FCC Test Report

Equipment	:	**Wireless module**
Brand Name	:	**PEGATRON**
Model No.	:	**UPWL6580**
FCC ID	:	**VUIUPWL6580**
Standard	:	**47 CFR FCC Part 15.407**
Frequency Range	:	**5150 MHz – 5250 MHz**
Equipment Class	:	**NII**
Applicant **Manufacturer**	:	**PEGATRON CORPORATION** **5F., NO. 76, LIGONG ST., BEITOU DISTRICT, TAIPEI CITY 112 Taiwan**
Operate Mode	:	**Client without radar detection**

The product sample received on Jul. 30, 2012 and completely tested on Oct. 10, 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

Table of Contents

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]:17.29MHz 36.19 (Margin 13.81dB) - AV 42.23 (Margin 17.77dB) - QP	FCC 15.207	Complied
3.2	15.407(a)	Emission Bandwidth	Bandwidth [MHz] 20MHz: 23.07 40MHz: 48.00	Information only	Complied
3.3	15.407(a)	RF Output Power (Maximum Conducted (Average) Output Power)	Power [dBm] 5150-5250MHz:16.94	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:3.95	PPSD [dBm/MHz] 5150-5250MHz:4 5250-5350MHz:11 5470-5725MHz:11	Complied
3.5	15.407(a)	Peak Excursion	10.24 dB	13 dB	Complied
3.6	15.407(b)	Transmitter Radiated Bandedge Emissions	Restricted Bands [dBuV/m at 1m]: 5396.10MHz 76.04 (Margin 7.50dB) - PK 62.53 (Margin 1.01dB) - AV	Non-Restricted Bands: ≤ -27dBm (68.3dBuV/m@3m) Restricted Bands: FCC 15.209	Complied
3.7	15.407(b)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 1m]: 6888MHz 74.98 (Margin 2.86dB) - PK	Non-Restricted Bands: ≤ -27dBm (68.3dBuV/m@3m) Restricted Bands: FCC 15.209	Complied
3.8	15.407(g)	Frequency Stability	5.31 ppm	Signal shall remain in-band	Complied

Revision History

Report No.	Version	Description	Issued Date
FR272809AN	Rev. 01	Initial issue of report	Oct. 23, 2012

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	14.92	N/A
5150-5250	n (HT20)	5180-5240	36-48 [4]	3	15.34	N/A
5150-5250	n (HT40)	5190-5230	38-46 [2]	3	16.94	N/A

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.
Note 2: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
Note 3: 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		
	☒	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	Brand	Part No.	$G_{ANT\ (dBi)}$
1	Integral	PCB	Wanshih	UC3WFI0057	1.99
2	Integral	PCB	Wanshih	UC3WFI0058	2.08
3	Integral	PCB	Wanshih	UC3WFI0090	2.03
4	Integral	PCB	Airgain	N5X20B (6.5cm)	1.70
5	Integral	PCB	Airgain	N5X20B (10cm)	1.70
6	Integral	PCB	Airgain	N5X20SC	1.90

EUT is consist of multiple antenna models assembly (multiple antenna models are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type. Then Ant. No. 2 shall be performed the radiated test.

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)**
☒ 98.81% - IEEE 802.11a	0.05	0.10
☒ 100.00% - IEEE 802.11n (HT20)	0.00	0.00
☒ 100.00% - IEEE 802.11n (HT40)	0.00	0.00

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

1.1.5 EUT Operational Condition

Supply Voltage	☐ AC mains	☒ DC	
Type of DC Source	☐ Internal DC supply	☒ Host	☐ Battery
Operational Voltage	☒ Vnom (110 V)	☒ Vmax (126.5 V)	☒ Vmin (93.5 V)
Operational Climatic	☒ Tnom (20°C)	☒ Tmax (50°C)	☒ Tmin (-20°C)

1.2 Support Equipment

Support Equipment - Conducted Emissions				
No.	**Equipment**	**Brand Name**	**Model Name**	**Serial No.**
1	Notebook	DELL	XPS M1330	DoC
2	USB Cable (Client Provide)	-	-	-
3	Wireless AP (Remote Workstation)	ASUS	RT-AC66U	DoC

Support Equipment - Radiated Emissions				
No.	**Equipment**	**Brand Name**	**Model Name**	**Serial No.**
1	Notebook	DELL	E5520	DoC
2	(USB) Mouse	Microsoft	1113	DoC
3	iPod	APPLE	A1199	DoC
4	USB Cable (Client Provide)	-	-	-
5	Wireless AP (Remote Workstation)	ASUS	RT-AC66U	DoC

1.3 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
- FCC KDB 662911
- FCC KDB 412172

1.4 Testing Location Information

Testing Location					
☒	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., 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**	
RF Conducted	TH06-HY	Shiming	24.1°C / 41%	05-Oct-12~10-Oct-12	
AC Conduction	CO04-HY	Bill	24.8°C / 51.7%	10-Sep-12	
Radiated Emission	03CH02-HY	Hsiao	25.9°C / 64%	11-Sep-12~10-Oct-12	

1.5 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					
IEEE Std. 802.11	**Transmit Chains (N_{TX})**	**Data Rate / MCS**	**Worst Data Rate / MCS**	**Modulation Mode**	**RF Output Power (dBm)**
a	1	6-54 Mbps	6 Mbps	11A5.2G-20M	**14.92**
n (HT20)	3	MCS 16-23	MCS 16	11N5.2G-20M	**15.34**
n (HT40)	3	MCS 16-23	MCS 16	11N5.2G-40M	**16.94**
Note 1: IEEE Std. 802.11n-2009 modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. Worst modulation mode of Guard Interval (GI) is 800ns. Note 2: Modulation modes consist of below configuration: 11A: IEEE 802.11a, 11N: IEEE 802.11n. 5.2G: 5.15-5.25GHz band 20M/40M: Channel Bandwidth 20MHz/40MHz					

2.2 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration		
Frequency Range (MHz)	**IEEE Std. 802.11**	**Test Channel Freq. (MHz) – FX (Frequencies Abbreviations)**
5150-5250	a, n (HT20)	5180-(F1), 5200-(F2), 5240-(F3)
5150-5250	n (HT40)	5190-(F1'), 5230-(F2')

2.3 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter					
Test Software Version		Atheros Radio Test 2 (ART2-GUI)_ 2.3			
Modulation Mode	**Transmit Chains (N_{TX})**	**Frequency (MHz)**	**Power Setting**	**Data Rate / MCS**	**RF Output Power (dBm)**
11A5.2G-20M	1	5180	16	6 Mbps	14.92
11A5.2G-20M	1	5200	16	6 Mbps	14.62
11A5.2G-20M	1	5240	16.5	6 Mbps	14.90
11N5.2G-20M	3	5180	11.5 ; 11.5 ; 11.5	MCS 16	15.12
11N5.2G-20M	3	5200	11.5 ; 11.5 ; 11.5	MCS 16	15.34
11N5.2G-20M	3	5240	11.5 ; 11.5 ; 11.5	MCS 16	14.93
11N5.2G-40M	3	5190	13 ; 13 ; 13	MCS 16	16.94
11N5.2G-40M	3	5230	13 ; 13 ; 13	MCS 16	16.67
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.					

2.4 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	Radio link (5G-WLAN)

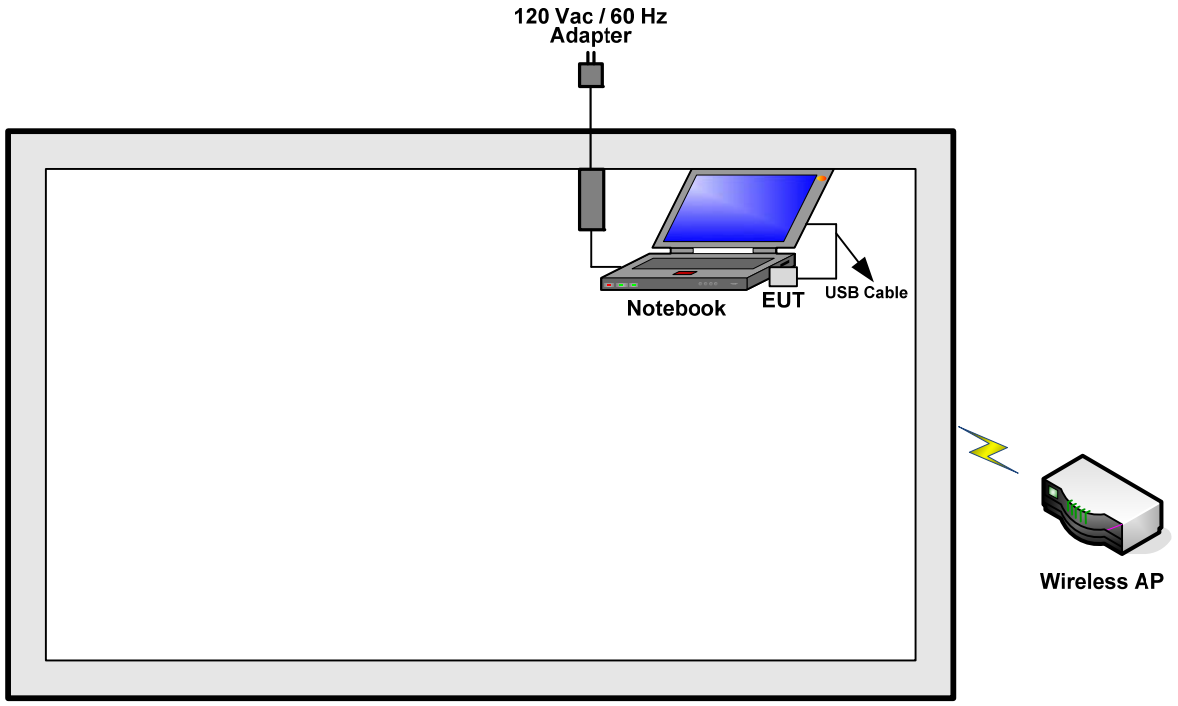
The Worst Case Mode for Following Conformance Tests			
Tests Item	RF Output Power, Peak Power Spectral Density, Emission Bandwidth, Peak Excursion		
Test Condition	Conducted measurement at transmit chains		
Modulation Mode	**Transmit Chains (N_{TX})**	**Data Rate / MCS**	**Test Frequency**
11A5.2G-20M	1	6 Mbps	F1, F2, F3
11N5.2G-20M	3	MCS 16	F1, F2, F3
11N5.2G-40M	3	MCS 16	F1', F2'

The Worst Case Mode for Following Conformance Tests			
Tests Item	Transmitter Radiated Bandedge Emissions		
Test Condition	Radiated measurement		
Modulation Mode	**Transmit Chains (N_{TX})**	**Data Rate / MCS**	**Test Frequency**
11A5.2G-20M	1	6 Mbps	F1, F3
11N5.2G-20M	3	MCS 16	F1, F3
11N5.2G-40M	3	MCS 16	F1', F2'

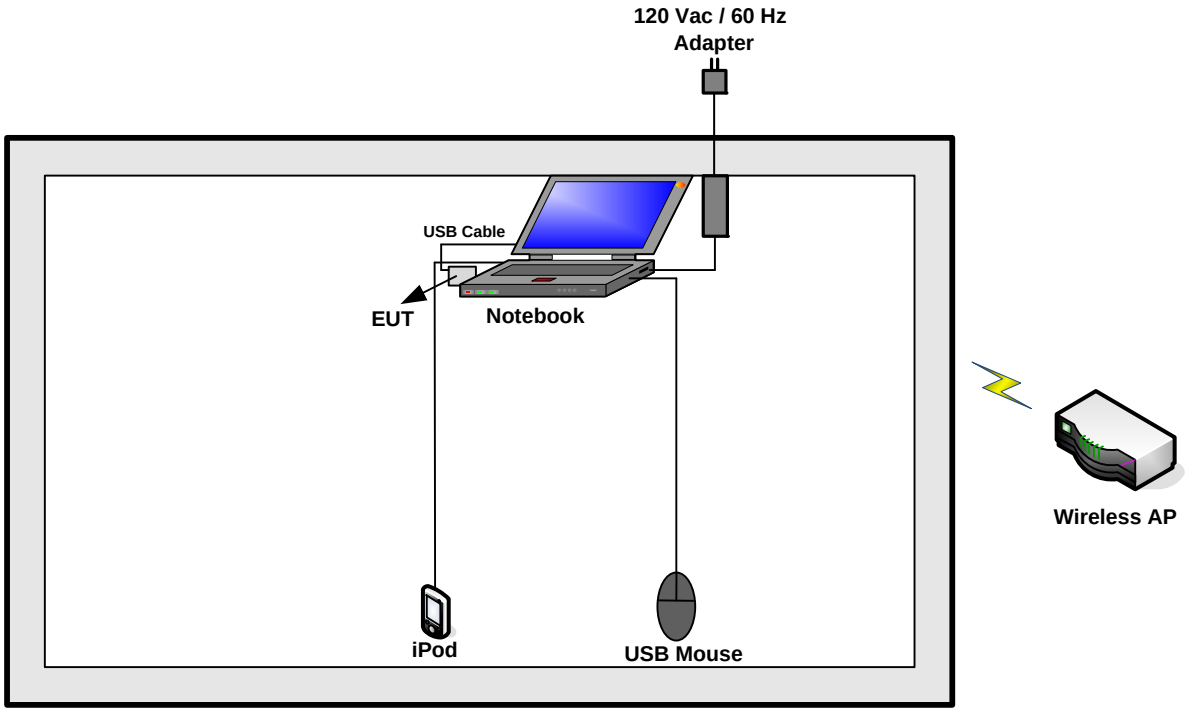
The Worst Case Mode for Following Conformance Tests		
Tests Item	Transmitter Radiated Unwanted Emissions	
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.	
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. Radio link (5G-WLAN)	
Modulation Mode	**Data Rate / MCS**	**Test Frequency**
11A5.2G-20M	6 Mbps	F1, F2, F3
11N5.2G-20M	MCS 16	F1, F2, F3
11N5.2G-40M	MCS 16	F1', F2'

2.5 Test Setup Diagram

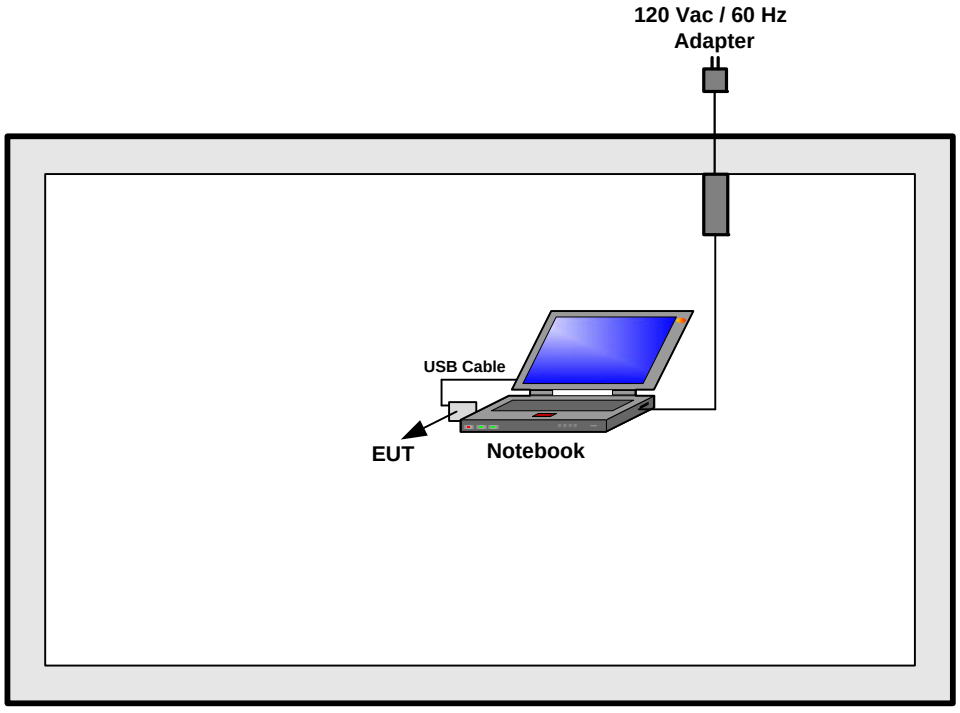
Test Setup Diagram – AC Line Conducted Emission Test	
Operating Mode 1	**Radio link (5G-WLAN)**



