

Report No.: FR091815AA



# **FCC RADIO TEST REPORT**

FCC ID

: S9GT350D

Equipment

: Access point

Brand Name : RUCKUS

Model Name : T350d

Applicant

: Ruckus Wireless Inc.

350 W. Java Dr., Sunnyvale CA 94089 USA

Manufacturer : Ruckus Wireless Inc.

350 W. Java Dr., Sunnyvale CA 94089 USA

Standard

: 47 CFR FCC Part 15.247

The product was received on Dec. 28, 2020, and testing was started from Dec. 30, 2020 and completed on Jan. 28, 2021. 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 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-A10\_10 Ver1.2

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: Feb. 26, 2021

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# History of this test report

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Report No.	Version	Description	Issued Date
FR091815AA	01	Initial issue of report	Feb. 26, 2021

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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	-

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

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

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

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

Reviewed by: Sam Chen

Report Producer: Sandy Chuang

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# 1 General Description

#### 1.1 Information

#### 1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
2400-2483.5	b, g, n (HT20), VHT20, ax (HEW20)	2412-2462	1-11 [11]
2400-2483.5	n (HT40), VHT40, ax (HEW40)	2422-2452	3-9 [7]

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Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	2TX
2.4-2.4835GHz	802.11g	20	2TX
2.4-2.4835GHz	802.11n HT20	20	2TX
2.4-2.4835GHz	VHT20	20	2TX
2.4-2.4835GHz	802.11ax HEW20	20	2TX
2.4-2.4835GHz	802.11n HT40	40	2TX
2.4-2.4835GHz	VHT40	40	2TX
2.4-2.4835GHz	802.11ax HEW40	40	2TX

#### 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.
- HEW20, HEW40 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- BWch is the nominal channel bandwidth.

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#### 1.1.2 Antenna Information

				Antonno			Gain (dBi)		
Ant.	Port	Brand	Model Name	Antenna	Connector	WLAN	WLAN	Bluetooth/	
				Туре	туре		2.4GHz	5GHz	Zigbee
1	1	RUCKUS	Corzar / Izar (Vertical)	PCB	I-PEX	2.4	3.2	-	
2	2	RUCKUS	Procyon (Horizontal)	PCB	I-PEX	2.1	3.2	-	
3	1	RUCKUS	Stamped IFA	PIFA	I-PEX	-	-	0.3	

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Note: The above information was declared by manufacturer.

#### For WLAN 2.4GHz Function:

#### For IEEE 802.11b/g/n/VHT/ax (2TX/2RX):

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

Port 1 and Port 2 could transmit/receive simultaneously.

#### For WLAN 5GHz Function:

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

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

Port 1 and Port 2 could transmit/receive simultaneously.

#### For Bluetooth Function (1TX/1RX)

Only Port 1 can be used as transmitting/receiving.

#### For Zigbee Function (1TX/1RX)

Only Port 1 can be used as transmitting/receiving.

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# 1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11b	0.998	0.01	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11g	0.989	0.05	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ax HEW20	0.991	0.04	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ax HEW40	0.984	0.07	n/a (DC>=0.98)	n/a (DC>=0.98)

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

## 1.1.4 EUT Operational Condition

EUT Power Type	Fro	From PoE or DC Power Supply			
Beamforming Function	☐ With beamforming ☐ Without beamforming				
Function	Point-to-multipoint Deint-to-point				
<b>Test Software Version</b>	Pul	PuTTY (Release 0.62)			

Note: The above information was declared by 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

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 558074 D01 v05r02
- FCC KDB 662911 D01 v02r01
- FCC KDB 414788 D01 v01r01

# 1.3 Testing Location Information

	Testing Location						
	HWA YA ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)						
		TEL	:	886-3-327-3456 FAX : 886-3-327-0973			
$\boxtimes$	JHUBEI	ADD	:	No.8, Ln. 724, Bo'ai St., Zhubei 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 (°C / %)	Test Date
RF Conducted	TH01-CB	Serway Li	18.6-19.2 / 65-67	Jan. 06, 2021~ Jan. 26, 2021
Radiated (For Co-location test)	03CH04-CB	Cola Fan	22.2-22.6 / 60-62	Dec. 30, 2020~ Jan. 28, 2021
Radiated (For other tests)	03CH06-CB	Cola Fan	21.5-22.1 / 59-62	Dec. 30, 2020~ Jan. 28, 2021
AC Conduction	CO01-CB	Peter Wu	20~21 / 59~63	Jan. 22, 2021~ Jan. 23, 2021

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

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# 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

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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 (9kHz ~ 30MHz)	3.8 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	5.0 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.9 dB	Confidence levels of 95%
Conducted Emission	2.8 dB	Confidence levels of 95%
Output Power Measurement	1.4 dB	Confidence levels of 95%
Power Density Measurement	2.8 dB	Confidence levels of 95%
Bandwidth Measurement	0.4%	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)_2TX	-
2412MHz	46
2437MHz	46
2462MHz	46
802.11g_Nss1,(6Mbps)_2TX	-
2412MHz	43
2417MHz	46
2437MHz	46
2457MHz	43
2462MHz	41
802.11ax HEW20_Nss1,(MCS0)_2TX	-
2412MHz	42
2417MHz	45
2437MHz	46
2457MHz	43
2462MHz	40
802.11ax HEW40_Nss1,(MCS0)_2TX	-
2422MHz	42
2427MHz	42
2437MHz	43
2447MHz	40
2452MHz	37

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#### Note:

• Evaluated HEW20/HEW40 mode only, due to similar modulation. The power setting of HT20/HT40/VHT20/VHT40 mode are the same or lower than HEW20/HEW40.

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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	СТХ	
1	1 WLAN 2.4GHz + PoE	
2	WLAN 2.4GHz + DC Power Supply	
Mode 1 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 ~ 5 wi follow this same test mode.		
3	WLAN 5GHz + PoE	
4	Bluetooth + PoE	
5 Zigbee + PoE		
For operating mode 4 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		

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Th	The Worst Case Mode for Following Conformance Tests			
Tests Item Emissions in Restricted Frequency Bands				
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.			
Operating Mode < 1GHz	СТХ			
The EUT was performed at Y axis and Z axis position for Radiated measurement, and the worst case found at 2.4GHz/ Bluetooth / Zigbee Y axis position and 5GHz Z axis position.				
1	WLAN 2.4GHz + Place EUT in Y axis + PoE			
2	WLAN 2.4GHz + Place EUT in Y axis + DC Power Supply			
Mode 2 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 ~ 5 follow this same test mode.				
3	WLAN 5GHz + Place EUT in Z axis + DC Power Supply			
4	Bluetooth + Place EUT in Y axis + DC Power Supply			
5	Zigbee + Place EUT in Y axis + DC Power Supply			
For operating mode 4 is the worst case and it was record in this test report.				
Operating Mode > 1GHz   CTX				
The EUT was performed at Y axis and Z axis position. The worst case was found at Y axis, thus th measurement will follow this same test configuration.				

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The Worst Case Mode for Following Conformance Tests			
Tests Item	Tests Item Simultaneous Transmission Analysis - Radiated Emission Co-location		
Test Condition	Test Condition Radiated measurement		
Operating Mode Normal Link			
The EUT can be placed in Y axis and Z axis. EUT Y axis has been evaluated to be the worst case at Emissions in Radiated measurement <above 1ghz="">; thus, the measurement will follow this same test configuration.</above>			
1 WLAN 2.4GHz + WLAN 5GHz + Place EUT in Y axis			
Refer to Appendix G 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	1 WLAN 2.4GHz + WLAN 5GHz + Bluetooth + Zigbee		
Refer to Sporton Test Report No.: FA091815 for Co-location RF Exposure Evaluation.			

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Note: The PoE and DC Power Supply below are for measurement only, would not be marketed.

The PoE and DC Power Supply information as below:

Support Unit	Brand Holder	Model Name
PoE	RUCKUS	GRT-480125A (740-64284-001)
DC Power Supply	Advanced	LPS-305

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# 2.3 EUT Operation during Test

CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link Mode:

During the test, the EUT operation to normal function.

#### 2.4 Accessories

N/A

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# 2.5 Support Equipment

#### For AC Conduction:

	Support Equipment				
No.	No. Equipment Brand Name Model Name FCC ID				
А	LAN NB	DELL	E6430	N/A	
В	GRT-480125A				

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For Radiated (below 1GHz):

	Support Equipment				
No.	No. Equipment Brand Name Model Name FCC ID				
Α	A LAN NB DELL E4300 N/A			N/A	
В	B Power Supply Advanced LPS-305 N/A				

For Radiated (above 1GHz):

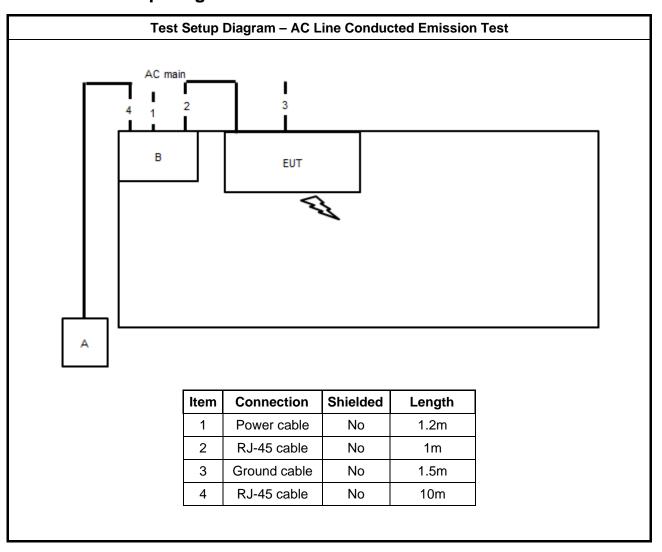
	Support Equipment			
No.	No. Equipment Brand Name Model Name FCC ID			
А	LAN NB	DELL	E4300	N/A
В	B PoE RUCKUS GRT-480125A (740-62484-001) N/A			

