FCC RADIO TEST REPORT

Report No. : FR991919-01



FCC RADIO TEST REPORT

FCC ID		TE7RE505X	
Equipment	:	AX1500 Wi-Fi Range Extender	
Brand Name		tp-link	
Model Name	e :	RE505X	
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	
Manufacture	er :	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 Sep. 23, 2019, and testing was started from Oct. 16, 2019 and completed on Nov. 27, 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 variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

TEL : 886-3-656-9065 FAX : 886-3-656-9085 Report Template No.: CB-A12_1 Ver1.0

Page Number: 1 of 28Issued Date: May 15, 2020Report Version: 02



Table of Contents

Histor	History of this test report3						
Summ	nary of Test Result4						
1	General Description5						
1.1	Information5						
1.2	Applicable Standards10						
1.3	Testing Location Information						
1.4	Measurement Uncertainty10						
2	Test Configuration of EUT11						
2.1	Test Channel Mode11						
2.2	The Worst Case Measurement Configuration13						
2.3	EUT Operation during Test14						
2.4	Accessories15						
2.5	Support Equipment15						
2.6	Test Setup Diagram16						
3	Transmitter Test Result18						
3.1	Emission Bandwidth						
3.2	Maximum Conducted Output Power20						
3.3	Peak Power Spectral Density22						
3.4	Unwanted Emissions25						
4	Test Equipment and Calibration Data28						
Apper	Appendix A. Test Results of Emission Bandwidth						
Appendix B. Test Results of Maximum Conducted Output Power							
Apper	Appendix C. Test Results of Peak Power Spectral Density						

Appendix D. Test Results of Unwanted Emissions

Appendix E. Test Photos

Photographs of EUT v01



History of this test report

Report No.	Version	Description	Issued Date
FR991919-01	01	Initial issue of report	May 11, 2020
FR991919-01	02	Revise the information of Support Equipment on section 2.5.	May 15, 2020



Summary of Test Result

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

Declaration of Conformity:

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

Comments and Explanations:

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

Reviewed by: Sam Chen

Report Producer: Viola Huang



General Description 1

Information 1.1

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5250-5350	a, n (HT20), ac (VHT20),	5260-5320	52-64 [4]
5470-5725	ax (HEW20)	5500-5700	100-140 [11]
5250-5350	n (HT40), ac (VHT40),	5270-5310	54-62 [2]
5470-5725	ax (HEW40)	5510-5670	102-134 [5]
5250-5350	ac (VHT80), ax (HEW80)	5290	58 [1]
5470-5725	ao (minoo), ax (ne moo)	5530-5610	106-122 [2]

Band	Mode	BWch (MHz)	Nant	
5.25-5.35GHz	802.11a	20 2TX		
5.25-5.35GHz	802.11n HT20	20 2TX		
5.25-5.35GHz	802.11ac VHT20	20	2TX	
5.25-5.35GHz	802.11ac VHT20-BF	20	2TX	
5.25-5.35GHz	802.11ax HEW20	20	2TX	
5.25-5.35GHz	802.11ax HEW20-BF	20	2TX	
5.25-5.35GHz	802.11n HT40	40	2TX	
5.25-5.35GHz	802.11ac VHT40	40	2TX	
5.25-5.35GHz	802.11ac VHT40-BF	40	2TX	
5.25-5.35GHz	802.11ax HEW40	40	2TX	
5.25-5.35GHz	802.11ax HEW40-BF	40	2TX	
5.25-5.35GHz	802.11ac VHT80	80	2TX	
5.25-5.35GHz	802.11ac VHT80-BF	80	2TX	
5.25-5.35GHz	802.11ax HEW80	80	2TX	
5.25-5.35GHz	802.11ax HEW80-BF	80	2TX	
5.47-5.725GHz	802.11a	802.11a 20		
5.47-5.725GHz	802.11n HT20	20	2TX	
5.47-5.725GHz	802.11ac VHT20	20	2TX	
5.47-5.725GHz	802.11ac VHT20-BF	20	2TX	
5.47-5.725GHz	802.11ax HEW20	20	2TX	
5.47-5.725GHz	802.11ax HEW20-BF	20	2TX	
5.47-5.725GHz	802.11n HT40	HT40 40 2TX		
5.47-5.725GHz	802.11ac VHT40	40 2TX		
5.47-5.725GHz	802.11ac VHT40-BF	40	2TX	
5.47-5.725GHz	802.11ax HEW40	40	2TX	

Page Number : 5 of 28 : May 15, 2020 Issued Date

Report Version : 02



Band	Mode	BWch (MHz)	Nant
5.47-5.725GHz	802.11ax HEW40-BF	40	2TX
5.47-5.725GHz	802.11ac VHT80	80	2TX
5.47-5.725GHz	802.11ac VHT80-BF	80	2TX
5.47-5.725GHz	802.11ax HEW80	80	2TX
5.47-5.725GHz	802.11ax HEW80-BF	80	2TX

Note:

- 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40, VHT80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- HEW20, HEW40, HEW80 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- BWch is the nominal channel bandwidth.



1.1.2 Antenna Information

_	Po	ort		Model Name	Antenna Type	Connector	Gain (dBi)	
Ant.	WLAN 2.4GHz	WLAN 5GHz	Brand				WLAN 2.4GHz	WLAN 5GHz
1	1	2	tp-link	3101502662	Dipole	I-PEX	3	5
2	2	1	tp-link	3101502662	Dipole	I-PEX	3	5

Note: The above information was declared by manufacturer.

For 2.4GHz function:

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

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

For IEEE 802.11g/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 function:

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

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

Port 1 and Port 2 could transmit/receive simultaneously.



1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	0.952	0.21	2.065m	1k
802.11ac VHT20-BF	0.933	0.3	3.84m	300
802.11ac VHT40-BF	0.945	0.25	3.025m	1k
802.11ac VHT80-BF	0.958	0.19	3.69m	300
802.11ax HEW20-BF	0.949	0.23	3.21m	1k
802.11ax HEW40-BF	0.944	0.25	3.248m	1k
802.11ax HEW80-BF	0.937	0.28	4.17m	300

Note:

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

1.1.4 EUT Operational Condition

EUT Power Type		Internal power supply				
Beamforming Function	\boxtimes	With beamforming		Without beamforming		
	For 802.11ac/ax in 5GHz					
Weather Band	\boxtimes	With 5600~5650MHz		Without 5600~5650MHz		
Function		Outdoor P2M	\boxtimes	Indoor P2M		
		Fixed P2P		Client		
TPC Function	\square	With TPC		Without TPC		
Test Software Version Mtool ver 3.1.0.3						

Note: The above information was declared by manufacturer.

1.1.5 Table for EUT support function

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



1.1.6 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR991919AB Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
	1. Emission Bandwidth
Adding U-NII-2A and U-NII-2C bands (5250~5350 MHz,	2. Maximum Conducted Output Power
5470~5725 MHz) for this device.	3. Peak Power Spectral Density
	4. Unwanted Emissions above 1GHz



1.2 Applicable Standards

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

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 789033 D02 v02r01
- FCC KDB 662911 D01 v02r01
- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

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

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Eddie Weng	24~25.8°C / 57~59%	Oct. 21, 2019 ~ Nov. 27, 2019
Radiated>1GHz	03CH06-CB	KJ Chang	24.1~25.7°C / 55~58%	Oct. 16, 2019 ~ Nov. 26, 2019

Test site Designation No. TW0006 with FCC

Test site registered number IC 4086D with Industry Canada.

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
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%



2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11a_Nss1,(6Mbps)_2TX	-
5260MHz	77
5300MHz	78
5320MHz	75
5500MHz	71
5580MHz	77
5700MHz	60
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-
5260MHz	71
5300MHz	75
5320MHz	79
5500MHz	71
5580MHz	75
5700MHz	33
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-
5270MHz	89
5310MHz	38
5510MHz	25
5550MHz	94
5670MHz	60
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-
5290MHz	35
5530MHz	28
5610MHz	94
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-
5260MHz	75
5300MHz	79
5320MHz	79
5500MHz	50
5580MHz	79
5700MHz	30
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-
5270MHz	75
5310MHz	42
5510MHz	28
5550MHz	84

TEL : 886-3-656-9065 FAX : 886-3-656-9085 Report Template No.: CB-A12_1 Ver1.0 Page Number: 11 of 28Issued Date: May 15, 2020Report Version: 02



Mode	Power Setting
5670MHz	63
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	-
5290MHz	35
5530MHz	28
5610MHz	28

Note:

- There are two modes of EUT. One is beamforming mode, and the other is non-beamforming mode, after evaluating, beamforming mode has been evaluated to be the worst case, so it was selected to test and record in this test report.
- 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.



2.2 The Worst Case Measurement Configuration

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

The Worst Case Mode for Following Conformance Tests			
Tests Item	Unwanted Emissions		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
Operating Mode > 1GHz	СТХ		
The EUT was performed at Y axis + antenna in vertical, Z axis + antenna in 90° and Z axis + antenna in 180 position, and the worst case was found at Z axis + antenna in 180°. So the measurement will follow thi same test configuration.			
1 EUT in Z axis + antenna in 180°			

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.: FA991919-01 for Co-location RF Exposure Evaluation.			



2.3 EUT Operation during Test

For CTX Mode:

non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

beamforming mode:

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

The program was executed as follows:

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



2.4 Accessories

N/A

Support Equipment 2.5

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

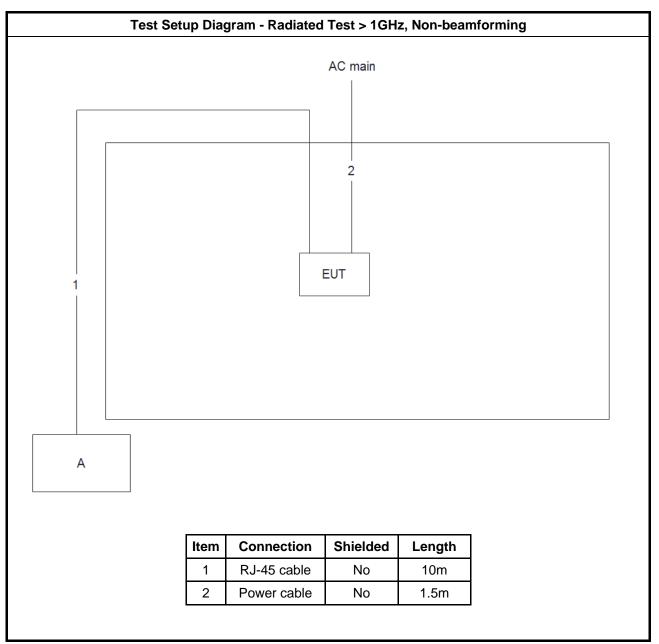
	Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID		
А	Notebook	DELL	E4300	N/A		

Bbeamforming mode:

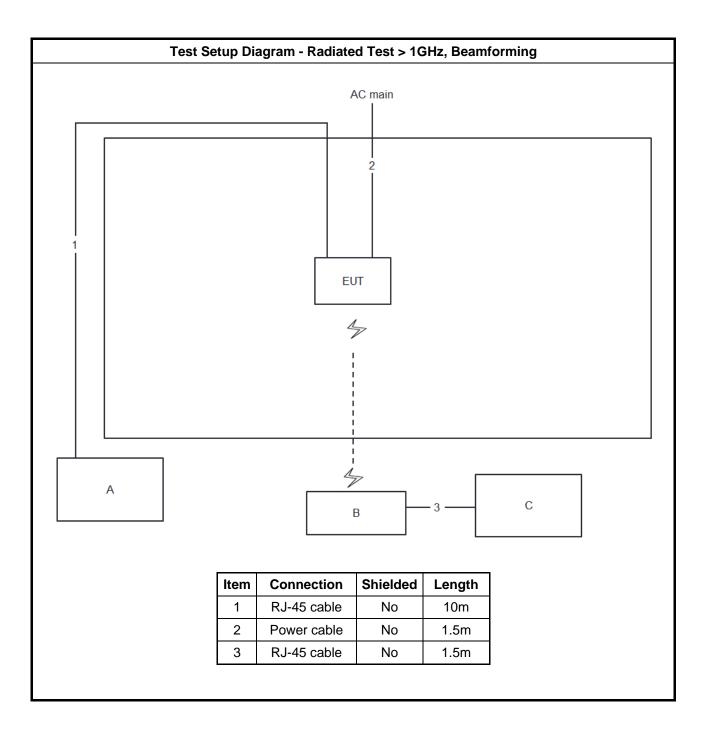
	Support Equipment						
No.	Equipment	Brand Name	Model Name	FCC ID			
А	Notebook	DELL	E4300	N/A			
В	RX device	tp-link	RE505X	TE7RE505X			
С	Notebook	DELL	E4300	N/A			



2.6 Test Setup Diagram









3 Transmitter Test Result

3.1 Emission Bandwidth

3.1.1 Emission Bandwidth Limit

	Emission Bandwidth Limit				
UNI	UNII Devices				
	For the 5.15-5.25 GHz band, N/A				
\boxtimes	For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.				
\boxtimes	For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.				
	For the 5.725-5.85 GHz band, 6 dB emission bandwidth \geq 500kHz.				
LE-	LE-LAN Devices				
	For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.				
	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz				
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz				
	For the 5.725-5.85 GHz band, 6 dB emission bandwidth \geq 500kHz.				
~ 4	2.1.2 Moscuring Instruments				

3.1.2 Measuring Instruments

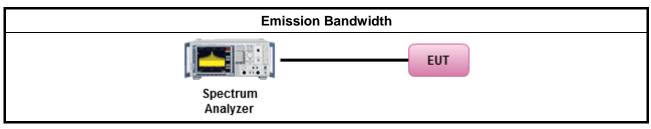
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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



3.1.4 Test Setup



3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A



3.2 Maximum Conducted Output Power

3.2.1 Maximum Conducted Output Power Limit

	Maximum Conducted Output Power Limit						
UNI	I Devices						
	For the 5.15-5.25 GHz band:						
	 Outdoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 - (G_{TX} - 6). e.i.r.p. at any elevation angle above 30 degrees ≤ 125mW [21dBm] 						
	• Indoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$						
	• Point-to-point AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W If $G_{TX} > 23$ dBi, then $P_{Out} = 30 - (G_{TX} - 23)$.						
	 Mobile or Portable Client: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW. If G_{TX} > 6 dBi, then P_{Out} = 24 - (G_{TX} - 6). 						
\boxtimes	For the 5.25-5.35 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$.						
\boxtimes	For the 5.47-5.725 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$.						
	For the 5.725-5.85 GHz band:						
	• Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$.						
	 Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. 						
LE-	LAN Devices						
	For the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.						
	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz						
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz						
	For the 5.725-5.85 GHz band:						
	• Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$.						
	 Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. 						
	= maximum conducted output power in dBm, = the maximum transmitting antenna directional gain in dBi.						

3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

	Test Method						
•	 Maximum Conducted Output Power 						
	Average over on/off periods with duty factor						
	Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).						
	Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)						
	Wideband RF power meter and average over on/off periods with duty factor						
	Refer as FCC KDB 789033, clause E Method PM-G (using an RF average power meter).						
•	For conducted measurement.						
	 If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them. 						
	 If multiple transmit chains, EIRP calculation could be following as methods: P_{total} = P₁ + P₂ + + P_n (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP_{total} = P_{total} + DG 						

3.2.4 Test Setup

RF Output Power (Power Meter)					
Powe	EUT EUT er Meter				

3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B



3.3 Peak Power Spectral Density

3.3.1 Peak Power Spectral Density Limit

Peak Power Spectral Density Limit						
UNI	I Devices					
	For the 5.15-5.25 GHz band:					
	• Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 17 - (G_{TX} - 6)$.					
	• Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 17 - (G_{TX} - 6)$.					
	 Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 23 dBi, then P_{Out} = 17 – (G_{TX} – 23). 					
	 Mobile or Portable Client: the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6) 					
\boxtimes	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).					
	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) \leq 10 dBm/MHz.					
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz.					
	 e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below: -13 dBW/MHz for 0° ≤ θ < 8°; -13 - 0.716 (θ-8) dBW/MHz for 8° ≤ θ < 40° -35.9 - 1.22 (θ-40) dBW/MHz for 40° ≤ θ ≤ 45°; -42 dBW/MHz for θ > 45° 					
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) \leq 11 dBm/MHz.					
	For the 5.725-5.85 GHz band:					
	 Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If G_{TX} > 6 dBi, then PPSD= 30 - (G_{TX} - 6). 					
	 Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. 					
pow	SD = peak power spectral density that he same method as used to determine the conducted output ver shall be used to determine the power spectral density. And power spectral density in dBm/MHz = the maximum transmitting antenna directional gain in dBi.					

3.3.2 Measuring Instruments

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

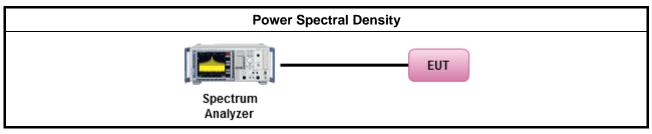


3.3.3 Test Procedures

		Test Method								
•	Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:									
	Refer as FCC KDB 789033, F)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth									
	[duty	/ cycle ≥ 98% or external video / power trigger]								
	\square	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]) $EIRP_{total} = PPSD_{total} + DG$								



3.3.4 Test Setup



3.3.5 Test Result of Peak Power Spectral Density

Refer as Appendix C



3.4 Unwanted Emissions

3.4.1 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				

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						

Report Version : 02



٦

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

3.4.2 Measuring Instruments

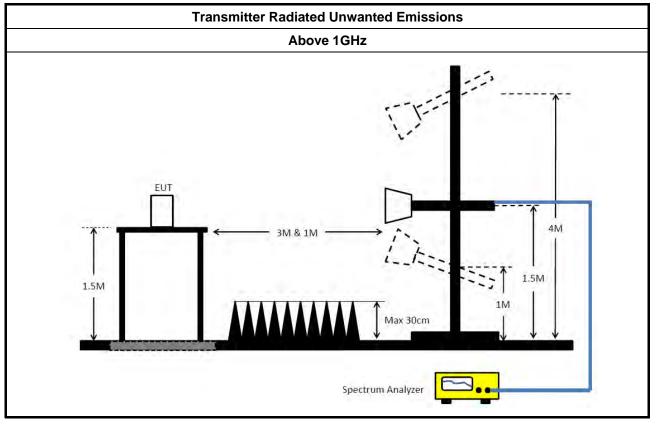
Refer a test equipment and calibration data table in this test report.

3.4.3 **Test Procedures**

		Test Method					
•	Measurements may be performed at a distance other than the limit distance provided they are 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 \geq 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.					
•		amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value no need to be reported.					



3.4.4 Test Setup



3.4.5 Measurement Results Calculation

The measured Level is calculated using:

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

3.4.6 Transmitter Unwanted Emissions (Below 30MHz)

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

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

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

3.4.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix D



4 Test Equipment and Calibration Data

Instrument	Instrument Manufacturer		Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Horn Antenna	SCHWARZBE CK	BBHA9120D	9120D-1292	1GHz~18GHz	Jul. 17, 2019	Jul. 16, 2020	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 12, 2019	Jun. 11, 2020	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	May 08, 2019	May 07, 2020	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH06-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Jan. 31, 2019	Jan. 30, 2020	Radiation (03CH06-CB)
RF Cable-high	HUBER+SUH NER	RG402	High Cable-05	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
RF Cable-high	HUBER+SUH NER	RG402	High Cable-05+24	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Feb. 25, 2019	Feb. 24, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-28	1 GHz –26.5 GHz	Nov. 19, 2018	Nov. 18, 2019	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-28	1 GHz –26.5 GHz	Nov. 18, 2019	Nov. 17, 2020	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Jan. 15, 2019	Jan. 14, 2020	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Jan. 15, 2019	Jan. 14, 2020	Conducted (TH01-CB)

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



Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
5.25-5.35GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	27.05M	16.667M	16M7D7W	22.1M	16.542M
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	23.97M	17.871M	17M9D7W	22.17M	17.781M
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	86.94M	38.381M	38M4D7W	39.78M	36.222M
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	81.24M	75.922M	75M9D7W	80.76M	75.682M
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	28.98M	19.01M	19M0D7W	22.77M	18.981M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	54.6M	37.721M	37M7D7W	40.14M	37.541M
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	80.88M	77.121M	77M1D7W	80.64M	77.001M
5.47-5.725GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	27.425M	16.642M	16M6D7W	21.25M	16.492M
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	28.98M	17.901M	17M9D7W	21.69M	17.721M
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	74.4M	36.522M	36M5D7W	39.84M	36.222M
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	109.92M	76.042M	76M0D7W	80.76M	75.682M
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	35.61M	19.07M	19M1D7W	21.51M	18.921M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	70.56M	37.781M	37M8D7W	40.02M	37.541M
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	81.36M	77.121M	77M1D7W	80.88M	77.001M

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



Result

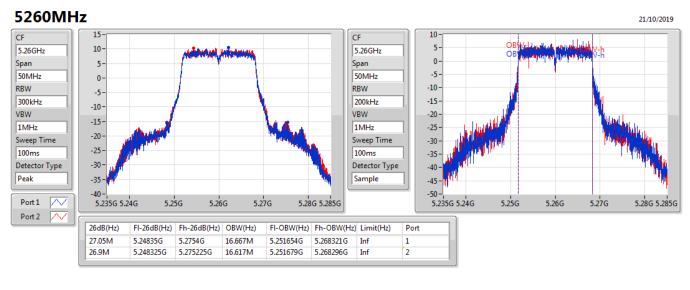
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
Wode	Result	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_2TX		-	-	-	-	-
5260MHz	Pass	Inf	27.05M	16.667M	26.9M	16.617M
5300MHz	Pass	Inf	26.9M	16.592M	26.95M	16.617M
5320MHz	Pass	Inf	25.875M	16.542M	22.1M	16.567M
5500MHz	Pass	Inf	21.9M	16.592M	21.85M	16.567M
5580MHz	Pass	Inf	27.425M	16.642M	22.075M	16.592M
5700MHz	Pass	Inf	21.525M		22.075M	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	- Fd55		21.32310	16.492M		16.567M
,_		-		-	-	-
5260MHz	Pass	Inf	23.97M	17.841M	22.59M	17.781M
5300MHz	Pass	Inf	22.17M	17.811M	23.76M	17.841M
5320MHz	Pass	Inf	23.19M	17.871M	22.68M	17.781M
5500MHz	Pass	Inf	26.55M	17.901M	24.03M	17.781M
5580MHz	Pass	Inf	28.98M	17.871M	22.74M	17.811M
5700MHz	Pass	Inf	21.78M	17.751M	21.69M	17.721M
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	Inf	86.94M	38.381M	70.2M	36.702M
5310MHz	Pass	Inf	40.08M	36.282M	39.78M	36.222M
5510MHz	Pass	Inf	39.84M	36.282M	40.38M	36.282M
5550MHz	Pass	Inf	74.22M	36.522M	74.4M	36.522M
5670MHz	Pass	Inf	48.36M	36.282M	45.6M	36.222M
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	Inf	80.76M	75.922M	81.24M	75.682M
5530MHz	Pass	Inf	80.76M	75.682M	82.8M	75.922M
5610MHz	Pass	Inf	109.92M	75.922M	81.84M	76.042M
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5260MHz	Pass	Inf	28.98M	18.981M	28.62M	18.981M
5300MHz	Pass	Inf	23.43M	18.981M	25.44M	19.01M
5320MHz	Pass	Inf	23.07M	18.981M	22.77M	18.981M
5500MHz	Pass	Inf	28.29M	18.981M	21.6M	18.951M
5580MHz	Pass	Inf	35.61M	19.07M	28.71M	18.951M
5700MHz	Pass	Inf	21.57M	18.951M	21.51M	18.921M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5270MHz	Pass	Inf	51.18M	37.721M	54.6M	37.721M
5310MHz	Pass	Inf	40.44M	37.541M	40.14M	37.541M
5510MHz	Pass	Inf	40.26M	37.541M	40.02M	37.541M
5550MHz	Pass	Inf	70.56M	37.781M	58.5M	37.721M
5670MHz	Pass	Inf	45.84M	37.601M	46.38M	37.601M
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5290MHz	Pass	Inf	80.88M	77.121M	80.64M	77.001M
5530MHz	Pass	Inf	81M	77.121M	80.88M	77.001M
5530WH 12 5610MHz	Pass	Inf	81.36M	77.001M	81.12M	77.001M
			81.30IVI	77.00 HVI	01.1ZIVI	77.001101

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;

