



RADIO TEST REPORT

FCC ID : RSL-TQM6403GEN2

Equipment : IEEE802.11ax tri-radio 5G/5G/2.4GHz 2x2+2x2+2x2 wireless AP

Brand Name : Allied Telesis

Model Name : AT-TQm6403 GEN2

: Allied Telesis K.K. **Applicant**

2nd. TOC Bldg.7-21-11 Nishi-Gotanda, Shinagawa-ku Tokyo

1410031 Japan

Manufacturer : Allied Telesis K.K.

2nd. TOC Bldg.7-21-11 Nishi-Gotanda, Shinagawa-ku Tokyo

1410031 Japan

Standard : 47 CFR FCC Part 15.407

The product was received on Aug. 01, 2022, and testing was started from Aug. 04, 2022 and completed on Sep. 05, 2022. We, Sporton International Inc. Hsinchu 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 test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

TEL: 886-3-656-9065

FAX: 886-3-656-9085

Report Template No.: CB-A12_1 Ver1.4

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: Oct. 06, 2022

Report Version : 01

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Photographs of EUT v01

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History of this test report

Report No. : FR272620AB

Report No.	Version	Description	Issued Date
FR272620AB	01	Initial issue of report	Oct. 06, 2022

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Summary of Test Result

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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 Output Power	PASS	-
3.4	15.407(a)	Power Spectral Density	PASS	-
3.5	15.407(b)	Unwanted Emissions	PASS	-
Note: Refe	erence to Sport	on Project No.: 272619.	•	

Declaration of Conformity:

- The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
- 2. The measurement uncertainty please refer to report "Measurement Uncertainty".

Comments and Explanations:

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: Jessie Wei

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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),	5180-5240	36-48 [4]
5725-5850	ax (HEW20)	5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40),	5190-5230	38-46 [2]
5725-5850	ax (HEW40)	5755-5795	151-159 [2]
5150-5250	as (V/HT90), av (HEW90)	5210	42 [1]
5725-5850	ac (VHT80), ax (HEW80)	5775	155 [1]

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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	802.11n HT20-BF	20	2TX
5.15-5.25GHz	802.11ac VHT20	20	2TX
5.15-5.25GHz	802.11ac VHT20-BF	20	2TX
5.15-5.25GHz	802.11ax HEW20	20	2TX
5.15-5.25GHz	802.11ax HEW20-BF	20	2TX
5.15-5.25GHz	802.11n HT40	40	2TX
5.15-5.25GHz	802.11n HT40-BF	40	2TX
5.15-5.25GHz	802.11ac VHT40	40	2TX
5.15-5.25GHz	802.11ac VHT40-BF	40	2TX
5.15-5.25GHz	802.11ax HEW40	40	2TX
5.15-5.25GHz	802.11ax HEW40-BF	40	2TX
5.15-5.25GHz	802.11ac VHT80	80	2TX
5.15-5.25GHz	802.11ac VHT80-BF	80	2TX
5.15-5.25GHz	802.11ax HEW80	80	2TX
5.15-5.25GHz	802.11ax HEW80-BF	80	2TX
5.725-5.85GHz	802.11a	20	2TX
5.725-5.85GHz	802.11n HT20	20	2TX
5.725-5.85GHz	802.11n HT20-BF	20	2TX
5.725-5.85GHz	802.11ac VHT20	20	2TX
5.725-5.85GHz	802.11ac VHT20-BF	20	2TX

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Band	Mode	BWch (MHz)	Nant
5.725-5.85GHz	802.11ax HEW20	20	2TX
5.725-5.85GHz	802.11ax HEW20-BF	20	2TX
5.725-5.85GHz	802.11n HT40	40	2TX
5.725-5.85GHz	802.11n HT40-BF	40	2TX
5.725-5.85GHz	802.11ac VHT40	40	2TX
5.725-5.85GHz	802.11ac VHT40-BF	40	2TX
5.725-5.85GHz	802.11ax HEW40	40	2TX
5.725-5.85GHz	802.11ax HEW40-BF	40	2TX
5.725-5.85GHz	802.11ac VHT80	80	2TX
5.725-5.85GHz	802.11ac VHT80-BF	80	2TX
5.725-5.85GHz	802.11ax HEW80	80	2TX
5.725-5.85GHz	802.11ax HEW80-BF	80	2TX

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 modulation.
- HEW20, HEW40, HEW80 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- BWch is the nominal channel bandwidth.

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1.1.2 Antenna Information

Ant.		Port		Brand	P/N	Antenna	Connector	Gain
7	2.4GHz	5GHz UNII 1	5GHz UNII 3	2.4		Type		(dBi)
1	1	1	-	WNC	ATKK RANQ-AK610	PIFA	I-PEX	
2	2	2	-	WNC	ATKK RANQ-AK610	PIFA	I-PEX	Note 1
3	-	-	1	WNC	ATKK RANQ-AK610	PIFA	I-PEX	Note 1
4	-	-	2	WNC	ATKK RANQ-AK610	PIFA	I-PEX	

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Note 1

A 4		Gain (dBi)	
Ant.	2.4GHz	5GHz UNII 1	5GHz UNII 3
1	2.93	5.39	5.95
2	2.69	5.99	5.88
3	-	5.54	5.92
4	-	5.84	5.91

Note 2: The above information was declared by manufacturer.

For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/ax mode (2TX/2RX)

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11a/n/ac/ax mode (2TX/2RX)

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

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Note 3: The directional gain is measured which follows the procedure of KDB 662911 D01.

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	Directiona lGain = $10 \cdot \log \left[\frac{\sum_{i=1}^{N_{SN}} \left\{ \sum_{k=1}^{N_{SNT}} g_{i,k} \right\}^{2}}{N_{ANT}} \right]$
BF	Directiona IGain = $10 \cdot \log \left[\frac{\sum_{i=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{i,k} \right\}^{2}}{N_{ANT}} \right]$	Directional Gain = $10 \cdot \log \left[\frac{\sum_{i=1}^{N_{SST}} \left\{ \sum_{k=1}^{N_{ANT}} \mathbf{g}_{i,k} \right\}^{2}}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula:
$$Directiona\ \mathit{IGain} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^{2}}{N_{\mathit{ANT}}} \right]$$

$$\begin{split} & \underline{NSS1}(g1,1) = \ 10^{G1/20} \ ; \ NSS1(g1,2) = \ 10^{G2/20} \ ; \\ & \underline{gi.k} = & (Nss1(g1,1) \ + \ Nss1(g1,2) \)^2 \\ & DG = \ 10 \ | \underline{log}[(Nss1(g1,1) \ + \ Nss1(g1,2) \)^2 \ / \ N_{ANT}] = > \ 10 \ | \underline{log}[(10^{G1/20} \ + \ 10^{G2/20} \)^2 \ / \ N_{ANT}] \\ & \underline{Where} : \\ & G1 = \ 10 \ ; \ G2 = \ 10 \ ; \end{split}$$

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1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	0.932	0.31	1.978m	1k
802.11ax HEW20	0.986	0.06	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ax HEW40	0.981	0.08	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ax HEW80	0.978	0.1	4.01m	300

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

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter or PoE				
	\boxtimes	With beamforming		Without beamforming	
Beamforming Function	The product has beamforming function for n/VHT/ax in 2.4GHz and n/ac/ax in 5GHz.				
		Outdoor P2M	\boxtimes	Indoor P2M	
Function		Fixed P2P		Client	
	\boxtimes	Point-to-multipoint		Point-to-point	
Test Software Version	QSPR V5.0-00199				

Note: The above information was declared by manufacturer.

1.1.5 Table for Radio function

Radio	WLAN 2.4GHz	5GHz UNII 1	5GHz UNII 3
1	V	-	-
2	-	V	-
3	-	-	V

Note: The above information was declared by manufacturer.

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1.2 Applicable Standards

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

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- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 789033 D02 v02r01

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 662911 D01 v02r01
- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location Information

Test Lab. : Sporton International Inc. Hsinchu Laboratory

Hsinchu ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

(TAF: 3787) TEL: 886-3-656-9065 FAX: 886-3-656-9085

Test site Designation No. TW3787 with FCC.

Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH02-CB	Owen Hsu	23.3~24.9 / 67~69	Aug. 08, 2022~ Aug. 09, 2022
Radiated	03CH05-CB	Stim Sung	25.1~25.6 / 63~65	Sep. 01, 2022~
<below 1ghz=""></below>	03CH06-CB	Stim Sung	24.3~26.3 / 63~66	Sep. 02, 2022
Radiated <above 1ghz=""></above>	03CH02-CB	KJ Chang	24.8~26.9 / 62~66	Aug. 04, 2022~ Aug. 08, 2022
Radiated <co-location></co-location>	03CH06-CB	KJ Chang	24.4-25.5 / 55-58	Aug. 04, 2022~ Aug. 08, 2022
AC Conduction	CO01-CB	Dean Chang	20~22 / 60~62	Sep. 05, 2022

Note: The tested sample of the Radiated Emission <Below 1GHz> and AC Power-line Conducted Emissions test item was received on Aug. 08, 2022.

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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%

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confidence level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	5.2 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.7 dB	Confidence levels of 95%
Conducted Emission	3.2 dB	Confidence levels of 95%
Output Power Measurement	0.8 dB	Confidence levels of 95%
Power Density Measurement	3.2 dB	Confidence levels of 95%
Bandwidth Measurement	2.0 %	Confidence levels of 95%

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2 Test Configuration of EUT

2.1 Test Channel Mode

<Non-beamforming mode>

Mode	Power Setting
802.11a_Nss1,(6Mbps)_2TX	-
5180MHz	20
5200MHz	22
5240MHz	20.5
5745MHz	23
5785MHz	23
5825MHz	23
802.11ax HEW20_Nss1,(MCS0)_2TX	-
5180MHz	20.5
5200MHz	22
5240MHz	21
5745MHz	23
5785MHz	23
5825MHz	23
802.11ax HEW40_Nss1,(MCS0)_2TX	-
5190MHz	19
5230MHz	20
5755MHz	22
5795MHz	23
802.11ax HEW80_Nss1,(MCS0)_2TX	-
5210MHz	17.5
5775MHz	20

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<Beamforming mode>

Mode	Power Setting
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-
5180MHz	20.5
5200MHz	22
5240MHz	21
5745MHz	23
5785MHz	23
5825MHz	23
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-
5190MHz	19
5230MHz	20
5755MHz	22
5795MHz	23
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	-
5210MHz	17.5
5775MHz	20

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Note:

- 1. Evaluated HEW20/HEW40/HEW80/HEW160 mode only, Due to similar modulation. The power setting of HT20/HT40/VHT20/VHT40/VHT80/VHT160 mode are the same or lower than HEW20/HEW40/HEW80/HEW160.
- 2. The EUT supports non-beamforming and beamforming modes, after evaluating, the non-beamforming mode has been evaluated to be the worst case, so it was selected to test. The beamforming mode evaluates the output power only.

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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 Test Voltage: 120Vac / 60Hz			
Operating Mode Normal Link			
1 EUT with Adapter			
2	EUT with PoE 1_LAN 1		
3 EUT with PoE 1_LAN 2			
Mode 3 generated the worst test result, so it was recorded in this report.			

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The Worst Case Mode for Following Conformance Tests			
	Tests Item Emission Bandwidth Maximum Output Power Power Spectral Density		
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 in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.				
Operating Mode < 1GHz	Normal Link				
1	EUT in Z axis with Adapter				
2	EUT in Y axis with Adapter				
3	EUT in X axis with Adapter				
Mode 1 has been evaluate follow this same test mode	ed to be the worst case among Mode 1~3, thus measurement for Mode 4~5 will				
4 EUT in Z axis with PoE 1_LAN 1					
5	EUT in Z axis with PoE 1_LAN 2				
For operating mode 4 is the	e worst case and it was record in this test report.				
	СТХ				
Operating Mode > 1GHz	The EUT was performed at X axis, Y axis and Z axis position, and the worst case as below:				
1	EUT in Z axis				

The Worst Case Mode for Following Conformance Tests			
Tests Item Simultaneous Transmission Analysis - Radiated Emission Co-location			
Test Condition Radiated measurement			
	Normal Link		
Operating Mode	The EUT can be placed in X axis, Y axis and Z axis. EUT Z axis has been evaluated to be the worst case at Radiated measurement <above 1ghz="">; thus, the measurement will follow this same test configuration.</above>		
1	EUT in Z axis + WLAN 2.4GHz + WLAN 5GHz_UNII1		
Refer to Appendix F for Radiated Emission Co-location.			

The Worst Case Mode for Following Conformance Tests			
Tests Item Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation			
Operating Mode			
1 EUT + WLAN 2.4GHz + WLAN 5GHz_UNII1 + WLAN 5GHz_UNII3			
Refer to Sporton Test Report No.: FA272620 for Co-location RF Exposure Evaluation.			

Note: The Adapter and PoEs below are for measurement only, would not be marketed.

The Adapter and PoEs information as below:

Support Unit	Brand Name	Model
Adapter	APD	DA-48Z12
PoE 1	Microsemi	PD-9001-10GC/AC
PoE 2	PHIHONG	POEA33U-1ATE

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link Mode:

During the test, the EUT operation to normal function.

2.4 Accessories

Wall-mounted rack*1

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2.5 Support Equipment

For AC Conduction:

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	LAN1 NB	DELL	E6430	N/A	
В	LAN2 NB	DELL	E6430	N/A	
С	2.4G NB	DELL	E6430	N/A	
D	5GL NB	DELL	E6430	N/A	
E	5GH NB	DELL	E6430	N/A	
F	PoE 1	Microsemi	PD-9001-10GC/AC	N/A	

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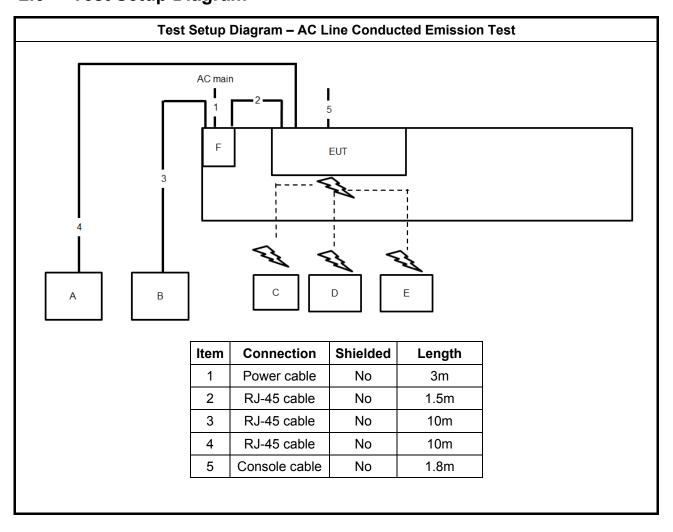
For Radiated <below 1GHz>:

	Support Equipment			
No.	Equipment	Brand Name	Model Name	FCC ID
Α	PC (PoE LAN)	DELL	T3400	N/A
В	PC(LAN)	DELL	OPTIPLEX 380	N/A
С	2.4G WIFI NB	DELL	E4300	N/A
D	5G L WIFI NB	DELL	E4300	N/A
Е	5G H WIFI NB	DELL	E4300	N/A
F	PoE 1	Microsemi	PD-9001-10GC/AC	N/A

For Radiated <above 1GHz> and For RF Conducted:

	Support Equipment			
No.	Equipment	Brand Name	Model Name	FCC ID
Α	NB	DELL	E4300	N/A
В	PoE 2	PHIHONG	POEA33U-1ATE	N/A

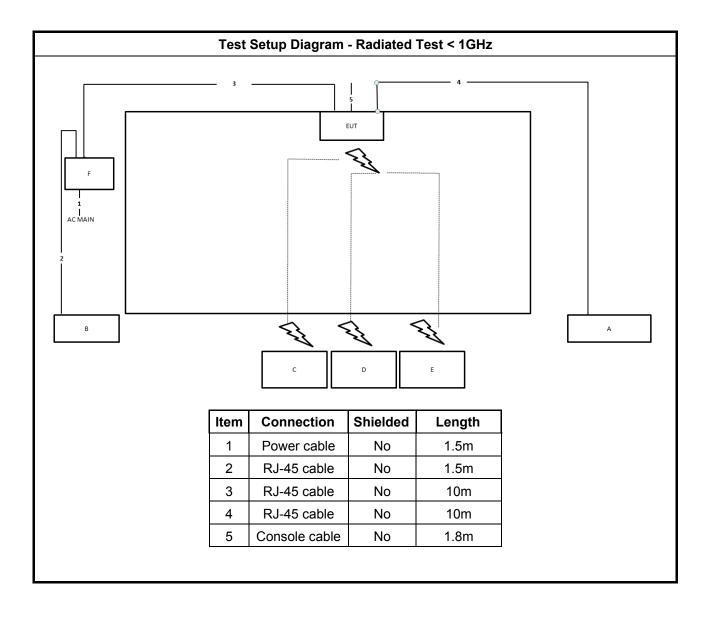
2.6 Test Setup Diagram



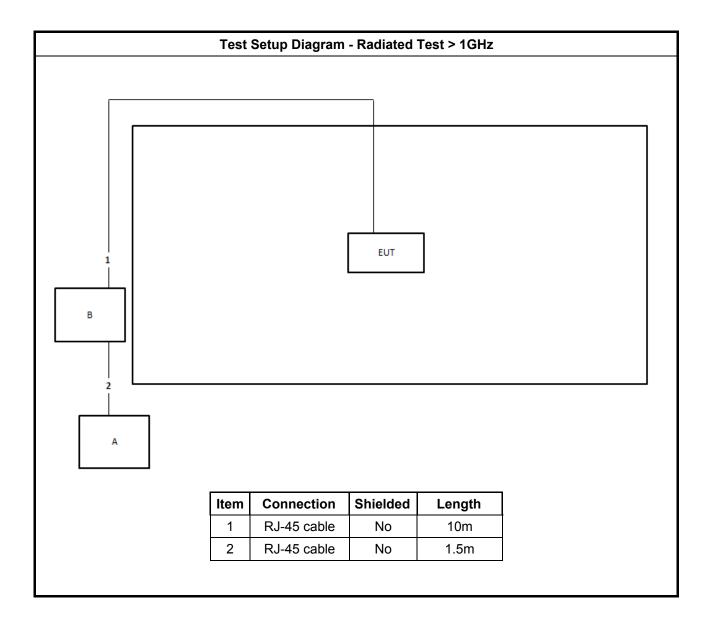
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3 Transmitter Test Result

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.		

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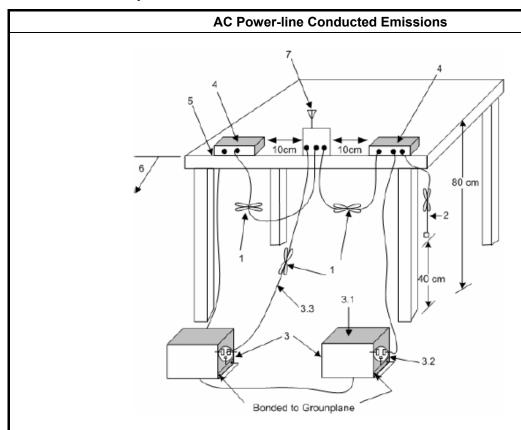
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

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.

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- 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 Measurement Results Calculation

The measured Level is calculated using:

- a. Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- b. Margin = -Limit + Level

3.1.6 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

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3.2 Emission Bandwidth

3.2.1 Emission Bandwidth Limit

	Emission Bandwidth Limit		
UNI	UNII 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, 26 dB emission bandwidth ,N/A. 6 dB emission bandwidth ≥ 500kHz.		
	For the 5.85-5.895 GHz band, 26 dB emission bandwidth ,N/A. 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.		

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3.2.2 Measuring Instruments

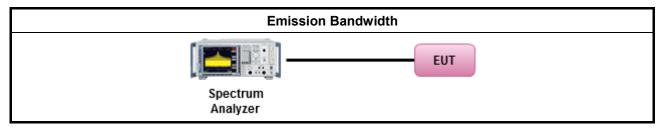
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

	Test Method
For	the emission bandwidth shall be measured using one of the options below:
\boxtimes	Refer as FCC KDB 789033 D02, 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.

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3.2.4 Test Setup



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3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

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3.3 Maximum Output Power

3.3.1 Limit

	Maximum Output Power Limit	
UN	Il 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. 	
	Maximum EIRP Limit	
	For the 5.85-5.895 GHz band:	
	■ Indoor AP & subordinate device < 36 dBm	
	■ Client device < 30 dBm	
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	

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lesser of 1 W.

Pout = maximum conducted output power in dBm,
G_{TX} = the maximum transmitting antenna directional gain in dBi.

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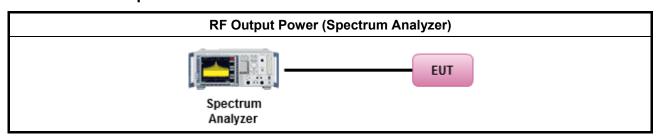
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

	Test Method
	Average over on/off periods with duty factor
	Refer as FCC KDB 789033 D02, clause E Method SA-2 (spectral trace averaging).
	Refer as FCC KDB 789033 D02, 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 D02, clause E Method PM-G (using an RF average power meter).
\boxtimes	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} = P ₁ + P ₂ + + P _n (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP _{total} = P _{total} + DG
	For radiated measurement.
	 Refer as FCC KDB 789033 D02 clause II A.1.F "Antenna-port Conducted versus Radiated Testing"
	 Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.
	 Refer as FCC KDB 412172 D01 clause 2.2 for EIRP calculation.

3.3.4 Test Setup



3.3.5 Test Result of Maximum Output Power

Refer as Appendix C

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3.4 Power Spectral Density

3.4.1 Limit

Peak Power Spectral Density Limit			
UNII Devices			
☑ 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).			
Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) \leq 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.			
EIRP Power Spectral Density Limit			
For the 5.85-5.895 GHz band:			
 Indoor AP & subordinate device < 20dBm/MHz 			
■ Client device < 14dBm/MHz			
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 $0^{\circ} \le \theta < 8^{\circ}$; -13 – 0.716 (θ -8) dBW/MHz for $8^{\circ} \le \theta < 40^{\circ}$ -35.9 – 1.22 (θ -40) dBW/MHz for $40^{\circ} \le \theta \le 45^{\circ}$; -42 dBW/MHz for $\theta > 45^{\circ}$			
\square 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) \leq 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.			
PPSD = peak power spectral density that he same method as used to determine the conducted output			

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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.

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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 D02, F)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth
	[duty	v cycle ≥ 98% or external video / power trigger]
	\boxtimes	Refer as FCC KDB 789033 D02, clause E Method SA-1 (spectral trace averaging).
		Refer as FCC KDB 789033 D02, 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 D02, clause E Method SA-2 (spectral trace averaging).
		Refer as FCC KDB 789033 D02, 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])

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Test Method

EIRP_{total} = PPSD_{total} + DG

For radiated measurement.

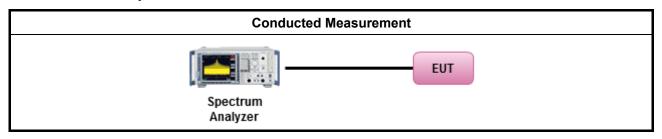
Refer as FCC KDB 789033 D02 clause II A.1.F "Antenna-port Conducted versus Radiated Testing"

Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.

Refer as FCC KDB 412172 D01 clause 2.2 for EIRP calculation.

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3.4.4 Test Setup



3.4.5 Test Result of 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

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- 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 ELIT
- 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.

