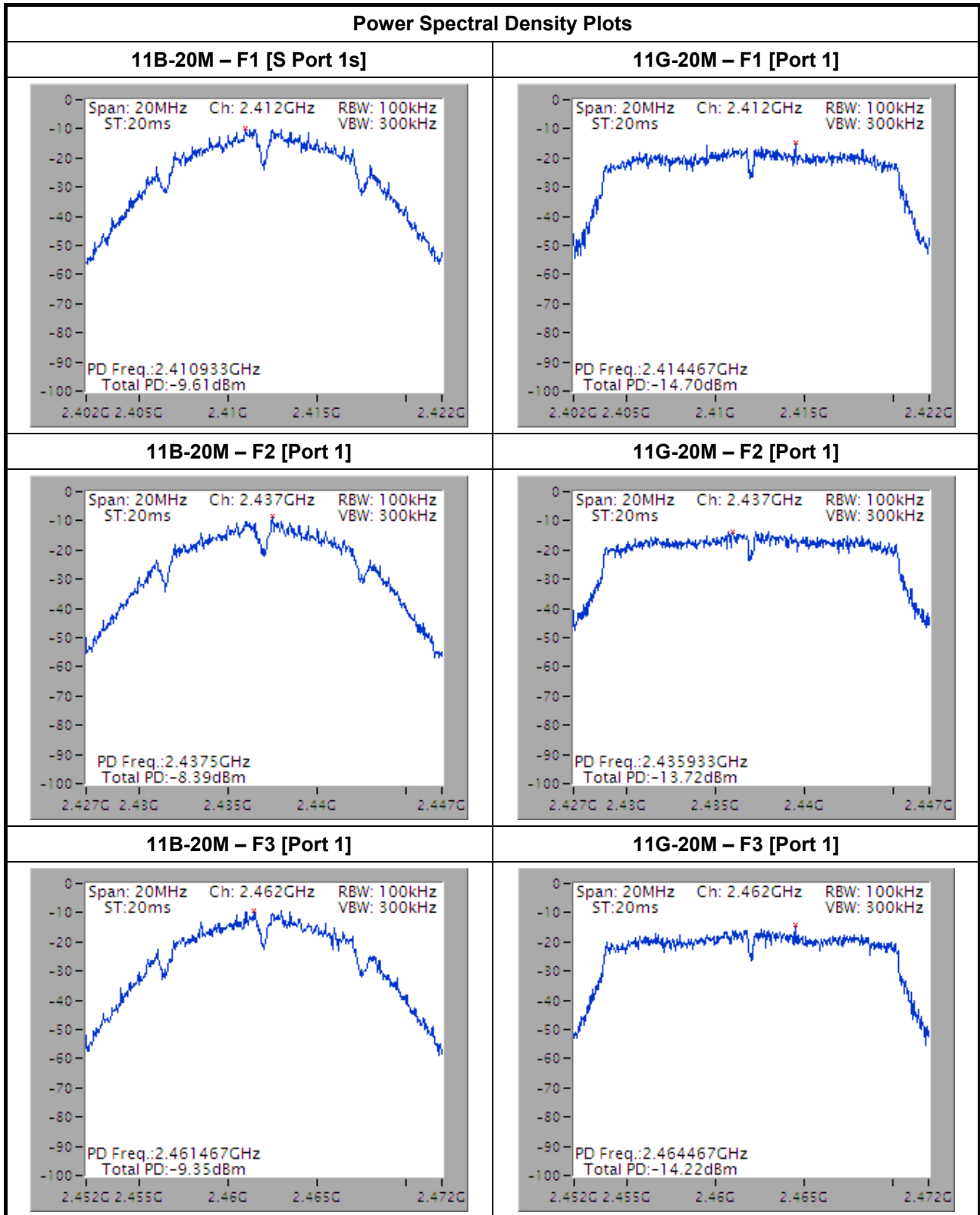
3.4.5 Test Result of Power Spectral Density

Power Spectral Density Result							
Directional Gain (dBi)		1.93	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	-	-	-	PSD Limit
11B-20M	1	2412	-9.61	-	-	-	8
11B-20M	1	2437	-8.39	-	-	-	8
11B-20M	1	2462	-9.35	-	-	-	8
<b>Result</b>			<b>Complied</b>				
Note 1: N <sub>TX</sub> = Number of Transmit Chains							

Power Spectral Density Result							
Directional Gain (dBi)		1.93	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	-	-	-	PSD Limit
11G-20M	1	2412	-14.70	-	-	-	8
11G-20M	1	2437	-13.72	-	-	-	8
11G-20M	1	2462	-14.22	-	-	-	8
<b>Result</b>			<b>Complied</b>				
Note 1: N <sub>TX</sub> = Number of Transmit Chains							

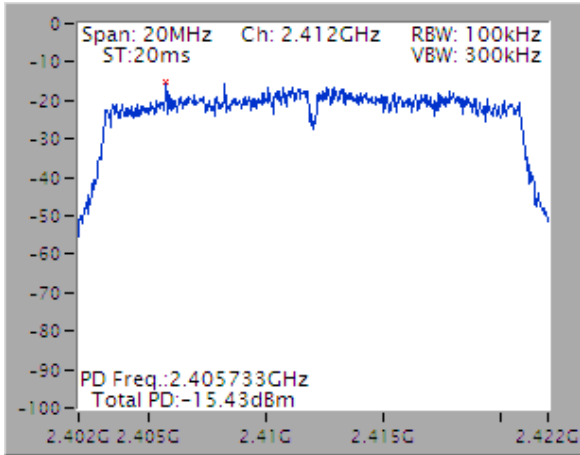
Power Spectral Density Result							
Directional Gain (dBi)		1.93	Power Spectral Density (dBm/3kHz)				
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Chain-Port 1	-	-	-	PSD Limit
11N2.4G-20M	1	2412	-15.43	-	-	-	8
11N2.4G-20M	1	2437	-16.13	-	-	-	8
11N2.4G-20M	1	2462	-17.23	-	-	-	8
<b>Result</b>			<b>Complied</b>				
Note 1: N <sub>TX</sub> = Number of Transmit Chains							



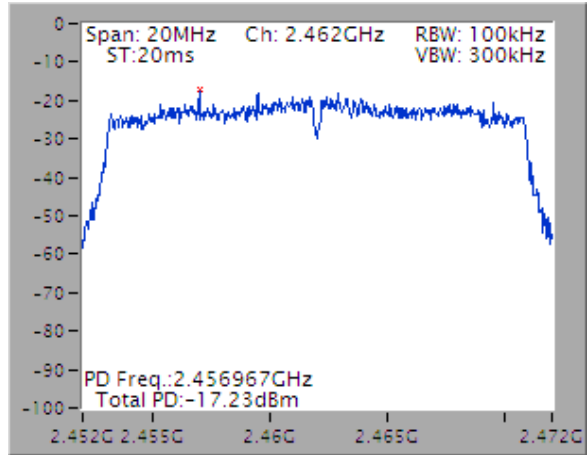


Power Spectral Density Plots

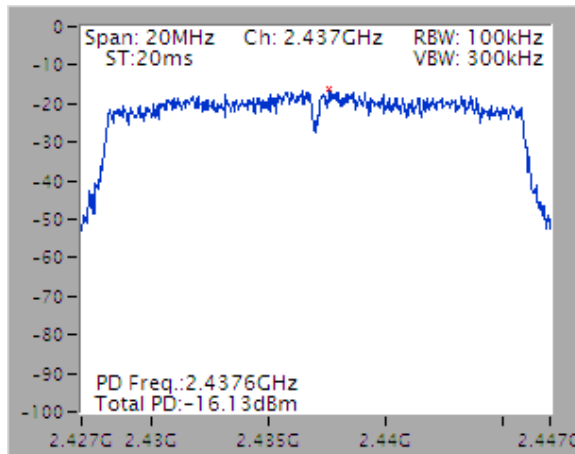
11N2.4G-20M – F1 [Port 1]



11N2.4G-20M – F3 [Port 1]

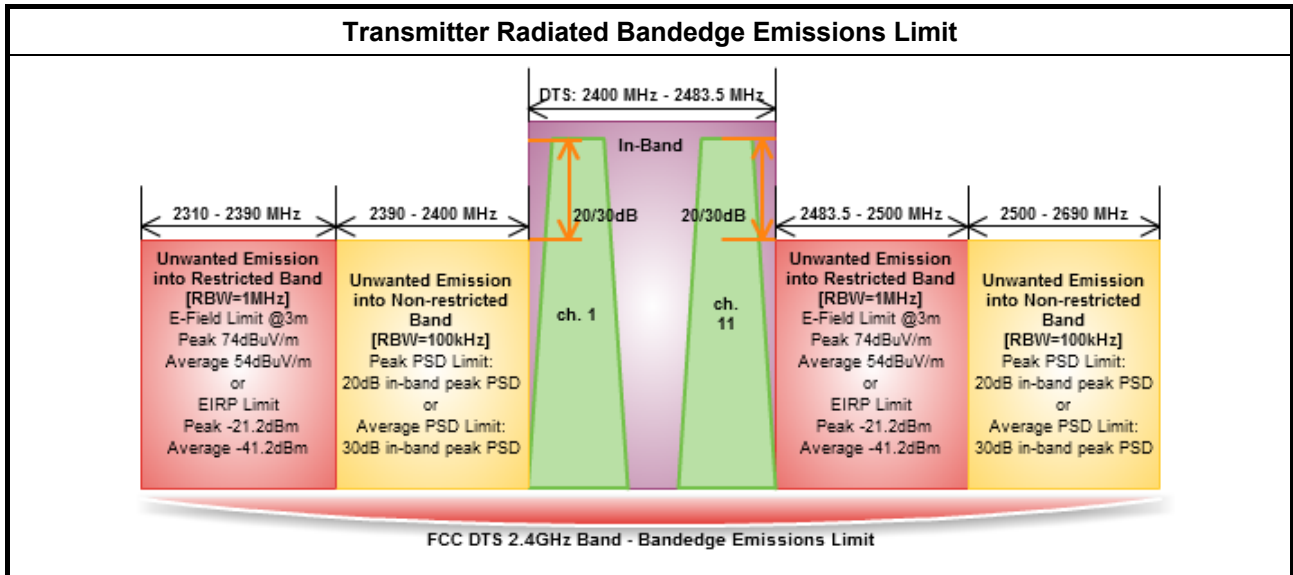


11N2.4G-20M – F2 [Port 1]



