

Report No.: FR842742AA



FCC RADIO TEST REPORT

FCC ID : UIDW31

Equipment : W31

Brand Name : ARRIS

Model Name : W31

Applicant : ARRIS

3871 Lakefield Drive Suite 300, Suwanee, Georgia,

30024 United States

Manufacturer : ARRIS

3871 Lakefield Drive Suite 300, Suwanee, Georgia,

30024 United States

Standard : 47 CFR FCC Part 15.247

The product was received on Mar. 26, 2018, and testing was started from Mar. 26, 2018 and completed on May 07, 2018. 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.)

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History of this test report

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Report No.	Version	Description	Issued Date
FR842742AA	01	Initial issue of report	Jun. 28, 2018
FR842742AA	02	Updating photographs of EUT version to "Version 2" from "Version 1"	Jul. 17, 2018

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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	15.247(a)	DTS Bandwidth	PASS	-
3.3	15.247(b)	Maximum Conducted Output Power	PASS	-
3.4	15.247(e)	Power Spectral Density	PASS	-
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.6	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

Reviewed by: Sam Chen Report Producer: Viola Huang

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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
2400-2483.5	b, g, n (HT20), ac (VHT20)	2412-2462	1-11 [11]
2400-2483.5	n (HT40), ac (VHT40)	2422-2452	3-9 [7]

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Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	4TX
2.4-2.4835GHz	802.11g	20	4TX
2.4-2.4835GHz	802.11n HT20	20	4TX
2.4-2.4835GHz	2.4-2.4835GHz 802.11ac VHT20		4TX
2.4-2.4835GHz	802.11n HT40	40	4TX
2.4-2.4835GHz	2.4-2.4835GHz 802.11ac VHT40		4TX

Note:

- ◆ 11b mode uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
- 11g, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.
- BWch is the nominal channel bandwidth.
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs. e.g., 2(2,3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.

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1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	PEGATRON	RFPCA2620-01_Rev02	Dual band PCB dipole antenna	I-PEX	
2	PEGATRON	RFPCA2620-02_Rev02	Dual band PCB dipole antenna	I-PEX	
3	PEGATRON	RFPCA2620-03_Rev01	Dual band PCB dipole antenna	I-PEX	
4	PEGATRON	RFPCA2620-04_Rev02	Dual band PCB dipole antenna	I-PEX	
5	PEGATRON	RFPCA2307-02 Rev02	PCA2307-02 Rev02 PCB dipole antenna		Note
6	PEGATRON RFPCA2211-03 Rev01 PCB dipole antenna		I-PEX	Note	
7	PEGATRON	RFPCA2211-04 Rev02	PCB dipole antenna	I-PEX	
8	PEGATRON	RFPCA1806-03 Rev01	PCB dipole antenna	I-PEX	
9	PEGATRON	RFPCA3508-05_Rev02	PCB antenna	I-PEX	
10	PEGATRON	RFPCA1806-03 Rev01	PCB dipole antenna	I-PEX	

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Note:

A 4	Dont	Un	correlated (d	Bi)	C	Correlated (dBi)		(dBi)
Ant.	Port	2.4G	5G B1	5G B4	2.4G	5G B1	5G B4	Bluetooth
1	1	4.22	5.71	-	5.35	6.23		-
2	2	4.22	5.71	-	5.35	6.23		-
3	3	4.22	5.71	-	5.35	6.23		-
4	4	4.22	5.71	-	5.35	6.23		-
5	1	-	-	5.82	-	-	6.93	-
6	2	-	-	5.82	-	-	6.93	-
7	3	-	-	5.82	-	-	6.93	-
8	4	-	-	5.82	-	-	6.93	-
9	1	-	-	-	-	-	-	4.12
10	-	-	5.23	5.23	-	-	-	-

Note: The EUT has ten antennas.

For Radio 1

2.4GHz Functions

For IEEE 802.11b/g/n/ac mode (4TX, 4RX):

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

5GHz Functions (1RX):

The EUT only supports the antenna receive function.

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For Radio 3

5GHz B1 Functions

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

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For Radio 2

5GHz B4 Functions

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

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For Radio 4

Bluetooth Functions (1TX, 1RX):

Only Port 1 could transmit/receive simultaneously.

1.1.3 Table for radio type

Radio No.	2.4G	5G B1	5G B4	ВТ
Radio 1	V	Only RX function	Only RX function	-
Radio 2	-	-	V	-
Radio 3	-	V	-	-
Radio 4	-	-	-	V

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1.1.4 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11b	0.983	0.074	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11g	0.969	0.137	2.068m	1k
802.11ac VHT20	0.965	0.155	1.933m	1k
802.11ac VHT40	0.93	0.315	955u	3k

1.1.5 EUT Operational Condition

EUT Power Type	From Power Adapter			
Beamforming Function	ing Function ☐ With beamforming ☐ Without beamforming			
Function	Point-to-point			
Test Software Version	accessMTool(version 3.0.0.6)			

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1.2 Testing Applied Standards

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

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- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 558074 D01 v04
- FCC KDB 662911 D01 v02r01
- FCC KDB 412172 D01 v01r01

1.3 Testing Location Information

	Testing Location					
	HWA YA ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.					
		TEL	:	886-3-327-3456 FAX : 886-3-318-0055		
\boxtimes	JHUBEI	ADD	:	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.		
		TEL	:	886-3-656-9065 FAX : 886-3-656-9085		

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Stim Sung	22°C / 55%	Mar. 26, 2018 ~ May 04, 2018
Radiated below 1GHz	03CH01-CB	Joy Tseng & Cola Fan	22°C / 54%	May 04, 2018
Radiated above 1GHz	03CH01-CB	Joy Tseng & Cola Fan	22°C / 54%	Apr. 03, 2018 ~ May 07, 2018
AC Conduction	CO01-CB	Rick Yeh	24°C / 52%	May 07, 2018

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

1.4 Measurement Uncertainty

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

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%
Output Power Measurement	1.33 dB	Confidence levels of 95%
Power Density Measurement	1.27 dB	Confidence levels of 95%
Bandwidth Measurement	9.74 x10 ⁻⁸	Confidence levels of 95%

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2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11b_Nss1,(1Mbps)_4TX	-
2412MHz	88
2417MHz	88
2422MHz	88
2427MHz	88
2432MHz	88
2437MHz	89
2447MHz	88
2452MHz	89
2457MHz	89
2462MHz	89
802.11g_Nss1,(6Mbps)_4TX	-
2412MHz	83
2417MHz	95
2422MHz	96
2427MHz	96
2432MHz	96
2437MHz	96
2442MHz	96
2447MHz	96
2452MHz	96
2457MHz	96
2462MHz	87
802.11ac VHT20_Nss1,(MCS0)_4TX	-
2412MHz	81
2417MHz	87
2422MHz	95
2427MHz	97
2432MHz	97
2437MHz	96
2442MHz	97

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Mode	Power Setting
2447MHz	97
2452MHz	97
2457MHz	94
2462MHz	89
802.11ac VHT40_Nss1,(MCS0)_4TX	-
2422MHz	67
2427MHz	72
2432MHz	77
2437MHz	84
2452MHz	84

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Note:

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

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2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests			
Tests Item	AC power-line conducted emissions		
Condition	Condition AC power-line conducted measurement for line and neutral		
Operating Mode CTX			
1 EUT in Y axis - Radio 1 (2.4GHz)			
2 EUT in Y axis - Radio 3 (5GHz B1)			
3	EUT in Y axis - Radio 2 (5GHz B4)		
4 EUT in Y axis - Radio 4 (Bluetooth)			
For operating mode 2 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	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands	
Test Condition	Conducted measurement at transmit chains	

Th	The Worst Case Mode for Following Conformance Tests			
Tests Item	Emissions in Restricted Frequency Bands			
Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used regardless of spatial multiplexing MIMO configuration), the radiated test be performed with highest antenna gain of each antenna type.				
Operating Mode < 1GHz	CTX			
1	EUT in Y axis - Radio 1 (2.4GHz)			
2	EUT in Y axis - Radio 3 (5GHz B1)			
3	EUT in Y axis - Radio 2 (5GHz B4)			
4	EUT in Y axis - Radio 4 (Bluetooth)			
For operating mode 1 is the worst case and it was record in this test report.				
Operating Mode > 1GHz CTX				
1	EUT in Y axis - Radio 1 (2.4GHz)			

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The Worst Case Mode for Following Conformance Tests			
Tests Item Simultaneous Transmission Analysis - Radiated Emission Co-location			
Test Condition Radiated measurement			
Operating Mode CTX			
1 Radio 1 (2.4GHz) + Radio 3 (WLAN 5GHz B1)			
Refer to Appendix G 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			
Radio 1 (2.4GHz) + Radio 3 (WLAN 5GHz B1) + Radio 2 (WLAN 5GHz Badio 4 (Bluetooth)			
Refer to Sporton Test Report No.: FA842742 for Co-location RF Exposure Evaluation.			

Note 1: The EUT can only be used at Y axis position.

2.3 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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2.4 Accessories

Accessories				
Equipment Name	Brand Name	Model Name	P/N	Rating
Adapter	APD	WA-36L12FU	AREP05681	INPUT: 100-120V ~, 60Hz, 0.9A Max OUTPUT: 12V, 3A

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2.5 Support Equipment

For Test Site No: CO01-CB

	Support Equipment					
No.	No. Equipment Brand Name Model Name FCC ID					
1	NB	DELL	E6430	DoC		
2	Flash disk3.0	Transcend	JetFlash-700	N/A		

For Test Site No: 03CH01-CB

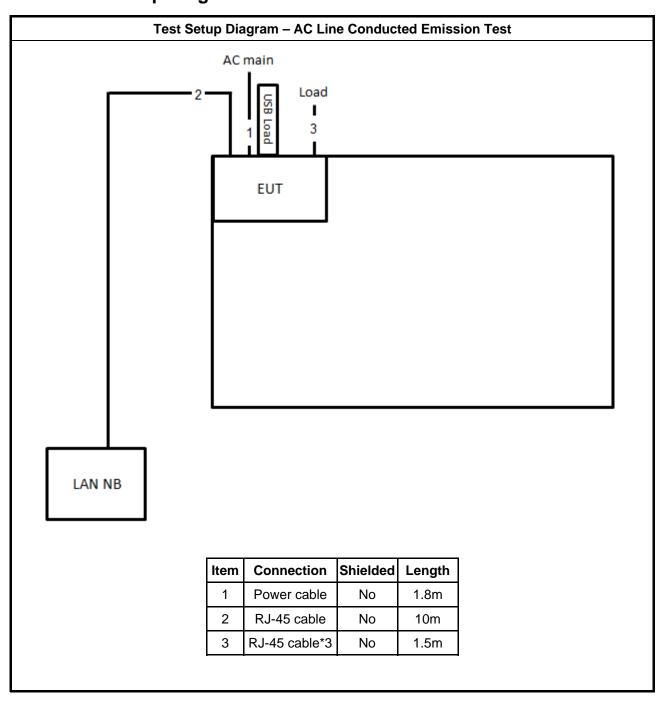
Support Equipment					
No.	No. Equipment Brand Name Model Name FCC ID				
1	NB	DELL	E4300	DoC	

For Test Site No: TH01-CB

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

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2.6 Test Setup Diagram

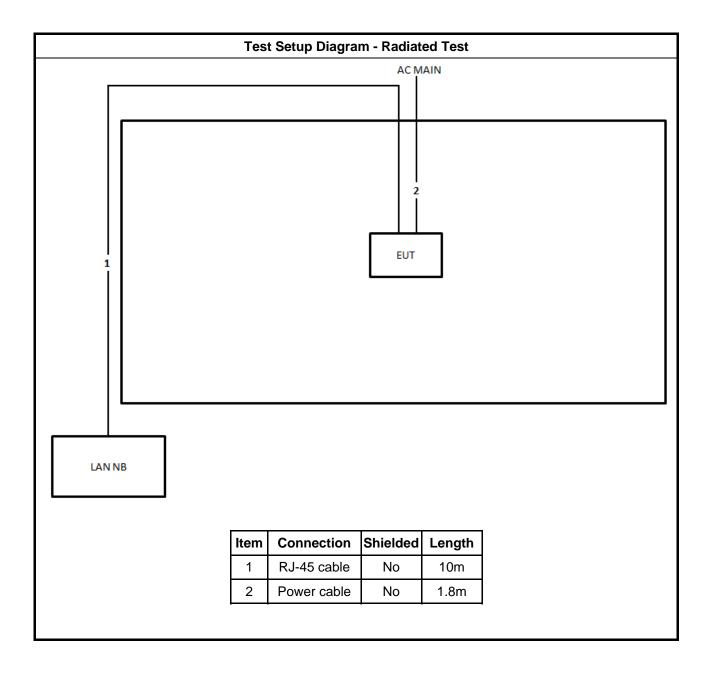


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3 Transmitter Test Result

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

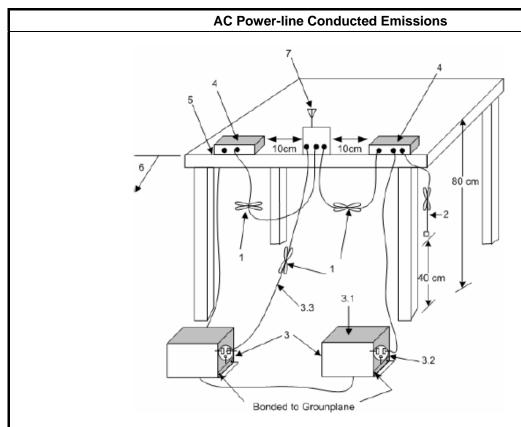
Refer a test equipment and calibration data table in this test report.

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 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit				
Systems using digital modulation techniques:				
■ 6 dB bandwidth ≥ 500 kHz.				

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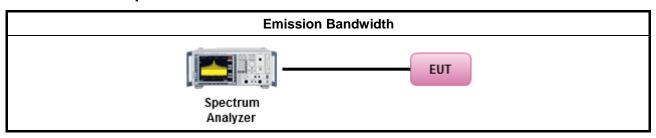
3.2.2 Measuring Instruments

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 558074, clause 8.1 Option 1 for 6 dB bandwidth measurement.							
		Refer as FCC KDB 558074, clause 8.2 Option 2 for 6 dB bandwidth measurement.					
		Refer as ANSI C63.10, clause 6.9.1 for occupied 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

- If G_{TX} ≤ 6 dBi, then P_{Out} ≤ 30 dBm (1 W)
- Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)$ dBm
- Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
- Smart antenna system (SAS):
 - Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
 - Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3$ dBm
 - Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 (G_{TX} 6)/3 + 8$ dB dBm

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 \mathbf{P}_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, \mathbf{G}_{TX} = the maximum transmitting antenna directional gain in dBi.

3.3.2 Measuring Instruments

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

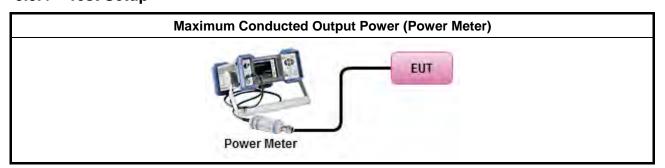
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3.3.3 Test Procedures

		Test Method
•	Maxir	num Peak Conducted Output Power
	F	Refer as FCC KDB 558074, clause 9.1.1 Option 1 (RBW ≥ EBW method).
	F	Refer as FCC KDB 558074, clause 9.1.3 (peak power meter for VBW ≥ DTS BW)
•	Maxir	num Conducted Output Power
	[duty	cycle ≥ 98% or external video / power trigger]
	□ F	Refer as FCC KDB 558074, clause 9.2.2.2 Method AVGSA-1 (spectral trace averaging).
		Refer as FCC KDB 558074, clause 9.2.2.3 Method AVGSA-1 Alt. (slow sweep speed)
	duty o	cycle < 98% and average over on/off periods with duty factor
		Refer as FCC KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
		Refer as FCC KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
	Meas	urement using a power meter (PM)
	⊠ I	Refer as FCC KDB 558074, clause 9.2.3 Method AVGPM (using an RF average power meter).
		Refer as FCC KDB 558074, clause 9.2.3.2 Method AVGPM-G (using an gate RF average power meter).
•	For co	onducted measurement.
	l a	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.
	l (If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP _{total} = $P_{total} + DG$

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3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

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3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit ■ Power Spectral Density (PSD) ≤ 8 dBm/3kHz

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3.4.2 Measuring Instruments

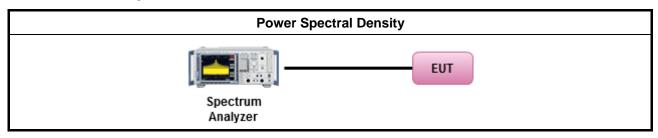
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

	Test Method							
•	Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).							
	Refer as FCC KDB 558074, clause 10.2 Method PKPSD (RBW=3-100kHz; Detector=peak).							
	[duty cycle ≥ 98% or external video / power trigger]							
	Refer as FCC KDB 558074, clause 10.3 Method AVGPSD-1 (spectral trace averaging).							
	Refer as FCC KDB 558074, clause 10.4 Method AVGPSD-2 (slow sweep speed)							
	duty cycle < 98% and average over on/off periods with duty factor							
	Refer as FCC KDB 558074, clause 10.5 Method AVGPSD-1 Alt (spectral trace averaging).							
	Refer as FCC KDB 558074, clause 10.6 Method AVGPSD-2 Alt. (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 6629 In-band power spectral density (PSD). Sample all transmit ports simultaneously using spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit pure summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add the amplitude (power) values for the different transmit chains and use this as the new of trace.	g a port the the d up						
	Option 2: Measure and sum spectral maxima across the outputs. With this technique, speare measured at each output of the device at the required resolution bandwidth. maximum value (peak) of each spectrum is determined. These maximum values are the summed mathematically in linear power units across the outputs. These operations shall performed separately over frequency spans that have different out-of-band or spuriemission limits,	The hen I be						
	Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refe 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 Or each transmit chains shall be add 10 log(N) to compared with the limit.	ains						

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3.4.4 Test Setup



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3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

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3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit					
RF output power procedure Limit (dB)					
Peak output power procedure	20				
Average output power procedure	30				

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- Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.
- Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

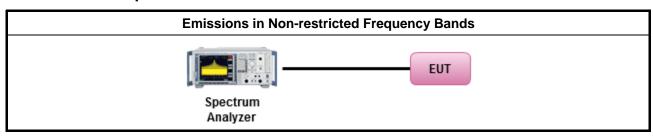
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

	Test Method
•	Refer as FCC KDB 558074, clause 11 for unwanted emissions into non-restricted bands.

3.5.4 Test Setup



3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

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3.6 Emissions in Restricted Frequency Bands

3.6.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions 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 ELIT
- 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.

3.6.2 Measuring Instruments

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

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3.6.3 Test Procedures

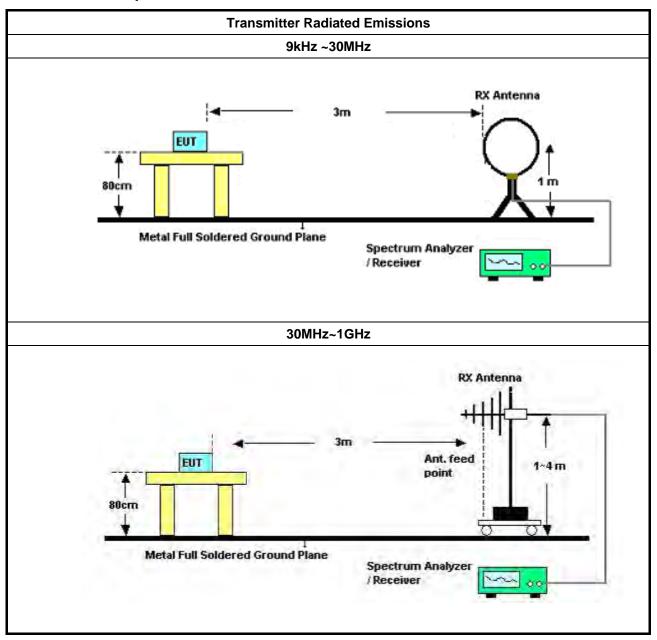
		Test Method				
•	The	average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].				
•	Refer as ANSI C63.10, clause 6.9.2.2 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.					
•	For t	he transmitter unwanted emissions shall be measured using following options below:				
	•	Refer as FCC KDB 558074, clause 12 for unwanted emissions into restricted bands.				
		☐ Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle ≥98%)				
		Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).				
		Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW≥1/T).				
		☐ Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.				
		Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.				
		Refer as FCC KDB 558074, clause 12.2.4 measurement procedure peak limit.				
•	For t	he transmitter band-edge emissions shall be measured using following options below:				
 Refer as FCC KDB 558074 clause 13.1, When the performing peak or average radio measurements, emissions within 2 MHz of the authorized band edge may be measured using marker-delta method described below. 						
		Refer as FCC KDB 558074, clause 13.2 (ANSI C63.10, clause 6.9.3) for marker-delta method for band-edge measurements.				
		Refer as FCC KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).				
•	For o	conducted and cabinet radiation measurement, refer as FCC KDB 558074, clause 12.2.2.				
	•	For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB				
	•	For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.				

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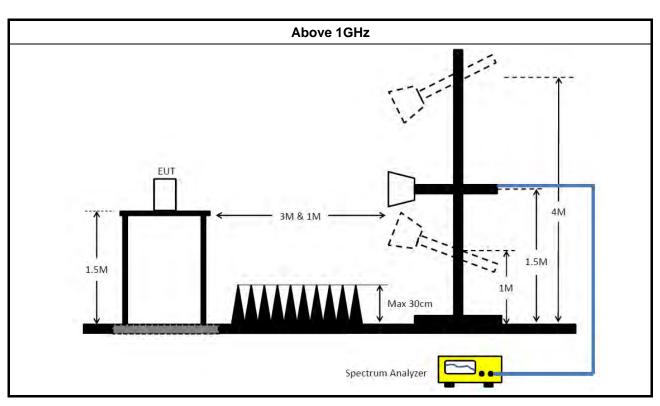
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3.6.4 Test Setup



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3.6.5 Transmitter Radiated 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.

3.6.6 Test Result of Transmitter Radiated Unwanted Emissions

Refer as Appendix F

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4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 31, 2018	Jan. 30, 2019	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50- 16-2	04083	150kHz~100MHz	Dec. 20, 2017	Dec. 19, 2018	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 29, 2017	Dec. 28, 2018	Conduction (CO01-CB)
Impulsbegrenzer Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 06, 2018	Feb. 05, 2019	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 23, 2017	May 22, 2018	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2017	Aug. 29, 2018	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2018	Mar. 15, 2019	Radiation (03CH01-CB
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 20, 2017	Nov. 19, 2018	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 05, 2017	Jul. 04, 2018	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2018	May 01, 2019	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 09, 2018	Jan. 08, 2019	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35- HG	1864479	18GHz ~ 40GHz	Jul. 10, 2017	Jul. 09, 2018	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 23, 2017	Nov. 22, 2018	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 06, 2017	May 05, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 21, 2017	Dec. 20, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 20, 2017	Nov. 19, 2018	Conducted (TH01-CB)

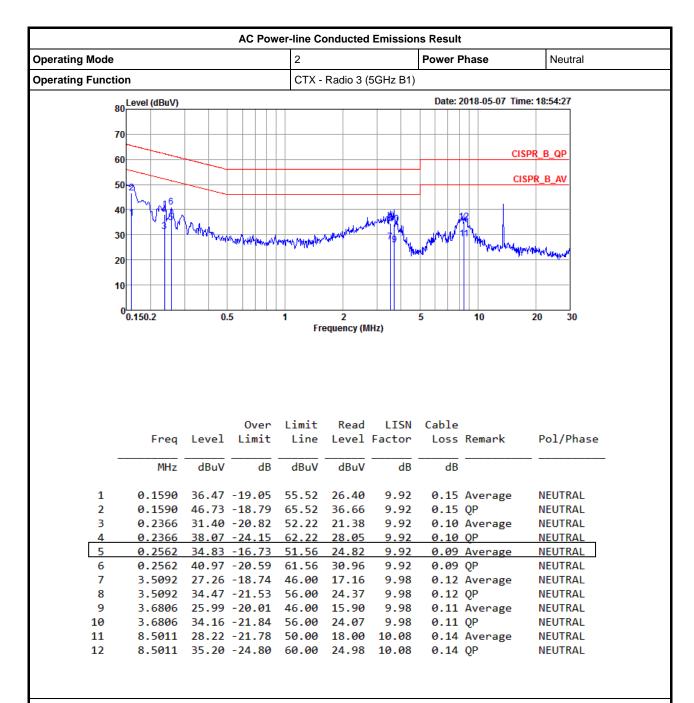
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Note: Calibration Interval of instruments listed above is one year.

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

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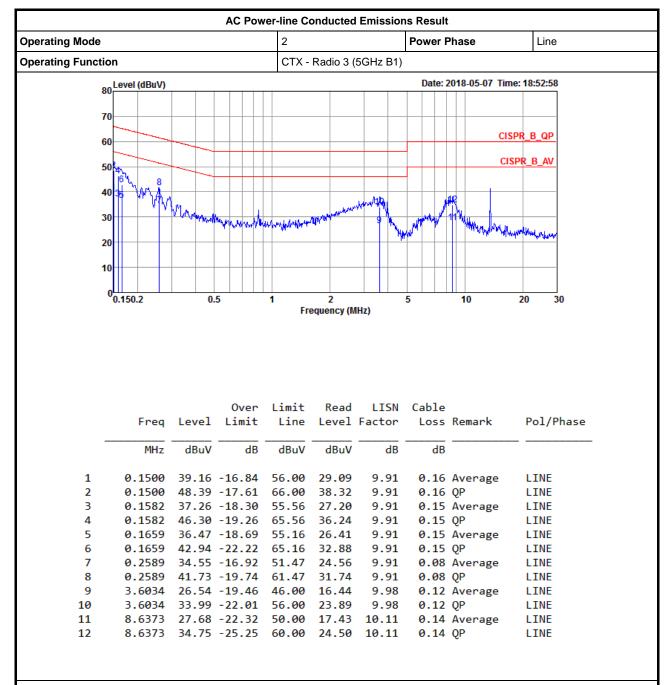
AC Power-line Conducted Emissions Result



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



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.)



EBW Result Appendix B

Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW	
	(Hz)	(Hz)		(Hz)	(Hz)	
2.4-2.4835GHz	-	-	-	-	-	
802.11b_Nss1,(1Mbps)_4TX	7.55M	10.245M	10M2G1D	6.075M	10.12M	
802.11g_Nss1,(6Mbps)_4TX	16.375M	16.592M	16M6D1D	16.05M	16.492M	
802.11ac VHT20_Nss1,(MCS0)_4TX	17.6M	17.791M	17M8D1D	17.3M	17.691M	
802.11ac VHT40_Nss1,(MCS0)_4TX	36.35M	36.332M	36M3D1D	36.1M	36.132M	

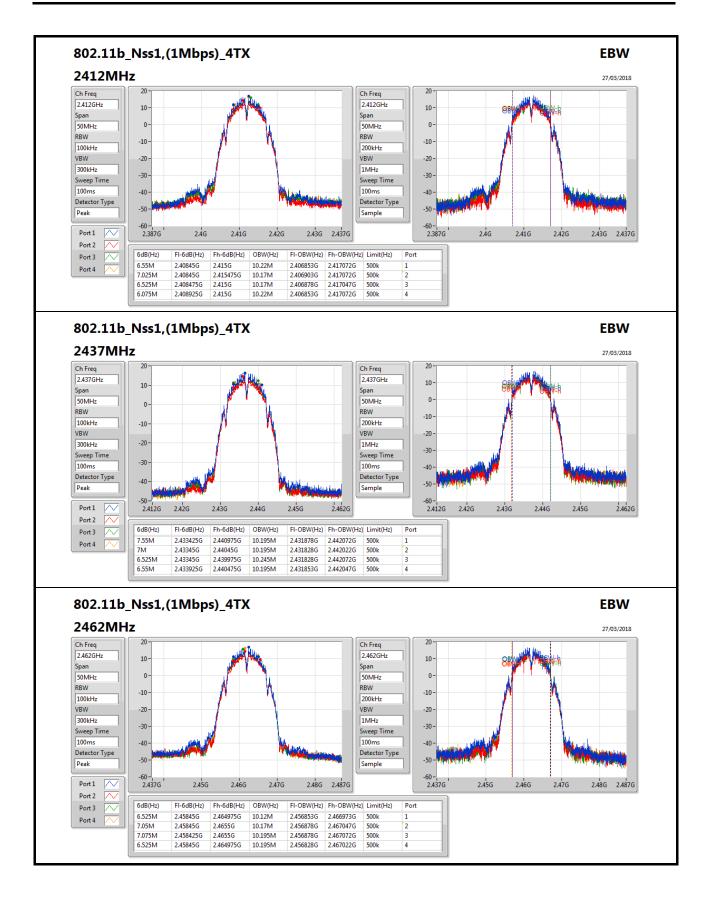
Max-N dB = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth; **Min-N dB** = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

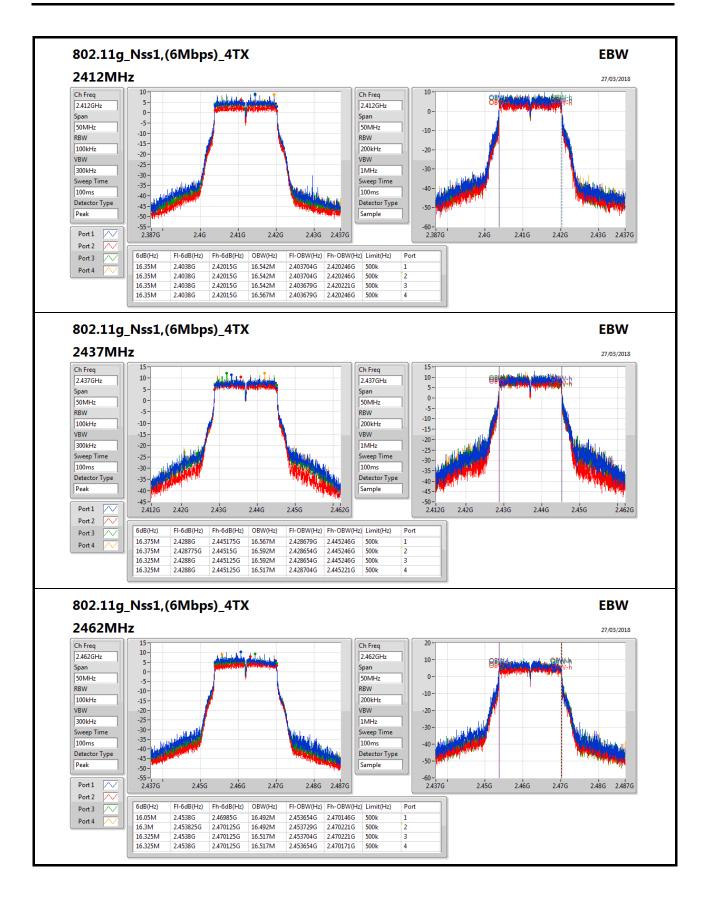
Result

Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW	Port 3-N dB	Port 3-OBW	Port 4-N dB	Port 4-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	6.55M	10.22M	7.025M	10.17M	6.525M	10.17M	6.075M	10.22M
2437MHz	Pass	500k	7.55M	10.195M	7M	10.195M	6.525M	10.245M	6.55M	10.195M
2462MHz	Pass	500k	6.525M	10.12M	7.05M	10.17M	7.075M	10.195M	6.525M	10.195M
802.11g_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	16.35M	16.542M	16.35M	16.542M	16.35M	16.542M	16.35M	16.567M
2437MHz	Pass	500k	16.375M	16.567M	16.375M	16.592M	16.325M	16.592M	16.325M	16.517M
2462MHz	Pass	500k	16.05M	16.492M	16.3M	16.492M	16.325M	16.517M	16.325M	16.517M
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	17.575M	17.741M	17.6M	17.741M	17.55M	17.766M	17.6M	17.766M
2437MHz	Pass	500k	17.575M	17.791M	17.6M	17.766M	17.55M	17.766M	17.575M	17.766M
2462MHz	Pass	500k	17.3M	17.691M	17.55M	17.716M	17.575M	17.716M	17.55M	17.741M
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	500k	36.35M	36.232M	36.3M	36.182M	36.3M	36.132M	36.35M	36.282M
2437MHz	Pass	500k	36.1M	36.332M	36.35M	36.182M	36.35M	36.232M	36.3M	36.232M
2452MHz	Pass	500k	36.25M	36.182M	36.35M	36.332M	36.35M	36.282M	36.3M	36.182M

