FCC Test Report

Equipment	:	**Home Monitoring Device**
Brand Name	:	**Nest**
Model No.	:	**02A**
FCC ID	:	**ZQAT20**
Standard	:	**47 CFR FCC Part 15.247**
Applicant	:	**Nest Labs Inc** **900 Hansen Way, Palo Alto California, 94304**
Manufacturer	:	**Pegatron Corporation** **No. 400, Sec. 7, Chengde Rd., Beitou District,** **Taipei City 11262 Taiwan**

The product sample received on Jul. 20, 2012 and completely tested on Aug. 13, 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

Testing Laboratory
1190

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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	3.970MHz: 35.71dBuV (10.29dB) - AV 42.45dBuV (13.55dB) - QP	FCC 15.207	Complied
3.2	15.247(a)	6dB Bandwidth	6dB Bandwidth Unit [MHz] 11B-20M: 14.44 11G-20M: 16.41 11N2.4G-20M: 17.63	≥500kHz	Complied
3.3	15.247(b)	RF Output Power (Maximum Peak Conducted Output Power)	Power [dBm] 11B-20M: 25.52 11G-20M: 22.98 11N2.4G-20M: 21.60	Power [dBm] 30	Complied
3.4	15.247(d)	Power Spectral Density	PSD [dBm/3kHz] 11B-20M: -4.57 11G-20M: -12.03 11N2.4G-20M: -13.14	PSD [dBm/3kHz] 8	Complied
3.5	15.247(c)	Transmitter Radiated Bandedge Emissions	Non-Restricted Bands: 2399.82MHz: 31.65dB Restricted Bands [dBuV/m at 3m]: 2493.80MHz: 60.48 (Margin 13.52dB) - PK 53.85 (Margin 0.15dB) - 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]: 4824.00MHz: 58.46 (Margin 15.54dB) – PK 52.05 (Margin 1.95dB) - AV	Non-Restricted Bands: > 20 dB Restricted Bands: FCC 15.209	Complied

Revision History

Report No.	Version	Description	Issued Date
FR272106AC	Rev. 01	Initial issue of report	Aug. 29, 2012

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information				
Frequency Range (MHz)	**IEEE Std. 802.11 Protocol**	**Ch. Frequency (MHz)**	**Channel Number**	**RF Output Power (dBm)**
2400-2483.5	b	2412-2462	1-11 [11]	25.52
2400-2483.5	g	2412-2462	1-11 [11]	22.98
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	21.60
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 (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_{TX})**	**Number of Receive Chains (N_{RX})**	**Correlation Signals with Multiple N_{TX}**	**99% Emission Bandwidth (MHz)**	**Co-location**
b	1	1	N/A	14.44	Yes
g	1	1	N/A	16.41	Yes
n (HT20)	1	1	N/A	17.63	Yes
Note 1: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)					

1.1.2 Antenna Information

Antenna Category	
☐	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							
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	PCB	-1.37	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) =
$10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N]$ dBi
All transmit signals are completely uncorrelated, Directional Gain (DG) =
$10 \log[(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10})/N]$ dBi

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)**
☒ 45.85% - IEEE 802.11b	3.39	6.77
☒ 17.09% - IEEE 802.11g	7.67	15.35
☒ 15.51% - IEEE 802.11n (HT20)	8.09	16.19

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				
Battery 1	Brand Name	ATL	Model Name	284449
	Power Rating	3.7Vdc, 580 mAh	Type	Lithium-ion Polymer
Battery 2	Brand Name	Samsung	Model Name	P11GY1-01-S01
	Power Rating	3.7Vdc, 450 mAh	Type	Lithium-ion Polymer

1.3 Support Equipment

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

1.4 Testing Applied Standards

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

- 47 CFR FCC Part 15
- ANSI C63.10-2009
- FCC KDB 558074
- FCC KDB 662911
- FCC KDB 412172

1.5 Testing Location Information

Testing Location					
☒	HWA YA	ADD : 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	David Tu	25°C / 54%	13-Aug-12
RF Conducted		TH01-HY	Ian Du	24.6°C / 44%	02-Aug-12
Radiated Emission		03CH02-HY	Hsiao	23°C / 59%	09-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	25.52	-4.57
g	1	6-54 Mbps	6 Mbps	11G-20M	22.98	-12.03
n (HT20)	1	MCS 0-15	MCS 0	11N2.4G-20M	21.60	-13.14

Note 1: IEEE Std. 802.11n-2009 modulation consists of HT20 (HT: High Throughput). Then EUT support HT20. Worst modulation mode of Guard Interval (GI) is 400ns.
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: 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_{TX})**	**Frequency (MHz)**	**Power Setting**	**Worst Data Rate / MCS**	**RF Output Power (dBm)**
11B-20M	1	2412	18	1 Mbps	25.15
11B-20M	1	2437	18	1 Mbps	25.37
11B-20M	1	2462	18	1 Mbps	25.52
11G-20M	1	2412	13	6 Mbps	22.42
11G-20M	1	2437	13	6 Mbps	22.80
11G-20M	1	2462	13	6 Mbps	22.98
11N2.4G-20M	1	2412	12	MCS 0	21.46
11N2.4G-20M	1	2437	12	MCS 0	21.32
11N2.4G-20M	1	2462	12	MCS 0	21.60
Note 1: RF output power specifies that Maximum Peak Conducted Output Power.					

2.4 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests				
Tests Item	AC power-line conducted emissions			
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120V/60 Hz			
Operating Mode	**Operating Mode Description**	**Worst Modulation Mode**	**Test Freq.**	**Power Level**
1	WiFi TX+Zigbee TX+Charger(Battery : ATL)	11N2.4G-20M	F2	1
2	WiFi TX+Zigbee TX+Charger(Battery : Samsung)	11N2.4G-20M	F2	1

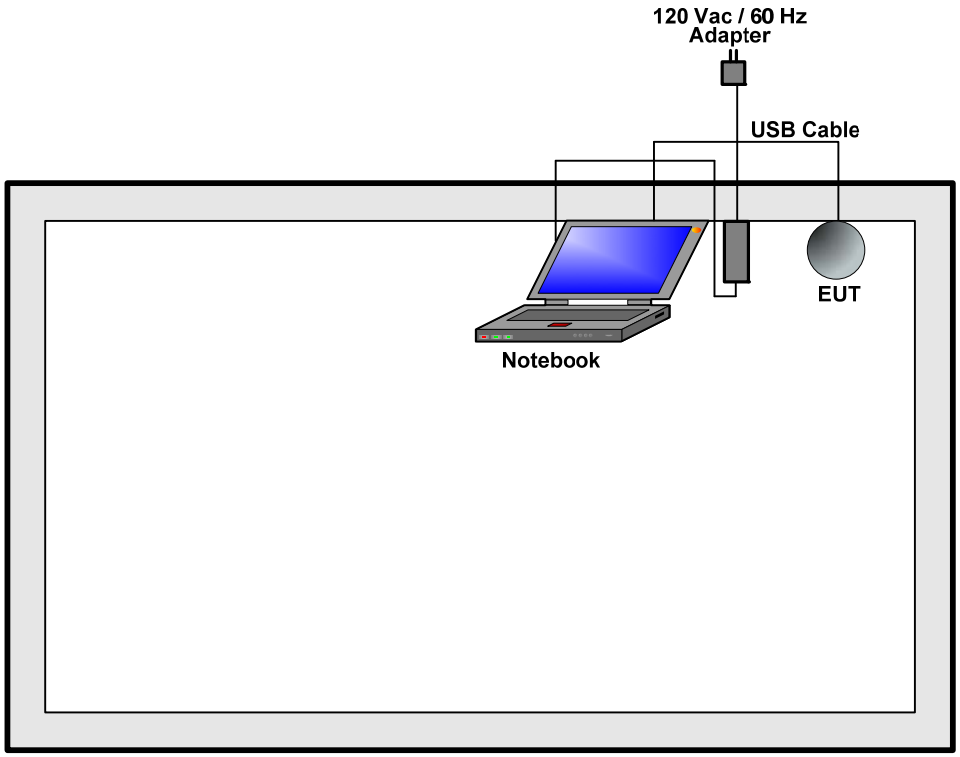
The Worst Case Mode for Following Conformance Tests			
Tests Item	RF Output Power Power Spectral Density 6 dB Bandwidth		
Test Condition	Conducted measurement at transmit chains		
Worst Modulation Mode	**Number of Transmit Chains (N_{TX})**	**Worst Data Rate / MCS**	**Test Frequency**
11B-20M	1	1 Mbps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

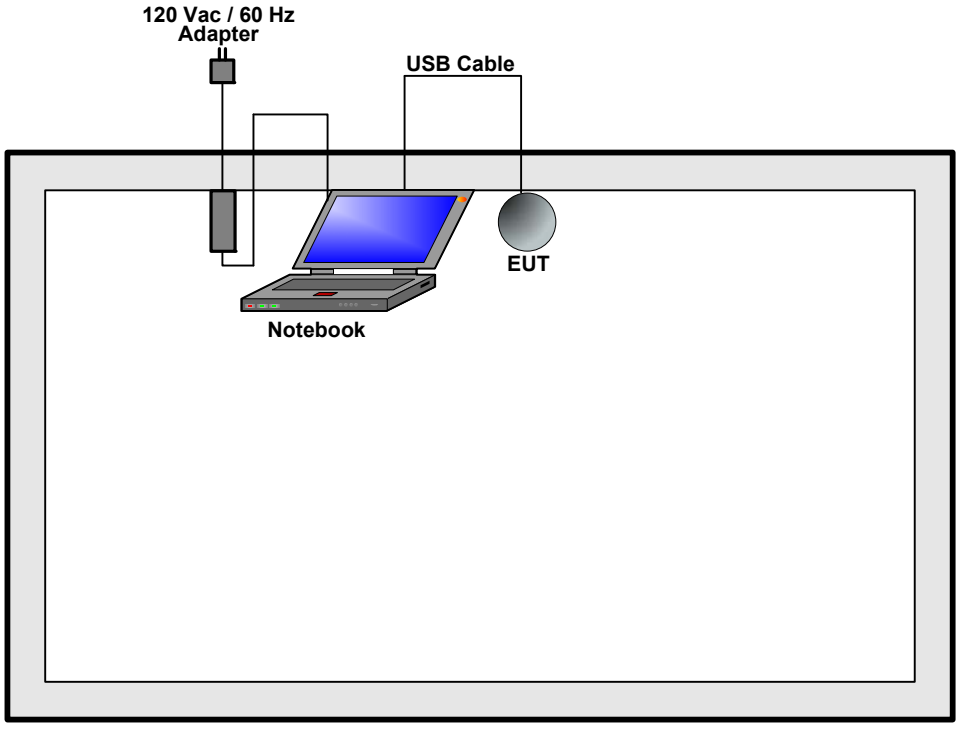
The Worst Case Mode for Following Conformance Tests				
Tests Item	Transmitter Radiated Unwanted Emissions			
Test Condition	Radiated measurement			
User Position	☒ EUT will be placed in fixed position.			
	☐ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed 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.WiFi TX+Zigbee TX+Charger(Battery : ATL)			
	☒ 2.WiFi TX+Zigbee TX+Charger(Battery : Samsung)			
Worst Modulation Mode	**Number of Transmit Chains (N_{TX})**	**Worst Data Rate / MCS**	**Test Frequency**	**Worst Orthogonal Planes of EUT**
11B-20M	1	1 Mbps	F1, F2, F3	Y Plane
11G-20M	1	6 Mbps	F1, F2, F3	Y Plane
11N2.4G-20M	1	MCS 0	F1, F2, F3	Y Plane
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**	
				

2.5 Test Setup Diagram

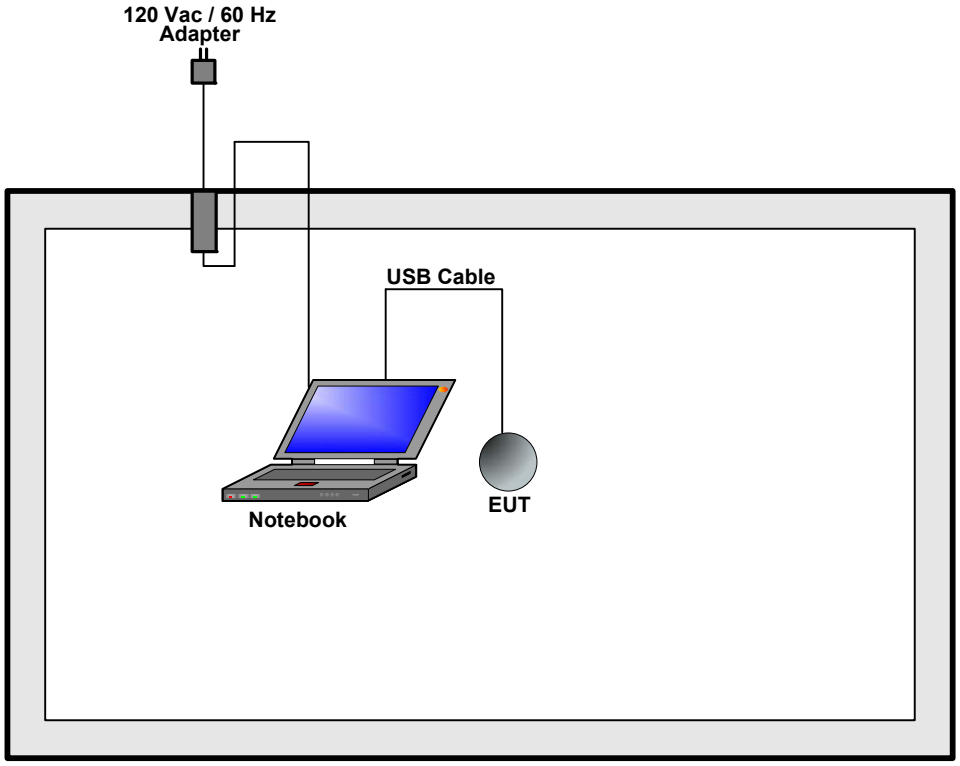
Test Setup Diagram – AC Line Conducted Emission Test	
Operating Mode	**Transmission Mode**



Operating Mode	**Transmission Mode (Below 1GHz)**



Test Setup Diagram - Radiated Test	
Operating Mode	**Transmission Mode (Above 1GHz)**



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Measuring Instruments

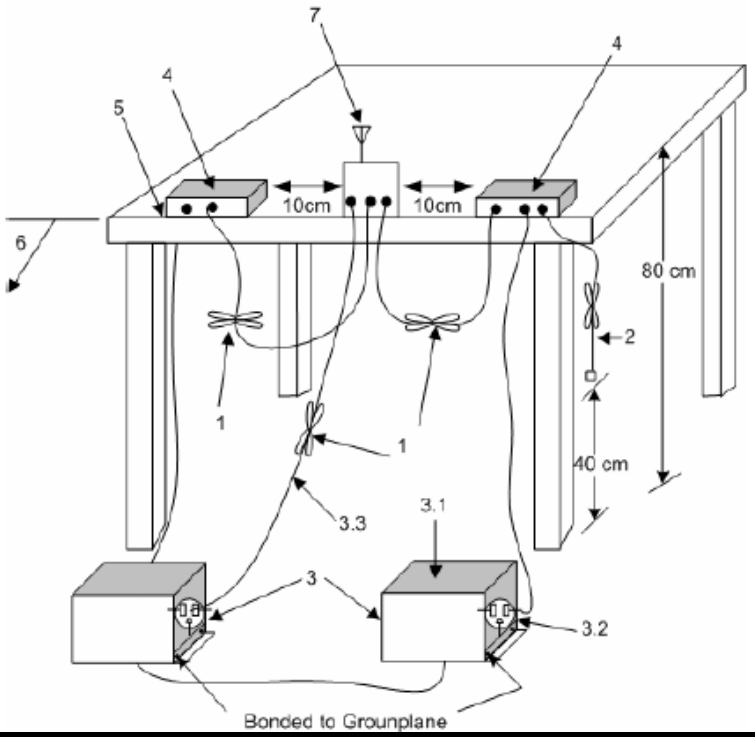
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
☒ Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.

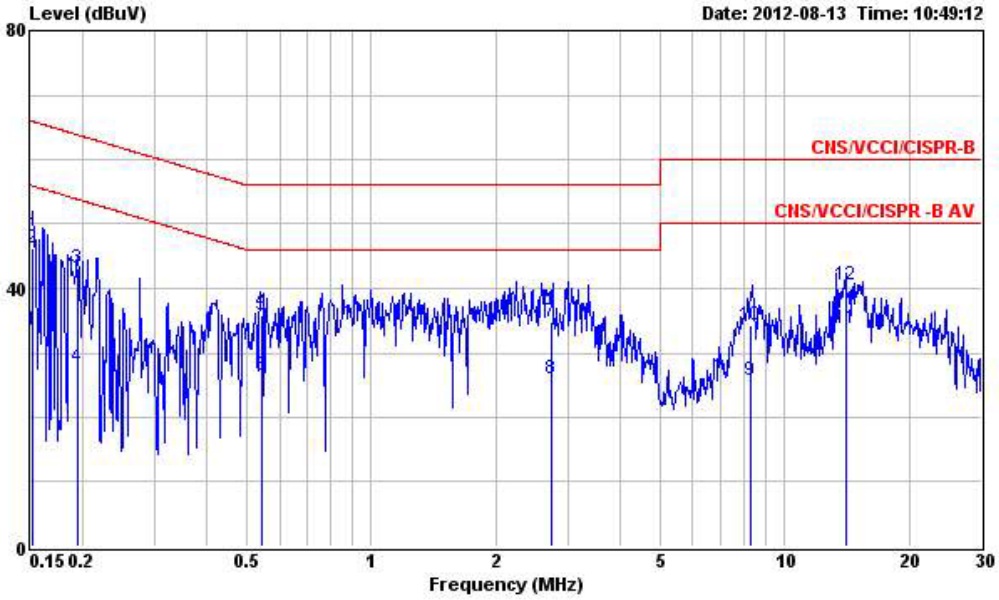
3.1.4 Test Setup

AC Power-line Conducted Emissions



3.1.5 Test Result of AC Power-line Conducted Emissions

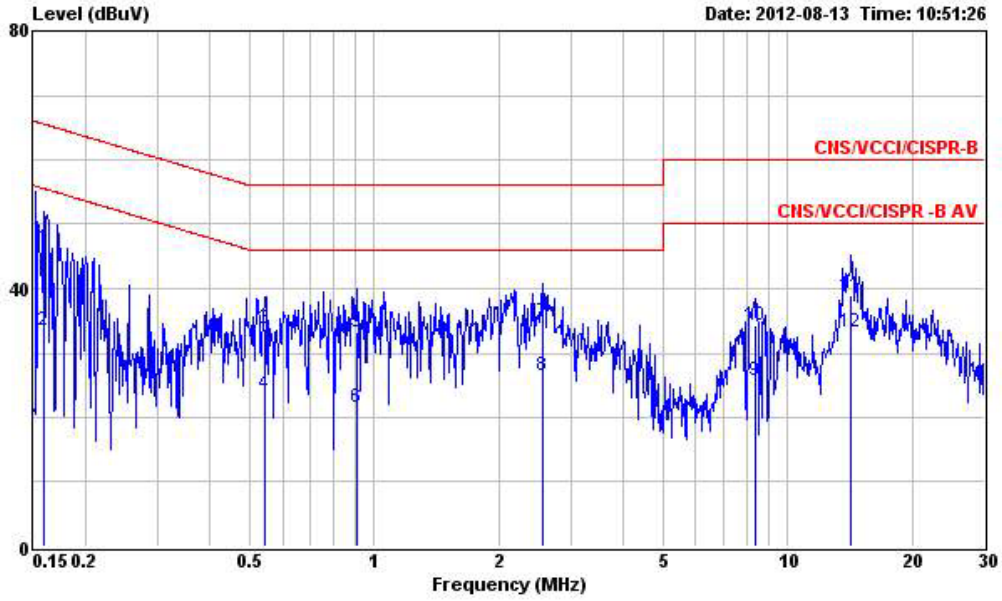
AC Power-line Conducted Emissions Result			
Modulation Mode	11N2.4G-20M	**Test Freq. (FX)**	F2
Operating Mode	1	**Power Phase**	Neutral
Operating Function	WiFi TX+Zigbee TX+Charger(Battery :ATL)		



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	33.42	-22.47	55.89	33.20	0.12	0.10	Average
2	0.152	46.21	-19.68	65.89	45.99	0.12	0.10	QP
3	0.194	43.13	-20.73	63.86	42.91	0.12	0.10	QP
4	0.194	27.77	-26.09	53.86	27.55	0.12	0.10	Average
5	0.541	35.87	-20.13	56.00	35.64	0.13	0.10	QP
6	0.541	26.58	-19.42	46.00	26.35	0.13	0.10	Average
7	2.728	34.83	-21.17	56.00	34.54	0.19	0.10	QP
8	2.728	26.03	-19.97	46.00	25.74	0.19	0.10	Average
9	8.293	25.59	-24.41	50.00	25.11	0.30	0.18	Average
10	8.293	34.40	-25.60	60.00	33.92	0.30	0.18	QP
11	14.040	33.72	-16.28	50.00	33.22	0.38	0.12	Average
12	14.041	40.56	-19.44	60.00	40.06	0.38	0.12	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.)

