



# **FCC RADIO TEST REPORT**

FCC ID : NKR-LVSK-X1

Equipment : Wi-Fi Extender Mini

Brand Name : verizon

Model Name : LVX1

Applicant : Wistron NeWeb Corporation

20 Park Ave. II, Hsinchu Science Park, Hsinchu

308, Taiwan

Manufacturer : Wistron NeWeb Corporation

20 Park Ave. II, Hsinchu Science Park, Hsinchu

308, Taiwan

Standard: 47 CFR FCC Part 15.407

The product was received on Jul. 19, 2019, and testing was started from Jul. 27, 2019 and completed on Aug. 06, 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 Ver1.0

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Report Version : 02

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**Appendix G. Test Photos** 

Photographs of EUT v02

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: Aug. 13, 2019

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# History of this test report

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Version	Description	Issued Date
01	Initial issue of report	Aug. 13, 2019
02	Modifying the Photographs of EUT to version 2.	Aug. 13, 2019
	01	01 Initial issue of report

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## **Summary of Test Result**

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

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

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

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

- The 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: Wendy Pan

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

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#### Note:

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

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

#### 1.1.2 Antenna Information

Ant.	Port	Port Brand	t Brand	Brand	Drand	Drand	Duand	Drand	Brand	Brand	u Brand	Model Name	Antonno Tyno	Connector		Direction Gain (	(dBi)
Ant.	Port		Wiodei Name	Antenna Type	Amerina Type	Connector	2.4GHz	5GHz Band 1	5GHz Band 4								
1	1	WNC	LVX1	PCB DIPOLE	I-PEX MHF	4.51	-	5.85									
2	2	WNC	LVX1	Metal PIFA	I-PEX MHF	4.51	-	5.85									
3	1	WNC	LVX1	PCB DIPOLE	I-PEX MHF	-	5.20	-									
4	2	WNC	LVX1	PCB DIPOLE	I-PEX MHF	-	5.20	-									

Note: The above information was declared by manufacturer.

#### For 2.4GHz and 5GHz Band 4 function(2TX/2RX):

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

Port 1 and Port 2 could transmit/receive simultaneously.

#### For 5GHz Band 1 function(2TX/2RX):

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

Port 1 and Port 2 could transmit/receive simultaneously.

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### 1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	0.967	0.15	2.029m	1k
802.11ac VHT20	0.903	0.44	4.975m	300
802.11ac VHT20-BF	0.957	0.19	1.755m	1k
802.11ac VHT40	0.843	0.74	2.42m	1k
802.11ac VHT40-BF	0.95	0.22	1.847m	1k
802.11ac VHT80	0.878	0.57	3.333m	1k
802.11ac VHT80-BF	0.966	0.15	2.027m	1k

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- DC is Duty Cycle.
- 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 802.11n and VHT in 2.4GHz and 802.11n/ac in 5GHz.					
Function		Outdoor P2M	$\boxtimes$	Indoor P2M		
Tunction		Fixed P2P		Client		
TPC Function		With TPC		Without TPC		
Test Software Version	For non- beamforming 5GHz Band 1: QCA9886_EVM curve.xtt (V 5.0-00163) For non- beamforming 5GHz Band 4: AP.DK04_EVM curve.xtt (V 5.0-00163) For beamforming: Telnet					

Note: The above information was declared by manufacturer.

### 1.1.5 Table for EUT support function

Function	Support Type	Support Band
Bridge	Master	WLAN 2.4GHz/WLAN 5GHz Band 1+4
Mesh	Master + Slave	WLAN 2.4GHz/WLAN 5GHz Band 1~4

Note: 1. The above information was declared by manufacturer.

2.Only the Mesh mode was tested and recorded in this test report that is designated by the manufacturer.

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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	TH02-CB	Jeff Wu	26.5~27.8°C / 62~65%	Jul. 27, 2019~Aug.03, 2019
Radiated<1GHz and Radiated Emission Co-location	03CH04-CB	Welson Chen	26.2~28.3°C / 56~60%	Aug. 01, 2019
Radiated>1GHz	03CH01-CB	Bruce Yang	26.6~28.2°C / 60~65%	Aug. 06, 2019
AC Conduction	CO02-CB	Peter Wu	24~25°C / 59~60%	Aug. 06, 2019

Test site Designation No. TW0006 with FCC

Test site registered number IC 4086B 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
802.11a_Nss1,(6Mbps)_2TX	-
5180MHz	17
5200MHz	20
5240MHz	20.5
5745MHz	21.5
5785MHz	22.5
5825MHz	21
802.11ac VHT20_Nss1,(MCS0)_2TX	-
5180MHz	17
5200MHz	21
5240MHz	21
5745MHz	21.5
5785MHz	22.5
5825MHz	21.5
802.11ac VHT40_Nss1,(MCS0)_2TX	-
5190MHz	14
5230MHz	19.5
5755MHz	22.5
5795MHz	21.5
802.11ac VHT80_Nss1,(MCS0)_2TX	-
5210MHz	14
5775MHz	20
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-
5180MHz	18
5200MHz	21
5240MHz	21
5745MHz	23
5785MHz	23
5825MHz	23
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-
5190MHz	16
5230MHz	21
5755MHz	23
5795MHz	23
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-
5210MHz	16

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Mode	PowerSetting
5775MHz	23

#### Note:

- There are two modes of EUT for 802.11n/ac in 5GHz. One is beamforming mode, and the other is non-beamforming mode, Both modes have been tested and recorded in this test report.
- VHT 20MHz / 40MHz modulation and bandwidth are similar for 802.11n mode for 20MHz / 40MHz, therefore investigated worst case to representative mode in test 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	Normal Link	

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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			
Test Condition  Radiated measurement  If EUT consist of multiple antenna assembly (multiple antenna are used in regardless of spatial multiplexing MIMO configuration), the radiated test she be performed with highest antenna gain of each antenna type.				
Operating Mode < 1GHz	Normal Link			
1	EUT in Y axis			
Operating Mode > 1GHz	стх			
There are two modes of EUT, one is Y axis Power port is right side up , the other is Y axis Power port is right side down, and the worst case was found at Y axis Power port is right side up. So the measurement will follow this same test configuration.				
1	EUT in Y axis Power port is right side up			

The Worst Case Mode for Following Conformance Tests			
Tests Item	Tests Item Simultaneous Transmission Analysis - Radiated Emission Co-location		
Test Condition Radiated measurement			
Operating Mode	Operating Mode Normal Link		
1 WLAN 2.4GHz + WLAN 5GHz Band 4			
Refer to Appendix F for Radiated Emission Co-location.			

The Worst Case Mode for Following Conformance Tests			
Tests Item Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation			
Operating Mode			
1 WLAN 2.4GHz + WLAN 5GHz Band 1 + WLAN 5GHz Band 4			
Refer to Sporton Test Report No.: FA953010 for Co-location RF Exposure Evaluation.			

Note: The EUT can only be used Y axis.

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## 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%.

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For Normal Link:

During the test, the EUT operation to normal function.

#### 2.4 Accessories

N/A

## 2.5 Support Equipment

#### For AC Conduction:

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	Device	Verizon	LVR1	N/A	
В	Notebook	DELL	E6430	N/A	
С	Device	Calix	100-05147 01	N/A	
D	Notebook	DELL	E6430	N/A	
Е	Device	Calix	100-05147 01	N/A	
F	Notebook	DELL	E6430	N/A	

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For Radiated (below 1GHz):

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	WLAN AP	Verizon	LVR1	N/A	
В	WLAN AP	Calix	100-05147 01	N/A	
С	WLAN AP	Calix	100-05147 01	N/A	
D	Notebook	DELL	E4300	N/A	
Е	Notebook	DELL	E4300	N/A	
F	Notebook	DELL	E4300	N/A	

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# For Radiated (above 1GHz) and RF Conducted: <For Non-Beamforming Mode>

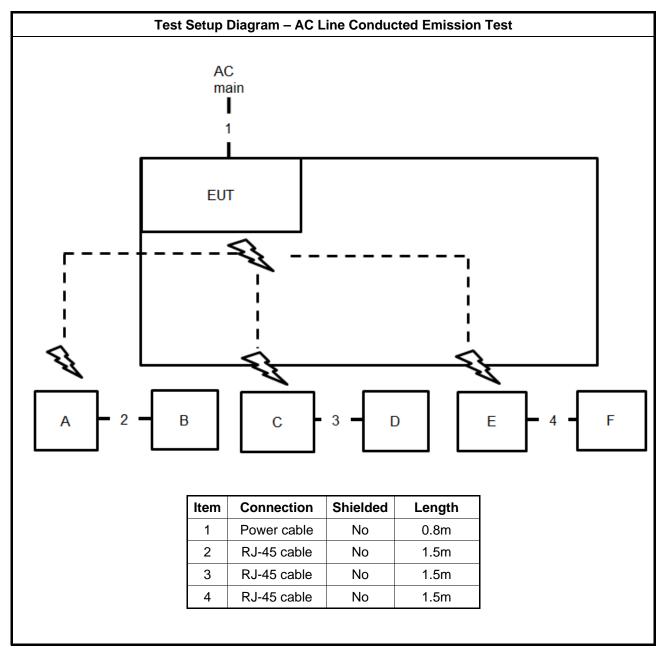
Support Equipment					
No.	No. Equipment Brand Name Model Name FCC ID				
Α	Notebook	DELL	E4300	N/A	

<For Beamforming Mode>

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	Notebook	DELL	E4300	N/A	
В	Notebook	DELL	E4300	N/A	
С	RX Device	verizon	Wi-Fi Extender LVM1	N/A	

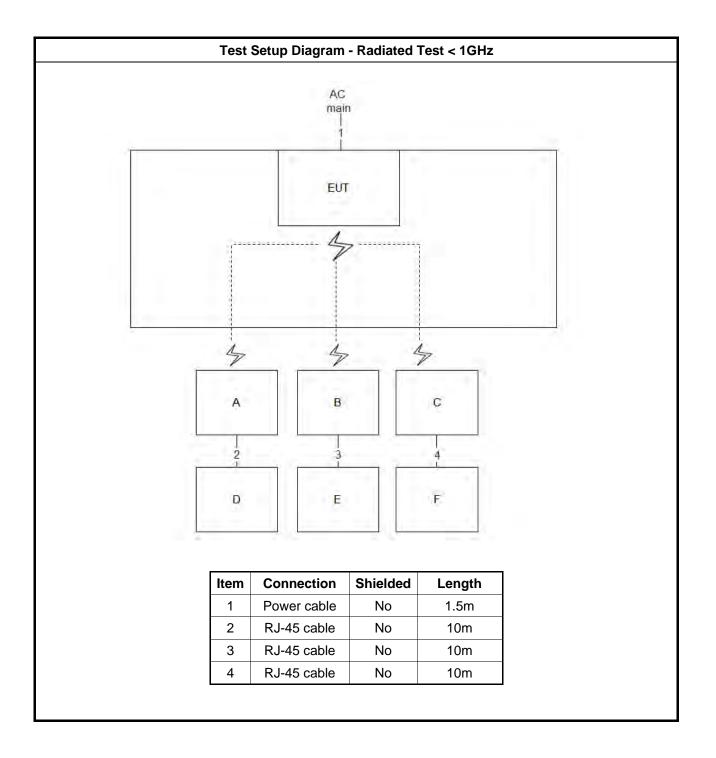
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# 2.6 Test Setup Diagram



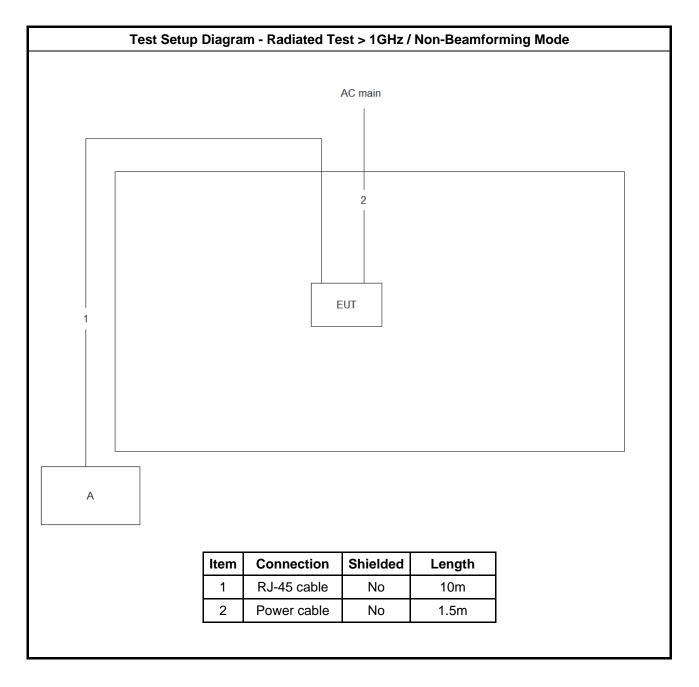
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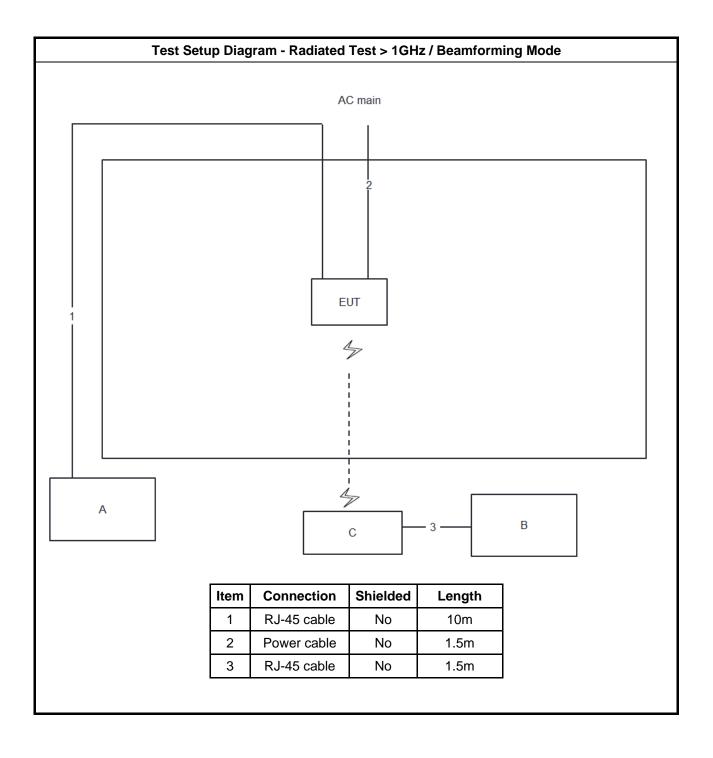
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## 3 Transmitter Test Result

## 3.1 AC Power-line Conducted Emissions

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

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

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### 3.1.2 Measuring Instruments

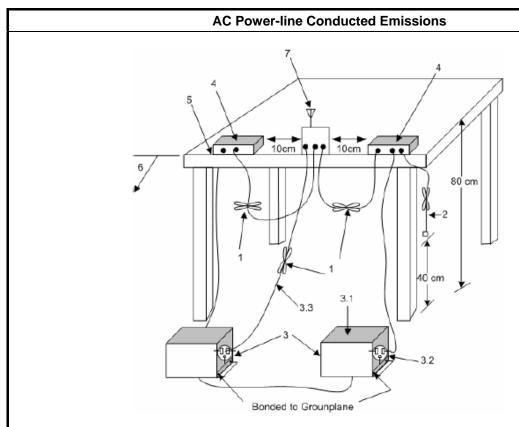
Refer a test equipment and calibration data table in this test report.

#### 3.1.3 Test Procedures

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

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### 3.1.4 Test Setup



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

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

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

Refer as Appendix A

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## 3.2 Emission Bandwidth

#### 3.2.1 Emission Bandwidth Limit

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

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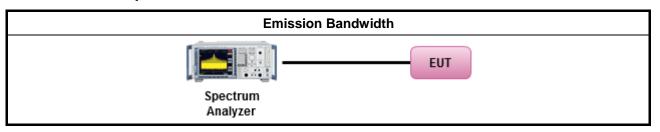
### 3.2.2 Measuring Instruments

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

#### 3.2.3 Test Procedures

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

### 3.2.4 Test Setup



#### 3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

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# 3.3 Maximum Conducted Output Power

## 3.3.1 Maximum Conducted Output Power Limit

	Maximum Conducted Output Power Limit						
UNII Devices							
$\boxtimes$	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 <sub>Out</sub> ) shall not exceed the lesser of 250 mW. If G <sub>TX</sub> > 6 dBi, then P <sub>Out</sub> = 24 - (G <sub>TX</sub> - 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).						
	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 $P_{Out} = 30 - (G_{TX} - 6)$ .						
	<ul> <li>Point-to-point systems (P2P): the maximum conducted output power (P<sub>Out</sub>) shall not exceed the lesser of 1 W.</li> </ul>						
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 <sub>Out</sub> ) shall not exceed the lesser of 1 W. If G <sub>TX</sub> > 6 dBi, then P <sub>Out</sub> = 30 – (G <sub>TX</sub> – 6).						
	<ul> <li>Point-to-point systems (P2P): the maximum conducted output power (P<sub>Out</sub>) shall not exceed the lesser of 1 W.</li> </ul>						
	e = maximum conducted output power in dBm, = the maximum transmitting antenna directional gain in dBi.						

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## 3.3.2 Measuring Instruments

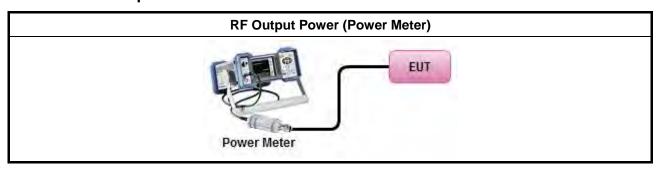
Refer a test equipment and calibration data table in this test report.

#### 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)						
	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 <sub>total</sub> = P <sub>1</sub> + P <sub>2</sub> + + P <sub>n</sub> (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP <sub>total</sub> = P <sub>total</sub> + 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:						
	<ul> <li>Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G<sub>TX</sub> &gt; 6 dBi, then P<sub>Out</sub> = 17 - (G<sub>TX</sub> - 6).</li> </ul>						
	Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 17 - (G_{TX} - 6)$ .						
	Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If $G_{TX} > 23$ dBi, then $P_{Out} = 17 - (G_{TX} - 23)$ .						
	■ 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) ≤ 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= $30 - (G_{TX} - 6)$ .						
	Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.						
LE-	LAN Devices						
	For the 5.15-5.25 GHz band, the e.i.r.p. peak power spectral density (PPSD) ≤ 10 dBm/MHz.						
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.						
	<ul> <li>e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below:</li> <li>-13 dBW/MHz for 0° ≤ θ &lt; 8°; -13 − 0.716 (θ-8) dBW/MHz for 8° ≤ θ &lt; 40°</li> <li>-35.9 − 1.22 (θ-40) dBW/MHz for 40° ≤ θ ≤ 45°; -42 dBW/MHz for θ &gt; 45°</li> </ul>						
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) $\leq$ 11 dBm/MHz.						
	For the 5.725-5.85 GHz band:						
	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) $\leq$ 30 dBm/500kHz. If $G_{TX} > 6$ dBi, then PPSD= $30 - (G_{TX} - 6)$ .						
	Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.						
pow	<b>PPSD</b> = peak power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz $G_{TX}$ = the maximum transmitting antenna directional gain in dBi.						

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## 3.4.2 Measuring Instruments

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

### 3.4.3 Test Procedures

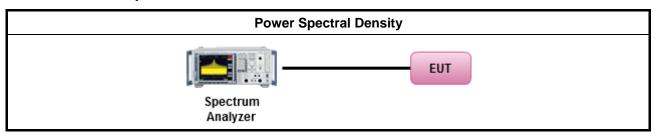
		Test Method							
•	outp func	k power spectral density procedures that the same method as used to determine the conducted ut power shall be used to determine the peak power spectral density and use the peak search tion on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral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

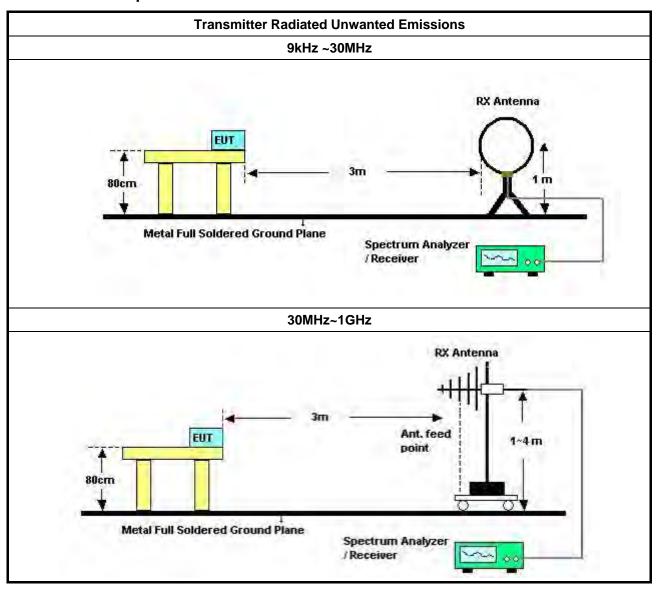
#### 3.5.3 Test Procedures

#### **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.

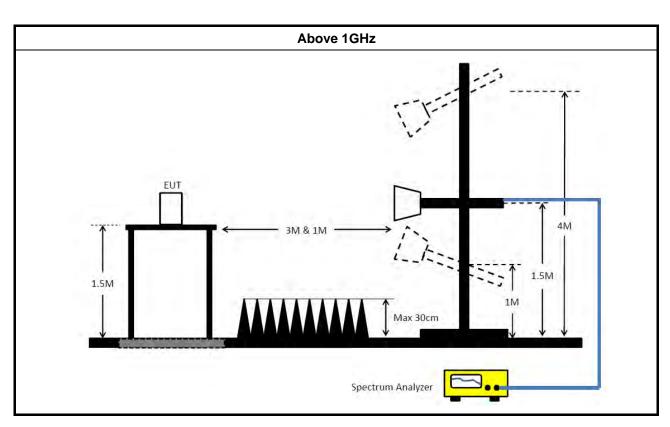
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### 3.5.4 Test Setup



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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)

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

	1	1	ı	1	i	1	i
Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 21, 2018	Nov. 20, 2019	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 05, 2018	Nov. 04, 2019	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 16, 2019	Jan. 15, 2020	Conduction (CO02-CB)
COND Cable	Woken	Cable	2	0.15MHz ~ 30MHz	Nov. 06, 2018	Nov. 05, 2019	Conduction (CO02-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO02-CB)
BILOG ANTENNA with 6 dB attenuator	Schaffner & Woken	CBL6112B & N-6-06	22021&AT-N06 07	30MHz ~ 1GHz	Oct. 12, 2018	Oct. 11, 2019	Radiation (03CH04-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 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)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 13, 2018	Nov. 12, 2019	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jun. 27, 2019	Jun. 26, 2020	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 08, 2019	Jan. 07, 2020	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Jan. 31, 2019	Jan. 30, 2020	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16	1 GHz ~ 18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16+17	1 GHz ~ 18 GHz	Oct. 08, 2018	Oct. 07, 2019	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Feb. 25, 2019	Feb. 24, 2020	Conducted (TH02-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-01	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-02	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-3	1 GHz – 26.5 GHz	Oct. 24, 2018	Oct. 23, 2019	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-04	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-05	1 GHz – 26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH02-CB)
Power Sensor	Anritsu	MA2411B	1126203	300MHz~40GHz	Sep. 03, 2018	Sep. 02, 2019	Conducted (TH02-CB)
Power Meter	Anritsu	ML2495A	1210004	300MHz~40GHz	Sep. 03, 2018	Sep. 02, 2019	Conducted (TH02-CB)

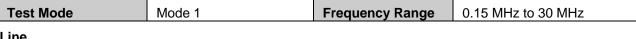
Note: Calibration Interval of instruments listed above is one year.

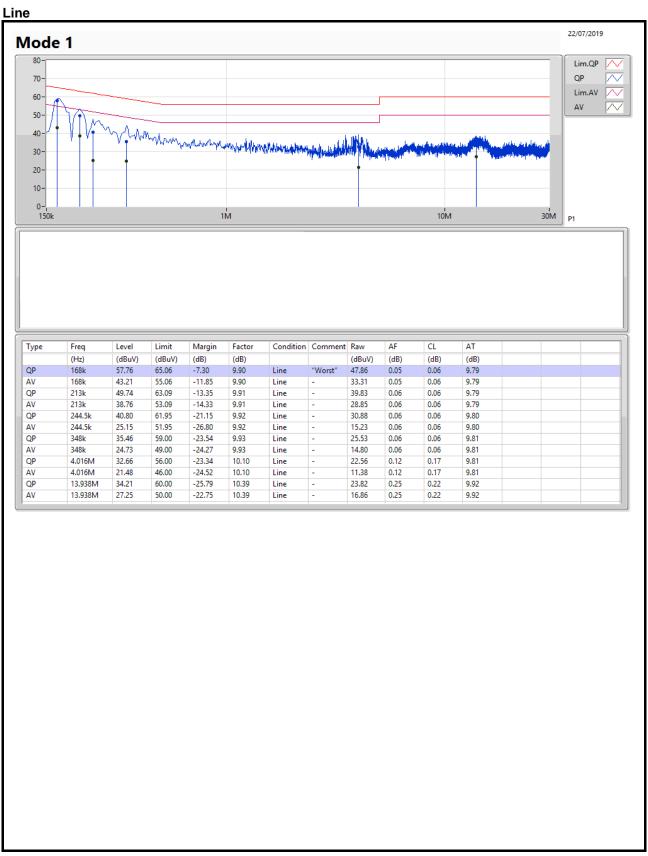
N.C.R. means Non-Calibration required.

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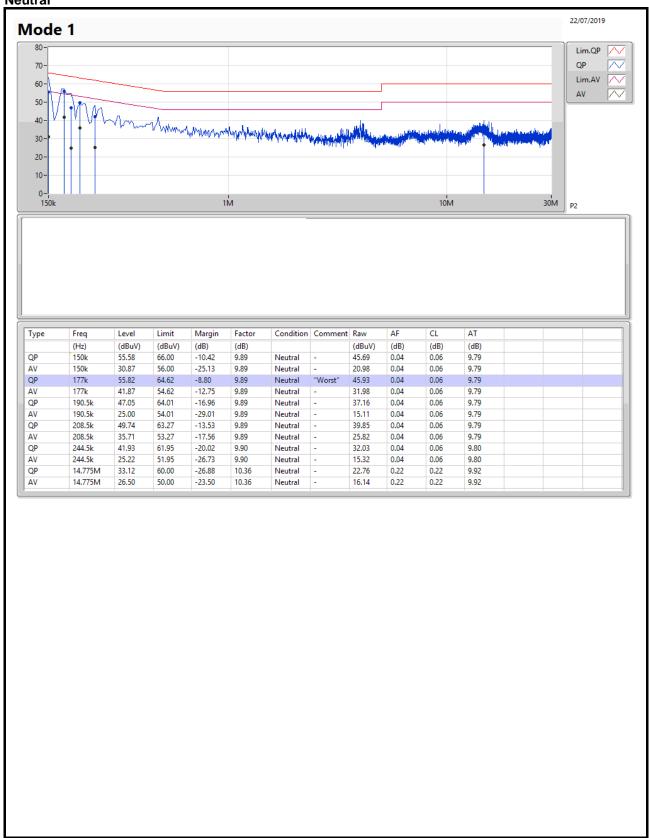
#### **AC Power Port Conducted Emission Result**













**EBW** Appendix B

Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW	
	(Hz)	(Hz)		(Hz)	(Hz)	
5.15-5.25GHz	-	-	-	-	-	
802.11a_Nss1,(6Mbps)_2TX	41.275M	20.09M	20M1D1D	20.25M	16.442M	
802.11ac VHT20_Nss1,(MCS0)_2TX	43.5M	20.79M	20M8D1D	20.95M	17.641M	
802.11ac VHT40_Nss1,(MCS0)_2TX	81.9M	36.582M	36M6D1D	39.85M	36.032M	
802.11ac VHT80_Nss1,(MCS0)_2TX	87M	75.662M	75M7D1D	83.1M	75.562M	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	25.825M	17.741M	17M7D1D	20.825M	17.591M	
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	70.95M	36.132M	36M1D1D	38.95M	35.982M	
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	83.3M	75.862M	75M9D1D	81.8M	75.362M	
5.725-5.85GHz	-	-	-	-	=	
802.11a_Nss1,(6Mbps)_2TX	16.325M	20.19M	20M2D1D	16.275M	16.542M	
802.11ac VHT20_Nss1,(MCS0)_2TX	17.575M	21.314M	21M3D1D	17.525M	17.716M	
802.11ac VHT40_Nss1,(MCS0)_2TX	35.55M	52.374M	52M4D1D	33.75M	36.682M	
802.11ac VHT80_Nss1,(MCS0)_2TX	75.5M	75.962M	76M0D1D	75M	75.962M	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	17.575M	17.741M	17M7D1D	17.25M	17.666M	
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	35.05M	36.082M	36M1D1D	31.35M	36.032M	
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	73.8M	75.962M	76M0D1D	73.3M	75.762M	

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

Max-OBW = Maximum 99% occupied bandwidth;

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

Min-OBW = Minimum 99% occupied bandwidth;

EBW Appendix B

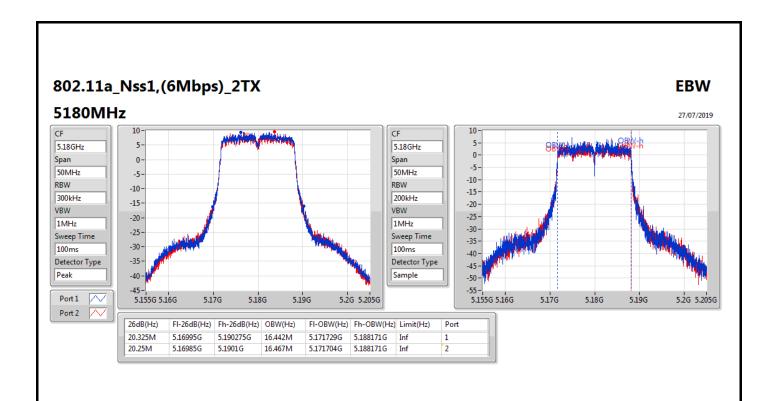
#### Result

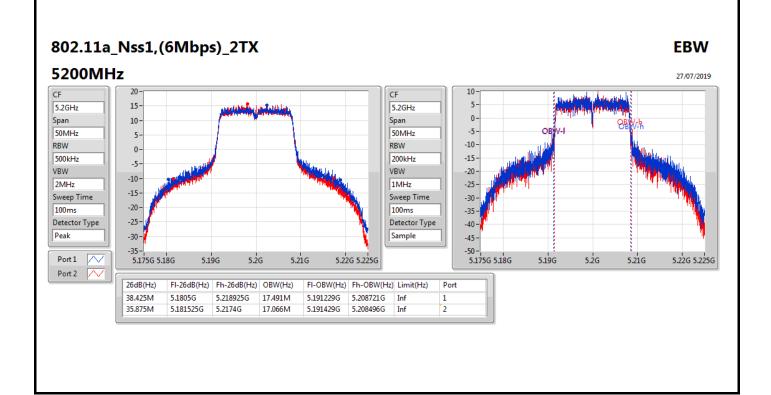
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	20.325M	16.442M	20.25M	16.467M
5200MHz	Pass	Inf	38.425M	17.491M	35.875M	17.066M
5240MHz	Pass	Inf	41.275M	19.565M	39.25M	20.09M
5745MHz	Pass	500k	16.275M	16.542M	16.325M	16.767M
5785MHz	Pass	500k	16.3M	17.916M	16.325M	20.19M
5825MHz	Pass	500k	16.325M	16.692M	16.325M	16.667M
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	20.95M	17.641M	21M	17.641M
5200MHz	Pass	Inf	43.5M	20.79M	40.1M	18.716M
5240MHz	Pass	Inf	43.225M	20.29M	42.05M	20.04M
5745MHz	Pass	500k	17.575M	17.716M	17.55M	17.966M
5785MHz	Pass	500k	17.55M	18.966M	17.575M	21.314M
5825MHz	Pass	500k	17.525M	18.091M	17.55M	18.016M
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	Inf	40.3M	36.032M	39.85M	36.082M
5230MHz	Pass	Inf	81.9M	36.582M	81.15M	36.532M
5755MHz	Pass	500k	35.55M	38.381M	33.75M	52.374M
5795MHz	Pass	500k	35.35M	36.682M	35.25M	36.932M
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	Inf	83.1M	75.562M	87M	75.662M
5775MHz	Pass	500k	75.5M	75.962M	75M	75.962M
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5180MHz	Pass	Inf	20.825M	17.591M	20.975M	17.641M
5200MHz	Pass	Inf	23.575M	17.641M	25M	17.691M
5240MHz	Pass	Inf	22.05M	17.691M	25.825M	17.741M
5745MHz	Pass	500k	17.575M	17.666M	17.55M	17.741M
5785MHz	Pass	500k	17.275M	17.691M	17.575M	17.666M
5825MHz	Pass	500k	17.25M	17.716M	17.4M	17.716M
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5190MHz	Pass	Inf	39.65M	36.032M	38.95M	36.132M
5230MHz	Pass	Inf	69.8M	35.982M	70.95M	36.082M
5755MHz	Pass	500k	31.35M	36.032M	32.55M	36.032M
5795MHz	Pass	500k	35.05M	36.082M	33.8M	36.032M
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5210MHz	Pass	Inf	81.8M	75.362M	83.3M	75.862M
5775MHz	Pass	500k	73.8M	75.962M	73.3M	75.762M