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	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.	
□ 5.85 - 5.895 GHz	(i) For an indoor access point or subordinate device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of 15 dBm/MHz and shall decrease linearly to an e.i.r.p. of - 7 dBm/MHz at or above 5.925 GHz. (ii) For a client device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of -5 dBm/MHz and shall decrease linearly to an e.i.r.p. of -27 dBm/MHz at or above 5.925 GHz. (iii) For a client device or indoor access point or subordinate device, all emissions below 5.725 GHz shall not exceed an e.i.r.p. of -27 dBm/MHz at 5.65 GHz increasing linearly to 10 dBm/ MHz at 5.7 GHz, and from 5.7 GHz increasing linearly to a level of 15.6 dBm/MHz at 5.725 GHz.	
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

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3.5.2 Measuring Instruments

measurements).

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

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3.5.3 Test Procedures

Test Method

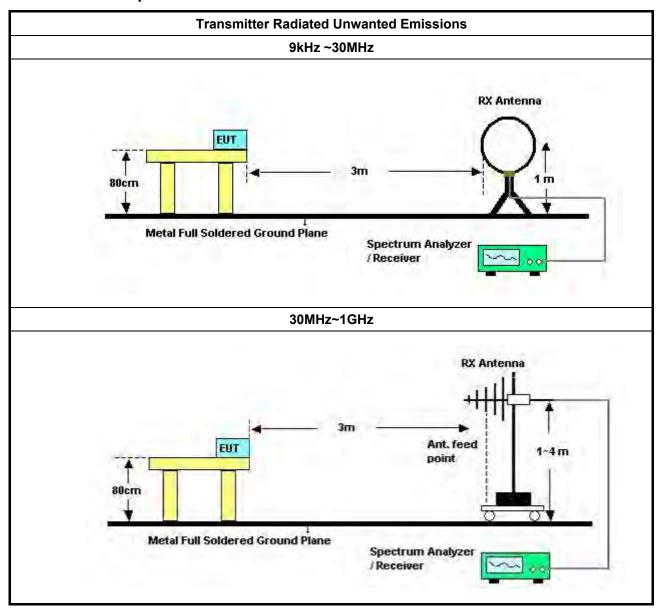
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- Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance 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 D02, clause G)2) for unwanted emissions into non-restricted bands.
 - Refer as FCC KDB 789033 D02, clause G)1) for unwanted emissions into restricted bands.
 - Refer as FCC KDB 789033 D02, G)6) Method AD (Trace Averaging).
 - Refer as FCC KDB 789033 D02, 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 D02, 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.

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Test Setup 3.5.4



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Above 1GHz

Spectrum Analyzer

Above 1GHz

Spectrum Analyzer

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3.5.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = 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 10th harmonic or 40 GHz, whichever is appropriate.

3.5.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix E

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4 Test Equipment and Calibration Data

				I	I	I	I
Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 22, 2022	Feb. 21, 2023	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-1 6-2	04083	150kHz ~ 100MHz	Feb. 09, 2022	Feb. 08, 2023	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Apr. 12, 2022	Apr. 11, 2023	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwa rz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 10, 2022	Feb. 09, 2023	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 18, 2022	May 17, 2023	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 18, 2022	Mar. 17, 2023	Radiation (03CH05-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 03, 2022	Aug. 02, 2023	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 25, 2022	Mar. 24, 2023	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 26, 2022	Apr. 25, 2023	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Mar. 14, 2022	Mar. 13, 2023	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 17, 2022	Jun. 16, 2023	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 13, 2021	Oct. 12, 2022	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 18, 2022	Mar. 17, 2023	Radiation (03CH06-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH06-CB	30 MHz ~ 1 GHz	Aug. 04, 2022	Aug. 03. 2023	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH06-CB	1GHz ~18GHz 3m	Oct. 01, 2021	Sep. 30, 2022	Radiation (03CH06-CB)
Bilog Antenna with 6 dB attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37878 & AT-N0606	20MHz ~ 2GHz	Jul. 31, 2022	Jul. 30, 2023	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	BBHA 9120 D 1370	1GHz~18GHz	Jun. 23, 2022	Jun. 22, 2023	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jul. 05, 2022	Jul. 04, 2023	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	Nov. 04, 2021	Nov. 03, 2022	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	Aug 02, 2022	Aug 01, 2023	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 20, 2022	Jul. 19, 2023	Radiation (03CH06-CB)

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Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Dec. 24, 2021	Dec. 23, 2022	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 17, 2022	Jun. 16, 2023	Radiation (03CH06-CB)
RF Cable-low	Woken	RG402	Low Cable-24+67	30MHz~1GHz	Jun. 20, 2022	Jun. 19, 2023	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-67	1GHz~18GHz	Feb. 24, 2022	Feb. 23, 2023	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+67	1GHz~18GHz	Feb. 24, 2022	Feb. 23, 2023	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#5+7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 08, 2021	Dec. 07, 2022	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	RIKEN	SAC-3M	03CH02-CB	1GHz ~18GHz	Mar. 26, 2022	Mar. 25, 2023	Radiation (03CH02-CB)
Horn Antenna	EMCO	3115	9610-4976	1GHz ~ 18GHz	Apr. 19, 2022	Apr. 18, 2023	Radiation (03CH02-CB)
Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jul. 05, 2022	Jul. 04, 2023	Radiation (03CH02-CB)
Pre-Amplifier	Agilent	83017A	MY39501305	1GHz ~ 26.5GHz	Jul. 01, 2022	Jun. 30, 2023	Radiation (03CH02-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 20, 2022	Jul. 19, 2023	Radiation (03CH02-CB)
Spectrum analyzer	R&S	FSU	100015	9kHz~26GHz	Oct. 25, 2021	Oct. 24, 2022	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18	1GHz ~ 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18+19	1GHz ~ 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#5+7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 08, 2021	Dec. 07, 2022	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH02-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	Apr. 26, 2022	Apr. 25, 2023	Conducted (TH02-CB)
Power Sensor	Anritsu	MA2411B	1126203	300MHz~40GHz	Oct. 25, 2021	Oct. 24, 2022	Conducted (TH02-CB)
Power Meter	Anritsu	ML2495A	1210004	300MHz~40GHz	Oct. 25, 2021	Oct. 24, 2022	Conducted (TH02-CB)

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 Issued Date : Oct. 06, 2022

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-01	1 GHz – 18 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-02	1 GHz – 18 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-03	1 GHz – 18 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-04	1 GHz – 18 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-05	1 GHz – 18 GHz	Oct. 04, 2021	Oct. 03, 2022	Conducted (TH02-CB)
Switch	SPTCB	SP-SWI	SWI-02	1 GHz –26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	SWI-02-P1	1 GHz –26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	SWI-02-P2	1 GHz –26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	SWI-02-P3	1 GHz –26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	SWI-02-P4	1 GHz –26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	SWI-02-P5	1 GHz –26.5 GHz	Dec. 13, 2021	Dec. 12, 2022	Conducted (TH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH02-CB)

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

NCR means Non-Calibration required.

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Conducted Emissions at Powerline

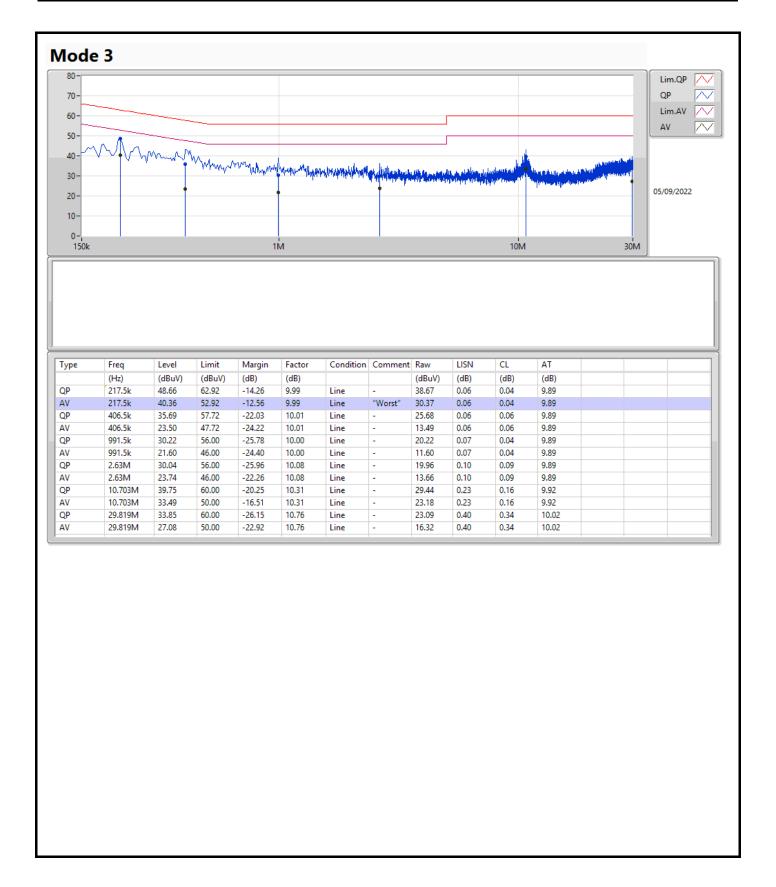
Appendix A

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 3	Pass	AV	217.5k	40.36	52.92	-12.56	Line

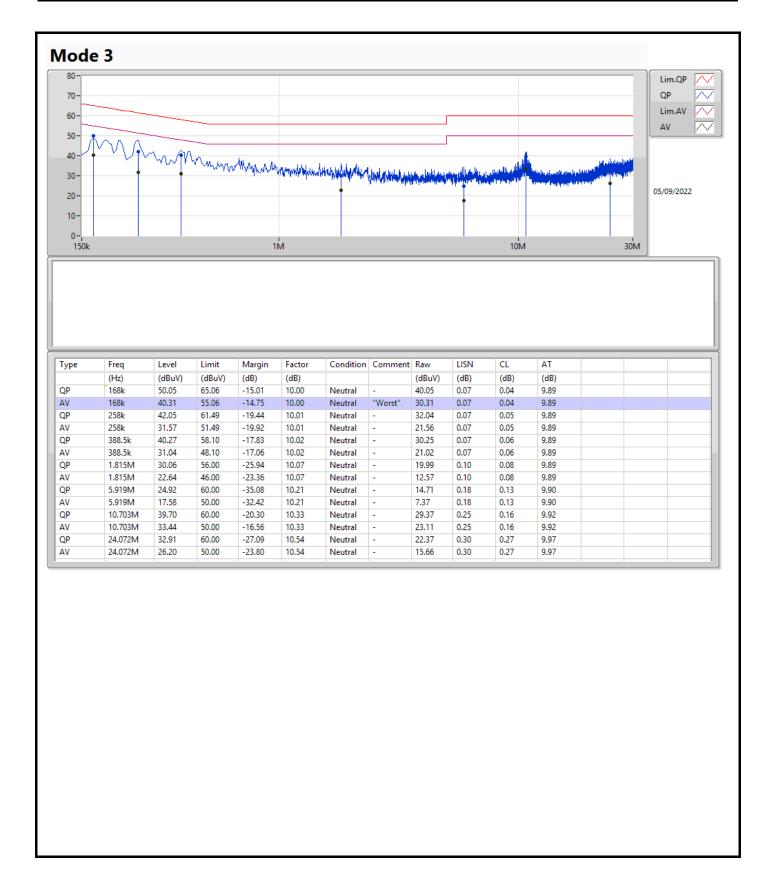
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Appendix B **EBW**

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	36.48M	21.259M	21M3D1D	20.55M	16.432M
802.11ax HEW20_Nss1,(MCS0)_2TX	38.04M	19.91M	19M9D1D	21.99M	18.951M
802.11ax HEW40_Nss1,(MCS0)_2TX	70.5M	39.1M	39M1D1D	41.1M	37.901M
802.11ax HEW80_Nss1,(MCS0)_2TX	82.56M	77.241M	77M2D1D	82.44M	77.241M
5.725-5.85GHz	=	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	16.35M	32.054M	32M1D1D	16.32M	19.49M
802.11ax HEW20_Nss1,(MCS0)_2TX	19.02M	34.423M	34M4D1D	18.9M	20.03M
802.11ax HEW40_Nss1,(MCS0)_2TX	37.56M	63.328M	63M3D1D	36.72M	53.733M
802.11ax HEW80_Nss1,(MCS0)_2TX	77.04M	78.561M	78M6D1D	74.64M	78.441M

 $\label{eq:max-NdB} Max - N \ dB = Maximum \ 6dB \ down \ bandwidth \ for \ 5.725-5.85 GHz \ band \ / \ Maximum \ 26dB \ down \ bandwidth \ for \ other \ band; \\ Max - OBW = Maximum \ 99\% \ occupied \ bandwidth; \\ Min - N \ dB = Minimum \ 6dB \ down \ bandwidth \ for \ 5.725-5.85 GHz \ band \ / \ Maximum \ 26dB \ down \ bandwidth \ for \ other \ band; \\ Min - OBW = Minimum \ 99\% \ occupied \ bandwidth \ for \ other \ band; \\ Min - OBW = Minimum \ 99\% \ occupied \ bandwidth \ for \ other \ band; \\ Min - OBW = Minimum \ 99\% \ occupied \ bandwidth \ for \ other \ band; \\ Min - OBW = Minimum \ 99\% \ occupied \ bandwidth \ for \ other \ b$

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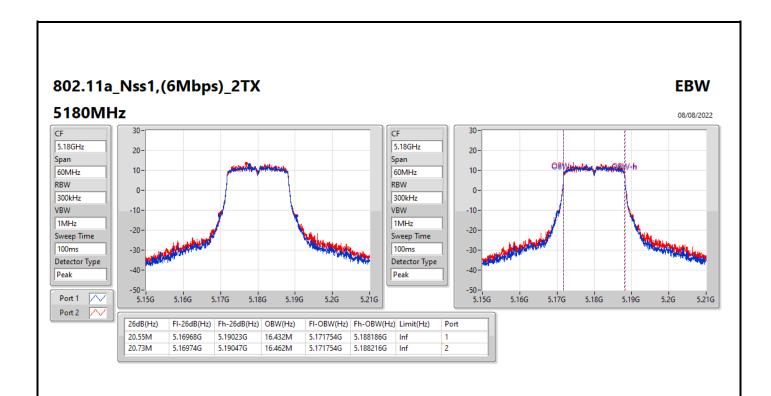
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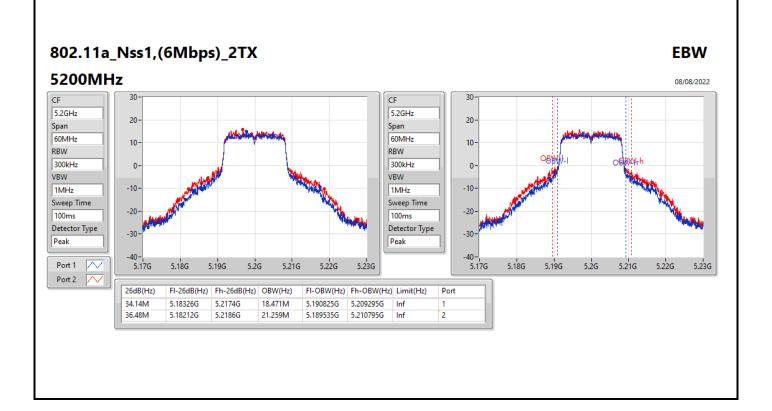
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_2TX	-	-	=	-	-	-
5180MHz	Pass	Inf	20.55M	16.432M	20.73M	16.462M
5200MHz	Pass	Inf	34.14M	18.471M	36.48M	21.259M
5240MHz	Pass	Inf	29.28M	17.151M	29.13M	17.001M
5745MHz	Pass	500k	16.32M	32.054M	16.32M	30.015M
5785MHz	Pass	500k	16.32M	28.516M	16.35M	29.085M
5825MHz	Pass	500k	16.32M	19.49M	16.32M	31.844M
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	22.05M	18.951M	21.99M	18.981M
5200MHz	Pass	Inf	33.21M	19.25M	38.04M	19.91M
5240MHz	Pass	Inf	35.64M	19.4M	33.75M	19.49M
5745MHz	Pass	500k	18.99M	34.333M	18.93M	31.874M
5785MHz	Pass	500k	19.02M	29.265M	18.99M	30.915M
5825MHz	Pass	500k	18.96M	20.03M	18.9M	34.423M
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	Inf	41.1M	37.961M	41.4M	37.901M
5230MHz	Pass	Inf	69.18M	38.561M	70.5M	39.1M
5755MHz	Pass	500k	36.72M	58.051M	37.44M	53.733M
5795MHz	Pass	500k	37.56M	60.93M	37.44M	63.328M
802.11ax HEW80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	Inf	82.44M	77.241M	82.56M	77.241M
5775MHz	Pass	500k	74.64M	78.561M	77.04M	78.441M

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

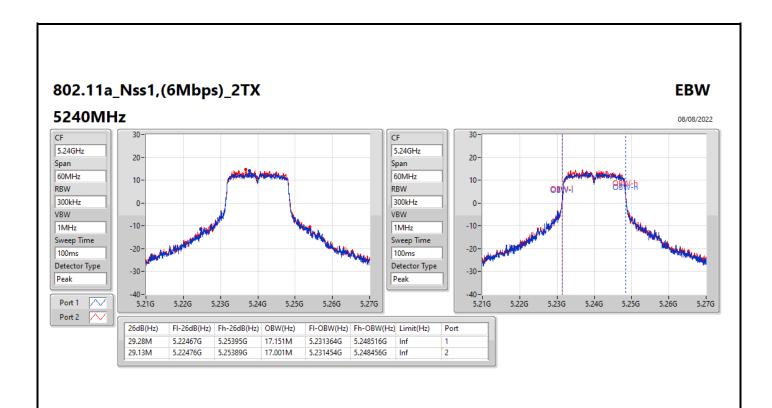
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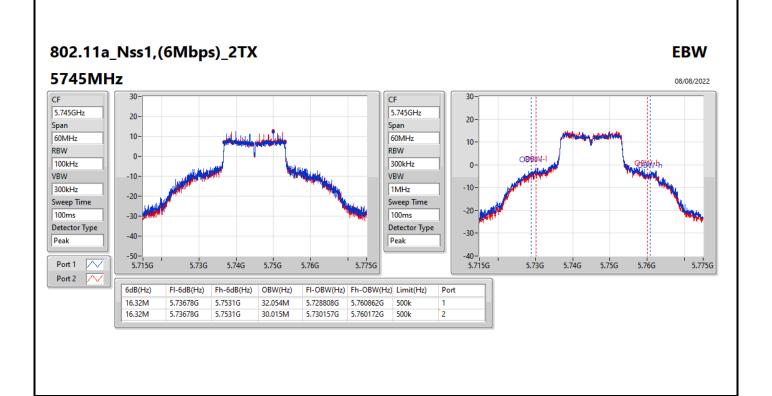
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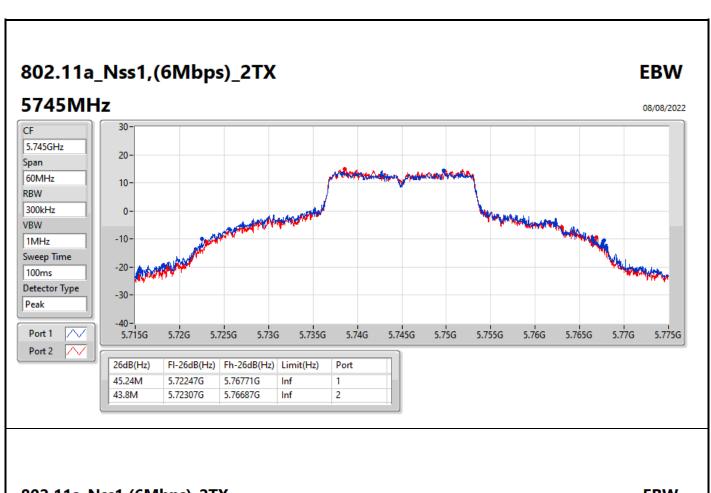


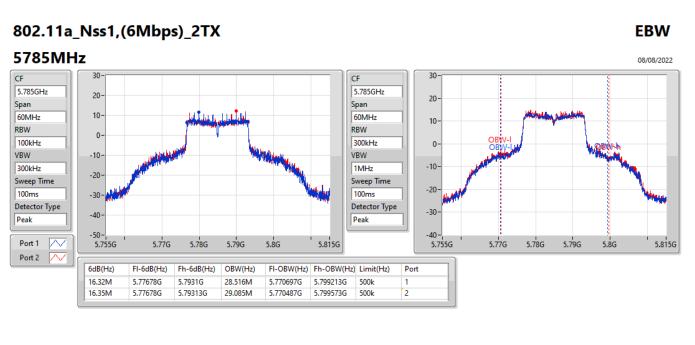
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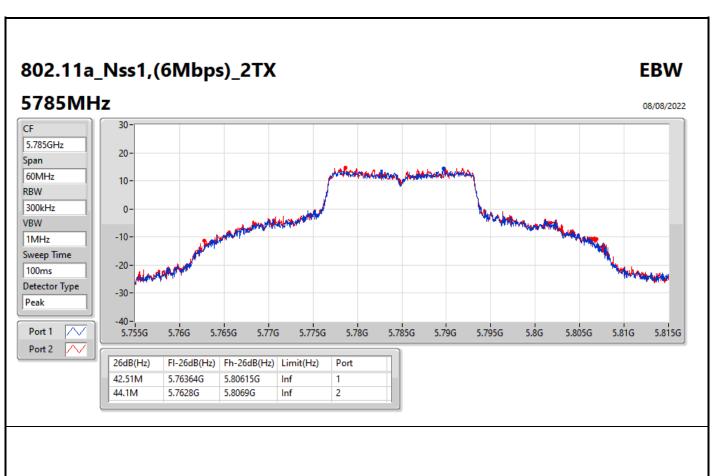


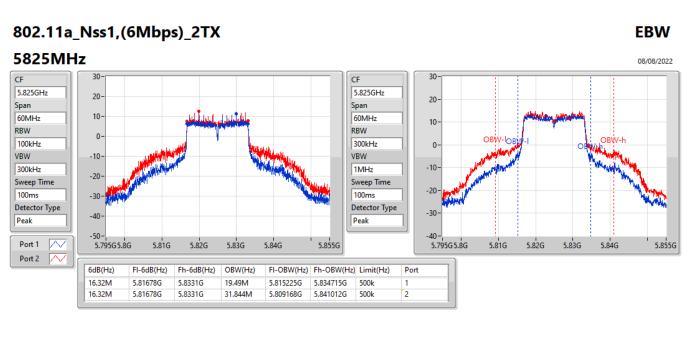
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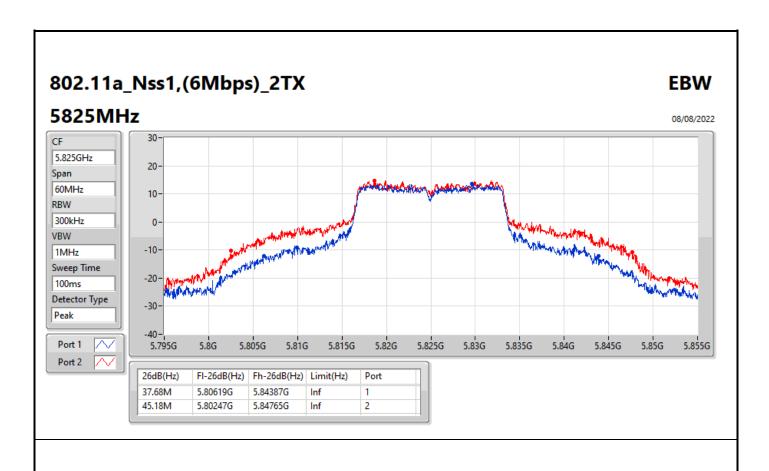


