

Report No.: FR900421AB



FCC RADIO TEST REPORT

FCC ID : G95-CGA4233

Equipment : Cable Modem DOCSIS 3.1

Trade Name : technicolor

Model Number: CGA4233WXYZ, CGA4233TLV, CGA4233TGC,

CGA4233CLC, CGA4233XXX

(Refer to section 1.1.5 for more details)

Product Code : CGA4233WXYZ

(Refer to section 1.1.5 for more details)

Applicant : Technicolor Connected Home USA LLC

5030 Sugarloaf Parkway Building 6, Lawrenceville,

Georgia, United States

Manufacturer : Technicolor Connected Home USA LLC

5030 Sugarloaf Parkway Building 6, Lawrenceville,

Georgia, United States

Standard : 47 CFR FCC Part 15.407

The product was received on Oct. 04, 2019, and testing was started from Oct. 04, 2019 and completed on Oct. 31, 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: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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

TEL: 886-3-656-9065 FAX: 886-3-656-9085

Report Template No.: CB-A12_1 Ver1.0

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Report Version : 01

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Appendix A. Test Results of AC Power-line Conducted Emissions

Appendix B. Test Results of Emission Bandwidth

Appendix C. Test Results of Maximum Conducted Output Power

Appendix D. Test Results of Peak Power Spectral Density

Appendix E. Test Results of Unwanted Emissions

Appendix F. Test Results of Radiated Emission Co-location

Appendix G. Test Photos

Photographs of EUT v01

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History of this test report

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Report No.	Version	Description	Issued Date
FR9O0421AB	01	Initial issue of report	Nov. 27, 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:

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

Reviewed by: Sam Chen
Report Producer: Cindy Peng

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1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5150-5250	a, n (HT20), ac (VHT20)	5180-5240	36-48 [4]
5725-5850		5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40)	5190-5230	38-46 [2]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80)	5210	42 [1]
5725-5850		5775	155 [1]

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

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Note:

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

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

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1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector
1	1	-	-	-	-
2	2	-	-	-	-
3	3	-	-	-	-
4	4	-	-	-	-

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Number of Transmit Antennas & Bandwidth

Number of Transmit Antennas		4TX	
Bandwidth Mode	20 MHz	40 MHz	80 MHz
802.11a	V	Х	Х
802.11n	V	V	Х
802.11ac	V	V	V

	Antenna Gain (dBi) for CDD mode											
	Ant. 1 (Port 1)			Ant. 2 (Port 2)		Ant. 3 (Port 3)			Ant. 4 (Port 4)			
Frequency	20	40	80	20	40	80	20	40	80	20	40	80
	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz	MHz
5180MHz	4.78	-	-	4.01	-	-	3.09	-	-	3.52	-	-
5190MHz	-	4.78	-	-	4.01	-	-	3.23	-	-	3.56	-
5200MHz	4.49	-	-	3.76	-	-	3.23	-	-	3.56	-	-
5210MHz	-	-	4.82	-	-	4.20	-	-	3.23	-	-	3.56
5230MHz	-	4.97	-	-	4.36	-	-	3.23	-	-	3.66	-
5240MHz	4.97	-	-	4.36	-	-	3.23	-	-	3.66	-	-
5745MHz	4.74	-	-	3.64	-	-	4.07	-	-	3.97	-	-
5755MHz	-	4.88	-	-	3.69	-	-	4.01	-	-	4.09	-
5775MHz	-	-	4.63	-	-	3.56	-	-	3.94	-	-	4.12
5785MHz	4.63	-	-	3.56	-	-	3.94	-	-	4.12	-	-
5795MHz	-	4.52	-	-	3.42	-	-	3.81	-	-	3.99	-
5825MHz	5.02	-	-	3.68	-	-	3.77	-	-	4.12	-	-

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	Directional Gain (dBi) for TxBF mode							
Frequency	4 TX for TxBF mode							
	20 MHz	40 MHz	80 MHz					
5180MHz	7.21	-	-					
5190MHz	-	7.21	-					
5200MHz	6.98	-	-					
5210MHz	-	-	7.09					
5230MHz	-	7.14	-					
5240MHz	7.14	-	-					
5745MHz	6.57	-	-					
5755MHz	-	6.56	-					
5775MHz	-	-	6.59					
5785MHz	6.59	-	-					
5795MHz	-	6.74	-					
5825MHz	6.83	-	-					

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Note: The above information was declared by manufacturer.

Mode Test Duty Cycle 1.1.3

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11ac VHT20	0.986	0.06	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ac VHT20-BF	0.971	0.13	3.831m	300
802.11ac VHT40	0.972	0.12	954.375u	3k
802.11ac VHT40-BF	0.951	0.22	3.69m	300
802.11ac VHT80	0.824	0.84	463.125u	3k
802.11ac VHT80-BF	0.955	0.2	5.09m	300

Note:

DC is Duty Cycle.
DCF is Duty Cycle Factor.

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1.1.4 EUT Operational Condition

EUT Power Type	Fro	From power adapter				
Poomforming Function	\boxtimes	With beamforming		Without beamforming		
Beamforming Function	The product has beamforming function for 11n/ac in 5GHz.					
Function		Outdoor P2M	\boxtimes	Indoor P2M		
runction	Fixed P2P Client					
Test Software Version	version 10.10.122.20(r683106 WLTEST)FWID01-1c497f81					

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Note: The above information was declared by manufacturer.

1.1.5 Table for Multiple Listing

The model numbers in the following table are all refer to the identical product.

Model Number	Description	Difference
	where W, X, Y and Z characters can be replaced	
CGA4233WXYZ	by either alphanumeric character between A and	
	Z and between 0 and 9 or "-" or "." or "blank"	
CGA4233TLV	-	For marketing reason the same
CGA4233TGC	-	product will be covered by
CGA4233CLC	-	different name.
	where X character can be replaced by either	
CGA4233XXX	alphanumeric character between A and Z and	
	between 0 and 9 or "-" or "." or "blank"	

From the above, model: CGA4233TLV was selected as representative model for the test and its data was recorded in this report.

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1.2 Applicable Standards

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

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

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	TH01-CB	Eddie Weng	24~25.4°C / 56~60%	Oct. 15, 2019~Oct. 31, 2019
Radiated below 1GHz	03CH04-CB	Stim Sung	24.4~25°C / 57~58%	Oct. 04, 2019~Oct. 22, 2019
Radiated above 1GHz	03CH03-CB	Stim Sung	24.2~25.3°C / 51~54%	Oct. 04, 2019~Oct. 22, 2019
AC Conduction	CO01-CB	Rick Yeh	25~26°C / 45~46%	Oct. 22, 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
Conducted Emission (150kHz ~ 30MHz)	2.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	5.1 dB	Confidence levels of 95%
Conducted Emission	2.4 dB	Confidence levels of 95%
Output Power Measurement	1.5 dB	Confidence levels of 95%
Power Density Measurement	2.4 dB	Confidence levels of 95%
Bandwidth Measurement	2%	Confidence levels of 95%

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2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	PowerSetting
802.11ac VHT20_Nss1,(MCS0)_4TX	-
5180MHz	79
5200MHz	80
5240MHz	92
5745MHz	95
5785MHz	98
5825MHz	96
802.11ac VHT40_Nss1,(MCS0)_4TX	-
5190MHz	67
5230MHz	88
5755MHz	88
5795MHz	88
802.11ac VHT80_Nss1,(MCS0)_4TX	-
5210MHz	70
5775MHz	77
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-
5180MHz	77
5200MHz	76
5240MHz	90
5745MHz	87
5785MHz	89
5825MHz	97
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	-
5190MHz	66
5230MHz	88
5755MHz	88
5795MHz	88
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	-
5210MHz	70
5775MHz	77

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Note:

- 11a CDD modes can be covered by 11ac 20M CDD
- 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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• There are two functions of EUT, one is beamforming function, and the other is non-beamforming function for for 11n/ac in 5GHz. All test results were recorded in the report.

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2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests			
Tests Item AC power-line conducted emissions			
Condition AC power-line conducted measurement for line and neutral			
Operating Mode CTX			
1 WLAN 2.4GHz			
2 WLAN 5GHz			
For operating mode 1 is the worst case and it was record in this test report.			

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

Th	The Worst Case Mode for Following Conformance Tests			
Tests Item Unwanted Emissions				
Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are u regardless of spatial multiplexing MIMO configuration), the radiated be performed with highest antenna gain of each antenna type.				
Operating Mode < 1GHz	СТХ			
1 WLAN 2.4GHz				
2	WLAN 5GHz			
For operating mode 1 is the worst case and it was record in this test report.				
Operating Mode > 1GHz CTX				

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			
1 WLAN 2.4GHz + WLAN 5GHz			
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.: FA9O0421AA for Co-location RF Exposure Evaluation.			

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

2.3 EUT Operation during Test

For CTX Mode:

For non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

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 PUTTY, Iperf.
- 3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by WLAN Card and transmit duty cycle no less than 98%.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

Accessories							
No. Equipment Brand Name			Model Name	Rating			
1	Adapter	ноюто	ADS-36FKJ-12 12036EPBR	INPUT: 100-240V ~ 50/60Hz, Max. 1.0A OUTPUT: 12V, 3.0A			

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2.5 Support Equipment

For AC Conduction:

Support Equipment								
No.	No. Equipment Brand Name Model Name FCC ID							
Α	Notebook	DELL	E6430	N/A				
В	Flash disk3.0	Transcend	JetFlash-700	N/A				

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For Radiated (below 1GHz):

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

For Radiated (above 1GHz) and RF Conducted:

For non-beamforming mode:

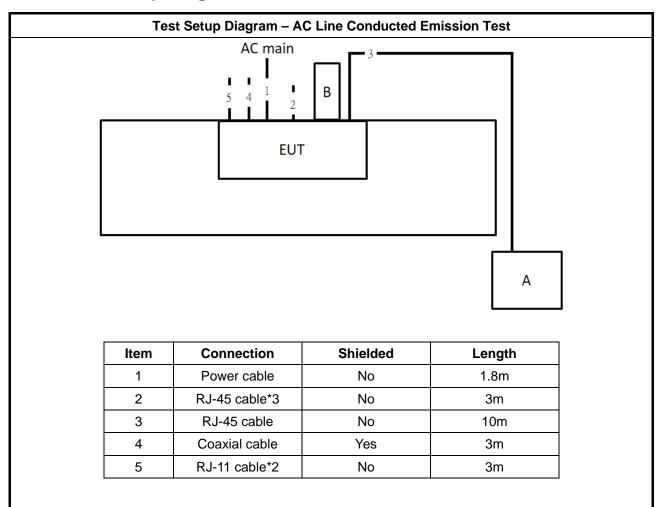
	Support Equipment			
No.	Equipment	Brand Name	Model Name	FCC ID
Α	Notebook	DELL	E4300	N/A

For beamforming mode:

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	Notebook	DELL	E4300	N/A	
В	WLAN card	ASUS	PCE-88U	MSQ-PCIE0U00	

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2.6 Test Setup Diagram



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Test Setup Diagram - Radiated Test < 1GHz

AC MAIN

EUT

AC MAIN

AC MAIN

EUT

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Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Power cable	No	1.8m

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Test Setup Diagram - Radiated Test > 1GHz

For non-beamforming mode:

ACMAIN

EUT

ACMAIN

A

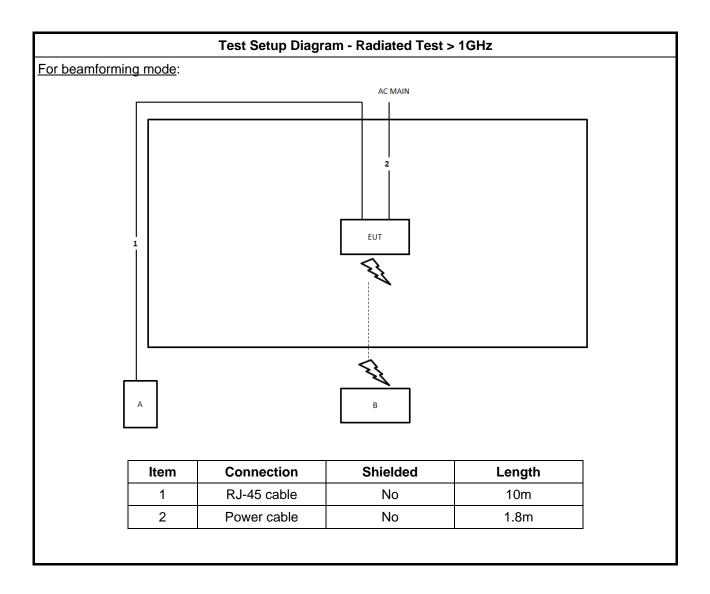
A

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Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Power cable	No	1.8m

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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

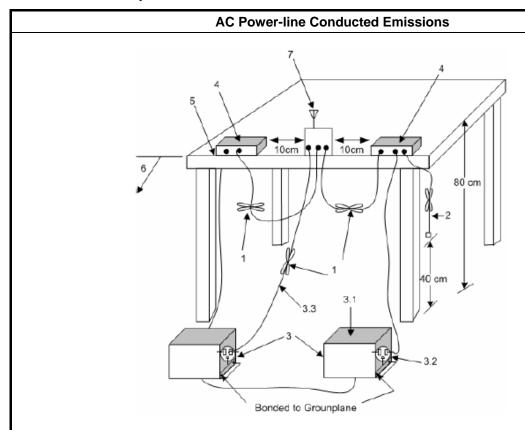
Refer a test equipment and calibration data table in this test report.

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 Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
- 3.1—All other equipment powered from additional LISN(s).
- 3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
- 3.3—LISN at least 80 cm from nearest part of EUT chassis.
- 4—Non-EUT components of EUT system being tested.
- 5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
- 6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
- 7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

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3.2 Emission Bandwidth

3.2.1 Emission Bandwidth Limit

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

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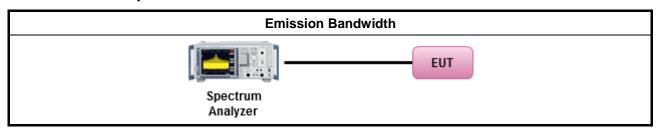
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

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

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

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3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

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

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3.3.2 Measuring Instruments

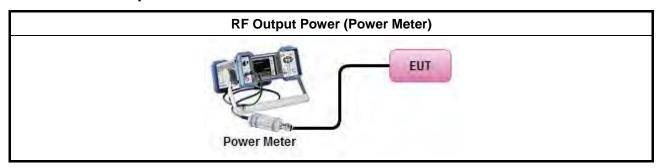
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

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

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3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

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3.4 Peak Power Spectral Density

3.4.1 Peak Power Spectral Density Limit

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

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3.4.2 Measuring Instruments

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

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3.4.3 Test Procedures

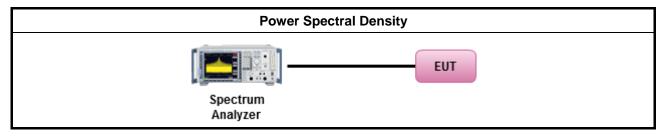
	Test Method				
	outp func	k power spectral density procedures that the same method as used to determine the conducted ut power shall be used to determine the peak power spectral density and use the peak search tion on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral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

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3.4.4 Test Setup



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3.4.5 Test Result of Peak Power Spectral Density

Refer as Appendix D

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3.5 Unwanted Emissions

3.5.1 Transmitter Unwanted Emissions Limit

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

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

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

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

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

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

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3.5.2 Measuring Instruments

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

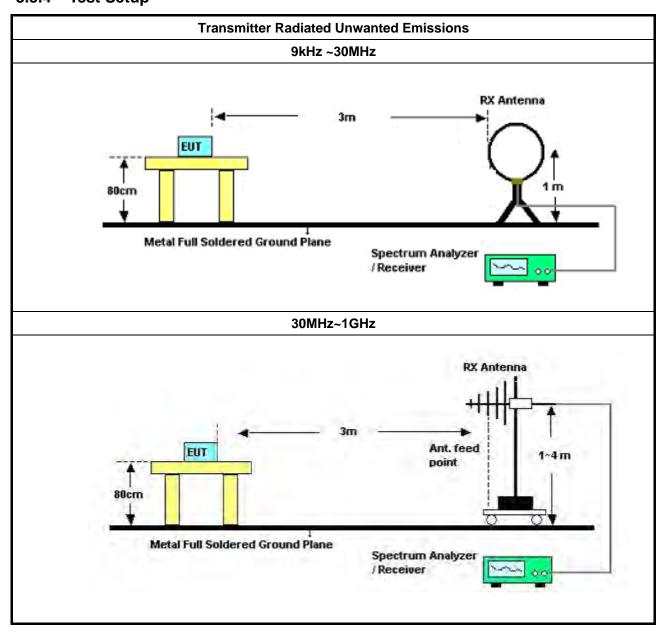
3.5.3 Test Procedures

Test Method

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

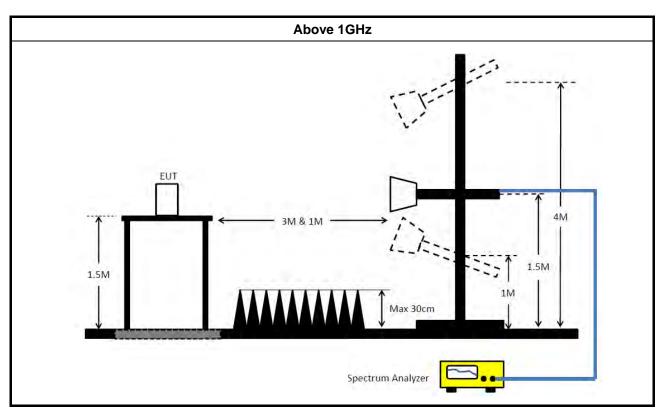
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3.5.4 Test Setup



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3.5.5 Measurement Results Calculation

The measured Level is calculated using:

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

3.5.6 Transmitter Unwanted Emissions (Below 30MHz)

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

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

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

3.5.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix E

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4 Test Equipment and Calibration Data

Instrument	t 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 (03CH04-CB)	
Bilog Antenna with 6 dB attenuator	Schaffner	CBL6112B & N-6-06	2928 & AT-N0607	20MHz ~ 2GHz	Jan. 02, 2019	Jan. 01, 2020	Radiation (03CH04-CB)	
Pre-Amplifier	Agilent	310N	187291	0.1MHz ~ 1GHz	Mar. 19, 2019	Mar. 18, 2020	Radiation (03CH04-CB)	
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Dec. 26, 2018	Dec. 25, 2019	Radiation (03CH04-CB	
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH04-CB)	
RF Cable-low	Woken	RG402	Low Cable-03+22	30MHz – 1GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH04-CB)	
RF Cable-low	Woken	RG402	Low Cable-03+22	30MHz – 1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH04-CB)	
Horn Antenna	ETS · Lindgren	3115	6821	750MHz~18GHz	Jan. 24, 2019 Jan. 23, 202		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)	

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH03-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Hz~40GHz Feb. 25, 2019 Feb. 3		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)
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)

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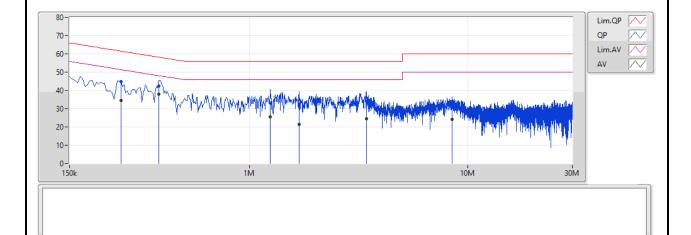
Note: Calibration Interval of instruments listed above is one year.

N.C.R. means Non-Calibration required.

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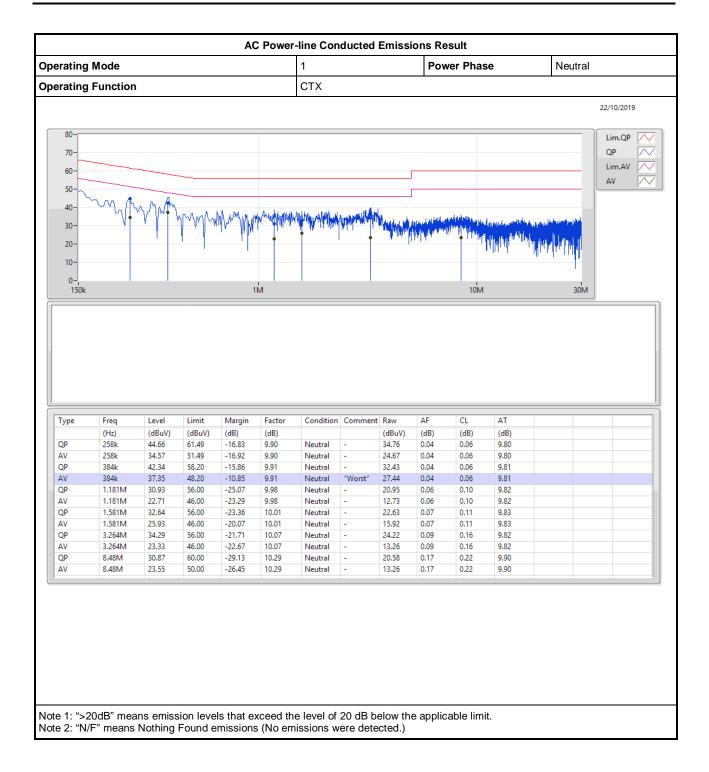
AC Power-line Conducted Emissions Result Operating Mode Power Phase Line СТХ **Operating Function**



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	AF	CL	AT		
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)		
QP	258k	44.68	61.49	-16.81	9.92	Line	-	34.76	0.06	0.06	9.80		
AV	258k	34.58	51.49	-16.91	9.92	Line	-	24.66	0.06	0.06	9.80		
QP	384k	42.39	58.20	-15.81	9.93	Line	-	32.46	0.06	0.06	9.81		
ΑV	384k	37.94	48.20	-10.26	9.93	Line	"Worst"	28.01	0.06	0.06	9.81		
QP	1.248M	33.18	56.00	-22.82	10.00	Line	-	23.18	0.08	0.10	9.82		
AV	1.248M	25.40	46.00	-20.60	10.00	Line	-	15.40	0.08	0.10	9.82		
QP	1.685M	32.28	56.00	-23.72	10.03	Line	-	22.25	0.09	0.11	9.83		
AV	1.685M	21.55	46.00	-24.45	10.03	Line	-	11.52	0.09	0.11	9.83		
QP	3.422M	34.02	56.00	-21.98	10.08	Line	-	23.94	0.11	0.16	9.81		
AV	3.422M	24.58	46.00	-21.42	10.08	Line	-	14.50	0.11	0.16	9.81		
QP	8.444M	30.82	60.00	-29.18	10.31	Line	-	20.51	0.19	0.22	9.90		
AV	8.444M	24.20	50.00	-25.80	10.31	Line	-	13.89	0.19	0.22	9.90		

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.)

AC Power-line Conducted Emissions Result





EBW Result Appendix B

Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW	
	(Hz)	(Hz)		(Hz)	(Hz)	
5.15-5.25GHz	-	-	-	-	-	
802.11ac VHT20_Nss1,(MCS0)_4TX	41.55M	18.411M	18M4D1D	21.81M	17.781M	
802.11ac VHT40_Nss1,(MCS0)_4TX	80.88M	36.462M	36M5D1D	39.72M	36.162M	
802.11ac VHT80_Nss1,(MCS0)_4TX	99.48M	75.082M	75M1D1D	81.12M	74.843M	
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	36.54M	17.931M	17M9D1D	21.6M	17.631M	
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	83.4M	36.642M	36M6D1D	40.02M	36.162M	
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	81.48M	75.082M	75M1D1D	79.92M	74.843M	
5.725-5.85GHz	-	-	-	-	-	
802.11ac VHT20_Nss1,(MCS0)_4TX	17.61M	27.676M	27M7D1D	17.55M	21.469M	
802.11ac VHT40_Nss1,(MCS0)_4TX	36.36M	37.001M	37M0D1D	36.3M	36.582M	
802.11ac VHT80_Nss1,(MCS0)_4TX	76.32M	76.042M	76M0D1D	75.72M	75.682M	
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	17.67M	21.319M	21M3D1D	16.5M	18.021M	
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	36.36M	39.04M	39M0D1D	31.74M	36.882M	
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	76.2M	76.042M	76M0D1D	74.88M	75.682M	

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

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

Min-OBW = Minimum 99% occupied bandwidth;

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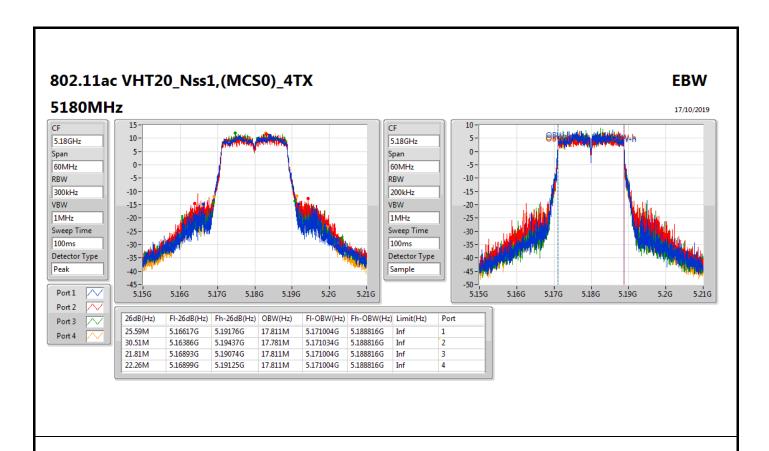
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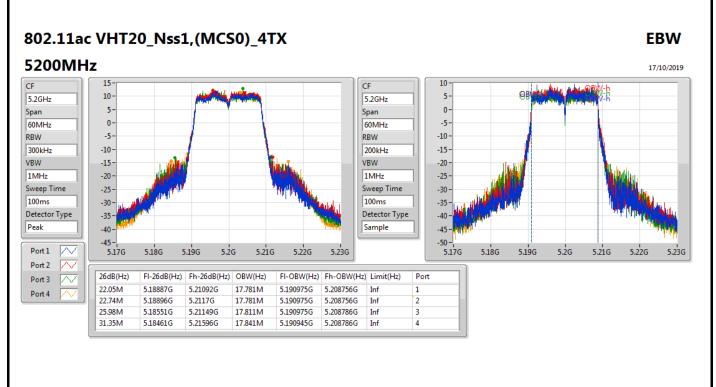
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW	Port 3-N dB	Port 3-OBW	Port 4-N dB	Port 4-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5180MHz	Pass	Inf	25.59M	17.811M	30.51M	17.781M	21.81M	17.811M	22.26M	17.811M
5200MHz	Pass	Inf	22.05M	17.781M	22.74M	17.781M	25.98M	17.811M	31.35M	17.841M
5240MHz	Pass	Inf	38.58M	17.931M	41.55M	18.411M	38.13M	17.991M	38.79M	17.961M
5745MHz	Pass	500k	17.61M	21.919M	17.58M	22.549M	17.55M	23.328M	17.55M	23.538M
5785MHz	Pass	500k	17.58M	23.358M	17.58M	27.676M	17.58M	24.348M	17.61M	26.207M
5825MHz	Pass	500k	17.58M	21.619M	17.55M	26.537M	17.58M	21.469M	17.58M	24.138M
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5190MHz	Pass	Inf	40.44M	36.162M	39.72M	36.282M	40.14M	36.222M	39.96M	36.342M
5230MHz	Pass	Inf	72.42M	36.402M	80.88M	36.462M	70.98M	36.402M	72.3M	36.462M
5755MHz	Pass	500k	36.3M	36.642M	36.36M	36.642M	36.36M	36.582M	36.3M	36.762M
5795MHz	Pass	500k	36.36M	37.001M	36.3M	36.882M	36.36M	36.582M	36.3M	36.702M
802.11ac VHT80_Nss1,(MCS0)_4TX		i	-	·	·	T.	-	·	-	-
5210MHz	Pass	Inf	85.44M	74.963M	99.48M	75.082M	81.12M	74.963M	81.6M	74.843M
5775MHz	Pass	500k	75.72M	75.922M	76.32M	76.042M	75.72M	75.682M	75.72M	75.922M
802.11ac VHT20-BF_Nss1,(MCS0)_4TX		i	-	·	·	T.	-	·	-	-
5180MHz	Pass	Inf	21.84M	17.781M	27.36M	17.721M	21.63M	17.631M	21.84M	17.871M
5200MHz	Pass	Inf	21.6M	17.721M	24.33M	17.781M	21.72M	17.691M	21.9M	17.901M
5240MHz	Pass	Inf	36.03M	17.781M	36.54M	17.901M	34.44M	17.901M	35.25M	17.931M
5745MHz	Pass	500k	17.58M	18.051M	17.28M	18.081M	17.67M	18.201M	17.58M	18.051M
5785MHz	Pass	500k	17.61M	18.411M	17.55M	18.201M	17.55M	18.021M	17.58M	18.231M
5825MHz	Pass	500k	17.55M	20.48M	16.5M	21.319M	17.64M	19.4M	17.58M	20.33M
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	-	i	-	-	-	·	-	-	-	-
5190MHz	Pass	Inf	40.08M	36.222M	49.08M	36.282M	40.02M	36.222M	40.08M	36.162M
5230MHz	Pass	Inf	66.78M	36.282M	83.4M	36.642M	76.44M	36.402M	77.58M	36.402M
5755MHz	Pass	500k	36.36M	36.882M	36M	37.541M	33.84M	37.061M	36.3M	37.961M
5795MHz	Pass	500k	36.3M	38.021M	31.74M	39.04M	36.36M	37.121M	35.46M	37.361M
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5210MHz	Pass	Inf	80.4M	75.082M	81.48M	74.843M	79.92M	75.082M	79.92M	74.963M
5775MHz	Pass	500k	75.72M	75.802M	76.2M	75.922M	74.88M	76.042M	75.36M	75.682M

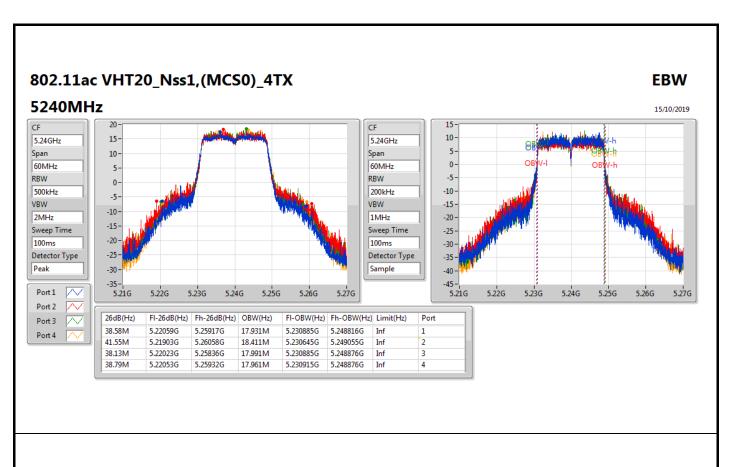
Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band Port X-OBW = Port X 99% occupied bandwidth;

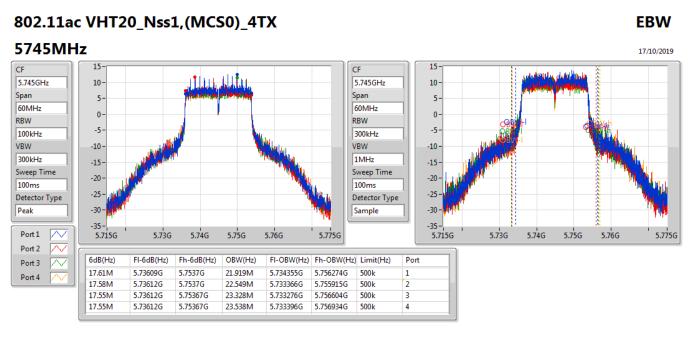
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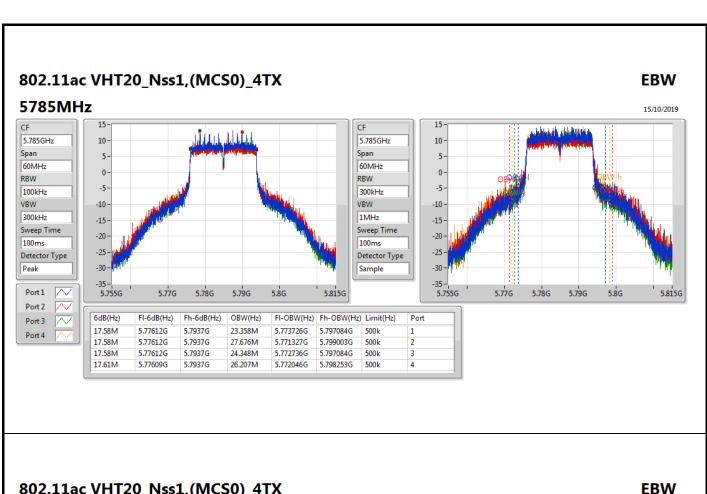
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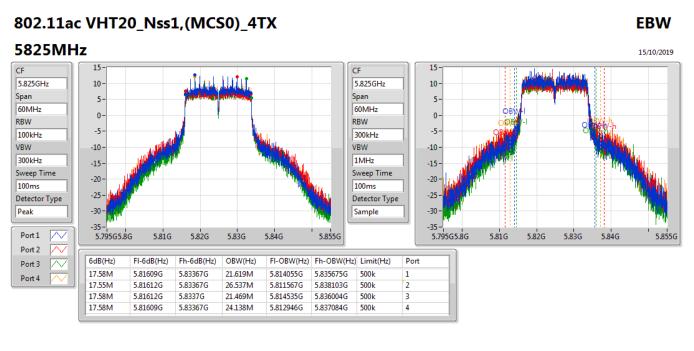


