

Report No.: FR990901AB



FCC RADIO TEST REPORT

FCC ID

: 2AOIDGRYPHON02

Equipment

: Gryphon Guardian

Brand Name

: Gryphon

Model Name

: Guardian

Applicant

: Gryphon Online Safety, Inc.

10265 Prairie Springs Road, San Diego CA 92127 USA

Manufacturer : Gryphon Online Safety, Inc.

10265 Prairie Springs Road, San Diego CA 92127 USA

Standard

: 47 CFR FCC Part 15.407

The product was received on Oct. 31, 2019, and testing was started from Nov. 01, 2019 and completed on Jan. 17, 2020. 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-A12_1 Ver1.0

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History of this test report

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FR990901AB	01	Initial issue of report	Jan. 23, 2020

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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 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:

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

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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		5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40)	5190-5230	38-46 [2]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80)	5210	42 [1]
5725-5850		5775	155 [1]

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Band	Mode	BWch (MHz)	Nant
5.15-5.25GHz	802.11a	20	2
5.15-5.25GHz	802.11n HT20	20	2
5.15-5.25GHz	802.11n HT20-BF	20	2
5.15-5.25GHz	802.11ac VHT20	20	2
5.15-5.25GHz	802.11ac VHT20-BF	20	2
5.15-5.25GHz	802.11n HT40	40	2
5.15-5.25GHz	802.11n HT40-BF	40	2
5.15-5.25GHz	802.11ac VHT40	40	2
5.15-5.25GHz	802.11ac VHT40-BF	40	2
5.15-5.25GHz	802.11ac VHT80	80	2
5.15-5.25GHz	802.11ac VHT80-BF	80	2
5.725-5.85GHz	802.11a	20	2
5.725-5.85GHz	802.11n HT20	20	2
5.725-5.85GHz	802.11n HT20-BF	20	2
5.725-5.85GHz	802.11ac VHT20	20	2
5.725-5.85GHz	802.11ac VHT20-BF	20	2
5.725-5.85GHz	802.11n HT40	40	2
5.725-5.85GHz	802.11n HT40-BF	40	2
5.725-5.85GHz	802.11ac VHT40	40	2
5.725-5.85GHz	802.11ac VHT40-BF	40	2
5.725-5.85GHz	802.11ac VHT80	80	2
5.725-5.85GHz	802.11ac VHT80-BF	80	2

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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.

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- 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.

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1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain	(dBi)
AIII.	Ant. Port Brand Woder Nar		Woder Name	Antenna Type	Connector	2.4GHz	5GHz
1	1	Gemtek	WRTQ-348ACN	PIFA Antenna	I-PEX	2.58	5.94
2	2	Gemtek	WRTQ-348ACN	PIFA Antenna	I-PEX	4.15	5.34

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Note1: The EUT has two antennas.

Note2: The above information was declared by manufacturer.

<For 2.4GHz Band>

For IEEE 802.11b/g/n/VHT 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 Band>

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

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

Port 1 and Port 2 could transmit/receive simultaneously.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	0.966	0.15	2.065m	1k
802.11ac VHT20	0.985	0.07	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ac VHT20-BF	0.926	0.33	1.762m	1k
802.11ac VHT40	0.97	0.13	2.44m	1k
802.11ac VHT40-BF	0.917	0.38	1.759m	1k
802.11ac VHT80	0.938	0.28	1.153m	1k
802.11ac VHT80-BF	0.927	0.33	1.95m	1k

Note:

DC is Duty Cycle.

DCF is Duty Cycle Factor.

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1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter				
Beamforming Function	\boxtimes	With beamforming		Without beamforming	
	For VHT in 2.4GHz and 11n/ac in 5GHz				
Function		Outdoor P2M	\boxtimes	Indoor P2M	
T dilotion		Fixed P2P		Client	
Test Software Version	Non beamforming mode: QRCT: v3.0.298.0 & Beamforming mode: teraterm.exe				

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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
- 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	Eddie Weng	23.4~24.9°C / 54~59%	Nov. 05, 2019~Nov. 06, 2019
Radiated below 1GHz	03CH03-CB	KJ Chang	22.4~23.4°C / 57~61%	Jan. 17, 2020
Radiated above 1GHz	03CH05-CB	Justin Lin	22.8~24.1°C / 54~58%	Nov. 01, 2019~Nov. 06, 2019
AC Conduction	CO02-CB	Rick Yeh	20~21°C / 50~51%	Dec. 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%

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2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	PowerSetting
802.11a_Nss1,(6Mbps)_2TX	-
5180MHz	21.5
5200MHz	26
5240MHz	22.5
5745MHz	22
5785MHz	26
5825MHz	26
802.11ac VHT20_Nss1,(MCS0)_2TX	-
5180MHz	21.5
5200MHz	26
5240MHz	22
5745MHz	26
5785MHz	26
5825MHz	26
802.11ac VHT40_Nss1,(MCS0)_2TX	-
5190MHz	17.5
5230MHz	21.5
5755MHz	22
5795MHz	26
802.11ac VHT80_Nss1,(MCS0)_2TX	-
5210MHz	16
5775MHz	21
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-
5180MHz	26
5200MHz	26
5240MHz	26
5745MHz	26
5785MHz	26
5825MHz	26
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-
5190MHz	20.5
5230MHz	26
5755MHz	26
5795MHz	26
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-
5210MHz	20.5

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Mode	PowerSetting
5775MHz	26

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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.
- There are two modes of EUT for VHT in 2.4GHz and 11n/ac in 5GHz. One is beamforming mode, and the other is non-beamforming mode. Both modes have been tested and recorded in this test report.

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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	Condition AC power-line conducted measurement for line and neutral	
Operating Mode Normal Link		
1	EUT + Adapter (Mesh Mode)	

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The Worst Case Mode for Following Conformance Tests		
Tests Item	Emission Bandwidth Maximum Conducted Output Power Peak 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 + Adapter (Mesh Mode)		
Operating Mode > 1GHz	CTX		

The Worst Case Mode for Following Conformance Tests		
Tests Item Simultaneous Transmission Analysis - Radiated Emission Co-location		
Test Condition Radiated measurement		
Operating Mode Normal Link		
1 WLAN 2.4GHz + WLAN 5GHz		
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 WLAN 2.4GHz + WLAN 5GHz		
Refer to Sporton Test Report No.: FA990901 for Co-location RF Exposure Evaluation.		

Note: The EUT supports AP Router and Mesh mode, after evaluating, only Mesh mode was tested and recorded in this test report.

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2.3 EUT Operation during Test

For CTX Mode:

non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

beamforming mode:

During the test, the following programs under WIN 7 were executed.

The program was executed as follows:

- 1. During the test, the EUT operation to normal function.
- 2. Executed command fixed test channel under telnet.
- 3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by RX Device and transmit duty cycle no less than 98%.

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For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

Accessories				
Equipment Name	Brand Holder	Model Name	Rating	
AC Adapter	CHENZHOU FRECOM ELECTRONICS CO.,LTD.	F12L33-120100SPAU	INPUT: 100-240V, 50/60Hz, 0.3A OUTPUT: 12V, 1A	
Other				
RJ-45 cable*1: Non-Shielded, 1m				

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Support Equipment 2.5

For AC Conduction:

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	LAN NB	DELL	E6430	N/A	
В	2.4G NB	DELL	E6430	N/A	
С	5G NB	DELL	E6430	N/A	
D	AP Router	ASUS	RP-N53	N/A	
Е	AP Router NB	DELL	E6430	N/A	

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For Radiated (below 1GHz):

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	NB	DELL	E4300	N/A	
В	NB	DELL	E4300	N/A	
С	Phone	HTC	One X9	N/A	
D	NB	Apple	Mac Book	N/A	
Е	WLAN AP	D-LINK	DIR860L	N/A	

For Radiated (above 1GHz) and RF Conducted: For non-beamforming mode

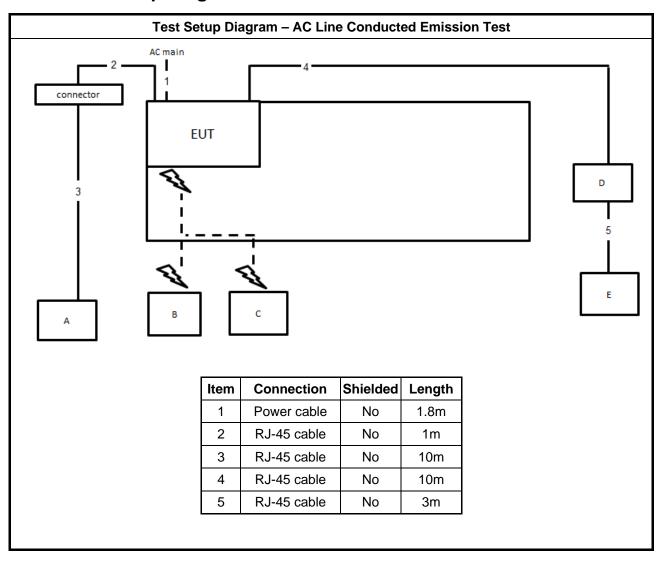
	Support Equipment				
No.	No. Equipment Brand Name Model Name FCC ID				
Α	NB	DELL	E4300	N/A	

For beamforming mode

	Support Equipment				
No.	No. Equipment Brand Name Model Name FCC ID				
Α	NB	DELL	E4300	N/A	
В	RX Device	Gryphon	Guardian	2AOIDGRYPHON02	
С	NB	DELL	E4300	N/A	

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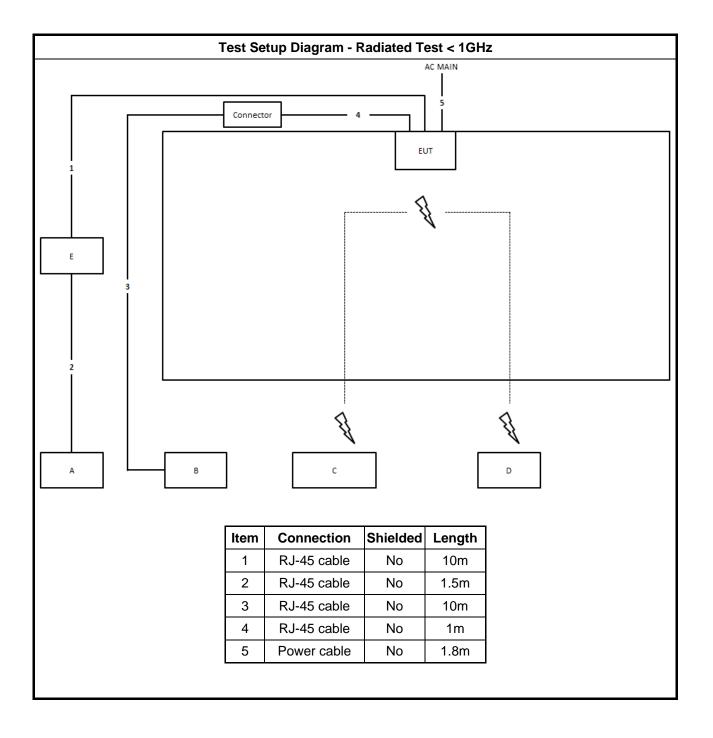
2.6 Test Setup Diagram



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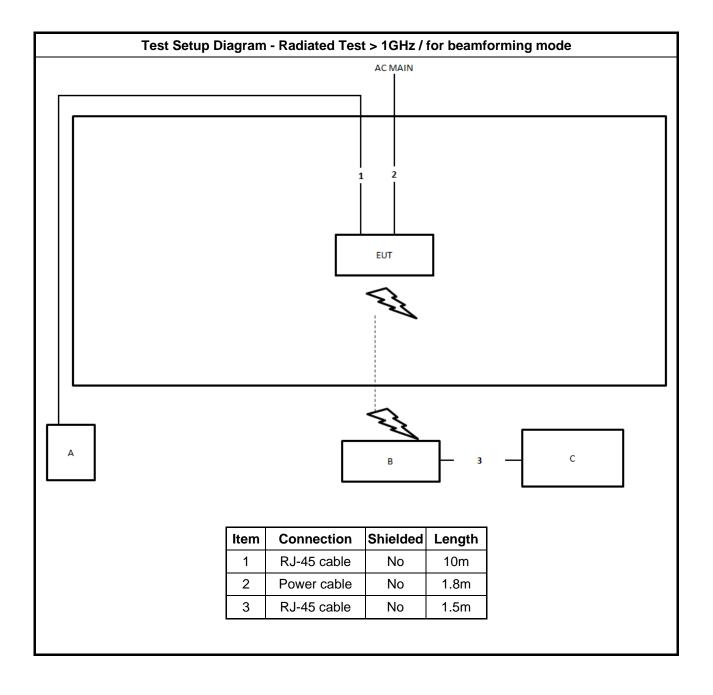
Test Setup Diagram - Radiated Test > 1GHz / for non-beamforming mode

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Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Power cable	No	1.8m

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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

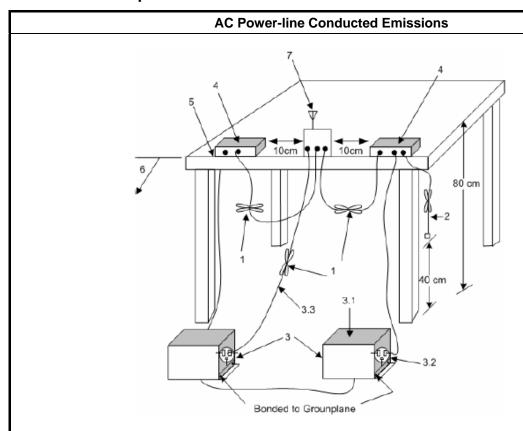
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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

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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 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					
UN	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, 6 dB emission bandwidth ≥ 500kHz.					
LE-	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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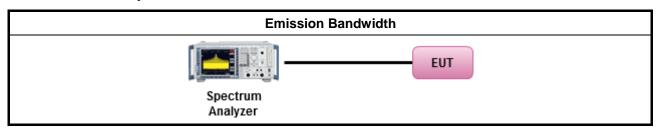
3.2.2 Measuring Instruments

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:						
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

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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.						

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3.3.2 Measuring Instruments

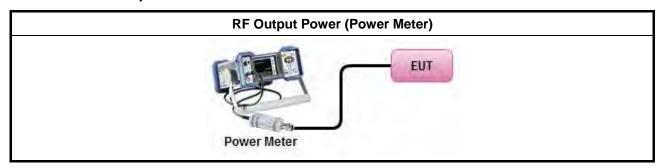
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

	Test Method						
•	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 						

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3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

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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) \leq 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	PPSD = peak power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz G_{Tx} = the maximum transmitting antenna directional gain in dBi.					

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3.4.2 Measuring Instruments

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

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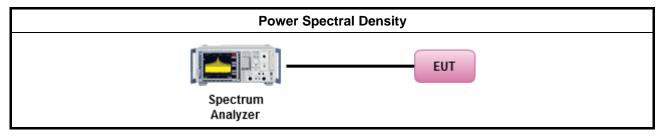
3.4.3 Test Procedures

		Test Method							
•	outp func	k power spectral density procedures that the same method as used to determine the conducted out 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 I 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	y 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							

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3.4.4 Test Setup



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3.4.5 Test Result of Peak Power Spectral Density

Refer as Appendix D

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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 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

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

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3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

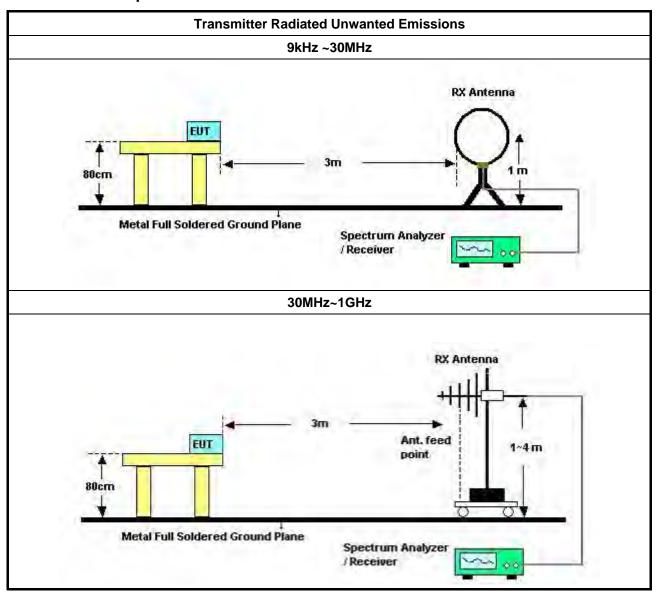
Test Method

- 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.

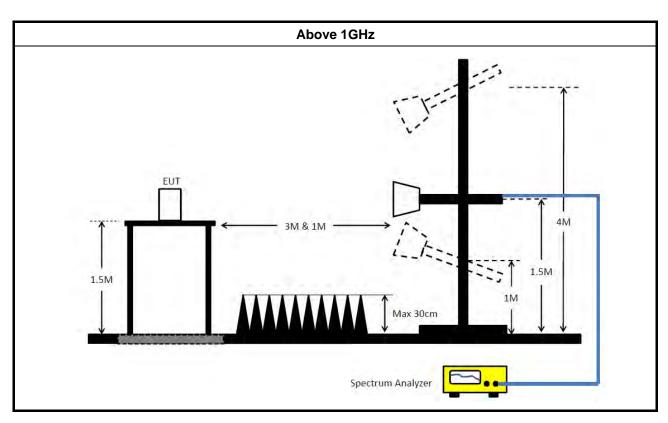
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3.5.4 Test Setup



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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

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4 Test Equipment and Calibration Data

					Calibration	Calibration	
Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Date	Due Date	Remark
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 21, 2019	Nov. 20, 2020	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Oct. 30, 2019	Oct. 29, 2020	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 16, 2019	Jan. 15, 2020	Conduction (CO02-CB)
COND Cable	Woken	Cable	2	0.15MHz ~ 30MHz	Oct. 21, 2019	Oct. 20, 2020	Conduction (CO02-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO02-CB)
Bilog Antenna with 6dB Attenuator	Schaffner & EMCI	CBL6112 & N-6-06	2888 & AT-N0611	30MHz ~ 1GHz	Oct. 12, 2019	Oct. 11, 2020	Radiation (03CH03-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 2020	Radiation (03CH03-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 01, 2019	Apr. 30, 2020	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 19, 2019	Jun. 18, 2020	Radiation (03CH03-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH03-CB)
RF Cable-low	Woken	RG402	Low Cable-02+27	25MHz ~ 1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH03-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1291	1GHz~18GHz	Oct. 05, 2019	Oct. 04, 2020	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 12, 2019	Jun. 11, 2020	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC12630SE	980287	1GHz – 26.5GHz	Apr. 16, 2019	Apr. 15, 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)
RF Cable-high	Woken	RG402	High Cable-28	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+28	1GHz~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)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	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)

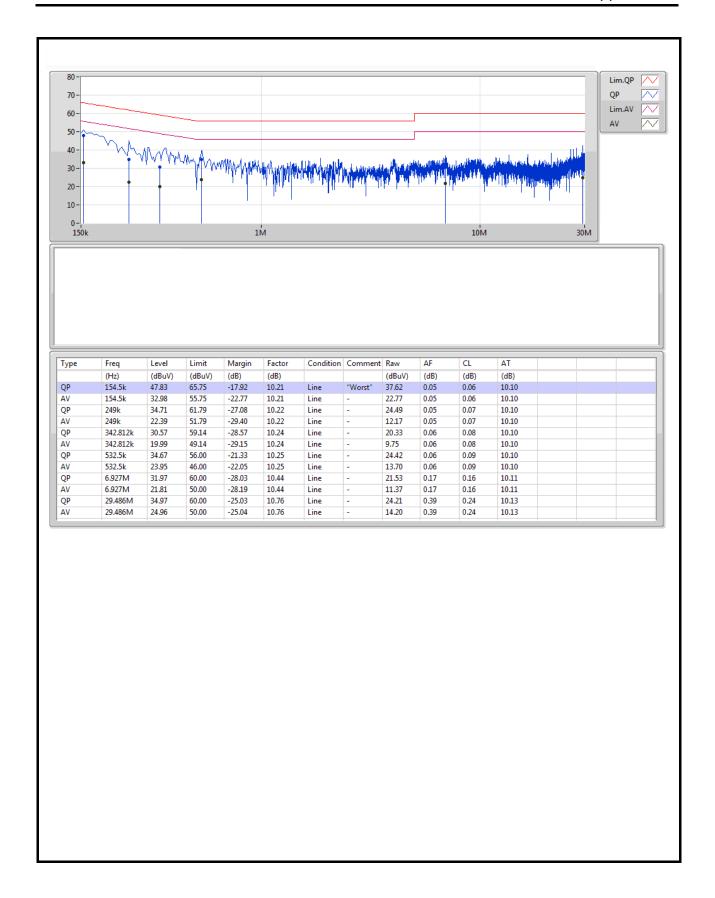
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Note: Calibration Interval of instruments listed above is one year.

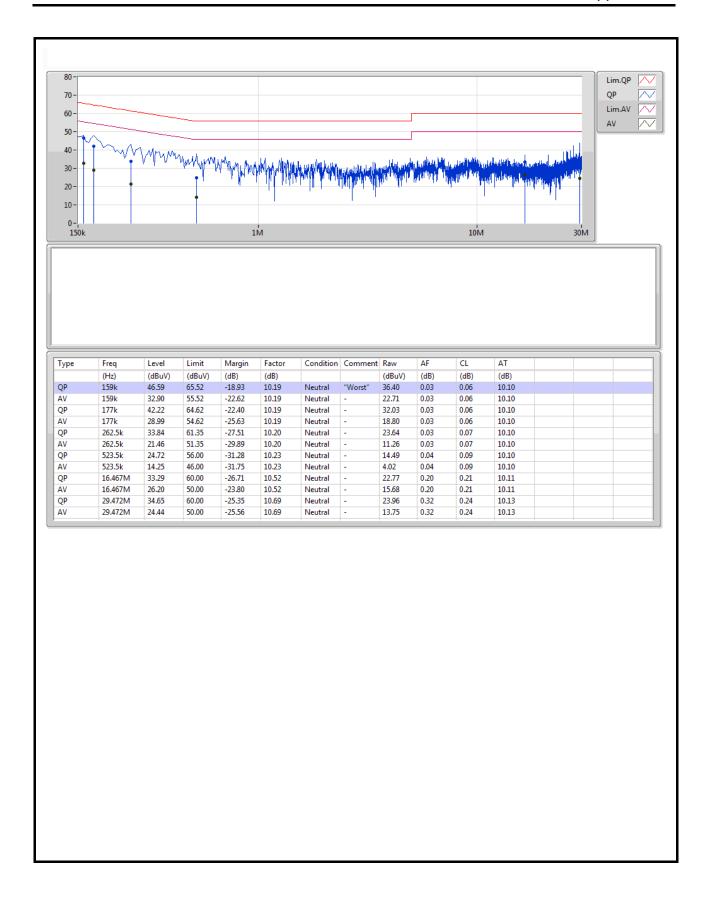
N.C.R. means Non-Calibration required.

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Appendix B.1 **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	47.16M	30.375M	30M4D1D	33.39M	16.642M	
802.11ac VHT20_Nss1,(MCS0)_2TX	50.01M	31.214M	31M2D1D	36.84M	17.871M	
802.11ac VHT40_Nss1,(MCS0)_2TX	74.82M	36.462M	36M5D1D	39.78M	35.922M	
802.11ac VHT80_Nss1,(MCS0)_2TX	83.28M	75.802M	75M8D1D	83.04M	75.802M	
5.725-5.85GHz	-	-	-	-	-	
802.11a_Nss1,(6Mbps)_2TX	16.32M	33.673M	33M7D1D	16.02M	18.231M	
802.11ac VHT20_Nss1,(MCS0)_2TX	17.61M	35.502M	35M5D1D	17.28M	31.454M	
802.11ac VHT40_Nss1,(MCS0)_2TX	35.28M	66.687M	66M7D1D	35.04M	46.297M	
802.11ac VHT80_Nss1,(MCS0)_2TX	75.6M	84.918M	84M9D1D	73.8M	76.522M	

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

Max-OBW = Maximum99% 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.1

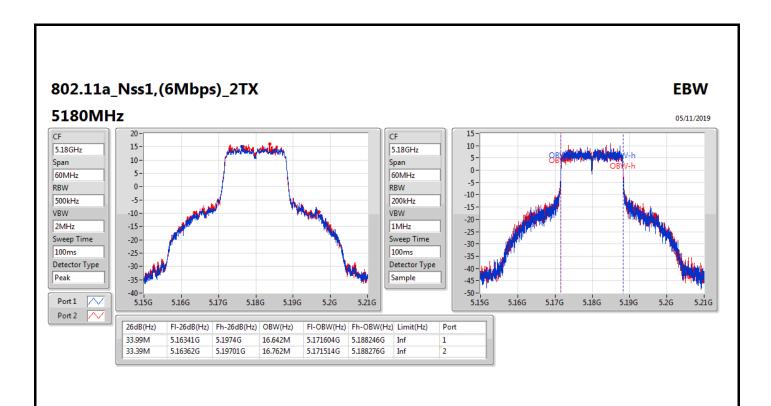
Result

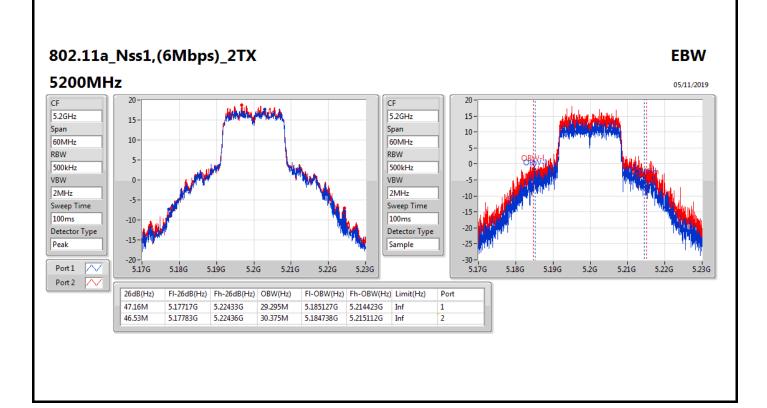
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	33.99M	16.642M	33.39M	16.762M
5200MHz	Pass	Inf	47.16M	29.295M	46.53M	30.375M
5240MHz	Pass	Inf	40.38M	18.771M	39.51M	20.12M
5745MHz	Pass	500k	16.29M	18.231M	16.29M	23.478M
5785MHz	Pass	500k	16.32M	32.384M	16.32M	33.493M
5825MHz	Pass	500k	16.02M	30.165M	16.32M	33.673M
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	36.84M	17.871M	37.86M	17.901M
5200MHz	Pass	Inf	49.98M	29.805M	50.01M	31.214M
5240MHz	Pass	Inf	40.89M	18.171M	42.39M	18.651M
5745MHz	Pass	500k	17.55M	32.774M	17.58M	34.903M
5785MHz	Pass	500k	17.58M	33.523M	17.28M	35.352M
5825MHz	Pass	500k	17.55M	31.454M	17.61M	35.502M
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	Inf	39.9M	35.922M	39.78M	36.102M
5230MHz	Pass	Inf	73.62M	36.402M	74.82M	36.462M
5755MHz	Pass	500k	35.16M	46.297M	35.1M	58.411M
5795MHz	Pass	500k	35.28M	60.45M	35.04M	66.687M
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	Inf	83.28M	75.802M	83.04M	75.802M
5775MHz	Pass	500k	75.6M	76.522M	73.8M	84.918M

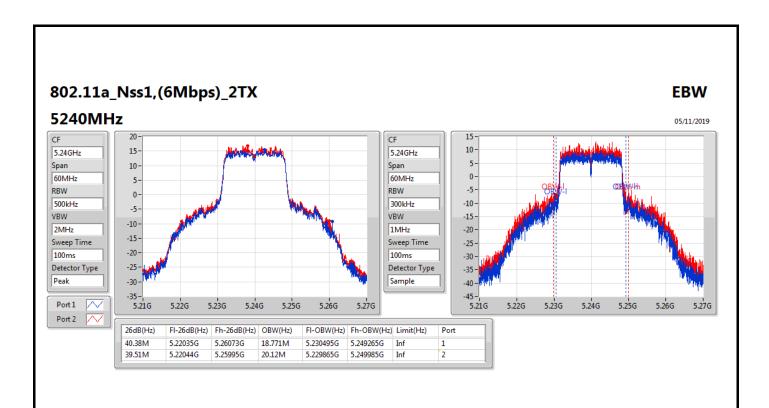
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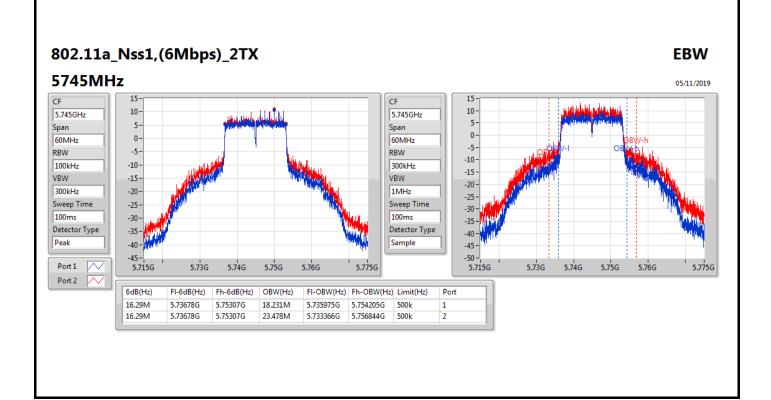
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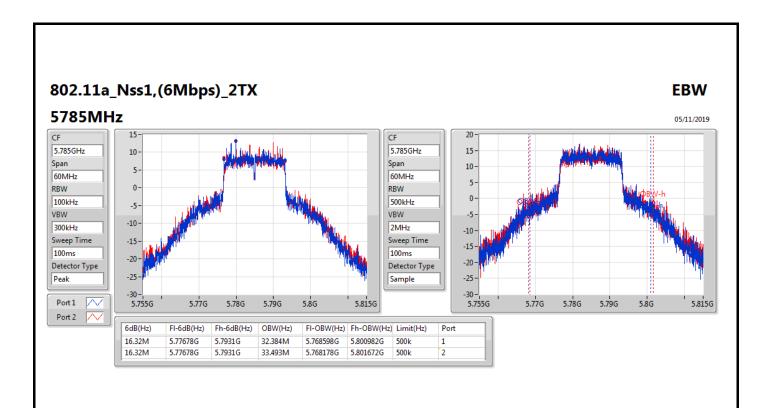
Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band Port X-OBW = Port X 99% occupied bandwidth;

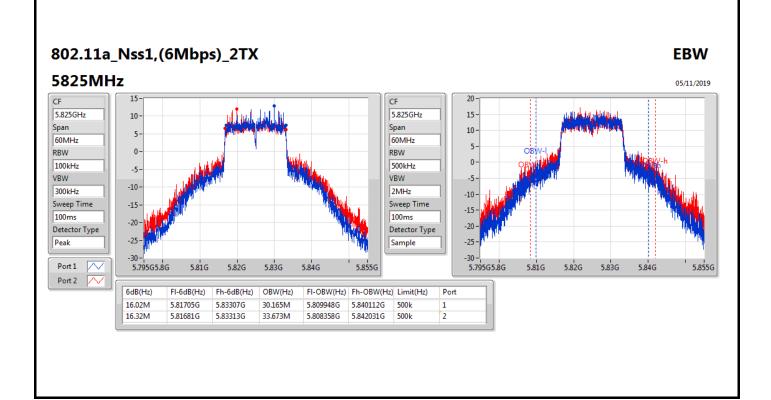


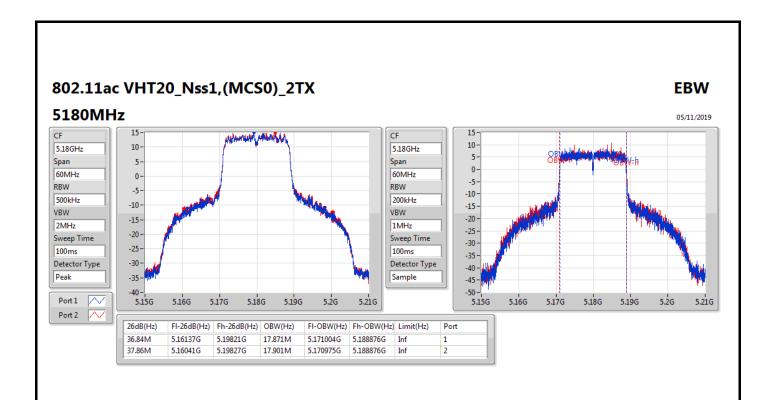


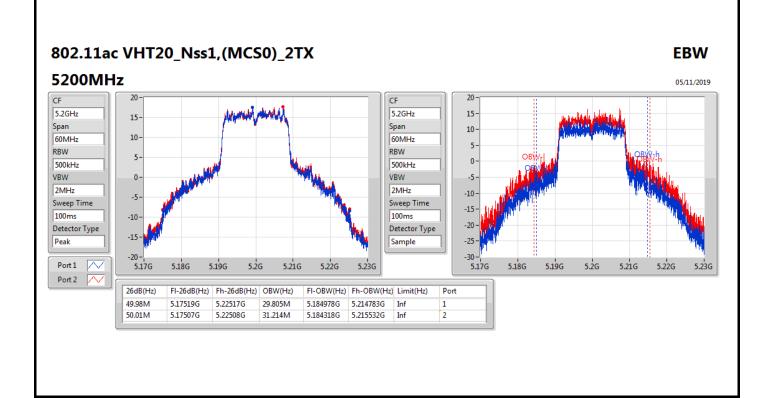


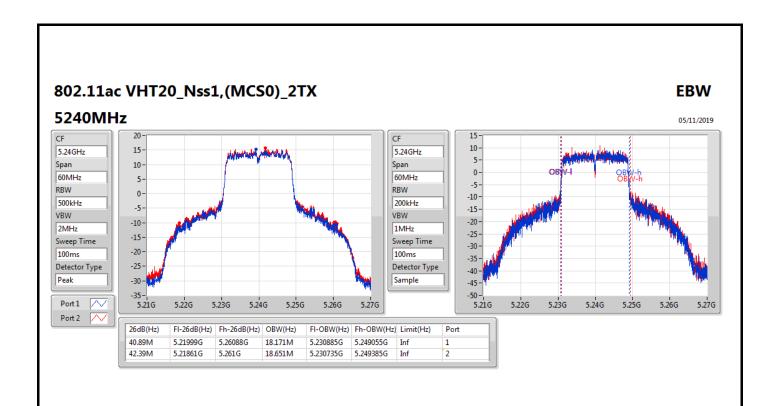


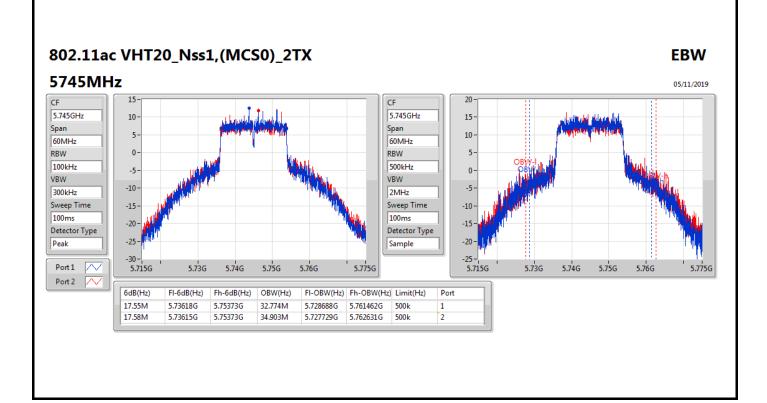




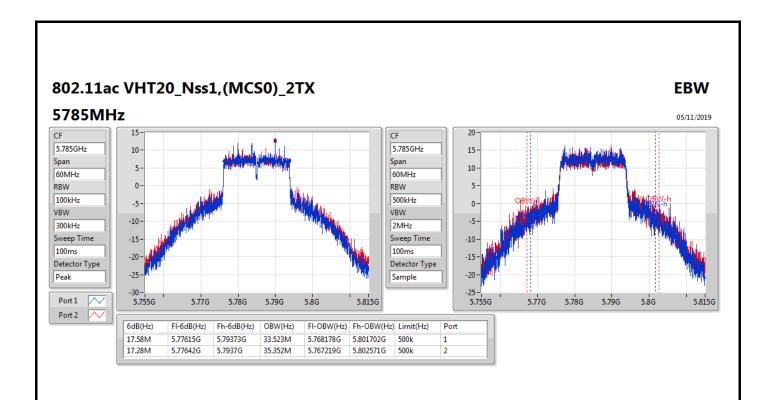


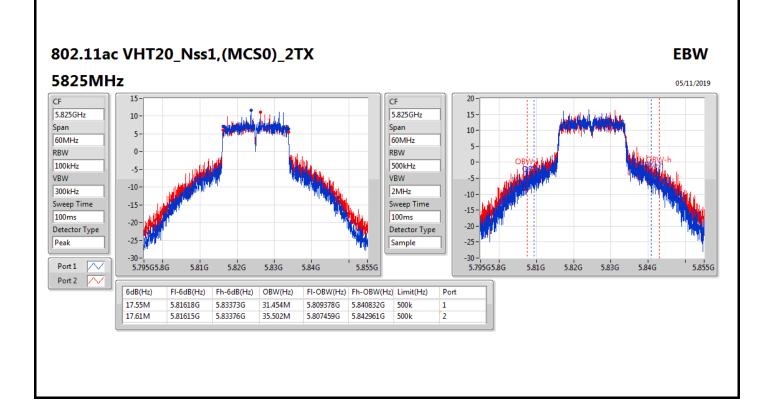


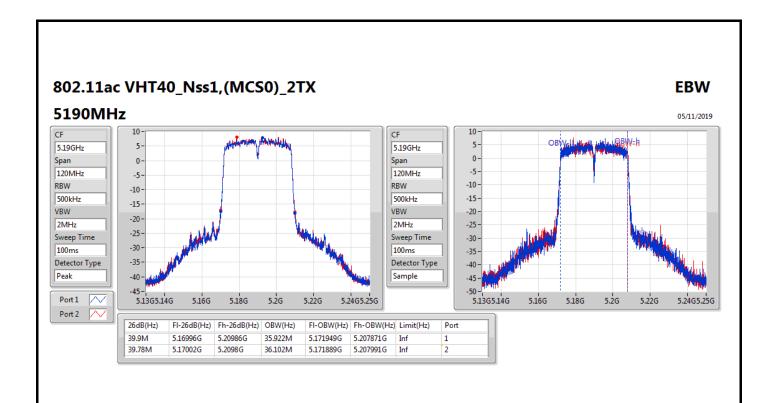


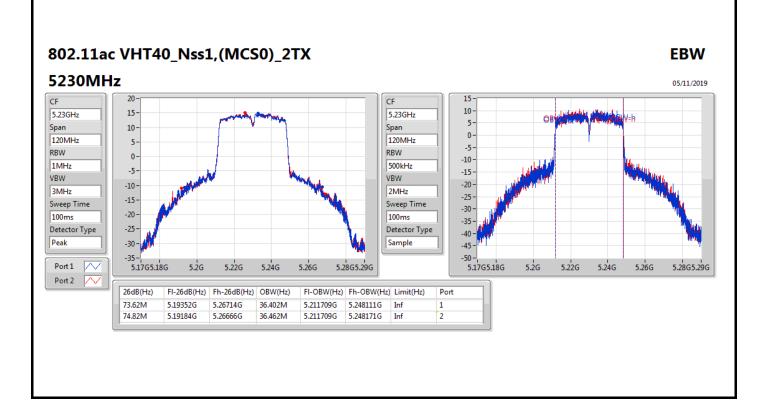


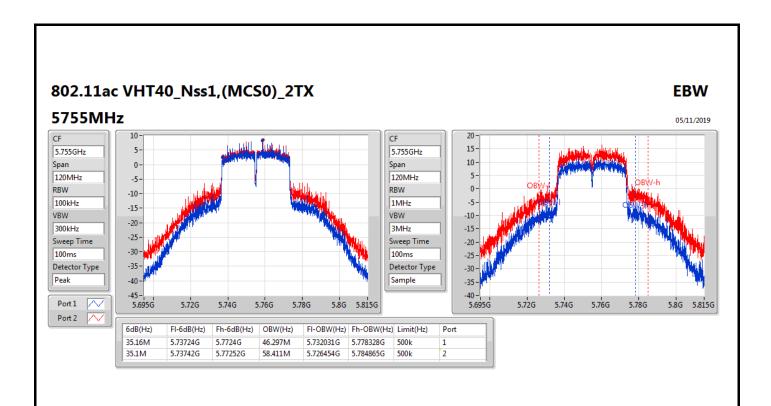
Appendix B.1

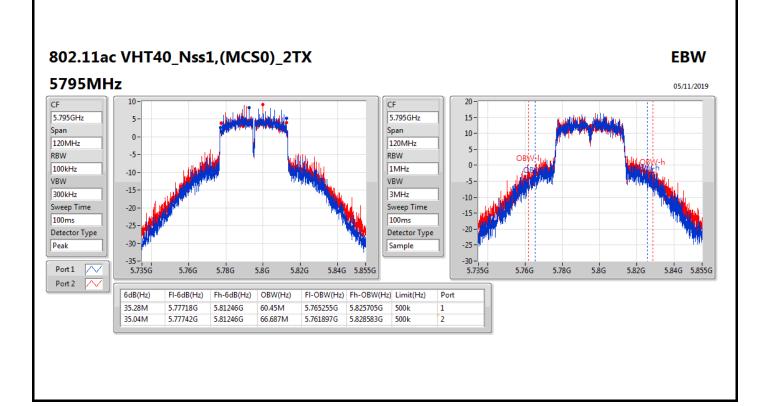


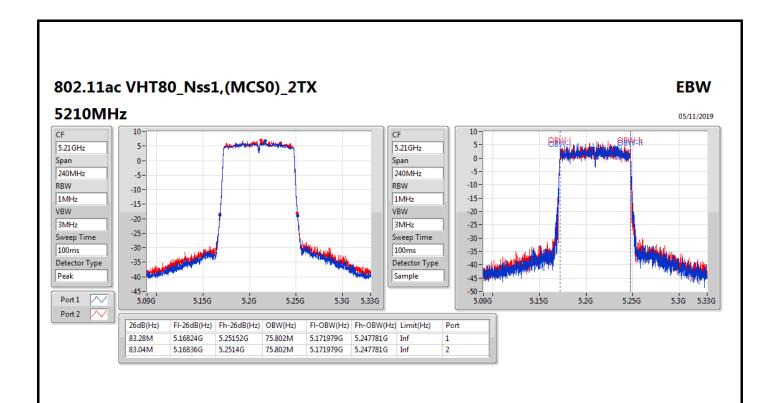


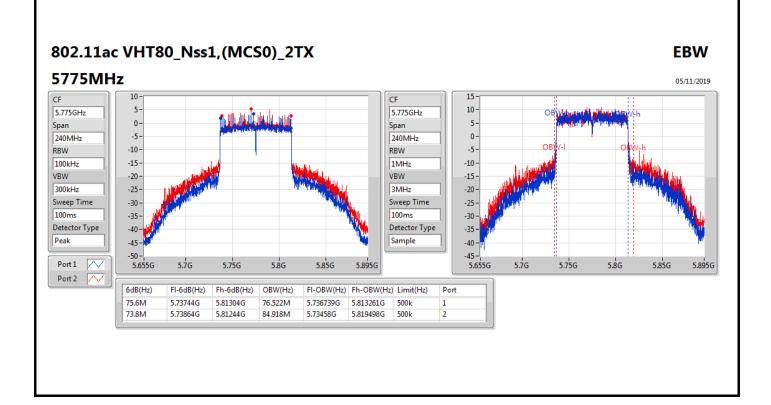














Appendix B.2 **EBW**

Summary

Mode	Max-N dB Max-OBW		ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
5.15-5.25GHz	-	-	-	-	-
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	39.51M	18.471M	18M5D1D	36.24M	17.991M
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	70.44M	36.522M	36M5D1D	38.76M	35.922M
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	81.12M	76.162M	76M2D1D	81.12M	75.682M
5.725-5.85GHz	-	-	-	-	-
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	17.58M	19.22M	19M2D1D	17.25M	18.081M
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	35.1M	36.702M	36M7D1D	32.58M	36.462M
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	72.96M	76.522M	76M5D1D	14.88M	76.162M