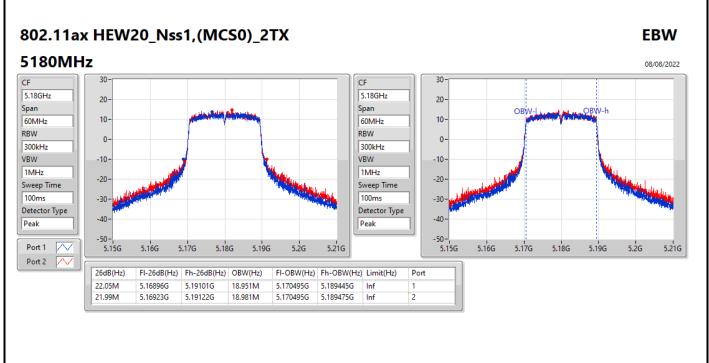
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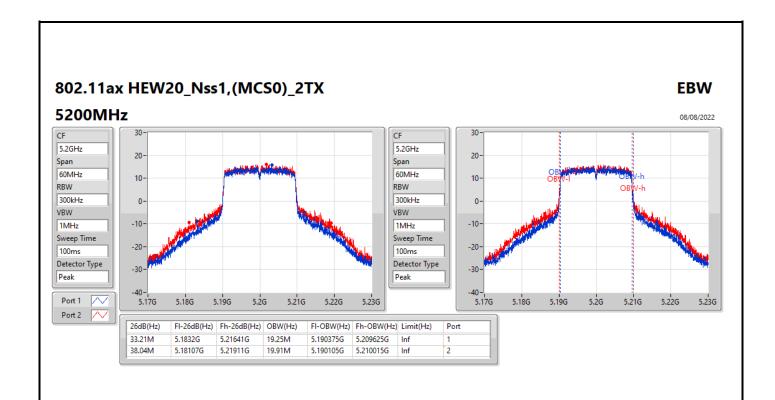


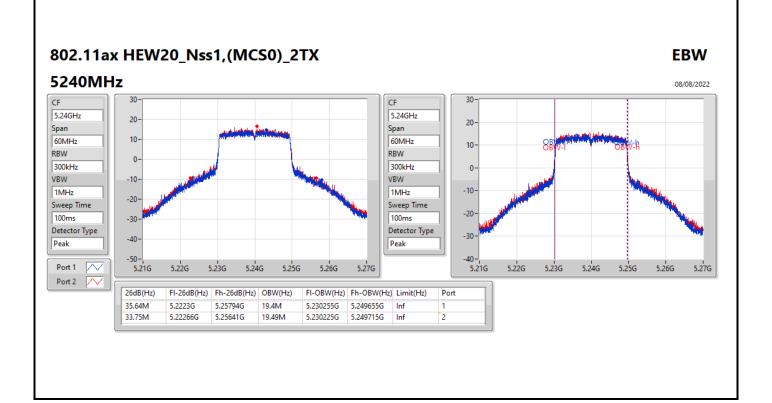
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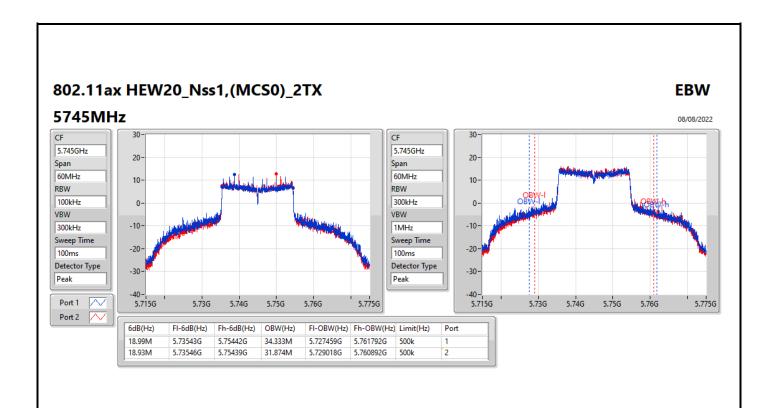


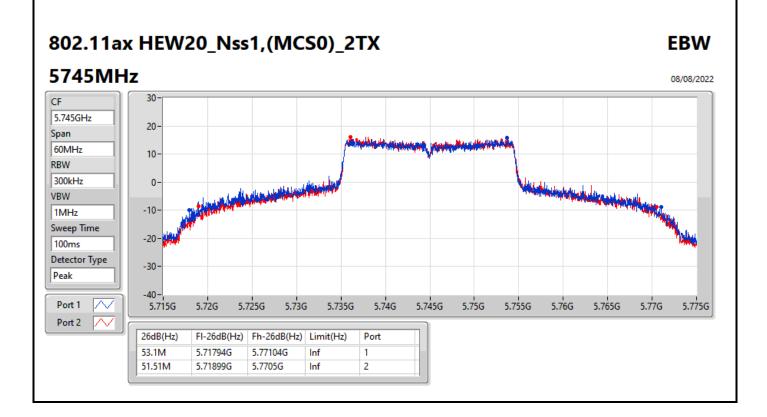
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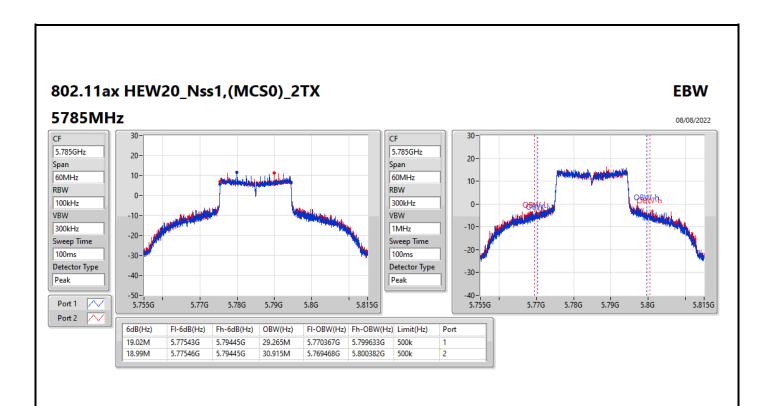


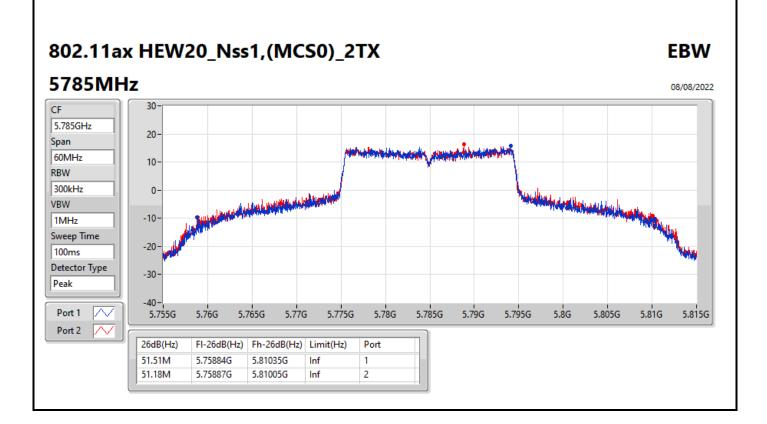
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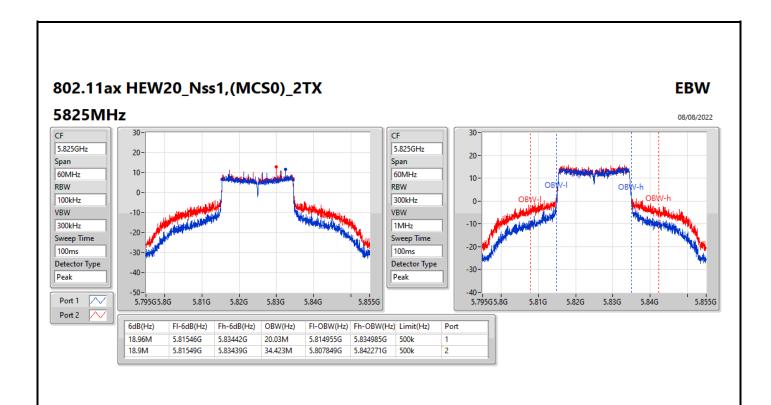


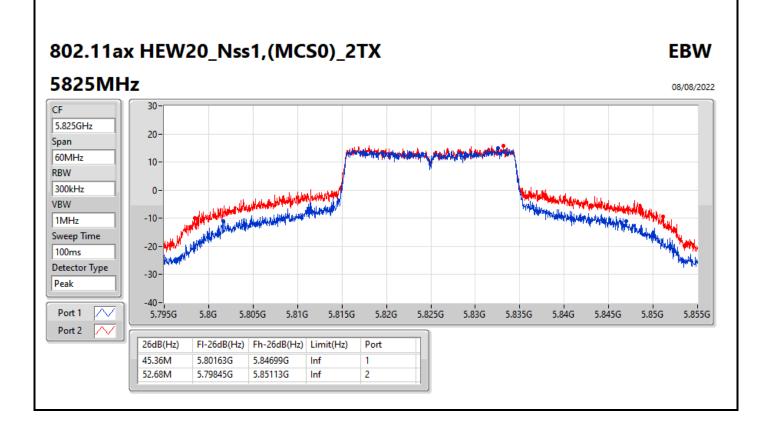
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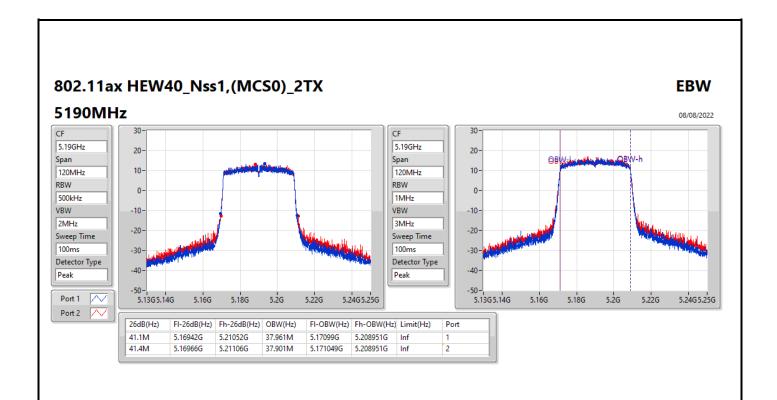


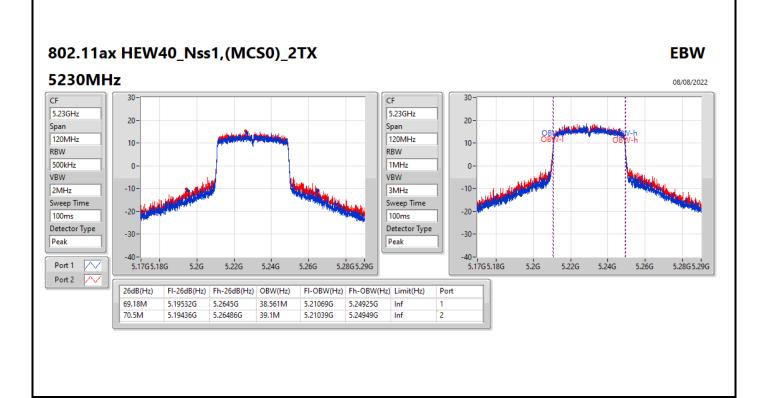
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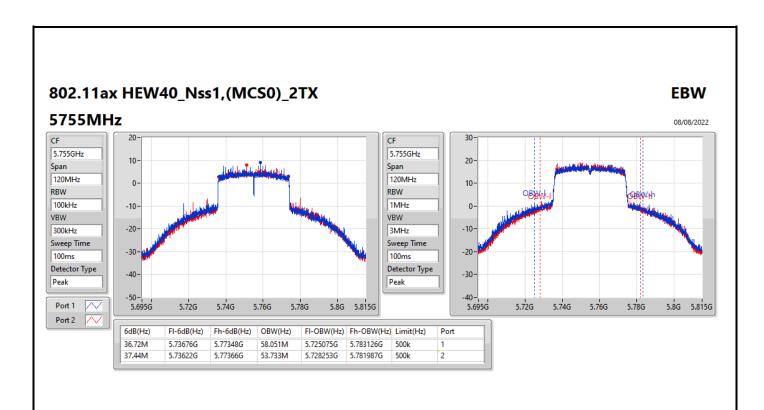


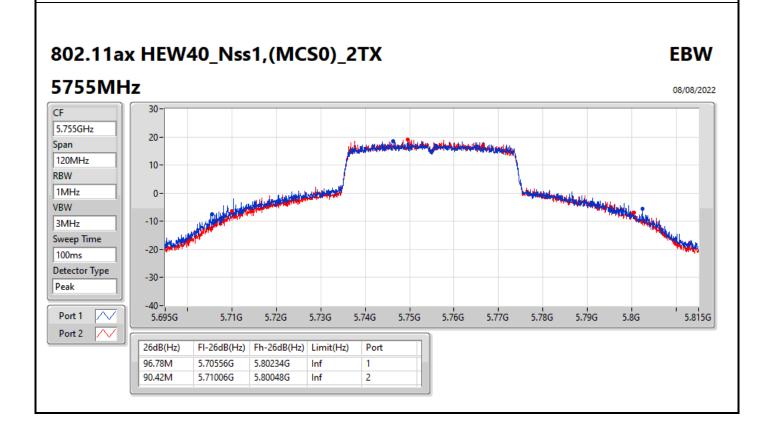
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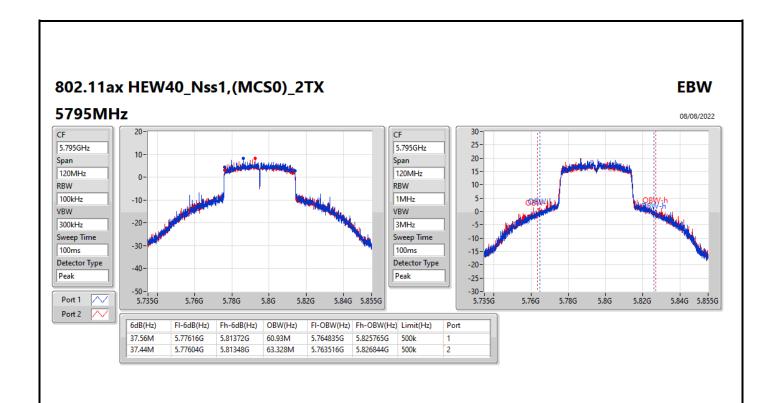


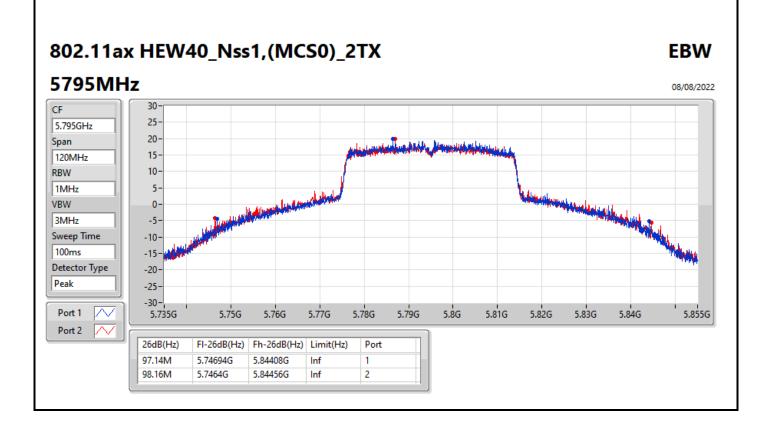
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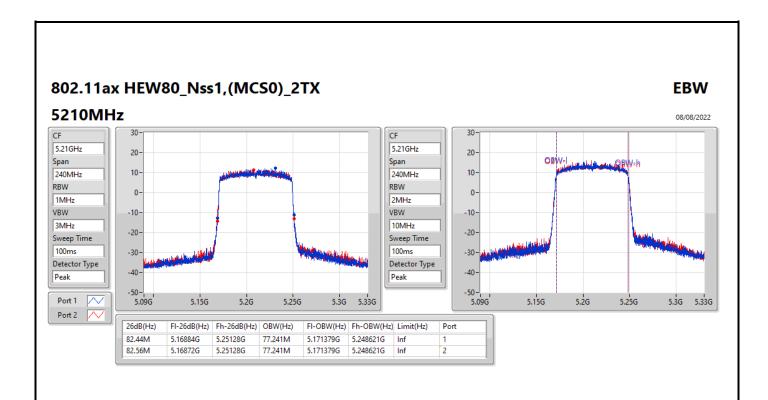


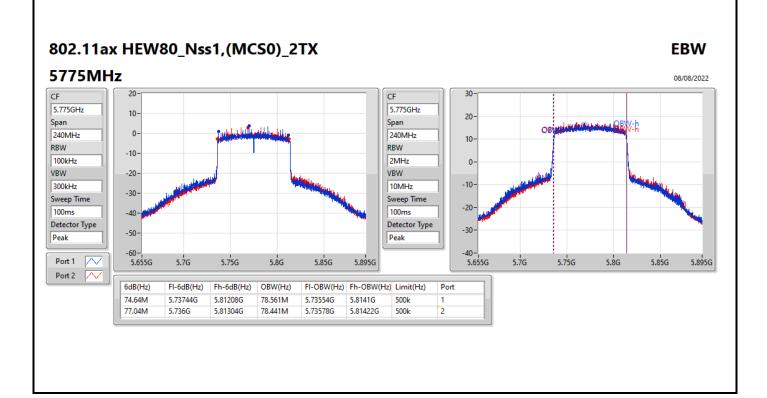
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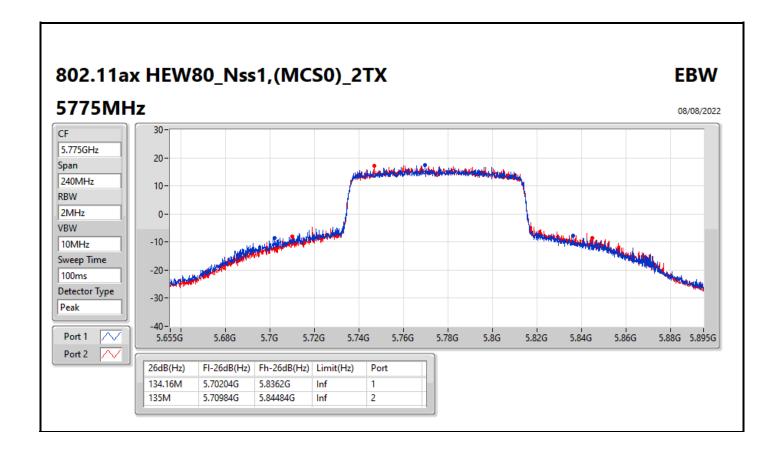
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EBW Appendix B



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Average Power <Non-beamforming mode>

Appendix C.1

Summary

Mode	Total Power	Total Power
	(dBm)	(W)
5.15-5.25GHz	-	-
802.11a_Nss1,(6Mbps)_2TX	25.26	0.33574
802.11ax HEW20_Nss1,(MCS0)_2TX	24.94	0.31189
802.11ax HEW40_Nss1,(MCS0)_2TX	23.74	0.23659
802.11ax HEW80_Nss1,(MCS0)_2TX	20.54	0.11324
5.725-5.85GHz	-	-
802.11a_Nss1,(6Mbps)_2TX	25.82	0.38194
802.11ax HEW20_Nss1,(MCS0)_2TX	25.86	0.38548
802.11ax HEW40_Nss1,(MCS0)_2TX	26.14	0.41115
802.11ax HEW80_Nss1,(MCS0)_2TX	23.52	0.22491

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Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
802.11a_Nss1,(6Mbps)_2TX	-	-	=	-	-	-
5180MHz	Pass	5.99	20.03	20.15	23.10	30.00
5200MHz	Pass	5.99	22.04	22.45	25.26	30.00
5240MHz	Pass	5.99	20.92	21.09	24.02	30.00
5745MHz	Pass	5.92	22.71	22.91	25.82	30.00
5785MHz	Pass	5.92	22.51	21.86	25.21	30.00
5825MHz	Pass	5.92	22.22	22.80	25.53	30.00
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	=	-	-	-
5180MHz	Pass	5.99	19.94	20.16	23.06	30.00
5200MHz	Pass	5.99	21.74	22.12	24.94	30.00
5240MHz	Pass	5.99	21.18	21.39	24.30	30.00
5745MHz	Pass	5.92	22.76	22.93	25.86	30.00
5785MHz	Pass	5.92	22.66	22.57	25.63	30.00
5825MHz	Pass	5.92	22.44	22.85	25.66	30.00
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	=	-	-	-
5190MHz	Pass	5.99	19.03	19.19	22.12	30.00
5230MHz	Pass	5.99	20.49	20.96	23.74	30.00
5755MHz	Pass	5.92	22.61	22.81	25.72	30.00
5795MHz	Pass	5.92	23.18	23.07	26.14	30.00
802.11ax HEW80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	5.99	17.43	17.62	20.54	30.00
5775MHz	Pass	5.92	20.41	20.60	23.52	30.00

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

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Appendix C.2

Summary

Mode	Total Power	Total Power
	(dBm)	(W)
5.15-5.25GHz	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	24.94	0.31189
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	23.74	0.23659
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	20.54	0.11324
5.725-5.85GHz	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	25.86	0.38548
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	26.14	0.41115
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	23.52	0.22491

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Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	=	-
5180MHz	Pass	8.71	19.94	20.16	23.06	27.29
5200MHz	Pass	8.71	21.74	22.12	24.94	27.29
5240MHz	Pass	8.71	21.18	21.39	24.30	27.29
5745MHz	Pass	8.93	22.76	22.93	25.86	27.07
5785MHz	Pass	8.93	22.66	22.57	25.63	27.07
5825MHz	Pass	8.93	22.44	22.85	25.66	27.07
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	8.71	19.03	19.19	22.12	27.29
5230MHz	Pass	8.71	20.49	20.96	23.74	27.29
5755MHz	Pass	8.93	22.61	22.81	25.72	27.07
5795MHz	Pass	8.93	23.18	23.07	26.14	27.07
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	8.71	17.43	17.62	20.54	27.29
5775MHz	Pass	8.93	20.41	20.60	23.52	27.07

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

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Summary

Mode	PD
	(dBm/RBW)
5.15-5.25GHz	-
802.11a_Nss1,(6Mbps)_2TX	13.13
802.11ax HEW20_Nss1,(MCS0)_2TX	12.18
802.11ax HEW40_Nss1,(MCS0)_2TX	8.17
802.11ax HEW80_Nss1,(MCS0)_2TX	2.12
5.725-5.85GHz	-
802.11a_Nss1,(6Mbps)_2TX	11.69
802.11ax HEW20_Nss1,(MCS0)_2TX	11.21
802.11ax HEW40_Nss1,(MCS0)_2TX	8.19
802.11ax HEW80_Nss1,(MCS0)_2TX	2.75

