

FCC Test Report

Equipment : Personal Computer
Brand Name : SONY
Model No. : SVT112A2WL
FCC ID : AK8SVT112A2WL
Standard : 47 CFR FCC Part 15.407
Operating Band : 5150 MHz – 5250 MHz
5250 MHz – 5350 MHz
5470 MHz – 5725 MHz
FCC Classification : NII
Applicant : Sony Corporation
Manufacturer : 1-7-1 Konan, Minato-ku, Tokyo 108-0075, Japan
Operate Mode : Client without radar detection

The product sample received on Jun. 27, 2013 and completely tested on Sep. 17, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

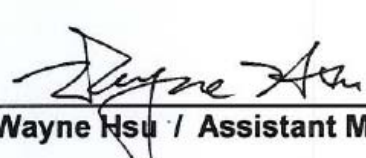

Wayne Hsu / Assistant Manager

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Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
1.1.2	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	[dBuV]: 0.1863950MHz 29.82 (Margin 24.38dB) - AV 49.24 (Margin 14.96dB) - QP	FCC 15.207	Complied
3.2	15.407(a)	Emission Bandwidth	Bandwidth [MHz] 20M:20.20 / 40M:41.20	Information only	Complied
3.3	15.407(a)	RF Output Power (Maximum Conducted Output Power)	Power [dBm] 5150-5250MHz:13.95 5250-5350MHz:14.38 5470-5725MHz:14.98	Power [dBm] 5150-5250MHz:17 5250-5350MHz:24 5470-5725MHz:24	Complied
3.4	15.407(a)	Peak Power Spectral Density	PPSD [dBm/MHz] 5150-5250MHz:2.54 5250-5350MHz:3.03 5470-5725MHz:3.71	PPSD [dBm/MHz] 5150-5250MHz:4 5250-5350MHz:11 5470-5725MHz:11	Complied
3.5	15.407(a)	Peak Excursion	8.14dB	13 dB	Complied
3.6	15.407(b)	Transmitter Bandedge Emissions	Restricted Bands [dBuV/m at 1m]: 5144.700MHz 77.57 (Margin 5.97dB) - PK 62.54 (Margin 1.00dB) - AV	Non-Restricted Bands: ≤ -27dBm (77.84dBuV/m@1m) Restricted Bands: FCC 15.209	Complied
3.7	15.407(b)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 1m]: 800.180MHz 40.95 (Margin 5.05dB) - PK	Non-Restricted Bands: ≤ -27dBm (68.3dBuV/m@3m) Restricted Bands: FCC 15.209	Complied
3.8	15.407(g)	Frequency Stability	5.0943 ppm	Signal shall remain in-band	Complied



SPORTON INTERNATIONAL INC.
TEL : 886-3-327-3456
FAX : 886-3-327-0973

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information						
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	RF Output Power (dBm)	Co-location
5150-5250	a	5180-5240	36-48 [4]	1	13.95	Yes
5250-5350		5260-5320	52-64 [4]	1	14.38	Yes
5470-5725		5500-5700	100-140 [8]	1	14.98	Yes
5150-5250	n (HT20)	5180-5240	36-48 [4]	2	10.86	Yes
5250-5350		5260-5320	52-64 [4]	2	11.30	Yes
5470-5725		5500-5700	100-140 [8]	2	11.79	Yes
5150-5250	n (HT40)	5190-5230	38-46 [2]	2	10.94	Yes
5250-5350		5270-5310	54-62 [2]	2	8.98	Yes
5470-5725		5510-5670	102-134 [3]	2	11.89	Yes

Note 1: RF output power specifies that Maximum Conducted Output Power.
 Note 2: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
 Note 4: 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	
☒	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			
No.	Ant. Cat.	Ant. Type	Gain (dBi)
1	Integral	PIFA	-0.65
2	Integral	PIFA	-1.45

Reminder: The EUT was pre-tested Antenna Port 1 and Antenna Port 2 for single chain, the worst case was Antenna Port 1. Therefore only the test data recorded in this report.

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)
☒ 99.00% - IEEE 802.11a	0.04
☒ 98.00% - IEEE 802.11n (HT20)	0.09
☒ 96.00% - IEEE 802.11n (HT40)	0.18

Note 1: RF Output Power Plots w/o Duty Factor Note 1: Power Density Plots w/o Duty Factor

1.1.5 EUT Operational Condition

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

1.1.6 DFS and TPC Information

The DFS Related Operating Mode(s) of the Equipment			
☐ Master			
☐ Cilent with radar detection			
☒ Cilent without radar detection			
Software / Firmware Version		16.0.5.3	
Communication Mode		☒ IP Based	☐ Frame Based
IEEE Std. 802.11	Frequency Range (MHz)	TPC (Transmit Power Control)	Passive Scan
a / n (HT20)	☒ 5250-5350	Yes	Yes
n (HT40)	☒ 5470-5725	Yes	Yes

1.2 Accessories

Accessories Information				
AC Adapter	Brand Name	SONY	Model Name	VGP-AC19V74
	Power Rating	INPUT: 100-240Vac, 1.0 A OUTPUT 1: 19.5Vdc, 2.0 A ; OUTPUT 2: 5.0Vdc, 1.0 A		
Li-ion Battery	Brand Name	SONY	Model Name	VGP-BPS39
	Power Rating	7.5Vdc, 3800mAh		
2.4G RF receiver	Brand Name	SONY	Model Name	VGP-WRC9

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

1.3 Support Equipment

Support Equipment- AC Line Conducted Emission Test				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Keyboard (Client Provide)	SONY	VGP-WKB16	DoC
2	Headset	INTOPIC	JAZZ-368	DoC
3	iPod Nano	Apple	A1199	DoC
4	Identity Badge	-	-	-
5	Wireless AP (Remote Workstation)	ZO TECH	WR110B	DoC
6	Bluetooth Headset (Remote Workstation)	SONY	Z354	DoC

Support Equipment- Radiated Emission Test				
No.	Equipment	Brand Name	Model Name	Serial No.
1	Keyboard (Client Provide)	SONY	VGP-WKB16	DoC
2	Headset	INTOPIC	JAZZ-368	DoC
3	iPod Nano	Apple	A1199	DoC
4	Identity Badge	-	-	-

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 789033 v01r03
- ◆ FCC KDB 644545 D01
- ◆ FCC KDB 662911 v02

1.5 Testing Location Information

Testing Location			
☒	HWA YA	ADD : No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.	
		TEL : 886-3-327-3456 FAX : 886-3-327-0973	
Test Condition	Test Site No.	Test Engineer	Test Environment
AC Conduction	CO04-HY	Zeus	24°C / 46%
RF Conducted	TH01-HY	Ian	24.8°C / 61%
Radiated Emission	03CH02-HY	Daniel	24.8°C / 53%

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		±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	±2.56 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			
Modulation Mode	Transmit Chains (N _{TX})	Data Rate / MCS	Worst Data Rate / MCS
11a,6-54Mbps	1	6-54Mbps	6 Mbps
HT20,M8-15	2	M8-15	MCS 8
HT40,M8-15	2	M8-15	MCS 8

2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter (5150-5250MHz band)						
Test Software Version	DRTU					
Modulation Mode	N _{TX}	Test Frequency (MHz)				
		NCB: 20MHz			NCB: 40MHz	
		5180	5200	5240	5190	5230
11a,6-54Mbps	1	26.5	30	29	-	-
HT20,M8-15	2	23,23	24.5,24.5	23.5,23.5	-	-
HT40,M8-15	2	-	-	-	19,19	23,23

The Worst Case Power Setting Parameter (5250-5350MHz band)						
Test Software Version	DRTU					
Modulation Mode	N _{TX}	Test Frequency (MHz)				
		NCB: 20MHz			NCB: 40MHz	
		5260	5300	5320	5270	5310
11a,6-54Mbps	1	29.5	29.5	26.5	-	-
HT20,M8-15	2	25,25	24.5,24.5	24.5,24.5	-	-
HT40,M8-15	2	-	-	-	19.5,19.5	21.5,21.5

The Worst Case Power Setting Parameter (5470-5725MHz band)							
Test Software Version	DRTU						
Modulation Mode	N _{TX}	Test Frequency (MHz)					
		NCB: 20MHz			NCB: 40MHz		
		5500	5580	5700	5510	5550	5670
11a,6-54Mbps	1	26	31.5	25	-	-	-
HT20,M8-15	2	21.5,21.5	23,23	23,23	-	-	-
HT40,M8-15	2	-	-	-	19,19	26.5,26.5	26,26

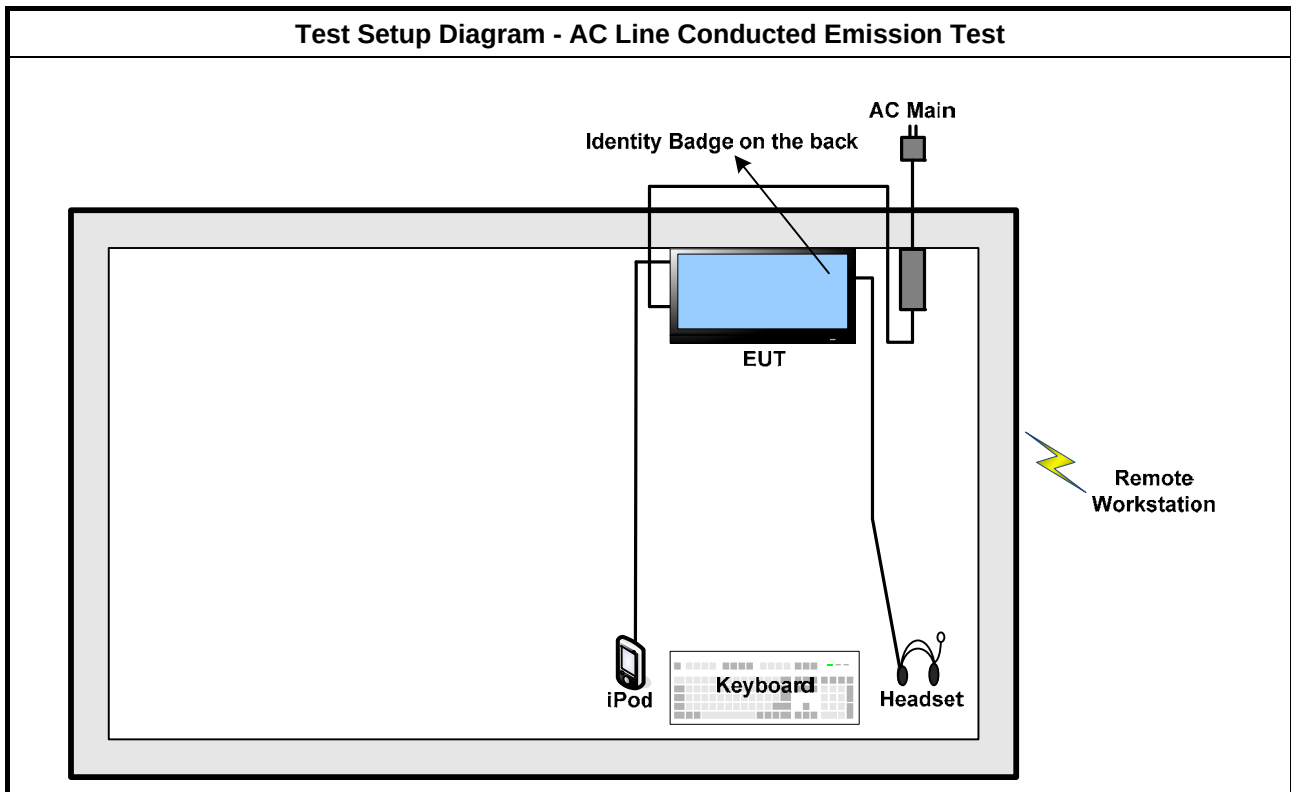
2.3 The Worst Case Measurement Configuration

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

The Worst Case Mode for Following Conformance Tests	
Tests Item	RF Output Power, Peak Power Spectral Density, Emission Bandwidth, Peak Excursion
Test Condition	Conducted measurement at transmit chains
Modulation Mode	11a, HT20, HT40

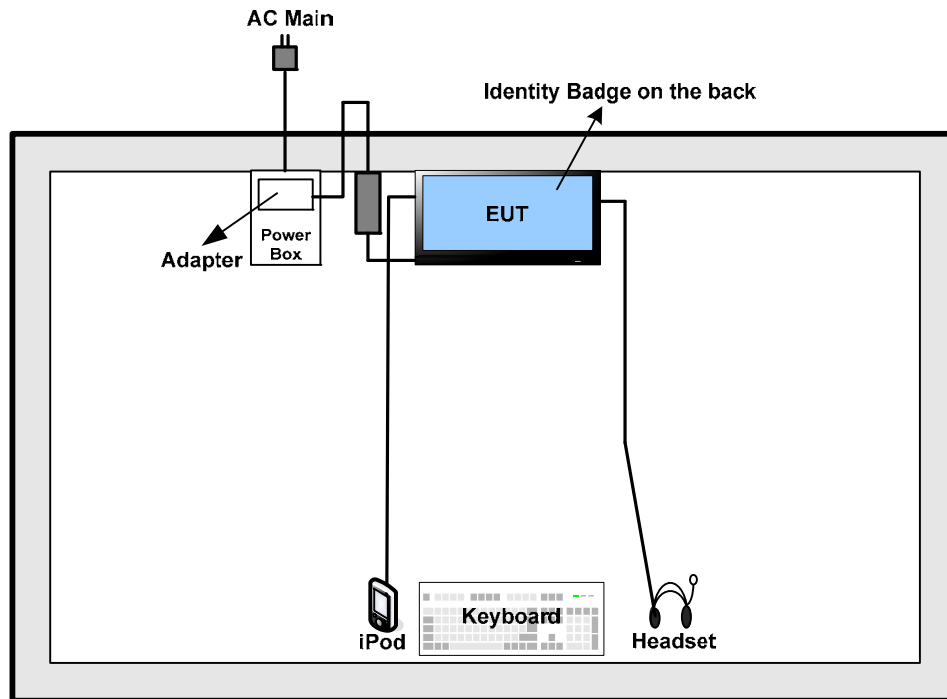
The Worst Case Mode for Following Conformance Tests			
Tests Item	Transmitter Radiated Unwanted Emissions Transmitter Radiated Bandedge Emissions		
Test Condition	Radiated measurement		
User Position	☒ EUT will be placed in fixed position. The worst planes is Z.		
	☐ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two 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. AC Power & Radio Link		
Modulation Mode	11a, HT20, HT40		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			

2.4 Test Setup Diagram



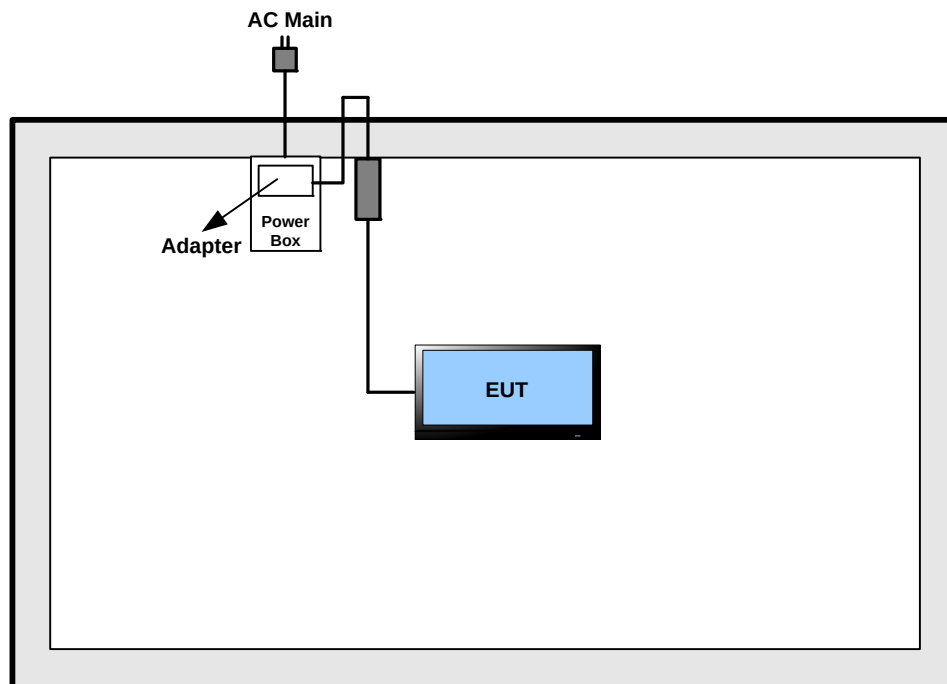
Test Setup Diagram - Radiated Below 1GHz Test

Operating Mode 1 **AC Power & Radio Link**



Test Setup Diagram - Radiated Above 1GHz Test

Operating Mode **AC Power & Continuous Transmit**



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.

