



Report No.: FR032025AB



FCC RADIO TEST REPORT

FCC ID

: HDCSR820AC

Equipment

: Wireless Voice Gateway

Brand Name

Model Name

: SR820ac

Applicant

: ADTRAN

901 Explorer BlvdHuntsville, AL 35806United States

Manufacturer

: COMPAL BROADBAND NETWORKS, INC.

13F-1, No.1, Taiyuan 1st St., Zhubei City, Hsinchu

County 30288. Taiwan, R.O.C.

Standard

: 47 CFR FCC Part 15.407

The product was received on Mar. 27, 2020, and testing was started from Apr. 08, 2020 and completed on Apr. 28, 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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Issued Date

: May 13, 2020

Report Version : 02

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Photographs of EUT v01

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History of this test report

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Report No.	Version	Description	Issued Date
FR032025AB	01	Initial issue of report	May 11, 2020
FR032025AB	02	Revising section 2.6 test setup diagram	May 13, 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:

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

Reviewed by: Sam Chen

Report Producer: Viola Huang

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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	a, 11 (11120), ac (111120)	5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40)	5190-5230	38-46 [2]
5725-5850	11 (11140), ac (111140)	5755-5795	151-159 [2]
5150-5250	ac (VHT80)	5210	42 [1]
5725-5850	ac (viiio)	5775	155 [1]

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

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.
- BWch is the nominal channel bandwidth.

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1.1.2 Antenna Information

Ant	Po	rt	Brand	Drand Madel News Antonna Time		Connector	Gain	(dBi)
Ant.	2.4GHz	5GHz	Brand	Model Name	Antenna Type	Connector	2.4GHz	5GHz
1	1	1	YAGEO	ANTA0ZZ14022WLAN4	Dipole Antenna	I-PEX	4.6	4.6
2	2	3	YAGEO	ANTA0ZZ14022WLAN3	Dipole Antenna	I-PEX	4.4	5.6
3	3	4	YAGEO	ANTA0ZZ14022WLAN2	Dipole Antenna	I-PEX	3.2	5.7
4	-	2	YAGEO	ANTA0ZZ14021WLAN1	Dipole Antenna	I-PEX	-	5.7

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Note: The above information was declared by manufacturer.

For 2.4GHz function:

For IEEE 802.11b/g/n mode (3TX/3RX):

Port 1, Port 2 and Port 3 can be used as transmitting/receiving antenna.

Port 1, Port 2 and Port 3 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11a/n/ac mode (4TX/4RX):

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

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

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	0.969	0.14	2.066m	1k
802.11ac VHT20	0.988	0.05	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ac VHT40	0.974	0.11	2.441m	1k
802.11ac VHT80	0.947	0.24	1.155m	1k

N	oto:	

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

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter				
Beamforming Function		☐ With beamforming			
Function		Outdoor P2M	\boxtimes	Indoor P2M	
Tanction		Fixed P2P		Client	
Test Software Version	on QRCT(Version3.0.187.0)				
Serial Number	1418568200053				

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			
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	TH03-CB	Owen Hsu	23.5~25.5°C / 53~55%	Apr. 09, 2020~Apr. 15, 2020
Radiated Below 1GHz	03CH06-CB	Stim Sung	21.5~22.4°C / 55~57%	Apr. 27, 2020
Radiated Above 1GHz	03CH03-CB	Stim Sung	24.2~24.5°C / 52~53%	Apr. 08, 2020~Apr. 09, 2020
AC Conduction	CO01-CB	Beck Wu	23~24°C / 55~60%	Apr. 28, 2020

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	Power Setting
802.11a_Nss1,(6Mbps)_4TX	-
5180MHz	17.5
5200MHz	17.5
5240MHz	17.5
5745MHz	20.5
5785MHz	19.5
5825MHz	19
802.11ac VHT20_Nss1,(MCS0)_4TX	-
5180MHz	18
5200MHz	18
5240MHz	18
5745MHz	20.5
5785MHz	20
5825MHz	19.5
802.11ac VHT40_Nss1,(MCS0)_4TX	-
5190MHz	18.5
5230MHz	19.5
5755MHz	20.5
5795MHz	19.5
802.11ac VHT80_Nss1,(MCS0)_4TX	-
5210MHz	16.5
5775MHz	17

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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.

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2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests		
Tests Item AC power-line conducted emissions		
Condition AC power-line conducted measurement for line and neutral		
Operating Mode	Normal Link	
1	EUT + Adapter	

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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

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	
Operating Mode > 1GHz	CTX	

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.: FA032025 for Co-location RF Exposure Evaluation.		

Note: The EUT can only be used at Y axis position.

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2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

Accessories			
Equipment Name	Brand Holder	Model Name	Rating
Adapter	ChenZhou Frecom Electronics Co., Ltd.	F42L1-120350SPAU	INPUT: 100-240V ~ 50/60Hz, 1.4A OUTPUT: 12V, 3.5A
Others			
RJ-45 cable, non-shielded, 1.8m			

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2.5 Support Equipment

For AC Conduction:

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	Flash disk3.0	Transcend	JetFlash-700	N/A	
В	LAN NB	DELL	E6430	N/A	
С	2.4G NB	DELL	E6430	N/A	
D	5G NB	DELL	E6430	N/A	
Е	Terminal System	MOTOROLA	BSR2000	N/A	
F	Terminal System NB	Acer	MS2308	N/A	
G	Phone 1	SAMPO	HT-B 907WL	N/A	
Η	Phone 2	SAMPO	HT-B 907WL	N/A	

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For Radiated (below 1GHz):

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	2.4G NB	Apple	Mac Book	N/A	
В	5G NB	Apple	Mac Book	N/A	
С	LAN NB	DELL	E4300	N/A	
D	Terminal system NB	Acer	MS2308	N/A	
Е	Phone 1	SAMPO	HT-B 907WL	N/A	
F	Phone 2	SAMPO	HT-B 907WL	N/A	
G	Terminal system	MOTOROLA	BSR2000	N/A	
Н	Flash disk3.0	Silicon Power	B06	N/A	

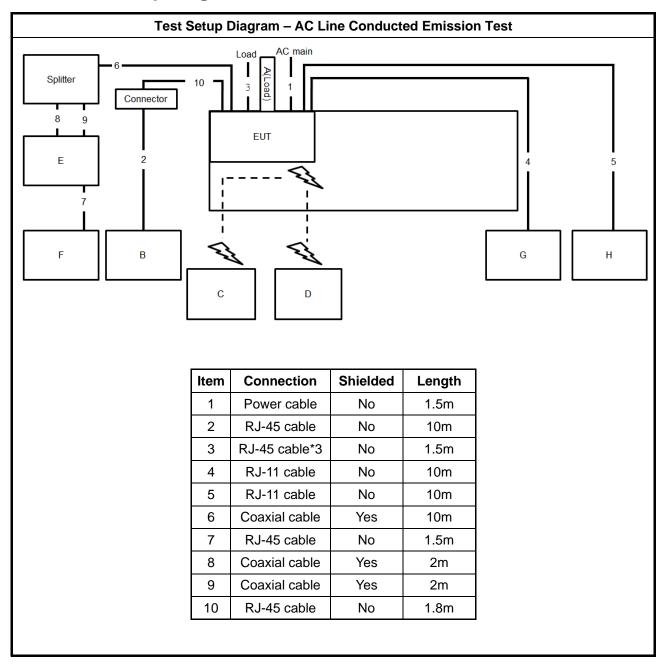
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For Radiated (above 1GHz) and RF Conducted:

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

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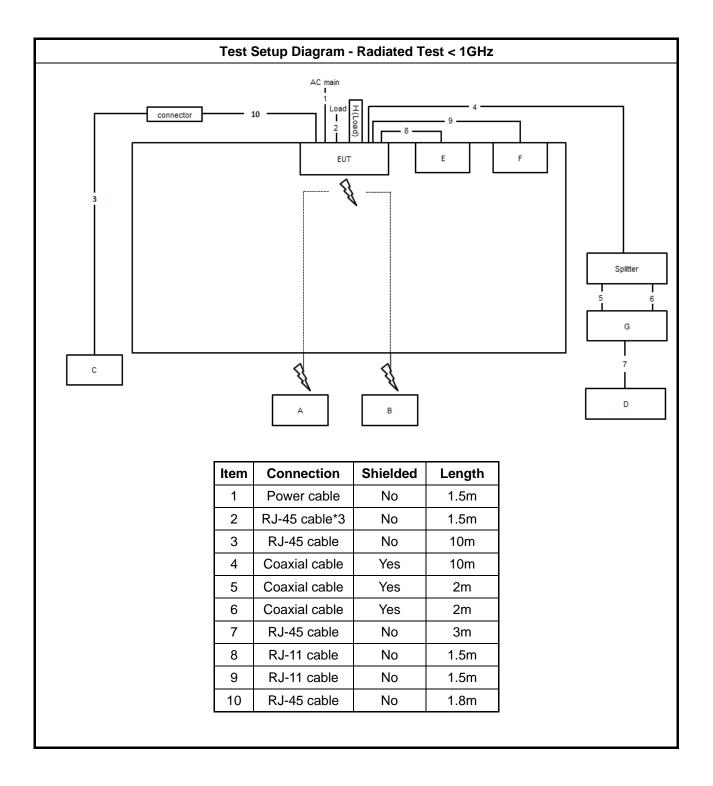
2.6 Test Setup Diagram



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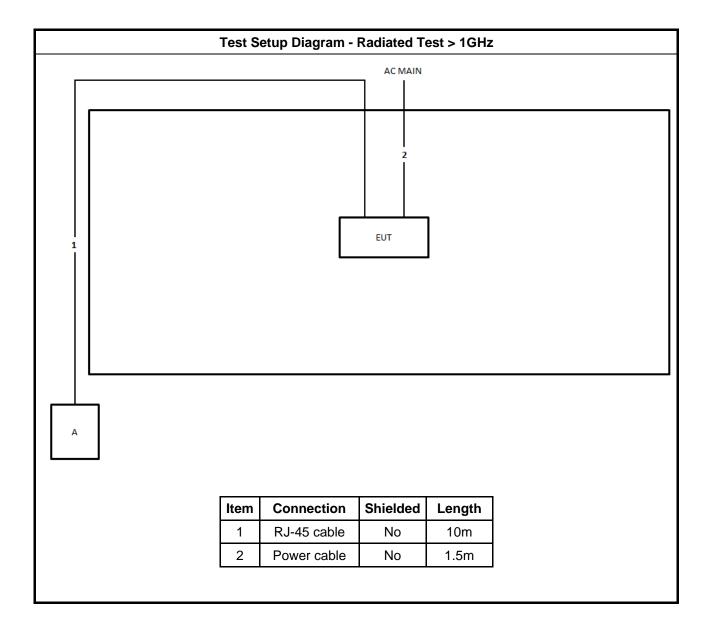
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3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power	er-line Conducted Emissions L	_imit
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	of the frequency.	

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3.1.2 Measuring Instruments

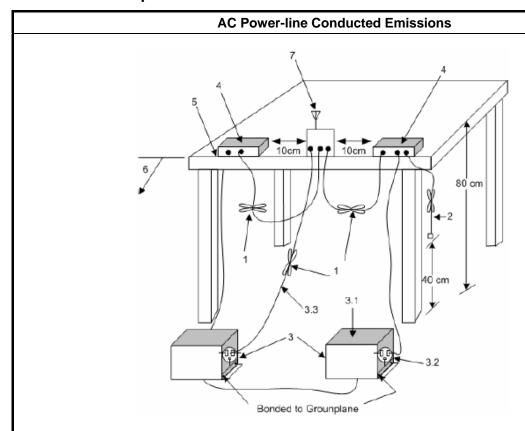
Refer a test equipment and calibration data table in this test report.

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
UNI	I Devices
\boxtimes	For the 5.15-5.25 GHz band, N/A
	For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
	For the $5.47-5.725$ GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
\boxtimes	For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.
LE-	LAN Devices
	For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.

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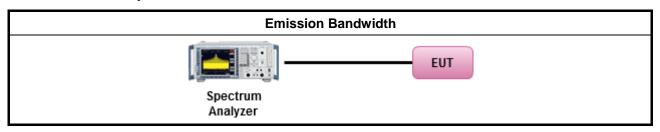
3.2.2 Measuring Instruments

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	I 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 \leq 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).
	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.
	e = maximum conducted output power in dBm, = the maximum transmitting antenna directional gain in dBi.

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3.3.2 Measuring Instruments

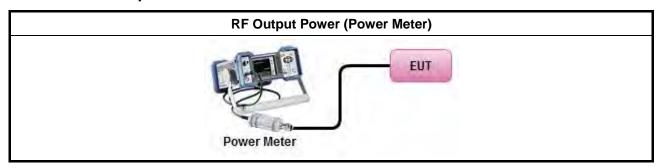
Refer a test equipment and calibration data table in this test report.

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) ≤ 11 dBm/MHz. If G _{TX} > 6 dBi, then PPSD= 11 - (G _{TX} - 6)
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz. If $G_{TX} > 6$ dBi, then PPSD= 11 – ($G_{TX} - 6$).
	For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz. If $G_{TX} > 6$ dBi, then PPSD= 11 – ($G_{TX} - 6$).
	For the 5.725-5.85 GHz band:
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= $30 - (G_{TX} - 6)$.
	Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
LE-	LAN Devices
	For the 5.15-5.25 GHz band, the e.i.r.p. peak power spectral density (PPSD) ≤ 10 dBm/MHz.
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.
	 e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below: -13 dBW/MHz for 0° ≤ θ < 8°; -13 − 0.716 (θ-8) dBW/MHz for 8° ≤ θ < 40° -35.9 − 1.22 (θ-40) dBW/MHz for 40° ≤ θ ≤ 45°; -42 dBW/MHz for θ > 45°
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz.
	For the 5.725-5.85 GHz band:
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= $30 - (G_{TX} - 6)$.
	 Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
pow	SD = peak power spectral density that he same method as used to determine the conducted output ver shall be used to determine the power spectral density. And power spectral density in dBm/MHz = the maximum transmitting antenna directional gain in dBi.

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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

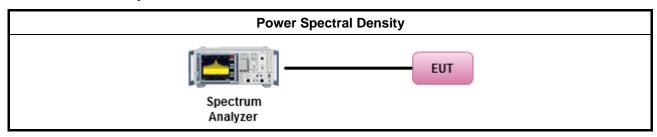
		Test Method									
•	Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:										
		Refer as FCC KDB 789033, F)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth									
	[duty	cycle ≥ 98% or external video / power trigger]									
	\boxtimes	Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).									
	Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)										
	duty	cycle < 98% and average over on/off periods with duty factor									
	\boxtimes	Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).									
		Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)									
•	For	conducted measurement.									
	•	If the EUT supports multiple transmit chains using options given below:									
		Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.									
		Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,									
		Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.									
	•	If multiple transmit chains, EIRP PPSD calculation could be following as methods: $ PPSD_{total} = PPSD_1 + PPSD_2 + \ldots + 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

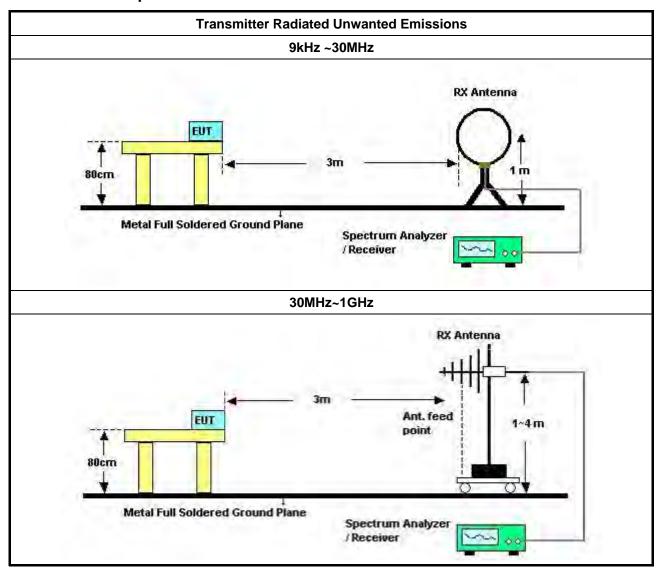
Test Method

- 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.

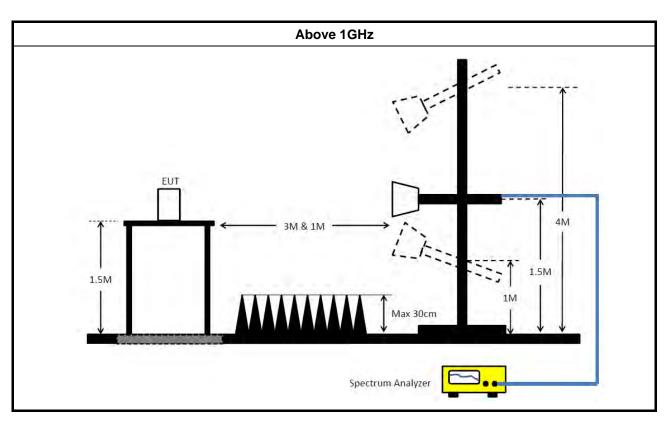
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3.5.4 Test Setup



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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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Feb. 26, 2020	Feb. 25, 2021	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-1 6-2	04083	150kHz ~ 100MHz	Dec. 25, 2019	Dec. 24, 2020	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Feb. 25, 2020	Feb. 24, 2021	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 21, 2019	May 20, 2020	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH06-CB)
Bilog Antenna with 6 dB attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37878 & AT-N0606	20MHz ~ 2GHz	Aug. 03, 2019	Aug. 02, 2020	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	May 07, 2019	May 06, 2020	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Oct. 21, 2019	Oct. 20, 2020	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH06-CB)
RF Cable-low	HUBER+SUH NER	RG402	Low Cable-05+24	30MHz~1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
Horn Antenna	ETS · Lindgren	3115	6821	750MHz~18GHz	Jan. 20, 2020	Jan. 19, 2021	Radiation (03CH03-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jun. 27, 2019	Jun. 26, 2020	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Dec. 19, 2019	Dec.18, 2020	Radiation (03CH03-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 19, 2019	Jun. 18, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+27	1GHz ~ 18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-27	1GHz ~ 18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH03-CB)
Spectrum analyzer	R&S	FSV40	101028	9kHz~40GHz	Nov. 01, 2019	Oct. 31, 2020	Conducted (TH03-CB)
Power Sensor	Anritsu	MA2411B	1726195	300MHz~40GHz	Aug. 13, 2019	Aug. 12, 2020	Conducted (TH03-CB)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Aug. 13, 2019	Aug. 12, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-11	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-12	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-13	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-14	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-15	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-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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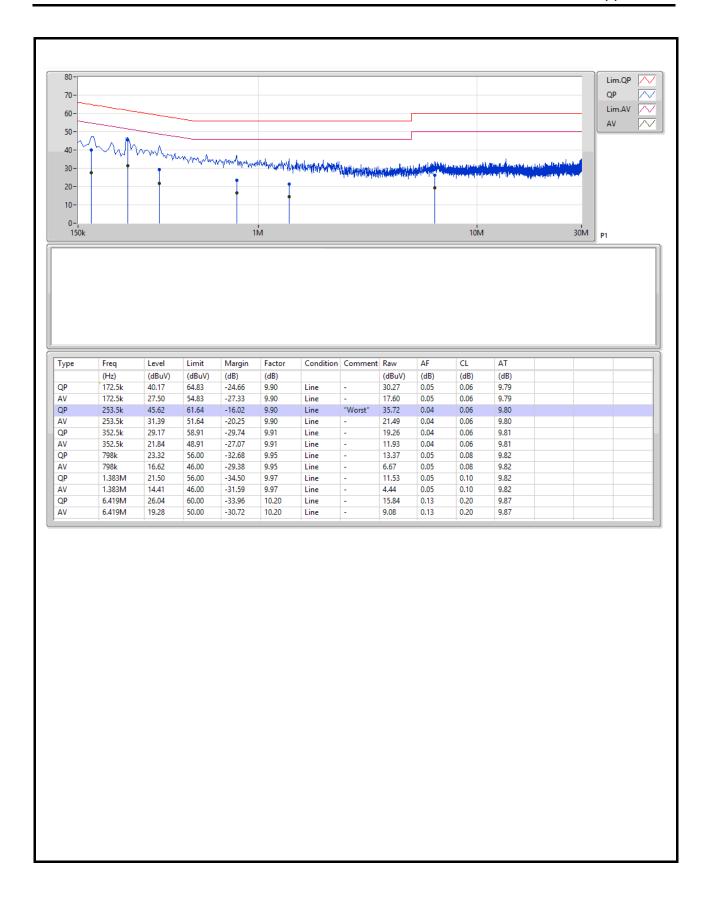
AC Power Port Conducted Emission Result

Appendix A

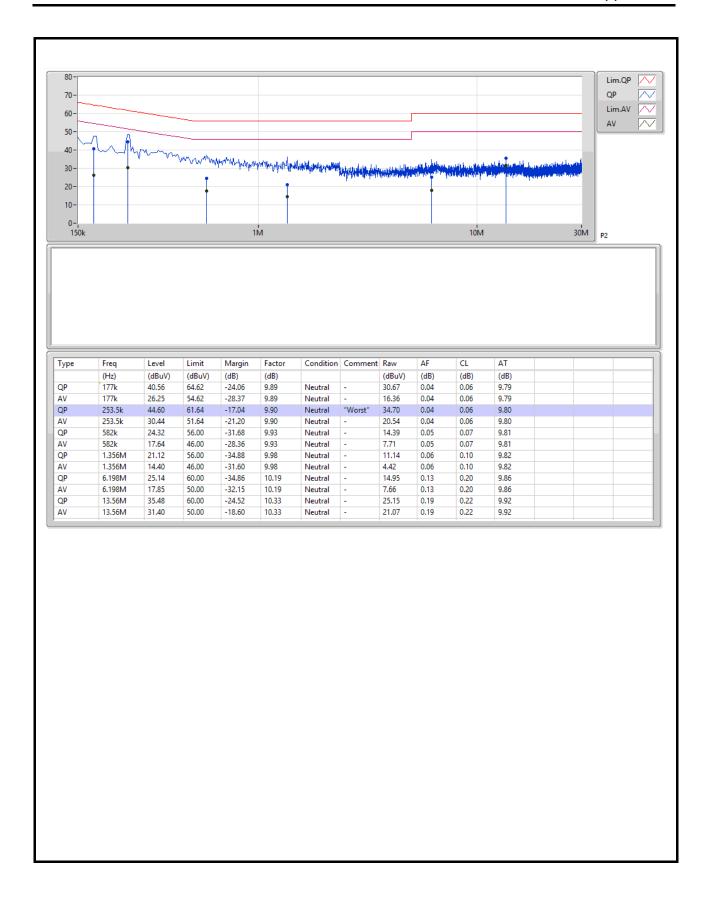
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Condition
			(Hz)	(dBuV)	(dBuV)	(dB)	(dB)	
Mode 1	Pass	QP	253.5k	45.62	61.64	-16.02	9.90	Line











Appendix B **EBW**

Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW	
	(Hz)	(Hz)		(Hz)	(Hz)	
5.15-5.25GHz	-	-	-	-	-	
802.11a_Nss1,(6Mbps)_4TX	19.77M	16.402M	16M4D1D	19.23M	16.372M	
802.11ac VHT20_Nss1,(MCS0)_4TX	20.34M	17.571M	17M6D1D	19.95M	17.571M	
802.11ac VHT40_Nss1,(MCS0)_4TX	40.08M	35.922M	35M9D1D	39.18M	35.742M	
802.11ac VHT80_Nss1,(MCS0)_4TX	83.64M	75.802M	75M8D1D	82.56M	75.562M	
5.725-5.85GHz	-	-	-	-	-	
802.11a_Nss1,(6Mbps)_4TX	16.35M	16.492M	16M5D1D	16.02M	16.312M	
802.11ac VHT20_Nss1,(MCS0)_4TX	17.58M	17.631M	17M6D1D	16.77M	17.511M	
802.11ac VHT40_Nss1,(MCS0)_4TX	36.3M	36.042M	36M0D1D	33.06M	35.802M	
802.11ac VHT80_Nss1,(MCS0)_4TX	76.32M	75.922M	75M9D1D	75.12M	75.682M	

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;

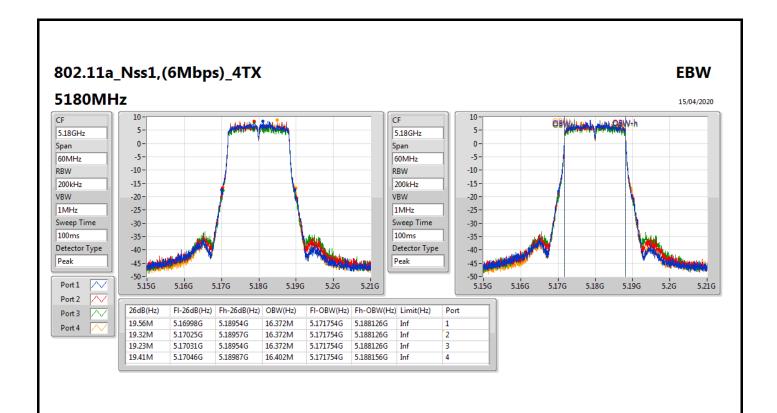
Min-OBW = Minimum 99% occupied bandwidth;

