

FCC Test Report

Equipment : Tablet device
Brand Name : VAIO
Model No. : SVJ202A11L (19.5V, 3.3A)
FCC ID : AK8SVJ202A11L
Standard : 47 CFR FCC Part 15.247
Applicant : Sony Corporation
1-7-1 Konan Minato-ku, Tokyo, 108-0075 JAPAN
Manufacturer : Foxconn
No. 3, Wu-Chuan 3rd Road, Wu-Ku Industrial Park,
New Taipei City, Taiwan
RF Module : Intel 135BNHMW

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

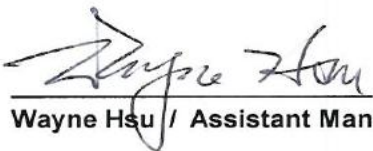

Wayne Hsu / Assistant Manager



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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	0.18838MHz: 39.59dBuV (14.52dB) - AV 53.46dBuV (10.65dB) - QP	FCC 15.207	Complied
3.2	15.247(a)	6dB Bandwidth	6dB Bandwidth Unit [MHz] 2412-2462MHz: 12.08-DSSS 2412-2462MHz: 17.34-OFDM 2422-2452MHz: 35.80-OFDM	≥500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm] 2412-2462MHz: 25.48-DSSS 2412-2462MHz: 24.69-OFDM 2422-2452MHz: 20.13-OFDM	Power [dBm] 2412-2462MHz: 30 2422-2452MHz: 30	Complied
3.4	15.247(d)	Power Spectral Density	PSD [dBm/3kHz] 2412-2462MHz: -6.74-DSSS 2412-2462MHz: -8.00-OFDM 2422-2452MHz: -17.92-OFDM	PSD [dBm/3kHz] 2412-2462MHz: 8 2422-2452MHz: 8	Complied
3.5	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2398.59MHz: 30.14dB Restricted Bands [dBuV/m at 3m]: 2483.50MHz: 70.58 (Margin 3.42dB) – PK 52.48 (Margin 1.52dB) - AV	Non-Restricted Bands: > 20 dBc Restricted Bands: FCC 15.209	Complied
3.6	15.247(c)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 3m]: 7311.00MHz: 65.76 (Margin 8.24dB) - PK 52.80 (Margin 1.20dB) - AV	Non-Restricted Bands: > 20 dBc 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)	Designation of Emission
2400-2483.5	b	2412-2462	1-11 [11]	25.48	15M2G1D
2400-2483.5	g	2412-2462	1-11 [11]	24.69	18M9D1D
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	23.43	17M8D1D
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	20.13	36M3D1D
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	15.25	N/A
g	1	1	Correlated	18.97	N/A
n (HT20)	1	1	Uncorrelated	17.89	N/A
n (HT40)	1	1	Uncorrelated	36.38	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	
☐	Equipment placed on the market without antennas
☒	Integral antenna (antenna permanently attached)
☒	Temporary RF connector provided
☐	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							
Antenna Port (Total 1 Port)				1(TX/RX)			
Maximum RF Output Power Level (PL)				1			
Transmit Chains Power Distribution				☒ symmetrical distribution ☐ asymmetrical distribution			
Ant. No.	PL	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} = 1
1	1	1	Integral	PIFA	2.06 (Main Ant.)	N/A	N/A
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) = $10 \log[(10^{G_{1/20}} + 10^{G_{2/20}} + \dots + 10^{G_{N/20}})^2 / N]$ dBi All transmit signals are completely uncorrelated, Directional Gain (DG) = $10 \log[(10^{G_{1/10}} + 10^{G_{2/10}} + \dots + 10^{G_{N/10}}) / N]$ dBi Note 3: The EUT supports diversity transmitting and the results on transmit chain port main is the worst case.							

1.1.3 Type of EUT

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

1.1.4 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle		
☐ Operated normally mode for worst duty cycle		
☒ 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)
☒ 100% - IEEE 802.11b	0	0
☒ 100% - IEEE 802.11g	0	0
☒ 100% - IEEE 802.11n (HT20)	0	0
☒ 100% - IEEE 802.11n (HT40)	0	0

1.1.5 EUT Operational Condition

Supply Voltage	☒ AC mains	☒ DC	
Type of DC Source	☐ Internal DC supply	☒ External DC adapter	☒ Battery

1.2 Accessories

Accessories Information				
AC Adapter	Brand Name	SONY	Model Name	VGP-AC19V48
	Power Rating	I/P: 100-240 V~1.5A 50/60 Hz ; O/P: 19.5V 3.3A		
Battery	Brand Name	SONY	Model Name	VGP-BPS21B
	Power Rating	10.8V /3 500mAh / 38Wh	Type	Li-ion

1.3 Support Equipment

The EUT was tested alone.

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 - Guidance for Performing Compliance Measurements on DTS
- ♦ FCC KDB 662911 - Emissions Testing of Transmitters with Multiple Outputs
- ♦ FCC KDB 412172 - Guidelines for Determining the ERP and EIRP

1.5 Testing Location Information

Testing Location				
☒	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C		
		TEL : 886-3-327-3456 FAX : 886-3-327-0973		
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
Conducted Emission	CO04-HY	Bill	25°C / 49.5%	16-Aug-12
RF Conducted	TH01-HY	Ian	23.9°C / 32%	15-Aug-12
Radiated Emission	03CH02-HY	Hsiao	24.2°C / 56%	16-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						
Power Level		1				
IEEE 802.11 Protocol	Number of Transmit Chains (N _{TX})	Data Rate / MCS	Worst Data Rate / MCS	Worst Modulation Mode	RF Output Power (dBm)	Power Spectral Density (dBm/3kHz)
b	1	1-11 Mbps	1 Mbps	11B-20M	25.48	-6.74
g	1	6-54 Mbps	6Mbps	11G-20M	24.69	-8.00
n (HT20)	1	MCS 0-7	MCS 0	11N2.4G-20M	23.43	-9.76
n (HT40)	1	MCS 0-7	MCS 0	11N2.4G-40M	20.13	-17.92
Note 1: IEEE Std. 802.11-2007 modulation consists of IEEE Std. 802.11g-2003 and IEEE Std. 802.11b-1999. Note 2: IEEE Std. 802.11n-2009 modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. Worst modulation mode of Guard Interval (GI) is 400ns. Note 3: Modulation modes consist of 11B-20M, 11G-20M, 11N2.4G-20M, 11N2.4G-40M: 11B: IEEE 802.11b, 11G: IEEE 802.11g, 11N2.4G: IEEE 802.11n (2.4GHz Band) 20M/40M: Channel Bandwidth 20MHz/40MHz Note 4: RF output power specifies that Maximum Peak Conducted Output Power.						

2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration		
IEEE 802.11 Protocol	Worst Modulation Mode	Test Channel Frequencies (MHz) – FX (Frequencies Abbreviations)
b	11B-20M	2412-(F1), 2437-(F2), 2462-(F3)
g	11G-20M	2412-(F1), 2437-(F2), 2462-(F3)
n (HT20)	11N2.4G-20M	2412-(F1), 2437-(F2), 2462-(F3)
n (HT40)	11N2.4G-40M	2422-(F4), 2437-(F5), 2452-(F6)
Note 1: Modulation modes consist of 11B-20M, 11G-20M, 11N2.4G-20M, 11N2.4G-40M: 11B: IEEE 802.11b, 11G: IEEE 802.11g, 11N2.4G: IEEE 802.11n (2.4GHz Band) 20M/40M: Channel Bandwidth 20M/40M		

2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter					
Power Level		1			
Test Software Version		DRTU			
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	19	1 Mbps	25.48
11B-20M	1	2442	19	1 Mbps	24.81
11B-20M	1	2472	19	1 Mbps	25.12
11G-20M	1	2412	14.5	6 Mbps	21.57
11G-20M	1	2442	17.5	6 Mbps	24.69
11G-20M	1	2472	14	6 Mbps	21.28
11N2.4G-20M	1	2412	13	MCS 0	20.00
11N2.4G-20M	1	2442	16	MCS 0	23.43
11N2.4G-20M	1	2472	13	MCS 0	19.95
11N2.4G-40M	1	2422	9.5	MCS 0	17.02
11N2.4G-40M	1	2437	12.5	MCS 0	20.13
11N2.4G-40M	1	2452	10	MCS 0	16.95
Note 1: Modulation modes consist of 11B-20M, 11G-20M, 11N2.4G-20M, 11N2.4G-40M: 11B: IEEE 802.11b, 11G: IEEE 802.11g, 11N2.4G: IEEE 802.11n (2.4GHz Band) 20M/40M: Channel Bandwidth 20MHz/40MHz Note 2: RF output power specifies that Maximum Peak Conducted Output Power.					

2.4 The Worst Case Measurement Configuration

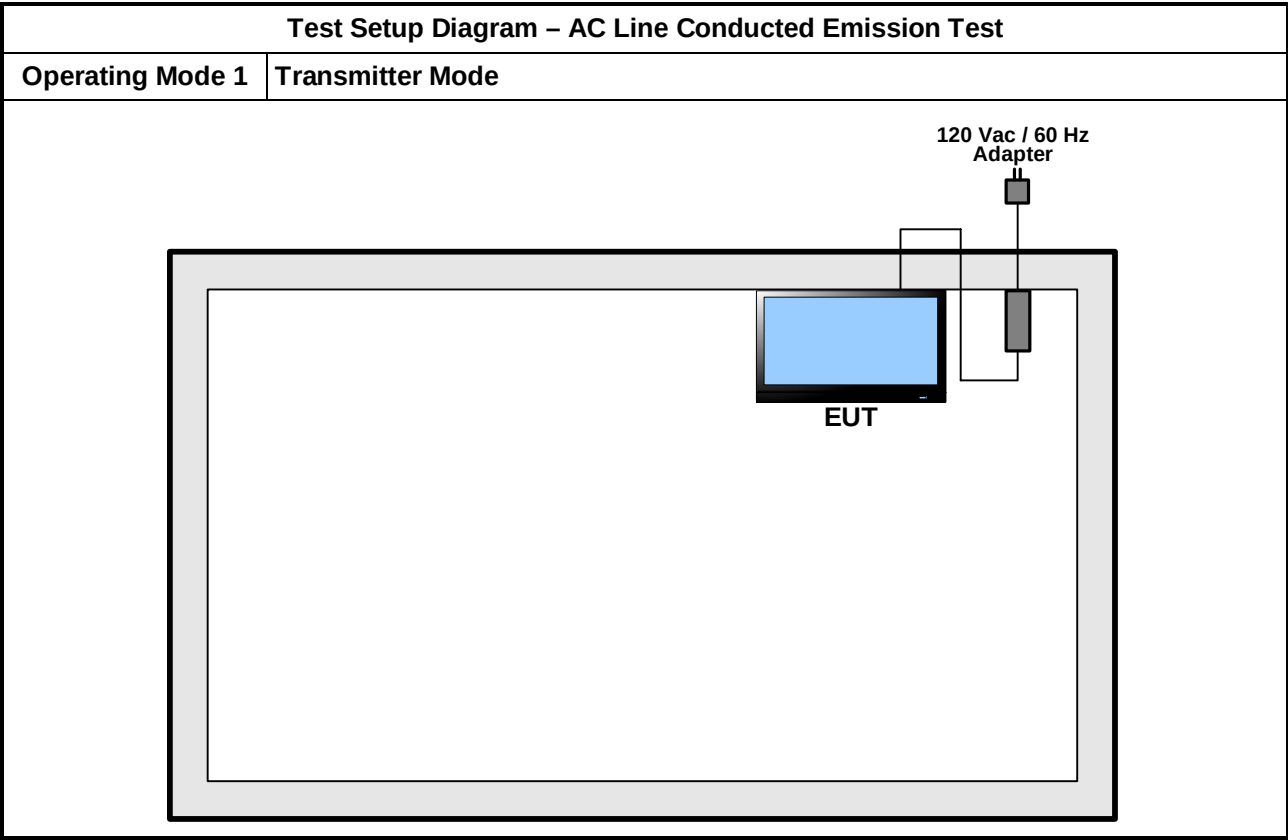
The Worst Case Mode for Following Conformance Tests				
Tests Item	AC power-line conducted emissions			
Condition	AC power-line conducted measurement for line and neutral			
Operating Mode	Operating Mode Description	Worst Modulation Mode	Test Freq.	Power Level
1	Transmitter Mode	11N2.4G-20M	F2	1

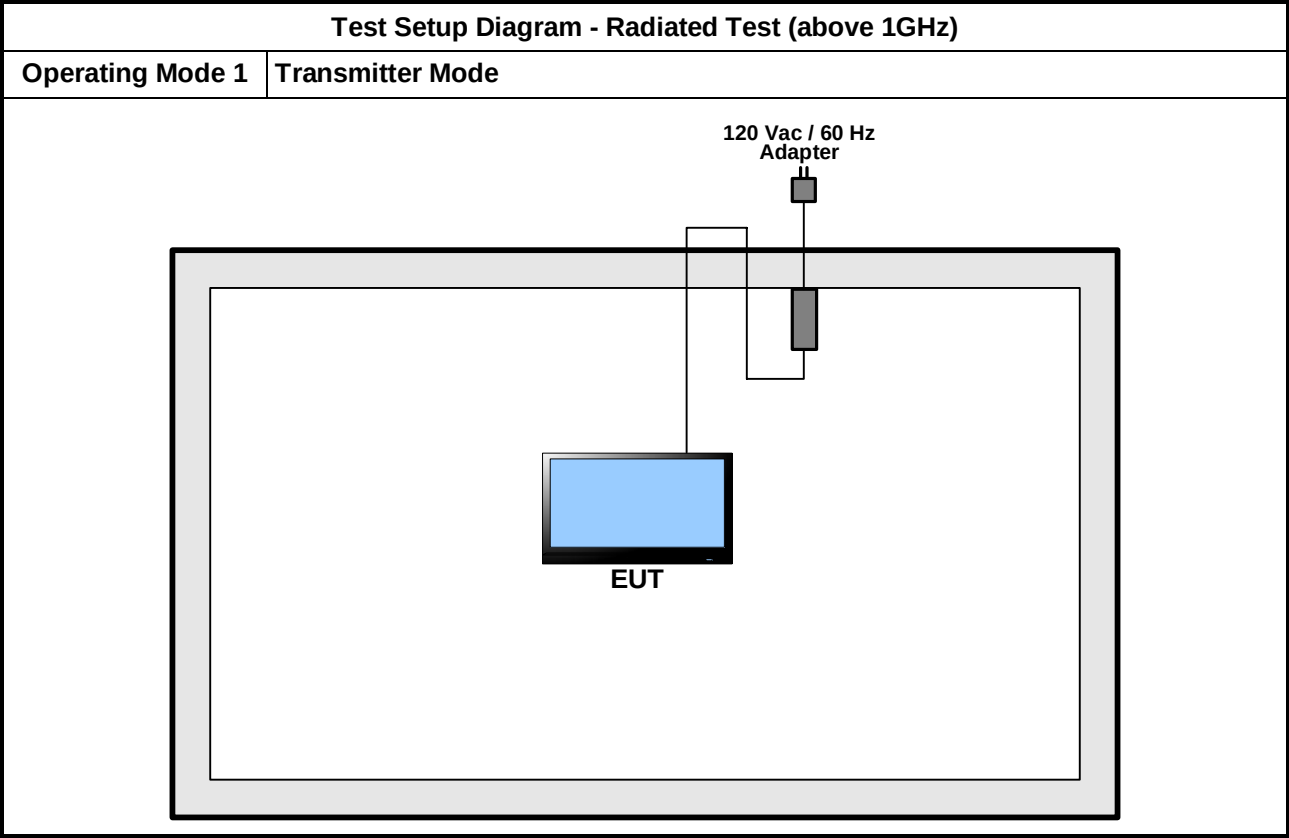
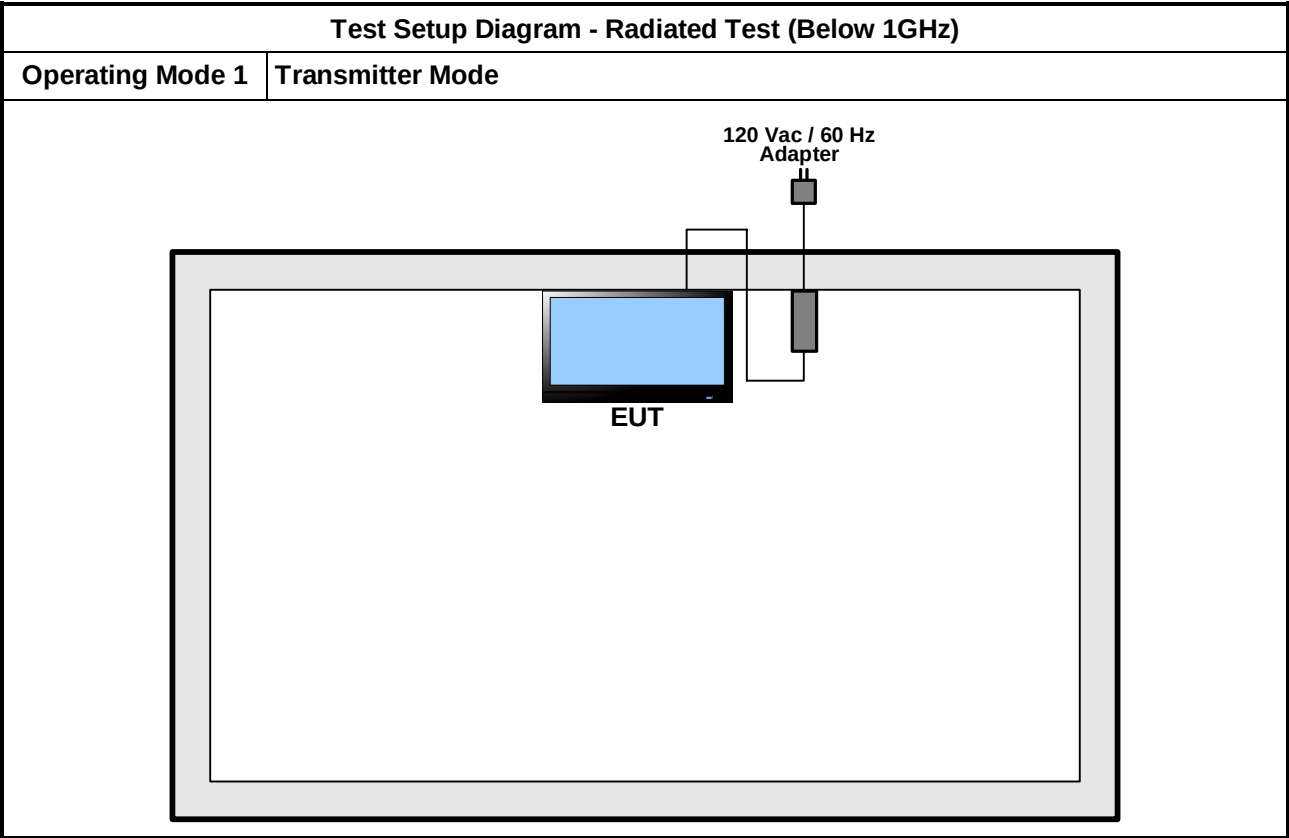
The Worst Case Mode for Following Conformance Tests				
Tests Item	RF Output Power Power Spectral Density 6 dB Bandwidth			
Test Condition	Conducted measurement at transmit chains			
Worst Modulation Mode	Number of Transmit Chains (N _{TX})	Worst Data Rate / MCS	Test Frequency	Power Level
11B-20M	1	1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