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

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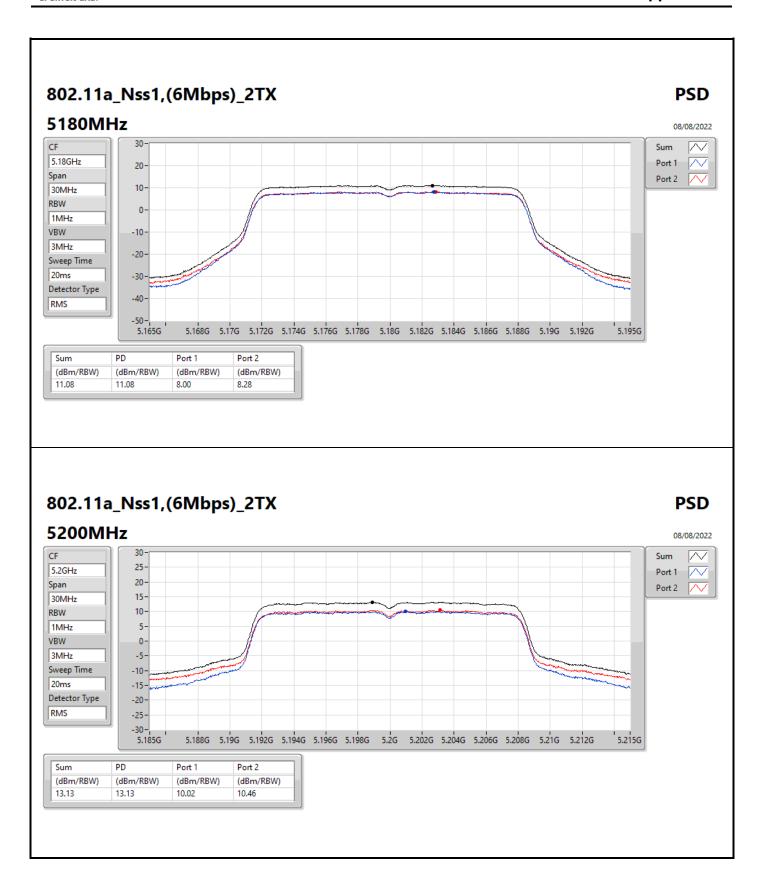
Appendix D **PSD**

Result

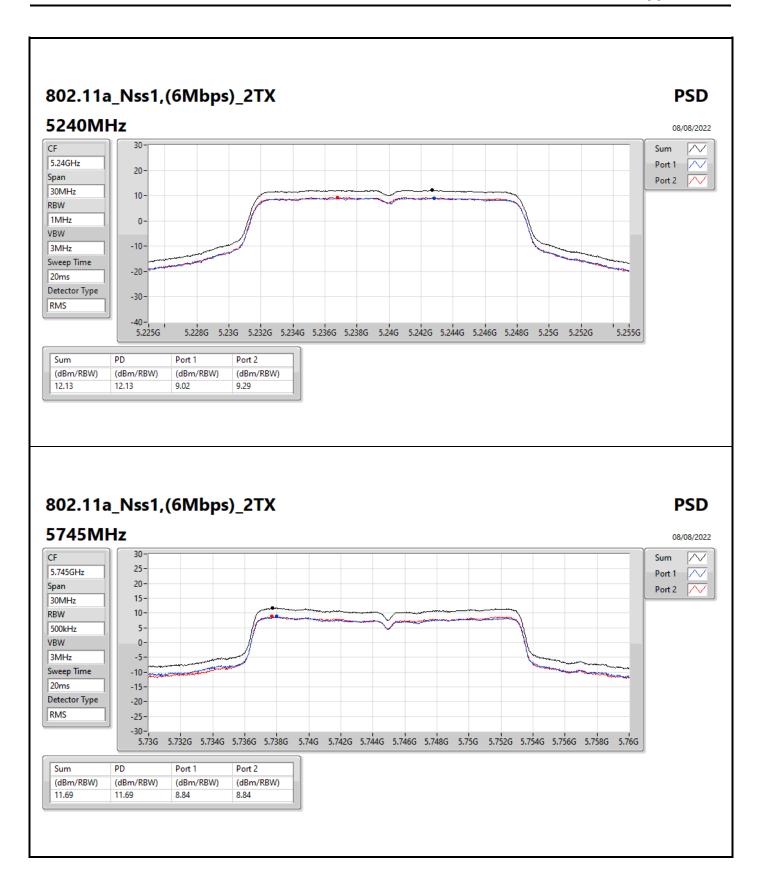
Mode	Result	DG	Port 1	Port 2	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5180MHz	Pass	8.71	8.00	8.28	11.08	14.29
5200MHz	Pass	8.71	10.02	10.46	13.13	14.29
5240MHz	Pass	8.71	9.02	9.29	12.13	14.29
5745MHz	Pass	8.93	8.84	8.84	11.69	27.07
5785MHz	Pass	8.93	8.28	8.31	11.26	27.07
5825MHz	Pass	8.93	7.87	8.50	11.17	27.07
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	=
5180MHz	Pass	8.71	7.29	7.60	10.34	14.29
5200MHz	Pass	8.71	8.99	9.41	12.18	14.29
5240MHz	Pass	8.71	8.59	8.92	11.71	14.29
5745MHz	Pass	8.93	8.17	8.32	11.21	27.07
5785MHz	Pass	8.93	8.16	7.88	10.91	27.07
5825MHz	Pass	8.93	7.78	8.01	10.83	27.07
802.11ax HEW40_Nss1,(MCS0)_2TX	-	=	-	-	=	-
5190MHz	Pass	8.71	3.57	3.84	6.66	14.29
5230MHz	Pass	8.71	4.97	5.48	8.17	14.29
5755MHz	Pass	8.93	4.74	4.89	7.77	27.07
5795MHz	Pass	8.93	5.44	5.07	8.19	27.07
802.11ax HEW80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	8.71	-0.91	-0.73	2.12	14.29
5775MHz	Pass	8.93	-0.28	-0.16	2.75	27.07

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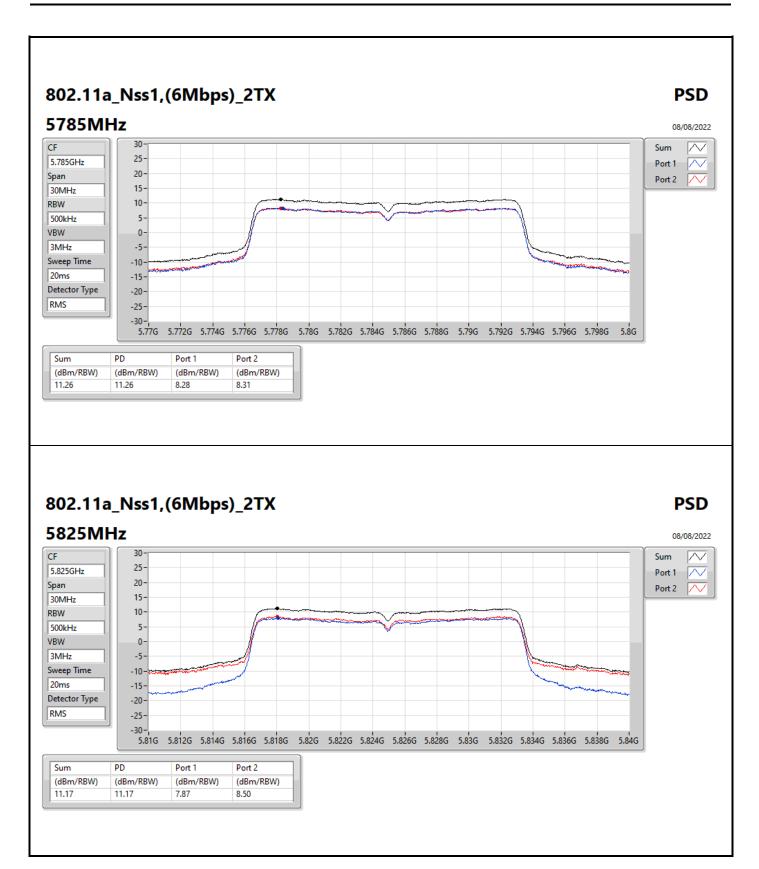
DG = Directional Gain; RBW = 500kHz for 5.725-5.85GHz band / 1MHz for other band; PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;



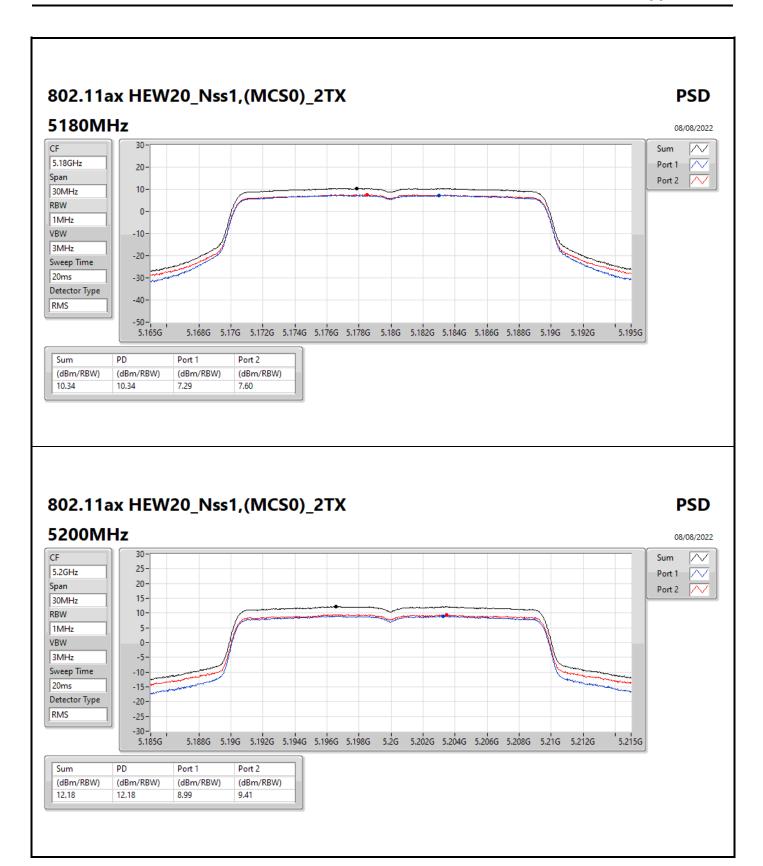
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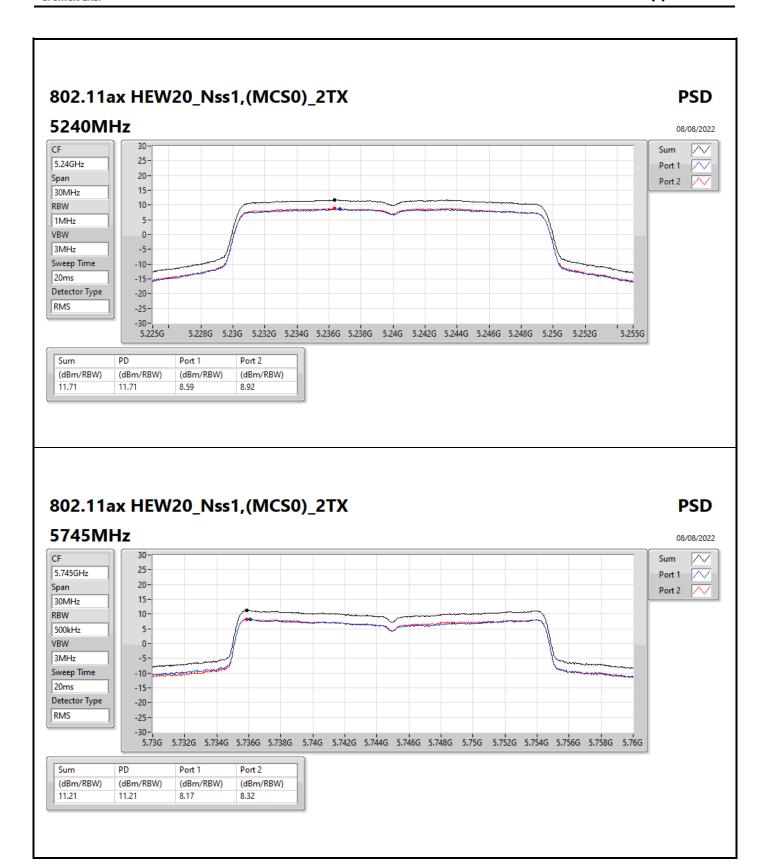
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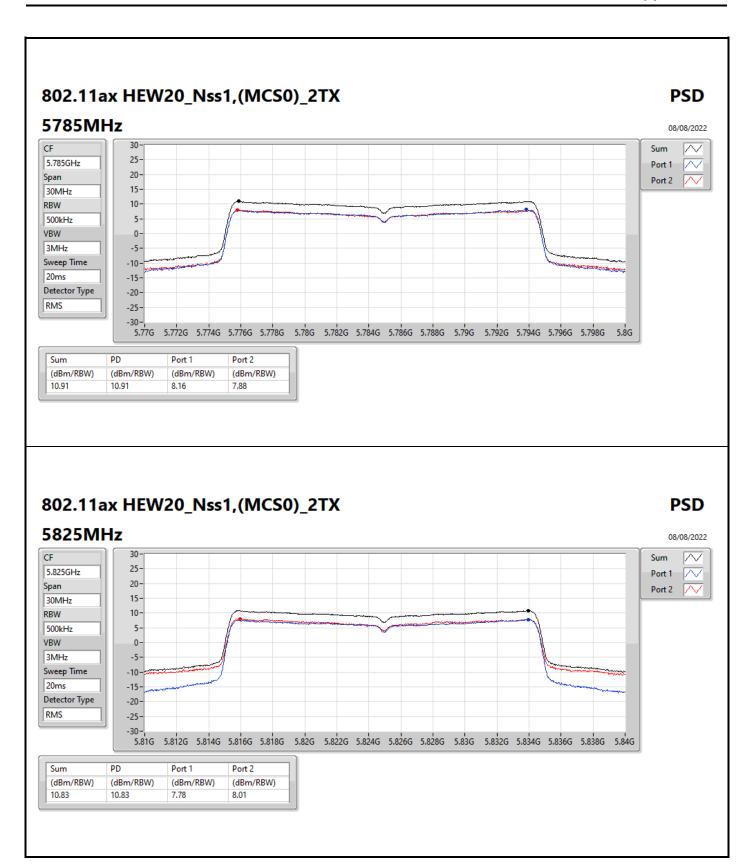
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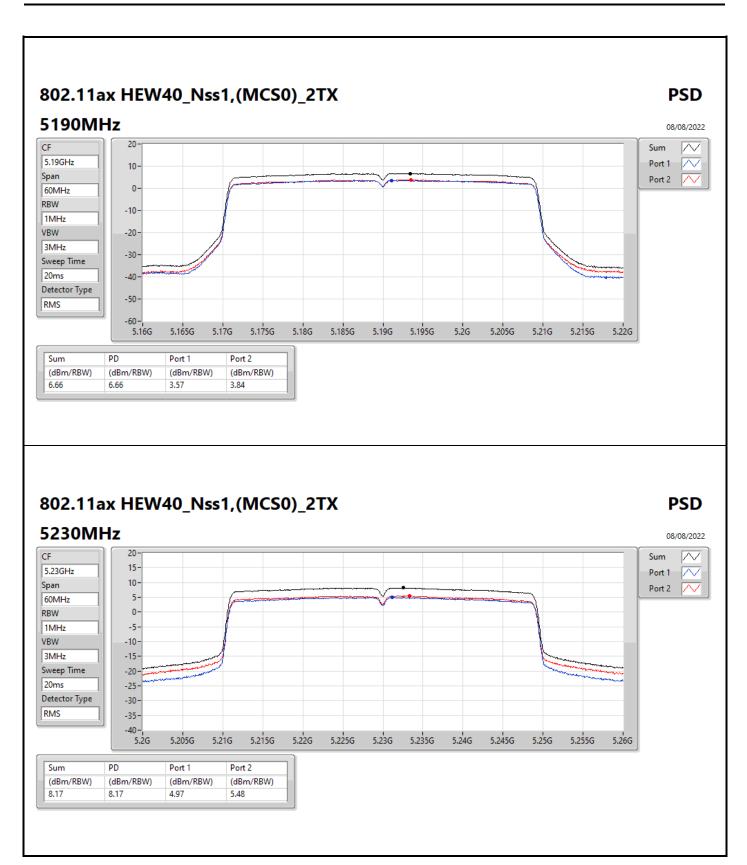
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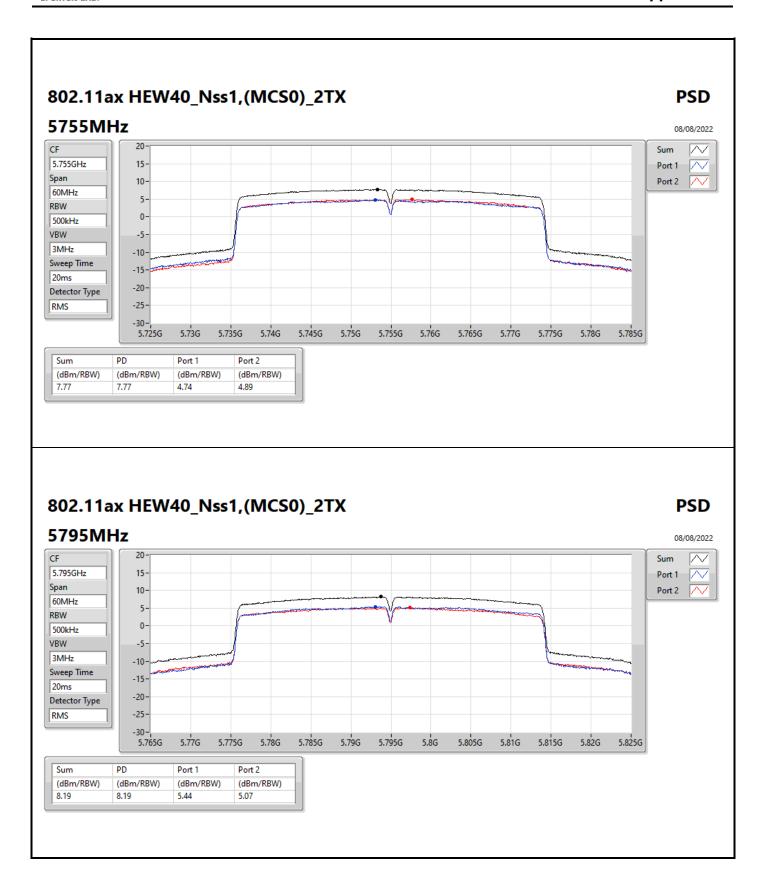
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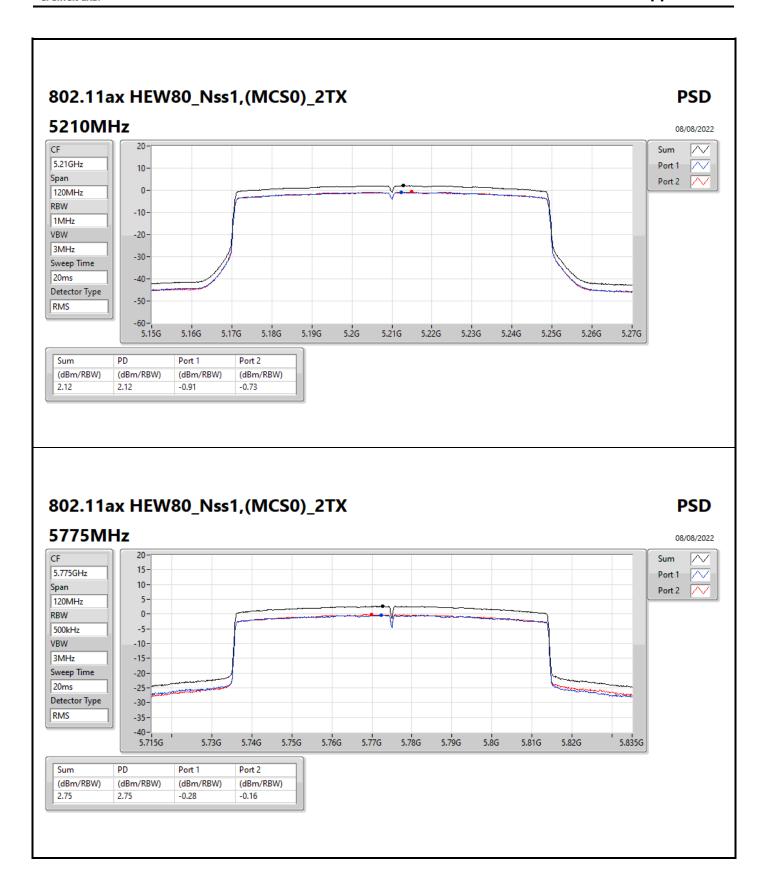
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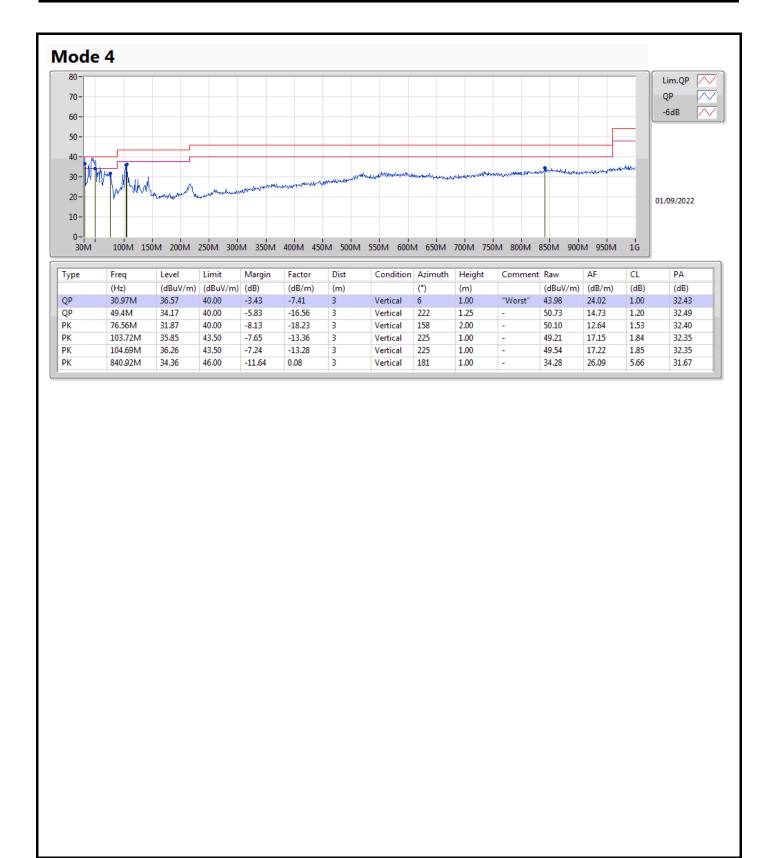
Radiated Emissions below 1GHz

Appendix E.1

Summary

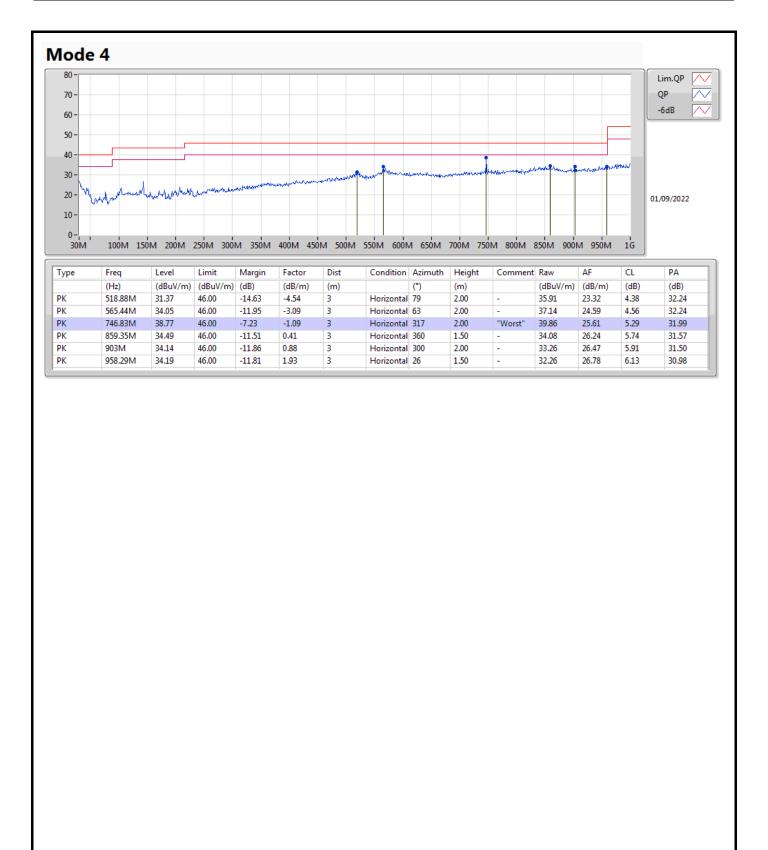
Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 4	Pass	QP	30.97M	36.57	40.00	-3.43	Vertical

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RSE TX above 1GHz

Appendix E.2

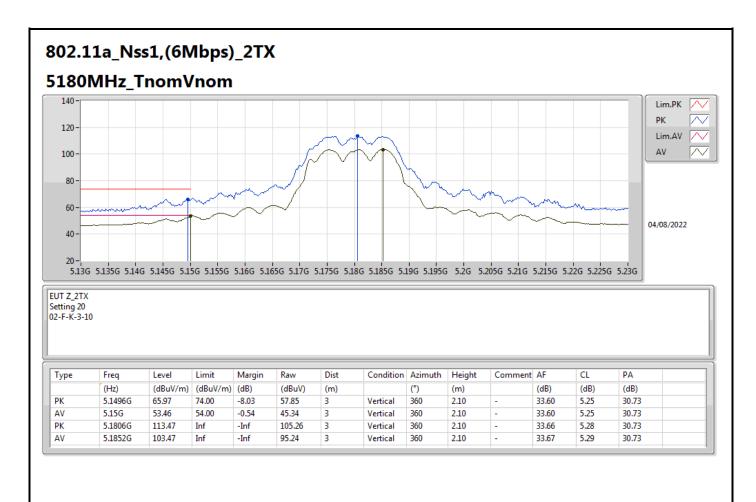
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth	Height (m)	Comments
5.15-5.25GHz	-	-	-	- (ubuviii)	- (ubuviii)	- -	-	-	-	-	-
802.11ax HEW40_Nss1,(MCS0)_2TX	Pass	AV	5.1448G	53.95	54.00	-0.05	3	Vertical	-0	2.28	-

Sporton International Inc. Hsinchu Laboratory Page No. Report No.

