

# **FCC RADIO TEST REPORT**

FCC ID

: TE7RE200V4

Equipment

: AC750 Wi-Fi Range Extender

**Brand Name** 

: tp-link

Model Name

: RE200/RE220

Applicant

: TP-Link Technologies Co., Ltd.

Building 24 (floors 1,3,4,5) and 28

(floors1-4), Central Science and Technology Park, Nanshan , Shenzhen, 518057 , China

Manufacturer : TP-Link Technologies Co., Ltd.

Building 24 (floors 1,3,4,5) and 28

(floors1-4), Central Science and Technology Park, Nanshan , Shenzhen, 518057 , China

Standard

: 47 CFR FCC Part 15.407

The product was received on Aug. 26, 2019, and testing was started from Sep. 10, 2019 and completed on Nov. 08, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

Approved by: Cliff Chang

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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

TEL: 886-3-656-9065

FAX: 886-3-656-9085

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: Nov. 11, 2019

Report Version : 02

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Photographs of EUT v01

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Report Version : 02

# History of this test report

Report No.: FR982620AB

Report No.	Version	Description	Issued Date
FR982620AB	01	Initial issue of report	Oct. 28, 2019
FR982620AB	02	Updating the test data for 5610MHz.	Nov. 11, 2019

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## **Summary of Test Result**

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Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.407(a)	Emission Bandwidth	PASS	-
3.3	15.407(a)	Maximum Conducted Output Power	PASS	-
3.4	15.407(a)	Peak Power Spectral Density	PASS	-
3.5	15.407(b)	Unwanted Emissions	PASS	-

#### **Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

#### **Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

**Report Producer: 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]
5250-5350		5260-5320	52-64 [4]
5470-5725		5500-5700	100-140 [11]
5725-5850		5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40)	5190-5230	38-46 [2]
5250-5350		5270-5310	54-62 [2]
5470-5725		5510-5670	102-134 [5]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80)	5210	42 [1]
5250-5350		5290	58 [1]
5470-5725		5530-5610	106-122 [2]
5725-5850		5775	155 [1]

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Band	Mode	BWch (MHz)	Nant
5.15-5.25GHz	802.11a	20	1TX
5.15-5.25GHz	5.15-5.25GHz 802.11n HT20		1TX
5.15-5.25GHz	802.11ac VHT20	20	1TX
5.15-5.25GHz	802.11n HT40	40	1TX
5.15-5.25GHz	802.11ac VHT40	40	1TX
5.15-5.25GHz	802.11ac VHT80	80	1TX
5.25-5.35GHz	802.11a	20	1TX
5.25-5.35GHz	802.11n HT20	20	1TX
5.25-5.35GHz	802.11ac VHT20	20	1TX
5.25-5.35GHz	802.11n HT40	40	1TX
5.25-5.35GHz	802.11ac VHT40	40	1TX
5.25-5.35GHz	802.11ac VHT80	80	1TX
5.47-5.725GHz	802.11a	20	1TX
5.47-5.725GHz	802.11n HT20	20	1TX
5.47-5.725GHz	802.11ac VHT20	20	1TX
5.47-5.725GHz	802.11n HT40	40	1TX
5.47-5.725GHz	802.11ac VHT40	40	1TX
5.47-5.725GHz	802.11ac VHT80	80	1TX
5.725-5.85GHz	802.11a	20	1TX
5.725-5.85GHz	802.11n HT20	20	1TX
5.725-5.85GHz	802.11ac VHT20	20	1TX
5.725-5.85GHz	802.11n HT40	40	1TX
5.725-5.85GHz	802.11ac VHT40	40	1TX
5.725-5.85GHz	802.11ac VHT80	80	1TX

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#### Note:

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

			Model	Antenna	_		(	Gain (dBi	i)	
Ant.	Port	Brand	Name	Туре	Connector	2.4GHz	5GHz Band 1	5GHz Band 2	5GHz Band 3	5GHz Band 4
1	1	TP-Link	N/A	Printed	N/A	1.95	-	-	-	-
2	2	TP-Link	N/A	Printed	N/A	1.96	-	-	-	-
3	1	TP-Link	N/A	Printed	N/A	-	2.50	2.28	2.75	2.98

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Note: The above information was declared by manufacturer.

#### <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 (1TX/1RX)

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

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### 1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ac VHT20	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ac VHT40	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ac VHT80	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)

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

### 1.1.4 EUT Operational Condition

EUT Power Type	From Internal Power Supply				
Beamforming Function		With beamforming	$\boxtimes$	Without beamforming	
Weather Band	$\boxtimes$	With 5600~5650MHz		Without 5600~5650MHz	
Function		Outdoor P2M	$\boxtimes$	Indoor P2M	
i dilotion		Fixed P2P		Client	
TPC Function	$\boxtimes$	☑ With TPC ☐ Without TPC		Without TPC	
Test Software Version MT76xxE QA UI (Version 2.0.10.0)			0)		

Note: The above information was declared by manufacturer.

### 1.1.5 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	Description
RE200	All the models are identical, the difference model for difference marketing strategy.
RE220	All the models are identical, the difference model for difference marketing strategy.

From the above models, model: RE200 was selected as representative model for the test and its data was recorded in this report.

#### 1.1.6 Table for EUT support function

Function
AP (Master) Mode
Repeater (Master + Client without radar detection) Mode

Note: The EUT supports AP and Repeater mode, only Repeater mode was tested and recorded in this test report by manufacturer request.

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## 1.2 Applicable Standards

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

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- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 789033 D02 v02r01
- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

## 1.3 Testing Location Information

	Testing Location						
	HWA YA	ADD	:	No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)			
		TEL	:	886-3-327-3456 FAX : 886-3-327-0973			
$\boxtimes$	JHUBEI	ADD	:	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.			
		TEL	:	886-3-656-9065 FAX : 886-3-656-9085			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH03-CB	Serway Li	25.1-26.6°C / 58-62%	Sep. 14, 2019~Nov. 08, 2019
Radiated (Below 1GHz)	03CH05-CB	KJ Chang	24.3-25.4°C / 60-63%	Sep. 10, 2019
Radiated (Above 1GHz)	03CH03-CB	KJ Chang	24.2-25.4°C / 59-63%	Sep. 18, 2019~Nov. 08, 2019
AC Conduction	CO01-CB	Rick Yeh	25-26°C / 45-46%	Sep. 11, 2019

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)	2.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	5.1 dB	Confidence levels of 95%
Conducted Emission	2.4 dB	Confidence levels of 95%
Output Power Measurement	1.5 dB	Confidence levels of 95%
Power Density Measurement	2.4 dB	Confidence levels of 95%
Bandwidth Measurement	2%	Confidence levels of 95%

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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)_1TX	-
5180MHz	13
5200MHz	1F
5240MHz	12
5260MHz	12
5300MHz	12
5320MHz	11
5500MHz	10
5580MHz	14
5700MHz	10
5745MHz	1A
5785MHz	18
5825MHz	18
802.11ac VHT20_Nss1,(MCS0)_1TX	-
5180MHz	13
5200MHz	1C
5240MHz	13
5260MHz	13
5300MHz	13
5320MHz	13
5500MHz	10
5580MHz	14
5700MHz	11
5745MHz	1C
5785MHz	1E
5825MHz	1D
802.11ac VHT40_Nss1,(MCS0)_1TX	-
5190MHz	09
5230MHz	13
5270MHz	13
5310MHz	09
5510MHz	09
5550MHz	11
5670MHz	17
5755MHz	18
5795MHz	1F

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Mode	PowerSetting
802.11ac VHT80_Nss1,(MCS0)_1TX	-
5210MHz	06
5290MHz	05
5530MHz	07
5610MHz	19
5775MHz	18

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#### Note:

• VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.

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# 2.2 The Worst Case Measurement Configuration

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

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

The Worst Case Mode for Following Conformance Tests				
Tests Item	Unwanted Emissions			
Test Condition  Radiated measurement  If EUT consist of multiple antenna assembly (multiple antenna are used in regardless of spatial multiplexing MIMO configuration), the radiated test s be performed with highest antenna gain of each antenna type.				
Operating Mode < 1GHz Normal Link				
1	Repeater Mode: Place EUT in Y axis			
2	Repeater Mode: Place EUT in Z axis			
For operating mode 2 is the worst case and it was record in this test report.				
Operating Mode > 1GHz CTX				
The EUT can be placed in Y-axis and Z-axis. After evaluating, Z-axis was the worst case, so the test w follow this same test configuration.				
1 EUT in Z axis				

The Worst Case Mode for Following Conformance Tests			
Tests Item Simultaneous Transmission Analysis - Radiated Emission Co-location			
Test Condition Radiated measurement			
Operating Mode Normal Link			
The EUT can be placed in Y-axis and Z-axis. After evaluating, Z-axis was the worst case, so the test will follow this same test configuration.			
1	WLAN 2.4GHz + WLAN 5GHz_EUT in Z axis		
Refer to Appendix F for Radiated Emission Co-location.			

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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.: FA982620 for Co-location RF Exposure Evaluation.			

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## 2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

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## 2.4 Accessories

N/A

## 2.5 Support Equipment

#### For AC Conduction:

	Support Equipment					
No.	No. Equipment Brand Name Model Name FCC ID					
Α	LAN NB	DELL	E6430	N/A		
В	2.4G NB	DELL	E6430	N/A		
С	5G NB	DELL	E6430	N/A		
D	AP Router	ASUS	RP-N53	MSQ-RPN53		

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For Radiated (below 1GHz):

	Support Equipment					
No.	No. Equipment Brand Name Model Name FCC ID					
Α	NB	DELL	E4300	N/A		
В	WLAN AP	NETGEAR	WNDR3300v2	PY309300116		
С	NB	DELL	E4300	N/A		
D	NB	DELL	E4300	N/A		

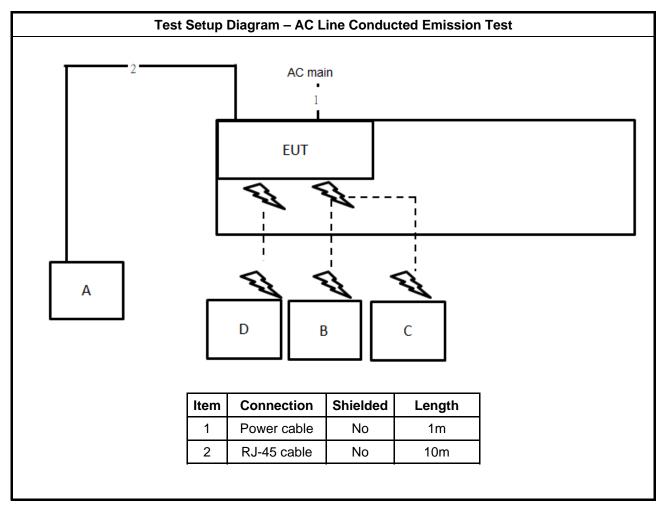
For Radiated (above 1GHz):

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

#### For RF Conducted:

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

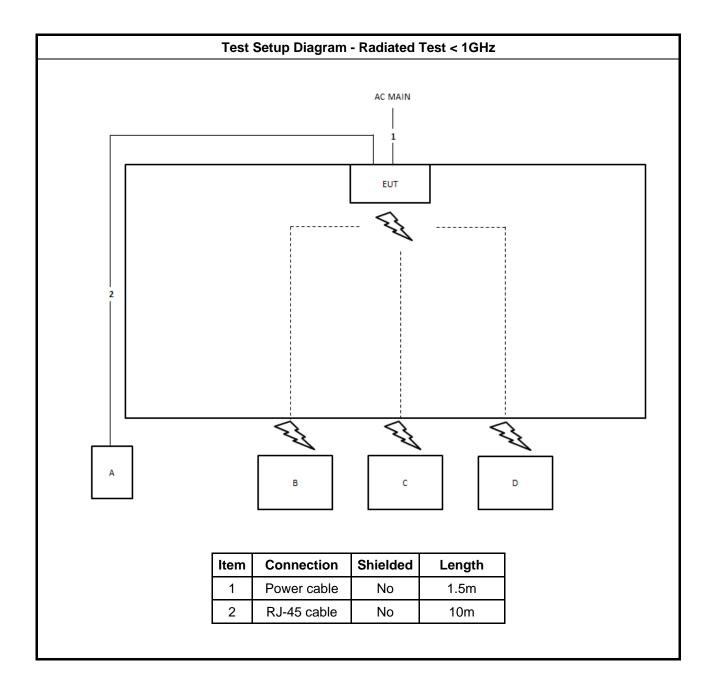
## 2.6 Test Setup Diagram



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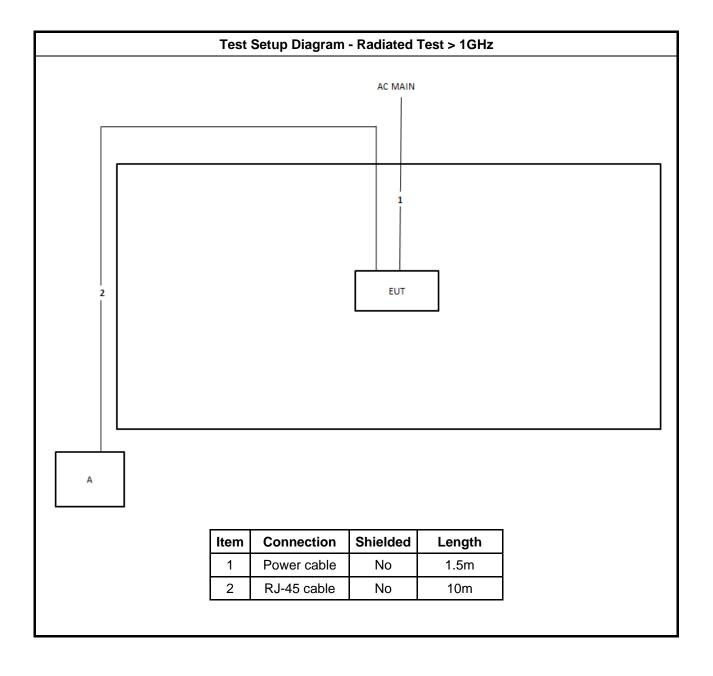
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## 3 Transmitter Test Result

## 3.1 AC Power-line Conducted Emissions

#### 3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit						
Frequency Emission (MHz) Quasi-Peak Average						
0.15-0.5 66 - 56 * 56 - 46 *						
0.5-5	56	46				
5-30	60	50				
Note 1: * Decreases with the logarithm of the frequency.						

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### 3.1.2 Measuring Instruments

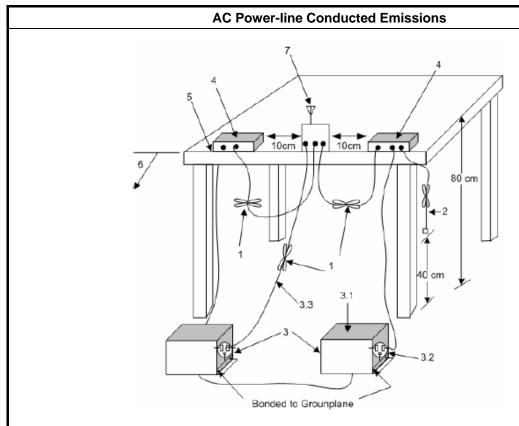
Refer a test equipment and calibration data table in this test report.

#### 3.1.3 Test Procedures

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

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### 3.1.4 Test Setup



1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.

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- 2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50  $\Omega$  loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
- 3.1—All other equipment powered from additional LISN(s).
- 3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
- 3.3—LISN at least 80 cm from nearest part of EUT chassis.
- 4—Non-EUT components of EUT system being tested.
- 5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
- 6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
- 7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

#### 3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

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## 3.2 Emission Bandwidth

#### 3.2.1 Emission Bandwidth Limit

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

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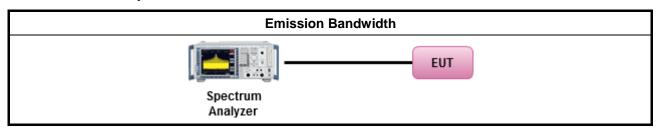
### 3.2.2 Measuring Instruments

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

#### 3.2.3 Test Procedures

	Test Method						
-	For the emission bandwidth shall be measured using one of the options below:						
	Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.						
Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.							
	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.						

## 3.2.4 Test Setup



#### 3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

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### 3.3 Maximum Conducted Output Power

#### 3.3.1 Maximum Conducted Output Power Limit

## **Maximum Conducted Output Power Limit UNII Devices** For the 5.15-5.25 GHz band: Outdoor AP: the maximum conducted output power (Pout) shall not exceed the lesser of 1 W. If GTX > 6 dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ . e.i.r.p. at any elevation angle above 30 degrees $\leq 125$ mW [21dBm] Indoor AP: the maximum conducted output power (P<sub>Out</sub>) shall not exceed the lesser of 1 W. If G<sub>TX</sub> > 6 dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ Point-to-point AP: the maximum conducted output power (Pout) 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 (Pout) 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<sub>Out</sub>) 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 (Pout) 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<sub>TX</sub> > 6 dBi, then $P_{Out} = 24 - (G_{TX} - 6).$ For the 5.725-5.85 GHz band: Point-to-multipoint systems (P2M): the maximum conducted output power (Pout) 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 (Pout) 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 (Pout) 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 (Pout) shall not exceed the lesser of 1 W. Pout = maximum conducted output power in dBm, $G_{TX}$ = the maximum transmitting antenna directional gain in dBi.

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## 3.3.2 Measuring Instruments

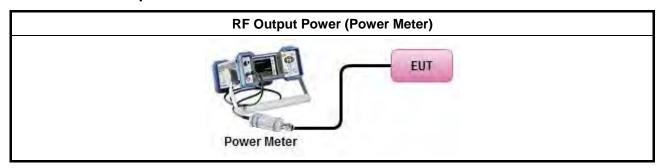
Refer a test equipment and calibration data table in this test report.

#### 3.3.3 Test Procedures

	Test Method						
•	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.						
	<ul> <li>If multiple transmit chains, EIRP calculation could be following as methods:</li> <li>P<sub>total</sub> = P<sub>1</sub> + P<sub>2</sub> + + P<sub>n</sub></li> <li>(calculated in linear unit [mW] and transfer to log unit [dBm])</li> <li>EIRP<sub>total</sub> = P<sub>total</sub> + DG</li> </ul>						

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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	UNII Devices						
$\boxtimes$	For the 5.15-5.25 GHz band:						
	<ul> <li>Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G<sub>TX</sub> &gt; 6 dBi, then P<sub>Out</sub> = 17 - (G<sub>TX</sub> - 6).</li> </ul>						
	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 $P_{Out} = 17 - (G_{TX} - 23)$ .						
	<ul> <li>Mobile or Portable Client: the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G<sub>TX</sub> &gt; 6 dBi, then PPSD= 11 - (G<sub>TX</sub> - 6)</li> </ul>						
	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) $\leq$ 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 e.i.r.p. peak power spectral density (PPSD) ≤ 10 dBm/MHz.						
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.						
	<ul> <li>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:</li> <li>-13 dBW/MHz for 0° ≤ θ &lt; 8°; -13 − 0.716 (θ-8) dBW/MHz for 8° ≤ θ &lt; 40°</li> <li>-35.9 − 1.22 (θ-40) dBW/MHz for 40° ≤ θ ≤ 45°; -42 dBW/MHz for θ &gt; 45°</li> </ul>						
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.						
	For the 5.725-5.85 GHz band:						
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) $\leq$ 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= $30 - (G_{TX} - 6)$ .						
	Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.						
pov	<b>PPSD</b> = peak power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz $G_{TX}$ = the maximum transmitting antenna directional gain in dBi.						

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### 3.4.2 Measuring Instruments

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

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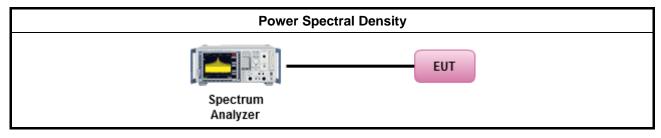
### 3.4.3 Test Procedures

		Test Method						
	outp func	c power spectral density procedures that the same method as used to determine the conducted ut power shall be used to determine the peak power spectral density and use the peak search tion on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density be measured using below options:						
	Refer as FCC KDB 789033, 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

#### 3.5 Unwanted Emissions

#### 3.5.1 Transmitter Unwanted Emissions Limit

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

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- Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
- Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

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

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

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

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#### 3.5.2 Measuring Instruments

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

#### 3.5.3 Test Procedures

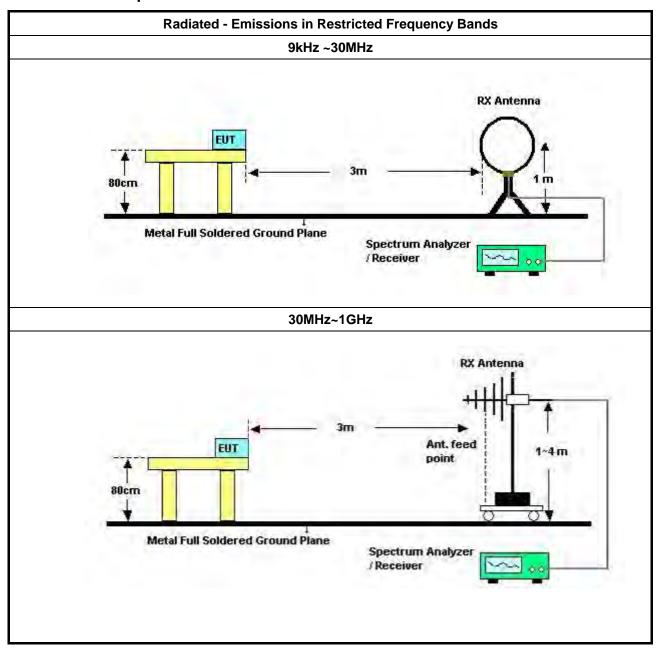
#### **Test Method**

- Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
- The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
- For the transmitter unwanted emissions shall be measured using following options below:
  - Refer as FCC KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.
  - Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.
    - Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
    - Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
    - Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
    - Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
    - Refer as FCC KDB 789033, clause G)5) measurement procedure peak limit.
    - Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.
- For radiated measurement.
  - Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.
  - Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.
  - Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.
- The any unwanted emissions level shall not exceed the fundamental emission level.
- All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

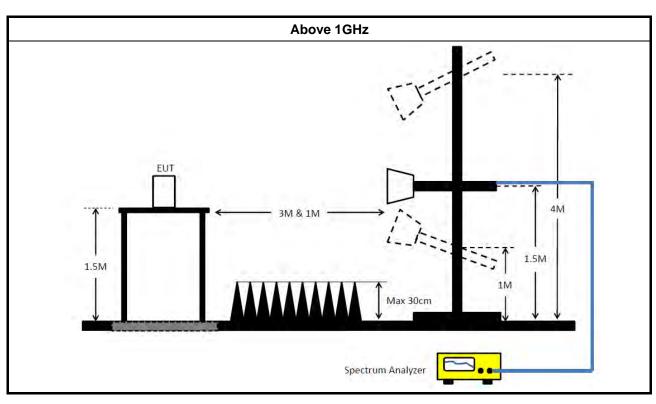
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## 3.5.4 Test Setup



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#### 3.5.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

#### 3.5.6 Emissions in Restricted Frequency Bands (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10 harmonic or 40 GHz, whichever is appropriate.

#### 3.5.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix E

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# 4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 28, 2019	Jan. 29, 2020	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50- 16-2	04083	150kHz ~ 100MHz	Dec. 24, 2018	Dec. 23, 2019	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Jan. 11, 2019	Jan. 10, 2020	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 21, 2019	May 20, 2020	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 2020	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESE & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 28, 2019	Mar. 27, 2020	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 02, 2019	May 01, 2020	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Aug, 15, 2019	Aug, 14, 2020	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+23	30MHz~18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH05-CB)
Horn Antenna	ETS • Lindgren	3115	6821	750MHz~18GHz	Jan. 24, 2019	Jan. 23, 2020	Radiation (03CH03-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jun. 27, 2019	Jun. 26, 2020	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Dec. 20, 2018	Dec. 19, 2019	Radiation (03CH03-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 19, 2019	Jun. 18, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+27	1GHz ~ 18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+27	1GHz ~ 18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-27	1GHz ~ 18GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-27	1GHz ~ 18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH03-CB)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum analyzer	R&S	FSV40	101028	9kHz~40GHz	Oct. 30, 2018	Oct. 29, 2019	Conducted (TH03-CB)
Spectrum analyzer	R&S	FSV40	101028	9kHz~40GHz	Nov. 01, 2019	Oct. 31, 2020	Conducted (TH03-CB)
Power Sensor	Anritsu	MA2411B	1726195	300MHz~40GHz	Aug. 13, 2019	Aug. 12, 2020	Conducted (TH03-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Aug. 13, 2019	Aug. 12, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-11	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-11	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-12	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-12	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-13	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-13	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-14	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-14	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-15	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-15	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)

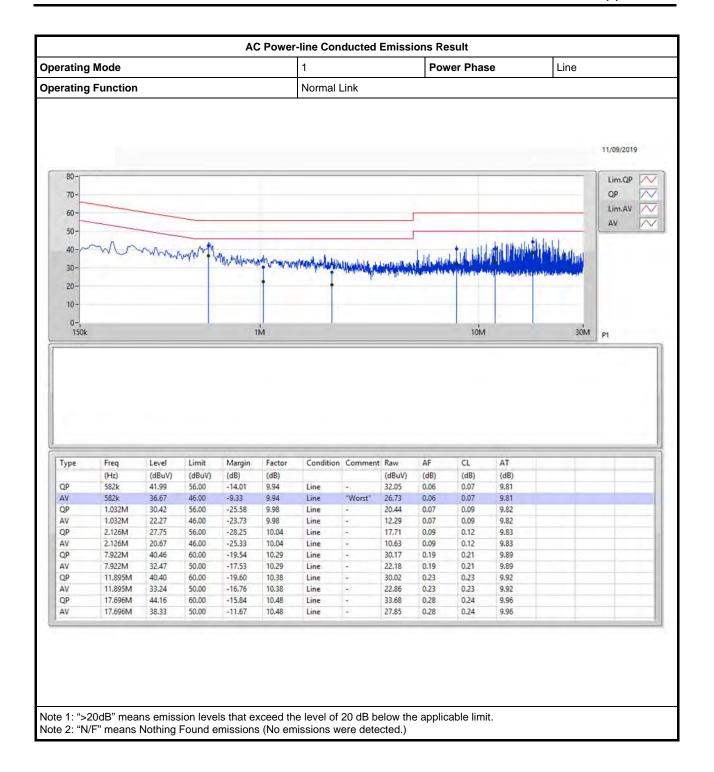
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Note: Calibration Interval of instruments listed above is one year.

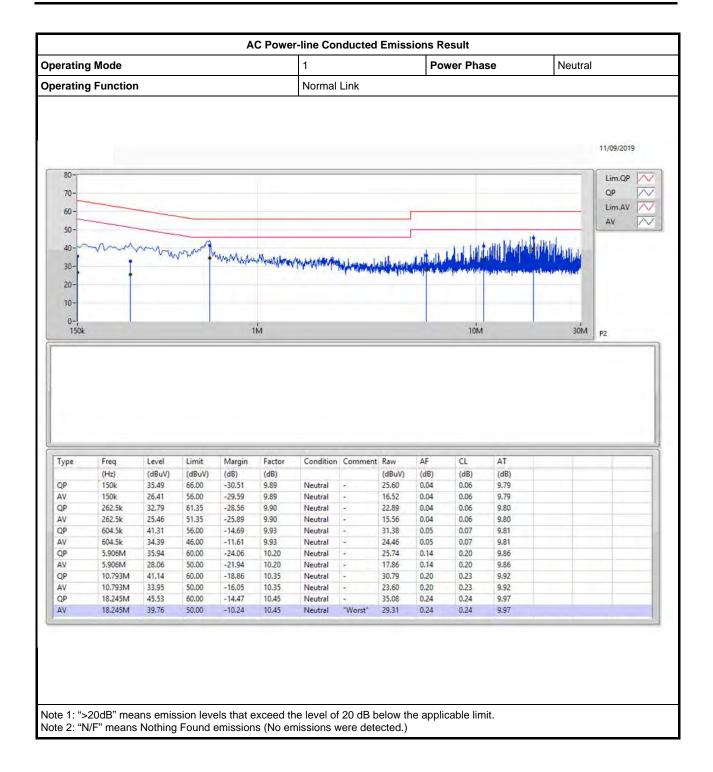
NCR means Non-Calibration required.

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#### AC Power-line Conducted Emissions Result



#### AC Power-line Conducted Emissions Result





**EBW** Appendix B

**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)_1TX	47.58M	31.994M	32M0D1D	37.08M	19.1M
802.11ac VHT20_Nss1,(MCS0)_1TX	48.48M	29.91M	29M9D1D	43.26M	18.626M
802.11ac VHT40_Nss1,(MCS0)_1TX	87.06M	39.671M	39M7D1D	56.58M	36.228M
802.11ac VHT80_Nss1,(MCS0)_1TX	97.68M	75.714M	75M7D1D	97.68M	75.714M
5.25-5.35GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX	38.22M	19.437M	19M4D1D	37.38M	18.996M
802.11ac VHT20_Nss1,(MCS0)_1TX	43.71M	19.76M	19M8D1D	43.47M	19.247M
802.11ac VHT40_Nss1,(MCS0)_1TX	88.08M	39.22M	39M2D1D	68.22M	36.293M
802.11ac VHT80_Nss1,(MCS0)_1TX	93.6M	75.628M	75M6D1D	93.6M	75.628M
5.47-5.725GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX	37.98M	19.162M	19M2D1D	27.36M	16.612M
802.11ac VHT20_Nss1,(MCS0)_1TX	43.14M	18.402M	18M4D1D	21.39M	17.58M
802.11ac VHT40_Nss1,(MCS0)_1TX	88.62M	38.043M	38M0D1D	67.56M	36.356M
802.11ac VHT80_Nss1,(MCS0)_1TX	192.96M	77.121M	77M1D1D	103.32M	75.636M
5.725-5.85GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX	16.38M	28.495M	28M5D1D	16.38M	23.448M
802.11ac VHT20_Nss1,(MCS0)_1TX	17.67M	33.097M	33M1D1D	17.61M	29.464M
802.11ac VHT40_Nss1,(MCS0)_1TX	36.42M	74.437M	74M4D1D	36.36M	60.287M
802.11ac VHT80_Nss1,(MCS0)_1TX	76.32M	111.788M	112MD1D	76.32M	111.788M

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

Max-OBW = Maximum99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;

**Min-OBW** = Minimum 99% occupied bandwidth;



EBW Appendix B

#### Result

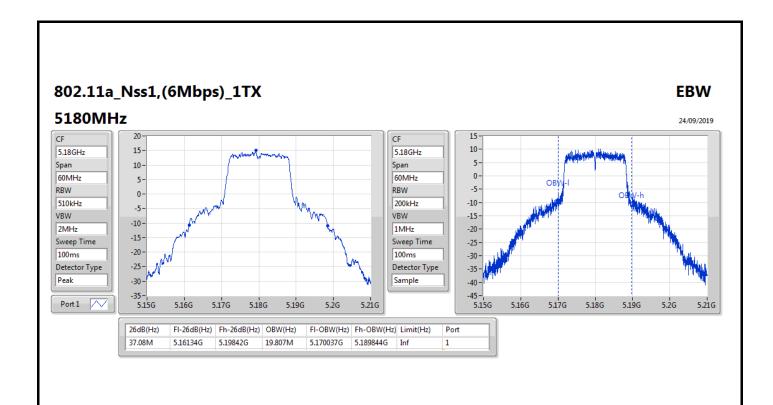
Result	D !!	119	D. J.A.N. ID.	D. 11 ODW
Mode	Result	Limit	Port 1-N dB	Port 1-OBW
000 44 - N - 4 //Mh> 4TV		(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_1TX	-	-		-
5180MHz	Pass	Inf	37.08M	19.807M
5200MHz	Pass	Inf	47.58M	31.994M
5240MHz	Pass	Inf	38.13M	19.1M
5260MHz	Pass	Inf	37.38M	19.437M
5300MHz	Pass	Inf	37.95M	19.22M
5320MHz	Pass	Inf	38.22M	18.996M
5500MHz	Pass	Inf	37.74M	17.828M
5580MHz	Pass	Inf	37.98M	19.162M
5700MHz	Pass	Inf	27.36M	16.612M
5745MHz	Pass	500k	16.38M	28.495M
5785MHz	Pass	500k	16.38M	25.969M
5825MHz	Pass	500k	16.38M	23.448M
802.11ac VHT20_Nss1,(MCS0)_1TX	-	-	1	-
5180MHz	Pass	Inf	43.26M	18.626M
5200MHz	Pass	Inf	48.48M	29.91M
5240MHz	Pass	Inf	43.68M	19.46M
5260MHz	Pass	Inf	43.71M	19.76M
5300MHz	Pass	Inf	43.65M	19.64M
5320MHz	Pass	Inf	43.47M	19.247M
5500MHz	Pass	Inf	21.39M	17.58M
5580MHz	Pass	Inf	43.14M	18.402M
5700MHz	Pass	Inf	37.98M	17.704M
5745MHz	Pass	500k	17.67M	29.464M
5785MHz	Pass	500k	17.61M	33.097M
5825MHz	Pass	500k	17.61M	32.054M
802.11ac VHT40_Nss1,(MCS0)_1TX	-	-	-	-
5190MHz	Pass	Inf	56.58M	36.228M
5230MHz	Pass	Inf	87.06M	39.671M
5270MHz	Pass	Inf	88.08M	39.22M
5310MHz	Pass	Inf	68.22M	36.293M
5510MHz	Pass	Inf	67.56M	36.356M
5550MHz	Pass	Inf	79.74M	37.464M
5670MHz	Pass	Inf	88.62M	38.043M
5755MHz	Pass	500k	36.42M	60.287M
5795MHz	Pass	500k	36.36M	74.437M
802.11ac VHT80_Nss1,(MCS0)_1TX	-	-	-	-
5210MHz	Pass	Inf	97.68M	75.714M
52 TOWN IZ 5290MHz	Pass	Inf	93.6M	75.714W
5290WHz	Pass	Inf	103.32M	75.636M
	+			
5610MHz	Pass	Inf	192.96M	77.121M
5775MHz	Pass	500k	76.32M	111.788M

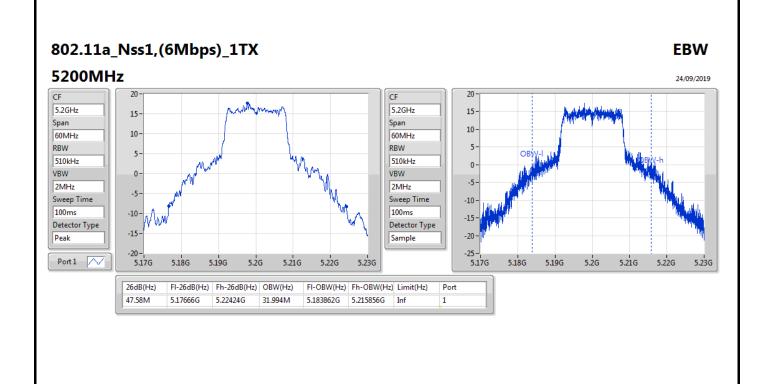
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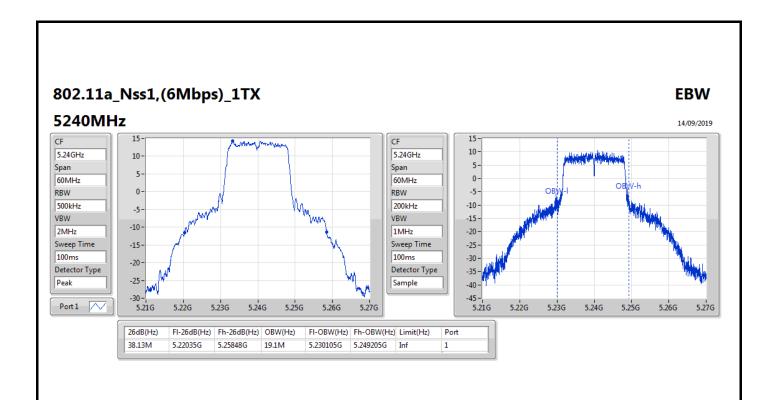
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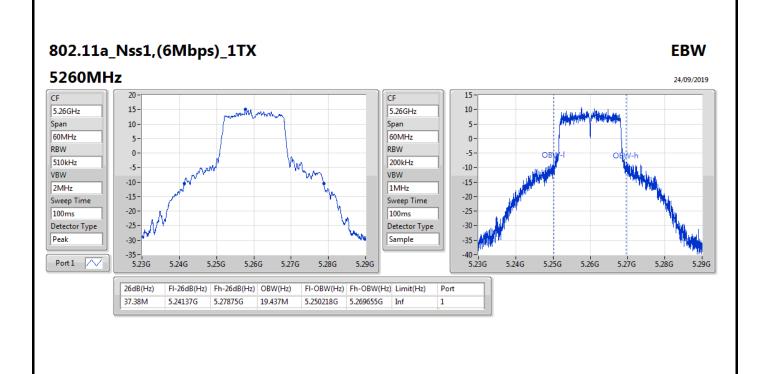
Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band Port X-OBW = Port X 99% occupied bandwidth;