#### For RF Conducted:

Support Equipment					
No.	No. Equipment Brand Name Model Name FCC ID				
Α	A LAN NB DELL E4300 N/A		N/A		
В	B PoE RUCKUS GRT-480125A (740-62484-001) N/A				

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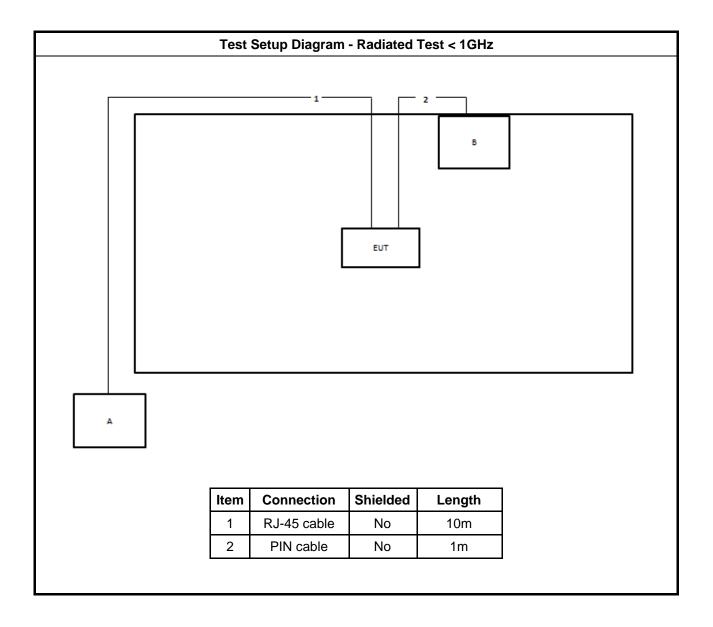
# 2.6 Test Setup Diagram



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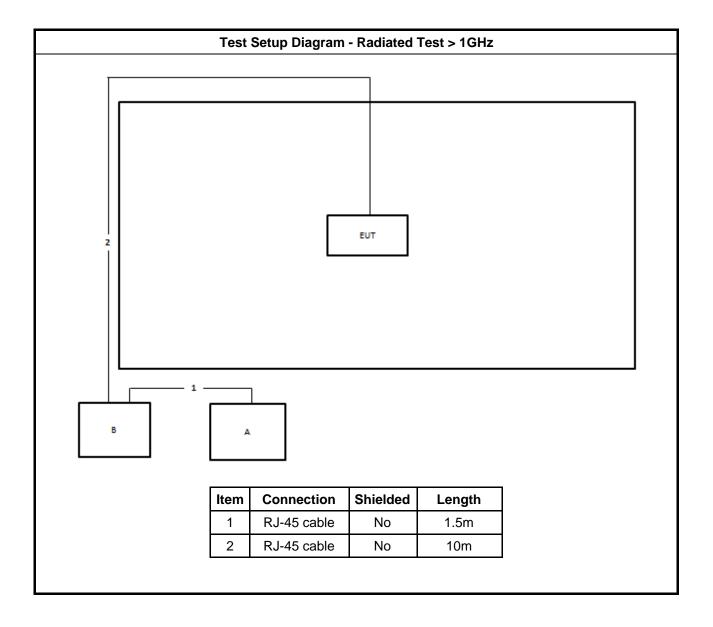
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# 3 Transmitter Test Result

## 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

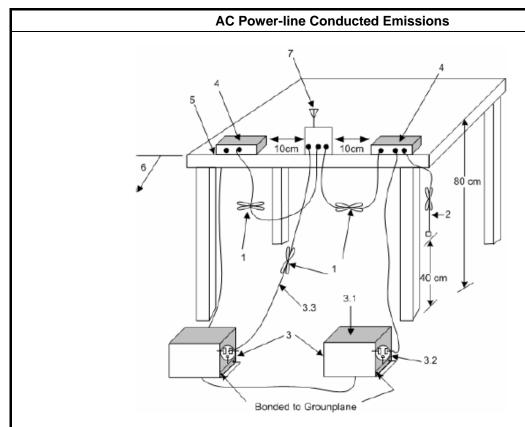
Refer a test equipment and calibration data table in this test report.

#### 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 Measurement Results Calculation

The measured Level is calculated using:

- a. Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- b. Margin = -Limit + Level

#### 3.1.6 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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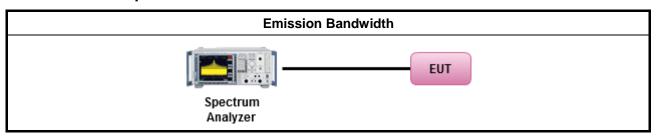
#### 3.2.2 Measuring Instruments

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 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement.									
		Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 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<sub>TX</sub> ≤ 6 dBi, then P<sub>Out</sub> ≤ 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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 $\mathbf{P}_{\text{Out}}$  = maximum peak conducted output power or maximum conducted output power in dBm,  $\mathbf{G}_{\text{TX}}$  = 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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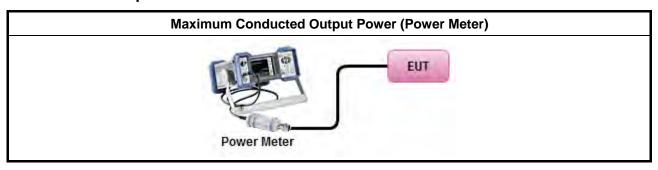
#### 3.3.3 Test Procedures

		Test Method
•	Max	imum Peak Conducted Output Power
		Refer as FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW ≥ EBW method).
		Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter).
•	Max	imum Conducted Output Power
	[duty	v cycle ≥ 98% or external video / power trigger]
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1.
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.3 Method AVGSA-1A. (alternative)
	duty	cycle < 98% and average over on/off periods with duty factor
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2.
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative)
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-3A (alternative)
	Mea	surement using a power meter (PM)
		Refer as FCC KDB 558074, clause $8.3.2.3 \& C63.10$ clause $11.9.2.3.1$ Method AVGPM (using an RF average power meter).
	$\boxtimes$	Refer as FCC KDB 558074, clause $8.3.2.3 \& C63.10$ clause $11.9.2.3.2$ Method AVGPM-G (using an gate RF average power meter).
•	For	conducted measurement.
	•	If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
	•	If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP <sub>total</sub> = $P_{total} + DG$

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## 3.3.4 Test Setup



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## 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

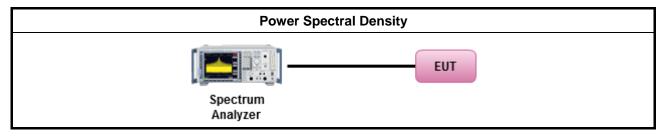
Refer a test equipment and calibration data table in this test report.

#### 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).									
	$\boxtimes$	Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD.								
•	For c	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.								

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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 (dBc)				
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.

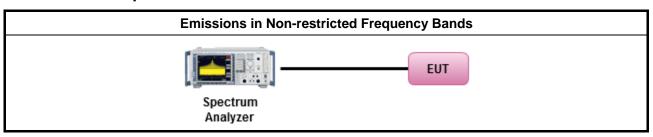
#### 3.5.2 Measuring Instruments

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 8.5 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 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.

#### 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

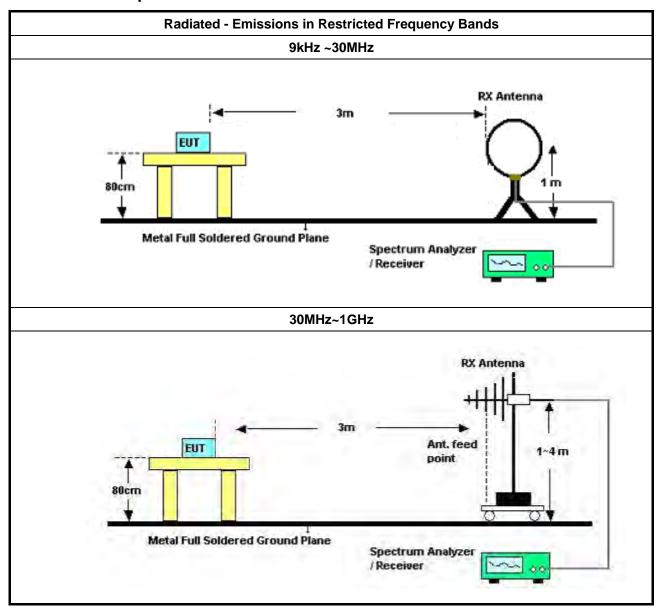
		Test Method						
•	The	average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].						
•	Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.							
•	For	the transmitter unwanted emissions shall be measured using following options below:						
	•	Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.						
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle ≥98%).						
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).						
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW≥1/T).						
		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 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.						
•	For	the transmitter band-edge emissions shall be measured using following options below:						
	•	Refer as FCC KDB 558074 clause 8.7 & C63.10 clause 11.13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.						
	•	Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.						
	•	Refer as FCC KDB 558074, clause 8.7 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).						
	•	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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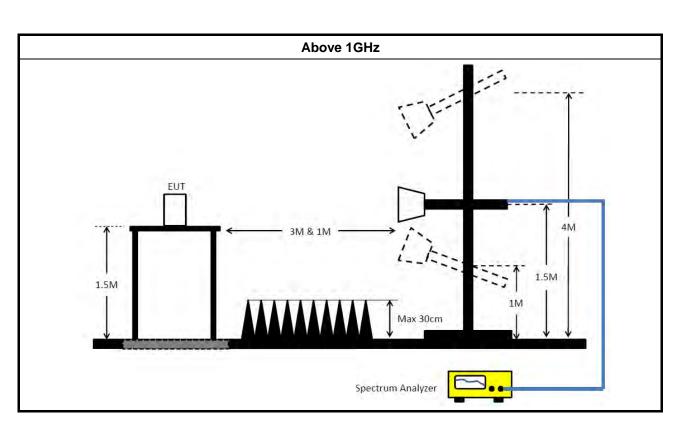
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## 3.6.4 Test Setup