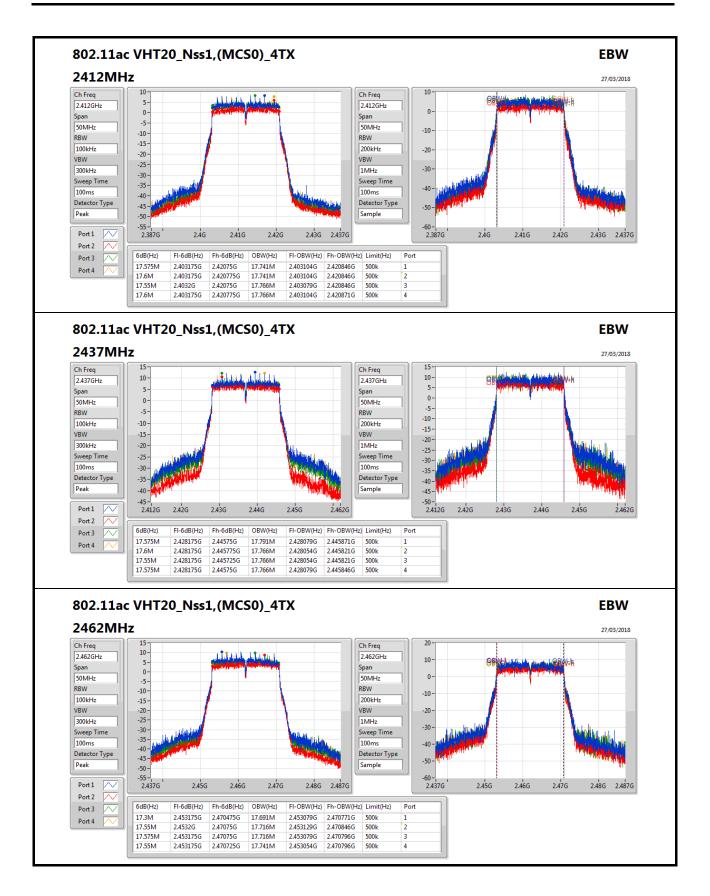
Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;











802.11ac VHT40_Nss1,(MCS0)_4TX **EBW** 2422MHz 27/03/2018 2.422GHz 2.422GHz 0-Span -5--10 -100MHz 100MHz -10 -15 RBW RBW -15--20 100kHz 500kHz -20 --25 -VBW VBW -25--30 300kHz 2MHz -30 -Sweep Time -35 -Sweep Time 100ms -40 100ms -40-Detector Type Detector Type -45 -45-Peak Sample -50 -50 --55 -2.372G -55 -2.372G 2.42G 2.44G 2.46G 2.472G 2.42G 2.46G 2.472G Port 2 6dB(Hz) FI-6dB(Hz) Fh-6dB(Hz) OBW(Hz) FI-OBW(Hz) Fh-OBW(Hz) Limit(Hz) Port 3 36.35M 2.4038G 2.44015G 36.232M 2.403859G 2.440091G 500k Port 4 36.3M 2.40385G 2.44015G 36.182M 2.403859G 2.440041G 500k 36.3M 2.4038G 2.4401G 36.132M 2.403909G 2.440041G 36.35M 2.4038G 2.44015G 36.282M 2.403859G 2.440141G 802.11ac VHT40_Nss1,(MCS0)_4TX **EBW** 2437MHz Ch Freq Ch Freq 2.437GHz 10-2.437GHz Span -5-100MHz 100MHz -10 -5-RBW RBW -15 -10 100kHz 500kHz -20 -15 VRW VRW -25 -300kHz 2MHz -30 -25 -Sweep Time Sweep Time -35 -30 -100ms 100ms -40 -35-Detector Type Detector Type Peak Sample -45--55 -2.387G -50 -2.387G 2.4G 2.42G 2.44G 2.46G 2.487G 2.4G 2.44G 2.487G Port 1 2.42G 2.46G FI-OBW(Hz) Fh-OBW(Hz) Limit(Hz) 6dB(Hz) FI-6dB(Hz) Fh-6dB(Hz) OBW(Hz) 36.1M 2.41905G 36.332M 2.418809G Port 4 36.35M 2.4188G 2.45515G 36 182M 2.418859G 2.455041G 500k 2.454991G 36.35M 2.4188G 2.45515G 36.232M 2.418759G 36.3M 2.4188G 2.4551G 36.232M 2.418859G 2.455091G 802.11ac VHT40_Nss1,(MCS0)_4TX **EBW** 2452MHz 27/03/2018 10-2.452GHz 2.452GH 0--5 --10 -100MHz 100MHz RBW RBW -10 -15 100kHz 500kHz -15--20 VBW VBW -20 --25 --25 300kHz 2MHz -30 -30 -Sweep Time Sweep Time -35 --35 100ms 100ms -40 -Detector Type -45 --45 Peak Sample -50 -50 --55 -55 -2.402G 2.42G 2.42G 2.44G Port 1 2.48G 2.402G 2.44G 2.46G Port 2 6dB(Hz) FI-OBW(Hz) Fh-OBW(Hz) Limit(Hz) Port 3 36.25M 2.43385G 2.4701G 36.182M 2.433859G 2.470041G 36.35M 2.4338G 2.47015G 36,332M 2.433809G 2.470141G 500k 2.47015G 2.433759G 2.470041G 36.3M 2.43385G 2.47015G 36.182M 2.433859G 2.470041G



AV Power Result Appendix C

Summary

Mode	Total Power	Total Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_4TX	29.97	0.99312
802.11g_Nss1,(6Mbps)_4TX	29.86	0.96828
802.11ac VHT20_Nss1,(MCS0)_4TX	29.97	0.99312
802.11ac VHT40_Nss1,(MCS0)_4TX	26.49	0.44566

Result

Mode	Result	DG	Port 1	Port 2	Port 3	Port 4	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	4.22	24.46	22.17	24.13	24.04	29.81	30.00
2417MHz	Pass	4.22	24.59	22.01	24.10	24.28	29.87	30.00
2422MHz	Pass	4.22	24.52	22.02	24.42	24.02	29.87	30.00
2427MHz	Pass	4.22	24.57	21.90	24.05	24.30	29.84	30.00
2432MHz	Pass	4.22	24.69	21.92	24.07	24.09	29.83	30.00
2437MHz	Pass	4.22	24.54	22.41	24.12	24.30	29.94	30.00
2447MHz	Pass	4.22	24.76	22.06	23.89	24.05	29.82	30.00
2452MHz	Pass	4.22	24.63	22.27	23.94	24.18	29.86	30.00
2457MHz	Pass	4.22	24.71	22.28	24.07	24.21	29.93	30.00
2462MHz	Pass	4.22	24.68	22.61	24.10	24.13	29.97	30.00
802.11g_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	=
2412MHz	Pass	4.22	21.08	18.49	20.64	20.60	26.33	30.00
2417MHz	Pass	4.22	23.87	22.17	23.78	23.66	29.44	30.00
2422MHz	Pass	4.22	24.35	22.60	23.94	24.02	29.80	30.00
2427MHz	Pass	4.22	24.30	22.67	24.07	23.86	29.79	30.00
2432MHz	Pass	4.22	24.30	22.88	24.02	23.97	29.85	30.00
2437MHz	Pass	4.22	24.20	22.96	23.89	23.96	29.80	30.00
2442MHz	Pass	4.22	24.38	22.97	24.05	23.83	29.86	30.00
2447MHz	Pass	4.22	24.30	23.09	23.91	23.74	29.80	30.00
2452MHz	Pass	4.22	24.35	22.91	23.84	23.75	29.76	30.00
2457MHz	Pass	4.22	24.20	22.86	23.83	23.58	29.67	30.00
2462MHz	Pass	4.22	22.05	19.98	21.49	21.24	27.27	30.00
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	4.22	20.38	17.96	20.50	20.12	25.87	30.00
2417MHz	Pass	4.22	21.90	19.57	21.59	21.48	27.24	30.00
2422MHz	Pass	4.22	23.86	22.19	23.76	23.43	29.38	30.00
2427MHz	Pass	4.22	24.40	23.10	23.99	24.21	29.97	30.00
2432MHz	Pass	4.22	24.70	23.28	24.09	23.51	29.95	30.00
2437MHz	Pass	4.22	24.31	22.95	23.93	23.89	29.82	30.00
2442MHz	Pass	4.22	24.40	23.16	24.04	24.06	29.96	30.00
2447MHz	Pass	4.22	24.37	23.08	24.25	23.79	29.92	30.00
2452MHz	Pass	4.22	24.38	23.25	24.09	23.85	29.93	30.00
2457MHz	Pass	4.22	23.51	22.00	23.06	22.99	28.94	30.00
2462MHz	Pass	4.22	22.47	20.36	21.93	21.83	27.73	30.00
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-		-	-



AV Power Result Appendix C

Mode	Result	DG	Port 1	Port 2	Port 3	Port 4	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
2422MHz	Pass	4.22	16.91	17.09	15.52	16.44	22.55	30.00
2427MHz	Pass	4.22	17.97	18.02	16.59	17.51	23.58	30.00
2432MHz	Pass	4.22	19.06	19.23	18.07	18.65	24.80	30.00
2437MHz	Pass	4.22	20.68	21.05	19.76	20.30	26.49	30.00
2452MHz	Pass	4.22	20.50	21.00	19.76	20.24	26.42	30.00

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



Appendix D **PSD Result**

Summary

Mode	PD
	(dBm/RBW)
2.4-2.4835GHz	
802.11b_Nss1,(1Mbps)_4TX	-0.65
802.11g_Nss1,(6Mbps)_4TX	0.97
802.11ac VHT20_Nss1,(MCS0)_4TX	0.02
802.11ac VHT40_Nss1,(MCS0)_4TX	-8.67

RBW=3kHz.

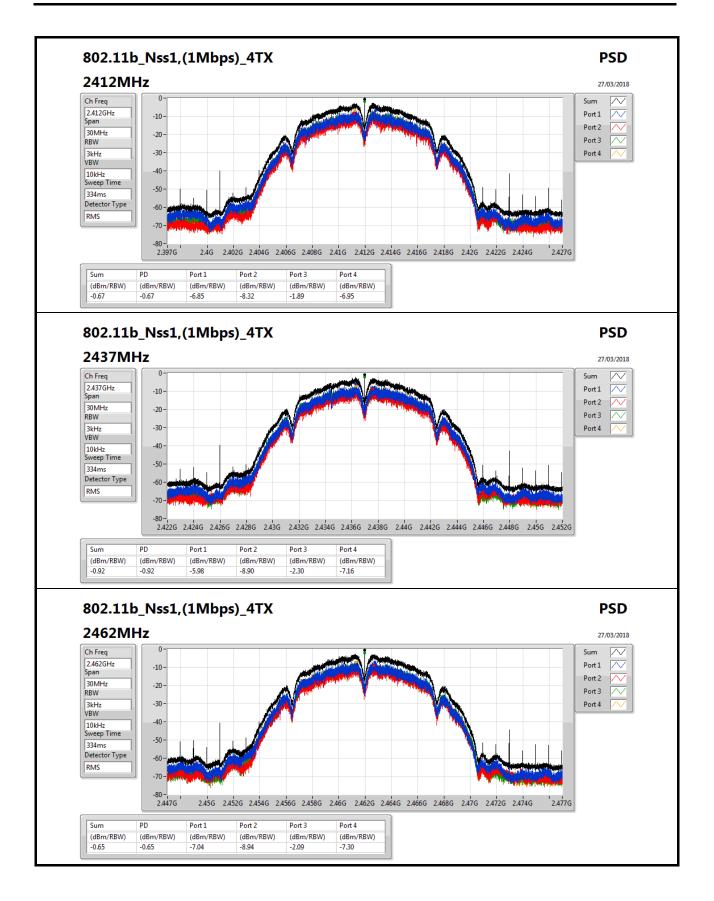
Result

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)
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	5.35	-6.85	-8.32	-1.89	-6.95	-0.67	8
2437MHz	Pass	5.35	-5.98	-8.90	-2.30	-7.16	-0.92	8
2462MHz	Pass	5.35	-7.04	-8.94	-2.09	-7.30	-0.65	8
802.11g_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	5.35	-12.54	-12.93	-2.99	-12.85	-2.11	8
2437MHz	Pass	5.35	-9.49	-10.51	-0.02	-9.28	0.97	8
2462MHz	Pass	5.35	-11.12	-14.02	-5.04	-12.11	-4.17	8
802.11ac VHT20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	5.35	-12.09	-15.19	-4.55	-11.56	-3.01	8
2437MHz	Pass	5.35	-8.80	-9.81	-1.42	-8.76	0.02	8
2462MHz	Pass	5.35	-10.13	-11.31	-4.17	-11.38	-2.62	8
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
2422MHz	Pass	5.35	-18.14	-17.97	-19.04	-18.26	-12.89	8
2437MHz	Pass	5.35	-13.36	-13.30	-15.03	-13.82	-8.67	8
2452MHz	Pass	5.35	-14.39	-14.43	-14.15	-14.50	-8.83	8

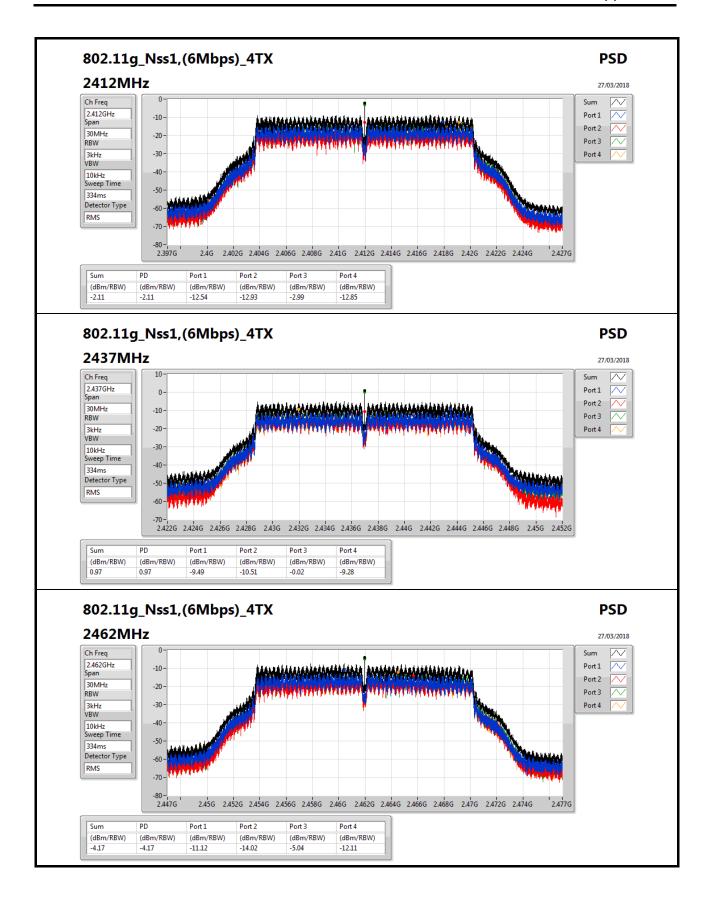
DG = Directional Gain; RBW=3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X power density;

Page No. : 1 of 5

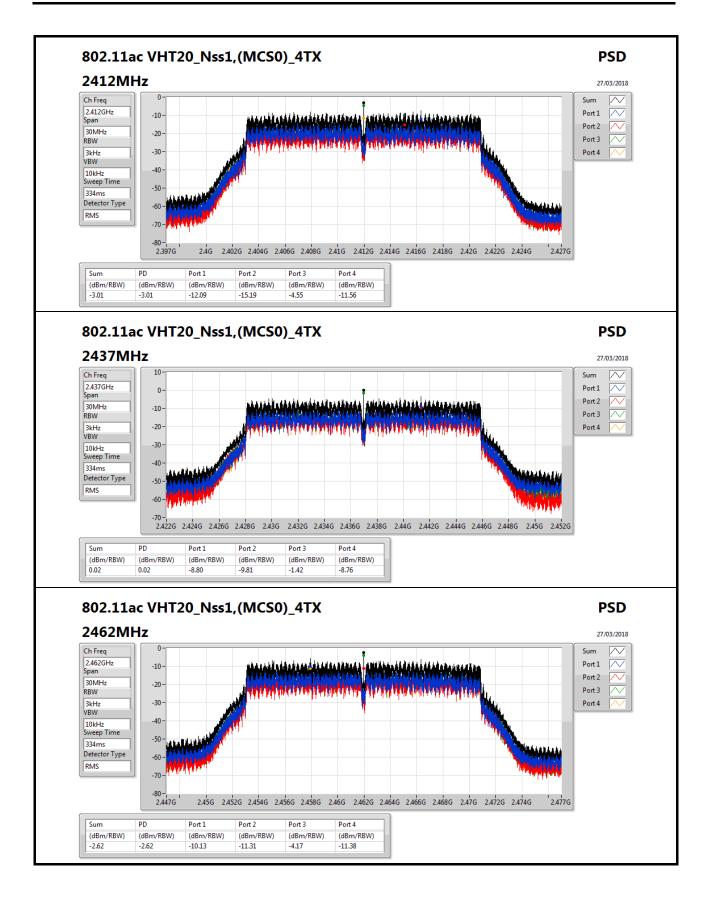




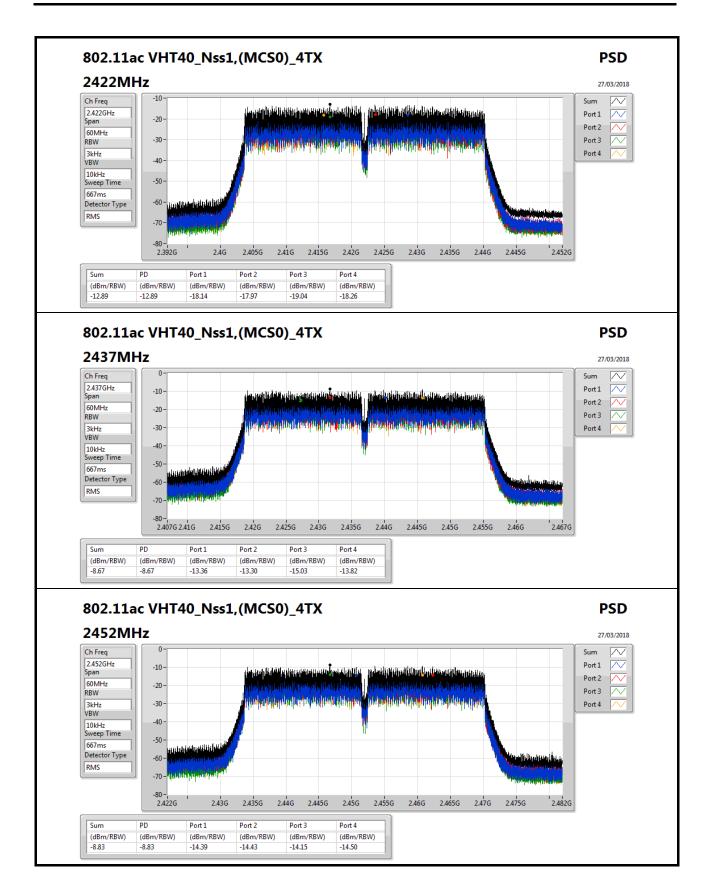














CSE Non-restricted Band Result

Appendix E

Summary

Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
2.4-2.4835GHz		-	-	-	-		-	-	-	-	-	-	-
802.11b_Nss1,(1Mbps)_4TX Pa:		2.436406G	15.65	-14.35	2.072245G	-56.10	2.398G	-39.09	2.48478G	-52.63	7.232327G	-30.35	3
802.11g_Nss1,(6Mbps)_4TX Pas		2.444422G	12.39	-17.61	507.65M	-56.47	2.39824G	-33.04	2.48366G	-52.74	7.232327G	-39.59	1
802.11ac VHT20_Nss1,(MCS0)_4TX P		2.435738G	11.96	-18.04	521.63M	-55.72	2.39984G	-33.24	2.4839G	-52.38	7.226708G	-40.12	4
802.11ac VHT40_Nss1,(MCS0)_4TX Pass		2.441917G	6.07	-23.93	31.145M	-55.91	2.39952G	-32.47	2.48558G	-44.95	24.402628G	-50.50	2

Result

Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.436406G	15.65	-14.35	895.595M	-55.71	2.39904G	-37.05	2.48502G	-51.36	7.237946G	-31.24	1
2412MHz	Pass	2.436406G	15.65	-14.35	853.655M	-56.10	2.398G	-43.08	2.48358G	-53.81	7.232327G	-32.77	2
2412MHz	Pass	2.436406G	15.65	-14.35	2.072245G	-56.10	2.398G	-39.09	2.48478G	-52.63	7.232327G	-30.35	3
2412MHz	Pass	2.436406G	15.65	-14.35	2.188745G	-55.95	2.39904G	-39.56	2.48406G	-51.29	7.235136G	-31.58	4
2437MHz	Pass	2.436406G	15.65	-14.35	620.655M	-56.48	2.39288G	-45.45	2.4839G	-49.41	16.225736G	-50.53	1
2437MHz	Pass	2.436406G	15.65	-14.35	2.193405G	-56.16	2.39712G	-47.48	2.48374G	-50.01	24.688139G	-49.73	2
2437MHz	Pass	2.436406G	15.65	-14.35	497.165M	-56.30	2.39128G	-47.37	2.48534G	-50.99	24.072844G	-51.67	3
2437MHz	Pass	2.436406G	15.65	-14.35	2.198065G	-55.24	2.39128G	-46.94	2.4839G	-50.43	25G	-50.85	4
2462MHz	Pass	2.436406G	15.65	-14.35	816.375M	-55.64	2.39688G	-48.51	2.48446G	-49.37	16.39712G	-50.09	1
2462MHz	Pass	2.436406G	15.65	-14.35	2.17826G	-55.83	2.39712G	-48.85	2.48374G	-50.33	24.466183G	-50.47	2
2462MHz	Pass	2.436406G	15.65	-14.35	2.1969G	-54.97	2.39824G	-48.44	2.48382G	-49.56	24.803331G	-50.68	3
2462MHz	Pass	2.436406G	15.65	-14.35	938.7M	-56.62	2.39968G	-48.41	2.4847G	-49.24	24.370658G	-50.83	4
802.11g_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.444422G	12.39	-17.61	507.65M	-56.47	2.39824G	-33.04	2.48366G	-52.74	7.232327G	-39.59	1
2412MHz	Pass	2.444422G	12.39	-17.61	901.42M	-56.42	2.39888G	-38.37	2.4839G	-55.31	7.232327G	-40.80	2
2412MHz	Pass	2.444422G	12.39	-17.61	734.825M	-56.79	2.39976G	-35.10	2.48454G	-54.90	7.240755G	-39.86	3
2412MHz	Pass	2.444422G	12.39	-17.61	708.03M	-57.24	2.39864G	-34.53	2.48422G	-49.91	7.232327G	-39.66	4
2437MHz	Pass	2.444422G	12.39	-17.61	2.186415G	-56.44	2.39824G	-44.95	2.48358G	-49.07	23.572742G	-50.53	1
2437MHz	Pass	2.444422G	12.39	-17.61	2.30874G	-54.34	2.39776G	-46.48	2.48358G	-50.90	24.48866G	-49.39	2
2437MHz	Pass	2.444422G	12.39	-17.61	489.01M	-55.89	2.39992G	-45.06	2.48494G	-49.83	15.256437G	-50.59	3
2437MHz	Pass	2.444422G	12.39	-17.61	775.6M	-56.49	2.39984G	-46.05	2.48374G	-49.14	16.453311G	-51.15	4
2462MHz	Pass	2.444422G	12.39	-17.61	887.44M	-55.18	2.3992G	-49.87	2.48358G	-40.81	16.439263G	-50.59	1
2462MHz	Pass	2.444422G	12.39	-17.61	639.295M	-56.70	2.39744G	-48.81	2.4843G	-47.74	16.472978G	-49.94	2
2462MHz	Pass	2.444422G	12.39	-17.61	485.515M	-56.66	2.39896G	-49.78	2.48446G	-42.37	16.686505G	-50.25	3
2462MHz	Pass	2.444422G	12.39	-17.61	487.845M	-54.77	2.3972G	-50.41	2.48662G	-43.06	24.075654G	-50.35	4
802.11ac VHT20_Nss1,(MCS0)_4TX		*			*	-		-	*	-		-	-
2412MHz	Pass	2.435738G	11.96	-18.04	932.875M	-56.03	2.39856G	-33.74	2.4847G	-50.44	7.235136G	-40.30	1
2412MHz	Pass	2.435738G	11.96	-18.04	797.735M	-55.49	2.39992G	-38.19	2.48374G	-54.08	7.235136G	-42.15	2
2412MHz	Pass	2.435738G	11.96	-18.04	808.22M	-56.74	2.39976G	-34.85	2.48702G	-55.35	7.240755G	-40.30	3
2412MHz	Pass	2.435738G	11.96	-18.04	521.63M	-55.72	2.39984G	-33.24	2.4839G	-52.38	7.226708G	-40.12	4
2437MHz	Pass	2.435738G	11.96	-18.04	2.307575G	-56.25	2.3976G	-43.65	2.48438G	-48.81	16.374643G	-50.61	1
2437MHz	Pass	2.435738G	11.96	-18.04	872.295M	-55.87	2.39976G	-45.93	2.48382G	-48.95	16.708981G	-49.44	2
2437MHz	Pass	2.435738G	11.96	-18.04	2.17826G	-56.83	2.39816G	-42.82	2.48638G	-50.78	24.376277G	-50.68	3
2437MHz	Pass	2.435738G	11.96	-18.04	790.745M	-56.30	2.39584G	-45.00	2.48438G	-49.51	16.64998G	-50.25	4
2462MHz	Pass	2.435738G	11.96	-18.04	928.215M	-56.31	2.3988G	-49.62	2.48358G	-38.73	24.800521G	-50.05	1
2462MHz	Pass	2.435738G	11.96	-18.04	490.175M	-55.58	2.39864G	-49.64	2.48606G	-46.66	24.339753G	-50.49	2
2462MHz	Pass	2.435738G	11.96	-18.04	491.34M	-55.33	2.3952G	-49.19	2.48414G	-38.18	24.409992G	-50.32	3
2462MHz	Pass	2.435738G	11.96	-18.04	794.24M	-56.51	2.39904G	-50.40	2.48358G	-40.47	16.374643G	-50.78	4

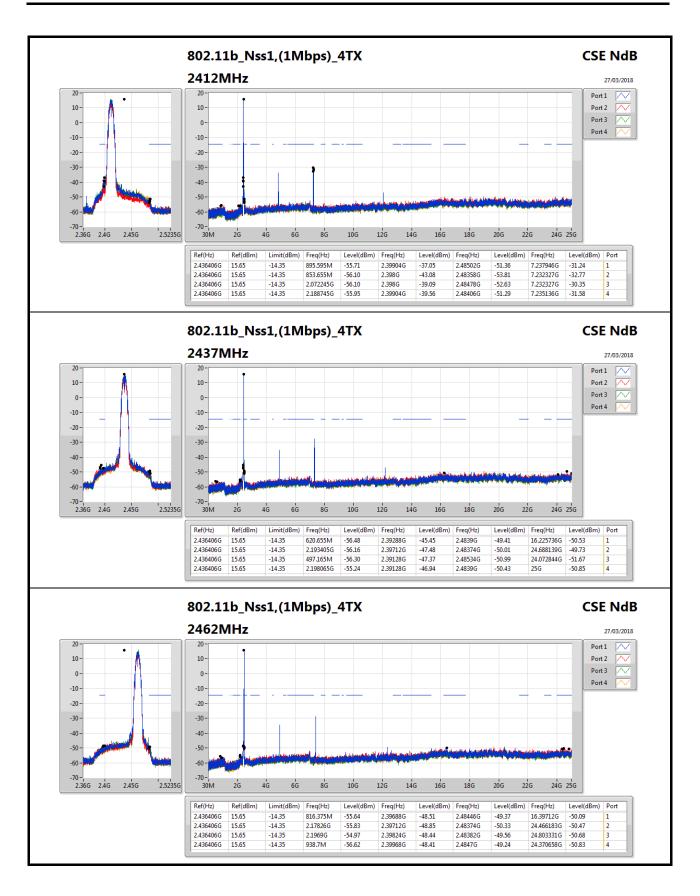


CSE Non-restricted Band Result

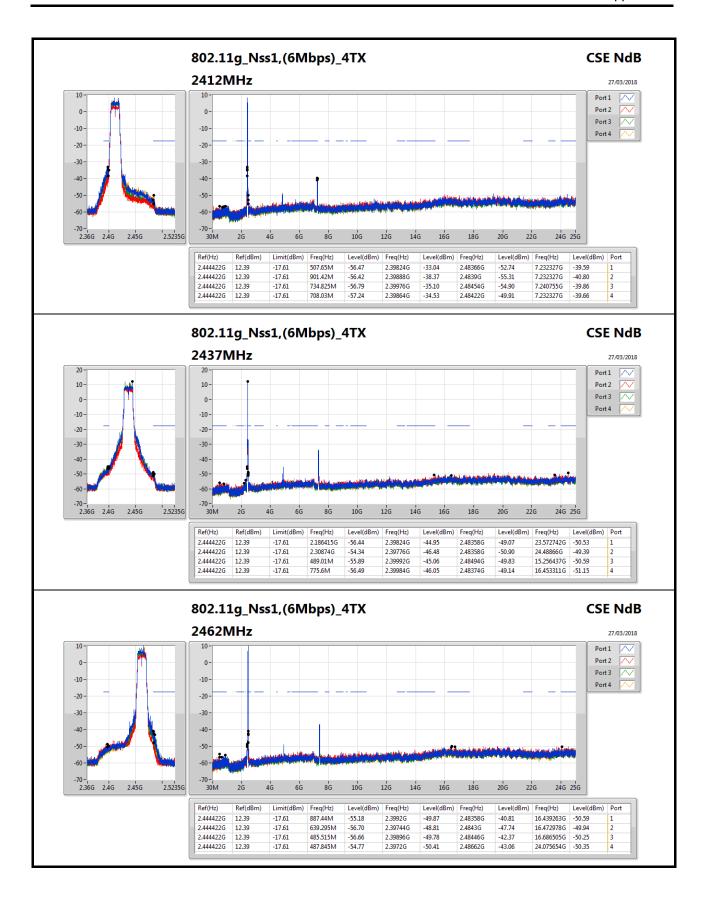
Appendix E

Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
802.11ac VHT40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.441917G	6.07	-23.93	478.84M	-56.33	2.39952G	-41.07	2.48542G	-52.96	7.247119G	-48.30	1
2422MHz	Pass	2.441917G	6.07	-23.93	923.1M	-56.07	2.39584G	-41.35	2.48446G	-53.73	7.249924G	-48.95	2
2422MHz	Pass	2.441917G	6.07	-23.93	721.58M	-55.29	2.39184G	-45.53	2.48734G	-54.38	7.247119G	-50.24	3
2422MHz	Pass	2.441917G	6.07	-23.93	492.58M	-55.98	2.39952G	-43.26	2.48494G	-54.39	7.249924G	-49.95	4
2437MHz	Pass	2.441917G	6.07	-23.93	2.19863G	-56.26	2.39968G	-37.64	2.48446G	-46.43	16.726541G	-49.64	1
2437MHz	Pass	2.441917G	6.07	-23.93	31.145M	-55.91	2.39952G	-32.47	2.48558G	-44.95	24.402628G	-50.50	2
2437MHz	Pass	2.441917G	6.07	-23.93	497.16M	-56.18	2.39952G	-36.91	2.4867G	-48.79	24.739176G	-51.20	3
2437MHz	Pass	2.441917G	6.07	-23.93	531.51M	-56.21	2.39952G	-37.10	2.48446G	-46.57	16.44328G	-50.85	4
2452MHz	Pass	2.441917G	6.07	-23.93	659.75M	-56.08	2.39712G	-44.66	2.48414G	-41.24	24.896231G	-50.46	1
2452MHz	Pass	2.441917G	6.07	-23.93	496.015M	-54.01	2.39888G	-44.11	2.4843G	-41.16	24.024012G	-50.22	2
2452MHz	Pass	2.441917G	6.07	-23.93	471.97M	-56.36	2.39984G	-45.47	2.48814G	-42.73	16.821896G	-51.29	3
2452MHz	Pass	2.441917G	6.07	-23.93	30M	-56.30	2.39984G	-44.84	2.48606G	-45.04	24.399824G	-51.03	4

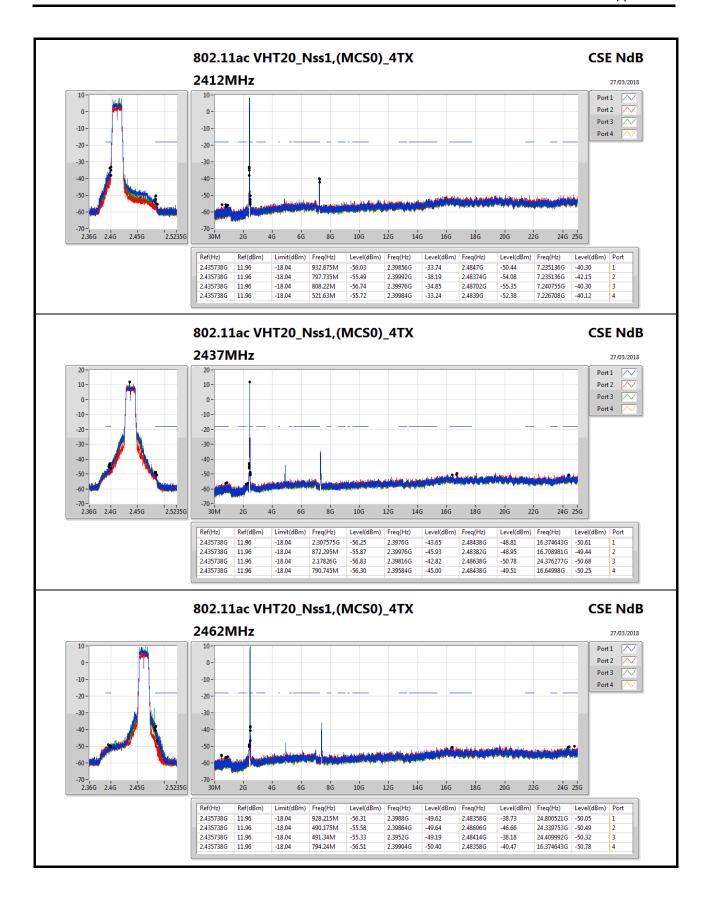




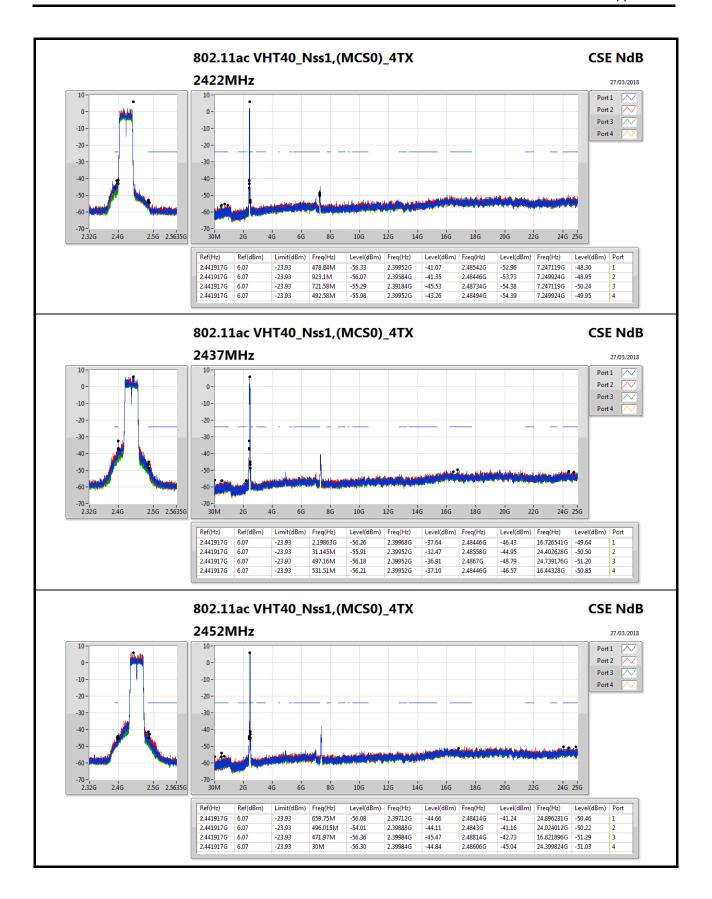




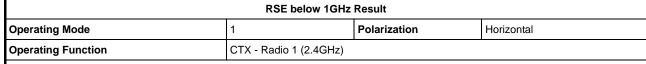


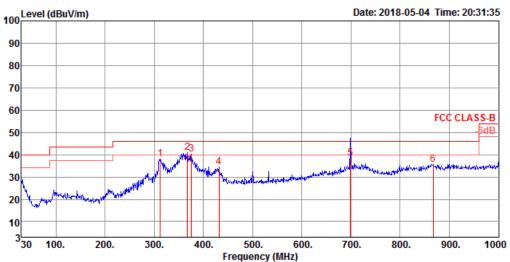








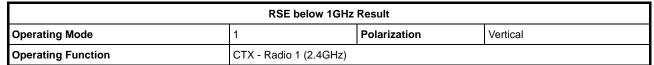


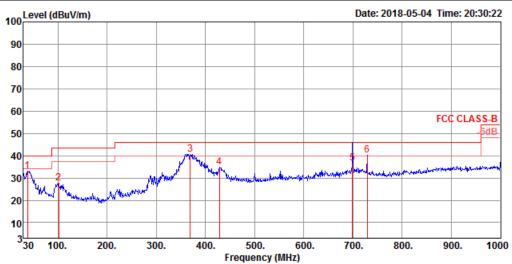


	Freq	Level	Limit Line					Preamp Factor	-	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	312.27	38.06	46.00	-7.94	47.86	2.31	20.15	32.26	100	162	Peak	HORIZONTAL
2	367.56	40.94	46.00	-5.06	49.57	1.96	21.68	32.27	125	210	Peak	HORIZONTAL
3	375.32	40.10	46.00	-5.90	48.28	2.22	21.88	32.28	150	210	Peak	HORIZONTAL
4	431.58	34.53	46.00	-11.47	41.19	2.82	22.82	32.30	200	264	Peak	HORIZONTAL
5	699.30	38.52	46.00	-7.48	42.00	3.28	25.60	32.36	169	210	QP	HORIZONTAL
6	867.11	35.58	46.00	-10.42	36.75	3.16	27.42	31.75	100	273	Peak	HORIZONTAL

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.)







