

Report No.: FR792934-01

Project No: CB10702261

FCC Test Report

Equipment		Home Wi-Fi Solution Kit
Brand Name	2	AirTies
Model No.		Air 4930
FCC ID	:	Z3WAIR4930
Standard		47 CFR FCC Part 15.407
Operating Band		5250 MHz - 5350 MHz 5470 MHz - 5725 MHz
Applicant	:	AirTies Wireless Networks Mithat Uluunlu Sokak No. 23 Esentepe, Sisli Istanbul 34394 Turkey
Manufacturer		AirTies Wireless Networks Mithat Uluunlu Sokak No. 23 Esentepe, Sisli Istanbul 34394 Turkey
Function	:	☐ Outdoor; ☐ Indoor; ☐ Fixed P2P☐ Client
TPC Function		With TPC

The product sample received on Sep. 29, 2017 and completely tested on Feb. 22, 2018. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

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

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PHOTOGRAPHS OF EUT V01



Summary of Test Result

Conformance Test Specifications					
Report Clause	· I Description				
1.1.2	15.203	Antenna Requirement	Complied		
3.1	15.407(a)	Emission Bandwidth	Complied		
3.2	15.407(a)	Maximum Conducted Output Power	Complied		
3.3	15.407(a)	Peak Power Spectral Density	Complied		
3.4	15.407(b)	Unwanted Emissions	Complied		
3.5	15.407(g)	Frequency Stability	Complied		

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Revision History

Report No.	Version	Description	Issued Date
FR792934-01	Rev. 01	Initial issue of report	Mar. 09, 2018

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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
5250-5350	a, n (HT20), ac (VHT20)	5260-5320	52-64 [4]
5470-5725		5500-5720	100-144 [9]
5250-5350	n (HT40), ac (VHT40)	5270-5310	54-62 [2]
5470-5725		5510-5710	102-142 [4]
5250-5350	ac (VHT80)	5290	58 [1]
5470-5725		5530-5690	106-138 [2]

Band	Mode	BWch (MHz)	Nant
5.25-5.35GHz	802.11a	20	4TX
5.25-5.35GHz	802.11n HT20	20	4TX
5.25-5.35GHz	802.11n HT20-BF	20	4TX
5.25-5.35GHz	802.11ac VHT20	20	4TX
5.25-5.35GHz	802.11ac VHT20-BF	20	4TX
5.25-5.35GHz	802.11n HT40	40	4TX
5.25-5.35GHz	802.11n HT40-BF	40	4TX
5.25-5.35GHz	802.11ac VHT40	40	4TX
5.25-5.35GHz	802.11ac VHT40-BF	40	4TX
5.25-5.35GHz	802.11ac VHT80	80	4TX
5.25-5.35GHz	802.11ac VHT80-BF	80	4TX
5.47-5.725GHz	802.11a	20	4TX
5.47-5.725GHz	802.11n HT20	20	4TX
5.47-5.725GHz	802.11n HT20-BF	20	4TX
5.47-5.725GHz	802.11ac VHT20	20	4TX
5.47-5.725GHz	802.11ac VHT20-BF	20	4TX
5.47-5.725GHz	802.11n HT40	40	4TX
5.47-5.725GHz	802.11n HT40-BF	40	4TX
5.47-5.725GHz	802.11ac VHT40	40	4TX
5.47-5.725GHz	802.11ac VHT40-BF	40	4TX
5.47-5.725GHz	802.11ac VHT80	80	4TX
5.47-5.725GHz	802.11ac VHT80-BF	80	4TX

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Note:

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

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- BWch is the nominal channel bandwidth.
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs. e.g., 2(2,3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.

1.1.2 Antenna Information

					Gain (dBi)					Remark	
Ant.	Brand	Model No.	Туре	Connector	2.404-	5GHz	5GHz	5GHz	5GHz	2.4GHz	ECH-
				,	2.4GHz	Band 1	Band 2	Band 3	Band 4	2.4GHZ	эвпи
1	Airties	Airties#1	Printed	N/A	1.7	1.5	2.3	1.9	3	Port 1	Port 1
2	Airties	Airties#1	Printed	N/A	-	1.5	2.3	1.9	3	-	Port 2
3	Airties	Airties#1	Printed	N/A	-	1.5	2.3	1.9	3	-	Port 3
4	Airties	Airties#1	Printed	N/A	1.7	1.5	2.3	1.9	3	Port 2	Port 4

Note: 1. The EUT has four antennas.

2. For WLAN 2.4GHz:

For IEEE 802.11b/g mode (1TX/1RX):

Only Ant. 1(Port 1) can be used as transmitting/receiving antenna.

For IEEE 802.11n mode (2TX/2RX):

Ant. 1(Port 1) and Ant. 4(Port 4)can be used as transmitting/receiving antenna.

Ant. 1(Port 1) and Ant. 4(Port 4) could transmit/receive simultaneously.

3. For WLAN 5GHz:

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

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

Ant. 1(Port 1), Ant. 2(Port 2), Ant. 3(Port 3) and Ant. 4(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	0.957	0.191	2.058m	1k
802.11ac VHT20-BF	0.948	0.232	1.921m	1k
802.11ac VHT40-BF	0.936	0.287	937.5u	3k
802.11ac VHT80-BF	0.865	0.63	445u	3k

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1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter				
Beamforming Function	eamforming Function With beamforming for IEEE 802.11 n/ac in 5GHz			Without beamforming	
Weather Band		With 5600~5650MHz	\boxtimes	Without 5600~5650MHz	
Test Software Version	Mtool_3.0.0.2				

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Note: This device supports AP and Mesh mode.

1.1.5 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR792934AB Below is the table for the change of the product with respect to the original one.

Description	Performance Checking
	1. Emission Bandwidth
Adding 5 Clip Bond 2 and Bond 2 (5250, 5250 Mile	2. Maximum Conducted Output Power
Adding 5 GHz Band 2 and Band3 (5250~5350 MHz,	3. Spectral Density
5470~5725 MHz)	4. Unwanted Emissions
	5. Frequency Stability

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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	Brian Sun	20°C / 56%	Feb. 13, 2018
Radiated	03CH01-CB	Justin Lin	22°C / 54%	Feb. 09, 2018~Feb. 22, 2018

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
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%
Frequency Stability	6.06 x10 ⁻⁸	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	-
5260MHz	63
5300MHz	63
5320MHz	63
5500MHz	65
5580MHz	65
5700MHz	60
5720MHz Straddle 5.47-5.725GHz	61
5720MHz Straddle 5.725-5.85GHz	61
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-
5260MHz	62
5300MHz	62
5320MHz	62
5500MHz	64
5580MHz	64
5700MHz	59
5720MHz Straddle 5.47-5.725GHz	60
5720MHz Straddle 5.725-5.85GHz	60
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	-
5270MHz	63
5310MHz	63
5510MHz	66
5550MHz	65
5670MHz	60
5710MHz Straddle 5.47-5.725GHz	62
5710MHz Straddle 5.725-5.85GHz	62
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	-
5290MHz	64
5530MHz	64
5690MHz Straddle 5.47-5.725GHz	62
5690MHz Straddle 5.725-5.85GHz	62

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 in 5GHz. Only the beamforming mode had been tested and recorded in this test report.

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2.2 The Worst Case Measurement Configuration

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

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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	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.: FA792934-01 for Co-location RF Exposure Evaluation.		

Note: The EUT can only be used at standing position.

2.3 EUT Operation during Test

For CTX Mode:

non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

beamforming mode:

During the test, the following programs under WIN 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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2.4 Accessories

Ĭ				Accessories	
	No. Equipment Brand Model Name Name		Rating		
	1	Adapter	MOSO	MSA-C1000CS12.0-12A-US	INPUT: 100-240V, 50/60Hz 0.5A max OUTPUT: 12V, 1A

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2.5 Support Equipment

For Test Site No: 03CH01-CB Non-Beamforming Mode

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

Beamforming Mode

	Support Equipment			
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB	DELL	E4300	DoC
2	RX Device	ASUS	PCE-88U	MSQ-PCIE0U00
3	PC	DELL	T3400	DoC

For Test Site No: TH01-CB

	Support Equipment			
No.	Equipment	Brand Name	Model Name	FCC ID
1	NB*2	DELL	E4300	DoC
2	WLAN module (RX Device)	Broadcom	BCM943162ZP	QDS-BRCM1075

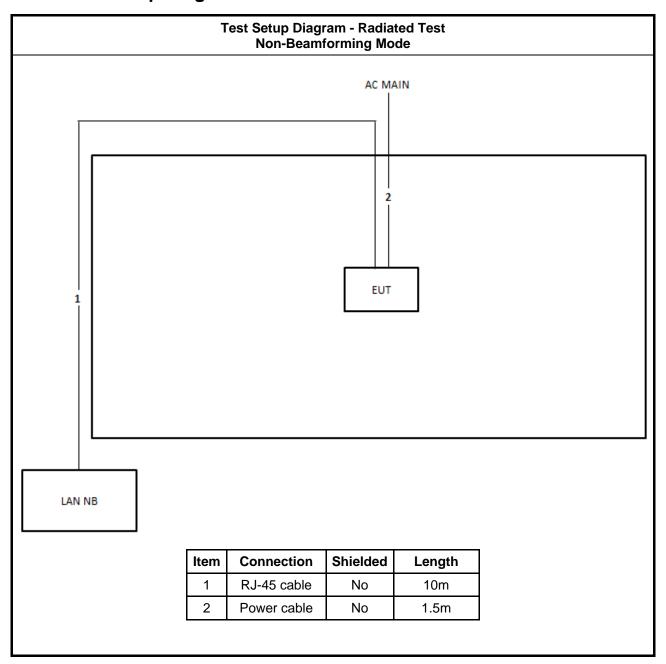
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2.6 Test Setup Diagram



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Test Setup Diagram - Radiated Test Beamforming Mode AC MAIN EUT Device PC LAN NB RX Device Connection **Shielded** Item Length 1 RJ-45 cable No 10m 2 Power cable No 1.5m 3 RJ-45 cable No 1.5m

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3 Transmitter Test Result

3.1 Emission Bandwidth

3.1.1 Emission Bandwidth Limit

	Emission Bandwidth Limit
UNI	Il Devices
	For the 5.15-5.25 GHz band, N/A
\boxtimes	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.
\boxtimes	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.

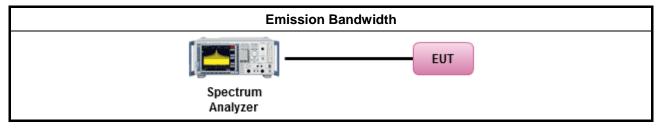
3.1.2 Measuring Instruments

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

3.1.3 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.		

3.1.4 Test Setup



3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A

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3.2 Maximum Conducted Output Power

3.2.1 Maximum Conducted Output Power Limit

	Maximum Conducted Output Power Limit
UNI	I Devices
	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 $P_{Out} = 24 - (G_{TX} - 6)$.
\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.
	= maximum conducted output power in dBm, = the maximum transmitting antenna directional gain in dBi.

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3.2.2 Measuring Instruments

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

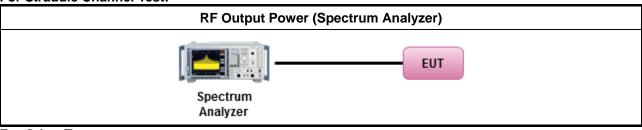
3.2.3 Test Procedures

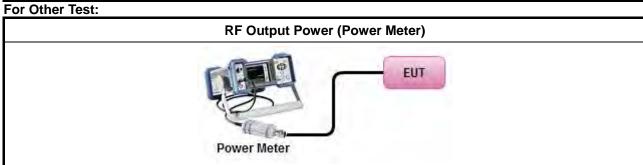
	Test Method								
•	Maximum Conducted Output Power								
	Average over on/off periods with duty factor								
	Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).								
	Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)								
	Wideband 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-sur approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW of all ports for each individual sample and save them.								
	If multiple transmit chains, EIRP calculation could be following as methods: P _{total} = P ₁ + P ₂ + + P _n (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP _{total} = P _{total} + DG								

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3.2.4 Test Setup

For Straddle Channel Test:





3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B

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3.3 Peak Power Spectral Density

3.3.1 Peak Power Spectral Density Limit

	Peak Power Spectral Density Limit
UNI	I Devices
	For the 5.15-5.25 GHz band:
	 Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 6 dBi, then P_{Out} = 17 - (G_{TX} - 6).
	Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 17 - (G_{TX} - 6)$.
	Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 23$ dBi, then $P_{Out} = 17 - (G_{TX} - 23)$.
	■ Mobile or Portable Client: the peak power spectral density (PPSD) \leq 11 dBm/MHz. If $G_{TX} > 6$ dBi, then PPSD= 11 $-$ ($G_{TX} - 6$)
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz. If $G_{TX} > 6$ dBi, then PPSD= 11 – ($G_{TX} - 6$).
\boxtimes	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) ≤ 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) ≤ 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.

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3.3.2 Measuring Instruments

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

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3.3.3 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 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							
		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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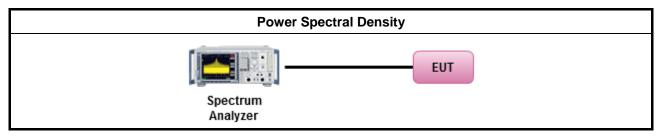
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FCC Test Report

3.3.4 Test Setup



3.3.5 Test Result of Peak Power Spectral Density

Refer as Appendix C

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3.4 Unwanted Emissions

3.4.1 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							

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

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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							
	Measurements may be performed at a distance other than the limit distance provided they are no 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-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.							

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- 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.

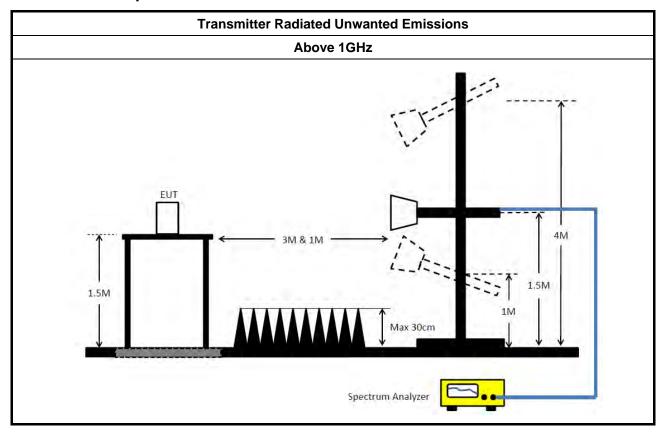
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3.4.4 Test Setup



3.4.5 Test Result of Transmitter Unwanted Emissions

Refer as Appendix D

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3.5 Frequency Stability

3.5.1 Frequency Stability Limit

Frequency Stability Limit

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UNII Devices

 In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

LE-LAN Devices

N/A

IEEE Std. 802.11

■ The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band and ± 25 ppm maximum for the 2.4 GHz band.

3.5.2 Measuring Instruments

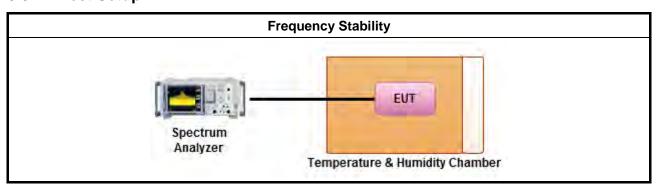
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method

- Refer as ANSI C63.10, clause 6.8 for frequency stability tests
 - Frequency stability with respect to ambient temperature
 - Frequency stability when varying supply voltage
 - Extreme temperature is 0°C~40°C.

3.5.4 Test Setup



3.5.5 Test Result of Frequency Stability

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
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 20, 2017	Nov. 19, 2018	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA91702 52	15GHz ~ 40GHz	Jul. 05, 2017	Jul. 04, 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- HG	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)
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)
Test Software	Audix	E3	6.2009-10-7	N/A	N/A	N/A	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 21, 2017	Dec. 20, 2018	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 02, 2017	Jun. 01, 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)
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.

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Appendix A EBW Result

Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
5.25-5.35GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_4TX	21.65M	16.617M	16M6D1D	21.325M	16.542M
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	21.95M	17.791M	17M8D1D	21.5M	17.716M
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	40.5M	36.332M	36M3D1D	39.65M	36.232M
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	82.2M	75.862M	75M9D1D	81.4M	75.662M
5.47-5.725GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_4TX	21.625M	16.667M	16M7D1D	15.615M	13.283M
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	21.925M	17.816M	17M8D1D	15.645M	13.838M
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	40.35M	36.332M	36M3D1D	34.93M	32.989M
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	82.1M	75.962M	76M0D1D	75.45M	72.414M
5.725-5.85GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_4TX	3.16M	3.998M	4M00D1D	3.16M	3.898M
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	3.82M	4.318M	4M32D1D	3.78M	4.198M
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	3.16M	3.558M	3M56D1D	3.14M	3.518M
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	3.16M	3.718M	3M72D1D	3.14M	3.658M

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;

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EBW Result Appendix A

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	-	-	-	-	-	-	-	-	-	-
5260MHz	Pass	Inf	21.65M	16.617M	21.525M	16.542M	21.35M	16.617M	21.4M	16.542M
5300MHz	Pass	Inf	21.55M	16.567M	21.375M	16.592M	21.325M	16.592M	21.45M	16.542M
5320MHz	Pass	Inf	21.65M	16.592M	21.65M	16.542M	21.575M	16.567M	21.4M	16.617M
5500MHz	Pass	Inf	21.625M	16.592M	21.45M	16.517M	21.425M	16.567M	21.375M	16.542M
5580MHz	Pass	Inf	21.45M	16.667M	21.45M	16.567M	21.525M	16.542M	21.3M	16.567M
5700MHz	Pass	Inf	21.625M	16.617M	21.5M	16.567M	21.5M	16.542M	21.35M	16.617M
5720MHz Straddle 5.47-5.725GHz	Pass	Inf	15.735M	13.283M	15.63M	13.298M	15.615M	13.283M	15.615M	13.283M
5720MHz Straddle 5.725-5.85GHz	Pass	500k	3.16M	3.958M	3.16M	3.998M	3.16M	3.958M	3.16M	3.898M
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5260MHz	Pass	Inf	21.75M	17.766M	21.625M	17.791M	21.675M	17.791M	21.65M	17.741M
5300MHz	Pass	Inf	21.95M	17.741M	21.55M	17.741M	21.65M	17.741M	21.5M	17.741M
5320MHz	Pass	Inf	21.85M	17.791M	21.7M	17.716M	21.575M	17.741M	21.625M	17.741M
5500MHz	Pass	Inf	21.825M	17.816M	21.5M	17.716M	21.525M	17.741M	21.45M	17.791M
5580MHz	Pass	Inf	21.775M	17.741M	21.525M	17.741M	21.325M	17.691M	21.55M	17.741M
5700MHz	Pass	Inf	21.925M	17.716M	21.425M	17.716M	21.675M	17.741M	21.525M	17.741M
5720MHz Straddle 5.47-5.725GHz	Pass	Inf	15.795M	13.838M	15.645M	13.898M	15.705M	13.883M	15.84M	13.883M
5720MHz Straddle 5.725-5.85GHz	Pass	500k	3.8M	4.198M	3.78M	4.258M	3.78M	4.218M	3.82M	4.318M
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5270MHz	Pass	Inf	40.5M	36.282M	39.8M	36.232M	39.7M	36.282M	39.9M	36.232M
5310MHz	Pass	Inf	40.2M	36.232M	39.65M	36.282M	39.65M	36.332M	40.05M	36.232M
5510MHz	Pass	Inf	40.35M	36.232M	39.7M	36.232M	39.65M	36.332M	39.85M	36.282M
5550MHz	Pass	Inf	40.2M	36.232M	39.8M	36.332M	39.7M	36.232M	39.8M	36.182M
5670MHz	Pass	Inf	40.35M	36.282M	39.9M	36.232M	39.75M	36.182M	39.8M	36.282M
5710MHz Straddle 5.47-5.725GHz	Pass	Inf	35.98M	32.989M	34.93M	33.023M	34.93M	33.023M	35.735M	33.023M
5710MHz Straddle 5.725-5.85GHz	Pass	500k	3.14M	3.538M	3.16M	3.518M	3.16M	3.538M	3.16M	3.558M
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5290MHz	Pass	Inf	82.2M	75.862M	81.5M	75.762M	81.6M	75.662M	81.4M	75.862M
5530MHz	Pass	Inf	81.7M	75.762M	82.1M	75.862M	81.7M	75.862M	81.5M	75.962M
5690MHz Straddle 5.47-5.725GHz	Pass	Inf	76.125M	72.414M	75.825M	72.564M	75.45M	72.714M	75.975M	72.489M
5690MHz Straddle 5.725-5.85GHz	Pass	500k	3.14M	3.718M	3.16M	3.718M	3.16M	3.658M	3.14M	3.678M

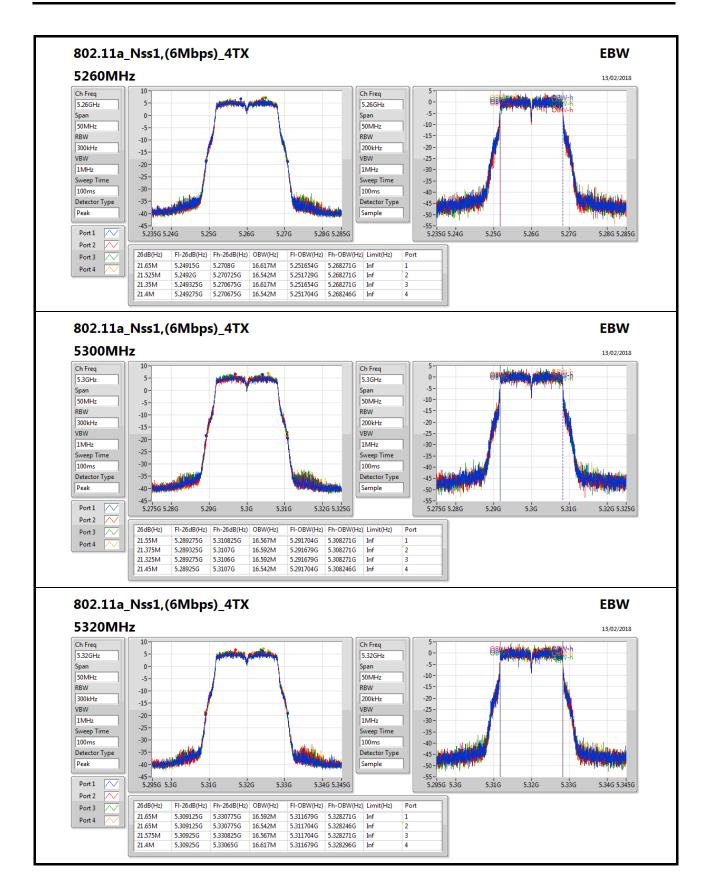
Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band Port X-OBW = Port X 99% occupied bandwidth;

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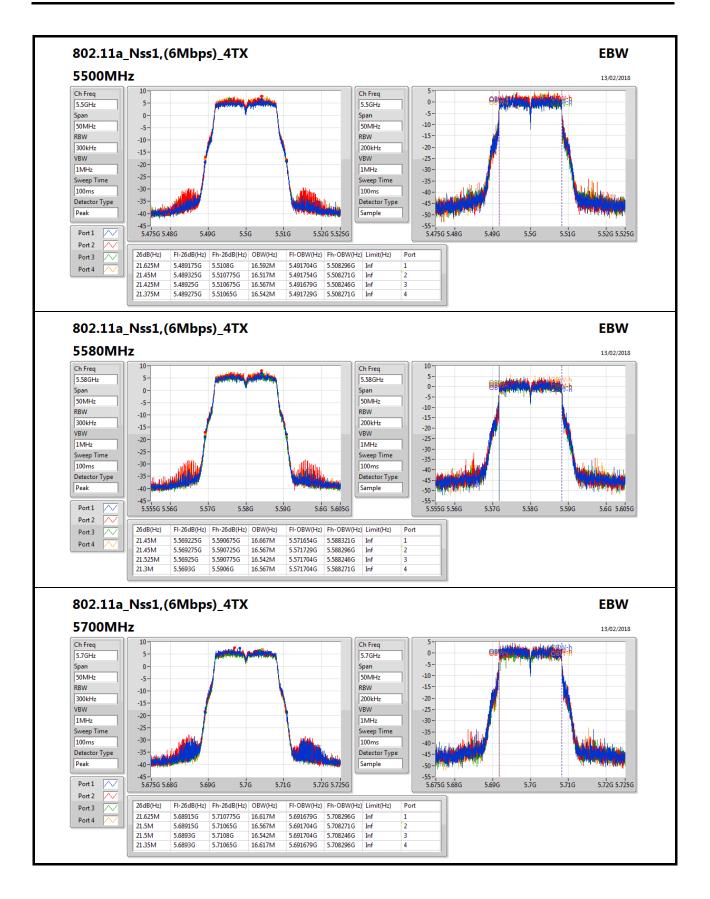
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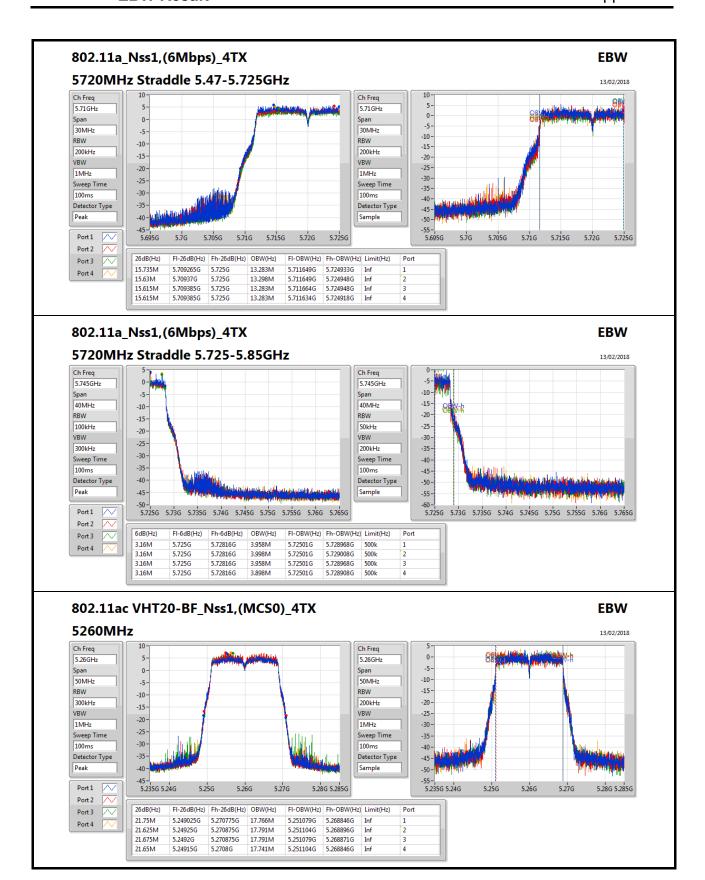


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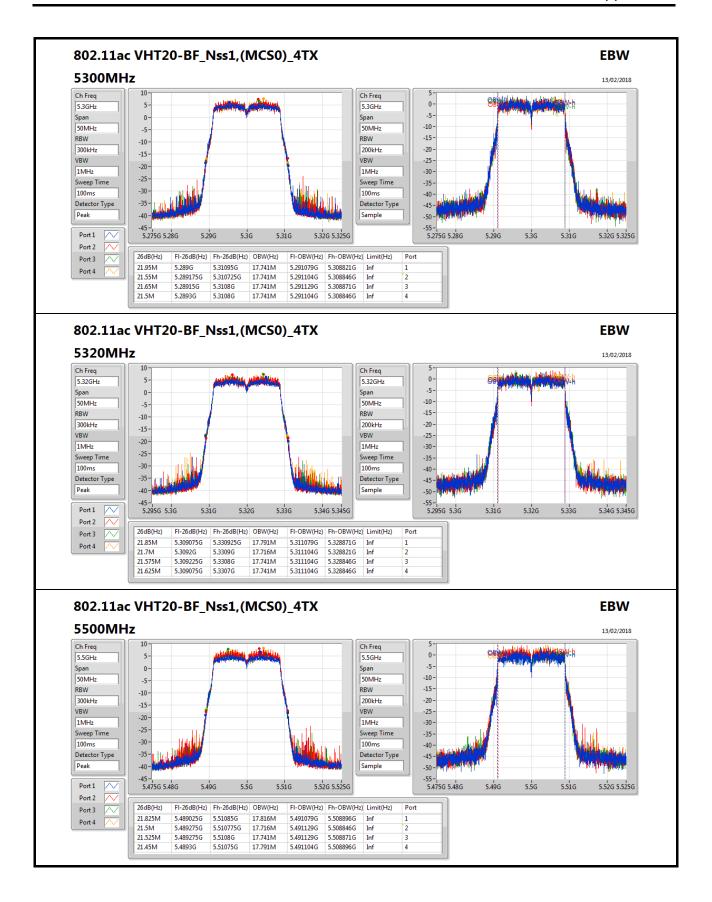