Test Setup Diagram - Radiated Test (Below 1GHz)	
Operating Mode 1	Radio link (5G-WLAN)



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



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

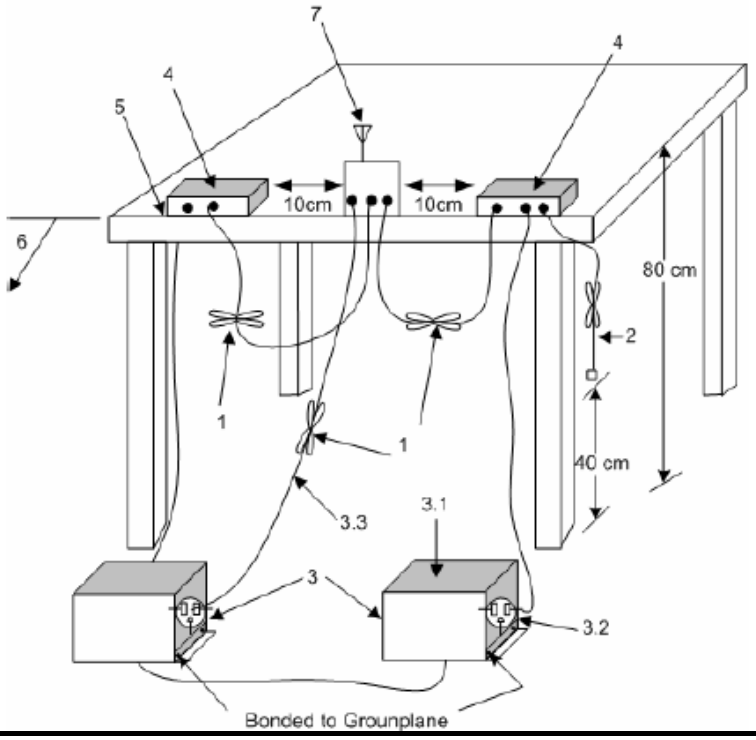
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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

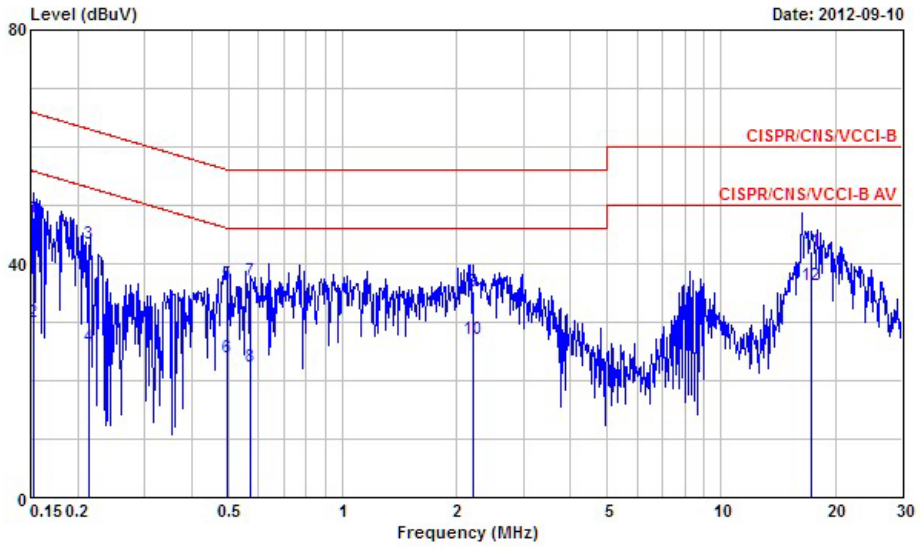
3.1.4 Test Setup

AC Power-line Conducted Emissions



3.1.5 Test Result of AC Power-line Conducted Emissions

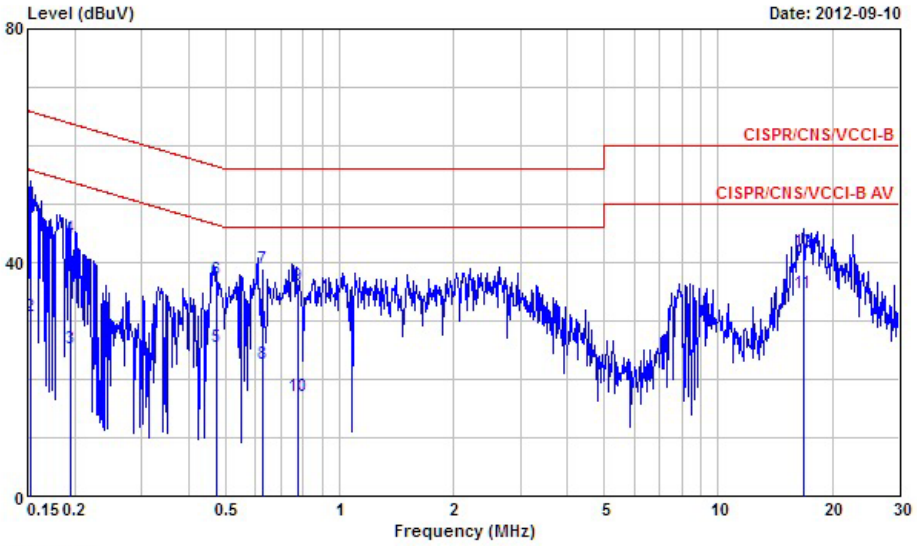
AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Neutral
Operating Function	Radio link (5G-WLAN)		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1524030	47.77	-18.10	65.87	47.36	0.11	0.30	QP
2	0.1524030	29.94	-25.93	55.87	29.53	0.11	0.30	Average
3	0.2135220	43.55	-19.52	63.07	43.14	0.11	0.30	QP
4	0.2135220	25.78	-27.29	53.07	25.37	0.11	0.30	Average
5	0.4939010	36.50	-19.60	56.10	36.10	0.10	0.30	QP
6	0.4939010	24.06	-22.04	46.10	23.66	0.10	0.30	Average
7	0.5731280	37.20	-18.80	56.00	36.80	0.10	0.30	QP
8	0.5731280	22.24	-23.76	46.00	21.84	0.10	0.30	Average
9	2.214	35.20	-20.80	56.00	34.69	0.13	0.38	QP
10	2.214	27.08	-18.92	46.00	26.57	0.13	0.38	Average
11	17.290	42.23	-17.77	60.00	41.58	0.30	0.35	QP
12 @	17.290	36.19	-13.81	50.00	35.54	0.30	0.35	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.)

AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Line
Operating Function	Radio link (5G-WLAN)		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1532130	50.24	-15.58	65.82	49.70	0.24	0.30	QP
2	0.1532130	30.74	-25.08	55.82	30.20	0.24	0.30	Average
3	0.1944860	25.29	-28.55	53.84	24.76	0.23	0.30	Average
4	0.1944860	44.34	-19.50	63.84	43.81	0.23	0.30	QP
5	0.4736720	25.55	-20.90	46.45	25.03	0.22	0.30	Average
6	0.4736720	37.20	-19.25	56.45	36.68	0.22	0.30	QP
7	0.6279240	38.82	-17.18	56.00	38.30	0.22	0.30	QP
8	0.6279240	22.71	-23.29	46.00	22.19	0.22	0.30	Average
9	0.7801390	36.06	-19.94	56.00	35.53	0.23	0.30	QP
10	0.7801390	17.14	-28.86	46.00	16.61	0.23	0.30	Average
11	@ 16.750	34.86	-15.14	50.00	33.98	0.52	0.36	Average
12	16.750	41.77	-18.23	60.00	40.89	0.52	0.36	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.)

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 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 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 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 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.

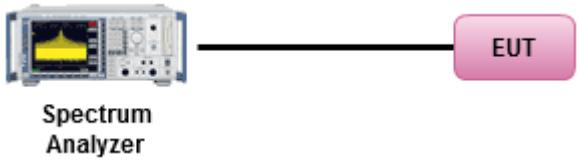
3.2.2 Measuring Instruments

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 D for EBW 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

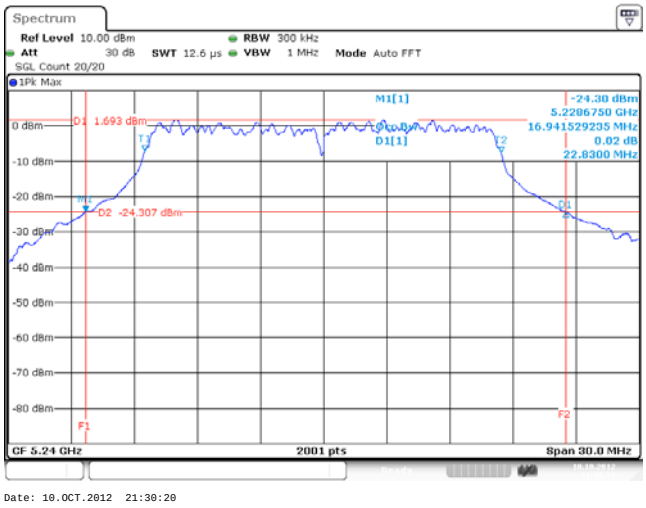
Emission Bandwidth


3.2.5 Test Result of Emission Bandwidth

UNII Emission Bandwidth Result								
Condition			Emission Bandwidth (MHz)					
Modulation Mode	N_{TX}	Freq. (MHz)	26dB Bandwidth				Conducted Power Limit (dBm)	
			Chain-Port 1	Chain-Port 2	Chain-Port 3	-	Calculation Power Limit	Final Power Limit
11A5.2G-20M	1	5180	22.56	-	-	-	17.5	17.0
11A5.2G-20M	1	5200	21.18	-	-	-	17.3	17.0
11A5.2G-20M	1	5240	22.83	-	-	-	17.6	17.0
11N5.2G-20M	3	5180	22.70	22.26	21.57	-	17.3	17.0
11N5.2G-20M	3	5200	20.87	22.29	21.84	-	17.2	17.0
11N5.2G-20M	3	5240	23.07	21.26	21.93	-	17.3	17.0
11N5.2G-40M	3	5190	47.20	48.00	43.60	-	20.4	17.0
11N5.2G-40M	3	5230	47.00	43.08	41.24	-	20.2	17.0
Result			Complied					
Note 1: N_{TX} = Number of Transmit Chains								

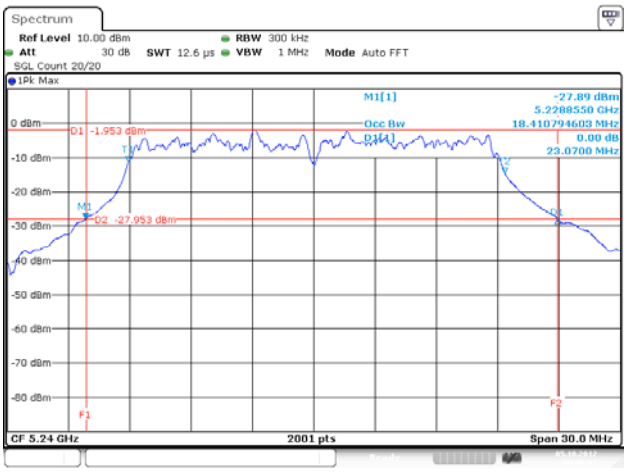
LE-LAN Emission Bandwidth Result								
Condition			Emission Bandwidth (MHz)					
Modulation Mode	N_{TX}	Freq. (MHz)	99% Bandwidth				e.i.r.p. Power Limit (dBm)	
			Chain-Port 1	Chain-Port 2	Chain-Port 3	-	Calculation Power Limit	Final Power Limit
11A5.2G-20M	1	5180	17.12	-	-	-	16.3	16.3
11A5.2G-20M	1	5200	16.57	-	-	-	16.2	16.2
11A5.2G-20M	1	5240	16.94	-	-	-	16.3	16.3
11N5.2G-20M	3	5180	18.16	17.99	17.74	-	16.5	16.5
11N5.2G-20M	3	5200	17.74	17.87	17.69	-	16.5	16.5
11N5.2G-20M	3	5240	18.41	17.93	17.92	-	16.5	16.5
11N5.2G-40M	3	5190	37.38	37.42	37.26	-	19.7	17.0
11N5.2G-40M	3	5230	37.30	36.90	36.90	-	19.7	17.0
Result			Complied					
Note 1: N_{TX} = Number of Transmit Chains								

Worst Emission Bandwidth Plots
11A5.8G-20M – F1 [Port 1]

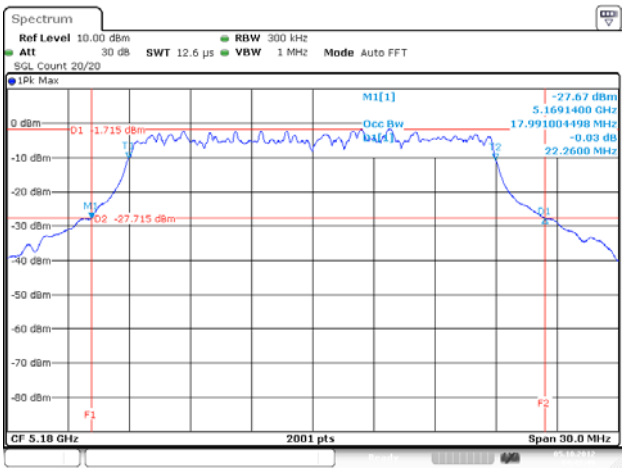


Worst Emission Bandwidth Plots

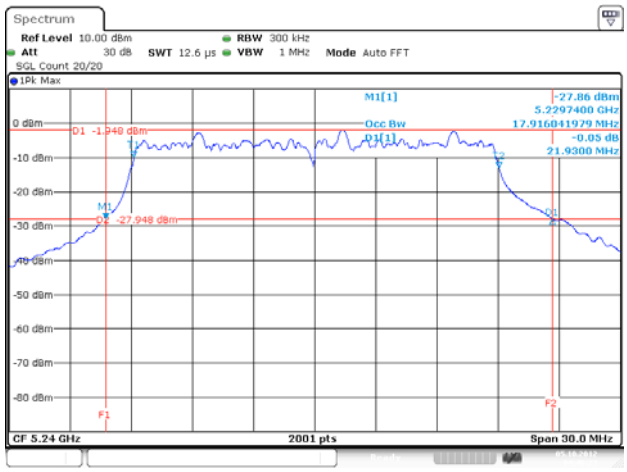
11N5.2G-20M – F3 [Port 1]



11N5.2G-20M – F2 [Port 2]

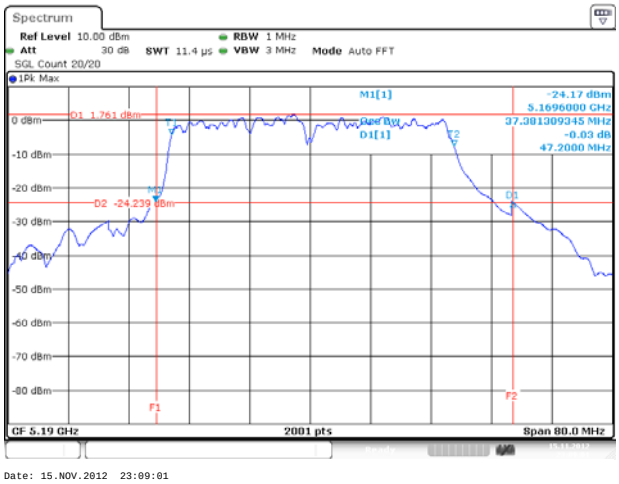


11N5.2G-20M – F3 [Port 3]