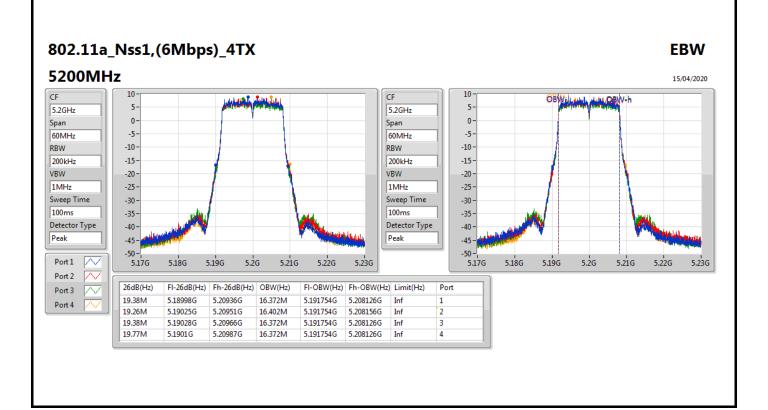


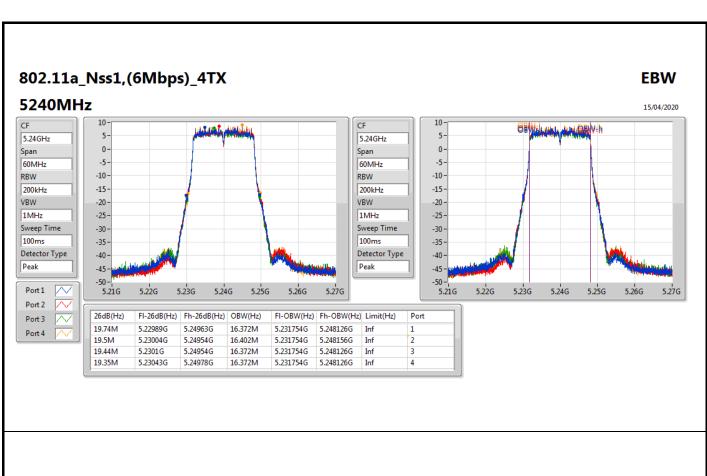
Result

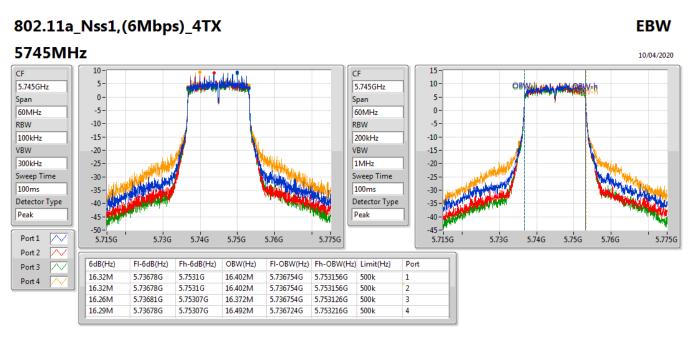
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW	Port 3-N dB	Port 3-OBW	Port 4-N dB	Port 4-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
5180MHz	Pass	Inf	19.56M	16.372M	19.32M	16.372M	19.23M	16.372M	19.41M	16.402M
5200MHz	Pass	Inf	19.38M	16.372M	19.26M	16.402M	19.38M	16.372M	19.77M	16.372M
5240MHz	Pass	Inf	19.74M	16.372M	19.5M	16.402M	19.44M	16.372M	19.35M	16.372M
5745MHz	Pass	500k	16.32M	16.402M	16.32M	16.402M	16.26M	16.372M	16.29M	16.492M
5785MHz	Pass	500k	16.32M	16.402M	16.32M	16.402M	16.29M	16.372M	16.32M	16.372M
5825MHz	Pass	500k	16.29M	16.432M	16.35M	16.402M	16.02M	16.312M	16.32M	16.372M
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5180MHz	Pass	Inf	19.95M	17.571M	20.19M	17.571M	20.1M	17.571M	20.22M	17.571M
5200MHz	Pass	Inf	20.1M	17.571M	20.16M	17.571M	20.19M	17.571M	20.28M	17.571M
5240MHz	Pass	Inf	19.95M	17.571M	20.19M	17.571M	20.34M	17.571M	20.19M	17.571M
5745MHz	Pass	500k	16.92M	17.601M	17.16M	17.571M	16.89M	17.571M	16.92M	17.631M
5785MHz	Pass	500k	17.25M	17.571M	17.55M	17.601M	17.13M	17.511M	17.13M	17.571M
5825MHz	Pass	500k	17.55M	17.571M	17.55M	17.571M	16.77M	17.511M	17.58M	17.571M
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5190MHz	Pass	Inf	39.84M	35.862M	39.78M	35.742M	39.6M	35.802M	39.18M	35.742M
5230MHz	Pass	Inf	40.08M	35.922M	39.96M	35.862M	39.9M	35.862M	39.18M	35.742M
5755MHz	Pass	500k	33.78M	35.982M	33.06M	35.922M	33.72M	35.982M	36.3M	36.042M
5795MHz	Pass	500k	35.04M	35.862M	36.24M	35.922M	35.94M	35.922M	35.28M	35.802M
802.11ac VHT80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	=
5210MHz	Pass	Inf	83.64M	75.802M	83.4M	75.562M	83.52M	75.682M	82.56M	75.682M
5775MHz	Pass	500k	76.32M	75.682M	76.2M	75.682M	75.6M	75.922M	75.12M	75.682M

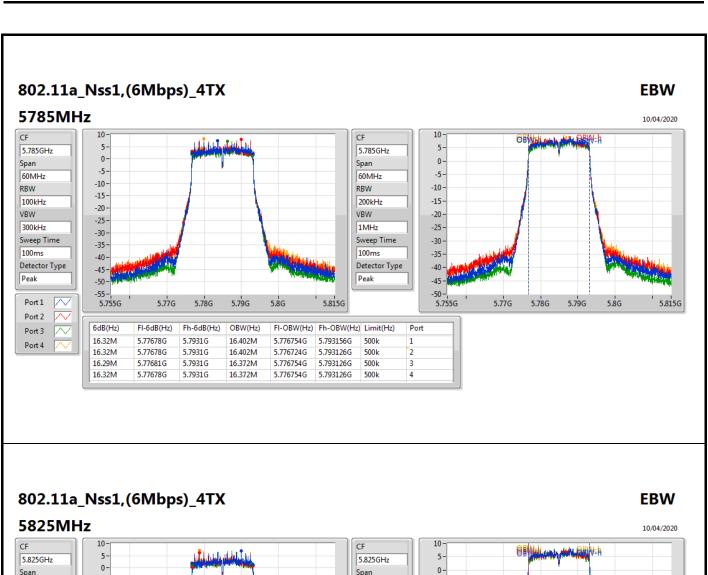
Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band Port X-OBW = Port X 99% occupied bandwidth;

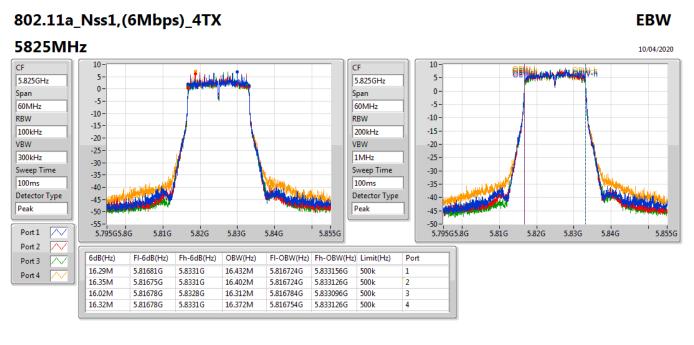




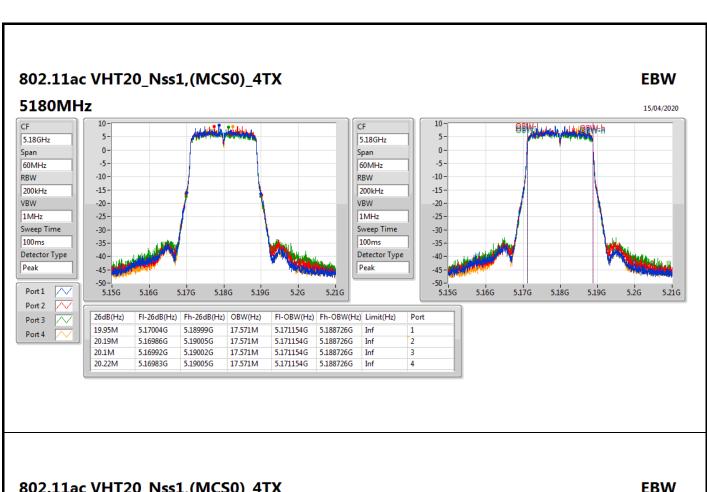


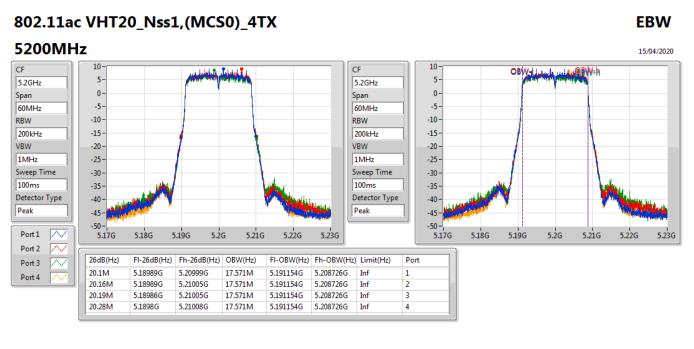




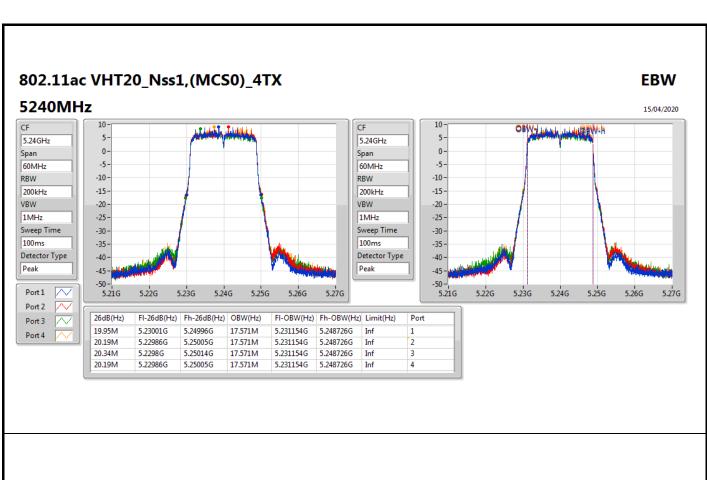


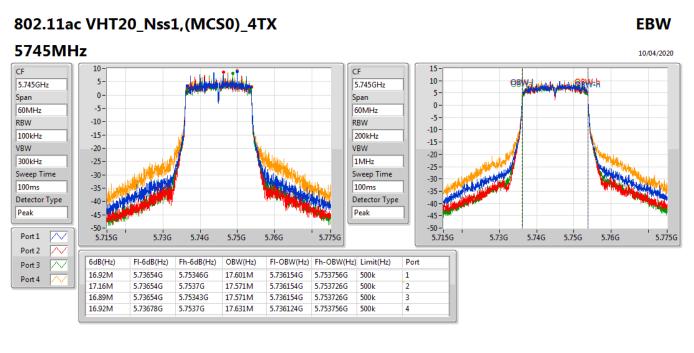
EBW Appendix B





EBW Appendix B





100ms

Peak

Port 2

Port 3

Port 4

 $\overline{\wedge}$

Detector Type

-40 -

-45 -

-50 --55 -5.795G5.8G

6dB(Hz)

17.55M

17.55M

16.77M

17.58M

5.81G

FI-6dB(Hz)

5.81615G

5.81615G

5.81654G

5.81615G

5.82G

Fh-6dB(Hz)

5.8337G

5.8337G

5.83331G

5.83373G

5.83G

OBW(Hz)

17.571M

17.571M

17.511M

17.571M

5.84G

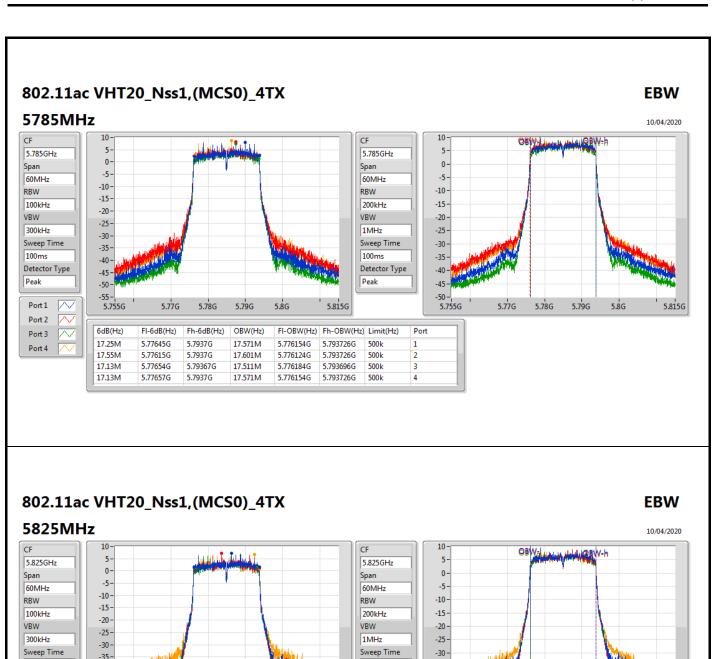
5.816154G

5.816154G

5.816184G

5.816154G

EBW Appendix B



100ms

Peak

500k

500k

500k

500k

5.855G

FI-OBW(Hz) Fh-OBW(Hz) Limit(Hz)

5.833726G

5.833726G

5.833696G

5.833726G

Detector Type

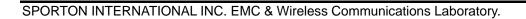
-35

-40

-45 -

-50 -5.795G5.8G

5.81G



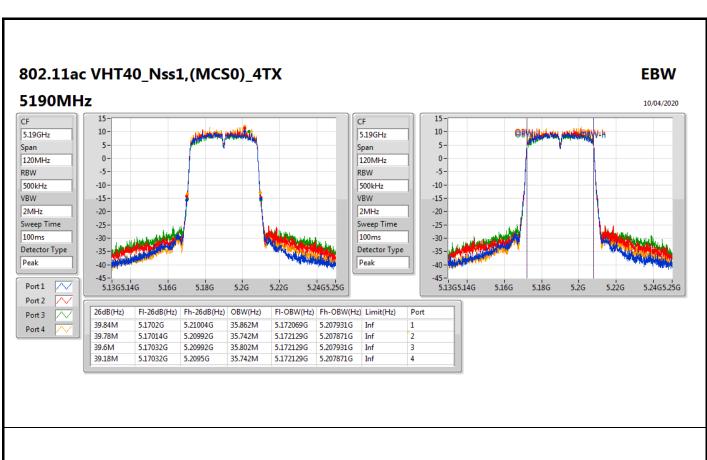
5.83G

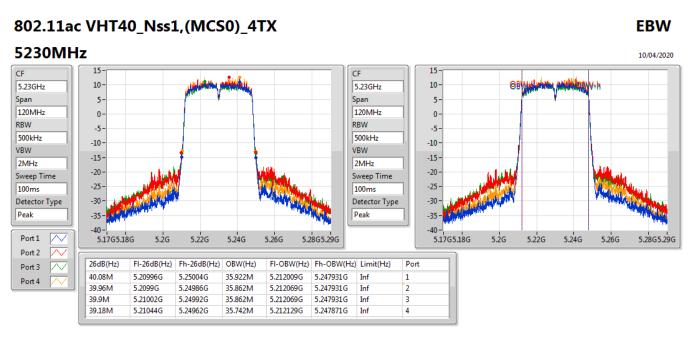
5.84G

5.855G

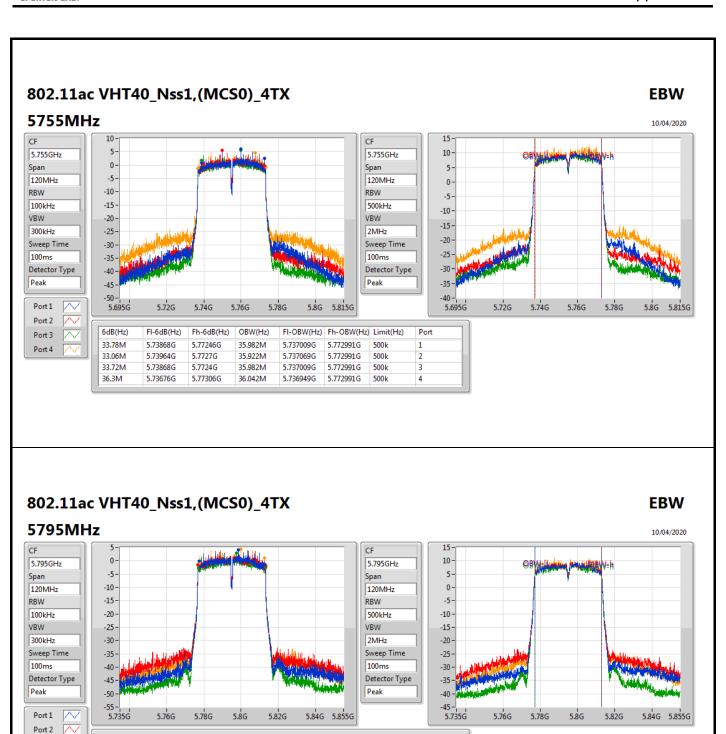
5.82G

EBW Appendix B





EBW Appendix B



OBW(Hz)

35.862M

35.922M

35.922M

35.802M

FI-OBW(Hz) Fh-OBW(Hz) Limit(Hz)

5.812871G

5.812931G

5.812931G

5.812811G

500k

500k

500k

500k

5.777009G

5.777009G

5.777009G

5.777009G

6dB(Hz)

35.04M

36.24M

35.94M

35.28M

Port 3

Port 4

FI-6dB(Hz)

5.77736G

5.77682G

5.77712G

5.77712G

Fh-6dB(Hz)

5.8124G

5.81306G

5.81306G

5.8124G

Port 2

Port 3

Port 4

6dB(Hz)

76.32M

76.2M

75.6M

75.12M

FI-6dB(Hz)

5.73684G

5.73684G

5.73744G

5.73732G

Fh-6dB(Hz)

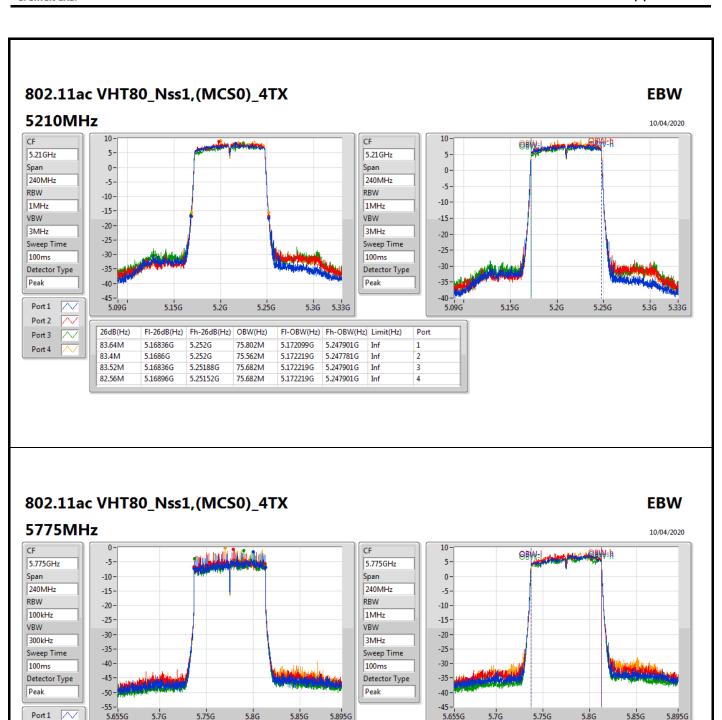
5.81316G

5.81304G

5.81304G

5.81244G

EBW Appendix B



OBW(Hz)

75.682M

75.682M

75.922M

75.682M

FI-OBW(Hz) Fh-OBW(Hz) Limit(Hz)

5.812901G

5.812901G

5.813021G

5.812781G

500k

500k

500k

500k

5.737219G

5.737219G

5.737099G

5.737099G



Average Power Appendix C

Summary

Mode	Total Power	Total Power		
	(dBm)	(W)		
5.15-5.25GHz	-	-		
802.11a_Nss1,(6Mbps)_4TX	24.50	0.28184		
802.11ac VHT20_Nss1,(MCS0)_4TX	24.81	0.30269		
802.11ac VHT40_Nss1,(MCS0)_4TX	26.06	0.40365		
802.11ac VHT80_Nss1,(MCS0)_4TX	23.26	0.21184		
5.725-5.85GHz	-	-		
802.11a_Nss1,(6Mbps)_4TX	26.09	0.40644		
802.11ac VHT20_Nss1,(MCS0)_4TX	25.65	0.36728		
802.11ac VHT40_Nss1,(MCS0)_4TX	25.51	0.35563		
802.11ac VHT80_Nss1,(MCS0)_4TX	22.09	0.16181		



Average Power Appendix C

Result

Mode	Result	DG	Port 1	Port 2	Port 3	Port 4	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11a_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-
5180MHz	Pass	5.70	18.31	18.40	17.69	18.48	24.25	30.00
5200MHz	Pass	5.70	18.68	18.59	17.94	18.65	24.50	30.00
5240MHz	Pass	5.70	18.19	18.31	17.91	18.81	24.34	30.00
5745MHz	Pass	5.70	20.21	20.03	19.57	20.42	26.09	30.00
5785MHz	Pass	5.70	19.04	19.10	18.53	19.21	25.00	30.00
5825MHz	Pass	5.70	18.21	18.31	17.92	18.30	24.21	30.00
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5180MHz	Pass	5.70	18.68	18.96	18.12	18.91	24.70	30.00
5200MHz	Pass	5.70	18.69	18.98	18.43	19.02	24.81	30.00
5240MHz	Pass	5.70	18.48	18.62	18.32	19.07	24.65	30.00
5745MHz	Pass	5.70	19.64	19.47	19.34	20.05	25.65	30.00
5785MHz	Pass	5.70	19.16	19.36	18.73	19.36	25.18	30.00
5825MHz	Pass	5.70	18.59	18.53	18.19	18.07	24.37	30.00
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5190MHz	Pass	5.70	19.13	19.60	18.38	19.53	25.21	30.00
5230MHz	Pass	5.70	19.50	20.60	19.69	20.27	26.06	30.00
5755MHz	Pass	5.70	19.38	19.59	18.95	19.97	25.51	30.00
5795MHz	Pass	5.70	18.56	18.70	17.78	18.43	24.40	30.00
802.11ac VHT80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5210MHz	Pass	5.70	17.26	17.38	16.69	17.56	23.26	30.00
5775MHz	Pass	5.70	16.06	16.39	15.48	16.30	22.09	30.00

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



Summary

Mode	PD					
	(dBm/RBW)					
5.15-5.25GHz						
802.11a_Nss1,(6Mbps)_4TX	11.51					
802.11ac VHT20_Nss1,(MCS0)_4TX	11.49					
802.11ac VHT40_Nss1,(MCS0)_4TX	10.30					
802.11ac VHT80_Nss1,(MCS0)_4TX	4.15					
5.725-5.85GHz	-					
802.11a_Nss1,(6Mbps)_4TX	11.81					
802.11ac VHT20_Nss1,(MCS0)_4TX	11.03					
802.11ac VHT40_Nss1,(MCS0)_4TX	8.34					
802.11ac VHT80_Nss1,(MCS0)_4TX	1.90					