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

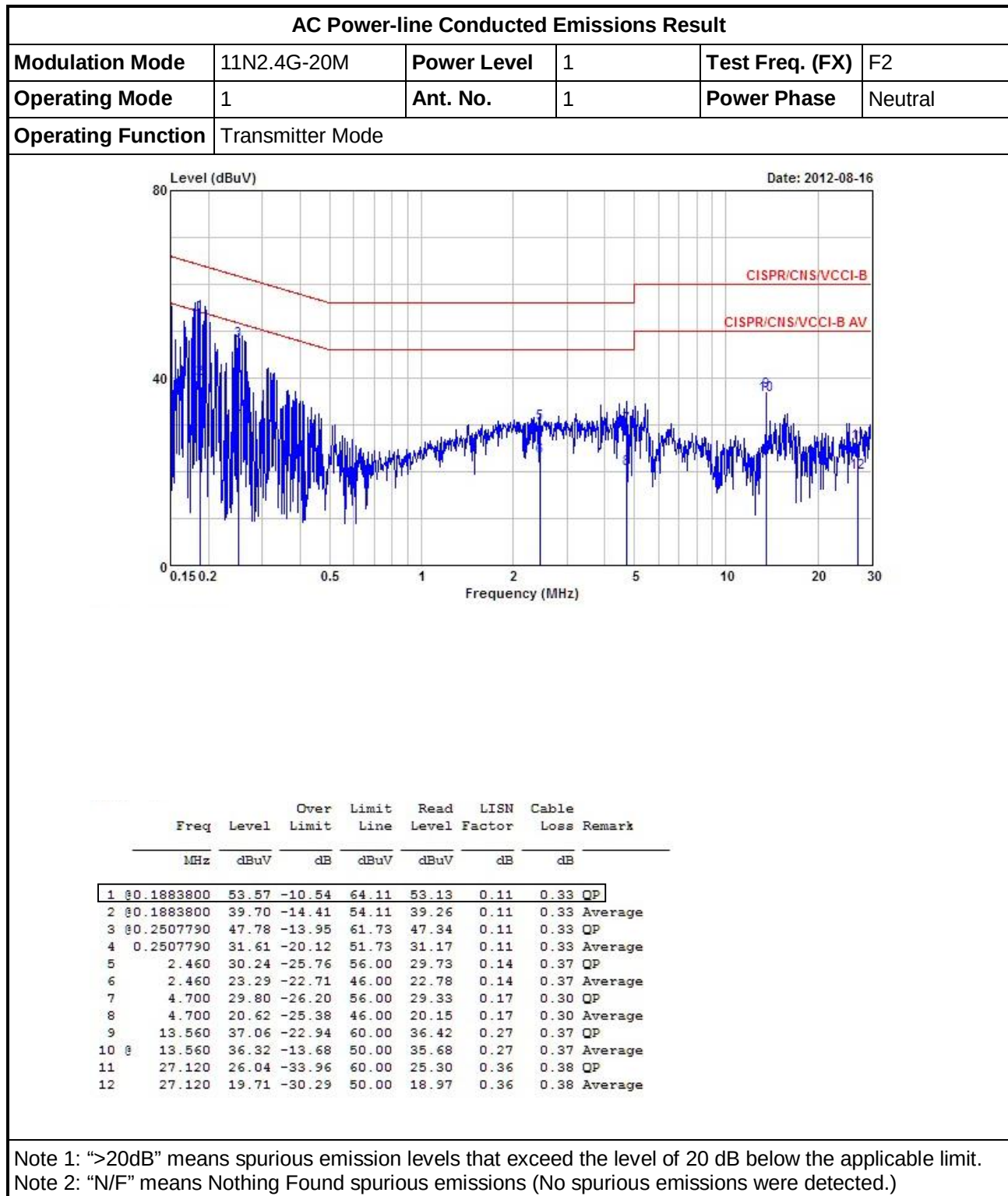
The Worst Case Mode for Following Conformance Tests						
Tests Item	Transmitter Radiated Unwanted Emissions					
Test Condition	Radiated measurement					
User Position	☐ EUT will be placed in fixed position.					
	☐ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two or three orthogonal planes.					
	☒ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes.					
Operating Mode < 1GHz	☒ 1. Normal Link					
Worst Modulation Mode	Number of Transmit Chains (N_{TX})	Worst Data Rate / MCS	Test Frequency	Power Level	Ant No.	Worst Orthogonal Planes of EUT
11B-20M	1	1 Mbps	F1, F2, F3	1	1	Z Plane
11G-20M	1	6 Mbps	F1, F2, F3	1	1	Z Plane
11N2.4G-20M	1	MCS 0	F1, F2, F3	1	1	Z Plane
11N2.4G-40M	1	MCS 0	F4, F5	1	1	Z Plane
Orthogonal Planes of EUT	X Plane		Y Plane		Z Plane	
						

2.5 Test Setup Diagram



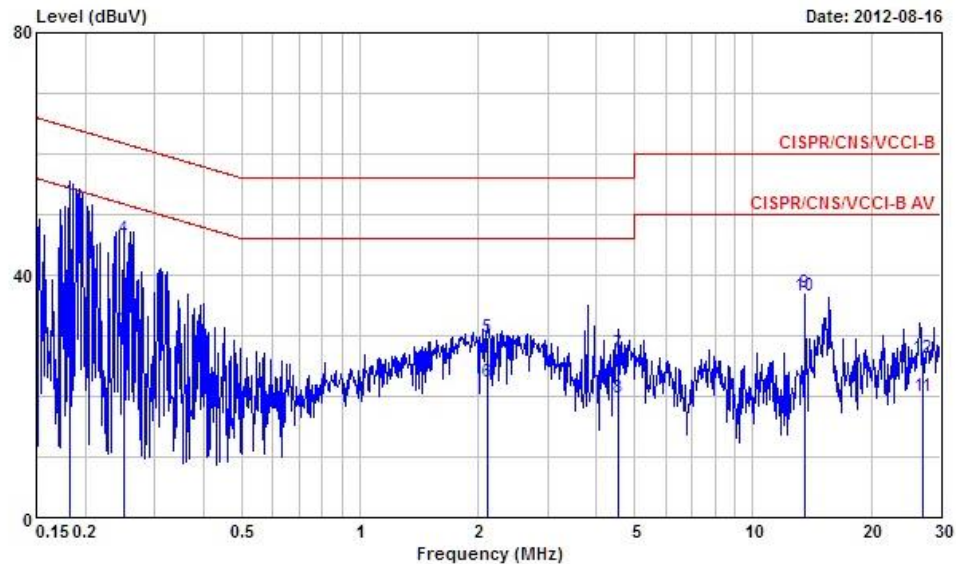


3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Modulation Mode	11N2.4G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Mode	1	Ant. No.	1	Power Phase	Line
Operating Function	Transmitter Mode				



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1824860	52.21	-12.16	64.37	51.63	0.23	0.35	QP
2	0.1824860	34.96	-19.41	54.37	34.38	0.23	0.35	Average
3	0.2507790	30.74	-20.99	51.73	30.18	0.23	0.33	Average
4	0.2507790	46.13	-15.60	61.73	45.57	0.23	0.33	QP
5	2.120	29.86	-26.14	56.00	29.22	0.25	0.39	QP
6	2.120	22.36	-23.64	46.00	21.72	0.25	0.39	Average
7	4.550	27.10	-28.90	56.00	26.49	0.31	0.30	QP
8	4.550	19.70	-26.30	46.00	19.09	0.31	0.30	Average
9	13.560	36.98	-23.02	60.00	36.13	0.48	0.37	QP
10	13.560	36.53	-13.47	50.00	35.68	0.48	0.37	Average
11	27.120	19.97	-30.03	50.00	18.91	0.68	0.38	Average
12	27.120	26.32	-33.68	60.00	25.26	0.68	0.38	QP

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

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

3.2 6dB Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
Systems using digital modulation techniques:
☒ 6 dB bandwidth $\geq$ 500 kHz.

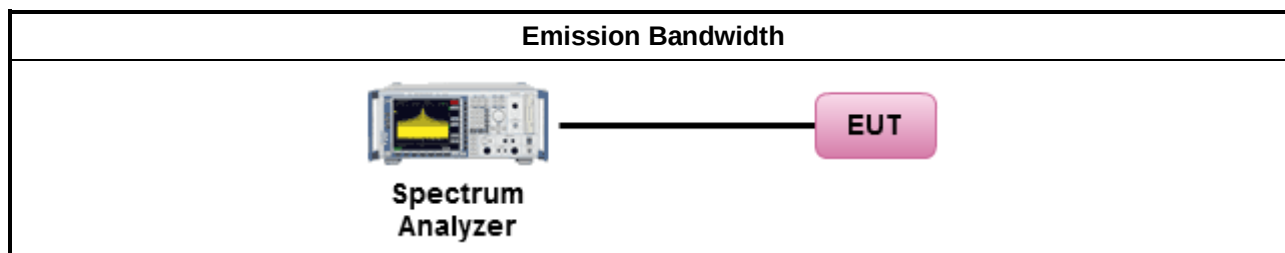
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method			
☒ For the emission bandwidth shall be measured using one of the options below:			
☒ Refer as FCC KDB 558074, clause 5.1.1 Option 1 for 6 dB bandwidth measurement. ☐ Refer as FCC KDB 558074, clause 5.1.2 Option 2 for 6 dB bandwidth measurement. ☐ Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.			
☒ For conducted measurement.			
☒ For conducted measurements on devices with multiple transmit chains using options given below: <table border="1"> <tbody> <tr> <td>☐ 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.</td> </tr> <tr> <td>☒ 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.</td> </tr> <tr> <td>☐ 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.</td> </tr> </tbody> </table>	☐ 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.	☒ 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.	☐ 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.
☐ 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.			
☒ 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.			
☐ 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.			
☐ For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.			

3.2.4 Test Setup

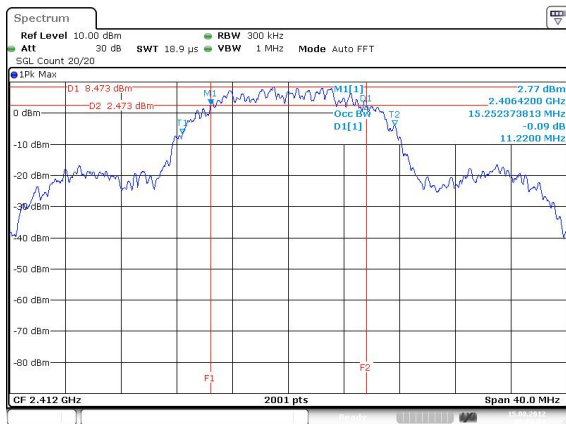


3.2.5 Test Result of Emission Bandwidth

Emission Bandwidth Result										
Power Level	1		Emission Bandwidth (MHz)							
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth				6dB Bandwidth			
			Chain-Port 1	-	-	-	Chain-Port 1	-	-	-
11B-20M	1	2412	15.25	-	-	-	11.22	-	-	-
11B-20M	1	2437	15.25	-	-	-	11.66	-	-	-
11B-20M	1	2462	15.01	-	-	-	12.08	-	-	-
11G-20M	1	2412	16.53	-	-	-	15.60	-	-	-
11G-20M	1	2437	18.97	-	-	-	15.94	-	-	-
11G-20M	1	2462	16.63	-	-	-	16.10	-	-	-
11N2.4G-20M	1	2412	17.77	-	-	-	17.34	-	-	-
11N2.4G-20M	1	2437	17.89	-	-	-	17.04	-	-	-
11N2.4G-20M	1	2462	17.57	-	-	-	17.26	-	-	-
11N2.4G-40M	1	2412	36.34	-	-	-	31.60	-	-	-
11N2.4G-40M	1	2437	36.38	-	-	-	35.44	-	-	-
11N2.4G-40M	1	2462	36.22	-	-	-	35.80	-	-	-
Limit			N/A				≥500 kHz			
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

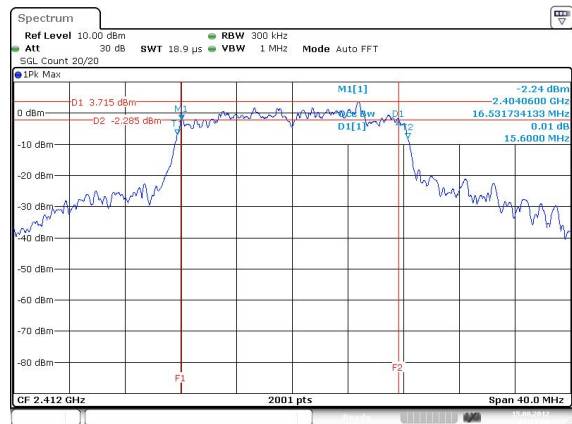
Emission Bandwidth Plots

11B-20M – F1 [Port 1]



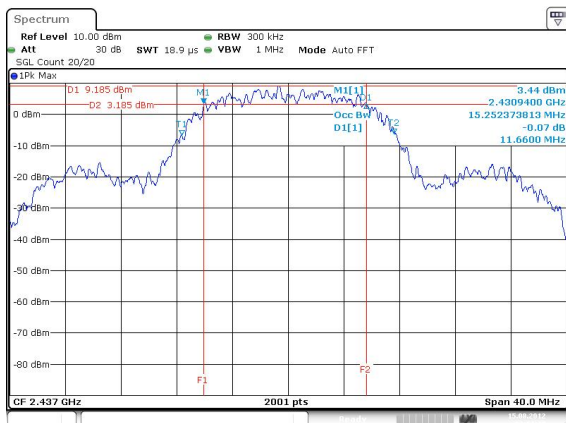
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11G-20M – F1 [Port 1]



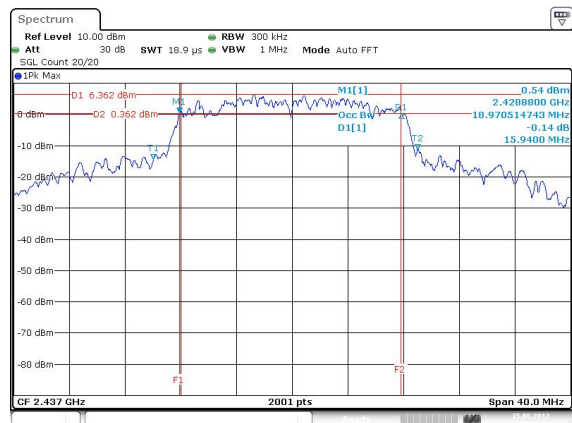
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11B-20M – F2 [Port 1]



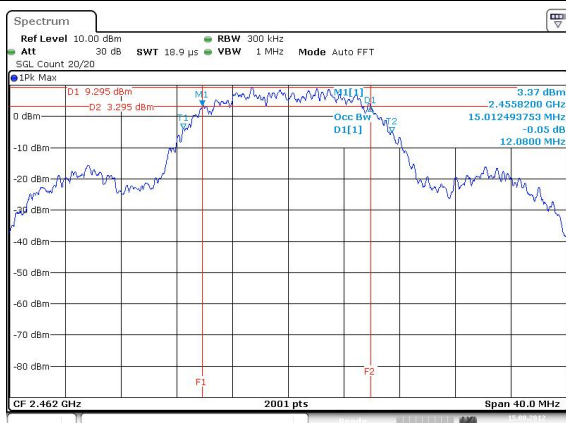
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11G-20M – F2 [Port 1]



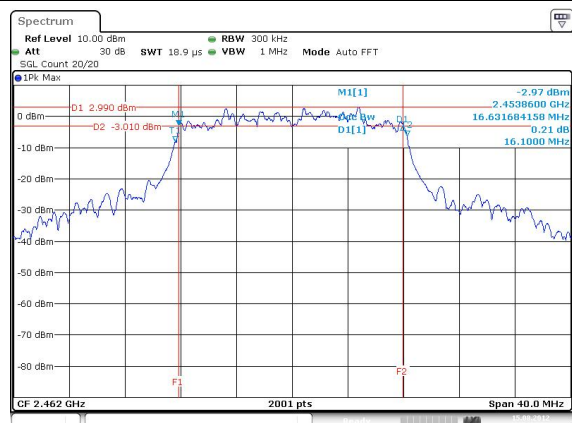
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11B-20M – F3 [Port 1]



Date: 15.AUG.2012 03:14:46

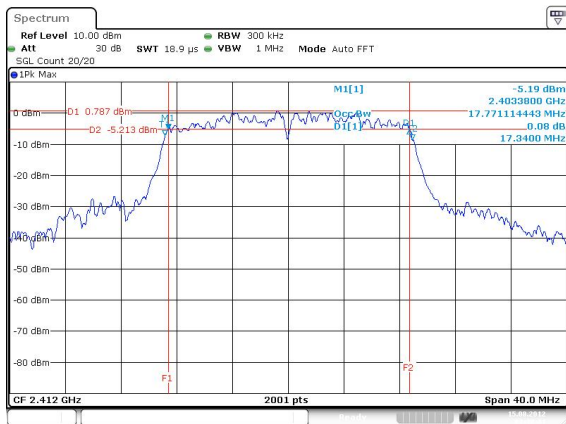
11G-20M – F3 [Port 1]



Date: 15.AUG.2012 03:22:53

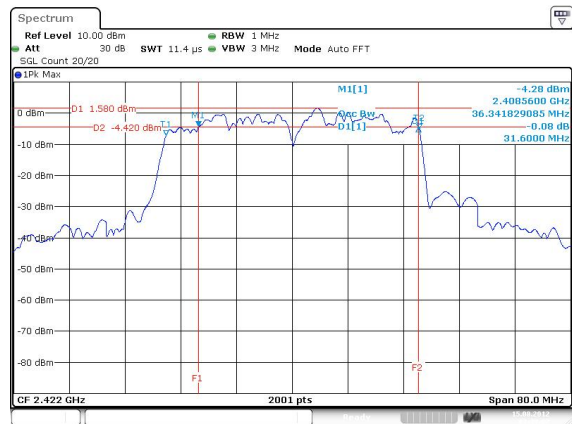
Emission Bandwidth Plots

11N2.4G-20M – F1 [Port 1]



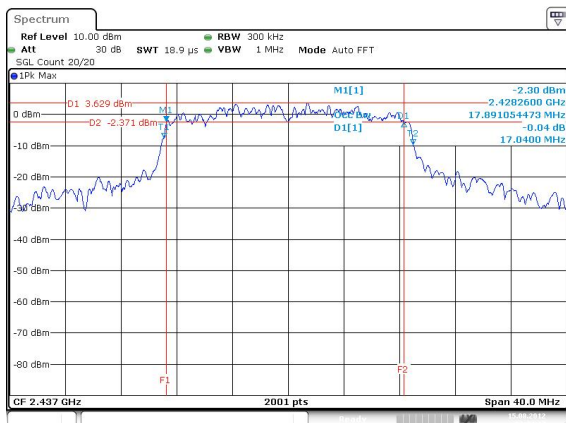
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11N2.4G-40M – F4 [Port 1]



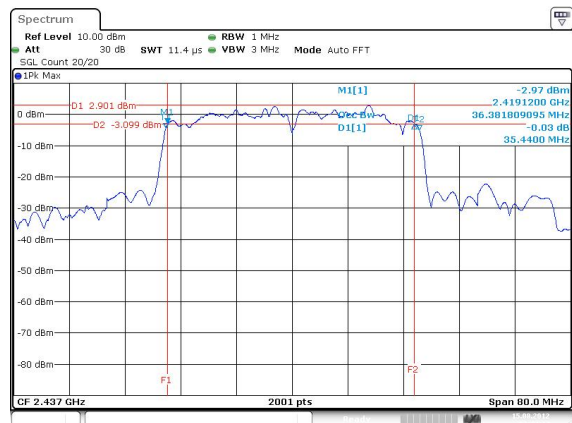
Date: 15.AUG.2012 03:39:07

11N2.4G-20M – F2 [Port 1]



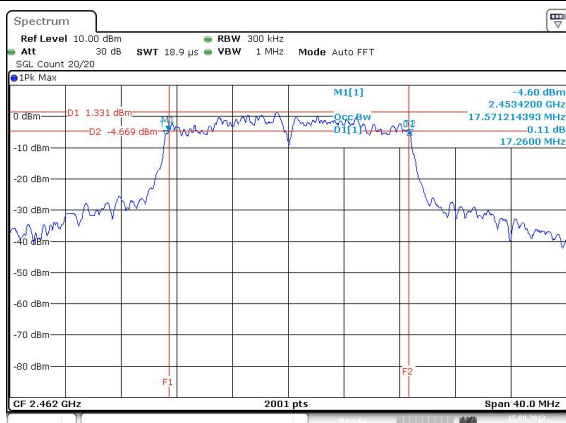
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11N2.4G-40M – F5 [Port 1]



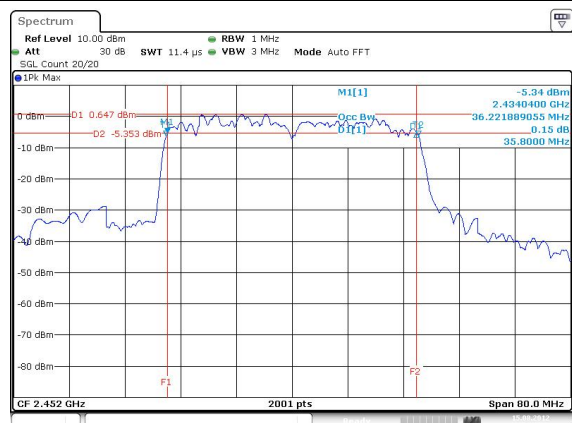
Date: 15.AUG.2012 03:42:22

11N2.4G-20M – F3 [Port 1]



Date: 15.AUG.2012 03:35:54

11N2.4G-40M – F6 [Port 1]



Date: 15.AUG.2012 03:44:43

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	
☐ 902-928 MHz Band:	
☐	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
☐	If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
☒ 2400-2483.5 MHz Band:	
☒	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
☒	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
☐	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
☐	Smart antenna system (SAS):
☐	Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
☐	Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
☐	Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dBm
☐ 5725-5850 MHz Band:	
☐	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
☐	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
☐	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30$ dBm
e.i.r.p. Power Limit:	
☐ 902-928 MHz Band: $P_{eirp} \leq 36$ dBm (4 W)	
☒ 2400-2483.5 MHz Band	
☒	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
☐	Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
☐	Smart antenna system (SAS)
☐	Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
☐	Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
☐	Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm
☐ 5725-5850 MHz Band	
☐	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
☐	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.	