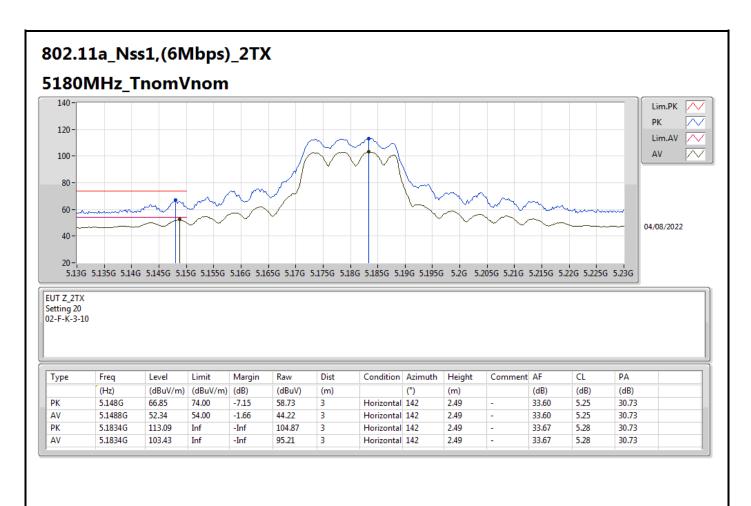
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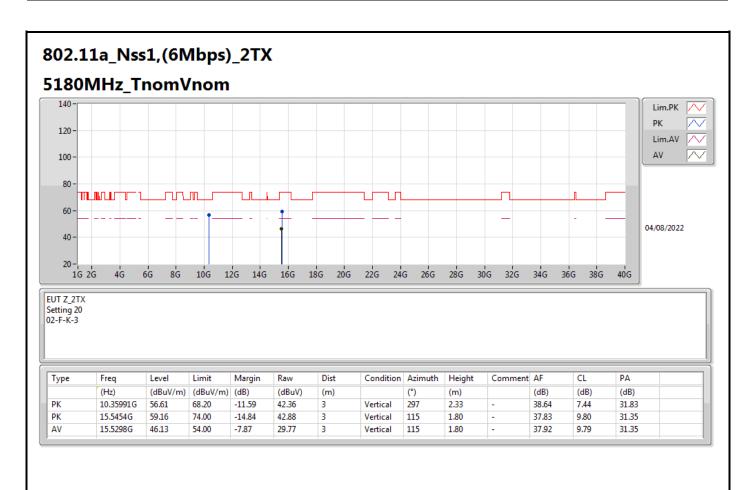
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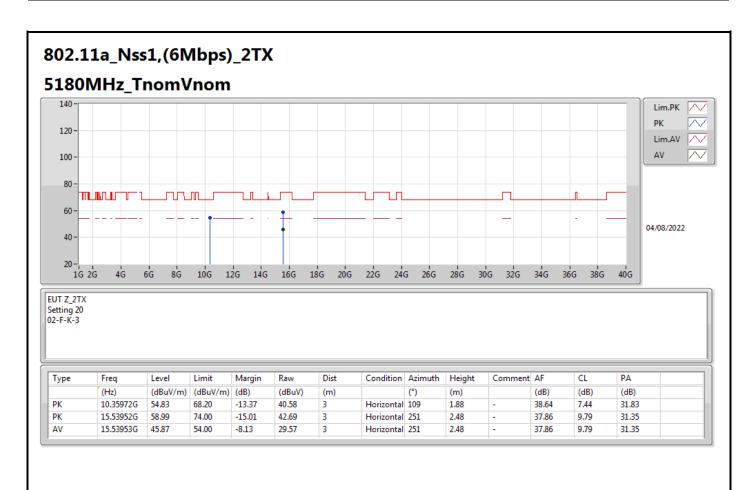
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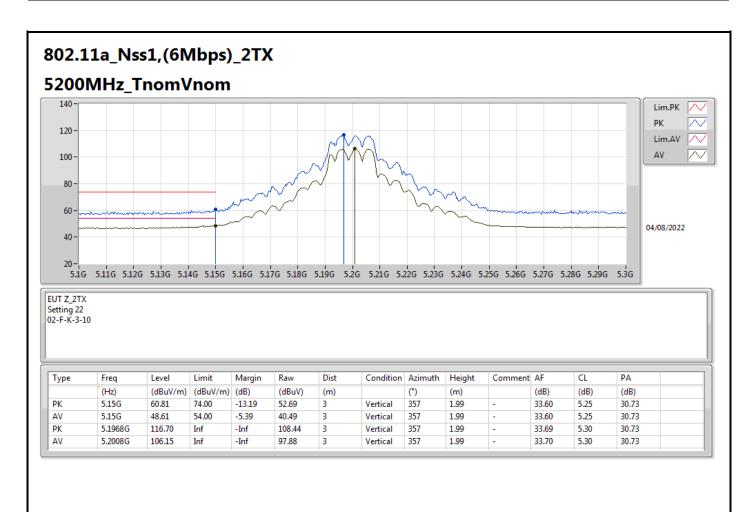
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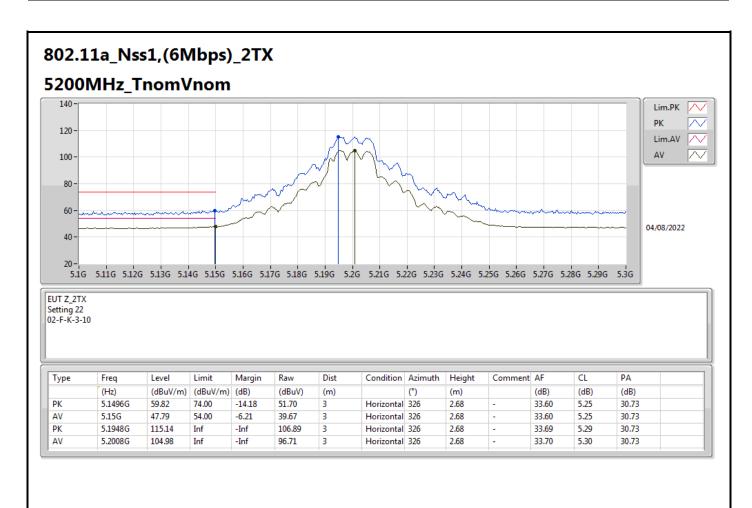
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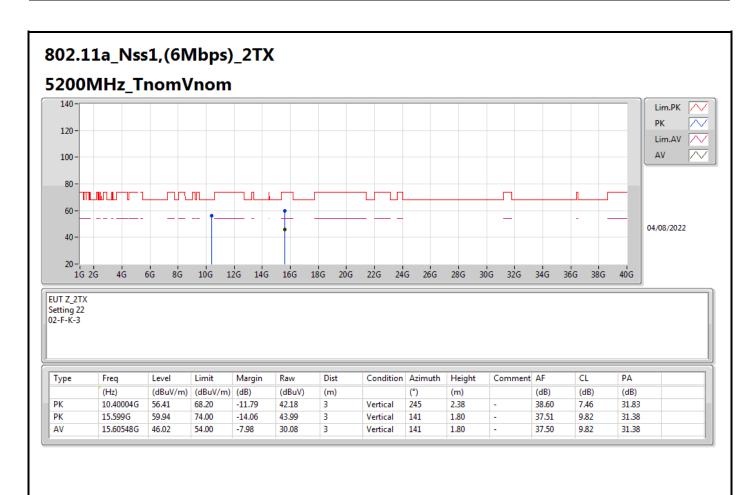
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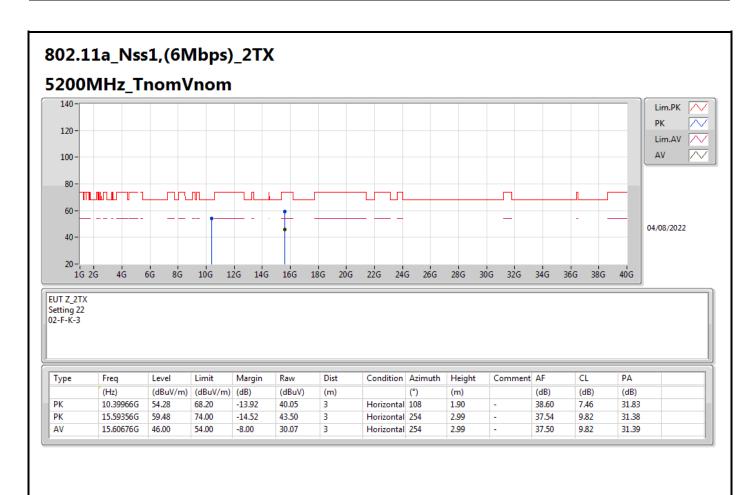
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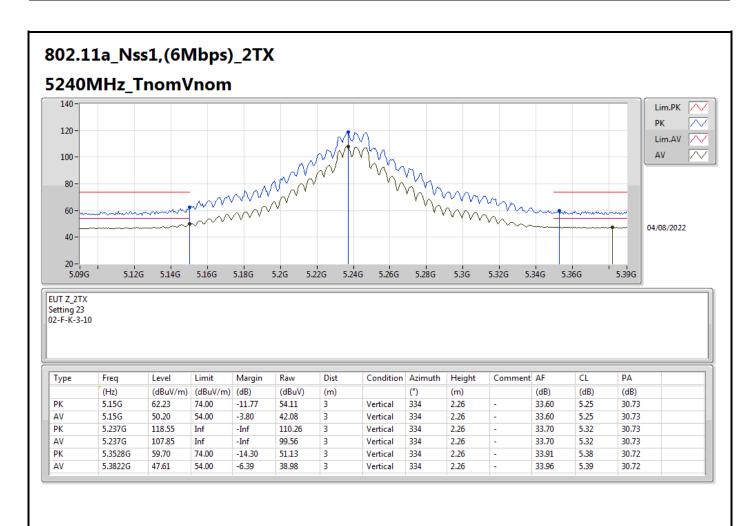
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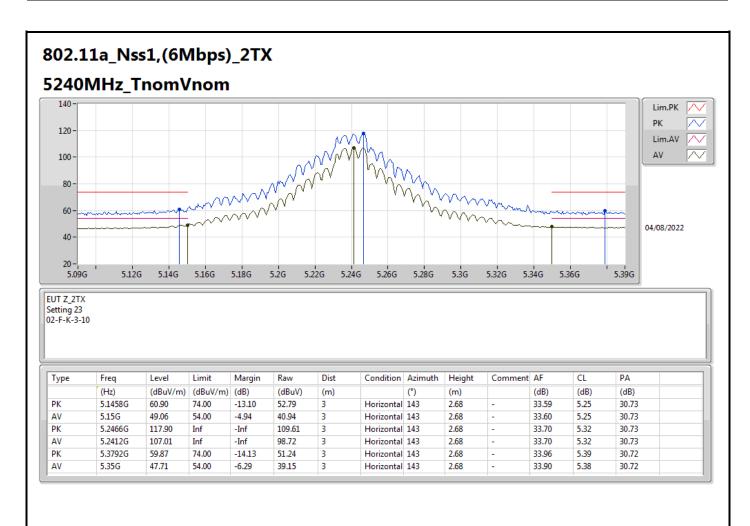
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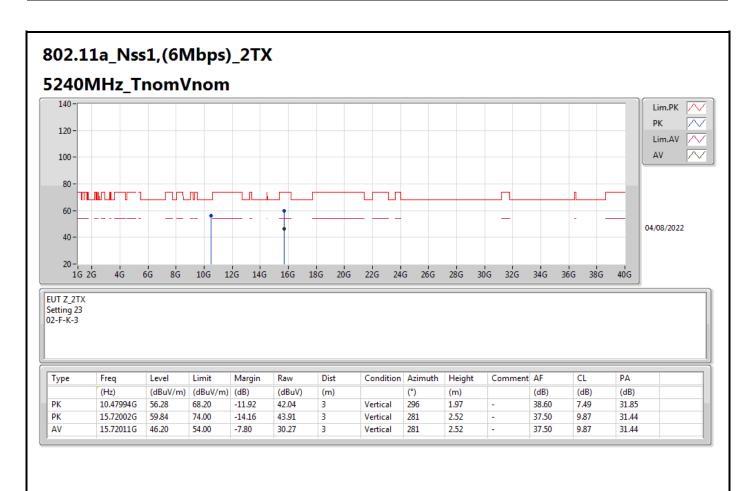
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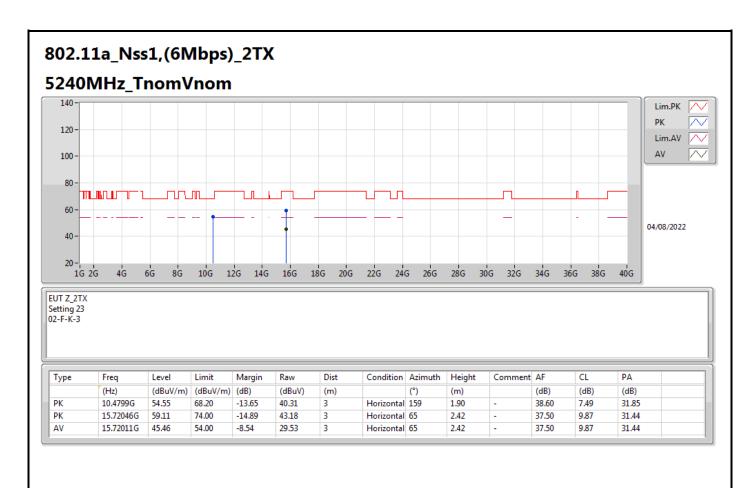
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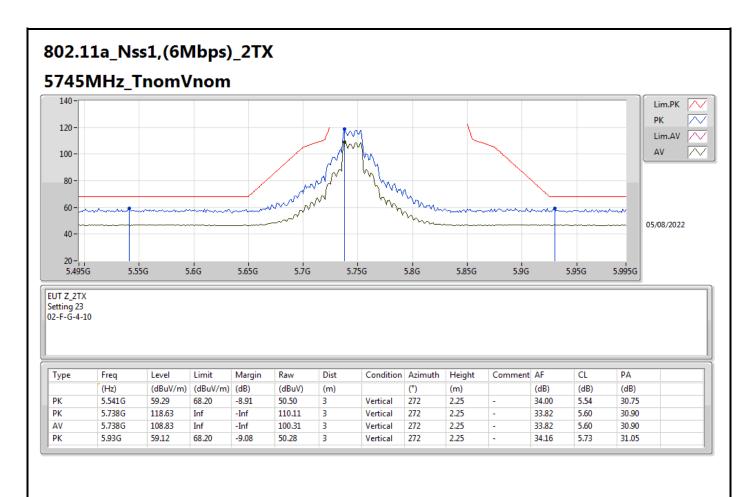
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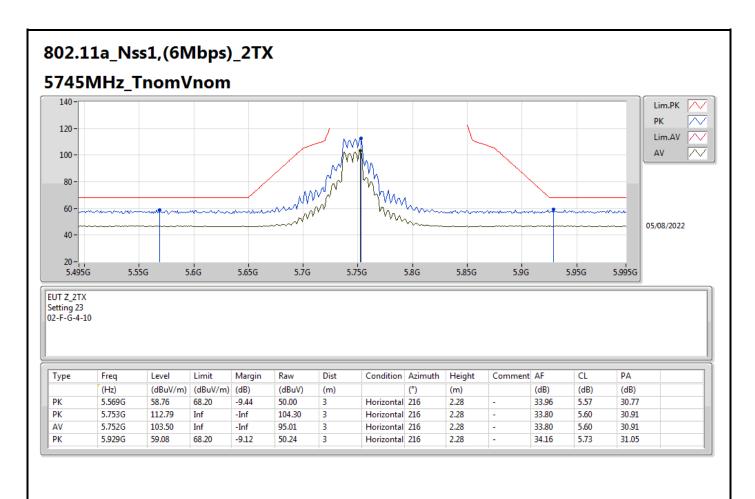
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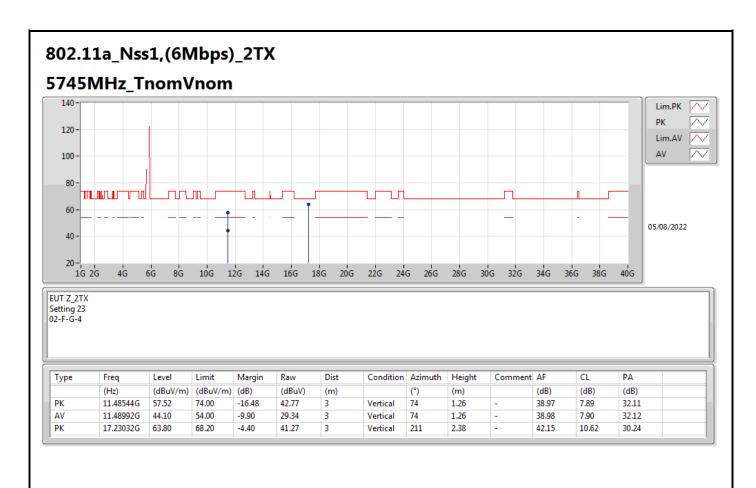
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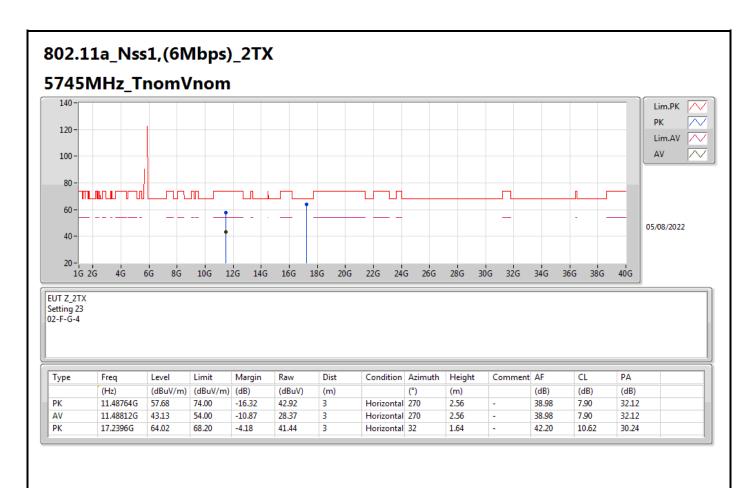
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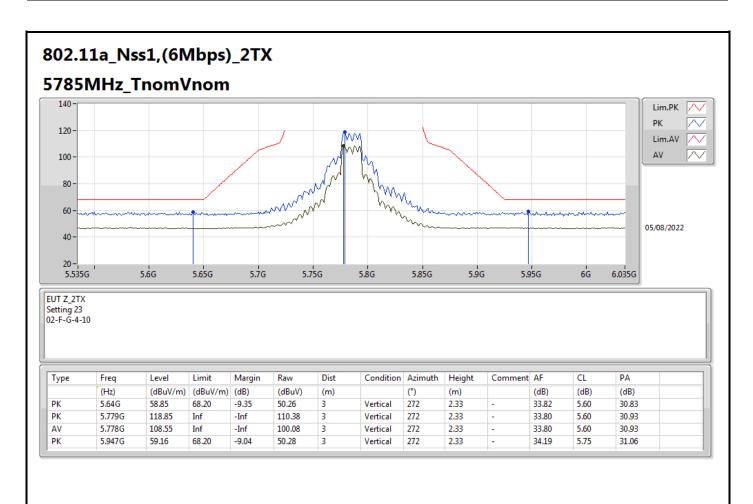
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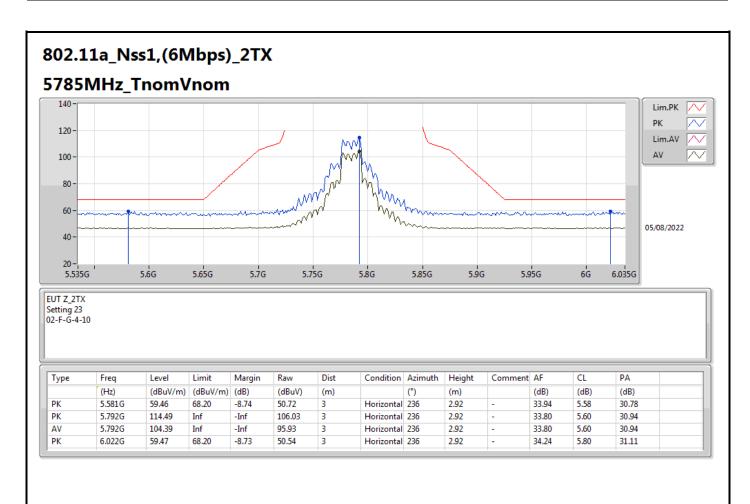
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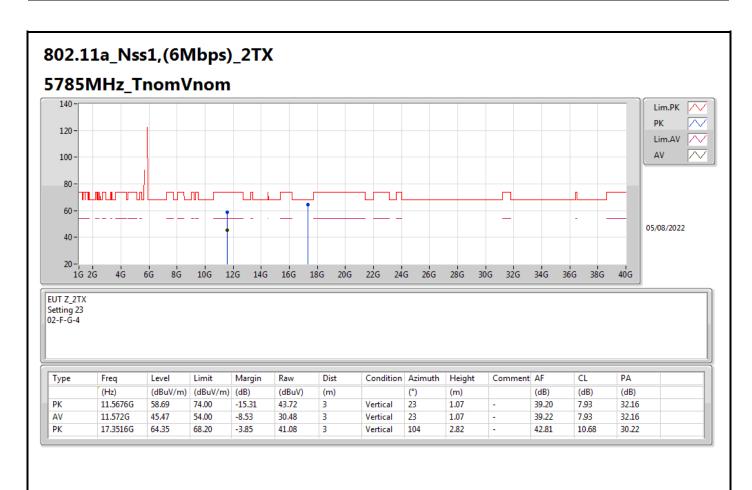
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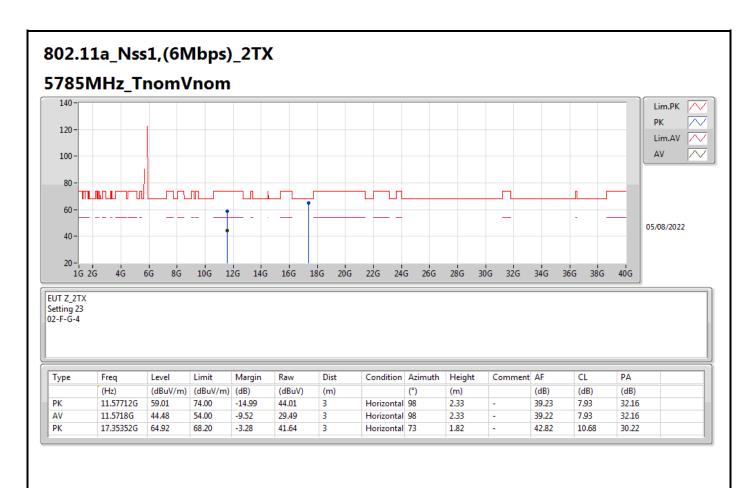
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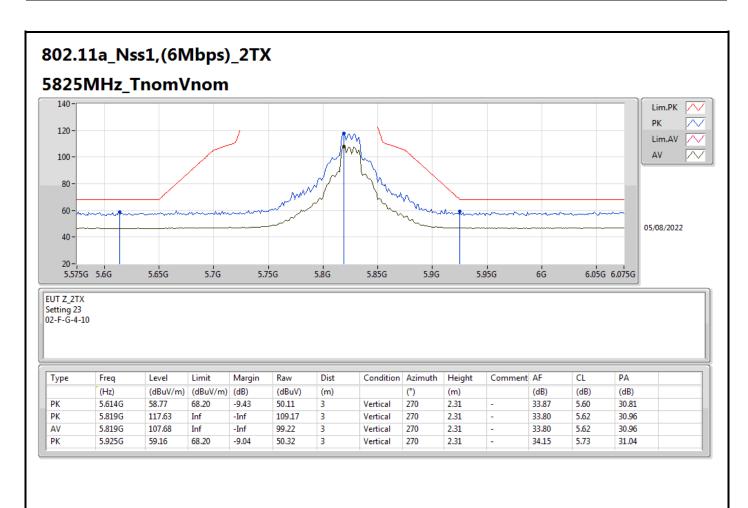
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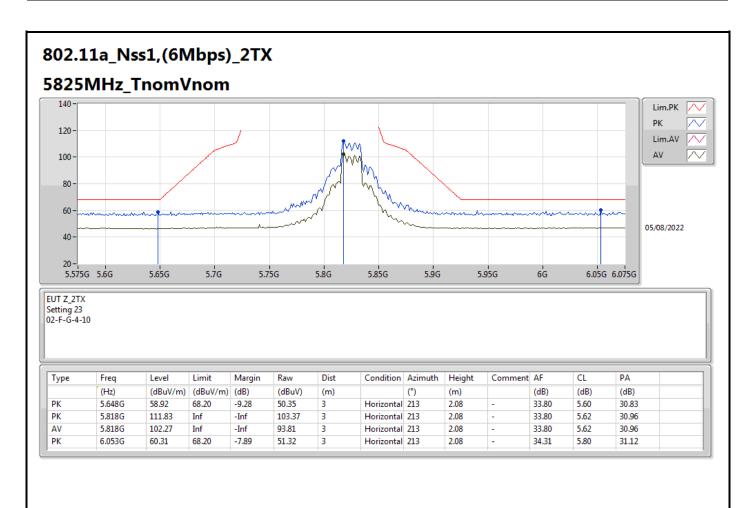
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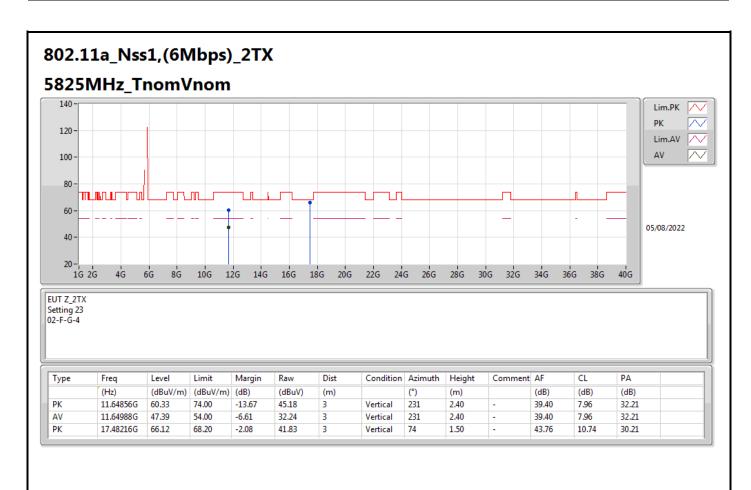
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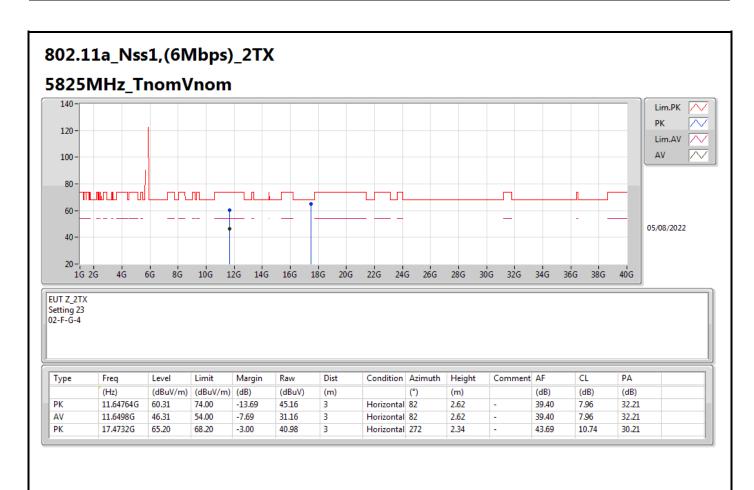
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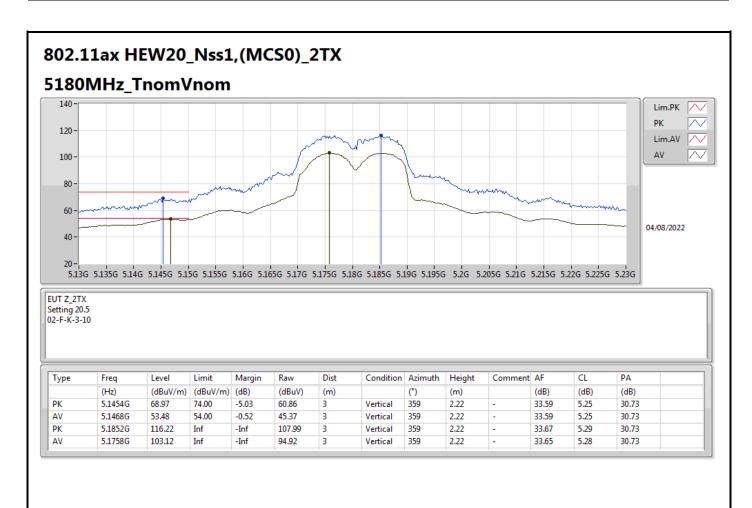