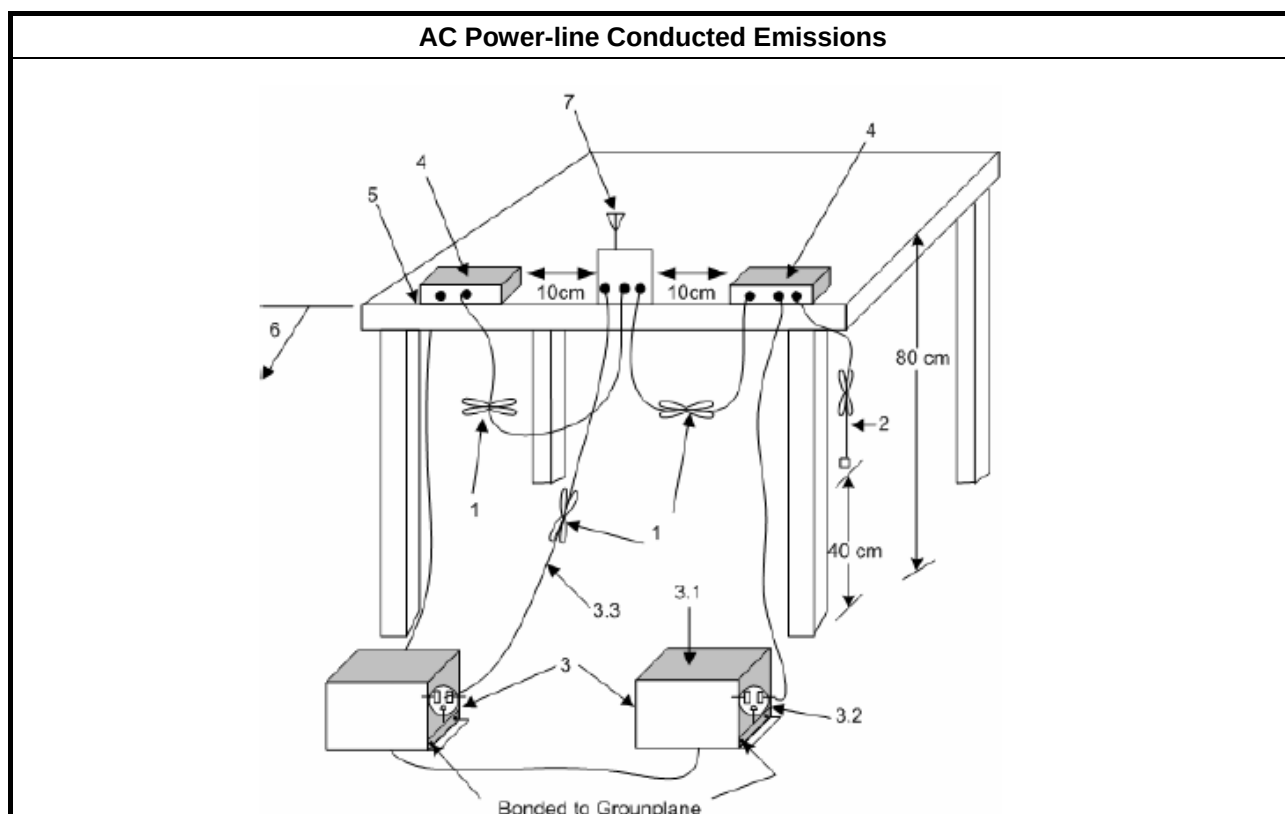
3.1.2 Measuring Instruments

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

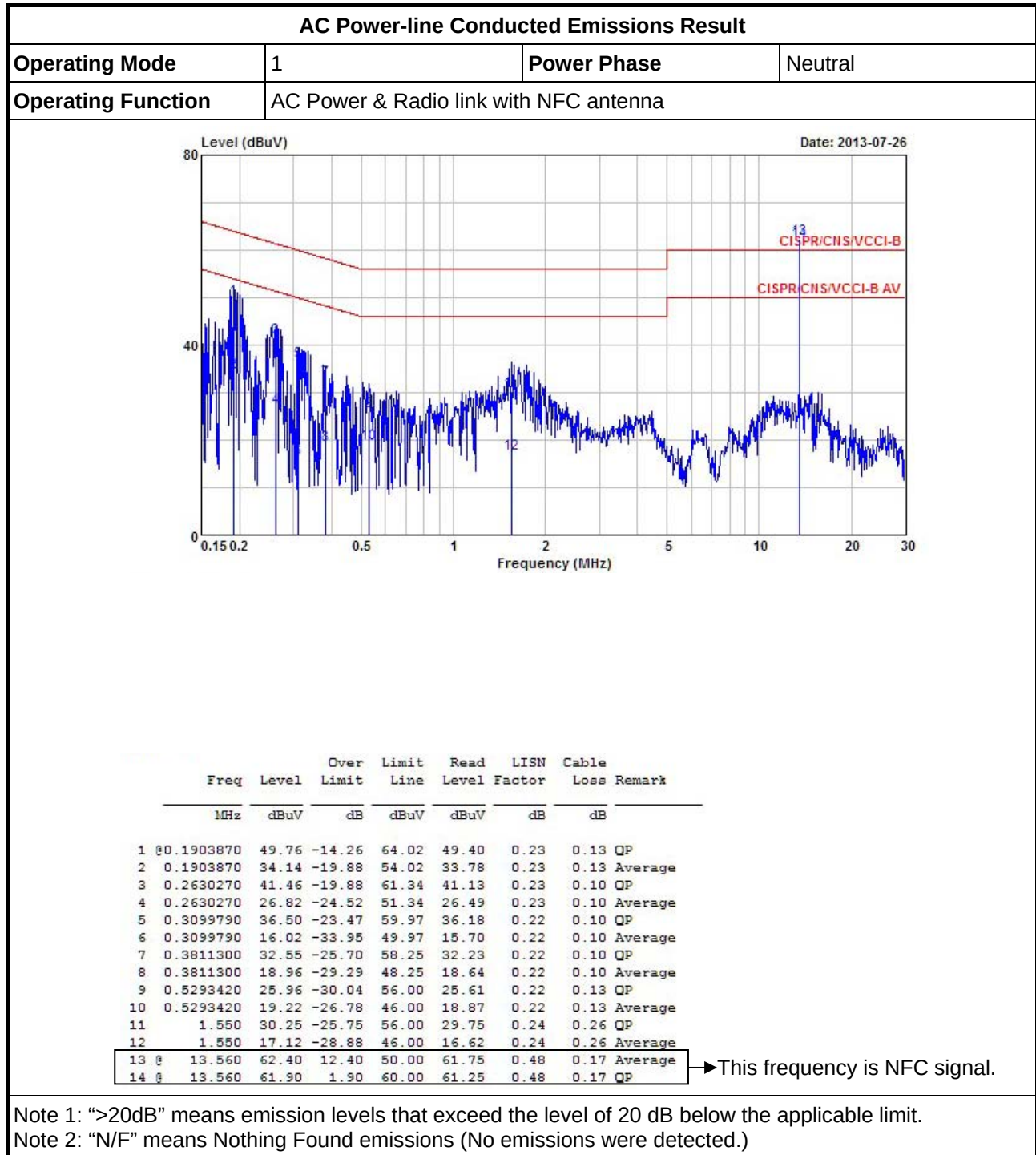
3.1.3 Test Procedures

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

3.1.4 Test Setup

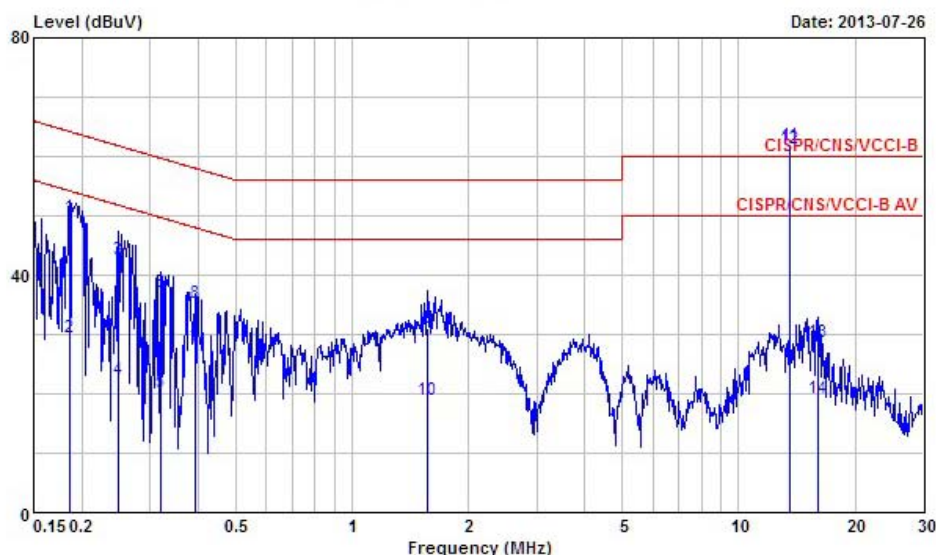


3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	AC Power & Radio link with NFC antenna		



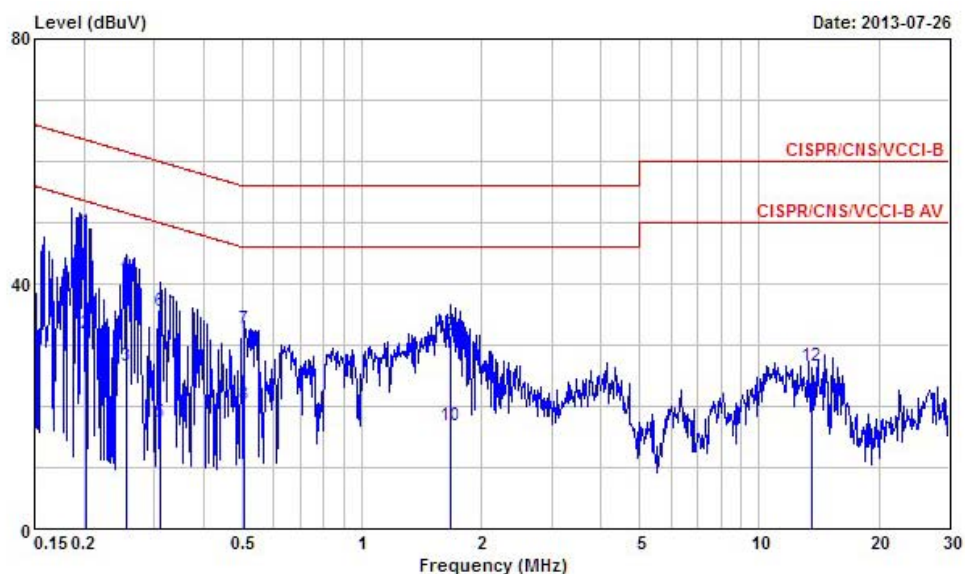
	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1854100	49.67	-14.57	64.24	49.42	0.11	0.14	QP
2	0.1854100	29.44	-24.80	54.24	29.19	0.11	0.14	Average
3	0.2481360	42.74	-19.08	61.82	42.53	0.11	0.10	QP
4	0.2481360	22.45	-29.37	51.82	22.24	0.11	0.10	Average
5	0.3183010	20.33	-29.42	49.75	20.13	0.10	0.10	Average
6	0.3183010	37.23	-22.52	59.75	37.03	0.10	0.10	QP
7	0.3934400	27.71	-20.28	47.99	27.51	0.10	0.10	Average
8	0.3934400	35.39	-22.60	57.99	35.19	0.10	0.10	QP
9	1.560	31.09	-24.91	56.00	30.71	0.12	0.26	QP
10	1.560	19.04	-26.96	46.00	18.66	0.12	0.26	Average
11	13.560	61.89	11.89	50.00	61.45	0.27	0.17	Average
12	13.560	61.33	1.33	60.00	60.89	0.27	0.17	QP
13	16.050	28.61	-31.39	60.00	28.12	0.29	0.20	QP
14	16.050	19.20	-30.80	50.00	18.71	0.29	0.20	Average

→This frequency is NFC signal.

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

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	AC Power & Radio link with NFC dummy load		

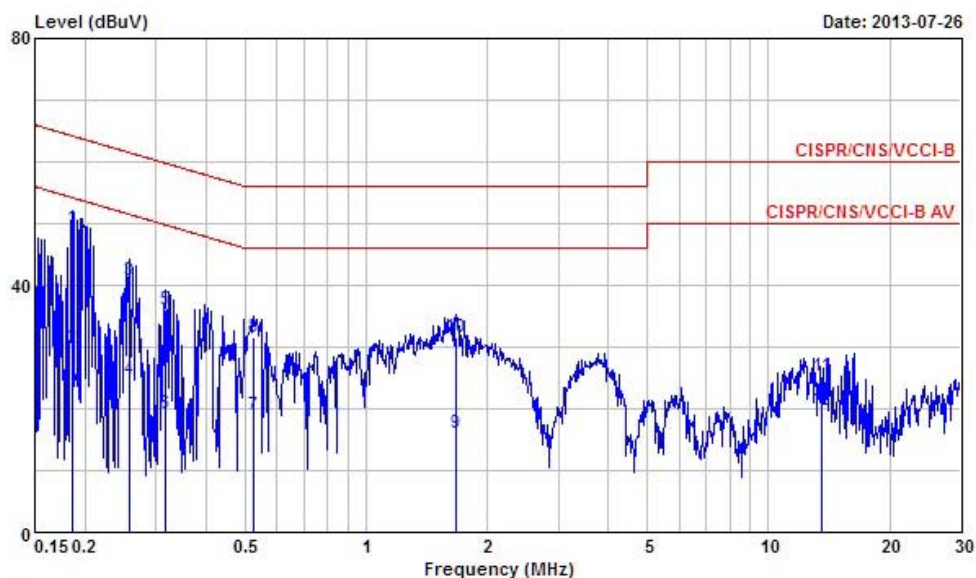


	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.2018130	48.53	-15.01	63.54	48.20	0.23	0.10	QP
2	0.2018130	31.83	-21.71	53.54	31.50	0.23	0.10	Average
3	0.2547970	26.56	-25.04	51.60	26.23	0.23	0.10	Average
4	0.2547970	41.53	-20.07	61.60	41.20	0.23	0.10	QP
5	0.3116260	17.44	-32.49	49.93	17.12	0.22	0.10	Average
6	0.3116260	35.42	-24.51	59.93	35.10	0.22	0.10	QP
7	0.5046930	32.52	-23.48	56.00	32.18	0.22	0.12	QP
8	0.5046930	20.39	-25.61	46.00	20.05	0.22	0.12	Average
9	1.670	31.61	-24.39	56.00	31.10	0.24	0.27	QP
10	1.670	16.93	-29.07	46.00	16.42	0.24	0.27	Average
11	13.560	21.27	-28.73	50.00	20.62	0.48	0.17	Average
12	13.560	26.53	-33.47	60.00	25.88	0.48	0.17	QP