### 3.5 Transmitter Radiated Bandedge Emissions

#### 3.5.1 Transmitter Radiated Bandedge Emissions Limit



#### 3.5.2 Measuring Instruments

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

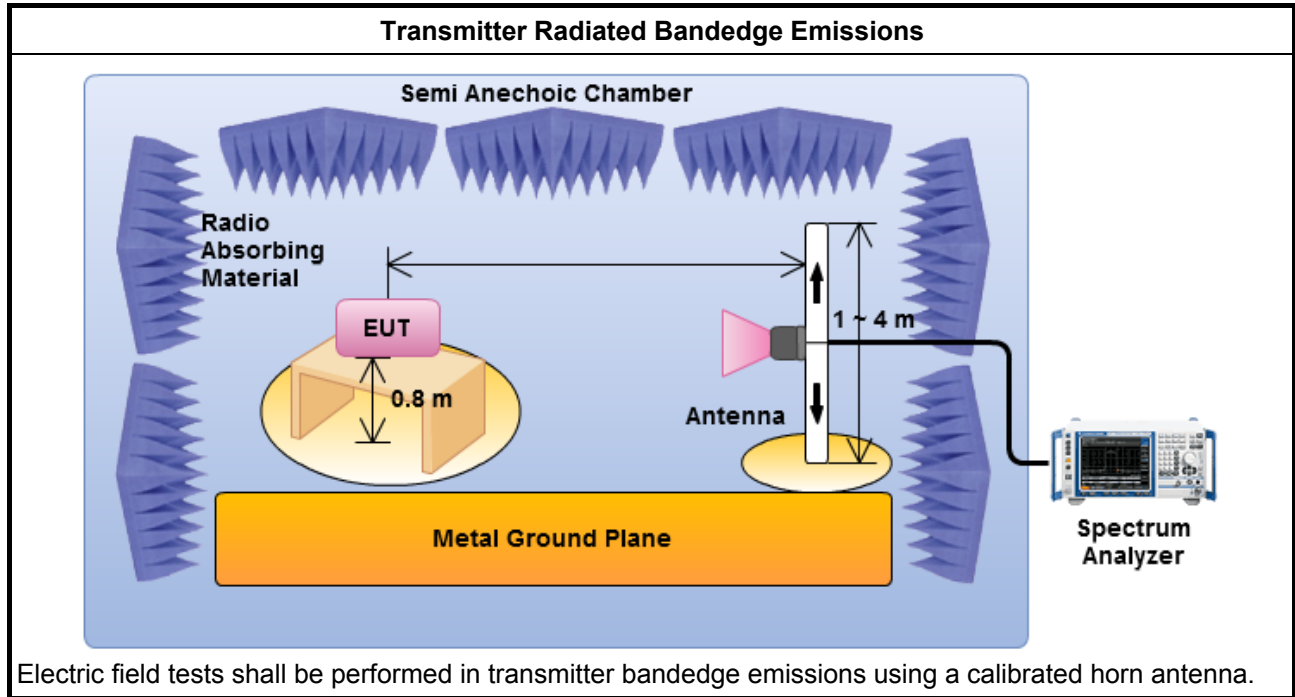
#### 3.5.3 Test Procedures

Test Method – General Information	
<input checked="" type="checkbox"/>	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
<input checked="" type="checkbox"/>	For the transmitter unwanted emissions shall be measured using following options below:
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2009 FCC KDB 558074, clause 5.4.1 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2009 FCC KDB 558074, clause 5.4.2 for unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as ANSI C63.10-2009 FCC KDB 558074, clause 5.4.2.2.1 Option 1 (Power Averaging).
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2009 FCC KDB 558074, clause 5.4.2.2.2 Option 2 (Trace Averaging).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). – Duty cycle ≥ 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 ANSI C63.10-2009 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 ANSI C63.10-2009 FCC KDB 558074, clause 5.4.2.2.4 for narrower resolution bandwidth using the band power and

<b>Test Method – General Information</b>	
	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 ANSI C63.10-2009 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 ANSI C63.10-2009 FCC KDB 558074, clause 5.4.2.2.1 unwanted emissions in restricted bands on frequencies $\leq$ 1000 MHz
<input type="checkbox"/>	Refer as ANSI C63.10-2009 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 ANSI C63.10-2009 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)		1.93		Non-restricted Band Emissions					
Modulation		11B-20M							
Non-restricted Band (MHz)	N <sub>TX</sub>	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	1	2412	109.42	2399.38	63.82	45.60	20	PK	V
2500-2690	1	2462	109.79	2511.40	52.94	56.85	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)		1.93		Restricted Band Emissions					
Modulation		11B-20M							
Restricted Band (MHz)	N <sub>TX</sub>	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	115.48	2389.18	3	61.67	74	PK	V
2310-2390	1	2412	104.21	2389.97	3	47.74	54	AV	V
2483.5-2500	1	2462	115.67	2487.10	3	61.32	74	PK	V
2483.5-2500	1	2462	104.35	2483.90	3	48.05	54	AV	V

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

Transmitter Radiated Bandedge Emissions Result									
Gain (dBi)		1.93		Non-restricted Band Emissions					
Modulation		11G-20M							
Non-restricted Band (MHz)	N <sub>TX</sub>	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	1	2412	103.86	2399.38	70.11	33.75	20	PK	V
2500-2690	1	2462	103.89	2502.20	53.46	50.43	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)		1.93		Restricted Band Emissions					
Modulation		11G-20M							
Restricted Band (MHz)	N <sub>TX</sub>	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	112.18	2390.00	3	71.28	74	PK	V
2310-2390	1	2412	100.25	2390.00	3	52.82	54	AV	V
2483.5-2500	1	2462	112.46	2484.20	3	72.56	74	PK	V
2483.5-2500	1	2462	100.44	2483.50	3	52.28	54	AV	V

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



Transmitter Radiated Bandedge Emissions Result									
Gain (dBi)		1.93		Non-restricted Band Emissions					
Modulation		11N2.4G-20M							
Non-restricted Band (MHz)	N <sub>TX</sub>	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	1	2412	103.68	2399.82	70.72	32.96	20	PK	V
2500-2690	1	2462	101.77	2500.60	53.42	48.35	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)		1.93		Restricted Band Emissions					
Modulation		11N2.4G-20M							
Restricted Band (MHz)	N <sub>TX</sub>	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	110.76	2389.07	3	72.30	74	PK	V
2310-2390	1	2412	99.58	2390.00	3	52.75	54	AV	V
2483.5-2500	1	2462	111.57	2484.20	3	72.61	74	PK	V
2483.5-2500	1	2462	99.69	2483.50	3	51.63	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

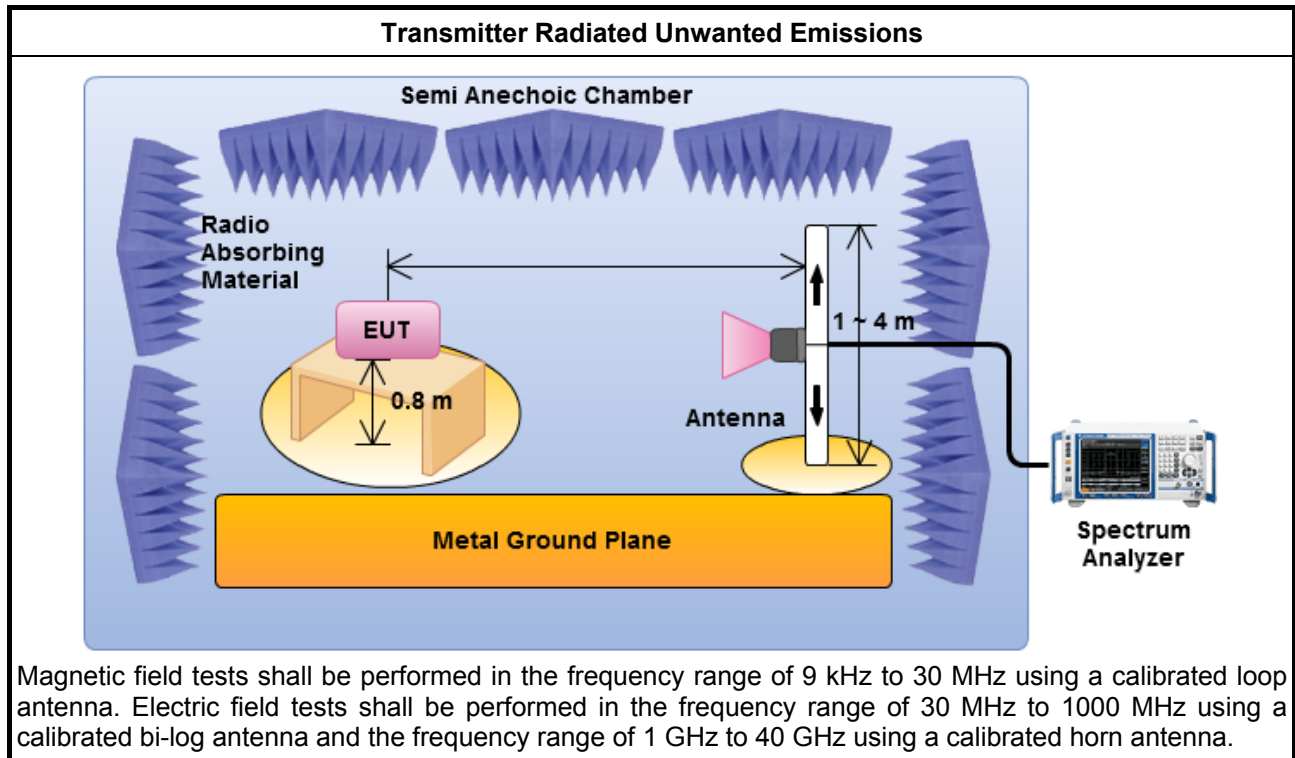
Refer a test equipment and calibration data table in this test report.

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 ≥ 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 ANSI C63.10-2009 FCC KDB 558074, clause 5.4.1 for unwanted emissions into non-restricted bands.
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2009 FCC KDB 558074, clause 5.4.2 for unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as ANSI C63.10-2009 FCC KDB 558074, clause 5.4.2.2.2.1 Option 1 (Power Averaging).
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2009 FCC KDB 558074, clause 5.4.2.2.2.2 Option 2 (Trace Averaging).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty cycle ≥ 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 ANSI C63.10-2009 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 ANSI C63.10-2009 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 ANSI C63.10-2009 FCC KDB 558074, clause 5.4.2.2.1 unwanted emissions in restricted bands on frequencies ≤ 1000 MHz
<input type="checkbox"/>	Refer as ANSI C63.10-2009 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.