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;

SPORTON LAB

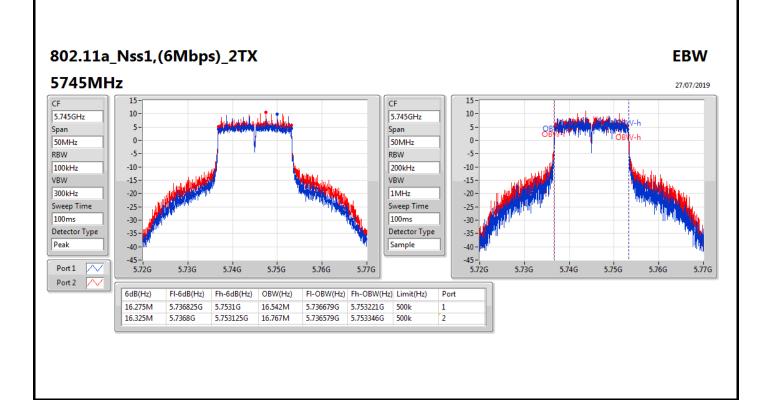
EBW Appendix B



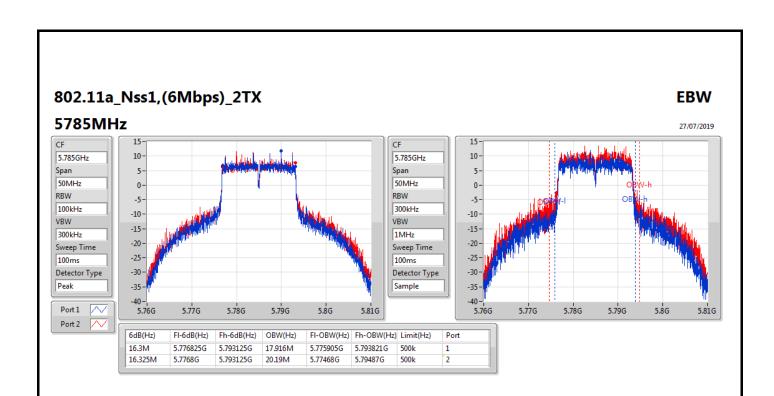


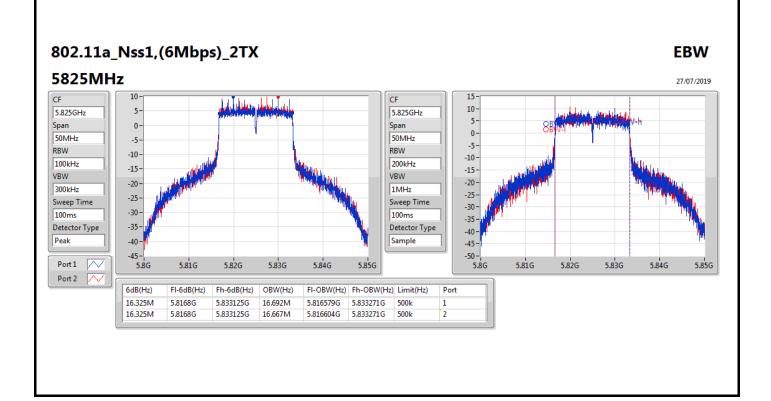
Appendix B



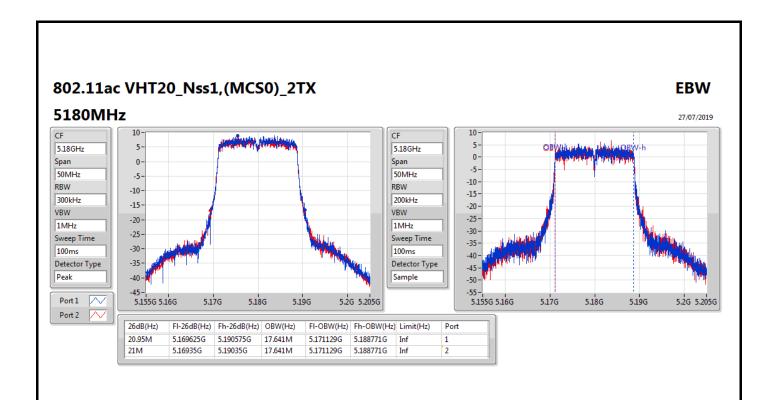


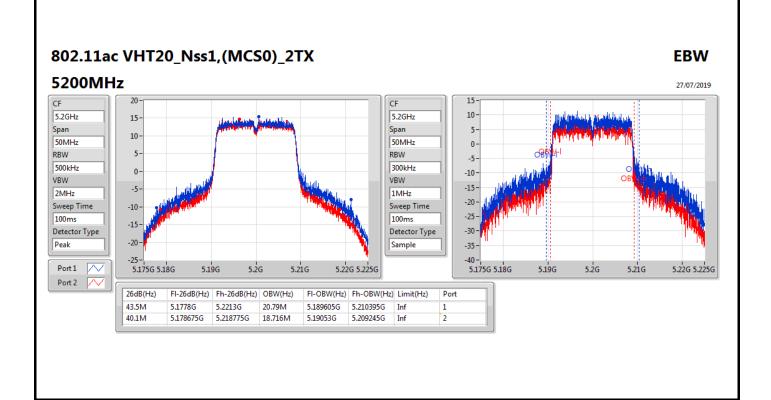
BW Appendix B



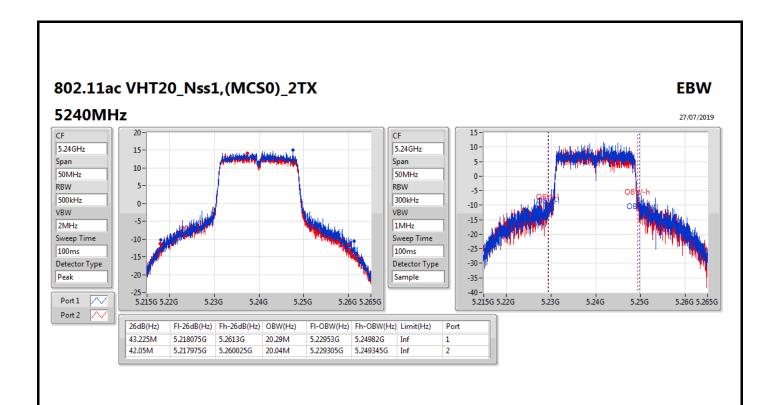


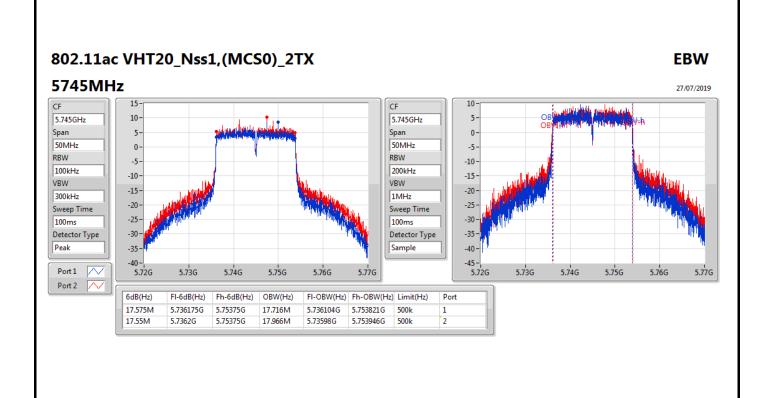
**EBW** Appendix B



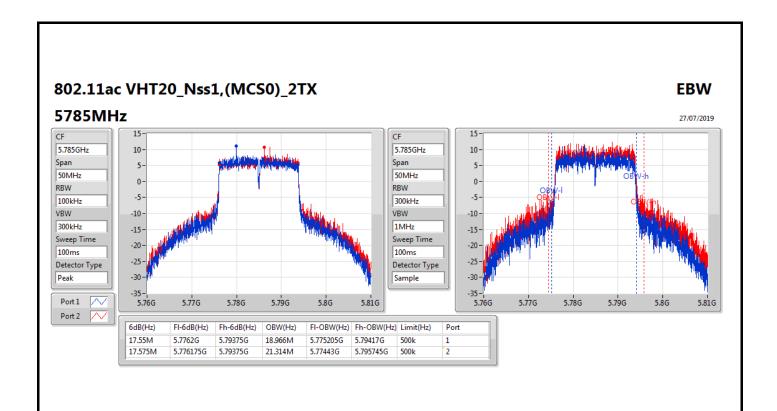


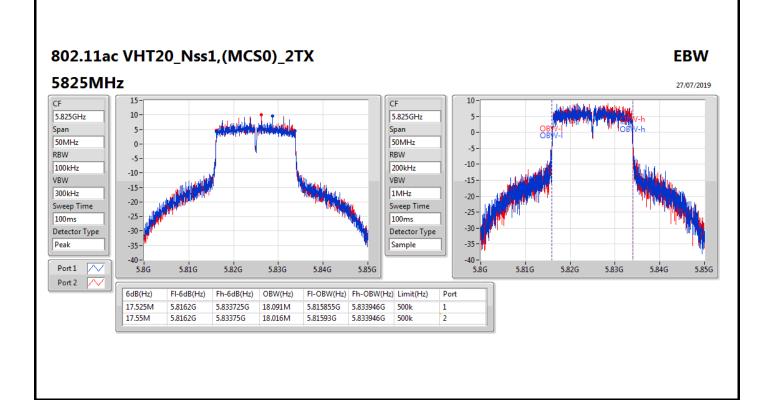
EBW Appendix B



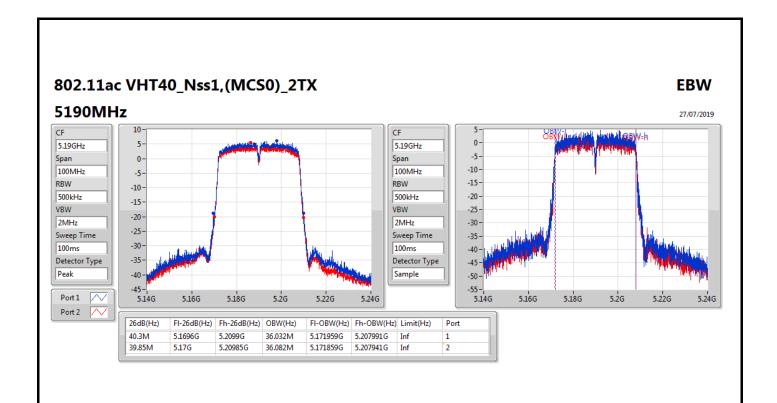


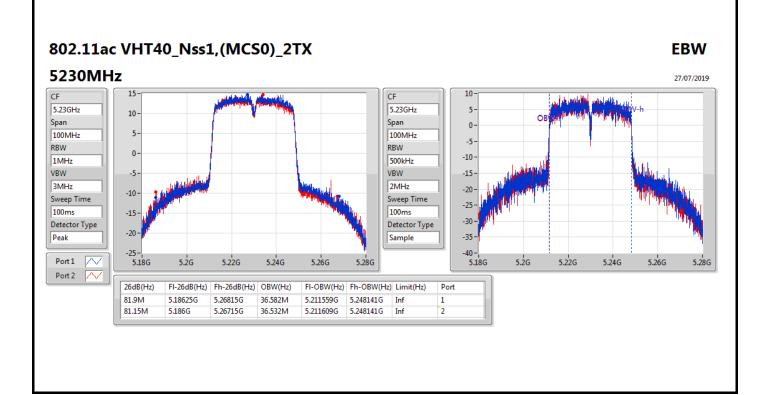






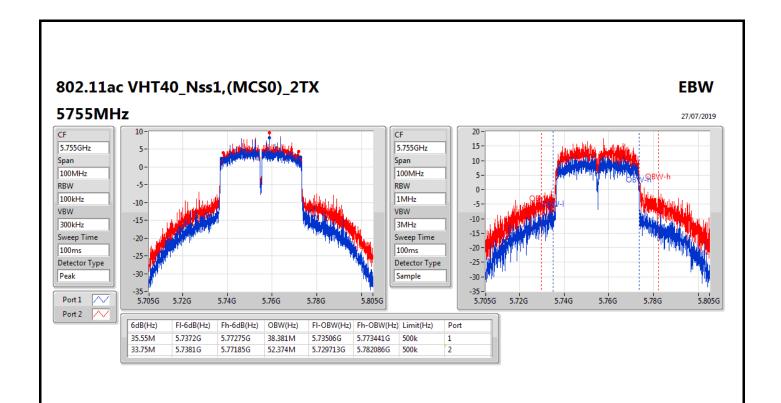
**EBW** Appendix B

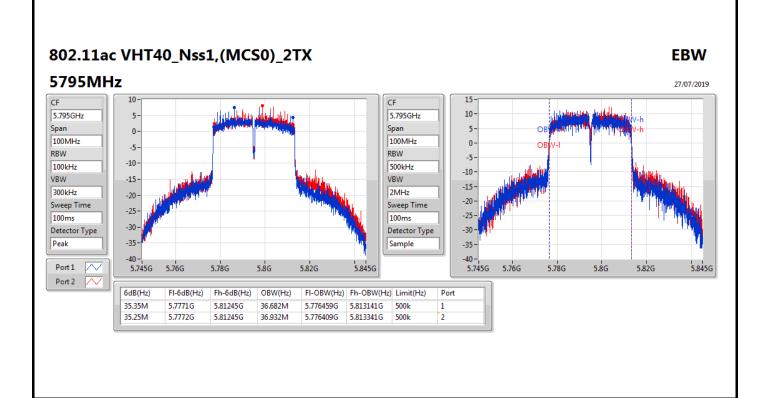




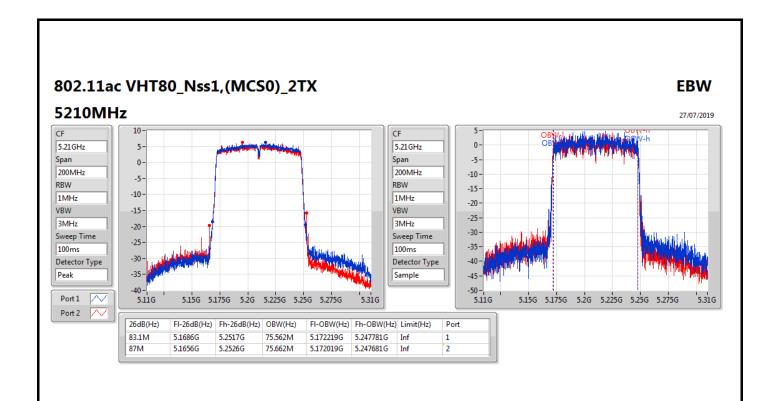


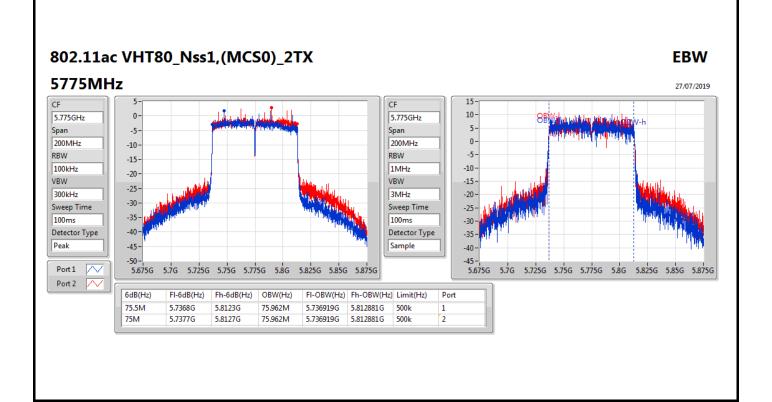




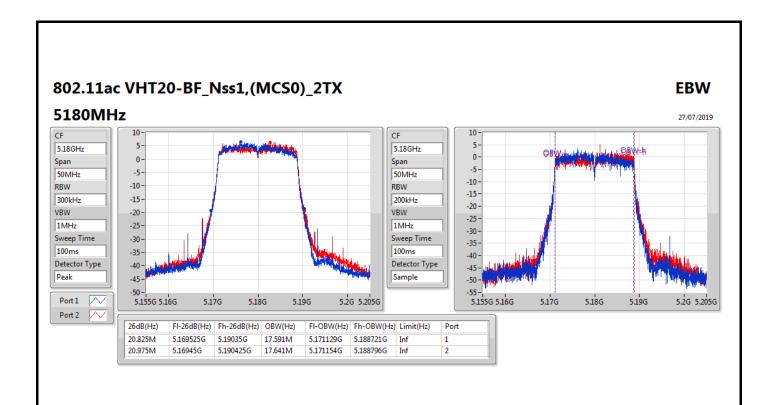


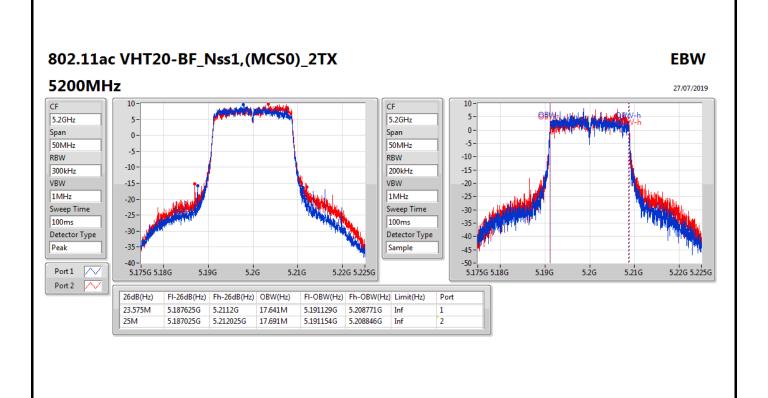
EBW Appendix B





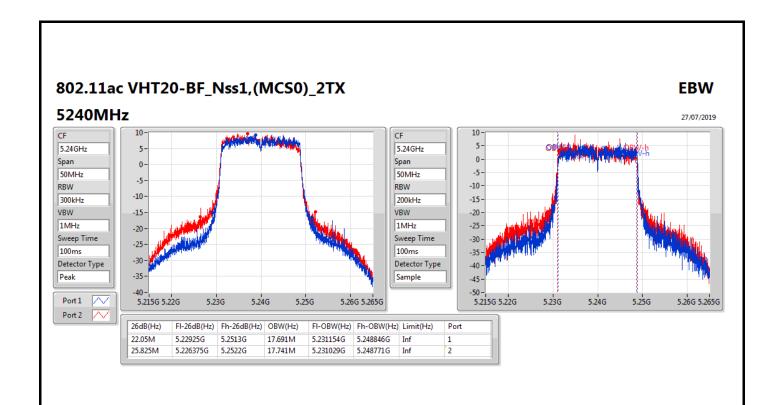
Appendix B

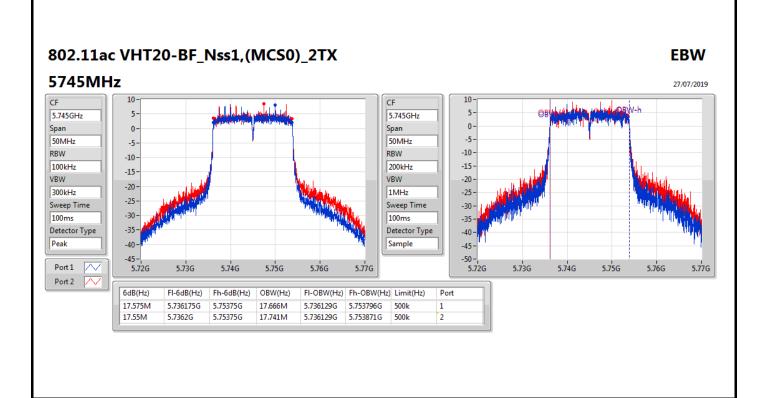




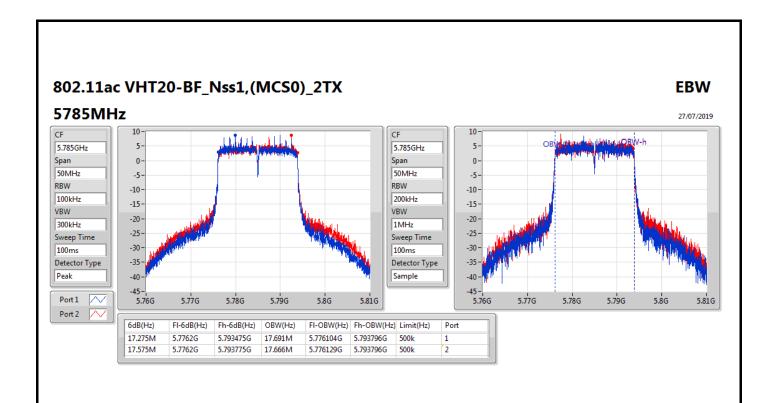
Appendix B

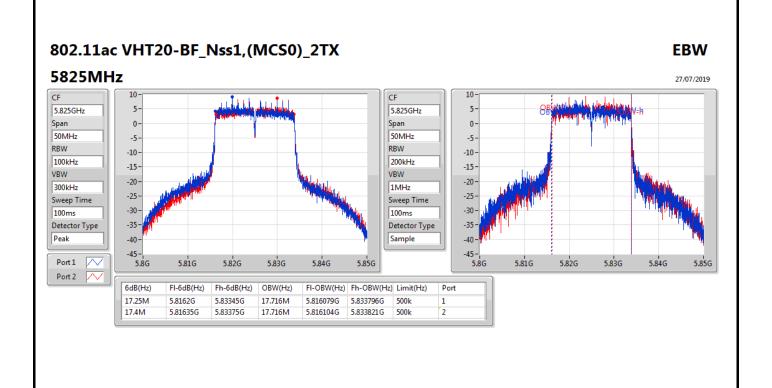




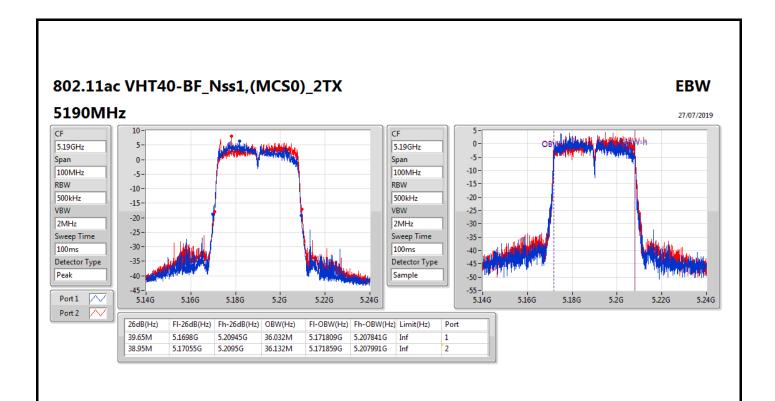


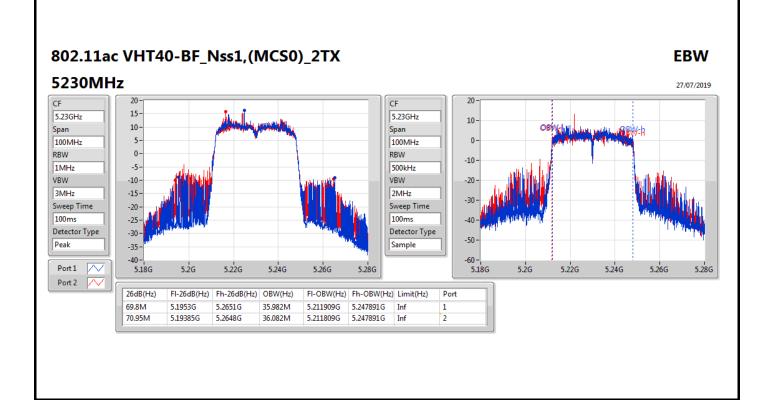
BW Appendix B



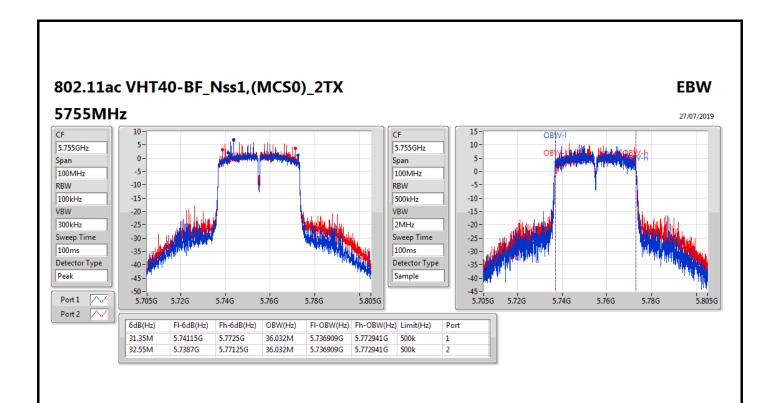


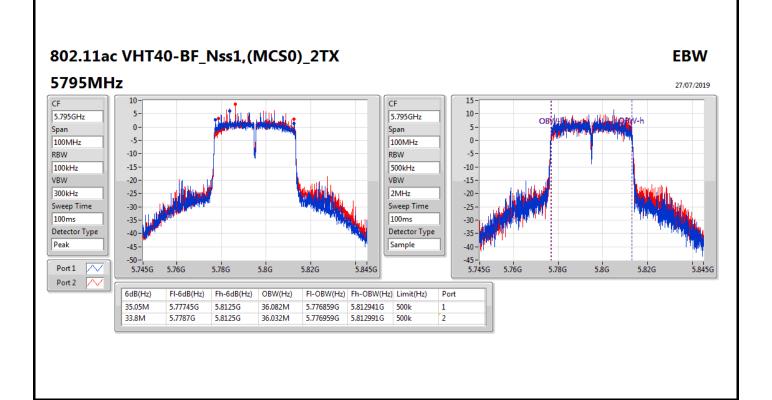
EBW Appendix B



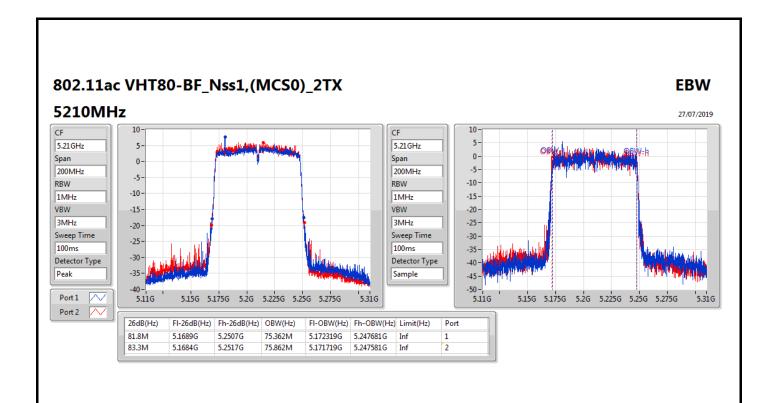


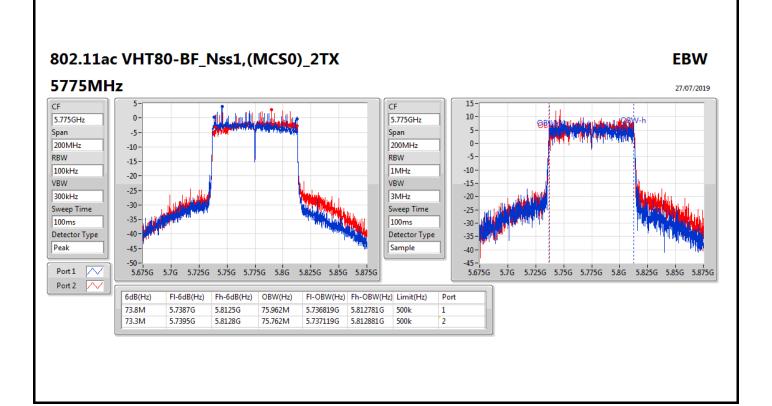
EBW Appendix B





Appendix B







Average Power Appendix C

**Summary** 

Mode	Total Power	Total Power
	(dBm)	(W)
5.15-5.25GHz	-	-
802.11a_Nss1,(6Mbps)_2TX	24.03	0.25293
802.11ac VHT20_Nss1,(MCS0)_2TX	24.38	0.27416
802.11ac VHT40_Nss1,(MCS0)_2TX	23.24	0.21086
802.11ac VHT80_Nss1,(MCS0)_2TX	18.36	0.06855
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	21.88	0.15417
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	19.83	0.09616
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	17.14	0.05176
5.725-5.85GHz	-	-
802.11a_Nss1,(6Mbps)_2TX	25.96	0.39446
802.11ac VHT20_Nss1,(MCS0)_2TX	25.97	0.39537
802.11ac VHT40_Nss1,(MCS0)_2TX	26.42	0.43853
802.11ac VHT80_Nss1,(MCS0)_2TX	23.52	0.22491
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	23.50	0.22387
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	23.18	0.20797
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	22.76	0.18880

Average Power Appendix C

## Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit	
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5180MHz	Pass	5.20	18.30	17.81	21.07	30.00	
5200MHz	Pass	5.20	21.24	20.79	24.03	30.00	
5240MHz	Pass	5.20	21.07	20.49	23.80	30.00	
5745MHz	Pass	5.85	21.25	21.95	24.62	30.00	
5785MHz	Pass	5.85	22.89	23.01	25.96	30.00	
5825MHz	Pass	5.85	21.40	21.65	24.54	30.00	
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	5.20	18.05	17.52	20.80	30.00	
5200MHz	Pass	5.20	21.67	21.04	24.38	30.00	
5240MHz	Pass	5.20	21.19	20.57	23.90	30.00	
5745MHz	Pass	5.85	21.23	21.90	24.59	30.00	
5785MHz	Pass	5.85	22.92	23.00	25.97	30.00	
5825MHz	Pass	5.85	21.99	22.14	25.08	30.00	
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	5.20	15.70	14.60	18.20	30.00	
5230MHz	Pass	5.20	20.45	19.99	23.24	30.00	
5755MHz	Pass	5.85	22.99	23.79	26.42	30.00	
5795MHz	Pass	5.85	22.38	22.83	25.62	30.00	
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	5.20	15.64	15.04	18.36	30.00	
5775MHz	Pass	5.85	20.25	20.76	23.52	30.00	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	5.20	15.47	15.30	18.40	30.00	
5200MHz	Pass	5.20	18.85	18.88	21.88	30.00	
5240MHz	Pass	5.20	18.49	18.64	21.58	30.00	
5745MHz	Pass	5.85	19.74	20.21	22.99	30.00	
5785MHz	Pass	5.85	20.41	20.57	23.50	30.00	
5825MHz	Pass	5.85	20.28	20.37	23.34	30.00	
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	5.20	13.79	14.30	17.06	30.00	
5230MHz	Pass	5.20	16.87	16.76	19.83	30.00	
5755MHz	Pass	5.85	19.48	19.92	22.72	30.00	
5795MHz	Pass	5.85	20.09	20.25	23.18	30.00	
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	5.20	13.82	14.42	17.14	30.00	
5775MHz	Pass	5.85	19.53	19.96	22.76	30.00	

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



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Summary

Mode	PD
	(dBm/RBW)
5.15-5.25GHz	-
802.11a_Nss1,(6Mbps)_2TX	10.39
802.11ac VHT20_Nss1,(MCS0)_2TX	10.46
802.11ac VHT40_Nss1,(MCS0)_2TX	6.70
802.11ac VHT80_Nss1,(MCS0)_2TX	-1.33
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	7.92
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	3.50
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-2.83
5.725-5.85GHz	-
802.11a_Nss1,(6Mbps)_2TX	10.83
802.11ac VHT20_Nss1,(MCS0)_2TX	10.45
802.11ac VHT40_Nss1,(MCS0)_2TX	8.16
802.11ac VHT80_Nss1,(MCS0)_2TX	2.05
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	80.8
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	5.12
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	1.28