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

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	AC Power & Radio link with NFC dummy load		



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1863950	49.24	-14.96	64.20	48.99	0.11	0.14	QP
2	0.1863950	29.82	-24.38	54.20	29.57	0.11	0.14	Average
3	0.2588790	40.76	-20.71	61.47	40.55	0.11	0.10	QP
4	0.2588790	24.80	-26.67	51.47	24.59	0.11	0.10	Average
5	0.3166190	35.95	-23.85	59.80	35.75	0.10	0.10	QP
6	0.3166190	19.30	-30.50	49.80	19.10	0.10	0.10	Average
7	0.5237620	18.99	-27.01	46.00	18.76	0.10	0.13	Average
8	0.5237620	31.46	-24.54	56.00	31.23	0.10	0.13	QP
9	1.670	15.93	-30.07	46.00	15.54	0.12	0.27	Average
10	1.670	31.56	-24.44	56.00	31.17	0.12	0.27	QP
11	13.560	25.35	-34.65	60.00	24.91	0.27	0.17	QP
12	13.560	19.73	-30.27	50.00	19.29	0.27	0.17	Average

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

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

3.2 Emission Bandwidth

3.2.1 Emission Bandwidth (EBW) Limit

Emission Bandwidth (EBW) Limit	
UNII Devices	
☒	For the 5.15-5.25 GHz band, the maximum conducted output power shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz.
☒	For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz.
☒	For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz.
☐	For the 5.725-5.825 GHz band, the maximum conducted output power shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz.
LE-LAN Devices	
☒	For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☒	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☒	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☐	For the 5.725-5.825 GHz band, the maximum e.i.r.p. shall not exceed 4.0 W or $23 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

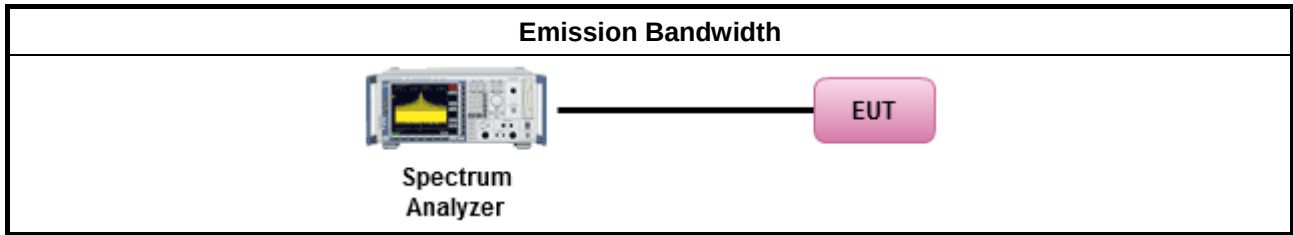
3.2.2 Measuring Instruments

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 789033, clause C for EBW and clause D for OBW measurement.
☐	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
☒	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain.
☒	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☒	The EUT supports 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.

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

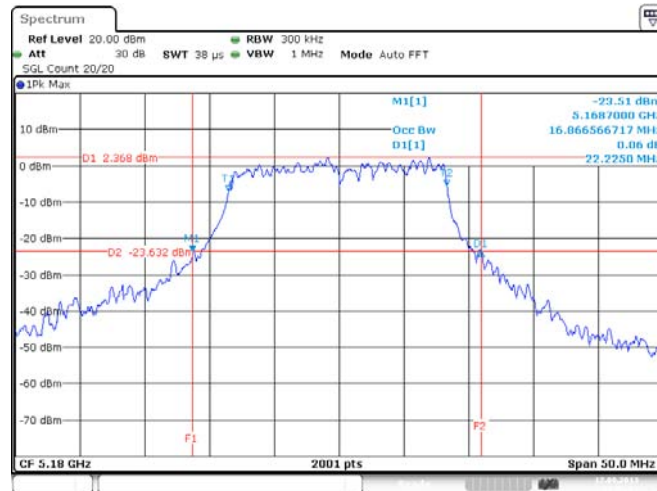
UNII Emission Bandwidth Result (5150-5250MHz band)								
Condition			Emission Bandwidth (MHz)					
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth		26dB Bandwidth		Power Limit	
			Chain Port 1	Chain Port 2	Chain Port 1	Chain Port 2	99% BW	26dB BW
11a	1	5180	16.86	-	22.22	-	16.27	17.47
11a	1	5200	16.71	-	25.27	-	16.23	18.03
11a	1	5240	16.94	-	24.52	-	16.29	17.90
HT20	2	5180	17.89	17.94	22.67	21.87	16.53	17.40
HT20	2	5200	17.69	17.71	20.40	20.20	16.48	17.05
HT20	2	5240	17.99	17.79	21.55	21.50	16.50	17.32
HT40	2	5190	36.06	36.06	41.32	41.64	19.57	20.16
HT40	2	5230	36.10	35.98	41.72	41.20	19.56	20.15
Result			Complied					
Note 1: N _{TX} = Number of Transmit Chains								

UNII Emission Bandwidth Result (5250-5350MHz band)								
Condition			Emission Bandwidth (MHz)					
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth		26dB Bandwidth		Power Limit	
			Chain Port 1	Chain Port 2	Chain Port 1	Chain Port 2	99% BW	26dB BW
11a	1	5260	17.11	-	24.37	-	23.33	24.87
11a	1	5300	17.09	-	26.72	-	23.33	25.27
11a	1	5320	17.34	-	21.75	-	23.39	24.37
HT20	2	5260	17.64	17.89	21.57	21.17	23.46	24.26
HT20	2	5300	17.91	17.71	20.87	20.45	23.48	24.11
HT20	2	5320	17.79	17.71	21.10	21.45	23.48	24.24
HT40	2	5270	36.02	36.10	41.64	41.40	26.57	27.17
HT40	2	5310	36.10	36.06	41.32	41.84	26.57	27.16
Result			Complied					
Note 1: N _{TX} = Number of Transmit Chains								

UNII Emission Bandwidth Result (5470-5725MHzMHz band)								
Condition			Emission Bandwidth (MHz)					
Modulation Mode	N _{TX}	Freq. (MHz)	99% Bandwidth		26dB Bandwidth		Power Limit	
			Chain Port 1	Chain Port 2	Chain Port 1	Chain Port 2	99% BW	26dB BW
11a	1	5500	16.59	-	20.37	-	23.20	24.09
11a	1	5580	17.89	-	35.57	-	23.53	26.51
11a	1	5700	16.84	-	21.20	-	23.26	24.26
HT20	2	5500	18.04	17.94	22.32	22.17	23.54	24.46
HT20	2	5580	18.19	17.99	22.42	22.40	23.55	24.50
HT20	2	5700	18.16	18.01	23.05	22.60	23.56	24.54
HT40	2	5510	36.10	36.10	42.56	42.36	26.58	27.27
HT40	2	5550	36.06	36.10	42.28	42.00	26.57	27.23
HT40	2	5670	36.10	36.10	41.40	41.24	26.58	27.15
Result			Complied					
Note 1: N _{TX} = Number of Transmit Chains								

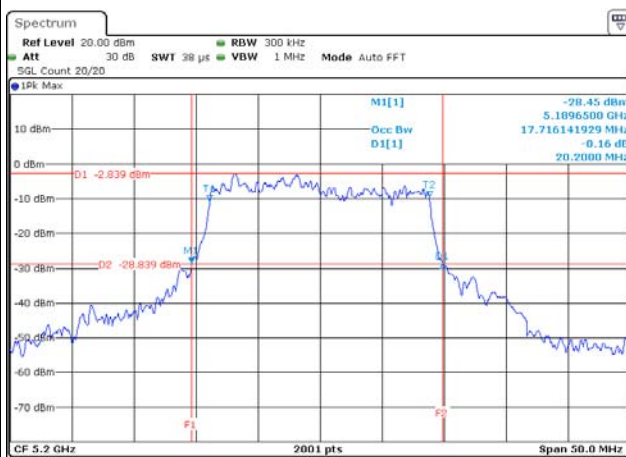
5150-5250MHz - Worst Emission 26dB Bandwidth Plots

11a



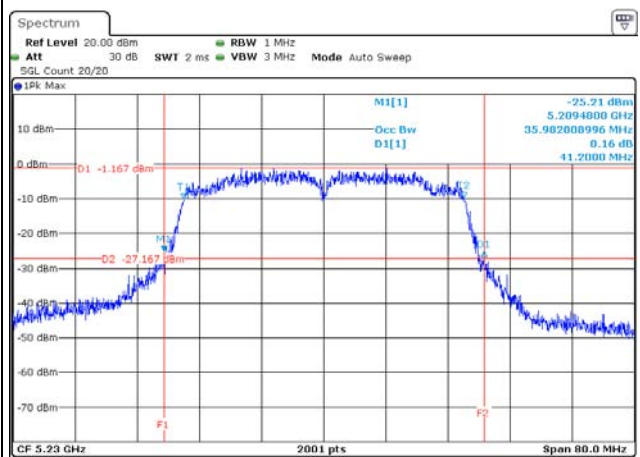
Date: 17.SEP.2013 20:56:51

HT20



Date: 17.SEP.2013 21:06:30

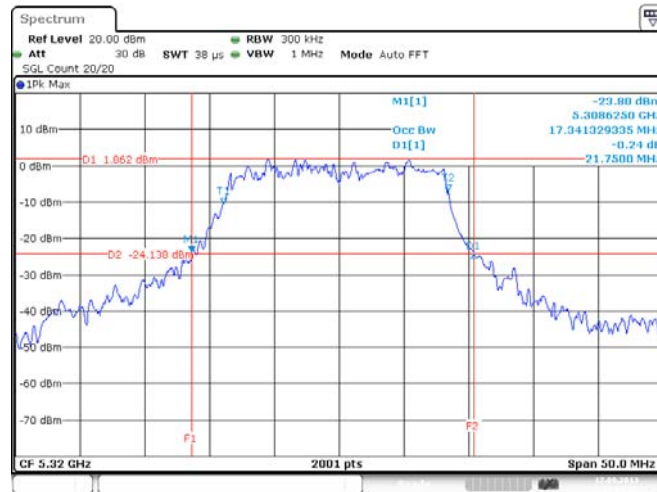
HT40



Date: 17.SEP.2013 21:23:54

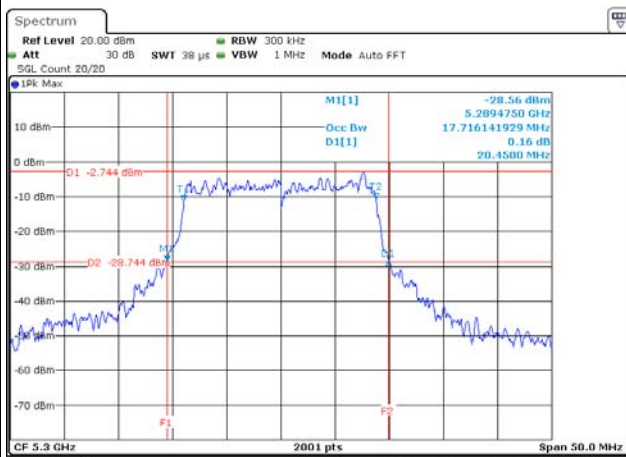
5250-5350MHz - Worst Emission 26dB Bandwidth Plots

11a



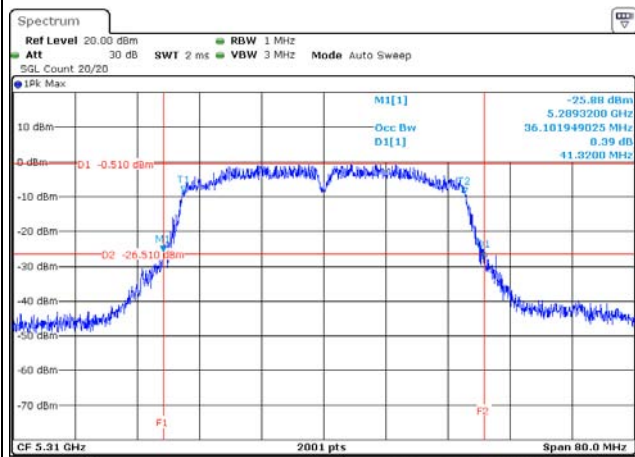
Date: 17.SEP.2013 21:00:26

HT20



Date: 17.SEP.2013 21:12:23

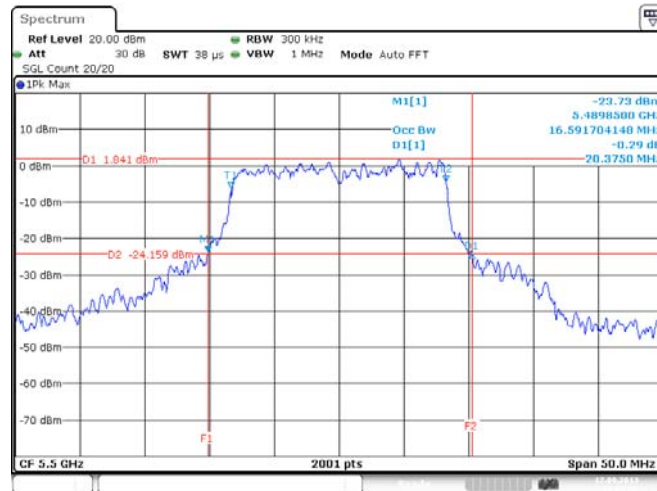
HT40



Date: 17.SEP.2013 21:25:45

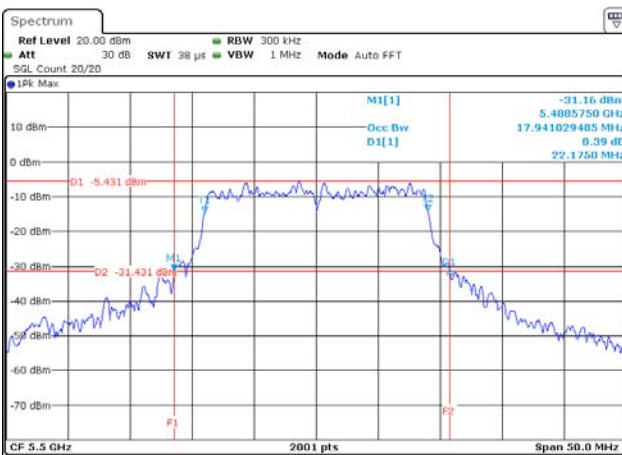
5470-5725MHz - Worst Emission 26dB Bandwidth Plots

11a



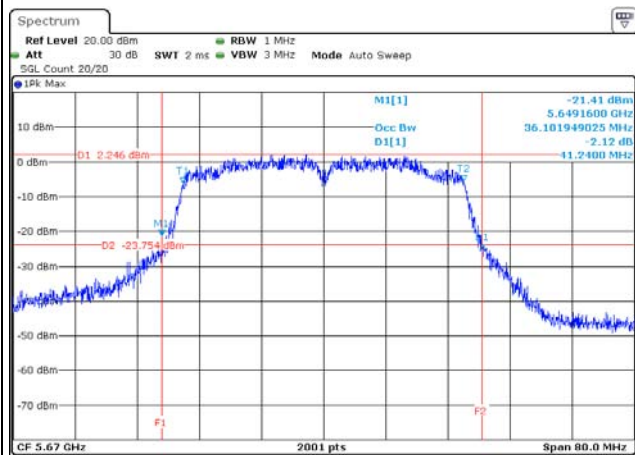
Date: 17.SEP.2013 21:01:33

HT20



Date: 17.SEP.2013 21:15:14

HT40



Date: 17.SEP.2013 21:29:24

3.3 RF Output Power

3.3.1 RF Output Power Limit

Maximum Conducted Output Power Limit	
UNII Devices	
☒	For the 5.15-5.25 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 17 - (G_{TX} - 6)$.
☒	For the 5.25-5.35 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 24 - (G_{TX} - 6)$.
☒	For the 5.47-5.725 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 24 - (G_{TX} - 6)$.
☐	For the 5.725-5.825 GHz band:
☐	Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6 \text{ dBi}$, then $P_{Out} = 30 - (G_{TX} - 6)$.
☐	Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 23 \text{ dBi}$, then $P_{Out} = 30 - (G_{TX} - 23)$.
LE-LAN Devices	
☒	For the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☒	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☒	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☐	For the 5.725-5.825 GHz band, the maximum e.i.r.p. shall not exceed 4.0 W or $23 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☐	Point-to-multipoint systems (P2M): the maximum e.i.r.p. shall not exceed 4.0 W or $23 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☐	Point-to-point systems (P2P): the maximum e.i.r.p. shall not exceed 4.0 W or $23 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. If e.i.r.p. $> 36 \text{ dBm}$, $G_{TX} \leq P_{Out}$
P_{Out} = maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.	