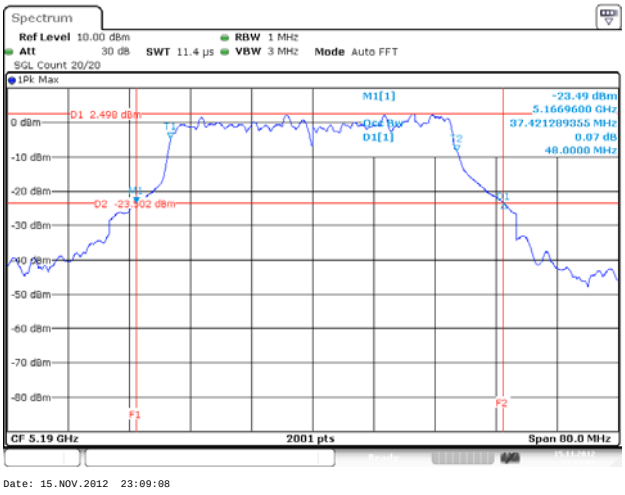


Worst Emission Bandwidth Plots

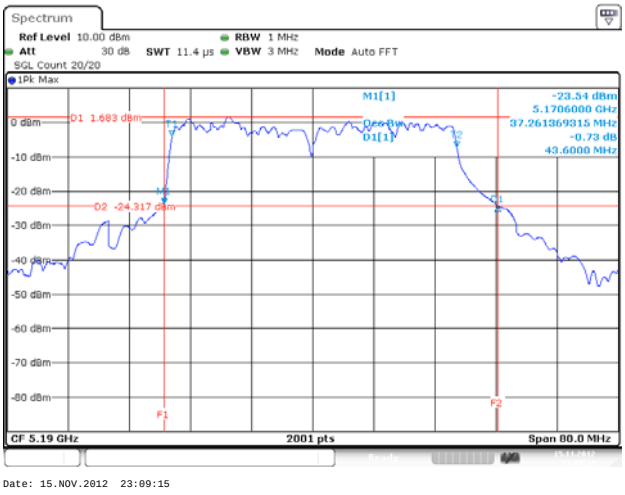
11N5.2G-40M –F1' [Port 1]



11N5.2G-40M –F1' [Port 1]



11N5.2G-40M –F1' [Port 1]



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 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 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 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 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 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 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 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 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 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 23 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 dBm, $G_{TX} \leq P_{Out}$
P_{Out} = maximum conducted output power in dBm, **G_{TX}** = the maximum transmitting antenna directional gain in dBi.	

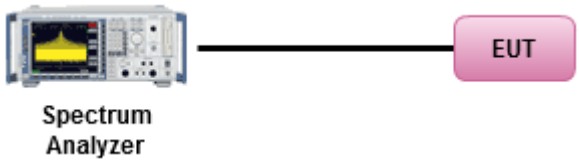
3.3.2 Measuring Instruments

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 ≥ 98% or external video / power trigger]
	☐ Refer as FCC KDB 789033, clause C Method SA-1 (spectral trace averaging).
	☐ Refer as FCC KDB 789033, clause C 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 C Method SA-2 (spectral trace averaging).
	☐ Refer as FCC KDB 789033, clause C 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 C 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: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup

RF Output Power (Spectrum Analyzer)


3.3.5 Directional Gain for Power Measurement

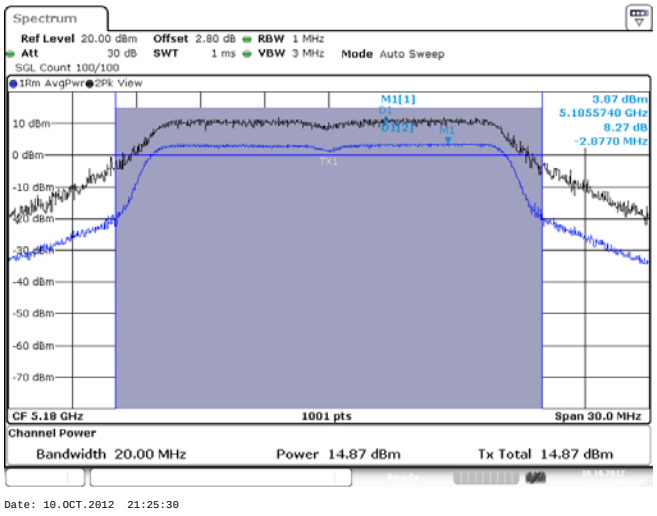
Directional Gain (DG) Result					
Transmit Chains No.		1	2	3	-
Maximum G_{ANT} (dBi)		2.08	2.08	2.08	-
Modulation Mode	**DG (dBi)**	**N_{TX}**	**N_{SS}**	**STBC**	**Array Gain (dB)**
Non HT20,6-54Mbps (11a)	2.08	1	1	-	-
HT20,M0-M7	2.08	3	3	-	-
HT40,M0-M7	2.08	3	3	-	-

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[($10^{G1/20}$ +… + $10^{GN/20}$)^2 /N_{TX}]
All transmit signals are completely uncorrelated, Directional Gain = 10 log[($10^{G1/10}$ +… + $10^{GN/10}$)/N_{TX}]
Note 3: For Spatial Multiplexing, Directional Gain (DG) = G_{ANT} + 10 log(N_{TX}/N_{SS}),
where Nss = the number of independent spatial streams data.
Note 4: For CDD transmissions, directional gain is calculated as power measurements:
Directional Gain (DG) = G_{ANT} + 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};

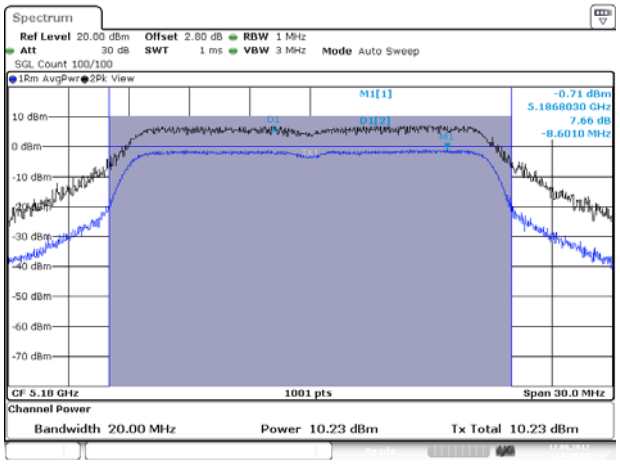
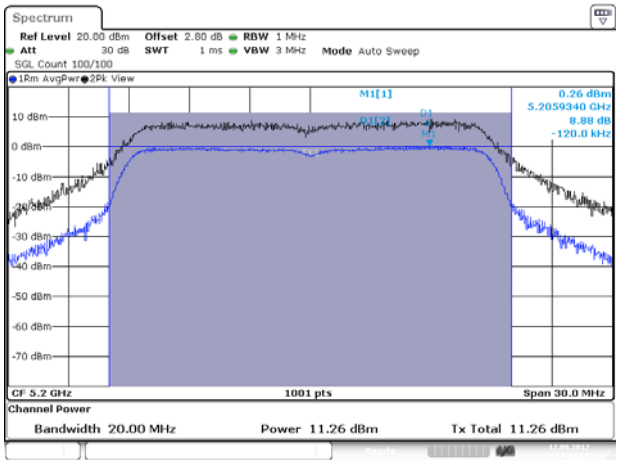
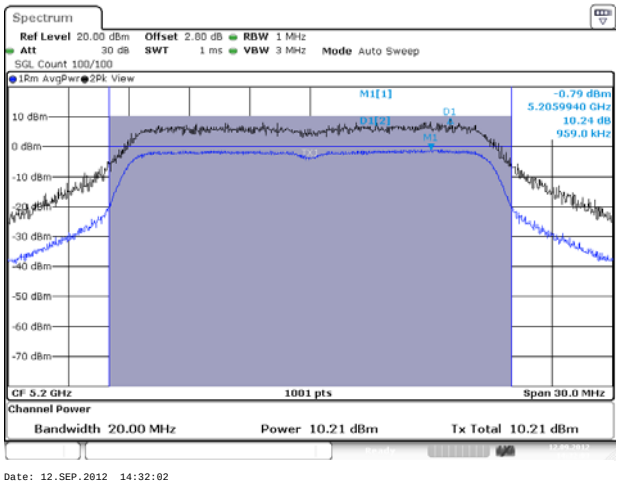
3.3.6 Test Result of Maximum Conducted Output Power

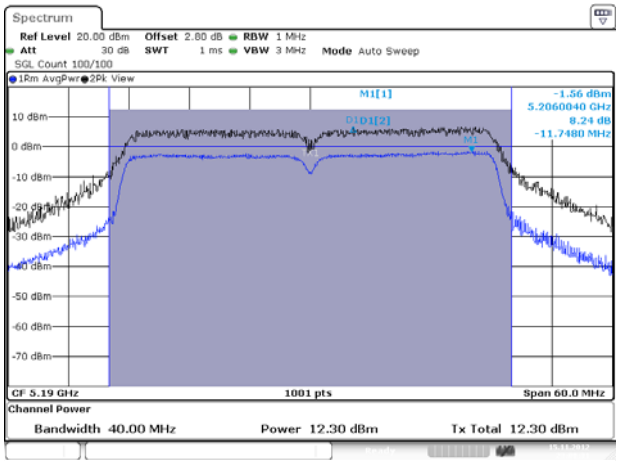
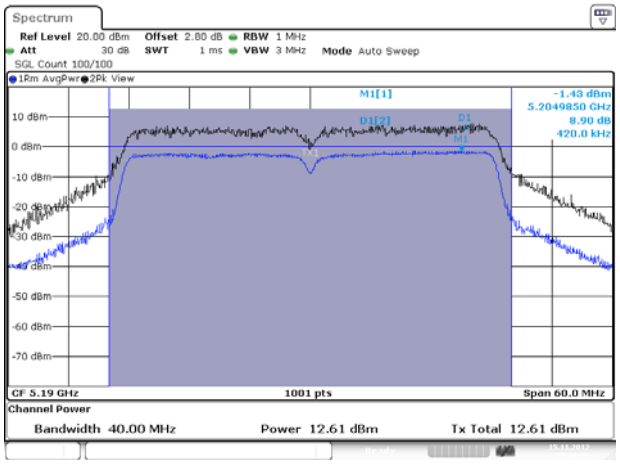
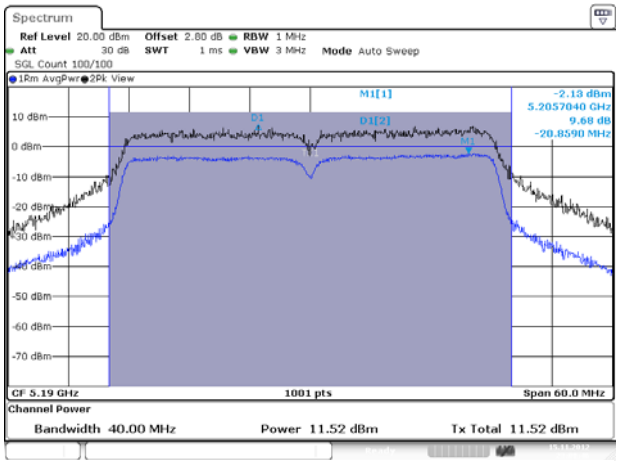
Maximum Conducted (Average) Output Power											
Condition			RF Output Power (dBm)								
Modulation Mode	N_{TX}	Freq. (MHz)	Chain Port 1	Chain Port 2	Chain Port 3	-	Sum Chain	Power Limit	DG (dBi)	EIRP Power	EIRP Limit
11A5.2G-20M	1	5180	14.92	-	-	-	14.92	17.0	2.08	17.00	23.0
11A5.2G-20M	1	5200	14.62	-	-	-	14.62	17.0	2.08	16.70	23.0
11A5.2G-20M	1	5240	14.90	-	-	-	14.90	17.0	2.08	16.98	23.0
11N5.2G-20M	3	5180	10.23	10.93	9.80	-	15.12	17.0	2.08	17.20	23.0
11N5.2G-20M	3	5200	10.15	11.26	10.21	-	15.34	17.0	2.08	17.42	23.0
11N5.2G-20M	3	5240	9.79	11.03	9.51	-	14.93	17.0	2.08	17.01	23.0
11N5.2G-40M	3	5190	12.30	12.61	11.52	-	16.94	17.0	2.08	19.02	23.0
11N5.2G-40M	3	5230	12.22	12.17	11.24	-	16.67	17.0	2.08	18.75	23.0
Result			Complied								

Worst Maximum Conducted Output Power and Peak Excursion Plots
11A5.2G-20M – F1 [Port 1]



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

Worst Maximum Conducted Output Power and Peak Excursion Plots	
11N5.2G-20M – F1 [Port 1]	**11N5.2G-20M – F2 [Port 2]**
	
11N5.2G-20M – F2 [Port 3]	
	

Worst Maximum Conducted Output Power and Peak Excursion Plots	
11N5.2G-40M – F2' [Port 1]	**11N5.2G-40M – F2' [Port 2]**
	
11N5.2G-40M – F2' [Port 3]	
	

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

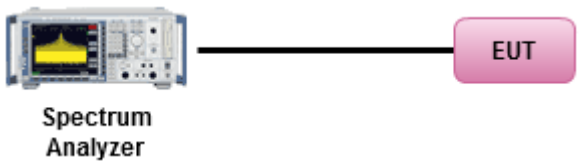
Refer a test equipment and calibration data table in this test report.

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:	
	[duty cycle ≥ 98% or external video / power trigger]	
	☐	Refer as FCC KDB 789033, clause C Method SA-1 (spectral trace averaging).
	☐	Refer as FCC KDB 789033, clause C 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 C Method SA-2 (spectral trace averaging).
	☐	Refer as FCC KDB 789033, clause C 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: $PPSD_{total} = PPSD_1 + PPSD_2 + \ldots + PPSD_n$ (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

Power Spectral Density



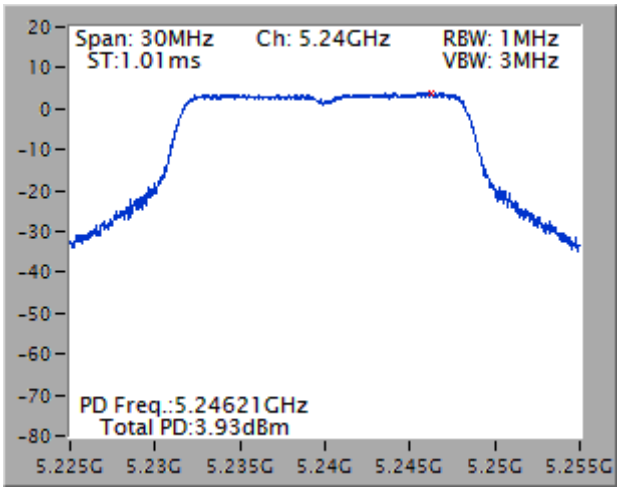
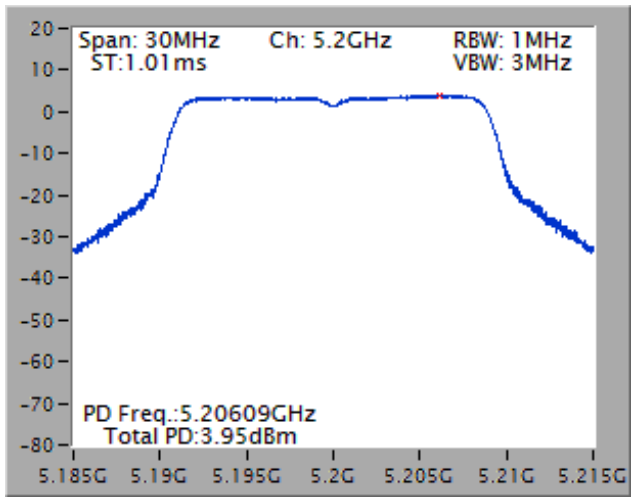
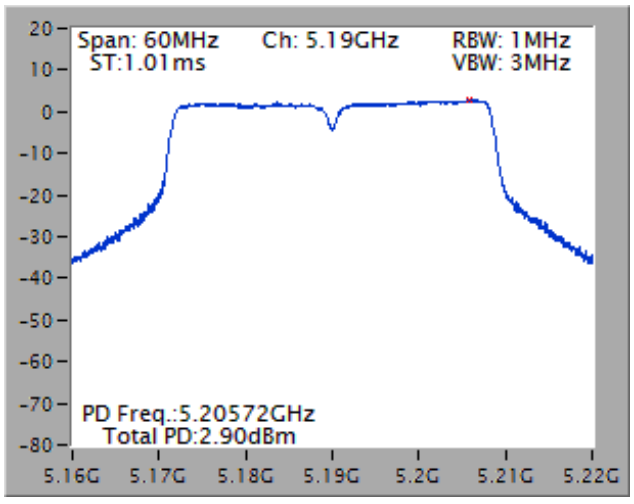
3.4.5 Directional Gain for Power Spectral Density Measurement