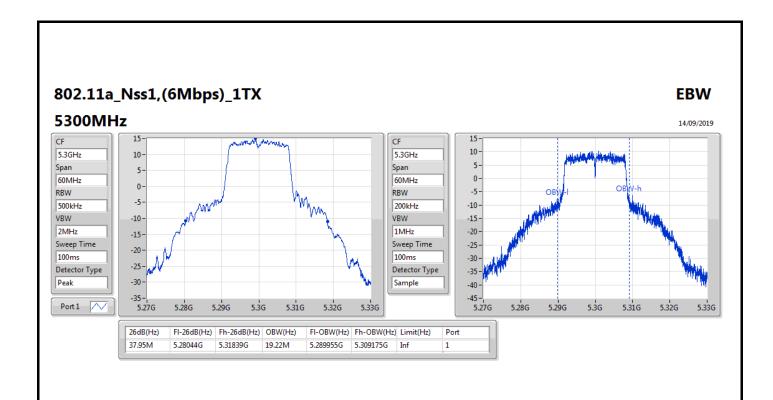
EBW Appendix B

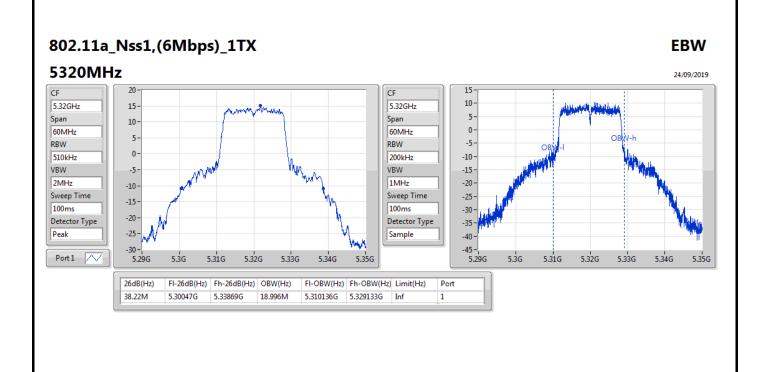


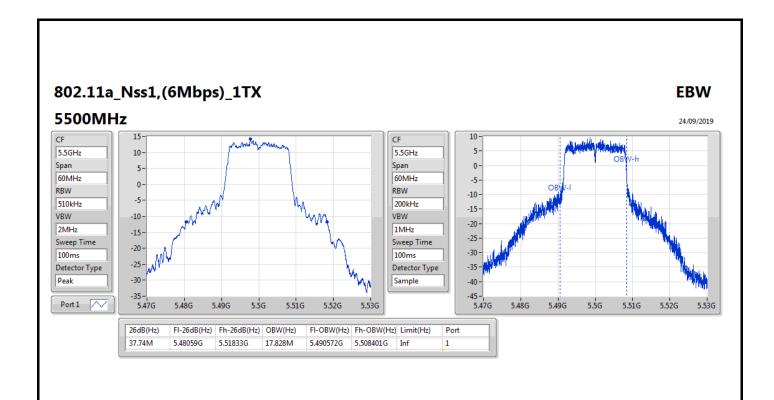


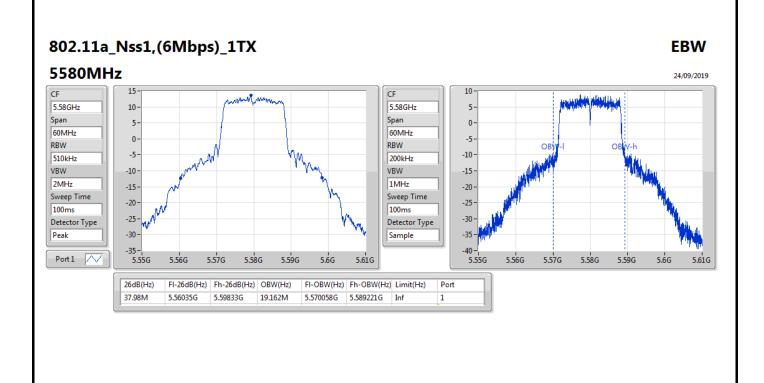


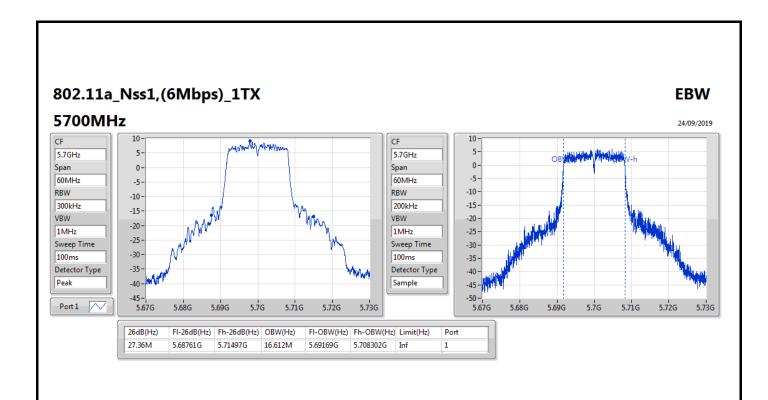


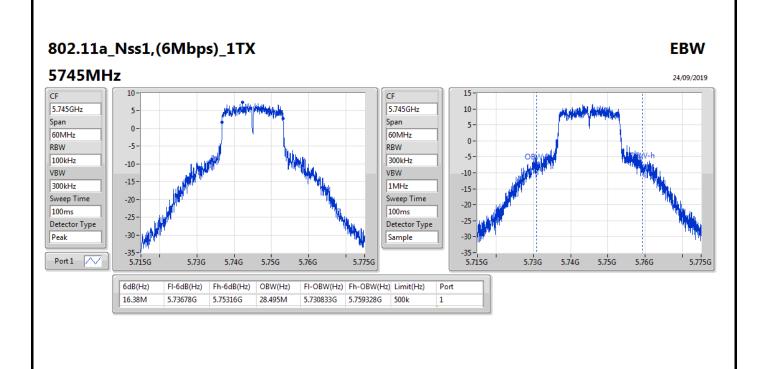


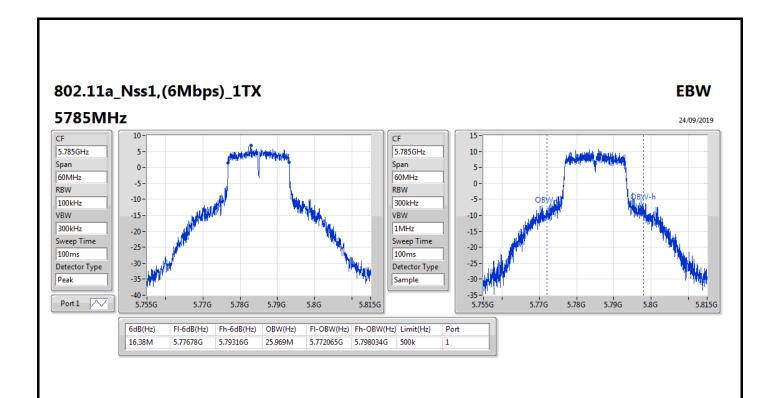


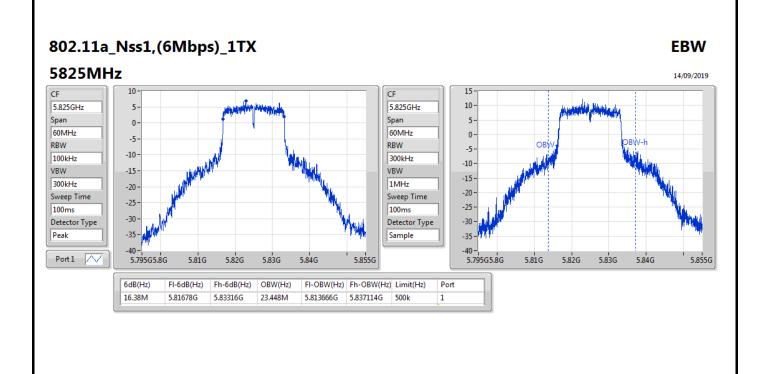


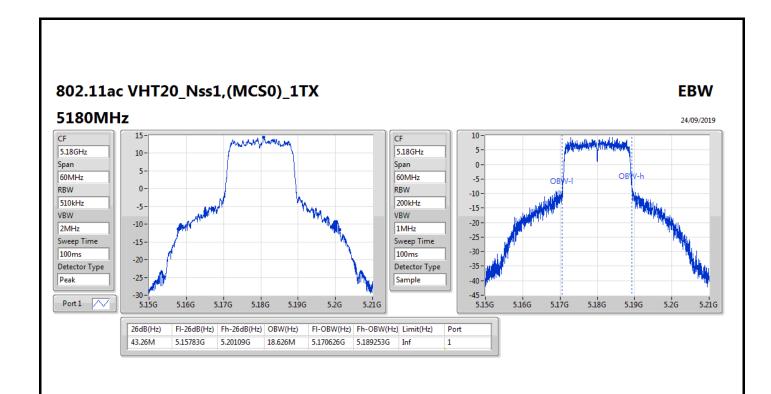


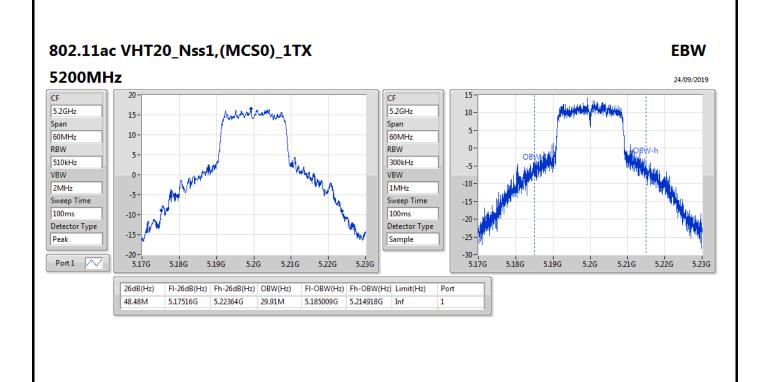


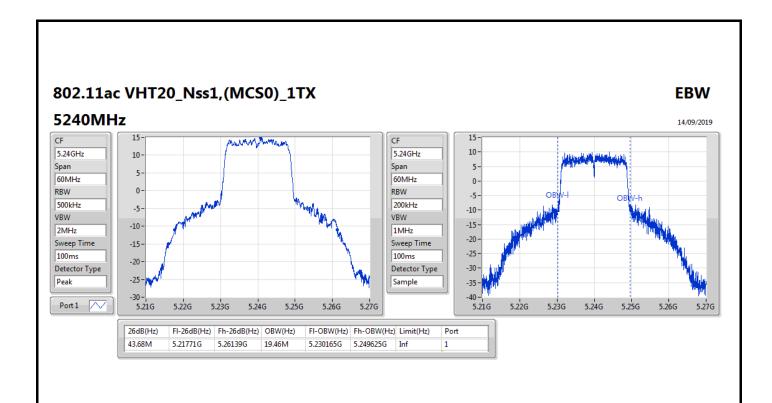


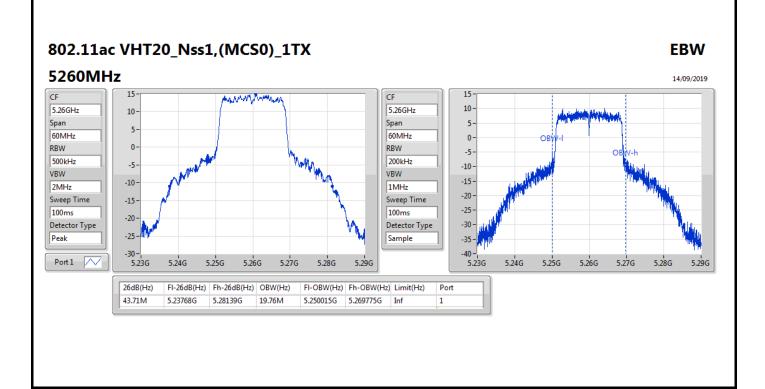


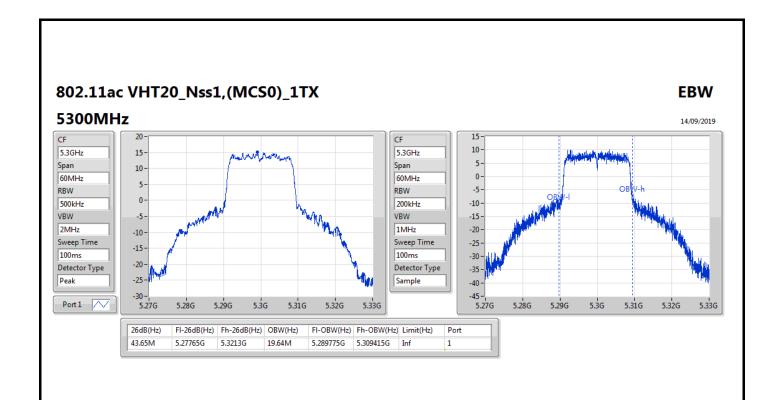


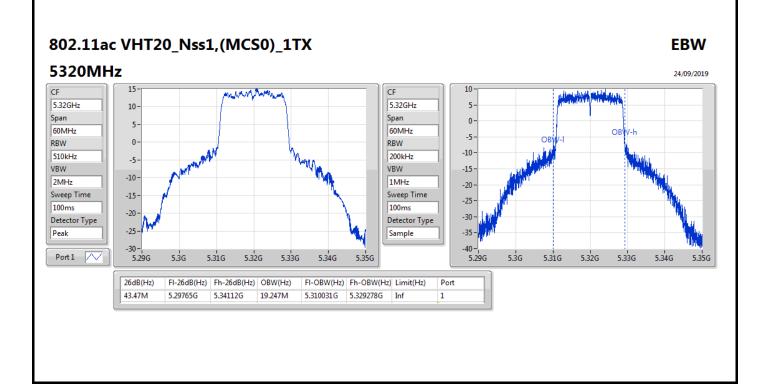


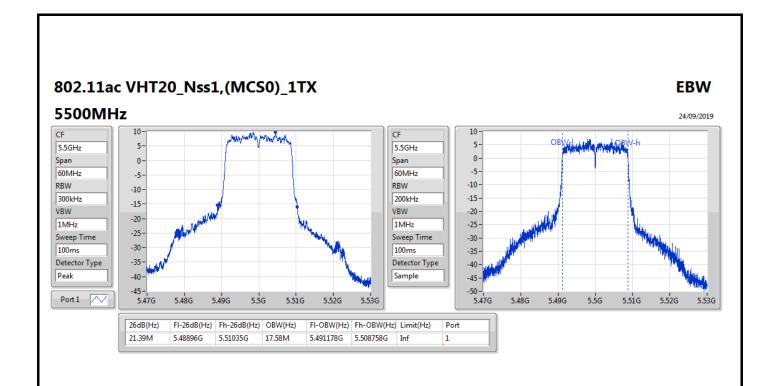


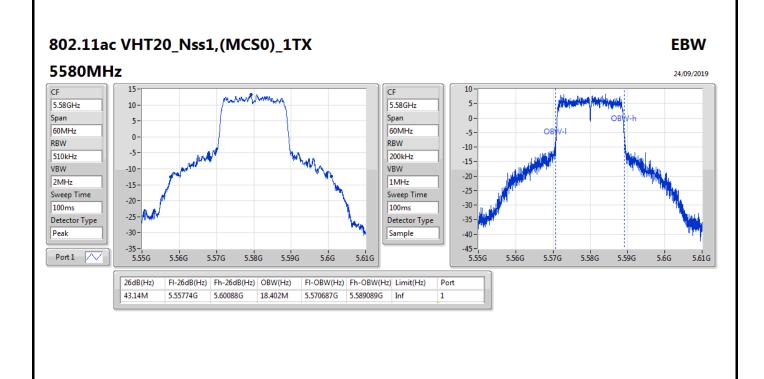


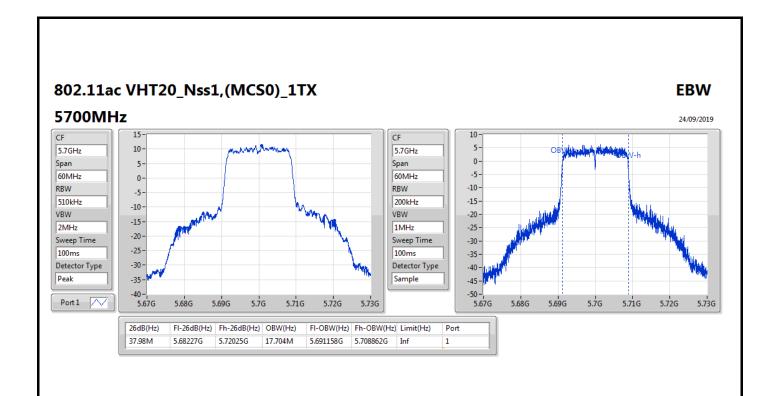


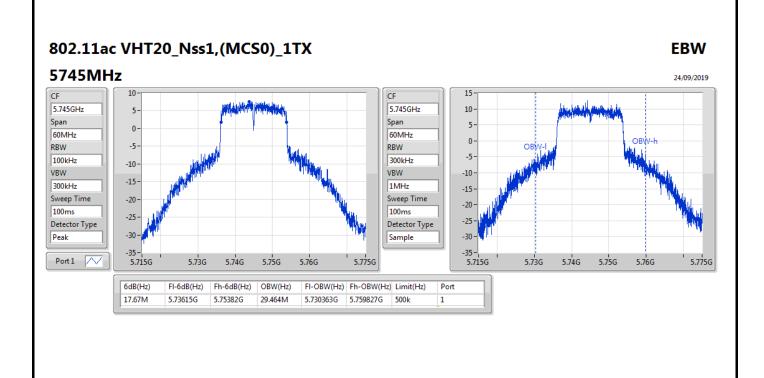


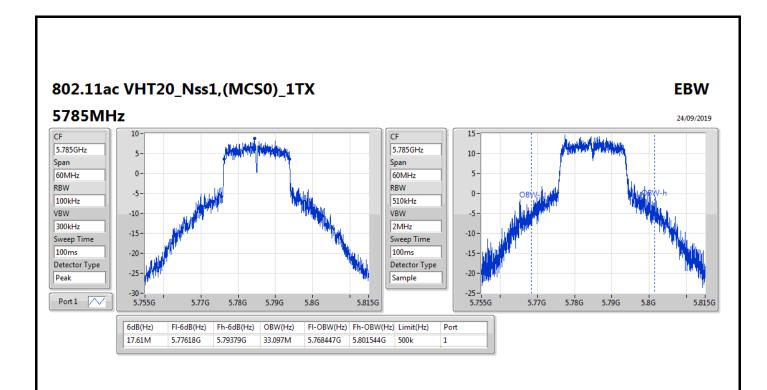


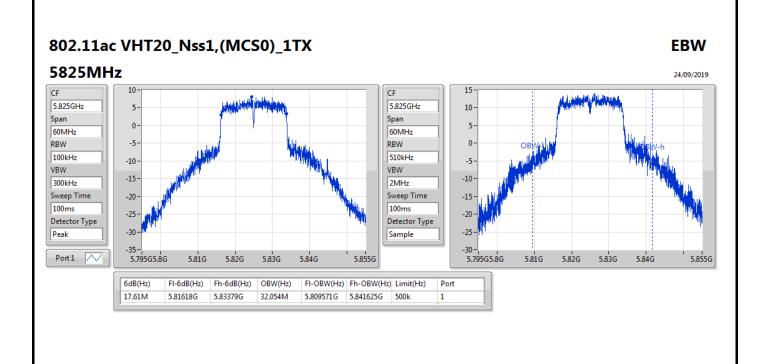


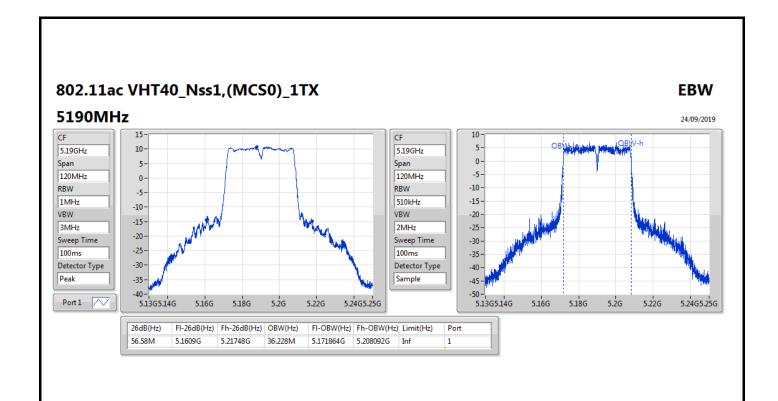


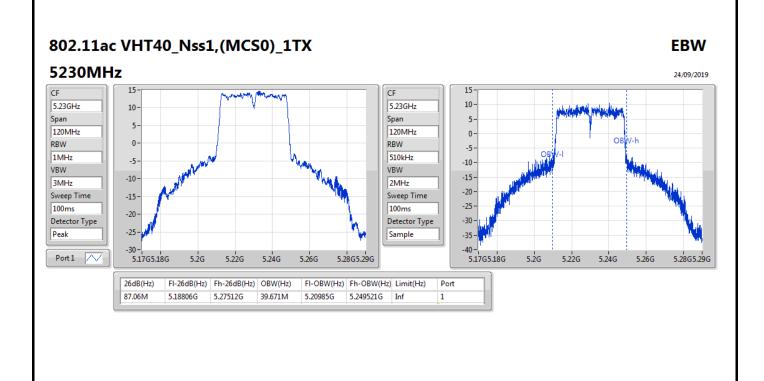


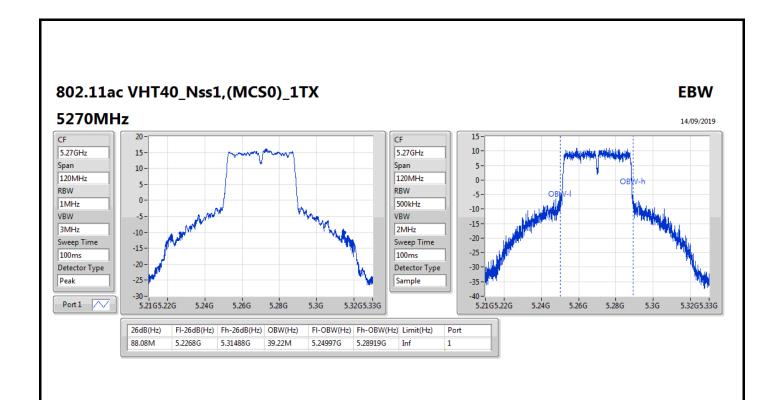


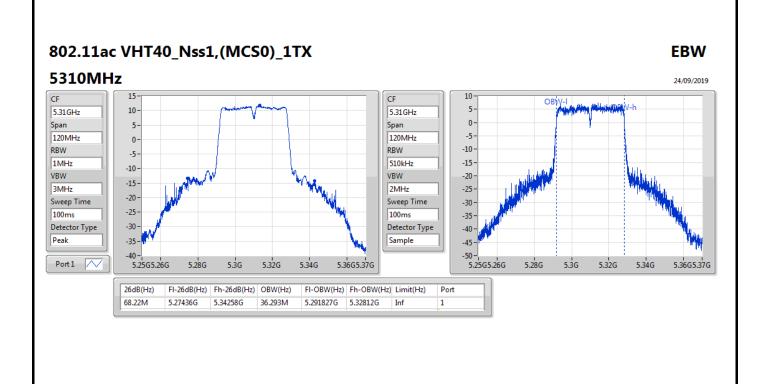


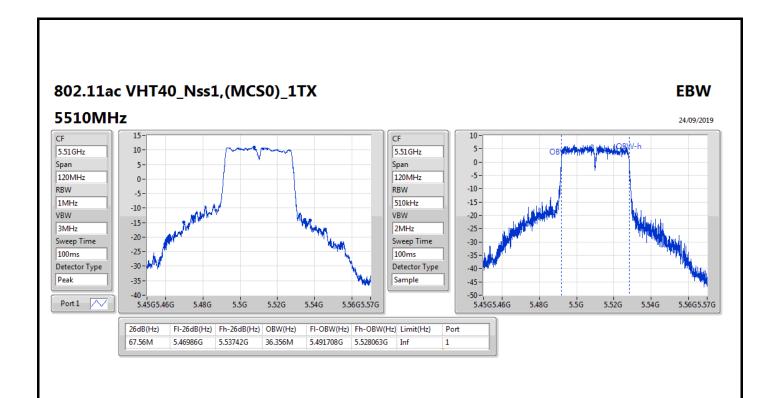


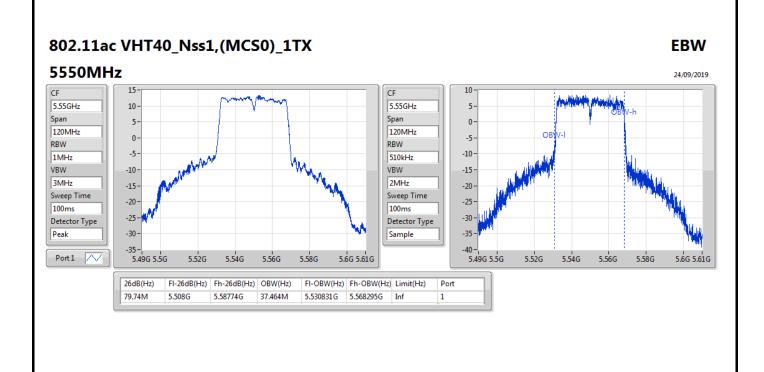


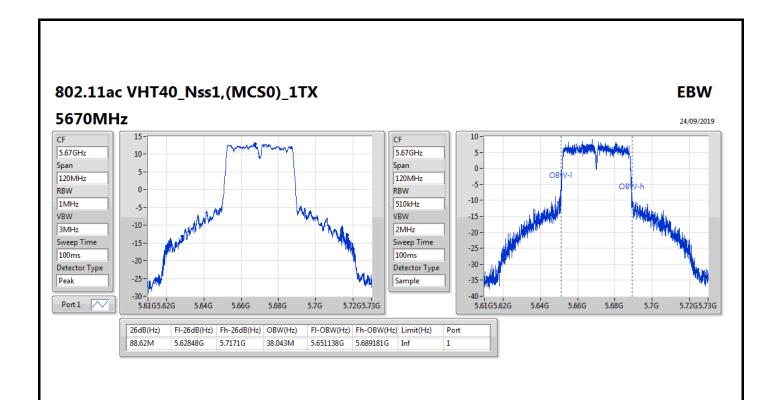


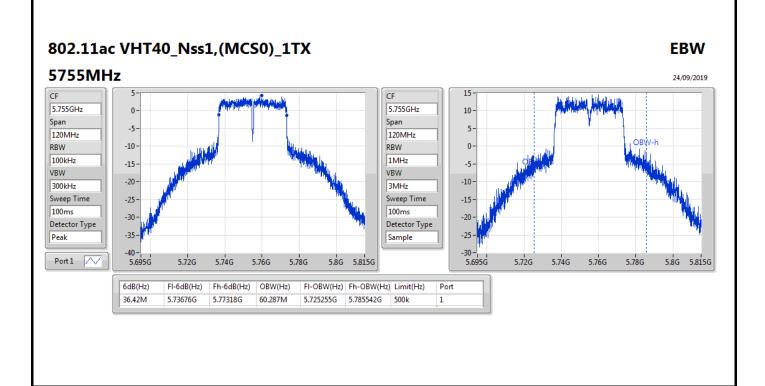


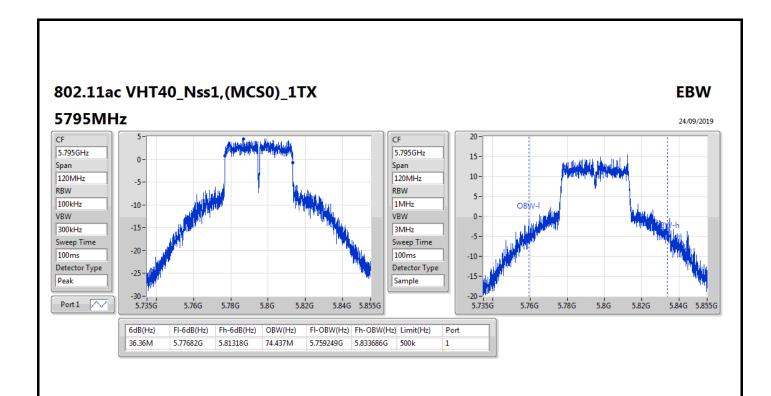


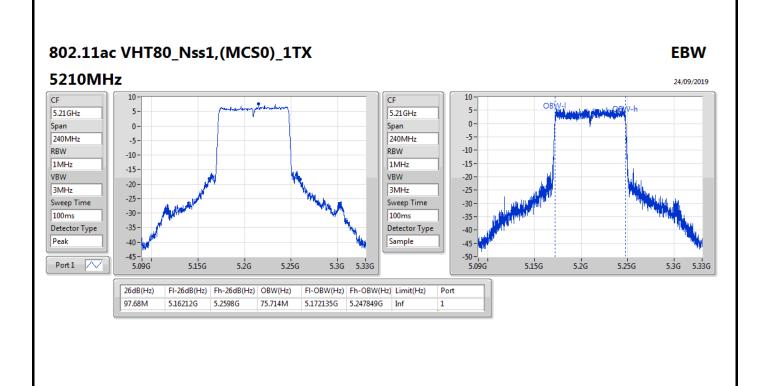


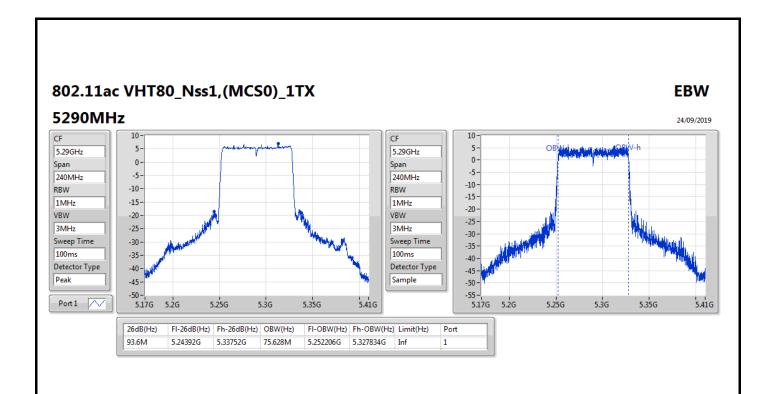


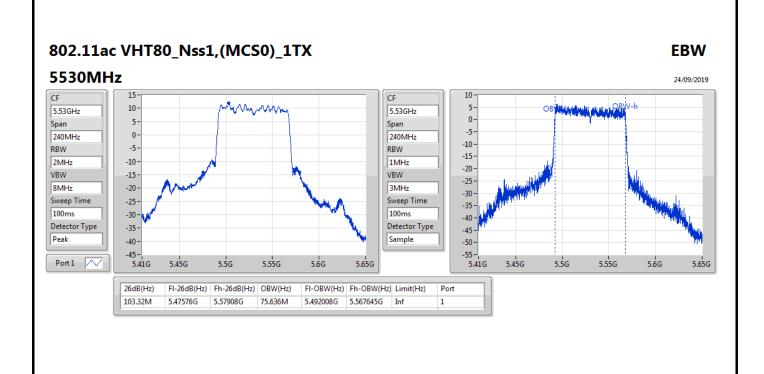


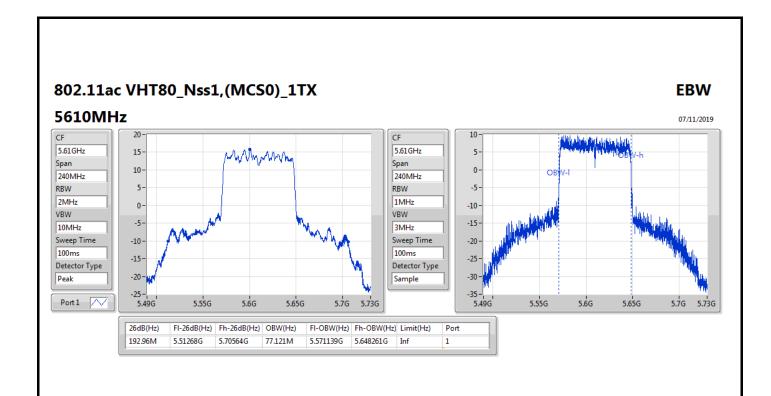


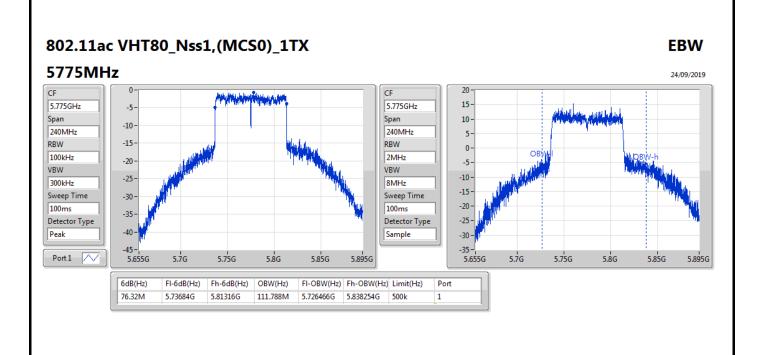














**Summary** 

Mode	Total Power	Total Power
	(dBm)	(W)
5.15-5.25GHz	-	-
802.11a_Nss1,(6Mbps)_1TX	24.02	0.25235
802.11ac VHT20_Nss1,(MCS0)_1TX	23.37	0.21727
802.11ac VHT40_Nss1,(MCS0)_1TX	20.78	0.11967
802.11ac VHT80_Nss1,(MCS0)_1TX	16.65	0.04624
5.25-5.35GHz	-	-
802.11a_Nss1,(6Mbps)_1TX	21.62	0.14521
802.11ac VHT20_Nss1,(MCS0)_1TX	21.63	0.14555
802.11ac VHT40_Nss1,(MCS0)_1TX	21.55	0.14289
802.11ac VHT80_Nss1,(MCS0)_1TX	16.01	0.03990
5.47-5.725GHz	-	-
802.11a_Nss1,(6Mbps)_1TX	20.41	0.10990
802.11ac VHT20_Nss1,(MCS0)_1TX	20.67	0.11668
802.11ac VHT40_Nss1,(MCS0)_1TX	19.45	0.08810
802.11ac VHT80_Nss1,(MCS0)_1TX	21.61	0.14488
5.725-5.85GHz	-	-
802.11a_Nss1,(6Mbps)_1TX	21.22	0.13243
802.11ac VHT20_Nss1,(MCS0)_1TX	21.81	0.15171
802.11ac VHT40_Nss1,(MCS0)_1TX	21.58	0.14388
802.11ac VHT80_Nss1,(MCS0)_1TX	19.77	0.09484



## Result

Result	Result	DG	Port 1	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)
802.11a_Nss1,(6Mbps)_1TX	-	-	-	-	-
5180MHz	Pass	2.50	21.36	21.36	30.00
5200MHz	Pass	2.50	24.02	24.02	30.00
5240MHz	Pass	2.50	21.41	21.41	30.00
5260MHz	Pass	2.28	21.62	21.62	23.98
5300MHz	Pass	2.28	21.51	21.51	23.98
5320MHz	Pass	2.28	21.51	21.51	23.98
5500MHz	Pass	2.75	20.41	20.41	23.98
5580MHz	Pass	2.75	20.34	20.34	23.98
5700MHz	Pass	2.75	17.92	17.92	23.98
5745MHz	Pass	2.98	21.22	21.22	30.00
5785MHz	Pass	2.98	20.78	20.78	30.00
5825MHz	Pass	2.98	20.90	20.90	30.00
802.11ac VHT20_Nss1,(MCS0)_1TX	-	-	-	-	-
5180MHz	Pass	2.50	21.32	21.32	30.00
5200MHz	Pass	2.50	23.37	23.37	30.00
5240MHz	Pass	2.50	21.43	21.43	30.00
5260MHz	Pass	2.28	21.52	21.52	23.98
5300MHz	Pass	2.28	21.49	21.49	23.98
5320MHz	Pass	2.28	21.63	21.63	23.98
5500MHz	Pass	2.75	20.58	20.58	23.98
5580MHz	Pass	2.75	20.67	20.67	23.98
5700MHz	Pass	2.75	17.84	17.84	23.98
5745MHz	Pass	2.98	21.81	21.81	30.00
5785MHz	Pass	2.98	21.75	21.75	30.00
5825MHz	Pass	2.98	21.75	21.75	30.00
802.11ac VHT40_Nss1,(MCS0)_1TX	-	-	-	-	-
5190MHz	Pass	2.50	17.81	17.81	30.00
5230MHz	Pass	2.50	20.78	20.78	30.00
5270MHz	Pass	2.28	21.55	21.55	23.98
5310MHz	Pass	2.28	18.22	18.22	23.98
5510MHz	Pass	2.75	17.89	17.89	23.98
5550MHz	Pass	2.75	19.45	19.45	23.98
5670MHz	Pass	2.75	19.24	19.24	23.98
5755MHz	Pass	2.98	21.16	21.16	30.00
5795MHz	Pass	2.98	21.58	21.58	30.00
802.11ac VHT80_Nss1,(MCS0)_1TX	-	-	=	-	=
5210MHz	Pass	2.50	16.65	16.65	30.00
5290MHz	Pass	2.28	16.01	16.01	23.98
5530MHz	Pass	2.75	16.21	16.21	23.98
5610MHz	Pass	2.75	21.61	21.61	23.98
5775MHz	Pass	2.98	19.77	19.77	30.00

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

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**Summary** 

Mode	PD		
	(dBm/RBW)		
5.15-5.25GHz	-		
802.11a_Nss1,(6Mbps)_1TX	11.12		
802.11ac VHT20_Nss1,(MCS0)_1TX	9.88		
802.11ac VHT40_Nss1,(MCS0)_1TX	4.43		
802.11ac VHT80_Nss1,(MCS0)_1TX	-2.59		
5.25-5.35GHz	-		
802.11a_Nss1,(6Mbps)_1TX	8.92		
802.11ac VHT20_Nss1,(MCS0)_1TX	8.59		
802.11ac VHT40_Nss1,(MCS0)_1TX	5.38		
802.11ac VHT80_Nss1,(MCS0)_1TX	-3.14		
5.47-5.725GHz	-		
802.11a_Nss1,(6Mbps)_1TX	7.72		
802.11ac VHT20_Nss1,(MCS0)_1TX	7.85		
802.11ac VHT40_Nss1,(MCS0)_1TX	3.29		
802.11ac VHT80_Nss1,(MCS0)_1TX	2.50		
5.725-5.85GHz	-		
802.11a_Nss1,(6Mbps)_1TX	6.92		
802.11ac VHT20_Nss1,(MCS0)_1TX	6.99		
802.11ac VHT40_Nss1,(MCS0)_1TX	3.55		
802.11ac VHT80_Nss1,(MCS0)_1TX	-0.71		

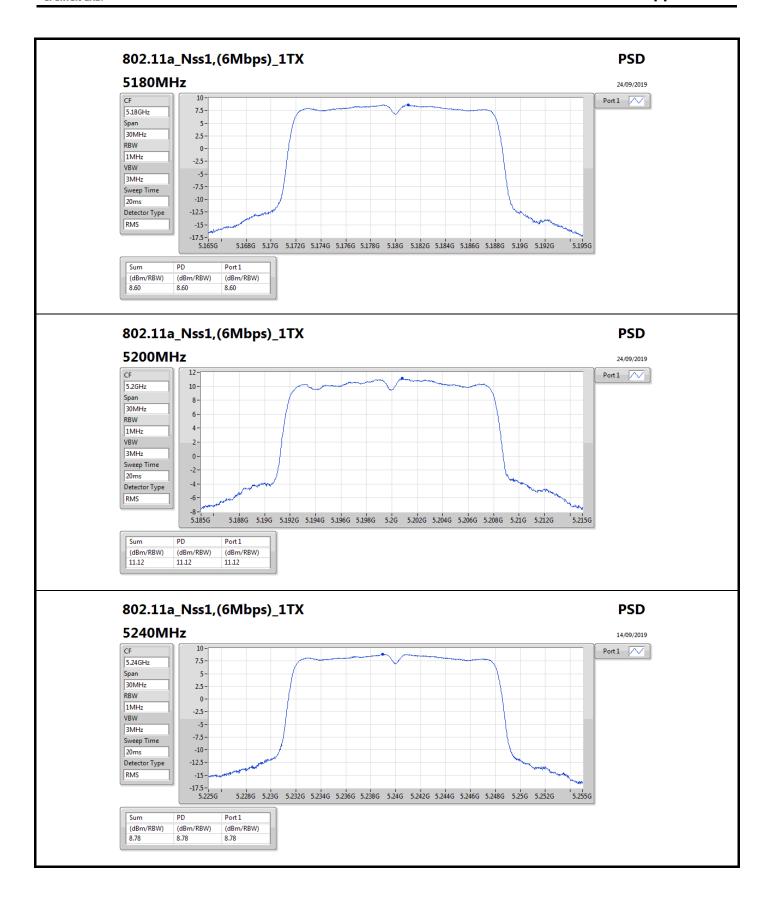
RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;

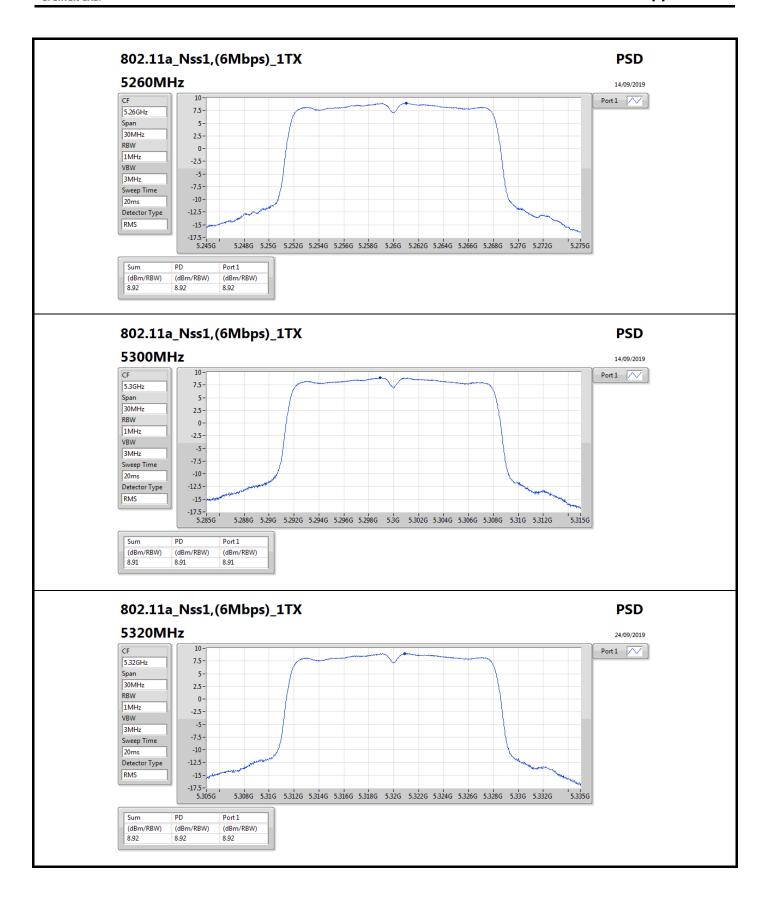
Appendix D **PSD** 

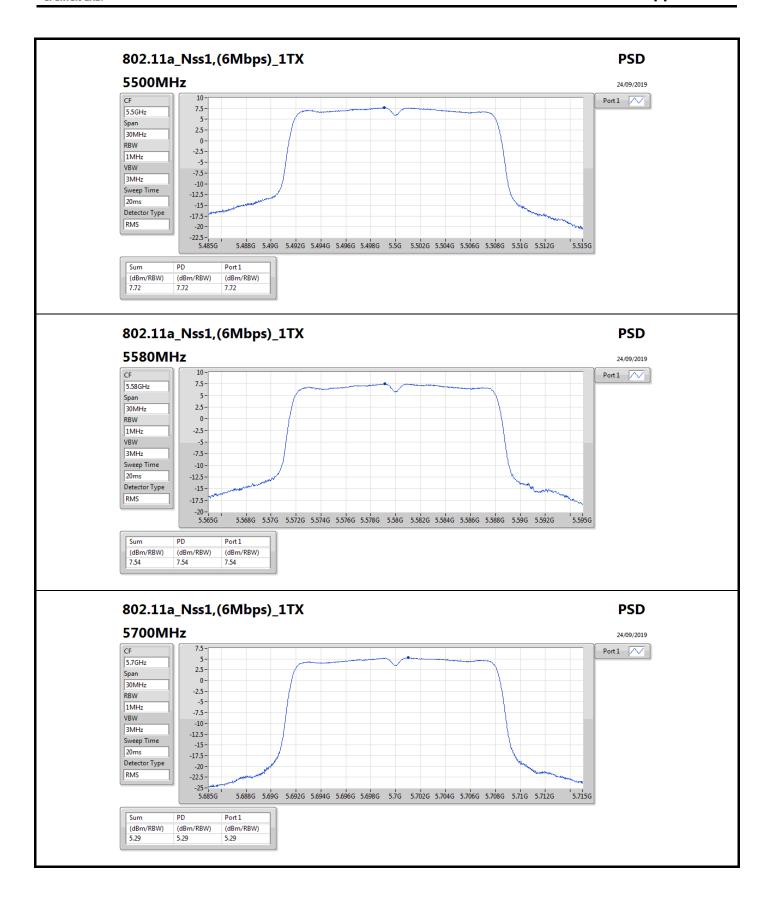
## Result

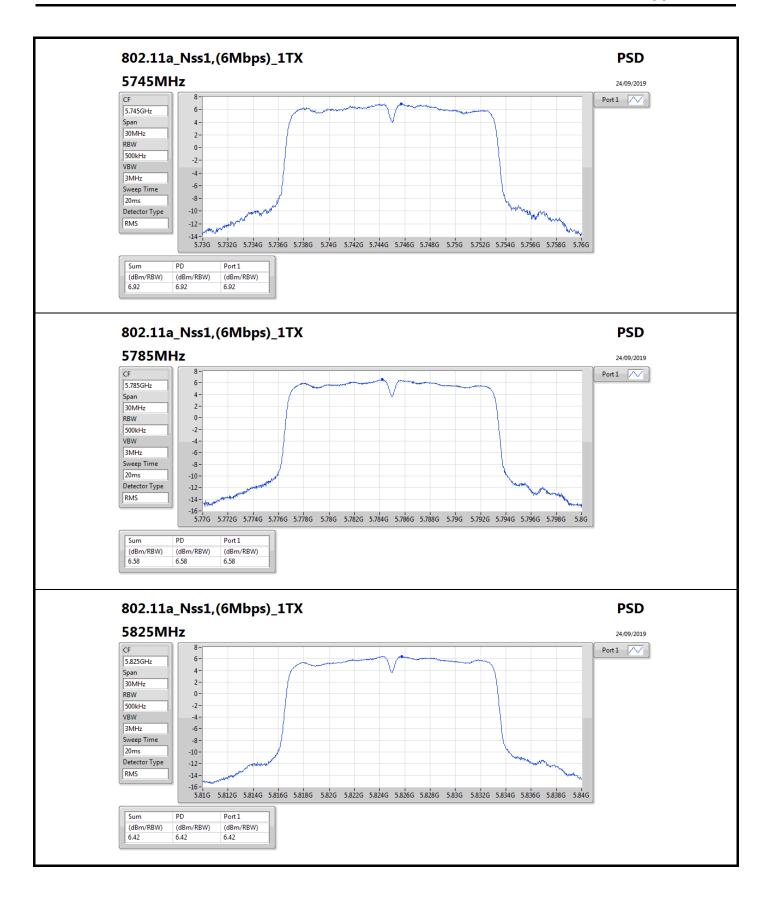
Mode	Result	DG	Port 1	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11a_Nss1,(6Mbps)_1TX	-	-	-	-	-
5180MHz	Pass	2.50	8.60	8.60	17.00
	Pass	2.50	11.12	11.12	17.00
5240MHz	Pass	2.50	8.78	8.78	17.00
5260MHz	Pass	2.28	8.92	8.92	11.00
5300MHz	Pass	2.28	8.91	8.91	11.00
5320MHz	Pass	2.28	8.92	8.92	11.00
5500MHz	Pass	2.75	7.72	7.72	11.00
5580MHz	Pass	2.75	7.54	7.54	11.00
5700MHz	Pass	2.75	5.29	5.29	11.00
5745MHz	Pass	2.98	6.92	6.92	30.00
5785MHz	Pass	2.98	6.58	6.58	30.00
5825MHz	Pass	2.98	6.42	6.42	30.00
802.11ac VHT20_Nss1,(MCS0)_1TX	-	-	-	-	-
5180MHz	Pass	2.50	8.09	8.09	17.00
5200MHz	Pass	2.50	9.88	9.88	17.00
5240MHz	Pass	2.50	8.53	8.53	17.00
5260MHz	Pass	2.28	8.59	8.59	11.00
5300MHz	Pass	2.28	8.55	8.55	11.00
5320MHz	Pass	2.28	8.58	8.58	11.00
5500MHz	Pass	2.75	7.49	7.49	11.00
5580MHz	Pass	2.75	7.85	7.85	11.00
5700MHz	Pass	2.75	5.01	5.01	11.00
5745MHz	Pass	2.98	6.99	6.99	30.00
5785MHz	Pass	2.98	6.89	6.89	30.00
5825MHz	Pass	2.98	6.85	6.85	30.00
802.11ac VHT40_Nss1,(MCS0)_1TX	-	-	-	-	-
5190MHz	Pass	2.50	1.20	1.19	17.00
5230MHz	Pass	2.50	4.42	4.43	17.00
5270MHz	Pass	2.28	5.38	5.38	11.00
5310MHz	Pass	2.28	2.03	2.03	11.00
5510MHz	Pass	2.75	1.61	1.61	11.00
5550MHz	Pass	2.75	3.29	3.29	11.00
5670MHz	Pass	2.75	3.08	3.08	11.00
5755MHz	Pass	2.98	3.30	3.30	30.00
5795MHz	Pass	2.98	3.55	3.55	30.00
802.11ac VHT80_Nss1,(MCS0)_1TX	-	-	-	-	-
5210MHz	Pass	2.50	-2.59	-2.59	17.00
5290MHz	Pass	2.28	-3.13	-3.14	11.00
5530MHz	Pass	2.75	-2.41	-2.41	11.00
5610MHz	Pass	2.75	2.50	2.50	11.00
5775MHz	Pass	2.98	-0.71	-0.71	30.00

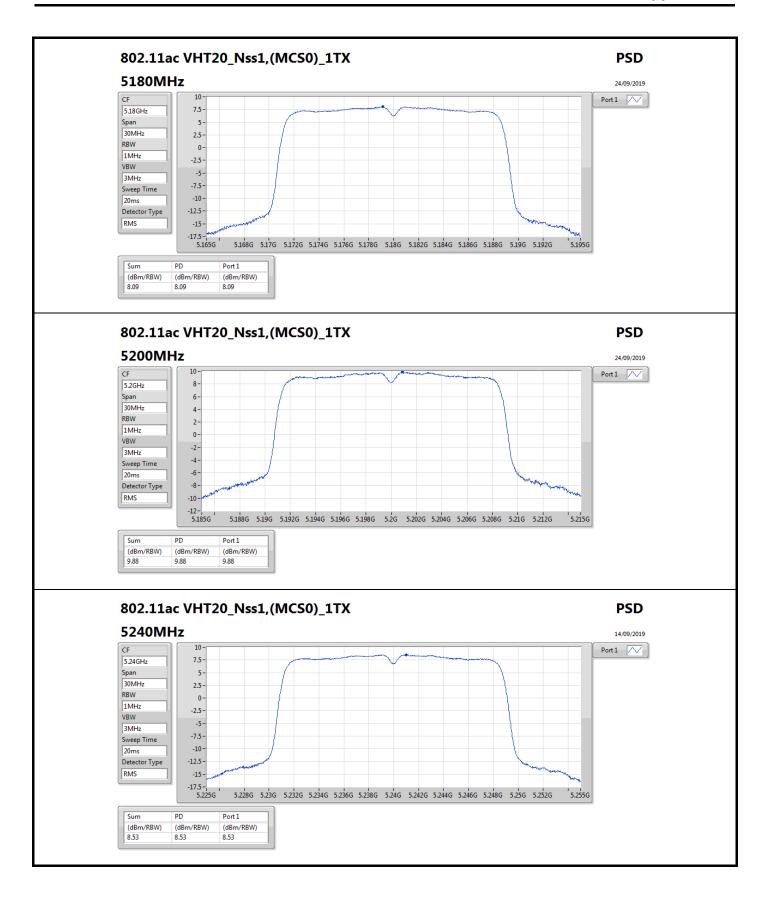
DG = Directional Gain; RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X power density;

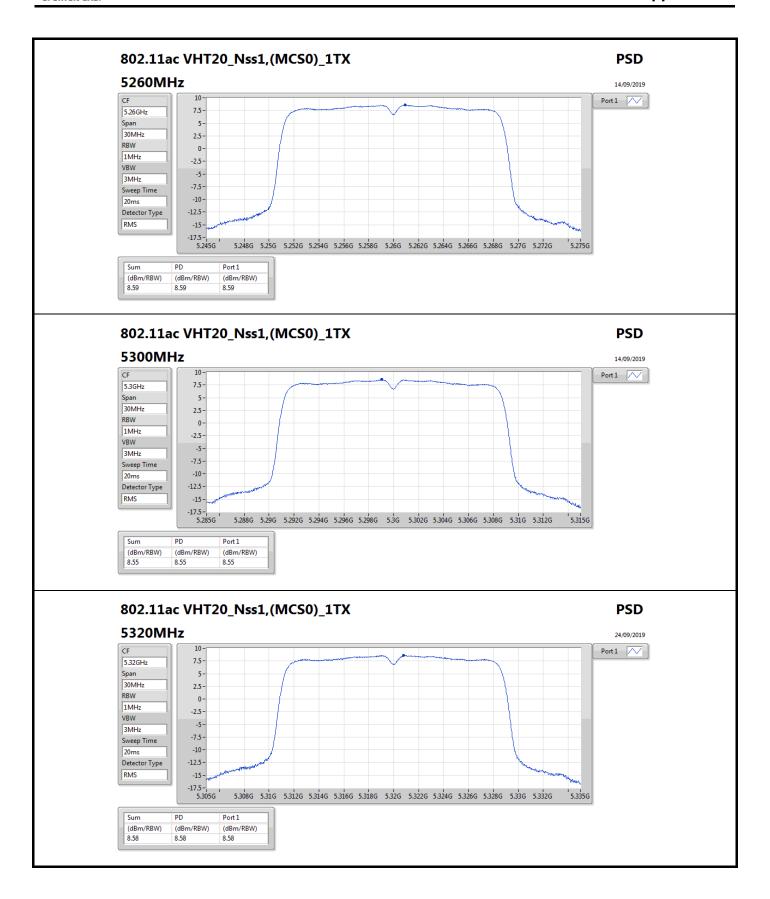


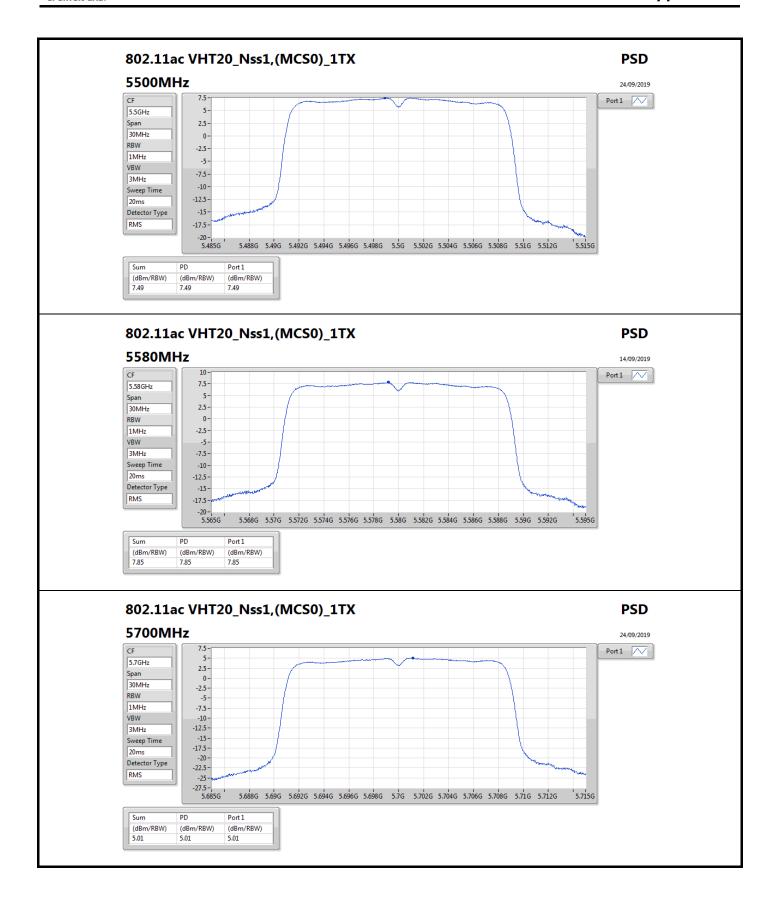


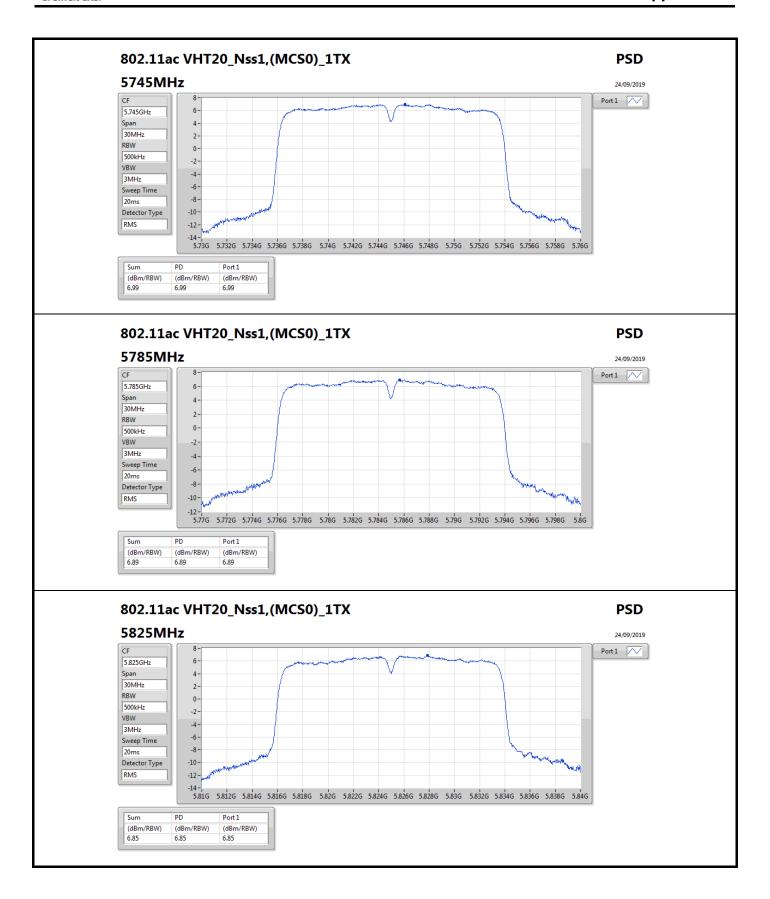


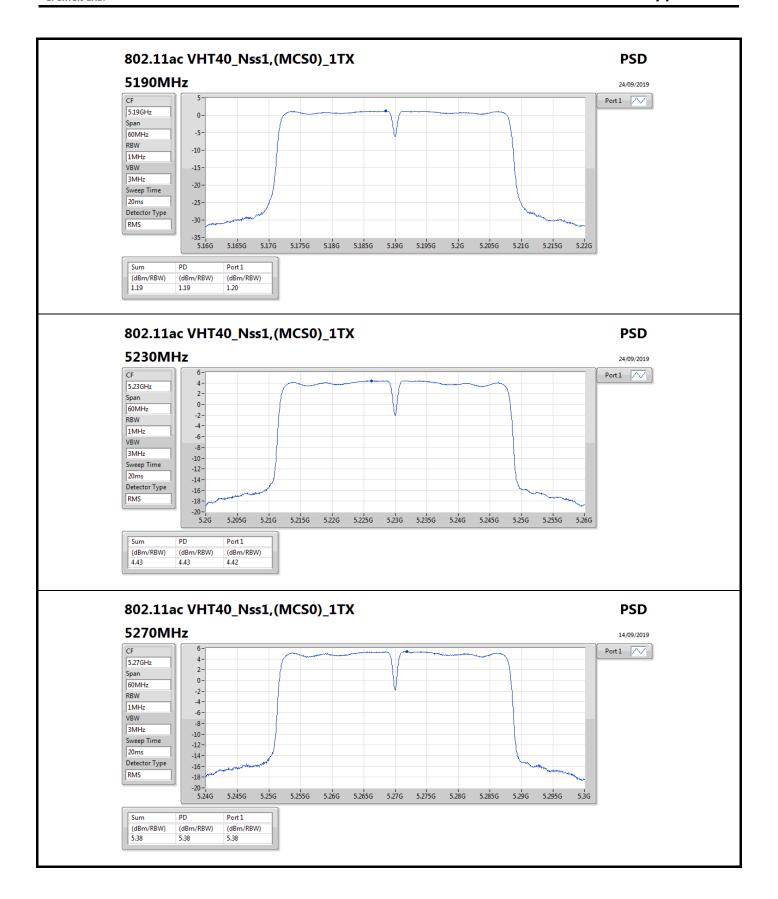


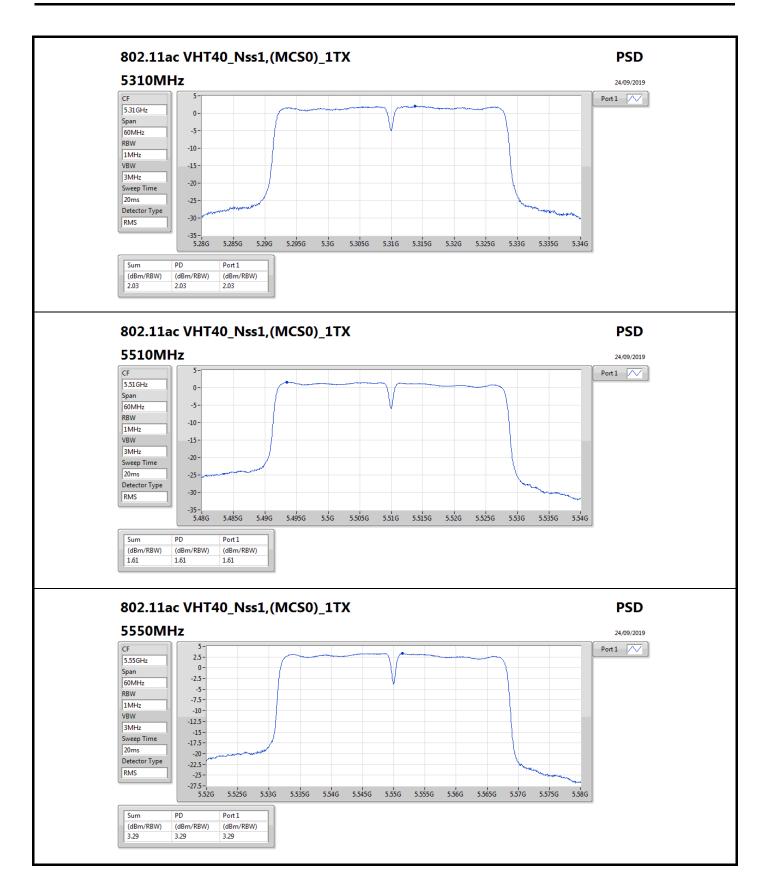


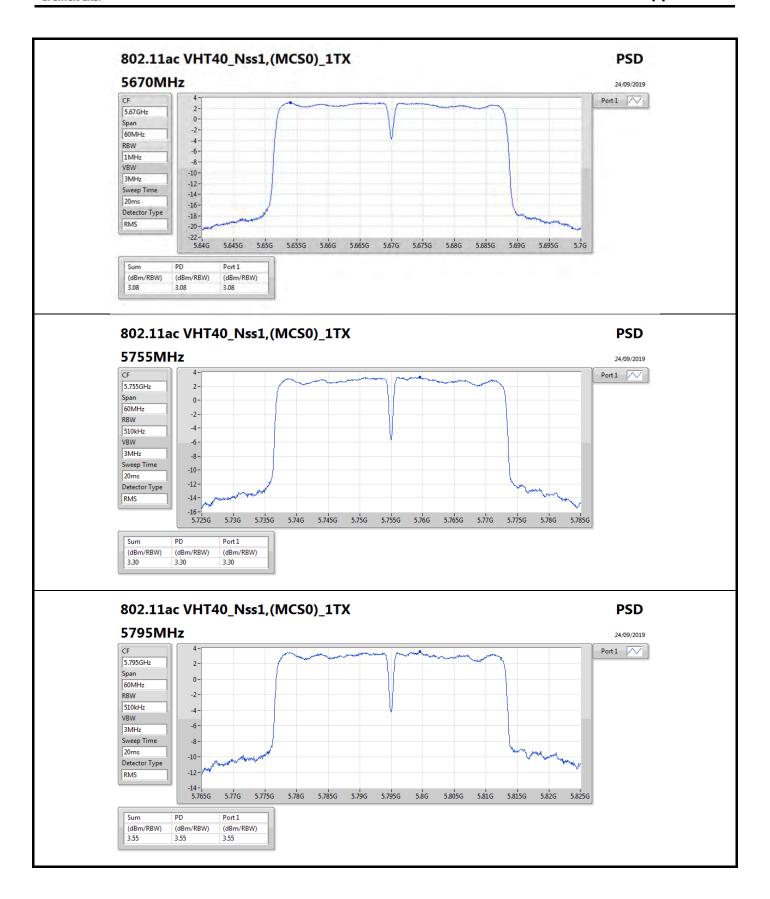


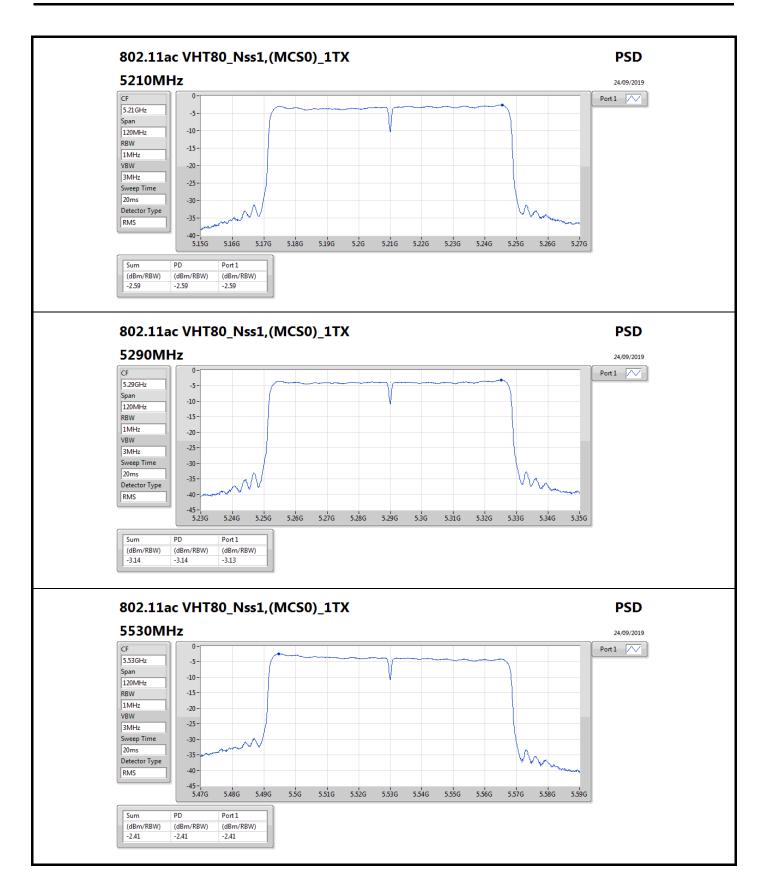


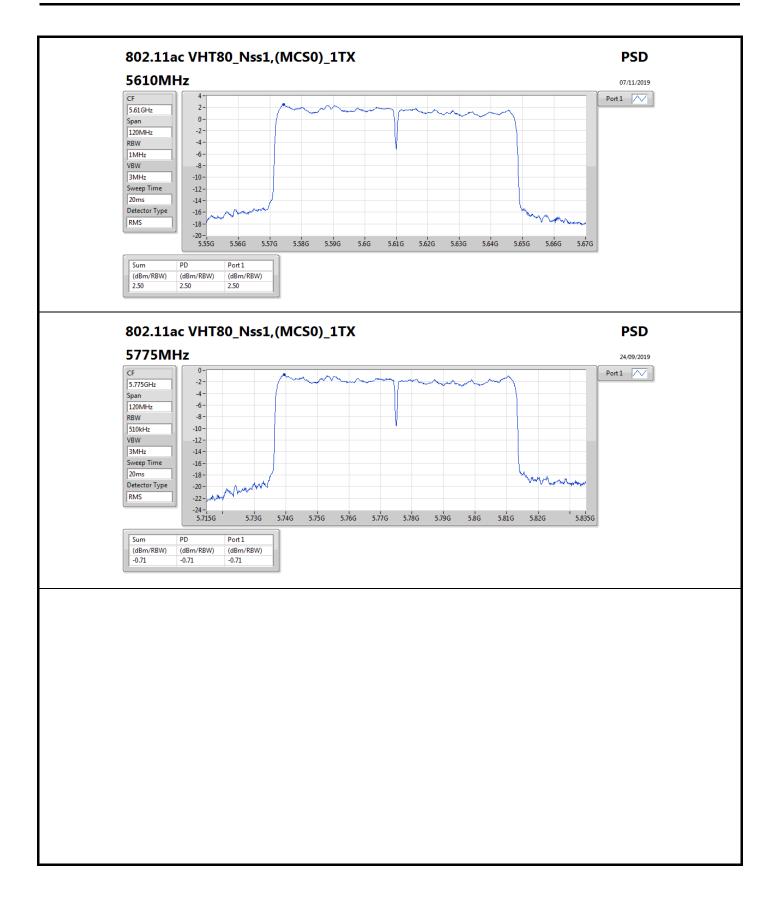




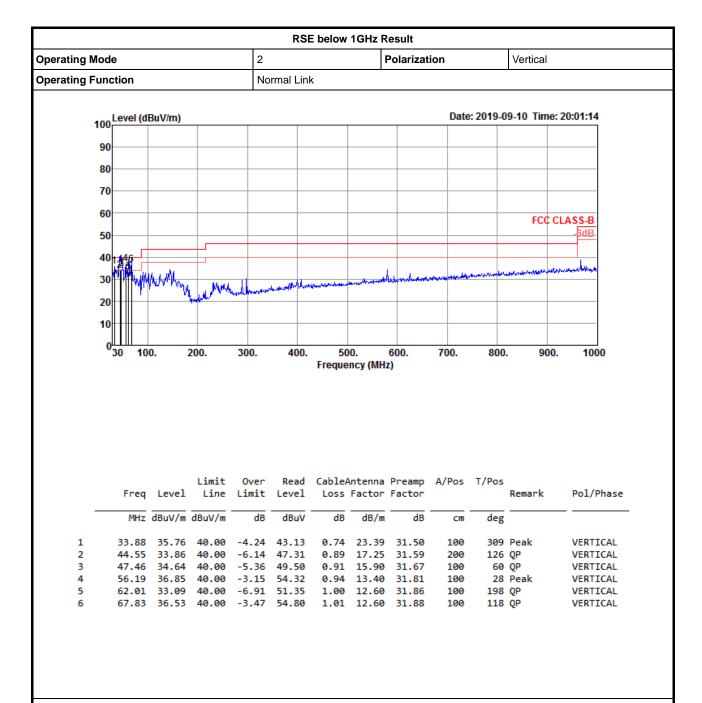








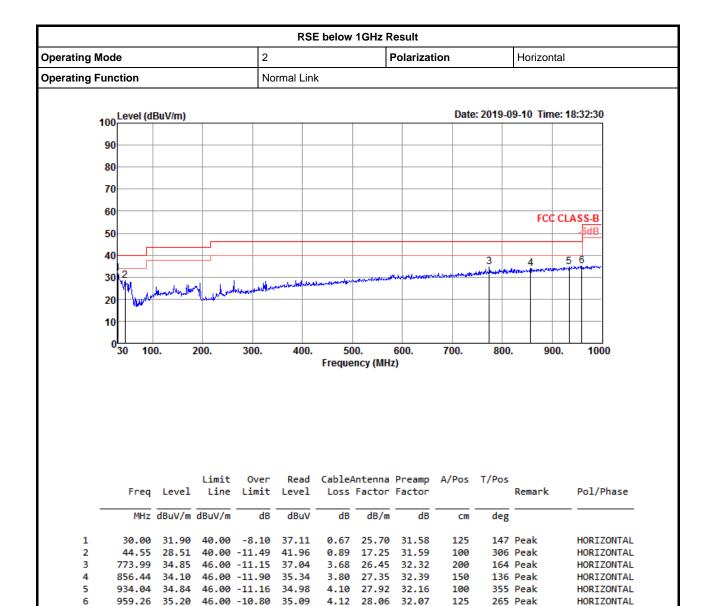




Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

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





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.)