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#### 3.6.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

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

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

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

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

#### 3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

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# 4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 26, 2020	Feb. 25, 2021	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz Nov. 20, 202		Nov. 19, 2021	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz Feb. 25, 2020		Feb. 24, 2021	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwa rz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 31, 2020	Jan. 30, 2021	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 20, 2020	May 19, 2021	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH06-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH06-CB	30 MHz ~ 1 GHz	Aug. 10, 2020	Aug. 09. 2021	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH06-CB	1GHz ~18GHz 3m	Oct. 02, 2020	Oct. 01, 2021	Radiation (03CH06-CB)
Bilog Antenna with 6 dB attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37878 & AT-N0606	20MHz ~ 2GHz	Aug. 02, 2020	Aug. 01, 2021	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBE CK	BBHA9120D	BBHA 9120D-1292	1GHz~18GHz	Jul. 22, 2020	Jul. 21, 2021	Radiation (03CH06-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz Jul. 21, 2020		Jul. 20, 2021	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	Nov. 05, 2020	Nov. 04, 2021	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	May 07, 2020	May 06, 2021	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Dec. 15, 2020	Dec. 14, 2021	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH06-CB)
RF Cable-low	Woken	RG402	Low Cable-05+24	30MHz~1GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+24	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)

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Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH04-CB	1GHz ~18GHz 3m	Feb. 26, 2020	Feb. 25, 2021	Radiation (03CH04-CB)
Horn Antenna	ETS • Lindgren	3115	00143147	750MHz~18GHz	Oct. 23, 2020	Oct. 22, 2021	Radiation (03CH04-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	83017A	MY53270063	0.5GHz ~ 26.5GHz	Jul. 14, 2020	Jul. 13, 2021	Radiation (03CH04-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH04-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	May 12, 2020	May 11, 2021	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21	1GHz - 18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21+67	1GHz - 18GHz	Nov. 05, 2020	Nov. 04, 2021	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH04-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH04-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 05, 2020	May 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz Oct. 05, 2020		Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-30	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Feb. 07, 2020	Feb. 06, 2021	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Feb. 07, 2020	Feb. 06, 2021	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)

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

NCR means Non-Calibration required.

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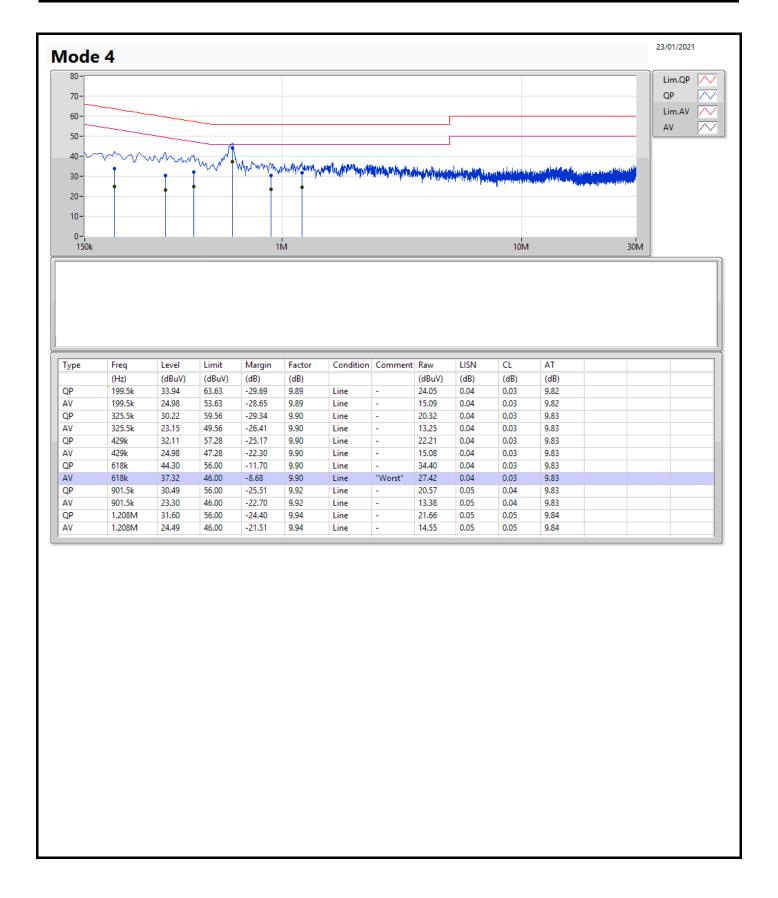
# Conducted Emissions at Powerline

Appendix A

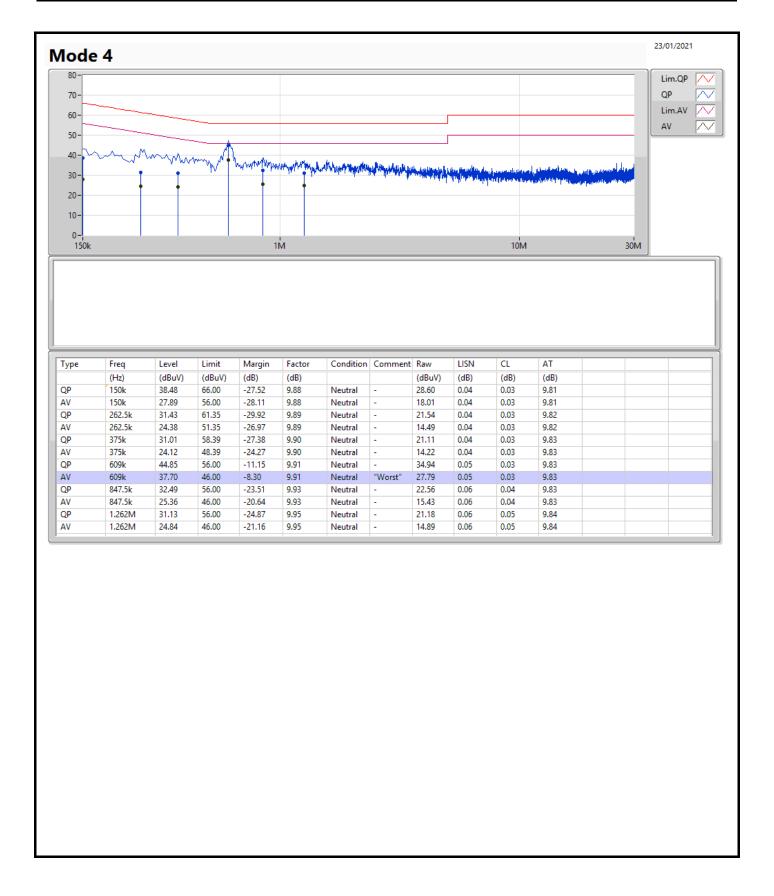
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 4	Pass	AV	609k	37.70	46.00	-8.30	Neutral











EBW 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)_2TX	9.05M	14.243M	14M2G1D	7.075M	13.093M
802.11g_Nss1,(6Mbps)_2TX	16.3M	17.441M	17M4D1D	15.425M	16.342M
802.11ax HEW20_Nss1,(MCS0)_2TX	18.225M	19.14M	19M1D1D	16.775M	18.866M
802.11ax HEW40_Nss1,(MCS0)_2TX	37.6M	37.831M	37M8D1D	33.55M	37.631M

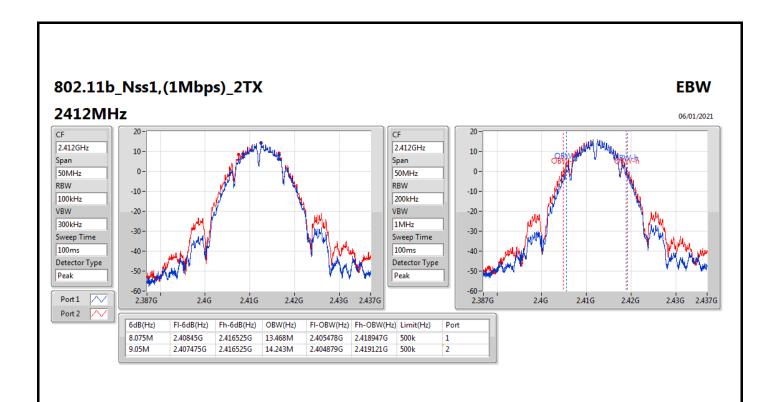
Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth; Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth;