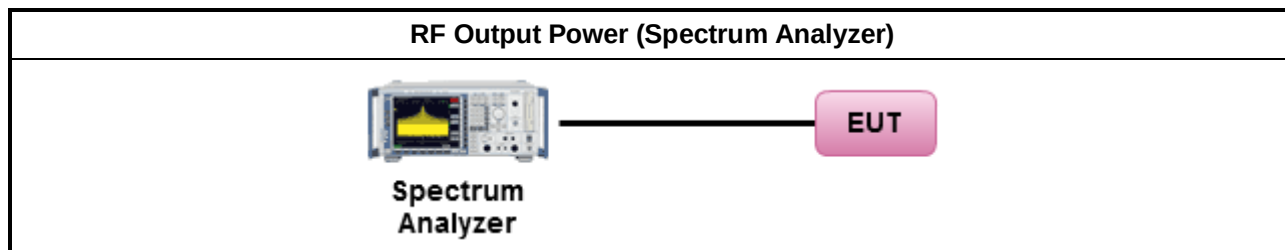
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
☒	Maximum Peak Conducted Output Power
☐	Refer as FCC KDB 558074, clause 7.2.1.1 Option 1 (zero-span method).
☒	Refer as FCC KDB 558074, clause 7.2.1.2 Option 2 (integrated band power method).
☐	Refer as FCC KDB 558074, clause 7.2.1.3 Option 3 (peak power meter method).
☐	Refer as FCC KDB 558074, clause 7.2.1.4 Alternative 1 (bandwidth correction method).
☐	Refer as ANSI C63.10, clause 6.10.2.1 a) for peak power meter.
☐	Refer as ANSI C63.10, clause 6.10.2.1 a) for spectrum analyzer - (RBW ≥ EBW).
☐	Refer as ANSI C63.10, clause 6.10.2.1 b) for spectrum analyzer - BW correction factor.
☒	Maximum Conducted Output Power
☐	Refer as FCC KDB 558074, clause 7.2.2.1 Option 1 (RMS detection with slow sweep speed).
☒	Refer as FCC KDB 558074, clause 7.2.2.2 Option 2 (spectral trace averaging).
☐	Refer as FCC KDB 558074, clause 7.2.2.3 Option 3 (average power meter method).
☐	Refer as FCC KDB 558074, clause 7.2.2.4 Alternative 1 (reduced VBW with max hold)
☐	Refer as FCC KDB 558074, clause 7.2.2.5 Alternative 2 (zero-span with trace averaging)
☐	Refer as FCC KDB 558074, clause 7.2.2.6 Alternative 3 (average on/off duty) - refer clause 1.1.4
☐	Refer as ANSI C63.10, clause 6.10.3.1 for spectrum analyzer - Method 1 (trace averaging).
☐	Refer as ANSI C63.10, clause 6.10.3.2 for spectrum analyzer - Method 2 (zero-span averaging).
☐	Refer as ANSI C63.10, clause 6.10.3.2 for spectrum analyzer - Method 3 (band power max-hold).
☒	Refer as FCC KDB 558074, clause 3 for conducted measurement.
☒	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.
☒	If multiple transmit chains, EIRP calculation could be following as methods:
☐	Method 1: $\text{EIRP}_1 = P_1 + G_{\text{ANT1}} ; \text{EIRP}_2 = P_2 + G_{\text{ANT2}} ; \dots \text{EIRP}_n = P_n + G_{\text{ANTn}}$ $\text{EIRP}_{\text{total}} = \text{EIRP}_1 + \text{EIRP}_2 + \dots + \text{EIRP}_n$ (calculated in linear unit [mW] and transfer to log unit [dBm])
☒	Method 2: $P_{\text{total}} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $\text{EIRP}_{\text{total}} = P_{\text{total}} + DG$
☐	Refer as FCC KDB 558074, clause 3 for radiated measurement.

3.3.4 Test Setup



3.3.5 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		2.06								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11B-20M	1	2412	25.48	-	-	-	25.48	30.0	27.54	36.0
11B-20M	1	2437	24.81	-	-	-	24.81	30.0	26.87	36.0
11B-20M	1	2462	25.12	-	-	-	25.12	30.0	27.18	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Maximum Peak Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		2.06								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11G-20M	1	2412	21.57	-	-	-	21.57	30.0	23.63	36.0
11G-20M	1	2437	24.69	-	-	-	24.69	30.0	26.75	36.0
11G-20M	1	2462	21.28	-	-	-	21.28	30.0	23.34	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Maximum Peak Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		2.06								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-20M	1	2412	20.00	-	-	-	20.00	30.0	22.06	36.0
11N2.4G-20M	1	2437	23.43	-	-	-	23.43	30.0	25.49	36.0
11N2.4G-20M	1	2462	19.95	-	-	-	19.95	30.0	22.01	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Maximum Peak Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		2.06								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-40M	1	2422	17.02	-	-	-	17.02	30.0	19.08	36.0
11N2.4G-40M	1	2437	20.13	-	-	-	20.13	30.0	22.19	36.0
11N2.4G-40M	1	2452	16.95	-	-	-	16.95	30.0	19.01	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

3.3.6 Test Result of Maximum Conducted Output Power

Maximum Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		2.06								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11B-20M	1	2412	19.24	-	-	-	19.24	30.0	21.30	36.0
11B-20M	1	2437	19.00	-	-	-	19.00	30.0	21.06	36.0
11B-20M	1	2462	18.74	-	-	-	18.74	30.0	20.80	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

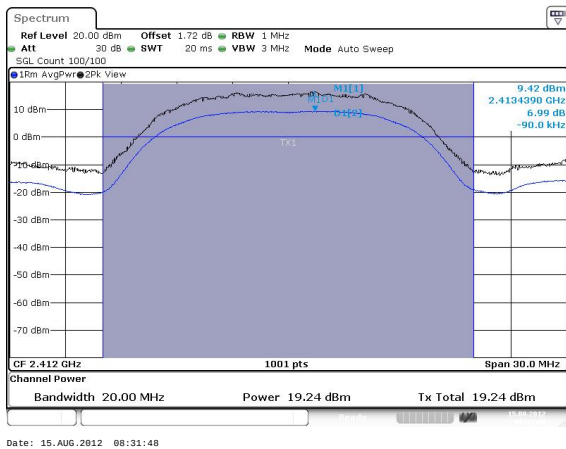
Maximum Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		2.06								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11G-20M	1	2412	13.79	-	-	-	13.79	30.0	15.85	36.0
11G-20M	1	2437	17.04	-	-	-	17.04	30.0	19.10	36.0
11G-20M	1	2462	13.56	-	-	-	13.56	30.0	15.62	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Maximum Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		2.06								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-20M	1	2412	11.94	-	-	-	11.94	30.0	14.00	36.0
11N2.4G-20M	1	2437	15.65	-	-	-	15.65	30.0	17.71	36.0
11N2.4G-20M	1	2462	11.94	-	-	-	11.94	30.0	14.00	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

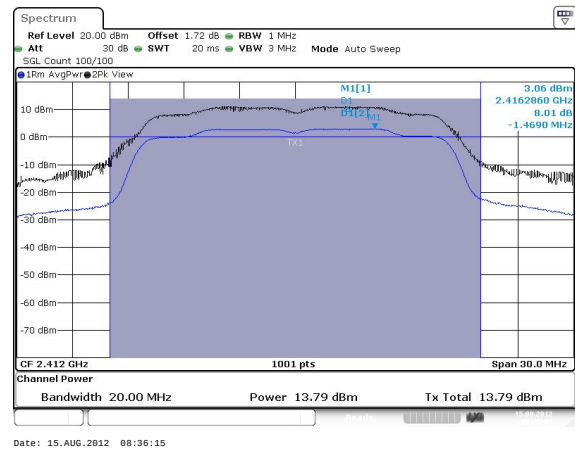
Maximum Conducted Output Power Result										
Power Level		1	RF Output Power (dBm)							
Directional Gain (dBi)		2.06								
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	Sum Chain	Power Limit	EIRP Power	EIRP Limit
11N2.4G-40M	1	2422	9.33	-	-	-	9.33	30.0	11.39	36.0
11N2.4G-40M	1	2437	12.26	-	-	-	12.26	30.0	14.32	36.0
11N2.4G-40M	1	2452	9.08	-	-	-	9.08	30.0	11.14	36.0
Result			Complied							
Note 1: N _{TX} = Number of Transmit Chains										

Maximum Conducted Output Power

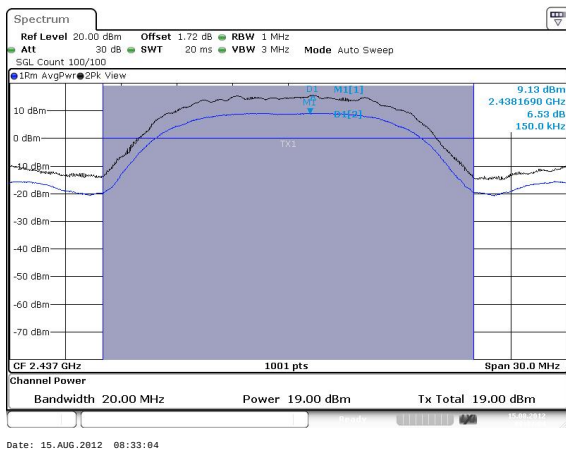
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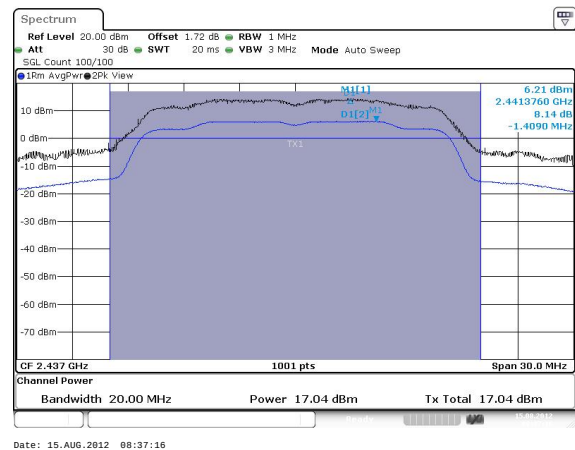
11G-20M – F1 [Port 1]



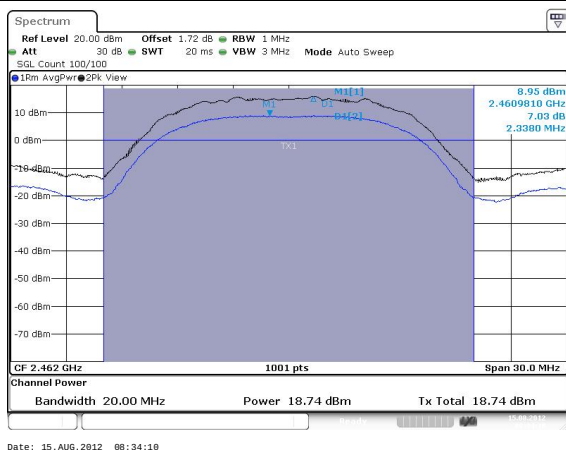
11B-20M – F2 [Port 1]



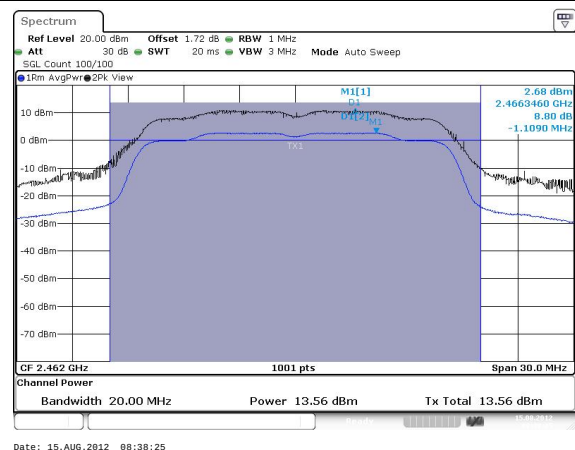
11G-20M – F2 [Port 1]



11B-20M – F3 [Port 1]

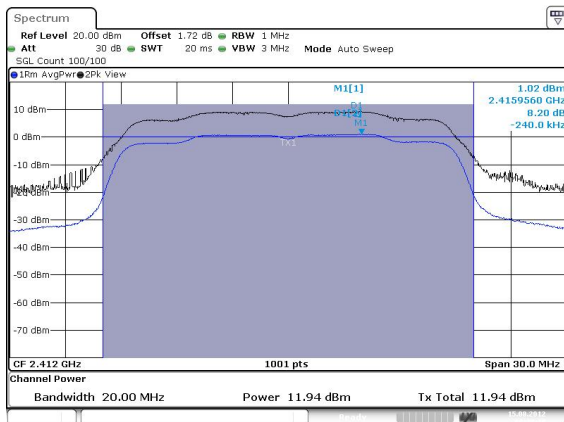


11G-20M – F3 [Port 1]



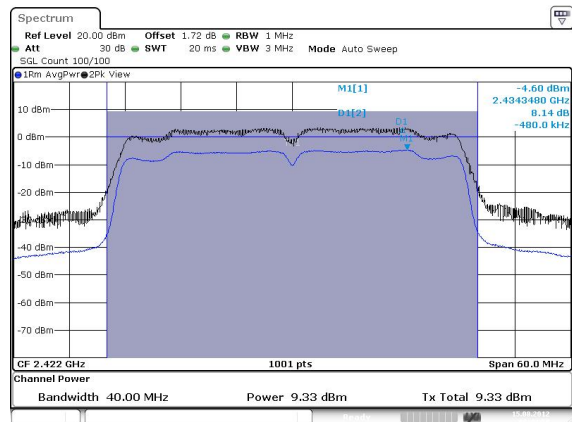
Maximum Peak Conducted Output Power Plots and Maximum Conducted Output Power

11N2.4G-20M – F1 [Port 1]



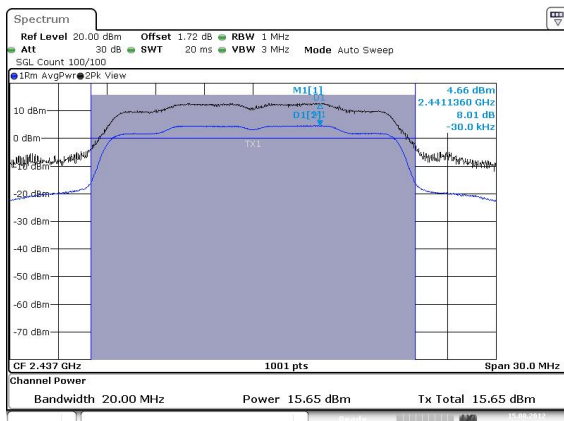
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11N2.4G-40M – F1 [Port 1]



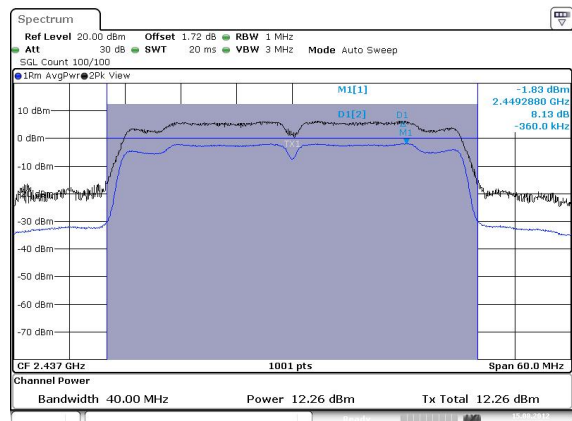
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11N2.4G-20M – F2 [Port 1]



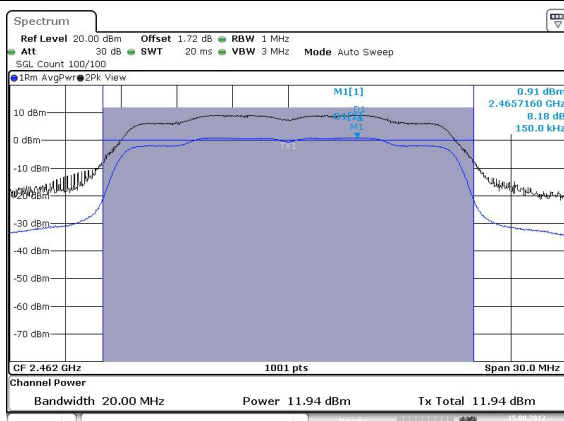
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11N2.4G-40M – F2 [Port 1]



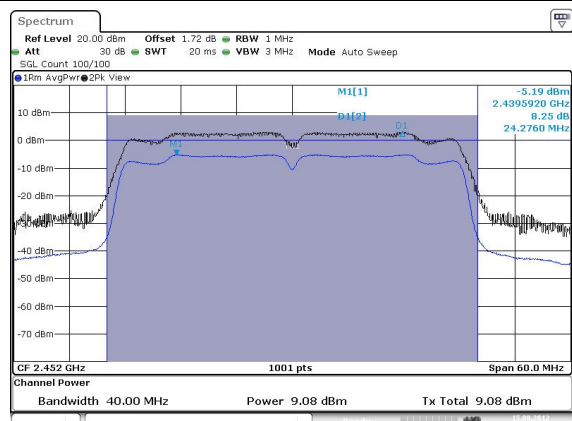
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11N2.4G-20M – F3 [Port 1]



Date: 15.AUG.2012 08:41:45

11N2.4G-40M – F3 [Port 1]



Date: 15.AUG.2012 08:45:32

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit	
☒	Power Spectral Density (PSD) ≤ 8 dBm/3kHz

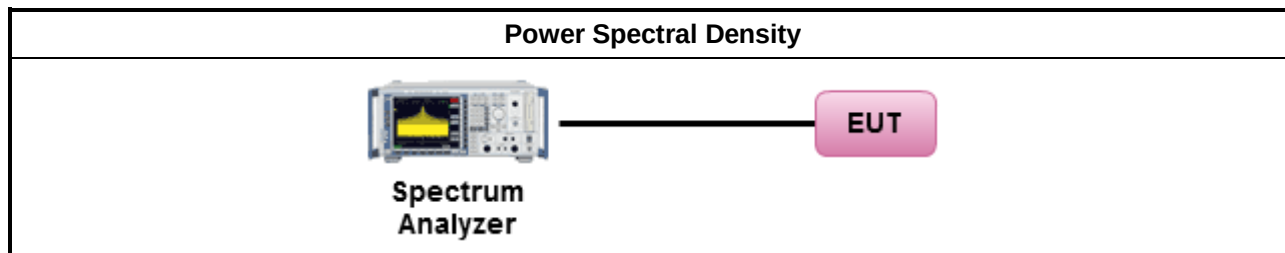
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method	
☒	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:
☒	Refer as FCC KDB 558074, clause 7.3.1 Option 1 (peak PSD; BWCF=-15.2dB).
☐	Refer as FCC KDB 558074, clause 7.3.2 Option 2 (average PSD; BWCF=-15.2dB).
☐	Refer as FCC KDB 558074, clause 7.3.3 Alternative 1 (peak PSD; RBW=3kHz; sweep=100s).
☐	Refer as FCC KDB 558074, clause 7.3.4 Alternative 2 (average PSD; RBW=3kHz; average=100).
☐	Refer as ANSI C63.10, clause 6.11.2.3 for PSD for DTS - (RBW=3kHz; sweep=100s).
☐	Refer as ANSI C63.10, clause 6.11.2.4 for Alternative PSD for DTS - (RBW=3kHz; average=100)
☒	Refer as FCC KDB 558074, clause 3 for conducted measurement.
☒	For conducted measurements on devices with multiple transmit chains using options given below:
☐	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.
☒	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.
☐	Refer as FCC KDB 558074, clause 3 for radiated measurement.