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

Max-OBW = Maximum99% occupied bandwidth;

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

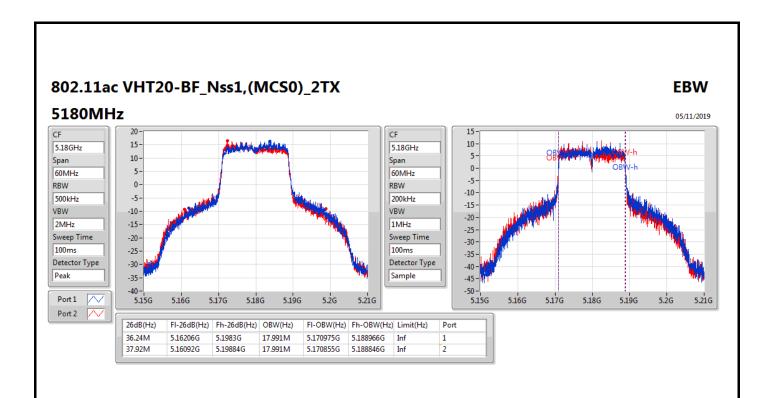
Min-OBW = Minimum 99% occupied bandwidth;

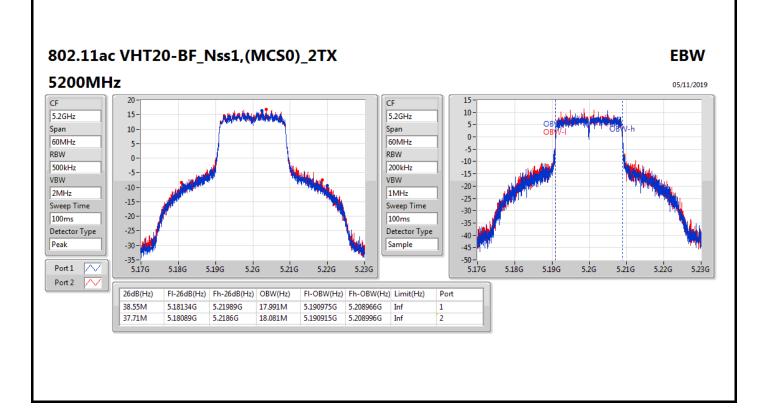


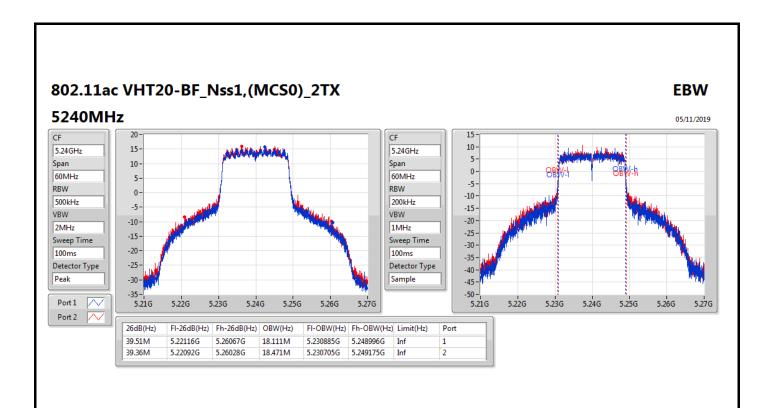
Result

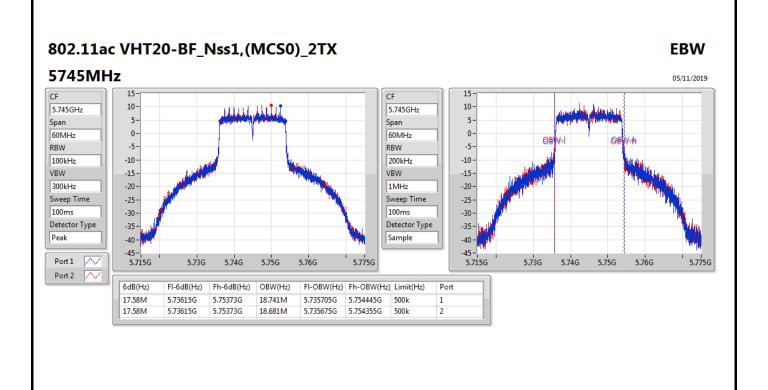
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW	
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	Inf	36.24M	17.991M	37.92M	17.991M	
5200MHz	Pass	Inf	38.55M	17.991M	37.71M	18.081M	
5240MHz	Pass	Inf	39.51M	18.111M	39.36M	18.471M	
5745MHz	Pass	500k	17.58M	18.741M	17.58M	18.681M	
5785MHz	Pass	500k	17.52M	18.081M	17.49M	18.111M	
5825MHz	Pass	500k	17.25M	19.07M	17.55M	19.22M	
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	Inf	39.3M	35.922M	38.76M	35.922M	
5230MHz	Pass	Inf	69.72M	36.522M	70.44M	36.522M	
5755MHz	Pass	500k	35.1M	36.702M	34.98M	36.642M	
5795MHz	Pass	500k	34.92M	36.462M	32.58M	36.582M	
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	Inf	81.12M	75.682M	81.12M	76.162M	
5775MHz	Pass	500k	14.88M	76.522M	72.96M	76.162M	

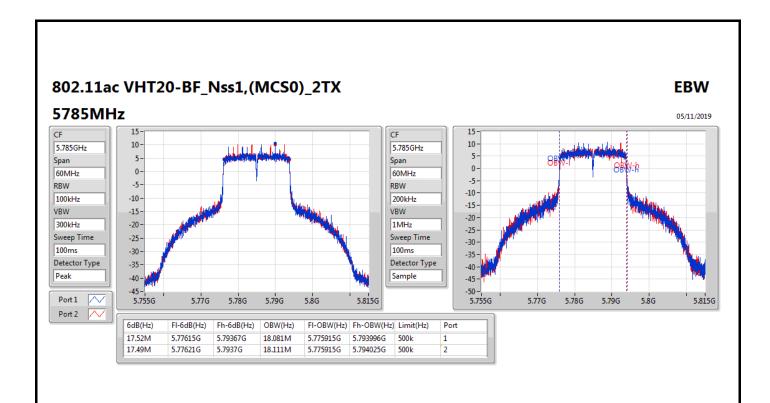
Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band Port X-OBW = Port X 99% occupied bandwidth;

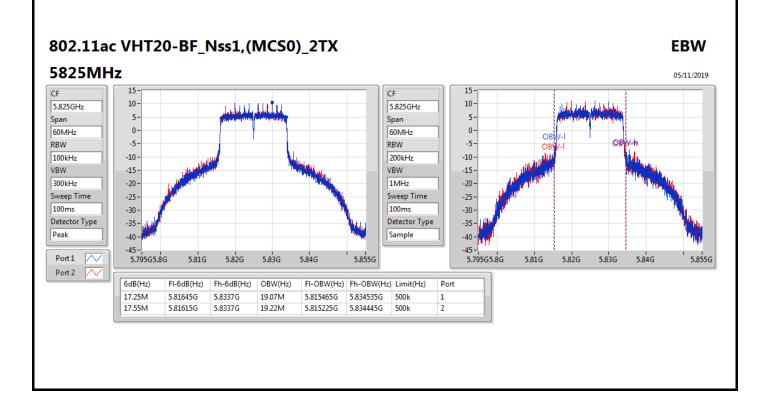


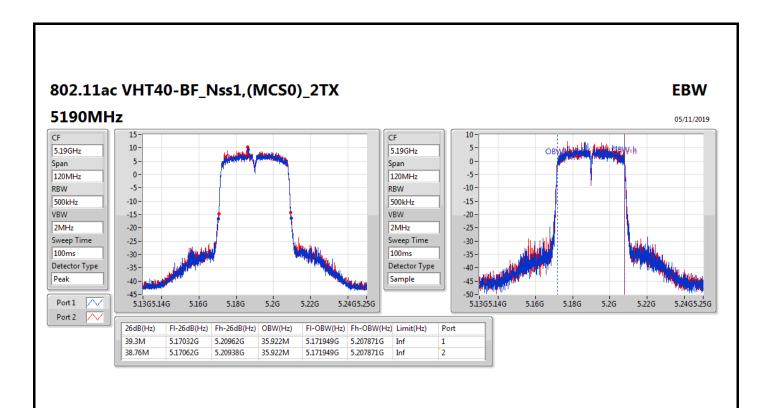


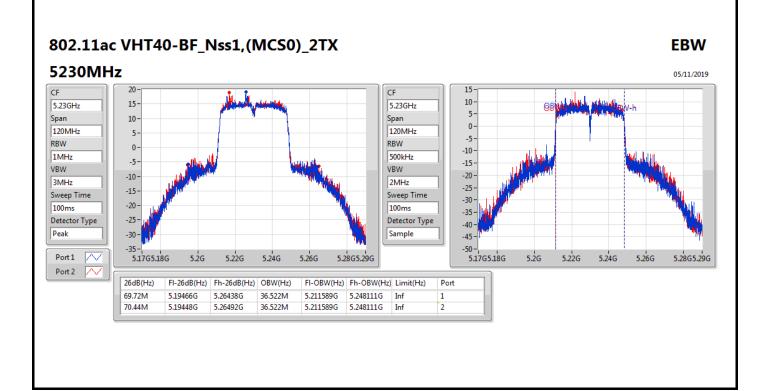


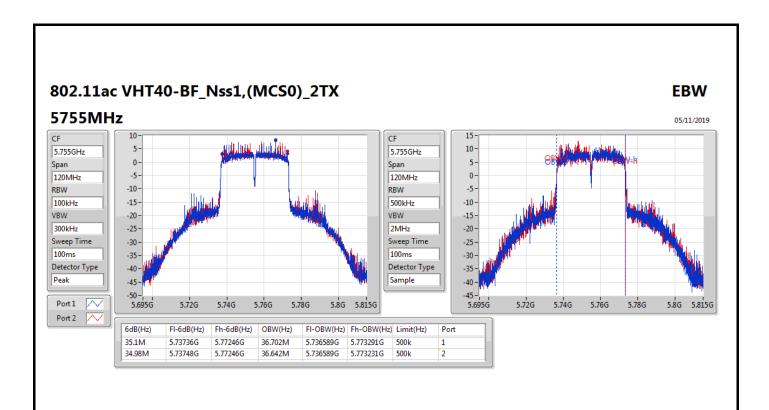


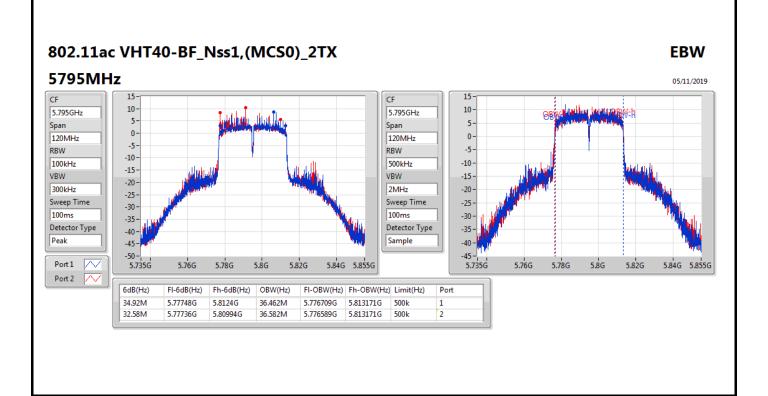


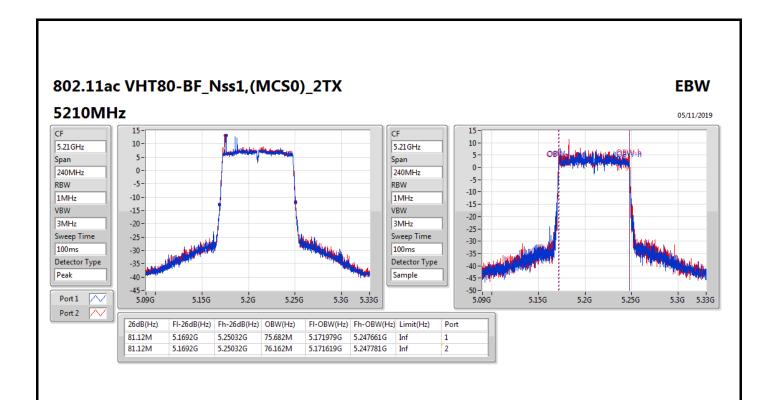


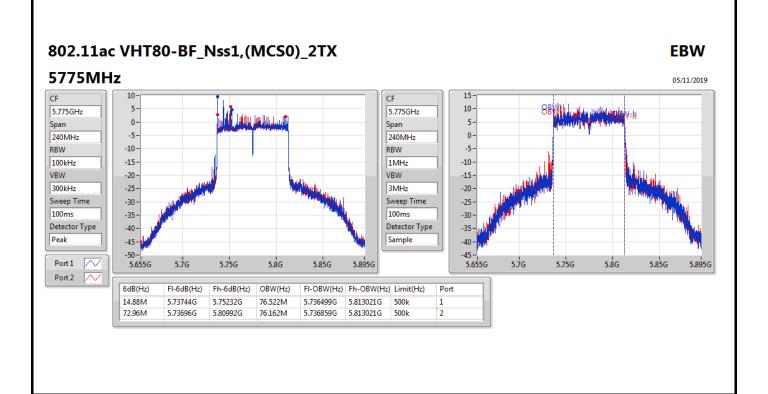














Summary

Mode	Total Power	Total Power
	(dBm)	(W)
5.15-5.25GHz	-	-
802.11a_Nss1,(6Mbps)_2TX	27.02	0.50350
802.11ac VHT20_Nss1,(MCS0)_2TX	26.74	0.47206
802.11ac VHT40_Nss1,(MCS0)_2TX	24.62	0.28973
802.11ac VHT80_Nss1,(MCS0)_2TX	19.37	0.08650
5.725-5.85GHz	-	-
802.11a_Nss1,(6Mbps)_2TX	26.99	0.50003
802.11ac VHT20_Nss1,(MCS0)_2TX	26.86	0.48529
802.11ac VHT40_Nss1,(MCS0)_2TX	26.42	0.43853
802.11ac VHT80_Nss1,(MCS0)_2TX	24.44	0.27797



Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5180MHz	Pass	5.94	21.40	21.57	24.50	30.00
5200MHz	Pass	5.94	24.02	23.99	27.02	30.00
5240MHz	Pass	5.94	22.32	22.50	25.42	30.00
5745MHz	Pass	5.94	22.09	22.52	25.32	30.00
5785MHz	Pass	5.94	24.06	23.90	26.99	30.00
5825MHz	Pass	5.94	23.56	23.46	26.52	30.00
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	5.94	21.43	21.49	24.47	30.00
5200MHz	Pass	5.94	23.67	23.78	26.74	30.00
5240MHz	Pass	5.94	21.84	22.20	25.03	30.00
5745MHz	Pass	5.94	23.93	23.76	26.86	30.00
5785MHz	Pass	5.94	23.78	23.68	26.74	30.00
5825MHz	Pass	5.94	23.41	23.40	26.42	30.00
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	5.94	18.09	17.99	21.05	30.00
5230MHz	Pass	5.94	21.53	21.69	24.62	30.00
5755MHz	Pass	5.94	22.89	23.36	26.14	30.00
5795MHz	Pass	5.94	23.37	23.45	26.42	30.00
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	=	-	-	-
5210MHz	Pass	5.94	16.18	16.53	19.37	30.00
5775MHz	Pass	5.94	21.18	21.67	24.44	30.00

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



Summary

Mode	Total Power	Total Power
	(dBm)	(W)
5.15-5.25GHz	-	-
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	24.91	0.30974
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	24.27	0.26730
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	20.42	0.11015
5.725-5.85GHz	-	-
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	25.09	0.32285
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	24.67	0.29309
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	23.85	0.24266



Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	8.66	21.86	21.93	24.91	27.34
5200MHz	Pass	8.66	21.58	21.80	24.70	27.34
5240MHz	Pass	8.66	21.56	21.82	24.70	27.34
5745MHz	Pass	8.66	22.01	22.15	25.09	27.34
5785MHz	Pass	8.66	21.87	21.92	24.91	27.34
5825MHz	Pass	8.66	21.91	21.57	24.75	27.34
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	8.66	17.08	17.42	20.26	27.34
5230MHz	Pass	8.66	21.01	21.49	24.27	27.34
5755MHz	Pass	8.66	21.59	21.73	24.67	27.34
5795MHz	Pass	8.66	20.83	21.42	24.15	27.34
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	8.66	17.37	17.44	20.42	27.34
5775MHz	Pass	8.66	20.78	20.90	23.85	27.34

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	13.31
802.11ac VHT20_Nss1,(MCS0)_2TX	12.64
802.11ac VHT40_Nss1,(MCS0)_2TX	7.83
802.11ac VHT80_Nss1,(MCS0)_2TX	-0.62
5.725-5.85GHz	
802.11a_Nss1,(6Mbps)_2TX	11.67
802.11ac VHT20_Nss1,(MCS0)_2TX	11.18
802.11ac VHT40_Nss1,(MCS0)_2TX	7.94
802.11ac VHT80_Nss1,(MCS0)_2TX	3.14

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



Appendix D.1 **PSD**

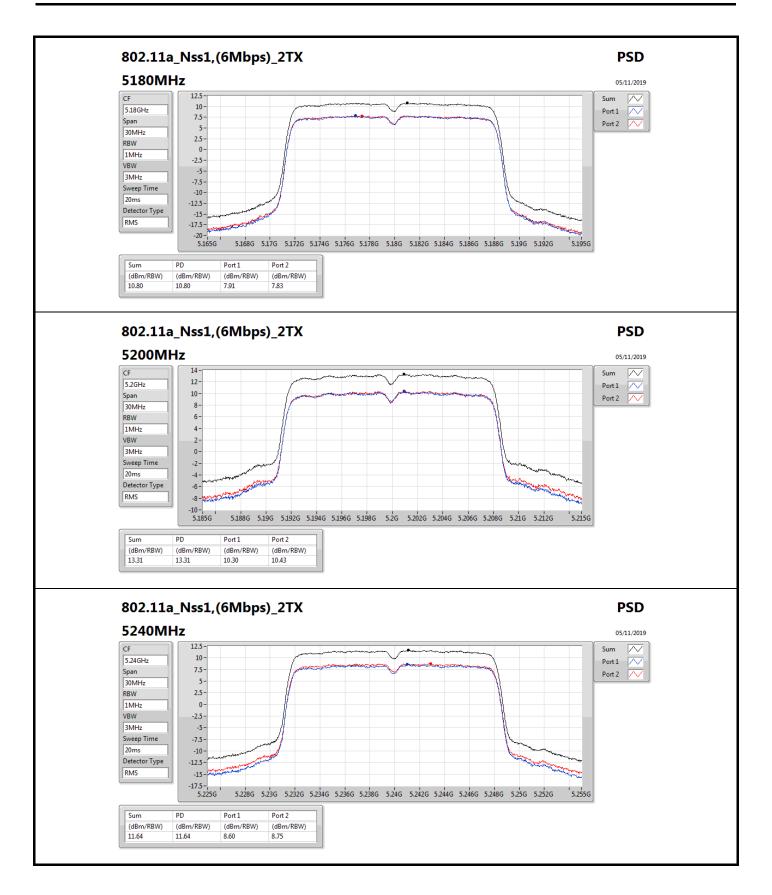
Result

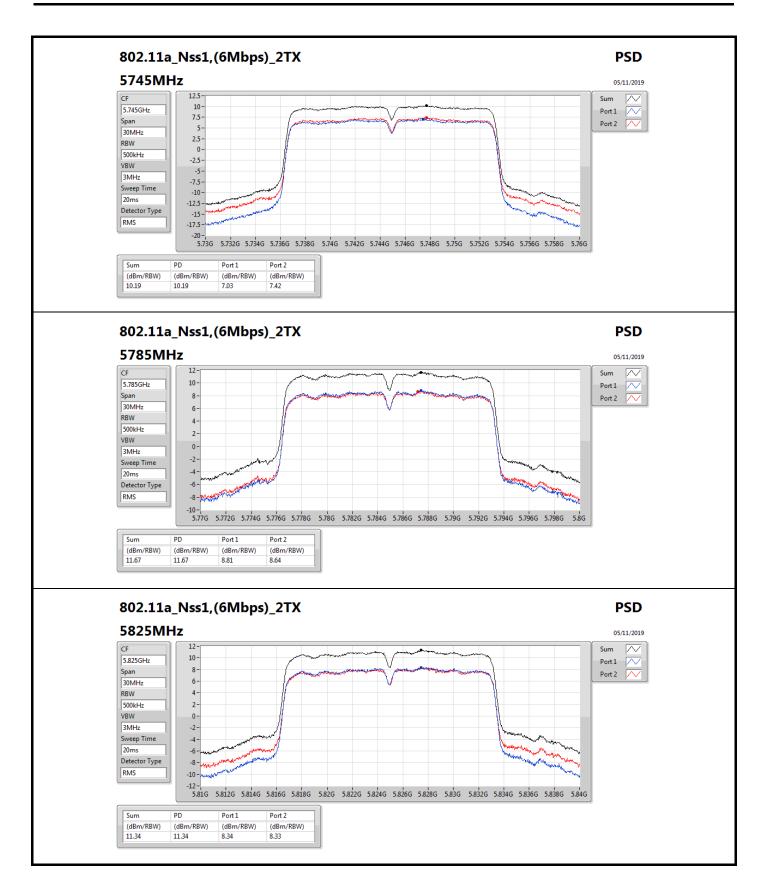
Mode	Result	DG	Port 1	Port 2	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5180MHz	Pass	8.66	7.91	7.83	10.80	14.34
5200MHz	Pass	8.66	10.30	10.43	13.31	14.34
5240MHz	Pass	8.66	8.60	8.75	11.64	14.34
5745MHz	Pass	8.66	7.03	7.42	10.19	27.34
5785MHz	Pass	8.66	8.81	8.64	11.67	27.34
5825MHz	Pass	8.66	8.34	8.33	11.34	27.34
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	8.66	7.52	7.48	10.46	14.34
5200MHz	Pass	8.66	9.69	9.65	12.64	14.34
5240MHz	Pass	8.66	7.86	8.11	10.96	14.34
5745MHz	Pass	8.66	8.36	8.13	11.18	27.34
5785MHz	Pass	8.66	8.09	8.01	11.02	27.34
5825MHz	Pass	8.66	7.75	7.70	10.66	27.34
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	8.66	1.45	1.28	4.36	14.34
5230MHz	Pass	8.66	4.80	4.89	7.83	14.34
5755MHz	Pass	8.66	4.63	5.15	7.88	27.34
5795MHz	Pass	8.66	4.98	5.18	7.94	27.34
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	8.66	-3.57	-3.55	-0.62	14.34
5775MHz	Pass	8.66	-0.07	0.35	3.14	27.34

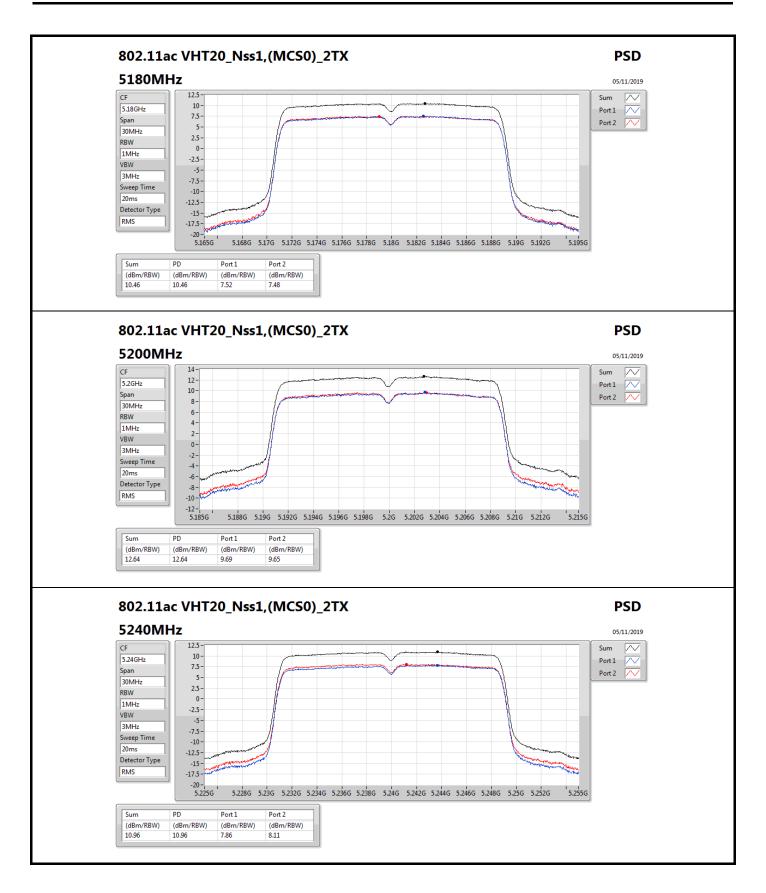
Page No.

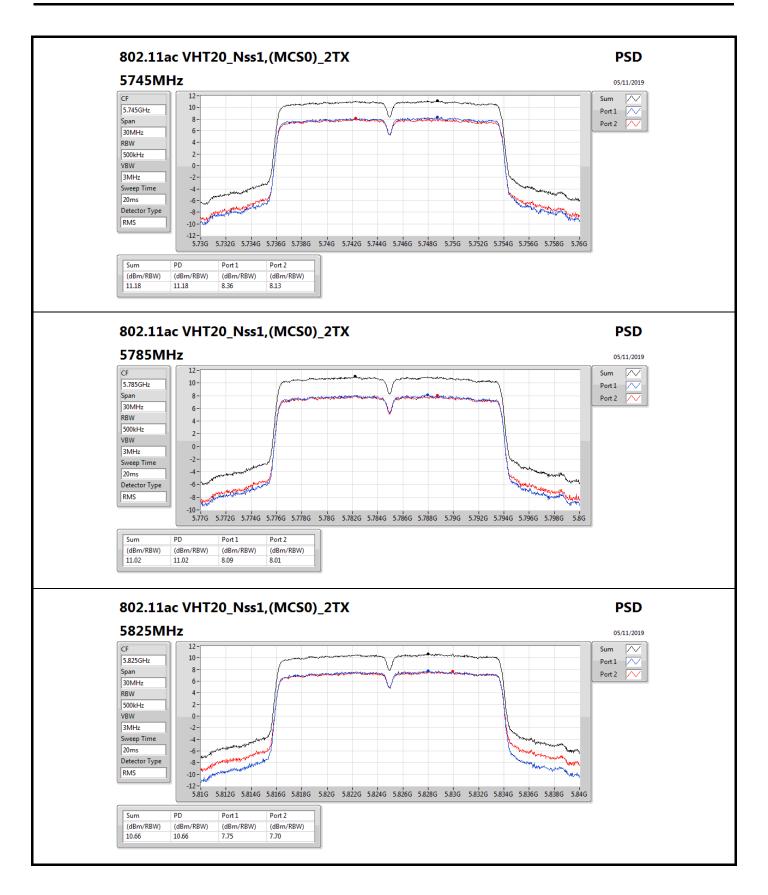
: 2 of 8

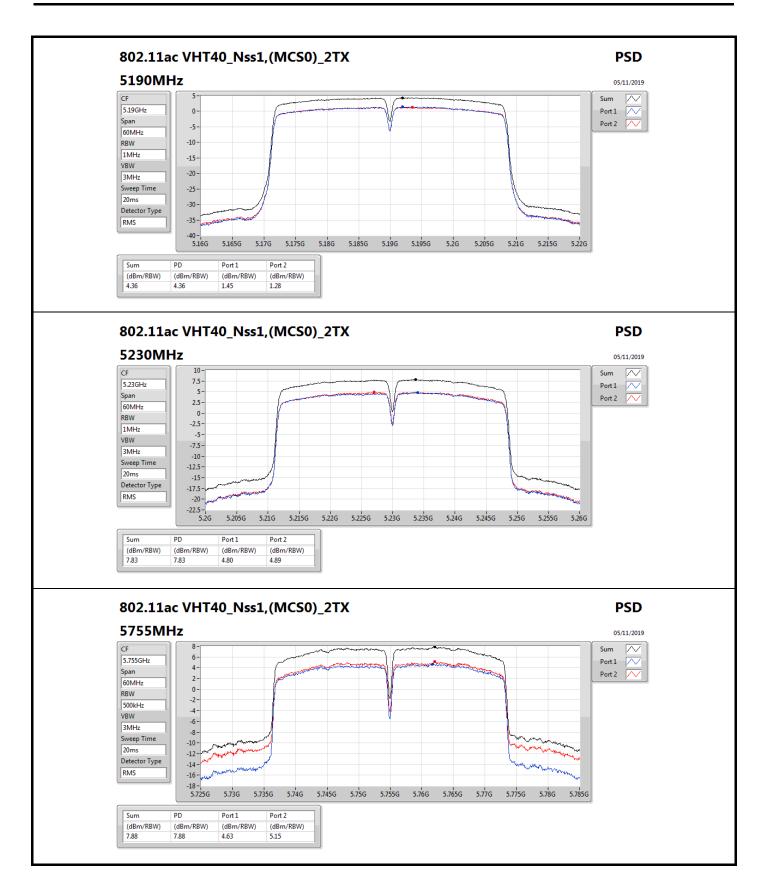
DG = Directional Gain; RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X power density;

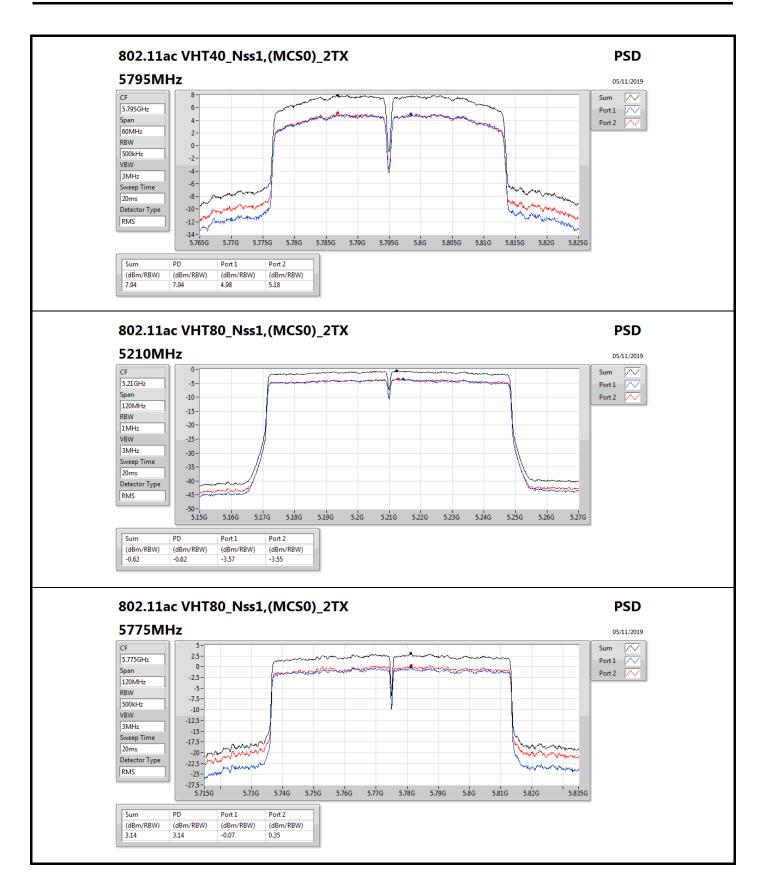














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Summary

Mode	PD				
	(dBm/RBW)				
5.15-5.25GHz	·				
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	11.48				
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	7.99				
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	0.05				
5.725-5.85GHz					
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	9.53				
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	6.48				
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	1.91				

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

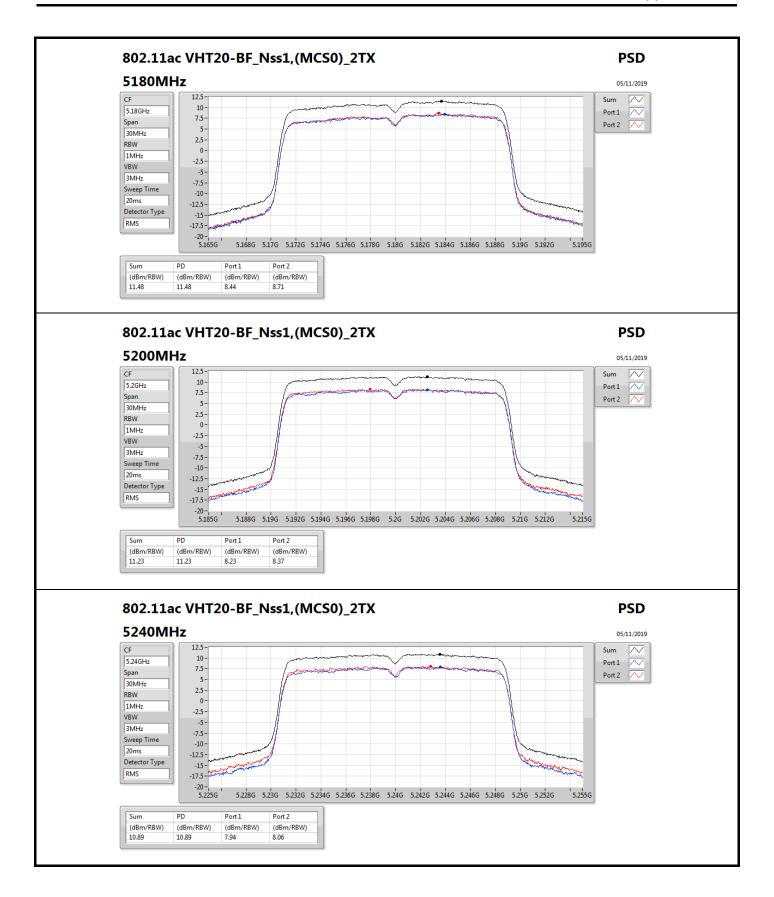


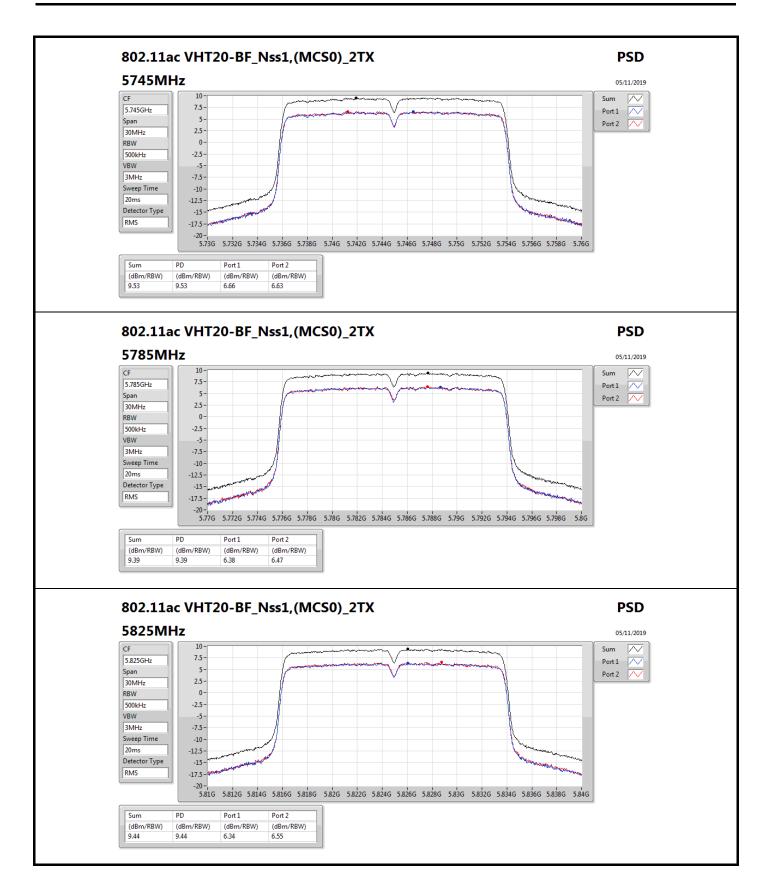
Result

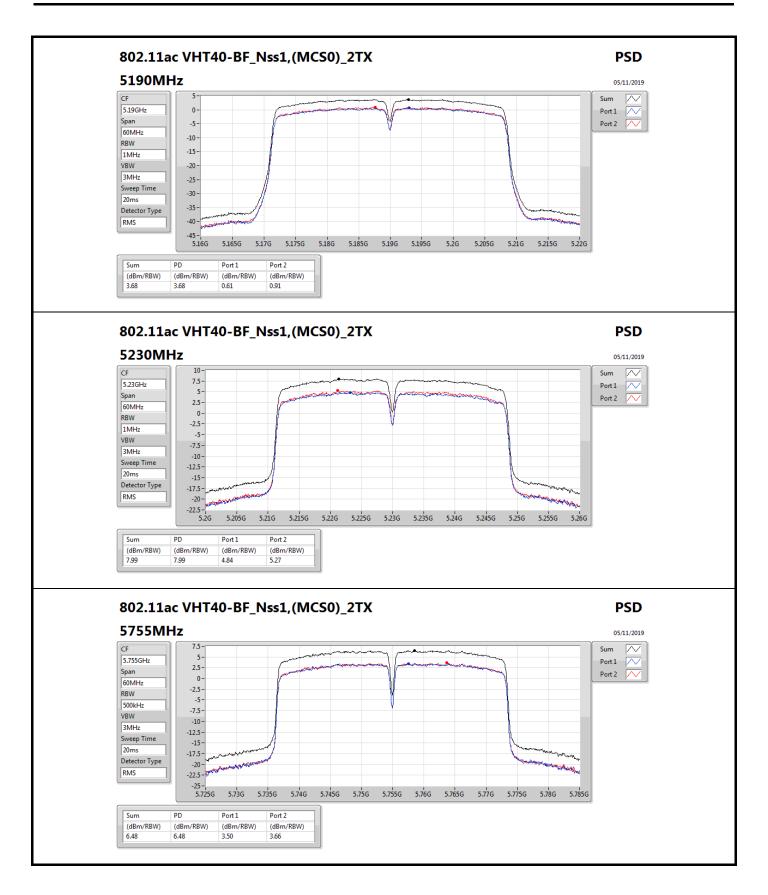
Mode	Result	DG	Port 1	Port 2	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	8.66	8.44	8.71	11.48	14.34
5200MHz	Pass	8.66	8.23	8.37	11.23	14.34
5240MHz	Pass	8.66	7.94	8.06	10.89	14.34
5745MHz	Pass	8.66	6.66	6.63	9.53	27.34
5785MHz	Pass	8.66	6.38	6.47	9.39	27.34
5825MHz	Pass	8.66	6.34 6.55		9.44	27.34
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	8.66	0.61	0.91	3.68	14.34
5230MHz	Pass	8.66	4.84	5.27	7.99	14.34
5755MHz	Pass	8.66	3.50 3.66		6.48	27.34
5795MHz	Pass	8.66	3.44	3.49	6.45	27.34
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	=	-	-	-
5210MHz	Pass	8.66	-2.81	-2.64	0.05	14.34
5775MHz	Pass	8.66	-1.21	-0.98	1.91	27.34