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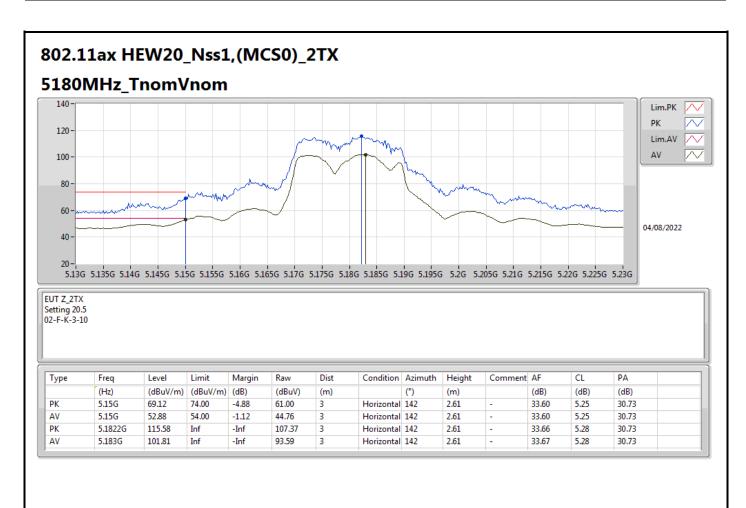
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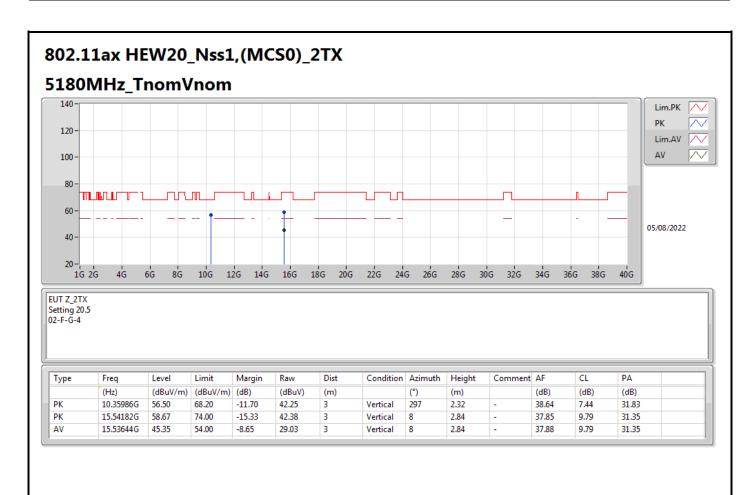
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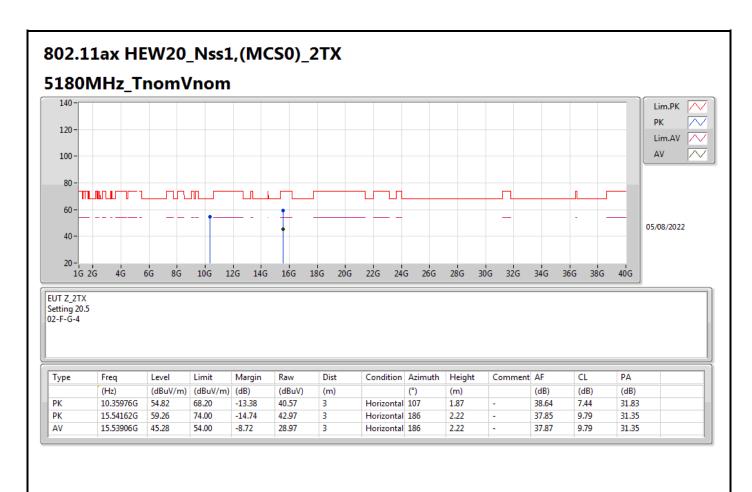
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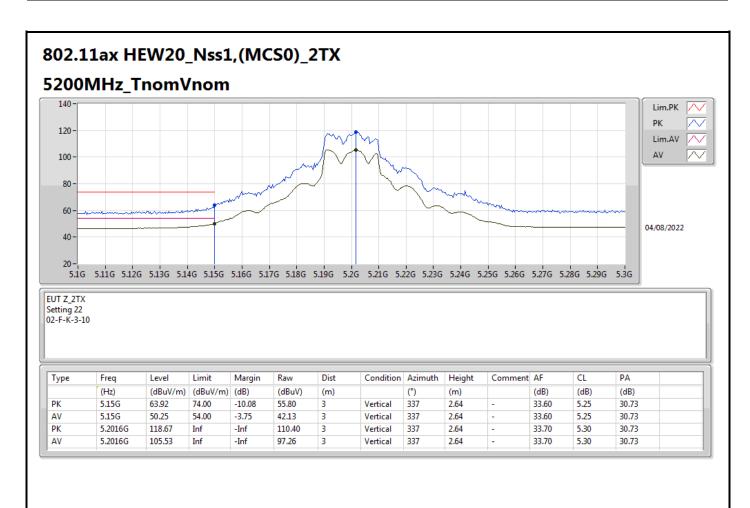
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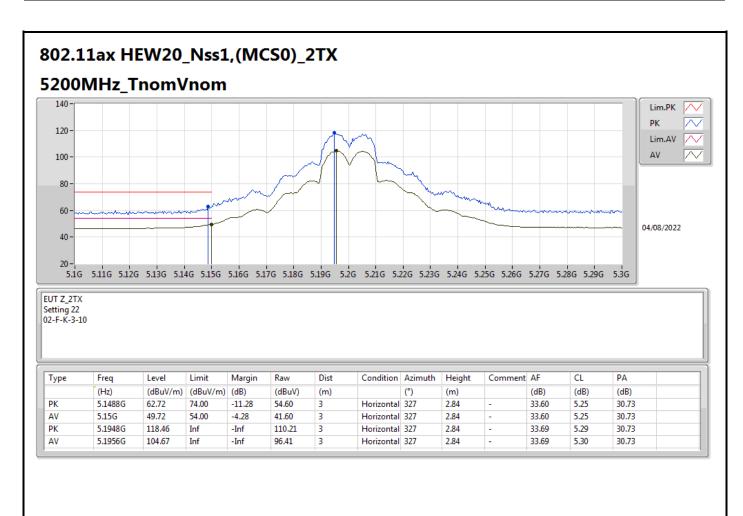
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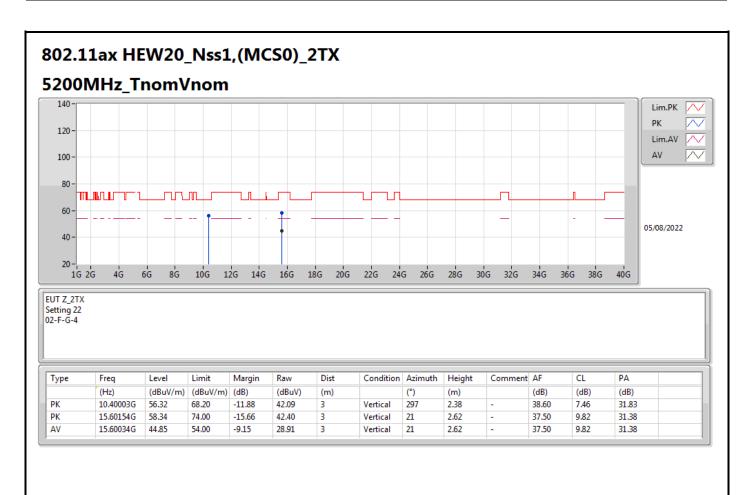
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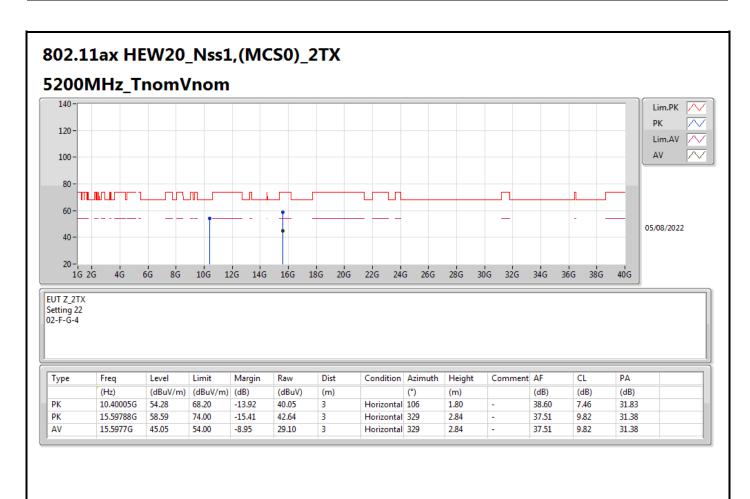
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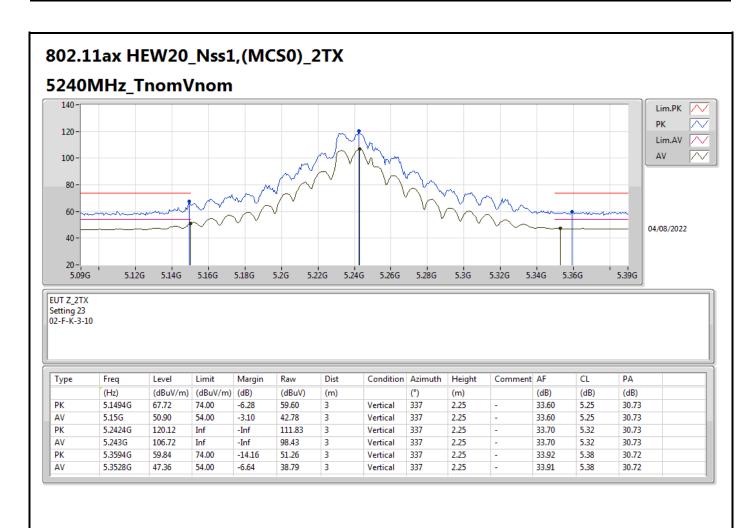
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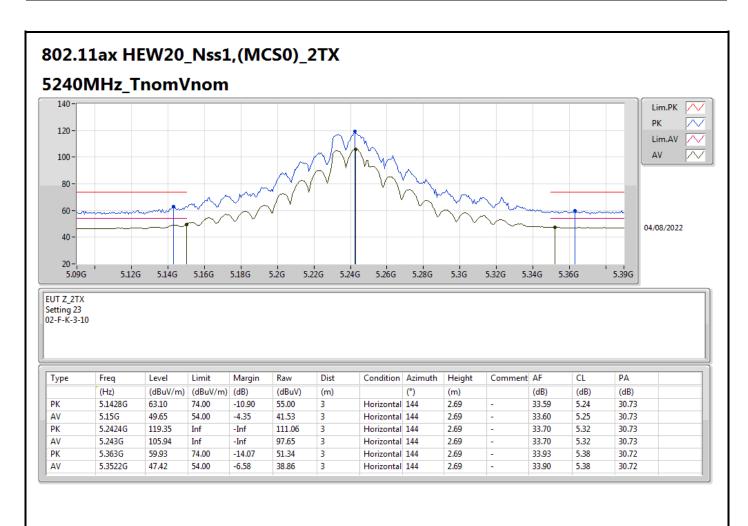
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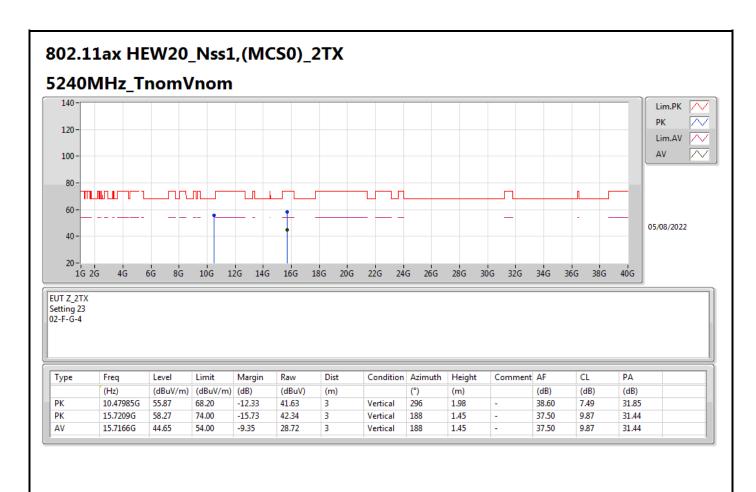
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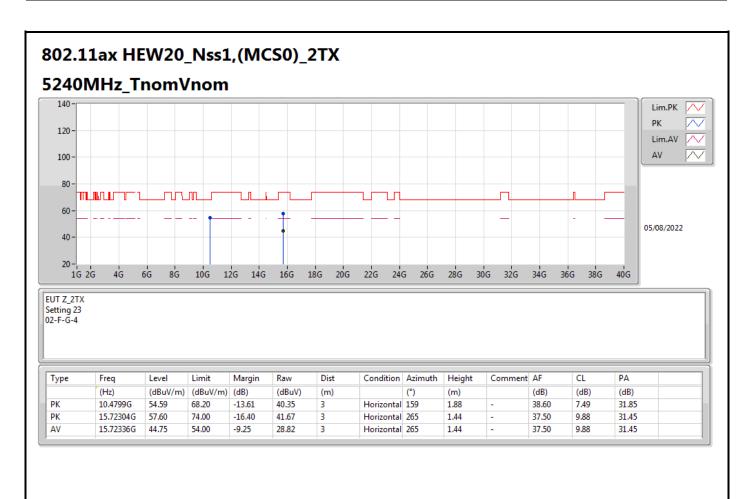
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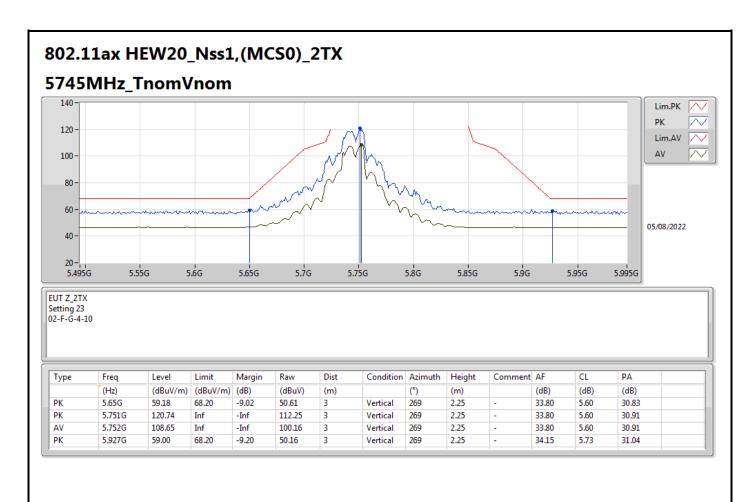
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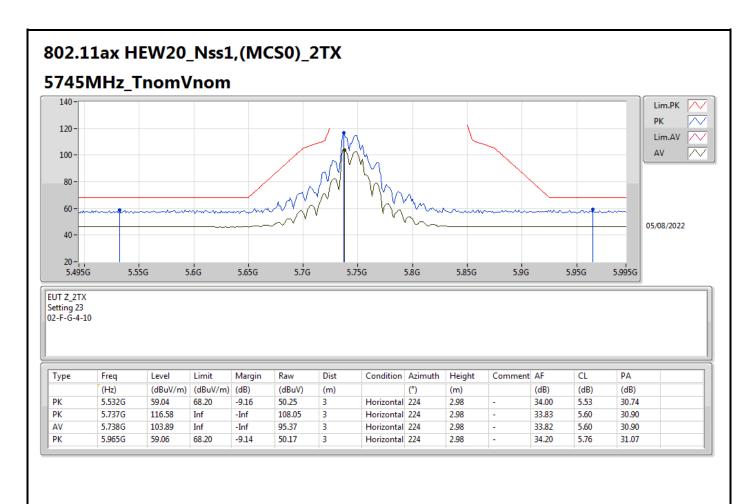
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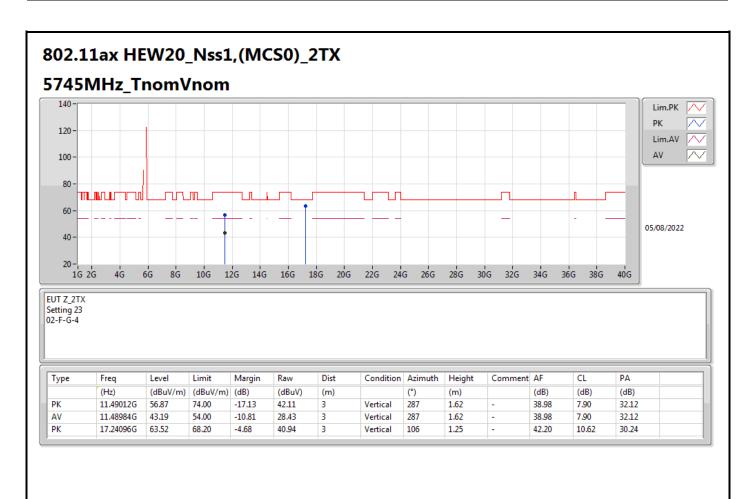
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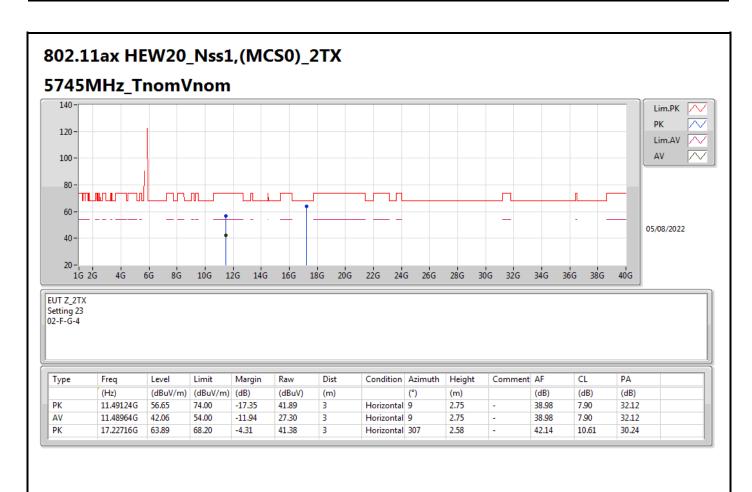
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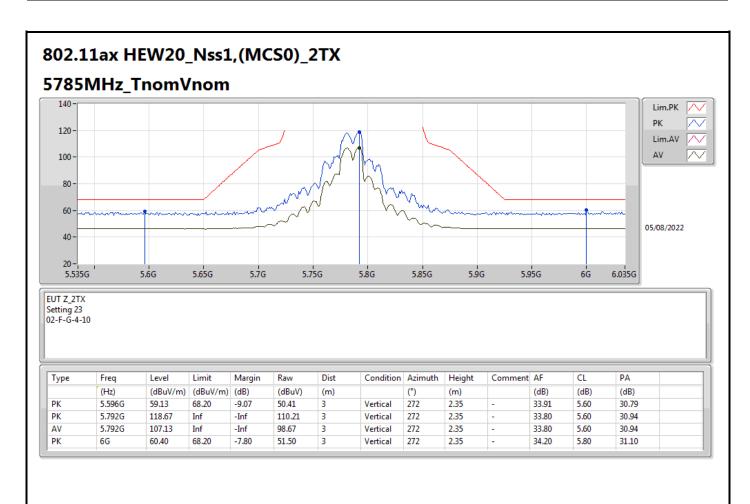
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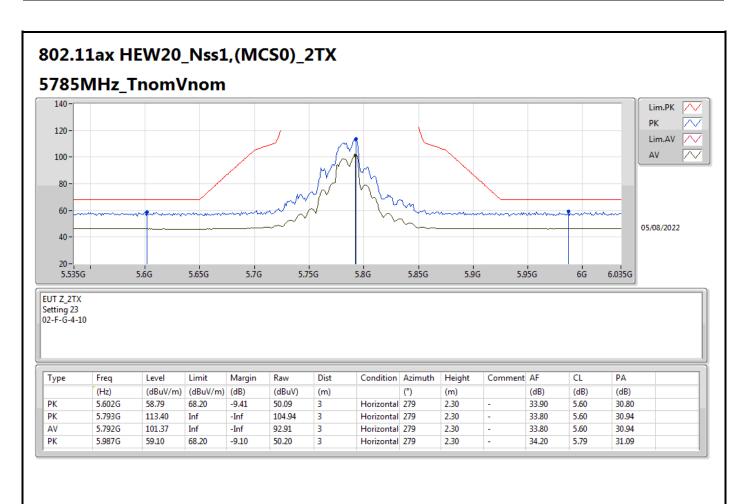
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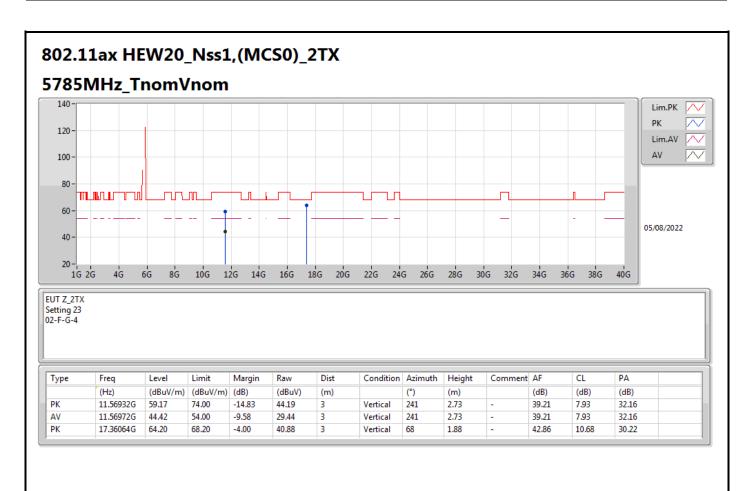
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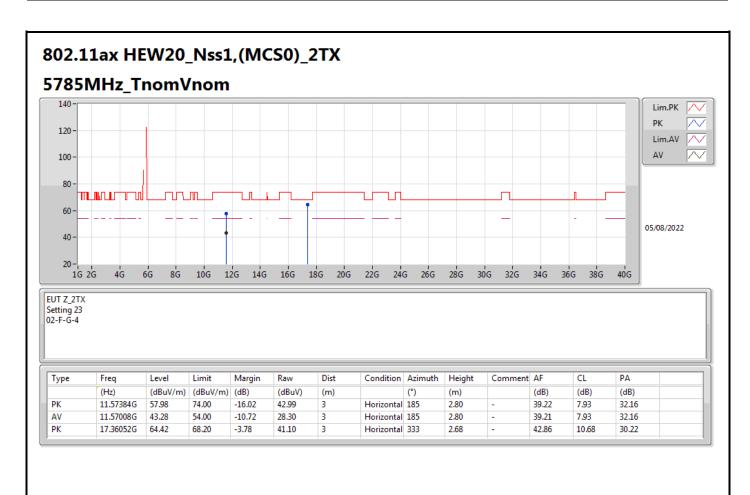
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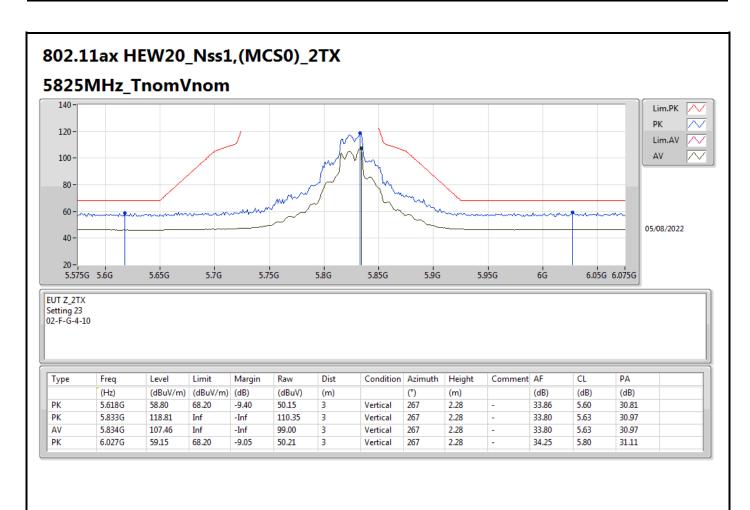
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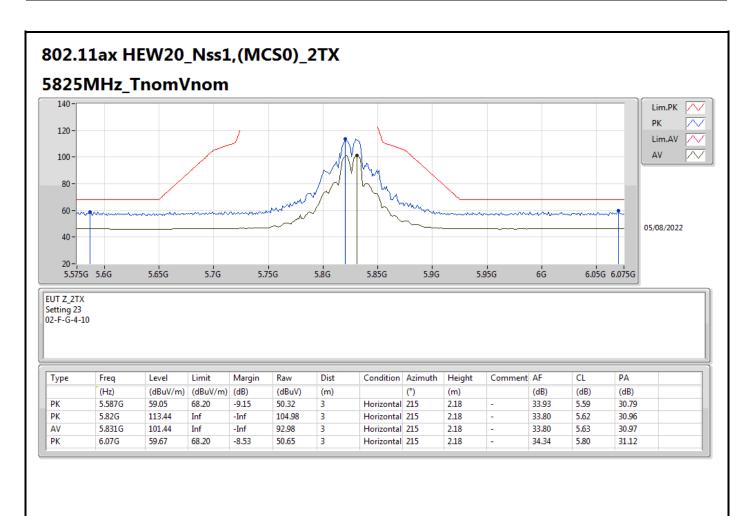
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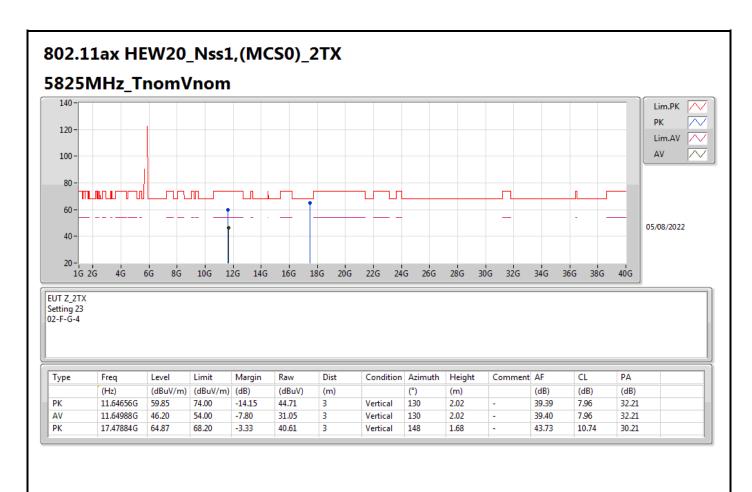
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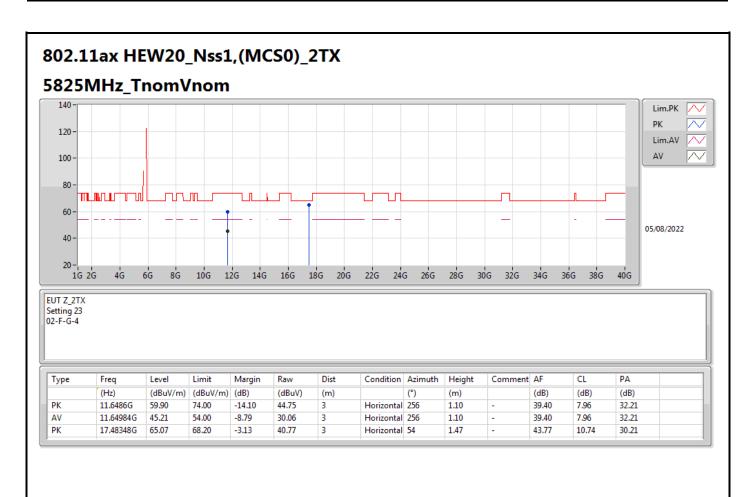
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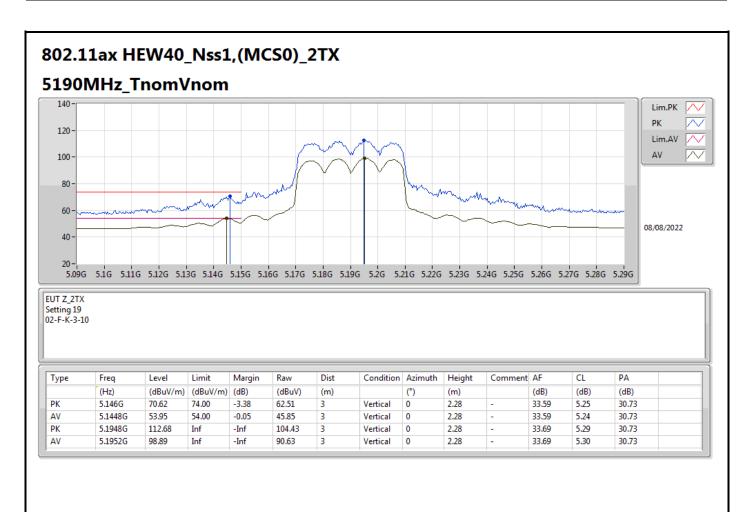