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



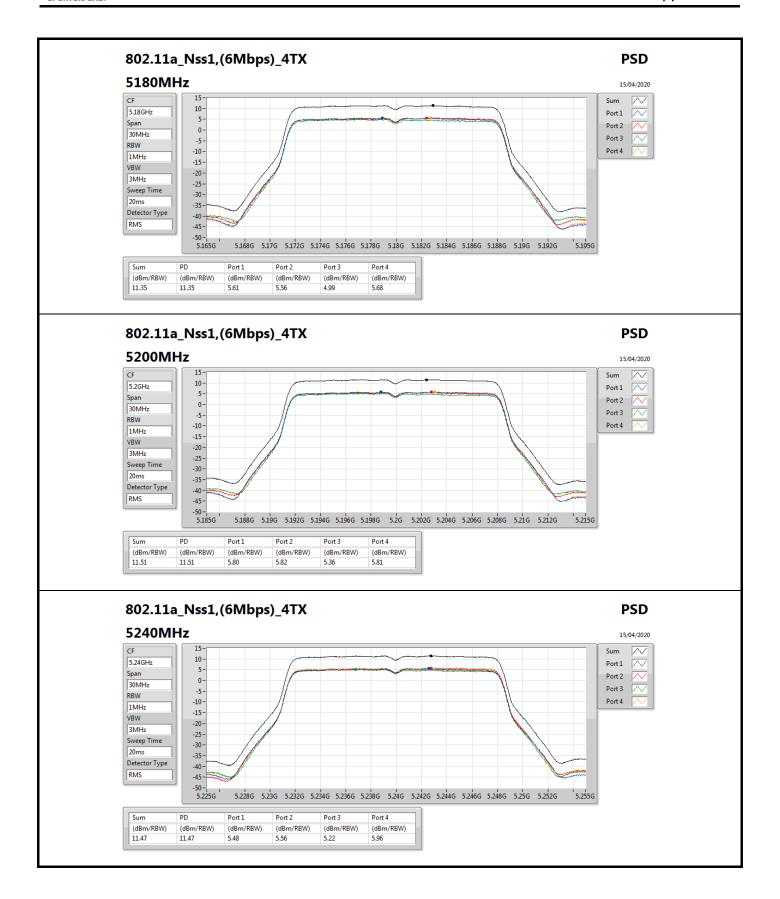
Appendix D **PSD**

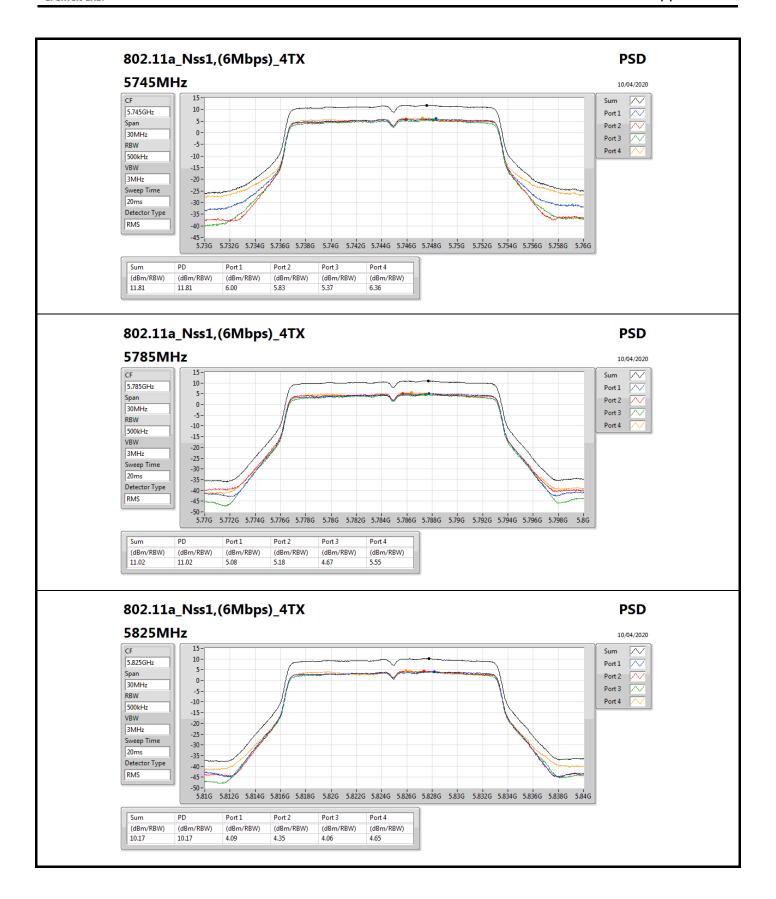
Result

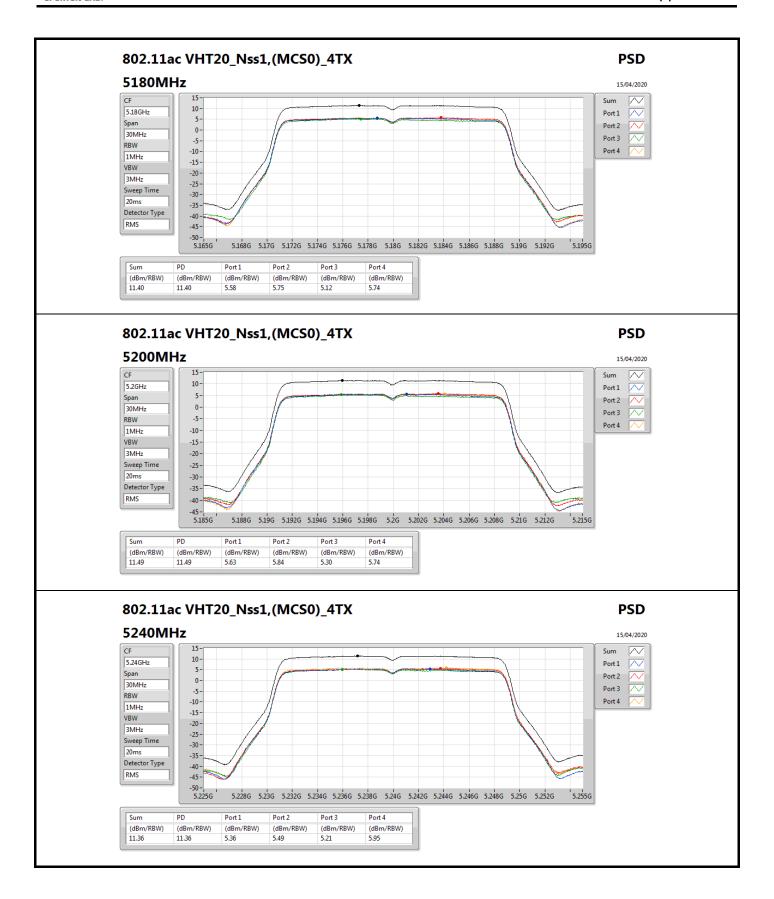
Mode	Result	DG	Port 1	Port 2	Port 3	Port 4	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11a_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-
5180MHz	Pass	11.43	5.61	5.56	4.99	5.68	11.35	11.57
5200MHz	Pass	11.43	5.80	5.82	5.36	5.81	11.51	11.57
5240MHz	Pass	11.43	5.48	5.56	5.22	5.96	11.47	11.57
5745MHz	Pass	11.43	6.00	5.83	5.37	6.36	11.81	24.57
5785MHz	Pass	11.43	5.08	5.18	4.67	5.55	11.02	24.57
5825MHz	Pass	11.43	4.09	4.35	4.06	4.65	10.17	24.57
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5180MHz	Pass	11.43	5.58	5.75	5.12	5.74	11.40	11.57
5200MHz	Pass	11.43	5.63	5.84	5.30	5.74	11.49	11.57
5240MHz	Pass	11.43	5.36	5.49	5.21	5.95	11.36	11.57
5745MHz	Pass	11.43	5.15	5.11	4.73	5.61	11.03	24.57
5785MHz	Pass	11.43	4.94	5.12	4.41	5.55	10.86	24.57
5825MHz	Pass	11.43	4.10	4.30	3.90	4.61	10.08	24.57
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5190MHz	Pass	11.43	3.25	4.02	2.91	3.66	9.33	11.57
5230MHz	Pass	11.43	4.50	4.98	4.08	4.54	10.30	11.57
5755MHz	Pass	11.43	2.29	2.66	1.79	3.05	8.34	24.57
5795MHz	Pass	11.43	1.65	1.68	1.05	2.03	7.49	24.57
802.11ac VHT80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5210MHz	Pass	11.43	-1.78	-1.63	-2.09	-1.17	4.15	11.57
5775MHz	Pass	11.43	-3.86	-3.77	-4.56	-3.36	1.90	24.57

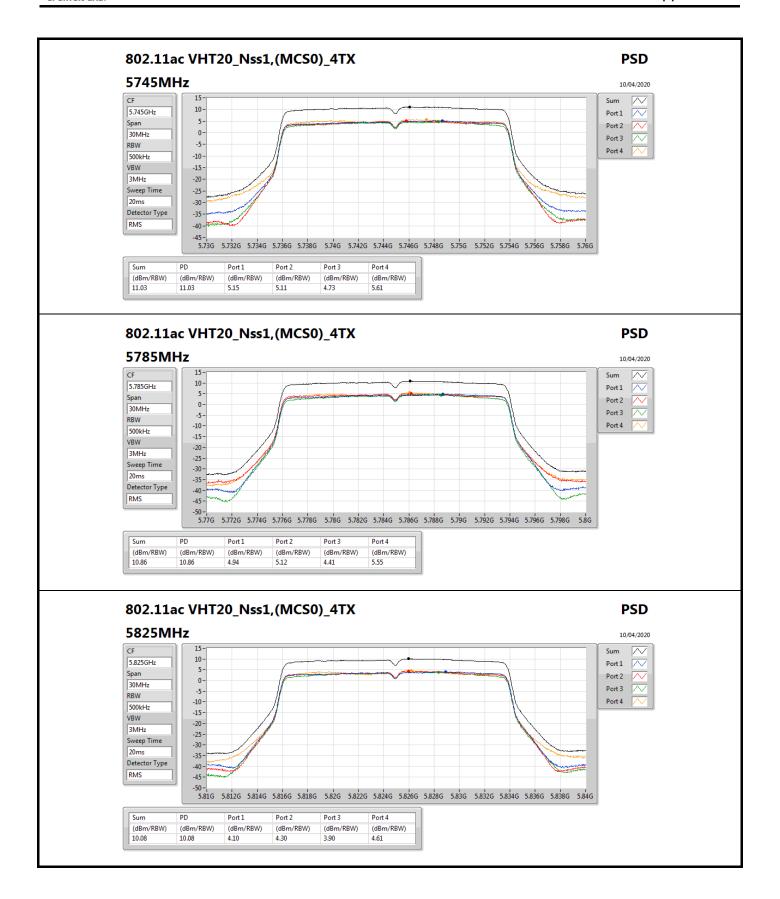
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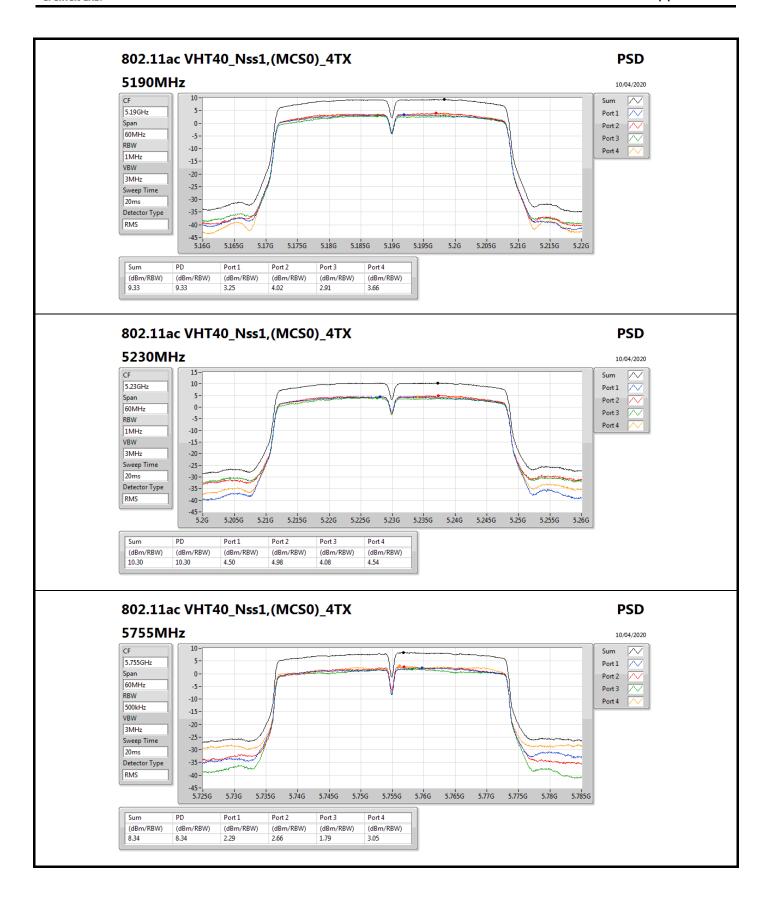
DG = Directional Gain; **RBW** = 500 kHz for 5.725-5.85GHz band / 1MHz for other band; **PD** = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

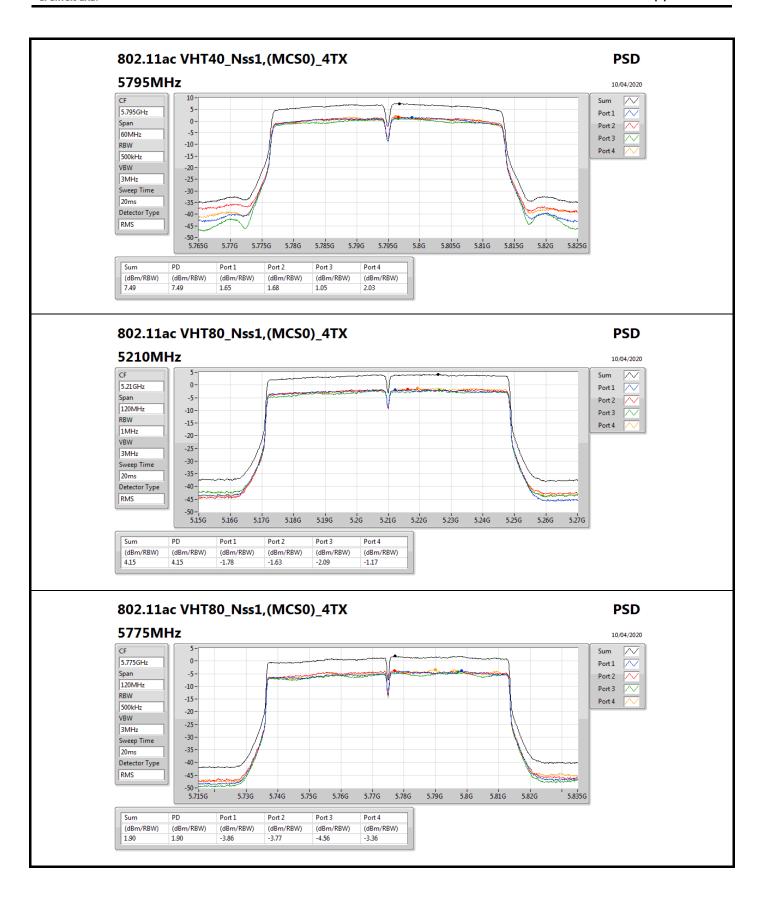














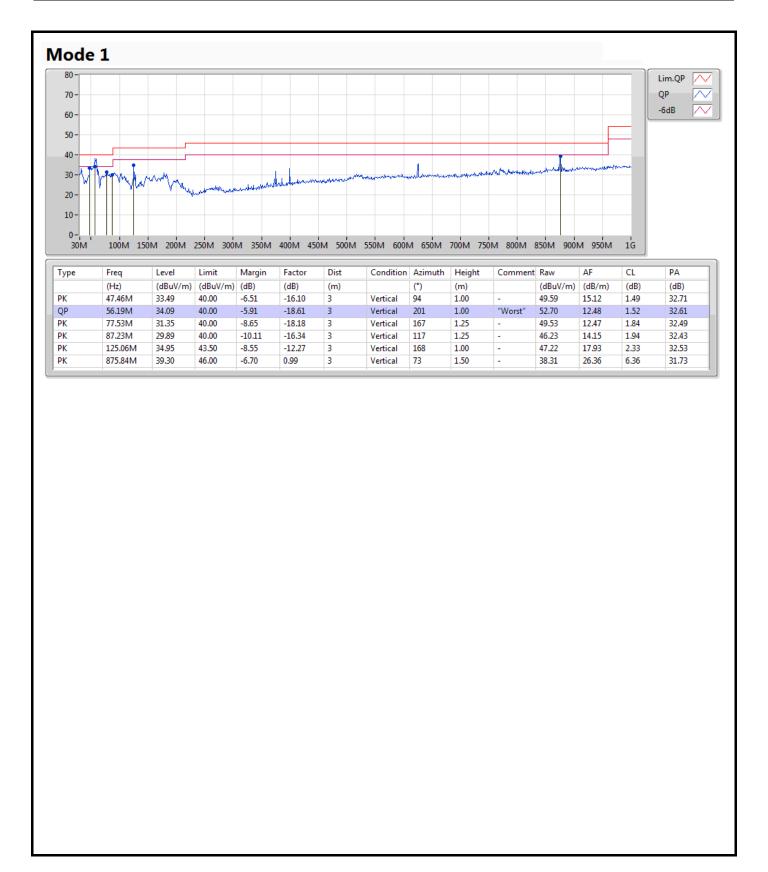
Radiated Emissions below 1GHz

Appendix E.1

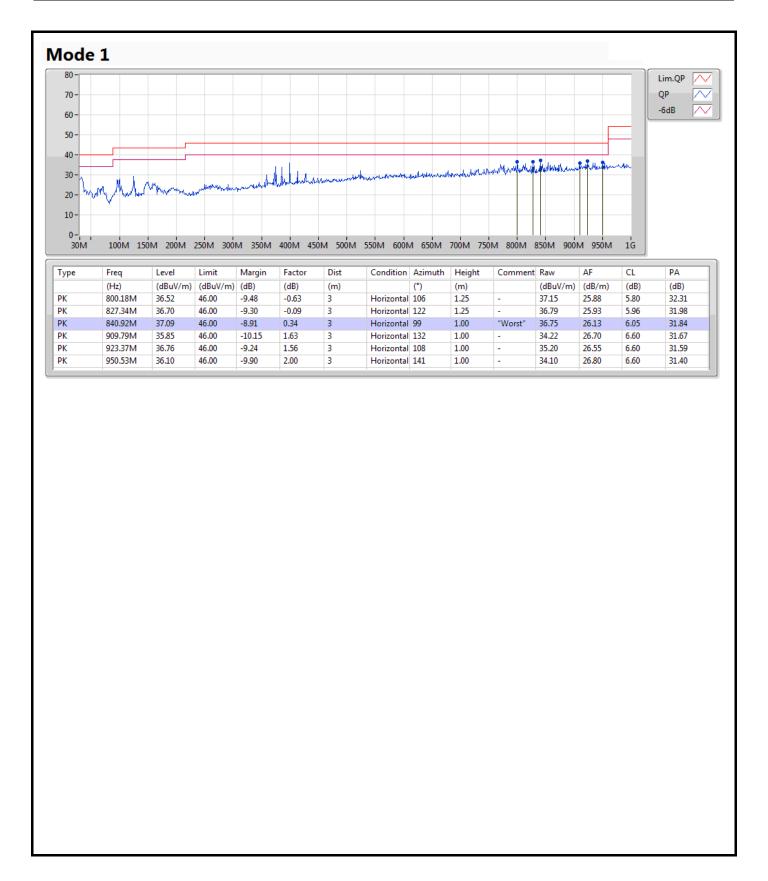
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV/m)	(dBuV/m) (dB)		
Mode 1	Pass	QP	56.19M	34.09	40.00	-5.91	Vertical











RSE TX above 1GHz

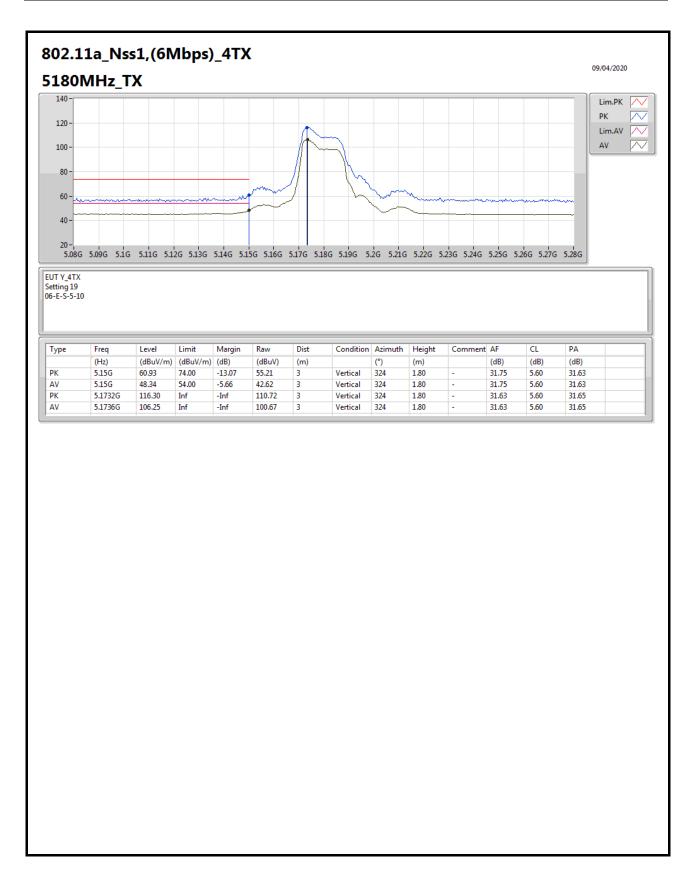
Appendix E.2

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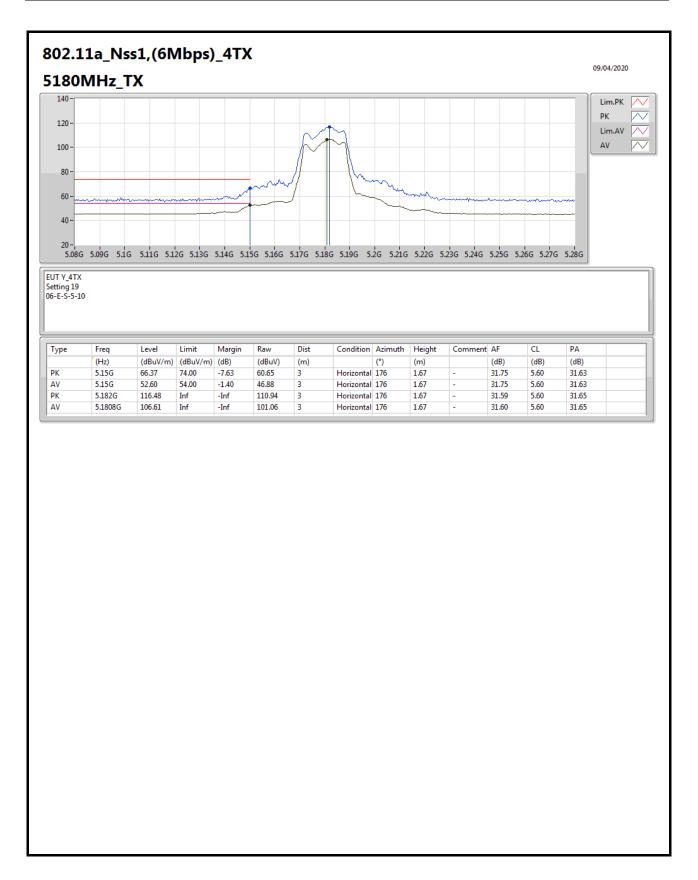
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
5.15-5.25GHz	-	-	-	-	-	-	-	-	-	-	-
802.11ac VHT40_Nss1,(MCS0)_4TX	Pass	AV	5.1408G	53.99	54.00	-0.01	3	Horizontal	180	1.80	-

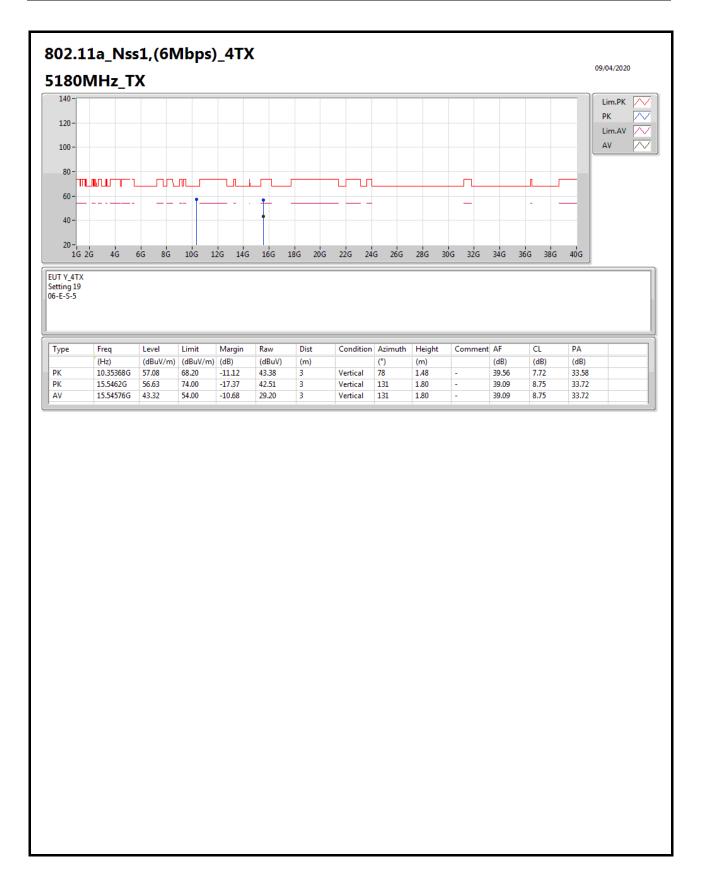






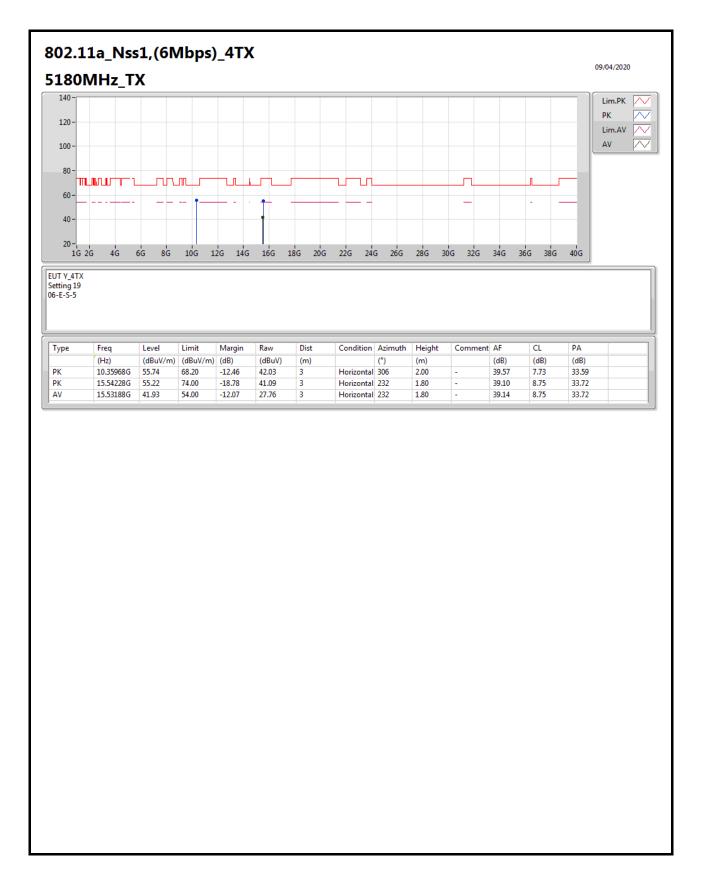






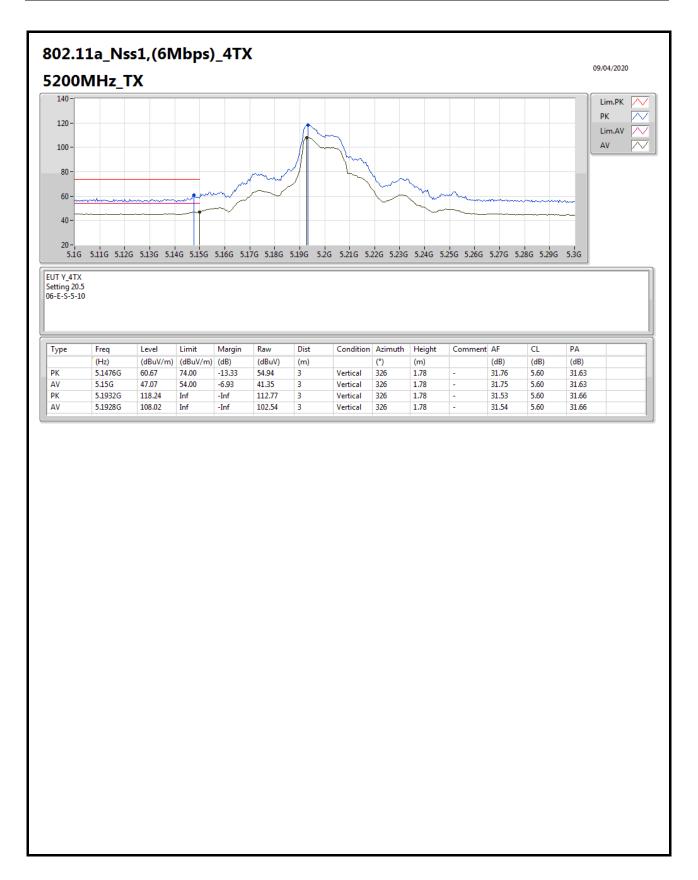
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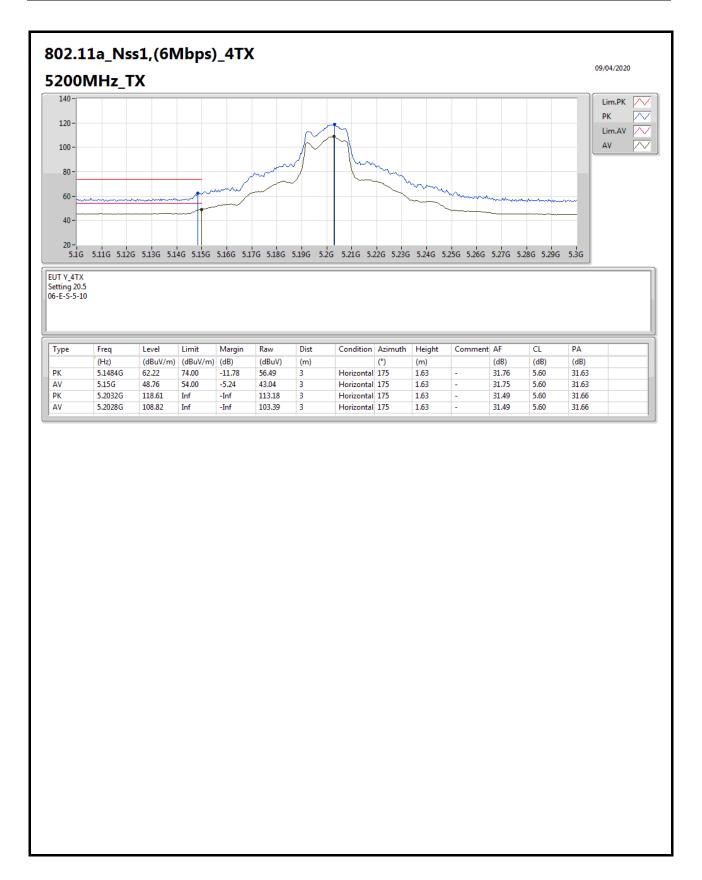