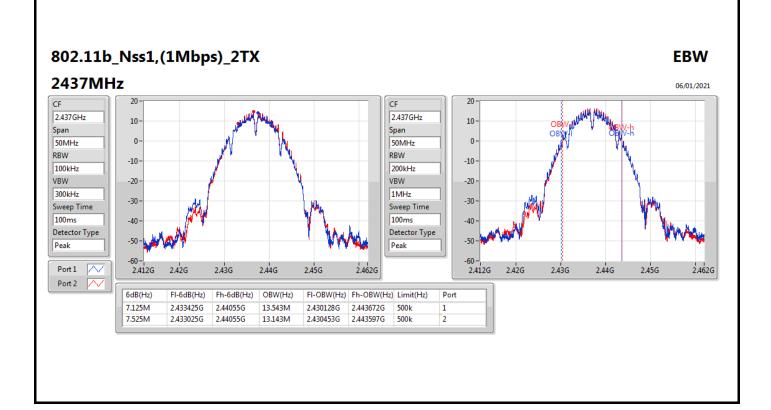


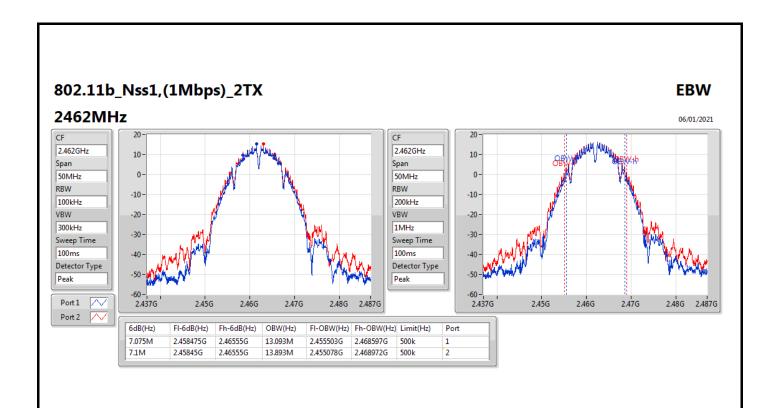
### Result

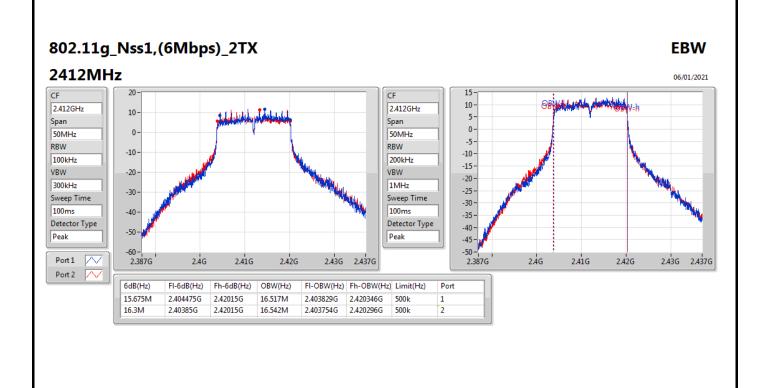
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	8.075M	13.468M	9.05M	14.243M
2437MHz	Pass	500k	7.125M	13.543M	7.525M	13.143M
2462MHz	Pass	500k	7.075M	13.093M	7.1M	13.893M
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	15.675M	16.517M	16.3M	16.542M
2437MHz	Pass	500k	16.3M	17.441M	16M	16.542M
2462MHz	Pass	500k	15.425M	16.342M	16.3M	16.442M
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	16.85M	18.916M	18.225M	18.966M
2437MHz	Pass	500k	18.225M	19.14M	17.6M	18.966M
2462MHz	Pass	500k	16.775M	18.866M	17.9M	18.916M
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	33.55M	37.631M	37.6M	37.781M
2437MHz	Pass	500k	37.55M	37.831M	37.15M	37.631M
2452MHz	Pass	500k	37.15M	37.731M	37.3M	37.781M

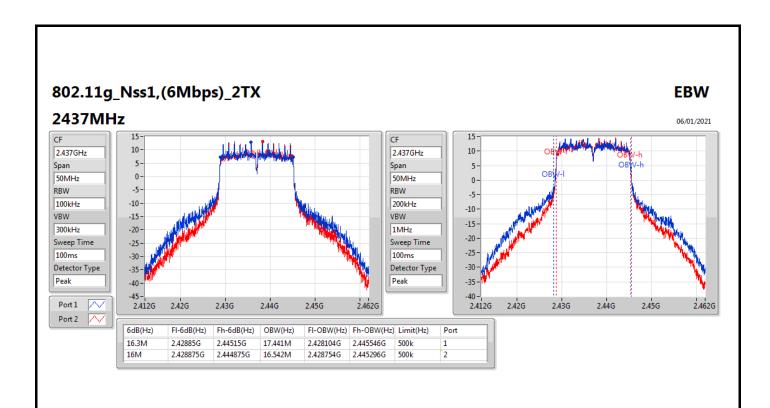
Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;