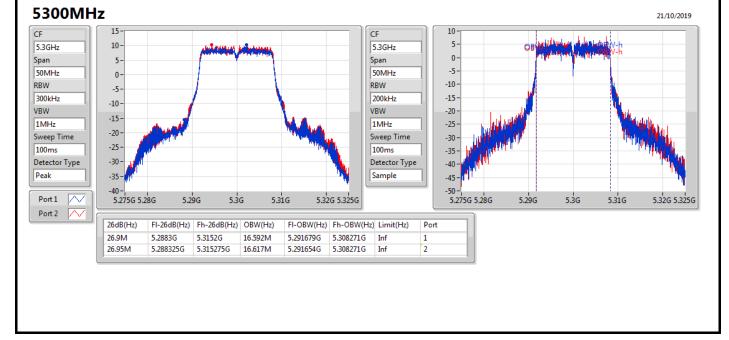


EBW

802.11a_Nss1,(6Mbps)_2TX

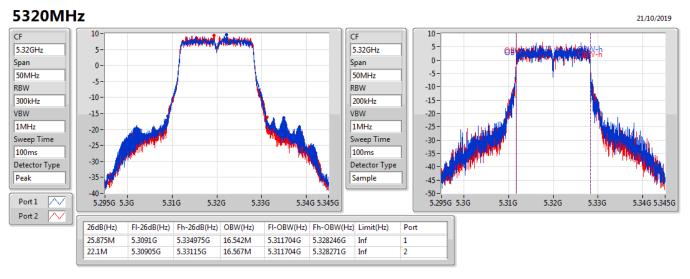


802.11a_Nss1,(6Mbps)_2TX

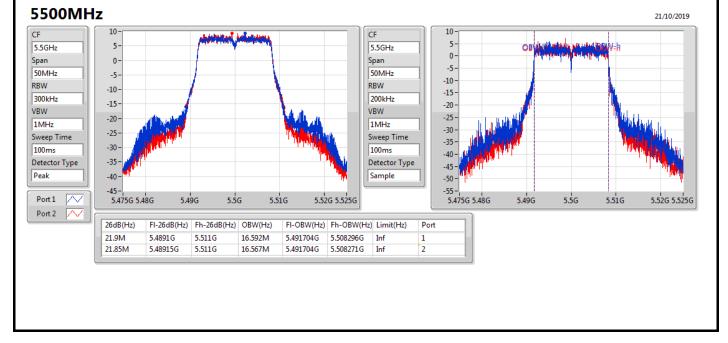




802.11a_Nss1,(6Mbps)_2TX

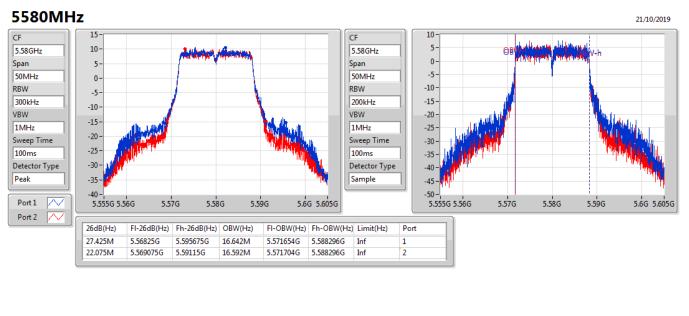


802.11a_Nss1,(6Mbps)_2TX

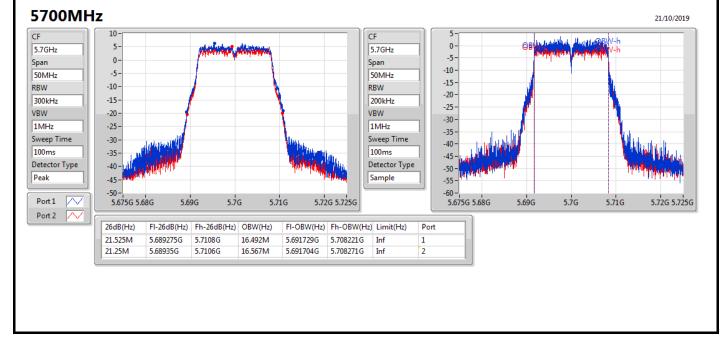




802.11a_Nss1,(6Mbps)_2TX



802.11a_Nss1,(6Mbps)_2TX

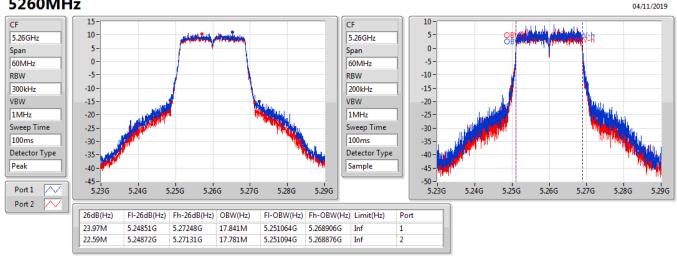




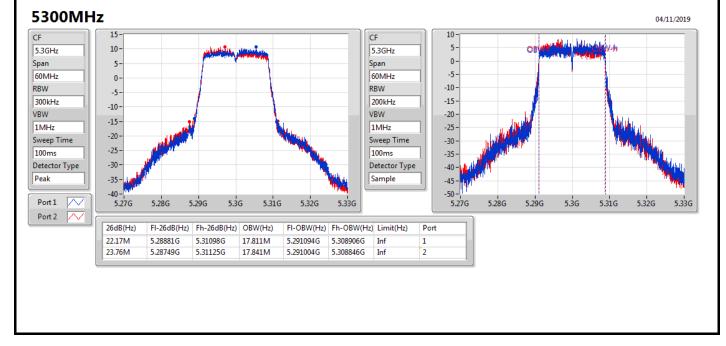
802.11ac VHT20-BF_Nss1,(MCS0)_2TX



5260MHz



802.11ac VHT20-BF_Nss1,(MCS0)_2TX



04/11/2019



5320MHz

CF

5.32GHz

60MHz

300kHz

Span

RBW

VBW

1MHz

100ms

Peak

Port 1

Sweep Time

Detector Type

 \sim

15

10-

5

0-

-5

-10

-15-

-20 -

-25 -

-30·

-35

-40 -

-45

5.29G

5.3G

5.31G

802.11ac VHT20-BF_Nss1,(MCS0)_2TX



10

5-

0-

-5-

-10 · -15 ·

-20-

-25 -

-30-

-35

-40

-45

-50

5.29G

5.3G

Span

RBW

VBW

1MHz

100ms

Sample

Sweep Time

Detector Type

60MHz

200kHz

8

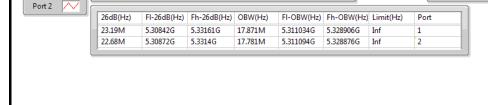
5.31G

5.32G

5.33G

5.34G

5.35G



5.33G

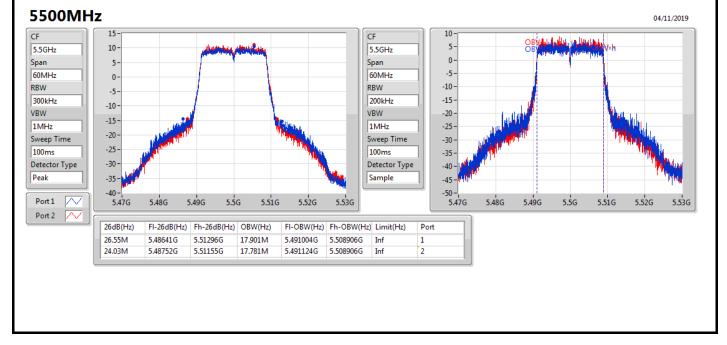
5.34G

5.35G

5.32G

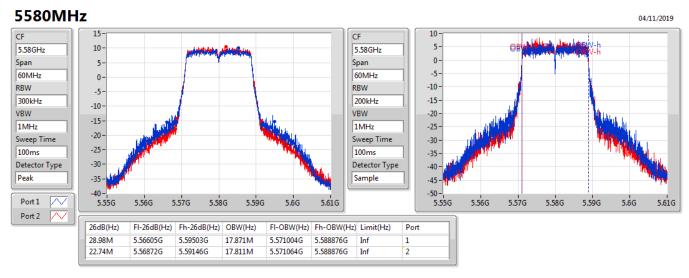
802.11ac VHT20-BF_Nss1,(MCS0)_2TX



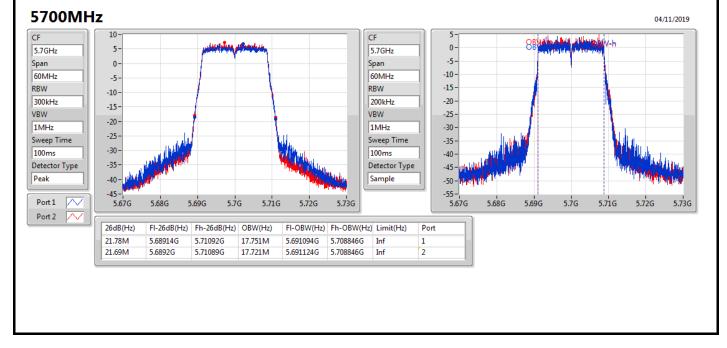




802.11ac VHT20-BF_Nss1,(MCS0)_2TX

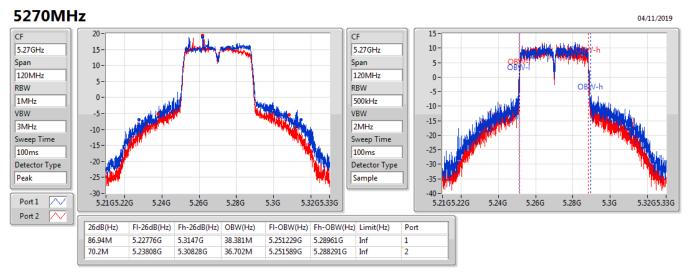


802.11ac VHT20-BF_Nss1,(MCS0)_2TX

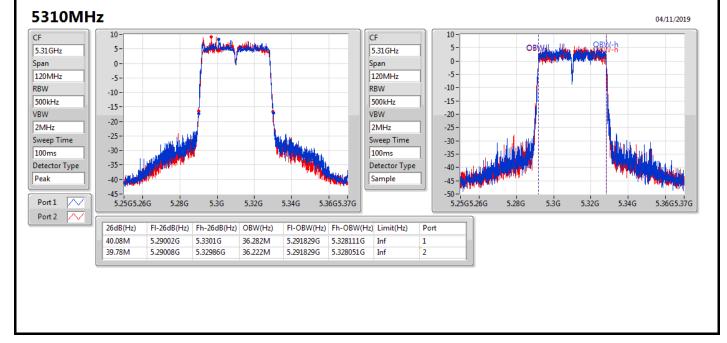




802.11ac VHT40-BF_Nss1,(MCS0)_2TX

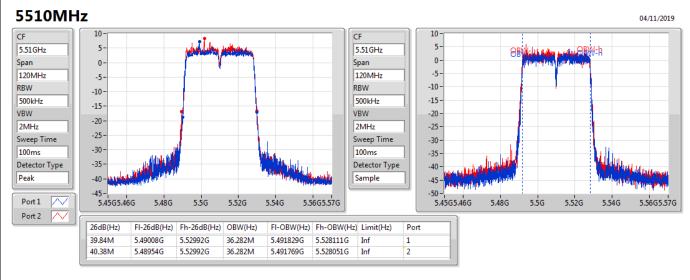


802.11ac VHT40-BF_Nss1,(MCS0)_2TX

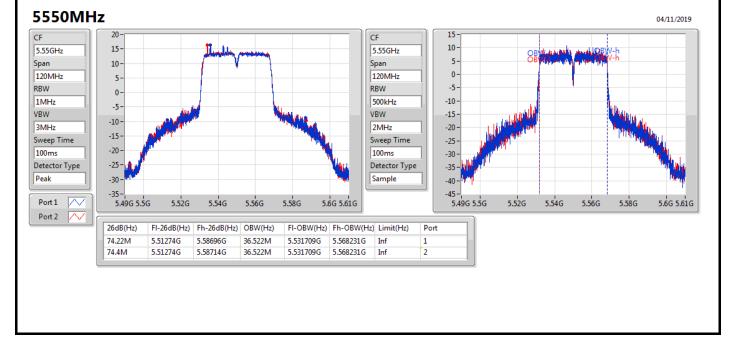




802.11ac VHT40-BF_Nss1,(MCS0)_2TX

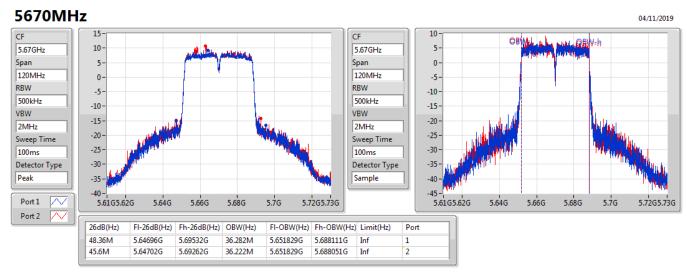


802.11ac VHT40-BF_Nss1,(MCS0)_2TX

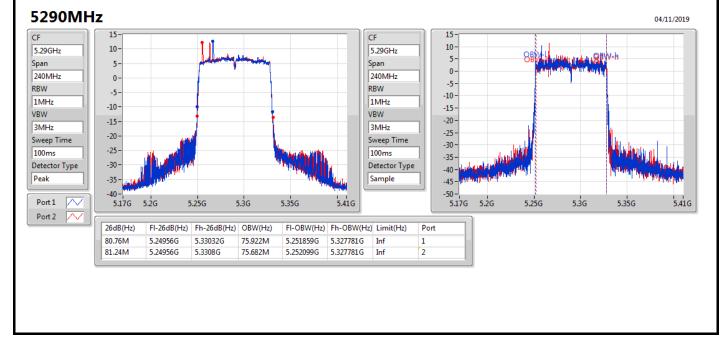




802.11ac VHT40-BF_Nss1,(MCS0)_2TX

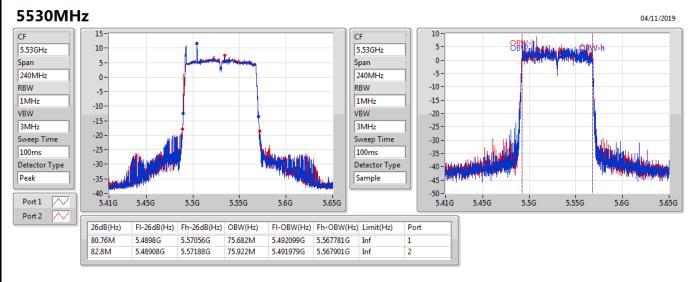


802.11ac VHT80-BF_Nss1,(MCS0)_2TX

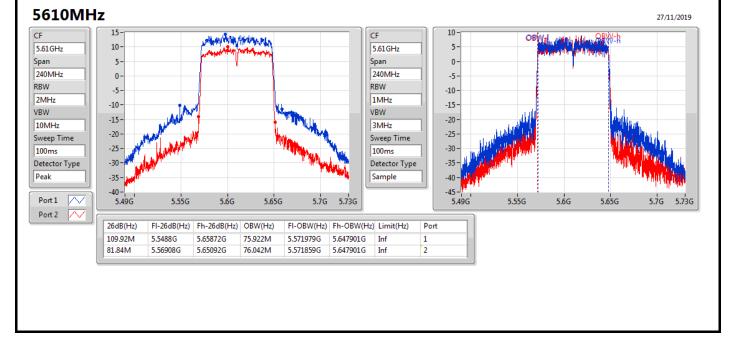




802.11ac VHT80-BF_Nss1,(MCS0)_2TX

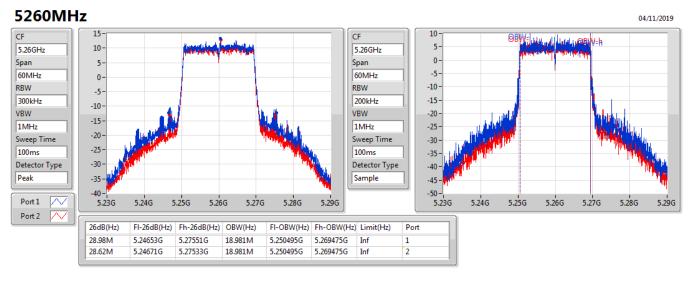


802.11ac VHT80-BF_Nss1,(MCS0)_2TX

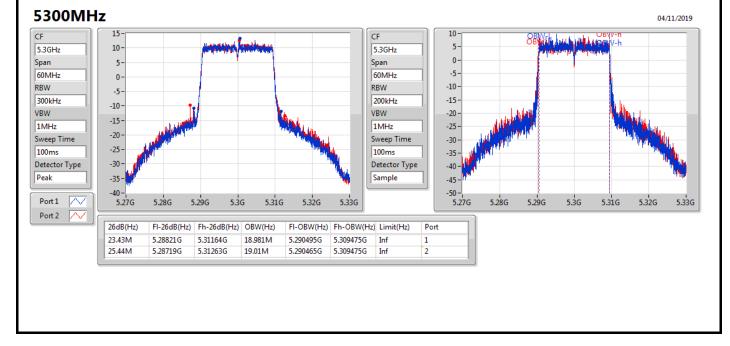




802.11ax HEW20-BF_Nss1,(MCS0)_2TX



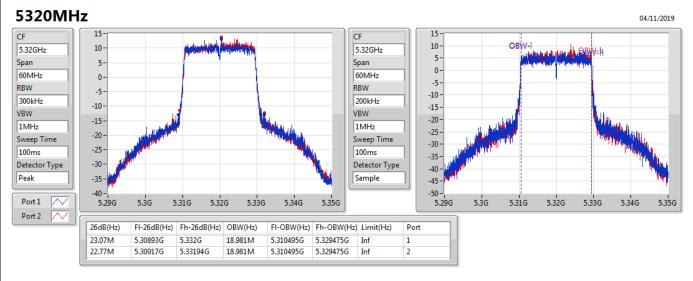
802.11ax HEW20-BF_Nss1,(MCS0)_2TX



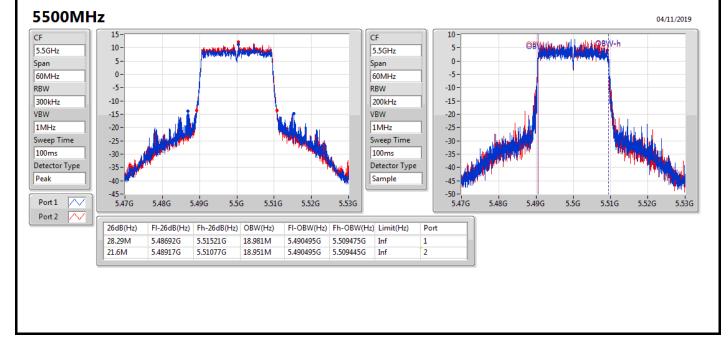




802.11ax HEW20-BF_Nss1,(MCS0)_2TX

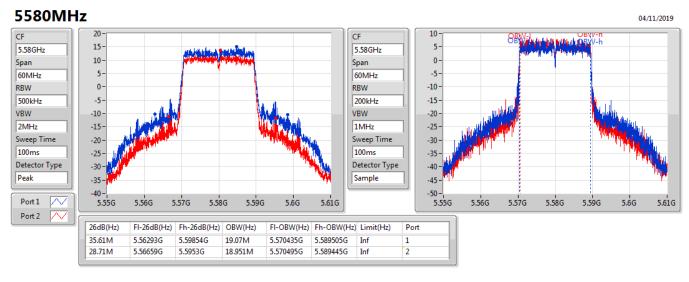


802.11ax HEW20-BF_Nss1,(MCS0)_2TX

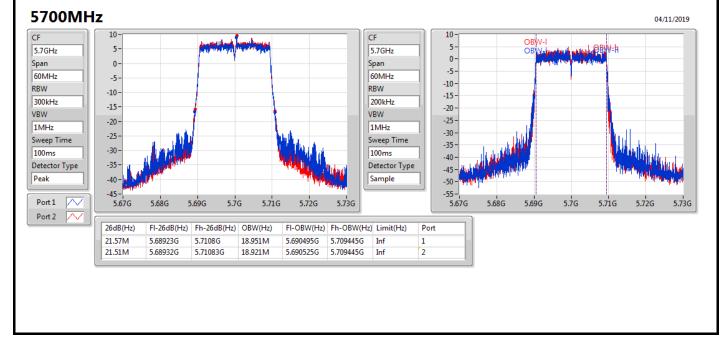




802.11ax HEW20-BF_Nss1,(MCS0)_2TX

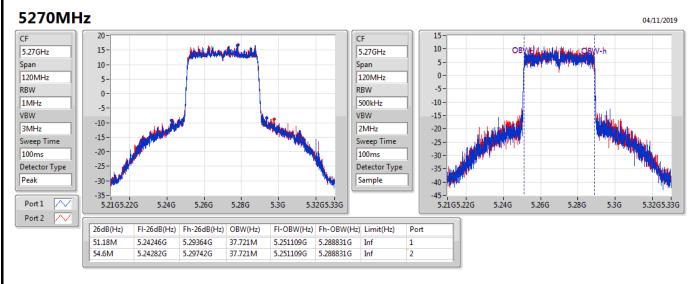


802.11ax HEW20-BF_Nss1,(MCS0)_2TX

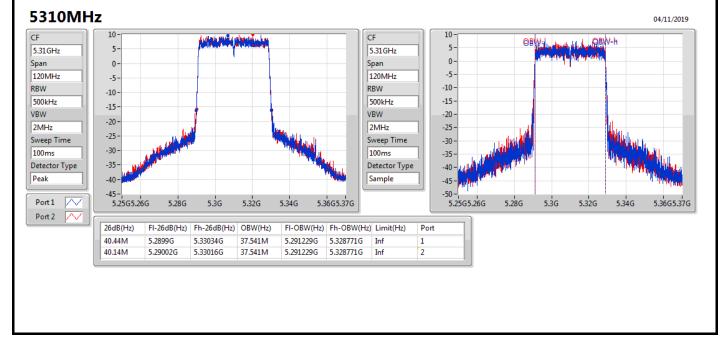




802.11ax HEW40-BF_Nss1,(MCS0)_2TX

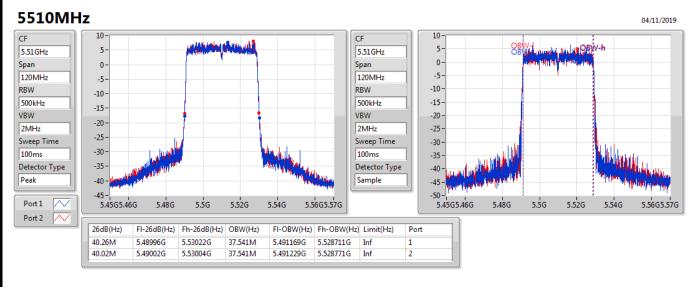


802.11ax HEW40-BF_Nss1,(MCS0)_2TX

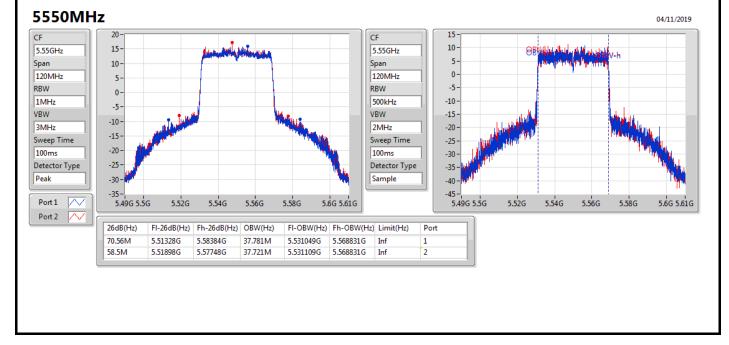




802.11ax HEW40-BF_Nss1,(MCS0)_2TX



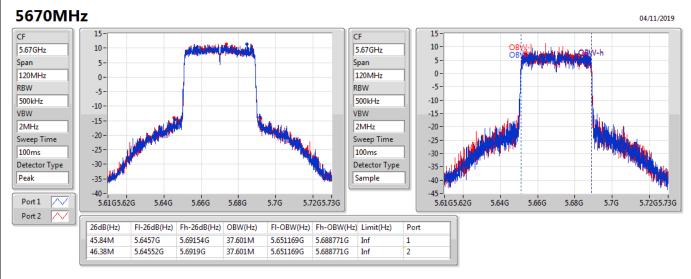
802.11ax HEW40-BF_Nss1,(MCS0)_2TX



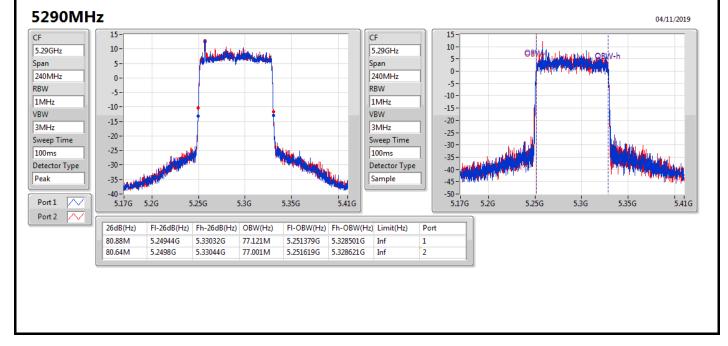




802.11ax HEW40-BF_Nss1,(MCS0)_2TX

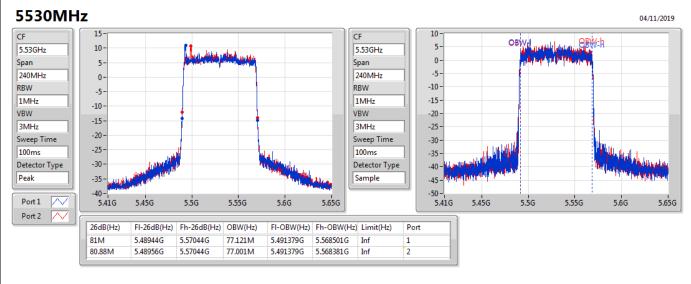


802.11ax HEW80-BF_Nss1,(MCS0)_2TX

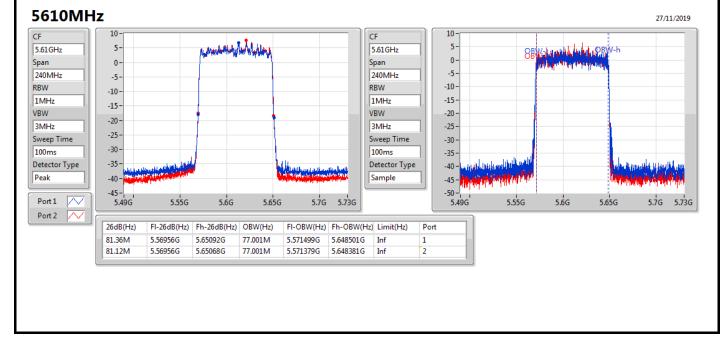




802.11ax HEW80-BF_Nss1,(MCS0)_2TX



802.11ax HEW80-BF_Nss1,(MCS0)_2TX





Summary

Mode	Total Power	Total Power		
	(dBm)	(W)		
5.25-5.35GHz	-	-		
802.11a_Nss1,(6Mbps)_2TX	22.68	0.18535		
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	21.53	0.14223		
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	21.93	0.15596		
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	17.81	0.06039		
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	21.67	0.14689		
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	21.92	0.15560		
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	18.40	0.06918		
5.47-5.725GHz	-	-		
802.11a_Nss1,(6Mbps)_2TX	22.83	0.19187		
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	21.40	0.13804		
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	21.93	0.15596		
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	21.87	0.15382		
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	21.32	0.13552		
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	21.75	0.14962		
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	21.03	0.12677		



Average Power

Appendix B

Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Lin	
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5260MHz	Pass	5.00	19.59	19.57	22.59	23.98	
5300MHz	Pass	5.00	19.51	19.83	22.68	23.98	
5320MHz	Pass	5.00	18.82	18.77	21.81	23.98	
5500MHz	Pass	5.00	18.29	18.64	21.48	23.98	
5580MHz	Pass	5.00	19.98	19.66	22.83	23.98	
5700MHz	Pass	5.00	15.67	14.45	18.11	23.98	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5260MHz	Pass	8.01	18.36	18.28	21.33	21.97	
5300MHz	Pass	8.01	18.56	18.01	21.30	21.97	
5320MHz	Pass	8.01 8.01	18.7 18.07	18.34 18.68	21.53 21.40	21.97 21.97	
5500MHz	Pass						
5580MHz	Pass	8.01	18.06	18.47	21.28	21.97	
5700MHz	Pass	8.01	14.45	14.66	17.57	21.97	
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5270MHz	Pass	8.01	19.36	18.44	21.93	21.97	
5310MHz	Pass	8.01	14.51	14.9	17.72	21.97	
5510MHz	Pass	8.01	13.36	13.79	16.59	21.97	
5550MHz	Pass	8.01	18.74	19.09	21.93	21.97	
5670MHz	Pass	8.01	17.12	17.62	20.39	21.97	
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-		-	-	-	
5290MHz	Pass	8.01	14.74	14.86	17.81	21.97	
5530MHz	Pass	8.01	14.18	14.43	17.32	21.97	
5610MHz	Pass	8.01	18.76	18.95	21.87	21.97	
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5260MHz	Pass	8.01	18.66	17.99	21.35	21.97	
5300MHz	Pass	8.01	18.46	18.85	21.67	21.97	
5320MHz	Pass	8.01	17.96	18.73	21.37	21.97	
5500MHz	Pass	8.01	16.22	17.11	19.70	21.97	
5580MHz	Pass	8.01	17.88	18.7	21.32	21.97	
5700MHz	Pass	8.01	14.18	14.47	17.34	21.97	
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5270MHz	Pass	8.01	18.49	19.29	21.92	21.97	
5310MHz	Pass	8.01	15.26	15.94	18.62	21.97	
5510MHz	Pass	8.01	14.38	13.85	17.13	21.97	
5550MHz	Pass	8.01	18.43	19.02	21.75	21.97	
5670MHz	Pass	8.01	17.36	17.58	20.48	21.97	
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5290MHz	Pass	8.01	15.44	15.33	18.40	21.97	
5530MHz	Pass	8.01	13.99	14.22	17.12	21.97	
5610MHz	Pass	8.01	18.08	17.96	21.03	21.97	

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



Summary

Mode	PD					
	(dBm/RBW)					
5.25-5.35GHz	· ·					
802.11a_Nss1,(6Mbps)_2TX	8.95					
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	8.98					
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	7.09					
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-0.02					
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	8.95					
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	6.66					
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	0.17					
5.47-5.725GHz						
802.11a_Nss1,(6Mbps)_2TX	8.84					
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	8.89					
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	7.11					
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	2.48					
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	8.9					
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	6.31					
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	-1.04					

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

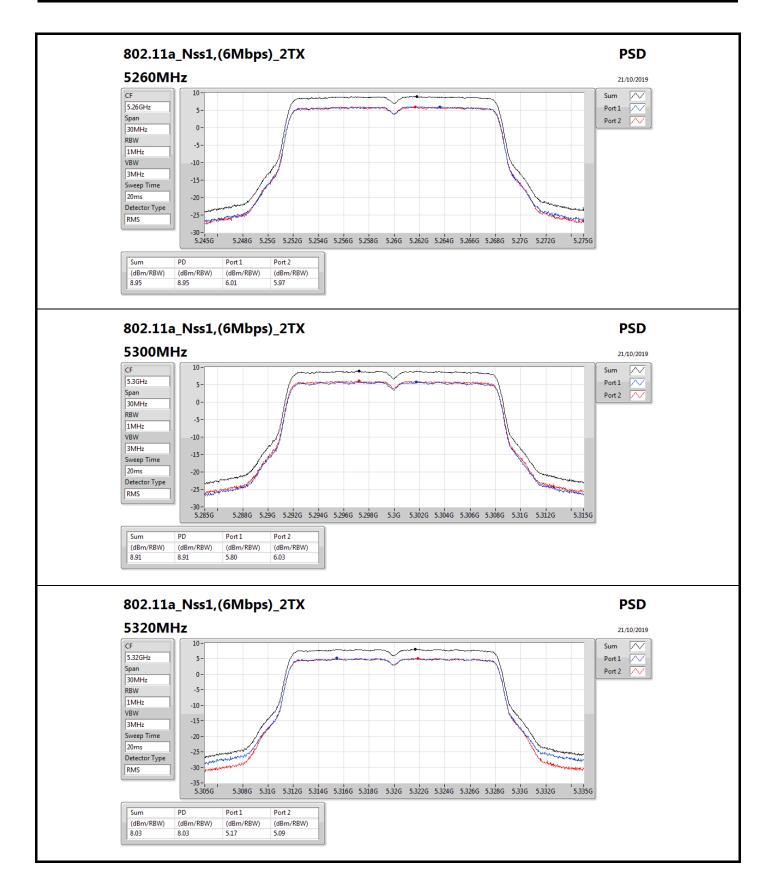


Result

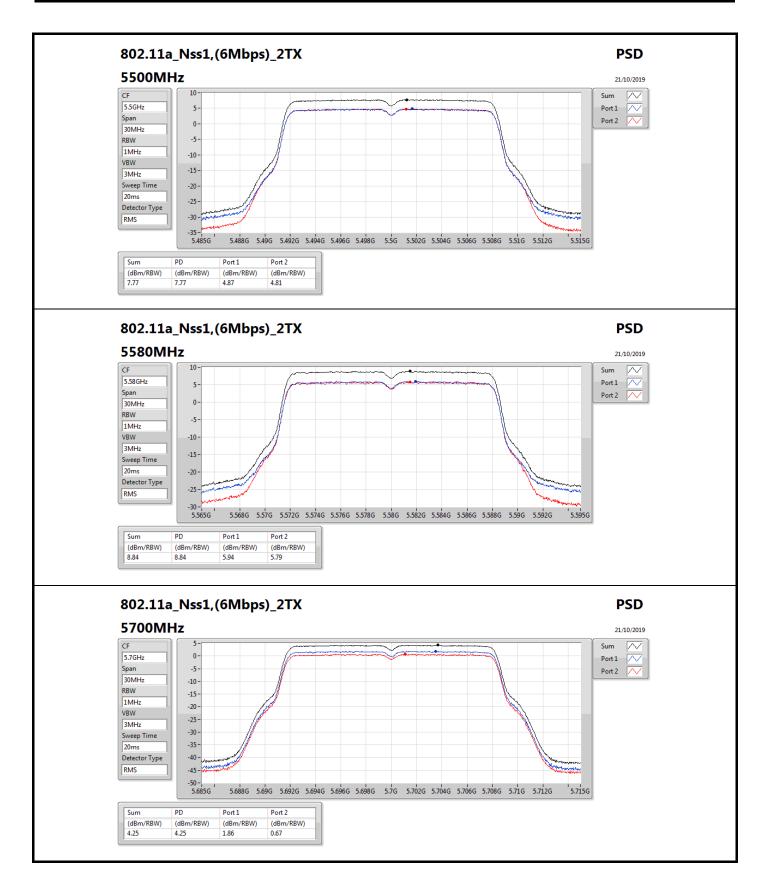
Mode	Result	DG	Port 1	Port 2	PD	PD Limit	
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5260MHz	Pass	8.01	6.01	5.97	8.95	8.99	
5300MHz	Pass	8.01	5.8	6.03	8.91	8.99	
5320MHz	Pass	8.01	5.17	5.09	8.03	8.99	
5500MHz	Pass	8.01	4.87	4.81	7.77	8.99	
5580MHz	Pass	8.01	5.94	5.79	8.84	8.99	
5700MHz	Pass	8.01	1.86	0.67	4.25	8.99	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5260MHz	Pass	8.01	6.29	5.78	8.96	8.99	
5300MHz	Pass	8.01	6.2	6.44	8.98	8.99	
5320MHz	Pass	8.01	5.87	6.17	8.97	8.99	
5500MHz	Pass	8.01	5.42	6.26	8.74	8.99	
5580MHz	Pass	8.01	5.73	6.15	8.89	8.99	
5700MHz	Pass	8.01	2.36	2.66	5.50	8.99	
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5270MHz	Pass	8.01	4.69	3.97	7.09	8.99	
5310MHz	Pass	8.01	0.15	0.21	2.86	8.99	
5510MHz	Pass	8.01	-1.8	-0.88	1.52	8.99	
5550MHz	Pass	8.01	4.1	4.15	7.11	8.99	
5670MHz	Pass	8.01	2.19	2.23	5.19	8.99	
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-		-	-		-	
5290MHz	Pass	8.01	-3.16	-2.78	-0.02	8.99	
5530MHz	Pass	8.01	-3.97	-3.83	-0.98	8.99	
5610MHz	Pass	8.01	-0.34	-0.72	2.48	8.99	
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-		-	-		-	
5260MHz	Pass	8.01	6.31	5.71	8.95	8.99	
5300MHz	Pass	8.01	6.02	5.98	8.93	8.99	
5320MHz	Pass	8.01	5.88	6.34	8.86	8.99	
5500MHz	Pass	8.01	4.05	4.93	7.46	8.99	
5580MHz	Pass	8.01	5.8	6.34	8.90	8.99	
5700MHz	Pass	8.01	1.79	2.13	4.87	8.99	
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5270MHz	Pass	8.01	3.66	3.81	6.66	8.99	
5310MHz	Pass	8.01	0.5	0.52	3.48	8.99	
5510MHz	Pass	8.01	-1.24	-1.09	1.78	8.99	
5550MHz	Pass	8.01	3.22	3.41	6.31	8.99	
5670MHz	Pass	8.01	2.44	2.55	5.47	8.99	
802.11ax HEW80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5290MHz	Pass	8.01	-2.79	-2.75	0.17	8.99	
5530MHz	Pass	8.01	-4.1	-3.86	-1.04	8.99	
5610MHz	Pass	8.01	-5.53	-5.31	-2.46	8.99	

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;

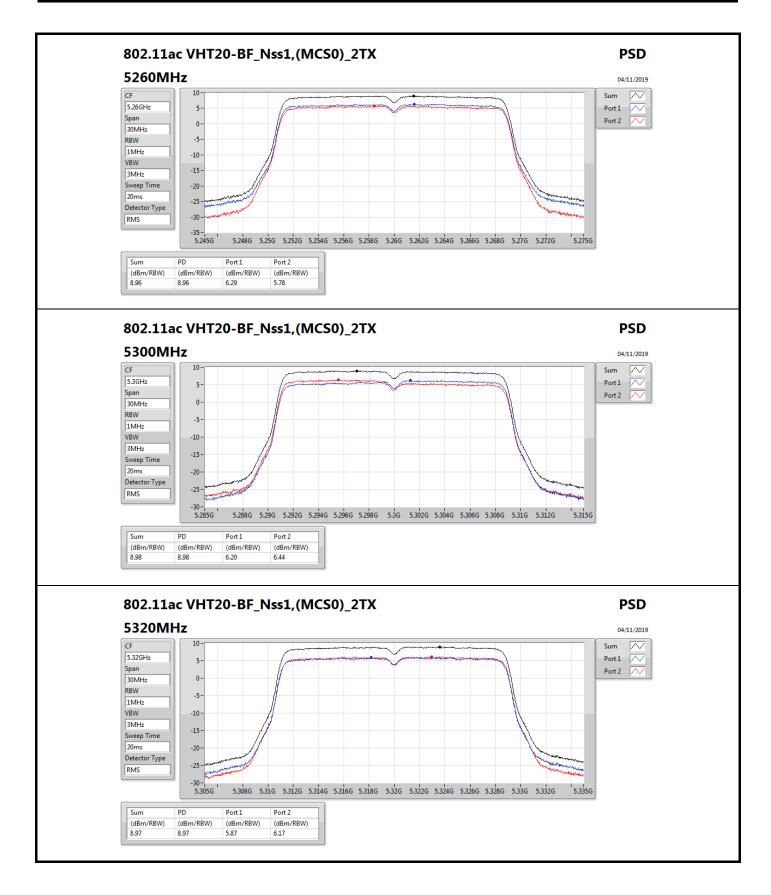




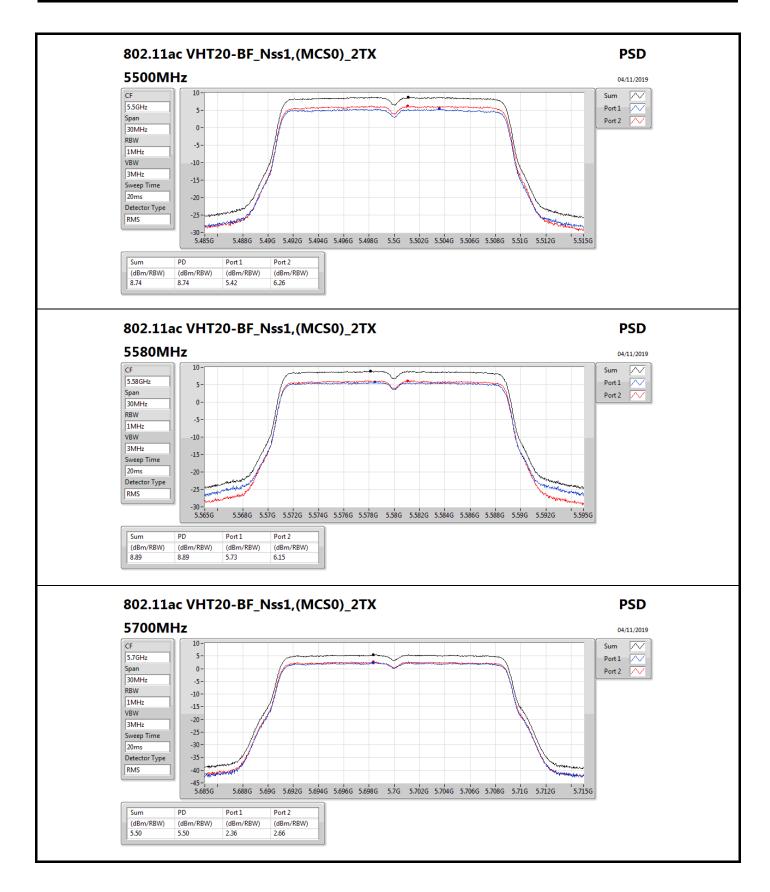




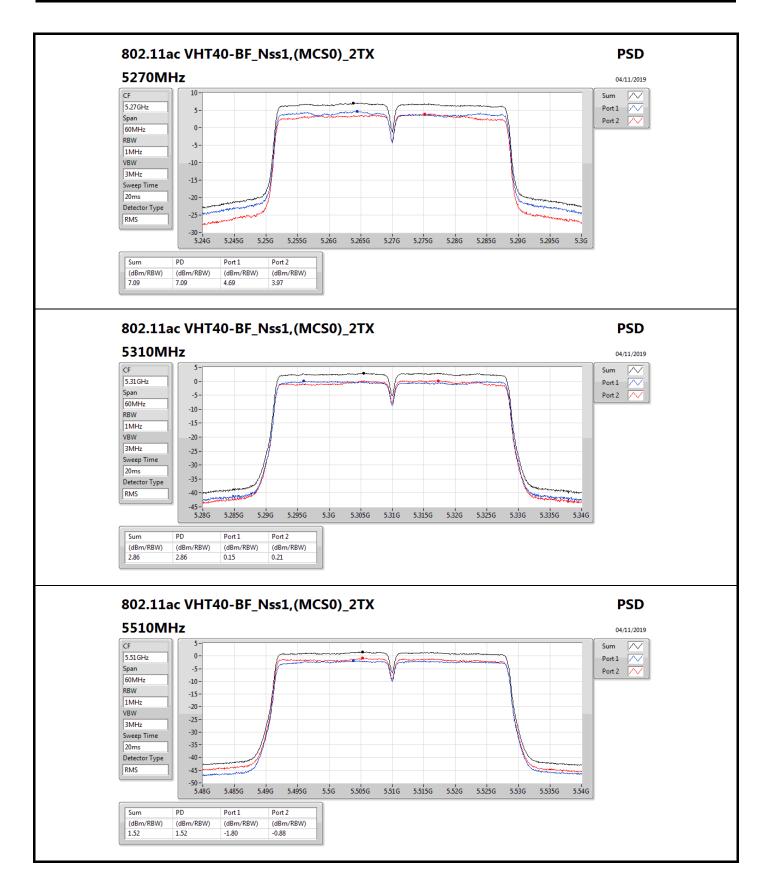




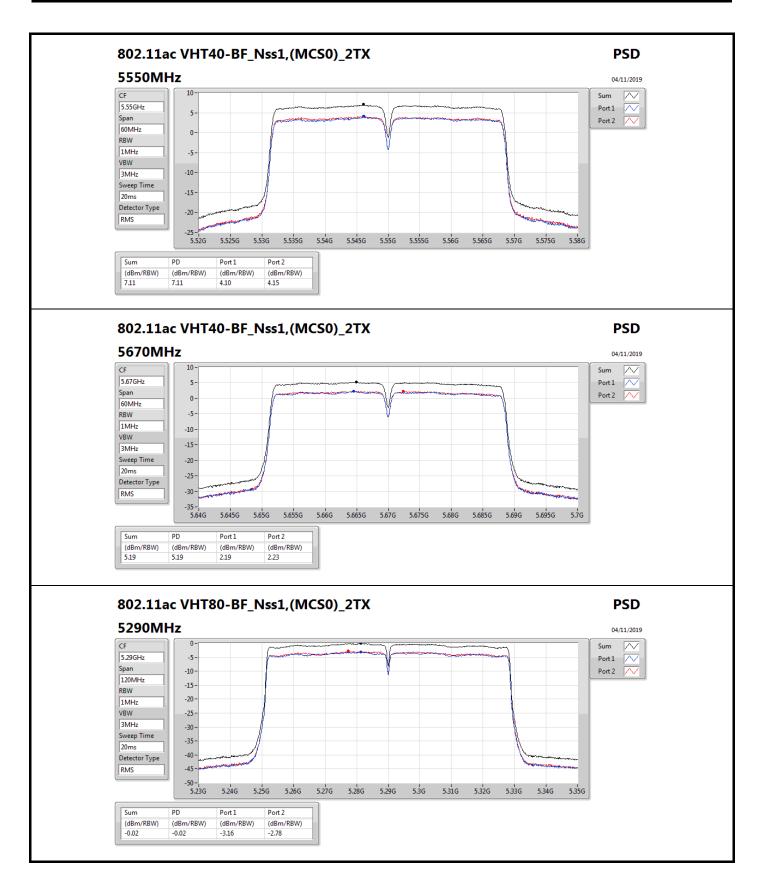




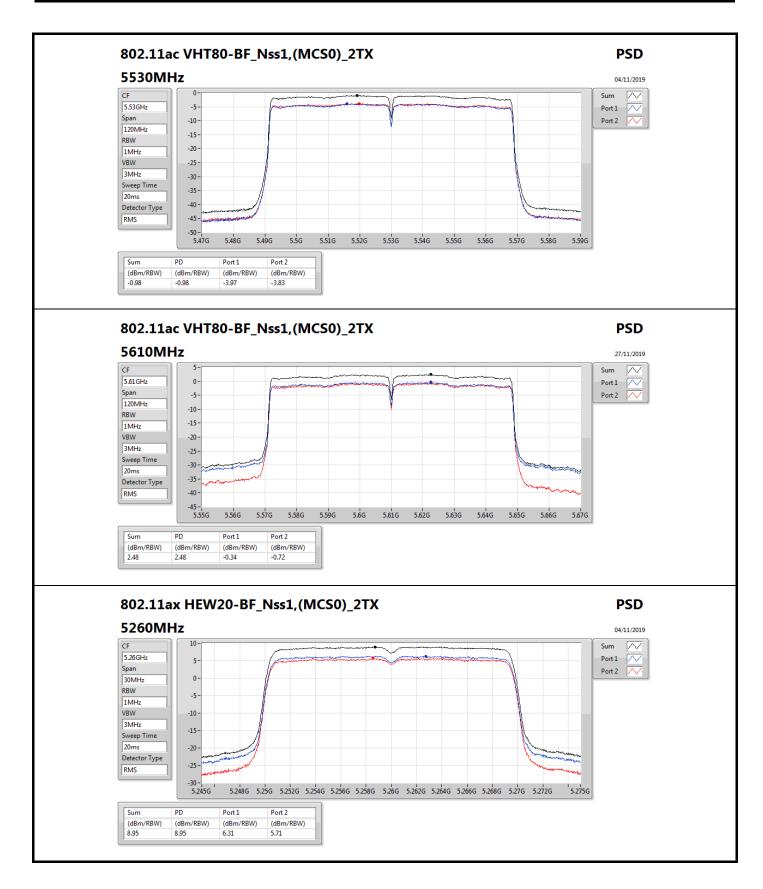




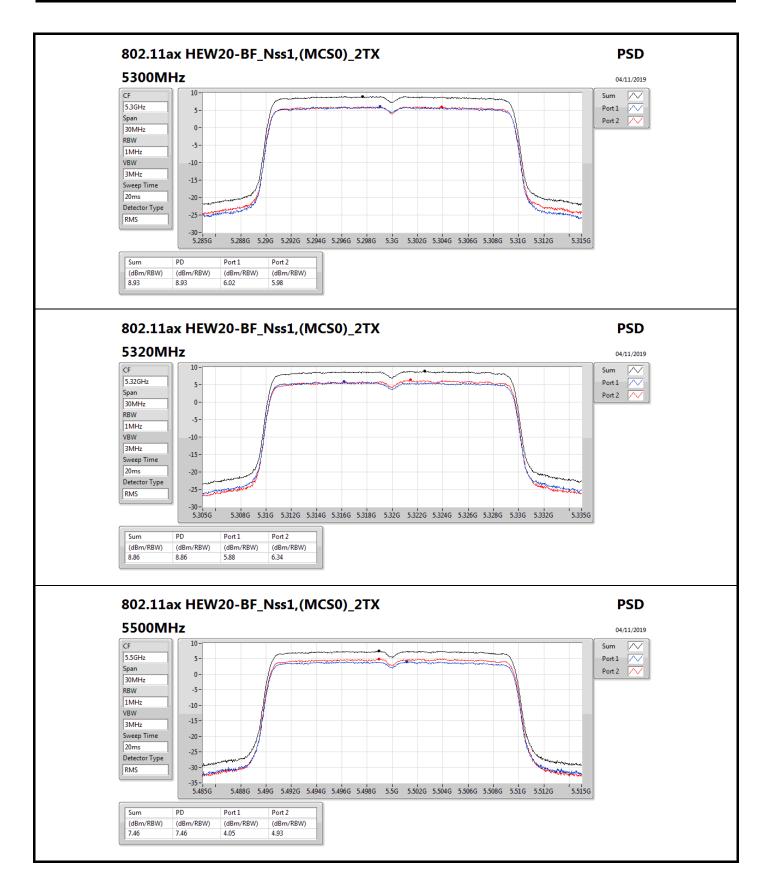




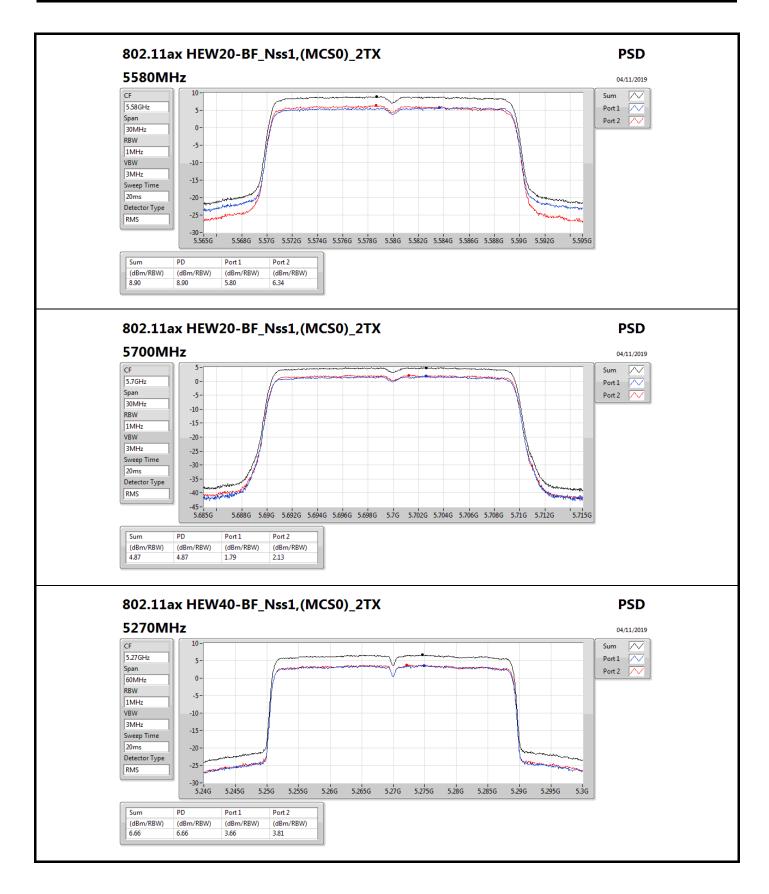




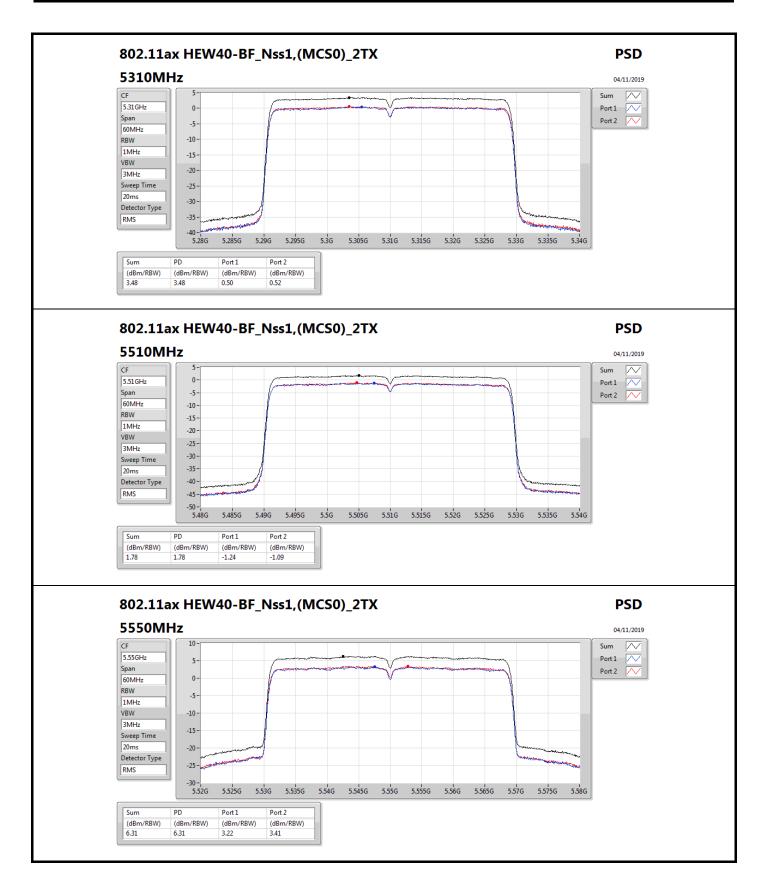




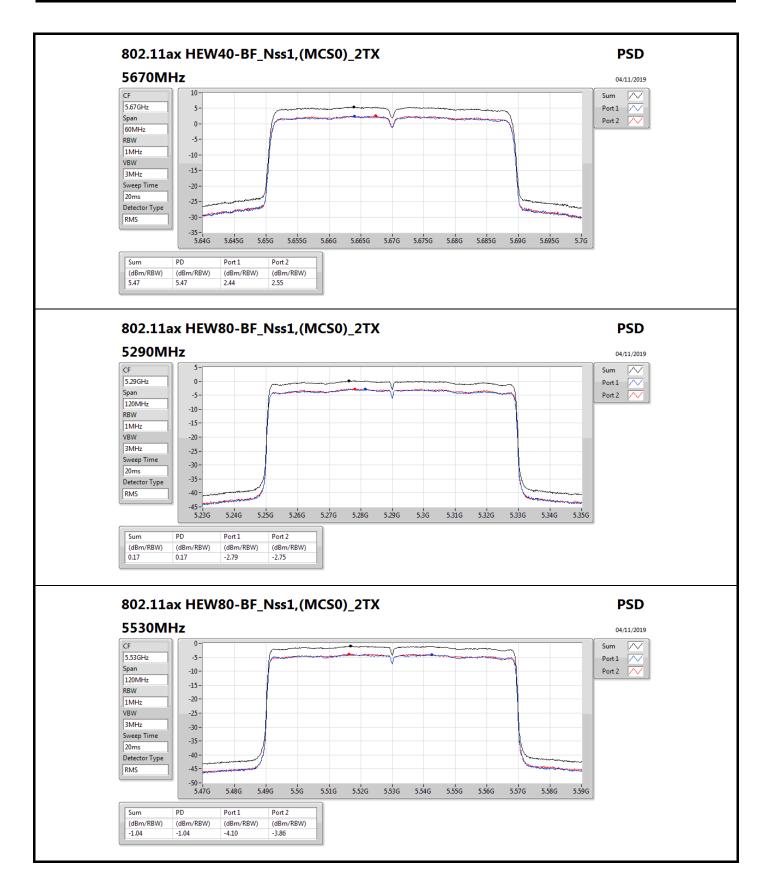




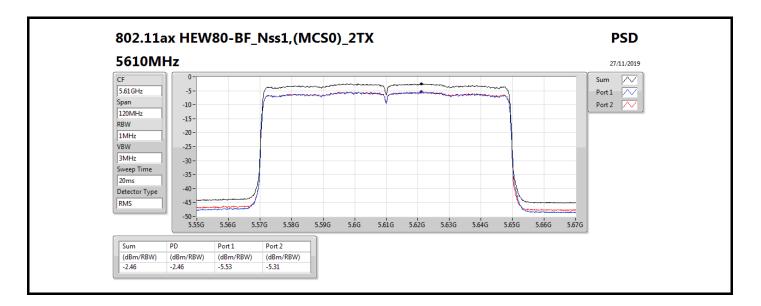












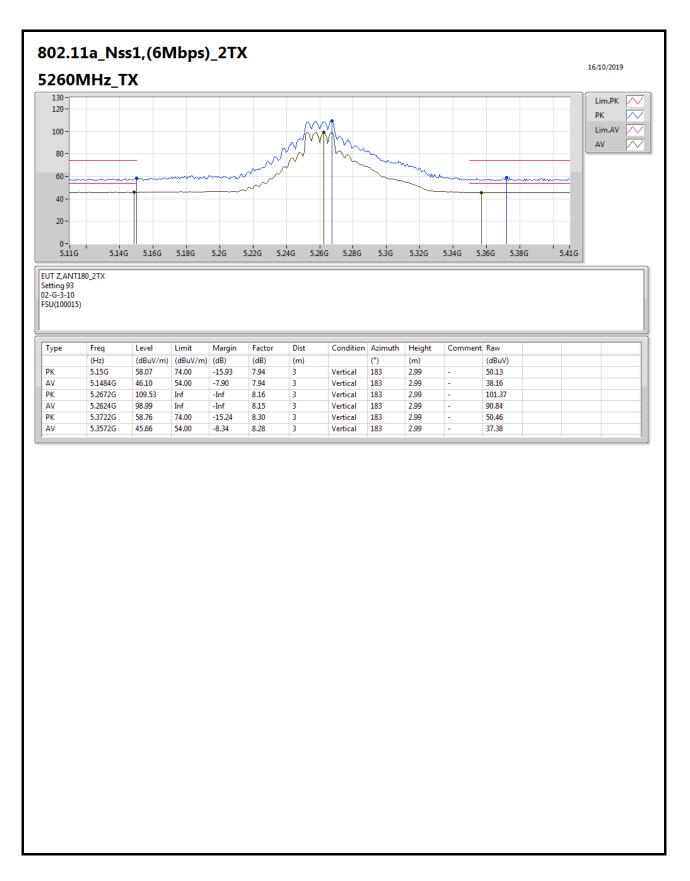


Appendix D

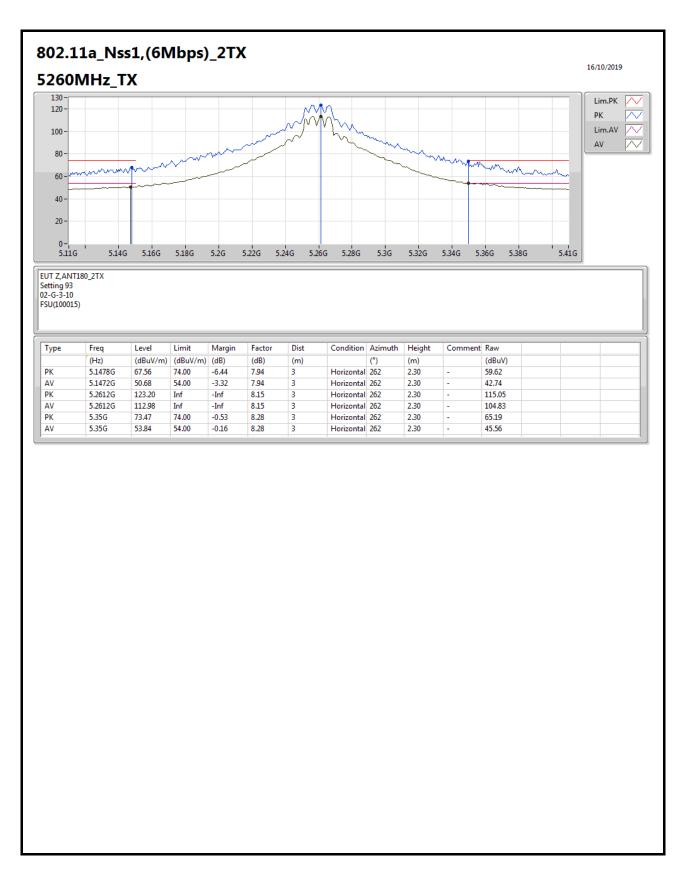
Summary

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	-		-	-	-	-	-	-	-	-	-	-
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	Pass	PK	5.351G	73.97	74.00	-0.03	5.81	3	Horizontal	269	2.02	-