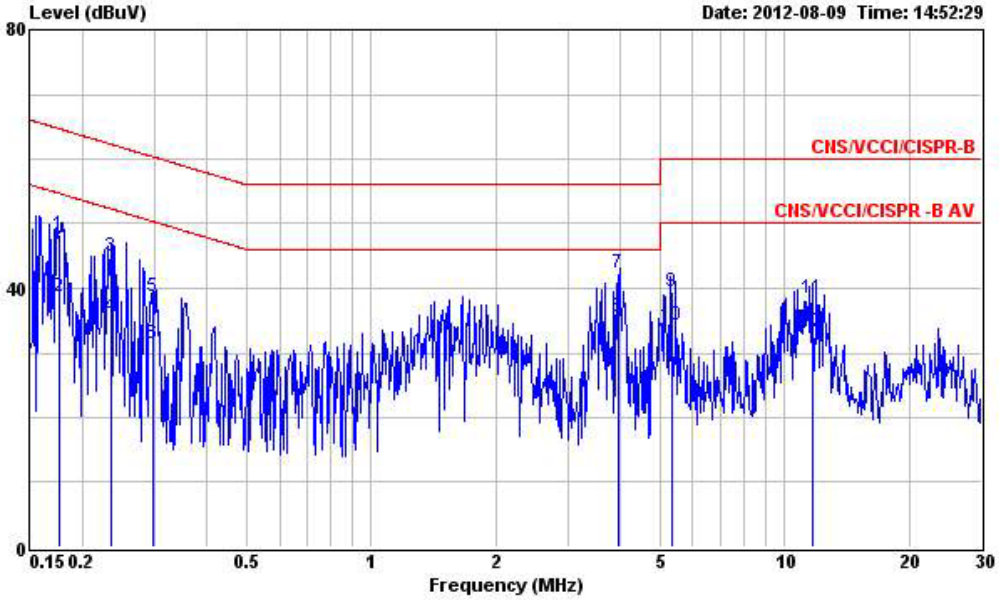
AC Power-line Conducted Emissions Result			
Modulation Mode	11N2.4G-20M	**Test Freq. (FX)**	F2
Operating Mode	1	**Power Phase**	Line
Operating Function	WiFi TX+Zigbee TX+Charger(Battery :ATL)		



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.159	46.33	-19.19	65.52	46.14	0.09	0.10	QP
2	0.159	33.50	-22.02	55.52	33.31	0.09	0.10	Average
3	0.544	33.67	-22.33	56.00	33.47	0.10	0.10	QP
4	0.544	23.59	-22.41	46.00	23.39	0.10	0.10	Average
5	0.904	33.22	-22.78	56.00	33.00	0.12	0.10	QP
6	0.904	21.46	-24.54	46.00	21.24	0.12	0.10	Average
7	2.550	34.91	-21.09	56.00	34.65	0.16	0.10	QP
8	2.550	26.54	-19.46	46.00	26.28	0.16	0.10	Average
9	8.356	25.63	-24.37	50.00	25.19	0.26	0.18	Average
10	8.356	34.22	-25.78	60.00	33.78	0.26	0.18	QP
11	14.290	38.84	-21.16	60.00	38.40	0.33	0.11	QP
12	14.290	33.20	-16.80	50.00	32.76	0.33	0.11	Average

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

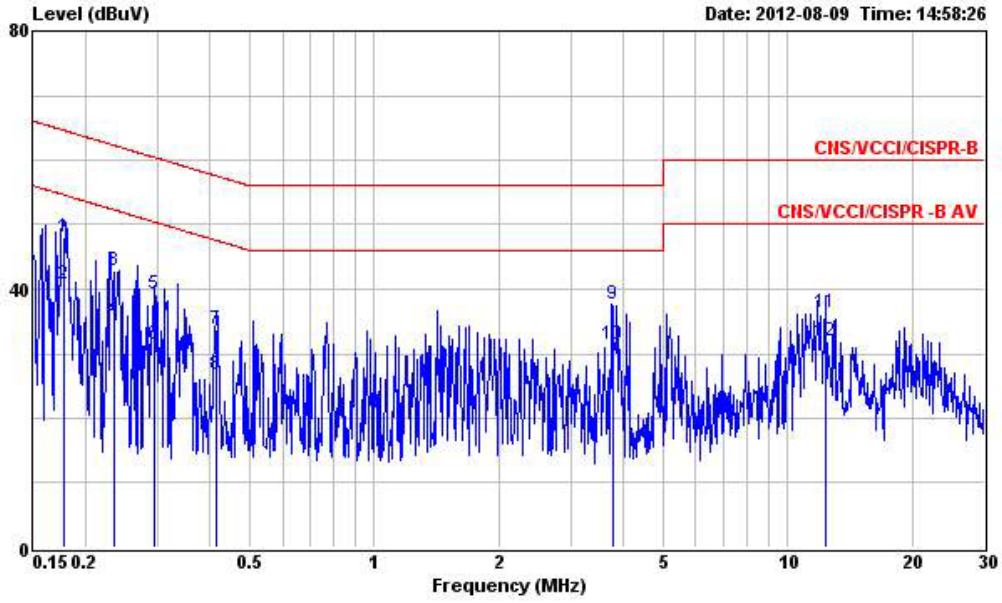
AC Power-line Conducted Emissions Result			
Modulation Mode	11N2.4G-20M	**Test Freq. (FX)**	F2
Operating Mode	1	**Power Phase**	Neutral
Operating Function	WiFi TX+Zigbee TX+Charger(Battery : Samsung)		



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.176	48.32	-16.33	64.65	48.10	0.12	0.10	QP
2	0.176	38.75	-15.90	54.65	38.53	0.12	0.10	Average
3	0.235	44.87	-17.40	62.27	44.65	0.12	0.10	QP
4	0.235	35.48	-16.79	52.27	35.26	0.12	0.10	Average
5	0.296	38.81	-21.53	60.34	38.59	0.12	0.10	QP
6	0.296	31.49	-18.85	50.34	31.27	0.12	0.10	Average
7	3.967	42.45	-13.55	56.00	42.14	0.21	0.10	QP
8	3.970	35.71	-10.29	46.00	35.40	0.21	0.10	Average
9	5.329	39.41	-20.59	60.00	39.04	0.24	0.13	QP
10	5.330	34.20	-15.80	50.00	33.83	0.24	0.13	Average
11	11.666	38.55	-21.45	60.00	38.04	0.35	0.16	QP
12	11.666	33.34	-16.66	50.00	32.83	0.35	0.16	Average

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

AC Power-line Conducted Emissions Result			
Modulation Mode	11N2.4G-20M	**Test Freq. (FX)**	F2
Operating Mode	1	**Power Phase**	Line
Operating Function	WiFi TX+Zigbee TX+Charger(Battery : Samsung)		



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.178	48.08	-16.50	64.58	47.90	0.08	0.10	QP
2	0.178	40.87	-13.71	54.58	40.69	0.08	0.10	Average
3	0.236	42.73	-19.51	62.24	42.55	0.08	0.10	QP
4	0.236	35.21	-17.03	52.24	35.03	0.08	0.10	Average
5	0.294	39.27	-21.14	60.41	39.08	0.09	0.10	QP
6	0.294	31.46	-18.95	50.41	31.27	0.09	0.10	Average
7	0.415	33.65	-23.90	57.55	33.46	0.09	0.10	QP
8	0.415	26.83	-20.72	47.55	26.64	0.09	0.10	Average
9	3.776	37.73	-18.27	56.00	37.44	0.19	0.10	QP
10	3.780	31.47	-14.53	46.00	31.18	0.19	0.10	Average
11	12.335	36.49	-23.51	60.00	36.03	0.31	0.15	QP
12	12.335	31.96	-18.04	50.00	31.50	0.31	0.15	Average

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

3.2 6dB Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
Systems using digital modulation techniques:
☒ 6 dB bandwidth ≥ 500 kHz.

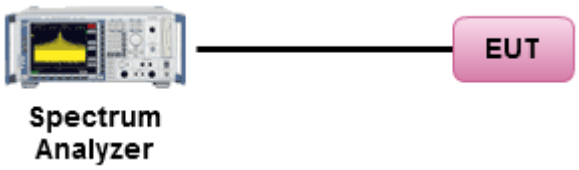
3.2.2 Measuring Instruments

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:	
		☐	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

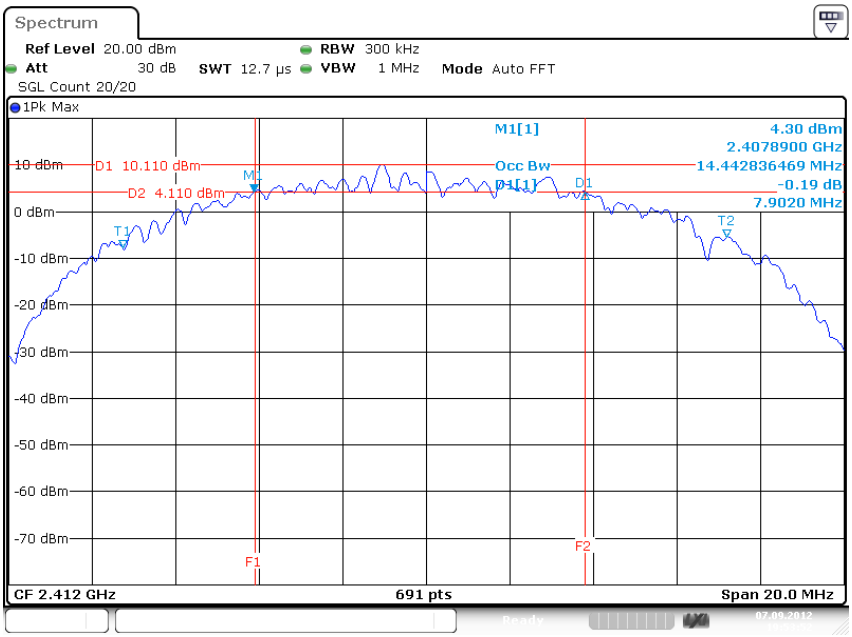
Emission Bandwidth


3.2.5 Test Result of Emission Bandwidth

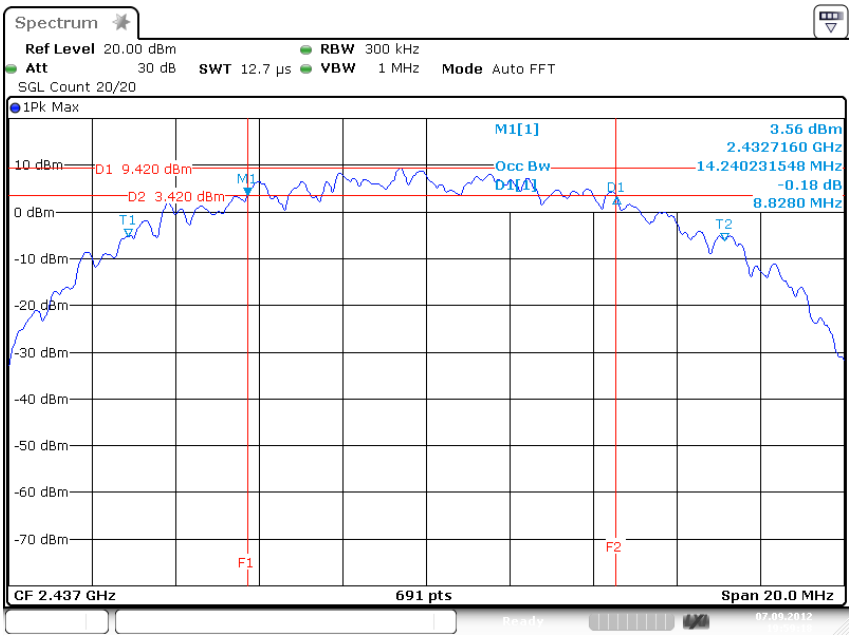
Emission Bandwidth Result										
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Emission Bandwidth (MHz)**							
			99% Bandwidth				**6dB Bandwidth**			
			Chain-Port 1	**-**	**-**	**-**	**Chain-Port 1**	**-**	**-**	**-**
11B-20M	1	2412	14.44	-	-	-	7.90	-	-	-
11B-20M	1	2437	14.24	-	-	-	8.83	-	-	-
11B-20M	1	2462	14.09	-	-	-	10.01	-	-	-
11G-20M	1	2412	16.30	-	-	-	16.09	-	-	-
11G-20M	1	2437	16.38	-	-	-	16.30	-	-	-
11G-20M	1	2462	16.41	-	-	-	16.35	-	-	-
11N2.4G-20M	1	2412	17.60	-	-	-	17.60	-	-	-
11N2.4G-20M	1	2437	17.63	-	-	-	16.99	-	-	-
11N2.4G-20M	1	2462	17.48	-	-	-	17.54	-	-	-
Limit			**N/A**				**≥500 kHz**			
Result			**Complied**							
Note 1: N_{TX} = Number of Transmit Chains										

Emission Bandwidth Plots

11B-20M – F1 [Port 1]

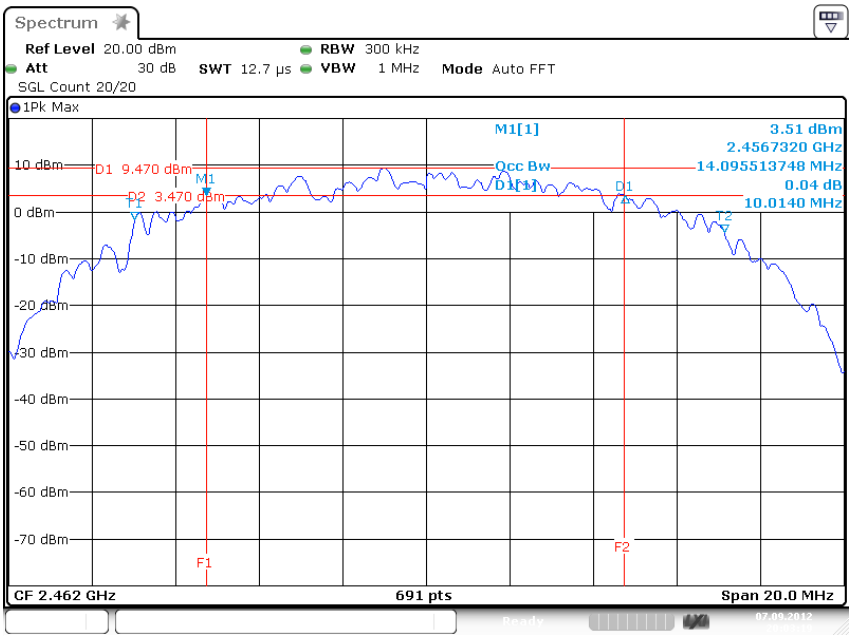


11B-20M – F2 [Port 1]

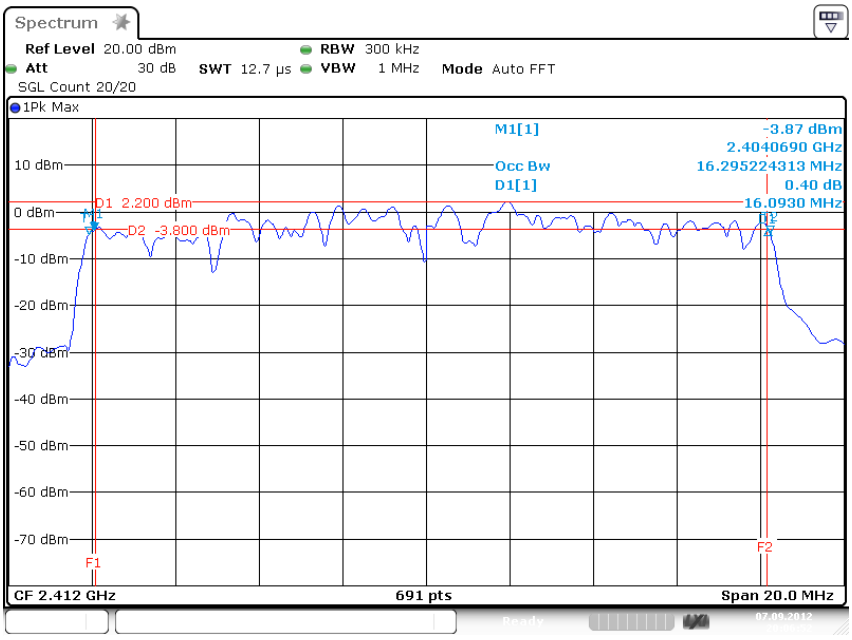


Emission Bandwidth Plots

11B-20M – F3 [Port 1]

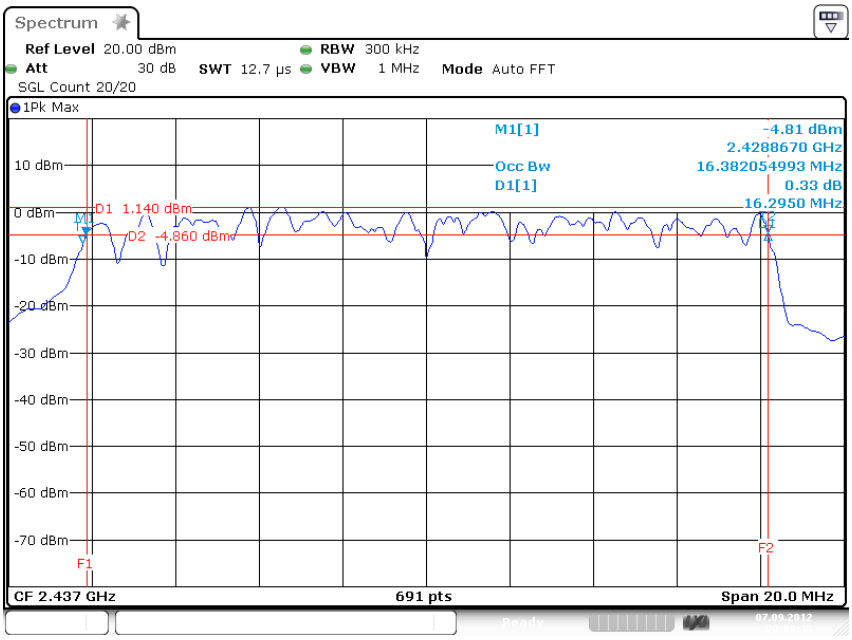


11G-20M – F1 [Port 1]

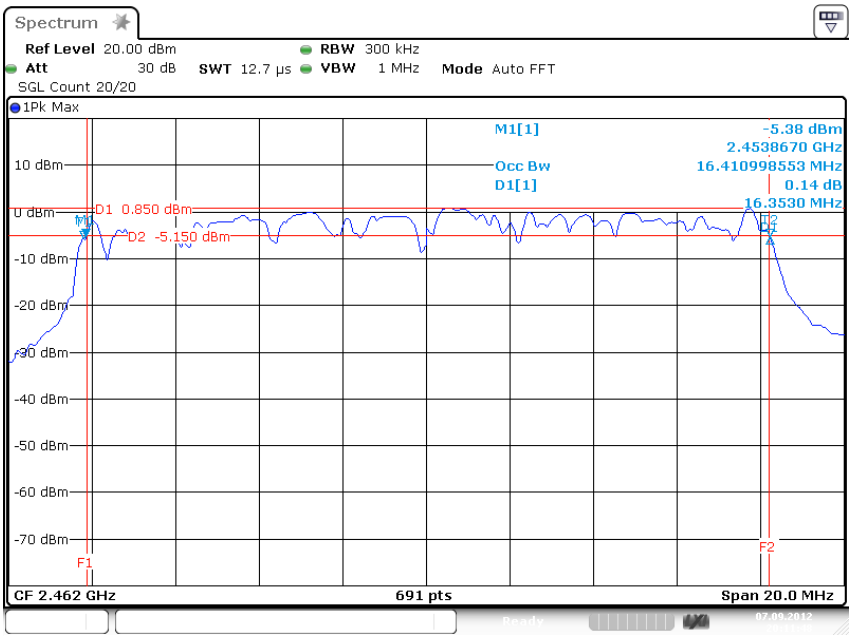


Emission Bandwidth Plots

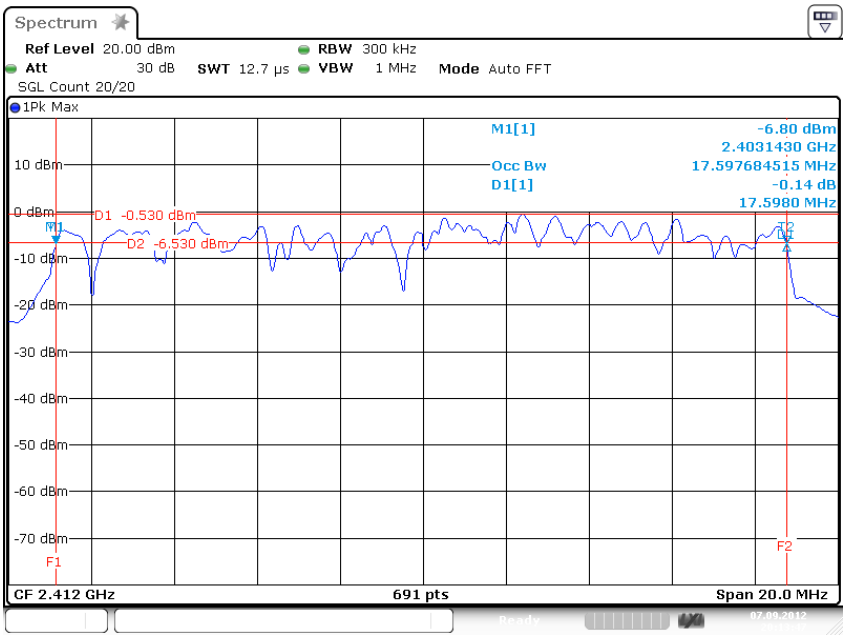
11G-20M – F2 [Port 1]



