



FCC RADIO TEST REPORT

FCC ID

: VGYAP903

Equipment

: Dual Band Security Firewall

Brand Name

: DrayTek Corp.

Model Name

: VigorAP 903, Vigor2122ac

Applicant

: DrayTek Corp.

No.26 Fu Shing Rd., HuKou County, Hsin-Chu Industrial Park, Hsin-Chu, Taiwan 303 R.O.C

Manufacturer

: DrayTek Corp.

No.26 Fu Shing Rd., HuKou County, Hsin-Chu Industrial Park, Hsin-Chu, Taiwan 303 R.O.C

Standard

: 47 CFR FCC Part 15.407

The product was received on Jan. 12, 2018, and testing was started from Jan. 12, 2018 and completed on Apr. 30, 2018. We, SPORTON INTERTIONAL 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 INTERTIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERTIONAL INC. EMC & Wireless Communications Laboratory

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

TEL: 886-3-656-9065

FAX: 886-3-656-9085

Report Template No.: CB Ver1.0

Page Number

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Issued Date

: Jun. 22, 2018

Report Version

: 01

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Report No.: FR7D2222AB

Report Version : 01

History of this test report

Report No.: FR7D2222AB

Report No.	Version	Description	Issued Date
FR7D2222AB	01	Initial issue of report	Jun. 22, 2018

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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	Note
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	-

Note

For PoE Mode, the EUT was powered by PoE, and the PoE was for measurement only, would not be marketed. it's not necessary to apply to AC Power Port Conducted Emission.

Reviewed by: Sam Chen

Report Producer: Sandy Chuang

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

Note:

- 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40, VHT80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.
- 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 Part Number		Antenna	Connector	Gain (dBi)		
7		2.4	T dit i tallilooi	Type		2.4GHz	5GHz
1	1	MAG. LAYERS	EDA-1313-25GR2-A10-E	Dipole	Reversed-SMA	1.81	3.88
!	Į.	MAG. LATENS	LDA-1313-23GN2-A10-L	Antenna	Neverseu-SiviA	1.01	3.00
2	2	MAG. LAYERS	EDA-1313-25GR2-A10-E	Dipole	Reversed-SMA	1.81	3.88
2	2	MAG. LATERS	EDA-1313-25GR2-A10-E	Antenna	Reversed-SiviA	1.01	3.00

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Note: The EUT has two antennas.

<For 2.4GHz Band>

For IEEE 802.11b/g/n 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	0.811	0.91	1.4m	1k
802.11ac VHT20	0.797	0.985	1.32m	1k
802.11ac VHT20-BF	0.995	0.022	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ac VHT40	0.667	1.759	660u	3k
802.11ac VHT40-BF	0.988	0.052	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ac VHT80	0.507	2.95	327.5u	10k
802.11ac VHT80-BF	0.995	0.022	n/a (DC>=0.98)	n/a (DC>=0.98)

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1.1.4 EUT Operational Condition

EUT Power Type	For EUT 1: From power adapter or PoE For EUT 2: From power adapter			
Beamforming Function	\boxtimes	With beamforming		Without beamforming
	Note: The product has beamforming function for 802.11n/ac in 5GHz			
Function		Outdoor P2M	\boxtimes	Indoor P2M
		Fixed P2P		Client
Test Software Version	<pre><for mode="" non-beamforming=""> QATool_Dbg.exe Version 0.0.1.71 <for beamforming="" mode=""> telnet</for></for></pre>			

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1.2 Testing Applied 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

1.3 Testing Location Information

	Testing Location						
	HWA YA	ADD	:	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.			
		TEL	:	886-3-327-3456 FAX : 886-3-318-0055			
\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	Gino Huang / Paul Chen	22°C / 54%	Jan. 15, 2018~ Apr. 25, 2018
Radiated	03CH01-CB	Lance Wu / Cola Fan	22°C / 54%	Jan. 12, 2018~ Apr. 30, 2018
AC Conduction	CO01-CB	Wei Li / GN Hou	22°C / 59%	Mar. 30, 2018

Test site Designation No. TW0006 with FCC

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)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%
Output Power Measurement	1.33 dB	Confidence levels of 95%
Power Density Measurement	1.27 dB	Confidence levels of 95%
Bandwidth Measurement	9.74 x10 ⁻⁸	Confidence levels of 95%

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Test site registered number IC 4086D with Industry Canada.

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	PowerSetting
802.11a_Nss1,(6Mbps)_2TX	-
5180MHz	0D
5200MHz	19
5240MHz	17
5745MHz	0C
5785MHz	0B
5825MHz	0C
802.11ac VHT20_Nss1,(MCS0)_2TX	-
5180MHz	0F
5200MHz	19
5240MHz	18
5745MHz	18
5785MHz	14
5825MHz	10
802.11ac VHT40_Nss1,(MCS0)_2TX	-
5190MHz	0A
5230MHz	15
5755MHz	17
5795MHz	14
802.11ac VHT80_Nss1,(MCS0)_2TX	-
5210MHz	08
5775MHz	12
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-
5180MHz	15
5200MHz	23
5240MHz	22
5745MHz	21
5785MHz	21
5825MHz	17
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-
5190MHz	9
5230MHz	14
5755MHz	22
5795MHz	19
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-
5210MHz	8

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Mode	PowerSetting	
5775MHz	20	

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, one is beamforming mode, and the other is non-beamforming mode for 802.11n/ac. All test results were recorded in the report.

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2.2 The Worst Case Measurement Configuration

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

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Т	The Worst Case Mode for Following Conformance Tests		
Tests Item	Emission Bandwidth Maximum Conducted Output Power Peak Power Spectral Density Unwanted Emissions		
Test Condition Conducted measurement at transmit chains			
1 EUT 1 + Adapter			

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 u regardless of spatial multiplexing MIMO configuration), the radiated be performed with highest antenna gain of each antenna type.				
Operating Mode < 1GHz	Normal Link			
1	EUT 1 + Adapter			
2	EUT 1 + PoE			
For operating mode 1 is th	e worst case and it was record in this test report.			
Operating Mode > 1GHz	CTX			
1	EUT 1			

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The Worst Case Mode for Following Conformance Tests					
Tests Item Simultaneous Transmission Analysis - Radiated Emission Co-location					
Test Condition	Test Condition Radiated measurement				
Operating Mode	Operating Mode Normal Link				
1 EUT 1: WLAN 2.4GHz + WLAN 5GHz					
Refer to Appendix G 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	Operating Mode				
1	1 EUT 1: WLAN 2.4GHz + WLAN 5GHz				
Refer to Sporton Test Report No.: FA7D2222 for Co-location RF Exposure Evaluation.					

Note 1: The EUT can only be used at Y axis position

Note 2: The PoE below is for measurement only, would not be marketed.

The PoE information as below:

Support Unit	Brand	Model Number
PoE	CRIO	POE-G30

2.3 EUT Operation during Test

For CTX Mode:

<For Non-Beamforming Mode>

The EUT was programmed to be in continuously transmitting mode.

<For Beamforming Mode>

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN XP 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.

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2.4 Accessories

No.	Equipment Name	Brand Name	Model Name	Rating	Remark
1	Adapter	DVE	DSA-18PFR-12 FUS 120150	Input: 100-240V~50/60Hz, 0.6A Output: +12V, 1.5A	For EUT 1 and EUT 2 use

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2.5 Table for Multiple Listing

The EUT has two model names which are identical to each other in all aspects except for the following table:

Model Name	WIFI	Ethernet Port	USB Port	PoE Function	Adapter DC Voltage	EUT
VigorAP 903	V	5	V	V	+12V, 1.5A	EUT 1
Vigor2122ac	V	5	V	X	+12V, 1.5A	EUT 2

Note 1: From the above models, model: VigorAP 903 (EUT 1) were selected as representative model for the test and its data was recorded in this report.

Note 2: V: With X: Without

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2.6 Support Equipment

For Test Site No: CO01-CB

	Support Equipment						
No.	No. Equipment Brand Name Model Name FCC ID						
1	NB*4	DELL	E6430	DoC			
2	Flash disk3.0	Transcend	JetFlash-700	DoC			

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For Test Site No: 03CH01-CB (below 1GHz)

	Support Equipment						
No.	No. Equipment Brand Name Model Name FCC ID						
1	NB*2	DELL	E4300	DoC			
2	2 NB*2 Apple Mac Book DoC						
3	Flash disk	Silicon Power	I-Series	DoC			

<For Non-Beamforming Mode>

For Test Site No: 03CH01-CB (above 1GHz)

	Support Equipment					
No.	No. Equipment Brand Name Model Name FCC ID					
1	NB	DELL	E4300	DoC		

<For Beamforming Mode>

For Test Site No: 03CH01-CB (above 1GHz)

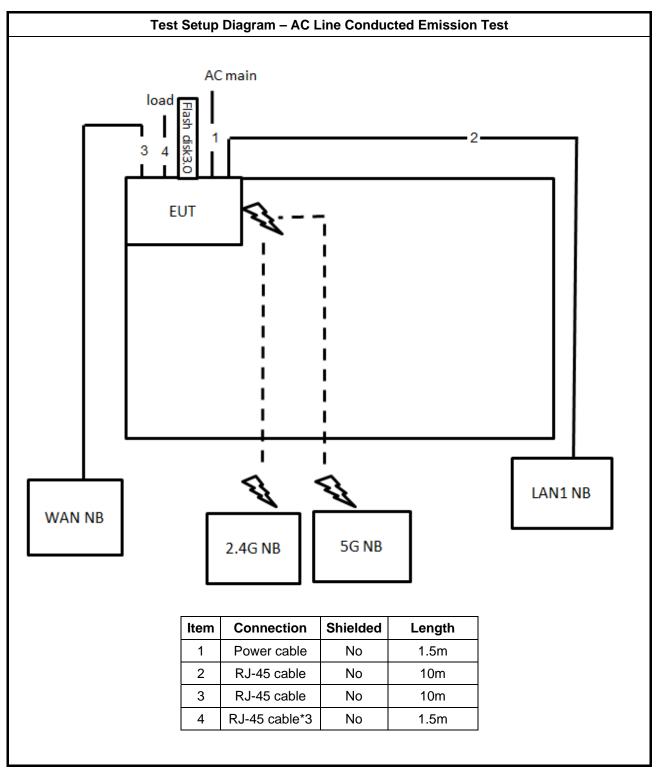
	Support Equipment			
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB*2	DELL	E4300	DoC
2	RX Device	DrayTek	VigorAP 903	VGYAP903

For Test Site No: TH01-CB

	Support Equipment			
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC

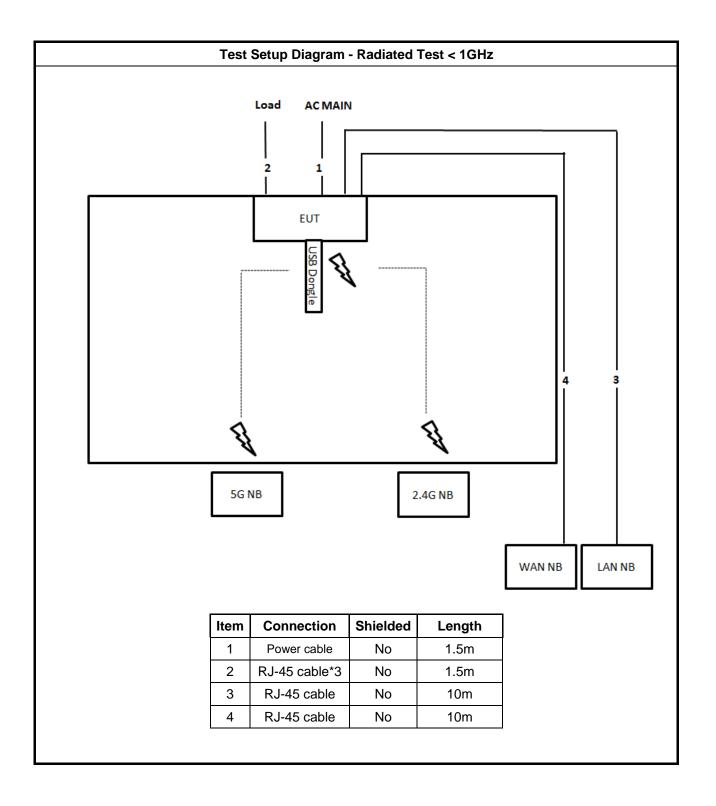
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2.7 Test Setup Diagram

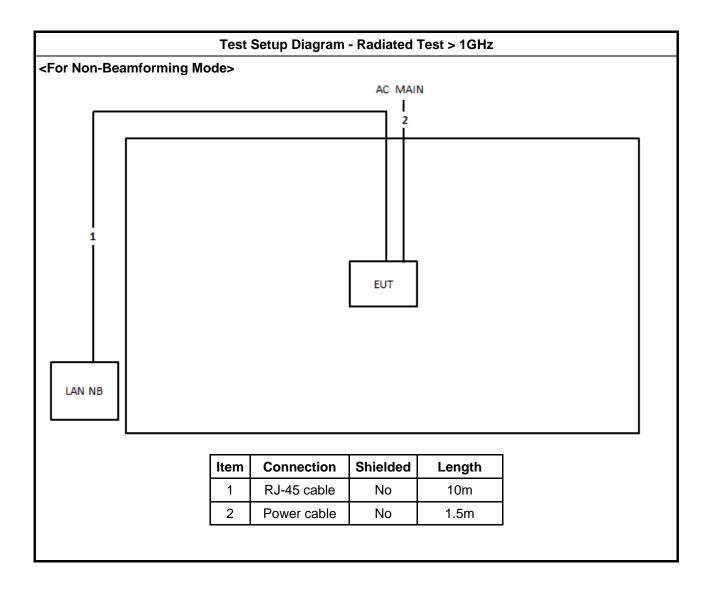


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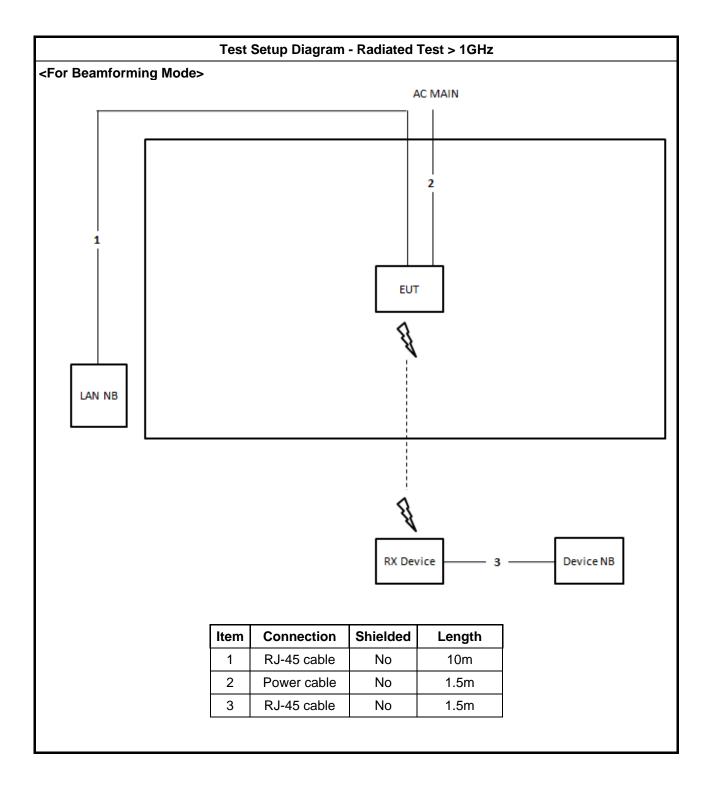
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3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-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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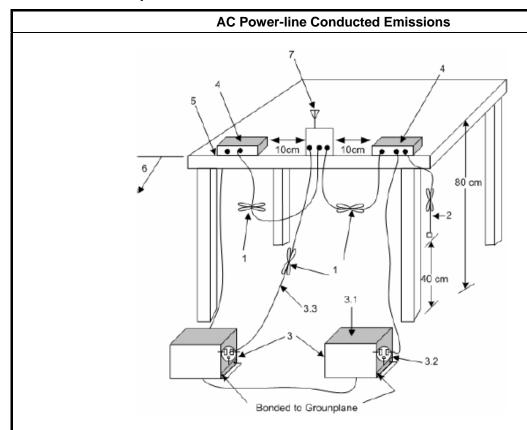
3.1.2 Measuring Instruments

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.

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	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-	LAN Devices		
	For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.		
	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz		
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz		
	For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.		

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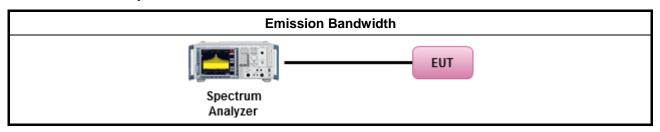
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

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

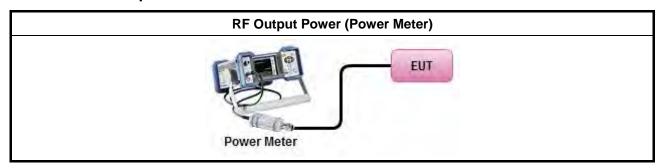
Refer a test equipment and calibration data table in this test report.

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		
UN	II 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 – $(G_{TX} - 6)$.		
\boxtimes	For the 5.725-5.85 GHz band:		
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) \leq 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= $30 - (G_{TX} - 6)$.		
	Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.		
LE-	LAN Devices		
	For the 5.15-5.25 GHz band, the peak power spectral density (PPSD) \leq 4 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) \leq 10 dBm/MHz.		
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz and the e.i.r.p. peak power spectral density (PPSD) \leq 17 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 and the e.i.r.p. peak power spectral density (PPSD) \leq 17 dBm/MHz.		
	For the 5.725-5.85 GHz band:		
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) \leq 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= $30 - (G_{TX} - 6)$.		
	Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.		
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.

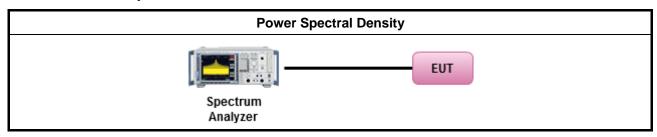
3.4.3 Test Procedures

	Test Method		
•	outp func	k power spectral density procedures that the same method as used to determine the conducted ut power shall be used to determine the peak power spectral density and use the peak search tion on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density 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	/ 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 Radiated Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

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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.

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

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

3.5.2 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 H)2) for unwanted emissions into non-restricted bands. Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands. Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging). Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW). Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time. Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions. Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit. Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit. For radiated measurement.

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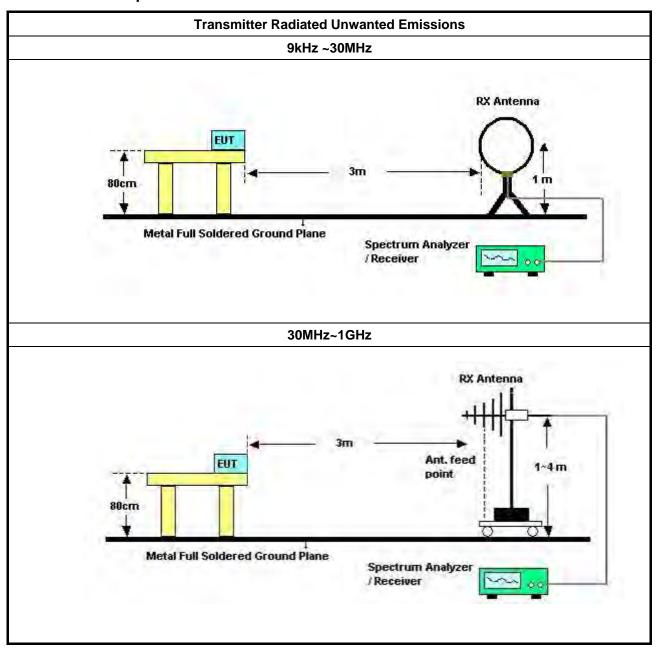
Test Method

- 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.

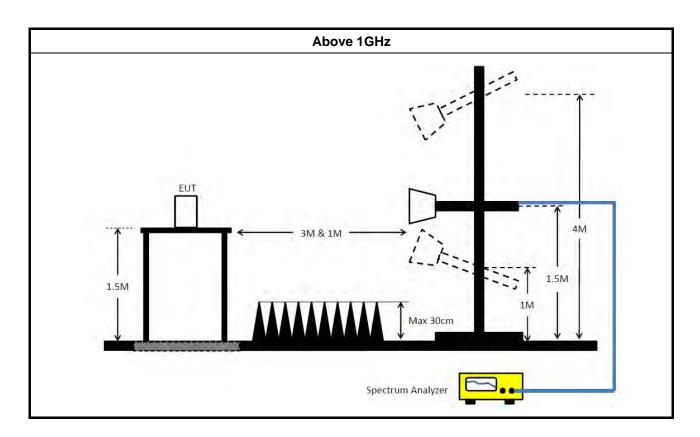
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- Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.
- The any unwanted emissions level shall not exceed the fundamental emission level.
- All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.5.4 Test Setup



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3.5.5 Transmitter Unwanted Emissions (Below 30MHz)

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.

3.5.6 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	Jan. 31, 2018	Jan. 30, 2019	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 24, 2017	Nov. 23, 2018	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 13, 2017	Nov. 12, 2018	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 23, 2017	May 22, 2018	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2017	Aug. 29, 2018	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Mar. 15, 2018*	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2018	Mar. 15, 2019	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 20, 2017	Nov. 19, 2018	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 05, 2017	Jul. 04, 2018	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2017	May 01, 2018	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 09, 2018	Jan. 08, 2019	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 10, 2017	Jul. 09, 2018	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 23, 2017	Nov. 22, 2018	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 06, 2017	May 05, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 21, 2017	Dec. 20, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	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. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 20, 2017	Nov. 19, 2018	Conducted (TH01-CB)

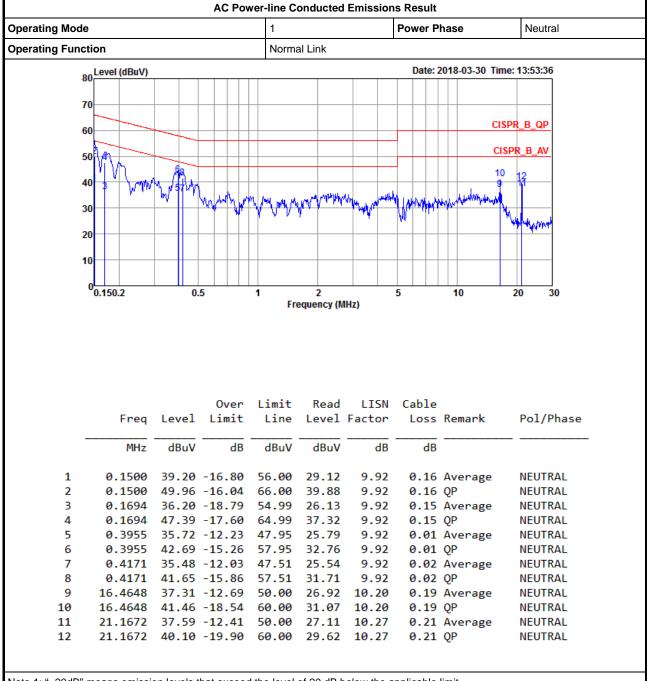
Note: Calibration Interval of instruments listed above is one year.

NCR means Non-Calibration required.

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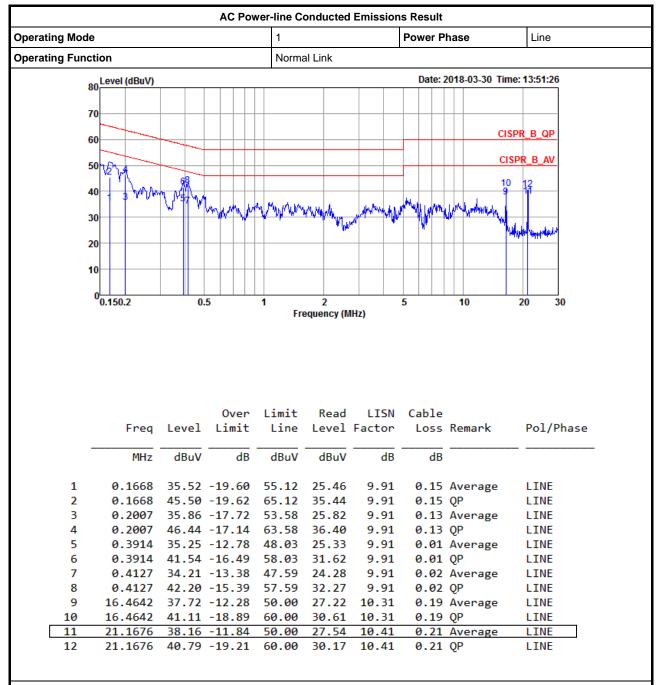
[&]quot;*" Calibration Interval of instruments listed above is two years.

AC Power-line Conducted Emissions Result



Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

AC Power-line Conducted Emissions Result



Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



Appendix B EBW Result

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	39.7M	24.163M	24M2D1D	26.375M	16.392M
802.11ac VHT20_Nss1,(MCS0)_2TX	48.325M	23.088M	23M1D1D	29.575M	17.616M
802.11ac VHT40_Nss1,(MCS0)_2TX	70.2M	36.332M	36M3D1D	62.35M	35.982M
802.11ac VHT80_Nss1,(MCS0)_2TX	81.2M	75.262M	75M3D1D	79.6M	75.062M
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	38.975M	17.916M	17M9D1D	26.4M	17.591M
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	41.1M	36.082M	36M1D1D	39.9M	35.932M
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	81.4M	75.262M	75M3D1D	79.5M	75.062M
5.725-5.85GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	15.65M	21.814M	21M8D1D	15M	16.467M
802.11ac VHT20_Nss1,(MCS0)_2TX	15.9M	25.312M	25M3D1D	14.975M	18.316M
802.11ac VHT40_Nss1,(MCS0)_2TX	35M	53.373M	53M4D1D	28.85M	38.431M
802.11ac VHT80_Nss1,(MCS0)_2TX	72.5M	77.161M	77M2D1D	70M	76.862M
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	15.675M	20.615M	20M6D1D	13.775M	17.641M
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	35.1M	36.882M	36M9D1D	35M	36.132M
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	75M	75.962M	76M0D1D	67.5M	75.662M

Max-N dB = Maximum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;
Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;
Min-OBW = Minimum 99% occupied bandwidth;



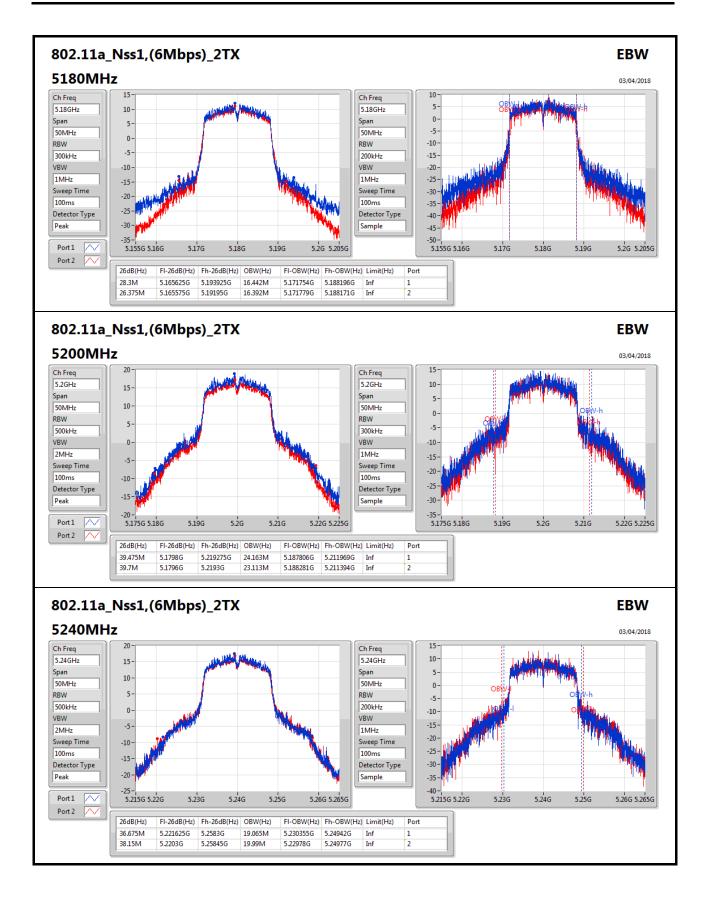
EBW Result Appendix B

Result

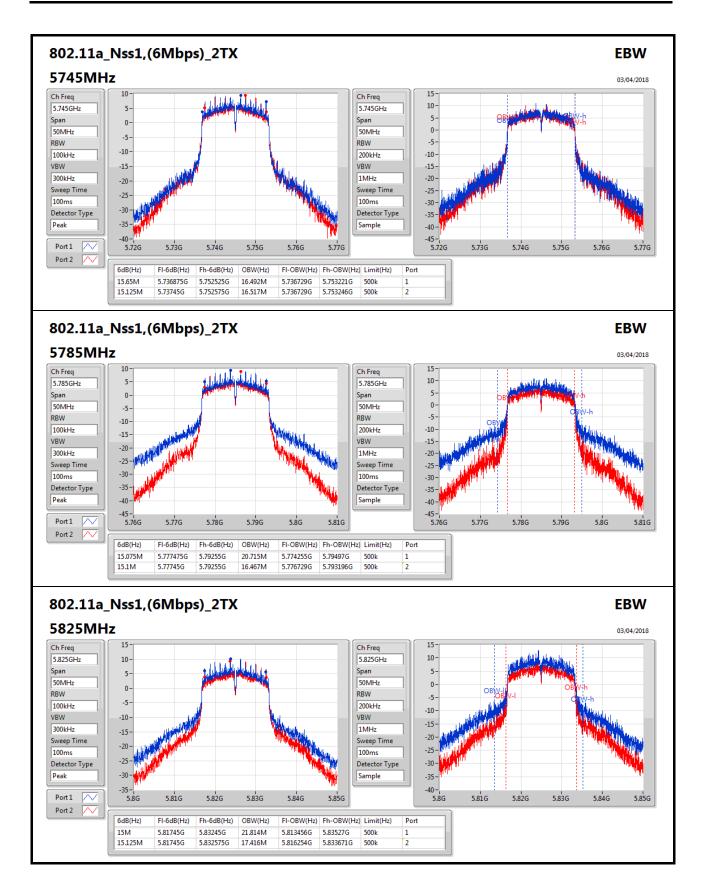
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW (Hz)	
		(Hz)	(Hz)	(Hz)	(Hz)		
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5180MHz	Pass	Inf	28.3M	16.442M	26.375M	16.392M	
5200MHz	Pass	Inf	39.475M	24.163M	39.7M	23.113M	
5240MHz	Pass	Inf	36.675M	19.065M	38.15M	19.99M	
5745MHz	Pass	500k	15.65M	16.492M	15.125M	16.517M	
5785MHz	Pass	500k	15.075M	20.715M	15.1M	16.467M	
5825MHz	Pass	500k	15M	21.814M	15.125M	17.416M	
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	Inf	48.325M	23.088M	29.575M	17.616M	
5200MHz	Pass	Inf	42M	22.614M	43.175M	20.365M	
5240MHz	Pass	Inf	41.5M	19.54M	39.5M	18.066M	
5745MHz	Pass	500k	15.9M	25.312M	15.125M	23.788M	
5785MHz	Pass	500k	15.1M	21.989M	15.025M	19.74M	
5825MHz	Pass	500k	15.6M	22.514M	14.975M	18.316M	
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	Inf	70.2M	35.982M	62.35M	35.982M	
5230MHz	Pass	Inf	68.8M	36.332M	68.15M	36.282M	
5755MHz	Pass	500k	28.85M	53.373M	32.55M	47.876M	
5795MHz	Pass	500k	35M	38.431M	33.8M	48.776M	
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	Inf	79.6M	75.062M	81.2M	75.262M	
5775MHz	Pass	500k	72.5M	77.161M	70M	76.862M	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	Inf	26.4M	17.591M	27.825M	17.666M	
5200MHz	Pass	Inf	38.975M	17.791M	37.675M	17.916M	
5240MHz	Pass	Inf	33.675M	17.616M	36.4M	17.816M	
5745MHz	Pass	500k	13.775M	17.816M	15.625M	17.866M	
5785MHz	Pass	500k	14.975M	20.615M	15.075M	18.516M	
5825MHz	Pass	500k	15.075M	18.416M	15.675M	17.641M	
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	Inf	40.45M	35.932M	39.9M	35.932M	
5230MHz	Pass	Inf	41.1M	35.932M	40.25M	36.082M	
5755MHz	Pass	500k	35M	36.532M	35M	36.882M	
5795MHz	Pass	500k	35.1M	36.132M	35.05M	36.332M	
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	Inf	81.4M	75.062M	79.5M	75.262M	
5775MHz	Pass	500k	75M	75.662M	67.5M	75.962M	