	Freq	Level						Preamp Factor	-	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	38.73	33.07	40.00	-6.93	43.86	1.12	20.51	32.42	100	6	Peak	VERTICAL
2	101.78	27.60	43.50	-15.90	41.81	0.86	17.30	32.37	300	234	Peak	VERTICAL
3	369.50	40.70	46.00	-5.30	49.26	2.00	21.71	32.27	200	79	Peak	VERTICAL
4	428.67	34.97	46.00	-11.03	41.64	2.84	22.79	32.30	150	284	Peak	VERTICAL
5	699.30	36.52	46.00	-9.48	40.00	3.28	25.60	32.36	135	88	QP	VERTICAL
6	729.37	40.17	46.00	-5.83	42.90	3.58	25.96	32.27	125	185	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 TX above 1GHz Result

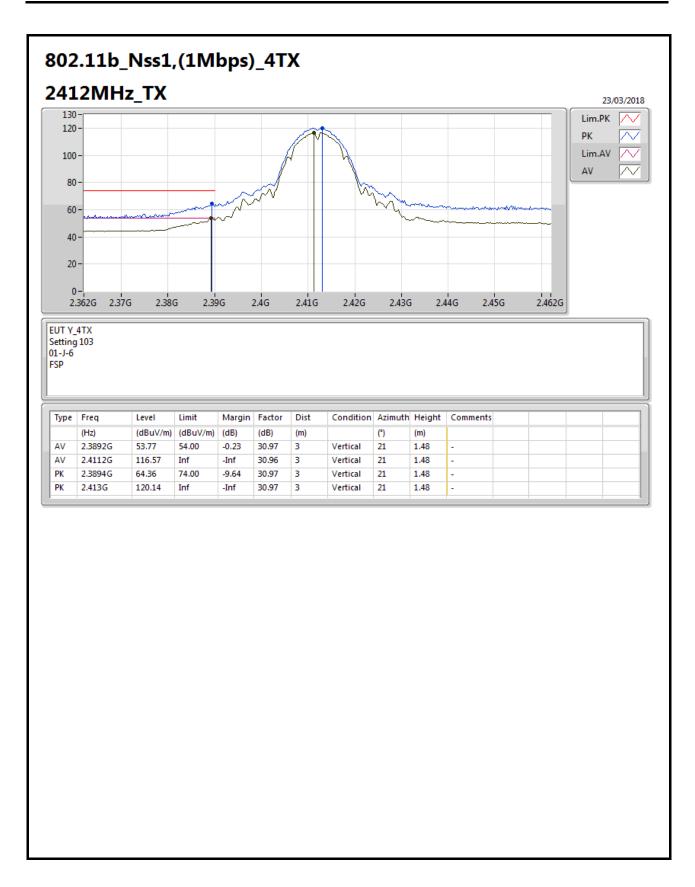
Appendix F.2

Summary

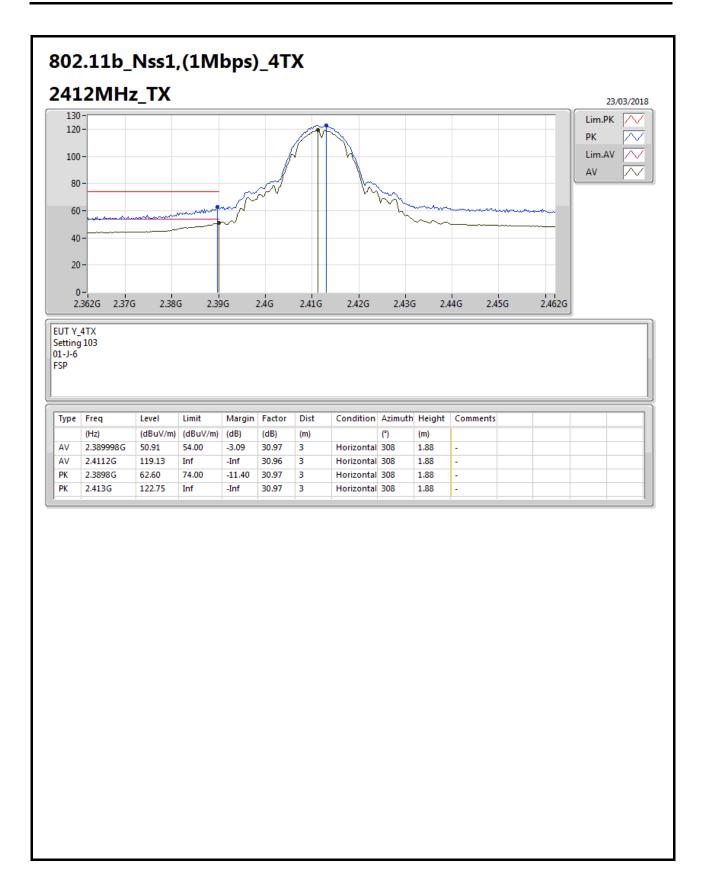
Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
802.11ac VHT20_Nss1,(MCS0)_4TX	Pass	AV	2.4838G	53.98	54.00	-0.02	31.17	3	Vertical	87	1.79	-

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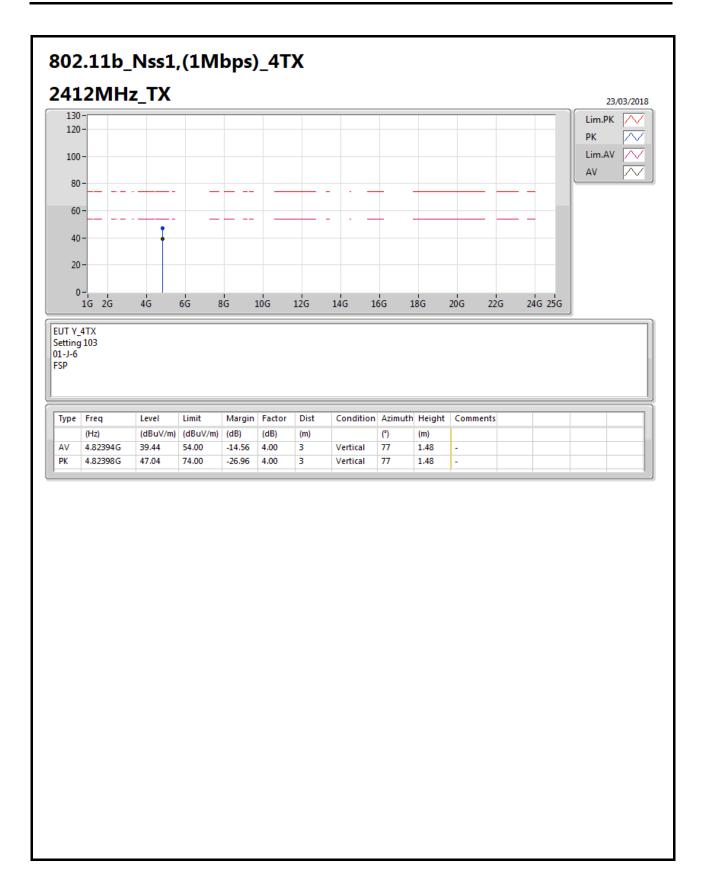