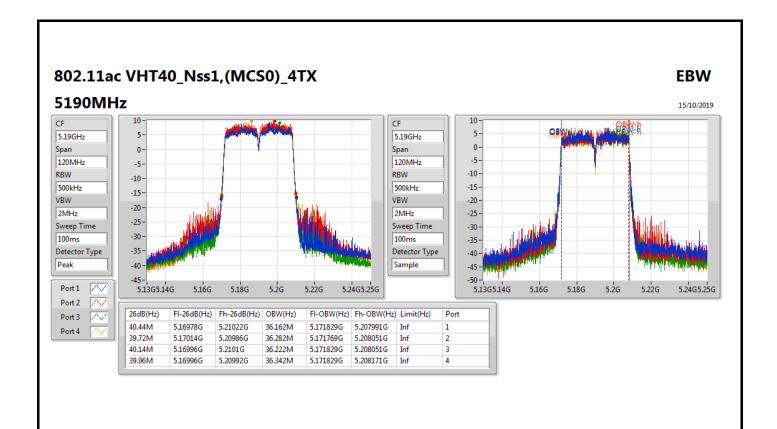


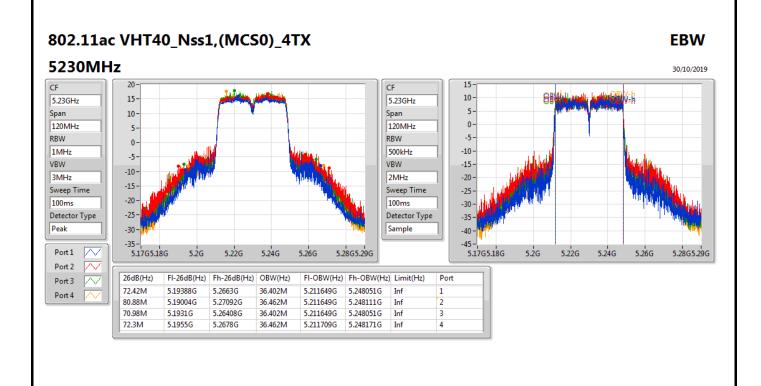


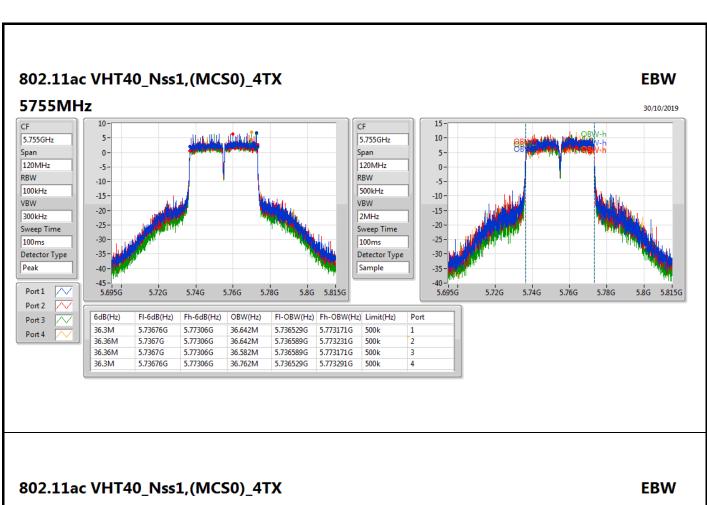


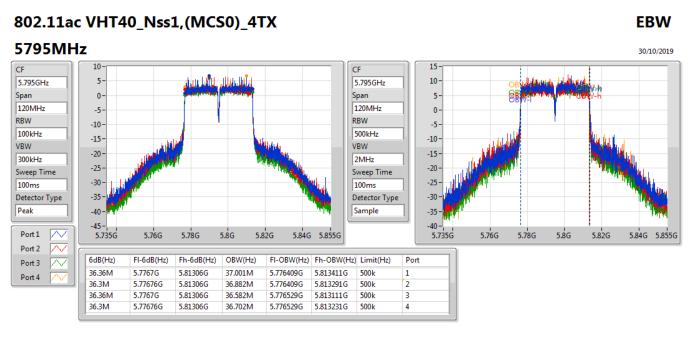


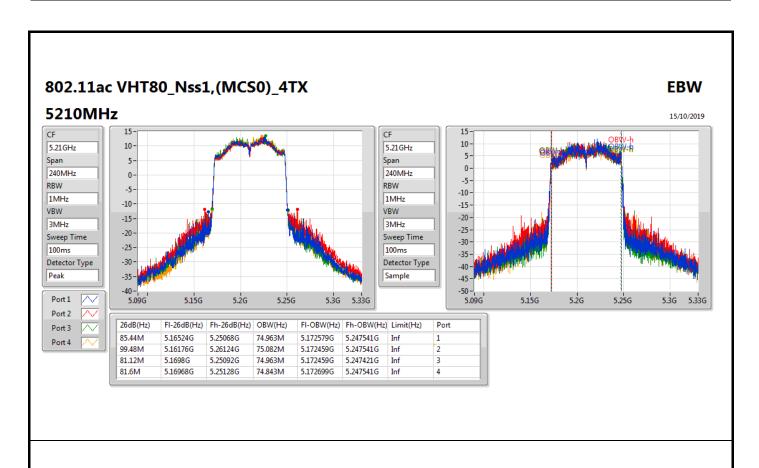


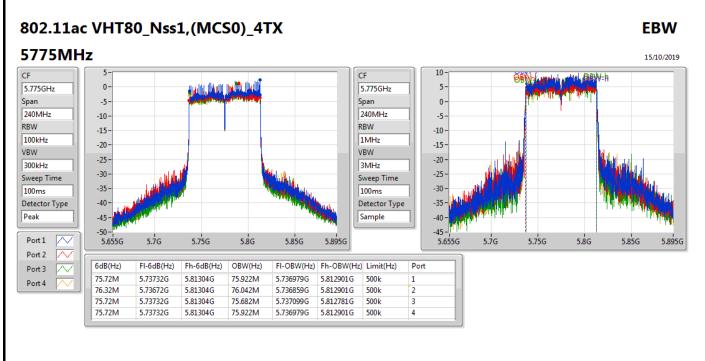


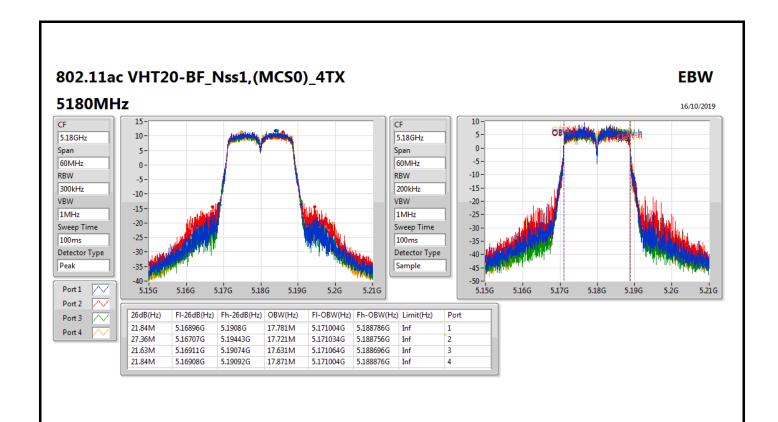


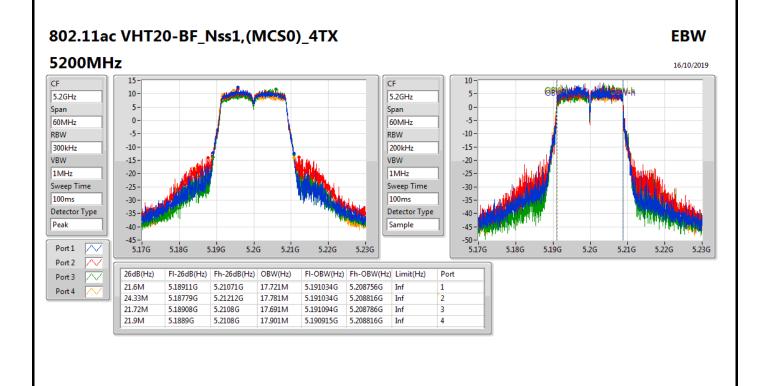


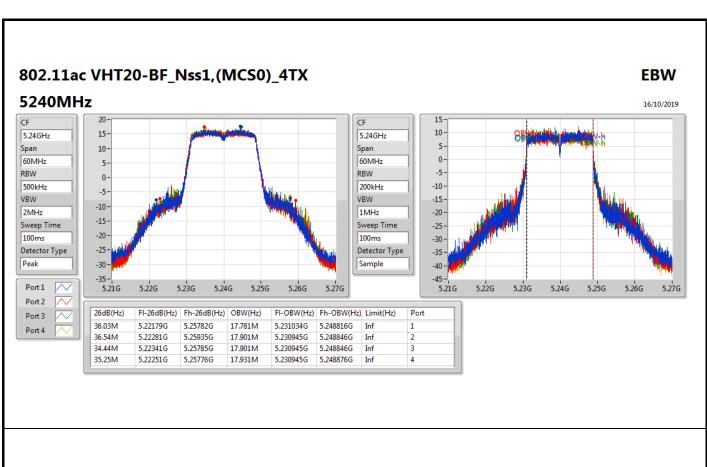


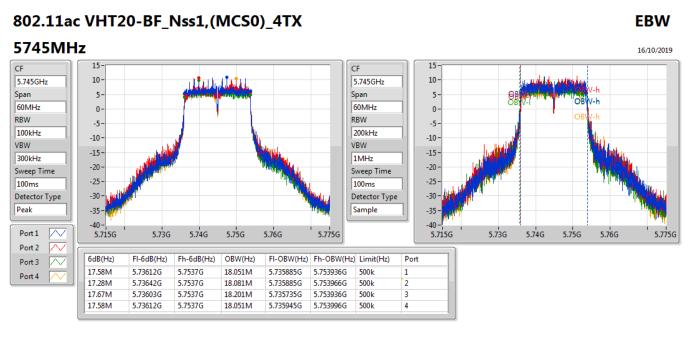


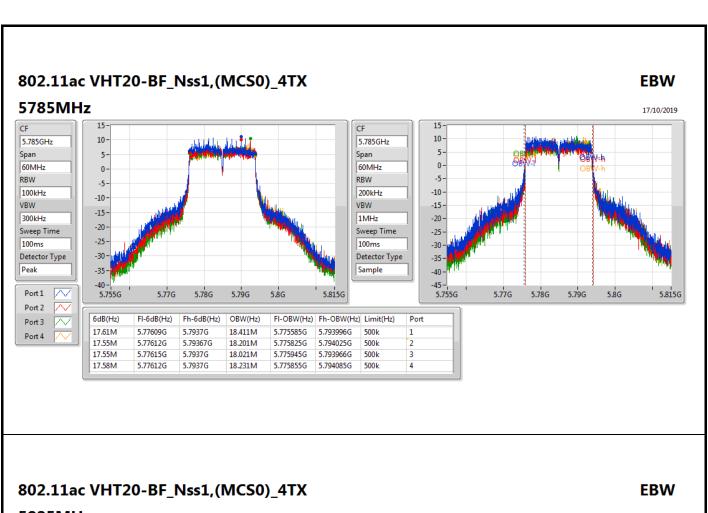


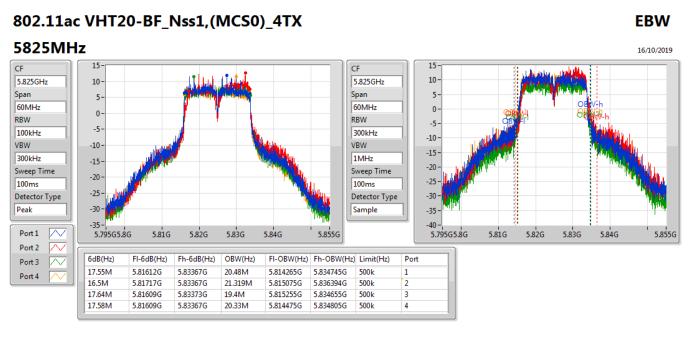


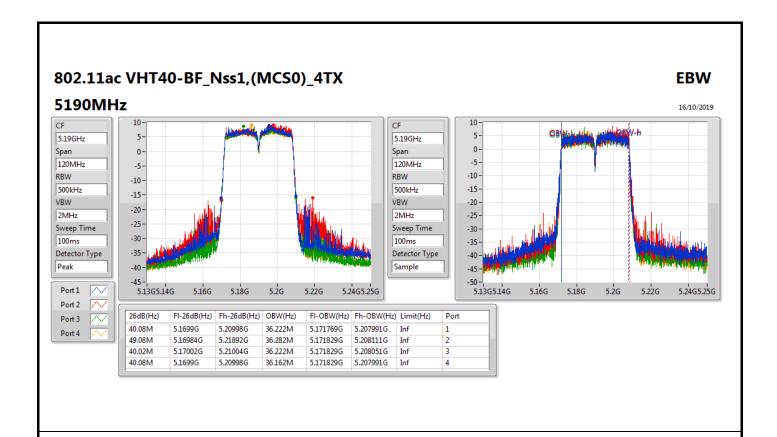


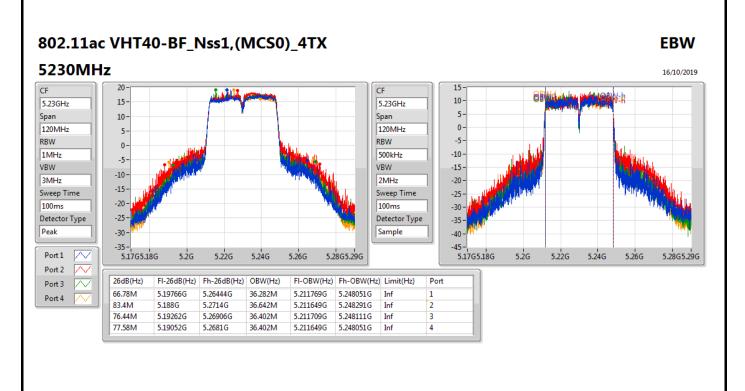


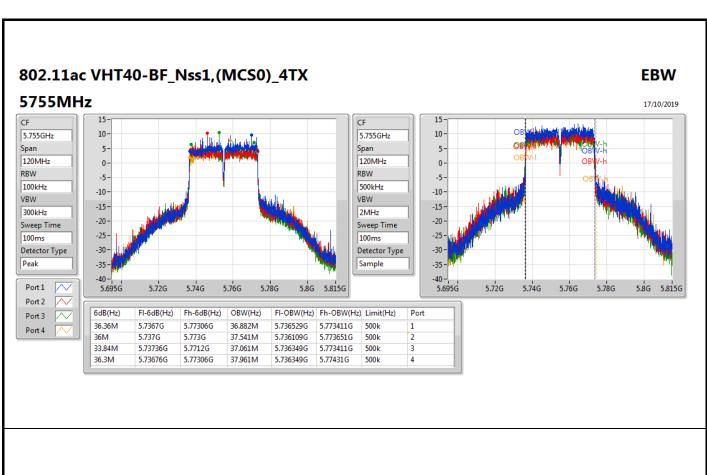


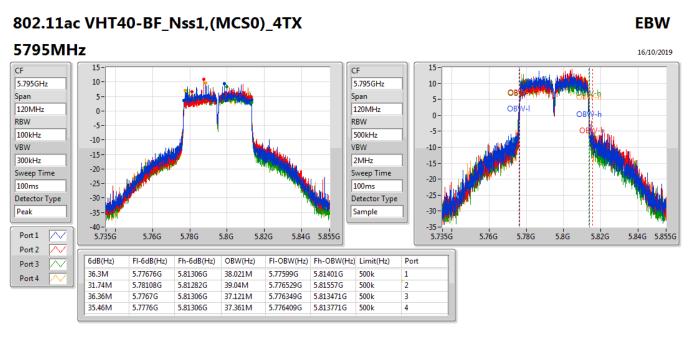


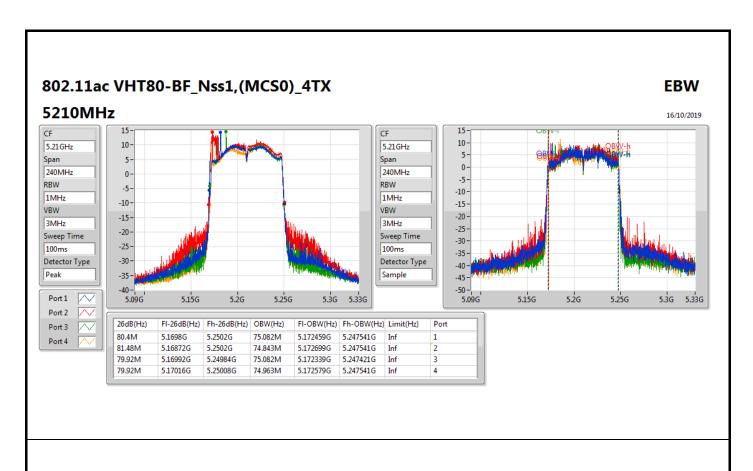


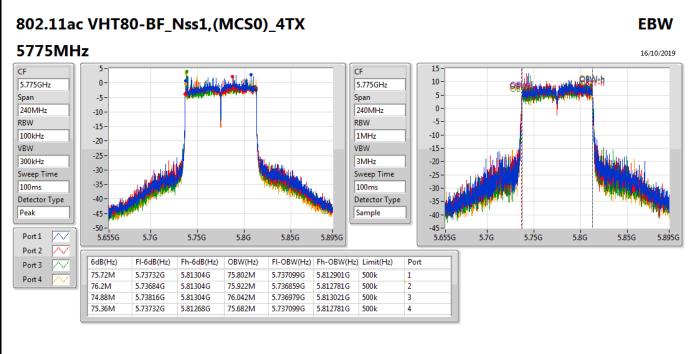














Appendix C



Summary

Mode	Total Power	Total Power
	(dBm)	(W)
5.15-5.25GHz	-	-
802.11ac VHT20_Nss1,(MCS0)_4TX	28.61	0.72611
802.11ac VHT40_Nss1,(MCS0)_4TX	27.71	0.59020
802.11ac VHT80_Nss1,(MCS0)_4TX	23.55	0.22646
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	28.61	0.72611
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	27.82	0.60534
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	23.48	0.22284
5.725-5.85GHz	-	-
802.11ac VHT20_Nss1,(MCS0)_4TX	29.49	0.88920
802.11ac VHT40_Nss1,(MCS0)_4TX	27.37	0.54576
802.11ac VHT80_Nss1,(MCS0)_4TX	24.62	0.28973
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	29.07	0.80724
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	27.58	0.57280
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	24.68	0.29376



Result

Mode	Result	DG	Port 1	Port 2	Port 3	Port 4	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5180MHz	Pass	4.78	19.71	19.11	19.73	19.49	25.54	30.00
5200MHz	Pass	4.49	20.09	19.56	20.21	19.97	25.98	30.00
5240MHz	Pass	4.97	22.92	22.23	22.66	22.53	28.61	30.00
5745MHz	Pass	4.74	23.43	22.89	22.63	22.53	28.90	30.00
5785MHz	Pass	4.63	23.92	23.12	23.16	23.64	29.49	30.00
5825MHz	Pass	5.02	23.15	22.58	22.61	22.92	28.84	30.00
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5190MHz	Pass	4.78	16.54	16.52	16.40	16.41	22.49	30.00
5230MHz	Pass	4.97	21.32	21.95	21.68	21.77	27.71	30.00
5755MHz	Pass	4.88	21.73	21.20	21.07	21.27	27.35	30.00
5795MHz	Pass	4.52	21.70	21.20	20.95	21.51	27.37	30.00
802.11ac VHT80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5210MHz	Pass	4.82	17.69	17.52	17.72	17.16	23.55	30.00
5775MHz	Pass	4.63	19.22	18.37	18.26	18.46	24.62	30.00
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5180MHz	Pass	7.21	18.29	19.74	19.01	19.00	25.06	28.79
5200MHz	Pass	6.98	19.11	18.93	18.36	18.62	24.79	29.02
5240MHz	Pass	7.14	22.52	22.42	22.78	22.61	28.61	28.86
5745MHz	Pass	6.57	21.54	21.42	21.22	21.44	27.43	29.43
5785MHz	Pass	6.59	21.12	21.41	21.70	21.28	27.40	29.41
5825MHz	Pass	6.83	23.41	22.89	22.85	23.01	29.07	29.17
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5190MHz	Pass	7.21	17.10	16.57	16.31	16.82	22.73	28.79
5230MHz	Pass	7.14	21.82	21.95	21.54	21.88	27.82	28.86
5755MHz	Pass	6.56	21.52	21.28	21.64	21.77	27.58	29.44
5795MHz	Pass	6.74	21.48	21.34	21.29	21.63	27.46	29.26
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5210MHz	Pass	7.09	17.29	17.38	17.73	17.44	23.48	28.91
5775MHz	Pass	6.59	18.77	19.04	18.07	18.71	24.68	29.41

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

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Summary

Mode	PD
	(dBm/RBW)
5.15-5.25GHz	
802.11ac VHT20_Nss1,(MCS0)_4TX	15.83
802.11ac VHT40_Nss1,(MCS0)_4TX	12.06
802.11ac VHT80_Nss1,(MCS0)_4TX	5.82
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	15.00
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	12.10
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	5.52
5.725-5.85GHz	
802.11ac VHT20_Nss1,(MCS0)_4TX	14.92
802.11ac VHT40_Nss1,(MCS0)_4TX	9.55
802.11ac VHT80_Nss1,(MCS0)_4TX	4.55
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	14.32
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	9.99
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	4.94

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

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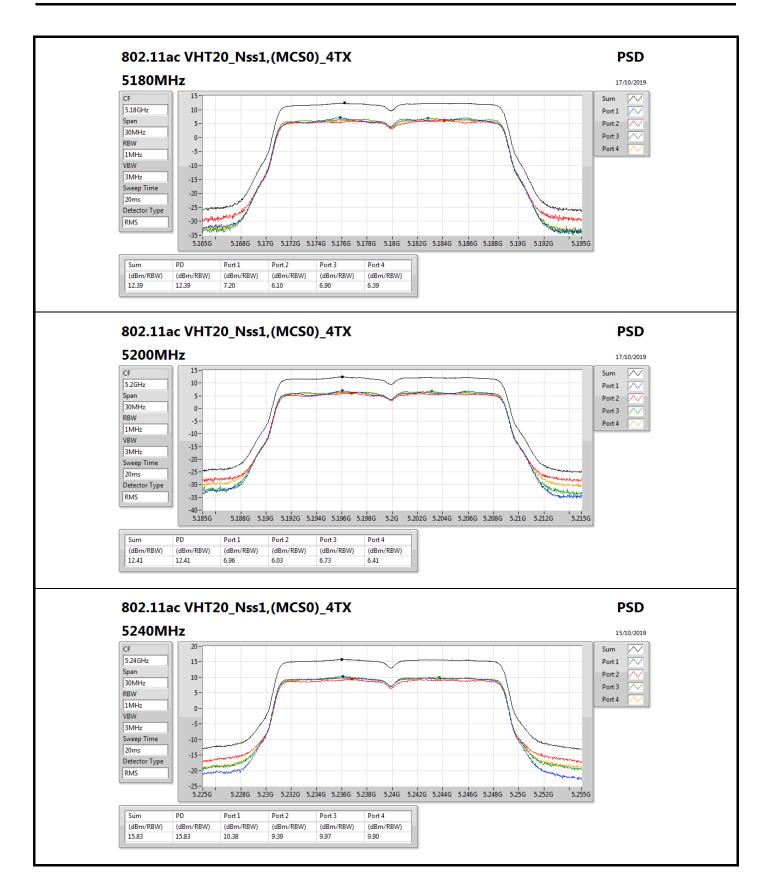
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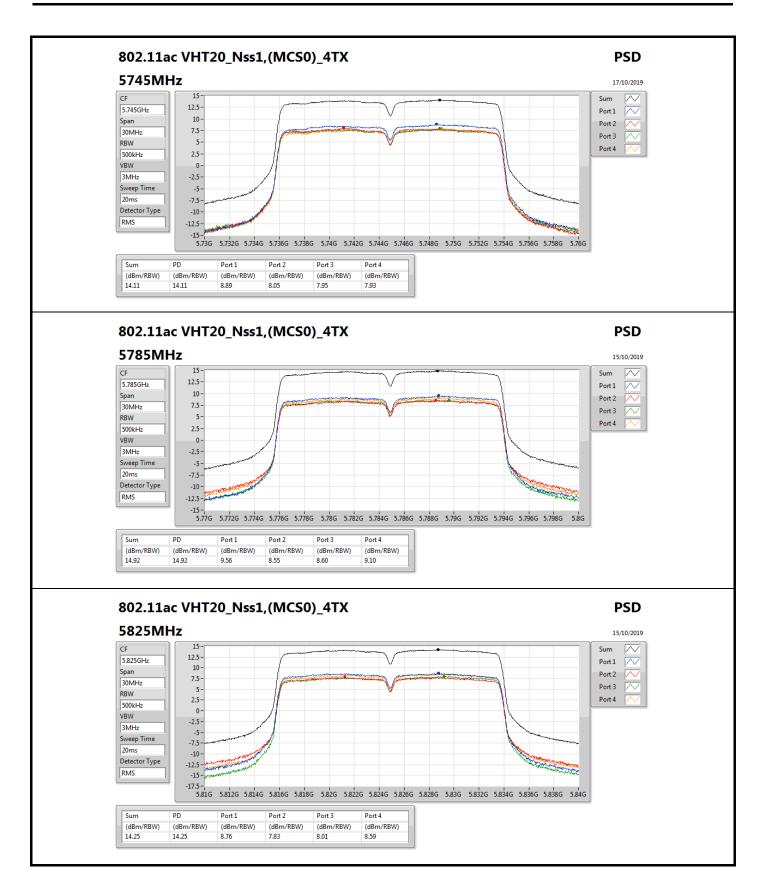
Mode	Result	DG	Port 1	Port 2	Port 3	Port 4	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5180MHz	Pass	7.21	7.20	6.10	6.90	6.39	12.39	15.79
5200MHz	Pass	6.98	6.96	6.03	6.73	6.41	12.41	16.02
5240MHz	Pass	7.14	10.38	9.39	9.97	9.90	15.83	15.86
5745MHz	Pass	6.57	8.89	8.05	7.95	7.93	14.11	29.43
5785MHz	Pass	6.59	9.56	8.55	8.60	9.10	14.92	29.41
5825MHz	Pass	6.83	8.76	7.83	8.01	8.59	14.25	29.17
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5190MHz	Pass	7.21	1.41	1.02	1.04	1.05	6.99	15.79
5230MHz	Pass	7.14	5.85	6.43	6.21	6.10	12.06	15.86
5755MHz	Pass	6.56	3.96	3.53	3.39	3.67	9.55	29.44
5795MHz	Pass	6.74	3.72	3.28	3.19	3.65	9.41	29.26
802.11ac VHT80_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5210MHz	Pass	7.09	0.28	0.25	-0.12	-0.42	5.82	15.91
5775MHz	Pass	6.59	-0.61	-1.52	-1.73	-1.36	4.55	29.41
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5180MHz	Pass	7.21	5.85	6.41	6.28	5.89	11.98	15.79
5200MHz	Pass	6.98	5.72	5.77	6.26	5.27	11.68	16.02
5240MHz	Pass	7.14	9.31	9.09	10.25	8.79	15.00	15.86
5745MHz	Pass	6.57	7.75	8.09	6.60	6.86	13.15	29.43
5785MHz	Pass	6.59	6.93	8.70	8.02	7.17	12.59	29.41
5825MHz	Pass	6.83	9.05	9.76	8.23	8.05	14.32	29.17
802.11ac VHT40-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	=
5190MHz	Pass	7.21	1.52	1.80	1.16	0.87	7.29	15.79
5230MHz	Pass	7.14	5.83	6.46	6.26	6.10	12.10	15.86
5755MHz	Pass	6.56	4.29	3.84	3.80	4.23	9.99	29.44
5795MHz	Pass	6.74	4.25	3.75	3.57	4.24	9.93	29.26
802.11ac VHT80-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5210MHz	Pass	7.09	-0.67	0.44	-0.56	-0.62	5.52	15.91
5775MHz	Pass	6.59	-0.05	-1.07	-0.58	-1.29	4.94	29.41

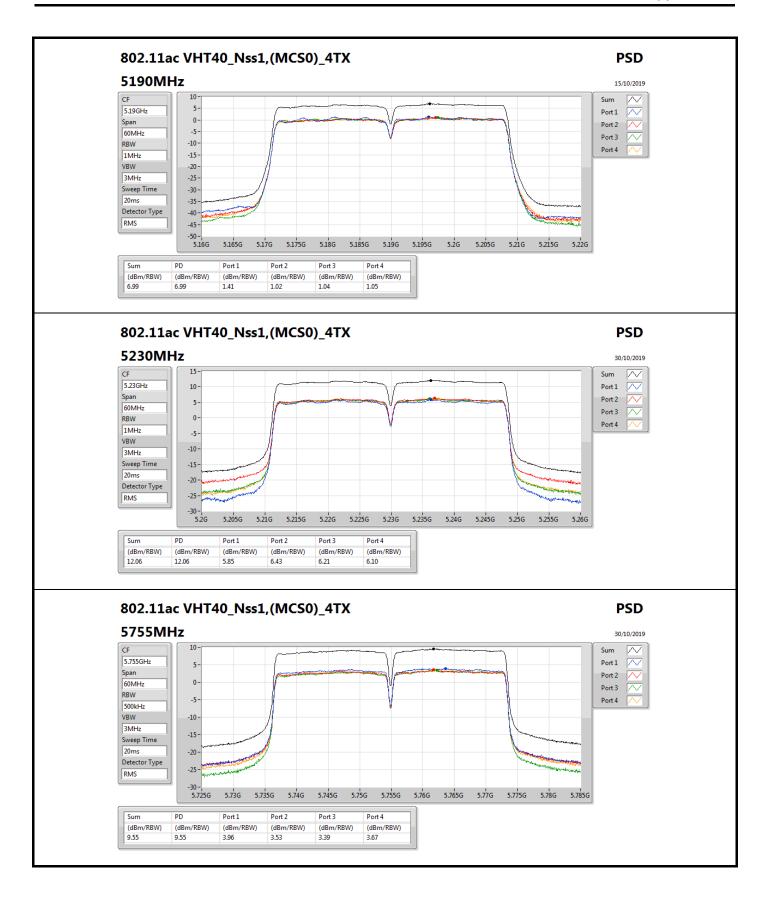
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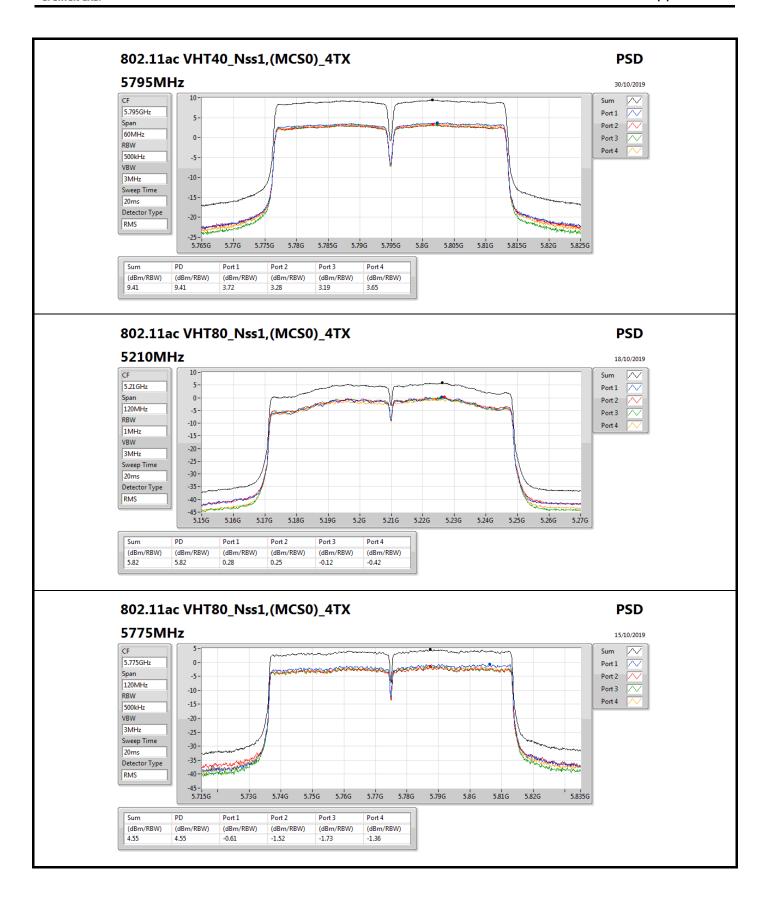
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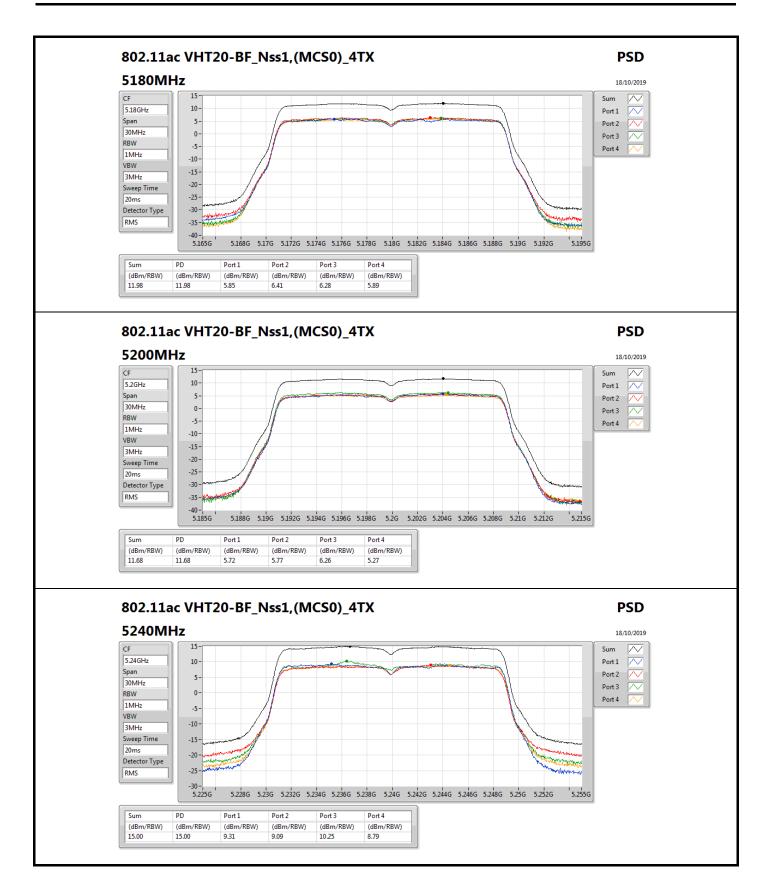
DG = Directional Gain; RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X power density;

