

Report No.: FR932906AB



FCC RADIO TEST REPORT

FCC ID

: UIDW21

Equipment

: Wireless Router

Brand Name

: ARRIS

Model Name

: W21

Applicant

: ARRIS

3871 Lakefield Drive Suite 300, Suwanee, Georgia,

30024 United States

Manufacturer

: ARRIS

3871 Lakefield Drive Suite 300, Suwanee, Georgia,

30024 United States

Standard

: 47 CFR FCC Part 15,407

The product was received on Jun. 03, 2019, and testing was started from Sep. 12, 2019 and completed on Oct. 09, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

TEL: 886-3-656-9065

FAX: 886-3-656-9085

Report Template No.: CB Ver1.0

Page Number

: 1 of 30

Issued Date

: Jan. 08, 2020

Report Version : 01

Table of Contents

ry of this test report	3
nary of Test Result	4
·	
• •	
·	
Test Configuration of EUT	11
Test Channel Mode	11
The Worst Case Measurement Configuration	13
EUT Operation during Test	14
Accessories	14
Support Equipment	14
Test Setup Diagram	15
Transmitter Test Result	17
AC Power-line Conducted Emissions	17
Emission Bandwidth	19
Maximum Conducted Output Power	20
Peak Power Spectral Density	22
Unwanted Emissions	25
Test Equipment and Calibration Data	29
	General Description Information. Applicable Standards Testing Location Information Measurement Uncertainty. Test Configuration of EUT. Test Channel Mode The Worst Case Measurement Configuration EUT Operation during Test Accessories Support Equipment. Test Setup Diagram Transmitter Test Result AC Power-line Conducted Emissions Emission Bandwidth Maximum Conducted Output Power Peak Power Spectral Density. Unwanted Emissions

Appendix A. Test Results of AC Power-line Conducted Emissions

Appendix B. Test Results of Emission Bandwidth

Appendix C. Test Results of Maximum Conducted Output Power

Appendix D. Test Results of Peak Power Spectral Density

Appendix E. Test Results of Unwanted Emissions

Appendix F. Test Photos

Photographs of EUT v01

TEL: 886-3-656-9065 FAX: 886-3-656-9085 Report Template No.: CB Ver1.0 Page Number : 2 of 30 Issued Date : Jan. 08, 2020

Report No.: FR932906AB

Report Version : 01

History of this test report

Report No.: FR932906AB

Report No.	Version	Description	Issued Date
FR932906AB	01	Initial issue of report	Jan. 08, 2020

TEL: 886-3-656-9065 Page Number : 3 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

Summary of Test Result

Report No.: FR932906AB

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.407(a)	Emission Bandwidth	PASS	-
3.3	15.407(a)	Maximum Conducted Output Power	PASS	-
3.4	15.407(a)	Peak Power Spectral Density	PASS	-
3.5	15.407(b)	Unwanted Emissions	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

- 1. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.
- 2. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen Report Producer: Viola Huang

TEL: 886-3-656-9065 Page Number : 4 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5150-5250	a, n (HT20), ac (VHT20), ax (HEW20)	5180-5240	36-48 [4]
5725-5850		5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40), ax (HEW40)	5190-5230	38-46 [2]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80), ax (HEW80)	5210	42 [1]
5725-5850		5775	155 [1]

Report No.: FR932906AB

Band	Mode	BWch (MHz)	Nant
5.15-5.25GHz	802.11a	20	2TX
5.15-5.25GHz	802.11n HT20	20	2TX
5.15-5.25GHz	802.11ac VHT20	20	2TX
5.15-5.25GHz	802.11ax HEW20	20	2TX
5.15-5.25GHz	802.11n HT40	40	2TX
5.15-5.25GHz	802.11ac VHT40	40	2TX
5.15-5.25GHz	802.11ax HEW40	40	2TX
5.15-5.25GHz	802.11ac VHT80	80	2TX
5.15-5.25GHz	802.11ax HEW80	80	2TX
5.725-5.85GHz	802.11a	20	4TX
5.725-5.85GHz	802.11n HT20	20	4TX
5.725-5.85GHz	802.11ac VHT20	20	4TX
5.725-5.85GHz	802.11ax HEW20	20	4TX
5.725-5.85GHz	802.11n HT40	40	4TX
5.725-5.85GHz	802.11ac VHT40	40	4TX
5.725-5.85GHz	802.11ax HEW40	40	4TX
5.725-5.85GHz	802.11ac VHT80	80	4TX
5.725-5.85GHz	802.11ax HEW80	80	4TX

TEL: 886-3-656-9065 Page Number : 5 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

Note:

- 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40, VHT80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.

Report No.: FR932906AB

- HEW20, HEW40, HEW80 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- BWch is the nominal channel bandwidth.
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs. e.g., 2(2,3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.

TEL: 886-3-656-9065 Page Number : 6 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

1.1.2 Antenna Information

Set	2.4G port	5G Band 1 port	5G Band 4 port	Brand Name	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	-	-	WHAYU	C1335-510379-A	PCB antenna	I-PEX	
2	2	-	-	WHAYU	C1335-510382-A	PCB antenna	I-PEX	
3	-	1	-	WHAYU	C1335-510380-A	PCB antenna	I-PEX	
4	-	2	-	WHAYU	C1335-510383-A	PCB antenna	I-PEX	Note 1
5	-	-	4	WHAYU	C1335-510381-A	PCB antenna	I-PEX	Note i
6	-	-	3	WHAYU	C1335-510384-A	PCB antenna	I-PEX	
7	-	-	2	WHAYU	C1335-510385-A	PCB antenna	I-PEX	
8	-	-	1	WHAYU	C1335-510386-A	PCB antenna	I-PEX	

Report No. : FR932906AB

Note1:

vote1:				
Set		Antenn Gain (dBi)		
Jet –	2.4GHz	5GHz Band 1	5GHz Band 4	
1	3.81	-	-	
2	3.59	-	-	
3	-	4.80	-	
4	-	4.03	-	
5	-	-	5.28	
6	-	-	3.47	
7	-	-	4.74	
8	-	-	4.21	
Cat		Directional gain (dBi)		
Set	2.4GHz	5GHz Band 1	5GHz Band 4	
1	4.73	-	-	
2	4.73	-	-	
3	-	6.04	-	
4	-	6.04	-	
5	-	-	7.95	
6	-	-	7.95	
7	-	-	7.95	
8	-	-	7.95	

TEL: 886-3-656-9065 Page Number : 7 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

Note2: The above information was declared by manufacturer.

Note3: The EUT has eight set antennas.

The EUT has two radios, Radio 1 supports WLAN 2.4GHz (802.11b/g/n/ac/ax mode) and WLAN 5GHz band 1 (802.11a/n/ac/ax mode), Radio 2 supports WLAN 5GHz band 4 (802.11a/n/ac/ax mode) function.

Report No.: FR932906AB

For Radio 1 (2.4GHz) and (5GHz band 1)

For 2TX/2RX:

Port 1 and Port 2 can be use as transmitting/receiving antenna

Port 1 and Port 2 could receive simultaneously.

For Radio 2 (5GHz band 4)

For 4TX/4RX:

Port 1, Port 2, Port 3 and Port 4 can be use as transmitting/receiving antenna

Port 1, Port 2, Port 3 and Port 4 could receive simultaneously.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)
802.11a	0.953	0.21
802.11ac VHT20	0.986	0.06
802.11ac VHT40	0.973	0.12
802.11ac VHT80	0.943	0.25
802.11ax HEW20	0.981	0.08
802.11ax HEW40	0.964	0.16
802.11ax HEW80	0.929	0.32

N	Ot A	
IN	o	

- DC is Duty Cycle.
- DCF is Duty Cycle Factor.

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter			
Beamforming Function	☐ With beamforming ☐ Without beamforming		Without beamforming	
Function		Outdoor P2M	\boxtimes	Indoor P2M
		Fixed P2P		Client
Test Software Version	Mto	ol_3.1.0.1		

Note: The above information was declared by manufacturer.

TEL: 886-3-656-9065 Page Number: 8 of 30
FAX: 886-3-656-9085 Issued Date: Jan. 08, 2020

1.1.5 Table for radio information

Radio	2.4GHz	5GHz
1	V	V (Band 1)
2	X	V (Band 4)

Report No.: FR932906AB

TEL: 886-3-656-9065 Page Number : 9 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

1.2 Applicable Standards

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

Report No.: FR932906AB

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 789033 D02 v02r01
- FCC KDB 662911 D01 v02r01
- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

	Testing Location					
	HWA YA	ADD	:	No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)		
		TEL	:	886-3-327-3456 FAX : 886-3-327-0973		
\boxtimes	JHUBEI	ADD	:	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.		
		TEL	:	886-3-656-9065 FAX : 886-3-656-9085		

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Ekko Hsieh	24.8~25.5°C / 64~66%	Sep. 16, 2019 ~ Sep. 18, 2019
Radiated below 1GHz	03CH05-CB	KJ Chang	24.4~25.7°C / 58~63%	Oct. 07, 2019
Radiated above 1GHz	03CH05-CB	KJ Chang	24.4~25.7°C / 58~63%	Sep. 12, 2019 ~ Oct. 07, 2019
AC Conduction	CO01-CB	Rick Yeh	25~26°C / 42~46%	Oct. 09, 2019

Test site Designation No. TW0006 with FCC

Test site registered number IC 4086D with Industry Canada.

1.4 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)

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	5.1 dB	Confidence levels of 95%
Conducted Emission	2.4 dB	Confidence levels of 95%
Output Power Measurement	1.5 dB	Confidence levels of 95%
Power Density Measurement	2.4 dB	Confidence levels of 95%
Bandwidth Measurement	2%	Confidence levels of 95%

TEL: 886-3-656-9065 Page Number : 10 of 30 FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	PowerSetting
802.11a_Nss1,(6Mbps)_2TX	<u> </u>
5180MHz	78
5200MHz	99
5240MHz	106
802.11a_Nss1,(6Mbps)_4TX	-
5745MHz	92
5785MHz	93
5825MHz	94
802.11ac VHT20_Nss1,(MCS0)_2TX	-
5180MHz	81
5200MHz	95
5240MHz	106
802.11ac VHT20_Nss1,(MCS0)_4TX	-
5745MHz	94
5785MHz	94
5825MHz	94
802.11ac VHT40_Nss1,(MCS0)_2TX	-
5190MHz	73
5230MHz	93
802.11ac VHT40_Nss1,(MCS0)_4TX	-
5755MHz	93
5795MHz	93
802.11ac VHT80_Nss1,(MCS0)_2TX	-
5210MHz	75
802.11ac VHT80_Nss1,(MCS0)_4TX	-
5775MHz	84
802.11ax HEW20_Nss1,(MCS0)_2TX	-
5180MHz	81
5200MHz	95
5240MHz	104
802.11ax HEW20_Nss1,(MCS0)_4TX	-
5745MHz	93
5785MHz	93
5825MHz	93
802.11ax HEW40_Nss1,(MCS0)_2TX	-
5190MHz	73

Report No.: FR932906AB

TEL: 886-3-656-9065 Page Number : 11 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

Mode	PowerSetting
5230MHz	93
802.11ax HEW40_Nss1,(MCS0)_4TX	-
5755MHz	92
5795MHz	93
802.11ax HEW80_Nss1,(MCS0)_2TX	-
5210MHz	75
802.11ax HEW80_Nss1,(MCS0)_4TX	-
5775MHz	84

Report No.: FR932906AB

Note:

 VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.

TEL: 886-3-656-9065 Page Number : 12 of 30 FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests			
Tests Item AC power-line conducted emissions			
Condition AC power-line conducted measurement for line and neutral			
Operating Mode CTX			
1	EUT-2.4GHz_Radio 1		
2 EUT-5GHz band 1_Radio 1			
3 EUT-5GHz band 4_Radio 2			
For operating mode 1 is the worst case and it was record in this test report.			

Report No.: FR932906AB

Т	The Worst Case Mode for Following Conformance Tests		
Tests Item	Emission Bandwidth Maximum Conducted Output Power Peak Power Spectral Density		
Test Condition	Test Condition Conducted measurement at transmit chains		

Th	The Worst Case Mode for Following Conformance Tests		
Tests Item	Unwanted Emissions		
Test Condition Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used regardless of spatial multiplexing MIMO configuration), the radiated test be performed with highest antenna gain of each antenna type.			
Operating Mode < 1GHz	СТХ		
1	EUT-2.4GHz_Radio 1		
2	EUT-5GHz band 1_Radio 1		
3	EUT-5GHz band 4_Radio 2		
For operating mode 2 is the worst case and it was record in this test report.			
Operating Mode > 1GHz CTX			
1	EUT-5GHz		

TEL: 886-3-656-9065 Page Number : 13 of 30 FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

The Worst Case Mode for Following Conformance Tests			
Tests Item	Tests Item Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation		
Operating Mode			
1 WLAN 2.4GHz + WLAN 5GHz band 1 + WLAN 5GHz band 4			
Refer to Sporton Test Report No.: FA932906 for Co-location RF Exposure Evaluation.			