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;

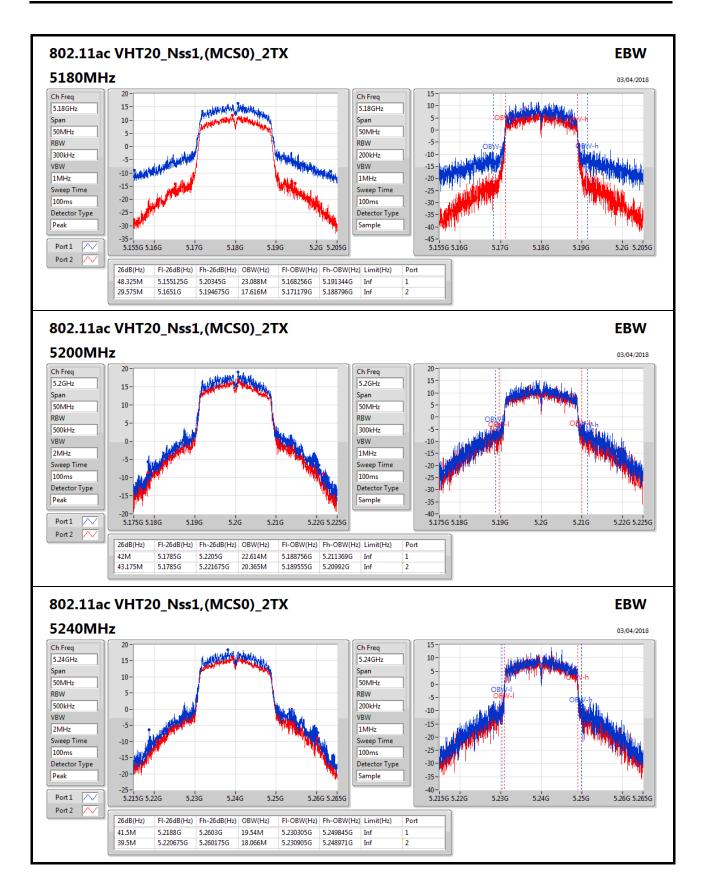




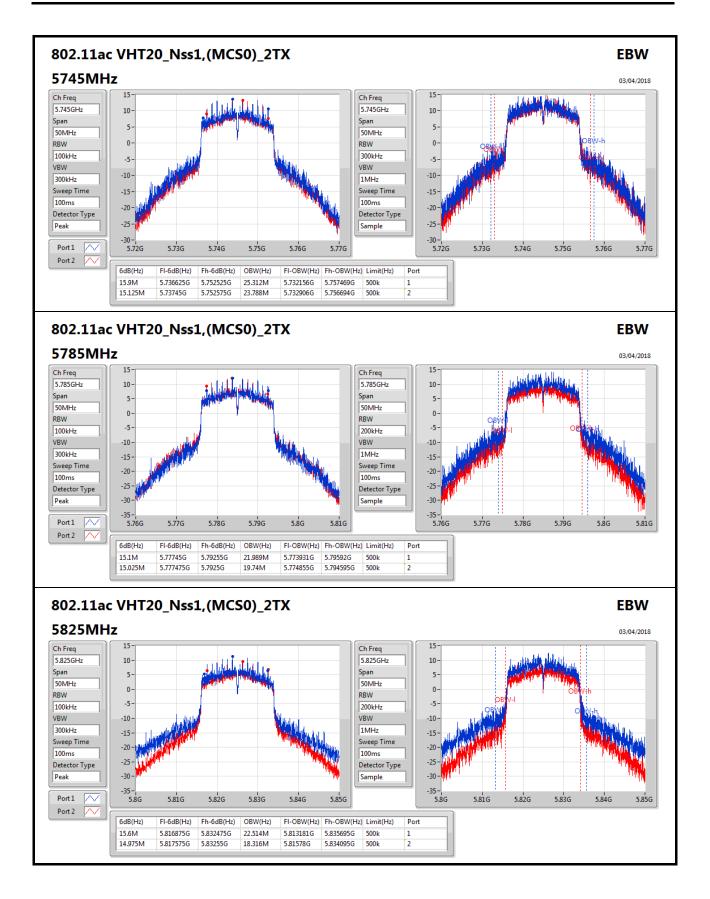




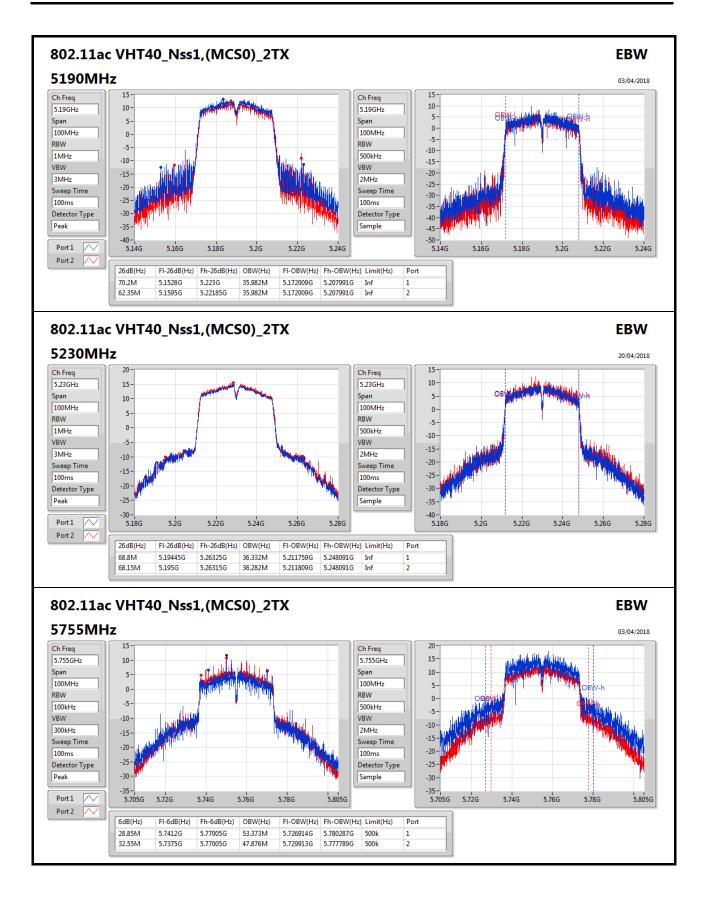




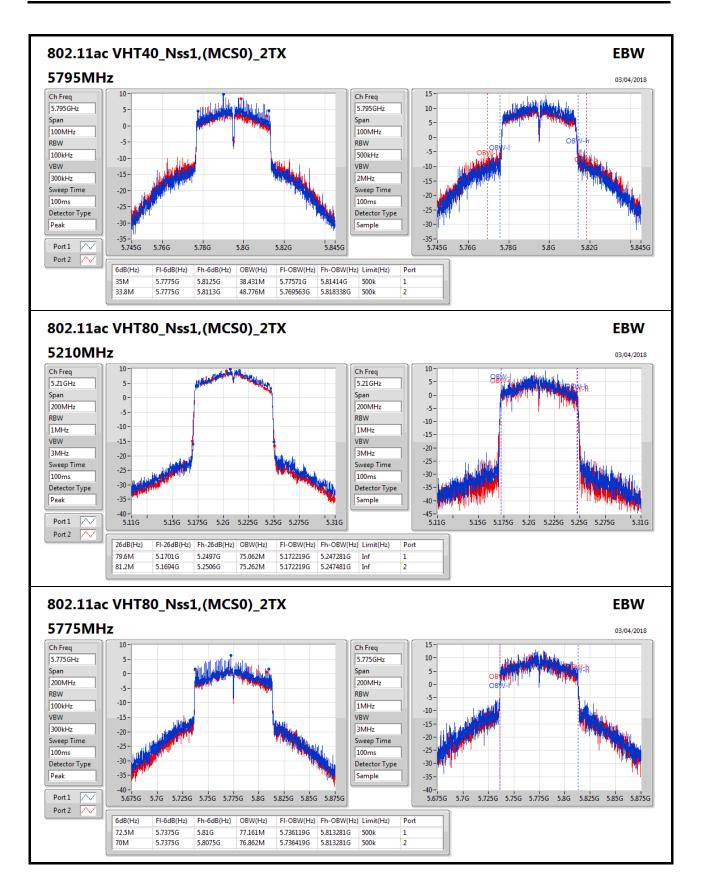




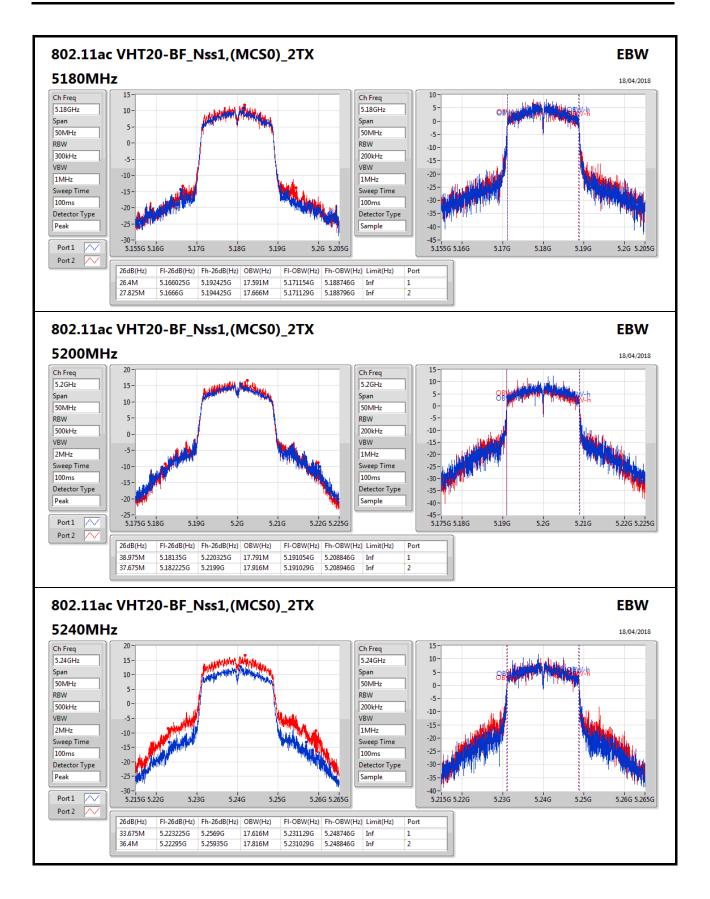




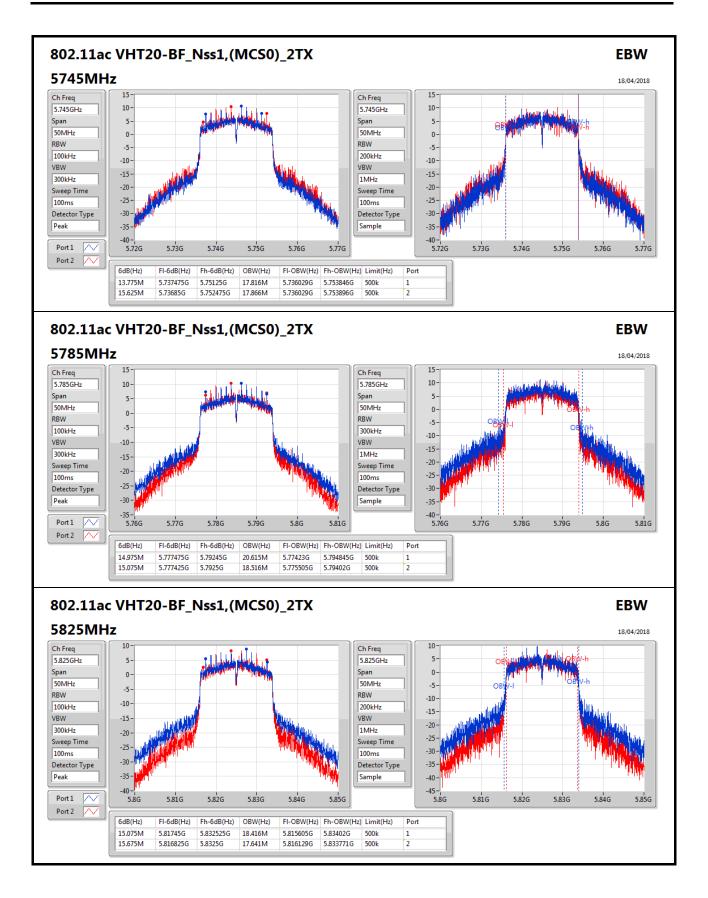




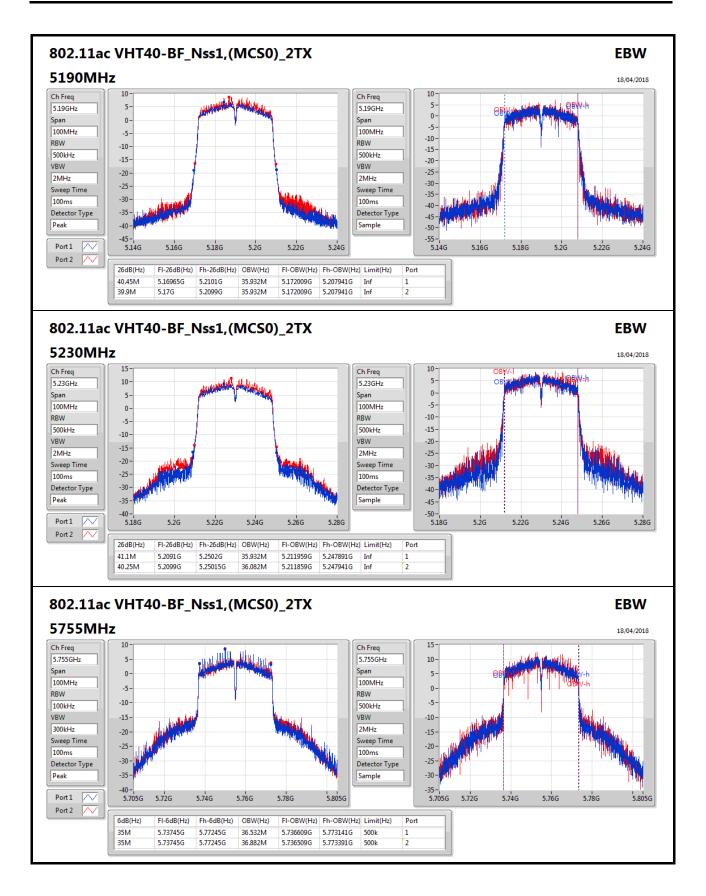




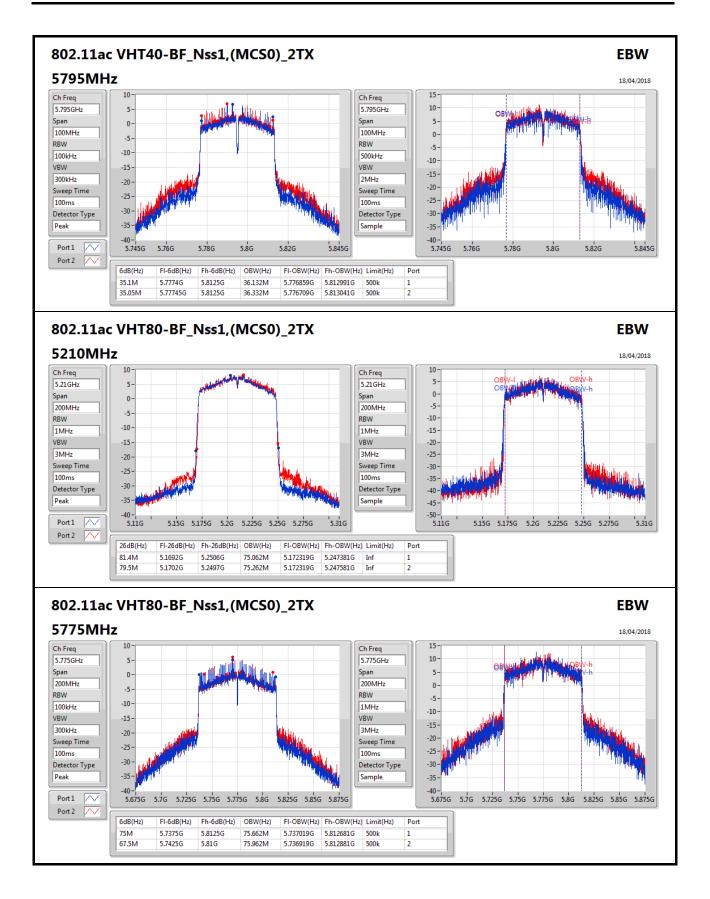














Power Result Appendix C

Summary

Mode	Total Power	Total Power
	(dBm)	(W)
5.15-5.25GHz	-	-
802.11a_Nss1,(6Mbps)_2TX	25.24	0.33420
802.11ac VHT20_Nss1,(MCS0)_2TX	25.19	0.33037
802.11ac VHT40_Nss1,(MCS0)_2TX	22.79	0.19011
802.11ac VHT80_Nss1,(MCS0)_2TX	19.00	0.07943
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	24.81	0.30269
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	21.37	0.13709
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	18.58	0.07211
5.725-5.85GHz	-	-
802.11a_Nss1,(6Mbps)_2TX	22.24	0.16749
802.11ac VHT20_Nss1,(MCS0)_2TX	25.75	0.37584
802.11ac VHT40_Nss1,(MCS0)_2TX	25.06	0.32063
802.11ac VHT80_Nss1,(MCS0)_2TX	23.70	0.23442
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	24.28	0.26792
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	24.96	0.31333
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	23.46	0.22182

Power Result Appendix C

Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit	
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5180MHz	Pass	3.88	19.14	18.53	21.86	30.00	
5200MHz	Pass	3.88	22.57	21.87	25.24	30.00	
5240MHz	Pass	3.88	21.9	21.26	24.60	30.00	
5745MHz	Pass	3.88	19.43	19.02	22.24	30.00	
5785MHz	Pass	3.88	18.78	18.14	21.48	30.00	
5825MHz	Pass	3.88	19.31	18.56	21.96	30.00	
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	3.88	19.96	19.11	22.57	30.00	
5200MHz	Pass	3.88	22.62	21.68	25.19	30.00	
5240MHz	Pass	3.88	22.24	21.43	24.86	30.00	
5745MHz	Pass	3.88	23	22.47	25.75	30.00	
5785MHz	Pass	3.88	21.39	20.95	24.19	30.00	
5825MHz	Pass	3.88	20.03	19.35	22.71	30.00	
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	3.88	16.63	15.81	19.25	30.00	
5230MHz	Pass	3.88	19.84	19.72	22.79	30.00	
5755MHz	Pass	3.88	21.83	22.25	25.06	30.00	
5795MHz	Pass	3.88	20.65	19.81	23.26	30.00	
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	3.88	16.11	15.87	19.00	30.00	
5775MHz	Pass	3.88	21.15	20.17	23.70	30.00	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	6.89	19.26	19.24	22.26	29.11	
5200MHz	Pass	6.89	21.98	21.61	24.81	29.11	
5240MHz	Pass	6.89	21.35	21.35	24.36	29.11	
5745MHz	Pass	6.89	21.2	21.34	24.28	29.11	
5785MHz	Pass	6.89	21.06	20.85	23.97	29.11	
5825MHz	Pass	6.89	19.69	19.3	22.51	29.11	
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	6.89	16.06	15.87	18.98	29.11	
5230MHz	Pass	6.89	18.34	18.38	21.37	29.11	
5755MHz	Pass	6.89	21.33	22.5	24.96	29.11	
5795MHz	Pass	6.89	20.04	19.89	22.98	29.11	
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	6.89	15.6	15.54	18.58	29.11	
5775MHz	Pass	6.89	20.37	20.53	23.46	29.11	

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



Summary

Mode	PD
	(dBm/RBW)
5.15-5.25GHz	-
802.11a_Nss1,(6Mbps)_2TX	13.57
802.11ac VHT20_Nss1,(MCS0)_2TX	14
802.11ac VHT40_Nss1,(MCS0)_2TX	8.63
802.11ac VHT80_Nss1,(MCS0)_2TX	0.8
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	11.67
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	4.92
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-1.76
5.725-5.85GHz	-
802.11a_Nss1,(6Mbps)_2TX	10.1
802.11ac VHT20_Nss1,(MCS0)_2TX	13.09
802.11ac VHT40_Nss1,(MCS0)_2TX	8.86
802.11ac VHT80_Nss1,(MCS0)_2TX	4.52
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	9.55
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	6.61
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	1.81

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

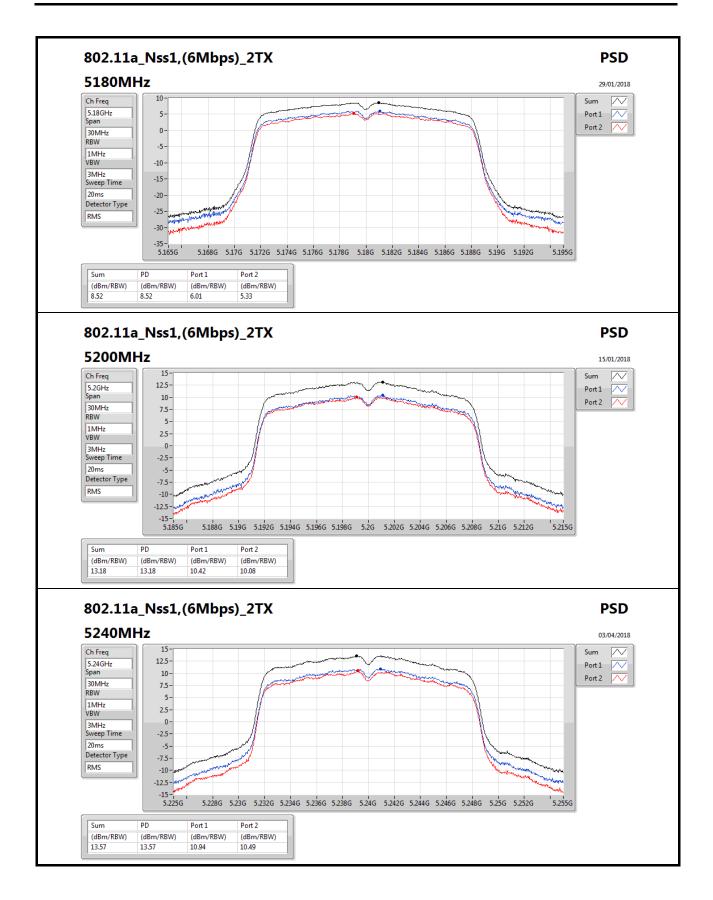
Appendix D **PSD Result**

Result

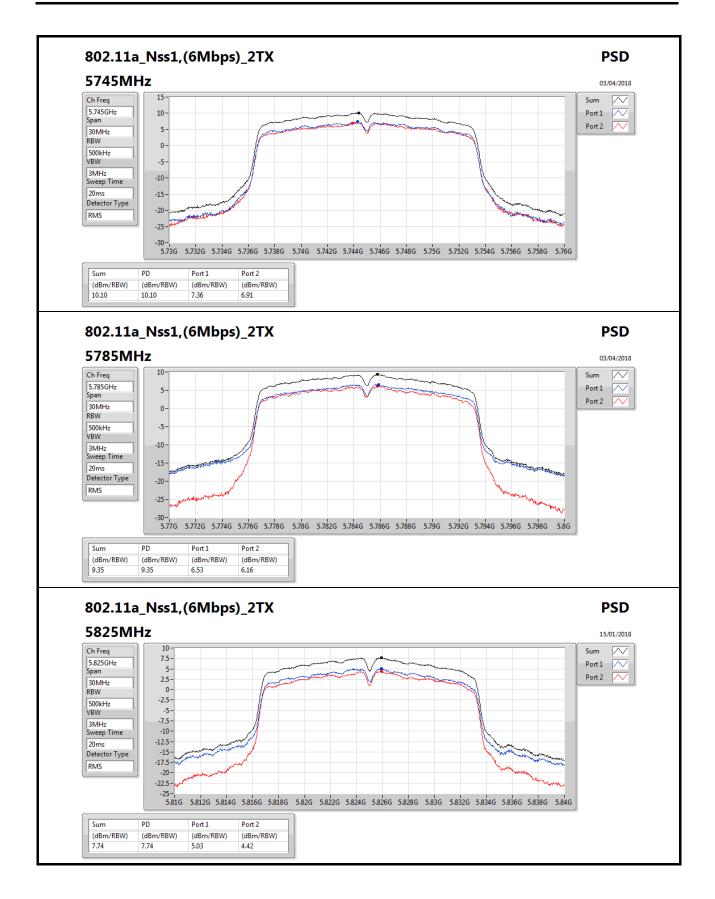
Mode	Result	DG	Port 1	Port 2	PD	PD Limit	
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5180MHz	Pass	6.89	6.01	5.33	8.52	16.11	
5200MHz	Pass	6.89	10.42	10.08	13.18	16.11	
5240MHz	Pass	6.89	10.94	10.49	13.57	16.11	
5745MHz	Pass	6.89	7.36	6.91	10.10	29.11	
5785MHz	Pass	6.89	6.53	6.16	9.35	29.11	
5825MHz	Pass	6.89	5.03	4.42	7.74	29.11	
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	6.89	7.31	6.31	9.78	16.11	
5200MHz	Pass	6.89	11.34	10.38	13.86	16.11	
5240MHz	Pass	6.89	11.43	10.55	14.00	16.11	
5745MHz	Pass	6.89	10.34	9.99	13.09	29.11	
5785MHz	Pass	6.89	9.18	8.88	11.91	29.11	
5825MHz	Pass	6.89	4.72	3.86	7.25	29.11	
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	6.89	1.47	0.44	3.98	16.11	
5230MHz	Pass	6.89	5.61	5.70	8.63	16.11	
5755MHz	Pass	6.89	5.4	6.57	8.86	29.11	
5795MHz	Pass	6.89	5.8	4.91	8.31	29.11	
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	6.89	-1.64	-1.96	0.80	16.11	
5775MHz	Pass	6.89	2.04	1.25	4.52	29.11	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	6.89	6.08	6.07	9.04	16.11	
5200MHz	Pass	6.89	8.9	8.71	11.67	16.11	
5240MHz	Pass	6.89	8.17	8.2	11.06	16.11	
5745MHz	Pass	6.89	6.39	6.23	9.18	29.11	
5785MHz	Pass	6.89	6.52	6.6	9.55	29.11	
5825MHz	Pass	6.89	4.78	4.72	7.65	29.11	
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	6.89	-0.61	-1	2.18	16.11	
5230MHz	Pass	6.89	1.82	2.1	4.92	16.11	
5755MHz	Pass	6.89	3.13	4.07	6.61	29.11	
5795MHz	Pass	6.89	1.59	2.11	4.63	29.11	
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	6.89	-4.37	-4.71	-1.76	16.11	
5775MHz	Pass	6.89	-1.36	-1.03	1.81	29.11	