3.4.4 Test Setup



3.4.5 Test Result of Power Spectral Density

Power Spectral Density Result							
Power Level		1	Power Spectral Density (dBm/3kHz)				
Directional Gain (dBi)		2.06					
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	PSD Limit
11B-20M	1	2412	-7.01	-	-	-	8
11B-20M	1	2437	-6.74	-	-	-	8
11B-20M	1	2462	-6.76	-	-	-	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]							

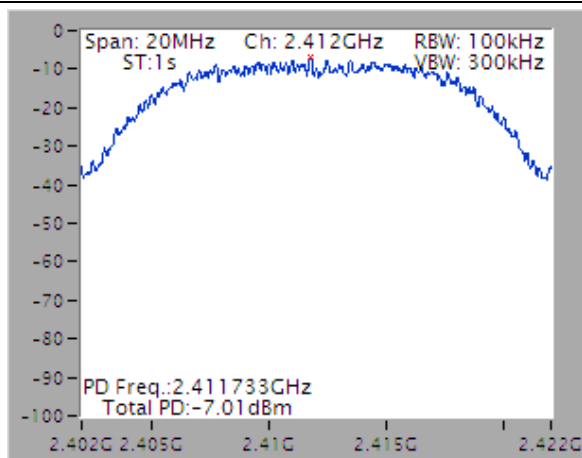
Power Spectral Density Result							
Power Level		1	Power Spectral Density (dBm/3kHz)				
Directional Gain (dBi)		2.06					
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	PSD Limit
11G-20M	1	2412	-11.47	-	-	-	8
11G-20M	1	2437	-8.00	-	-	-	8
11G-20M	1	2462	-11.90	-	-	-	8
Result			Complied				
Note 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							
Power Level		1	Power Spectral Density (dBm/3kHz)				
Directional Gain (dBi)		2.06					
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	PSD Limit
11N2.4G-20M	1	2412	-13.02	-	-	-	8
11N2.4G-20M	1	2437	-9.76	-	-	-	8
11N2.4G-20M	1	2462	-13.01	-	-	-	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]							

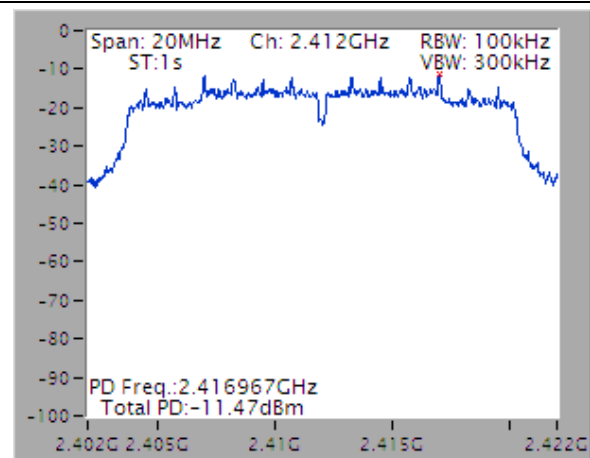
Power Spectral Density Result							
Power Level		1	Power Spectral Density (dBm/3kHz)				
Directional Gain (dBi)		2.06					
Modulation Mode	N _{TX}	Freq. (MHz)	Chain-Port 1	-	-	-	PSD Limit
11N2.4G-40M	1	2422	-19.13	-	-	-	8
11N2.4G-40M	1	2437	-17.92	-	-	-	8
11N2.4G-40M	1	2452	-19.32	-	-	-	8
Result			Complied				
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 Plots - w/o BWFC

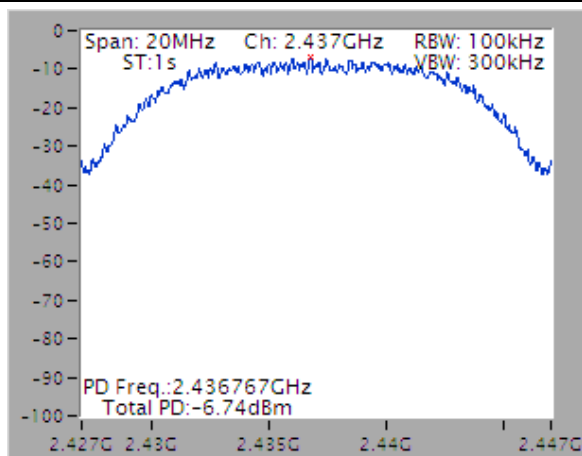
11B-20M – F1 [Port 1]



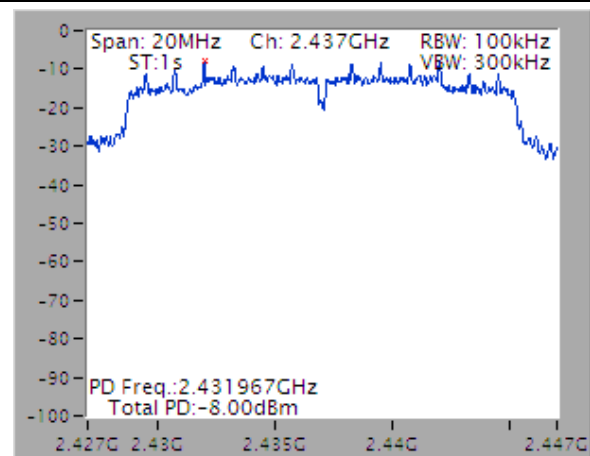
11G-20M – F1 [Port 1]



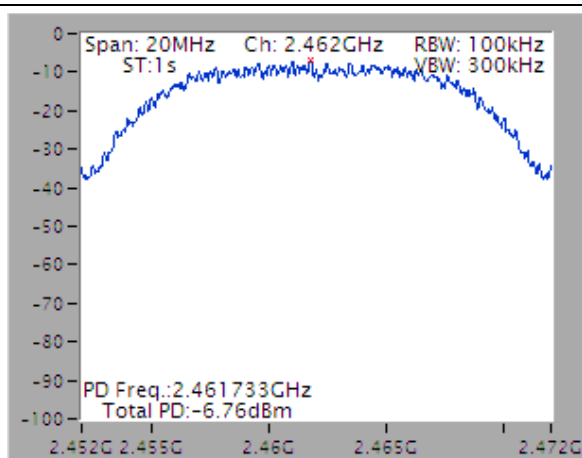
11B-20M – F2 [Port 1]



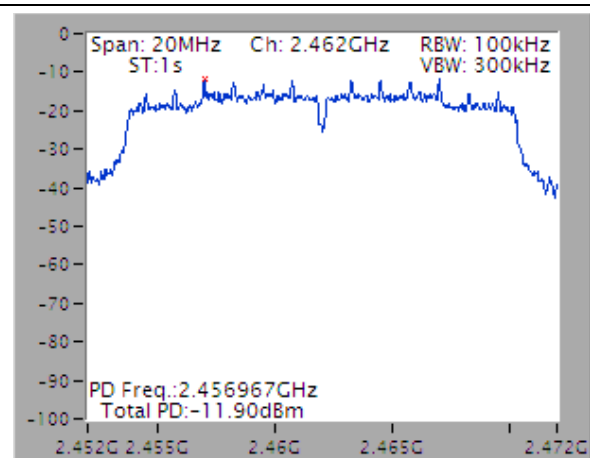
11G-20M – F2 [Port 1]



11B-20M – F3 [Port 1]

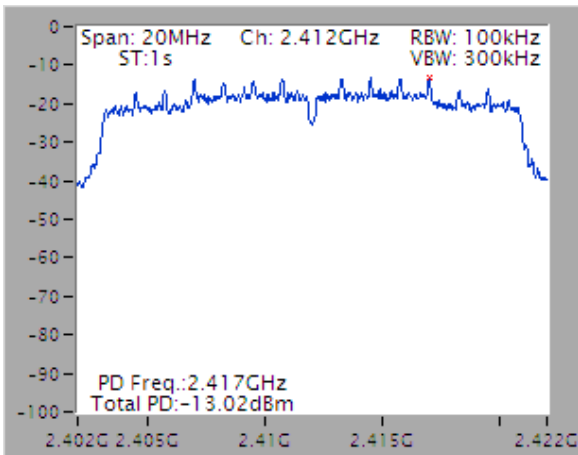


11G-20M – F3 [Port 1]

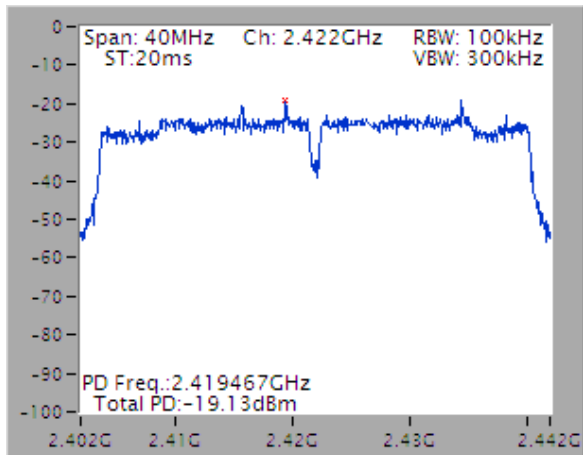


Power Spectral Density Plots - w/o BWFC and 10 x log 2

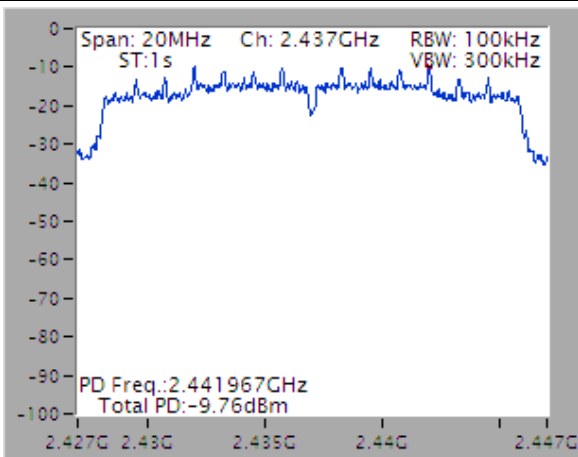
11N2.4G-20M – F1 [Port 1s]



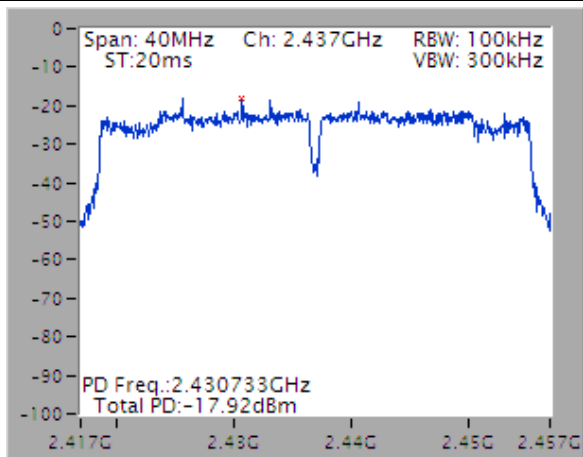
11N2.4G-40M – F4 [Port 1]



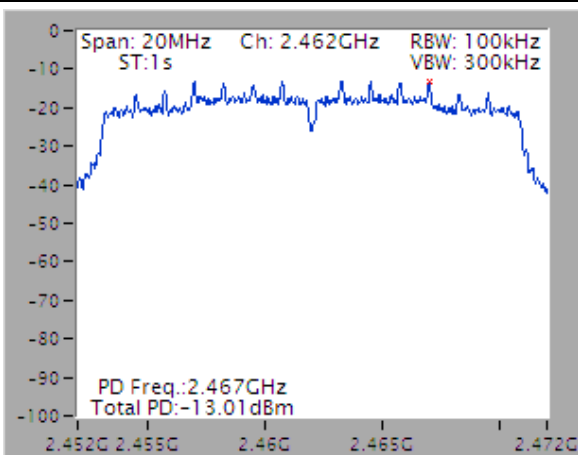
11N2.4G-20M – F2 [Port 1]



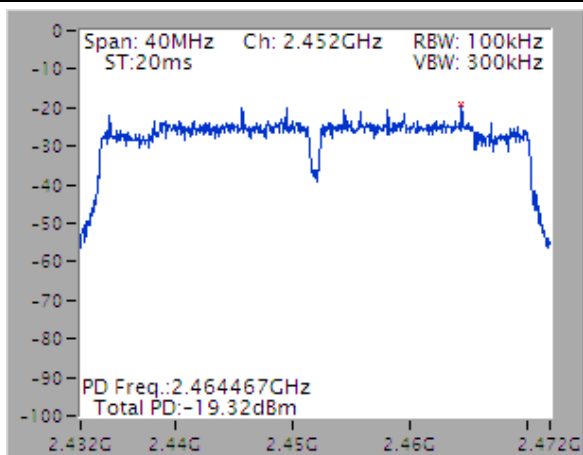
11N2.4G-40M – F5 [Port 1]



11N2.4G-20M – F3 [Port 1]

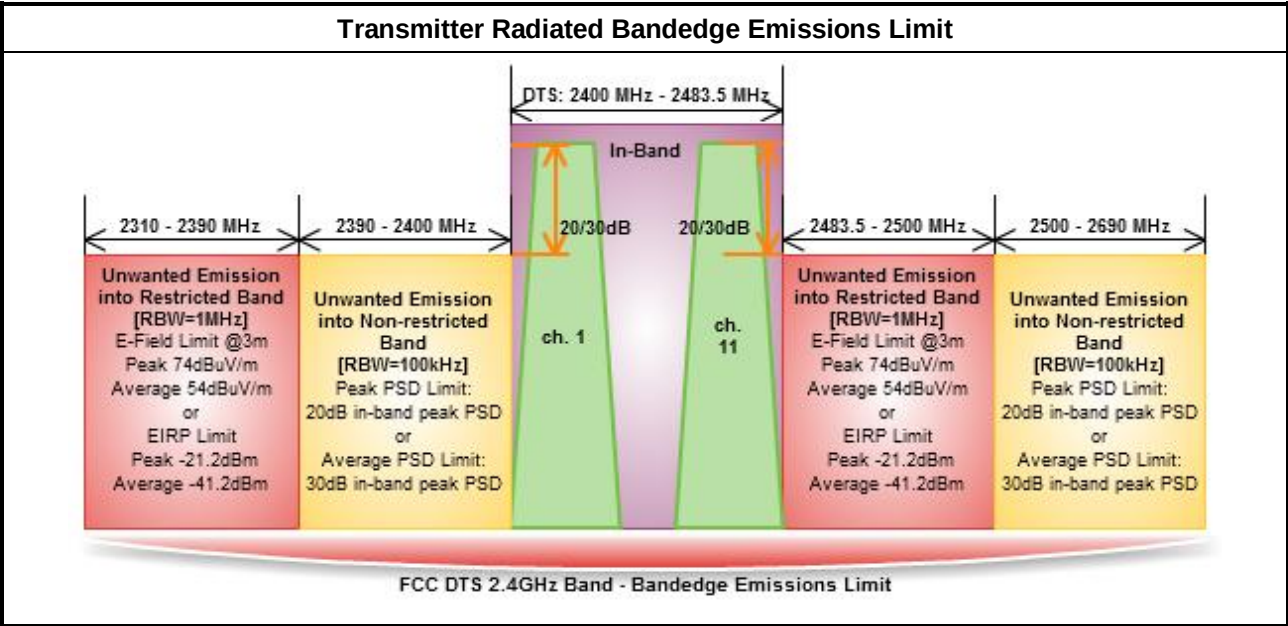


11N2.4G-40M – F6 [Port 1]



3.5 Transmitter Radiated Bandedge Emissions

3.5.1 Transmitter Radiated Bandedge Emissions Limit



3.5.2 Measuring Instruments

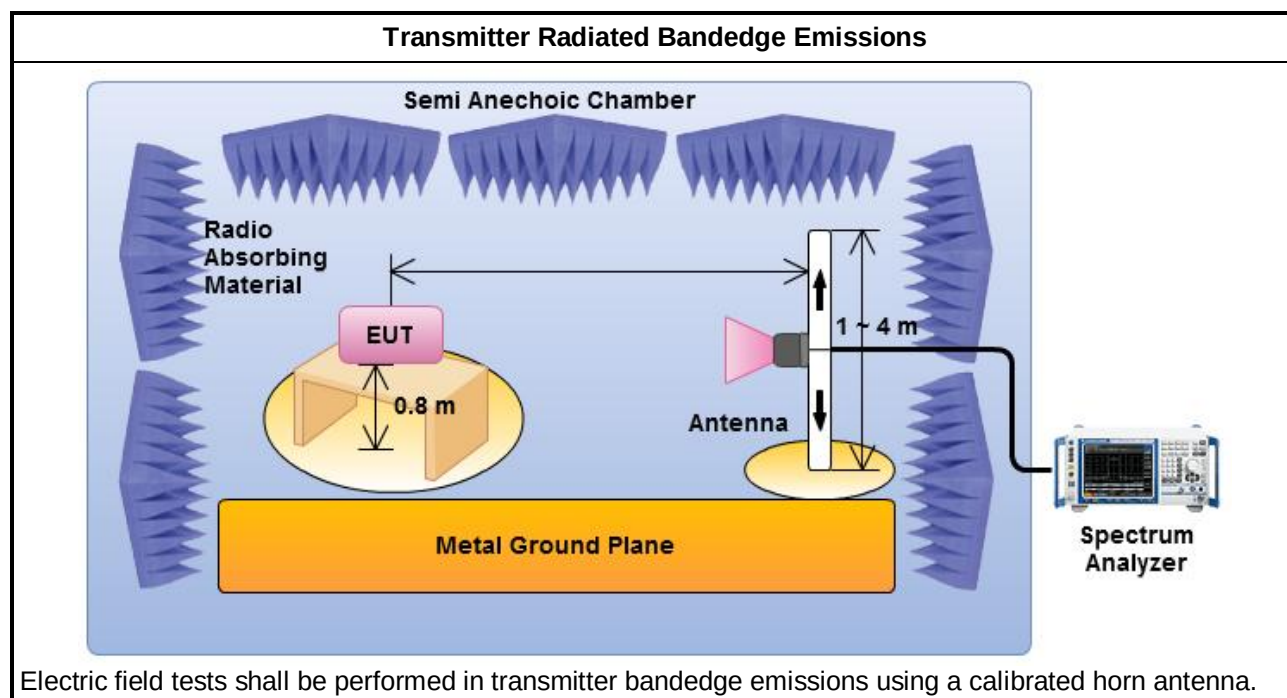
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

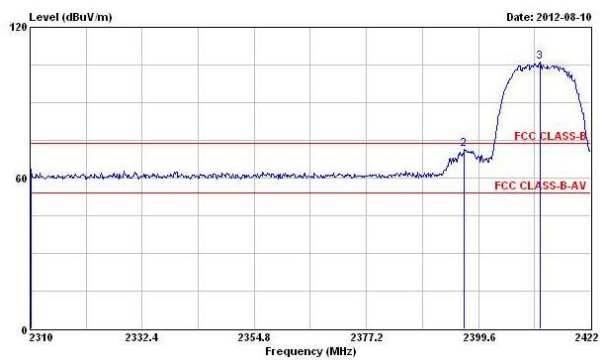
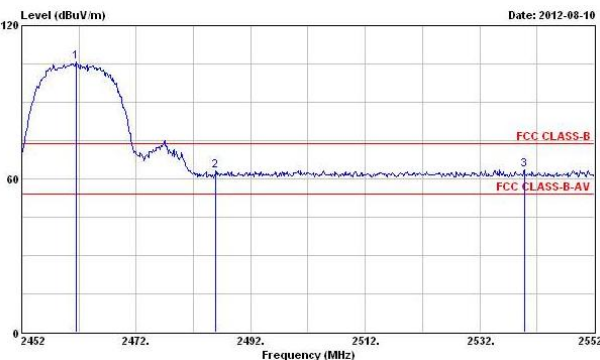
Test Method – General Information	
☒	The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].
☒	Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
☒	For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

Test Method	
☐	Refer as FCC KDB 558074, clause 3 for conducted measurement.
☐	For unwanted emissions into non-restricted bands (relative emission limits).
☐	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.
☐	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).
☐	Refer as FCC KDB 558074, clause 7.4.2.2.1 unwanted emissions in restricted bands on frequencies ≤ 1000 MHz
☐	Refer as FCC KDB 558074, clause 7.4.2.2.2 unwanted emissions in restricted bands on frequencies > 1000 MHz
☐	For conducted measurements on devices with multiple transmit chains using options given below:
☐	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.
☐	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.
☒	Refer as FCC KDB 558074, clause 3 for radiated measurement.
☐	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
☐	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.