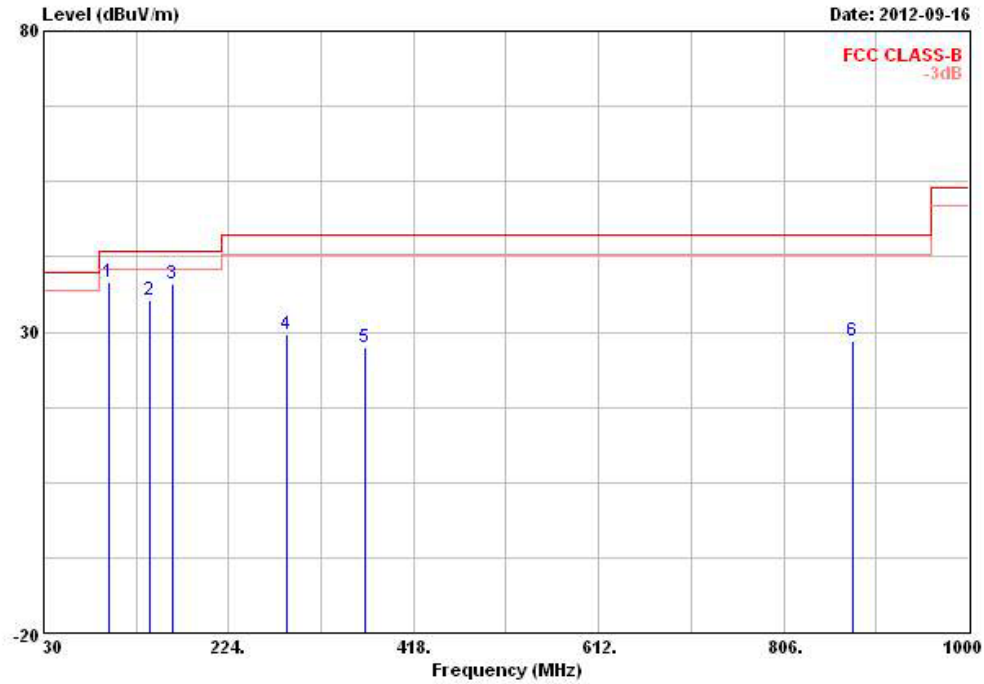
3.6.4 Test Setup



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

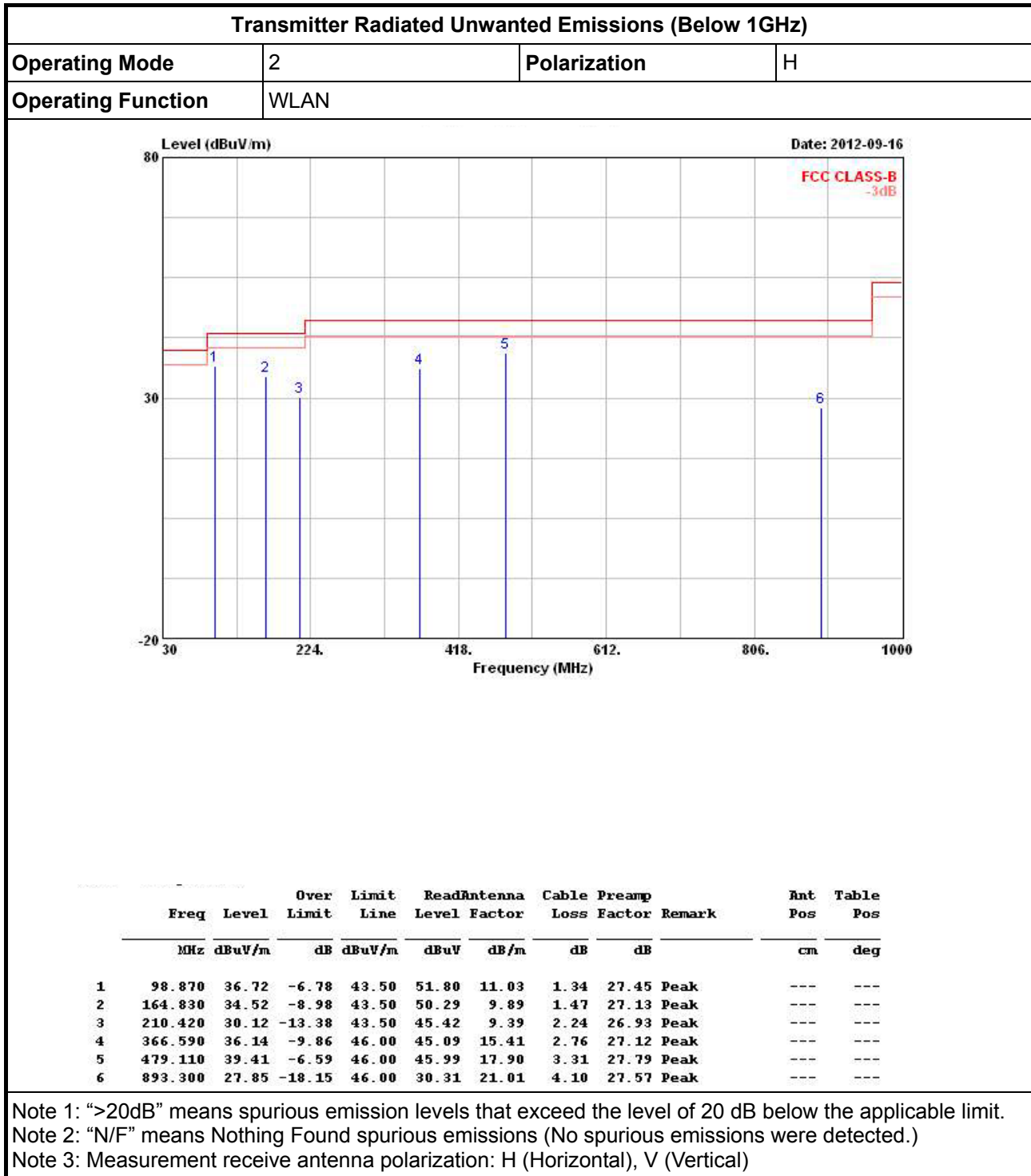
3.6.5 Test Result of Transmitter Radiated Unwanted Emissions (Below 1GHz)

Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Operating Mode	2	Polarization	V
Operating Function	WLAN		



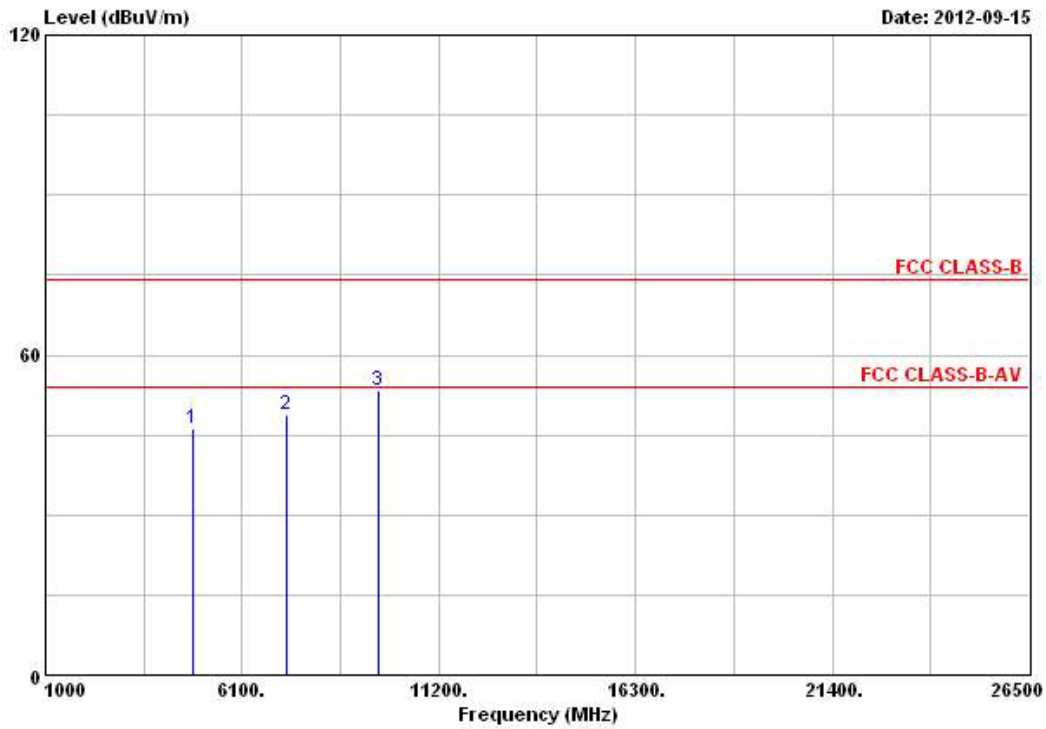
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	98.870	38.20	-5.30	43.50	53.28	11.03	1.34	27.45	Peak	---	---
2	141.550	35.15	-8.35	43.50	49.48	11.26	1.66	27.25	Peak	---	---
3	164.830	37.92	-5.58	43.50	53.69	9.89	1.47	27.13	Peak	---	---
4	285.110	29.51	-16.49	46.00	40.29	13.32	2.64	26.74	Peak	---	---
5	366.590	27.44	-18.56	46.00	36.39	15.41	2.76	27.12	Peak	---	---
6	877.780	28.50	-17.50	46.00	30.90	20.95	4.25	27.60	Peak	---	---

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



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

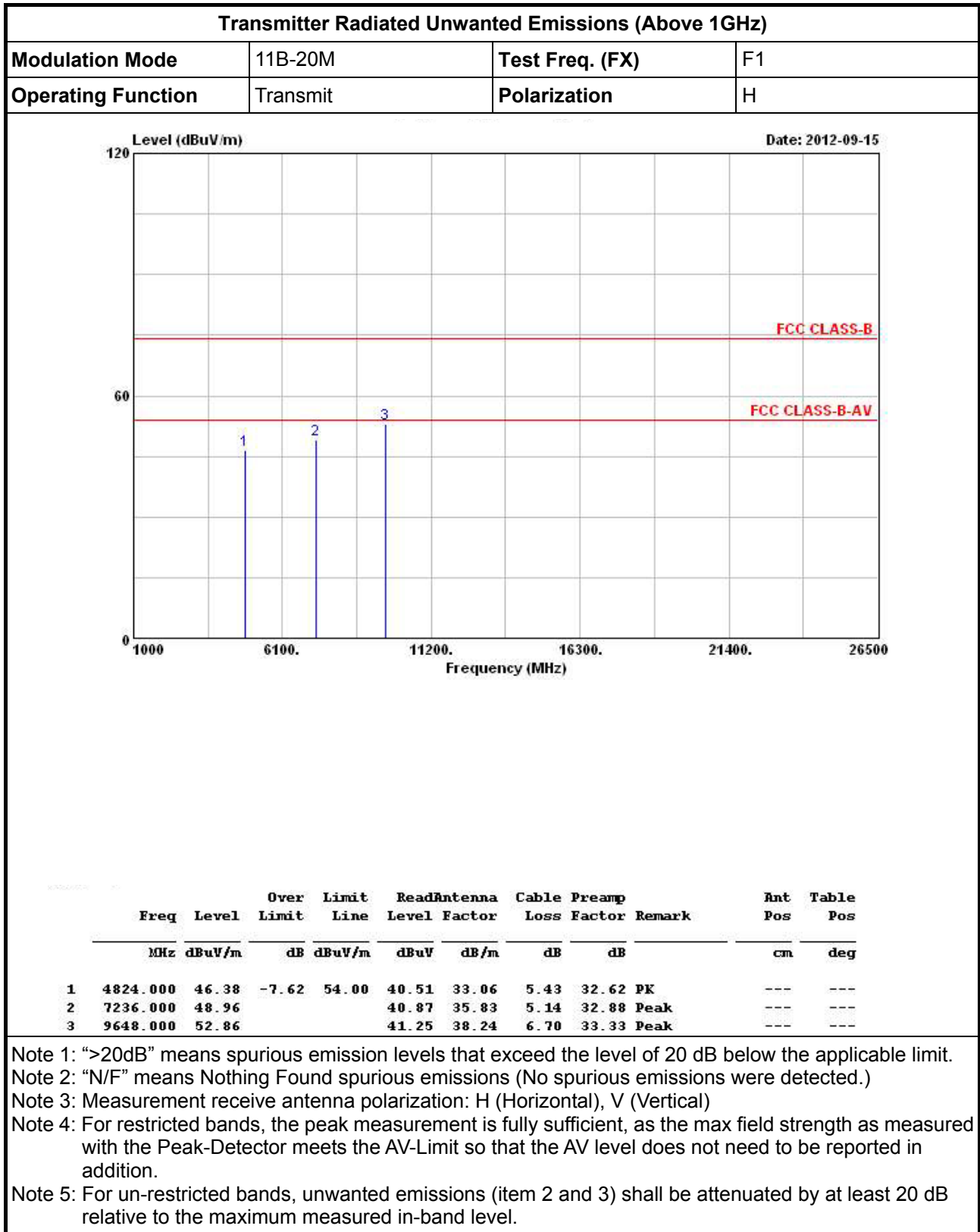
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11B-20M	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	V