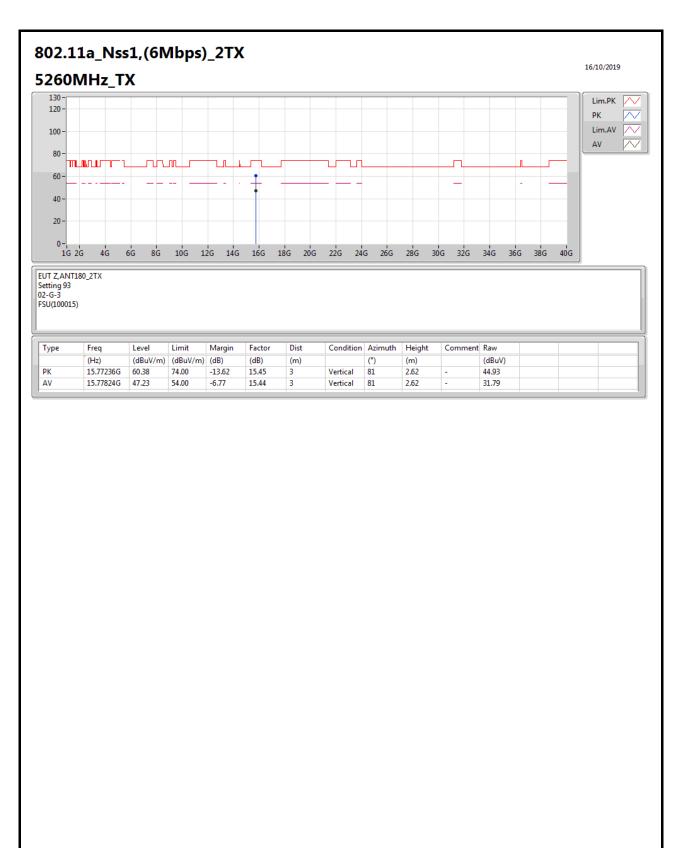




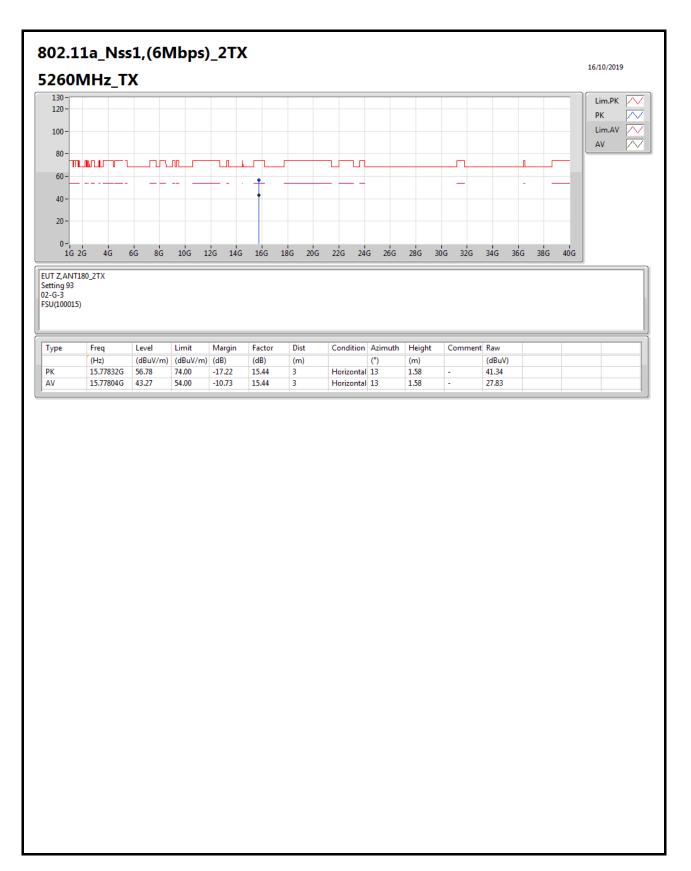




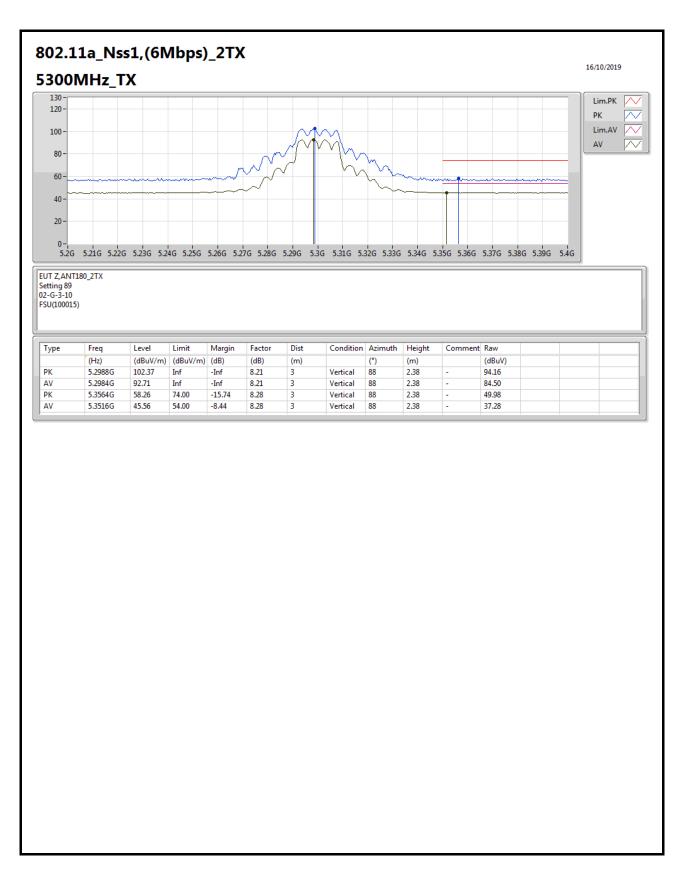




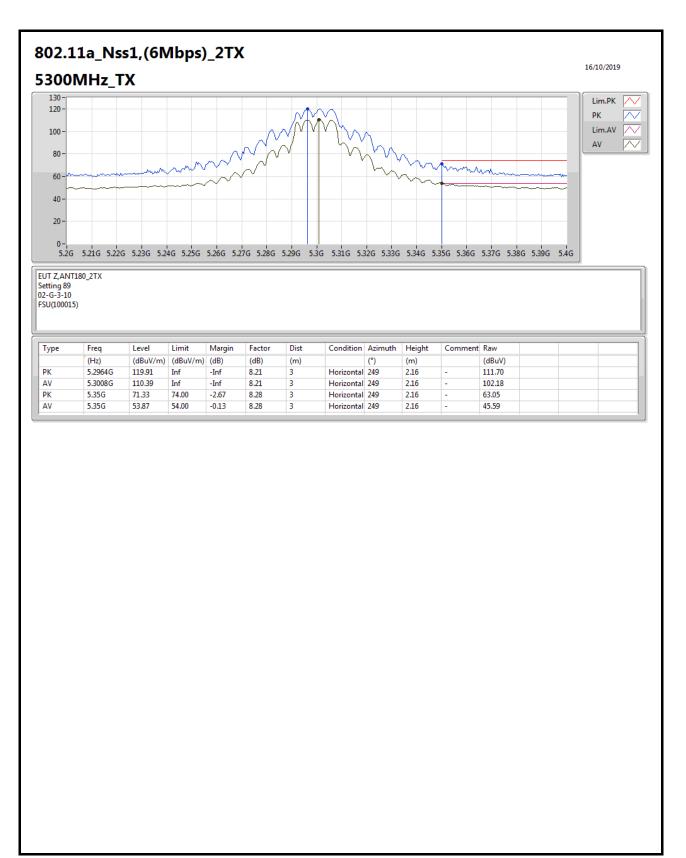




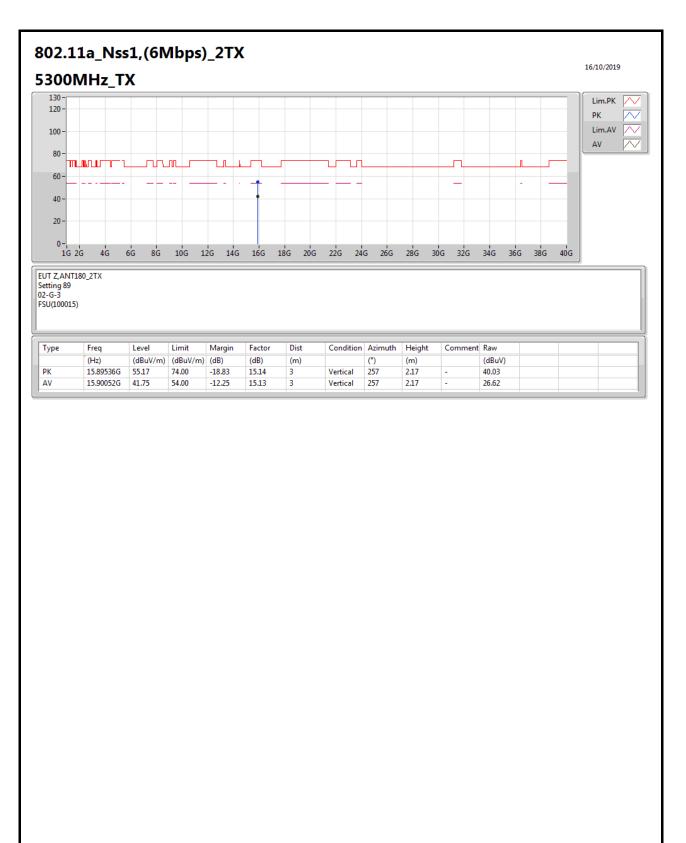




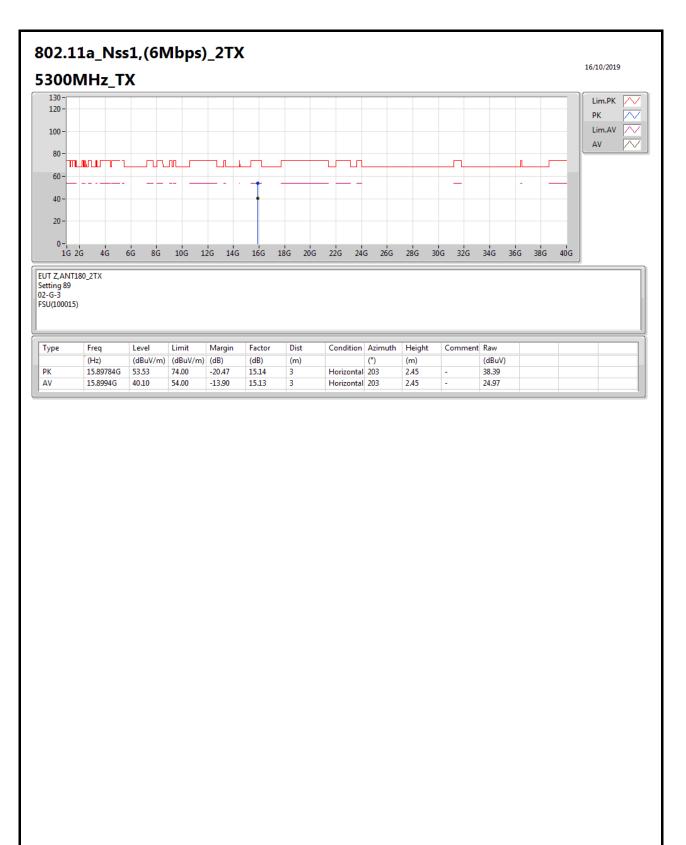




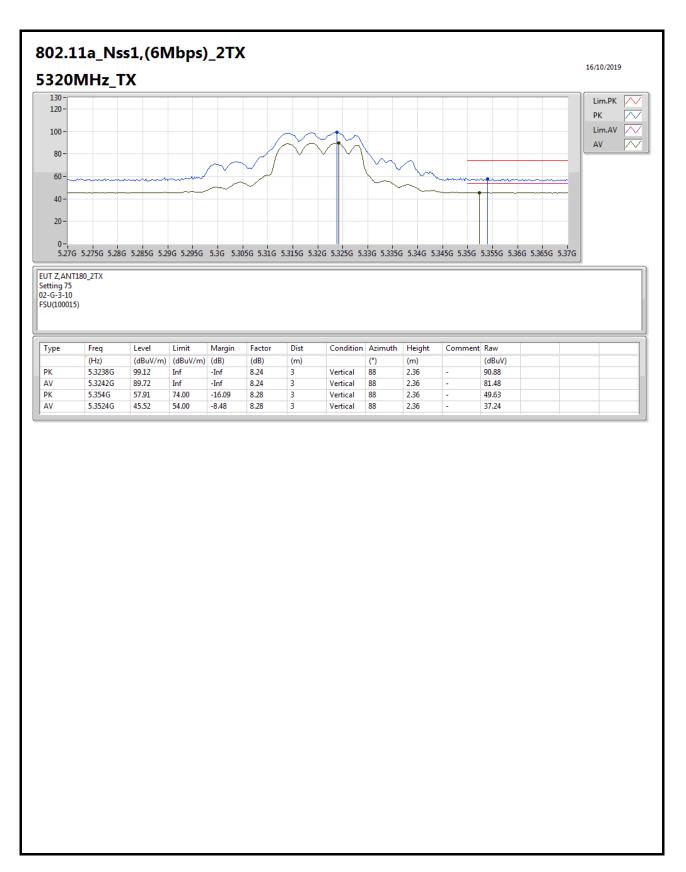




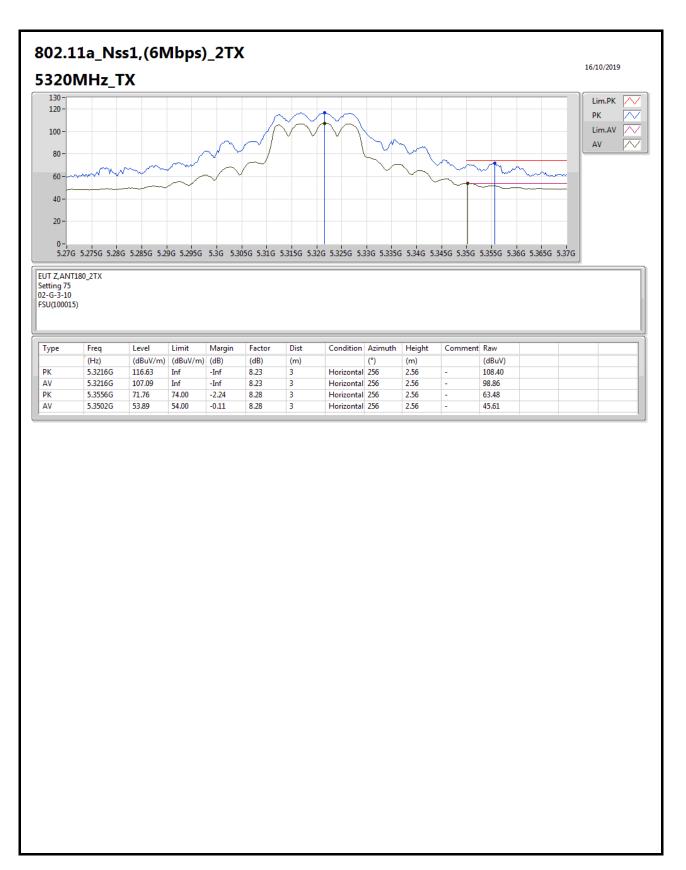




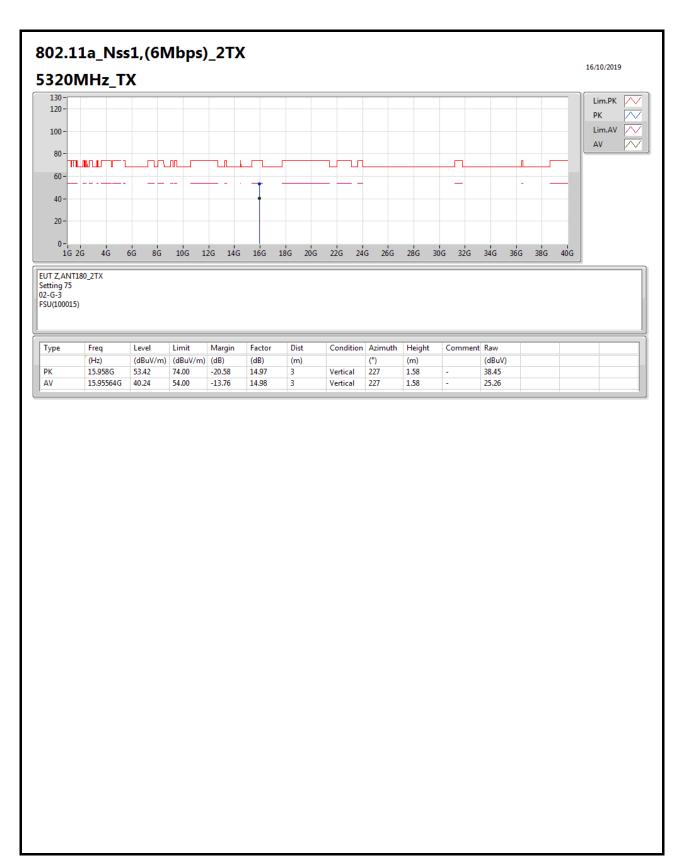




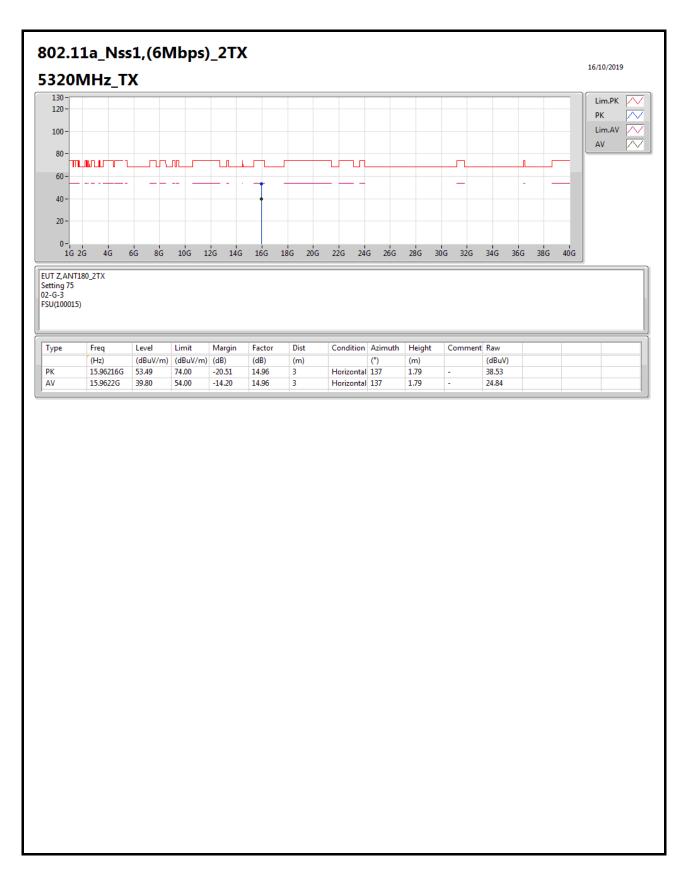




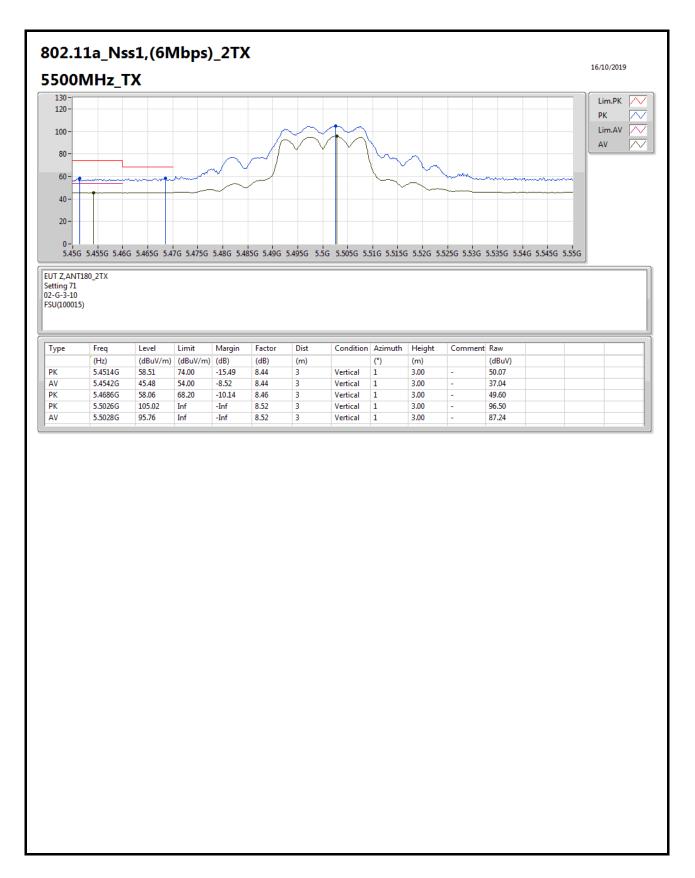




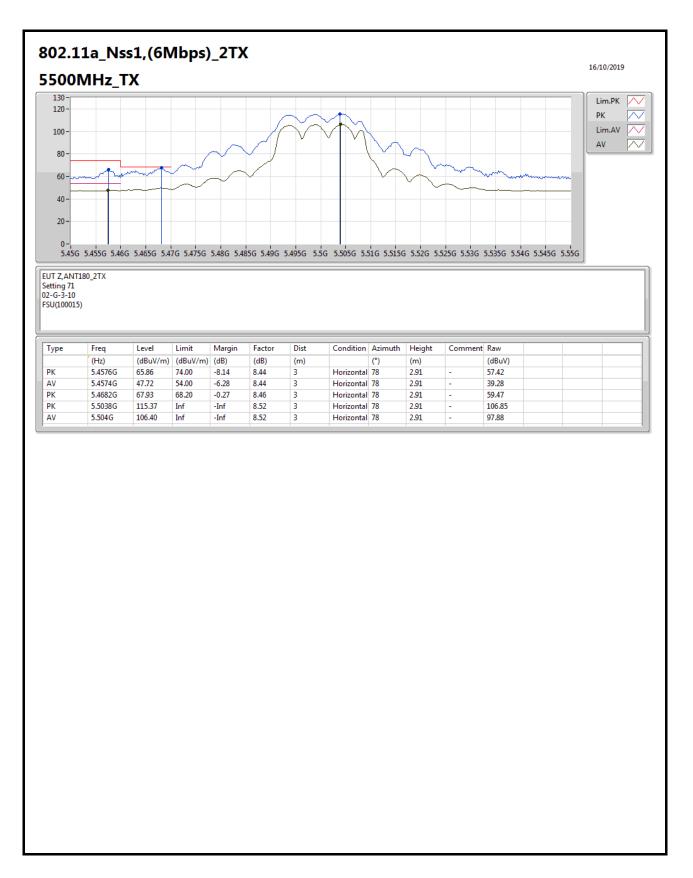




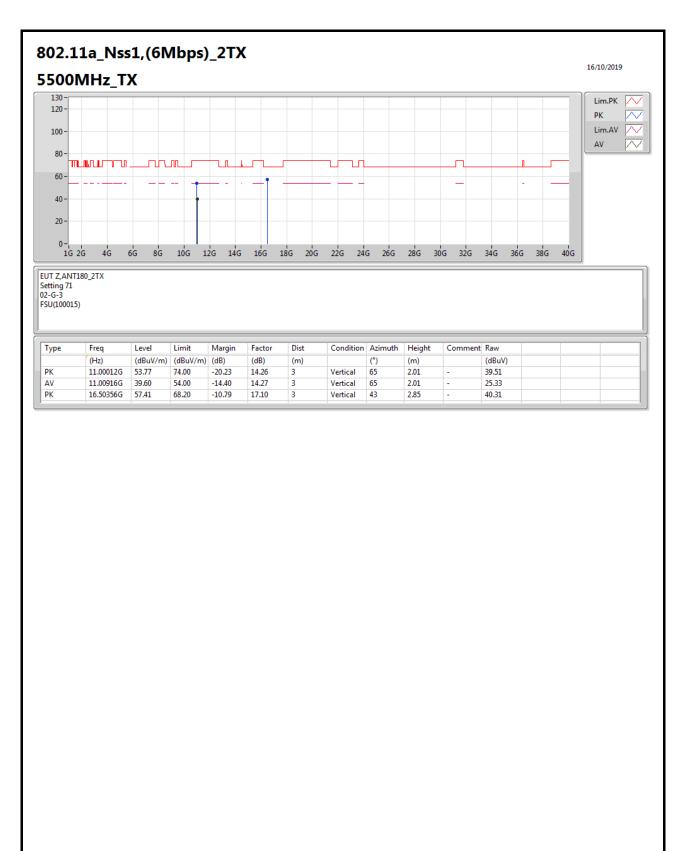




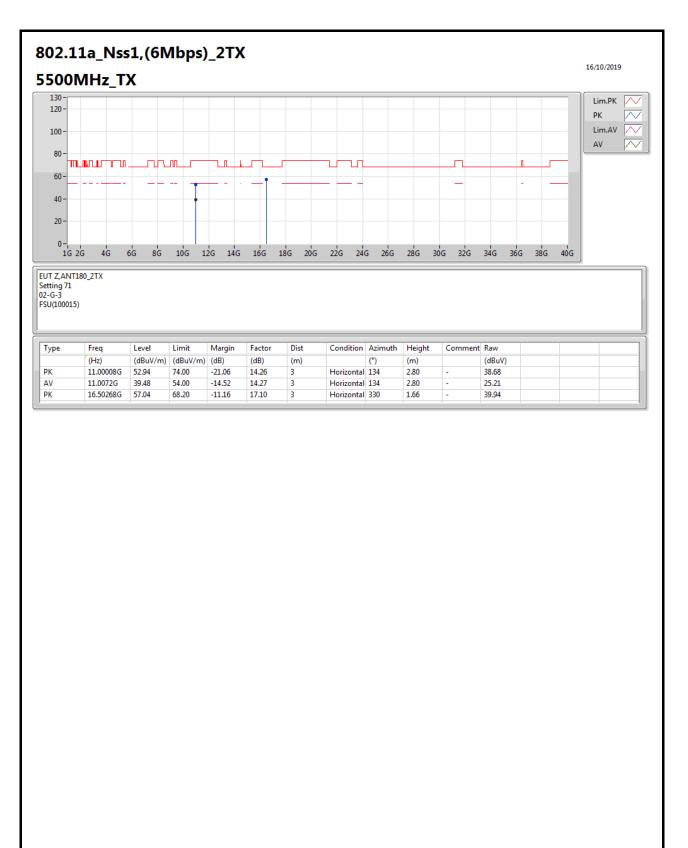




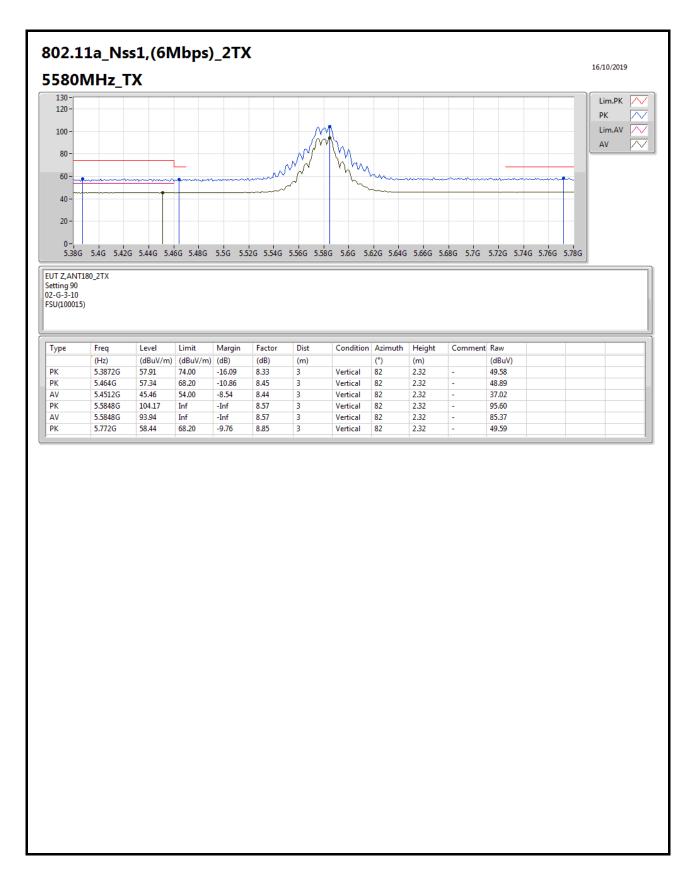




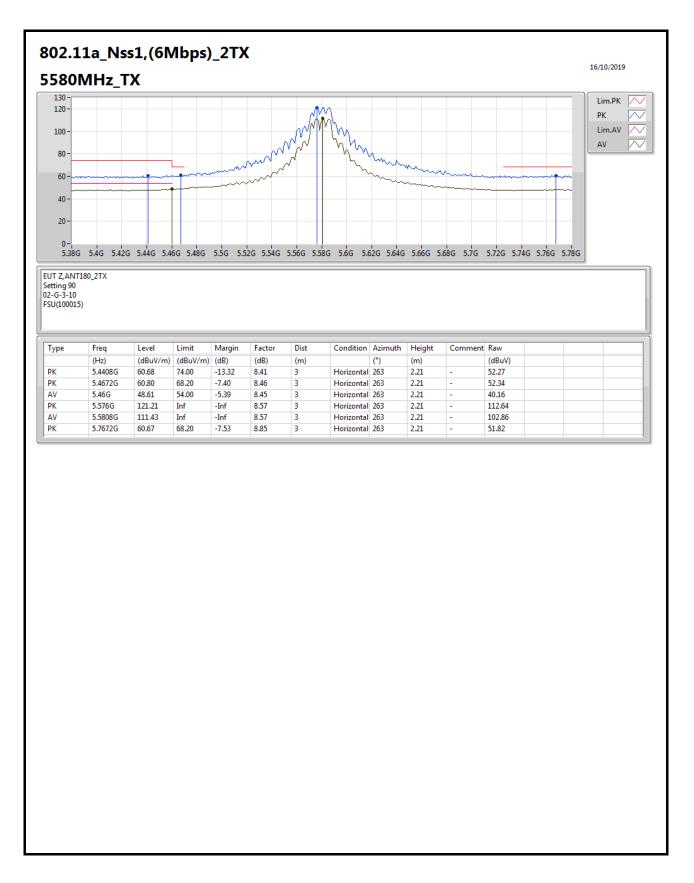




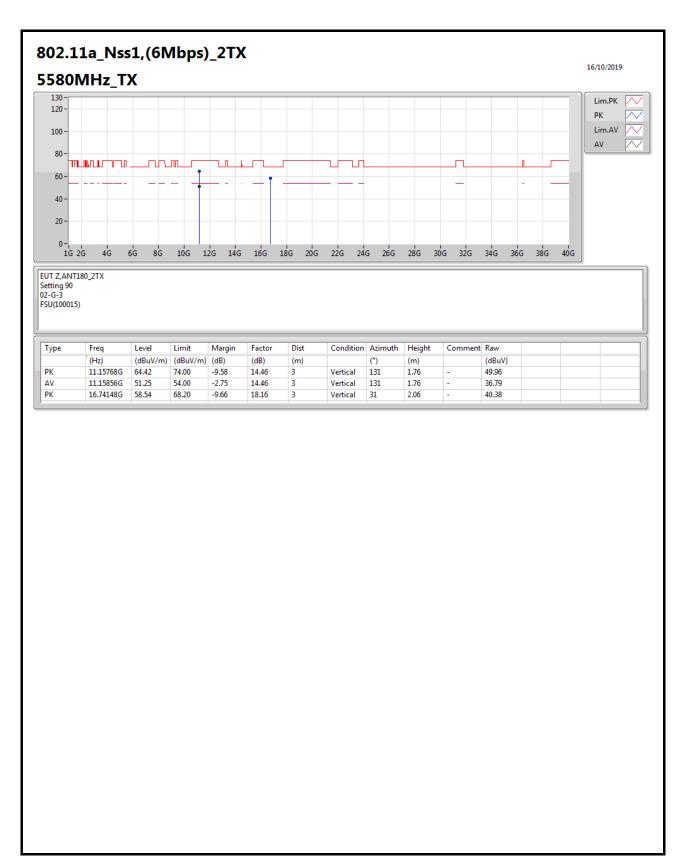




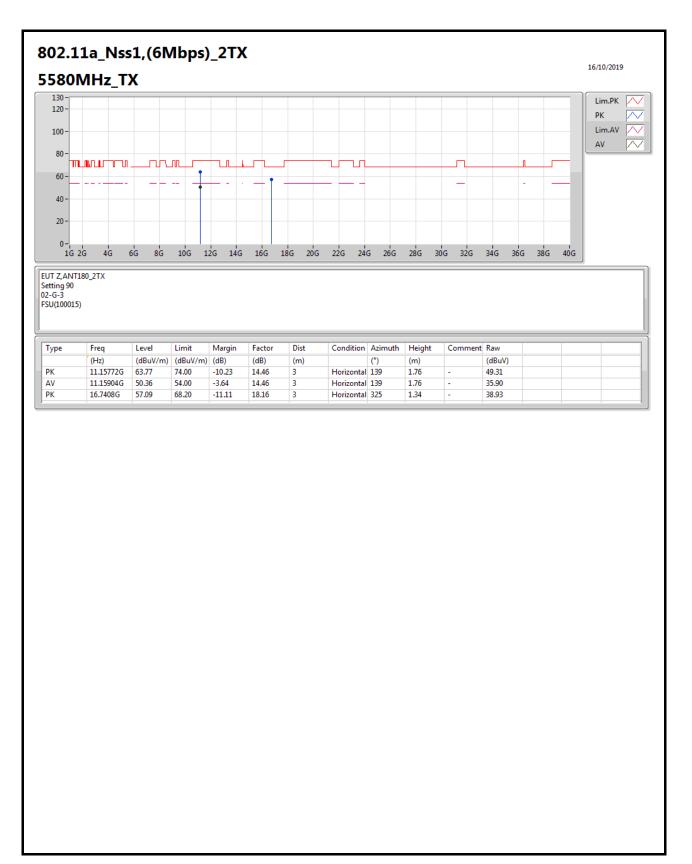




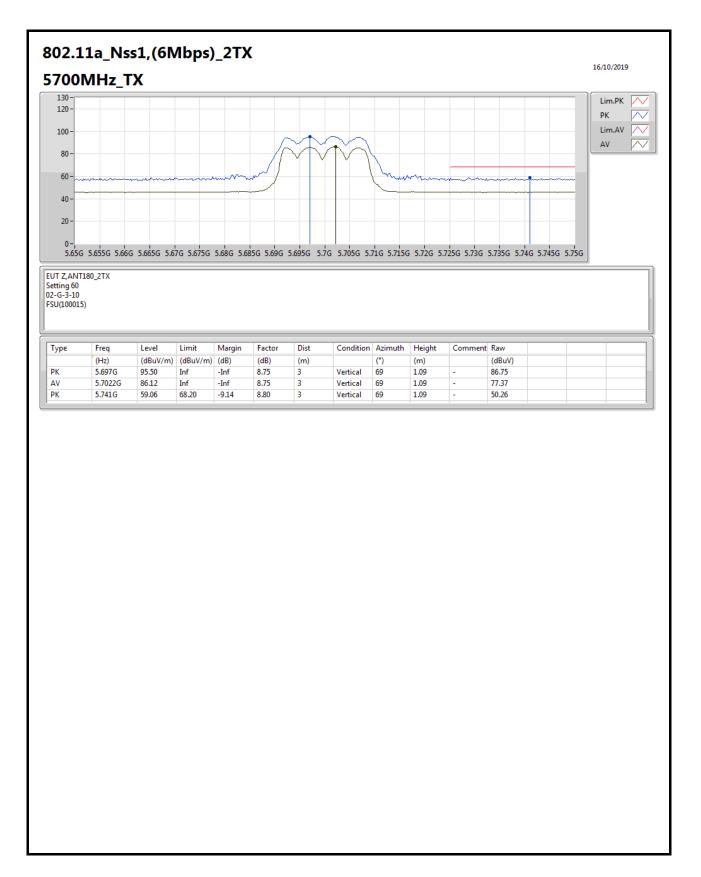




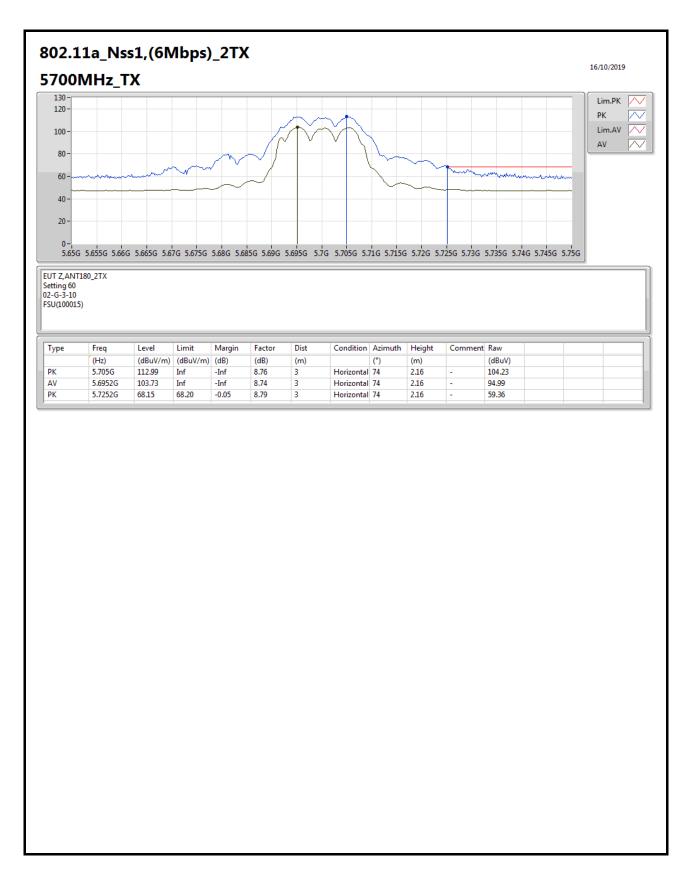




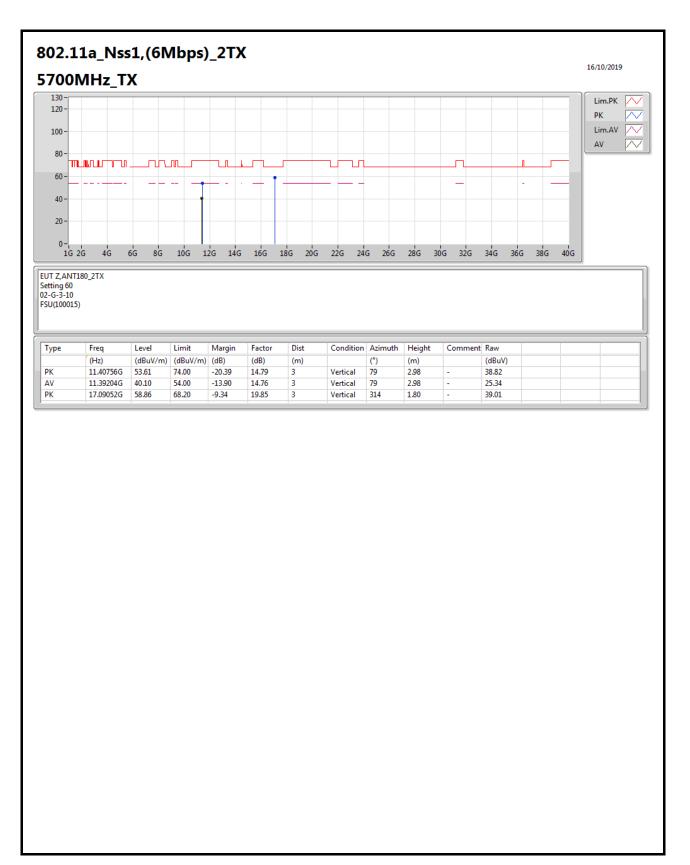