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

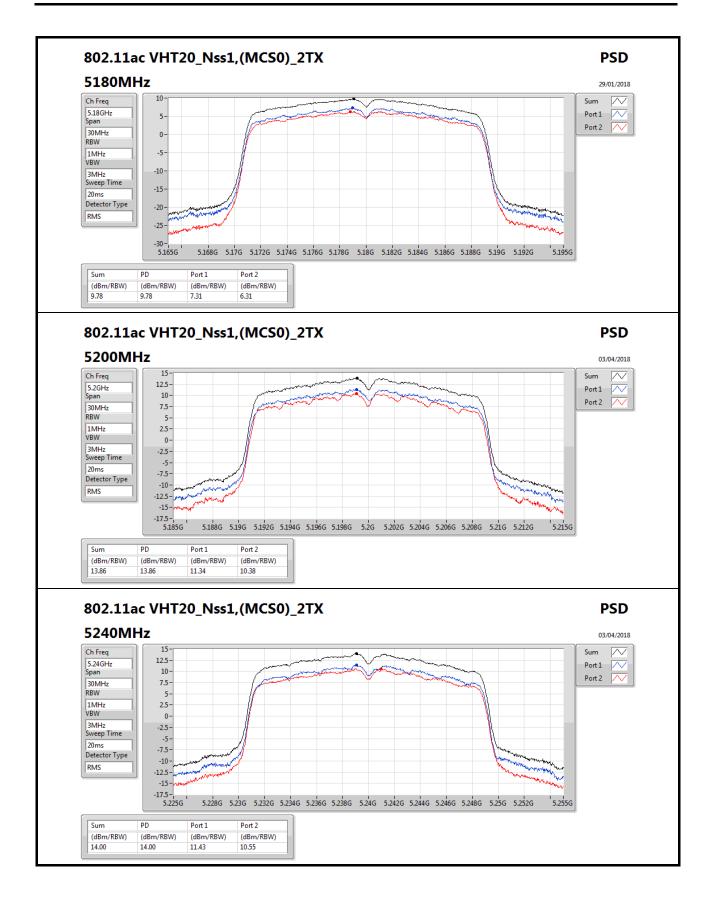




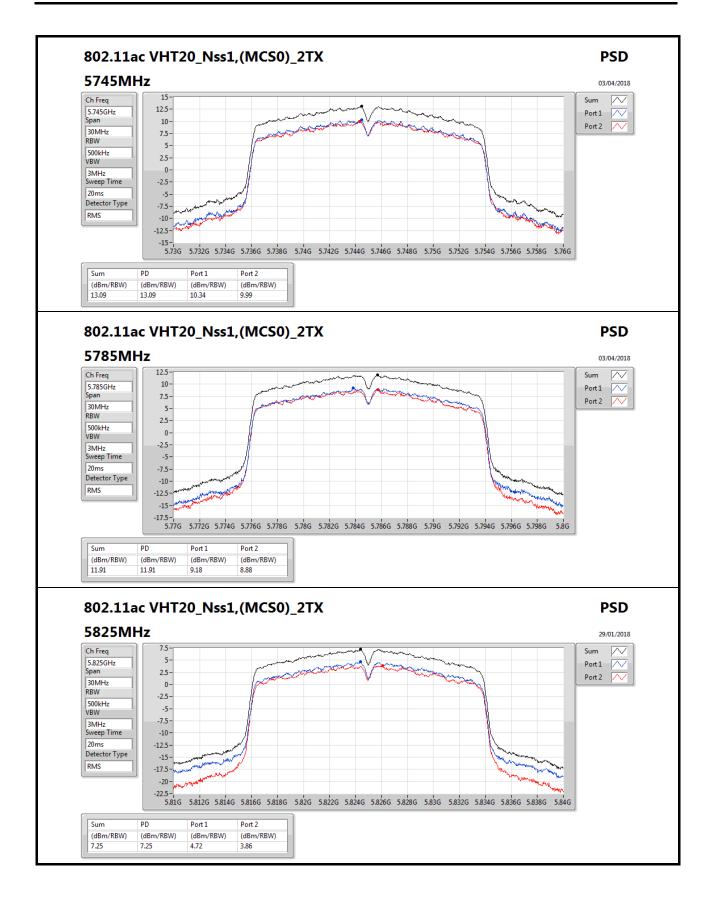




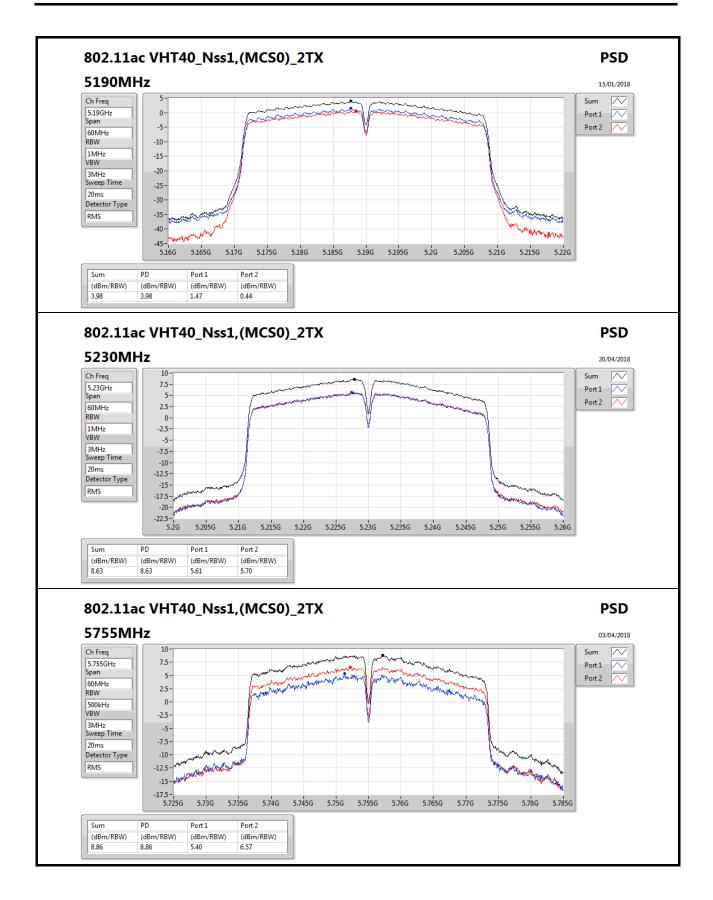




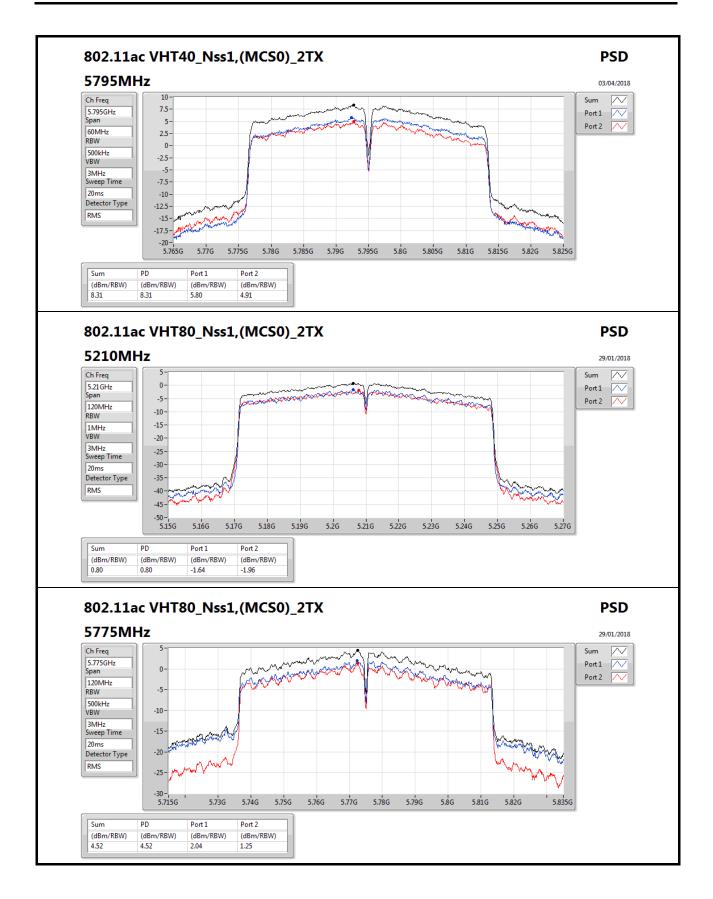




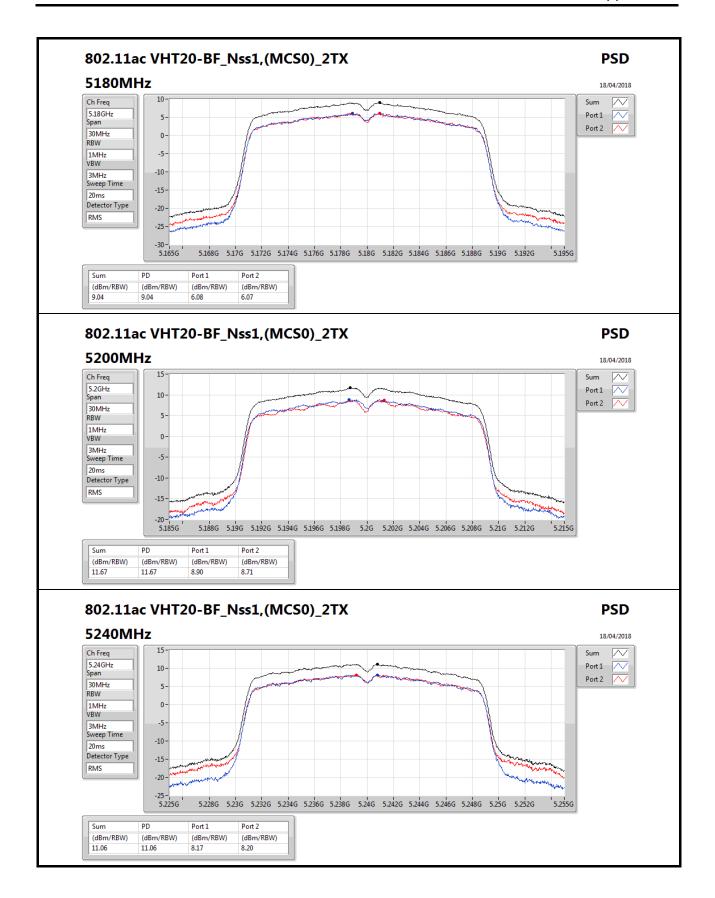




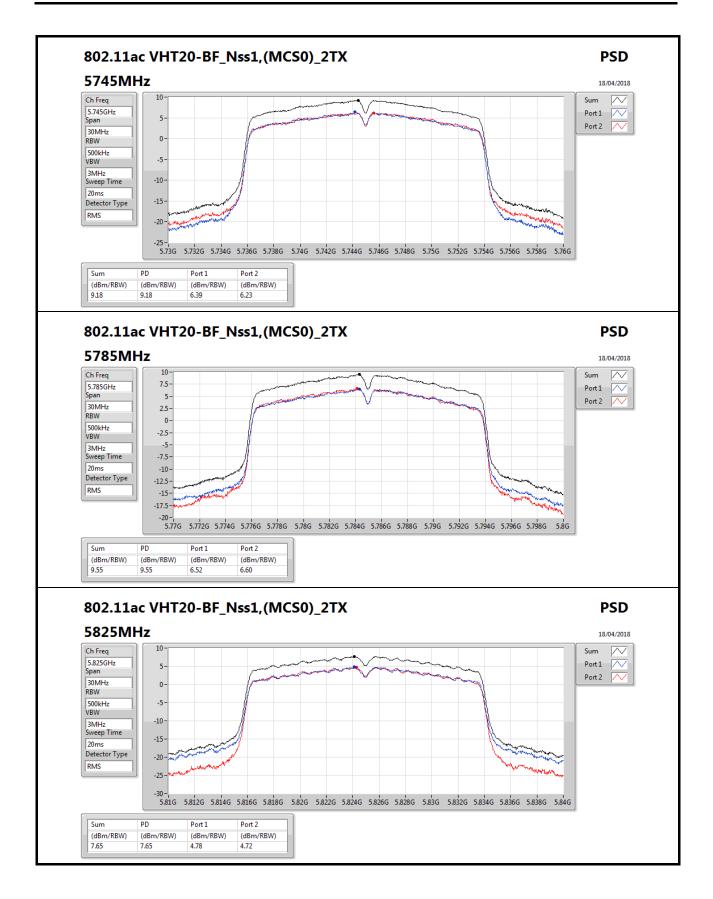




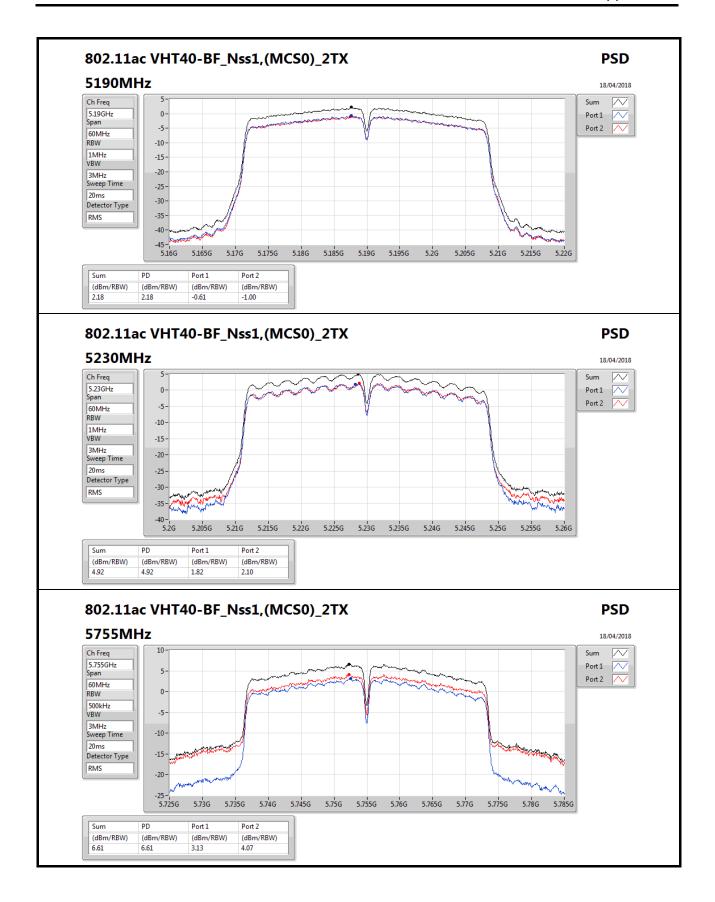




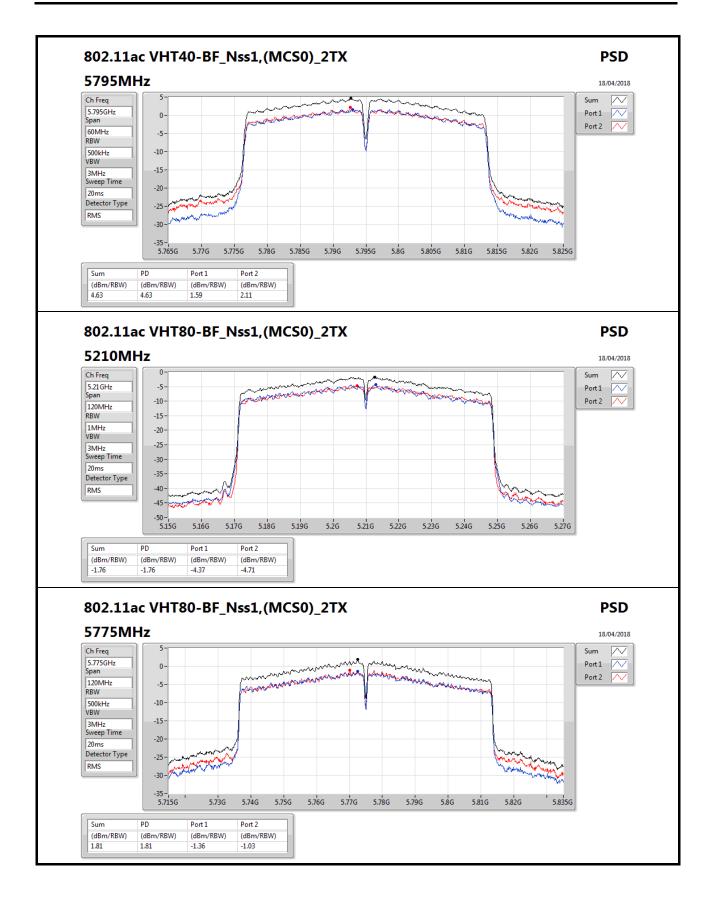


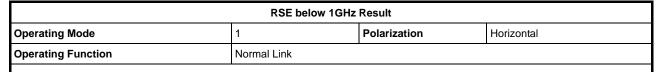


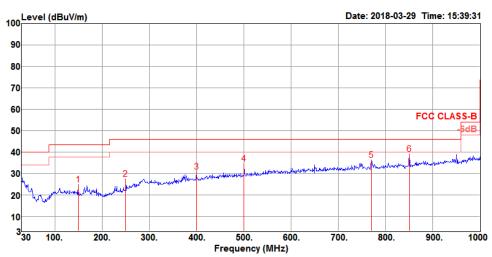








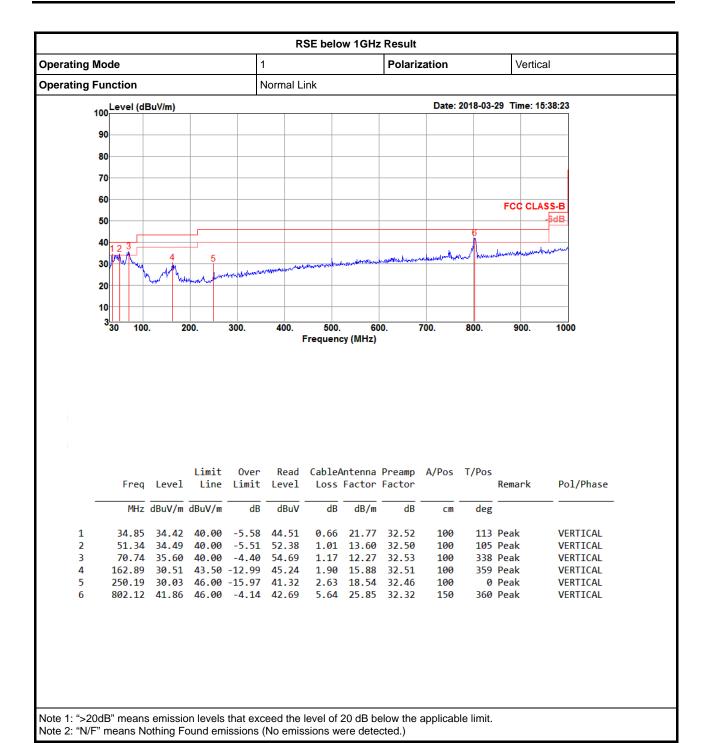




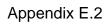
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	Freq	Level	Line	Limit	Level	Loss	Factor	Factor			Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	149.31	24.79	43.50	-18.71	38.97	1.88	16.46	32.52	200	284	Peak	HORIZONTAL
2	250.19	27.26	46.00	-18.74	38.55	2.63	18.54	32.46	100	237	Peak	HORIZONTAL
3	399.57	30.63	46.00	-15.37	37.96	3.54	21.58	32.45	100	248	Peak	HORIZONTAL
4	500.45	34.62	46.00	-11.38	39.71	4.12	23.28	32.49	150	201	Peak	HORIZONTAL
5	770.11	36.21	46.00	-9.79	37.41	5.46	25.72	32.38	150	5	Peak	HORIZONTAL
6	850.62	39.05	46.00	-6.95	39.00	5.87	26.24	32.06	100	243	Peak	HORIZONTAL

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)









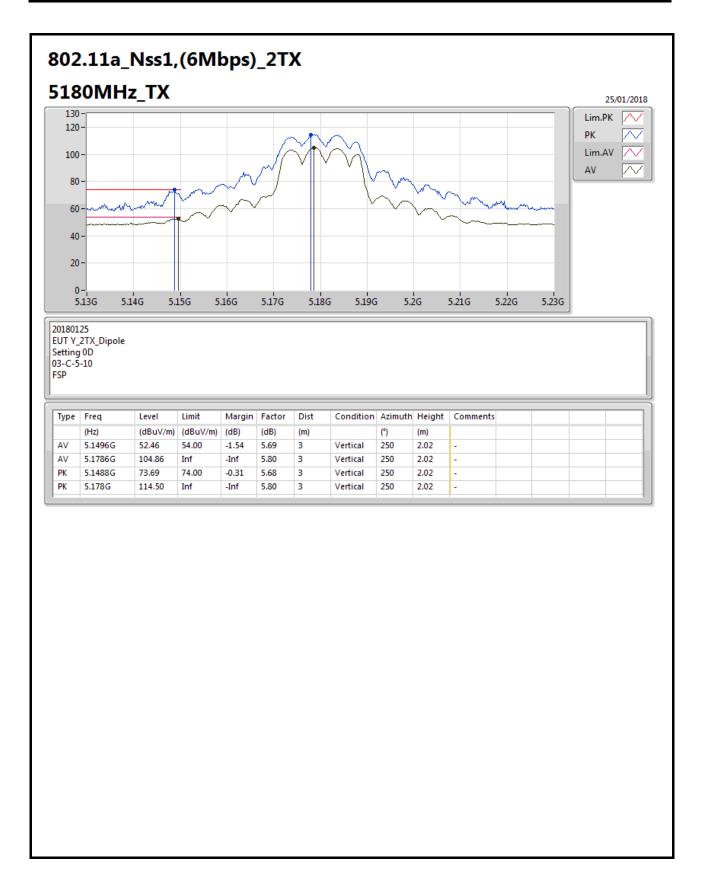


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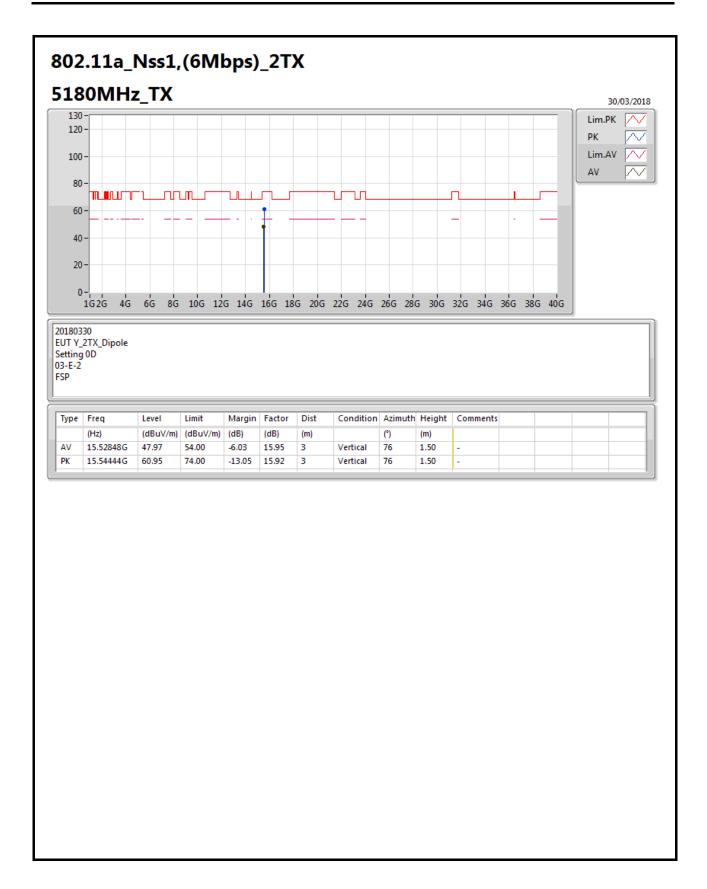
Summary

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_Nss1,(MCS0)_2TX	Pass	AV	5.149995G	53.99	54.00	-0.01	4.90	3	Vertical	57	1.49	-