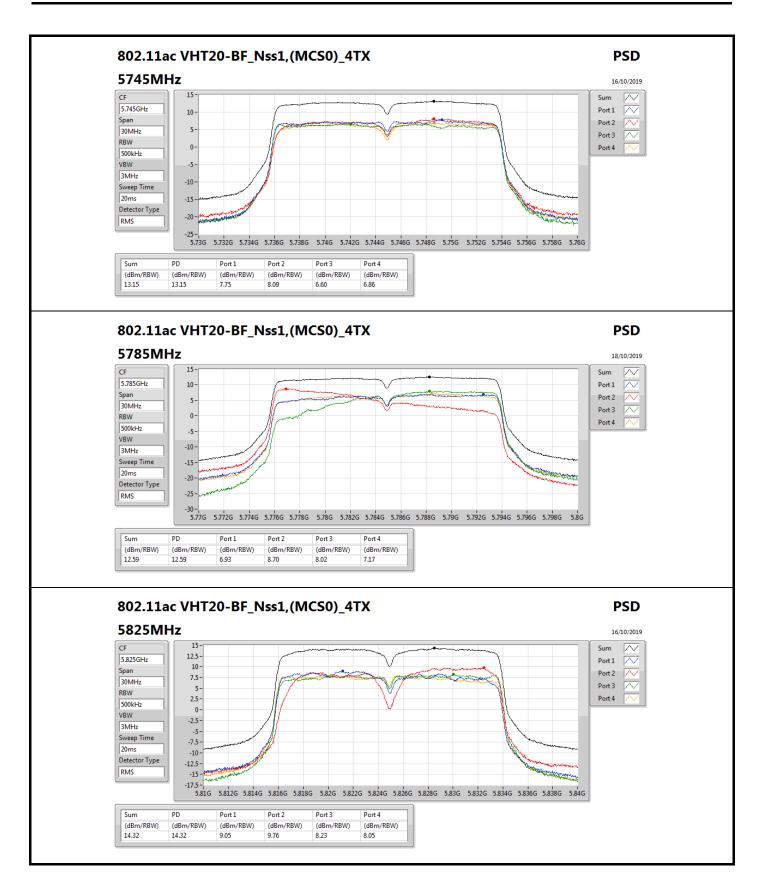


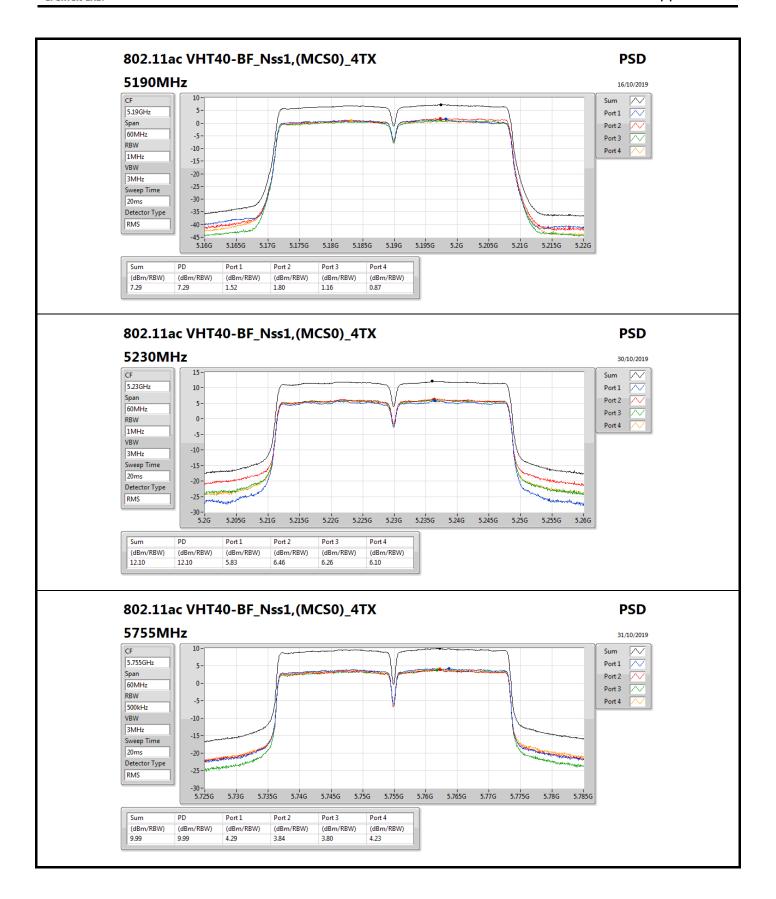


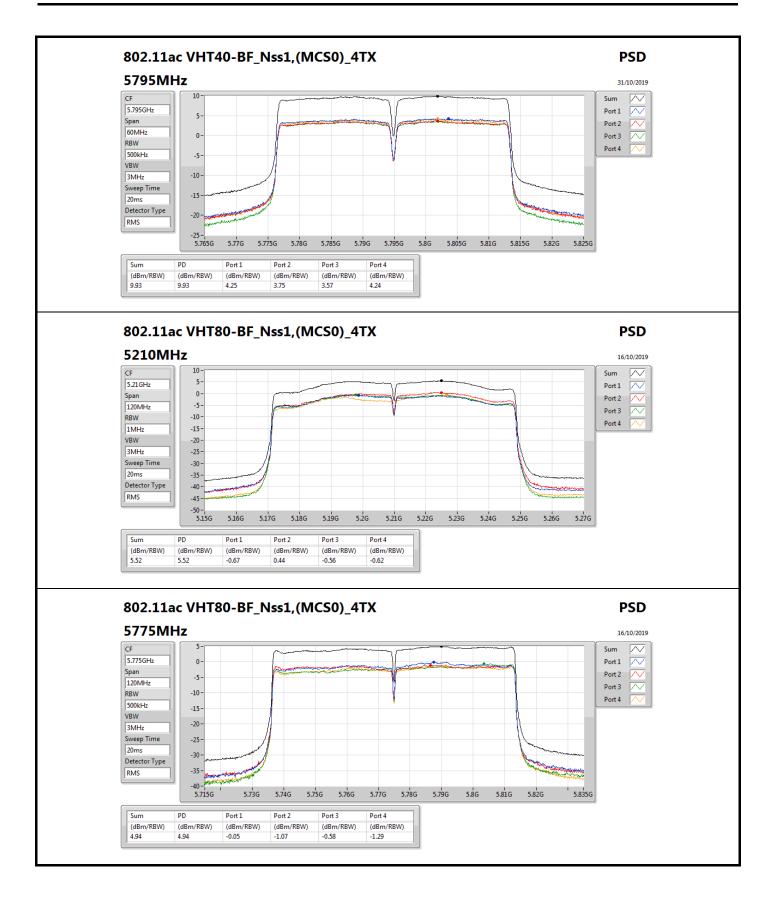


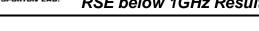




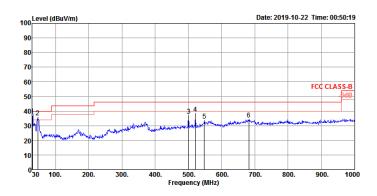








RSE below 1GHz Result											
Operating Mode	Operating Mode 1 Polarization Vertical										
Operating Function	СТХ										

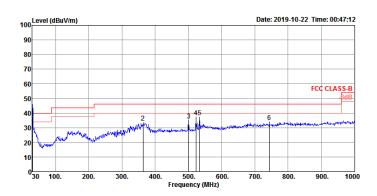


	Freq	Level		Limit				Factor	A/Pos	1/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	30.00	36.80	40.00	-3.20	44.10	0.49	24.40	32.19	100	230	QP	VERTICAL
2	46.49	35.79	40.00	-4.21	51.65	0.69	15.65	32.20	125	4	Peak	VERTICAL
3	500.45	36.95	46.00	-9.05	43.10	2.38	23.52	32.05	100	165	Peak	VERTICAL
4	520.82	38.28	46.00	-7.72	44.26	2.43	23.63	32.04	100	76	Peak	VERTICAL
5	547.98	33.55	46.00	-12.45	38.10	2.48	25.00	32.03	100	232	Peak	VERTICAL
6	681.84	34.18	46.00	-11.82	38.13	2.81	25.21	31.97	300	285	Peak	VERTICAL

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 below 1GHz Result

RSE below 1GHz Result											
Operating Mode	Operating Mode 1 Polarization Horizontal										
Operating Function	СТХ										



Freq	Level							A/Pos	T/Pos	Remark	Pol/Phase
MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
30.97	36.97	40.00	-3.03	44.79	0.51	23.86	32.19	100	69	QP	HORIZONTAL
363.68	33.49	46.00	-12.51	42.71	2.07	20.62	31.91	150	90	Peak	HORIZONTAL
500.45	34.94	46.00	-11.06	41.09	2.38	23.52	32.05	200	247	Peak	HORIZONTAL
522.76	37.19	46.00	-8.81	43.13	2.43	23.67	32.04	200	56	Peak	HORIZONTAL
533.43	37.43	46.00	-8.57	42.97	2.45	24.05	32.04	300	272	Peak	HORIZONTAL
743.92	33.94	46.00	-12.06	37.26	2.90	25.86	32.08	100	218	Peak	HORIZONTAL
	30.97 363.68 500.45 522.76 533.43	MHz dBuV/m 30.97 36.97 363.68 33.49 500.45 34.94 522.76 37.19 533.43 37.43	Freq Level Line	Freq Level Line Limit	Freq Level Line Limit Level	Freq Level Line Limit Level Loss MHz dBuV/m dB dBuV dB 30.97 36.97 40.00 -3.03 44.79 0.51 363.68 33.49 46.00 -12.51 42.71 2.07 500.45 34.94 46.00 -11.06 41.09 2.38 522.76 37.19 46.00 -8.81 43.13 2.43 533.43 37.43 46.00 -8.57 42.97 2.45	Freq Level Line Limit Level Loss Factor MHz dBuV/m dB dBuV dB dB/m 30.97 36.97 40.00 -3.03 44.79 0.51 23.86 363.68 33.49 46.00 -12.51 42.71 2.07 20.62 500.45 34.94 46.00 -11.06 41.09 2.38 23.52 522.76 37.19 46.00 -8.51 43.13 2.43 23.67 533.43 37.43 46.00 -8.57 42.97 2.45 24.05	Freq Level Lime Limit Level Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB dB/m dB 30.97 36.97 40.00 -3.03 44.79 0.51 23.86 32.19 363.68 33.49 46.00 -12.51 42.71 2.07 20.62 31.91 500.45 34.94 46.00 -11.06 41.09 2.38 23.52 32.05 522.76 37.19 46.00 -8.81 43.13 2.43 23.67 32.04	Freq Level Lime Limit Level Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB dB/m dB cm 30.97 36.97 40.00 -3.03 44.79 0.51 23.86 32.19 100 363.68 33.49 46.00 -12.51 42.71 2.07 20.62 31.91 150 500.45 34.94 46.00 -11.06 41.09 2.38 23.52 32.05 200 522.76 37.19 46.00 -8.81 43.13 2.43 23.67 32.04 200 533.43 37.43 46.00 -8.57 42.97 2.45 24.05 32.04 300	Freq Level Limit Level Loss Factor Factor MHz dBuV/m dBuV/m dB dBuV dB dB/m dB cm deg 30.97 36.97 40.00 -3.03 44.79 0.51 23.86 32.19 100 69 363.68 33.49 46.00 -12.51 42.71 2.07 20.62 31.91 150 90 500.45 34.94 46.00 -11.06 41.09 2.38 23.52 32.05 200 247 522.76 37.19 46.00 -8.81 43.13 2.43 23.67 32.04 200 56 533.43 37.43 46.00 -8.57 42.97 2.45 24.05 32.04 300 272	Freq Level Limit Level Loss Factor Factor Remark MHz dBuV/m dBuV/m dB dBuV dB dB/m dB cm deg 30.97 36.97 40.00 -3.03 44.79 0.51 23.86 32.19 100 69 QP 363.68 33.49 46.00 -12.51 42.71 2.07 20.62 31.91 150 90 Peak 500.45 34.94 46.00 -11.06 41.09 2.38 23.52 32.05 200 247 Peak 522.76 37.19 46.00 -8.81 43.13 2.43 23.67 32.04 200 56 Peak 533.43 37.43 46.00 -8.57 42.97 2.45 24.05 32.04 200 272 Peak

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.)



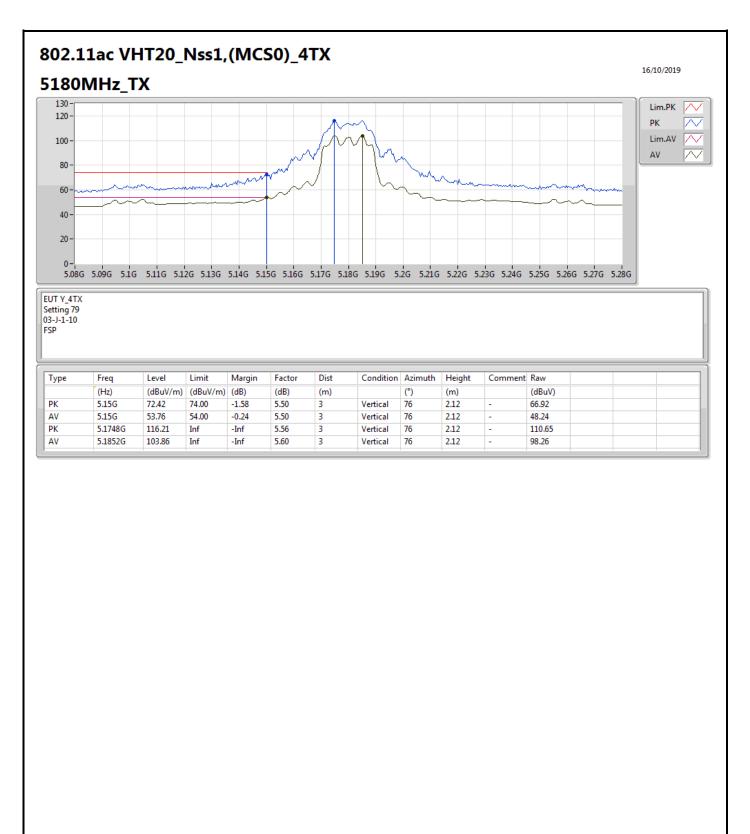
RSE TX above 1GHz Result

Appendix E.2

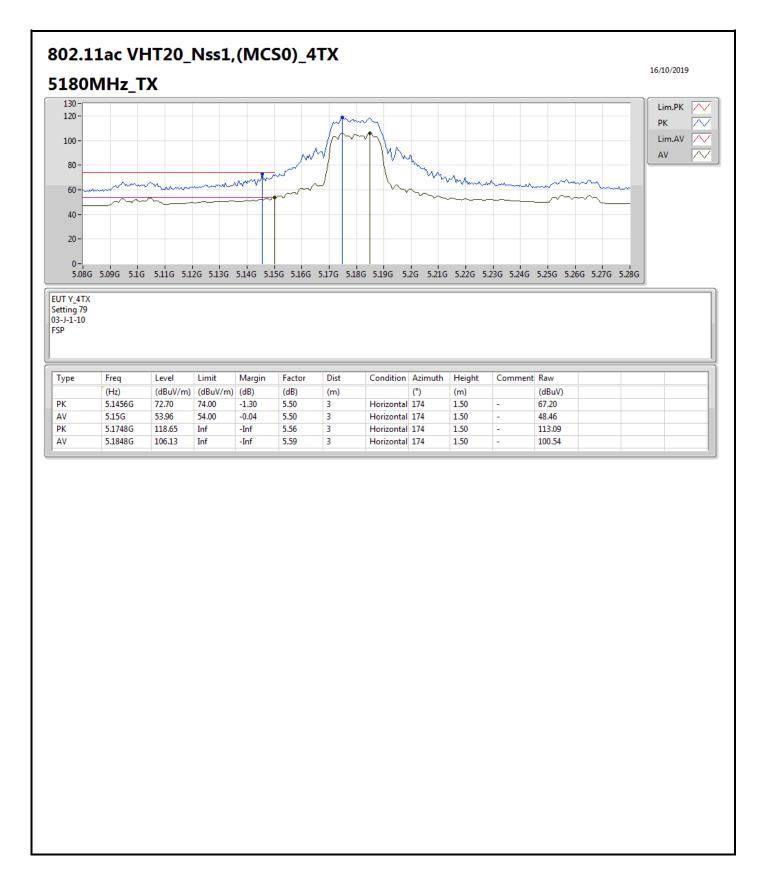
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
5.15-5.25GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	Pass	AV	5.15G	53.99	54.00	-0.01	5.50	3	Horizontal	188	1.50	-