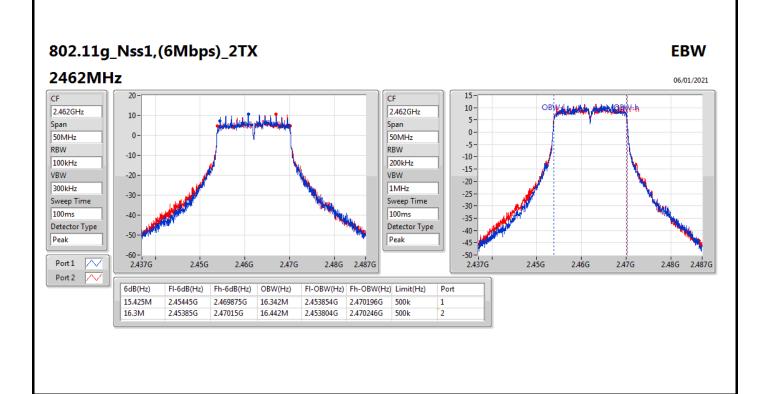


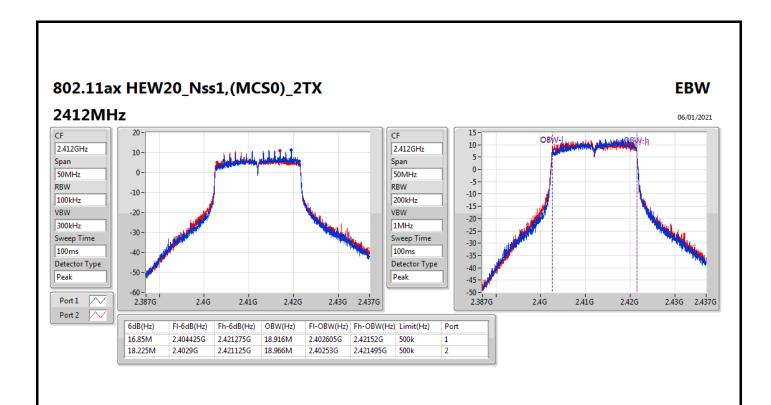


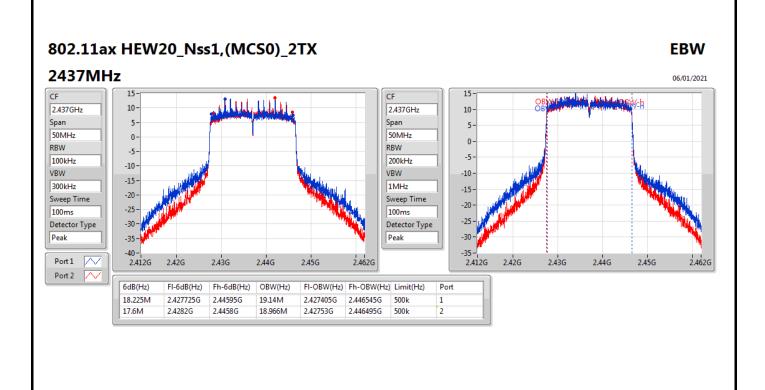


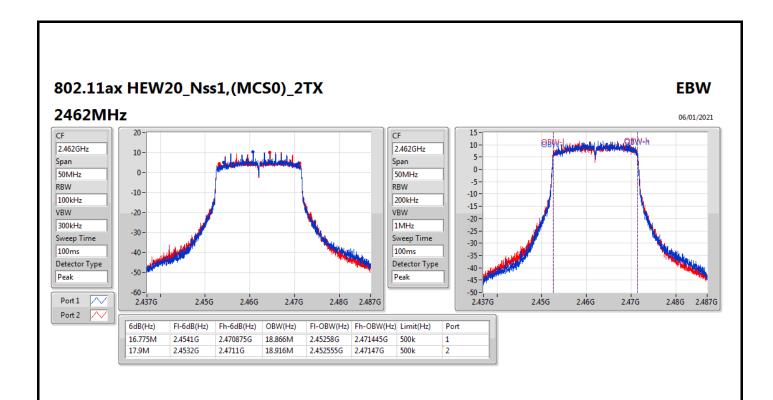


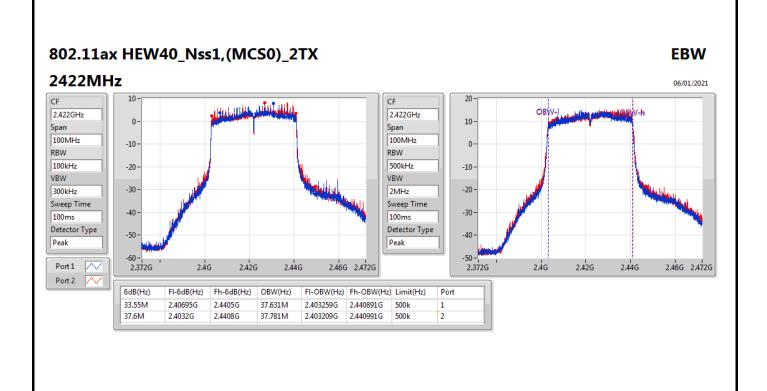


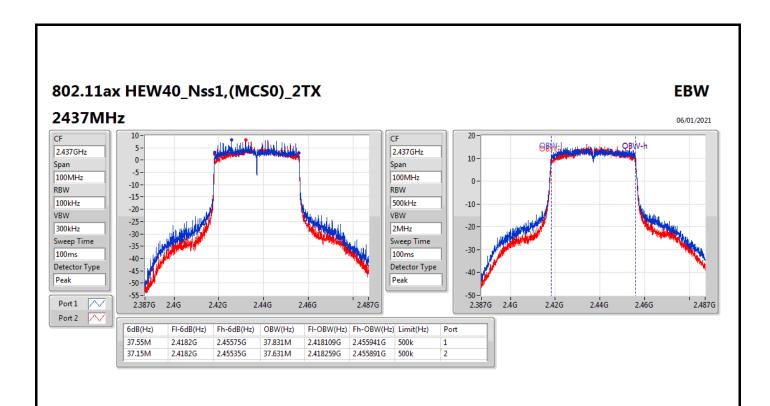


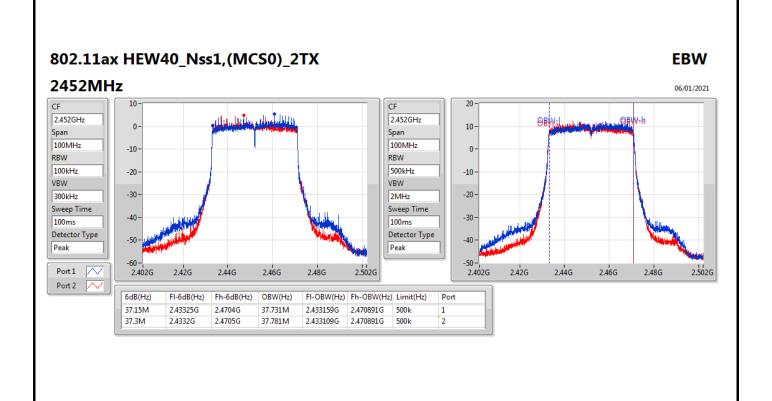














Average Power Appendix C

Mode	Total Power	Total Power		
	(dBm)	(W)		
2.4-2.4835GHz	-	-		
802.11b_Nss1,(1Mbps)_2TX	27.07	0.50933		
802.11g_Nss1,(6Mbps)_2TX	26.91	0.49091		
802.11ax HEW20_Nss1,(MCS0)_2TX	26.53	0.44978		
802.11ax HEW40_Nss1,(MCS0)_2TX	25.05	0.31989		



Average Power Appendix C

### Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	2.40	23.70	24.28	27.01	30.00
2437MHz	Pass	2.40	23.71	24.39	27.07	30.00
2462MHz	Pass	2.40	23.81	24.22	27.03	30.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	2.40	22.18	22.14	25.17	30.00
2417MHz	Pass	2.40	23.83	23.90	26.88	30.00
2437MHz	Pass	2.40	23.85	23.94	26.91	30.00
2457MHz	Pass	2.40	22.30	22.17	25.25	30.00
2462MHz	Pass	2.40	21.09	21.06	24.09	30.00
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	2.40	21.27	21.35	24.32	30.00
2417MHz	Pass	2.40	23.12	23.03	26.09	30.00
2437MHz	Pass	2.40	23.46	23.57	26.53	30.00
2457MHz	Pass	2.40	21.91	21.77	24.85	30.00
2462MHz	Pass	2.40	20.21	20.13	23.18	30.00
802.11ax HEW40_Nss1,(MCS0)_2TX	-	•	•	•	-	-
2422MHz	Pass	2.40	21.27	21.62	24.46	30.00
2427MHz	Pass	2.40	21.44	21.69	24.58	30.00
2437MHz	Pass	2.40	22.19	21.88	25.05	30.00
2447MHz	Pass	2.40	20.46	20.35	23.42	30.00
2452MHz	Pass	2.40	18.94	18.66	21.81	30.00

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



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**Summary** 

Mode	PD
	(dBm/RBW)
2.4-2.4835GHz	·
802.11b_Nss1,(1Mbps)_2TX	-1.08
802.11g_Nss1,(6Mbps)_2TX	-1.52
802.11ax HEW20_Nss1,(MCS0)_2TX	-0.85
802.11ax HEW40_Nss1,(MCS0)_2TX	-5.54