## RSE TX above 1GHz

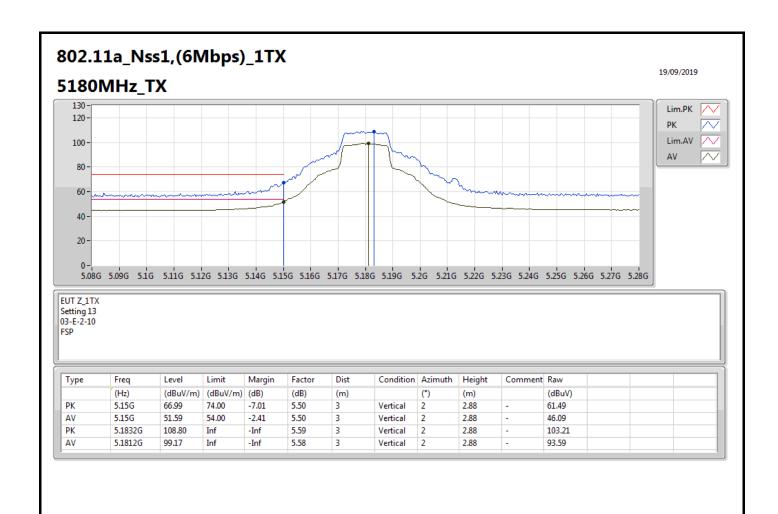
Appendix E.2

**Summary** 

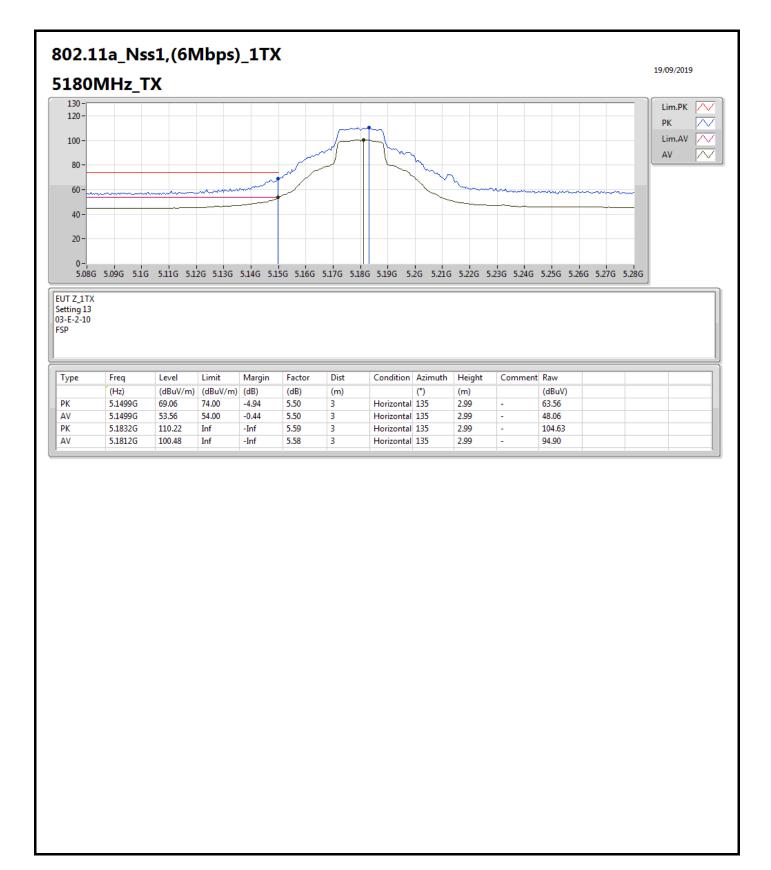
Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
5.25-5.35GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11a_Nss1,(6Mbps)_1TX	Pass	AV	5.3501G	53.98	54.00	-0.02	5.81	3	Horizontal	217	2.81	-

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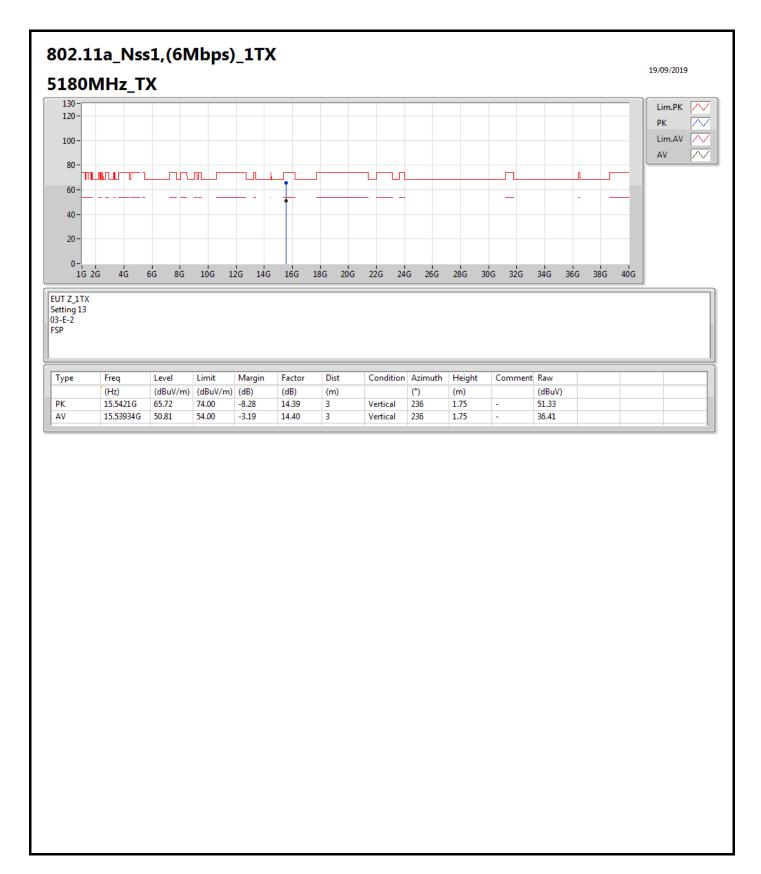






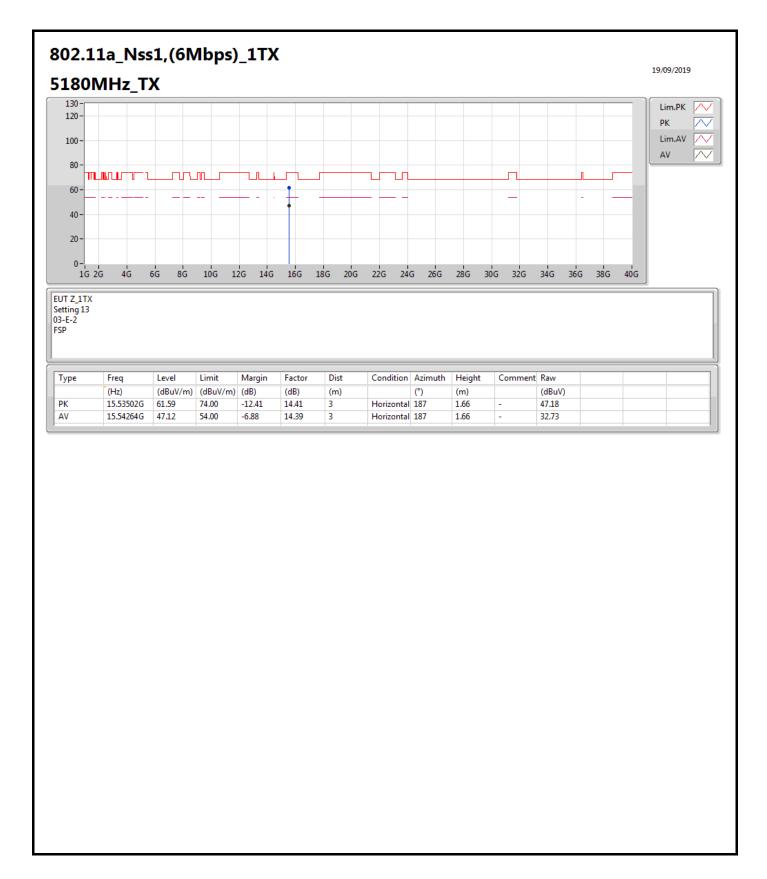
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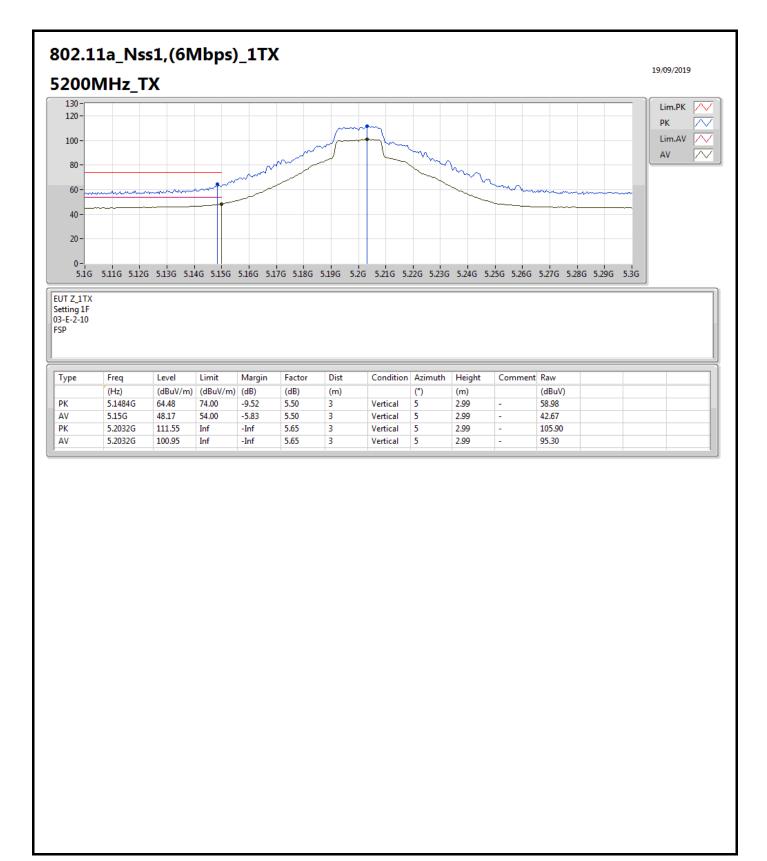
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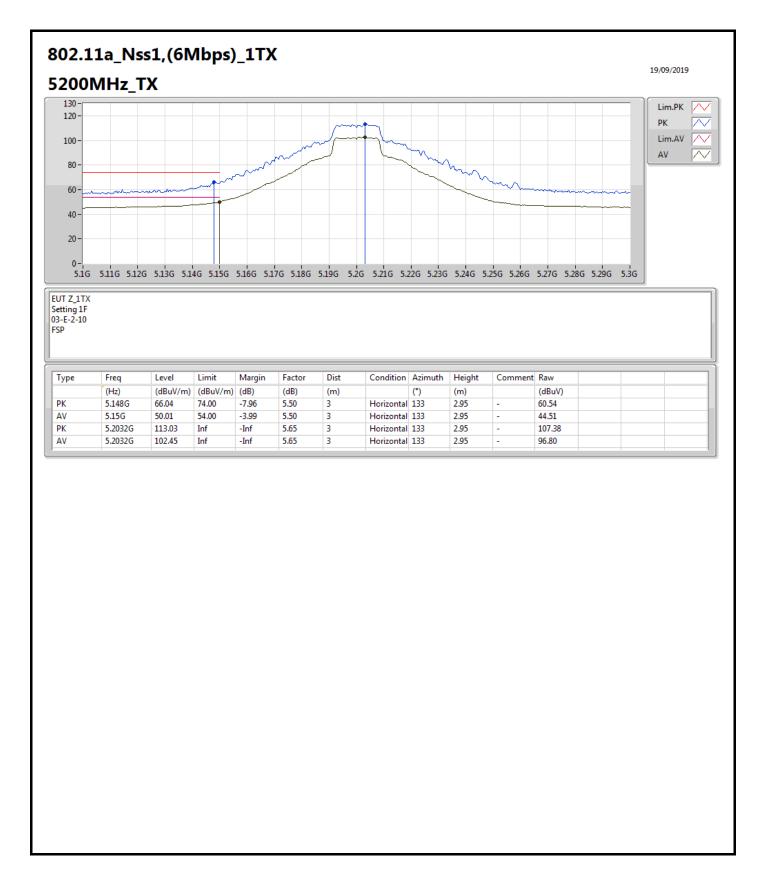
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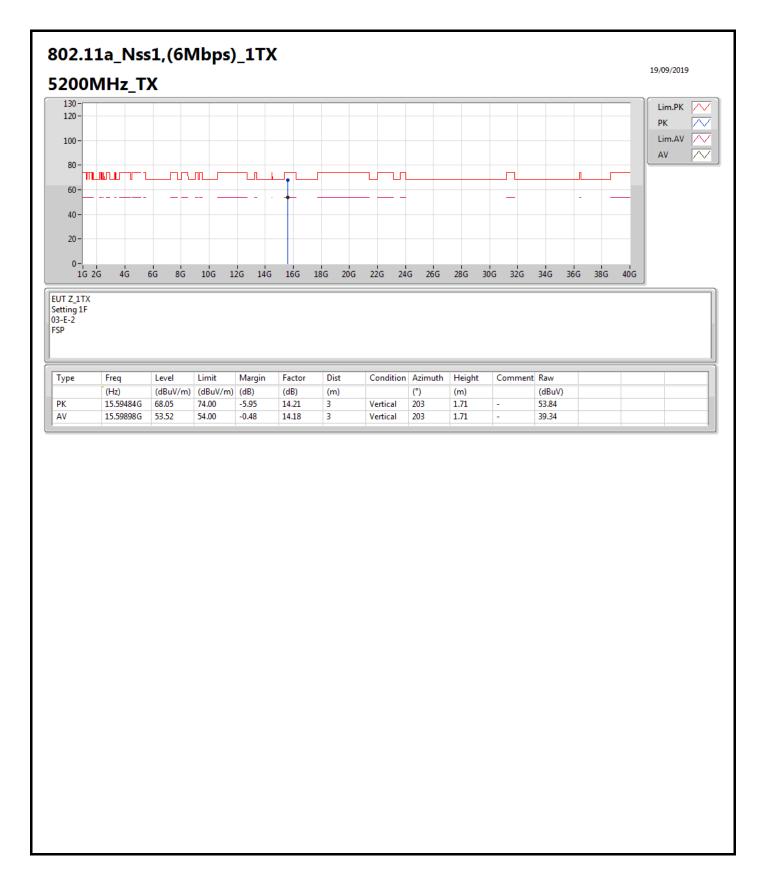
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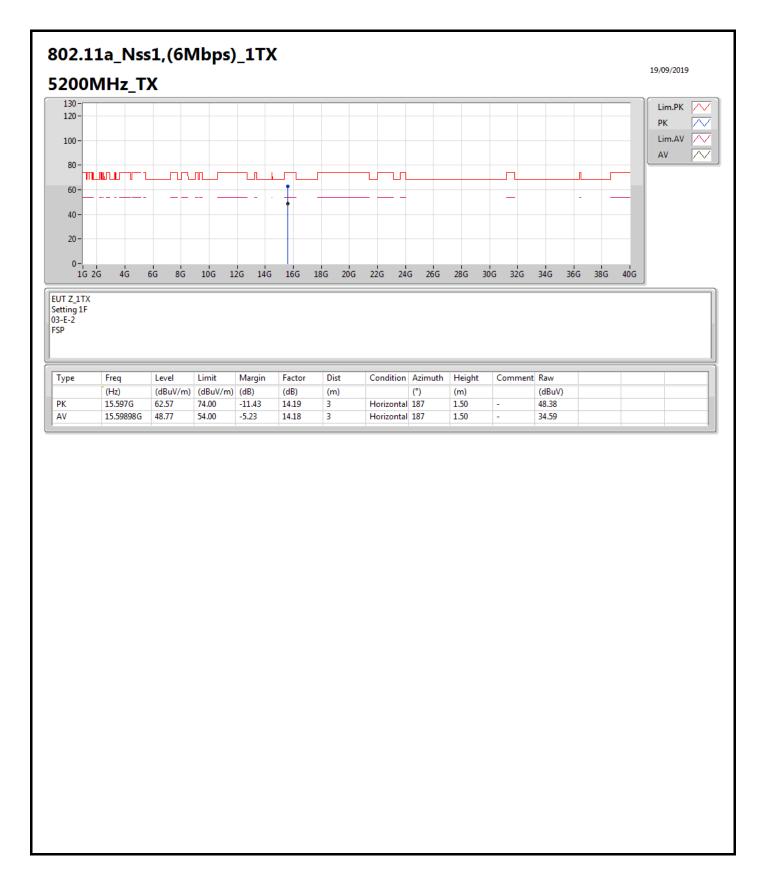
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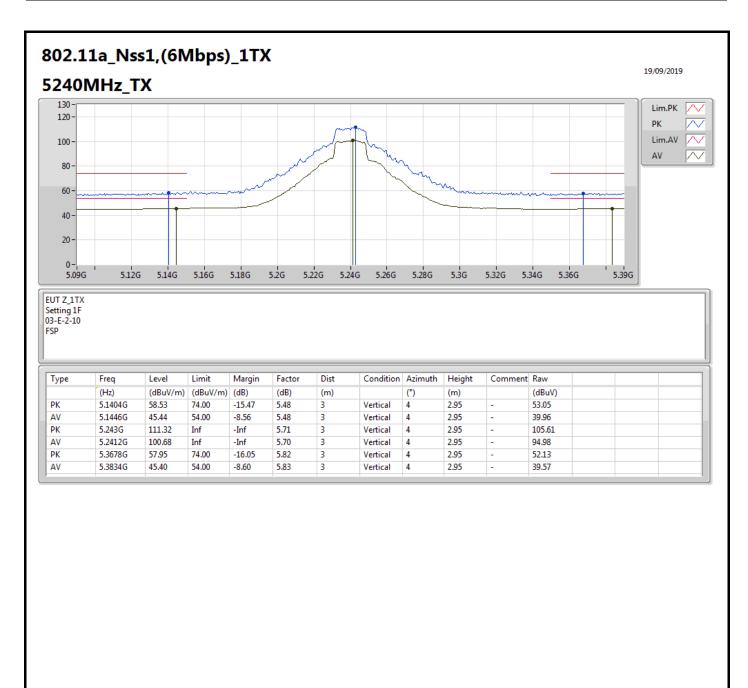
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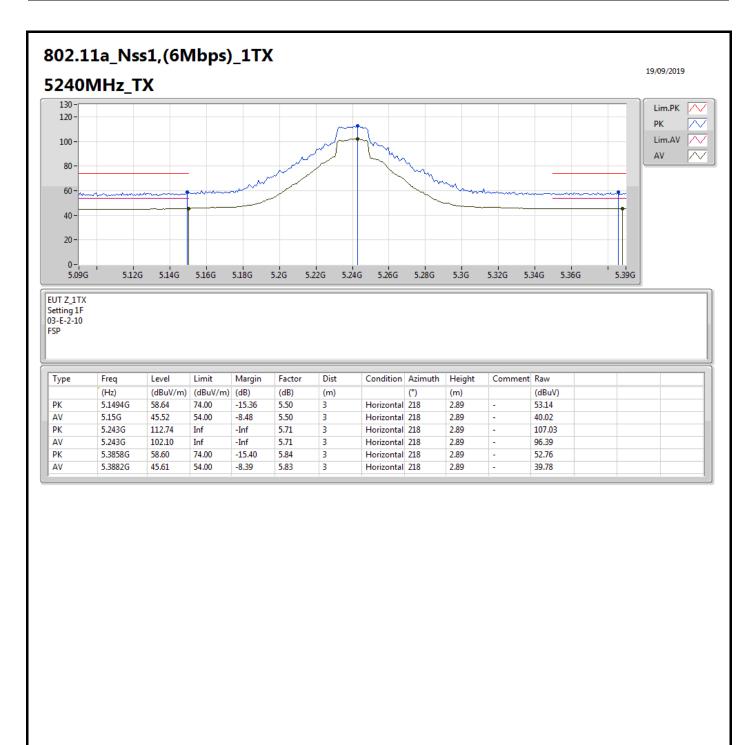
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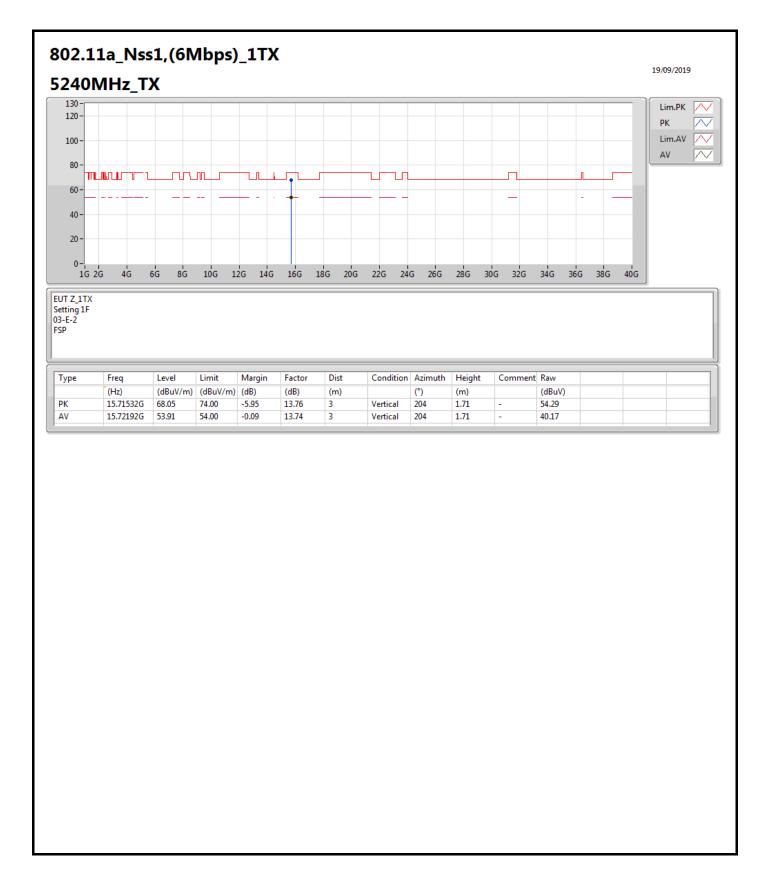


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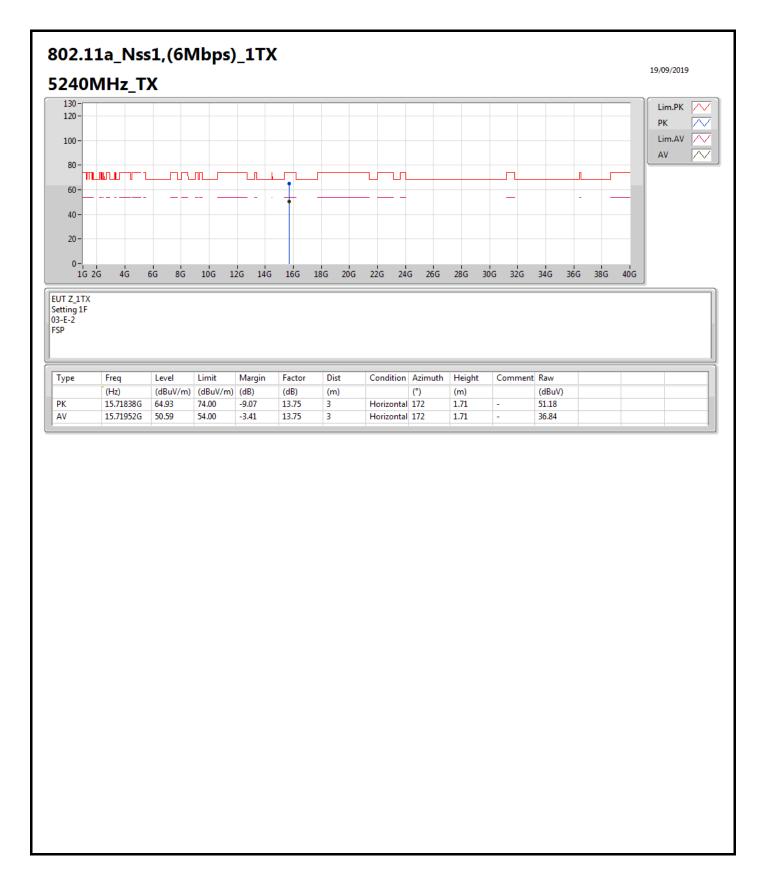






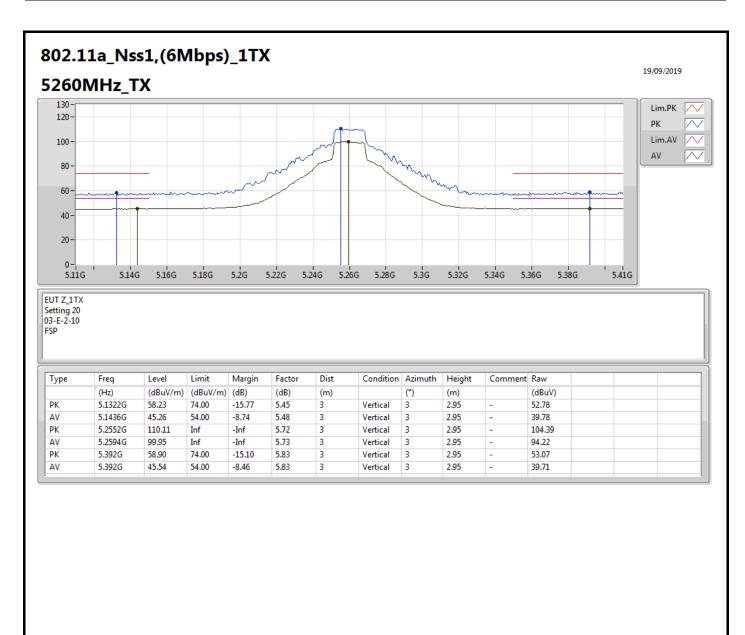
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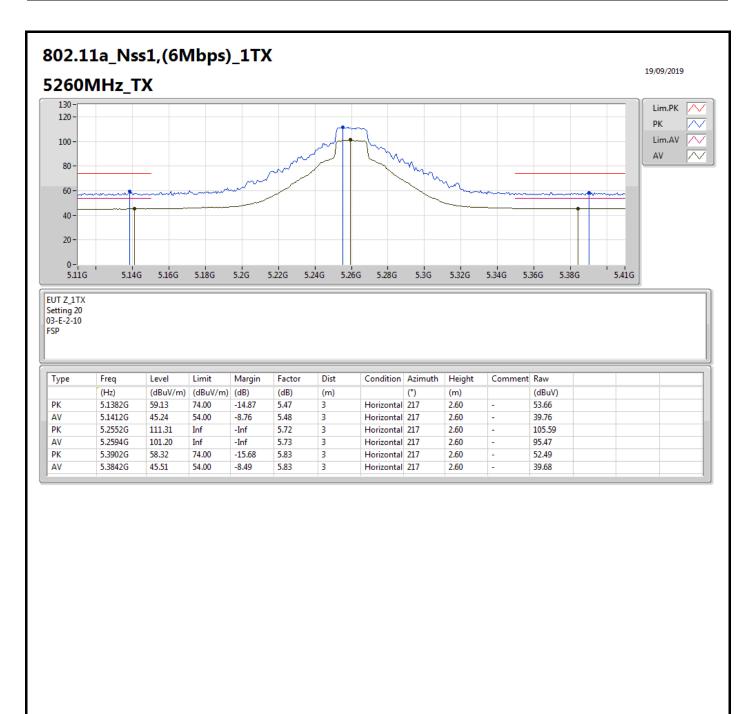
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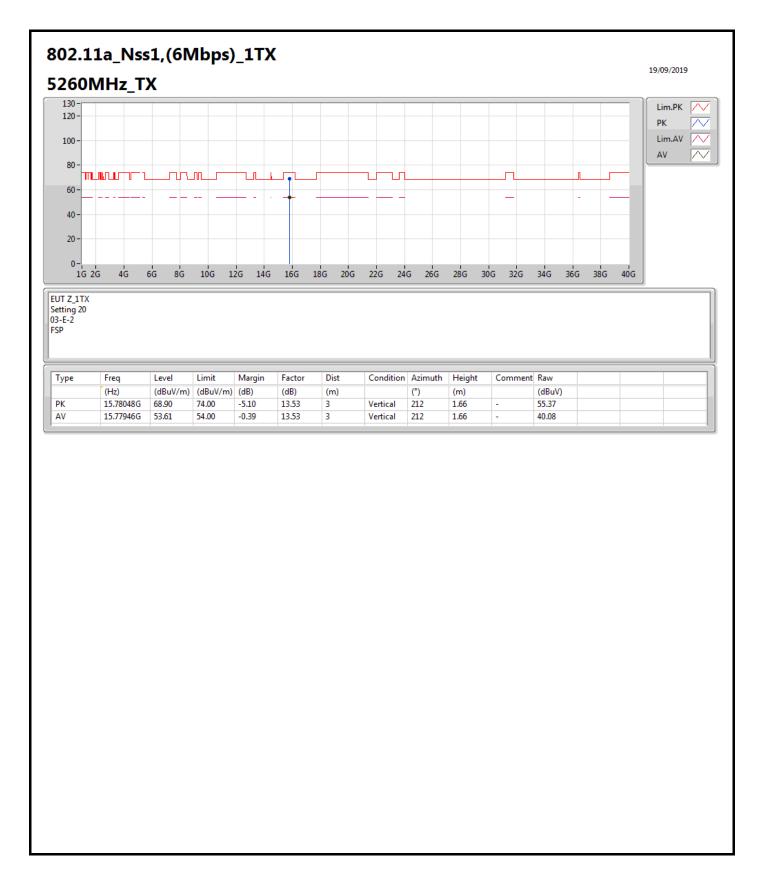


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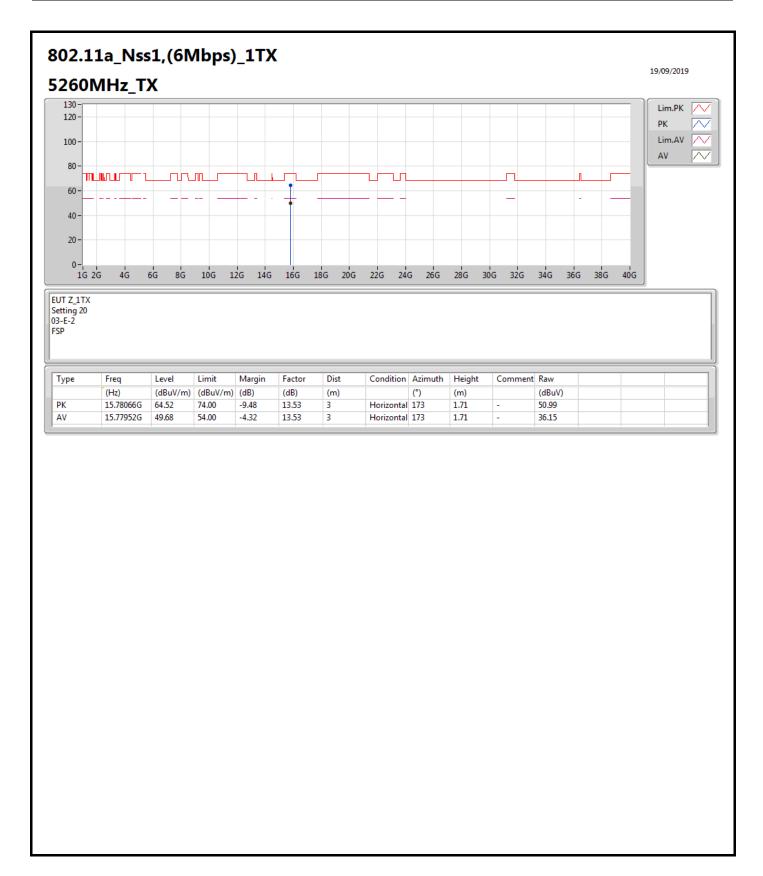






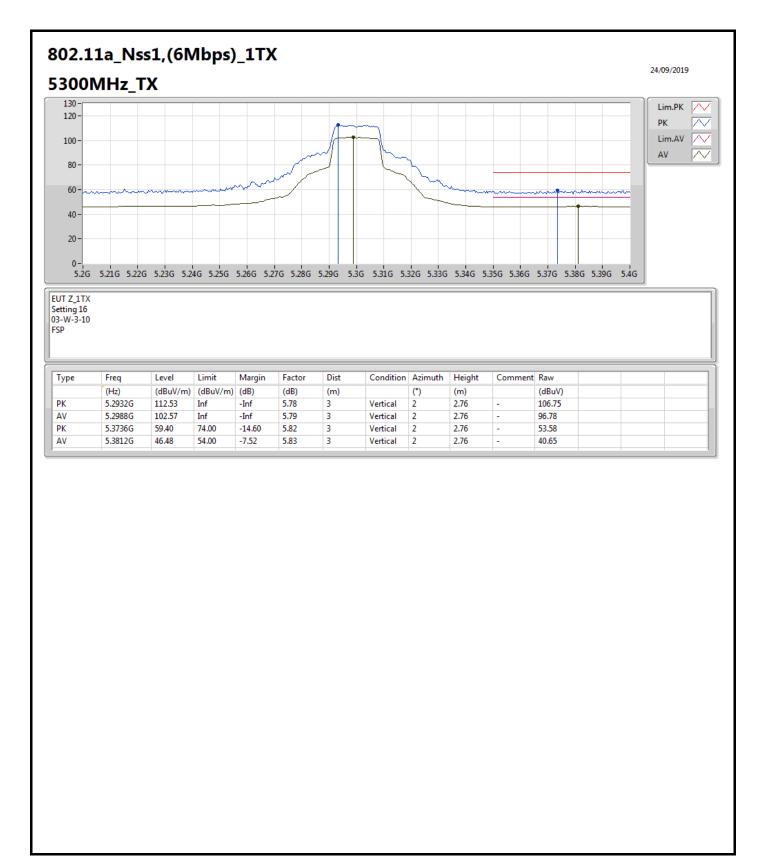
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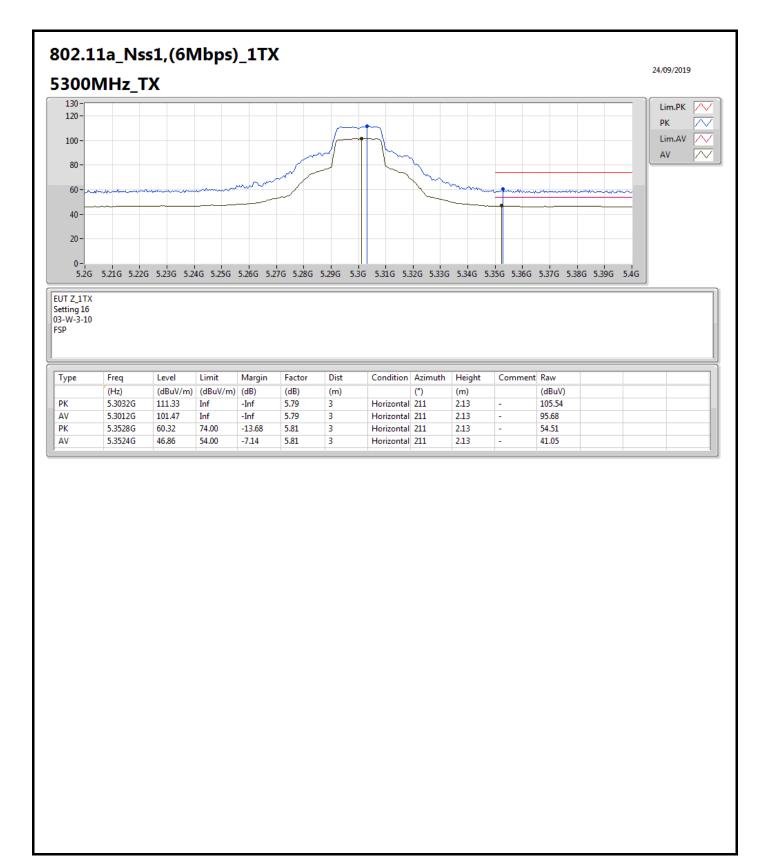
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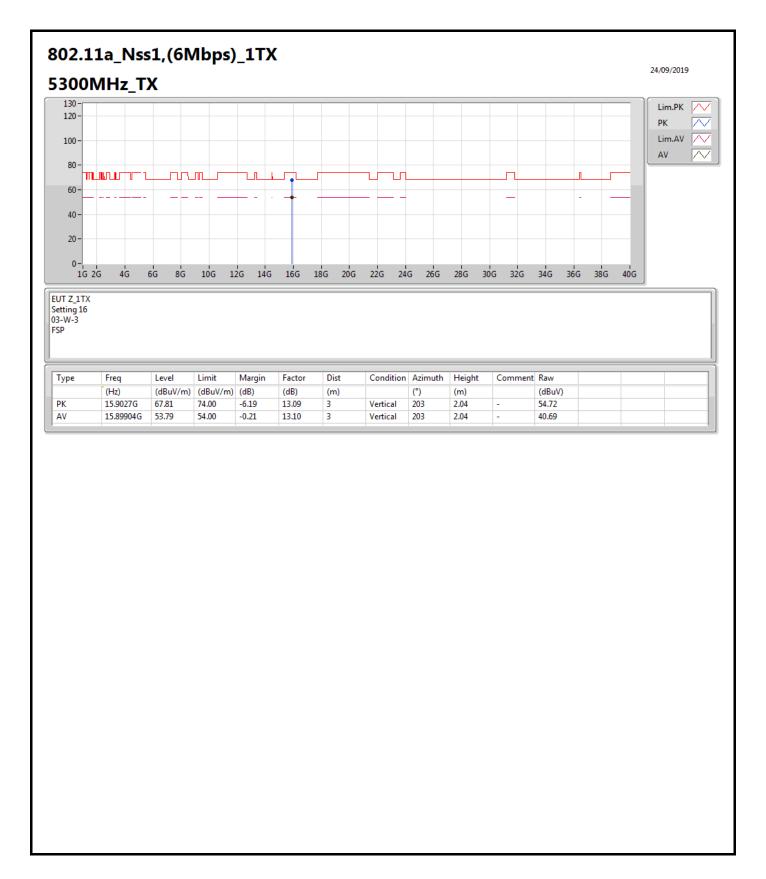
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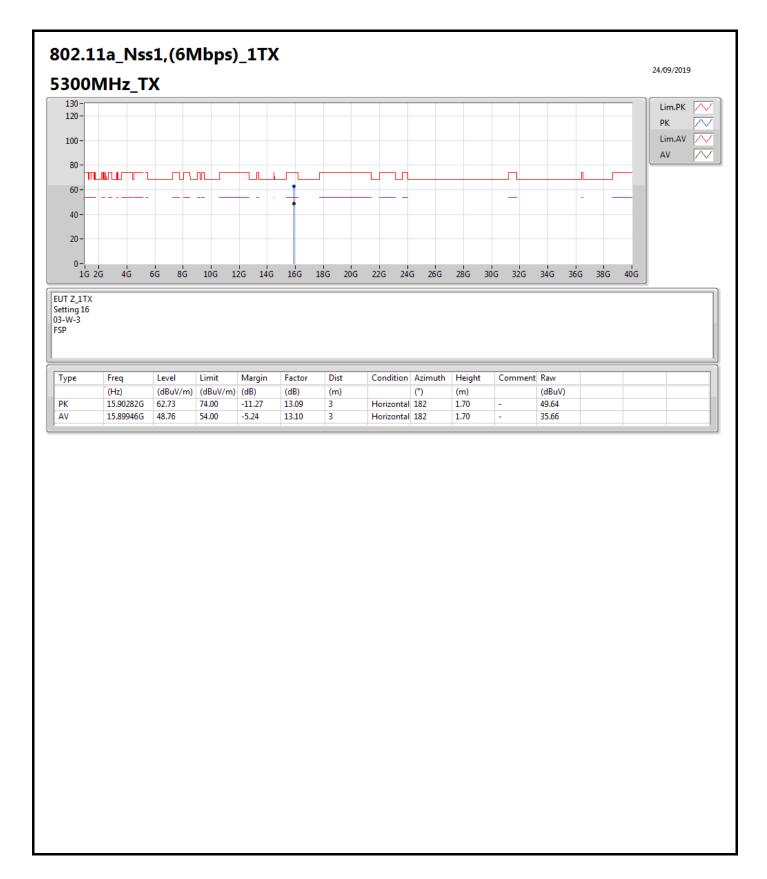
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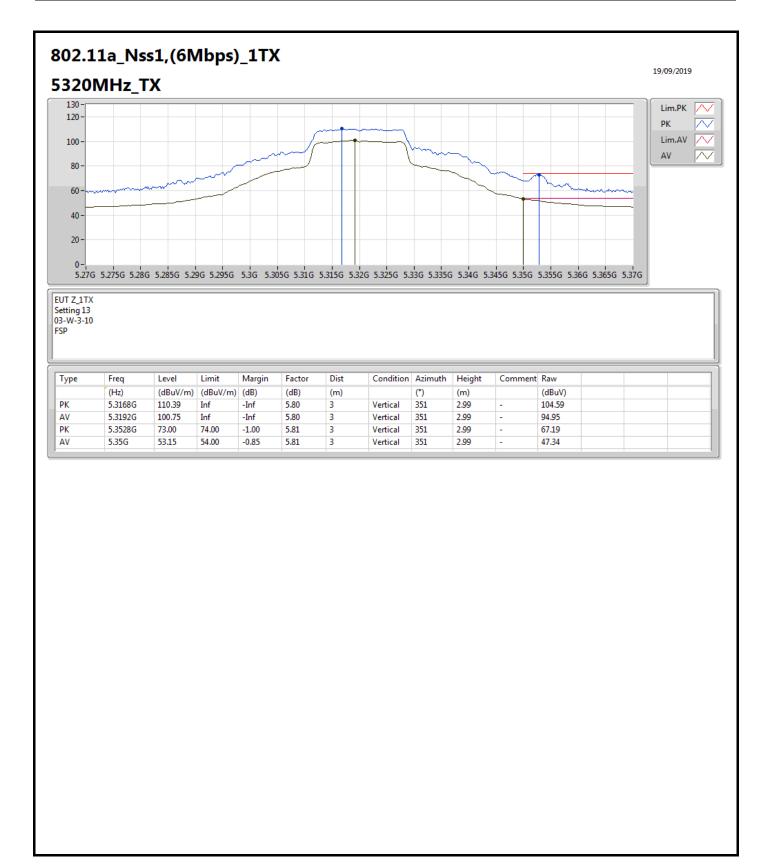
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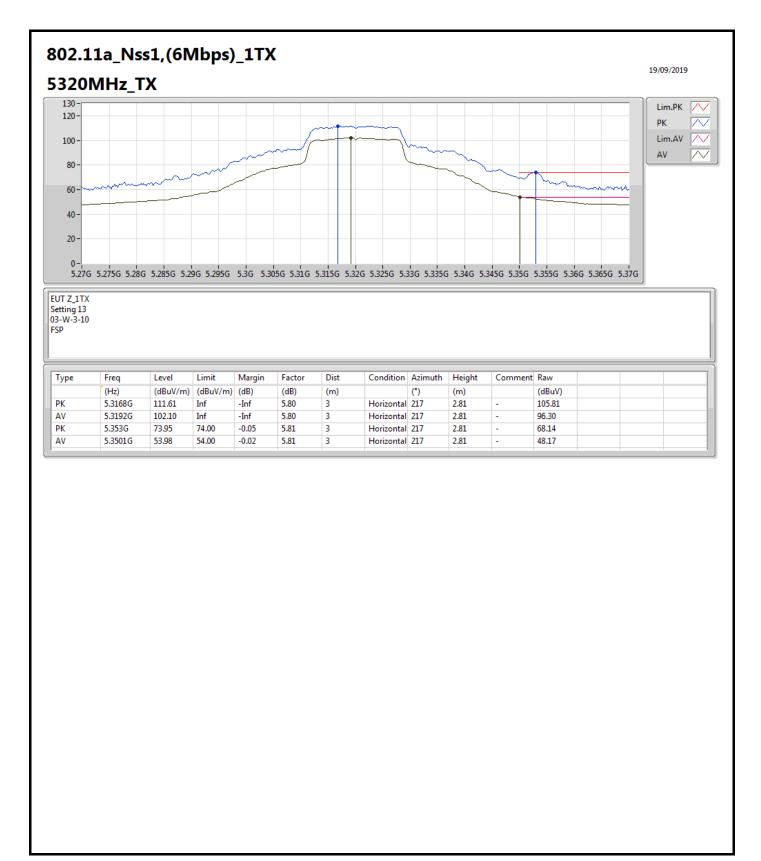


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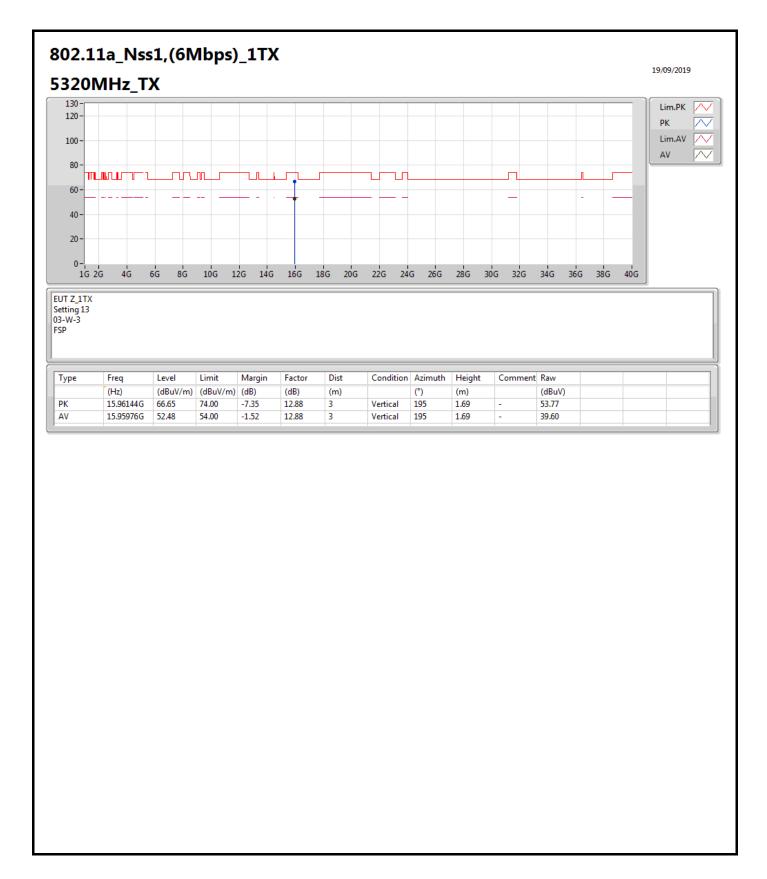