Report No.: FR932906AB

Note: The EUT can only use Y axis position.

2.3 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.4 Accessories

Accessories					
Equipment Name Brand Name Model Name P/N		P/N	Rating		
Adapter	APD	WB-30C12FU	AREP05649	INPUT: 100-240V~, 50-60Hz, 0.9AMax. OUTPUT: 12V, 2.5A	

2.5 Support Equipment

For AC Conduction:

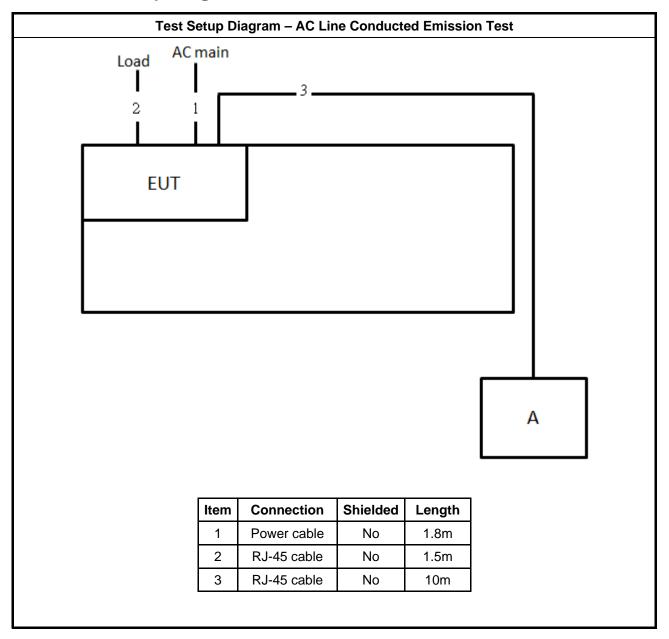
	Support Equipment				
No.	Equipment Brand Name Model Name FCC ID				
Α	LAN NB	DELL	E6430	N/A	

For Radiated and RF Conducted:

	Support Equipment				
No.	Equipment Brand Name Model Name FCC ID				
Α	Notebook	DELL	E4300	N/A	

TEL: 886-3-656-9065 Page Number : 14 of 30 FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

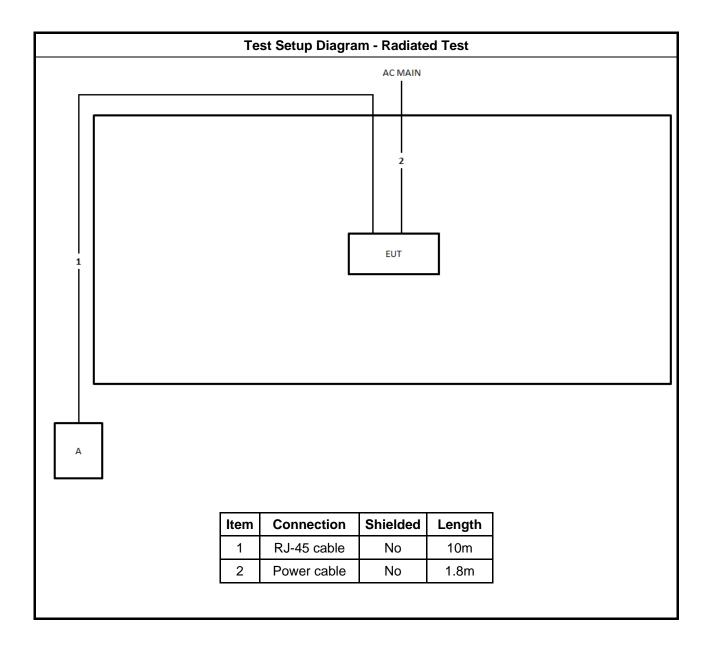
2.6 Test Setup Diagram



Report No.: FR932906AB

TEL: 886-3-656-9065 Page Number : 15 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

Report No.: FR932906AB



TEL: 886-3-656-9065 Page Number : 16 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

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.					

Report No.: FR932906AB

3.1.2 Measuring Instruments

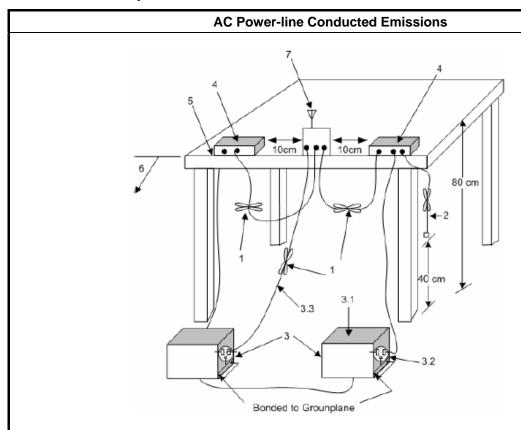
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

TEL: 886-3-656-9065 Page Number : 17 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

3.1.4 Test Setup



1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.

Report No.: FR932906AB

- 2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
- 3.1—All other equipment powered from additional LISN(s).
- 3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
- 3.3—LISN at least 80 cm from nearest part of EUT chassis.
- 4—Non-EUT components of EUT system being tested.
- 5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
- 6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
- 7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

TEL: 886-3-656-9065 Page Number : 18 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

3.2 Emission Bandwidth

3.2.1 Emission Bandwidth Limit

	Emission Bandwidth Limit						
UNI	I Devices						
\boxtimes	For the 5.15-5.25 GHz band, N/A						
	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.						
\boxtimes	For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.						
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 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.						

Report No.: FR932906AB

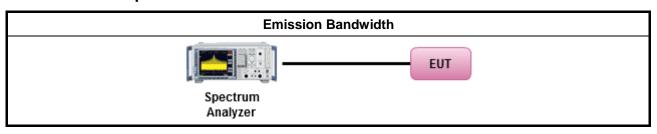
3.2.2 Measuring Instruments

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.						

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

TEL: 886-3-656-9065 Page Number : 19 of 30 FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

	Maximum Conducted Output Power Limit								
UNI	JNII Devices								
\boxtimes	For the 5.15-5.25 GHz band:								
	 Outdoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 - (G_{TX} - 6). e.i.r.p. at any elevation angle above 30 degrees ≤ 125mW [21dBm] 								
	Indoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$								
	Point-to-point AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W If $G_{TX} > 23$ dBi, then $P_{Out} = 30 - (G_{TX} - 23)$.								
	Mobile or Portable Client: the maximum conducted output power (P _{Out}) shall not exceed the lesser of 250 mW. If G _{TX} > 6 dBi, then P _{Out} = 24 - (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).								
\boxtimes	For the 5.725-5.85 GHz band:								
	 Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. 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. 								
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 5.725-5.85 GHz band:								
	 Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. 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. 								
	t = maximum conducted output power in dBm, = the maximum transmitting antenna directional gain in dBi.								

Report No.: FR932906AB

TEL: 886-3-656-9065 Page Number : 20 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

3.3.2 Measuring Instruments

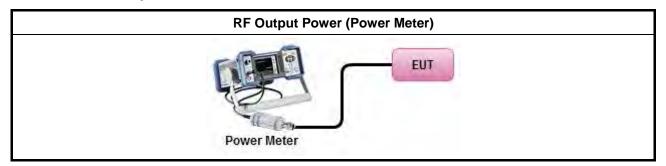
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

	Test Method							
•	Maximum Conducted Output Power							
	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-G (using an RF average power meter).							
•	For conducted measurement.							
	■ If 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} = P₁ + P₂ + + P_n (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP_{total} = P_{total} + DG 							

Report No.: FR932906AB

3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

TEL: 886-3-656-9065 Page Number : 21 of 30 FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

3.4 Peak Power Spectral Density

3.4.1 Peak Power Spectral Density Limit

	Peak Power Spectral Density Limit
UNI	I Devices
\boxtimes	For the 5.15-5.25 GHz band:
	 Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 6 dBi, then P_{Out} = 17 - (G_{TX} - 6).
	Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 17 - (G_{TX} - 6)$.
	Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 23$ dBi, then $P_{Out} = 17 - (G_{TX} - 23)$.
	Mobile or Portable Client: the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G _{TX} > 6 dBi, then PPSD= 11 - (G _{TX} - 6)
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) \leq 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) \leq 11 dBm/MHz. If $G_{TX} > 6$ dBi, then PPSD= 11 – ($G_{TX} - 6$).
	For the 5.725-5.85 GHz band:
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= $30 - (G_{TX} - 6)$.
	Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
LE-	LAN Devices
	For the 5.15-5.25 GHz band, 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.
	 e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below: -13 dBW/MHz for 0° ≤ θ < 8°; -13 − 0.716 (θ-8) dBW/MHz for 8° ≤ θ < 40° -35.9 − 1.22 (θ-40) dBW/MHz for 40° ≤ θ ≤ 45°; -42 dBW/MHz for θ > 45°
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz.
	For the 5.725-5.85 GHz band:
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= $30 - (G_{TX} - 6)$.
	 Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
pow	SD = peak power spectral density that he same method as used to determine the conducted output ver shall be used to determine the power spectral density. And power spectral density in dBm/MHz = the maximum transmitting antenna directional gain in dBi.

Report No.: FR932906AB

3.4.2 Measuring Instruments

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

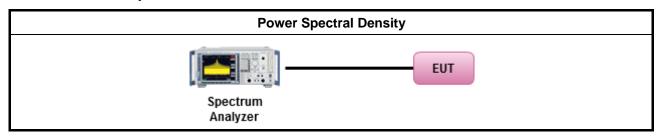
3.4.3 Test Procedures

		Test Method							
	outp func	c power spectral density procedures that the same method as used to determine the conducted ut power shall be used to determine the peak power spectral density and use the peak search tion on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density be measured using below options:							
	Refer as FCC KDB 789033, F)5) 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]								
	\boxtimes	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							
	\boxtimes	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.							
		If 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 spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.							
		Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,							
		Option 3: 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 + + PPSD_n \\ (calculated in linear unit [mW] and transfer to log unit [dBm]) \\ EIRP_{total} = PPSD_{total} + DG $							

Report No.: FR932906AB

TEL: 886-3-656-9065 Page Number : 23 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

3.4.4 Test Setup



Report No.: FR932906AB

3.4.5 Test Result of Peak Power Spectral Density

Refer as Appendix D

3.5 Unwanted Emissions

3.5.1 Transmitter 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				

Report No.: FR932906AB

- 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.
- Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

Un-restricted band emissions above 1GHz Limit						
Operating Band	Limit					
⊠ 5.15 - 5.25 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]					
☐ 5.25 - 5.35 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]					
☐ 5.47 - 5.725 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]					
⊠ 5.725 - 5.85 GHz	all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.					

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

TEL: 886-3-656-9065 Page Number : 25 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Report No.: FR932906AB

3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

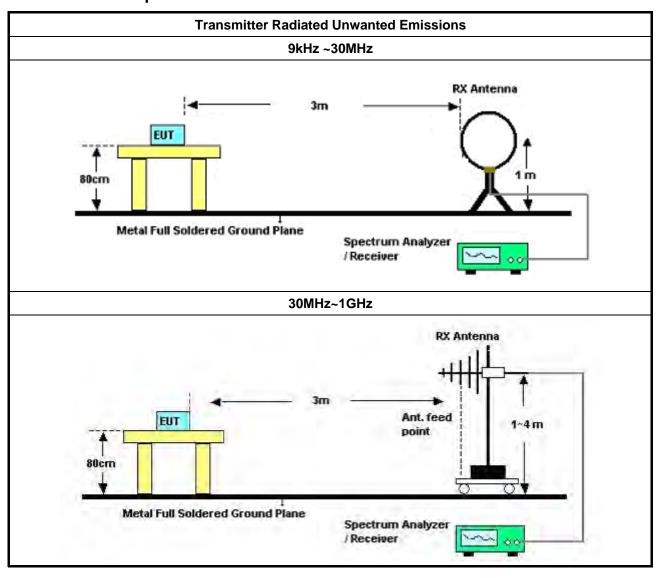
Test Method

- 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).
- 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 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
 - Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
 - Refer as FCC KDB 789033, clause G)5) measurement procedure peak limit.
 - Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.
- For radiated measurement.
 - Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.
 - Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.
 - Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.
- The any unwanted emissions level shall not exceed the fundamental emission level.
- All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