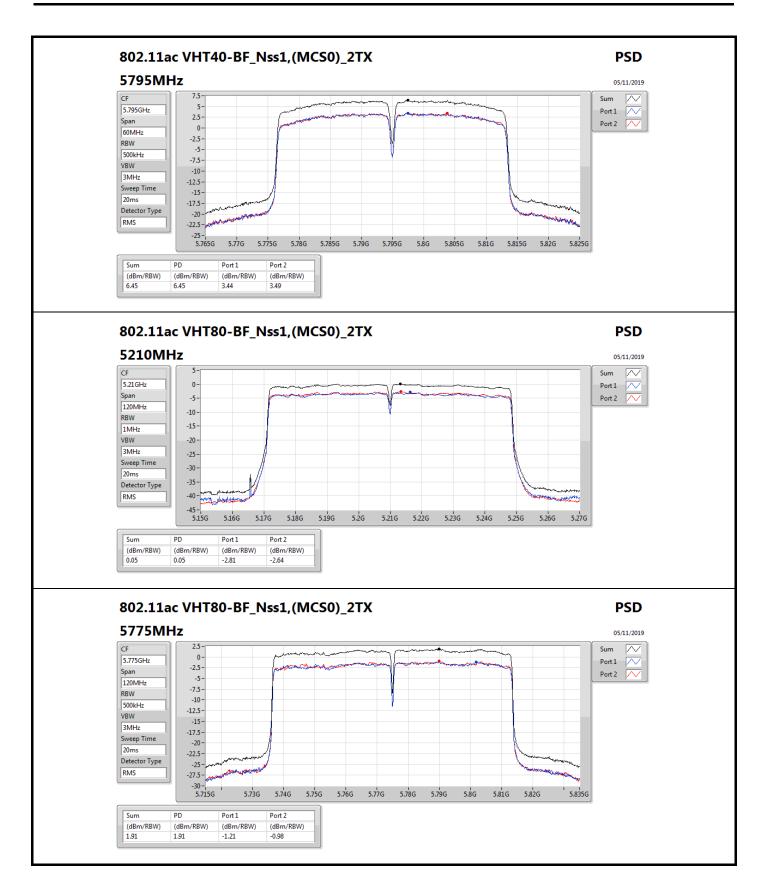
DG = Directional Gain; **RBW** = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;

PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X power density;





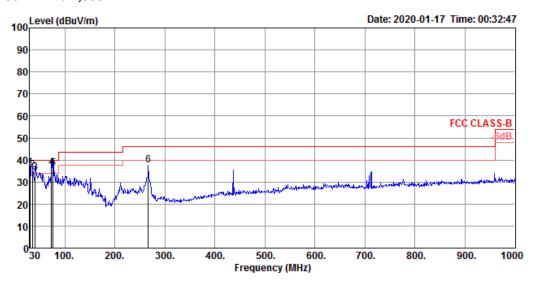




Radiated Emission below 1GHz Result

Test Mode	Mode 1	Frequency Range	30 MHz to 1,000 MHz

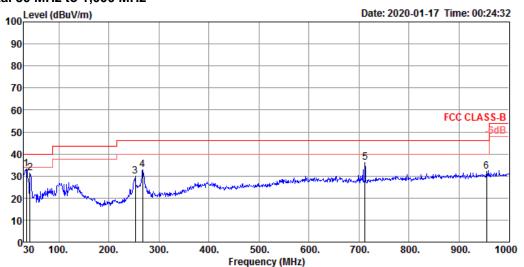
Vertical 30 MHz to 1,000 MHz



	Freq	Level	Limit					Factor		T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	30.97	36.39	40.00	-3.61	40.50	0.60	23.86	28.57	300	356	Peak	VERTICAL
2	34.85	35.49	40.00	-4.51	41.58	0.60	21.88	28.57	200	67	QP	VERTICAL
3	40.67	34.44	40.00	-5.56	43.68	0.60	18.72	28.56	200	360	QP	VERTICAL
4	73.65	36.56	40.00	-3.44	52.22	0.67	12.18	28.51	100	127	QP	VERTICAL
5	76.56	36.12	40.00	-3.88	51.28	0.70	12.64	28.50	100	209	QP	VERTICAL
6	266.68	37.59	46.00	-8.41	45.03	1.57	18.96	27.97	200	182	Peak	VERTICAL



Horizontal 30 MHz to 1,000 MHz



	Freq	Level				Loss Factor Factor			-	1/205	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg			
1	34.85	33.16	40.00	-6.84	39.25	0.60	21.88	28.57	300	35	Peak	HORIZONTAL	
2	42.61	31.46	40.00	-8.54	41.77	0.60	17.65	28.56	200	206	Peak	HORIZONTAL	
3	253.10	29.74	46.00	-16.26	37.46	1.51	18.76	27.99	200	302	Peak	HORIZONTAL	
4	267.65	32.70	46.00	-13.30	40.21	1.57	18.89	27.97	150	248	Peak	HORIZONTAL	
5	711.91	36.08	46.00	-9.92	37.40	2.93	25.20	29.45	100	129	Peak	HORIZONTAL	
6	955.38	32.06	46.00	-13.94	30.39	3.59	26.99	28.91	100	318	Peak	HORIZONTAL	



RSE TX above 1GHz

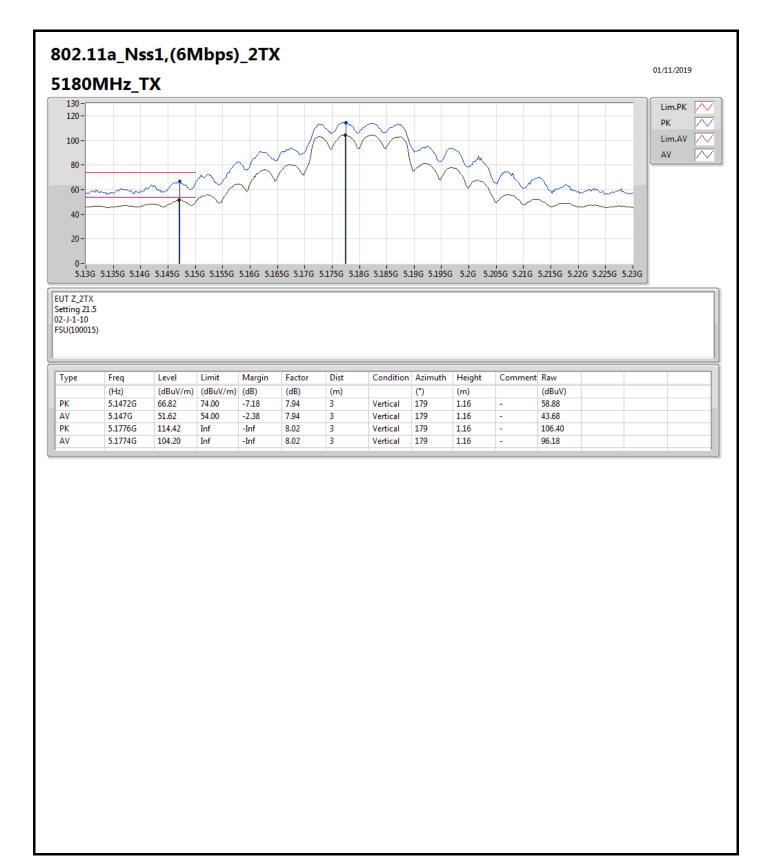
Appendix E.2

Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
5.15-5.25GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11ac VHT40_Nss1,(MCS0)_2TX	Pass	AV	5.1468G	53.95	54.00	-0.05	7.94	3	Vertical	210	2.64	-

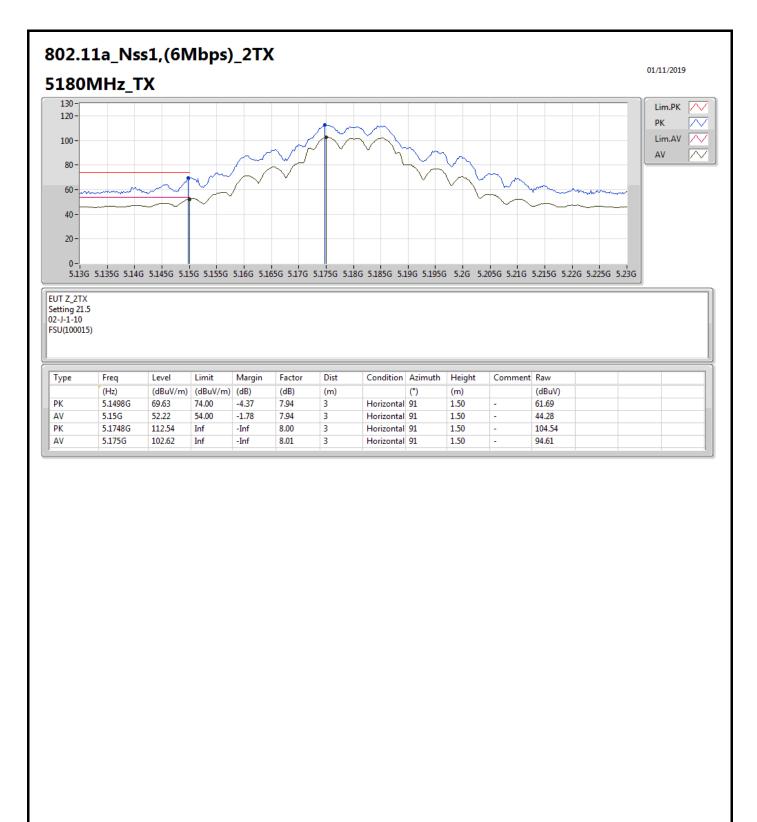
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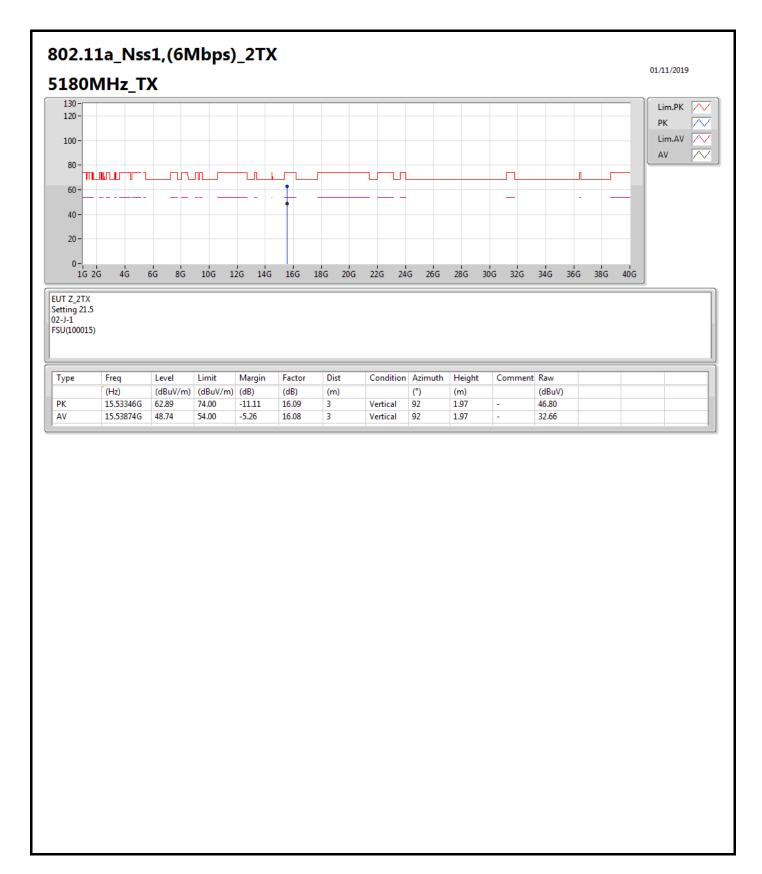
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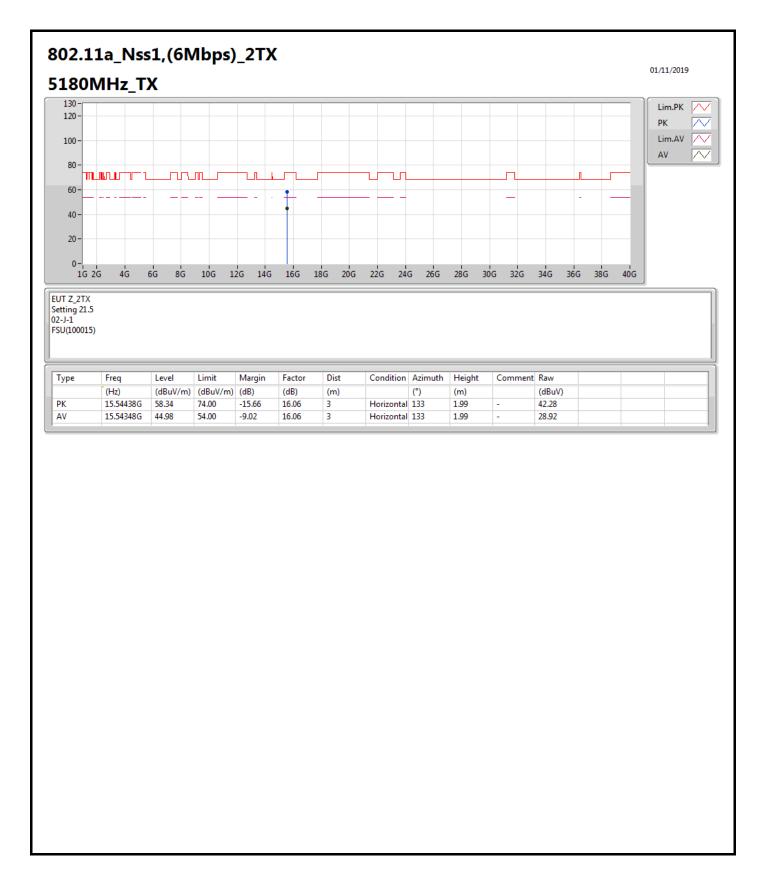
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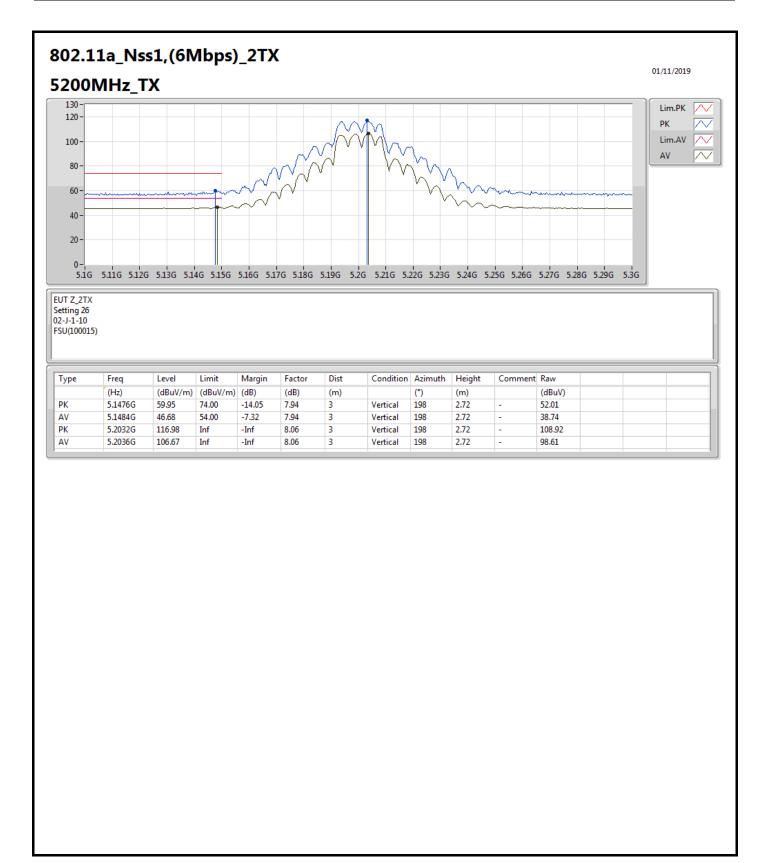
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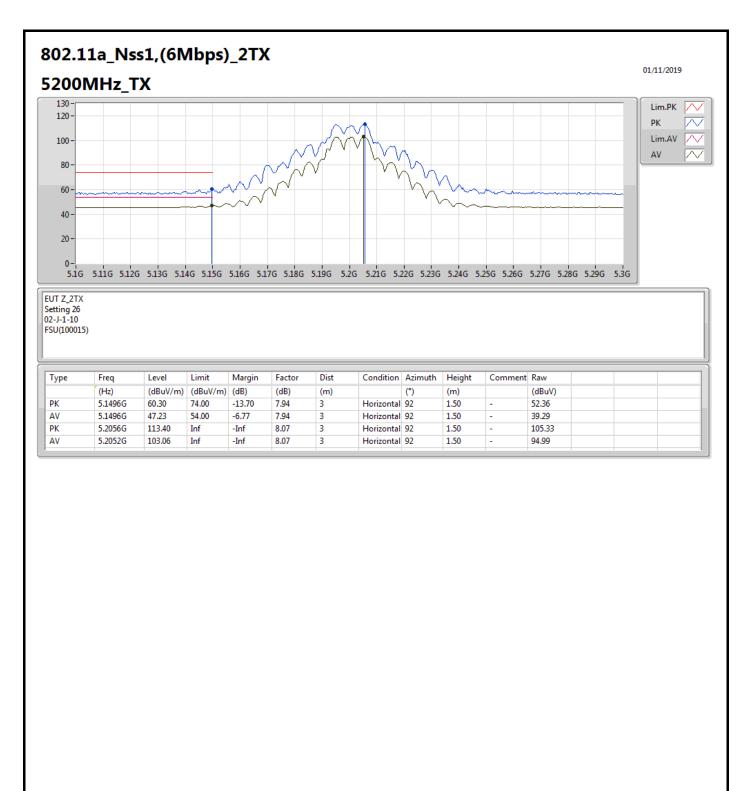
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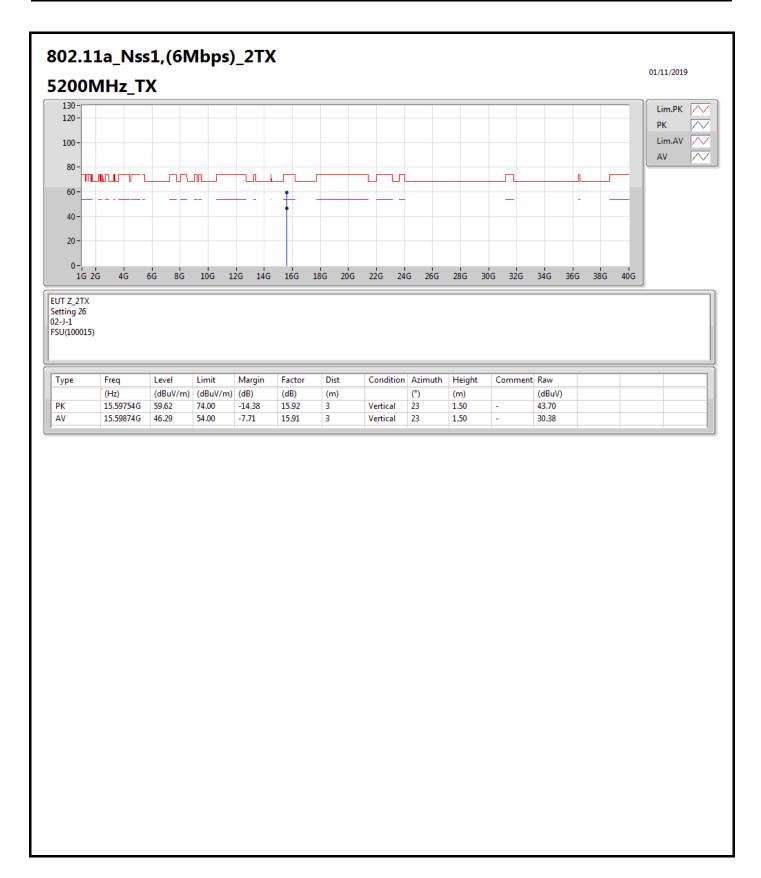
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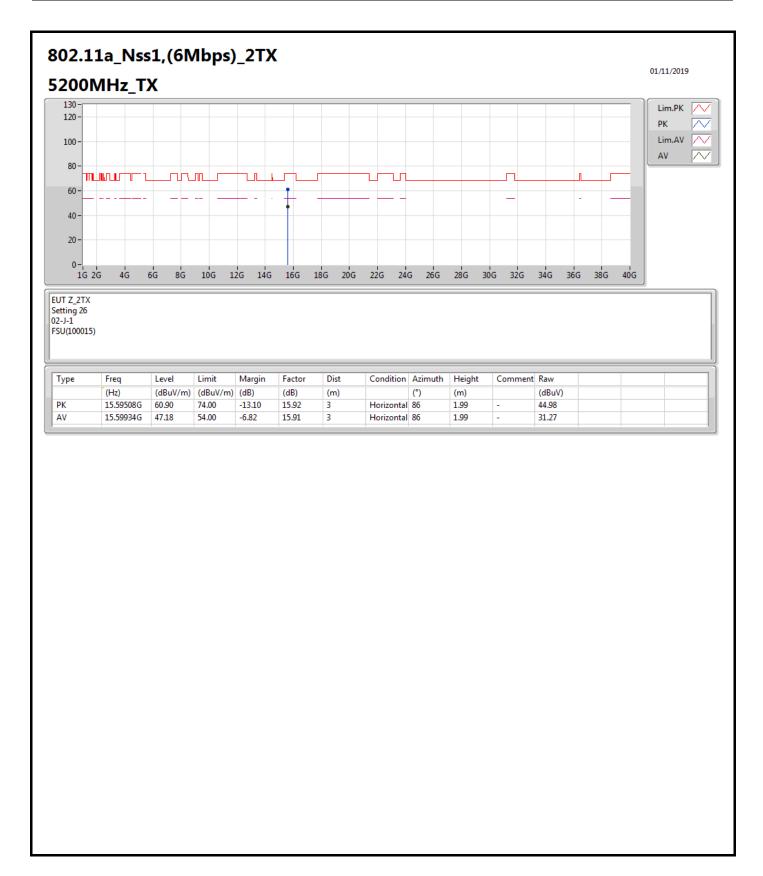
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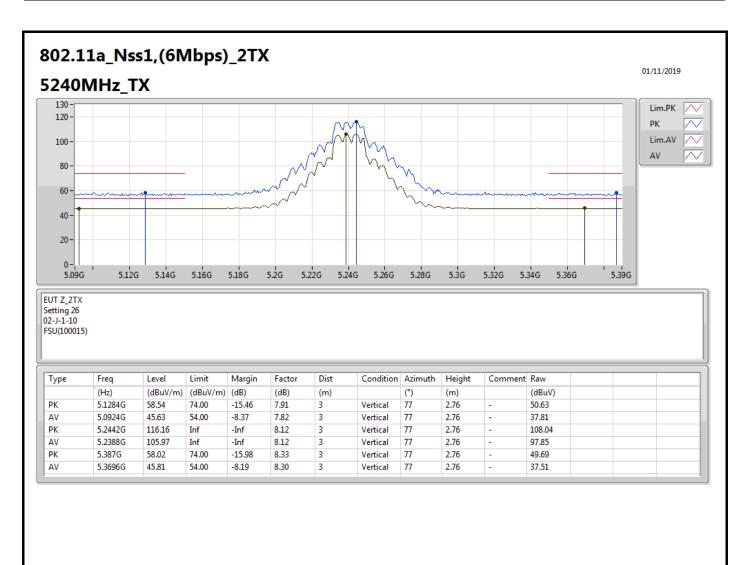
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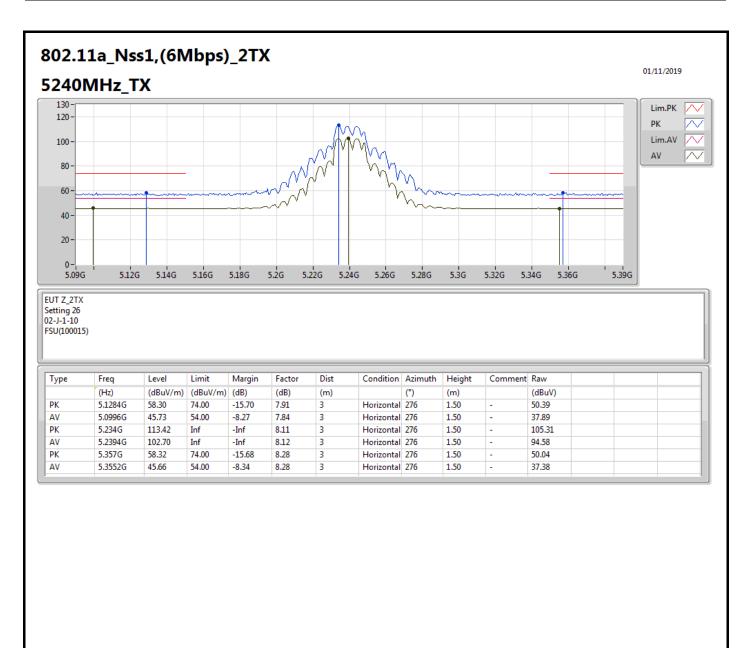
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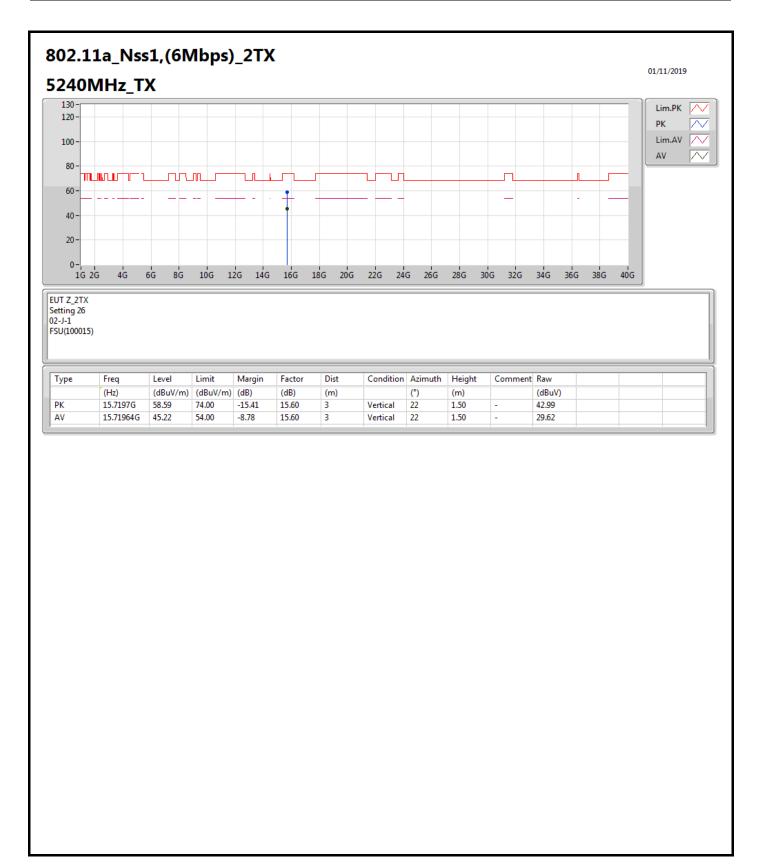
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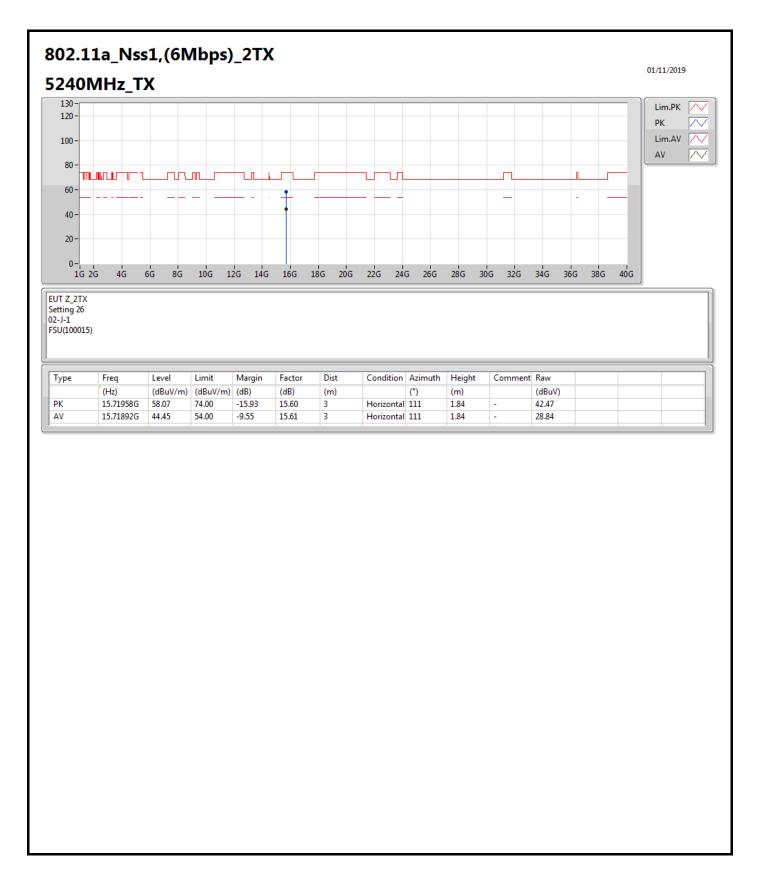
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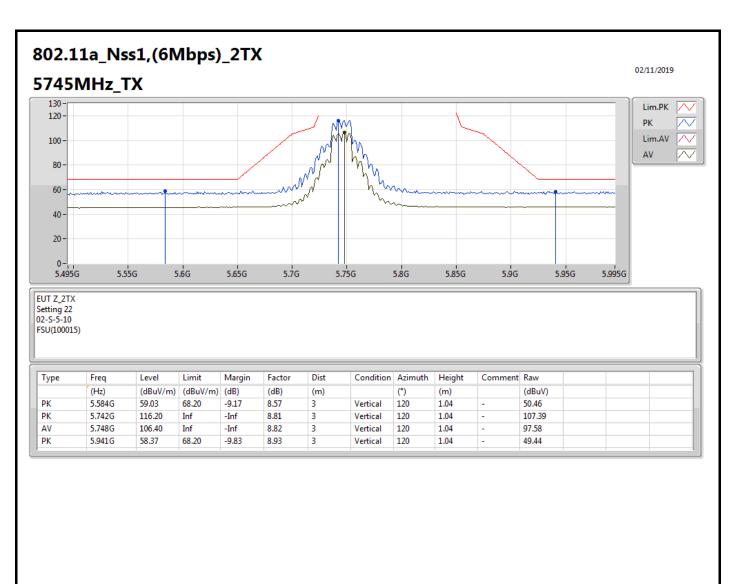
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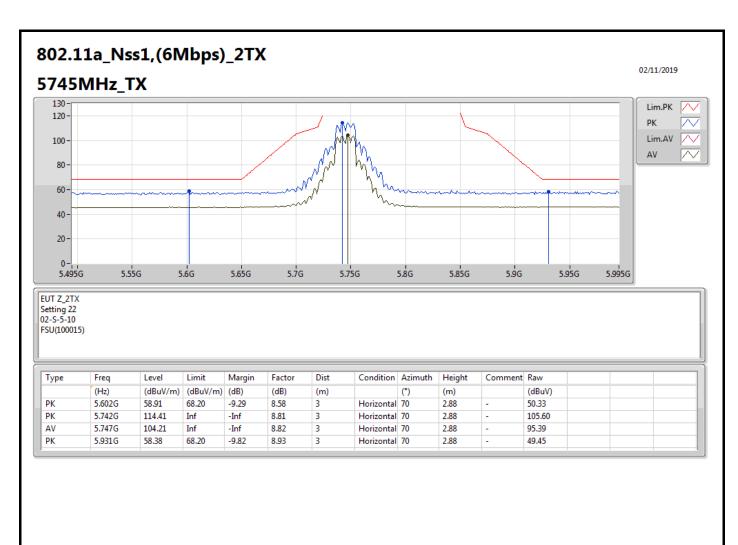
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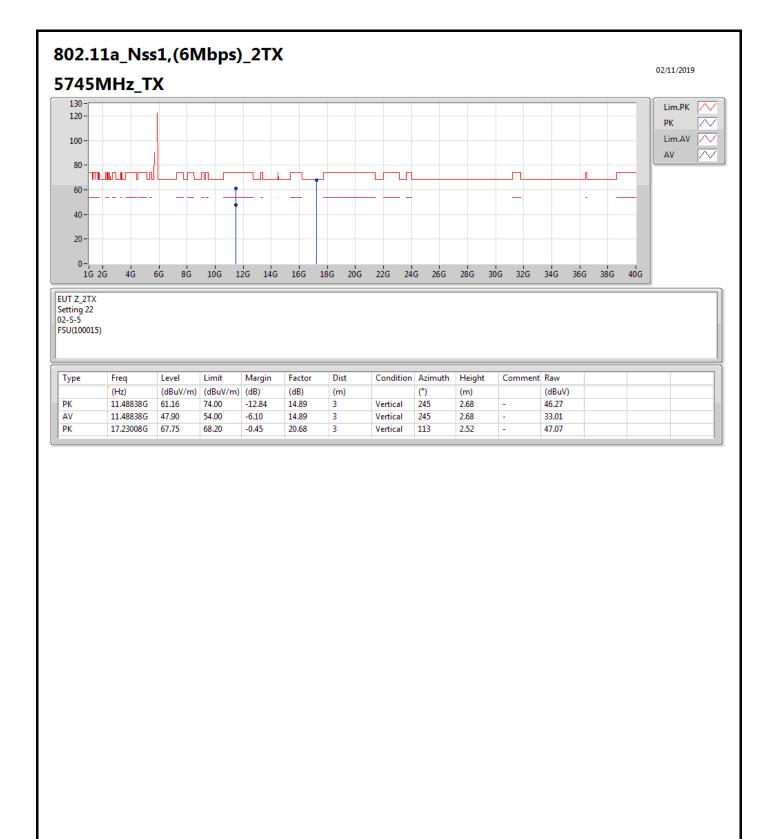
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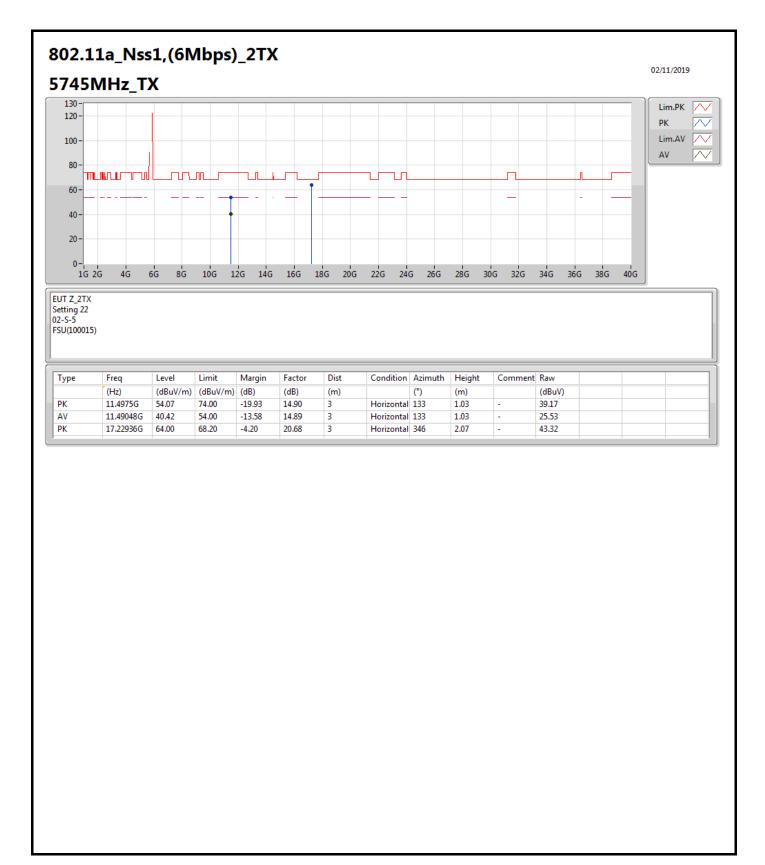
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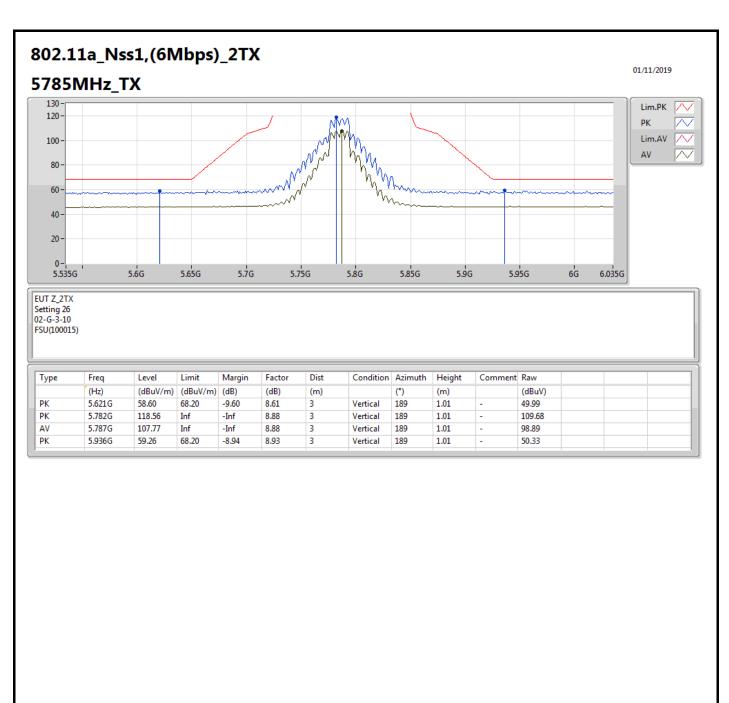
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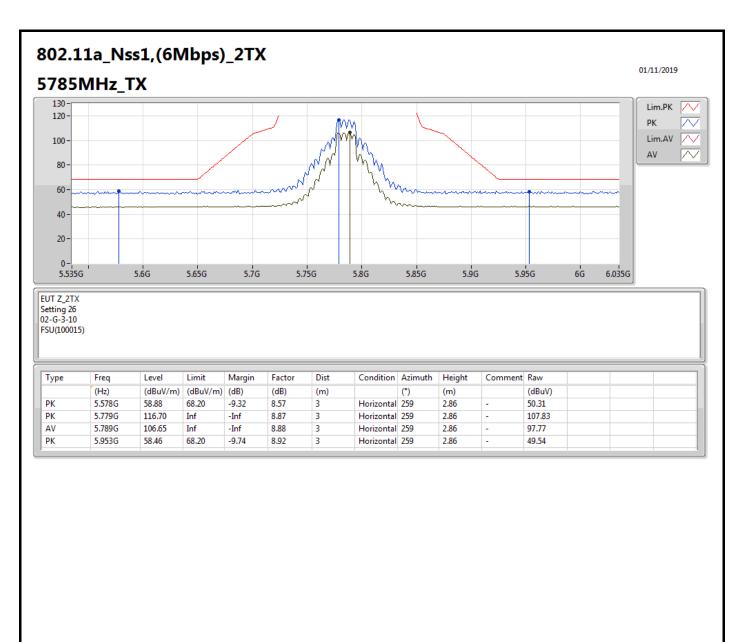
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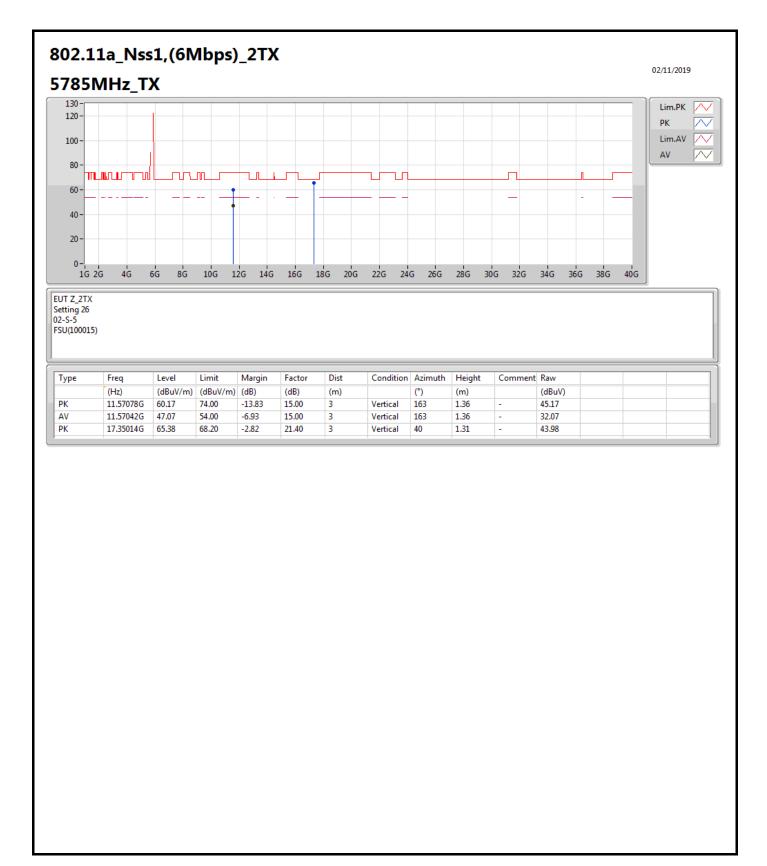
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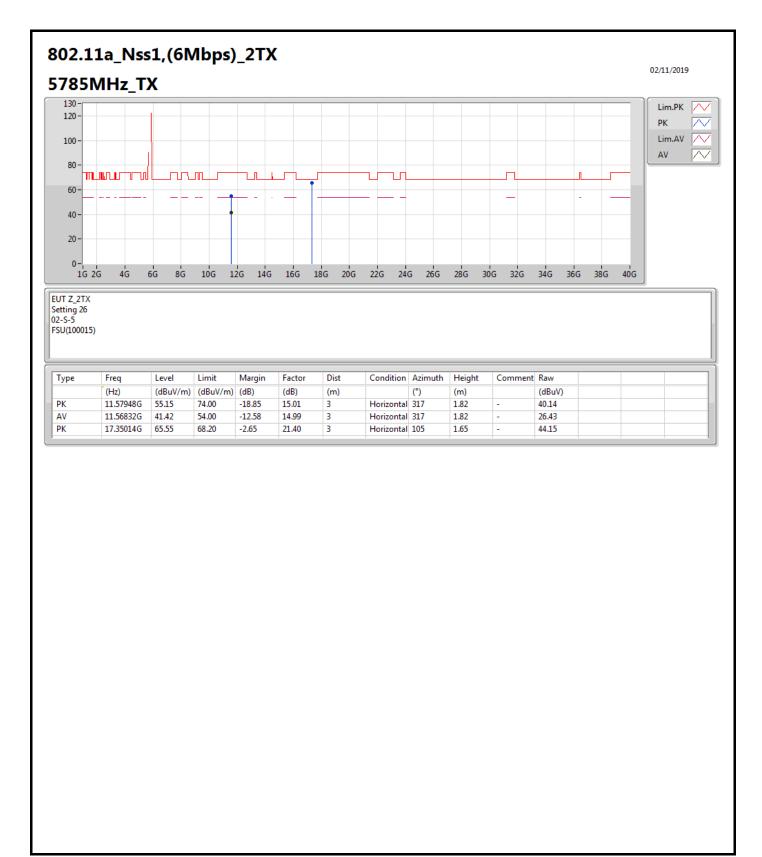
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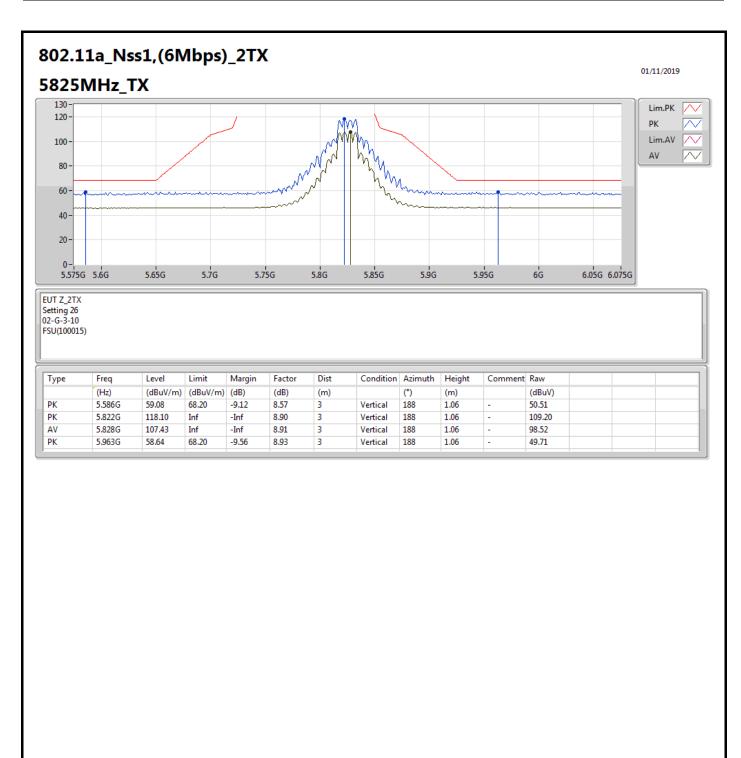
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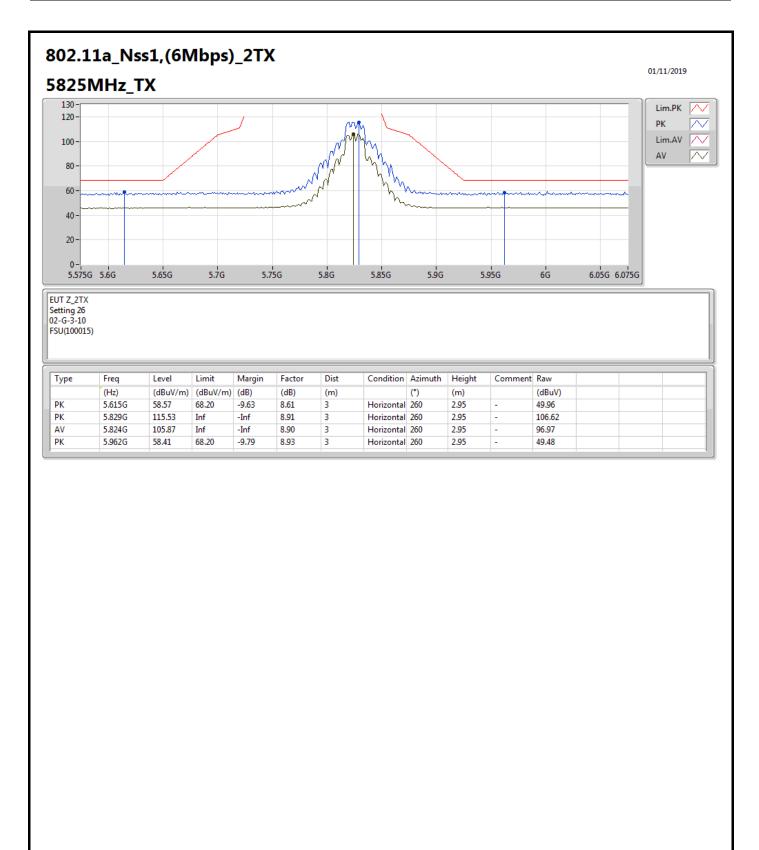
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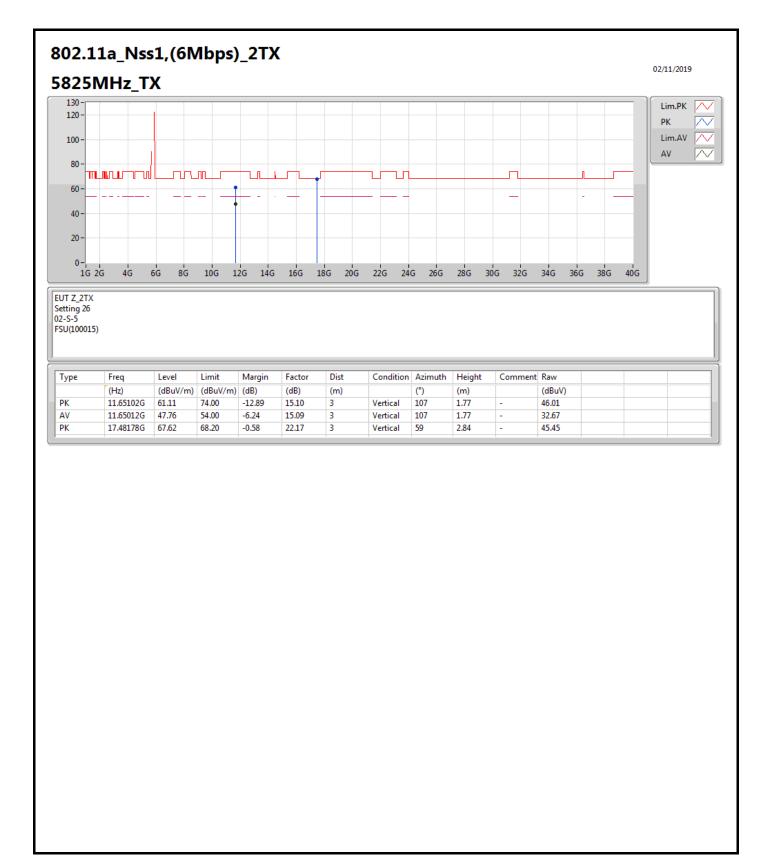