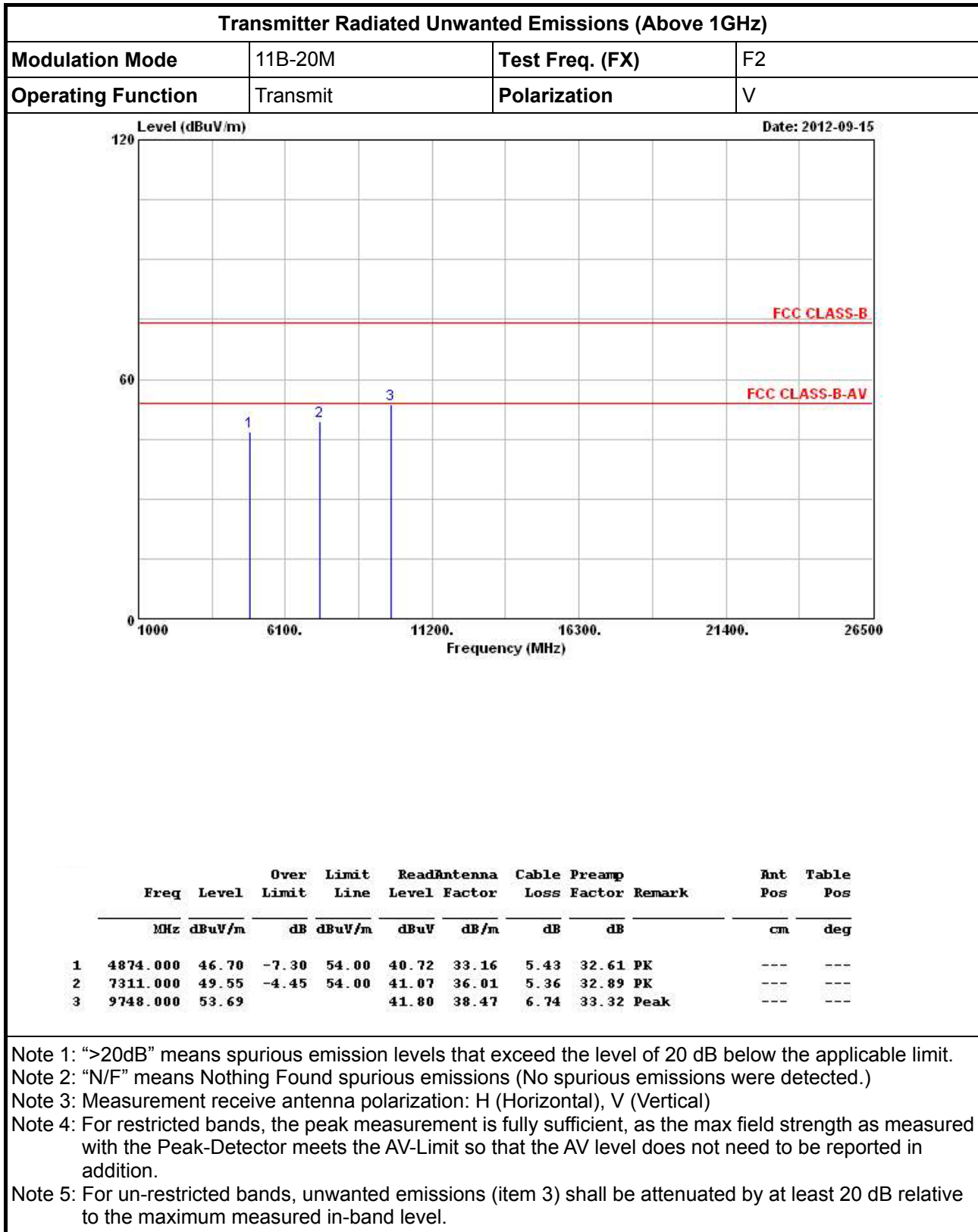


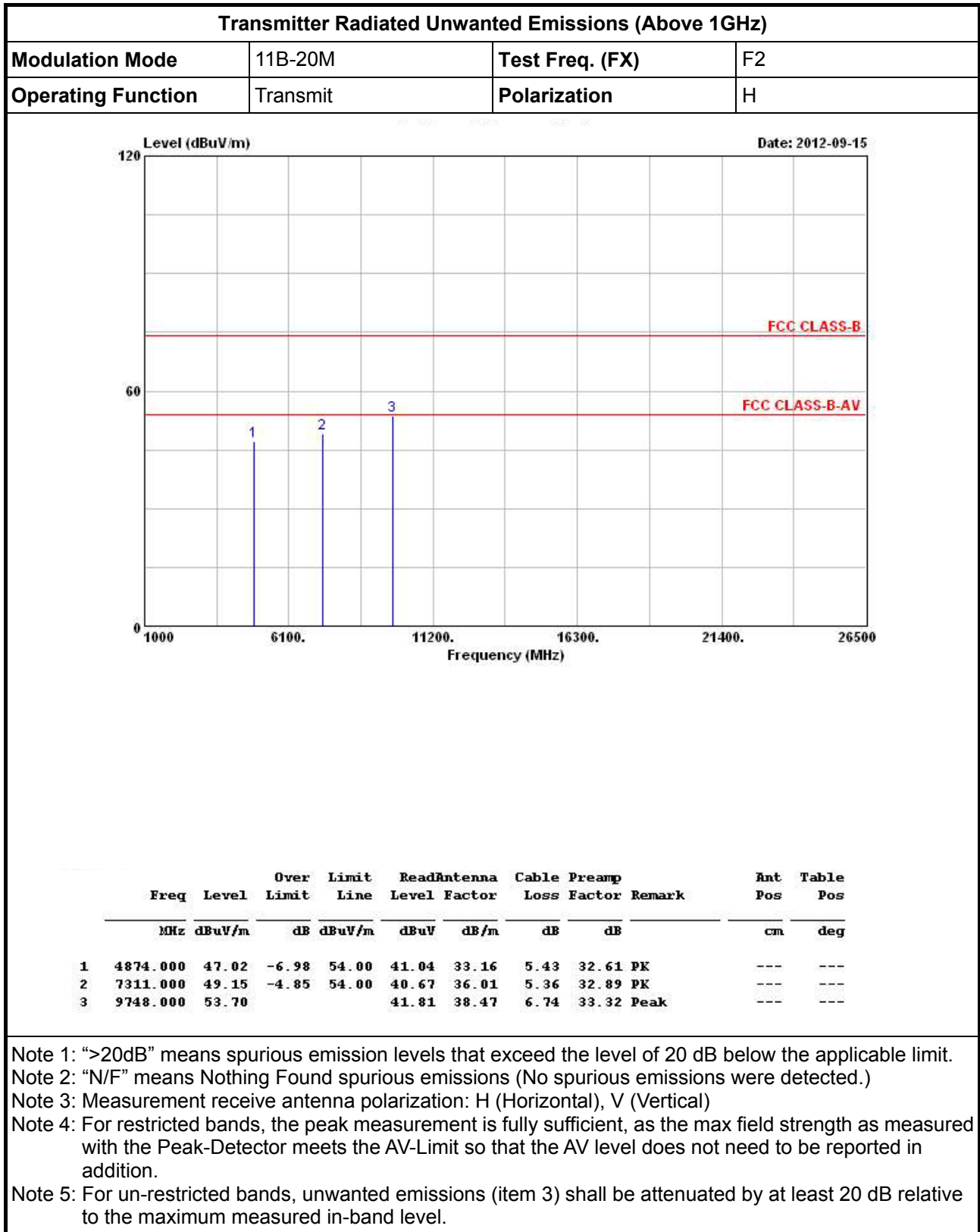
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	46.09	-7.91	54.00	40.22	33.06	5.43	32.62	PK	---	---
2	7236.000	48.74			40.65	35.83	5.14	32.88	Peak	---	---
3	9648.000	53.49			41.88	38.24	6.70	33.33	Peak	---	---

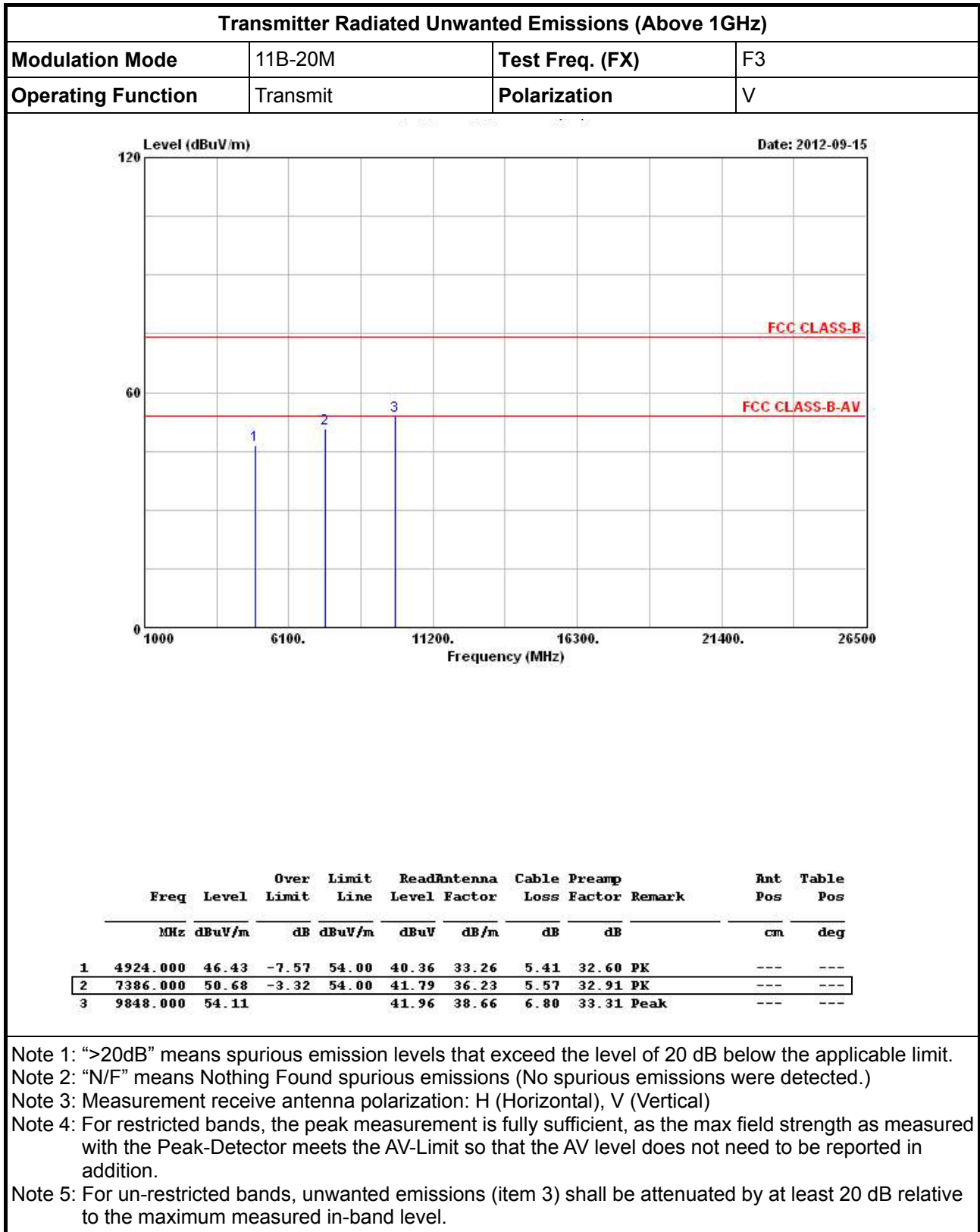
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)  
 Note 4: For restricted 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 2 and 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.