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



Appendix D **PSD** 

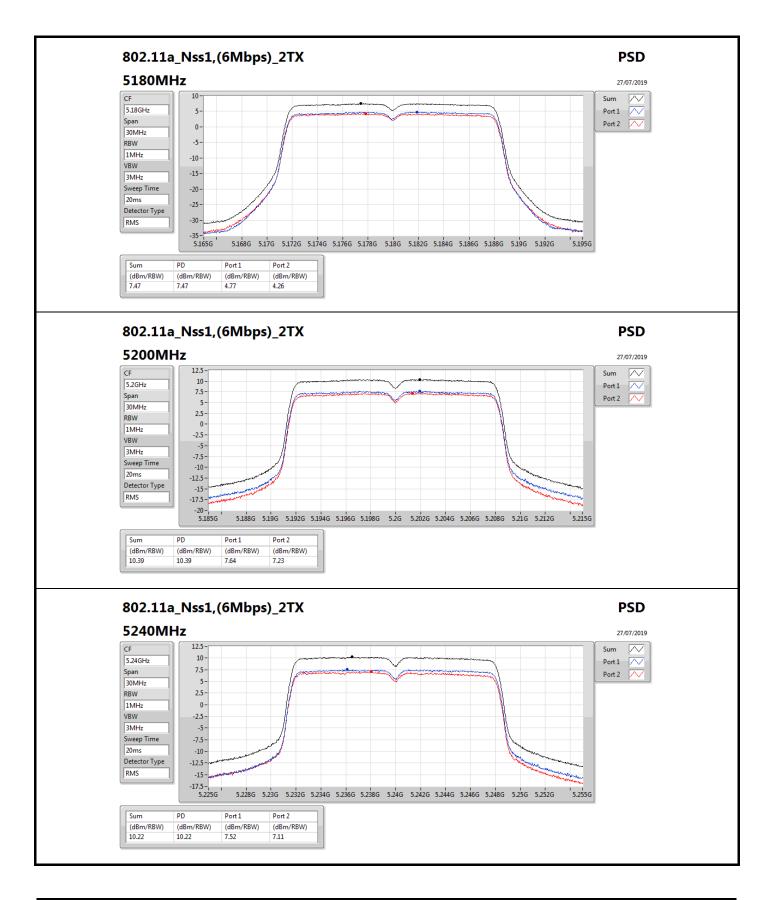
#### Result

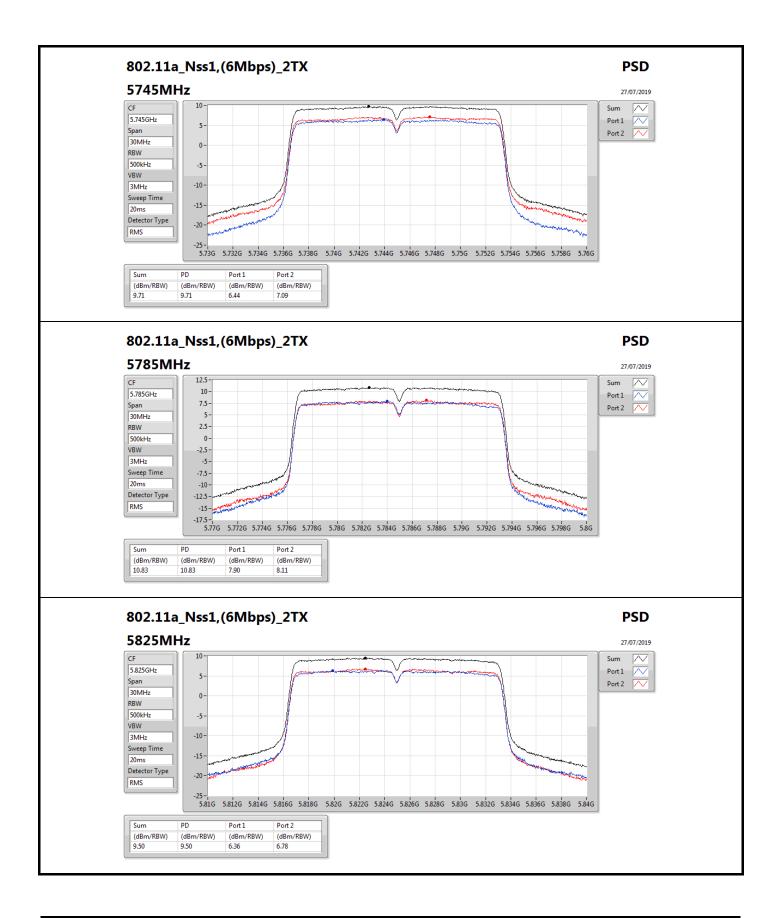
Mode	Result	DG	Port 1	Port 2	PD	PD Limit	
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
5180MHz	Pass	5.20	4.77	4.26	7.47	17.00	
5200MHz	Pass	5.20	7.64	7.23	10.39	17.00	
5240MHz	Pass	5.20	7.52	7.11	10.22	17.00	
5745MHz	Pass	5.85	6.44	7.09	9.71	30.00	
5785MHz	Pass	5.85	7.90	8.11	10.83	30.00	
5825MHz	Pass	5.85	6.36	6.78	9.50	30.00	
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	5.20	4.24	3.73	6.92	17.00	
5200MHz	Pass	5.20	7.76	7.25	10.46	17.00	
5240MHz	Pass	5.20	7.45	6.79	10.06	17.00	
5745MHz	Pass	5.85	6.14	6.68	9.20	30.00	
5785MHz	Pass	5.85	7.62	7.54	10.45	30.00	
5825MHz	Pass	5.85	6.62	6.64	9.56	30.00	
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	5.20	-0.79	-2.02	1.57	17.00	
5230MHz	Pass	5.20	3.93	3.51	6.70	17.00	
5755MHz	Pass	5.85	4.97	5.62	8.16	30.00	
5795MHz	Pass	5.85	4.53	4.72	7.34	30.00	
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	5.20	-4.04	-4.53	-1.33	17.00	
5775MHz	Pass	5.85	-1.05	-0.69	2.05	30.00	
802.11ac VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5180MHz	Pass	5.20	2.06	1.63	4.50	17.00	
5200MHz	Pass	5.20	5.02	5.60	7.92	17.00	
5240MHz	Pass	5.20	4.88	5.18	7.75	17.00	
5745MHz	Pass	5.85	4.71	5.11	7.84	30.00	
5785MHz	Pass	5.85	5.17	5.27	8.08	30.00	
5825MHz	Pass	5.85	5.45	5.32	7.98	30.00	
802.11ac VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5190MHz	Pass	5.20	-1.96	-2.00	0.32	17.00	
5230MHz	Pass	5.20	1.01	0.70	3.50	17.00	
5755MHz	Pass	5.85	1.50	1.99	4.67	30.00	
5795MHz	Pass	5.85	2.08	2.33	5.12	30.00	
802.11ac VHT80-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	
5210MHz	Pass	5.20	-6.06	-5.60	-2.83	17.00	
5775MHz	Pass	5.85	-1.36	-1.38	1.28	30.00	

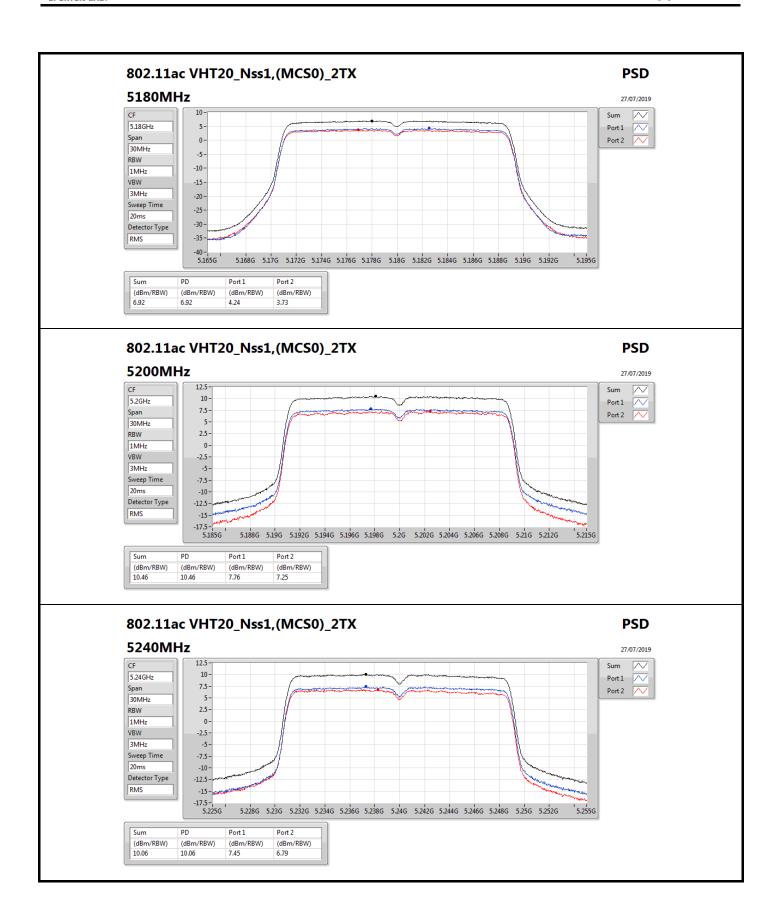
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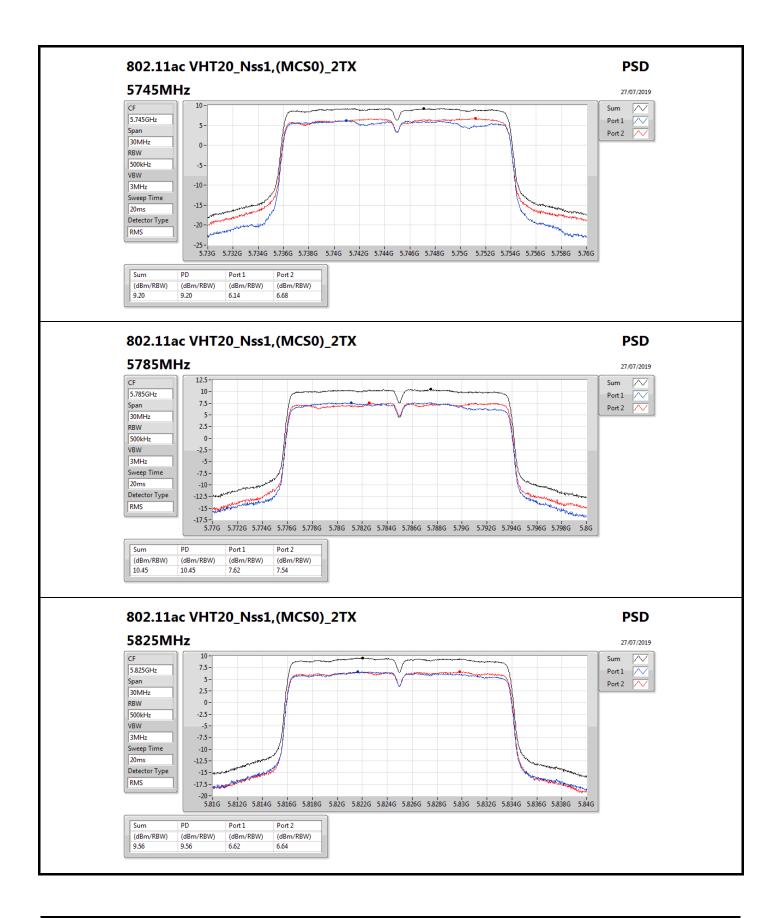
: 2 of 12

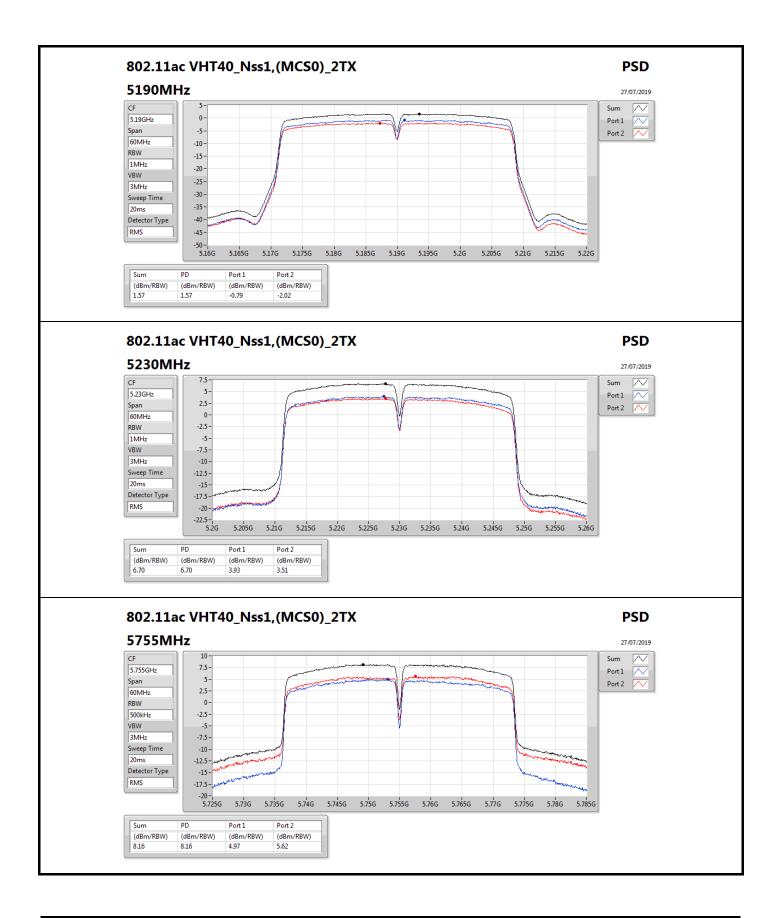
**DG** = Directional Gain; **RBW** = 500 kHz for 5.725-5.85GHz band / 1MHz for other band; **PD** = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

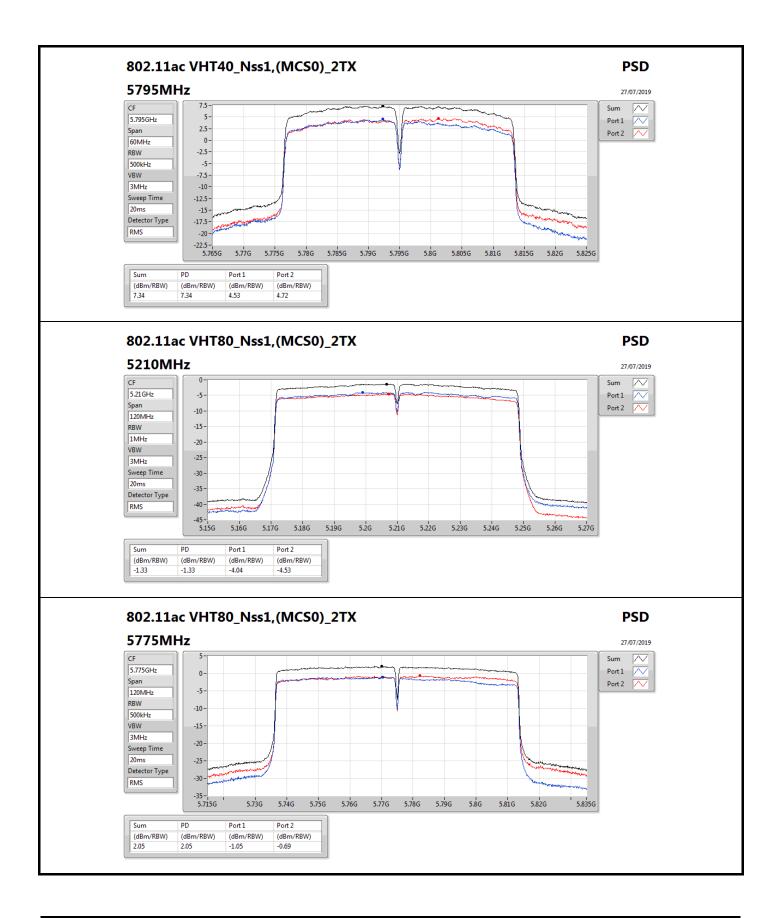


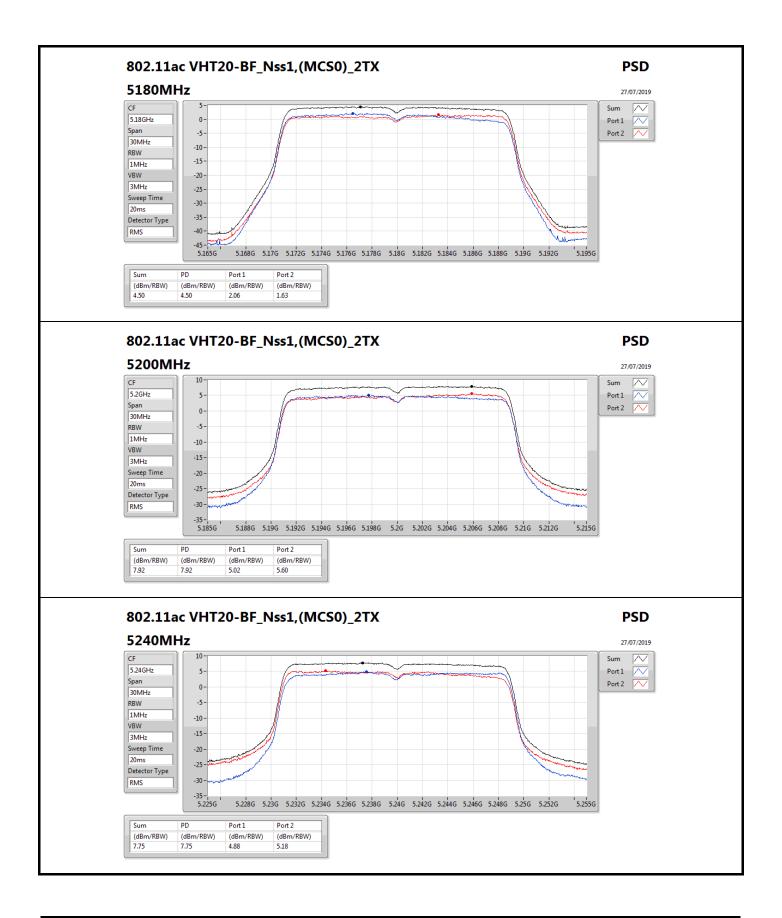


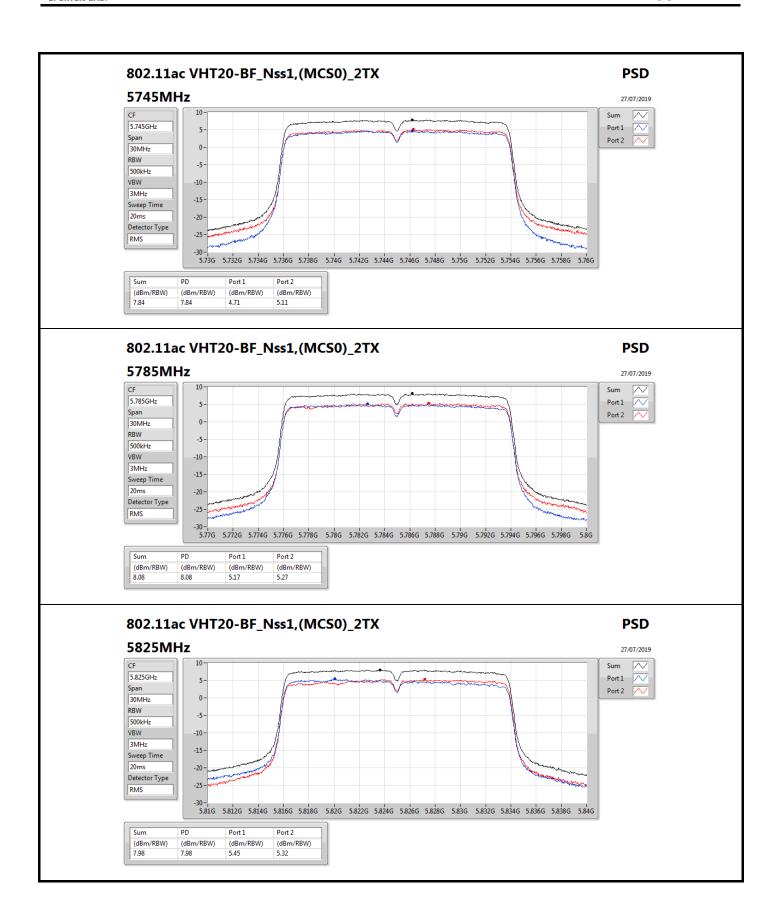


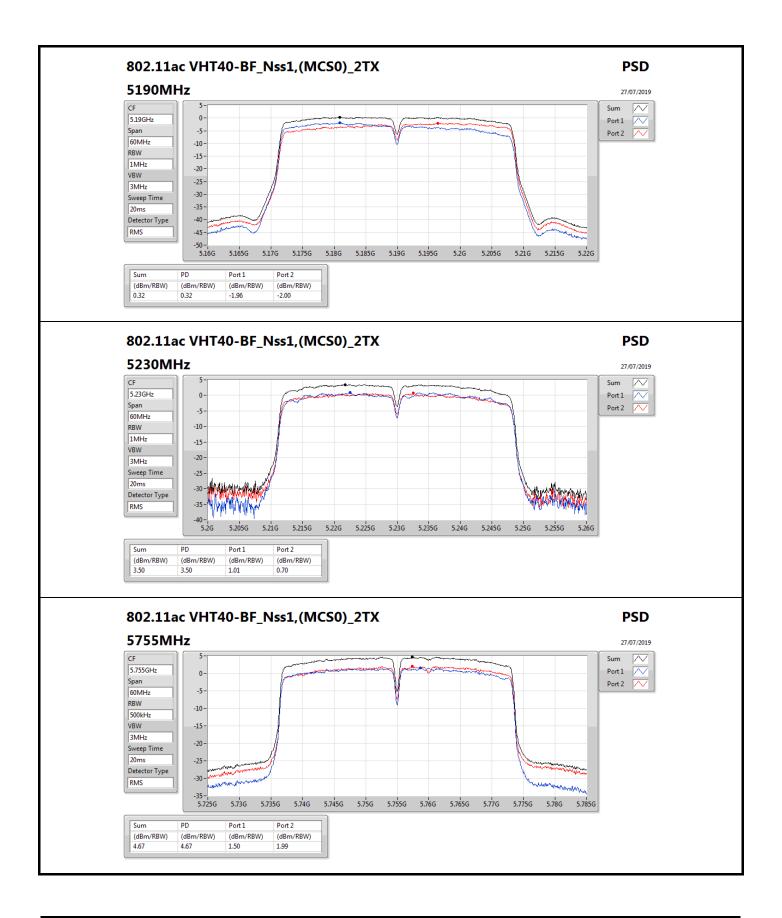


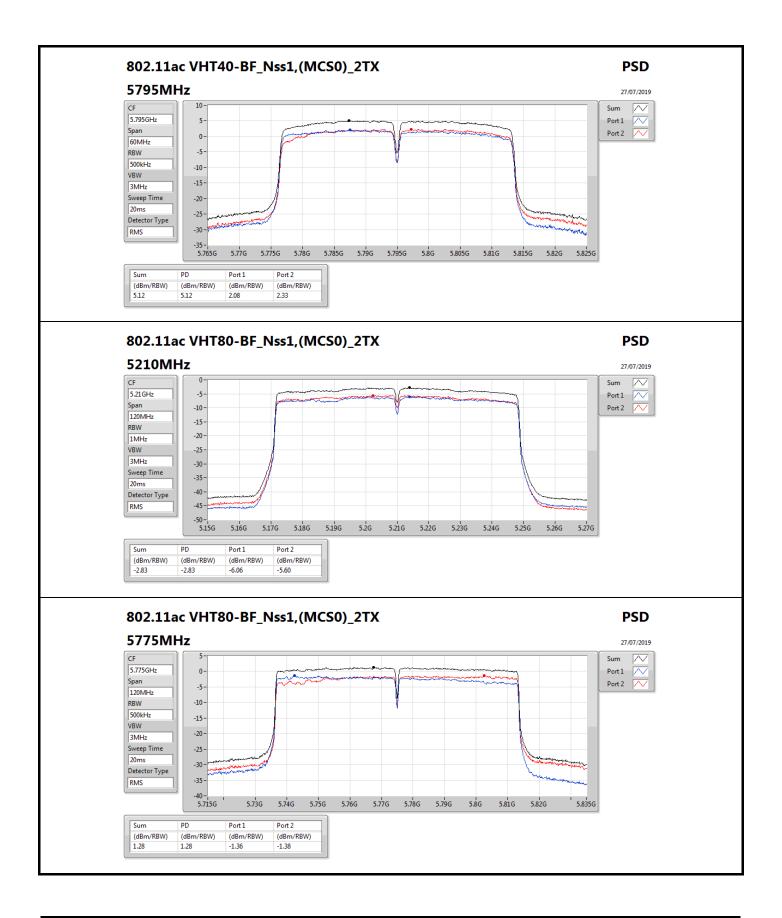










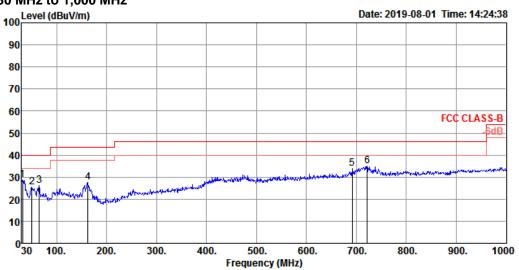




## Radiated Emission below 1GHz Result

Test Mode 1 Frequency Range 30 MHz to 1,000 MHz

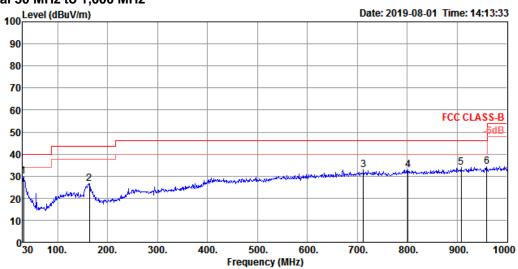
## Vertical 30 MHz to 1,000 MHz



	Freq	Level		Over Limit					-	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	31.94	28.64	40.00	-11.36	37.39	0.52	22.93	32.20	100	201	Peak	VERTICAL
2	50.37	25.49	40.00	-14.51	43.44	0.73	13.50	32.18	125	351	Peak	VERTICAL
3	64.92	26.16	40.00	-13.84	45.45	0.83	12.03	32.15	100	178	Peak	VERTICAL
4	162.89	27.65	43.50	-15.85	42.49	1.31	15.95	32.10	100	46	Peak	VERTICAL
5	691.54	33.82	46.00	-12.18	37.73	2.83	25.18	31.92	100	166	Peak	VERTICAL
6	721.61	34.88	46.00	-11.12	38.52	2.88	25.46	31.98	100	107	Peak	VERTICAL



#### Horizontal 30 MHz to 1,000 MHz



	Freq	Level		Limit					A/Pos	1/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	31.94	30.05	40.00	-9.95	38.80	0.52	22.93	32.20	200	317	Peak	HORIZONTAL
2	163.86	26.49	43.50	-17.01	41.36	1.31	15.91	32.09	150	168	Peak	HORIZONTAL
3	711.91	32.73	46.00	-13.27	36.49	2.87	25.31	31.94	200	360	Peak	HORIZONTAL
4	801.15	33.00	46.00	-13.00	35.34	3.08	26.23	31.65	100	4	Peak	HORIZONTAL
5	907.85	34.01	46.00	-11.99	35.34	3.12	26.71	31.16	200	85	Peak	HORIZONTAL
6	959.26	34.23	46.00	-11.77	34.92	3.28	26.70	30.67	200	5	Peak	HORIZONTAL



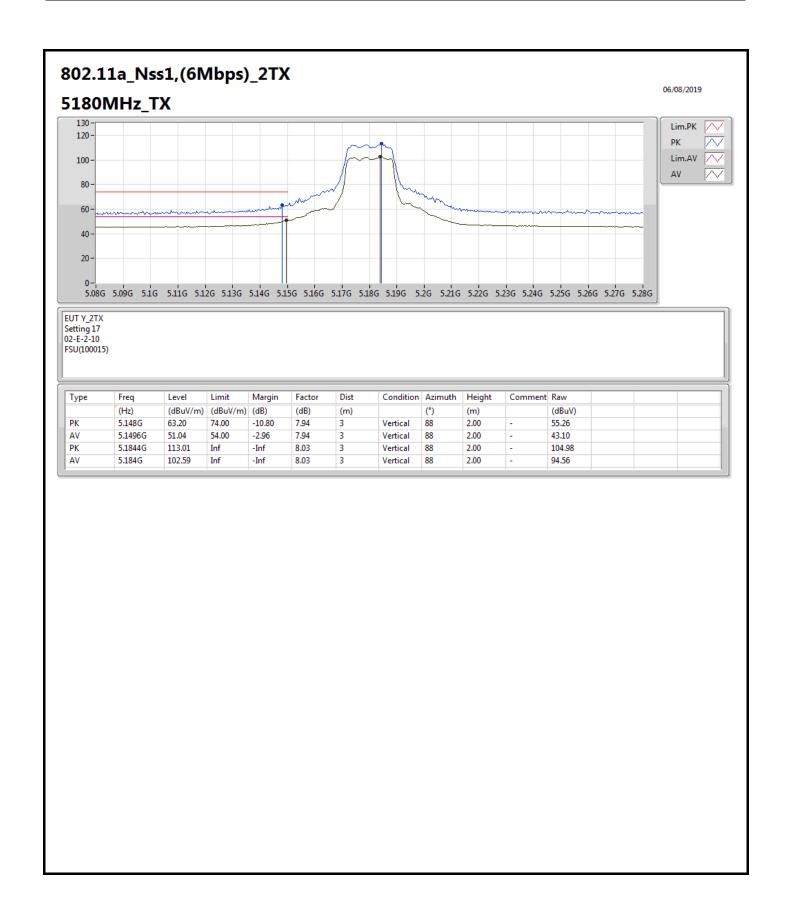
# RSE TX above 1GHz

Appendix E.2

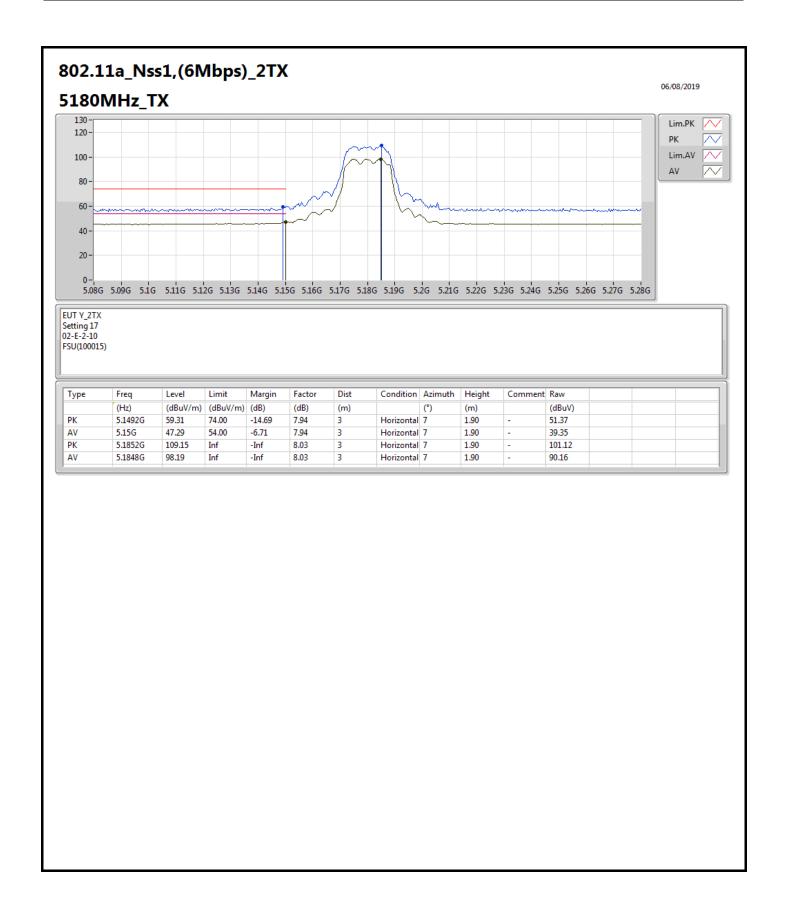
**Summary** 

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
5.725-5.85GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	Pass	PK	17.4681G	68.18	68.20	-0.02	22.09	3	Horizontal	209	1.87	-