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

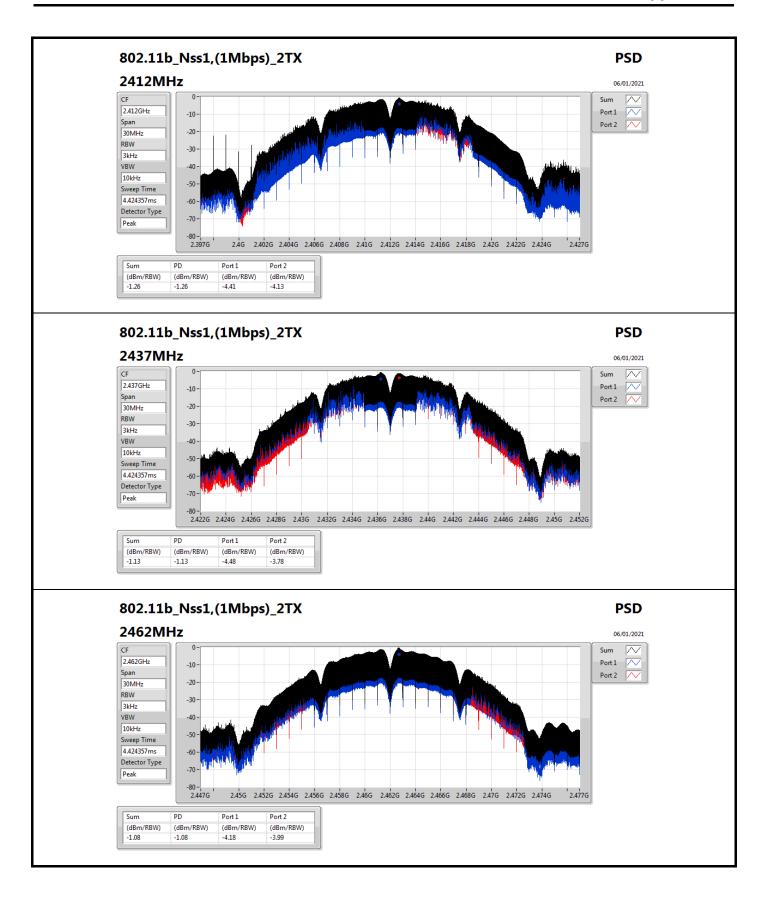


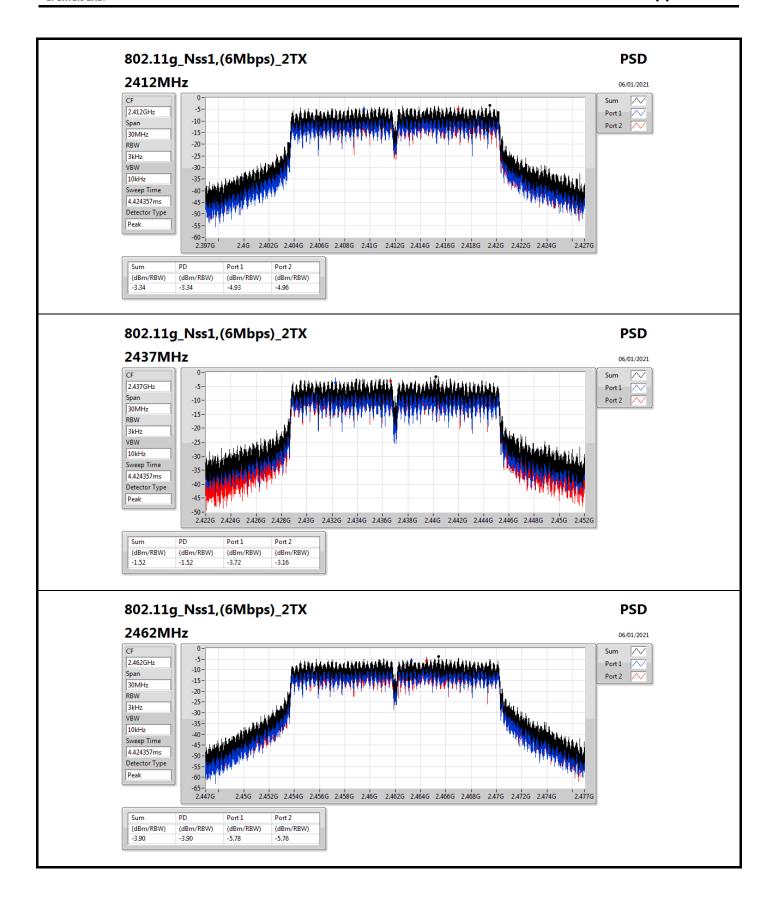
Appendix D **PSD** 

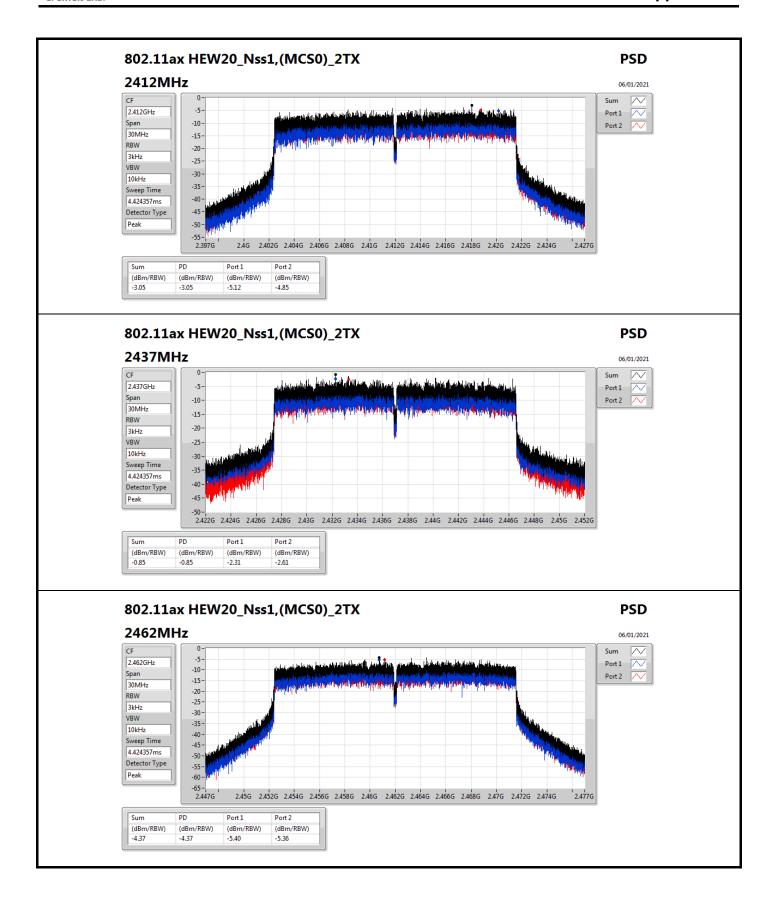
#### Result

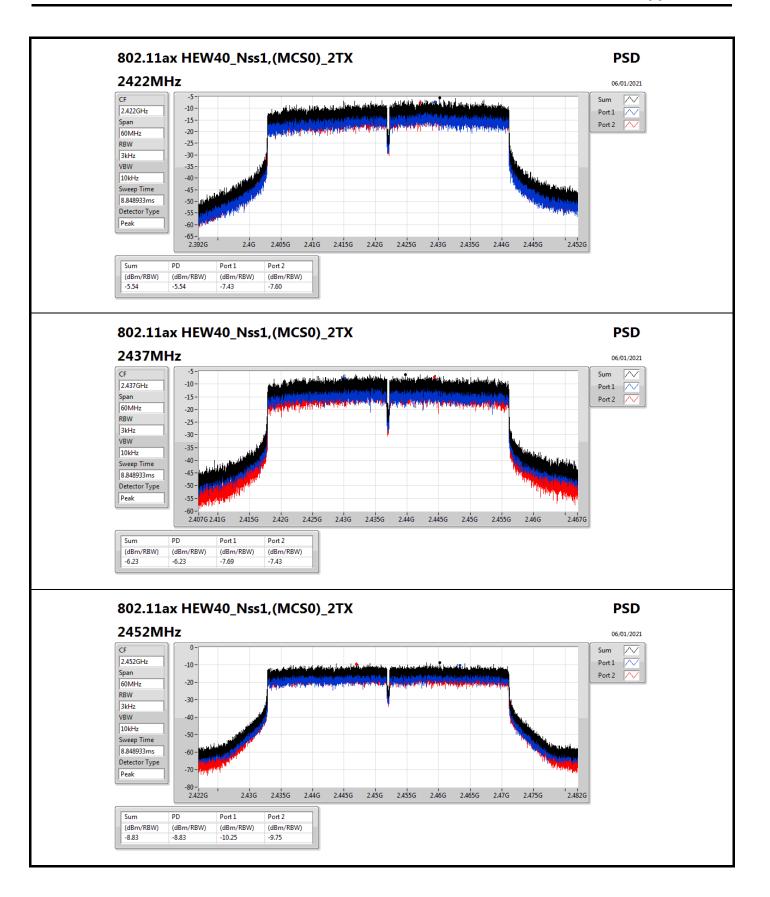
Mode	Result	DG	Port 1	Port 2	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	2.40	-4.41	-4.13	-1.26	8.00
2437MHz	Pass	2.40	-4.48	-3.78	-1.13	8.00
2462MHz	Pass	2.40	-4.18	-3.99	-1.08	8.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	2.40	-4.93	-4.96	-3.34	8.00
2437MHz	Pass	2.40	-3.72	-3.16	-1.52	8.00
2462MHz	Pass	2.40	-5.78	-5.76	-3.90	8.00
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	2.40	-5.12	-4.85	-3.05	8.00
2437MHz	Pass	2.40	-2.31	-2.61	-0.85	8.00
2462MHz	Pass	2.40	-5.40	-5.36	-4.37	8.00
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	2.40	-7.43	-7.60	-5.54	8.00
2437MHz	Pass	2.40	-7.69	-7.43	-6.23	8.00
2452MHz	Pass	2.40	-10.25	-9.75	-8.83	8.00

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











## CSE(Non-restricted Band)

Appendix E

															-
Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
2.4-2.4835GHz	-			-	+		-	-	-		-		*		-
802.11b_Nss1,(1Mbps)_2TX	Pass	2.43599G	15.08	-14.92	1.62256G	-54.58	2.39952G	-23.01	2.4G	-33.50	2.4866G	-50.66	17.6249G	-46.11	2
802.11g_Nss1,(6Mbps)_2TX	Pass	2.442G	13.49	-16.51	1.65343G	-53.14	2.3995G	-18.54	2.4G	-20.48	2.48448G	-51.43	17.63895G	-46.05	2
802.11ax HEW20_Nss1,(MCS0)_2TX	Pass	2.43574G	13.07	-16.93	2.01137G	-52.70	2.39978G	-19.60	2.4G	-21.05	2.48416G	-51.71	16.35498G	-46.60	2
802.11ax HEW40_Nss1,(MCS0)_2TX	Pass	2.43198G	8.50	-21.50	2.10617G	-53.53	2.39972G	-23.53	2.4G	-25.38	2.48702G	-45.34	16.47693G	-47.13	2