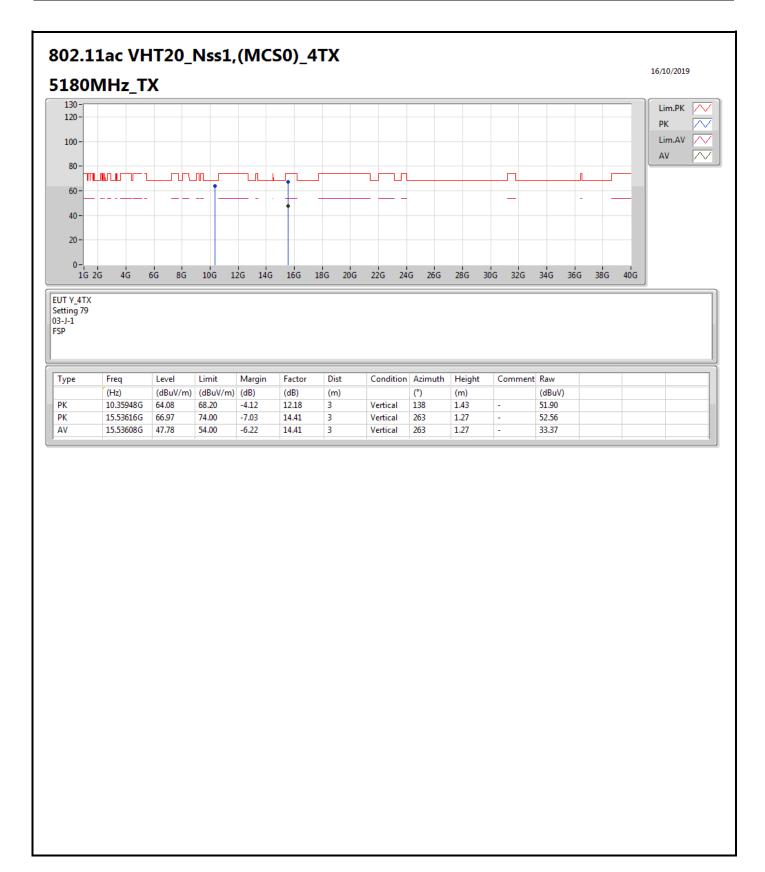




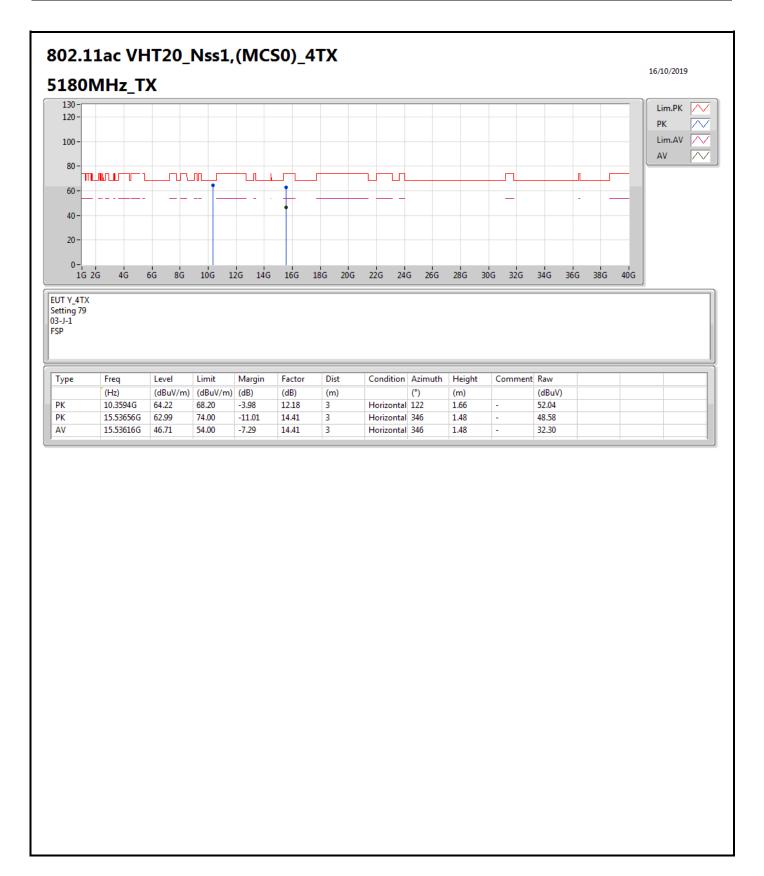




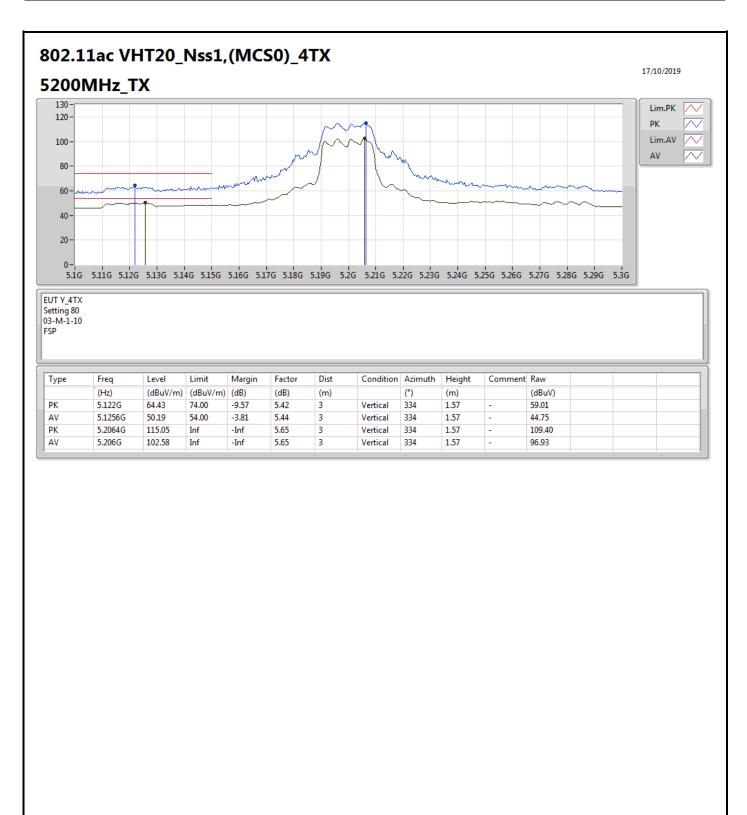




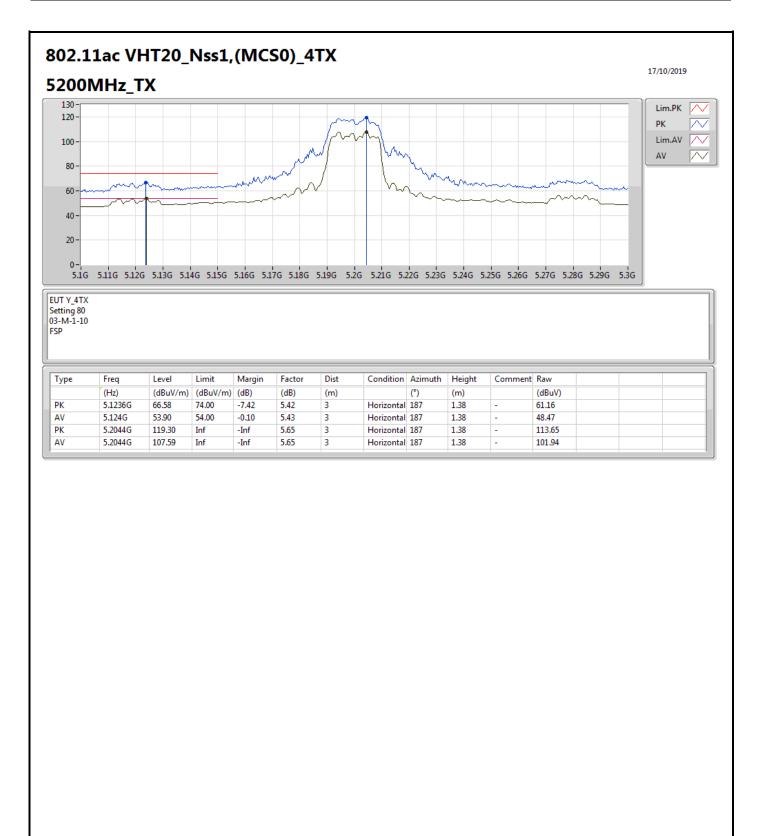




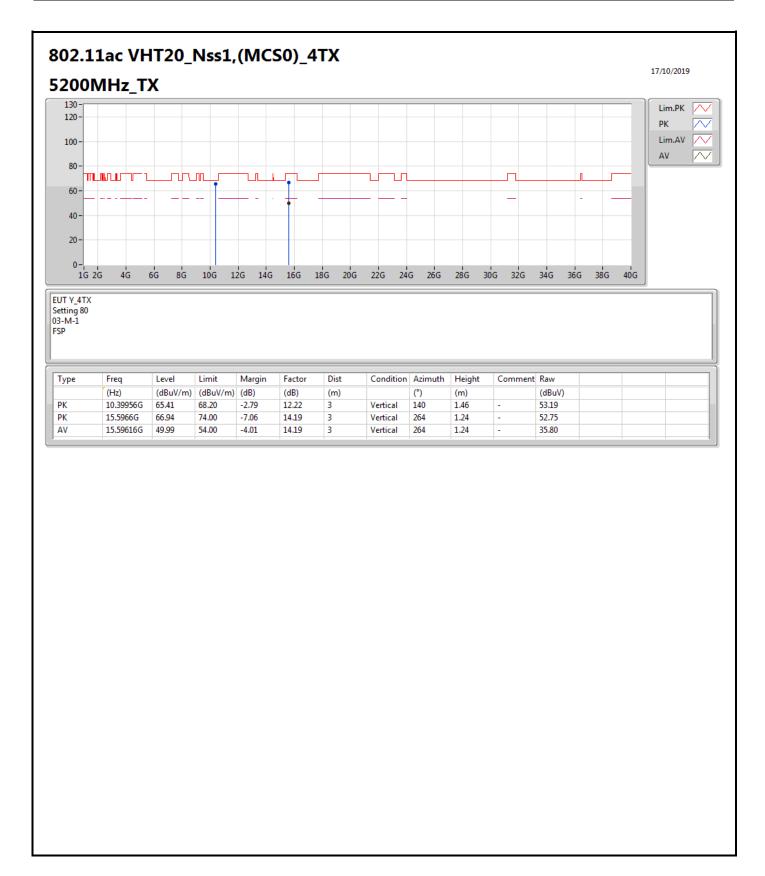




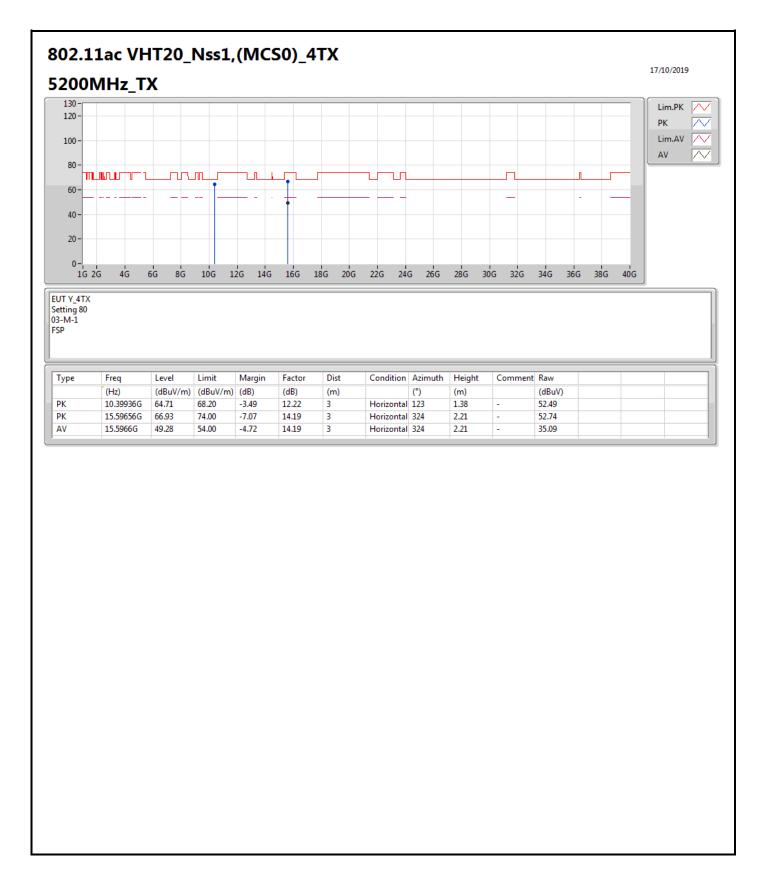




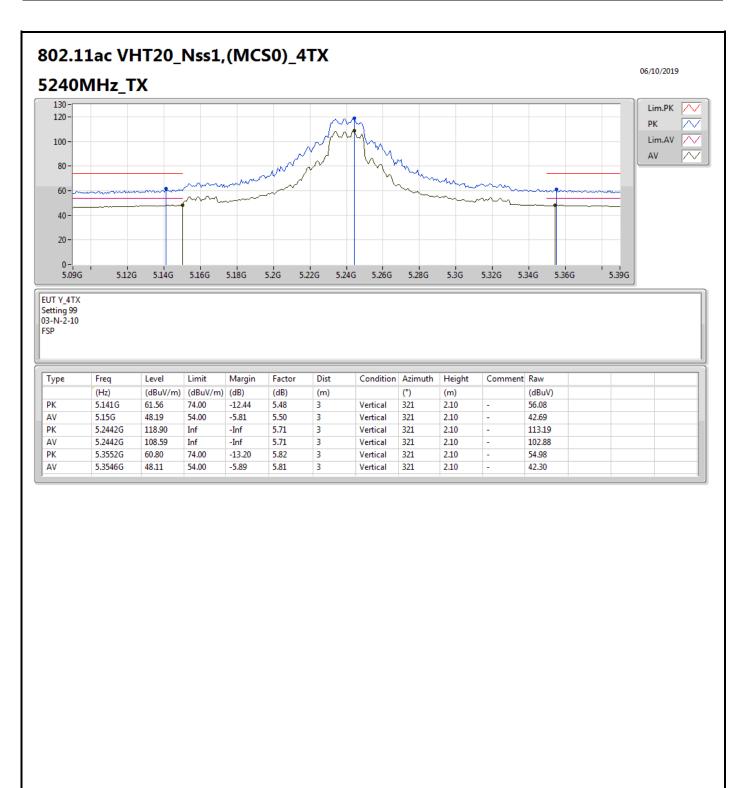




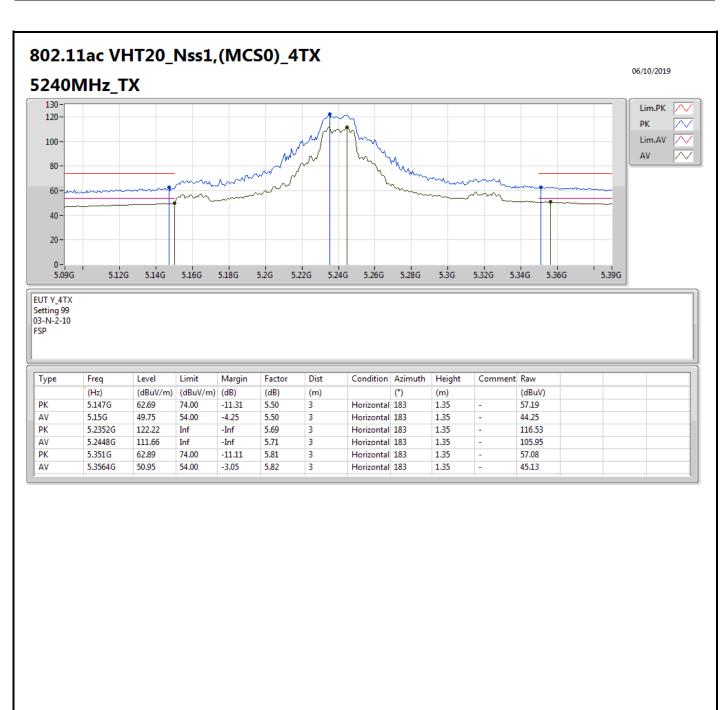




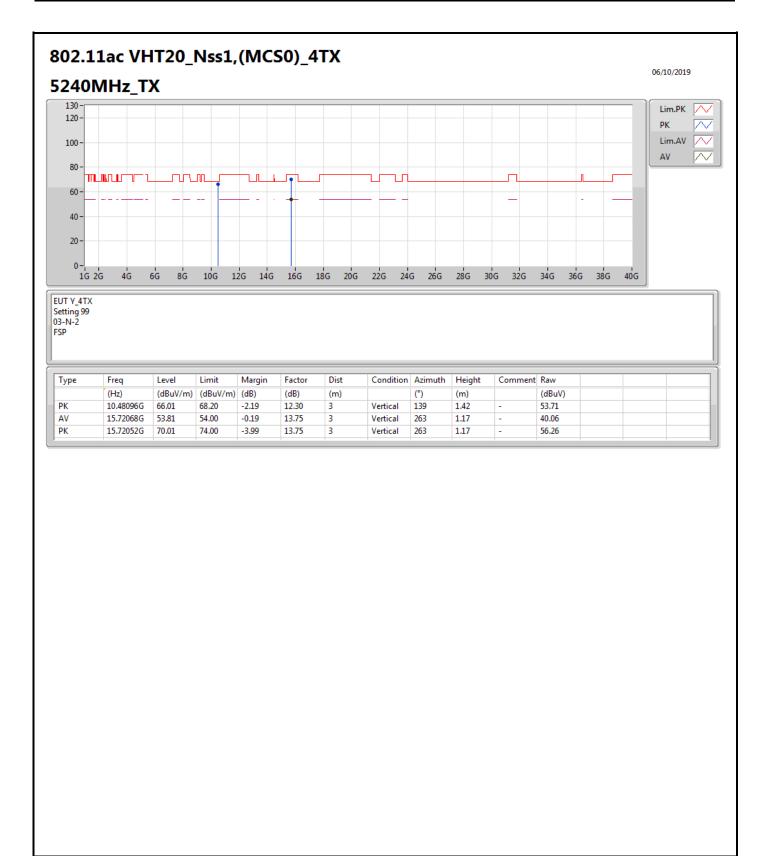




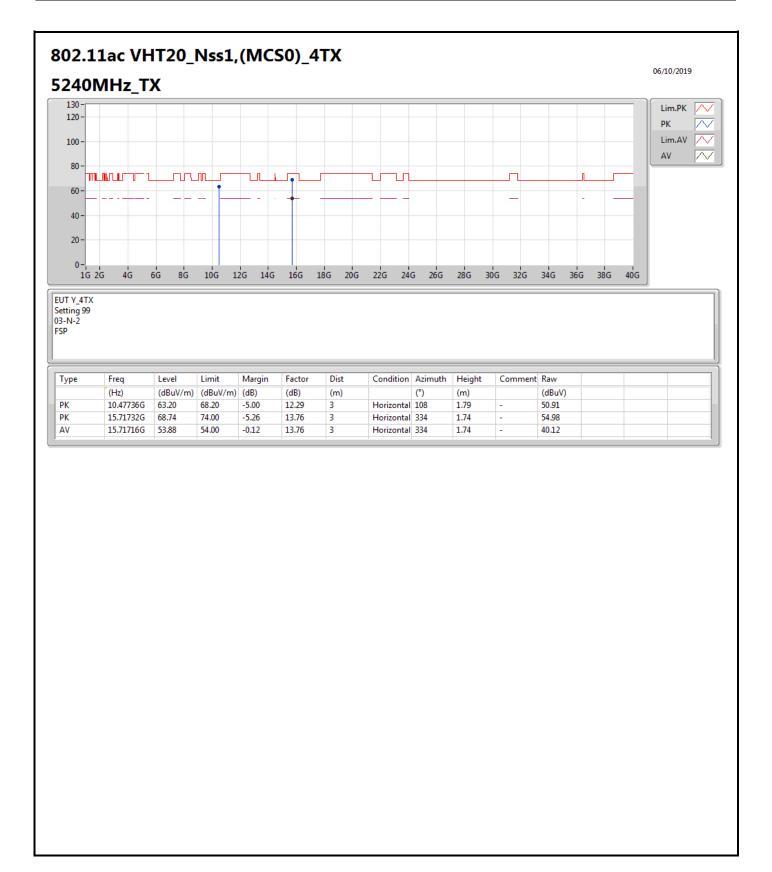




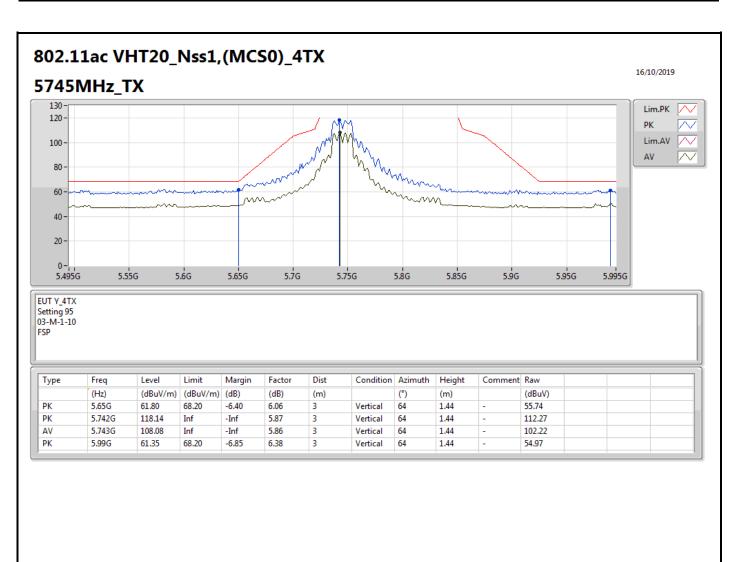




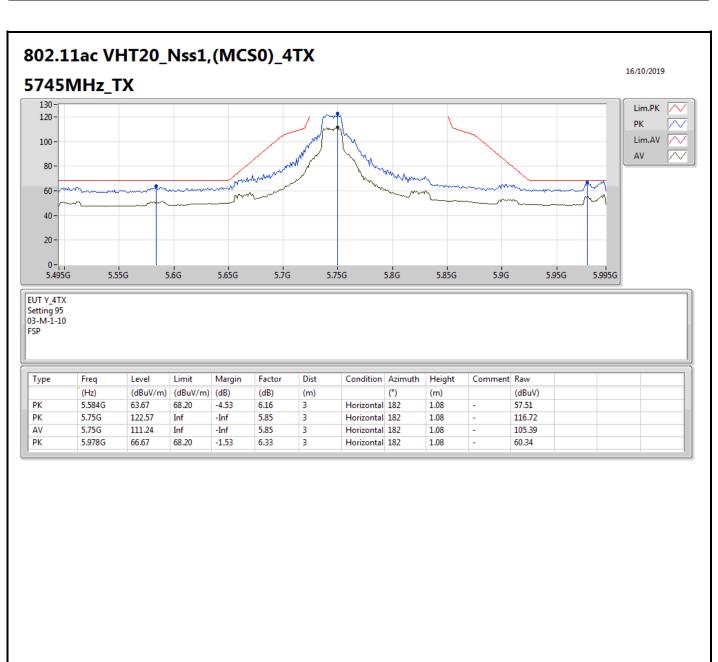




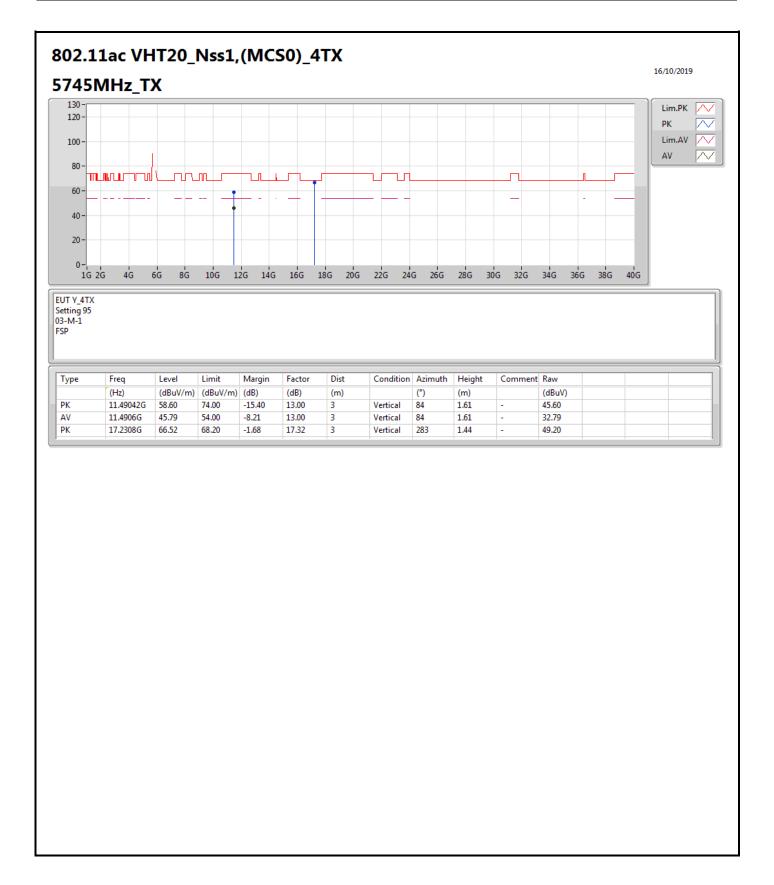




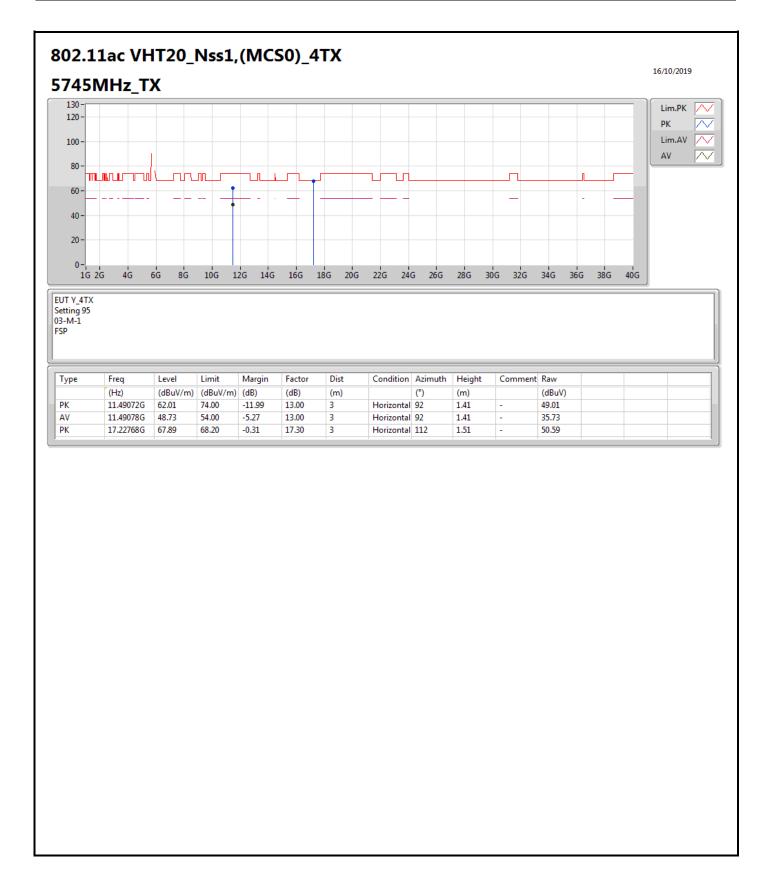




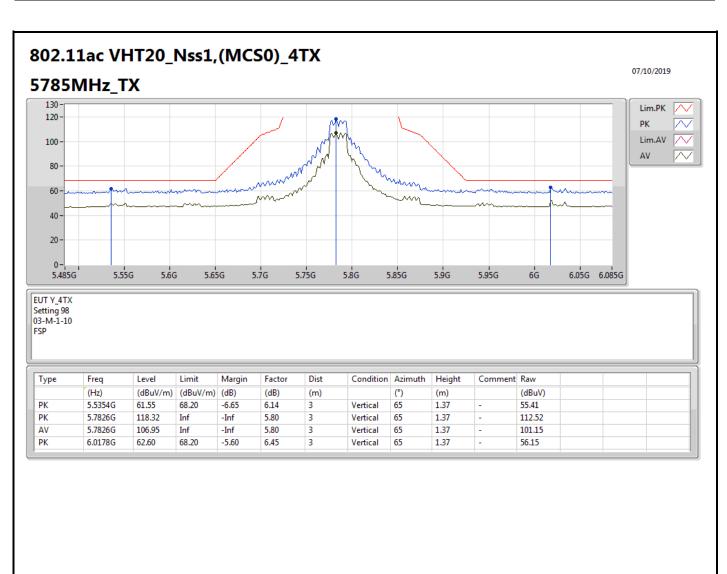




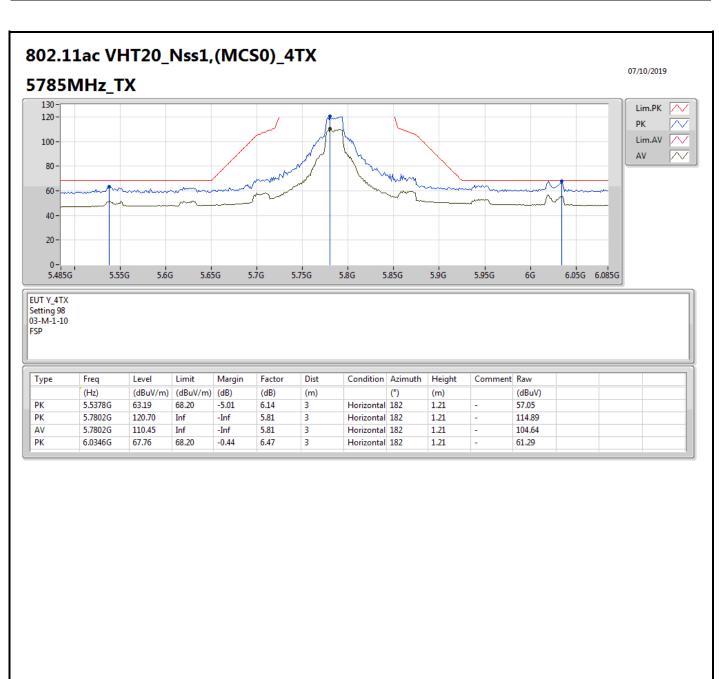




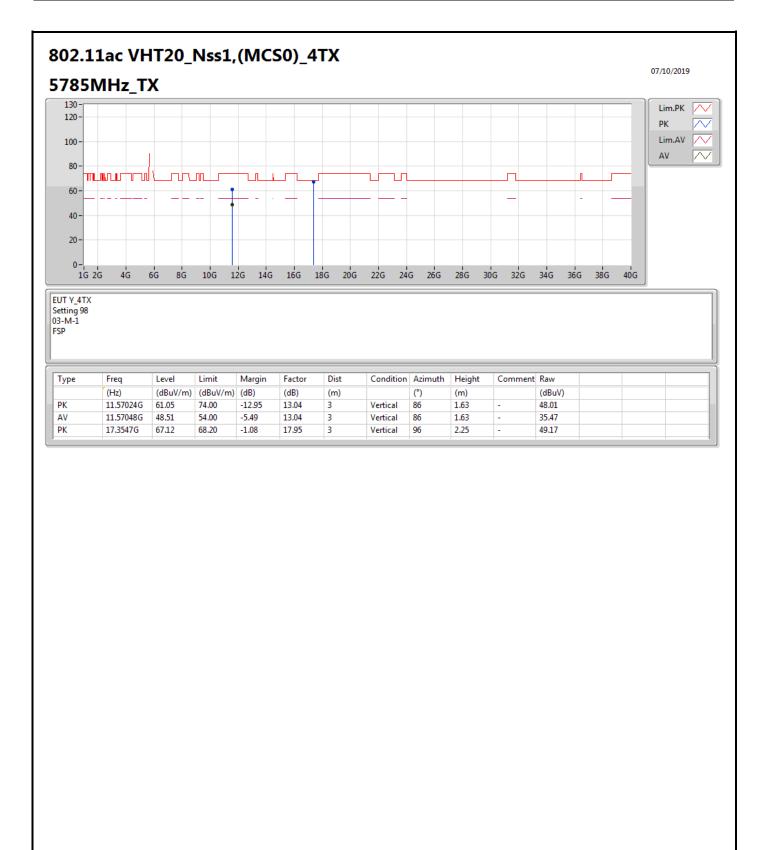




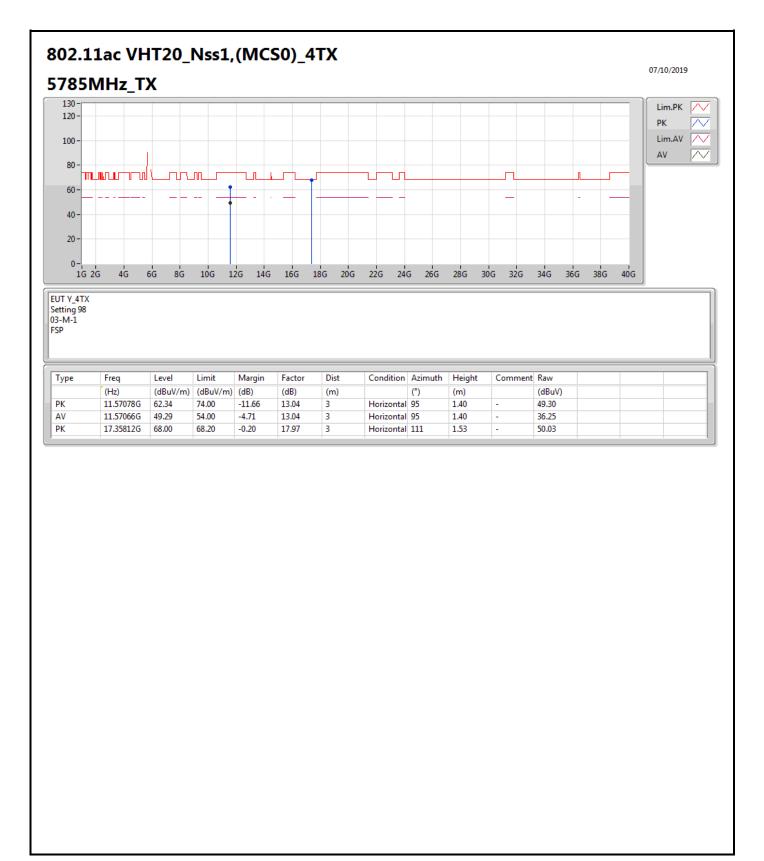




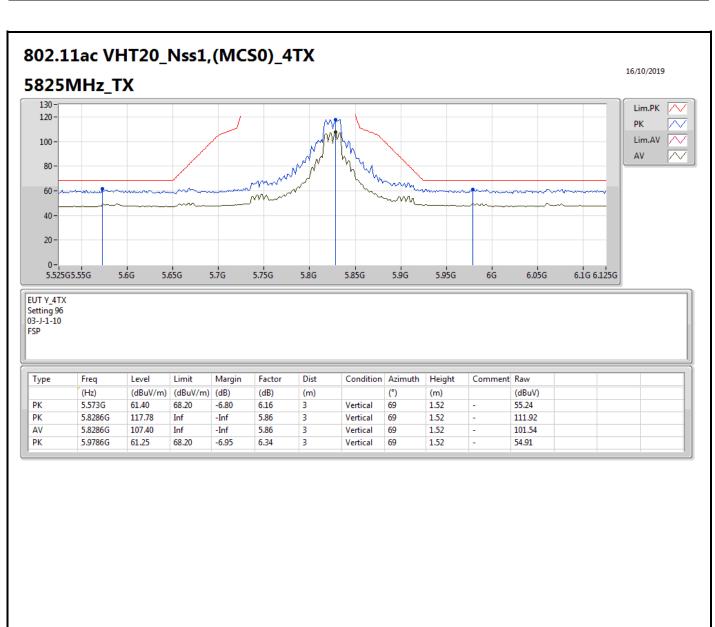




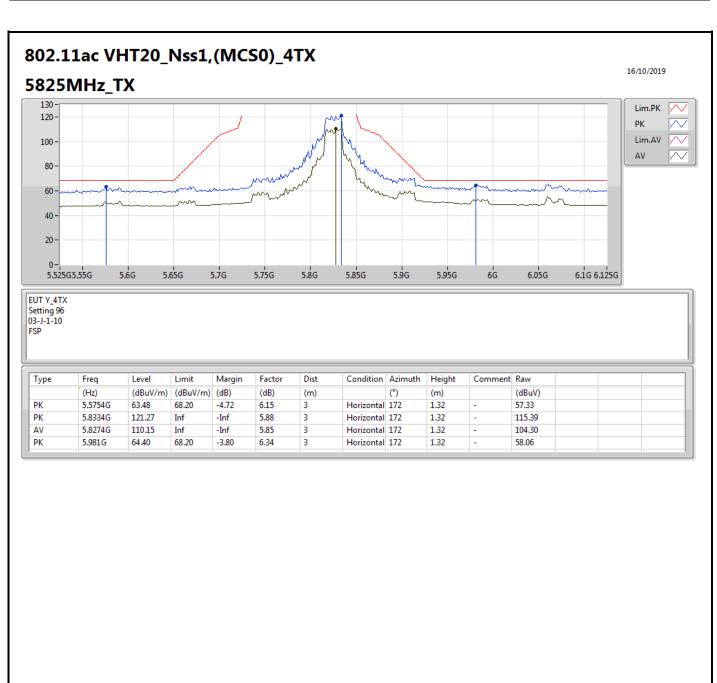




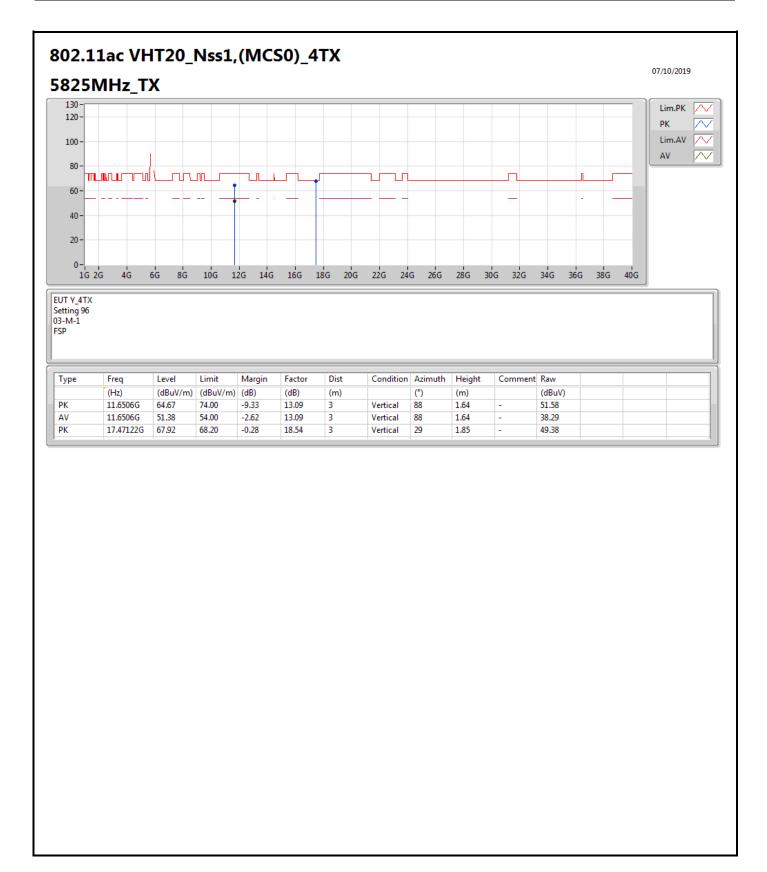




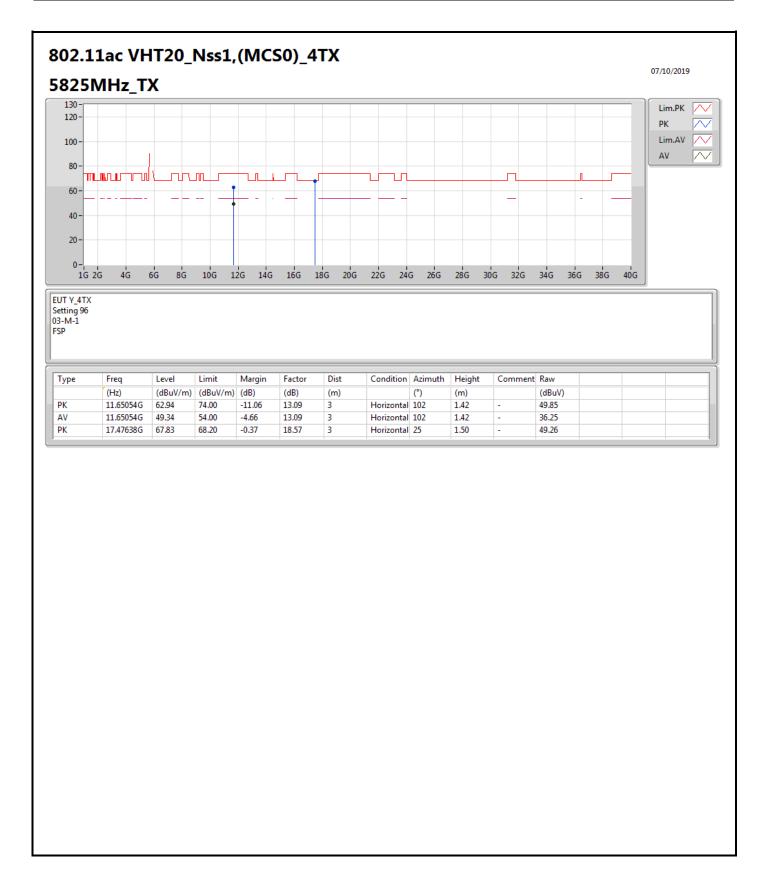