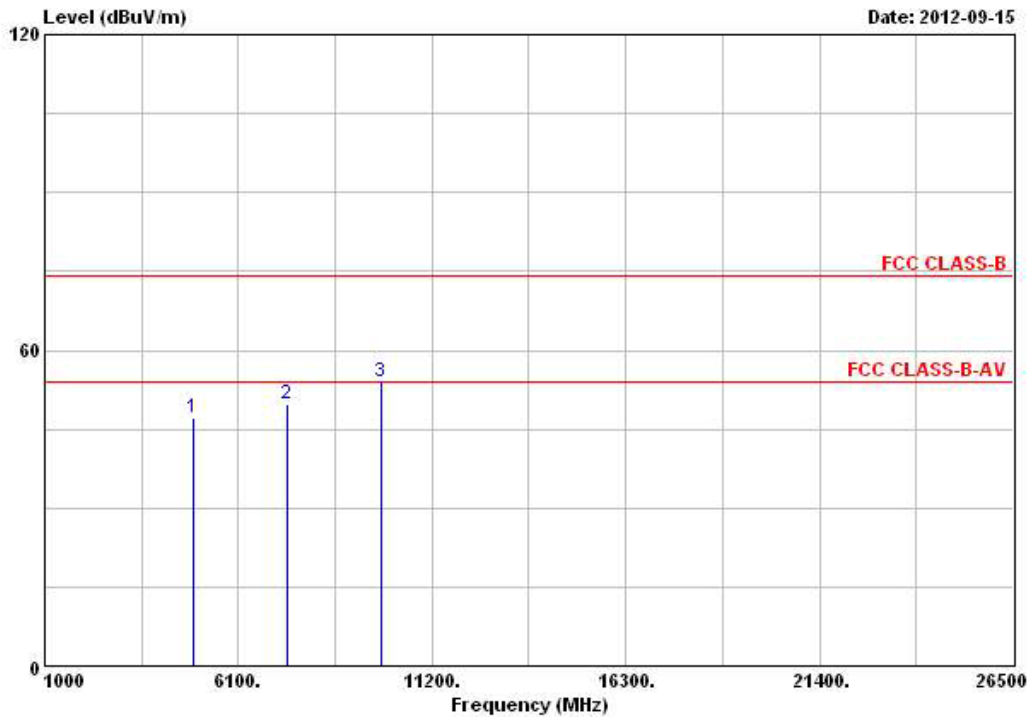








Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11B-20M	Test Freq. (FX)	F3
Operating Function	Transmit	Polarization	H

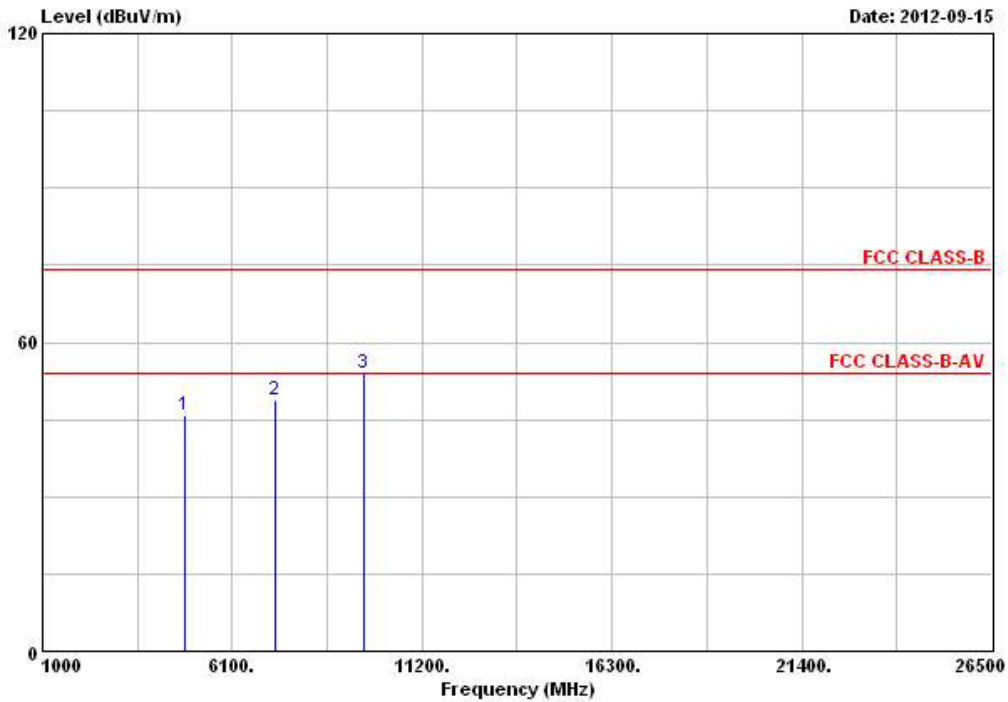


Item	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	47.03	-6.97	54.00	40.96	33.26	5.41	32.60	PK	---	---
2	7386.000	49.63	-4.37	54.00	40.74	36.23	5.57	32.91	PK	---	---
3	9848.000	53.96			41.81	38.66	6.80	33.31	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)  
 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 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

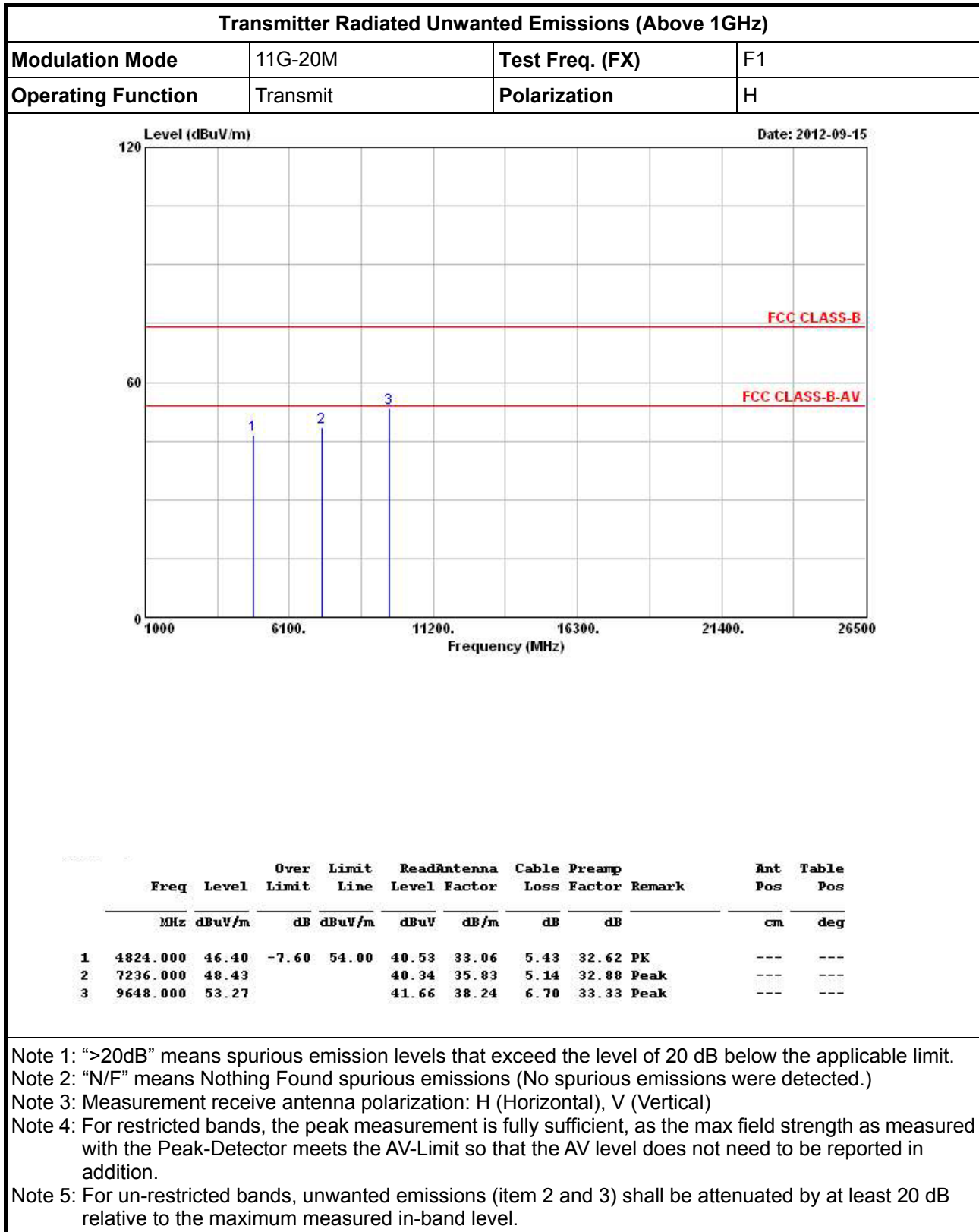
3.6.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11G-20M

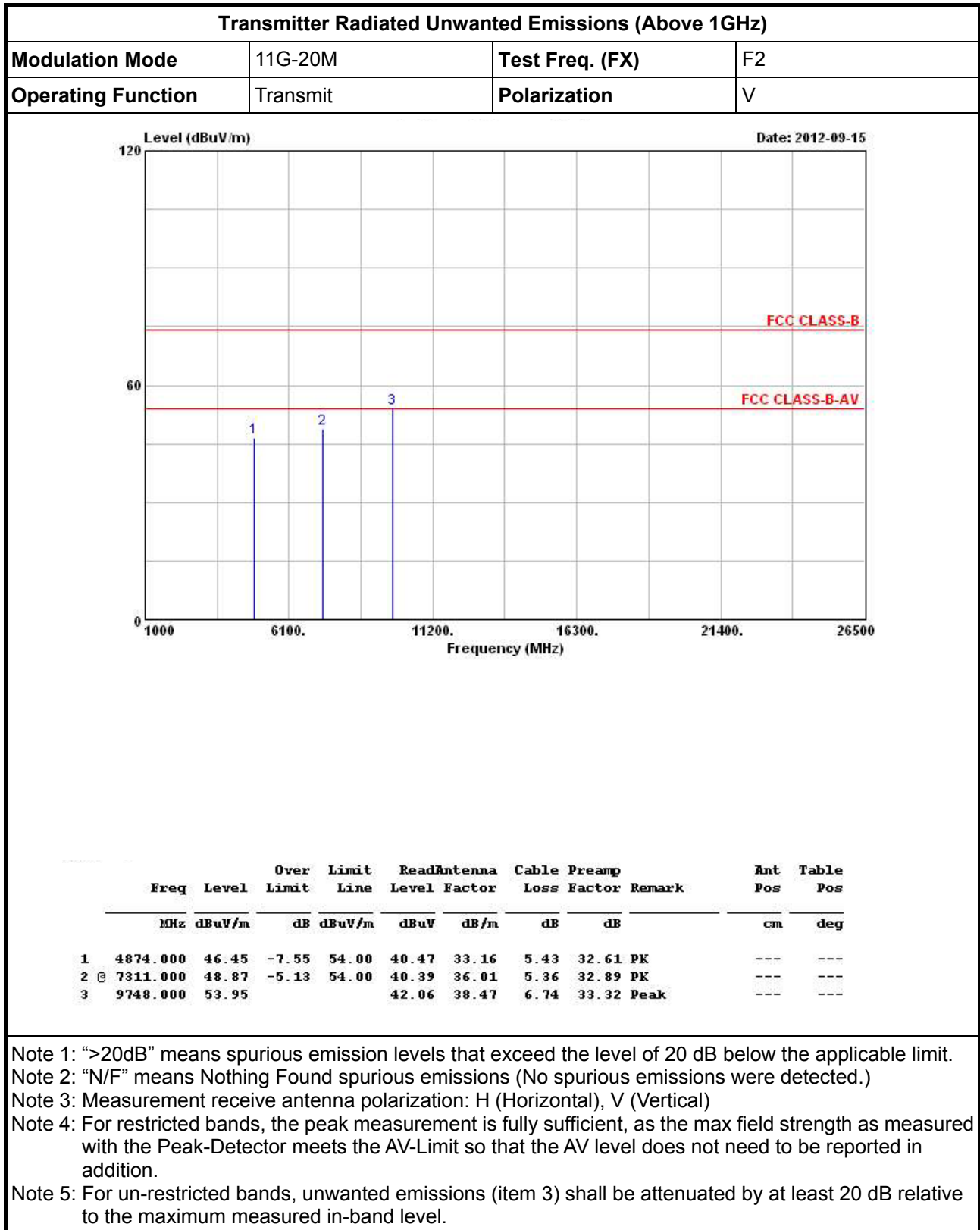
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11G-20M	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	V