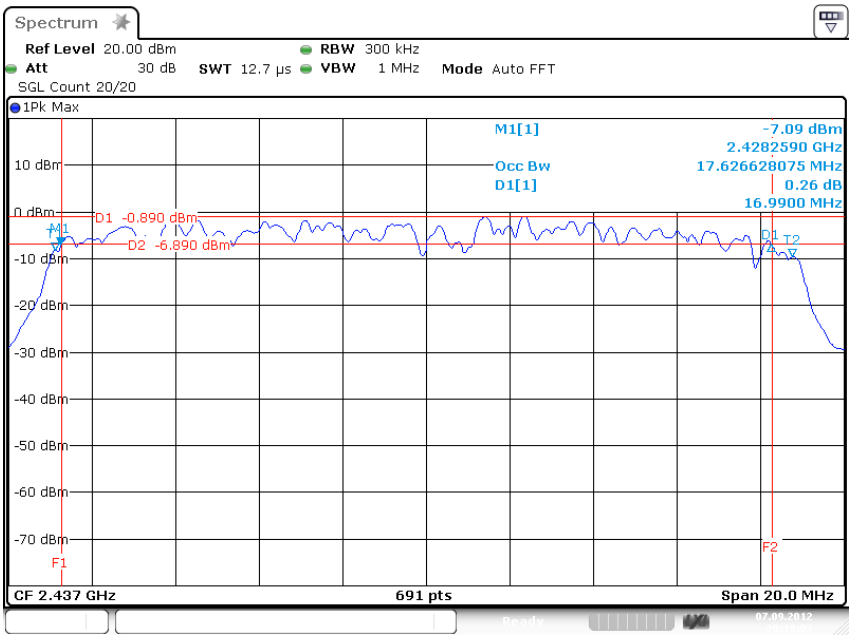
11G-20M – F3 [Port 1]



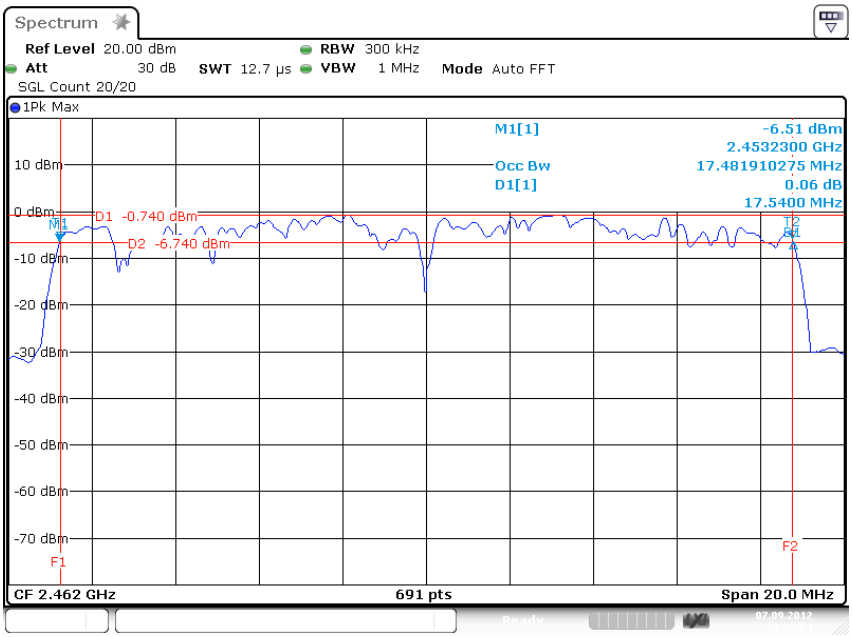
Emission Bandwidth Plots
11N2.4G-20M – F1 [Port 1]



11N2.4G-20M – F2 [Port 1]



Emission Bandwidth Plots
11N2.4G-20M – F3 [Port 1]



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 $P_{Out} = 30 – (G_{TX} – 6)/3 + 8$dB 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): $P_{eirp} \leq MAX(36, [P_{Out} + G_{TX}])$ dBm	
	☐	Smart antenna system (SAS)	
		☐	Single beam: $P_{eirp} \leq MAX(36, P_{Out} + G_{TX})$ dBm
		☐	Overlap beam: $P_{eirp} \leq MAX(36, P_{Out} + G_{TX})$ dBm
		☐	Aggregate power on all beams: $P_{eirp} \leq MAX(36, [P_{Out} + G_{TX} + 8])$ 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

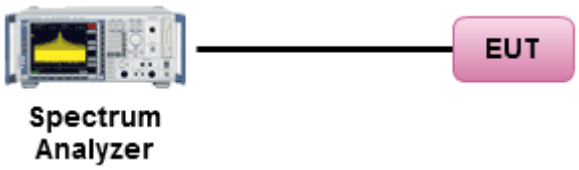
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
☒	Maximum Peak Conducted Output Power
☐	Refer as FCC KDB 558074, clause 5.2.1.1 Option 1 (RBW ≥ EBW method).
☒	Refer as FCC KDB 558074, clause 5.2.1.2 Option 2 (integrated band power 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 (Average) Output Power
☐	Refer as FCC KDB 558074, clause 5.2.2.1 Option 1 (RMS detection with slow sweep speed).
☒	Refer as FCC KDB 558074, clause 5.2.2.2 Option 2 (spectral trace averaging).
☐	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 2 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: $EIRP_1 = P_1 + G_{ANT1}$; $EIRP_2 = P_2 + G_{ANT2}$; … $EIRP_n = Pn + G_{ANTn}$ $EIRP_{total} = EIRP_1 + EIRP_2 + … + EIRP_n$ (calculated in linear unit [mW] and transfer to log unit [dBm])
☐	Method 2: $P_{total} = P_1 + P_2 + … + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$
☐	Refer as FCC KDB 558074, clause 2 for radiated measurement.

3.3.4 Test Setup

RF Output Power (Spectrum Analyzer)



3.3.5 Test Result of Maximum Peak Conducted Output Power

Maximum Peak Conducted Output Power Result										
Directional Gain (dBi)		-1.37	**RF Output Power (dBm)**							
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Chain-Port 1**	**-**	**-**	**-**	**Sum Chain**	**Power Limit**	**EIRP Power**	**EIRP Limit**
11B-20M	1	2412	25.15	-	-	-	25.15	30.0	23.78	36.0
11B-20M	1	2437	25.37	-	-	-	25.37	30.0	24.00	36.0
11B-20M	1	2462	25.52	-	-	-	25.52	30.0	24.15	36.0
Result			**Complied**							
Note 1: N_{TX} = Number of Transmit Chains										

Maximum Peak Conducted Output Power Result										
Directional Gain (dBi)		-1.37	**RF Output Power (dBm)**							
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Chain-Port 1**	**-**	**-**	**-**	**Sum Chain**	**Power Limit**	**EIRP Power**	**EIRP Limit**
11G-20M	1	2412	22.42	-	-	-	22.42	30.0	21.05	36.0
11G-20M	1	2437	22.80	-	-	-	22.80	30.0	21.43	36.0
11G-20M	1	2462	22.98	-	-	-	22.98	30.0	21.61	36.0
Result			**Complied**							
Note 1: N_{TX} = Number of Transmit Chains										

Maximum Peak Conducted Output Power Result										
Directional Gain (dBi)		-1.37	**RF Output Power (dBm)**							
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Chain-Port 1**	**-**	**-**	**-**	**Sum Chain**	**Power Limit**	**EIRP Power**	**EIRP Limit**
11N2.4G-20M	1	2412	21.46	-	-	-	21.46	30.0	20.09	36.0
11N2.4G-20M	1	2437	21.32	-	-	-	21.32	30.0	19.95	36.0
11N2.4G-20M	1	2462	21.60	-	-	-	21.60	30.0	20.23	36.0
Result			**Complied**							
Note 1: N_{TX} = Number of Transmit Chains										

3.3.6 Test Result of Maximum Conducted (Average) Output Power

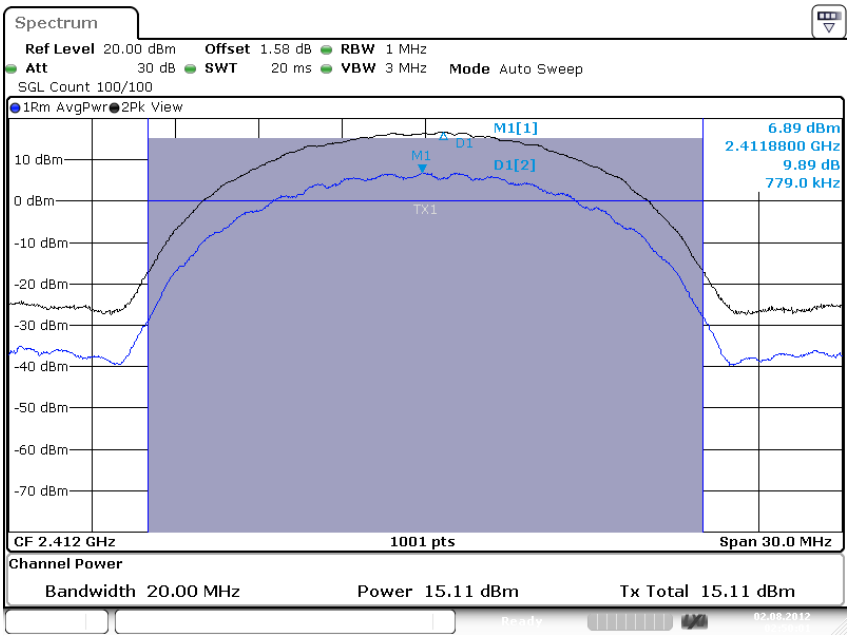
Maximum Conducted (Average) Output Power Result										
Directional Gain (dBi)		-1.37	**RF Output Power (dBm)**							
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Chain-Port 1**	**-**	**-**	**Duty Factor**	**Sum Chain**	**Power Limit**	**EIRP Power**	**EIRP Limit**
11B-20M	1	2412	15.11	-	-	3.39	18.50	30.0	17.13	36.0
11B-20M	1	2437	15.39	-	-	3.39	18.78	30.0	17.41	36.0
11B-20M	1	2462	15.49	-	-	3.39	18.88	30.0	17.51	36.0
Result			**Complied**							
Note 1: N_{TX} = Number of Transmit Chains										

Maximum Conducted (Average) Output Power Result										
Directional Gain (dBi)		-1.37	**RF Output Power (dBm)**							
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Chain-Port 1**	**-**	**-**	**Duty Factor**	**Sum Chain**	**Power Limit**	**EIRP Power**	**EIRP Limit**
11G-20M	1	2412	5.22	-	-	7.67	12.89	30.0	11.52	36.0
11G-20M	1	2437	5.42	-	-	7.67	13.09	30.0	11.72	36.0
11G-20M	1	2462	5.49	-	-	7.67	13.16	30.0	11.79	36.0
Result			**Complied**							
Note 1: N_{TX} = Number of Transmit Chains										

Maximum Conducted (Average) Output Power Result										
Directional Gain (dBi)		-1.37	**RF Output Power (dBm)**							
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Chain-Port 1**	**-**	**-**	**Duty Factor**	**Sum Chain**	**Power Limit**	**EIRP Power**	**EIRP Limit**
11N2.4G-20M	1	2412	3.71	-	-	8.09	11.80	30.0	10.43	36.0
11N2.4G-20M	1	2437	3.57	-	-	8.09	11.66	30.0	10.29	36.0
11N2.4G-20M	1	2462	3.85	-	-	8.09	11.94	30.0	10.57	36.0
Result			**Complied**							
Note 1: N_{TX} = Number of Transmit Chains										

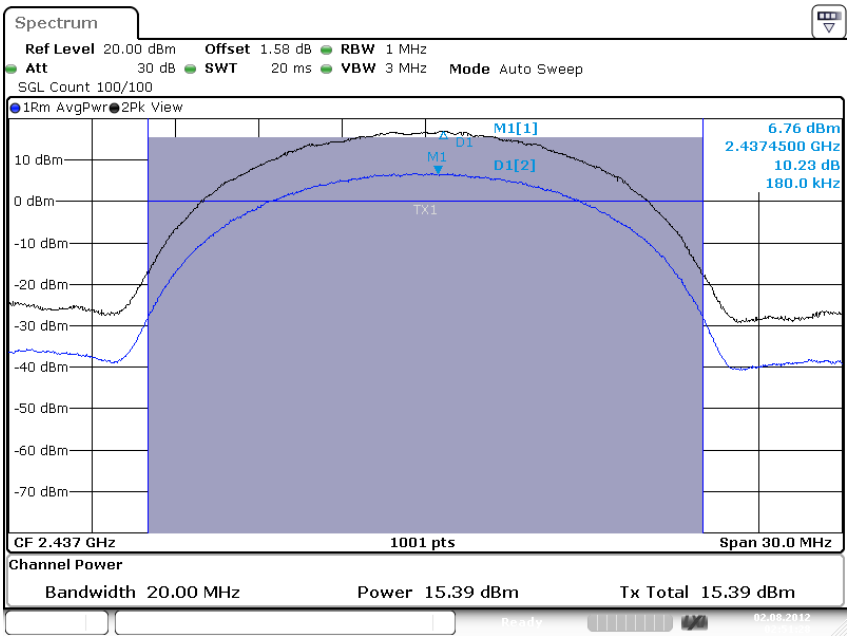
Maximum Peak Conducted Output Power and Maximum Conducted Output Power Plots

11B-20M – F1 [Port 1]



Date: 2.AUG.2012 02:50:02

11B-20M – F2 [Port 1]

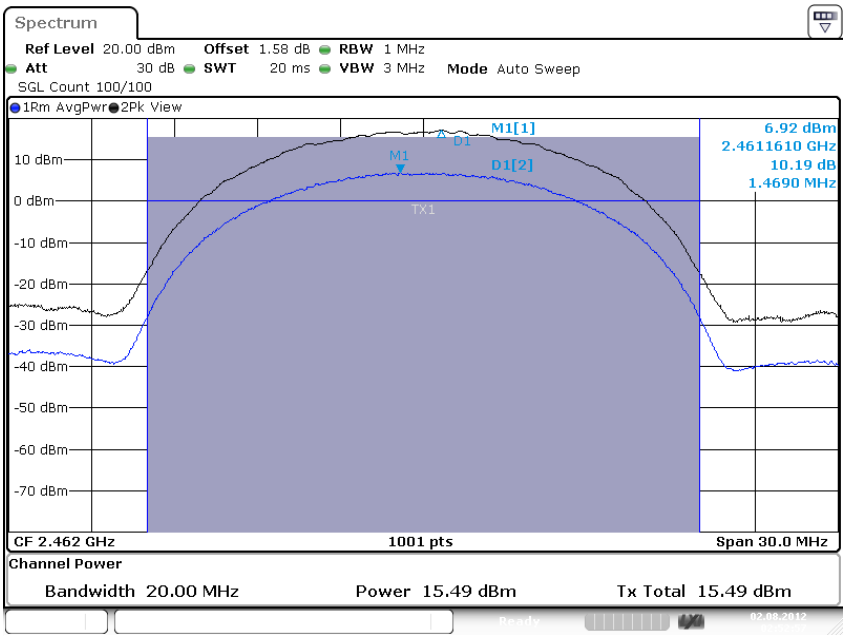


Date: 2.AUG.2012 02:51:28

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

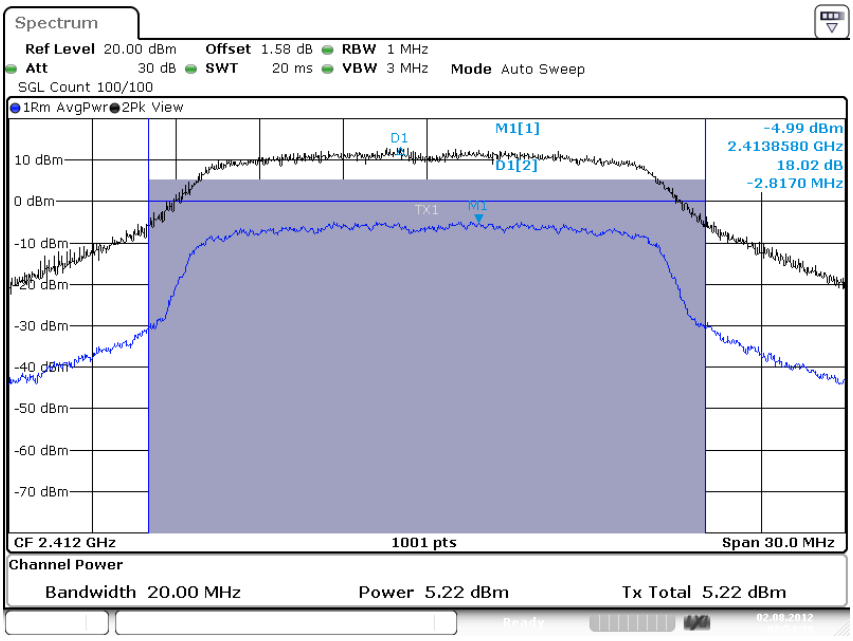
Maximum Peak Conducted Output Power and Maximum Conducted Output Power Plots

11B-20M – F3 [Port 1]



Date: 2.AUG.2012 02:52:58

11G-20M – F1 [Port 1]

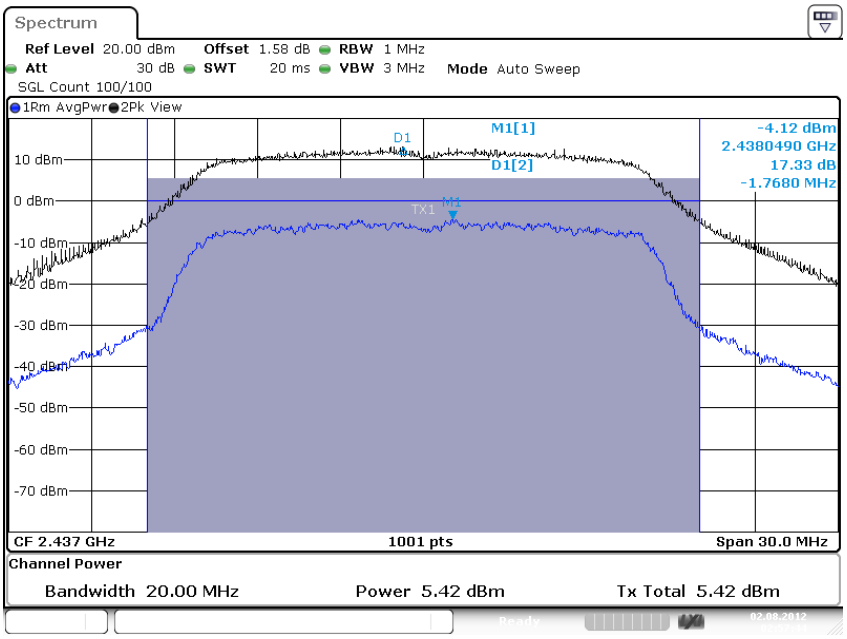


Date: 2.AUG.2012 02:54:39

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

Maximum Peak Conducted Output Power and Maximum Conducted Output Power Plots

11G-20M – F2 [Port 1]



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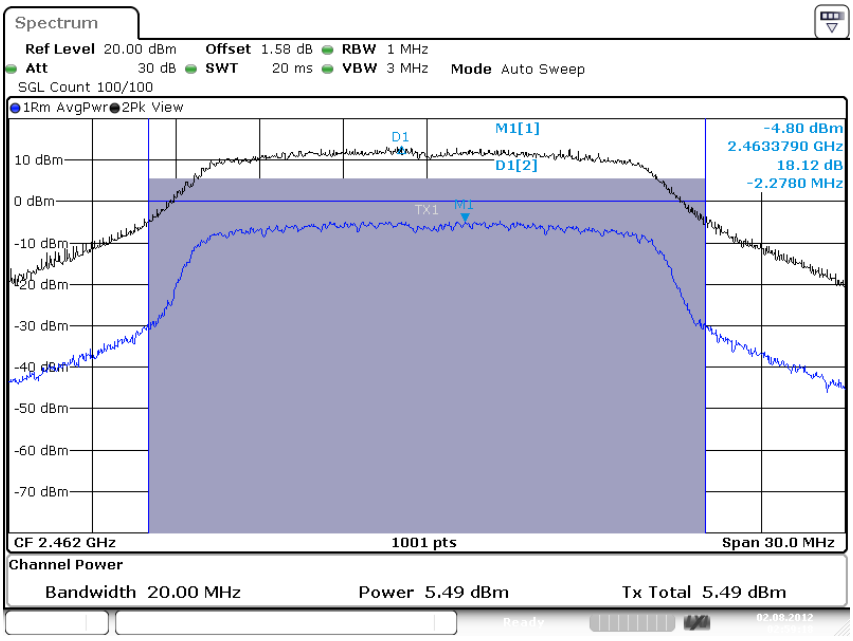
11G-20M – F3 [Port 1]