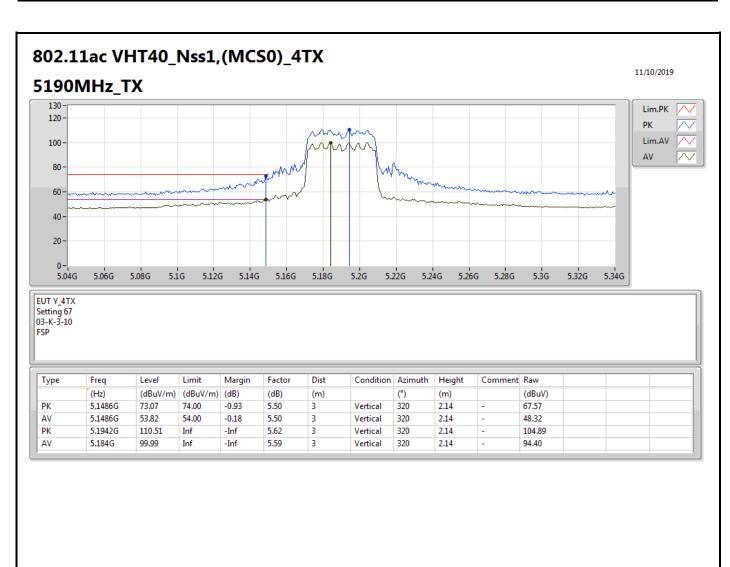




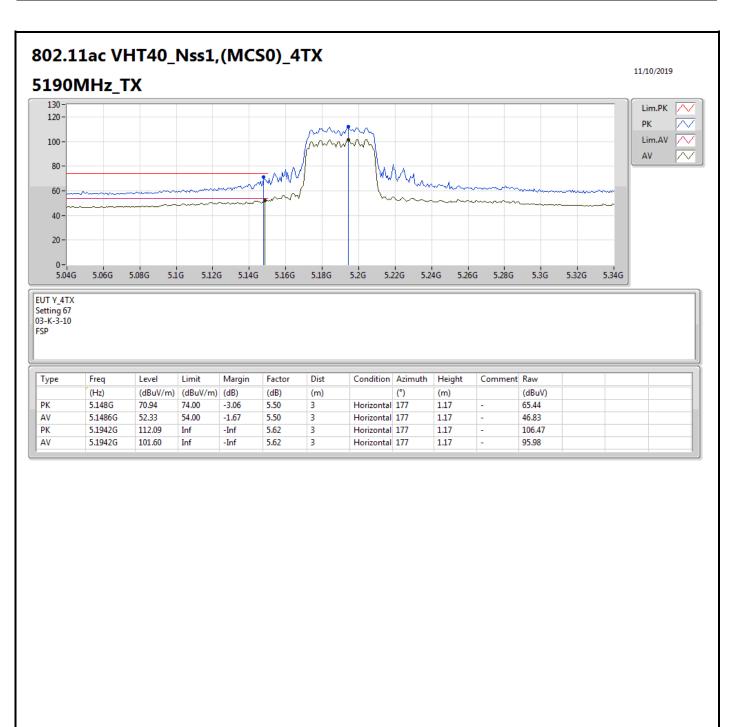




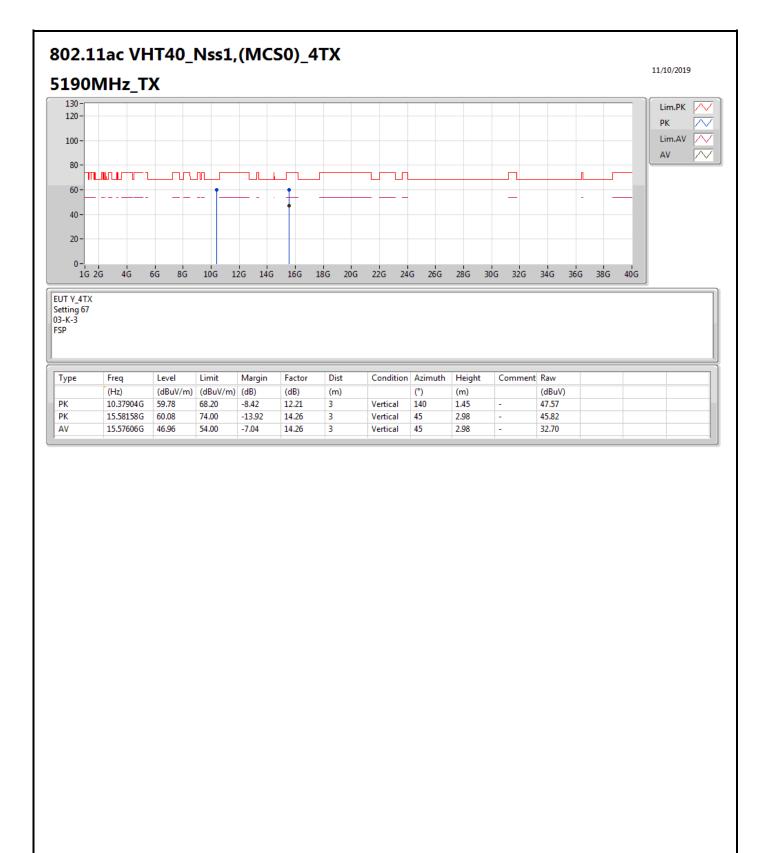




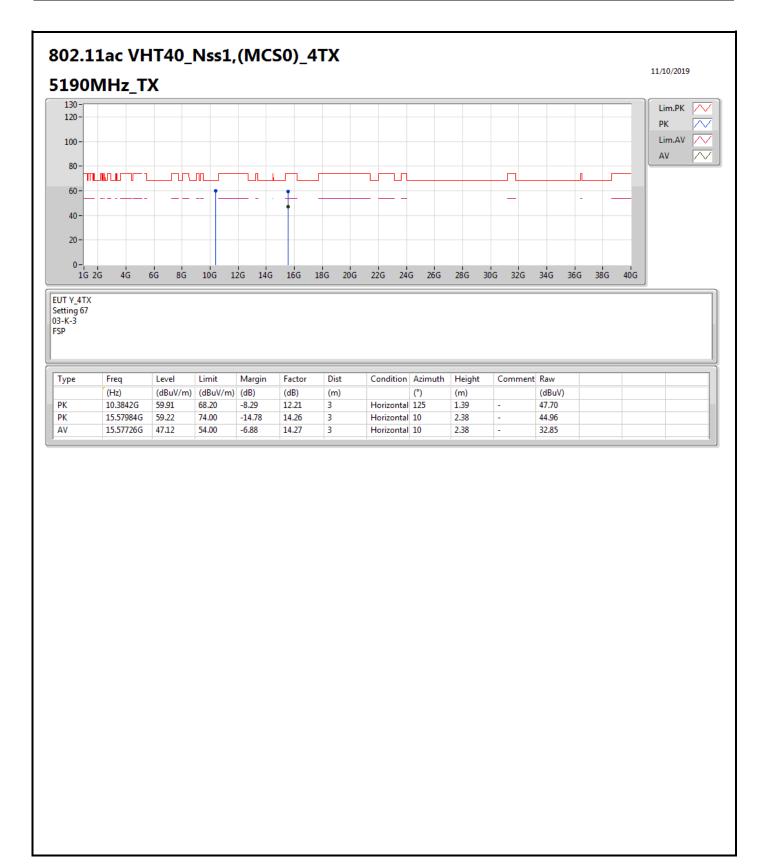




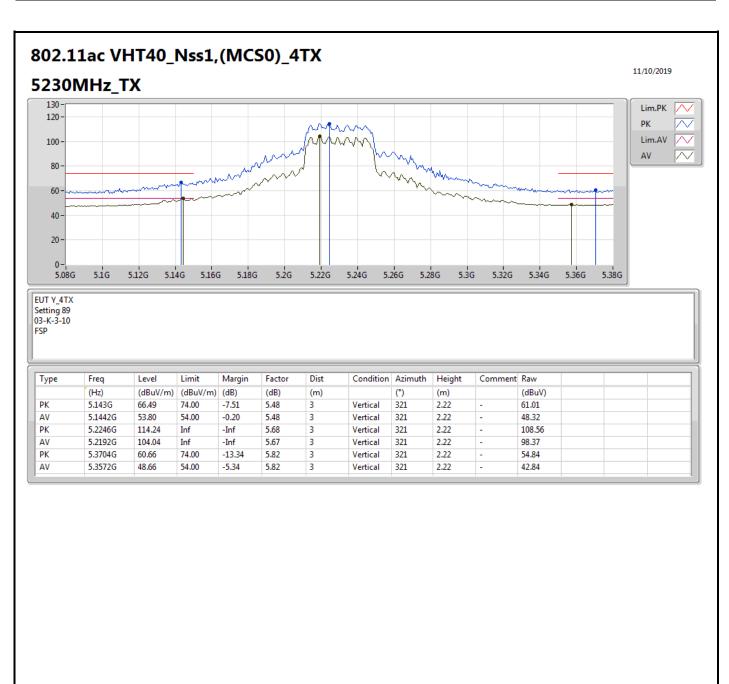




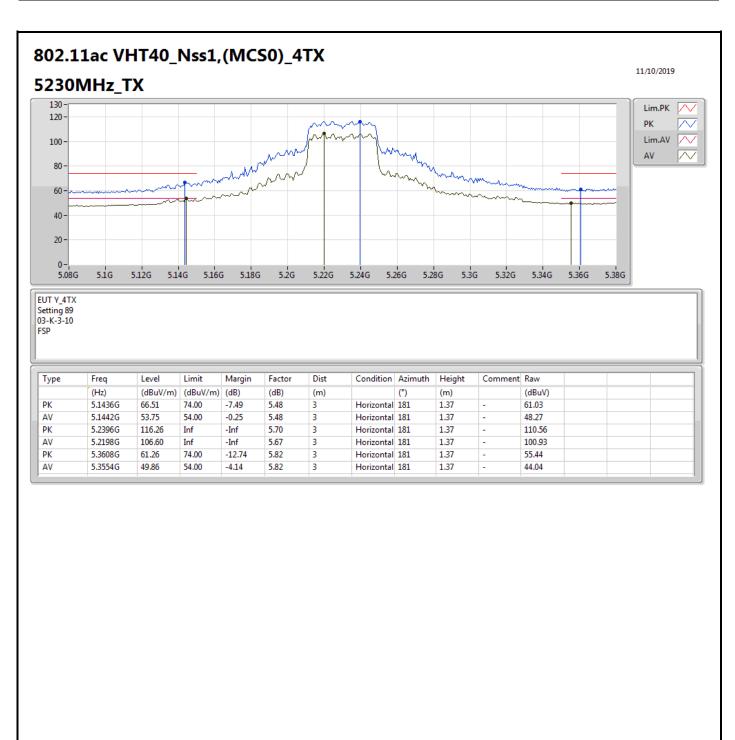




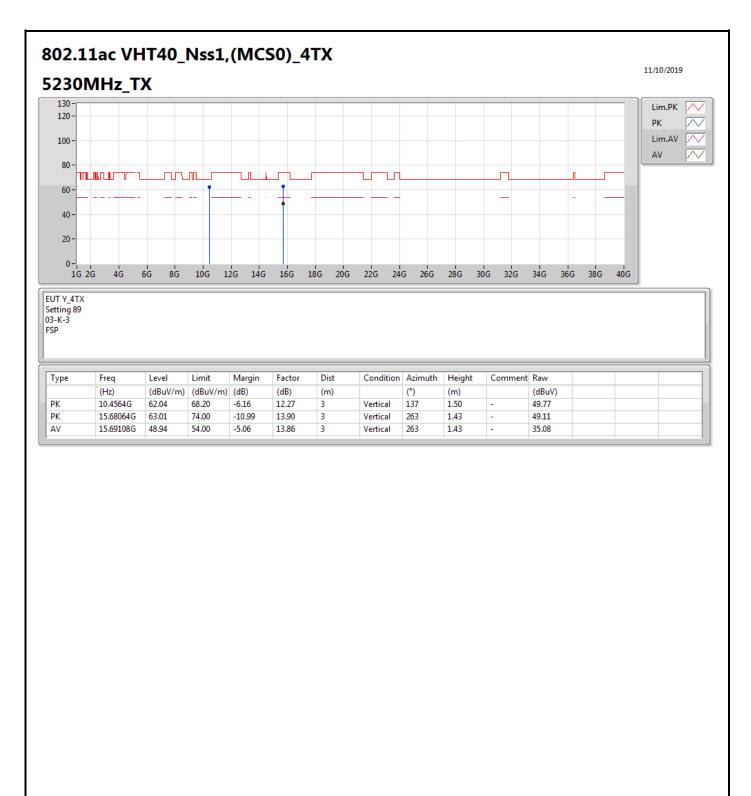




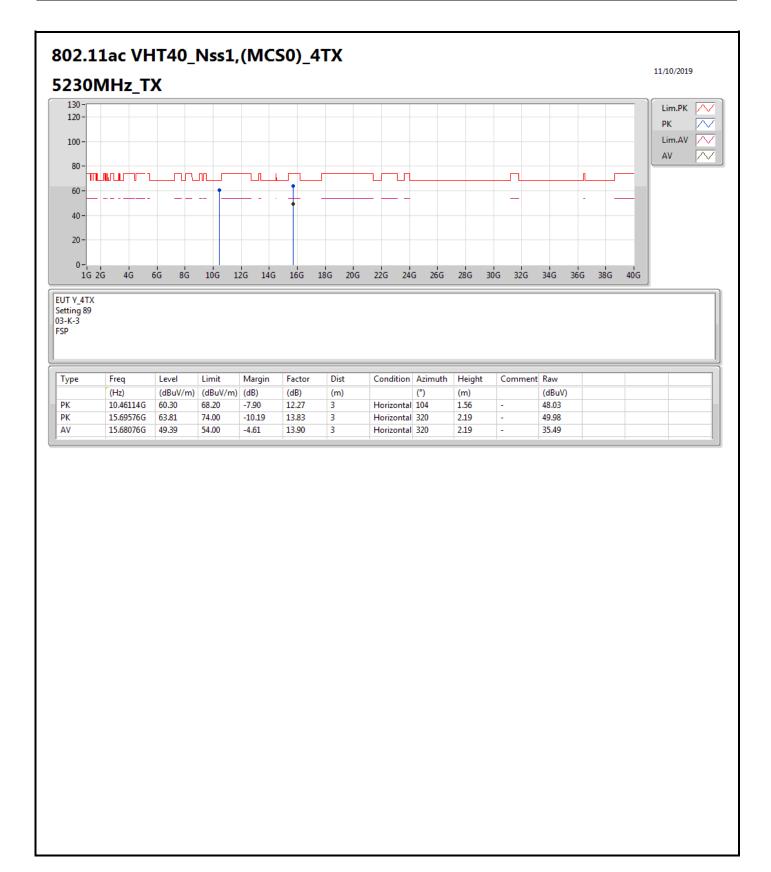




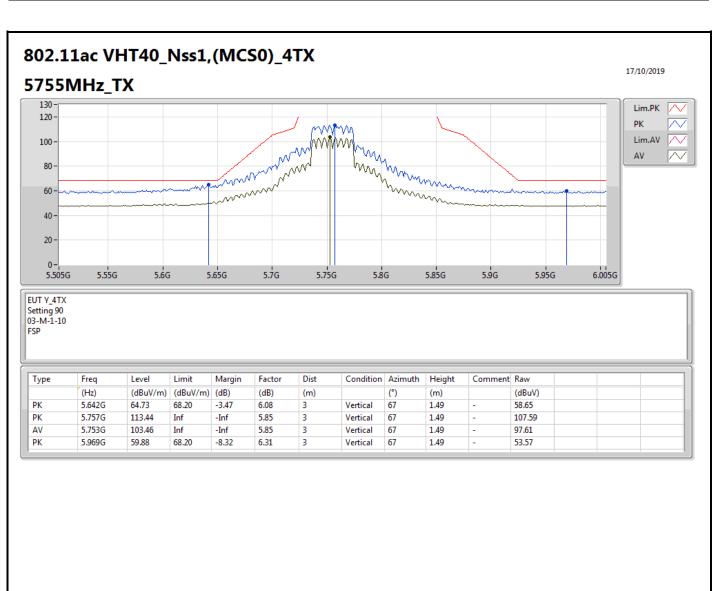




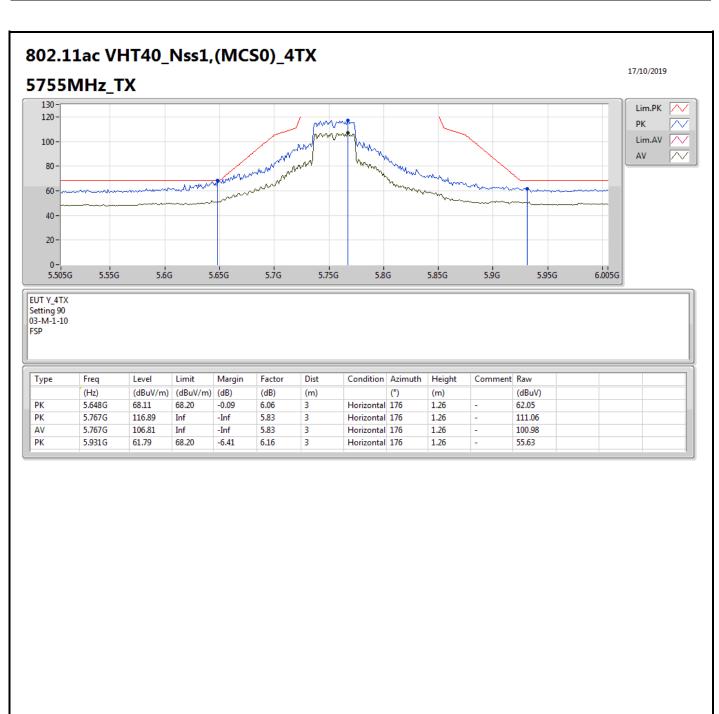




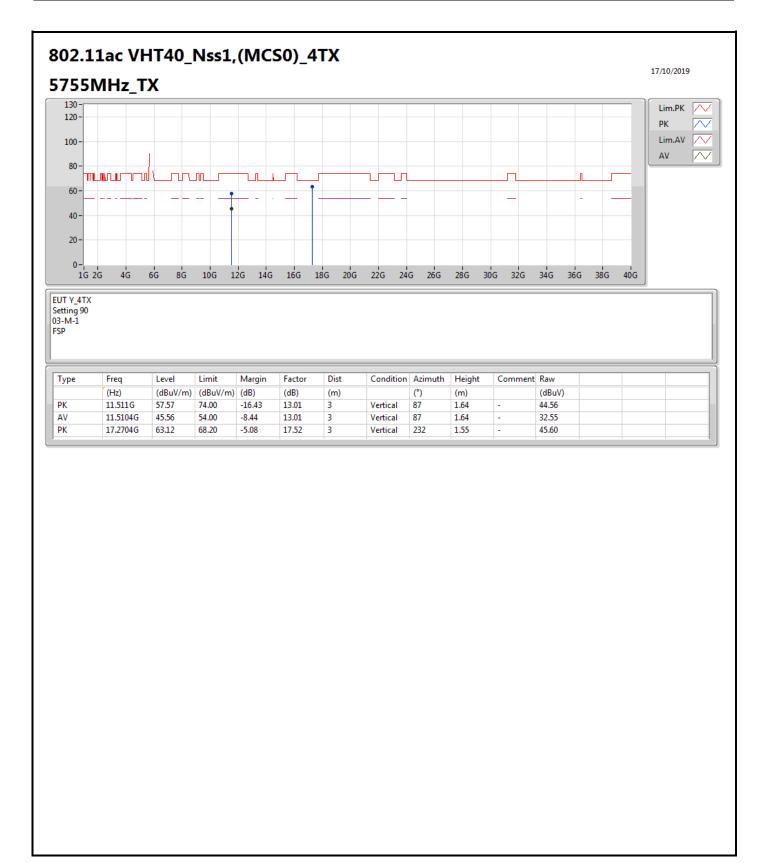




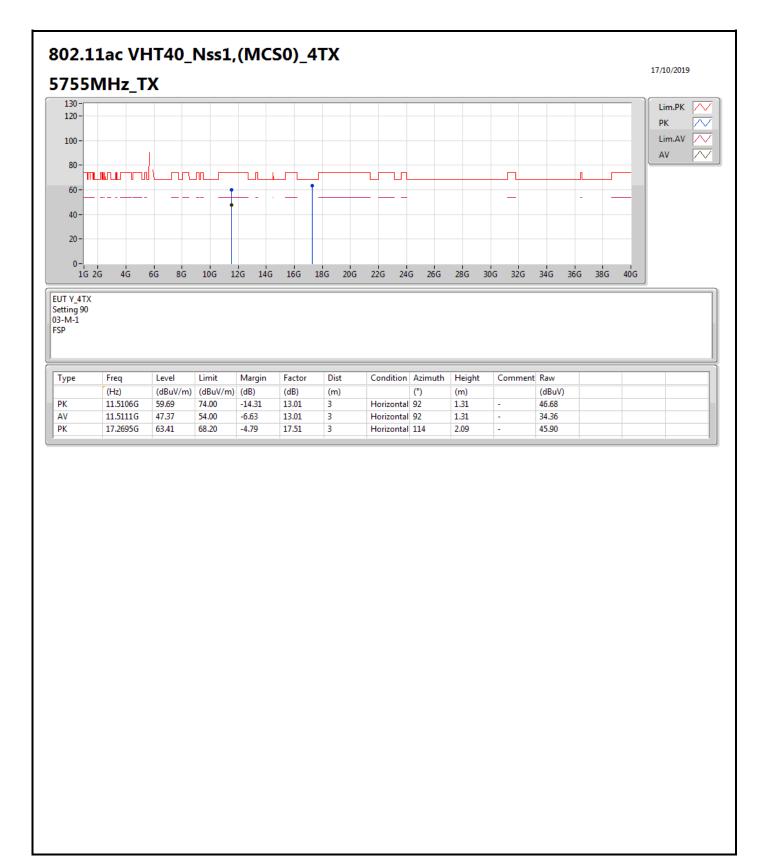




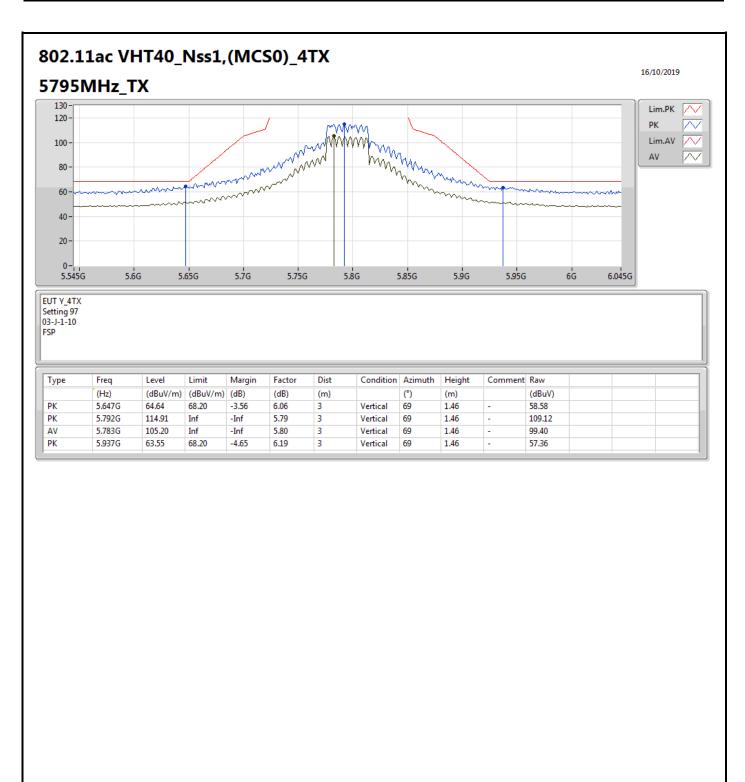




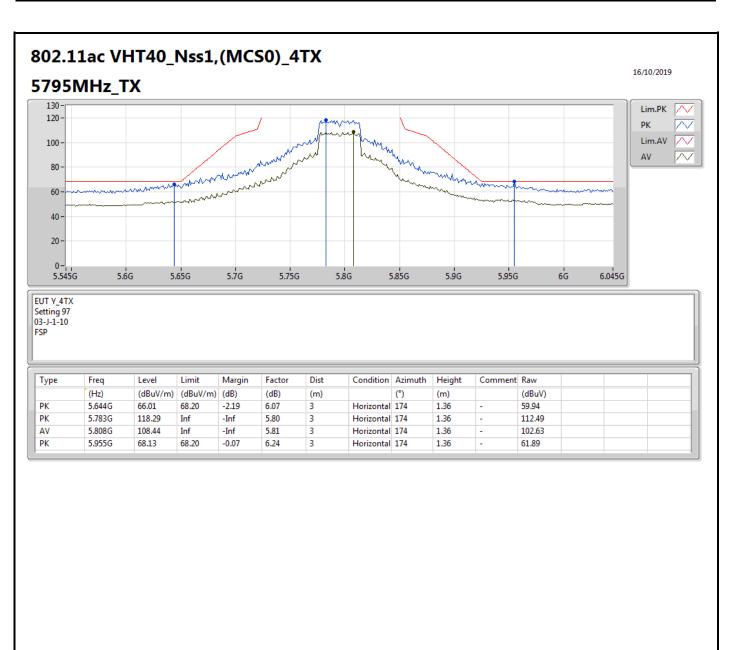




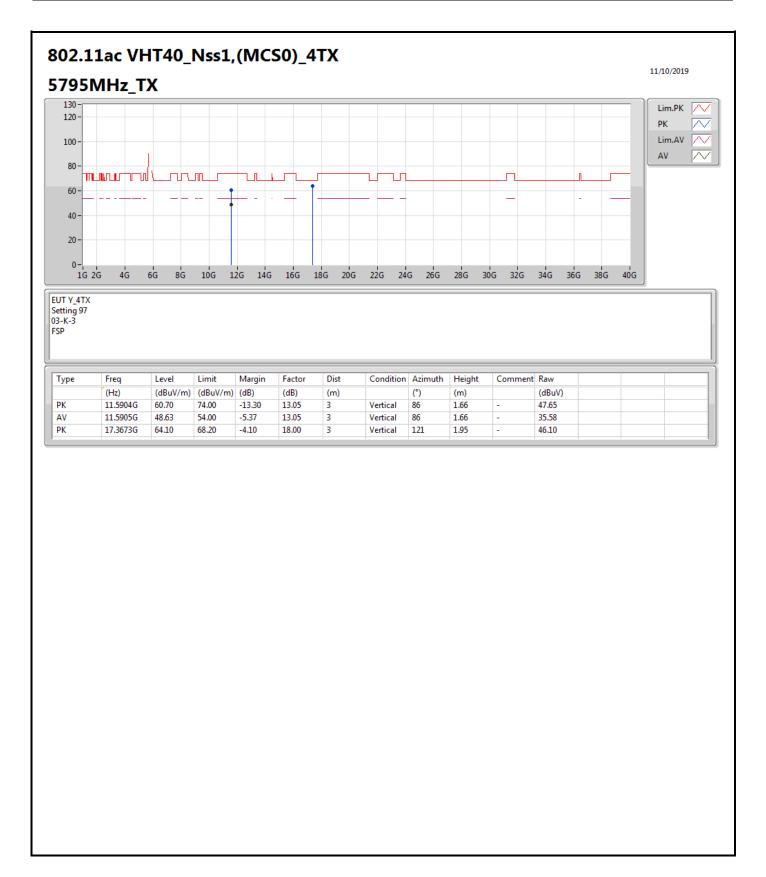




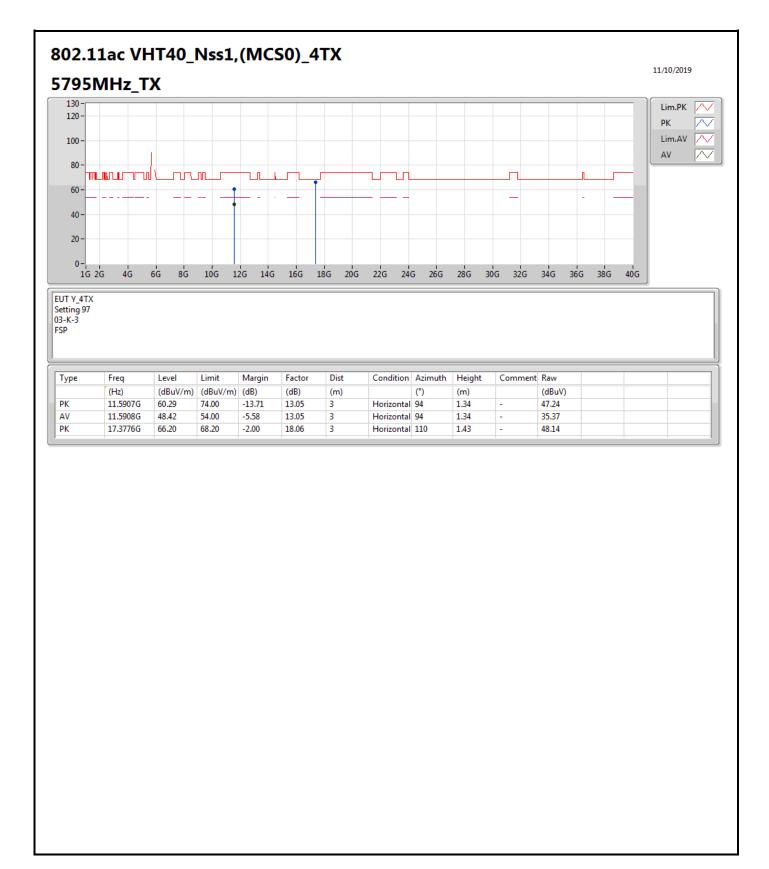




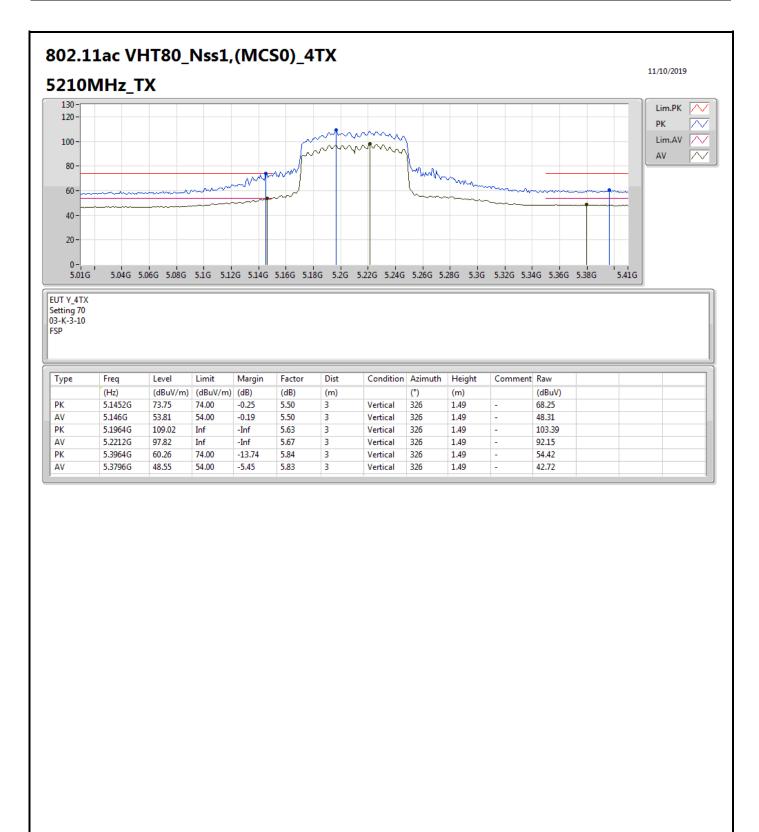




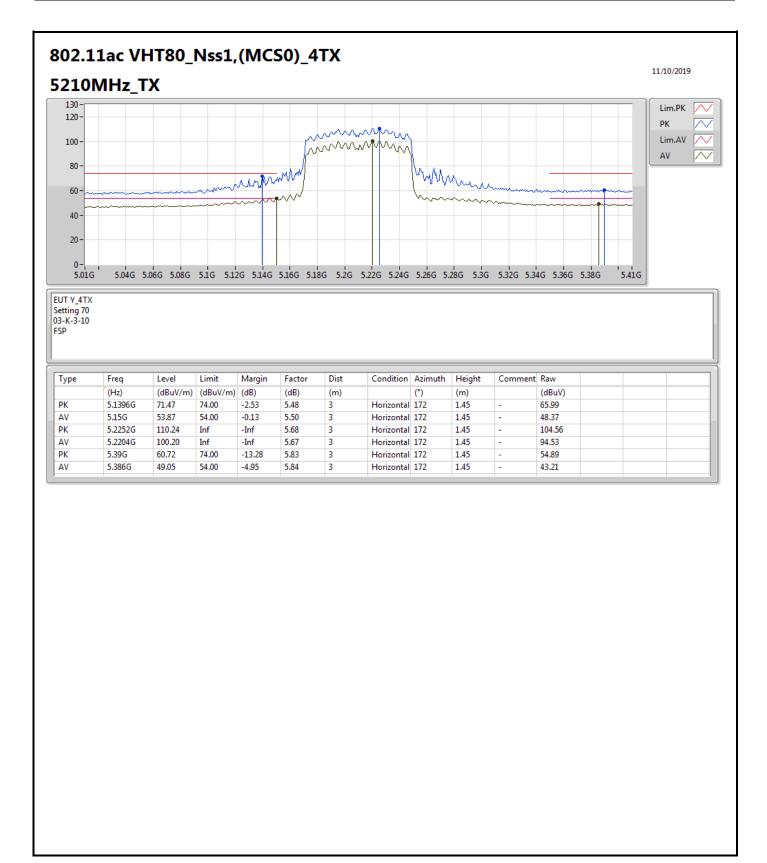




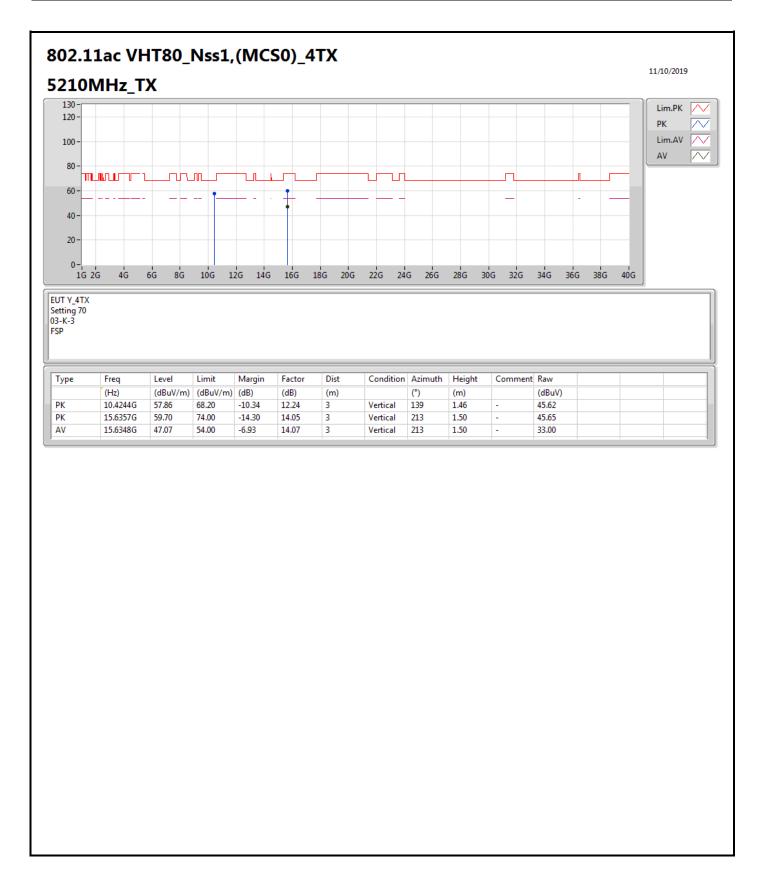




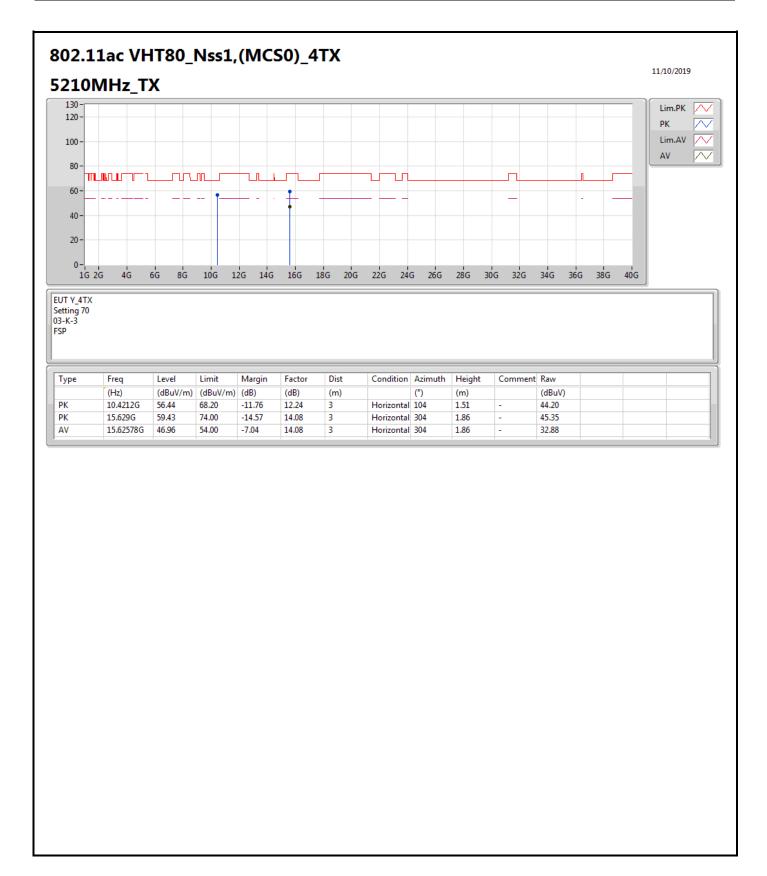




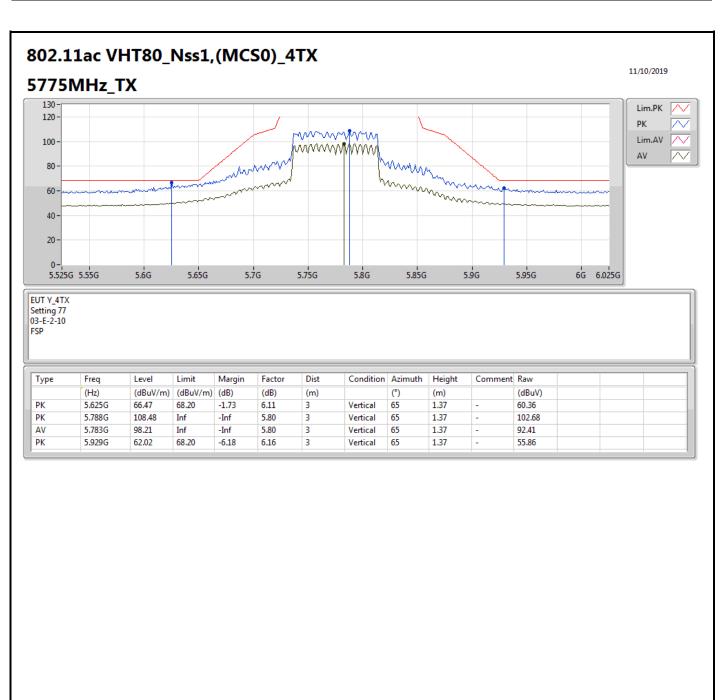




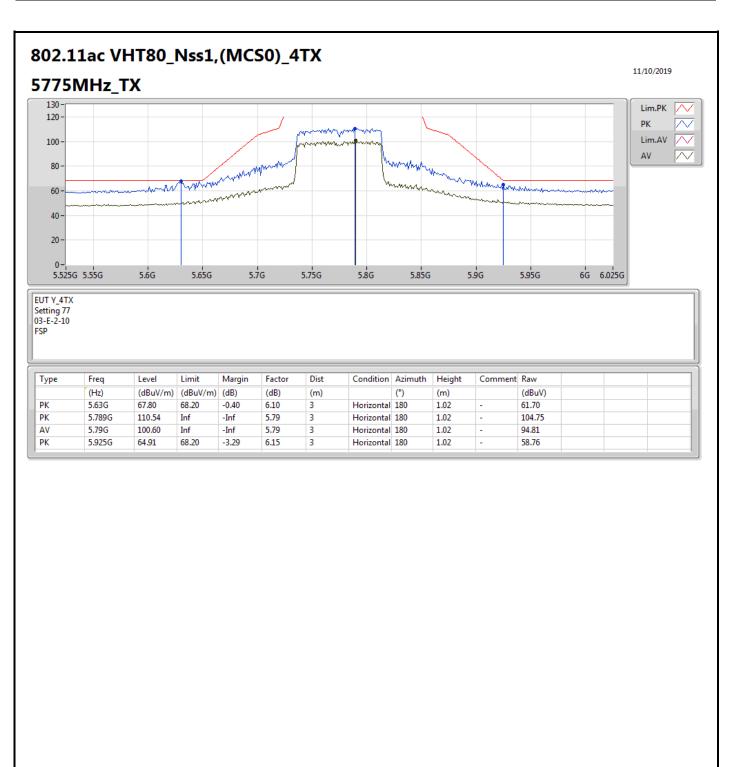