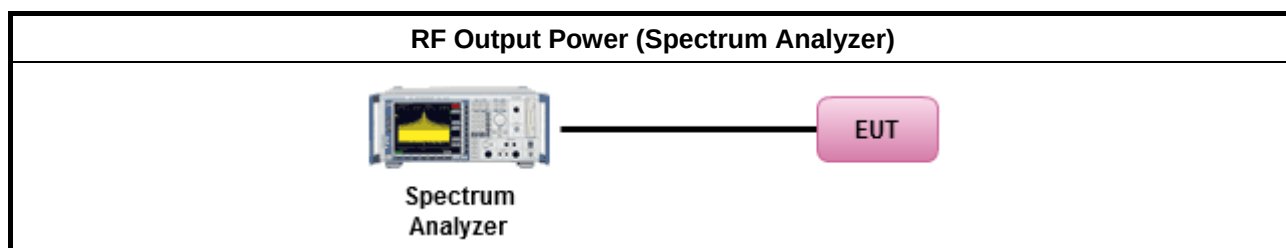
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
☒	Maximum Conducted Output Power
	[duty cycle $\geq 98\%$ or external video / power trigger]
☒	Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).
☐	Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)
	duty cycle $< 98\%$ and average over on/off periods with duty factor
☐	Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).
☐	Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
	Wideband RF power meter and average over on/off periods with duty factor
☐	Refer as FCC KDB 789033, clause E Method PM (using an RF average power meter).
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain.
☒	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☒	The EUT supports multiple transmit chains using options given below: 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: $P_{\text{total}} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $\text{EIRP}_{\text{total}} = P_{\text{total}} + \text{DG}$

3.3.4 Test Setup



3.3.5 Directional Gain for Power Measurement

Directional Gain (DG) Result				
Transmit Chains No.	1	2	-	-
Maximum G_{ANT} (dBi)	-0.65	-1.45	-	-
Modulation Mode	N_{TX}	N_{SS} (Min.)	Array Gain (dB)	Power DG (dBi) Note ³
11a,6-54Mbps	1	1	-	-0.65
HT20,M8-M15	2	2	0	-1.03
HT40, M8-M15	2	2	0	-1.03

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 = $G_{ANT} + 10 \log(N_{TX})$
All transmit signals are completely uncorrelated, Directional Gain = 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 = $10 \log[(10^{G_{1/20}} + \dots + 10^{G_{N/20}})^2 / N_{TX}]$
All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G_{1/10}} + \dots + 10^{G_{N/10}}) / N_{TX}]$

Note 3: For Spatial Multiplexing, Directional Gain (DG) = $G_{ANT} + 10 \log(N_{TX}/N_{SS})$,
where N_{SS} = the number of independent spatial streams data.

Note 4: For CDD transmissions, directional gain is calculated as power measurements:
Directional Gain (DG) = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows:
Array Gain = 0 dB (i.e., no array gain) for $N_{TX} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{TX} ;

3.3.6 Test Result of Maximum Conducted Output Power

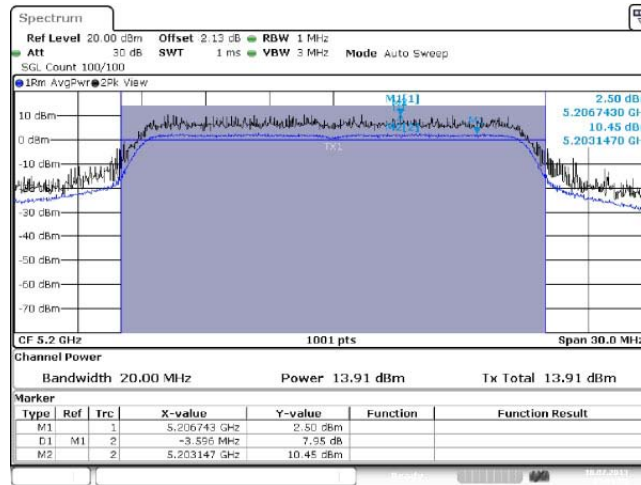
Maximum Conducted Output Power Result									
Condition			RF Output Power (dBm)						
Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 1	Chain Port 2	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11a	1	5180	11.69	-	11.69	17.00	-0.65	11.04	22.27
11a	1	5200	13.95	-	13.95	17.00	-0.65	13.30	22.23
11a	1	5240	13.84	-	13.84	17.00	-0.65	13.19	22.29
HT20	2	5180	7.57	7.03	10.32	17.00	-1.03	9.28	22.53
HT20	2	5200	8.06	7.64	10.86	17.00	-1.03	9.83	22.48
HT20	2	5240	7.93	7.62	10.79	17.00	-1.03	9.75	22.50
HT40	2	5190	3.03	3.48	6.27	17.00	-1.03	5.24	23.00
HT40	2	5230	8.25	7.60	10.94	17.00	-1.03	9.91	23.00
Result			Complied						

Maximum Conducted Output Power Result									
Condition			RF Output Power (dBm)						
Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 1	Chain Port 2	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11a	1	5260	14.19	-	14.19	24.00	-0.65	13.54	29.33
11a	1	5300	14.38	-	14.38	24.00	-0.65	13.73	29.33
11a	1	5320	11.72	-	11.72	24.00	-0.65	11.07	29.39
HT20	2	5260	8.77	7.76	11.30	24.00	-1.03	10.27	29.46
HT20	2	5300	8.17	8.26	11.22	24.00	-1.03	10.19	29.48
HT20	2	5320	7.60	8.00	10.81	24.00	-1.03	9.78	29.48
HT40	2	5270	4.48	4.13	7.32	24.00	-1.03	6.28	30.00
HT40	2	5310	5.79	6.14	8.98	24.00	-1.03	7.94	30.00
Result			Complied						

Maximum Conducted Output Power Result									
Condition			RF Output Power (dBm)						
Modulation Mode	N _{TX}	Freq. (MHz)	Chain Port 1	Chain Port 2	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11a	1	5500	11.84	-	11.84	24.00	-0.65	11.19	29.20
11a	1	5580	14.98	-	14.98	24.00	-0.65	14.33	29.53
11a	1	5700	10.73	-	10.73	24.00	-0.65	10.08	29.26
HT20	2	5500	5.25	6.24	8.78	24.00	-1.03	7.75	29.54
HT20	2	5580	8.44	9.09	11.79	24.00	-1.03	10.75	29.55
HT20	2	5700	5.47	6.32	8.92	24.00	-1.03	7.89	29.56
HT40	2	5510	3.48	3.68	6.59	24.00	-1.03	5.56	30.00
HT40	2	5550	8.45	9.28	11.89	24.00	-1.03	10.86	30.00
HT40	2	5670	8.03	8.82	11.45	24.00	-1.03	10.42	30.00
Result			Complied						

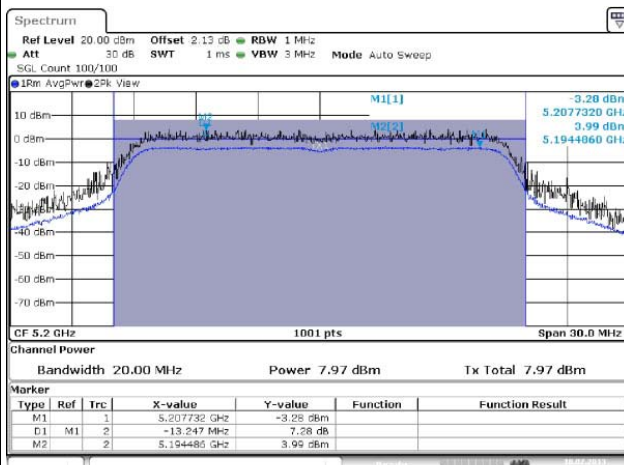
5150-5250MHz - Worst RF Output Power Plots

11a [Port 1]



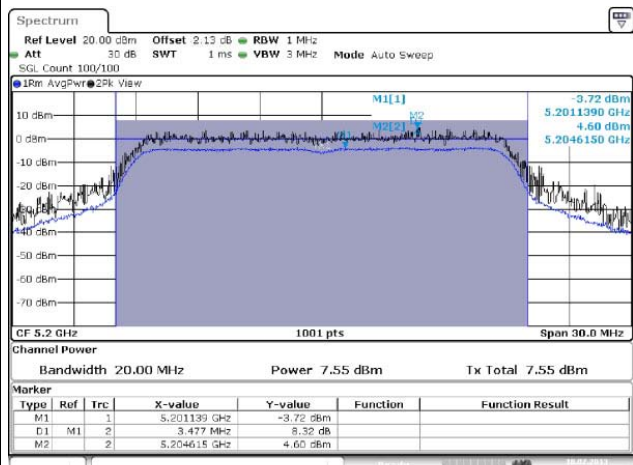
Date: 18.JUL.2013 03:44:50

HT20 [Port 1]



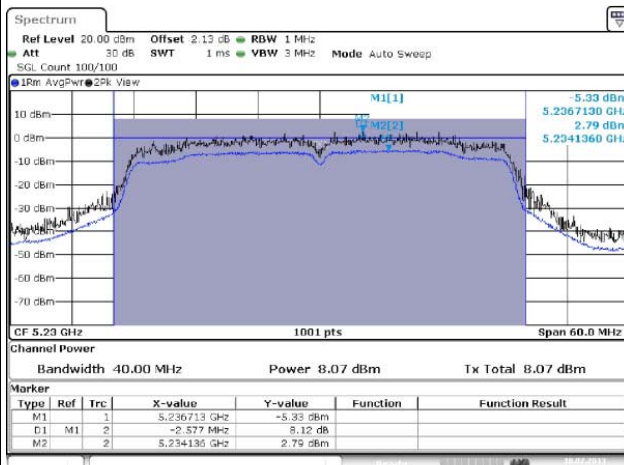
Date: 18.JUL.2013 04:10:03

HT20 [Port 2]



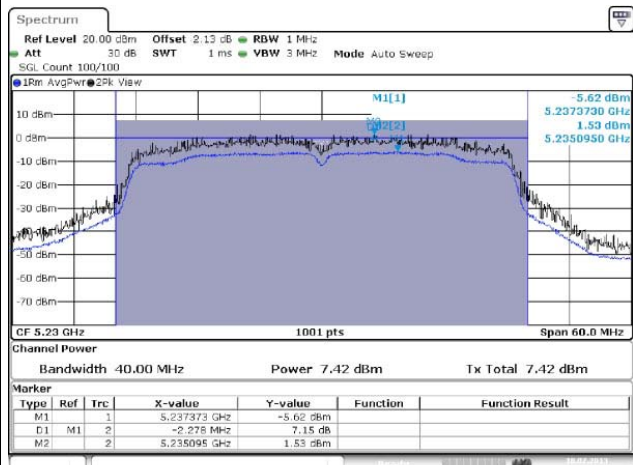
Date: 18.JUL.2013 04:10:10

HT40 [Port 1]



Date: 18.JUL.2013 04:15:54

HT40 [Port 2]

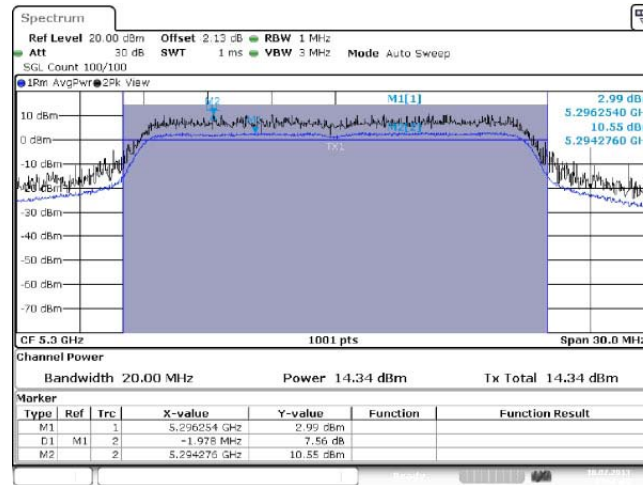


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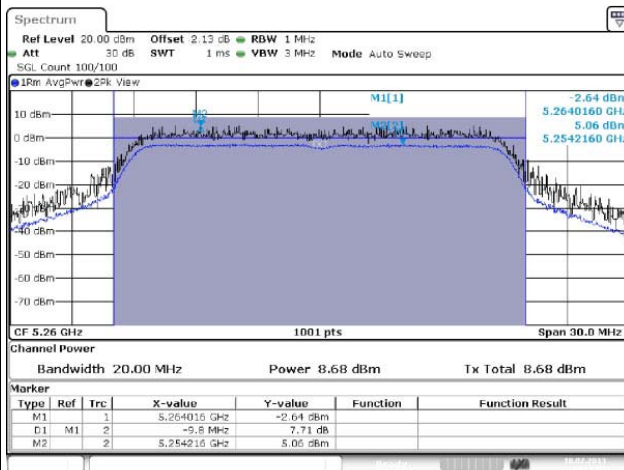
Note 1: RF Output Power Plots w/o Duty Factor

5250-5350MHz - Worst RF Output Power Plots

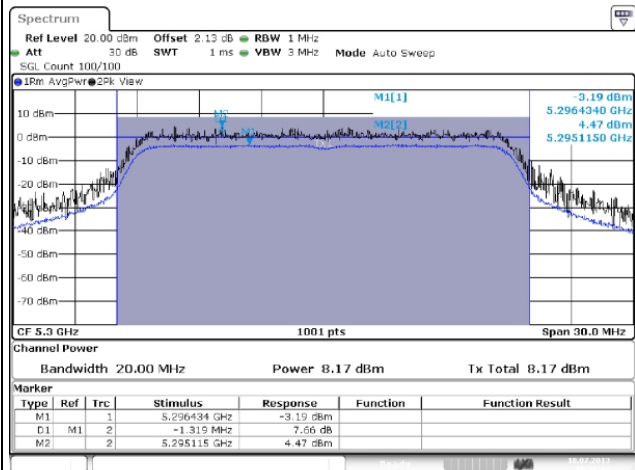
11a [Port 1]



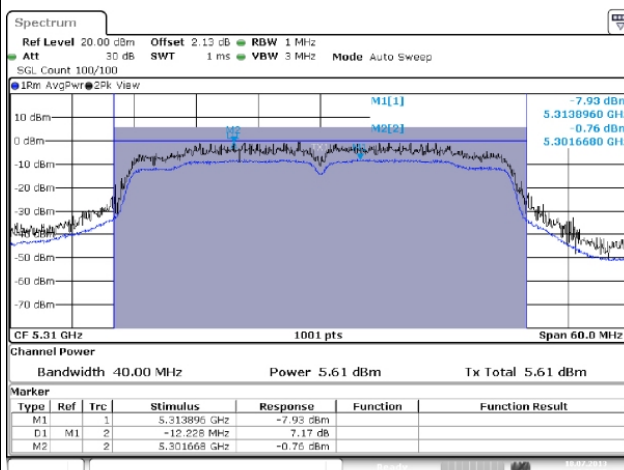
HT20 [Port 1]