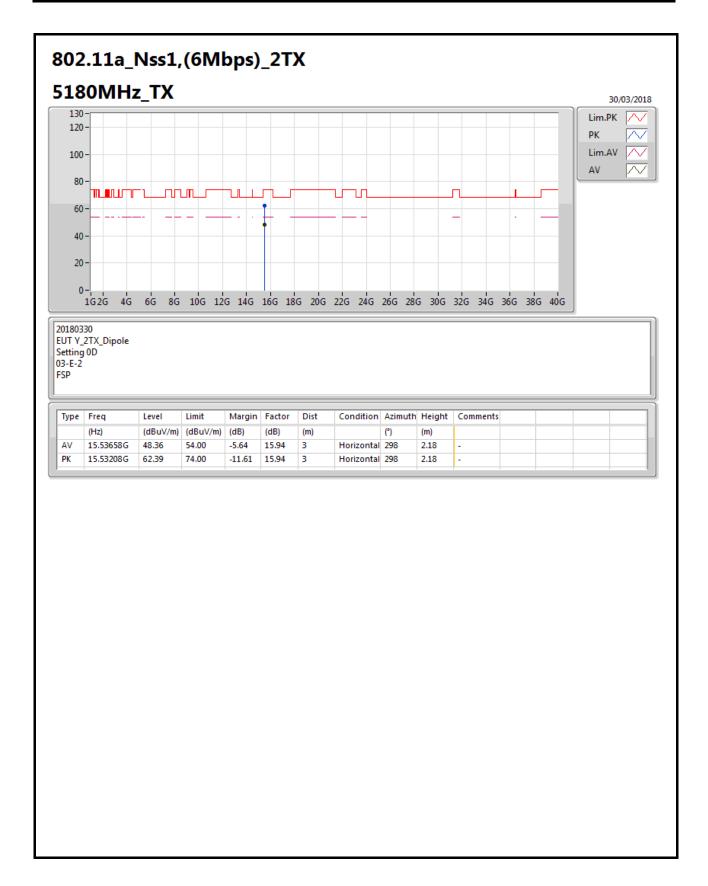




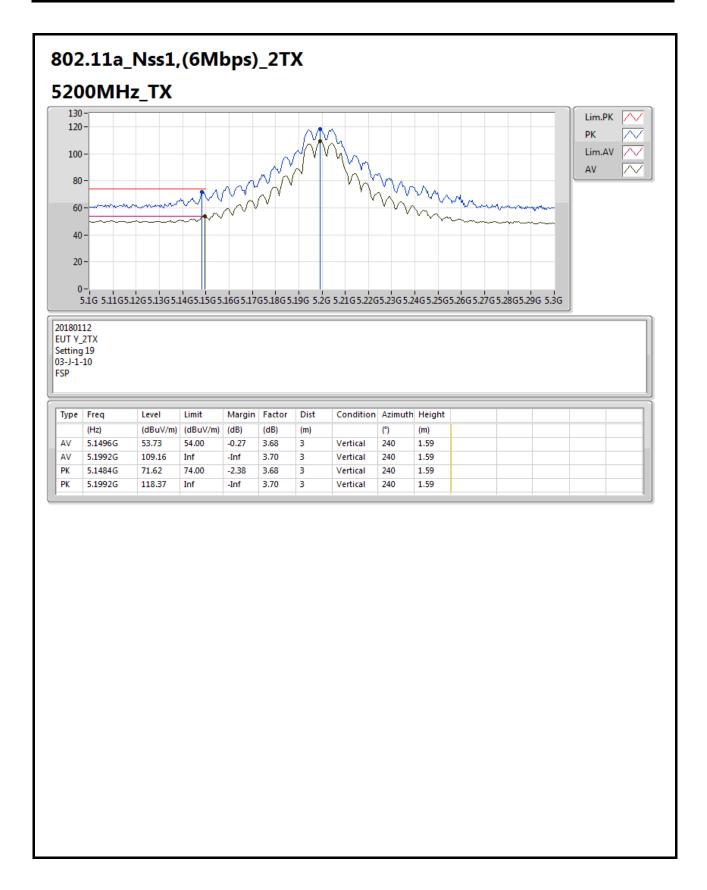




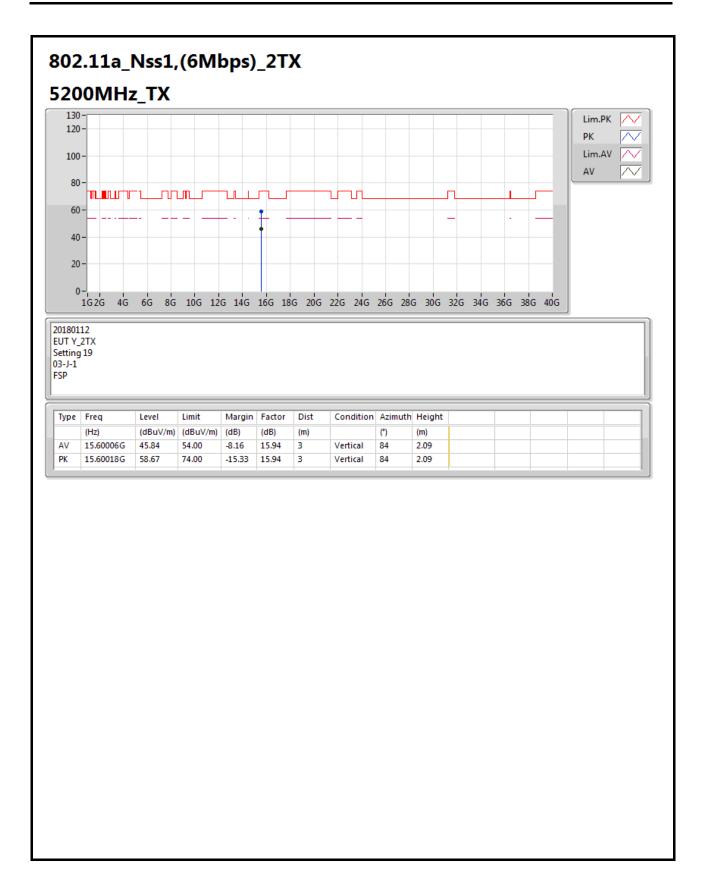




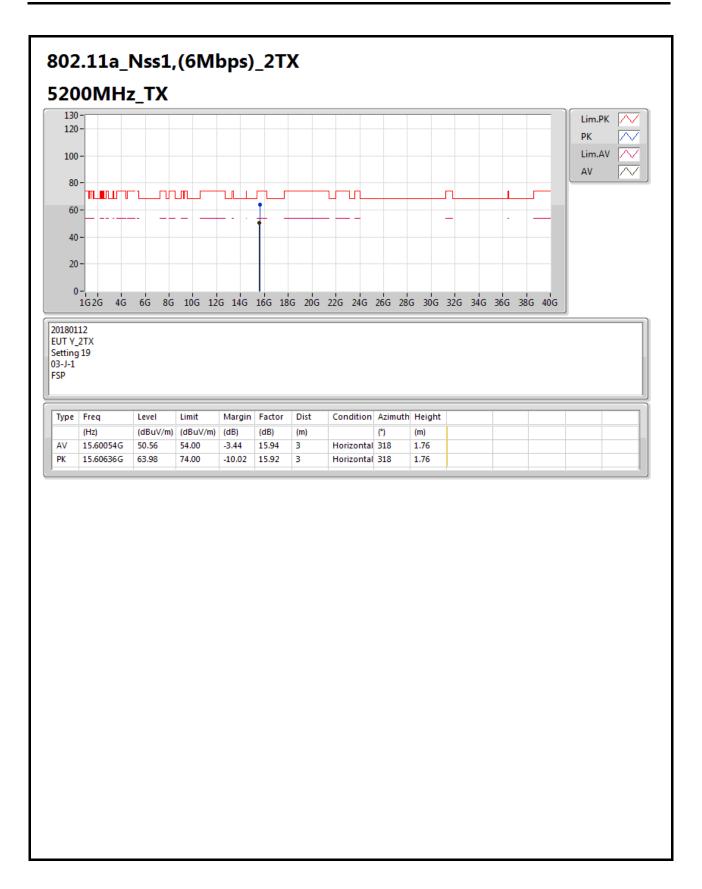




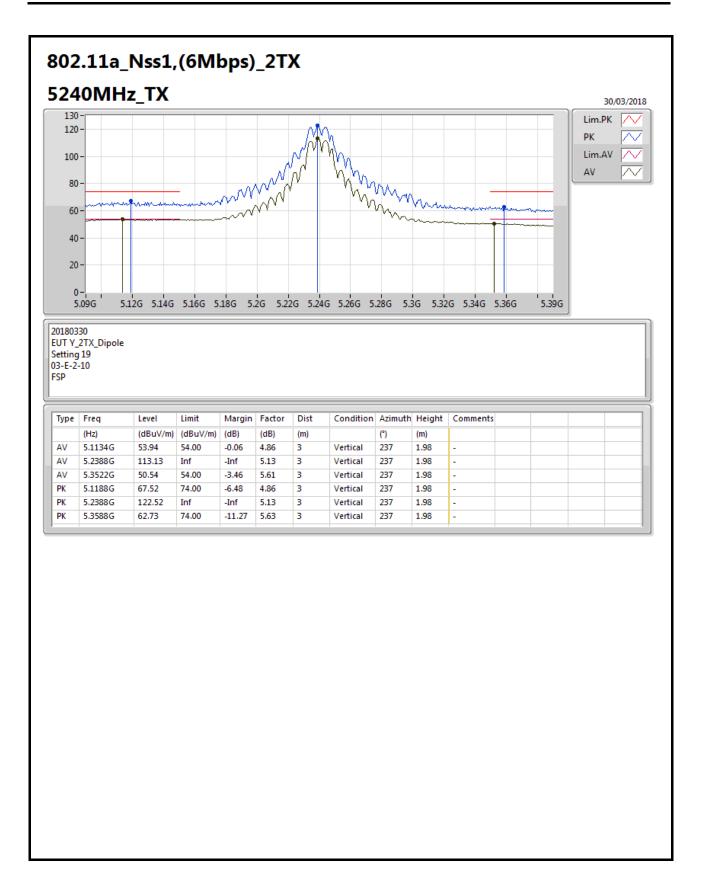






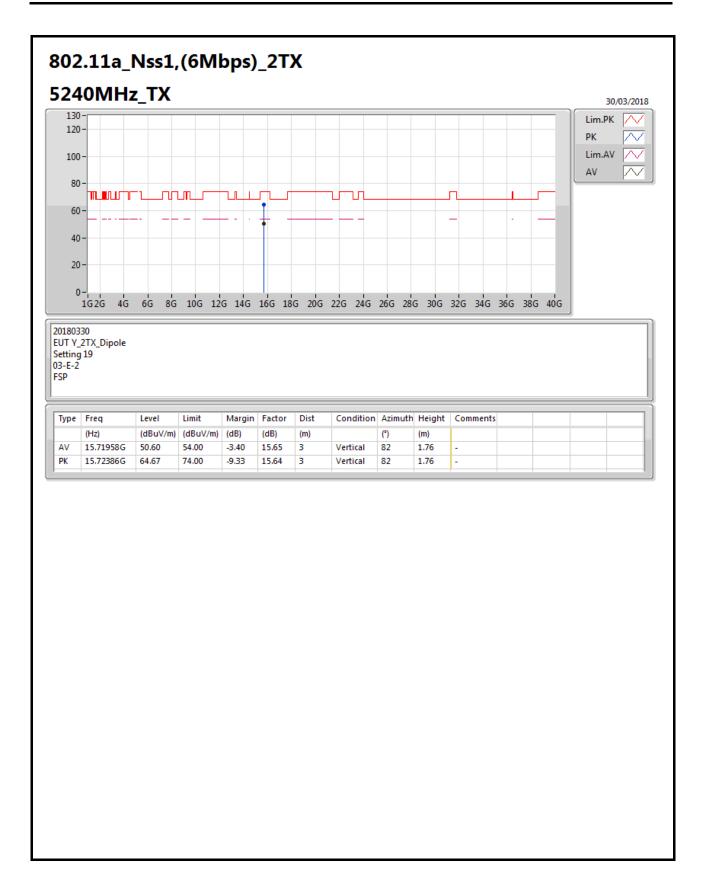






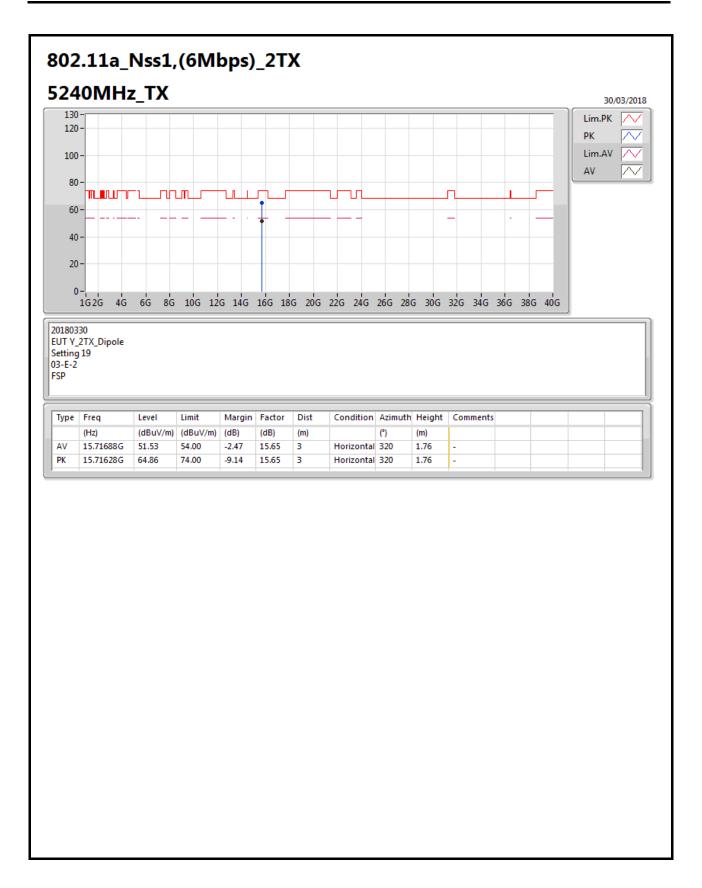
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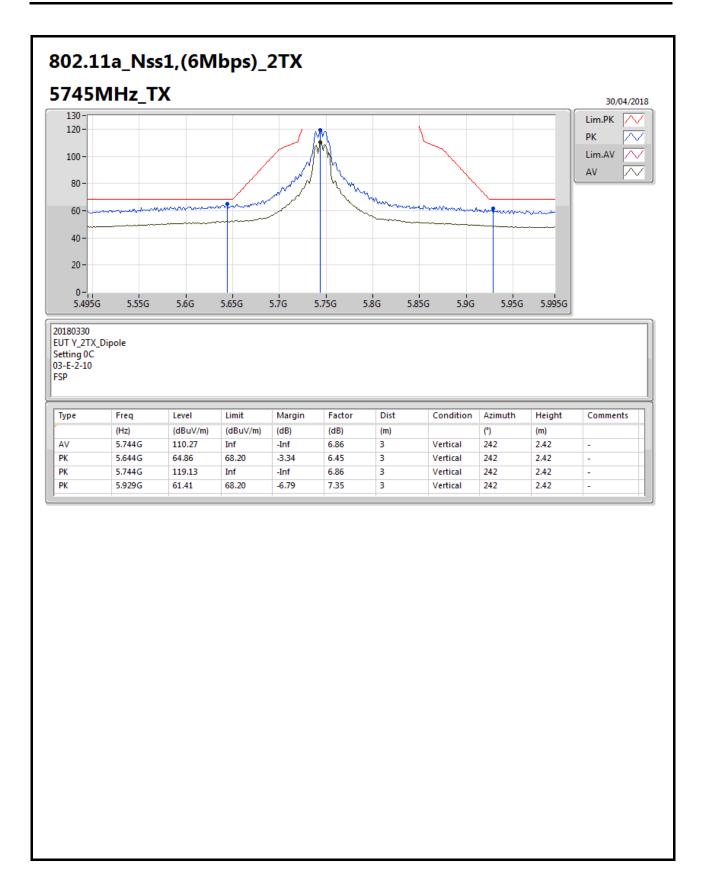
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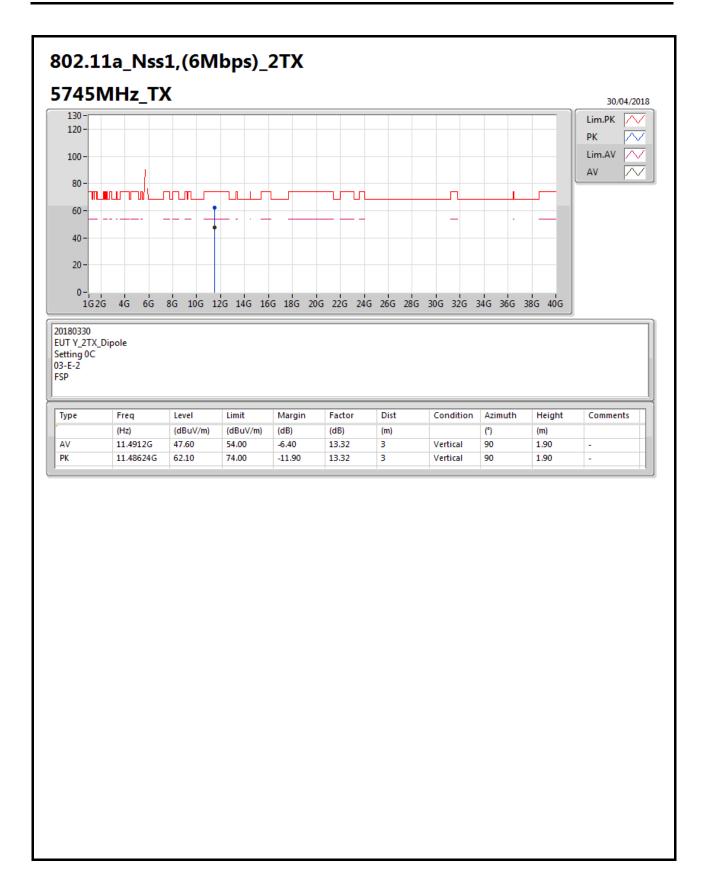
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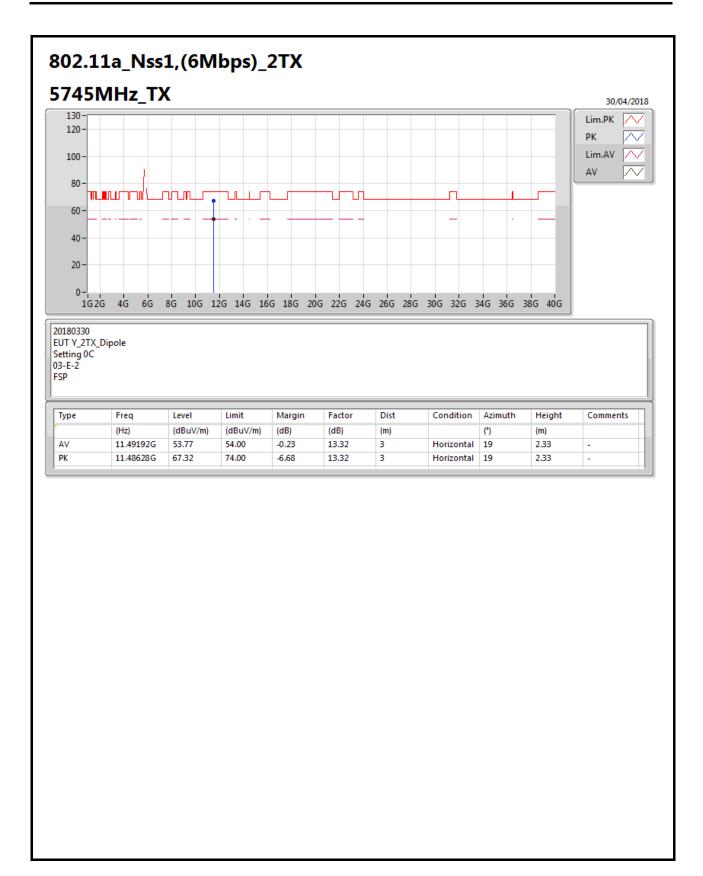
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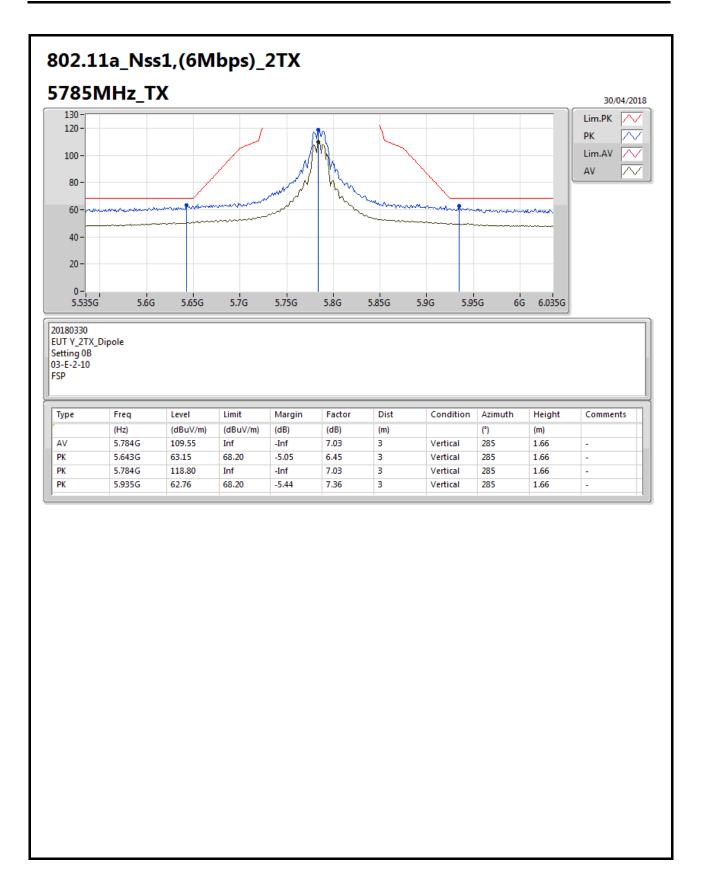
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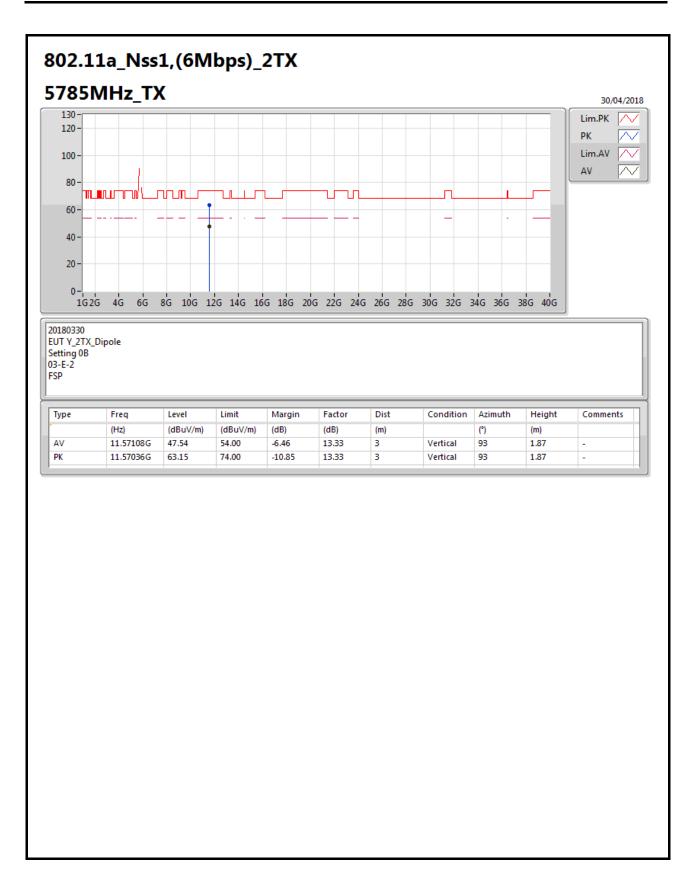
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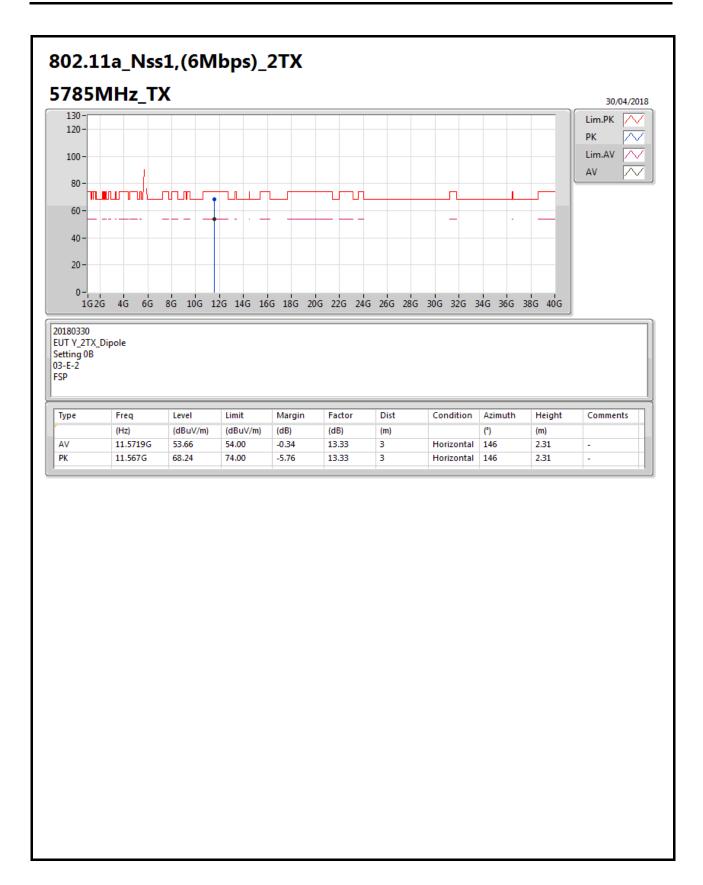
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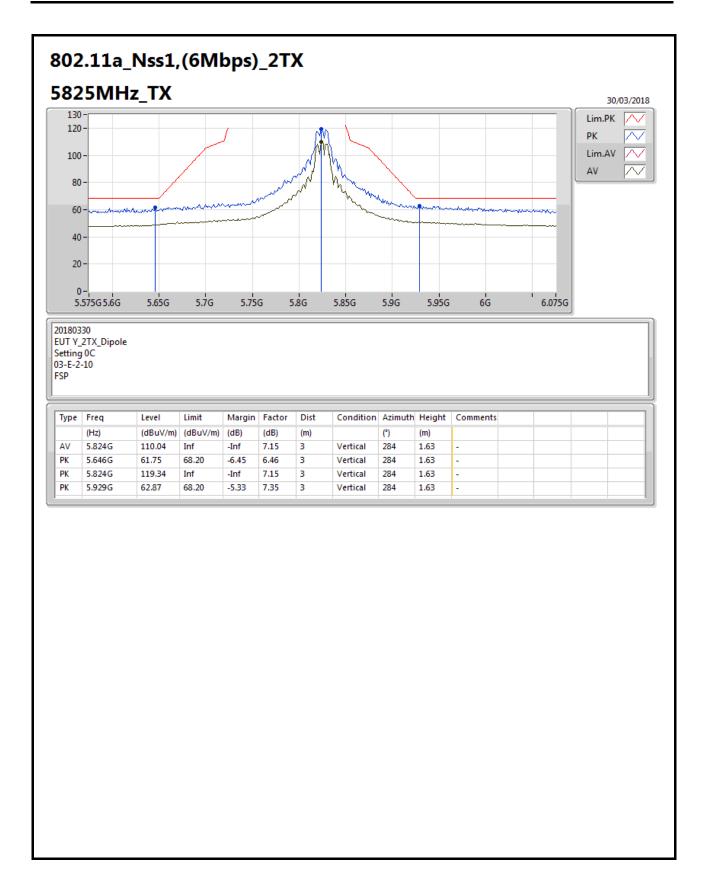
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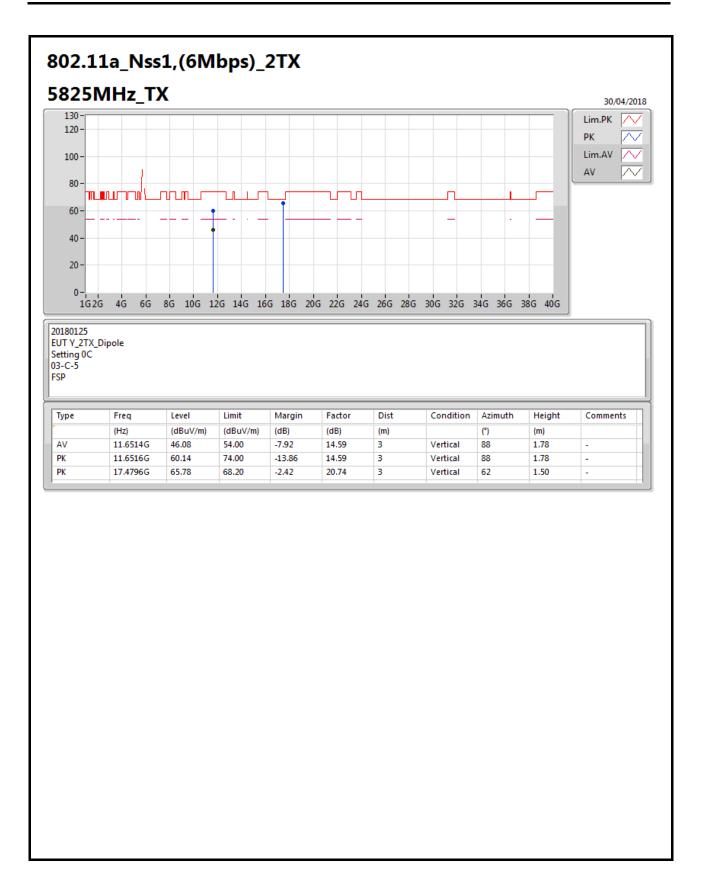
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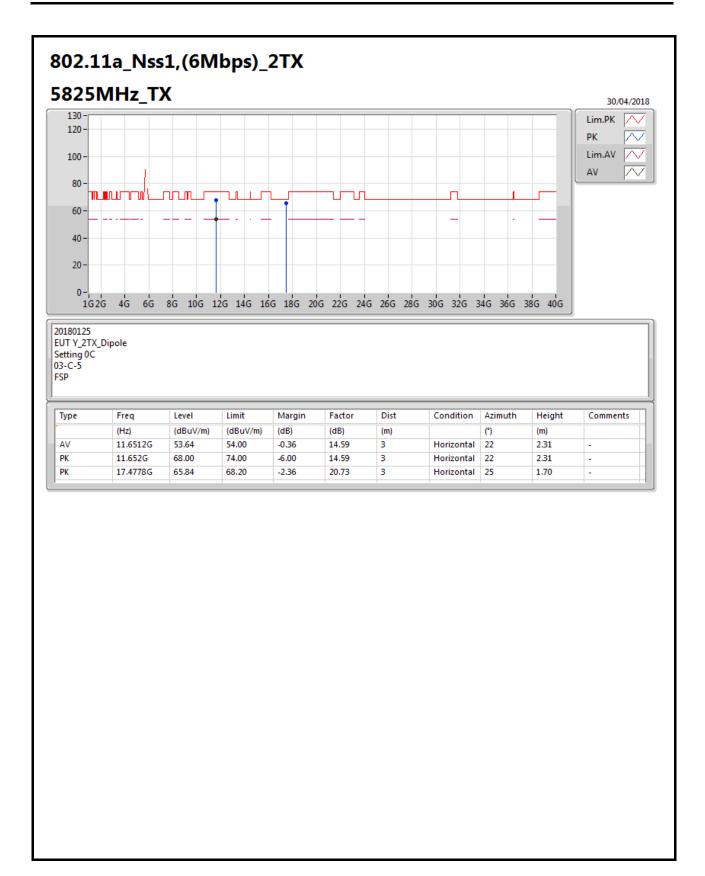
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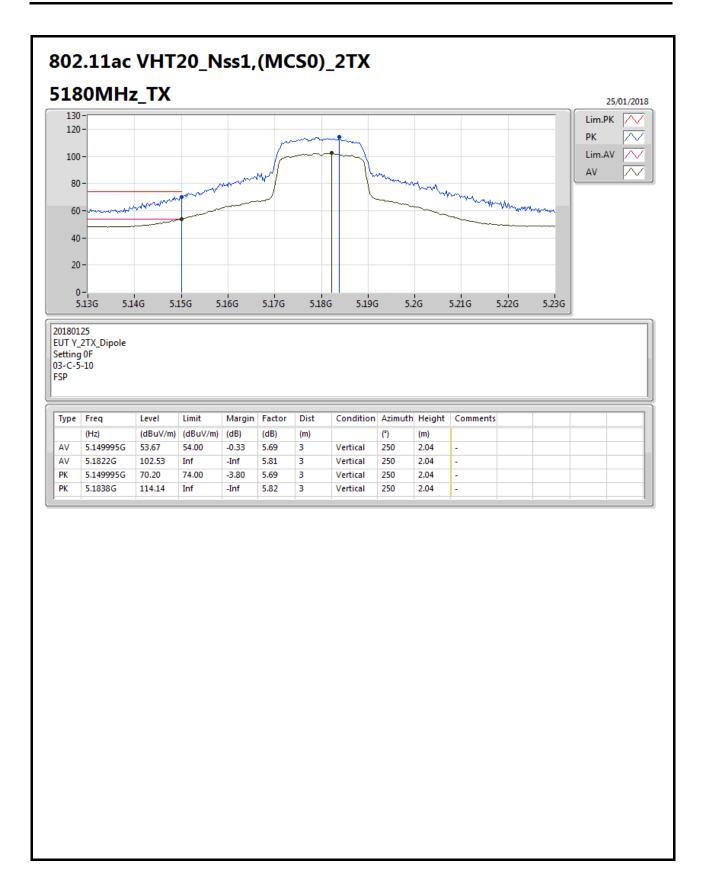
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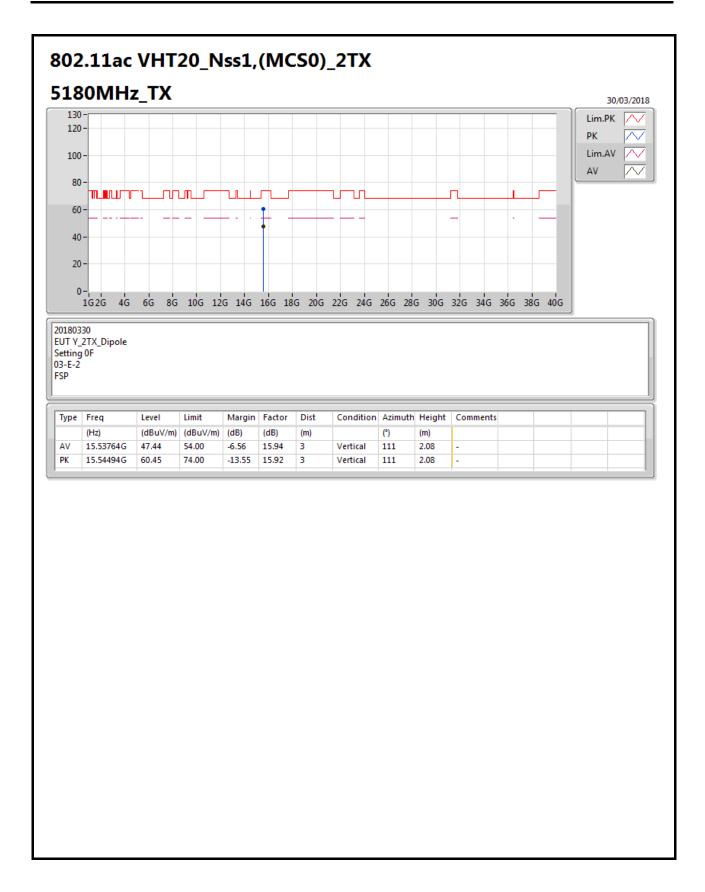
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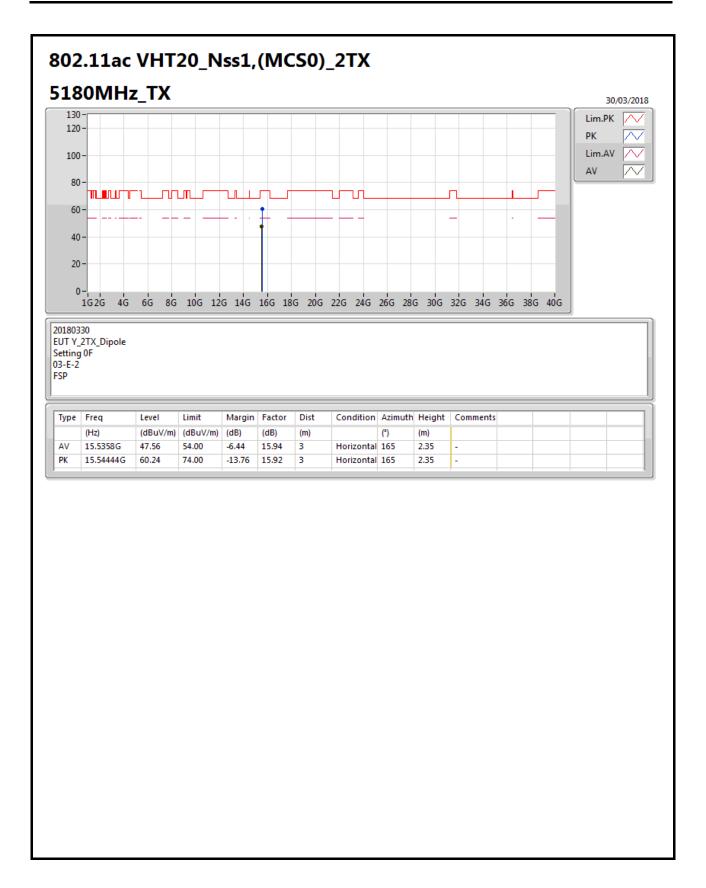
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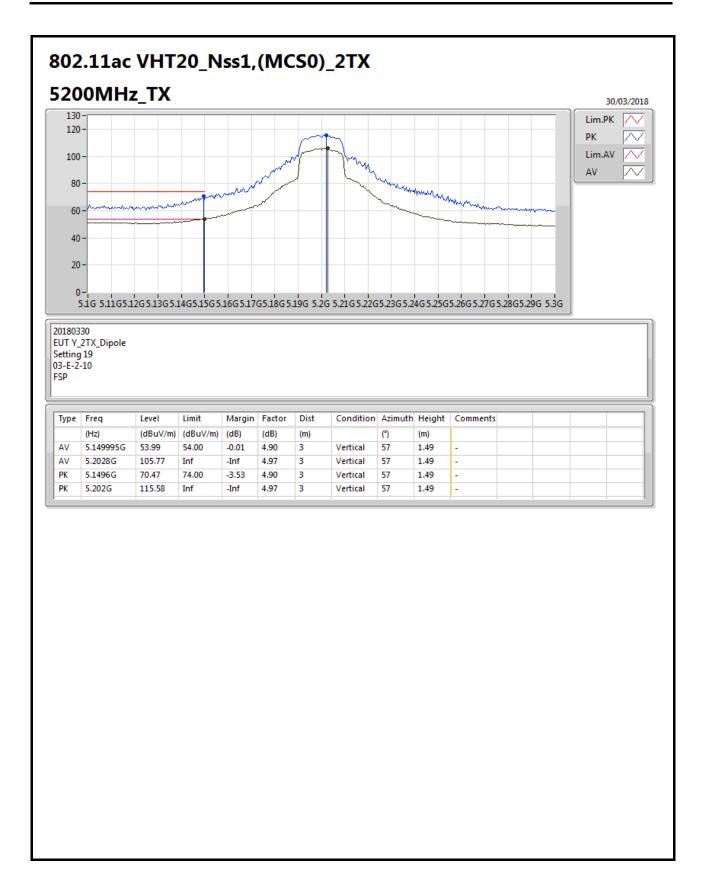