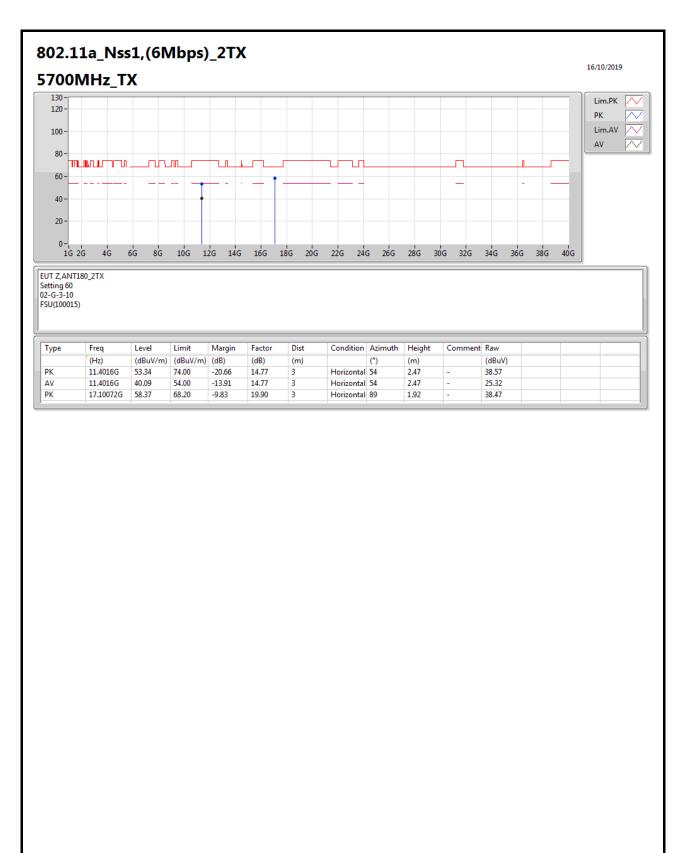






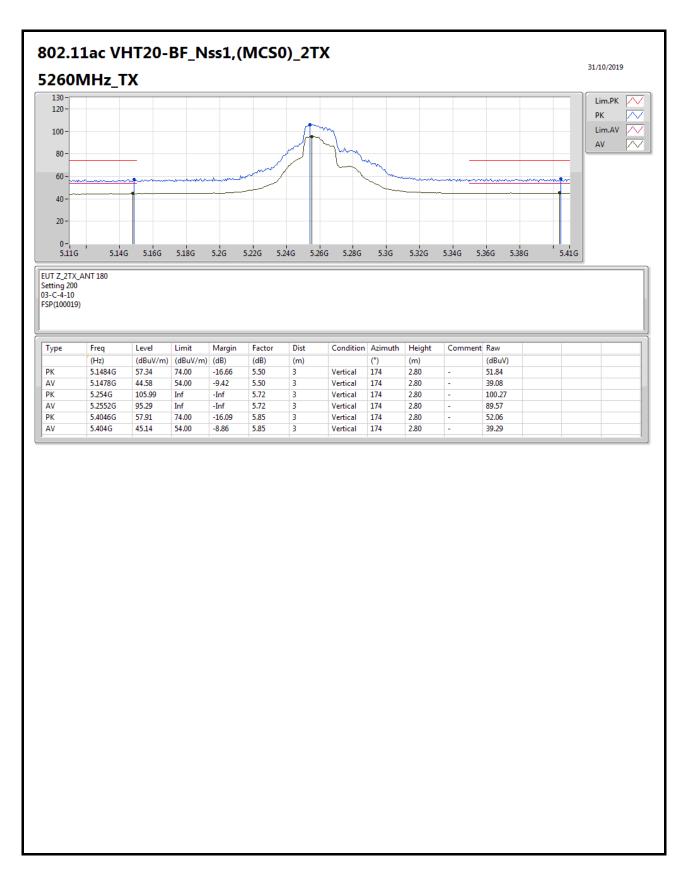




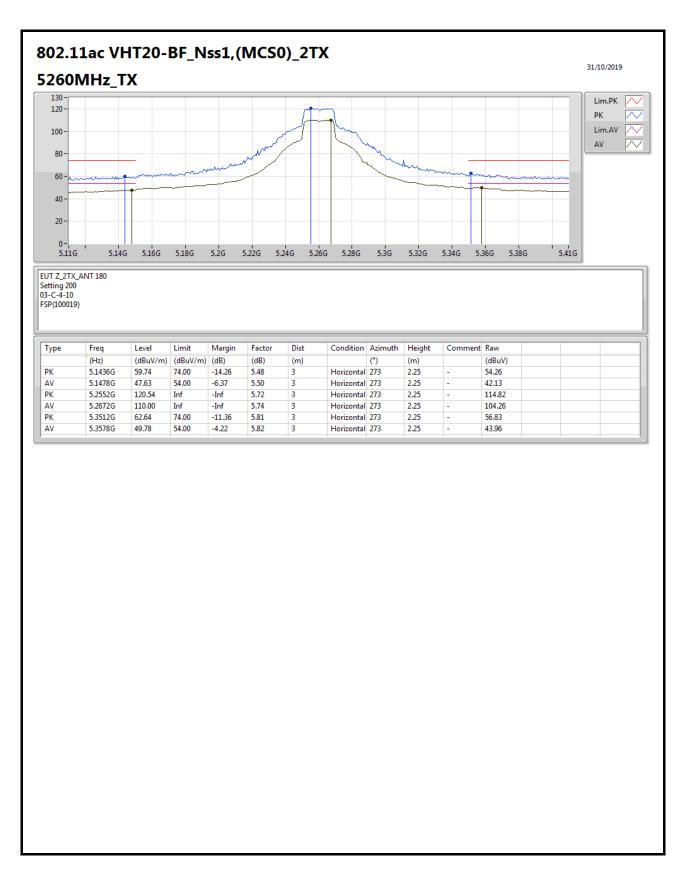




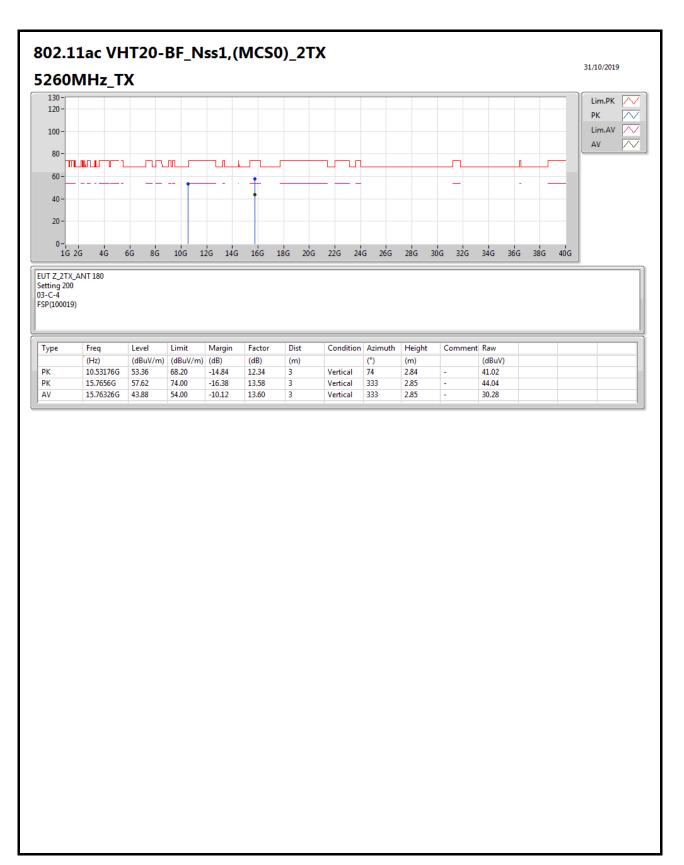
Appendix D



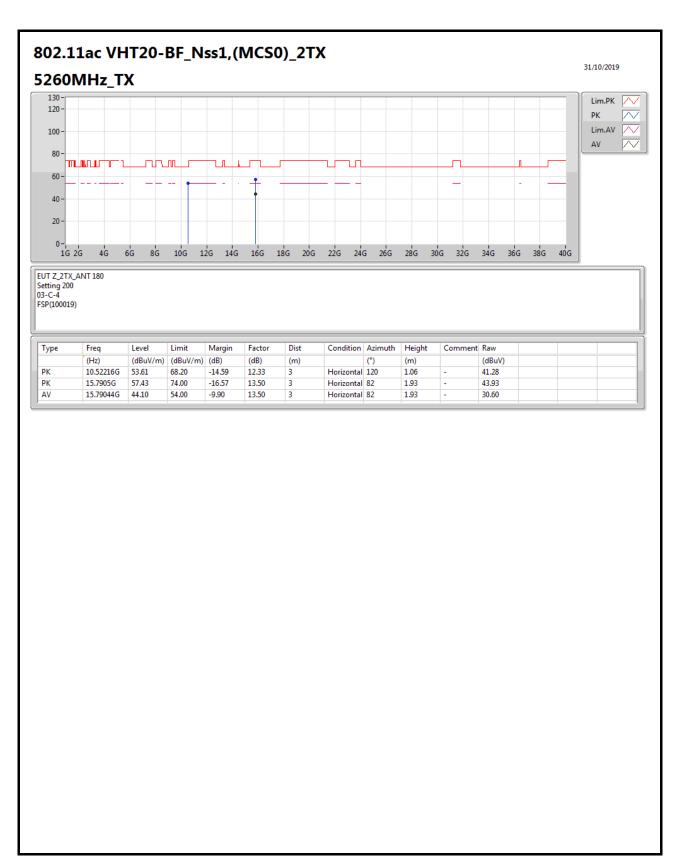




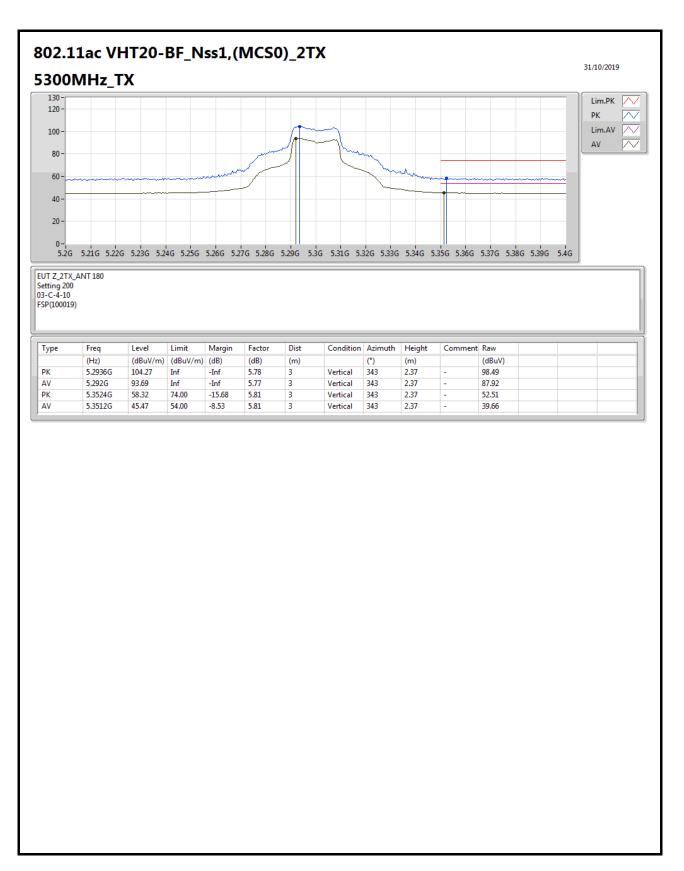




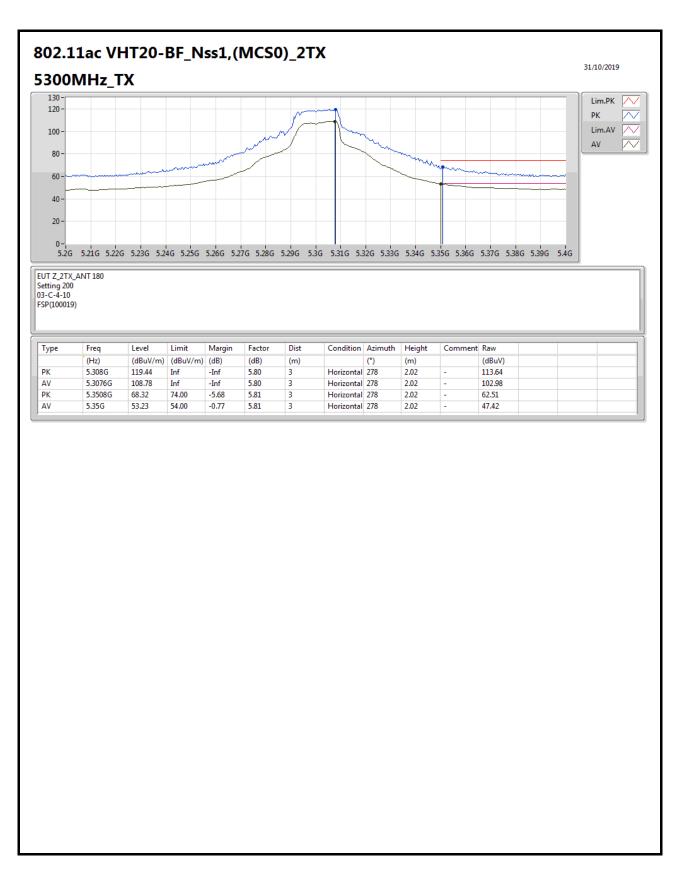




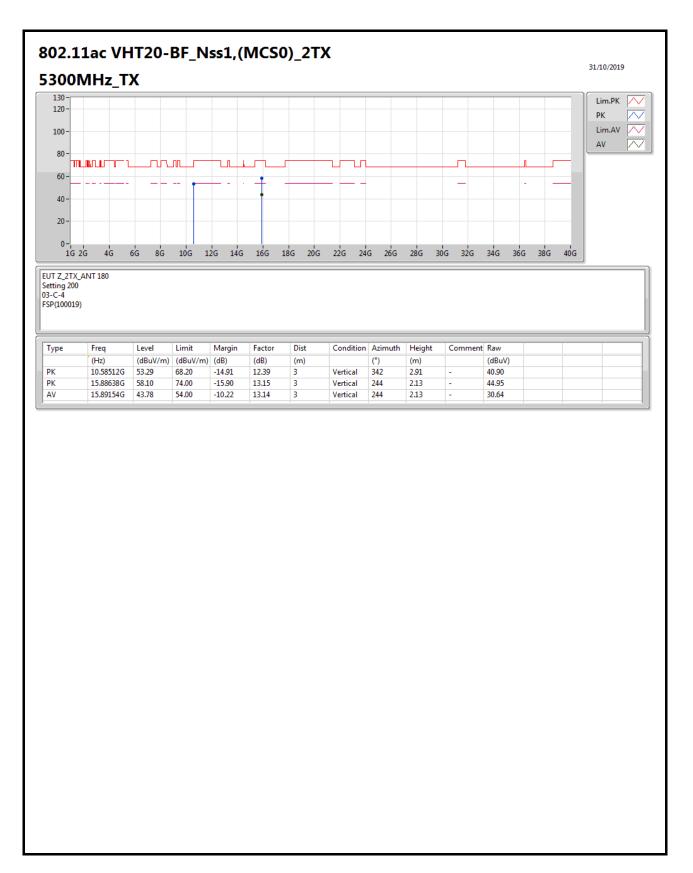




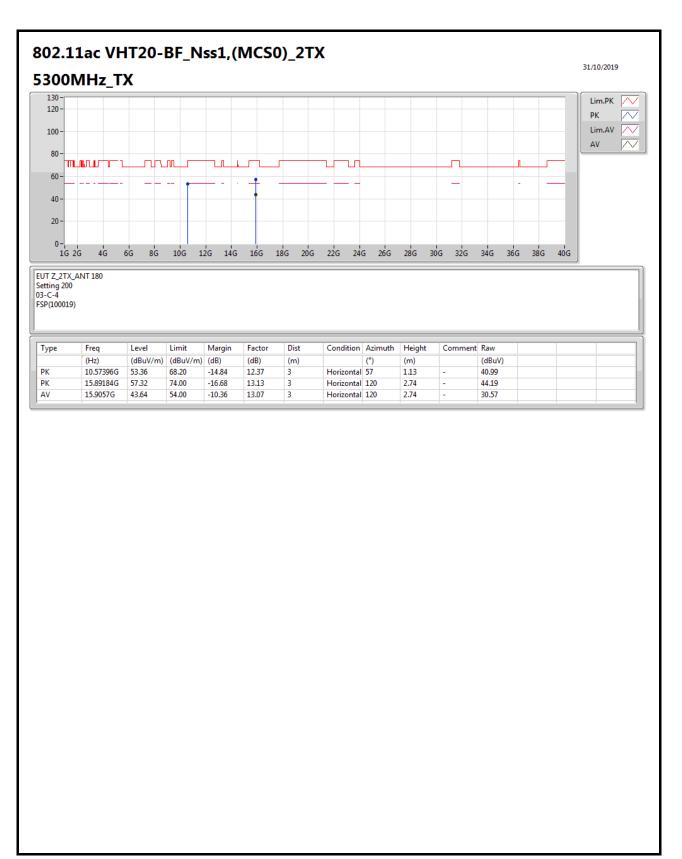




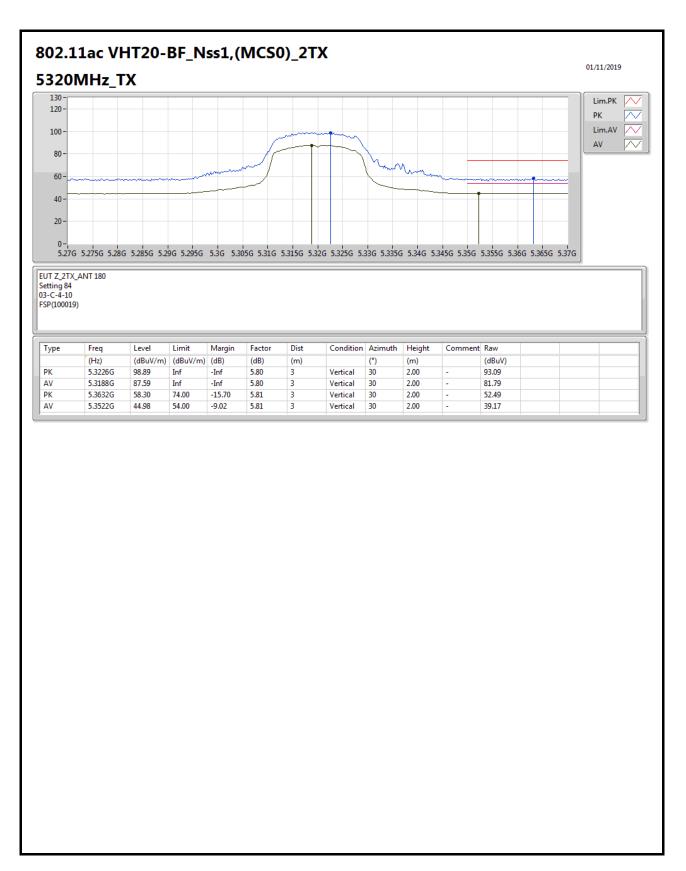




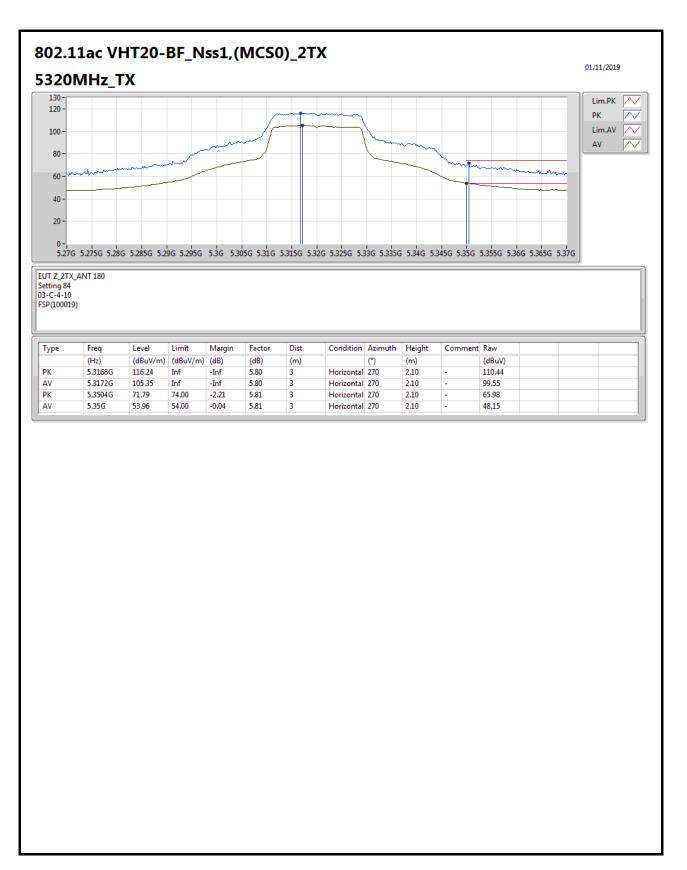




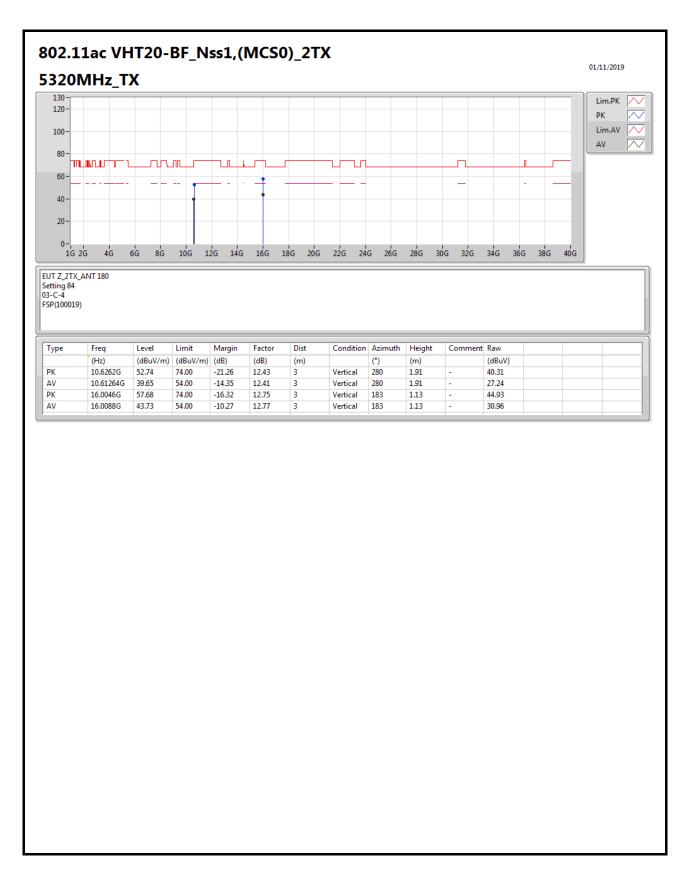




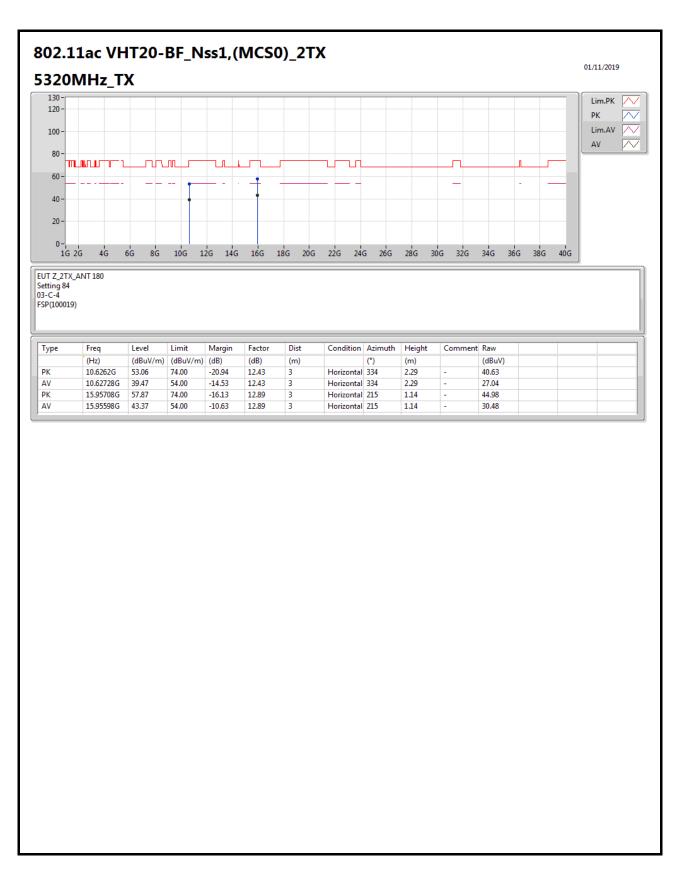




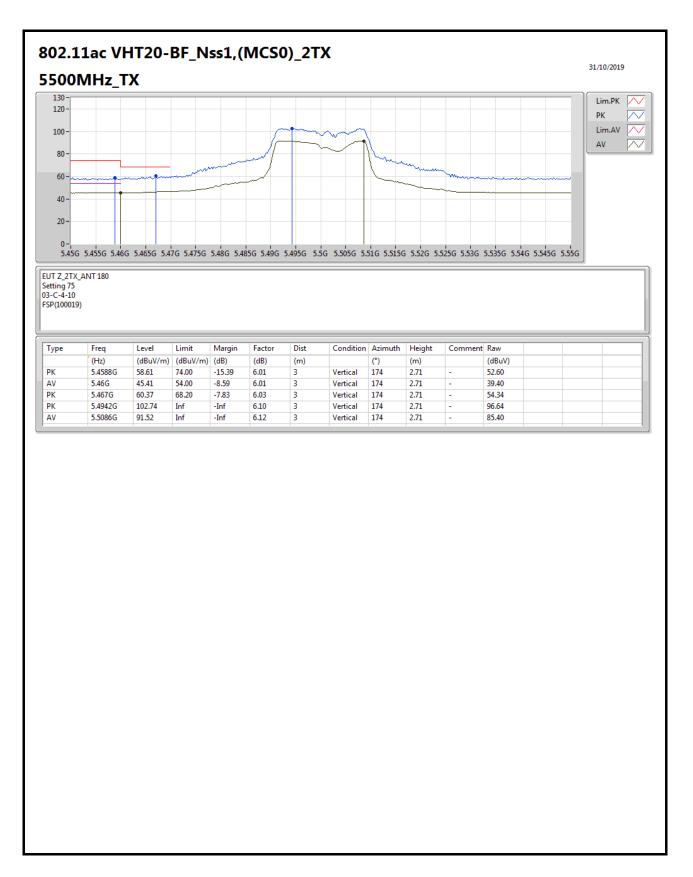




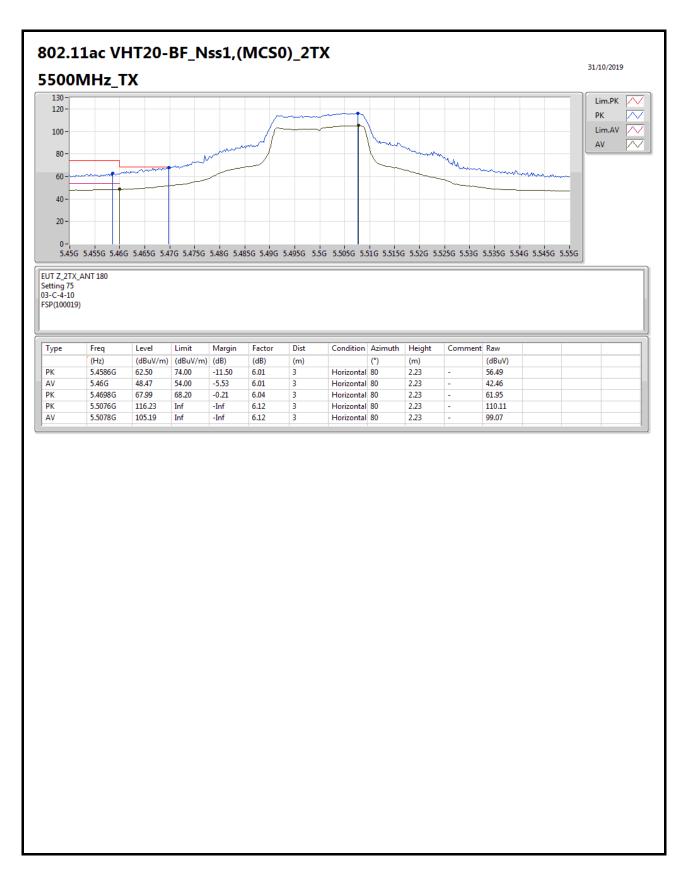




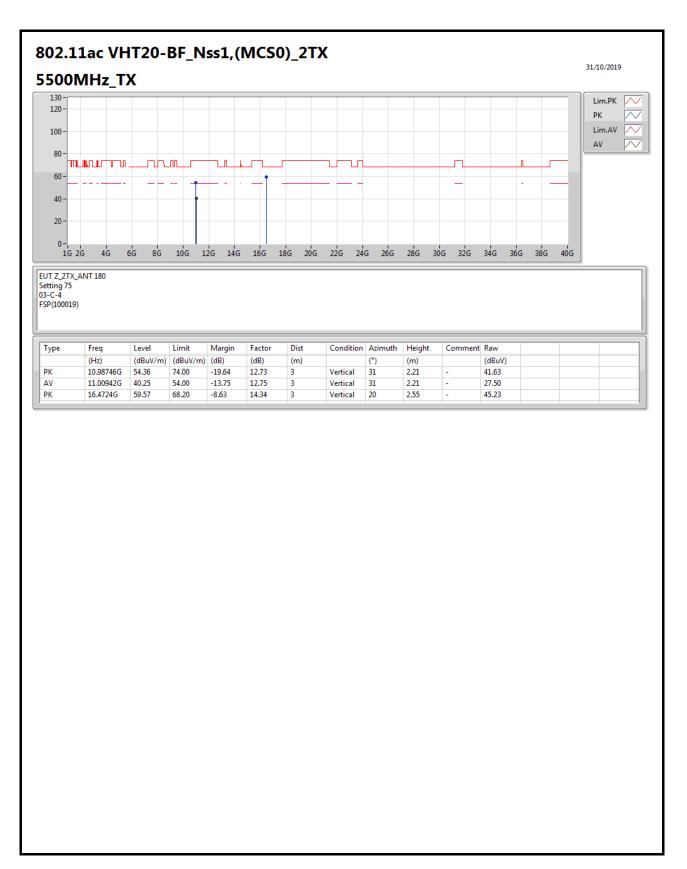




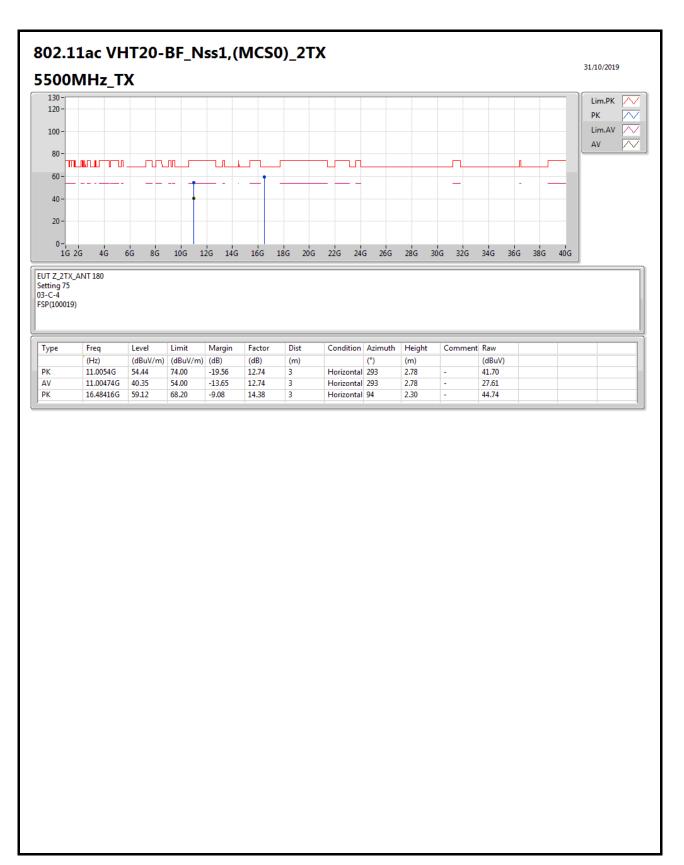




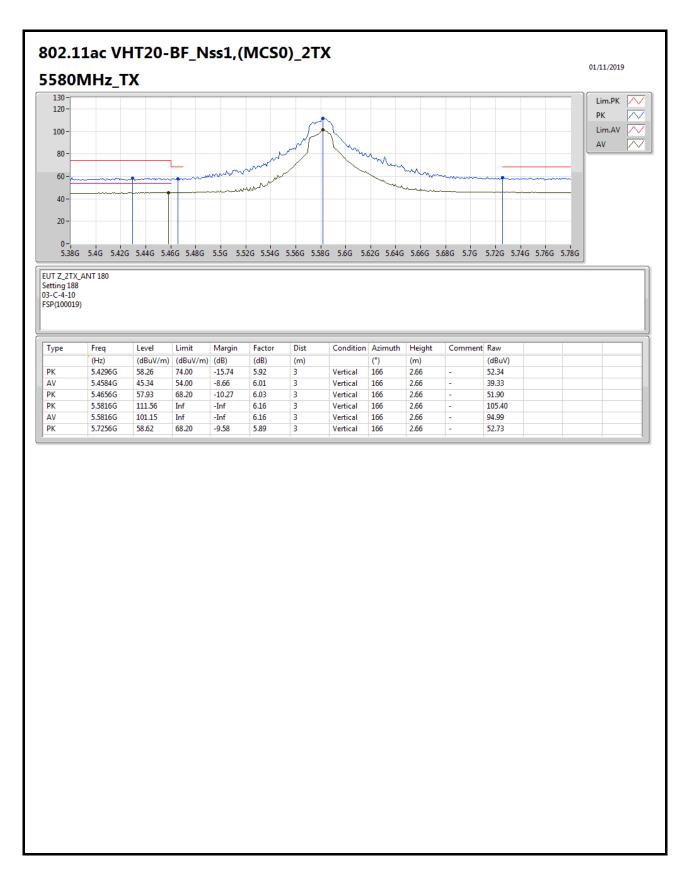




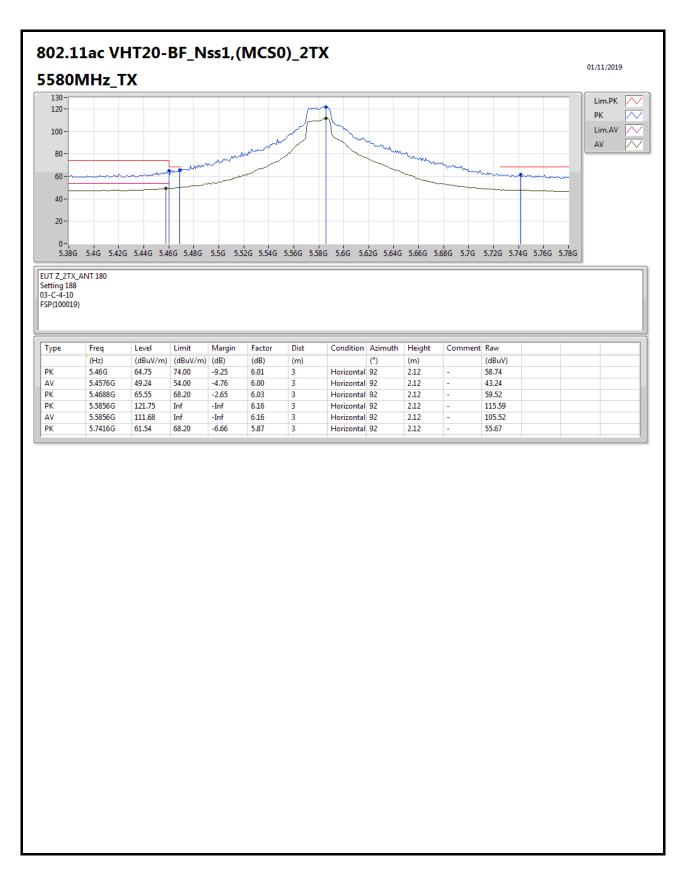




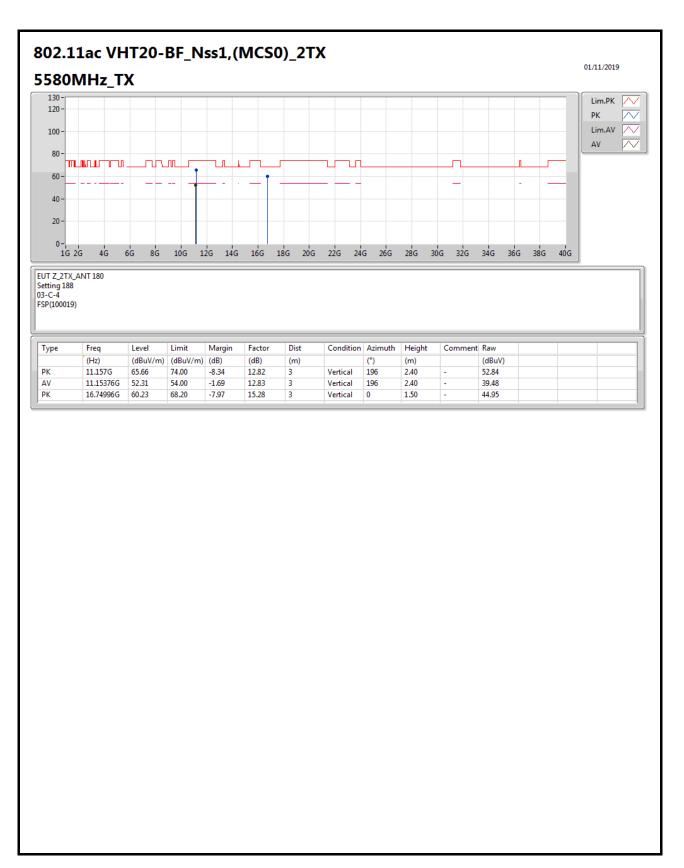




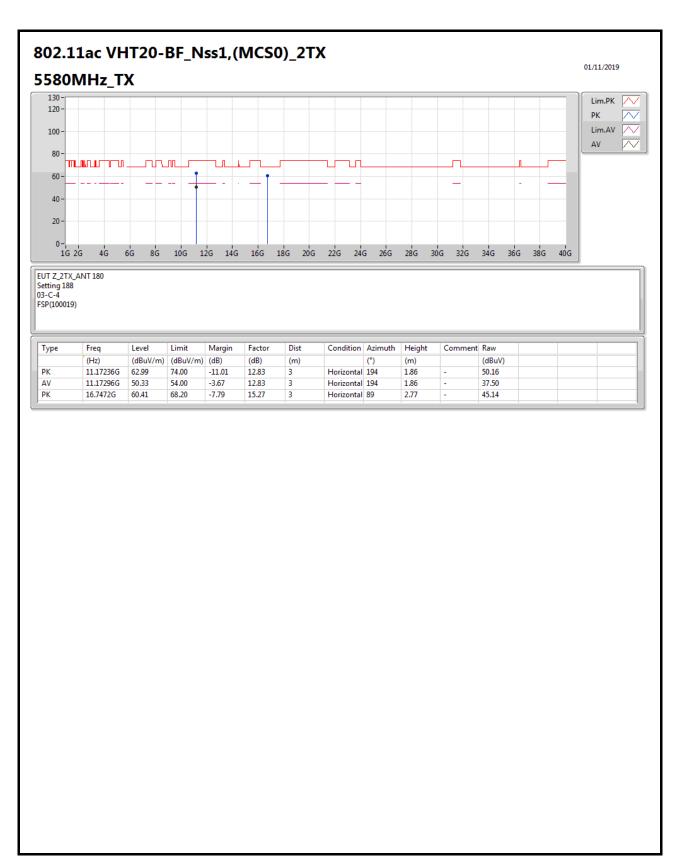




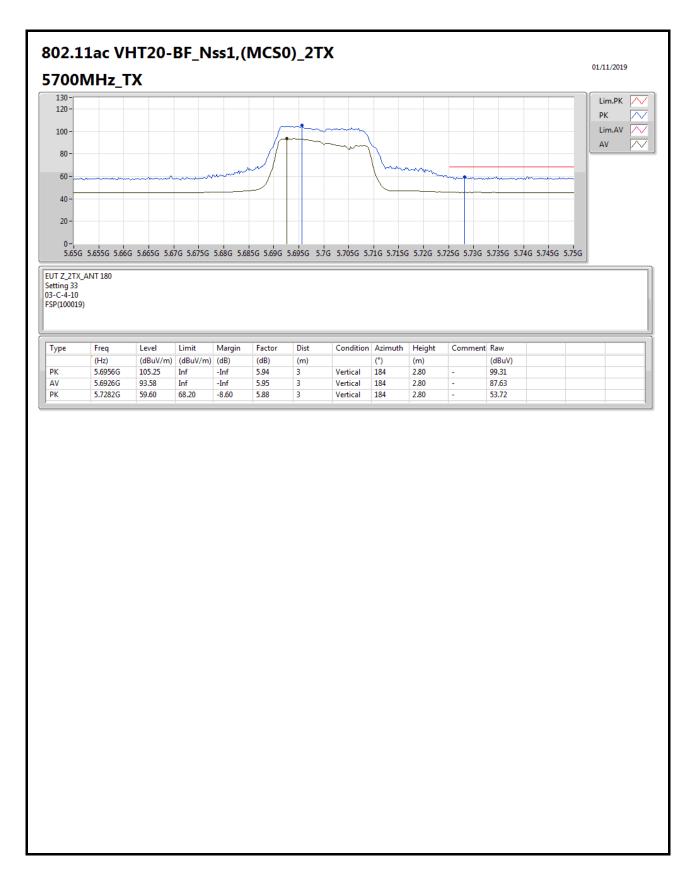