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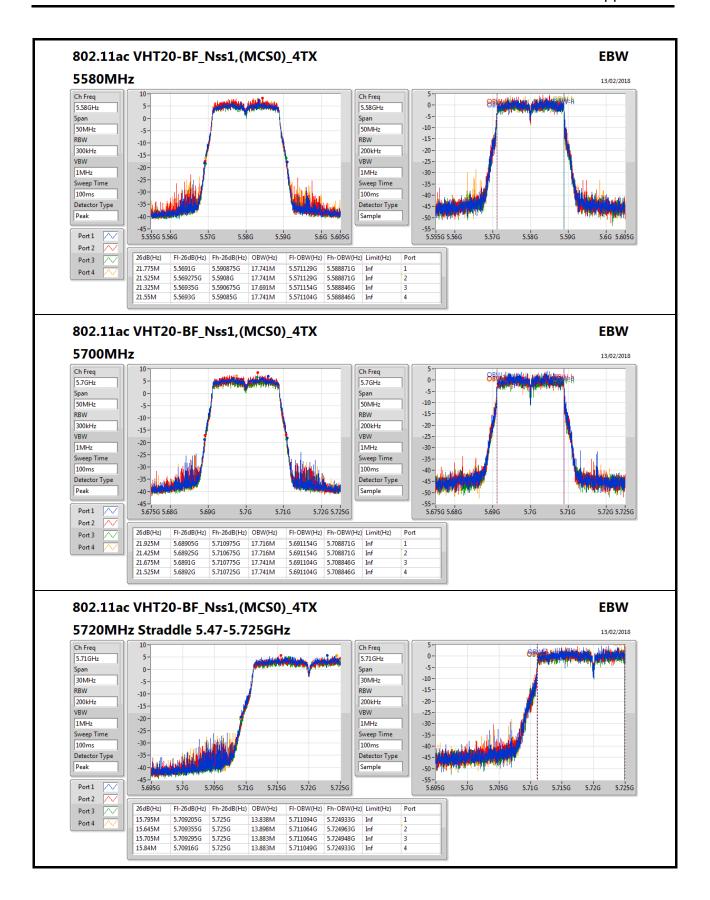
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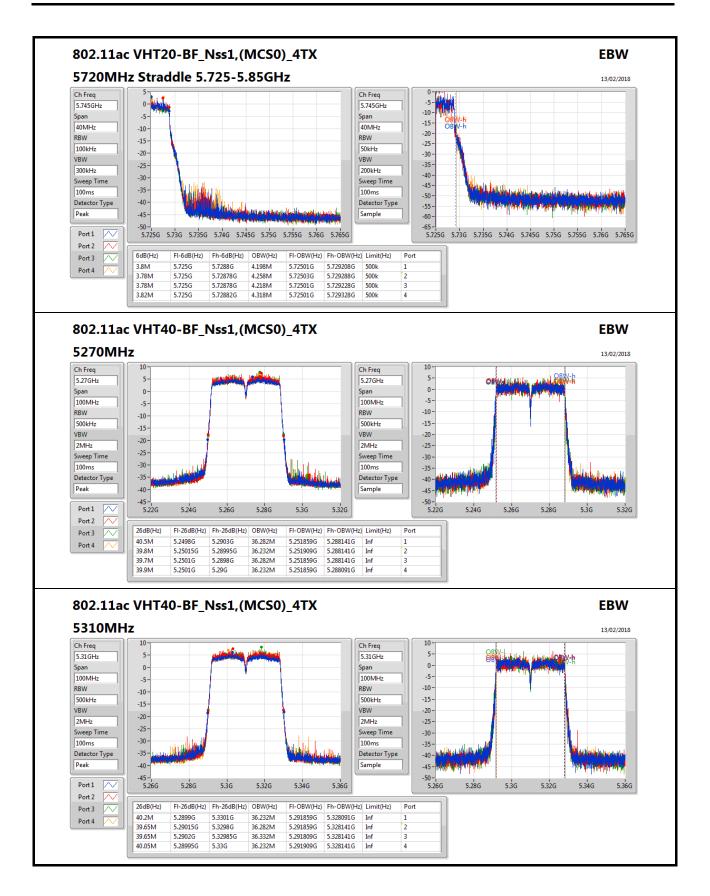
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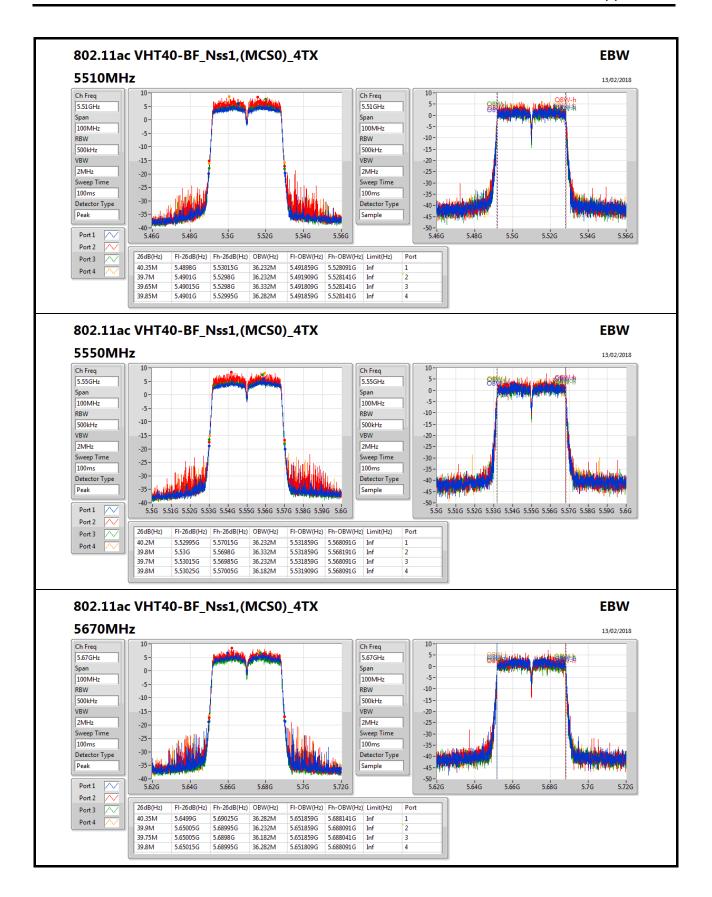
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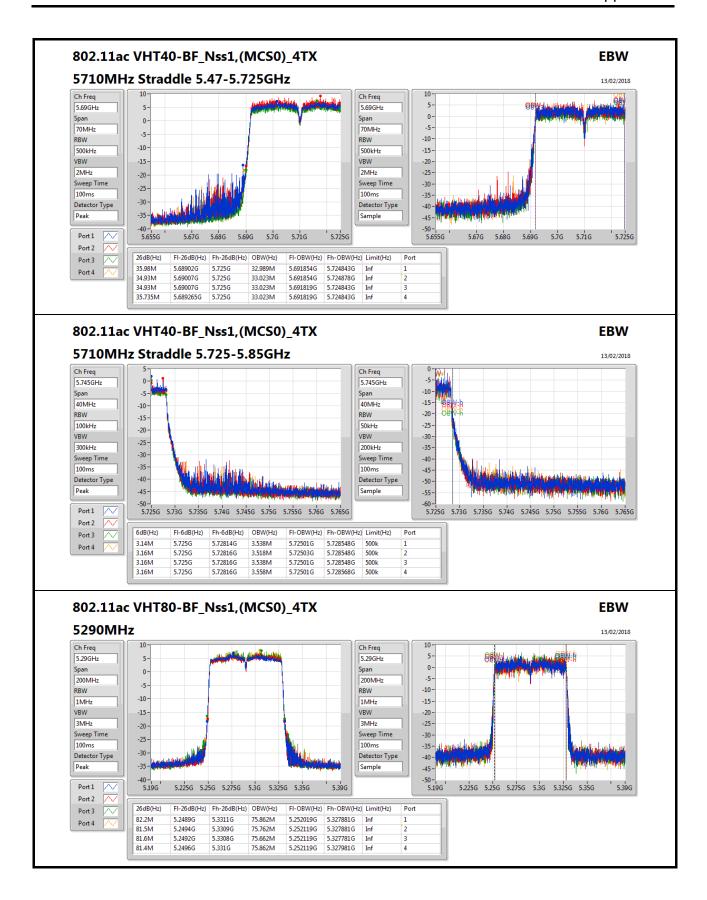


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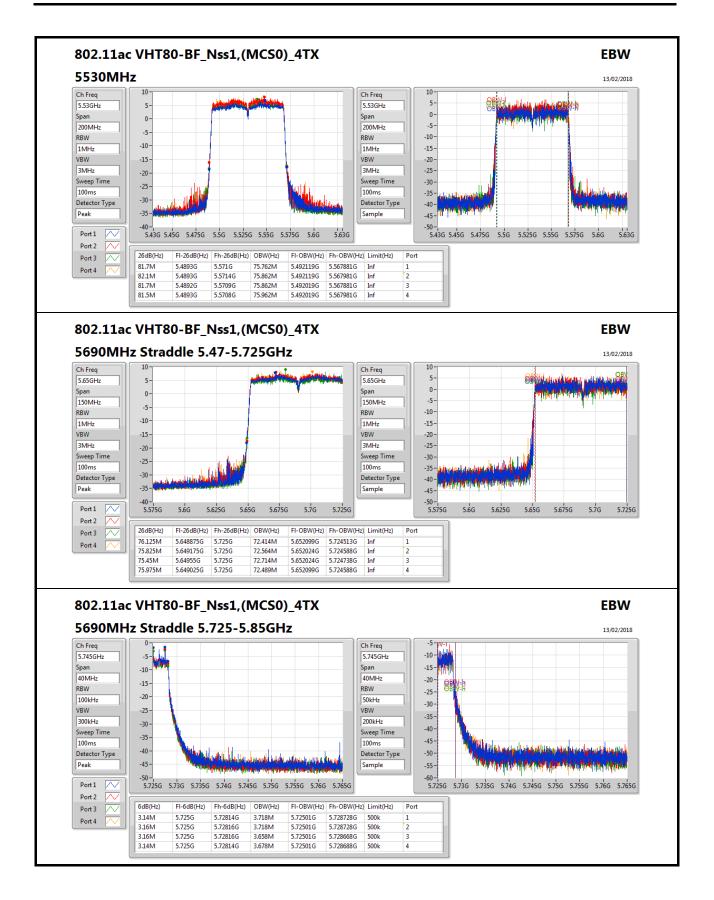


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Power Result Appendix B

Summary

Mode	Total Power	Total Power	EIRP	EIRP
	(dBm)	(W)	(dBm)	(W)
5.25-5.35GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_4TX	21.62	0.14521	23.92	0.24660
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	21.54	0.14256	29.86	0.96828
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	21.60	0.14454	29.92	0.98175
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	21.59	0.14421	29.91	0.97949
5.47-5.725GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_4TX	22.13	0.16331	24.03	0.25293
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	21.96	0.15704	29.88	0.97275
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	22.04	0.15996	29.96	0.99083
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	22.03	0.15959	29.95	0.98855
5.725-5.85GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_4TX	14.69	0.02944	16.59	0.04560
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	15.16	0.03281	23.08	0.20324
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	11.50	0.01413	19.42	0.08750
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	8.18	0.00658	16.10	0.04074

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Power Result Appendix B

Result

Mode	Result	DG	Port 1	Port 2	Port 3	Port 4	Total Power	Power Limit	EIRP	EIRP Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11a_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
5260MHz	Pass	2.30	15.77	15.51	15.07	15.62	21.52	23.98	23.82	30.00
5300MHz	Pass	2.30	15.50	15.63	15.27	15.84	21.59	23.98	23.89	30.00
5320MHz	Pass	2.30	15.44	15.52	15.65	15.79	21.62	23.98	23.92	30.00
5500MHz	Pass	1.90	15.83	15.96	15.74	15.66	21.82	23.98	23.72	30.00
5580MHz	Pass	1.90	16.04	16.19	15.91	15.75	22.00	23.98	23.90	30.00
5700MHz	Pass	1.90	16.44	16.57	15.68	15.66	22.13	23.98	24.03	30.00
5720MHz Straddle 5.47-5.725GHz	Pass	1.90	15.14	14.86	14.35	14.90	20.84	22.94	22.74	28.94
5720MHz Straddle 5.725-5.85GHz	Pass	1.90	9.05	8.61	8.20	8.78	14.69	30.00	16.59	36.00
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5260MHz	Pass	8.32	15.22	15.36	15.54	15.53	21.44	21.66	29.76	30.00
5300MHz	Pass	8.32	15.52	15.50	15.54	15.52	21.54	21.66	29.86	30.00
5320MHz	Pass	8.32	15.70	15.24	15.08	15.55	21.42	21.66	29.74	30.00
5500MHz	Pass	7.92	16.73	15.47	15.79	15.62	21.95	22.06	29.87	30.00
5580MHz	Pass	7.92	15.93	16.03	15.73	15.70	21.87	22.06	29.79	30.00
5700MHz	Pass	7.92	16.07	16.14	15.75	15.80	21.96	22.06	29.88	30.00
5720MHz Straddle 5.47-5.725GHz	Pass	7.92	14.98	14.81	14.29	14.90	20.77	21.02	28.69	28.94
5720MHz Straddle 5.725-5.85GHz	Pass	7.92	9.37	9.11	8.70	9.34	15.16	28.08	23.08	36.00
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5270MHz	Pass	8.32	15.50	15.61	15.40	15.41	21.50	21.66	29.82	30.00
5310MHz	Pass	8.32	15.58	15.68	15.56	15.50	21.60	21.66	29.92	30.00
5510MHz	Pass	7.92	15.93	15.94	15.78	15.82	21.89	22.06	29.81	30.00
5550MHz	Pass	7.92	16.08	15.85	16.04	15.83	21.97	22.06	29.89	30.00
5670MHz	Pass	7.92	16.48	16.51	15.47	15.52	22.04	22.06	29.96	30.00
5710MHz Straddle 5.47-5.725GHz	Pass	7.92	16.30	16.12	15.23	15.76	21.89	22.06	29.81	30.00
5710MHz Straddle 5.725-5.85GHz	Pass	7.92	5.92	5.58	5.02	5.35	11.50	28.08	19.42	36.00
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5290MHz	Pass	8.32	15.95	15.54	15.09	15.65	21.59	21.66	29.91	30.00
5530MHz	Pass	7.92	16.02	16.26	15.77	15.84	22.00	22.06	29.92	30.00
5690MHz Straddle 5.47-5.725GHz	Pass	7.92	16.26	16.30	15.47	15.97	22.03	22.06	29.95	30.00
5690MHz Straddle 5.725-5.85GHz	Pass	7.92	2.49	2.25	1.79	2.06	8.18	28.08	16.10	36.00

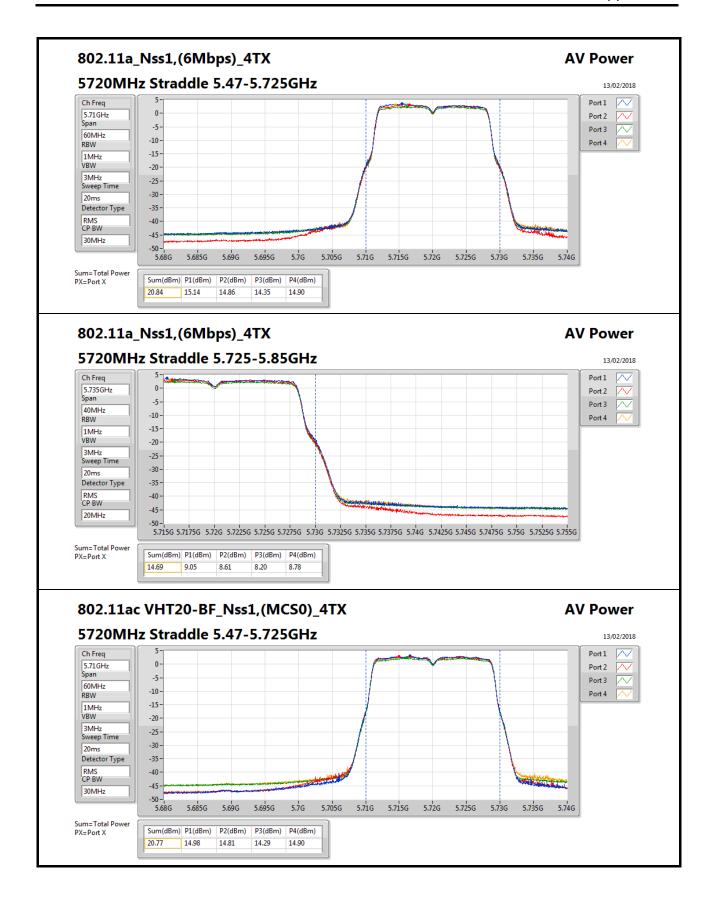
DG = Directional Gain;**Port X** = Port X output power

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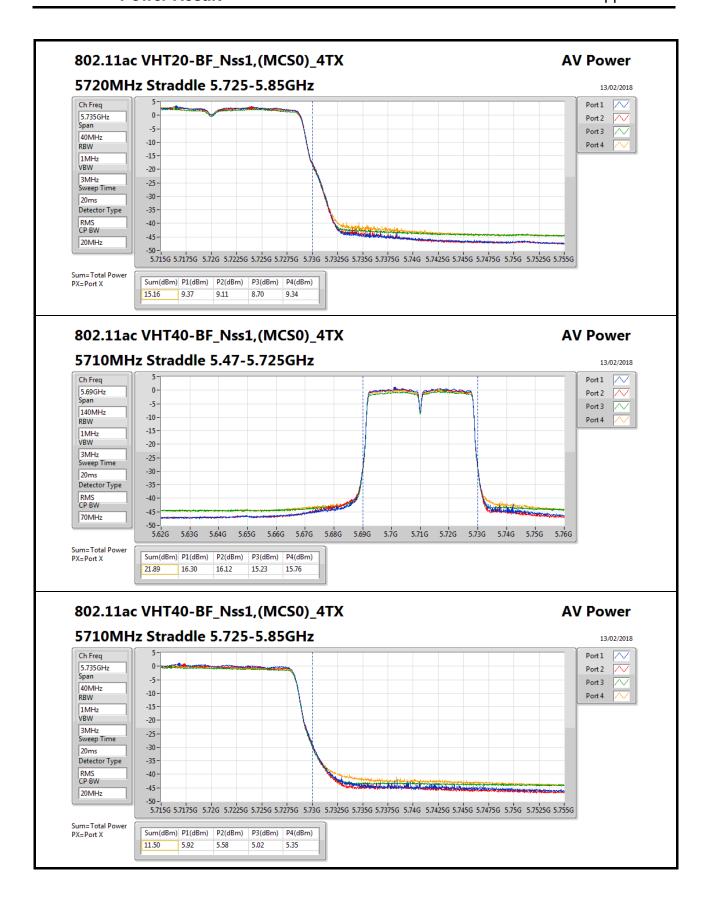
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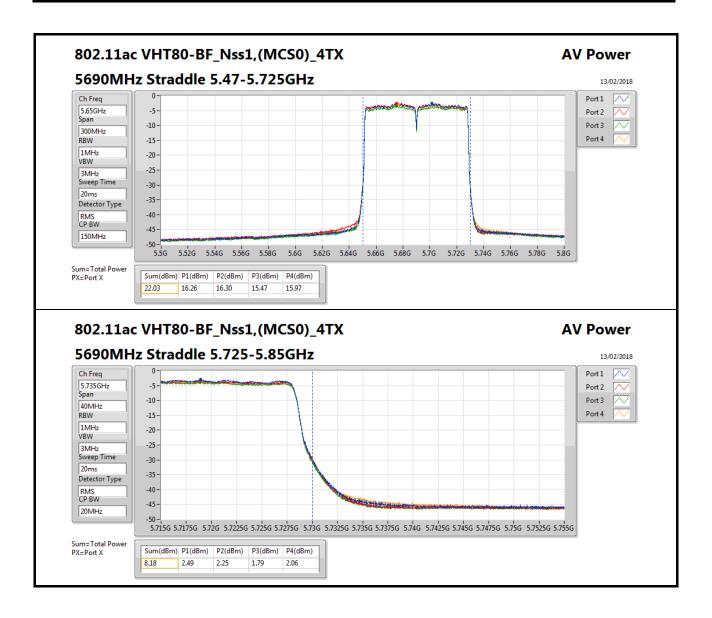


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PSD Result Appendix C

Summary

Mode	PD	EIRP PD		
	(dBm/RBW)	(dBm/RBW)		
5.25-5.35GHz	-	-		
802.11a_Nss1,(6Mbps)_4TX	8.53	16.85		
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	8.00	16.32		
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	5.12	13.44		
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	2.64	10.96		
5.47-5.725GHz	F	-		
802.11a_Nss1,(6Mbps)_4TX	9.03	16.95		
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	8.62	16.54		
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	6.11	14.03		
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	3.21	11.13		
5.725-5.85GHz	F	-		
802.11a_Nss1,(6Mbps)_4TX	7.06	14.98		
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	6.99	14.91		
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	3.87	11.79		
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	0.63	8.55		

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



Appendix C **PSD Result**

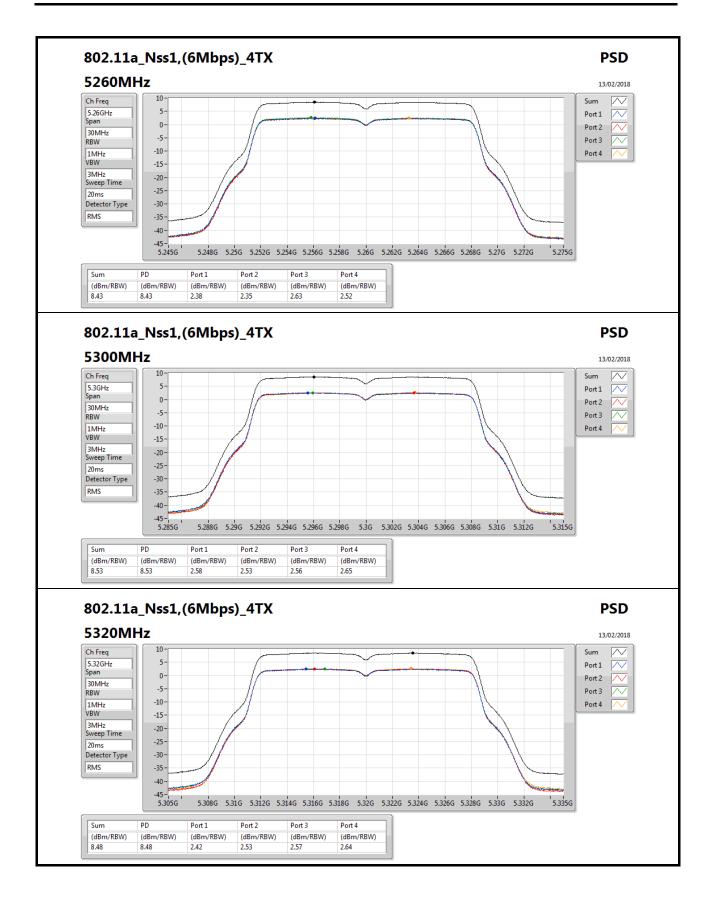
Result

Mode	Result	DG	Port 1	Port 2	Port 3	Port 4	PD	PD Limit	EIRP PD	EIRP PD Limit
		(dBi)	(dBm/RBW)							
802.11a_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
5260MHz	Pass	8.32	2.38	2.35	2.63	2.52	8.43	8.68	16.75	Inf
5300MHz	Pass	8.32	2.58	2.53	2.56	2.65	8.53	8.68	16.85	Inf
5320MHz	Pass	8.32	2.42	2.53	2.57	2.64	8.48	8.68	16.80	Inf
5500MHz	Pass	7.92	2.39	3.42	2.63	3.27	8.88	9.08	16.80	Inf
5580MHz	Pass	7.92	2.88	3.53	2.58	3.29	9.03	9.08	16.95	Inf
5700MHz	Pass	7.92	3.33	3.34	2.30	2.82	8.91	9.08	16.83	Inf
5720MHz Straddle 5.47-5.725GHz	Pass	7.92	3.55	3.26	2.47	3.15	8.97	9.08	16.89	Inf
5720MHz Straddle 5.725-5.85GHz	Pass	7.92	1.38	1.17	0.63	1.18	7.06	28.08	14.98	Inf
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-	=	-	-	-	-	-	=	-	=
5260MHz	Pass	8.32	1.87	1.96	2.09	2.04	7.93	8.68	16.25	Inf
5300MHz	Pass	8.32	2.07	2.07	2.10	2.05	8.00	8.68	16.32	Inf
5320MHz	Pass	8.32	1.79	1.99	2.06	2.15	7.91	8.68	16.23	Inf
5500MHz	Pass	7.92	1.90	2.64	2.09	2.90	8.31	9.08	16.23	Inf
5580MHz	Pass	7.92	2.57	2.87	2.10	2.69	8.51	9.08	16.43	Inf
5700MHz	Pass	7.92	2.87	2.74	1.86	2.20	8.40	9.08	16.32	Inf
5720MHz Straddle 5.47-5.725GHz	Pass	7.92	2.99	2.78	2.14	2.72	8.62	9.08	16.54	Inf
5720MHz Straddle 5.725-5.85GHz	Pass	7.92	1.27	1.07	0.56	1.16	6.99	28.08	14.91	Inf
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5270MHz	Pass	8.32	-0.83	-0.91	-0.60	-0.98	5.11	8.68	13.43	Inf
5310MHz	Pass	8.32	-0.81	-0.77	-0.82	-0.76	5.12	8.68	13.44	Inf
5510MHz	Pass	7.92	-0.58	0.48	-0.58	0.03	5.73	9.08	13.65	Inf
5550MHz	Pass	7.92	-0.86	0.05	-1.04	-0.59	5.32	9.08	13.24	Inf
5670MHz	Pass	7.92	0.10	-0.09	-0.98	-0.14	5.68	9.08	13.60	Inf
5710MHz Straddle 5.47-5.725GHz	Pass	7.92	0.71	0.51	-0.54	-0.01	6.11	9.08	14.03	Inf
5710MHz Straddle 5.725-5.85GHz	Pass	7.92	-1.61	-1.85	-2.55	-2.33	3.87	28.08	11.79	Inf
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5290MHz	Pass	8.32	-3.32	-3.53	-3.11	-3.26	2.64	8.68	10.96	Inf
5530MHz	Pass	7.92	-3.83	-2.80	-3.87	-3.27	2.46	9.08	10.38	Inf
5690MHz Straddle 5.47-5.725GHz	Pass	7.92	-2.75	-2.82	-3.44	-3.06	2.85	9.08	10.77	Inf
5690MHz Straddle 5.725-5.85GHz	Pass	7.92	-4.86	-5.17	-5.69	-5.42	0.63	28.08	8.55	Inf

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;

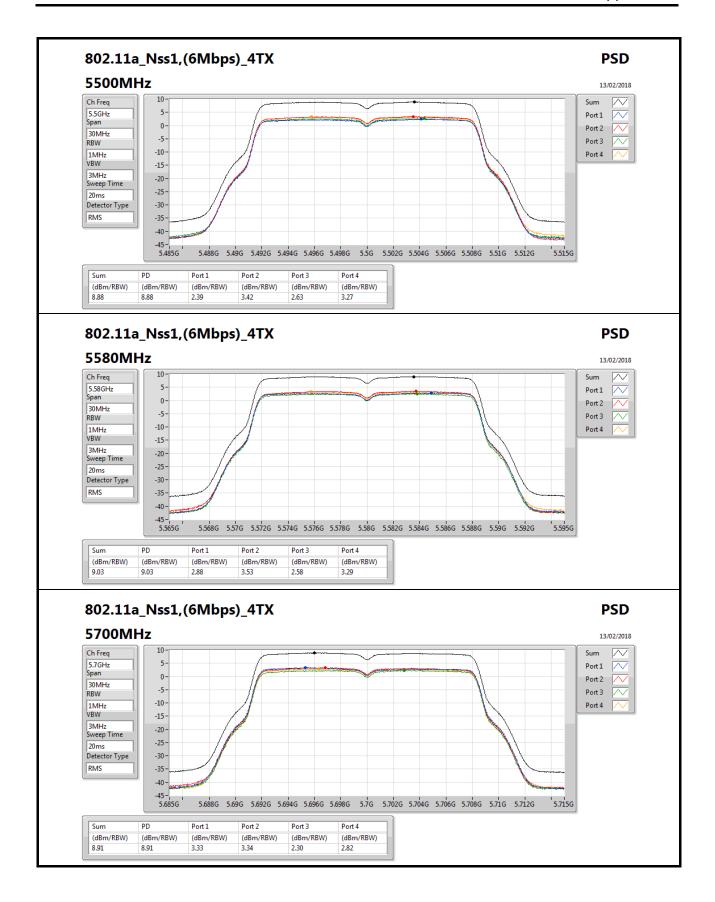
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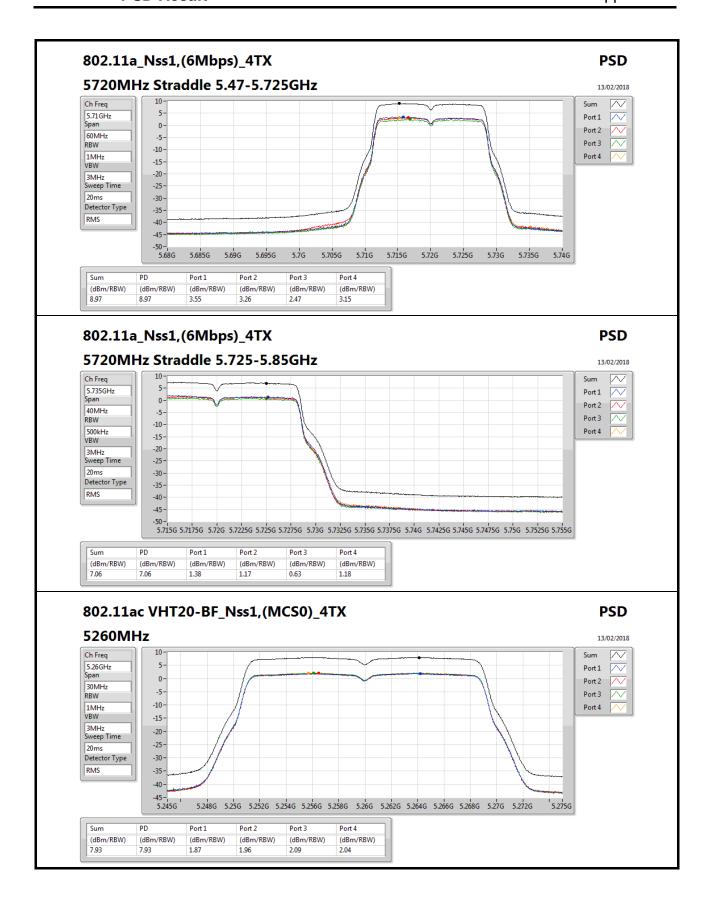
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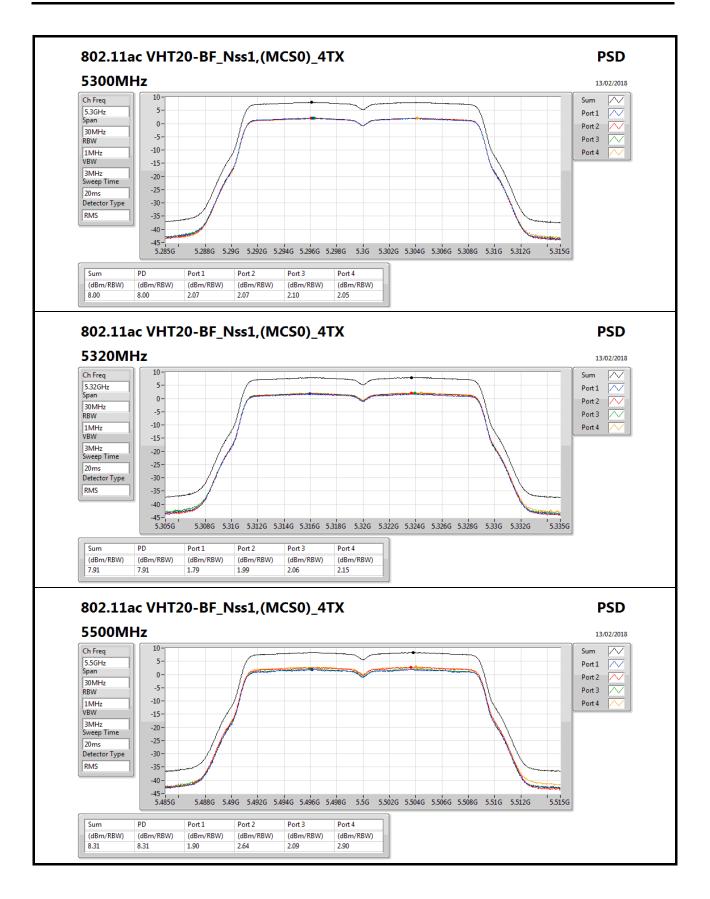
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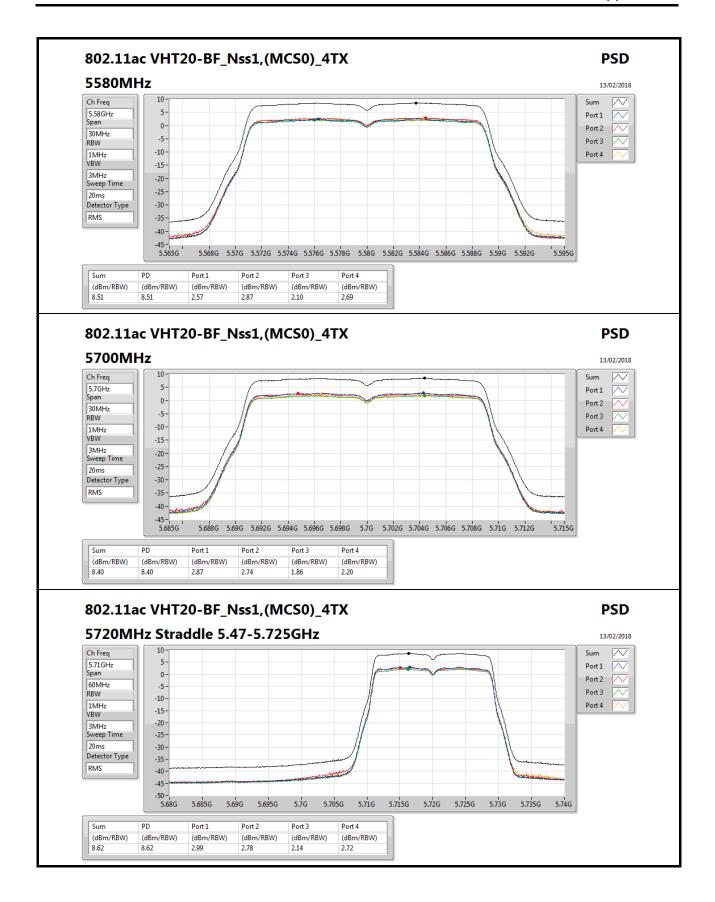