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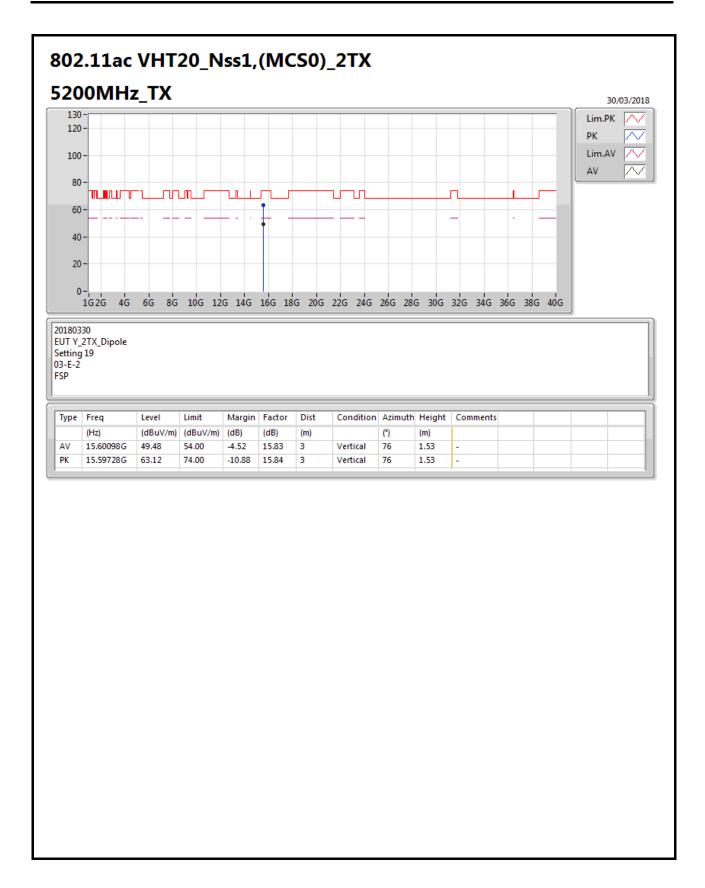
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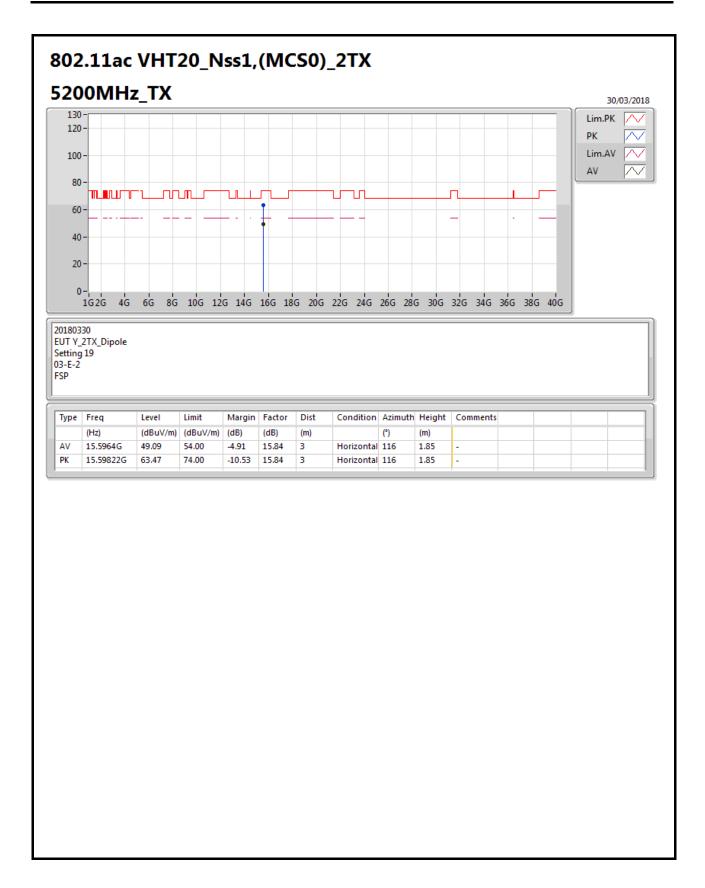
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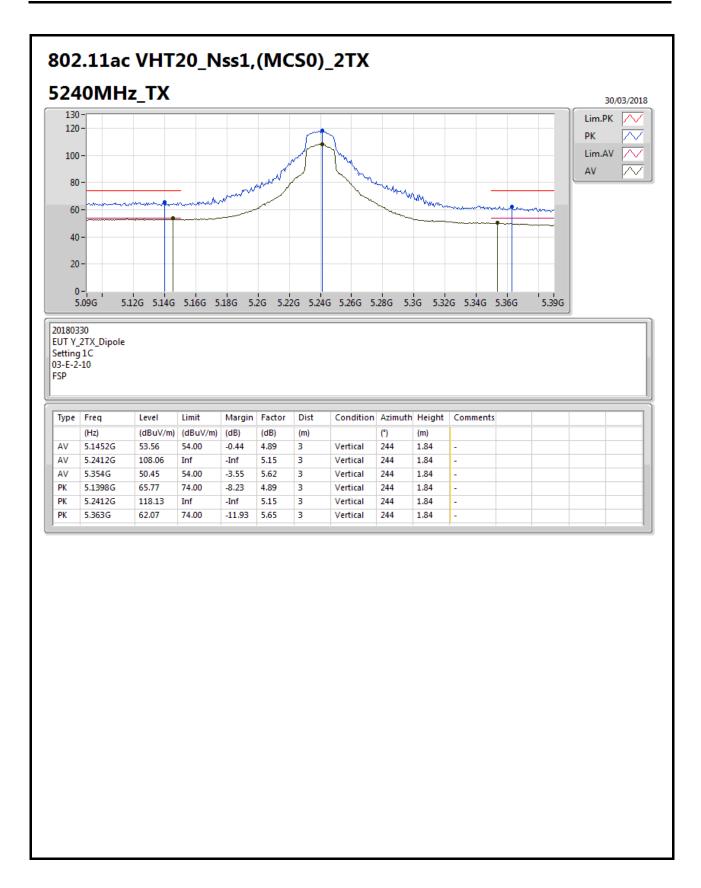
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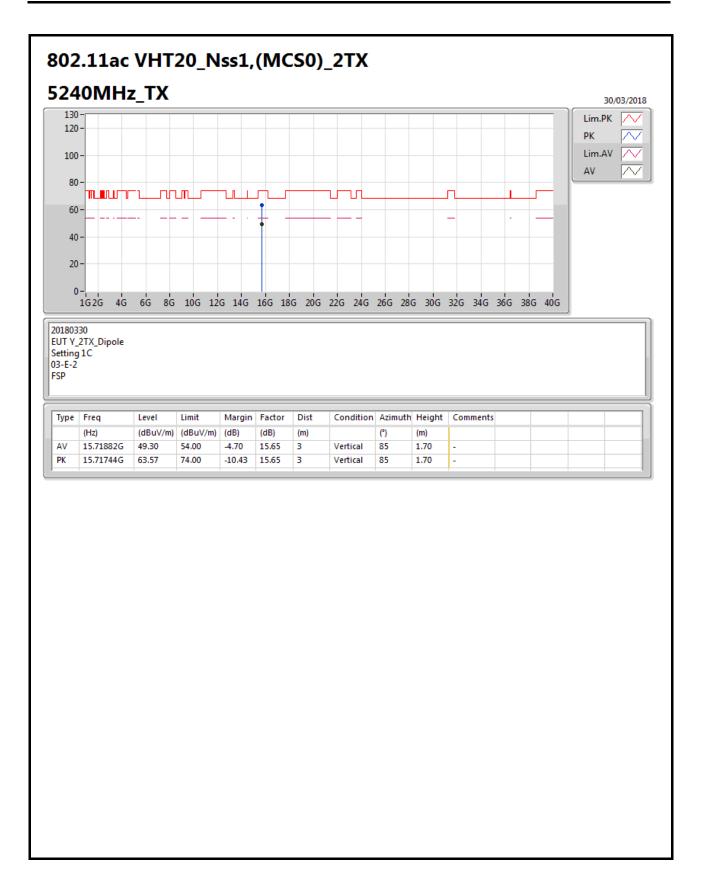
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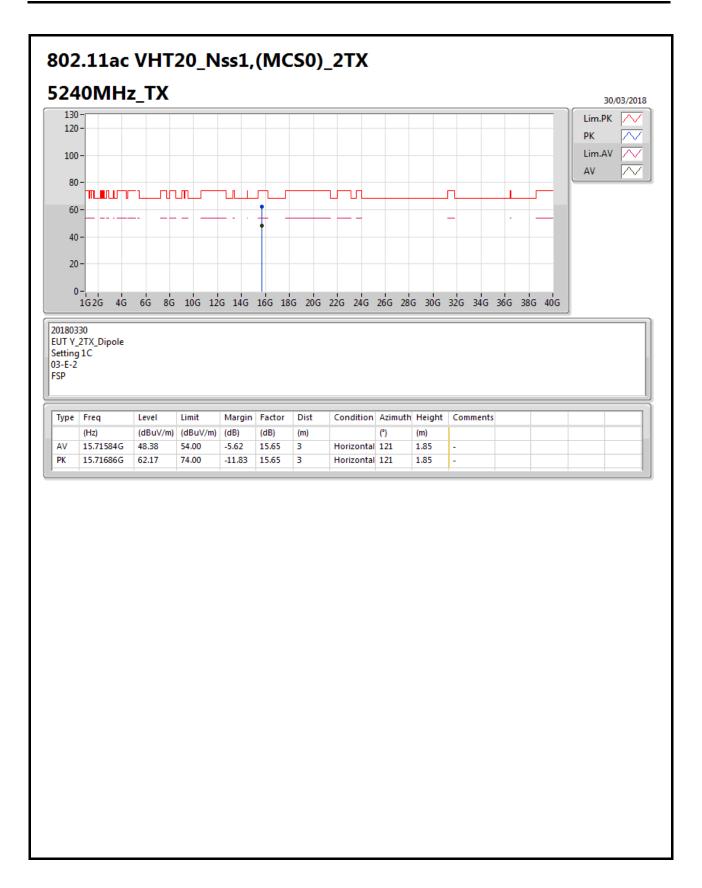
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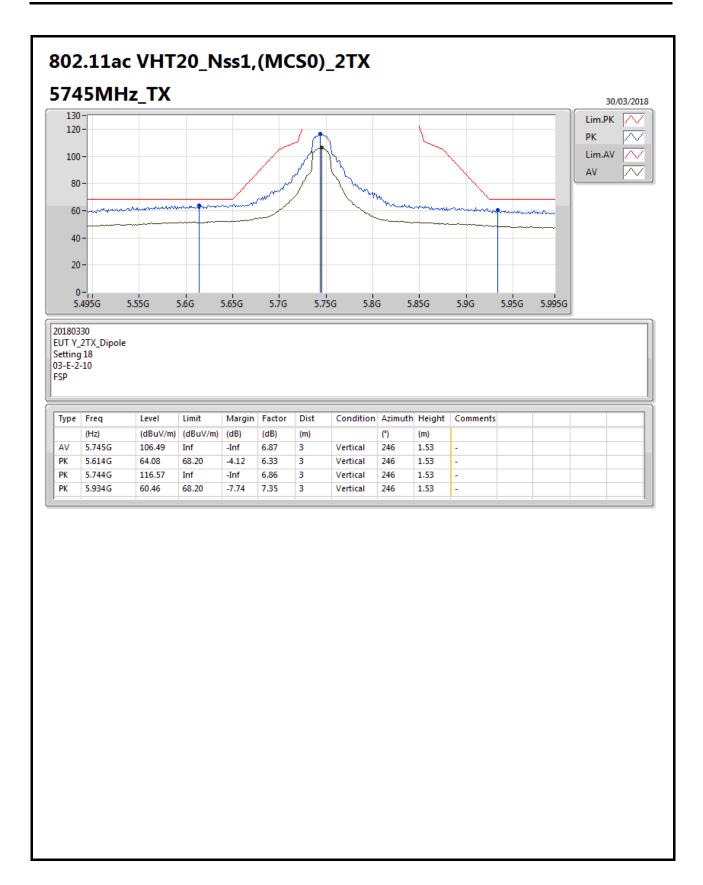
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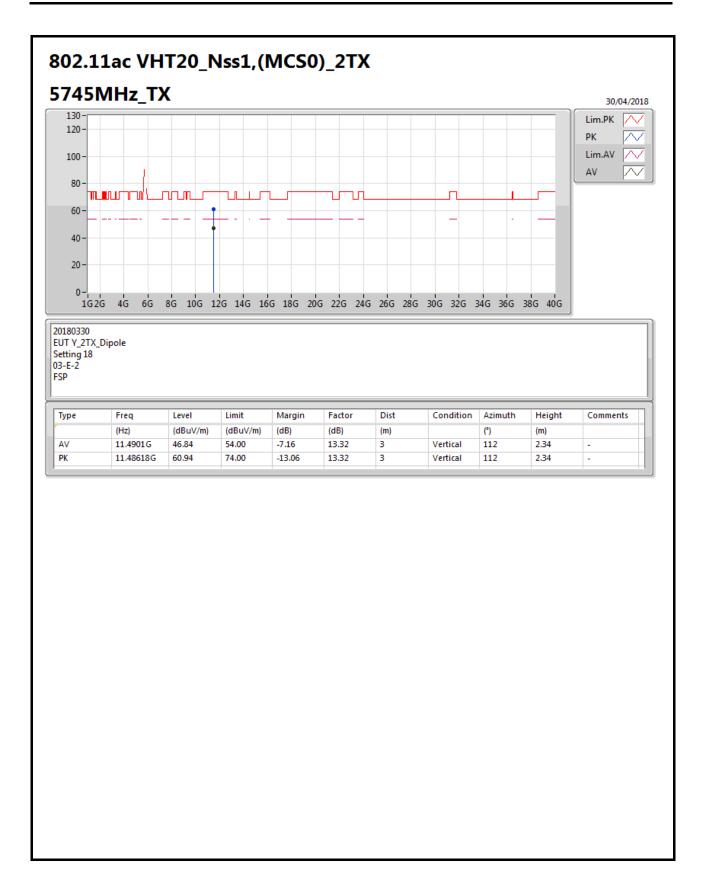
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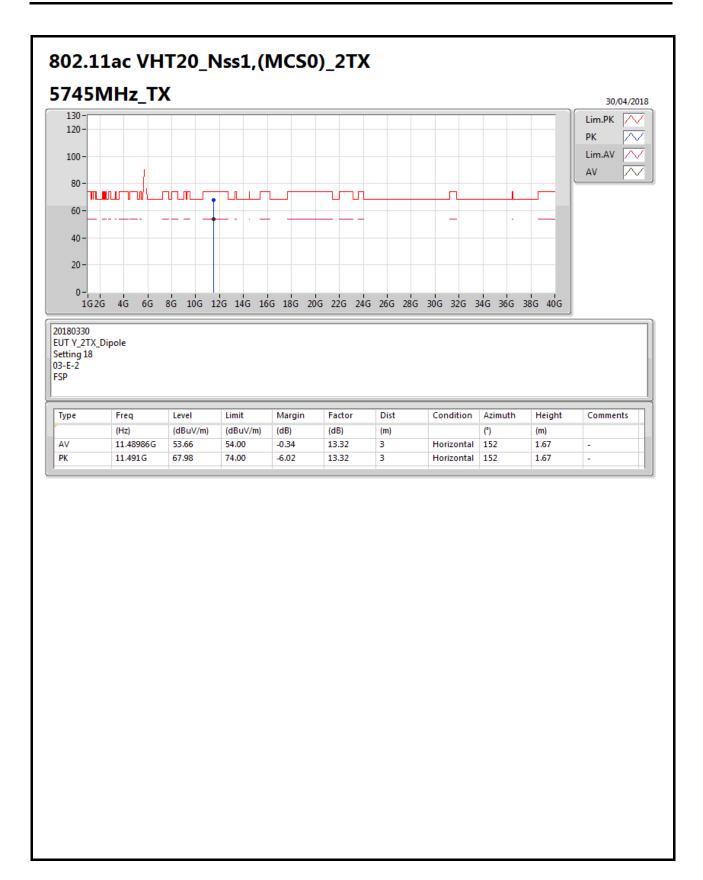
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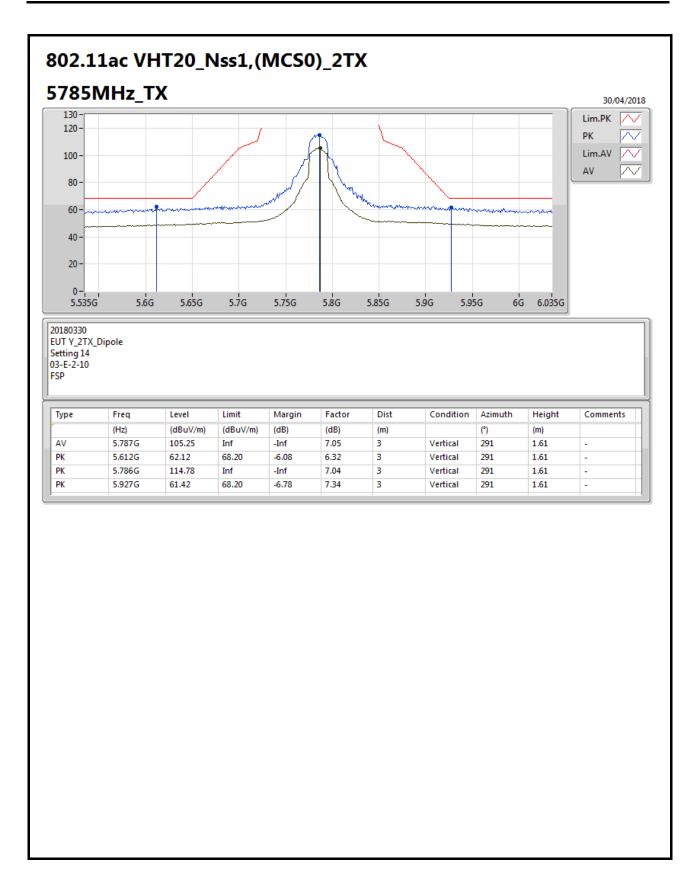
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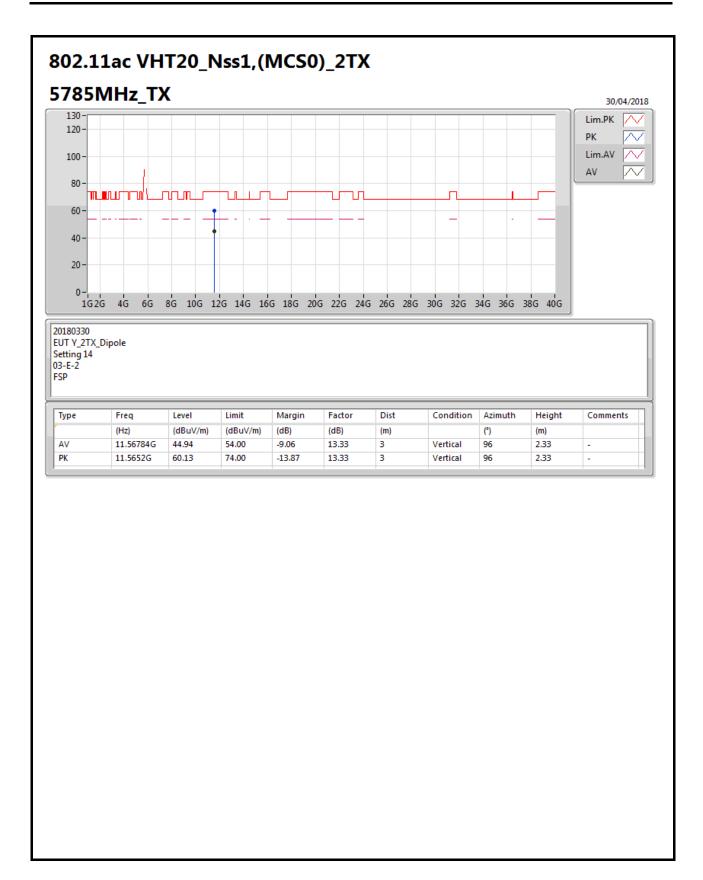
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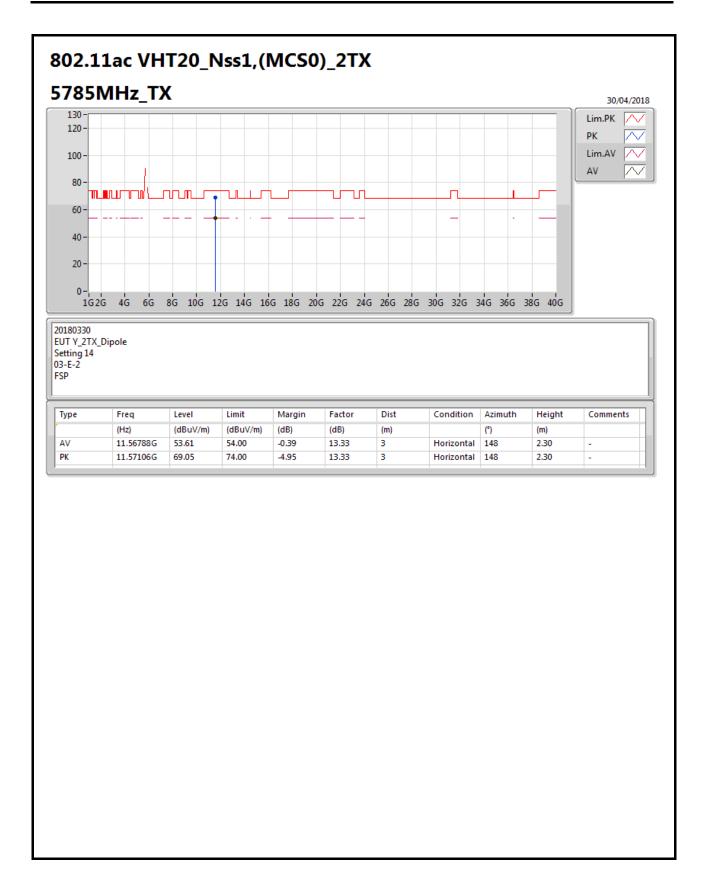
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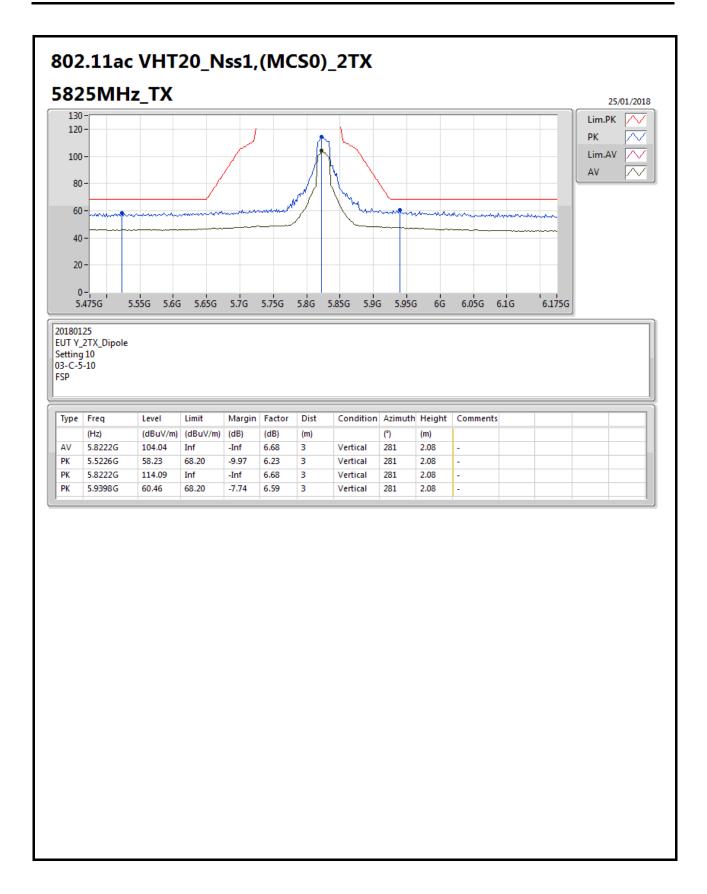
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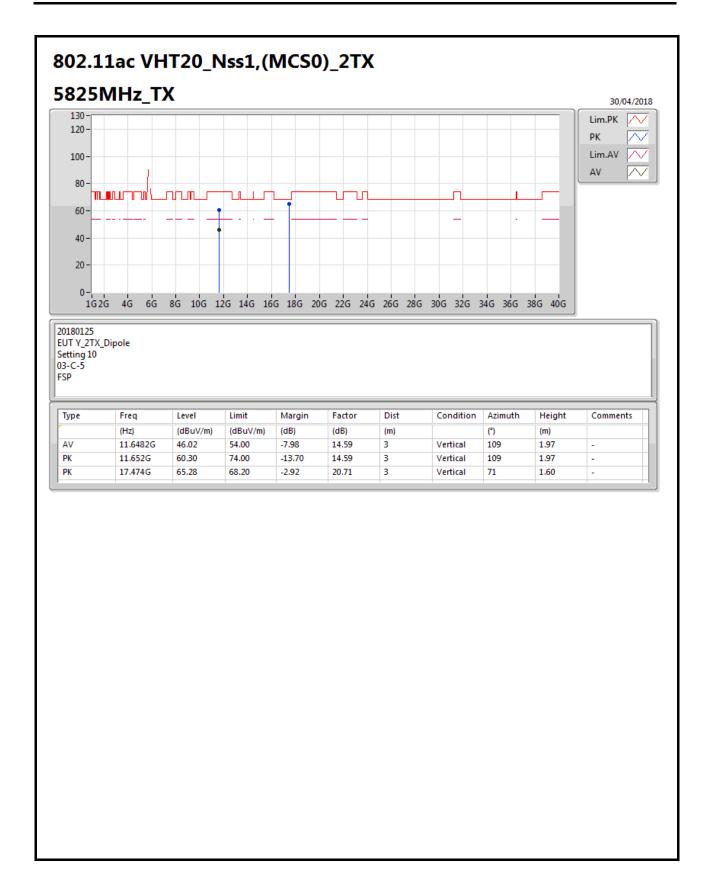
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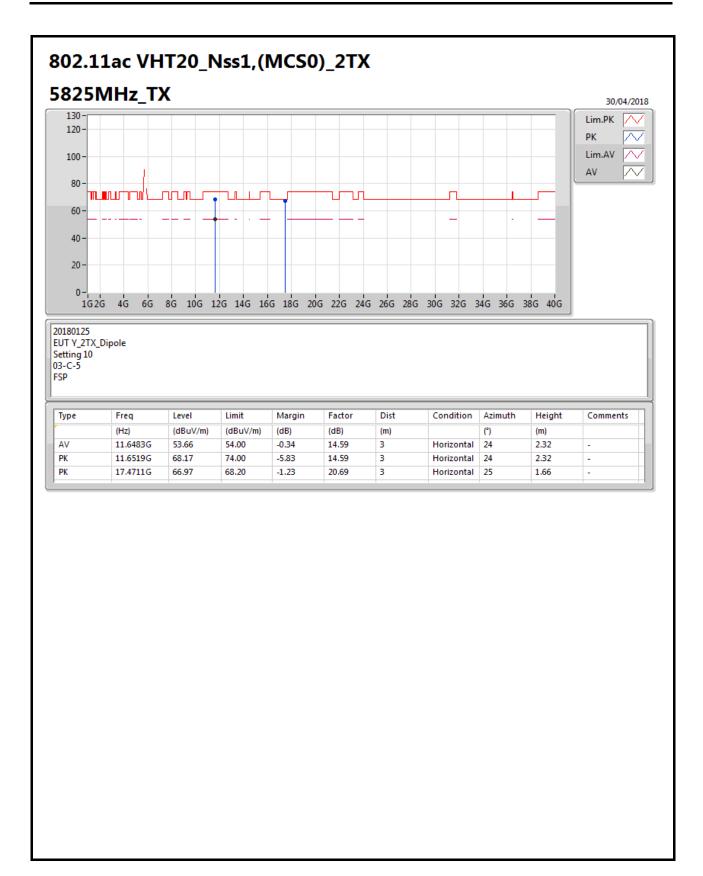
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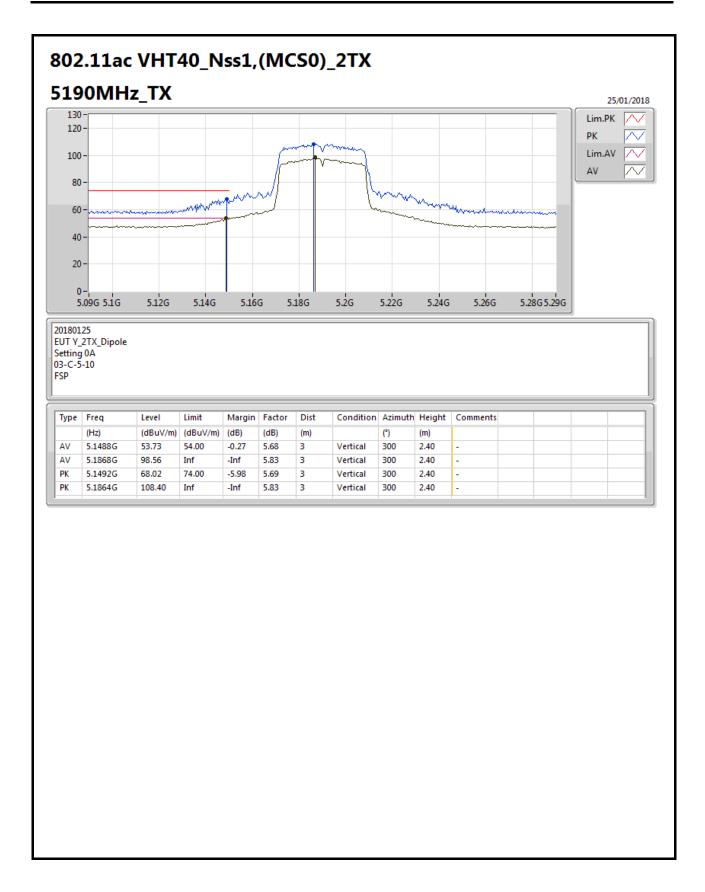
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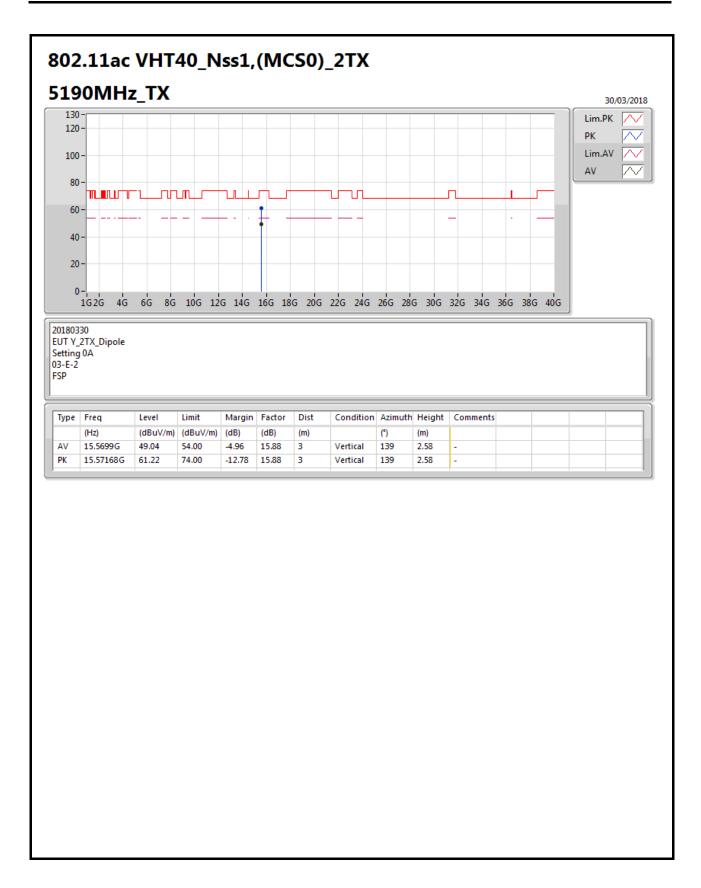