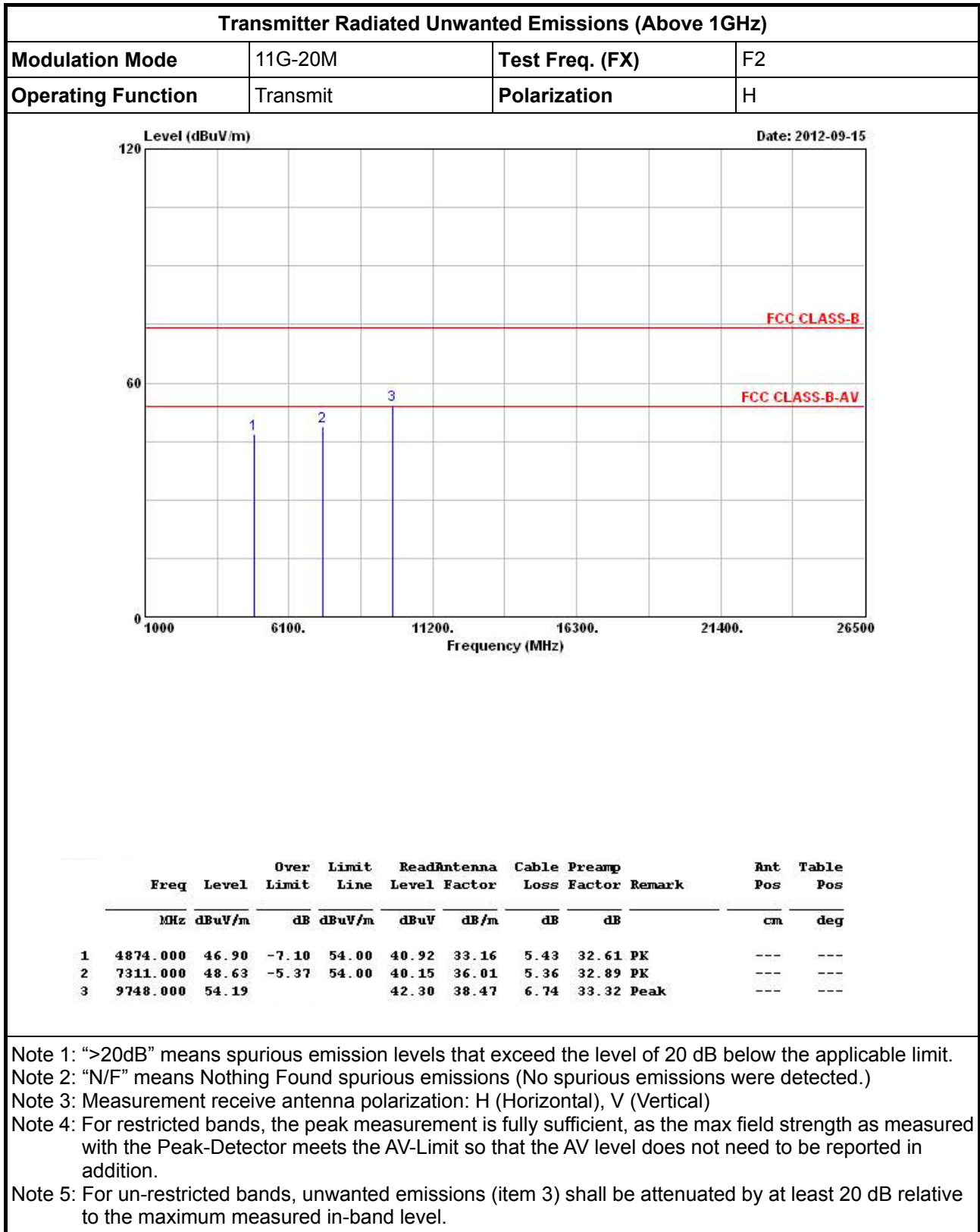
Freq	Level	Over Limit	Limit Line	Read Antenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	45.92	-8.08	54.00	40.05	33.06	5.43	32.62 PK	---	---
2	7236.000	48.88			40.79	35.83	5.14	32.88 Peak	---	---
3	9648.000	53.94			42.33	38.24	6.70	33.33 Peak	---	---

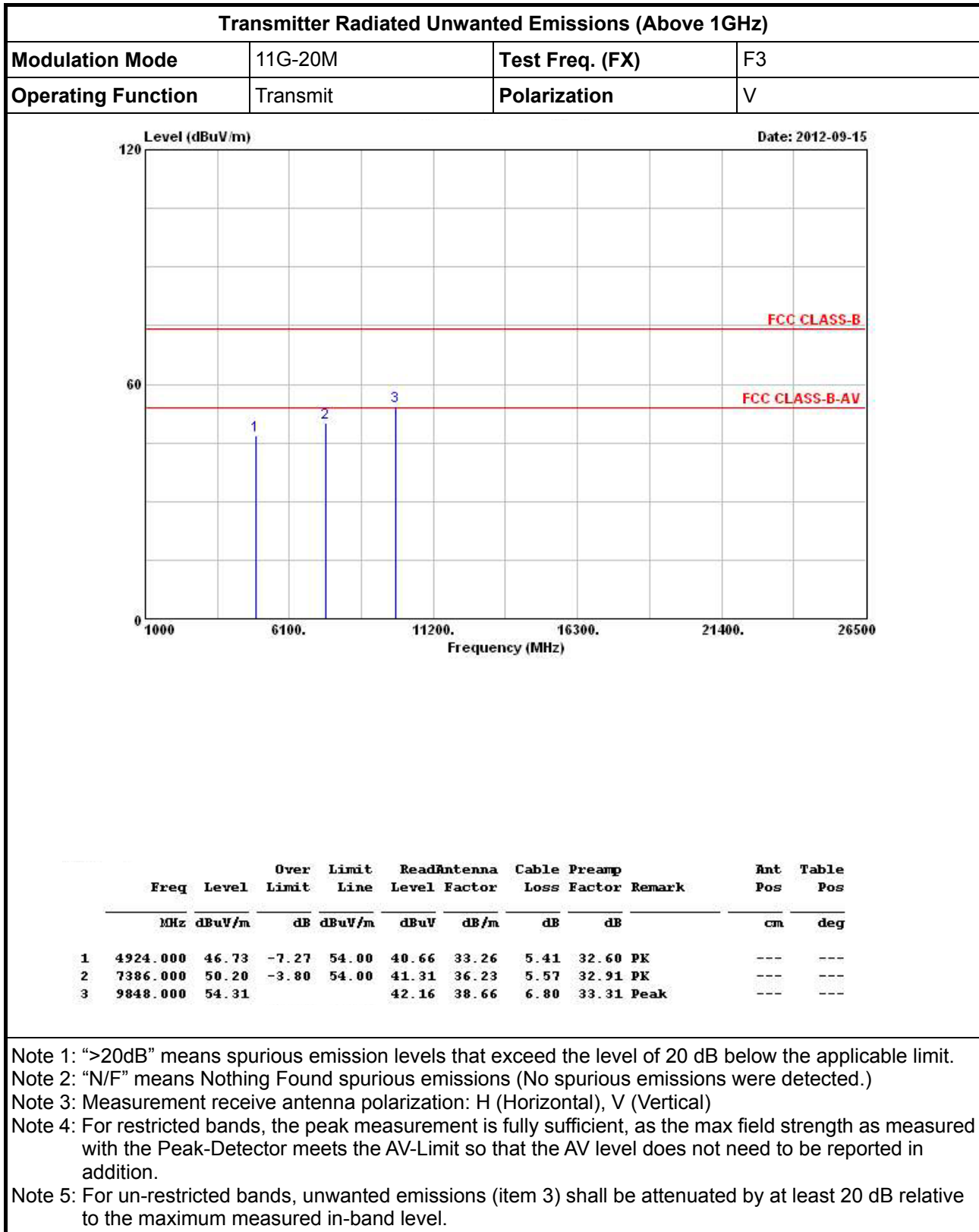
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)  
 Note 4: For restricted 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 2 and 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