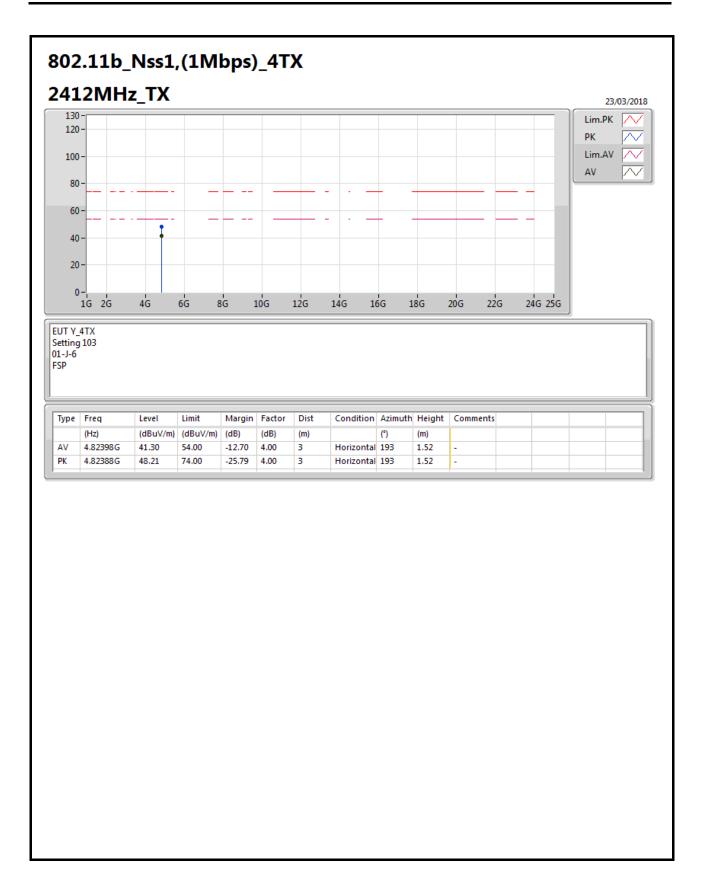




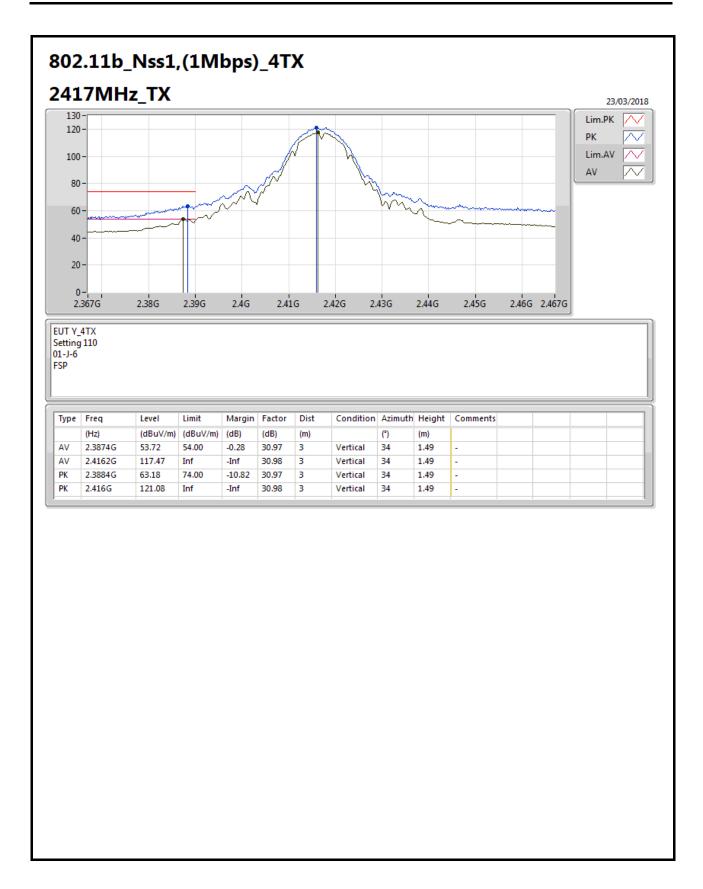




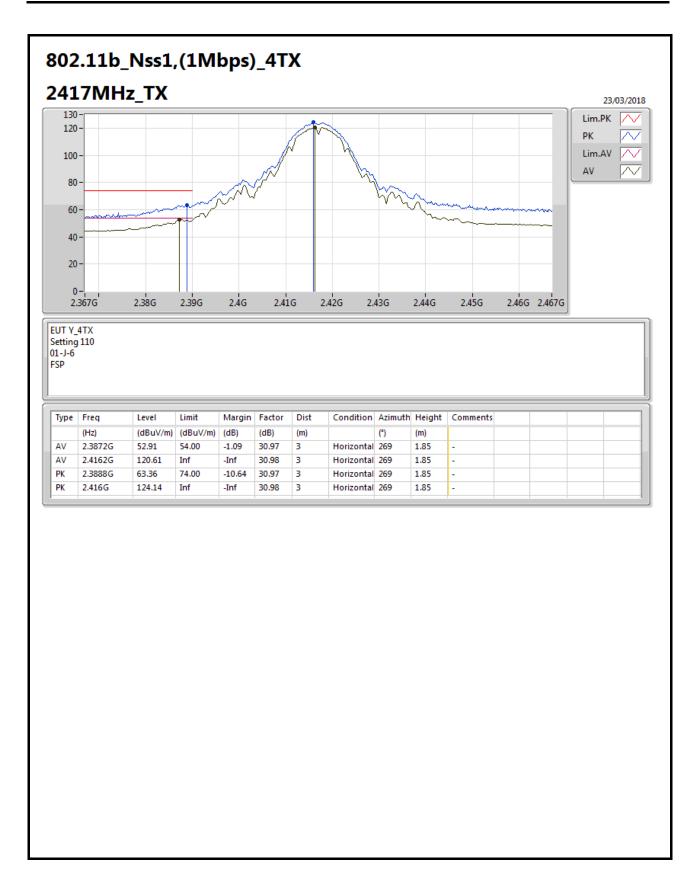




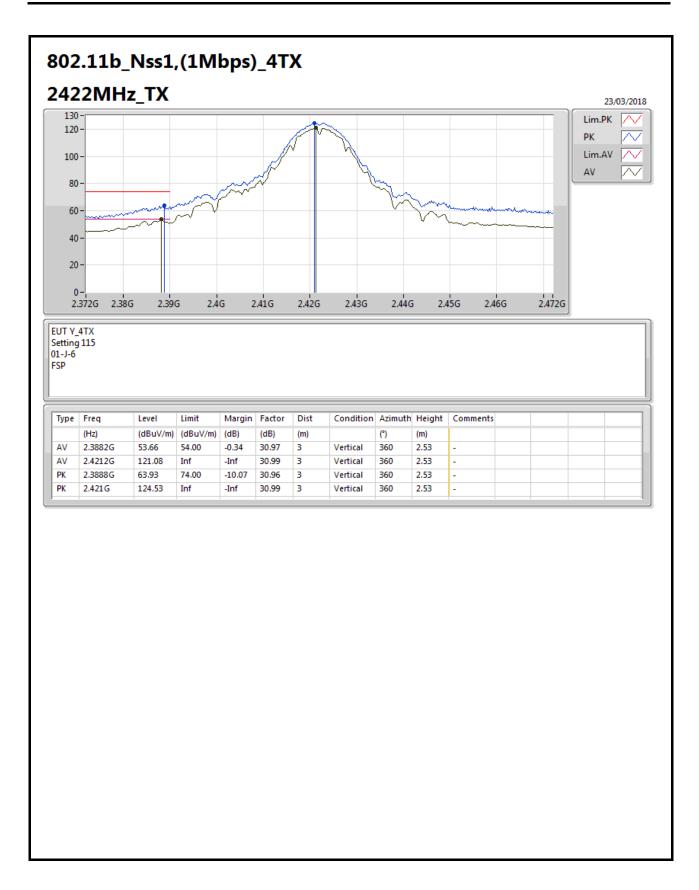




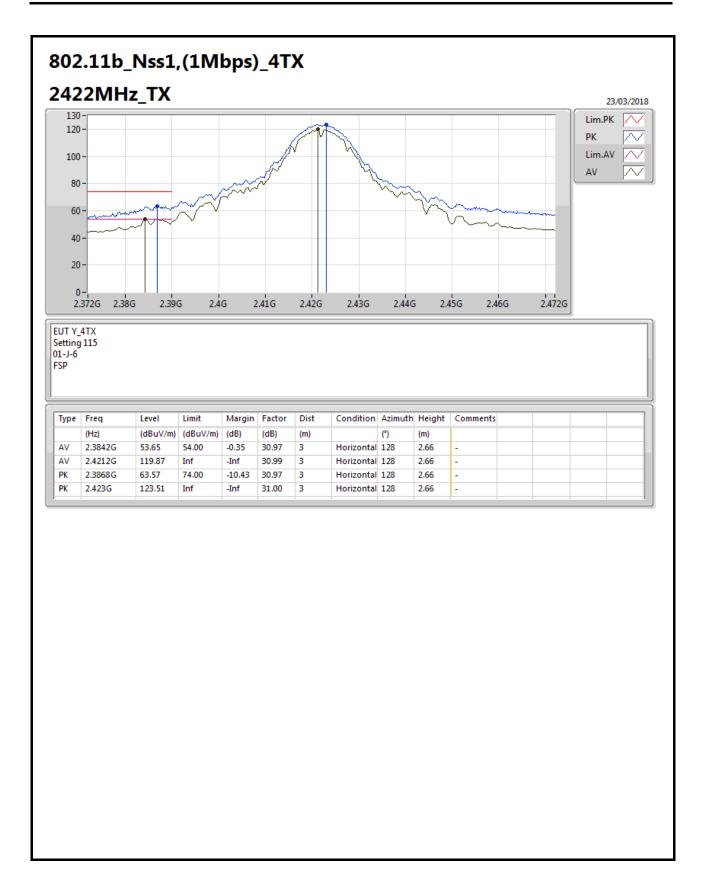




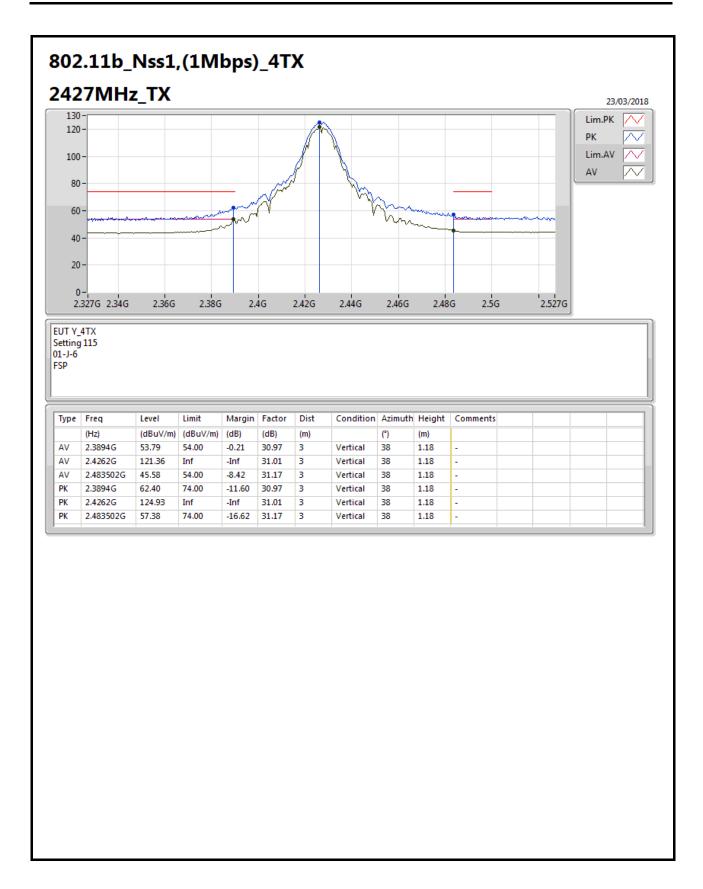




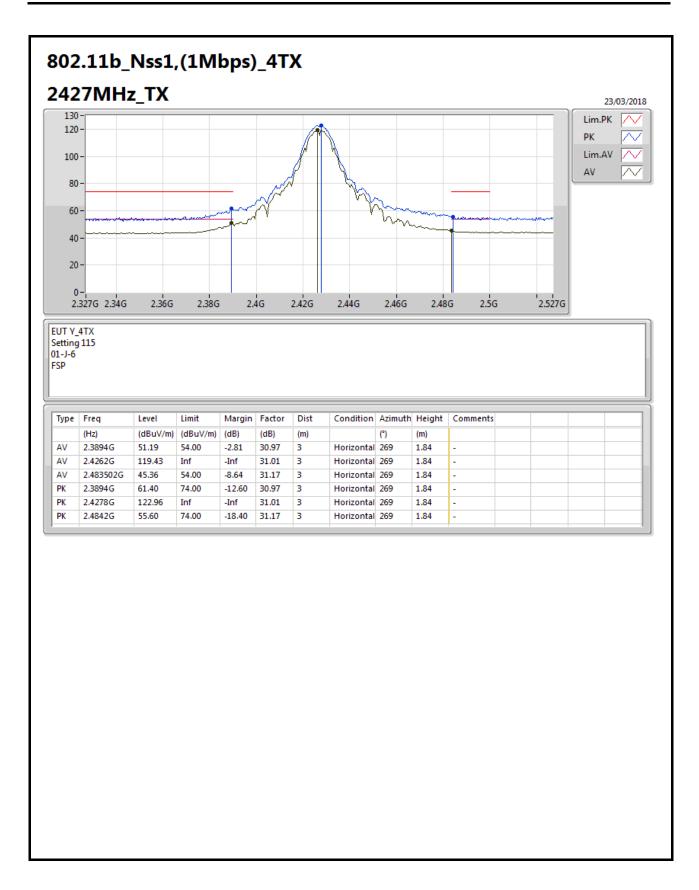




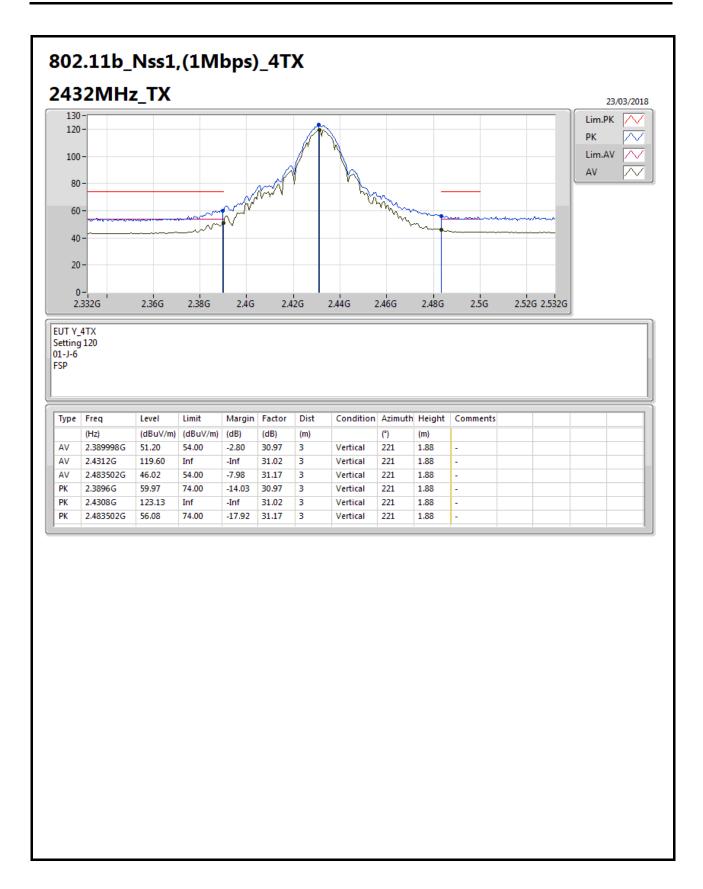




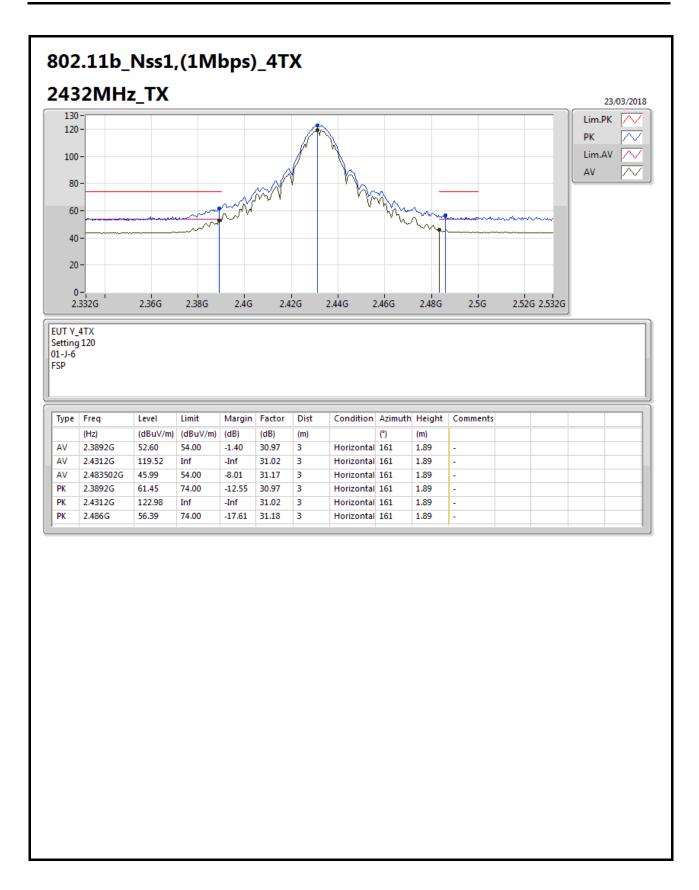




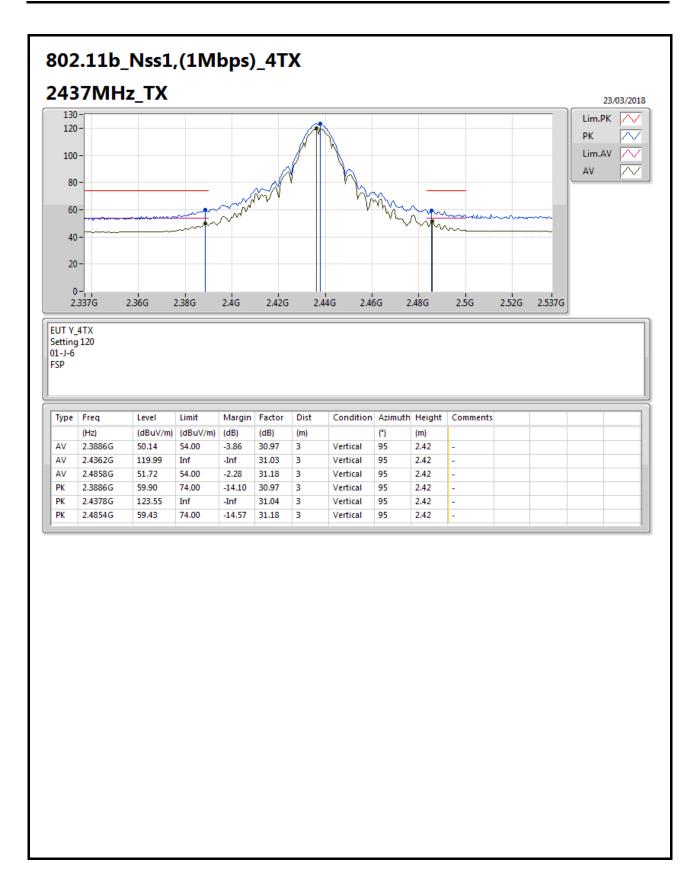




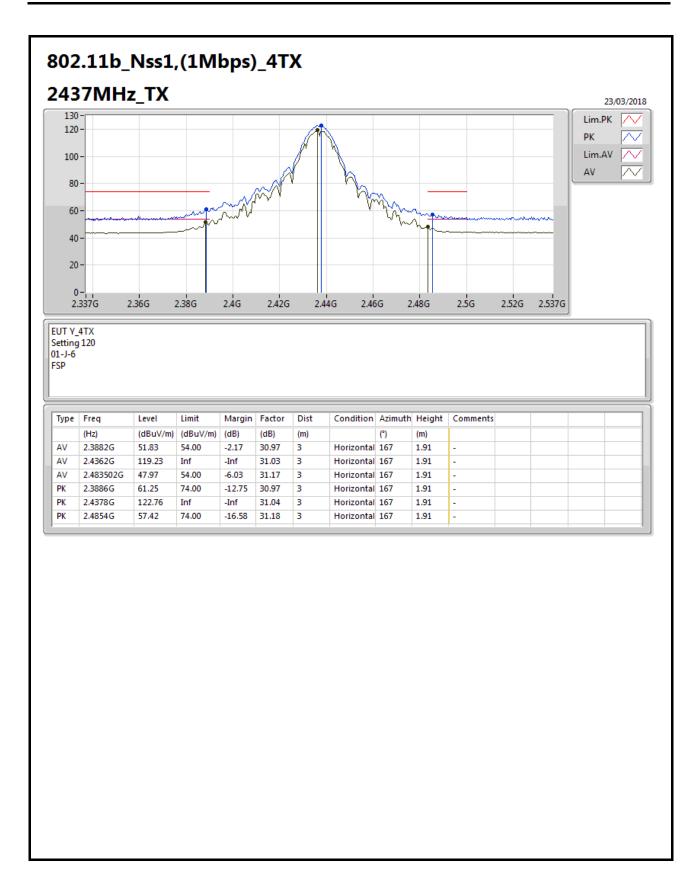




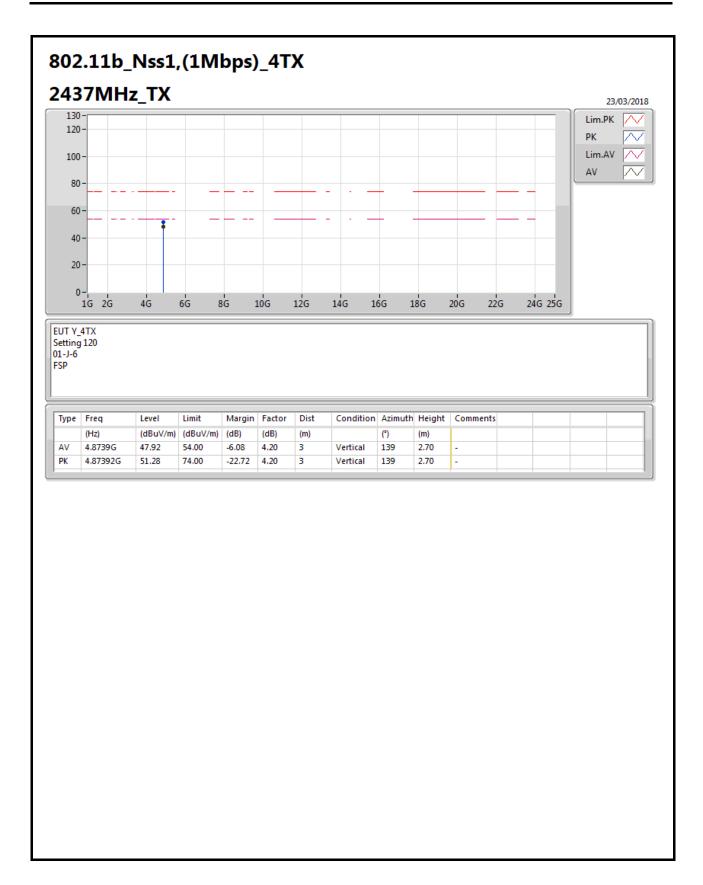




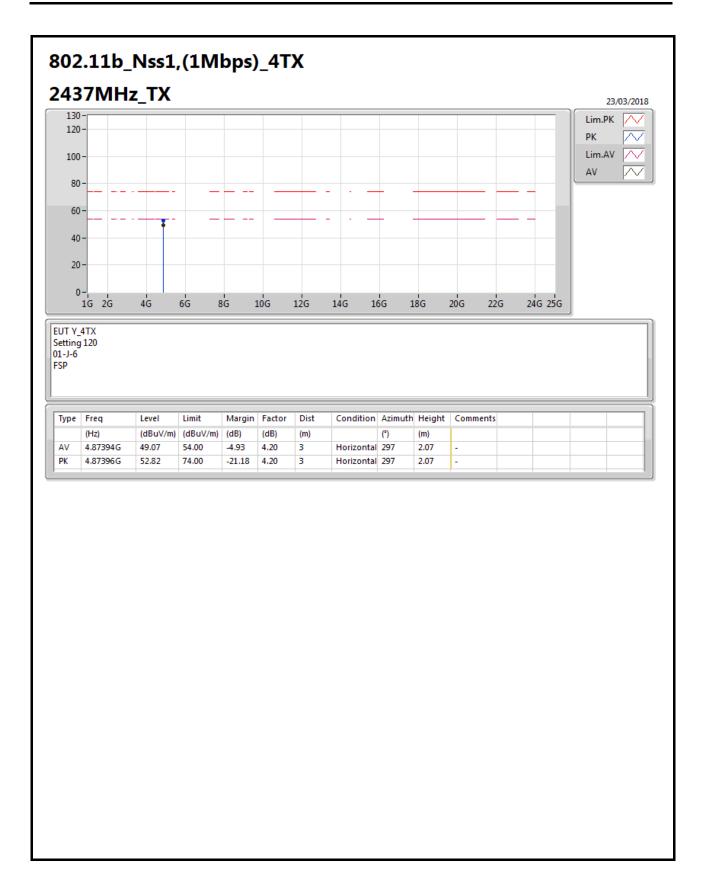




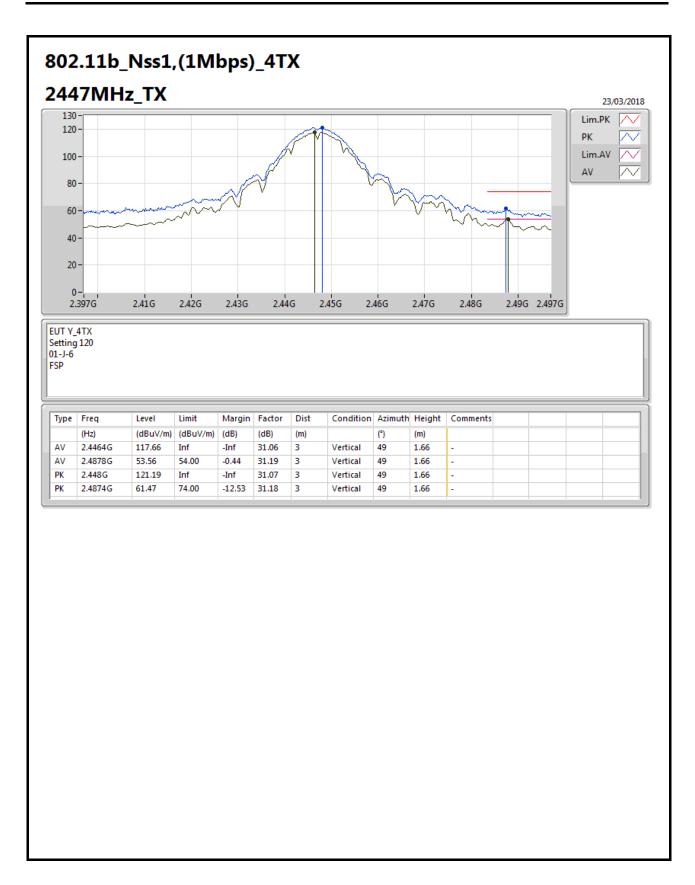




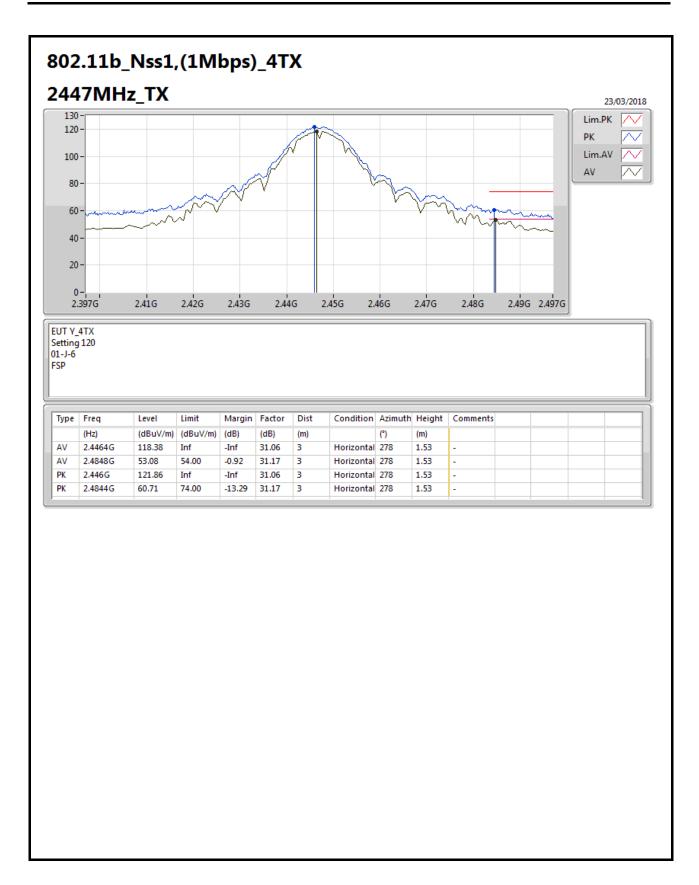




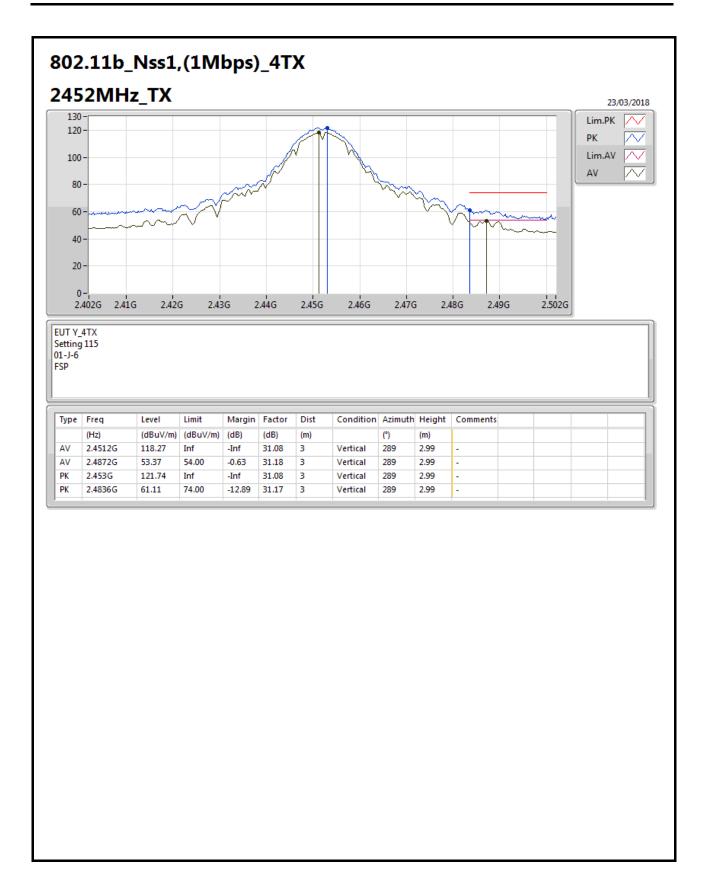




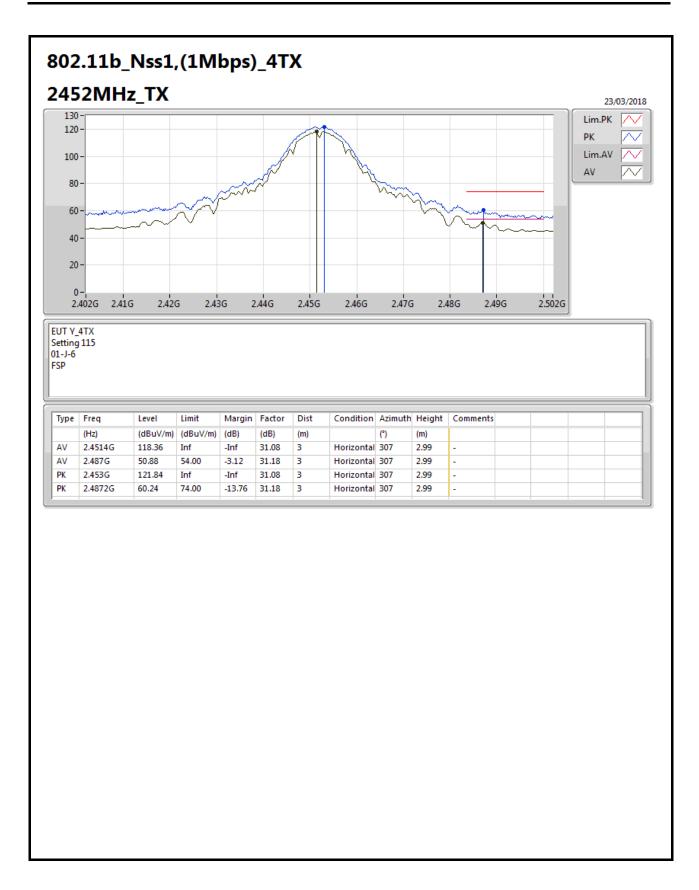




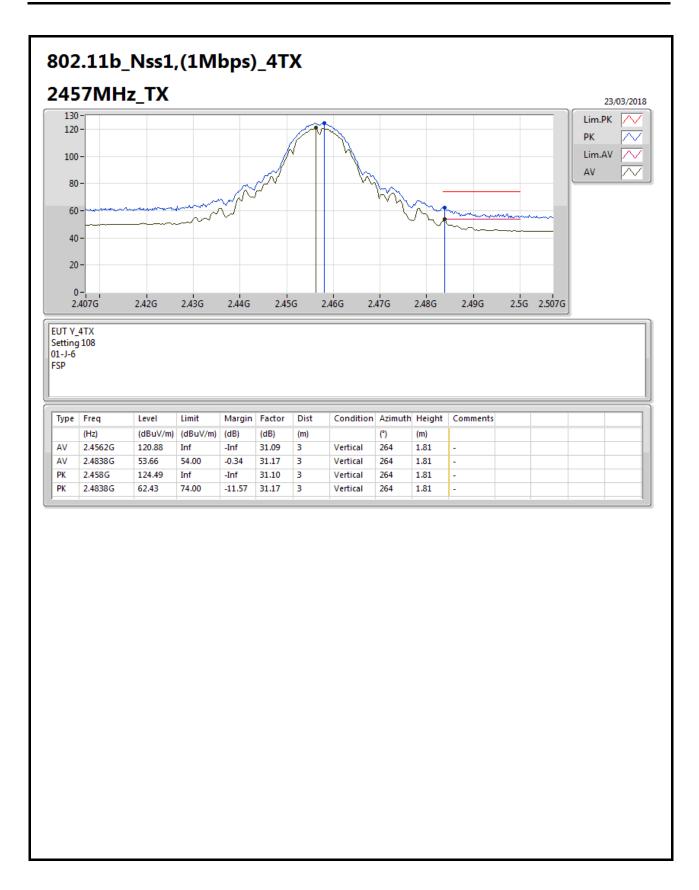








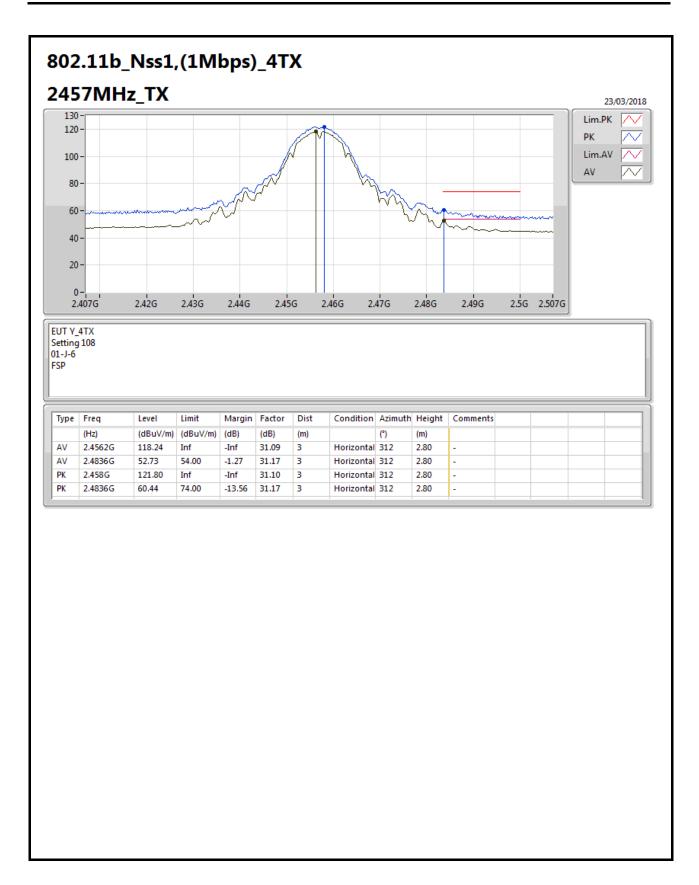




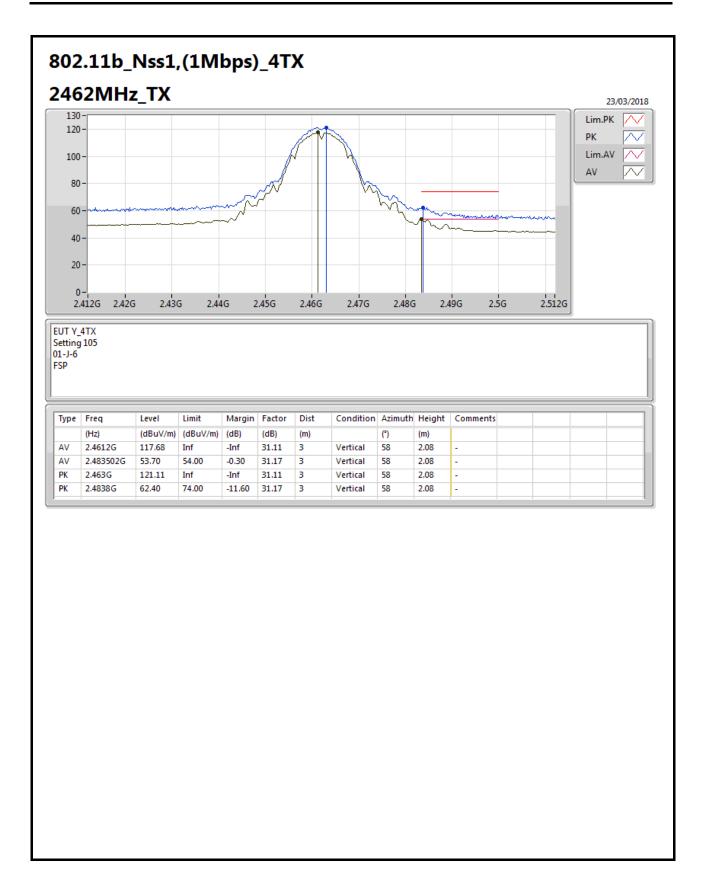
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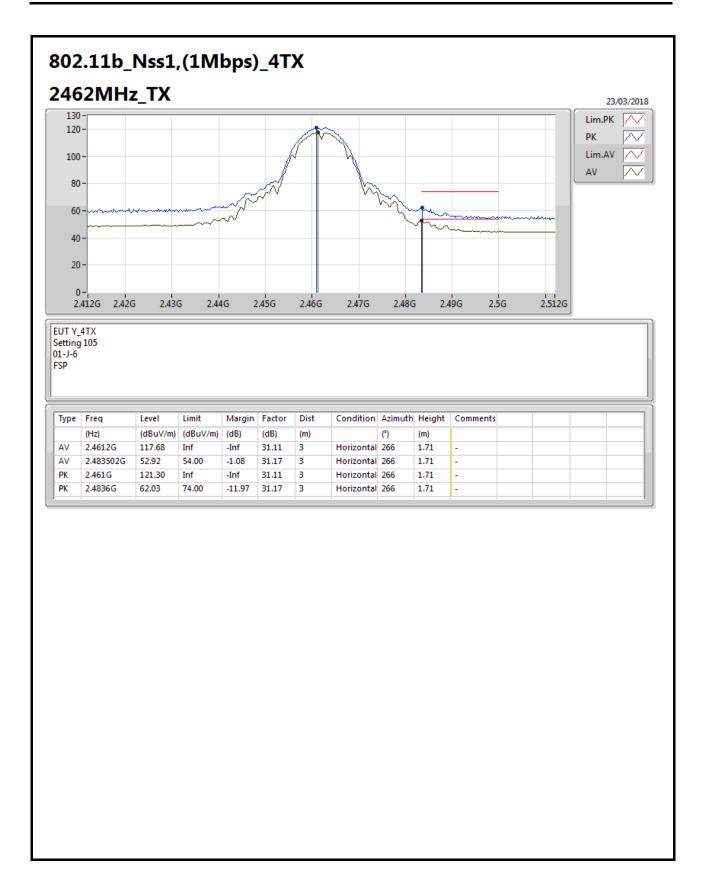












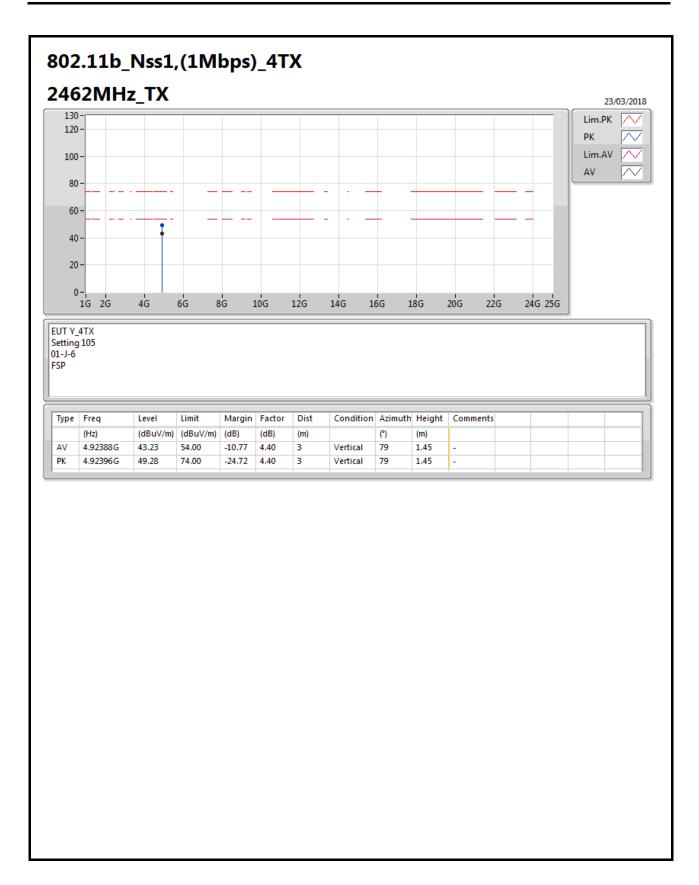
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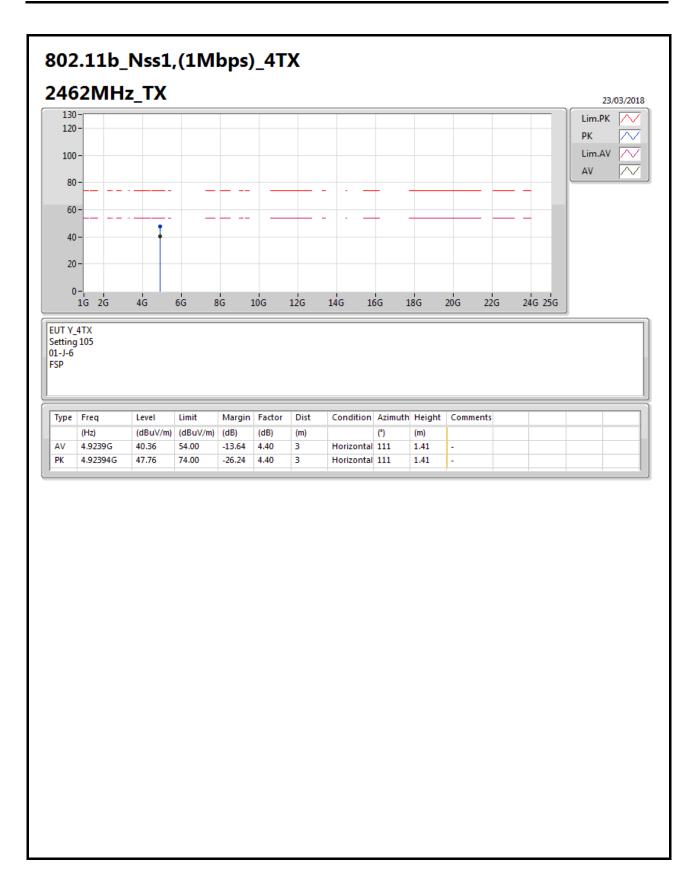
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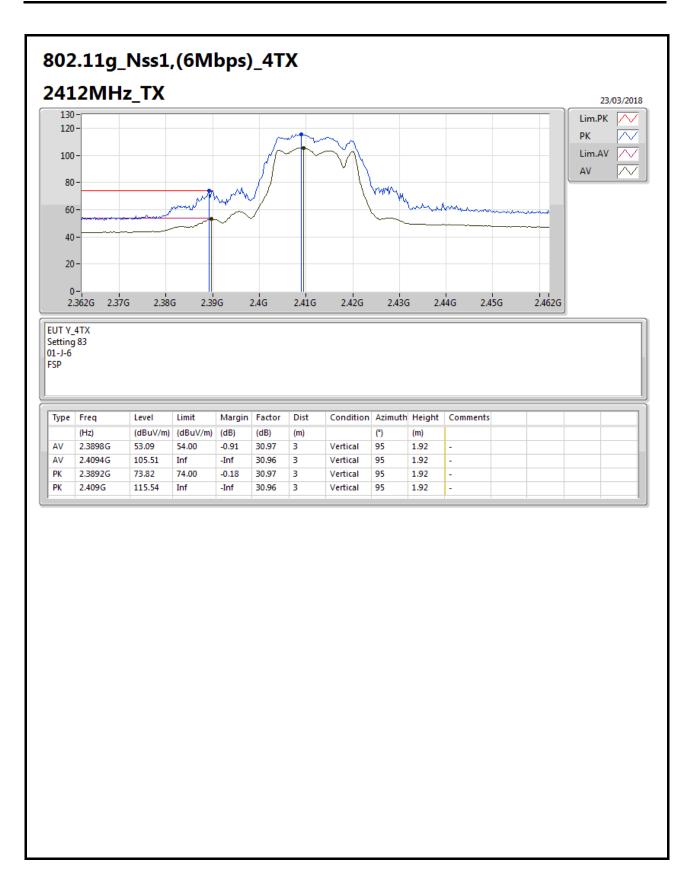