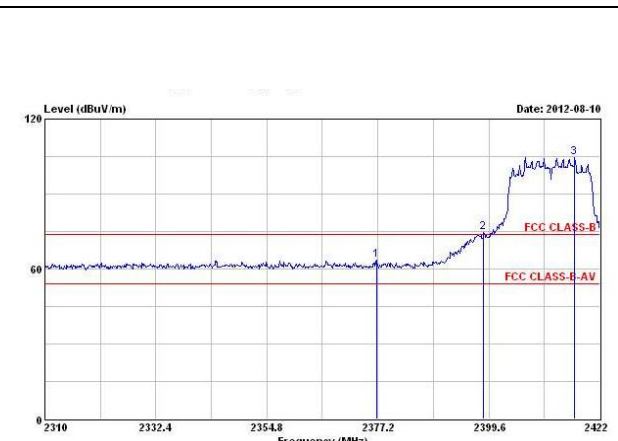
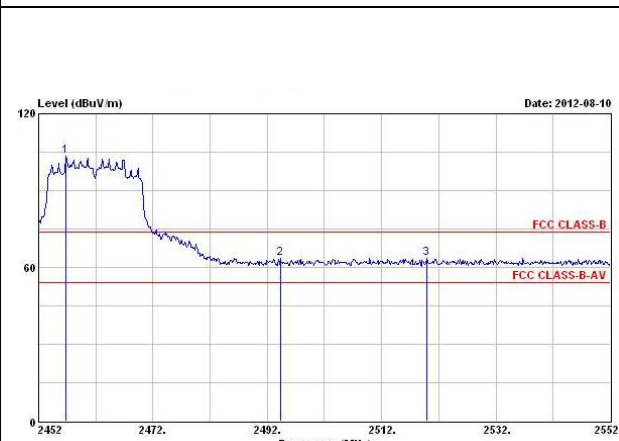
3.5.4 Test Setup



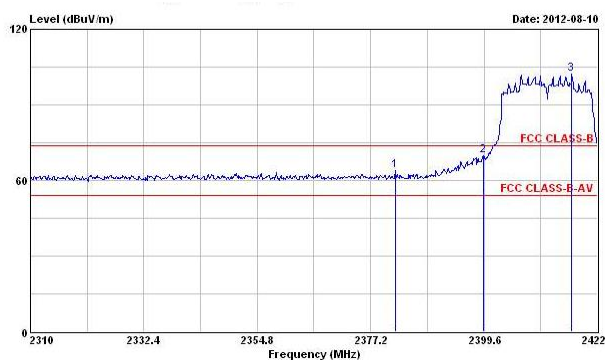
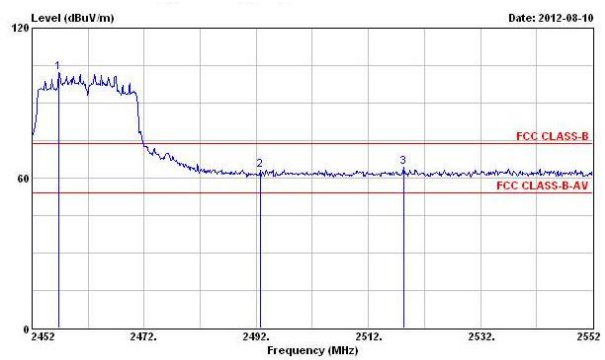
3.5.5 Test Result of Transmitter Radiated Bandedge Emissions

Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain (dBi)	2.06	Non-restricted Band Emissions					
Modulation	11B-20M								
Non-restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	1	2412	106.16	2396.80	71.27	34.89	20	PK	V
2500-2690	1	2462	105.83	2539.80	63.71	41.12	20	PK	V
Low Band				Up Band					
									
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)									

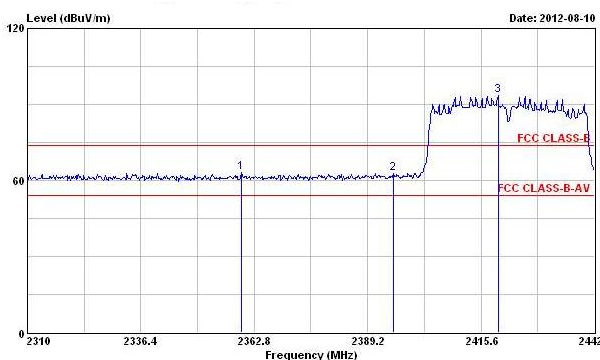
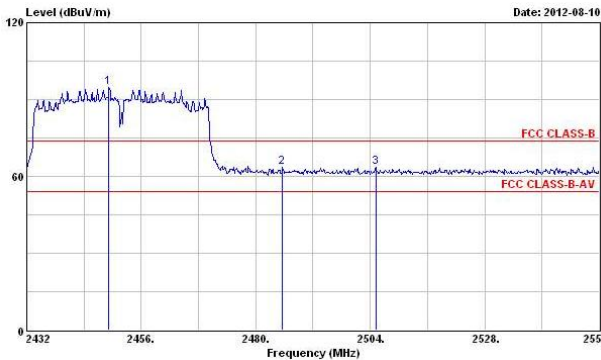
Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain _(dBi)	2.06	Restricted Band Emissions					
Modulation	11B-20M								
Restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dBuV/m)	Level Type	Pol. note 1
2310-2390	1	2412	112.42	2387.73	3	60.67	74	PK	V
2310-2390	1	2412	103.02	2369.36	3	48.52	54	AV	V
2483.5-2500	1	2462	111.95	2486.70	3	61.24	74	PK	V
2483.5-2500	1	2462	102.58	2483.90	3	49.91	54	AV	V
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).									

Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain (dBi)	2.06	Non-restricted Band Emissions					
Modulation	11G-20M								
Non-restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	1	2412	104.78	2398.59	74.64	30.14	20	PK	V
2500-2690	1	2462	103.28	2519.90	63.49	39.79	20	PK	V
Low Band				Up Band					
									
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)									

Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain _(dBi)	2.06	Restricted Band Emissions					
Modulation	11G-20M								
Restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dBuV/m)	Level Type	Pol. note 1
2310-2390	1	2412	110.45	2390.00	3	71.11	74	PK	V
2310-2390	1	2412	100.00	2390.00	3	52.35	54	AV	V
2483.5-2500	1	2462	108.93	2483.80	3	70.58	74	PK	V
2483.5-2500	1	2462	98.92	2483.50	3	52.48	54	AV	V
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).									

Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain (dBi)	2.06	Non-restricted Band Emissions					
Modulation	11N2.4G-20M								
Non-restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	1	2412	102.13	2399.49	69.97	32.16	20	PK	V
2500-2690	1	2462	102.20	2518.30	64.42	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									
Power Level	1	Gain _(dBi)	2.06	Restricted Band Emissions					
Modulation	11N2.4G-20M								
Restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dBuV/m)	Level Type	Pol. note 1
2310-2390	1	2412	107.86	2390.00	3	71.05	74	PK	V
2310-2390	1	2412	97.74	2390.00	3	52.04	54	AV	V
2483.5-2500	1	2462	107.52	2484.30	3	68.47	74	PK	V
2483.5-2500	1	2462	97.51	2483.50	3	52.46	54	AV	V
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).									

Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain (dBi)	2.06	Non-restricted Band Emissions					
Modulation	11N2.4G-40M								
Non-restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/100kHz)	NBE Freq. (MHz)	Out-band PSD [o] (dBuV/100kHz)	[i] – [o] (dB)	Limit (dB)	Level Type	Pol. note 1
2390-2400	1	2422	93.75	2395.27	62.64	31.11	20	PK	V
2500-2690	1	2452	94.59	2505.20	63.70	30.89	20	PK	V
Low Band				Up Band					
									
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)									

Transmitter Radiated Bandedge Emissions Result									
Power Level	1	Gain _(dBi)	2.06	Restricted Band Emissions					
Modulation	11N2.4G-40M								
Restricted Band (MHz)	N _{TX}	Test Ch. Freq. (MHz)	In-band PSD [i] (dBuV/1MHz)	RBE Freq. (MHz)	Measure Distance (m)	Out-Band Level (dBuV/m)	Limit (dBuV/m)	Level Type	Pol. note 1
2310-2390	1	2422	99.50	2389.60	3	61.82	74	PK	V
2310-2390	1	2422	89.20	2390.00	3	48.55	54	AV	V
2483.5-2500	1	2452	100.01	2484.08	3	61.94	74	PK	V
2483.5-2500	1	2452	89.83	2484.08	3	49.22	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

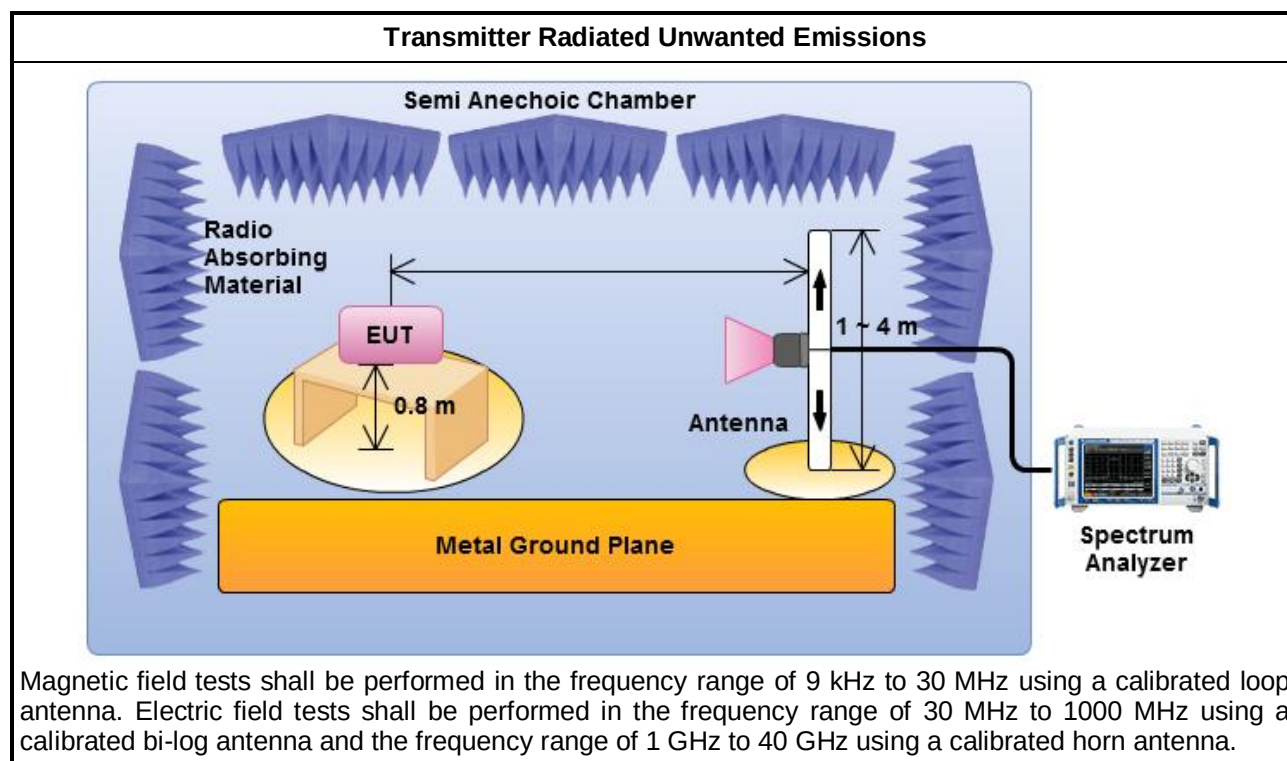
Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

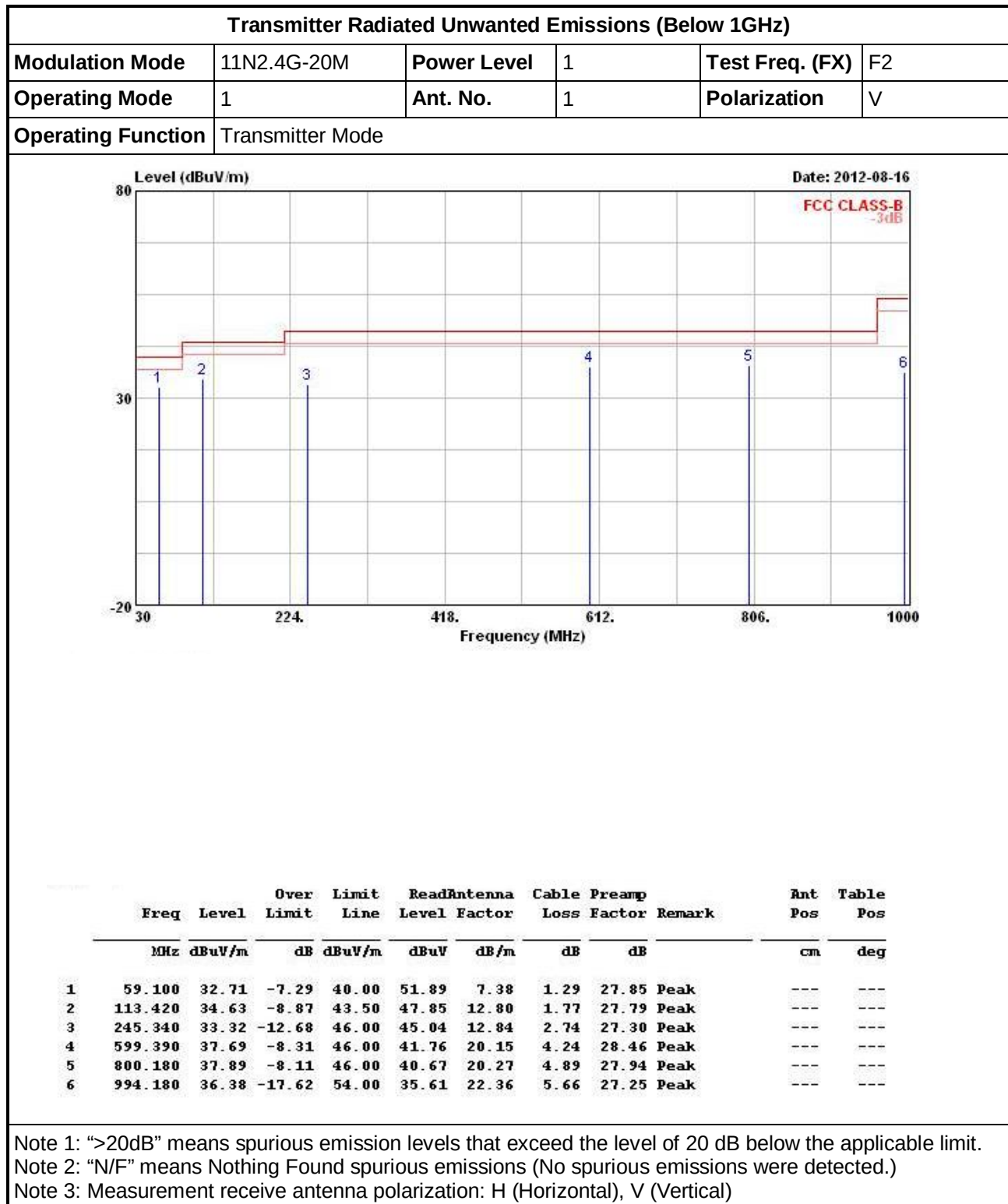
Test Method – General Information	
☒	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
☒	Measurements in the 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.
☒	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.
☒	The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].
☒	For the transmitter unwanted emissions shall be measured using following options below:
☒	Refer as FCC KDB 558074, clause 7.4.1 for unwanted emissions into non-restricted bands.
☒	Refer as FCC KDB 558074, clause 7.4.2 for unwanted emissions into restricted bands.
☐	Refer as FCC KDB 558074, clause 7.4.2.2.1 Option 1 (Power Averaging).
☐	Refer as FCC KDB 558074, clause 7.4.2.2.2 Option 2 (Trace Averaging).
☐	Refer as FCC KDB 558074, clause 7.4.2.2.2 Option 3 (Reduced VBW).
☒	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty cycle $\geq$ 98%.
☐	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
☒	Refer as FCC KDB 558074, clause 7.4.2.2.3 measurement procedure peak limit.
☐	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.

Test Method	
☐	Refer as FCC KDB 558074, clause 3 for conducted measurement.
☐	For unwanted emissions into non-restricted bands (relative emission limits).
☐	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.
☐	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).
☐	Refer as FCC KDB 558074, clause 7.4.2.2.1 unwanted emissions in restricted bands on frequencies ≤ 1000 MHz
☐	Refer as FCC KDB 558074, clause 7.4.2.2.2 unwanted emissions in restricted bands on frequencies > 1000 MHz
☐	For conducted measurements on devices with multiple transmit chains using options given below:
☐	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.
☐	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.
☒	For radiated measurement.
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.

3.6.4 Test Setup

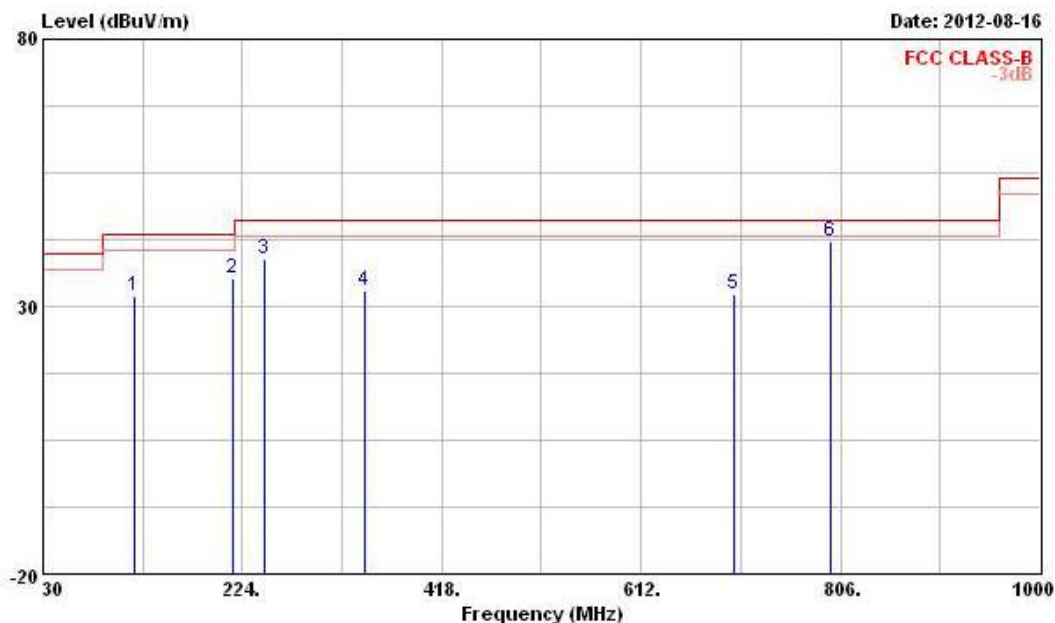


3.6.5 Test Result of Transmitter Radiated Unwanted Emissions (Below 1GHz)



Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation Mode	11N2.4G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Mode	1	Ant. No.	1	Polarization	H
Operating Function	Transmitter Mode				



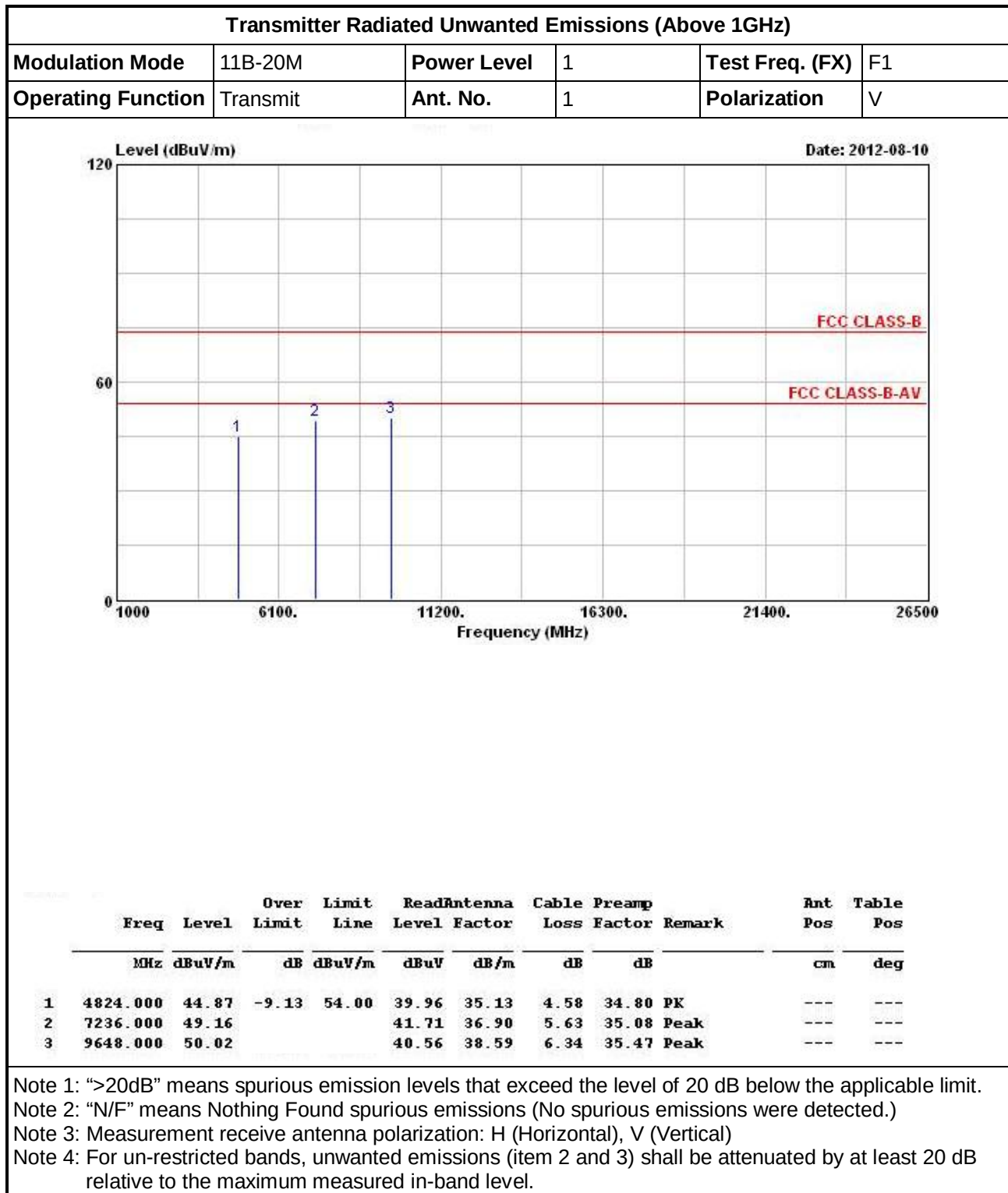
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	118.270	32.12	-11.38	43.50	44.70	13.38	1.81	27.77	Peak	---	---
2	214.300	35.11	-8.39	43.50	48.12	11.83	2.53	27.37	Peak	---	---
3	245.340	38.91	-7.09	46.00	50.63	12.84	2.74	27.30	Peak	---	---
4	343.310	32.92	-13.08	46.00	42.86	14.37	3.15	27.46	Peak	---	---
5	703.180	32.45	-13.55	46.00	37.26	18.91	4.55	28.27	Peak	---	---
6	796.300	42.22	-3.78	46.00	45.08	20.21	4.88	27.95	Peak	---	---