Directional Gain (DG) Result					
Transmit Chains No.		1	2	3	-
Maximum G_{ANT} (dBi)		2.08	2.08	2.08	-
Modulation Mode	**DG (dBi)**	**N_{TX}**	**N_{SS}**	**STBC**	**Array Gain (dB)**
Non HT20,6-54Mbps (11a)	2.08	1	1	-	0
HT20,M0-M7	2.08	3	3	-	3
HT40,M0-M7	2.08	3	3	-	3

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[($10^{G1/20}$ +… + $10^{GN/20}$)^2 /N_{TX}]
All transmit signals are completely uncorrelated, Directional Gain = 10 log[($10^{G1/10}$ +… + $10^{GN/10}$)/N_{TX}]
Note 3: For Spatial Multiplexing, Directional Gain (DG) = G_{ANT} + 10 log(N_{TX}/N_{SS}),
where Nss = the number of independent spatial streams data.
Note 4: For CDD transmissions, directional gain is calculated as power spectral density measurements:
Directional Gain (DG) = G_{ANT} + Array Gain, where Array Gain is as follows:
Array Gain = 10 log(N_{TX}/N_{SS});

3.4.6 Test Result of Peak Power Spectral Density

Peak Power Spectral Density Result											
Condition			**Peak Power Spectral Density (dBm/MHz)**								
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Sum Chain**	**-**	**-**	**-**	**-**	**PSD Limit**	**DG (dBi)**	**EIRP PSD**	**EIRP Limit**
11A5.2G-20M	1	5180	3.87	-	-	-	-	4.0	2.08	5.95	10.0
11A5.2G-20M	1	5200	3.69	-	-	-	-	4.0	2.08	5.77	10.0
11A5.2G-20M	1	5240	3.93	-	-	-	-	4.0	2.08	6.01	10.0
11N5.2G-20M	3	5180	3.78	-	-	-	-	4.0	2.08	5.86	10.0
11N5.2G-20M	3	5200	3.95	-	-	-	-	4.0	2.08	6.03	10.0
11N5.2G-20M	3	5240	3.38	-	-	-	-	4.0	2.08	5.46	10.0
11N5.2G-40M	3	5190	2.90	-	-	-	-	4.0	2.08	4.98	10.0
11N5.2G-40M	3	5230	2.74	-	-	-	-	4.0	2.08	4.82	10.0
Result			**Complied**								

Worst Power Spectral Density Plots	
11A5.2G-20M – F1 [Sum All Chains]	
	
11N5.2G-20M – F2 [Sum All Chains]	11N5.2G-40M – F1' [Sum All Chains]
	

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

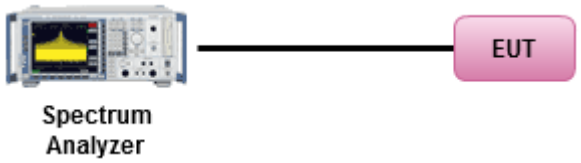
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method	
☒	Refer as FCC KDB 789033, clause F peak excursion method.
☒	Testing each modulation mode on a single channel is sufficient to demonstrate compliance with the peak excursion requirement
☒	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 given below method: Refer as FCC KDB 662911, when testing in-band (peak to average ratio) against relative emission limits, tests may be performed on each output individually without summing or adding 10 log(N).
☒	Test result plots refer as test report clause 3.3.5 with peak excursion ratio of the maximum of the peak-max-hold spectrum to the maximum of the average spectrum.

3.5.4 Test Setup

Peak Excursion



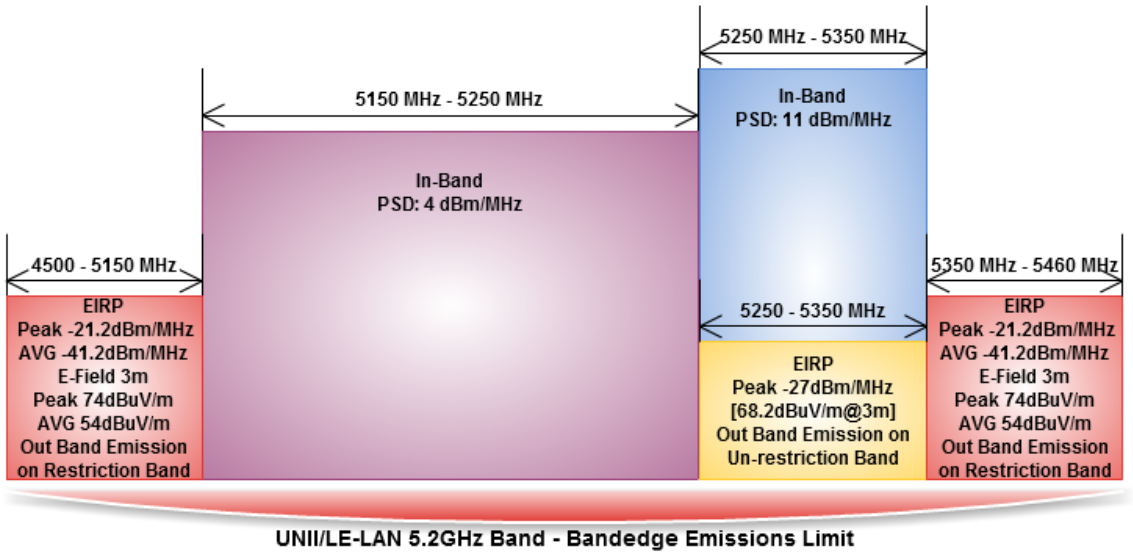
3.5.5 Test Result of Peak Excursion

UNII Peak Excursion Result							
Condition			Peak Excursion (dB)				
Modulation Mode	N_{TX}	Freq. (MHz)	Chain-Port 1	Chain-Port 2	Chain-Port 3	-	Limit
11A5.2G-20M	1	5180	8.27	-	-	-	13.0
11A5.2G-20M	1	5200	8.12	-	-	-	13.0
11A5.2G-20M	1	5240	8.18	-	-	-	13.0
11N5.2G-20M	3	5180	7.66	9.54	8.91	-	13.0
11N5.2G-20M	3	5200	7.99	8.88	10.24	-	13.0
11N5.2G-20M	3	5240	8.25	9.14	9.37	-	13.0
11N5.2G-40M	3	5190	8.24	8.90	9.68	-	13.0
11N5.2G-40M	3	5230	7.69	8.91	9.88	-	13.0
Result			Complied				

3.6 Transmitter Radiated Bandedge Emissions

3.6.1 Transmitter Radiated Bandedge Emissions Limit

Transmitter Radiated Bandedge Emissions Limit for 5.2GHz band: 5.15-5.25 GHz band



3.6.2 Measuring Instruments

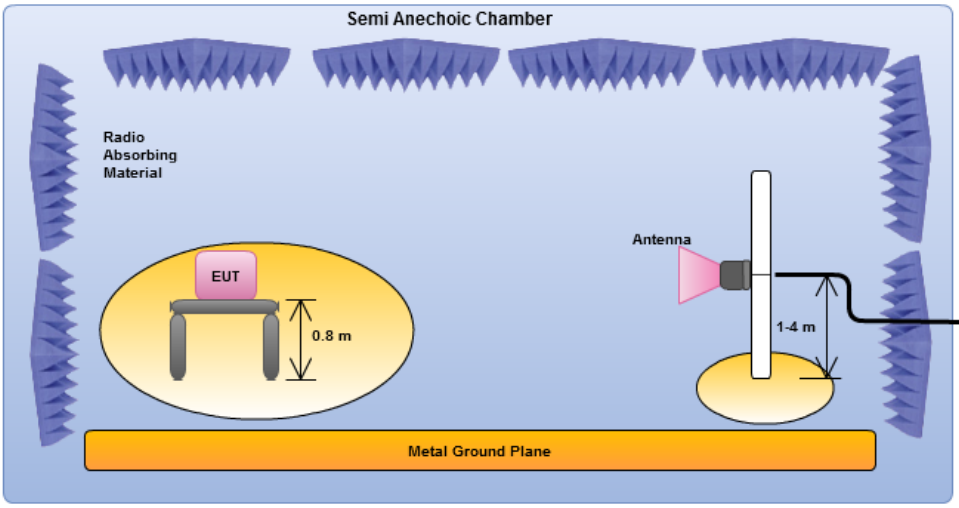
Refer a test equipment and calibration data table in this test report.

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 1.5m, 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].		
☒	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 G)2) for unwanted emissions into non-restricted bands.	
	☒	Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.	
		☐	Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
		☐	Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
		☒	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 789033, clause G)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 G)3)d) marker-delta method for band-edge measurements.	
	☒	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

Transmitter Radiated Bandedge Emissions

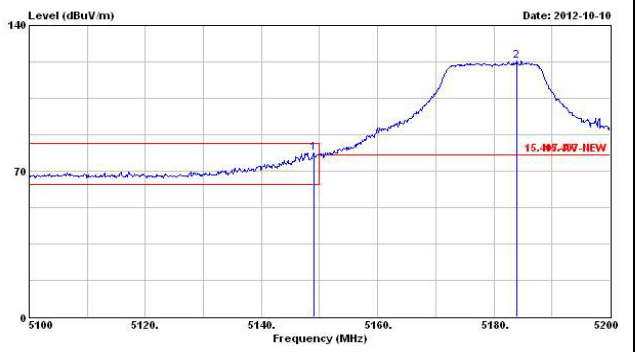


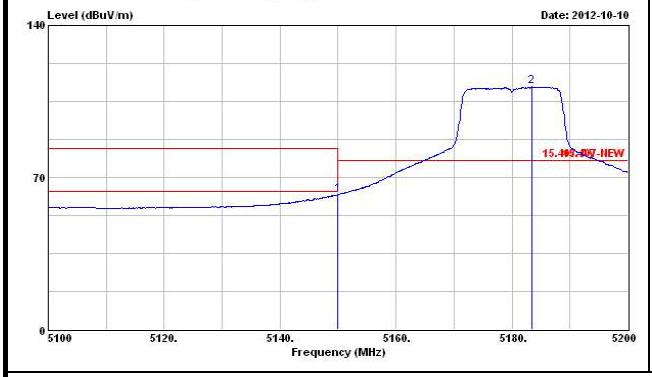
Electric field tests shall be performed in transmitter bandedge emissions using a calibrated horn antenna.

3.6.5 Test Result of Transmitter Radiated Bandedge Emissions

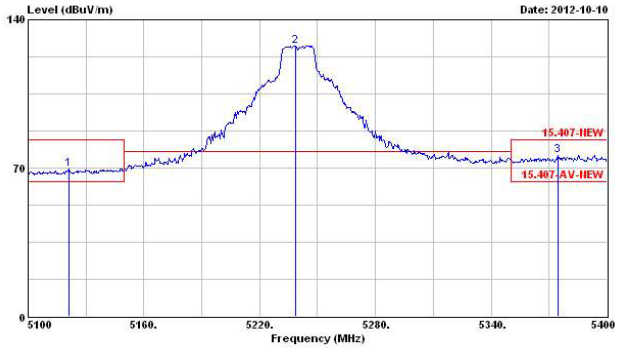
Transmitter Radiated Bandedge Emissions Result								
Modulation	11A-20M		**Restricted Band Emissions**					
Restricted Band (MHz)	**Test Ch. Freq. (MHz)**	**In-band PSD [i] (dBuV/1MHz)**	**RBE Freq. (MHz)**	**Measure Distance (m)**	**Out-Band Level (dBuV/m)**	**Limit (dBuV/m)**	**Level Type**	**Pol. note 1**
4500-5150	5180	123.14	5149.00	1	78.86	83.54	PK	V
4500-5150	5180	111.68	5150.00	1	62.15	63.54	AV	V
5350-5460	5240	127.72	5374.50	1	76.04	83.54	PK	V
5350-5460	5240	117.17	5396.10	1	62.53	63.54	AV	V

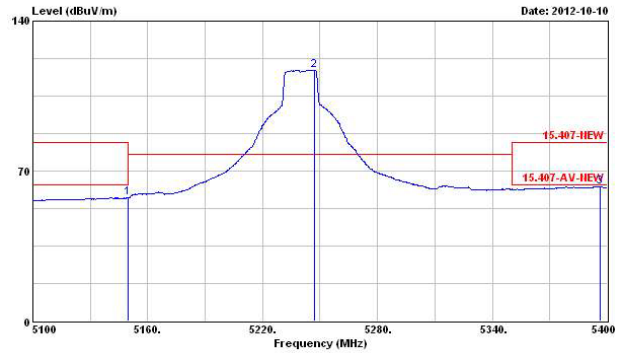
5.2GHz Lower-band (Lowest Ch.)





5.2GHz Higher-band (Highest Ch.)

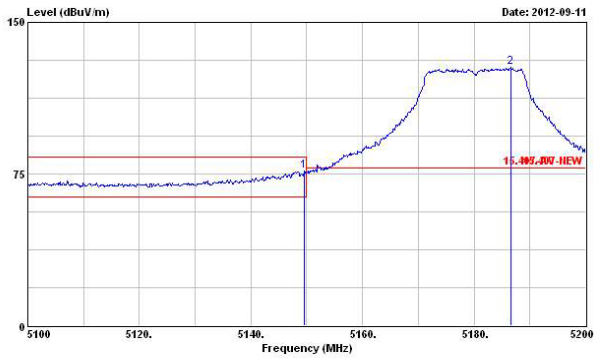


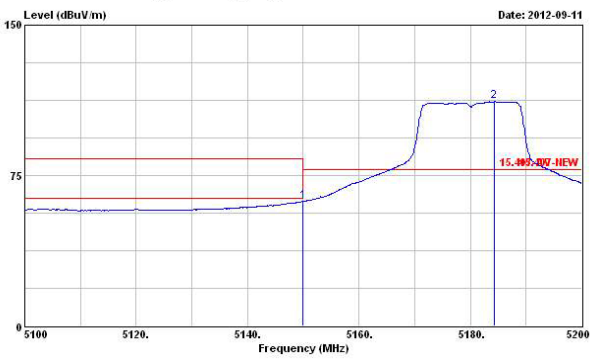


Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).