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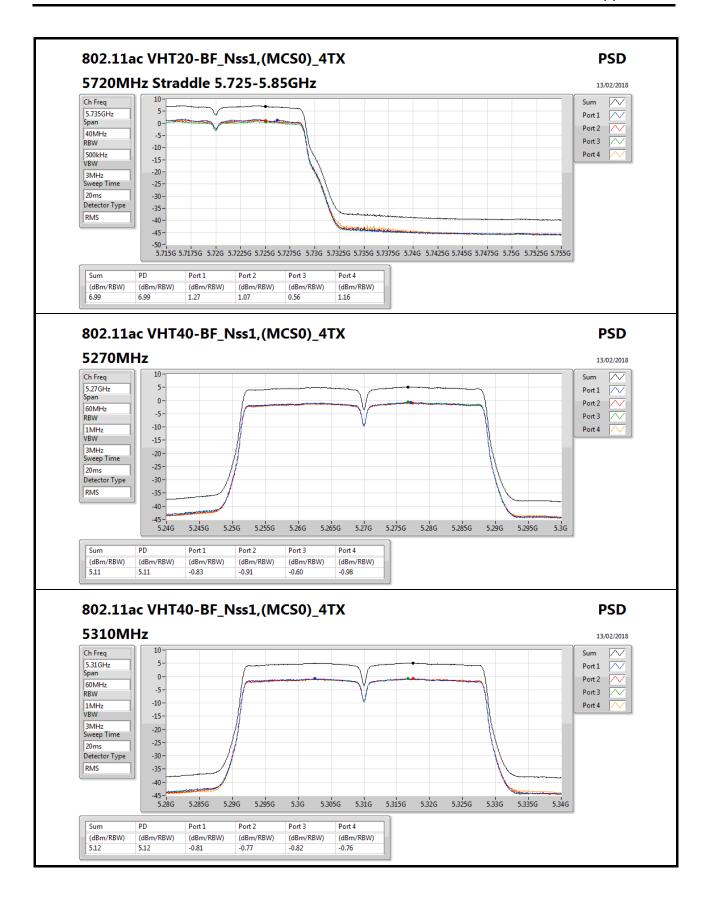
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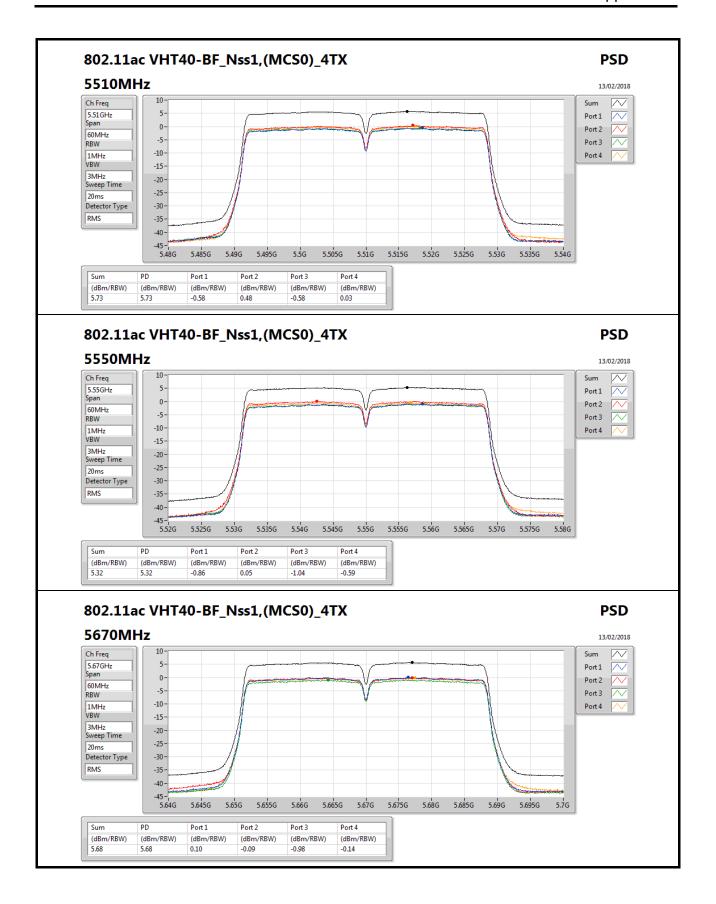
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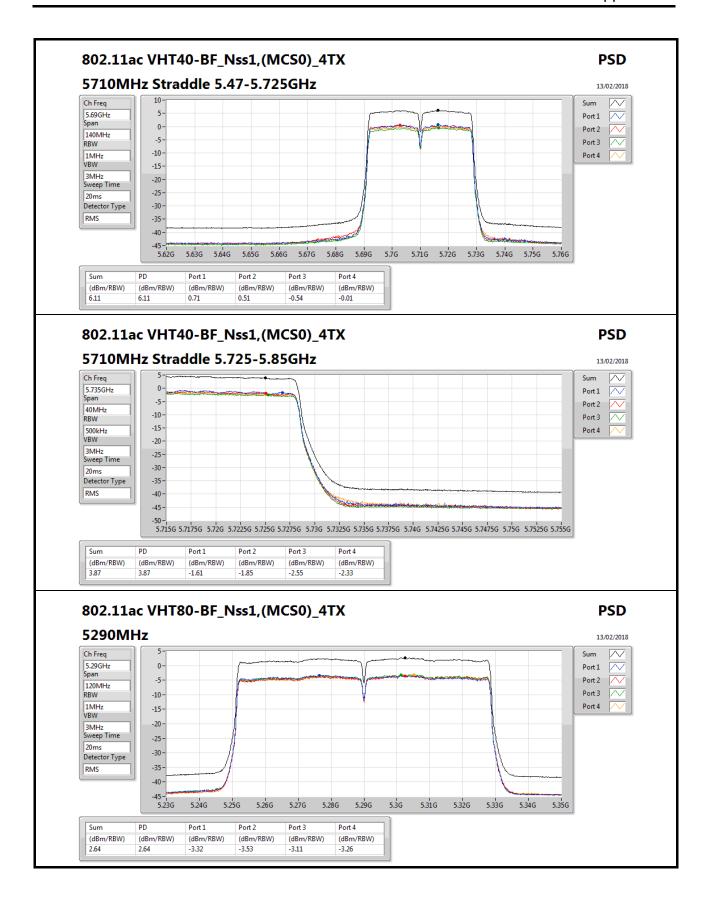


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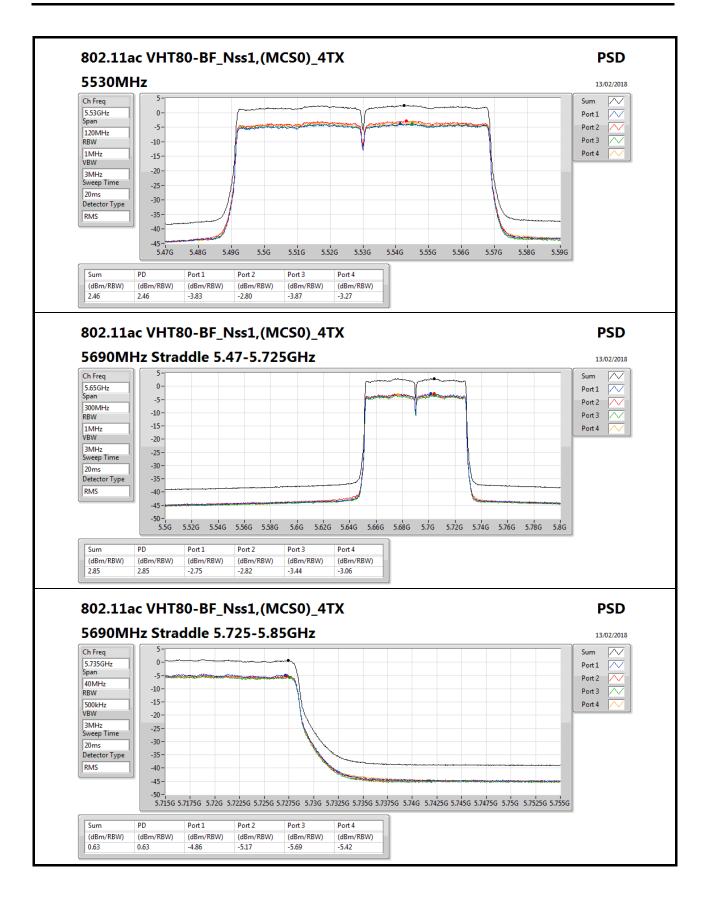




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RSE TX above 1GHz Result

Appendix D

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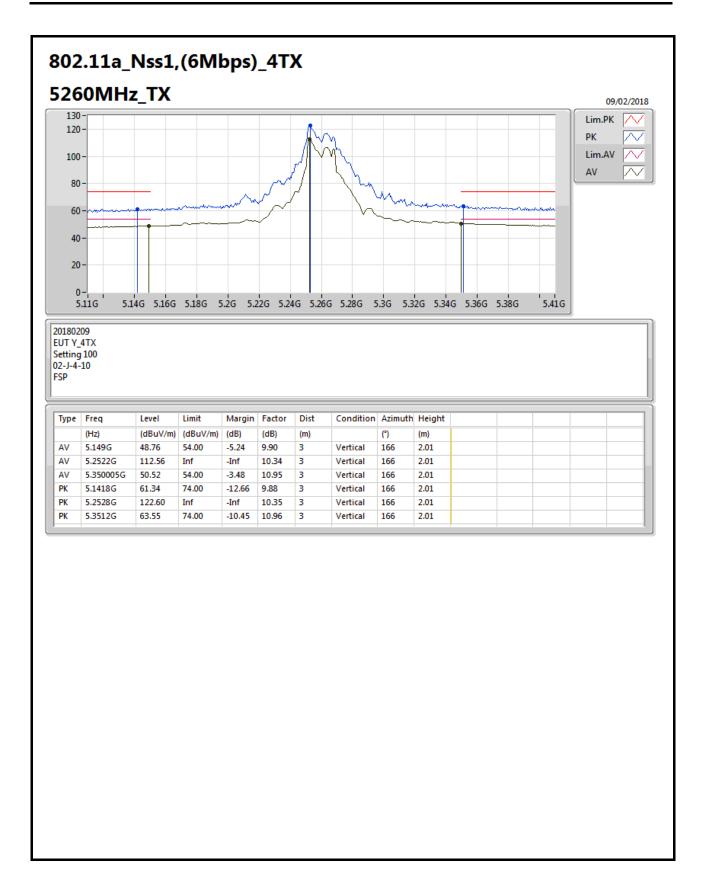
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
5.25-5.35GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11a_Nss1,(6Mbps)_4TX	Pass	AV	5.3524G	53.97	54.00	-0.03	10.96	3	Vertical	165	1.03	-

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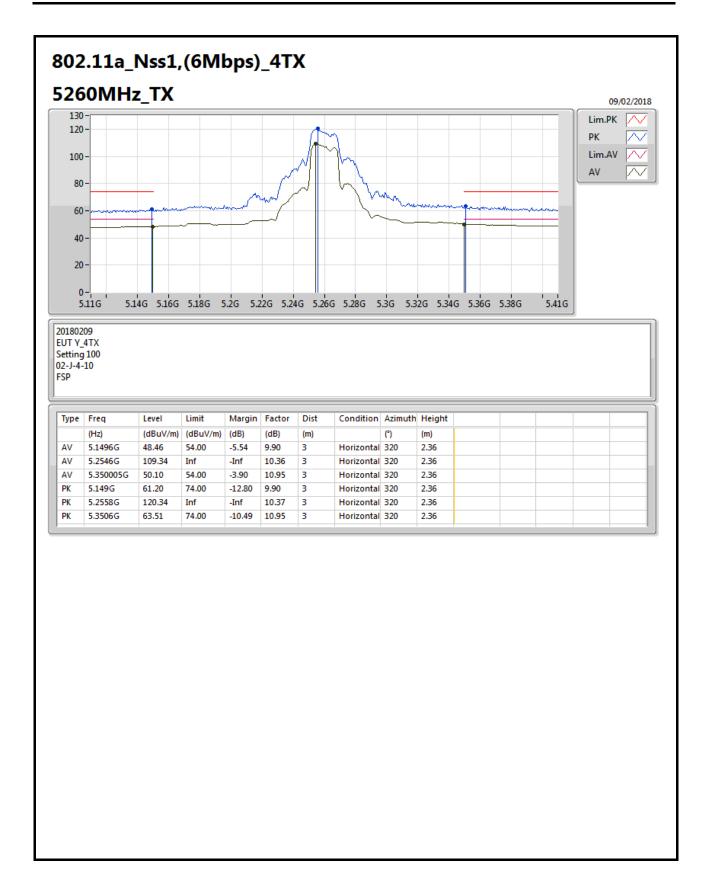
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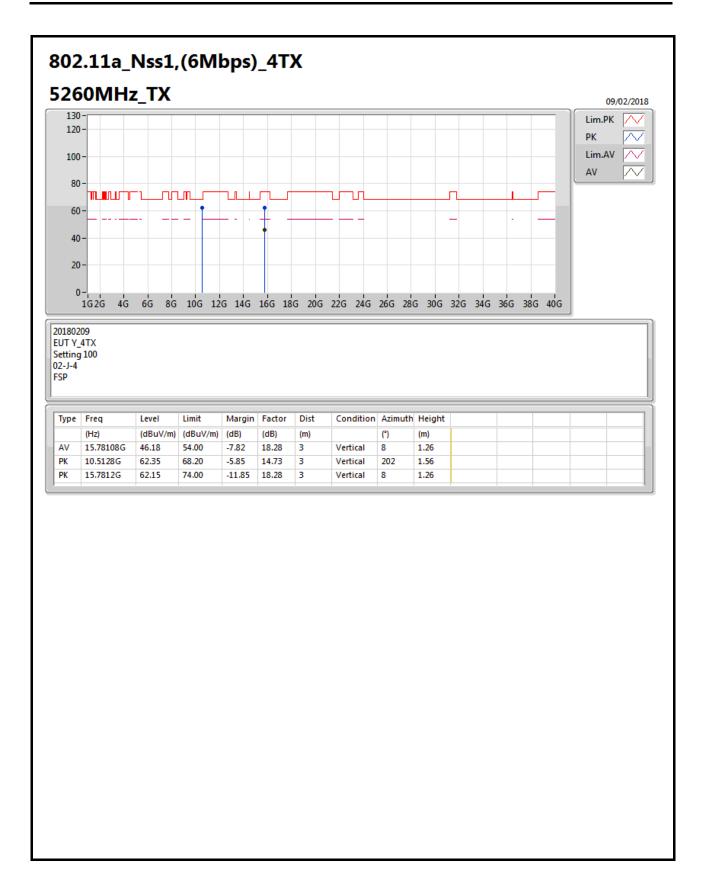


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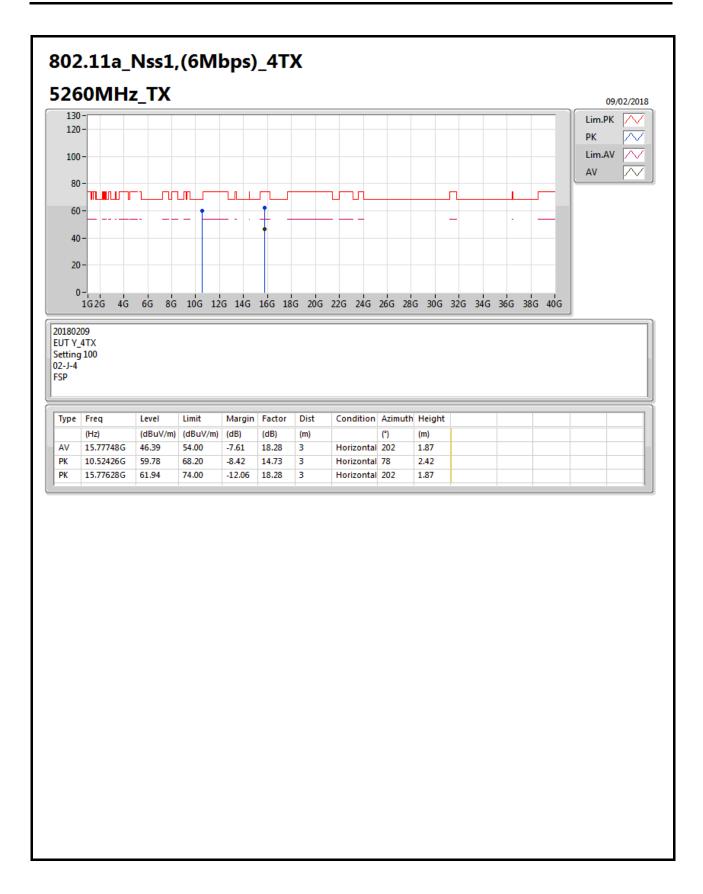






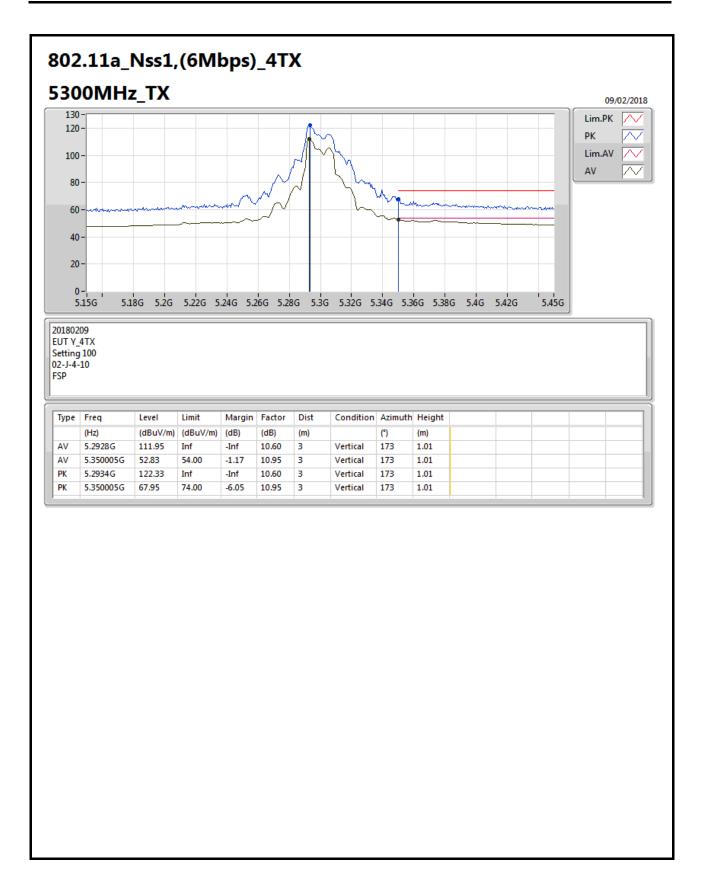






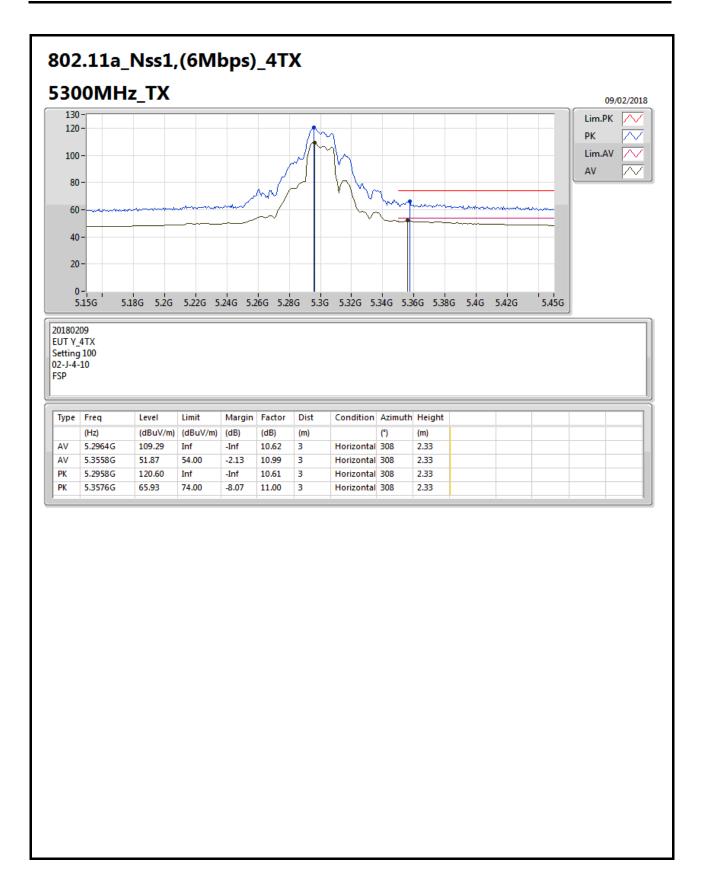
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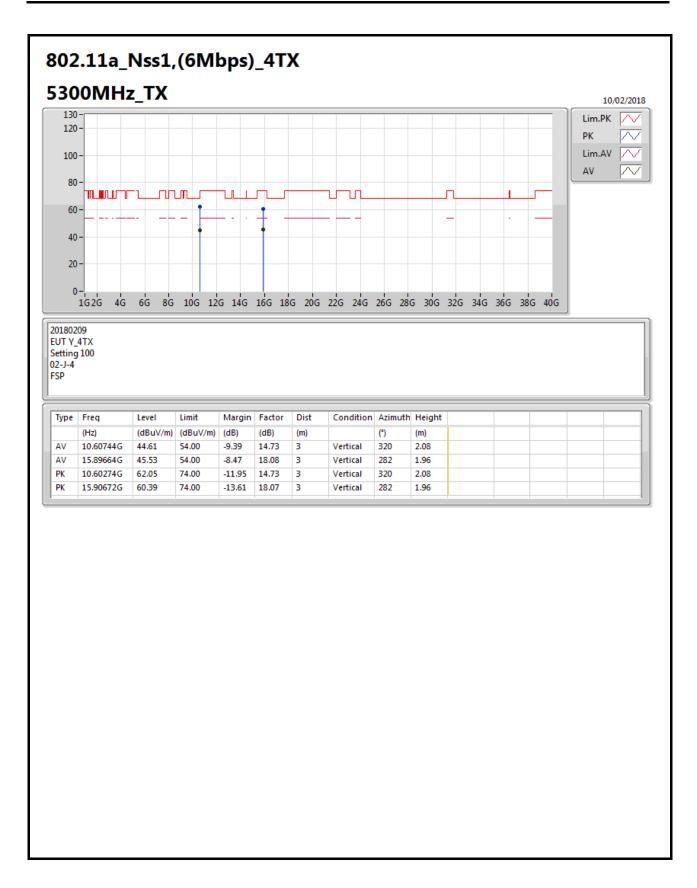


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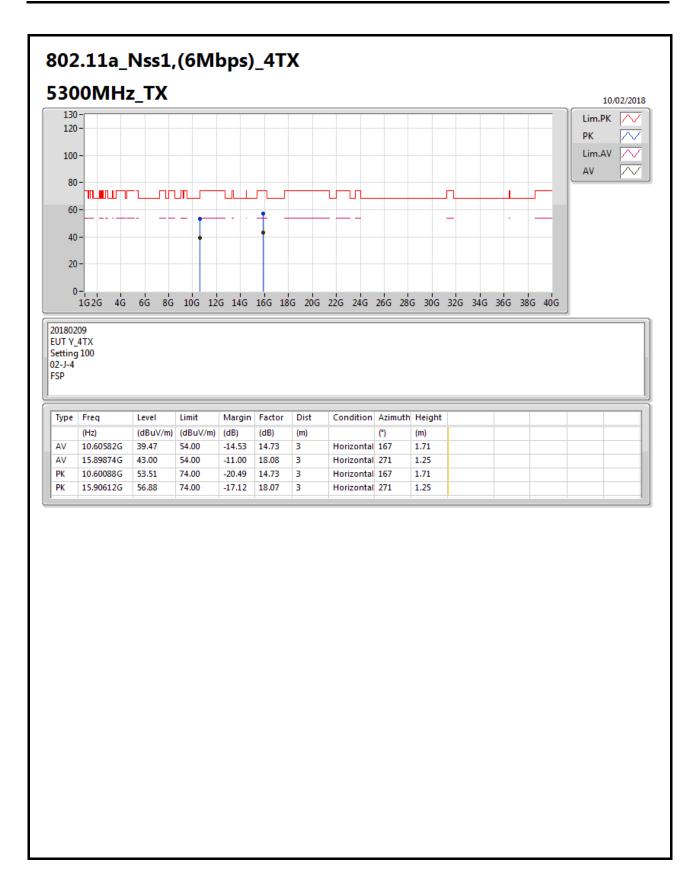




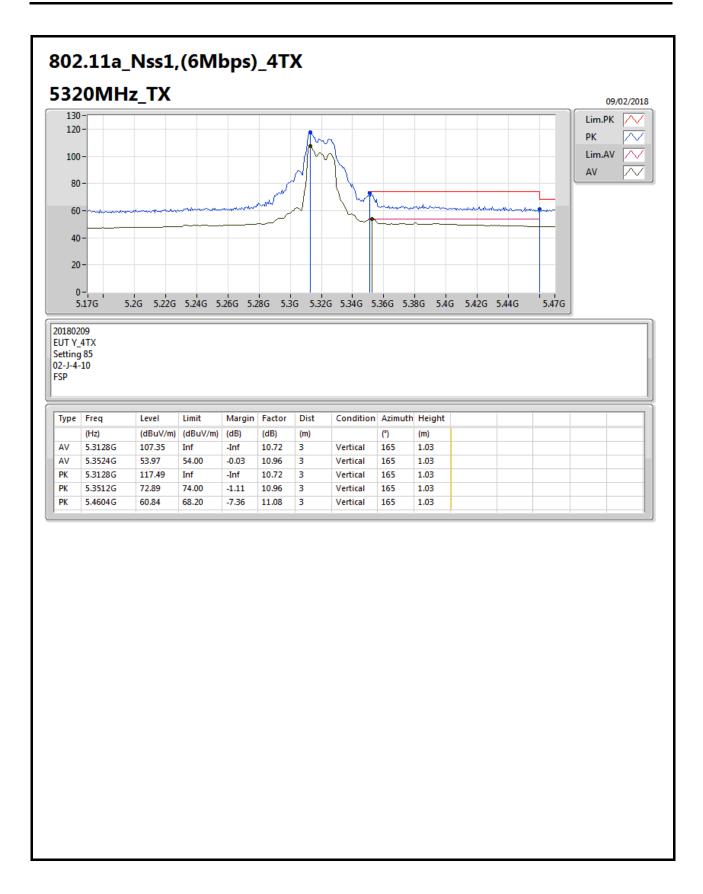






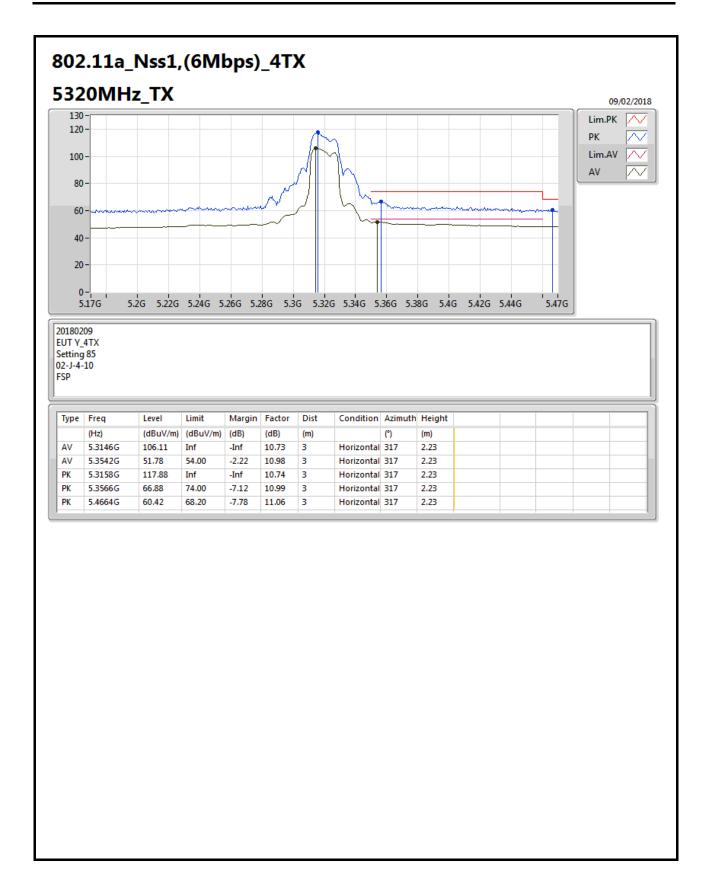






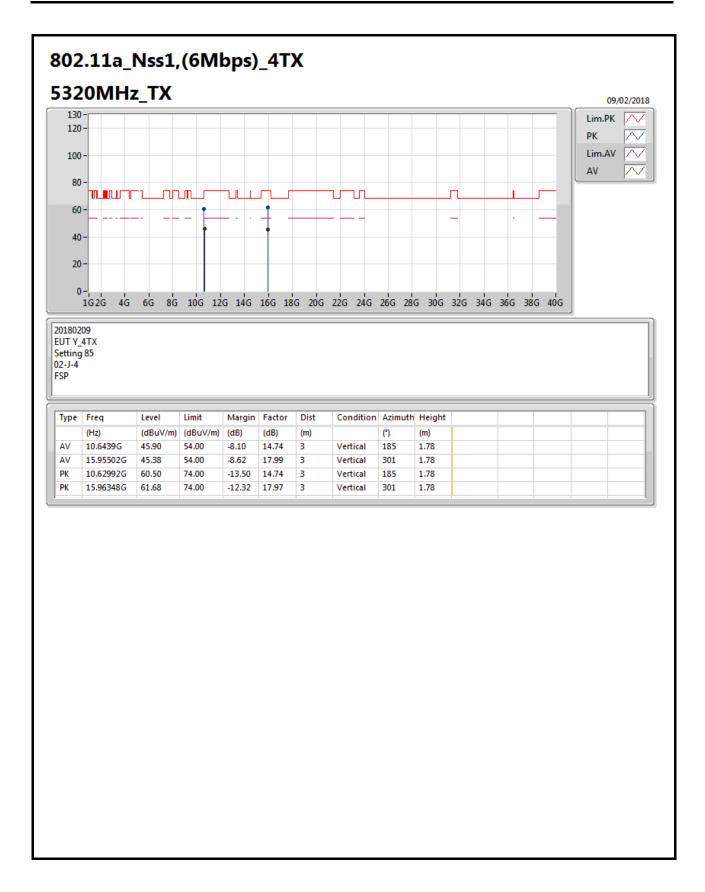
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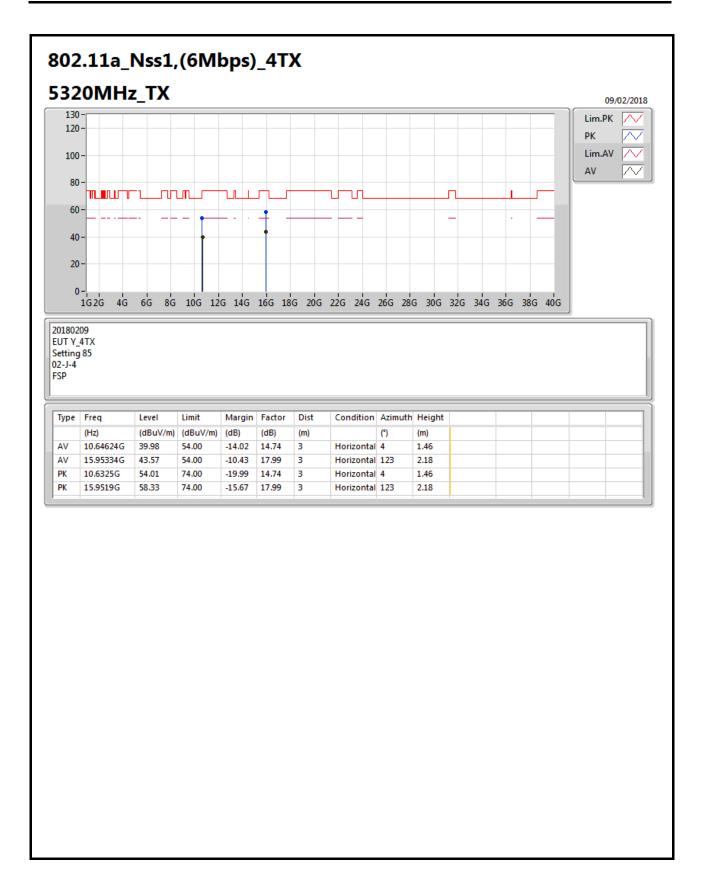


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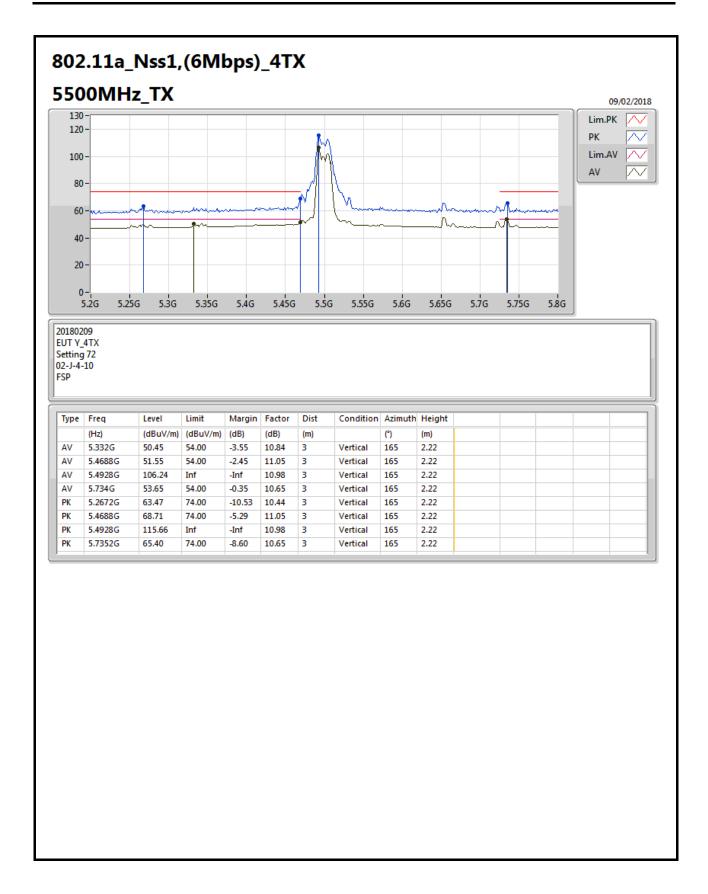