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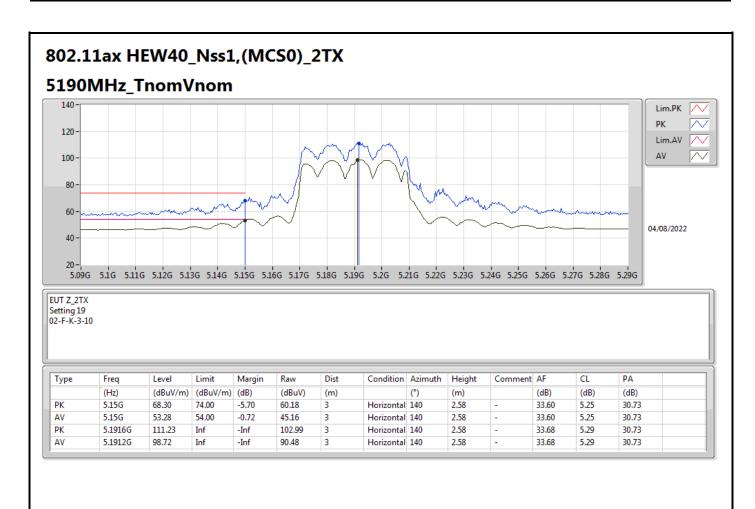
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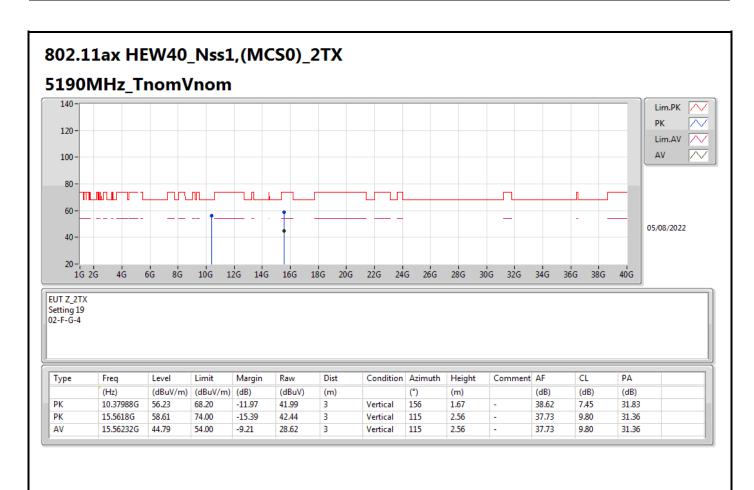
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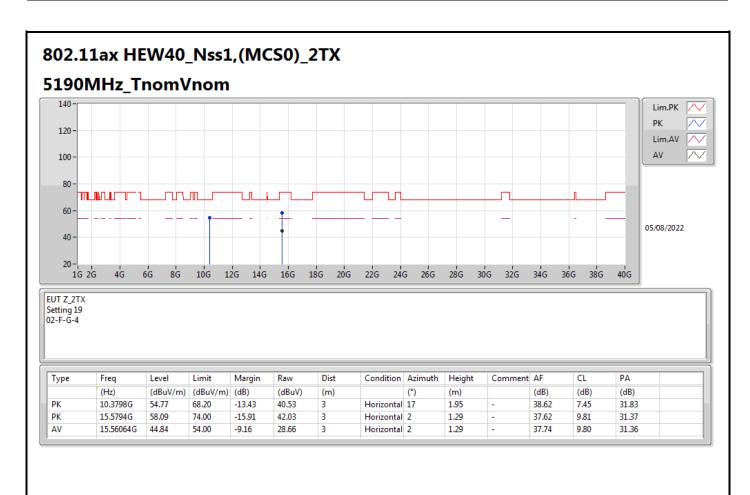
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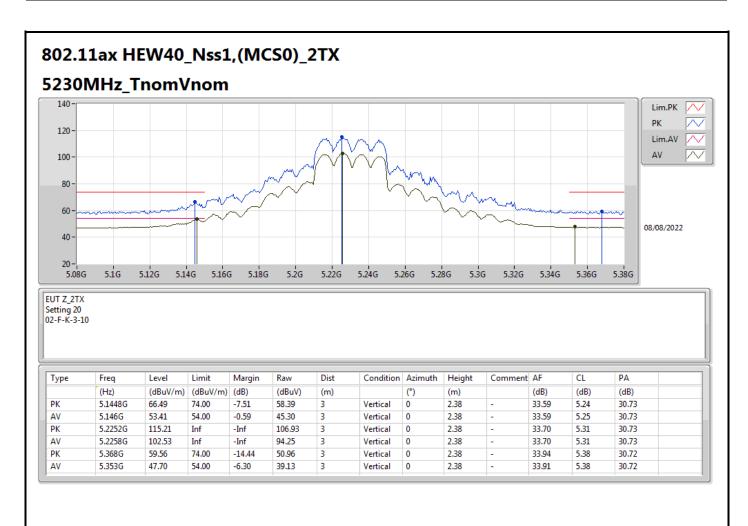
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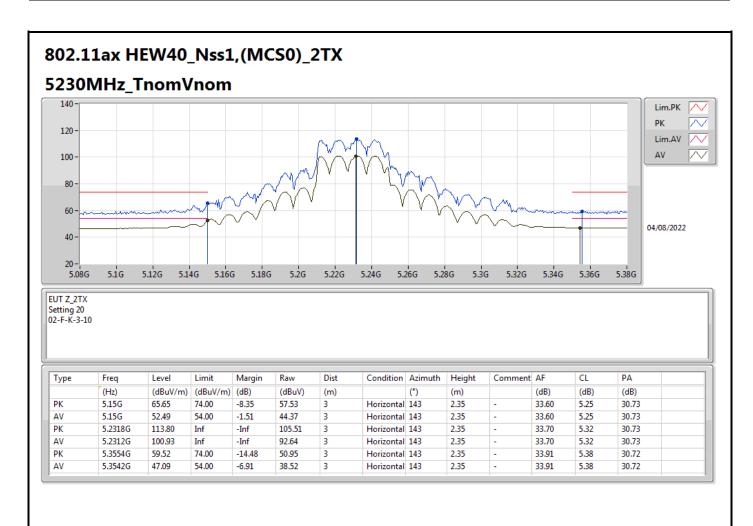
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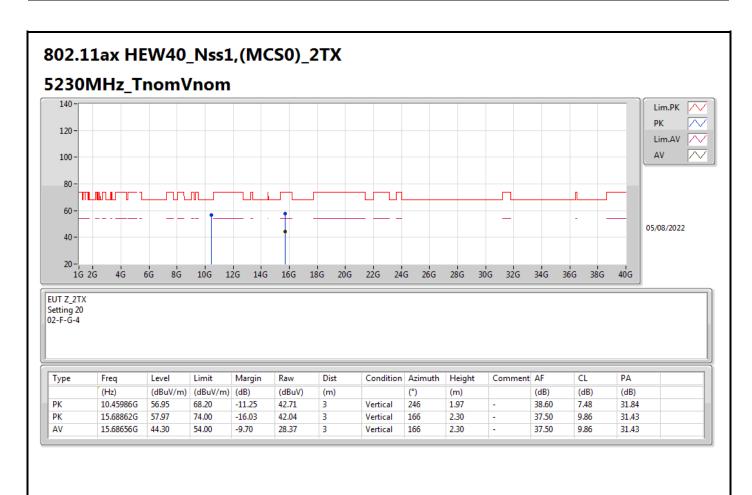
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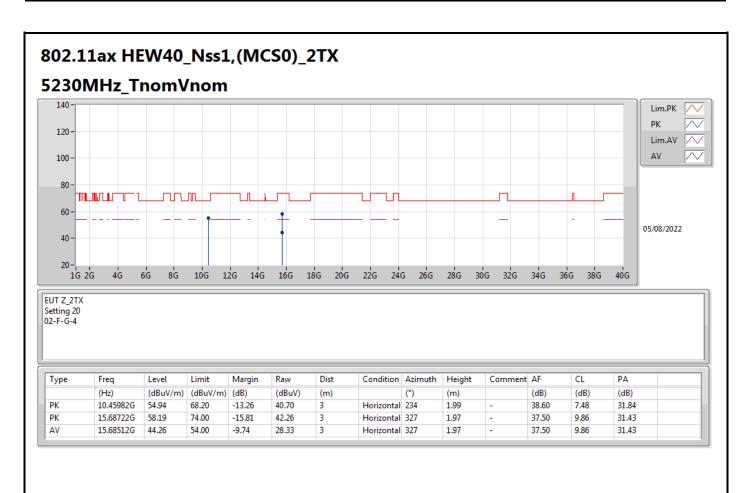
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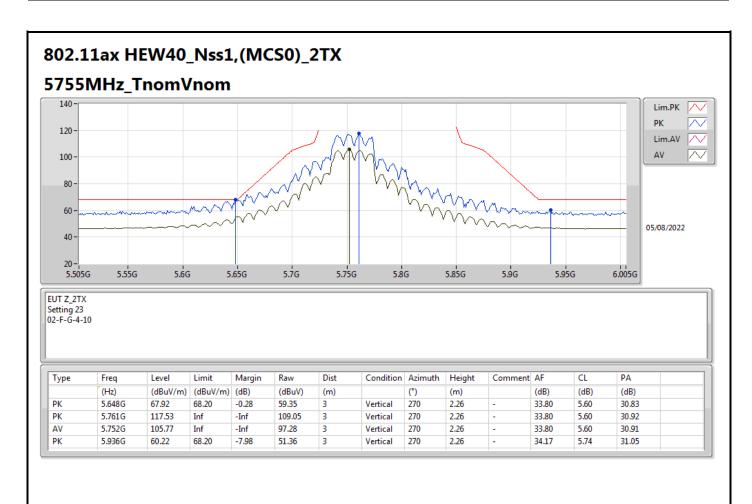
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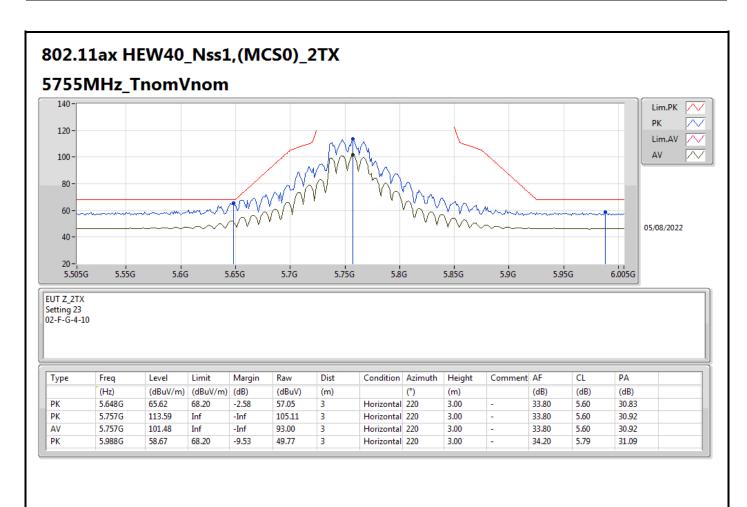
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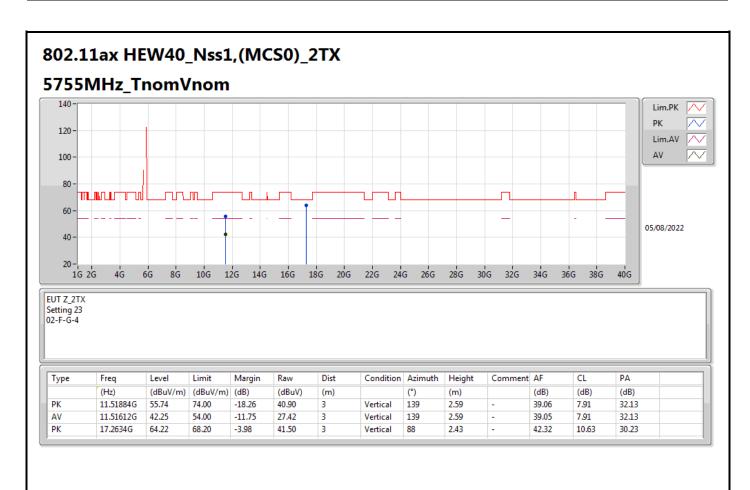
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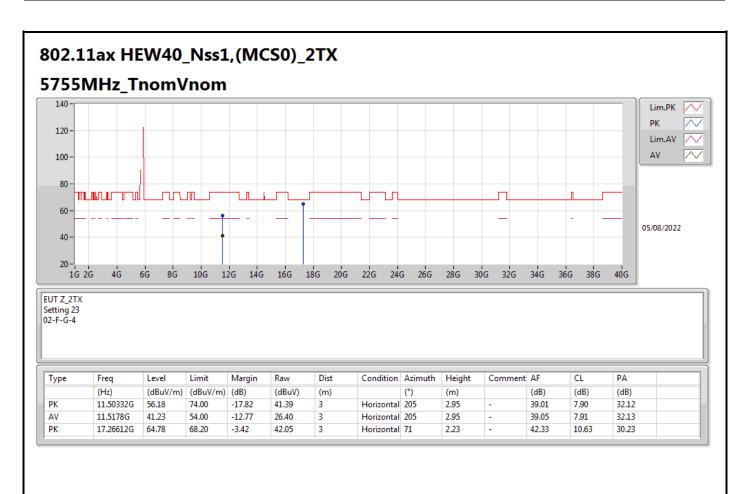
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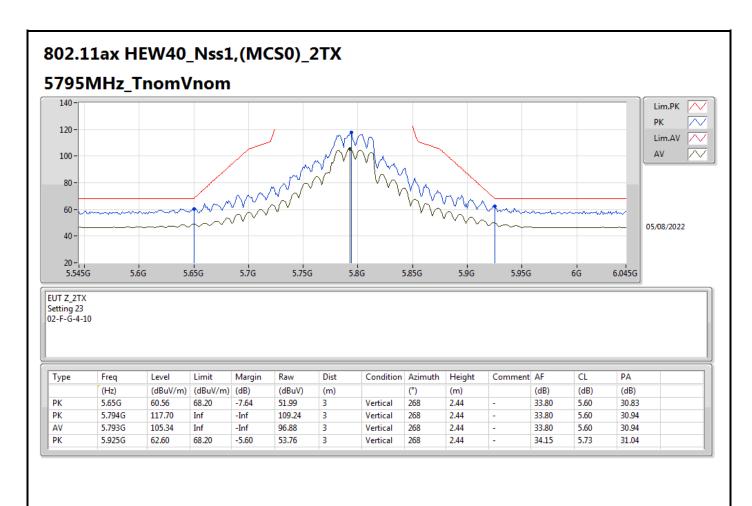
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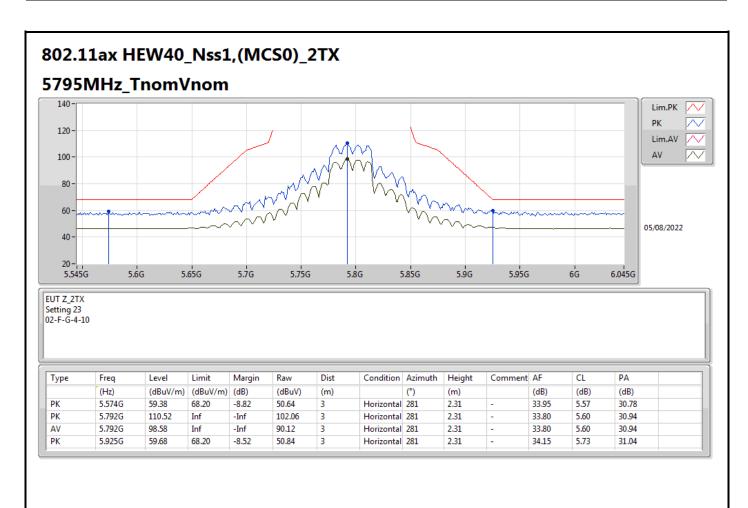
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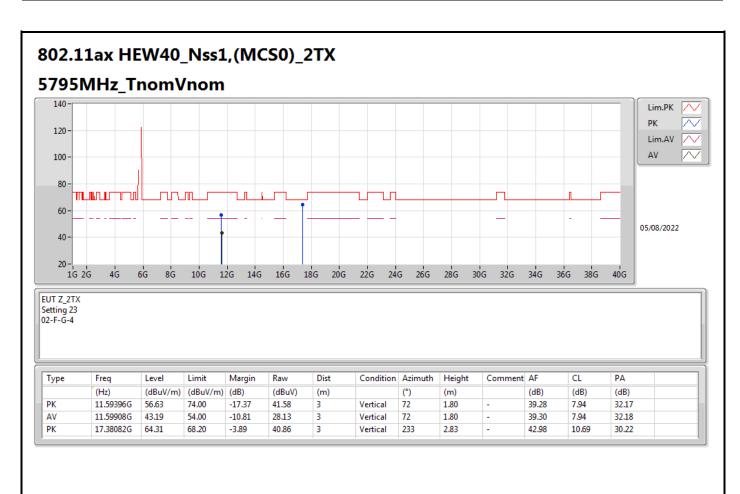
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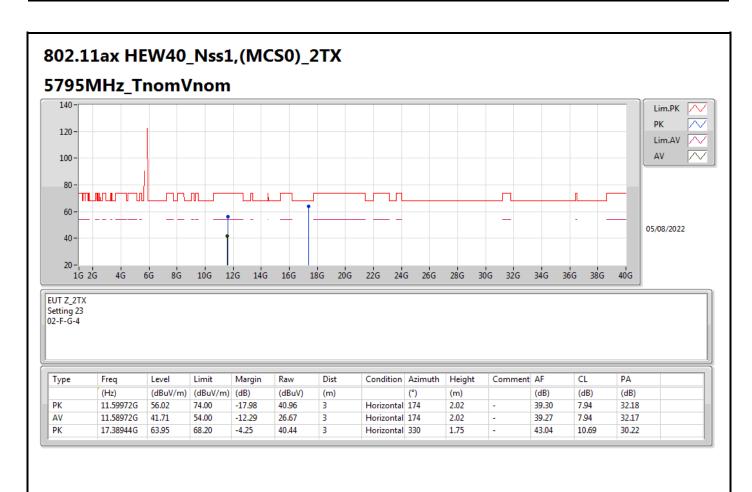
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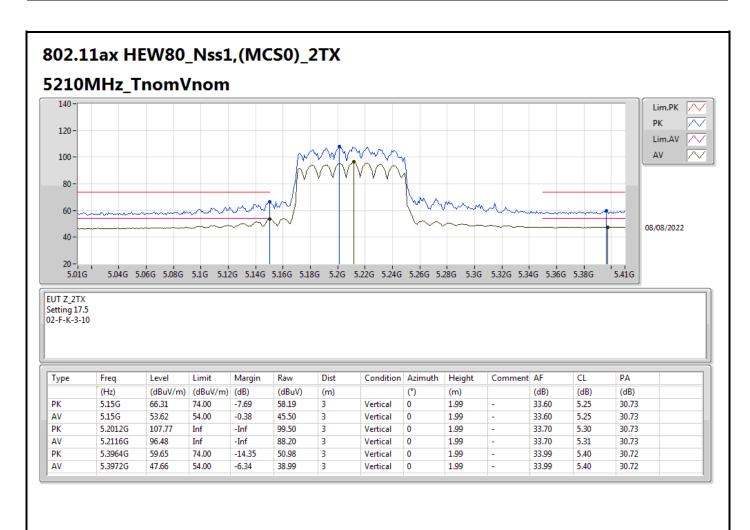
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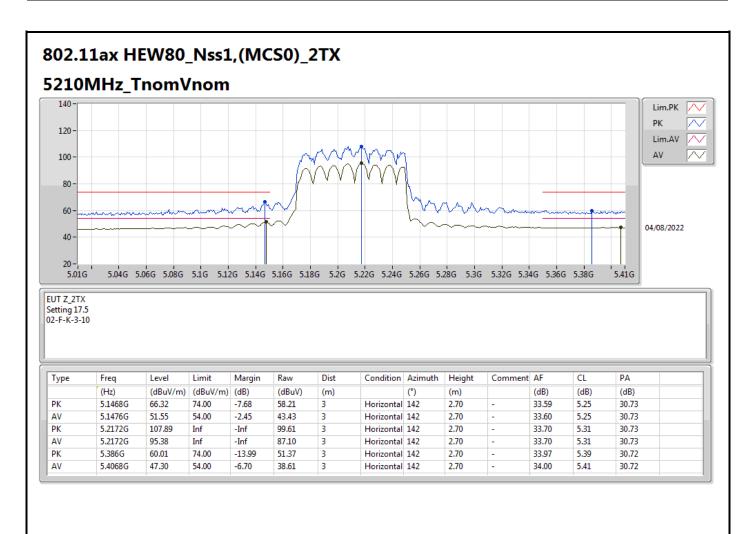
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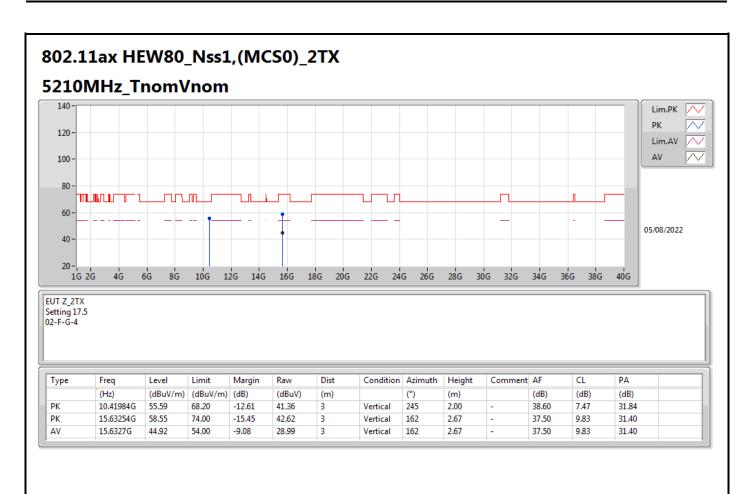
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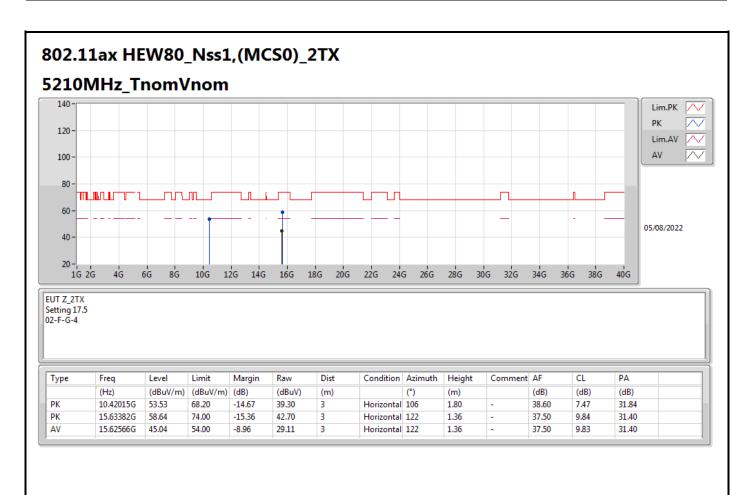
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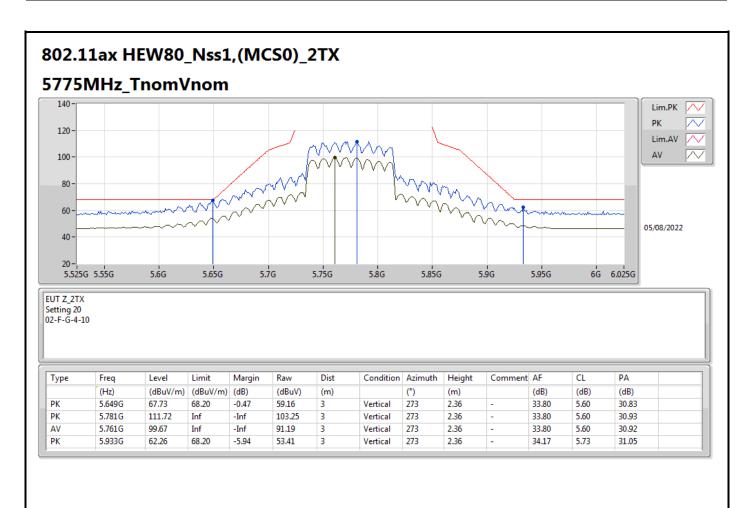
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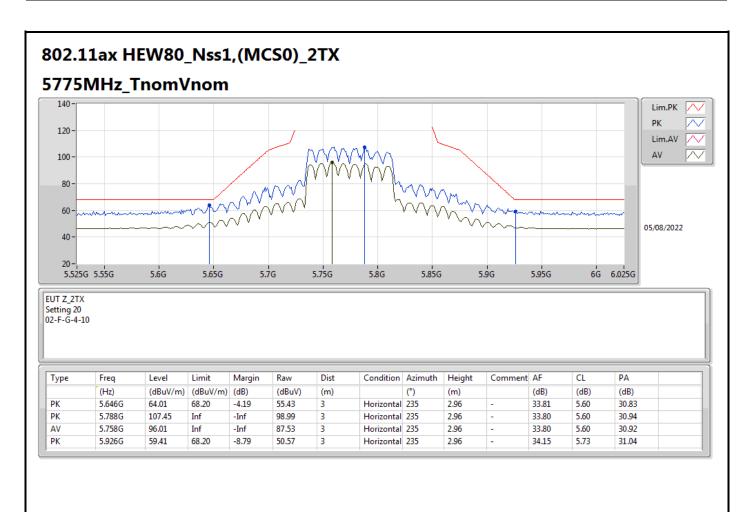
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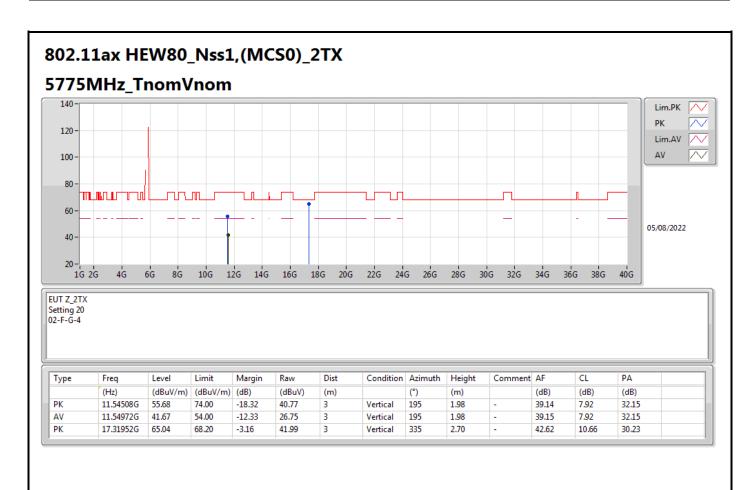
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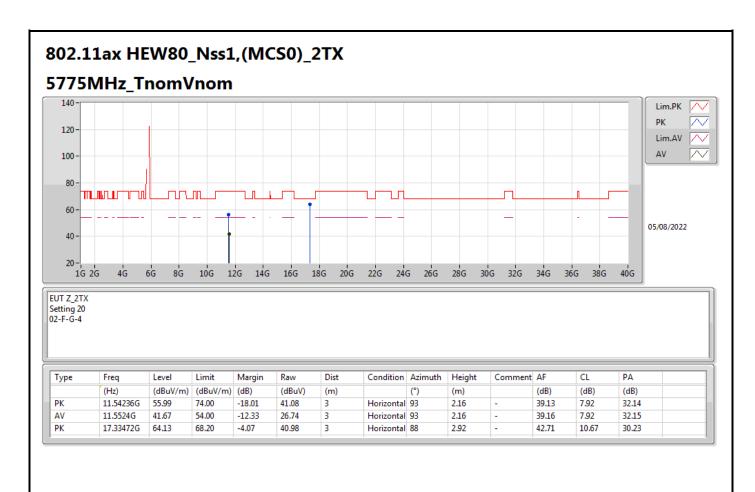
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Radiated Emission Co-location