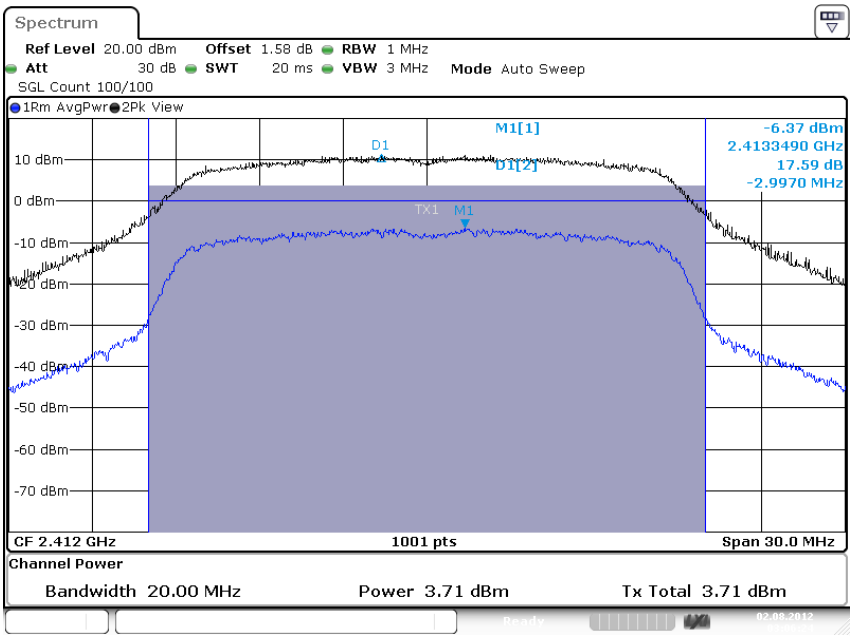


Date: 2.AUG.2012 02:59:19

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

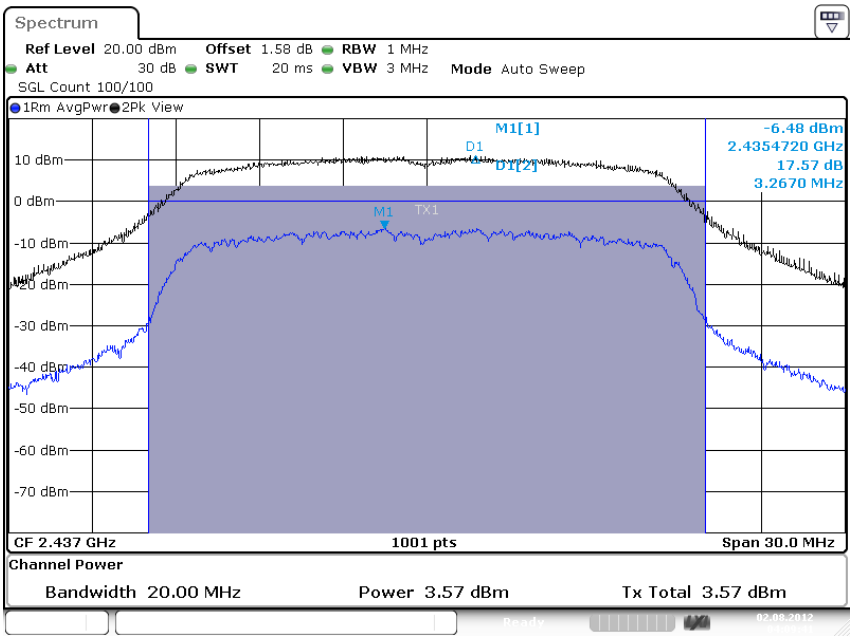
Maximum Peak Conducted Output Power and Maximum Conducted Output Power Plots

11N2.4G-20M – F1 [Port 1]



Date: 2.AUG.2012 03:06:25

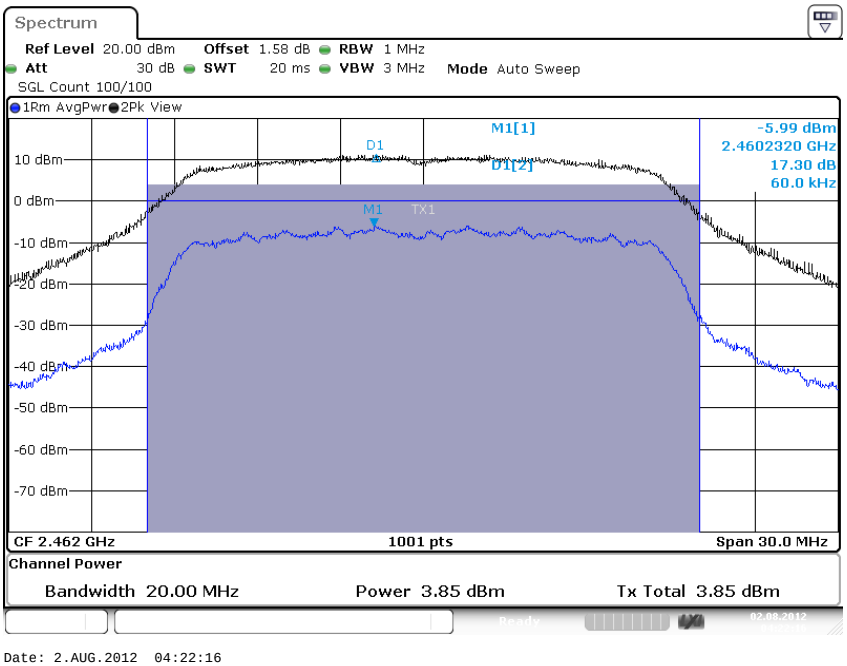
11N2.4G-20M – F2 [Port 1]



Date: 2.AUG.2012 04:09:41

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

Maximum Peak Conducted Output Power and Maximum Conducted Output Power Plots
11N2.4G-20M – F3 [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
☒ Power Spectral Density (PSD) ≤ 8 dBm/3kHz

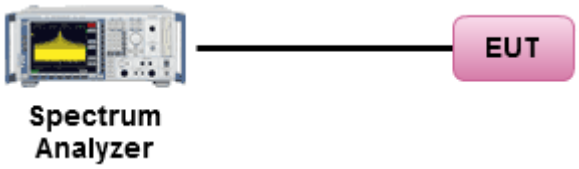
3.4.2 Measuring Instruments

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 5.3.1 Option 1 (peak PSD; BWCF=-15.2dB).	
	☐	Refer as FCC KDB 558074, clause 5.3.2 Option 2 (average PSD; BWCF=-15.2dB).	
	☐	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 2 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 2 for radiated measurement.		

3.4.4 Test Setup

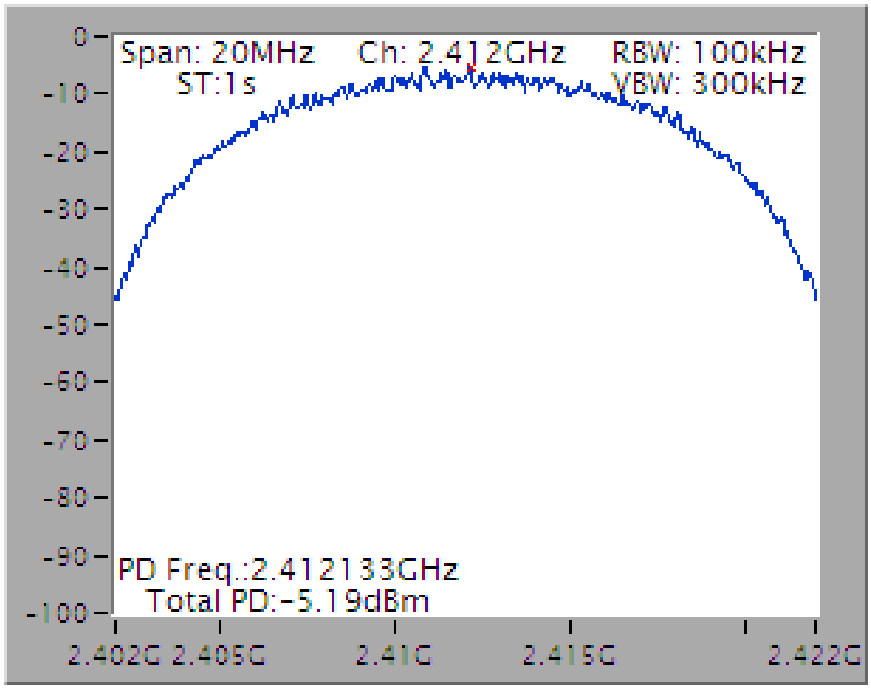
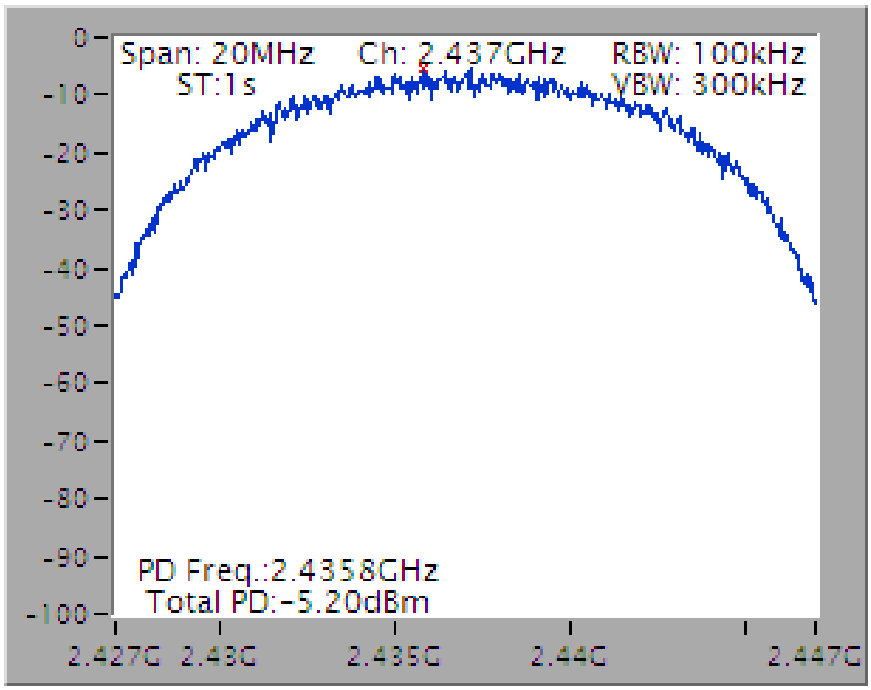
Power Spectral Density


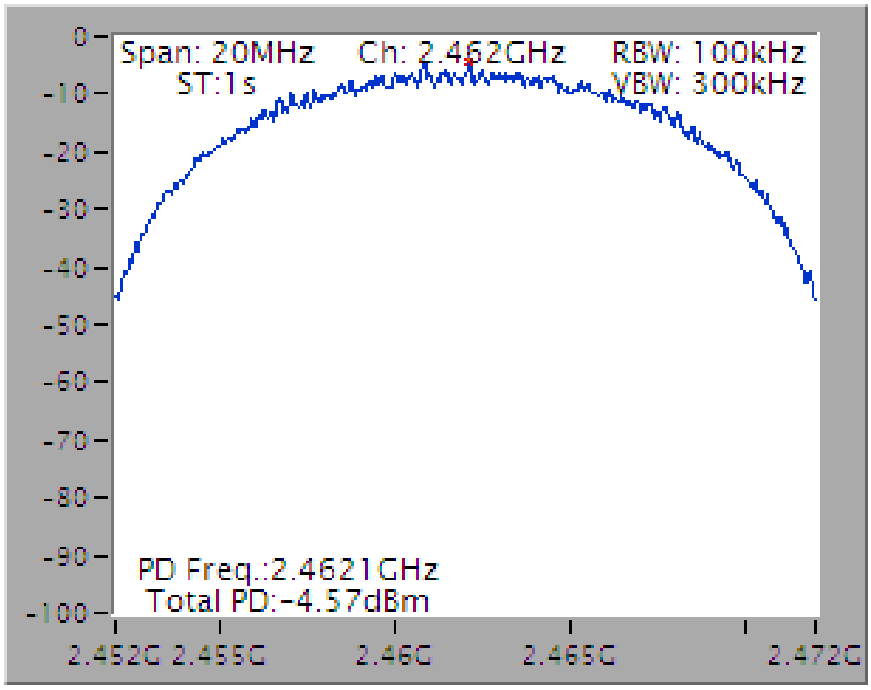
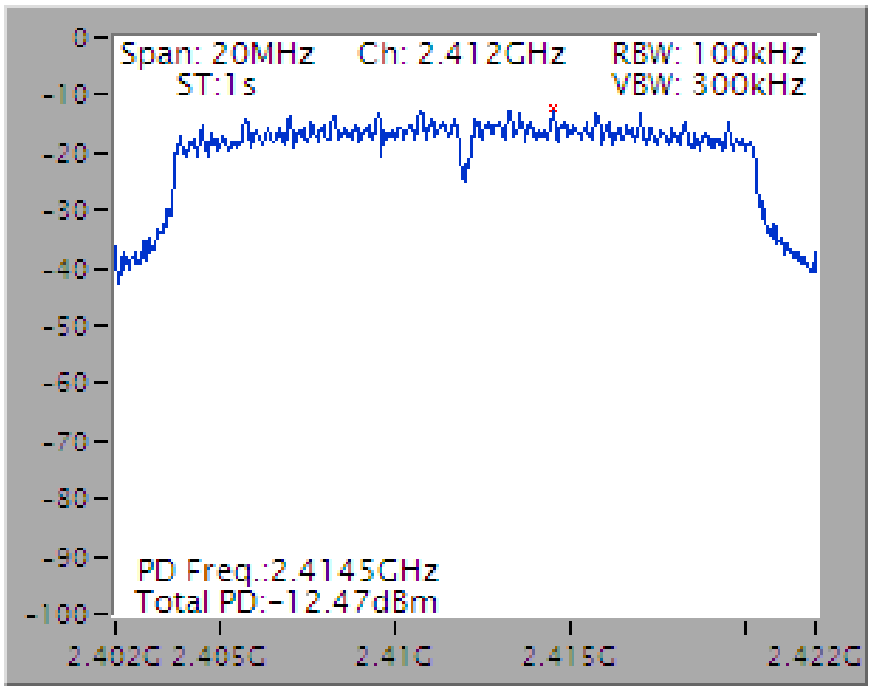
3.4.5 Test Result of Power Spectral Density

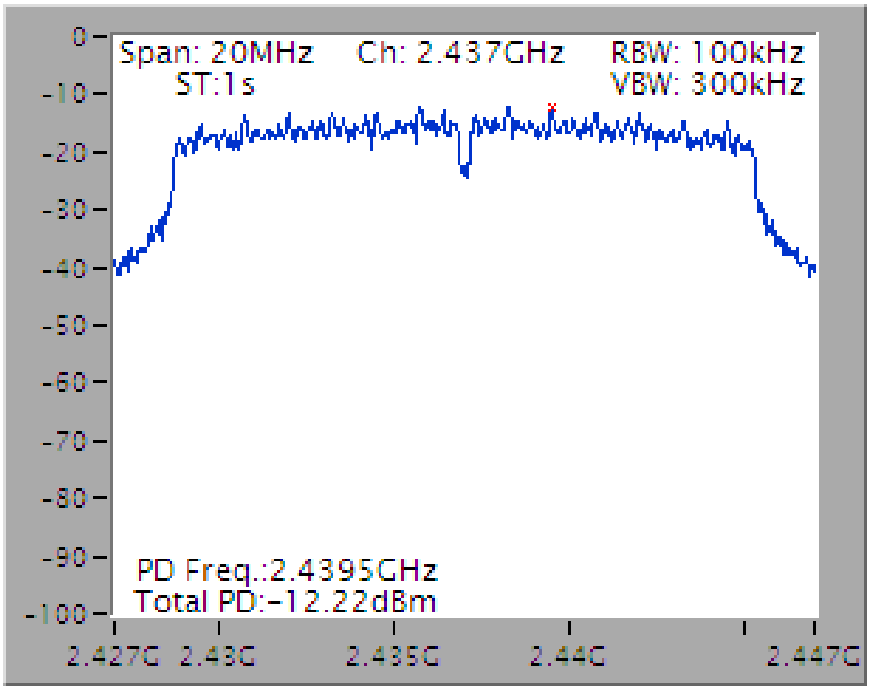
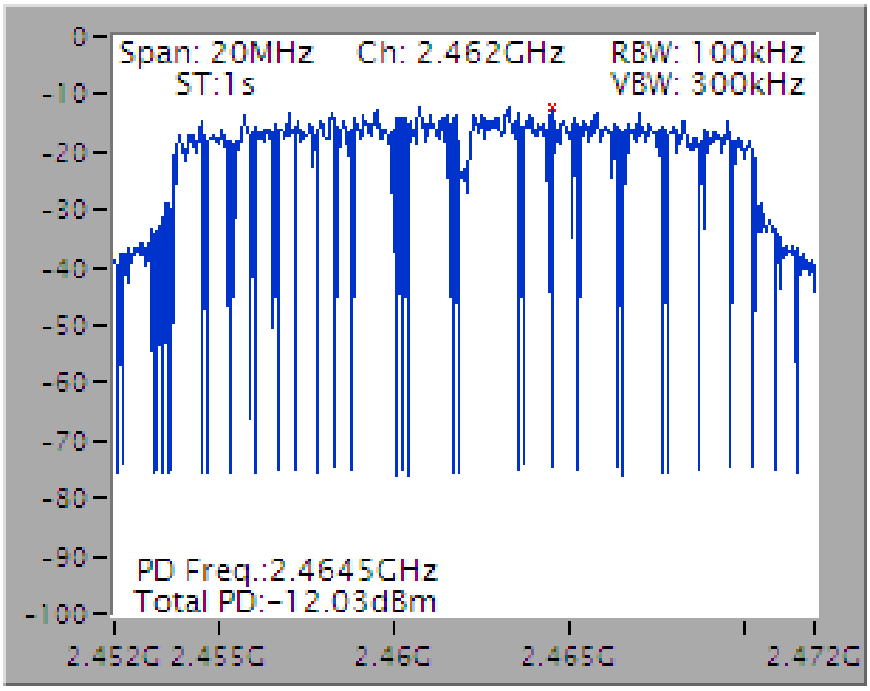
Power Spectral Density Result							
Directional Gain (dBi)		-1.37	**Power Spectral Density (dBm/3kHz)**				
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Chain-Port 1**	**-**	**-**	**-**	**PSD Limit**
11B-20M	1	2412	-5.19	-	-	-	8
11B-20M	1	2437	-5.20	-	-	-	8
11B-20M	1	2462	-4.57	-	-	-	8
Result			**Complied**				
Note 1: N_{TX} = Number of Transmit Chains							

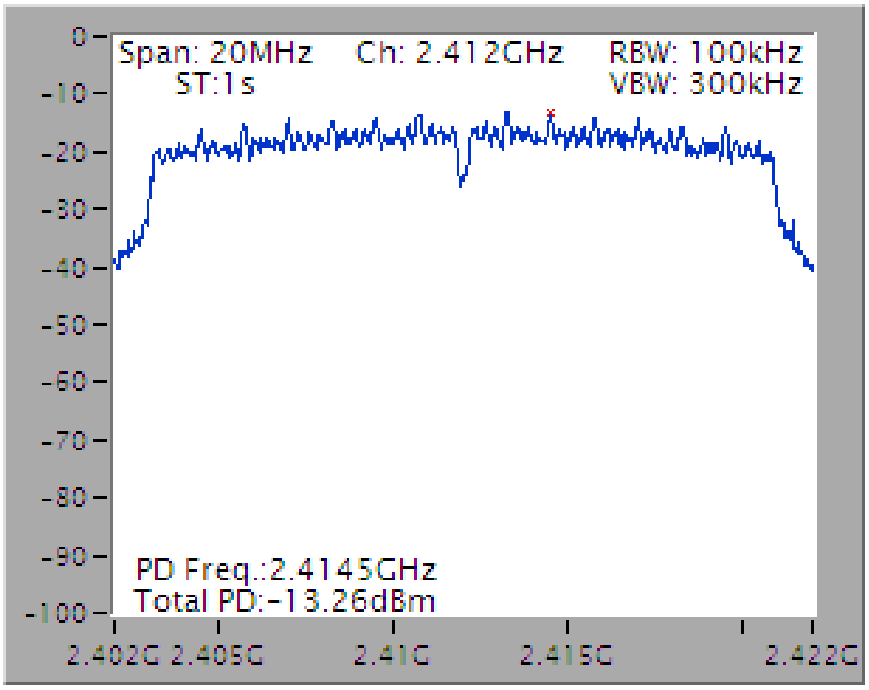
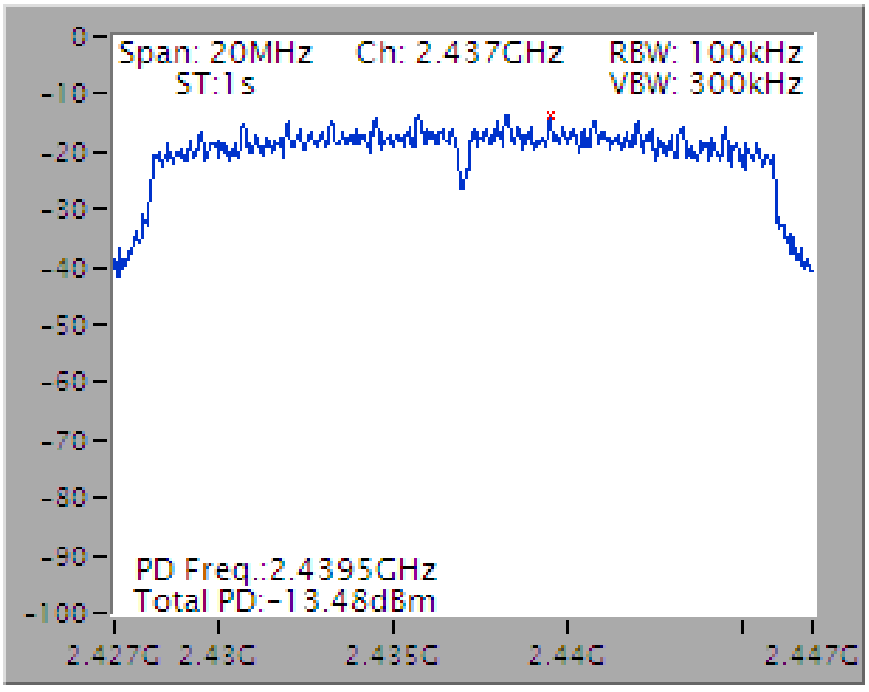
Power Spectral Density Result							
Directional Gain (dBi)		-1.37	**Power Spectral Density (dBm/3kHz)**				
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Chain-Port 1**	**-**	**-**	**-**	**PSD Limit**
11G-20M	1	2412	-12.47	-	-	-	8
11G-20M	1	2437	-12.22	-	-	-	8
11G-20M	1	2462	-12.03	-	-	-	8
Result			**Complied**				
Note 1: N_{TX} = Number of Transmit Chains							