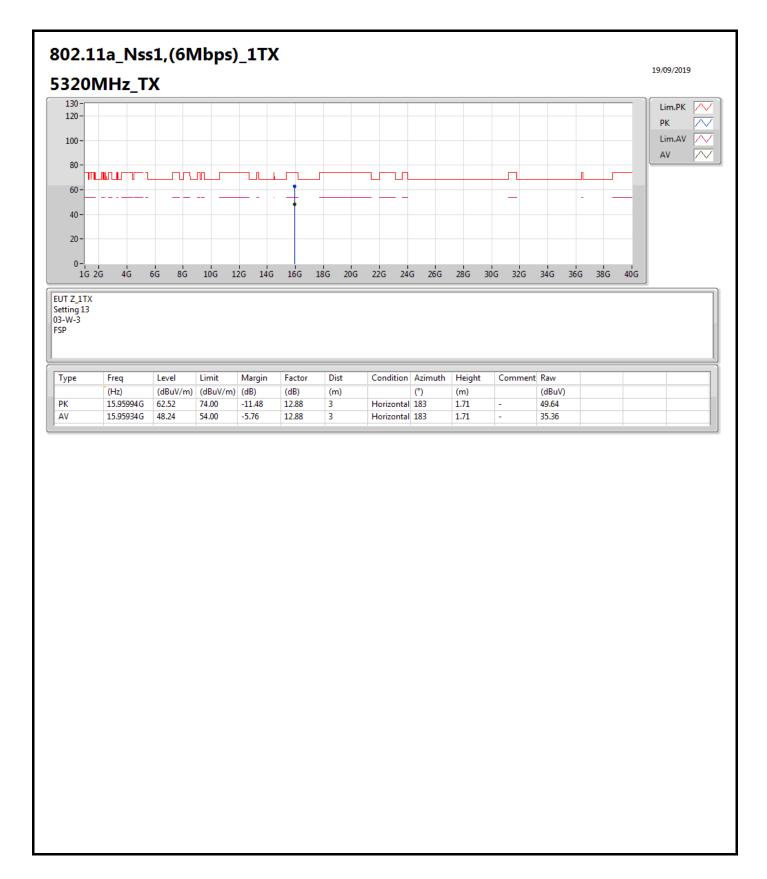
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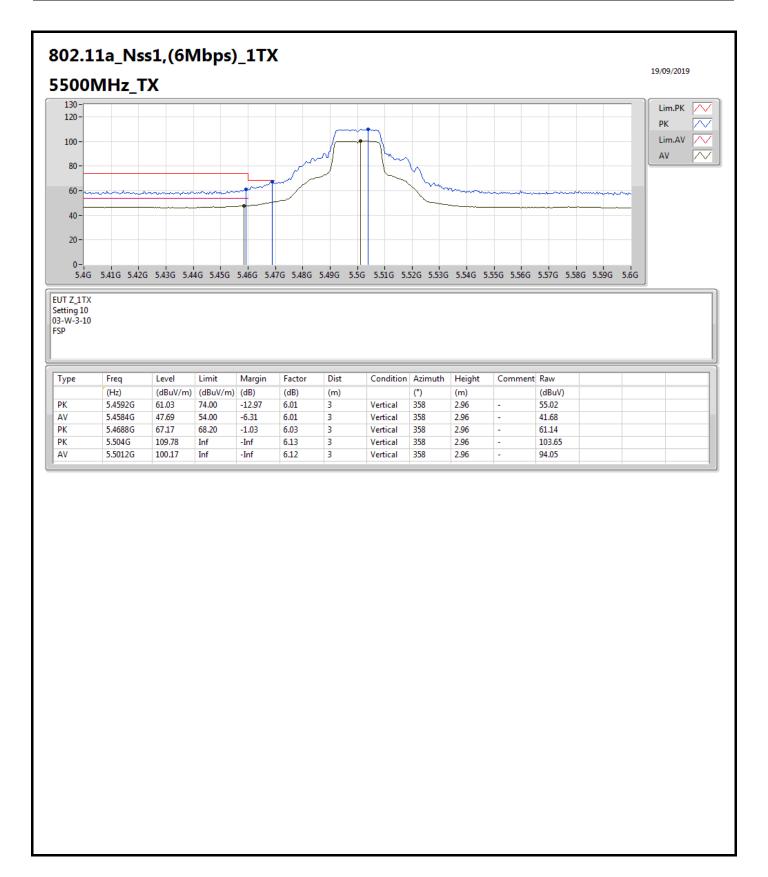
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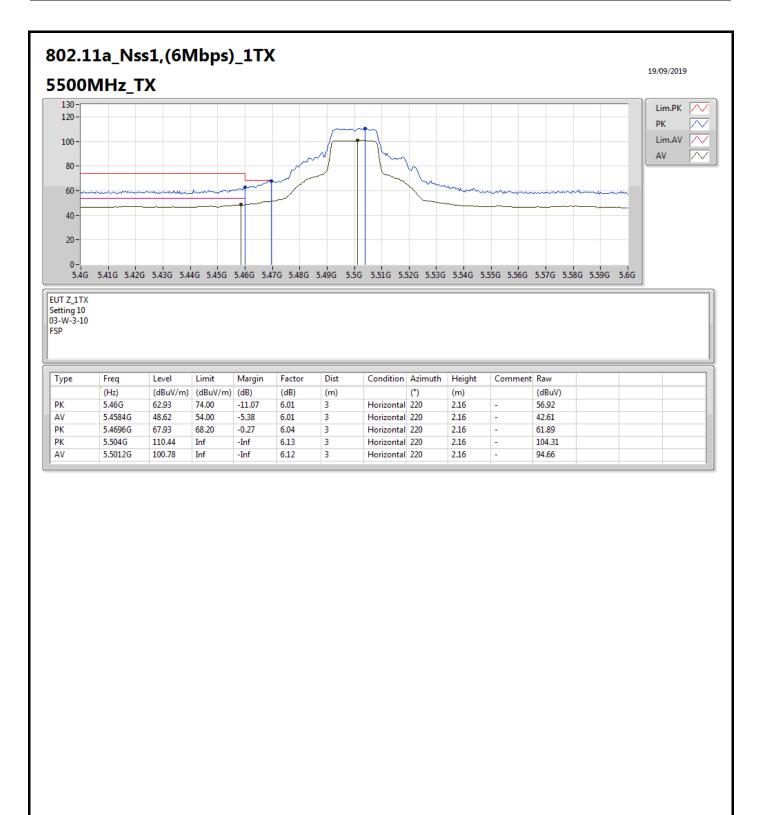


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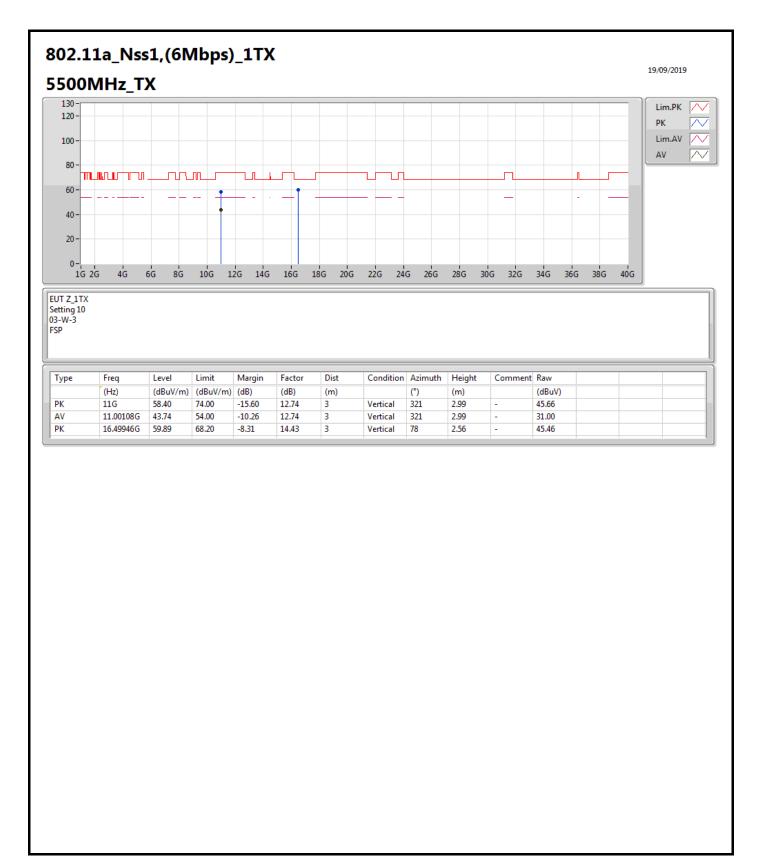






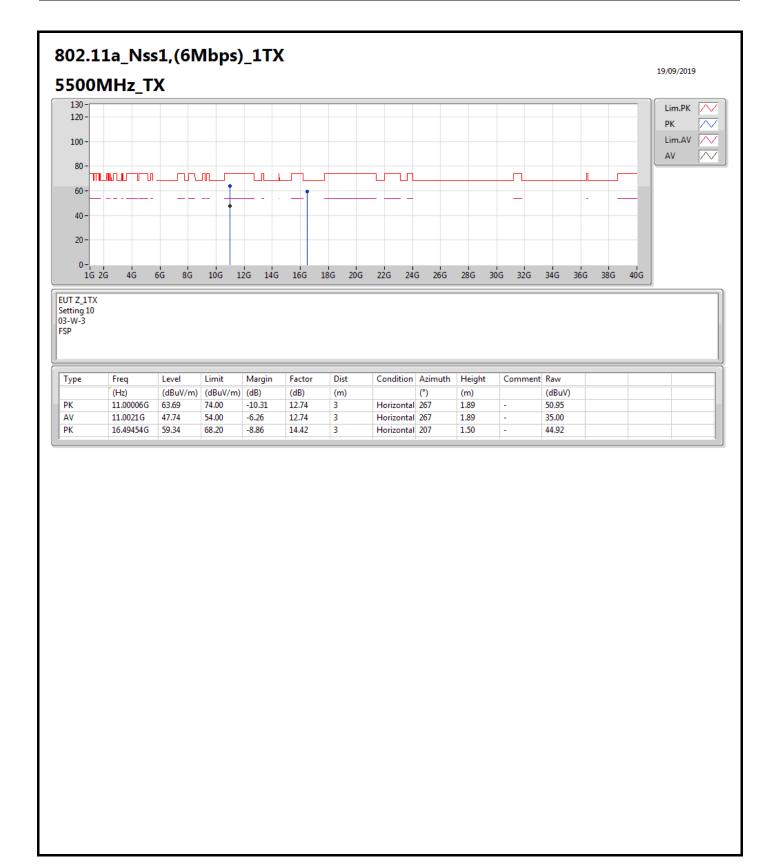






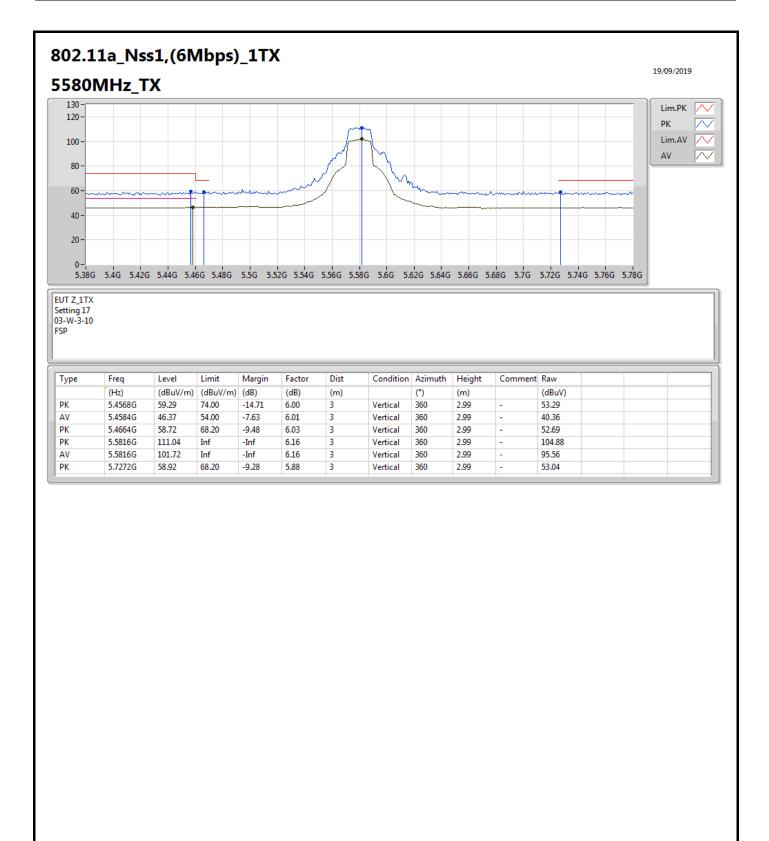
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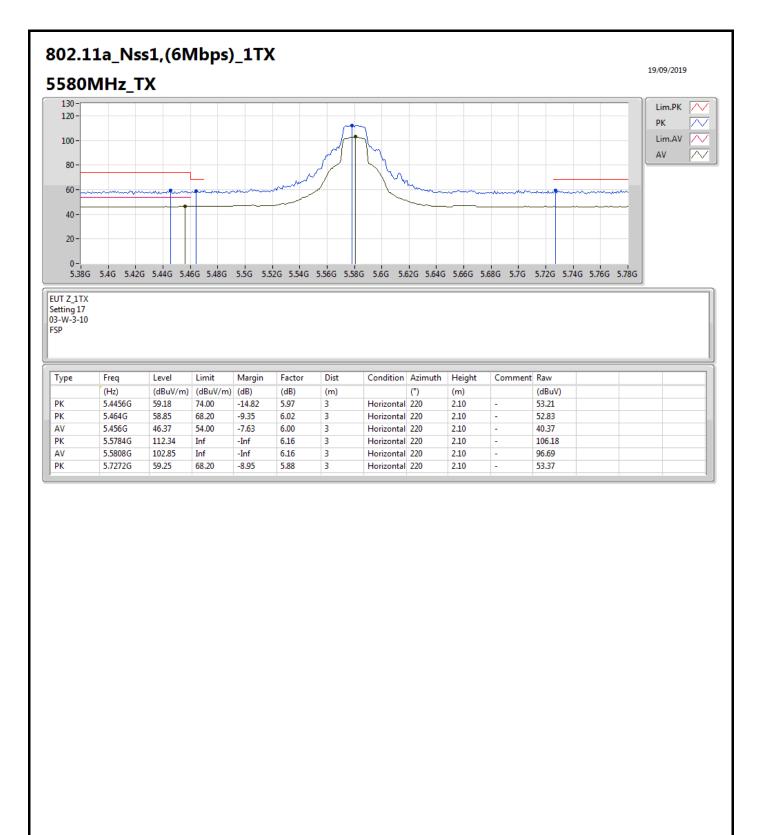


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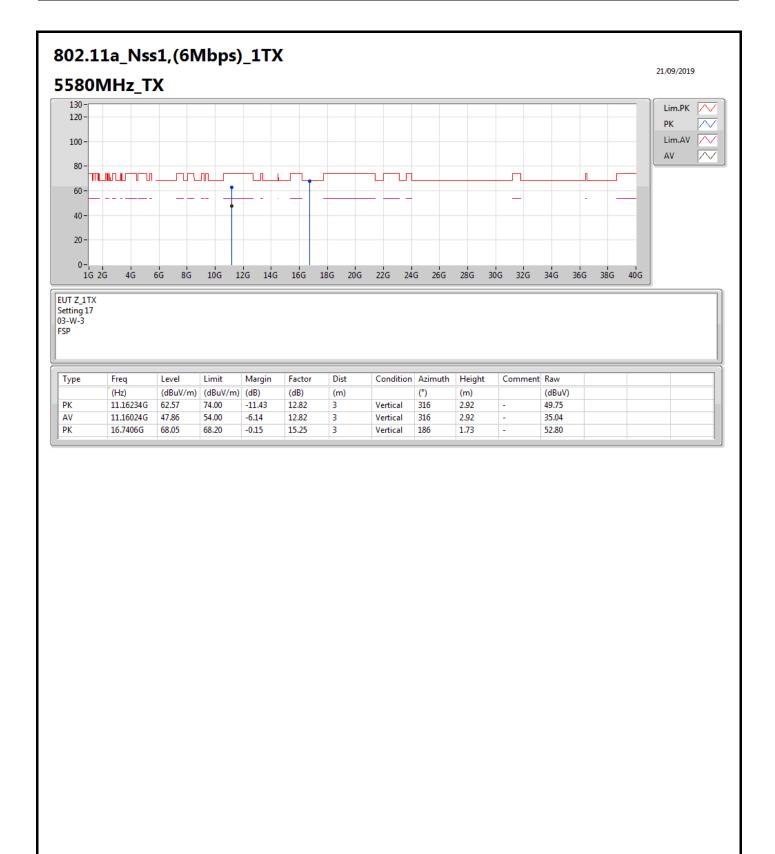






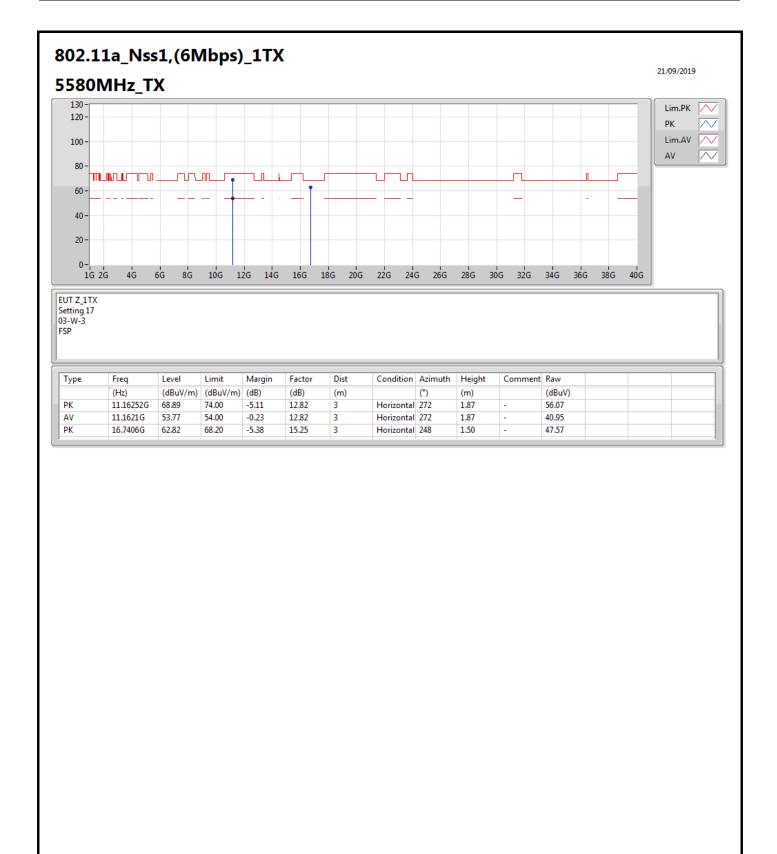






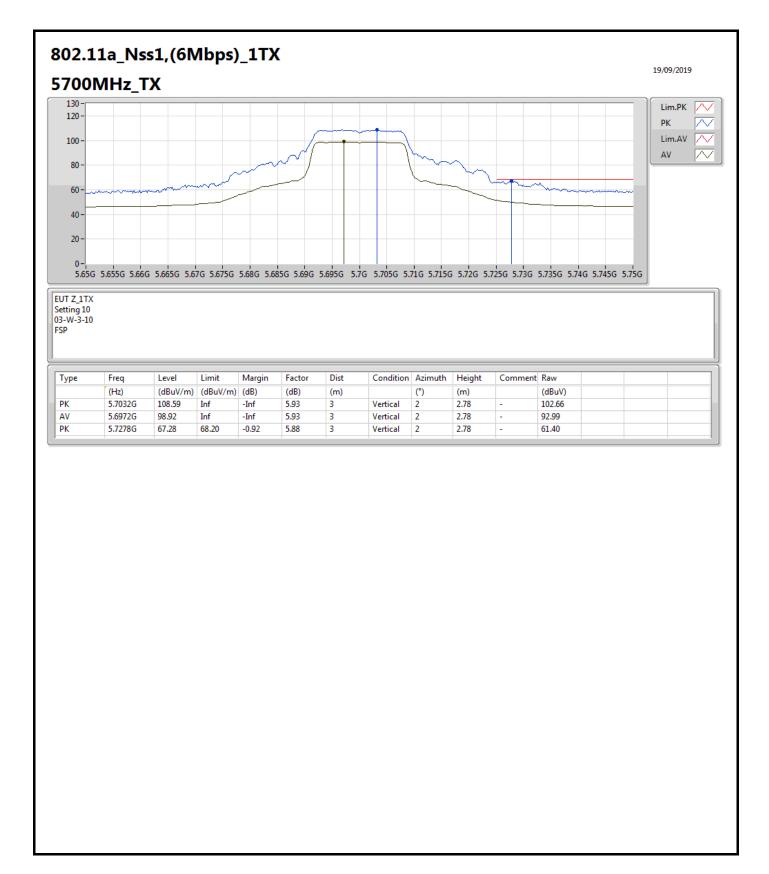
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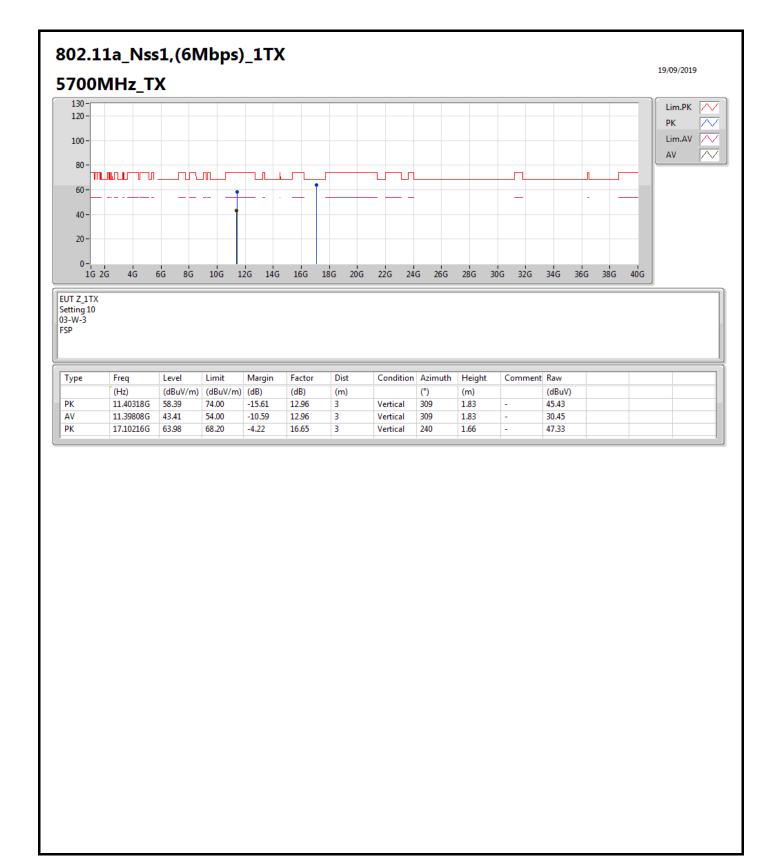
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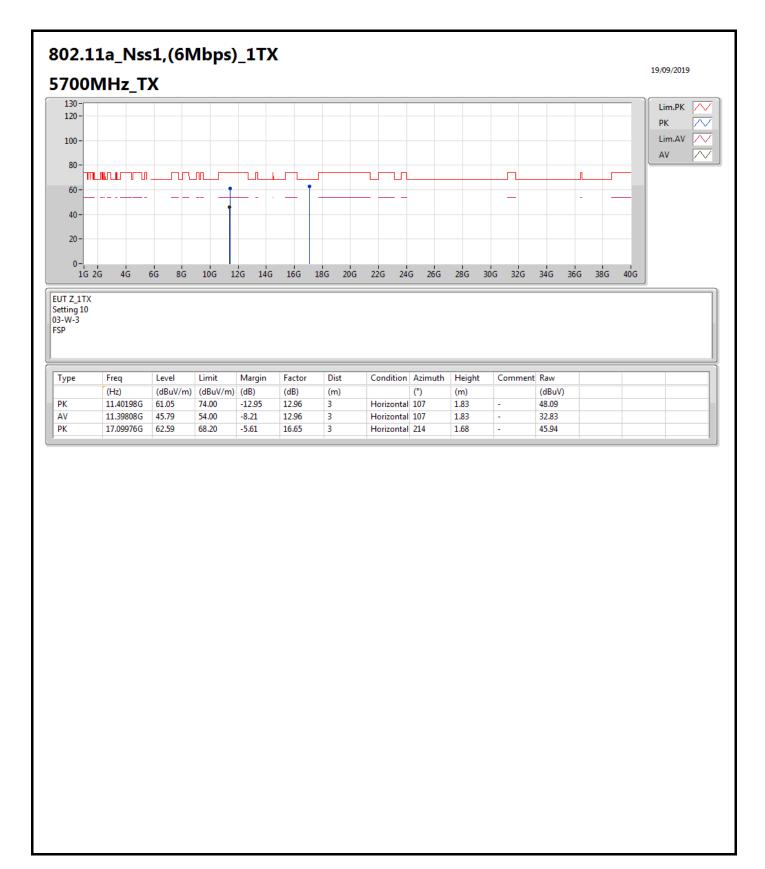
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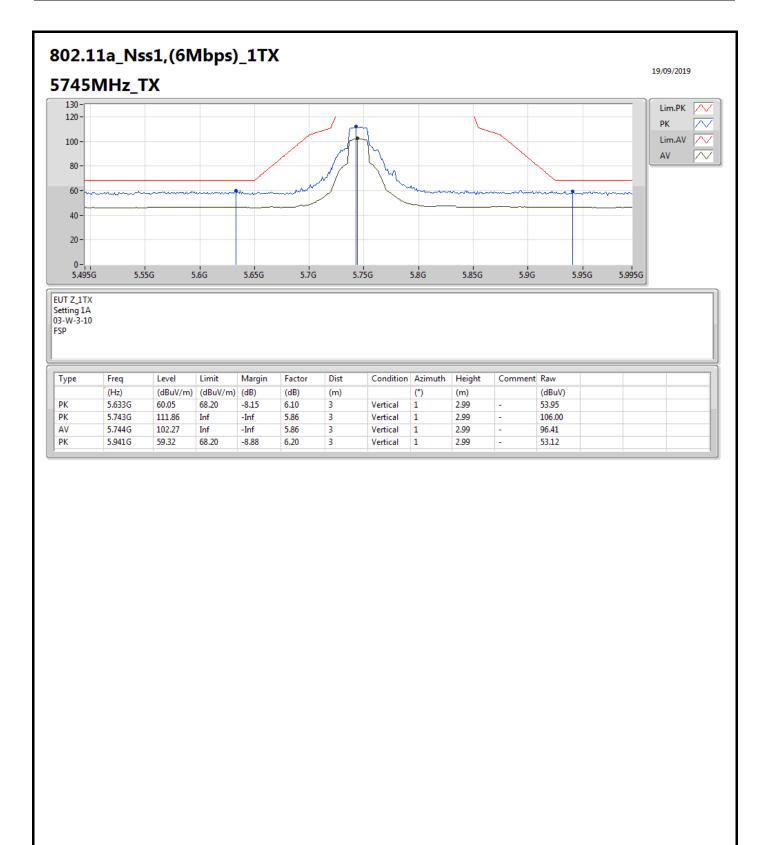
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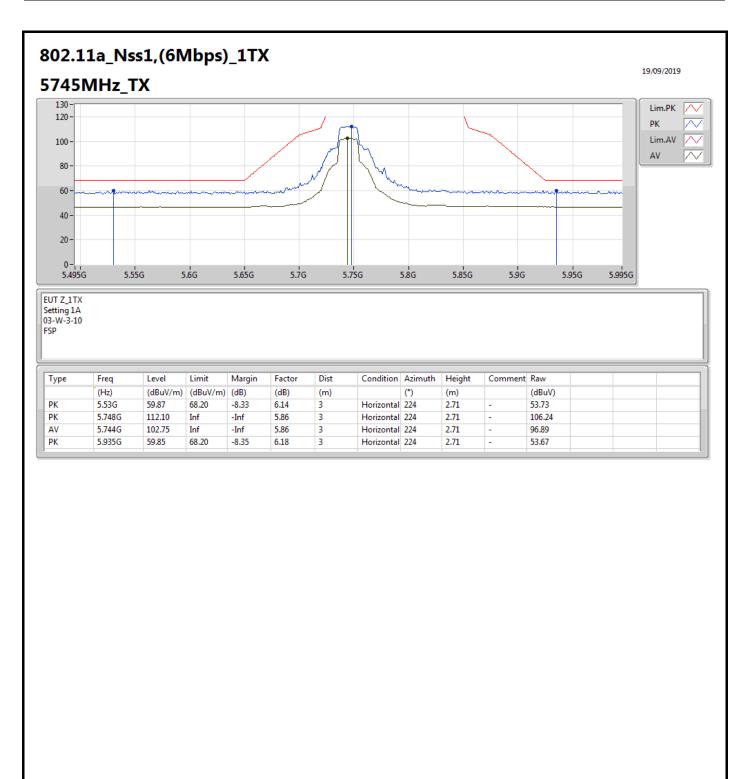
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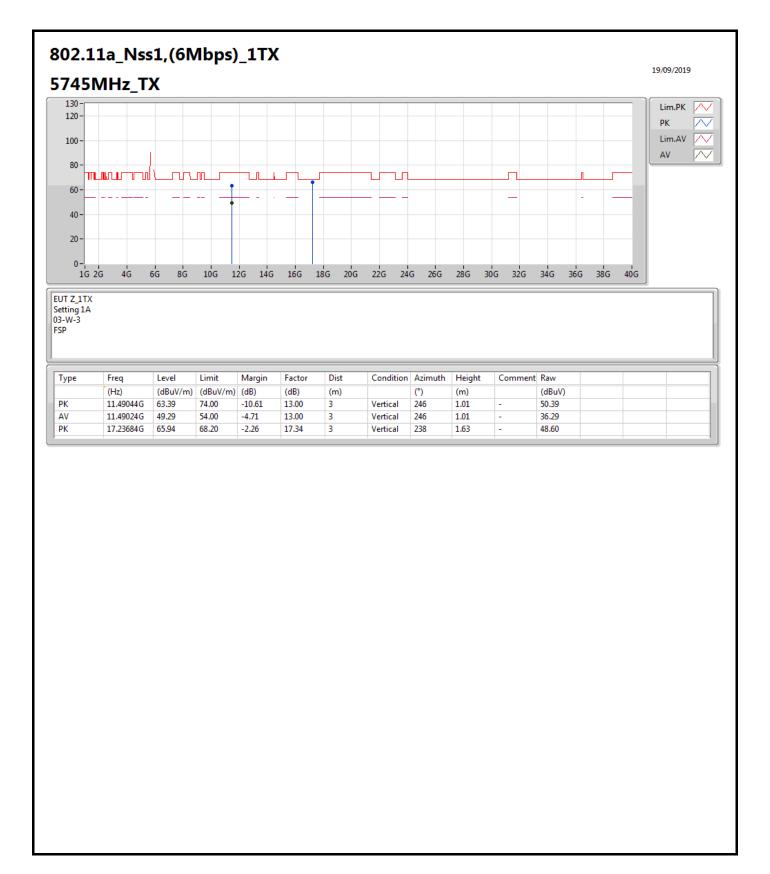
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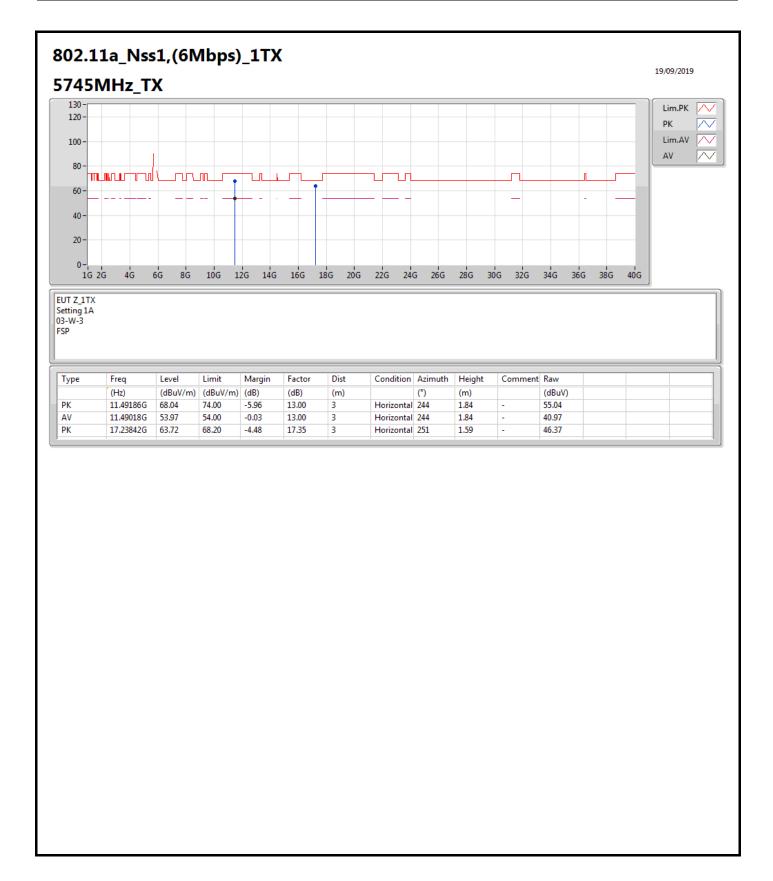


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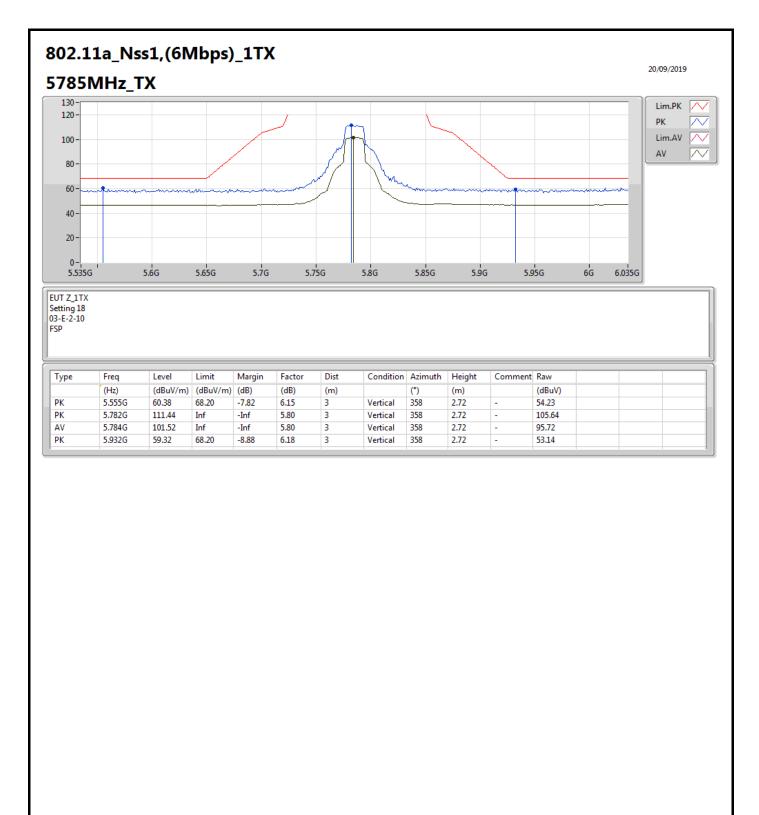




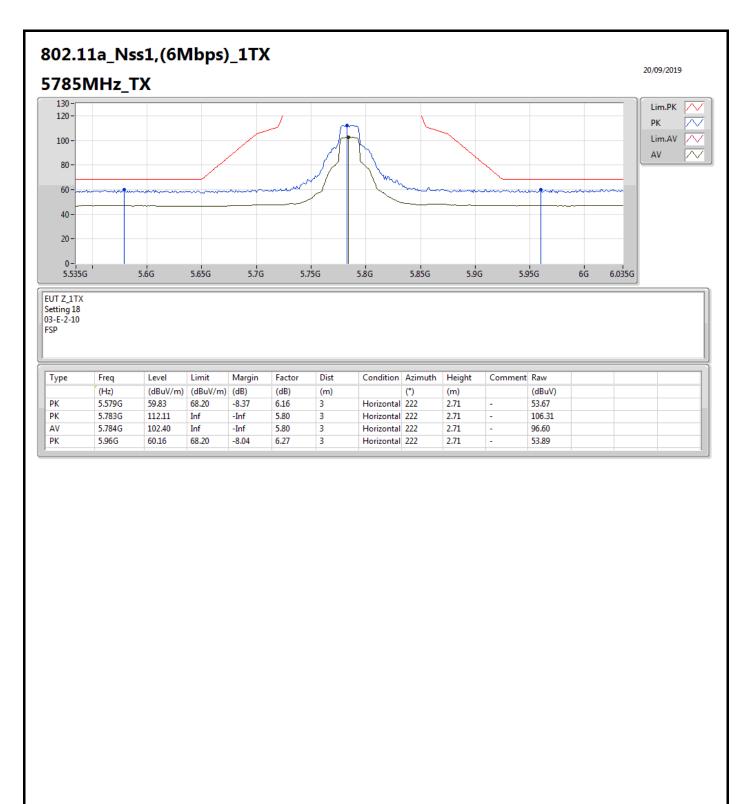




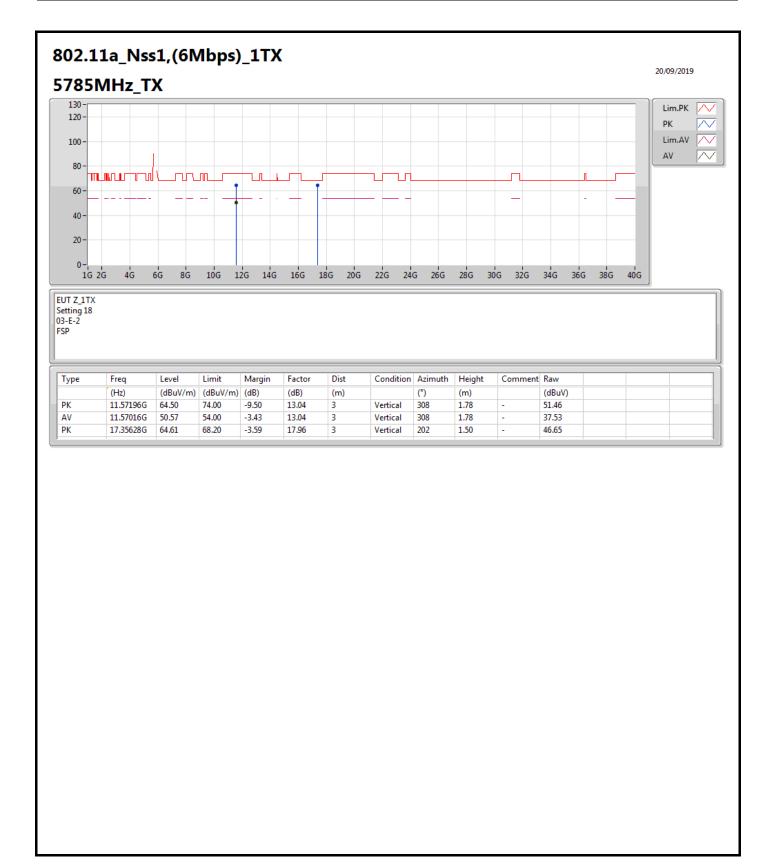






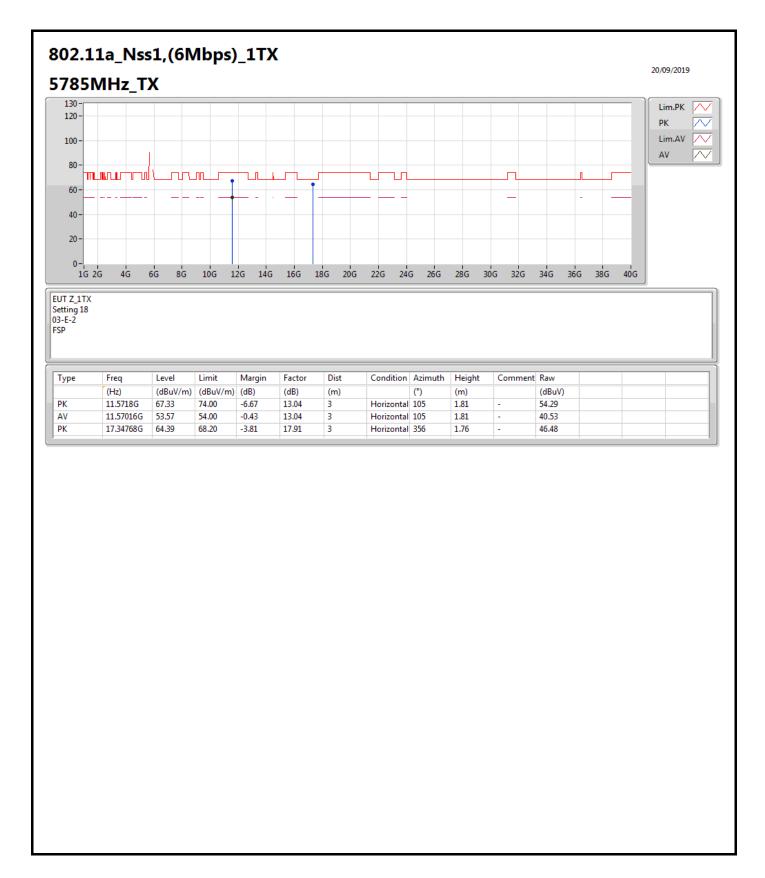




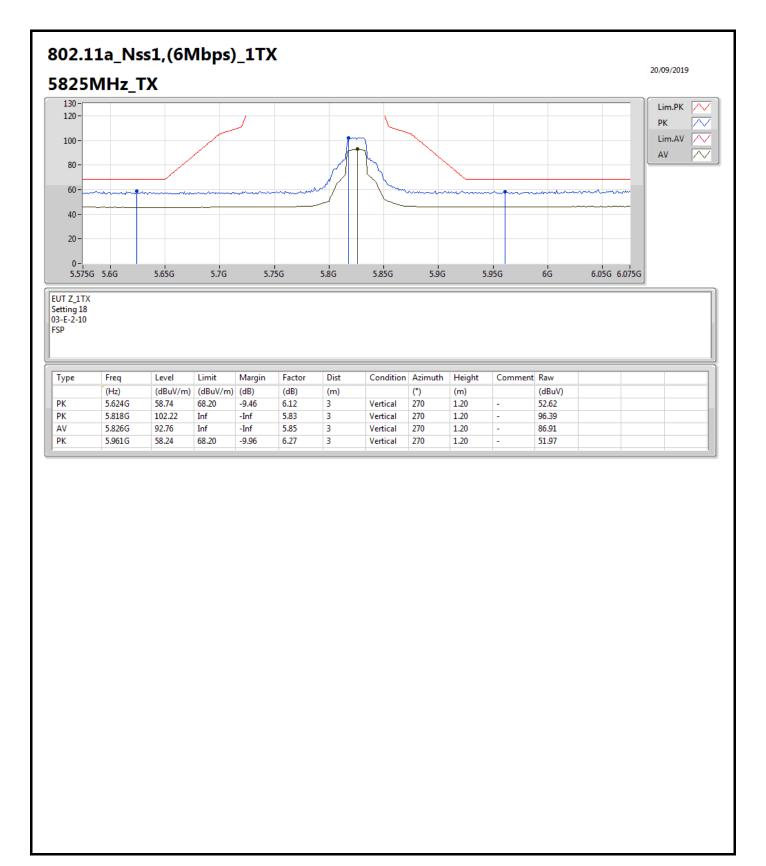


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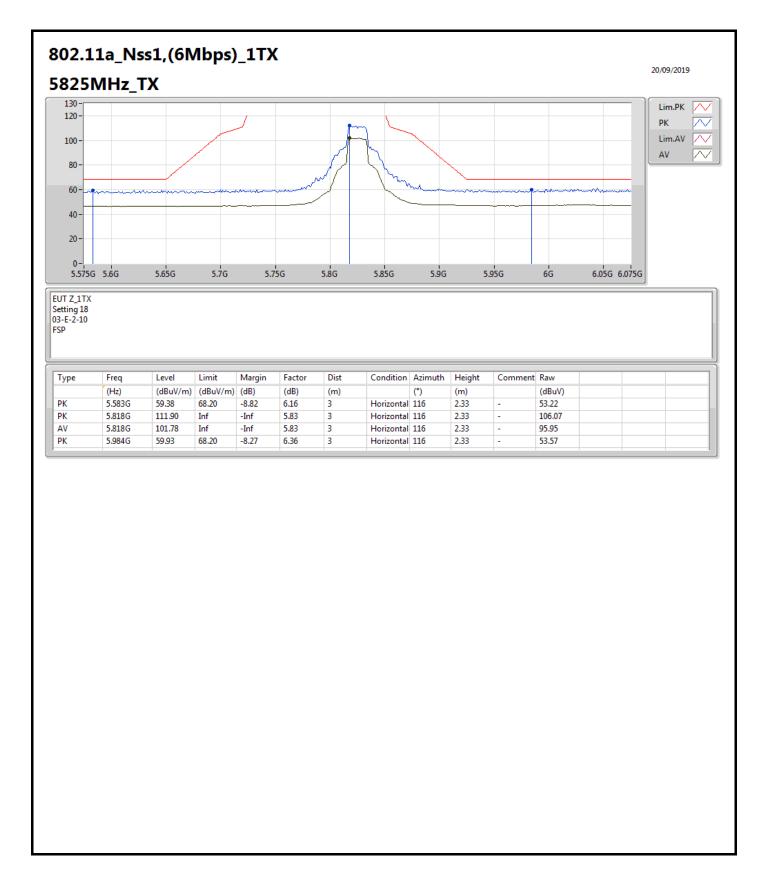