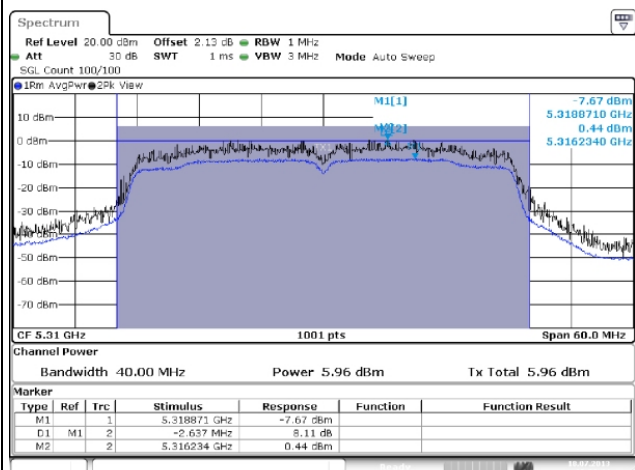
HT20 [Port 2]



HT40 [Port 2]



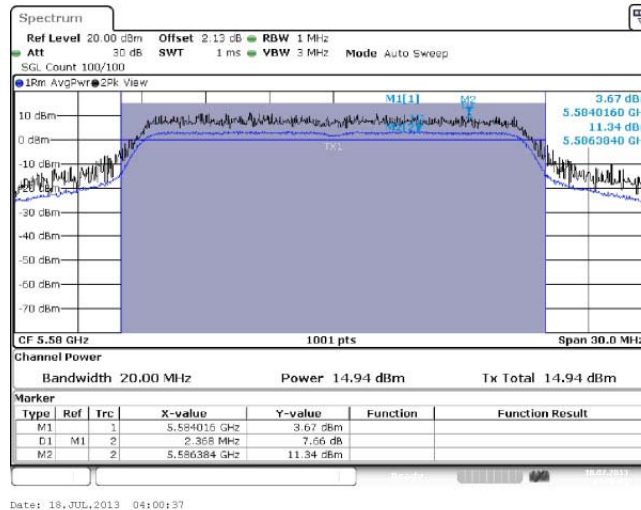
HT40 [Port 2]



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

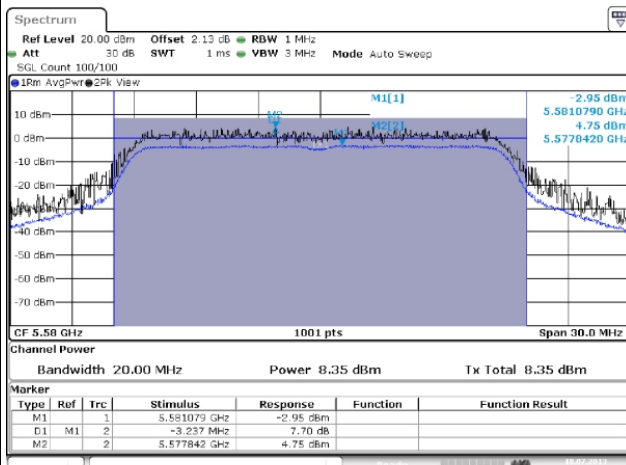
5470-5725MHz - Worst RF Output Power Plots

11a [Port 1]



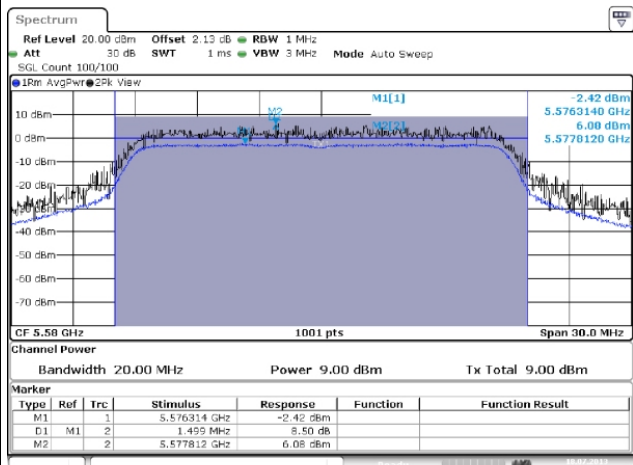
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HT20 [Port 1]



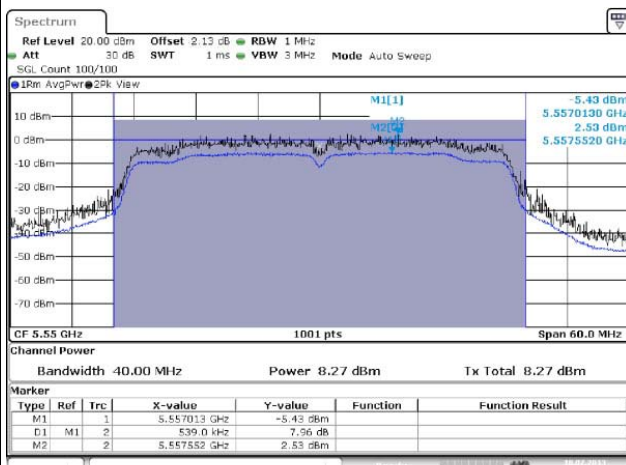
Date: 18.JUL.2013 12:27:18

HT20 [Port 2]



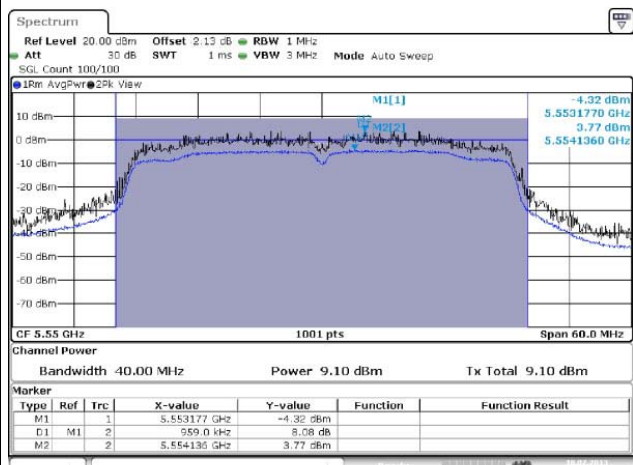
Date: 18.JUL.2013 12:27:26

HT40 [Port 1]



Date: 18.JUL.2013 04:20:38

HT40 [Port 2]



Date: 18.JUL.2013 04:20:46

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

3.4 Peak Power Spectral Density

3.4.1 Peak Power Spectral Density Limit

Peak Power Spectral Density Limit	
UNII Devices	
☒	For the 5.15-5.25 GHz band, the peak power spectral density (PPSD) ≤ 4 dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 4 - (G_{TX} - 6)$.
☒	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 11 - (G_{TX} - 6)$.
☒	For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 11 - (G_{TX} - 6)$.
☐	For the 5.725-5.825 GHz band:
☐	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 17 dBm/MHz. If $G_{TX} > 6$ dBi, then $PPSD = 17 - (G_{TX} - 6)$.
☐	Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 17 dBm/MHz. If $G_{TX} > 23$ dBi, then $PPSD = 17 - (G_{TX} - 23)$.
LE-LAN Devices	
☒	For the 5.15-5.25 GHz band, the peak power spectral density (PPSD) ≤ 4 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) ≤ 10 dBm/MHz.
☒	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) ≤ 17 dBm/MHz.
☒	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) ≤ 17 dBm/MHz.
☐	For the 5.725-5.825 GHz band, the peak power spectral density (PPSD) ≤ 17 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) ≤ 23 dBm/MHz.
PPSD = peak power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz G_{TX} = the maximum transmitting antenna directional gain in dBi.	

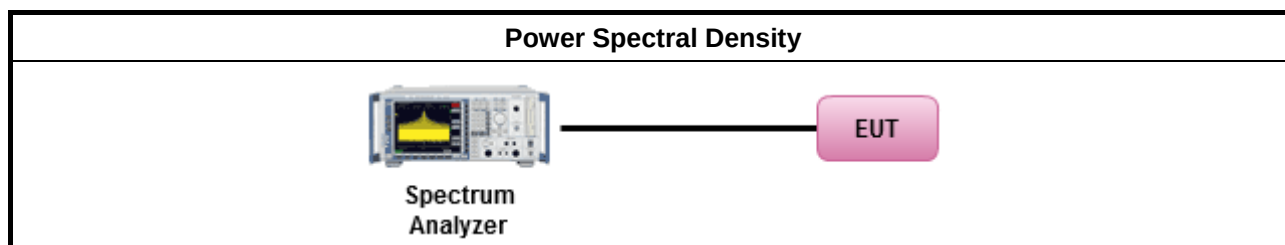
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method	
☒	Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:
☐	Refer as FCC KDB 789033, F5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth
	[duty cycle ≥ 98% or external video / power trigger]
☒	Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).
☐	Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)
	duty cycle < 98% and average over on/off periods with duty factor
☐	Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).
☐	Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
☒	For conducted measurement.
☒	The EUT supports single transmit chain and measurements performed on this transmit chain.
☒	The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
☒	The EUT supports 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 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.
☐	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.
☒	If multiple transmit chains, EIRP PPSD calculation could be following as methods: $PPSD_{total} = PPSD_1 + PPSD_2 + \dots + PPSD_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = PPSD_{total} + DG$
☒	Each individually PPSD plots refer as test report clause 3.3.5 with each individually PPSD plots.

3.4.4 Test Setup



3.4.5 Directional Gain for Power Spectral Density Measurement

Directional Gain (DG) Result				
Transmit Chains No.	1	2	-	-
Maximum G_{ANT} (dBi)	-0.65	-1.45	-	-
Modulation Mode	N_{TX}	N_{SS} (Min.)	Array Gain (dB)	PSD DG (dBi) Note ³
11a,6-54Mbps	1	1	-	-0.65
HT20,M8-M15	2	2	-1.03	1.98
HT40, M8-M15	2	2	-1.03	1.98

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 = $G_{ANT} + 10 \log(N_{TX})$
All transmit signals are completely uncorrelated, Directional Gain = 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 = $10 \log[(10^{G_{1/20}} + \dots + 10^{G_{N/20}})^2 / N_{TX}]$
All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G_{1/10}} + \dots + 10^{G_{N/10}}) / N_{TX}]$

Note 3: For Spatial Multiplexing, Directional Gain (DG) = $G_{ANT} + 10 \log(N_{TX}/N_{SS})$,
where N_{SS} = the number of independent spatial streams data.

Note 4: For CDD transmissions, directional gain is calculated as power measurements:
Directional Gain (DG) = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows:
Array Gain = 0 dB (i.e., no array gain) for $N_{TX} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{TX} ;

3.4.6 Test Result of Peak Power Spectral Density

Peak Power Spectral Density Result (5150-5250MHz band)							
Condition			Power Spectral Density				
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain	PSD Limit	DG (dBi)	EIRP PSD	EIRP Limit
11a	1	5180	0.22	4.00	-0.65	-0.43	10.00
11a	1	5200	2.54	4.00	-0.65	1.89	10.00
11a	1	5240	2.45	4.00	-0.65	1.80	10.00
HT20	2	5180	-1.22	4.00	1.98	0.76	10.00
HT20	2	5200	-0.68	4.00	1.98	1.30	10.00
HT20	2	5240	-0.71	4.00	1.98	1.27	10.00
HT40	2	5190	-7.40	4.00	1.98	-5.42	10.00
HT40	2	5230	-2.52	4.00	1.98	-0.54	10.00
Result			Complied				

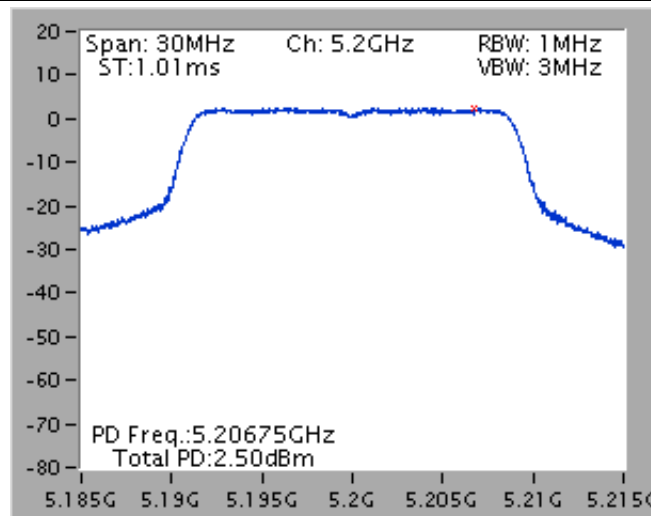
Peak Power Spectral Density Result (5250-5350MHz band)							
Condition			Power Spectral Density				
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain	PSD Limit	DG (dBi)	EIRP PSD	EIRP Limit
11a	1	5260	2.77	11.00	-0.65	2.12	17.00
11a	1	5300	3.03	11.00	-0.65	2.38	17.00
11a	1	5320	0.31	11.00	-0.65	-0.34	17.00
HT20	2	5180	-0.11	11.00	1.98	1.87	17.00
HT20	2	5200	-0.40	11.00	1.98	1.58	17.00
HT20	2	5240	-0.72	11.00	1.98	1.26	17.00
HT40	2	5190	-6.35	11.00	1.98	-4.37	17.00
HT40	2	5230	-4.83	11.00	1.98	-2.85	17.00
Result			Complied				

Peak Power Spectral Density Result (5470-5725MHz band)							
Condition			Power Spectral Density				
Modulation Mode	N _{TX}	Freq. (MHz)	Sum Chain	PSD Limit	DG (dBi)	EIRP PSD	EIRP Limit
11a	1	5500	0.38	11.00	-0.65	-0.27	17.00
11a	1	5580	3.71	11.00	-0.65	3.06	17.00
11a	1	5700	-0.53	11.00	-0.65	-1.18	17.00
HT20	2	5500	-2.80	11.00	1.98	-0.82	17.00
HT20	2	5580	0.32	11.00	1.98	2.30	17.00
HT20	2	5700	-2.69	11.00	1.98	-0.71	17.00
HT40	2	5510	-7.18	11.00	1.98	-5.20	17.00
HT40	2	5550	-1.81	11.00	1.98	0.17	17.00
HT40	2	5670	-2.23	11.00	1.98	-0.25	17.00
Result			Complied				

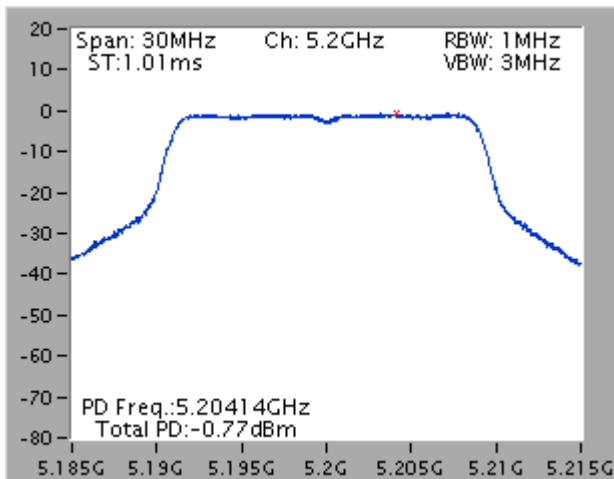


5150-5250MHz - Worst Power Spectral Density Plots

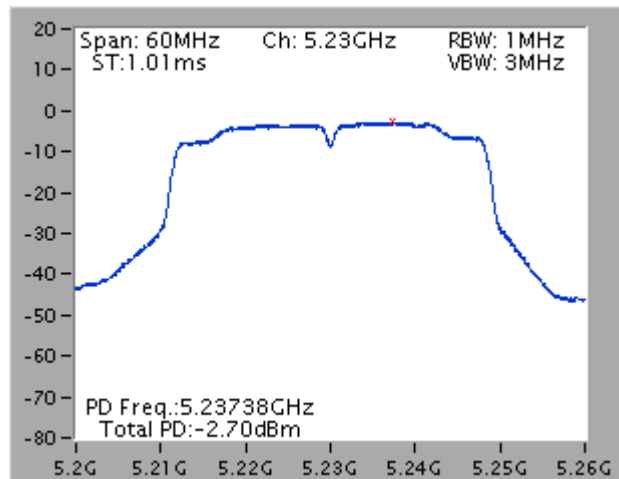
11a [Sum All Chains]