Power Spectral Density Result							
Directional Gain (dBi)		-1.37	**Power Spectral Density (dBm/3kHz)**				
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Chain-Port 1**	**-**	**-**	**-**	**PSD Limit**
11N2.4G-20M	1	2412	-13.26	-	-	-	8
11N2.4G-20M	1	2437	-13.48	-	-	-	8
11N2.4G-20M	1	2462	-13.14	-	-	-	8
Result			**Complied**				
Note 1: N_{TX} = Number of Transmit Chains							

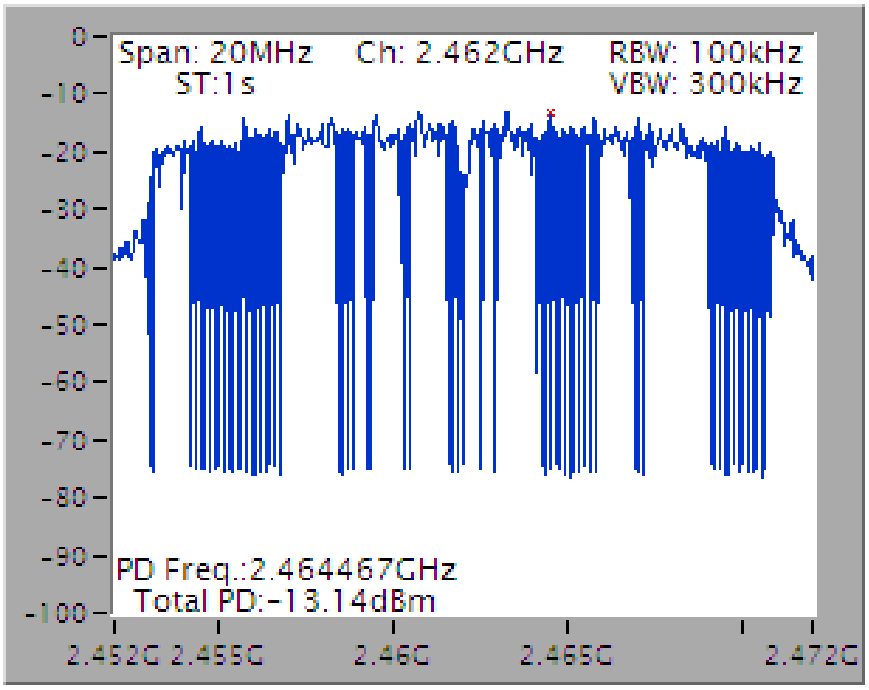
Power Spectral Density Plots
11B-20M – F1 [S Port 1]

11B-20M – F2 [Port 1]


Power Spectral Density Plots
11B-20M – F3 [Port 1]

11G-20M – F1 [Port 1]


Power Spectral Density Plots
11G-20M – F2 [Port 1]

11G-20M – F3 [Port 1]


Power Spectral Density Plots
11N2.4G-20M – F1 [Port 1]

11N2.4G-20M – F2 [Port 1]


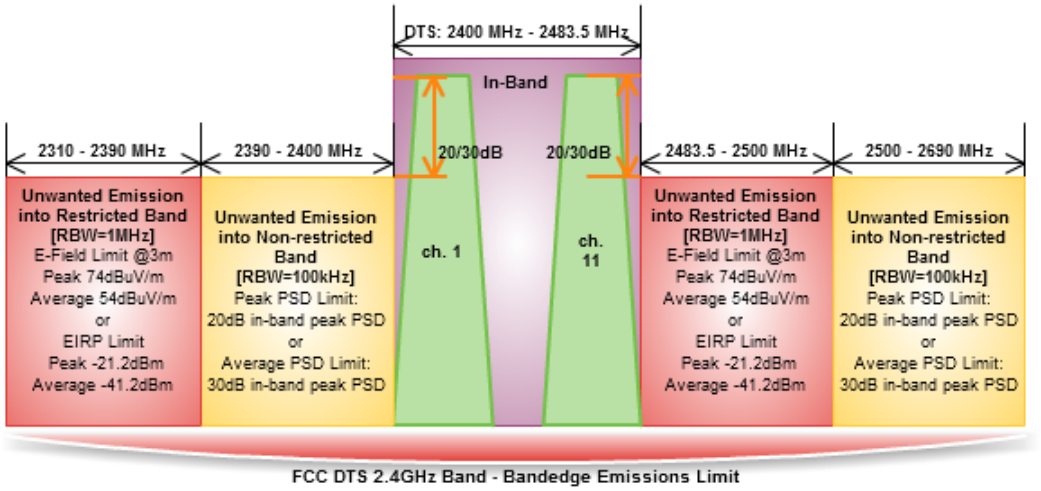
Power Spectral Density Plots
11N2.4G-20M – F3 [Port 1]



3.5 Transmitter Radiated Bandedge Emissions

3.5.1 Transmitter Radiated Bandedge Emissions Limit

Transmitter Radiated Bandedge Emissions Limit



3.5.2 Measuring Instruments

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

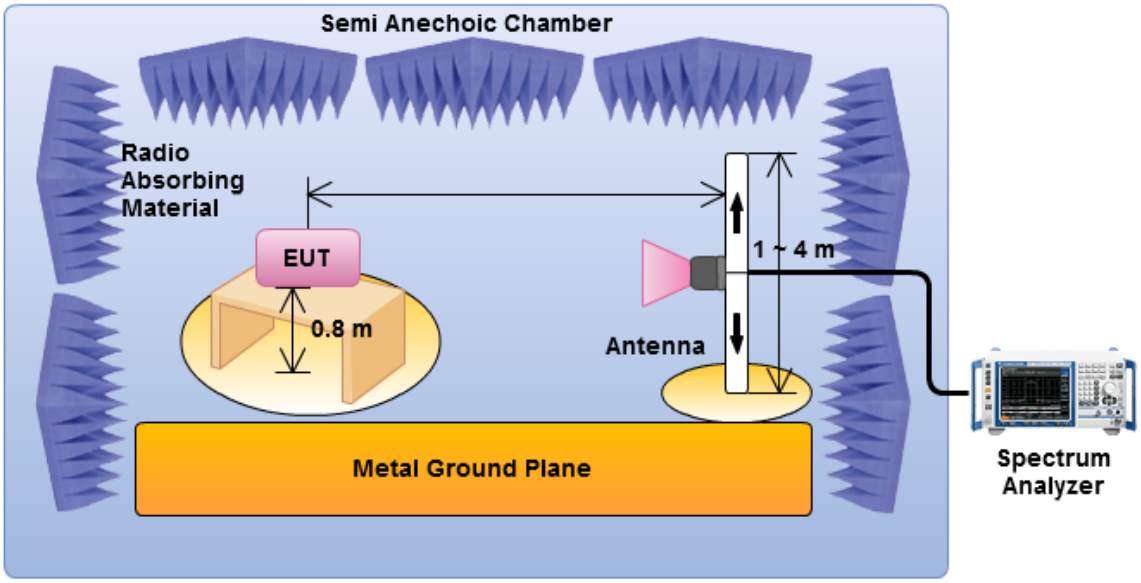
3.5.3 Test Procedures

Test Method – General Information		
☒	The average emission levels shall be measured in [duty cycle ≥ 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 5.4.1 for unwanted emissions into non-restricted bands.
	☒	Refer as FCC KDB 558074, clause 5.4.2 for unwanted emissions into restricted bands.
		☐ Refer as FCC KDB 558074, clause 5.4.2.2.2.1 Option 1 (Power Averaging).
		☒ Refer as FCC KDB 558074, clause 5.4.2.2.2.2 Option 2 (Trace Averaging).
		☐ Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). – Duty cycle ≥ 98%.
		☐ Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		☒ Refer as FCC KDB 558074, clause 5.4.2.2.1.1 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 5.4.2.2.4 for narrower resolution bandwidth using the band power and summing the spectral levels (i.e., 100 kHz or 1 MHz).
	☒	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 2 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 5.4.2.2.1 unwanted emissions in restricted bands on frequencies ≤ 1000 MHz
☐ Refer as FCC KDB 558074, clause 5.4.2.2.2 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 2 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.

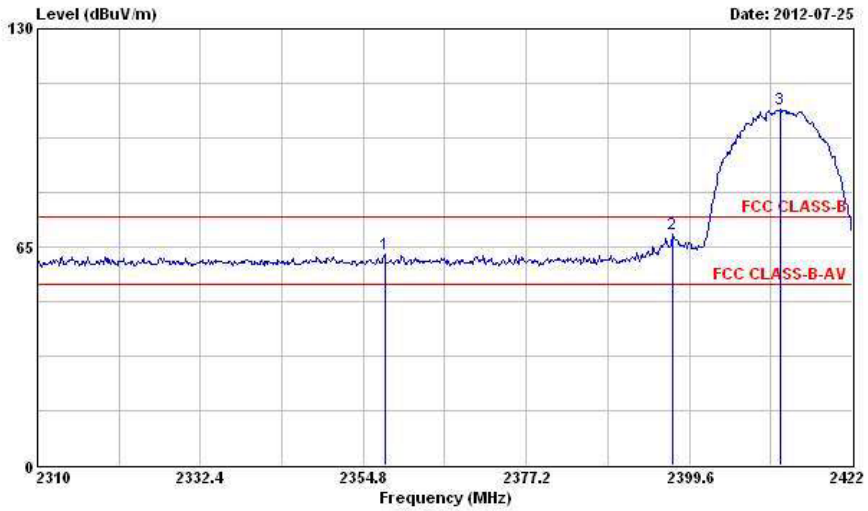
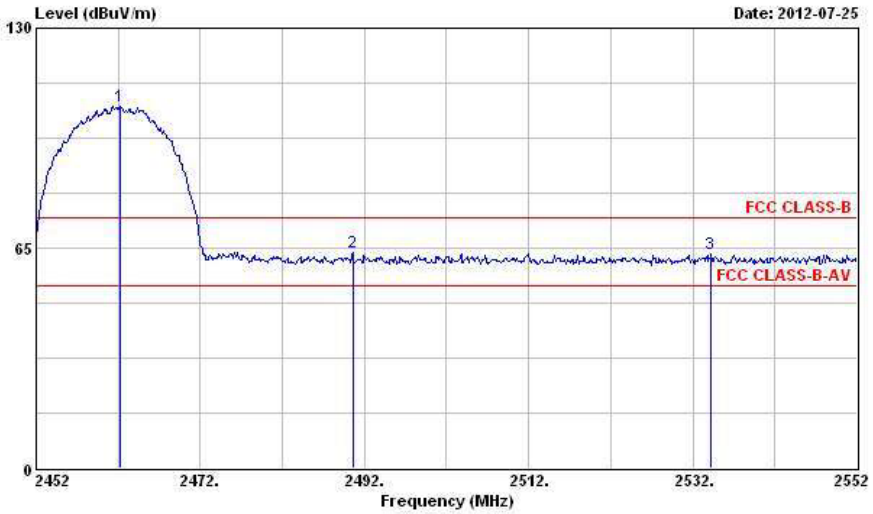
3.5.4 Test Setup

Transmitter Radiated Bandedge Emissions

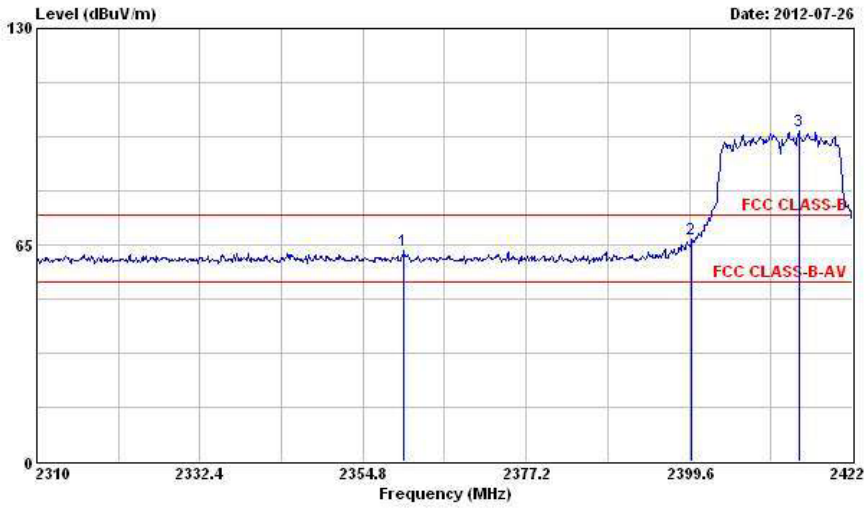
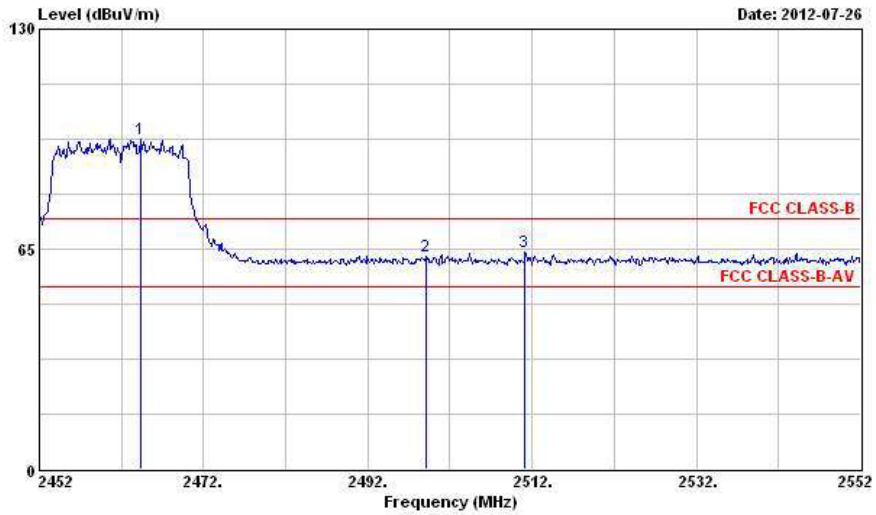


Electric field tests shall be performed in transmitter bandedge emissions using a calibrated horn antenna.

3.5.5 Test Result of Transmitter Radiated Bandedge Emissions

Transmitter Radiated Bandedge Emissions Result									
Gain (dBi)		-1.37		**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	105.97	2397.25	68.92	37.05	20	PK	V
2500-2690	1	2462	106.96	2534.20	63.41	43.55	20	PK	V
Low Band									
									
Up Band									
									
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)									

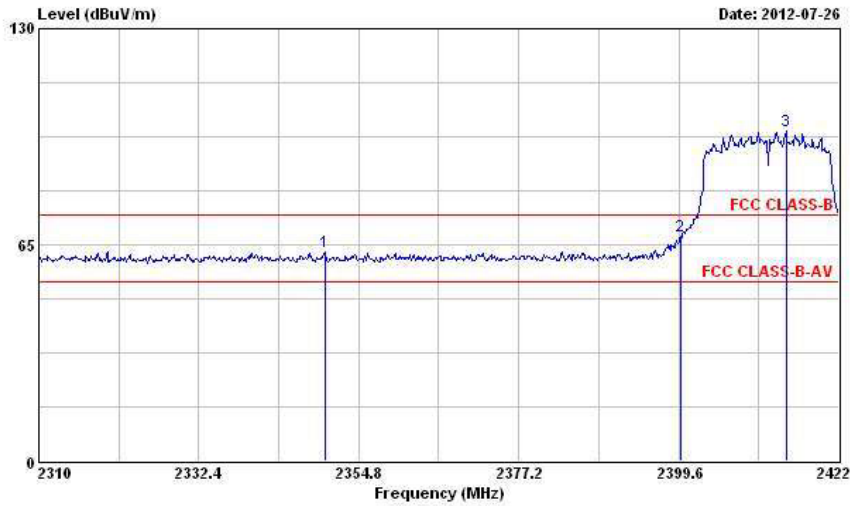
Transmitter Radiated Bandedge Emissions Result									
Gain (dBi)		-1.37		**Restricted Band Emissions**					
Modulation		11B-20M							
Restricted Band (MHz)	**N_{TX}**	**Test Ch. Freq. (MHz)**	**In-band PSD [i] (dBuV/1MHz)**	**RBE Freq. (MHz)**	**Measure Distance (m)**	**Out-Band Level (dBuV/m)**	**Limit (dBuV/m)**	**Level Type**	**Pol. note 1**
2310-2390	1	2412	112.86	2383.25	3	62.33	74	PK	V
2310-2390	1	2412	101.58	2387.73	3	50.12	54	AV	V
2483.5-2500	1	2462	113.25	2488.20	3	62.23	74	PK	V
2483.5-2500	1	2462	102.04	2485.90	3	49.69	54	AV	V
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).									

Transmitter Radiated Bandedge Emissions Result									
Gain (dBi)		-1.37		**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	99.33	2399.94	66.71	32.62	20	PK	V
2500-2690	1	2462	97.53	2511.10	64.04	33.49	20	PK	V
Low Band									
									
Up Band									
									
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)									

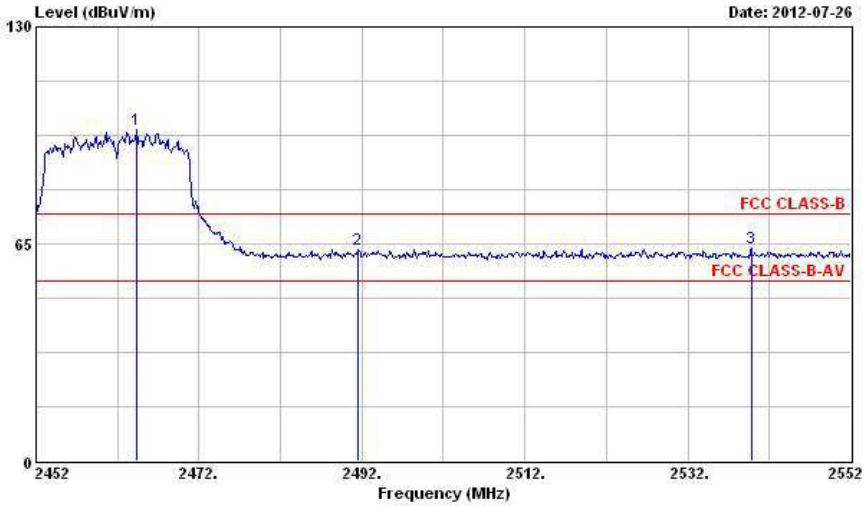
Transmitter Radiated Bandedge Emissions Result									
Gain (dBi)		-1.37		**Restricted Band Emissions**					
Modulation		11G-20M							
Restricted Band (MHz)	**N_{TX}**	**Test Ch. Freq. (MHz)**	**In-band PSD [i] (dBuV/1MHz)**	**RBE Freq. (MHz)**	**Measure Distance (m)**	**Out-Band Level (dBuV/m)**	**Limit (dBuV/m)**	**Level Type**	**Pol. note 1**
2310-2390	1	2412	107.19	2389.63	3	61.86	74	PK	V
2310-2390	1	2412	89.84	2389.97	3	53.68	54	AV	V
2483.5-2500	1	2462	106.24	2483.50	3	60.48	74	PK	V
2483.5-2500	1	2462	88.39	2493.80	3	53.85	54	AV	V
Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).									

Transmitter Radiated Bandedge Emissions Result									
Gain (dBi)		-1.37		**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	99.06	2399.82	67.41	31.65	20	PK	V
2500-2690	1	2462	99.36	2539.80	63.66	35.70	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)		-1.37		**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	106.49	2389.63	3	61.39	74	PK	V
2310-2390	1	2412	89.30	2389.52	3	53.27	54	AV	V
2483.5-2500	1	2462	106.69	2484.30	3	60.77	74	PK	V
2483.5-2500	1	2462	89.50	2483.80	3	53.65	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.