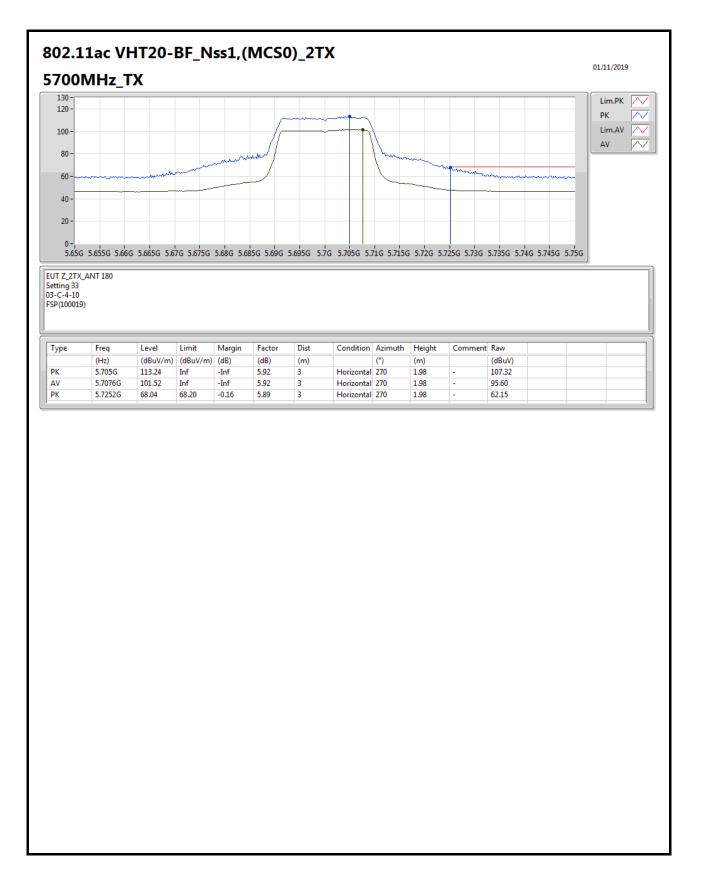




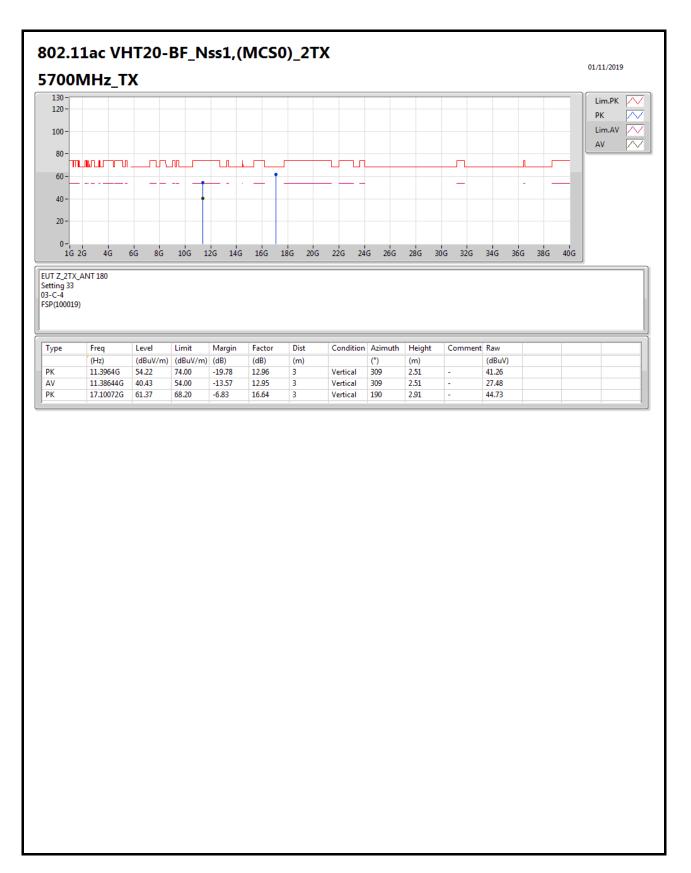




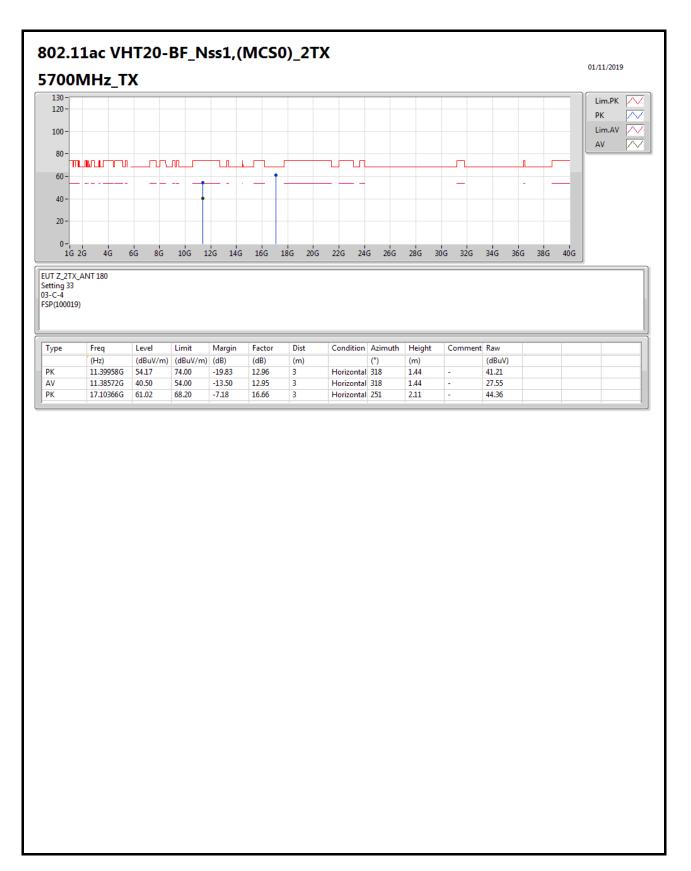




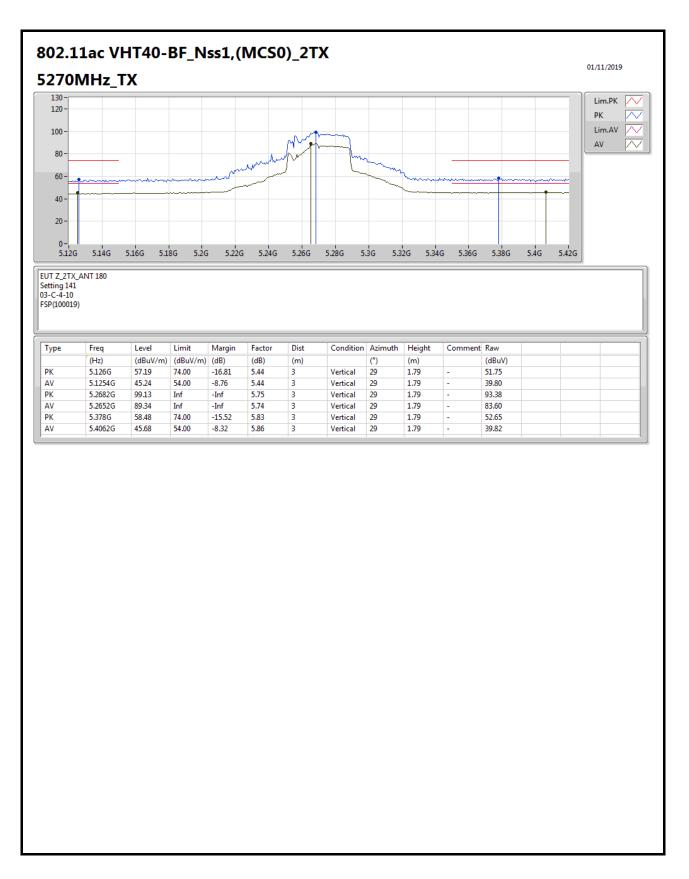




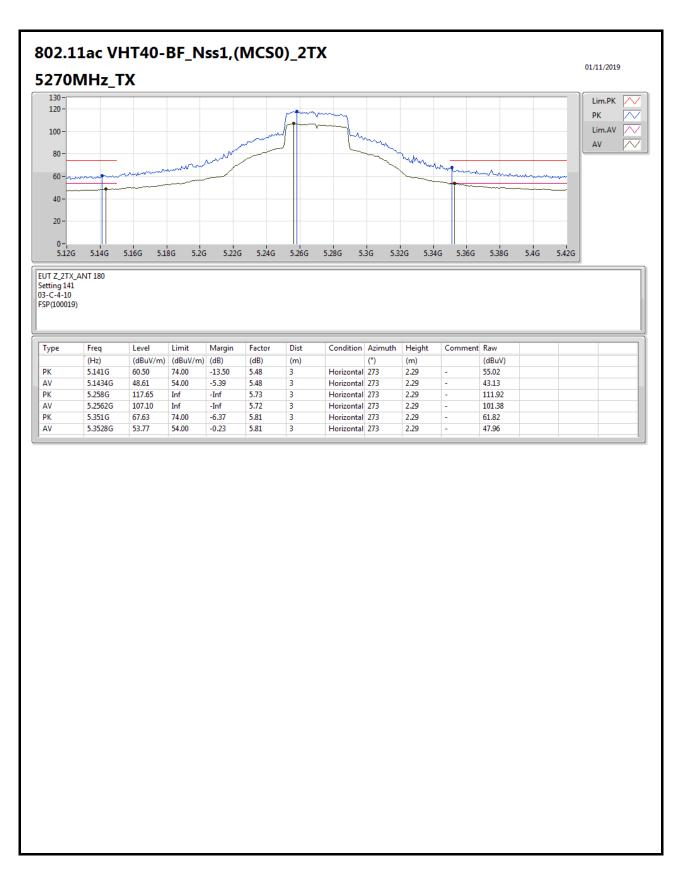




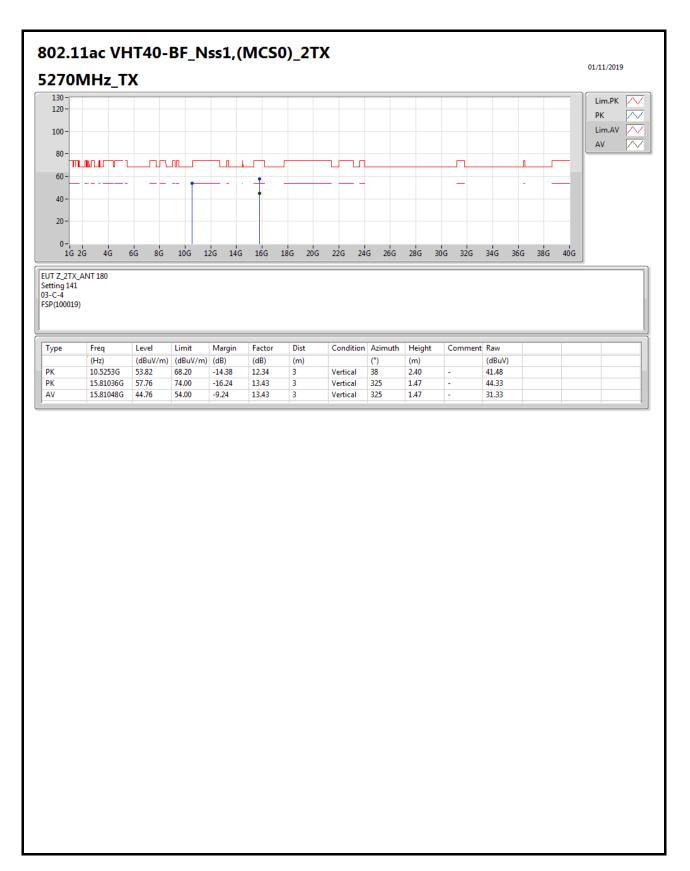




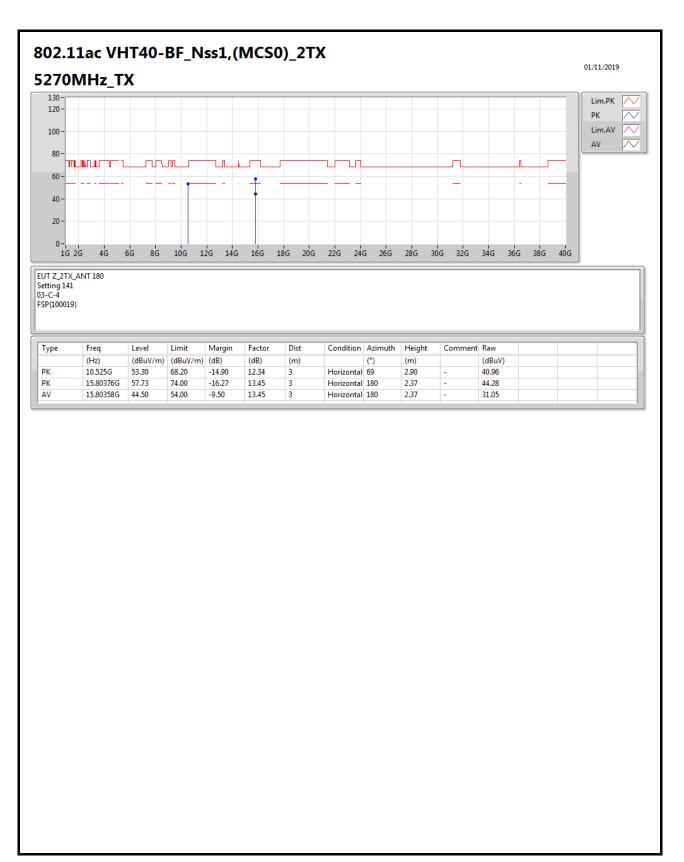




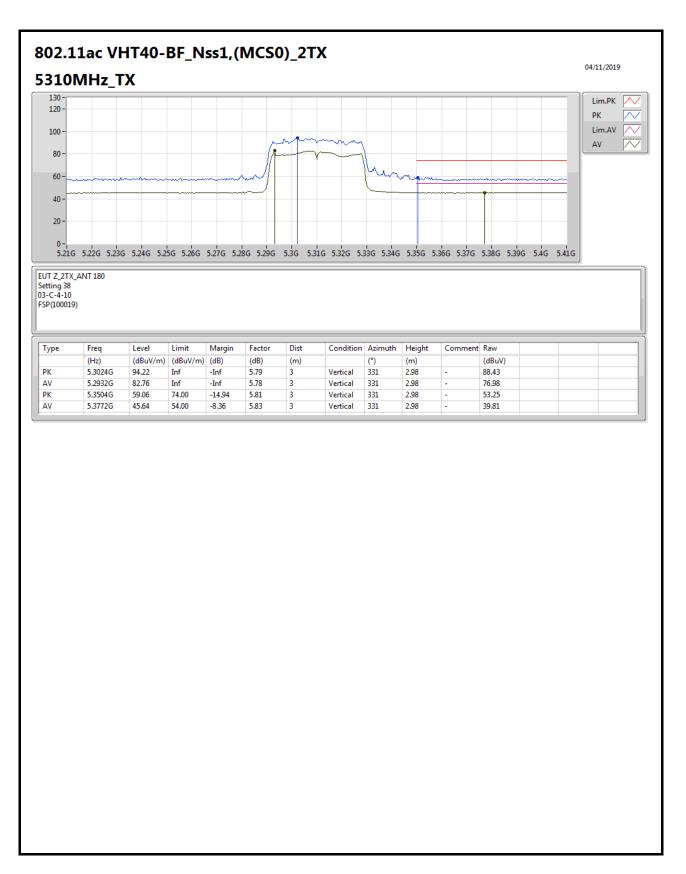




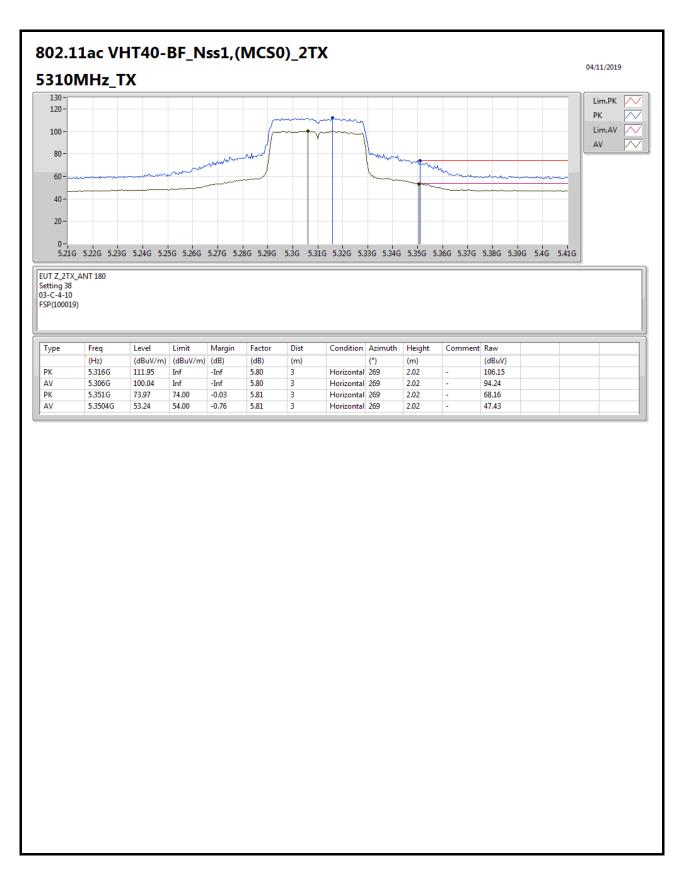




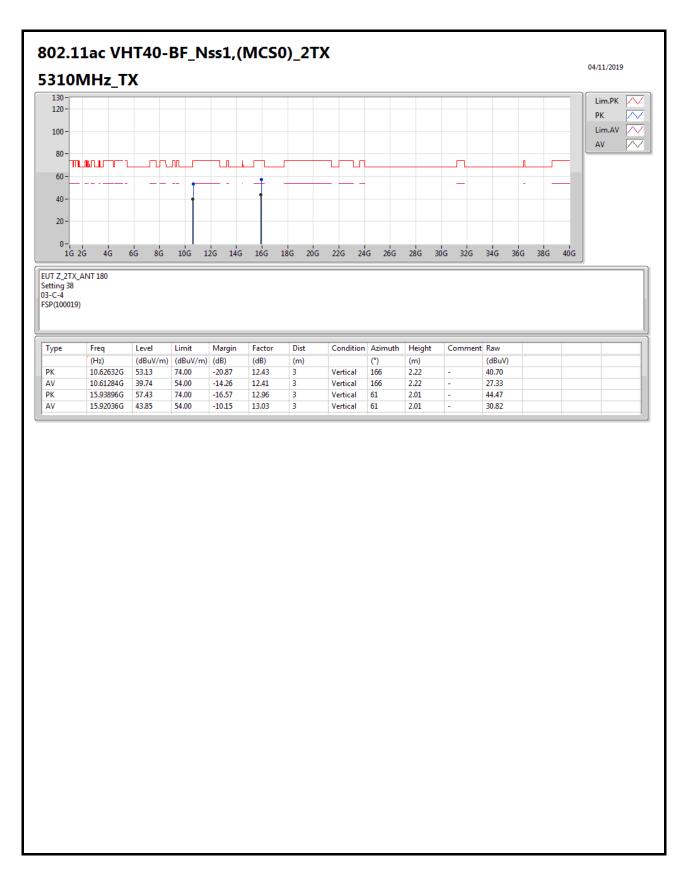




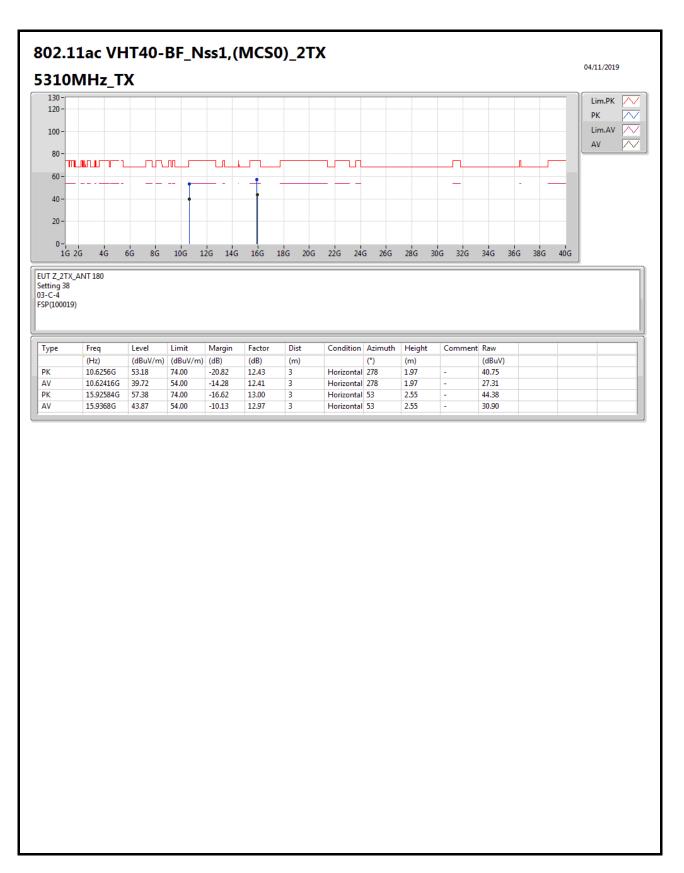




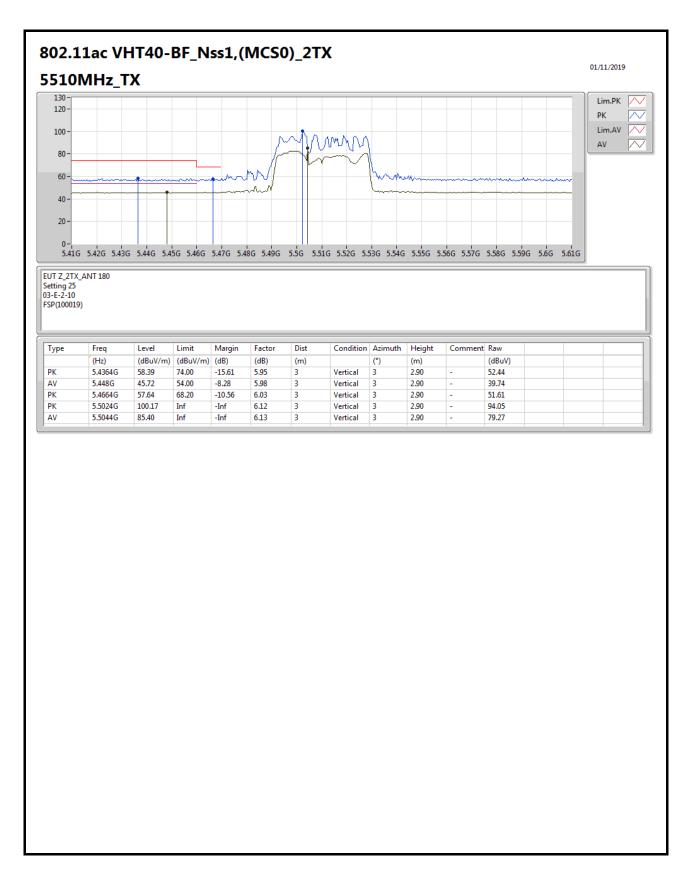




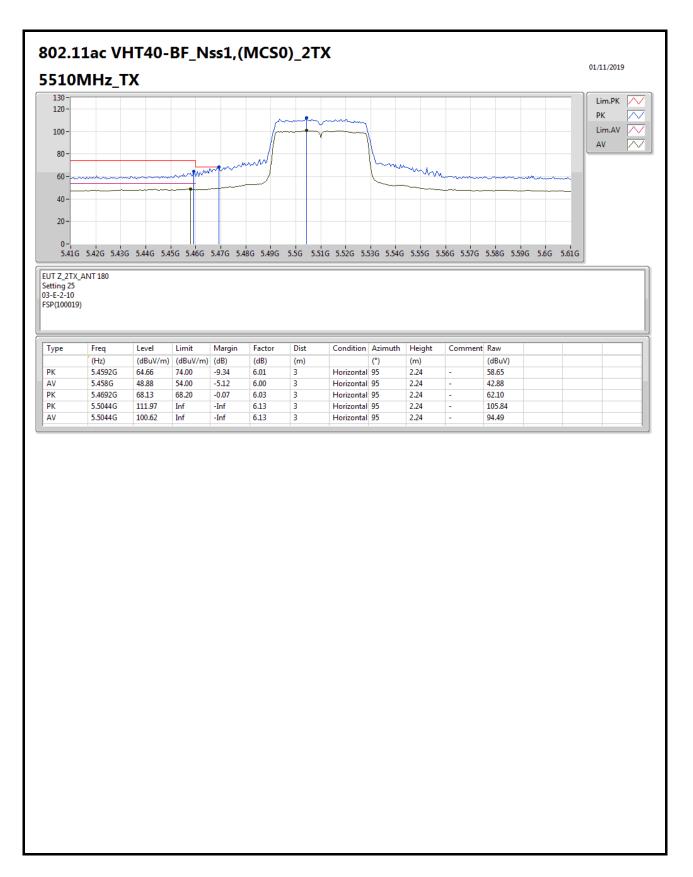




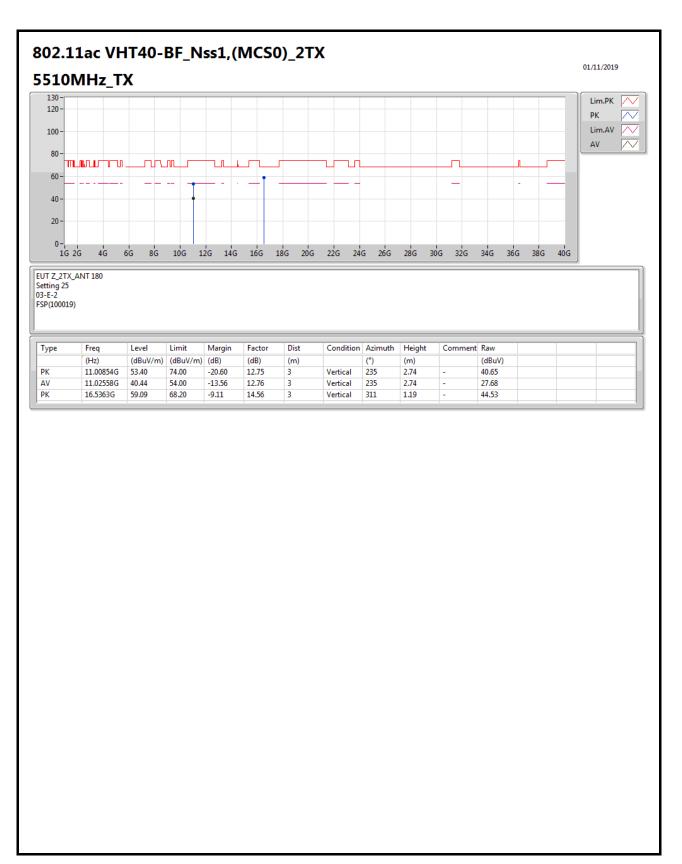




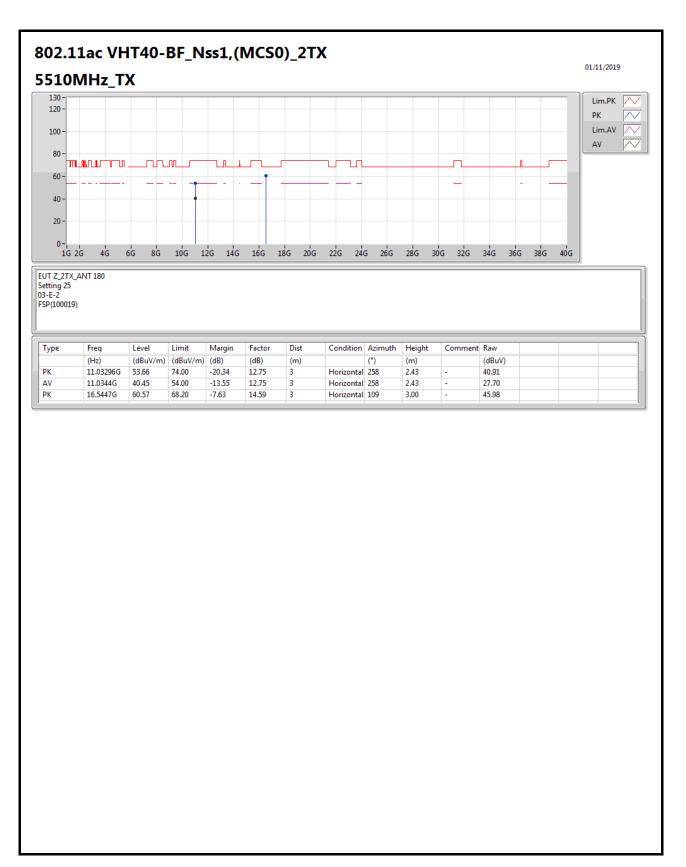




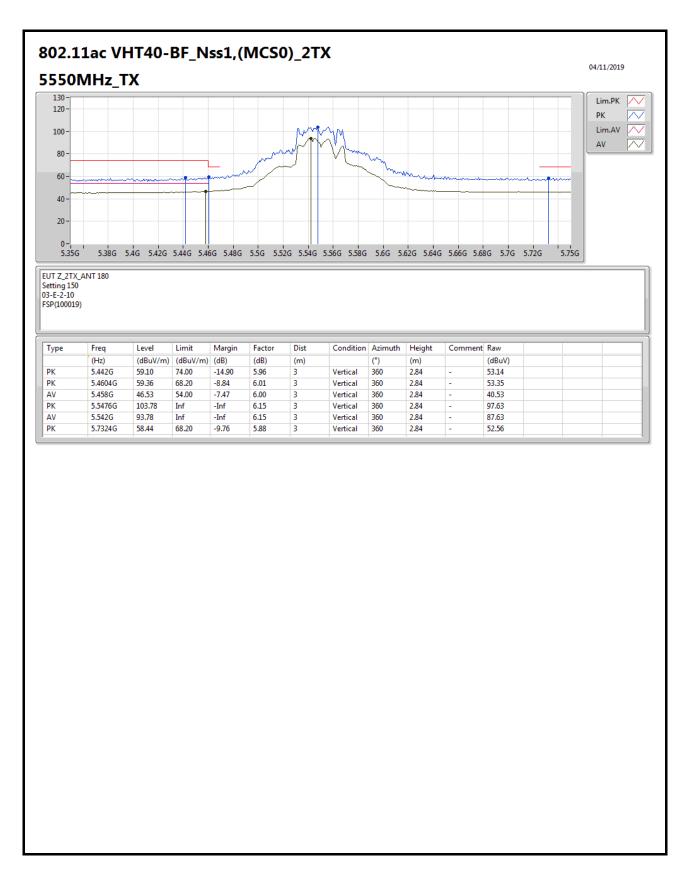




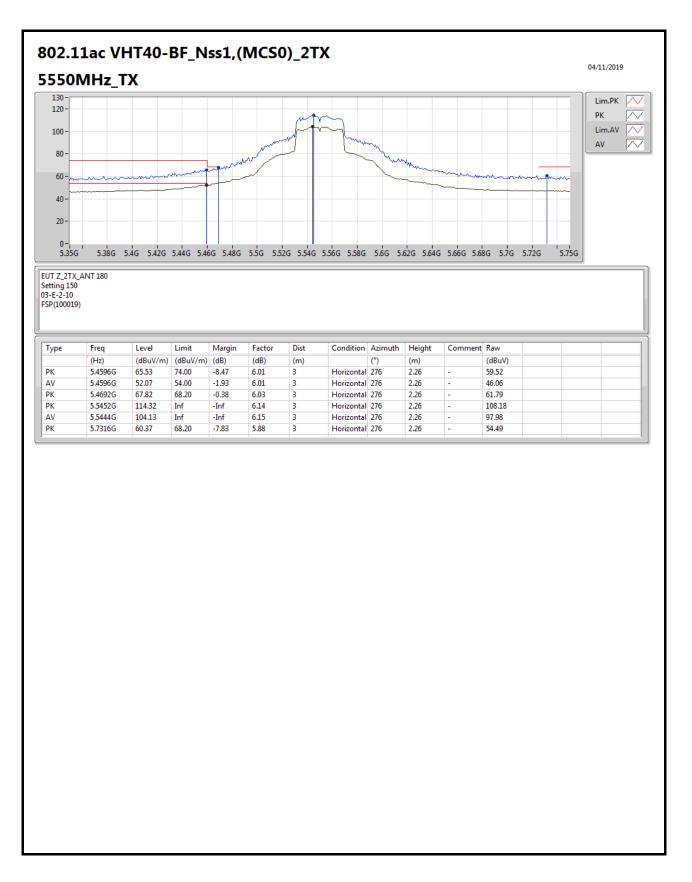




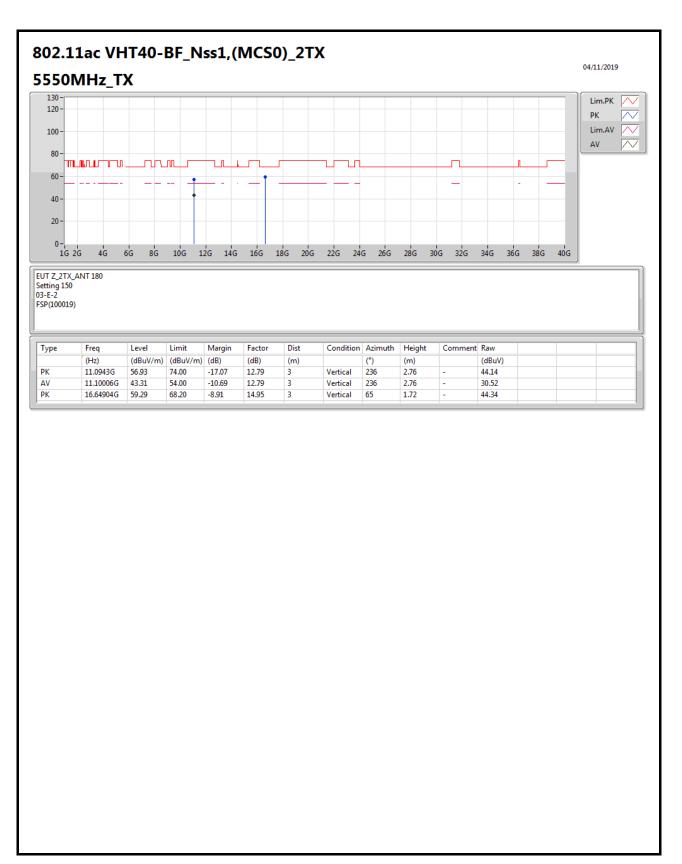




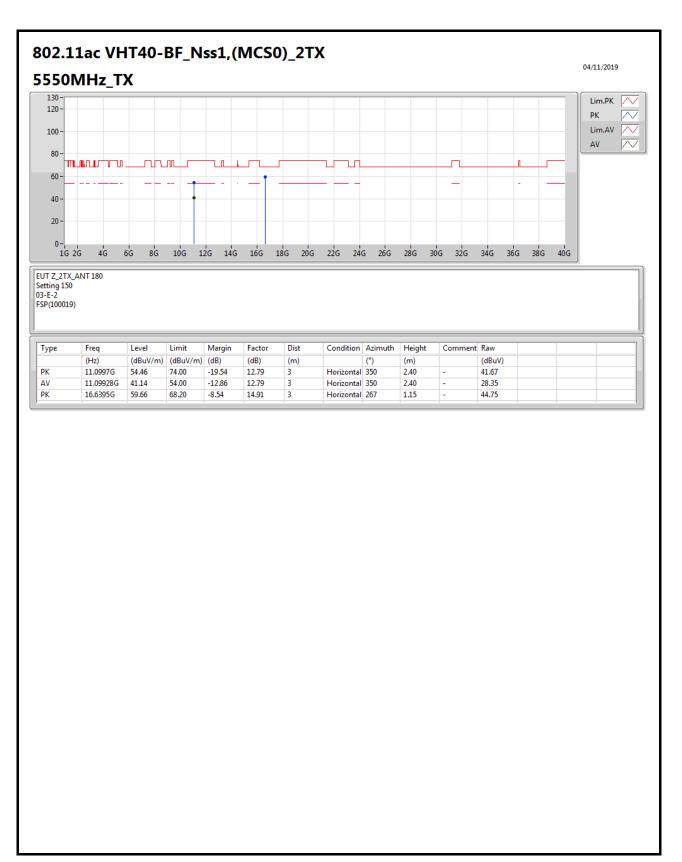




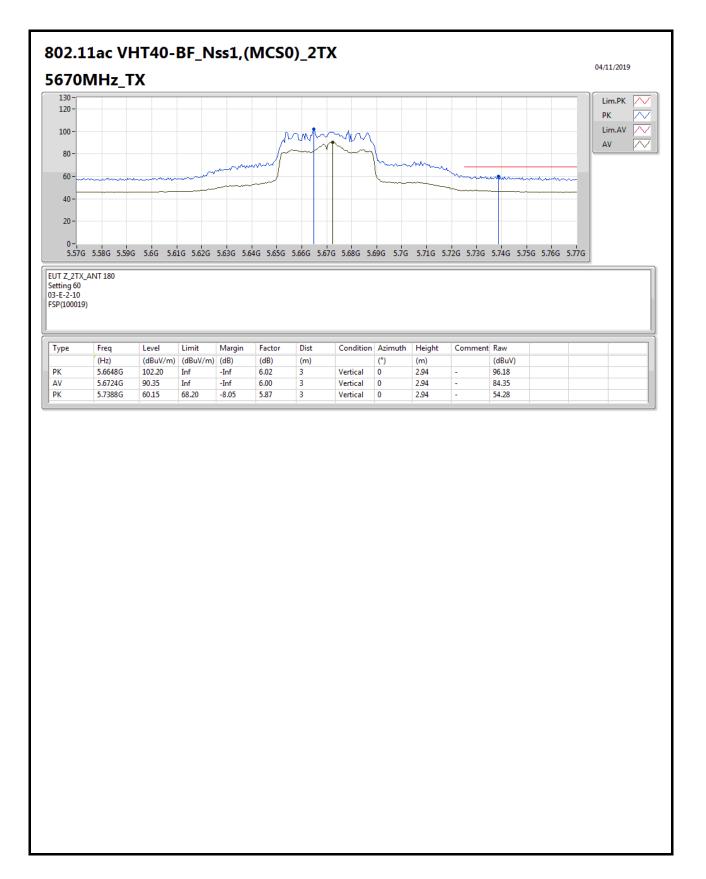




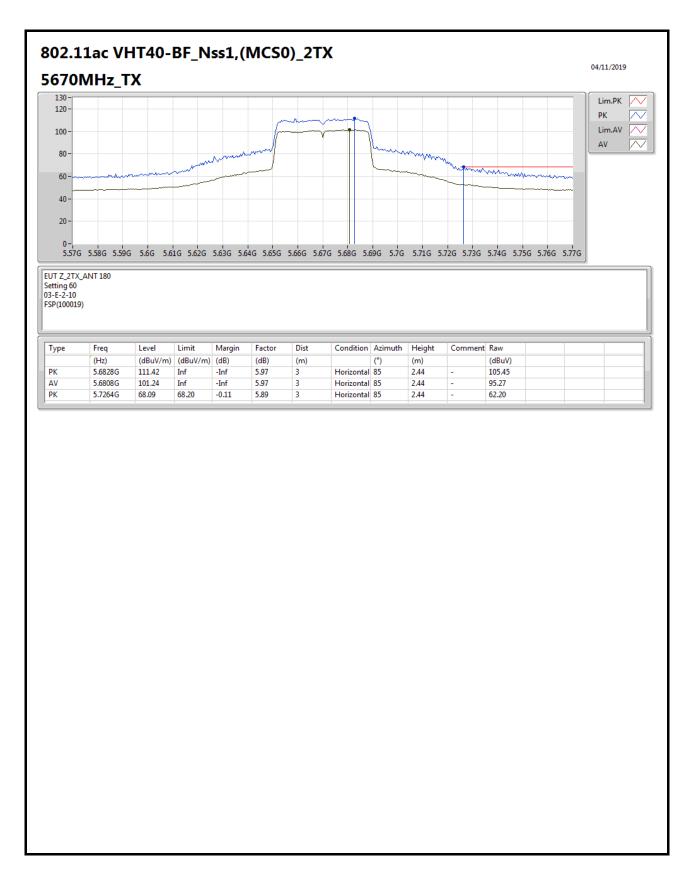