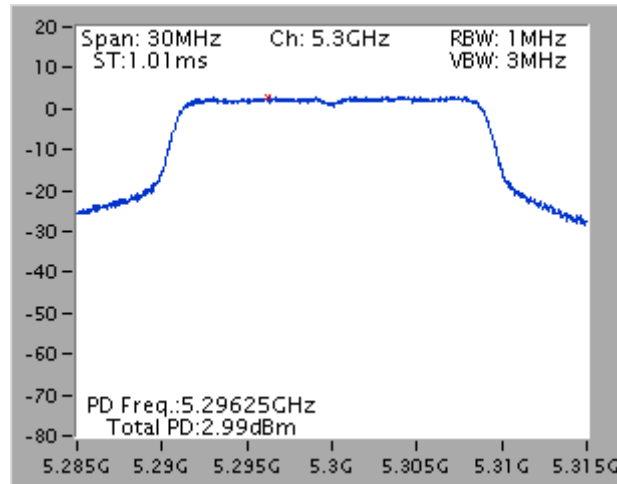
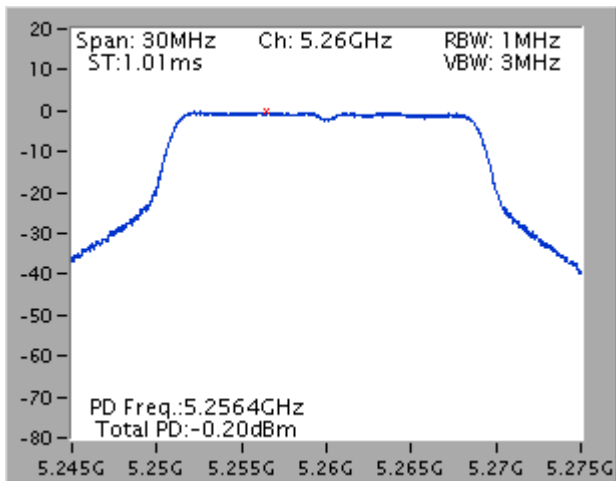
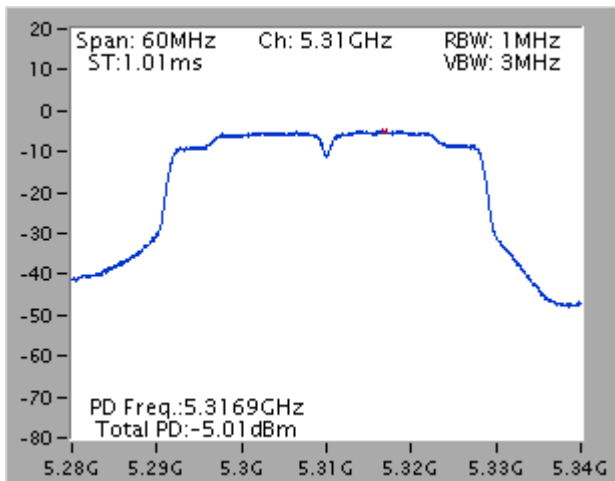
HT20 [Sum All Chains]



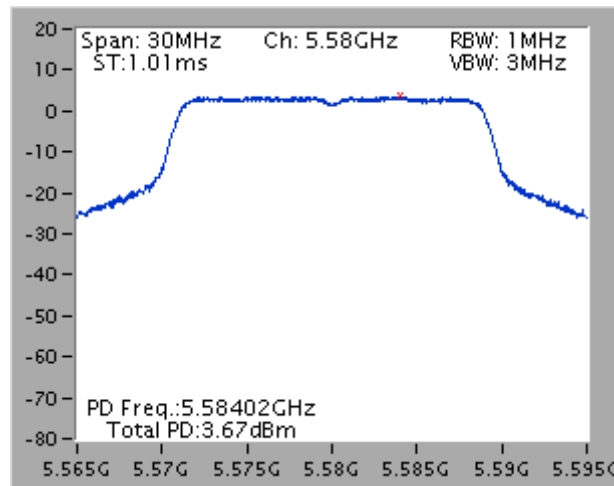
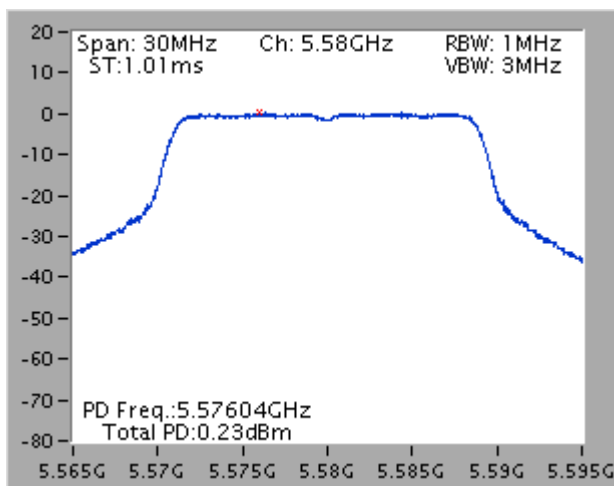
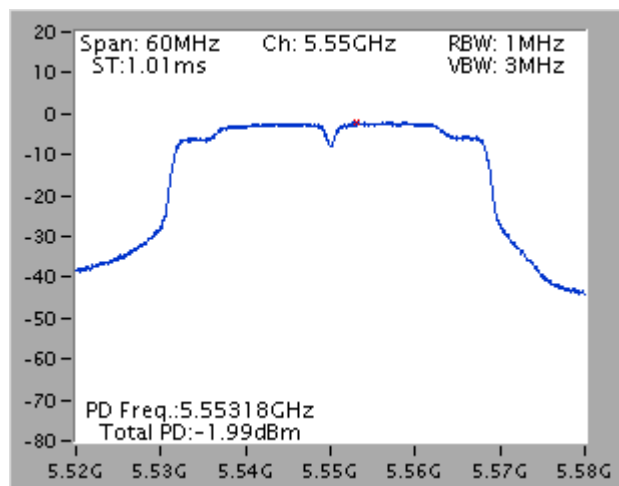
HT40 [Sum All Chains]



Note 1: Power Density Plots w/o Duty Factor

5250-5350MHz - Worst Power Spectral Density Plots
11a [Sum All Chains]

HT20 [Sum All Chains]

HT40 [Sum All Chains]


Note 1: Power Density Plots w/o Duty Factor

5470-5725MHz - Worst Power Spectral Density Plots
11a [Sum All Chains]

HT20 [Sum All Chains]

HT40 [Sum All Chains]


Note 1: Power Density Plots w/o Duty Factor

3.5 Peak Excursion

3.5.1 Peak Excursion Limit

Peak Excursion Limit	
UNII Devices	
☒	Peak excursion ≤ 13 dB. The ratio of the maximum of the peak-max-hold spectrum to the maximum of the average spectrum for continuous transmission does not exceed 13 dB. (Earlier procedures that required computing the ratio of the two spectra at each frequency across the emission bandwidth can lead to unintended failures at band edges and will no longer be required.)
LE-LAN Devices	
☒	N/A

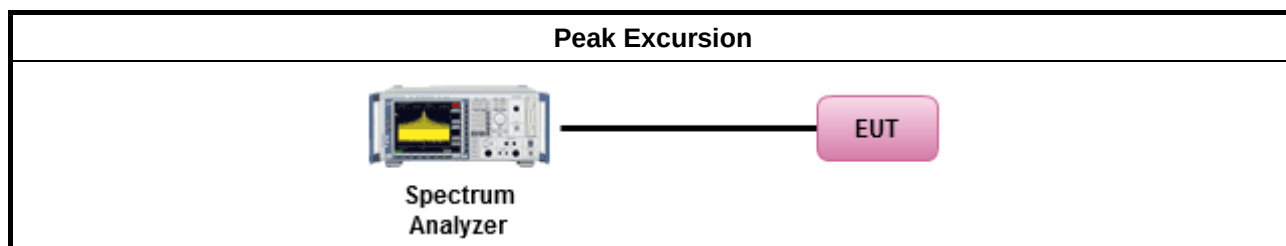
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method	
☒	Refer as FCC KDB 789033, clause G peak excursion method.
☒	Testing each modulation mode on a single channel is sufficient to demonstrate compliance with the peak excursion requirement
☒	For conducted measurement.
☐	☒ Testing a single output port is sufficient to demonstrate compliance with the peak excursion.

3.5.4 Test Setup

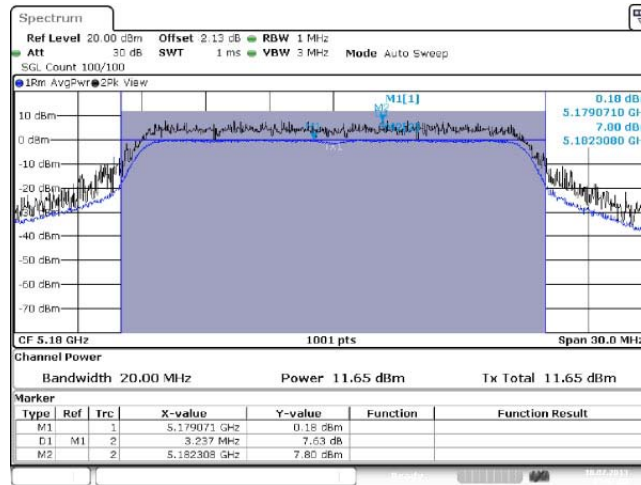


3.5.5 Test Result of Peak Excursion

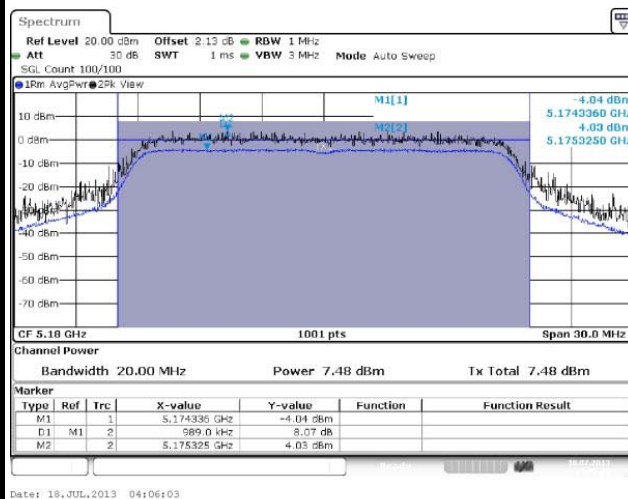
UNII Peak Excursion Result								
Condition			Peak Excursion (dB)					
Modulation Mode	N _{TX}	Freq. (MHz)	BPSK	QPSK	16QAM	64QAM	256QAM	Limit
11a	1	5180	7.63	7.55	7.52	7.45	-	13.0
HT20	2	5180	8.07	7.87	7.88	7.53	-	13.0
HT40	2	5190	7.58	7.12	8.14	7.79	-	13.0
Result			Complied					