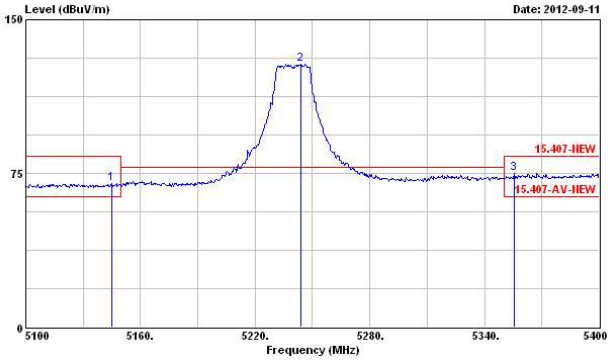
Transmitter Radiated Bandedge Emissions Result								
Modulation	11N-20M		**Restricted Band Emissions**					
Restricted Band (MHz)	**Test Ch. Freq. (MHz)**	**In-band PSD [i] (dBuV/1MHz)**	**RBE Freq. (MHz)**	**Measure Distance (m)**	**Out-Band Level (dBuV/m)**	**Limit (dBuV/m)**	**Level Type**	**Pol. note 1**
4500-5150	5180	127.70	5149.50	1	76.41	83.54	PK	V
4500-5150	5180	111.80	5150.00	1	62.08	63.54	AV	V
5350-5460	5240	128.48	5355.30	1	74.95	83.54	PK	V
5350-5460	5240	113.04	5393.70	1	61.59	63.54	AV	V

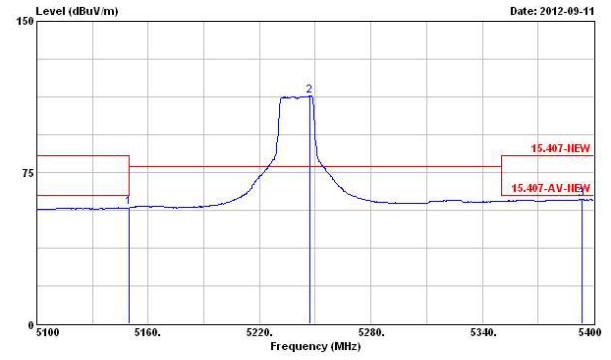
5.2GHz Lower-band (Lowest Ch.)





5.2GHz Higher-band (Highest Ch.)

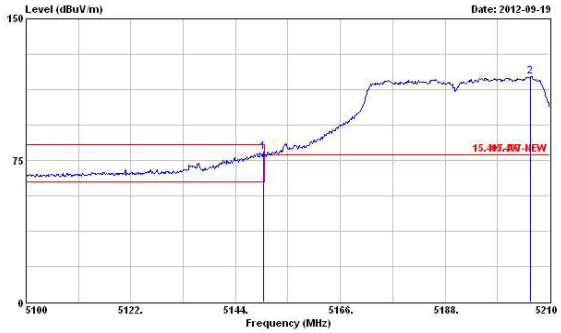


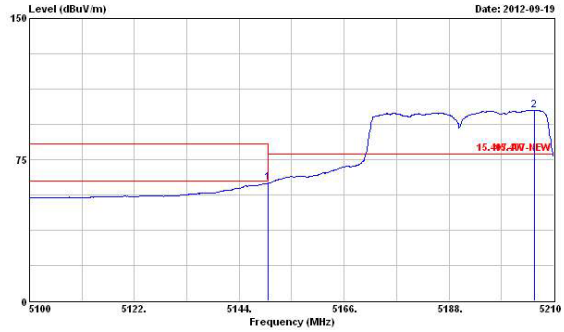


Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical).

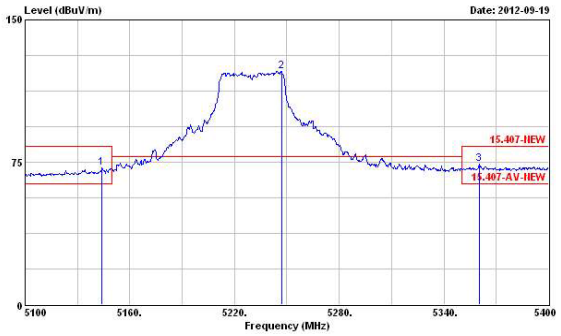
Transmitter Radiated Bandedge Emissions Result								
Modulation	11N-40M		**Restricted Band Emissions**					
Restricted Band (MHz)	**Test Ch. Freq. (MHz)**	**In-band PSD [i] (dBuV/1MHz)**	**RBE Freq. (MHz)**	**Measure Distance (m)**	**Out-Band Level (dBuV/m)**	**Limit (dBuV/m)**	**Level Type**	**Pol. note 1**
4500-5150	5190	119.33	5149.94	1	79.47	83.54	PK	V
4500-5150	5190	101.27	5150.00	1	62.52	63.54	AV	V
5350-5460	5230	122.99	5360.10	1	74.19	83.54	PK	V
5350-5460	5230	105.45	5360.10	1	62.12	63.54	AV	V

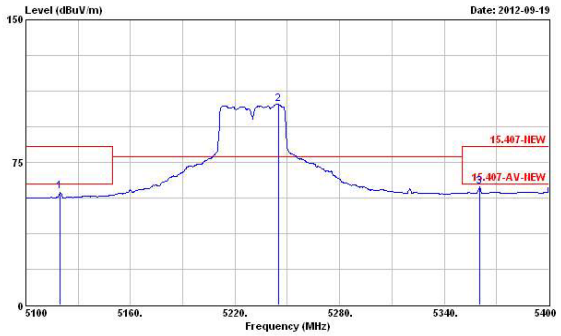
5.2GHz Lower-band (Lowest Ch.)





5.2GHz Higher-band (Highest Ch.)





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

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

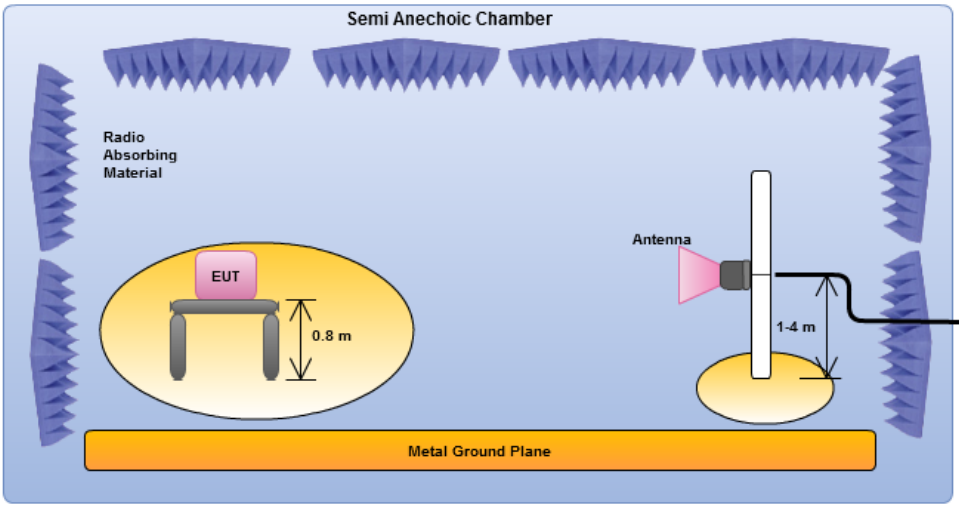
Refer a test equipment and calibration data table in this test report.

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 1.5m, 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 ≥ 98 or duty factor].		
☒	For the transmitter unwanted emissions shall be measured using following options below:		
	☒	Refer as FCC KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.	
	☒	Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.	
		☐	Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
		☐	Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
		☒	Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty ≥ 98%.
		☐	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		☒	Refer as FCC KDB 789033, clause G)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 6.5 for radiated emissions from above 1 GHz.	

3.7.4 Test Setup

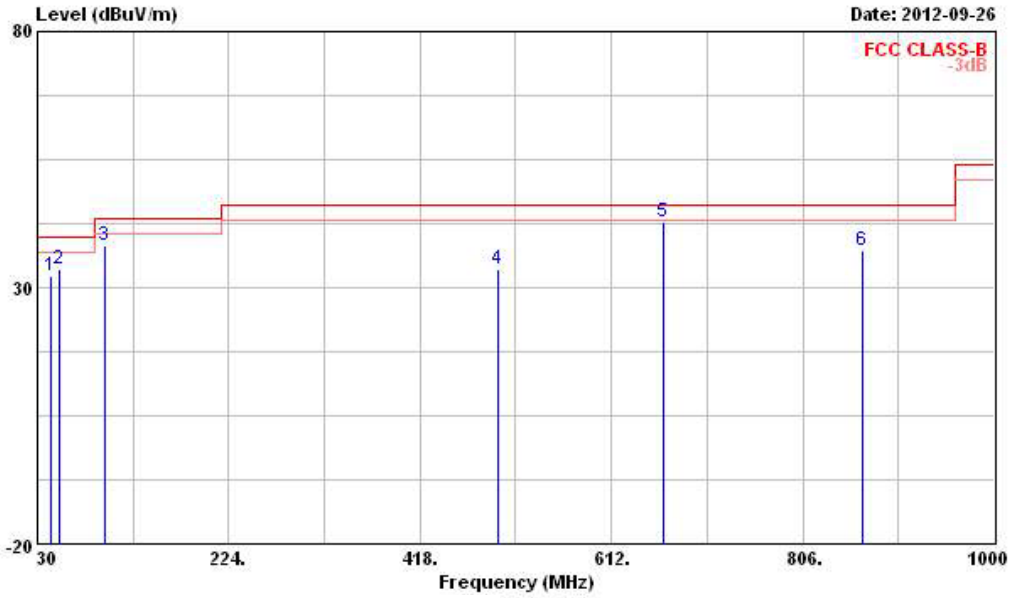
Transmitter Radiated Unwanted Emissions



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.

3.7.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)

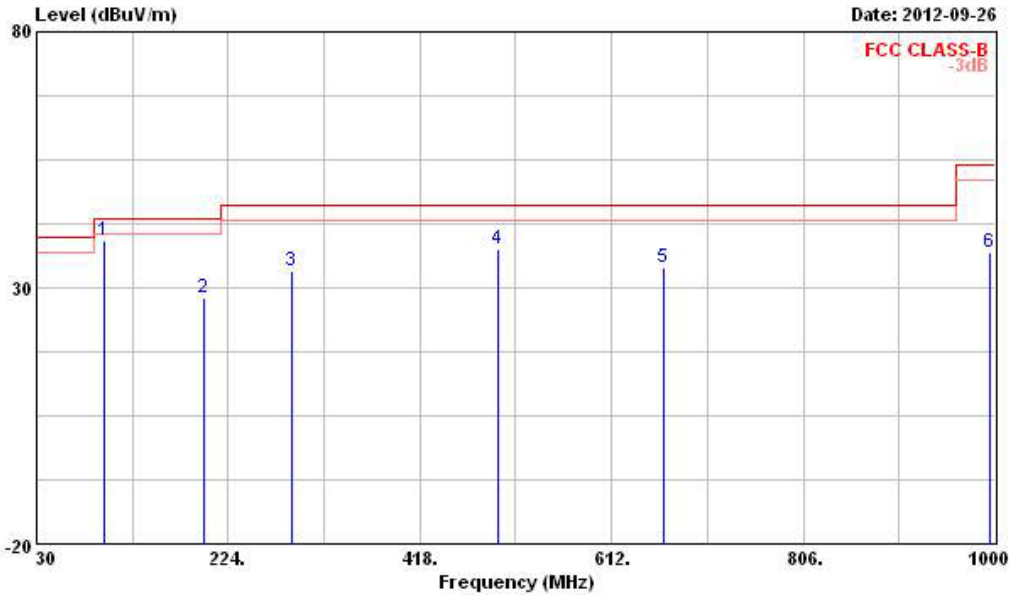
Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Operating Mode	1	**Polarization**	V
Operating Function	Radio link (5G-WLAN)		



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	43.580	32.20	-7.80	40.00	46.72	12.27	1.09	27.88	Peak	---	---
2 @	52.310	33.77	-6.23	40.00	51.46	8.94	1.22	27.85	Peak	---	---
3 @	98.870	38.21	-5.29	43.50	53.40	11.01	1.65	27.85	Peak	---	---
4 @	497.540	33.70	-12.30	46.00	41.00	17.24	3.82	28.36	Peak	---	---
5 @	665.350	42.81	-3.19	46.00	47.40	19.31	4.44	28.34	Peak	---	---
6 @	867.110	37.13	-8.87	46.00	39.61	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)			
Operating Mode	1	**Polarization**	H
Operating Function	Radio link (5G-WLAN)		

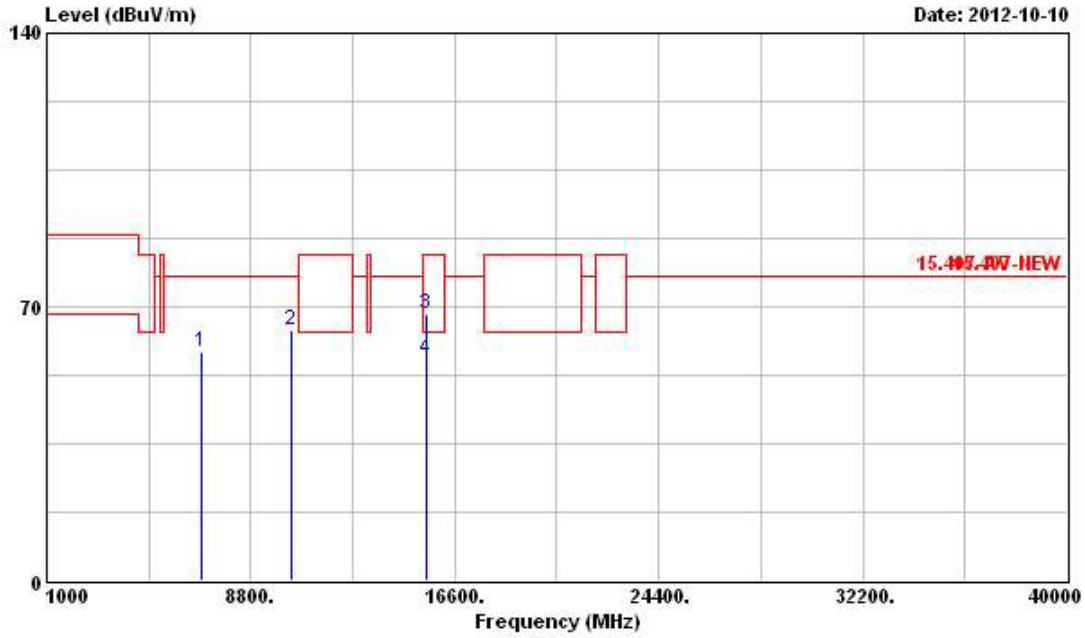


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	98.870	39.17	-4.33	43.50	54.36	11.01	1.65	27.85	Peak	---	---
2 @	198.780	27.87	-15.63	43.50	41.59	11.28	2.42	27.42	Peak	---	---
3 @	288.020	33.35	-12.65	46.00	44.08	13.54	2.92	27.19	Peak	---	---
4 @	497.540	37.49	-8.51	46.00	44.79	17.24	3.82	28.36	Peak	---	---
5 @	665.350	33.98	-12.02	46.00	38.57	19.31	4.44	28.34	Peak	---	---
6 @	995.150	36.85	-17.15	54.00	36.05	22.38	5.66	27.24	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)

3.7.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11A-20M

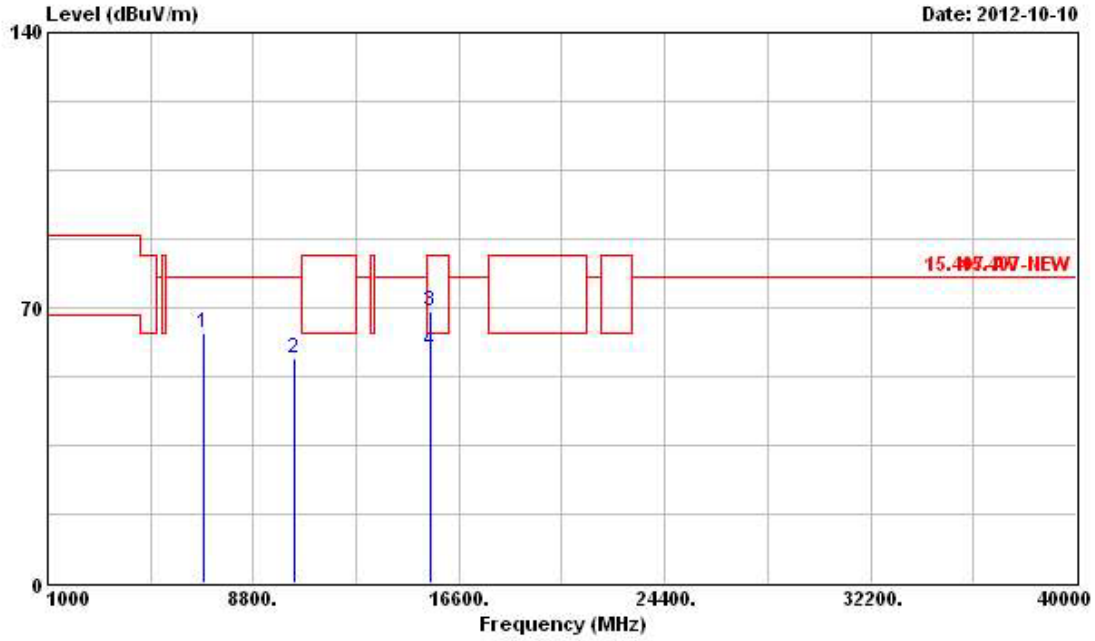
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11A5.2G-20M	**Test Freq. (FX)**	F1
Operating Function	Transmit	**Polarization**	V



	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	@ 6888.000	58.30	-19.54	77.84	51.87	35.85	5.57	34.99	Peak	---	---
2	@10360.000	63.84	-14.00	77.84	54.13	38.22	6.71	35.22	Peak	---	---
3	@15540.000	67.94	-15.60	83.54	53.71	40.81	8.45	35.03	Peak	---	---
4	@15540.000	56.80	-6.74	63.54	42.57	40.81	8.45	35.03	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.)
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.