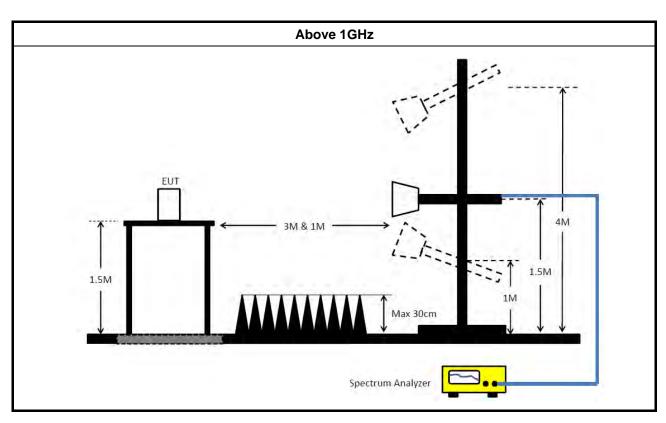
TEL: 886-3-656-9065 Page Number : 26 of 30 FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

Report No.: FR932906AB

3.5.4 Test Setup



TEL: 886-3-656-9065 Page Number : 27 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020



Report No.: FR932906AB

3.5.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

3.5.6 Transmitter Unwanted Emissions (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

3.5.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix E

TEL: 886-3-656-9065 Page Number : 28 of 30 FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

4 Test Equipment and Calibration Data

la atm. m. a.u.t	Manufacturan	Madal Na	Carial Na	Chanastaniatica	Calibration	Calibration	Damark
Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Date	Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 28, 2019	Jan. 29, 2020	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16 -2	04083	150kHz ~ 100MHz	Dec. 24, 2018	Dec. 23, 2019	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Jan. 11, 2019	Jan. 10, 2020	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 21, 2019	May 20, 2020	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Bilog Antenna with 6dB Attenuator	TESE & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 28, 2019	Mar. 27, 2020	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 2020	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBE CK	BBHA9120D	BBHA 9120D-1291	1GHz~18GHz	Oct. 12, 2018	Oct. 11, 2019	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 12, 2019	Jun. 11, 2020	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 02, 2019	May 01, 2020	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC12630SE	980287	1GHz – 26.5GHz	Mar. 28, 2019	Mar. 27, 2020	Radiation (03CH05-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Aug, 15, 2019	Aug, 14, 2020	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	LOW Cable-04+23	30MHz~1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04	1GHz~18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+23	30MHz~18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+23	30MHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH05-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Feb. 25, 2019	Feb. 24, 2020	Conducted (TH01-CB)

Report No.: FR932906AB

TEL: 886-3-656-9065 Page Number : 29 of 30
FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz Oct. 08, 2018		Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-28	1 GHz –26.5 GHz	Nov. 19, 2018	Nov. 18, 2019	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Jan. 15, 2019	Jan. 14, 2020	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Jan. 15, 2019	Jan. 14, 2020	Conducted (TH01-CB)

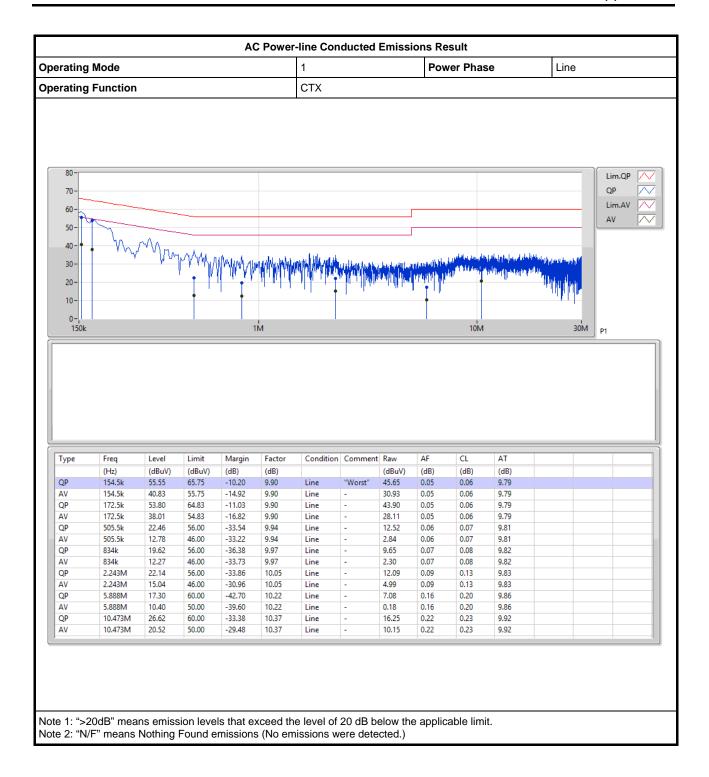
Report No.: FR932906AB

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

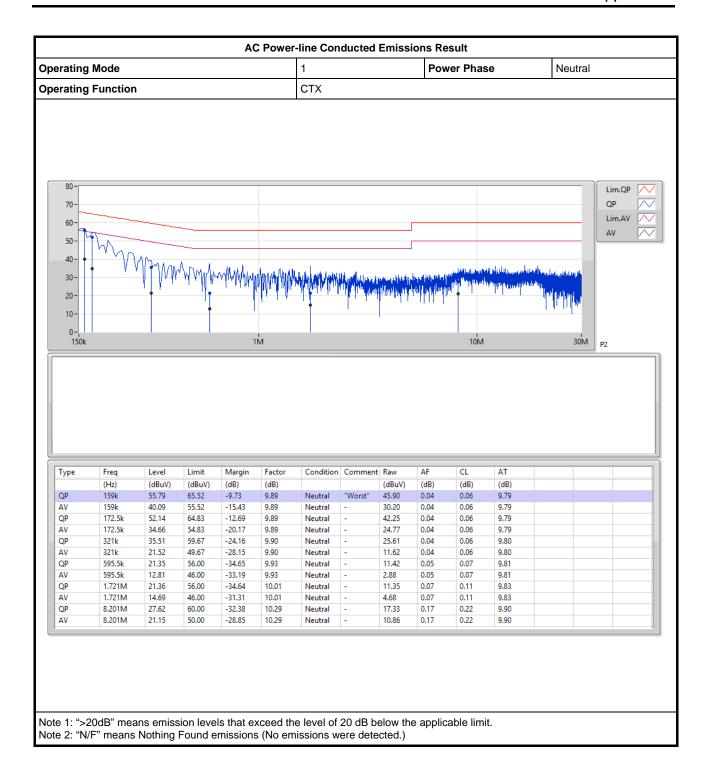
N.C.R. means Non-Calibration required.

TEL: 886-3-656-9065 Page Number : 30 of 30 FAX: 886-3-656-9085 Issued Date : Jan. 08, 2020

AC Power-line Conducted Emissions Result



AC Power-line Conducted Emissions Result





Appendix B **EBW**

Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
5.15-5.25GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	43.4M	19.529M	19M5D1D	21.275M	16.485M
802.11ac VHT20_Nss1,(MCS0)_2TX	45.425M	19.779M	19M8D1D	21.7M	17.688M
802.11ac VHT40_Nss1,(MCS0)_2TX	73.3M	36.417M	36M4D1D	39.75M	36.22M
802.11ac VHT80_Nss1,(MCS0)_2TX	81.8M	75.788M	75M8D1D	81.3M	75.599M
802.11ax HEW20_Nss1,(MCS0)_2TX	42.025M	19.636M	19M6D1D	21.675M	18.945M
802.11ax HEW40_Nss1,(MCS0)_2TX	46.4M	37.648M	37M6D1D	39.75M	37.543M
802.11ax HEW80_Nss1,(MCS0)_2TX	81.7M	77.116M	77M1D1D	81.4M	76.919M
5.725-5.85GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_4TX	16.325M	16.819M	16M8D1D	8.775M	16.367M
802.11ac VHT20_Nss1,(MCS0)_4TX	17.575M	18.011M	18M0D1D	15.6M	17.567M
802.11ac VHT40_Nss1,(MCS0)_4TX	36.3M	36.45M	36M4D1D	33.5M	36.05M
802.11ac VHT80_Nss1,(MCS0)_4TX	75.6M	75.883M	75M9D1D	62.5M	74.826M
802.11ax HEW20_Nss1,(MCS0)_4TX	18.975M	19.134M	19M1D1D	15.075M	18.64M
802.11ax HEW40_Nss1,(MCS0)_4TX	37.4M	37.781M	37M8D1D	33.85M	37.363M
802.11ax HEW80_Nss1,(MCS0)_4TX	76.4M	76.942M	76M9D1D	63.7M	76.723M

Max-N dB = Maximum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;

Max-OBW = Maximum 99% occupied bandwidth;

Min-N dB = Minimum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;

Min-OBW = Minimum 99% occupied bandwidth;



EBW Appendix B

Result

Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW	Port 3-N dB	Port 3-OBW	Port 4-N dB	Port 4-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-	-	-
5180MHz	Pass	Inf	21.275M	16.485M	21.45M	16.579M				
5200MHz	Pass	Inf	39.15M	16.846M	42.05M	17.216M				
5240MHz	Pass	Inf	43.05M	18.115M	43.4M	19.529M				
802.11a_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
5745MHz	Pass	500k	16.075M	16.819M	16.325M	16.624M	8.775M	16.367M	16.325M	16.634M
5785MHz	Pass	500k	15.625M	16.639M	16.3M	16.497M	15.375M	16.602M	16.325M	16.606M
5825MHz	Pass	500k	13.125M	16.593M	15.3M	16.491M	14.775M	16.661M	16.3M	16.632M
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-
5180MHz	Pass	Inf	21.7M	17.688M	21.975M	17.72M				
5200MHz	Pass	Inf	35.925M	17.828M	37.65M	17.883M				
5240MHz	Pass	Inf	45.425M	19.056M	42.475M	19.779M				
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5745MHz	Pass	500k	17.35M	17.94M	17.575M	17.814M	15.75M	17.919M	17.575M	17.844M
5785MHz	Pass	500k	17.525M	17.896M	16.925M	17.763M	16.925M	18.011M	17.55M	17.862M
5825MHz	Pass	500k	15.6M	17.567M	17.525M	17.767M	16.275M	17.916M	17.55M	17.833M
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	=	=	-	=	-	-	-
5190MHz	Pass	Inf	40.2M	36.22M	39.75M	36.32M				
5230MHz	Pass	Inf	73.3M	36.417M	61.95M	36.319M				
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5755MHz	Pass	500k	35.4M	36.418M	35.7M	36.251M	35.7M	36.325M	36.3M	36.399M
5795MHz	Pass	500k	33.5M	36.05M	35.9M	36.228M	33.85M	36.231M	36.3M	36.45M
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-
5210MHz	Pass	Inf	81.8M	75.788M	81.3M	75.599M				
802.11ac VHT80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5775MHz	Pass	500k	70.1M	74.826M	75.6M	75.534M	62.5M	74.859M	75M	75.883M
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-
5180MHz	Pass	Inf	21.675M	18.976M	21.75M	18.945M				
5200MHz	Pass	Inf	37.275M	19.114M	39.075M	19.078M				
5240MHz	Pass	Inf	42.025M	19.227M	41.55M	19.636M				
802.11ax HEW20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5745MHz	Pass	500k	17.4M	18.64M	18.975M	19.037M	15.55M	18.909M	18.775M	19.034M
5785MHz	Pass	500k	16.25M	19.062M	18.95M	19.069M	17.45M	18.697M	18.725M	18.989M
5825MHz	Pass	500k	15.075M	19.134M	18.975M	19.042M	18.3M	18.931M	18.775M	19.026M
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	=	-	-	=	-	=	-
5190MHz	Pass	Inf	40M	37.543M	39.75M	37.596M				
5230MHz	Pass	Inf	46.4M	37.627M	43.95M	37.648M				
802.11ax HEW40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5755MHz	Pass	500k	37.3M	37.726M	37.15M	37.582M	33.85M	37.781M	37.4M	37.726M
5795MHz	Pass	500k	35.45M	37.363M	37.25M	37.584M	35.3M	37.651M	37.1M	37.602M
802.11ax HEW80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-
5210MHz	Pass	Inf	81.7M	76.919M	81.4M	77.116M				



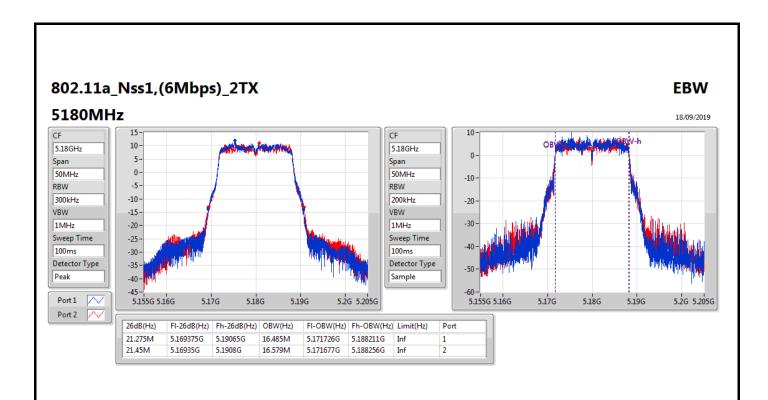
EBW Appendix B

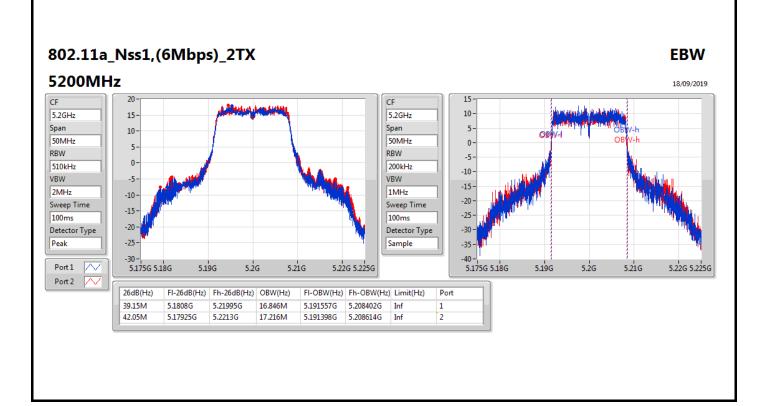
802.11ax HEW80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5775MHz	Pass	500k	70.6M	76.723M	76.4M	76.942M	63.7M	76.928M	75.7M	76.865M