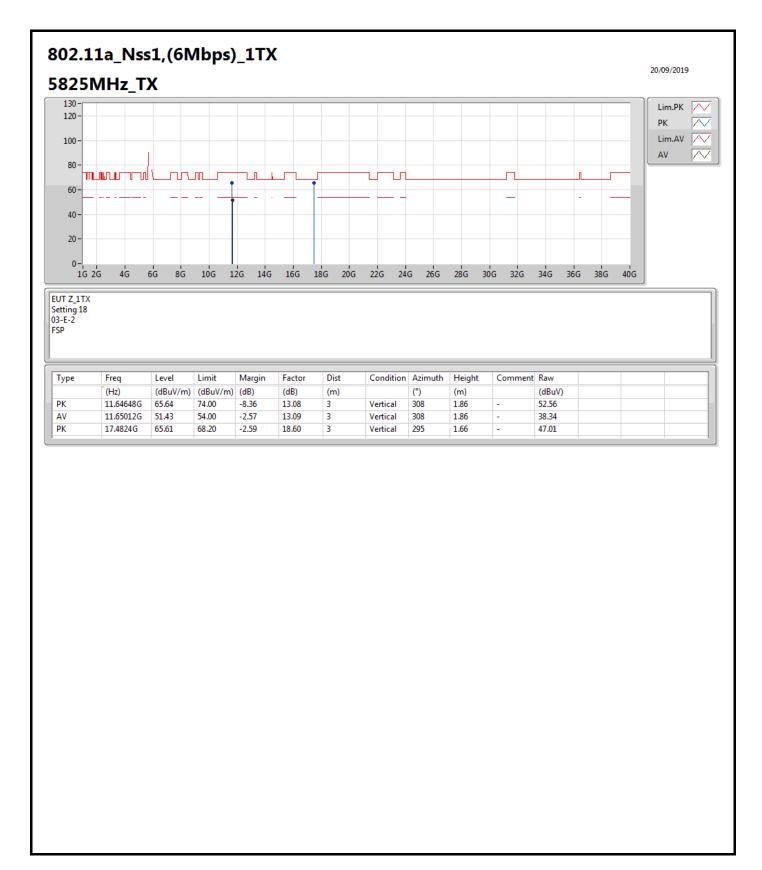




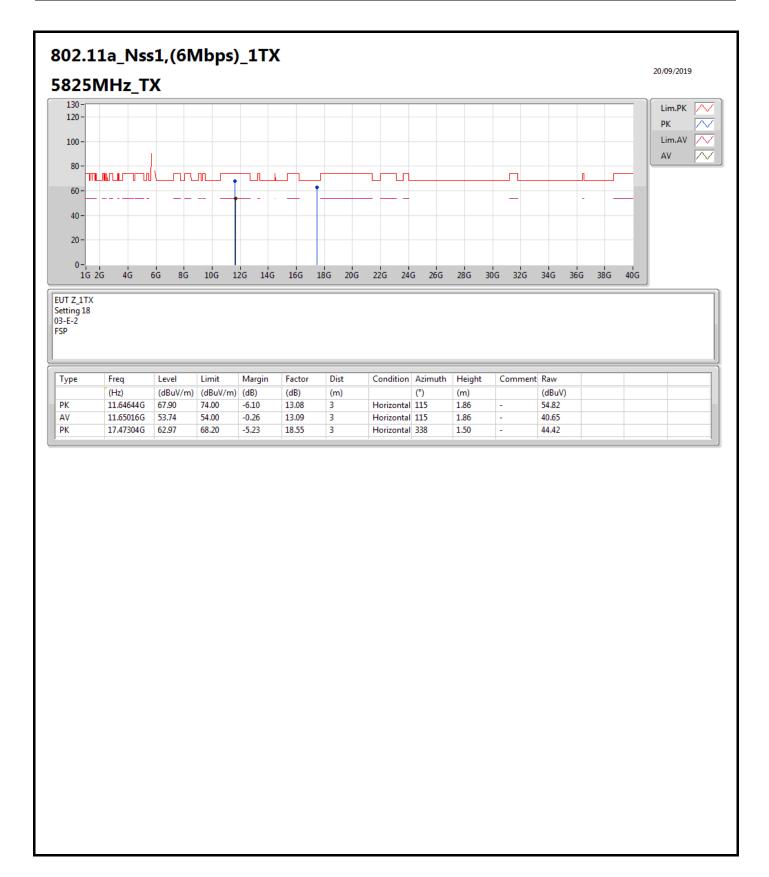




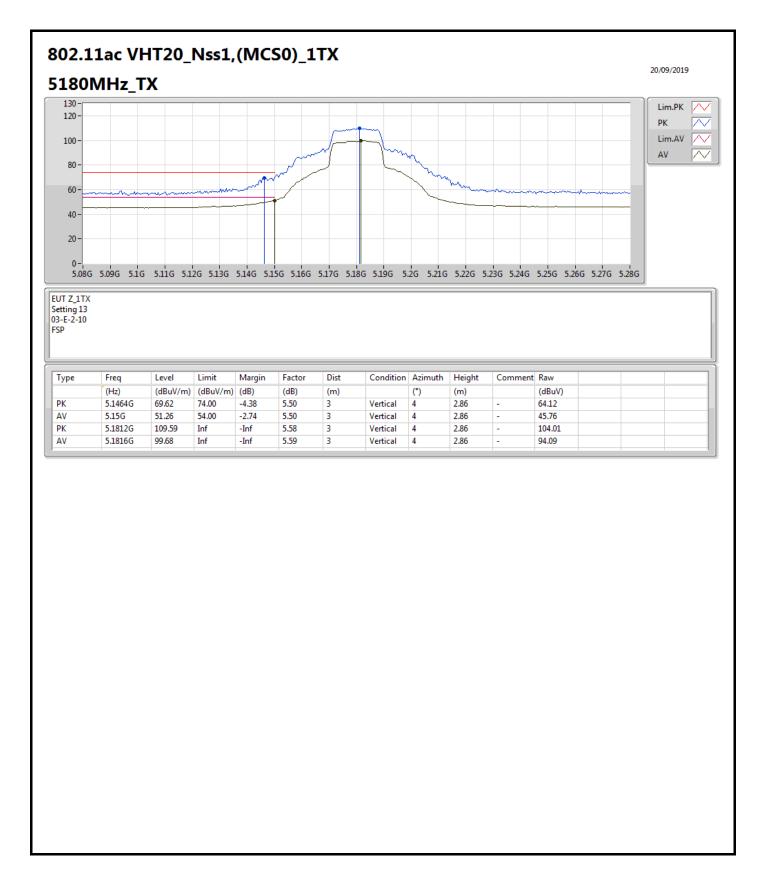




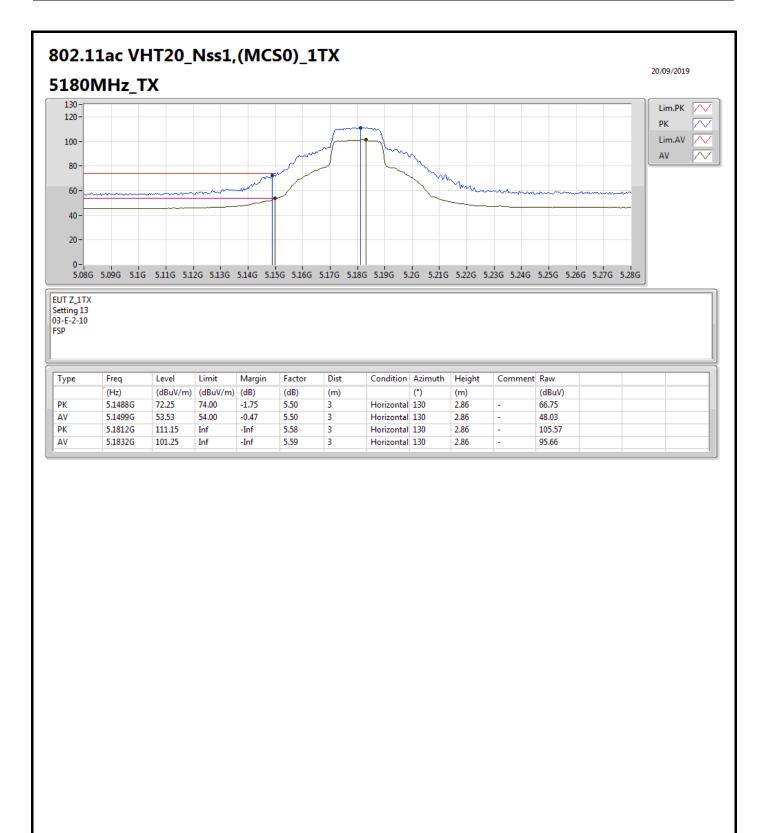




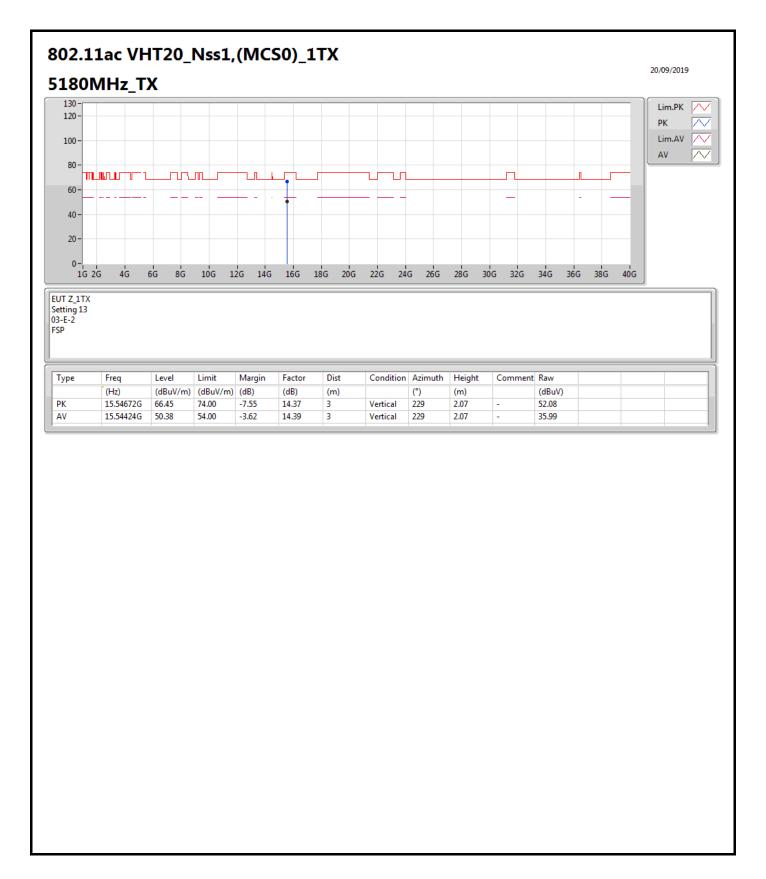






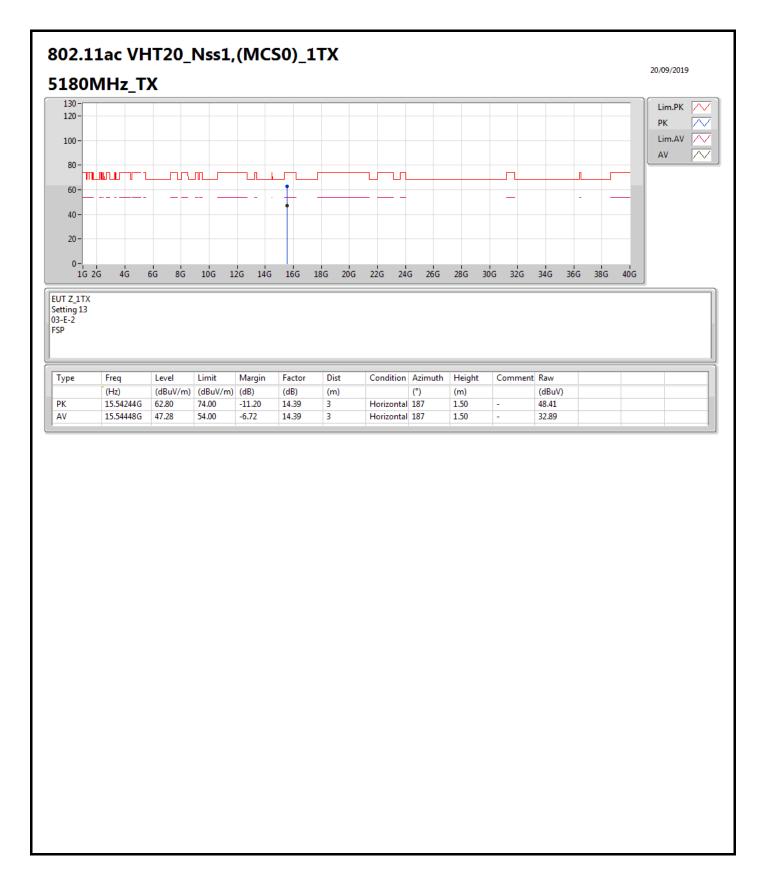




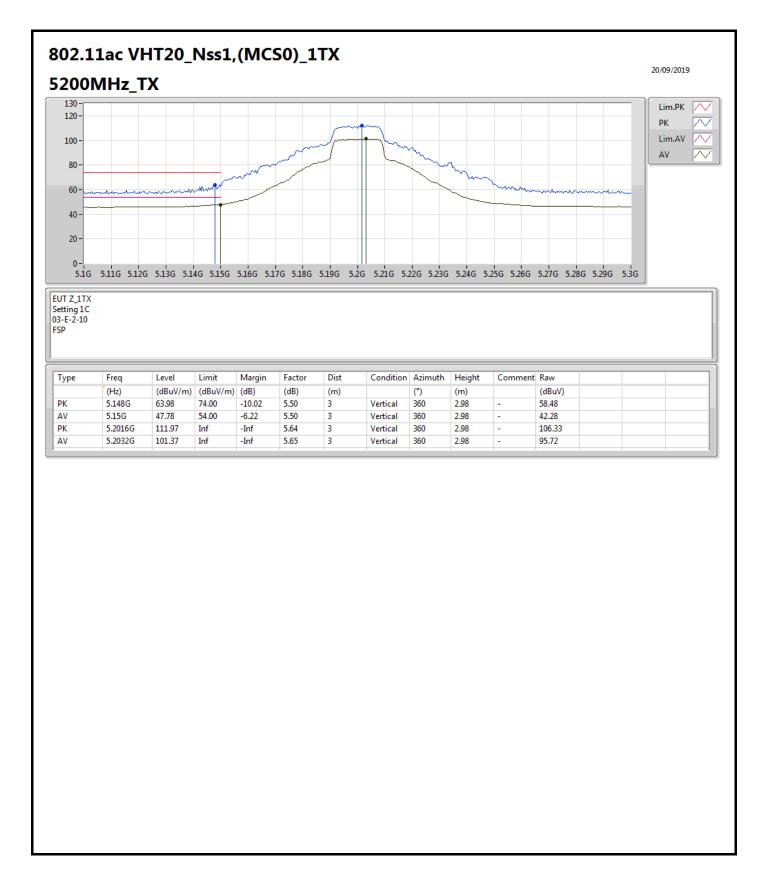


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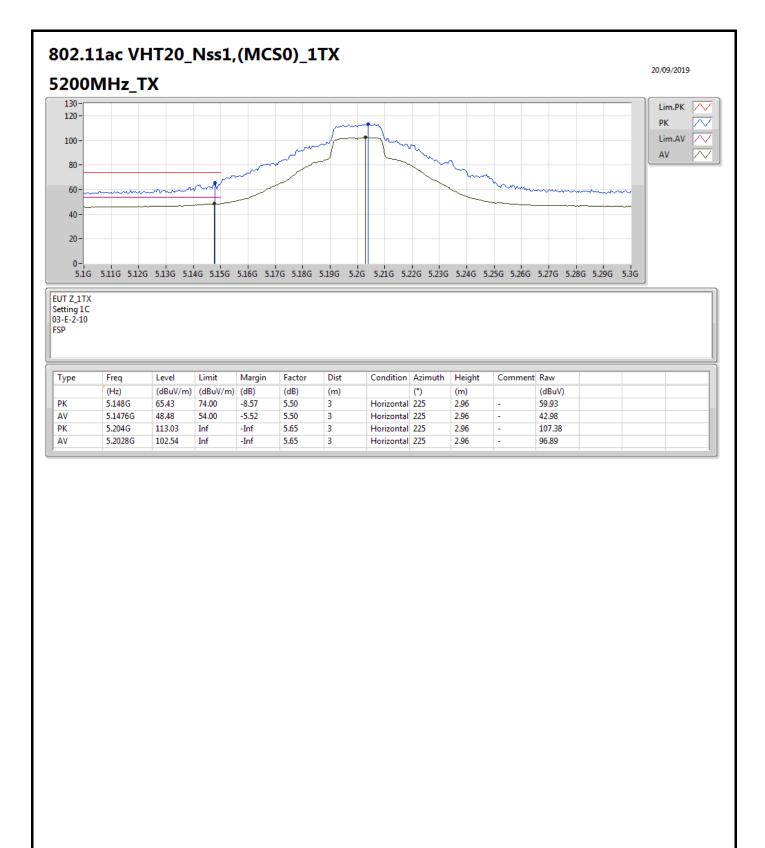




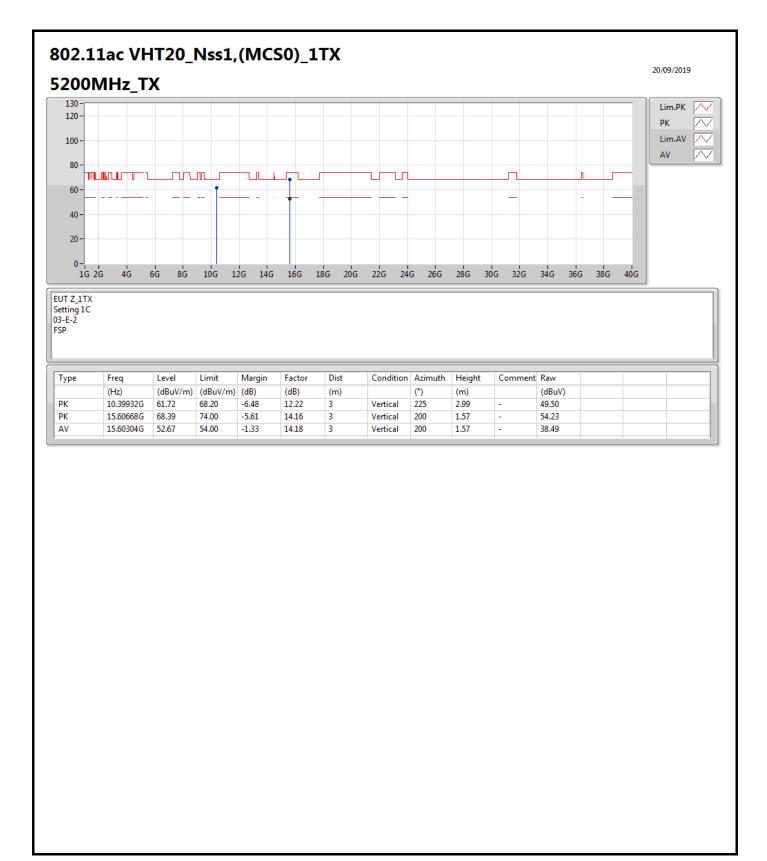






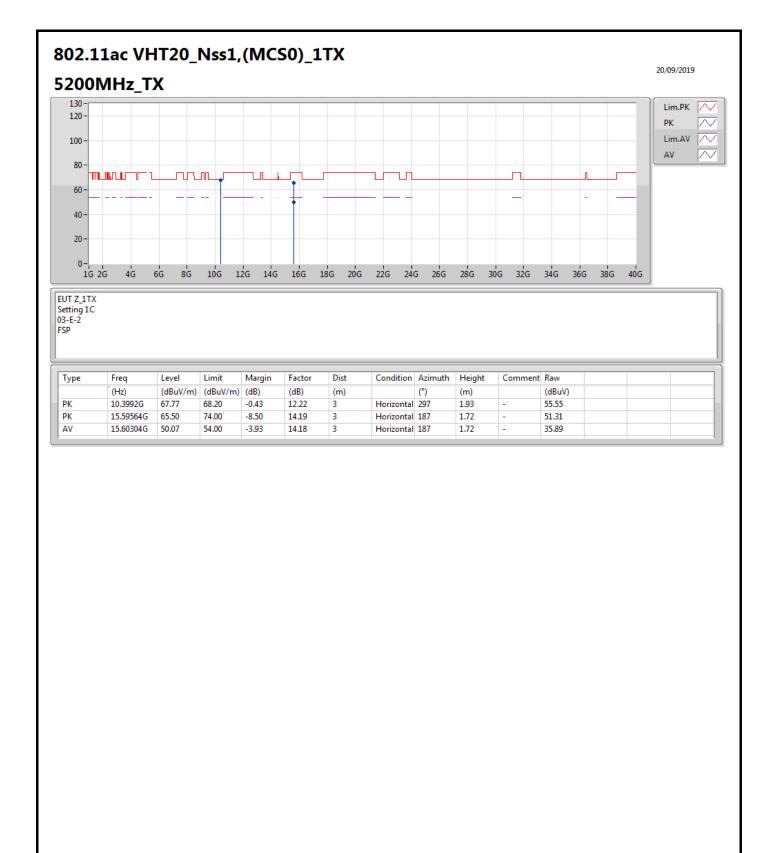






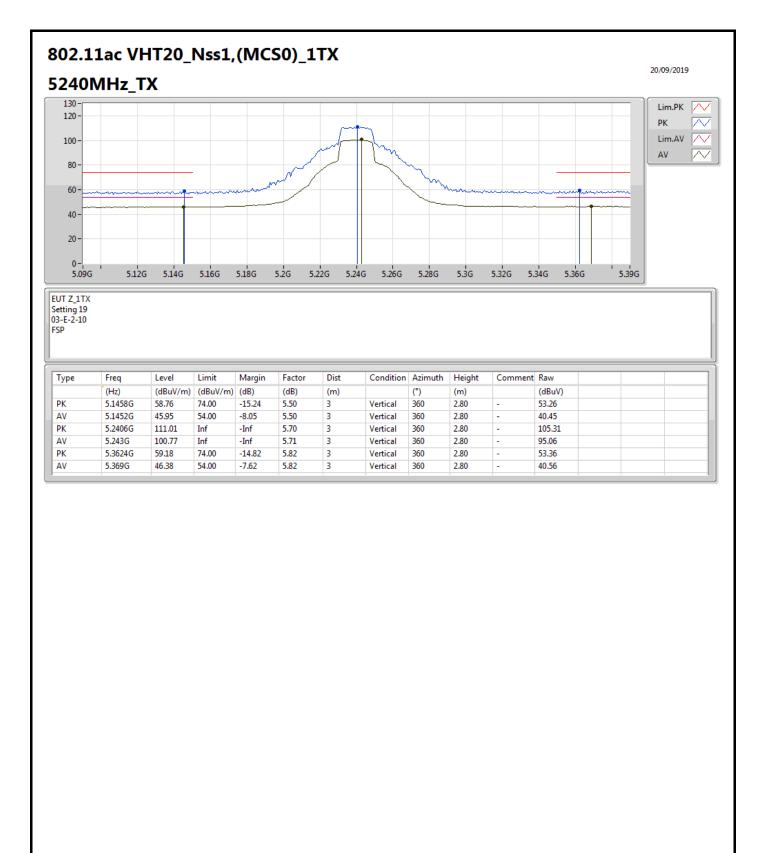
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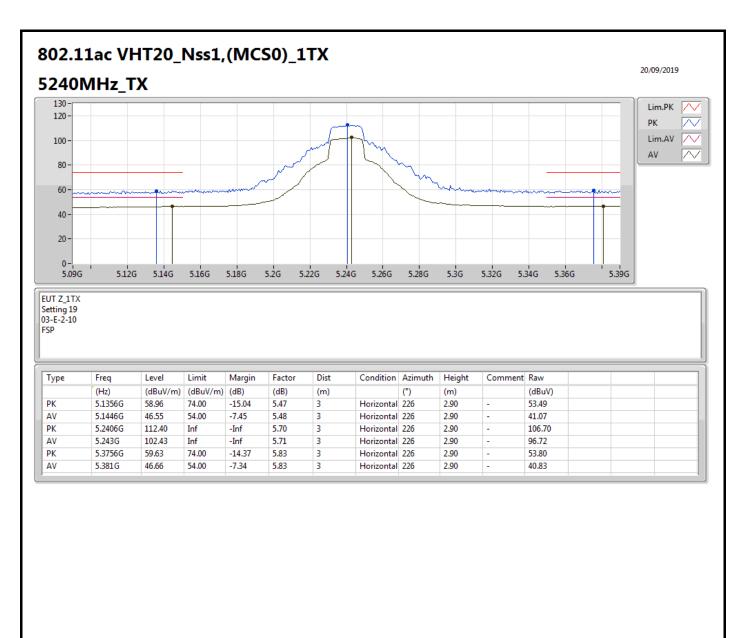


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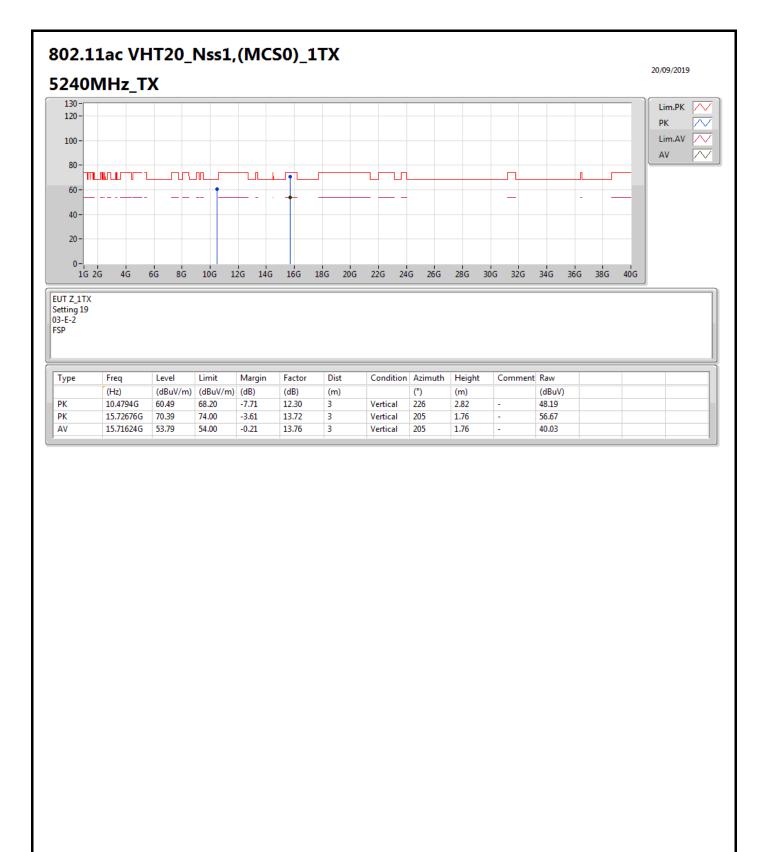






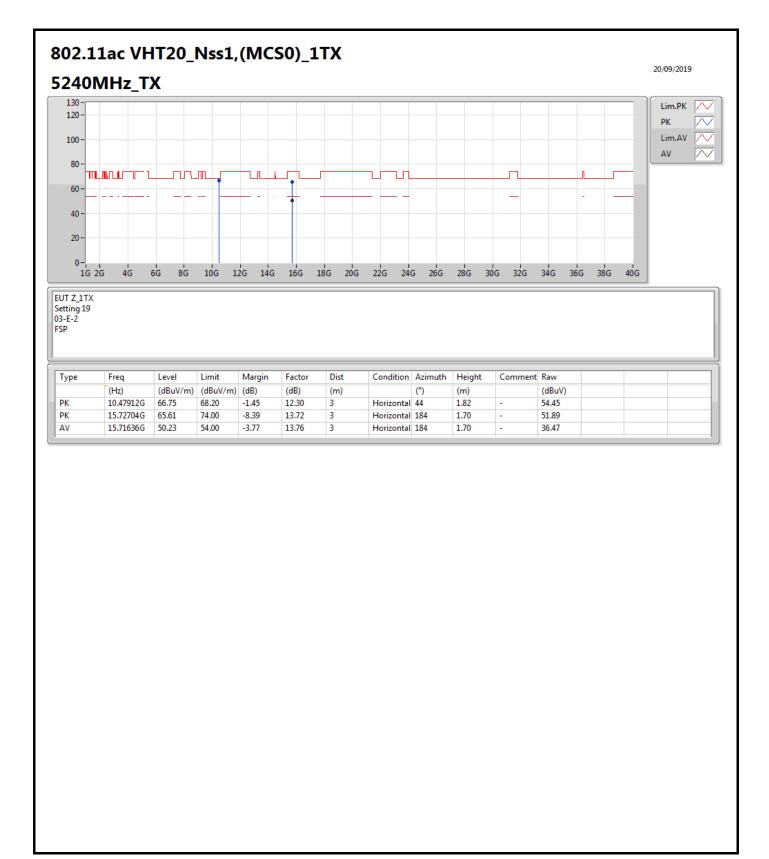
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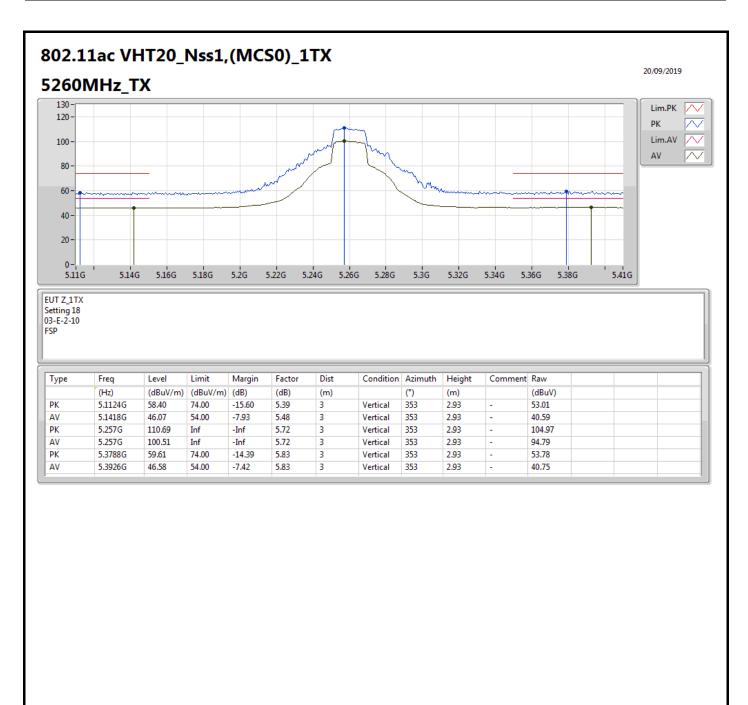
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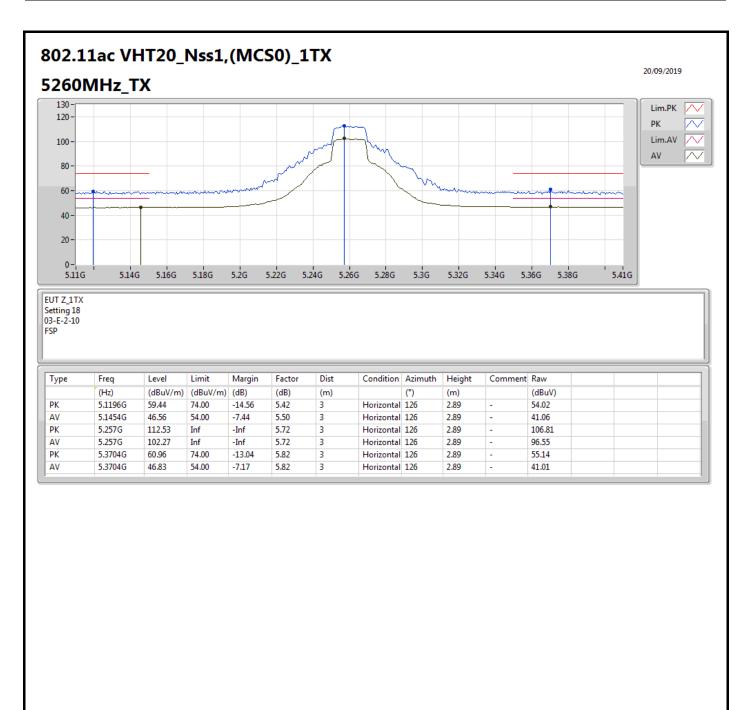


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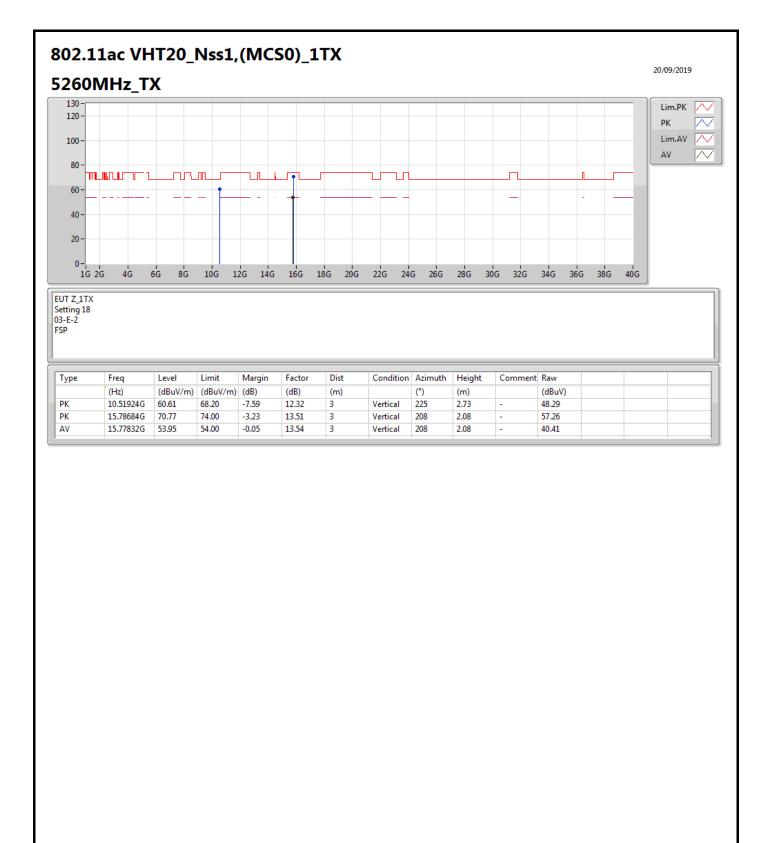






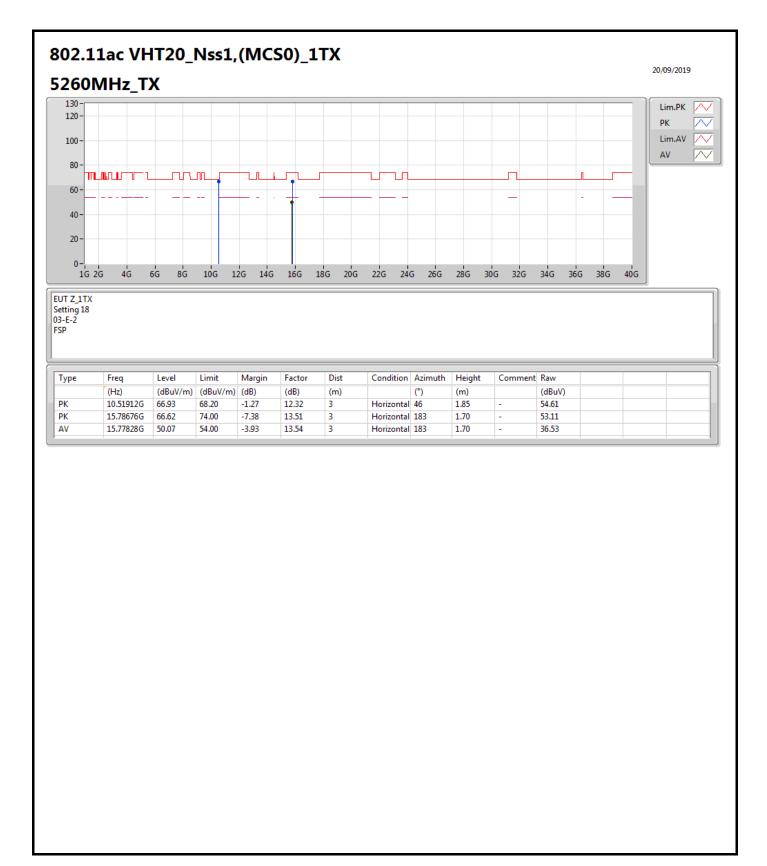






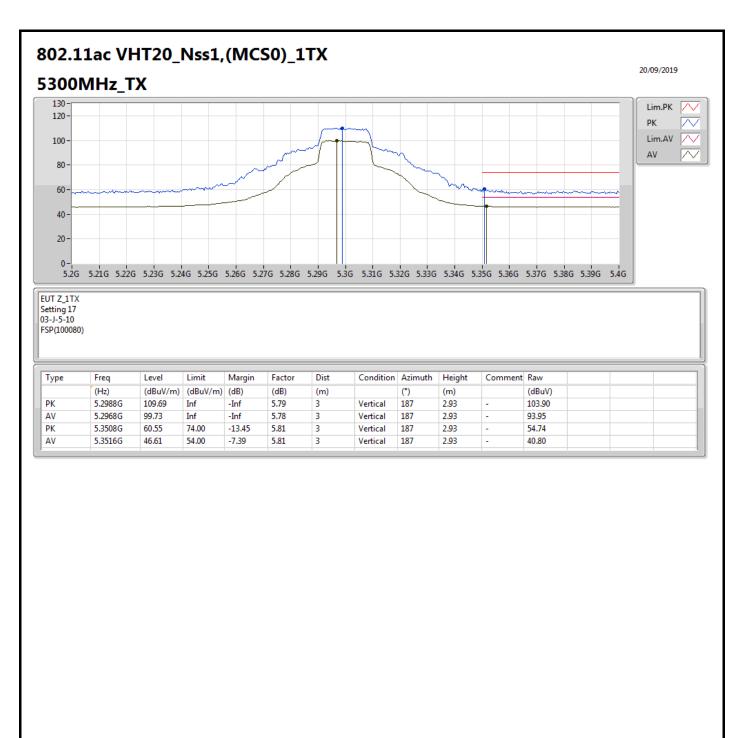
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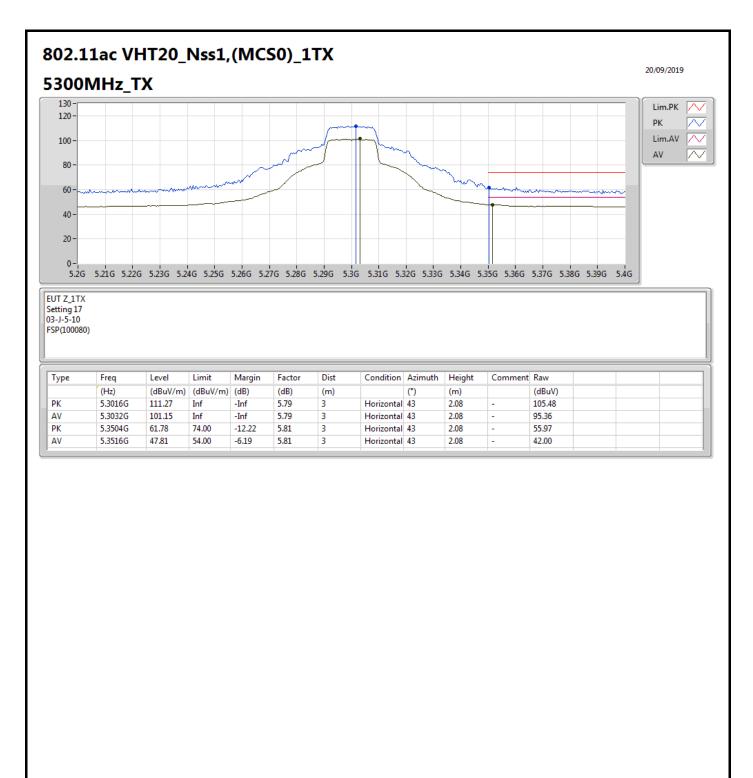


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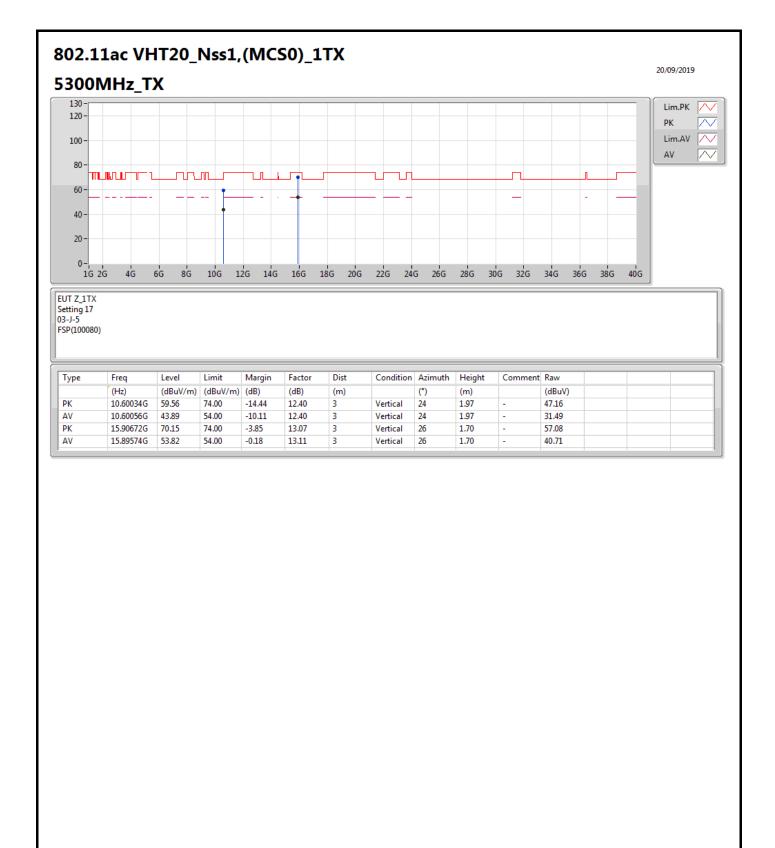




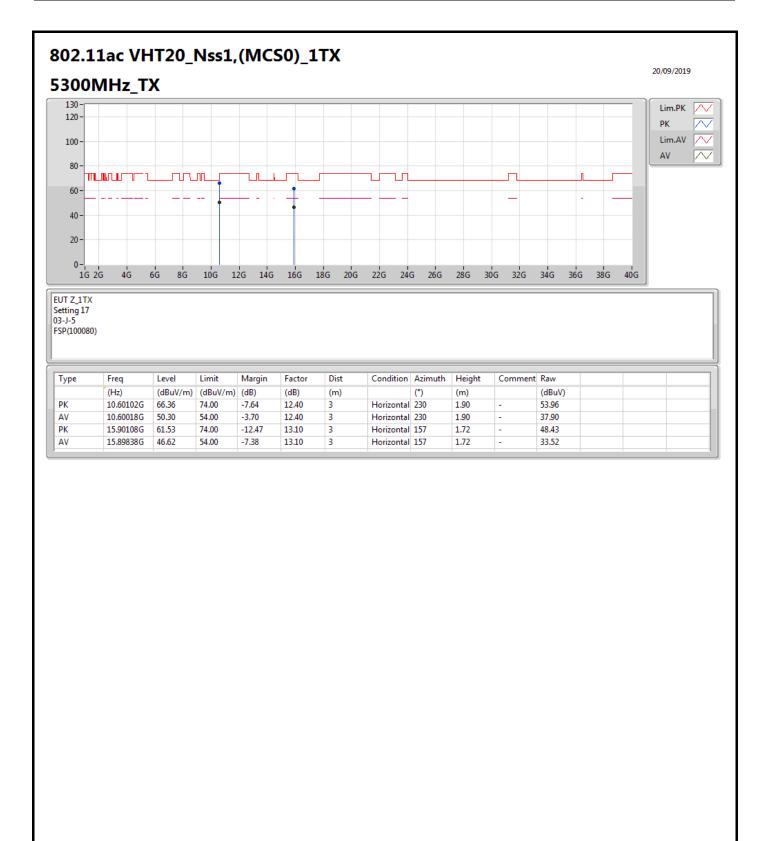


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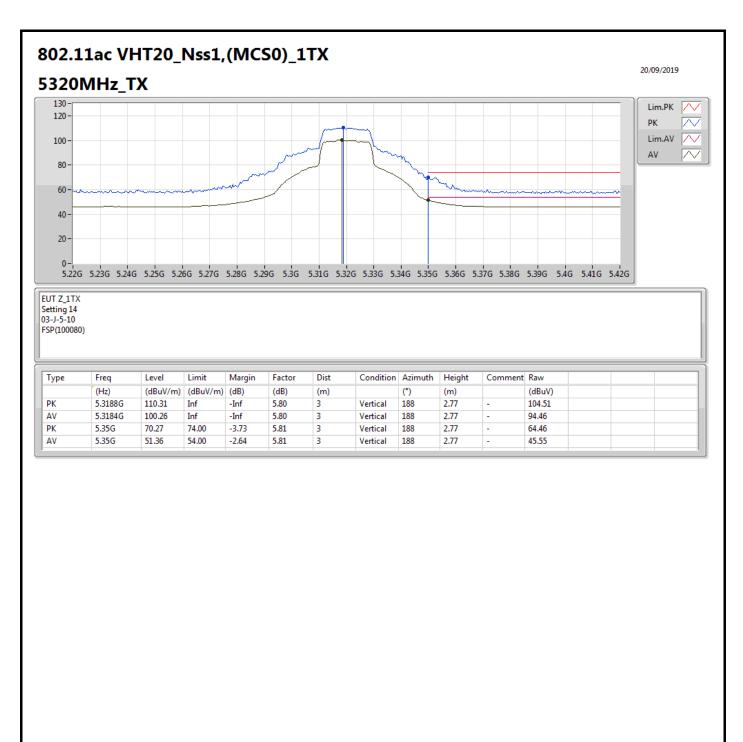




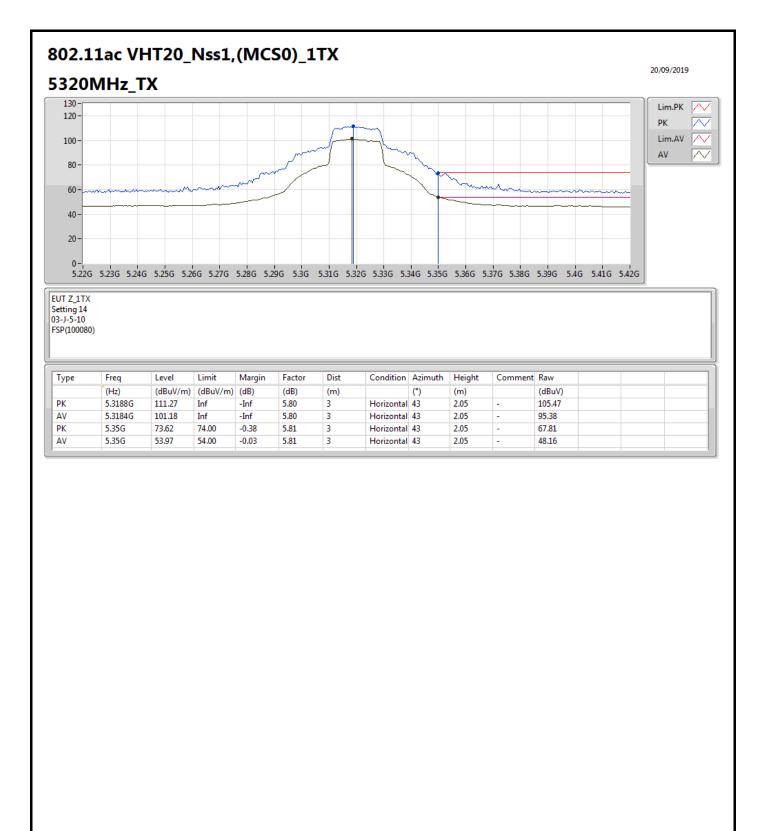






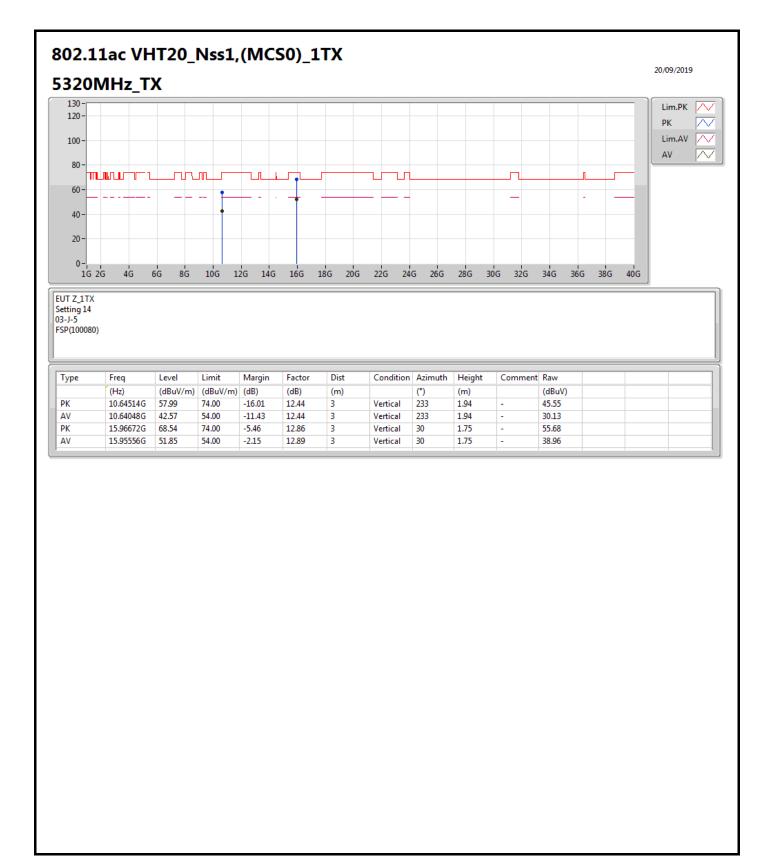






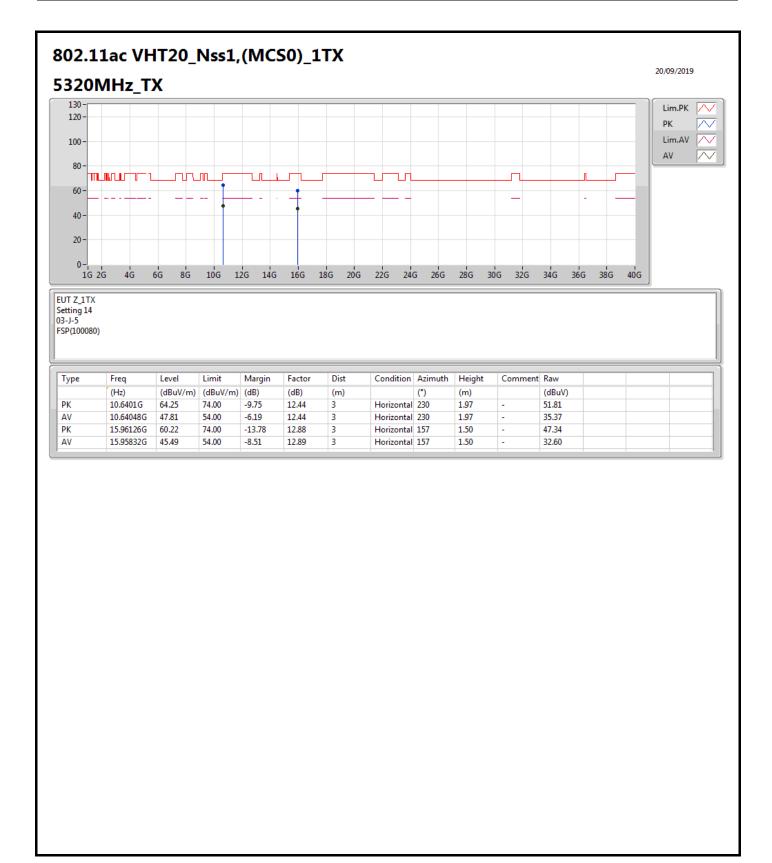
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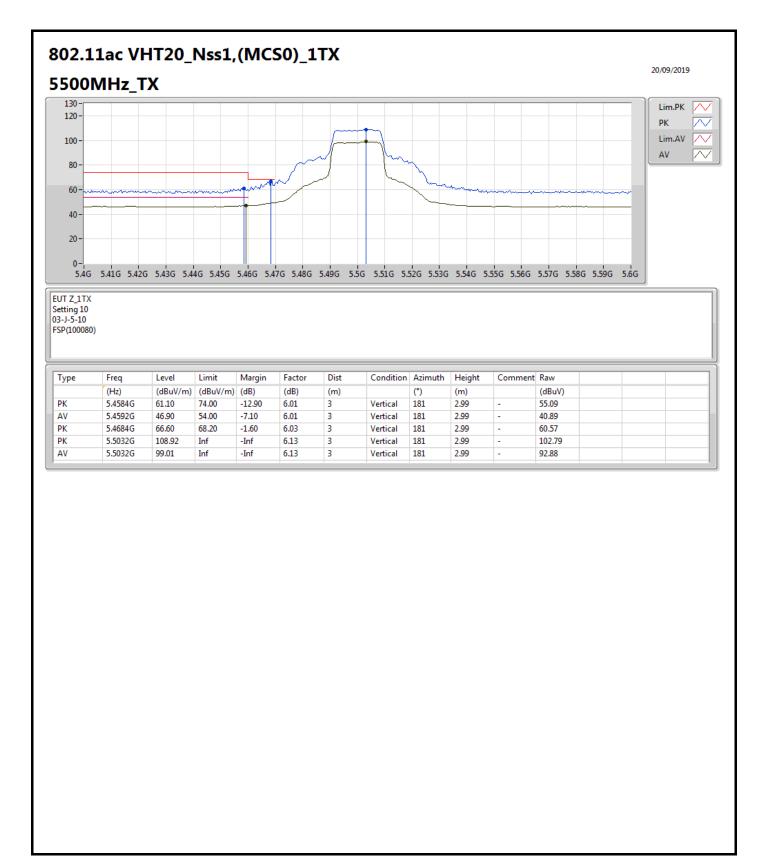


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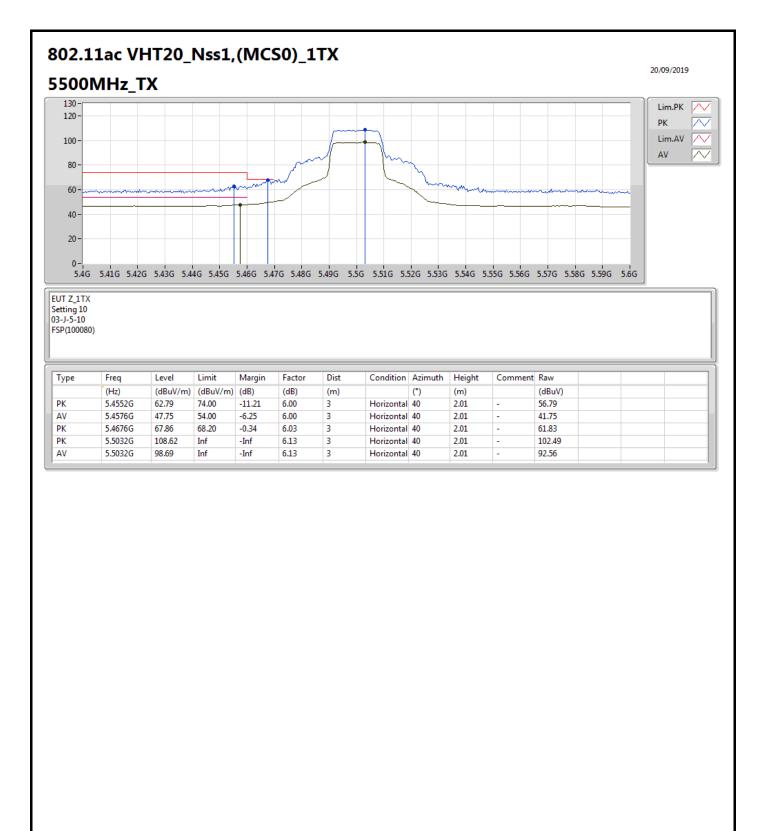