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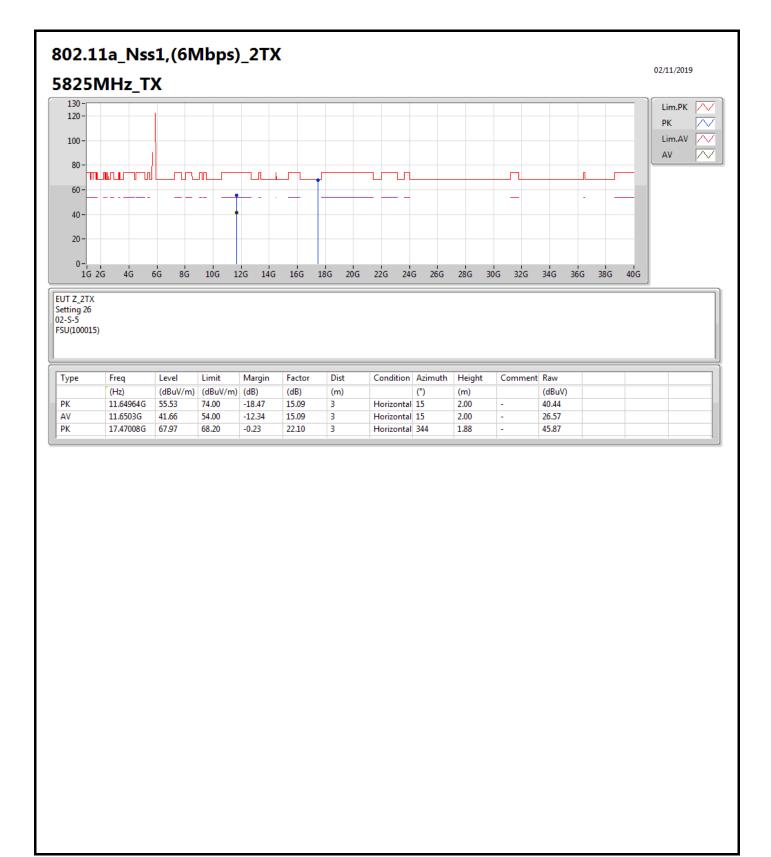






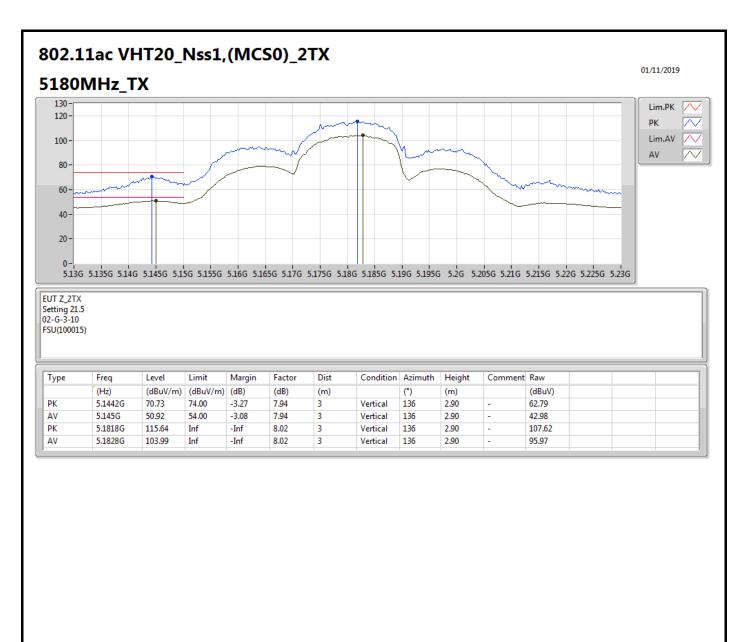
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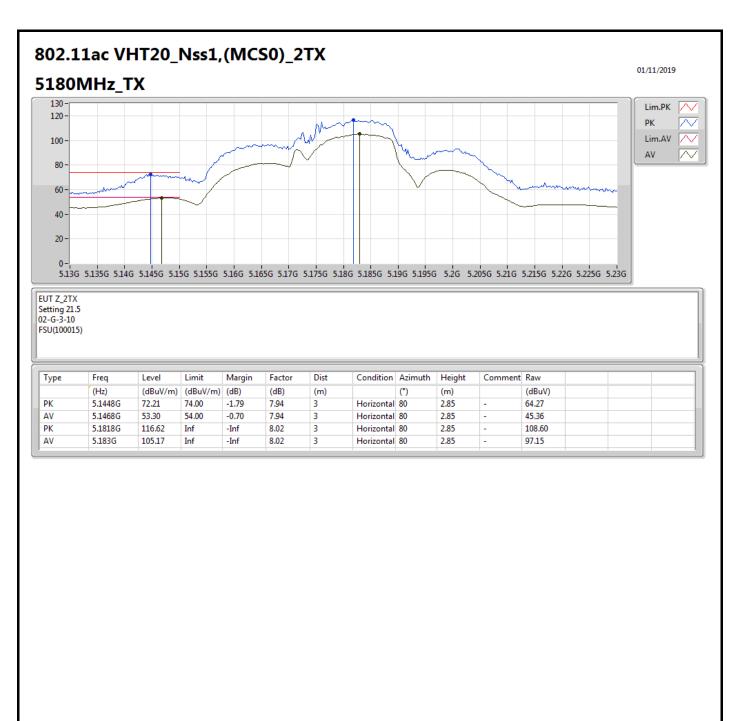
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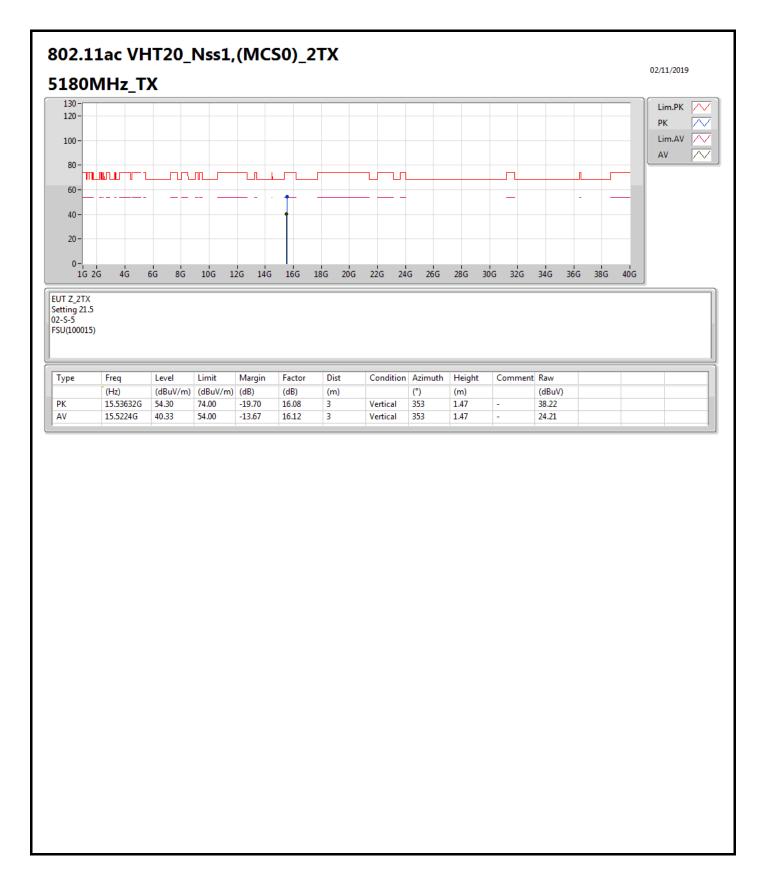


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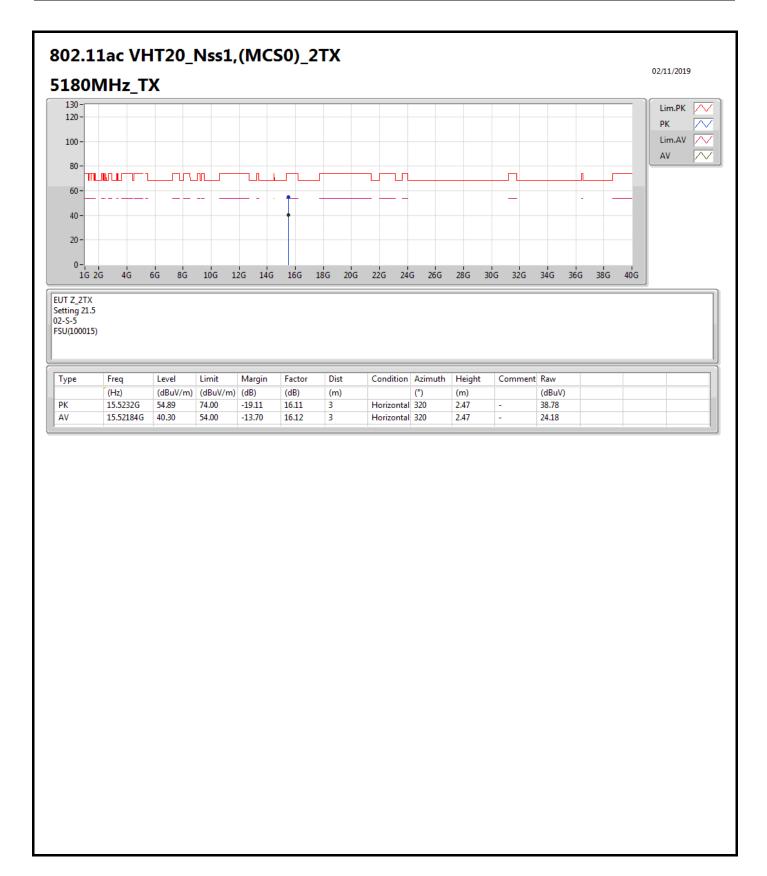






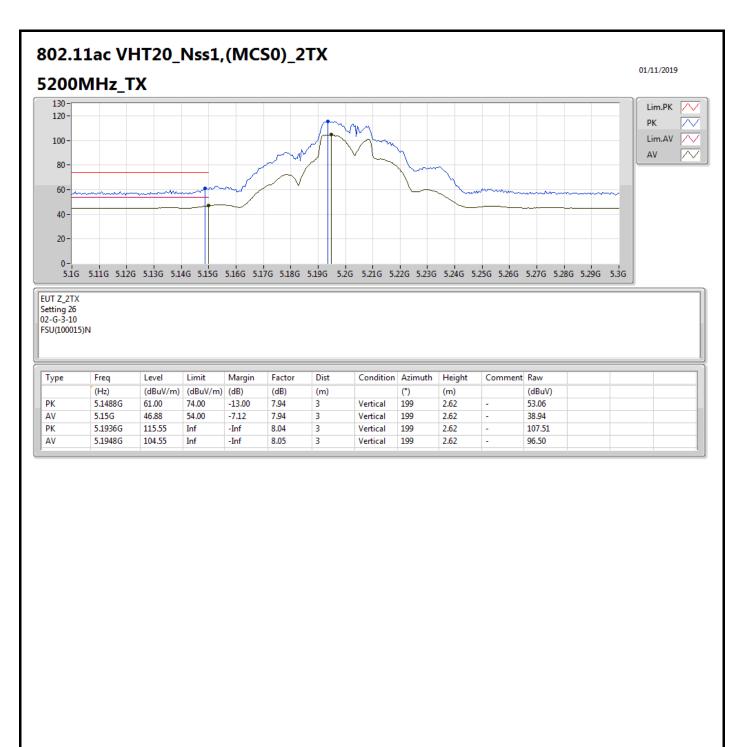
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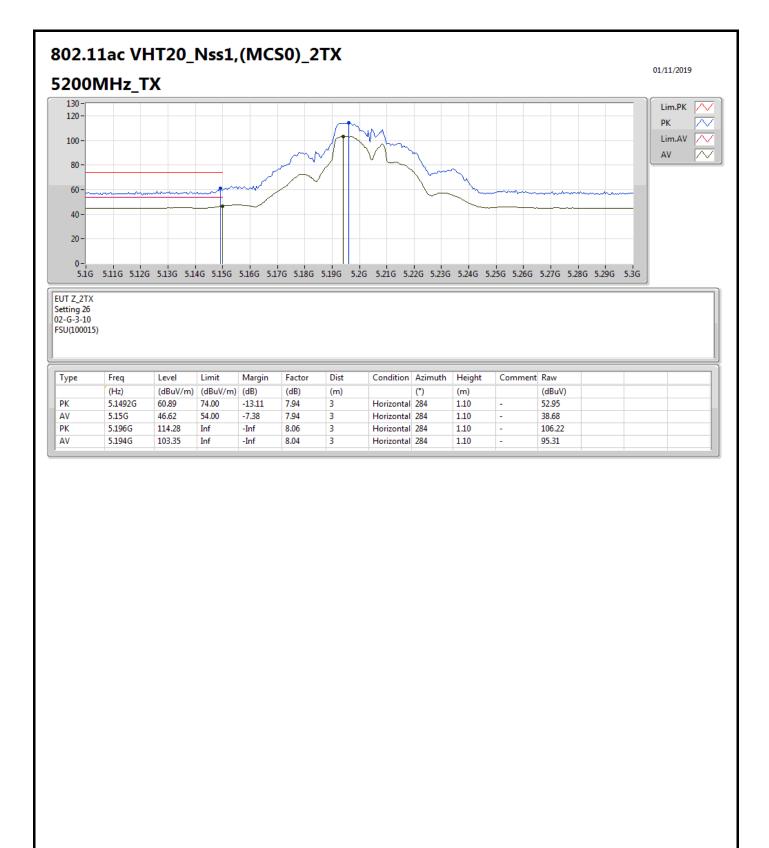
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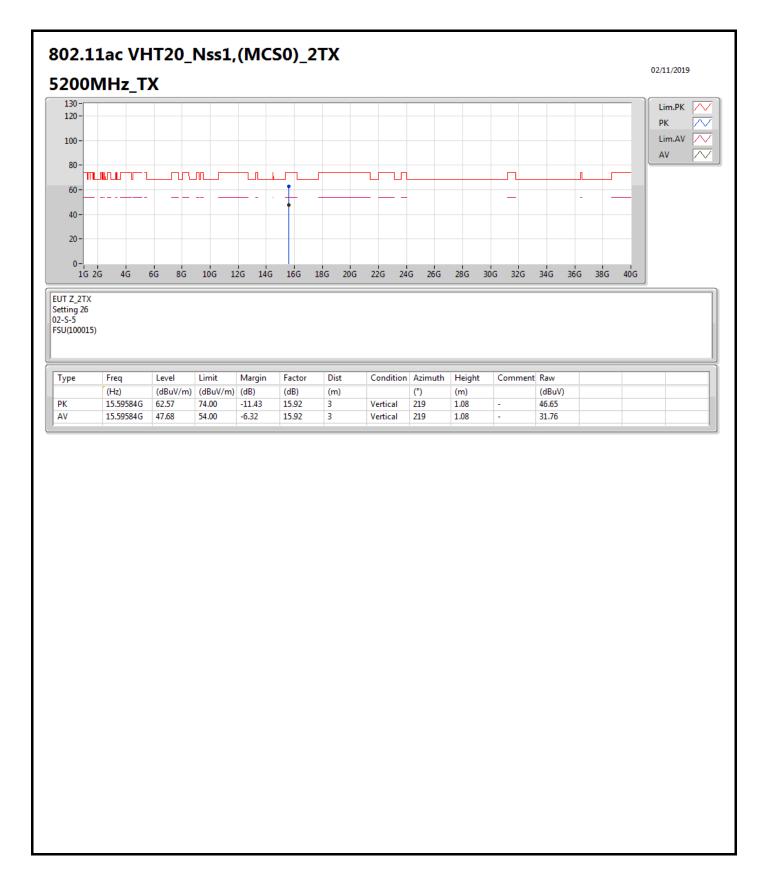
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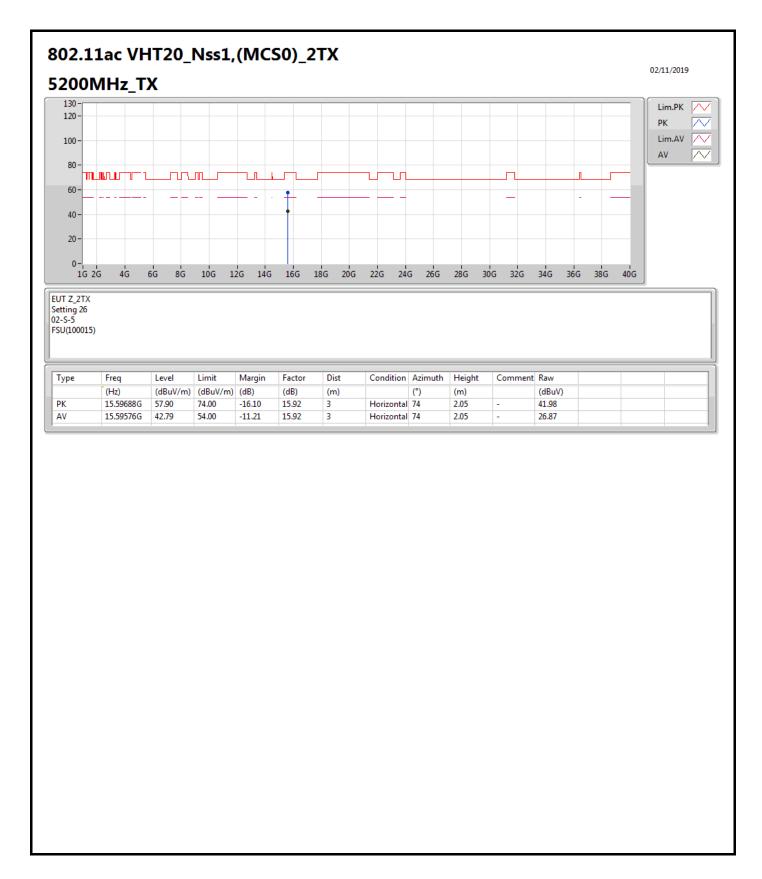
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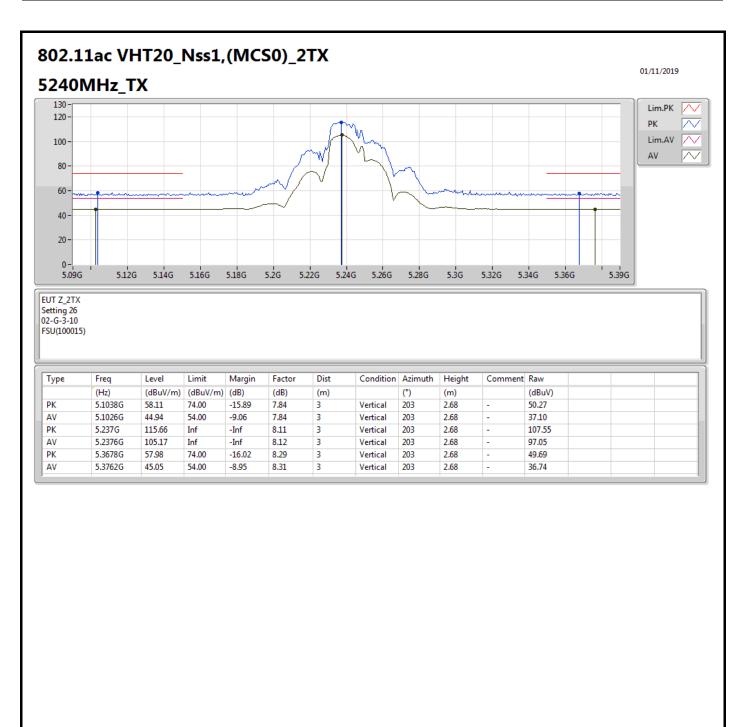
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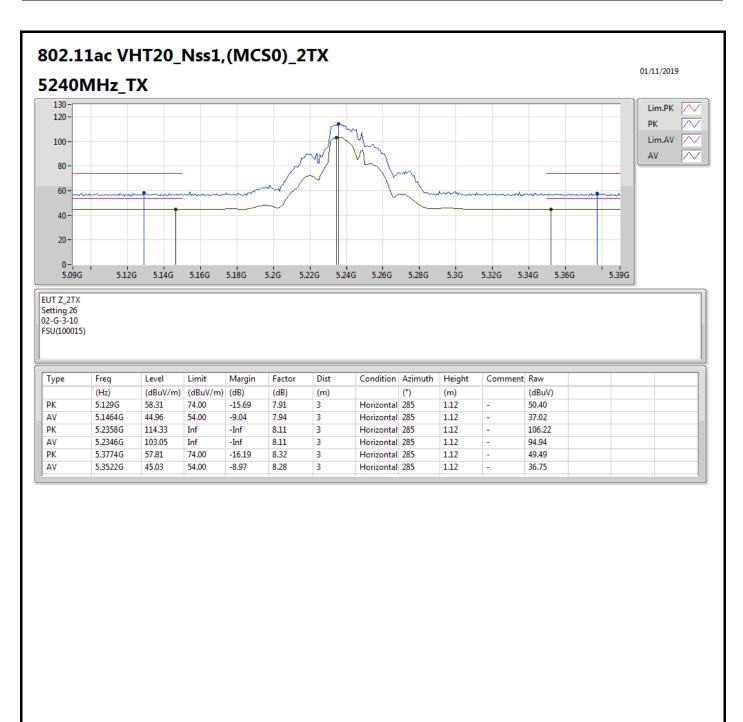


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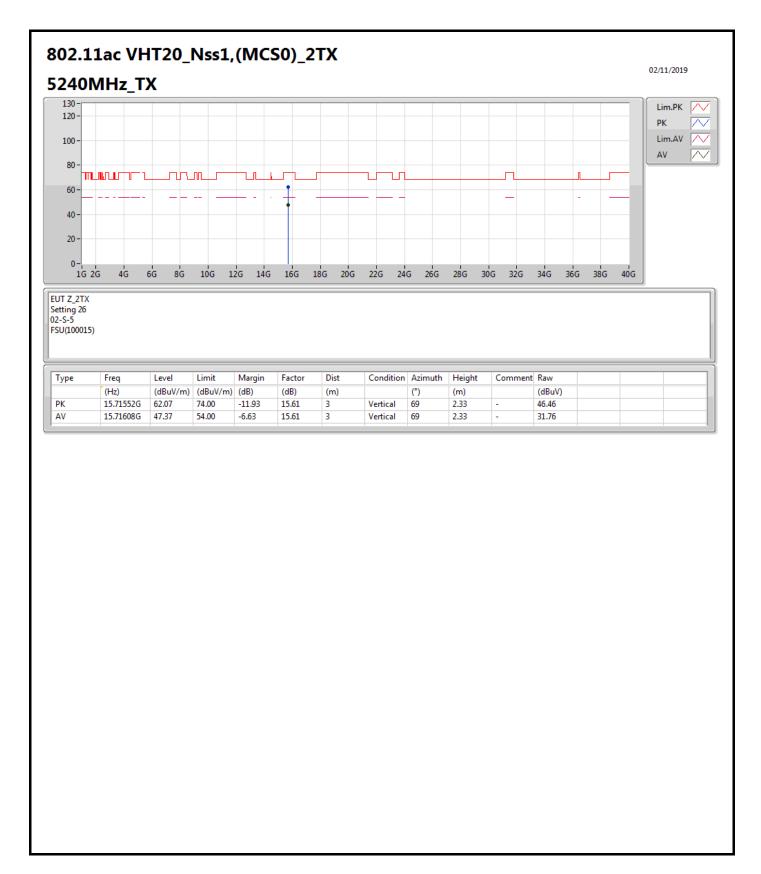