## CSE(Non-restricted Band)

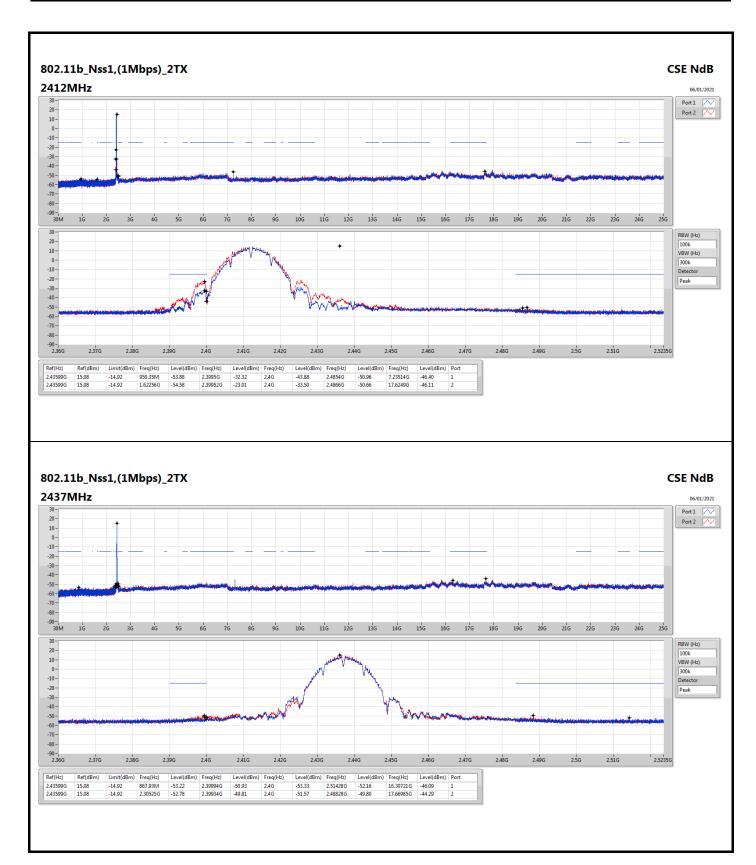
# Appendix E

#### Result

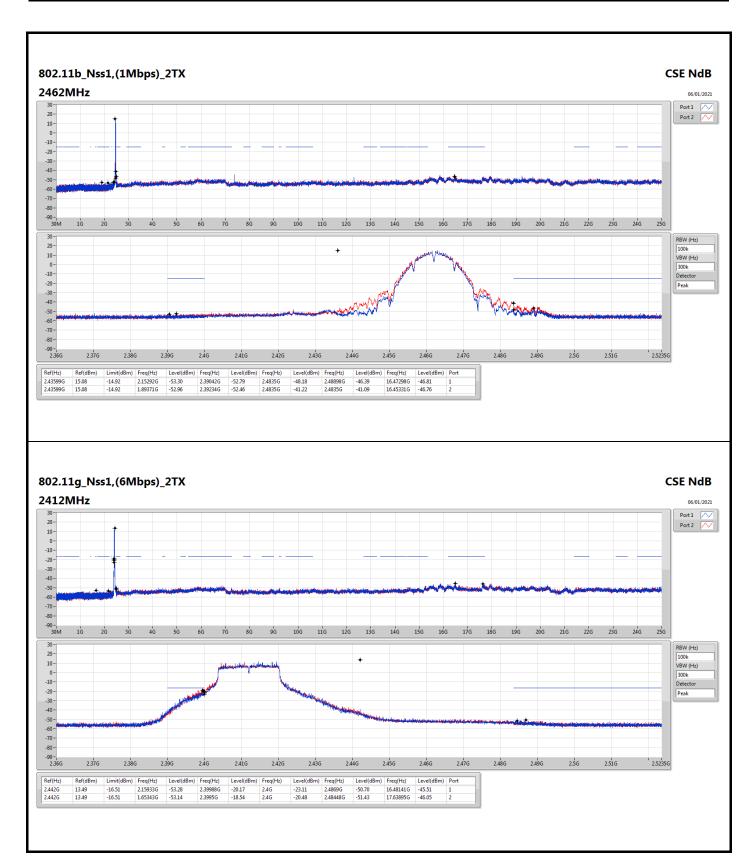
Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-		-	-	-	-	-	-	-	-
2412MHz	Pass	2.43599G	15.08	-14.92	950.35M	-53.88	2.3995G	-32.32	2.4G	-43.88	2.4854G	-50.96	7.23514G	-46.40	1
2412MHz	Pass	2.43599G	15.08	-14.92	1.62256G	-54.58	2.39952G	-23.01	2.4G	-33.50	2.4866G	-50.66	17.6249G	-46.11	2
2437MHz	Pass	2.43599G	15.08	-14.92	867.93M	-53.22	2.39994G	-50.93	2.4G	-53.33	2.51428G	-52.16	16.30721G	-46.09	1
2437MHz	Pass	2.43599G	15.08	-14.92	2.30525G	-52.78	2.39934G	-49.81	2.4G	-51.57	2.48828G	-49.80	17.66985G	-44.29	2
2462MHz	Pass	2.43599G	15.08	-14.92	2.15292G	-53.30	2.39042G	-52.79	2.4835G	-48.18	2.48898G	-46.39	16.47298G	-46.81	1
2462MHz	Pass	2.43599G	15.08	-14.92	1.89371G	-52.96	2.39234G	-52.46	2.4835G	-41.22	2.4835G	-41.09	16.45331G	-46.76	2
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.442G	13.49	-16.51	2.15933G	-53.28	2.39988G	-20.17	2.4G	-23.11	2.4869G	-50.70	16.48141G	-45.51	1
2412MHz	Pass	2.442G	13.49	-16.51	1.65343G	-53.14	2.3995G	-18.54	2.4G	-20.48	2.48448G	-51.43	17.63895G	-46.05	2
2437MHz	Pass	2.442G	13.49	-16.51	2.30117G	-54.33	2.39984G	-44.10	2.4G	-48.39	2.48512G	-49.19	17.60804G	-46.77	1
2437MHz	Pass	2.442G	13.49	-16.51	950.64M	-53.63	2.3989G	-48.55	2.4G	-49.90	2.48554G	-50.48	17.63052G	-45.41	2
2462MHz	Pass	2.442G	13.49	-16.51	1.98225G	-53.86	2.39436G	-52.05	2.4835G	-42.73	2.4835G	-41.15	17.68671G	-47.04	1
2462MHz	Pass	2.442G	13.49	-16.51	896.47M	-53.03	2.39232G	-52.21	2.4835G	-43.34	2.4845G	-42.08	16.43926G	-47.04	2
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43574G	13.07	-16.93	527.16M	-54.05	2.3997G	-22.71	2.4G	-21.80	2.48366G	-50.77	17.60523G	-46.29	1
2412MHz	Pass	2.43574G	13.07	-16.93	2.01137G	-52.70	2.39978G	-19.60	2.4G	-21.05	2.48416G	-51.71	16.35498G	-46.60	2
2437MHz	Pass	2.43574G	13.07	-16.93	2.30758G	-53.60	2.39986G	-42.12	2.4G	-44.79	2.48424G	-48.81	17.60242G	-45.88	1
2437MHz	Pass	2.43574G	13.07	-16.93	1.93623G	-54.01	2.39976G	-46.33	2.4G	-47.73	2.48688G	-50.55	16.43926G	-46.43	2
2462MHz	Pass	2.43574G	13.07	-16.93	1.92167G	-53.40	2.39518G	-52.62	2.4835G	-41.78	2.48354G	-40.48	17.61366G	-46.13	1
2462MHz	Pass	2.43574G	13.07	-16.93	579.88M	-53.10	2.39472G	-51.48	2.4835G	-45.12	2.48442G	-42.40	17.67266G	-45.59	2
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.43198G	8.50	-21.50	2.17802G	-53.14	2.39952G	-26.13	2.4G	-28.11	2.48694G	-48.34	17.60998G	-46.56	1
2422MHz	Pass	2.43198G	8.50	-21.50	2.10617G	-53.53	2.39972G	-23.53	2.4G	-25.38	2.48702G	-45.34	16.47693G	-47.13	2
2437MHz	Pass	2.43198G	8.50	-21.50	1.88175G	-53.28	2.39952G	-25.04	2.4G	-32.11	2.48574G	-34.79	17.68851G	-44.66	1
2437MHz	Pass	2.43198G	8.50	-21.50	1.75494G	-53.75	2.39952G	-29.25	2.4G	-37.14	2.48446G	-38.14	16.46852G	-46.93	2
2452MHz	Pass	2.43198G	8.50	-21.50	2.12363G	-52.41	2.39868G	-52.02	2.4835G	-43.30	2.4845G	-37.00	17.61839G	-46.22	1
2452MHz	Pass	2.43198G	8.50	-21.50	420.73M	-53.85	2.39848G	-52.51	2.4835G	-47.55	2.48818G	-42.86	16.23294G	-46.38	2

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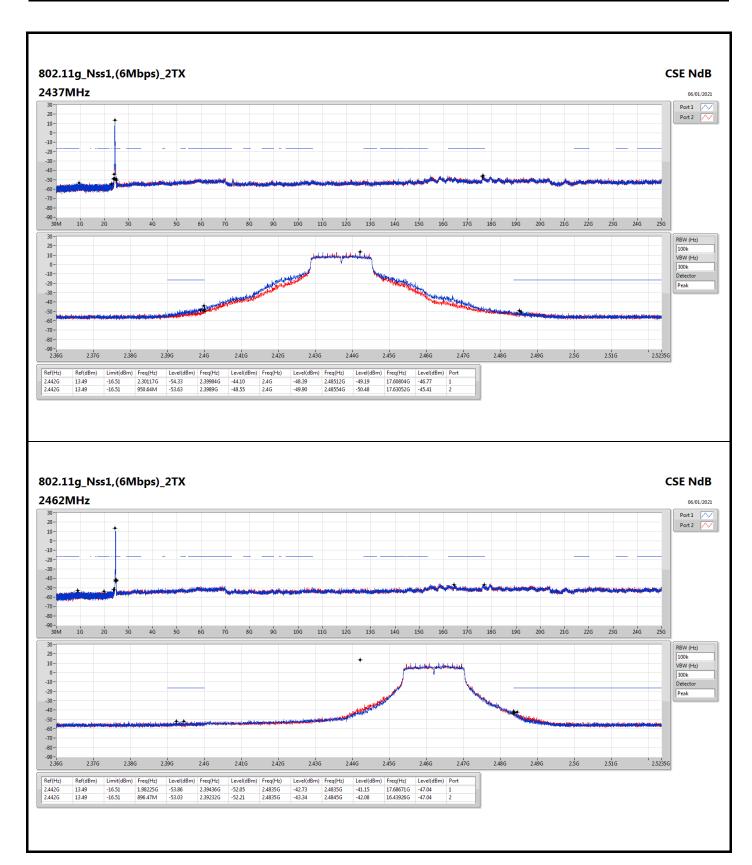