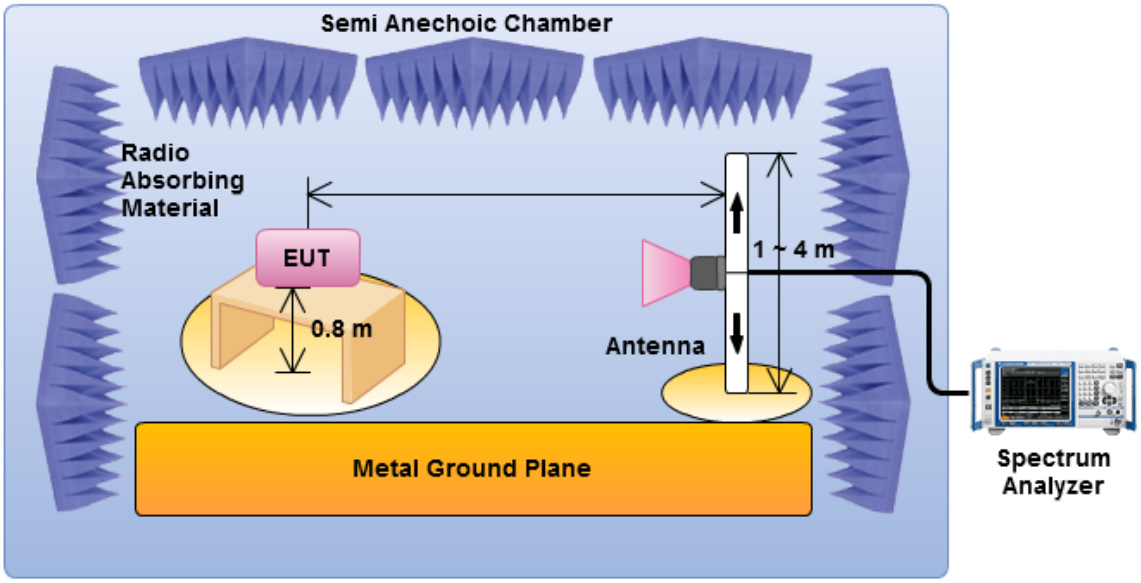
3.6.3 Test Procedures

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 ≥ 98 or duty factor].		
☒	For the transmitter unwanted emissions shall be measured using following options below:		
	☒	Refer as FCC KDB 558074, clause 5.4.1 for unwanted emissions into non-restricted bands.	
	☒	Refer as FCC KDB 558074, clause 5.4.2 for unwanted emissions into restricted bands.	
		☐	Refer as FCC KDB 558074, clause 5.4.2.2.2.1 Option 1 (Power Averaging).
		☒	Refer as FCC KDB 558074, clause 5.4.2.2.2.2 Option 2 (Trace Averaging).
		☐	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty cycle ≥ 98%.
		☐	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		☒	Refer as FCC KDB 558074, clause 5.4.2.2.1.1 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 2 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 5.4.2.2.1 unwanted emissions in restricted bands on frequencies ≤ 1000 MHz		
		☐ Refer as FCC KDB 558074, clause 5.4.2.2.2 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

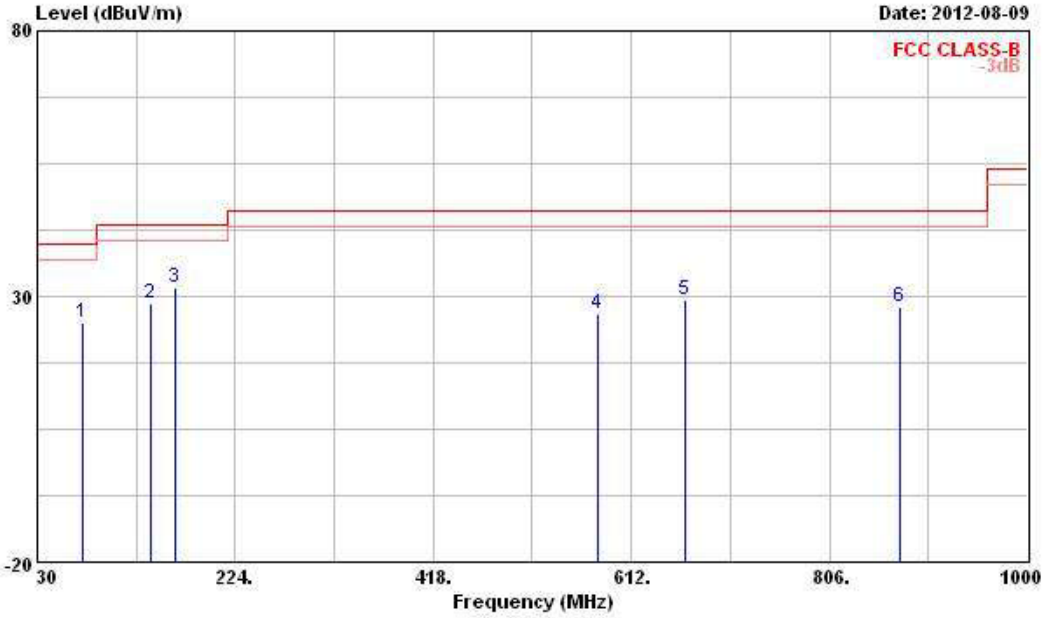
Transmitter Radiated Unwanted Emissions



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

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

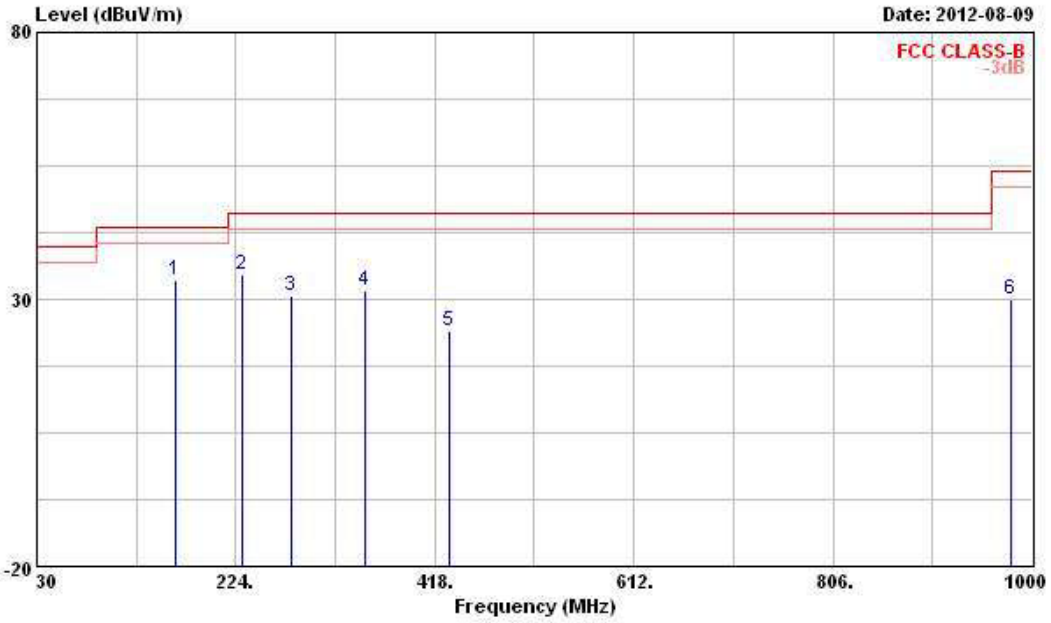
Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Modulation Mode	11G-20M	**Test Freq. (FX)**	F2
Operating Mode	1	**Polarization**	V
Operating Function	WiFi TX+Zigbee TX+Charger(Battery : ATL)		



	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	74.620	25.08	-14.92	40.00	44.42	7.05	1.46	27.85	Peak	---	---
2	141.550	28.66	-14.84	43.50	42.55	11.78	2.00	27.67	Peak	---	---
3	164.830	31.73	-11.77	43.50	46.81	10.34	2.14	27.56	Peak	---	---
4	579.990	26.76	-19.24	46.00	31.45	19.59	4.16	28.44	Peak	---	---
5	665.350	29.18	-16.82	46.00	33.77	19.31	4.44	28.34	Peak	---	---
6	874.870	28.00	-18.00	46.00	30.45	20.09	5.15	27.69	Peak	---	---

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

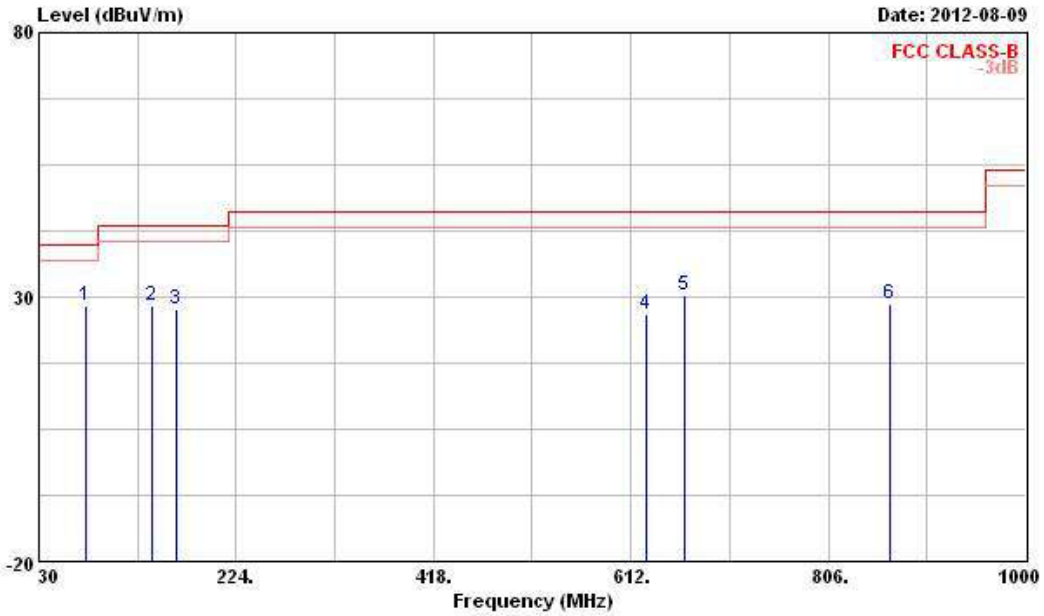
Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Modulation Mode	11G-20M	**Test Freq. (FX)**	F2
Operating Mode	1	**Polarization**	H
Operating Function	WiFi TX+Zigbee TX+Charger(Battery : ATL)		



	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 @	164.830	33.55	-9.95	43.50	48.63	10.34	2.14	27.56	Peak	---	---
2	230.790	34.53	-11.47	46.00	46.85	12.37	2.64	27.33	Peak	---	---
3	277.350	30.74	-15.26	46.00	41.70	13.38	2.88	27.22	Peak	---	---
4	350.100	31.79	-14.21	46.00	41.65	14.48	3.18	27.52	Peak	---	---
5	431.580	23.93	-22.07	46.00	32.55	15.90	3.51	28.03	Peak	---	---
6	979.630	30.02	-23.98	54.00	29.71	22.00	5.61	27.30	Peak	---	---

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

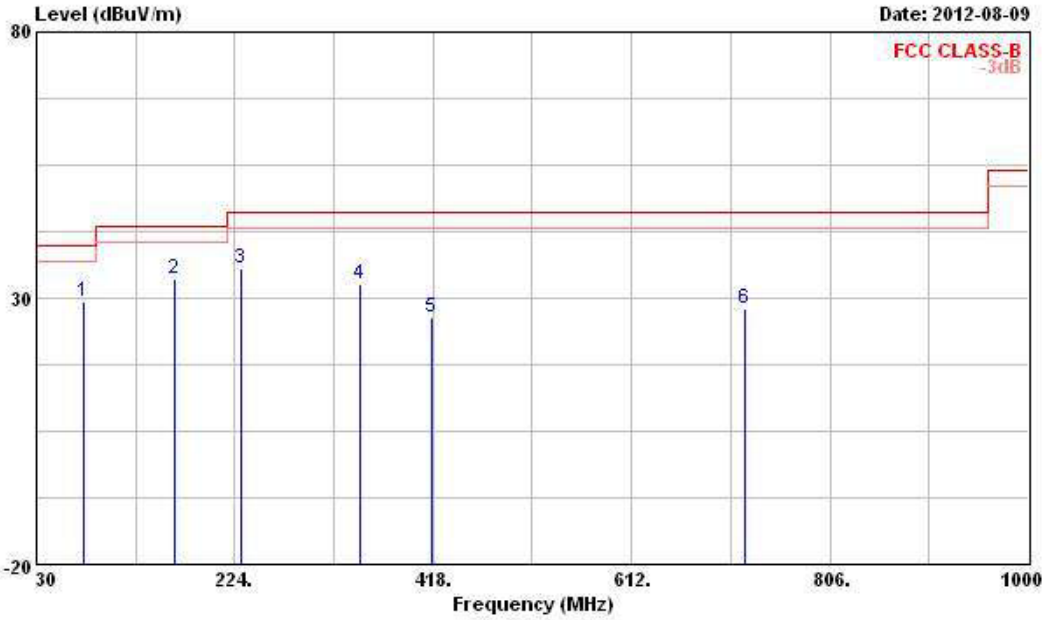
Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Modulation Mode	11G-20M	**Test Freq. (FX)**	F2
Operating Mode	1	**Polarization**	V
Operating Function	WiFi TX+Zigbee TX+Charger(Battery : Samsung)		



	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	75.590	28.28	-11.72	40.00	47.55	7.11	1.47	27.85	Peak	---	---
2	141.550	28.38	-15.12	43.50	42.27	11.78	2.00	27.67	Peak	---	---
3	164.830	27.79	-15.71	43.50	42.87	10.34	2.14	27.56	Peak	---	---
4	626.550	26.78	-19.22	46.00	31.04	19.83	4.32	28.41	Peak	---	---
5	665.350	30.39	-15.61	46.00	34.98	19.31	4.44	28.34	Peak	---	---
6	867.110	28.84	-17.16	46.00	31.32	20.11	5.12	27.71	Peak	---	---

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

Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Modulation Mode	11G-20M	**Test Freq. (FX)**	F2
Operating Mode	1	**Polarization**	H
Operating Function	WiFi TX+Zigbee TX+Charger(Battery : Samsung)		

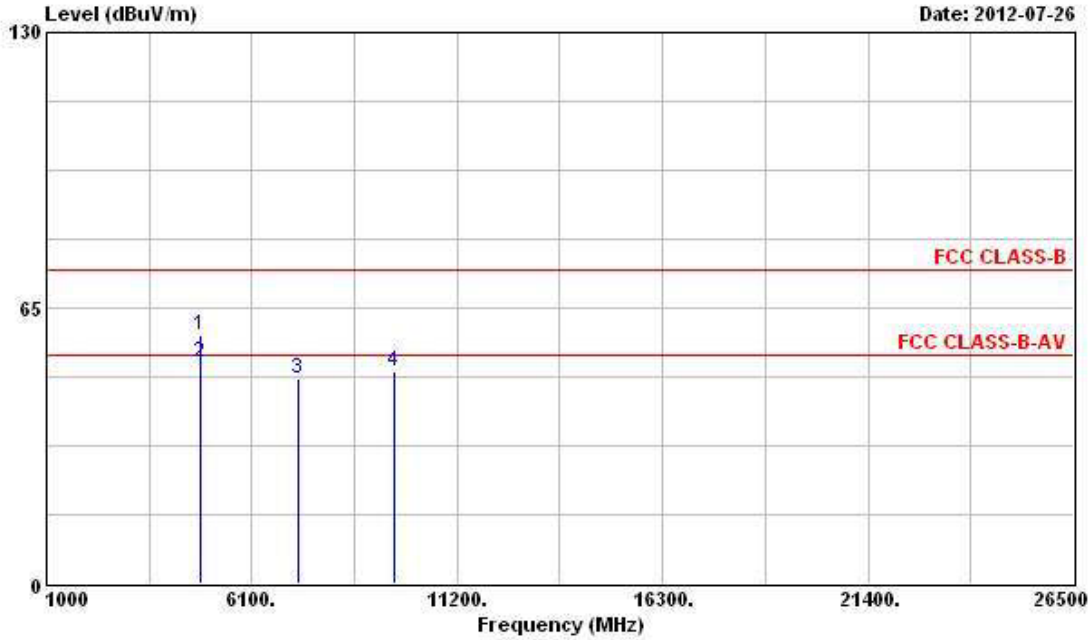


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	75.590	29.19	-10.81	40.00	48.46	7.11	1.47	27.85	Peak	---	---
2 @	164.830	33.70	-9.80	43.50	48.78	10.34	2.14	27.56	Peak	---	---
3 @	230.790	35.75	-10.25	46.00	48.07	12.37	2.64	27.33	Peak	---	---
4	347.190	32.77	-13.23	46.00	42.66	14.43	3.17	27.49	Peak	---	---
5	417.030	26.40	-19.60	46.00	35.29	15.61	3.46	27.96	Peak	---	---
6	723.550	28.00	-18.00	46.00	32.40	19.18	4.62	28.20	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

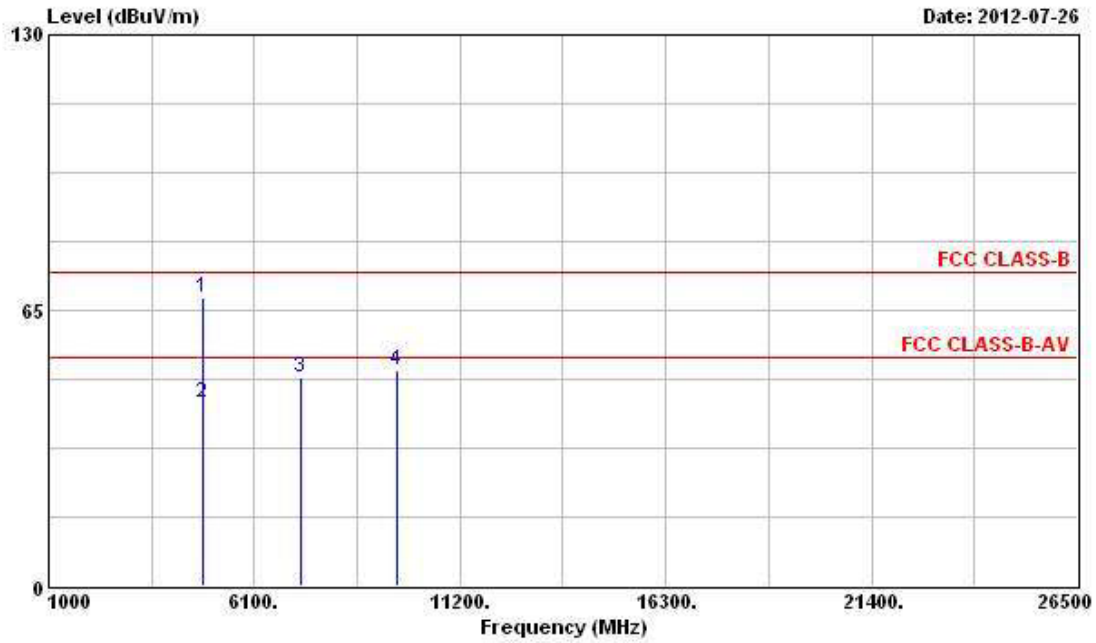
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11B-20M	**Test Freq. (FX)**	F1
Operating Function	Transmit	**Polarization**	V



	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	58.46	-15.54	74.00	53.55	35.13	4.58	34.80	Peak	---	---
2 @	4824.000	52.05	-1.95	54.00	47.14	35.13	4.58	34.80	Average	---	---
3	7236.000	48.33			40.88	36.90	5.63	35.08	Peak	---	---
4	9648.000	50.23			40.77	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 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 and 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

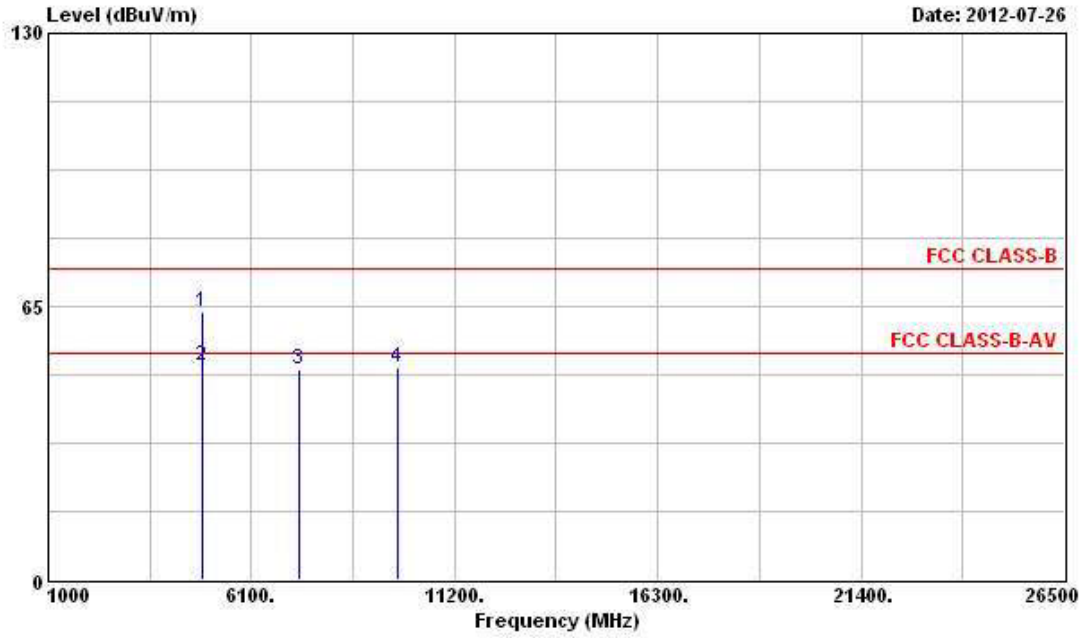
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11B-20M	**Test Freq. (FX)**	F1
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	4824.000	68.14	-5.86	74.00	62.60	35.76	4.58	34.80	Peak	---	---
2	4824.000	43.08	-10.92	54.00	37.54	35.76	4.58	34.80	Average	---	---
3	7236.000	48.98			40.58	37.85	5.63	35.08	Peak	---	---
4	9648.000	51.09			40.83	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 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 and 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