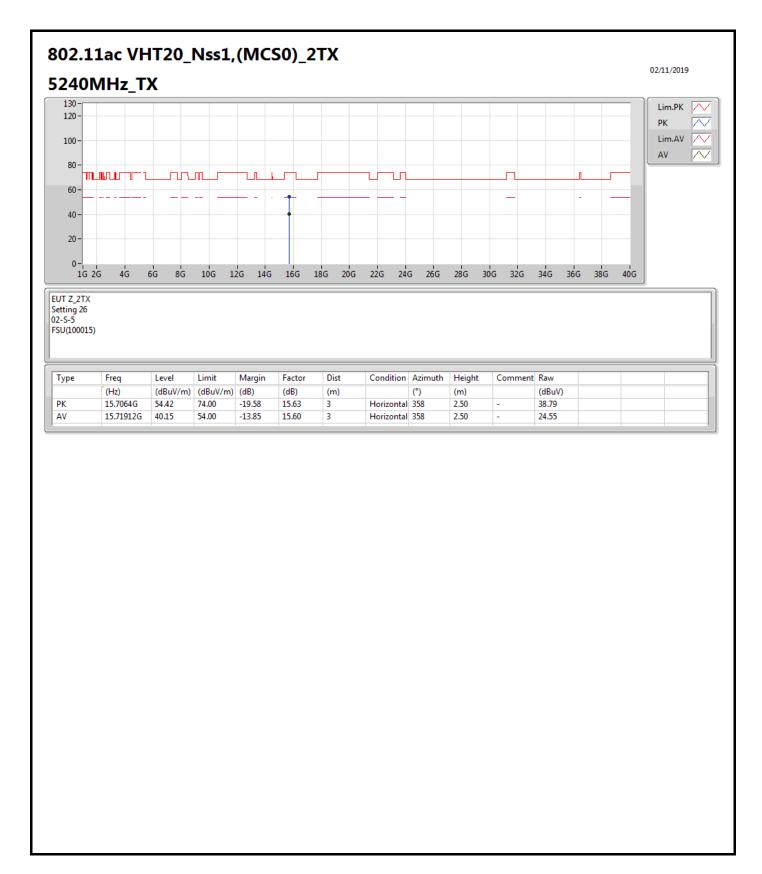
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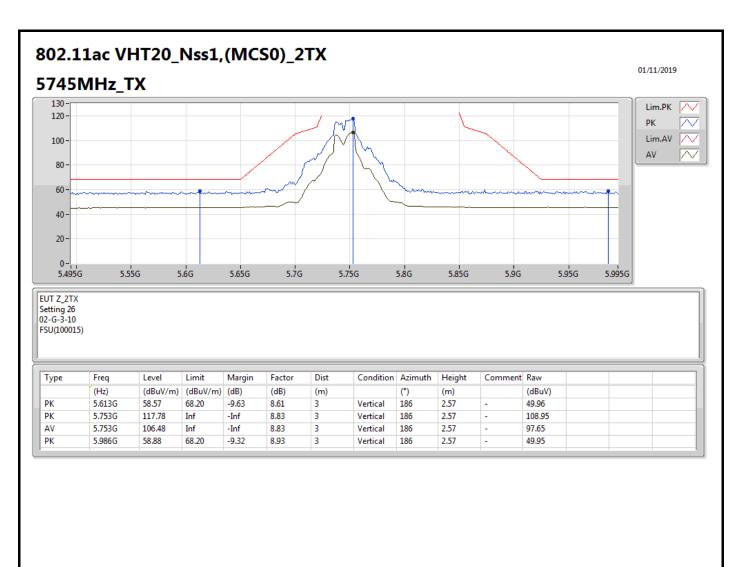
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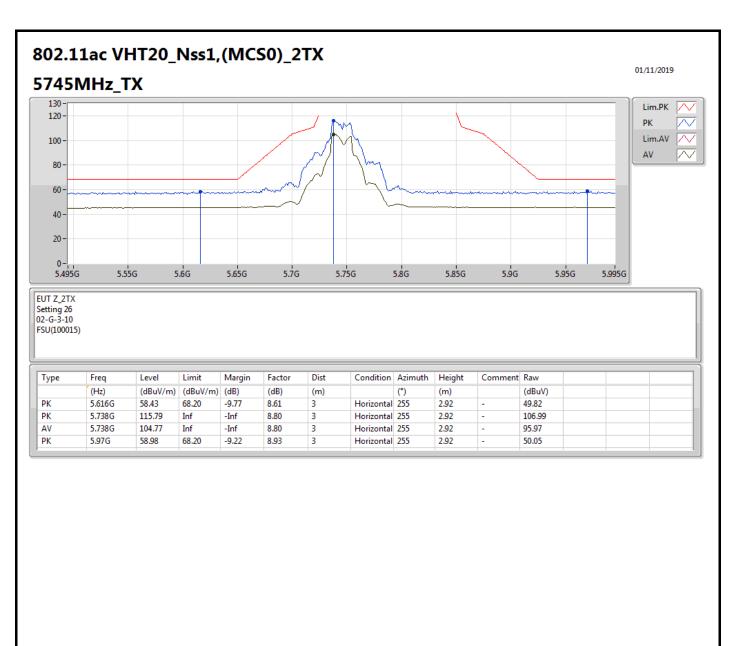
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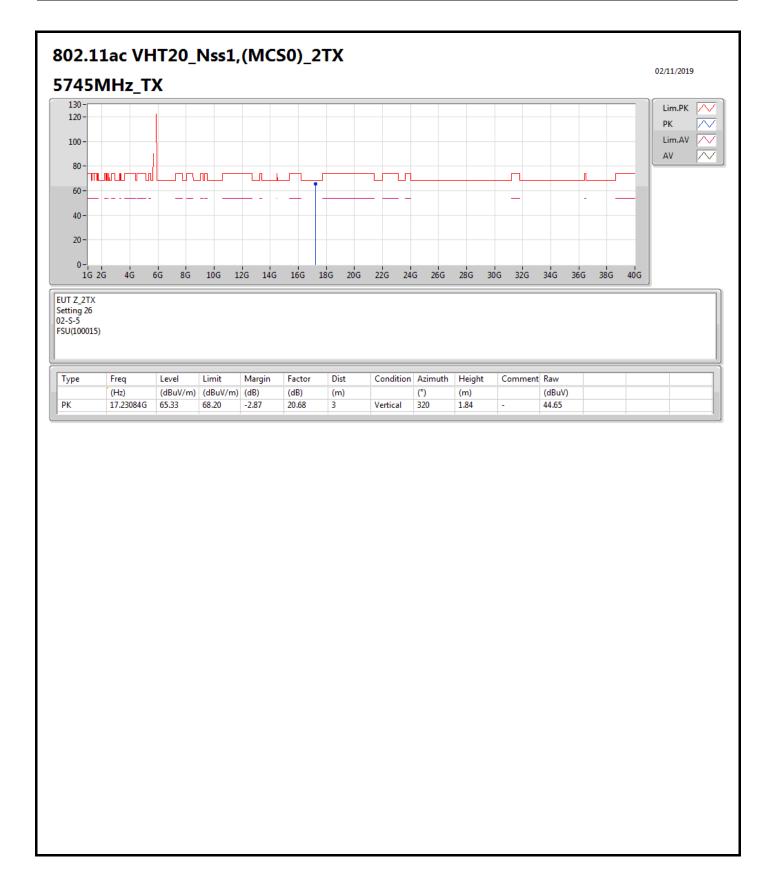
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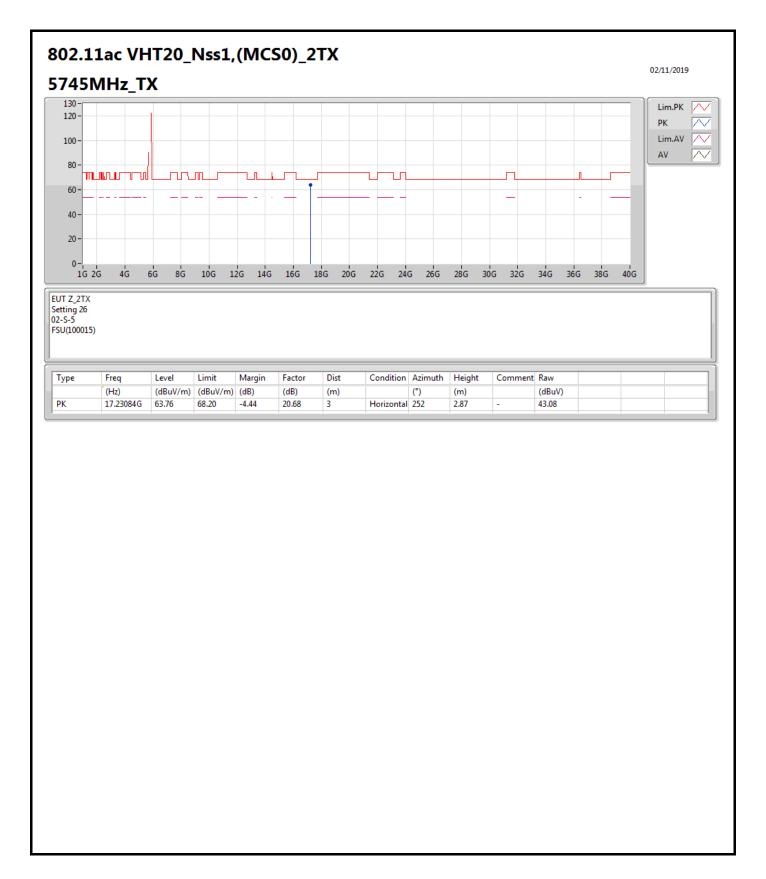
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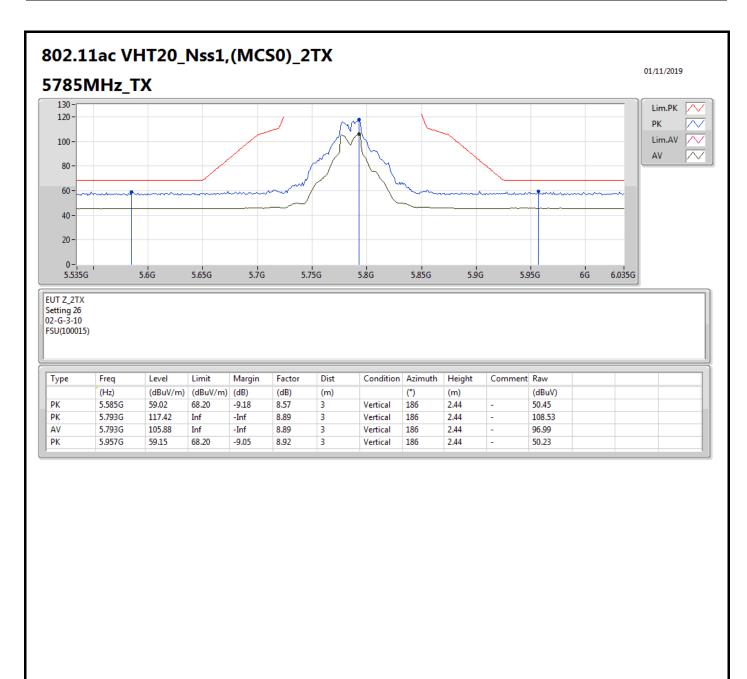
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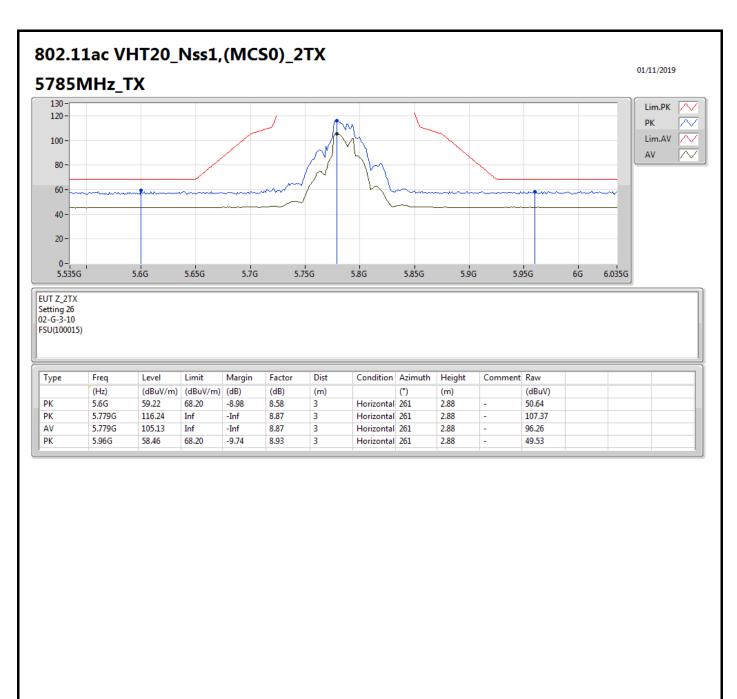
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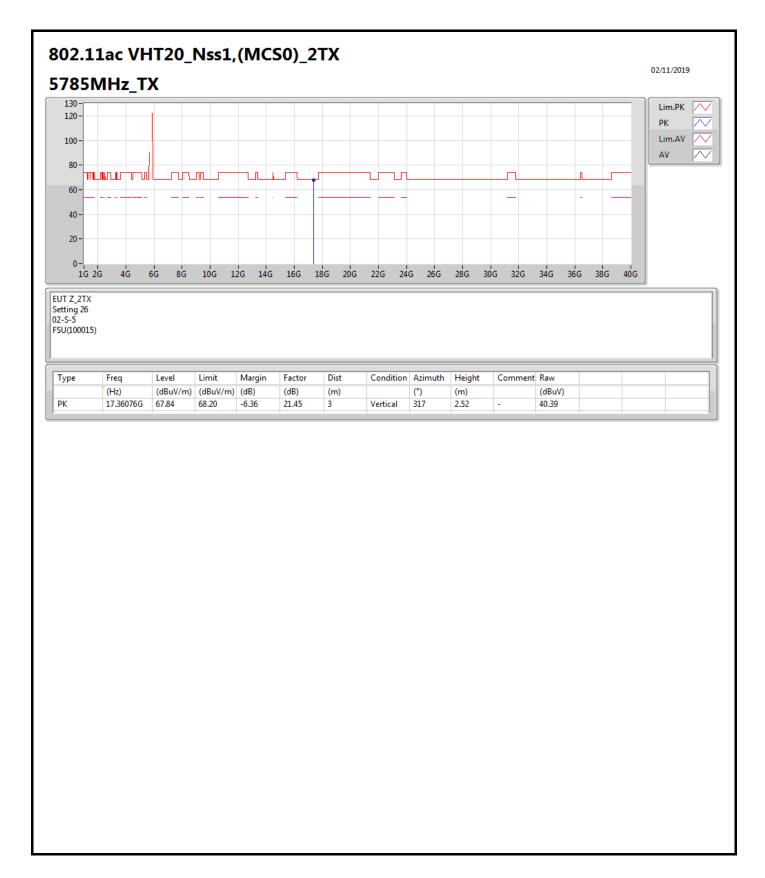
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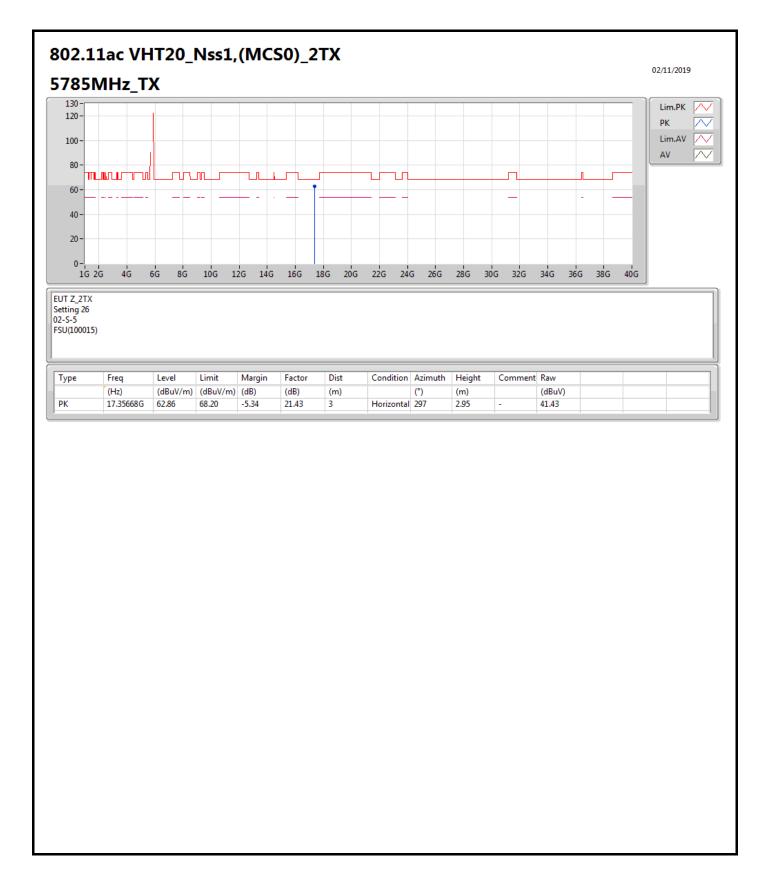
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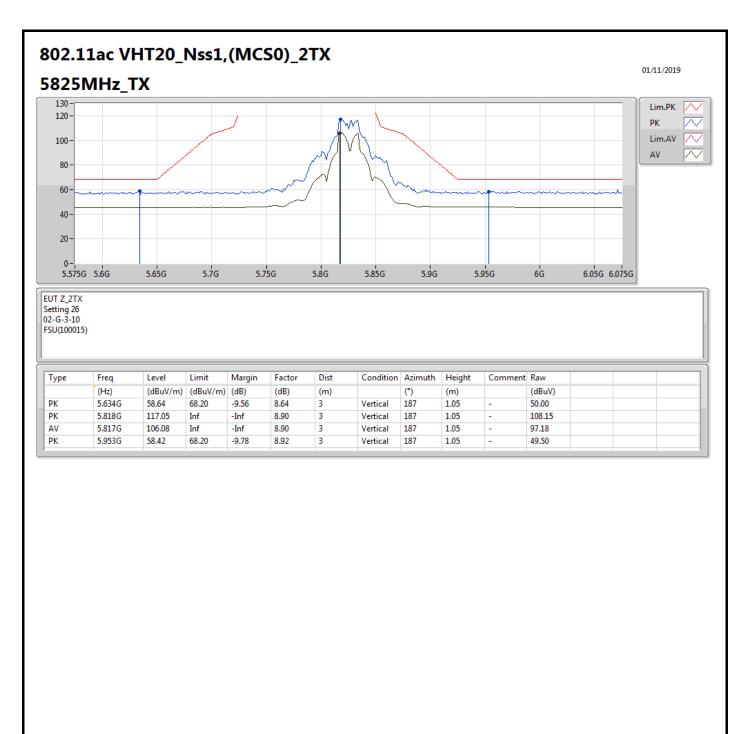
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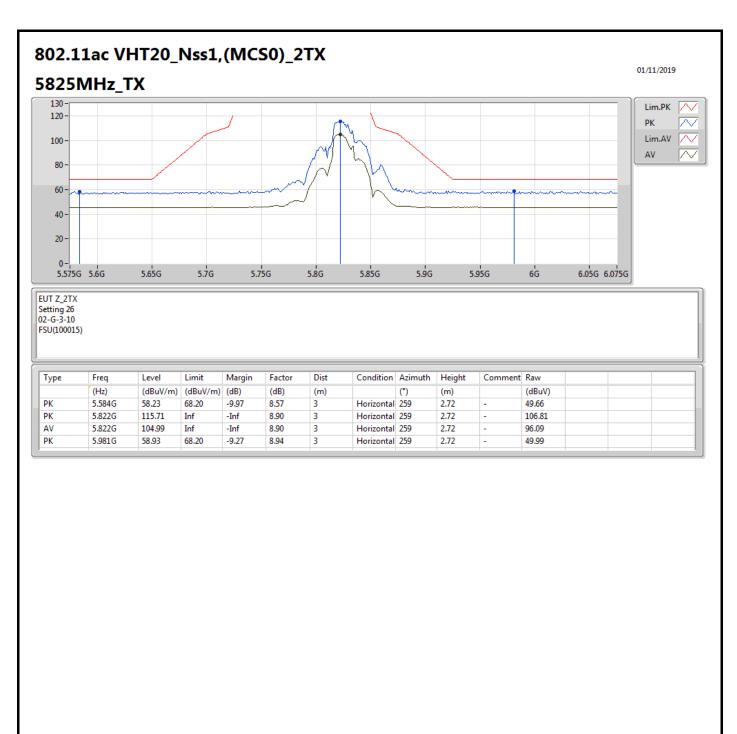
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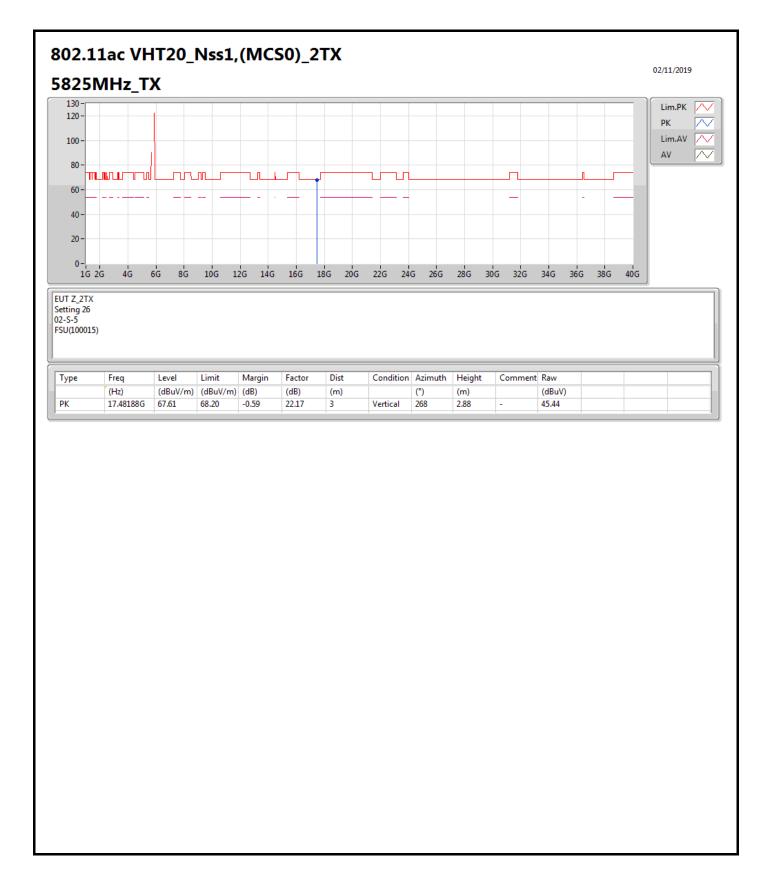


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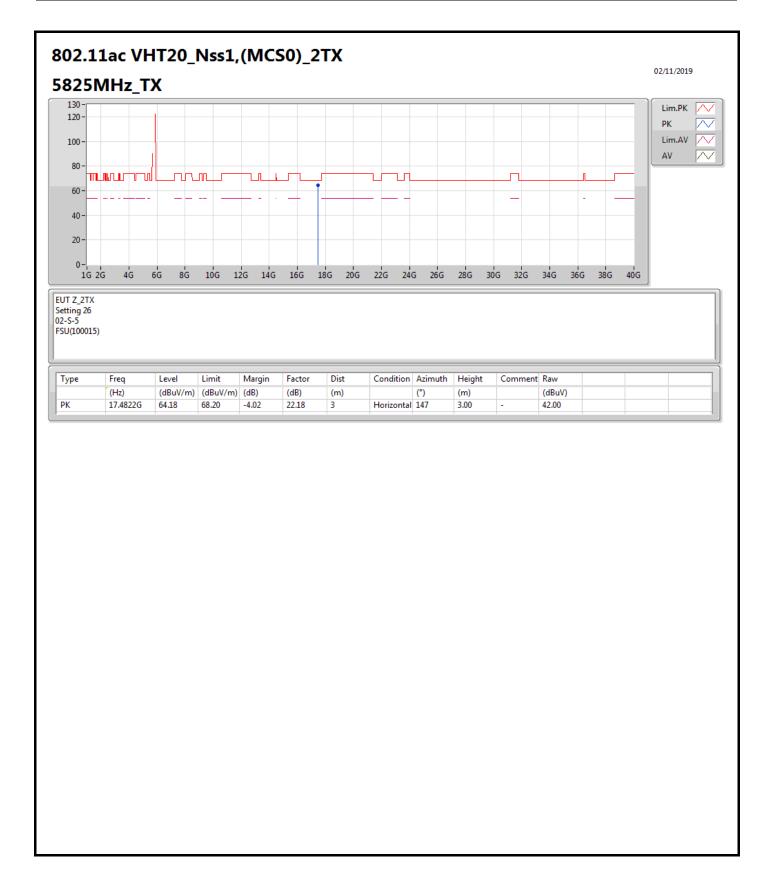






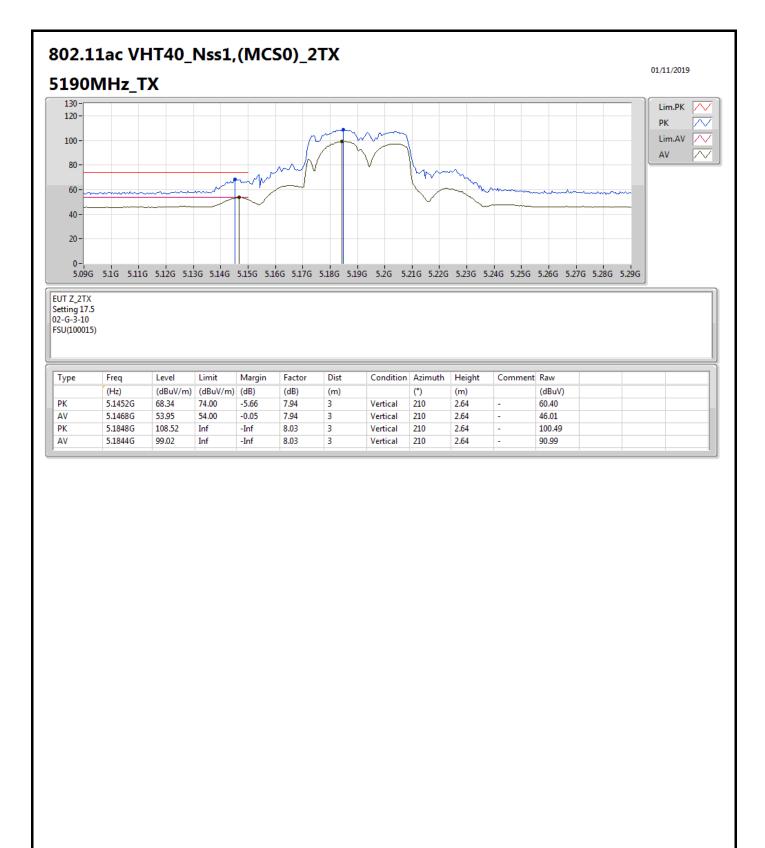
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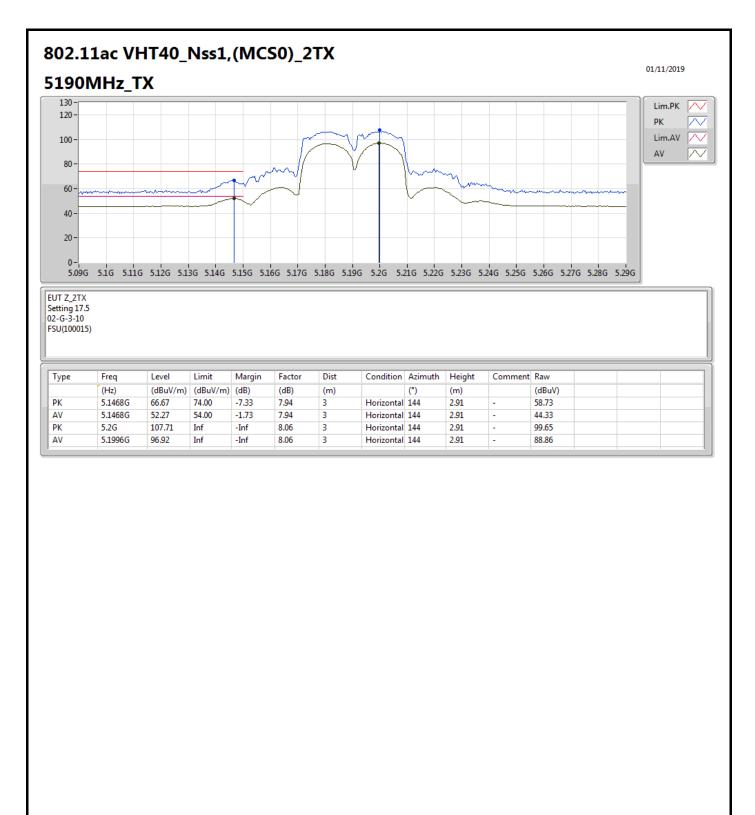
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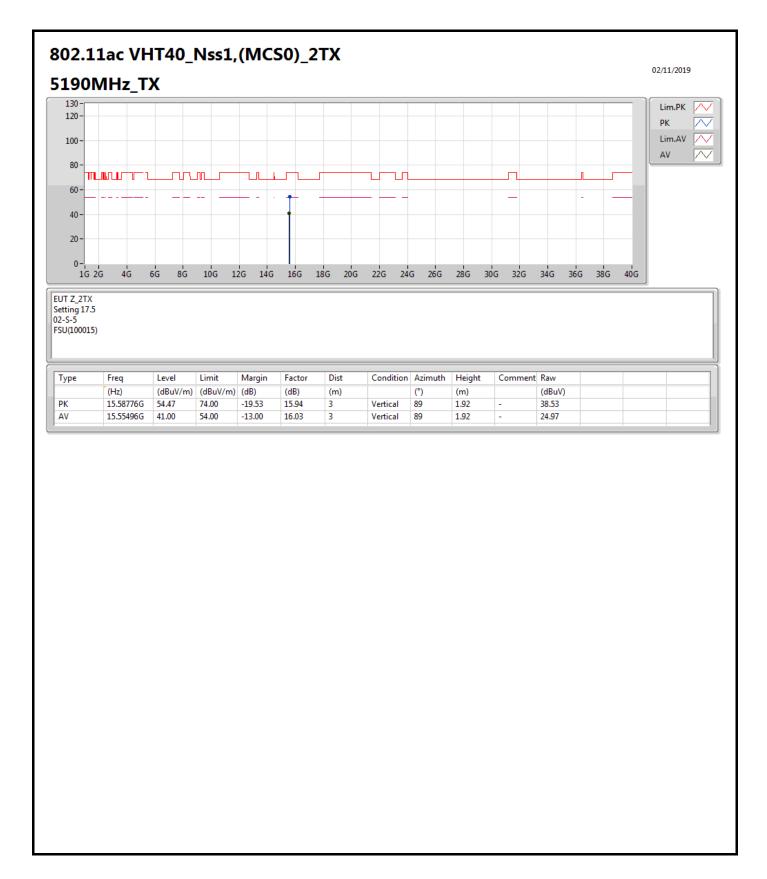
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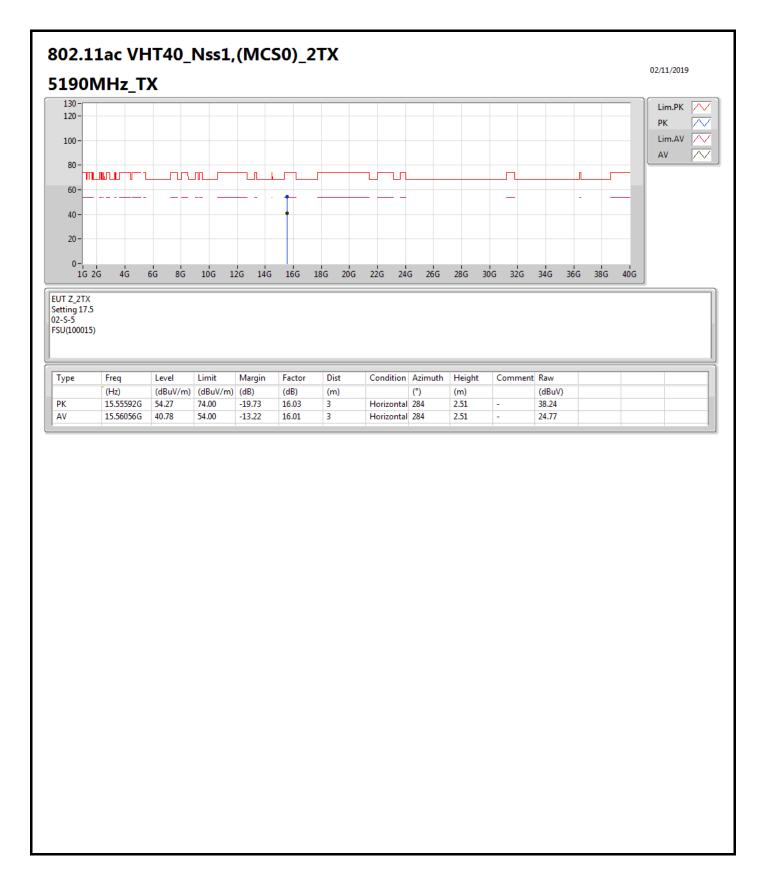
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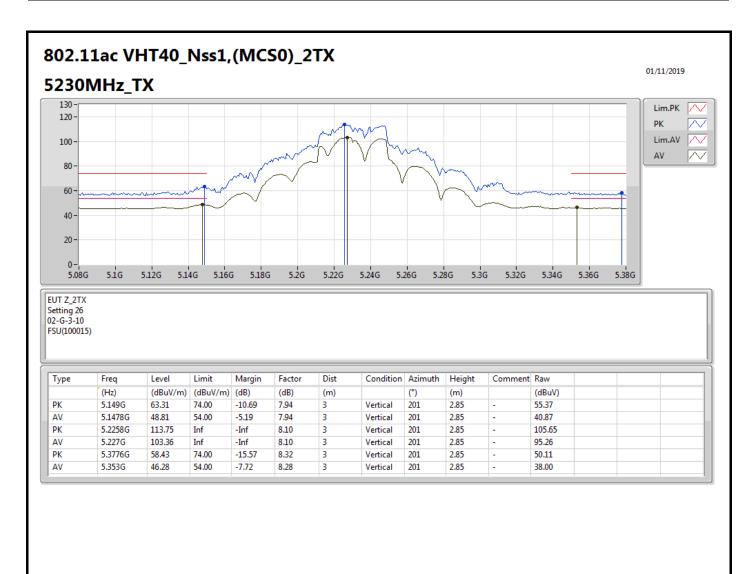
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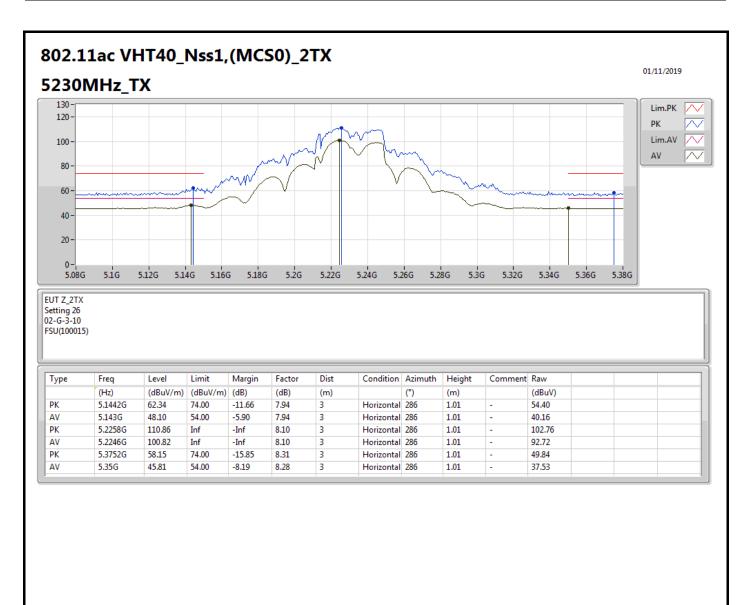
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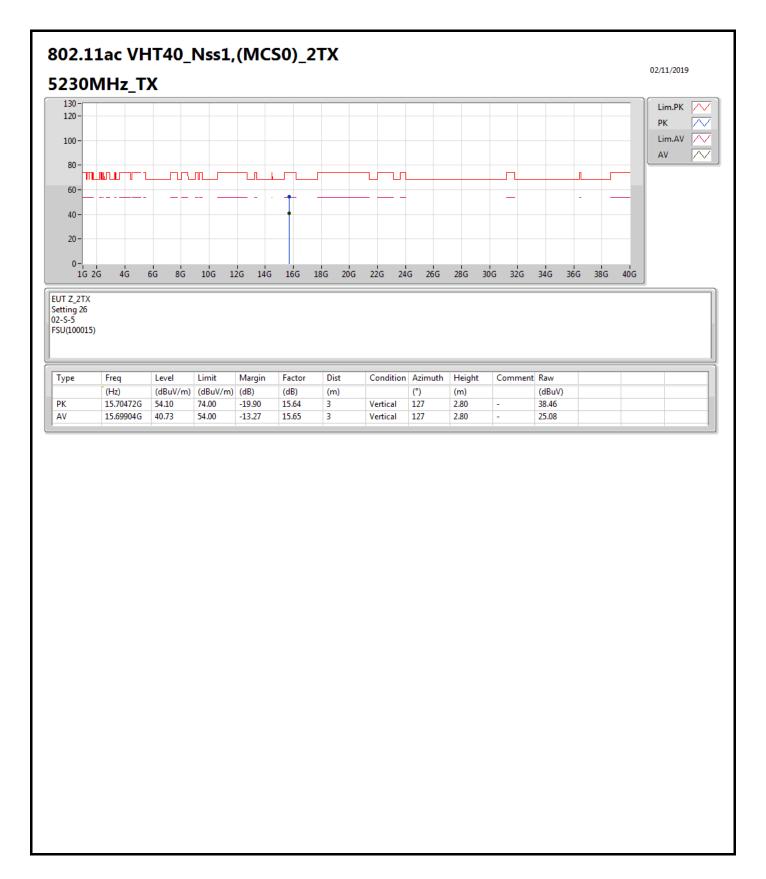
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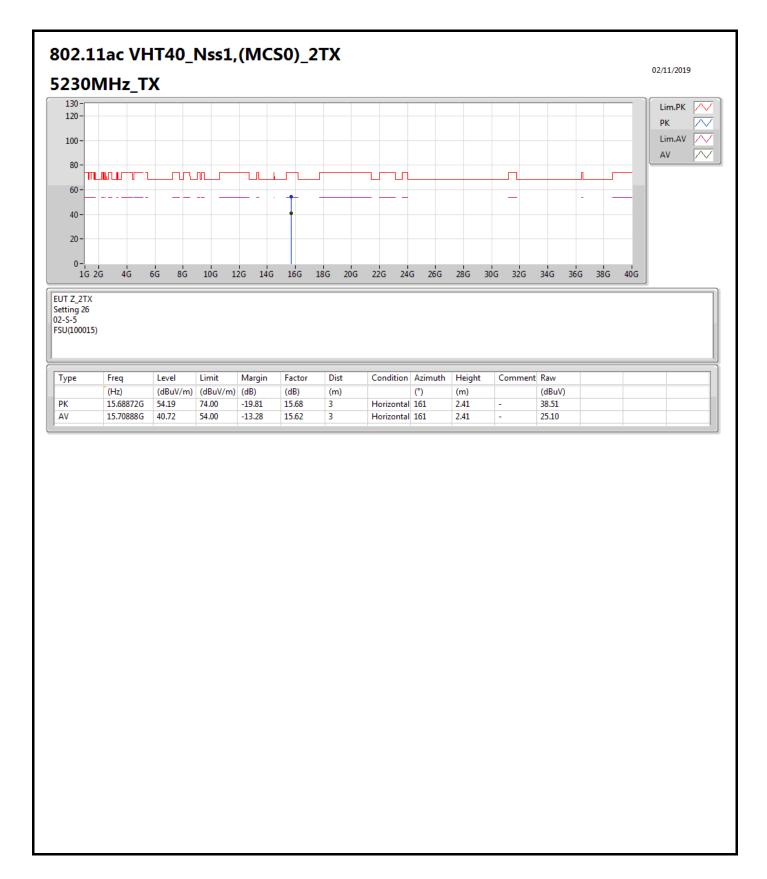
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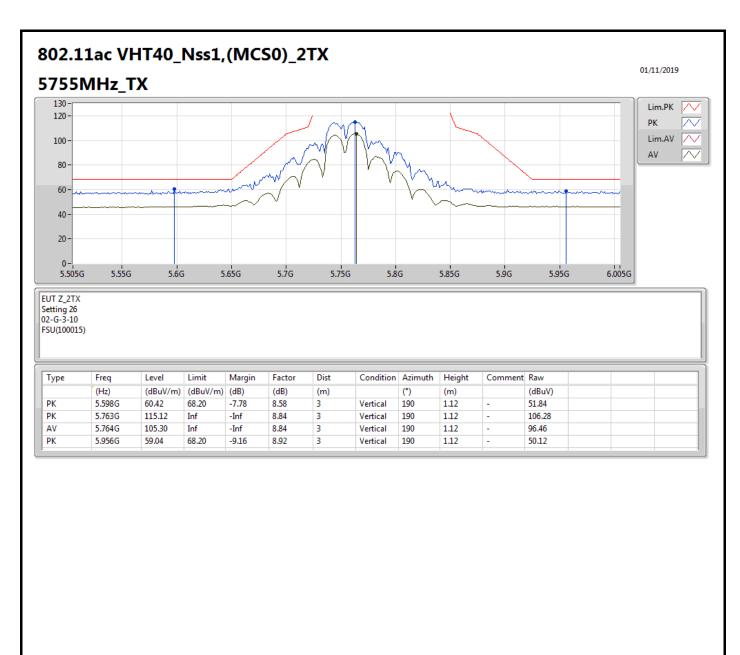
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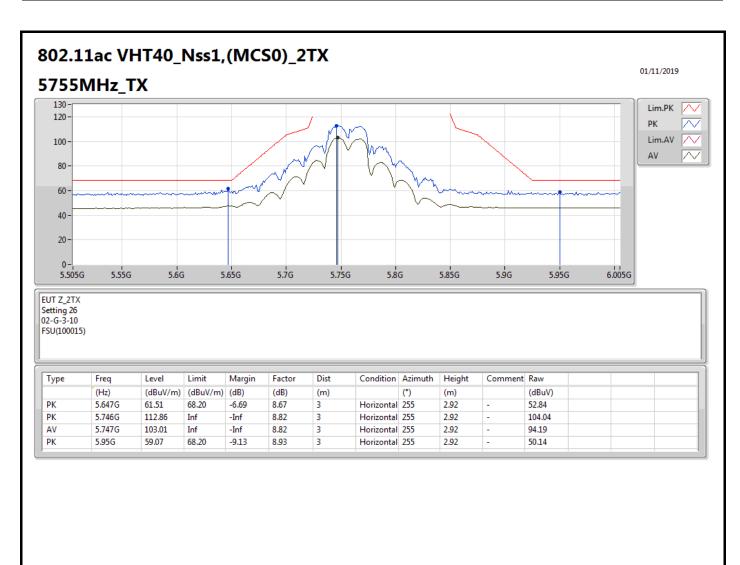
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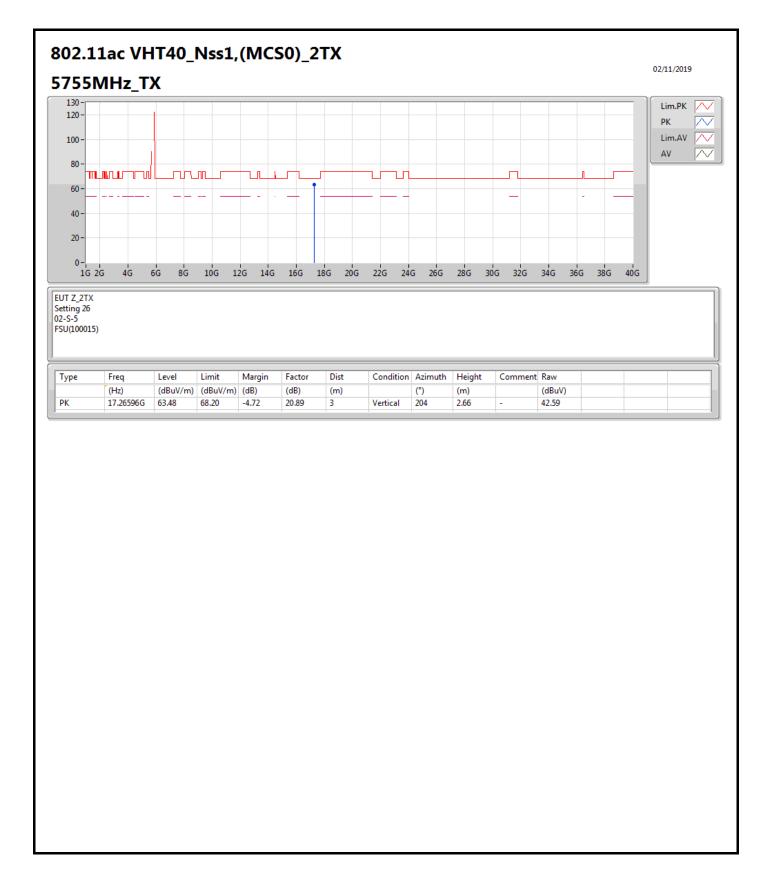