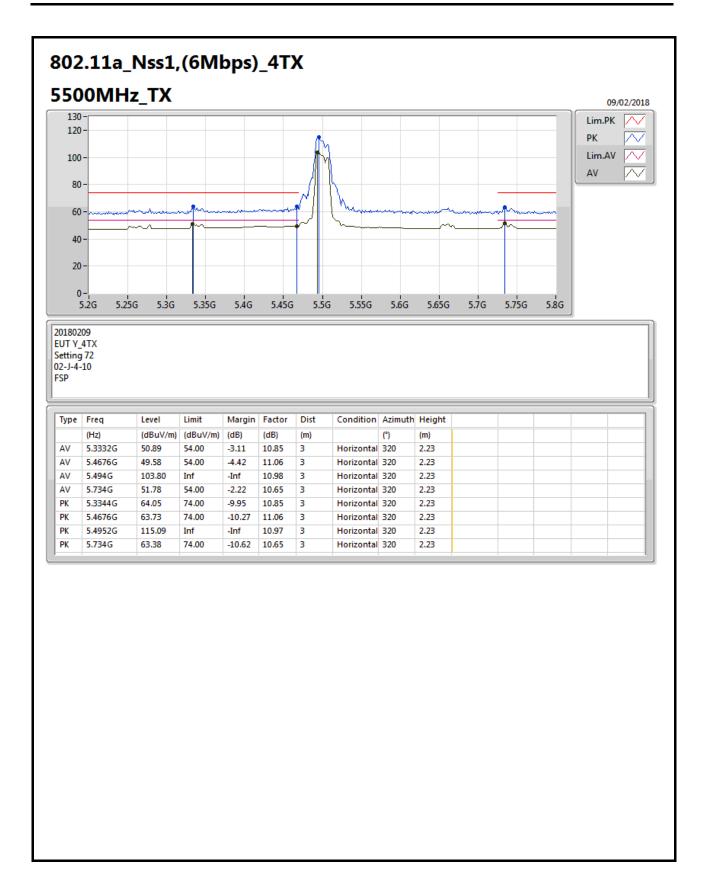
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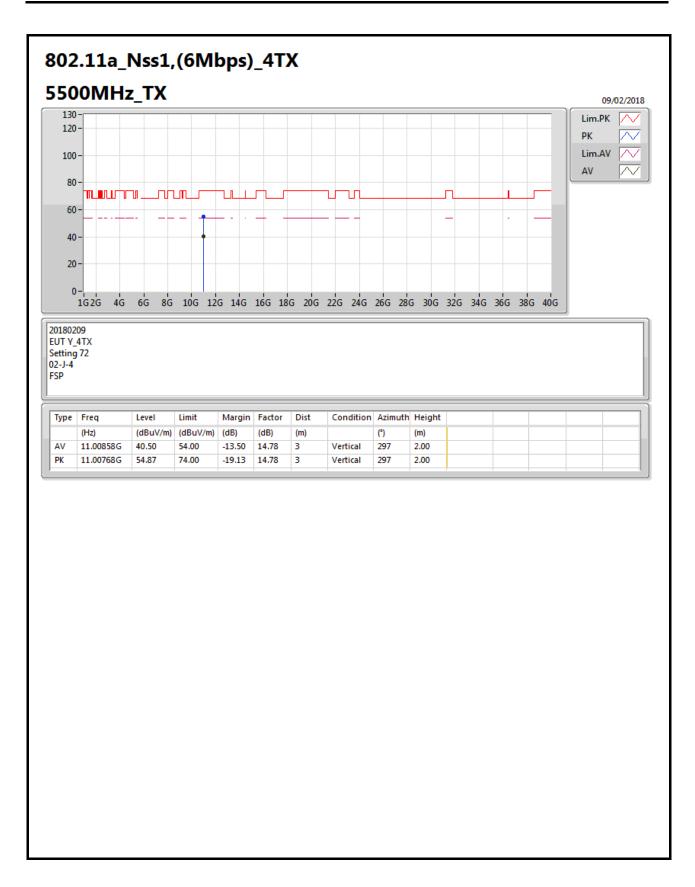


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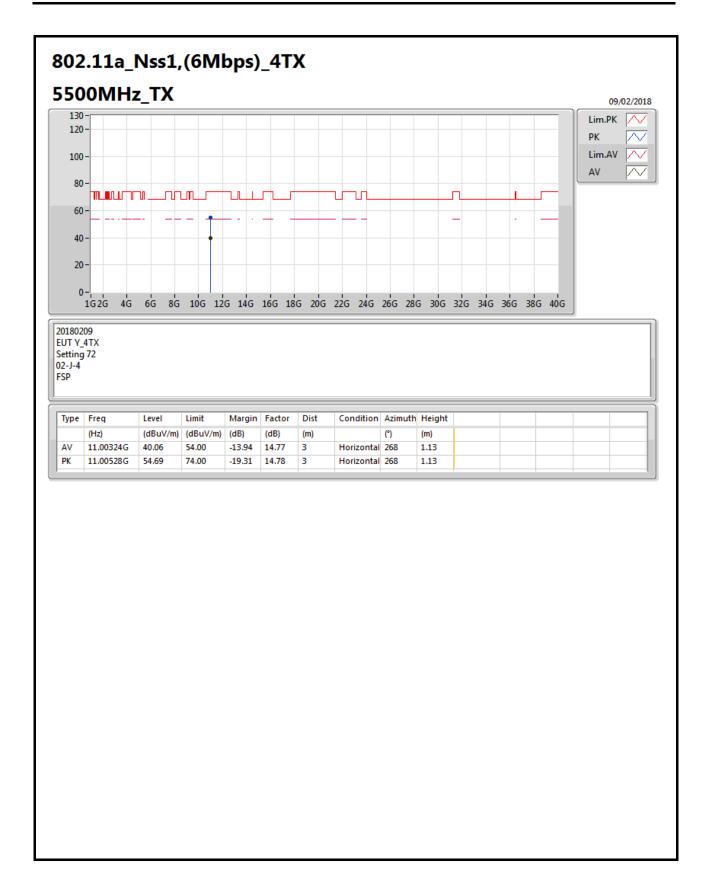




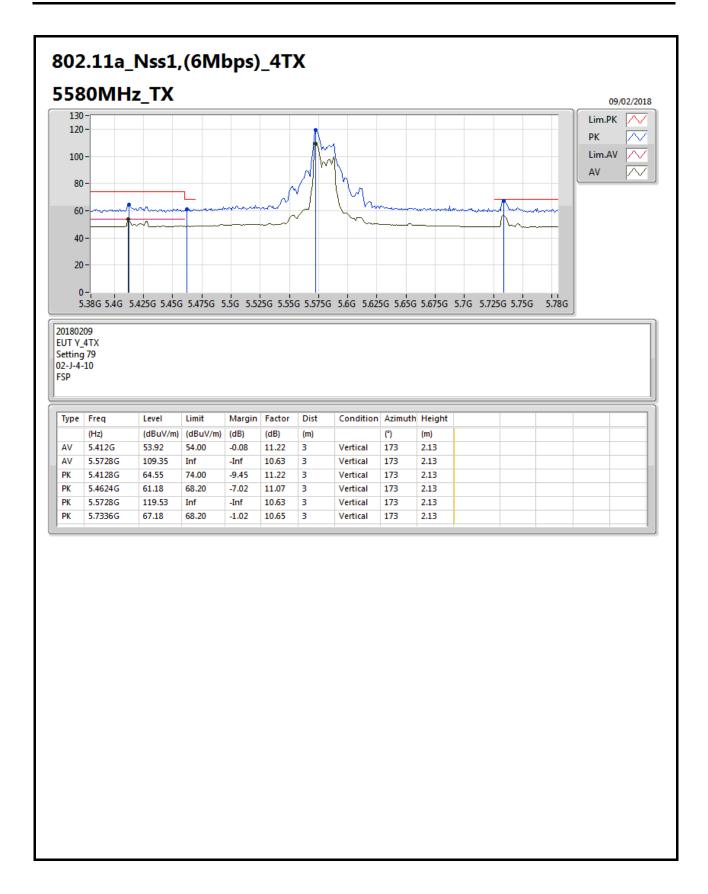


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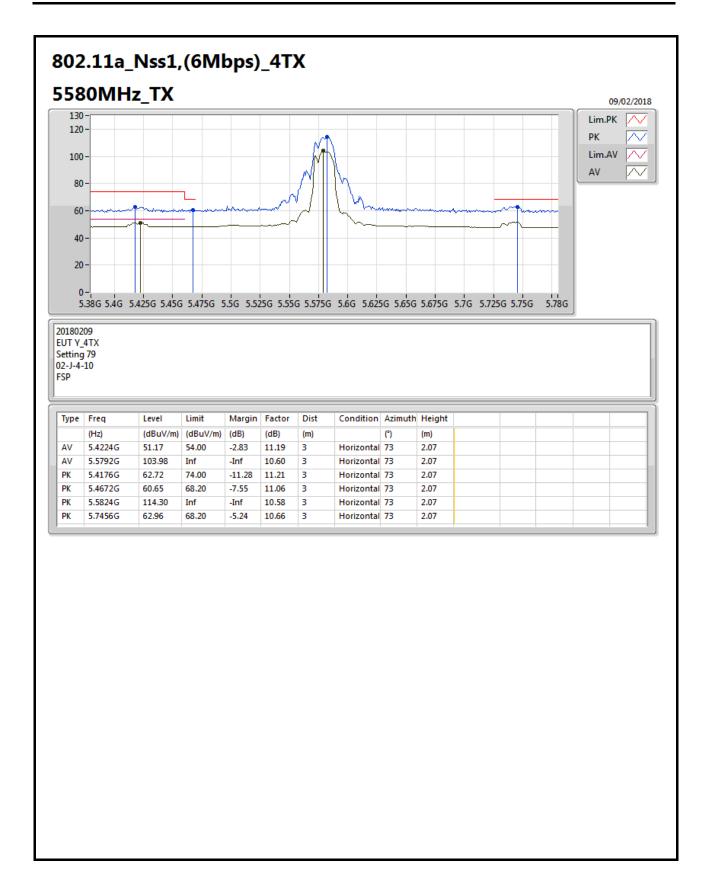




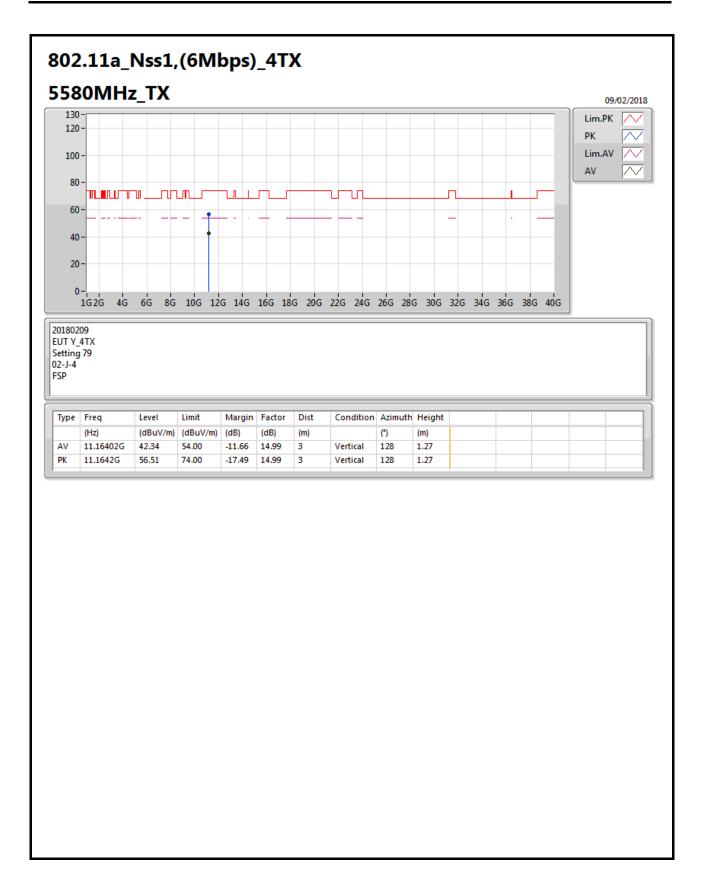






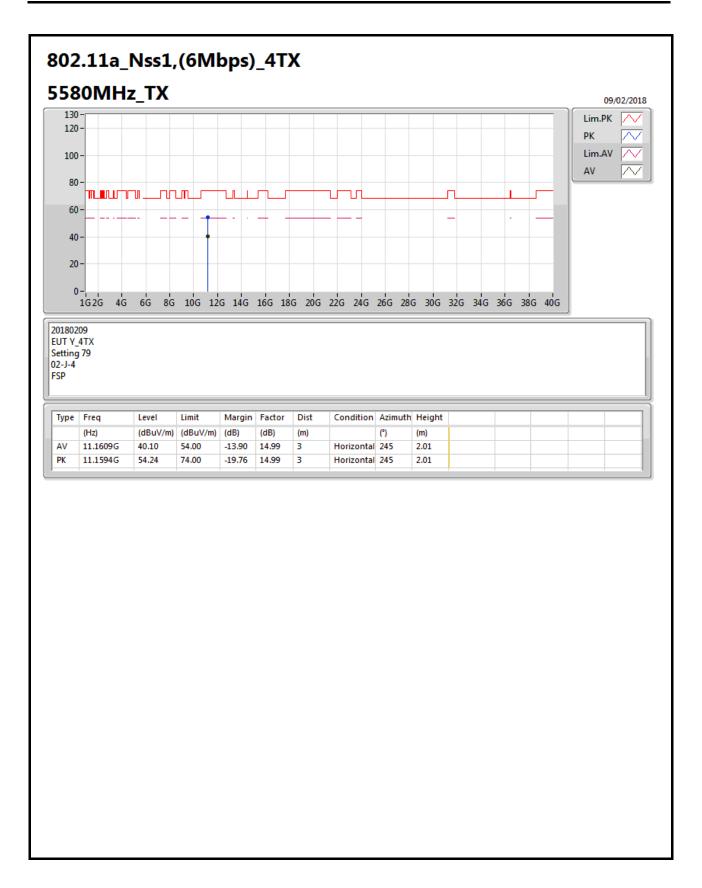






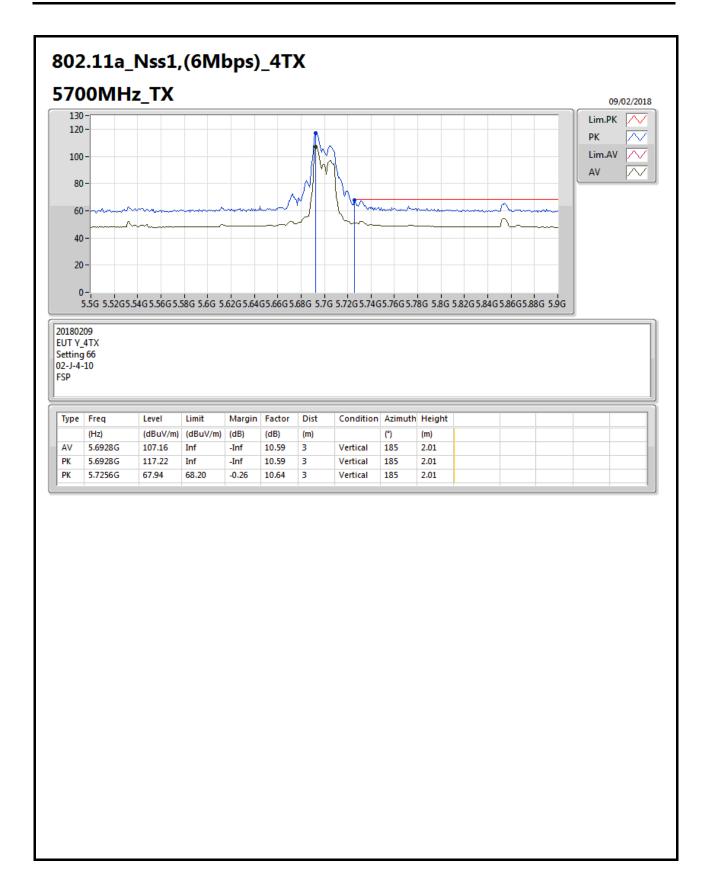
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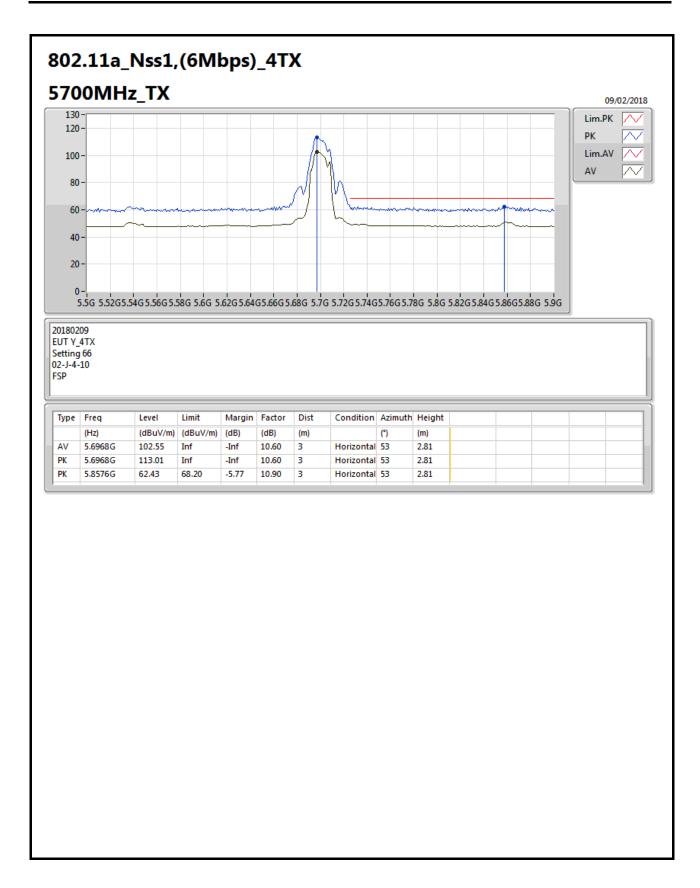
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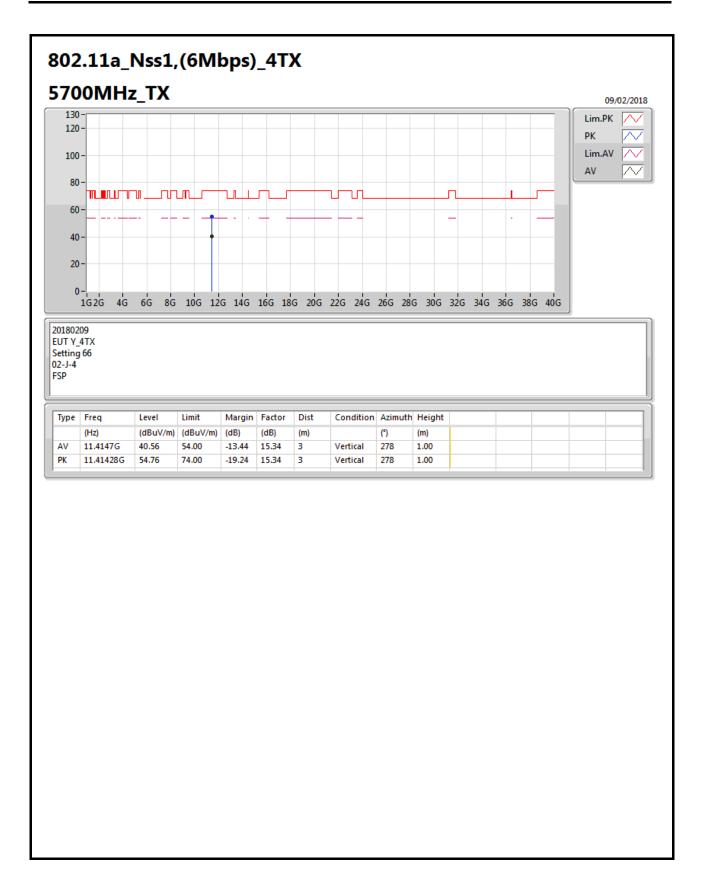


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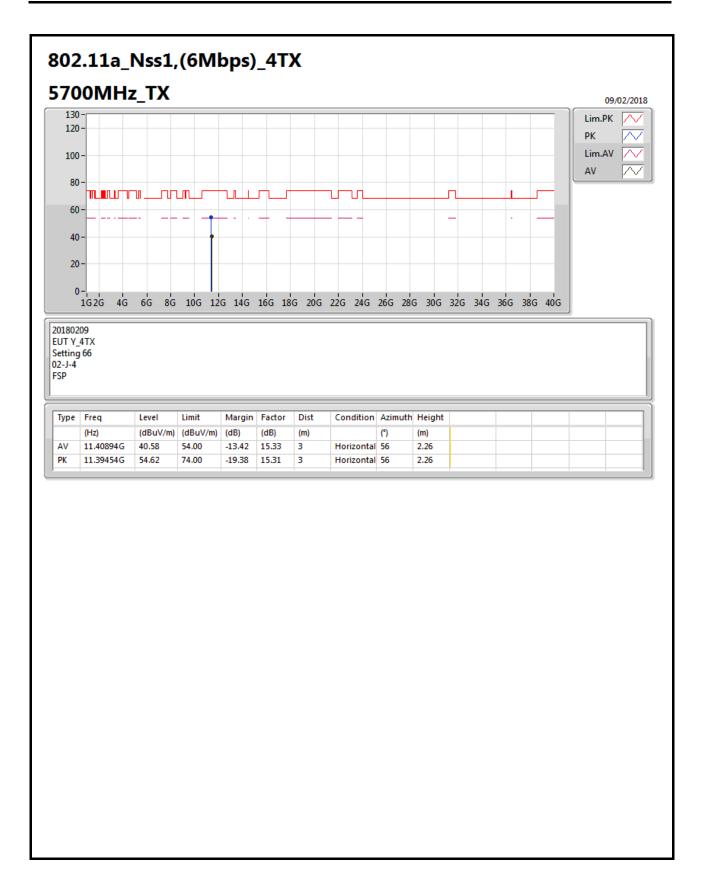




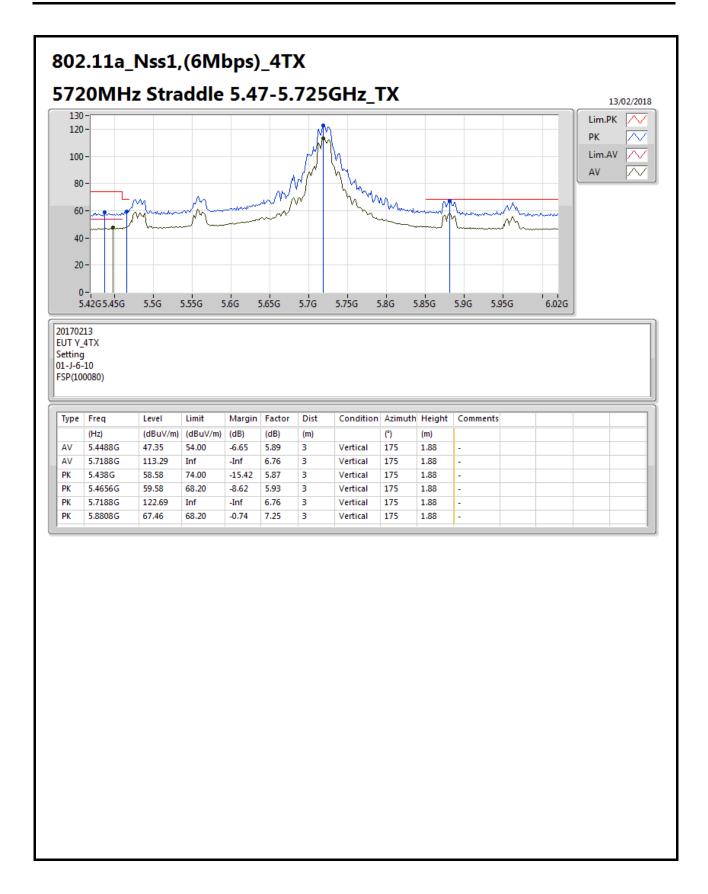






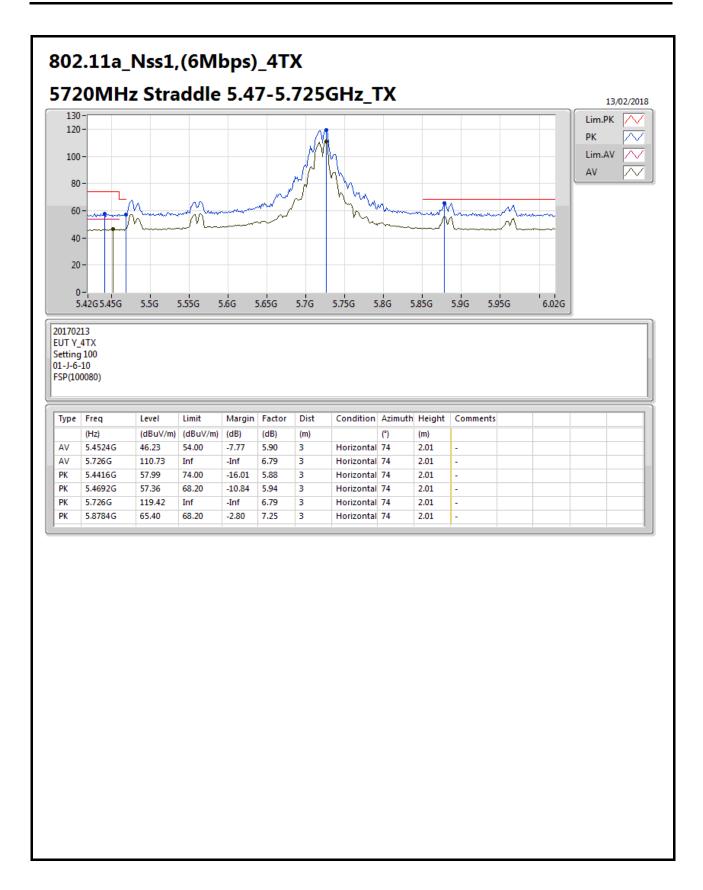






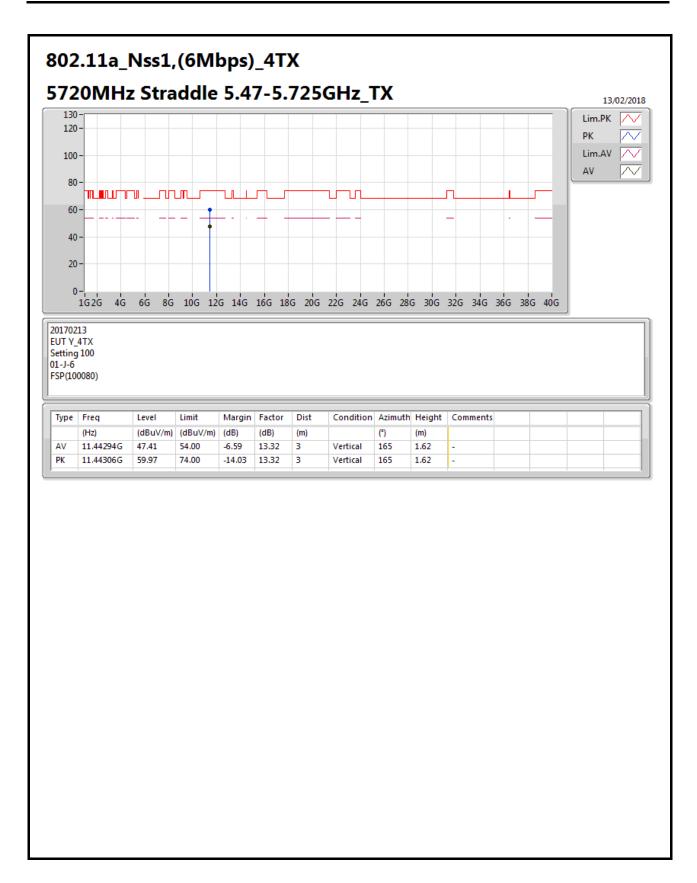
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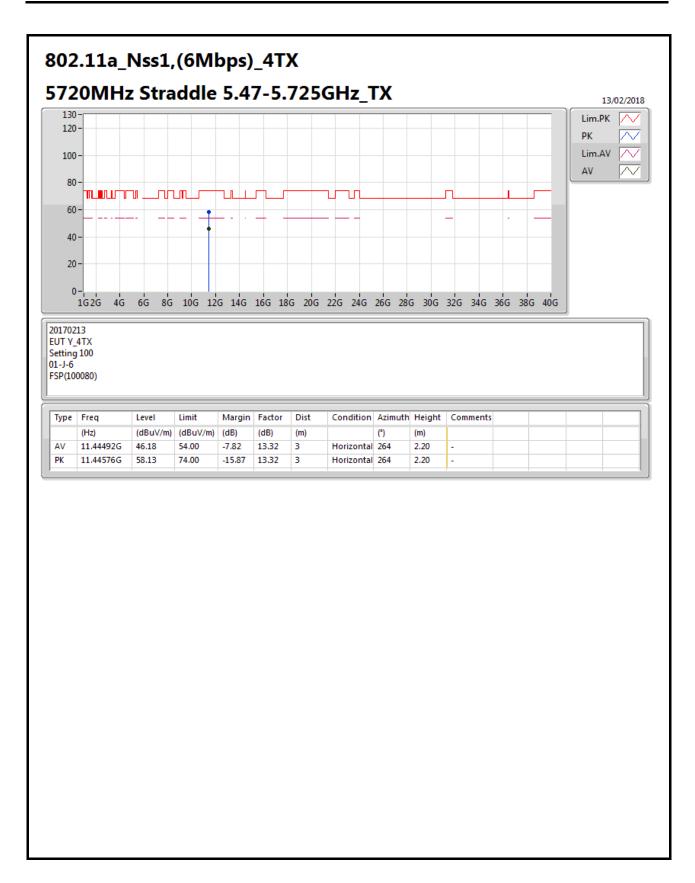
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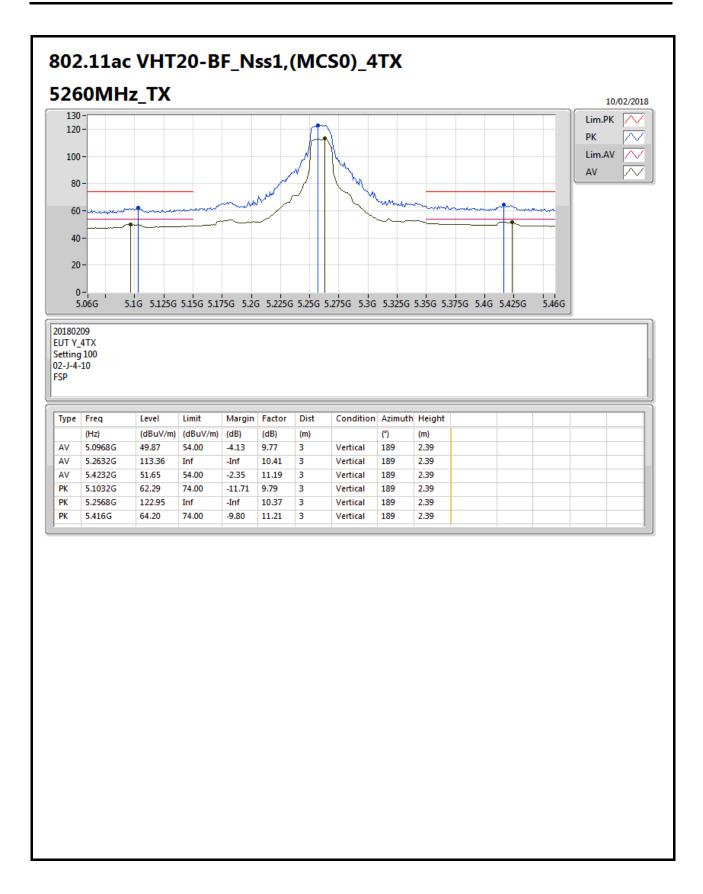