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

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

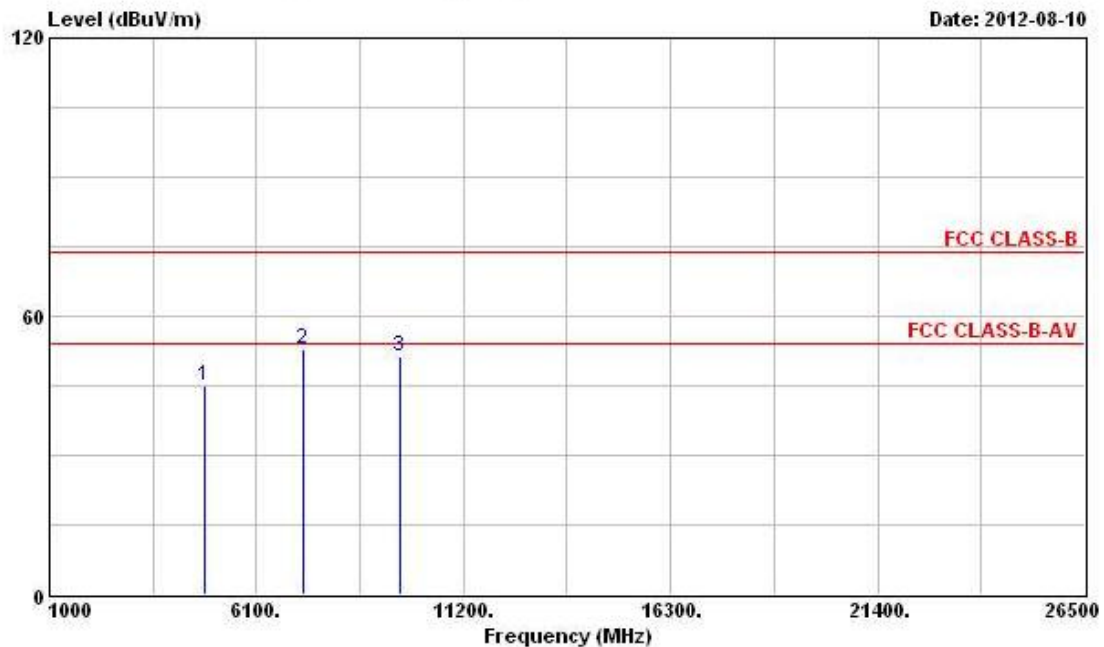
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

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



Transmitter Radiated Unwanted Emissions (Above 1GHz)

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



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	45.06	-8.94	54.00	39.52	35.76	4.58	34.80	PK	---	---
2	7236.000	52.75			44.35	37.85	5.63	35.08	Peak	---	---
3	9648.000	51.19			40.93	39.39	6.34	35.47	Peak	---	---

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

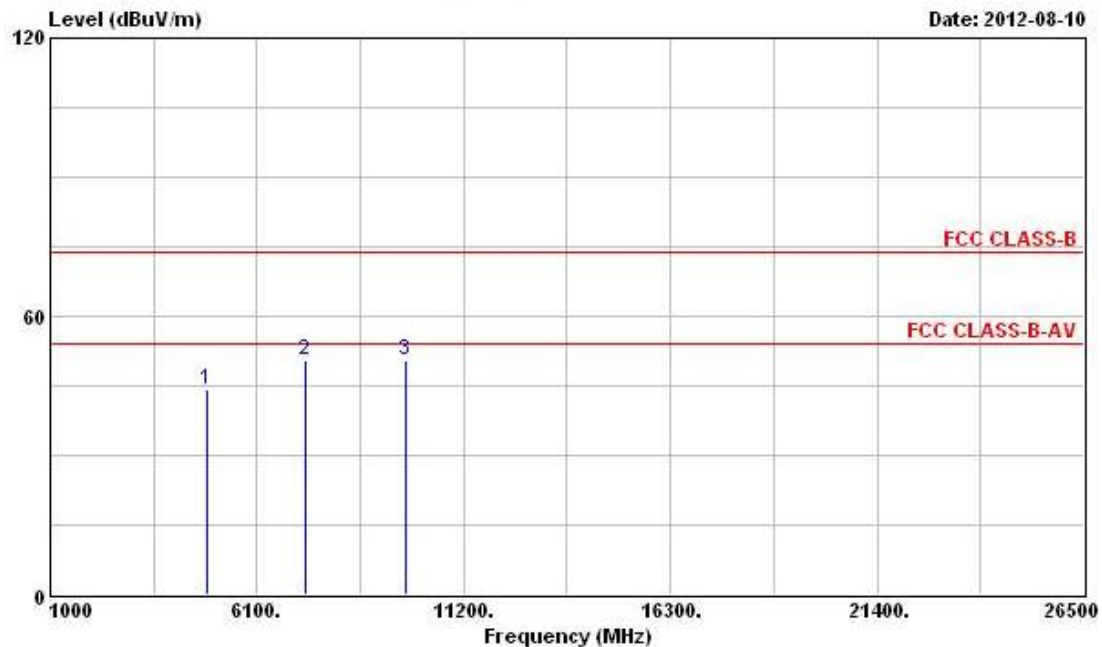
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For 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	Power Level	1	Test Freq. (FX)	F2
Operating Function	Transmit	Ant. No.	1	Polarization	V

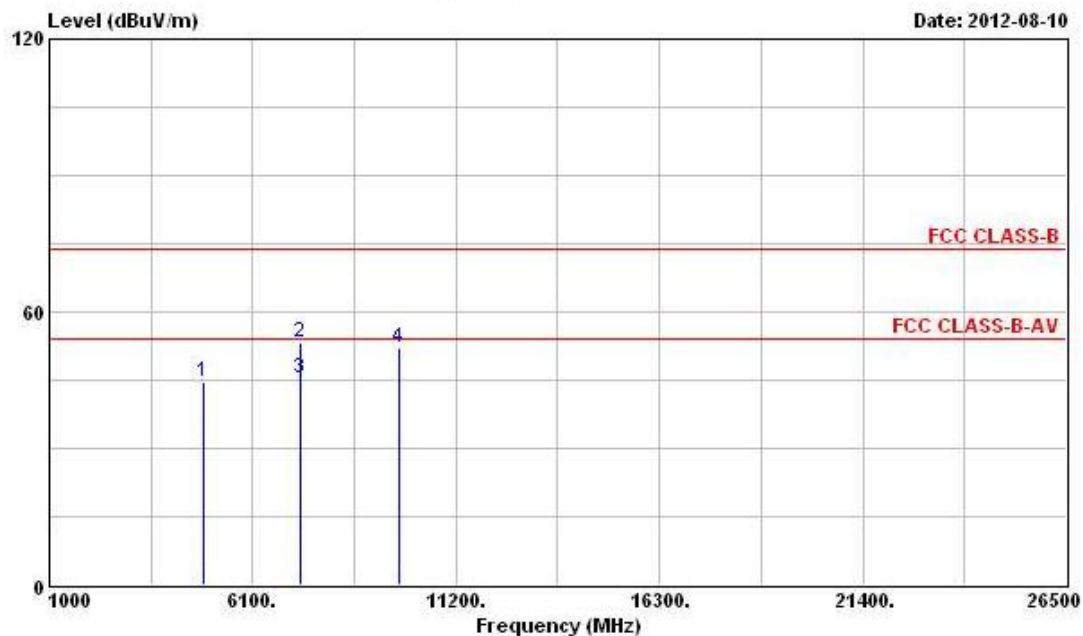


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4874.000	44.14	-9.86	54.00	39.13	35.18	4.61	34.78 PK	---	---
2	7311.000	50.49	-3.51	54.00	43.03	36.92	5.64	35.10 PK	---	---
3	9748.000	50.46			40.87	38.71	6.36	35.48 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 un-restricted bands, unwanted emissions (item 4) 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	Power Level	1	Test Freq. (FX)	F2
Operating Function	Transmit	Ant. No.	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	44.75	-9.25	54.00	39.09	35.83	4.61	34.78	PK	---	---
2	7311.000	53.22	-20.78	74.00	44.82	37.86	5.64	35.10	Peak	---	---
3	7311.000	45.50	-8.50	54.00	37.10	37.86	5.64	35.10	Average	---	---
4	9748.000	52.05			41.66	39.51	6.36	35.48	Peak	---	---

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

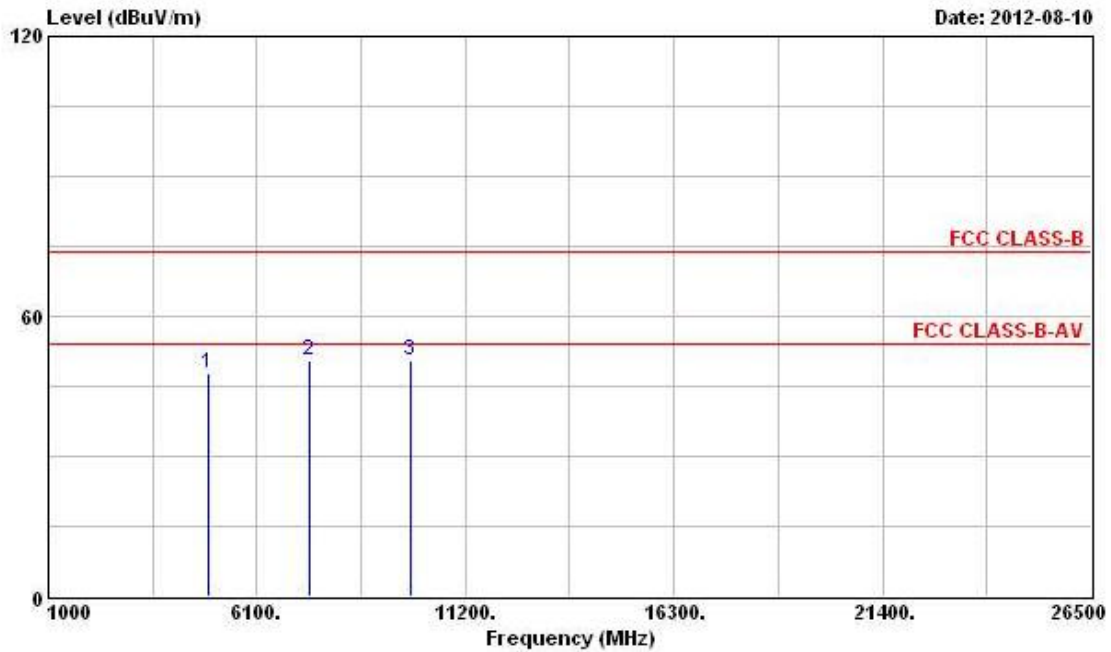
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For un-restricted bands, unwanted emissions (item 4) 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	Power Level	1	Test Freq. (FX)	F3
Operating Function	Transmit	Ant. No.	1	Polarization	V

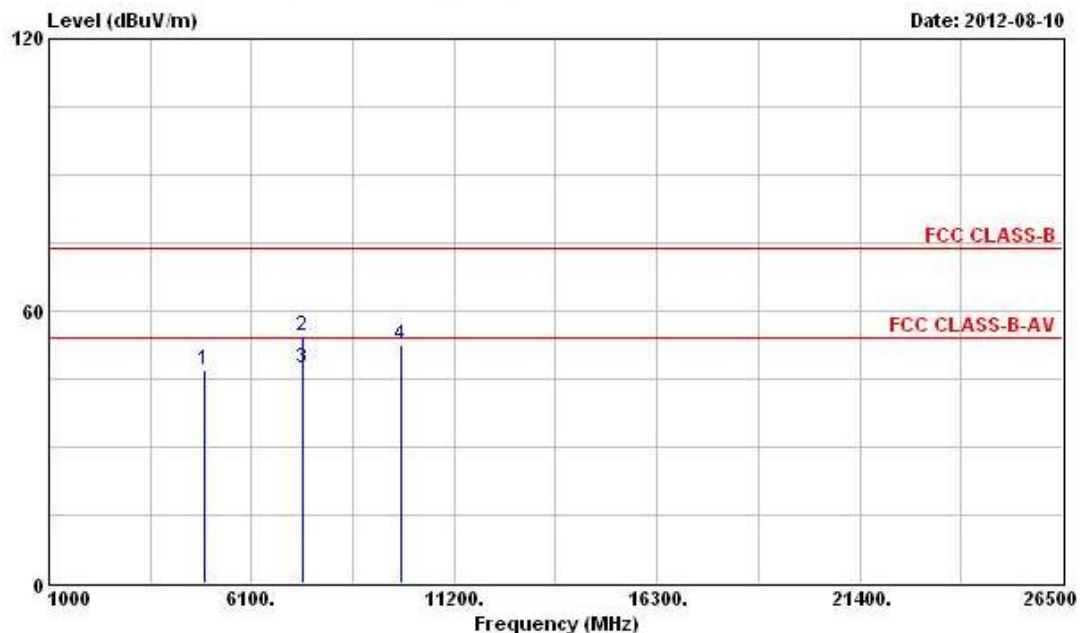


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	47.73	-6.27	54.00	42.59	35.23	4.68	34.77	PK	---	---
2	7386.000	50.58	-3.42	54.00	43.09	36.96	5.65	35.12	PK	---	---
3	9848.000	50.50			40.80	38.81	6.38	35.49	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 un-restricted bands, unwanted emissions (item 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	Power Level	1	Test Freq. (FX)	F3
Operating Function	Transmit	Ant. No.	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Preamp	Loss Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4924.000	46.96	-7.04	54.00	41.15	35.90	4.68	34.77 PK	---	---
2	7386.000	54.34	-19.66	74.00	45.93	37.88	5.65	35.12 Peak	---	---
3	7386.000	47.37	-6.63	54.00	38.96	37.88	5.65	35.12 Average	---	---
4	9848.000	52.44			41.94	39.61	6.38	35.49 Peak	---	---

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

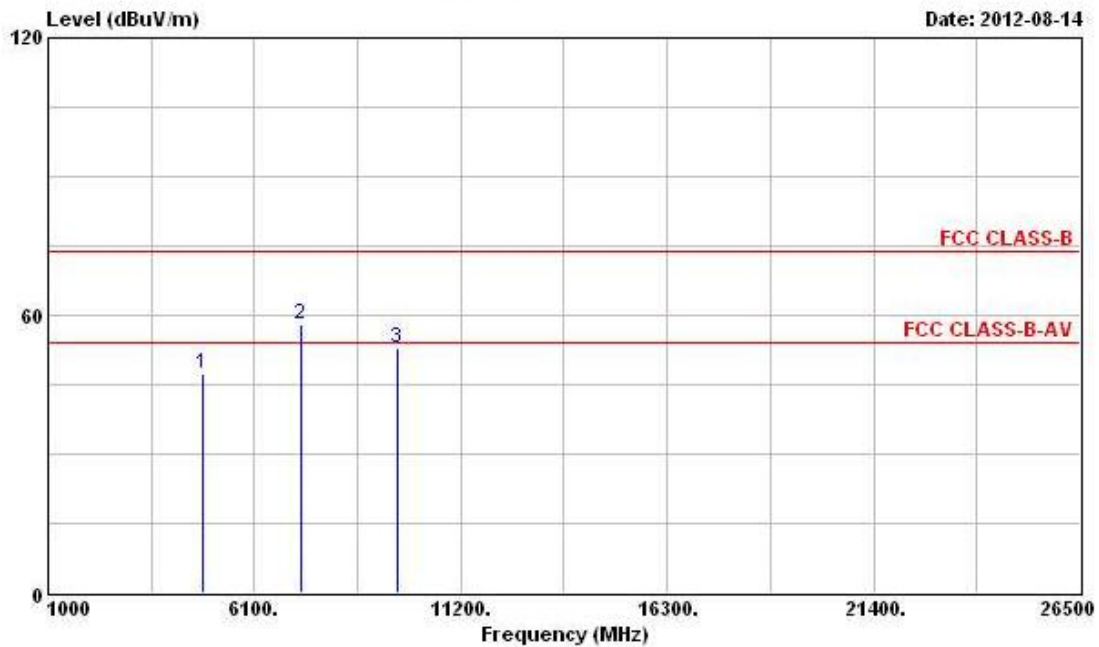
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For un-restricted bands, unwanted emissions (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

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



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level 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	47.56	-6.44	54.00	42.65	35.13	4.58	34.80 PK	---	---
2	7236.000	57.88			50.43	36.90	5.63	35.08 Peak	---	---
3	9648.000	52.91			43.45	38.59	6.34	35.47 Peak	---	---

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

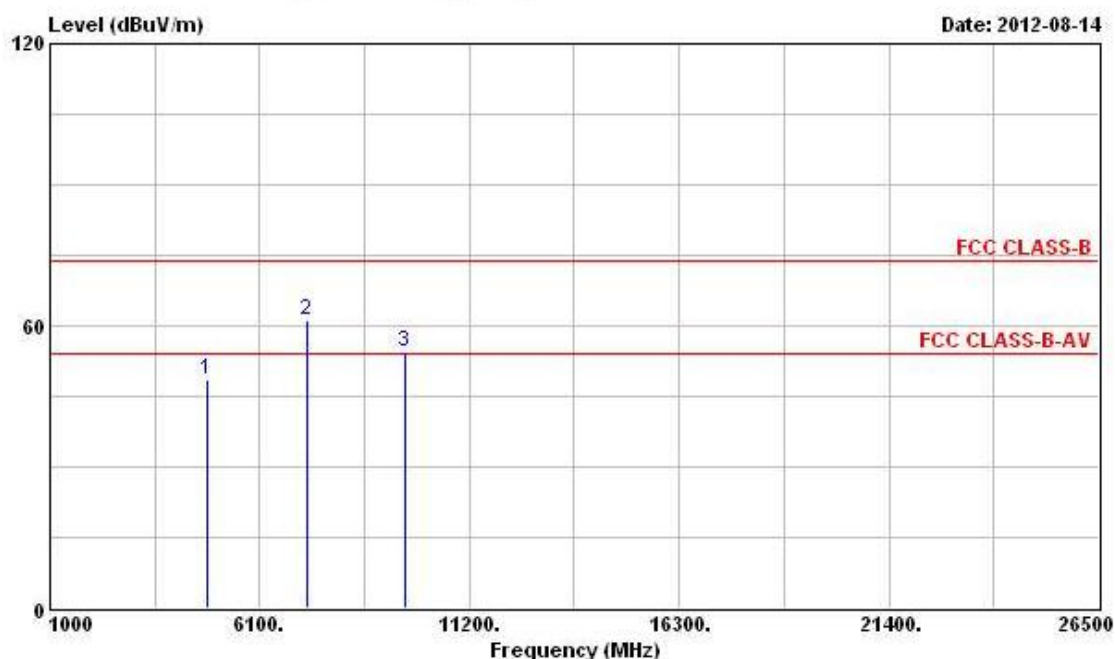
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For 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	11G-20M	Power Level	1	Test Freq. (FX)	F1
Operating Function	Transmit	Ant. No.	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	48.47	-5.53	54.00	42.93	35.76	4.58	34.80	PK	---	---
2	7236.000	61.30			52.90	37.85	5.63	35.08	Peak	---	---
3	9648.000	54.31			44.05	39.39	6.34	35.47	Peak	---	---

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

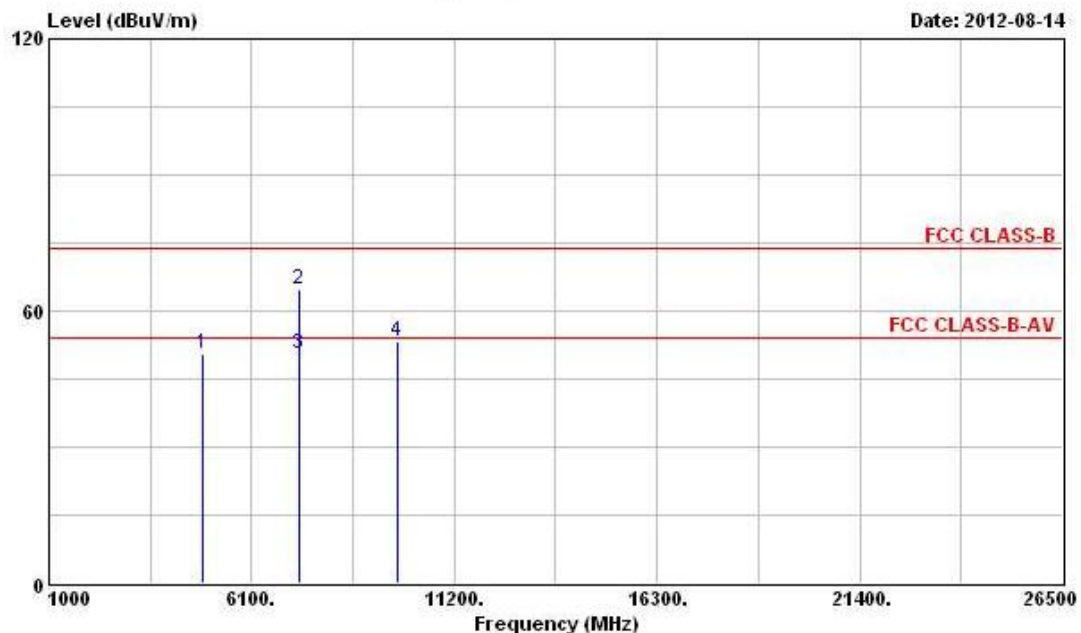
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For 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	11G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Function	Transmit	Ant. No.	1	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	50.52	-3.48	54.00	45.51	35.18	4.61	34.78	PK	---	---
2	7311.000	64.92	-9.08	74.00	57.46	36.92	5.64	35.10	Peak	---	---
3	7311.000	50.59	-3.41	54.00	43.13	36.92	5.64	35.10	Average	---	---
4	9748.000	53.10			43.51	38.71	6.36	35.48	Peak	---	---