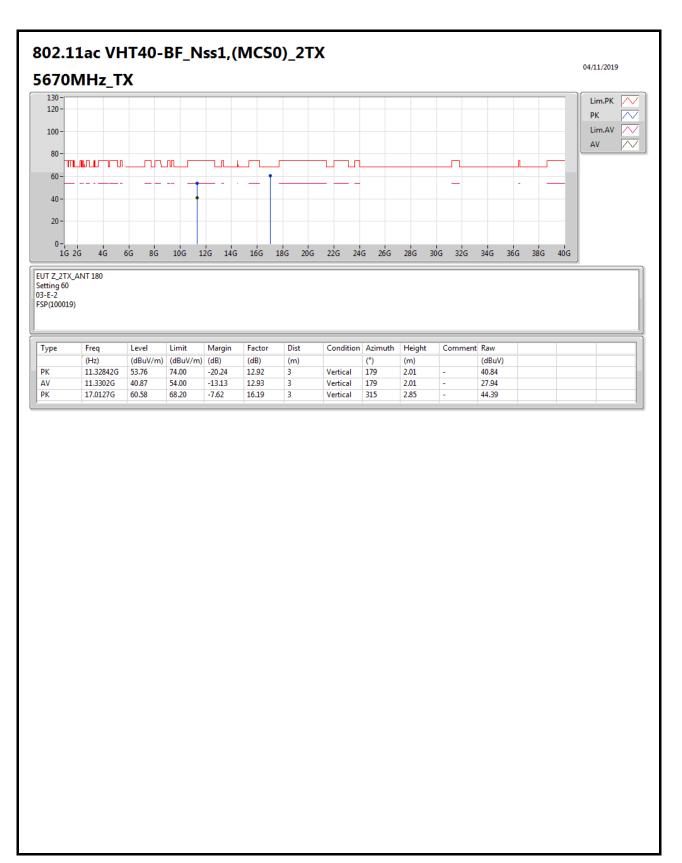




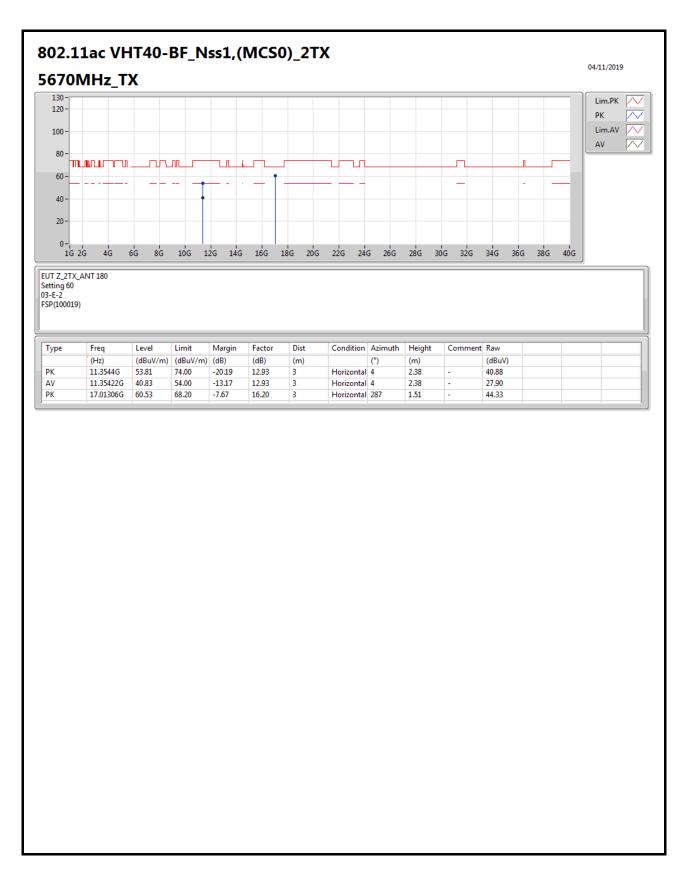




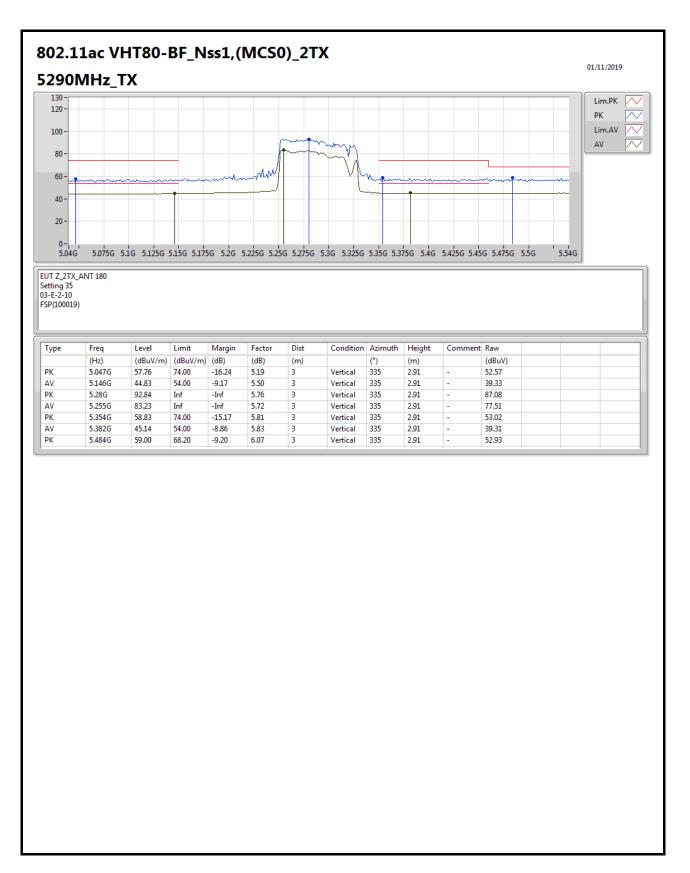




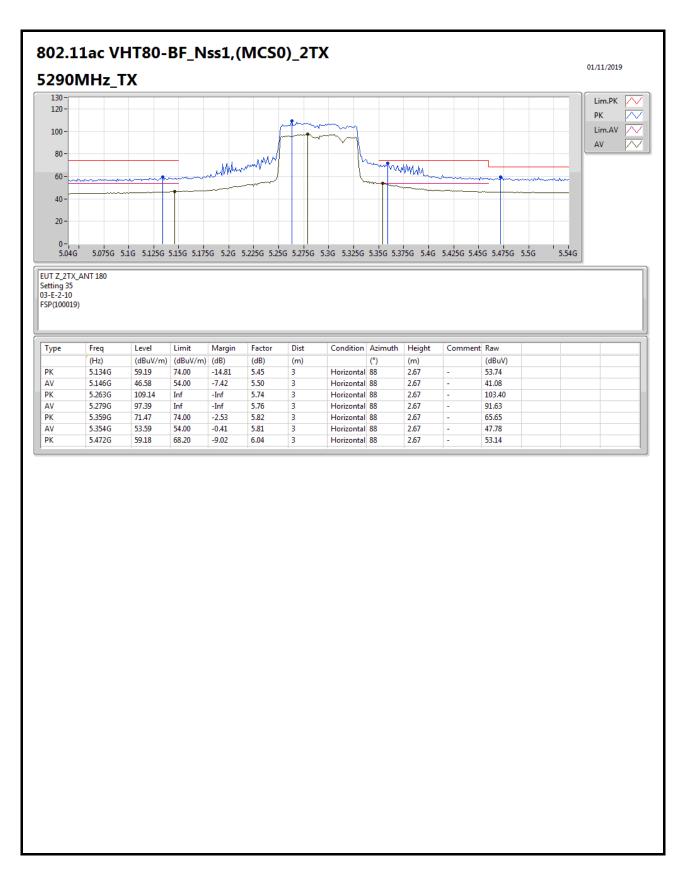




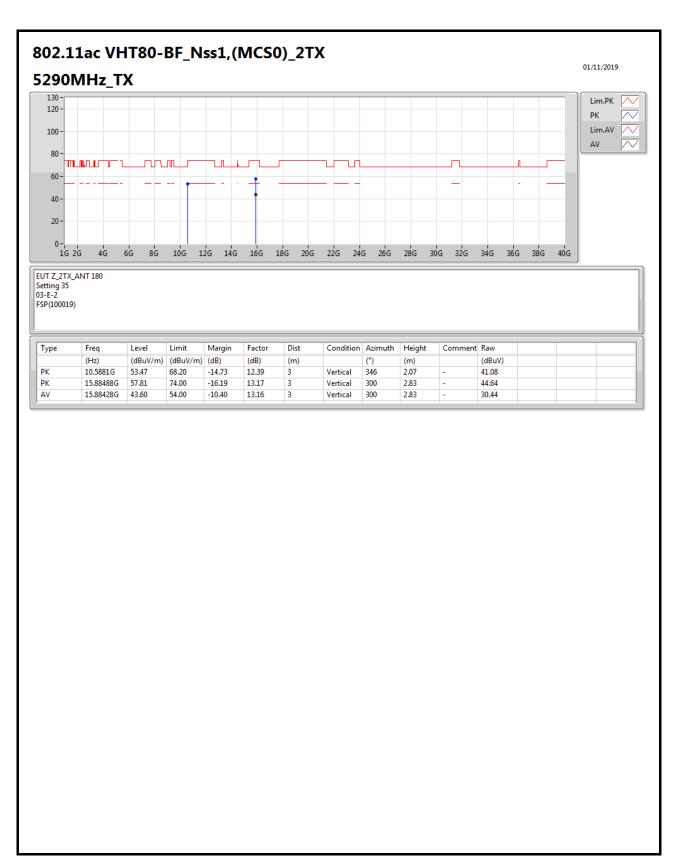




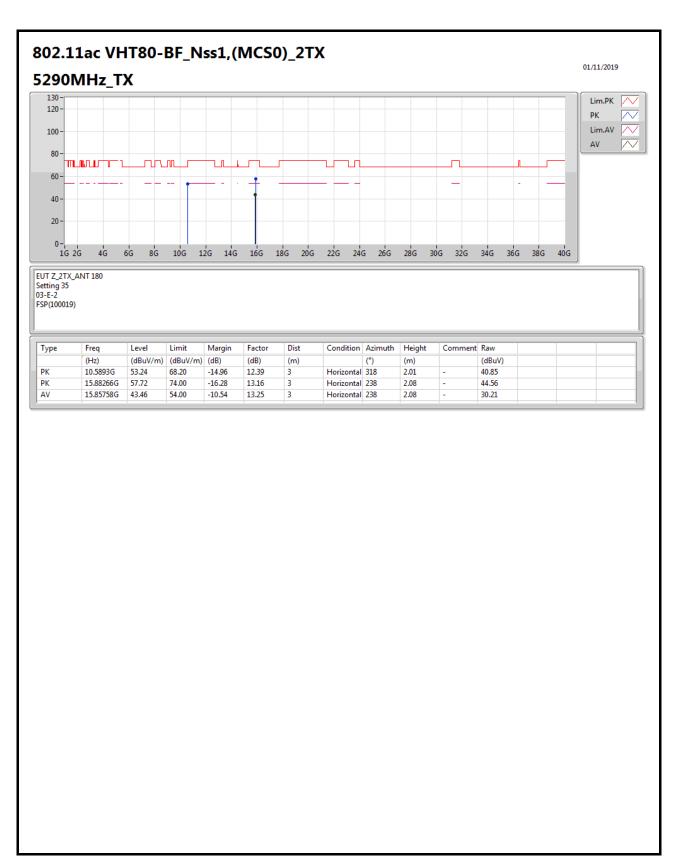




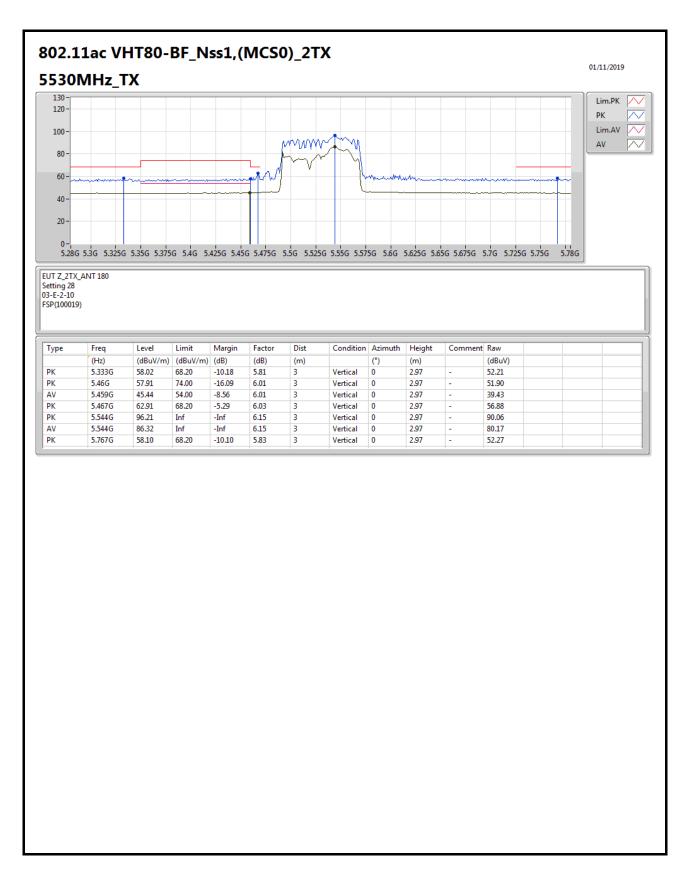




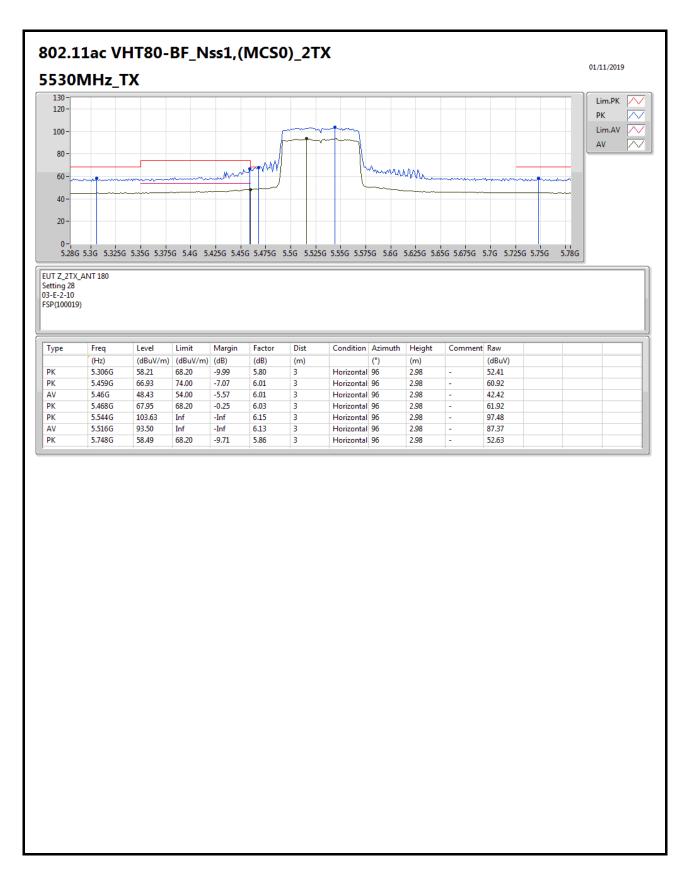




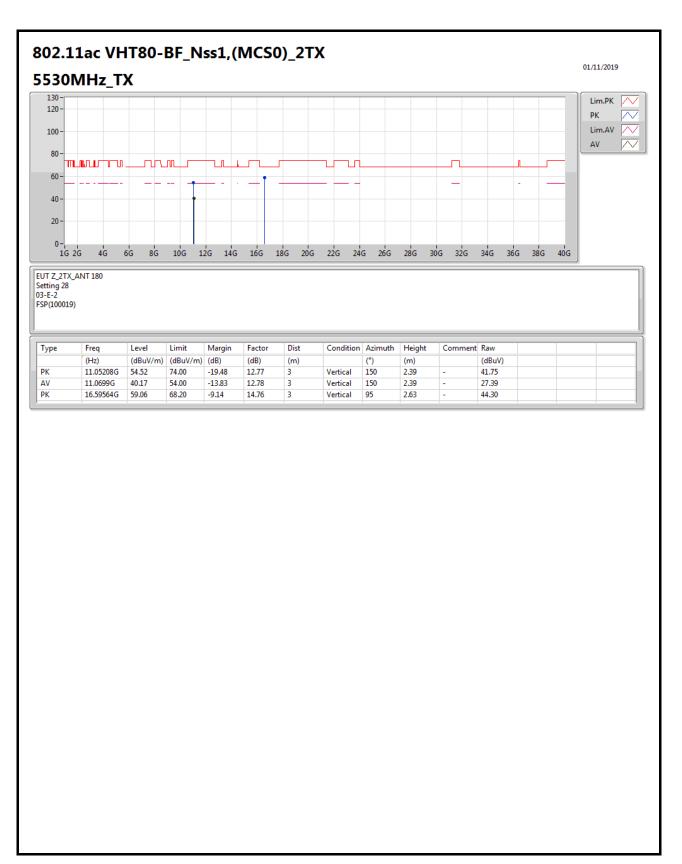




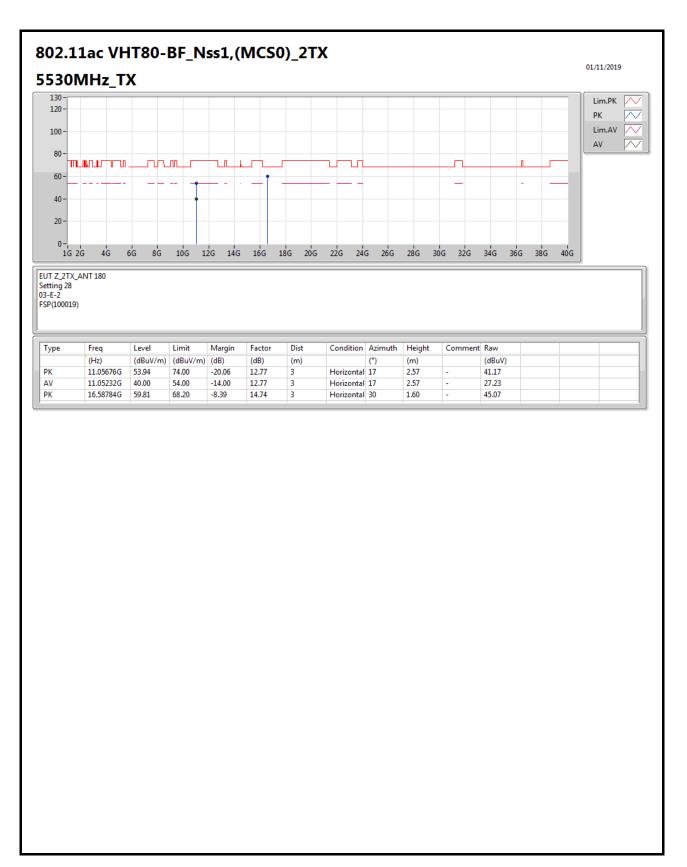




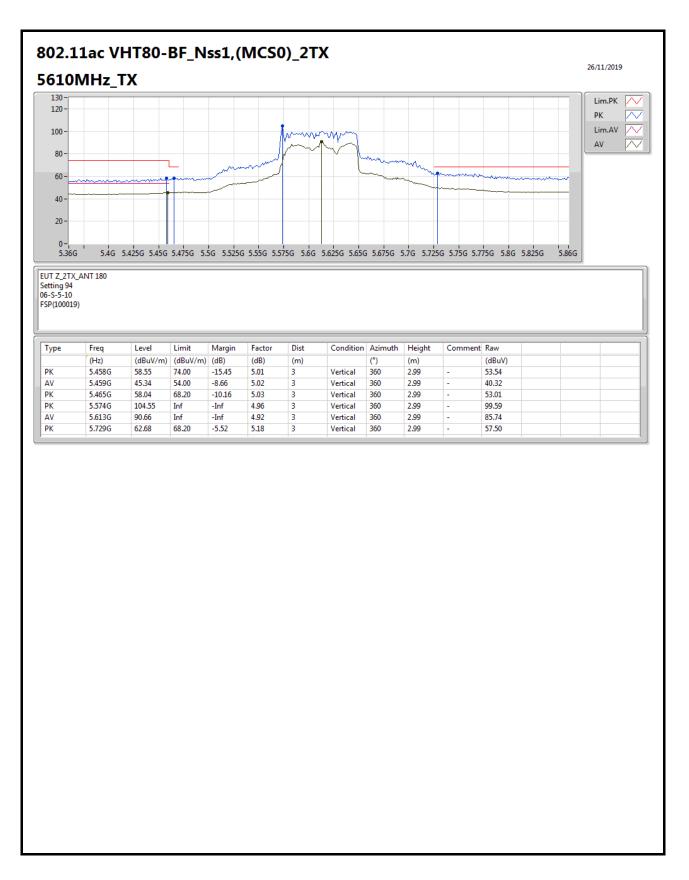




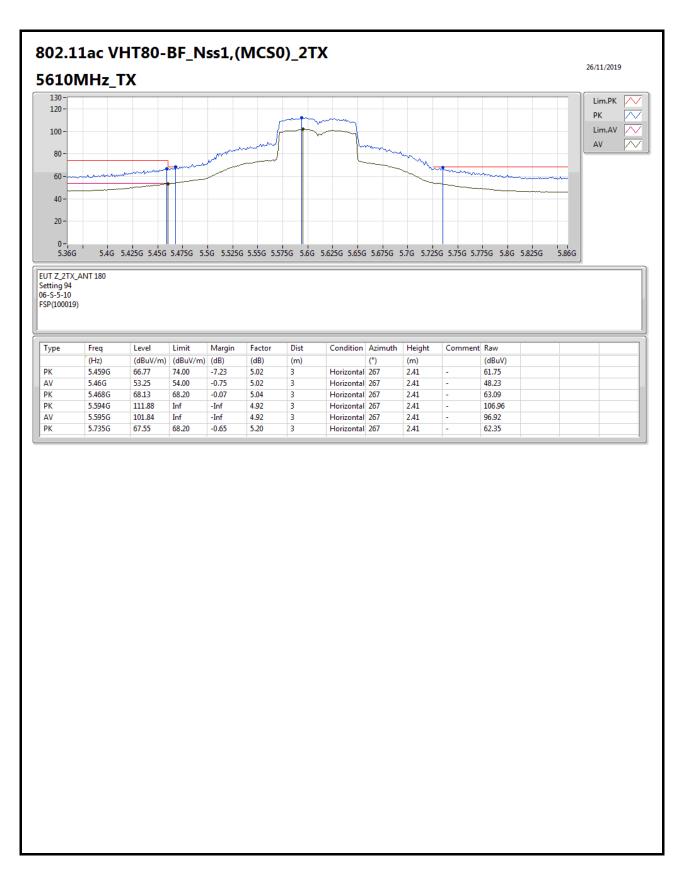




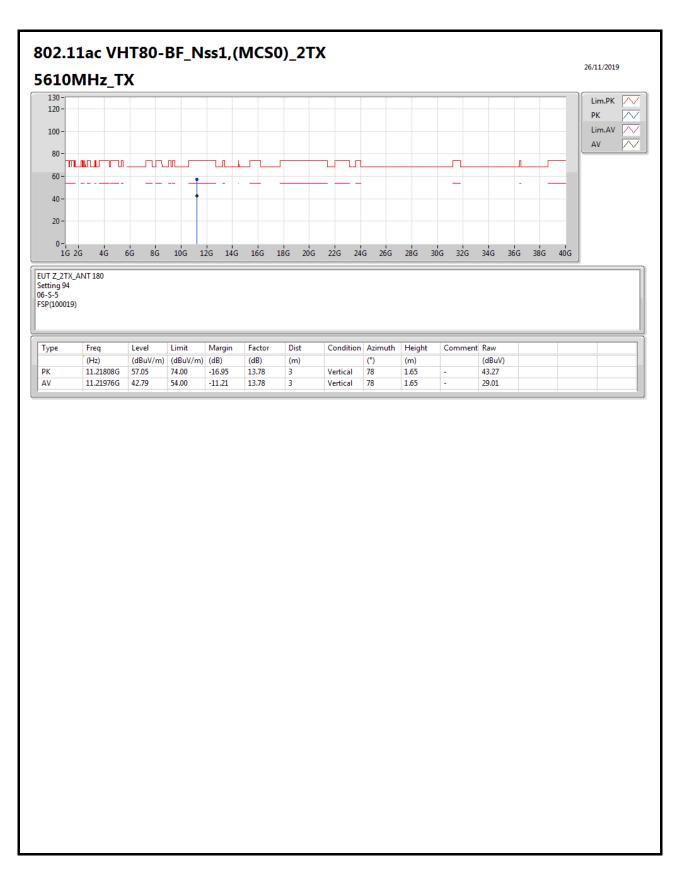




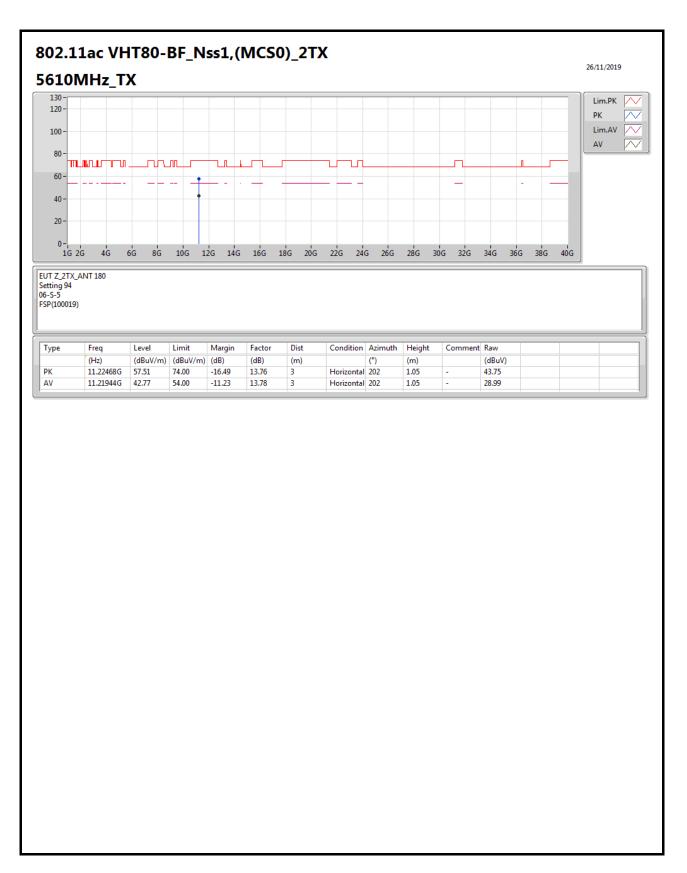




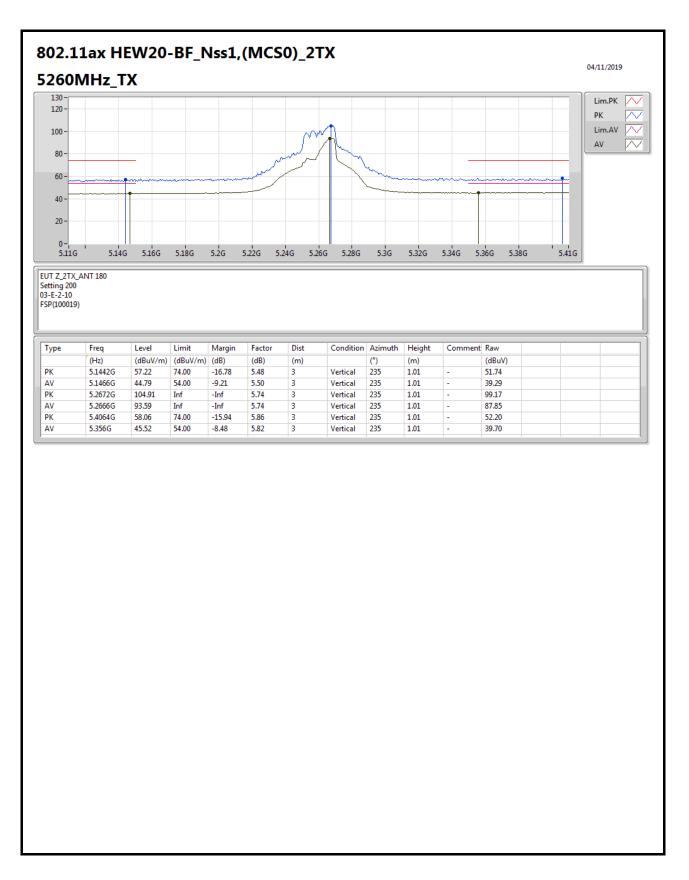




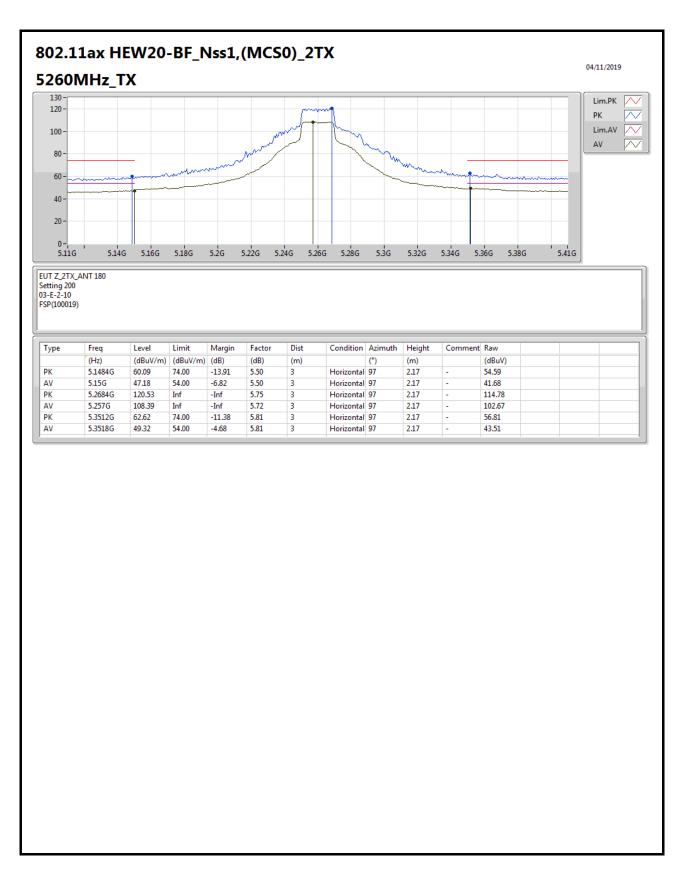




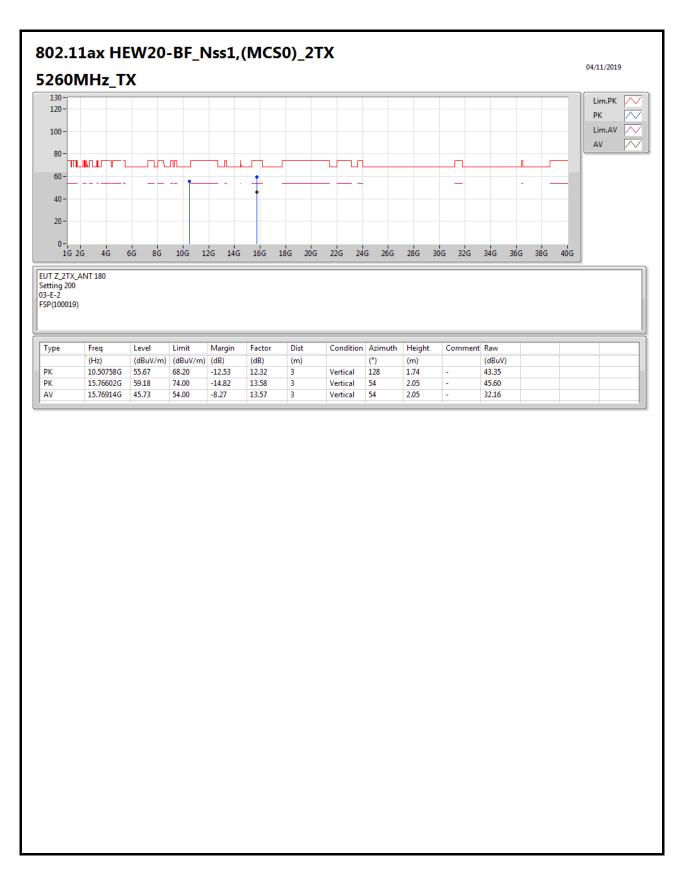




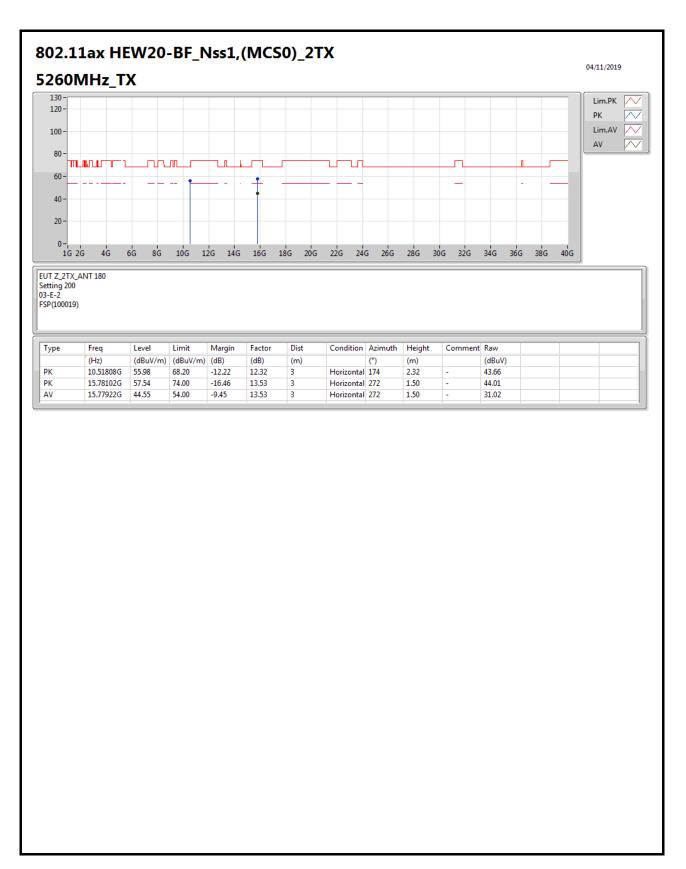






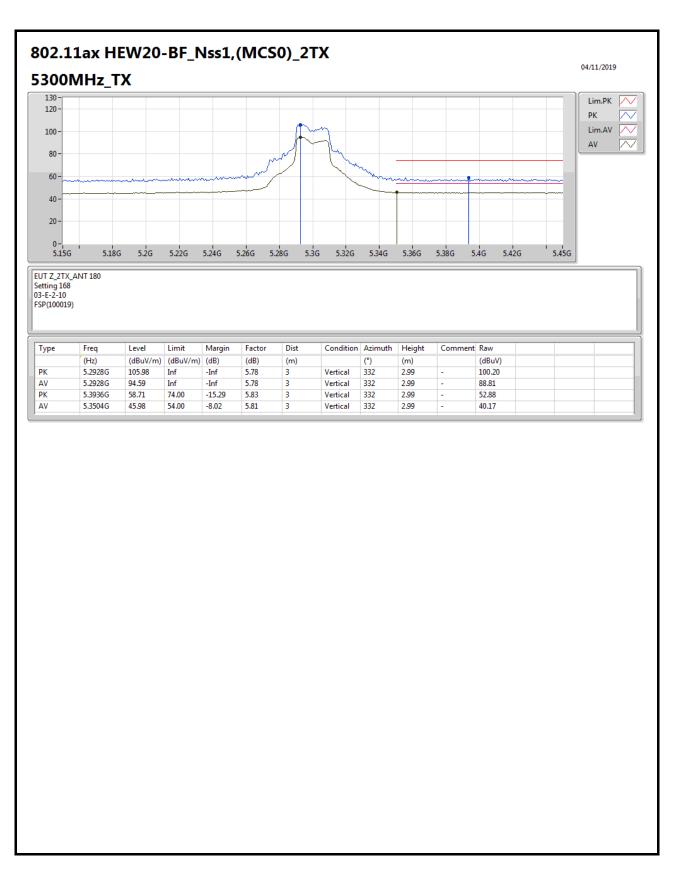






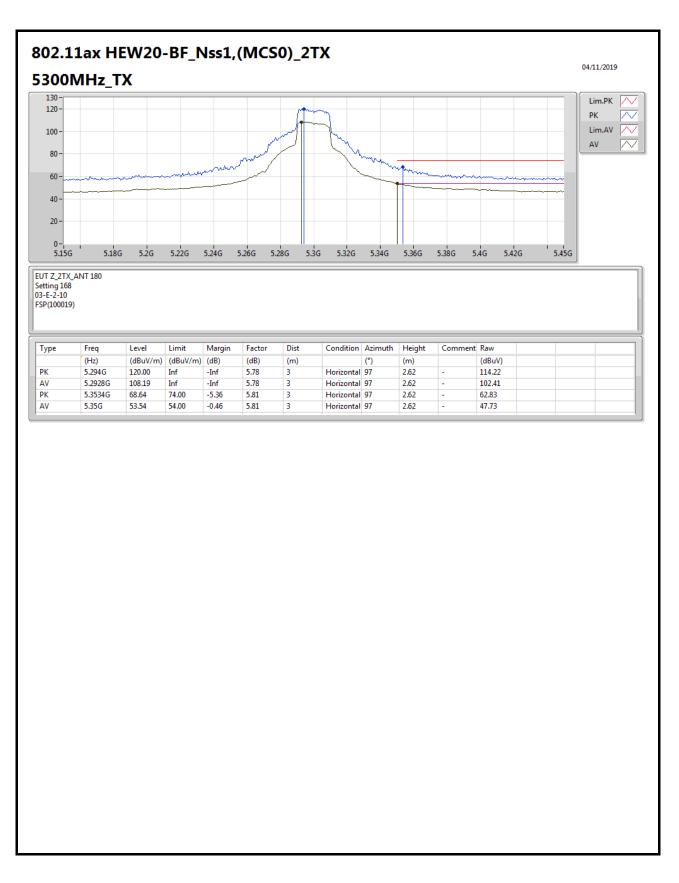


Appendix D

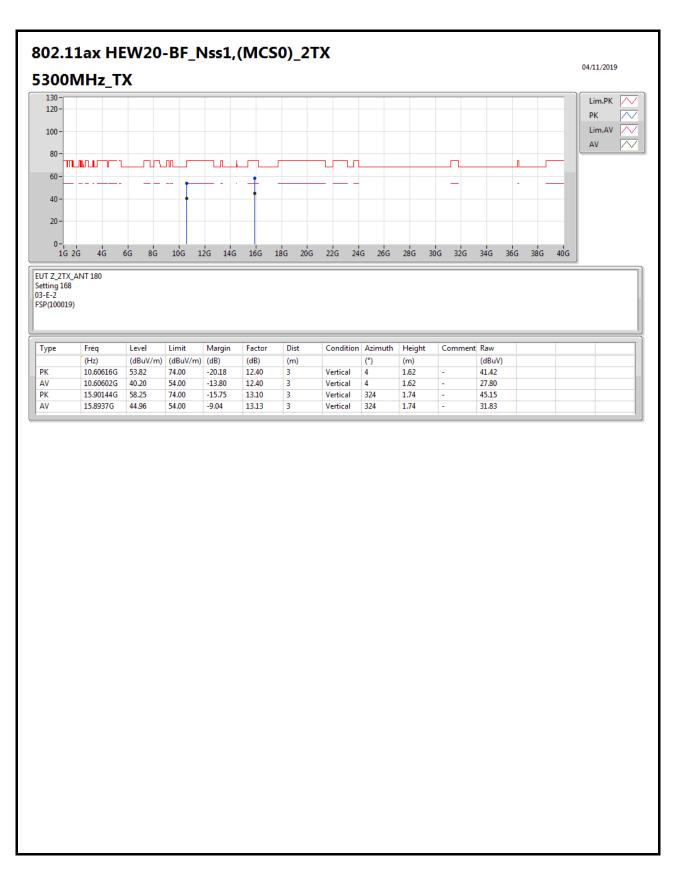