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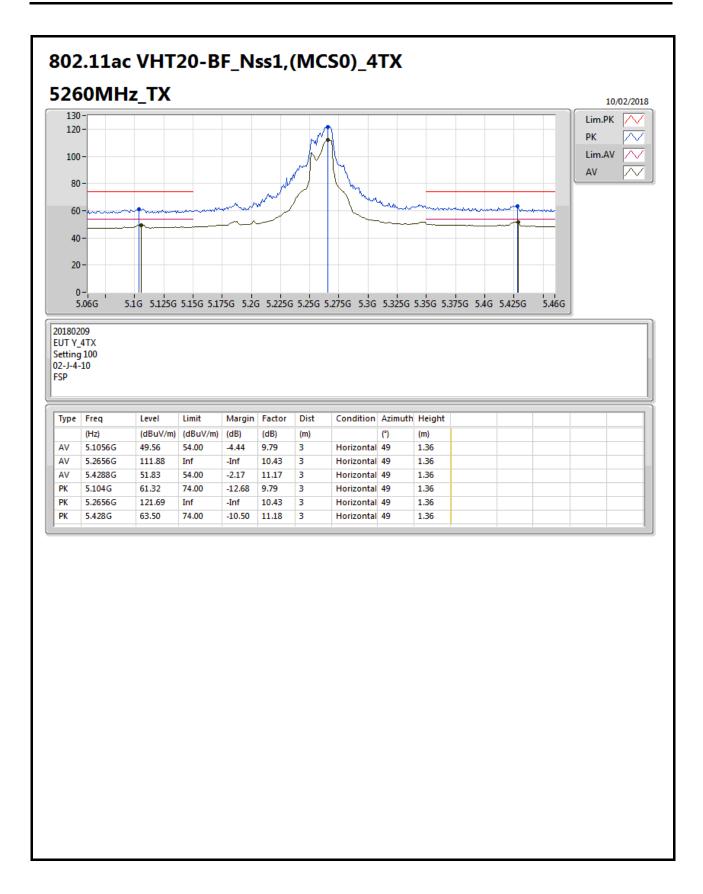






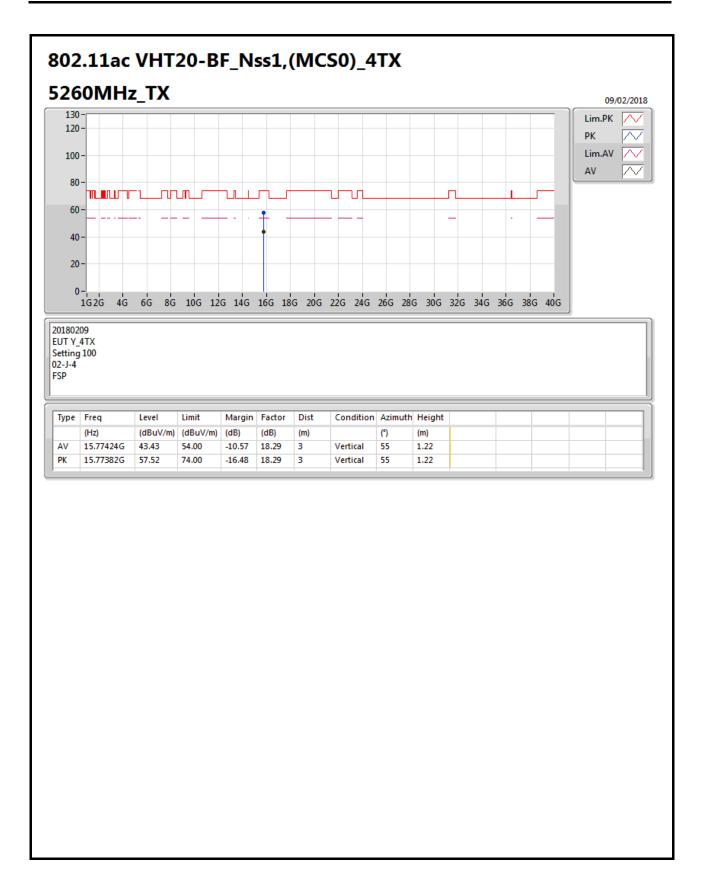




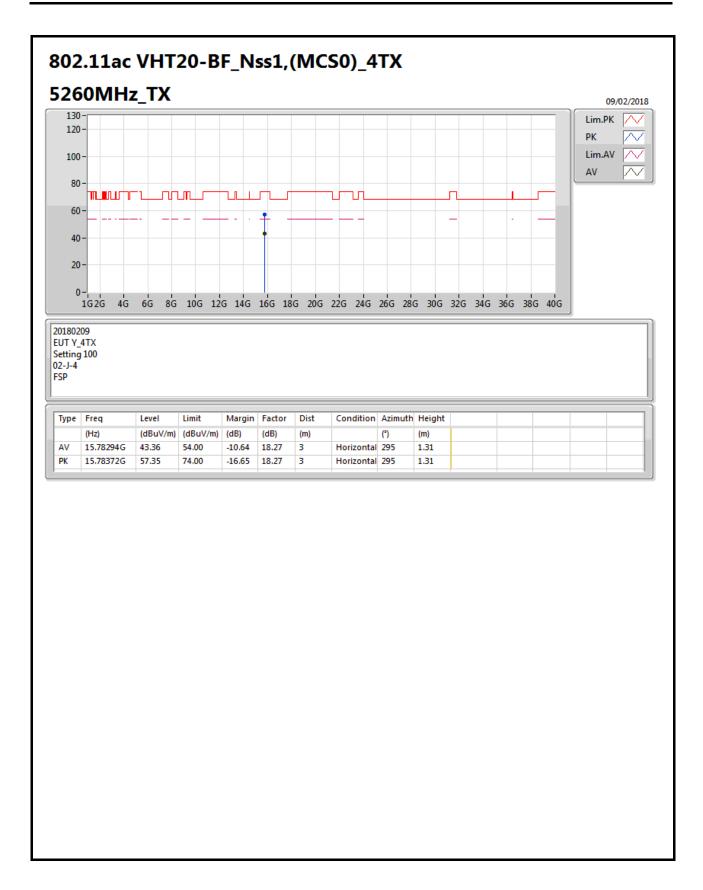


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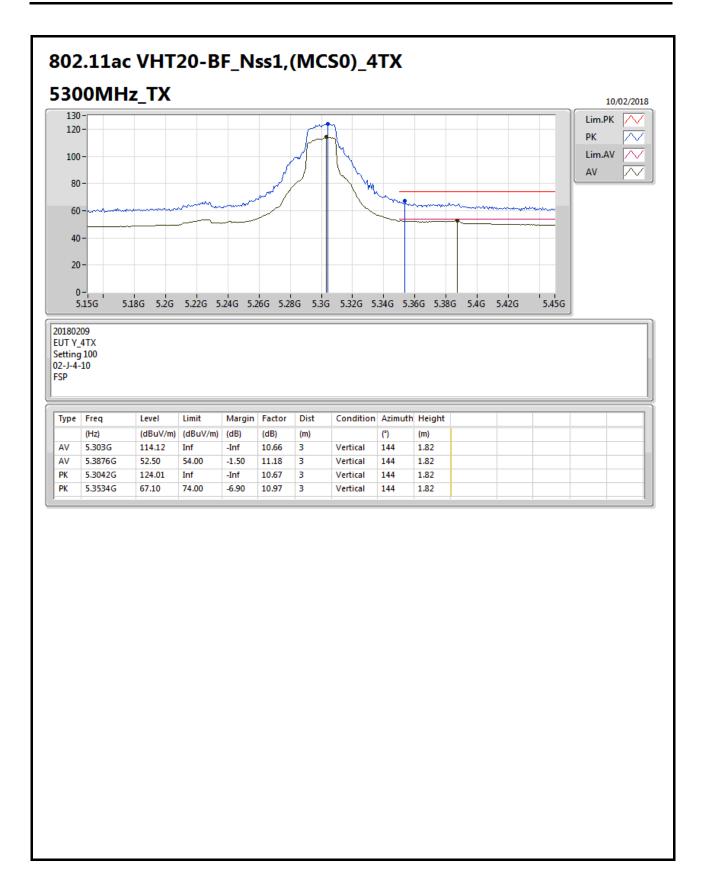






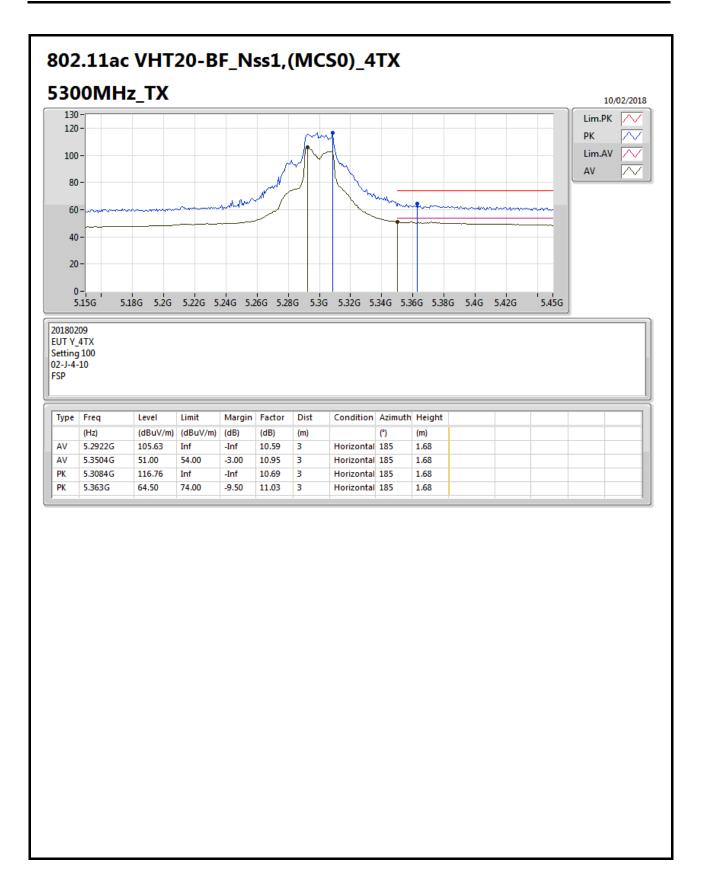




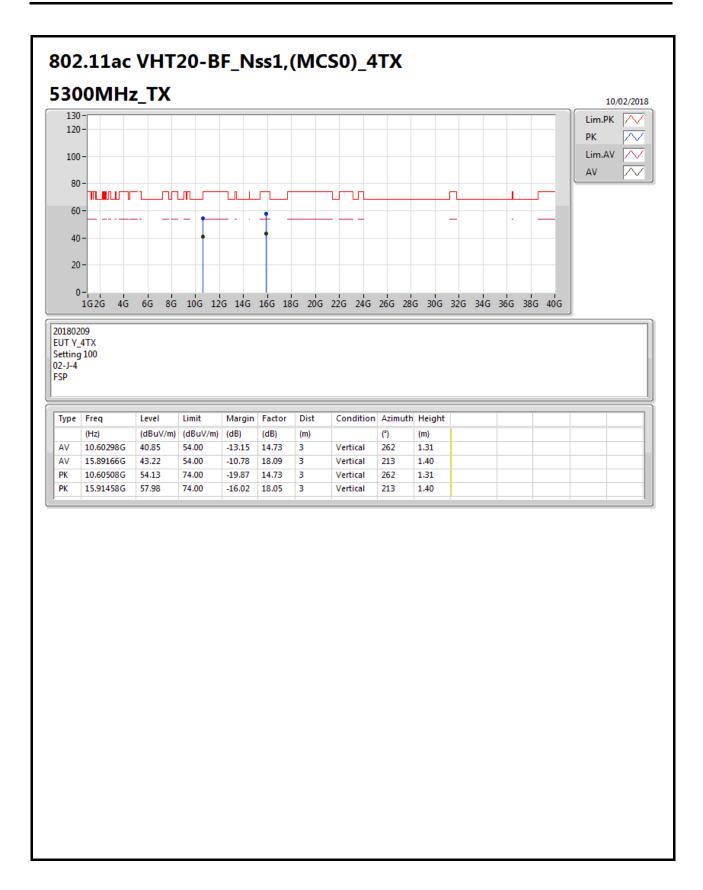


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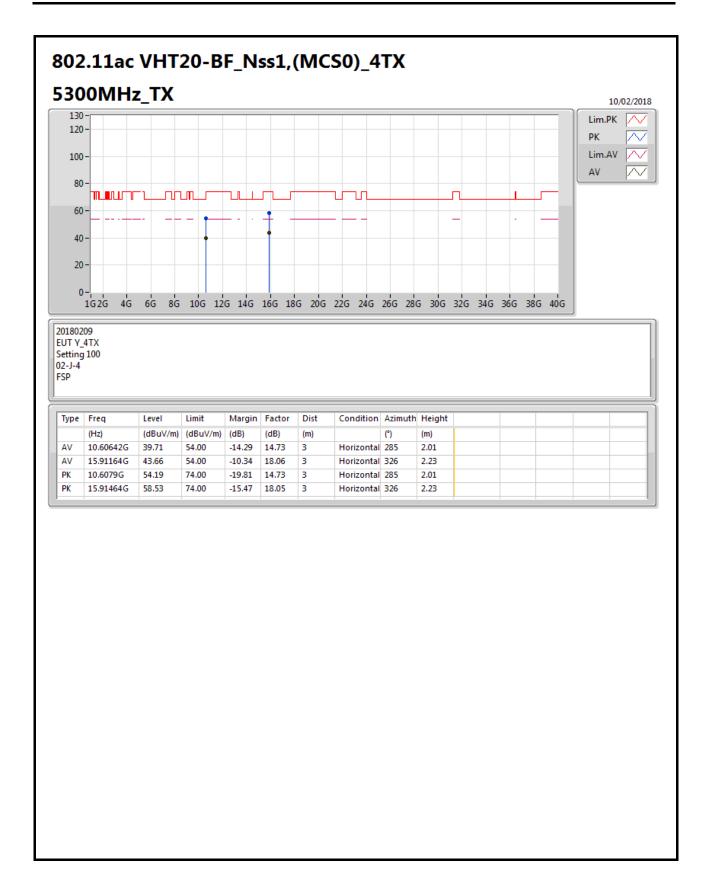




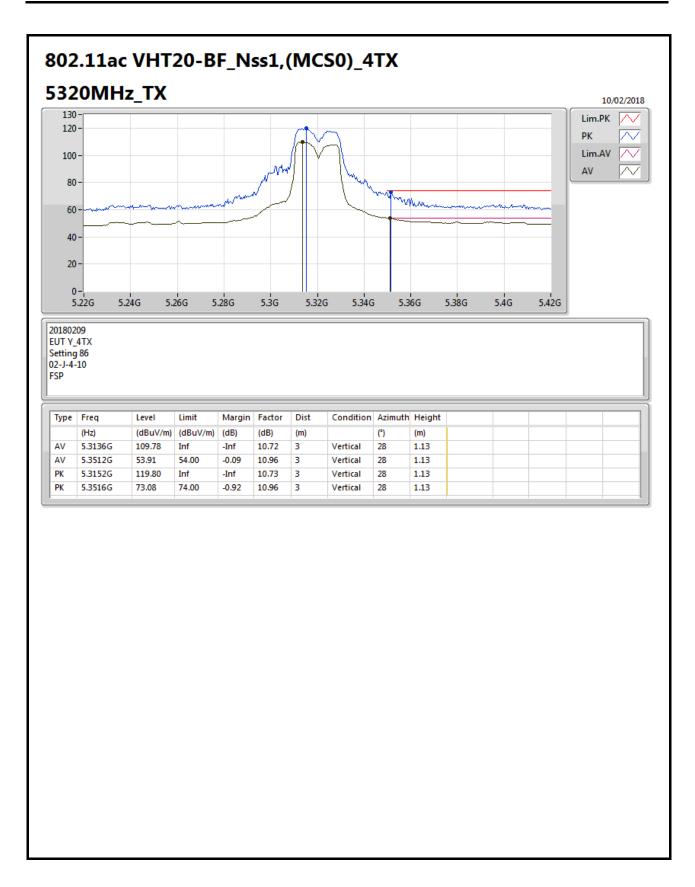




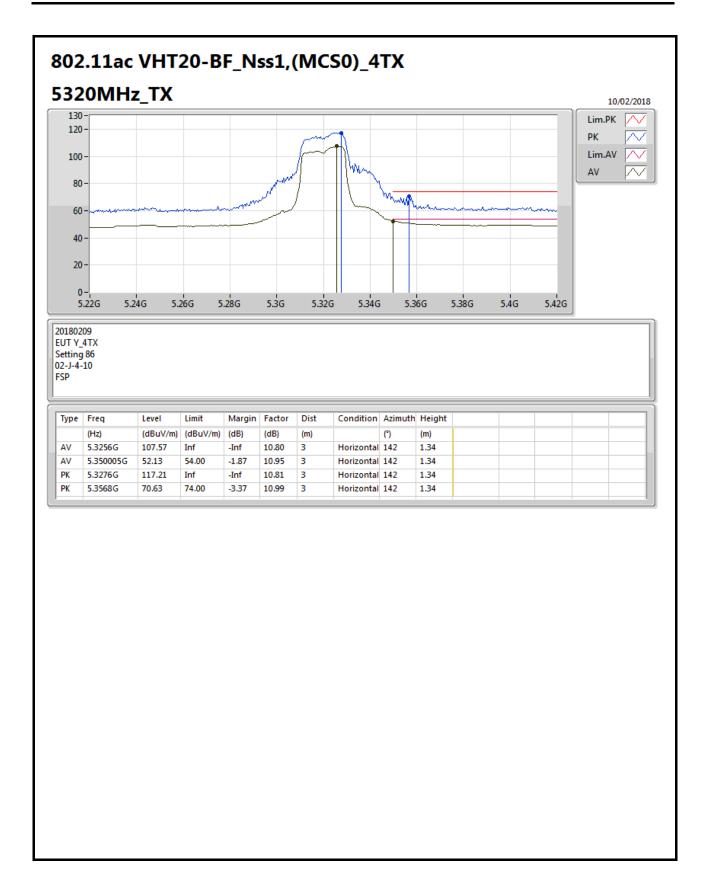




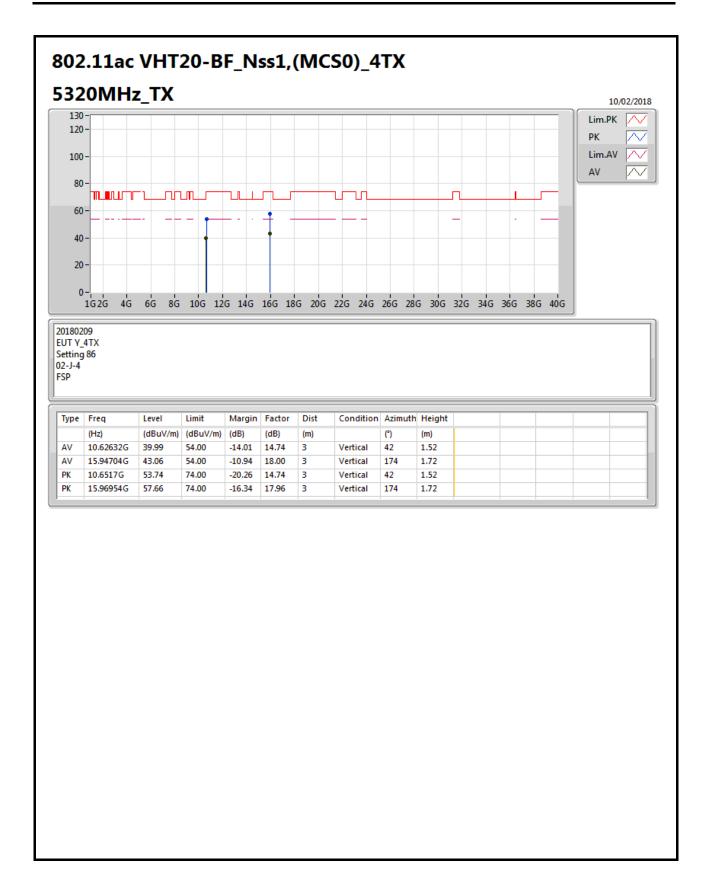






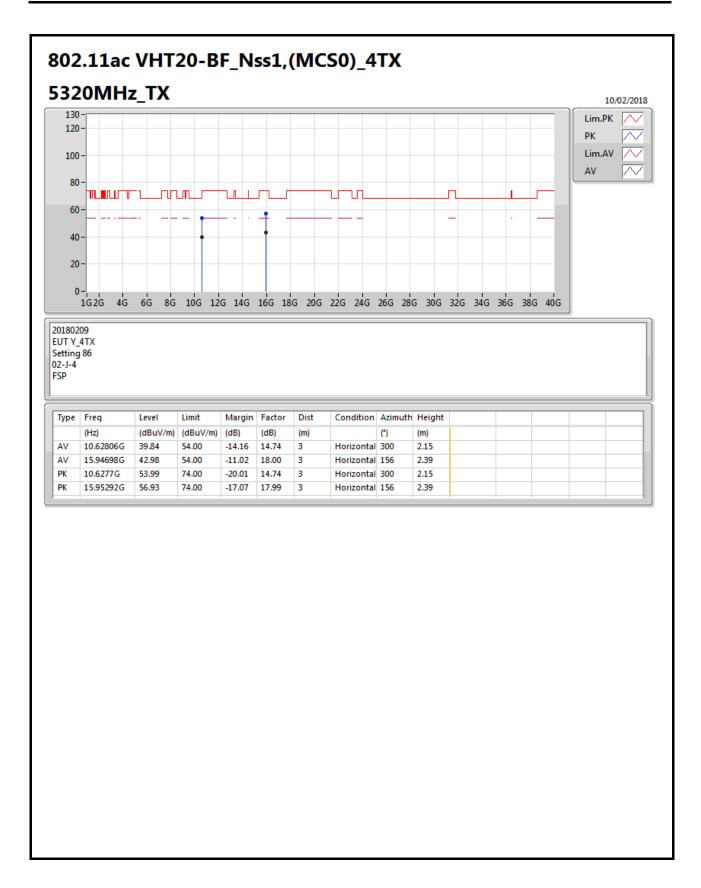




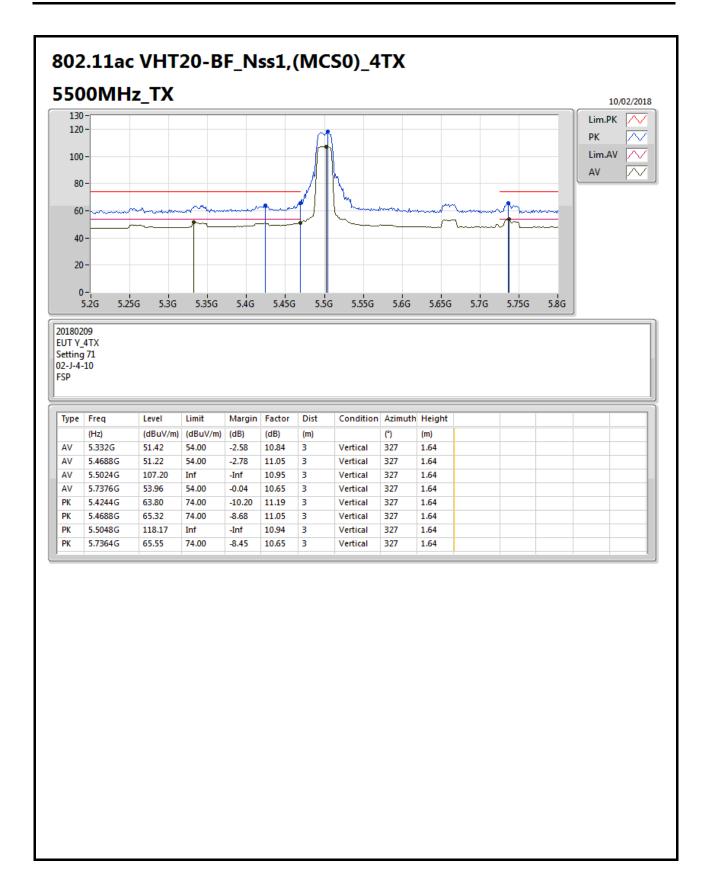


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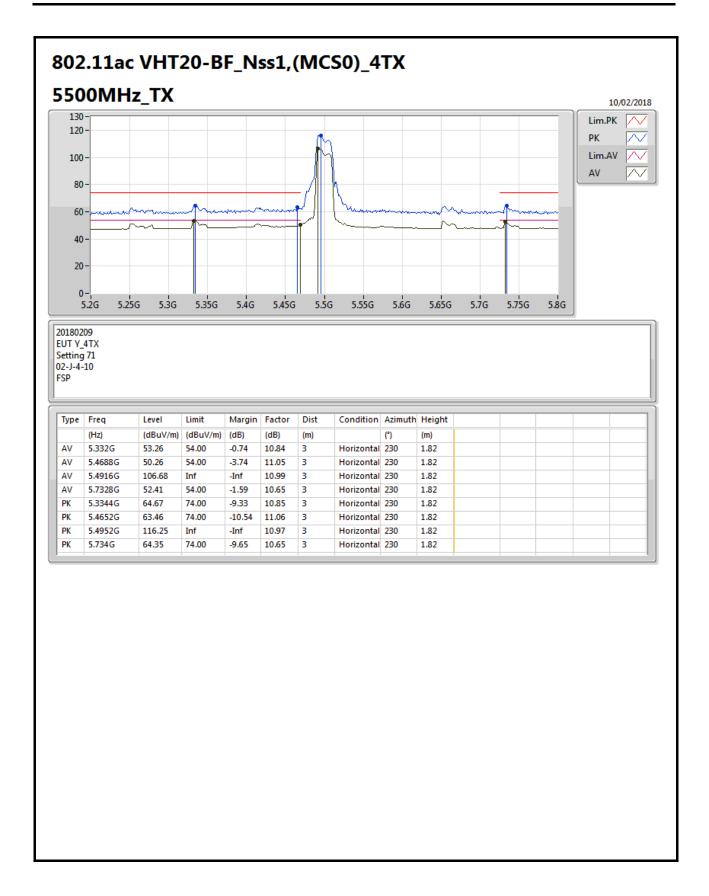






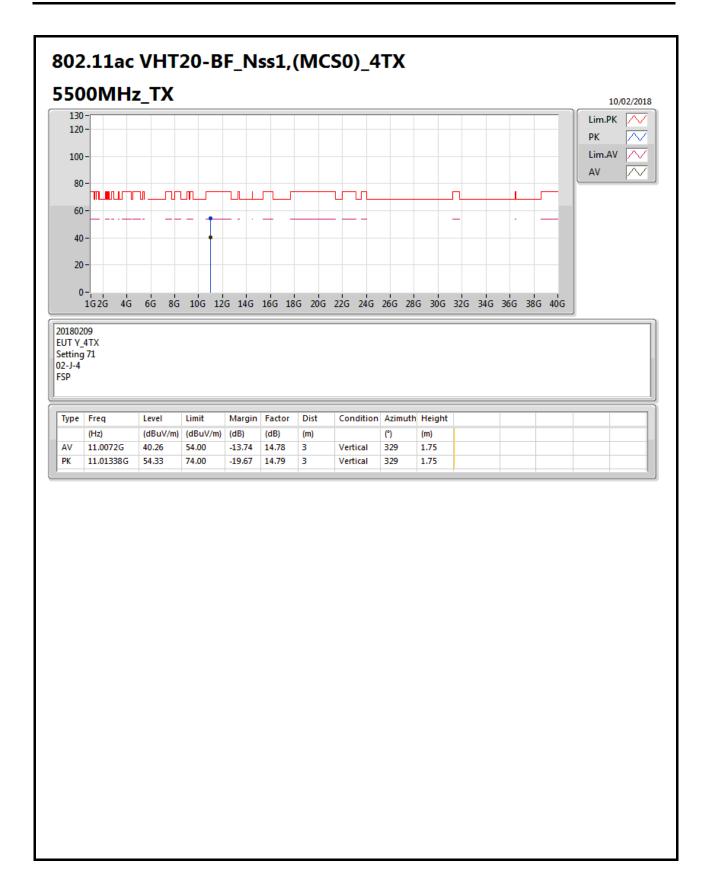




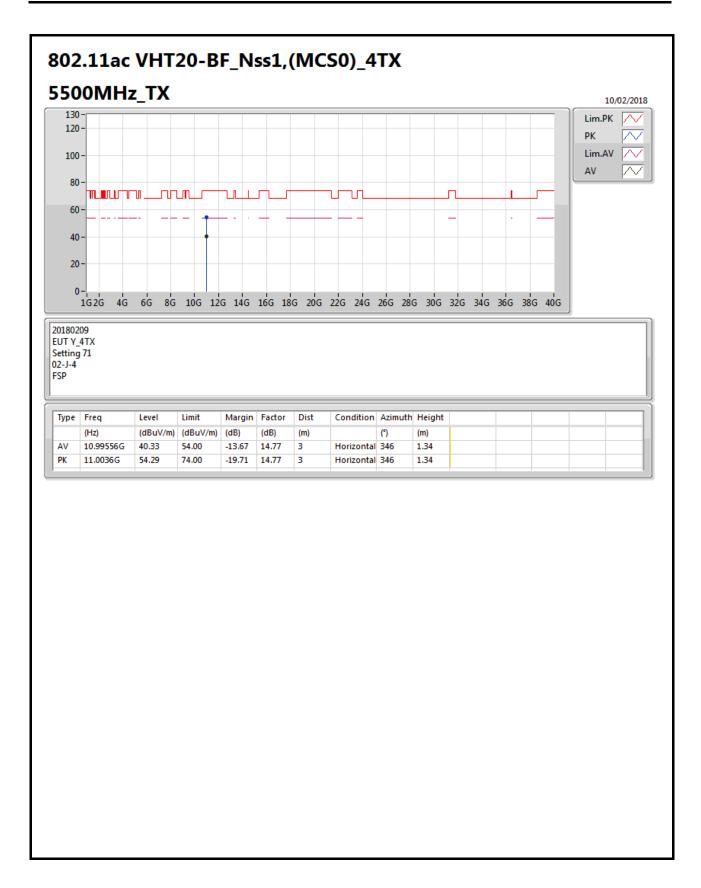


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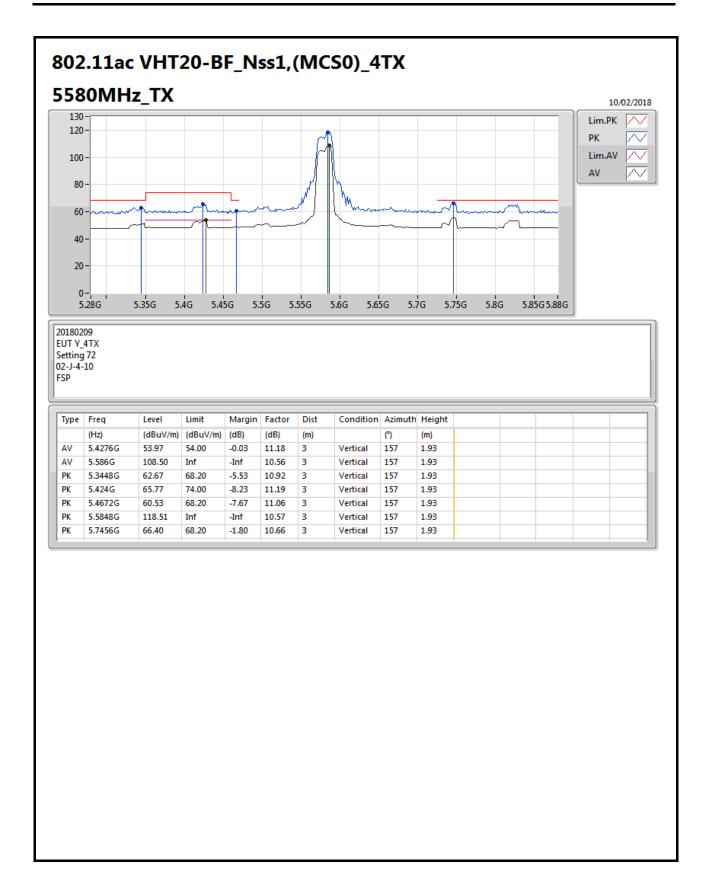