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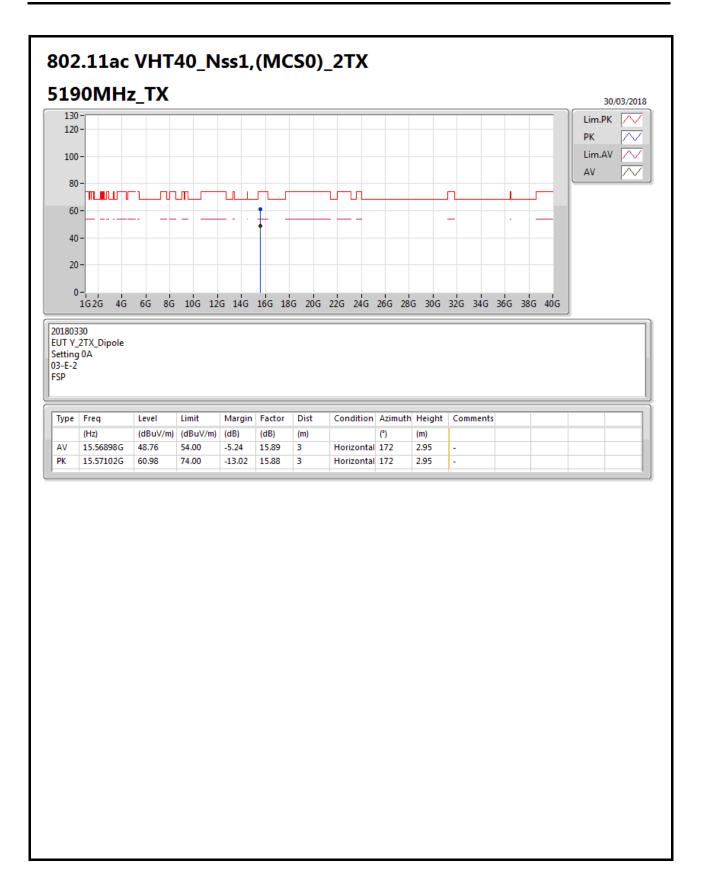
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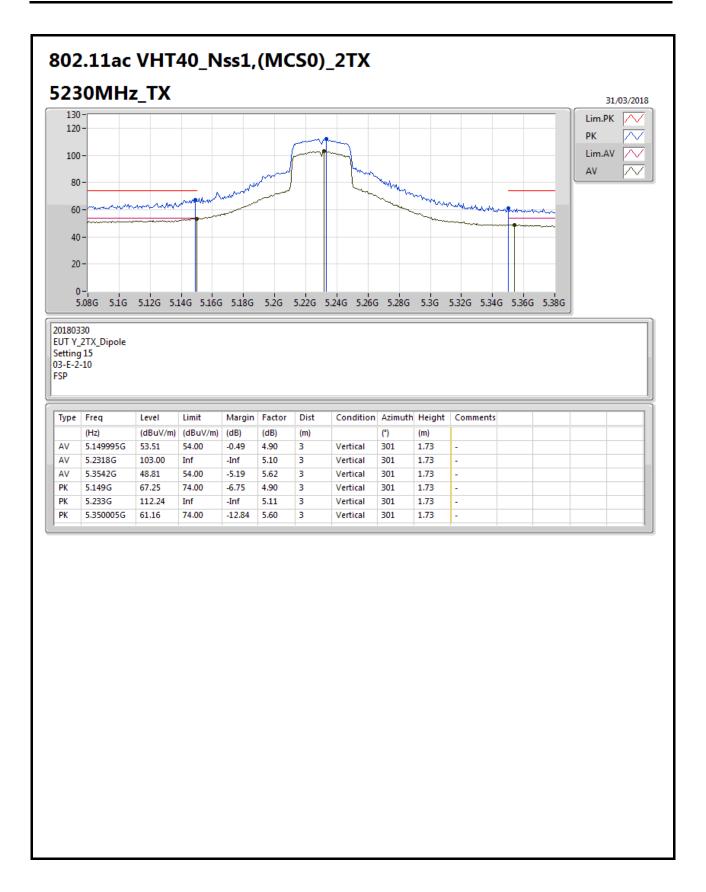
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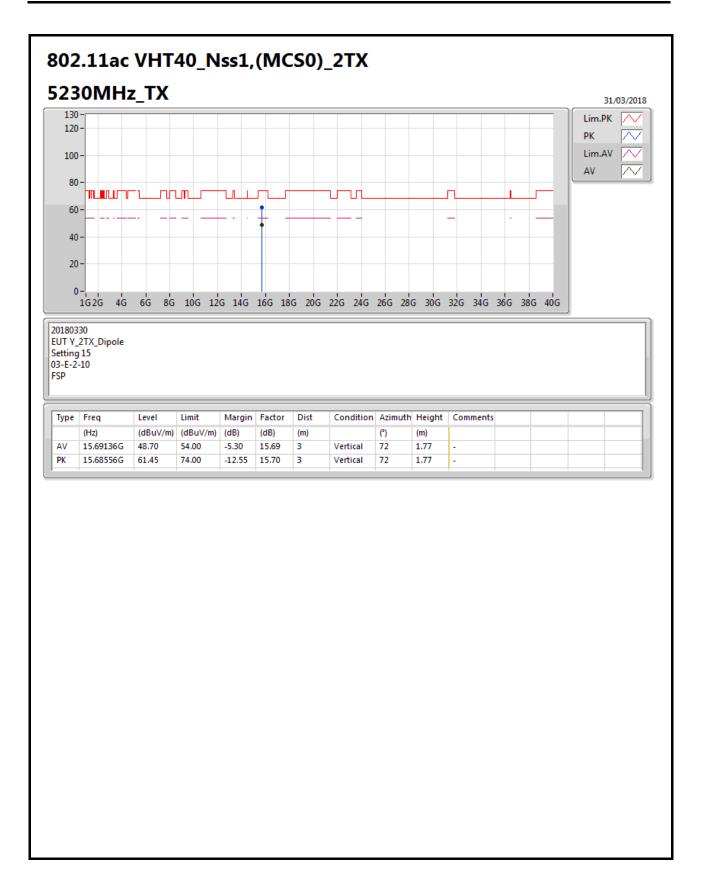
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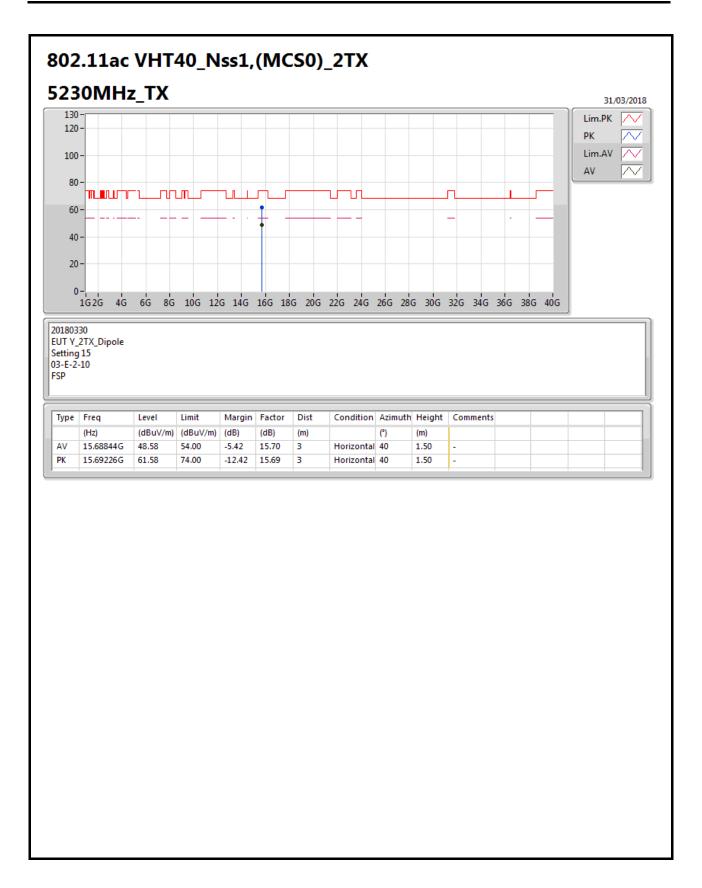
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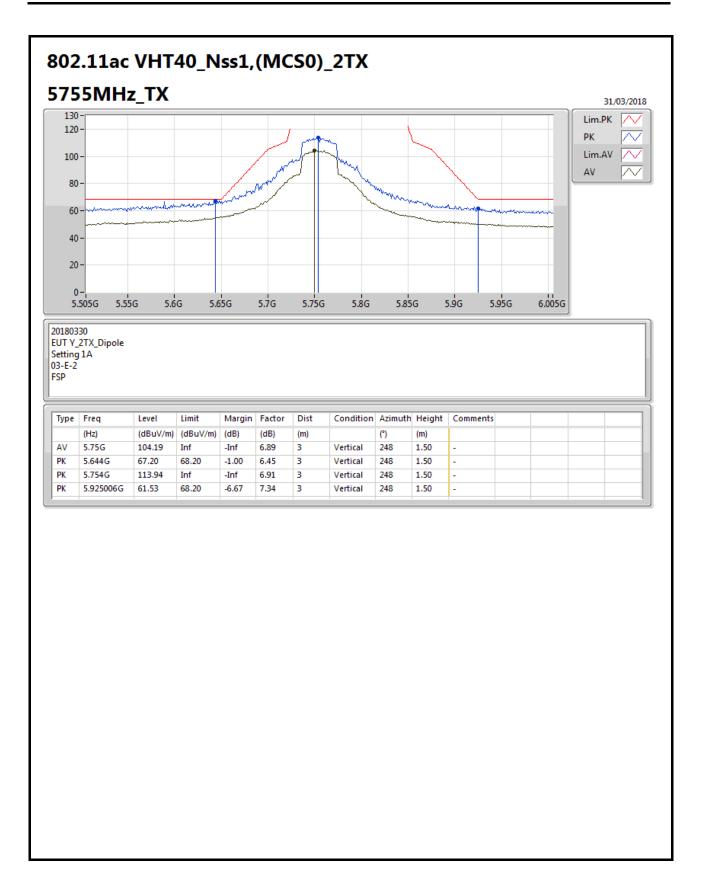
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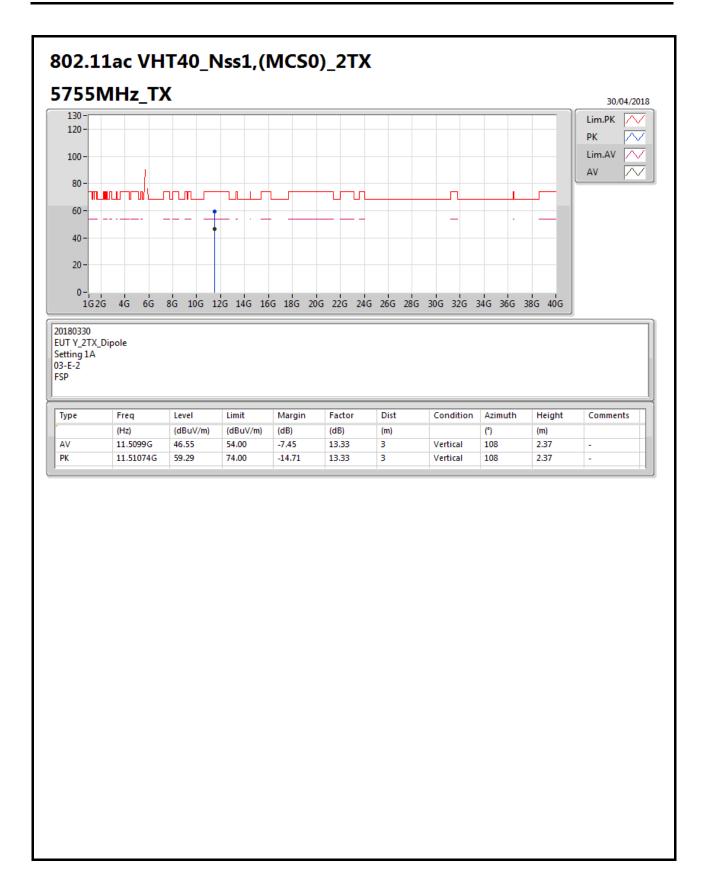
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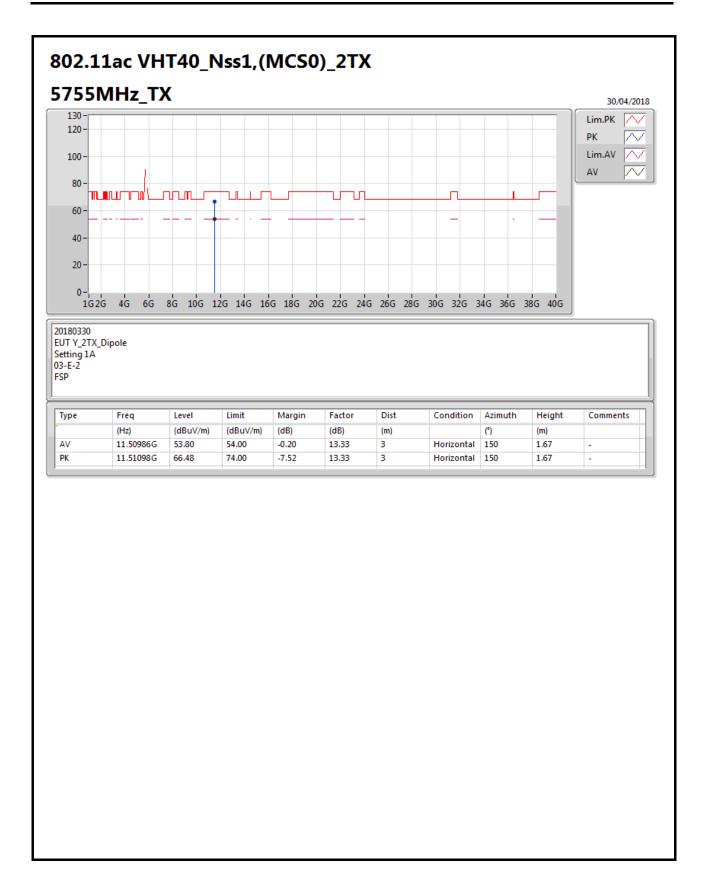
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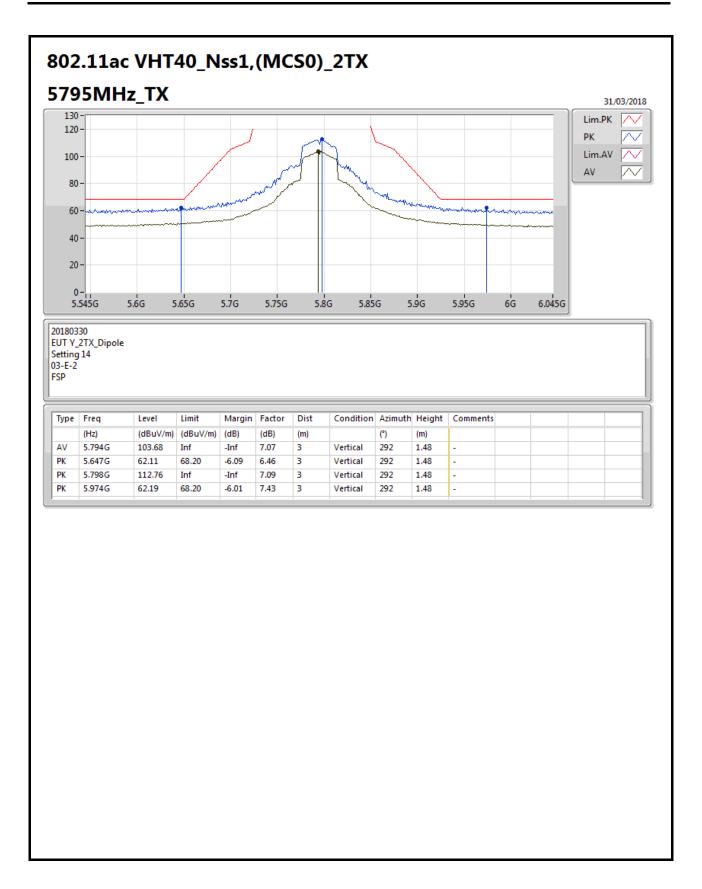
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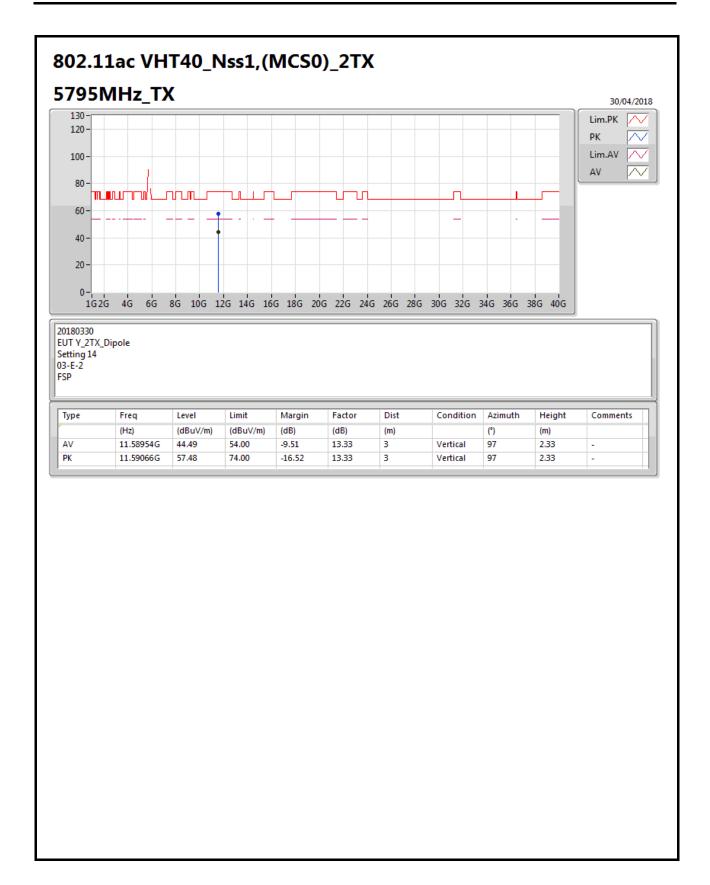
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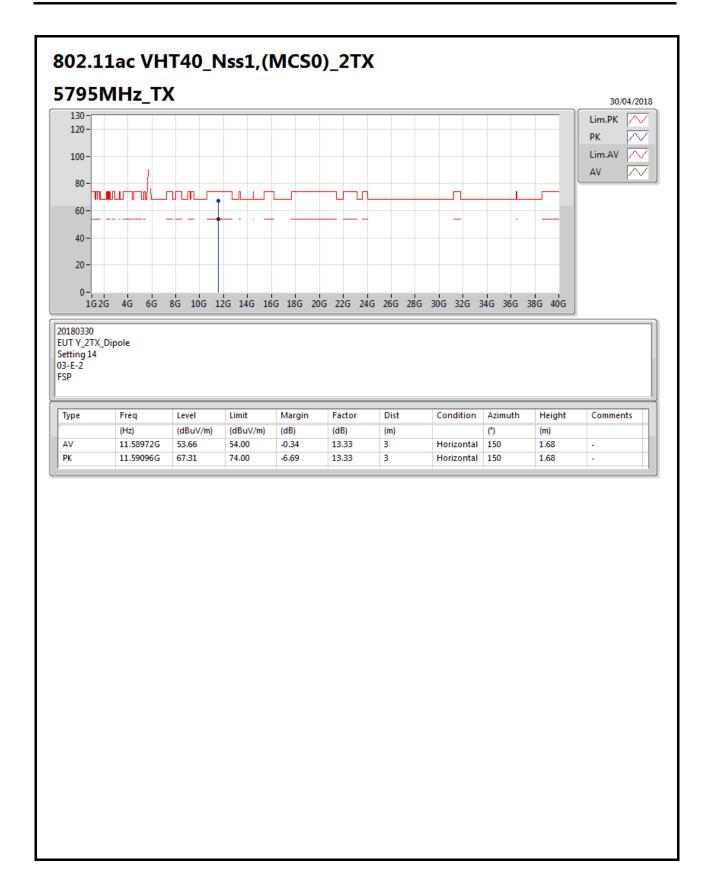
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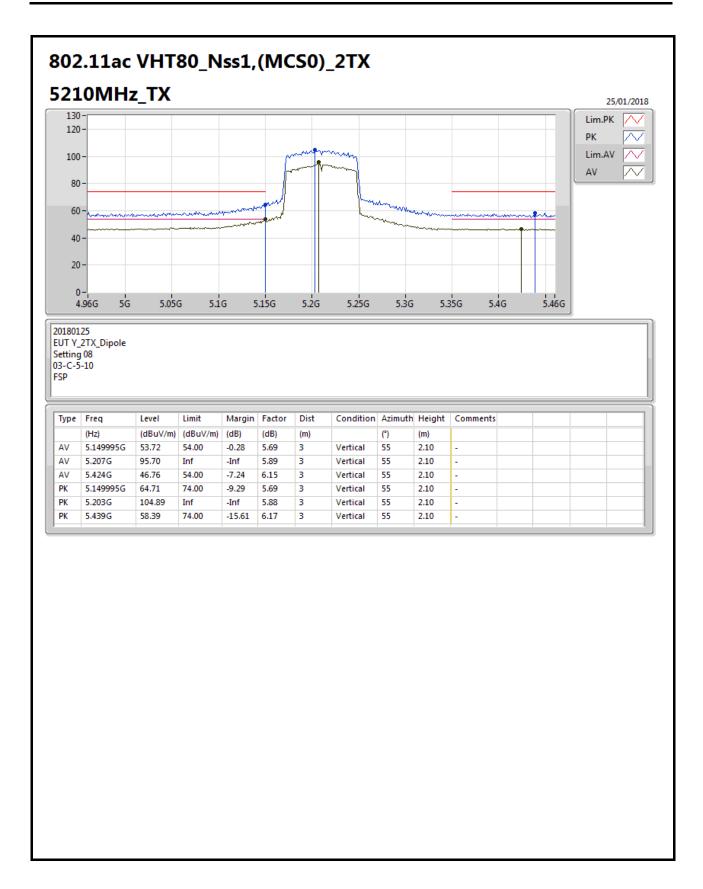
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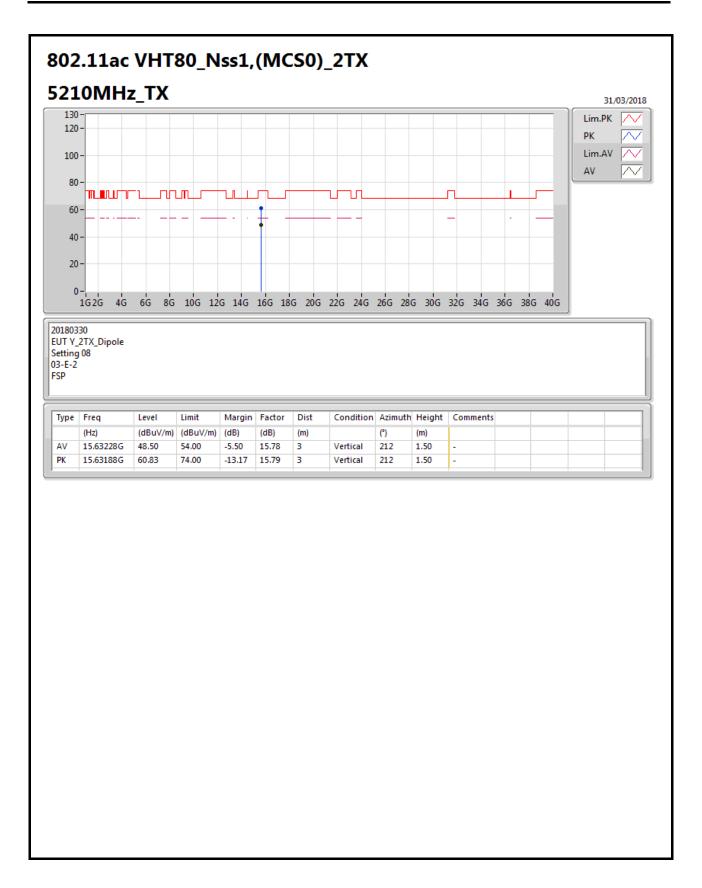
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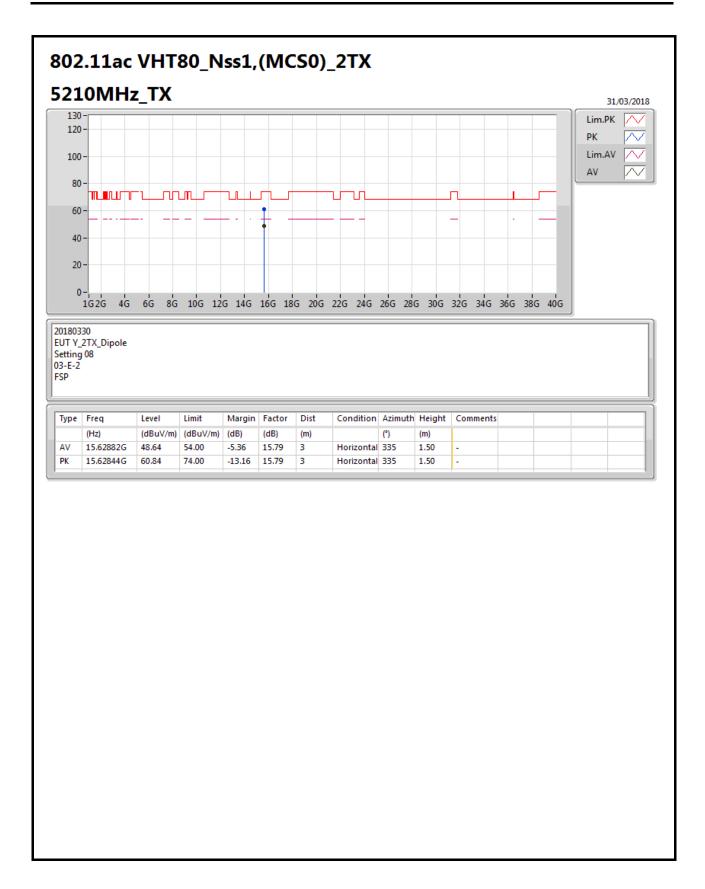
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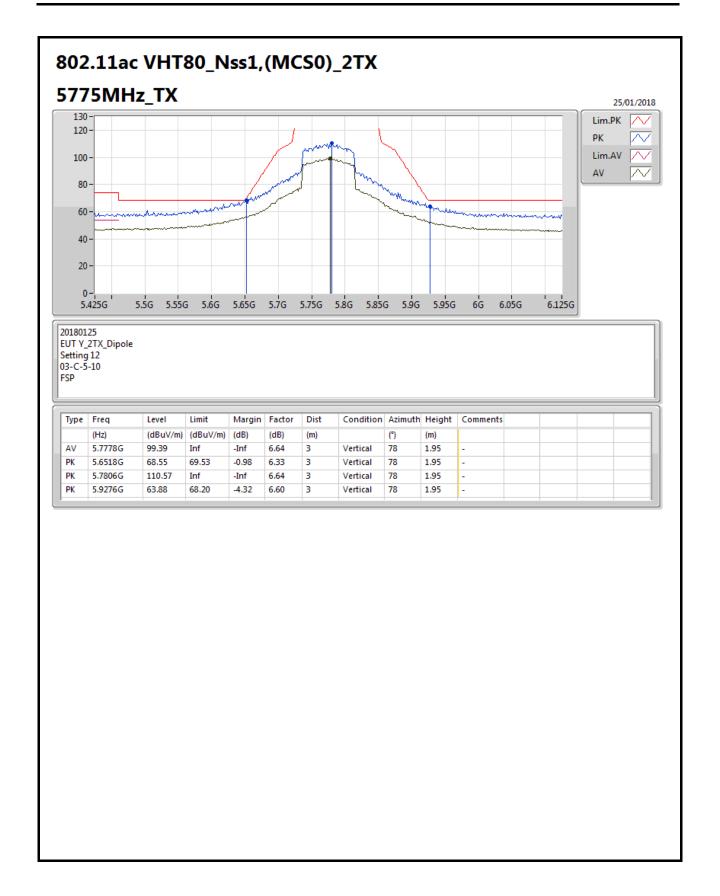
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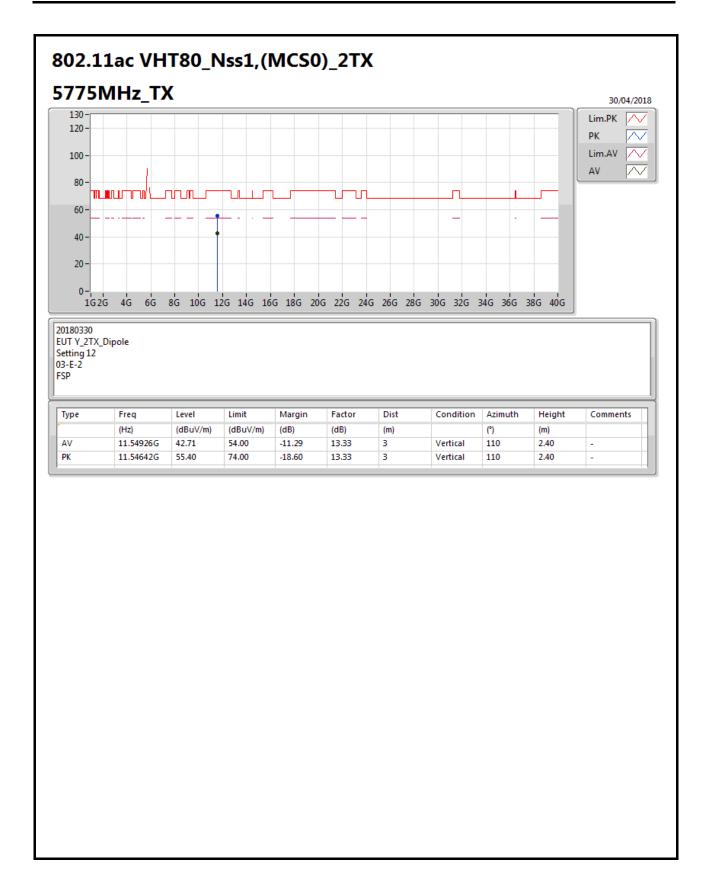
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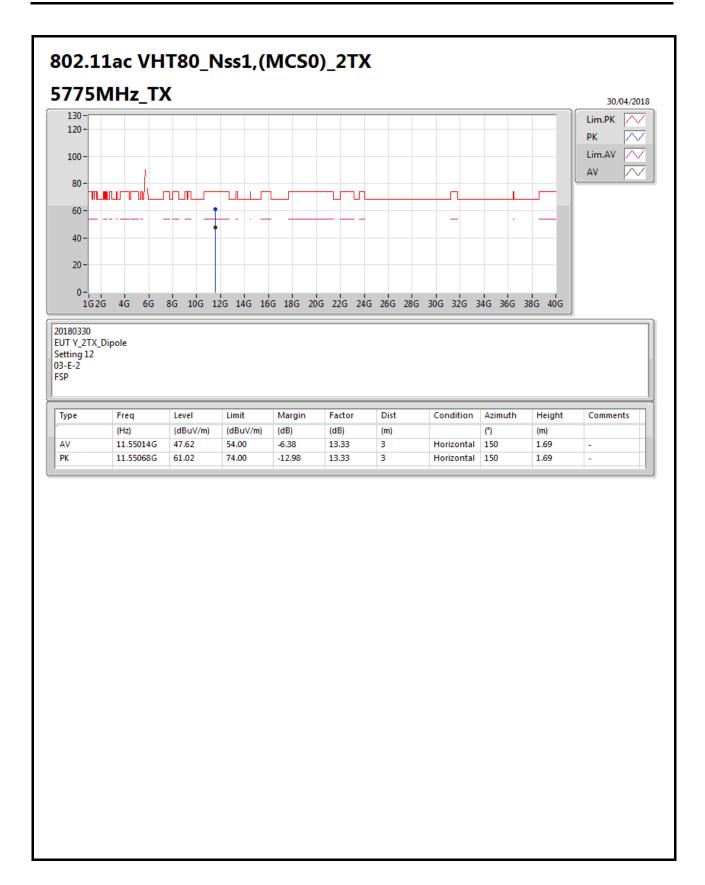
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Appendix E.3