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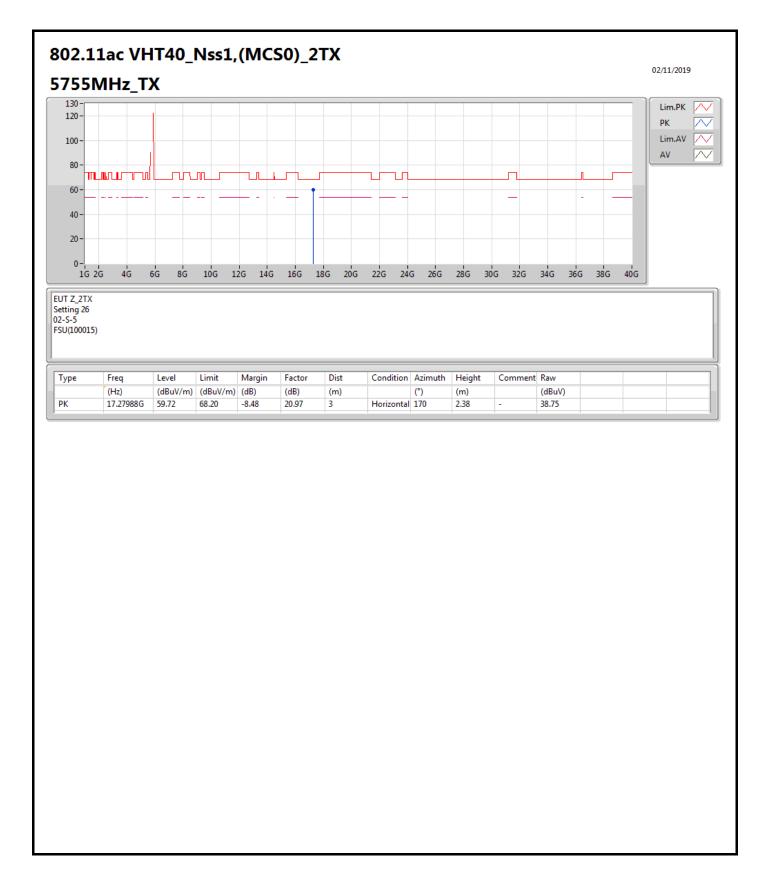






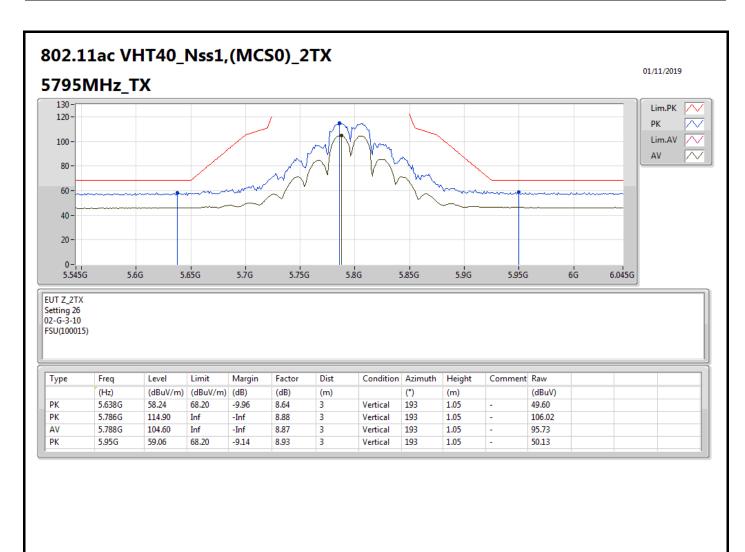
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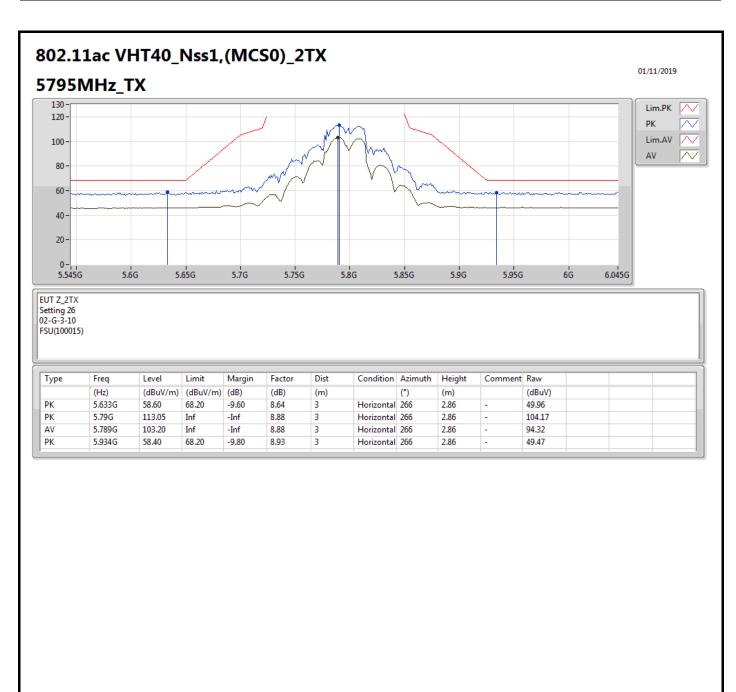
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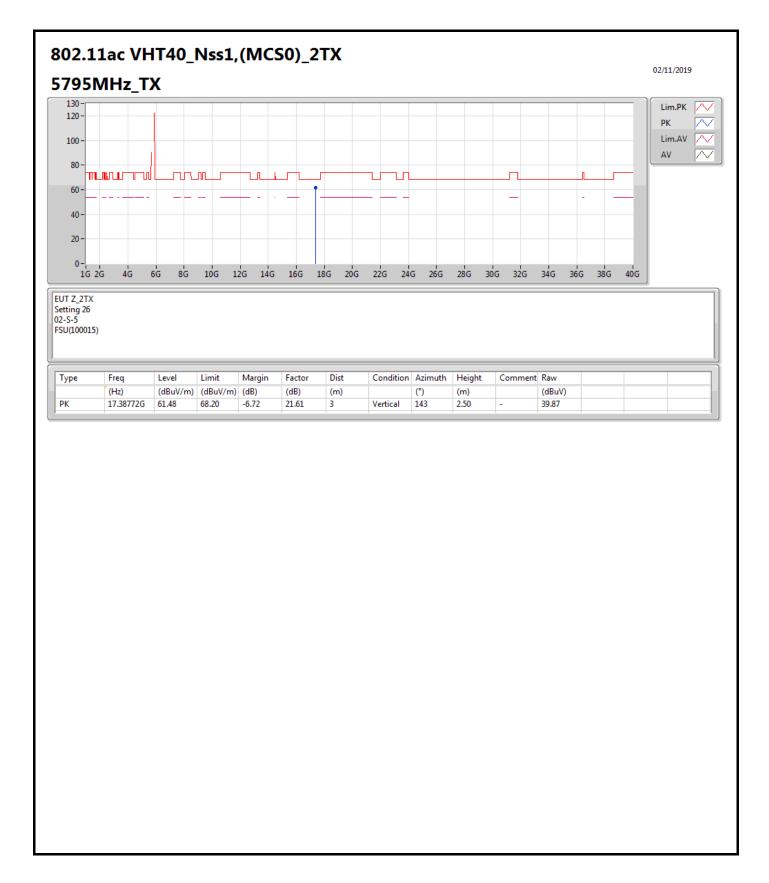
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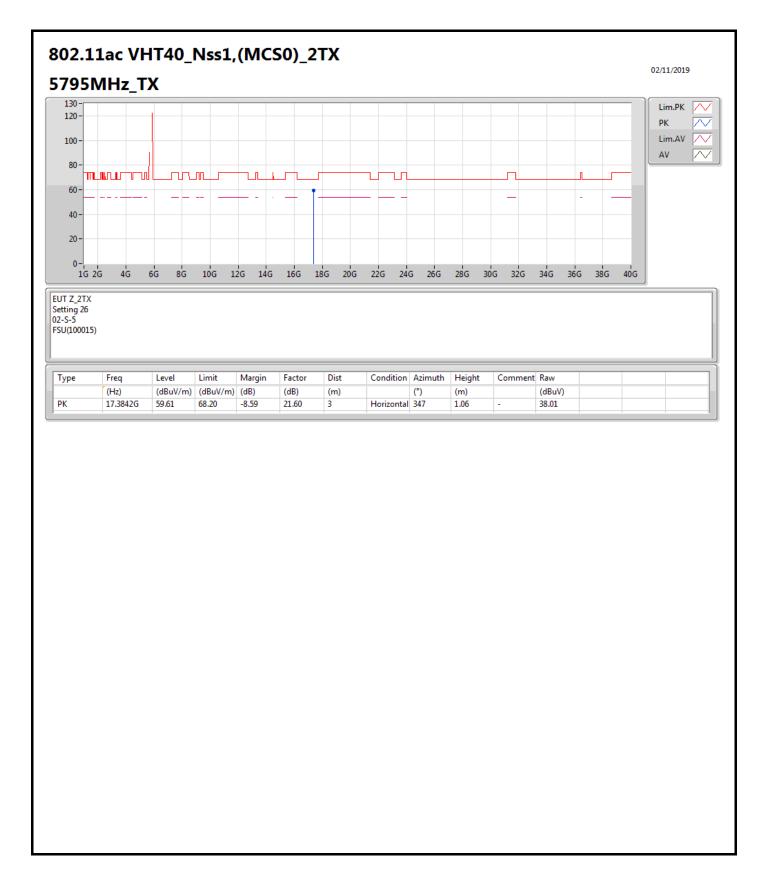
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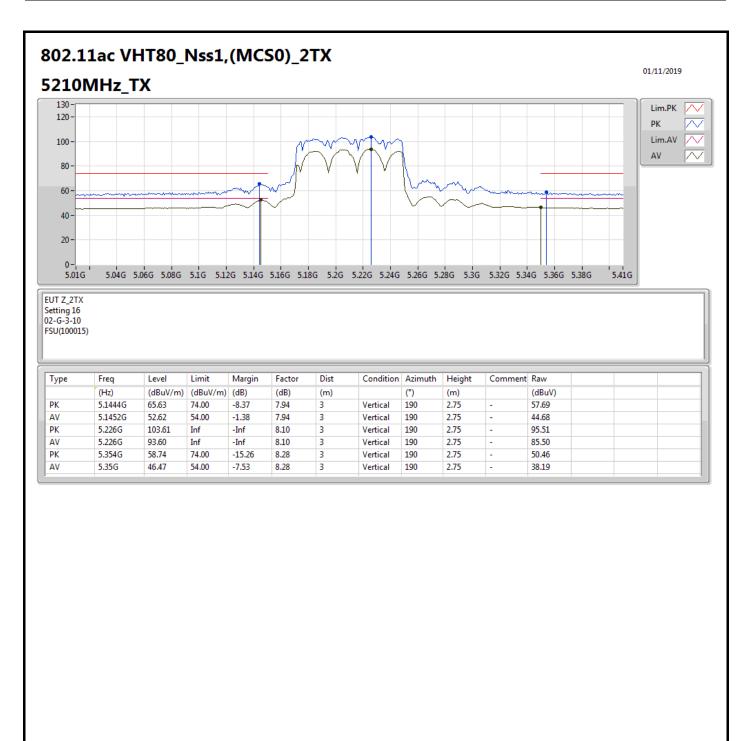
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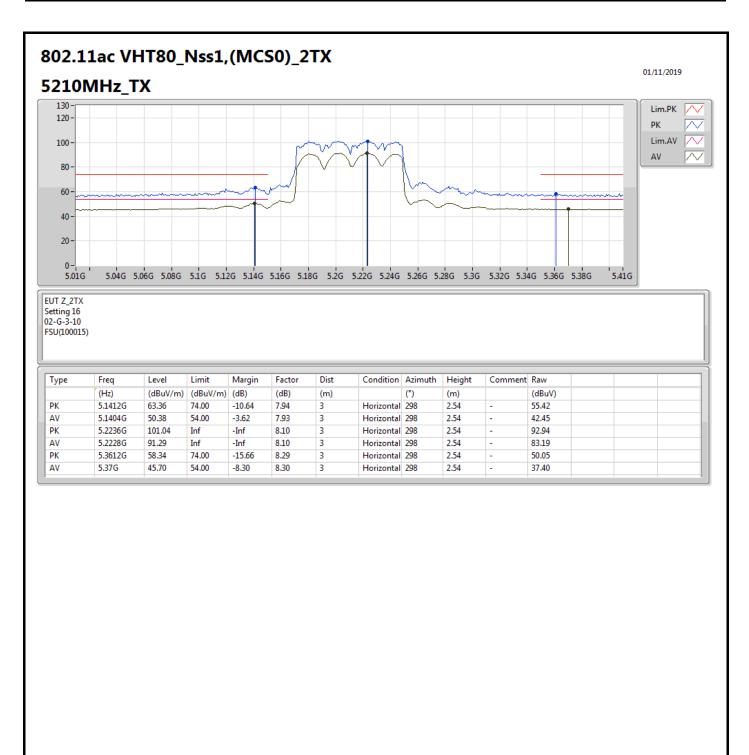


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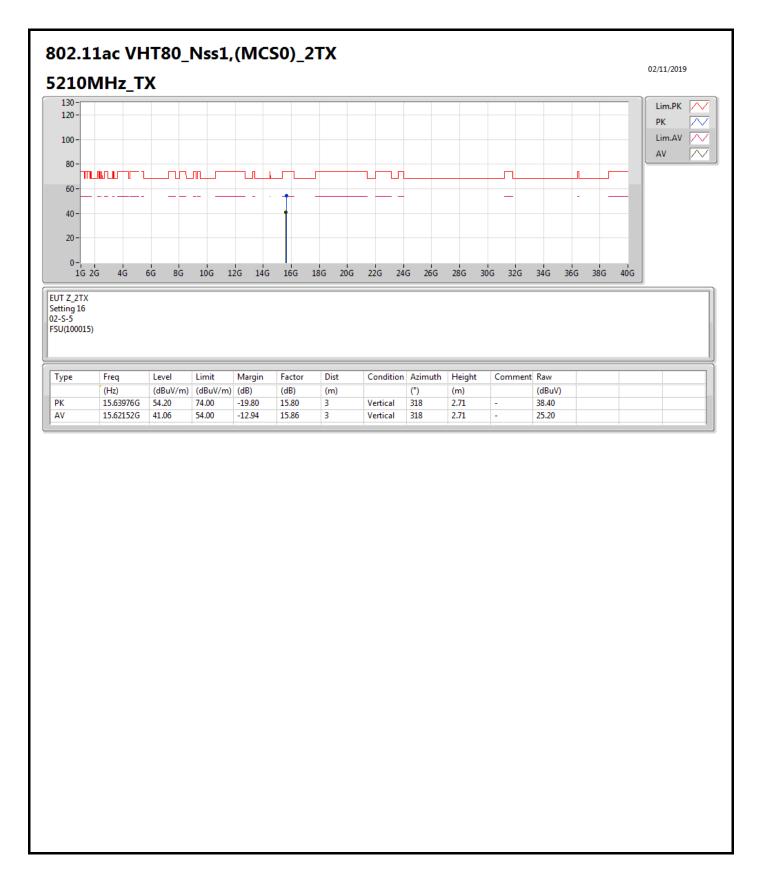






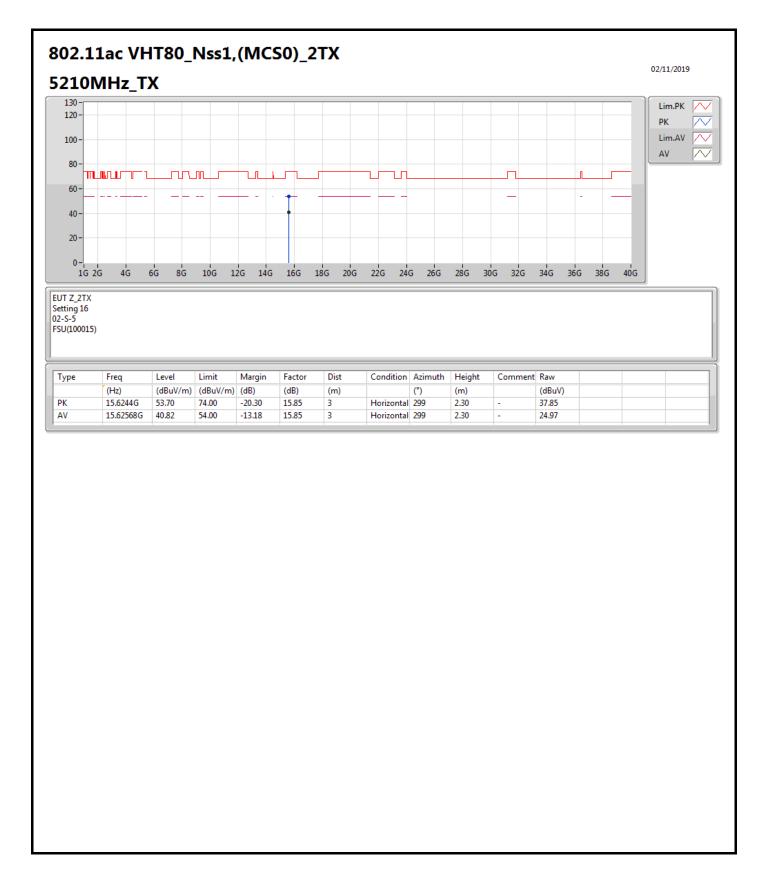






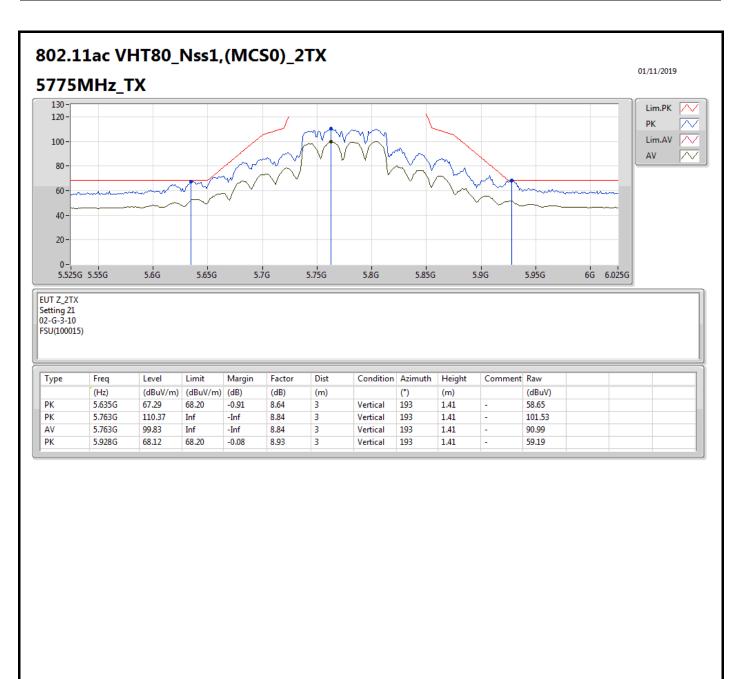
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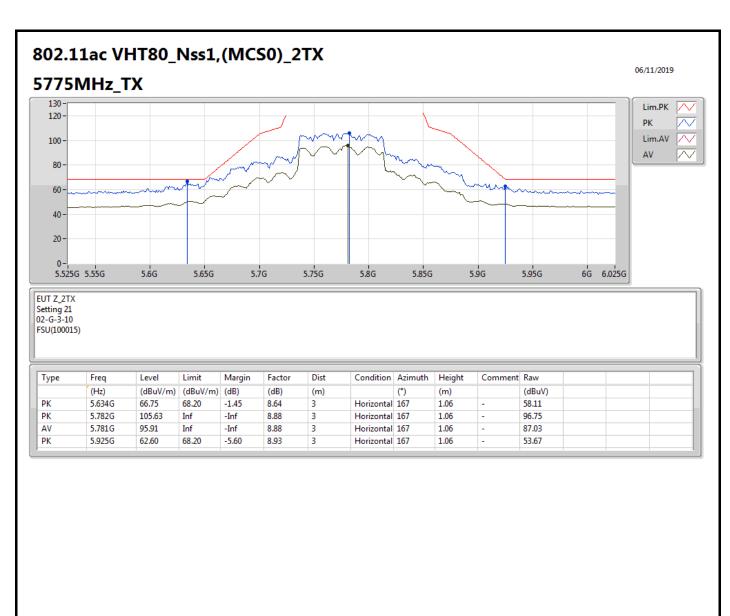


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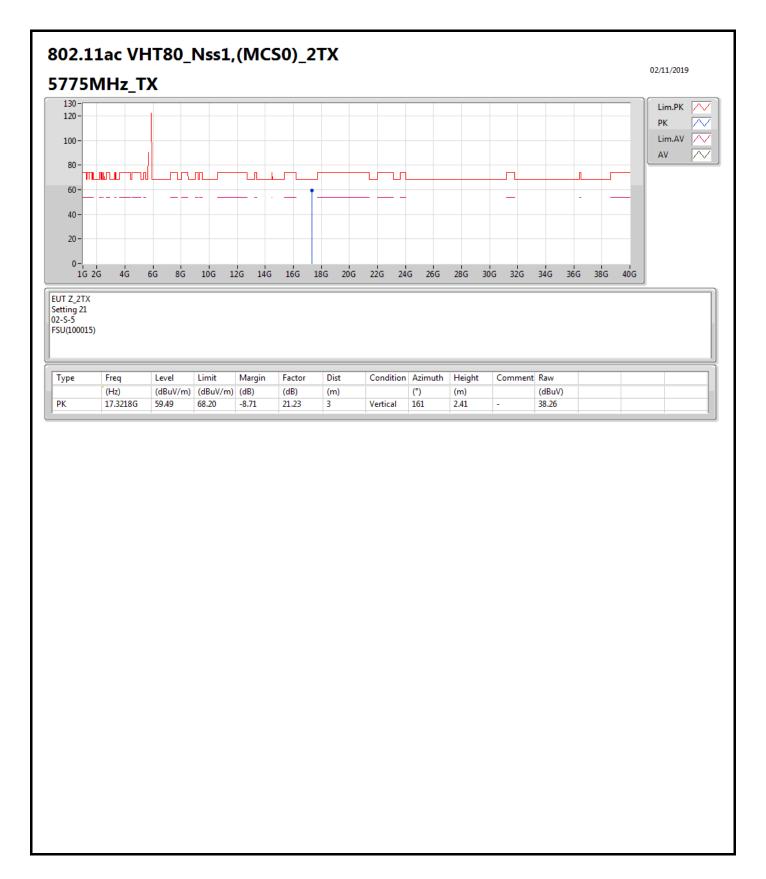






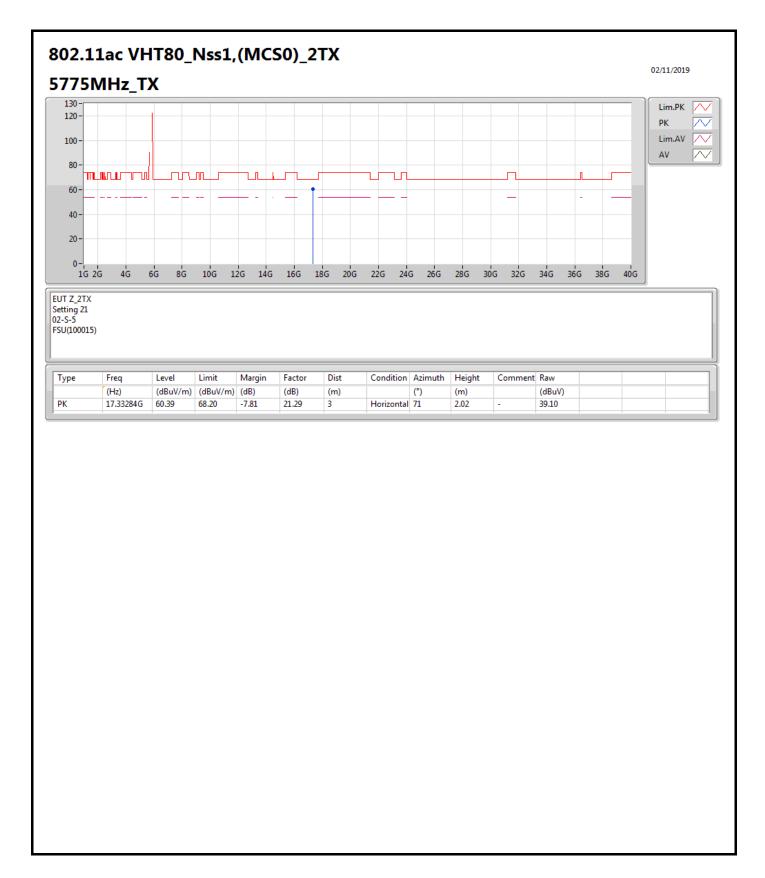
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RSE TX above 1GHz

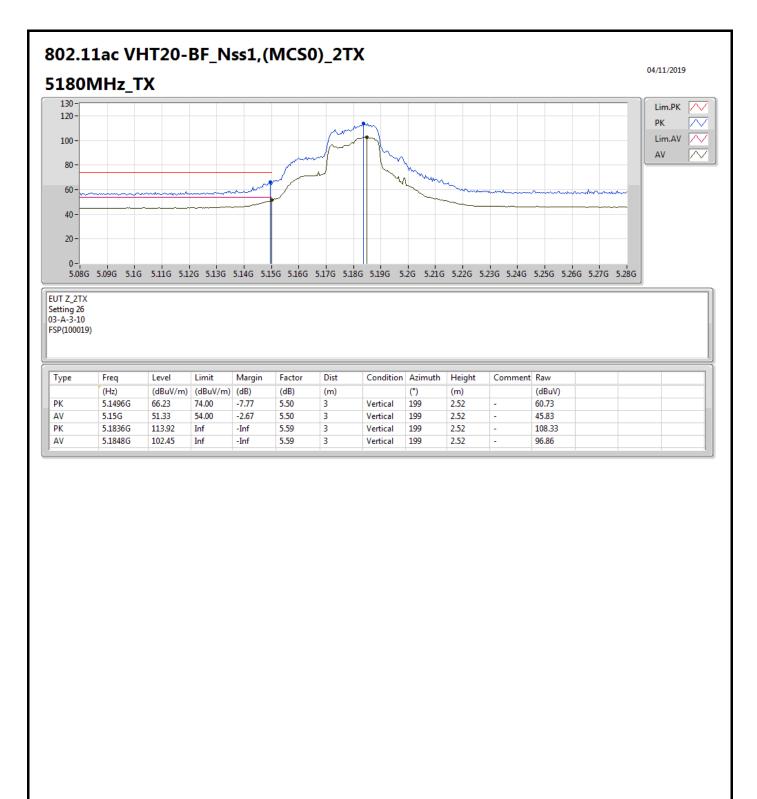
Appendix E.3

Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
5.15-5.25GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	Pass	AV	5.15G	52.00	54.00	-2.00	5.50	3	Horizontal	261	2.99	-

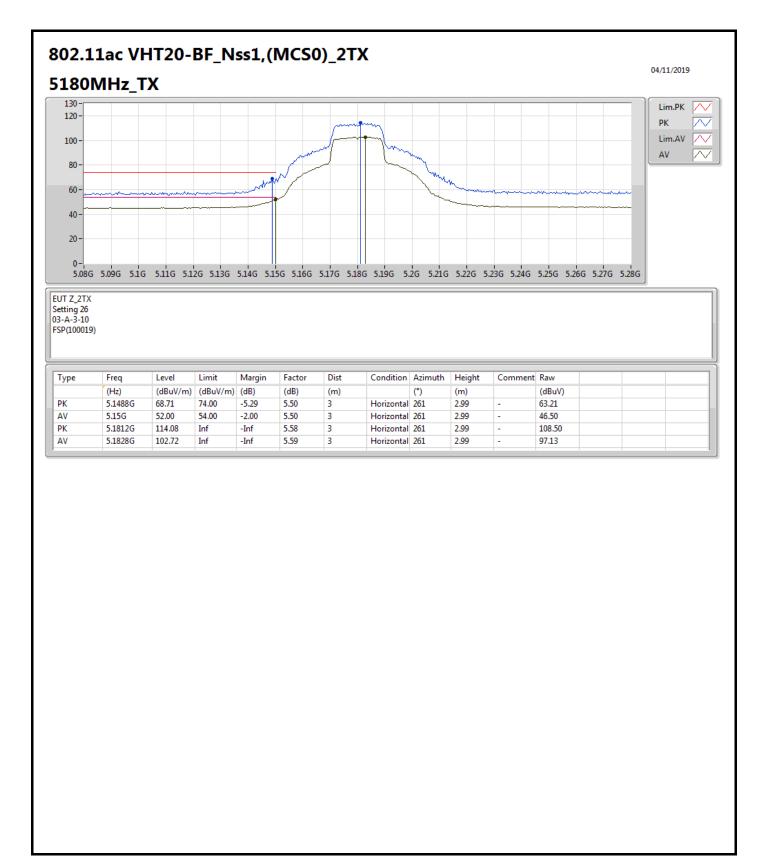
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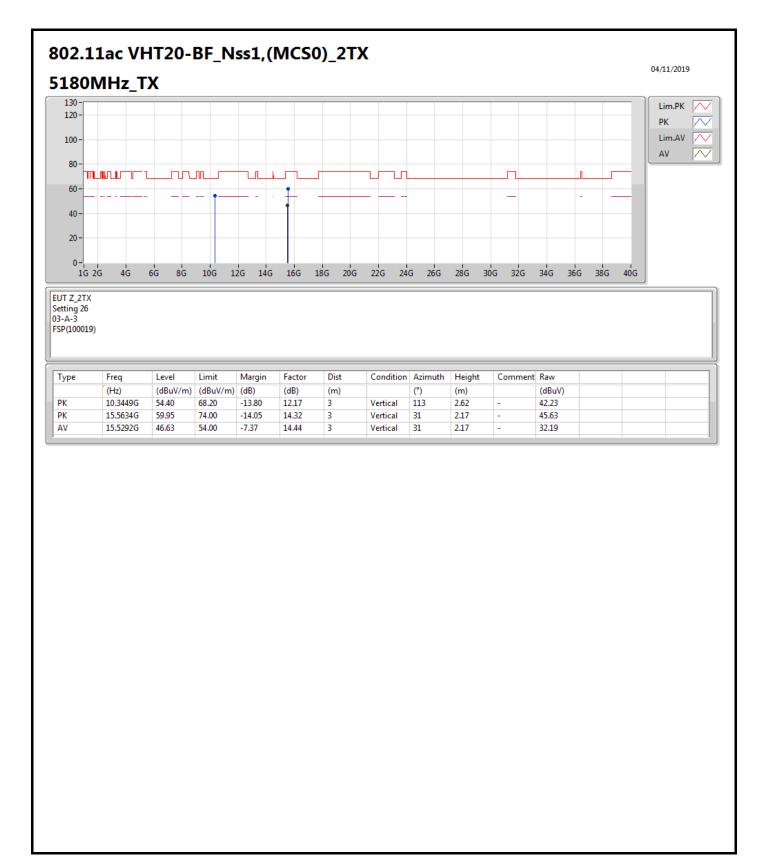
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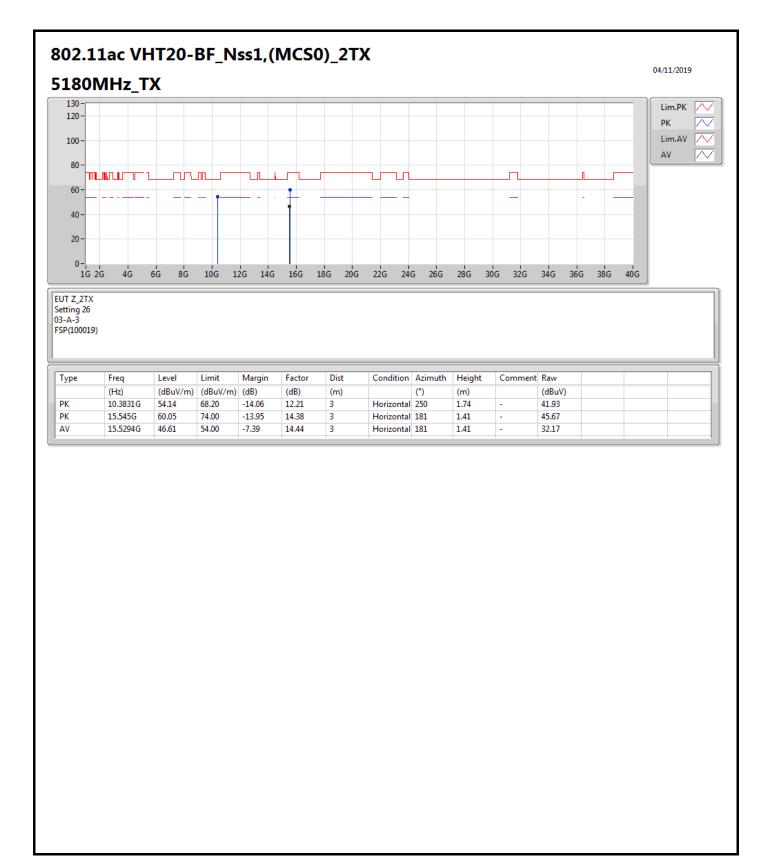
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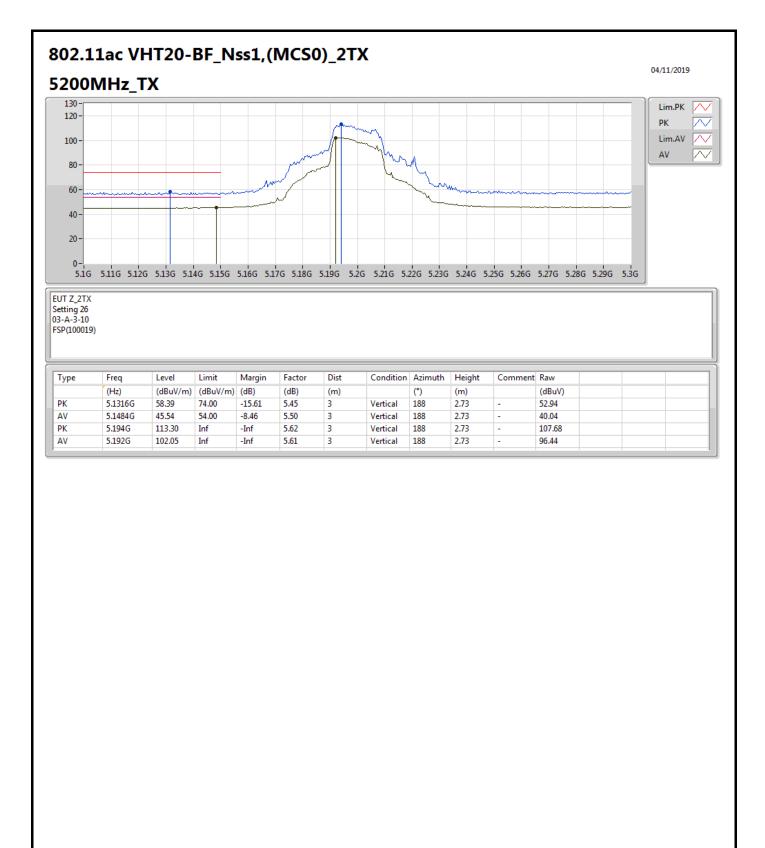
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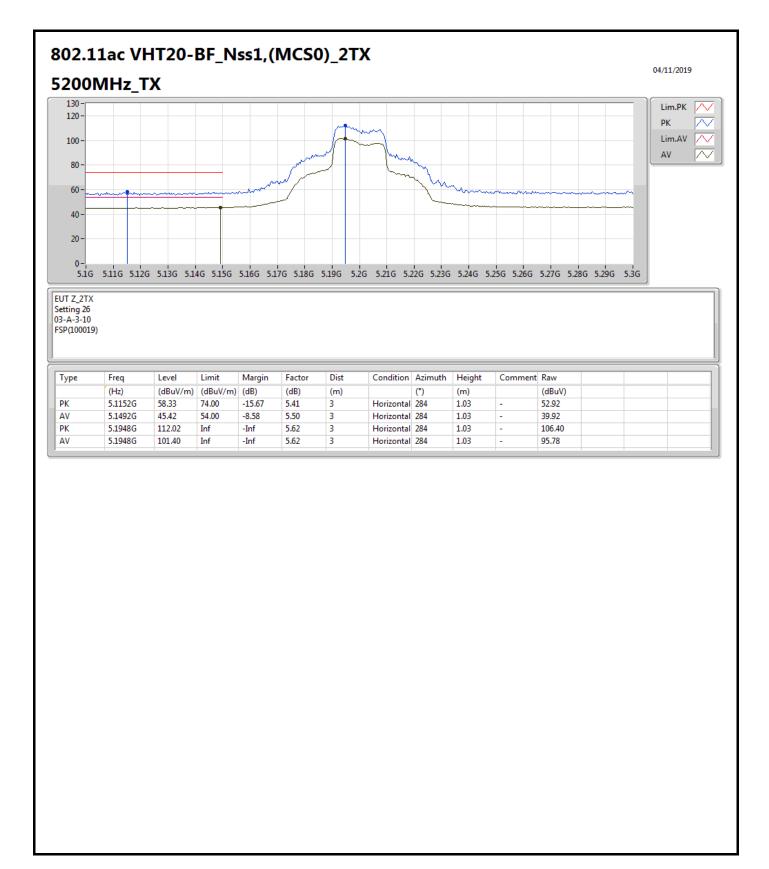


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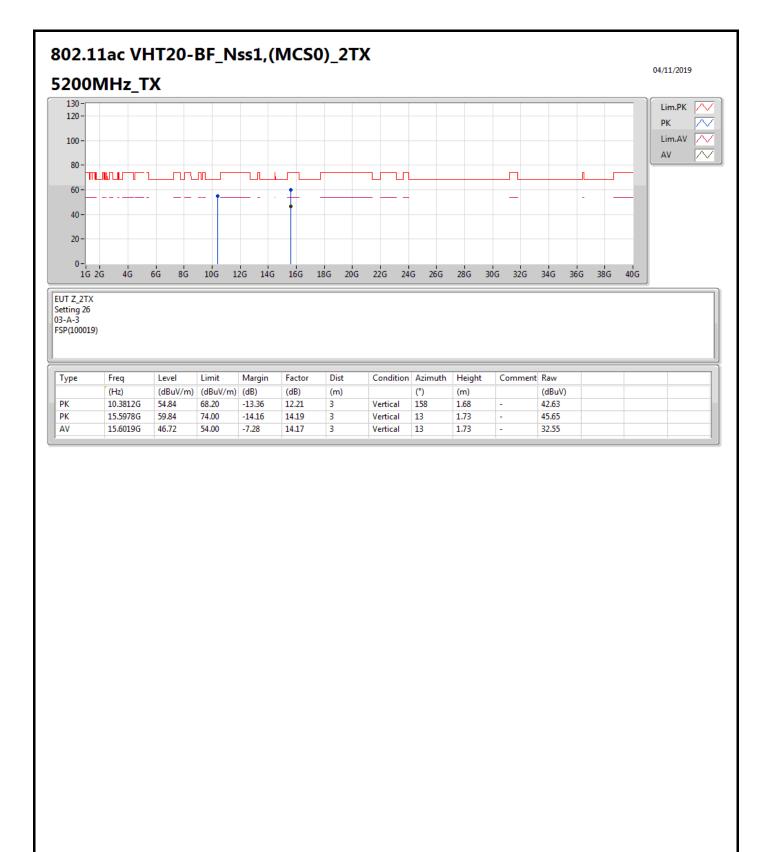