Peak Excursion Plots

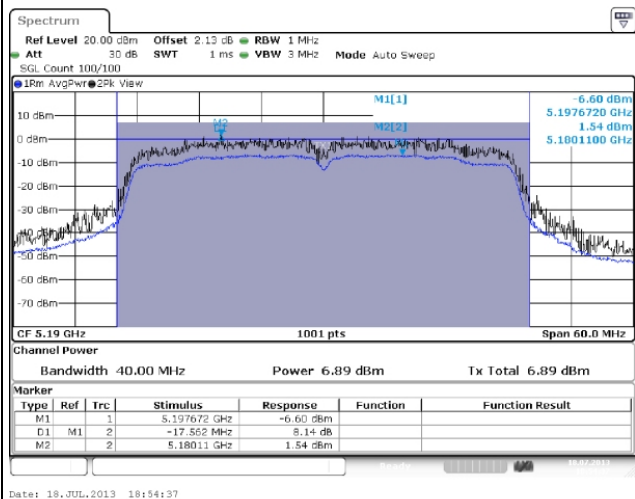
11a



HT20

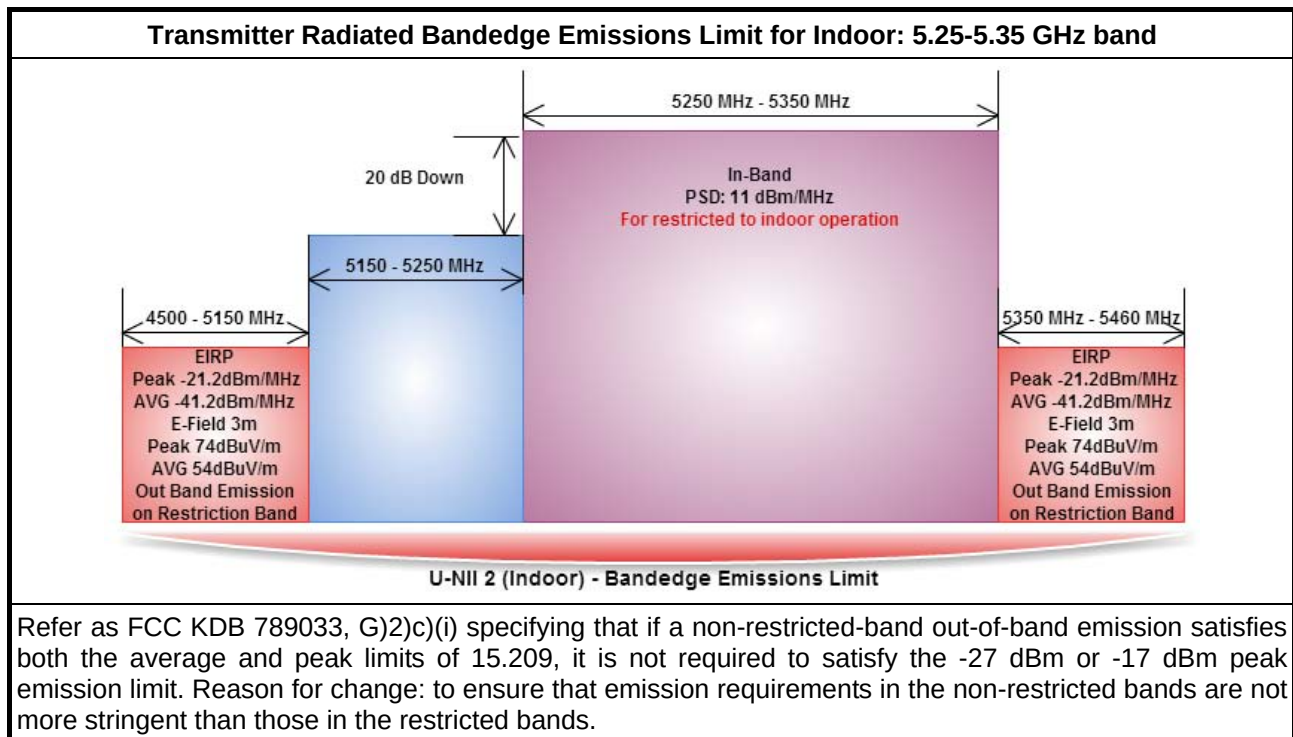
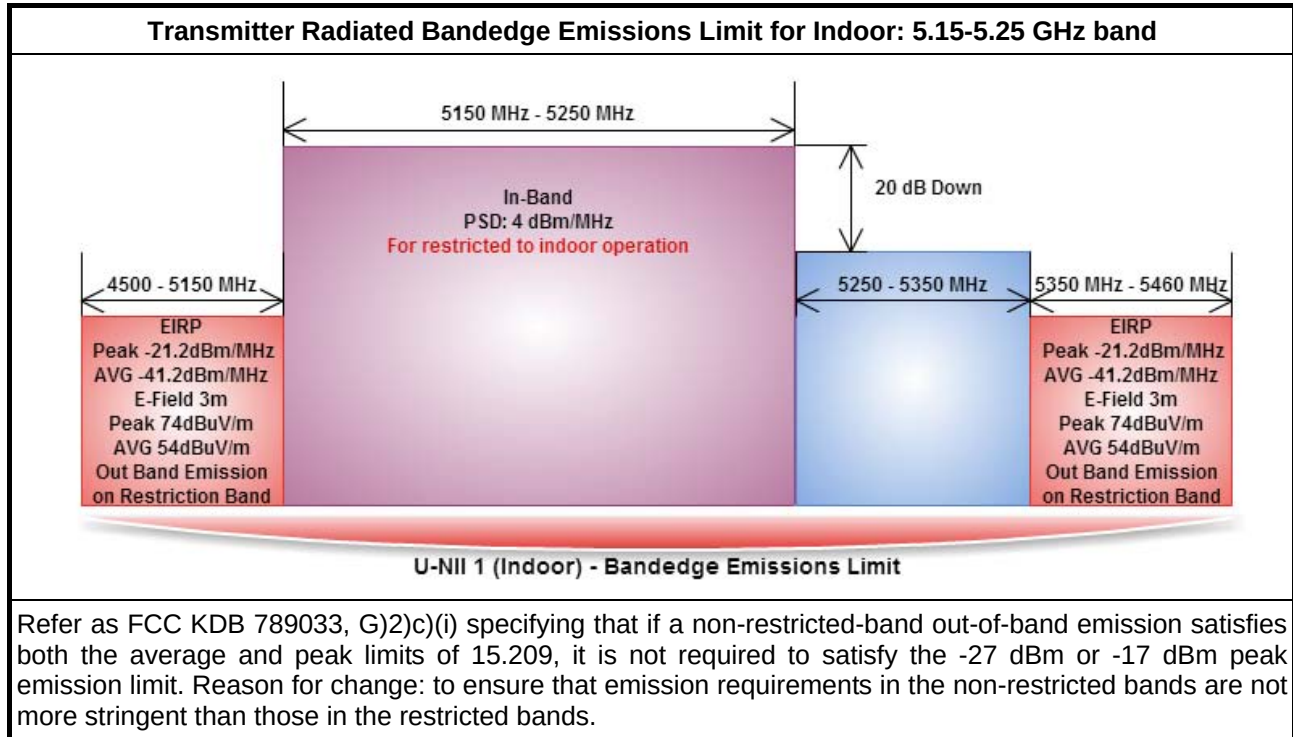


HT40

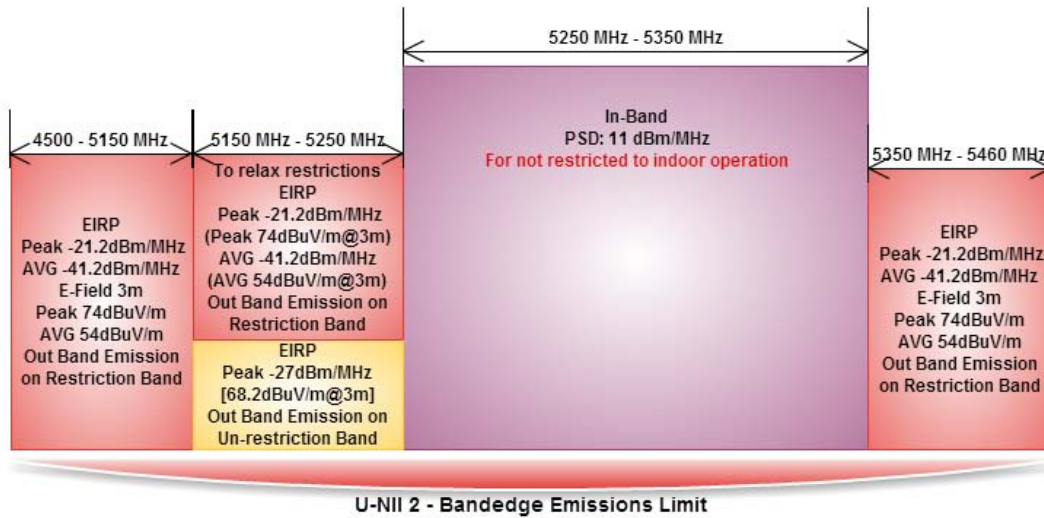


3.6 Transmitter Radiated Bandedge Emissions

3.6.1 Transmitter Radiated Bandedge Emissions Limit

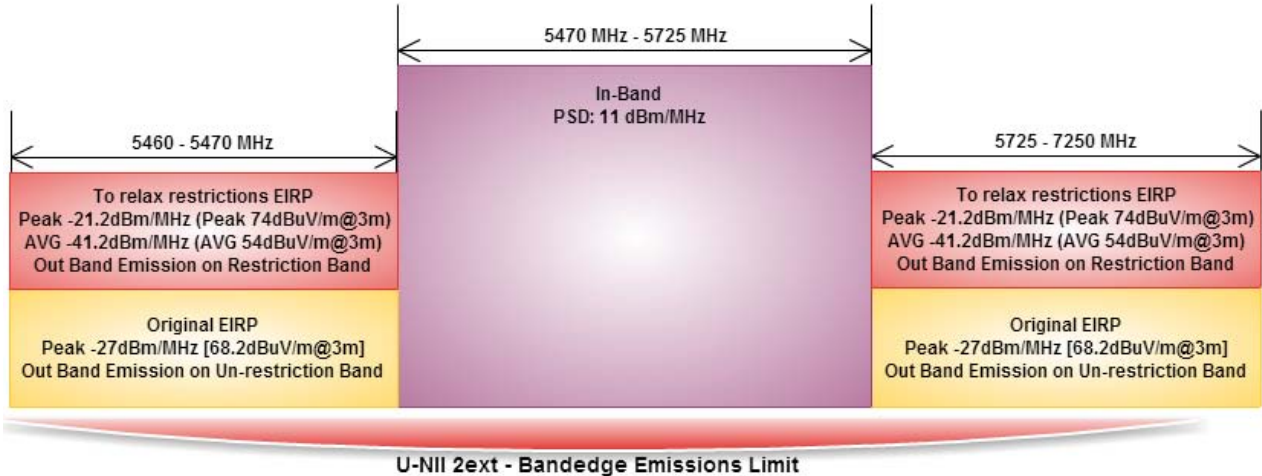


Transmitter Radiated Bandedge Emissions Limit for indoor/outdoor: 5.25-5.35 GHz band



Refer as FCC KDB 789033, G)2)c)(i) specifying that if a non-restricted-band out-of-band emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm or -17 dBm peak emission limit. Reason for change: to ensure that emission requirements in the non-restricted bands are not more stringent than those in the restricted bands.

Transmitter Radiated Bandedge Emissions Limit: 5.47-5.725 GHz band



Refer as FCC KDB 789033, G)2)c)(i) specifying that if a non-restricted-band out-of-band emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm or -17 dBm peak emission limit. Reason for change: to ensure that emission requirements in the non-restricted bands are not more stringent than those in the restricted bands.

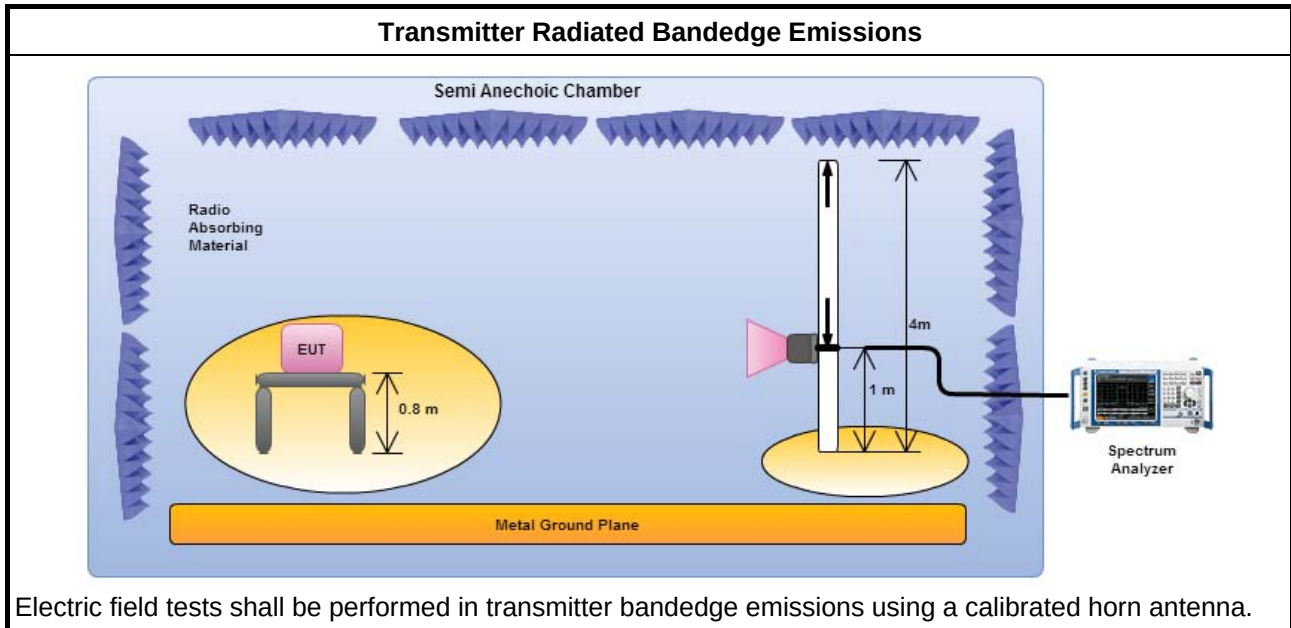
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

Test Method	
☒	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 bandedge are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
☒	The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].
☒	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.
☐	If EUT operate in adjacent contiguous bands, bandedge testing performed at the lowest frequency channel at lower-band and highest frequency channel at higher-band. Transmitter in-band emissions will consist of adjacent contiguous bands (e.g., IEEE 802.11ac VHT160 The lowest frequency channel at lower-band and highest frequency channel at higher-band in-band emissions will consist of two adjacent contiguous bands.)
☐	☐ Operating in 5.15-5.25 GHz band (lower-band) and 5.25-5.35 GHz band (higher-band). ☐ Operating in 5.47-5.725 GHz band (lower-band) and 5.725-5.825 GHz band (higher-band).
☐	If EUT operate in individual non-contiguous bands, bandedge testing performed at the lowest frequency channel and highest frequency channel within lower-band and higher-band. (e.g., (e.g., IEEE 802.11ac VHT160)
☐	☐ Operating in 5.25-5.35 GHz band (lower-band) and 5.47-5.725 GHz band (higher-band). ☐ Operating in 5.15-5.25 GHz band (lower-band) and 5.725-5.825 GHz band (higher-band).
☒	For the transmitter unwanted emissions shall be measured using following options below:
☒	Refer as FCC KDB 789033, clause H)2) for unwanted emissions into non-restricted bands.
☒	Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands.
☐	☐ Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging). ☐ Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW). ☒ Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW $\geq$ 1/T, where T is pulse time. ☐ Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions. ☒ Refer as FCC KDB 789033, clause H)5) 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 789033, clause H)3)d) for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 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.
☒	For radiated measurement, refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.

3.6.4 Test Setup



3.6.5 Transmitter Radiated Bandedge Emissions (with Antenna)

U-NII 5150-5250MHz Transmitter Radiated Bandedge (with Antenna)										
Modulation Mode	N _{TX}	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
11a	1	5180	1	5144.700	77.57	83.54	5150.000	62.54	63.54	V
11a	1	5240	1	5149.800	68.32	83.54	5150.000	56.16	63.54	V
HT20, M8-15	2	5180	1	5149.800	75.56	83.54	5149.900	62.18	63.54	V
HT20, M8-15	2	5240	1	5149.800	67.81	83.54	5150.000	55.61	63.54	V
HT40, M8-15	2	5190	1	5149.170	76.88	83.54	5150.000	62.31	63.54	V
HT40, M8-15	2	5230	1	5144.100	73.33	83.54	5148.900	58.38	63.54	V

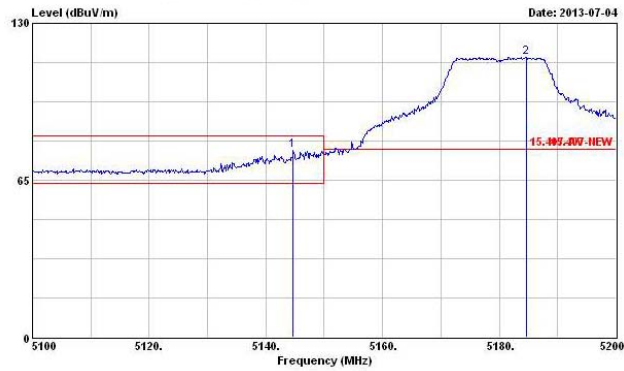
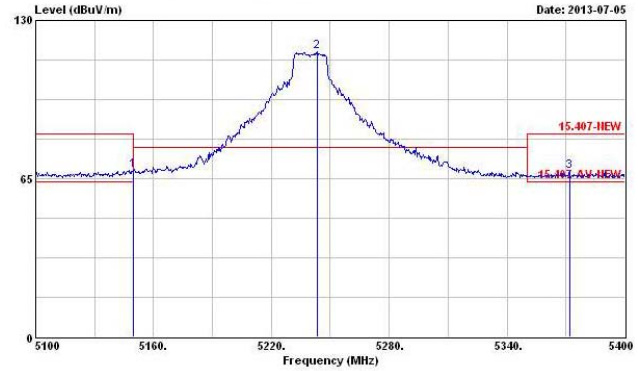
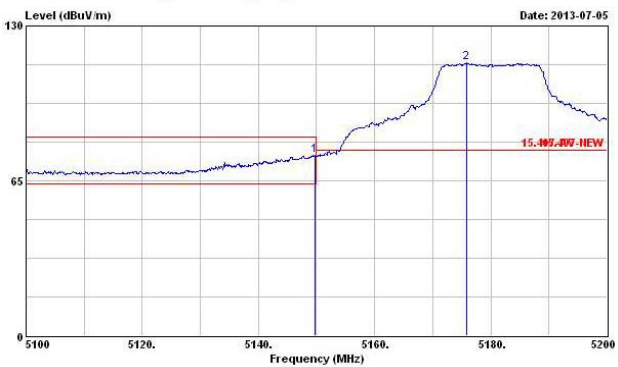
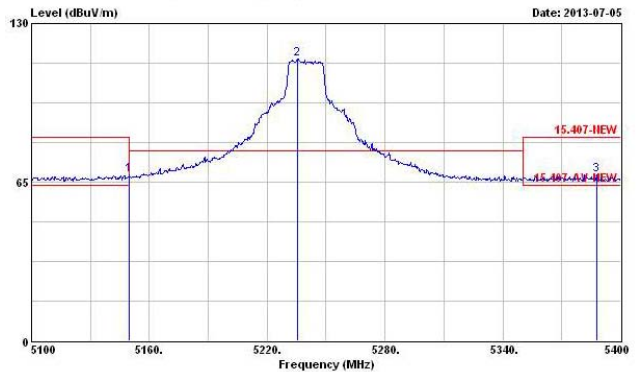
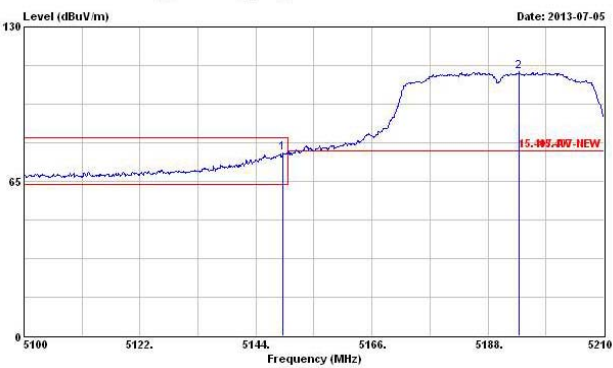
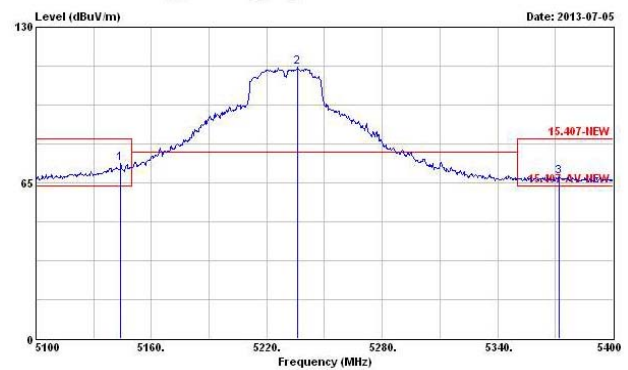
Note 1: Measurement worst emissions of receive antenna polarization.