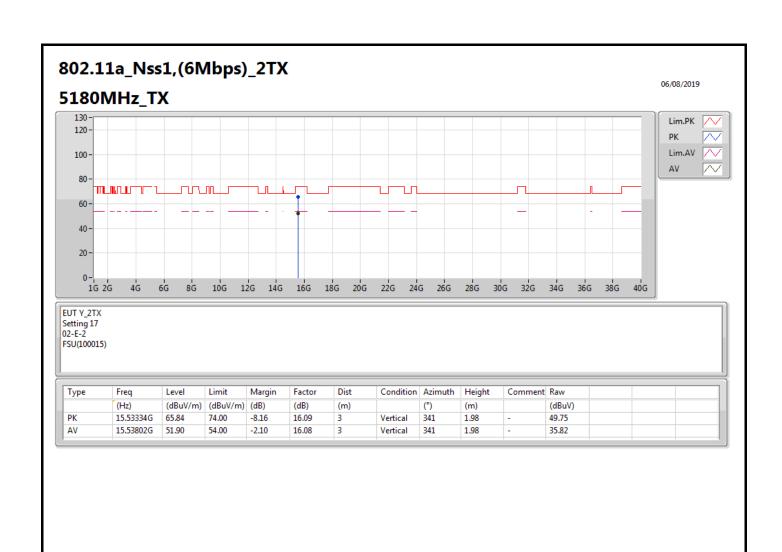




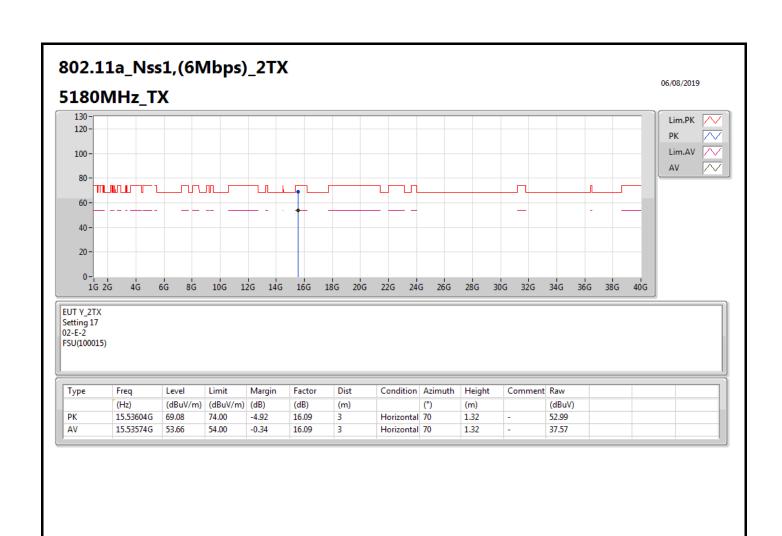




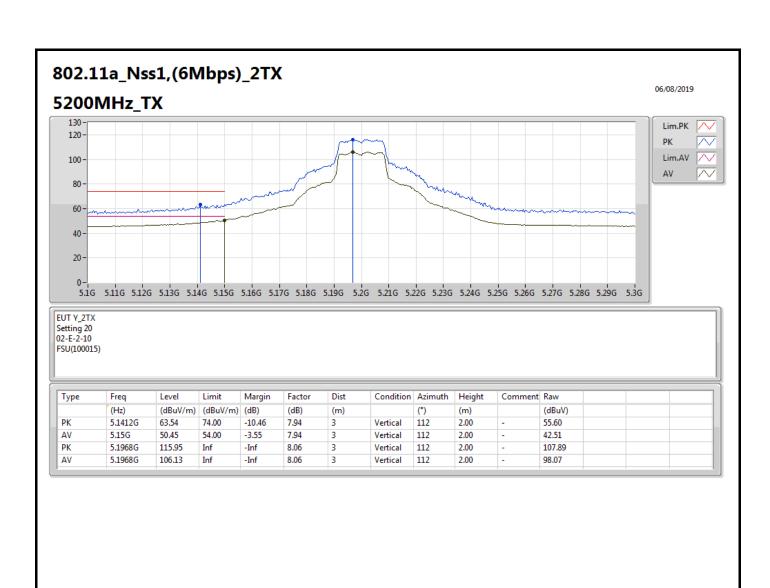




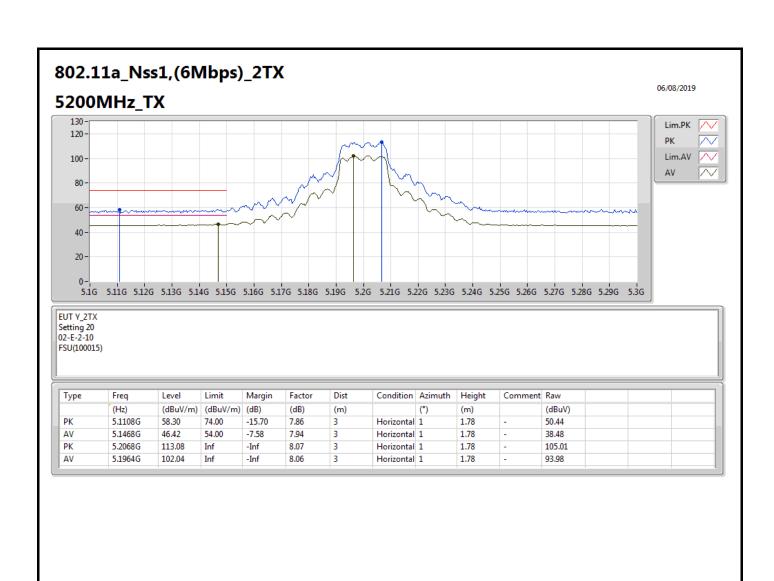




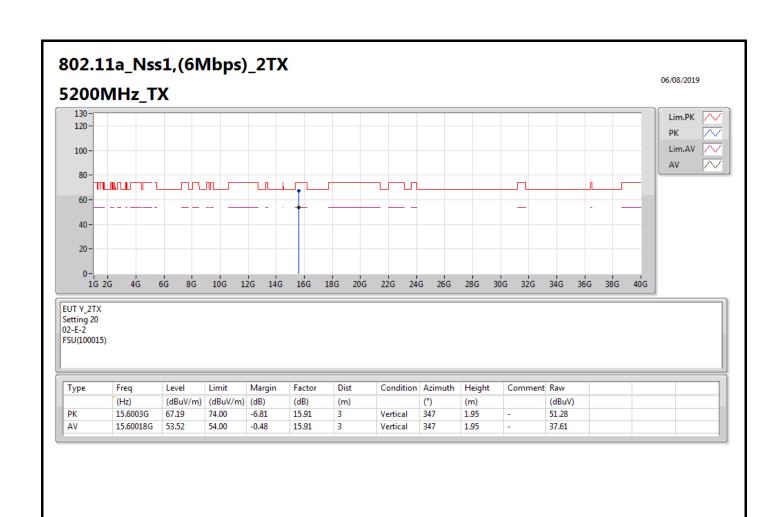




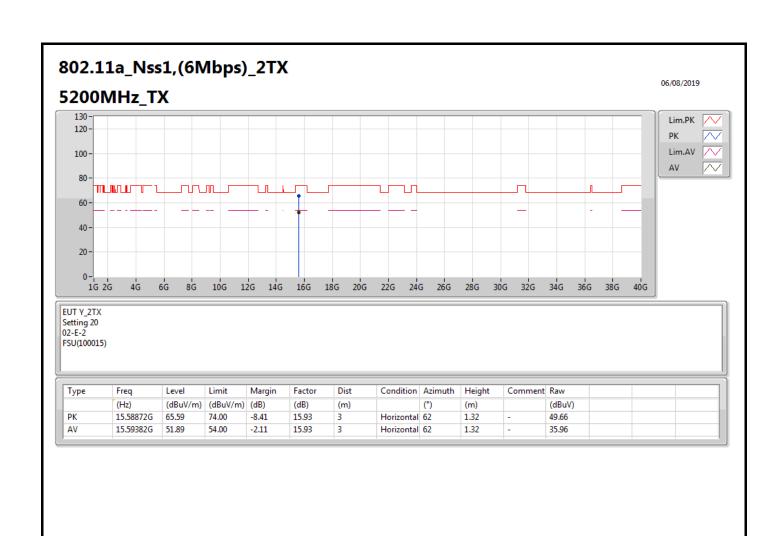




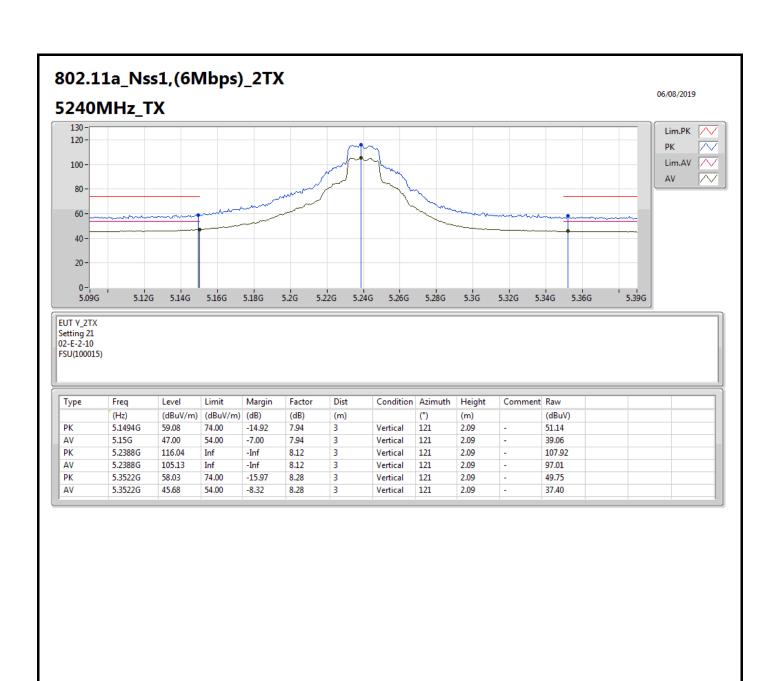




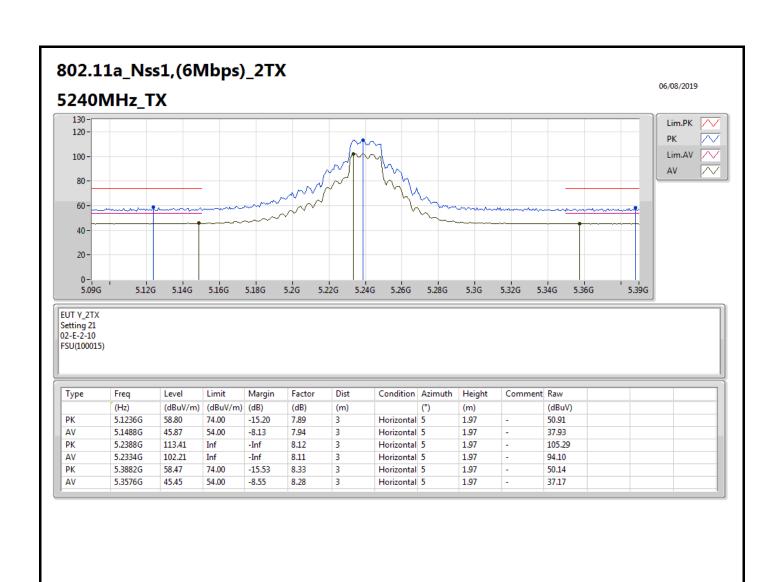




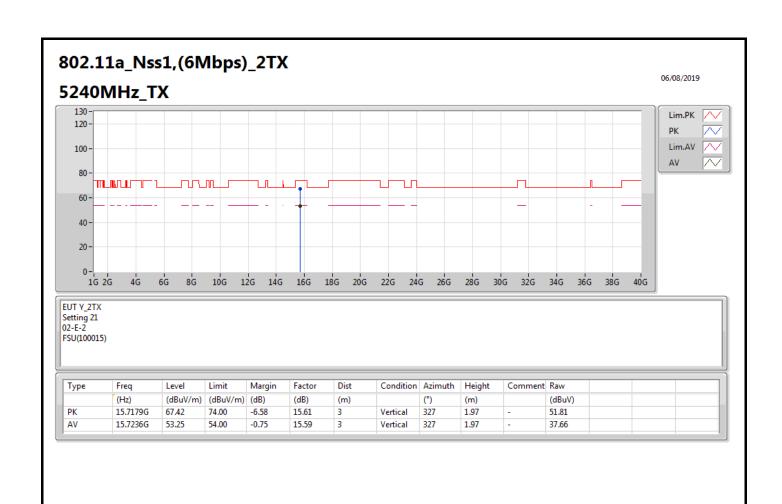




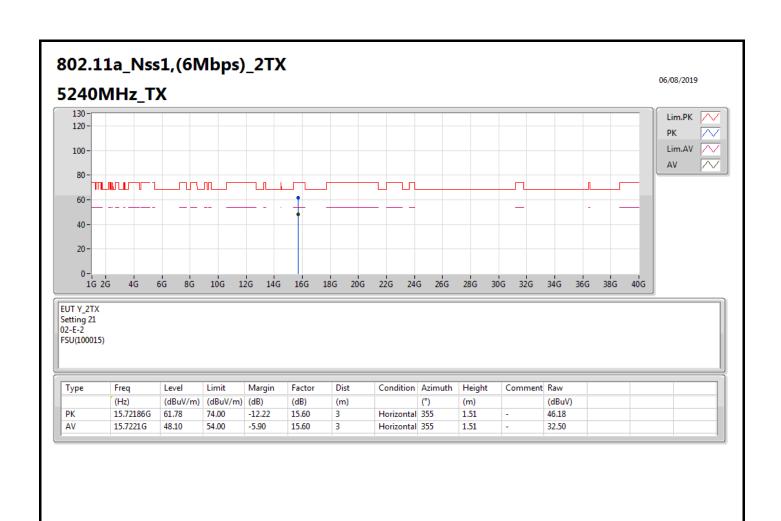




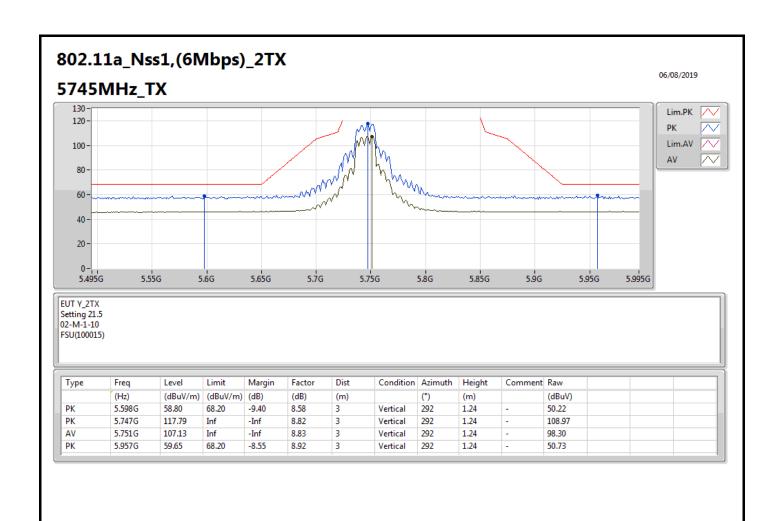




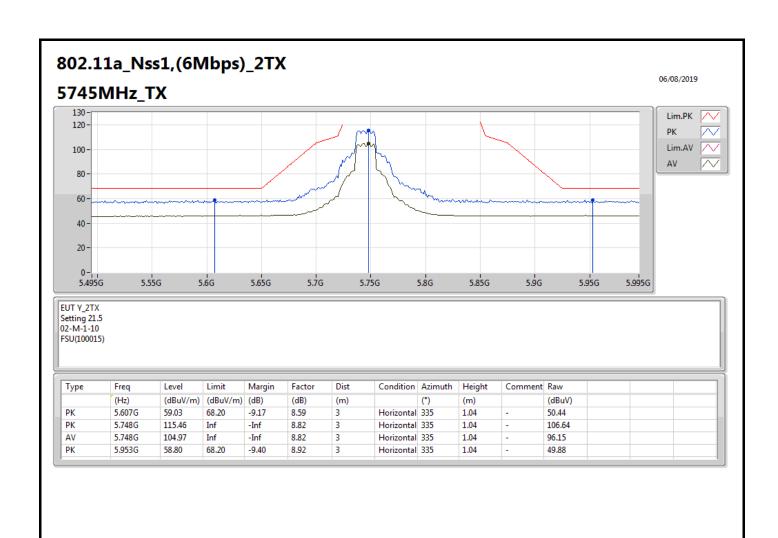




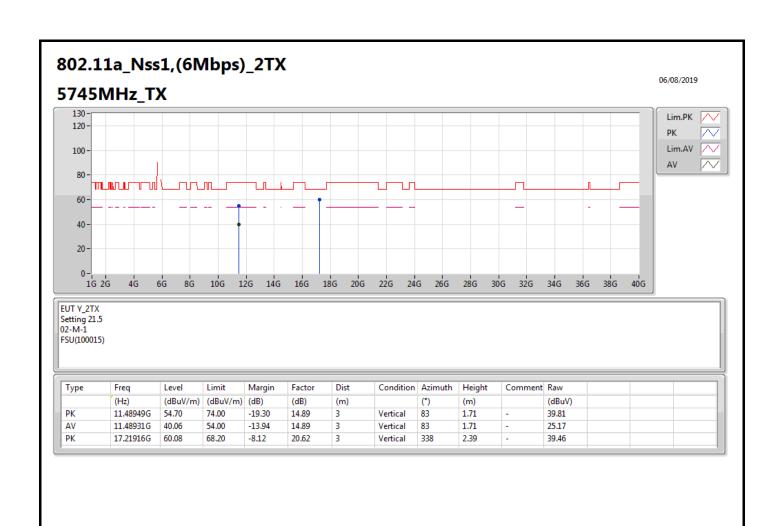




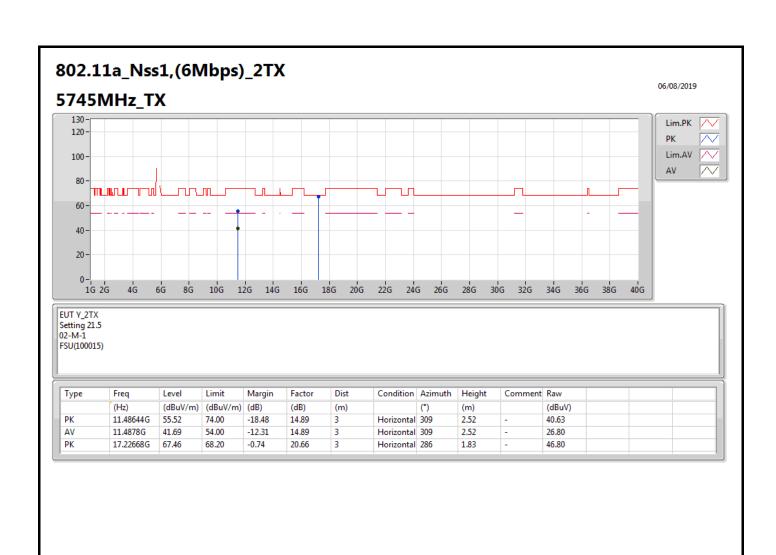




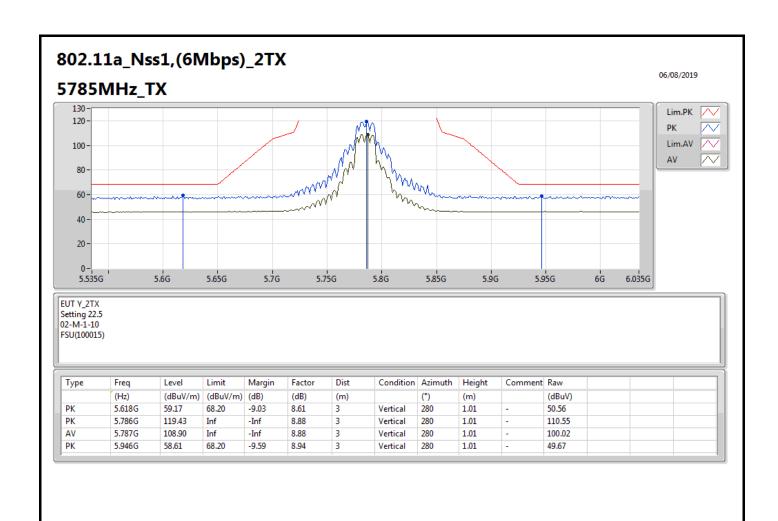




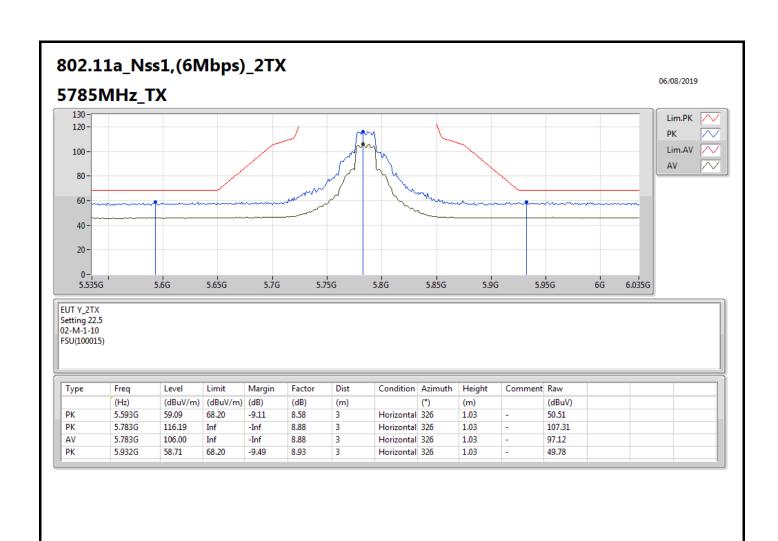




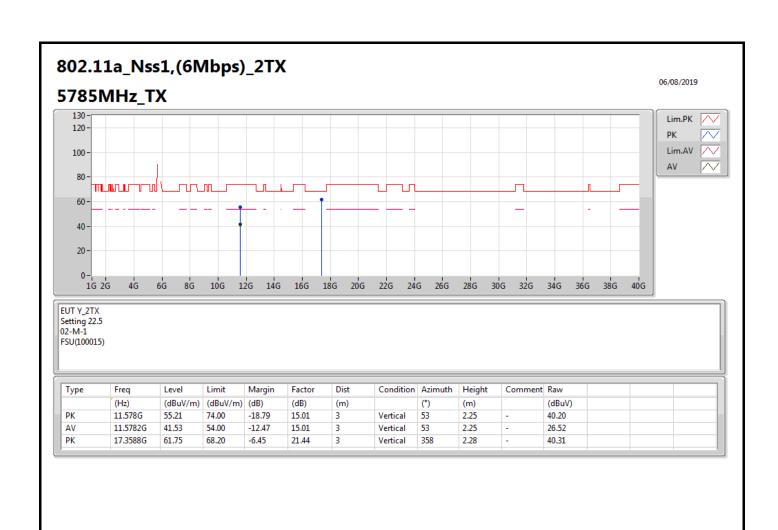




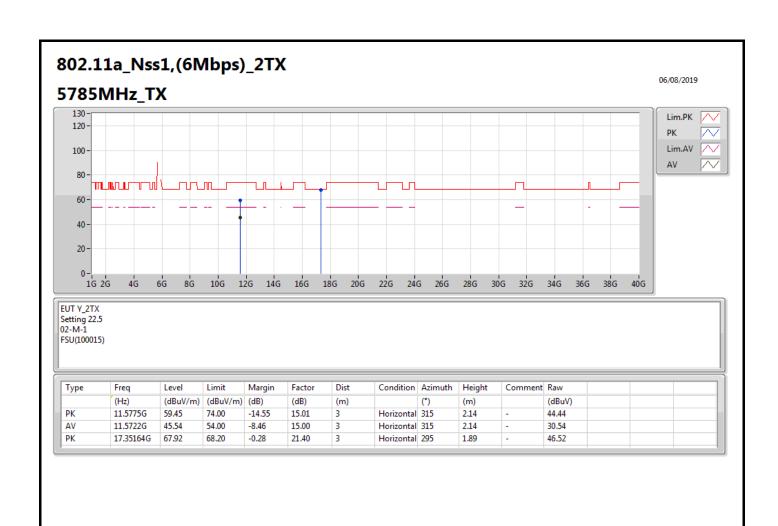




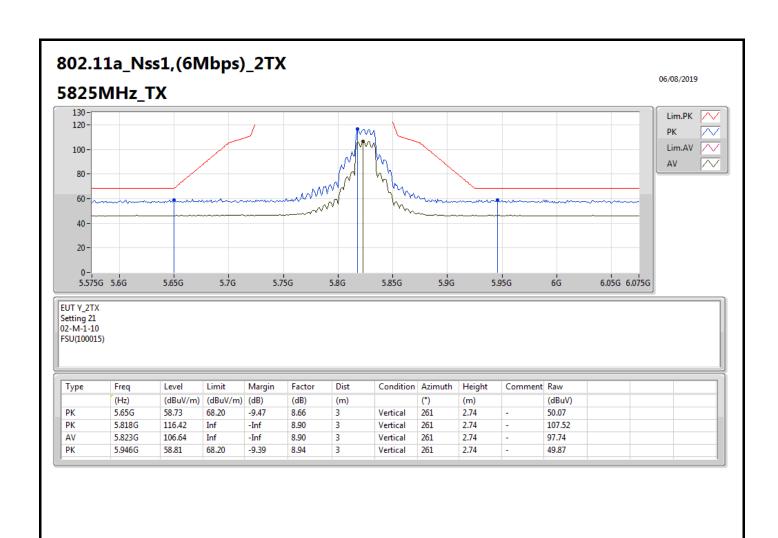




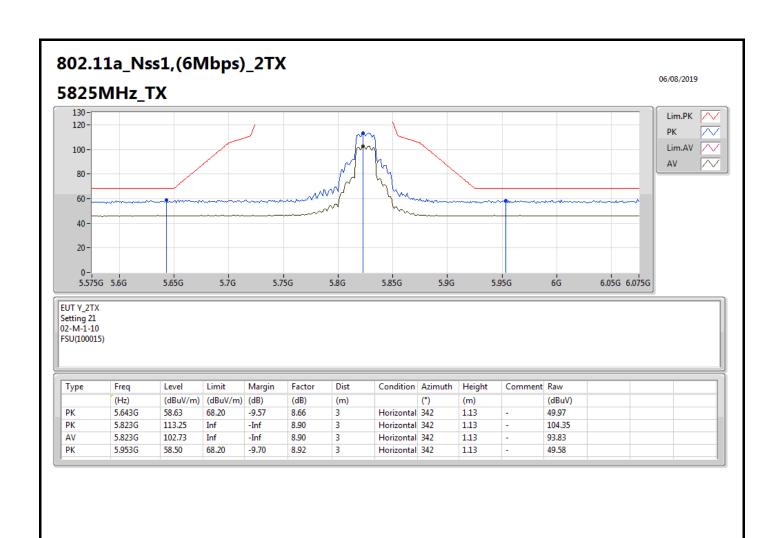




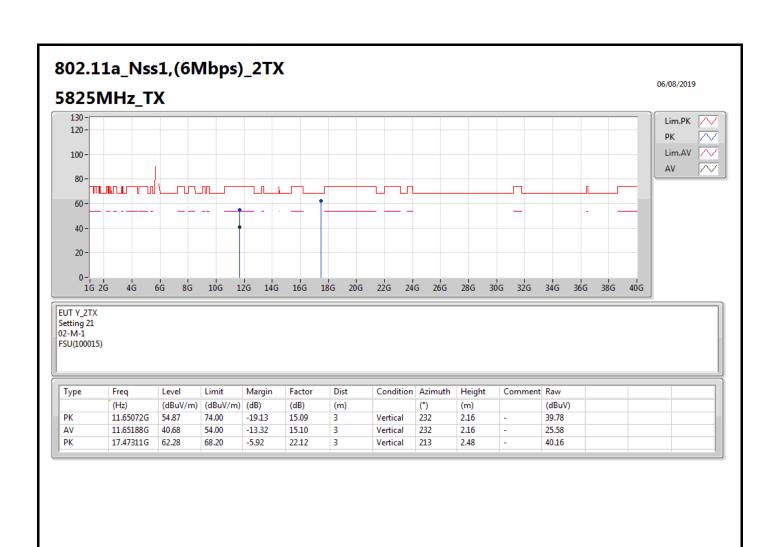




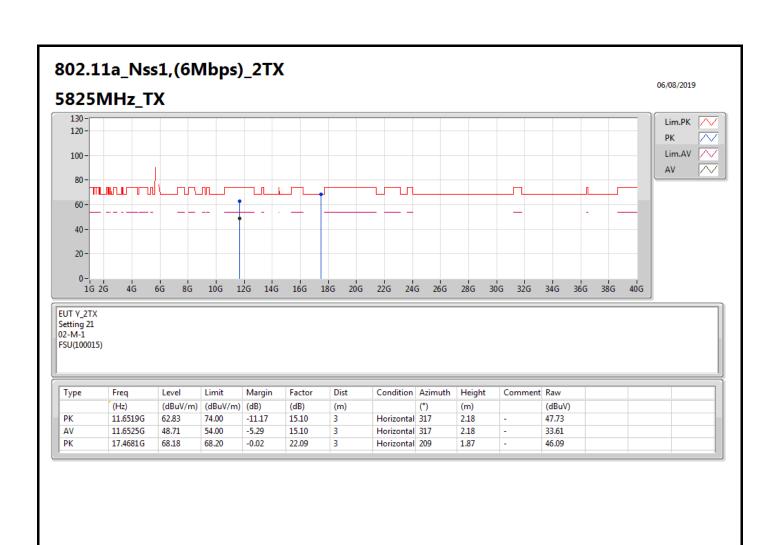




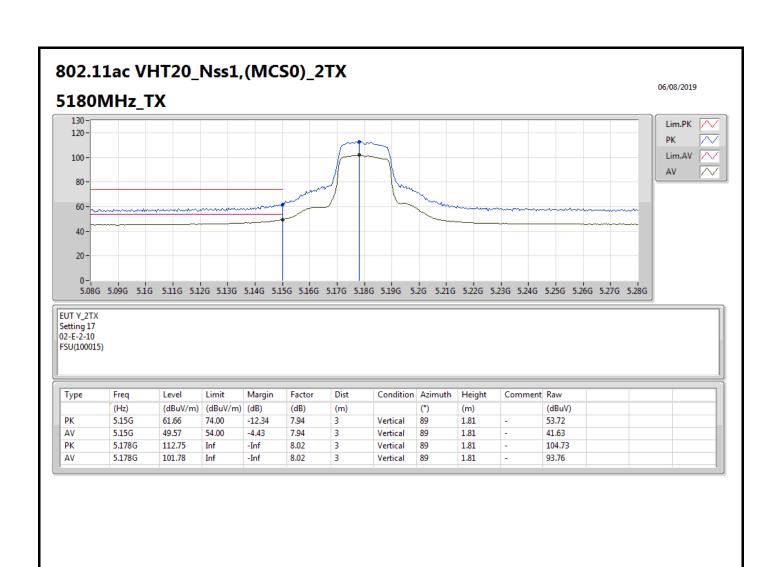




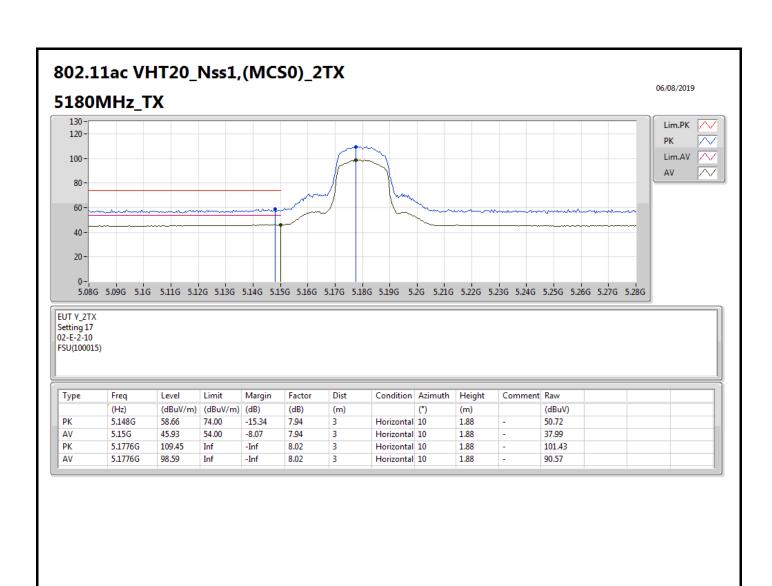




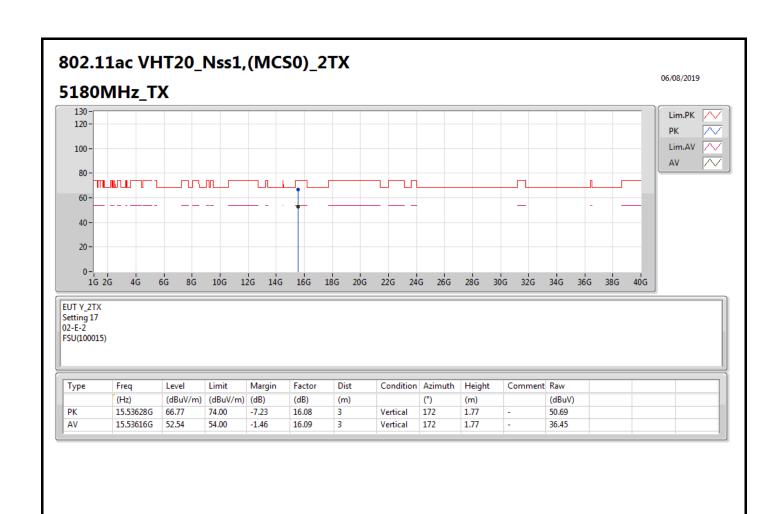




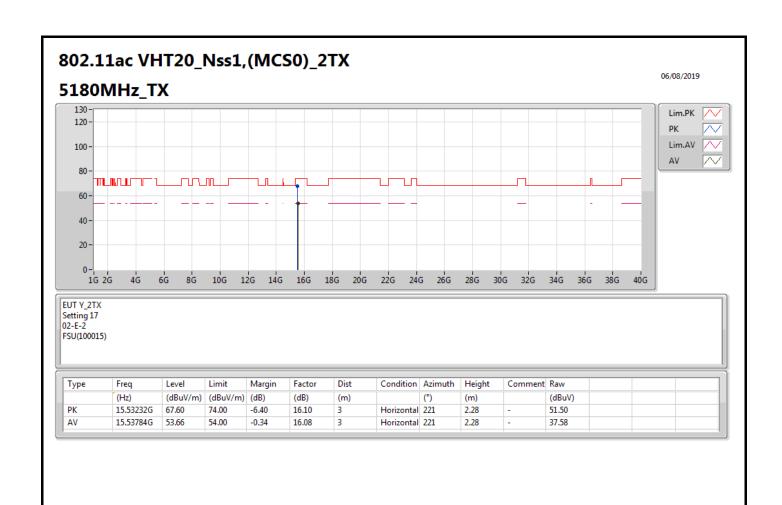




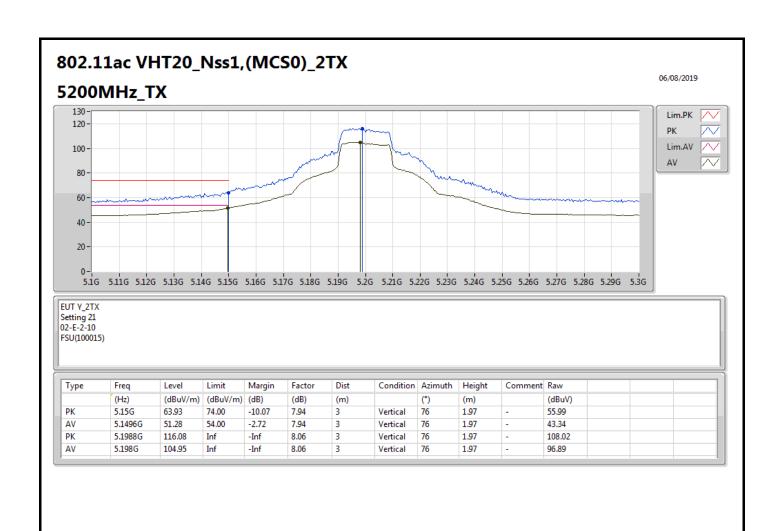




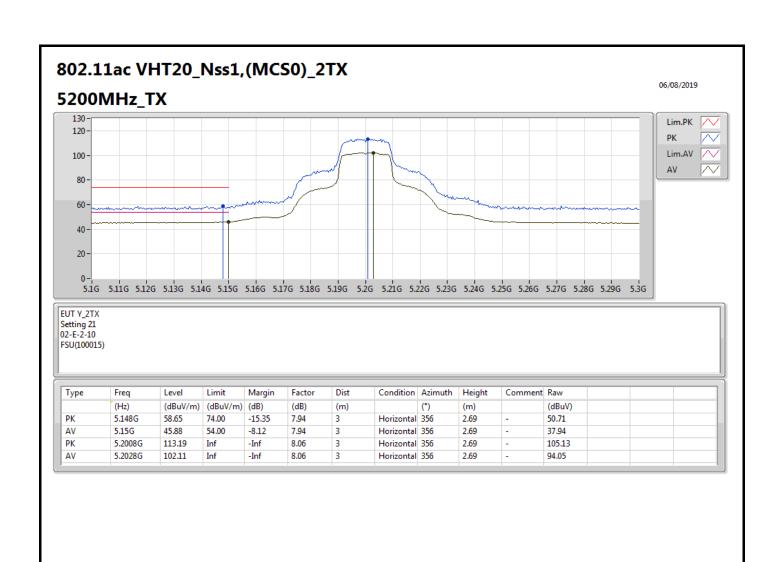