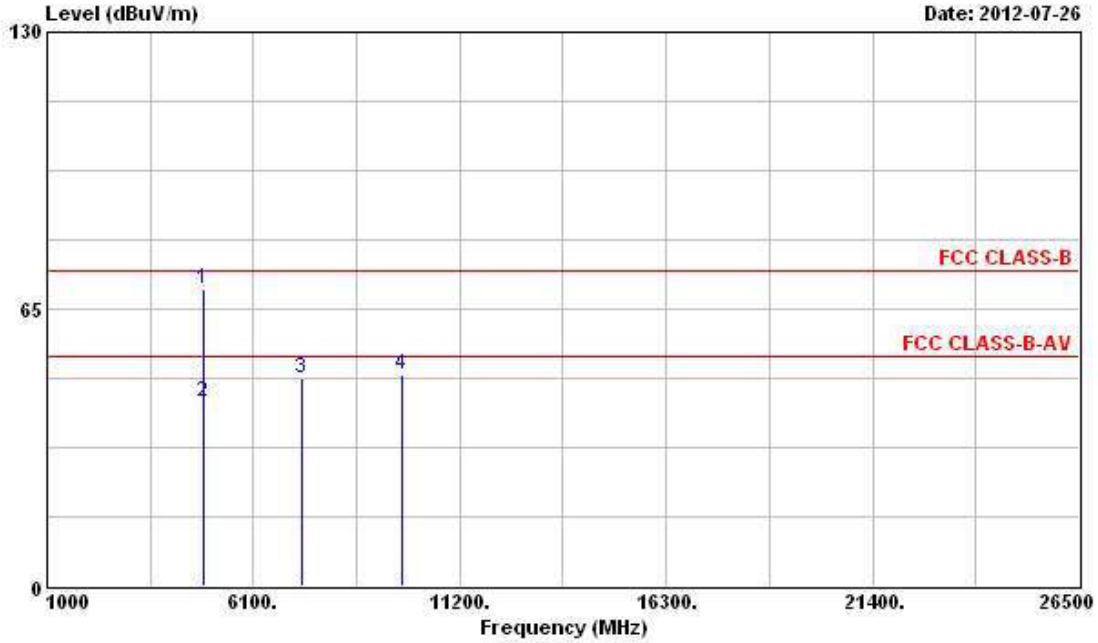
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11B-20M	**Test Freq. (FX)**	F2
Operating Function	Transmit	**Polarization**	V



	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 @	4874.000	63.62	-10.38	74.00	58.61	35.18	4.61	34.78	Peak	---	---
2 @	4874.000	51.08	-2.92	54.00	46.07	35.18	4.61	34.78	Average	---	---
3 @	7311.000	49.94	-4.06	54.00	42.48	36.92	5.64	35.10	PK	---	---
4	9748.000	50.58			40.99	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 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 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

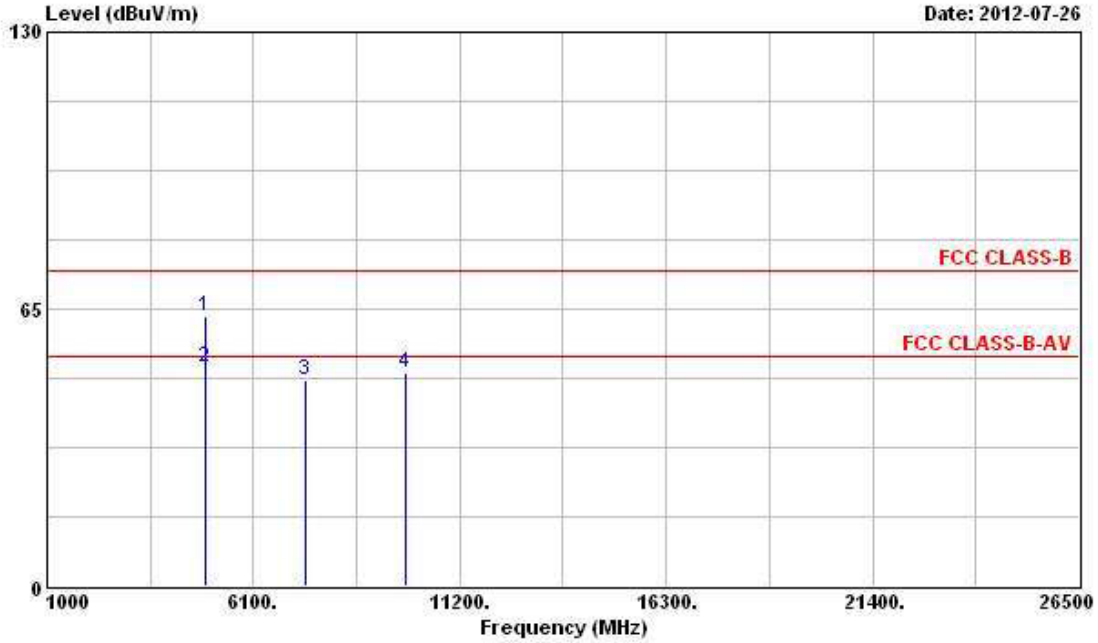
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11B-20M	**Test Freq. (FX)**	F2
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	4874.000	69.64	-4.36	74.00	63.98	35.83	4.61	34.78	Peak	---	---
2	4874.000	43.38	-10.62	54.00	37.72	35.83	4.61	34.78	Average	---	---
3 @	7311.000	48.67	-5.33	54.00	40.27	37.86	5.64	35.10	PK	---	---
4	9748.000	49.59			39.20	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 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 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

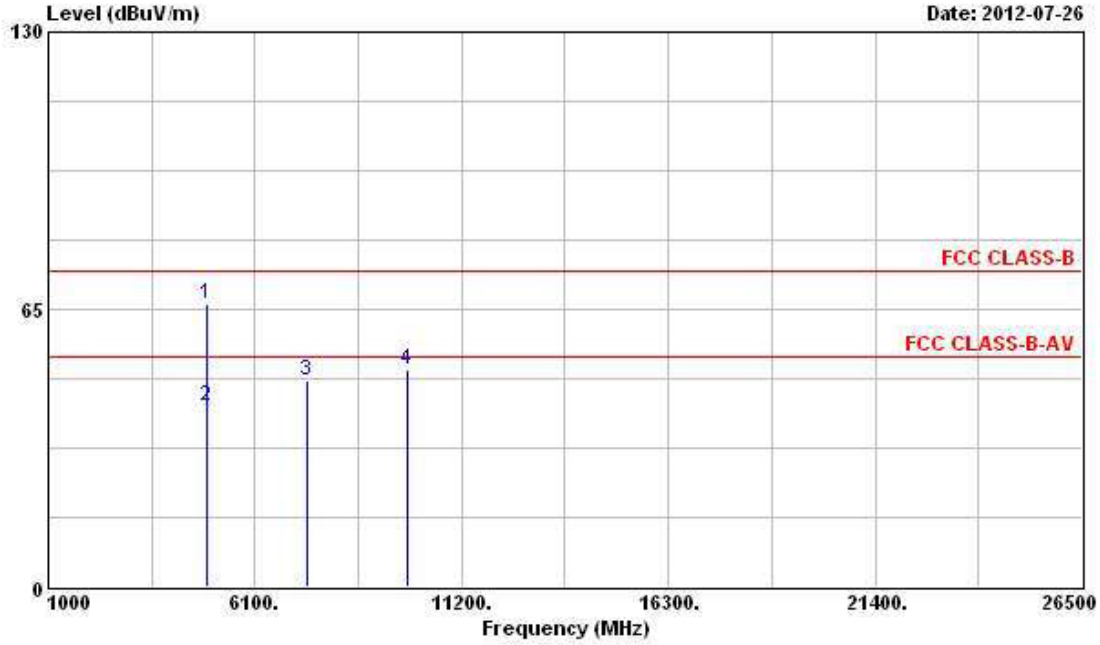
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11B-20M	**Test Freq. (FX)**	F3
Operating Function	Transmit	**Polarization**	V



	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	4924.000	63.36	-10.64	74.00	58.22	35.23	4.68	34.77	Peak	---	---
2 @	4924.000	51.12	-2.88	54.00	45.98	35.23	4.68	34.77	Average	---	---
3 @	7386.000	48.21	-5.79	54.00	40.72	36.96	5.65	35.12	PK	---	---
4	9848.000	50.22			40.52	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 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 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	**Test Freq. (FX)**	F3
Operating Function	Transmit	**Polarization**	H

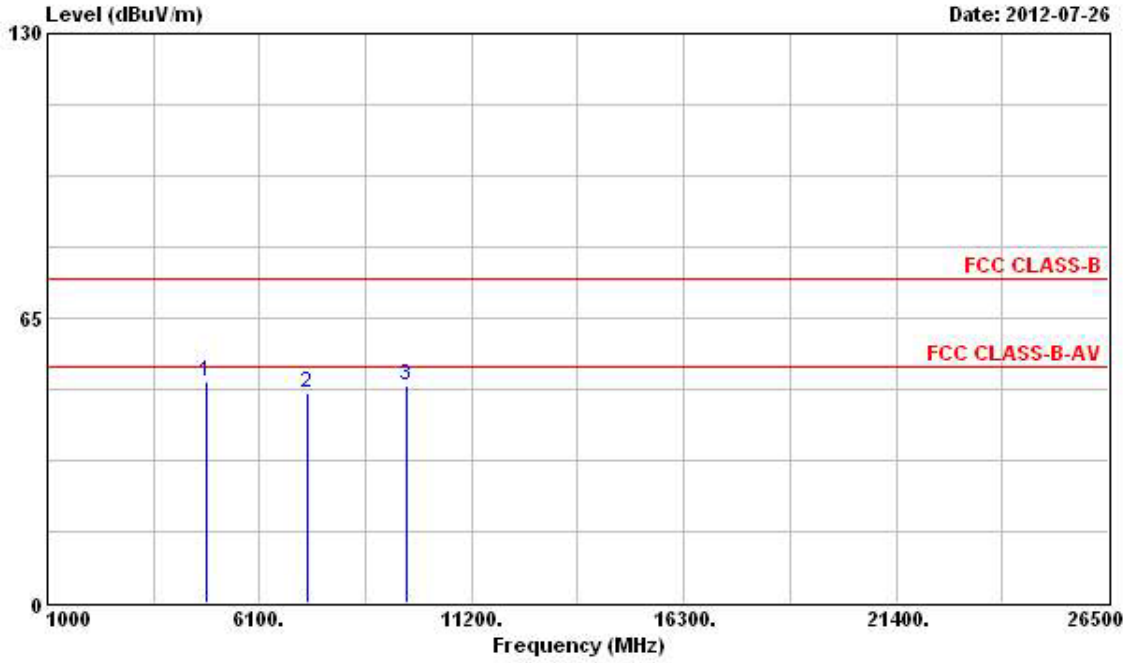


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	4924.000	66.38	-7.62	74.00	60.57	35.90	4.68	34.77	Peak	---	---
2	4924.000	42.44	-11.56	54.00	36.63	35.90	4.68	34.77	Average	---	---
3 @	7386.000	48.50			40.09	37.88	5.65	35.12	PK	---	---
4	9848.000	51.07			40.57	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 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 and 4) 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

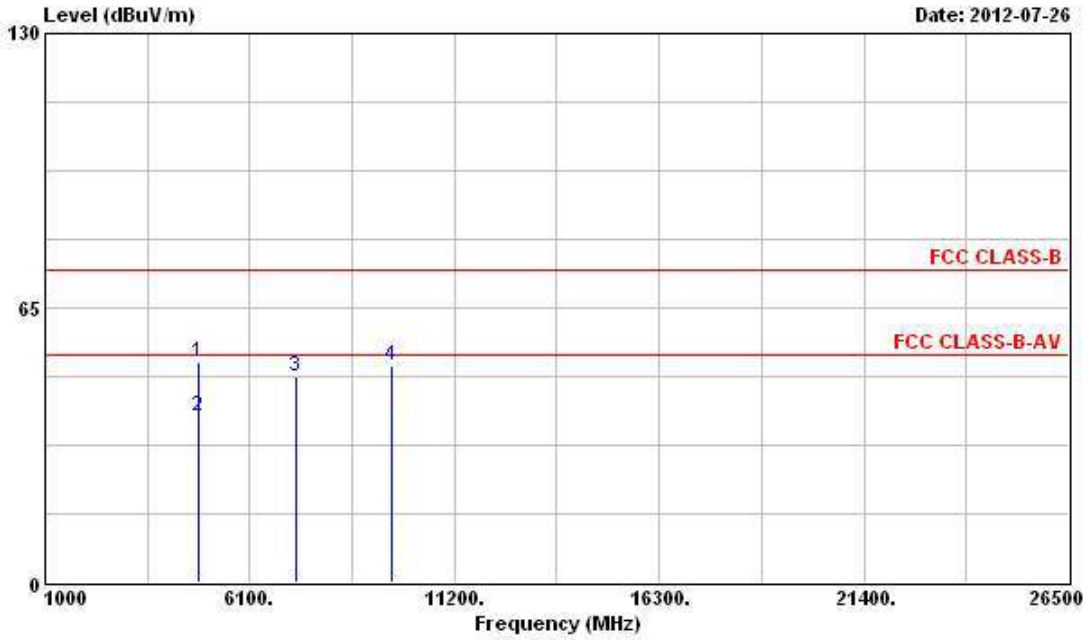
Battery :ATL**Transmitter Radiated Unwanted Emissions (Above 1GHz)**			
Modulation Mode	11G-20M	**Test Freq. (FX)**	F1
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read 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	50.31	-3.69	54.00	45.40	35.13	4.58	34.80	PK	---	---
2	7236.000	47.83			40.38	36.90	5.63	35.08	Peak	---	---
3	9648.000	49.71			40.25	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 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.

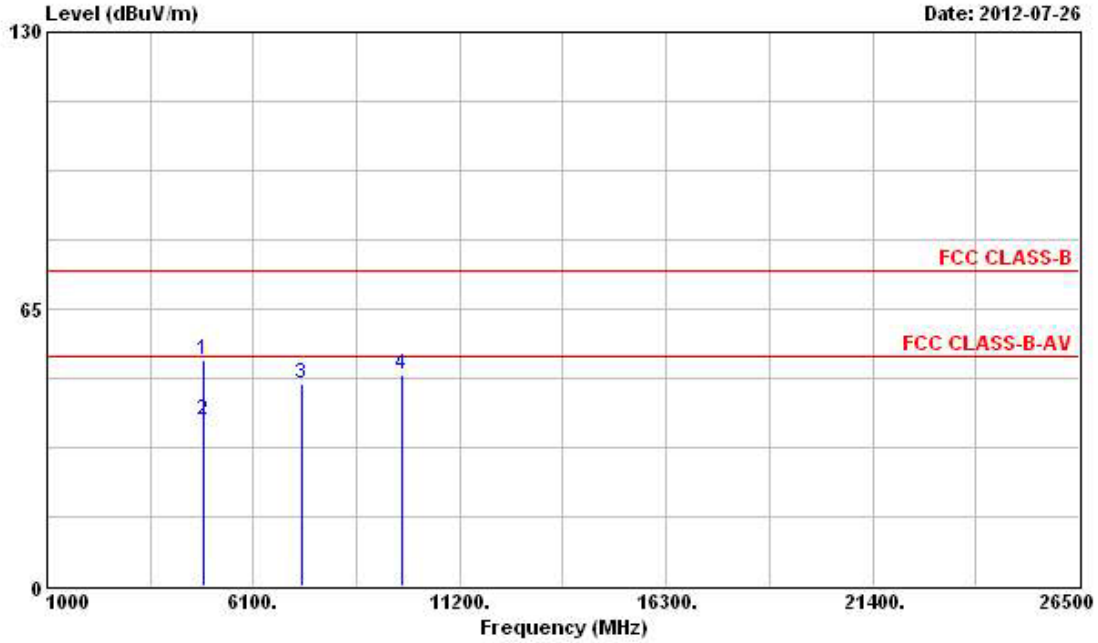
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11G-20M	**Test Freq. (FX)**	F1
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	52.13	-21.87	74.00	46.59	35.76	4.58	34.80	Peak	---	---
2	4824.000	39.18	-14.82	54.00	33.64	35.76	4.58	34.80	Average	---	---
3	7236.000	48.67			40.27	37.85	5.63	35.08	Peak	---	---
4	9648.000	51.14			40.88	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 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 and 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

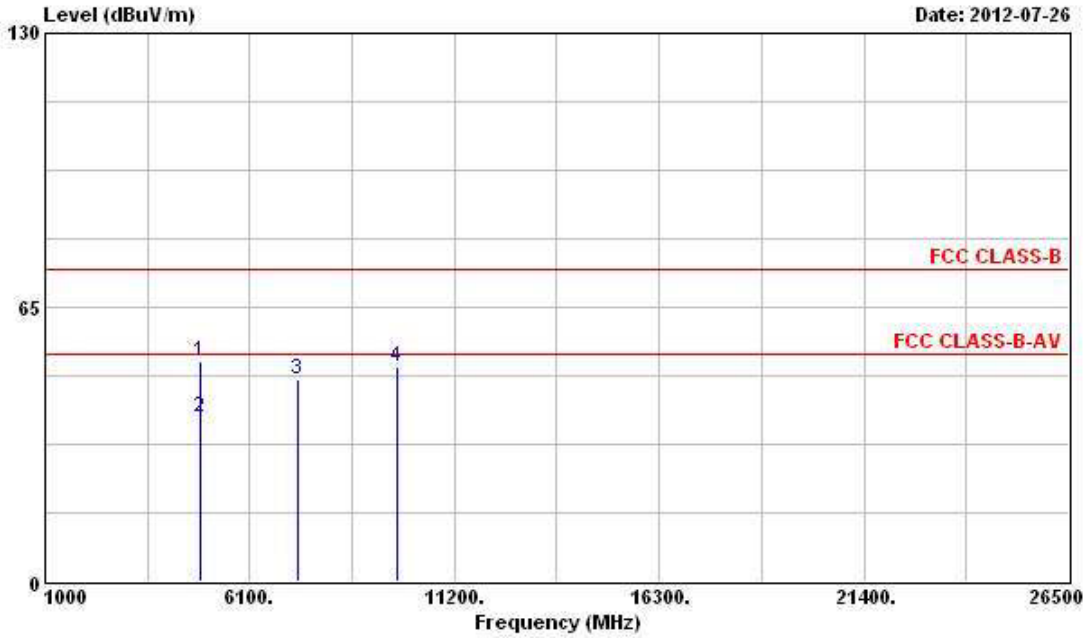
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11G-20M	**Test Freq. (FX)**	F2
Operating Function	Transmit	**Polarization**	V



	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	4874.000	53.10	-20.90	74.00	48.09	35.18	4.61	34.78	Peak	---	---
2	4874.000	38.98	-15.02	54.00	33.97	35.18	4.61	34.78	Average	---	---
3 @	7311.000	47.51	-6.49	54.00	40.05	36.92	5.64	35.10	PK	---	---
4	9748.000	49.73			40.14	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 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 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

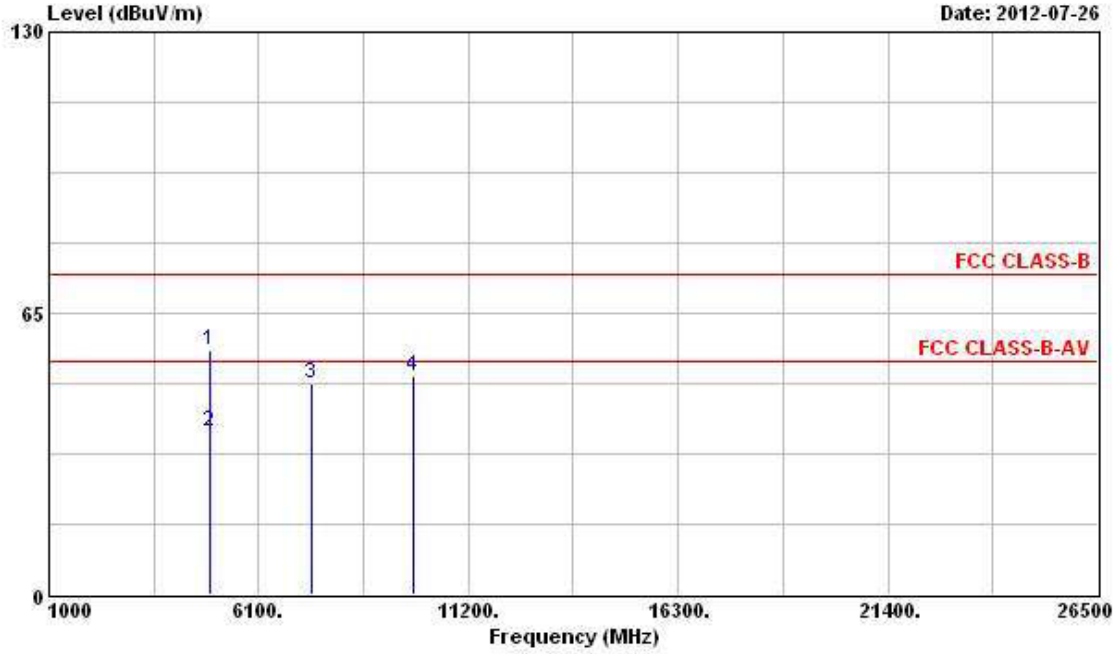
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11G-20M	**Test Freq. (FX)**	F2
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	52.29	-21.71	74.00	46.63	35.83	4.61	34.78	Peak	---	---
2	4874.000	38.72	-15.28	54.00	33.06	35.83	4.61	34.78	Average	---	---
3 @	7311.000	48.03	-5.97	54.00	39.63	37.86	5.64	35.10	PK	---	---
4	9748.000	50.99			40.60	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 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.