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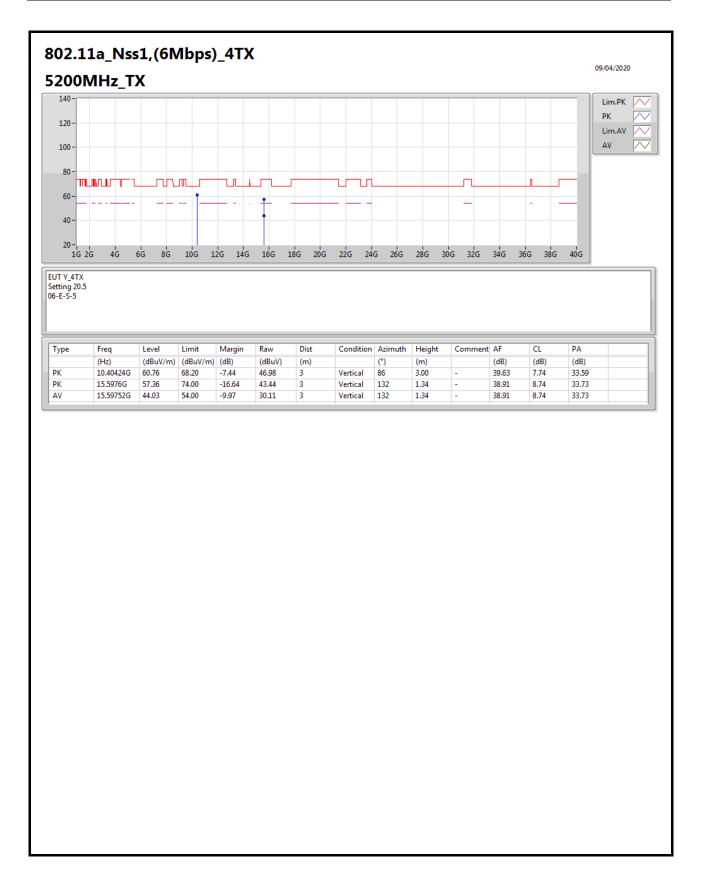




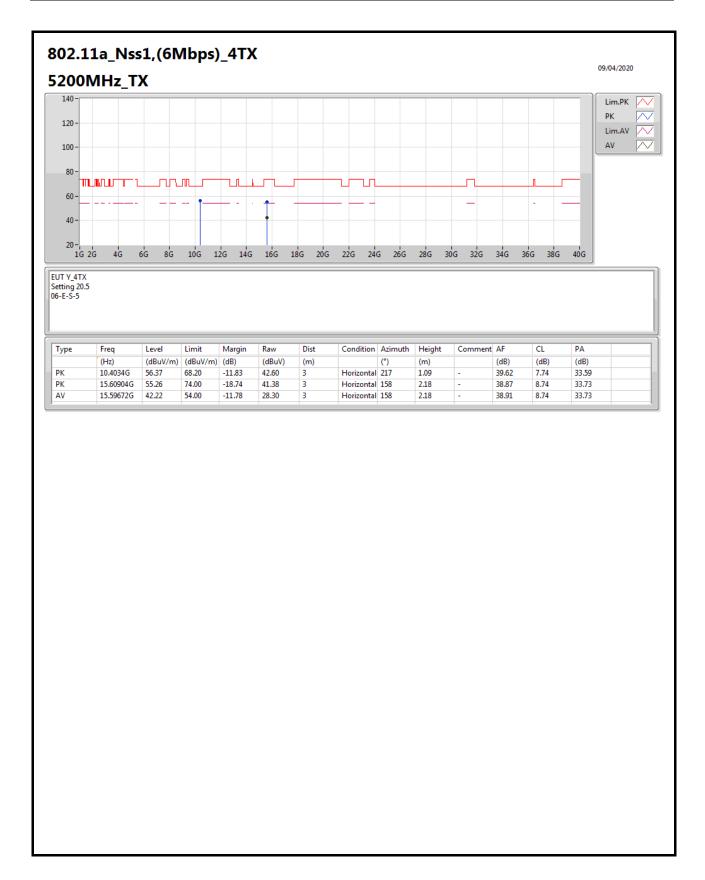


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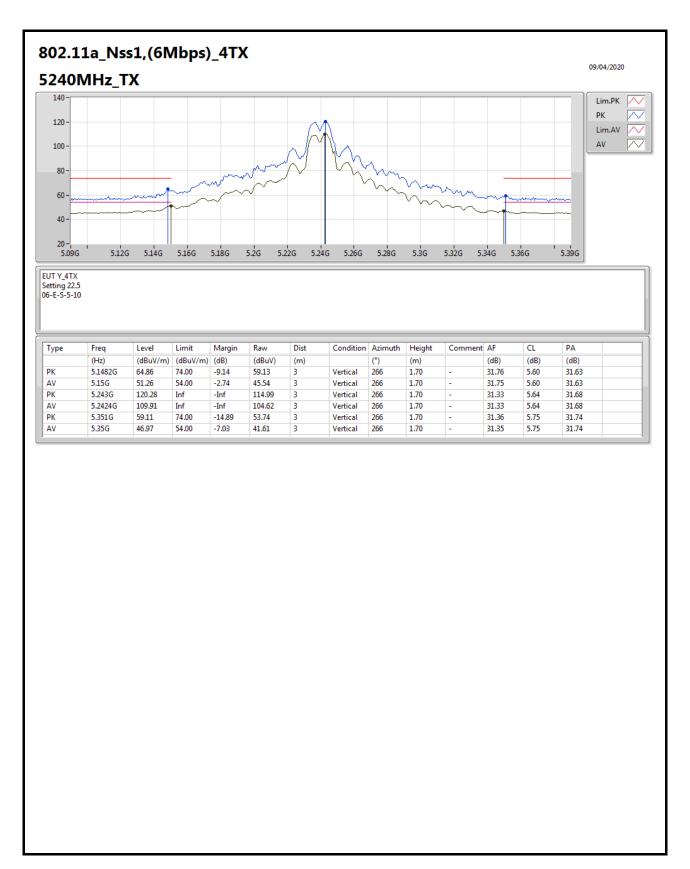




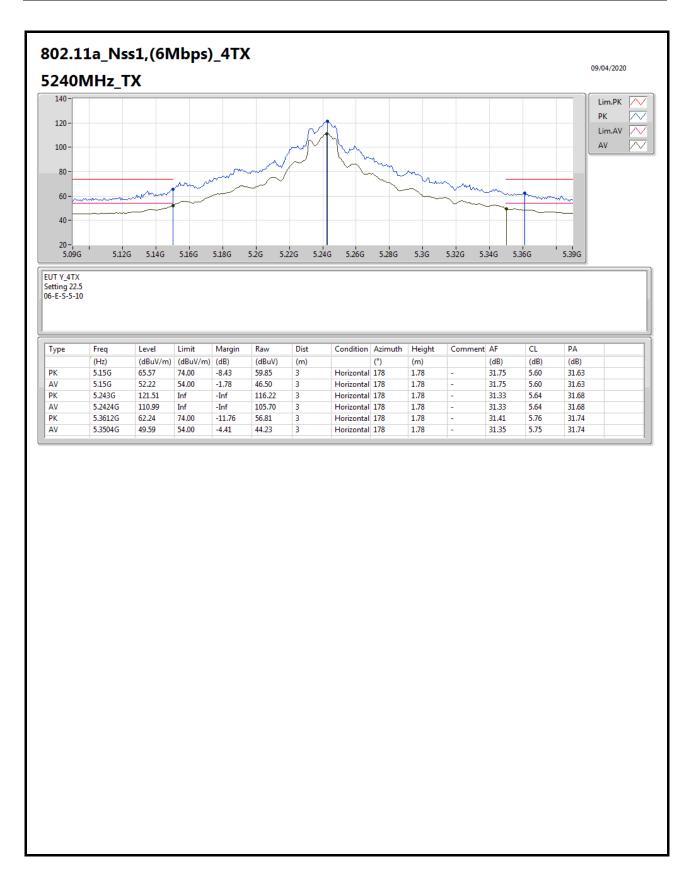






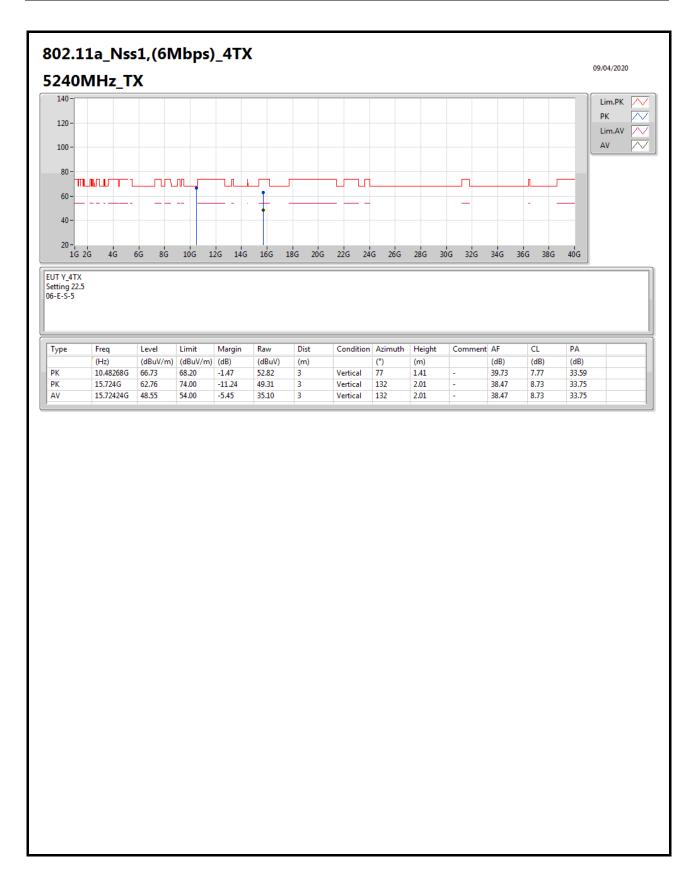






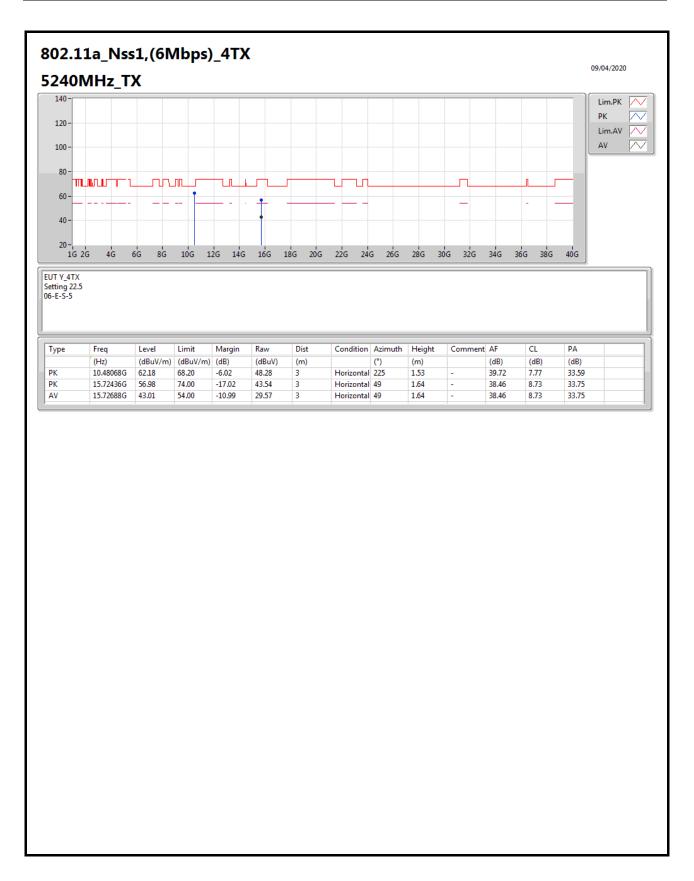
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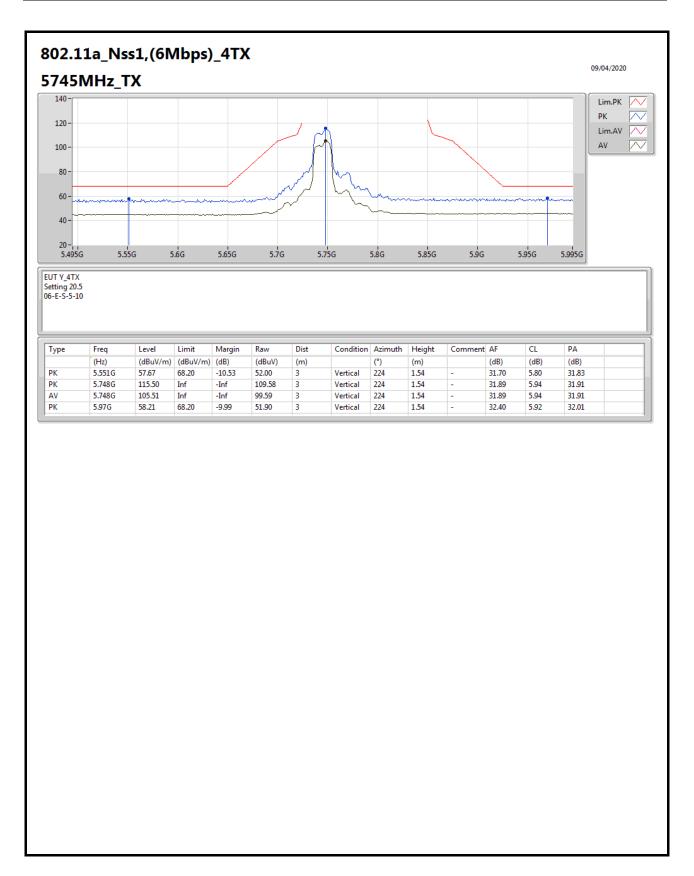


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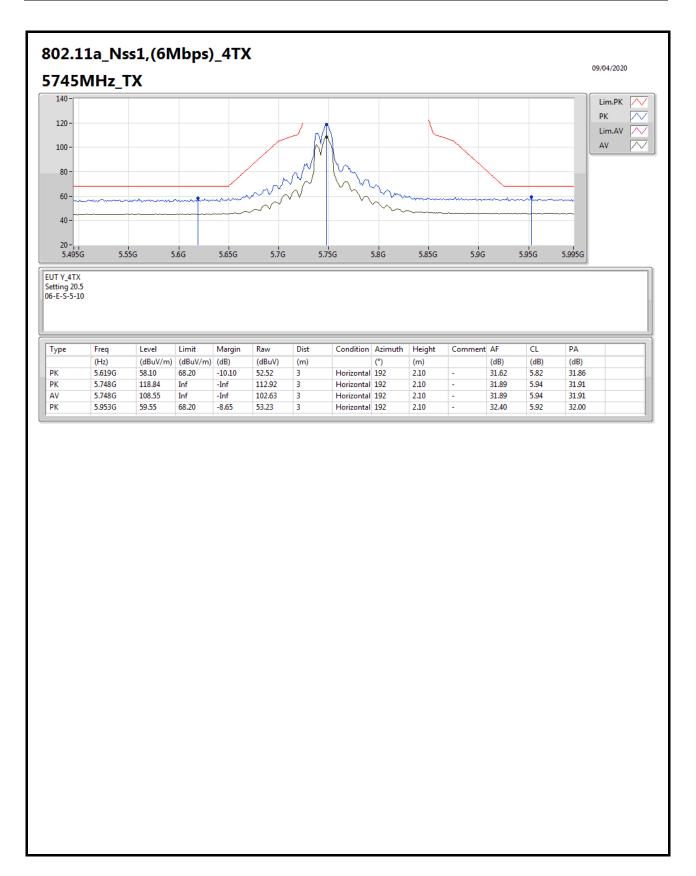






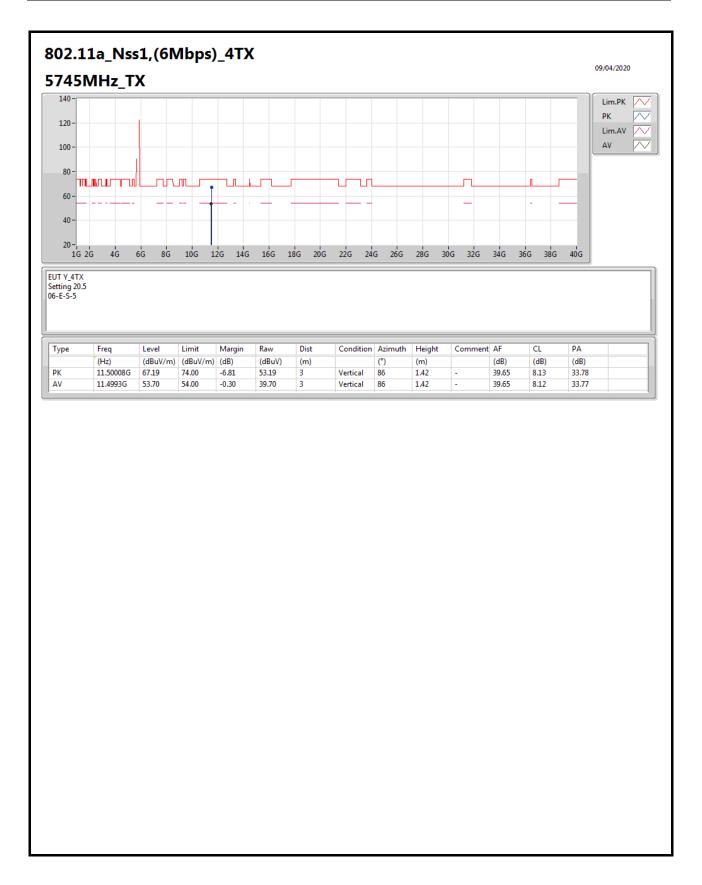






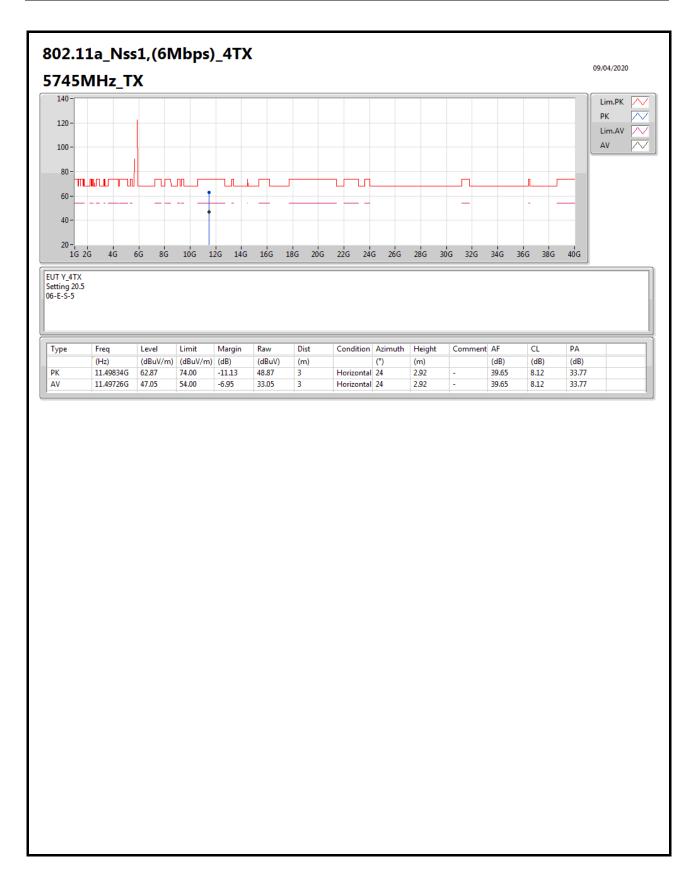
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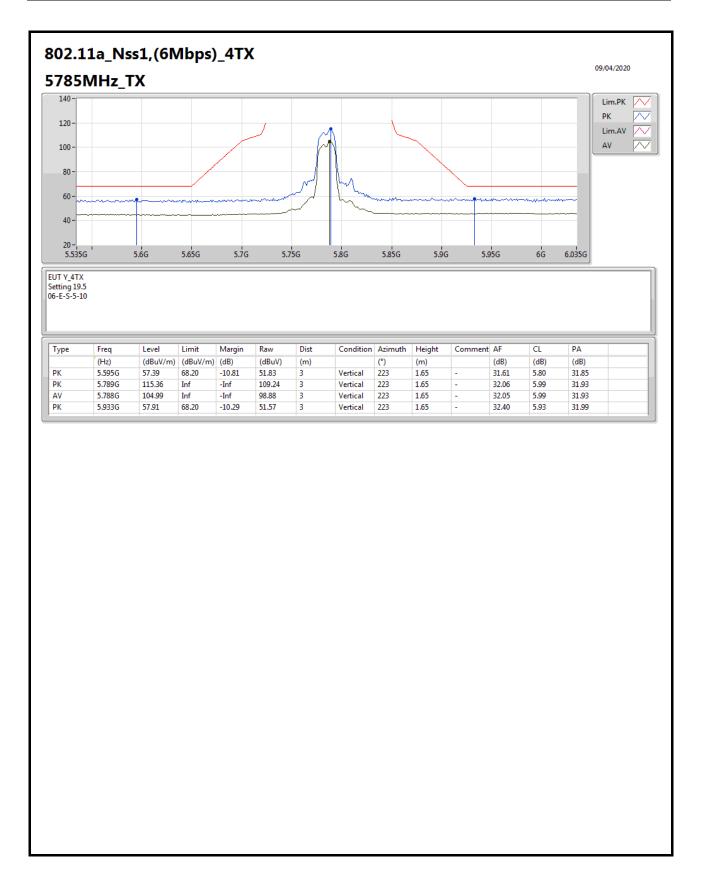


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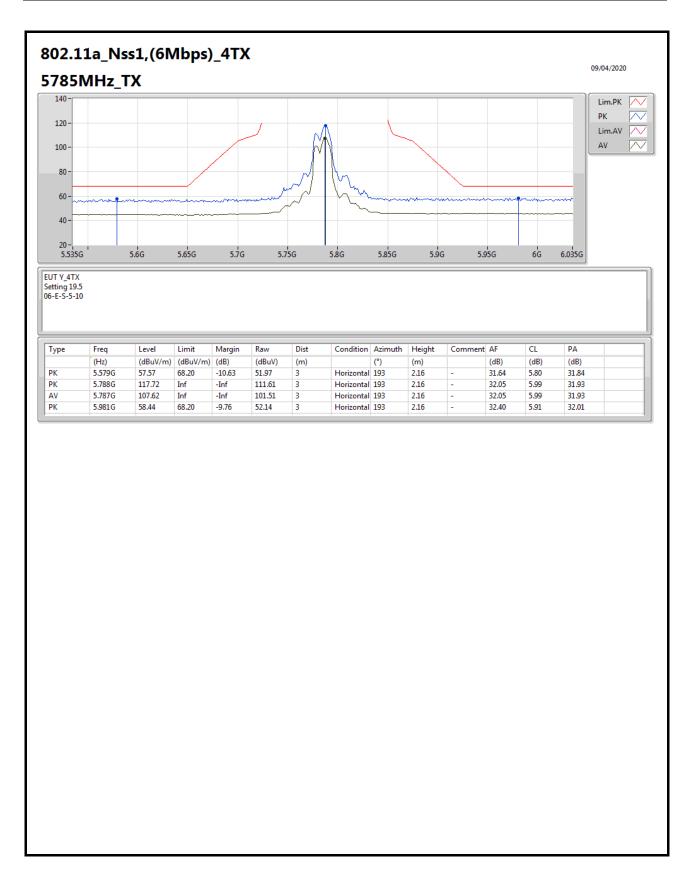