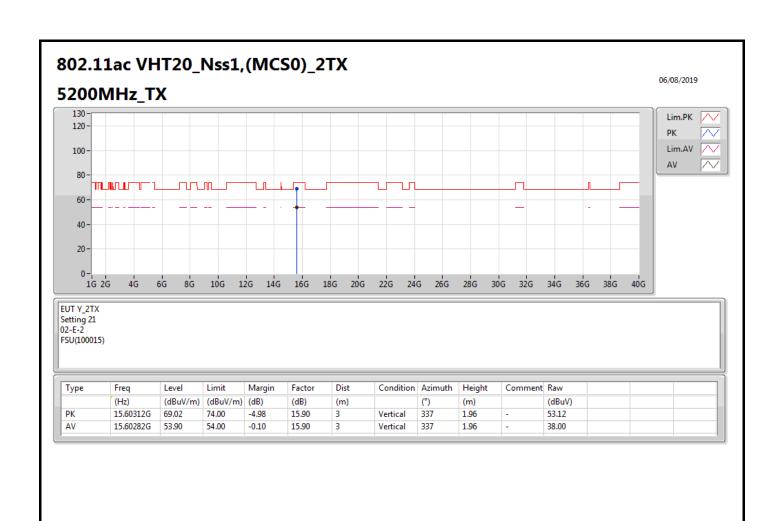




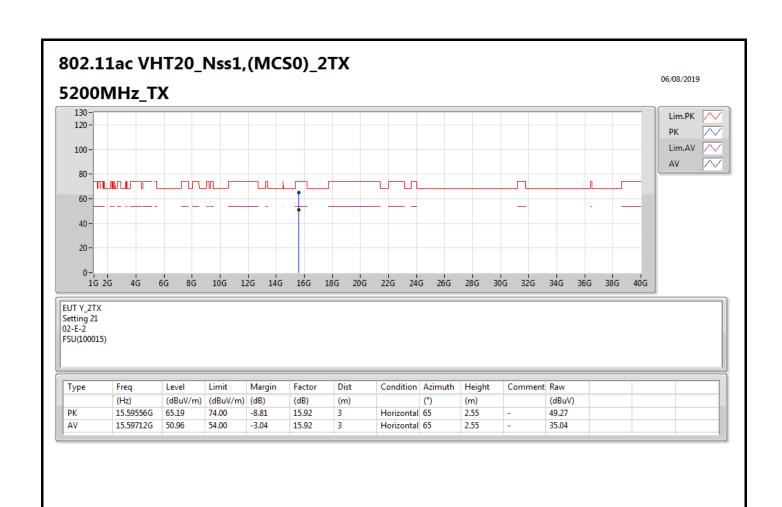




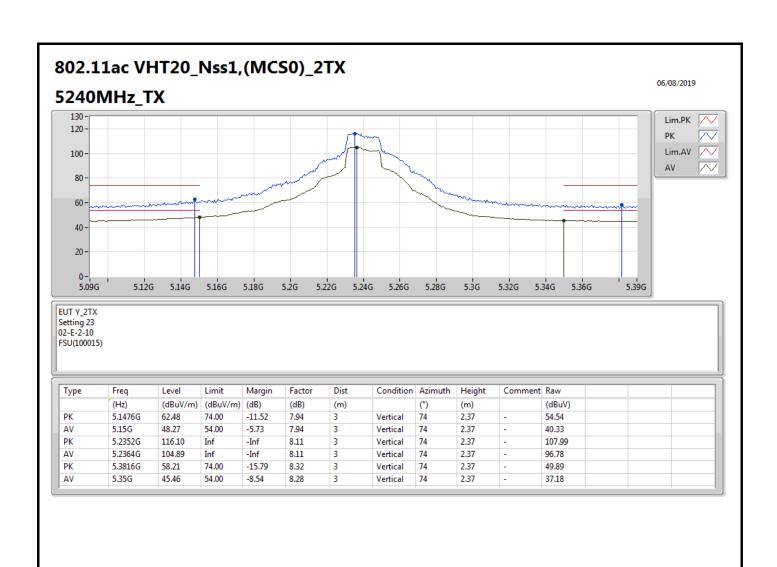




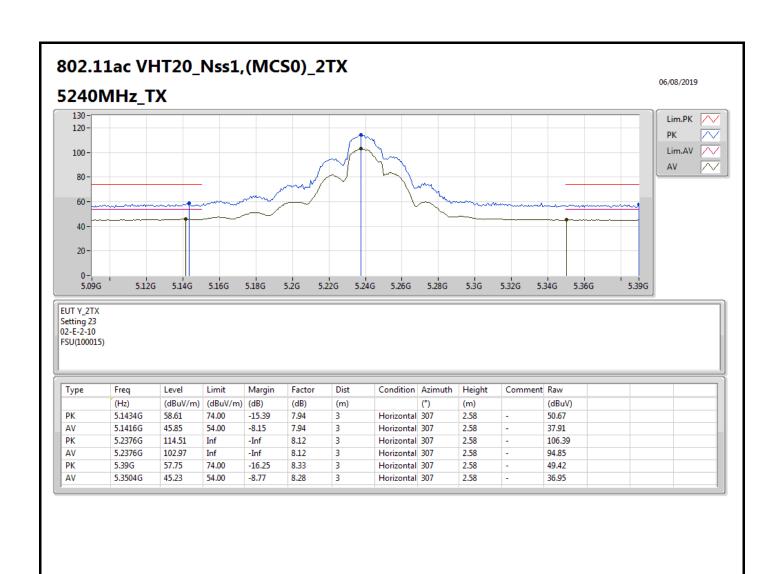




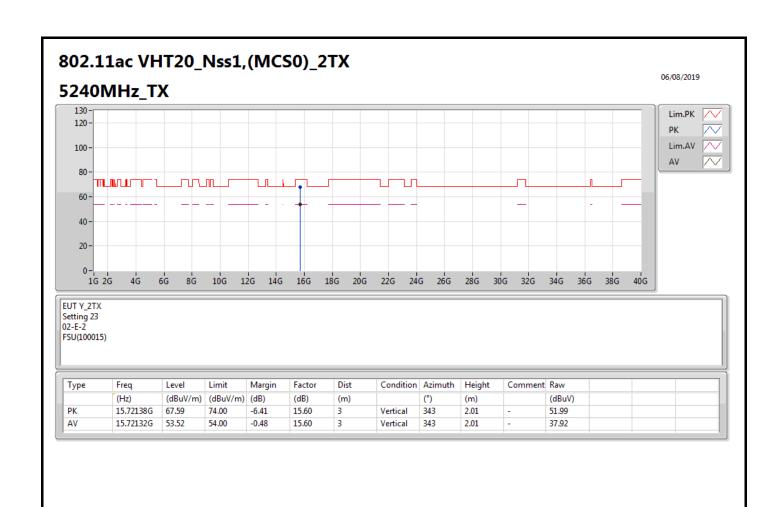




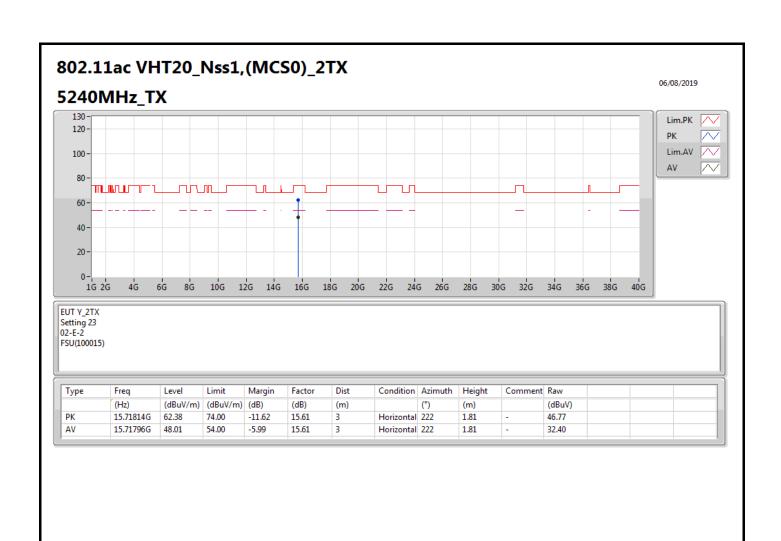




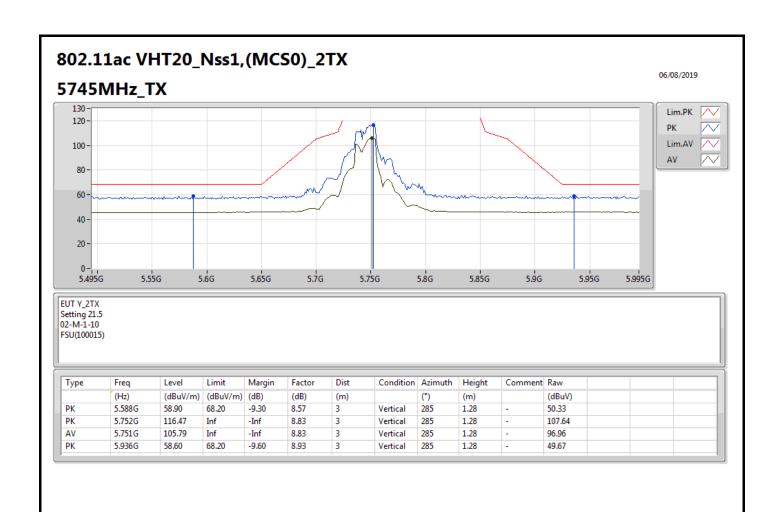




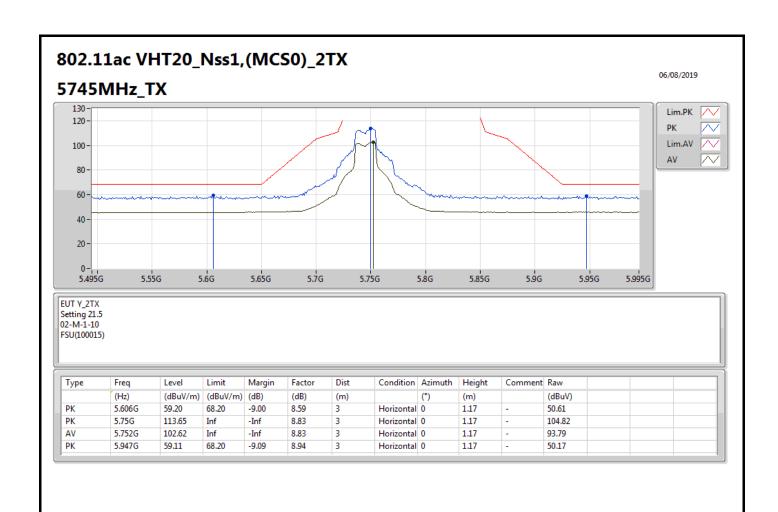




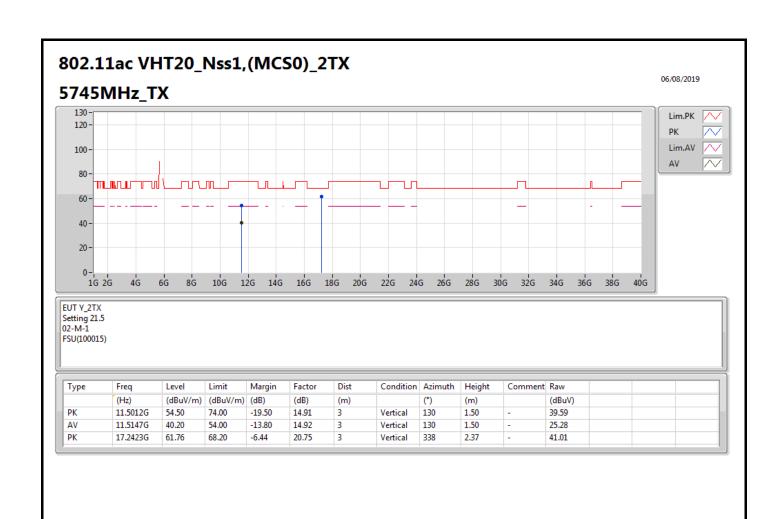




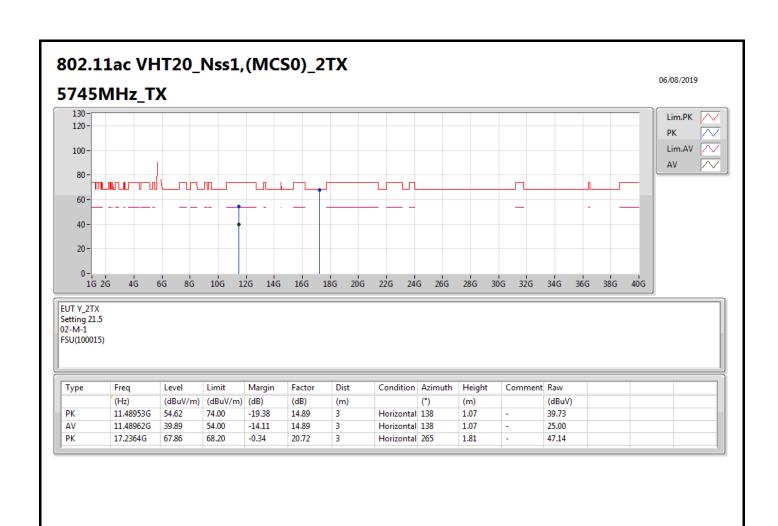




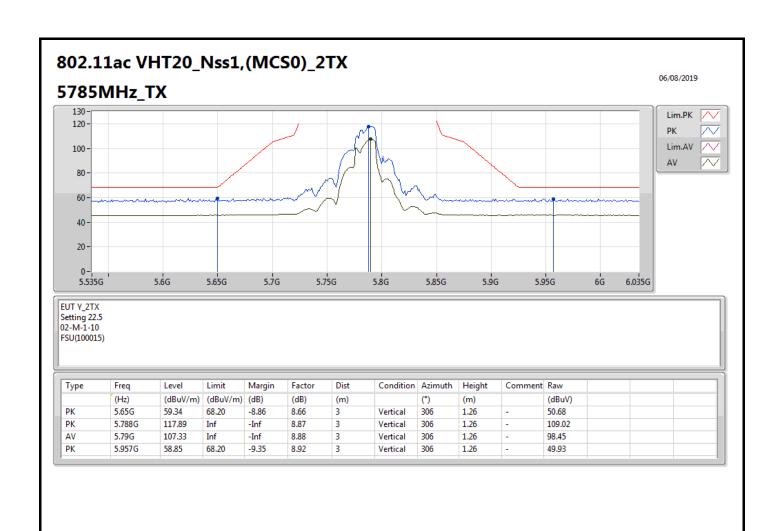




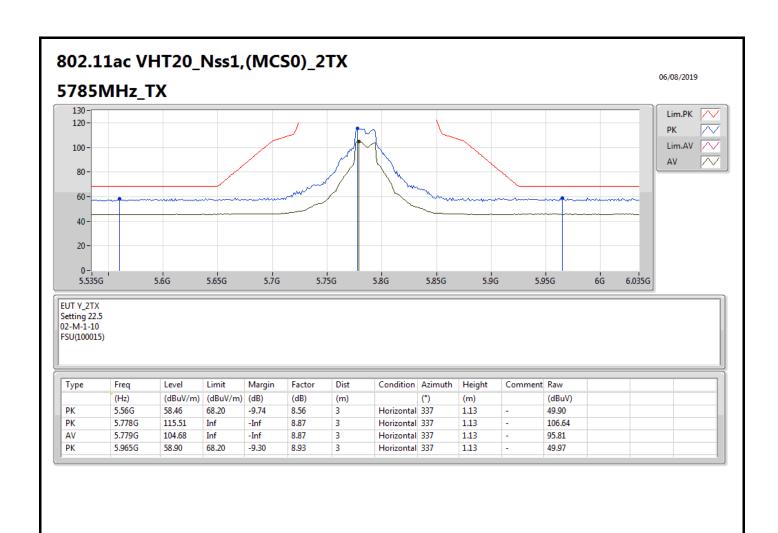




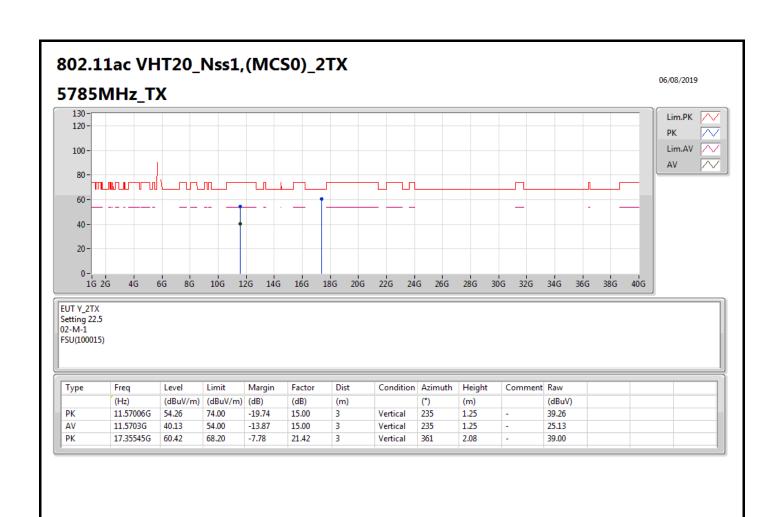




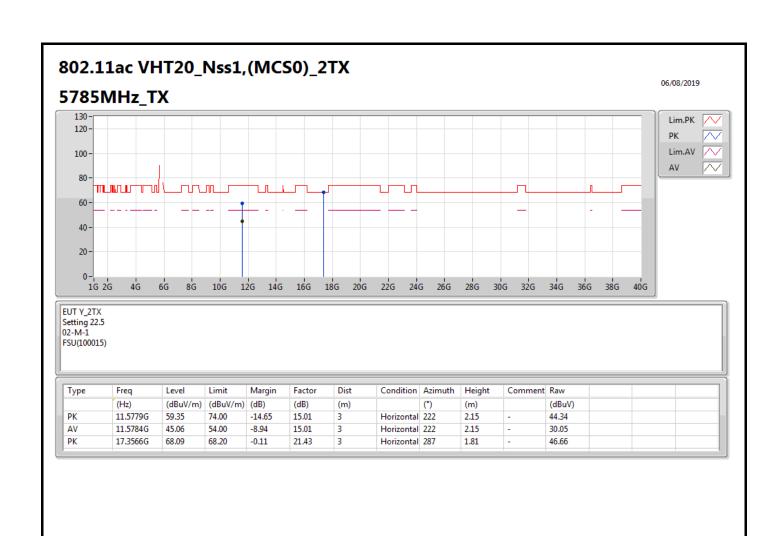




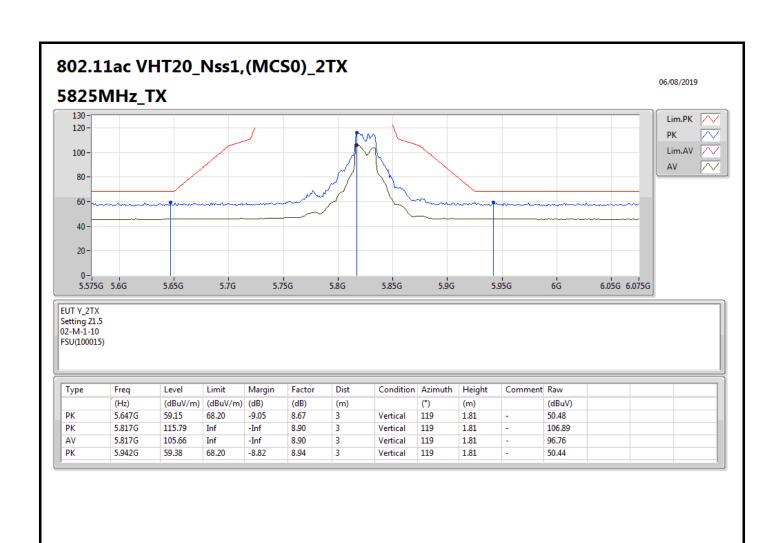




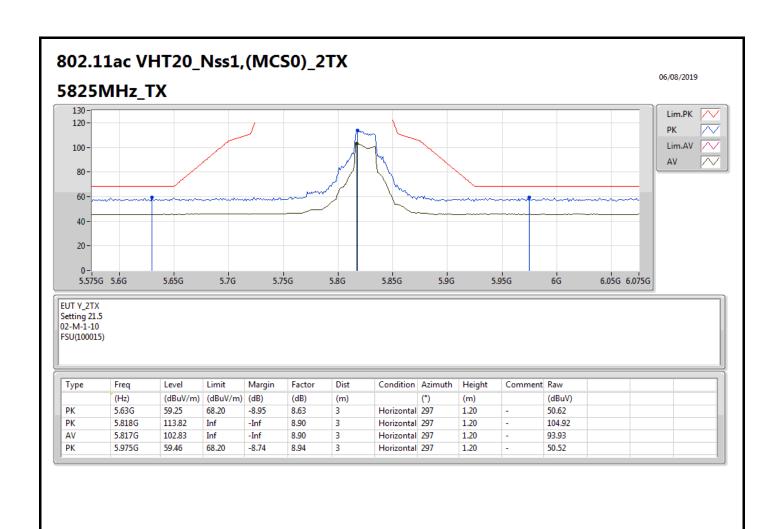




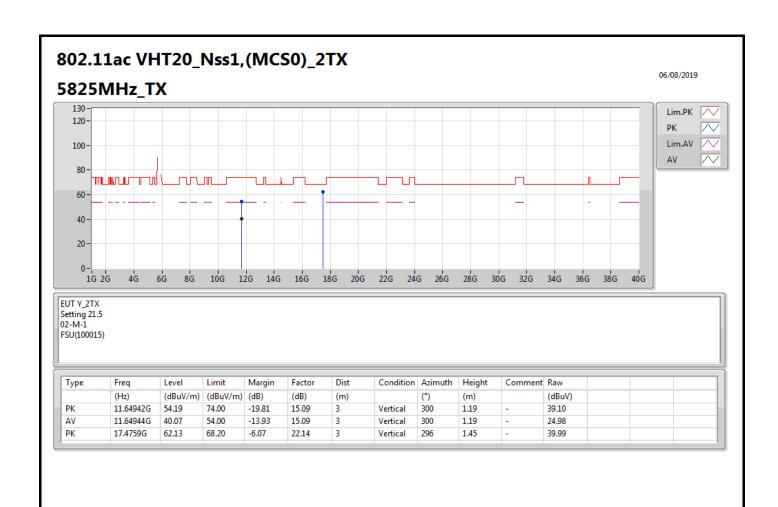




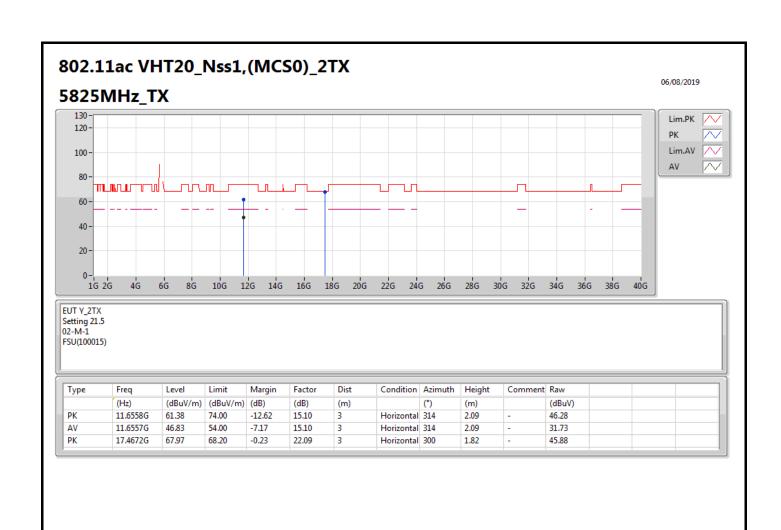




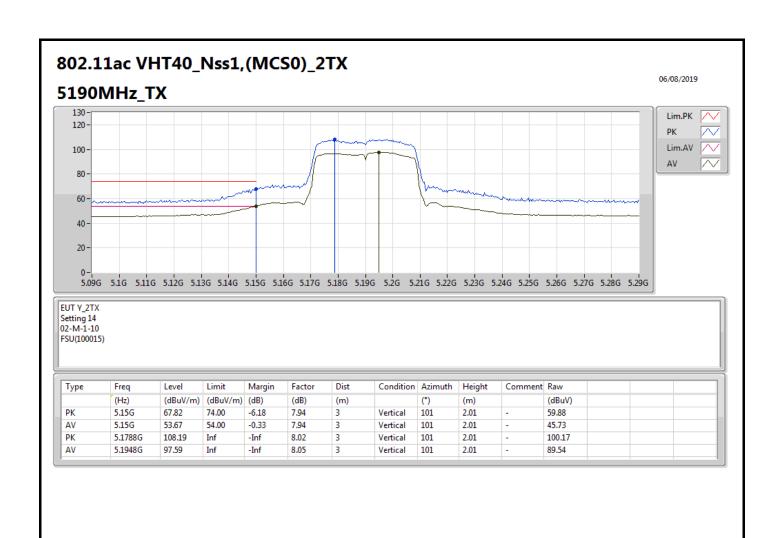




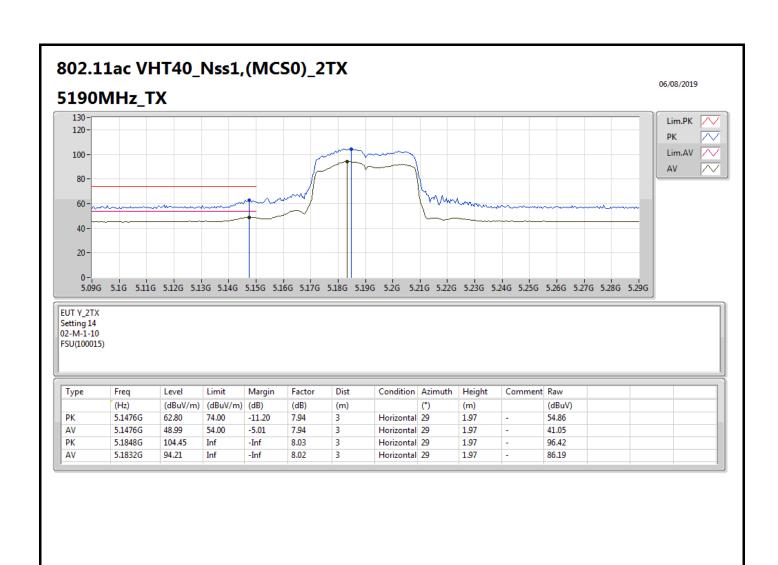




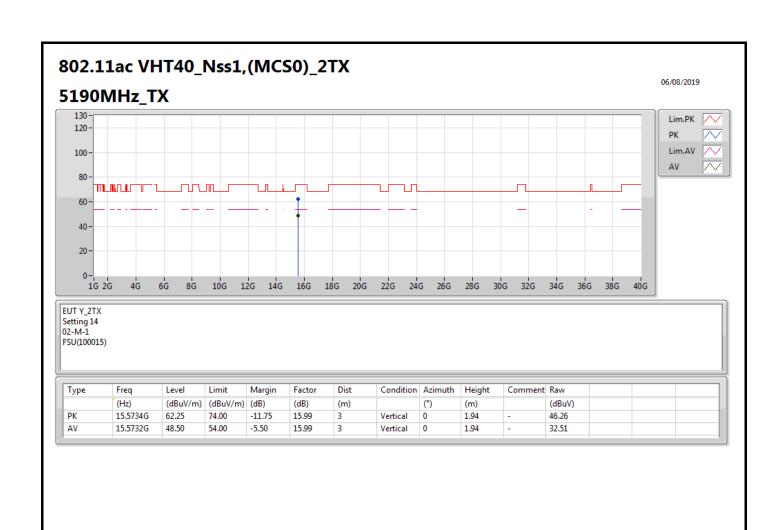




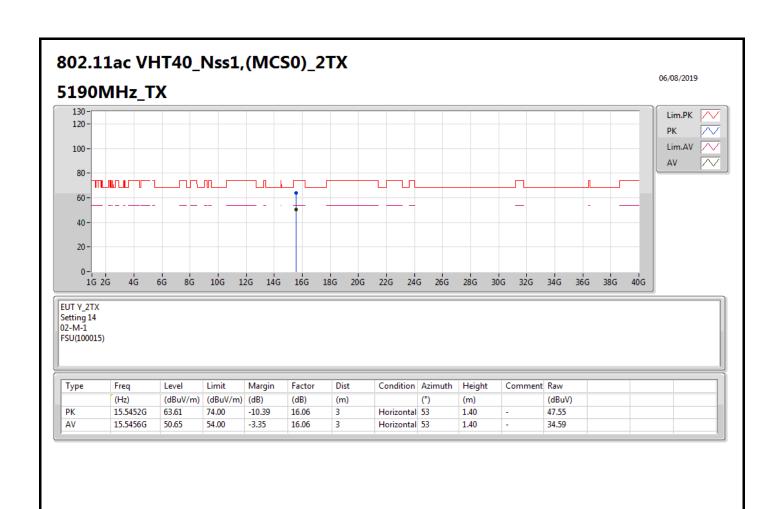




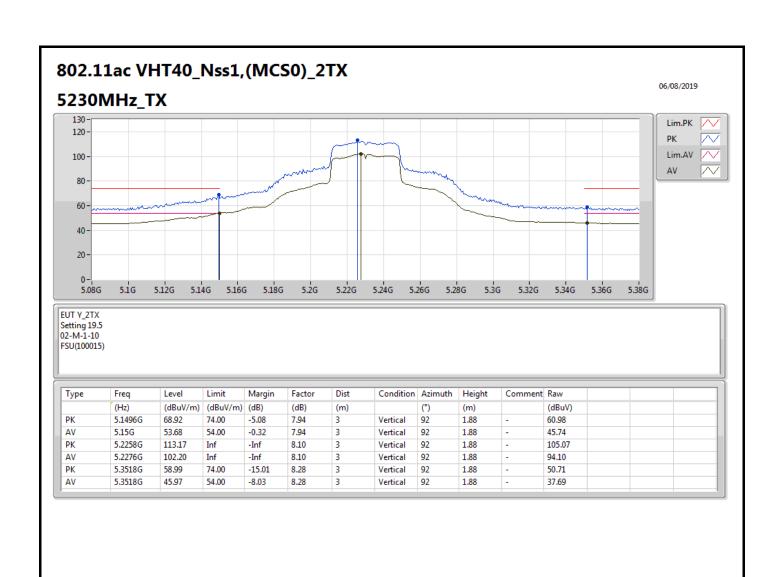




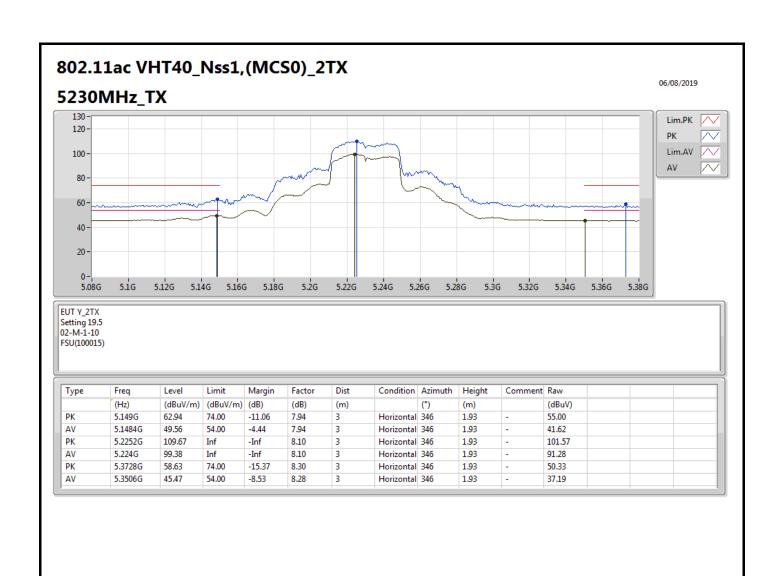




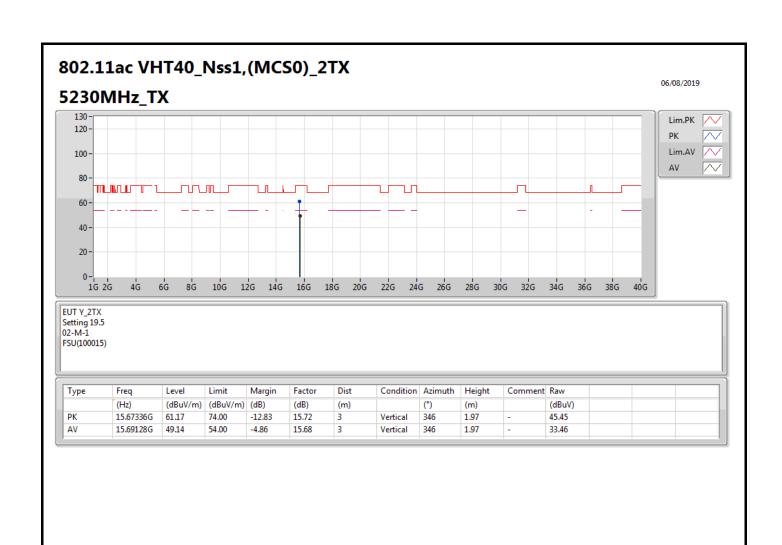




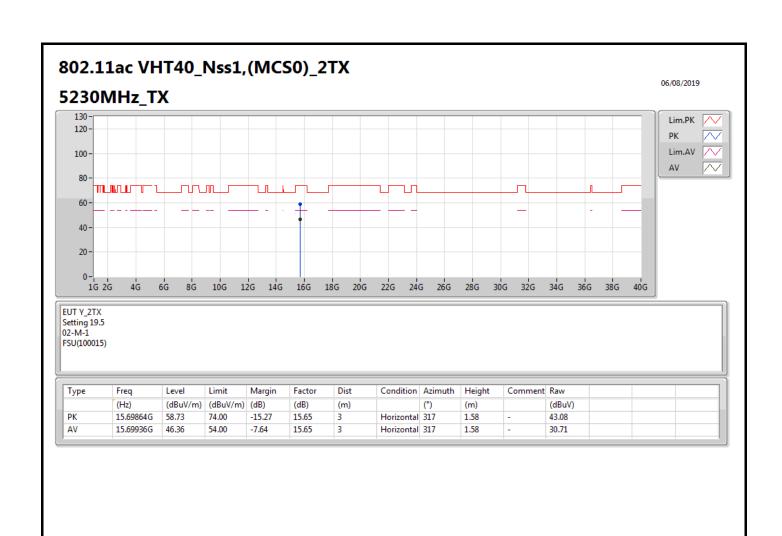




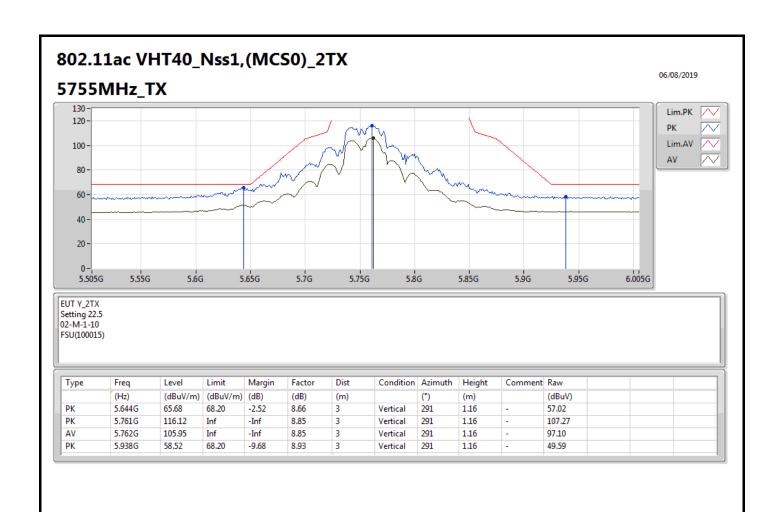




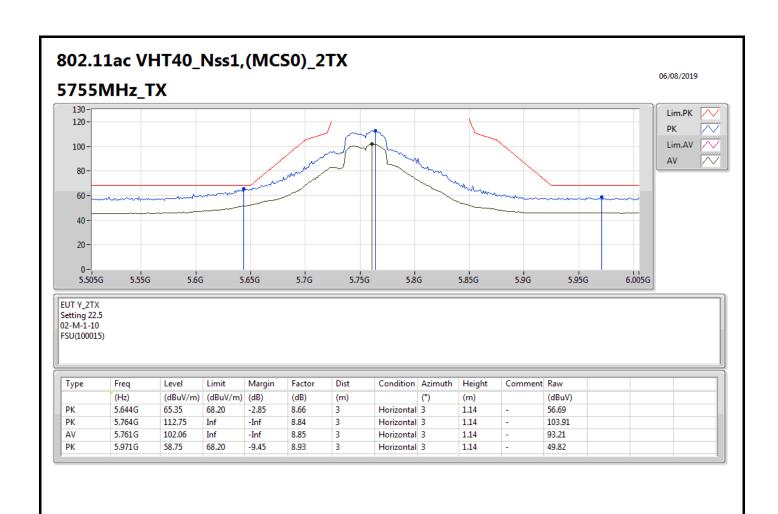