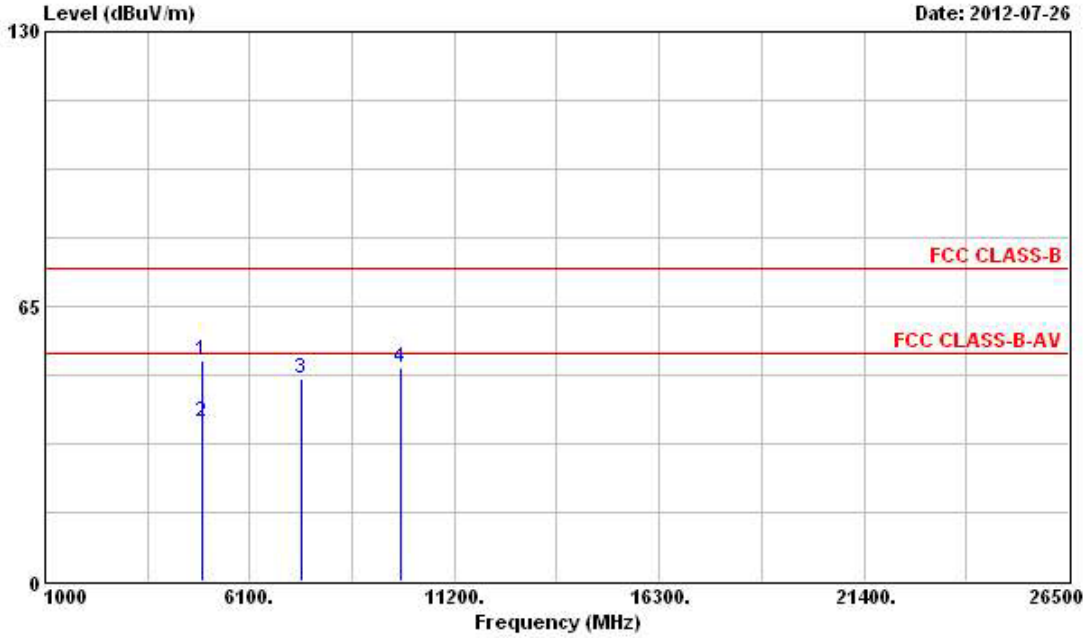
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11G-20M	**Test Freq. (FX)**	F3
Operating Function	Transmit	**Polarization**	V



	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	4924.000	56.45	-17.55	74.00	51.31	35.23	4.68	34.77	Peak	---	---
2	4924.000	37.84	-16.16	54.00	32.70	35.23	4.68	34.77	Average	---	---
3 @	7386.000	48.69	-5.31	54.00	41.20	36.96	5.65	35.12	PK	---	---
4	9848.000	50.55			40.85	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 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 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	**Test Freq. (FX)**	F3
Operating Function	Transmit	**Polarization**	H

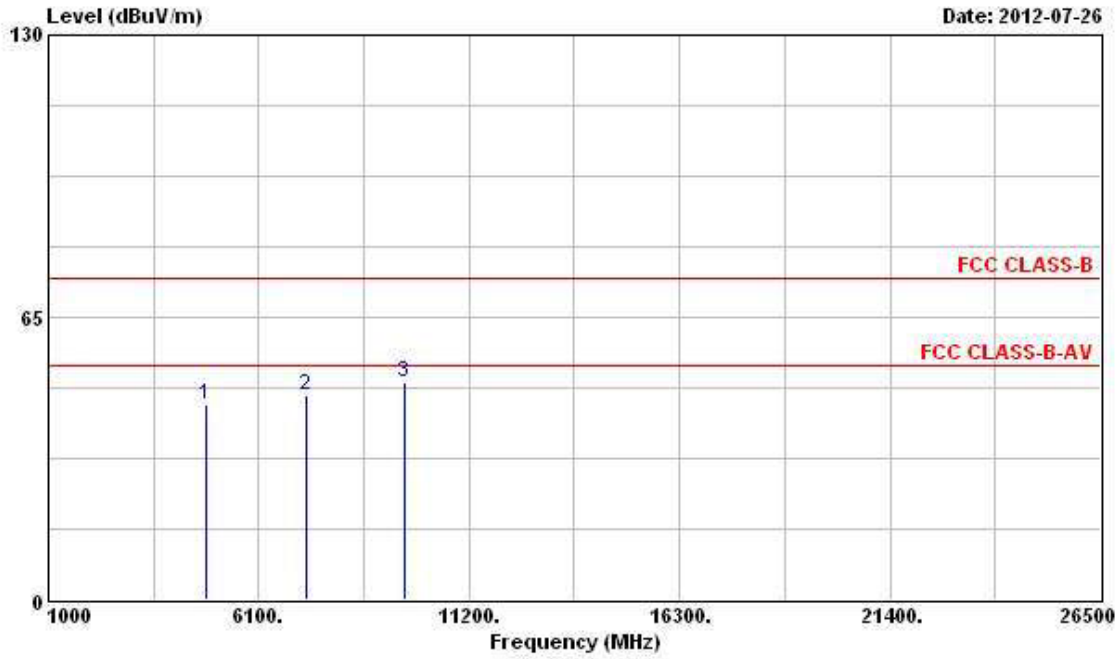


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4918.000	52.17	-21.83	74.00	46.42	35.88	4.64	34.77	Peak	---	---
2	4924.000	37.67	-16.33	54.00	31.86	35.90	4.68	34.77	Average	---	---
3 @	7386.000	48.10	-5.90	54.00	39.69	37.88	5.65	35.12	PK	---	---
4	9848.000	50.34			39.84	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 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 4) 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

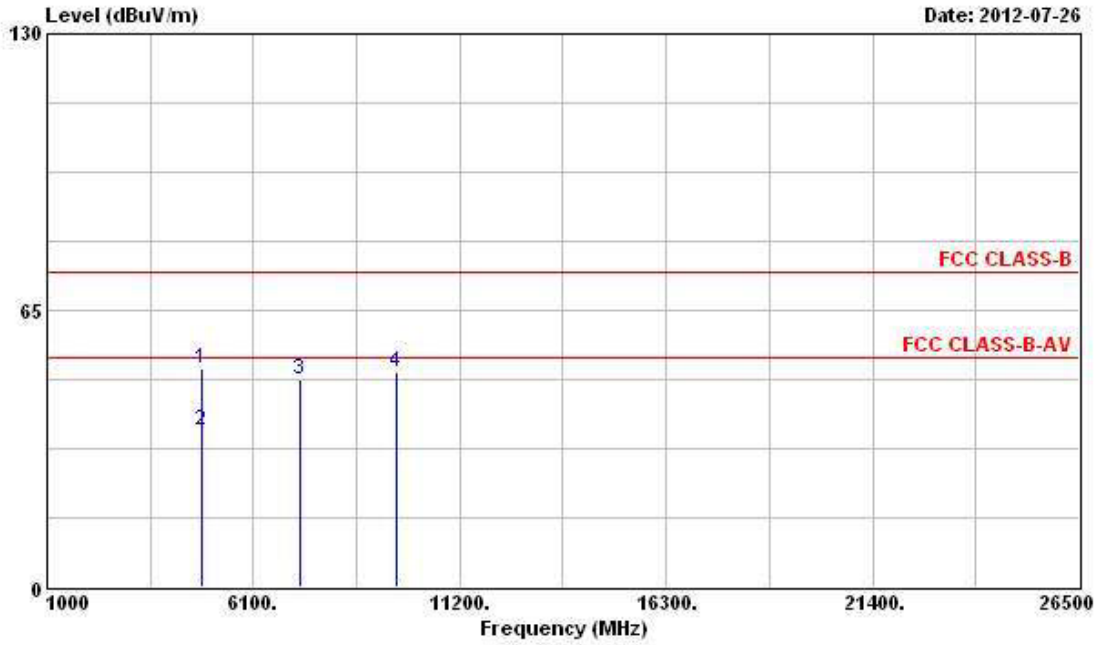
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N2.4G-20M	**Test Freq. (FX)**	F1
Operating Function	Transmit	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	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	44.91	-9.09	54.00	40.00	35.13	4.58	34.80	PK	---	---
2	7236.000	47.03			39.58	36.90	5.63	35.08	Peak	---	---
3	9648.000	50.16			40.70	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 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.

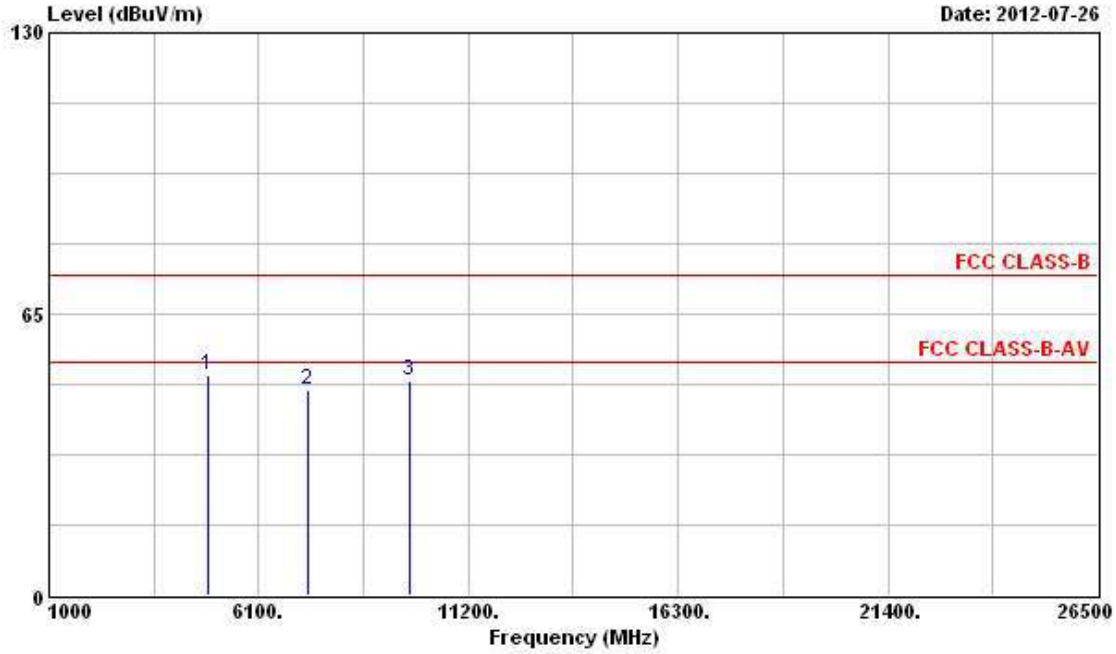
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N2.4G-20M	**Test Freq. (FX)**	F1
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	51.47	-22.53	74.00	45.93	35.76	4.58	34.80	Peak	---	---
2	4824.000	36.74	-17.26	54.00	31.20	35.76	4.58	34.80	Average	---	---
3	7236.000	48.58			40.18	37.85	5.63	35.08	Peak	---	---
4	9648.000	50.39			40.13	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 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 and 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

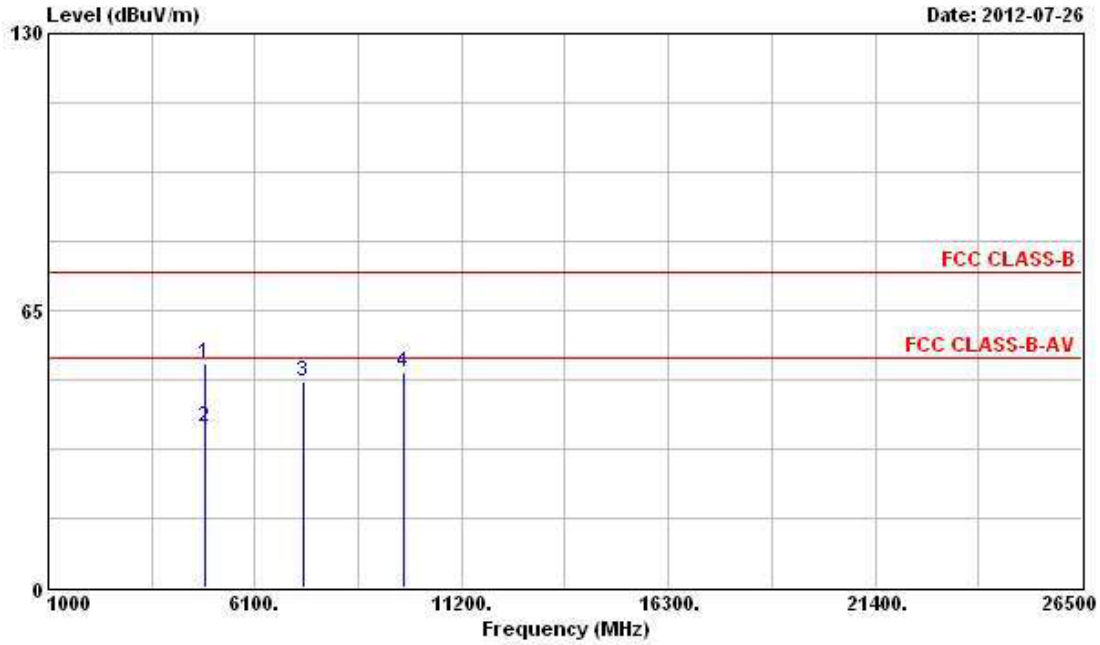
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N2.4G-20M	**Test Freq. (FX)**	F2
Operating Function	Transmit	**Polarization**	V



	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 @	4874.000	50.94	-3.06	54.00	45.93	35.18	4.61	34.78	PK	---	---
2 @	7311.000	47.45	-6.55	54.00	39.99	36.92	5.64	35.10	PK	---	---
3	9748.000	49.60			40.01	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 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.

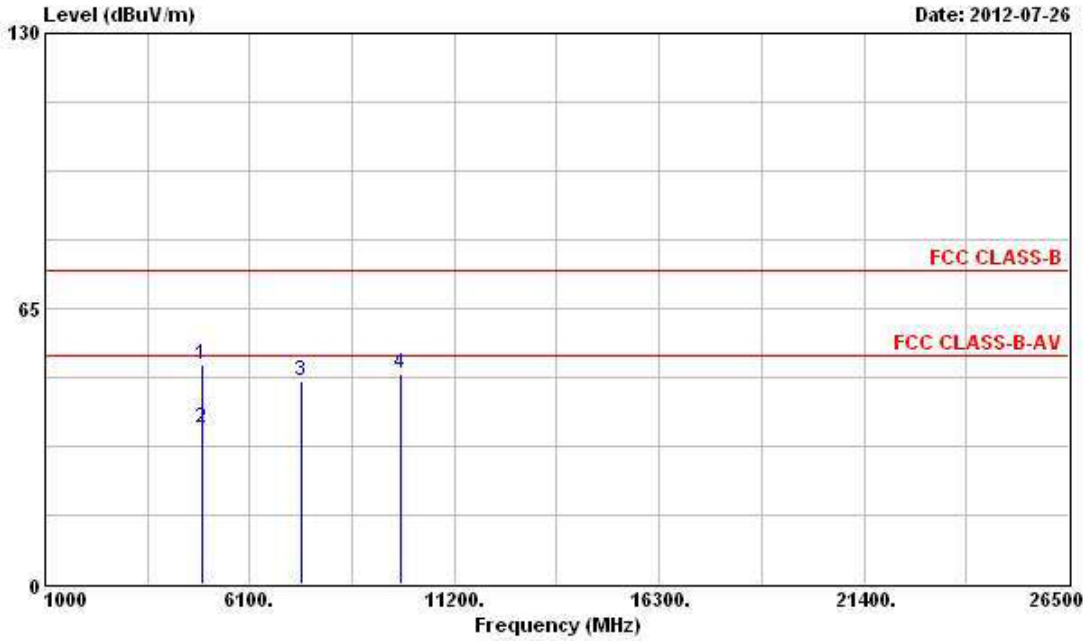
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N2.4G-20M	**Test Freq. (FX)**	F2
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	52.47	-21.53	74.00	46.81	35.83	4.61	34.78	Peak	---	---
2	4874.000	37.74	-16.26	54.00	32.08	35.83	4.61	34.78	Average	---	---
3 @	7311.000	48.11	-5.89	54.00	39.71	37.86	5.64	35.10	PK	---	---
4	9748.000	50.32			39.93	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 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 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

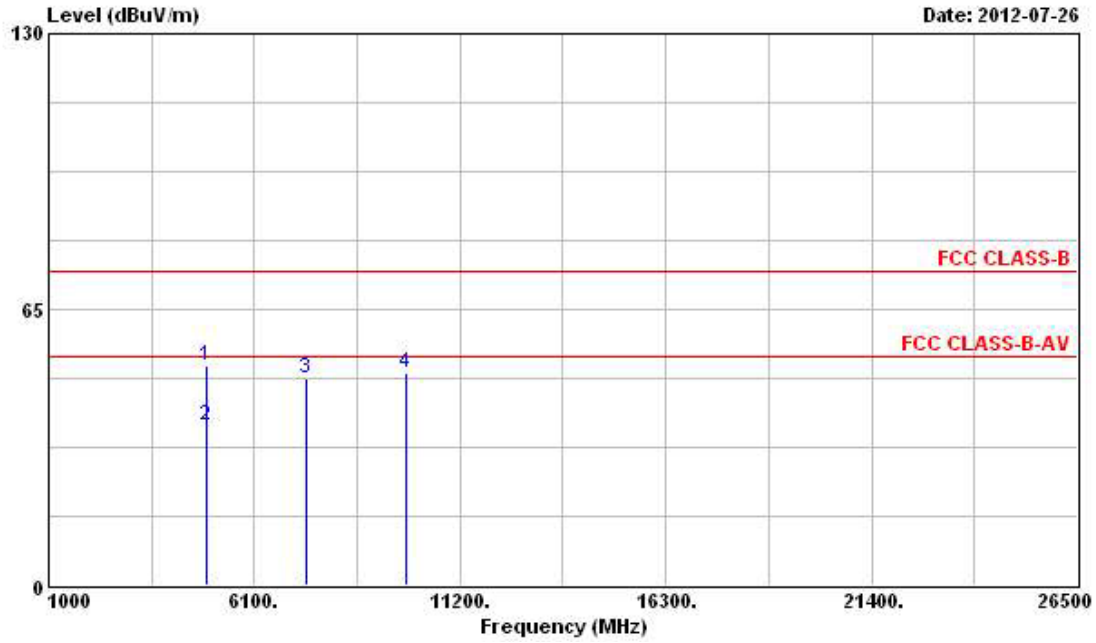
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N2.4G-20M	**Test Freq. (FX)**	F3
Operating Function	Transmit	**Polarization**	V



	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	4924.000	51.94	-22.06	74.00	46.80	35.23	4.68	34.77	Peak	---	---
2	4924.000	36.58	-17.42	54.00	31.44	35.23	4.68	34.77	Average	---	---
3 @	7386.000	47.73	-6.27	54.00	40.24	36.96	5.65	35.12	PK	---	---
4	9848.000	49.44			39.74	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 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 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	**Test Freq. (FX)**	F3
Operating Function	Transmit	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	51.69	-22.31	74.00	45.88	35.90	4.68	34.77	Peak	---	---
2	4924.000	37.47	-16.53	54.00	31.66	35.90	4.68	34.77	Average	---	---
3 @	7386.000	48.85	-5.15	54.00	40.44	37.88	5.65	35.12	PK	---	---
4	9848.000	50.01			39.51	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 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 4) 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	MessTec	NNB-2/16Z	2001/004	9kHz ~ 30MHz	Jan. 12, 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	07611832010 001	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℃	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	3008A02096	1GHz ~ 26.5GHz	Mar. 20, 2012	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 15, 2011	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Nov. 11, 2011	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 06, 2012	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 22, 2011	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0~ 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 ~ 4 m	N/A	Radiation (03CH02-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Antenna	R&S	HFH2-Z2	860004/001	9 kHz ~ 30 MHz	Jul. 03, 2012*	Radiation (03CH02-HY)

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

5 Certification of TAF Accreditation

Certificate No. : L1190-120405

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

Certificate of Accreditation

This is to certify that

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

is accredited in respect of laboratory

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

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

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