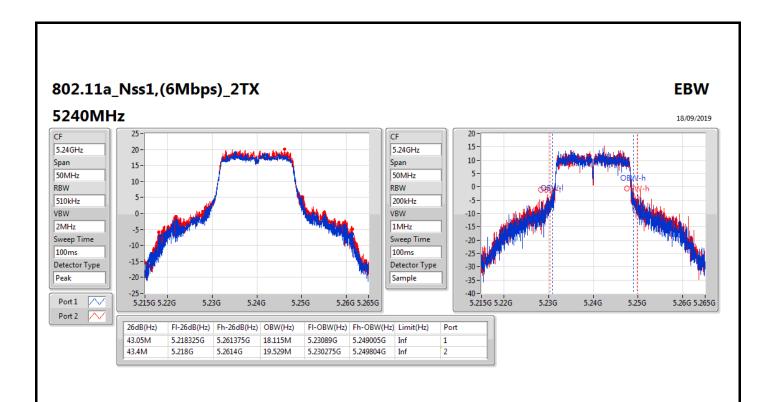
Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band Port X-OBW = Port X 99% occupied bandwidth;

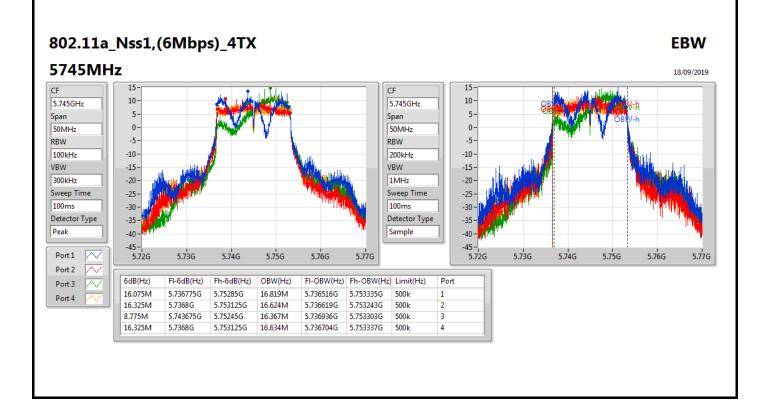
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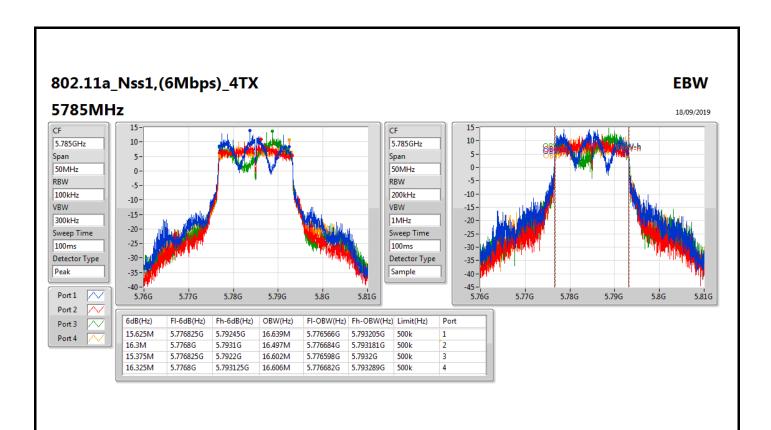
EBW Appendix B