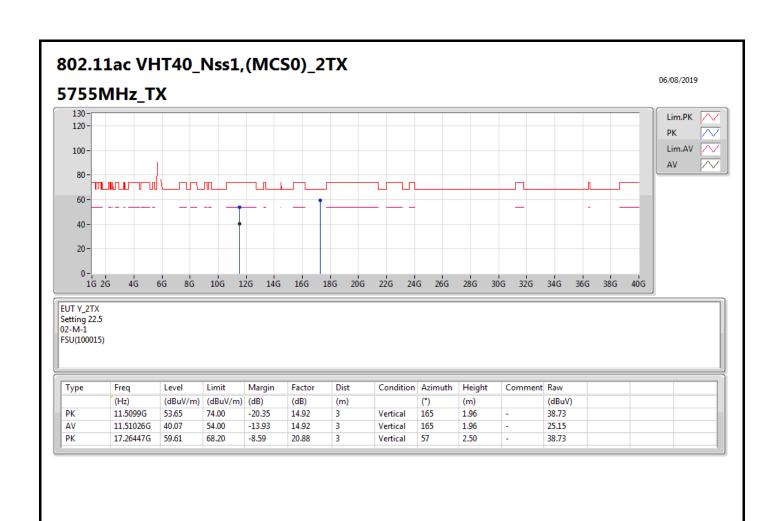




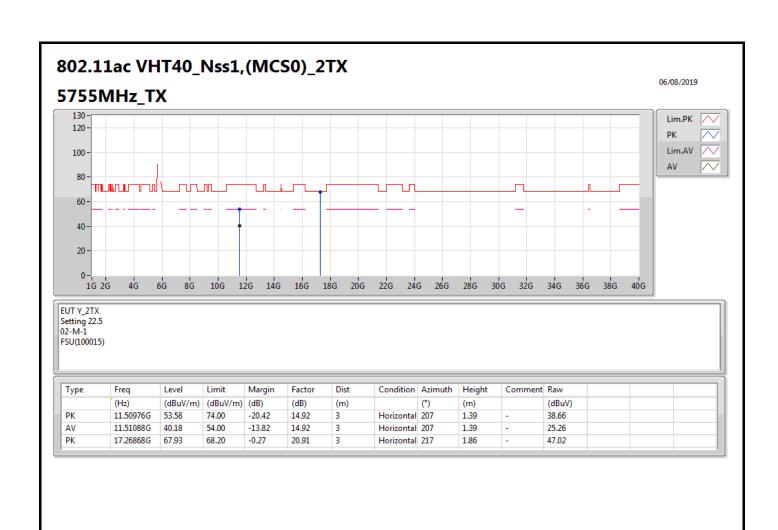




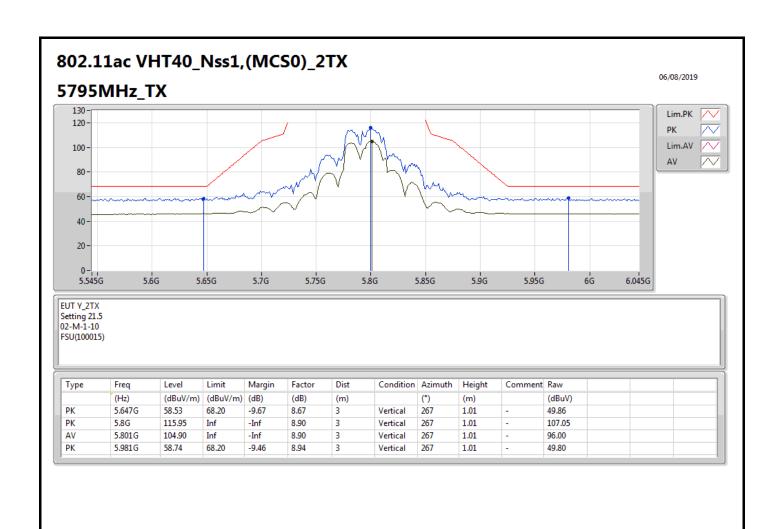




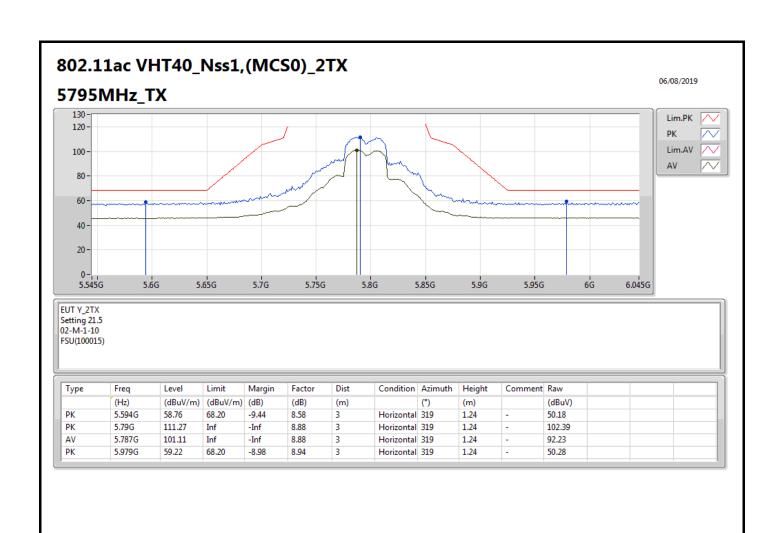




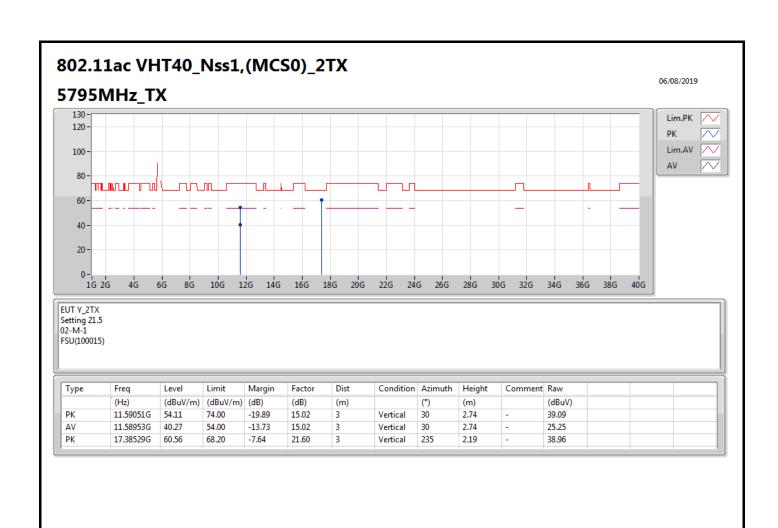




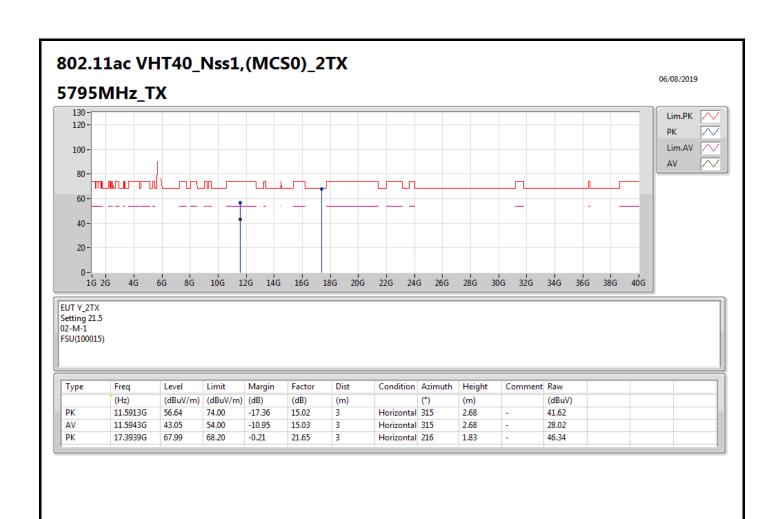




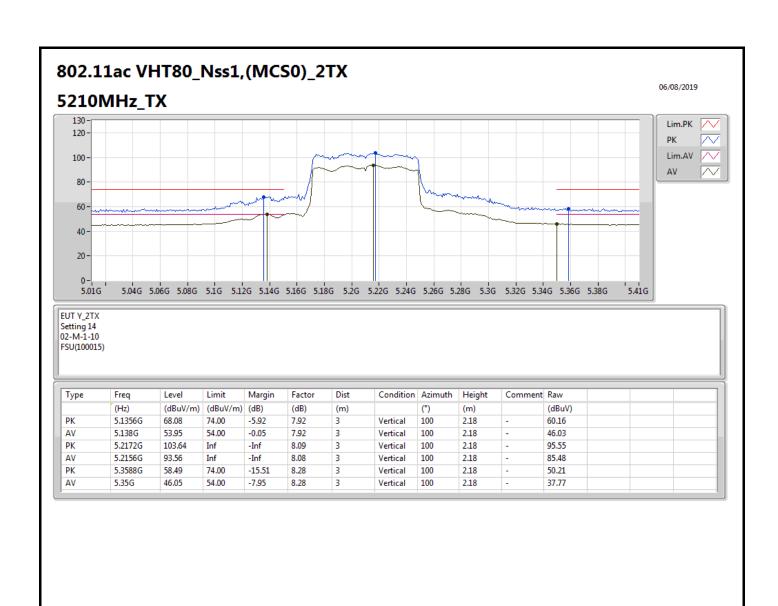




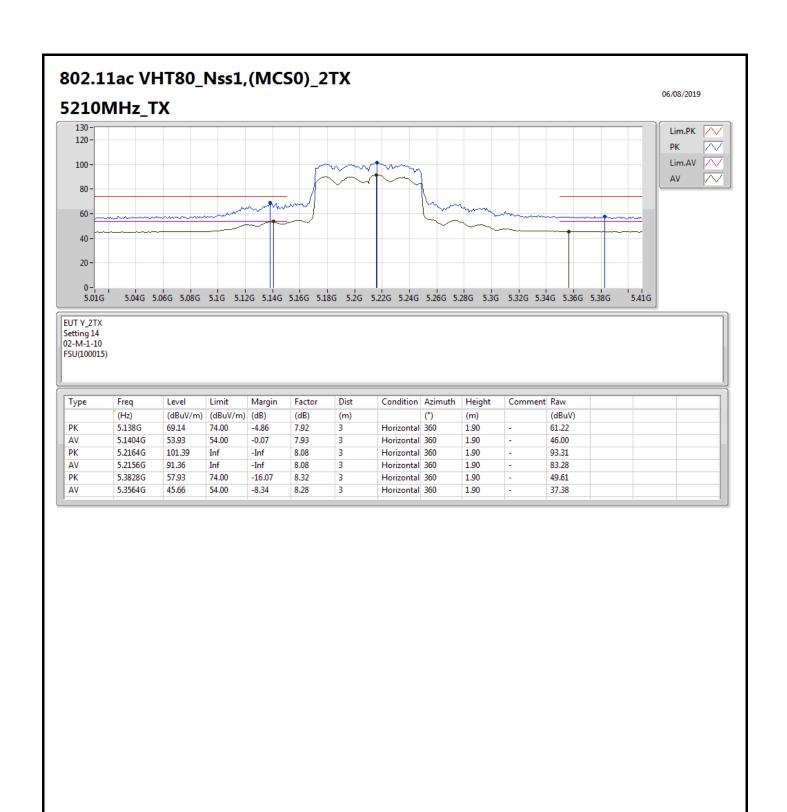




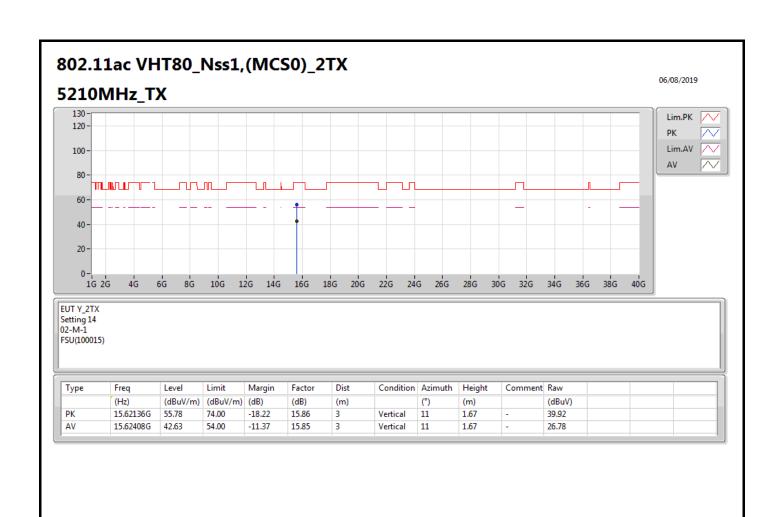




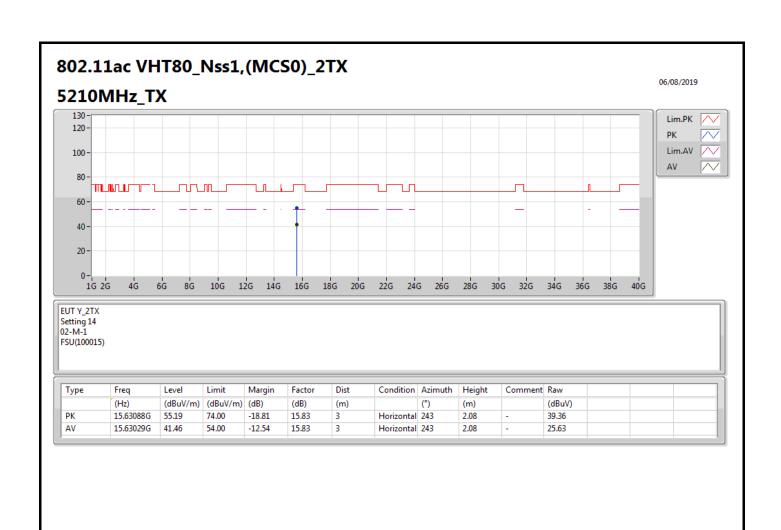




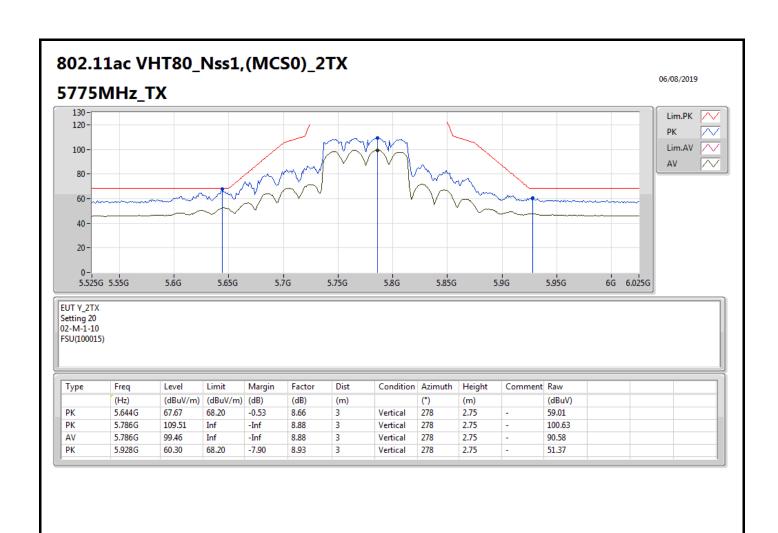




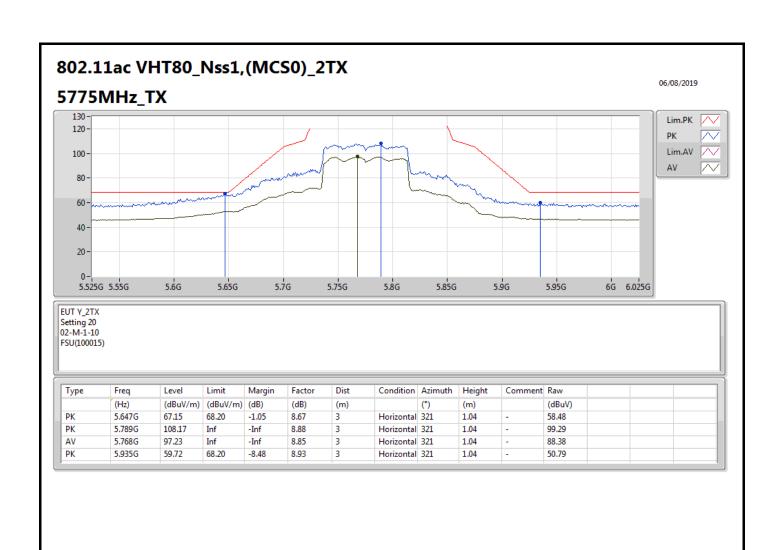




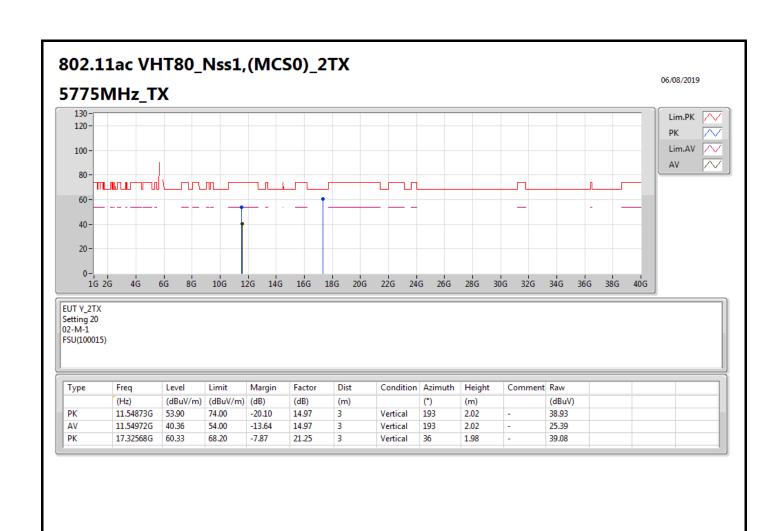




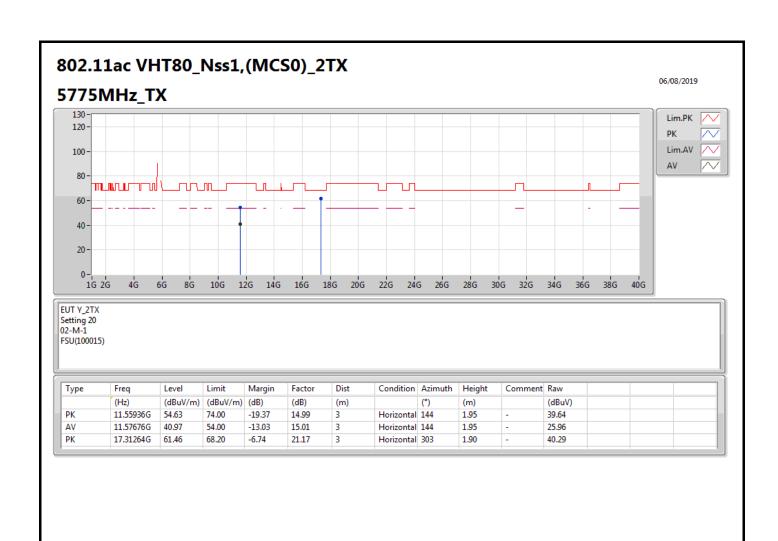




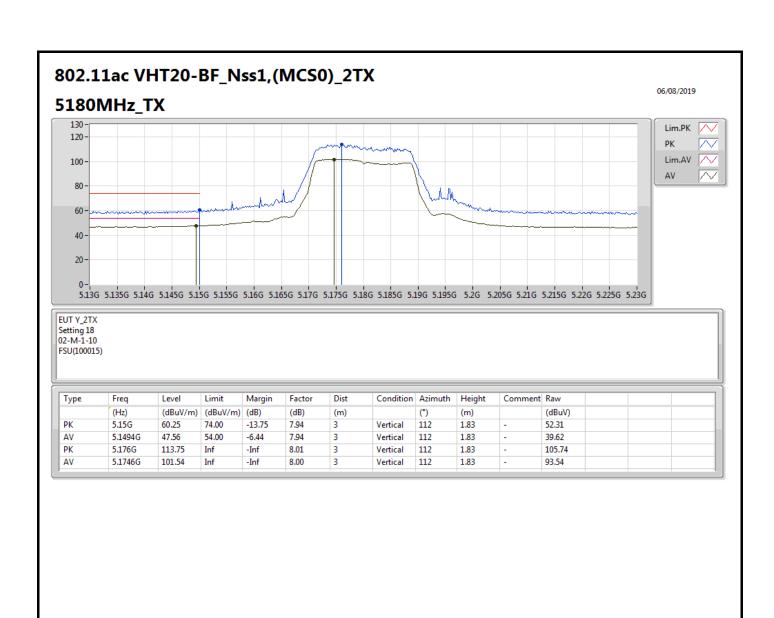




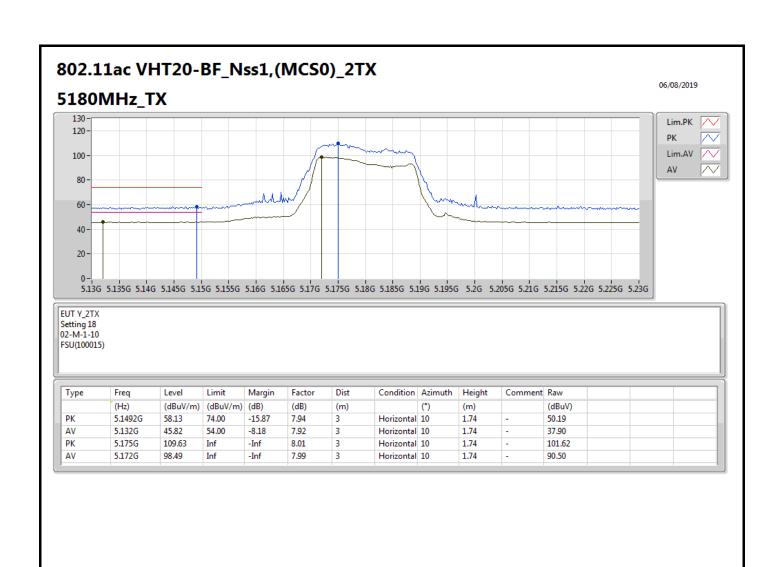




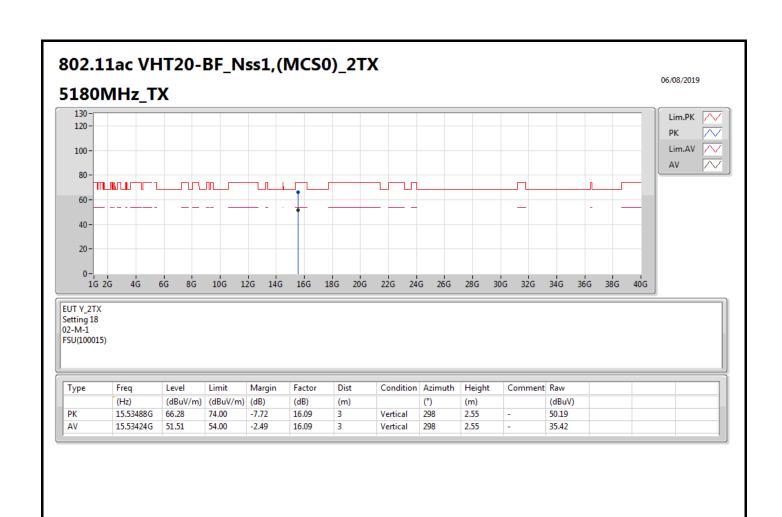




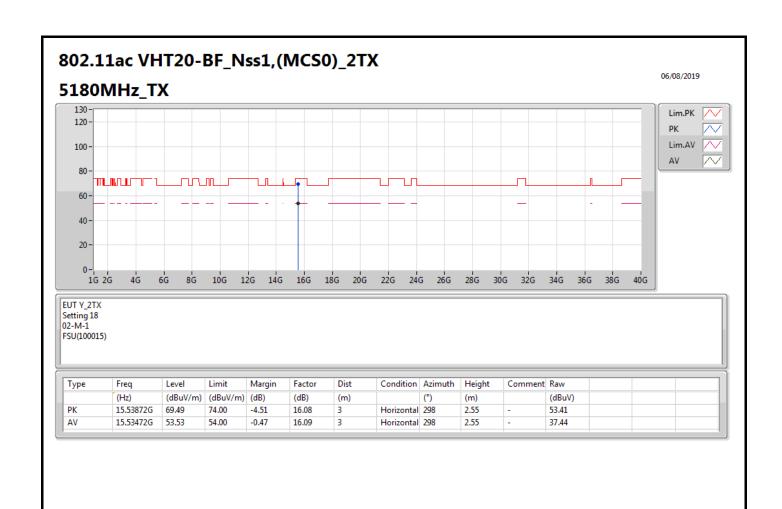




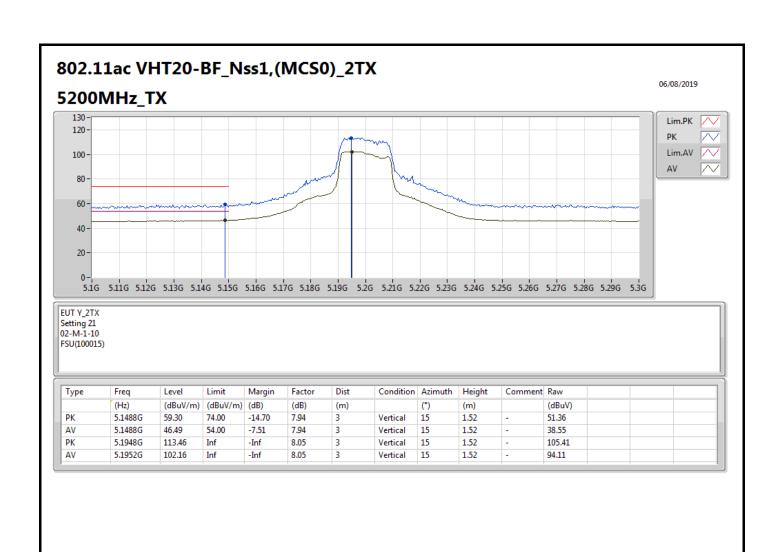




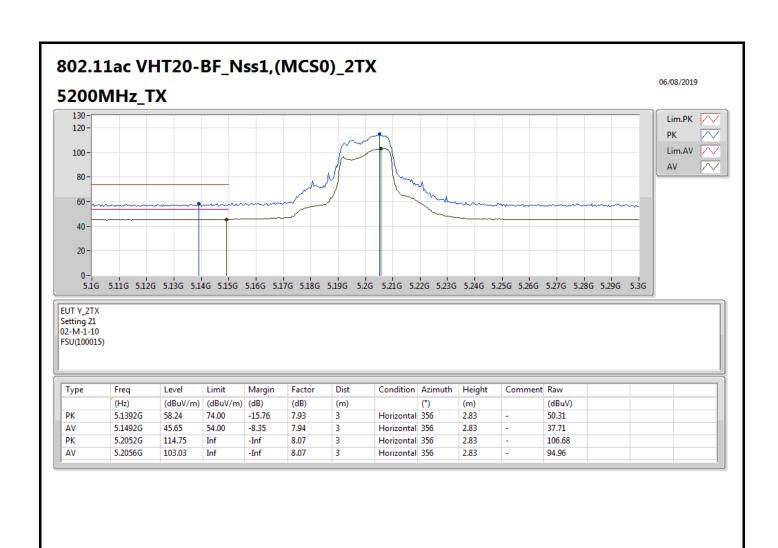




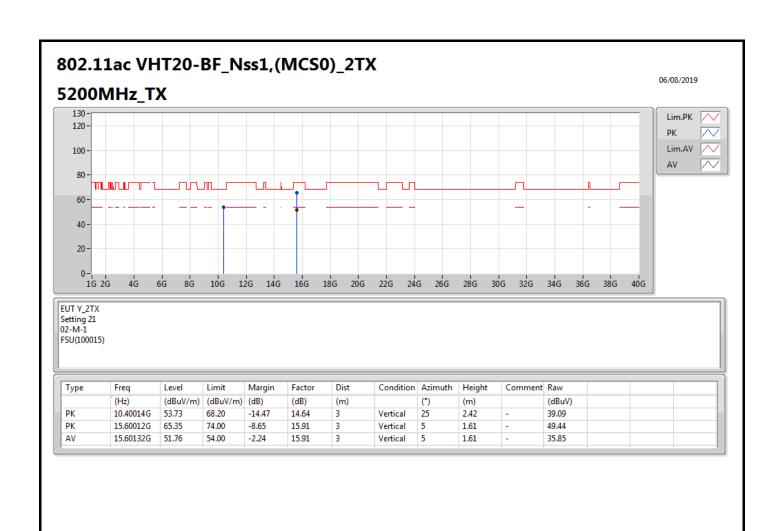




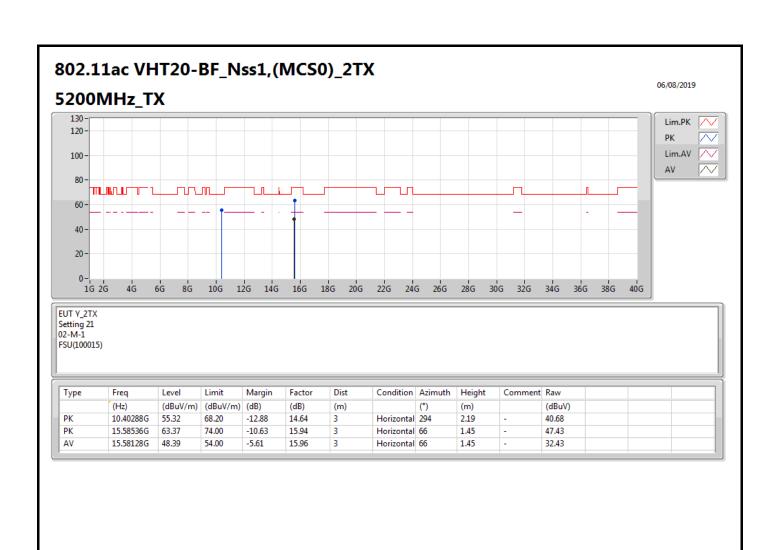




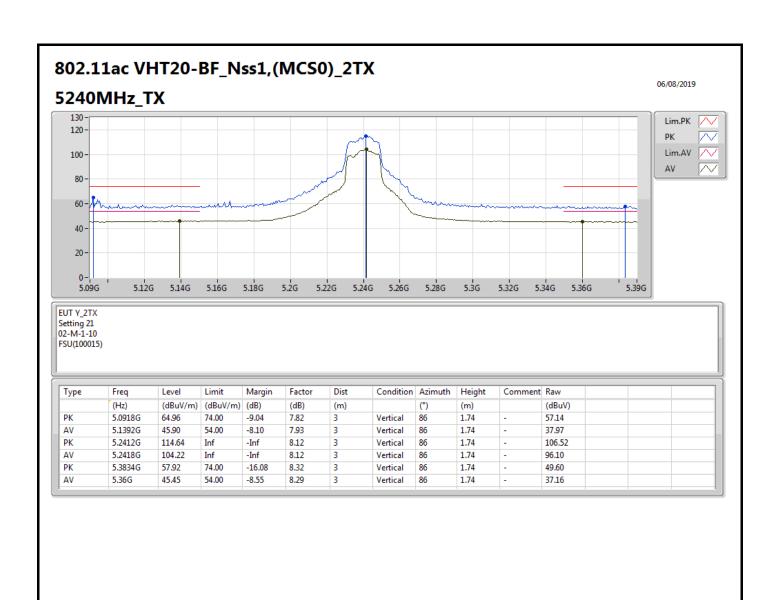




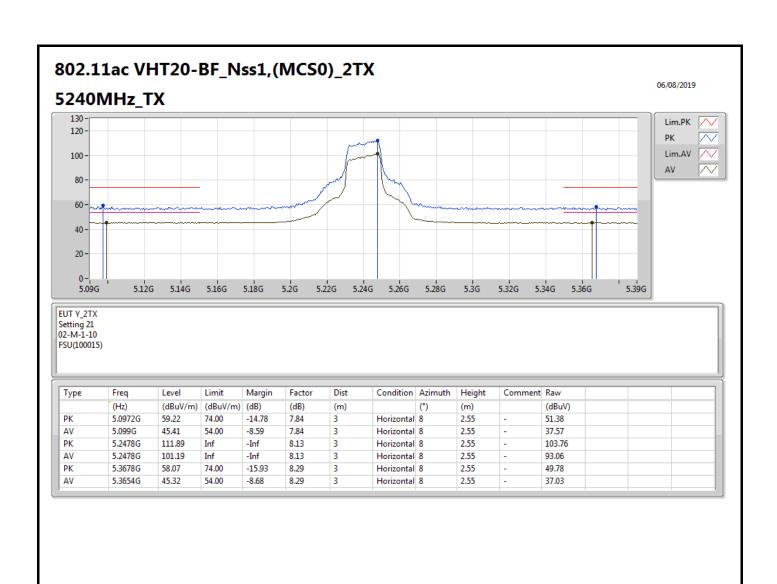




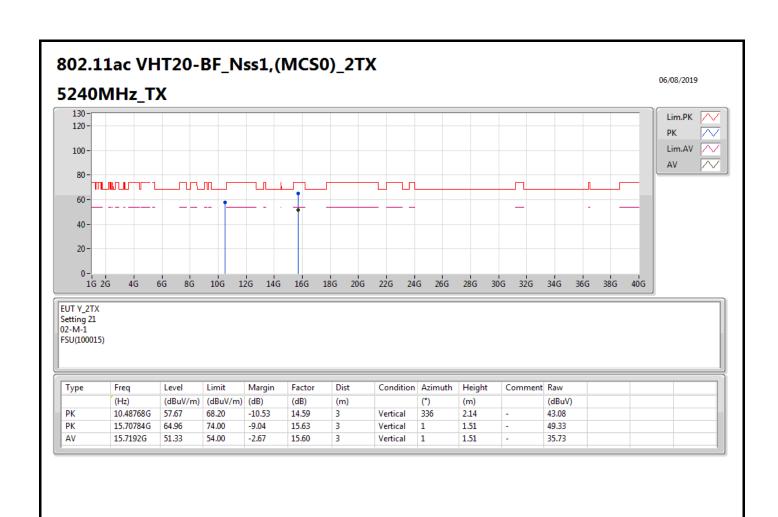




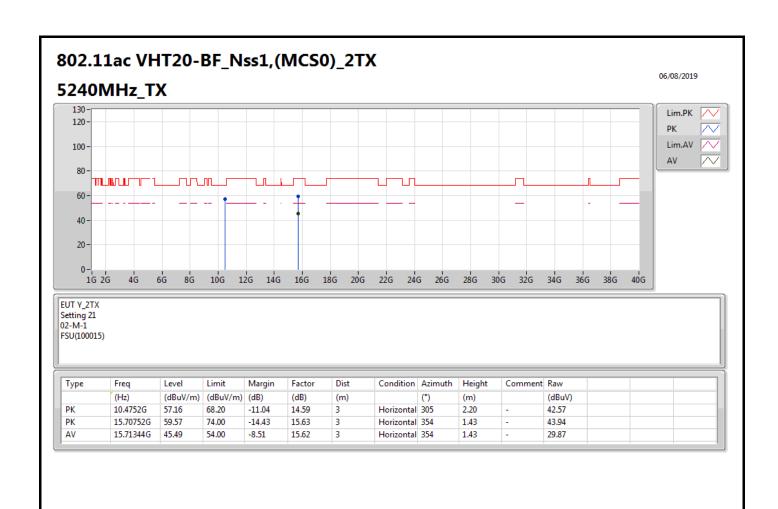




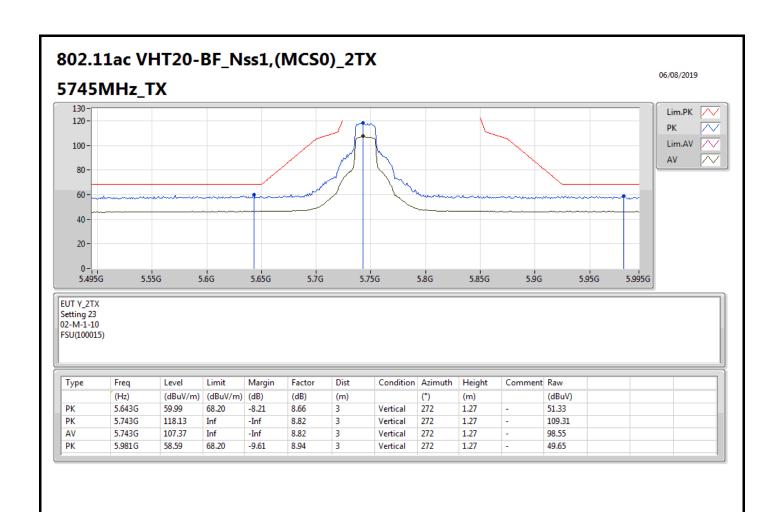




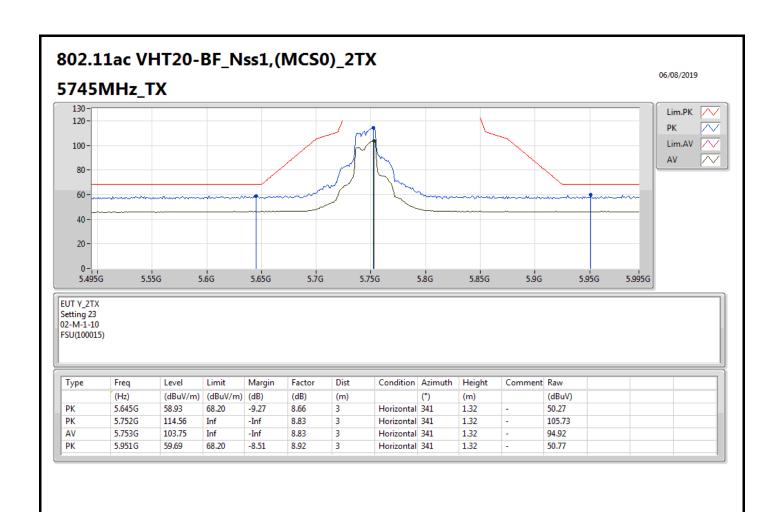




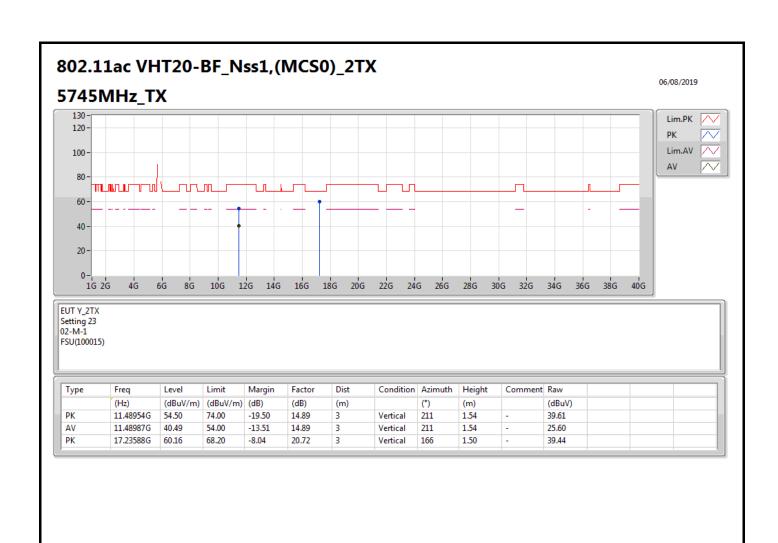