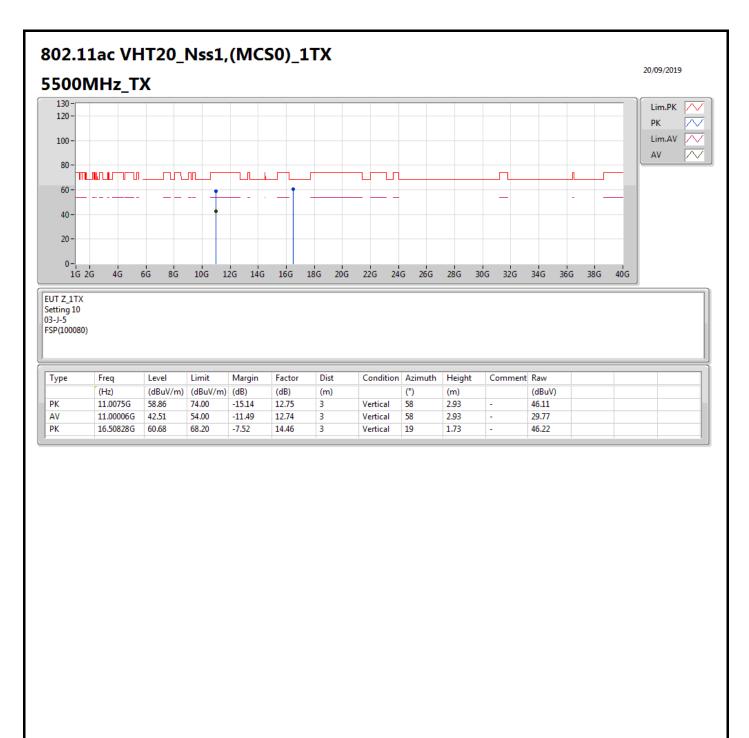






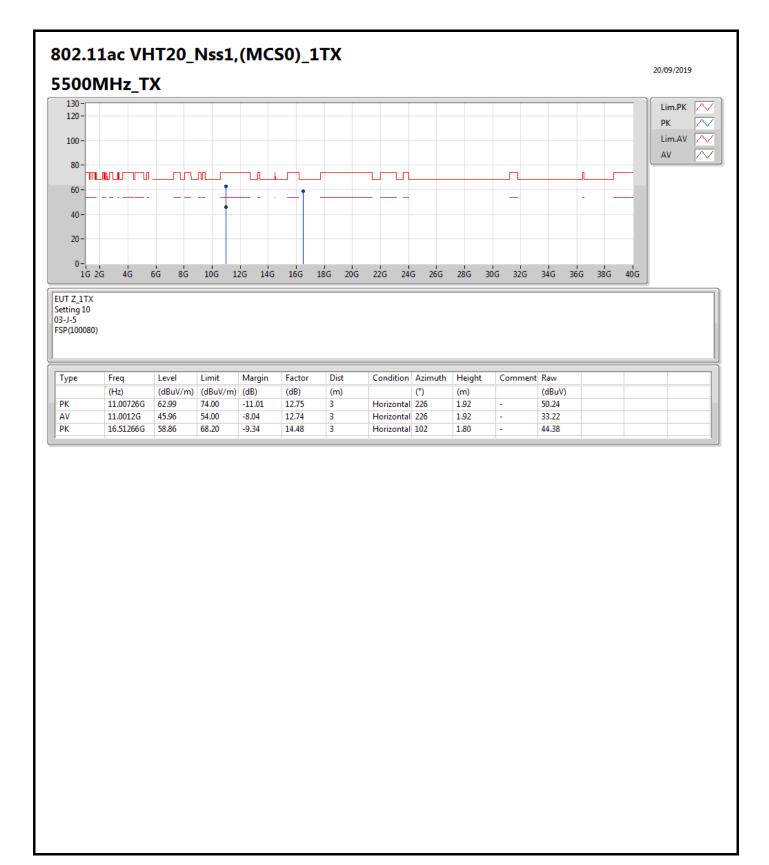






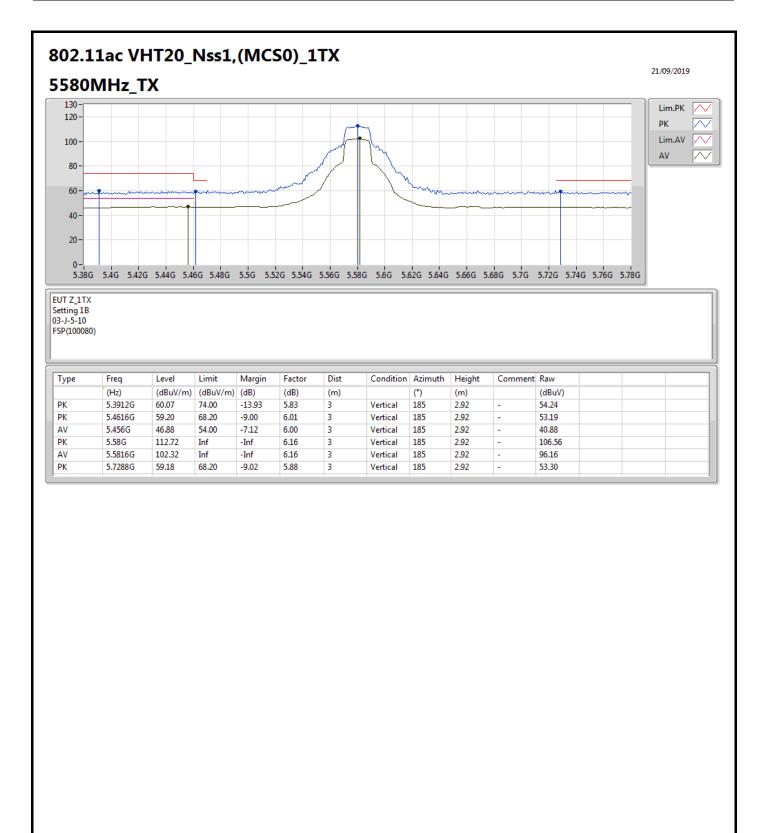
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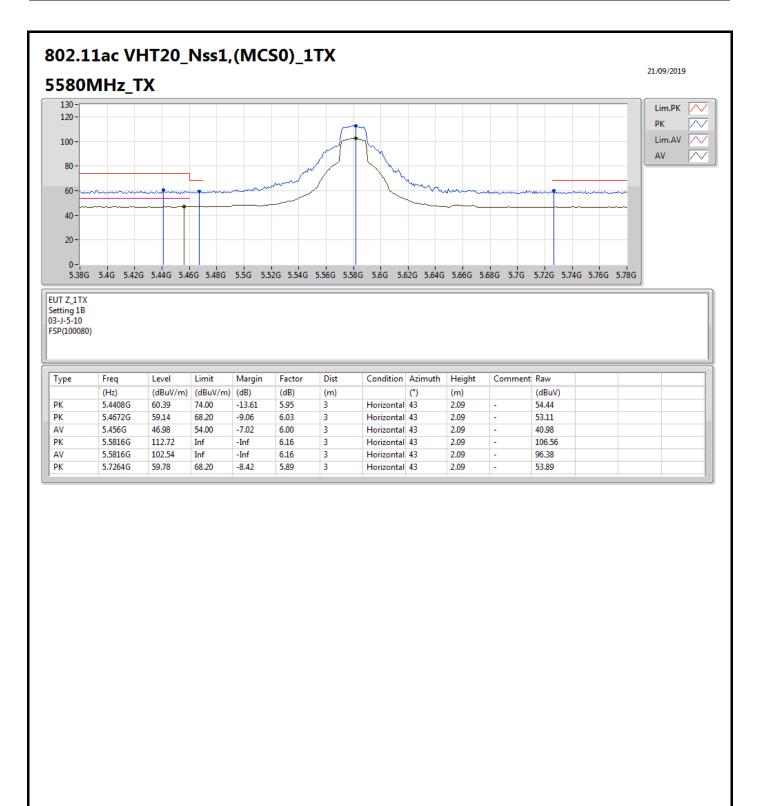


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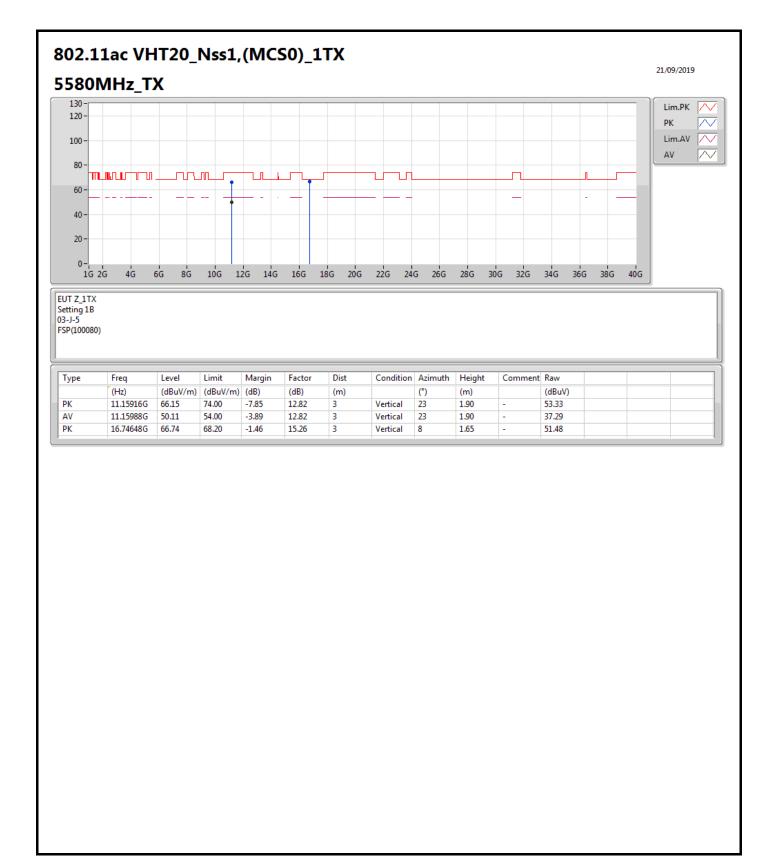






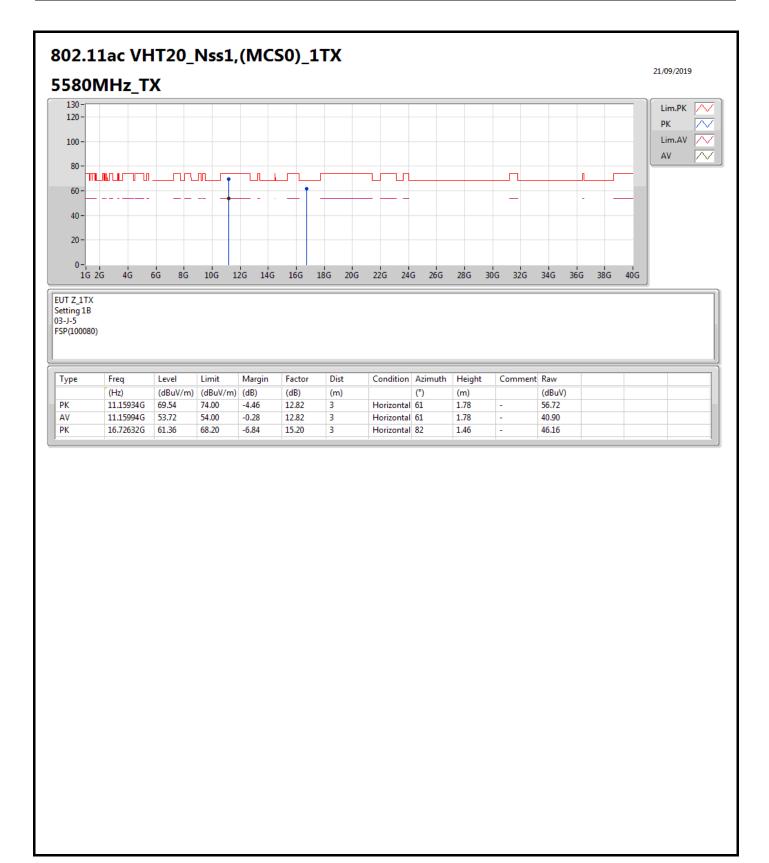






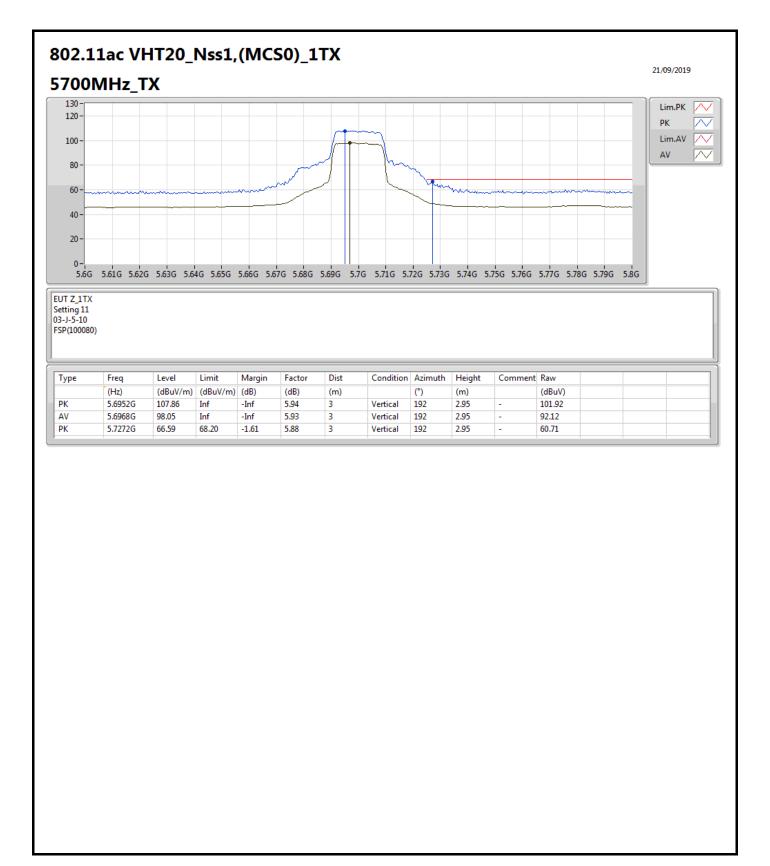
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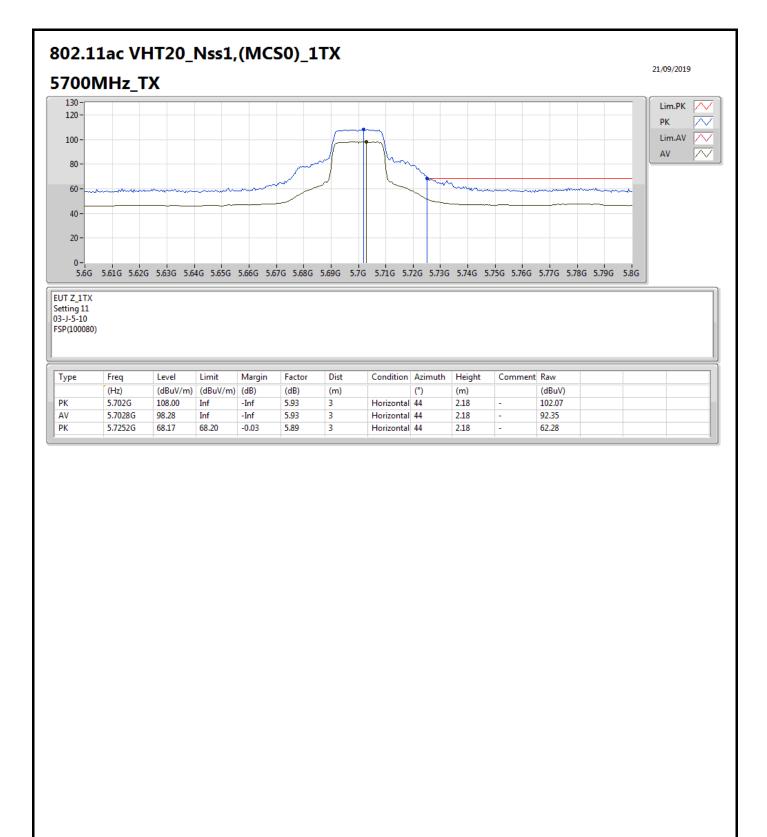
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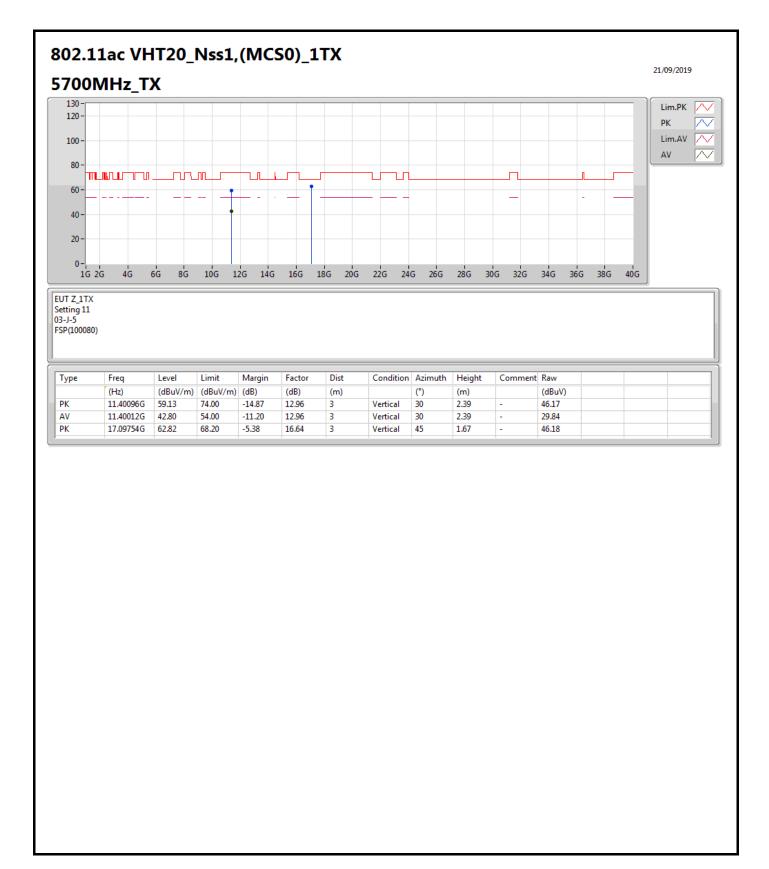
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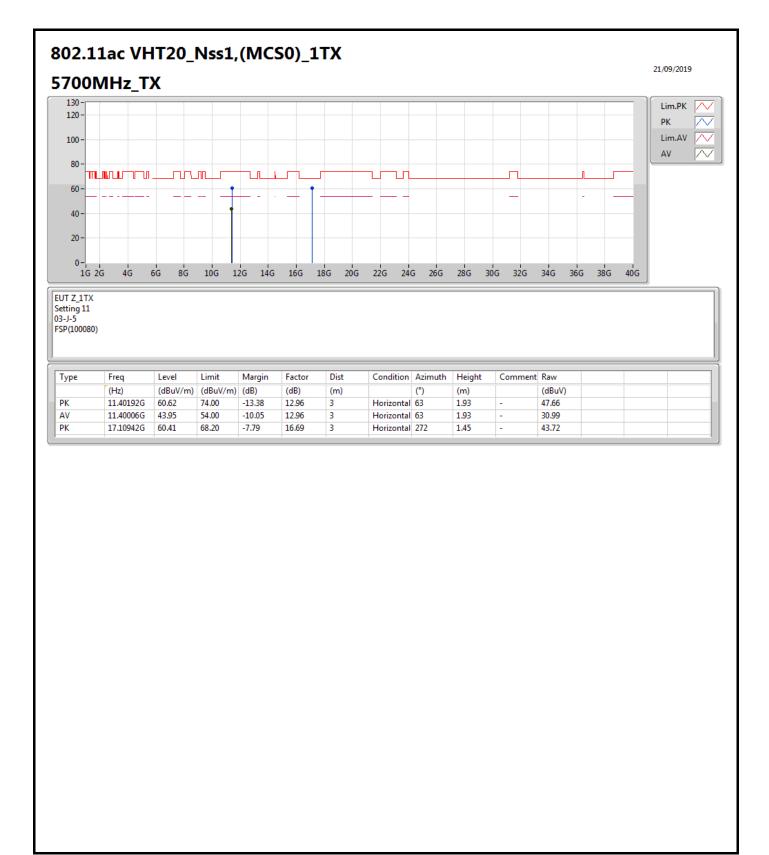
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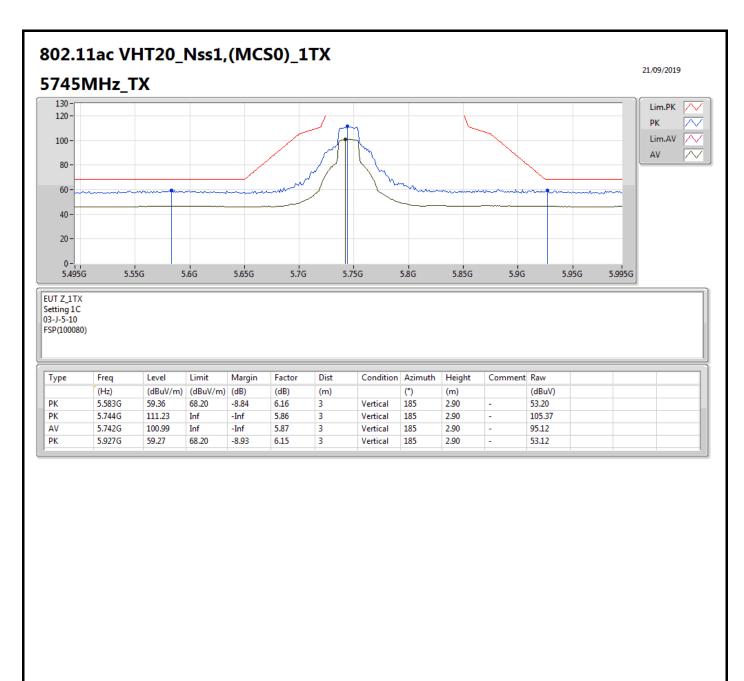
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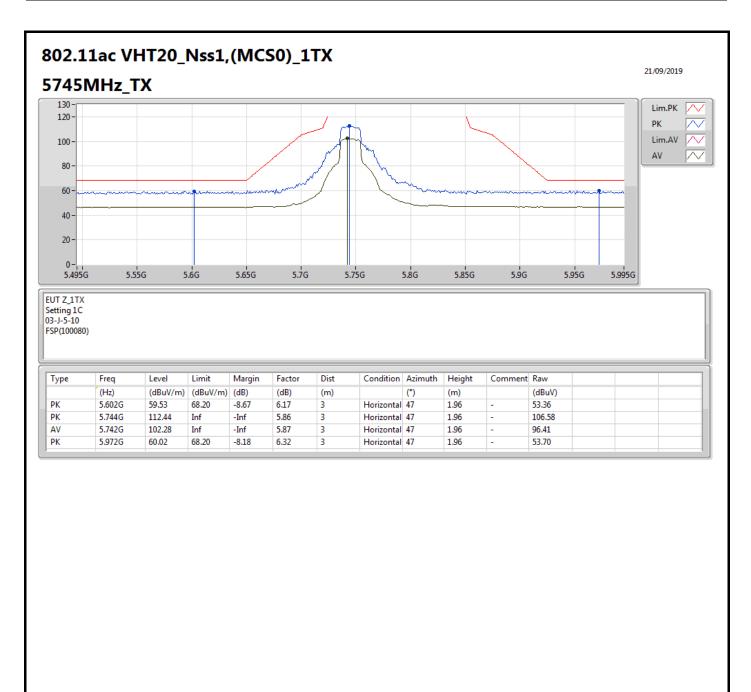
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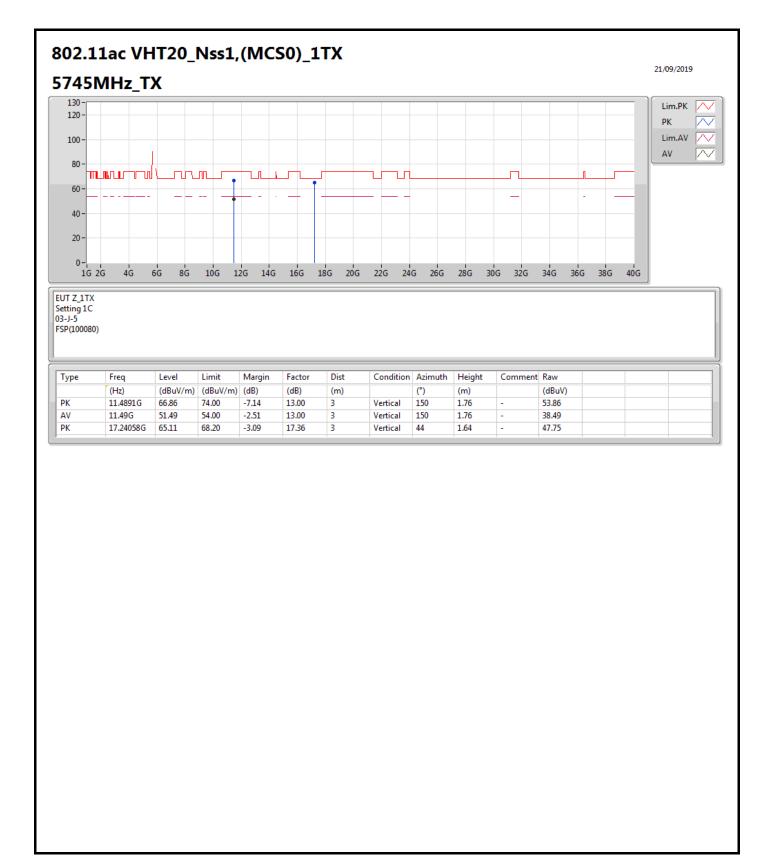
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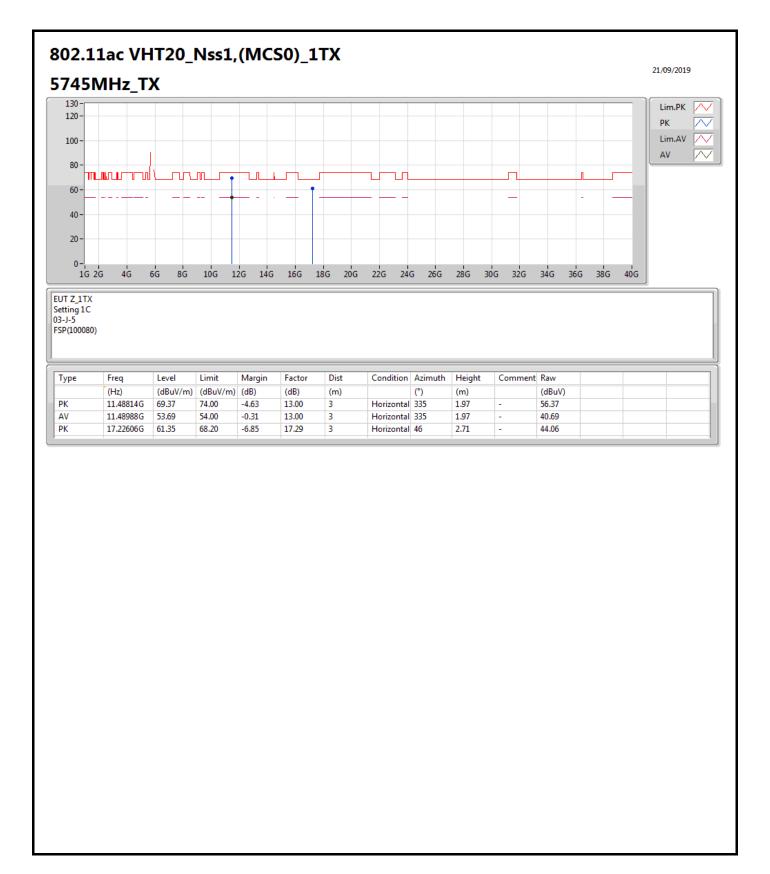
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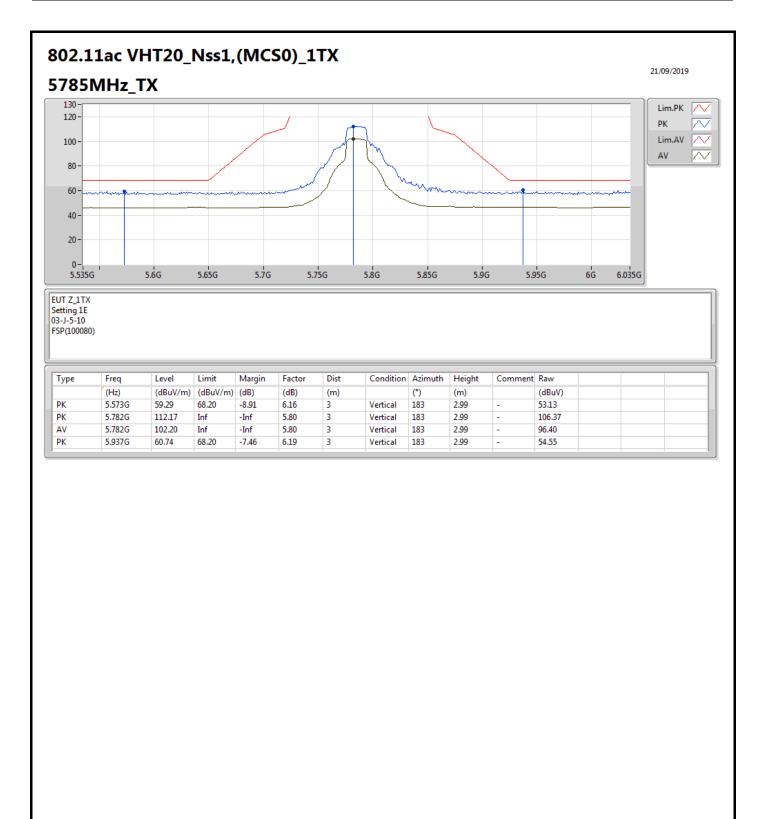


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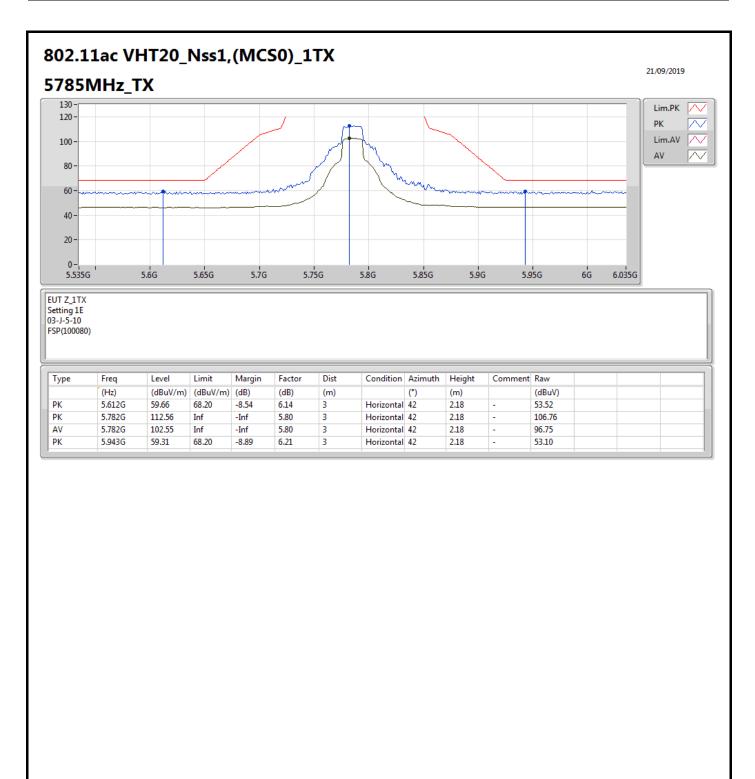






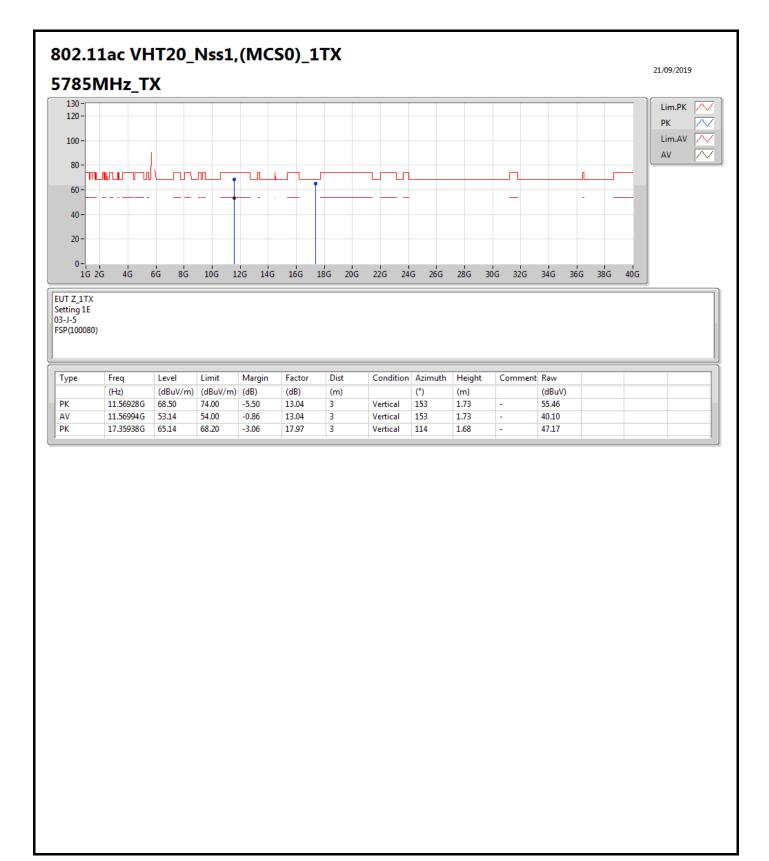
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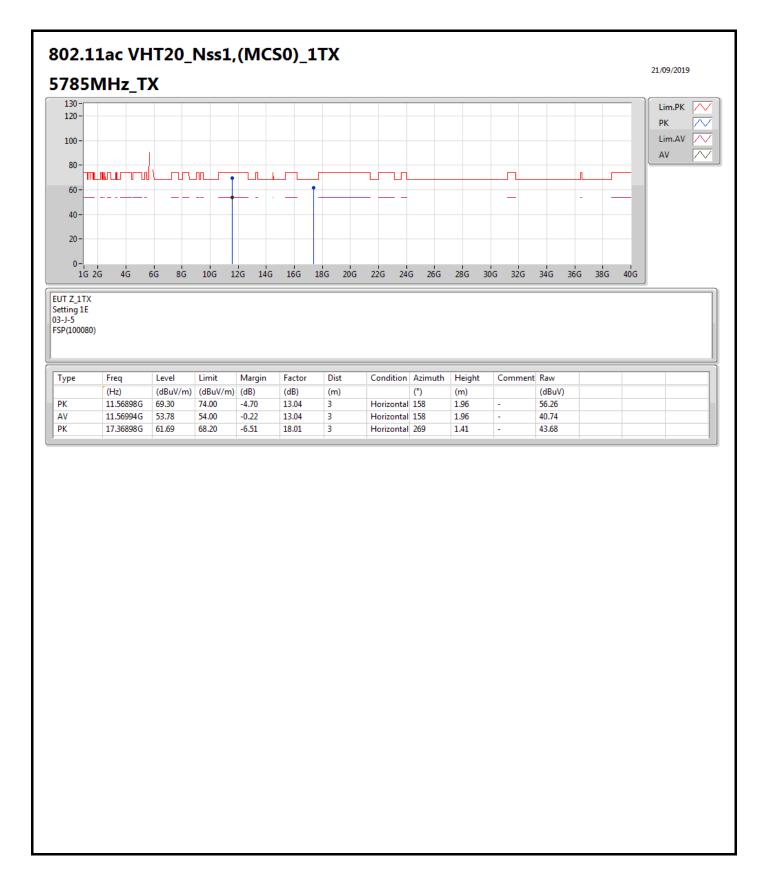
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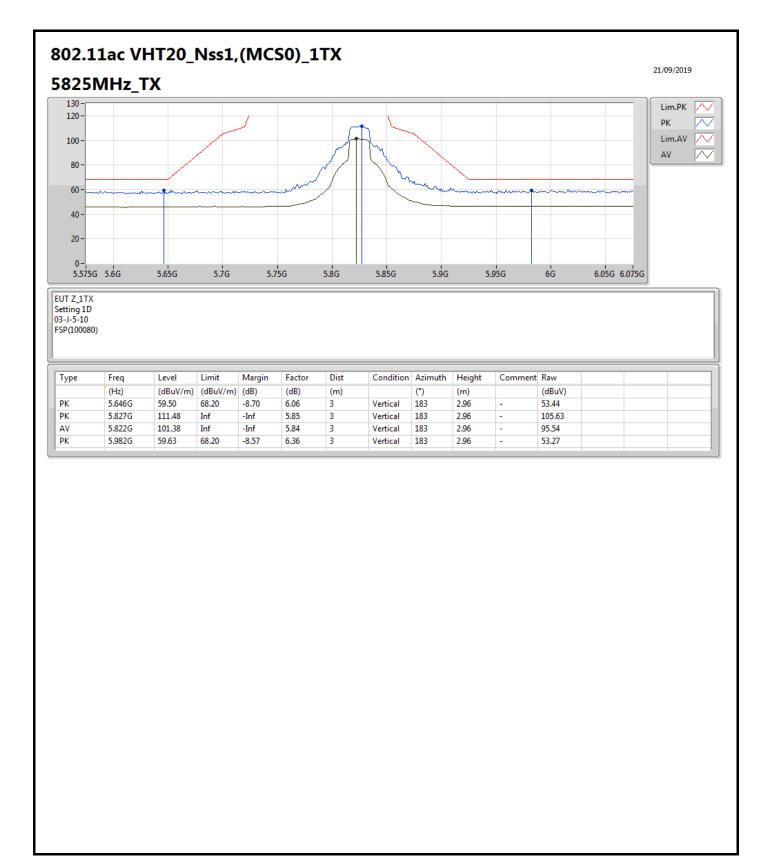
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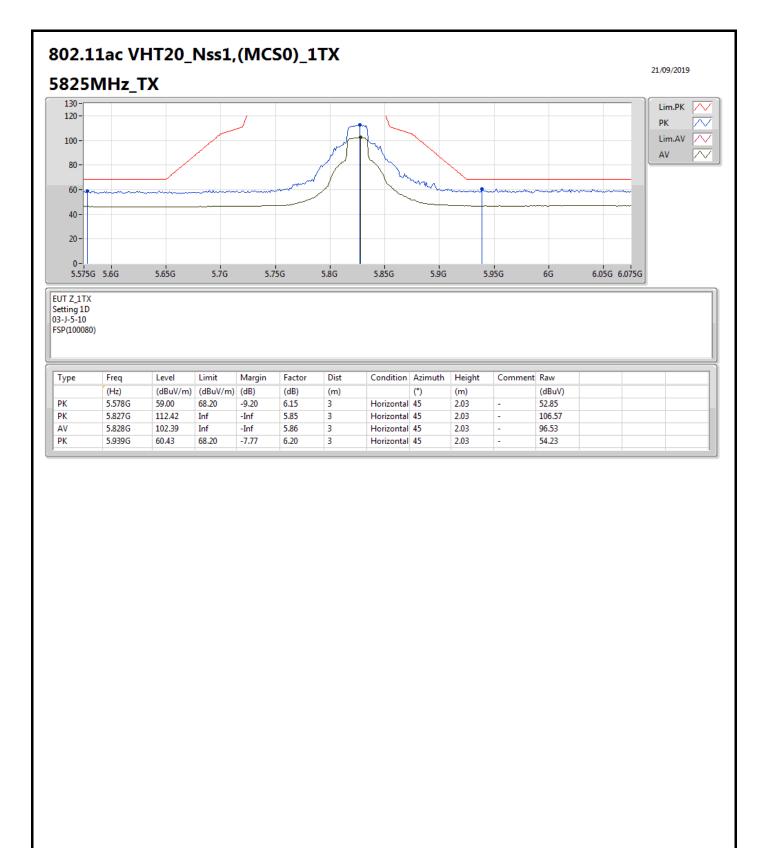
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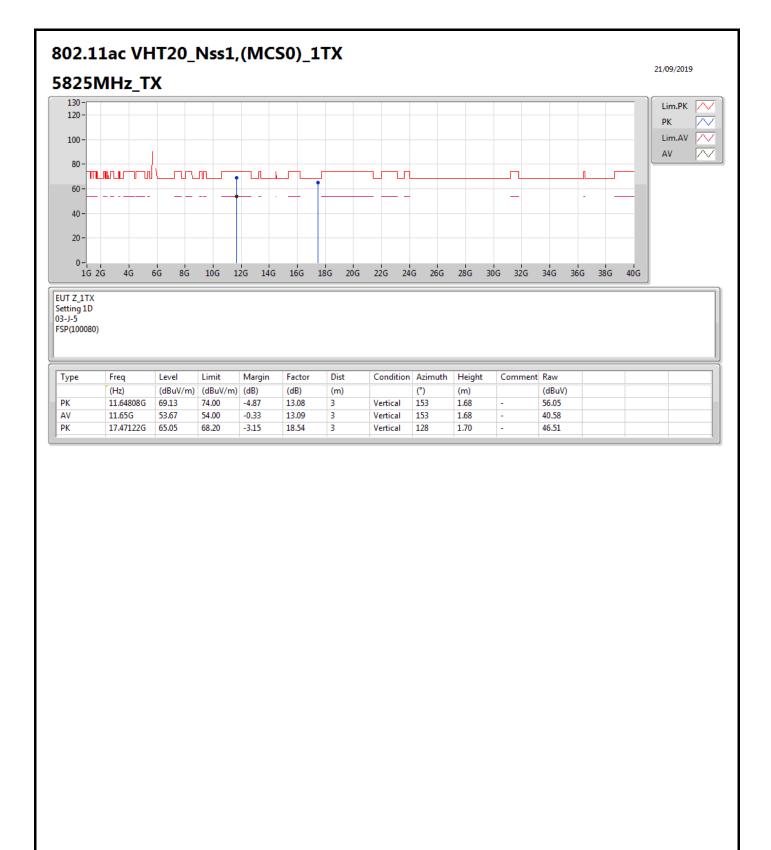


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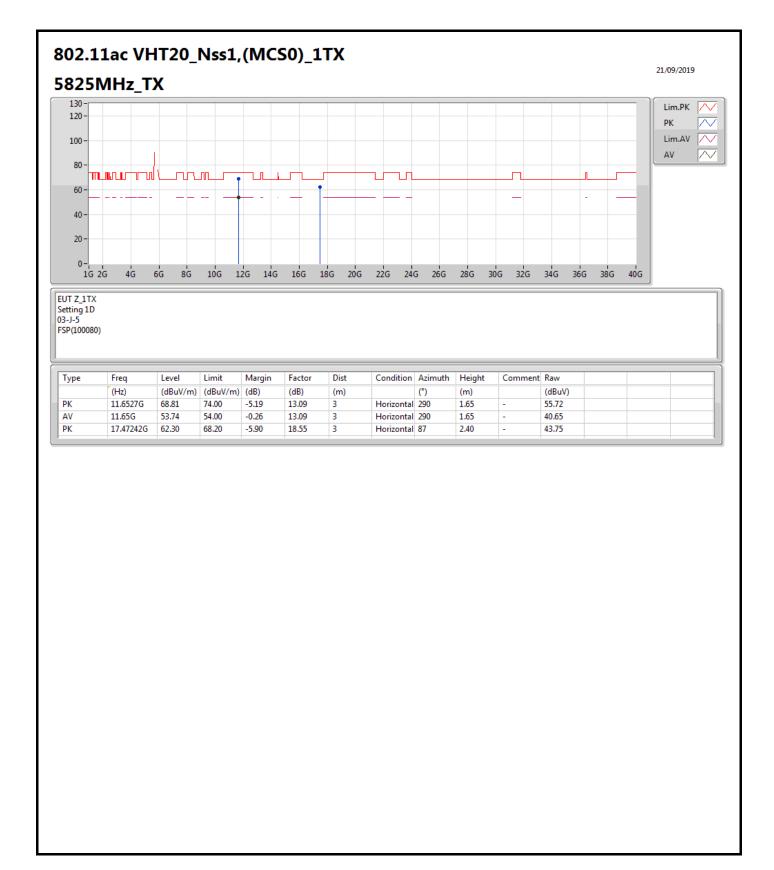






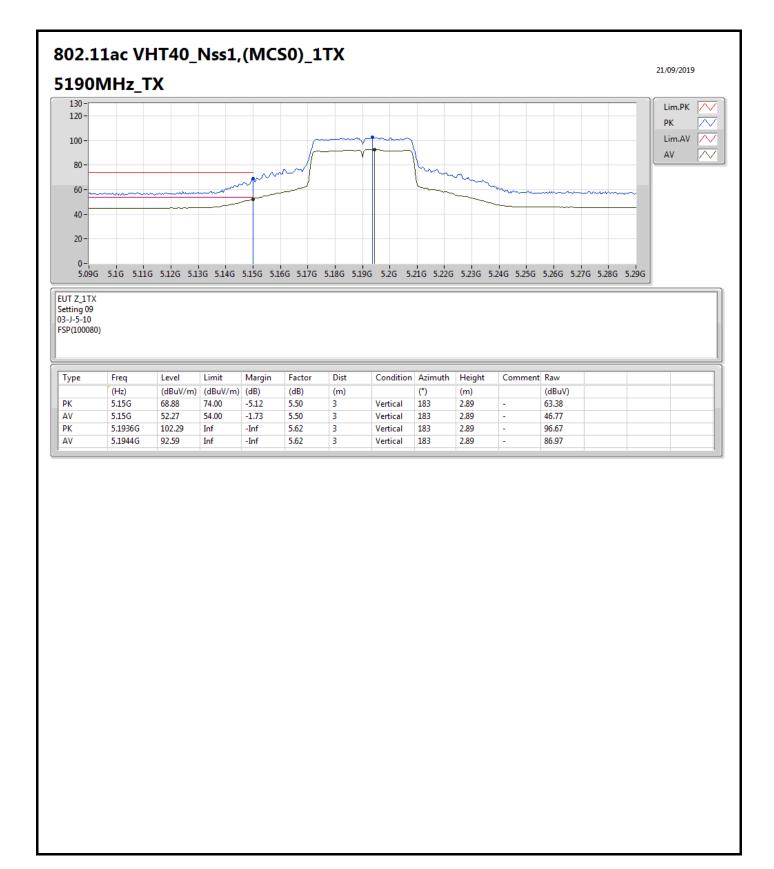
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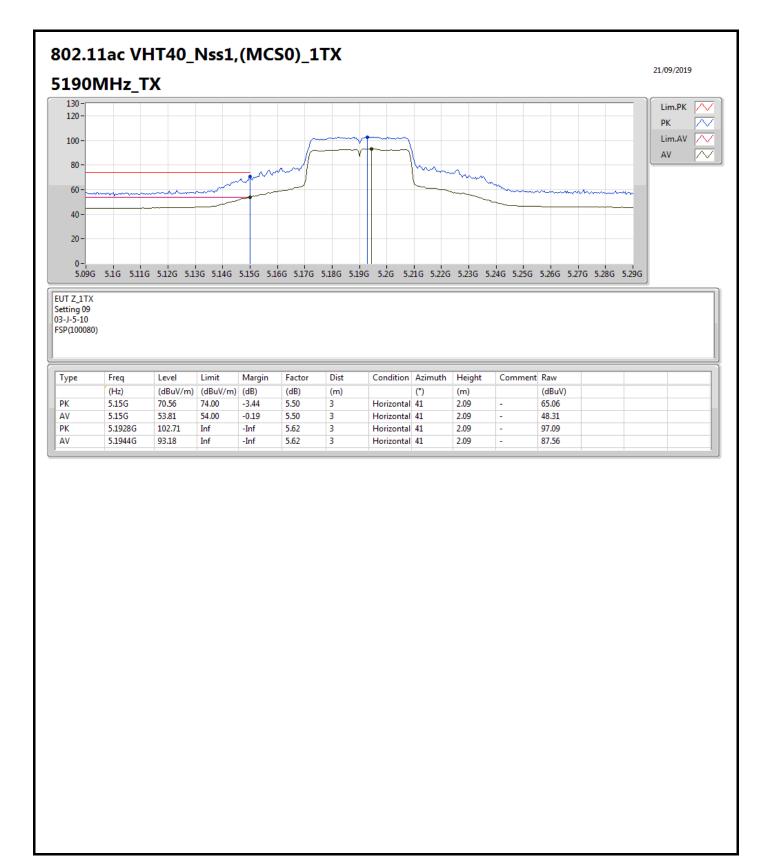
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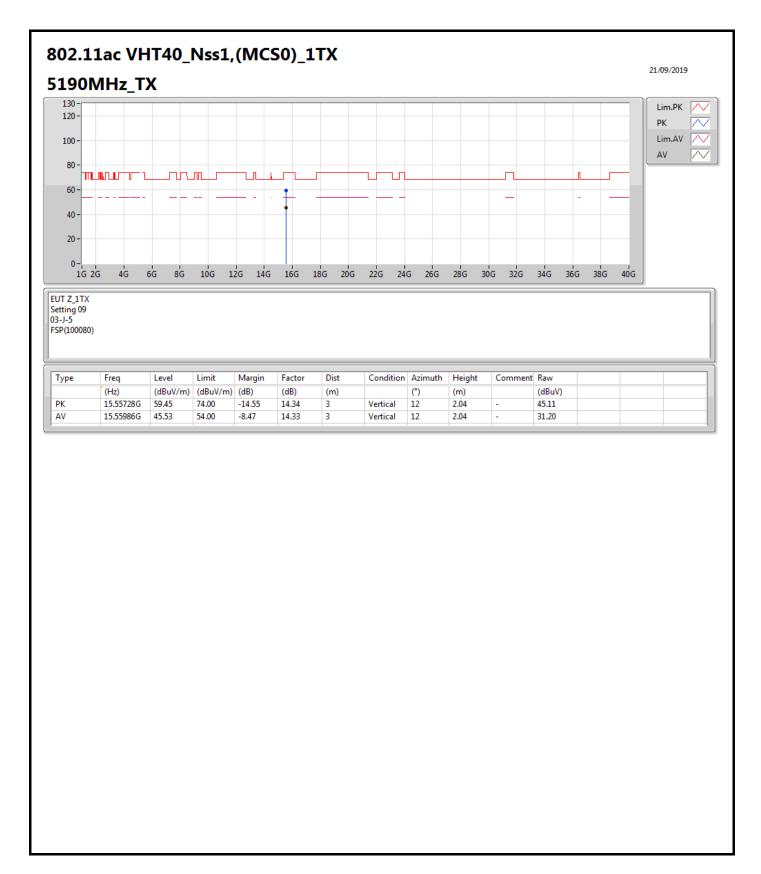


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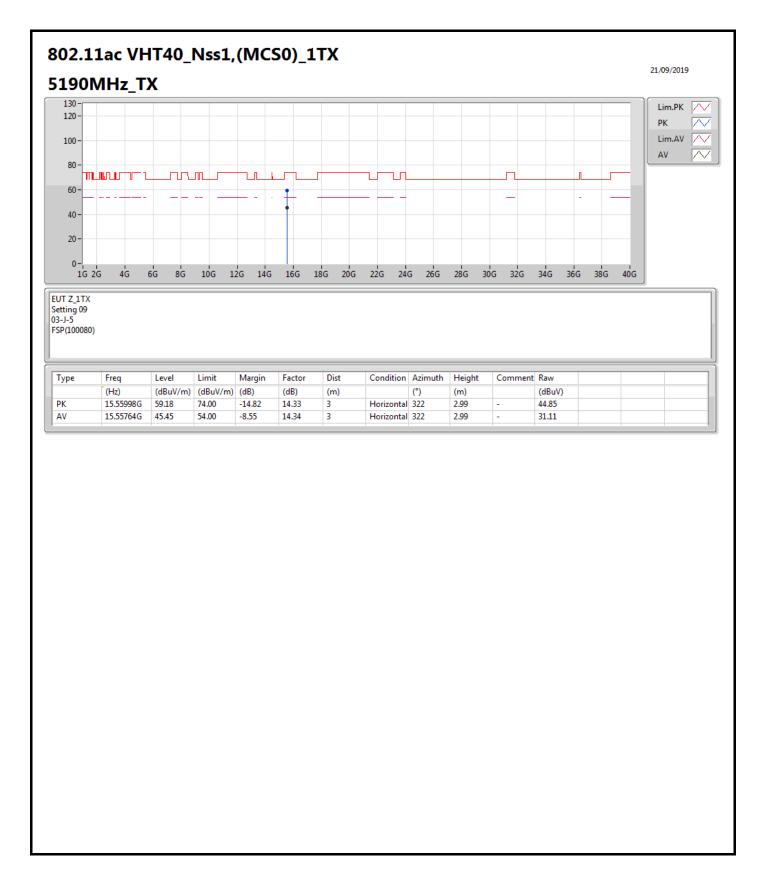