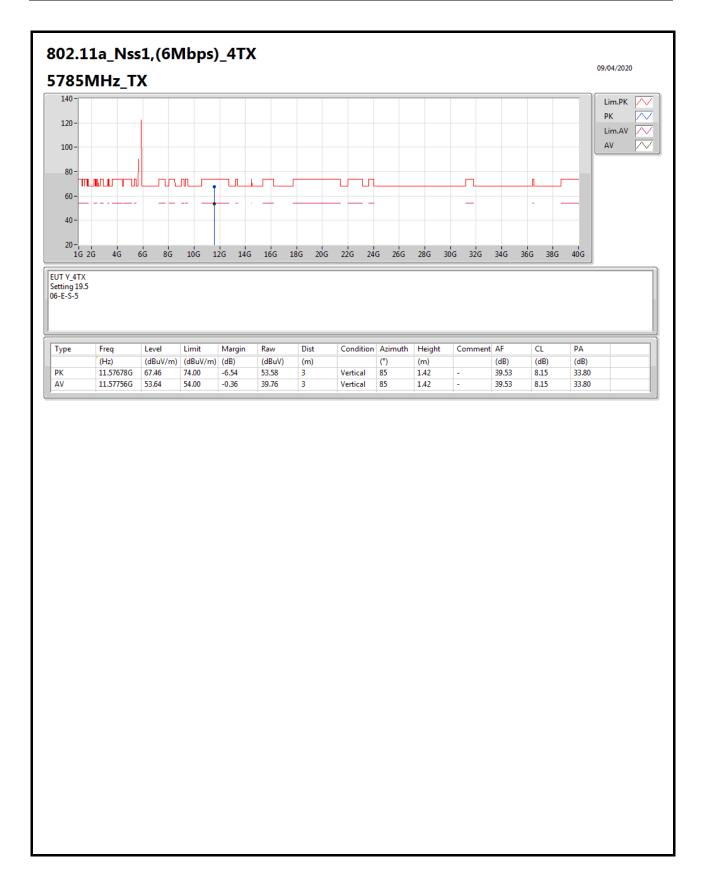




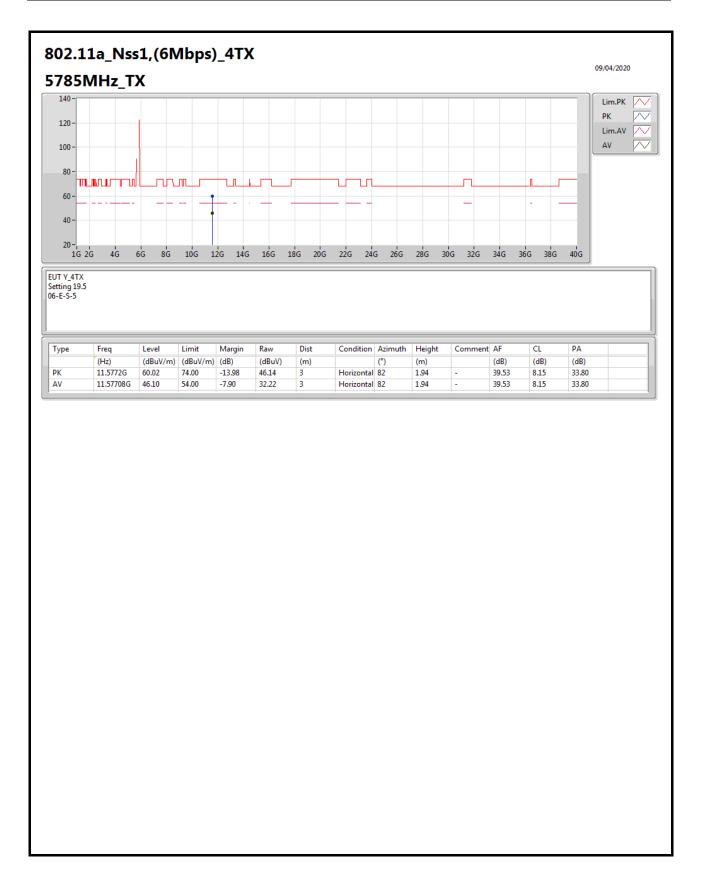




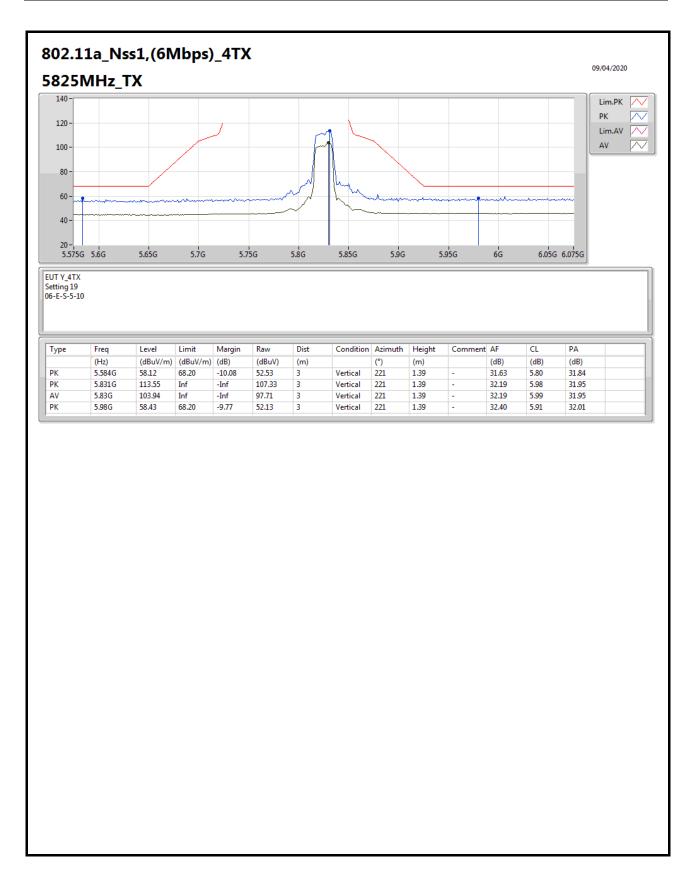




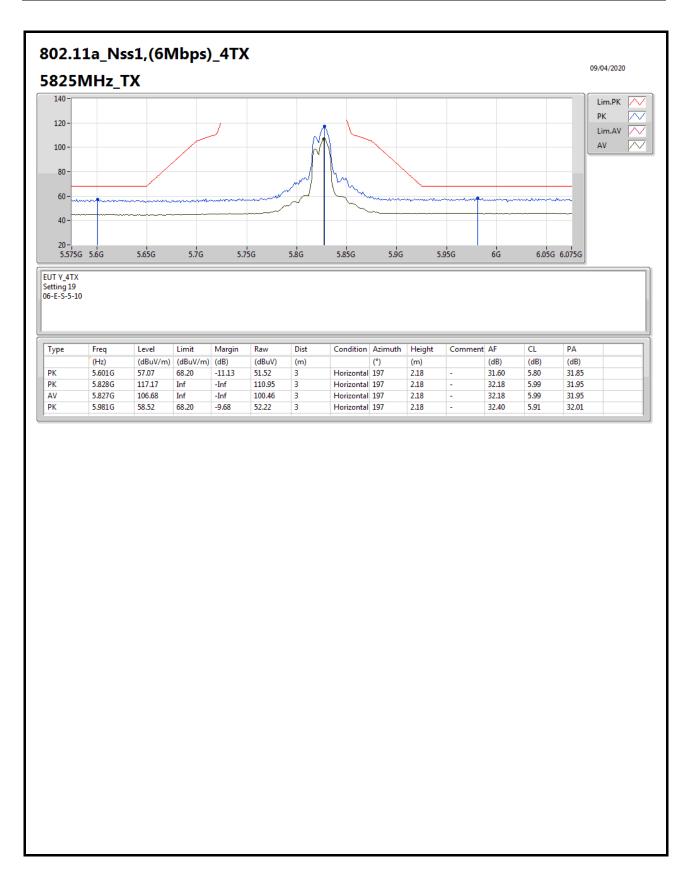






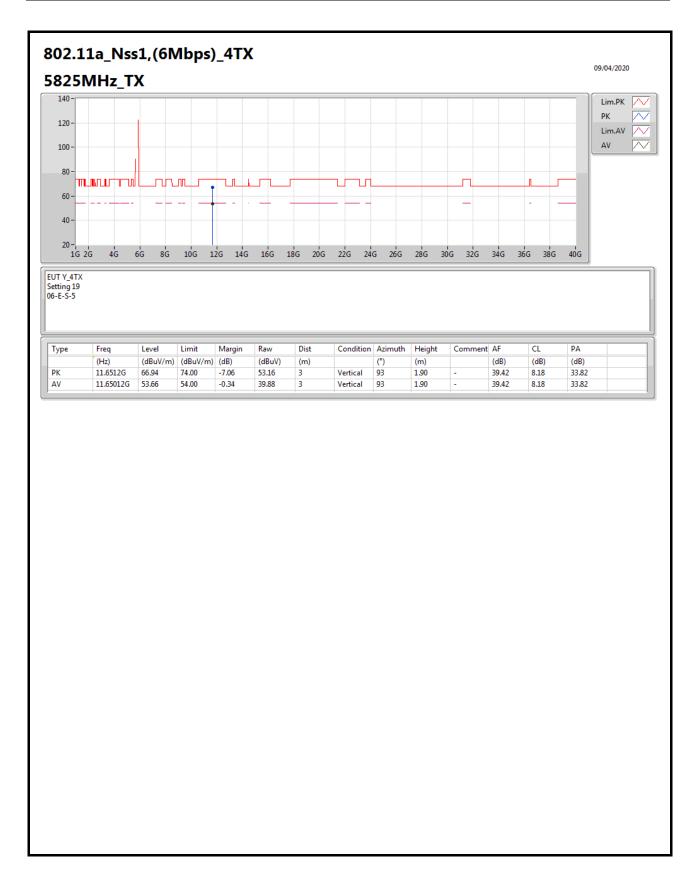




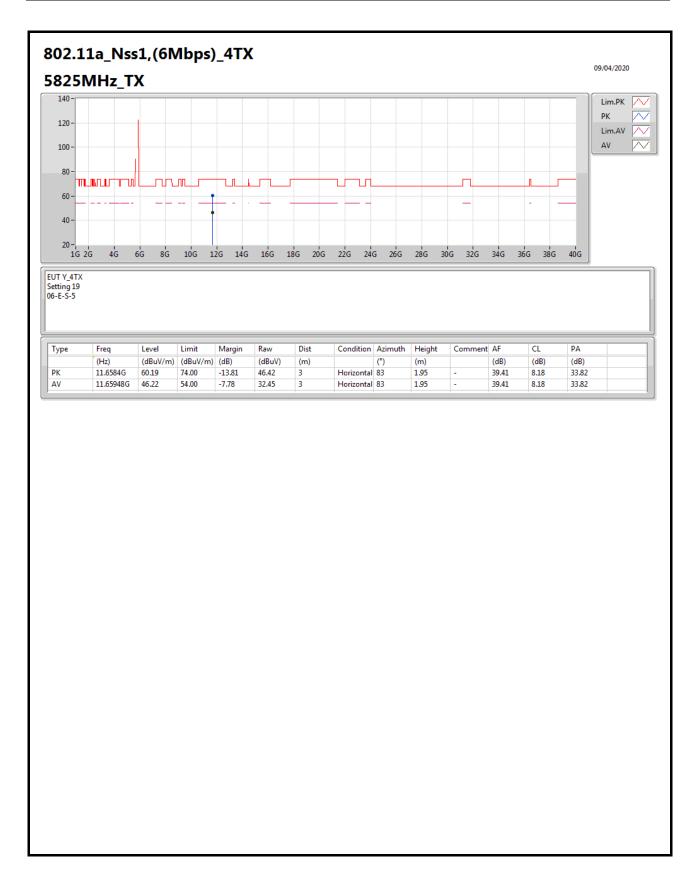


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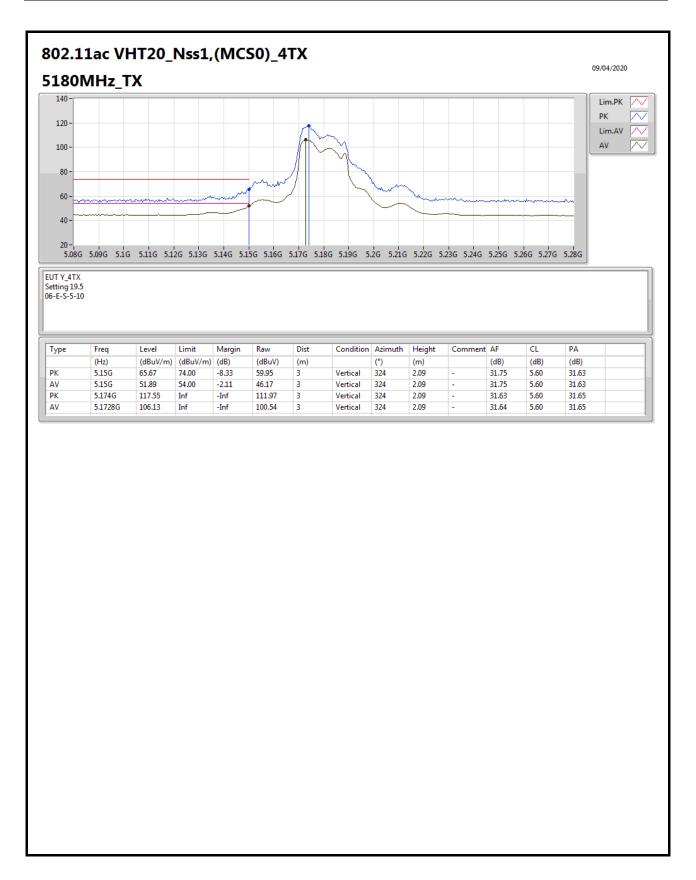




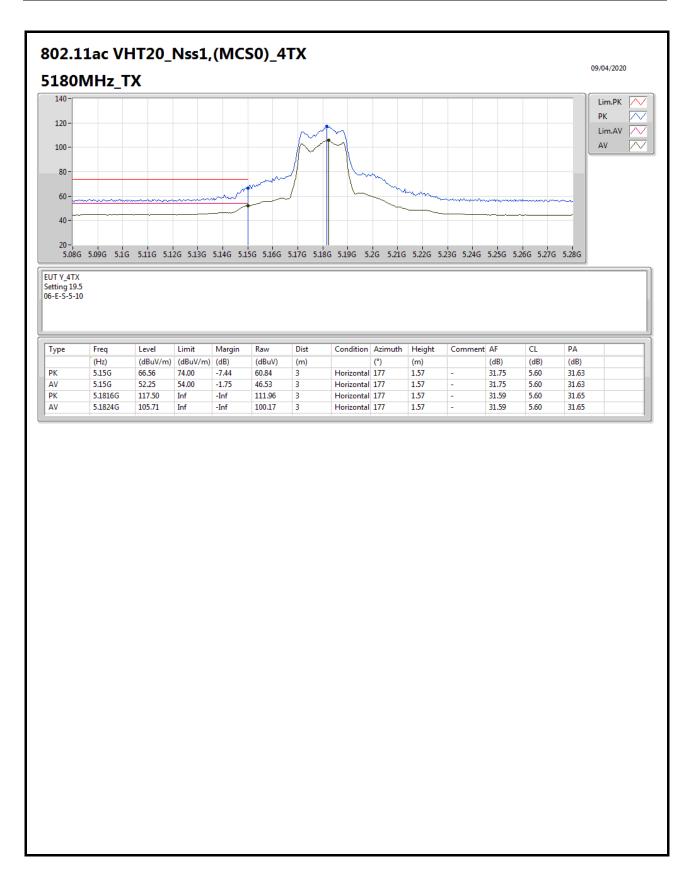






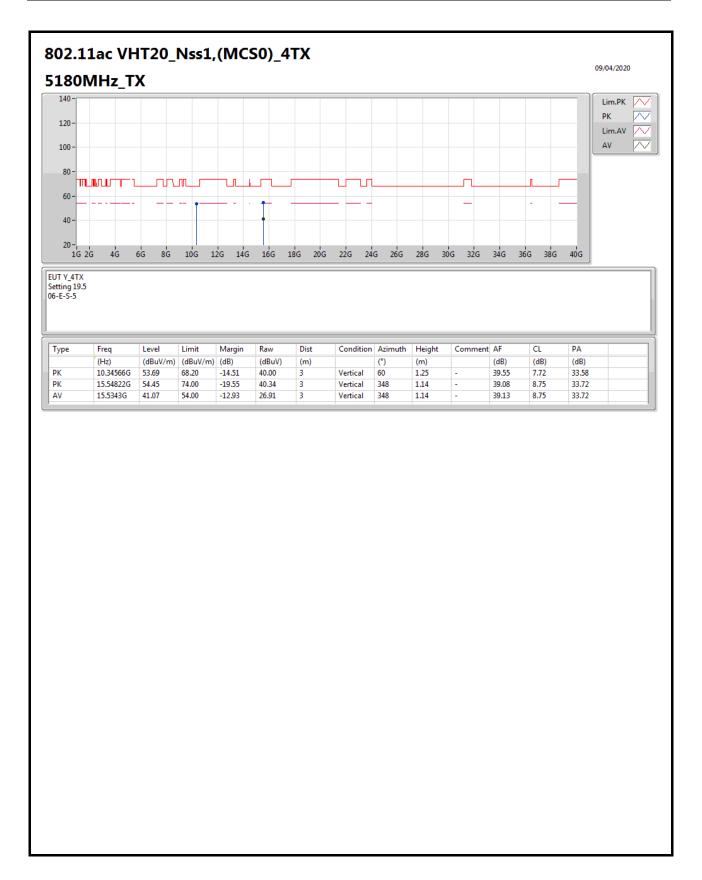






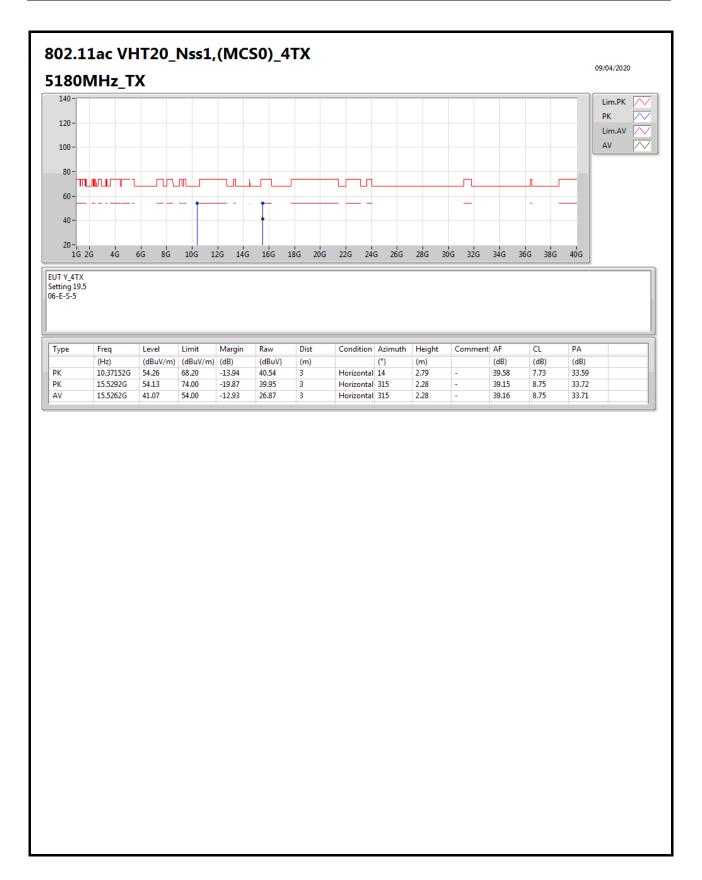
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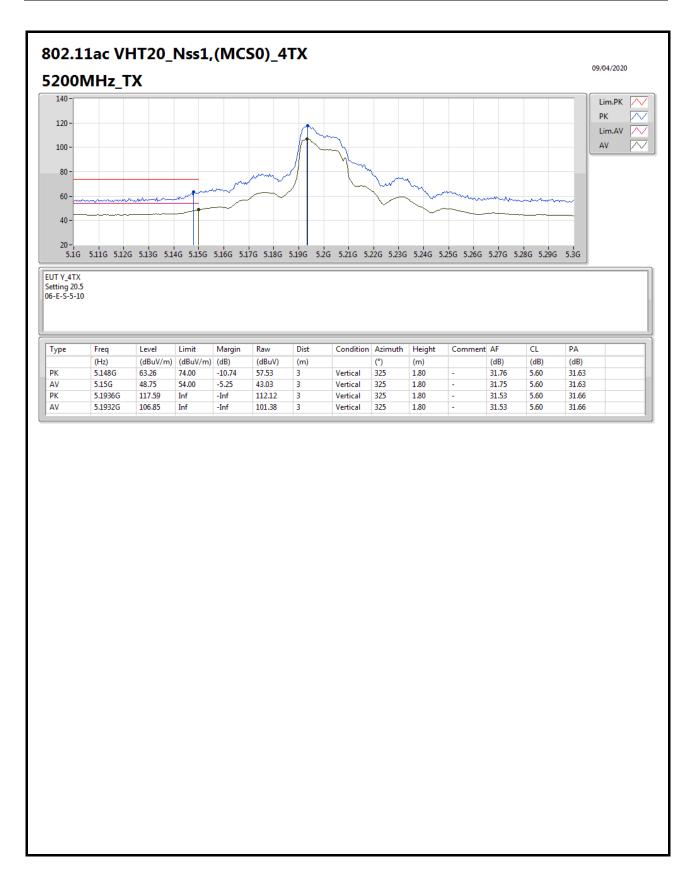


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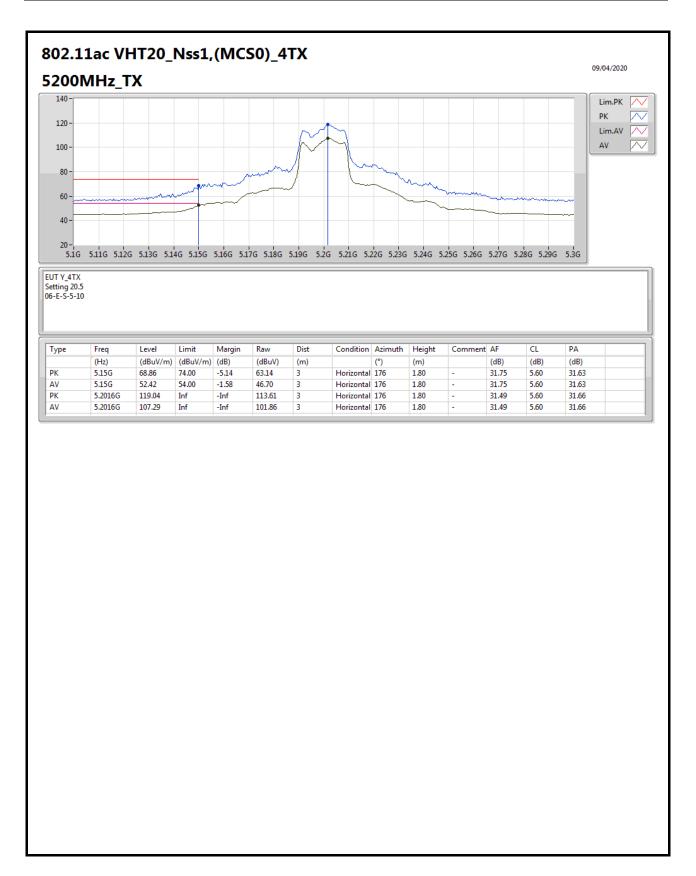