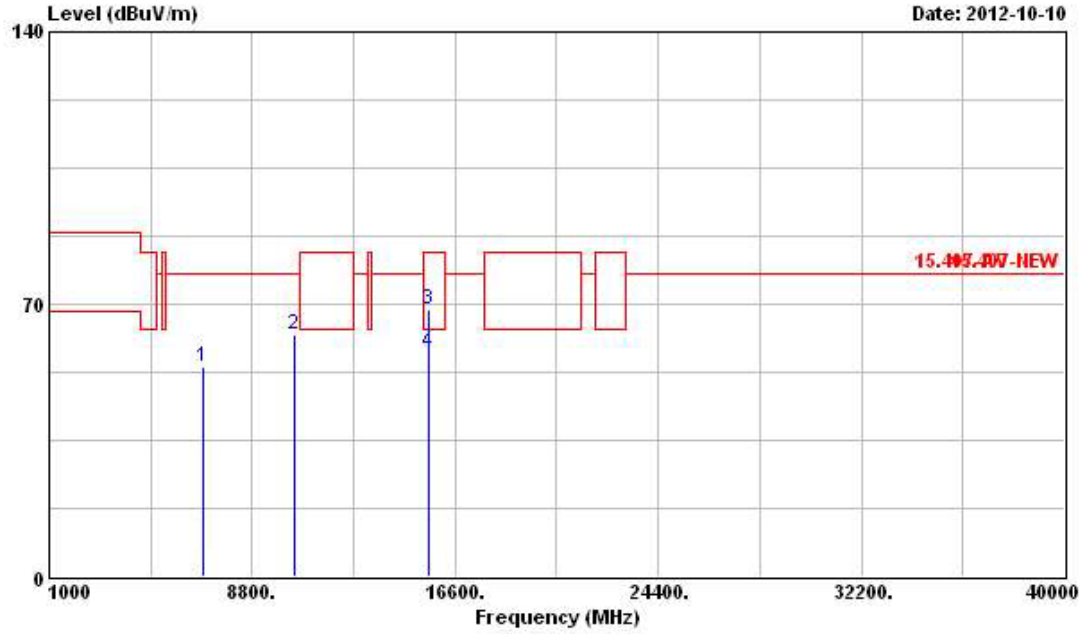
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11A5.2G-20M	**Test Freq. (FX)**	F1
Operating Function	Transmit	**Polarization**	H



	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	@ 6888.000	63.56	-14.28	77.84	57.13	35.85	5.57	34.99	Peak	---	---
2	@10360.000	57.31	-20.53	77.84	47.60	38.22	6.71	35.22	Peak	---	---
3	@15540.000	69.01	-14.53	83.54	54.78	40.81	8.45	35.03	Peak	---	---
4	@15540.000	59.07	-4.47	63.54	44.84	40.81	8.45	35.03	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.)
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.

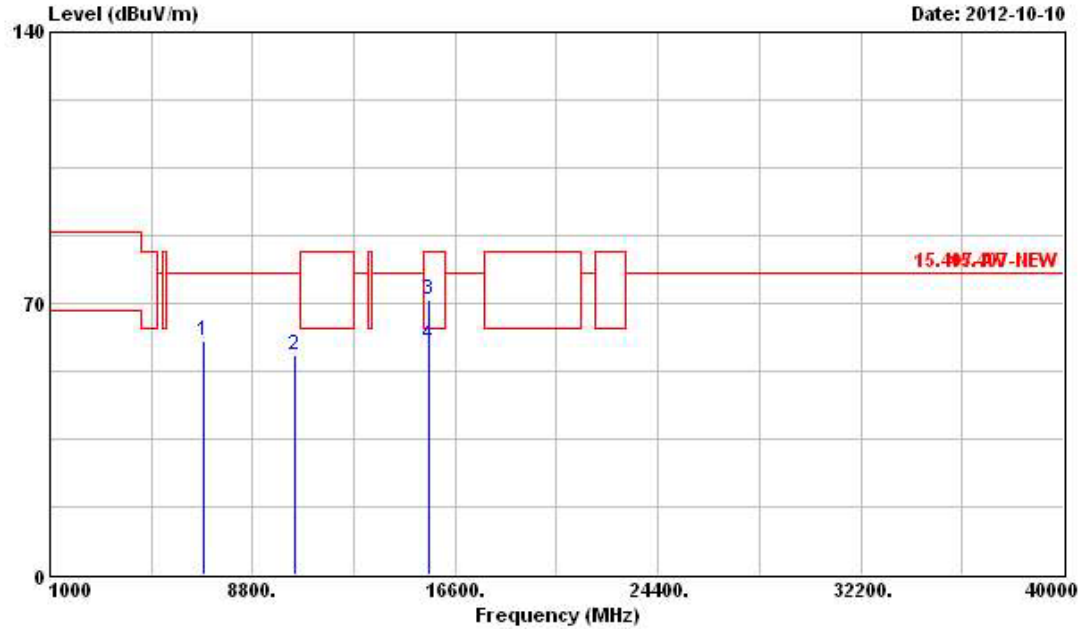
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11A5.2G-20M	**Test Freq. (FX)**	F2
Operating Function	Transmit	**Polarization**	V



	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	@ 6900.000	53.78	-24.06	77.84	47.34	35.86	5.57	34.99	Peak	---	---
2	@10400.000	62.14	-15.70	77.84	52.33	38.24	6.75	35.18	Peak	---	---
3	@15600.000	68.72	-14.82	83.54	54.53	40.84	8.45	35.10	Peak	---	---
4	@15600.000	57.55	-5.99	63.54	43.36	40.84	8.45	35.10	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.)
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.

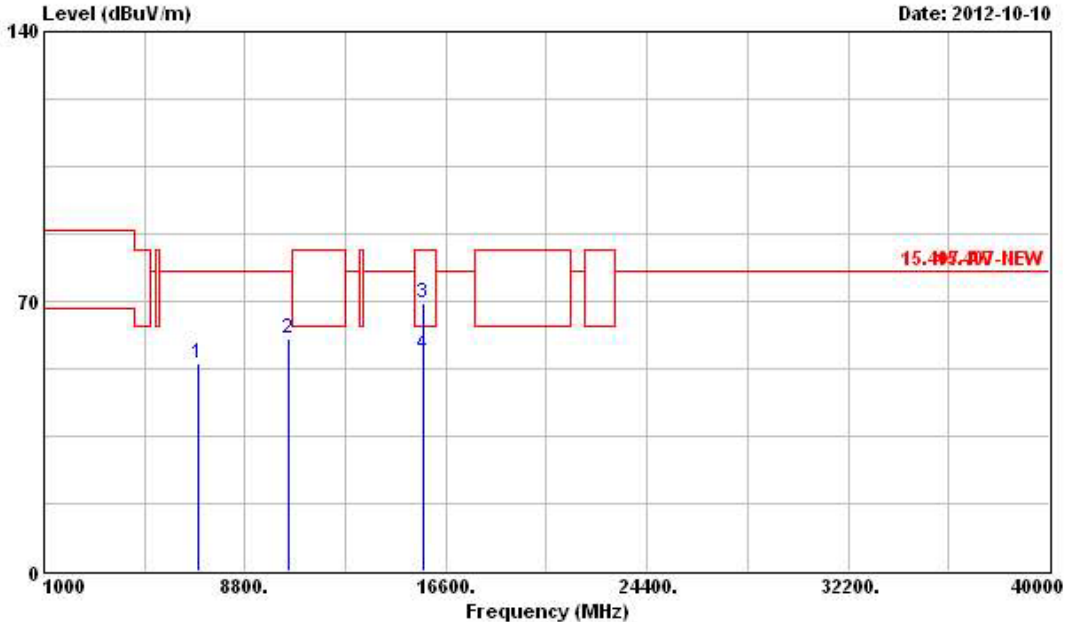
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11A5.2G-20M	**Test Freq. (FX)**	F2
Operating Function	Transmit	**Polarization**	H



	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	@ 6900.000	60.55	-17.29	77.84	54.11	35.86	5.57	34.99	Peak	---	---
2	@10400.000	56.59	-21.25	77.84	46.78	38.24	6.75	35.18	Peak	---	---
3	@15600.000	70.89	-12.65	83.54	56.70	40.84	8.45	35.10	Peak	---	---
4	@15600.000	59.21	-4.33	63.54	45.02	40.84	8.45	35.10	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.)
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.

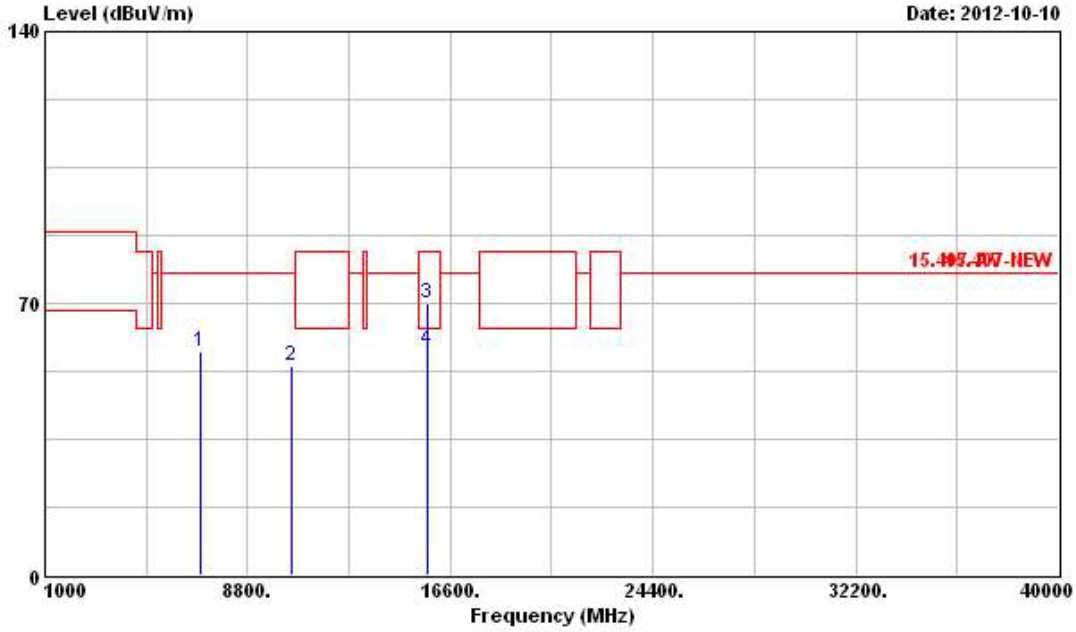
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11A5.2G-20M	**Test Freq. (FX)**	F3
Operating Function	Transmit	**Polarization**	V



	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	@ 6984.000	53.89	-23.95	77.84	47.43	35.89	5.59	35.02	Peak	---	---
2	@10480.000	60.25	-17.59	77.84	50.26	38.29	6.82	35.12	Peak	---	---
3	@15720.000	69.46	-14.08	83.54	55.31	40.89	8.46	35.20	Peak	---	---
4	@15720.000	56.21	-7.33	63.54	42.06	40.89	8.46	35.20	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.)
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.

Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11A5.2G-20M	**Test Freq. (FX)**	F3
Operating Function	Transmit	**Polarization**	H

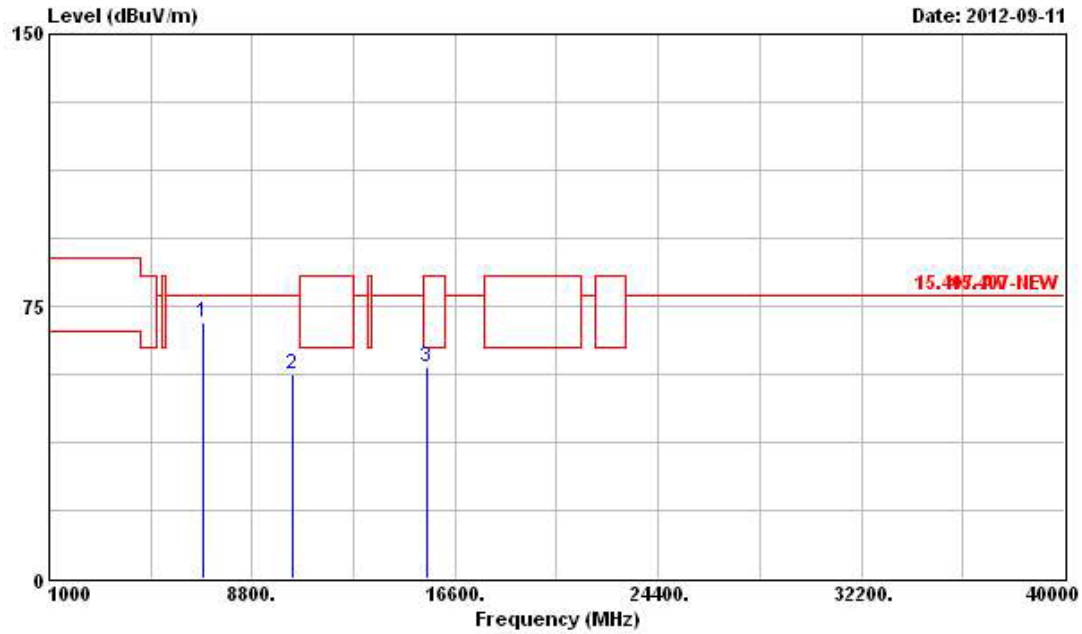


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	@ 6984.000	57.36	-20.48	77.84	50.90	35.89	5.59	35.02	Peak	---	---
2	@10480.000	54.08	-23.76	77.84	44.09	38.29	6.82	35.12	Peak	---	---
3	@15720.000	69.82	-13.72	83.54	55.67	40.89	8.46	35.20	Peak	---	---
4	@15720.000	58.13	-5.41	63.54	43.98	40.89	8.46	35.20	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.)
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.