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

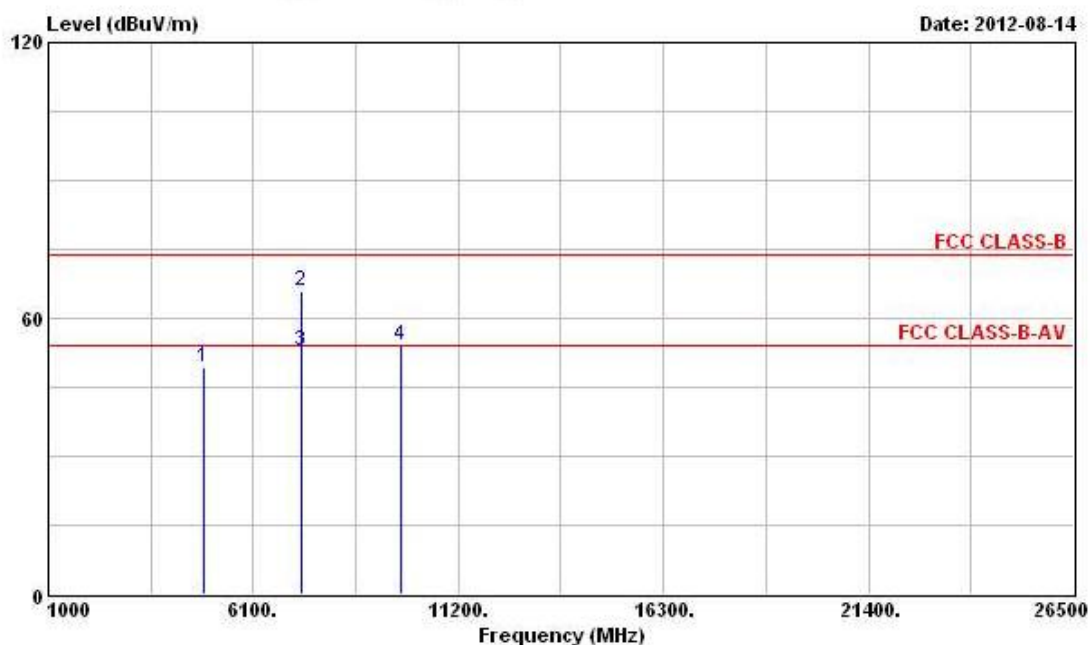
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For un-restricted bands, unwanted emissions (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

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



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	49.19	-24.81	74.00	43.53	35.83	4.61	34.78	Peak	---	---
2	7311.000	65.76	-8.24	74.00	57.36	37.86	5.64	35.10	Peak	---	---
3	7311.000	52.80	-1.20	54.00	44.40	37.86	5.64	35.10	Average	---	---
4	9748.000	54.12			43.73	39.51	6.36	35.48	Peak	---	---

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

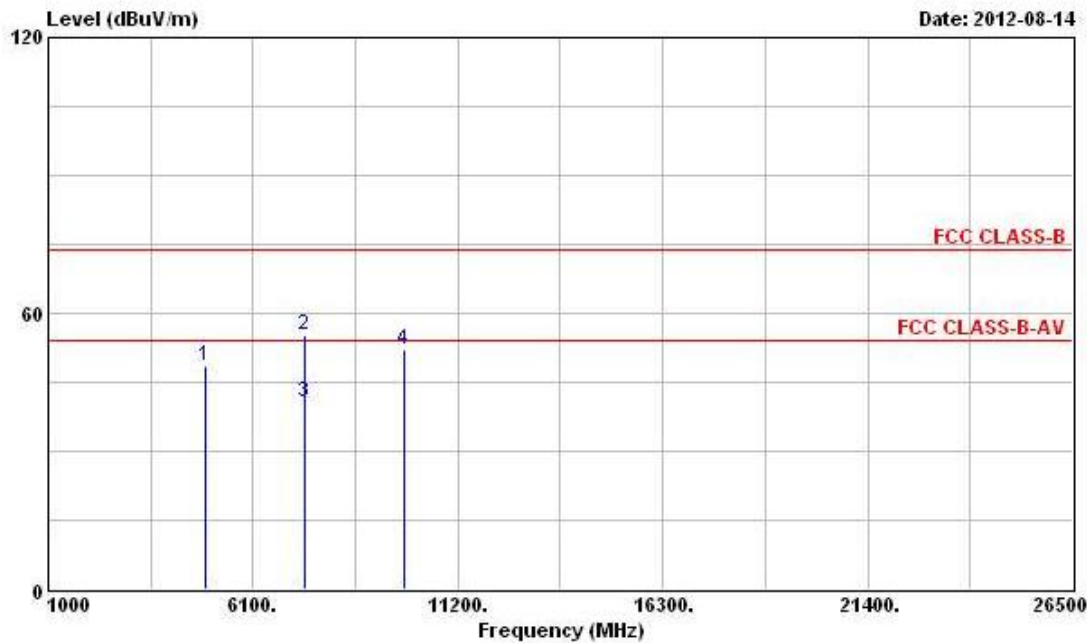
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For un-restricted bands, unwanted emissions (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11G-20M	Power Level	1	Test Freq. (FX)	F3
Operating Function	Transmit	Ant. No.	1	Polarization	V

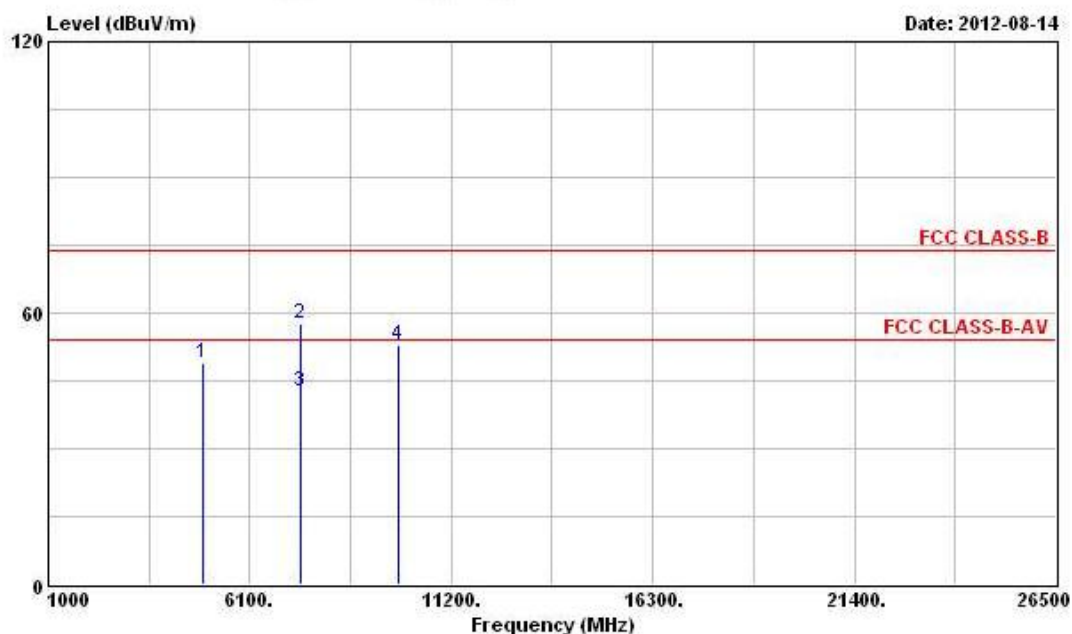


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	48.47	-5.53	54.00	43.33	35.23	4.68	34.77	PK	---	---
2	7386.000	55.28	-18.72	74.00	47.79	36.96	5.65	35.12	Peak	---	---
3	7386.000	40.61	-13.39	54.00	33.12	36.96	5.65	35.12	Average	---	---
4	9848.000	52.09			42.39	38.81	6.38	35.49	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 un-restricted bands, unwanted emissions (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11G-20M	Power Level	1	Test Freq. (FX)	F3
Operating Function	Transmit	Ant. No.	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	48.81	-5.19	54.00	43.00	35.90	4.68	34.77	PK	---	---
2	7386.000	57.78	-16.22	74.00	49.37	37.88	5.65	35.12	Peak	---	---
3	7386.000	42.63	-11.37	54.00	34.22	37.88	5.65	35.12	Average	---	---
4	9848.000	52.98			42.48	39.61	6.38	35.49	Peak	---	---

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

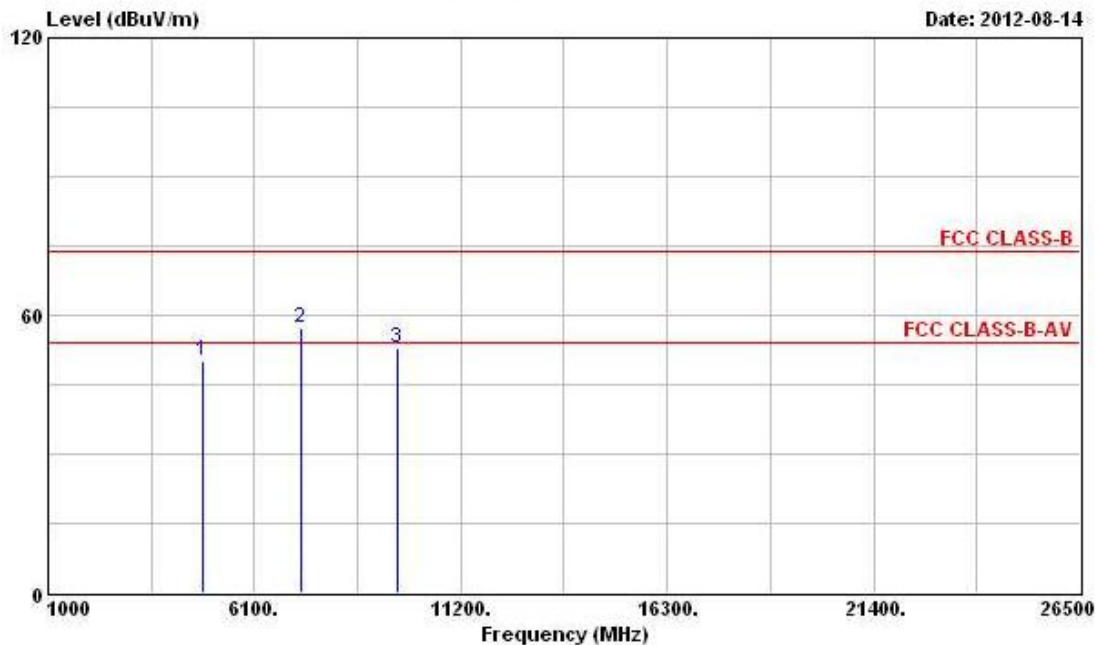
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For un-restricted bands, unwanted emissions (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11N2.4G-20M	Power Level	1	Test Freq. (FX)	F1
Operating Function	Transmit	Ant. No.	1	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	49.94	-4.06	54.00	45.03	35.13	4.58	34.80	PK	---	---
2	7242.000	57.24			49.79	36.90	5.63	35.08	Peak	---	---
3	9648.000	52.72			43.26	38.59	6.34	35.47	Peak	---	---

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

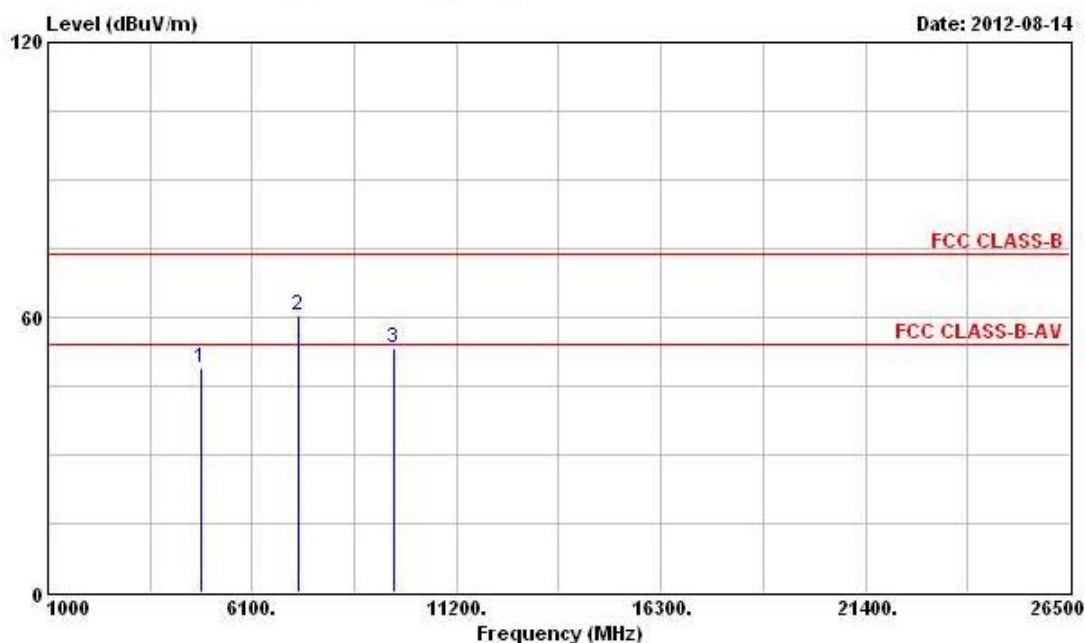
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For 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	11N2.4G-20M	Power Level	1	Test Freq. (FX)	F1
Operating Function	Transmit	Ant. No.	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	48.77	-5.23	54.00	43.23	35.76	4.58	34.80	PK	---	---
2	7236.000	60.57			52.17	37.85	5.63	35.08	Peak	---	---
3	9648.000	53.35			43.09	39.39	6.34	35.47	Peak	---	---

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

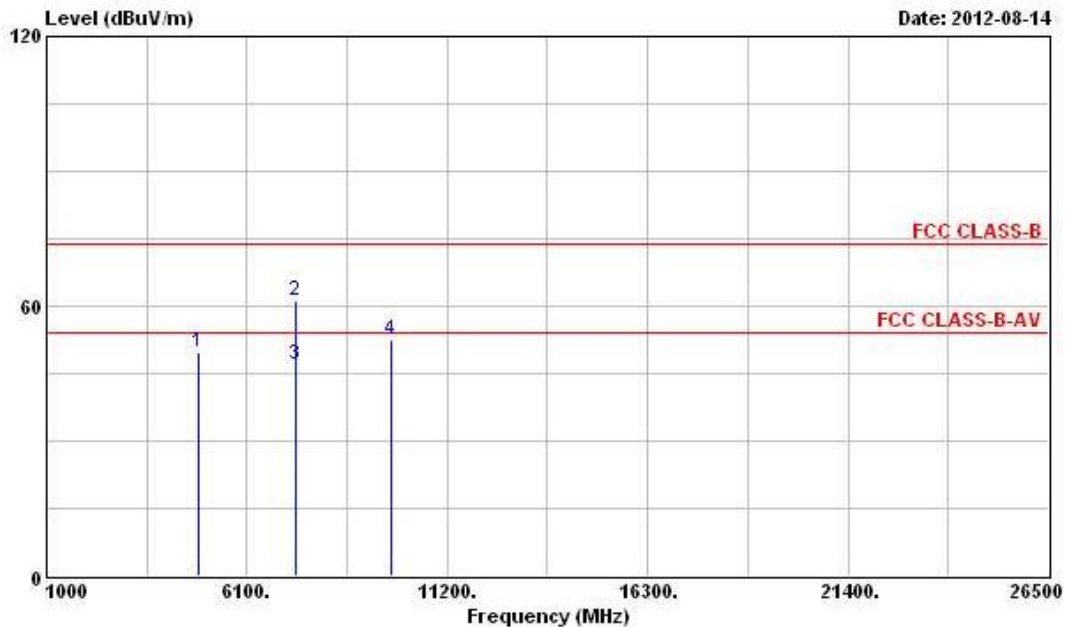
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For 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	11N2.4G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Function	Transmit	Ant. No.	1	Polarization	V

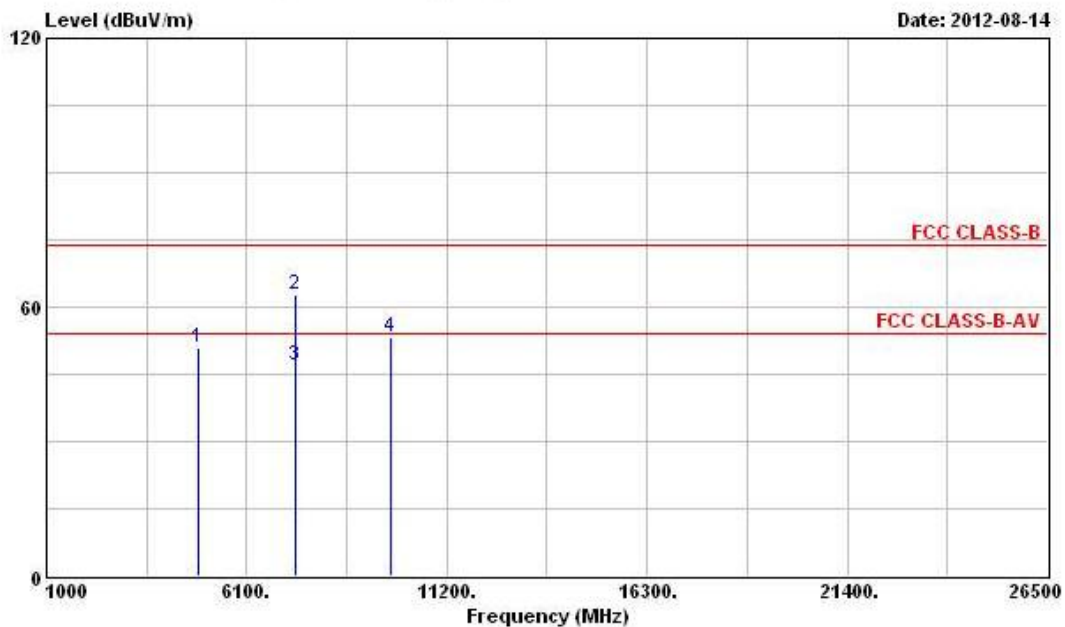


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	49.88	-4.12	54.00	44.87	35.18	4.61	34.78	PK	---	---
2	7326.000	61.16	-12.84	74.00	53.69	36.93	5.64	35.10	Peak	---	---
3	7326.000	47.10	-6.90	54.00	39.63	36.93	5.64	35.10	Average	---	---
4	9748.000	52.49			42.90	38.71	6.36	35.48	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 un-restricted bands, unwanted emissions (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11N2.4G-20M	Power Level	1	Test Freq. (FX)	F2
Operating Function	Transmit	Ant. No.	1	Polarization	H

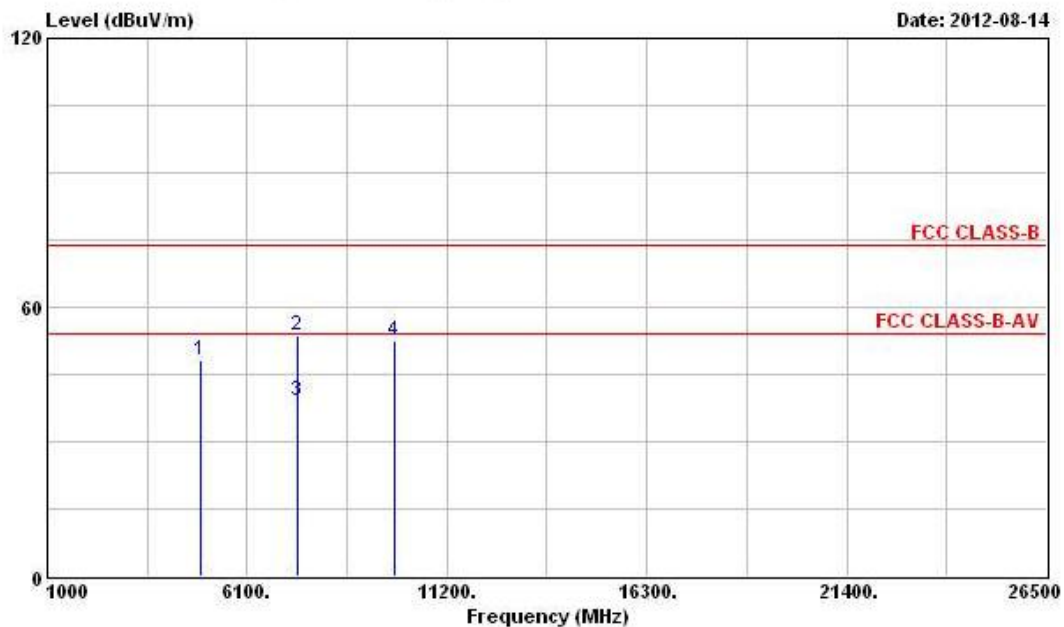


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	50.90	-3.10	54.00	45.24	35.83	4.61	34.78	PK	---	---
2	7326.000	62.60	-11.40	74.00	54.19	37.87	5.64	35.10	Peak	---	---
3	7326.000	46.87	-7.13	54.00	38.46	37.87	5.64	35.10	Average	---	---
4	9748.000	53.46			43.07	39.51	6.36	35.48	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 un-restricted bands, unwanted emissions (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11N2.4G-20M	Power Level	1	Test Freq. (FX)	F3
Operating Function	Transmit	Ant. No.	1	Polarization	V