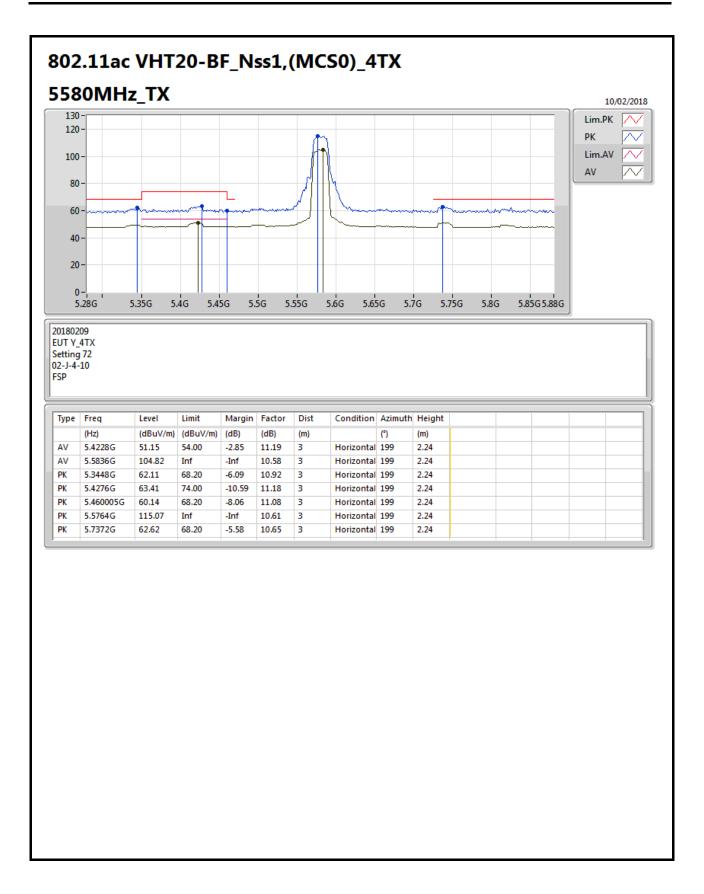


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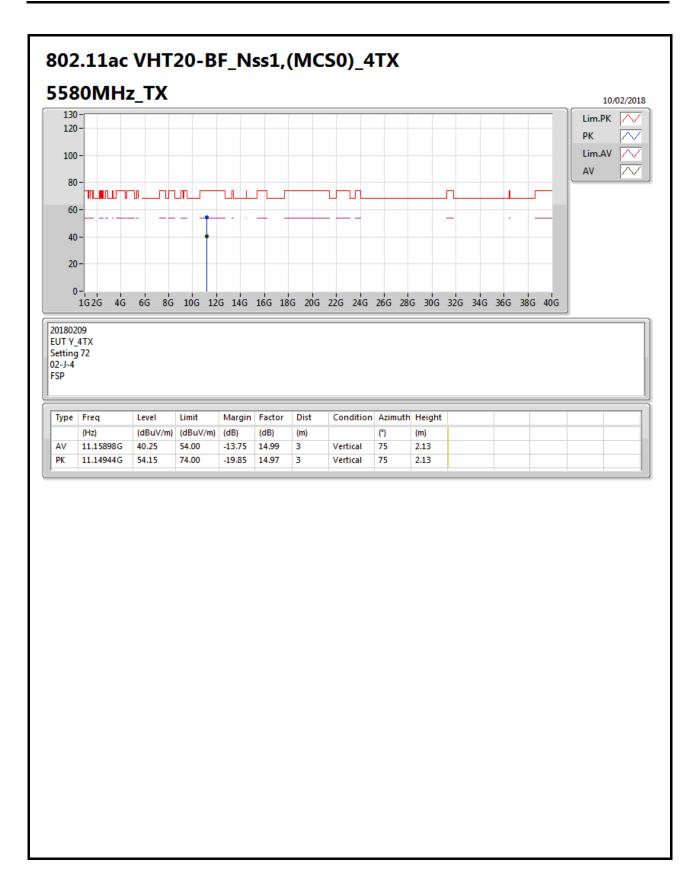






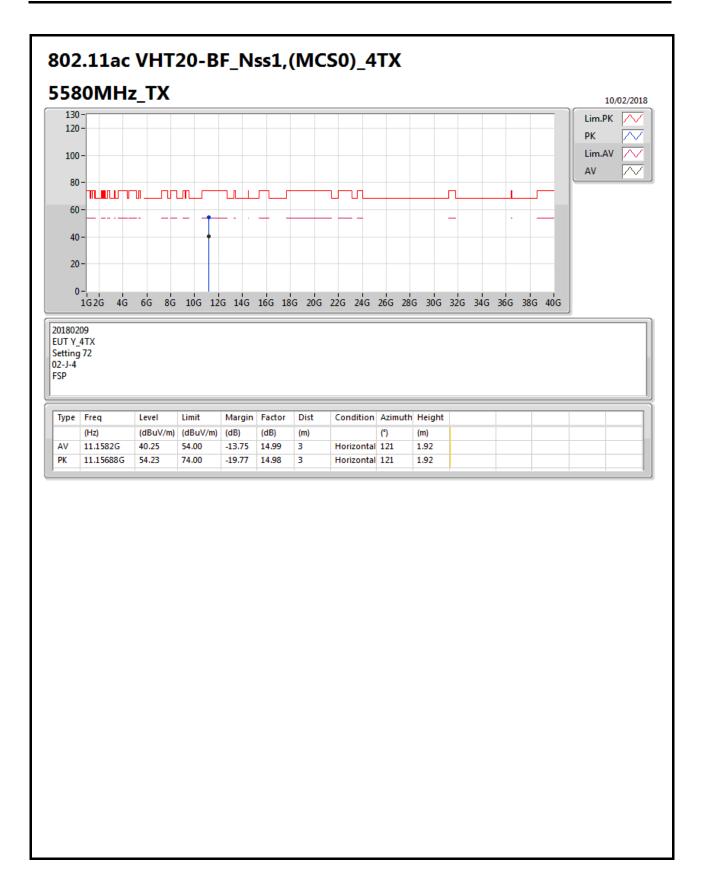
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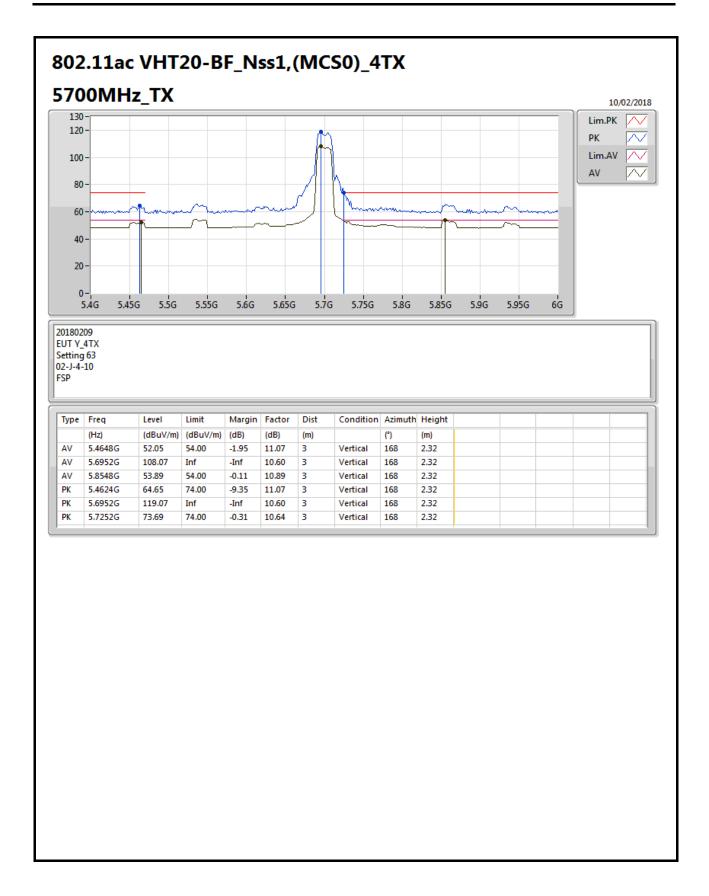


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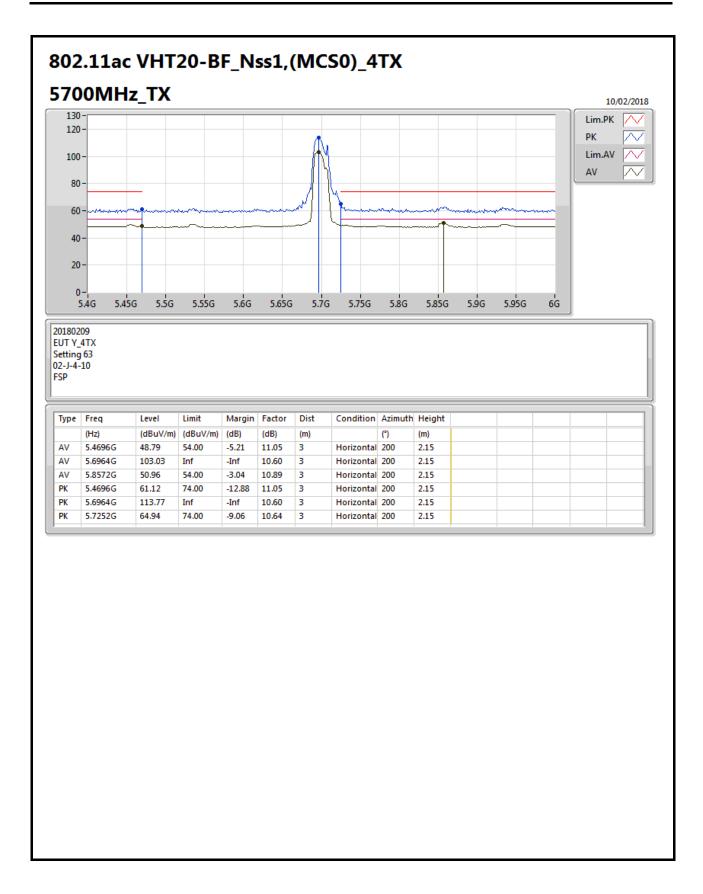






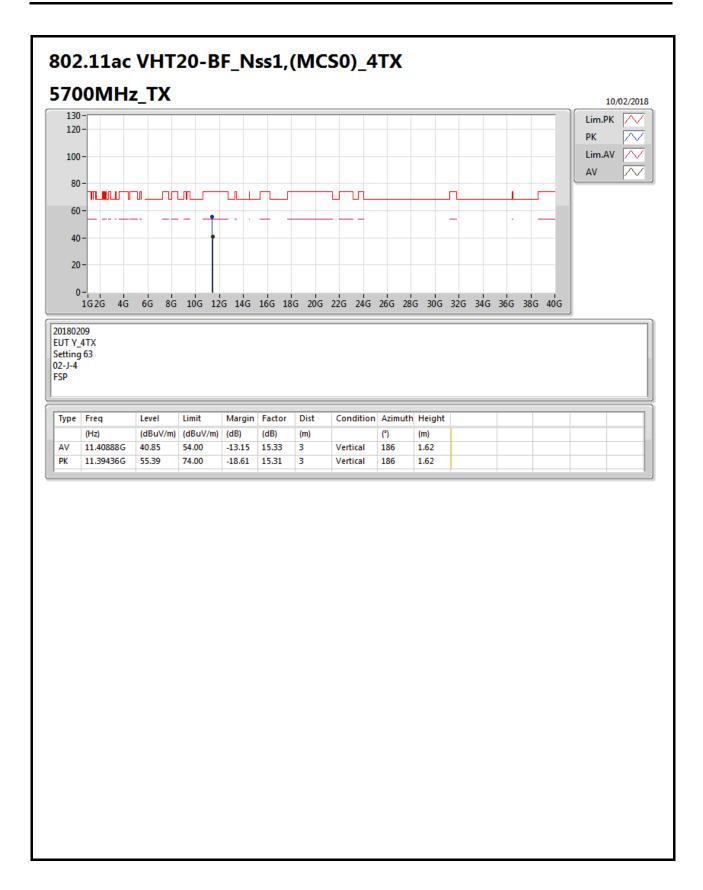






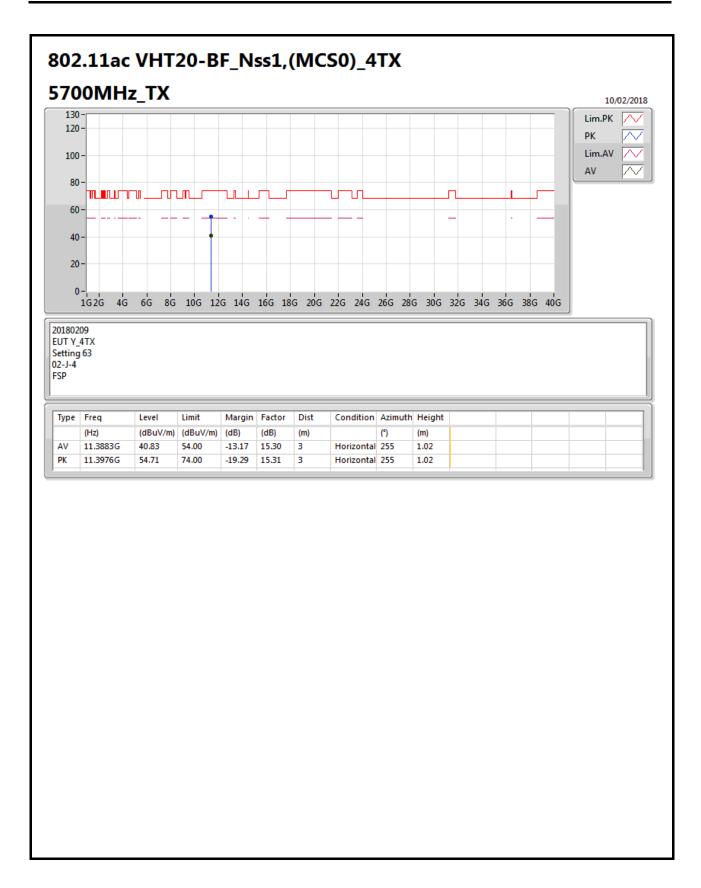
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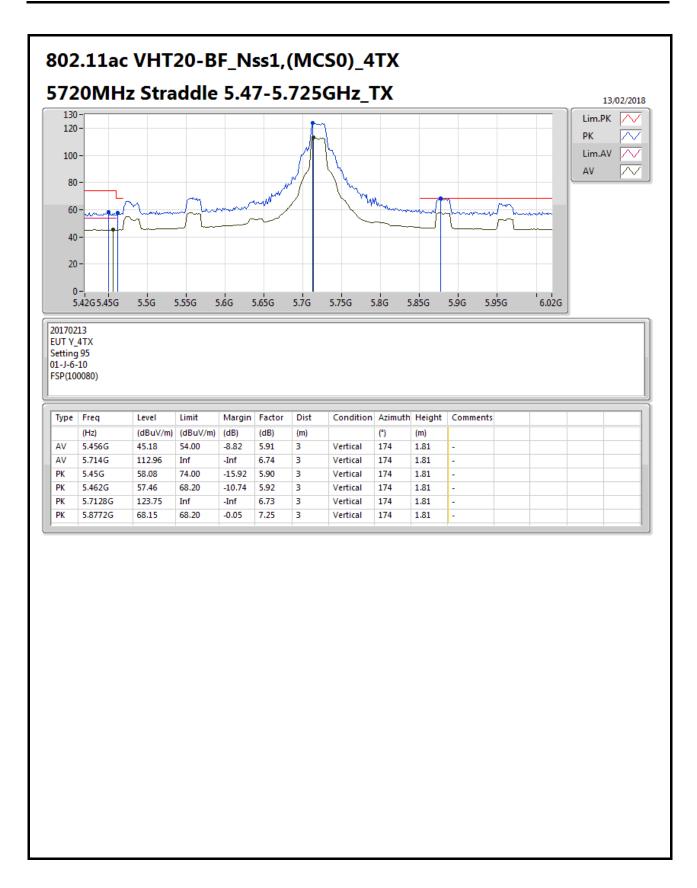


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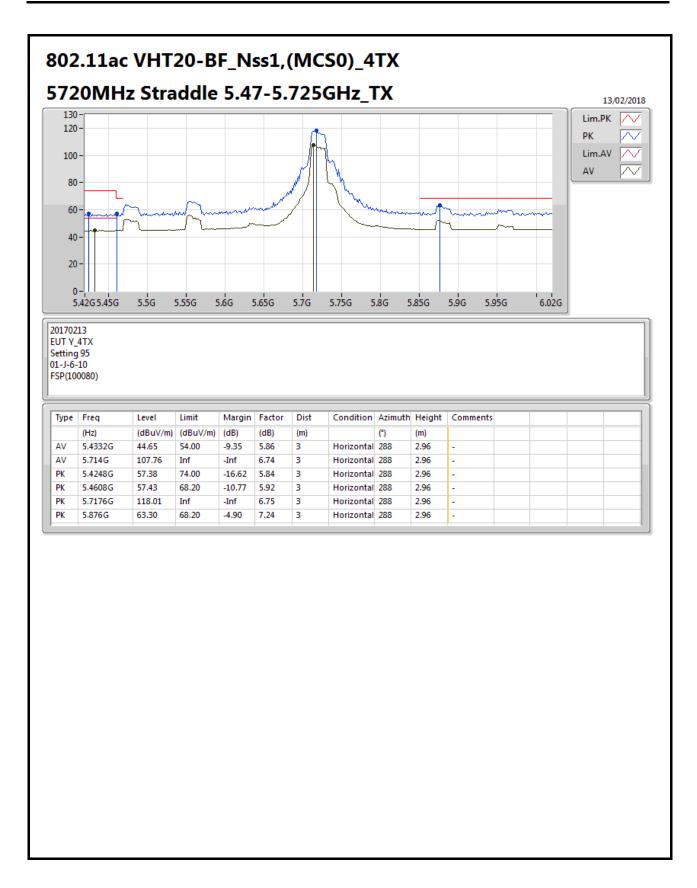






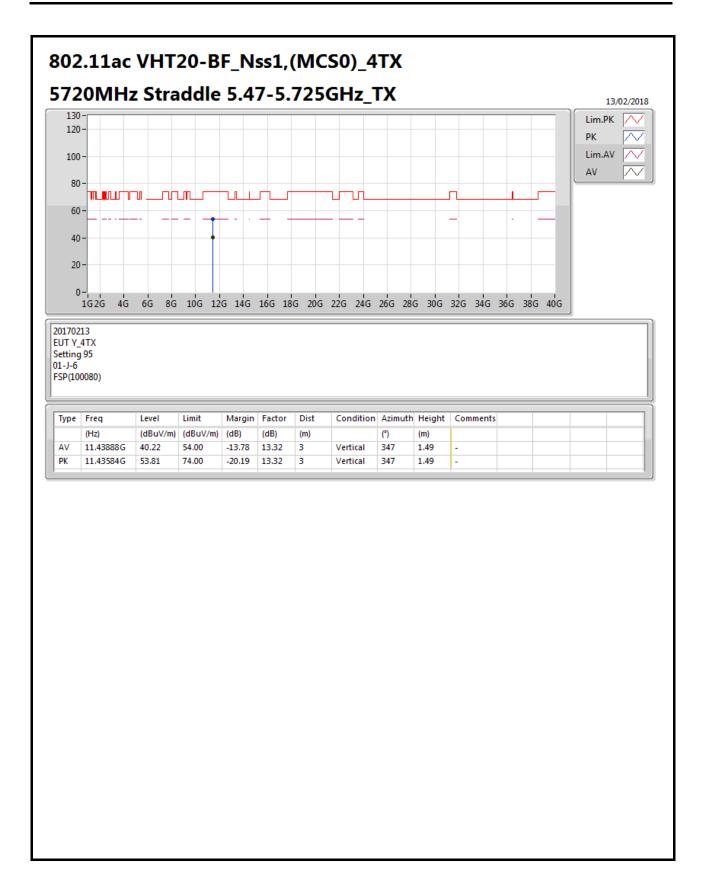






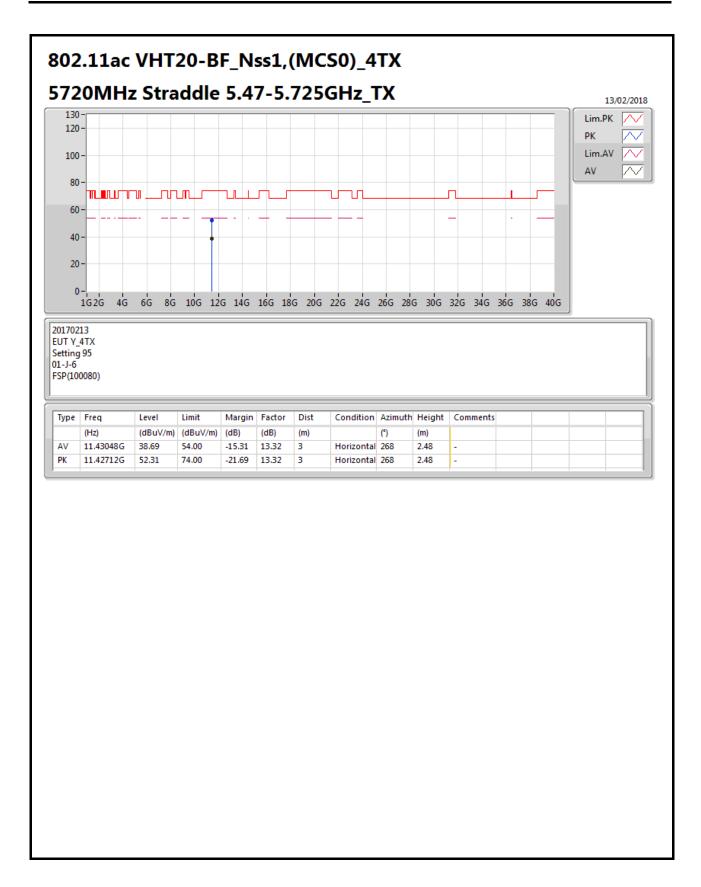
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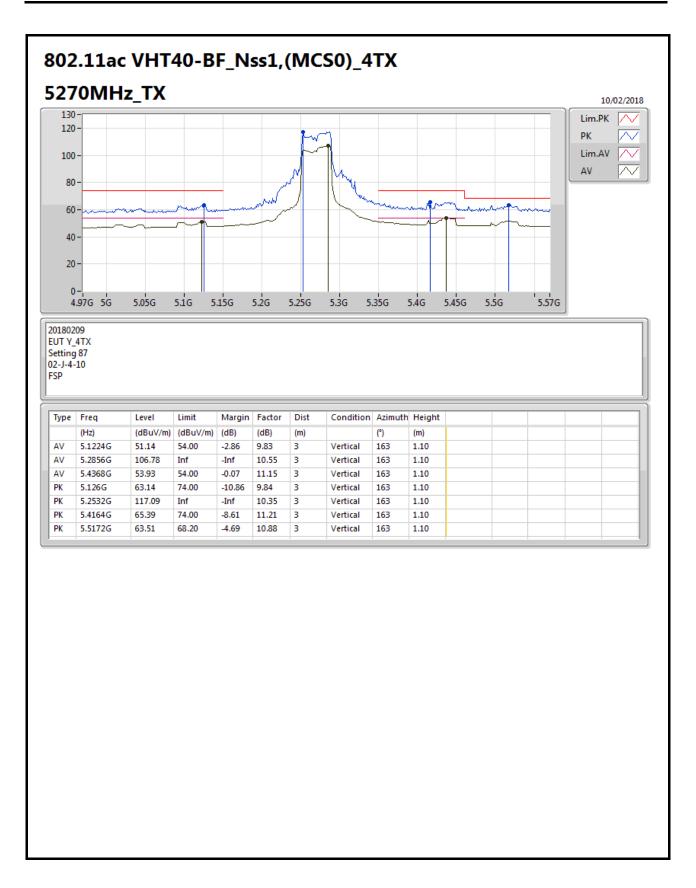
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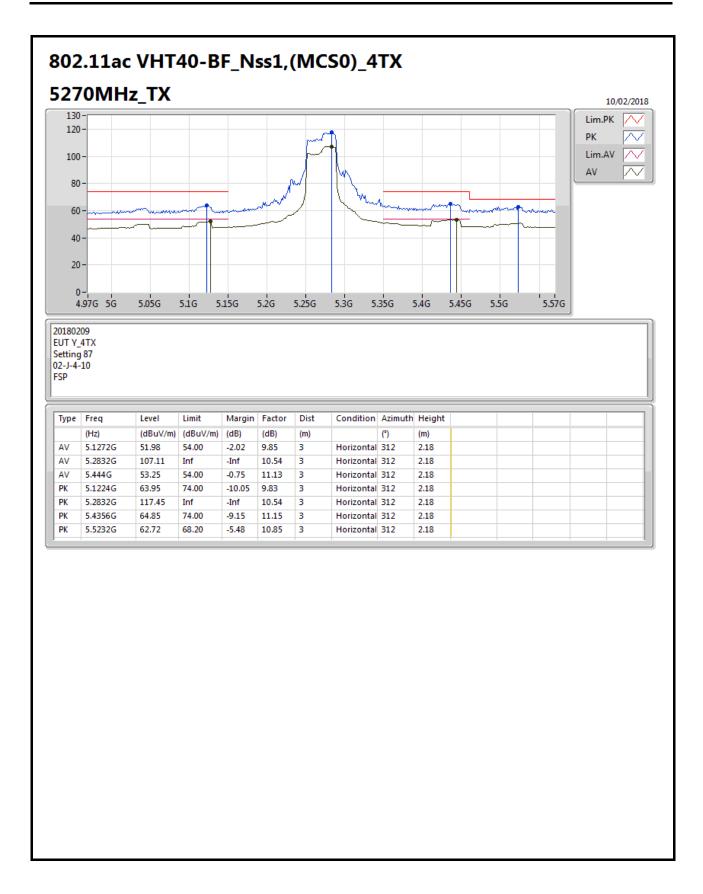
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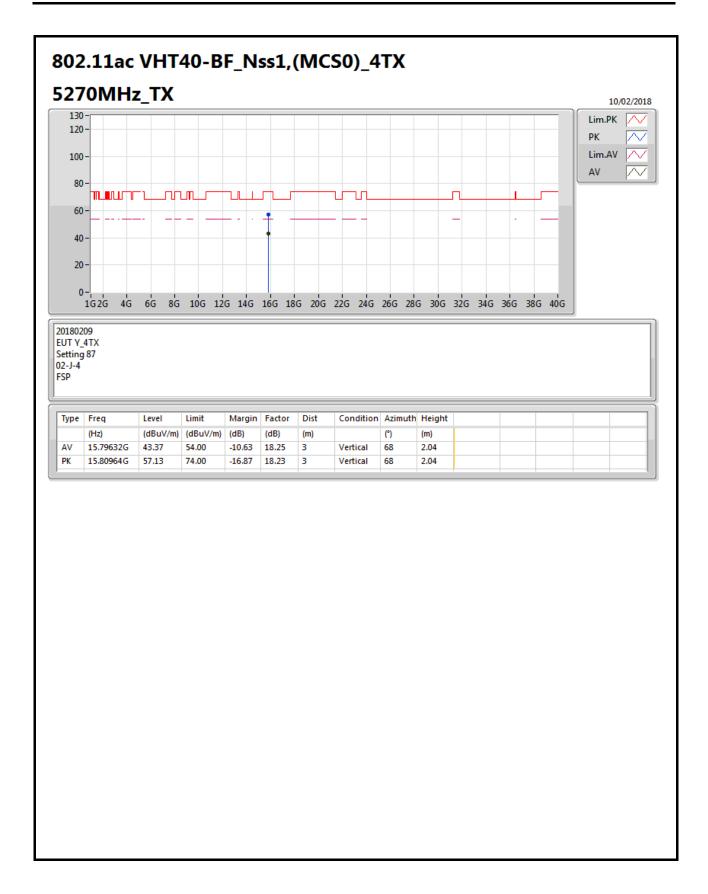


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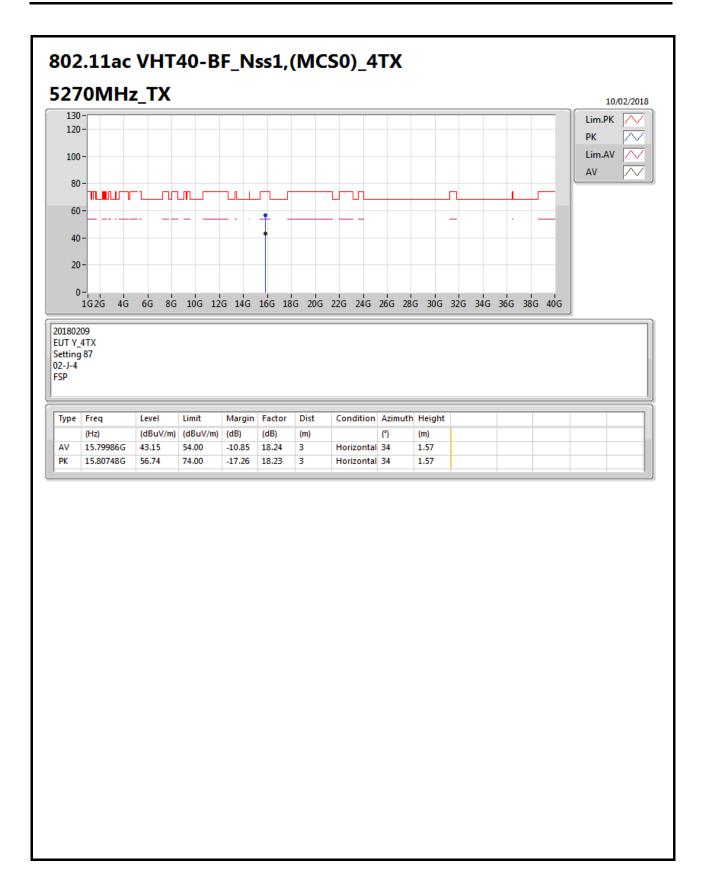






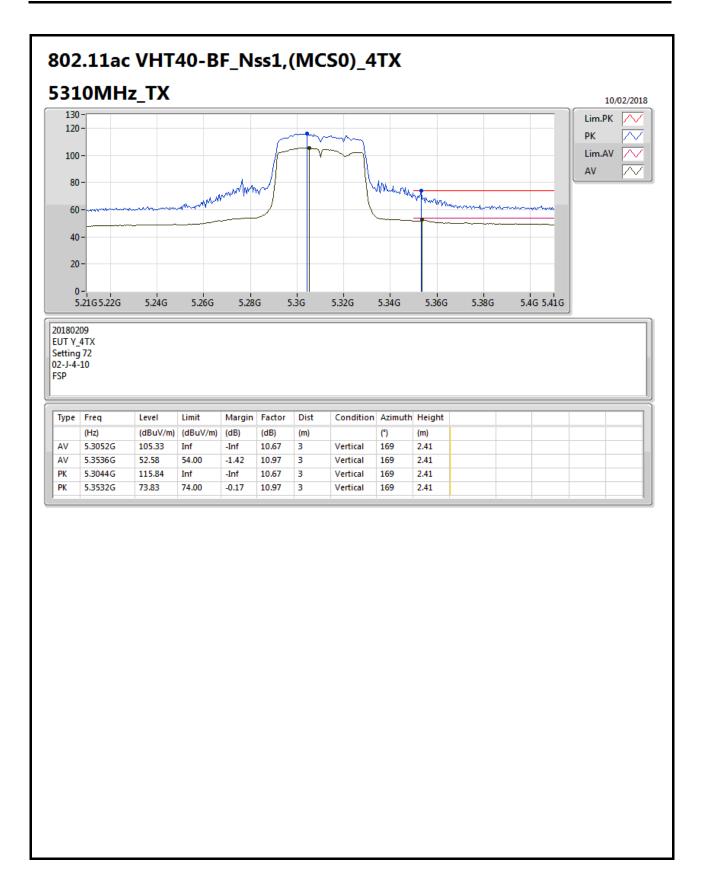
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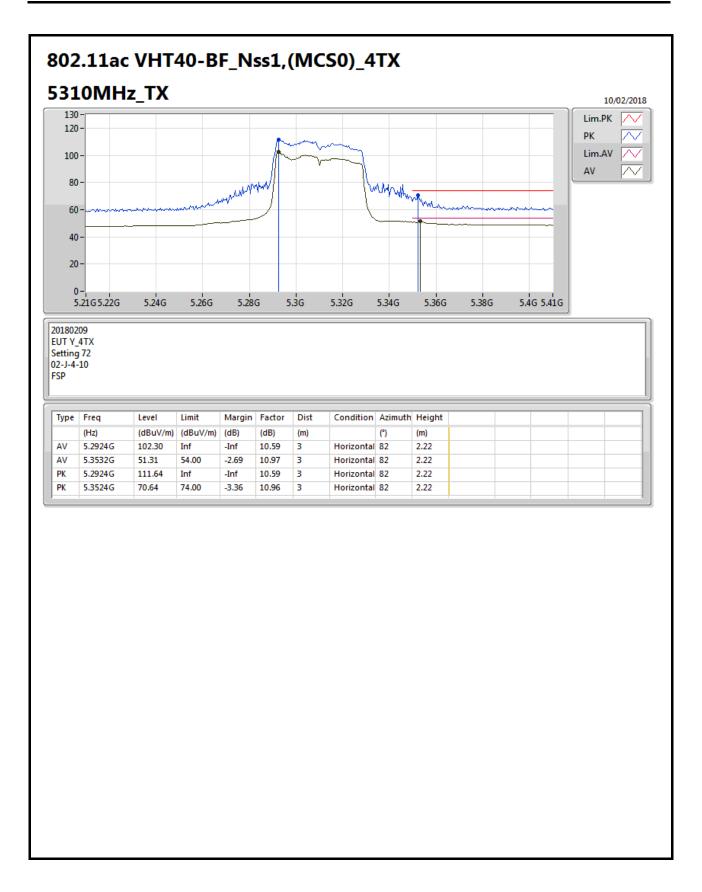