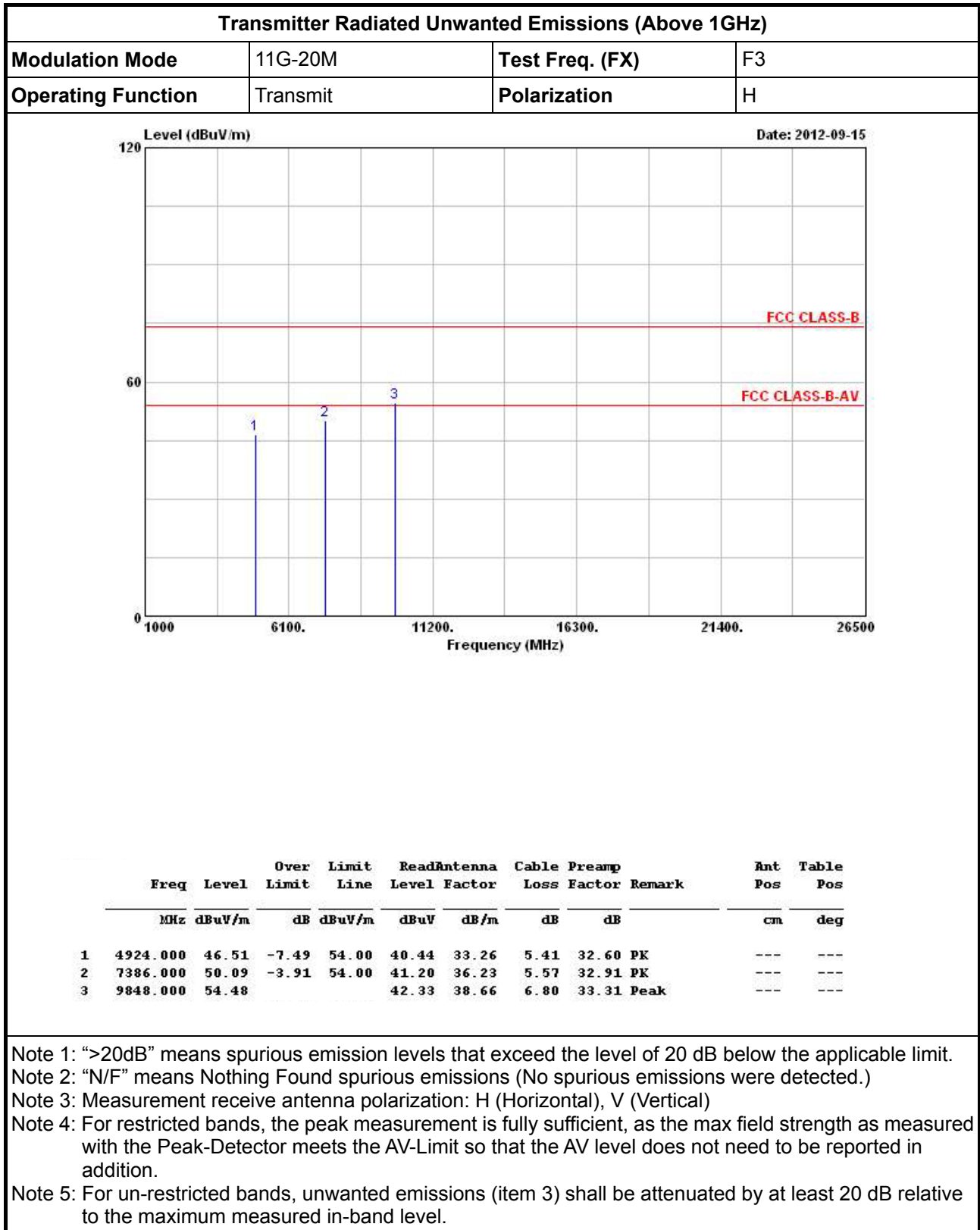






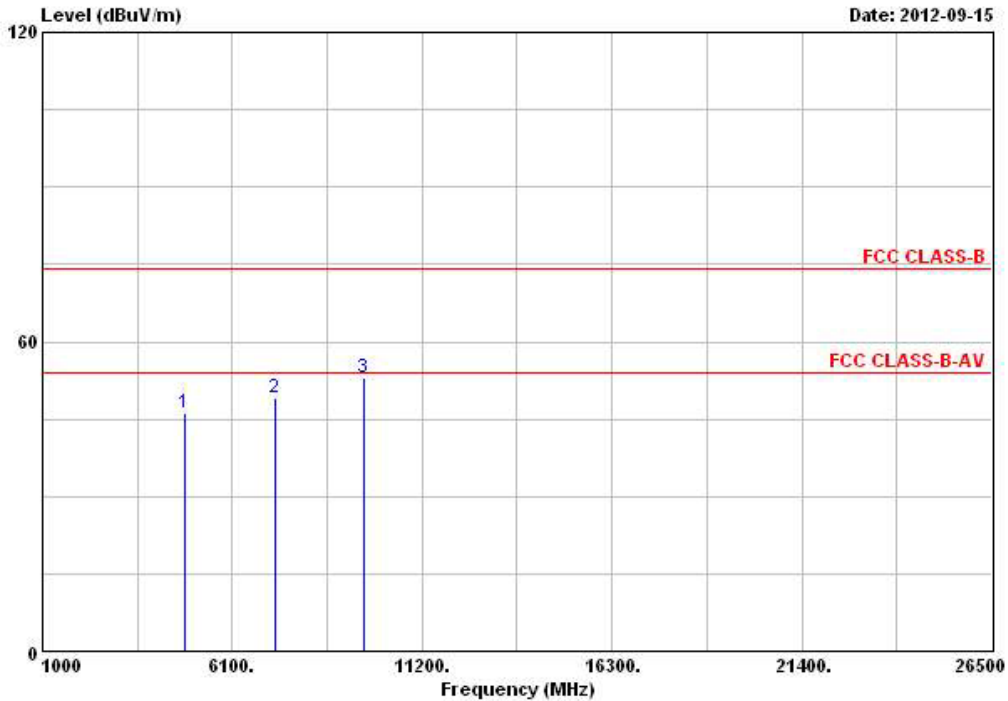






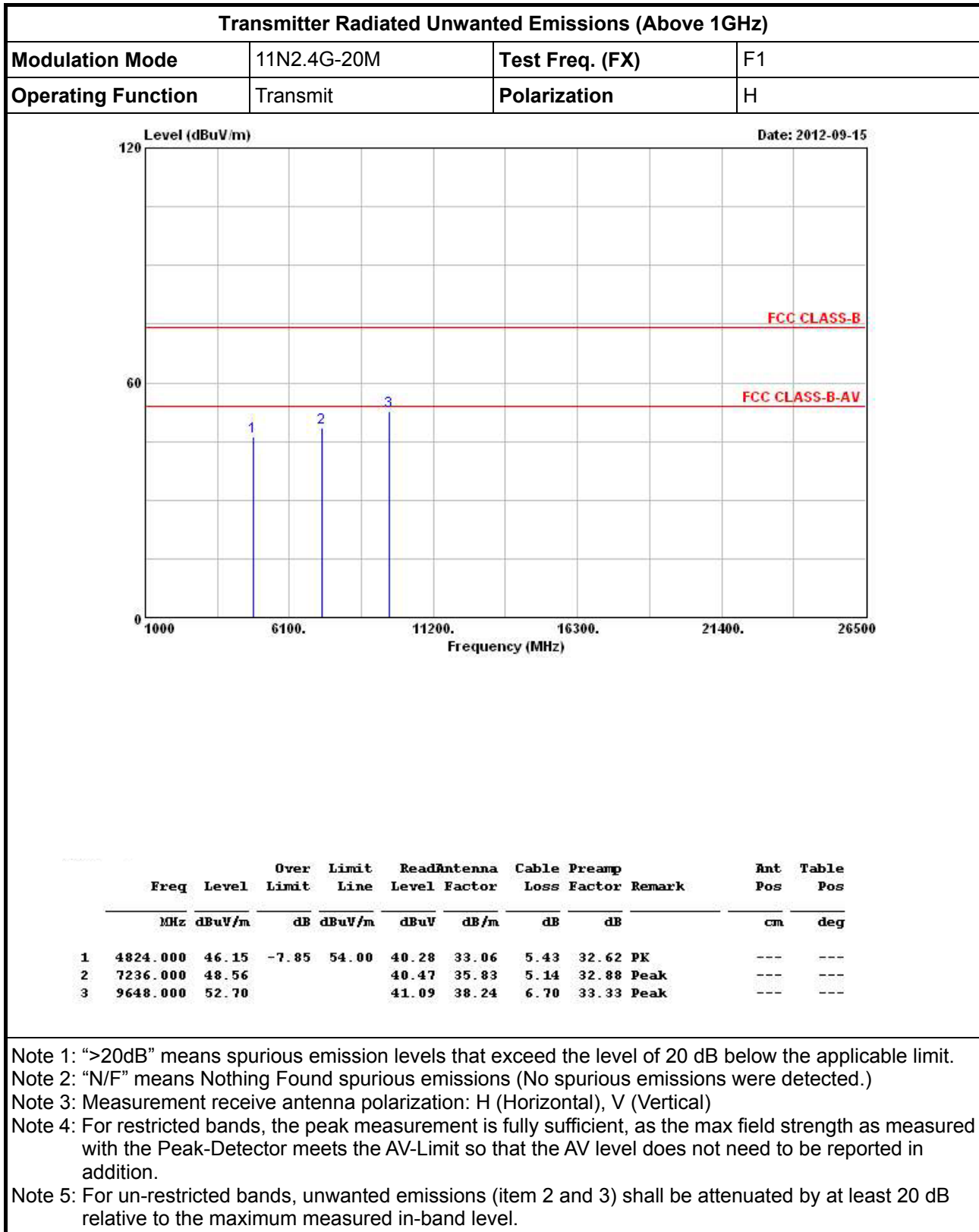
3.6.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11N2.4G-20M

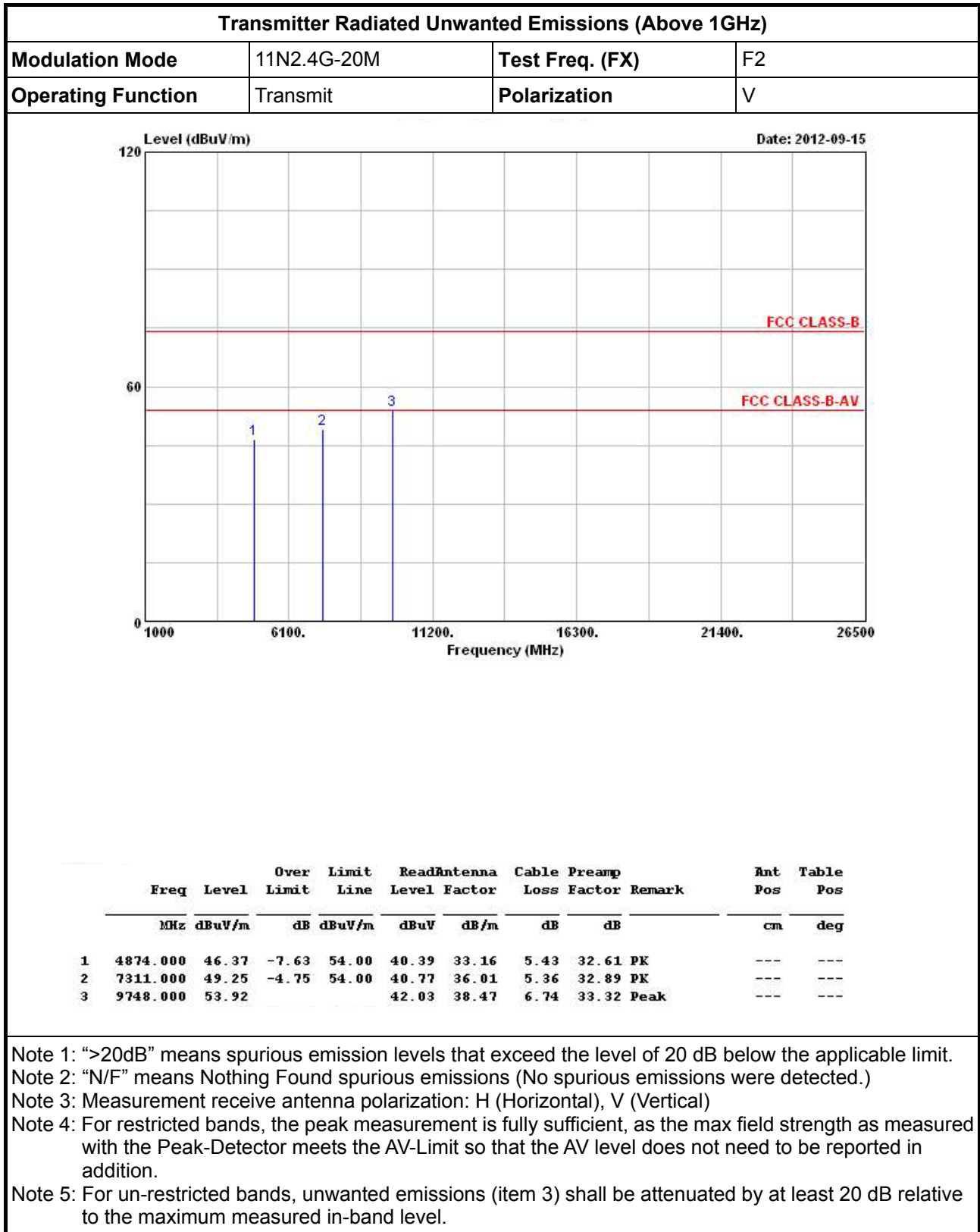
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N2.4G-20M	Test Freq. (FX)	F1
Operating Function	Transmit	Polarization	V