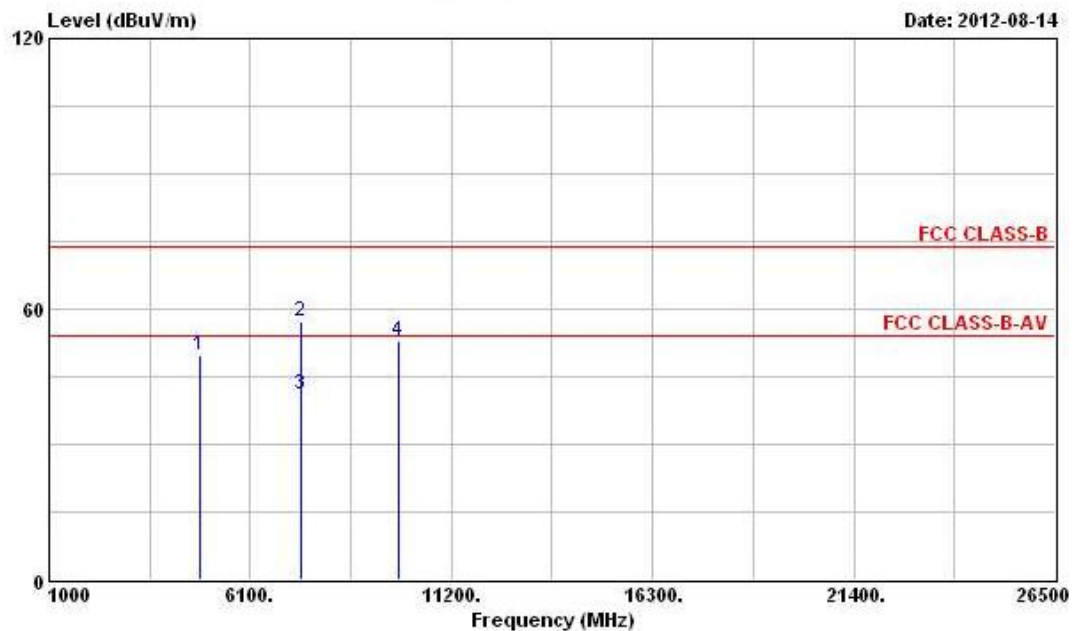


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	48.35	-5.65	54.00	43.21	35.23	4.68	34.77	PK	---	---
2	7386.000	53.67	-20.33	74.00	46.18	36.96	5.65	35.12	Peak	---	---
3	7386.000	38.89	-15.11	54.00	31.40	36.96	5.65	35.12	Average	---	---
4	9848.000	52.66			42.96	38.81	6.38	35.49	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 un-restricted bands, unwanted emissions (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11N2.4G-20M	Power Level	1	Test Freq. (FX)	F3
Operating Function	Transmit	Ant. No.	1	Polarization	H

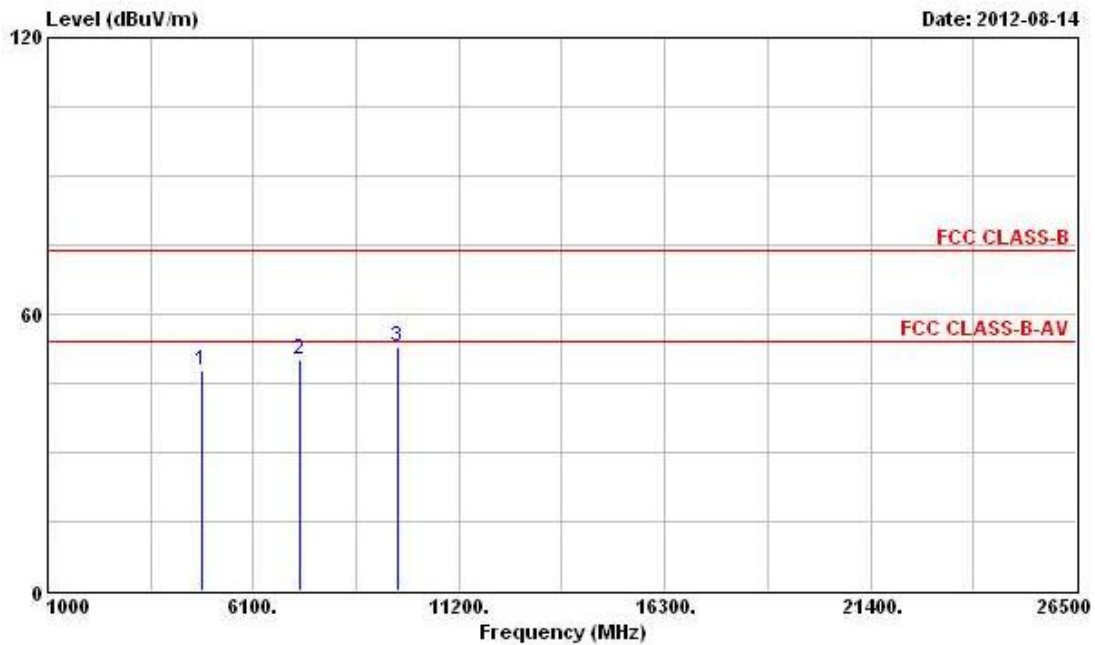


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	49.92	-4.08	54.00	44.38	35.76	4.58	34.80	PK	---	---
2	7386.000	57.29	-16.71	74.00	48.88	37.88	5.65	35.12	Peak	---	---
3	7386.000	41.11	-12.89	54.00	32.70	37.88	5.65	35.12	Average	---	---
4	9848.000	52.94			42.44	39.61	6.38	35.49	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 un-restricted bands, unwanted emissions (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11N2.4G-40M	Power Level	1	Test Freq. (FX)	F4
Operating Function	Transmit	Ant. No.	1	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4844.000	47.94	-6.06	54.00	42.98	35.14	4.61	34.79	PK	---	---
2	7266.000	50.02	-3.98	54.00	42.57	36.91	5.63	35.09	PK	---	---
3	9688.000	52.92			43.42	38.63	6.35	35.48	Peak	---	---

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

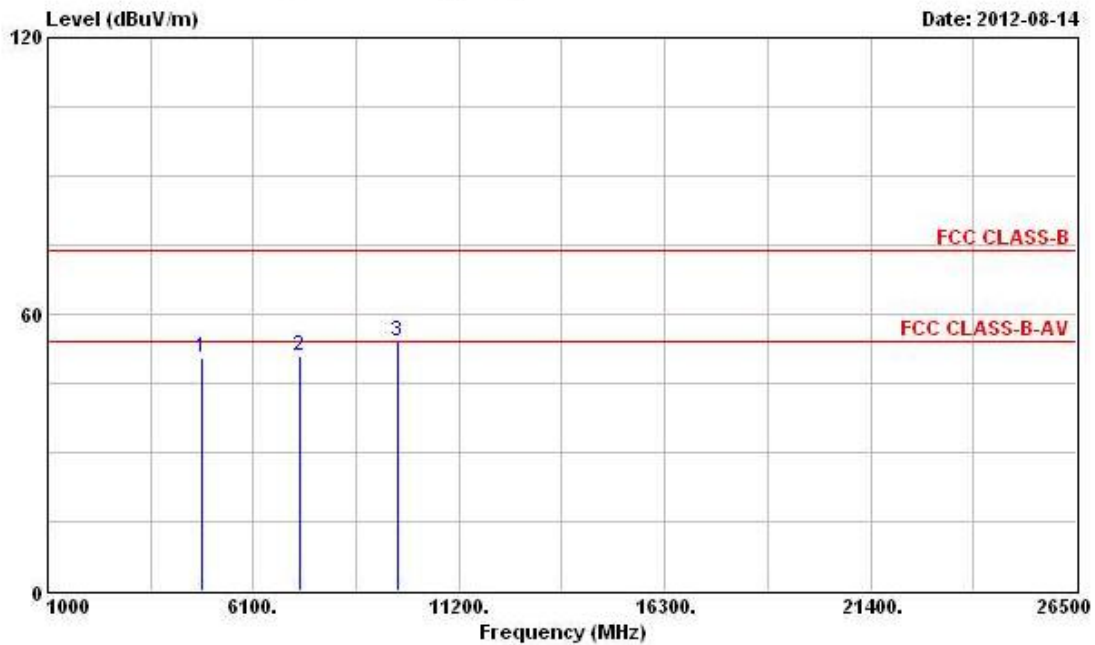
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For un-restricted bands, unwanted emissions (item 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	11N2.4G-40M	Power Level	1	Test Freq. (FX)	F4
Operating Function	Transmit	Ant. No.	1	Polarization	H

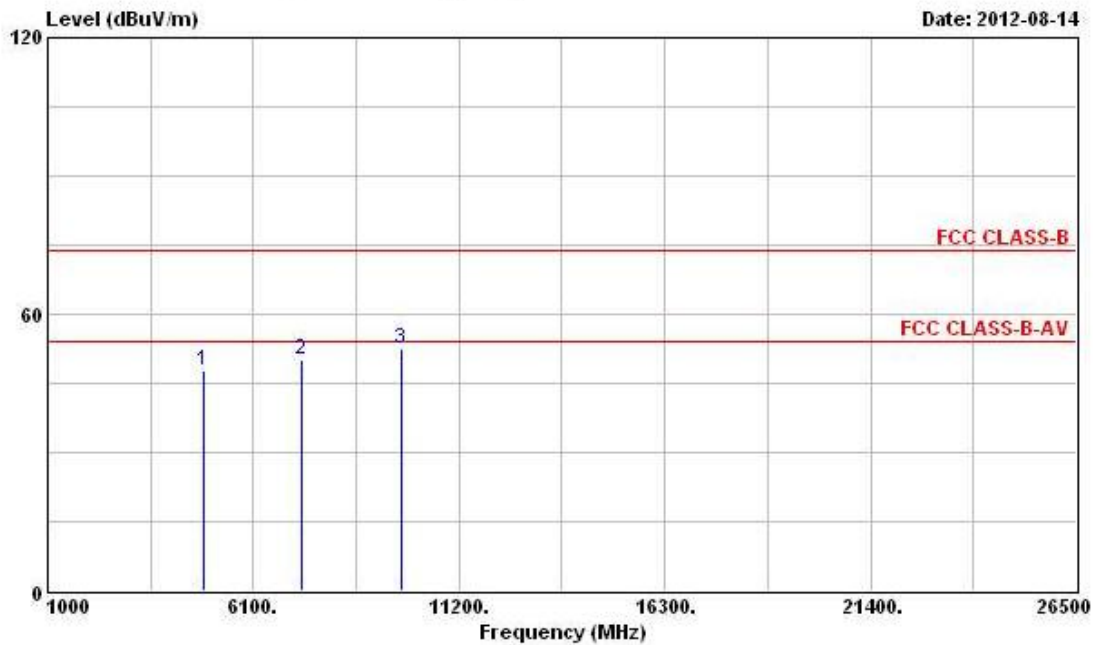


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4844.000	50.39	-3.61	54.00	44.79	35.78	4.61	34.79	PK	---	---
2	7266.000	50.84	-3.16	54.00	42.44	37.86	5.63	35.09	PK	---	---
3	9688.000	54.26			43.96	39.43	6.35	35.48	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 un-restricted bands, unwanted emissions (item 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	11N2.4G-40M	Power Level	1	Test Freq. (FX)	F5
Operating Function	Transmit	Ant. No.	1	Polarization	V

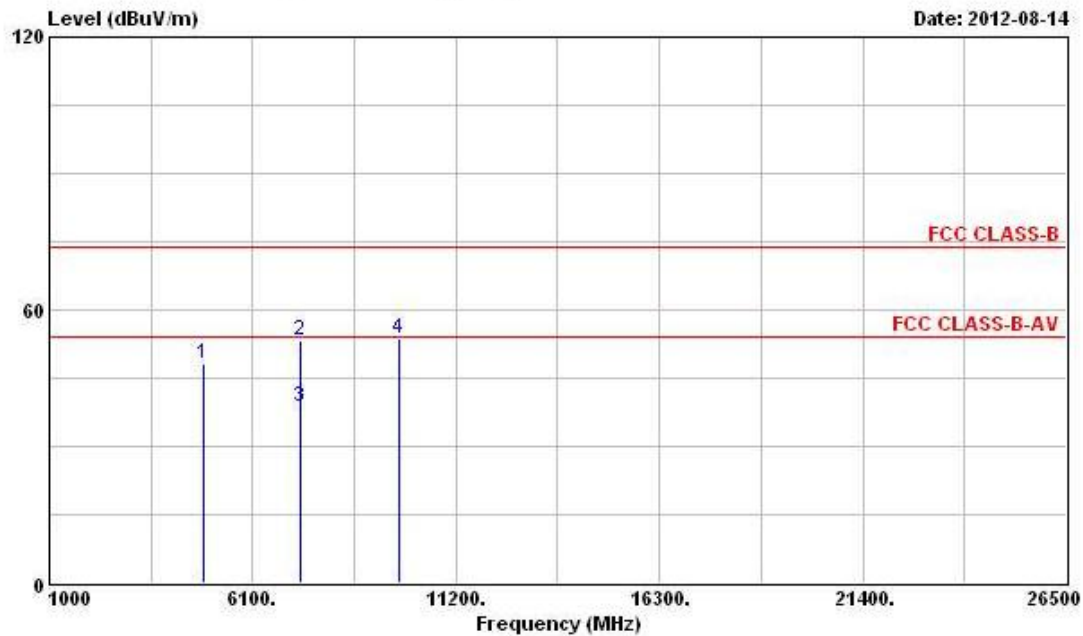


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	47.90	-6.10	54.00	42.89	35.18	4.61	34.78	PK	---	---
2	7311.000	50.28	-3.72	54.00	42.82	36.92	5.64	35.10	PK	---	---
3	9748.000	52.59			43.00	38.71	6.36	35.48	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 un-restricted bands, unwanted emissions (item 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	11N2.4G-40M	Power Level	1	Test Freq. (FX)	F5
Operating Function	Transmit	Ant. No.	1	Polarization	H

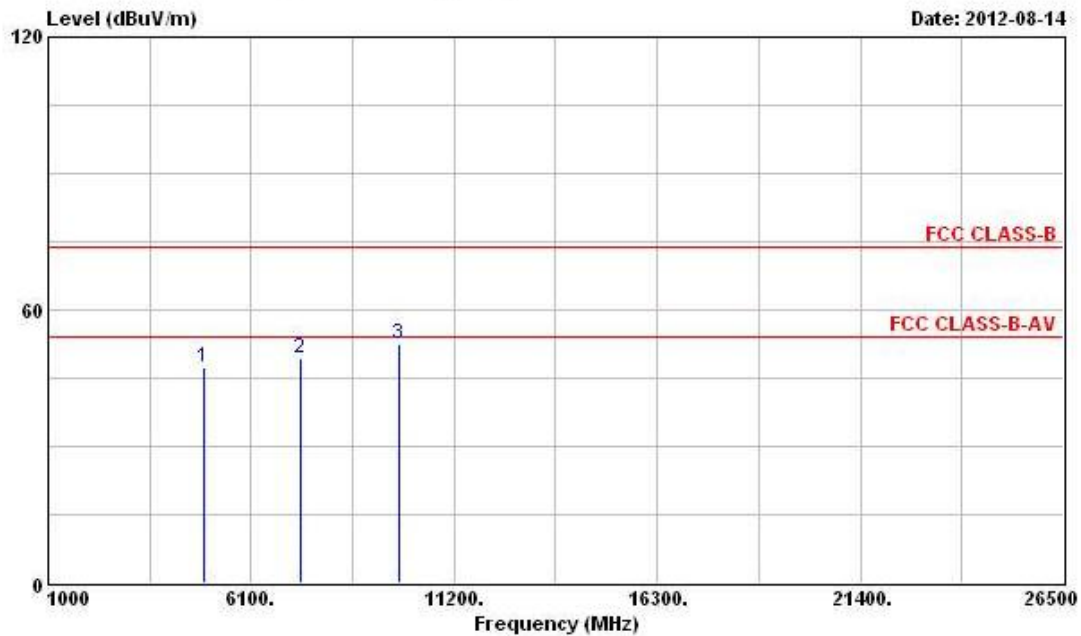


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	48.31	-5.69	54.00	42.65	35.83	4.61	34.78	PK	---	---
2	7311.000	53.15	-20.85	74.00	44.75	37.86	5.64	35.10	Peak	---	---
3	7311.000	38.68	-15.32	54.00	30.28	37.86	5.64	35.10	Average	---	---
4	9748.000	53.51			43.12	39.51	6.36	35.48	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 un-restricted bands, unwanted emissions (item 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation Mode	11N2.4G-40M	Power Level	1	Test Freq. (FX)	F6
Operating Function	Transmit	Ant. No.	1	Polarization	V



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4904.000	47.49	-6.51	54.00	42.42	35.21	4.64	34.78	PK	---	---
2	7356.000	49.29	-4.71	54.00	41.82	36.94	5.64	35.11	PK	---	---
3	9808.000	52.33			42.67	38.77	6.37	35.48	Peak	---	---

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

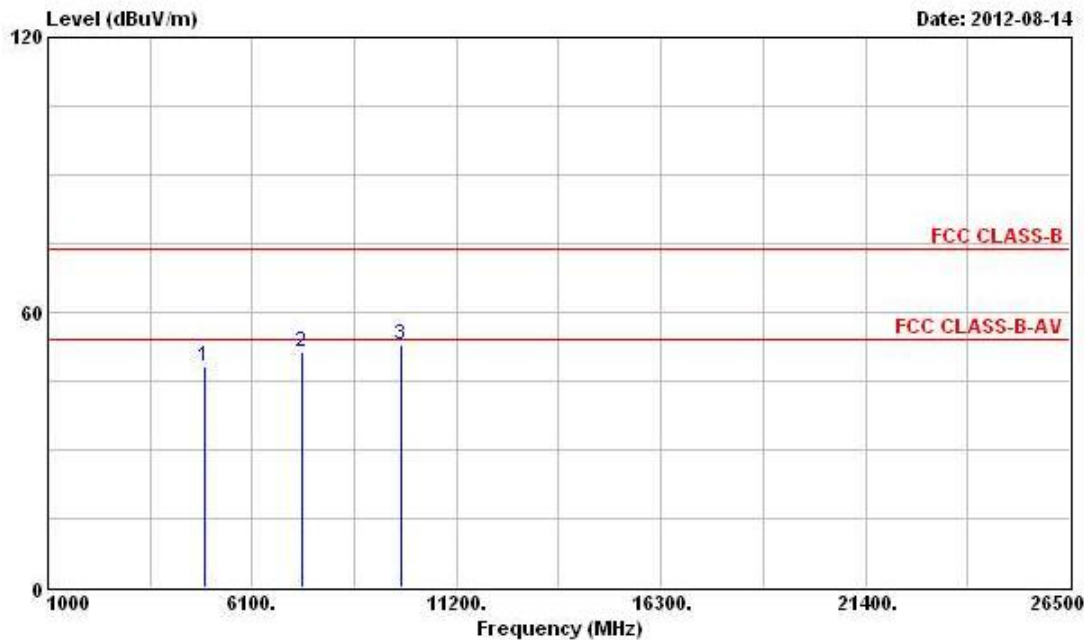
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

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

Note 4: For un-restricted bands, unwanted emissions (item 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	11N2.4G-40M	Power Level	1	Test Freq. (FX)	F6
Operating Function	Transmit	Ant. No.	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4904.000	48.32	-5.68	54.00	42.58	35.88	4.64	34.78	PK	---	---
2	7356.000	51.30	-2.70	54.00	42.90	37.87	5.64	35.11	PK	---	---
3	9808.000	53.00			42.54	39.57	6.37	35.48	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 un-restricted bands, unwanted emissions (item 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	100174	9 kHz ~ 2.75 GHz	Mar. 23, 2012	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Feb. 08, 2012	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9 kHz ~ 30 MHz	Apr. 20, 2012	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	CB049	9 kHz ~ 30 MHz	Apr. 25, 2012	Conduction (CO04-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
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
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	3008A02373	1GHz ~ 26.5GHz	Aug. 10, 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	Teseq	HLA 6120	24155	9 kHz ~ 30 MHz	Sep. 09, 2010*	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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