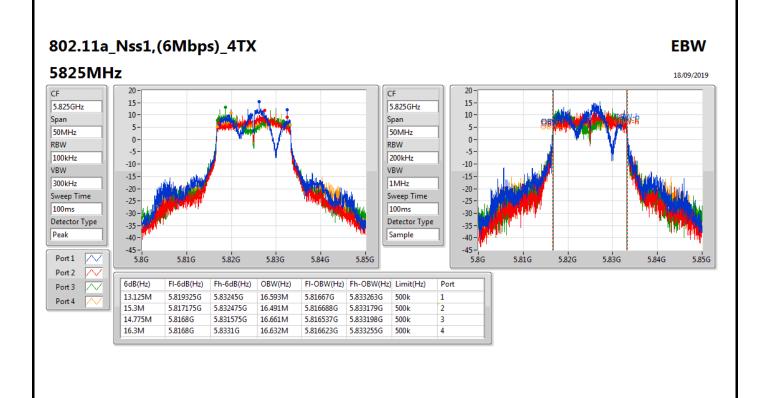


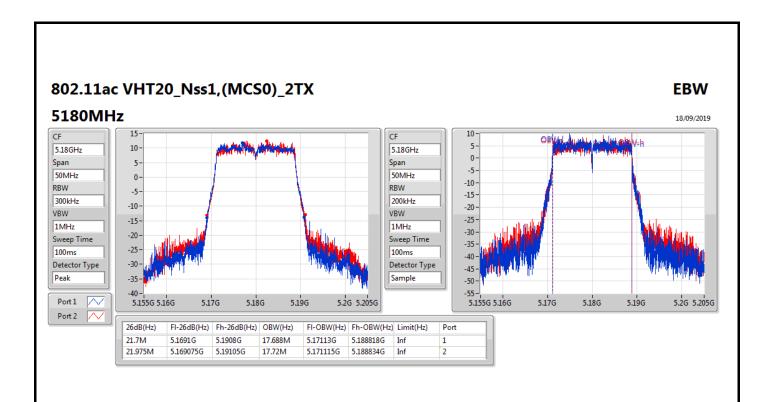


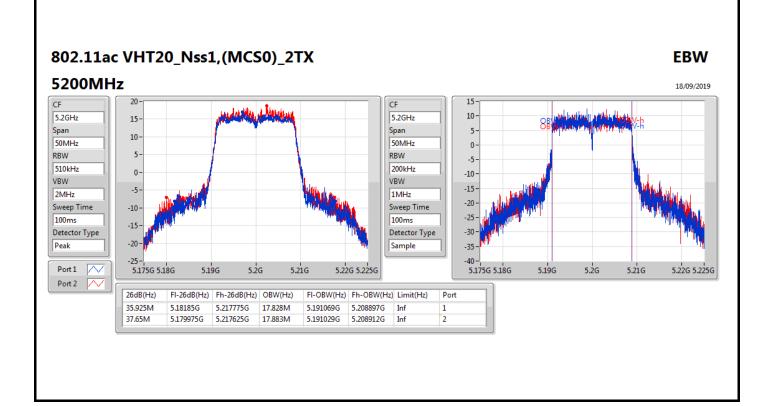


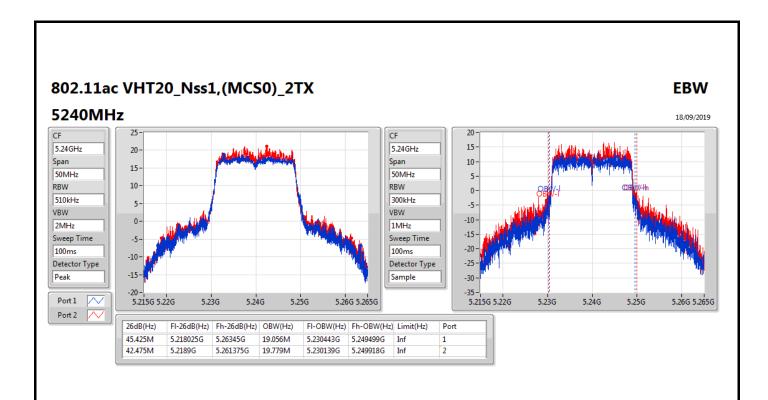


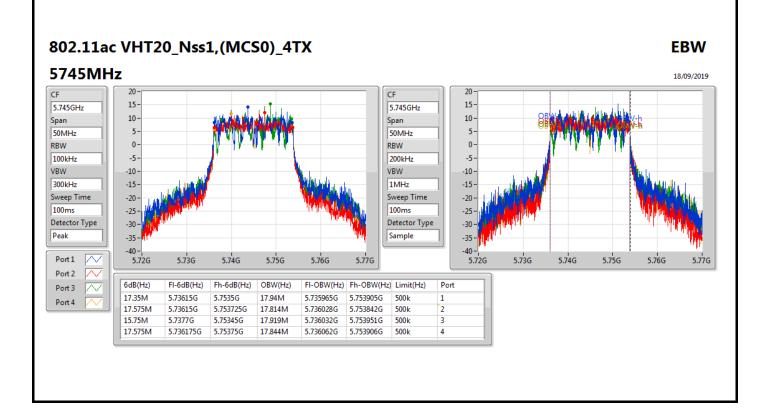


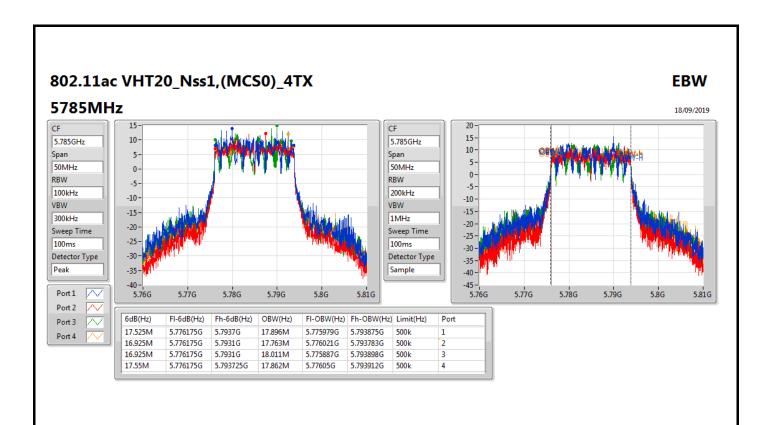


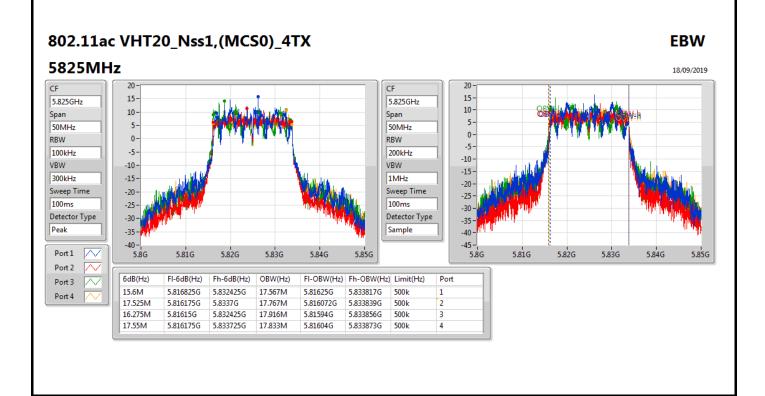


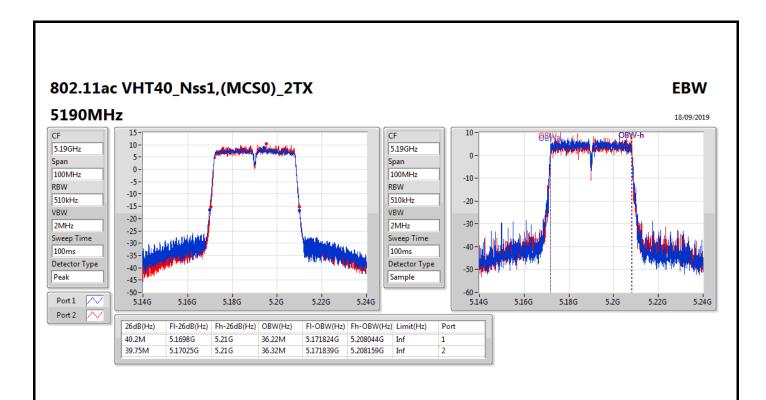


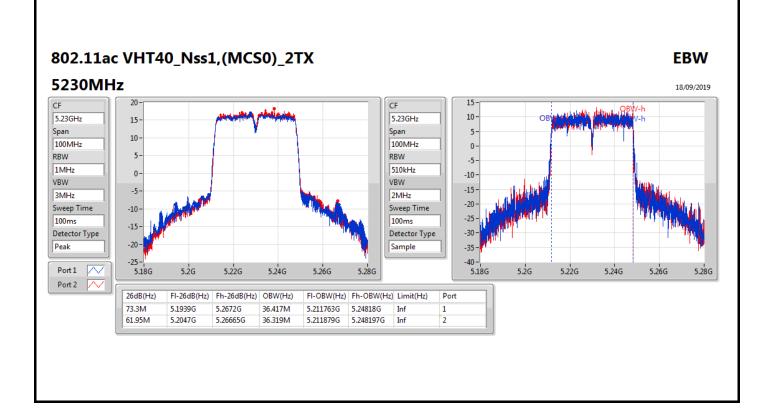


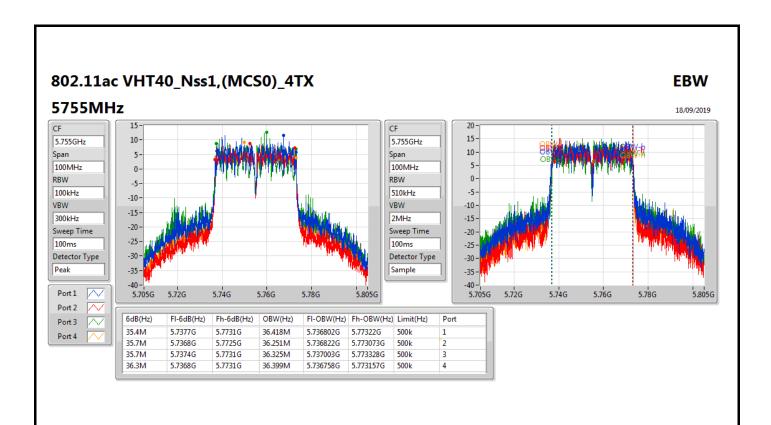


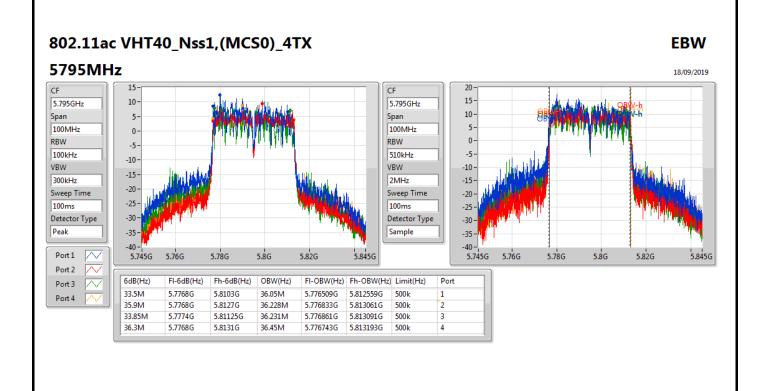


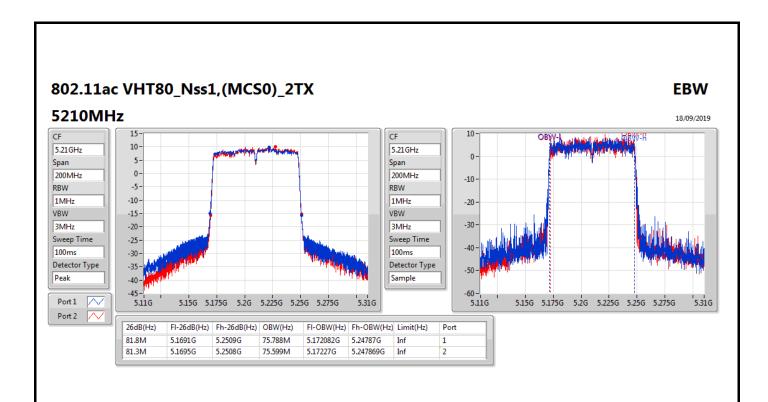


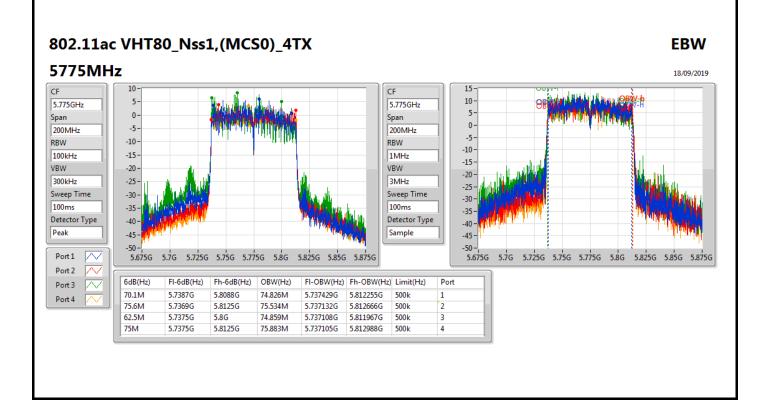


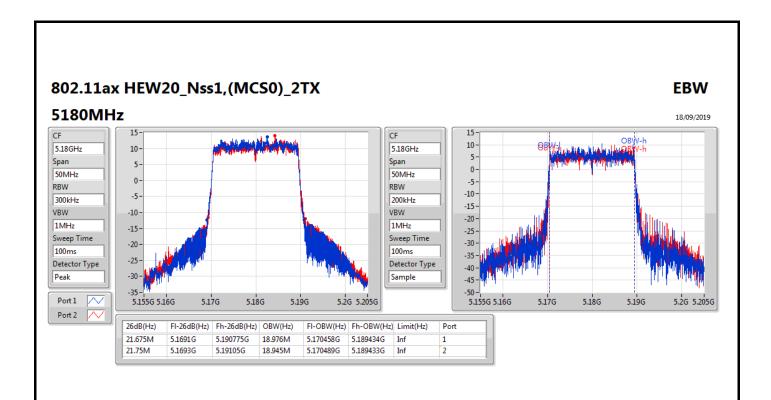


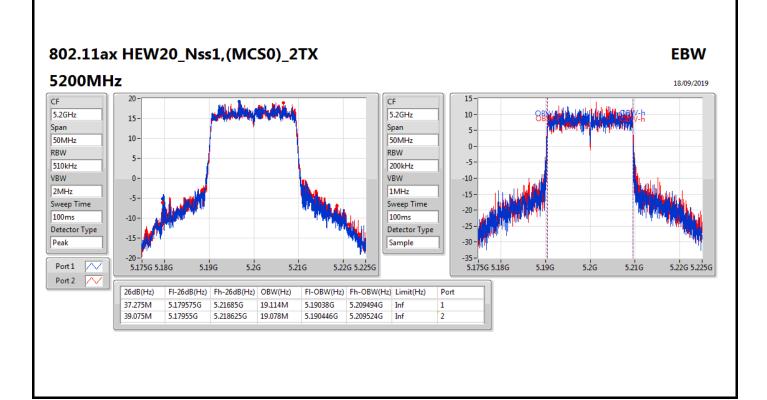


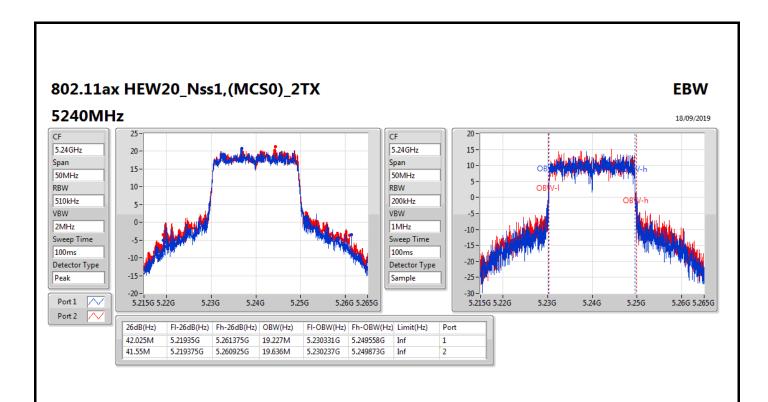


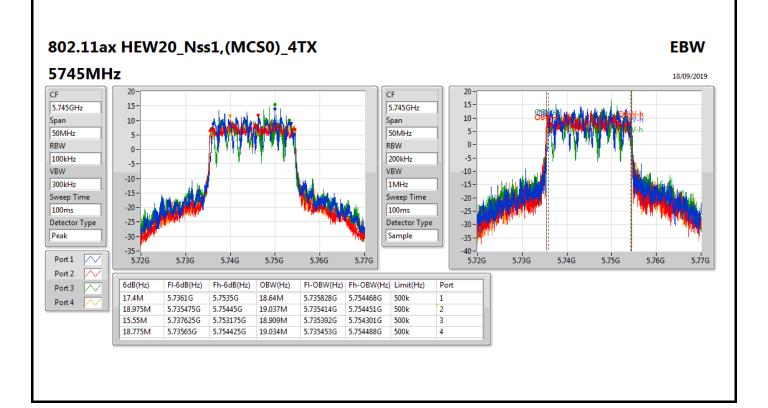


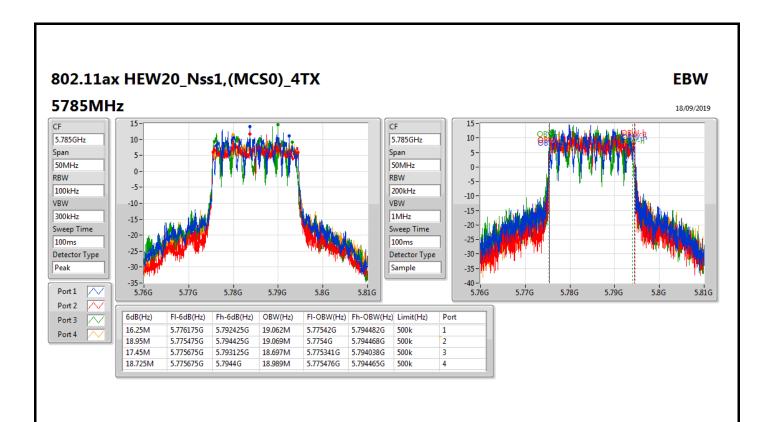


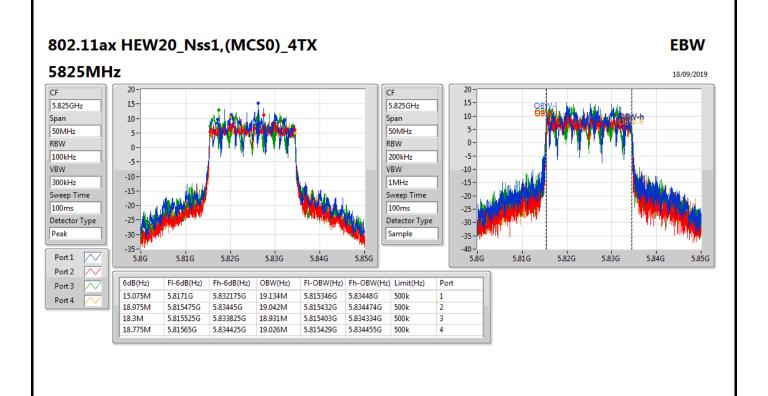


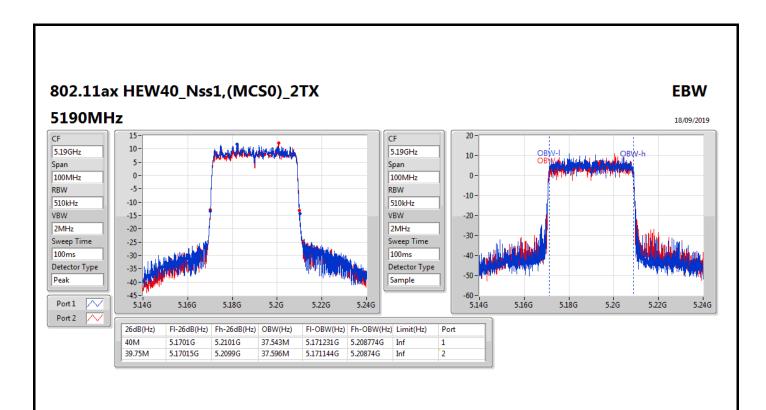


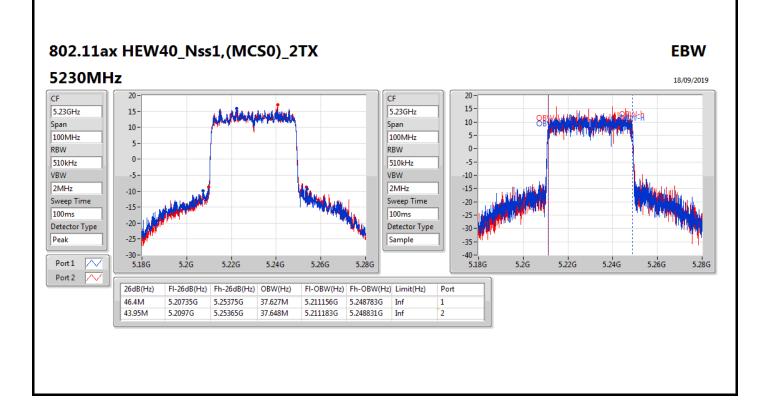


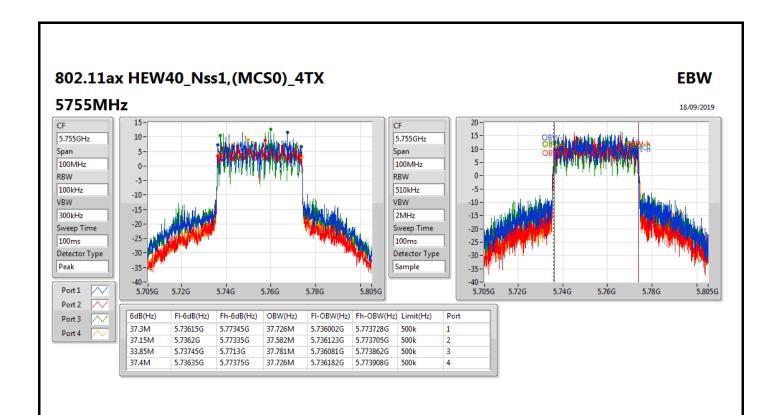


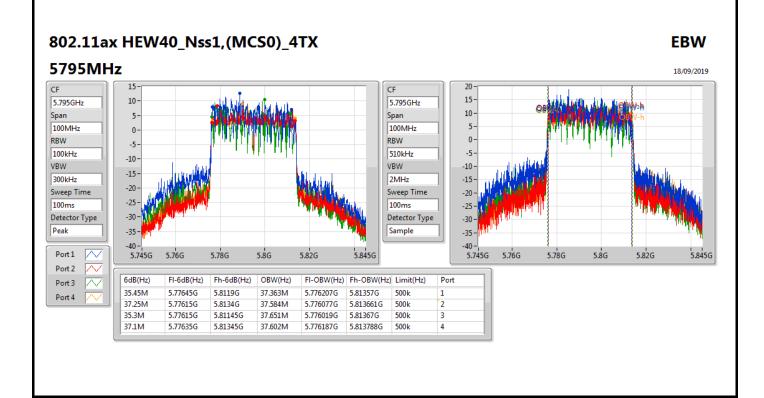


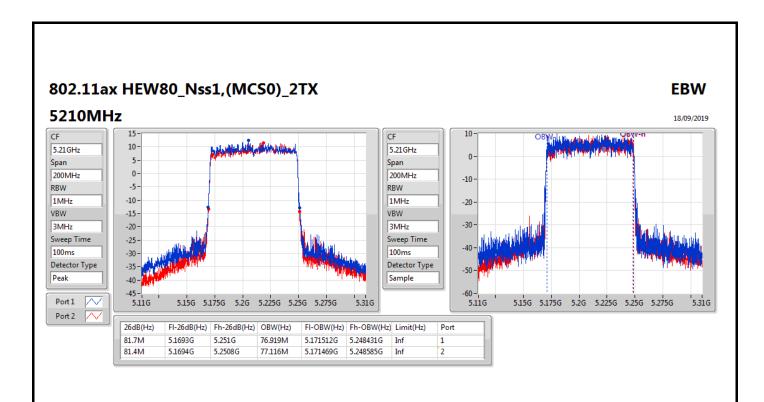


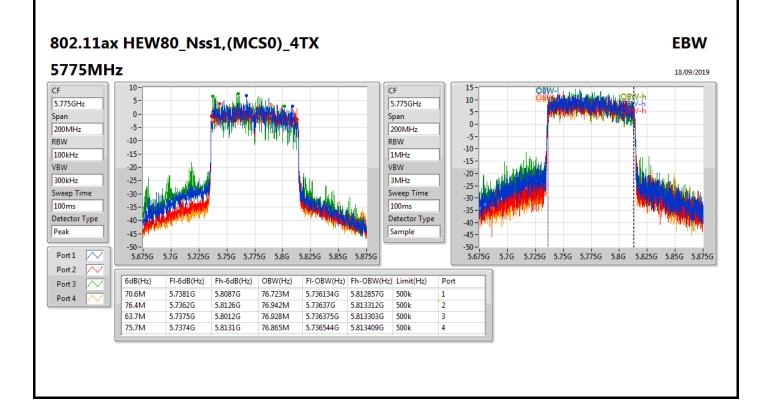














Average Power Appendix C

Summary

Mode	Total Power	Total Power		
	(dBm)	(W)		
5.15-5.25GHz	-	-		
802.11a_Nss1,(6Mbps)_2TX	29.16	0.82414		
802.11ac VHT20_Nss1,(MCS0)_2TX	29.11	0.81470		
802.11ac VHT40_Nss1,(MCS0)_2TX	26.89	0.48865		
802.11ac VHT80_Nss1,(MCS0)_2TX	22.43	0.17498		
802.11ax HEW20_Nss1,(MCS0)_2TX	29.04	0.80168		
802.11ax HEW40_Nss1,(MCS0)_2TX	27.10	0.51286		
802.11ax HEW80_Nss1,(MCS0)_2TX	22.87	0.19364		
5.725-5.85GHz	-	-		
802.11a_Nss1,(6Mbps)_4TX	29.86	0.96828		
802.11ac VHT20_Nss1,(MCS0)_4TX	29.99	0.99770		
802.11ac VHT40_Nss1,(MCS0)_4TX	29.98	0.99541		
802.11ac VHT80_Nss1,(MCS0)_4TX	27.38	0.54702		
802.11ax HEW20_Nss1,(MCS0)_4TX	29.99	0.99770		
802.11ax HEW40_Nss1,(MCS0)_4TX	29.96	0.99083		
802.11ax HEW80_Nss1,(MCS0)_4TX	28.00	0.63096		



Average Power Appendix C

Result

Mode	Result	DG	Port 1	Port 2	Port 3	Port 4	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
5180MHz	Pass	4.80	20.14	20.16			23.16	30.00
5200MHz	Pass	4.80	24.92	24.87			27.91	30.00
5240MHz	Pass	4.80	26.01	26.28			29.16	30.00
802.11a_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-
5745MHz	Pass	5.28	24.30	23.69	23.58	23.40	29.78	30.00
5785MHz	Pass	5.28	24.52	23.55	23.63	23.36	29.81	30.00
5825MHz	Pass	5.28	24.40	23.55	23.86	23.48	29.86	30.00
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-		-
5180MHz	Pass	4.80	21.31	21.12			24.23	30.00
5200MHz	Pass	4.80	24.29	24.22			27.27	30.00
5240MHz	Pass	4.80	26.10	26.09			29.11	30.00
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5745MHz	Pass	5.28	24.51	23.75	23.76	23.79	29.99	30.00
5785MHz	Pass	5.28	24.26	23.52	23.82	23.64	29.84	30.00
5825MHz	Pass	5.28	23.99	23.48	24.25	23.34	29.80	30.00
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5190MHz	Pass	4.80	19.39	19.04			22.23	30.00
5230MHz	Pass	4.80	23.86	23.89			26.89	30.00
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5755MHz	Pass	5.28	24.66	23.57	24.03	23.46	29.98	30.00
5795MHz	Pass	5.28	24.82	23.33	23.47	23.37	29.81	30.00
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5210MHz	Pass	4.80	19.62	19.21			22.43	30.00
802.11ac VHT80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5775MHz	Pass	5.28	21.58	21.38	21.74	20.66	27.38	30.00
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5180MHz	Pass	4.80	21.60	21.49			24.56	30.00
5200MHz	Pass	4.80	24.55	24.40			27.49	30.00
5240MHz	Pass	4.80	25.84	26.21			29.04	30.00
802.11ax HEW20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5745MHz	Pass	5.28	24.36	23.88	23.85	23.75	29.99	30.00