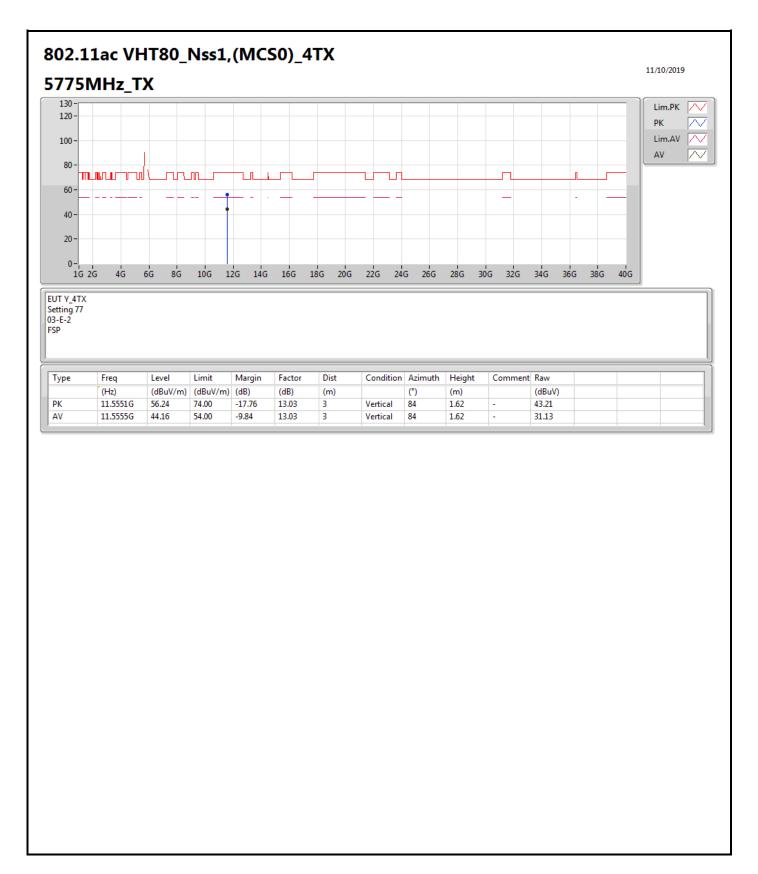




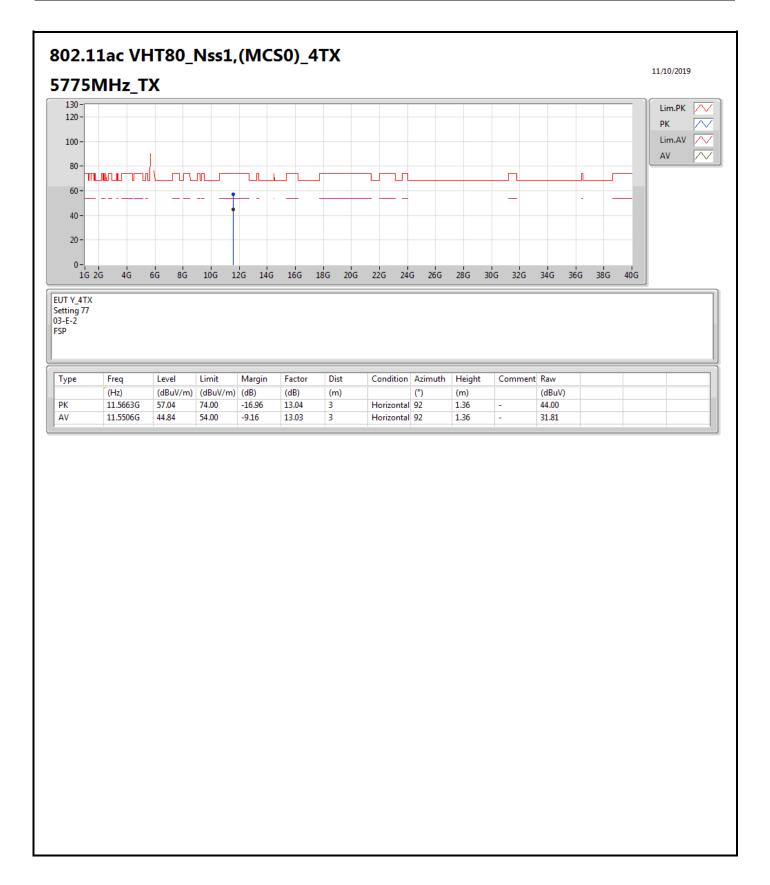




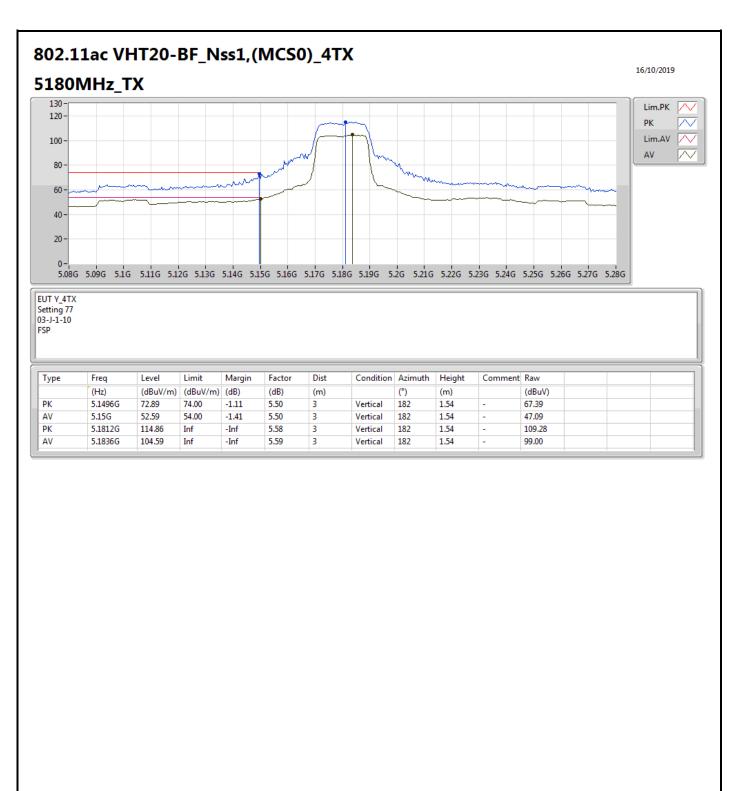




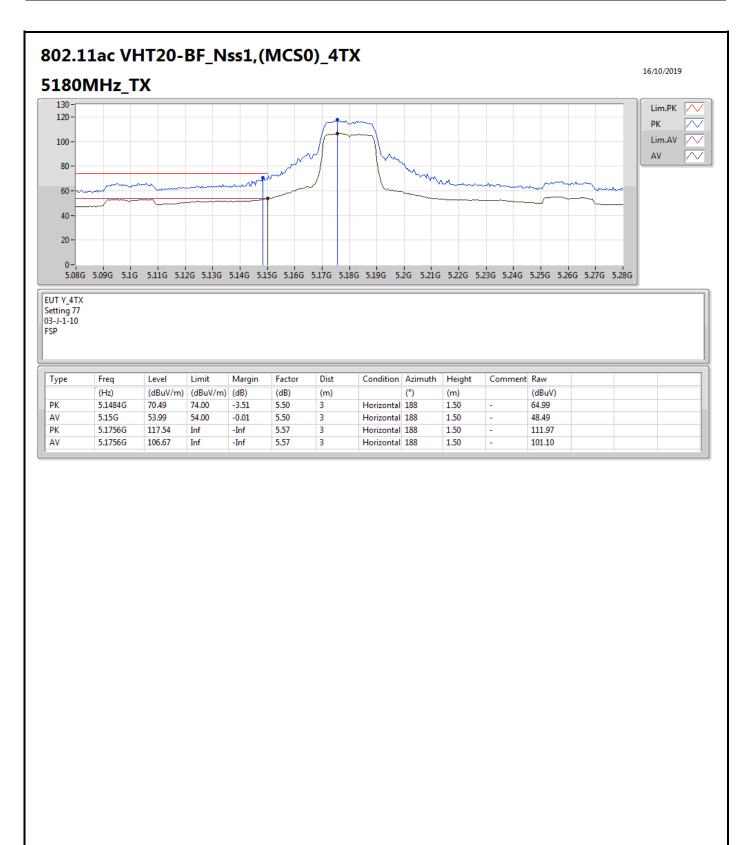




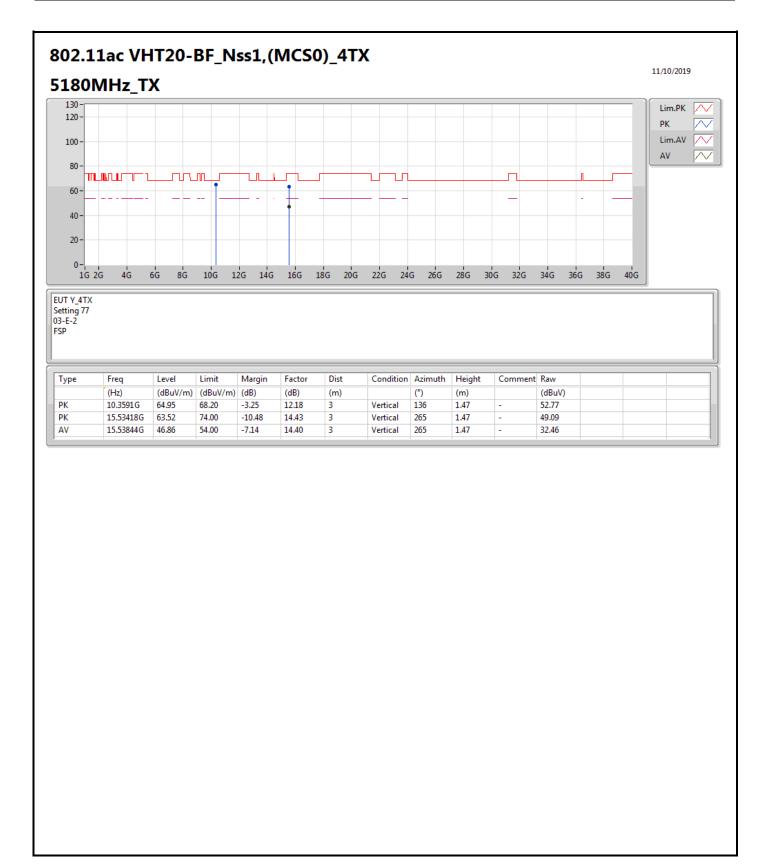




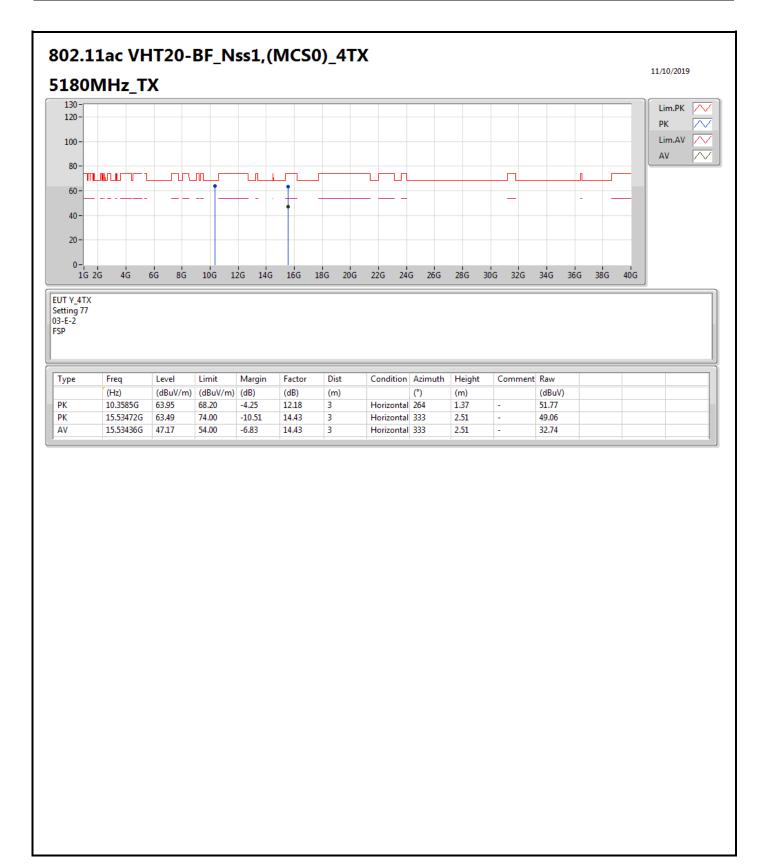




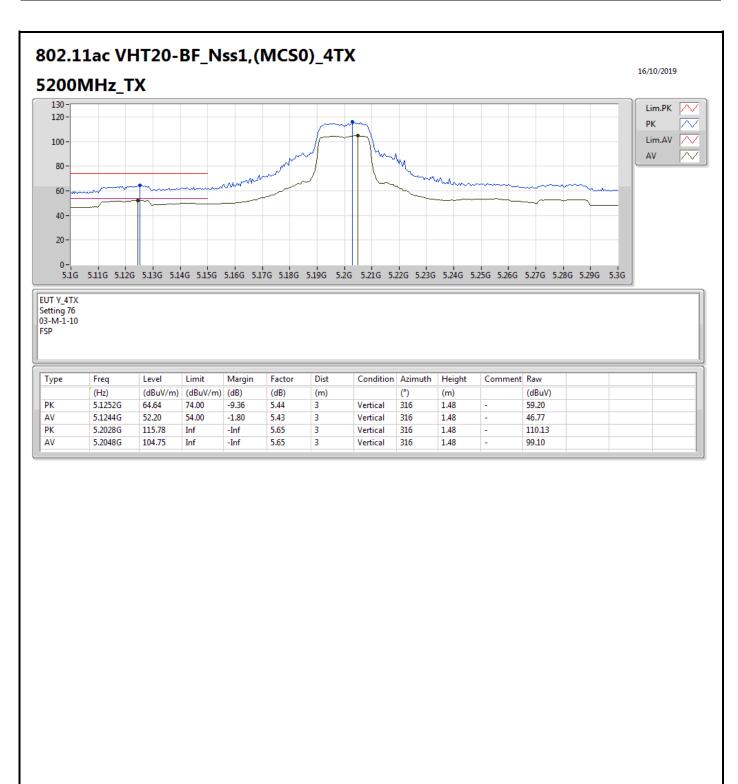




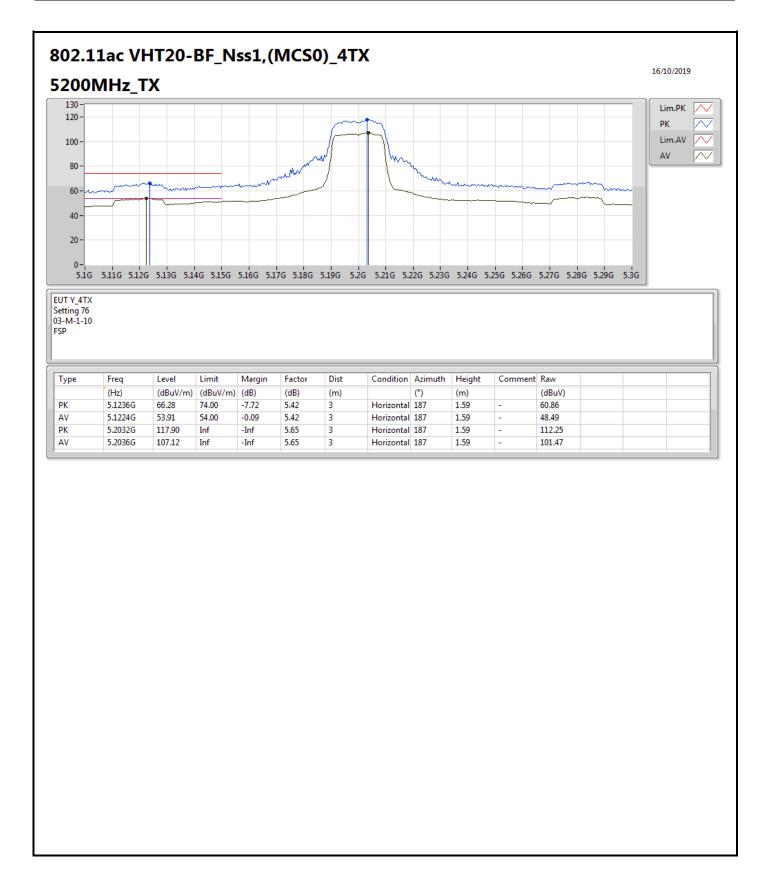




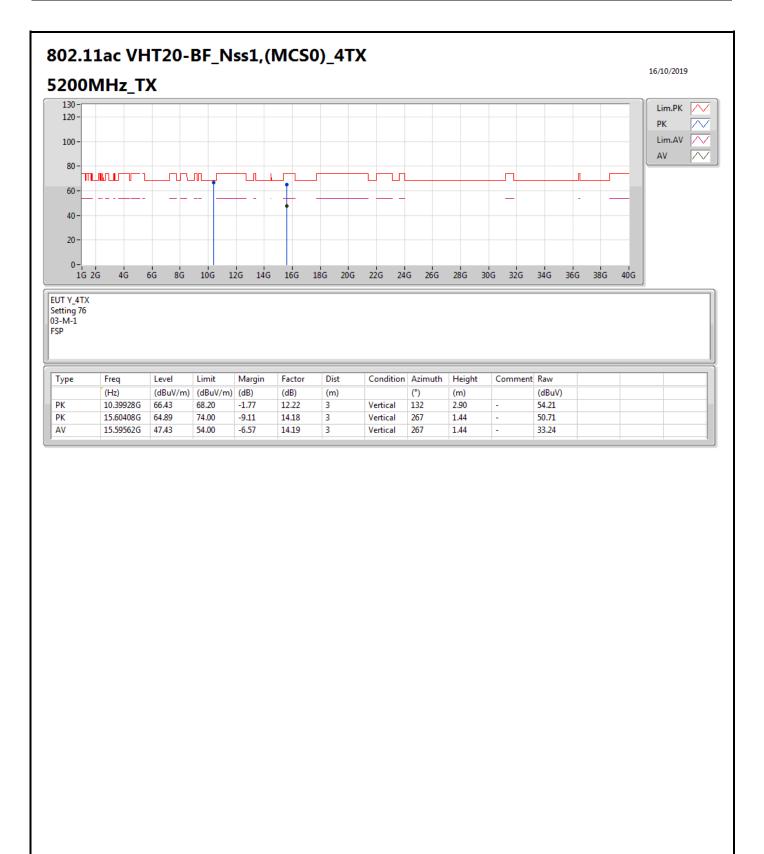




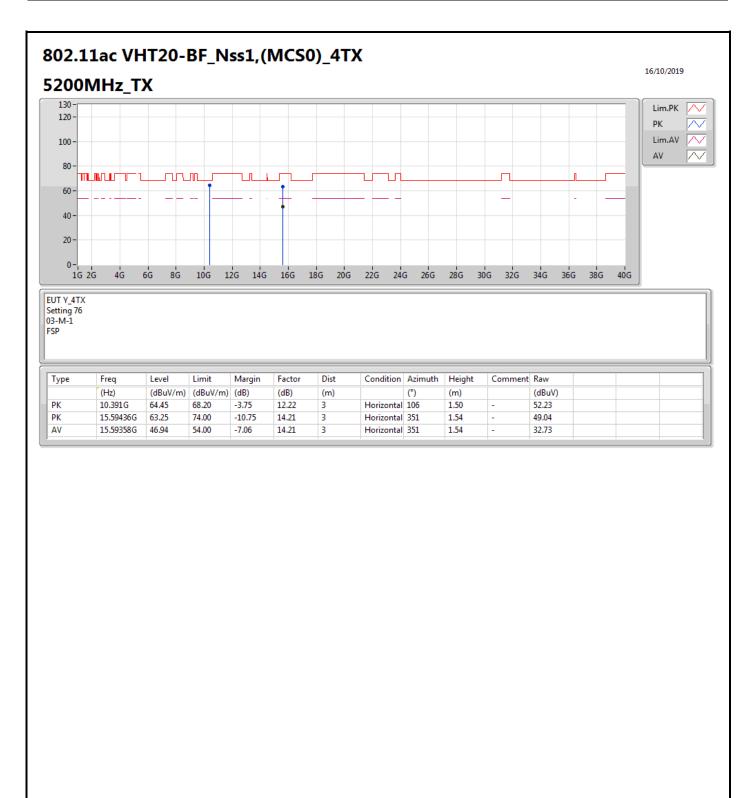




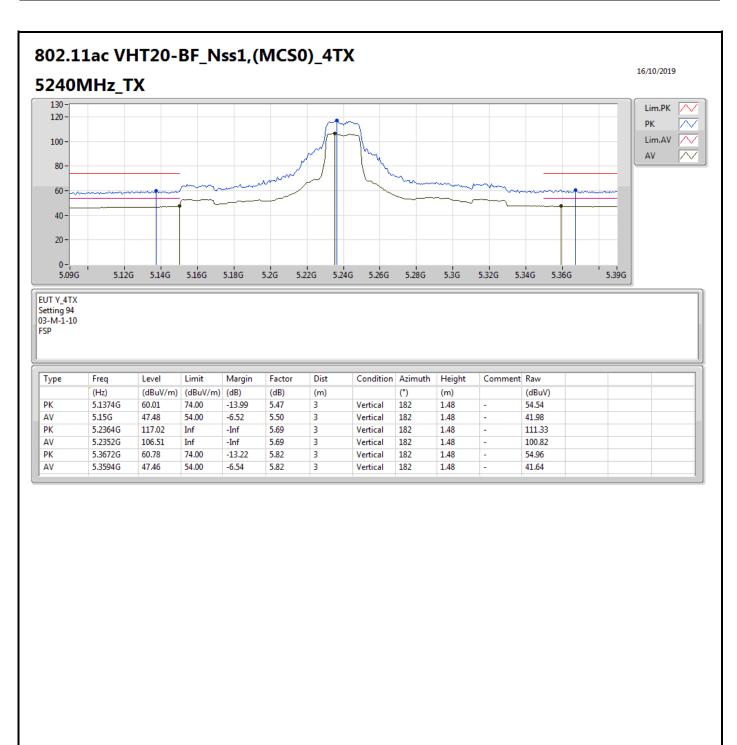




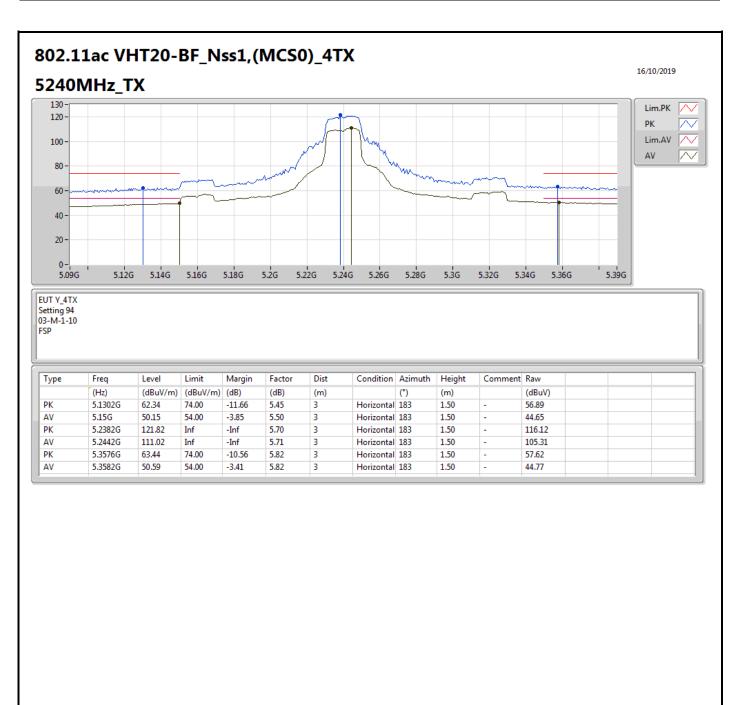




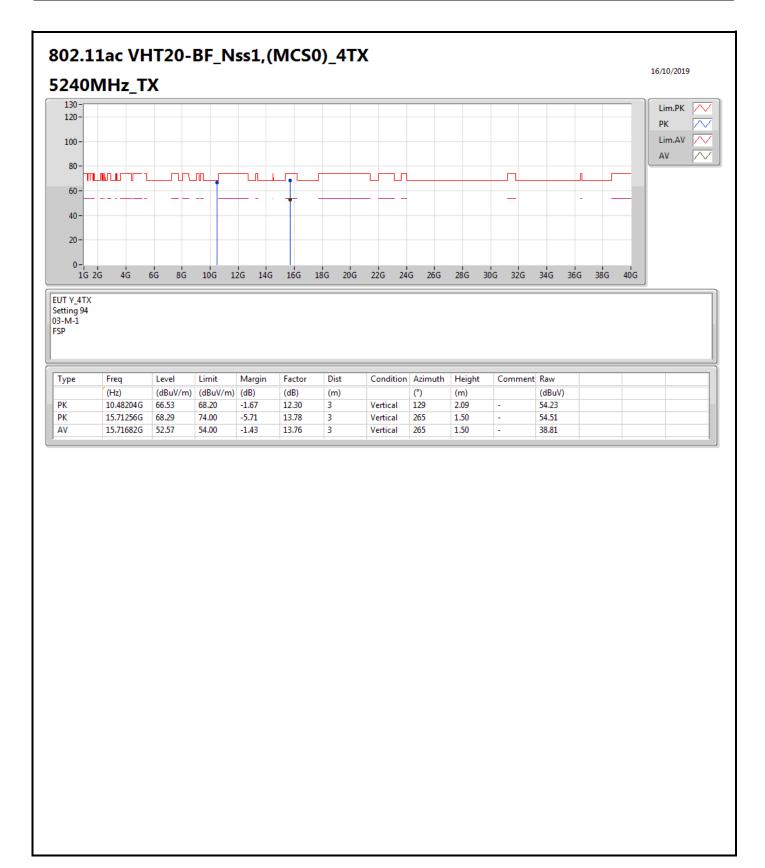




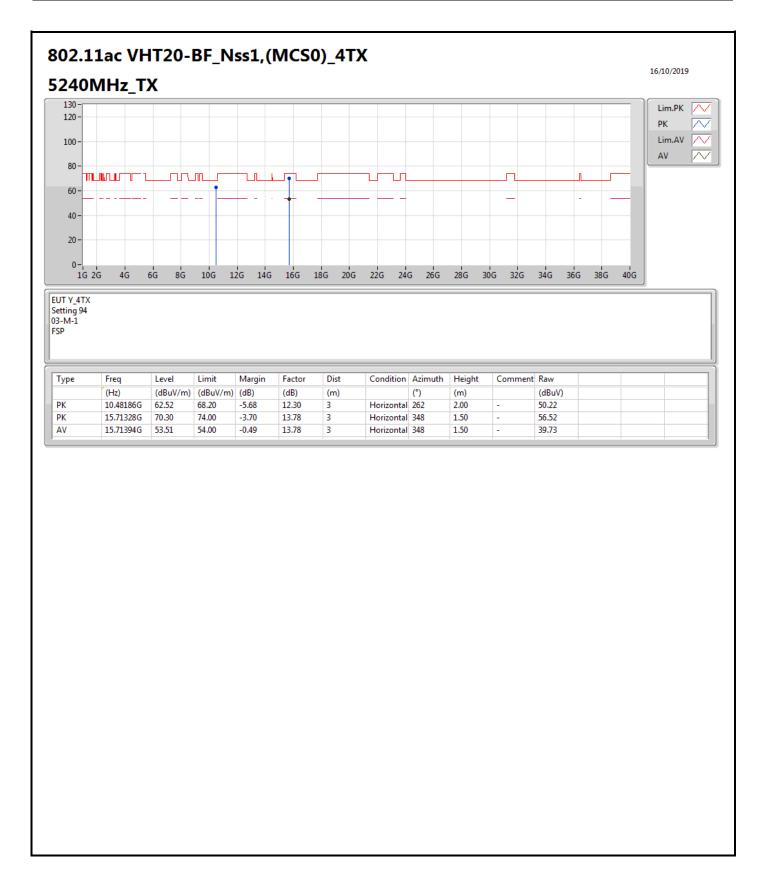




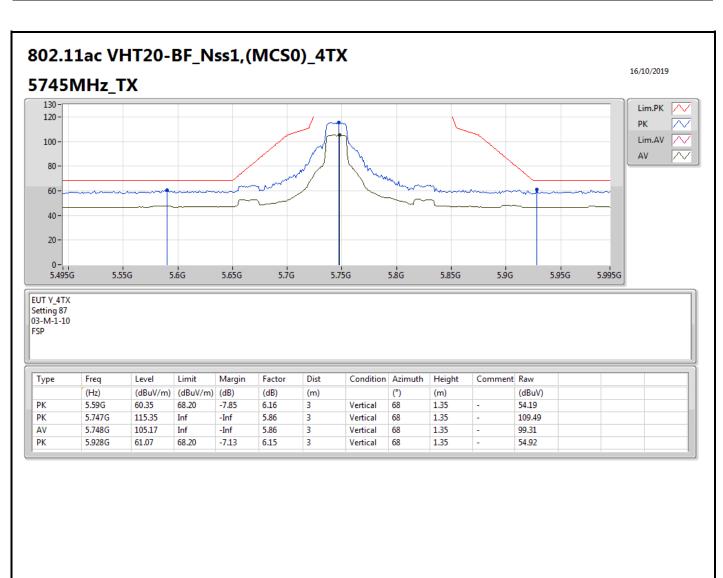




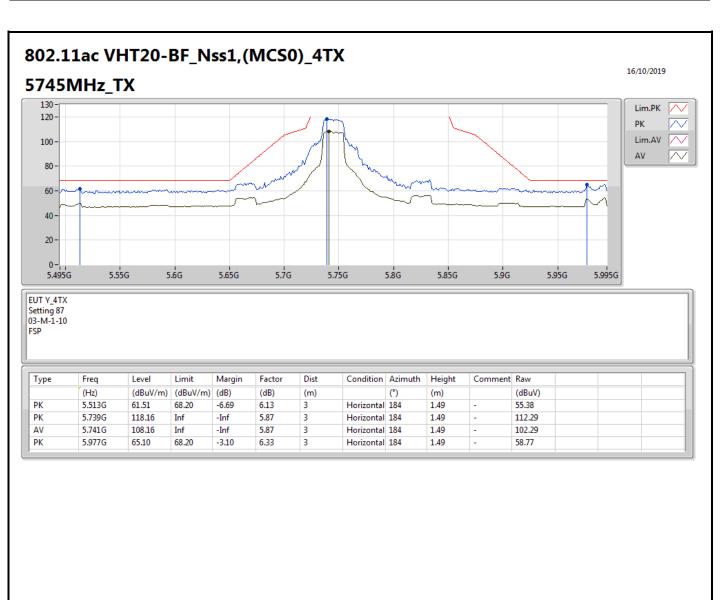




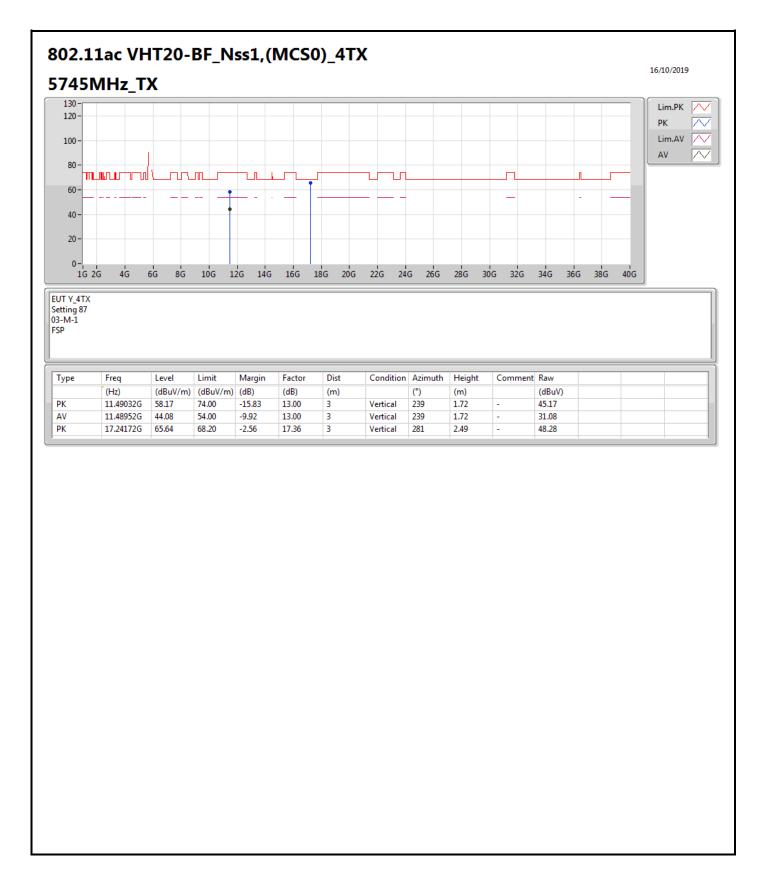




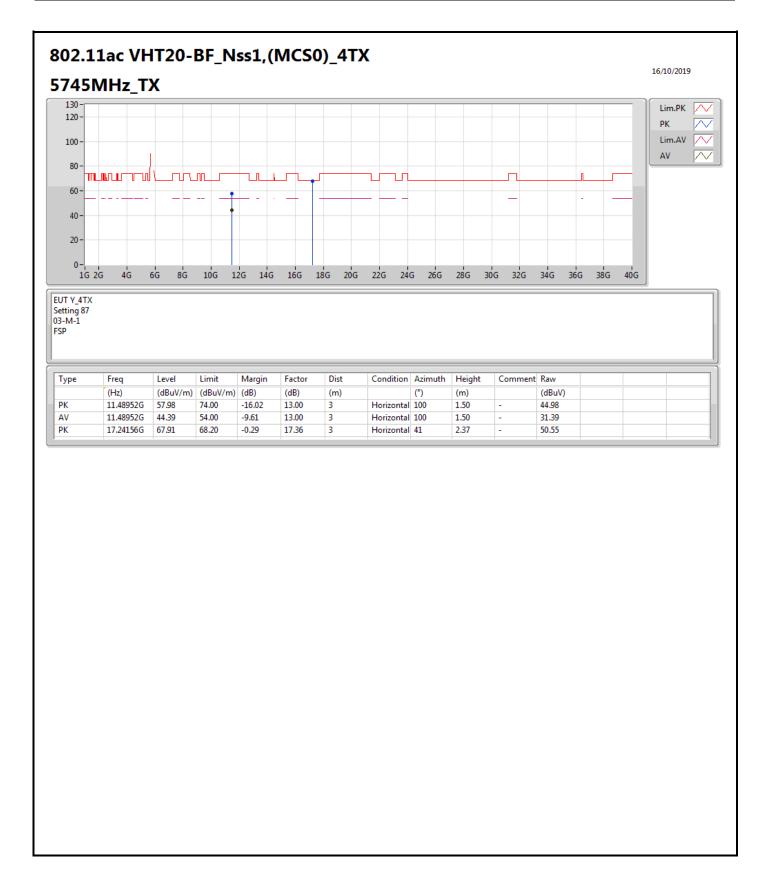




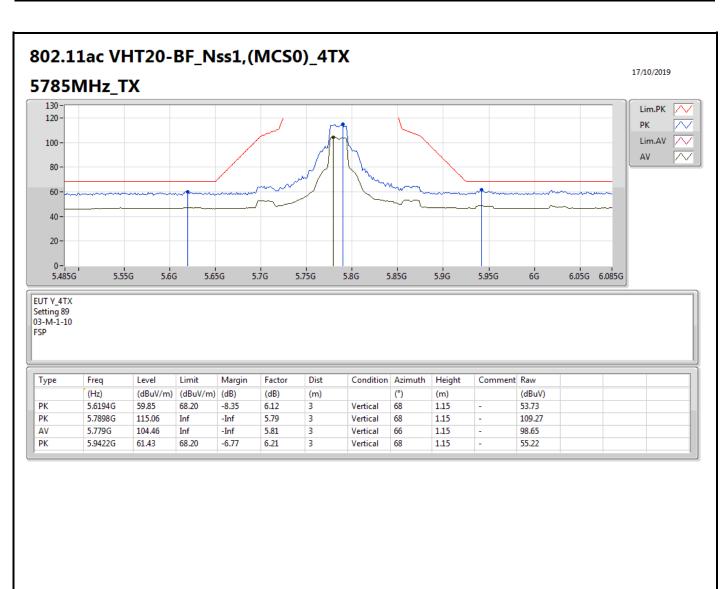




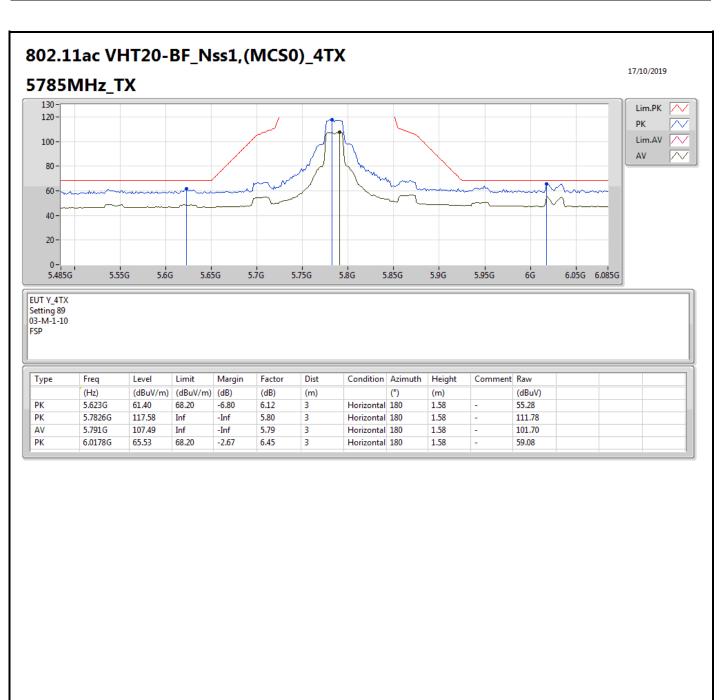




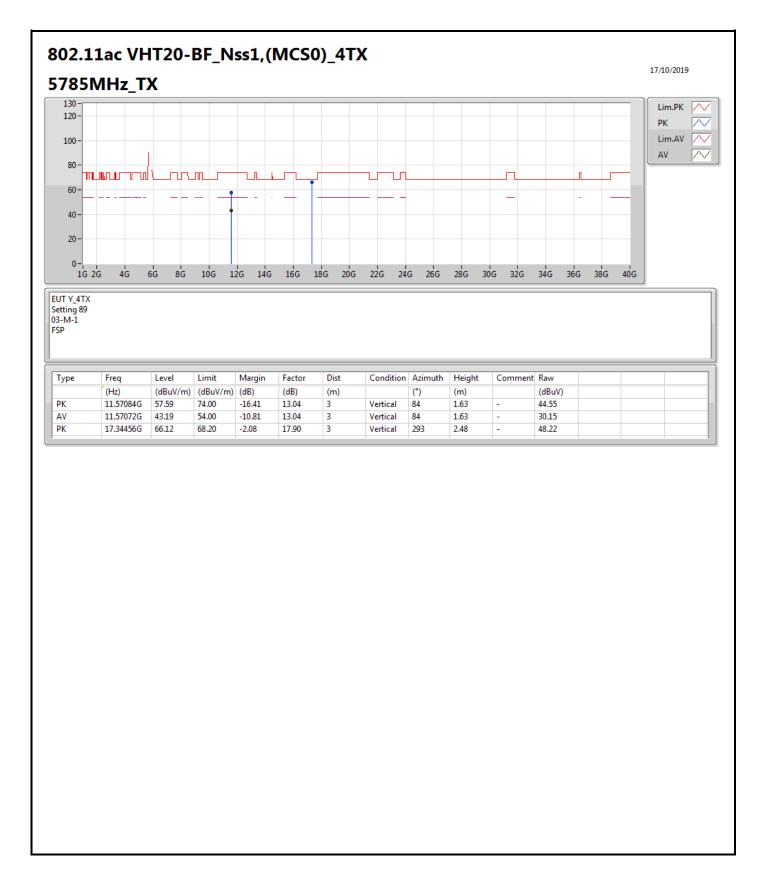




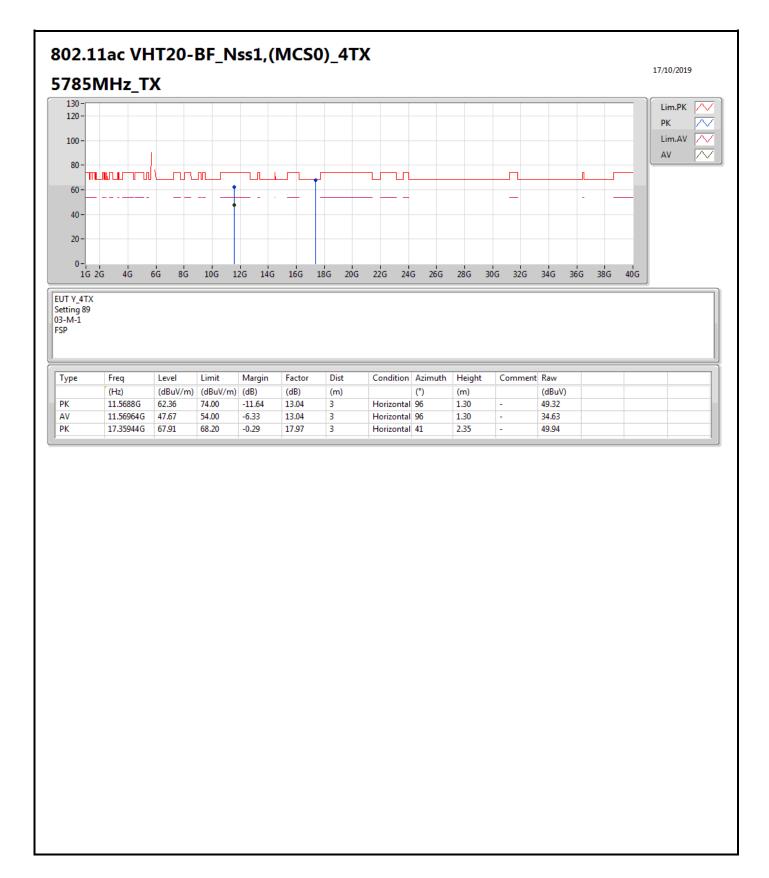