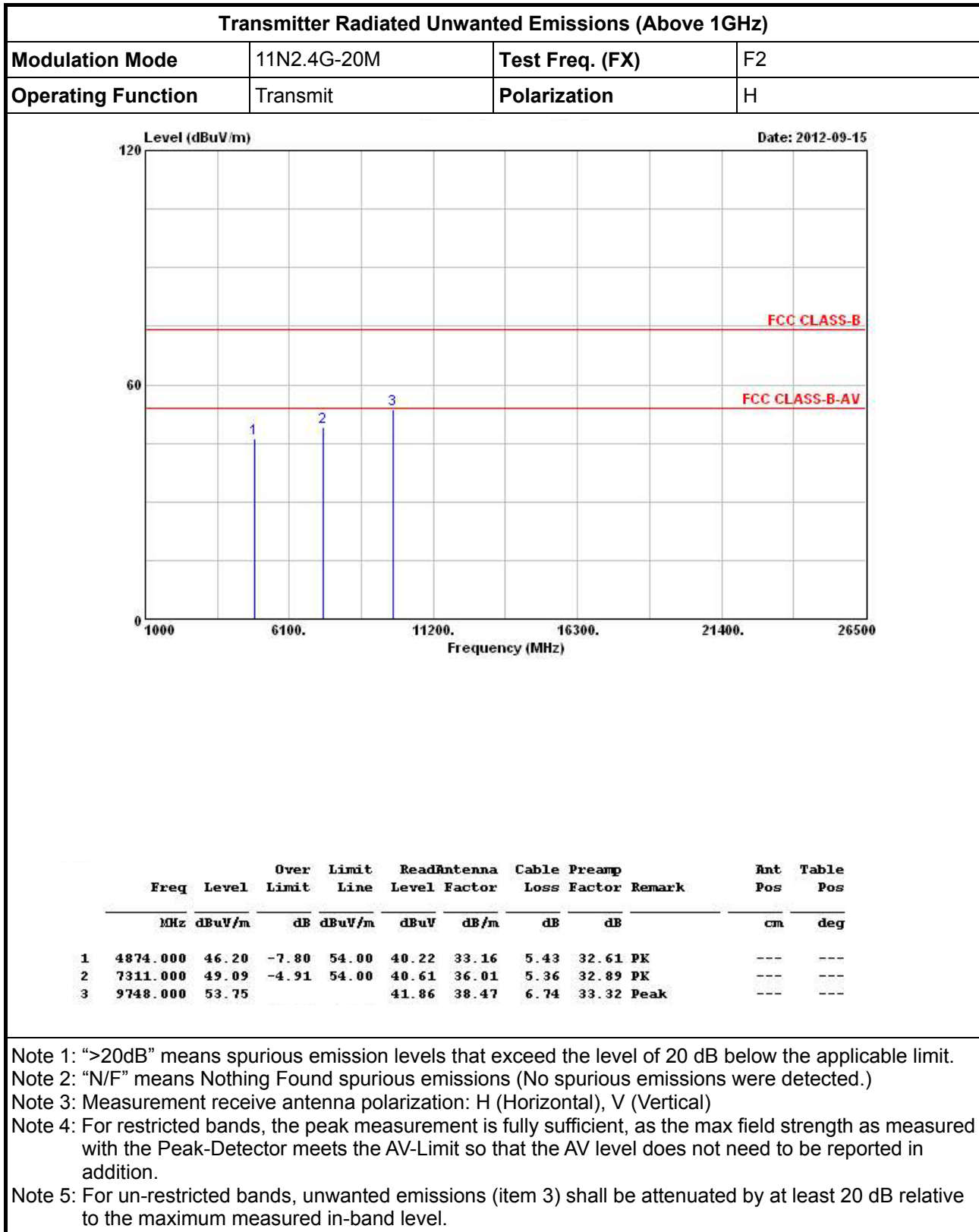


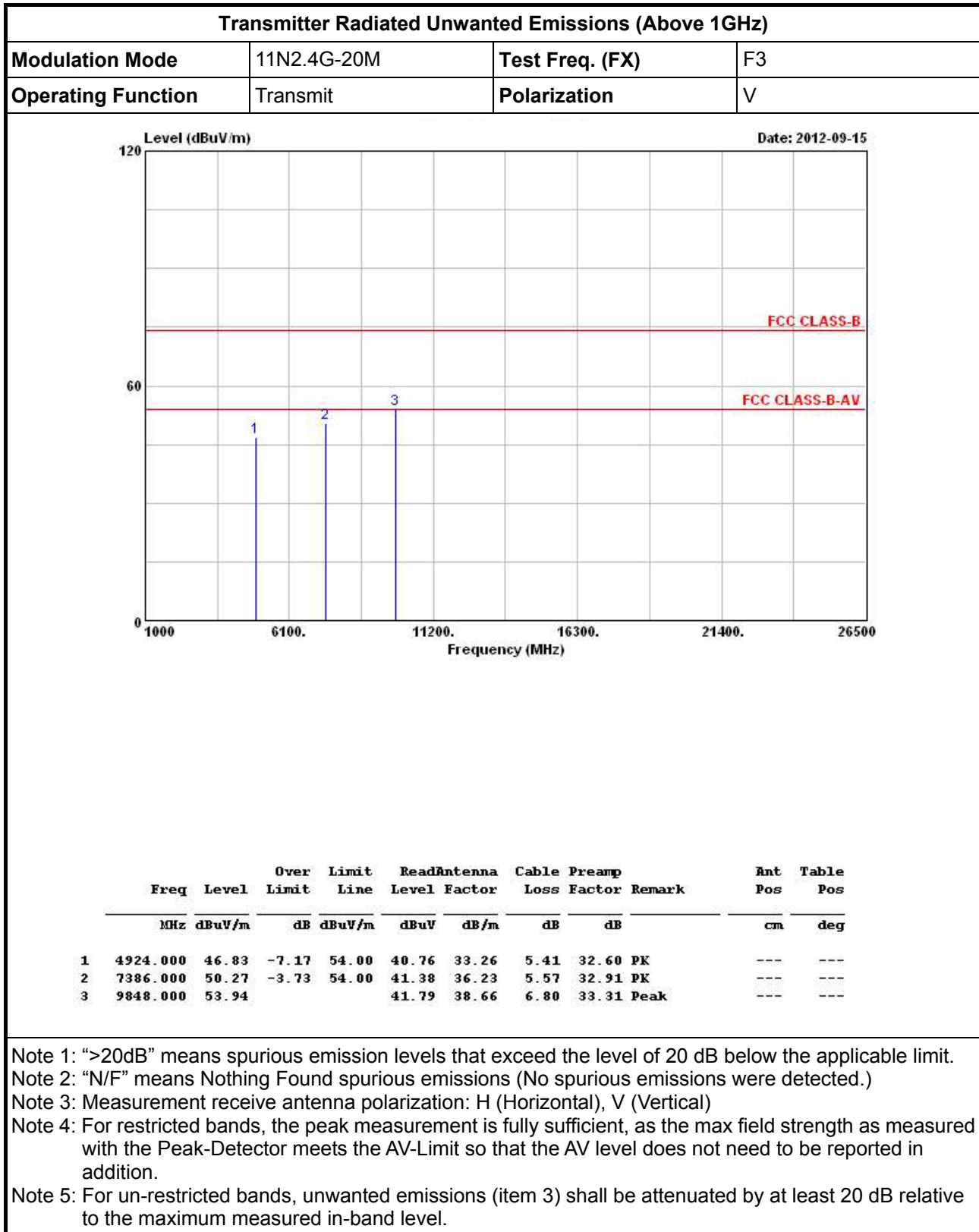
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	46.10	-7.90	54.00	40.23	33.06	5.43	32.62	PK	---	---
2	7236.000	49.14			41.05	35.83	5.14	32.88	Peak	---	---
3	9648.000	53.15			41.54	38.24	6.70	33.33	Peak	---	---

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)  
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)  
 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 2 and 3) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

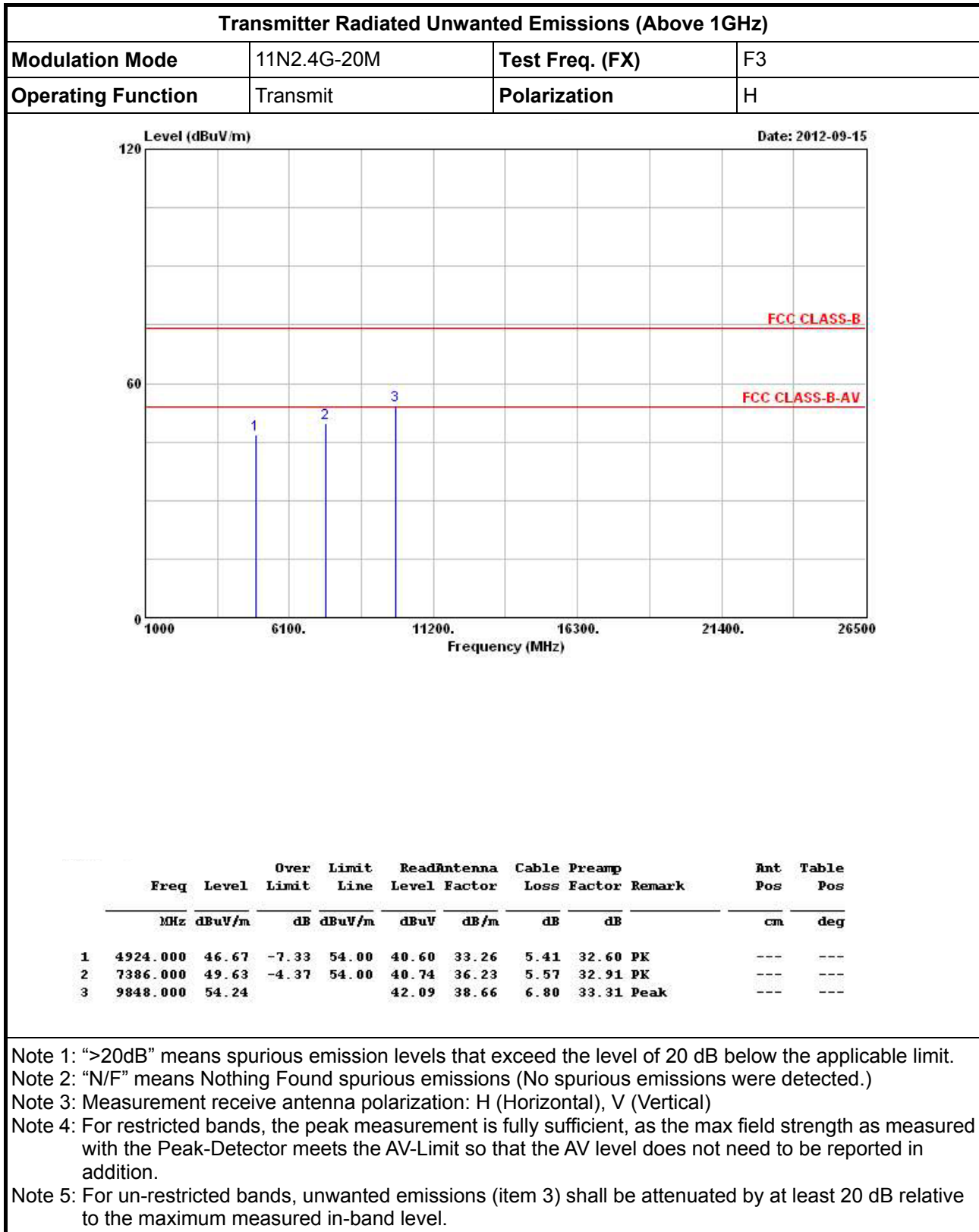












## 4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9kHz ~ 2.75GHz	Feb. 08, 2012	Conduction (CO01-HY)
LISN	TESEQ	NNB-52	27380	9kHz ~ 30MHz	Apr. 09, 2012	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz ~ 30MHz	Feb. 20, 2012	Conduction (CO01-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832010001	9kHz ~ 30MHz	Mar. 02, 2012	Conduction (CO01-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+SUHNER	SUCOFLEX_104	SN 345672/4	1GHz ~ 26.5GHz	Dec. 03, 2011	Conducted (TH01-HY)
RF Cable-3m	HUBER+SUHNER	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
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Sep. 14, 2012	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	3008A02373	1GHz ~ 26.5GHz	Aug. 10, 2012	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 15, 2011	Radiation (03CH02-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan.13, 2012	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	860004/0001	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*

Jay-San Chen  
President, Taiwan Accreditation Foundation  
Date: April 05, 2012

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