5785MHz	Pass	5.28	24.03	23.65	24.29	23.46	29.89	30.00
5825MHz	Pass	5.28	24.23	23.46	24.15	23.33	29.83	30.00
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5190MHz	Pass	4.80	19.76	19.25			22.52	30.00
5230MHz	Pass	4.80	24.04	24.14			27.10	30.00
802.11ax HEW40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5755MHz	Pass	5.28	24.68	23.61	23.74	23.64	29.96	30.00
5795MHz	Pass	5.28	25.01	23.64	23.35	23.46	29.94	30.00



Average Power Appendix C

802.11ax HEW80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5210MHz	Pass	4.80	20.03	19.68			22.87	30.00
802.11ax HEW80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5775MHz	Pass	5.28	22.50	21.83	22.27	21.21	28.00	30.00

DG = Directional Gain; **Port X** = Port X output power



Page No.

: 1 of 13

Summary

Mode	PD
	(dBm/RBW)
5.15-5.25GHz	
802.11a_Nss1,(6Mbps)_2TX	14.46
802.11ac VHT20_Nss1,(MCS0)_2TX	14.97
802.11ac VHT40_Nss1,(MCS0)_2TX	10.31
802.11ac VHT80_Nss1,(MCS0)_2TX	3.19
802.11ax HEW20_Nss1,(MCS0)_2TX	14.56
802.11ax HEW40_Nss1,(MCS0)_2TX	10.26
802.11ax HEW80_Nss1,(MCS0)_2TX	3.47
5.725-5.85GHz	
802.11a_Nss1,(6Mbps)_4TX	15.41
802.11ac VHT20_Nss1,(MCS0)_4TX	15.36
802.11ac VHT40_Nss1,(MCS0)_4TX	12.98
802.11ac VHT80_Nss1,(MCS0)_4TX	8.07
802.11ax HEW20_Nss1,(MCS0)_4TX	15.09
802.11ax HEW40_Nss1,(MCS0)_4TX	13.00
802.11ax HEW80_Nss1,(MCS0)_4TX	8.46

RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;



Result

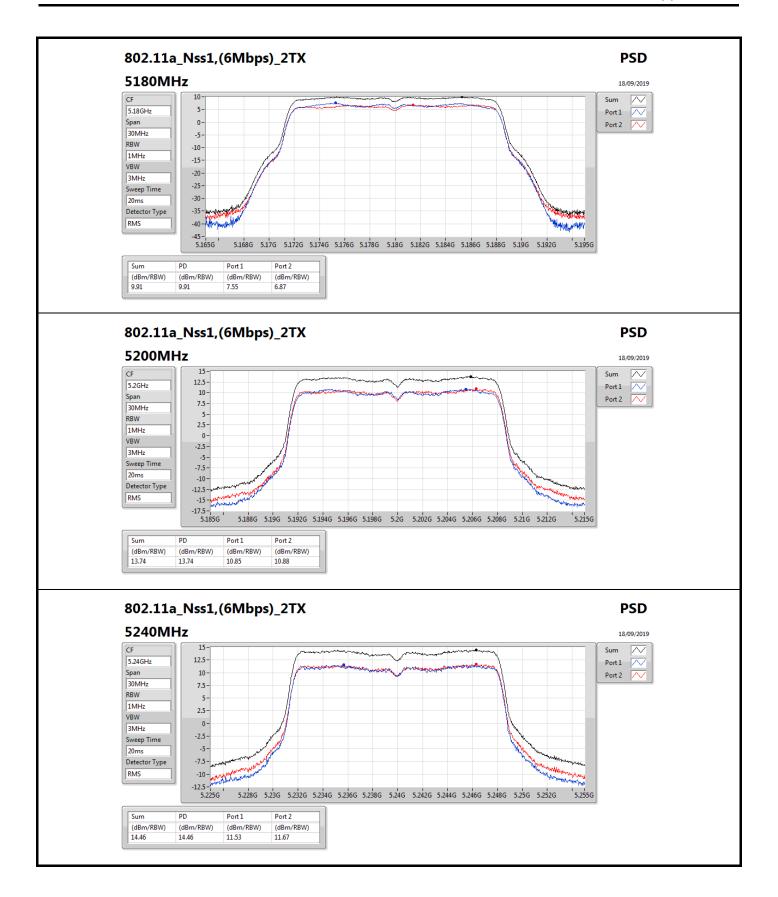
Mode	Result	DG	Port 1	Port 2	Port 3	Port 4	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
5180MHz	Pass	6.04	7.55	6.87			9.91	16.96
5200MHz	Pass	6.04	10.85	10.88			13.74	16.96
5240MHz	Pass	6.04	11.53	11.67			14.46	16.96
802.11a_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-
5745MHz	Pass	7.95	11.26	8.84	11.29	8.75	15.41	28.05
5785MHz	Pass	7.95	11.35	8.87	10.64	8.78	14.96	28.05
5825MHz	Pass	7.95	12.15	8.89	10.62	8.46	15.22	28.05
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5180MHz	Pass	6.04	7.80	7.40			10.45	16.96
5200MHz	Pass	6.04	10.32	10.14			13.16	16.96
5240MHz	Pass	6.04	11.99	12.04			14.97	16.96
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5745MHz	Pass	7.95	10.57	9.14	10.46	8.78	15.36	28.05
5785MHz	Pass	7.95	11.34	9.07	11.19	8.56	14.95	28.05
5825MHz	Pass	7.95	11.75	8.76	11.59	8.18	15.16	28.05
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5190MHz	Pass	6.04	2.94	2.36			5.49	16.96
5230MHz	Pass	6.04	7.37	7.43			10.31	16.96
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5755MHz	Pass	7.95	8.76	6.59	7.94	6.12	12.77	28.05
5795MHz	Pass	7.95	10.04	6.21	8.24	5.73	12.98	28.05
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5210MHz	Pass	6.04	0.51	0.09			3.19	16.96
802.11ac VHT80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5775MHz	Pass	7.95	3.46	2.12	3.91	0.54	8.07	28.05
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5180MHz	Pass	6.04	7.91	7.34			10.54	16.96
5200MHz	Pass	6.04	10.37	10.13			13.18	16.96
5240MHz	Pass	6.04	11.66	11.64			14.56	16.96
802.11ax HEW20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5745MHz	Pass	7.95	10.25	8.89	10.44	8.51	15.09	28.05
5785MHz	Pass	7.95	11.12	8.78	11.01	8.24	14.58	28.05
5825MHz	Pass	7.95	11.42	8.16	11.10	7.98	14.65	28.05
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5190MHz	Pass	6.04	3.19	2.35			5.63	16.96
5230MHz	Pass	6.04	7.50	7.32			10.26	16.96
802.11ax HEW40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5755MHz	Pass	7.95	8.44	6.42	7.89	5.93	12.59	28.05
5795MHz	Pass	7.95	9.67	6.18	8.93	5.89	13.00	28.05