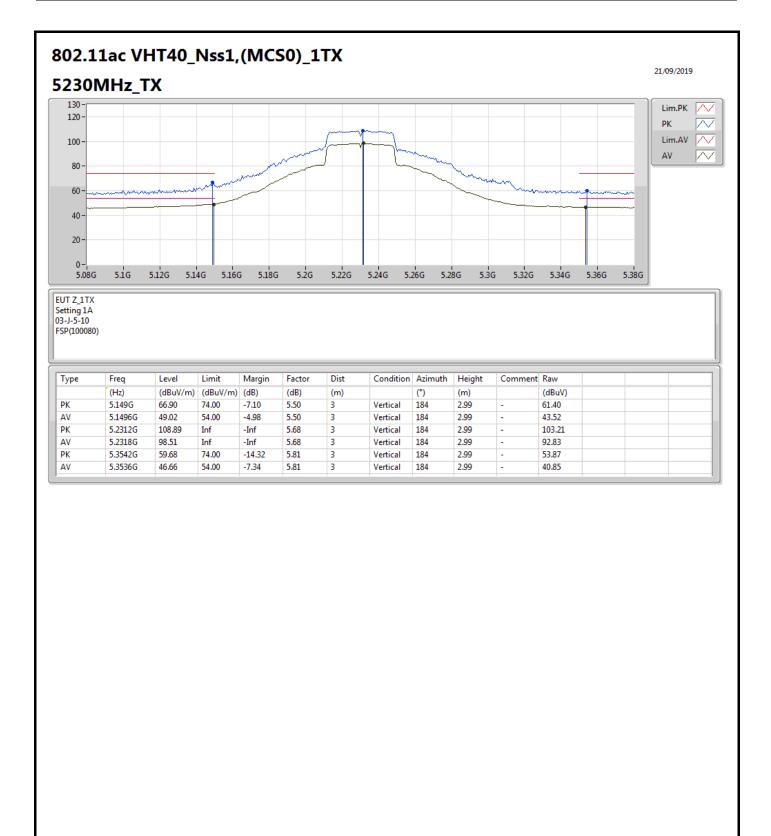
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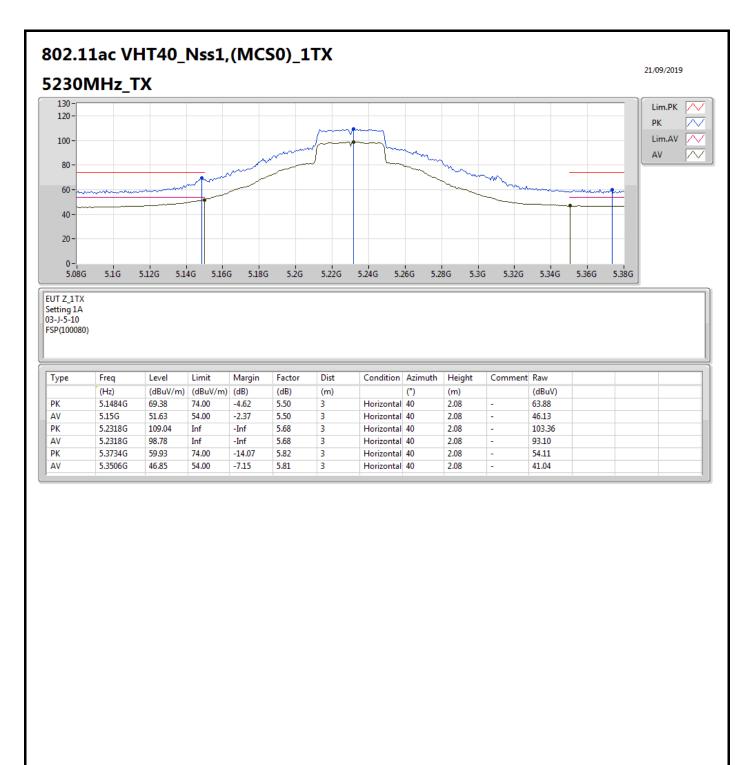
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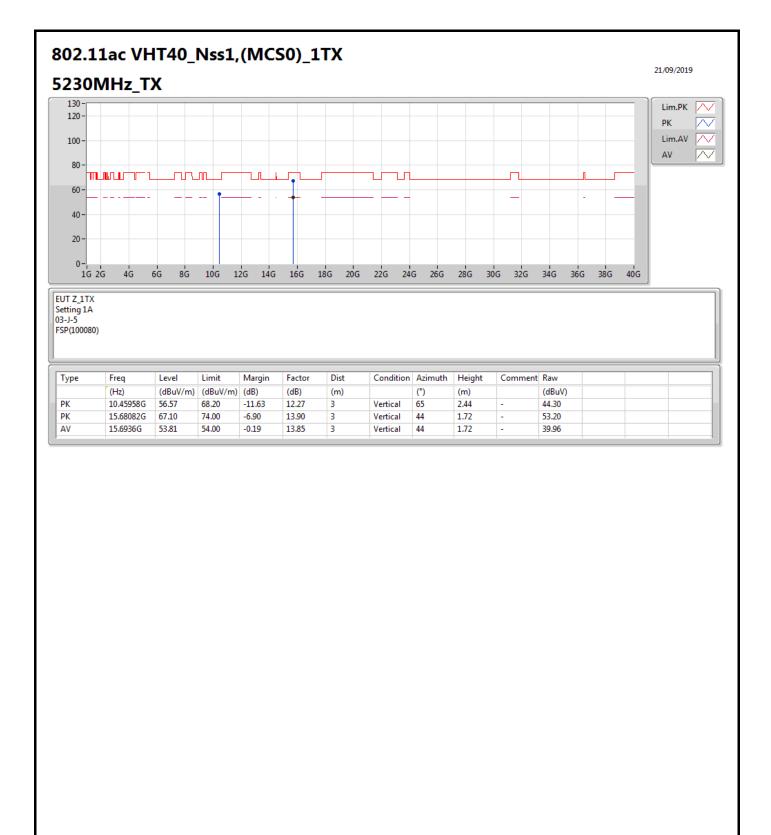
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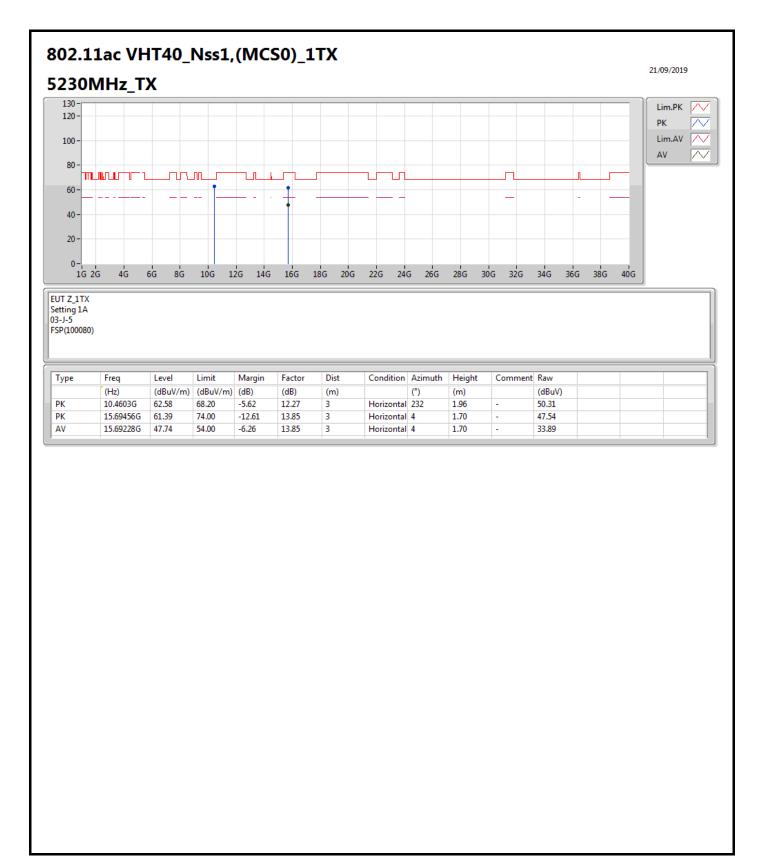
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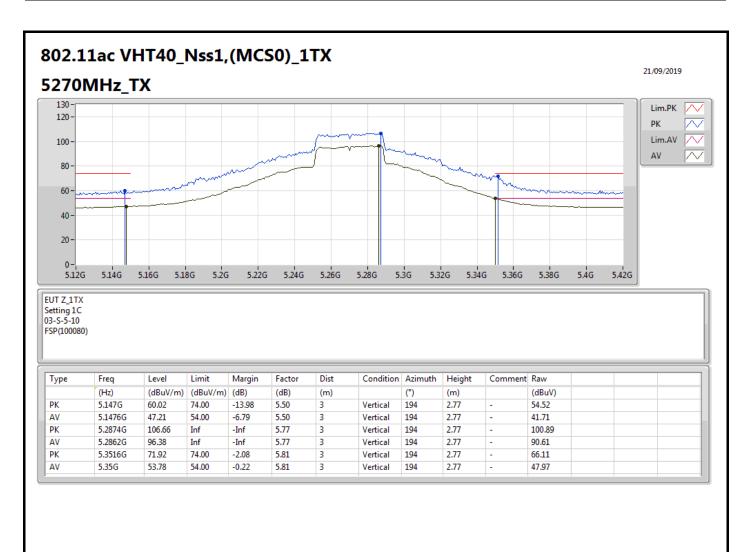
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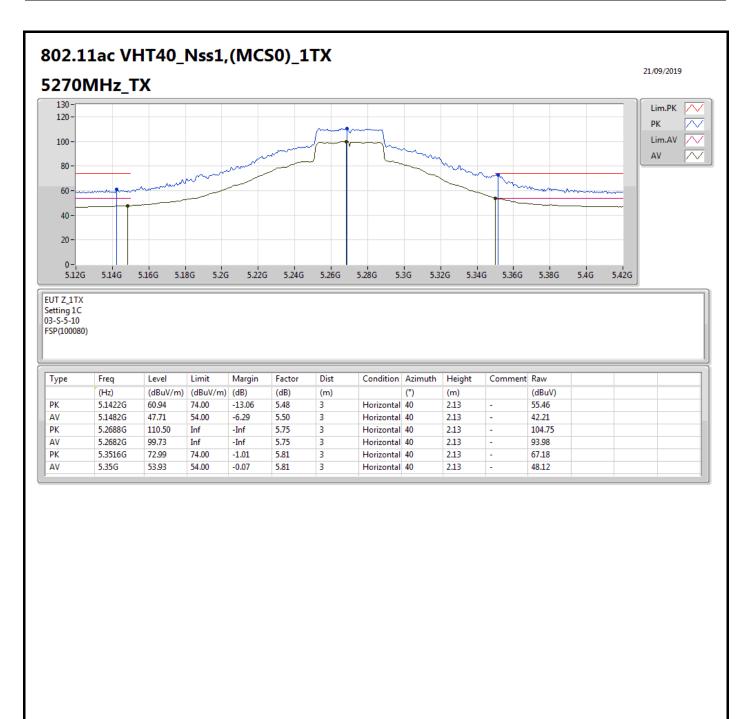
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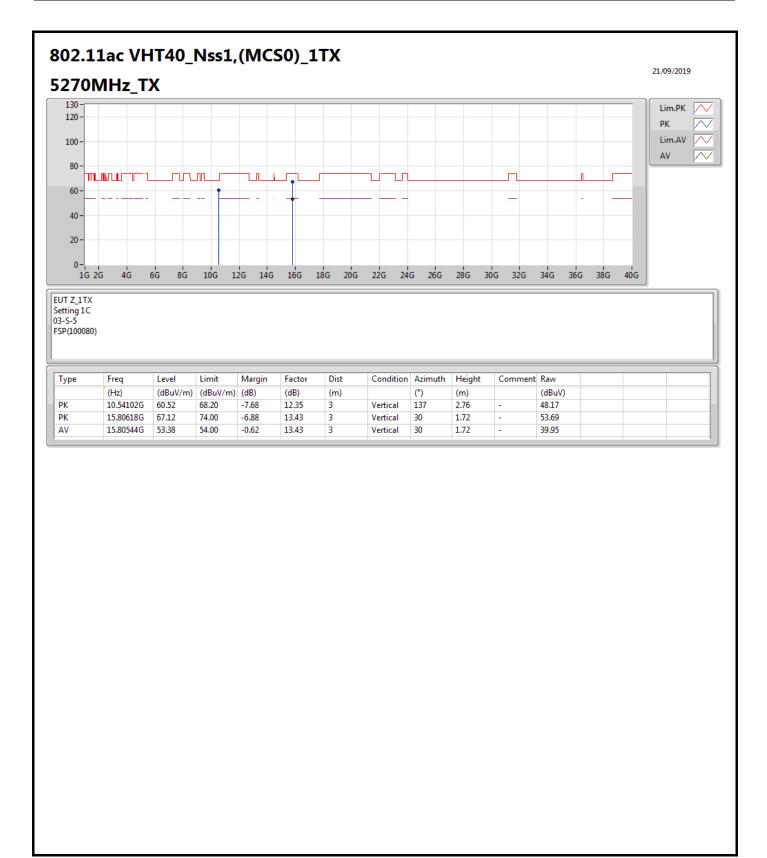
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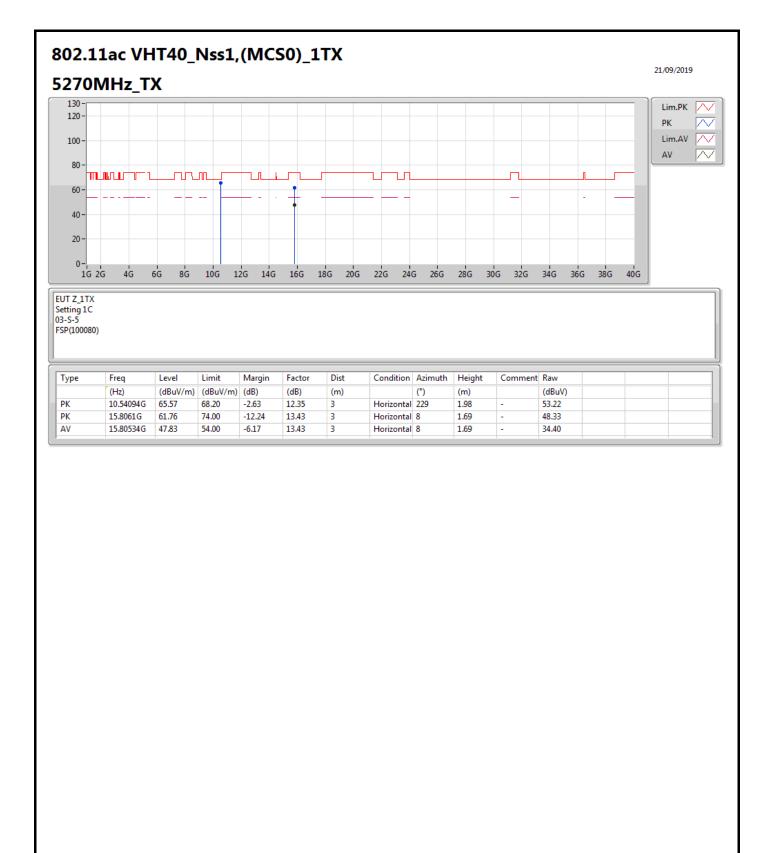
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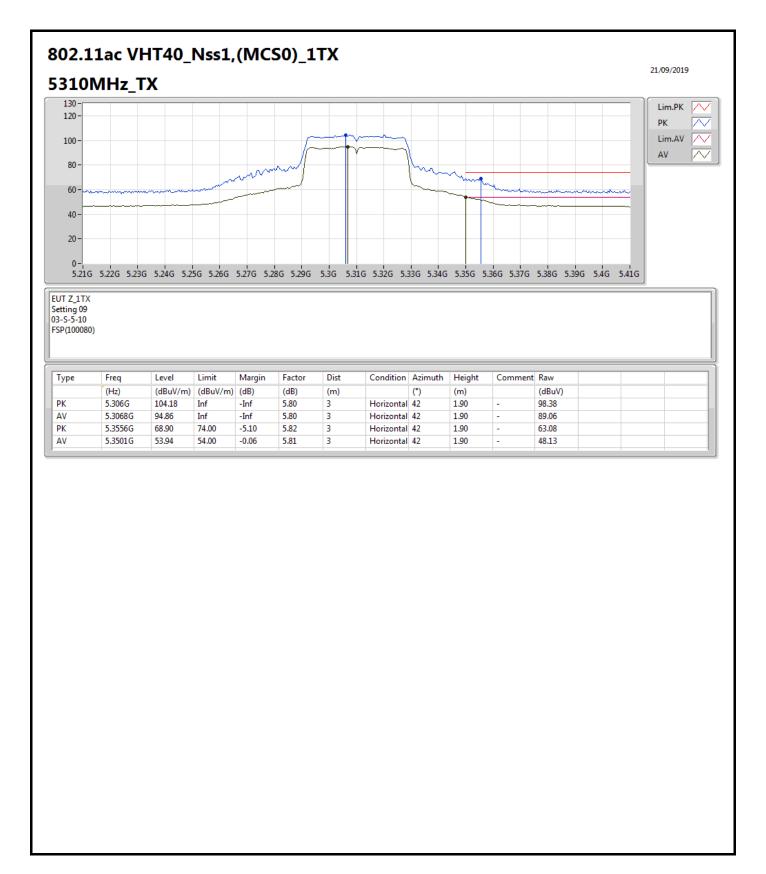
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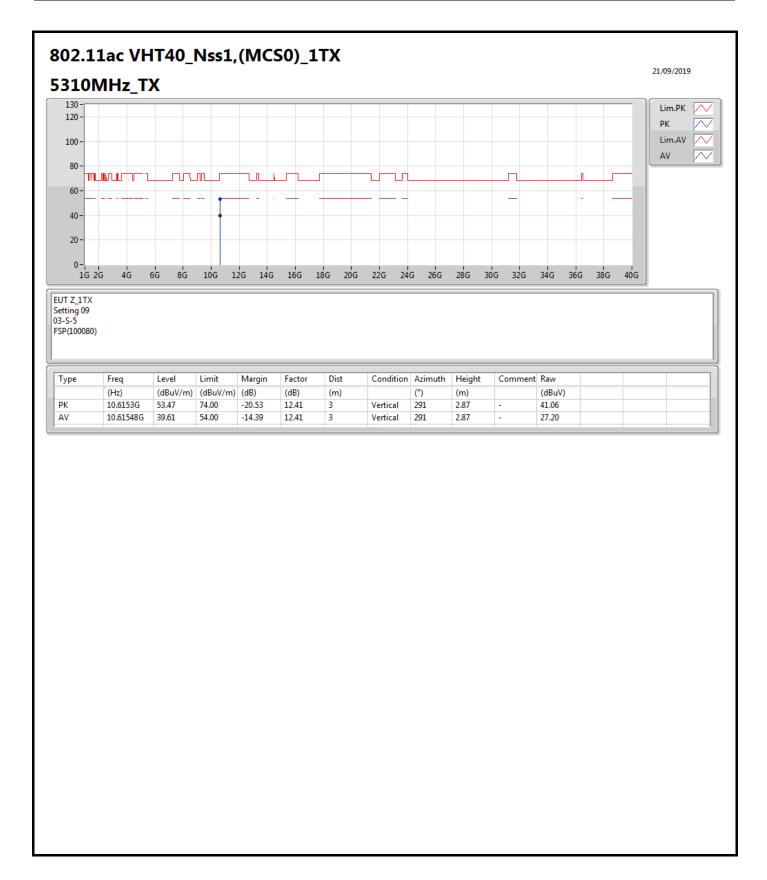
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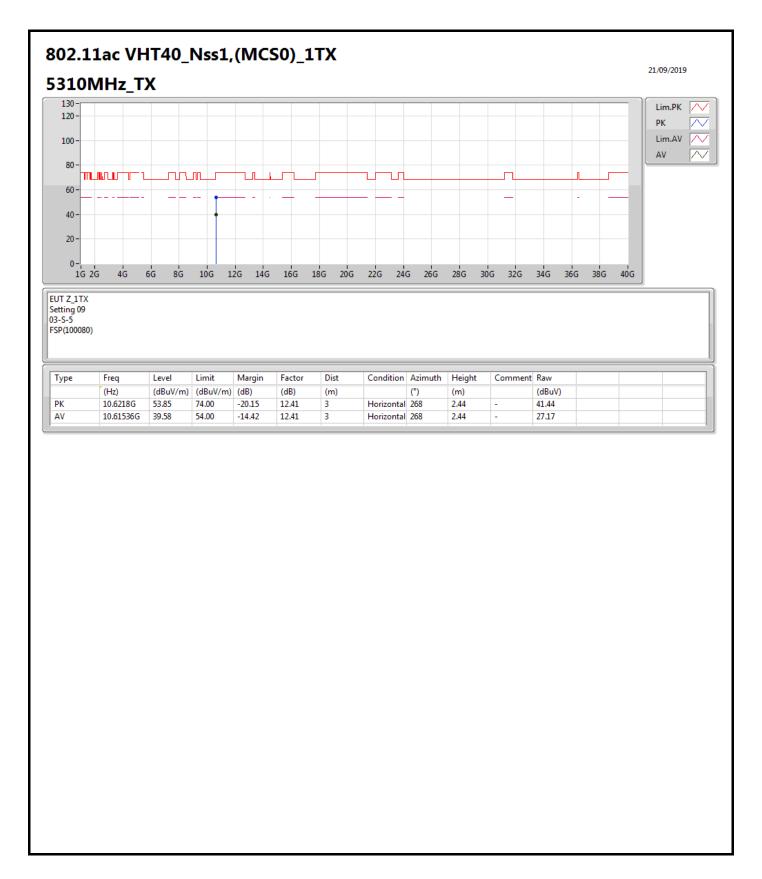
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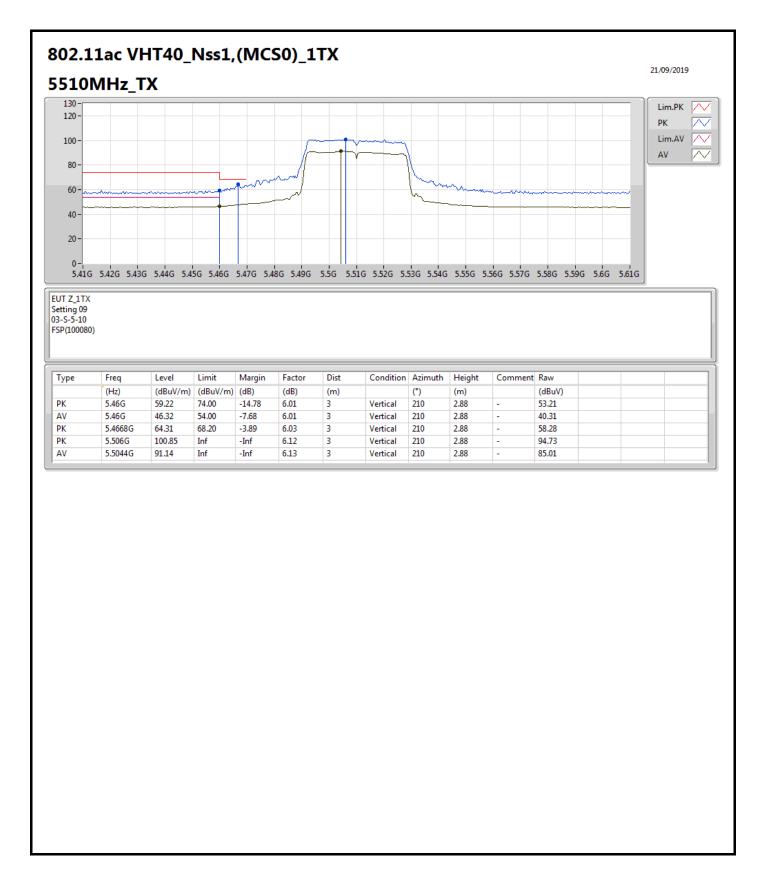
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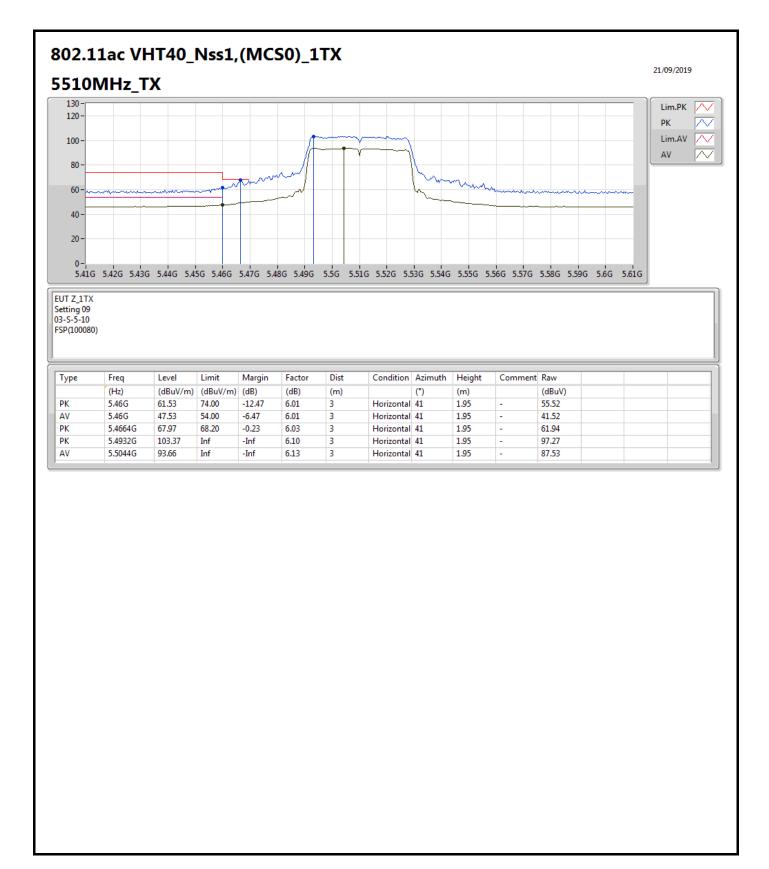
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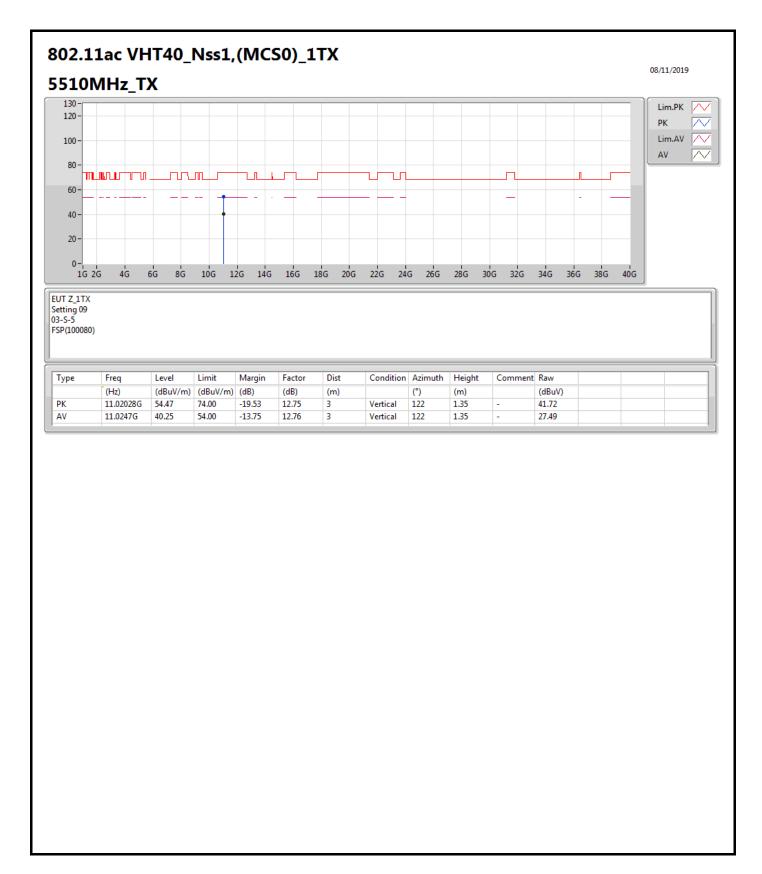
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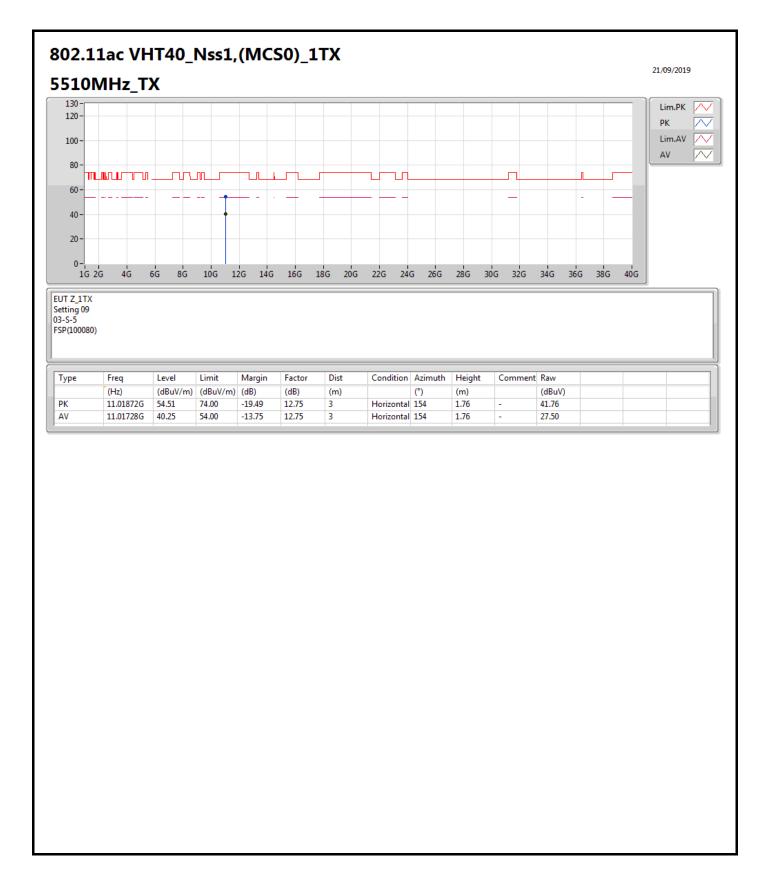
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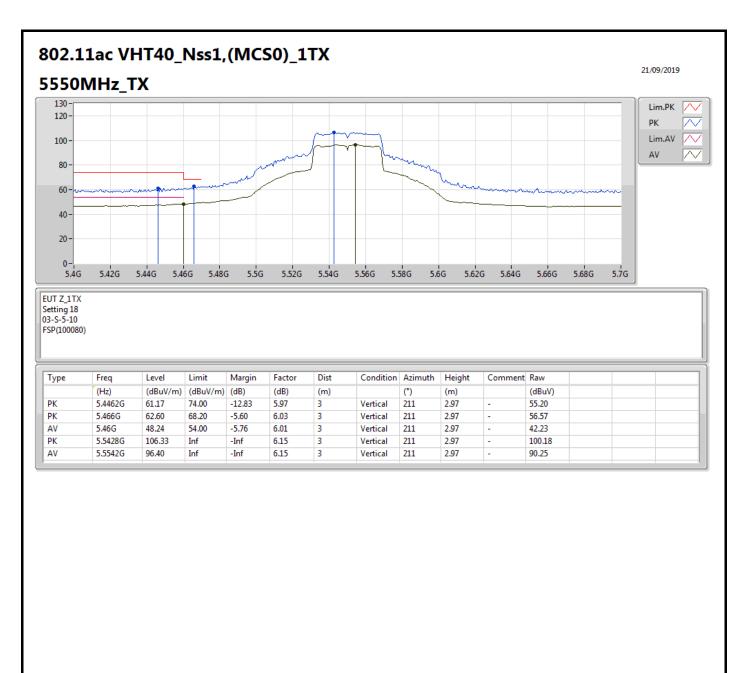
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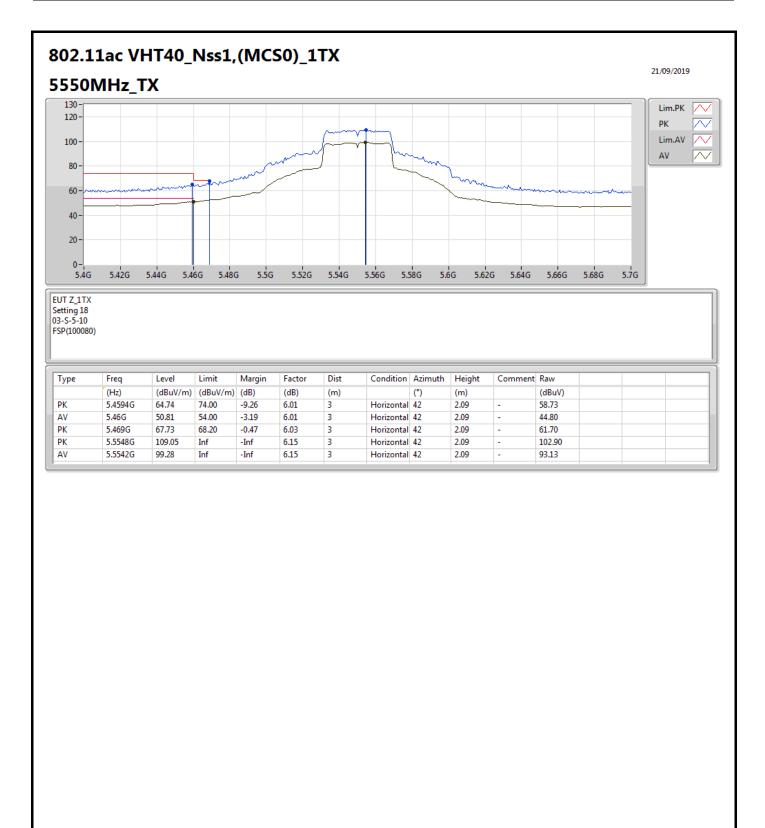
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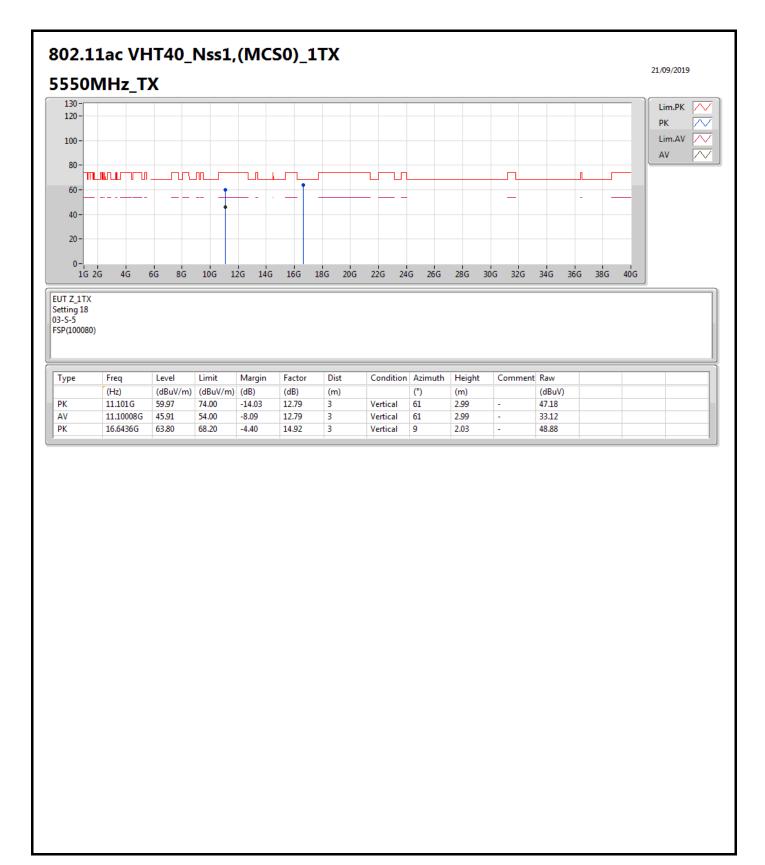
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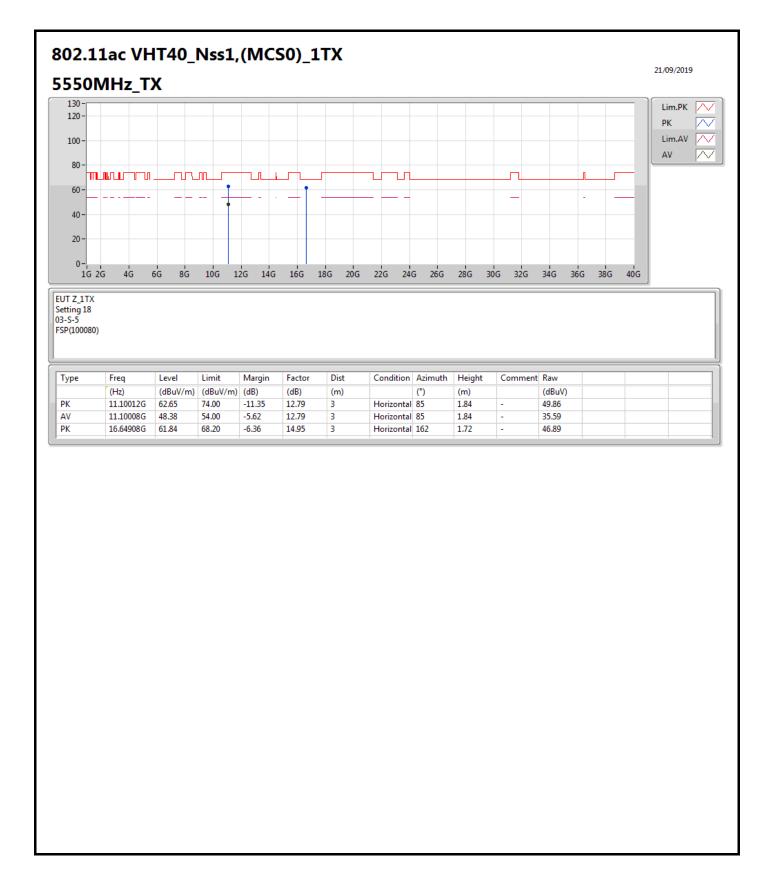
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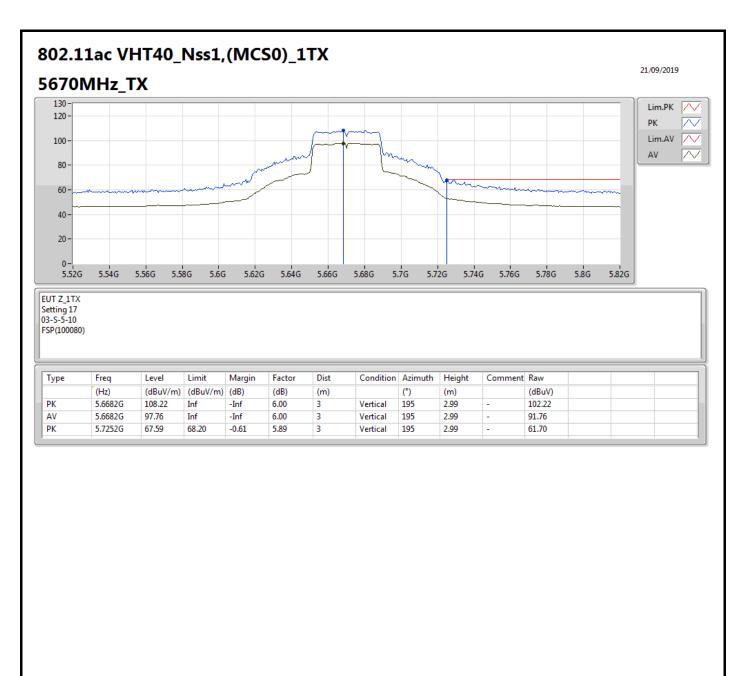
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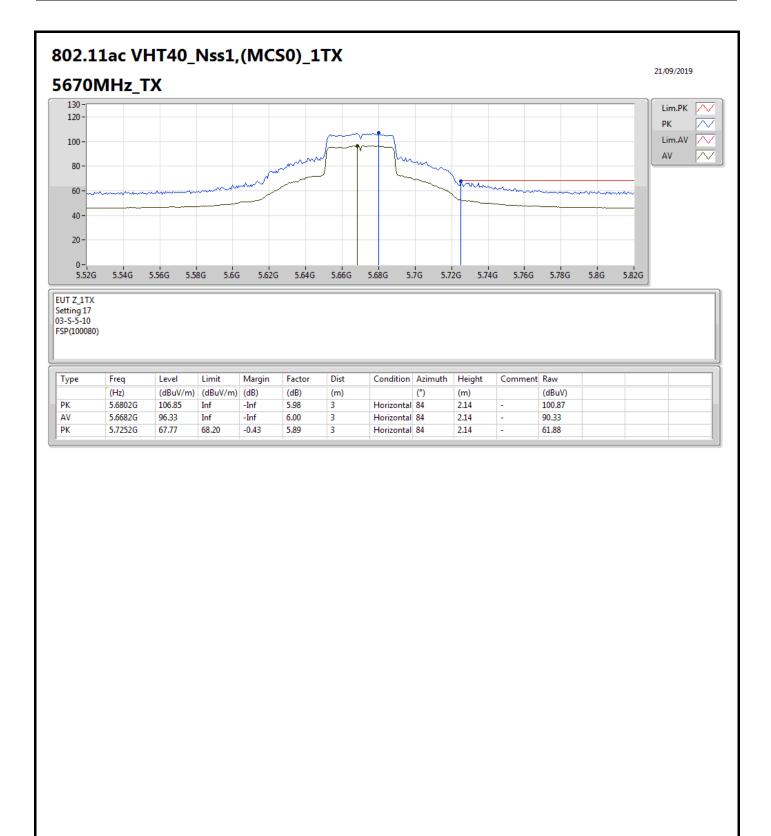
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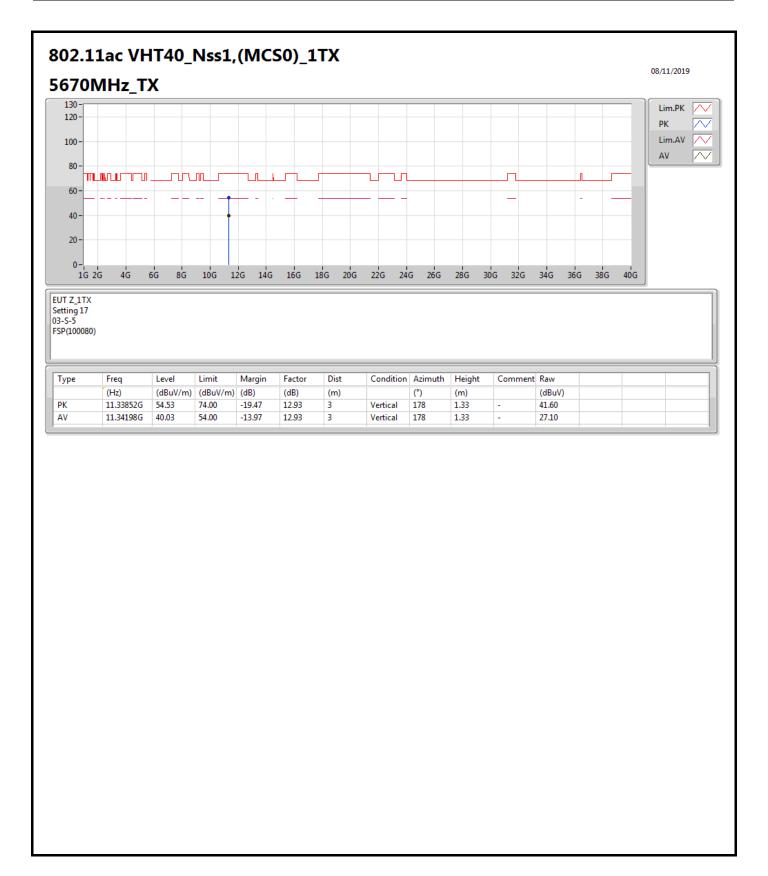
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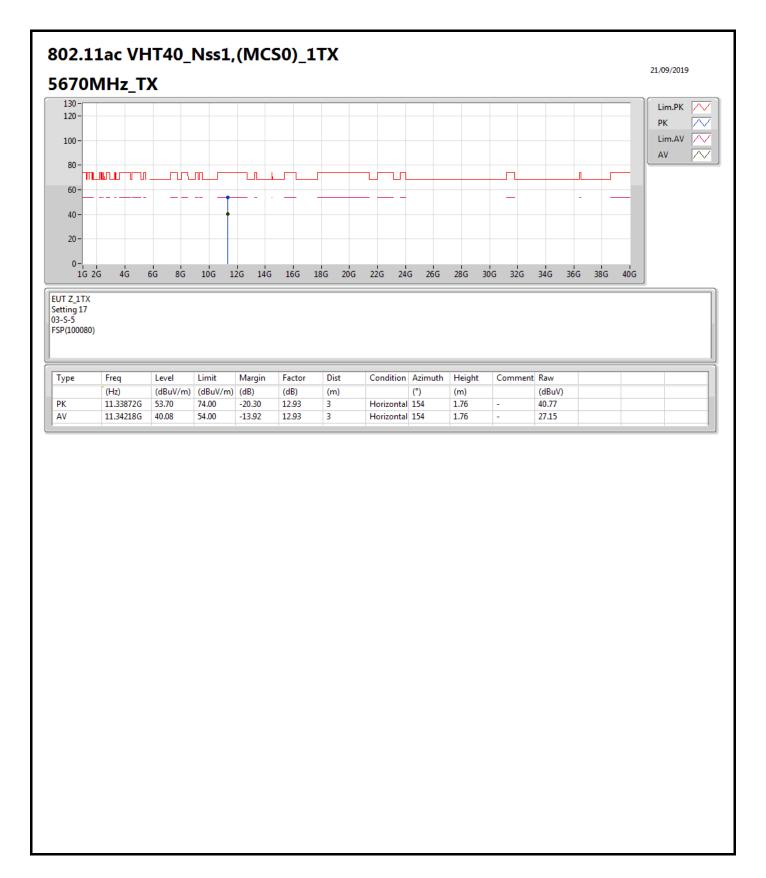
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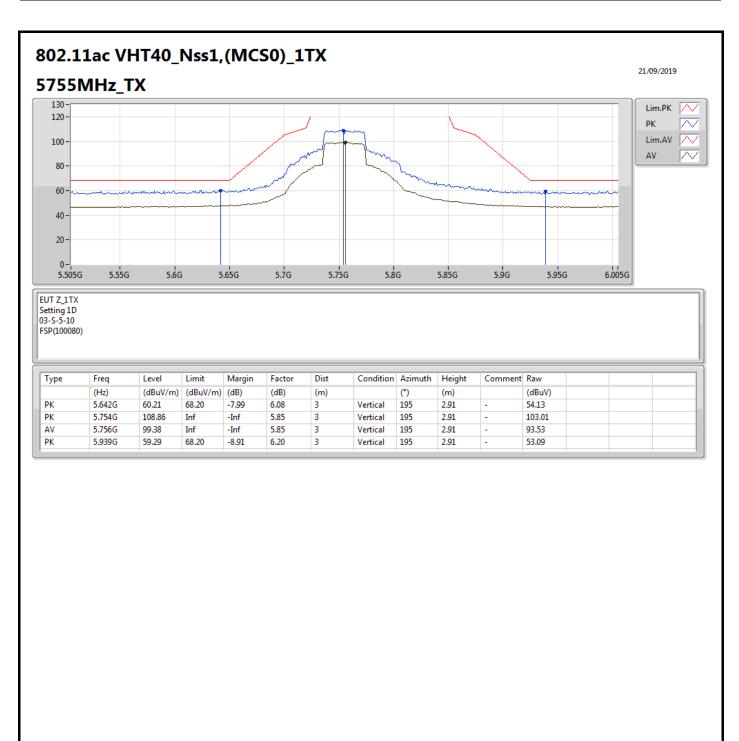
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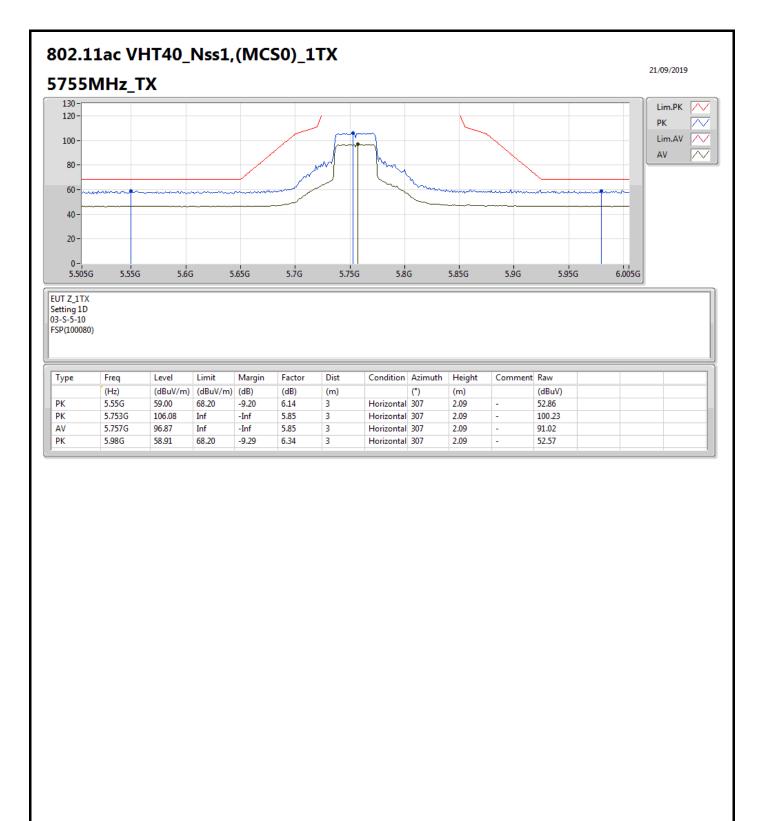
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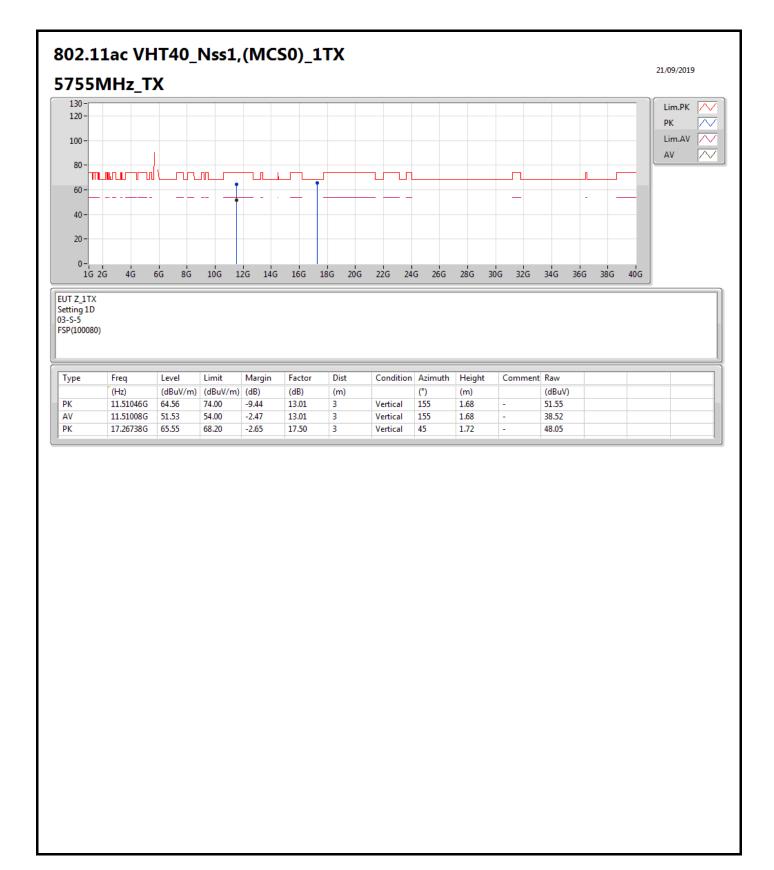
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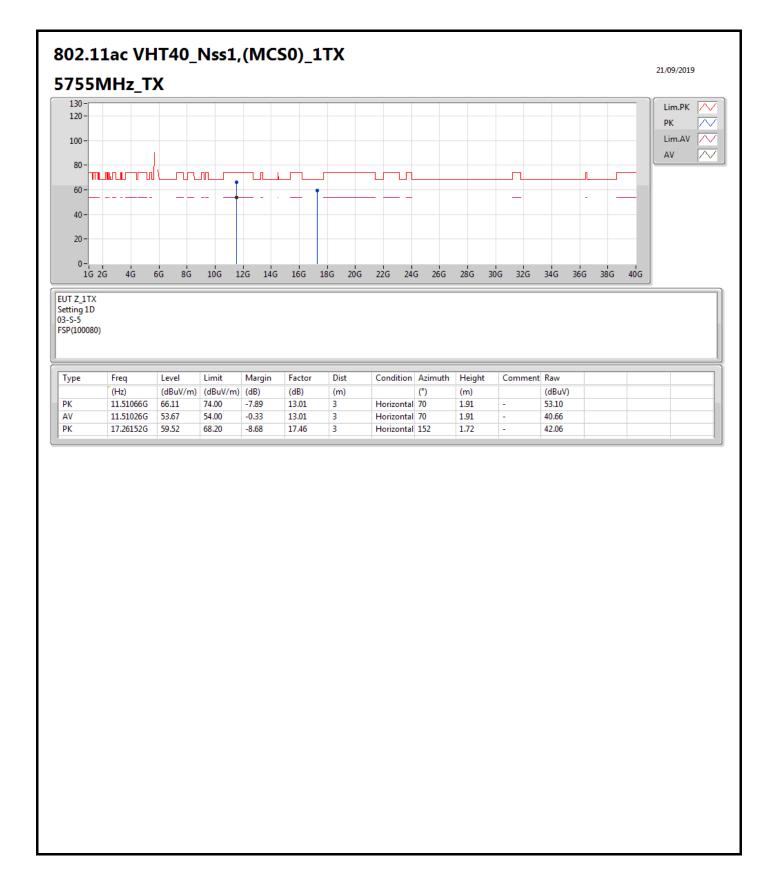
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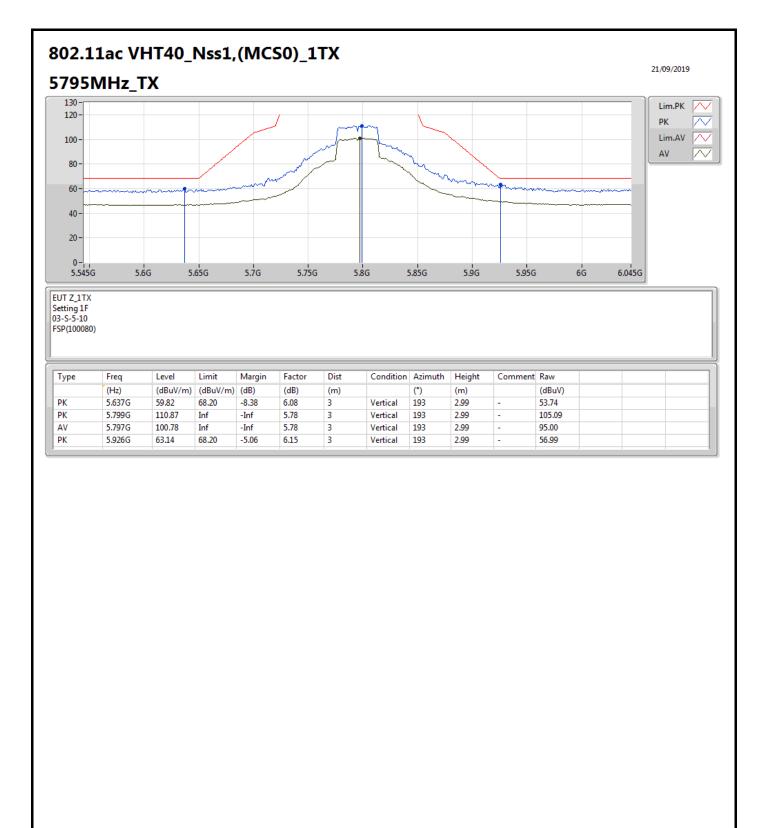
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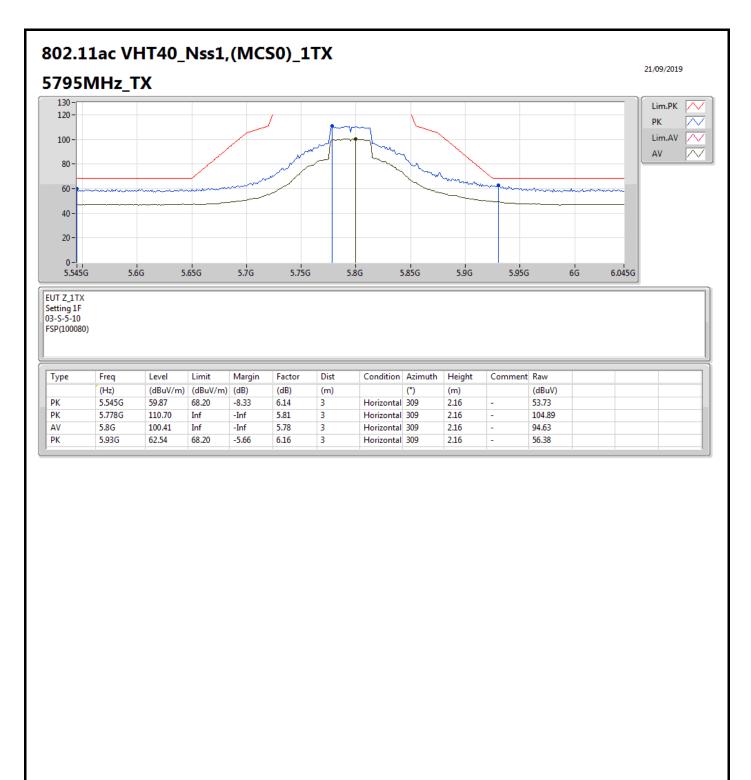
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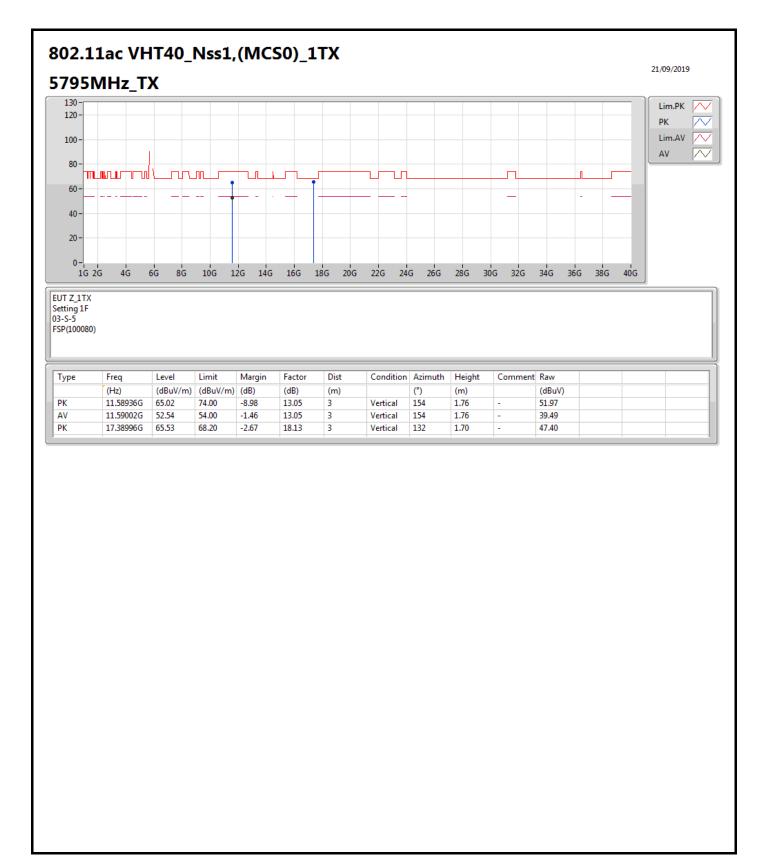
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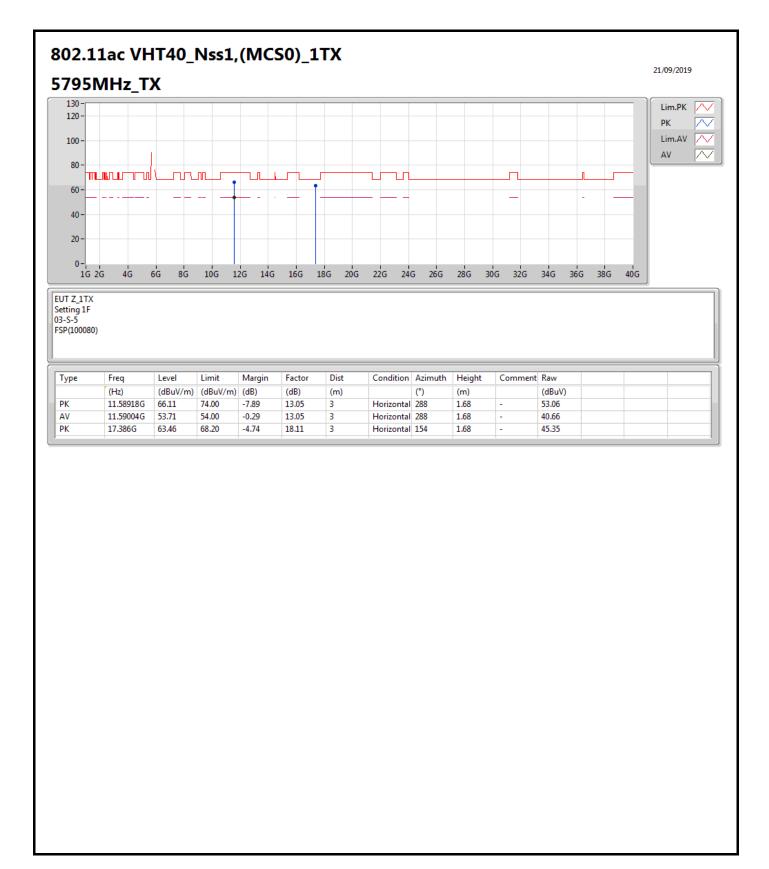
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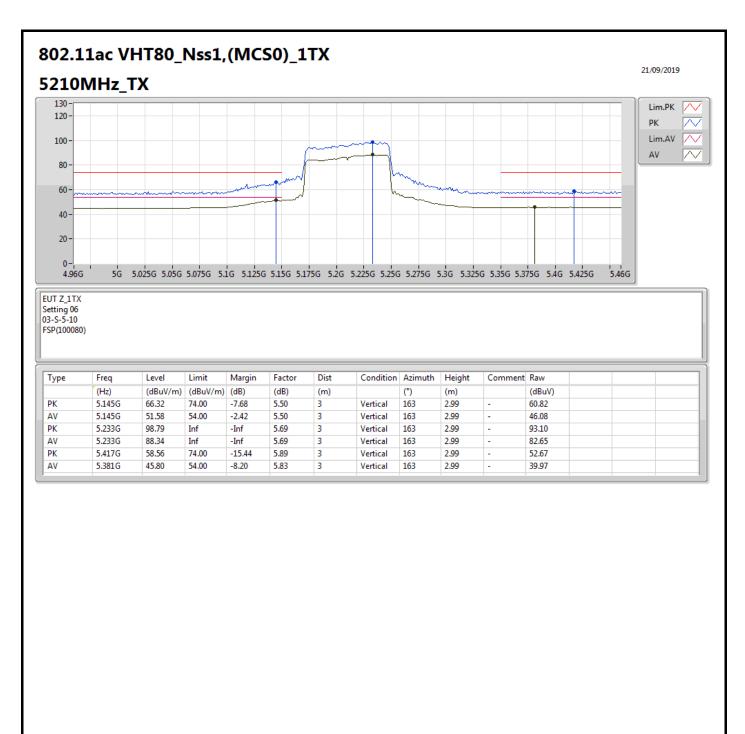
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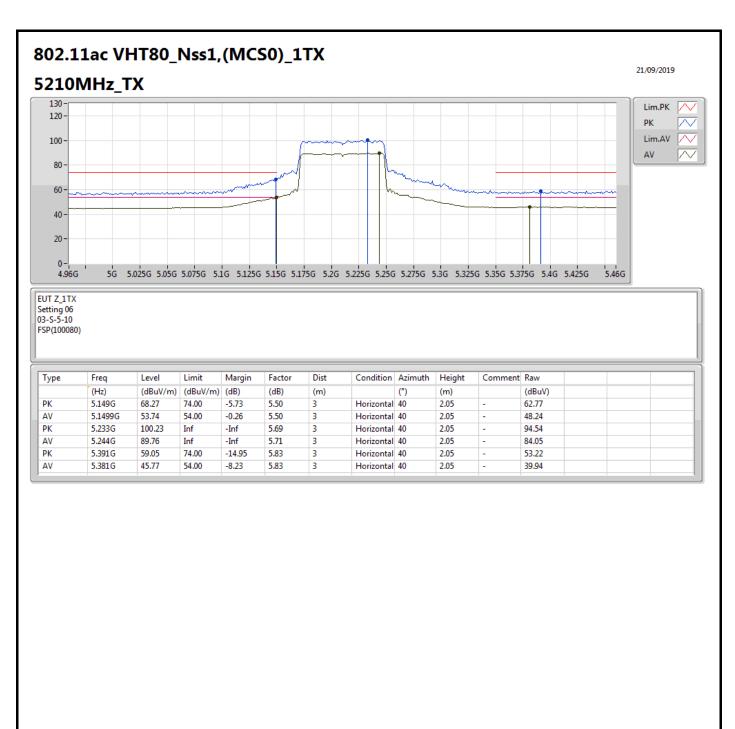
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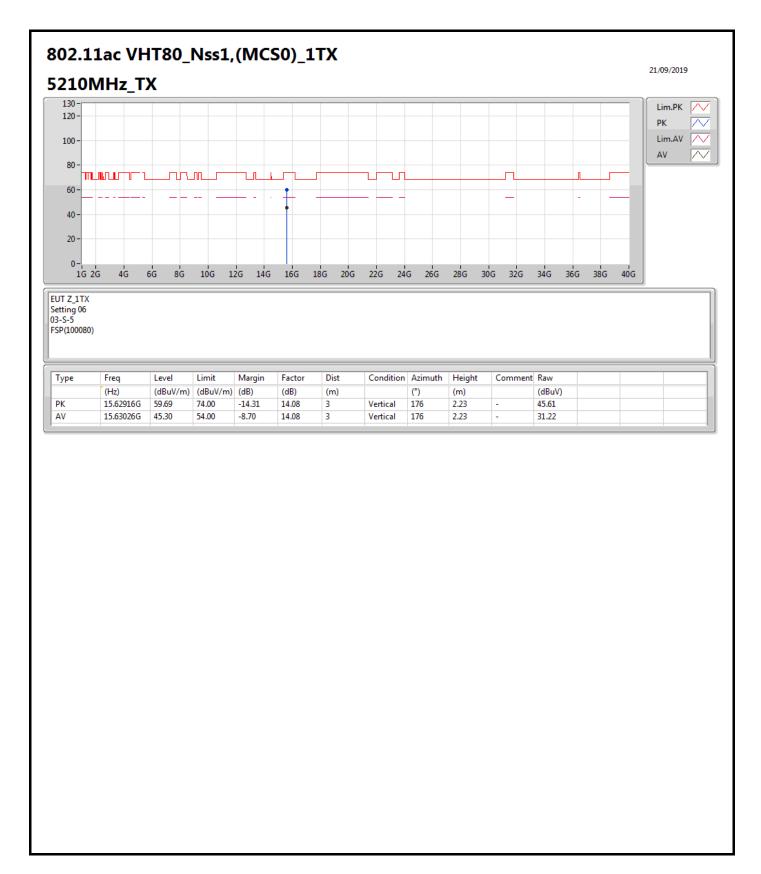
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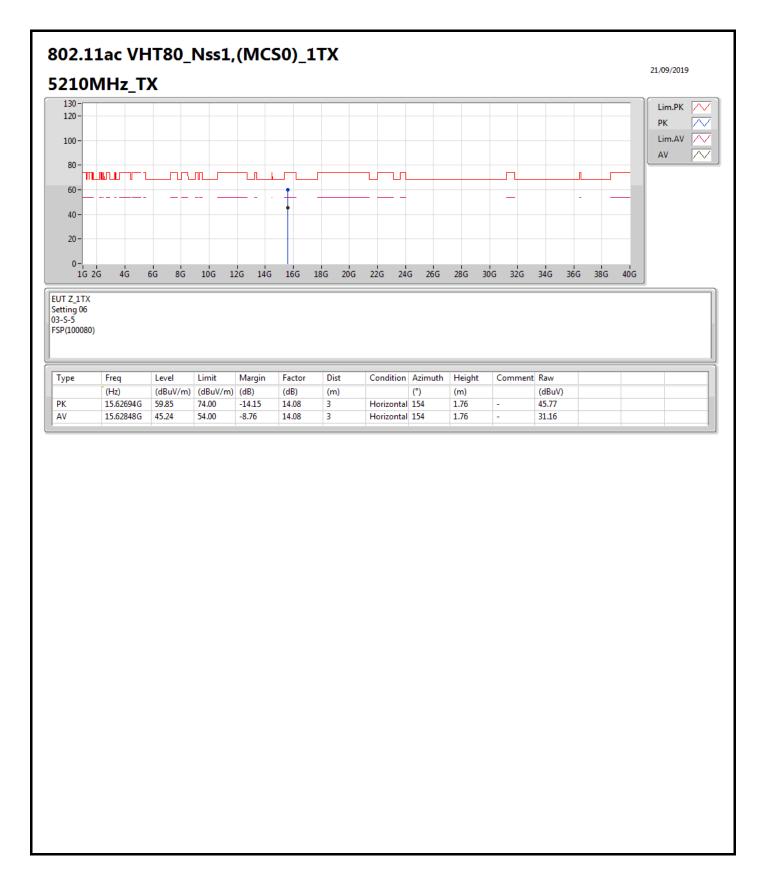
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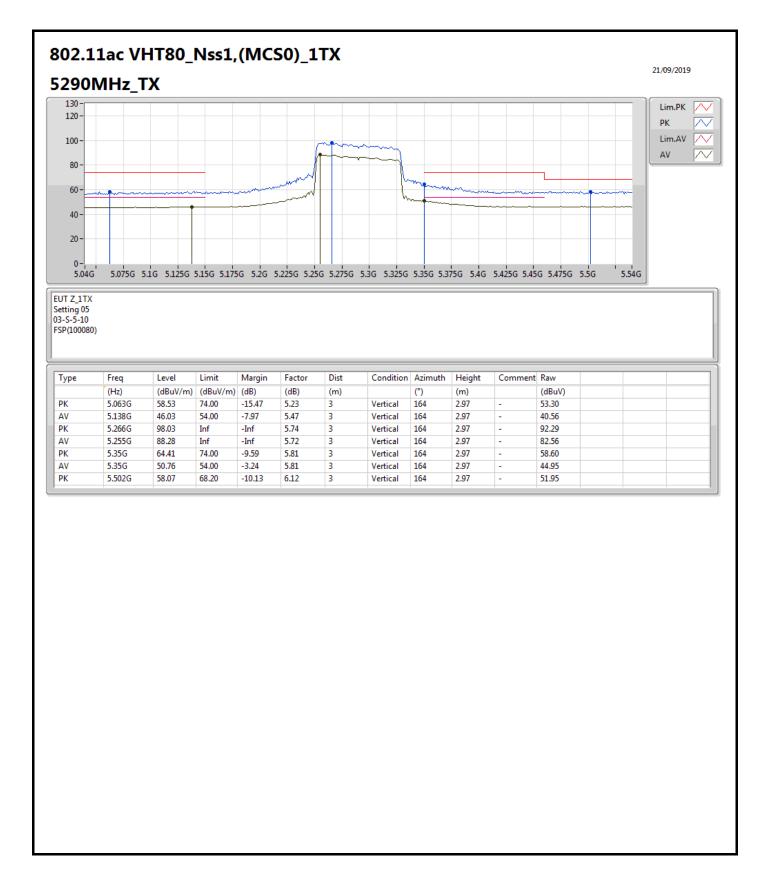
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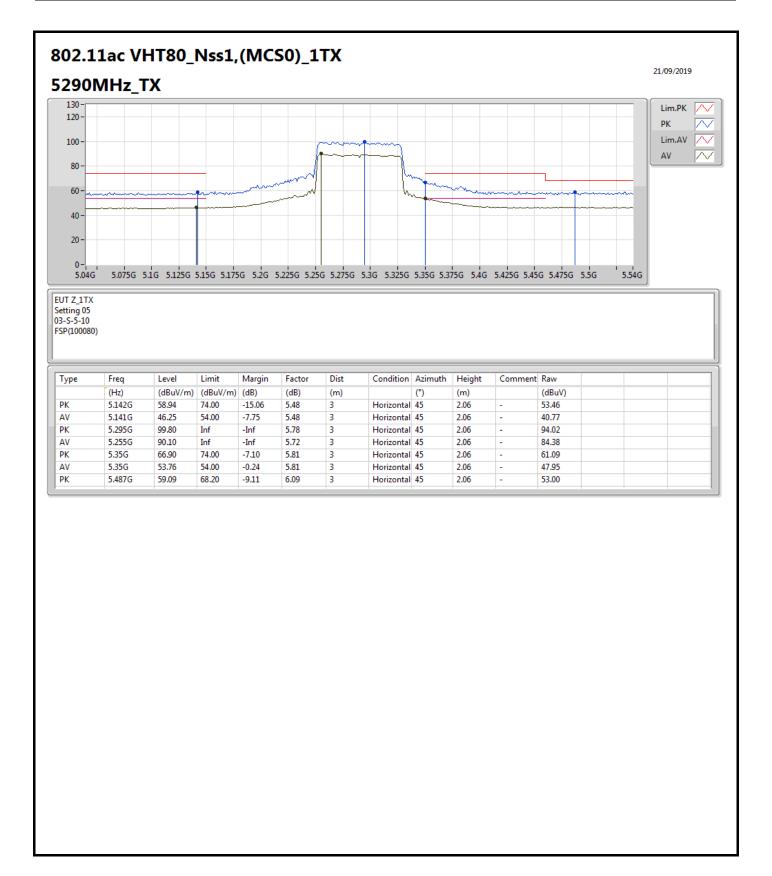
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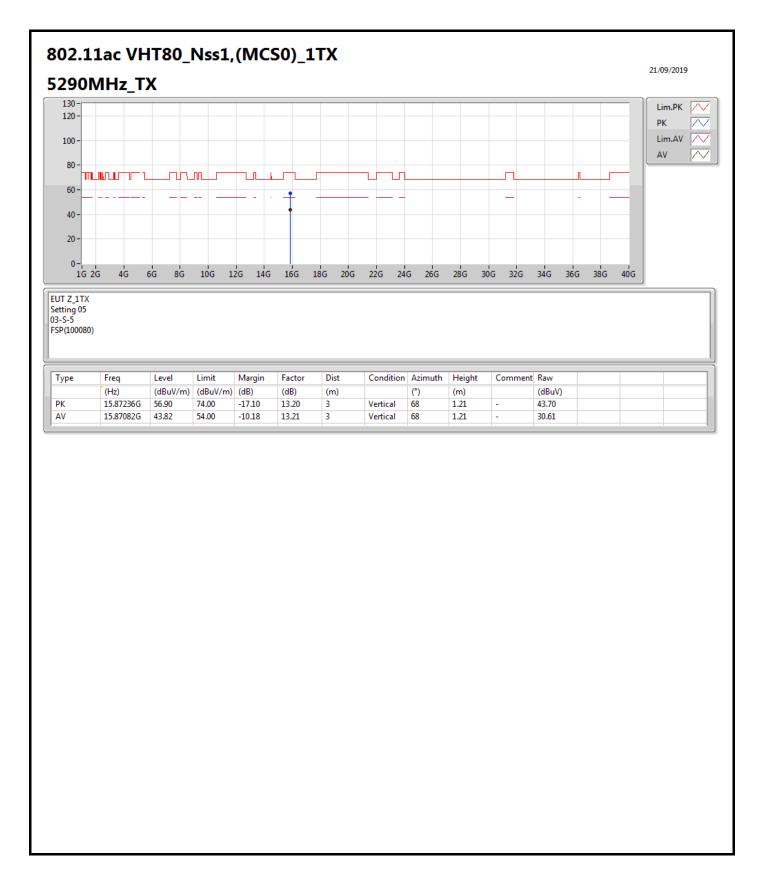