3.7.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11N-20M

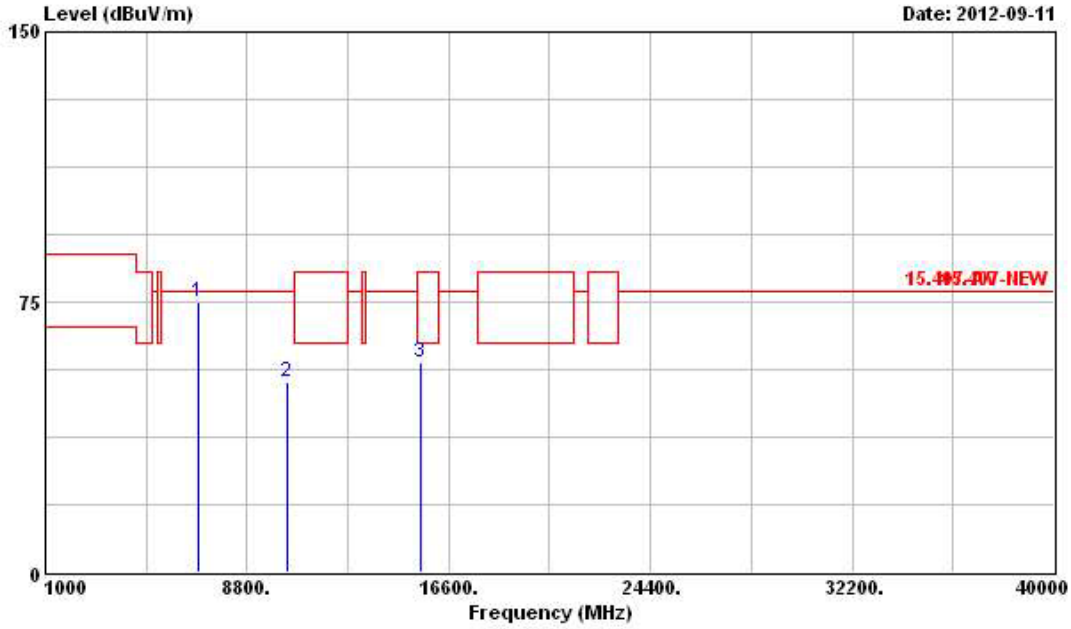
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N5.2G-20M	**Test Freq. (FX)**	F1
Operating Function	Transmit	**Polarization**	V



	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	@ 6888.000	70.53	-7.31	77.84	64.10	35.85	5.57	34.99	Peak	---	---
2	@10356.000	56.14	-21.70	77.84	46.44	38.21	6.71	35.22	Peak	---	---
3	@15540.000	58.41	-5.13	63.54	44.18	40.81	8.45	35.03	PK	---	---

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.

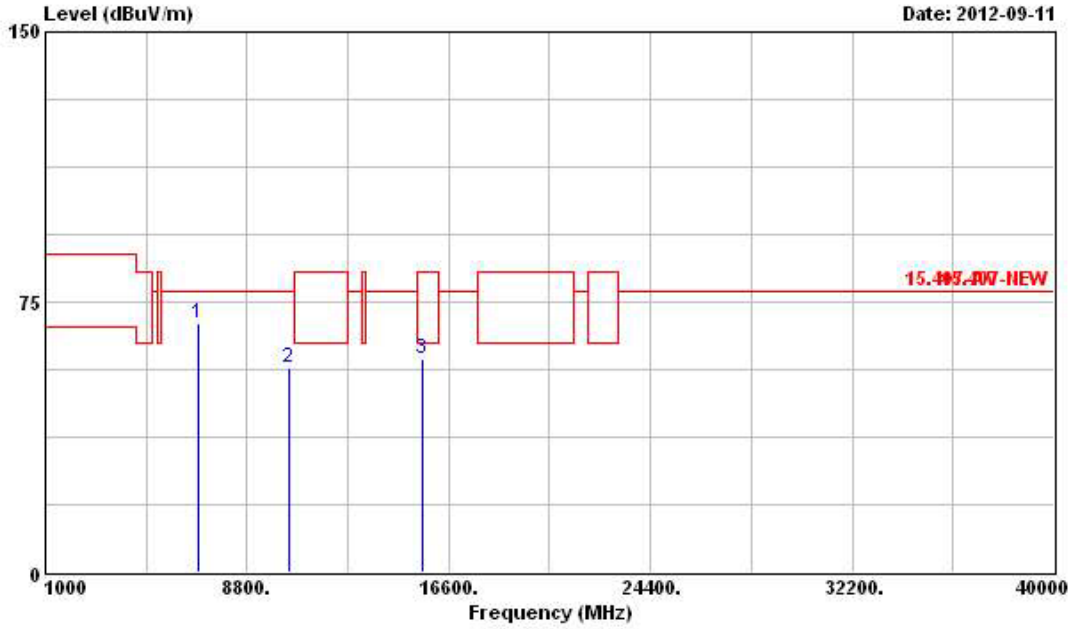
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N5.2G-20M	**Test Freq. (FX)**	F1
Operating Function	Transmit	**Polarization**	H



	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	@ 6888.000	74.98	-2.86	77.84	68.55	35.85	5.57	34.99	Peak	---	---
2	@10360.000	52.89	-24.95	77.84	43.18	38.22	6.71	35.22	Peak	---	---
3	@15540.000	58.32	-5.22	63.54	44.09	40.81	8.45	35.03	PK	---	---

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.

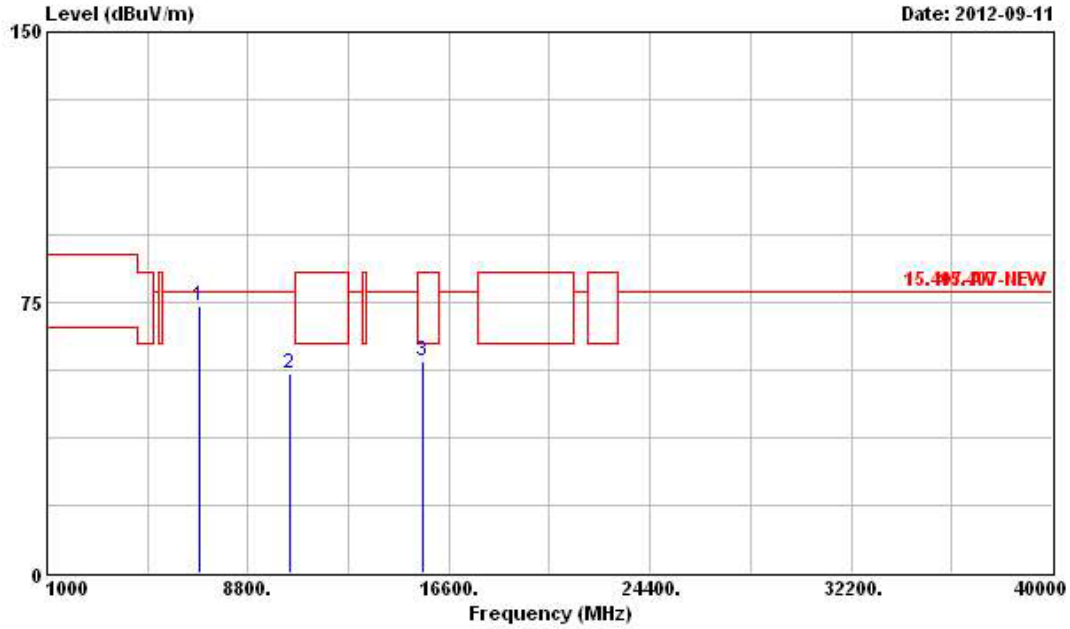
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N5.2G-20M	**Test Freq. (FX)**	F2
Operating Function	Transmit	**Polarization**	V



	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	@ 6900.000	69.13	-8.71	77.84	62.69	35.86	5.57	34.99	Peak	---	---
2	@10400.000	56.51	-21.33	77.84	46.70	38.24	6.75	35.18	Peak	---	---
3	@15600.000	58.97	-4.57	63.54	44.78	40.84	8.45	35.10	PK	---	---

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.

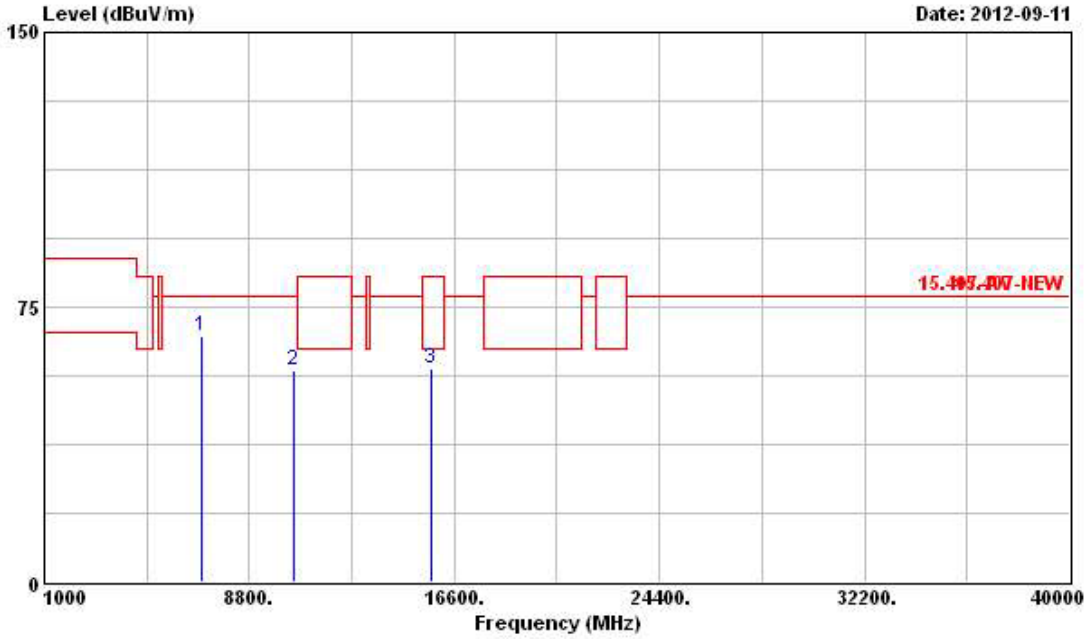
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N5.2G-20M	**Test Freq. (FX)**	F2
Operating Function	Transmit	**Polarization**	H



	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	@ 6900.000	74.21	-3.63	77.84	67.77	35.86	5.57	34.99	Peak	---	---
2	@10400.000	55.11	-22.73	77.84	45.30	38.24	6.75	35.18	Peak	---	---
3	@15600.000	58.91	-4.63	63.54	44.72	40.84	8.45	35.10	PK	---	---

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.

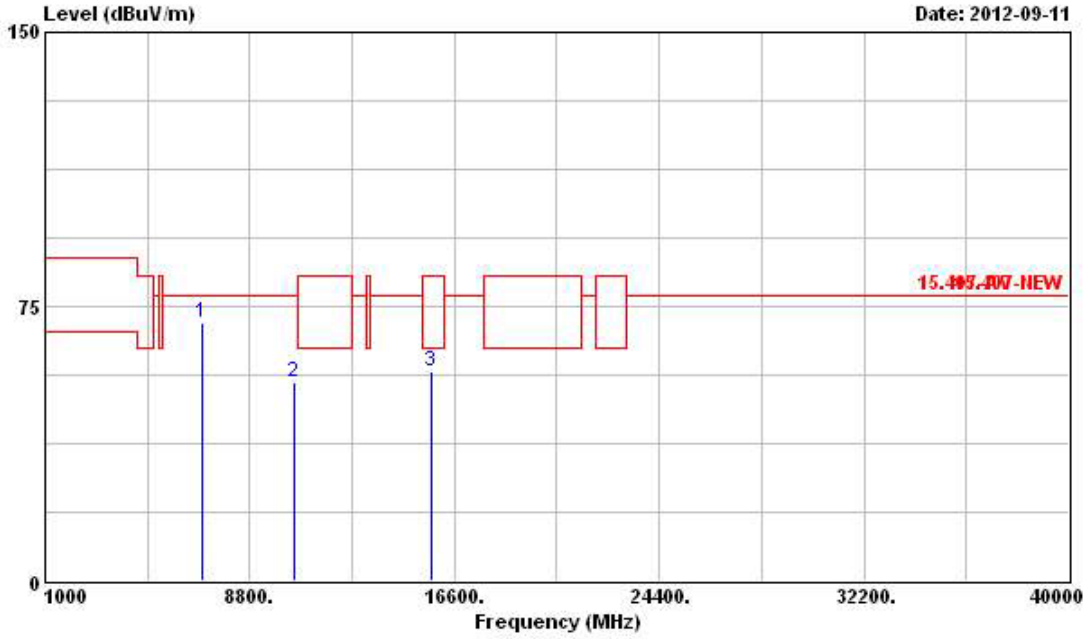
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N5.2G-20M	**Test Freq. (FX)**	F3
Operating Function	Transmit	**Polarization**	V



	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	@ 6984.000	67.18	-10.66	77.84	60.72	35.89	5.59	35.02	Peak	---	---
2	@10480.000	57.71	-20.13	77.84	47.72	38.29	6.82	35.12	Peak	---	---
3	@15720.000	58.24	-5.30	63.54	44.09	40.89	8.46	35.20	PK	---	---

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.

Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N5.2G-20M	**Test Freq. (FX)**	F3
Operating Function	Transmit	**Polarization**	H

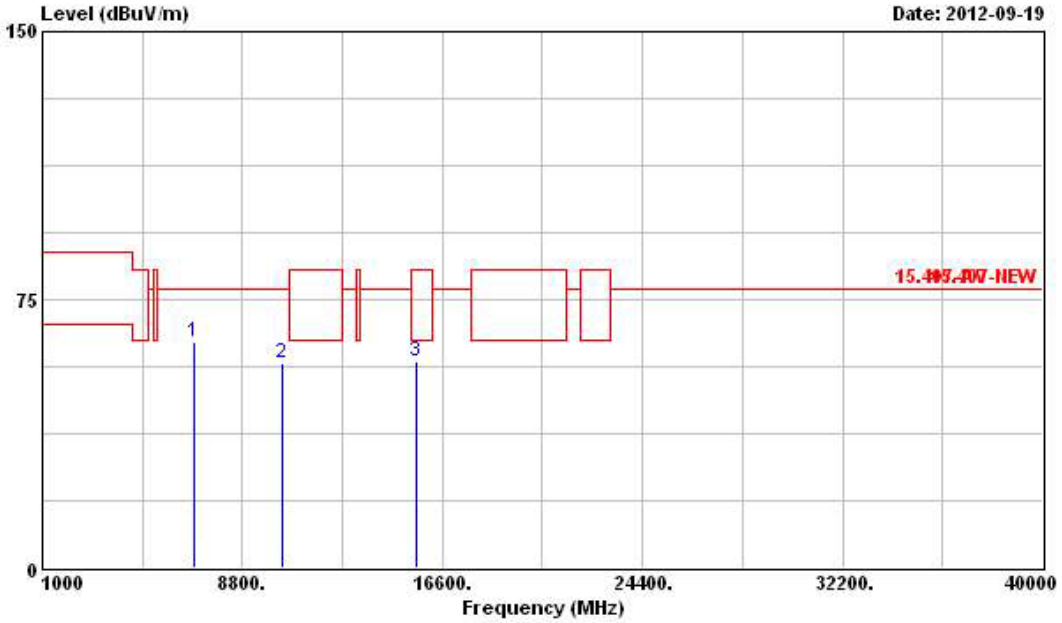


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	@ 6984.000	70.79	-7.05	77.84	64.33	35.89	5.59	35.02	Peak	---	---
2	@10480.000	54.33	-23.51	77.84	44.34	38.29	6.82	35.12	Peak	---	---
3	@15720.000	57.24	-6.30	63.54	43.09	40.89	8.46	35.20	PK	---	---

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.