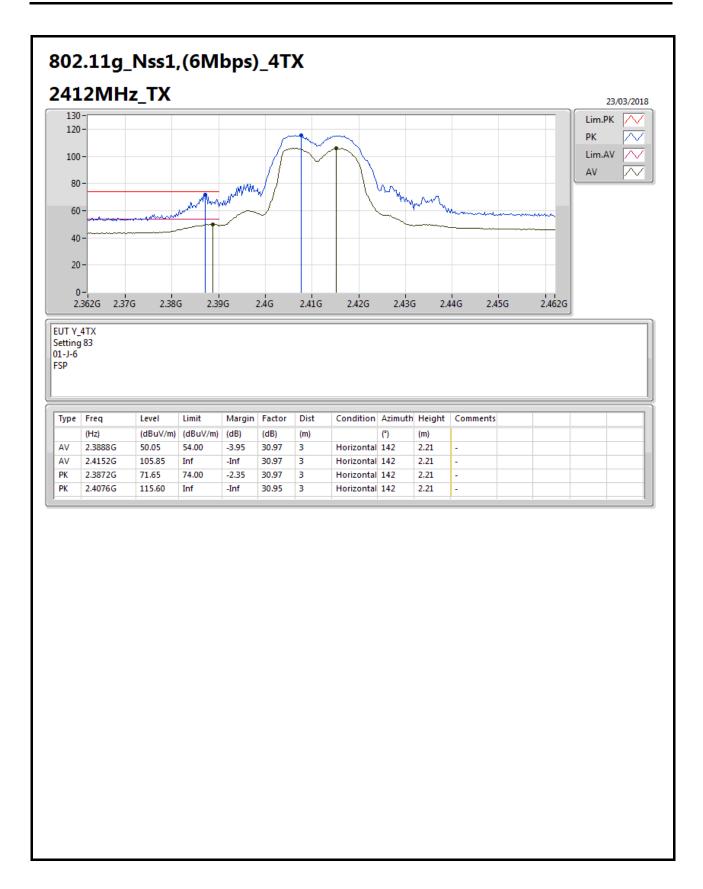




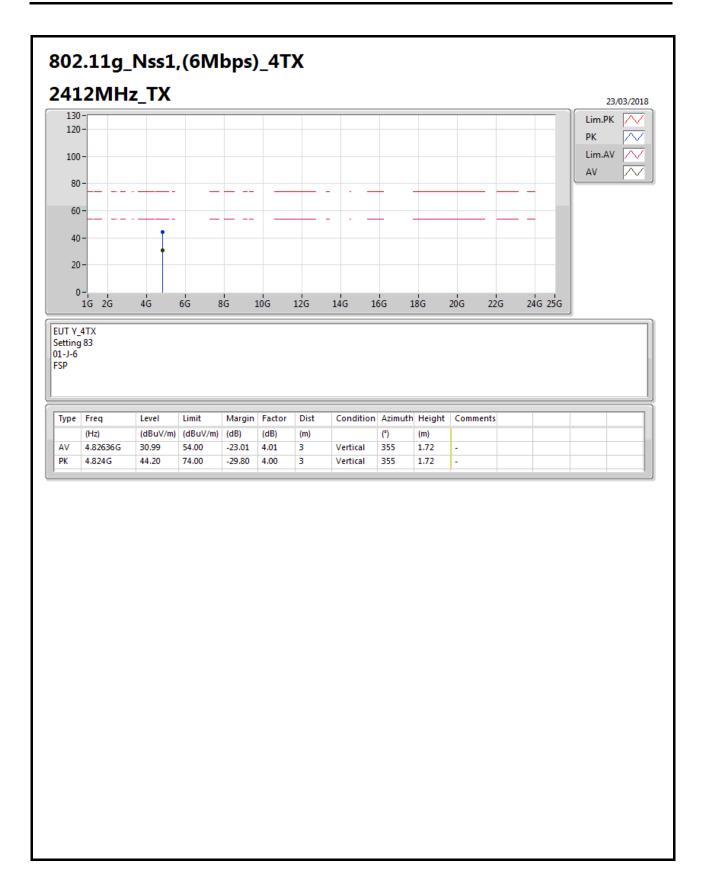




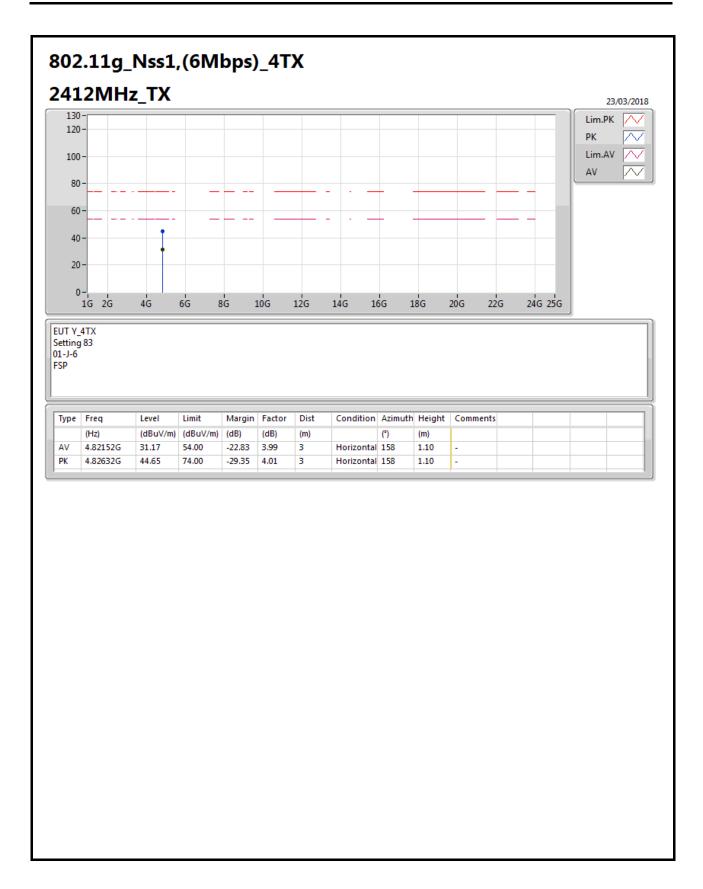




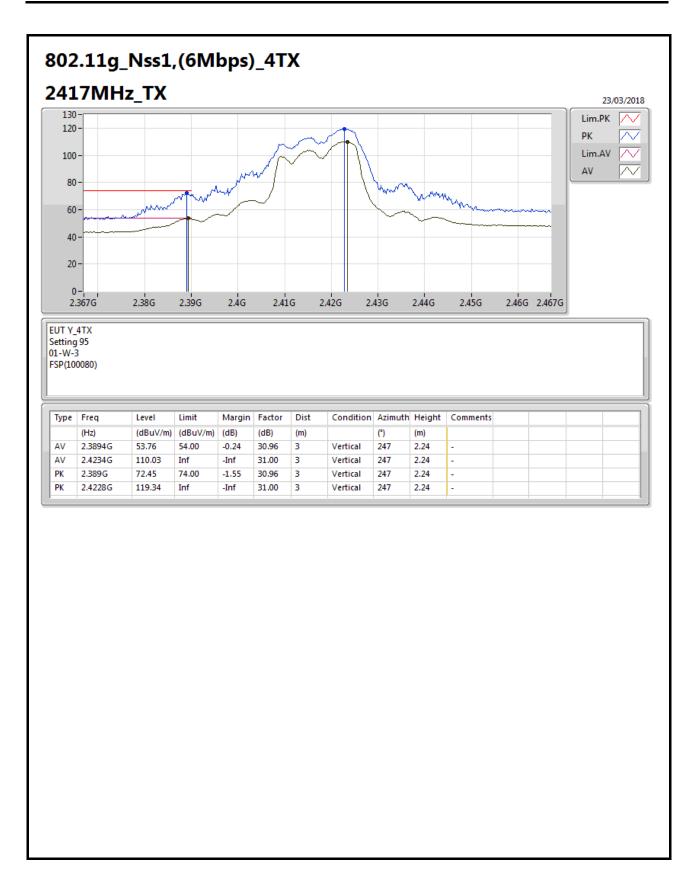




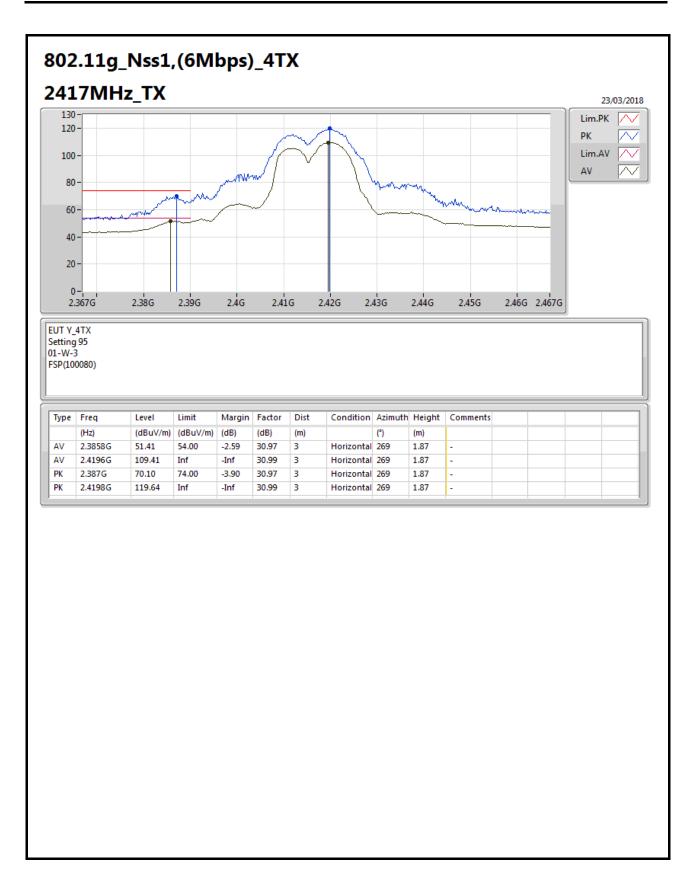








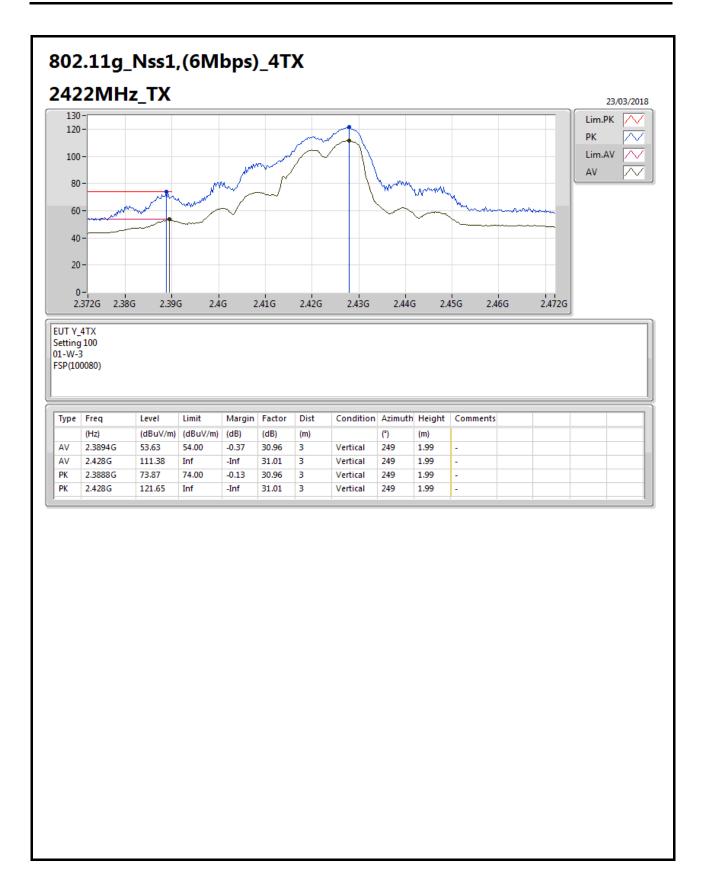




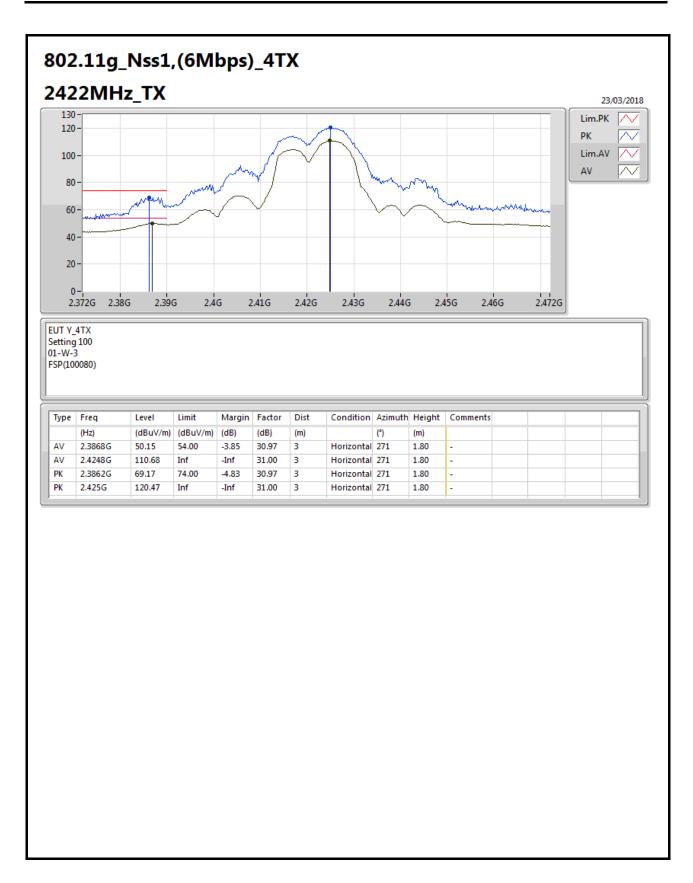
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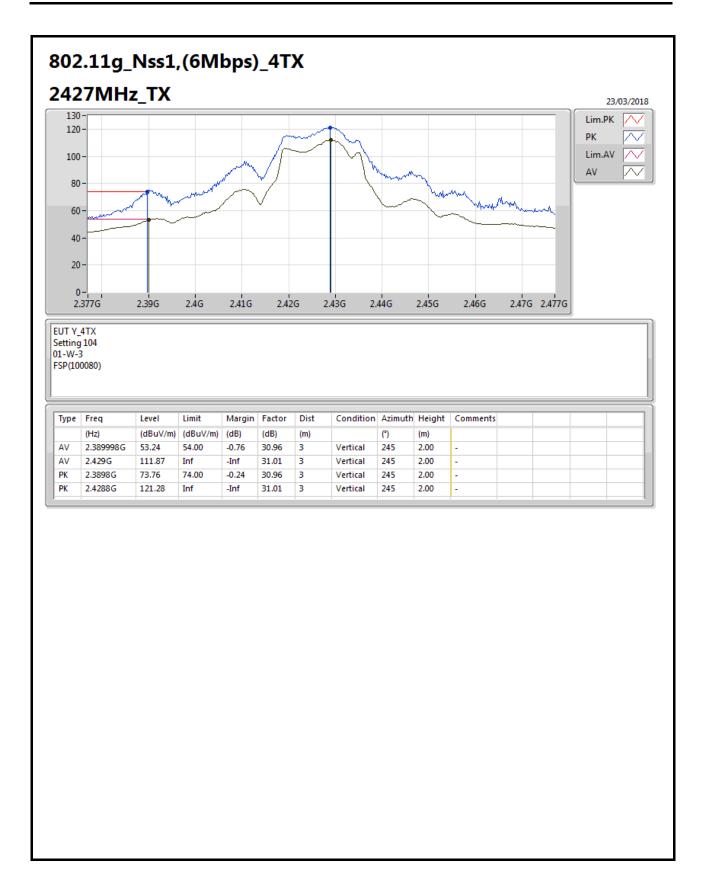








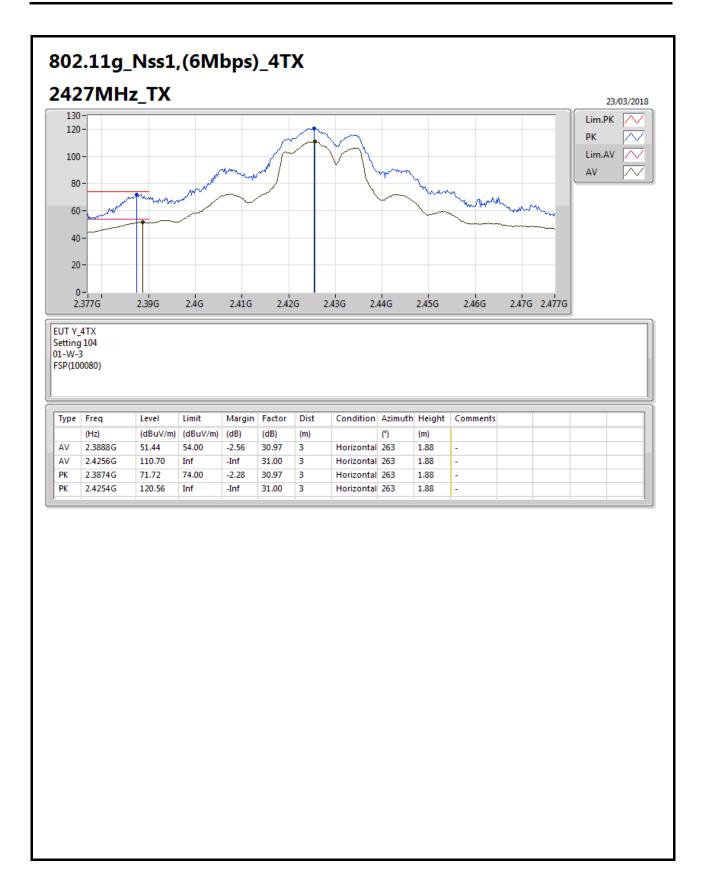




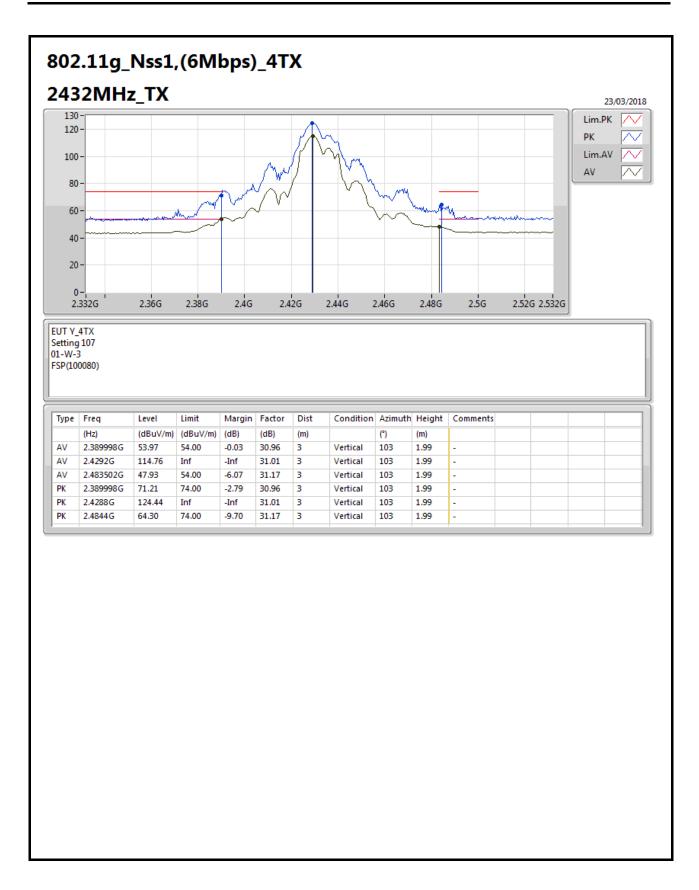
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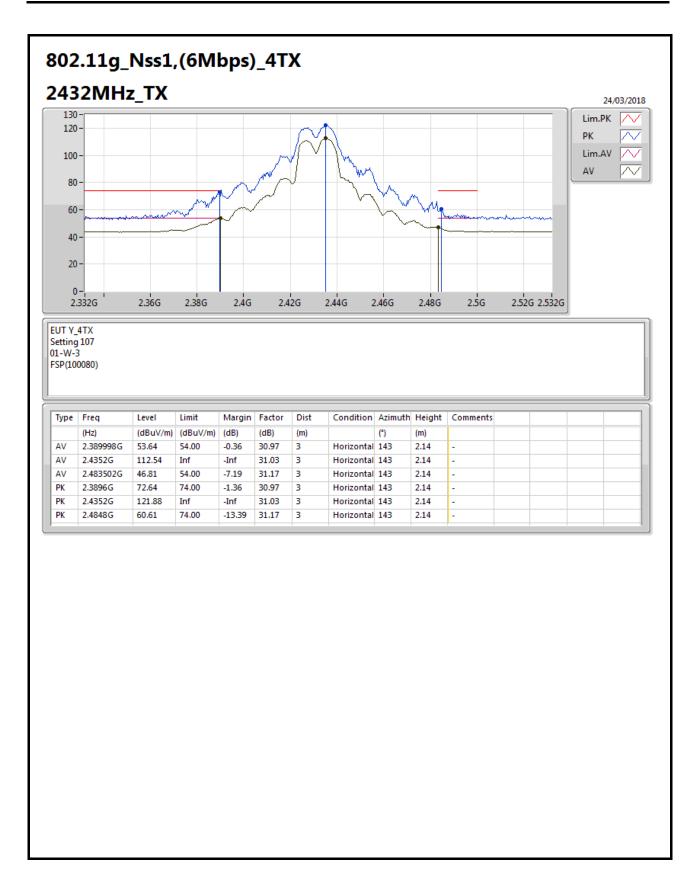