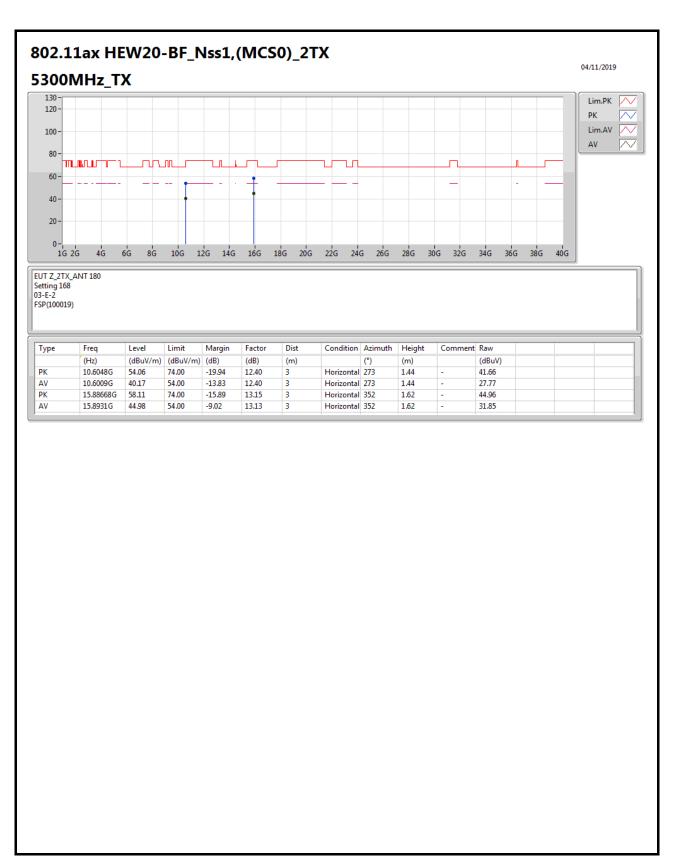
Appendix D



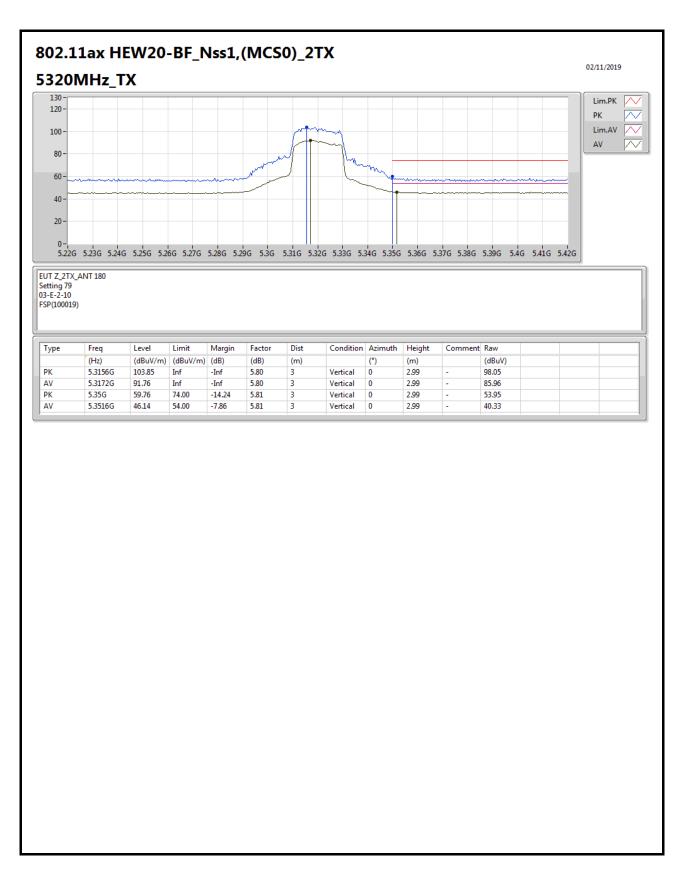




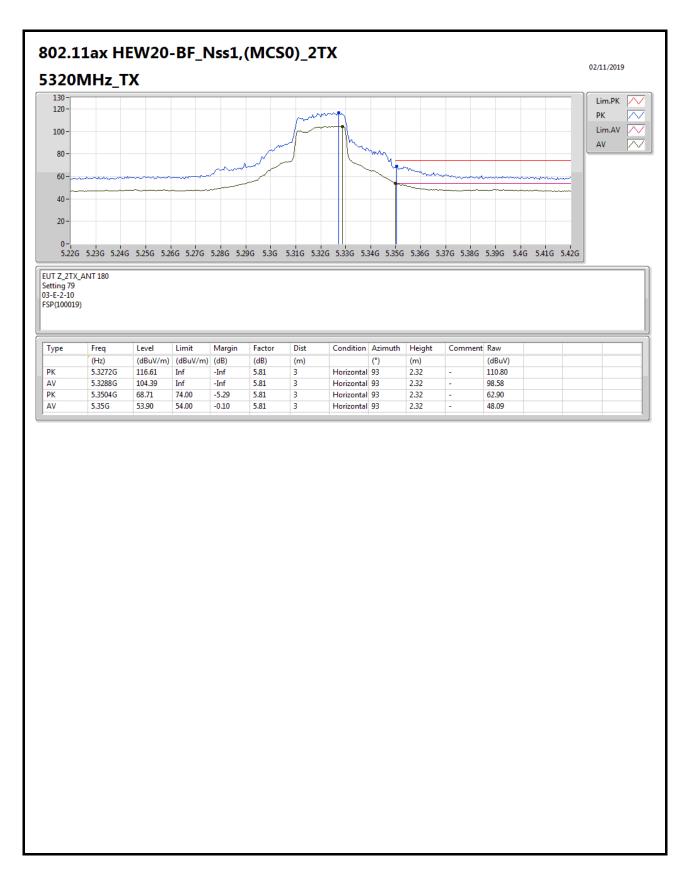




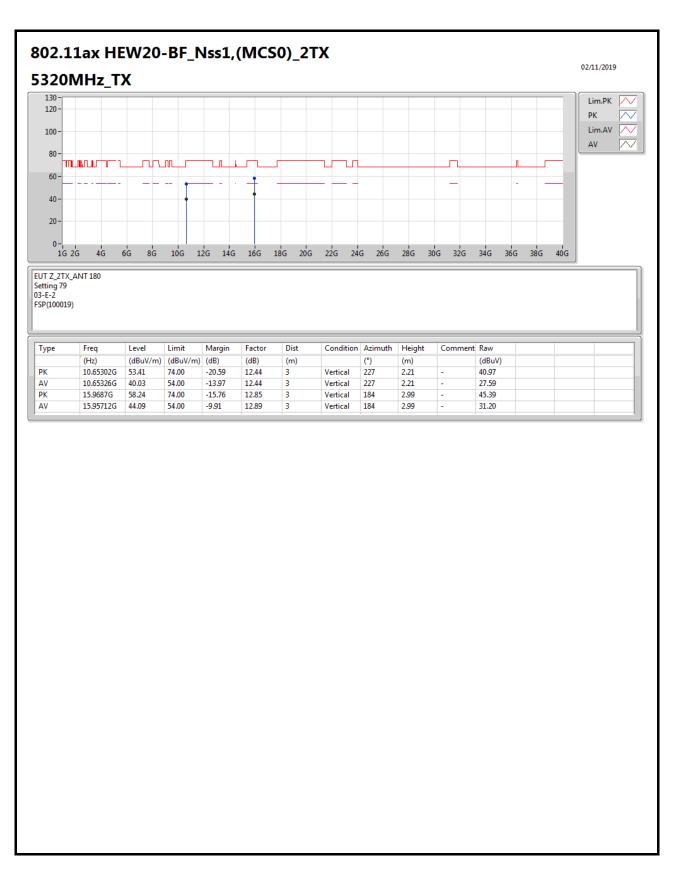




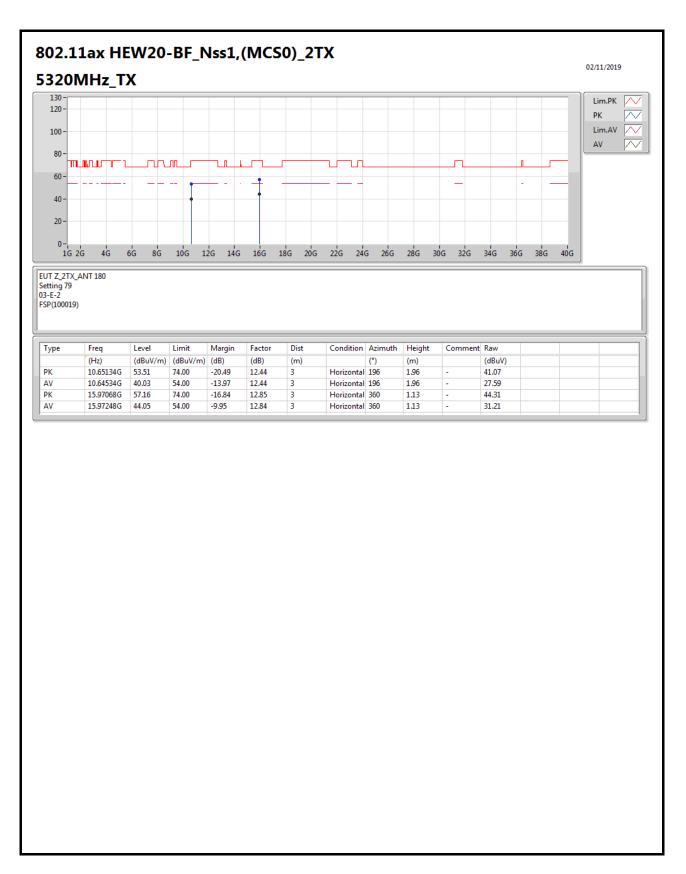




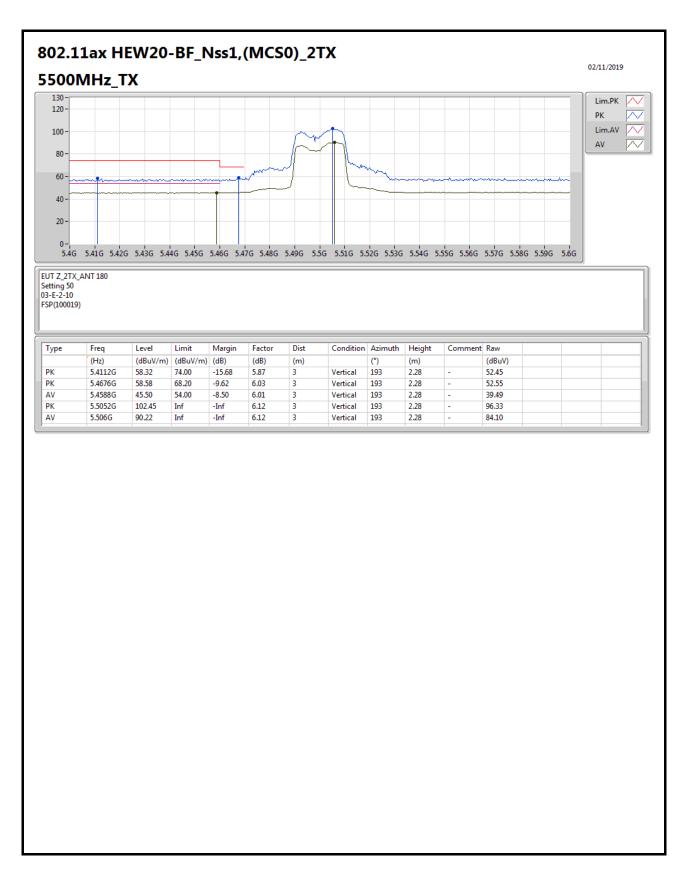




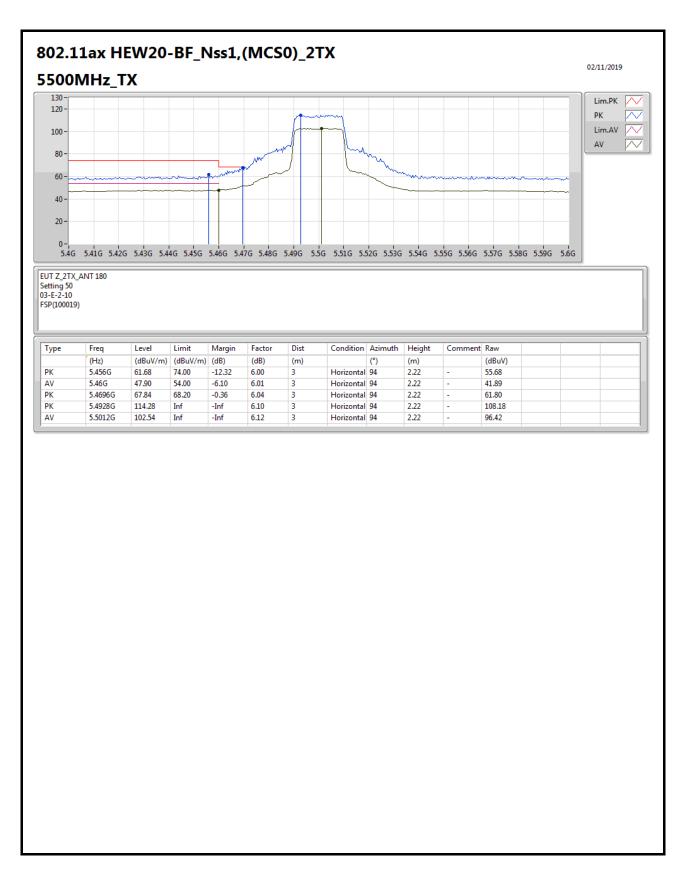




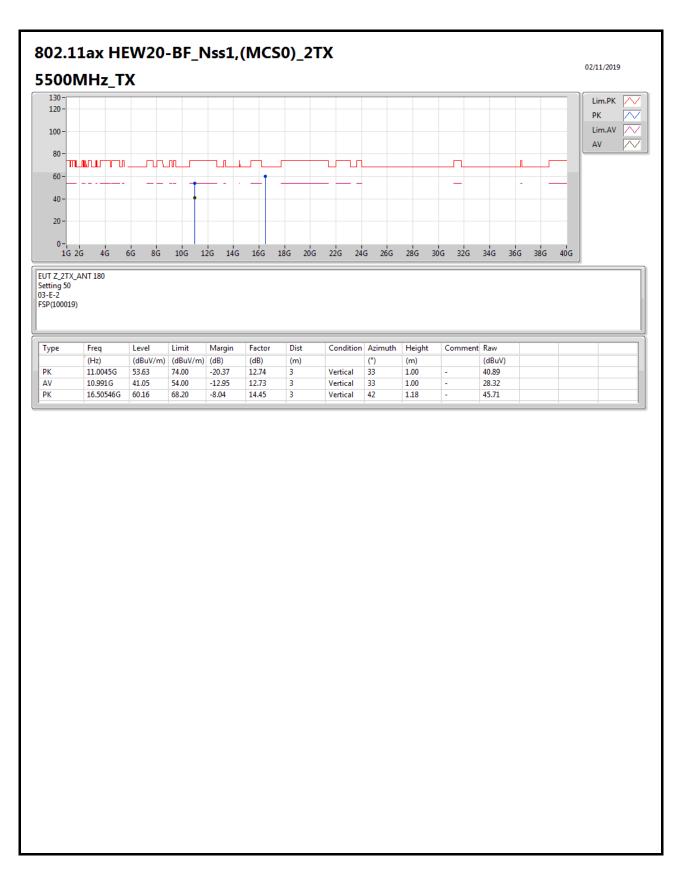




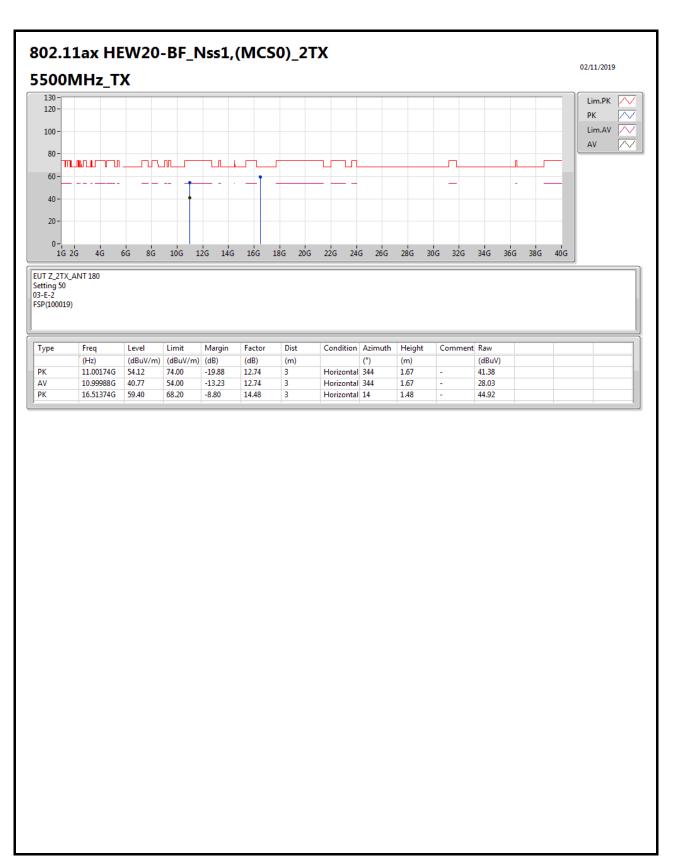




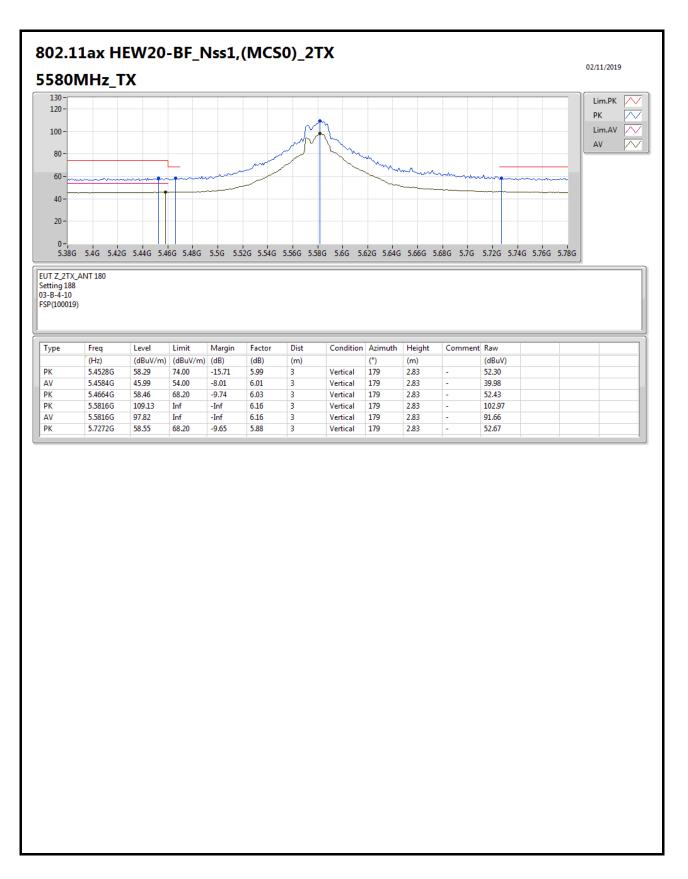




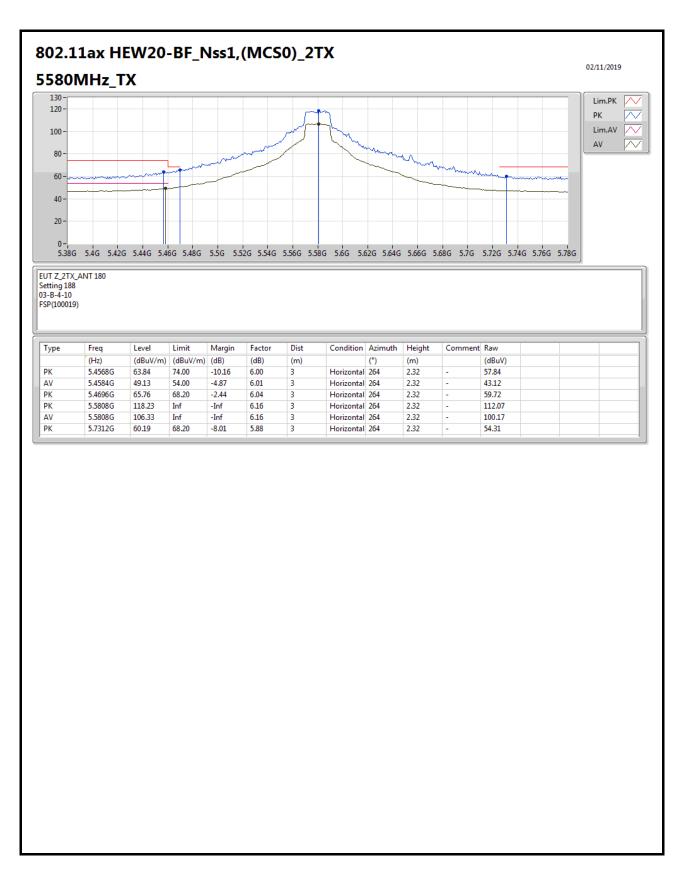




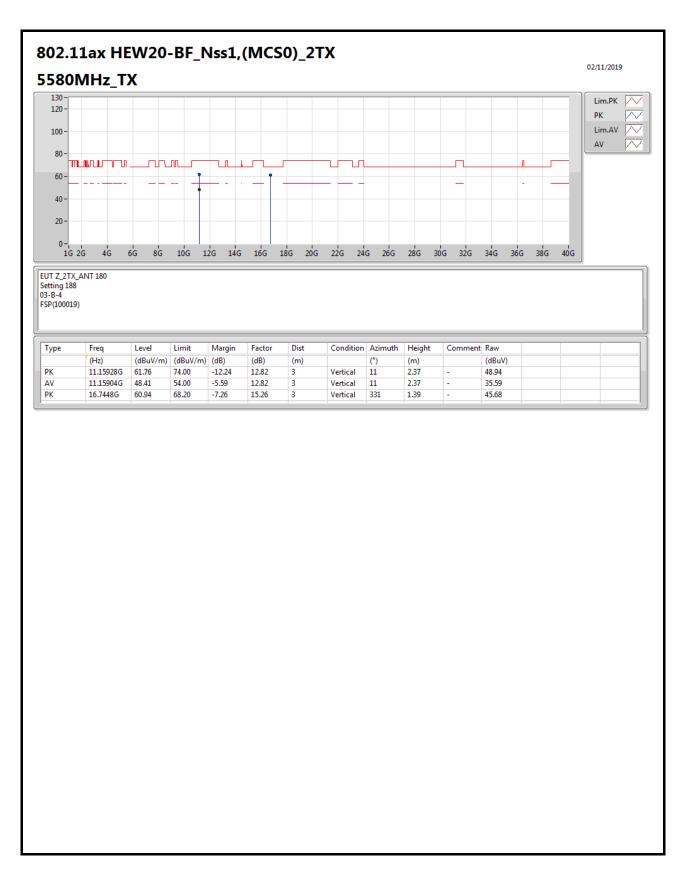




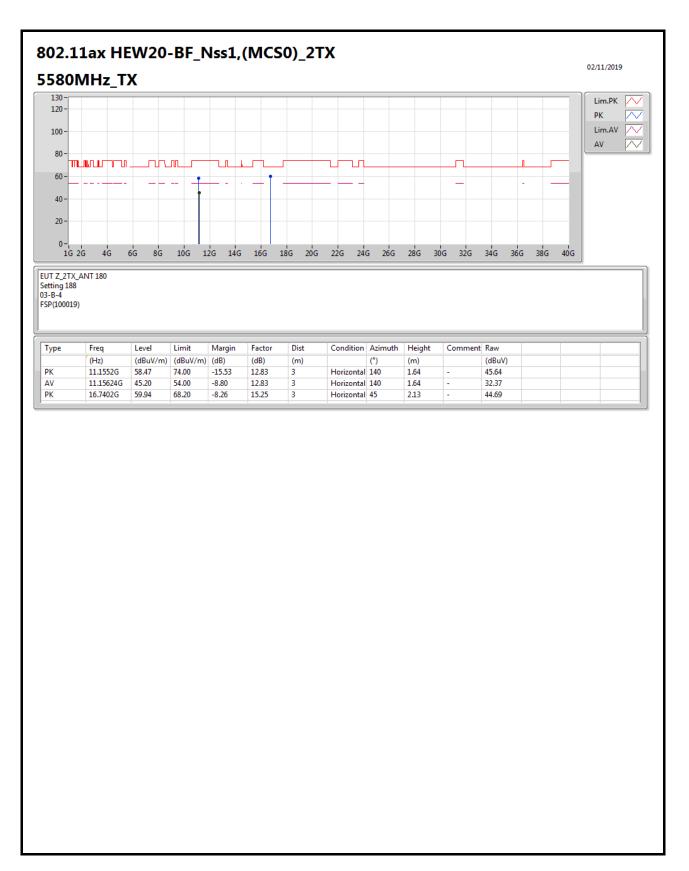




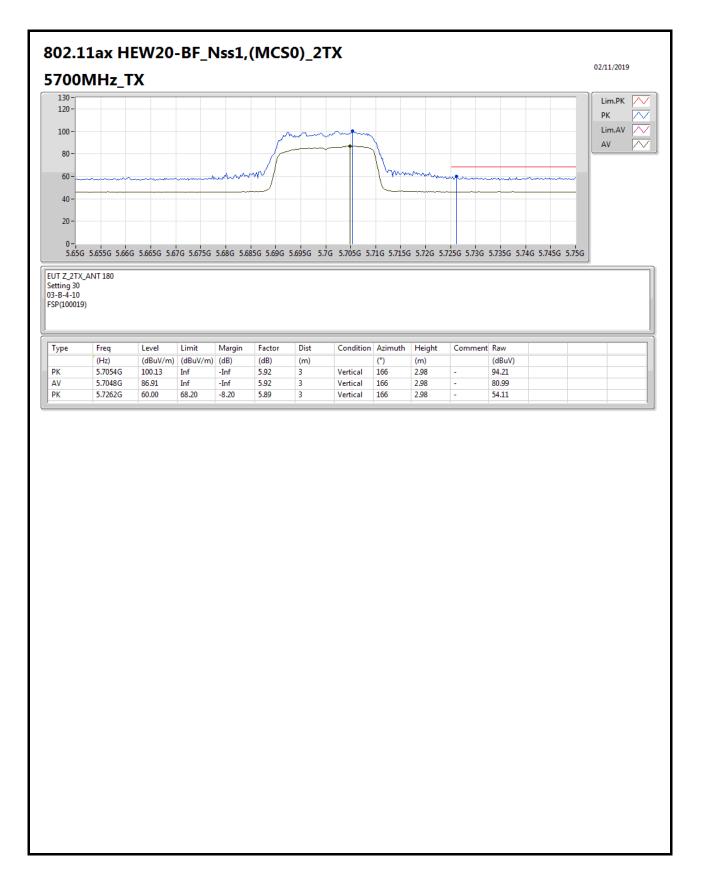




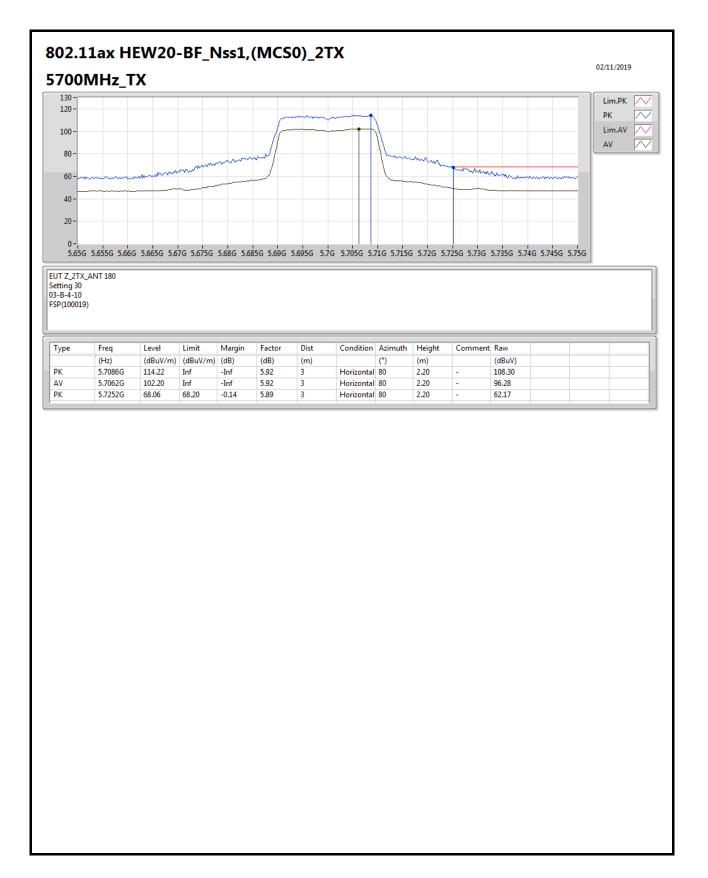




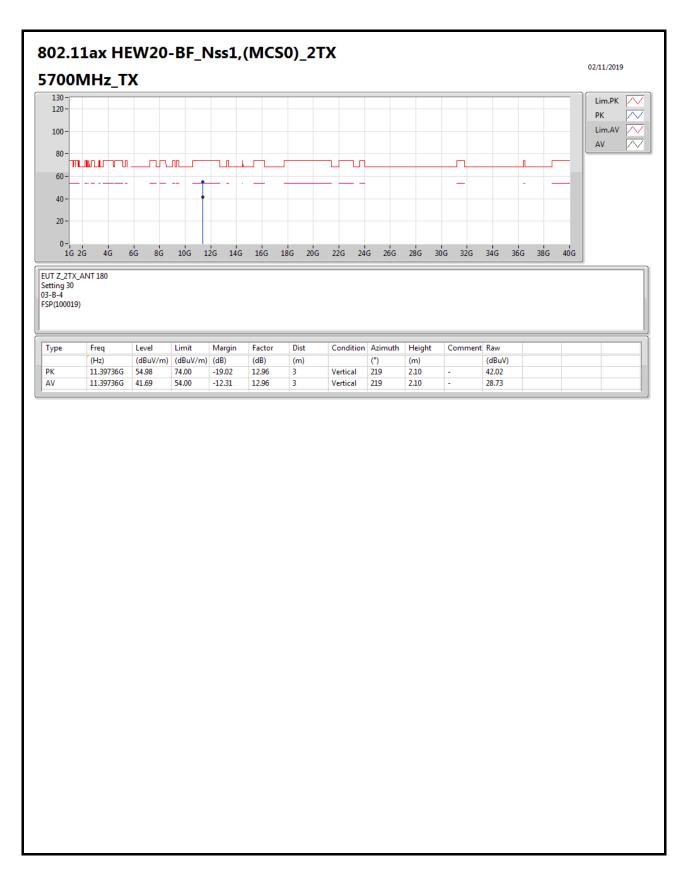




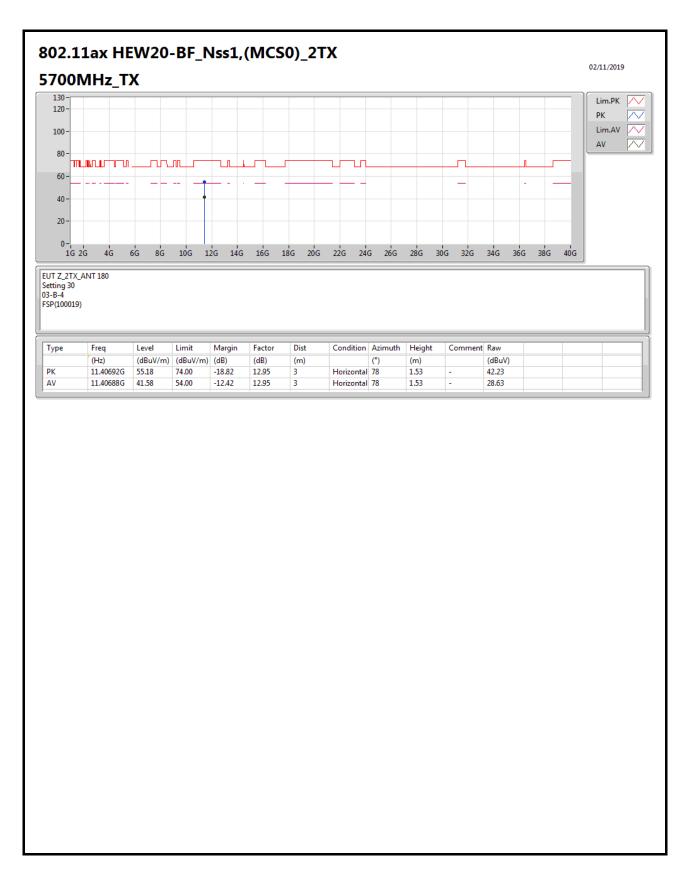






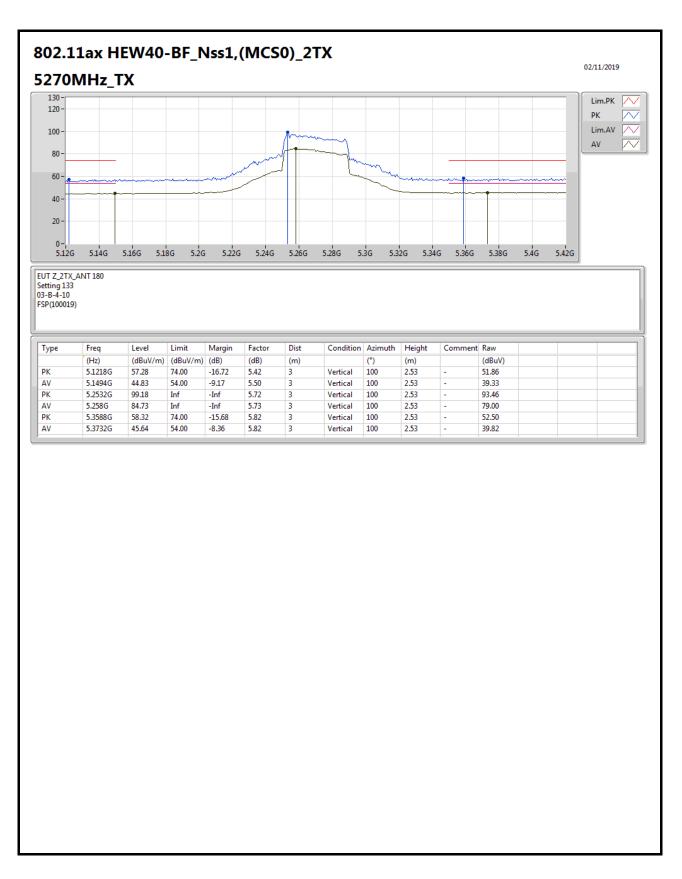




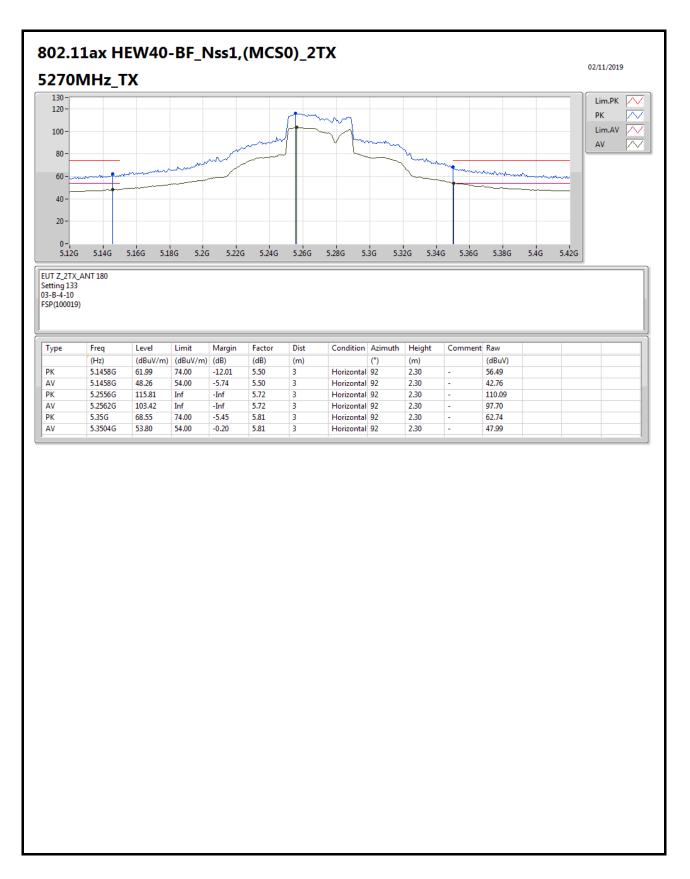




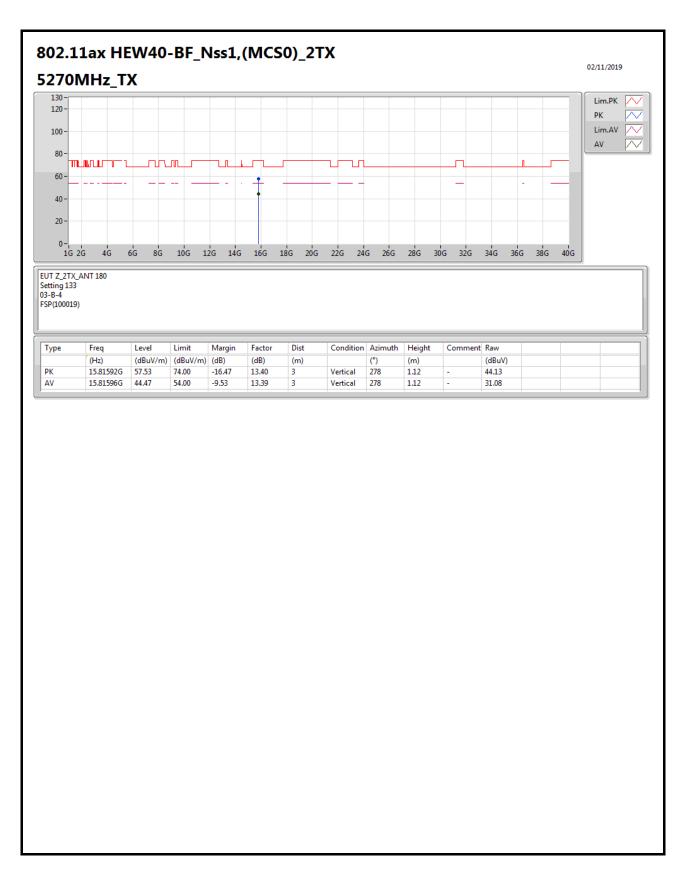
Appendix D



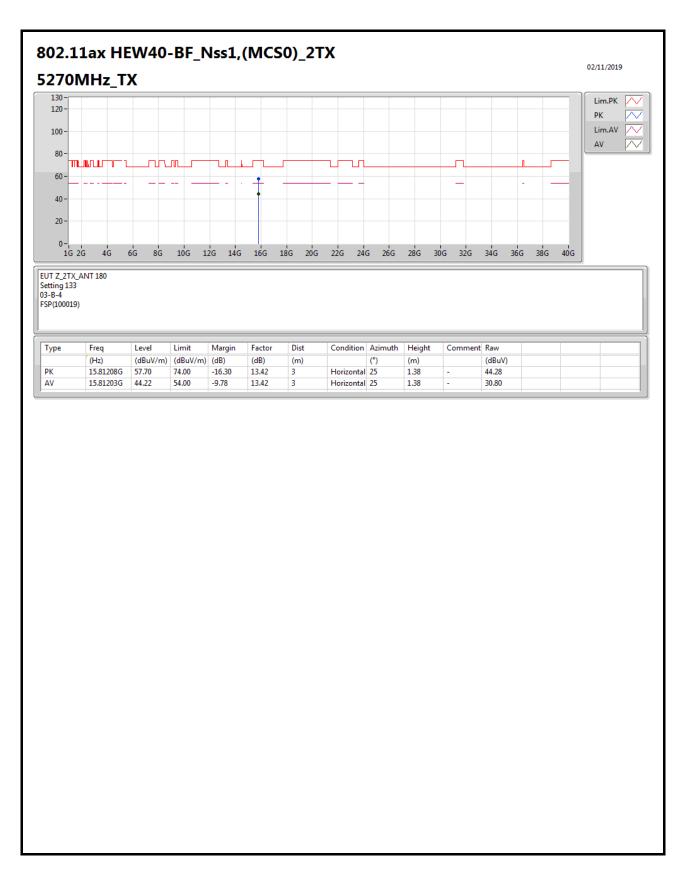