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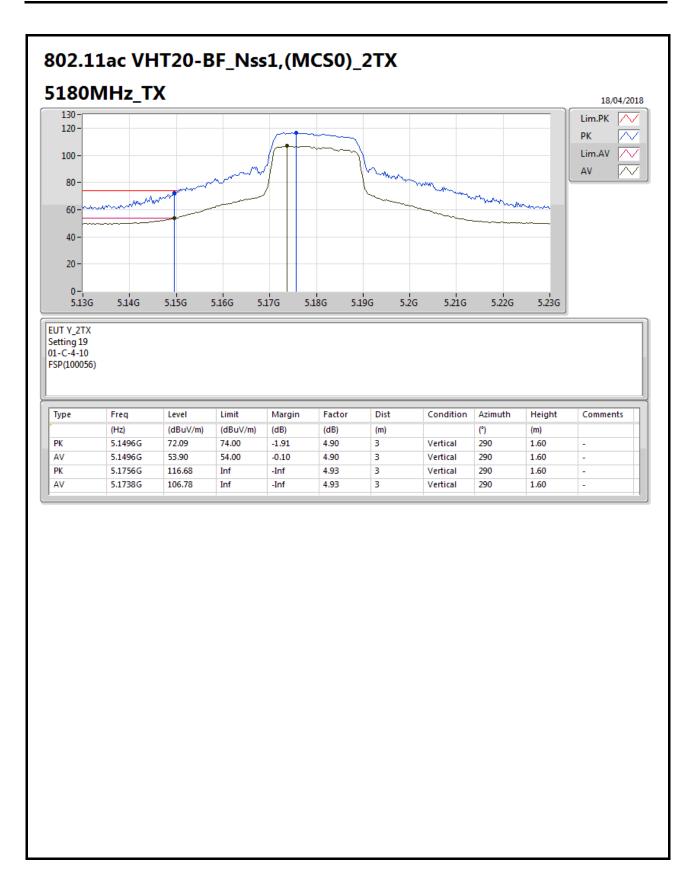
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Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
5.725-5.85GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	Pass	PK	17.3508G	68.18	68.20	-0.02	20.40	3	Horizontal	43	1.78	-