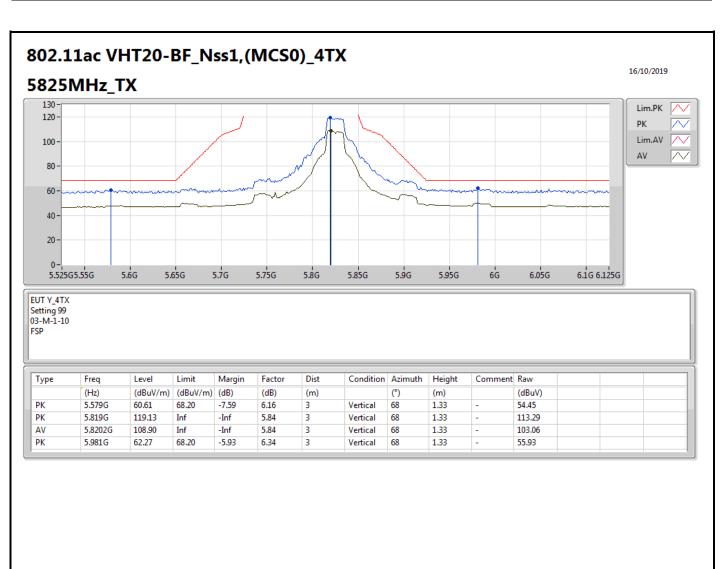




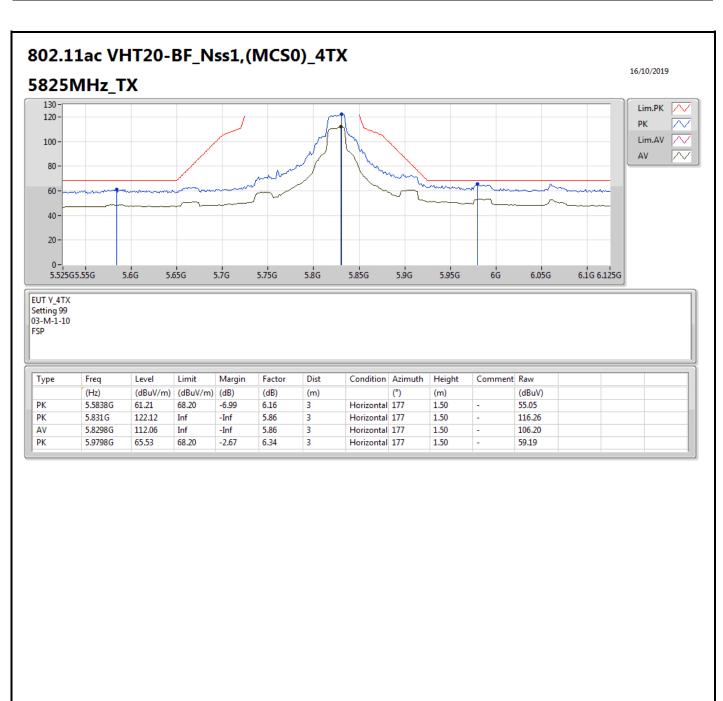




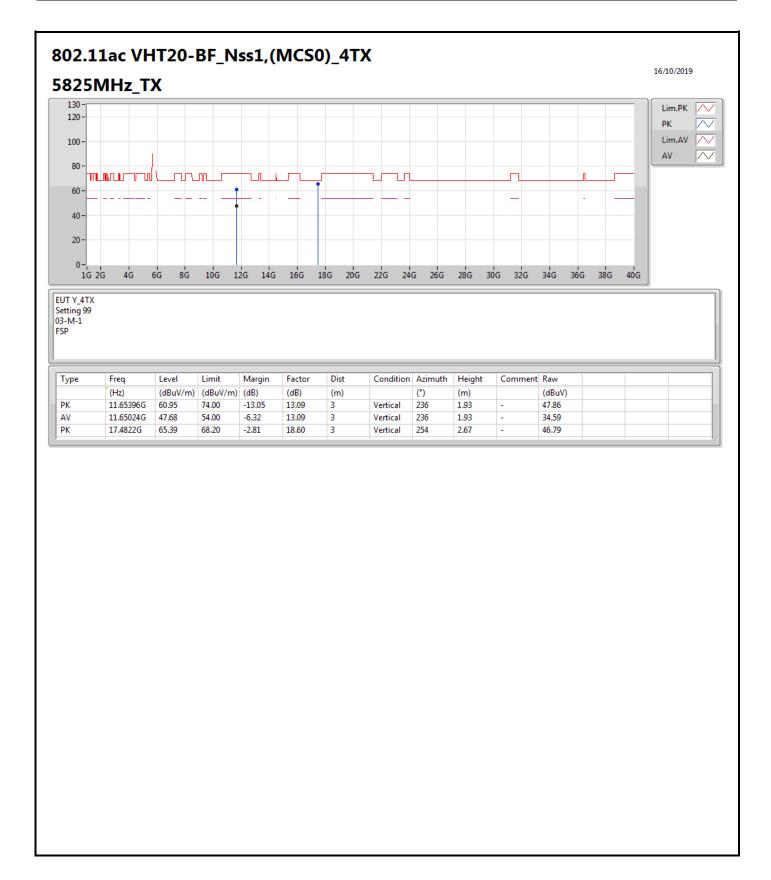




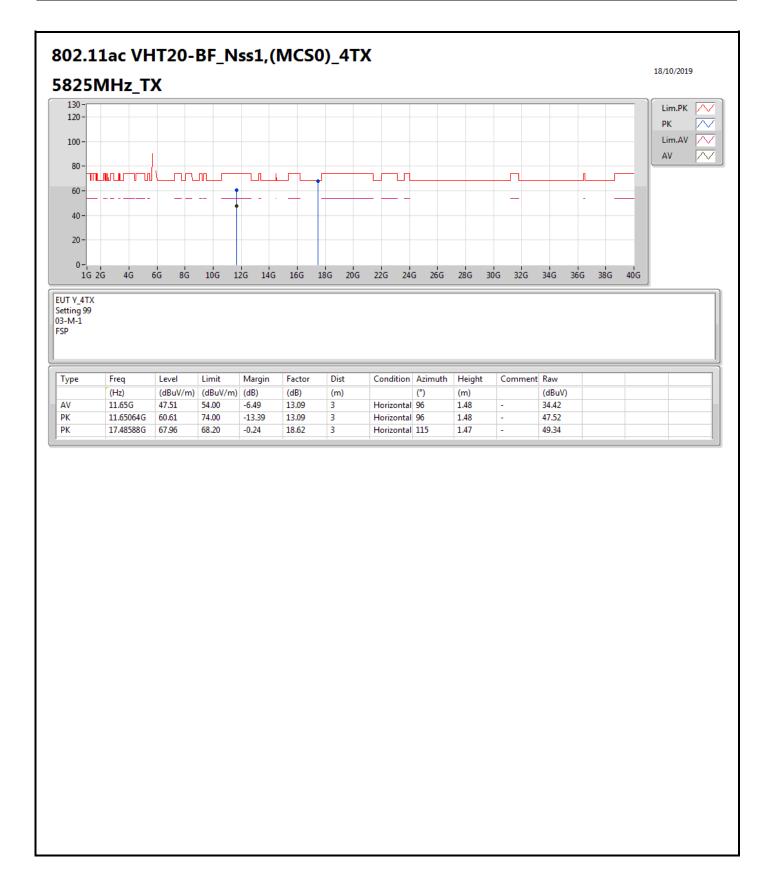




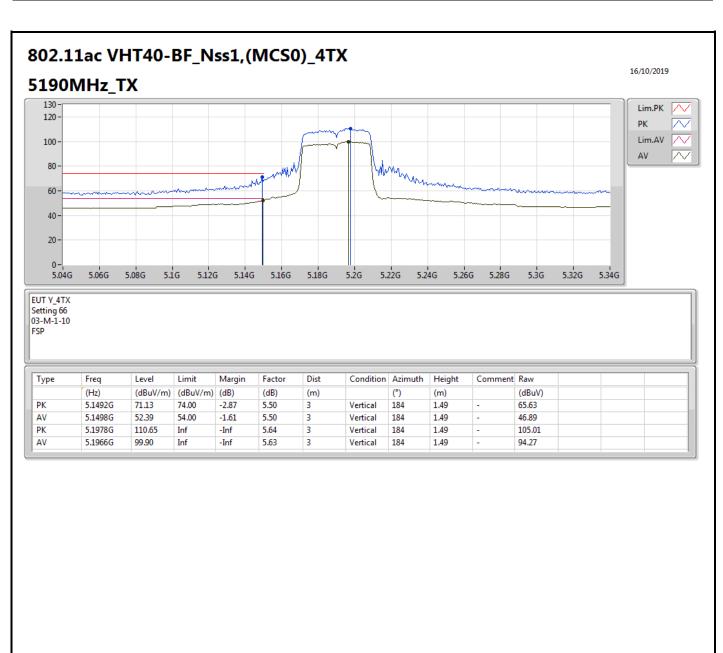




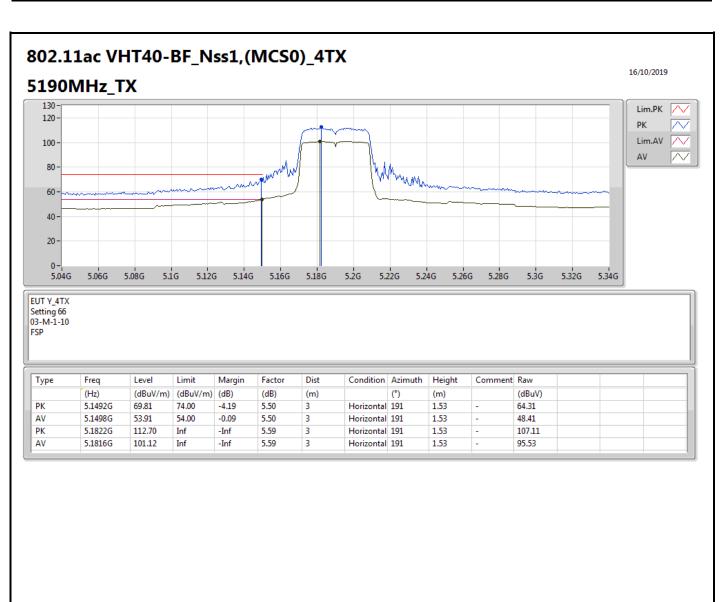




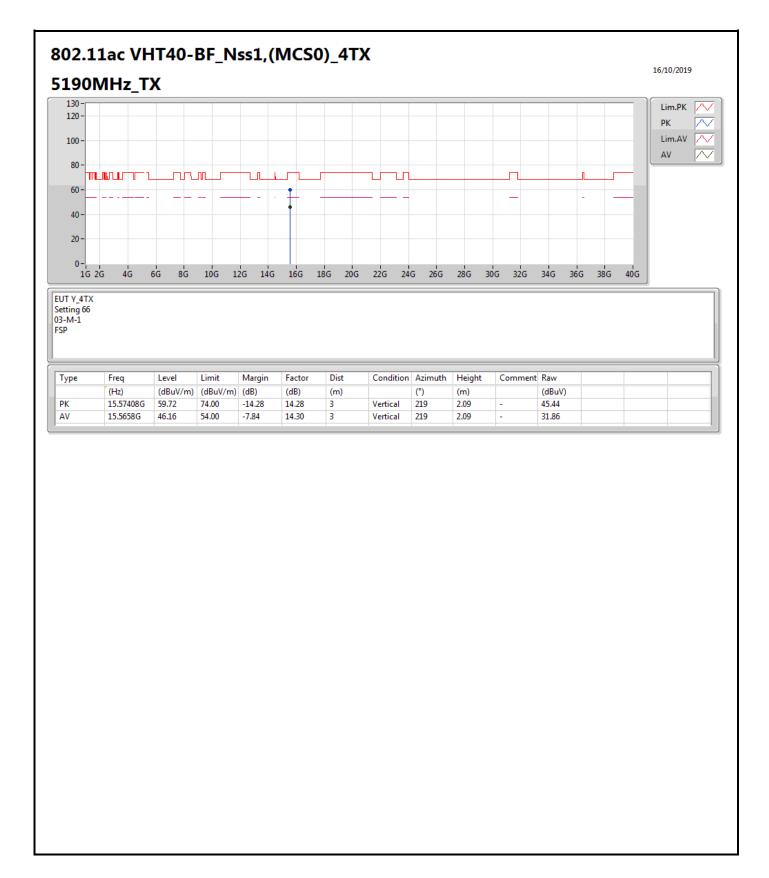




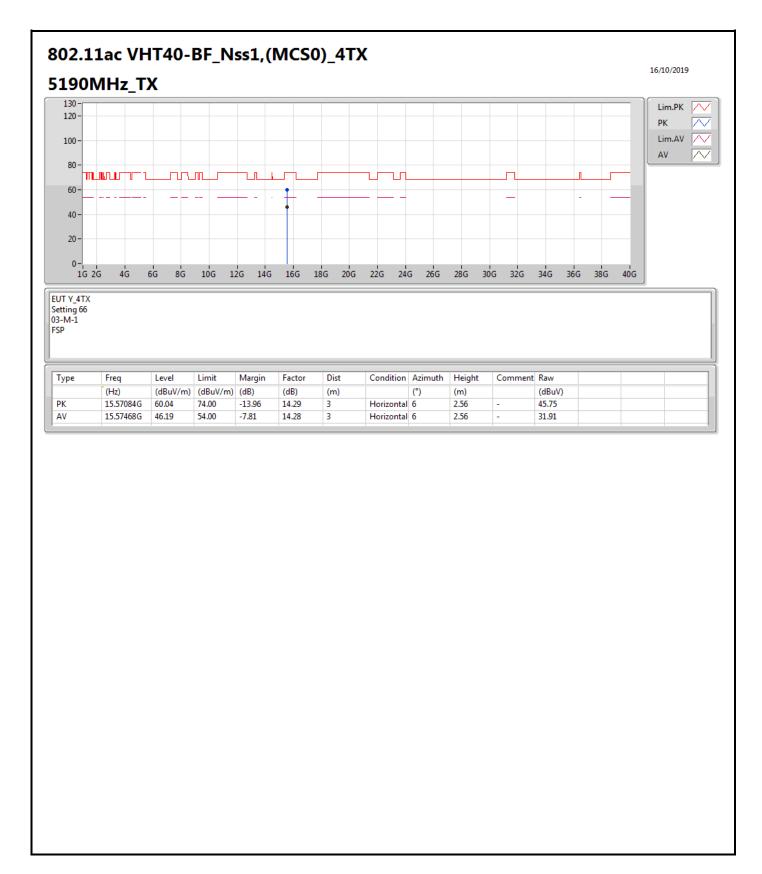




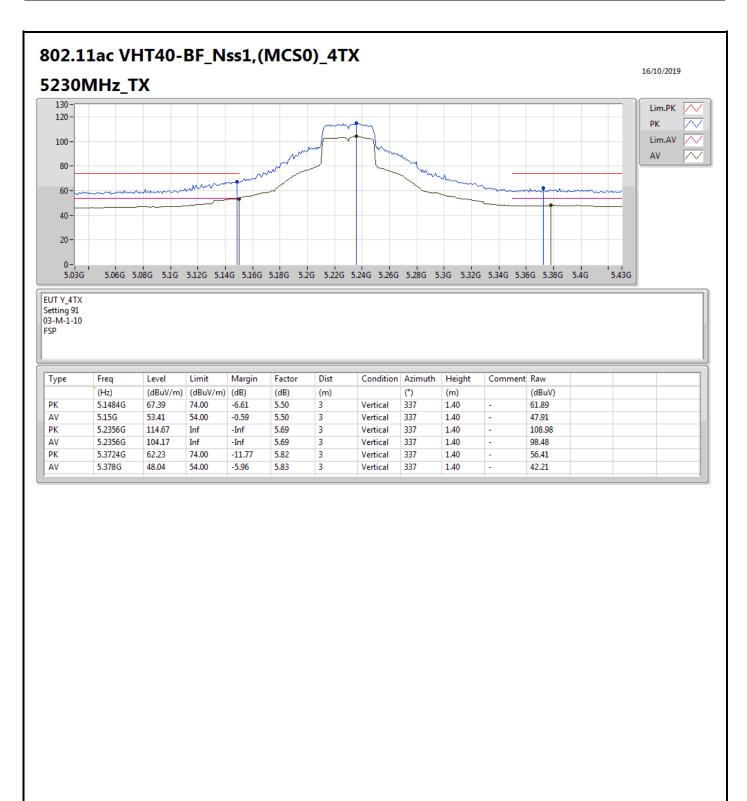




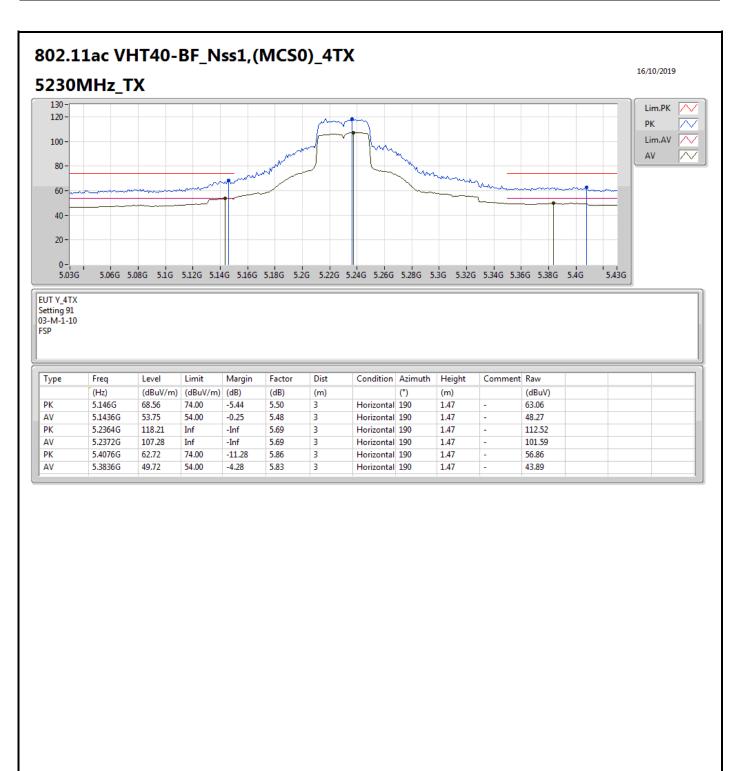




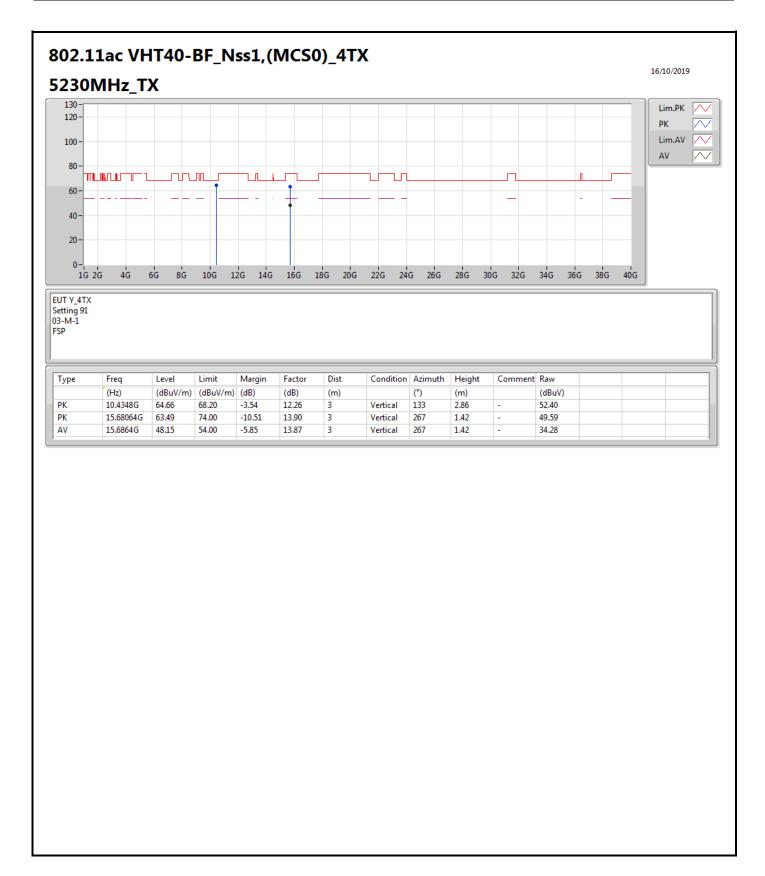




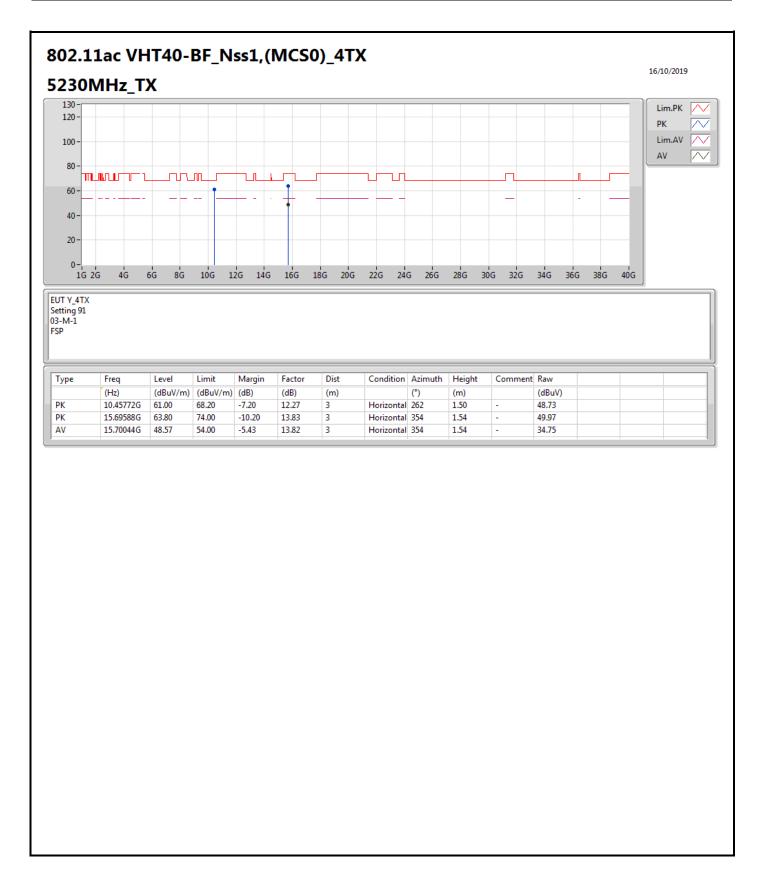




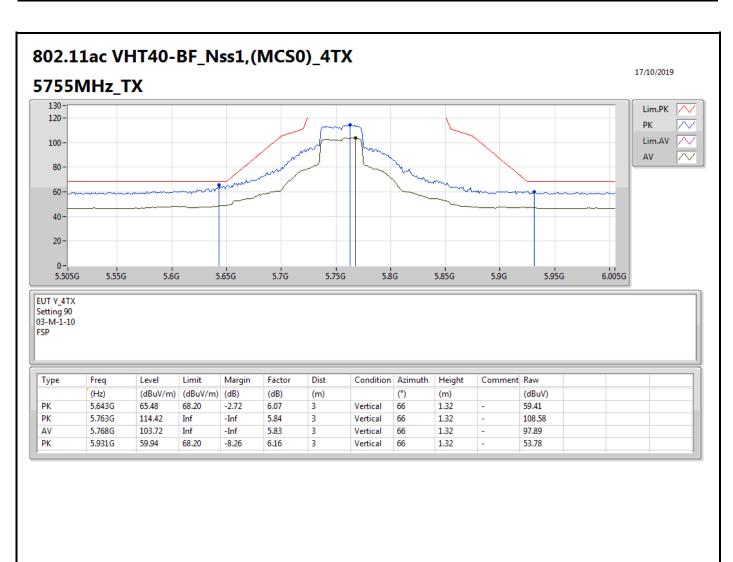




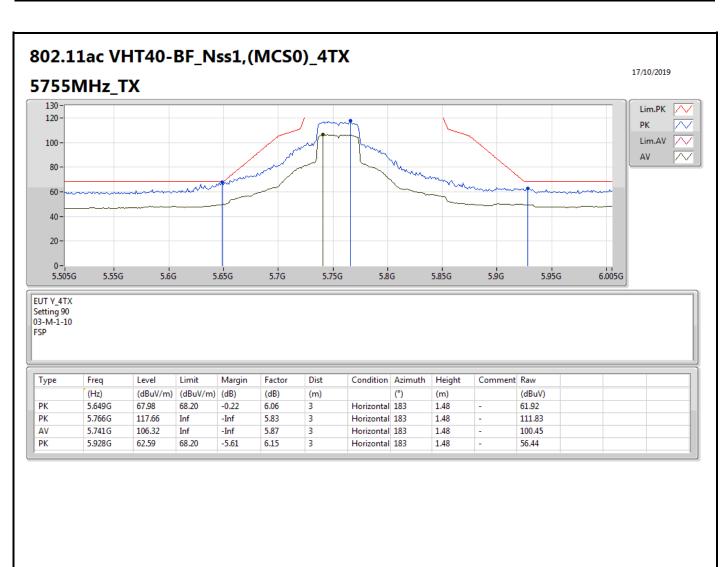




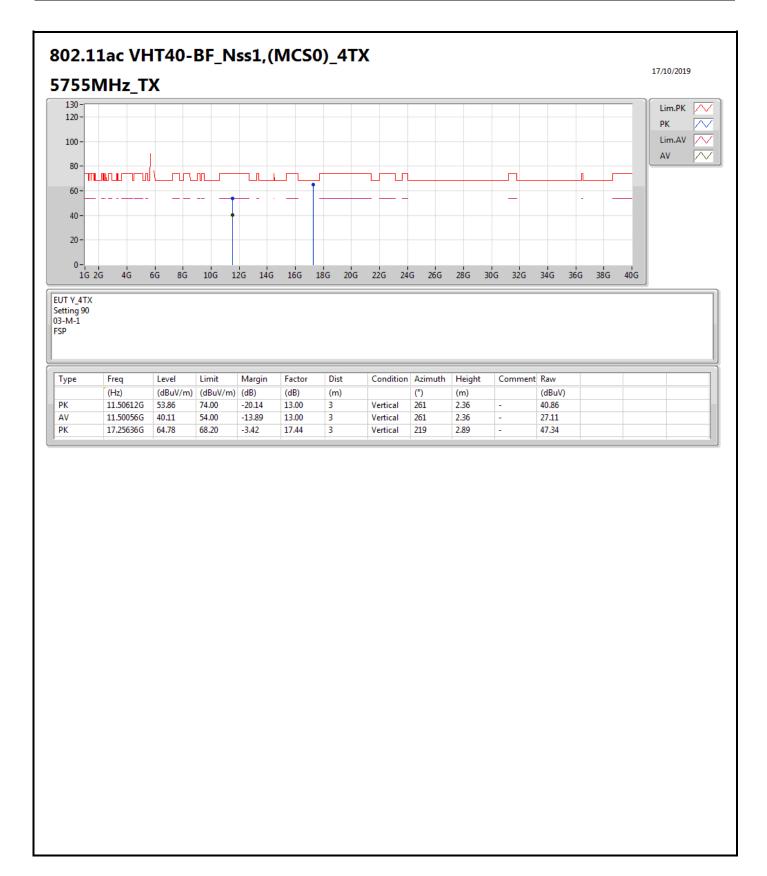




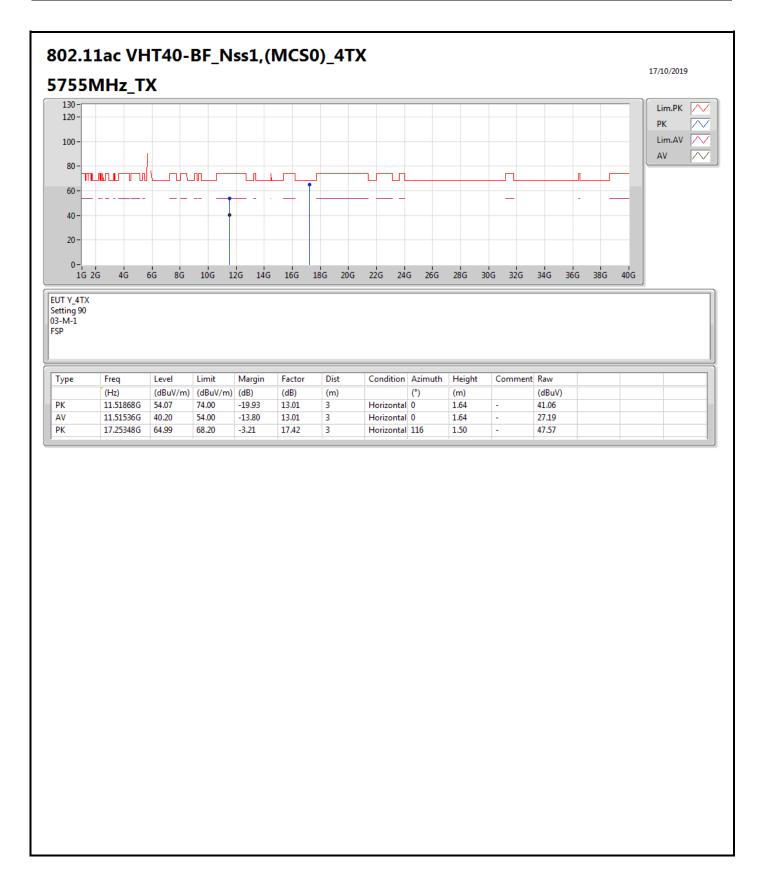




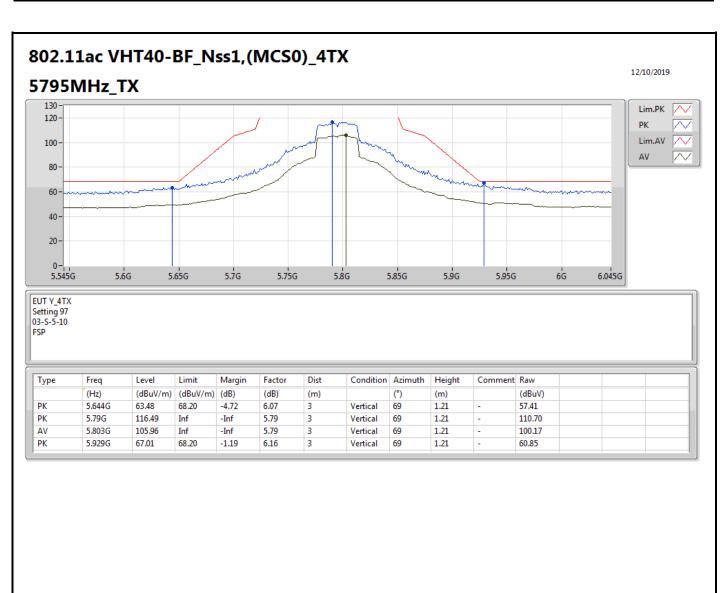




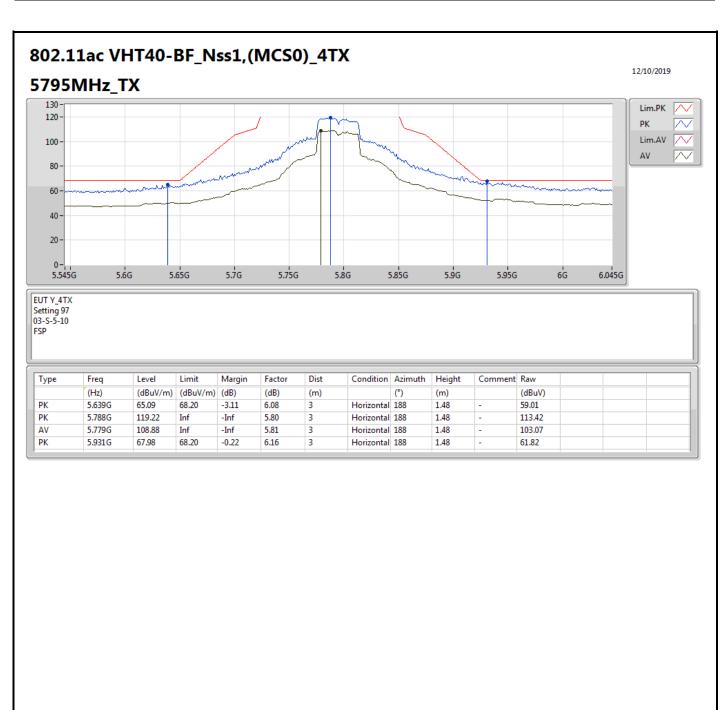




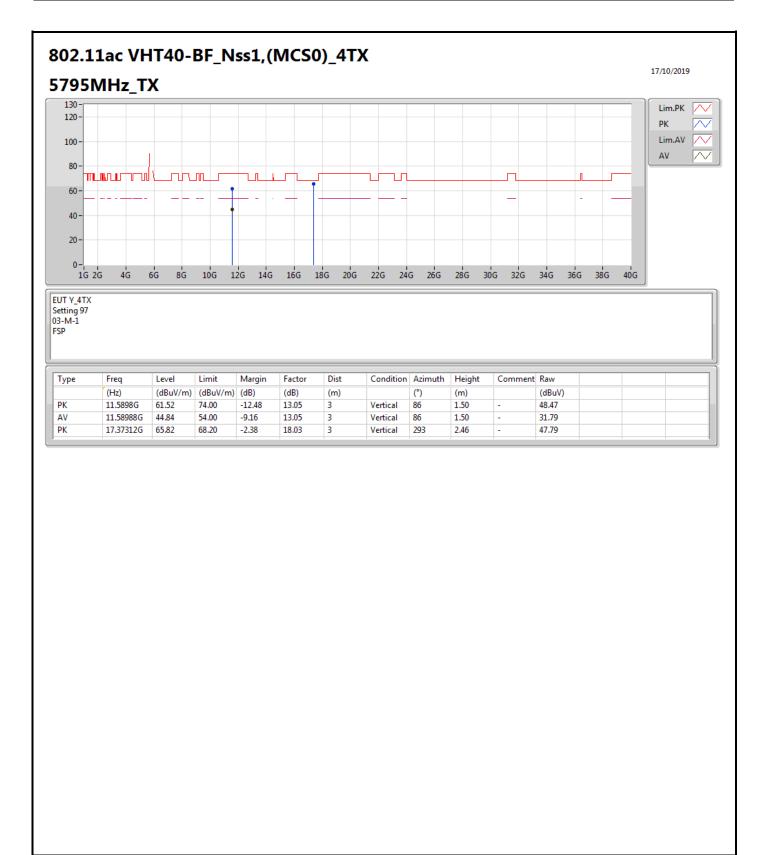




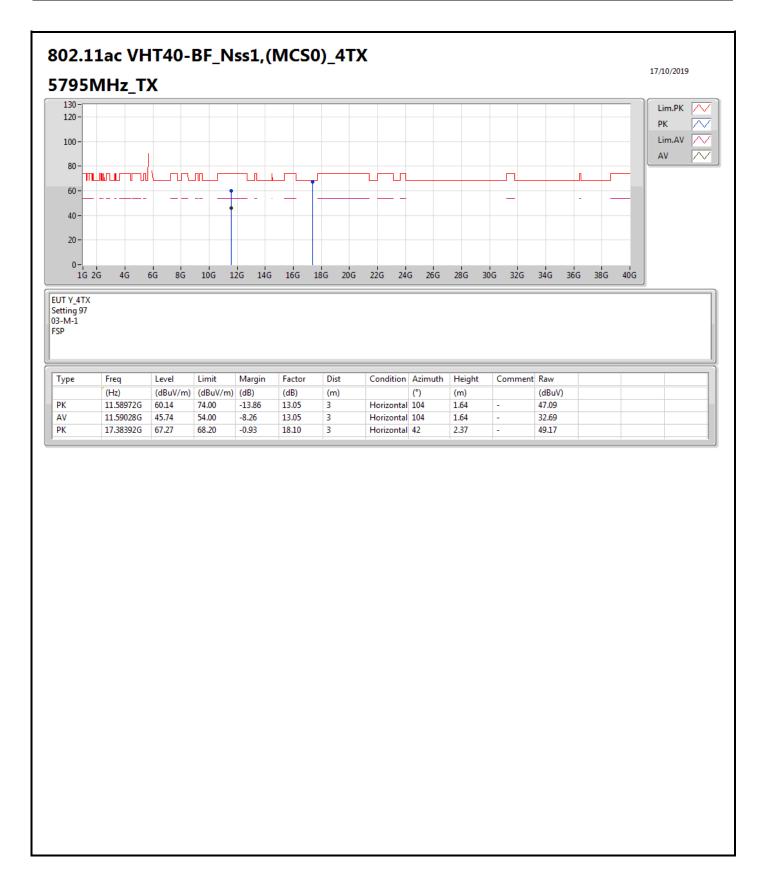




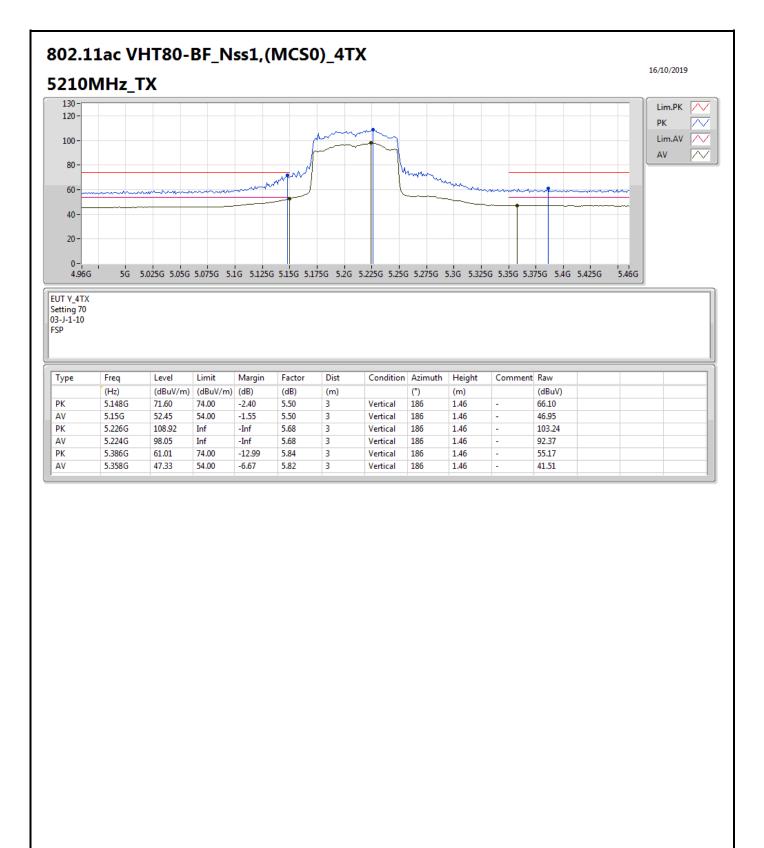




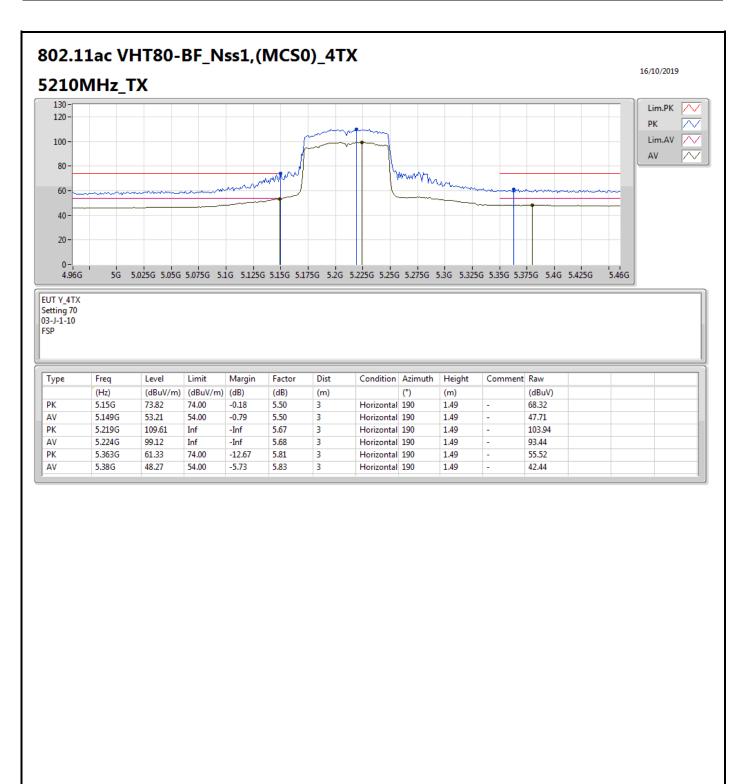