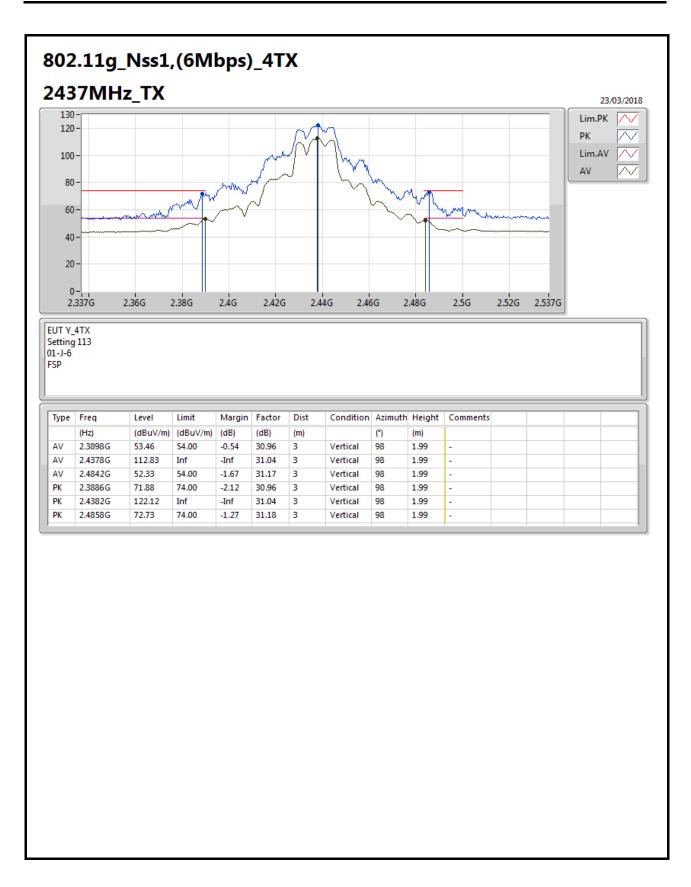




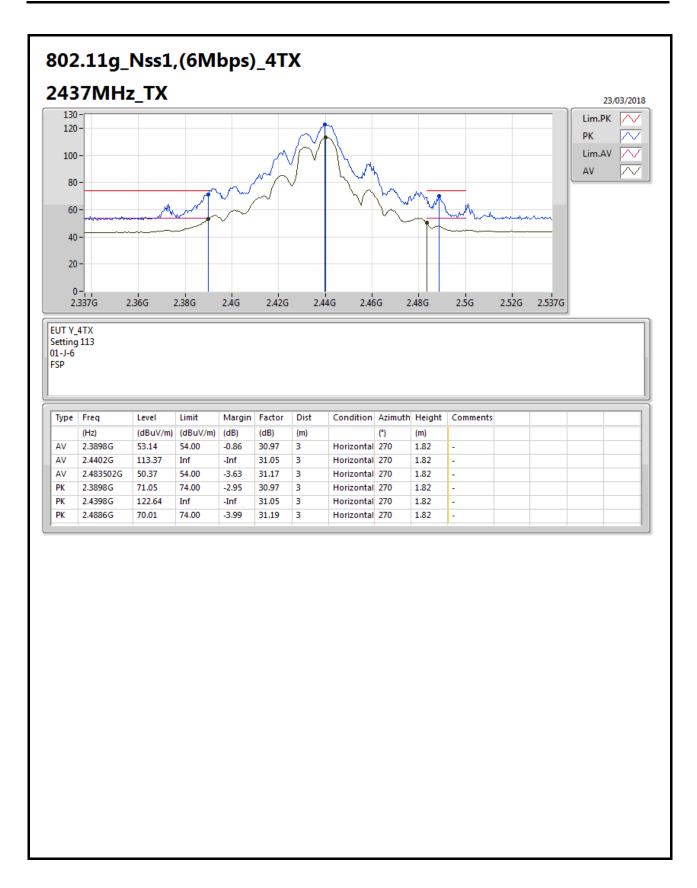




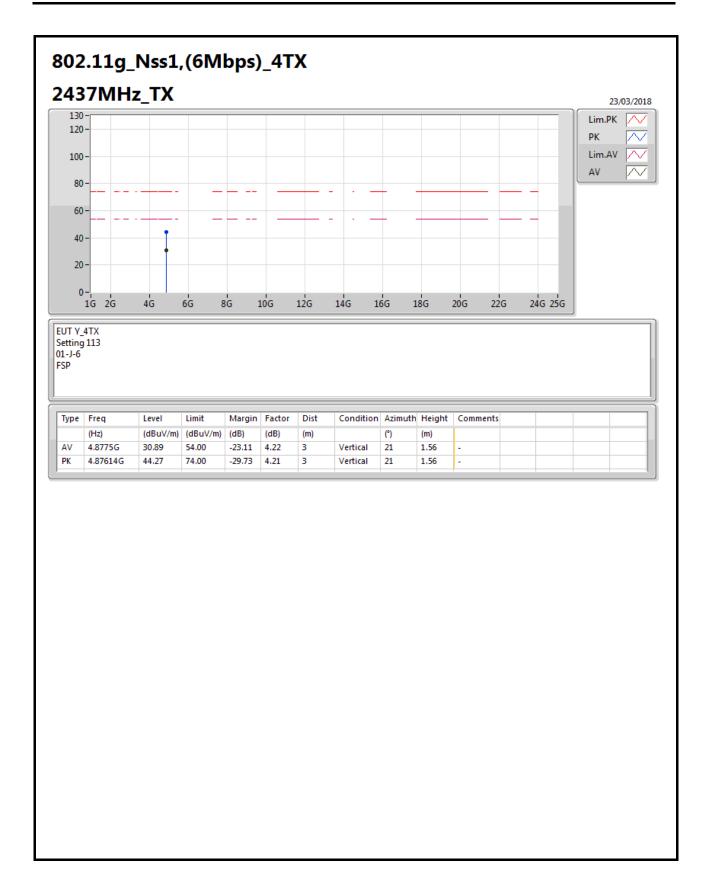




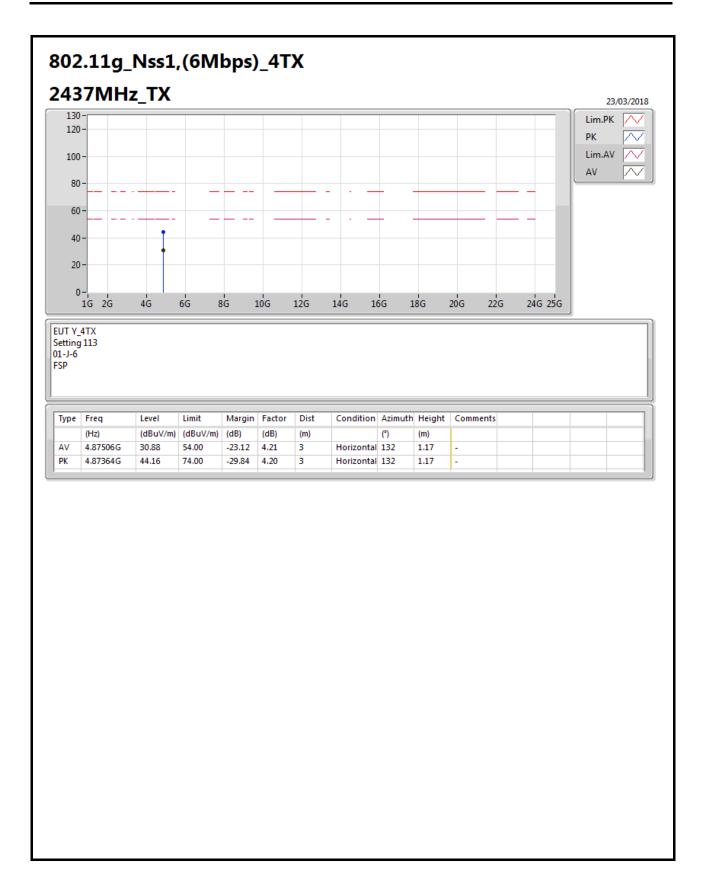




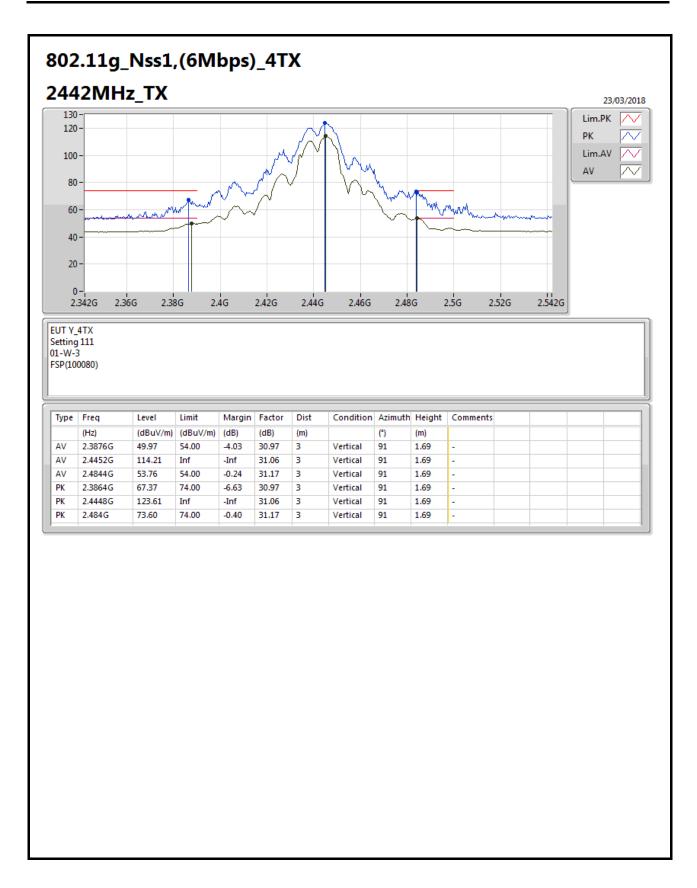




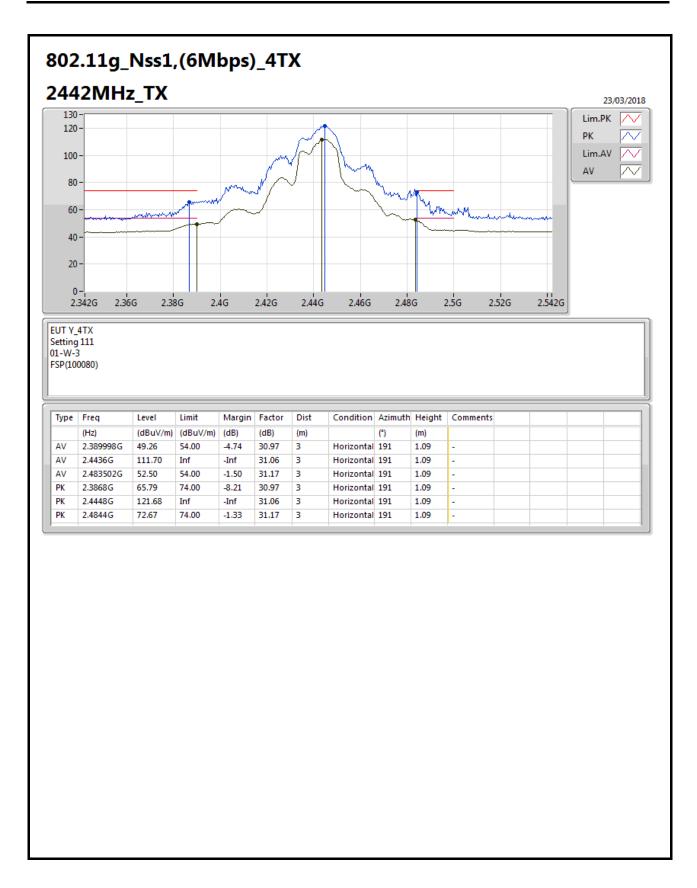




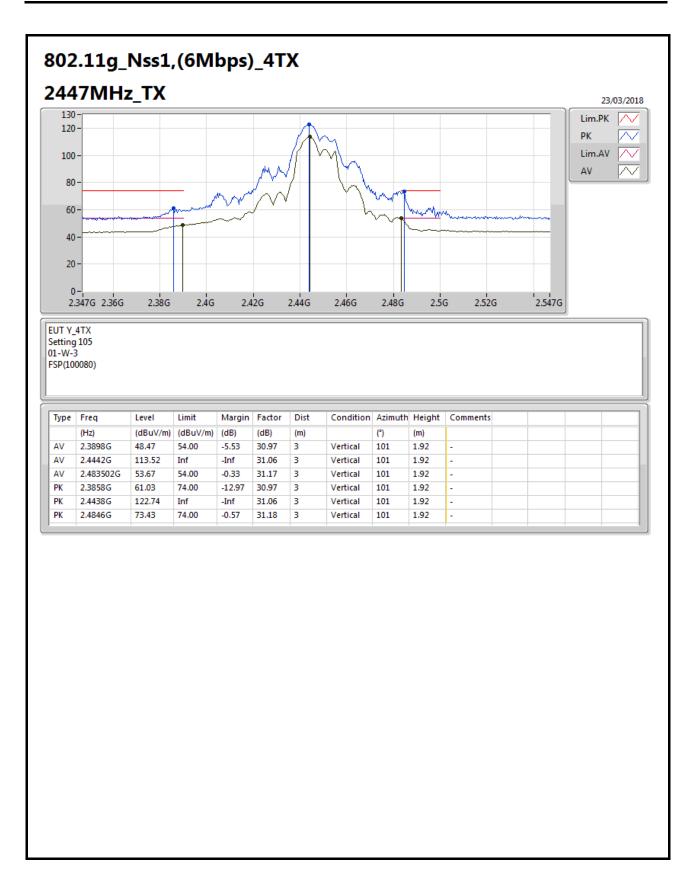




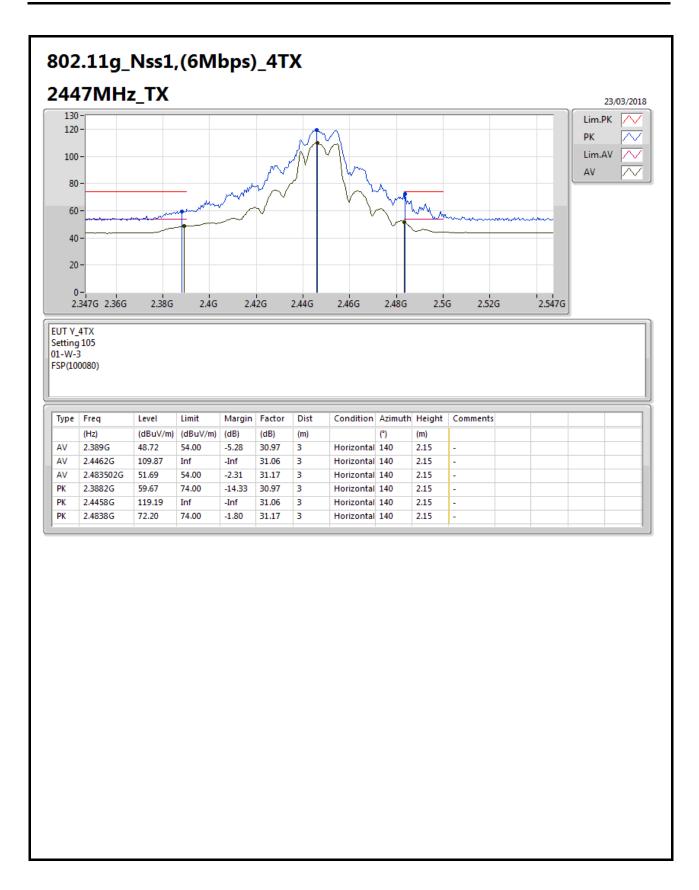




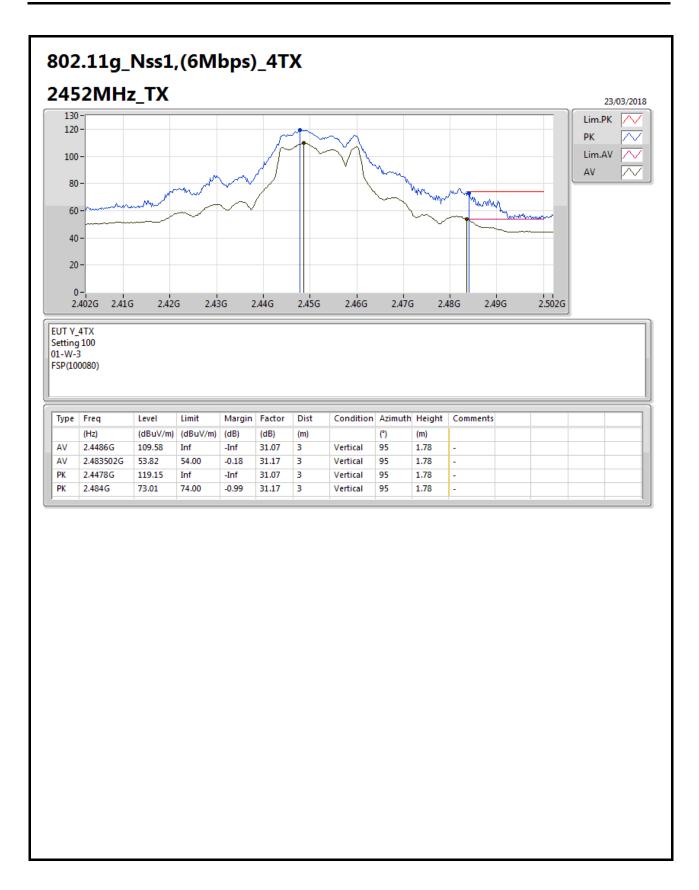




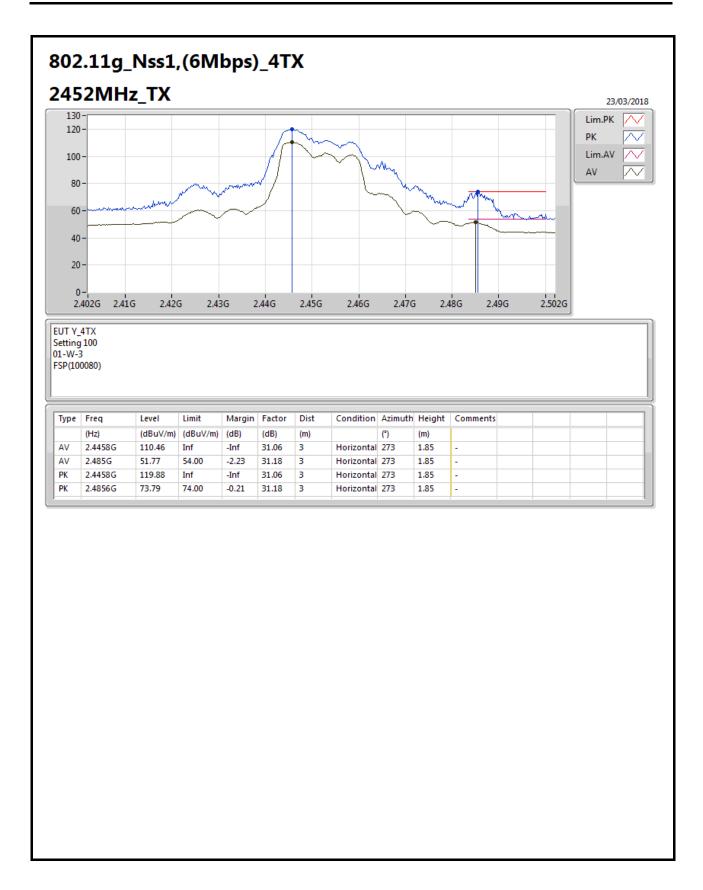




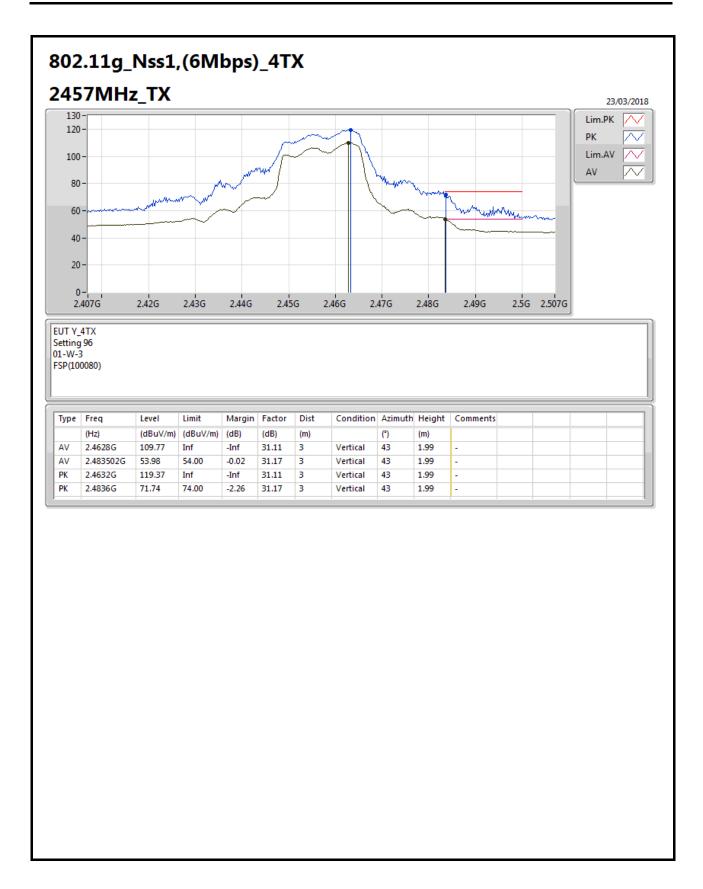




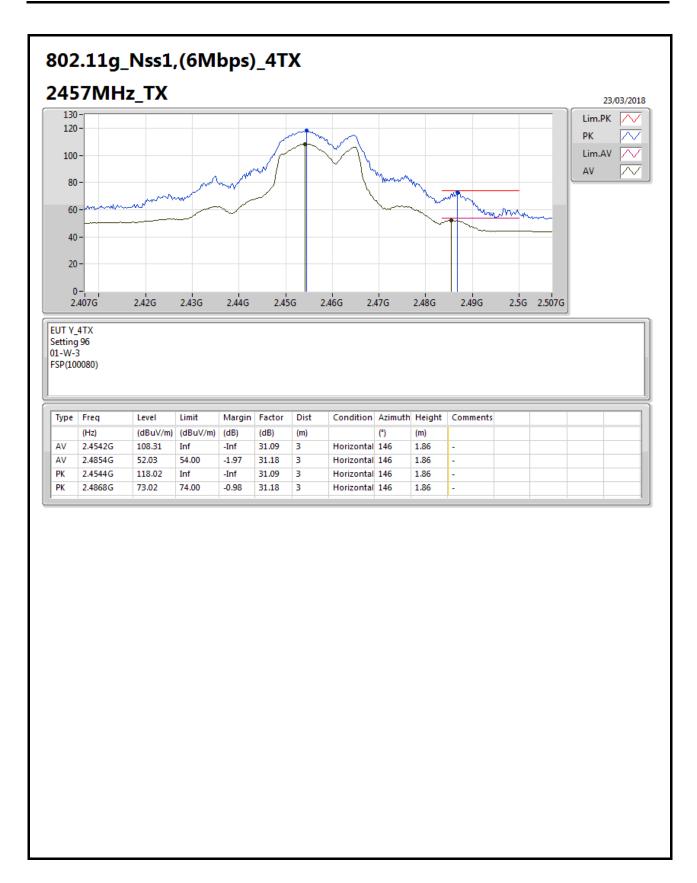




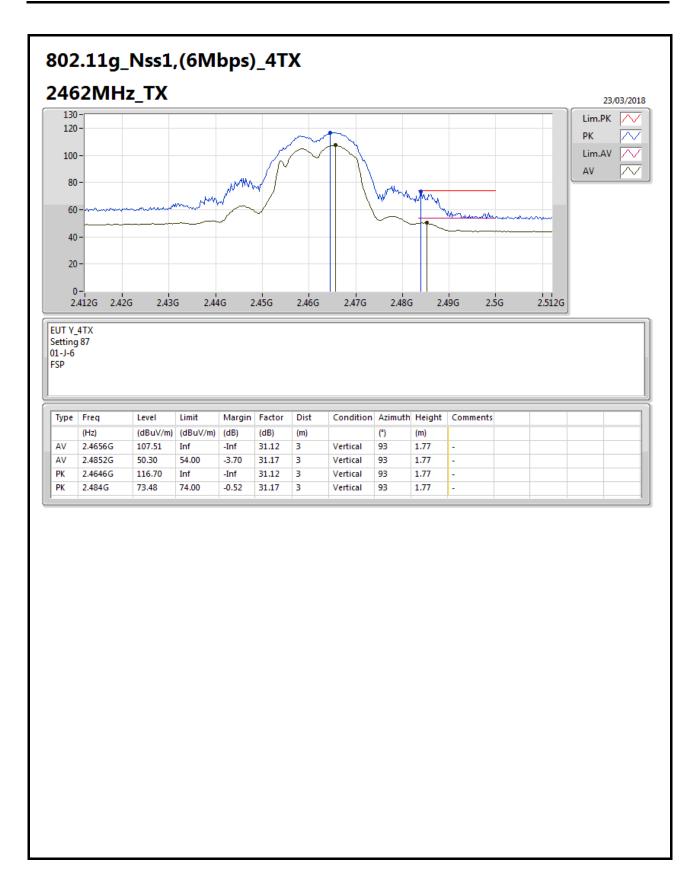




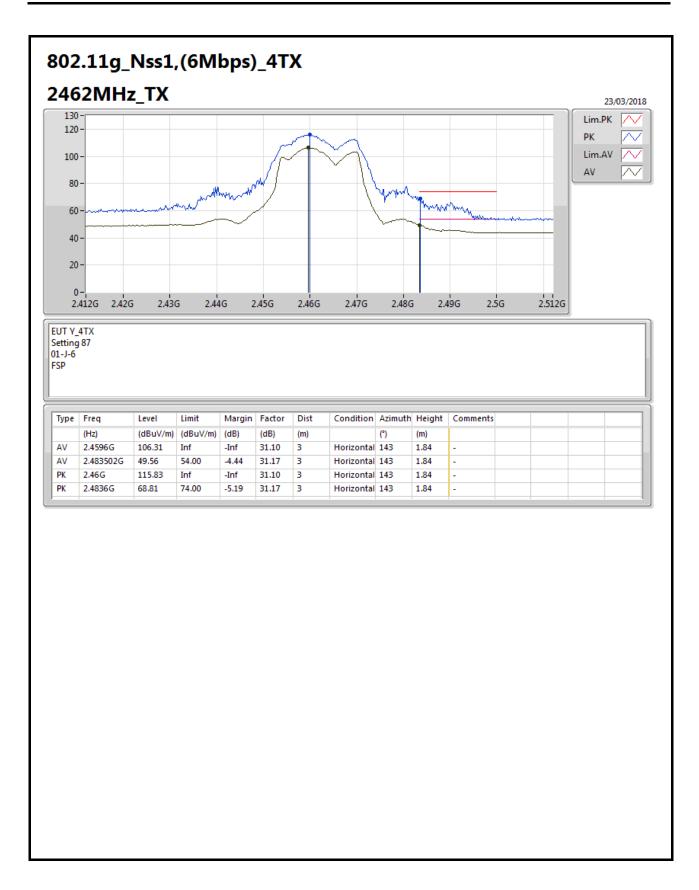








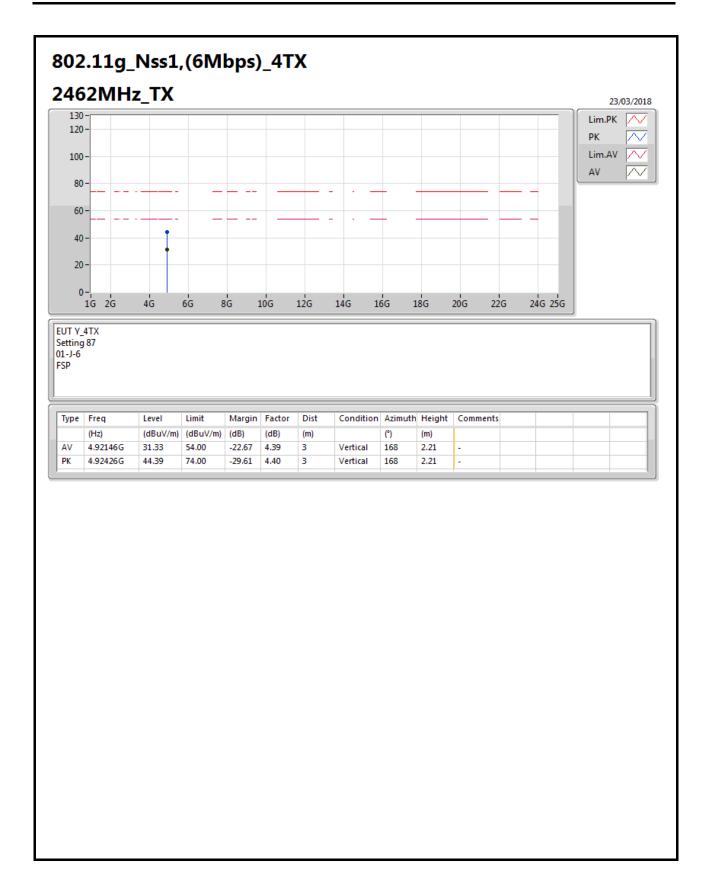




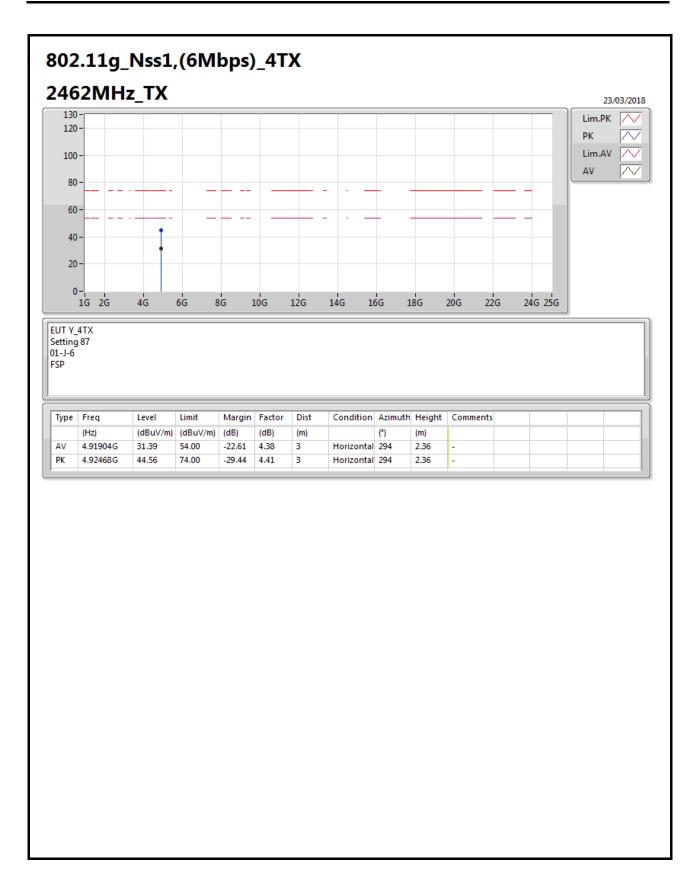
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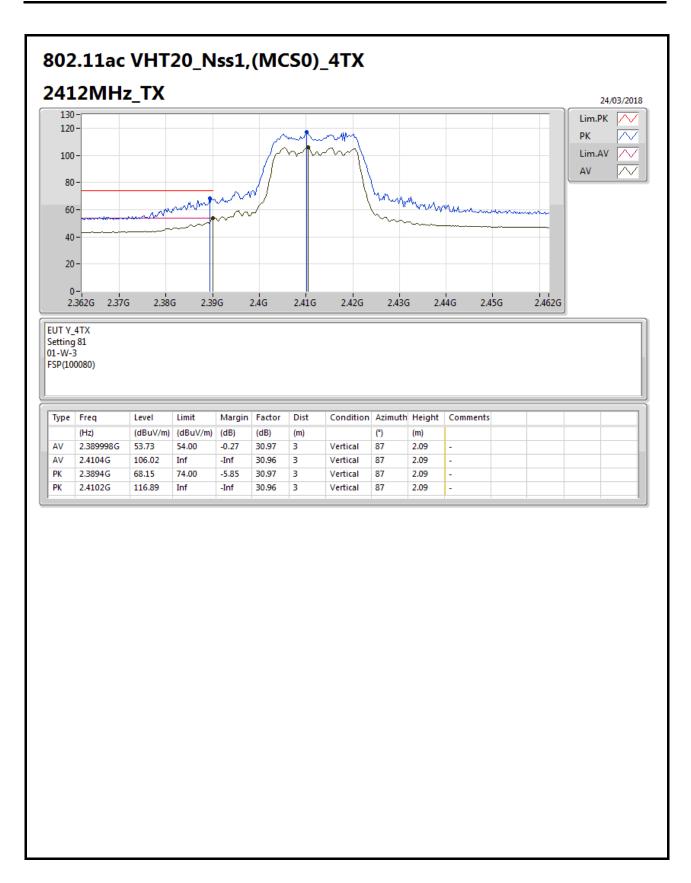




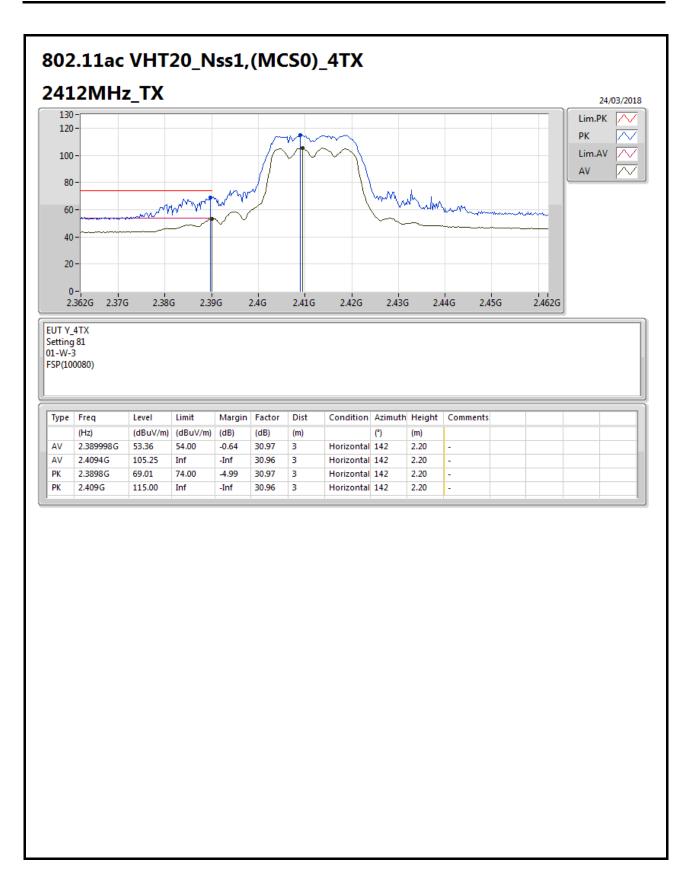




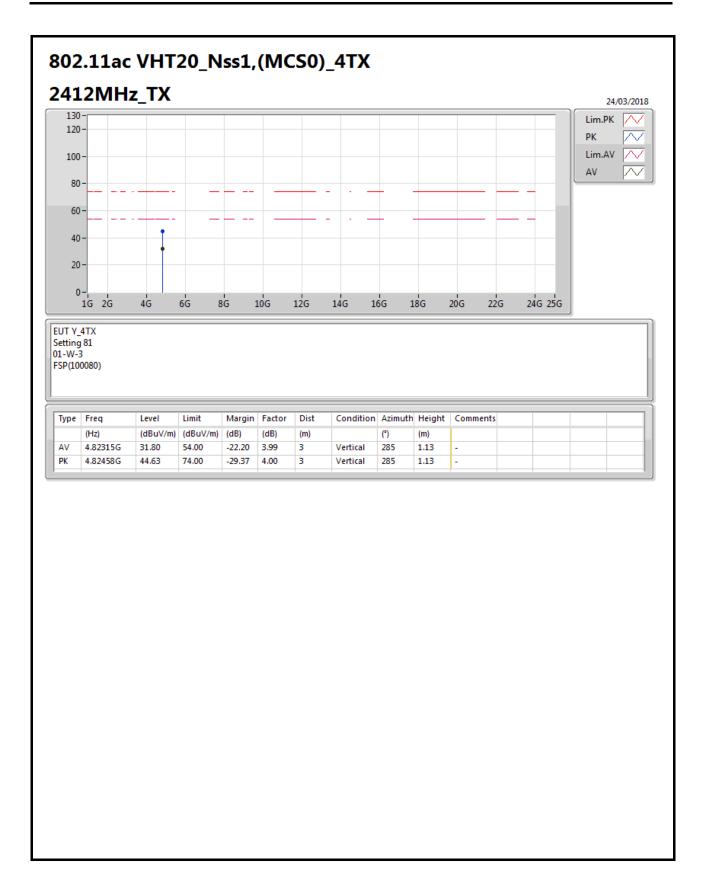








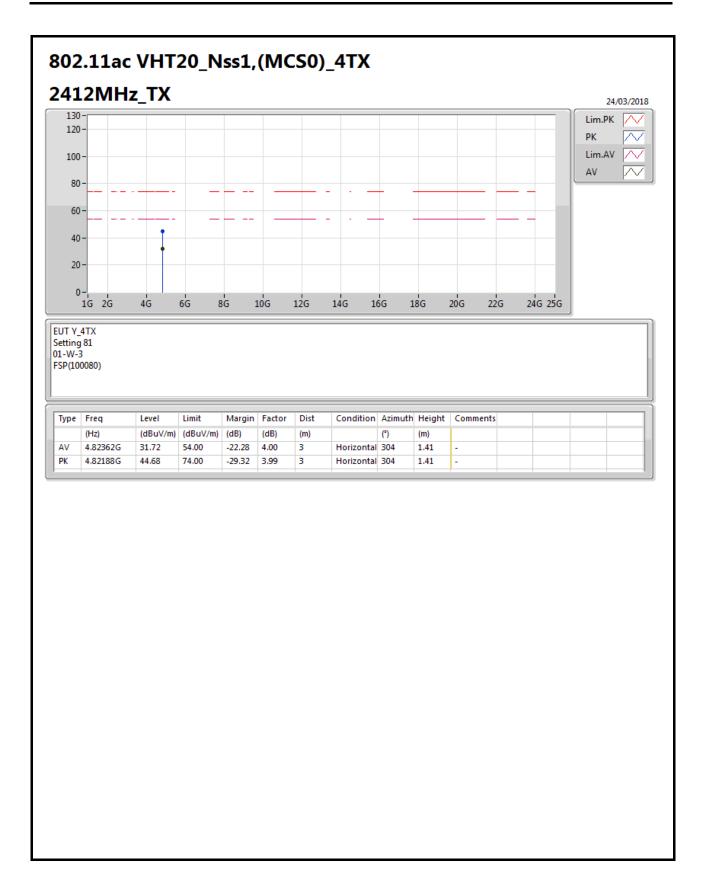




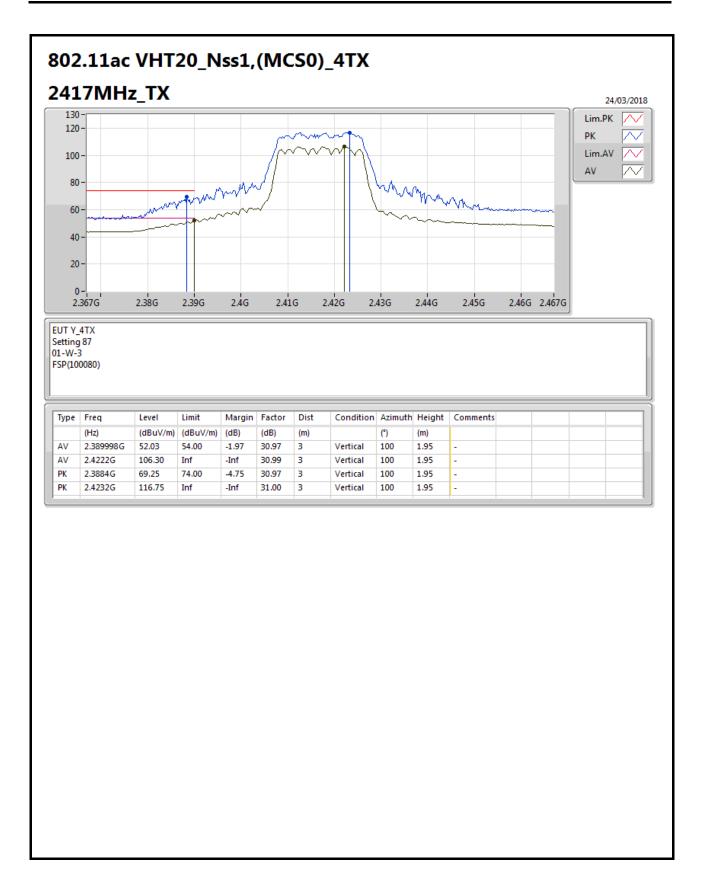
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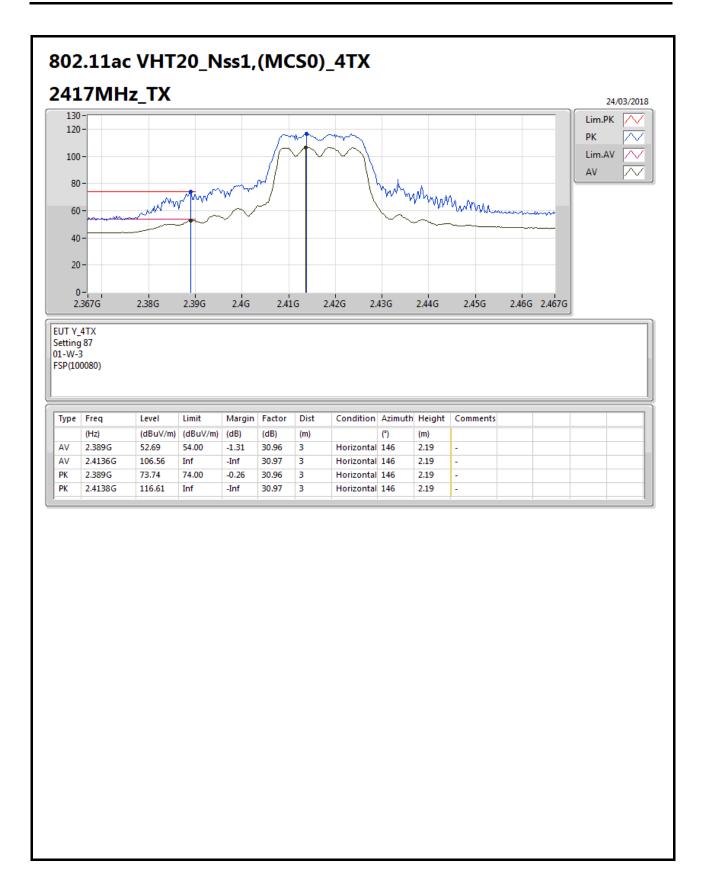