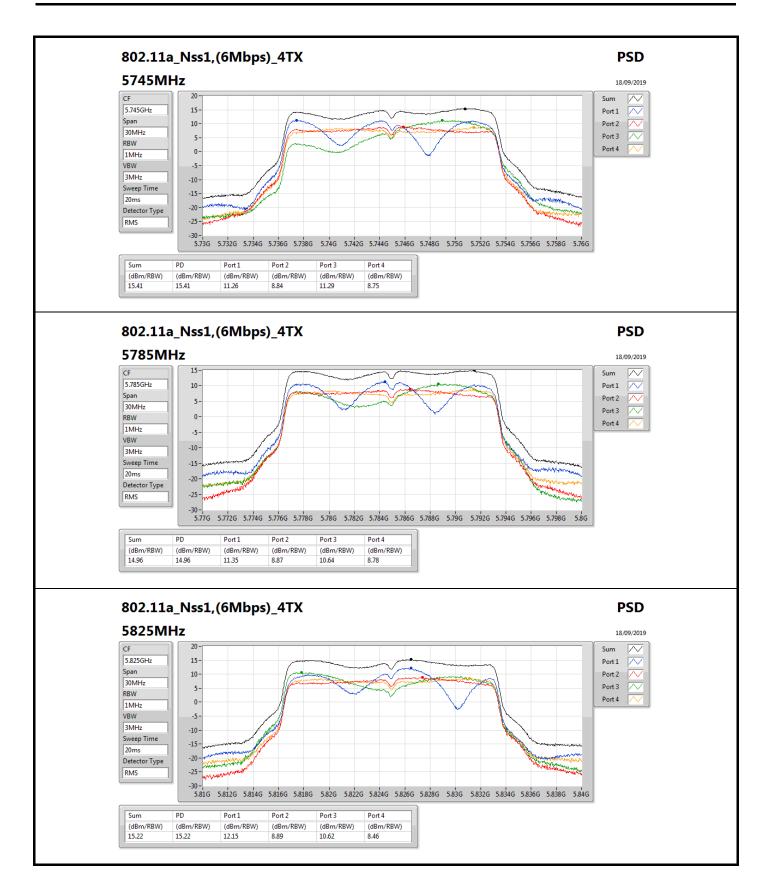


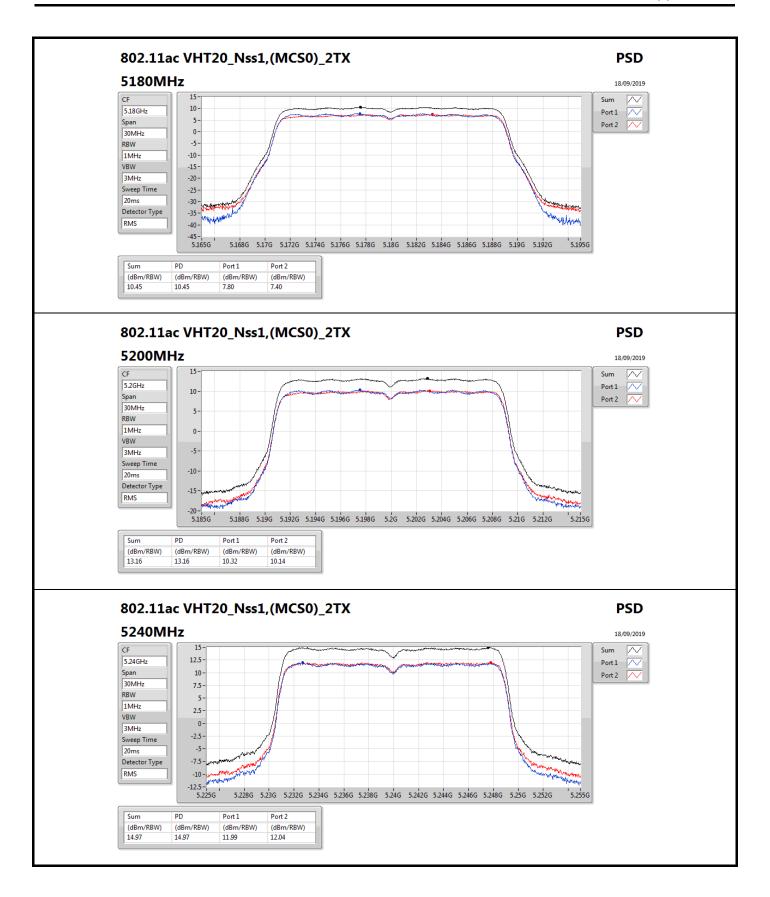
Appendix D **PSD**

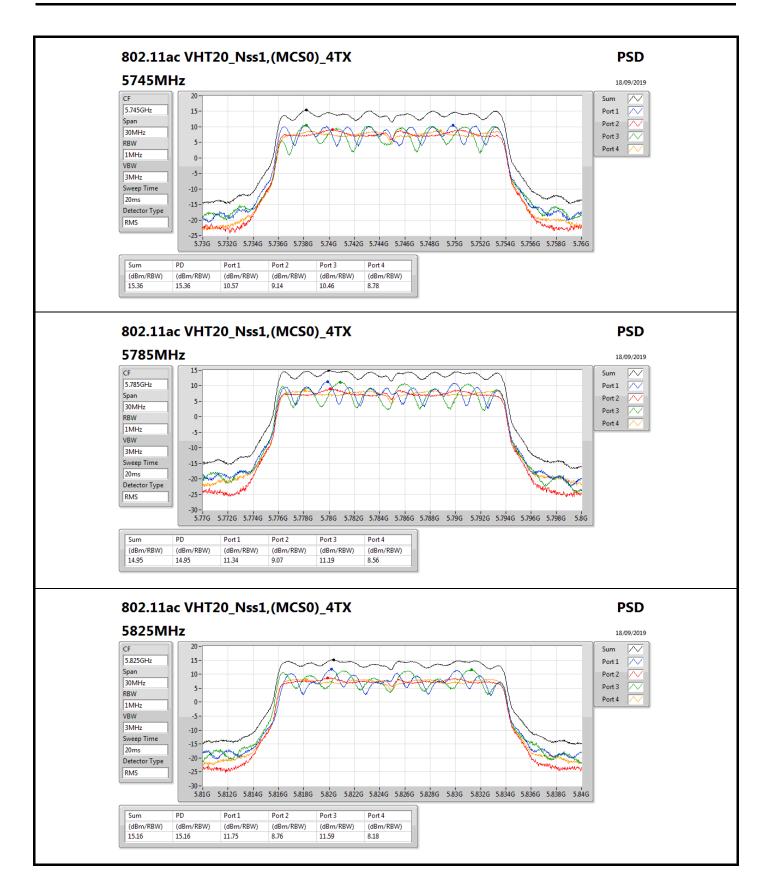
802.11ax HEW80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5210MHz	Pass	6.04	0.73	0.35			3.47	16.96
802.11ax HEW80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5775MHz	Pass	7.95	4.41	2.03	4.71	1.13	8.46	28.05

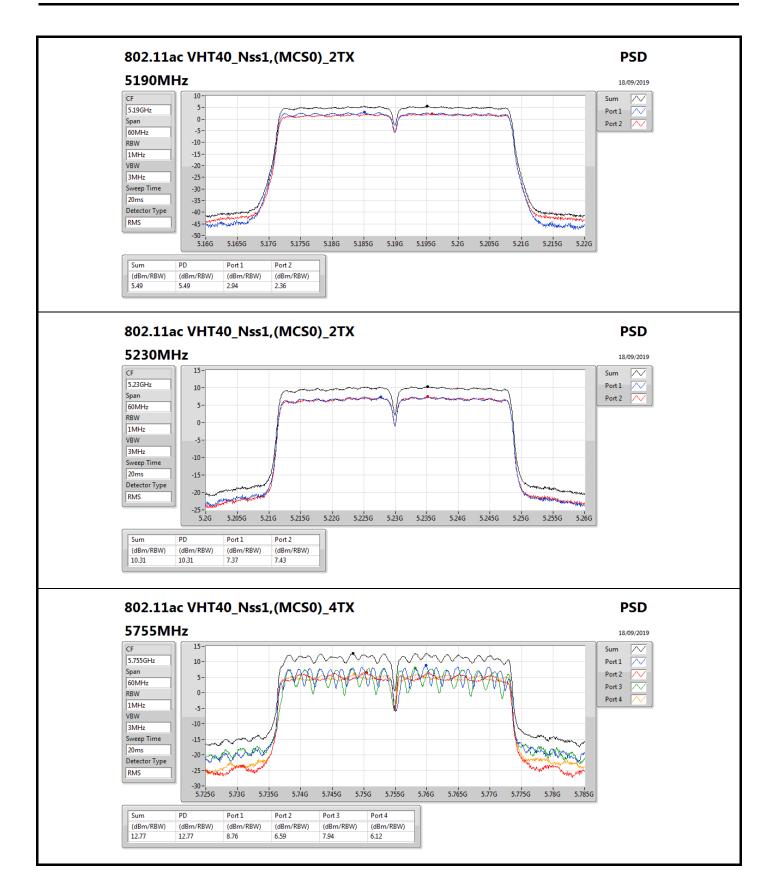
DG = Directional Gain; **RBW** = 500 kHz for 5.725-5.85GHz band / 1MHz for other band; **PD** = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