3.7.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11N-40M

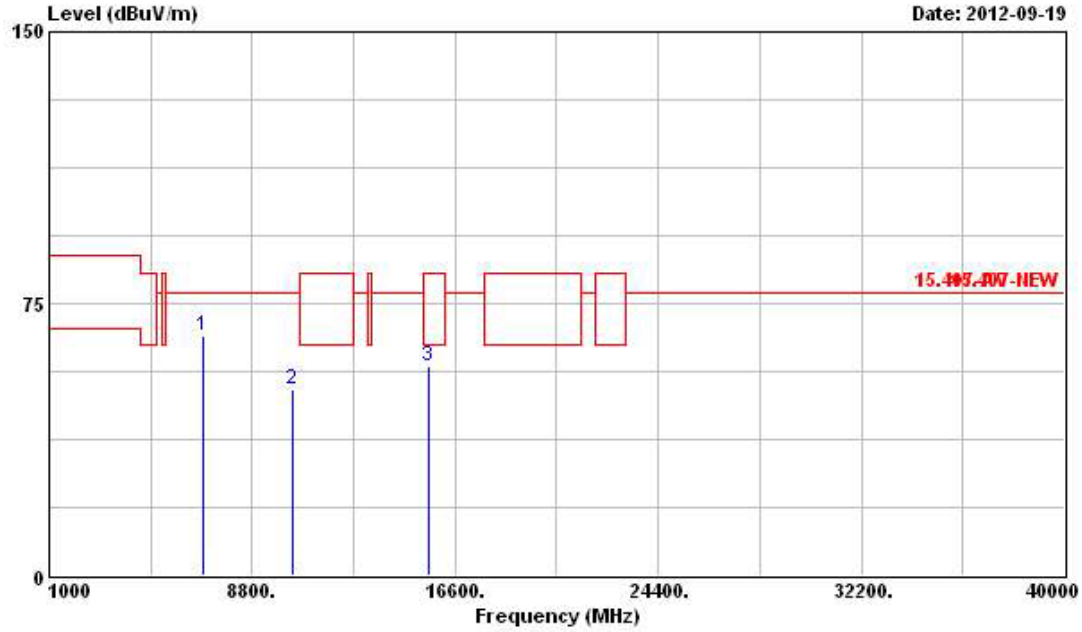
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N5.2G-40M	**Test Freq. (FX)**	F1'
Operating Function	Transmit	**Polarization**	V



	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	@ 6912.000	62.96	-14.88	77.84	56.51	35.87	5.58	35.00	Peak	---	---
2	@10380.000	57.00	-20.84	77.84	47.22	38.23	6.75	35.20	Peak	---	---
3	@15570.000	57.84	-5.70	63.54	43.61	40.83	8.45	35.05	PK	---	---

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.

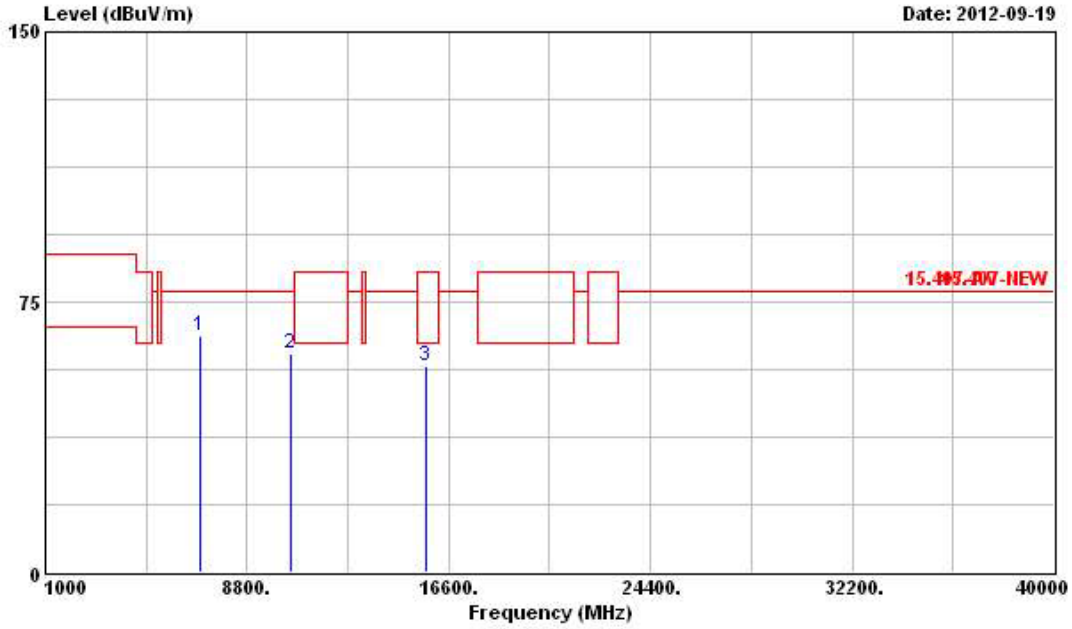
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N5.2G-40M	**Test Freq. (FX)**	F1'
Operating Function	Transmit	**Polarization**	H



	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	@ 6912.000	66.33	-11.51	77.84	59.88	35.87	5.58	35.00	Peak	---	---
2	@10380.000	51.35	-26.49	77.84	41.57	38.23	6.75	35.20	Peak	---	---
3	@15570.000	57.53	-6.01	63.54	43.30	40.83	8.45	35.05	PK	---	---

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.

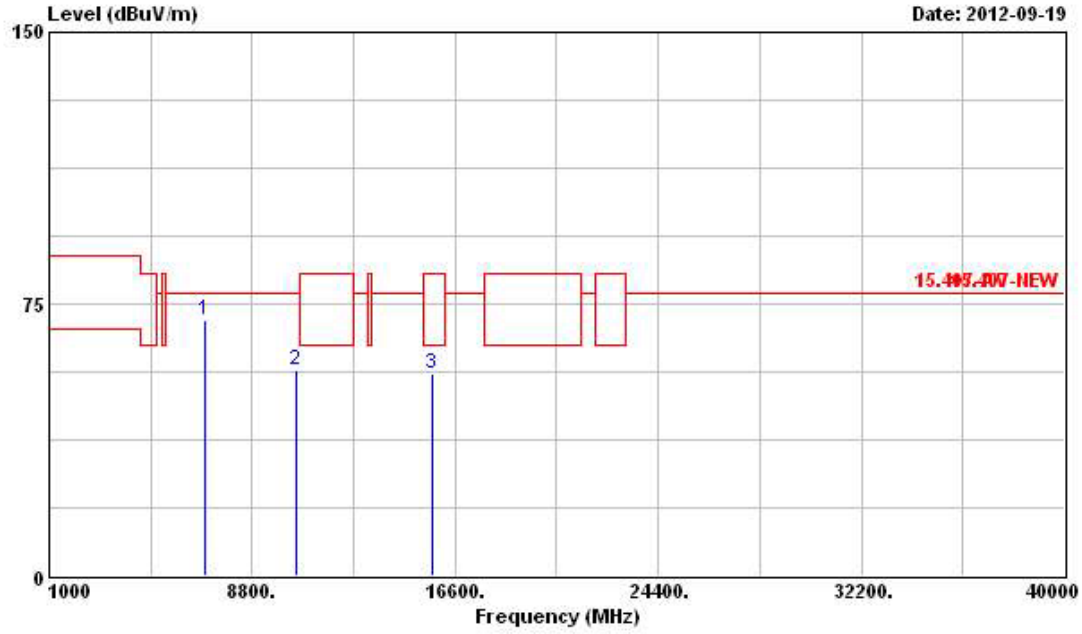
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N5.2G-40M	**Test Freq. (FX)**	F2'
Operating Function	Transmit	**Polarization**	V



	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	@ 6960.000	65.48	-12.36	77.84	59.01	35.89	5.59	35.01	Peak	---	---
2	@10460.000	60.53	-17.31	77.84	50.58	38.27	6.82	35.14	Peak	---	---
3	@15690.000	57.47	-6.07	63.54	43.31	40.88	8.46	35.18	PK	---	---

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.

Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11N5.2G-40M	**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	@ 6960.000	70.67	-7.17	77.84	64.20	35.89	5.59	35.01	Peak	---	---
2	@10460.000	56.81	-21.03	77.84	46.86	38.27	6.82	35.14	Peak	---	---
3	@15690.000	55.98	-7.56	63.54	41.82	40.88	8.46	35.18	PK	---	---

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.

3.8 Frequency Stability

3.8.1 Frequency Stability Limit

Frequency Stability Limit
UNII Devices
☒ In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.
LE-LAN Devices
☒ N/A
IEEE Std. 802.11n-2009
☒ The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band and ± 25 ppm maximum for the 2.4 GHz band.

3.8.2 Measuring Instruments

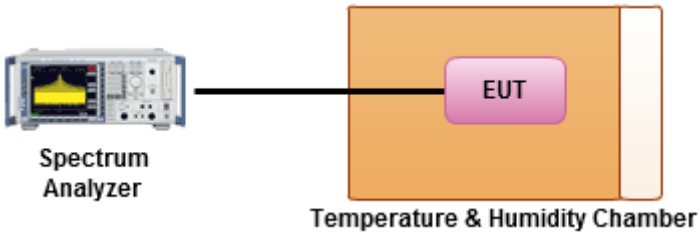
Refer a test equipment and calibration data table in this test report.

3.8.3 Test Procedures

Test Method	
☒	Refer as ANSI C63.10, clause 6.8 for frequency stability tests
	☒ Frequency stability with respect to ambient temperature
	☒ Frequency stability when varying supply voltage
☒	For conducted measurement.
	☒ For conducted measurements on devices with multiple transmit chains: Measurements need only to be performed on one of the active transmit chains (antenna outputs)
☐	For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.

3.8.4 Test Setup

Frequency Stability



3.8.5 Test Result of Frequency Stability

Frequency Stability Result						
Mode		Frequency Stability (ppm)				
Condition	Freq. (MHz)	0 min	2 min	5 min	10 min	Limit
$T_{20°C}$Vmax	5180	-10.31	-5.08	-3.35	-13.38	20.0
$T_{20°C}$Vmin	5180	-7.15	-2.42	-1.50	0.69	20.0
$T_{50°C}$Vnom	5180	-11.31	1.50	4.27	5.31	20.0
$T_{40°C}$Vnom	5180	-11.12	-2.81	-1.12	-0.48	20.0
$T_{30°C}$Vnom	5180	-9.95	-7.50	-6.52	-6.12	20.0
$T_{20°C}$Vnom	5180	-8.59	-12.19	-13.90	-16.02	20.0
$T_{10°C}$Vnom	5180	-7.23	-12.00	-12.00	-12.12	20.0
$T_{0°C}$Vnom	5180	-5.46	-10.42	-10.35	-10.54	20.0
$T_{-10°C}$Vnom	5180	-3.83	-9.23	-8.63	-8.81	20.0
$T_{-20°C}$Vnom	5180	-3.69	-7.85	-7.38	-7.73	20.0
Result		Complied				

Note 1: Measure at 85 % [Vmin] and 115 % [Vmax] of the nominal voltage [Vnom].
Note 2: The nominal voltage refer test report clause 1.1.5 for EUT operational condition.

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz ~ 2.75GHz	Mar. 23, 2012	Conduction (CO04-HY)
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	8127-477	9kHz ~ 30MHz	Feb. 08, 2012	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz ~ 30MHz	Apr. 20, 2012	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	CB049	9kHz ~ 30MHz	Apr. 25, 2012	Conduction (CO04-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP 40	100305	9KHz~40GHz	Feb. 21, 2012	Conducted (TH01-HY)
Spectrum Analyzer	R&S	FSV 40	15195-01-00	9KHz~40GHz	Jan. 06, 2012	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 19, 2012	Conducted (TH01-HY)
AC Power Source	G.W	APS-9102	EL920581	AC 0V ~ 300V	Jul. 02, 2012	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100℃	Dec. 07, 2011	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100302	10MHz ~ 40GHz	Nov. 22, 2011	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	Jan. 12, 2012	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	Jan. 12, 2012	Conducted (TH01-HY)
RF Cable-2m	HUBER+SUHNER	SUCOFLEX_104	SN 345672/4	1GHz ~ 26.5GHz	Dec. 03, 2011	Conducted (TH01-HY)
RF Cable-3m	HUBER+SUHNER	SUCOFLEX_104	SN 345668/4	1GHz ~ 26.5GHz	Dec. 03, 2011	Conducted (TH01-HY)

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

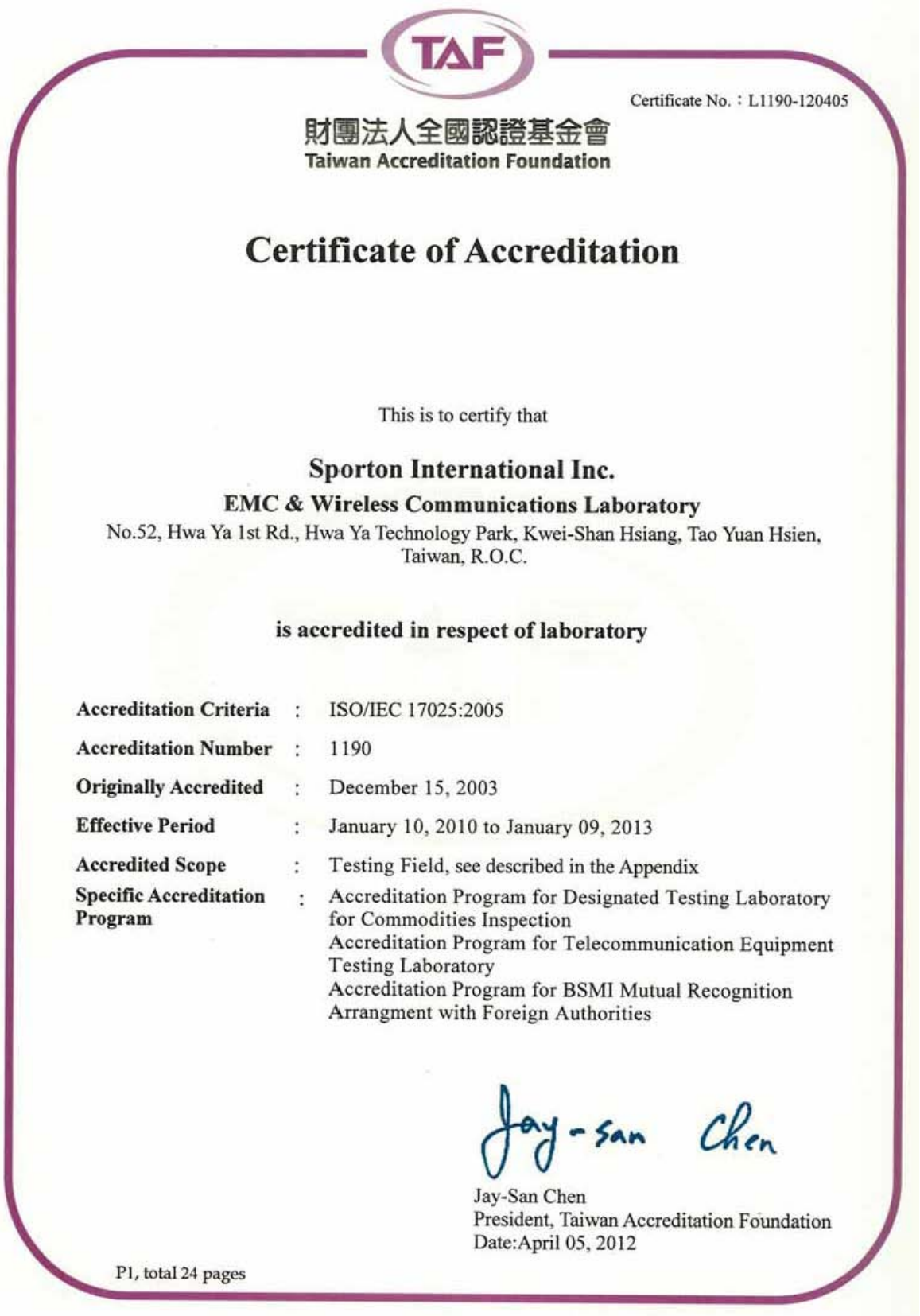
Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Sep. 14, 2012	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 10, 2012	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100kHz ~ 1.3GHz	Jul. 23, 2012	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	Aug. 10, 2012	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 15, 2011	Radiation (03CH02-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan.13, 2012	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Nov. 11, 2011	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 06, 2012	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 22, 2011	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0~ 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 ~ 4 m	N/A	Radiation (03CH02-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/0001	9 kHz - 30 MHz	Jul. 03, 2012*	Radiation (03CH02-HY)

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

5 Certification of TAF Accreditation



Certificate No. : L1190-120405

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

Certificate of Accreditation

This is to certify that

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

is accredited in respect of laboratory

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

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

P1, total 24 pages