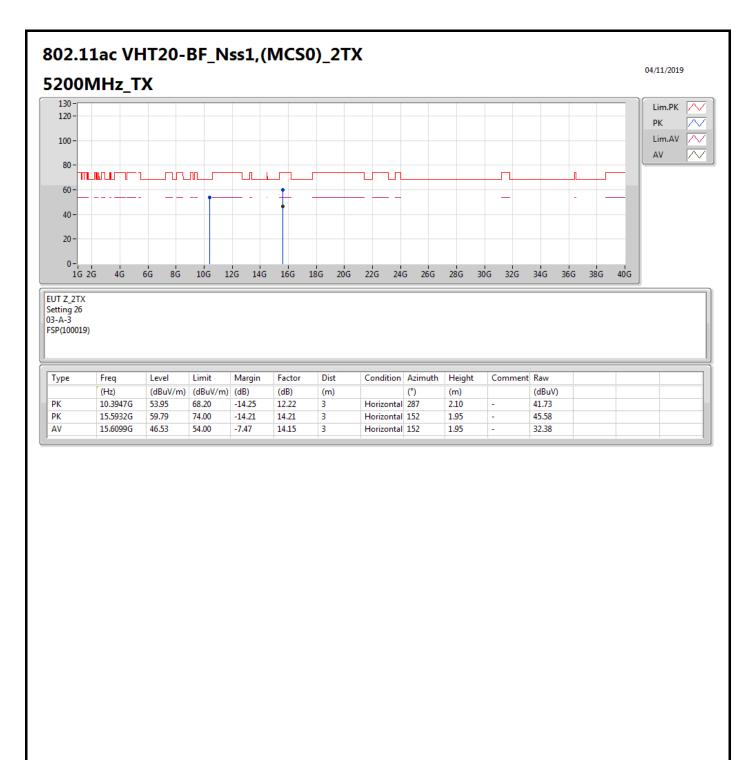
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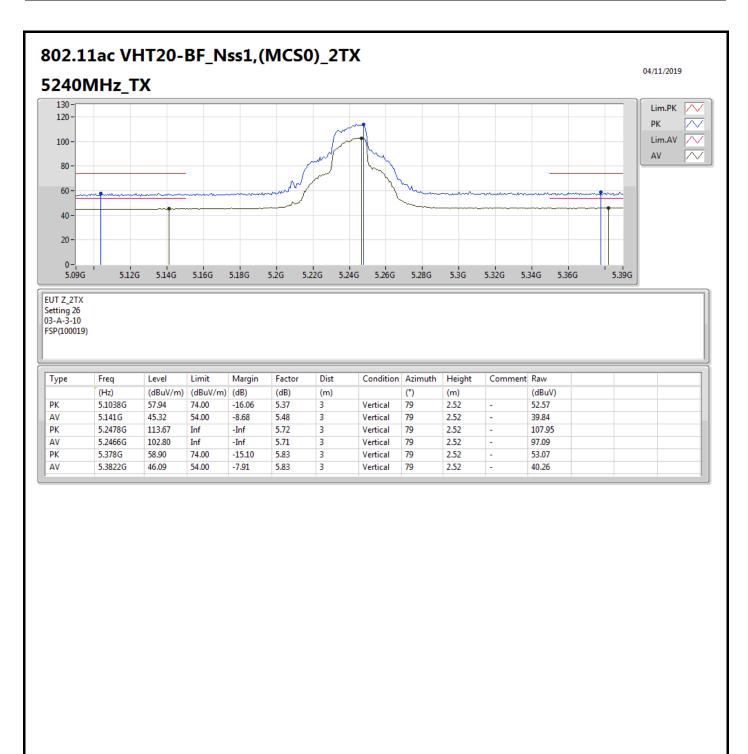
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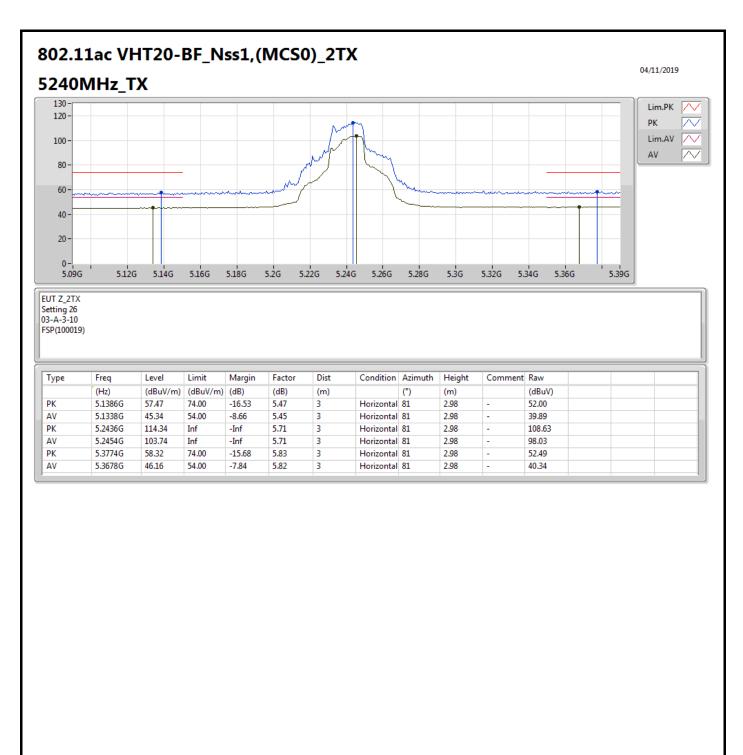
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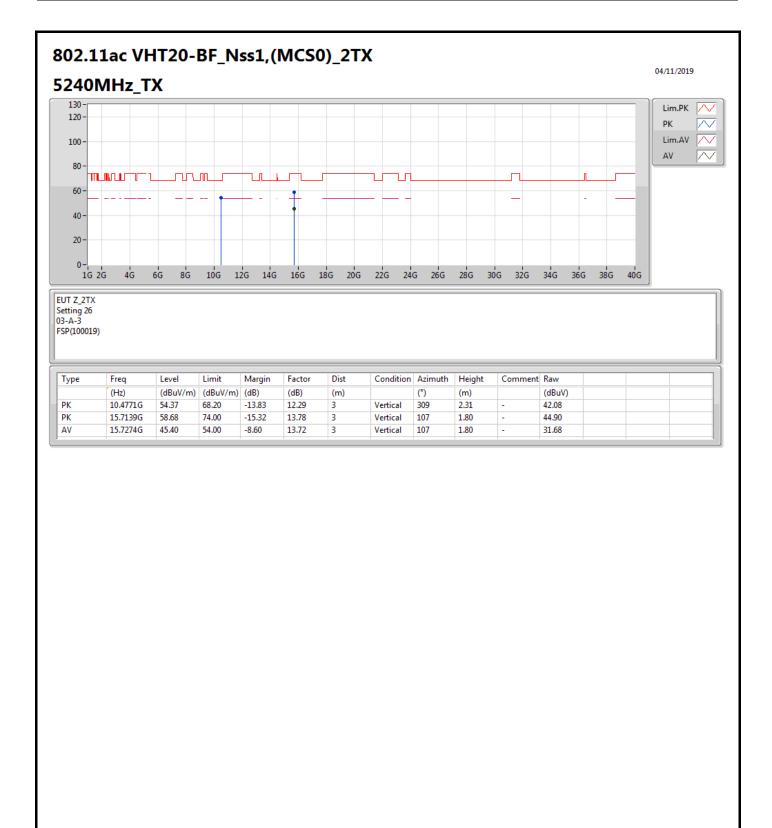
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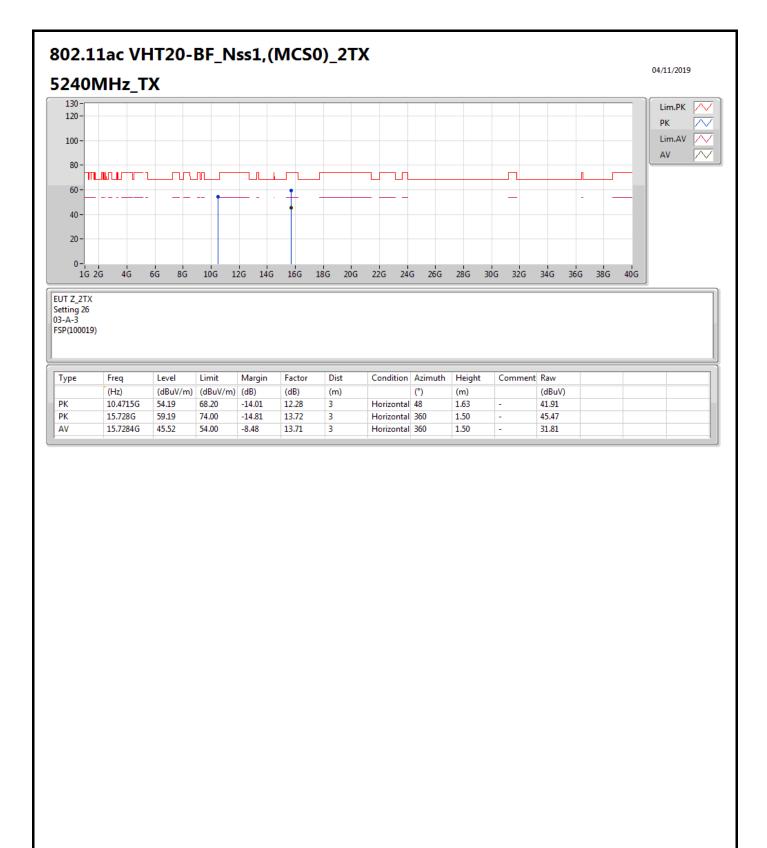
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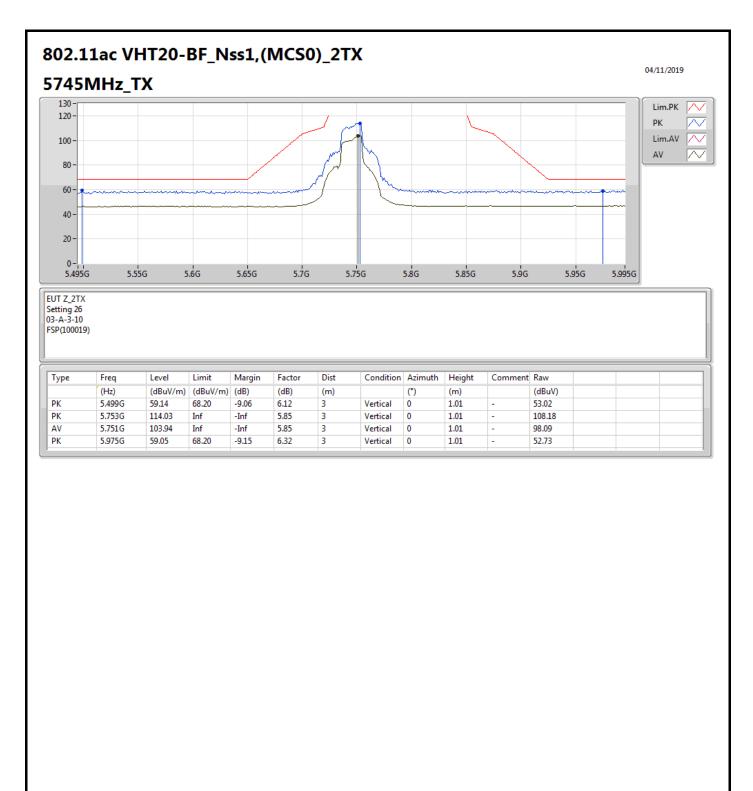
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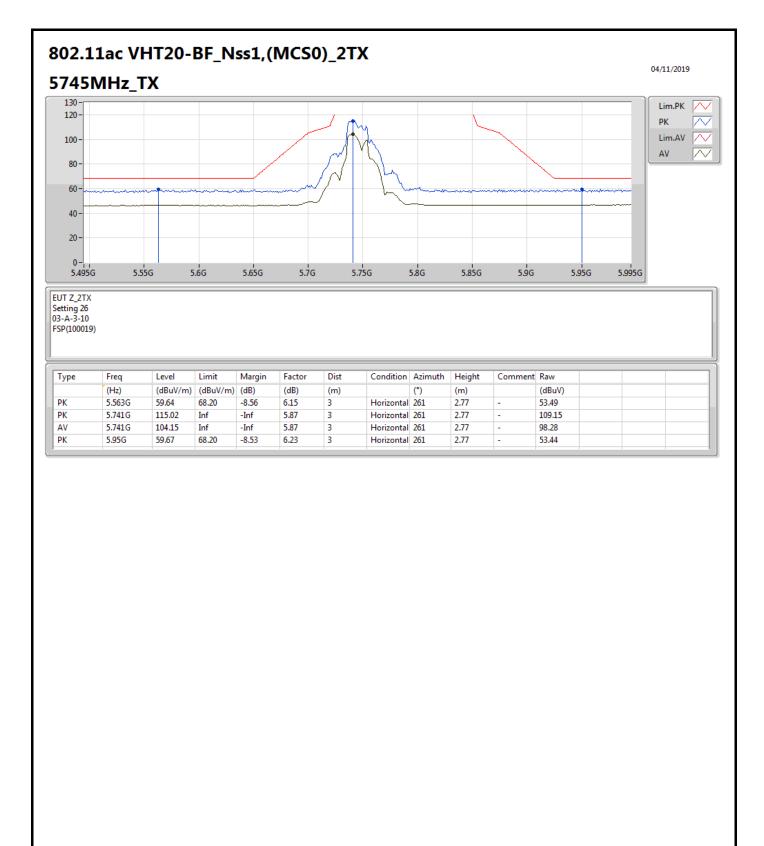
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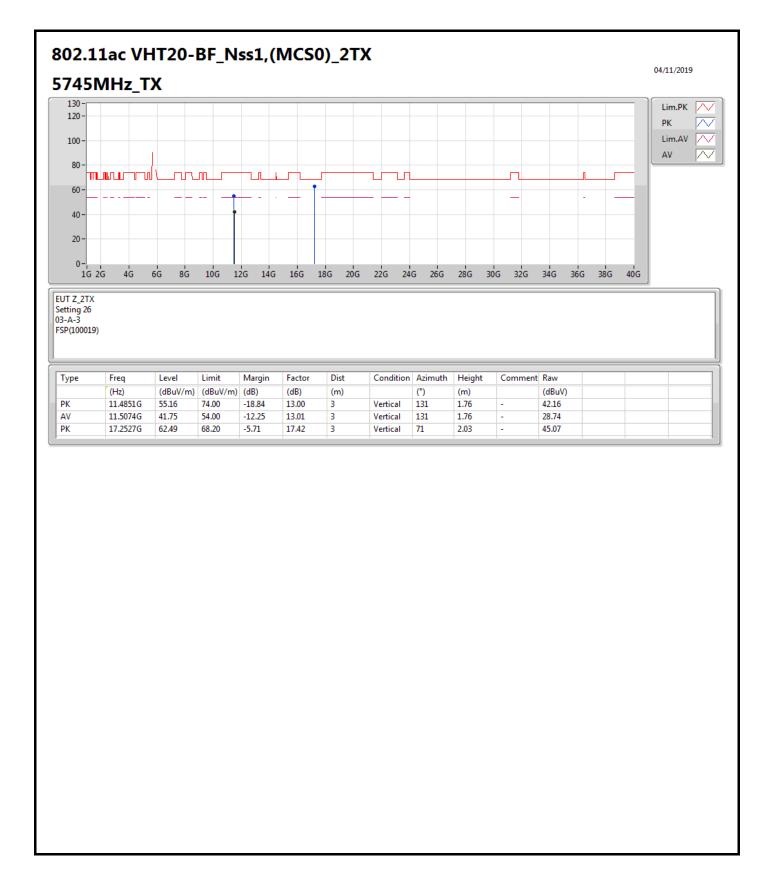
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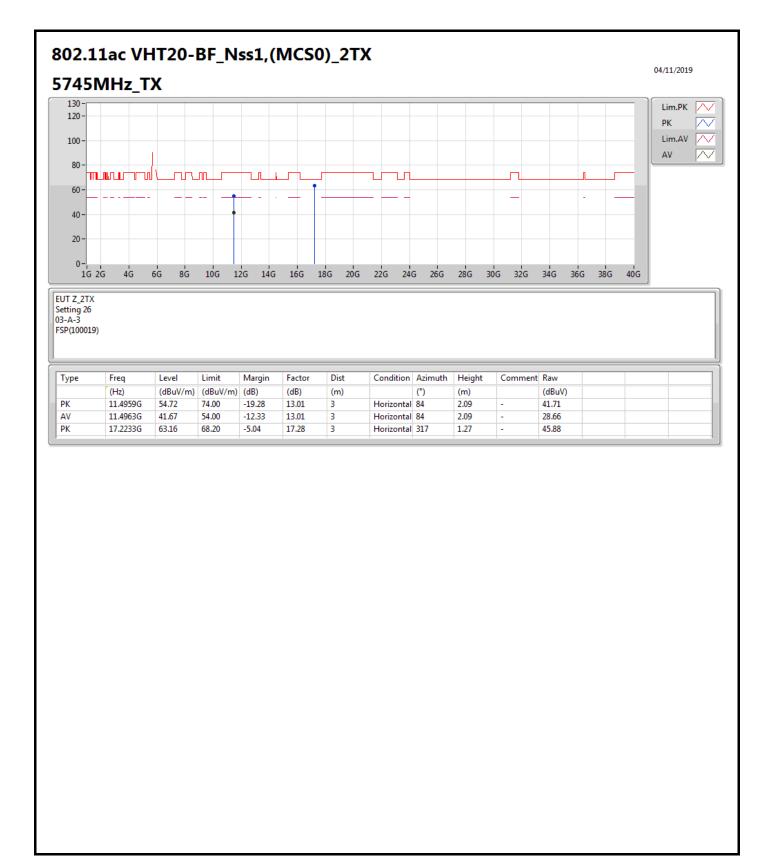
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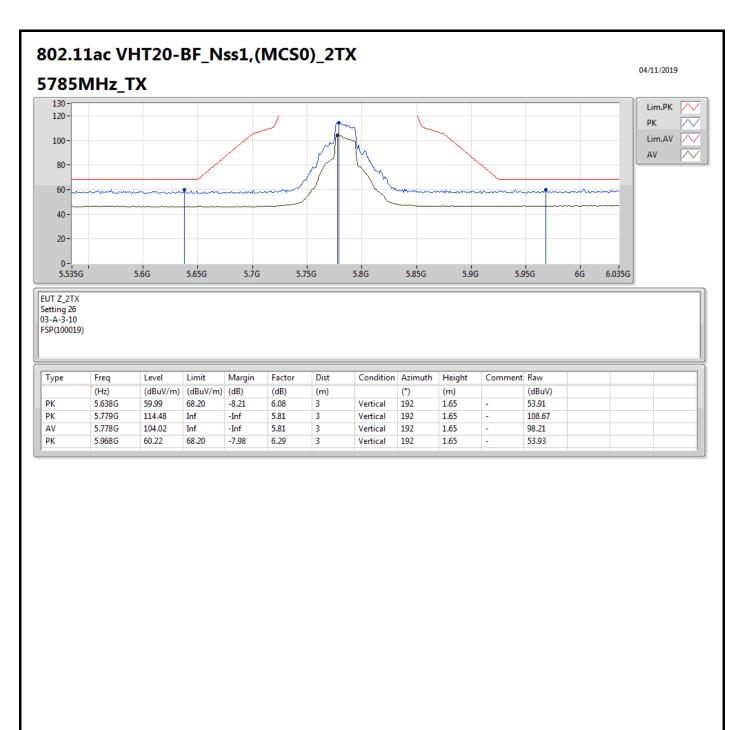
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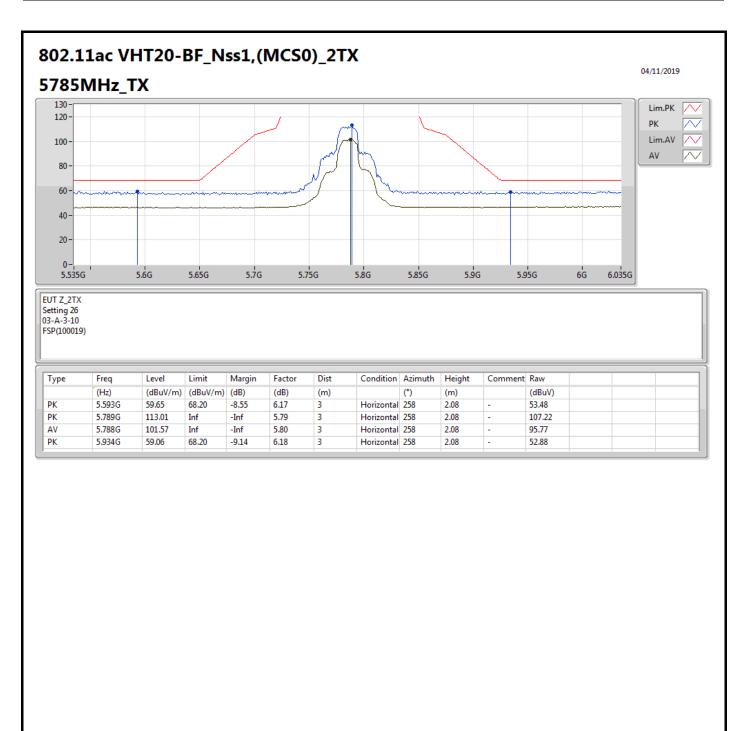
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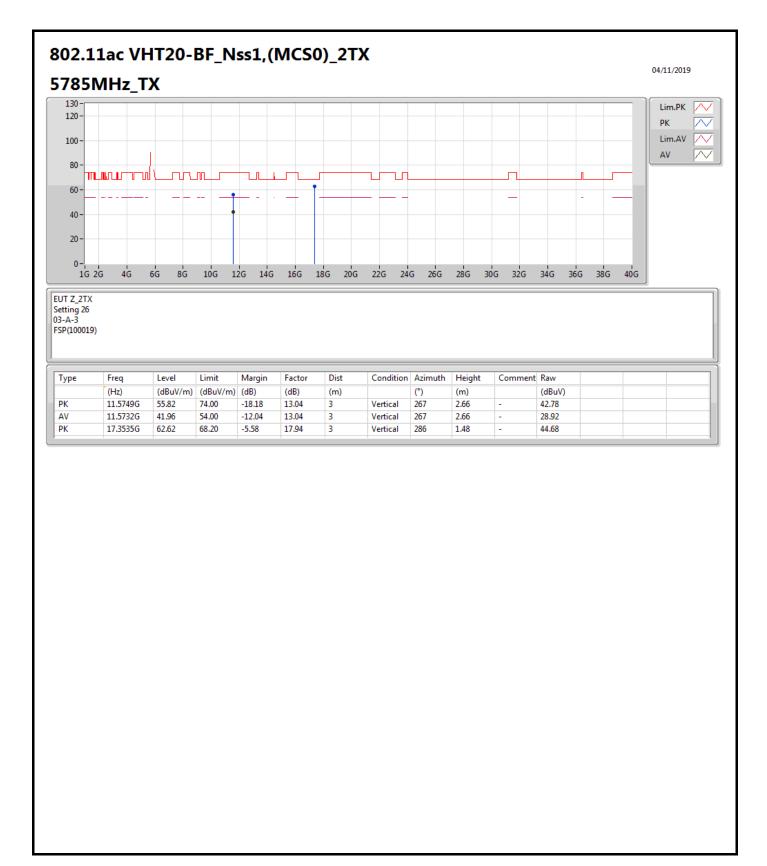
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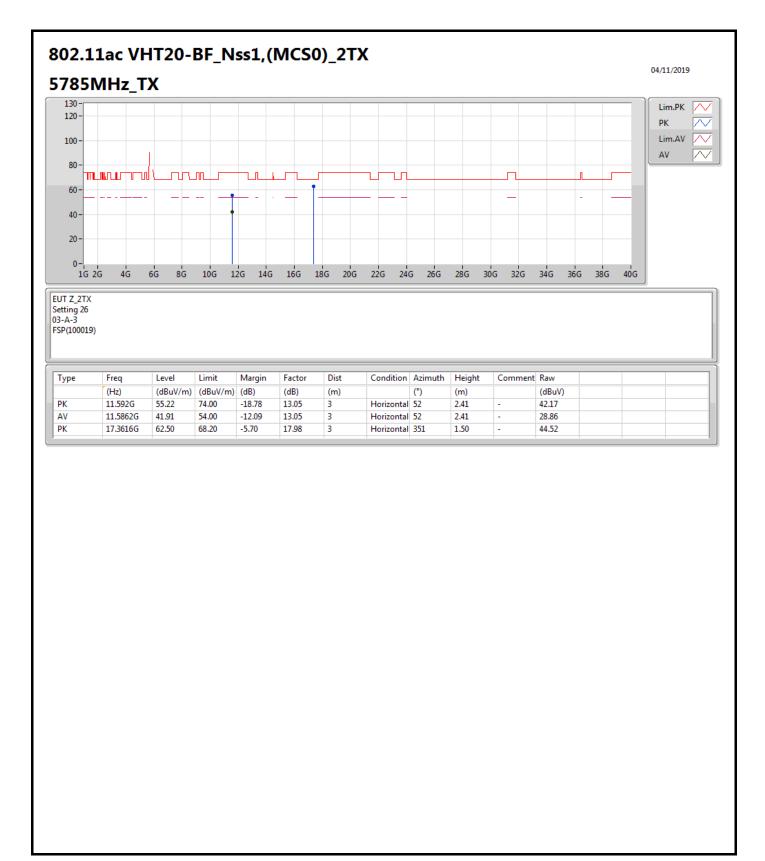
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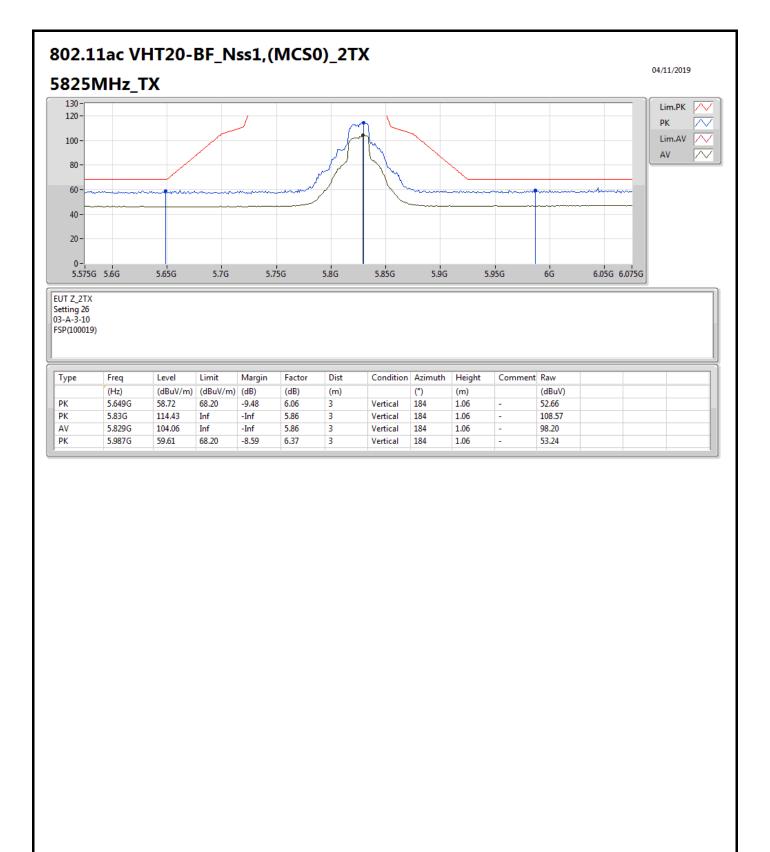
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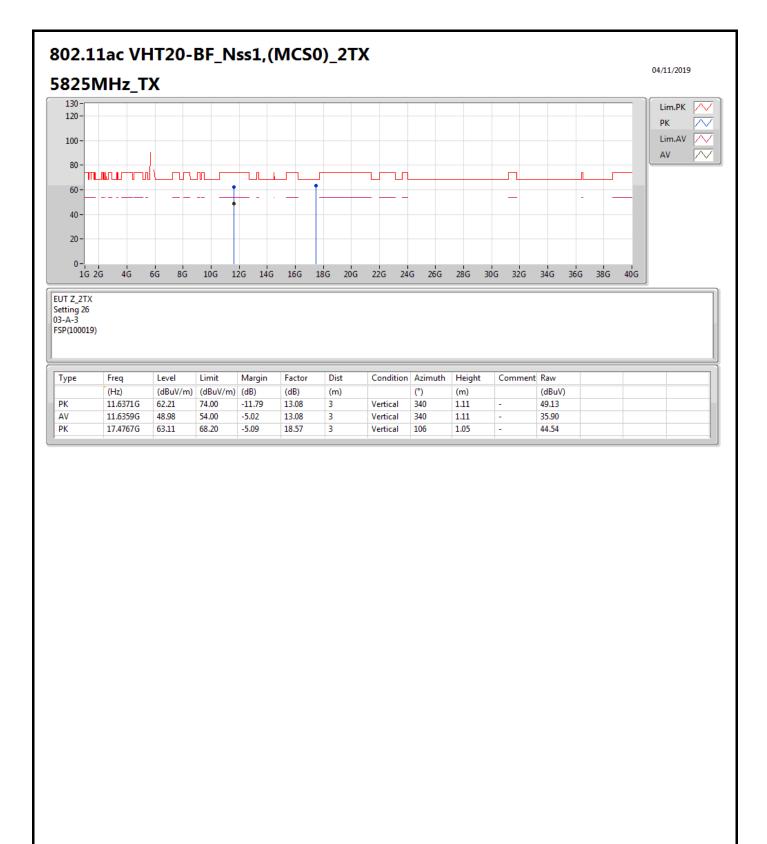
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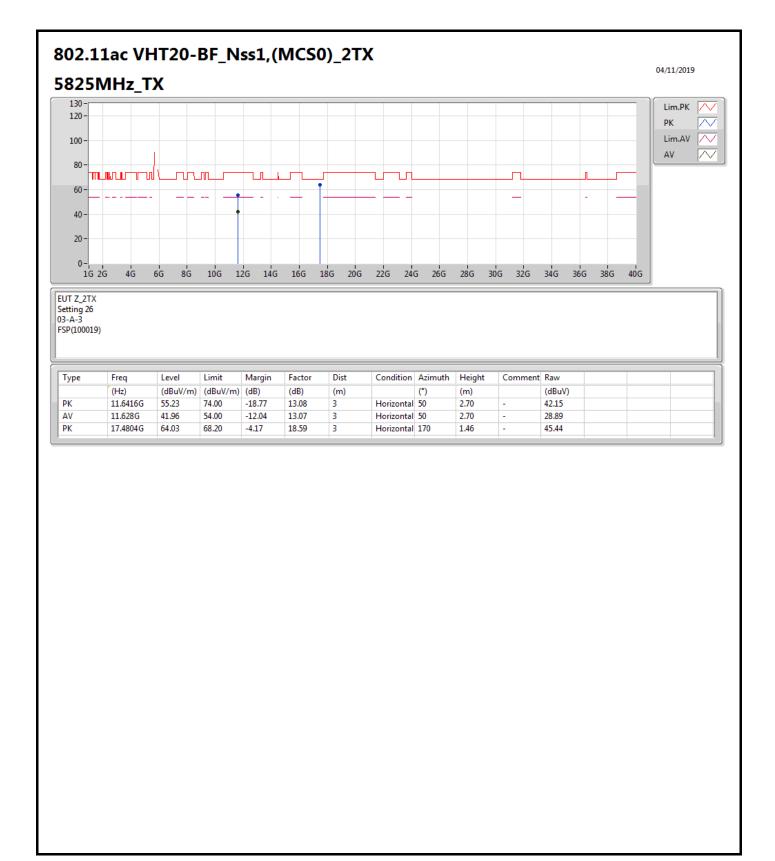
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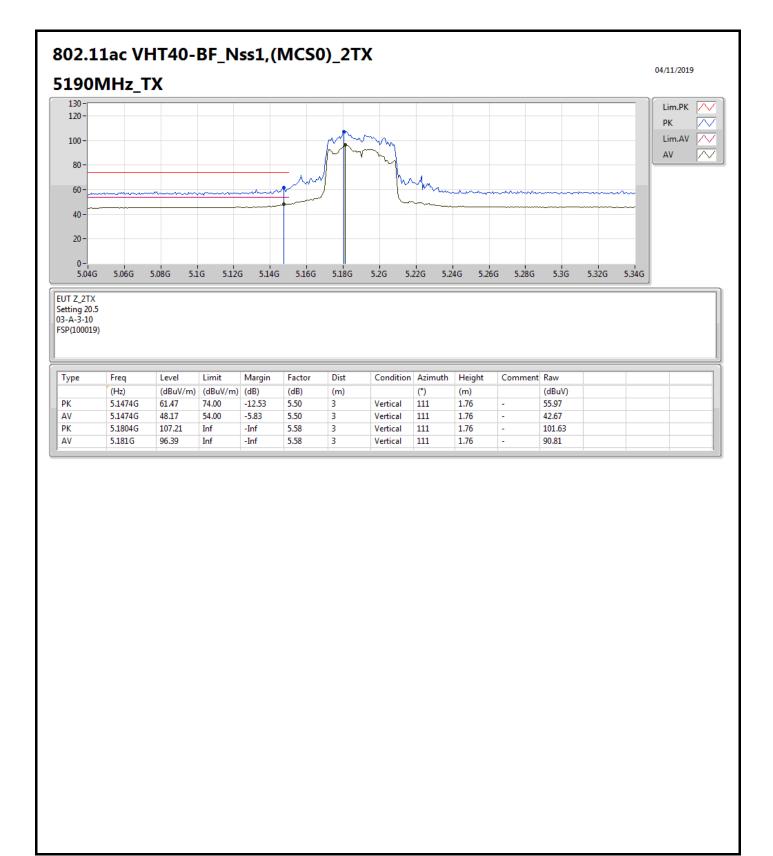
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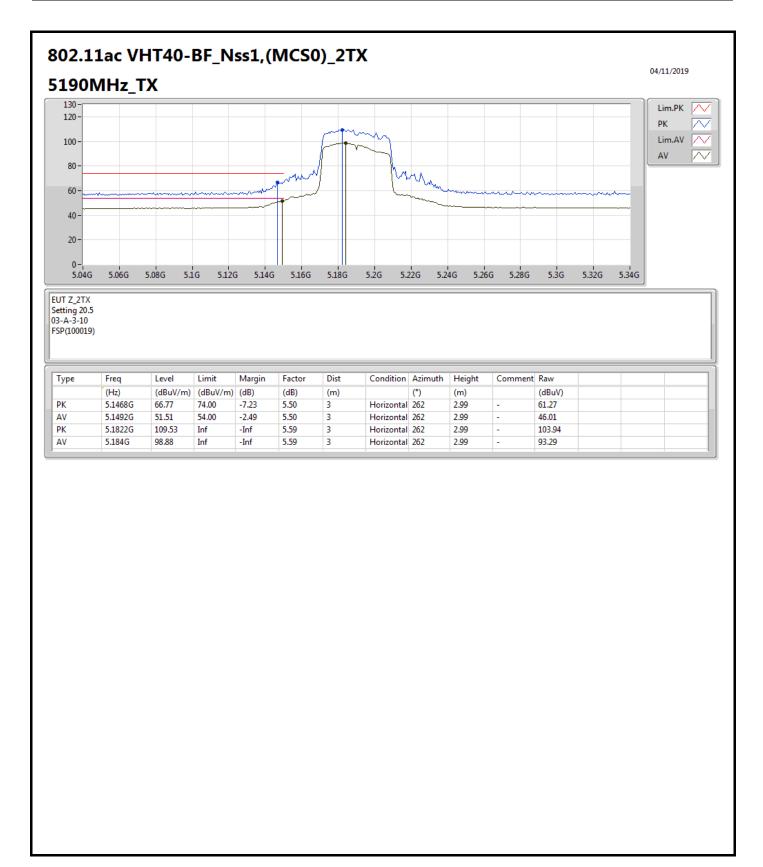
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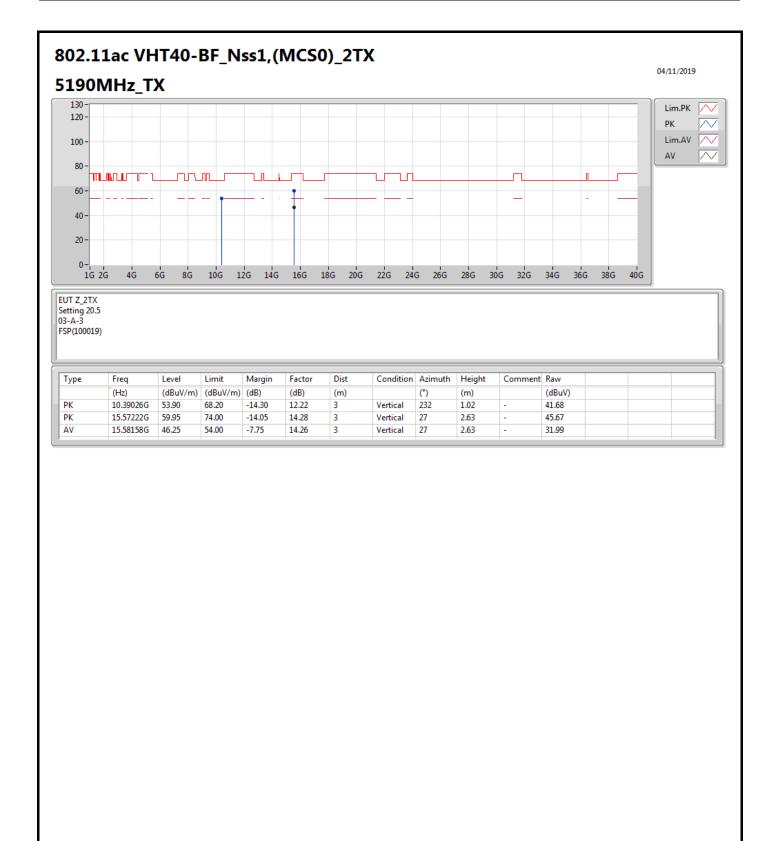


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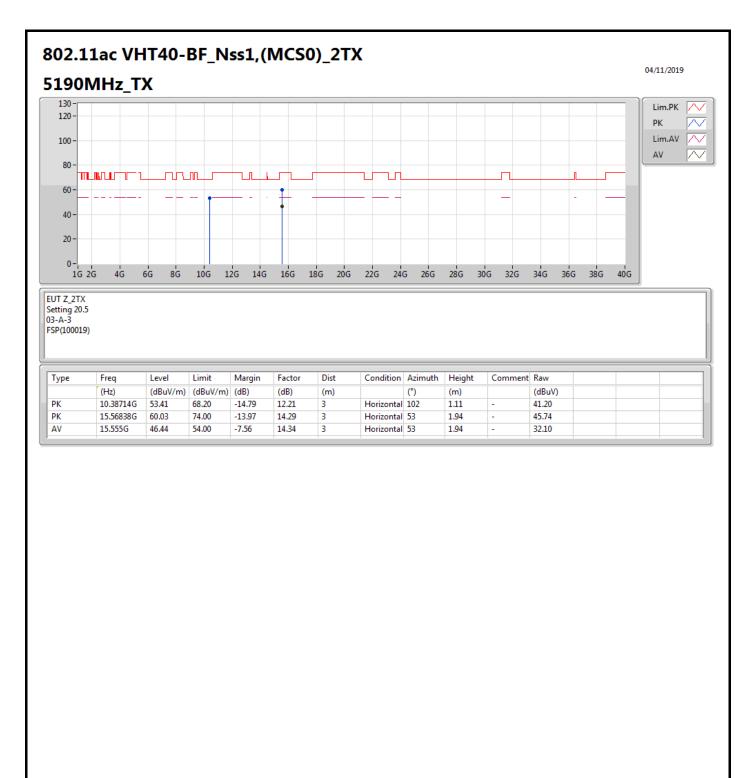