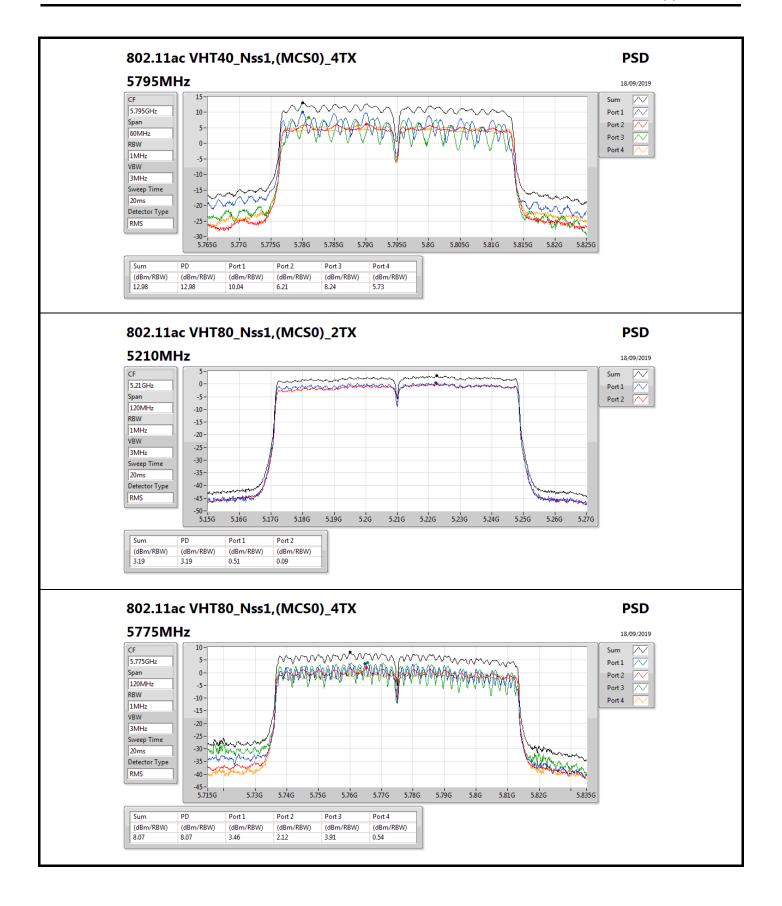


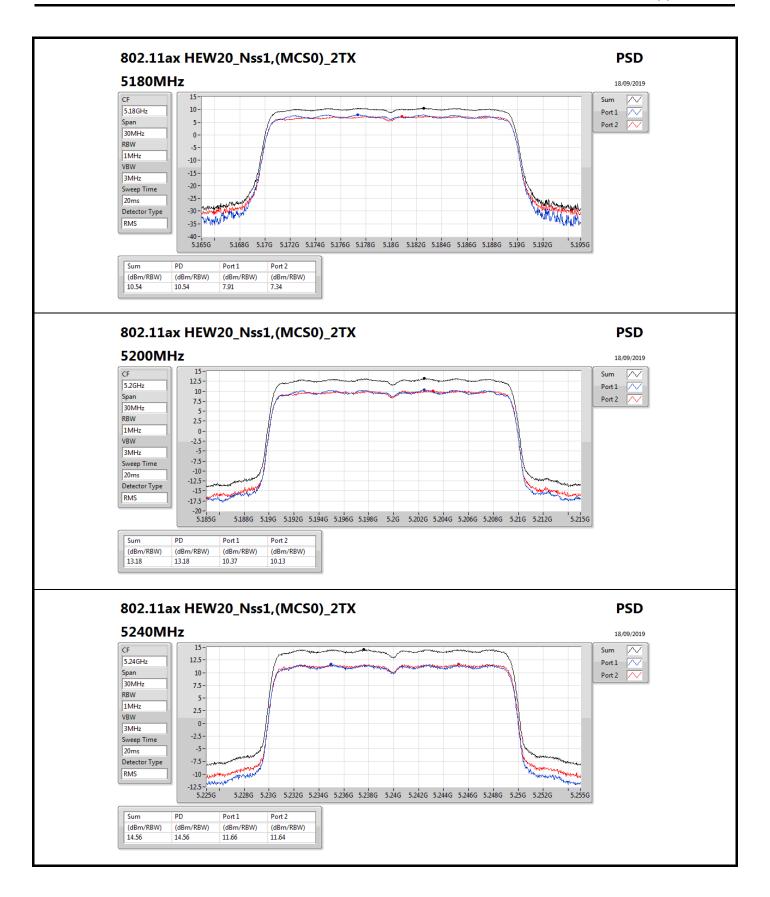


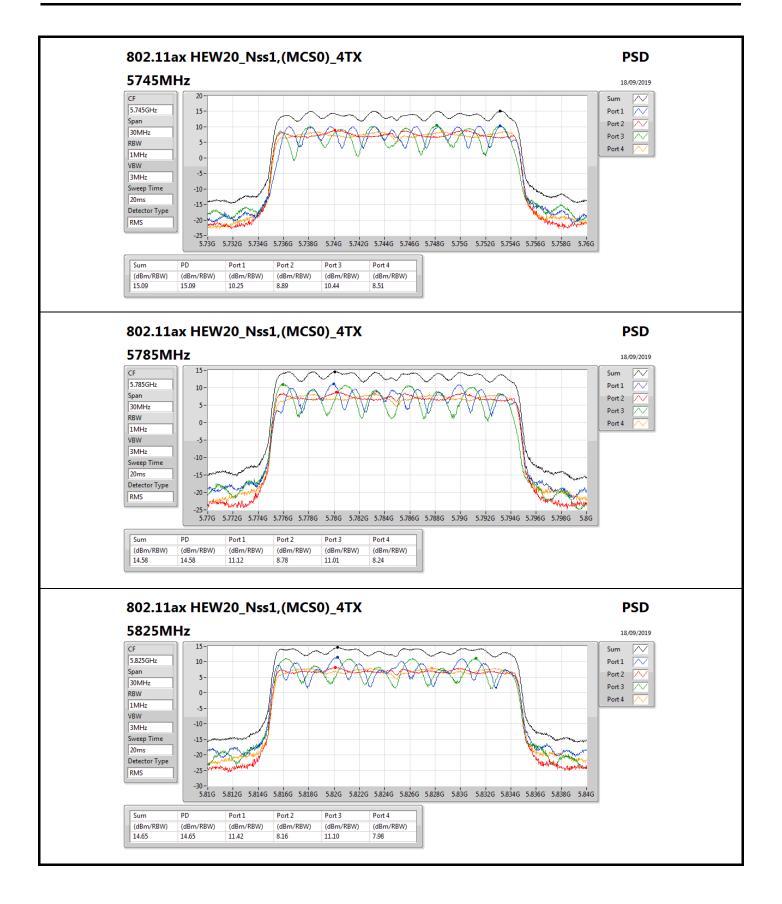


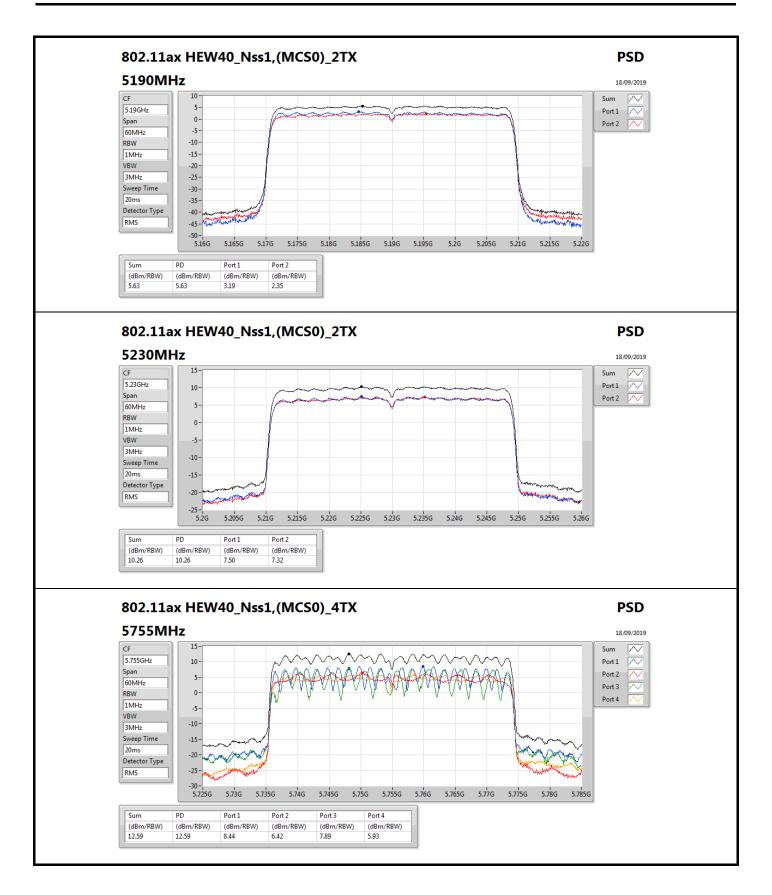


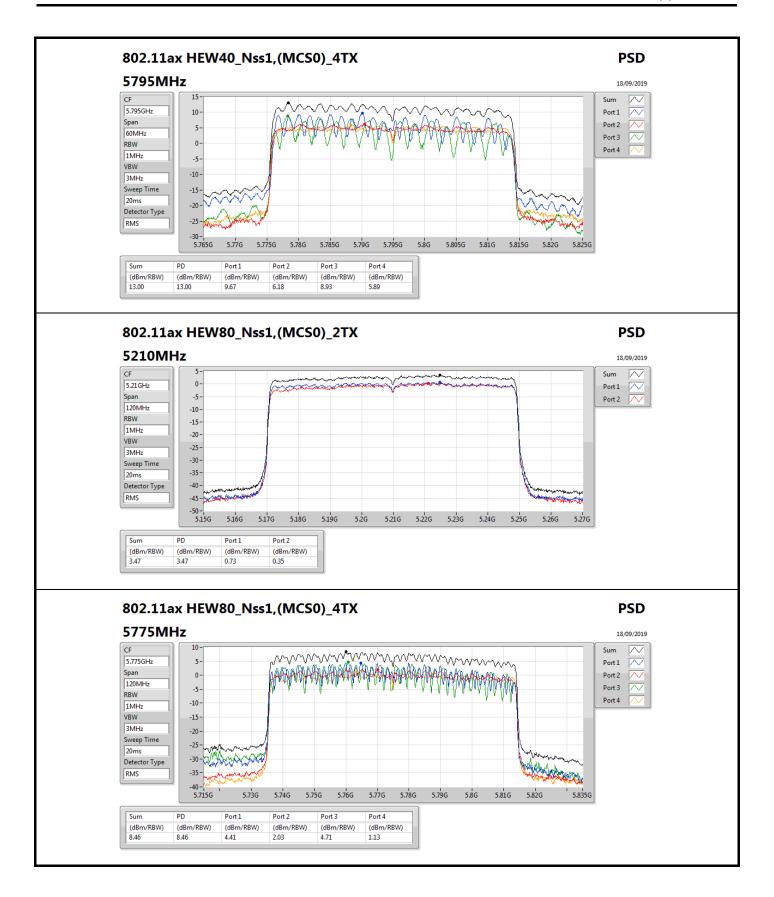






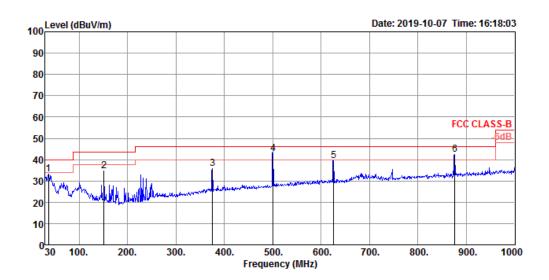








RSE below 1GHz Result										
Operating Mode 2 Polarization Vertical										
Operating Function	СТХ									

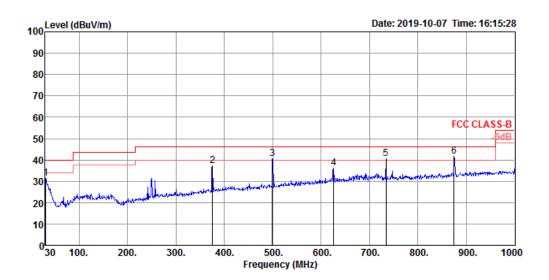


	Freq	Level		Over Limit						T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	36.79	33.19	40.00	-6.81	42.21	0.78	21.69	31.49	150	207	Peak	VERTICAL
2	151.25	34.52	43.50	-8.98	48.04	1.56	16.86	31.94	100	27	Peak	VERTICAL
3	375.32	35.76	46.00	-10.24	43.54	2.51	21.88	32.17	150	281	Peak	VERTICAL
4	500.45	42.88	46.00	-3.12	48.59	2.94	23.83	32.48	150	249	QP	VERTICAL
5	625.58	39.39	46.00	-6.61	43.33	3.28	25.21	32.43	100	260	Peak	VERTICAL
6	875.84	42.30	46.00	-3.70	43.28	3.92	27.50	32.40	200	360	Peak	VERTICAL

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.)



RSE below 1GHz Result										
Operating Mode	2 Polarization Horizontal									
Operating Function	CTX									



	Freq	Level	Limit Line					Preamp Factor		T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	30.97	31.29	40.00	-8.71	37.05	0.69	25.11	31.56	100	97	Peak	HORIZONTAL
2	375.32	37.39	46.00	-8.61	45.17	2.51	21.88	32.17	100	114	Peak	HORIZONTAL
3	499.48	40.44	46.00	-5.56	46.19	2.93	23.80	32.48	100	358	Peak	HORIZONTAL
4	625.58	36.30	46.00	-9.70	40.24	3.28	25.21	32.43	125	203	Peak	HORIZONTAL
5	734.22	40.57	46.00	-5.43	43.34	3.59	26.02	32.38	100	354	Peak	HORIZONTAL
6	874.87	41.70	46.00	-4.30	42.68	3.92	27.50	32.40	100	145	Peak	HORIZONTAL

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.)



RSE TX above 1GHz

Appendix E.2

Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
5.725-5.85GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11ax HEW20_Nss1,(MCS0)_4TX	Pass	PK	17.36238G	68.18	68.20	-0.02	21.46	3	Vertical	240	1.58	-