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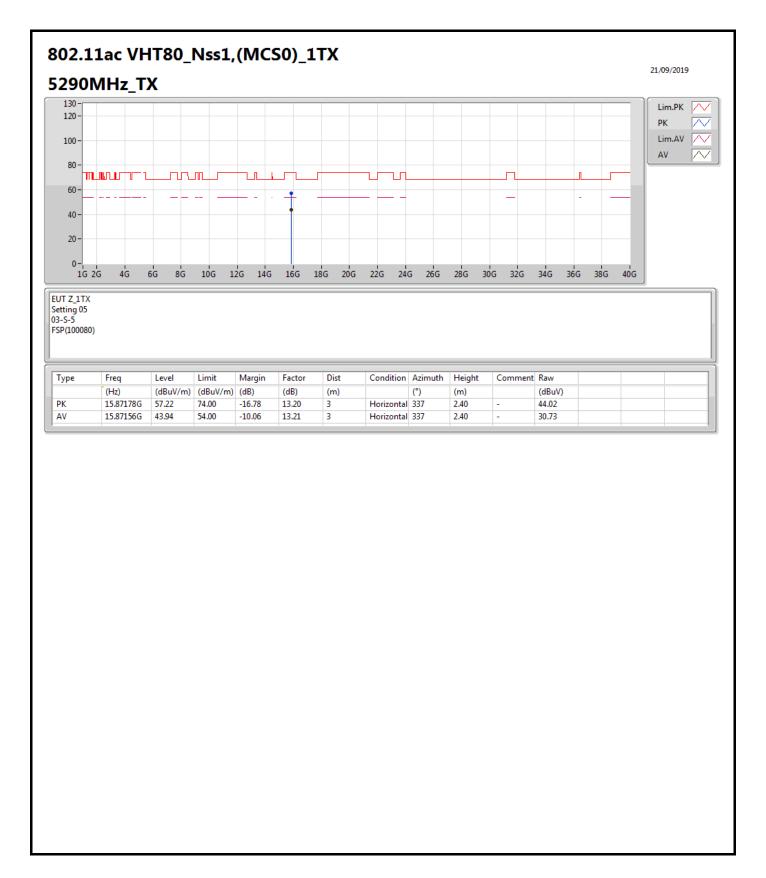






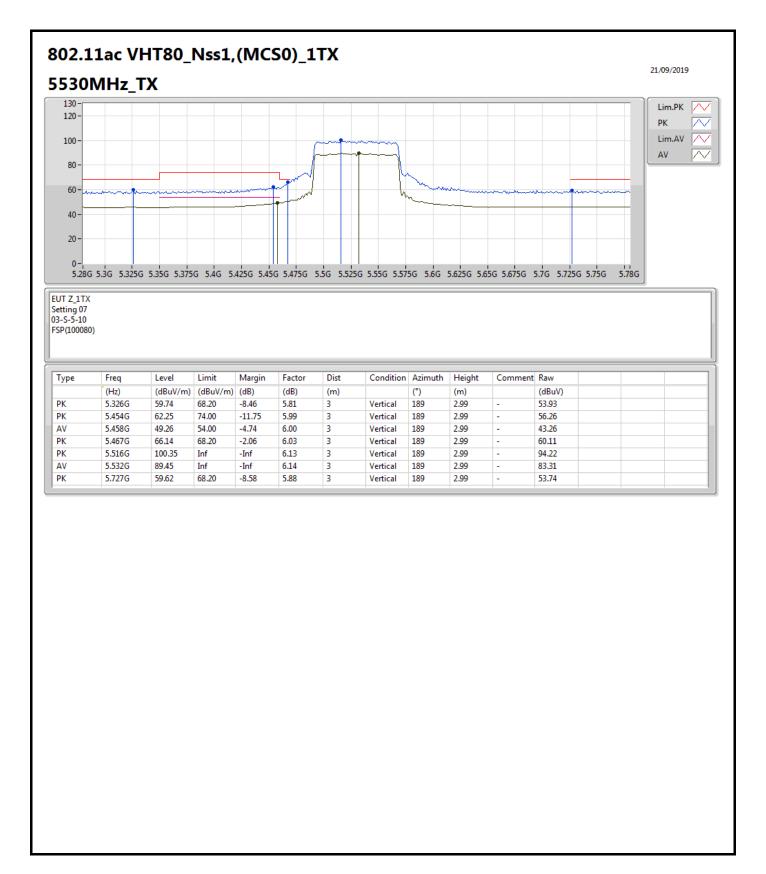
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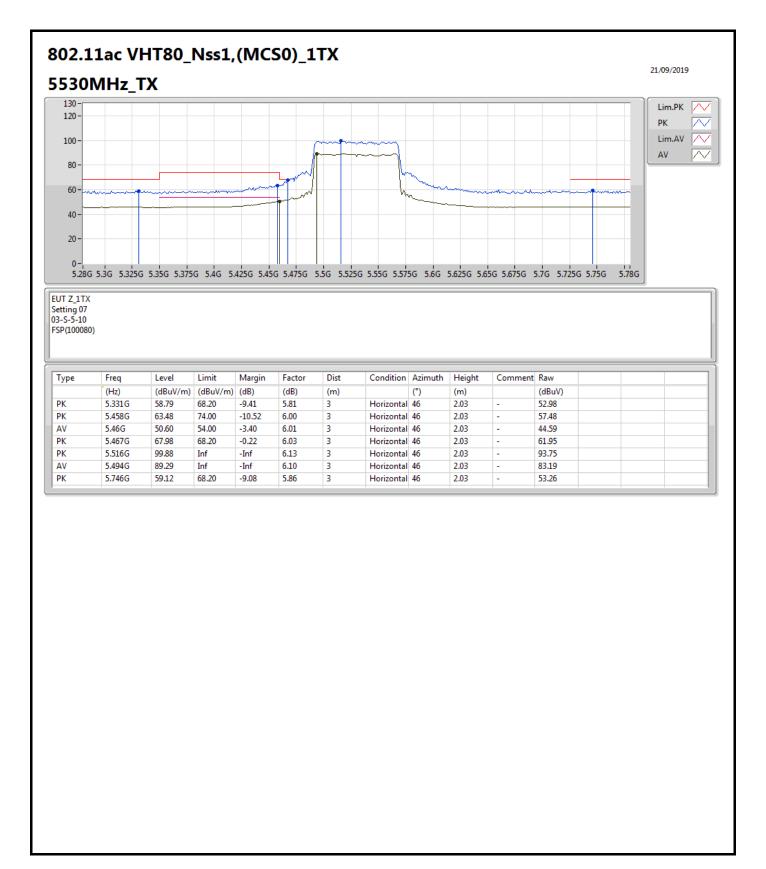
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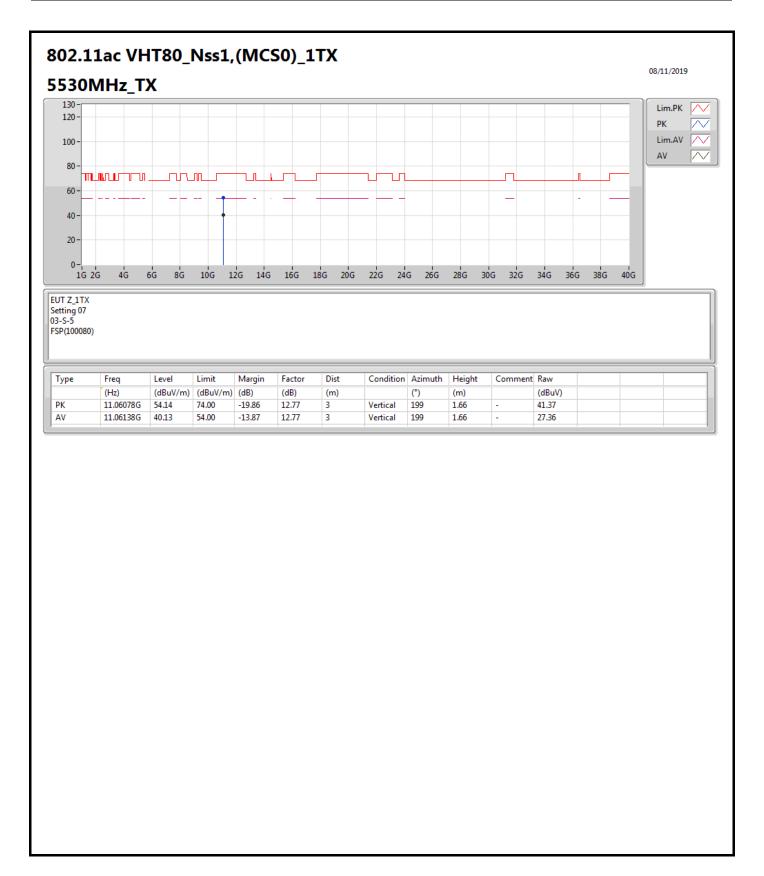
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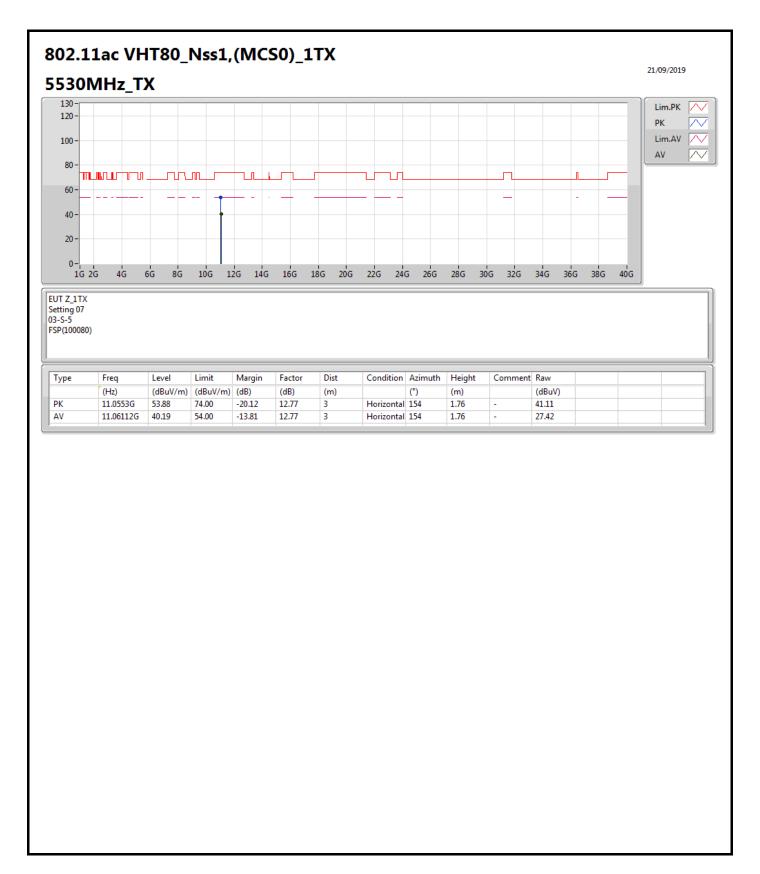
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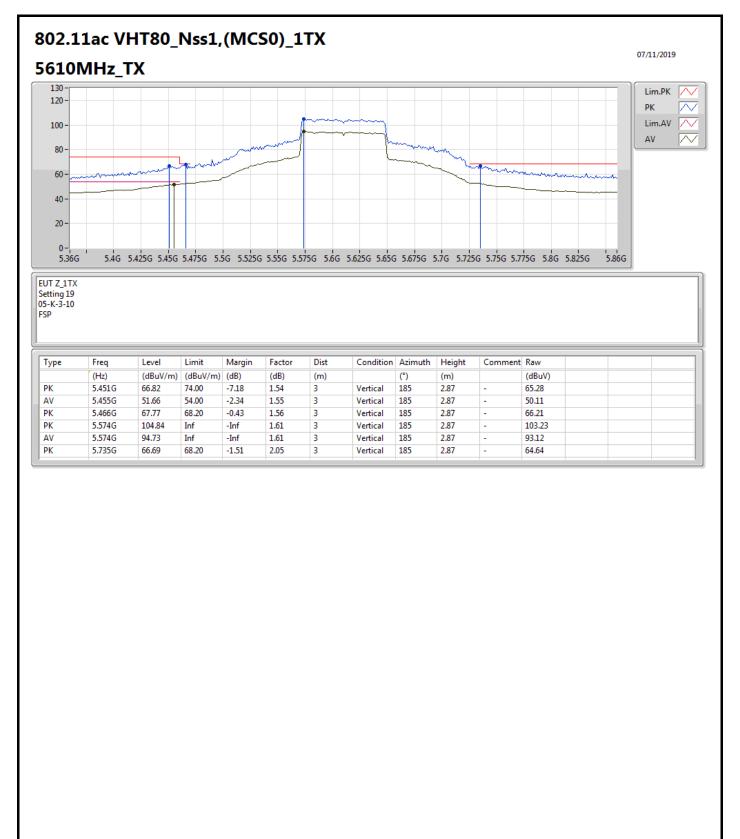
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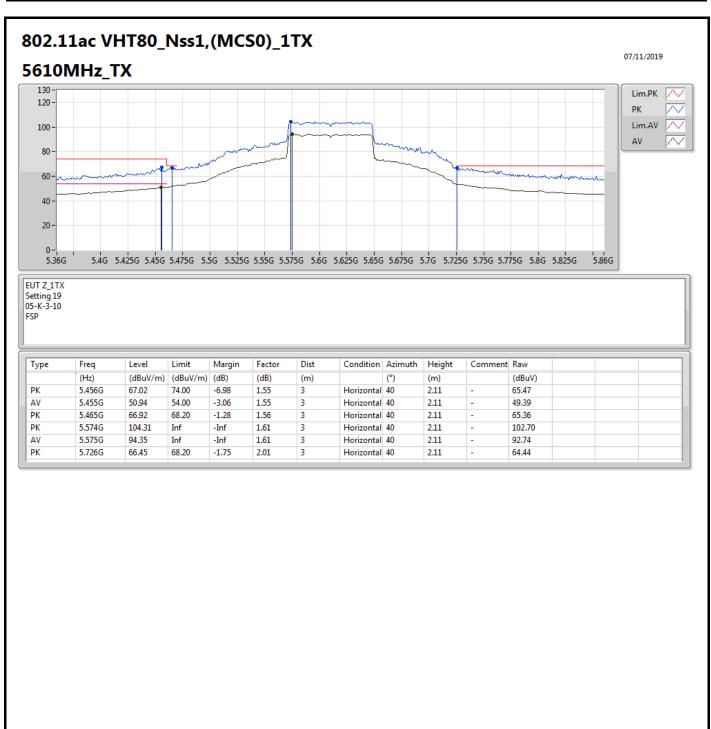


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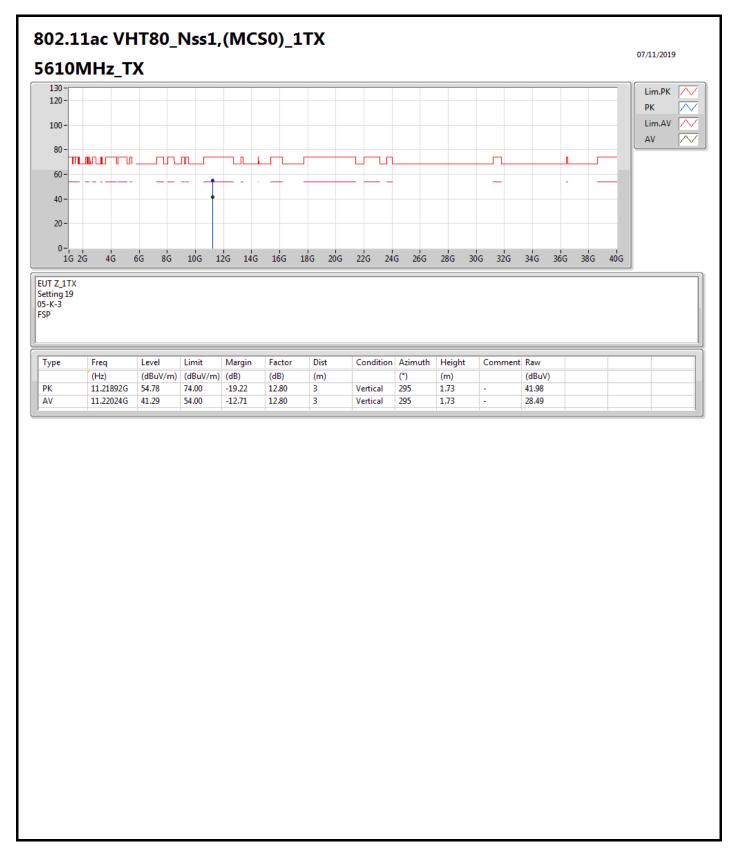






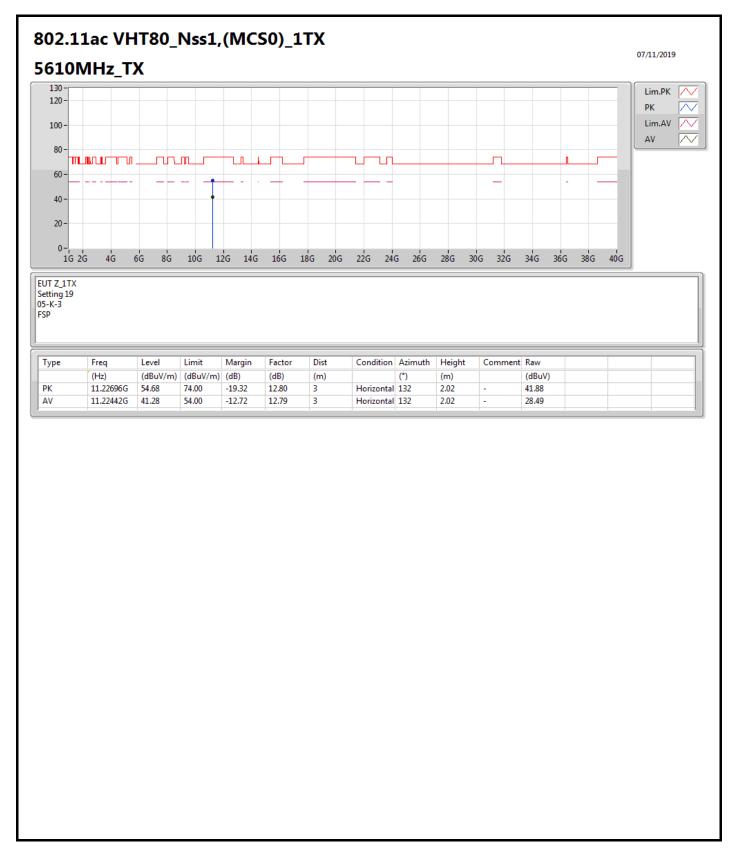
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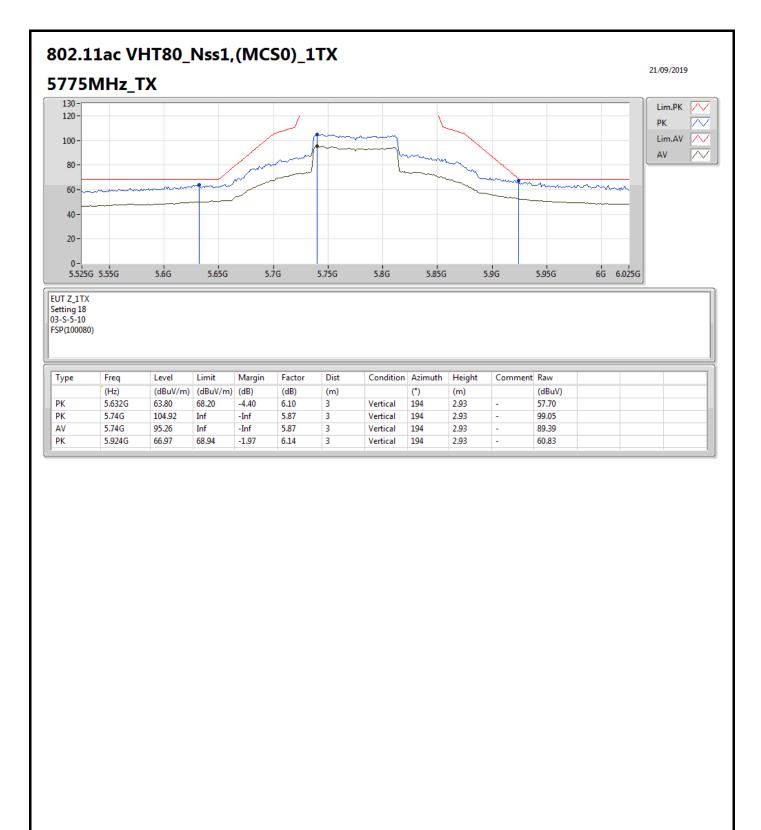


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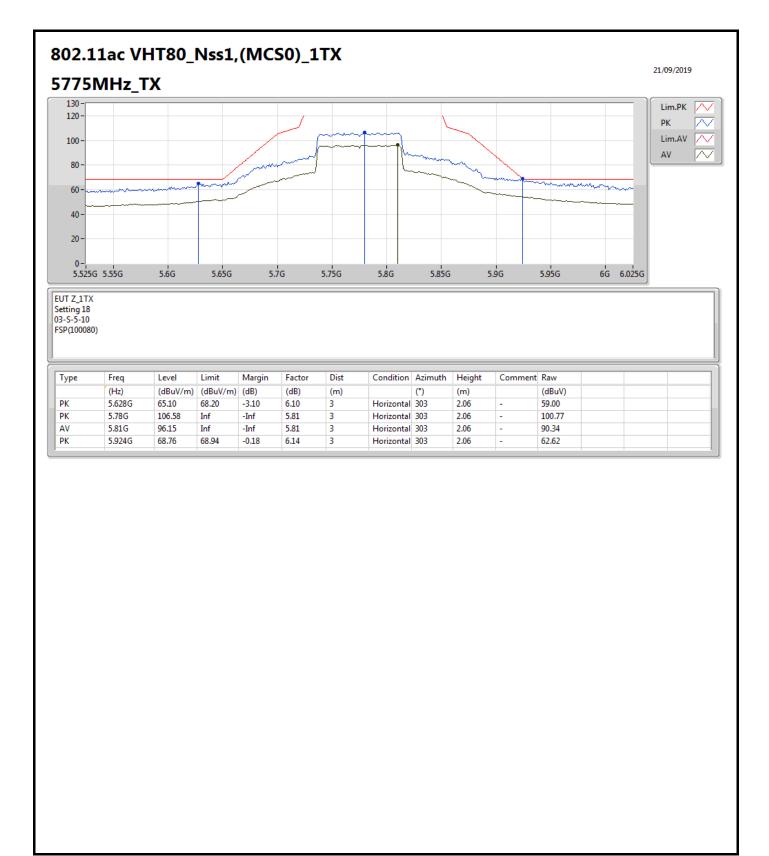






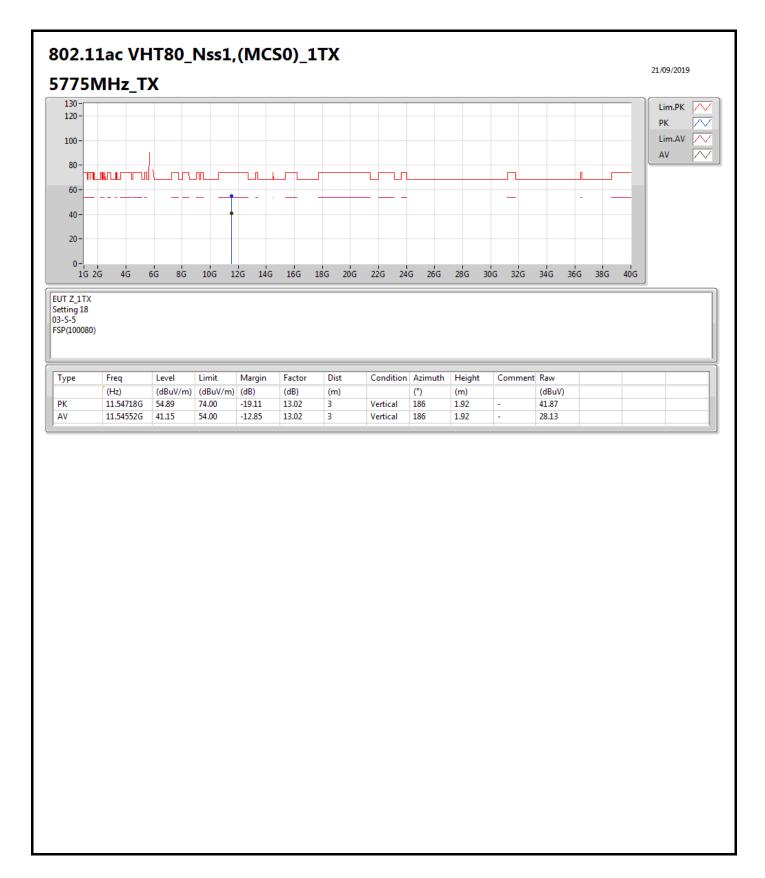
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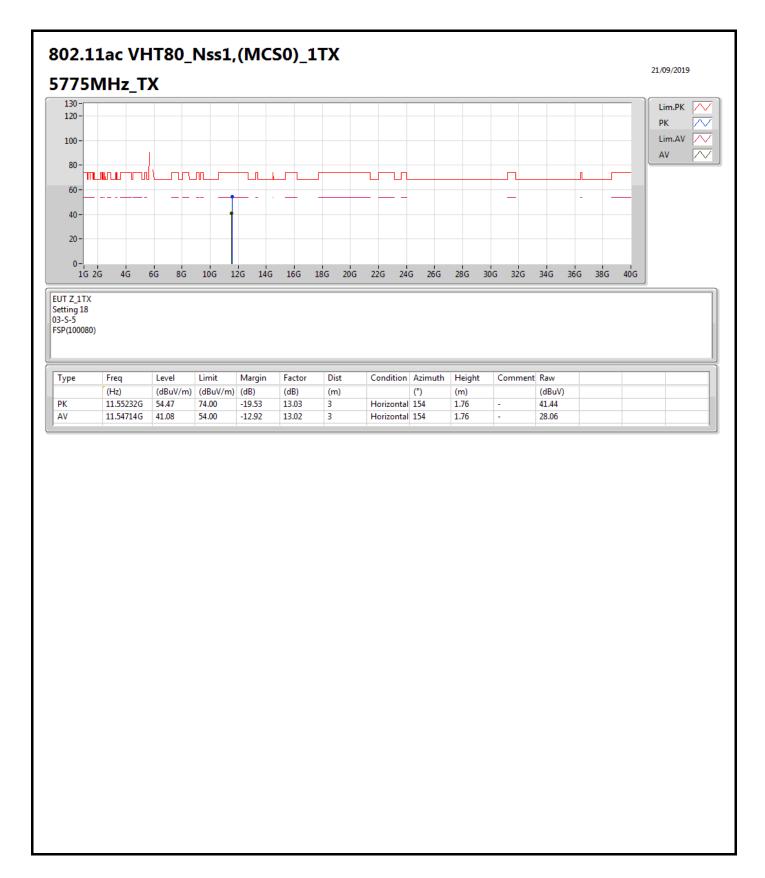
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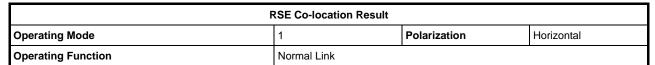
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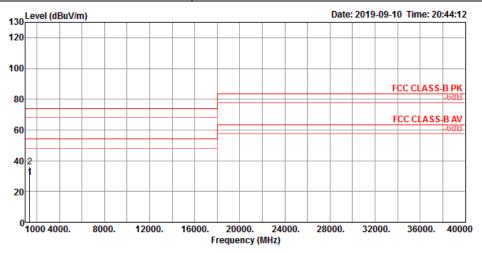




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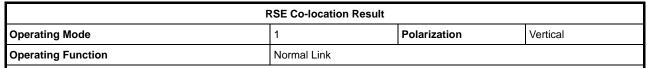


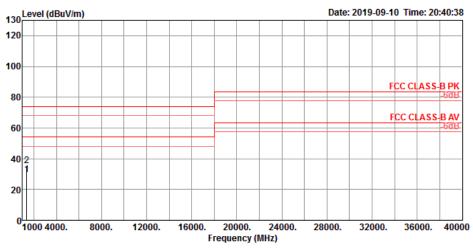




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	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1353.33	29.28	54.00	-24.72	37.08	2.92	26.18	36.90	118	160	Average	HORIZONTAL
2	1353.41	35.85	74.00	-38.15	43.65	2.92	26.18	36.90	118	160	Peak	HORIZONTAL







	Freq	Level		Over Limit				Preamp Factor	A/Pos		Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1353.25	29.88	54.00	-24.12	37.68	2.92	26.18	36.90	100	184	Average	VERTICAL
	1353.25	35.35	74.00	-38.65	43.15	2.92	26.18	36.90	100	184	Peak	VERTICAL