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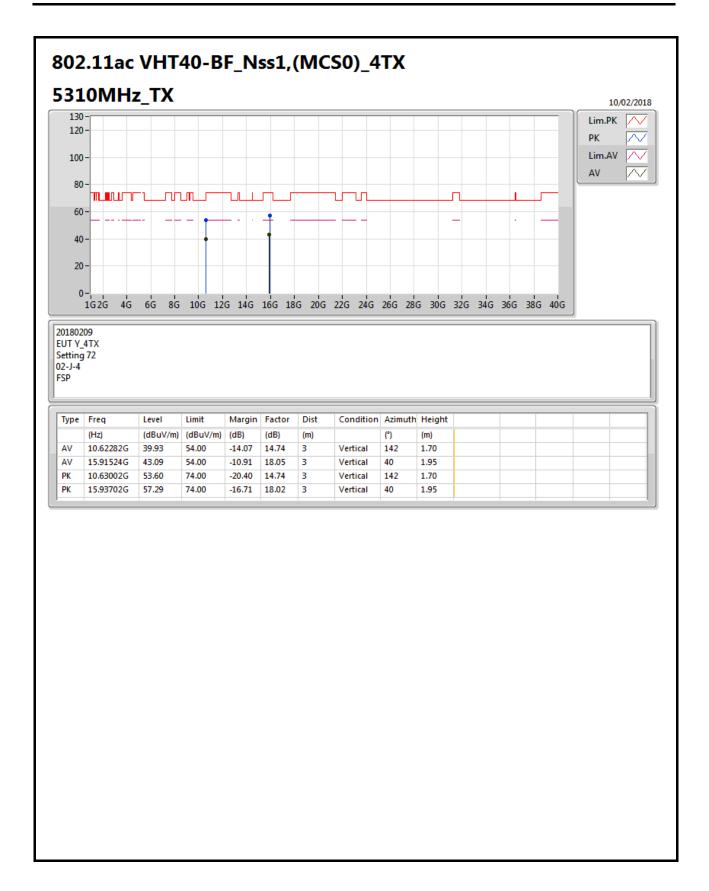






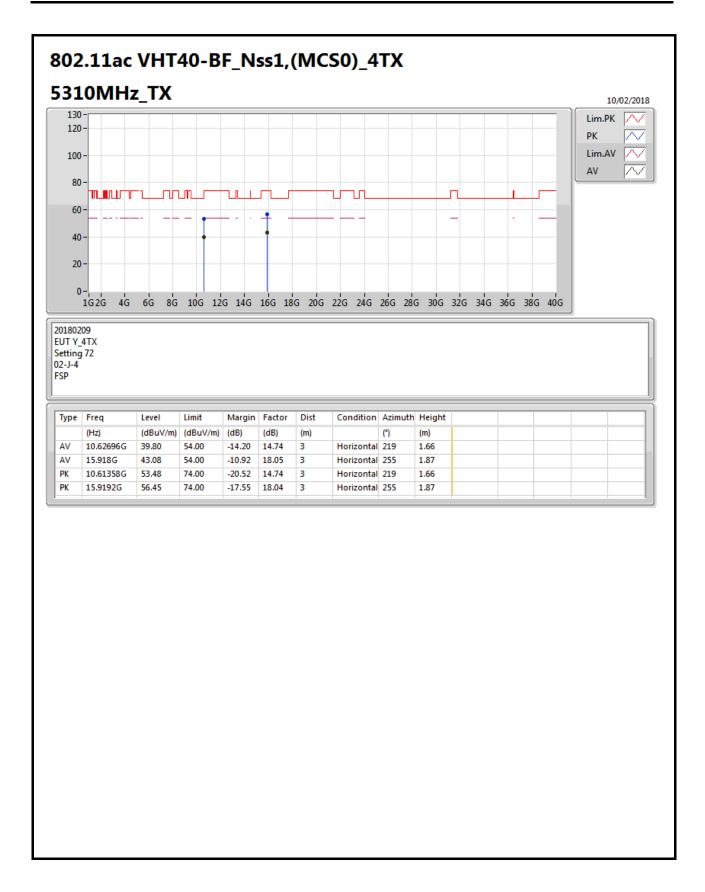




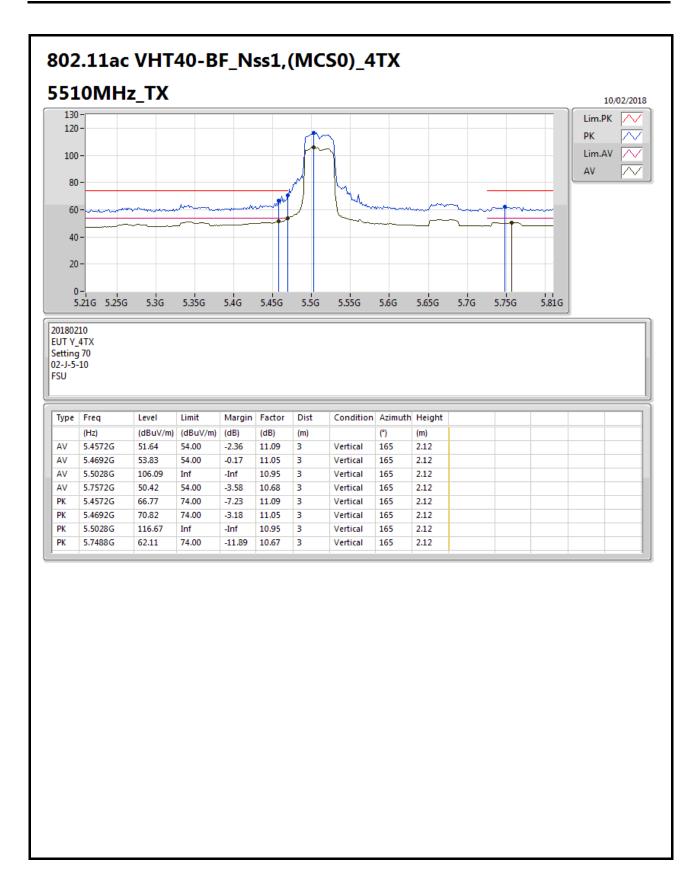


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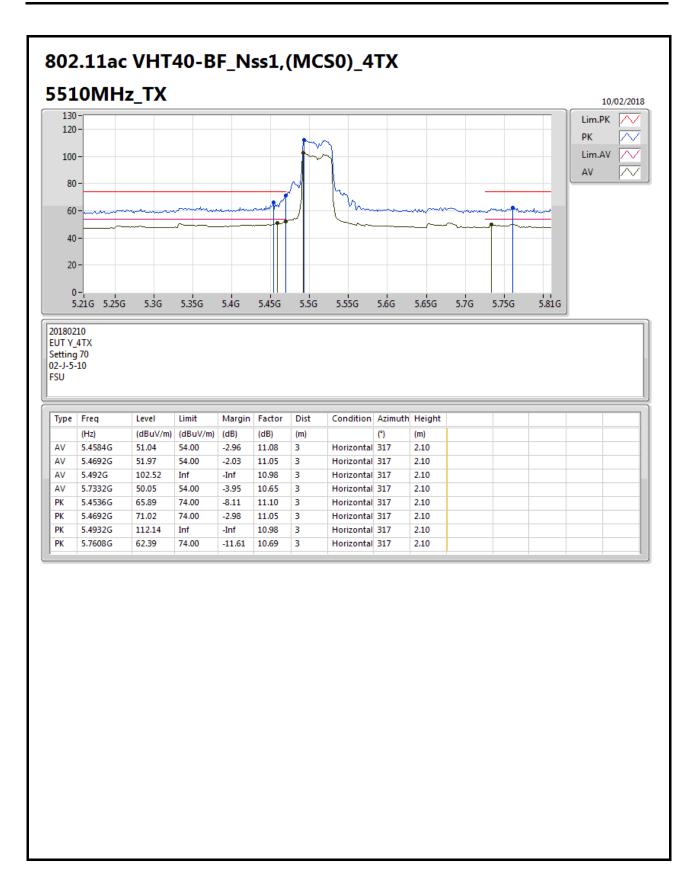




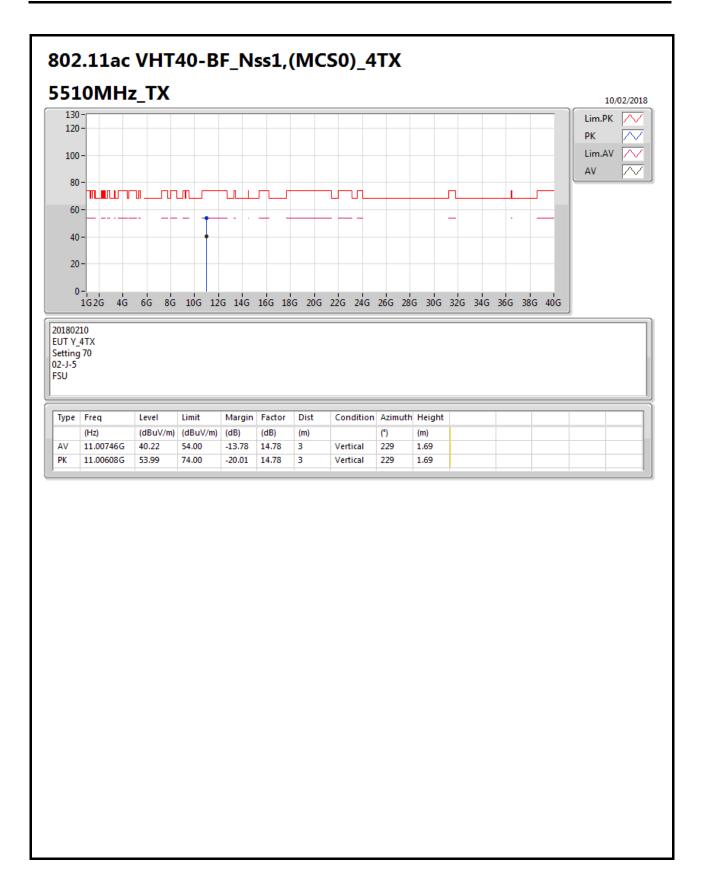




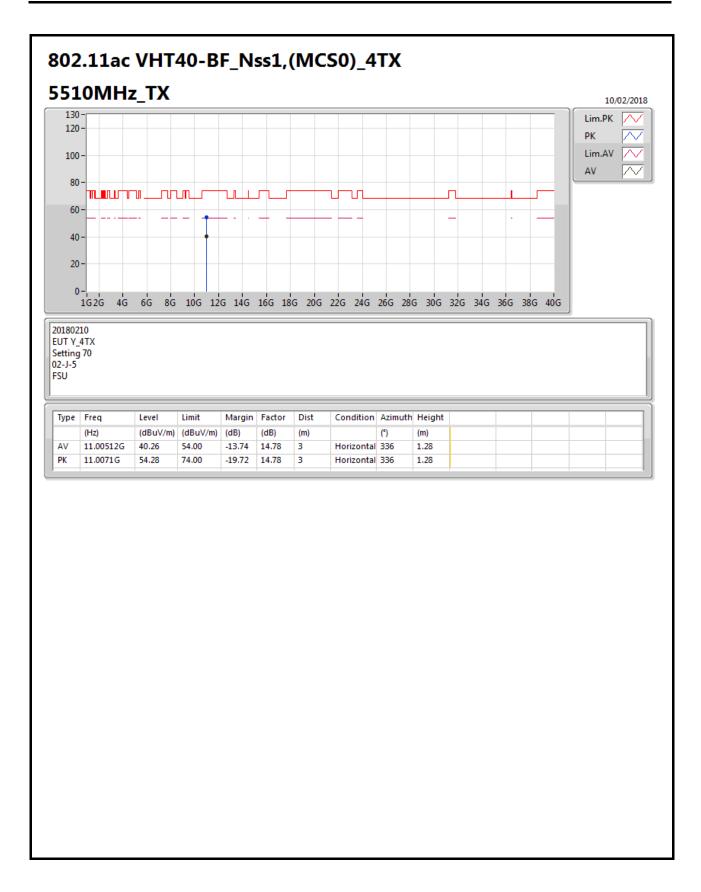






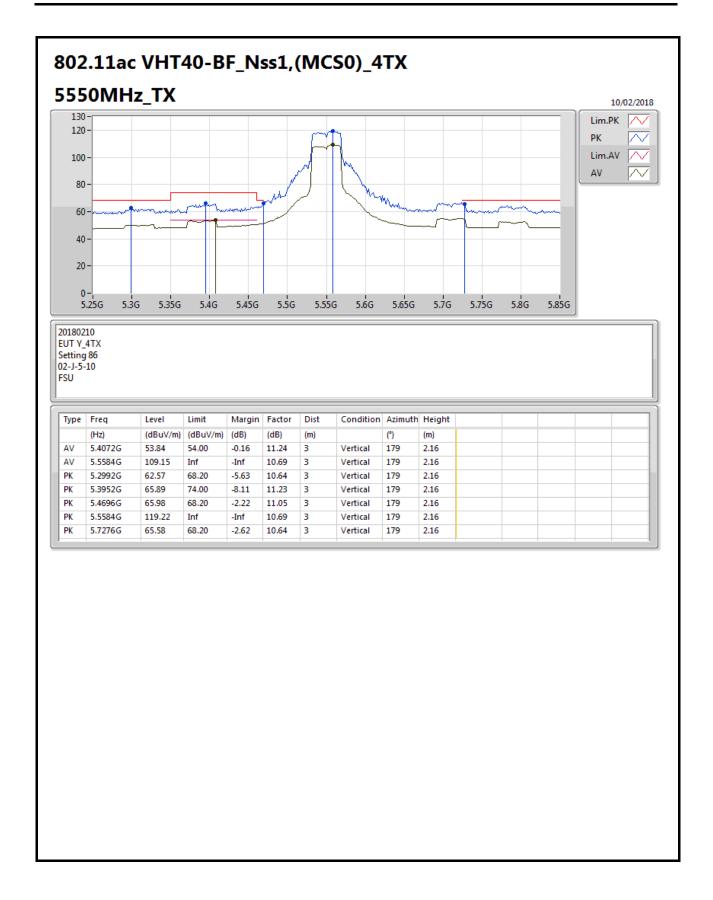






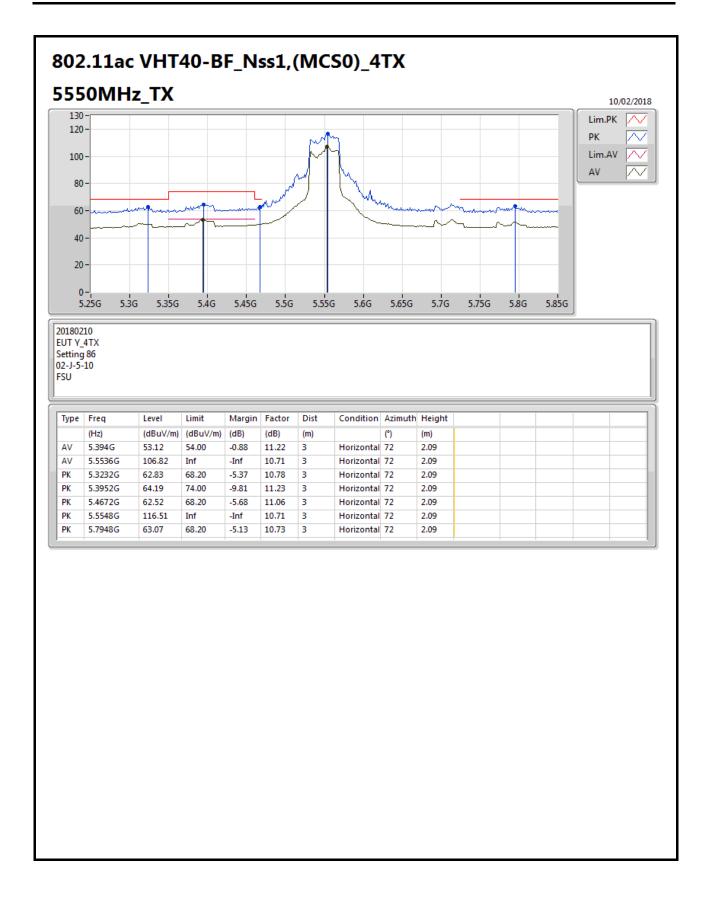
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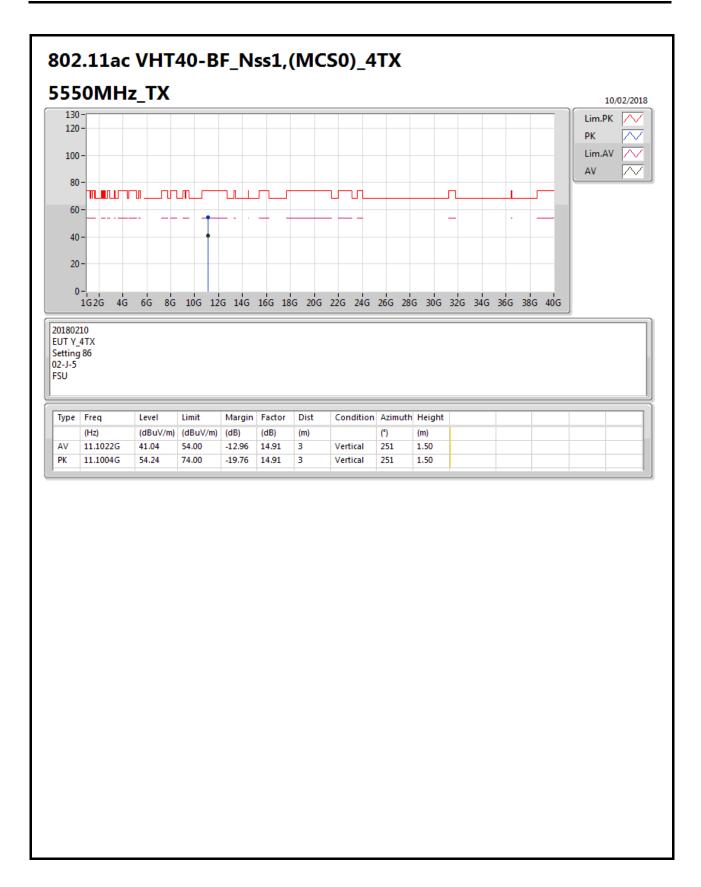
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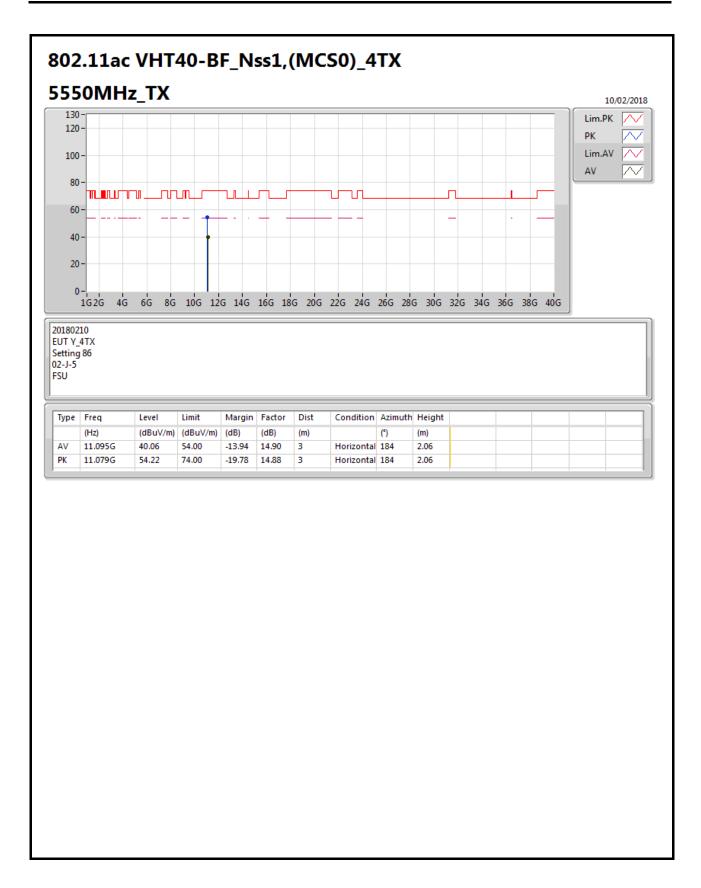


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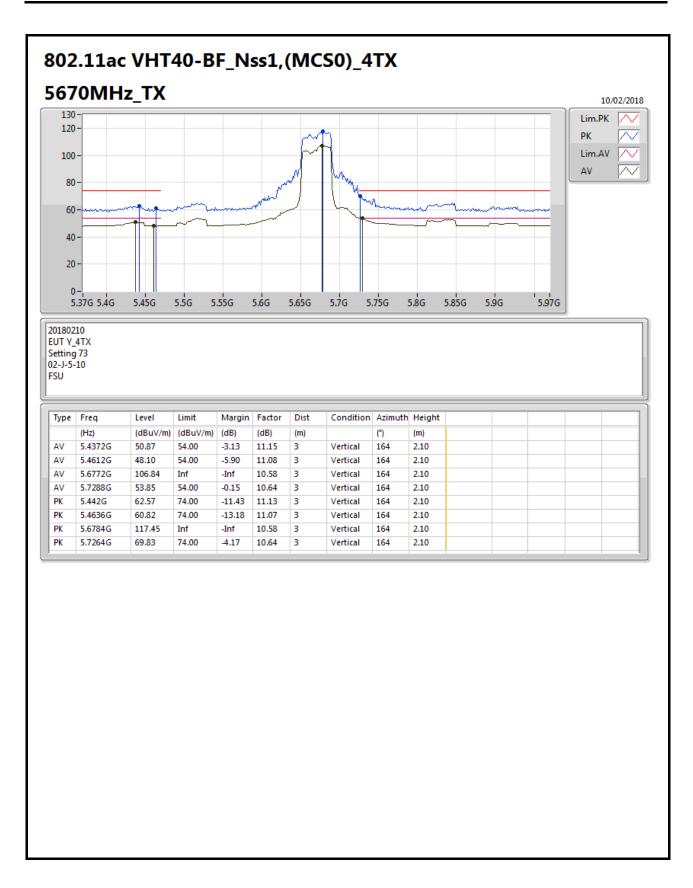




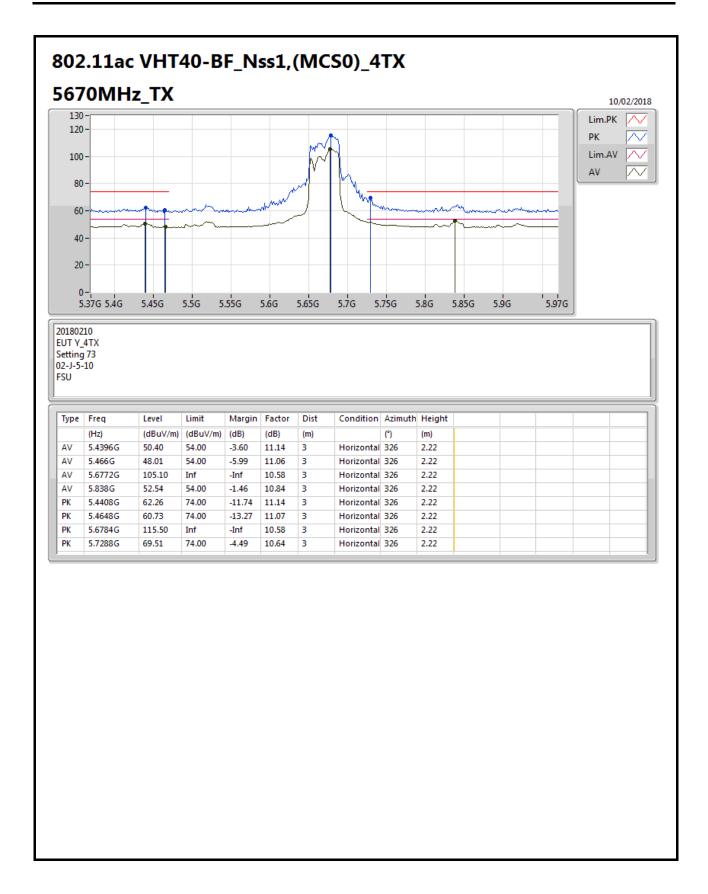


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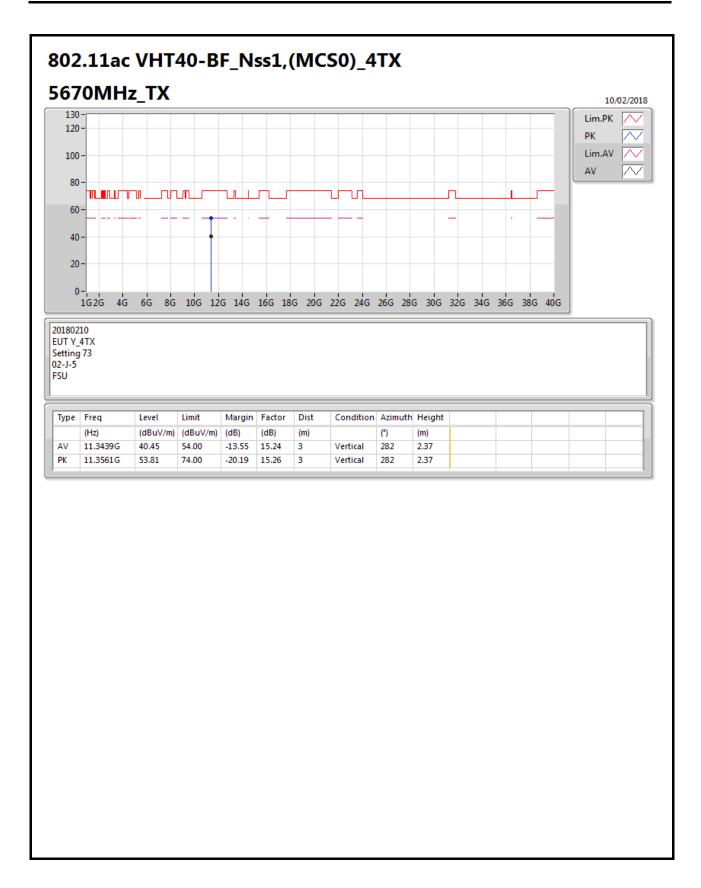






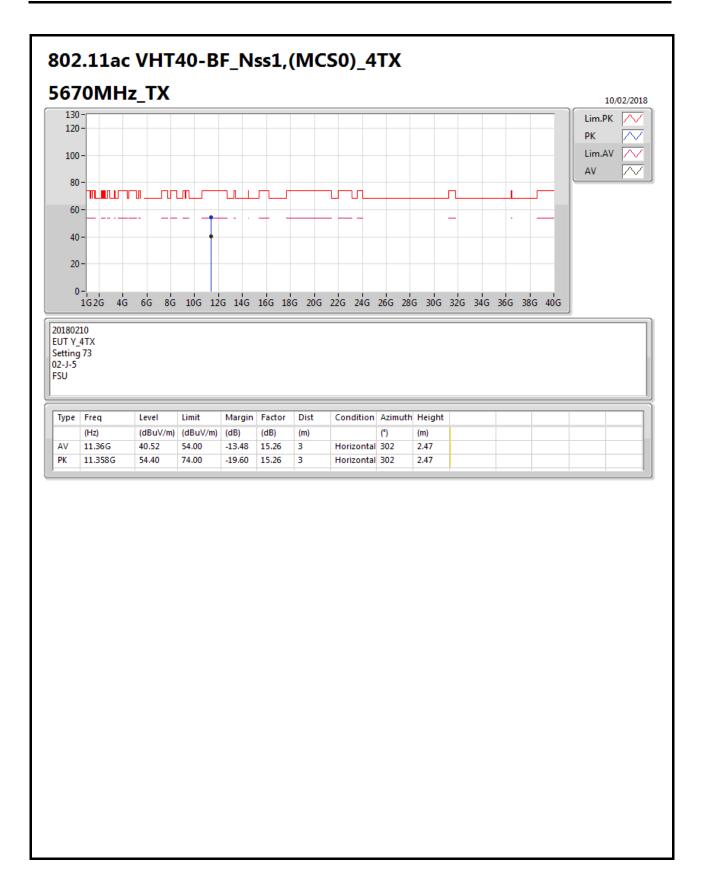
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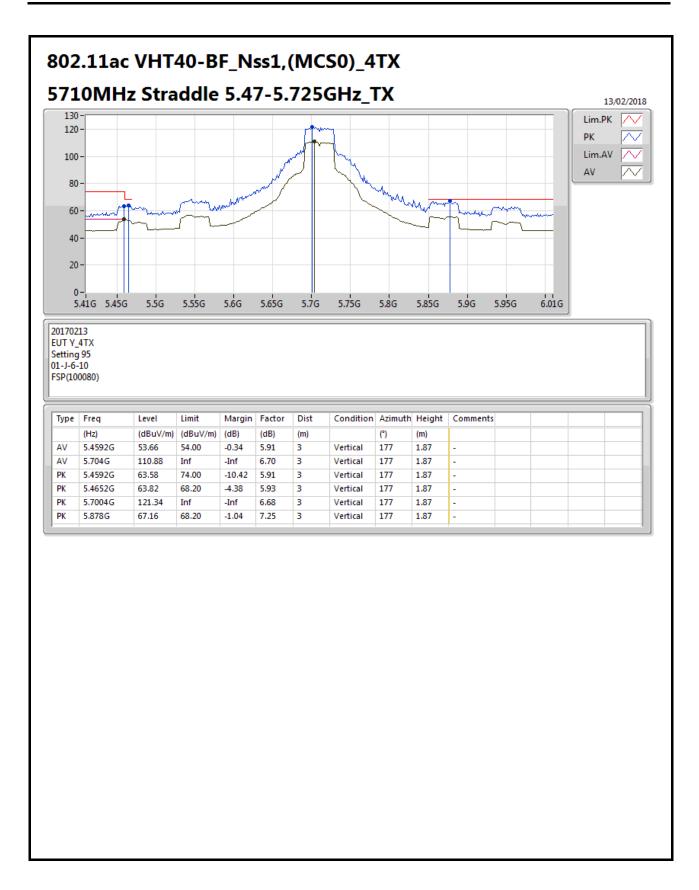


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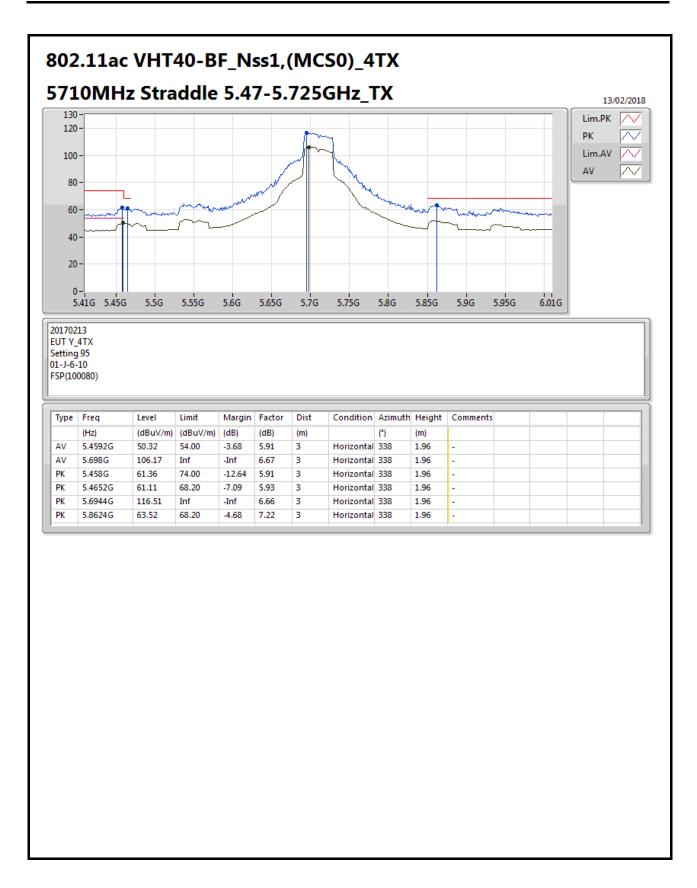