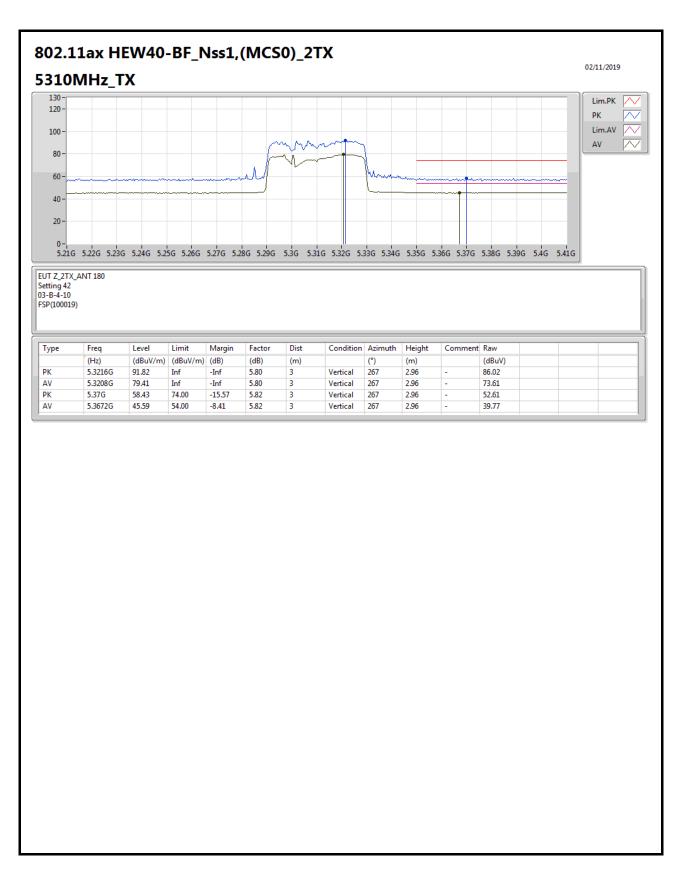




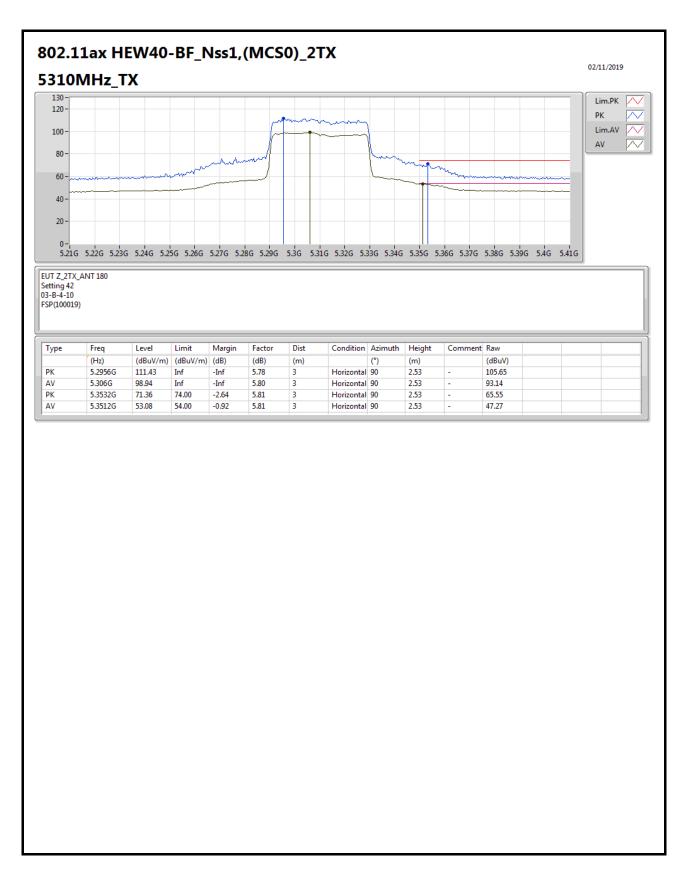




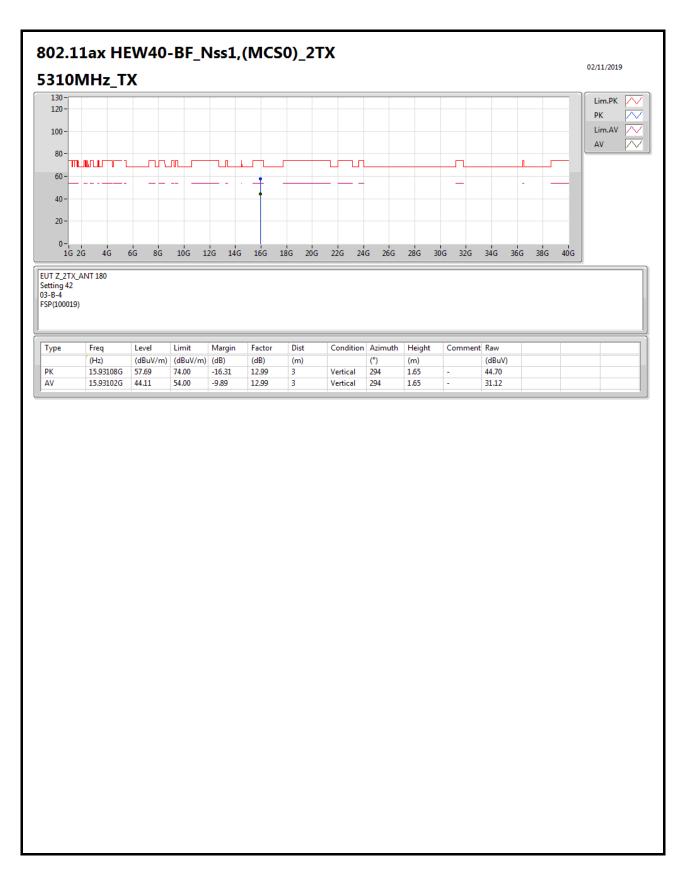




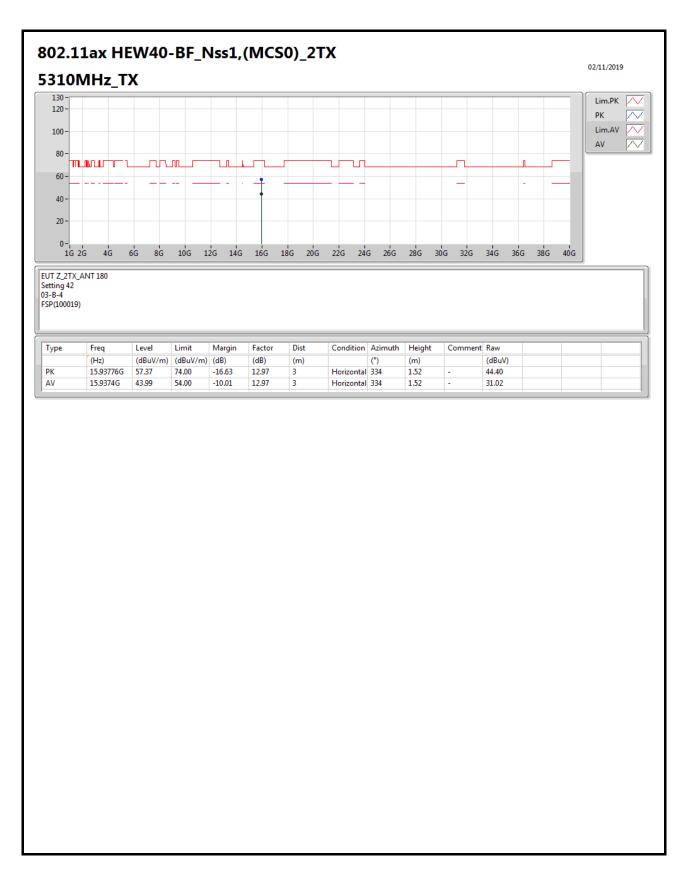




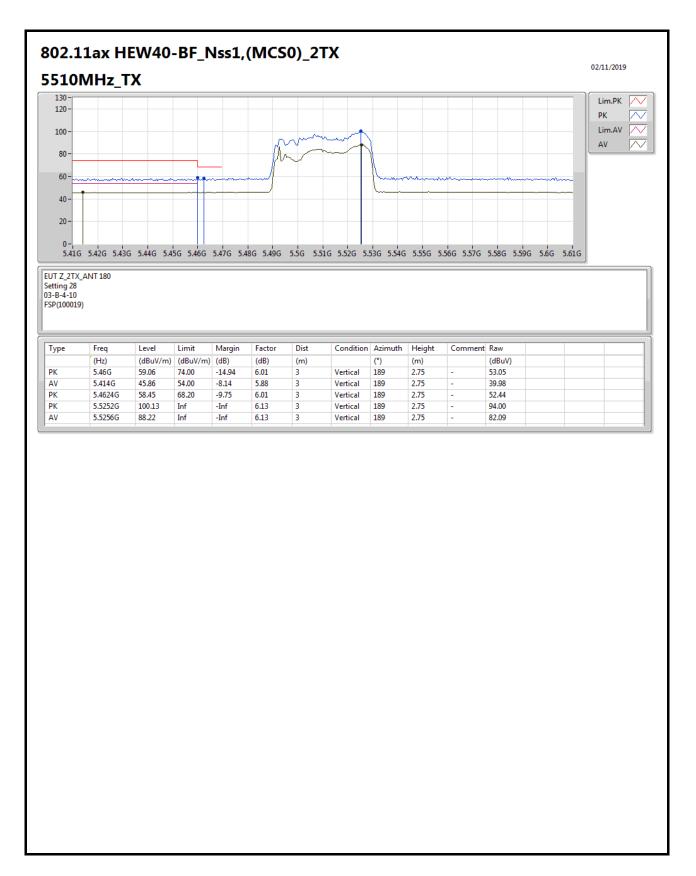




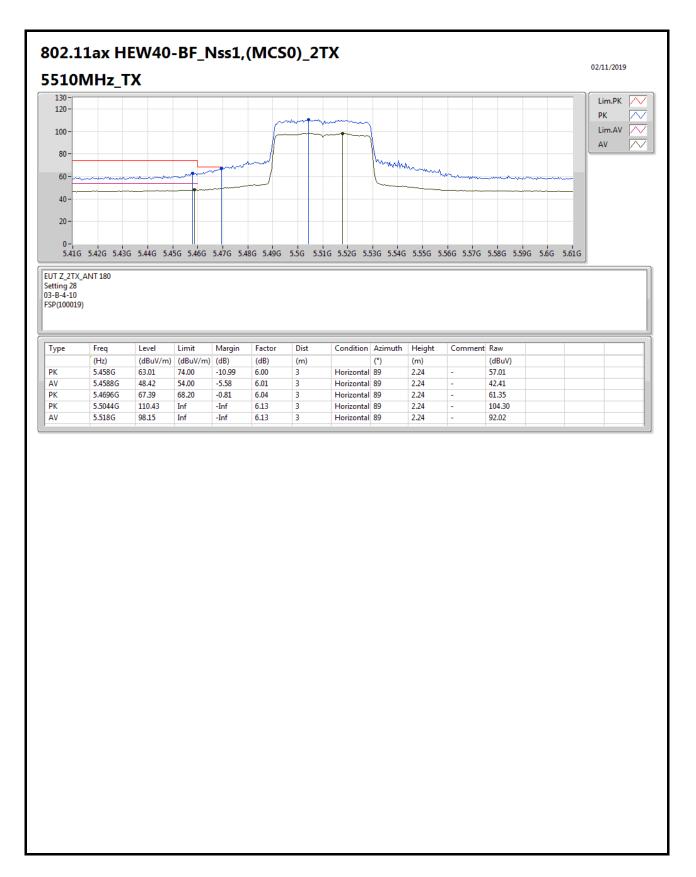




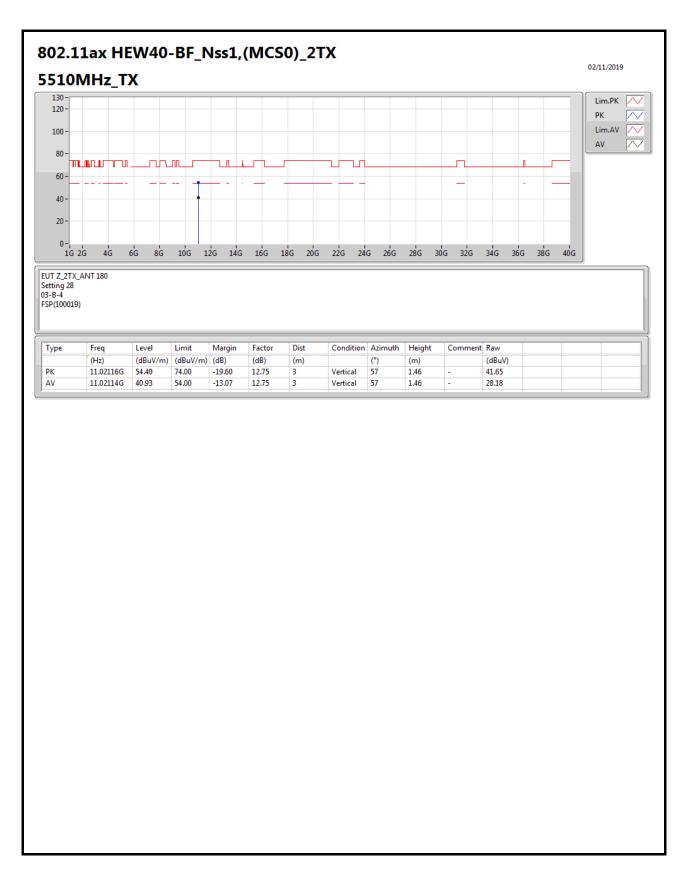




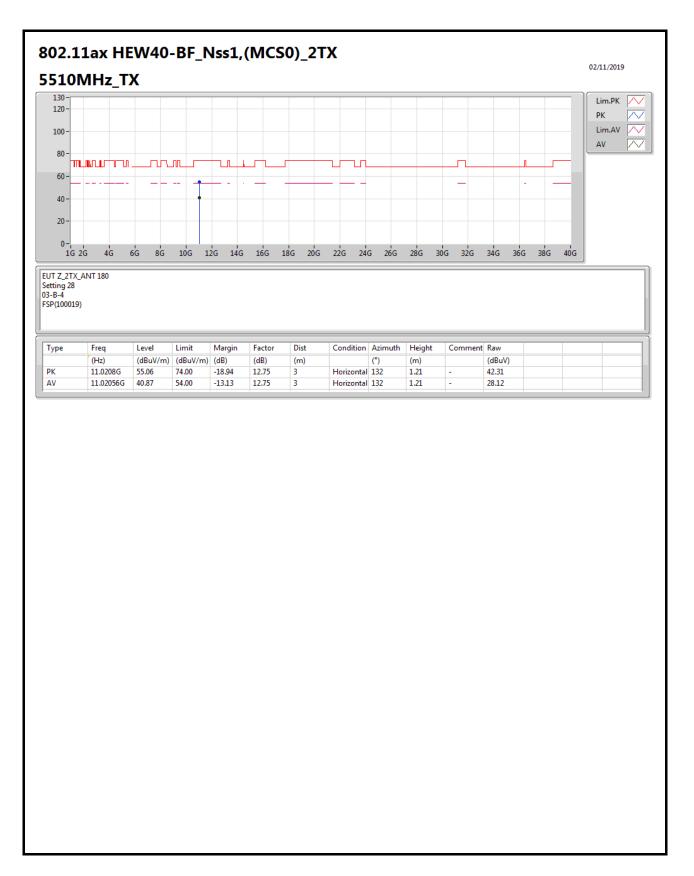




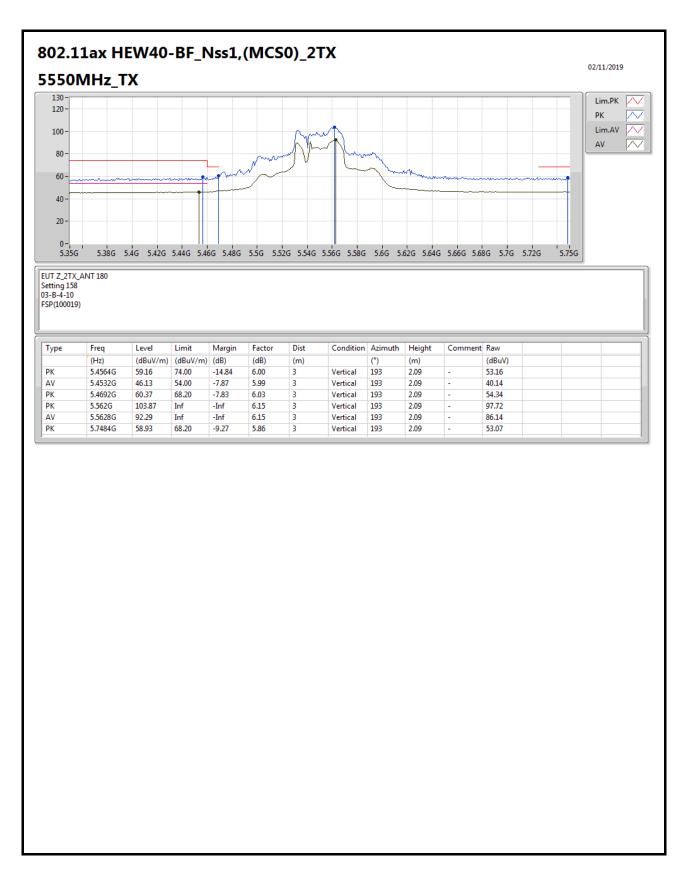




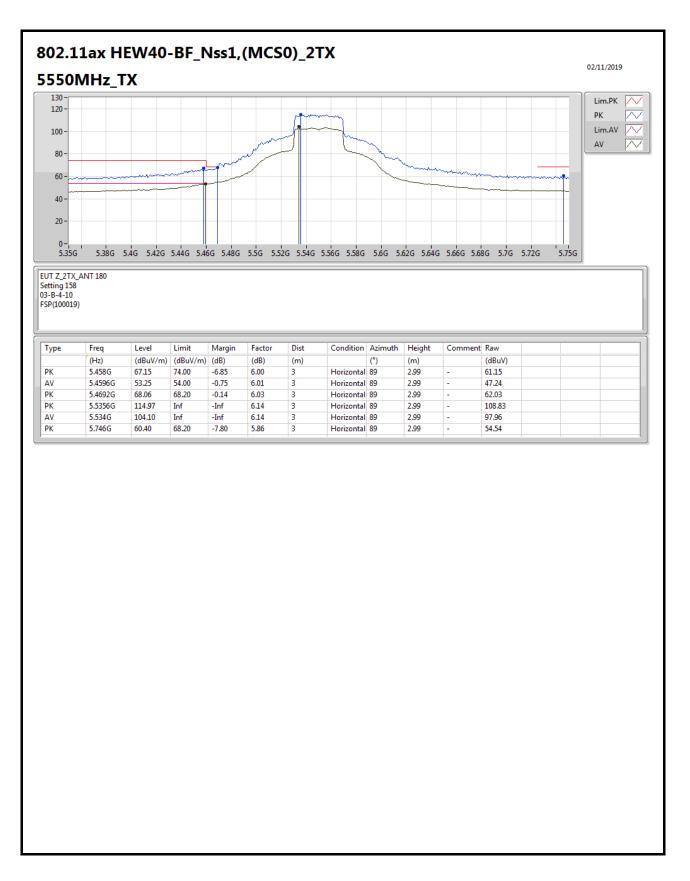




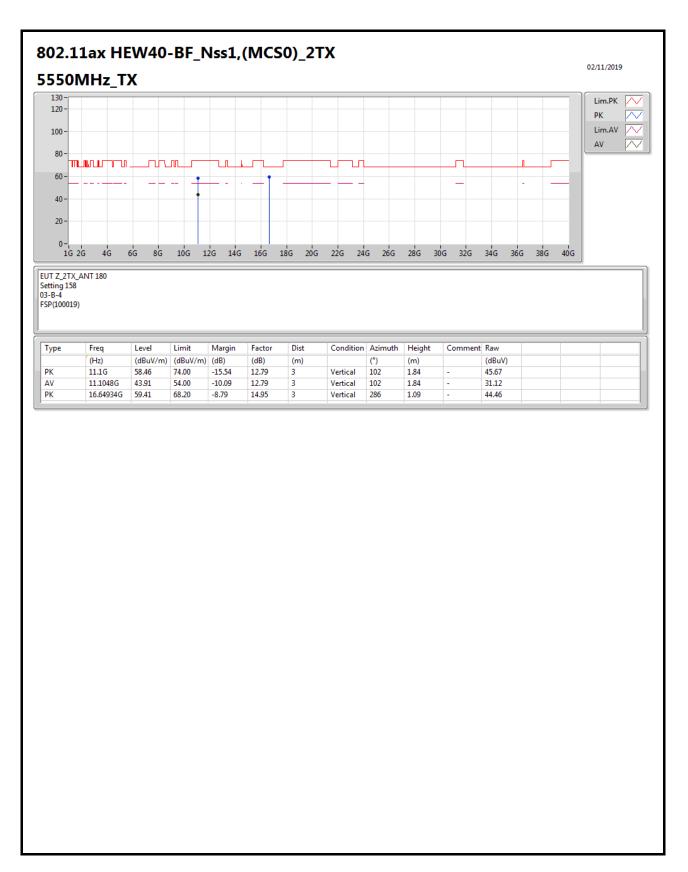




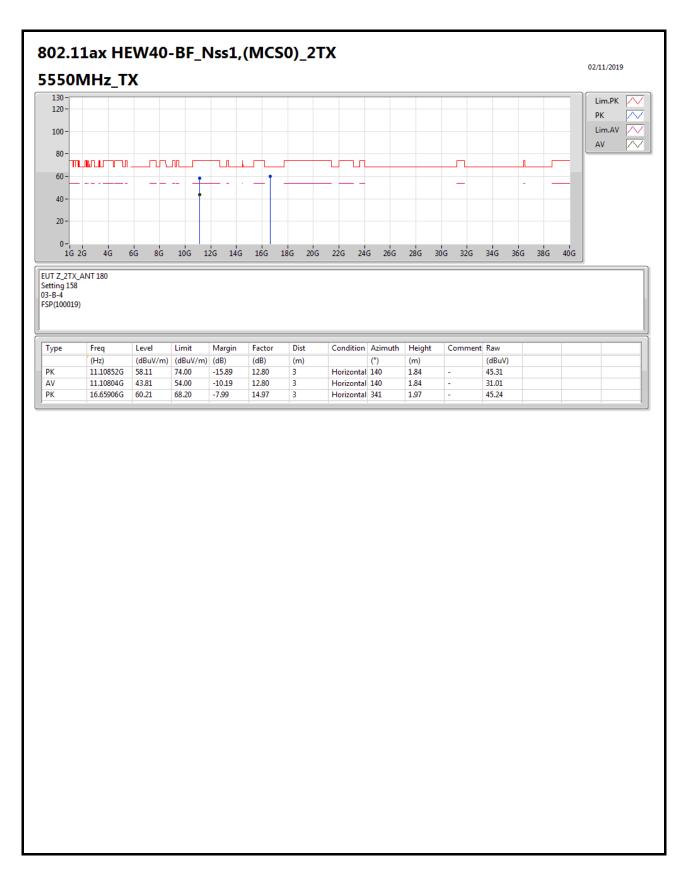




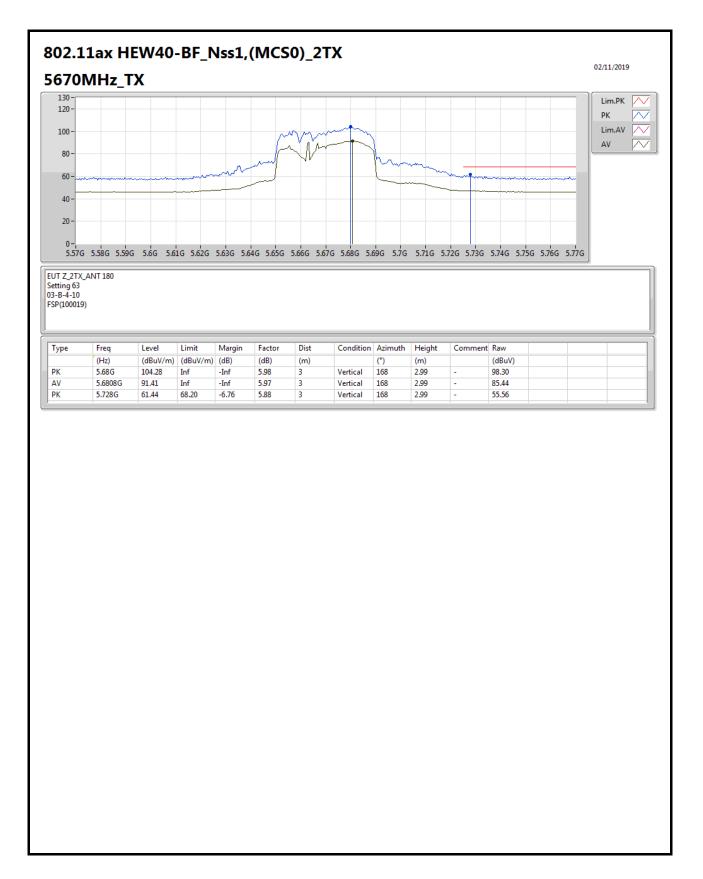




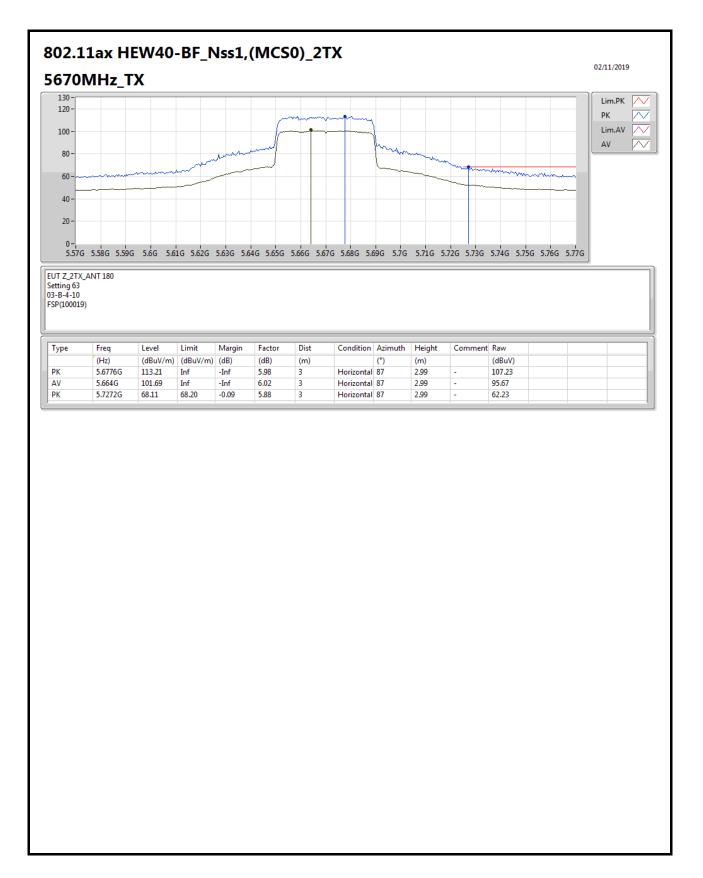




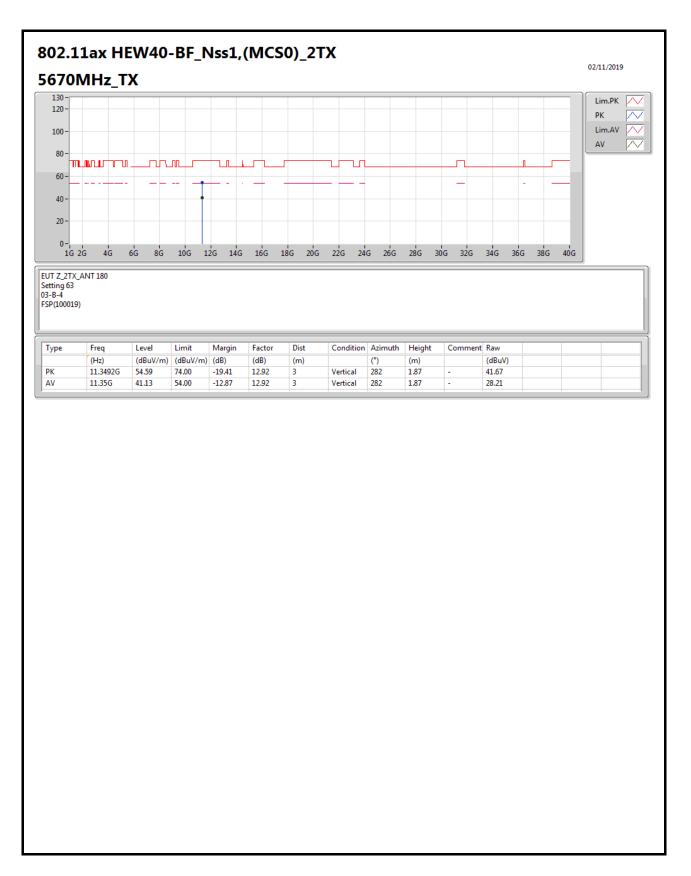




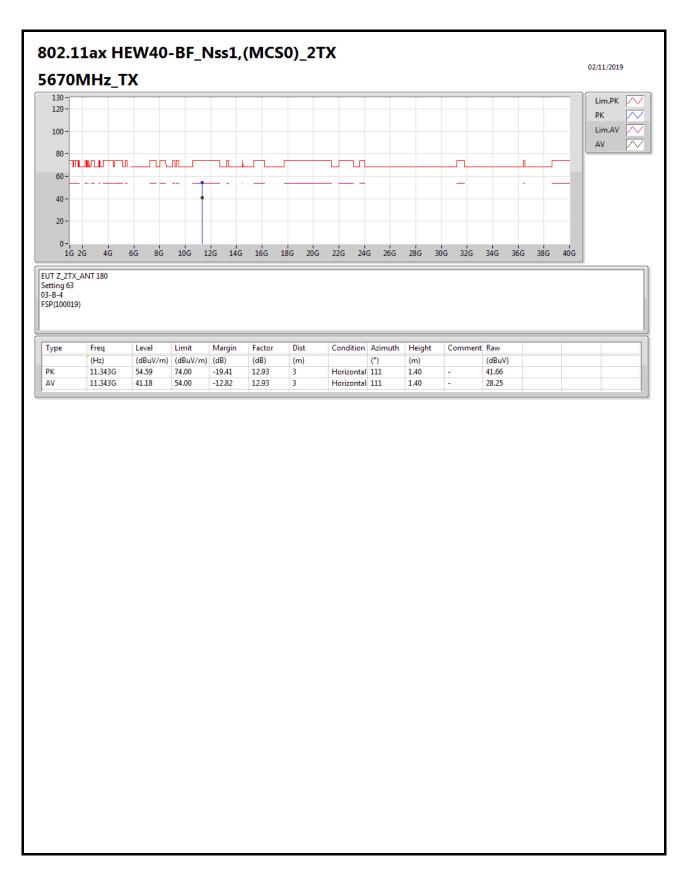




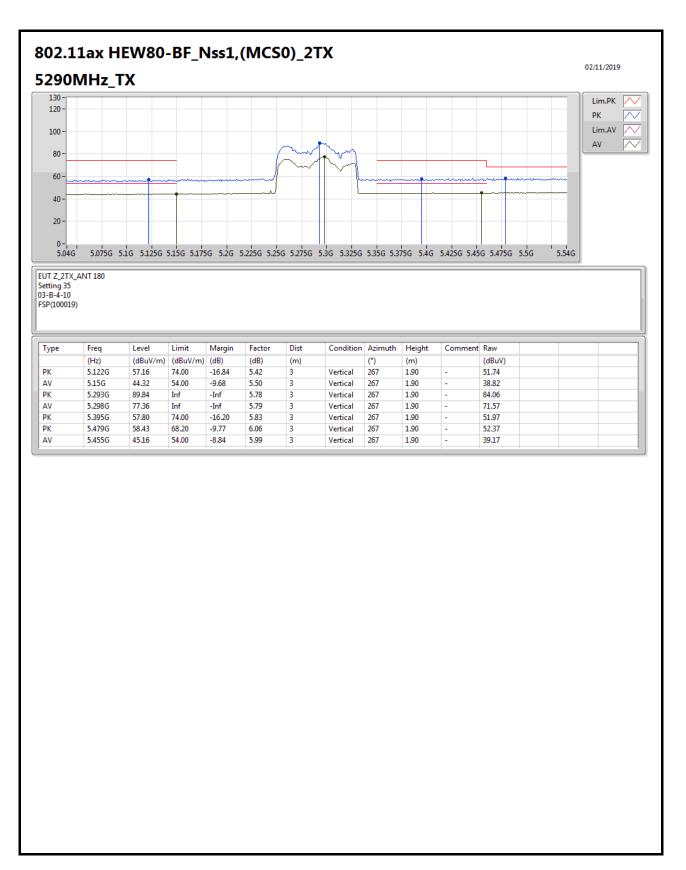




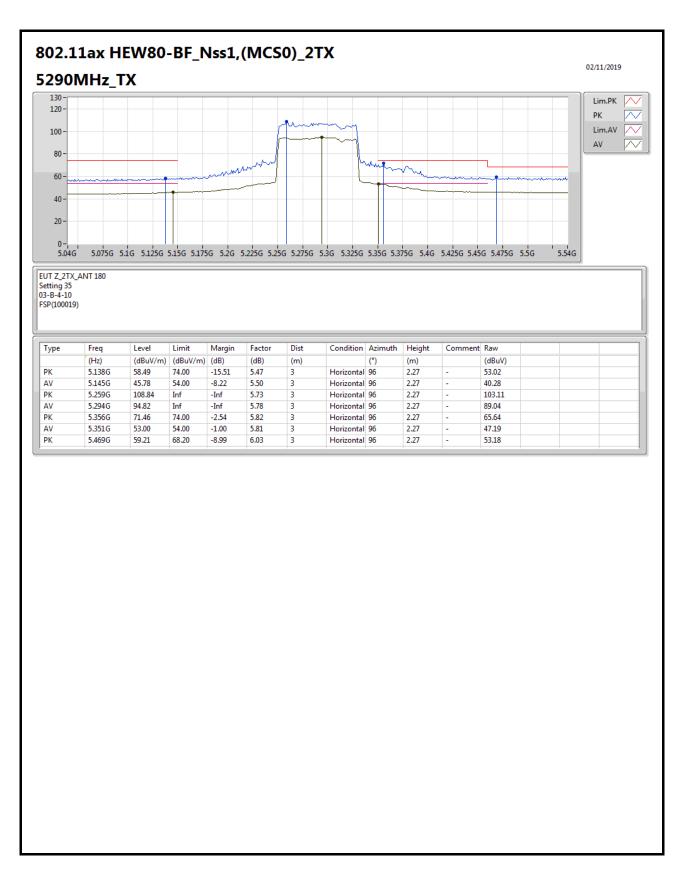




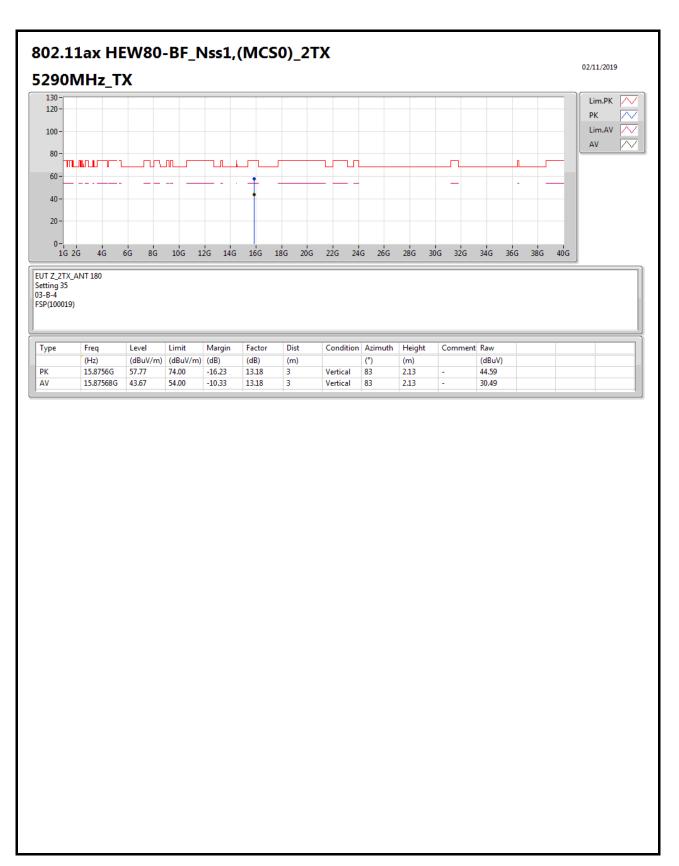




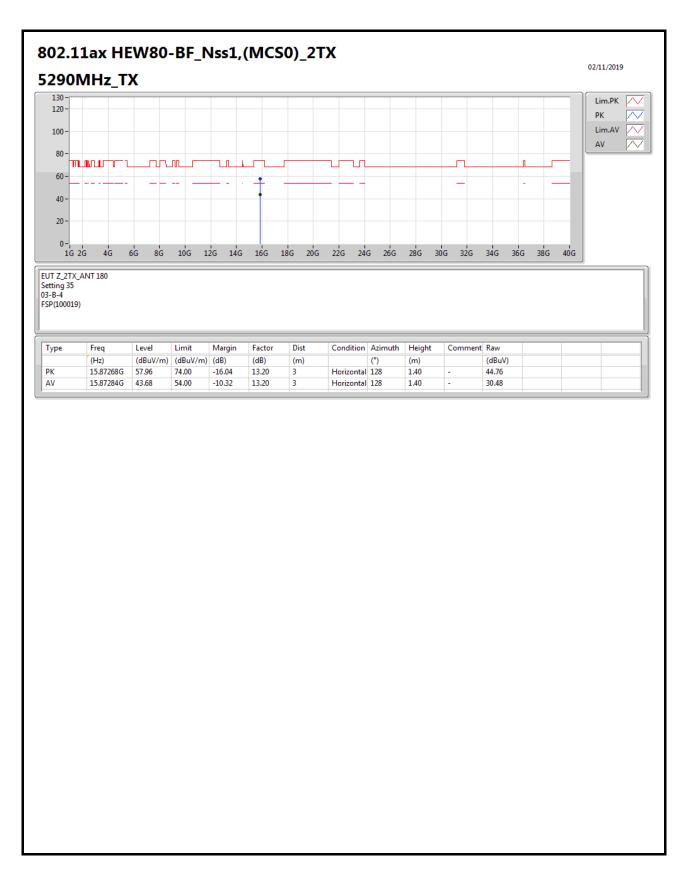




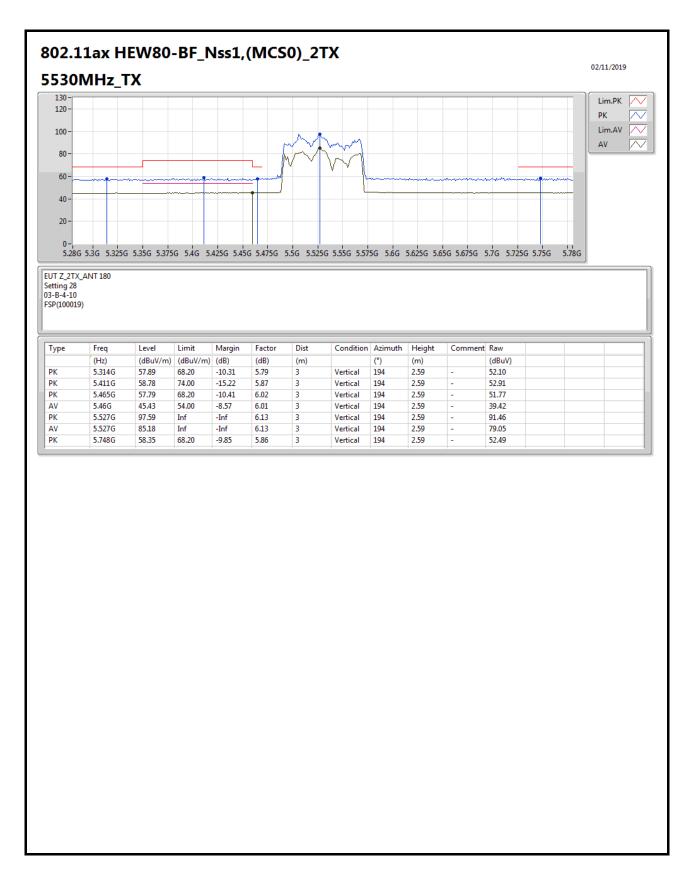














Appendix D