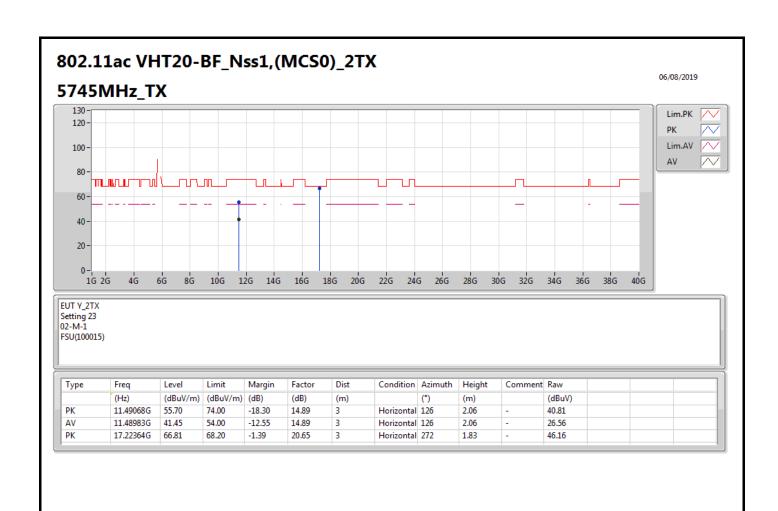




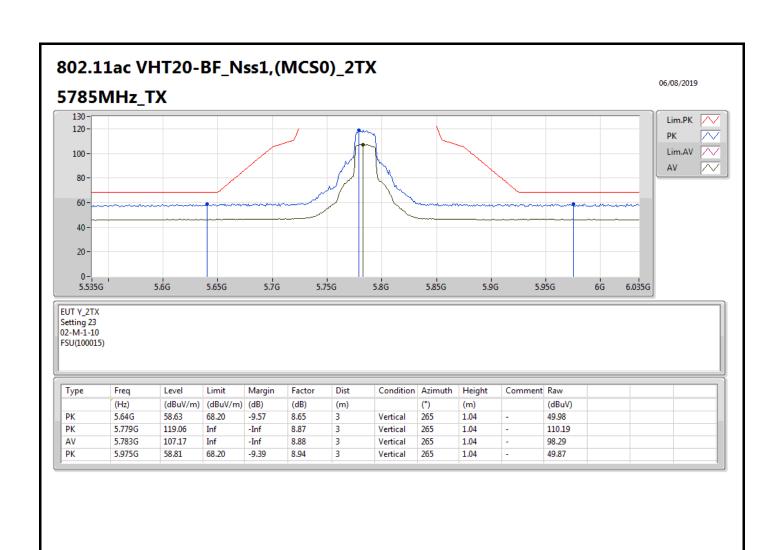




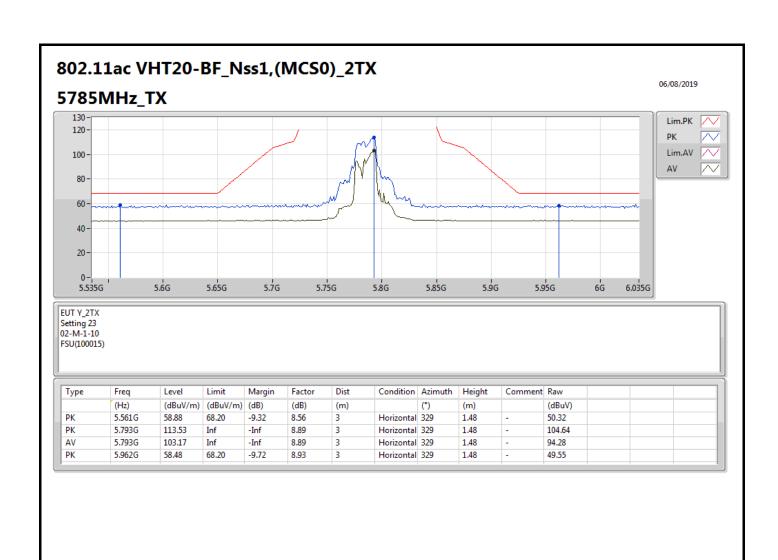




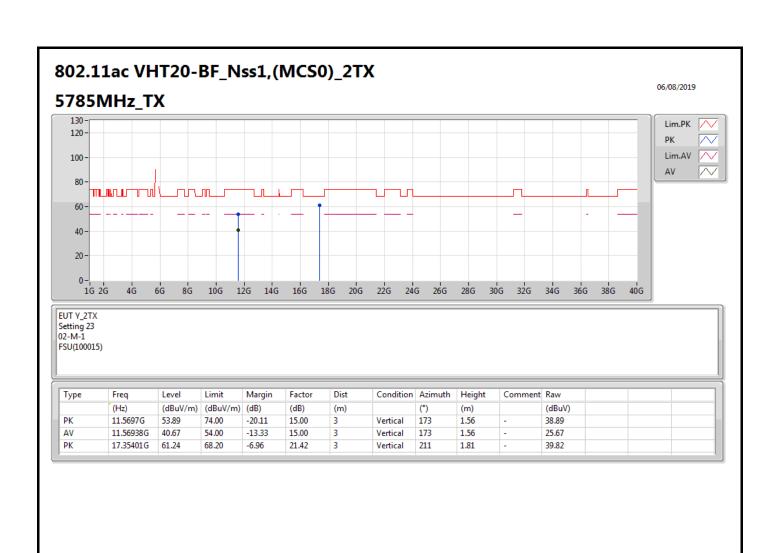




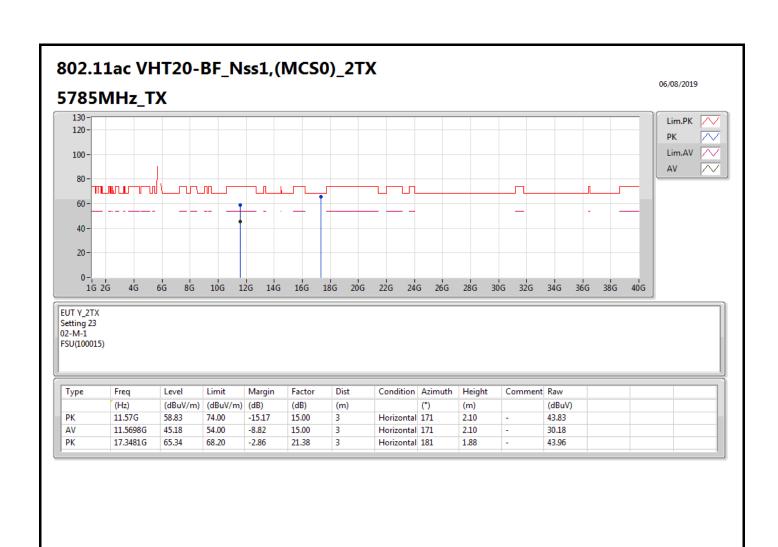




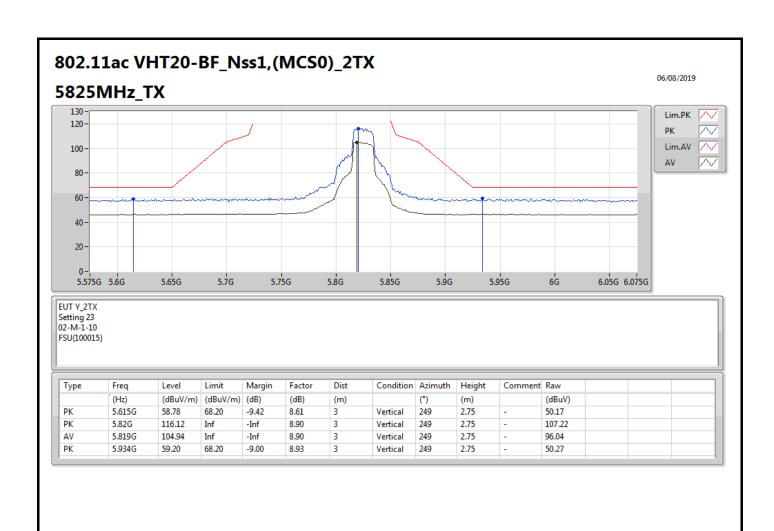




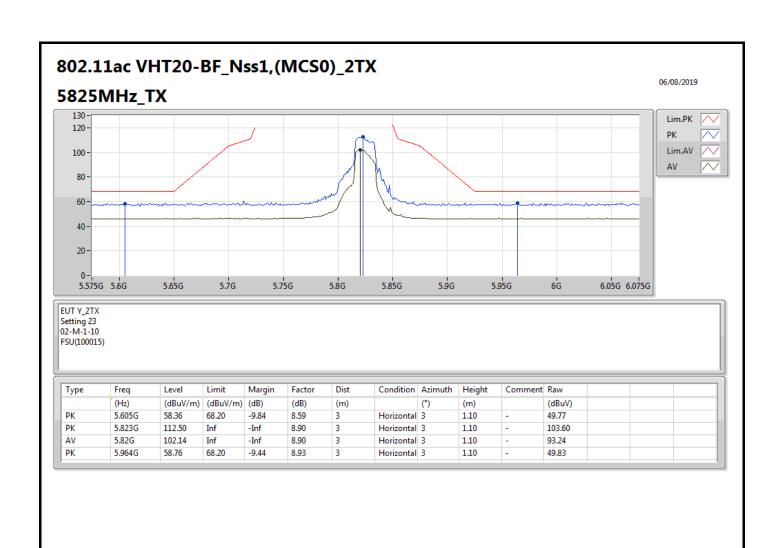




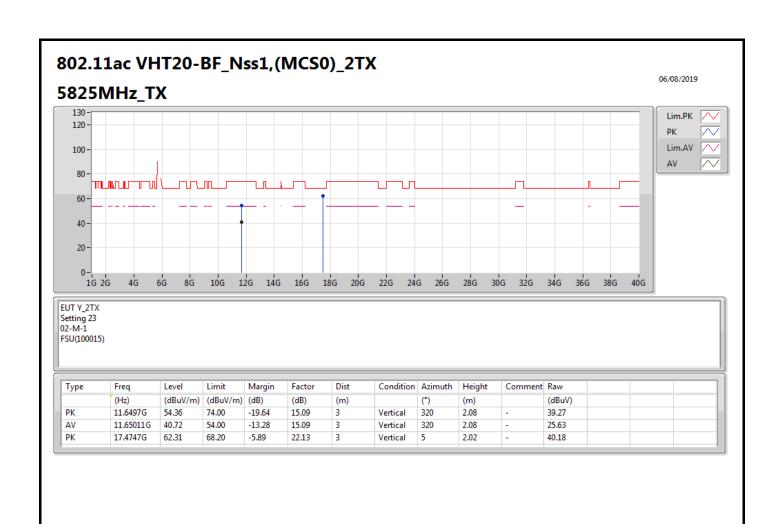




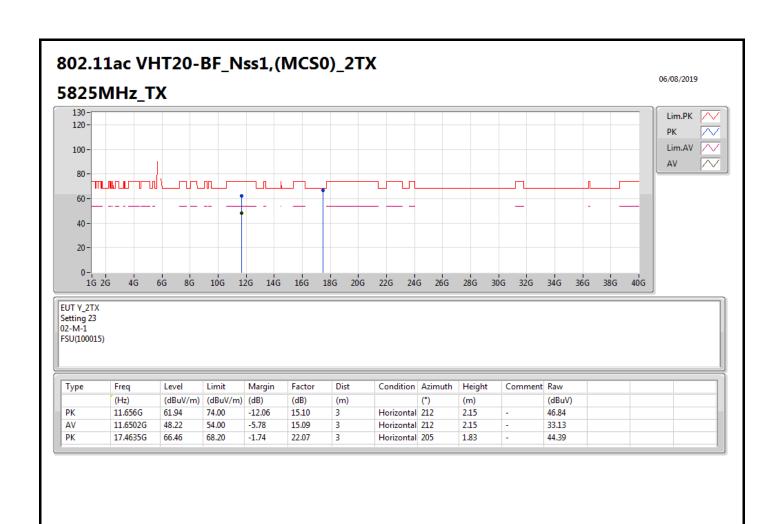




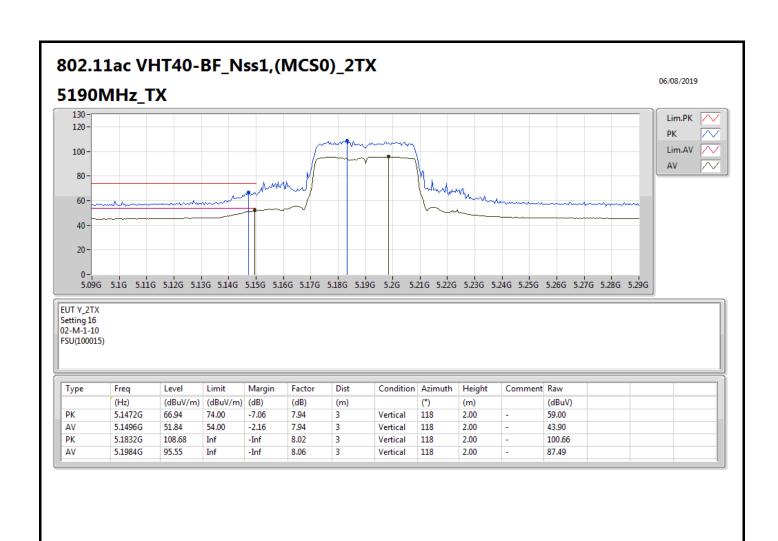




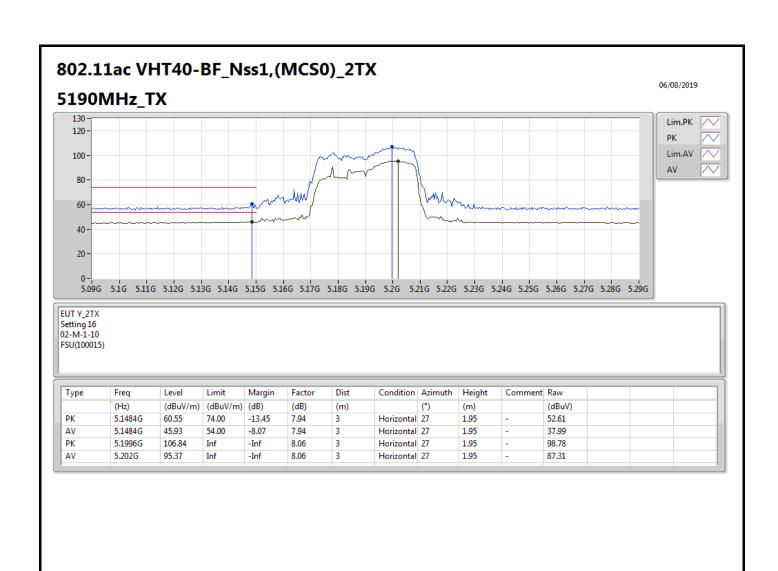




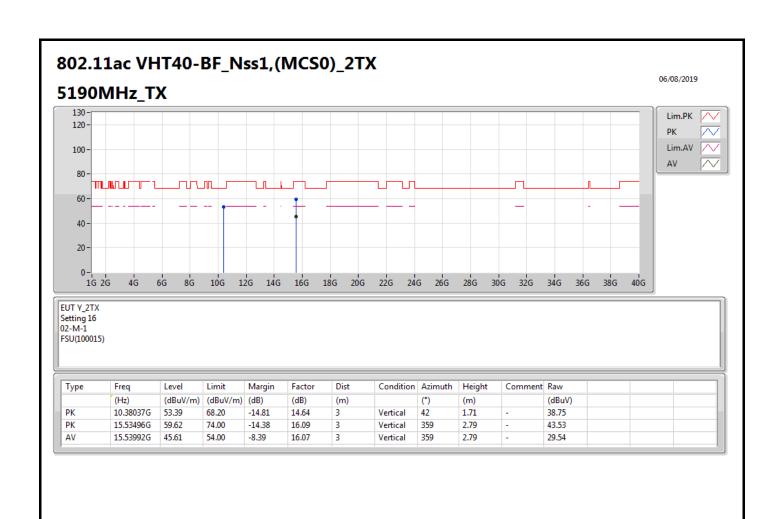




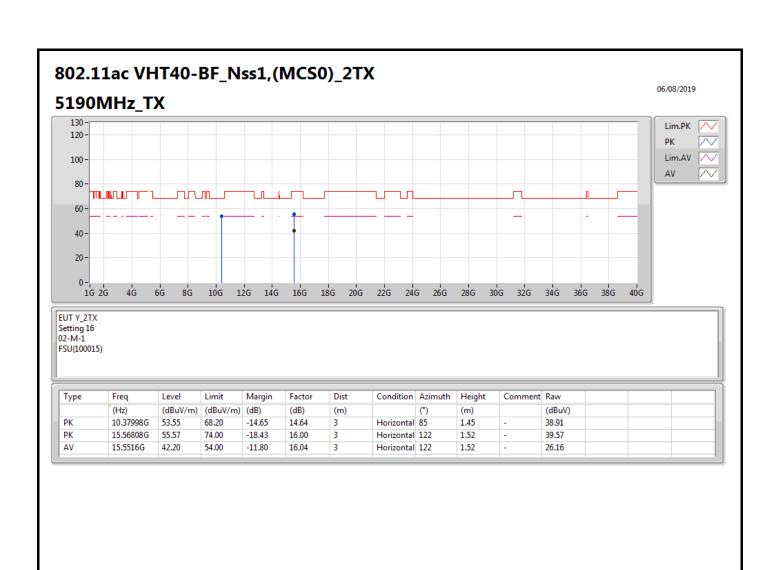




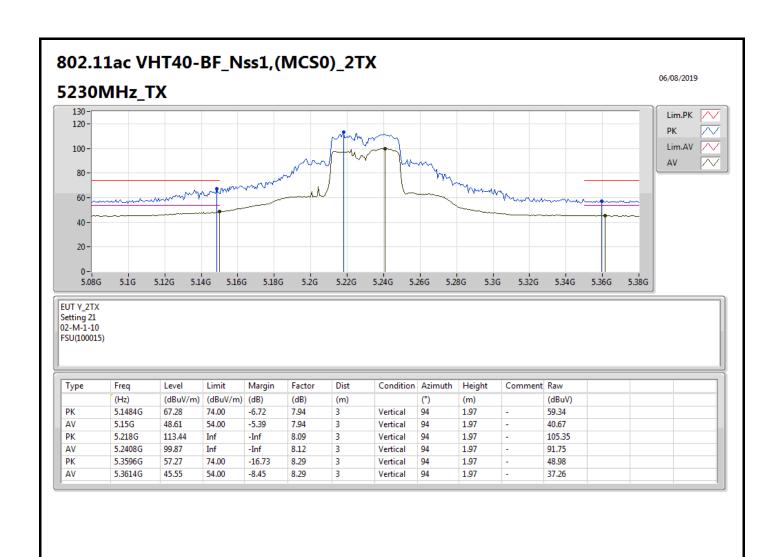




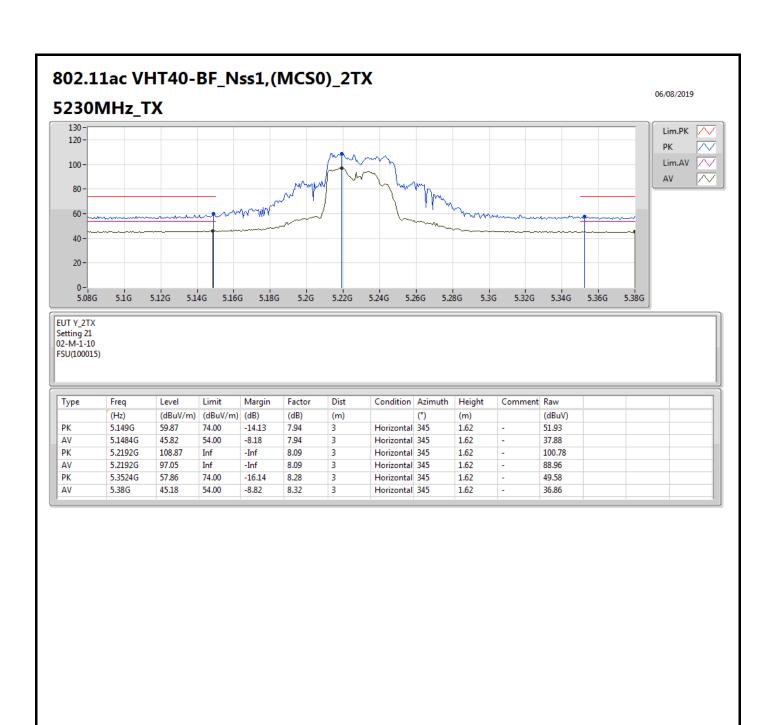




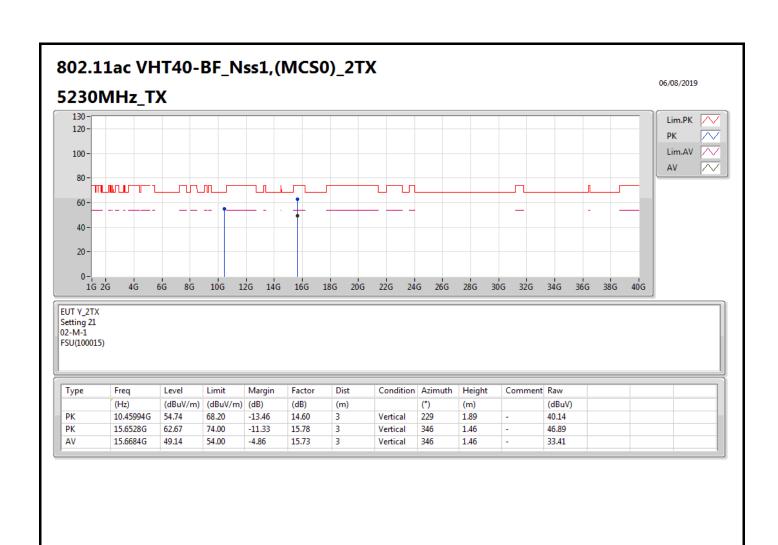




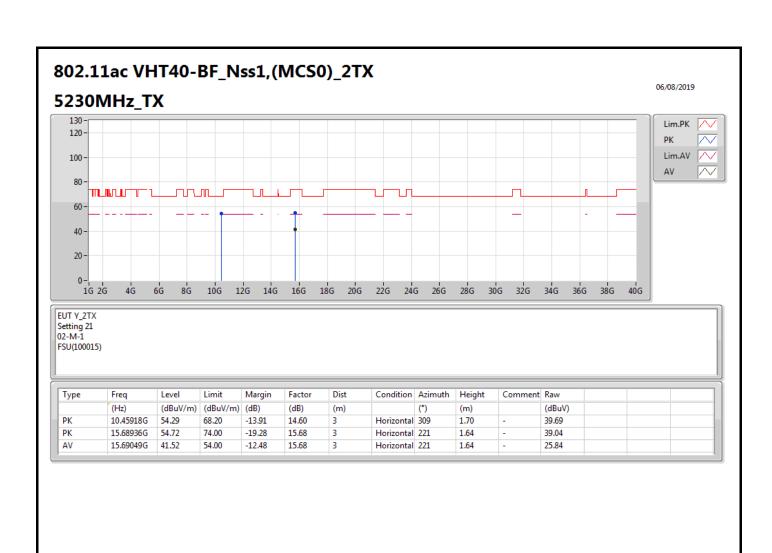




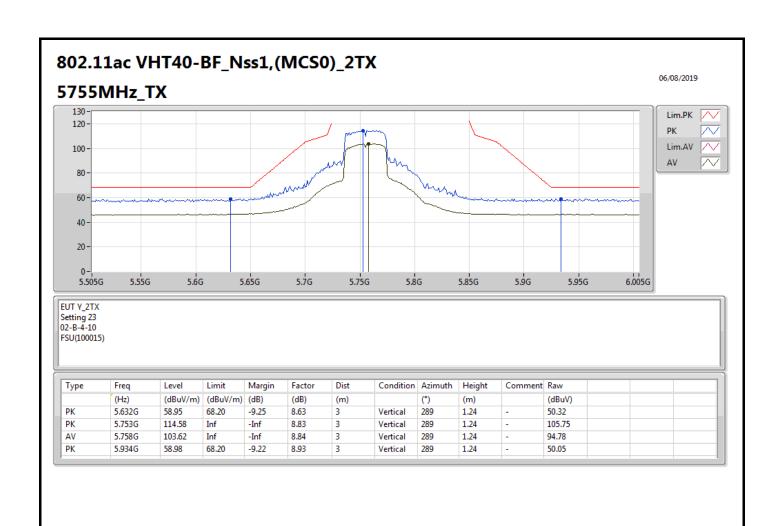




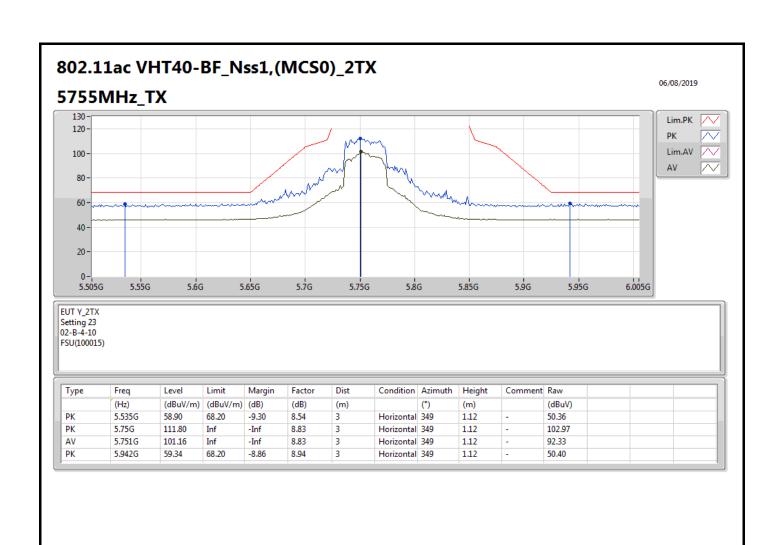




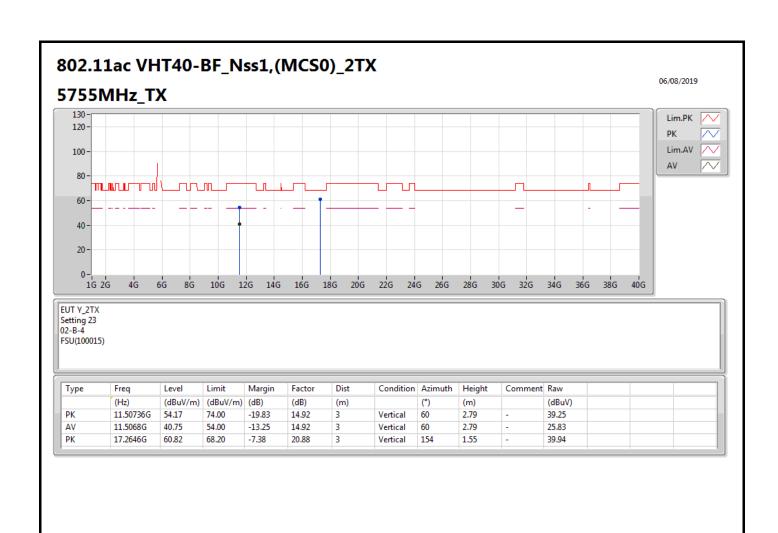




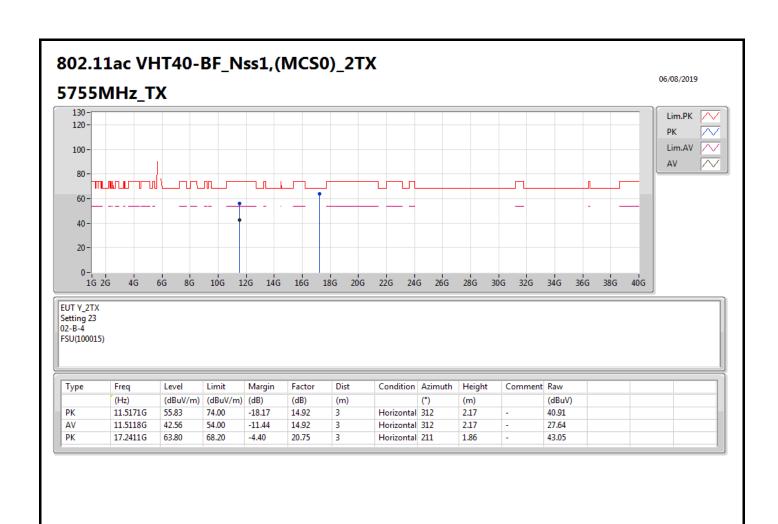




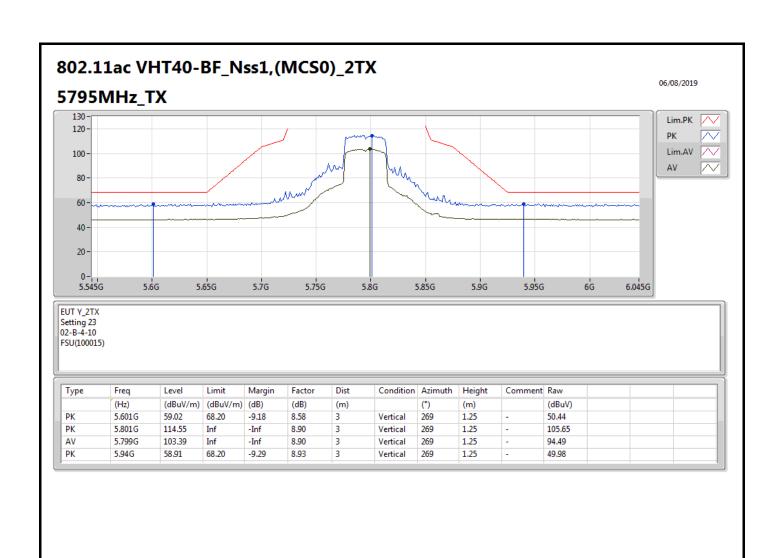




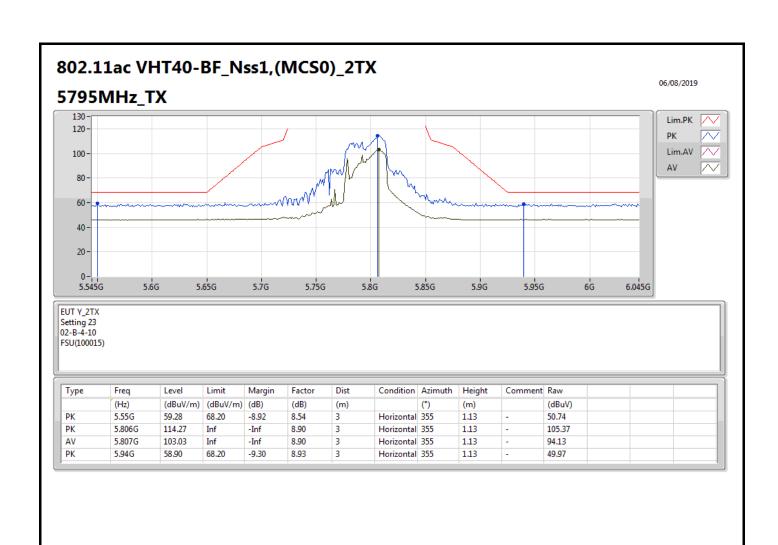




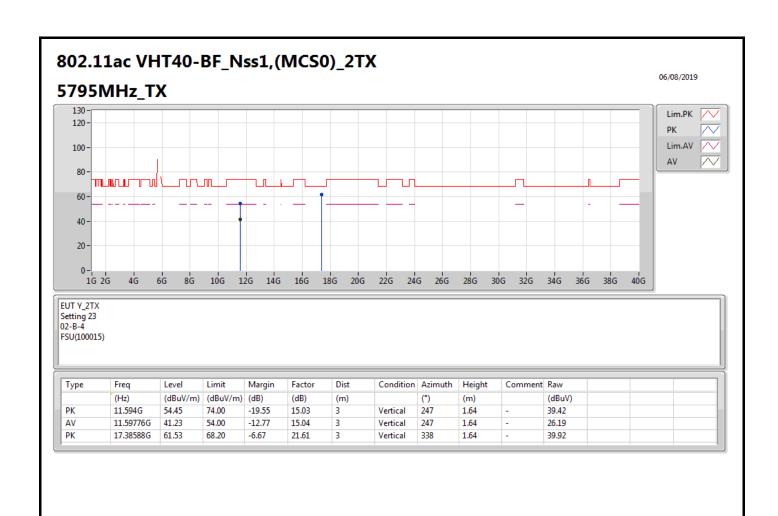




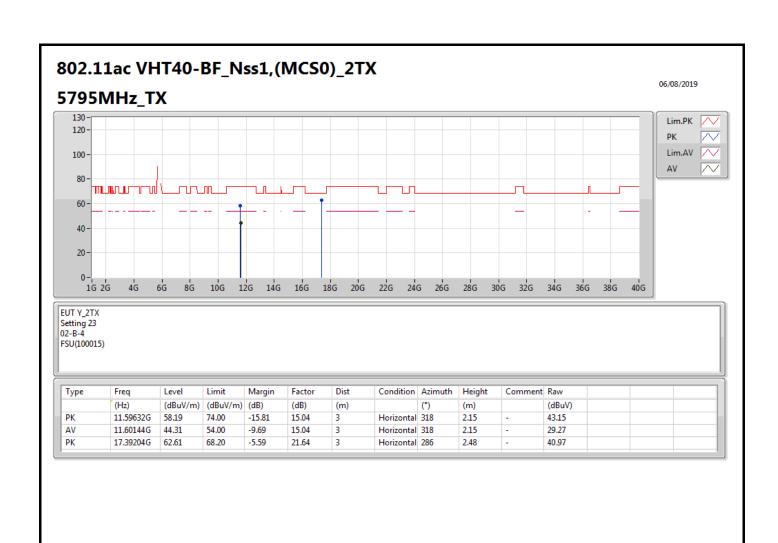




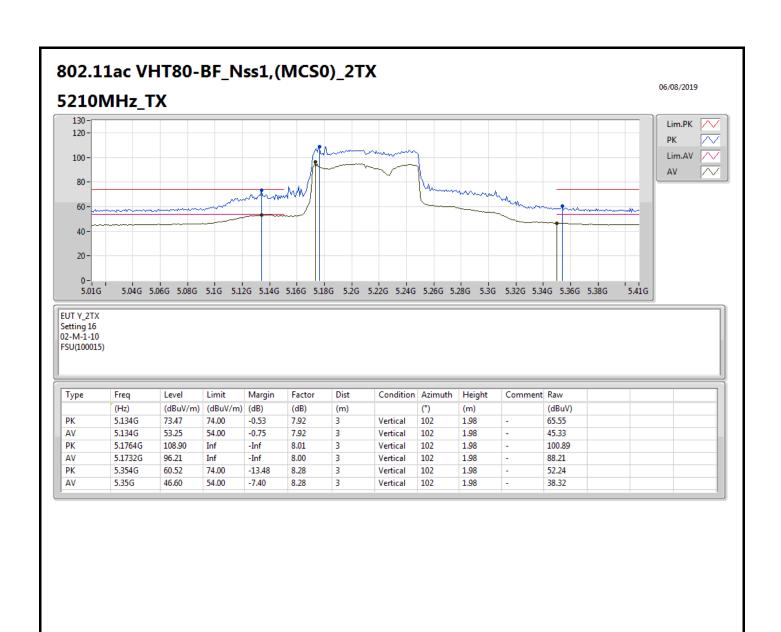




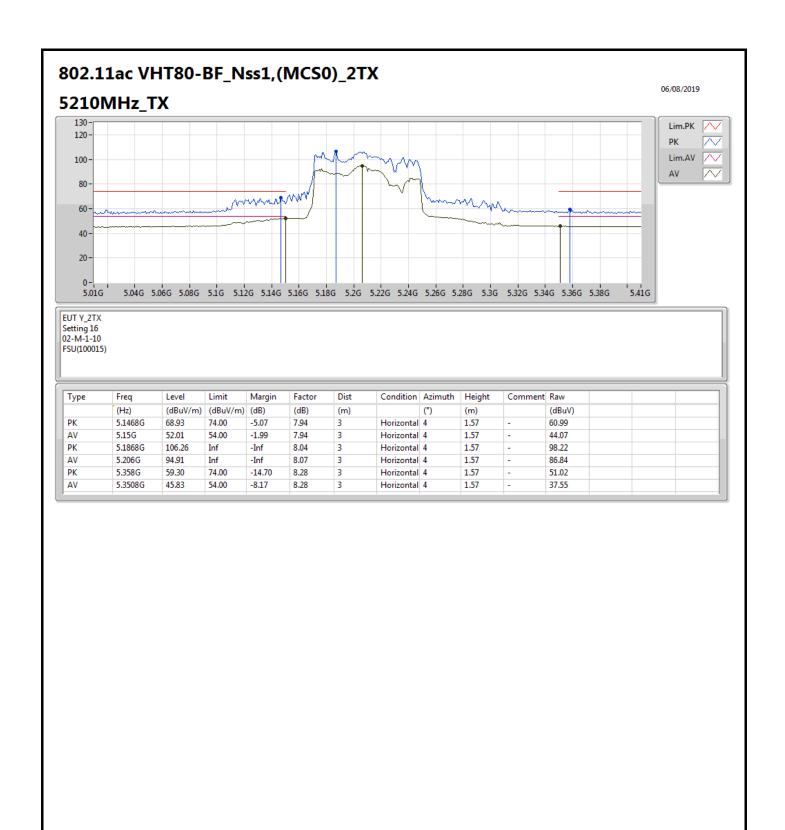




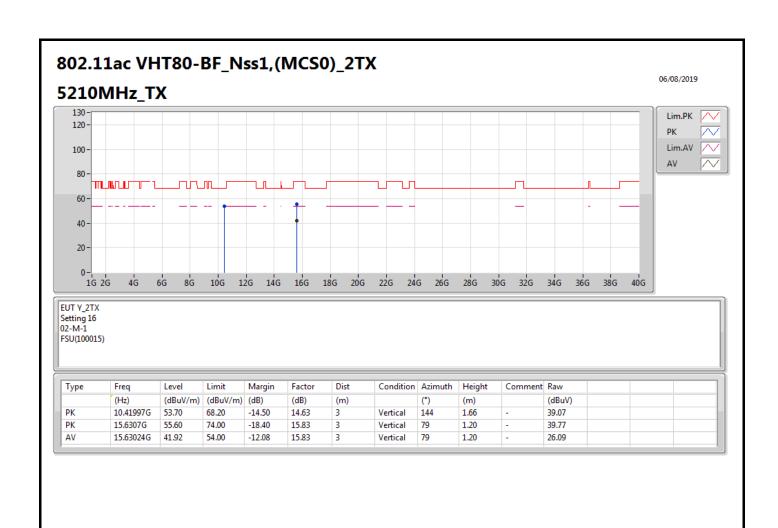