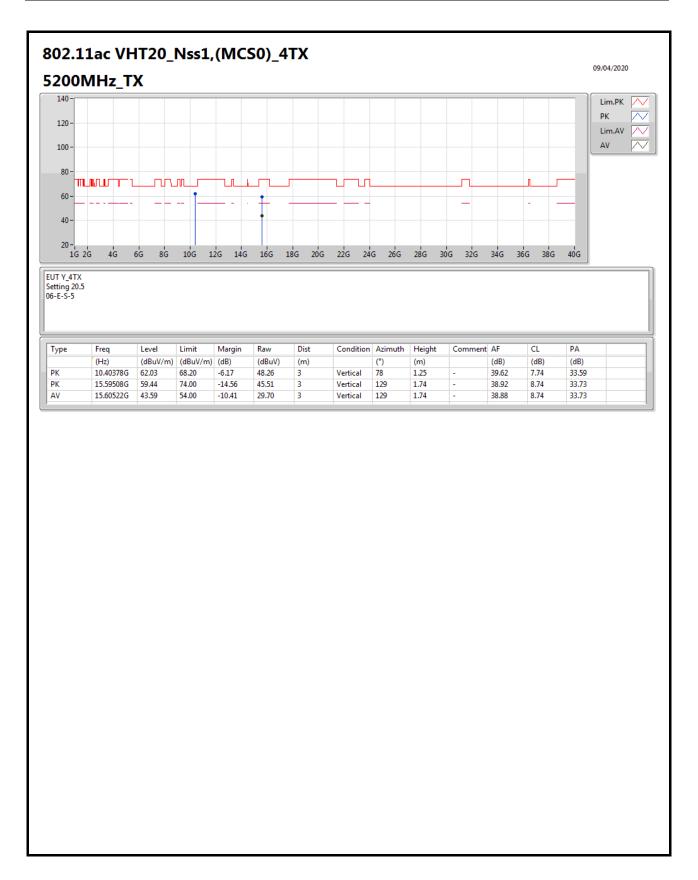




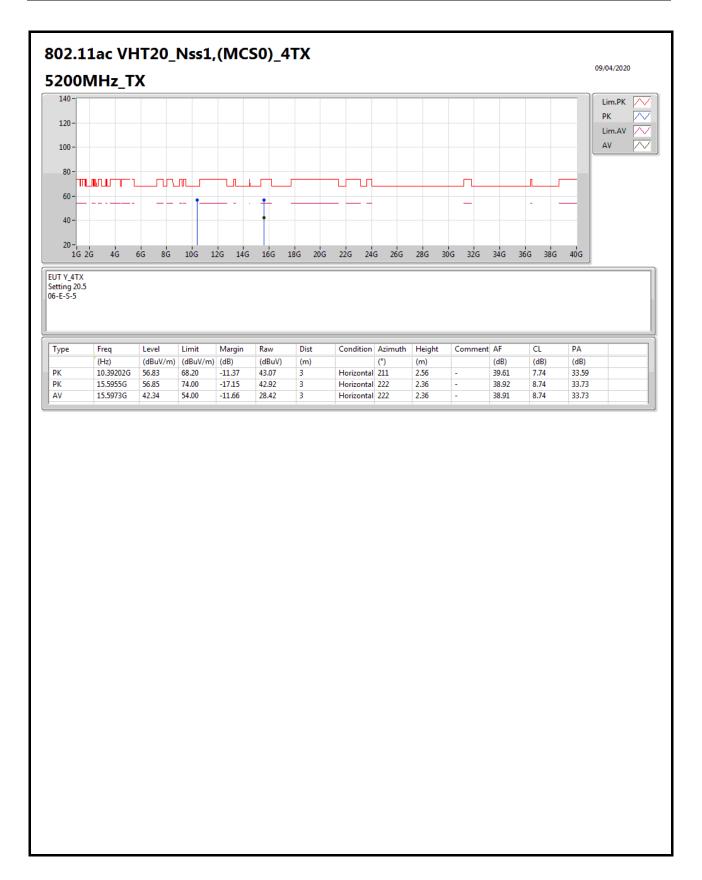




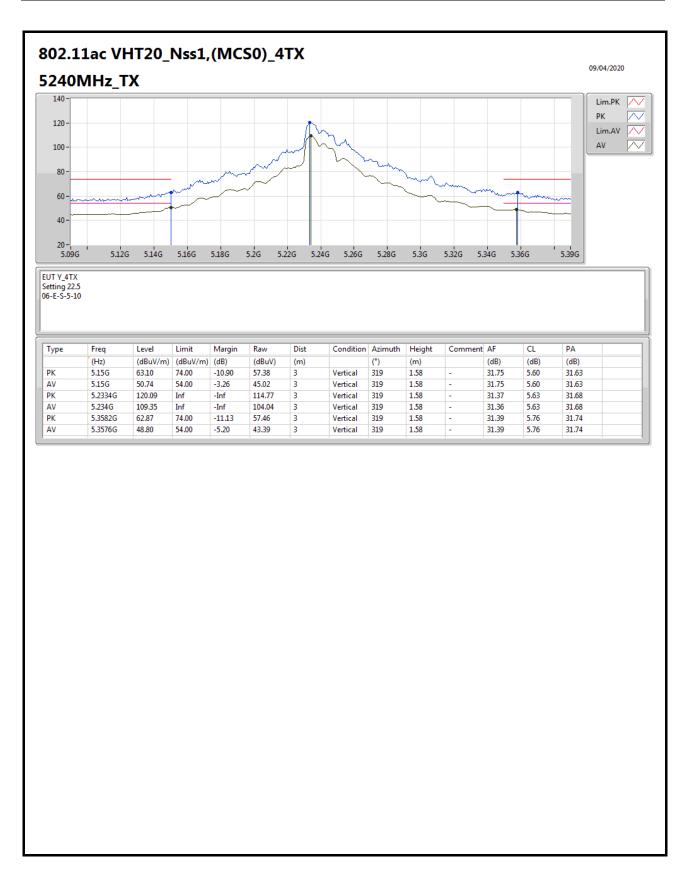




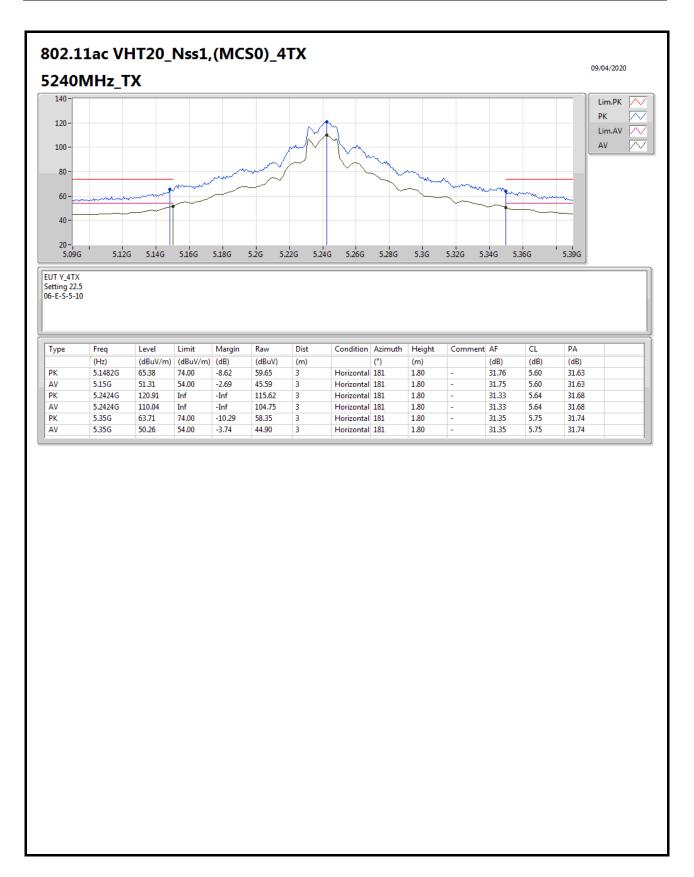




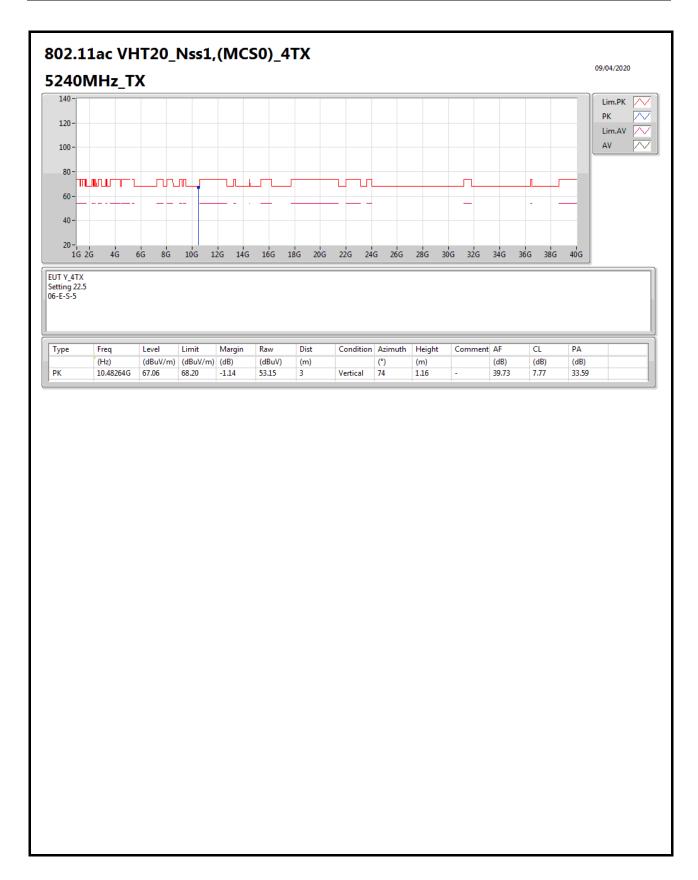






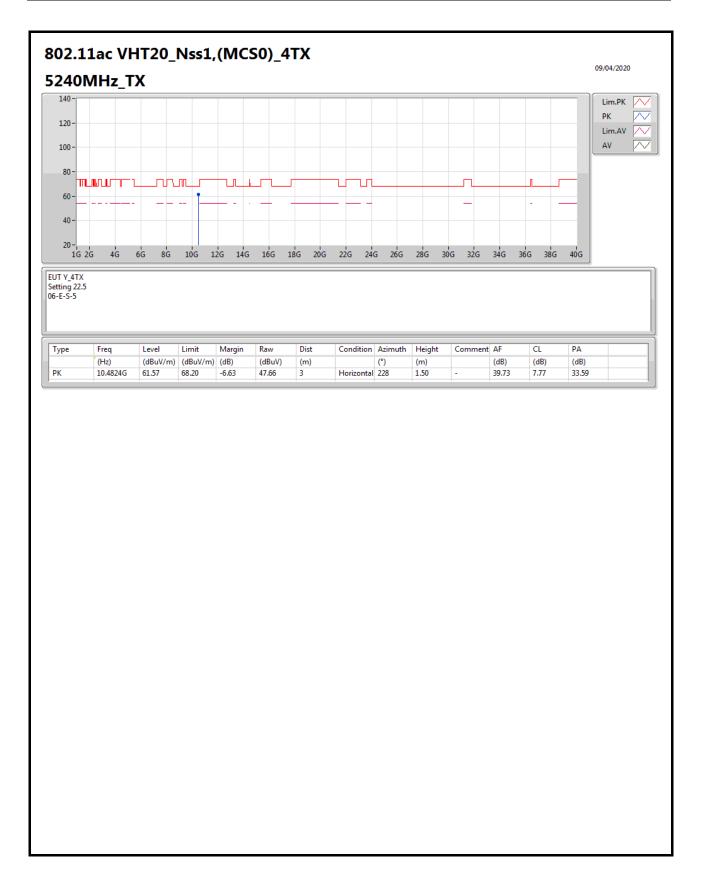




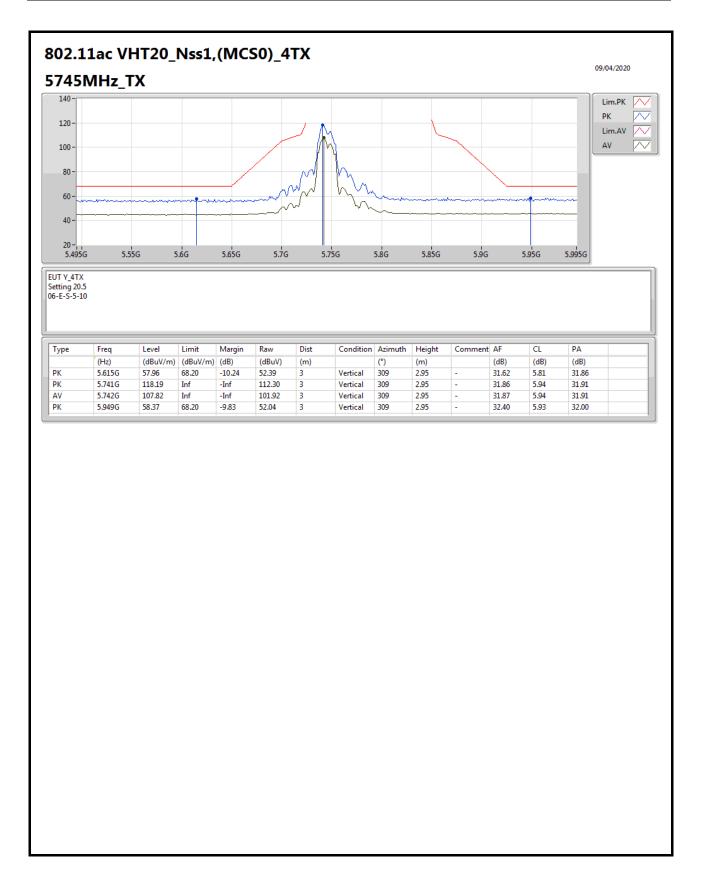


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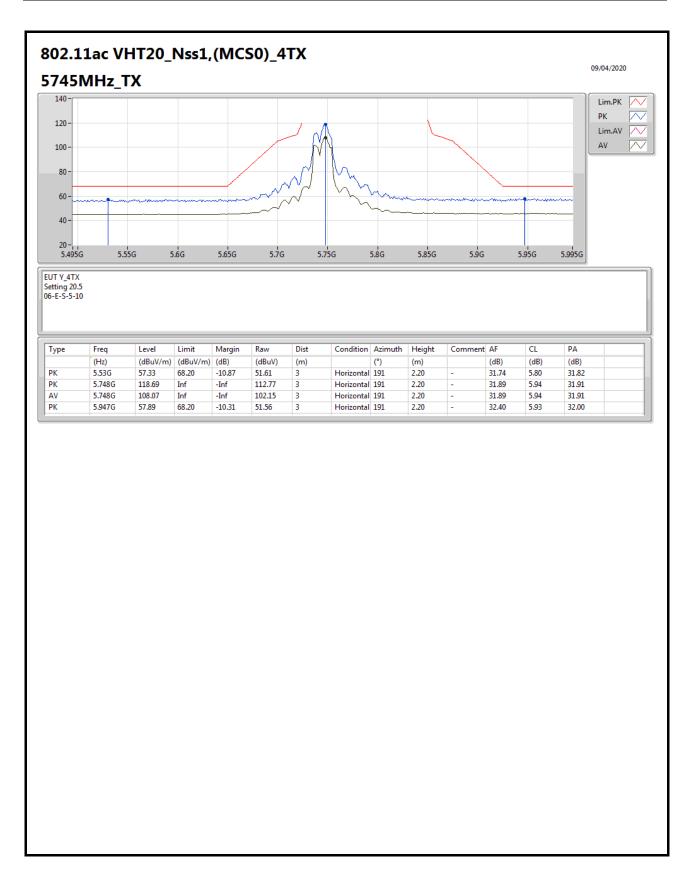






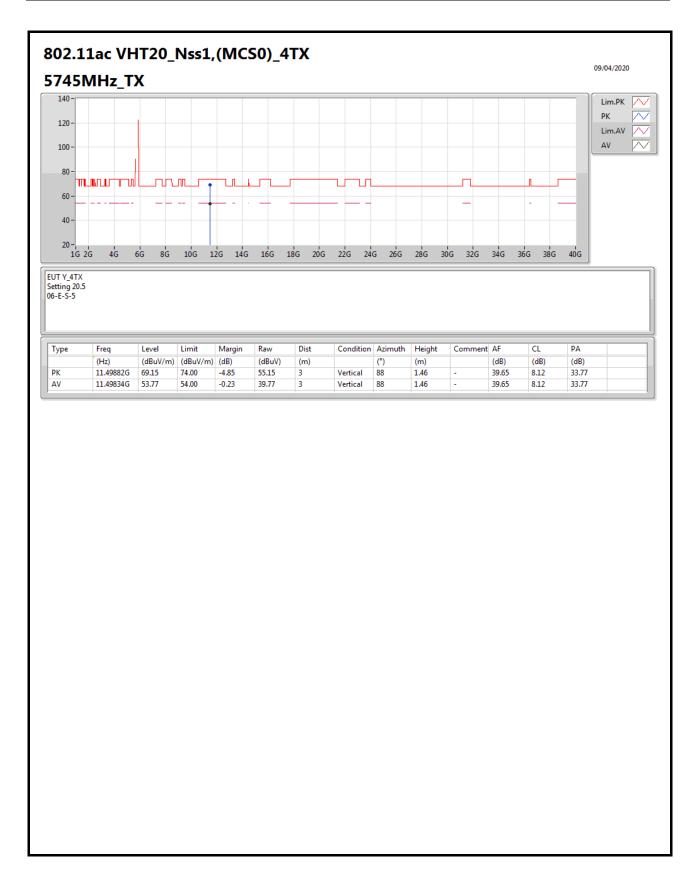




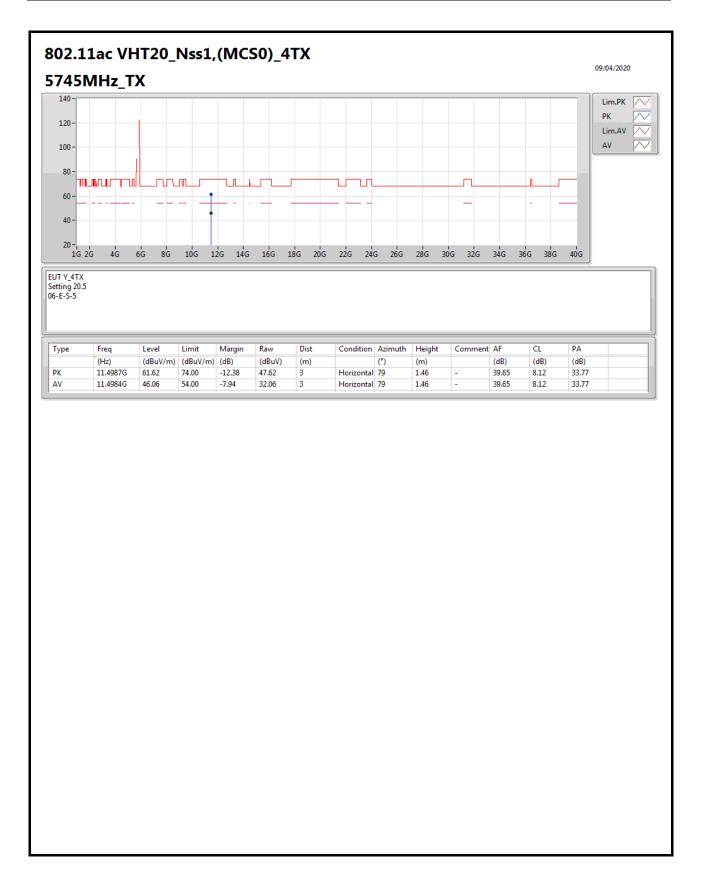


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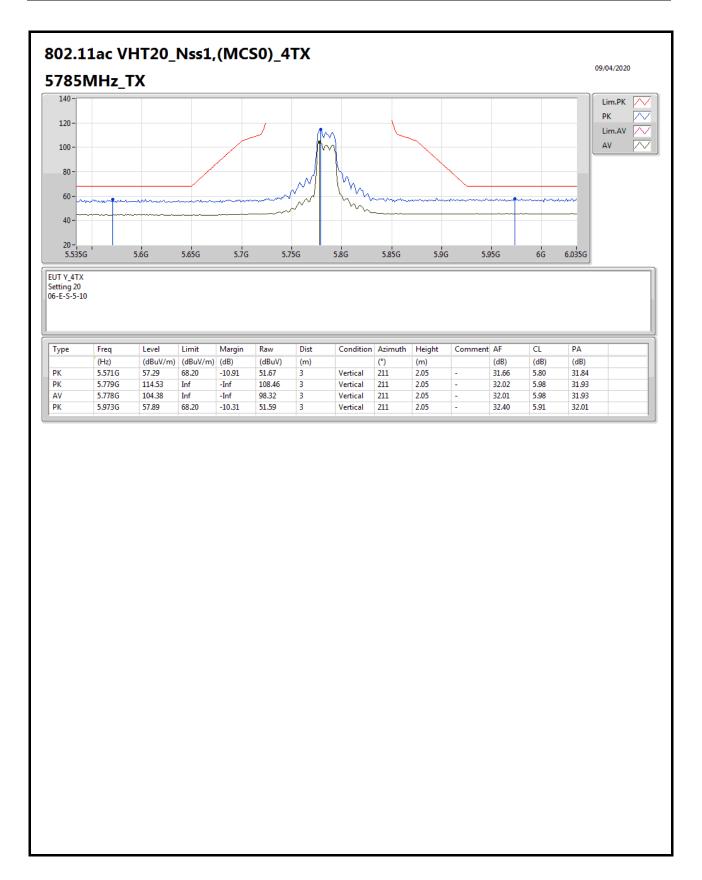






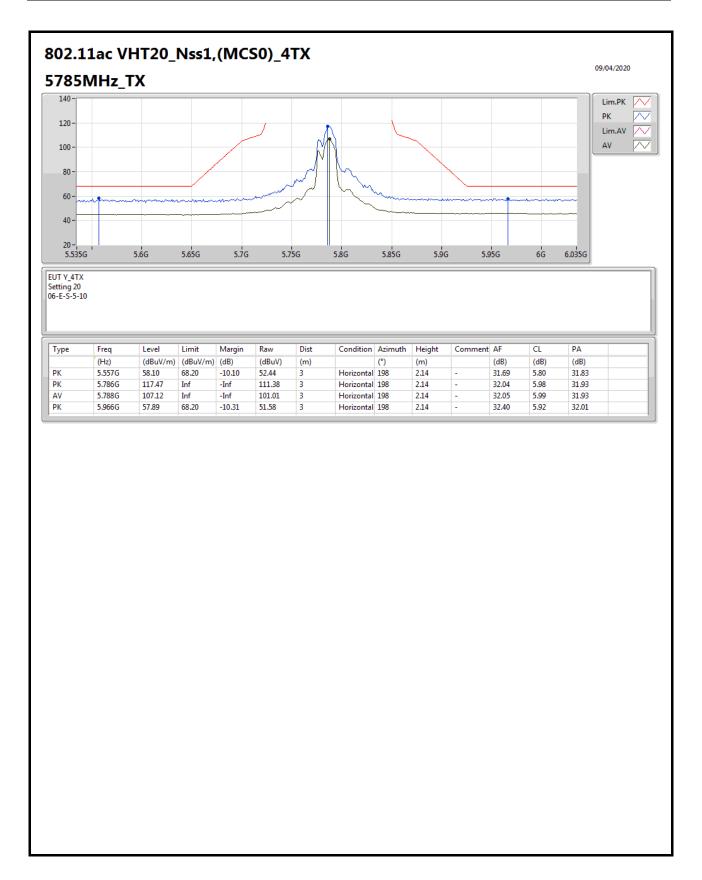
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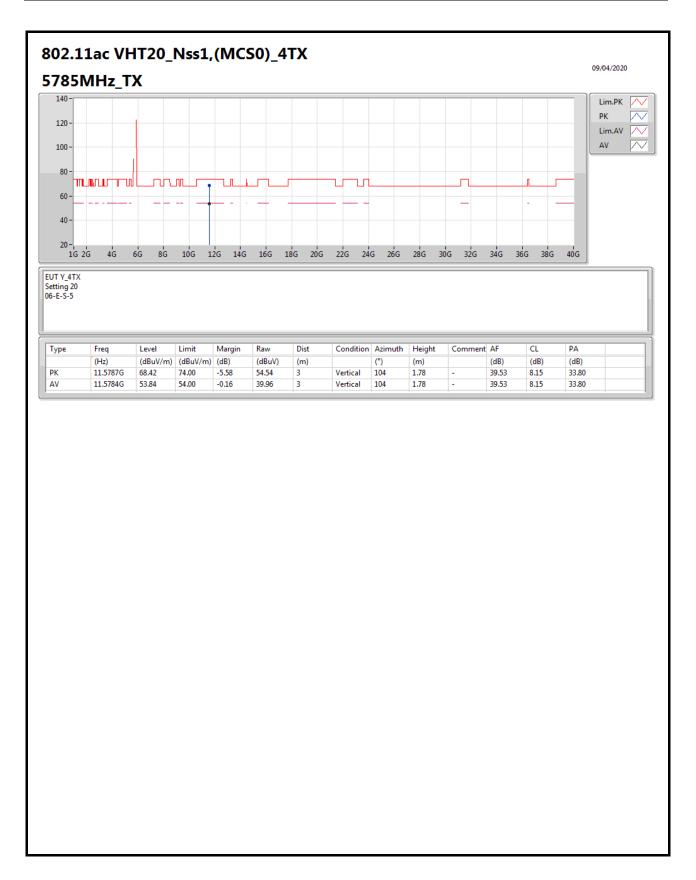
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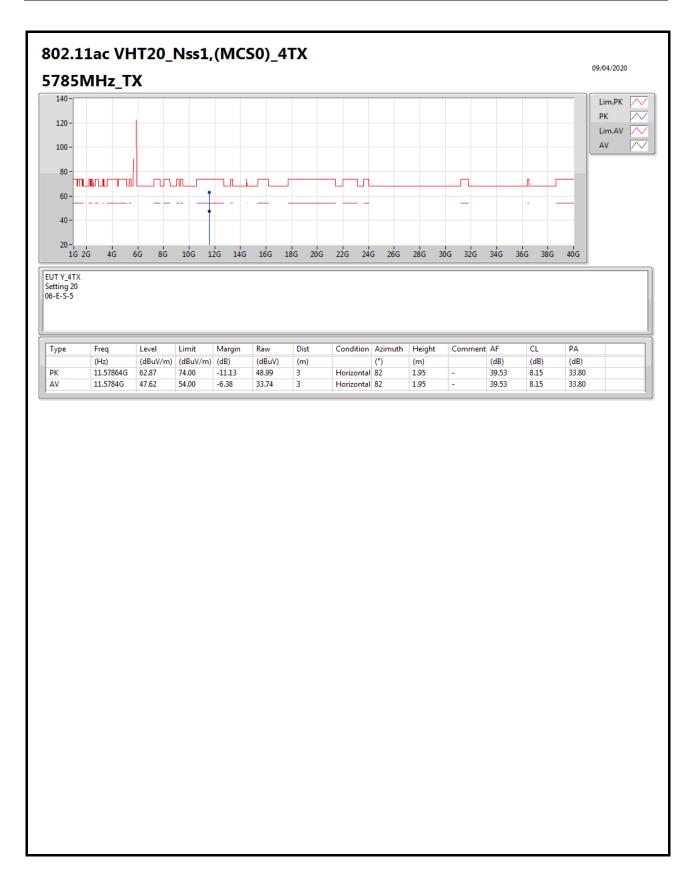
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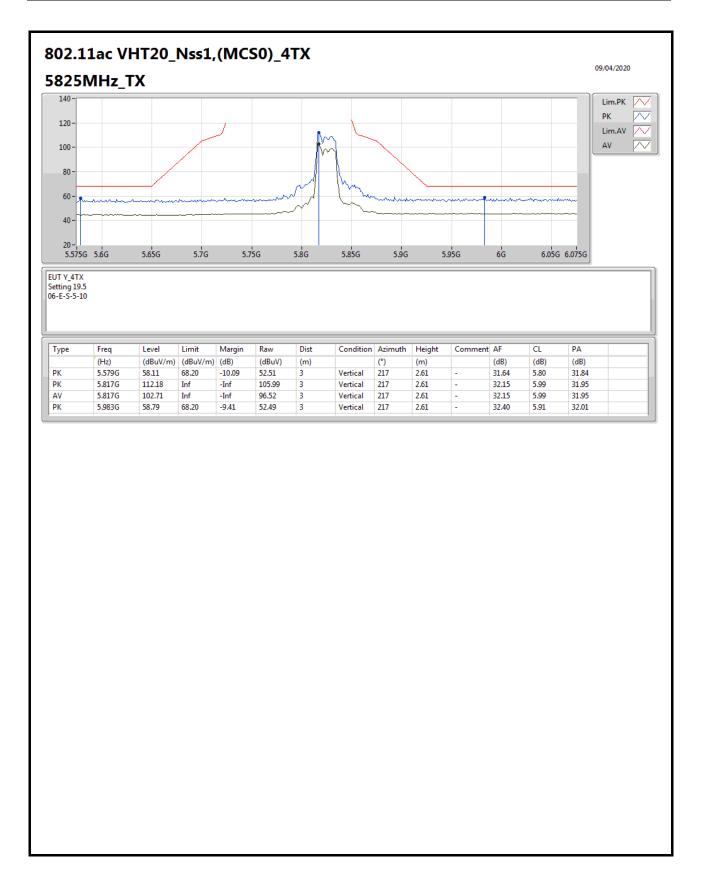
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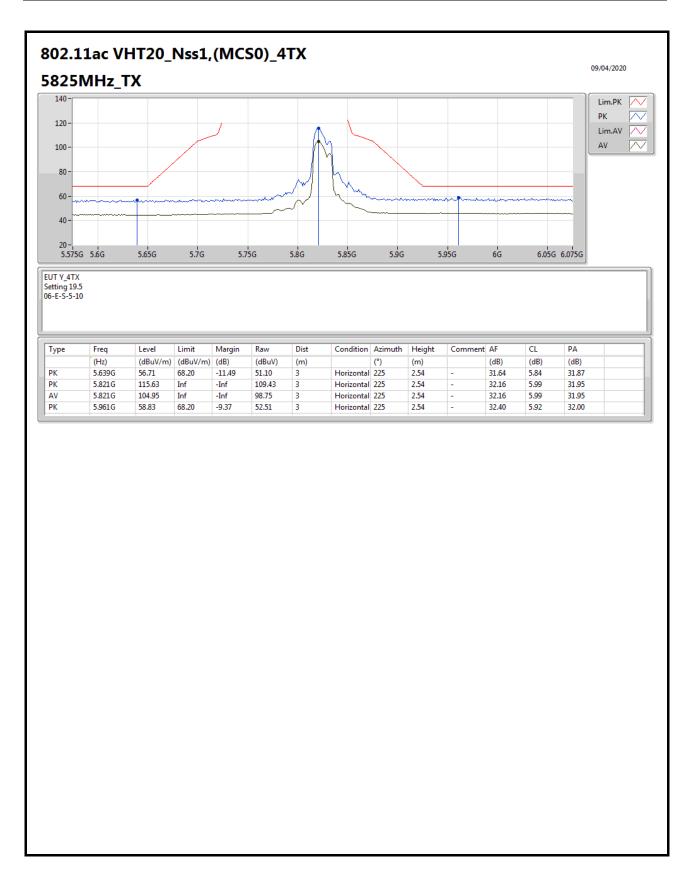