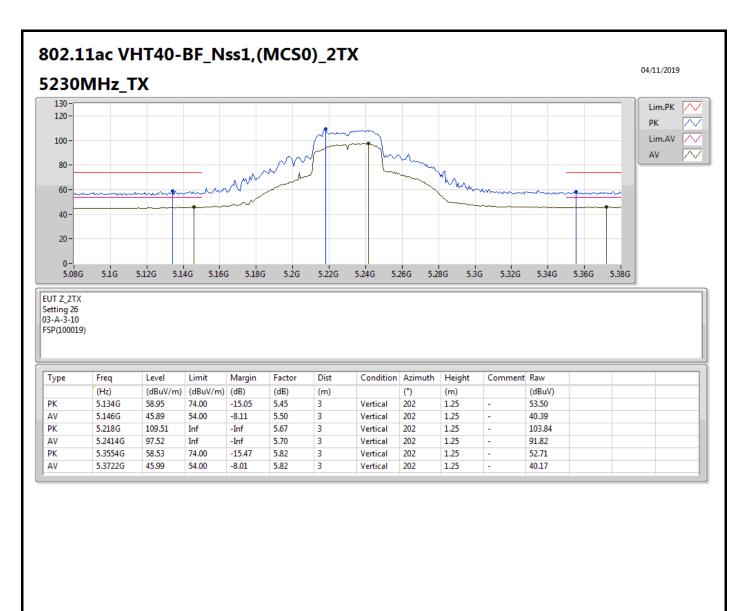
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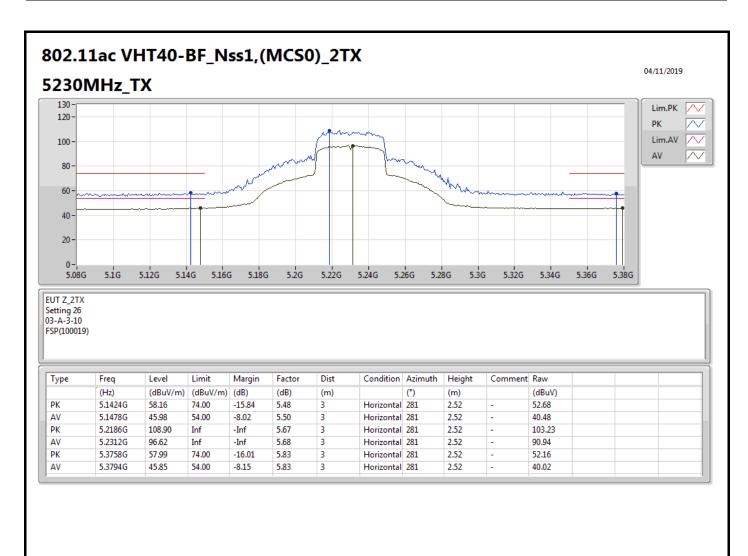
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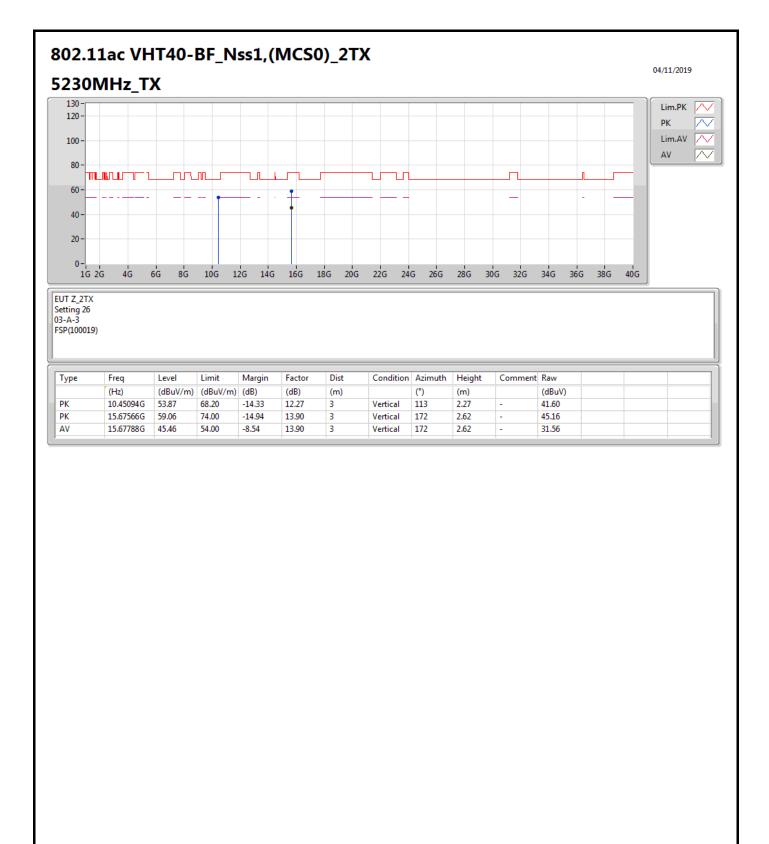
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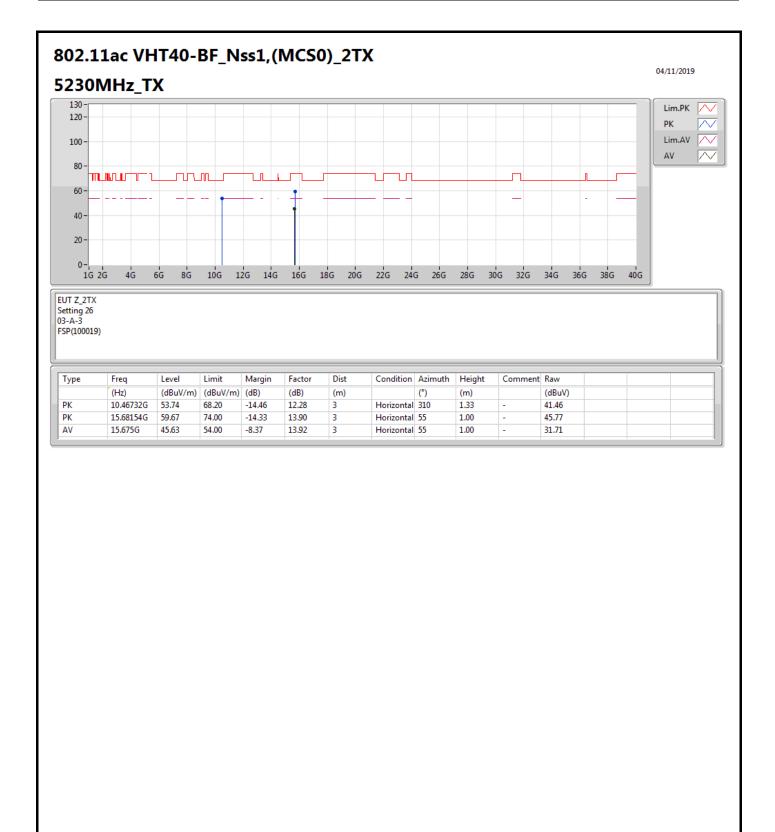
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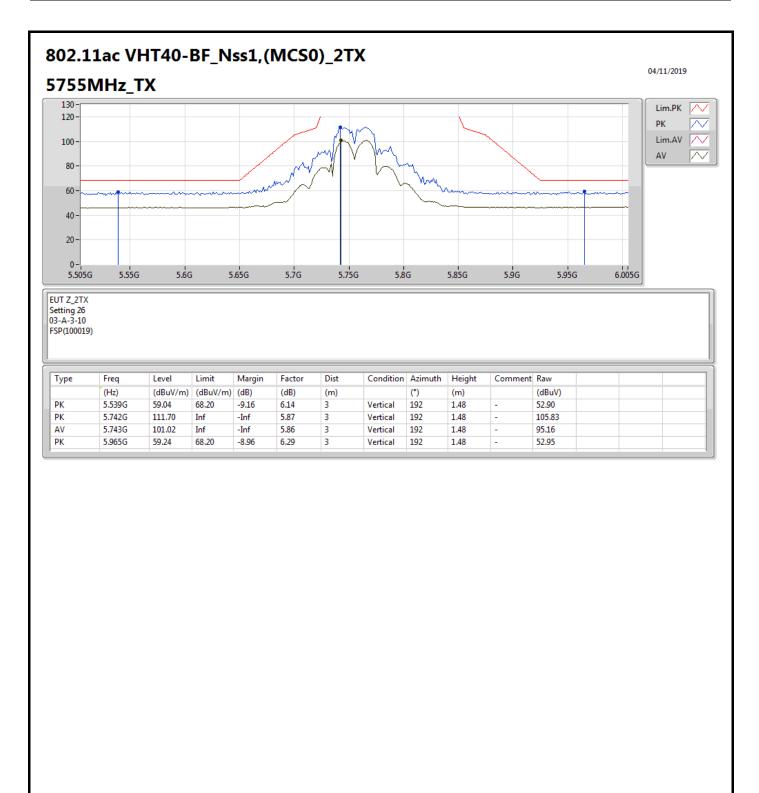
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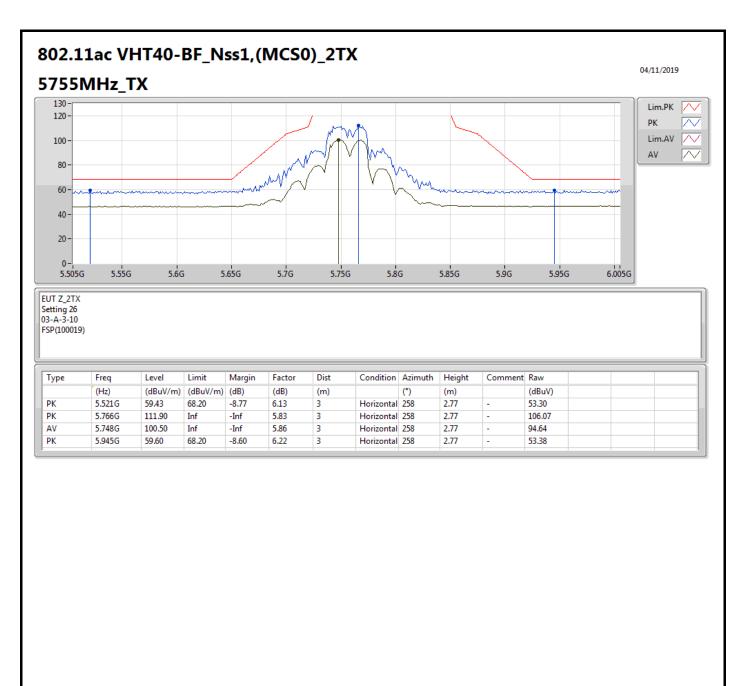
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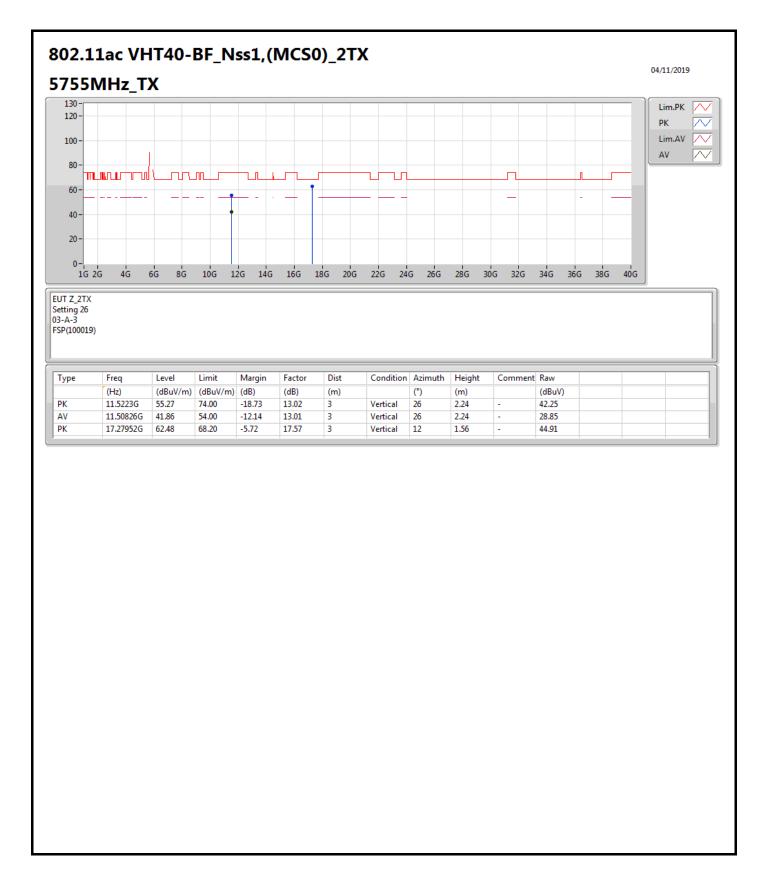
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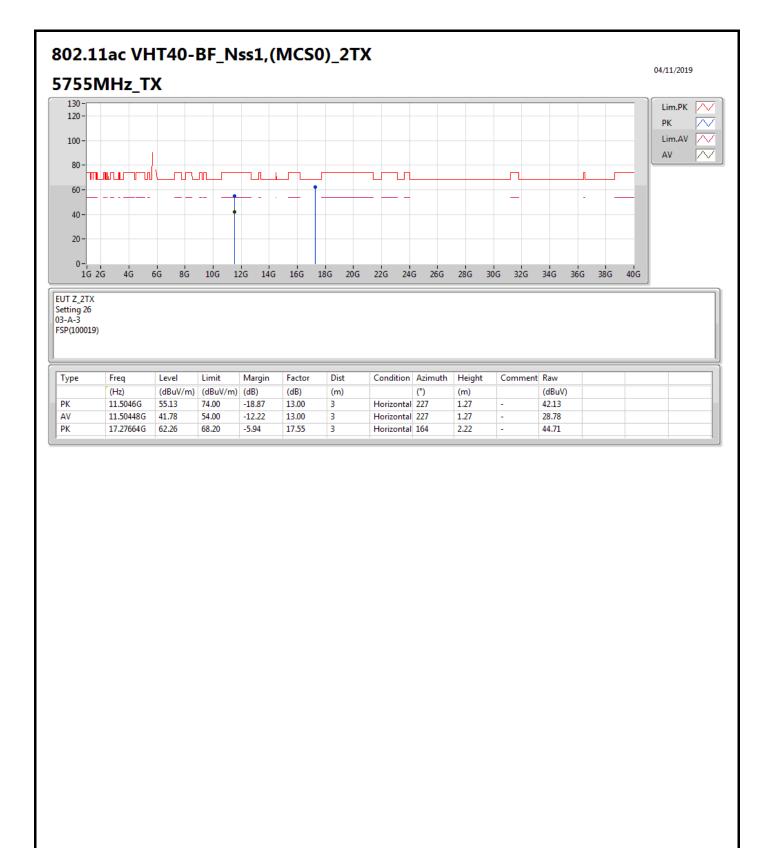
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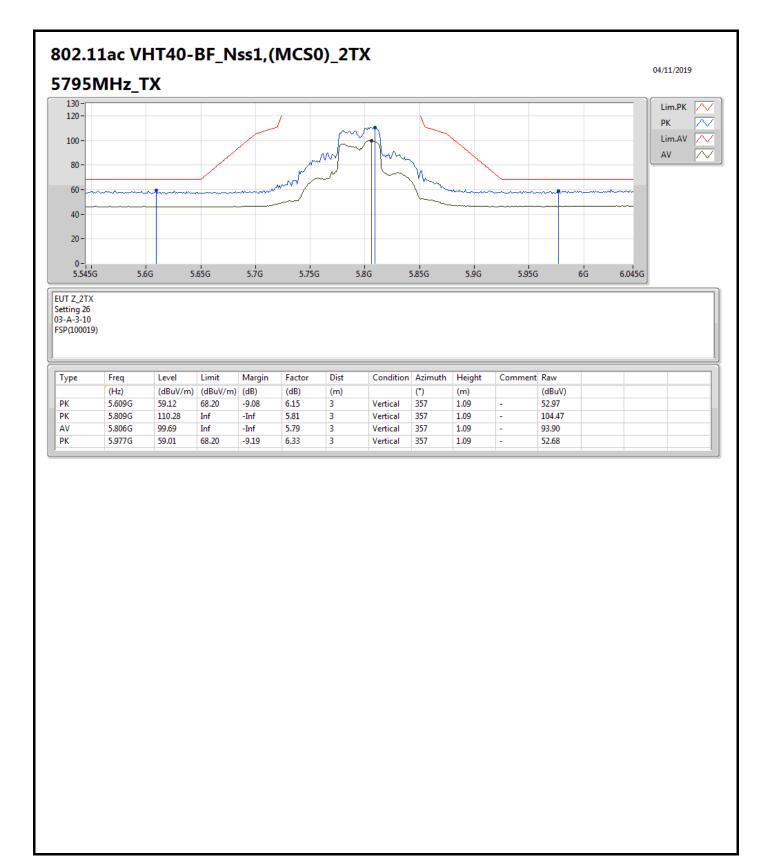
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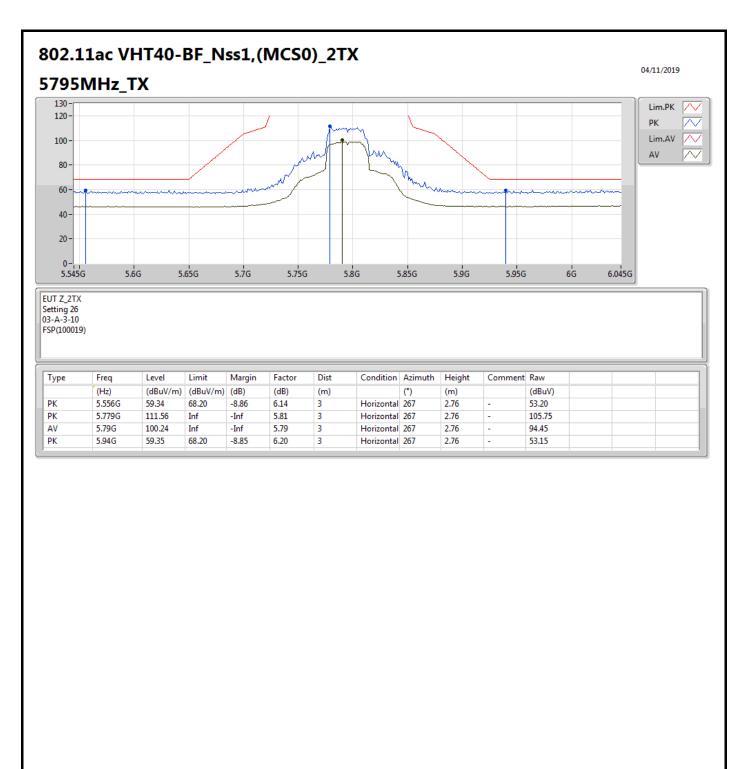
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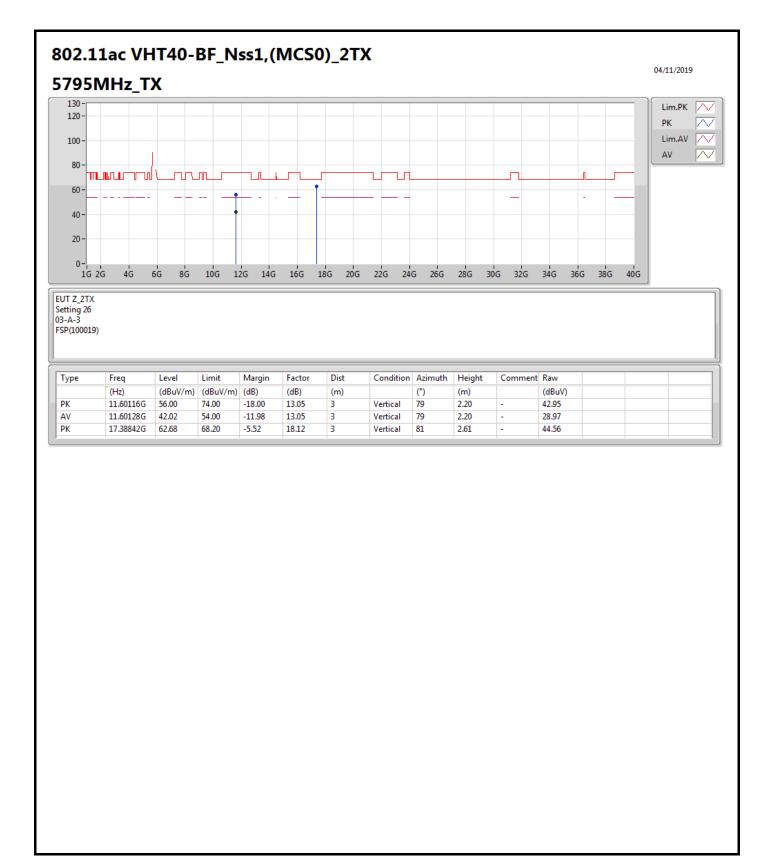
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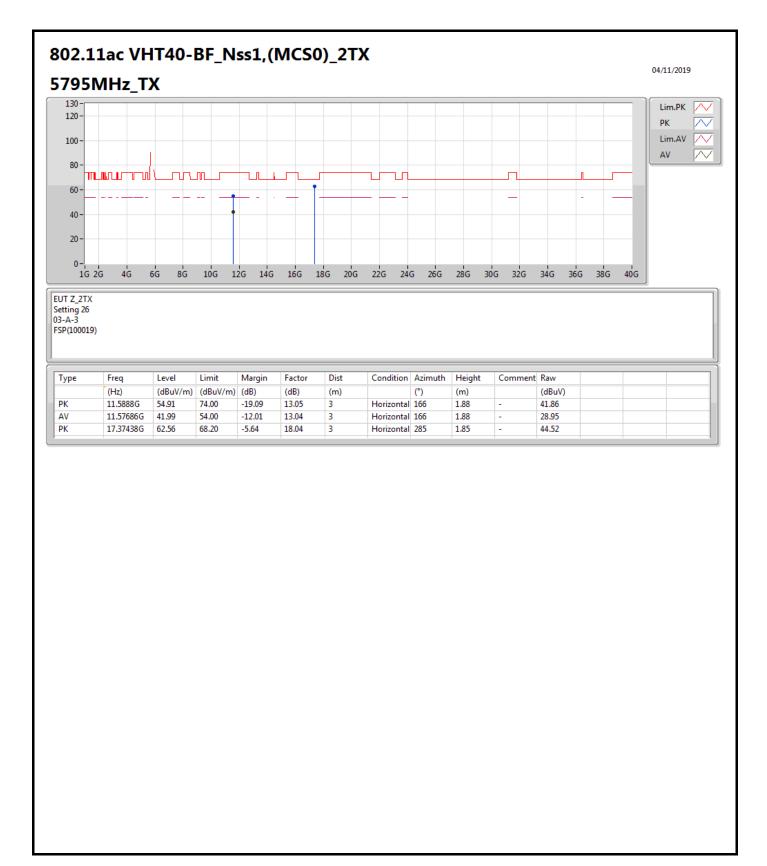
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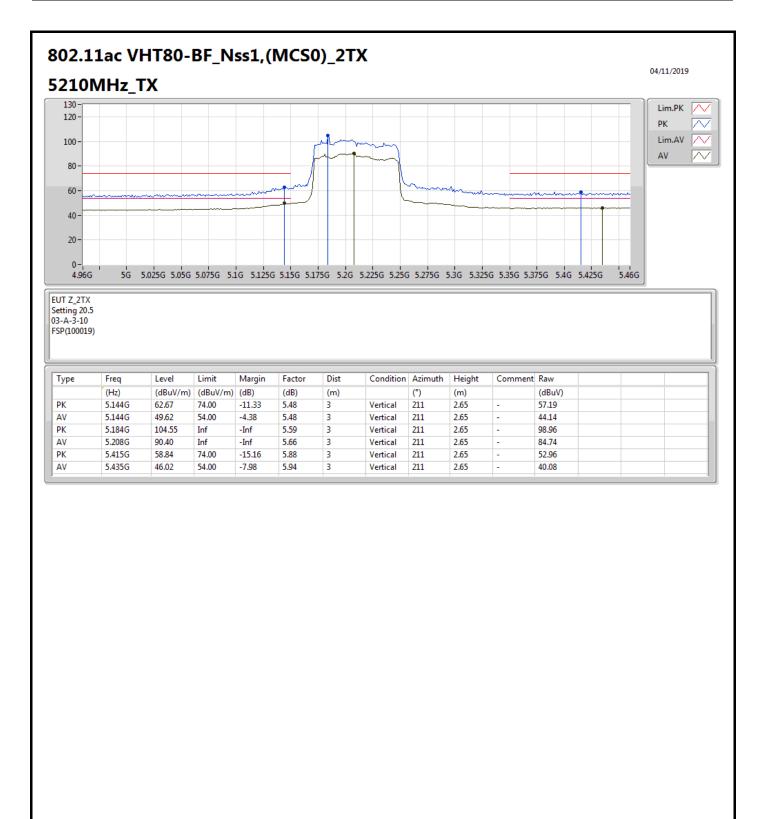
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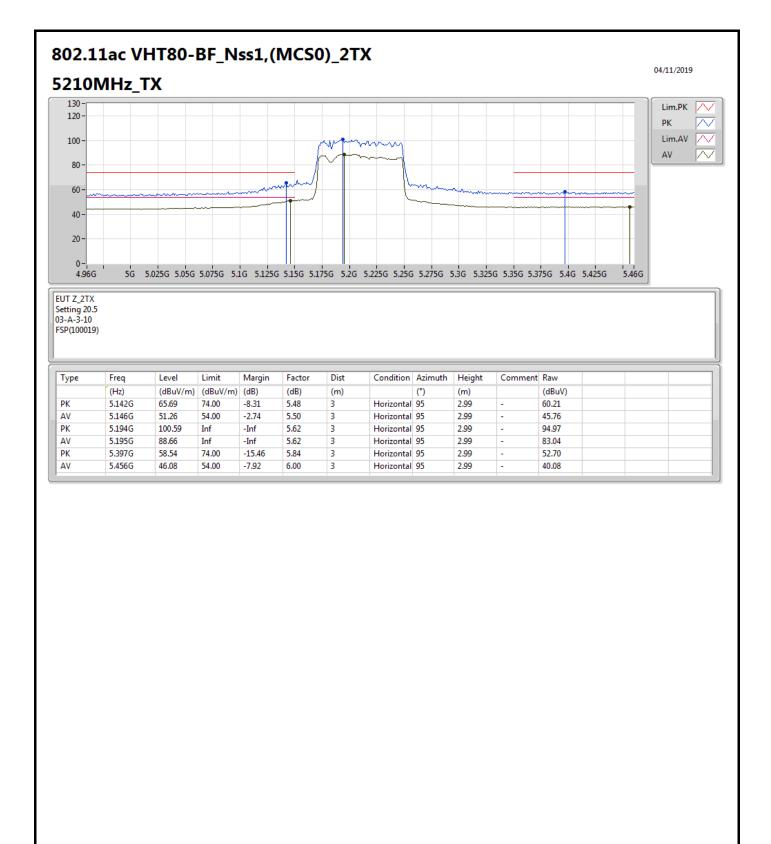


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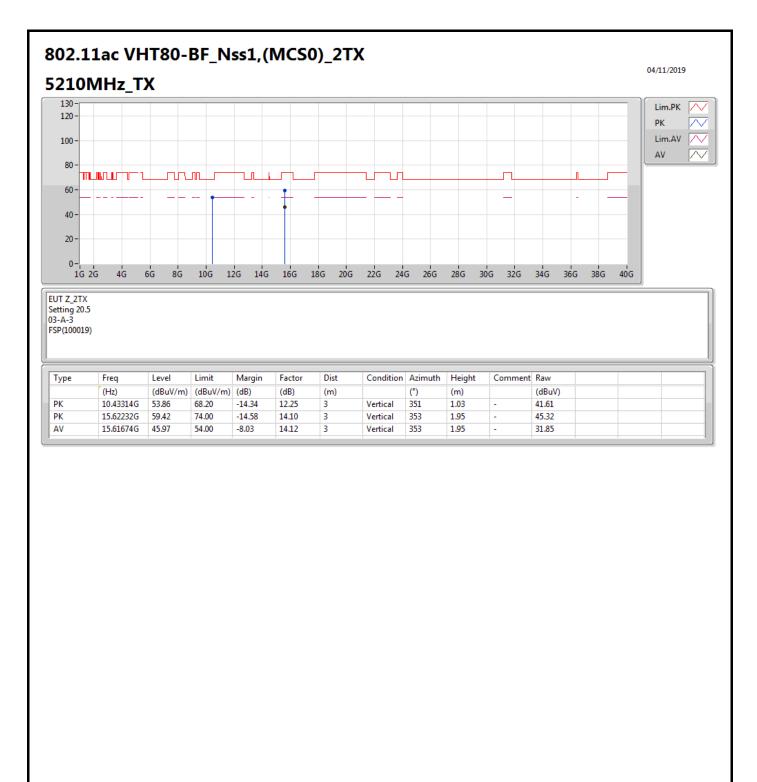






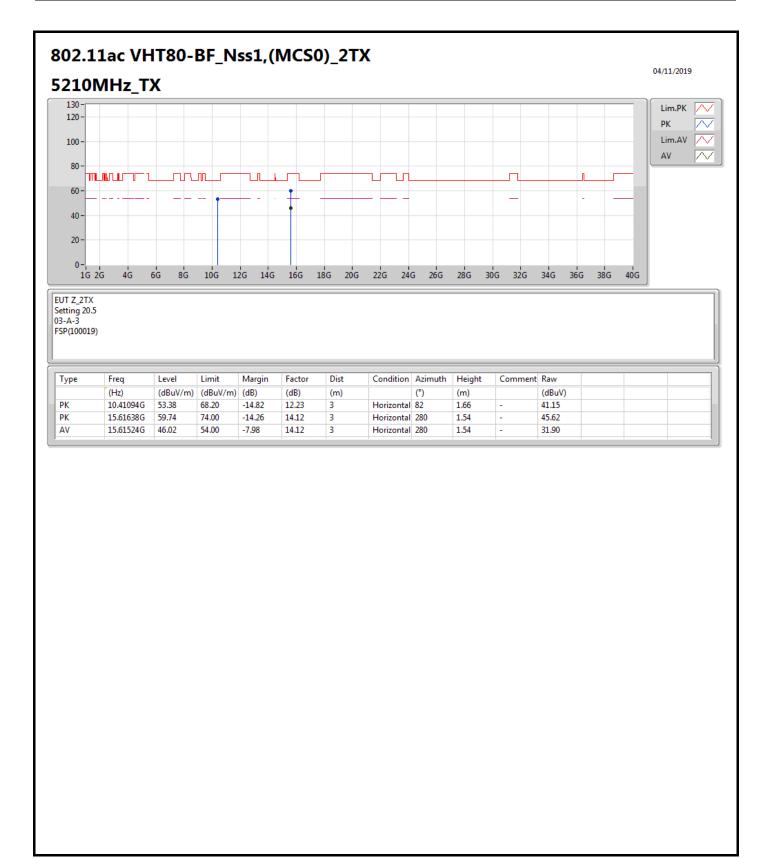




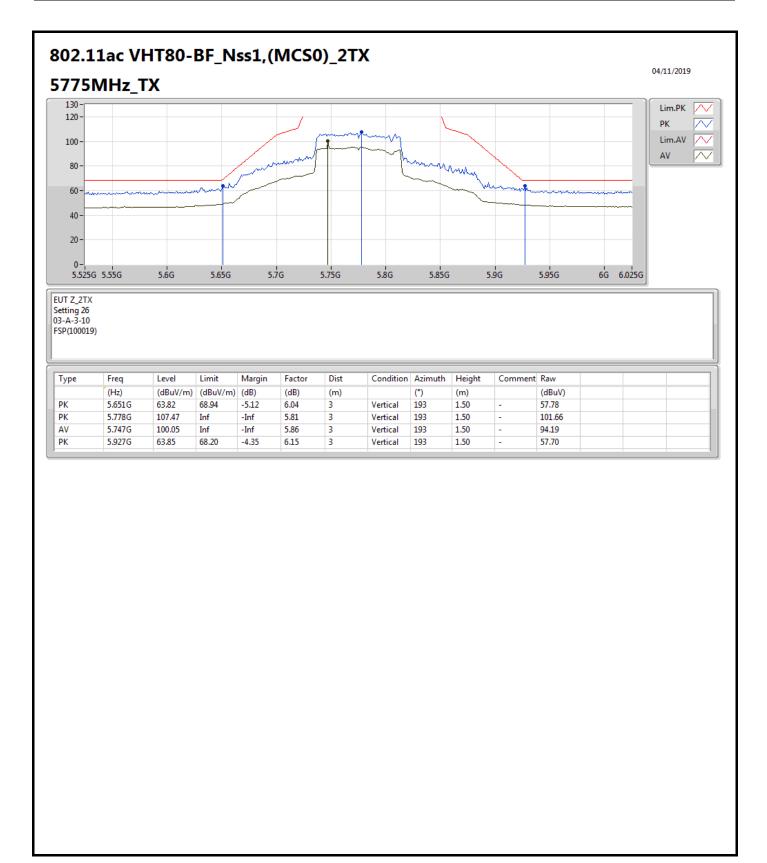


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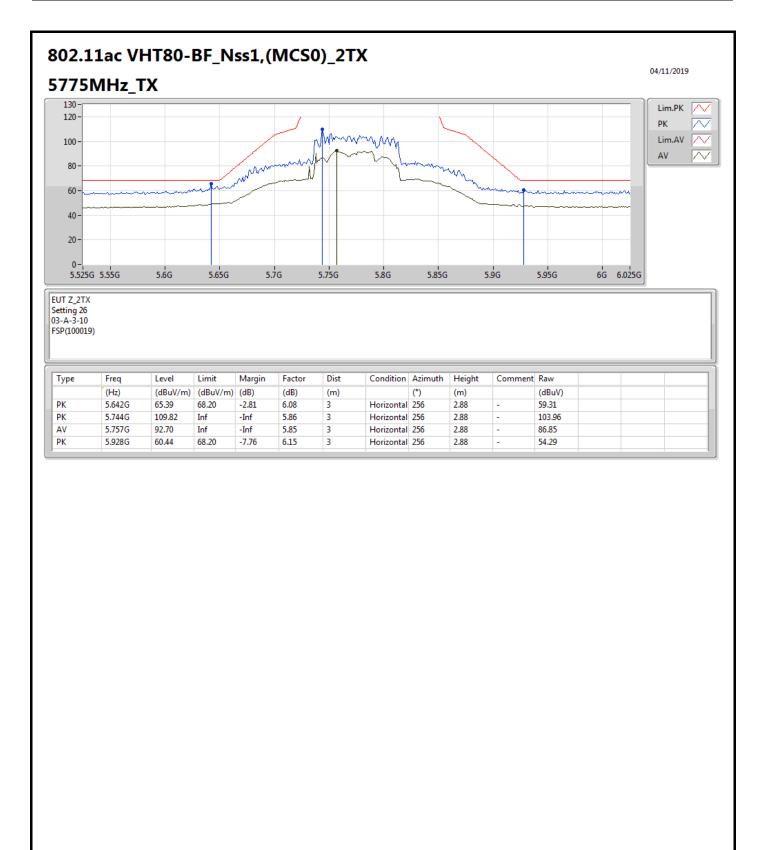




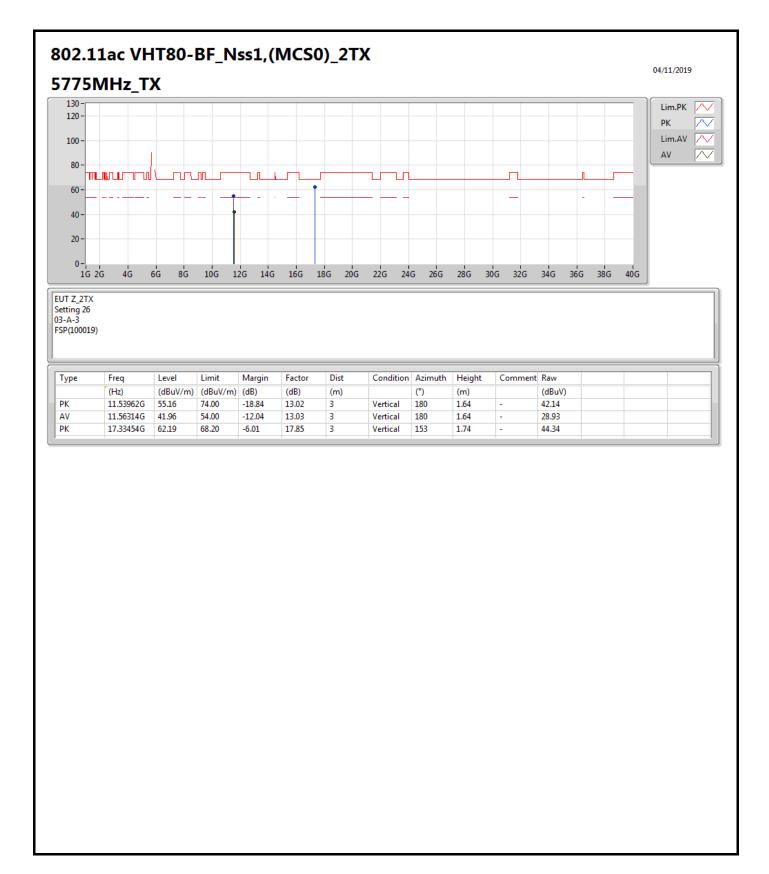


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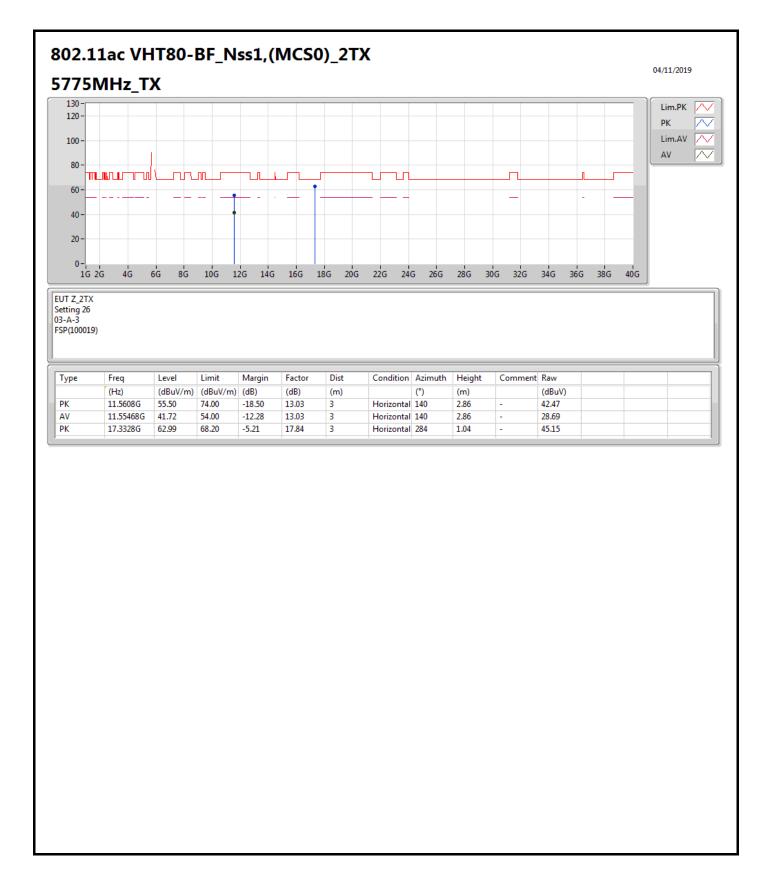








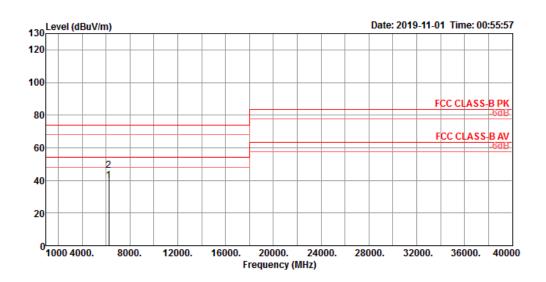




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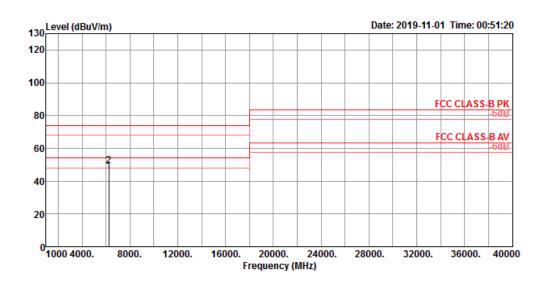
RSE Co-location Result								
Operating Mode	1	Polarization	Horizontal					
Operating Function	Normal Link							



	Freq	Level		Over Limit					-	T/Pos		Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	6249.90	39.74	54.00	-14.26	36.27	6.13	32.90	35.56	196	271	Average	HORIZONTAL
2	6249.90	46.09	74.00	-27.91	42.62	6.13	32.90	35.56	196	271	Peak	HORIZONTAL



RSE Co-location Result								
Operating Mode	1	Polarization	Vertical					
Operating Function	Normal Link							



	Freq	Level						Preamp Factor		T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	6249.90	45.90	54.00	-8.10	42.43	6.13	32.90	35.56	100	176	Average	VERTICAL
2	6249.90	49.55	74.00	-24.45	46.08	6.13	32.90	35.56	100	176	Peak	VERTICAL