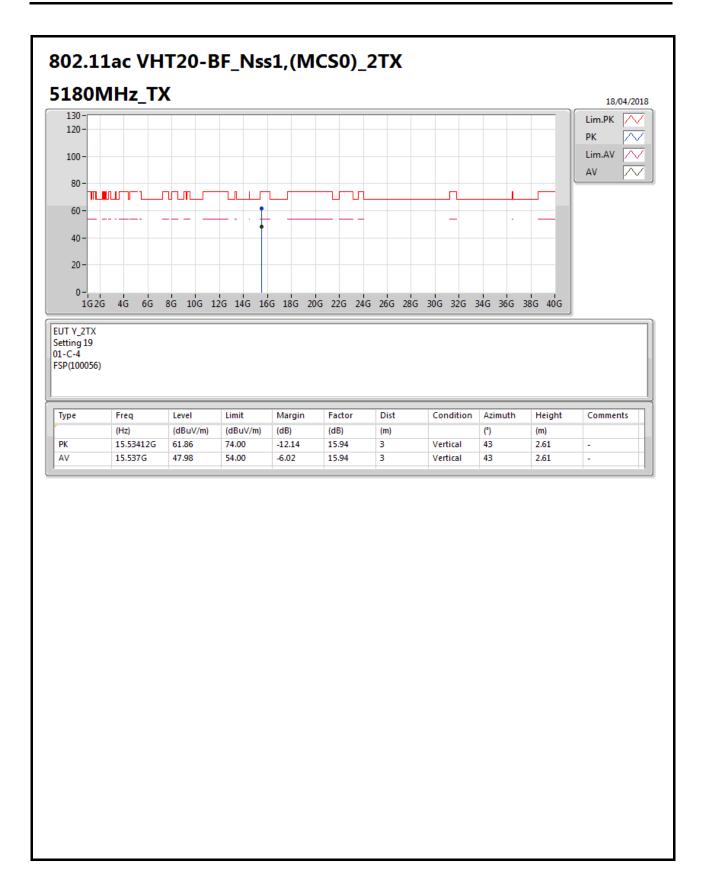
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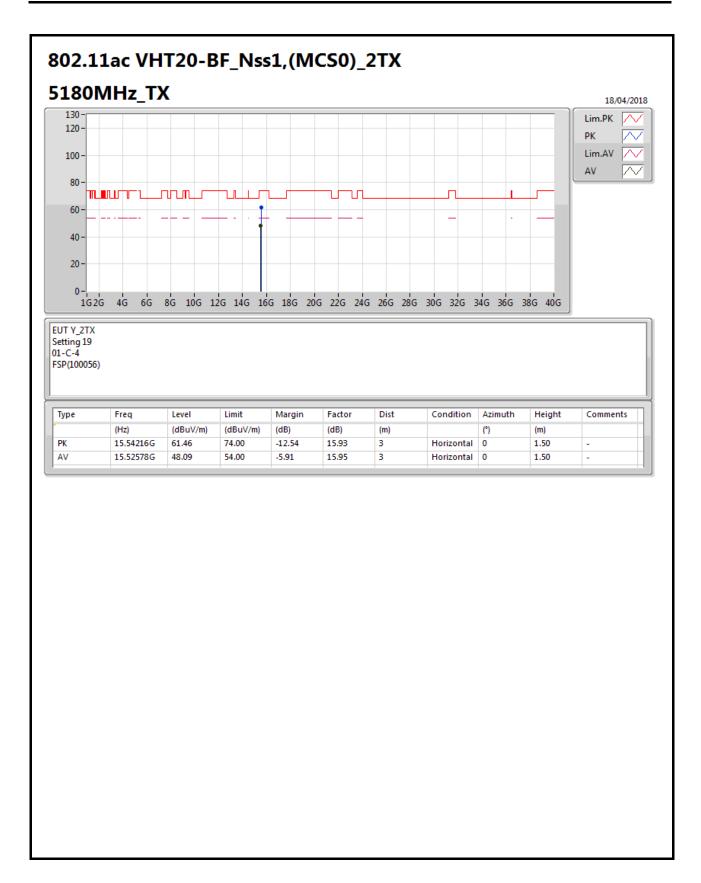
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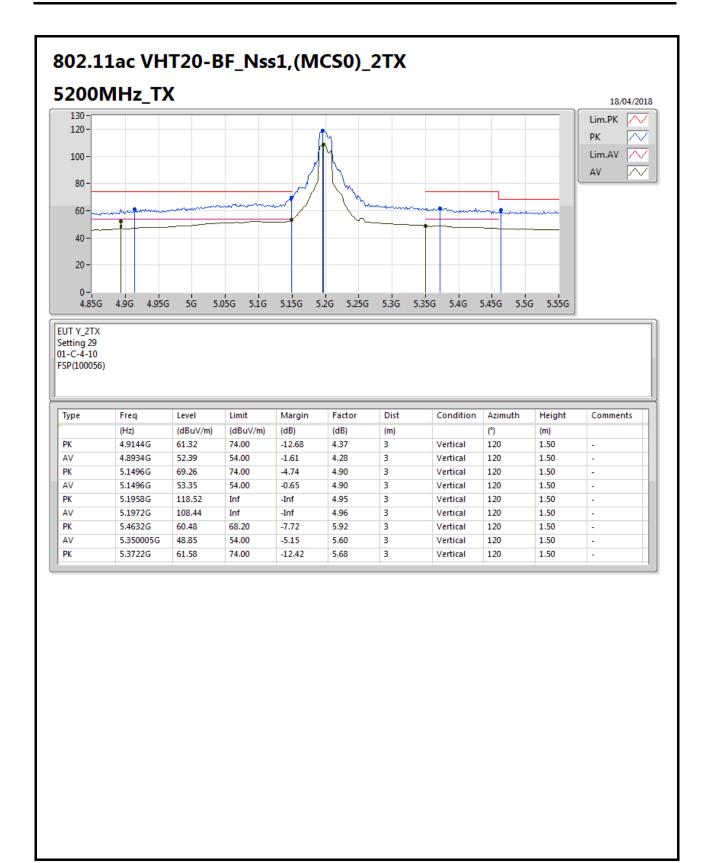
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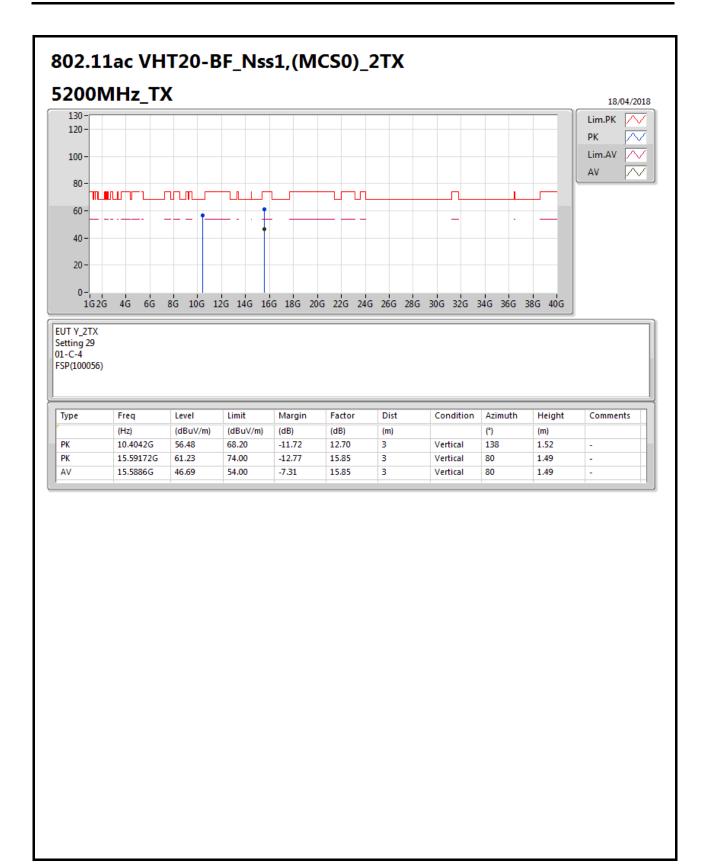
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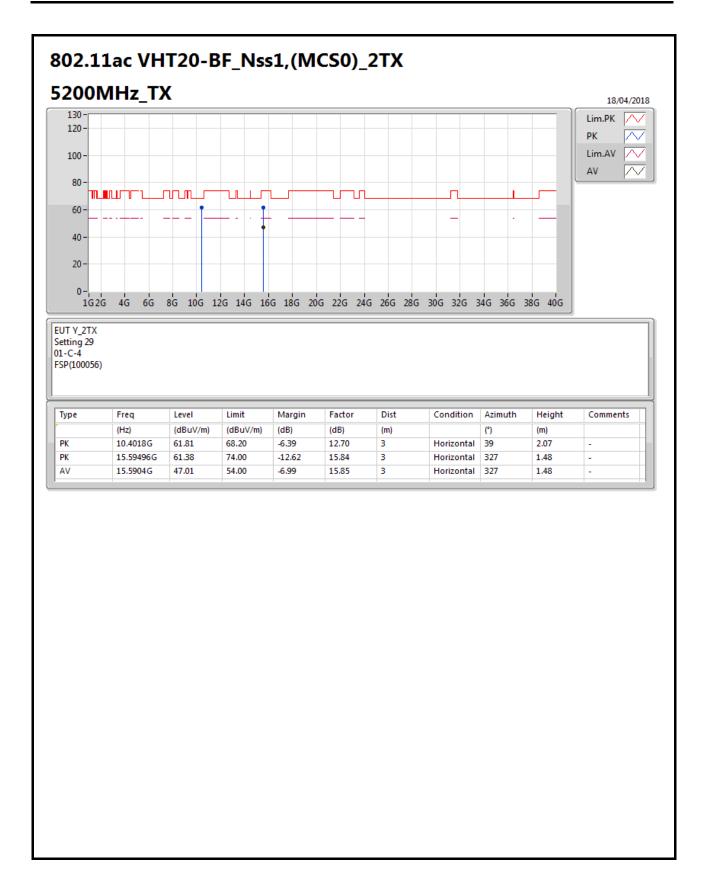
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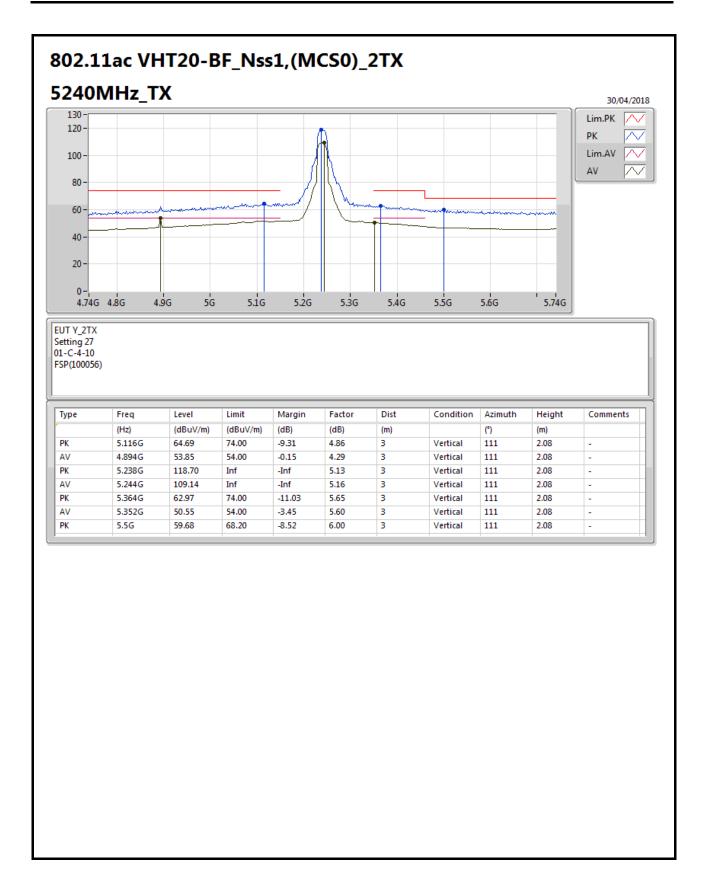
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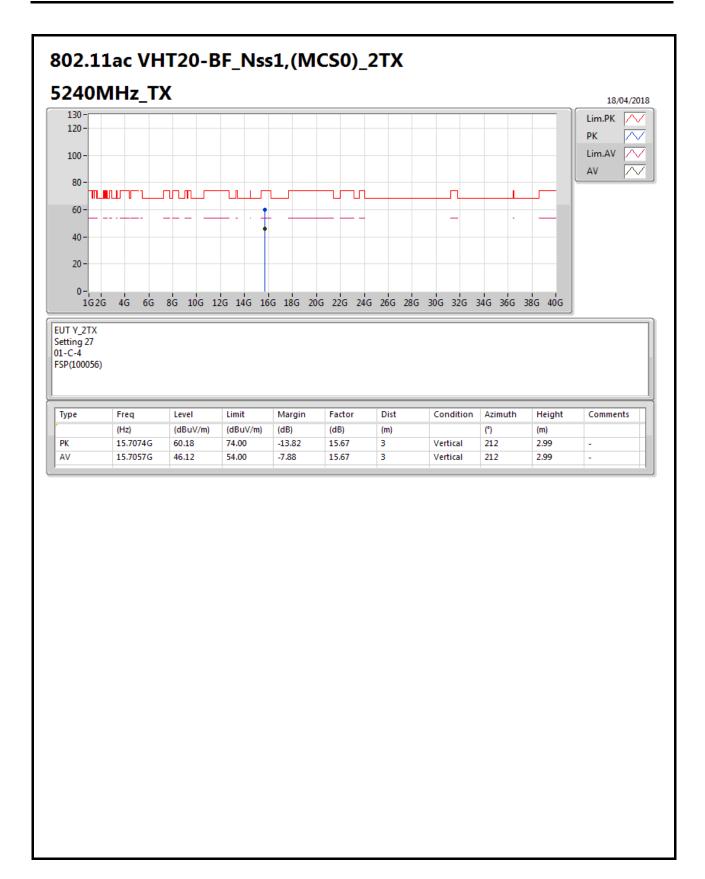
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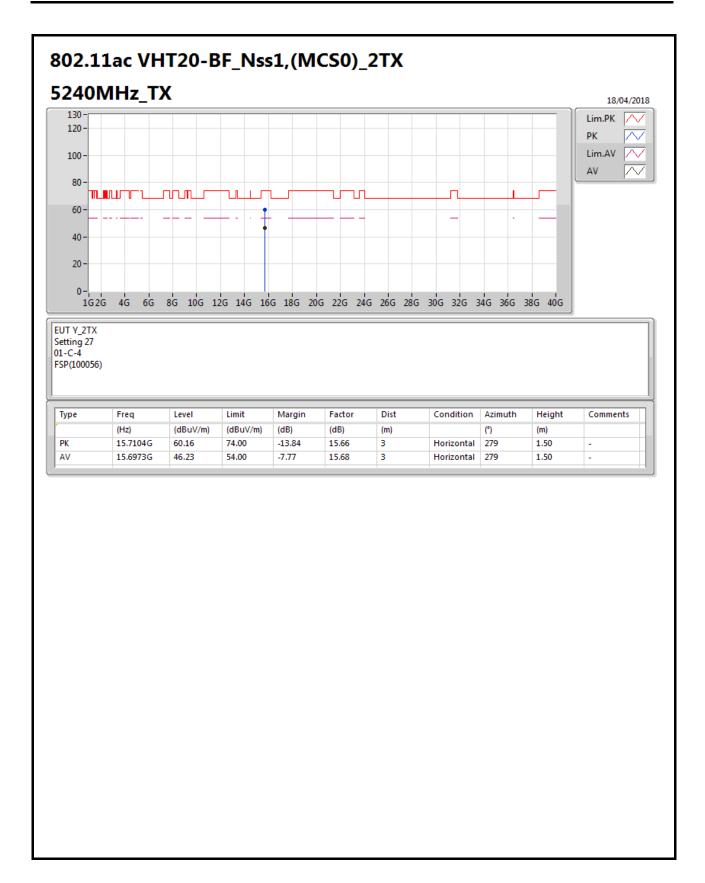
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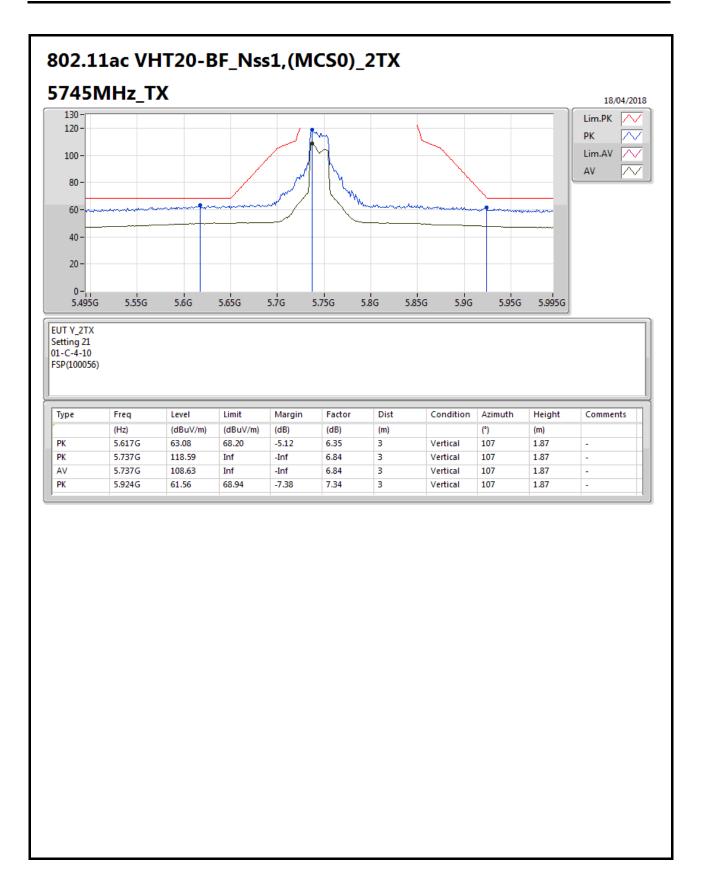
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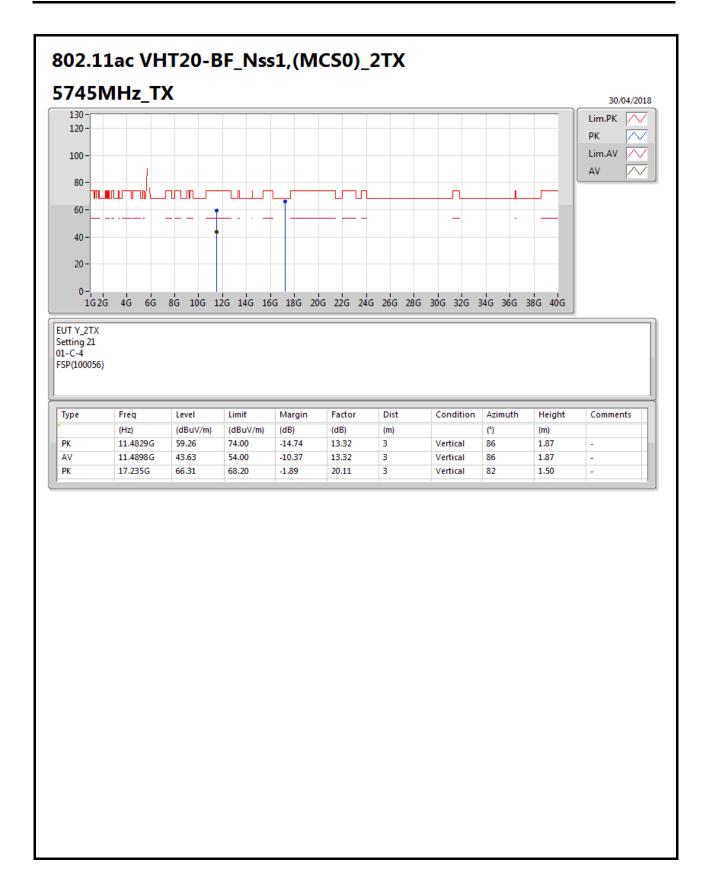
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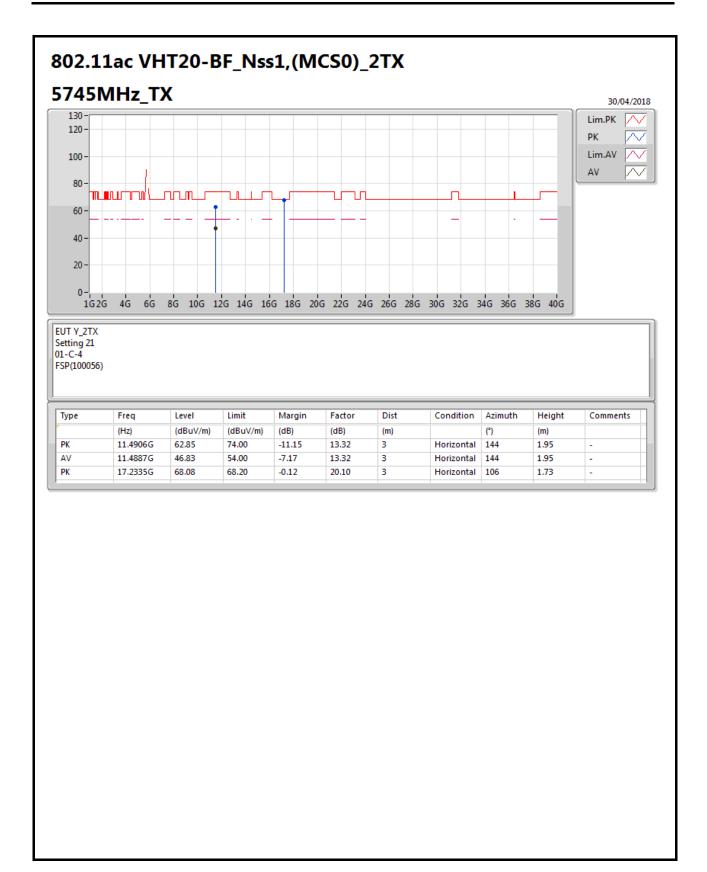
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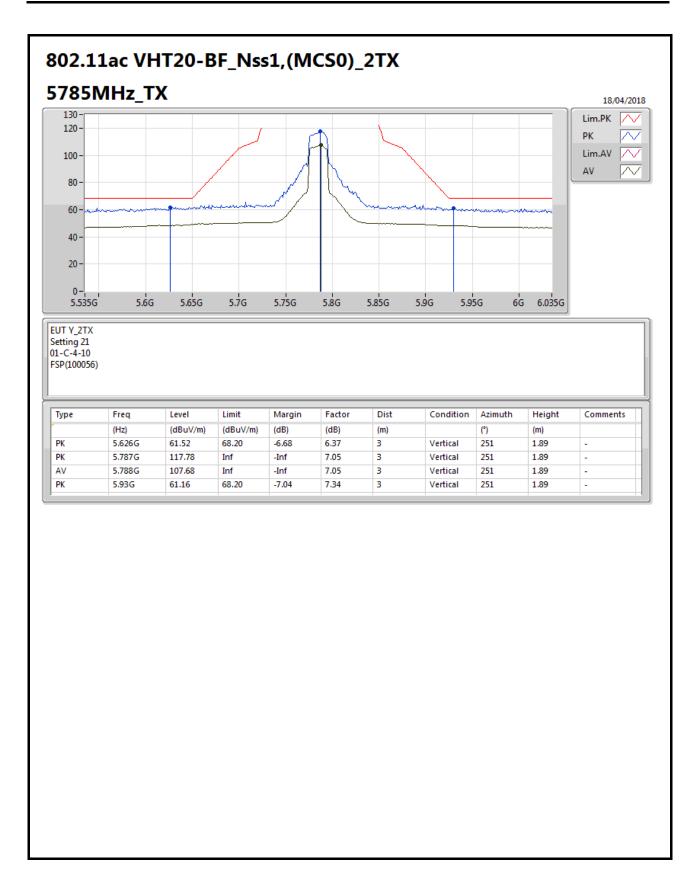
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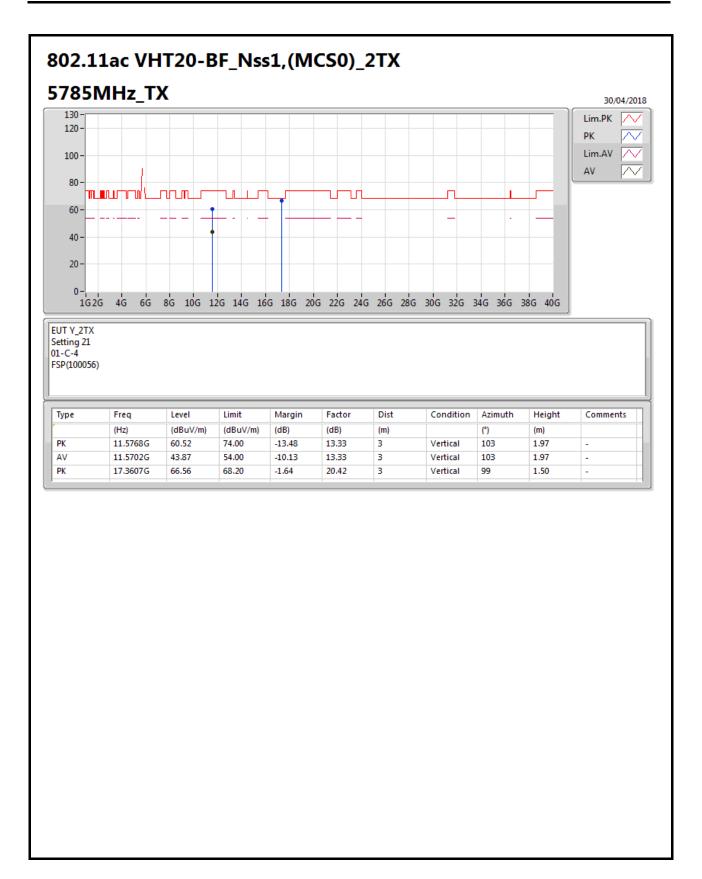
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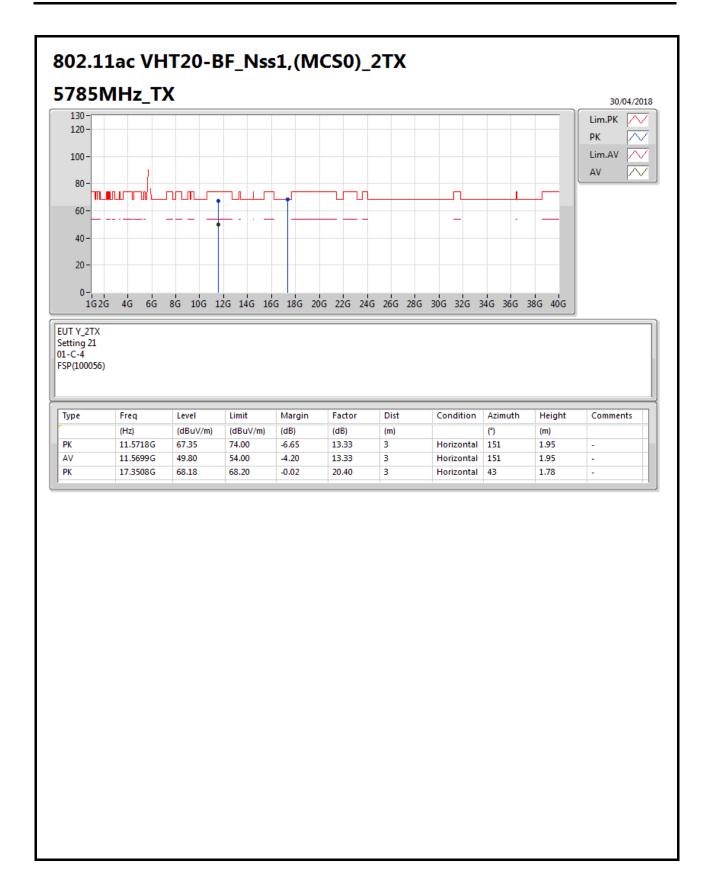
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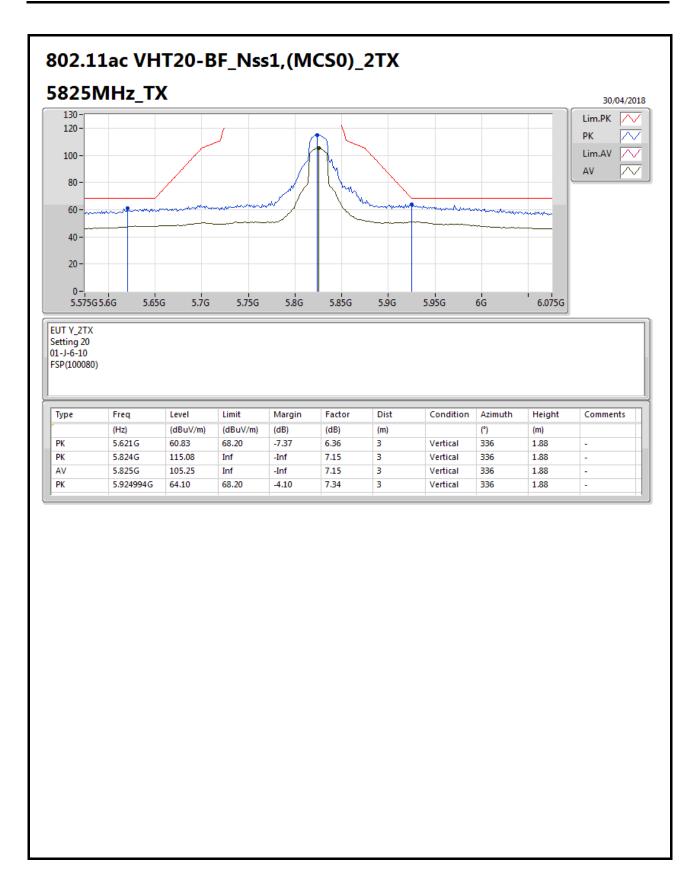
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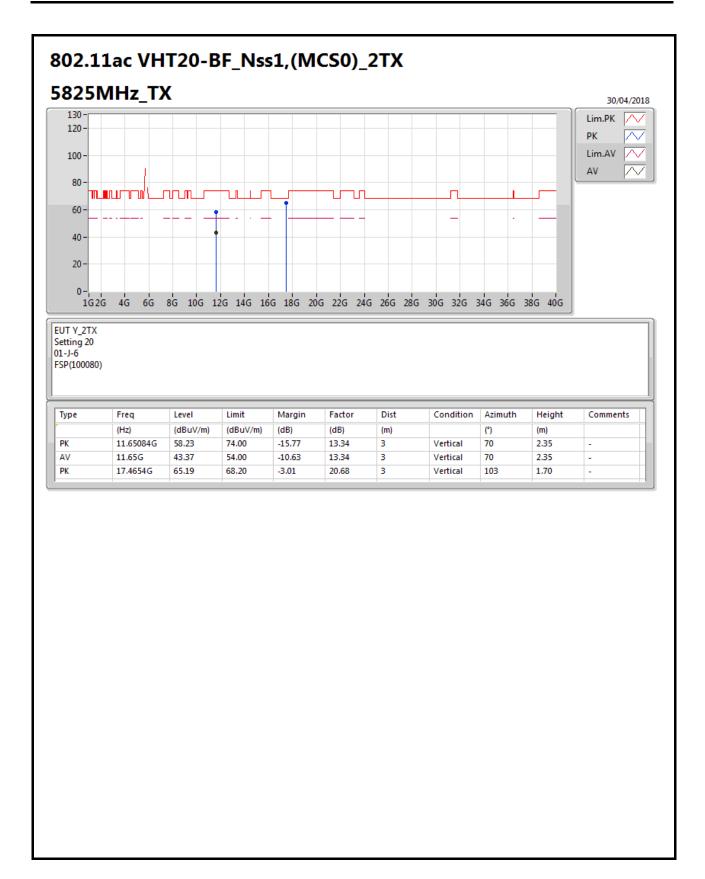
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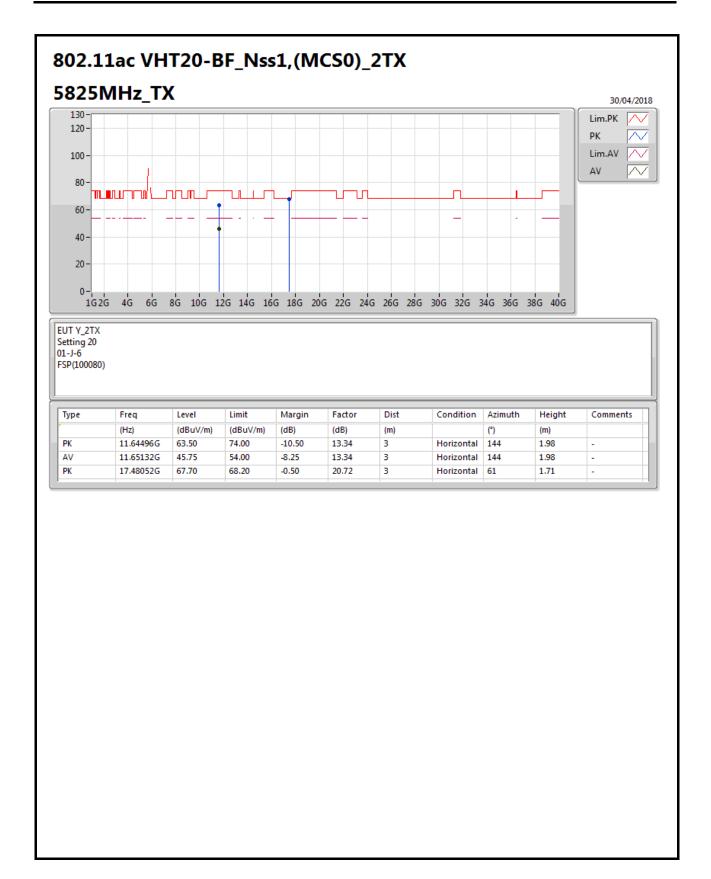
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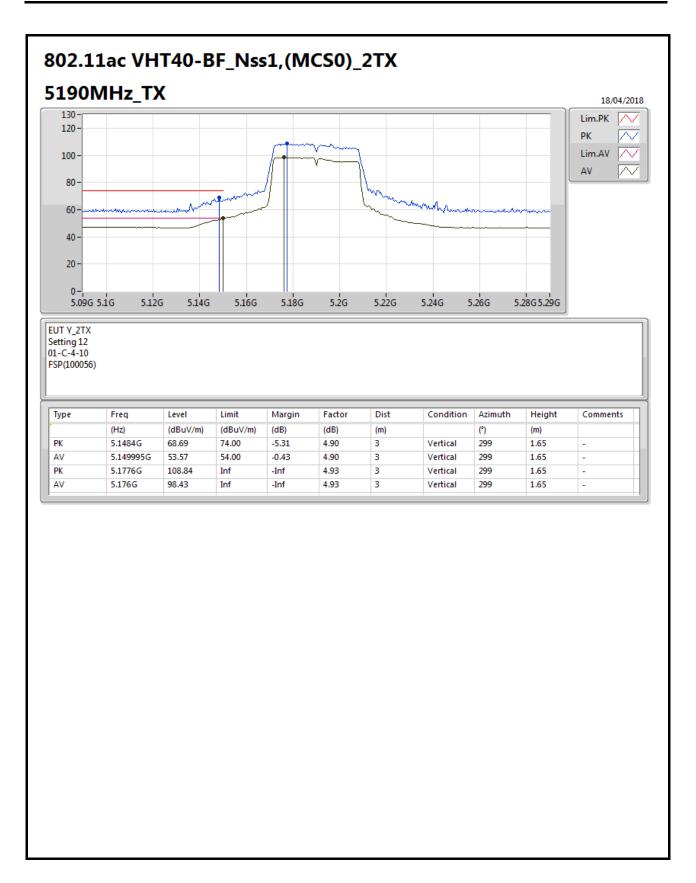
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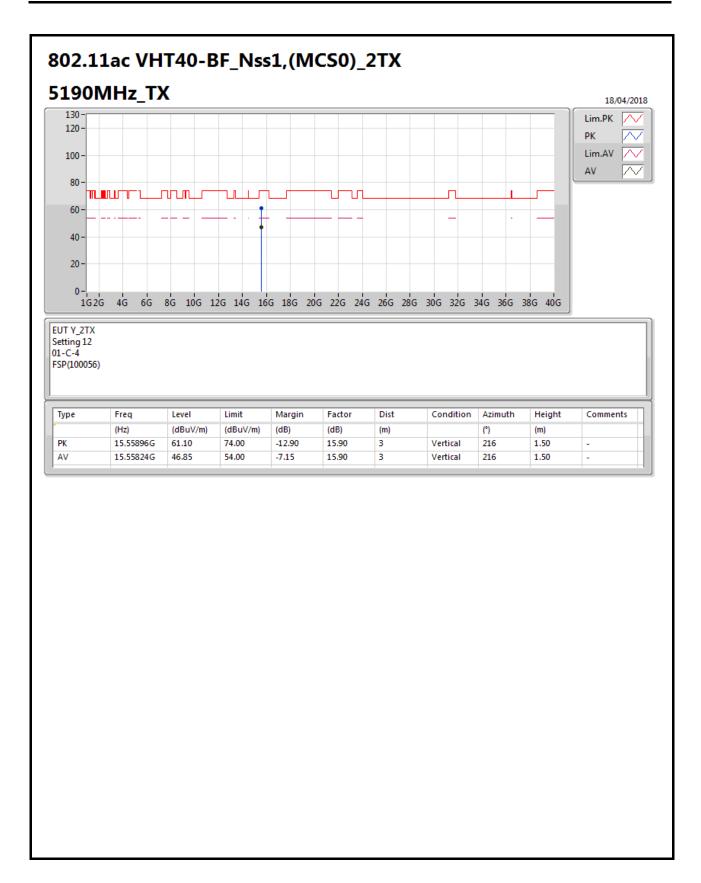
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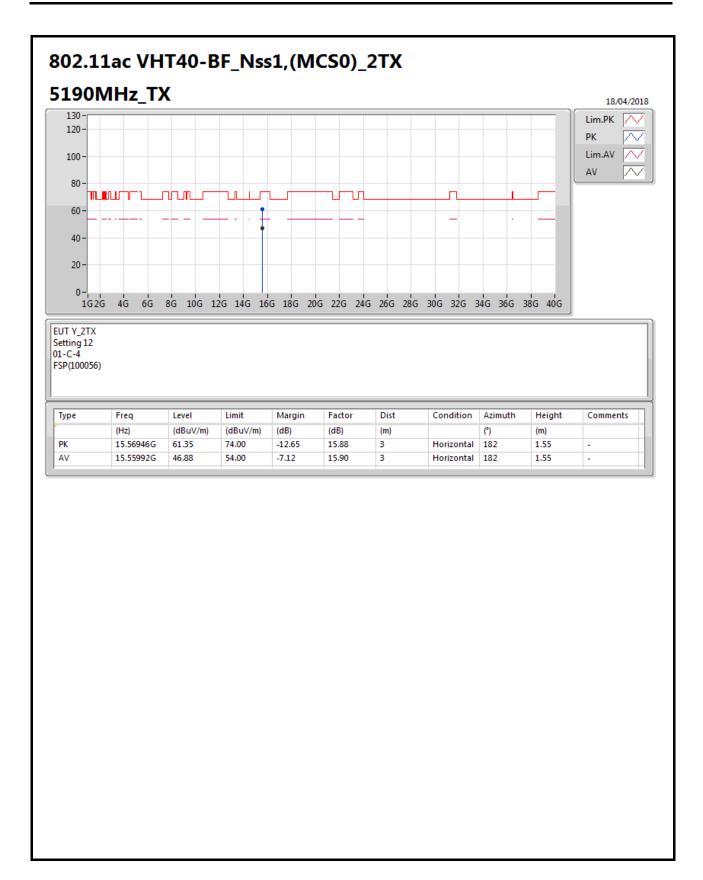
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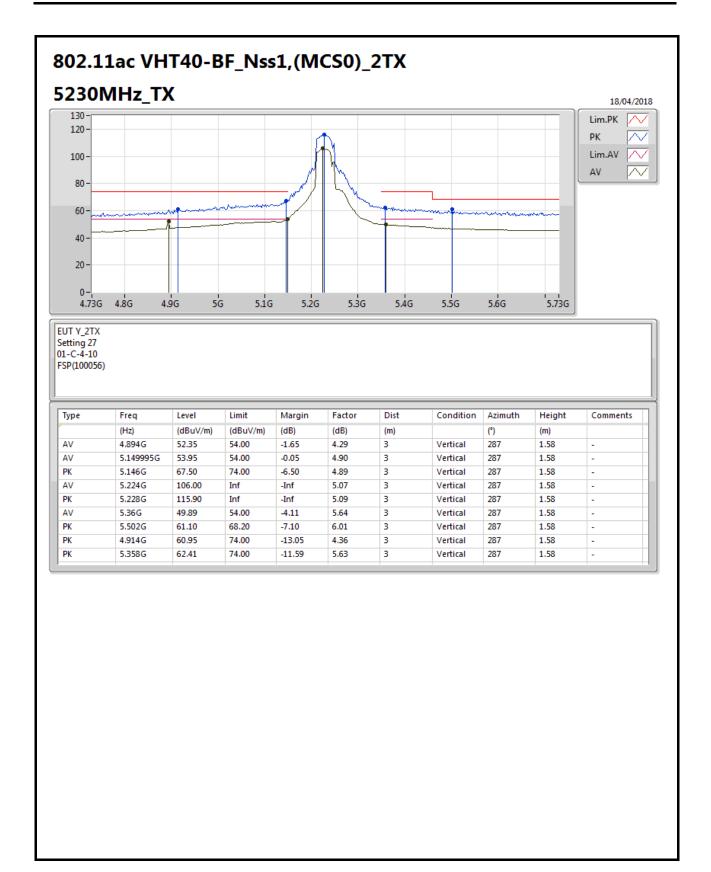
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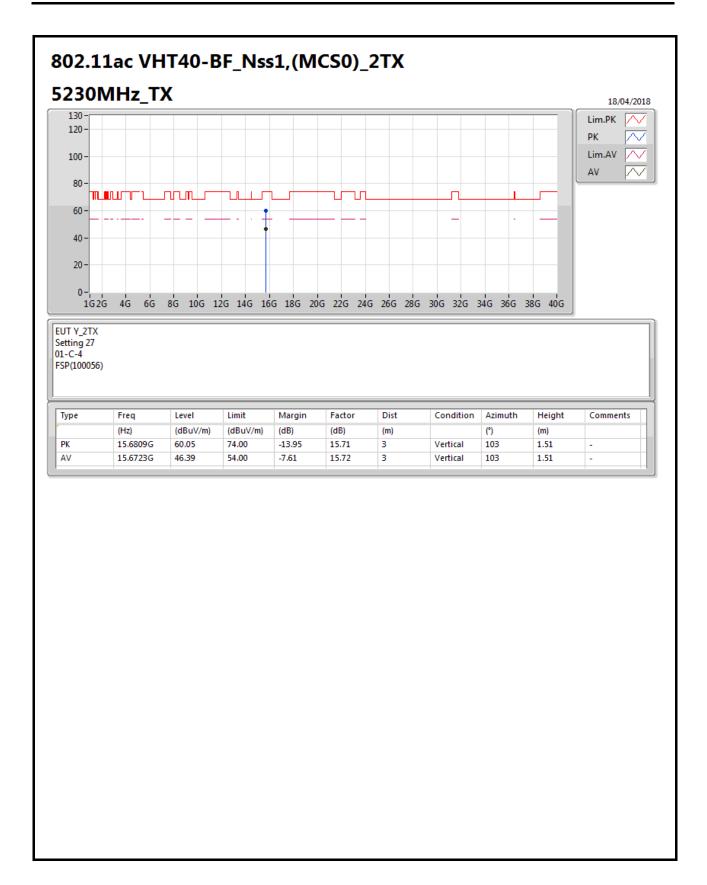
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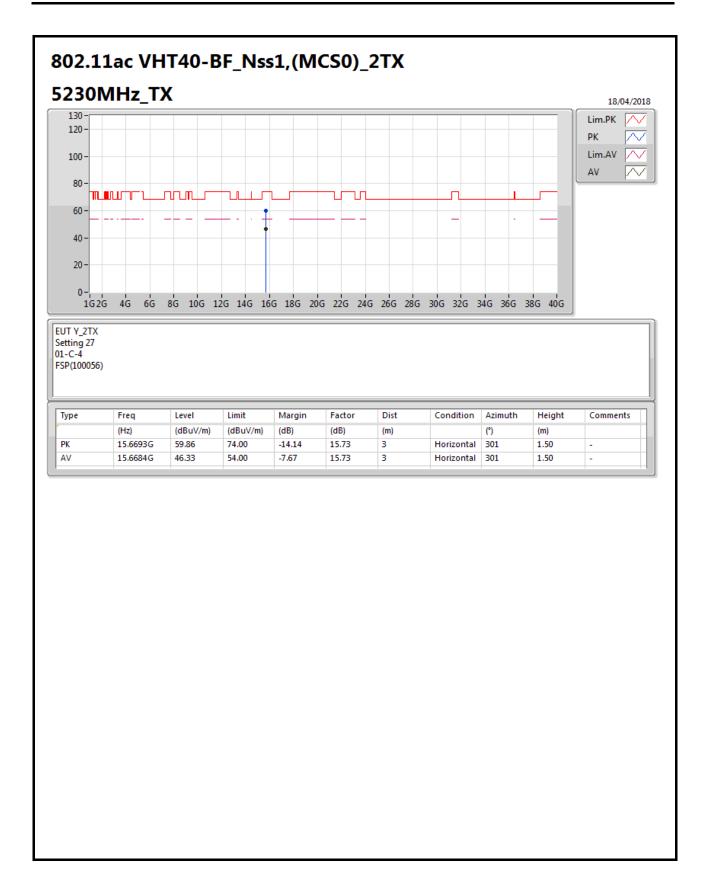
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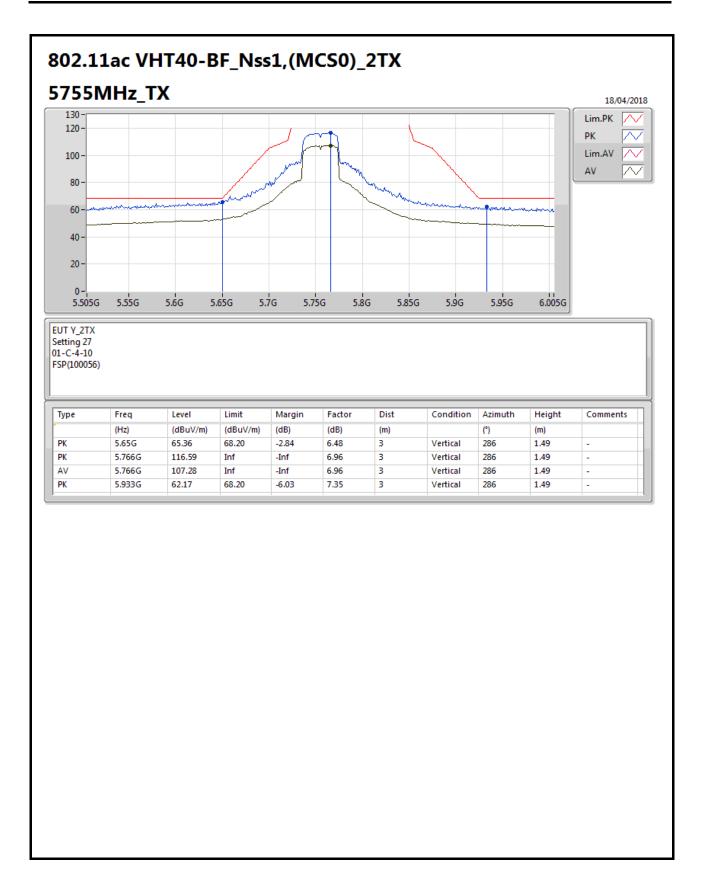
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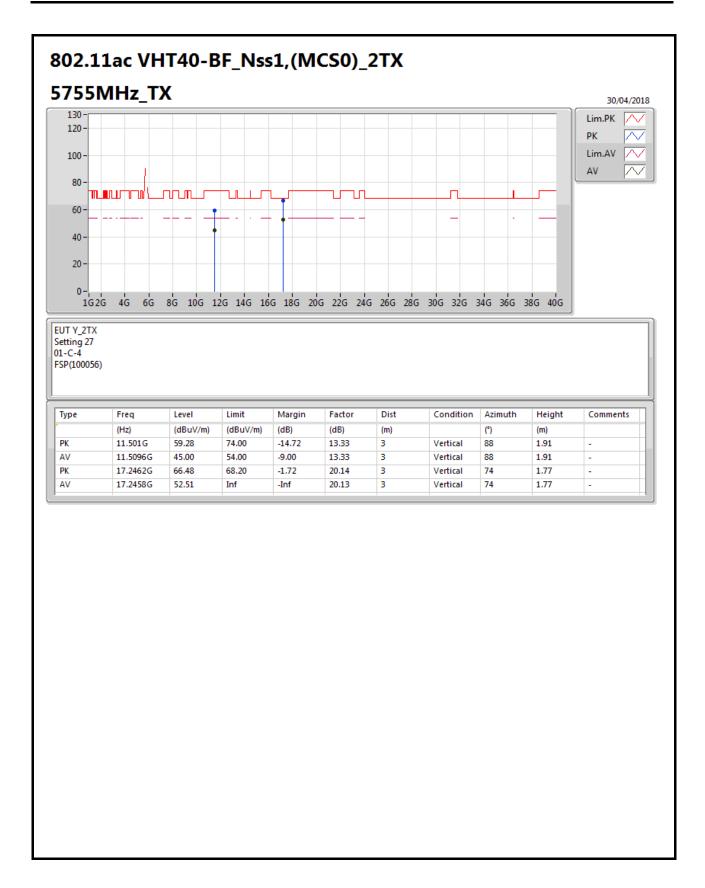
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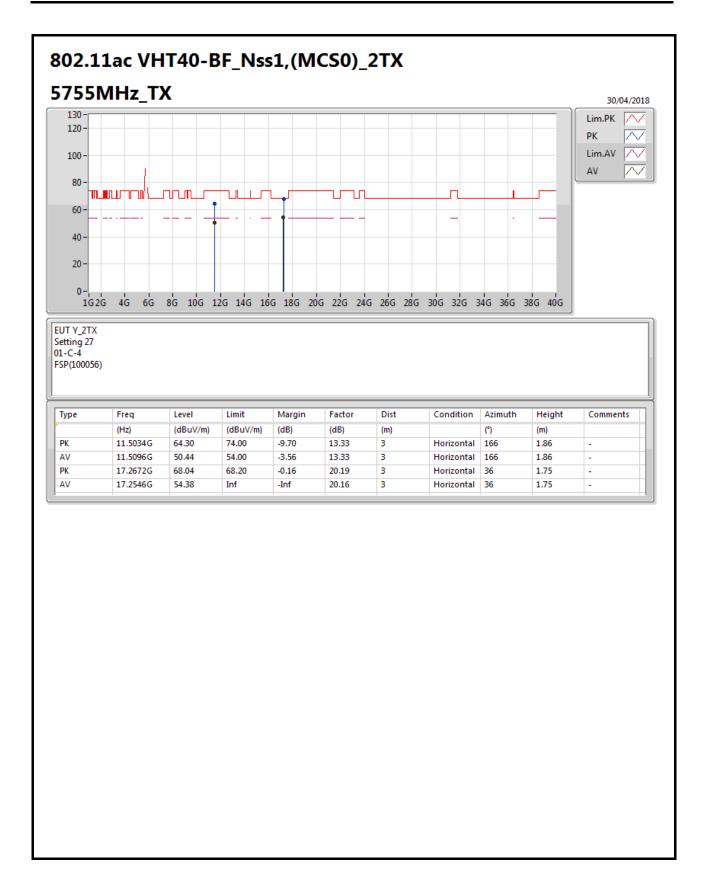
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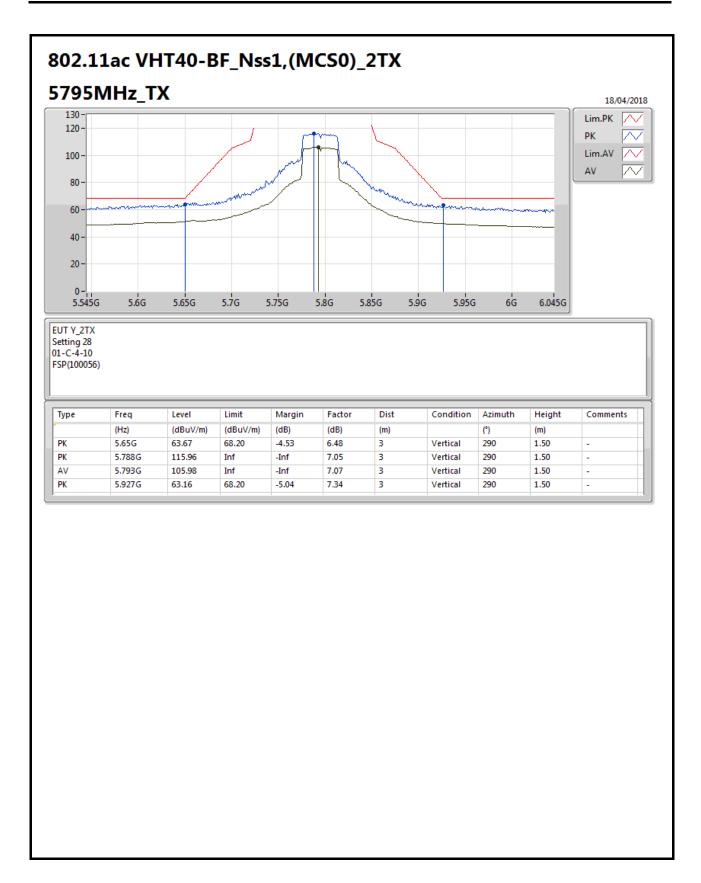
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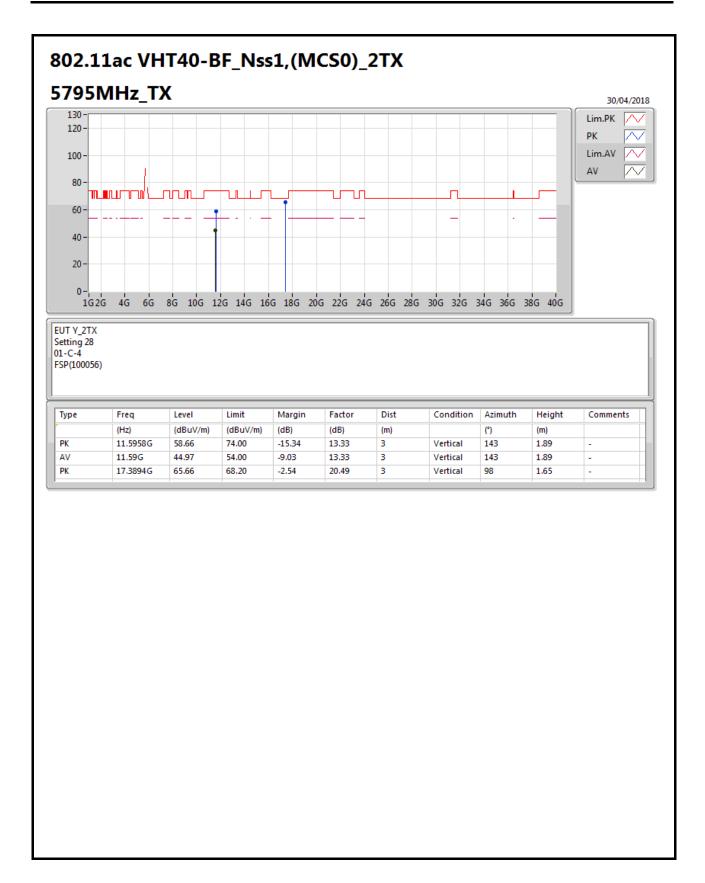
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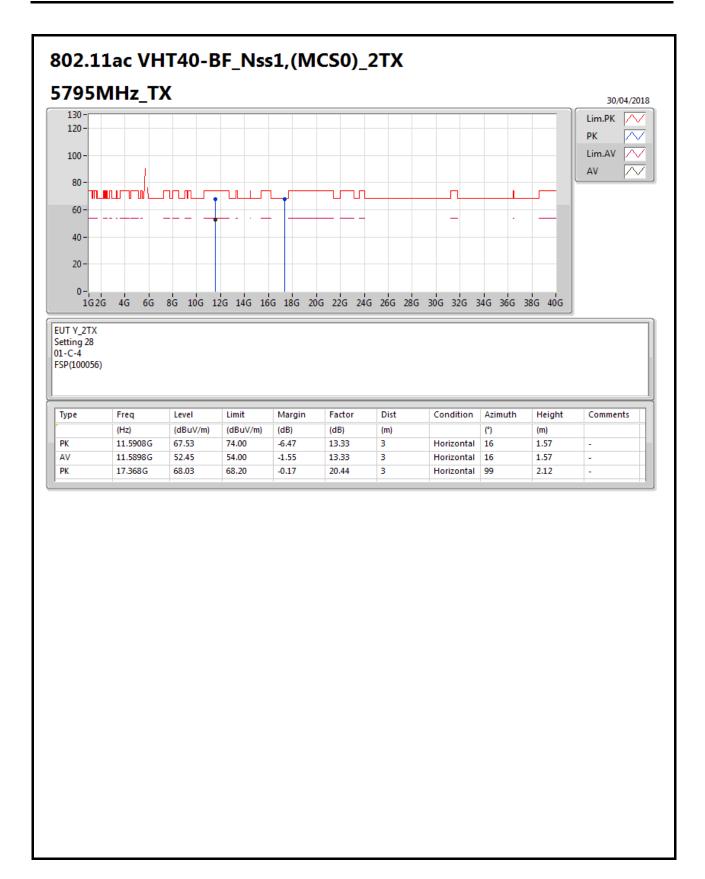
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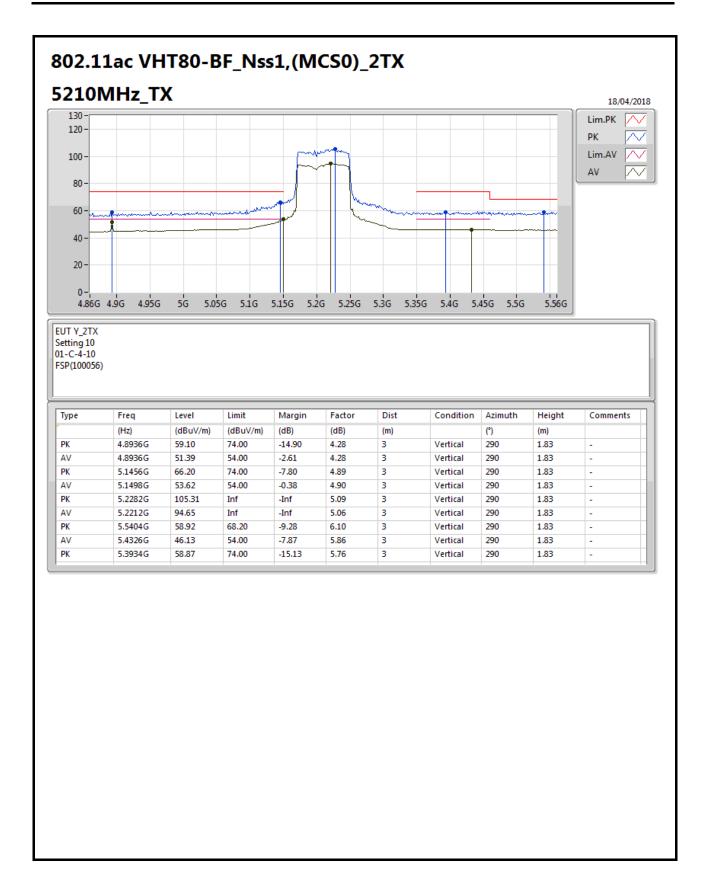
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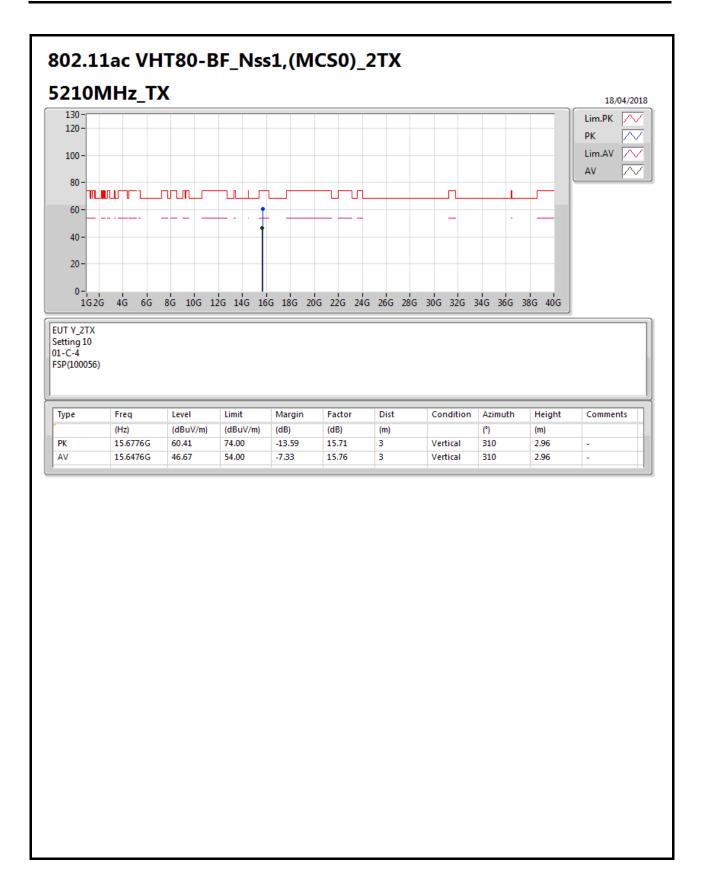
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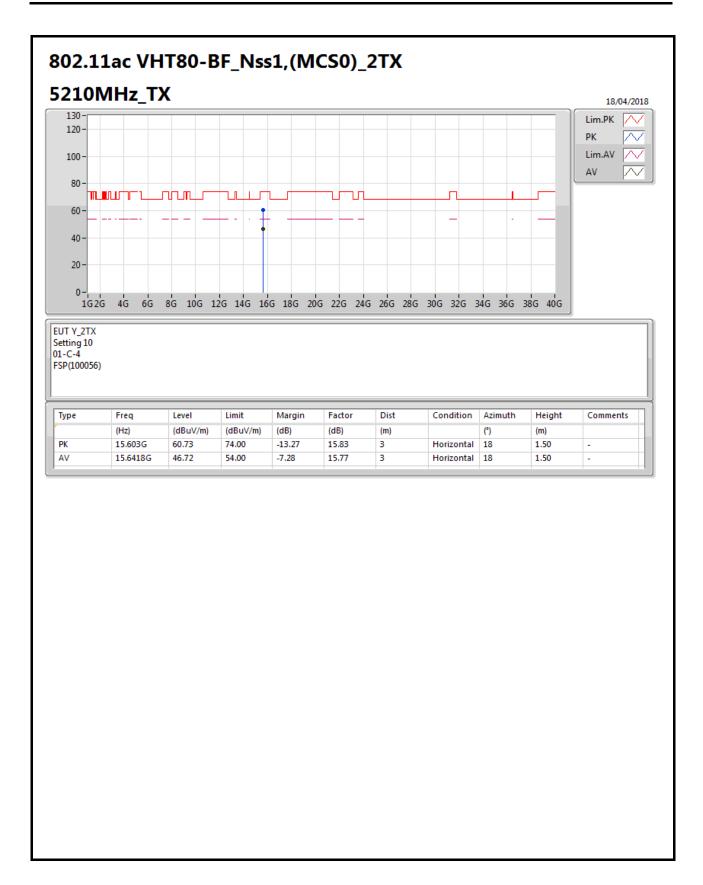
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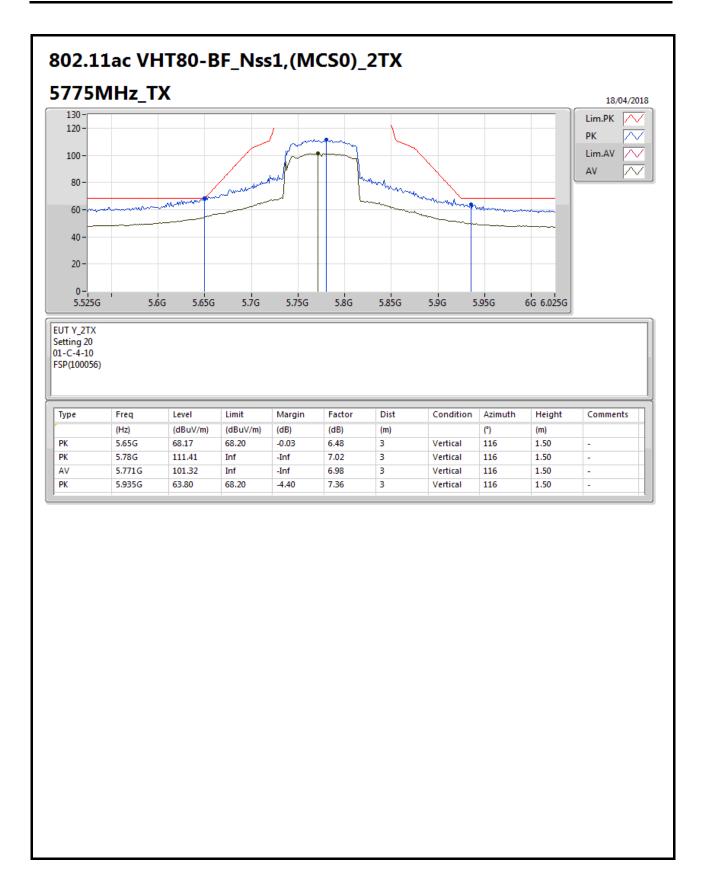
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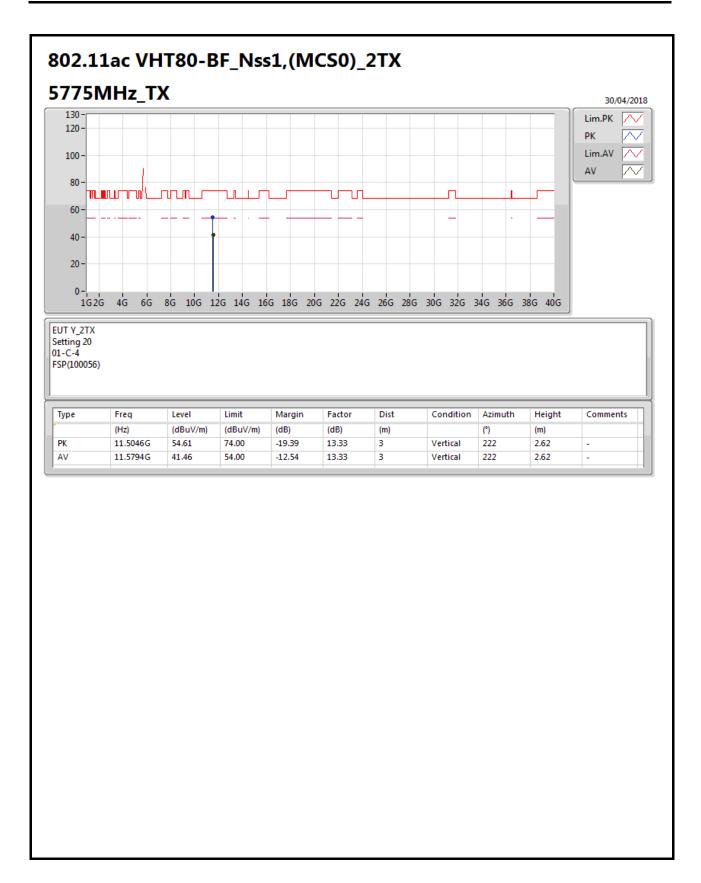
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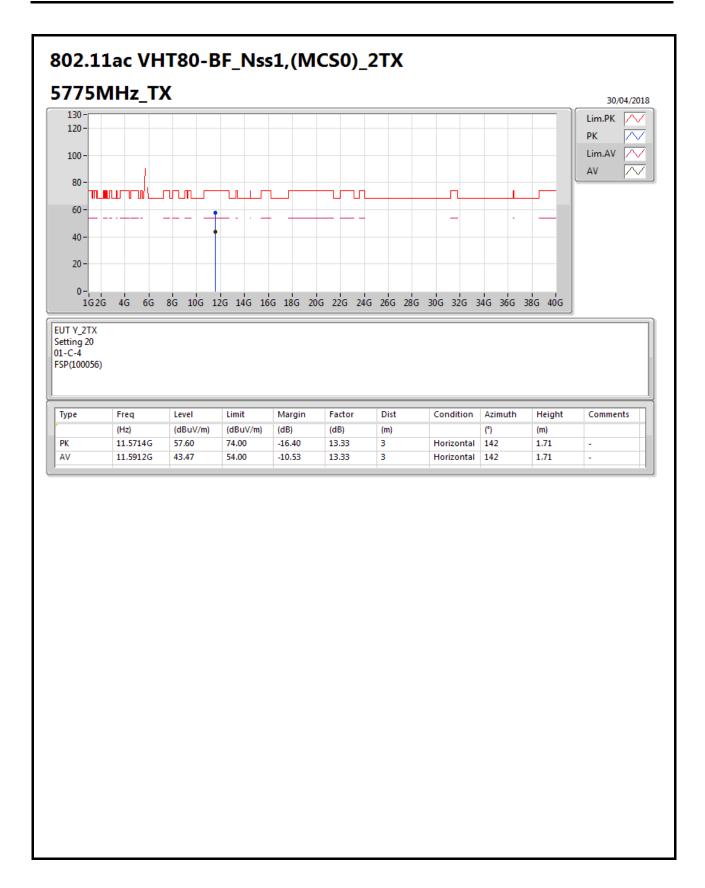
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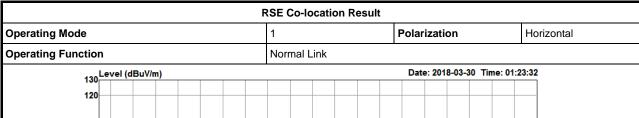


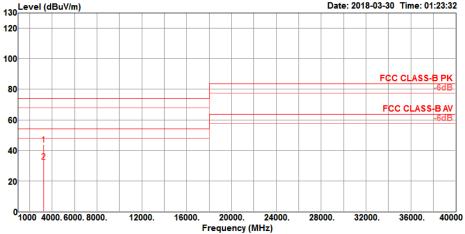
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	Freq	Level		Over Limit						T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1 2	3236.03 3236.04								160 160		Peak Average	HORIZONTAL HORIZONTAL