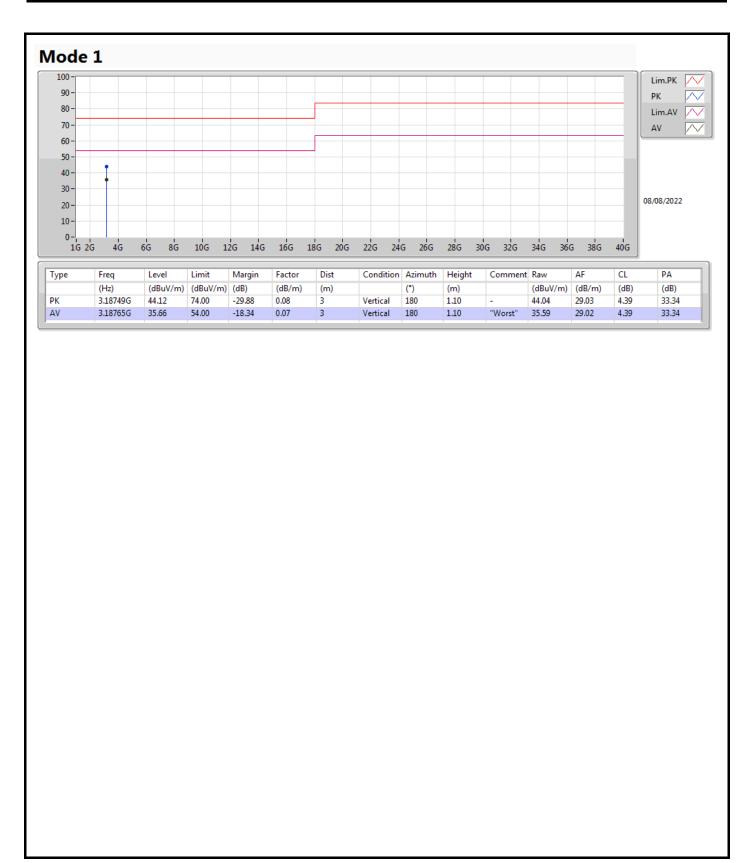
Appendix F

Summary

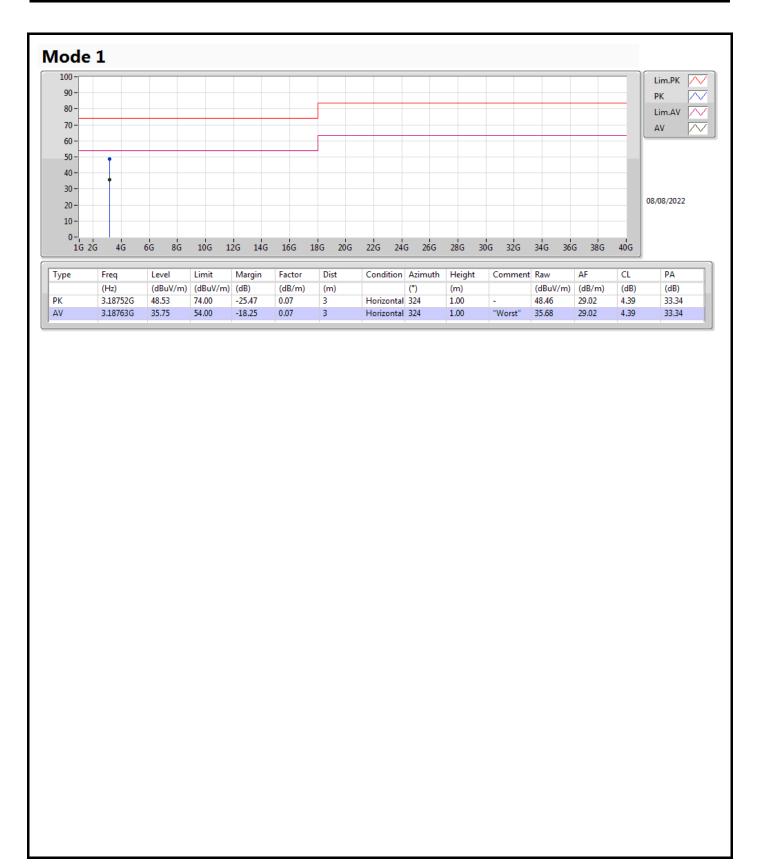
Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	
Mode 1	Pass	AV	3.18763G	35.75	54.00	-18.25	Horizontal

Sporton International Inc. Hsinchu Laboratory

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