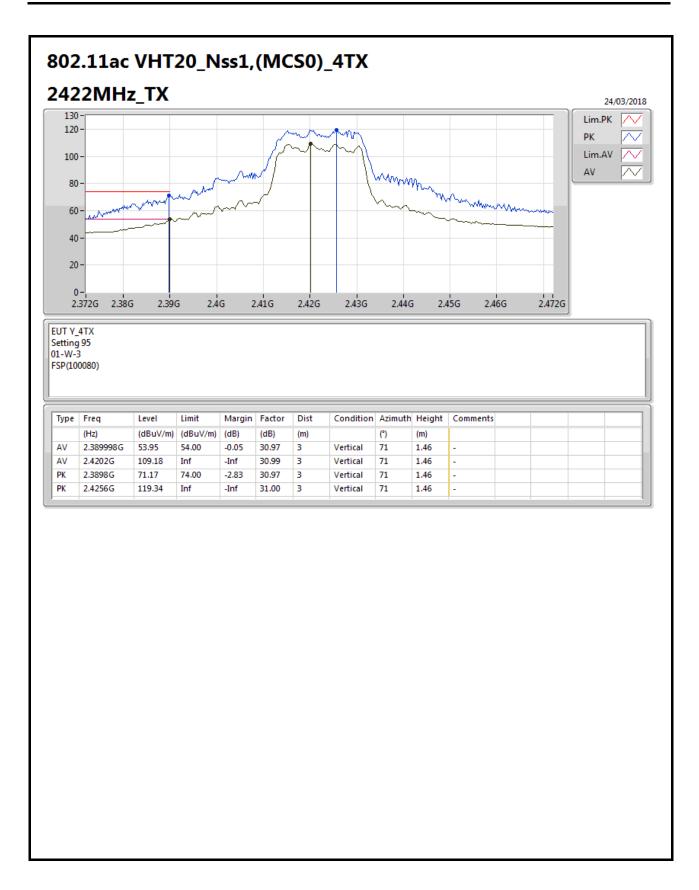




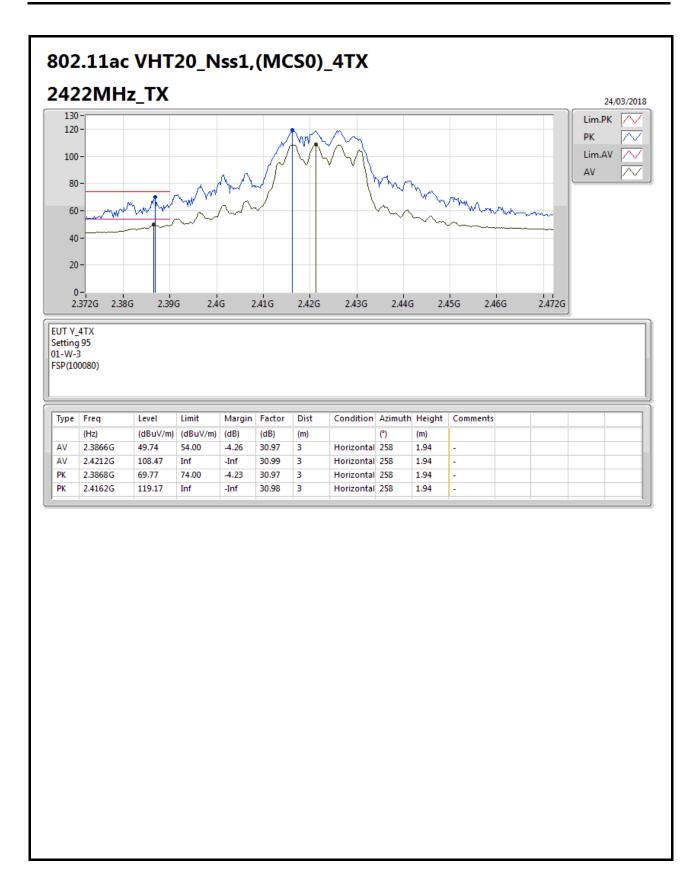




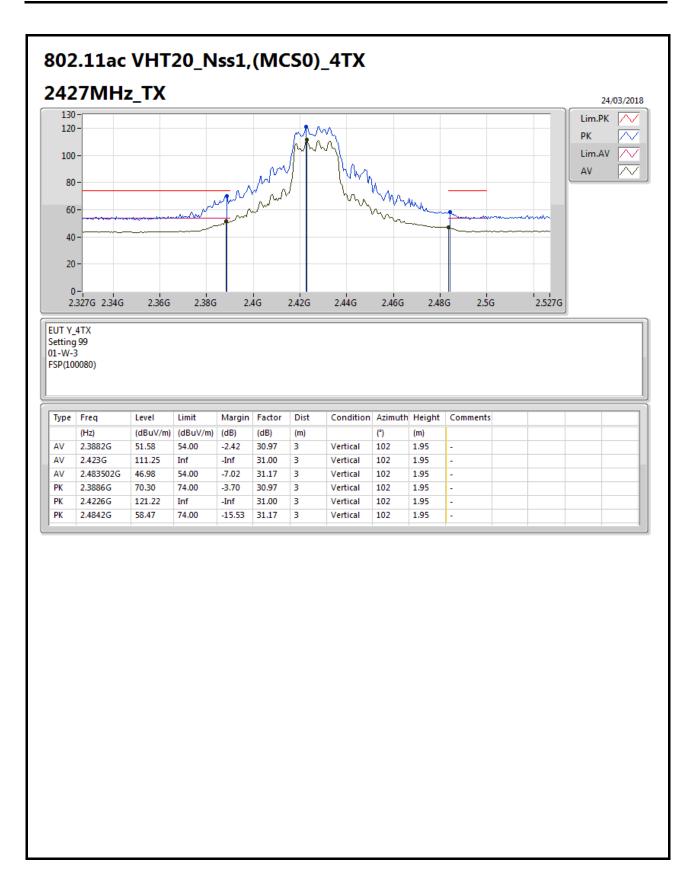




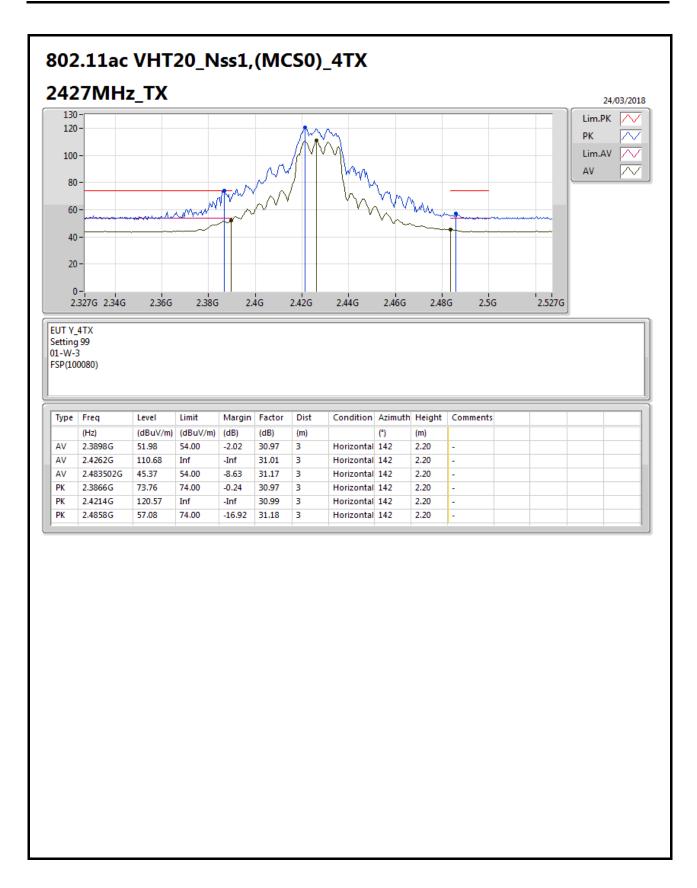




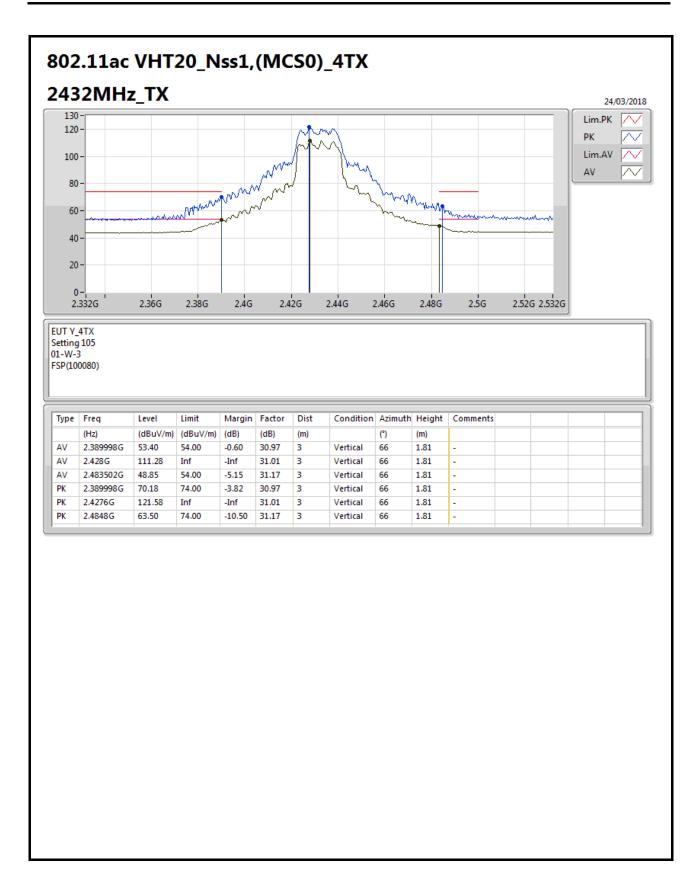




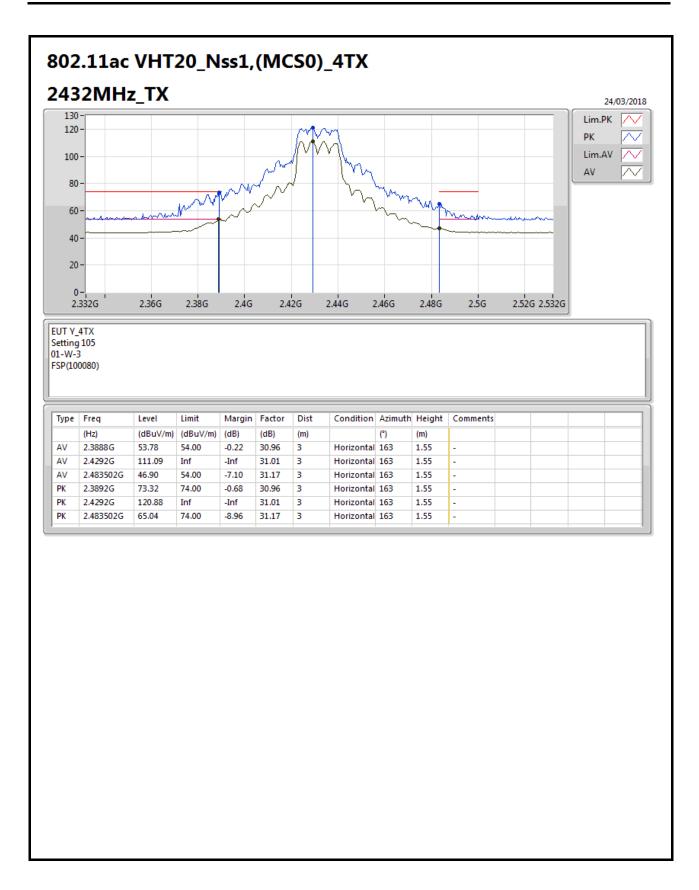




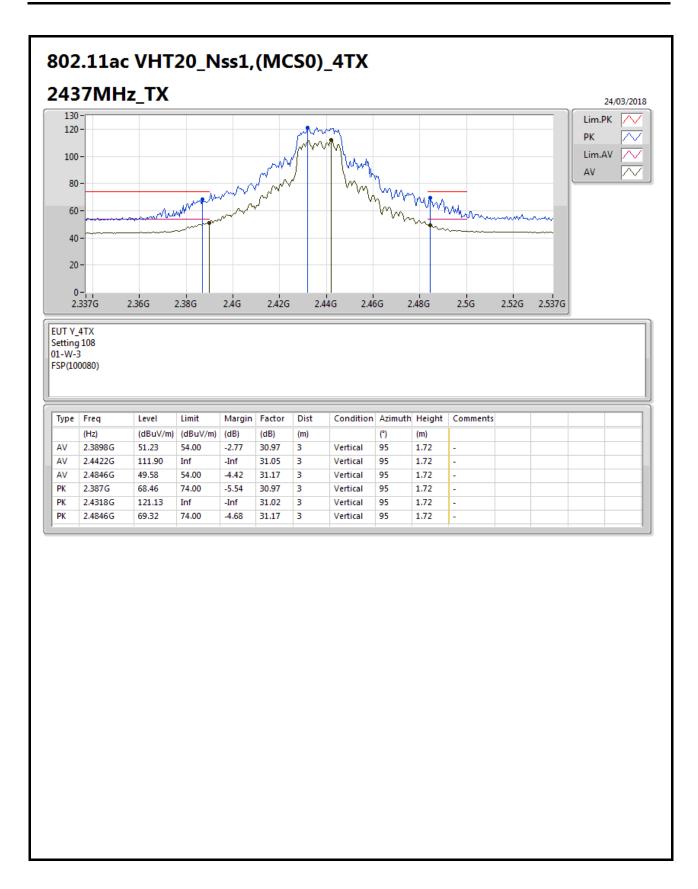




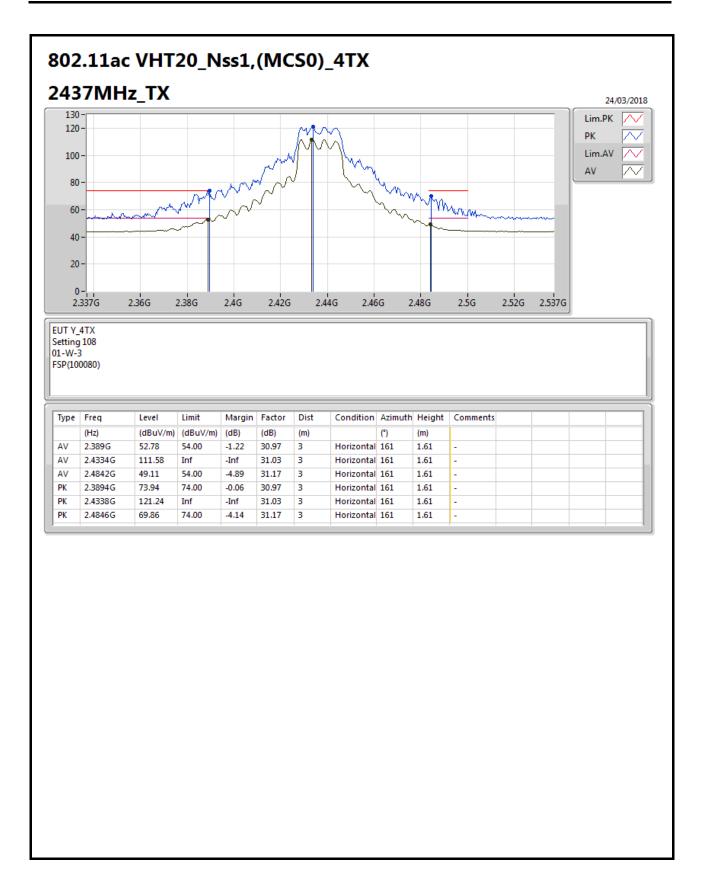




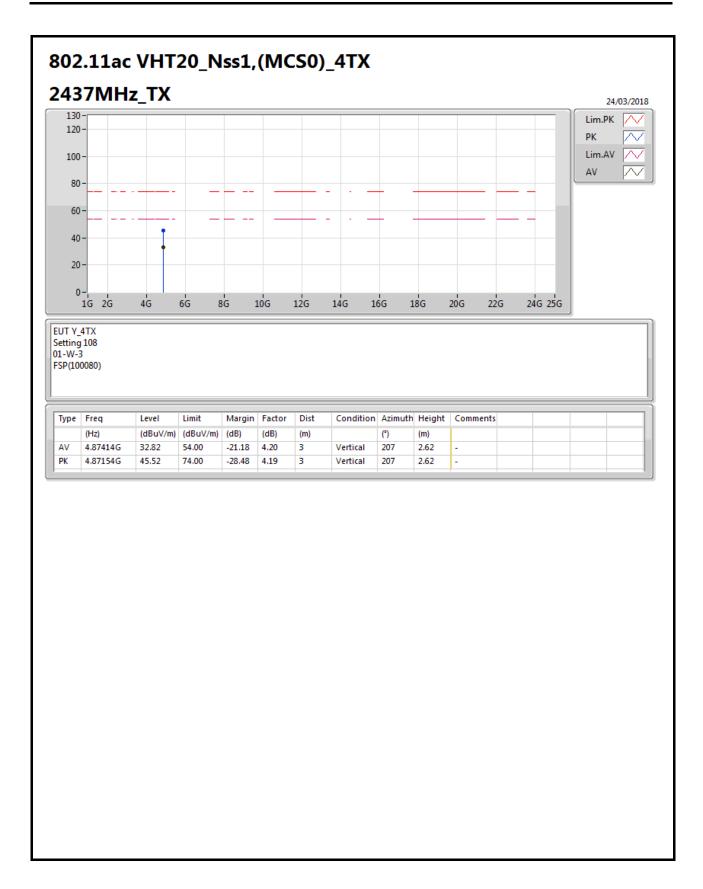




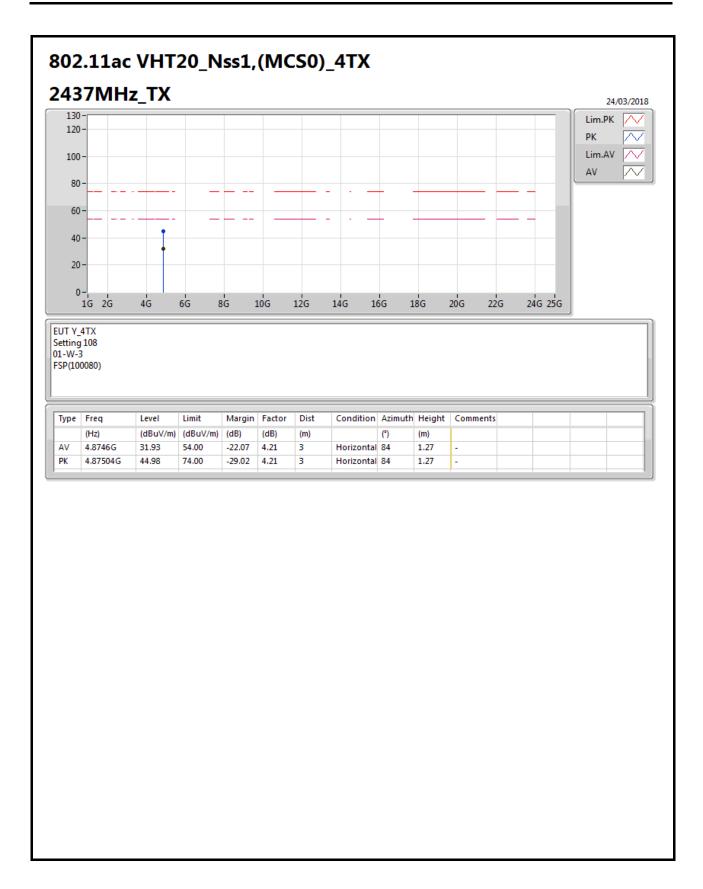




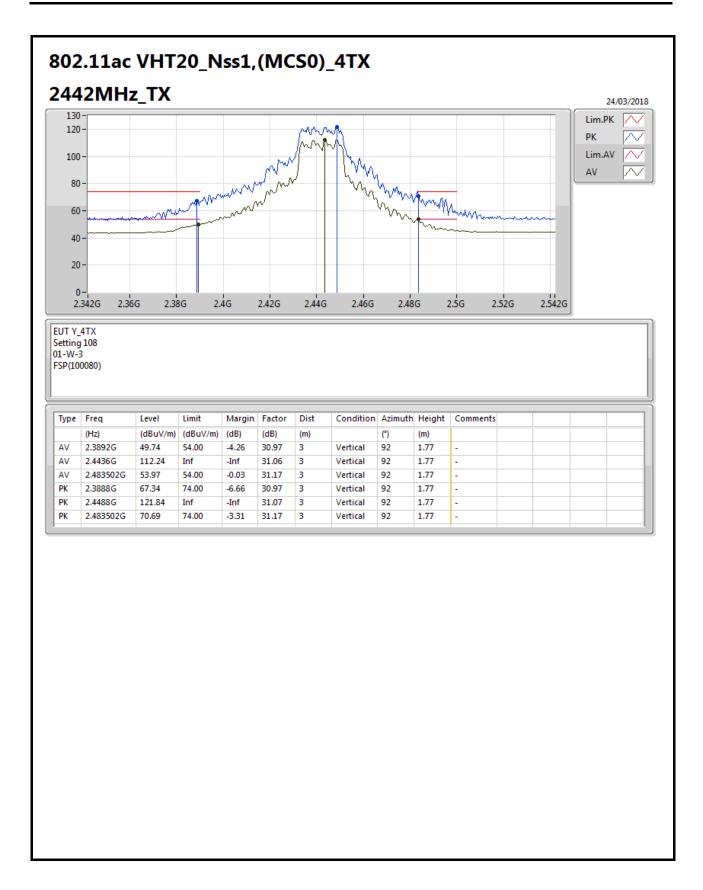




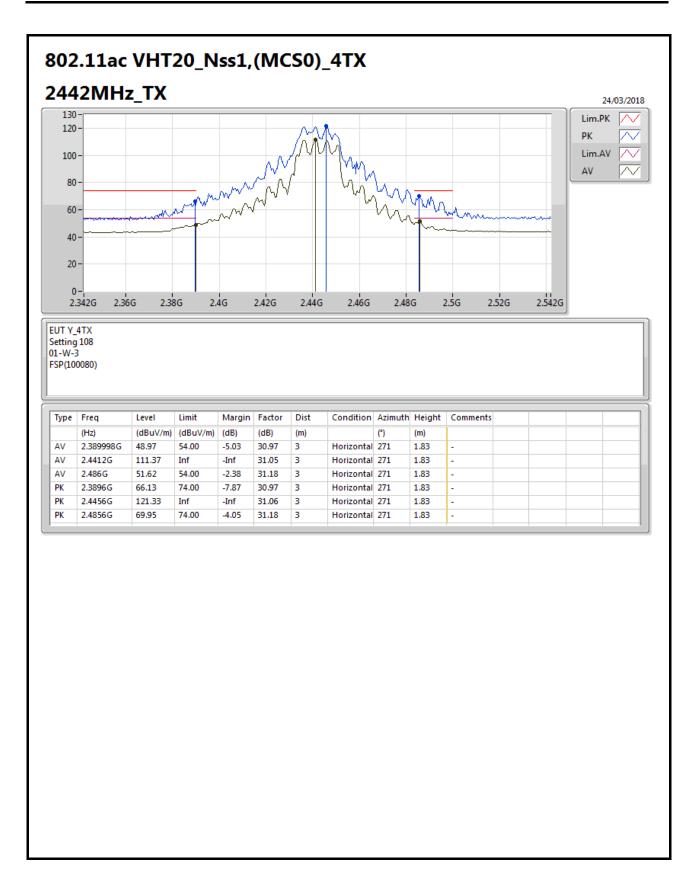




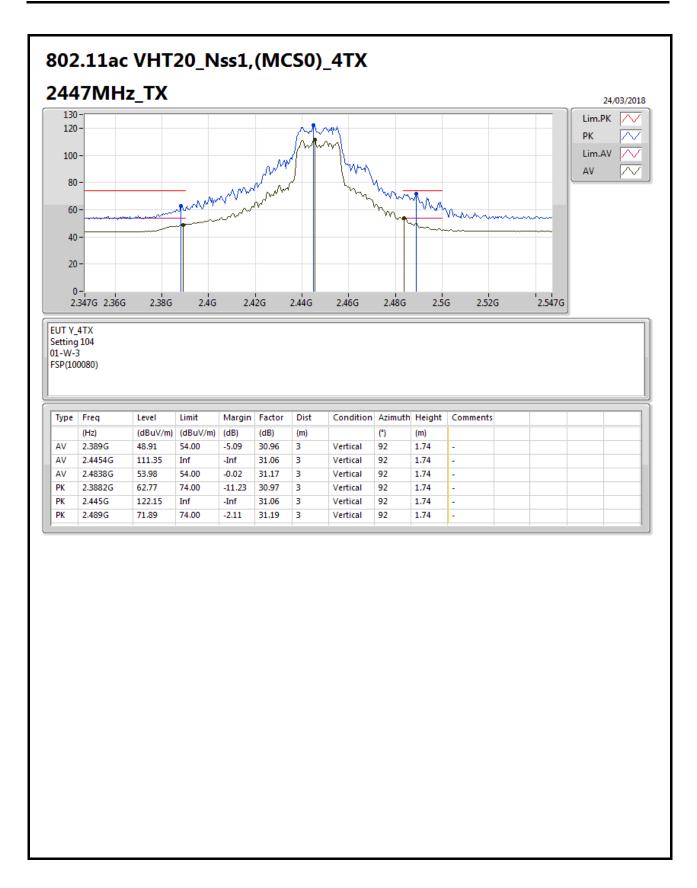




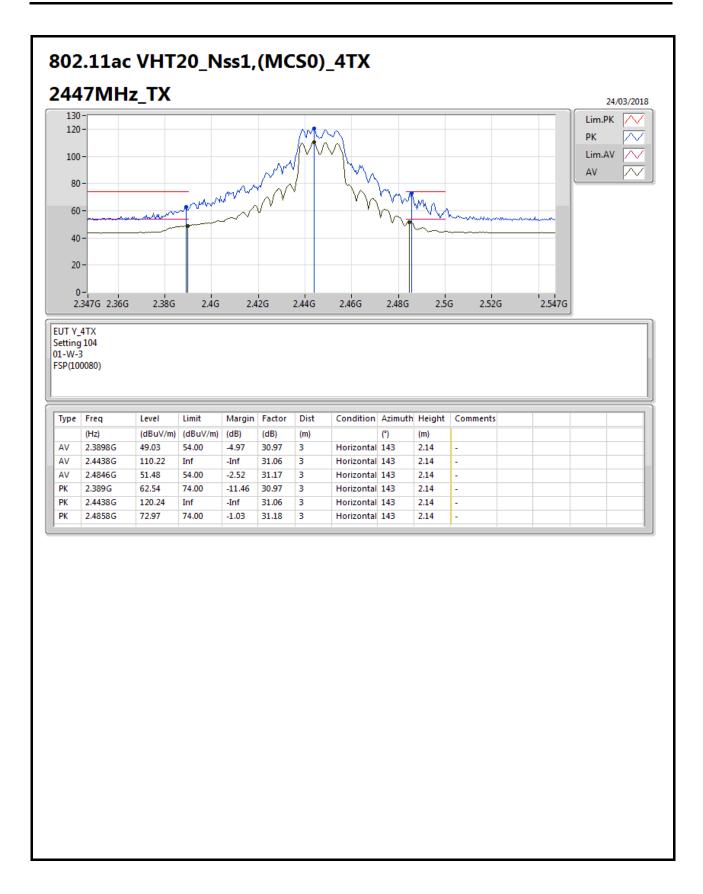




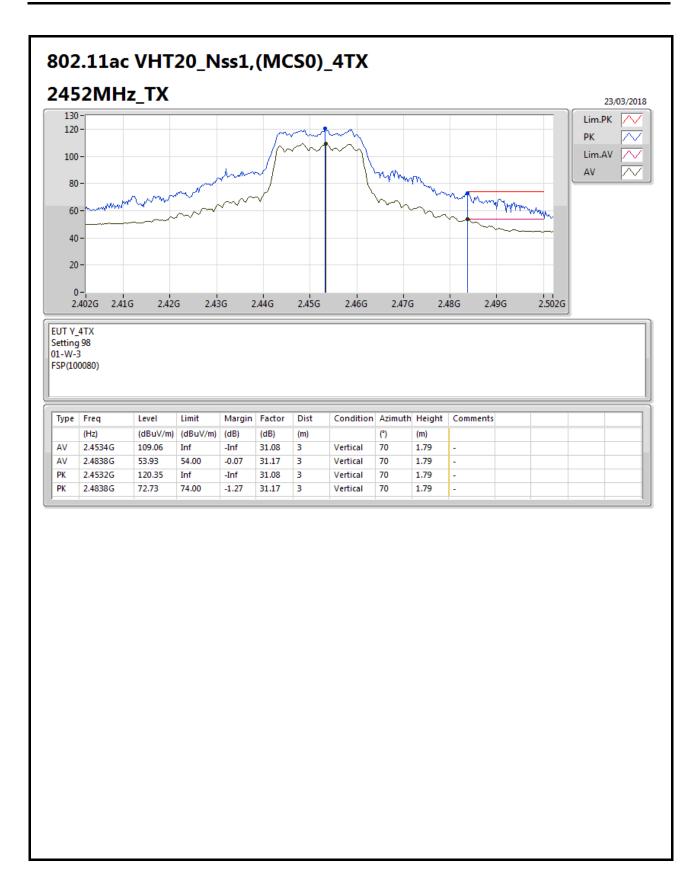




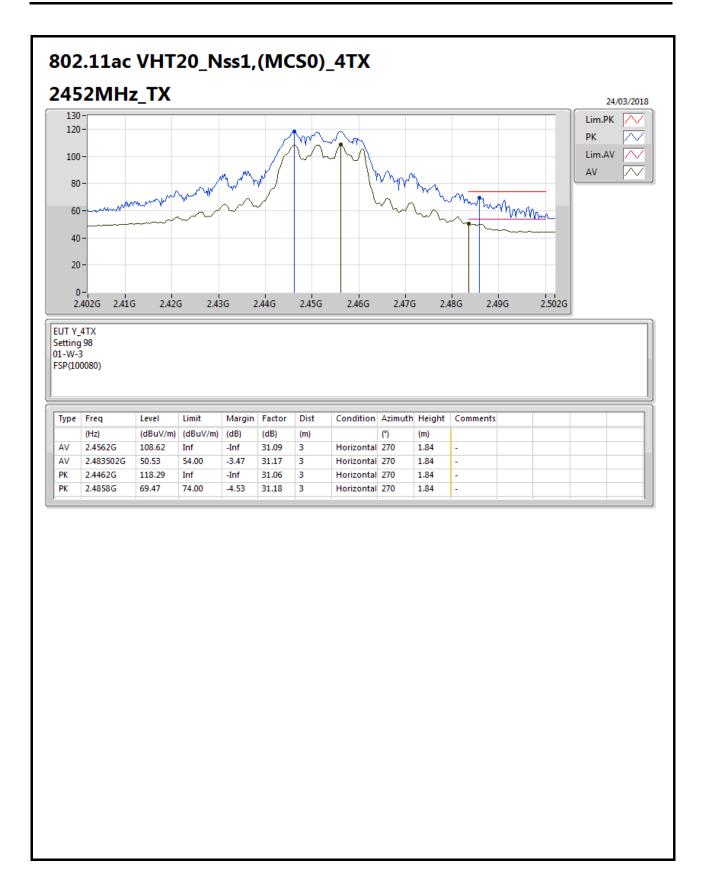




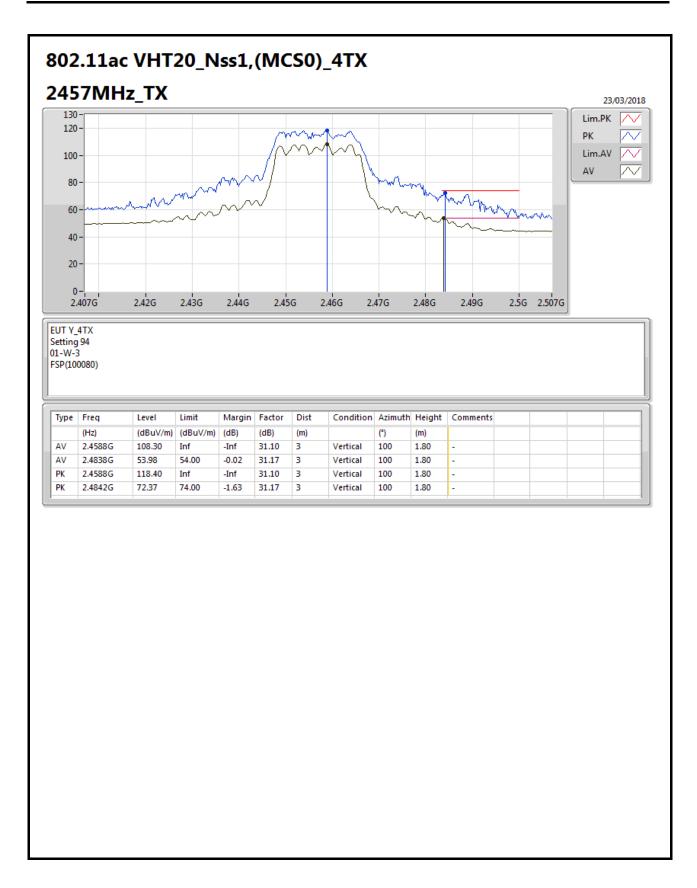




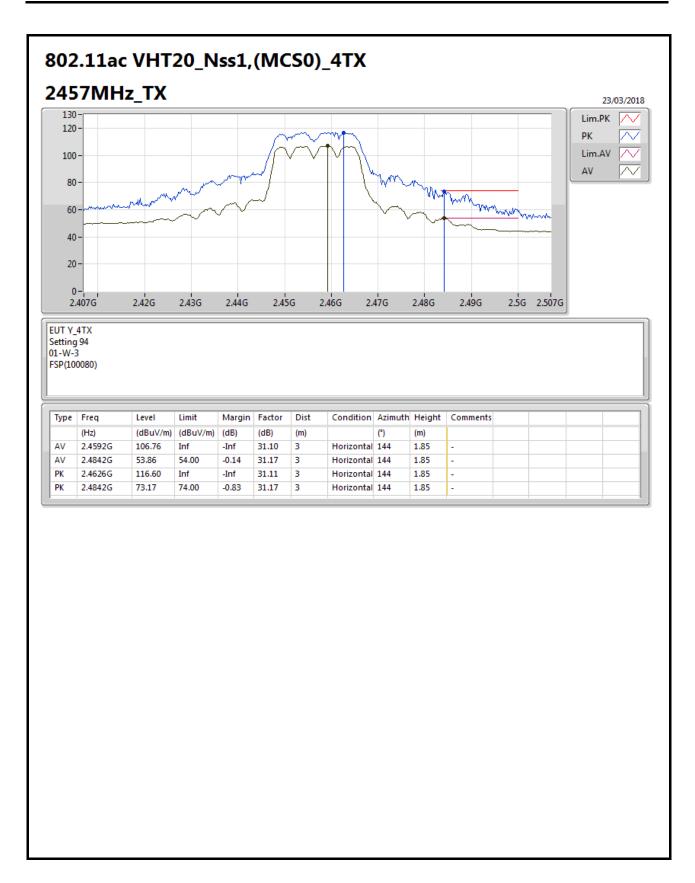




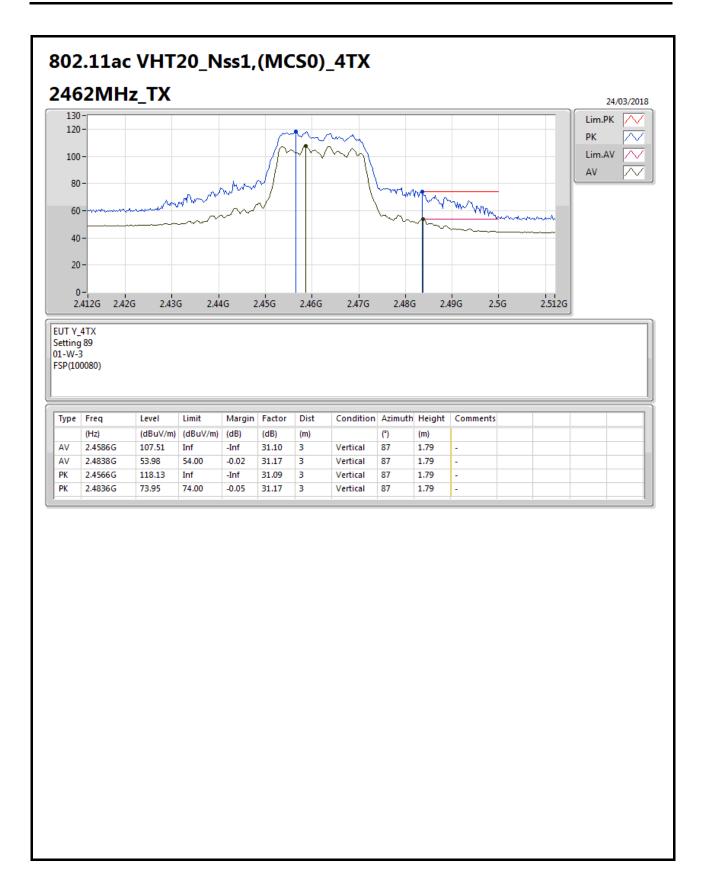




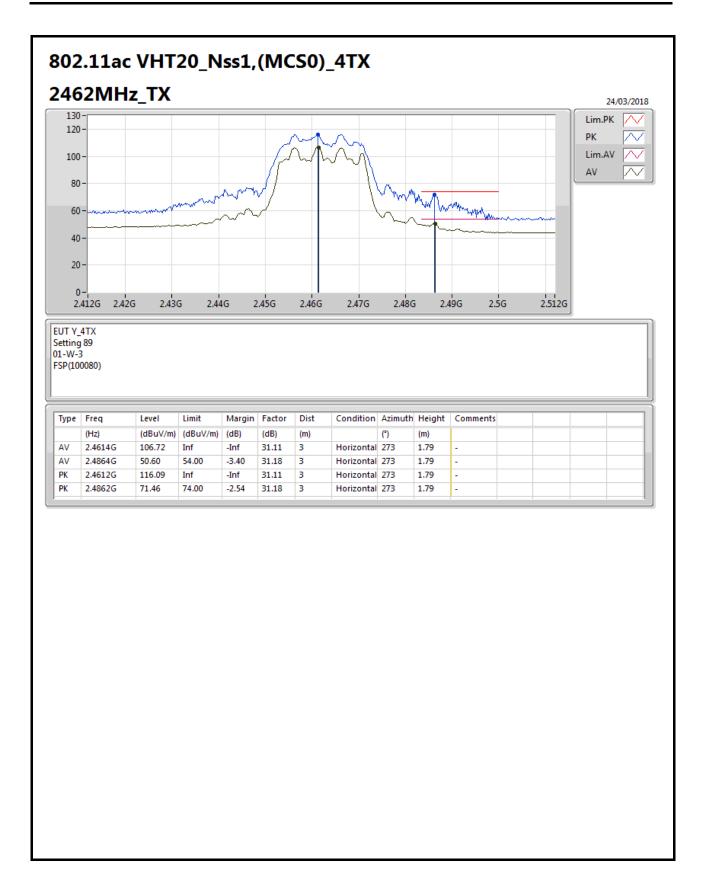




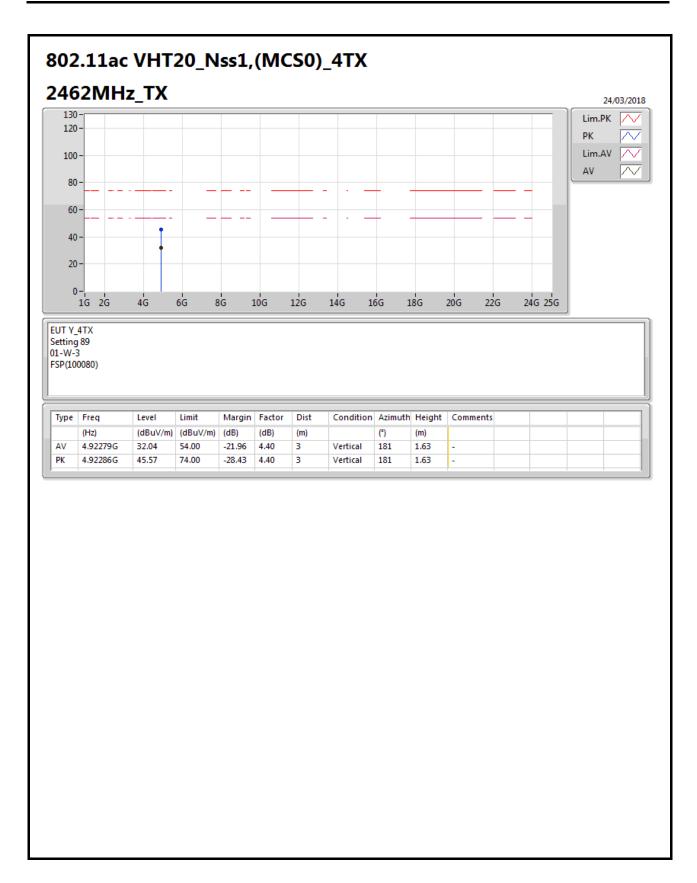




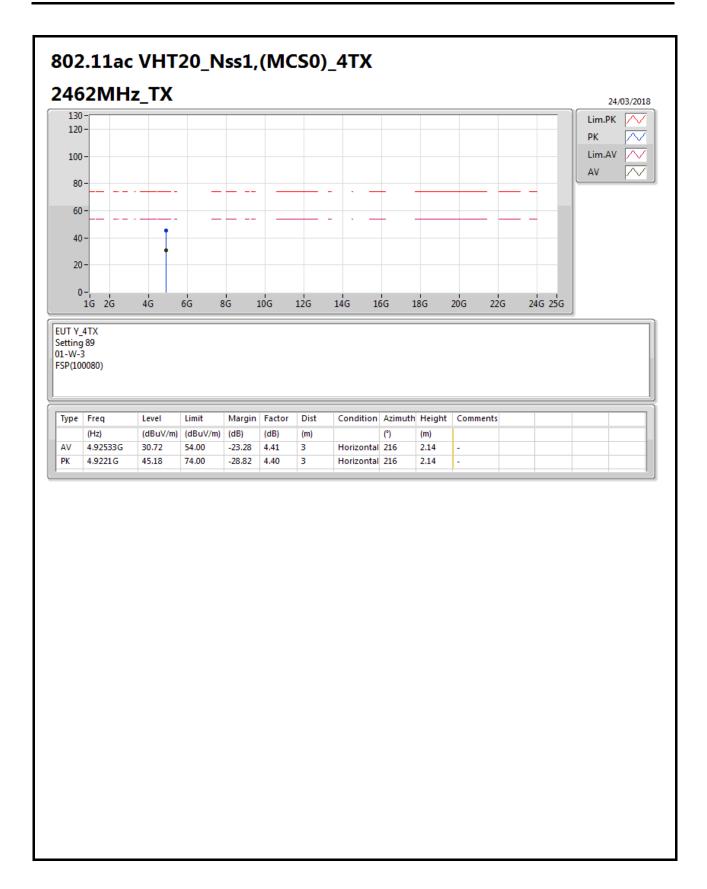




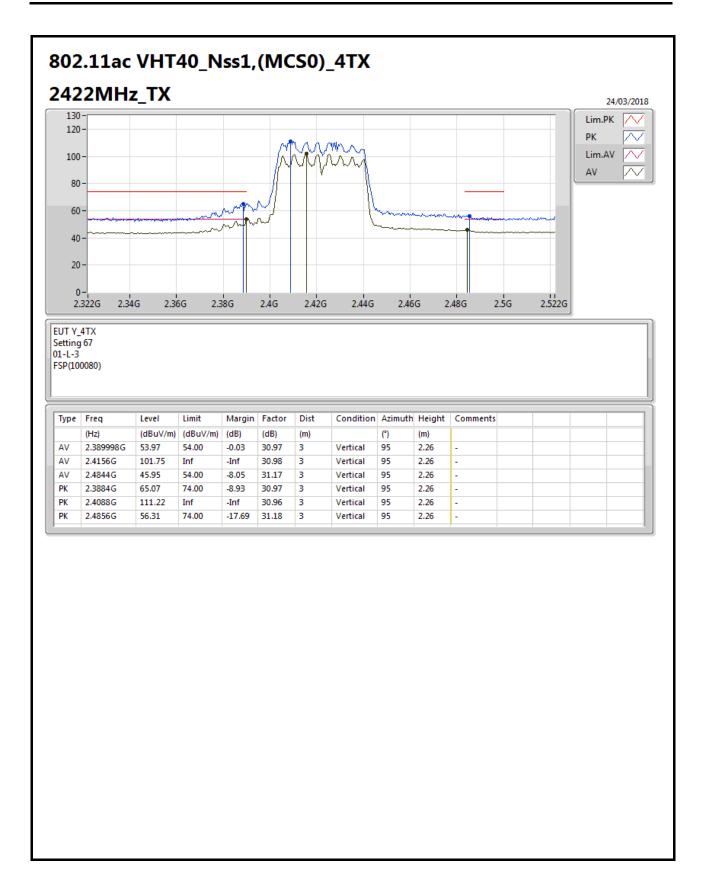




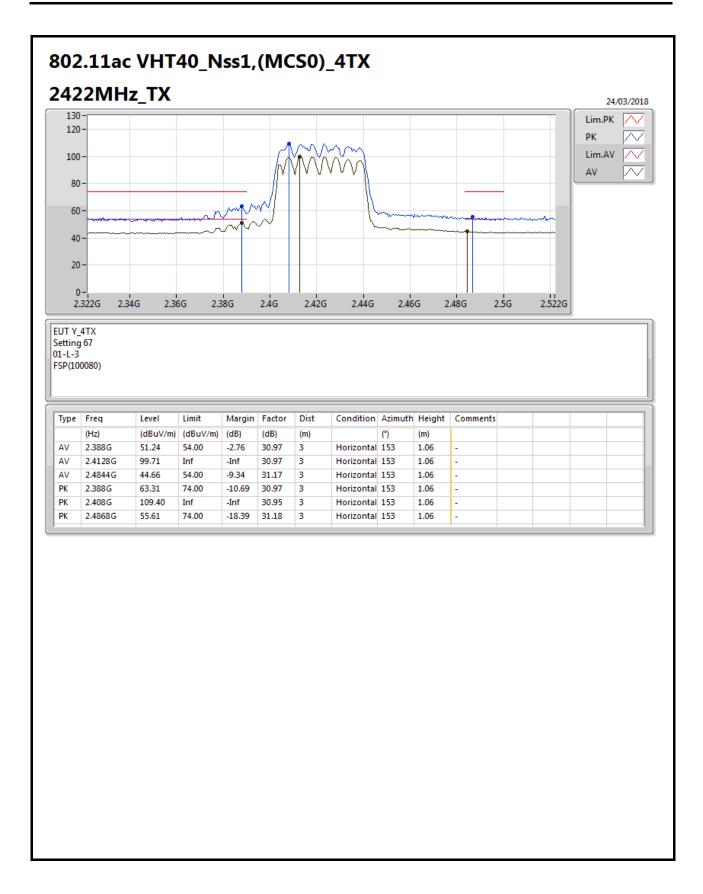




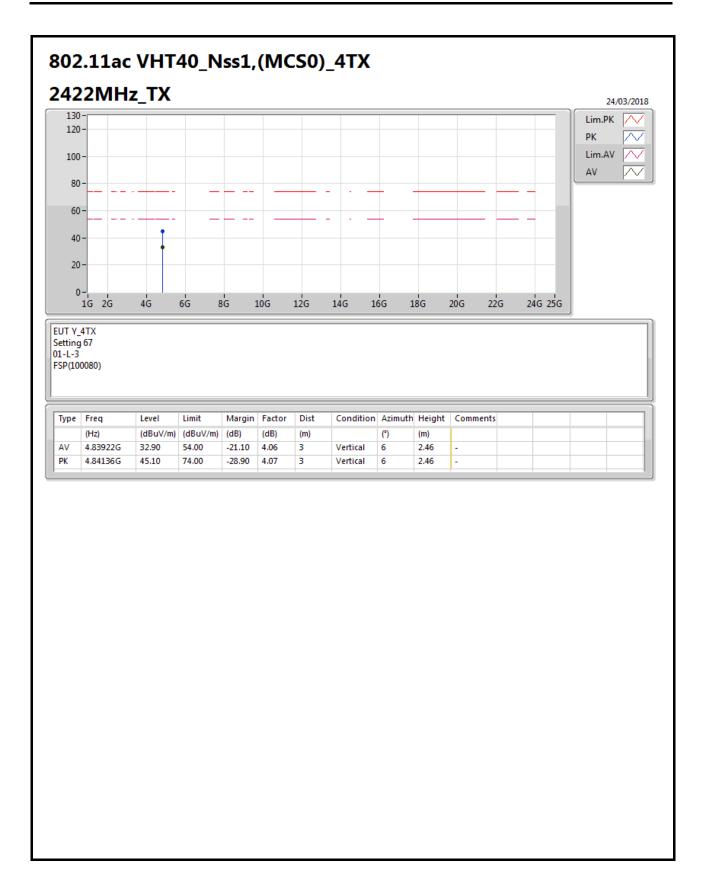




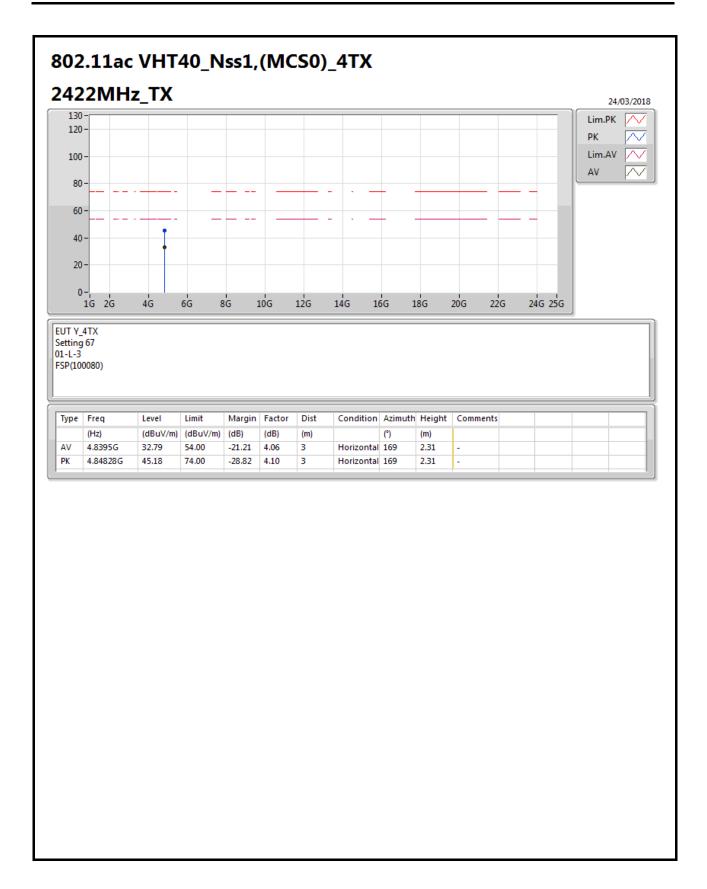




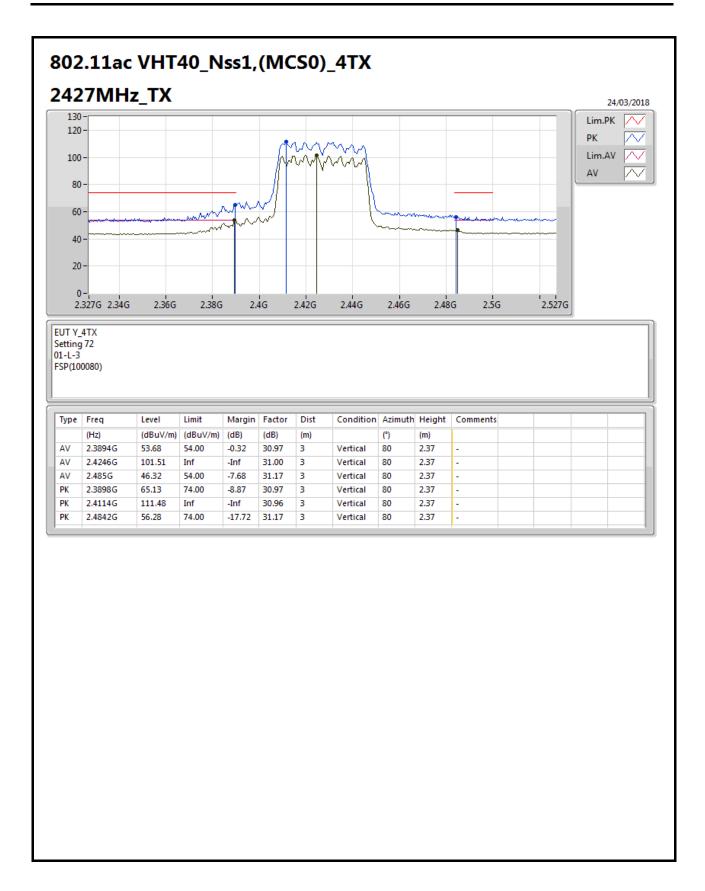