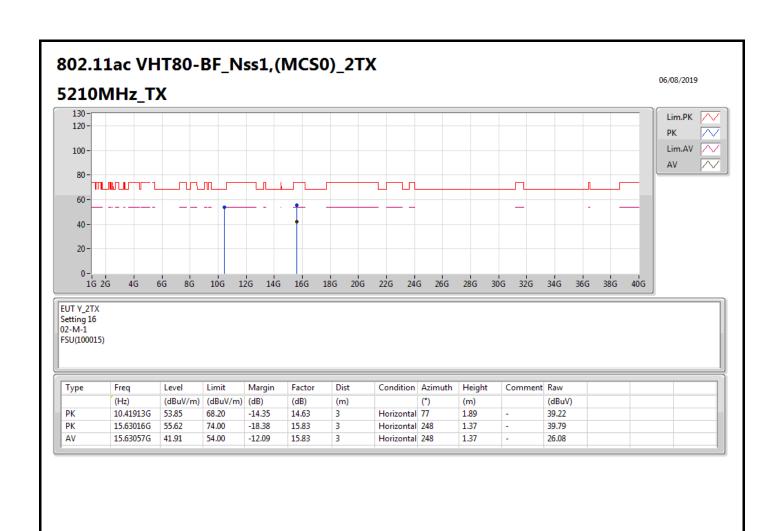




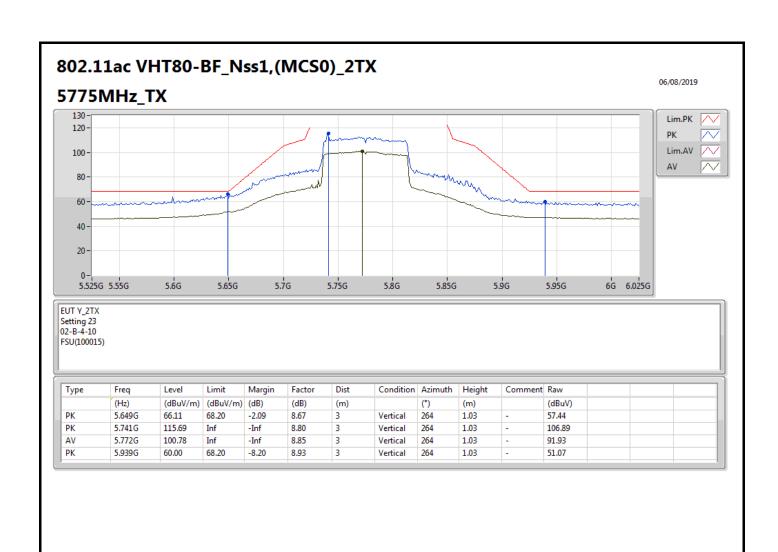




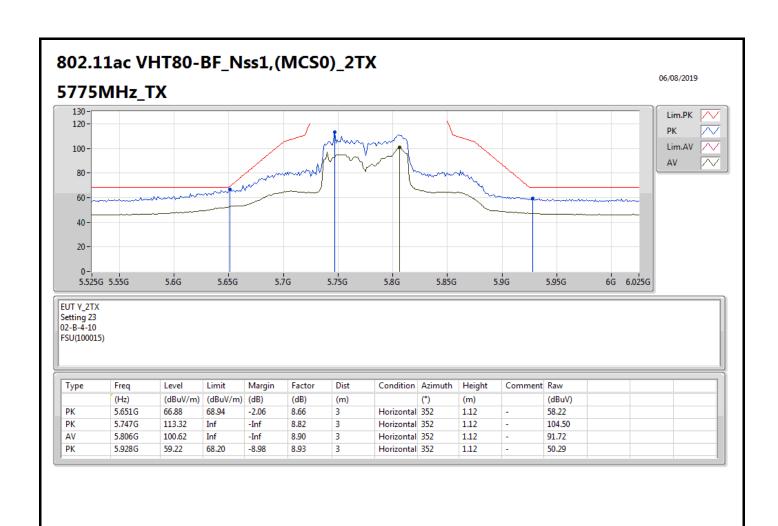




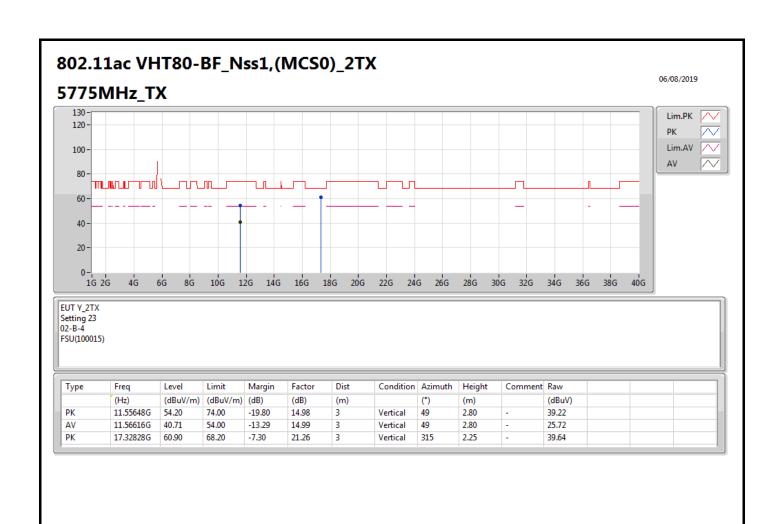




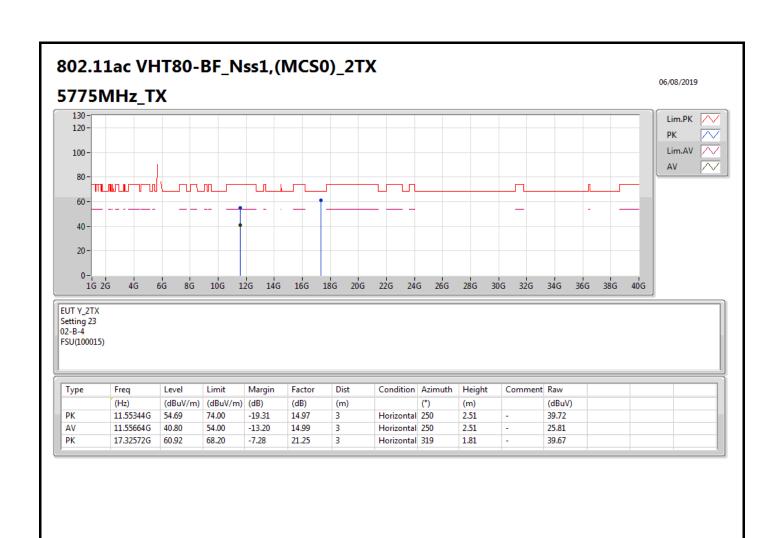




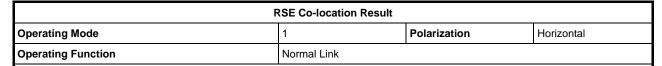


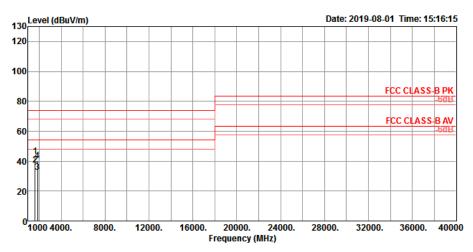






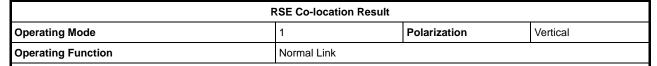


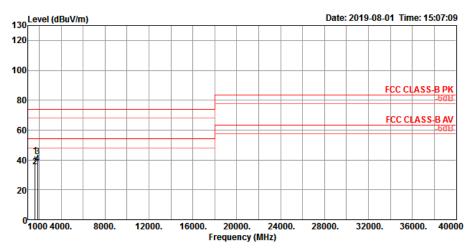




				Limit	Over	Read	CableA	ntenna	Preamp	A/Pos	T/Pos		
		Freq	Level	Line	Limit	Level	Loss	Factor	Factor			Remark	Pol/Phase
		MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
	1	1624.78	43.23	74.00	-30.77	51.12	2.32	25.40	35.61	150	187	Peak	HORIZONTAL
L	2	1624.97	37.61	54.00	-16.39	45.50	2.32	25.40	35.61	150	187	Average	HORIZONTAL
	3	1874.99	32.48	54.00	-21.52	39.05	2.51	26.22	35.30	100	201	Average	HORIZONTAL
	4	1875.05	40.07	74.00	-33.93	46.64	2.51	26.22	35.30	100	201	Peak	HORIZONTAL







	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	1624.92	42.68	74.00	-31.32	50.57	2.32	25.40	35.61	200	177	Peak	VERTICAL
2	1625.04	35.41	54.00	-18.59	43.30	2.32	25.40	35.61	200	177	Average	VERTICAL
3	1874.84	42.30	74.00	-31.70	48.87	2.51	26.22	35.30	166	158	Peak	VERTICAL
4	1874.99	37.46	54.00	-16.54	44.03	2.51	26.22	35.30	166	158	Average	VERTICAL