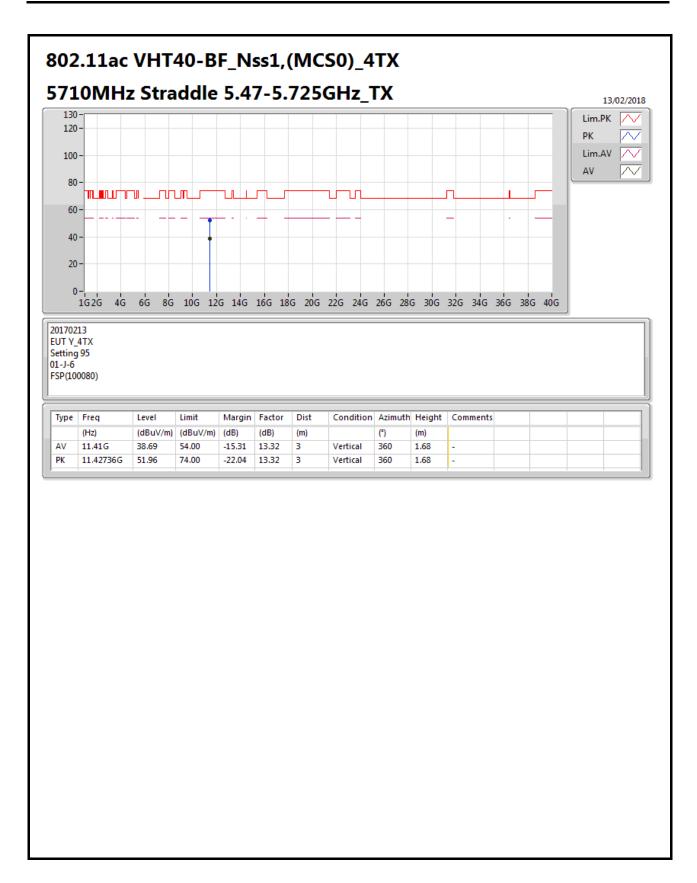






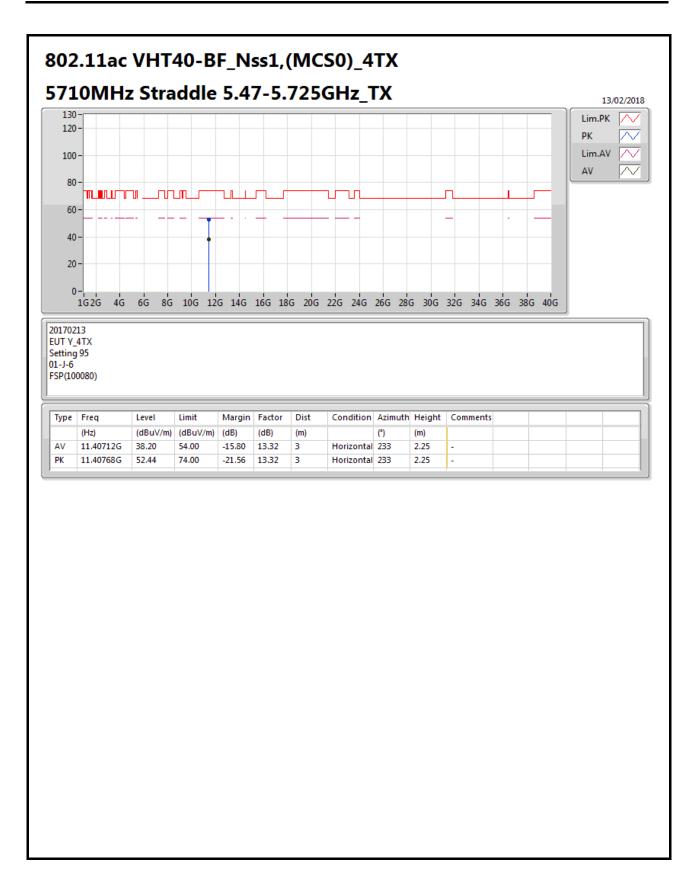
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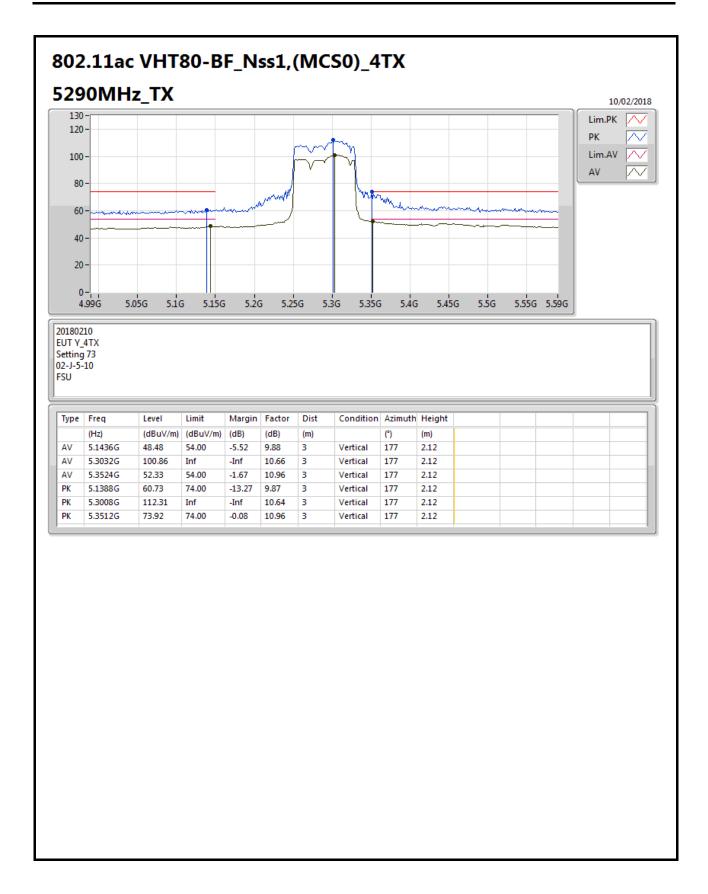
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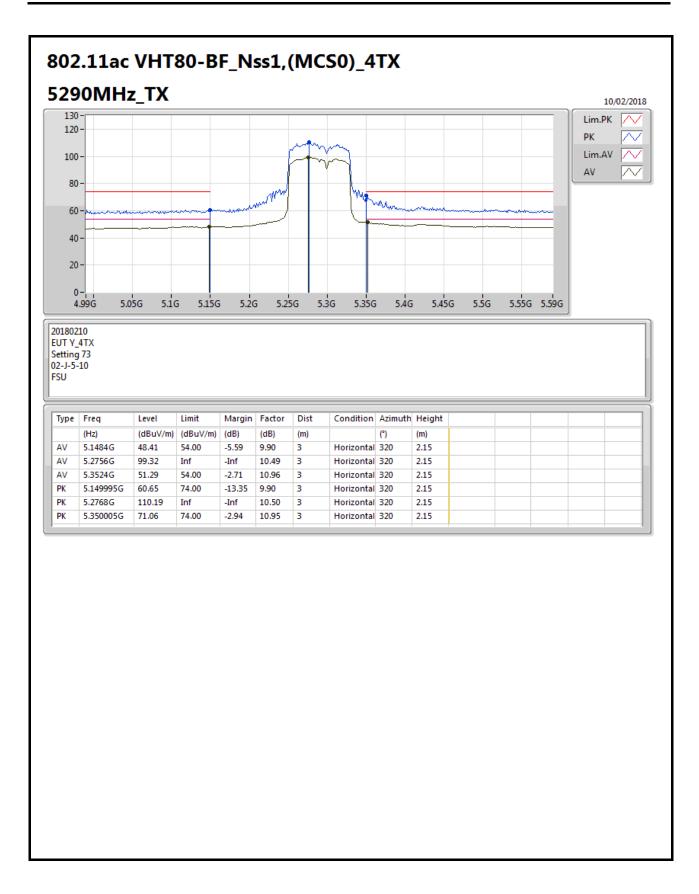
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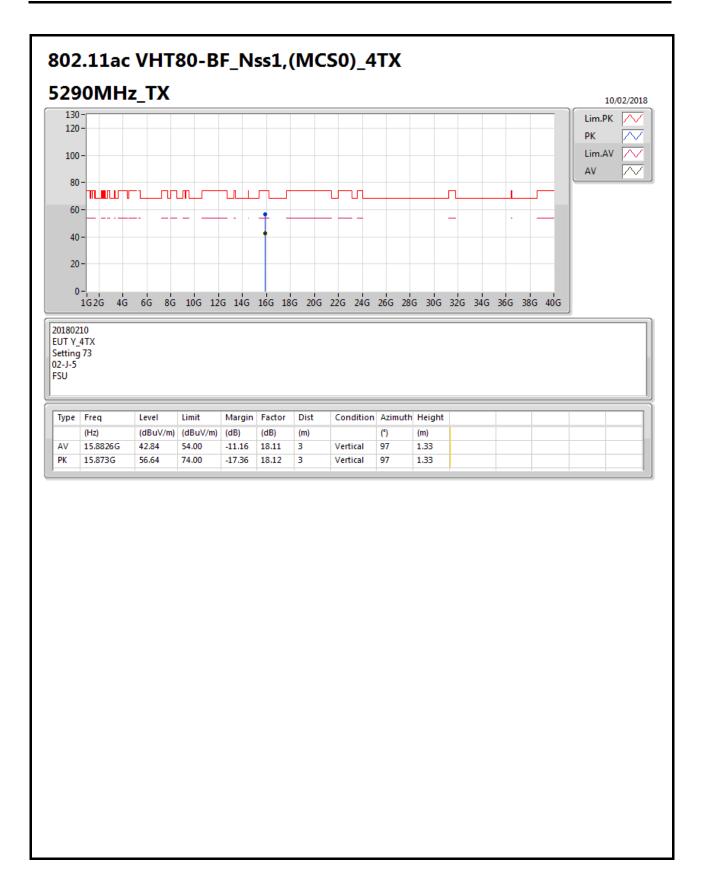
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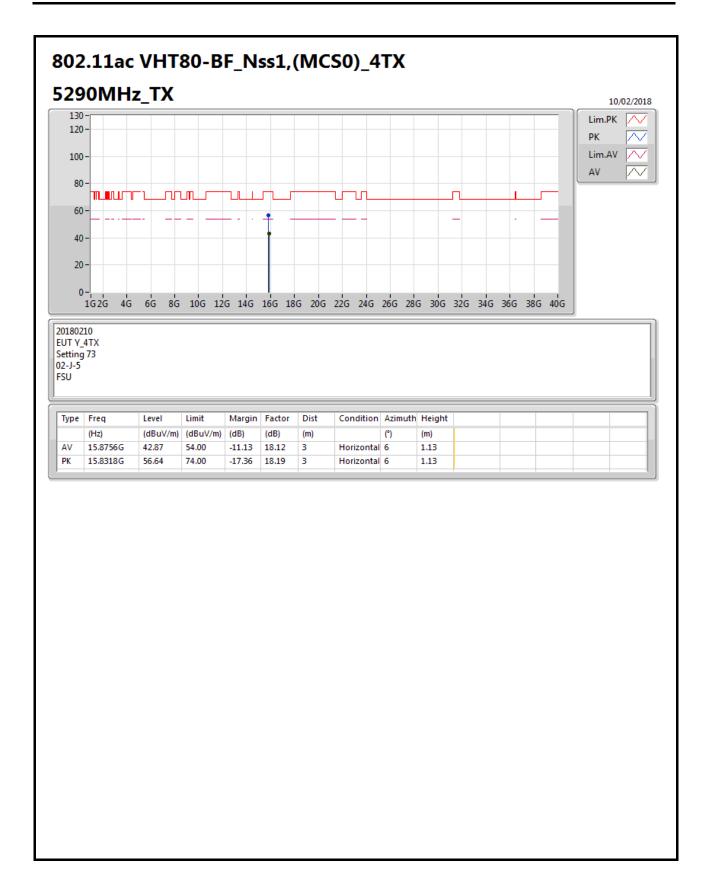
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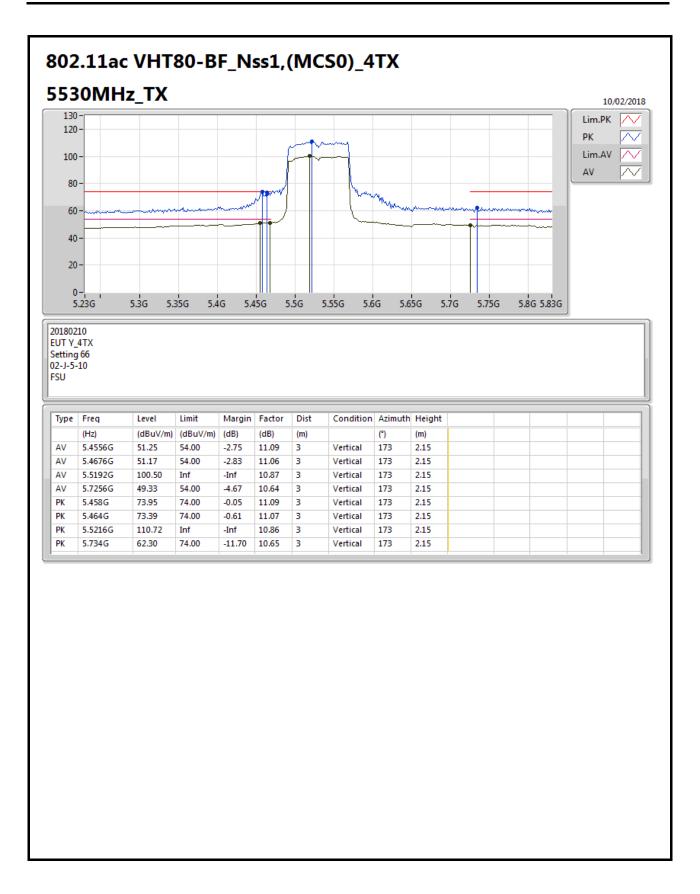
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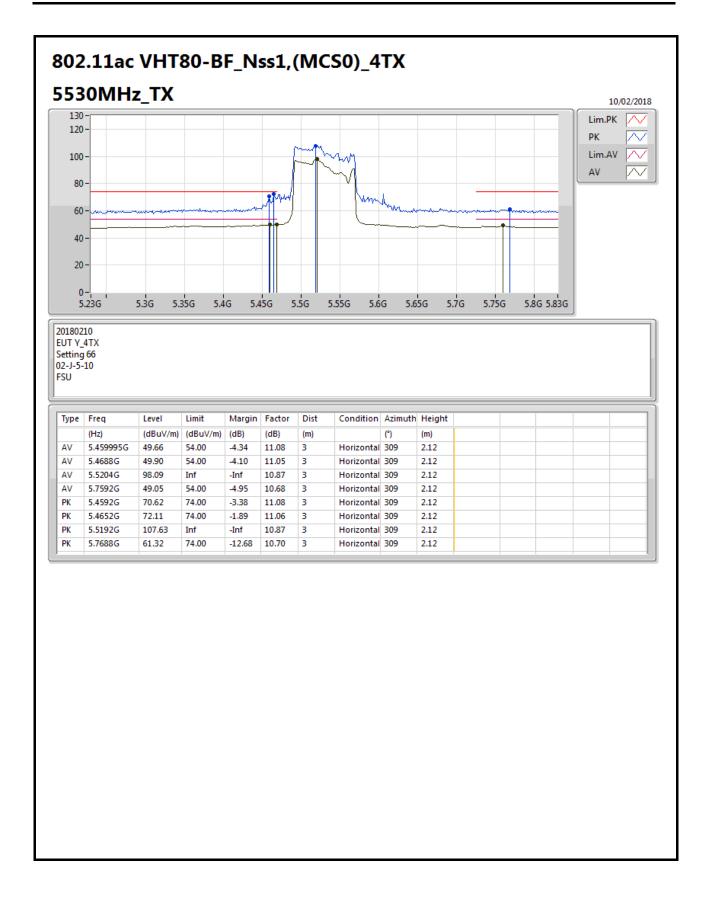
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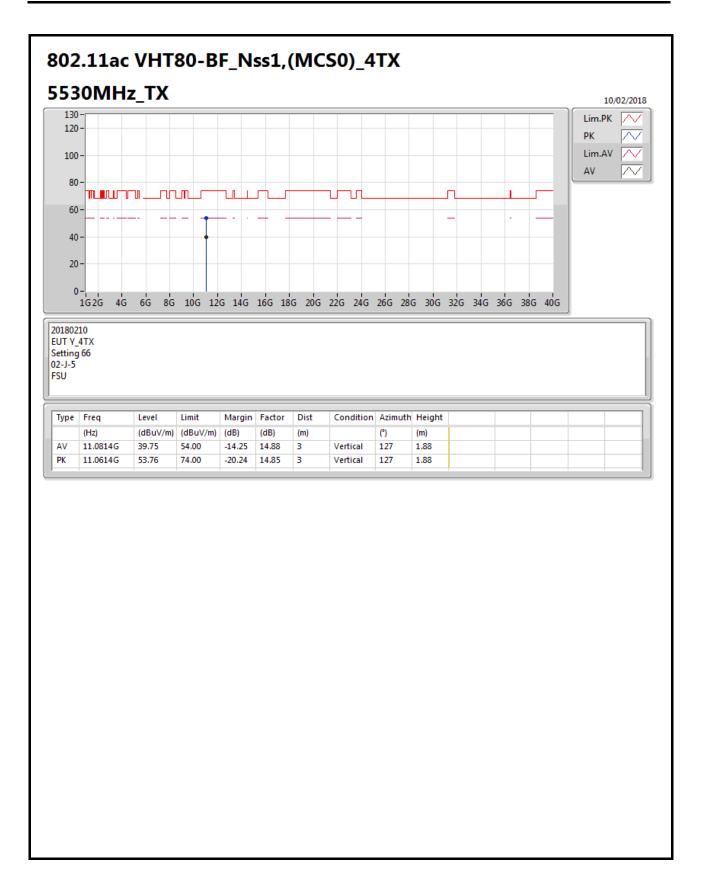
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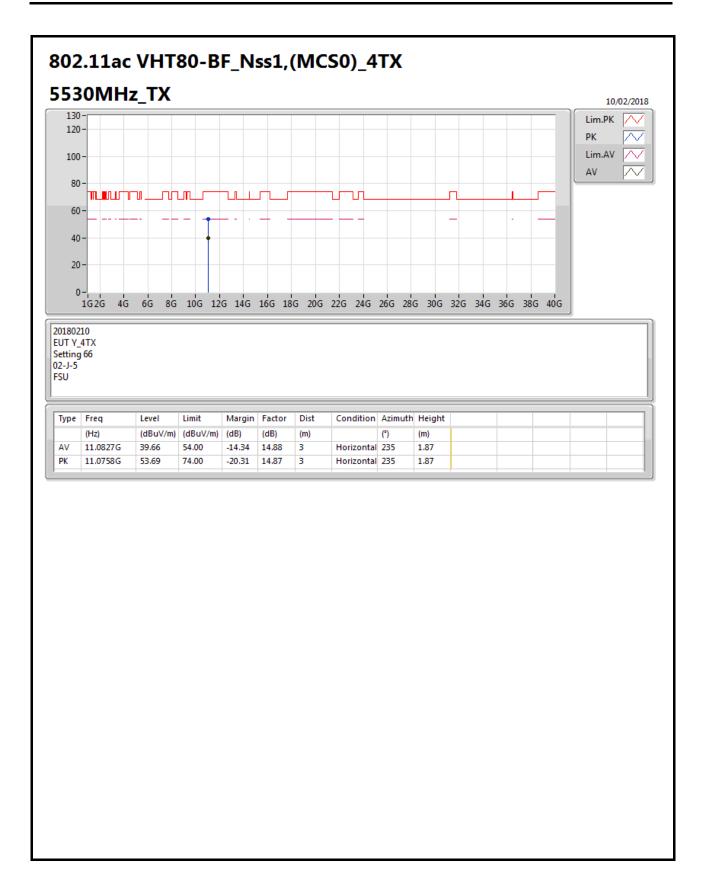
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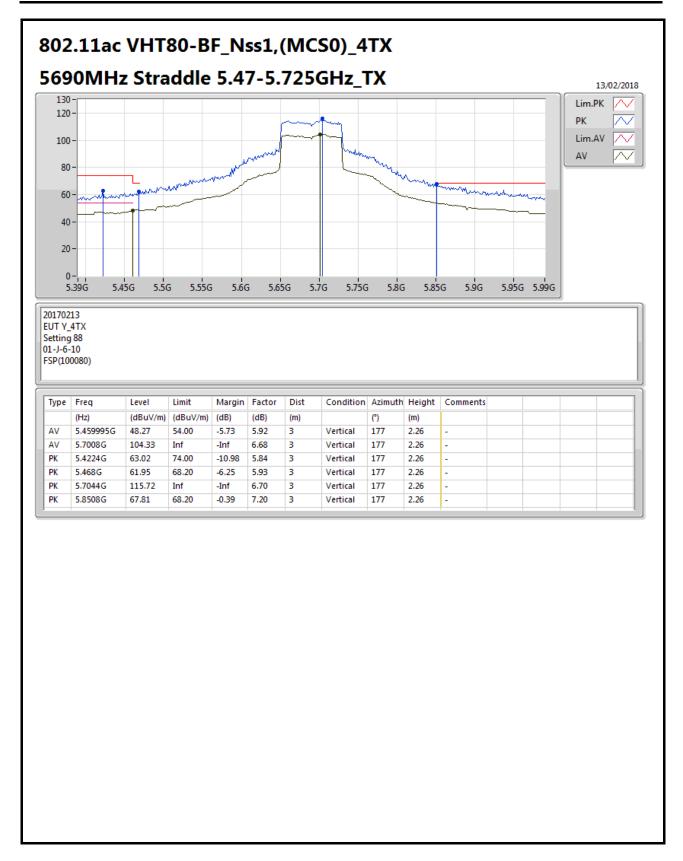
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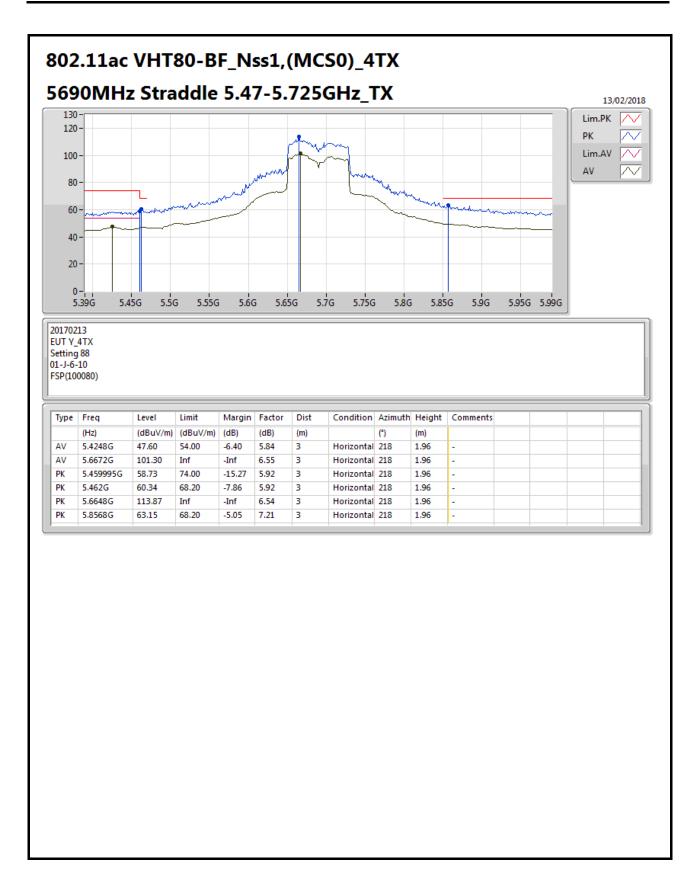


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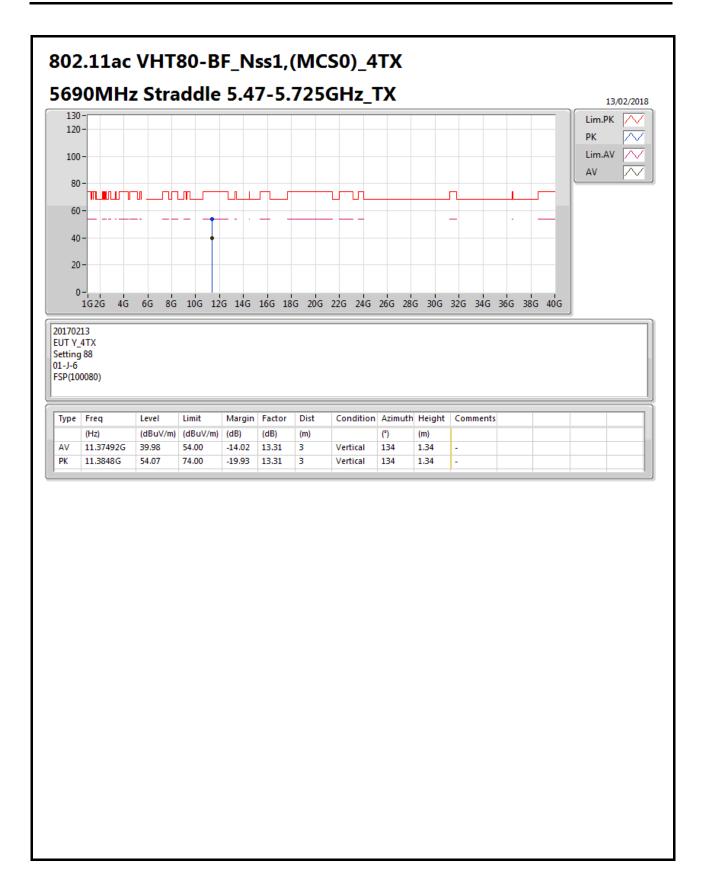




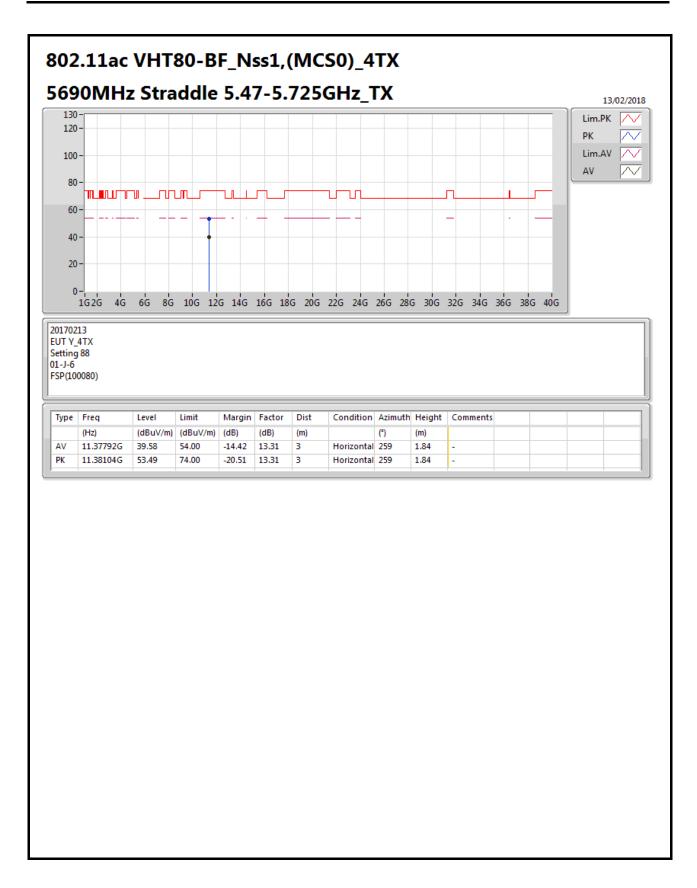


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FS Result Appendix E

Mode: 20 MHz / Port 2 Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)				
(V)		5300 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute	
126.50	5299.9971	5299.9969	5299.9968	5299.9962	
110.00	5299.9961	5299.9954	5299.9944	5299.9940	
93.50	5299.9952	5299.9950	5299.9940	5299.9932	
Max. Deviation (MHz)	0.0048	0.0050	0.0060	0.0068	
Max. Deviation (ppm)	0.91	0.94	1.13	1.28	
Result		Р	ass		

Temperature vs. Frequency Stability

Temperature		Measurement F	requency (MHz)	
(°C)	5300 MHz			
(℃)	0 Minute	2 Minute	5 Minute	10 Minute
0	5299.9942	5299.9934	5299.9932	5299.9922
10	5299.9955	5299.9954	5299.9948	5299.9946
20	5299.9961	5299.9956	5299.9947	5299.9943
30	5299.9965	5299.9955	5299.9950	5299.9947
40	5299.9979	5299.9975	5299.9965	5299.9956
Max. Deviation (MHz)	0.0090	0.0097	0.0098	0.0105
Max. Deviation (ppm)	1.70	1.83	1.85	1.98
Result		Pa	ass	

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
0.0	5580 MHz			
(V)	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5579.9968	5579.9962	5579.9960	5579.9959
110.00	5579.9961	5579.9955	5579.9949	5579.9948
93.50	5579.9959	5579.9949	5579.9944	5579.9934
Max. Deviation (MHz)	0.0041	0.0051	0.0056	0.0066
Max. Deviation (ppm)	0.73	0.91	1.00	1.18
Result	Pass			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)				
(°C)		5580 MHz			
(0)	0 Minute	2 Minute	5 Minute	10 Minute	
0	5579.9926	5579.9919	5579.9911	5579.9907	
10	5579.9945	5579.9941	5579.9936	5579.9929	
20	5579.9961	5579.9959	5579.9951	5579.9943	
30	5579.9965	5579.9961	5579.9957	5579.9952	
40	5579.9972	5579.9969	5579.9968	5579.9962	
Max. Deviation (MHz)	0.0096	0.0105	0.0115	0.0123	
Max. Deviation (ppm)	1.72	1.88	2.06	2.20	
Result	Pass				

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FS Result Appendix E

Mode: 40 MHz / Port 2 Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)				
0.0		5310 MHz			
(V)	0 Minute	2 Minute	5 Minute	10 Minute	
126.50	5309.9970	5309.9961	5309.9958	5309.9952	
110.00	5309.9961	5309.9959	5309.9957	5309.9950	
93.50	5309.9959	5309.9956	5309.9949	5309.9940	
Max. Deviation (MHz)	0.0041	0.0044	0.0051	0.0060	
Max. Deviation (ppm)	0.77	0.83	0.96	1.13	
Result		Pa	ass		

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5310 MHz			
(C)	0 Minute	2 Minute	5 Minute	10 Minute
0	5309.9934	5309.9930	5309.9928	5309.9919
10	5309.9941	5309.9937	5309.9936	5309.9933
20	5309.9961	5309.9954	5309.9948	5309.9941
30	5309.9965	5309.9958	5309.9949	5309.9945
40	5309.9970	5309.9964	5309.9961	5309.9953
Max. Deviation (MHz)	0.0086	0.0093	0.0094	0.0102
Max. Deviation (ppm)	1.62	1.75	1.77	1.92
Result		Pa	ass	

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)				
00		5550 MHz			
(V)	0 Minute	10 Minute			
126.50	5549.9963	5549.9957	5549.9951	5549.9942	
110.00	5549.9961	5549.9957	5549.9950	5549.9944	
93.50	5549.9959	5549.9955	5549.9946	5549.9939	
Max. Deviation (MHz)	0.0041	0.0045	0.0054	0.0061	
Max. Deviation (ppm)	0.74	0.81	0.97	1.10	
Result		Pa	ass		

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°a)		5550) MHz	
(℃)	0 Minute	2 Minute	5 Minute	10 Minute
0	5549.9938	5549.9936	5549.9931	5549.9924
10	5549.9956	5549.9955	5549.9953	5549.9946
20	5549.9961	5549.9957	5549.9953	5549.9950
30	5549.9965	5549.9957	5549.9955	5549.9947
40	5549.9983	5549.9981	5549.9974	5549.9969
Max. Deviation (MHz)	0.0092	0.0099	0.0102	0.0104
Max. Deviation (ppm)	1.66	1.78	1.84	1.87
Result	Pass			

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FS Result Appendix E

Mode: 80 MHz / Port 2 Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
()()	5290 MHz			
(V)	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5289.9965	5289.9959	5289.9951	5289.9946
110.00	5289.9961	5289.9957	5289.9951	5289.9949
93.50	5289.9958	5289.9953	5289.9949	5289.9944
Max. Deviation (MHz)	0.0042	0.0047	0.0051	0.0056
Max. Deviation (ppm)	0.79	0.89	0.96	1.06
Result		Pa	ass	

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5290 MHz			
(℃)	0 Minute	2 Minute	5 Minute	10 Minute
0	5289.9939	5289.9931	5289.9921	5289.9920
10	5289.9952	5289.9943	5289.9940	5289.9934
20	5289.9961	5289.9957	5289.9948	5289.9940
30	5289.9965	5289.9962	5289.9952	5289.9948
40	5289.9978	5289.9970	5289.9969	5289.9959
Max. Deviation (MHz)	0.0087	0.0088	0.0091	0.0100
Max. Deviation (ppm)	1.64	1.66	1.72	1.89
Result		Pa	ass	

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)				
0.0		5530) MHz		
(V)	0 Minute	0 Minute 2 Minute 5 Minute			
126.50	5529.9971	5529.9970	5529.9967	5529.9966	
110.00	5529.9961	5529.9954	5529.9951	5529.9945	
93.50	5529.9958	5529.9956	5529.9955	5529.9948	
Max. Deviation (MHz)	0.0042	0.0046	0.0049	0.0055	
Max. Deviation (ppm)	0.76	0.83	0.89	0.99	
Result		Pa	ass		

Temperature vs. Frequency Stability

Temperature		Measurement F	requency (MHz)	
(%C)	5530 MHz			
(℃)	0 Minute	2 Minute	5 Minute	10 Minute
0	5529.9921	5529.9916	5529.9915	5529.9909
10	5529.9941	5529.9932	5529.9925	5529.9923
20	5529.9961	5529.9955	5529.9947	5529.9939
30	5529.9965	5529.9961	5529.9955	5529.9949
40	5529.9967	5529.9962	5529.9954	5529.9949
Max. Deviation (MHz)	0.0102	0.0104	0.0107	0.0116
Max. Deviation (ppm)	1.84	1.88	1.93	2.10
Result		Pass		

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