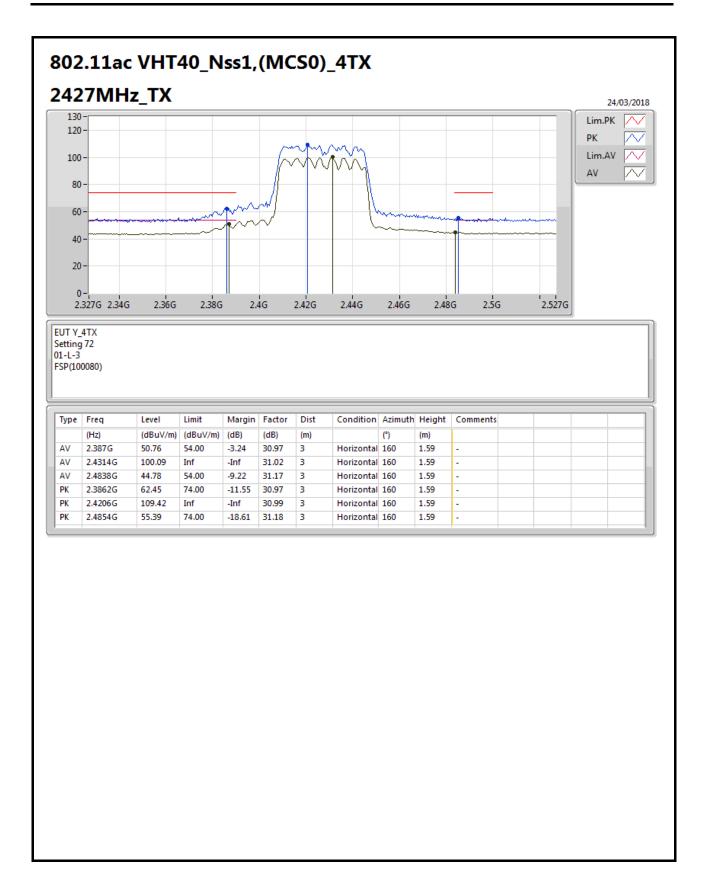




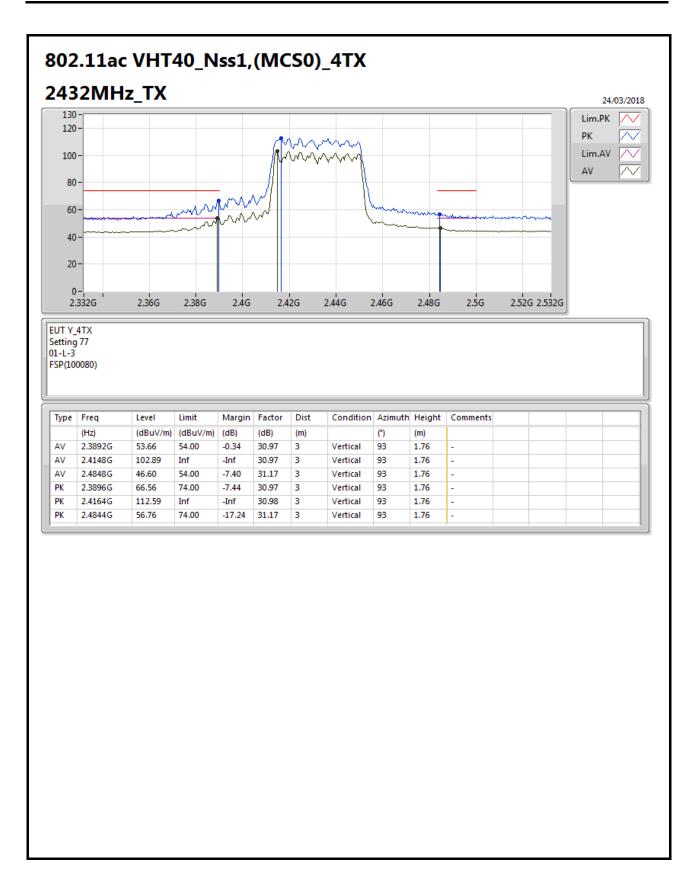




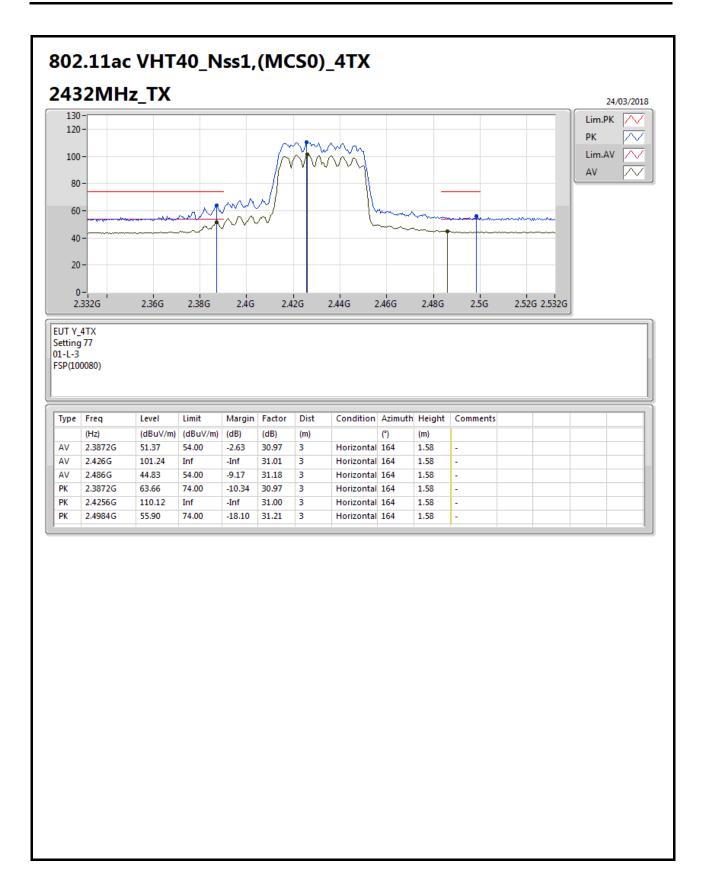








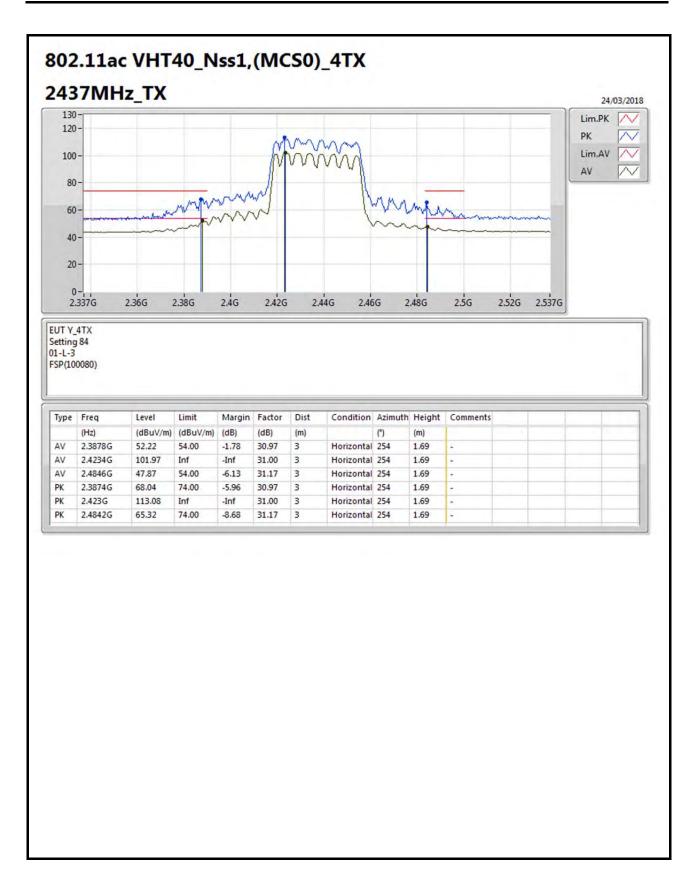




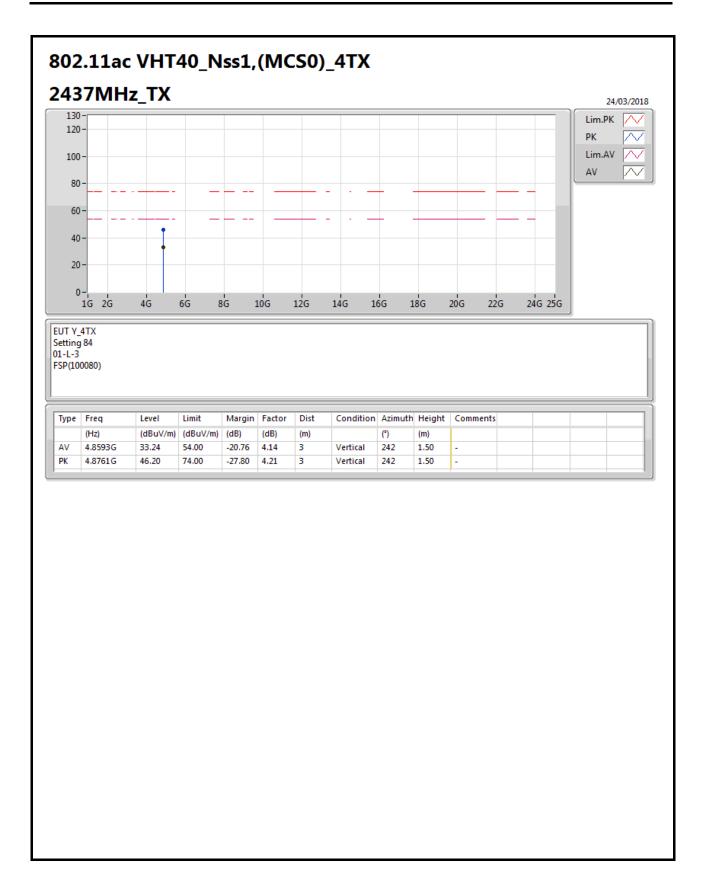




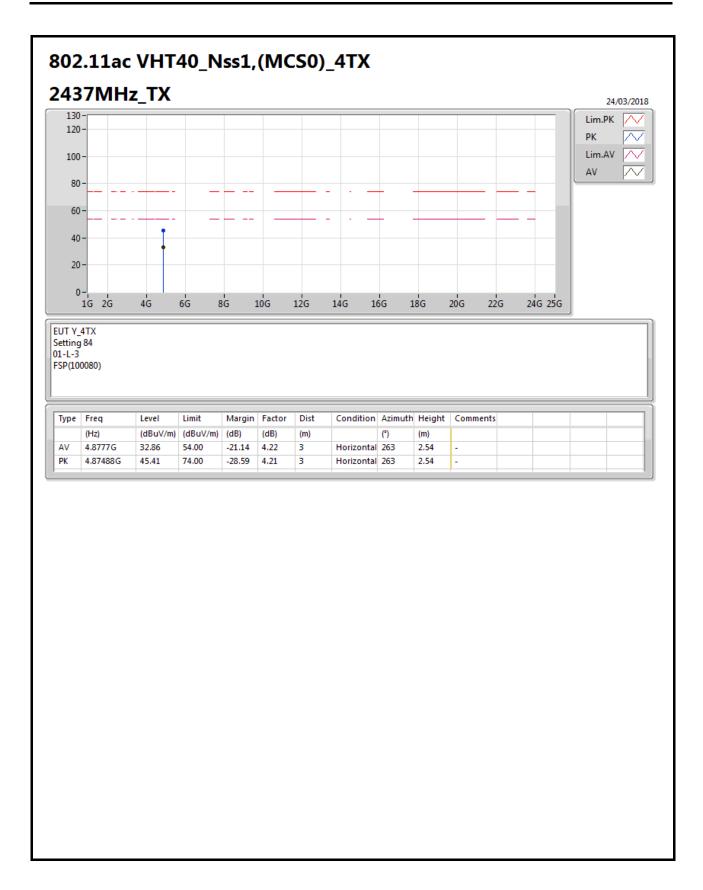




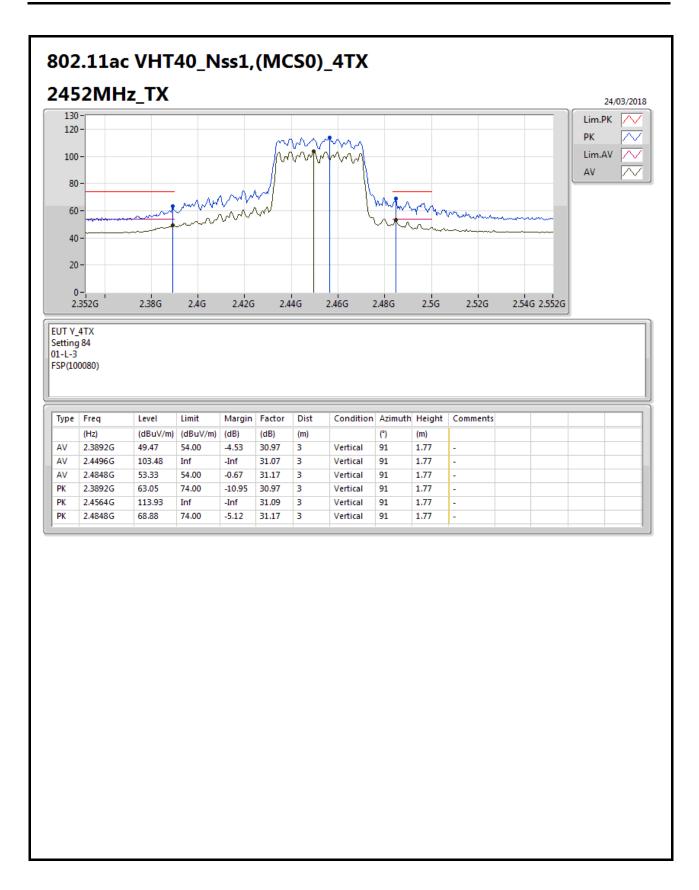




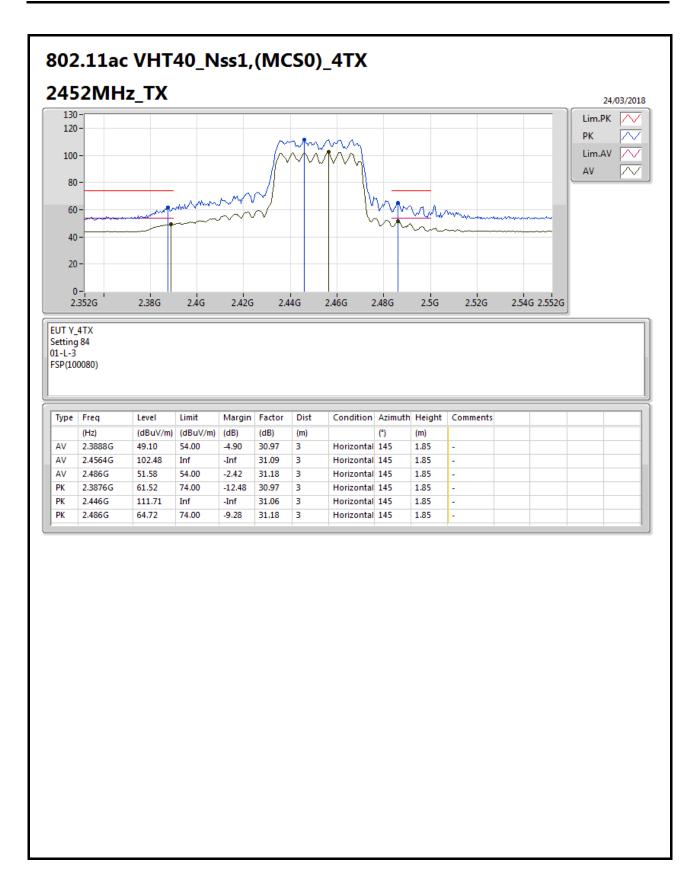




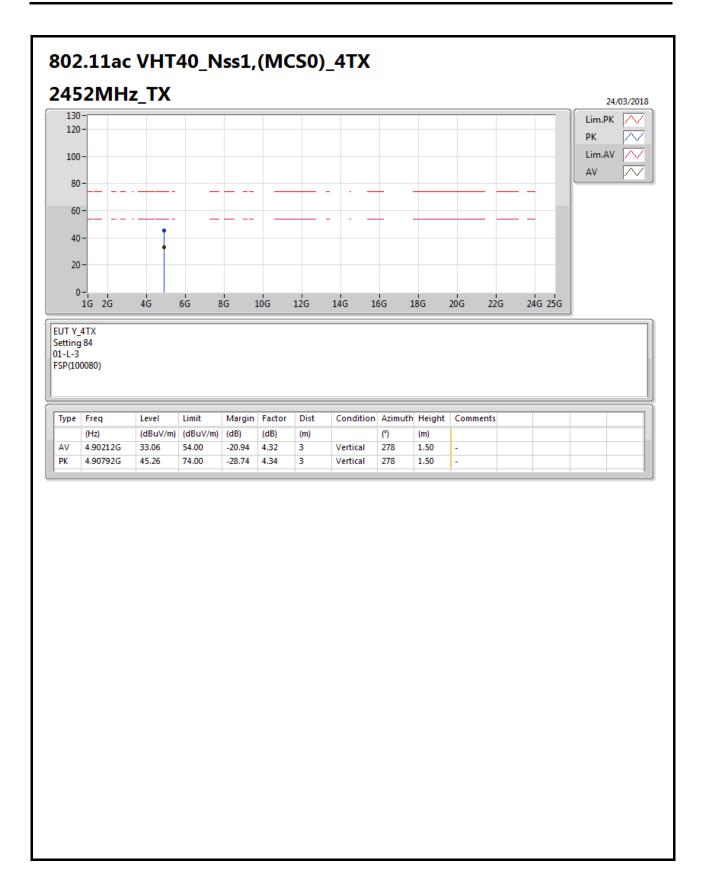




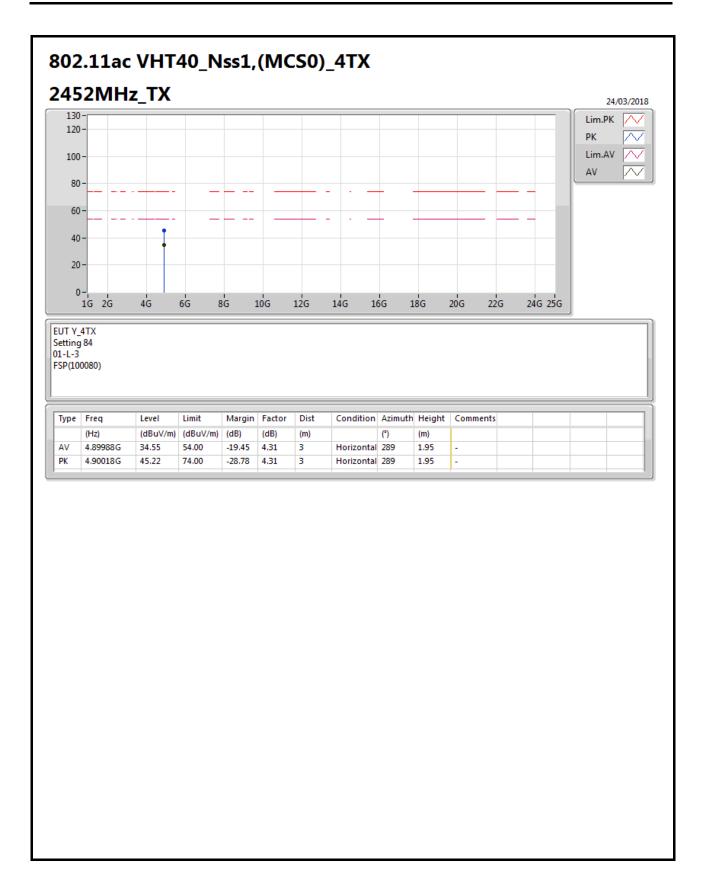






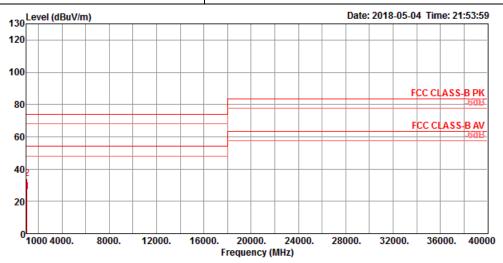






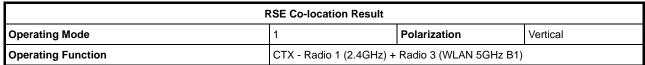


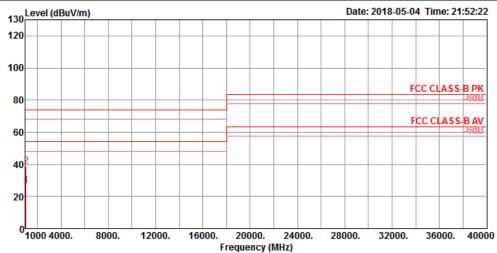
RSE Co-location Result									
Operating Mode	1	Polarization	Horizontal						
Operating Function	CTX - Radio 1 (2.4GHz) + Radio 3 (WLAN 5GHz B1)								



	Freq	Level		Over Limit								Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1056.62	25.81	54.00	-28.19	33.88	4.49	24.45	37.01	118	171	Average	HORIZONTAL
2	1056.93	34.08	74.00	-39.92	42.15	4.49	24.45	37.01	118	171	Peak	HORIZONTAL







	Freq	Level		Over Limit					A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	1056.56	26.63	54.00	-27.37	34.70	4.49	24.45	37.01	140	329	Average	VERTICAL
2	1058.08	39.07	74.00	-34.93	47.10	4.50	24.46	36.99	140	329	Peak	VERTICAL