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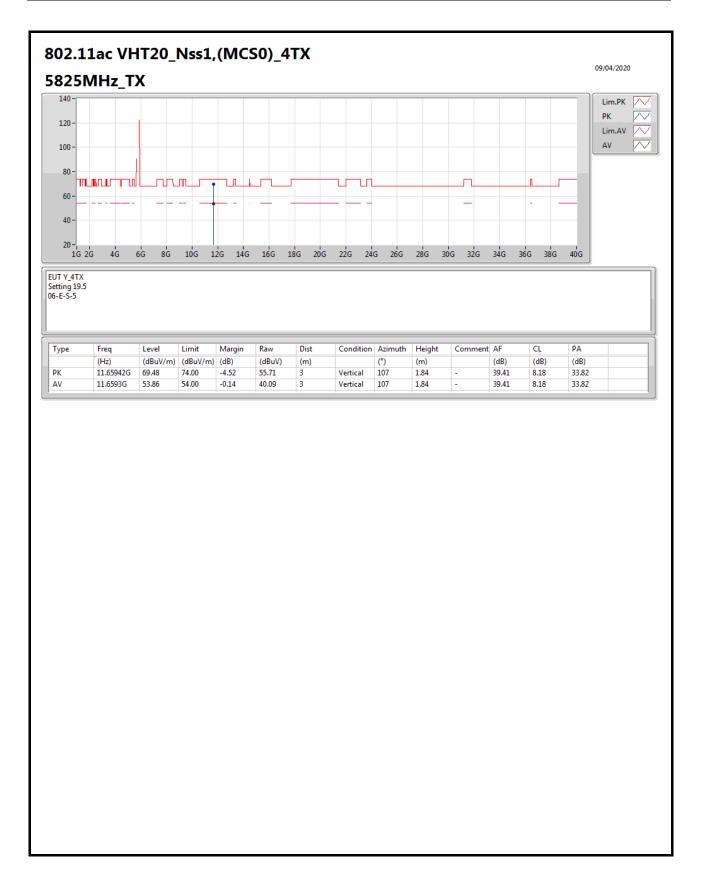




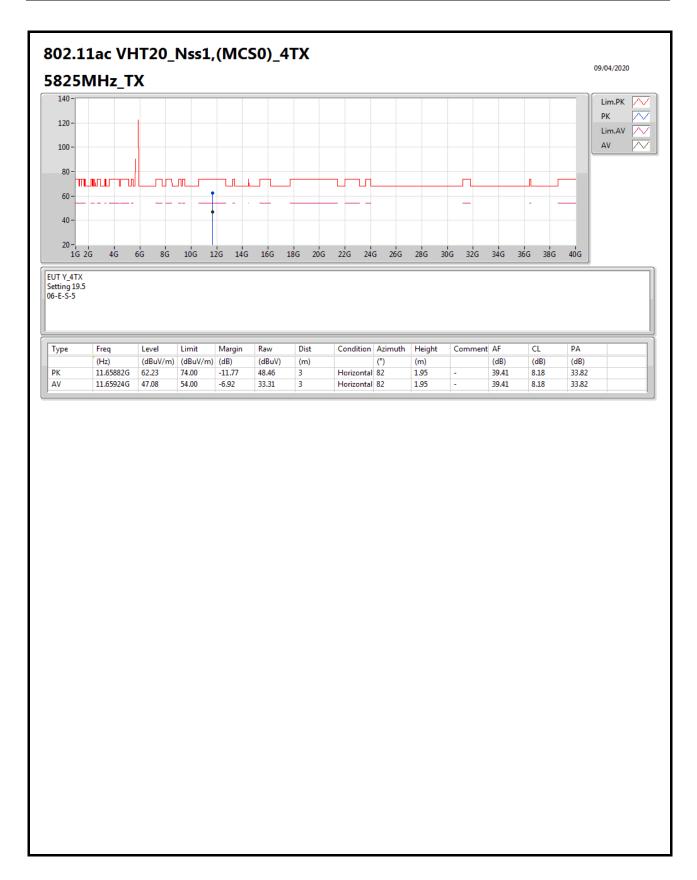


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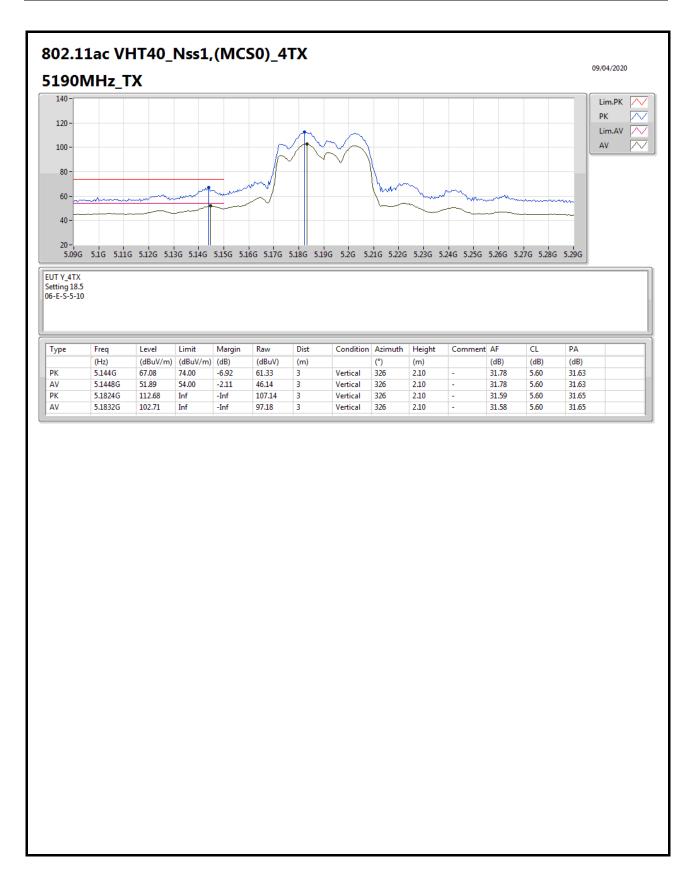






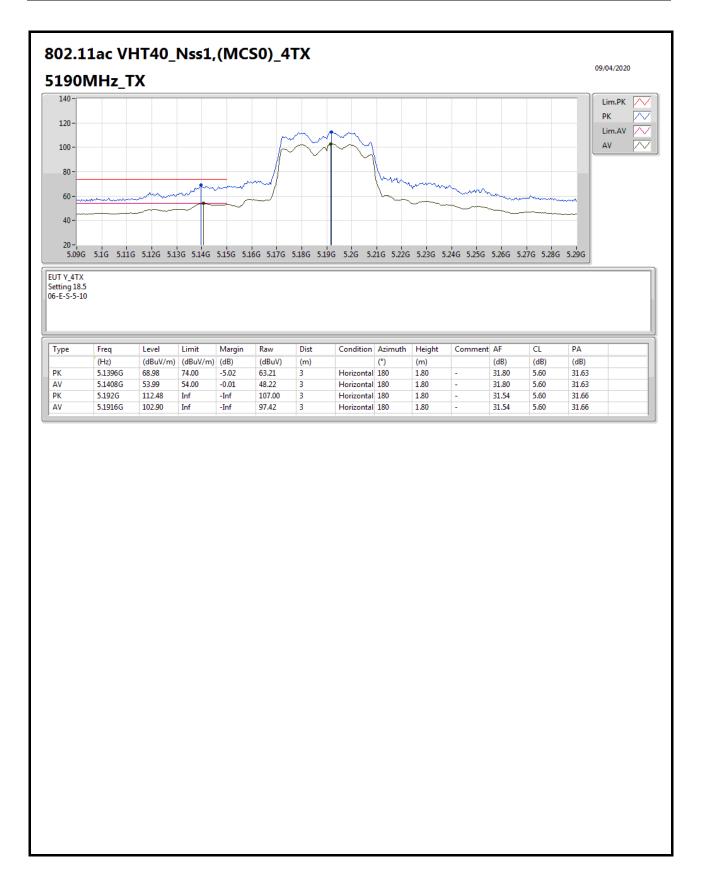






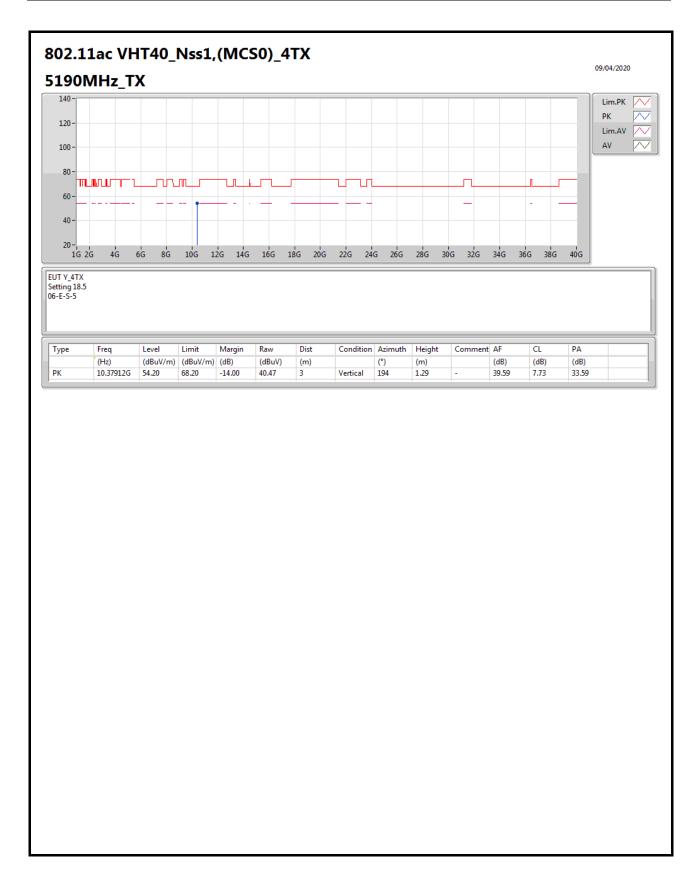
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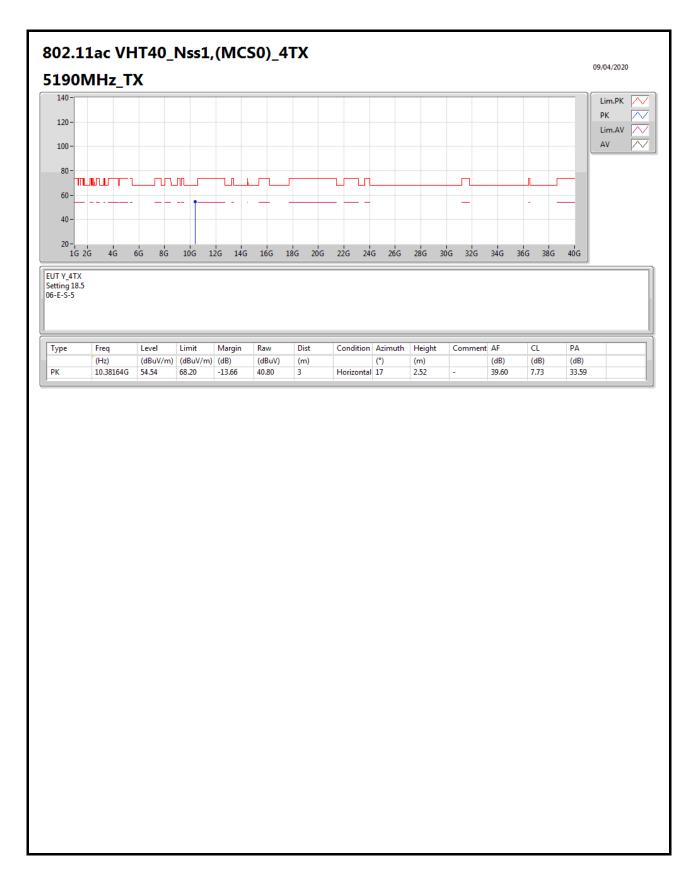
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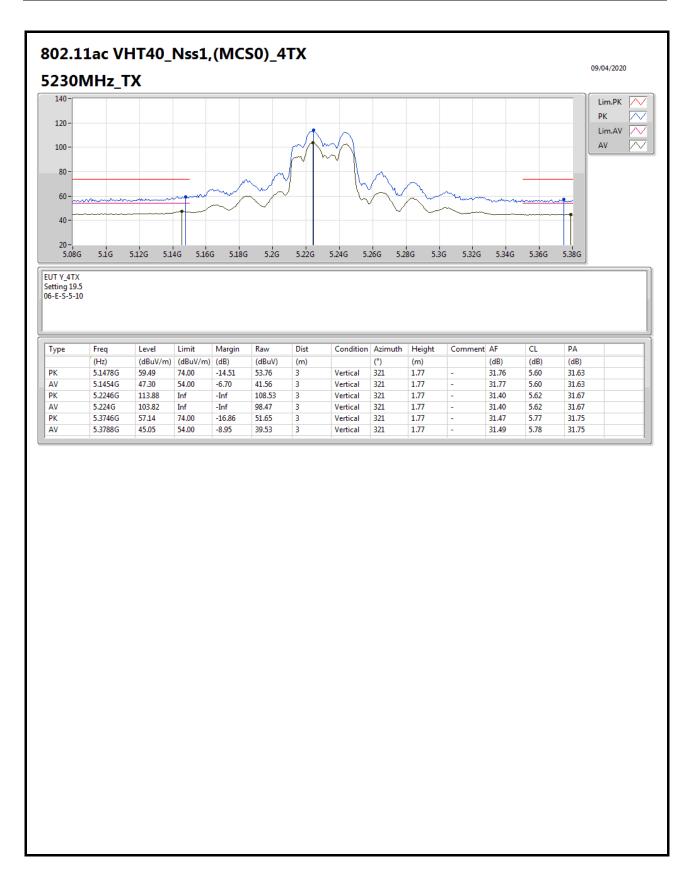


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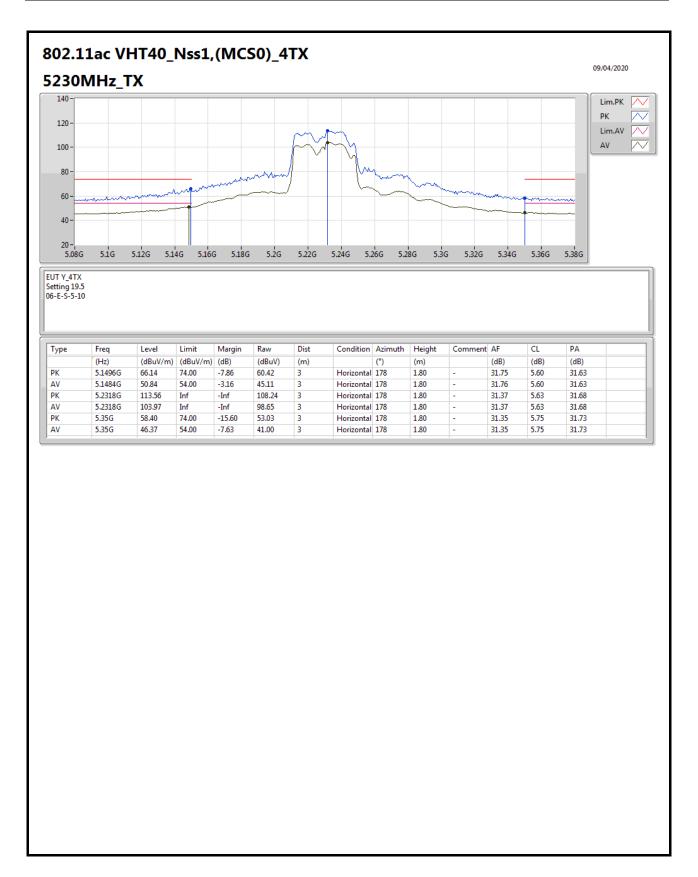






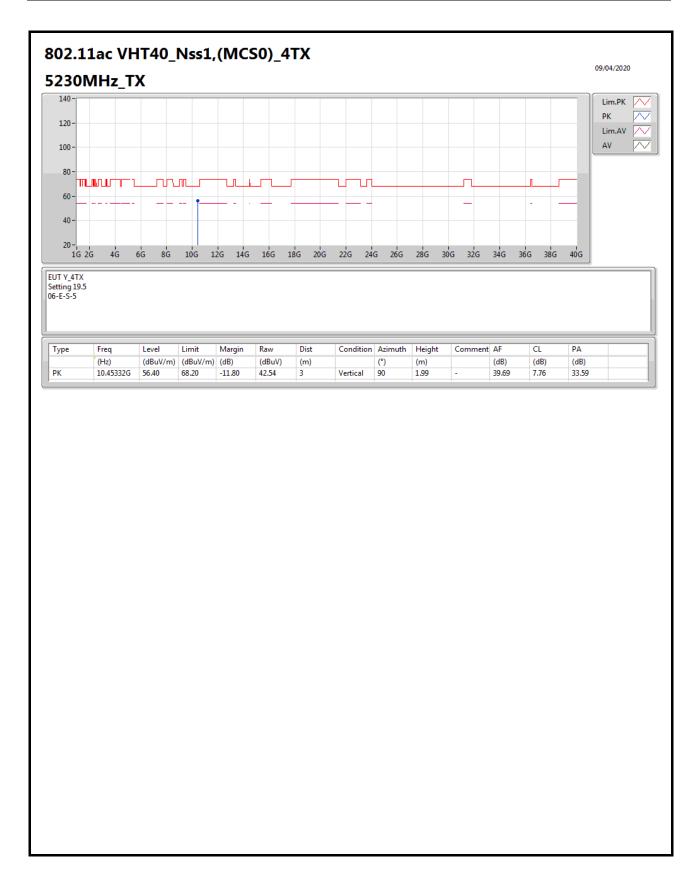






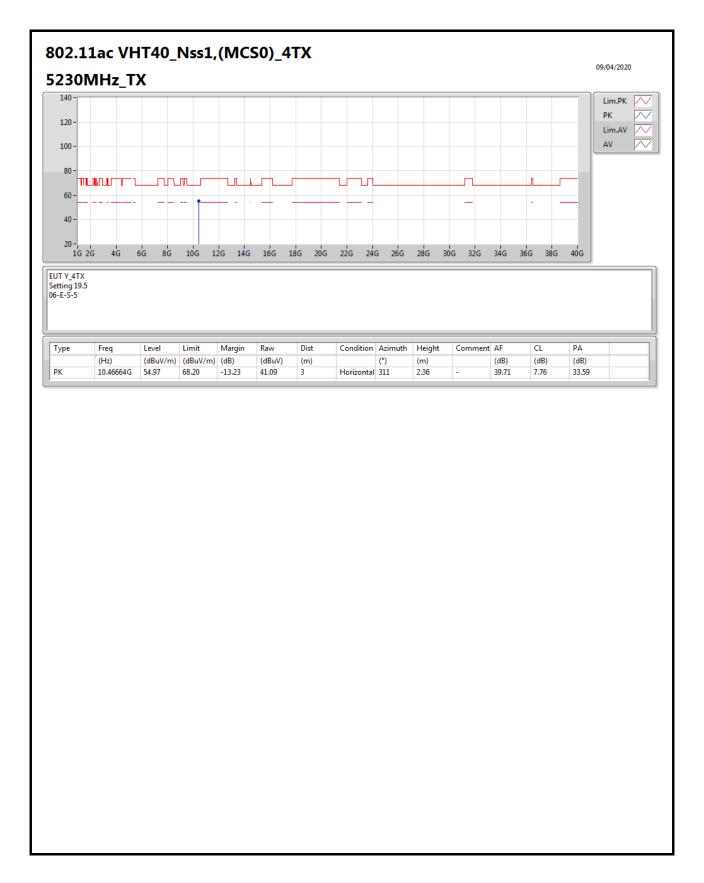
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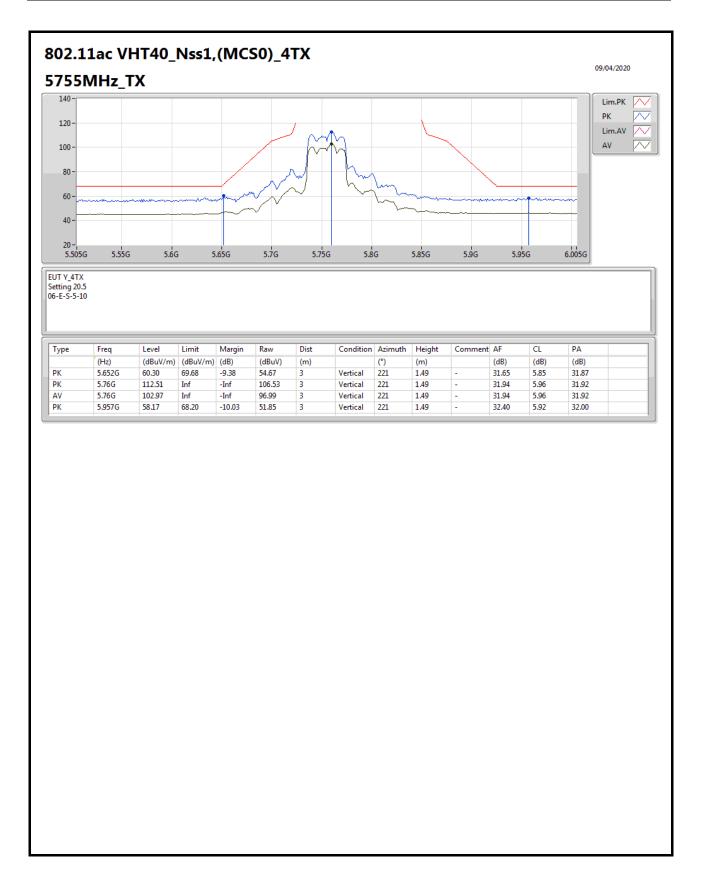
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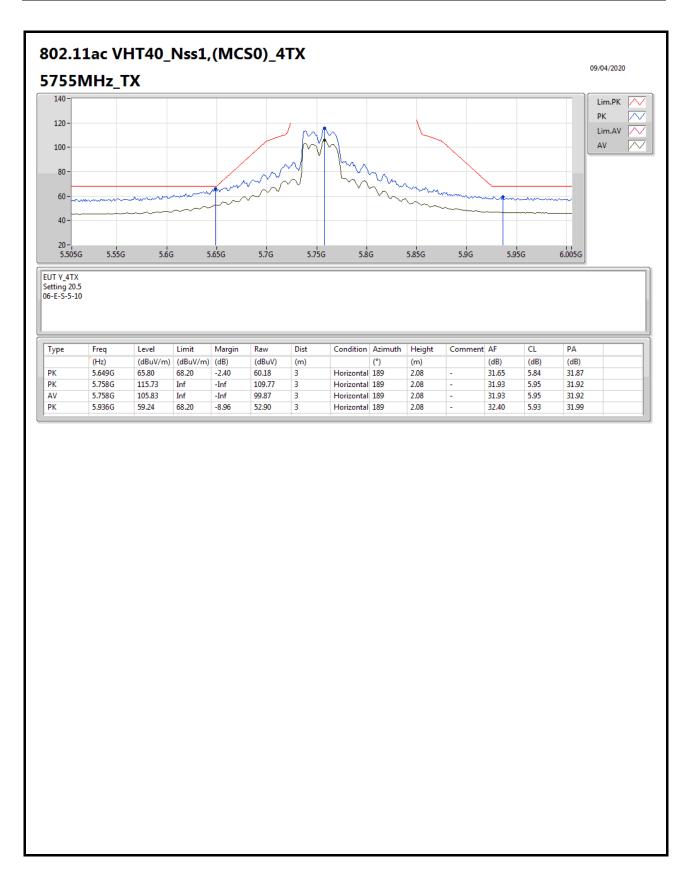