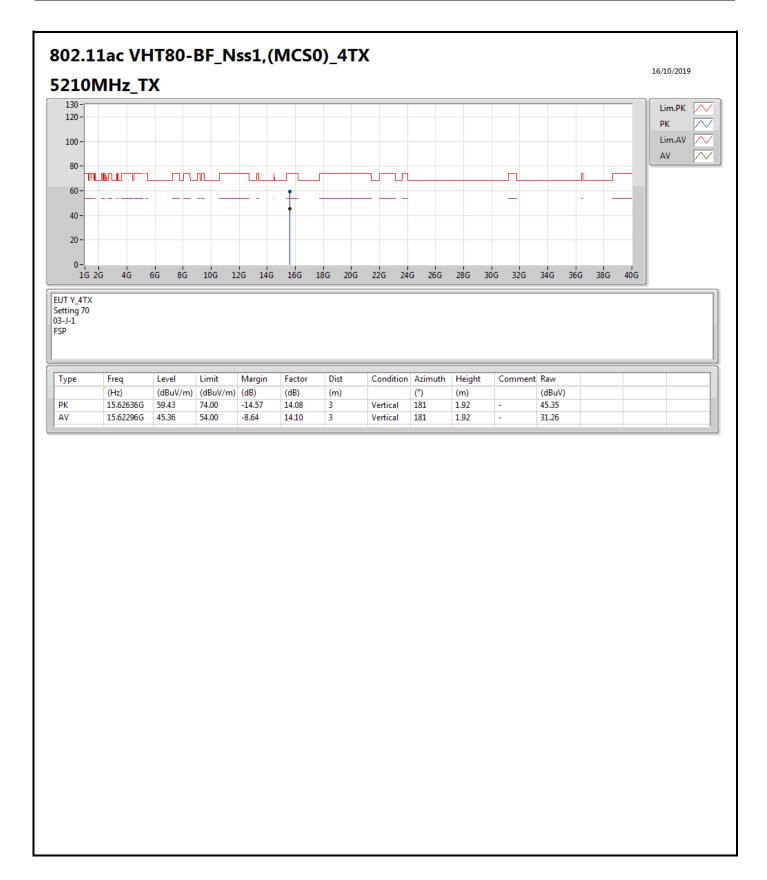




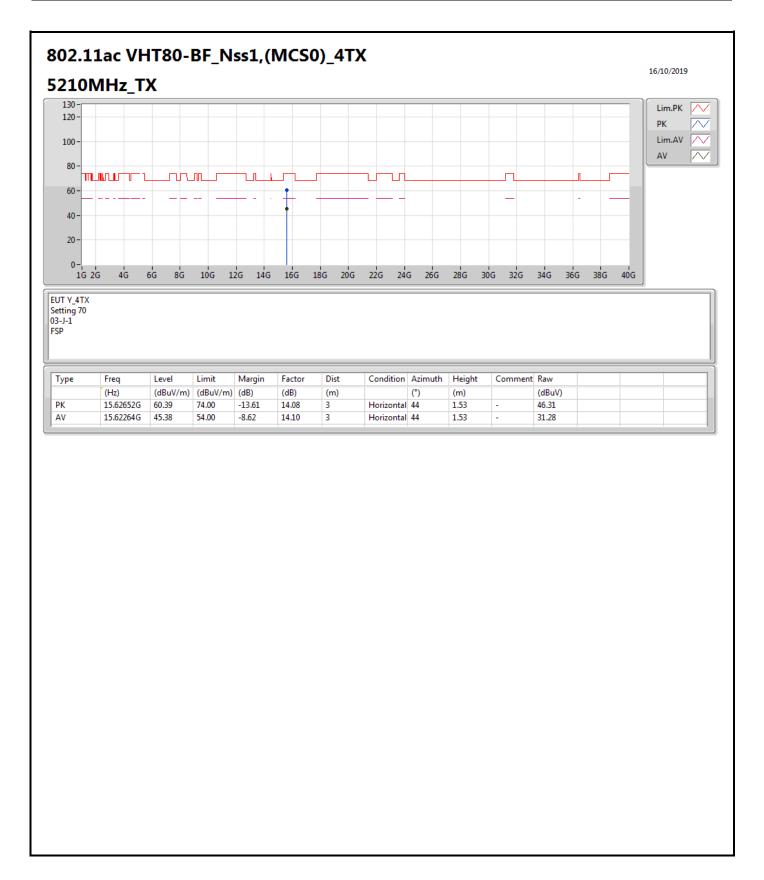




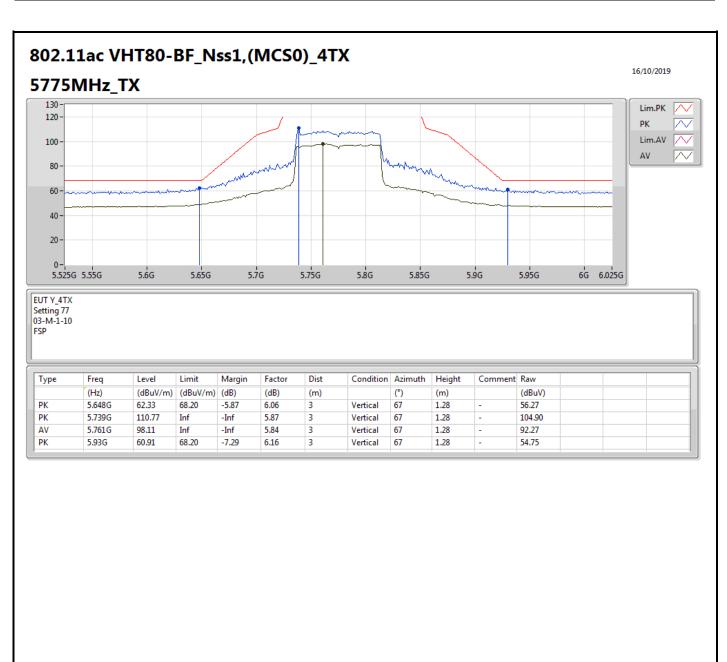




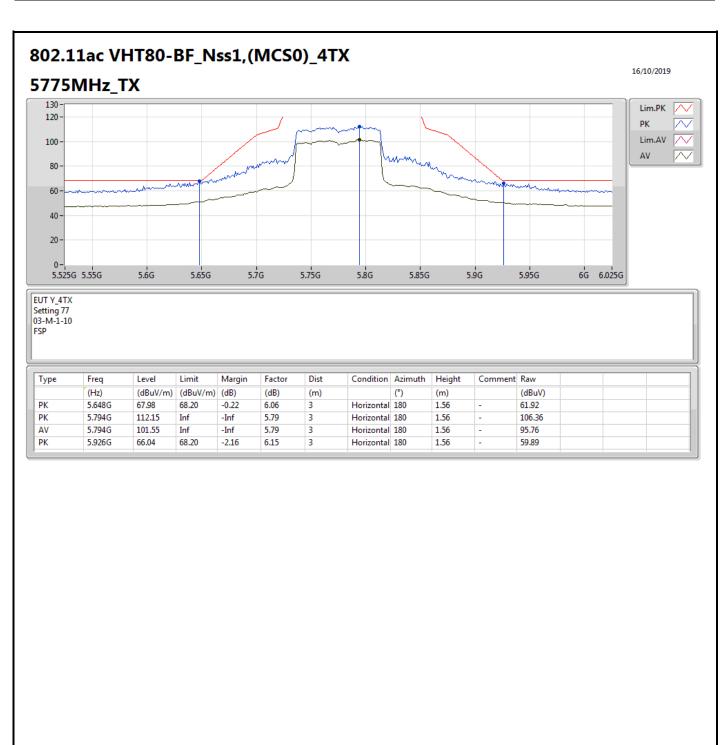




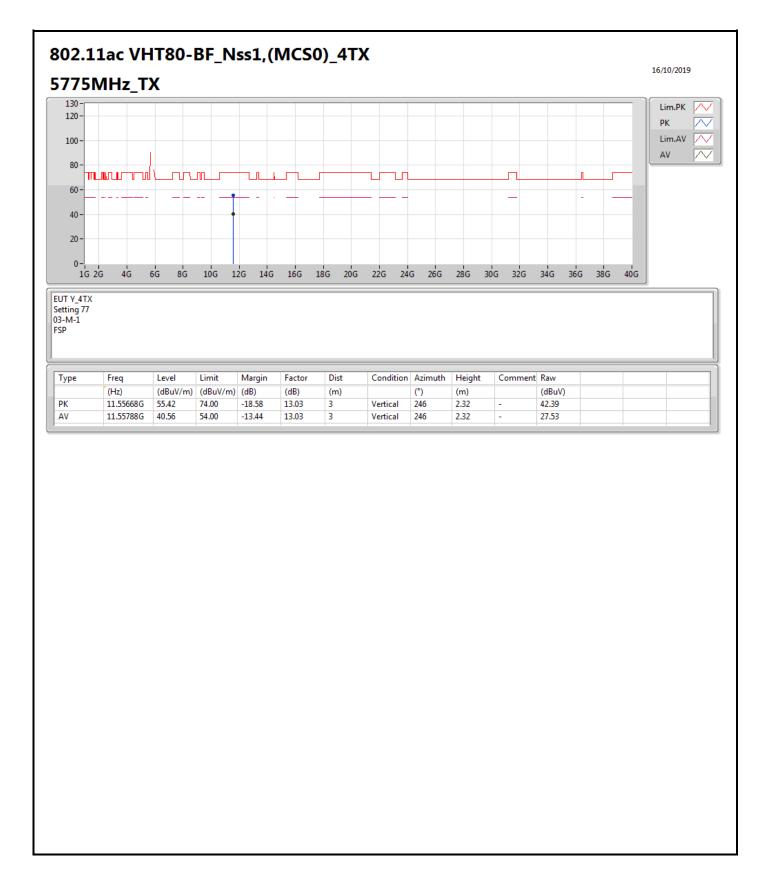




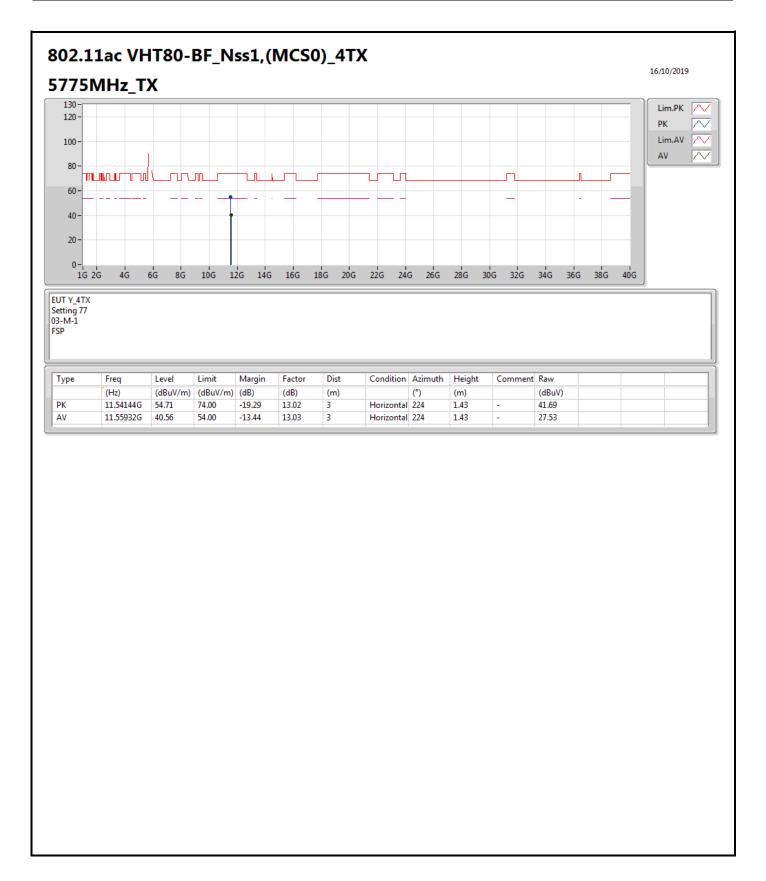


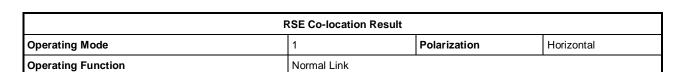


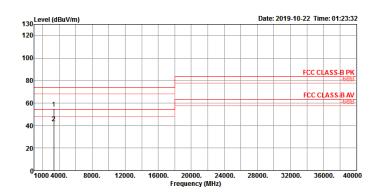




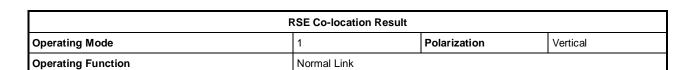


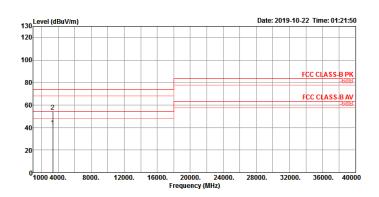






	Freq	Limit Over Read CableA Freq Level Line Limit Level Loss					T/Pos Remark		Pol/Phase			
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	3347.20	55.19	74.00	-18.81	55.93	3.29	30.40	34.43	122	338	Peak	HORIZONTAL
2	3347.70	41.99	54.00	-12.01	42.73	3.29	30.40	34.43	122	338	Average	HORIZONTAL





	Freq	Level						Factor			Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	3348.00	41.01	54.00	-12.99	41.75	3.29	30.40	34.43	124	83	Average	VERTICAL
2	3349.10	54.37	74.00	-19.63	55.11	3.29	30.40	34.43	124	83	Peak	VERTICAL