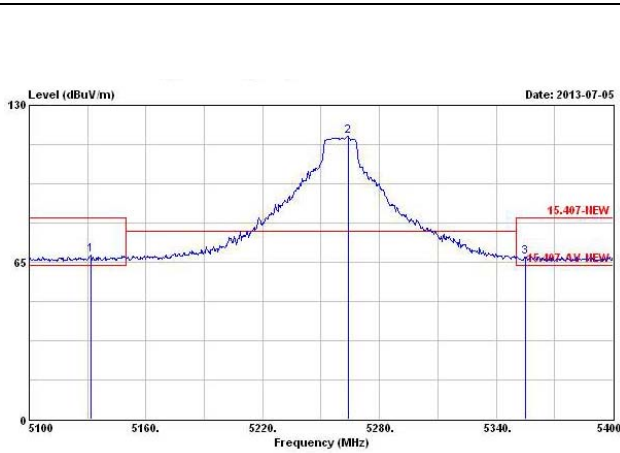
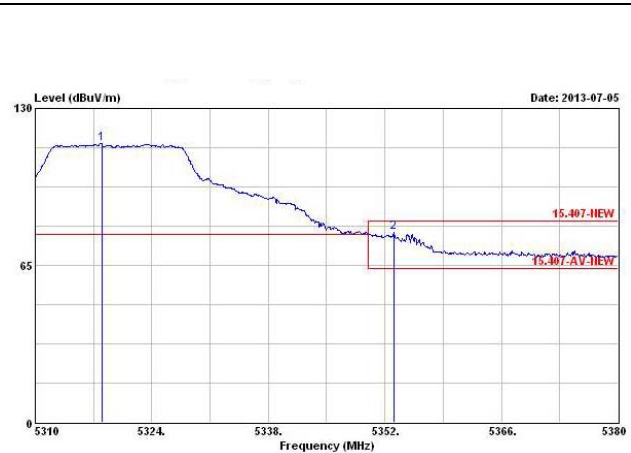
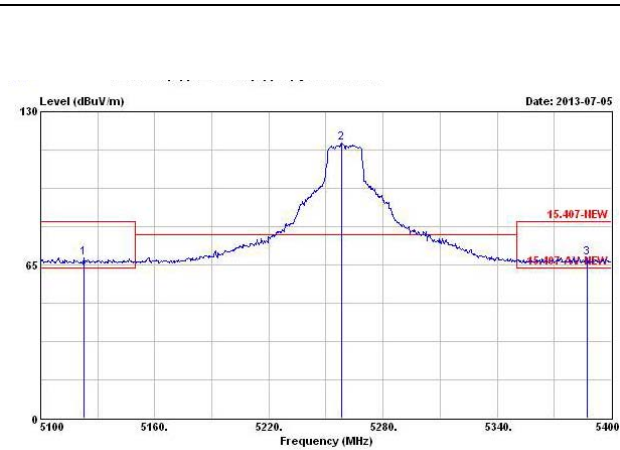
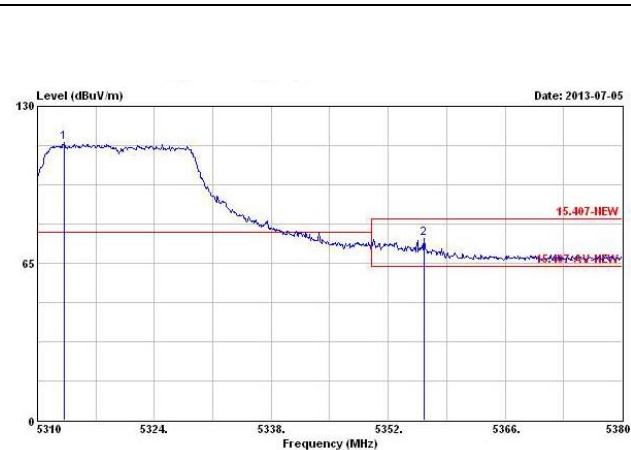
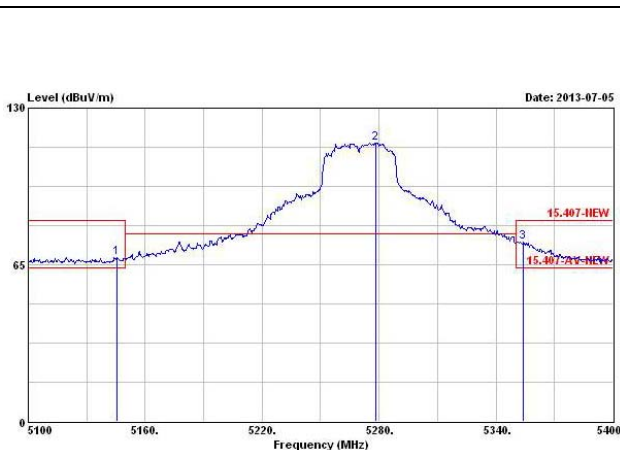
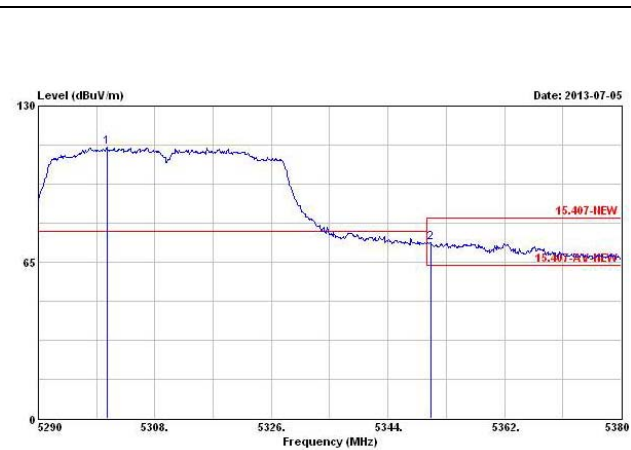
U-NII 5250-5350MHz Transmitter Radiated Bandedge (with Antenna)										
Modulation Mode	N _{TX}	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
11a	1	5260	1	5355.000	67.34	83.54	5350.200	55.51	63.54	V
11a	1	5320	1	5353.050	78.74	83.54	5350.000	61.97	63.54	V
HT20, M8-15	2	5260	1	5387.400	68.18	83.54	5350.500	55.29	63.54	V
HT20, M8-15	2	5320	1	5356.340	75.44	83.54	5350.000	62.50	63.54	V
HT40, M8-15	2	5270	1	5354.100	74.51	83.54	5350.000	61.84	63.54	V
HT40, M8-15	2	5310	1	5350.660	73.27	83.54	5350.390	62.31	63.54	V

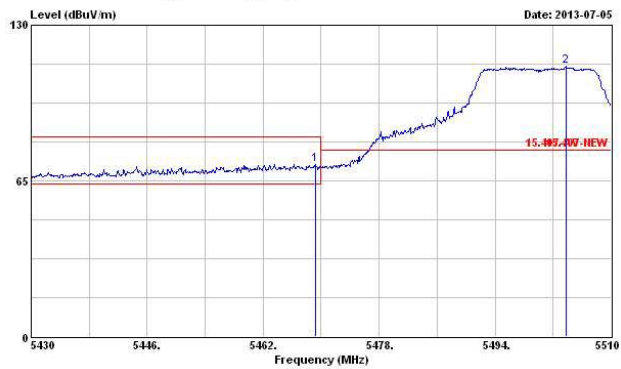
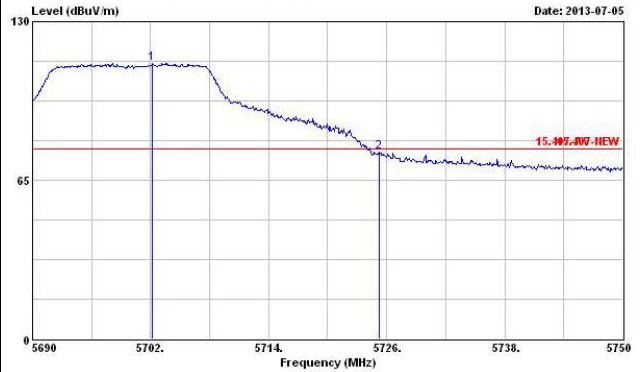
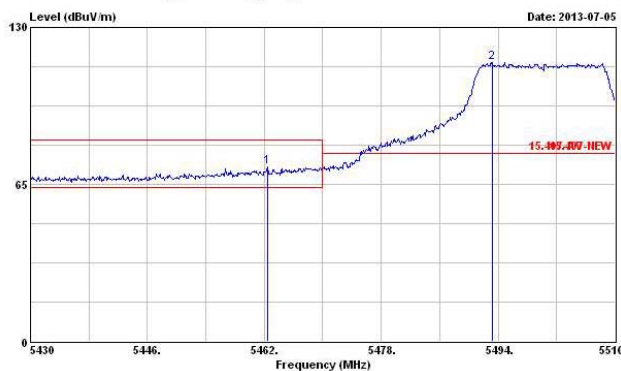
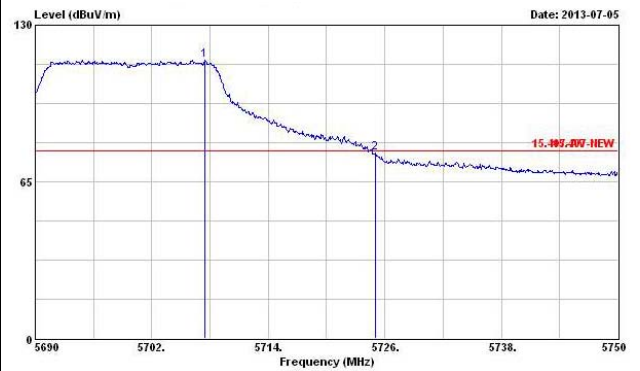
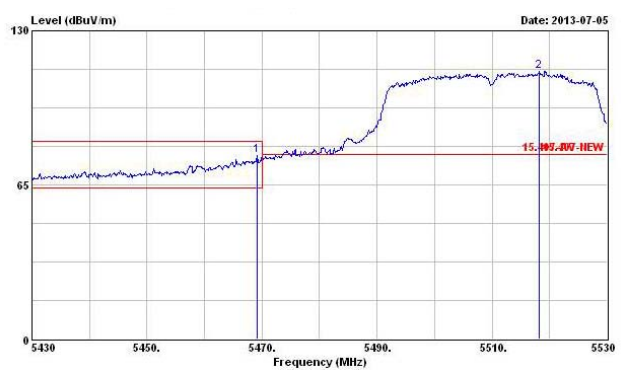
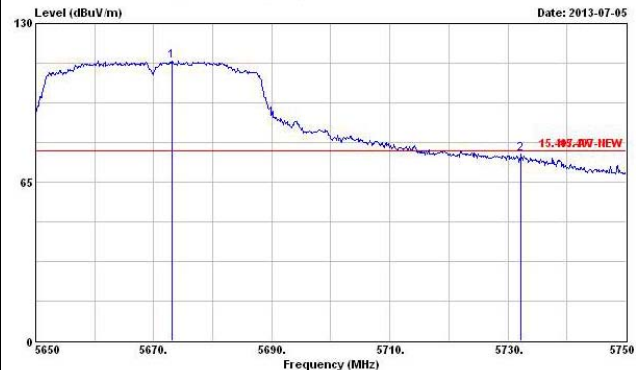
Note 1: Measurement worst emissions of receive antenna polarization.

U-NII 5470-5725MHz Transmitter Radiated Bandedge (with Antenna)										
Modulation Mode	N _{TX}	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
11a	1	5500	1	5469.200	71.83	83.54	5470.000	59.12	63.54	V
11a	1	5700	1	5725.220	76.35	83.54	5725.000	60.98	63.54	V
HT20, M8-15	2	5500	1	5462.480	72.45	83.54	5470.000	61.82	63.54	V
HT20, M8-15	2	5700	1	5725.000	76.84	77.84	-	-	-	V
HT40, M8-15	2	5510	1	5469.100	77.20	83.54	5470.000	62.48	63.54	V
HT40, M8-15	2	5670	1	5732.200	76.64	77.84	-	-	-	V

Note 1: Measurement worst emissions of receive antenna polarization.

5150-5250MHz - Transmitter Radiated Bandedge Emissions Plots (with Antenna)
11a-(Lowest Ch.)

11a-(Highest Ch.)

HT20-(Lowest Ch.)

HT20-(Highest Ch.)

HT40-(Lowest Ch.)

HT40-(Highest Ch.)


5250-5350MHz - Transmitter Radiated Bandedge Emissions Plots (with Antenna)
11a-(Lowest Ch.)

11a-(Highest Ch.)

HT20-(Lowest Ch.)

HT20-(Highest Ch.)

HT40-(Lowest Ch.)

HT40-(Highest Ch.)


5470-5725MHz - Transmitter Radiated Bandedge Emissions Plots (with Antenna)
11a-(Lowest Ch.)

11a-(Highest Ch.)

HT20-(Lowest Ch.)

HT20-(Highest Ch.)

HT40-(Lowest Ch.)

HT40-(Highest Ch.)


3.7 Transmitter Radiated Unwanted Emissions

3.7.1 Transmitter Radiated Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz 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 above 1GHz Limit	
Operating Band	Limit
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.825 GHz	5.715 5.725 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] 5.825 5.835 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] Other un-restricted band: e.i.r.p. -27 dBm [68.2 dBuV/m@3m]

Note 1: 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).

3.7.2 Measuring Instruments

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

3.7.3 Test Procedures

Test Method	
☒	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. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. 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 5 GHz - 10GHz 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 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 - 40GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit.
☒	The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].
☒	For the transmitter unwanted emissions shall be measured using following options below:
☒	Refer as FCC KDB 789033, clause H)2) for unwanted emissions into non-restricted bands.
☒	Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands.
☒	Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging).
☐	Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW).
☐	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW $\geq$ 1/T, where T is pulse time.
☐	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
☒	Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit.
☐	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak 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 6.6 for radiated emissions from above 1 GHz.