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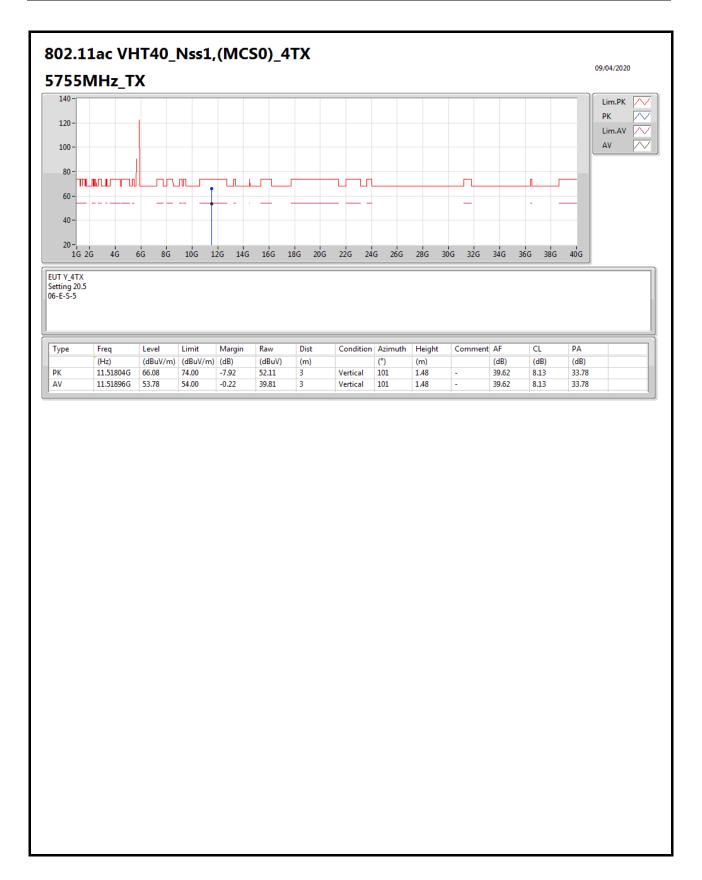




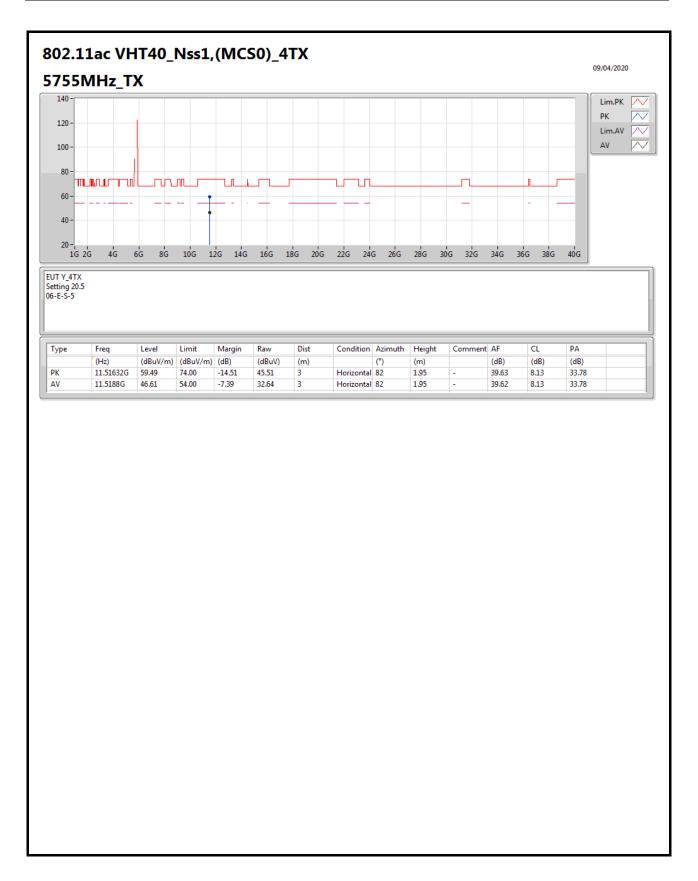


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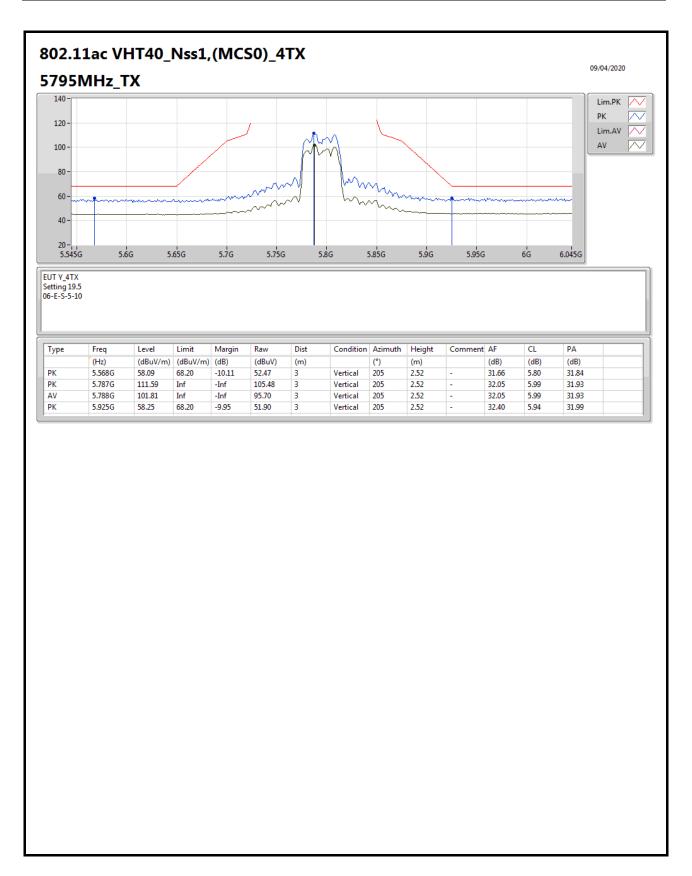




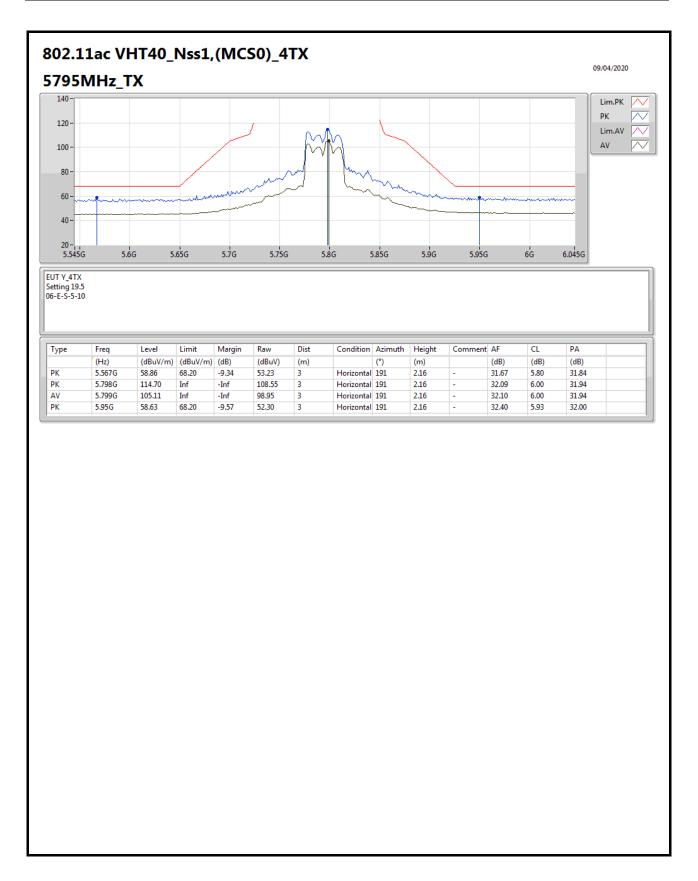




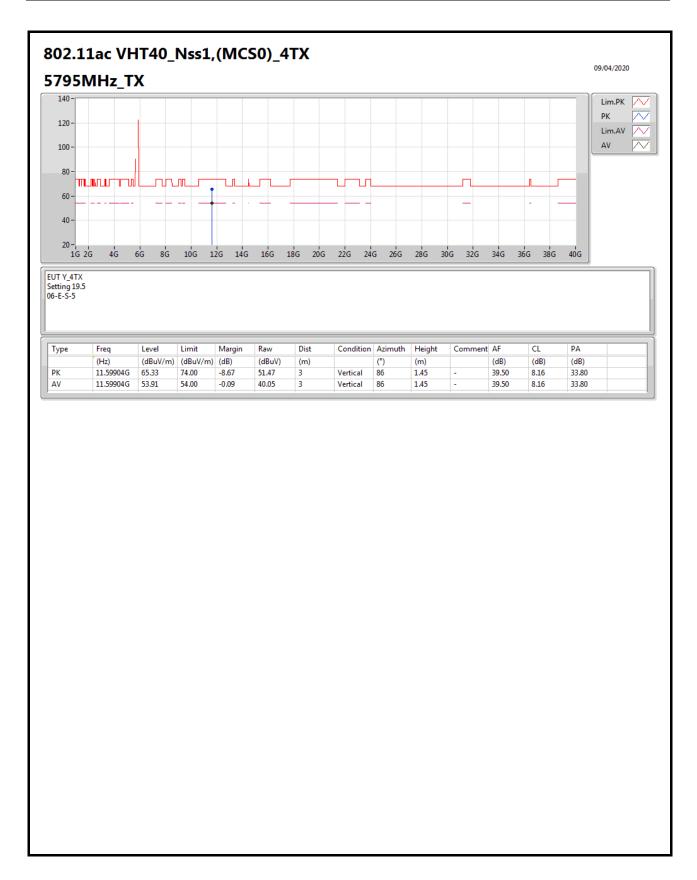






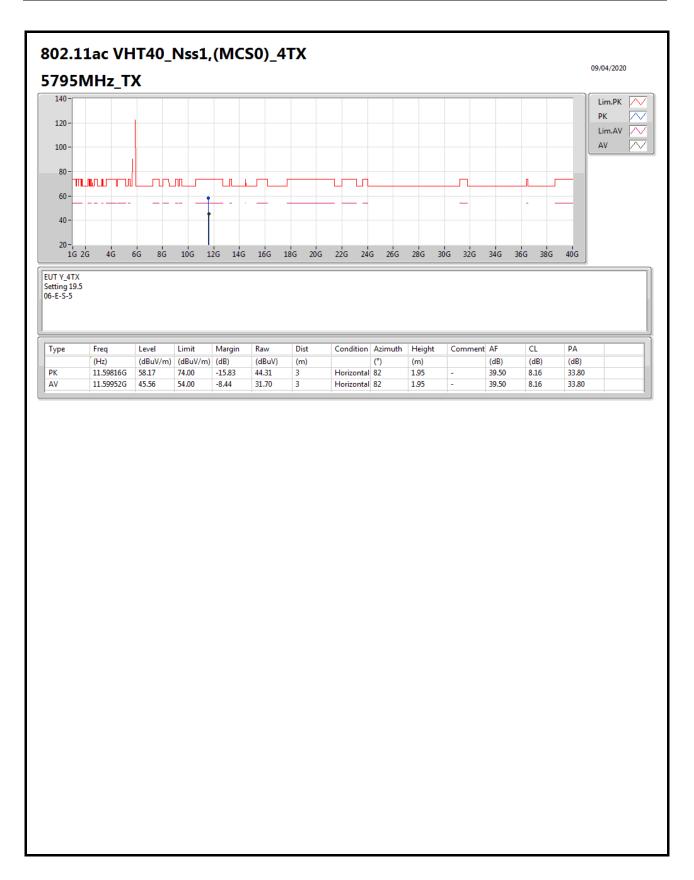




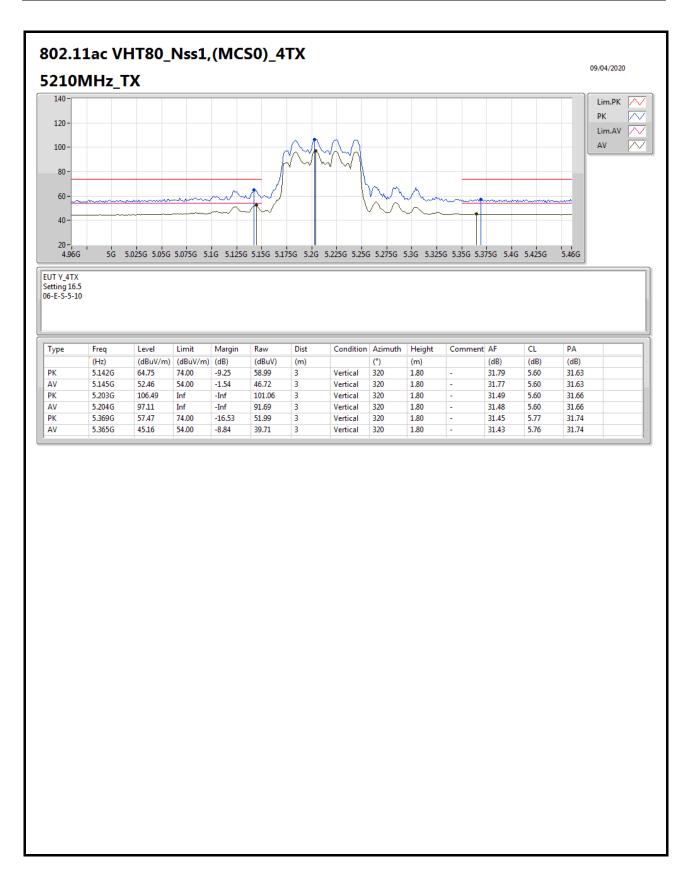


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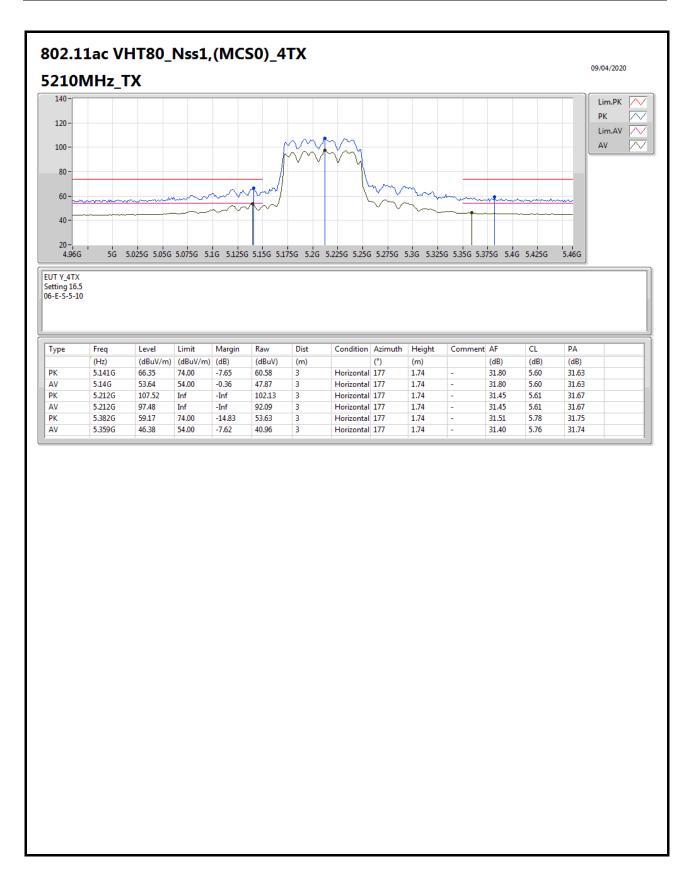




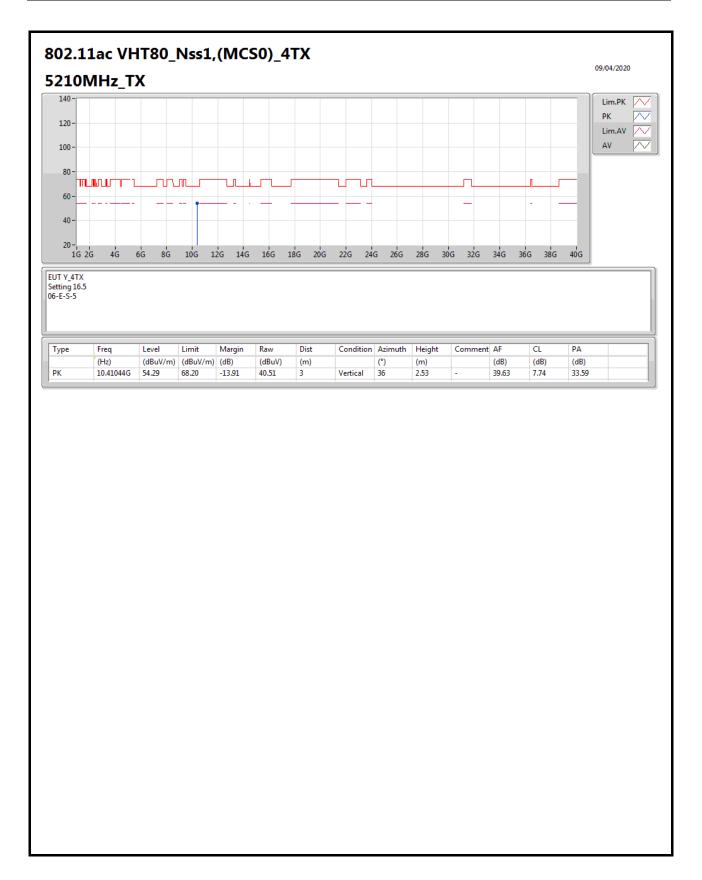




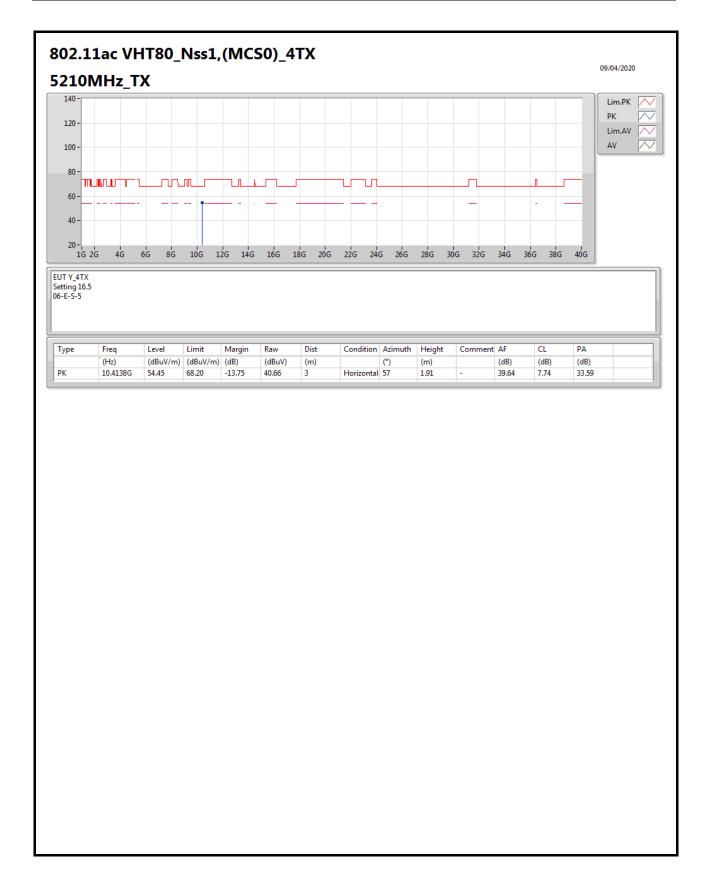






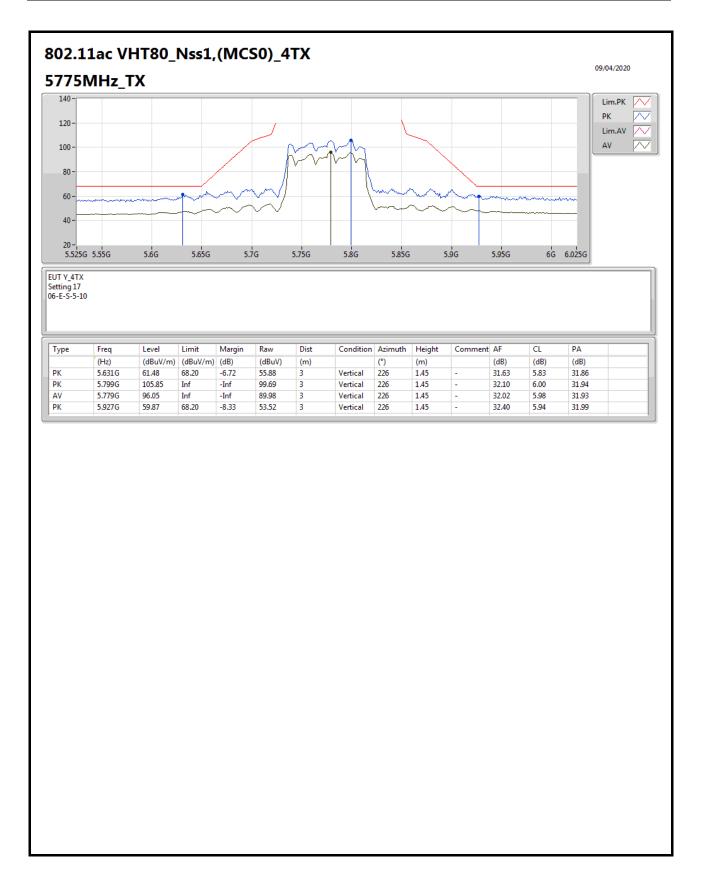




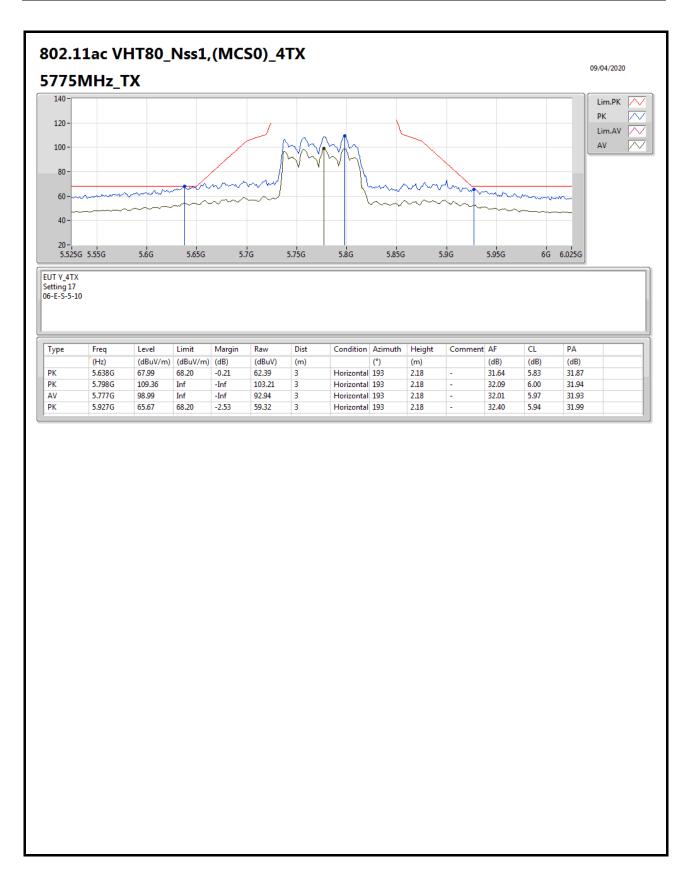


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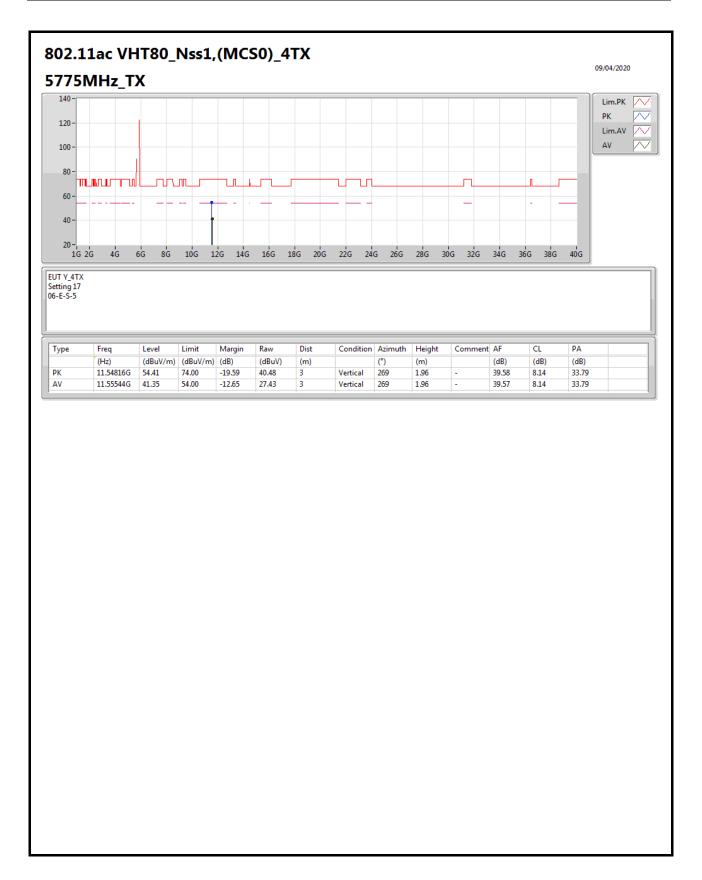












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