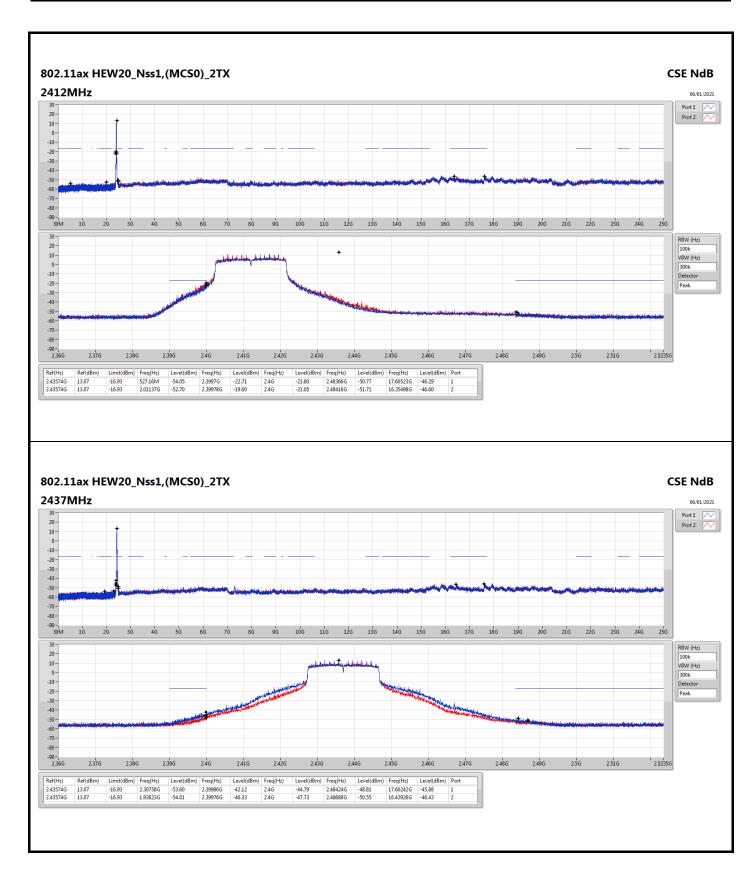




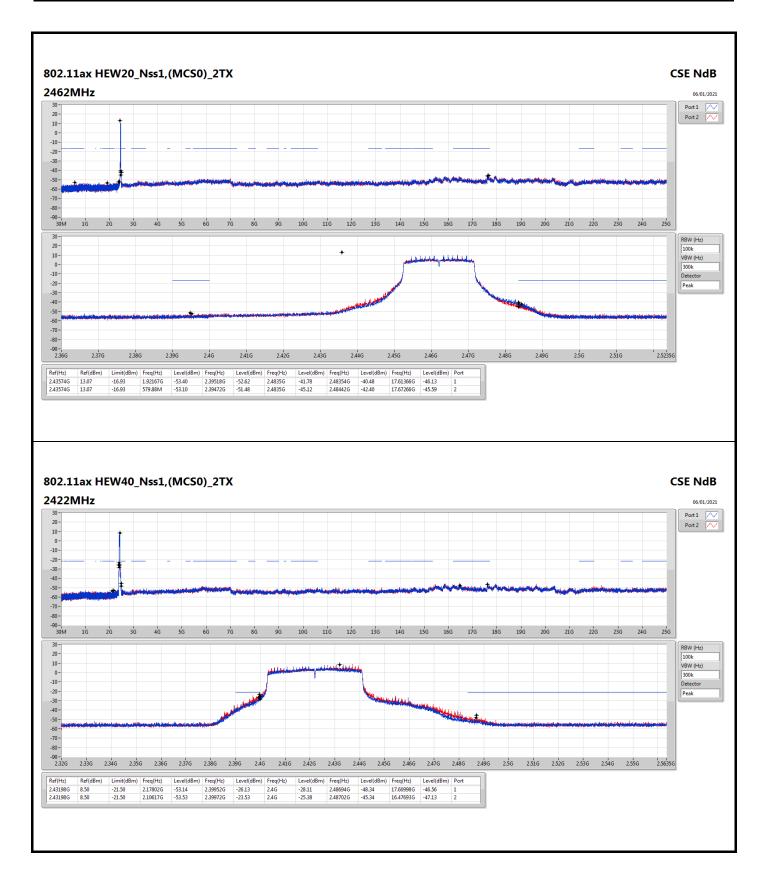




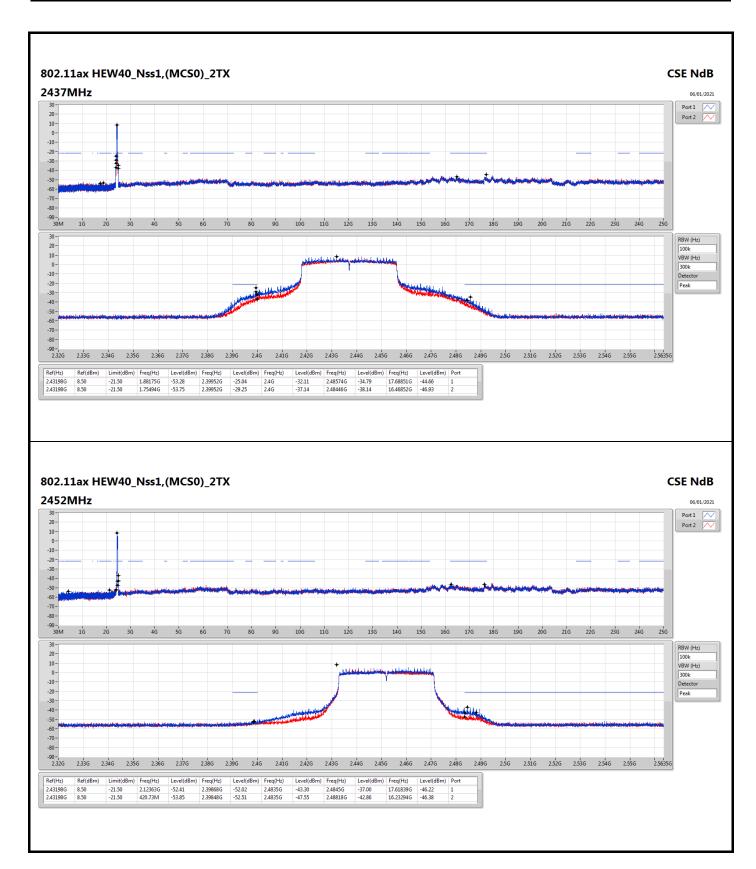












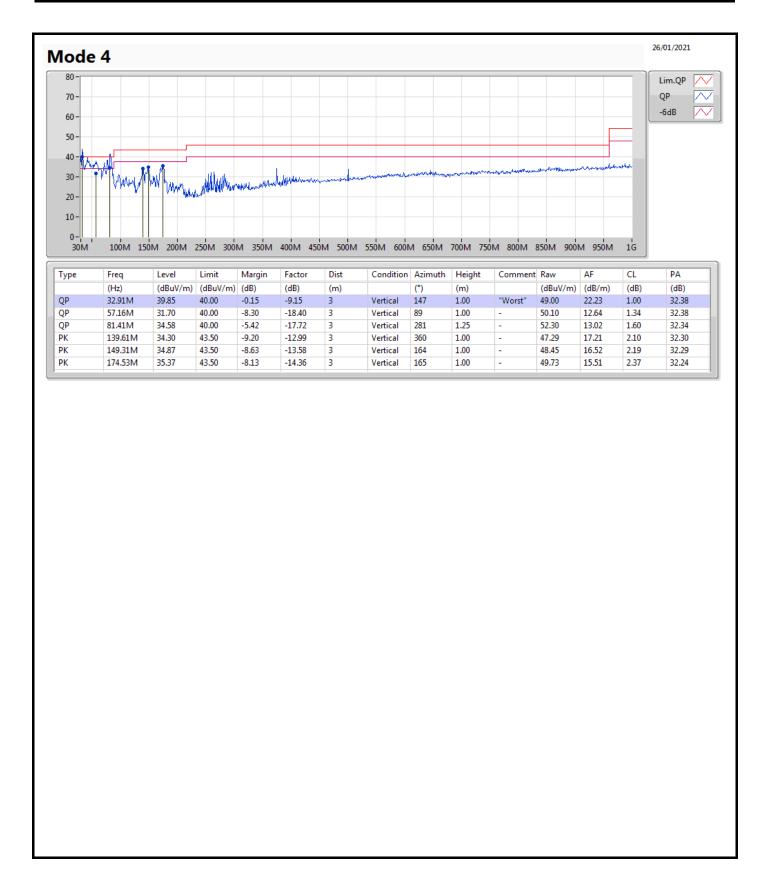


## Radiated Emissions below 1GHz

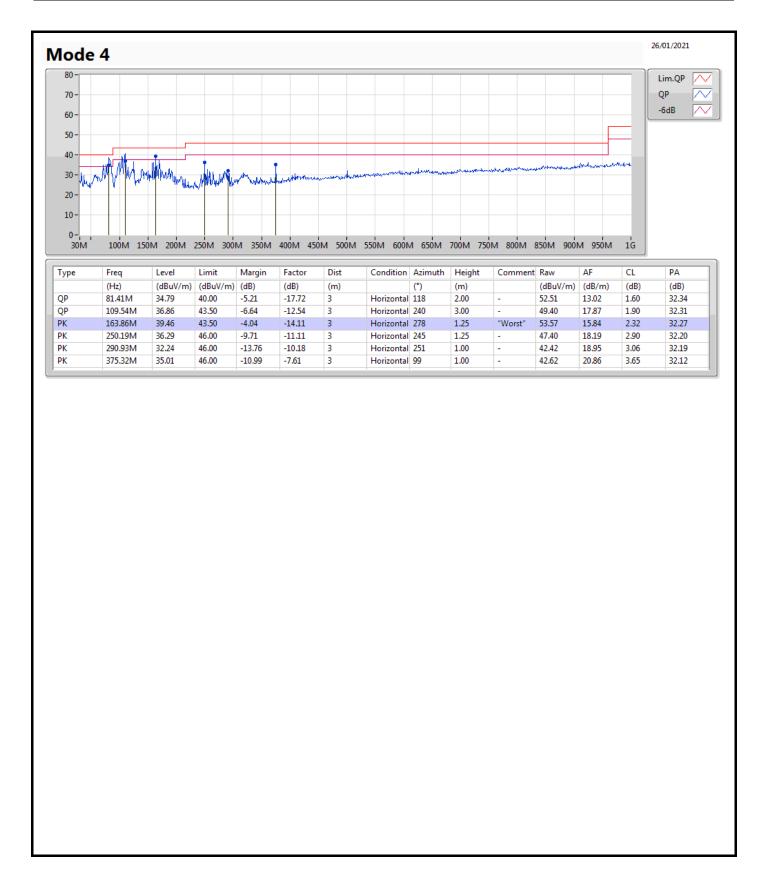
Appendix F.1

Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	
Mode 4	Pass	QP	32.91M	39.85	40.00	-0.15	Vertical









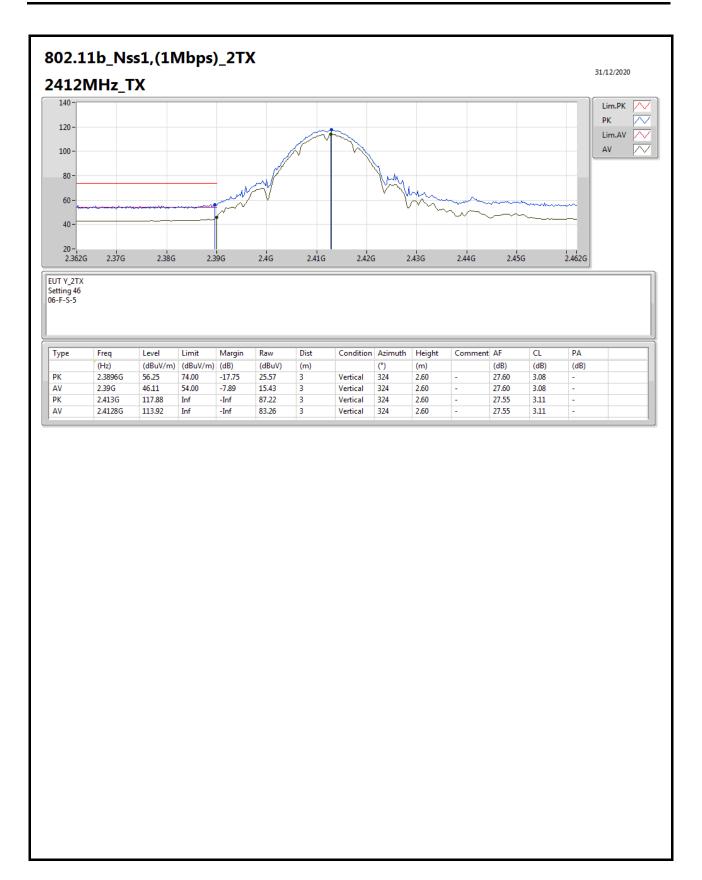


### RSE TX above 1GHz

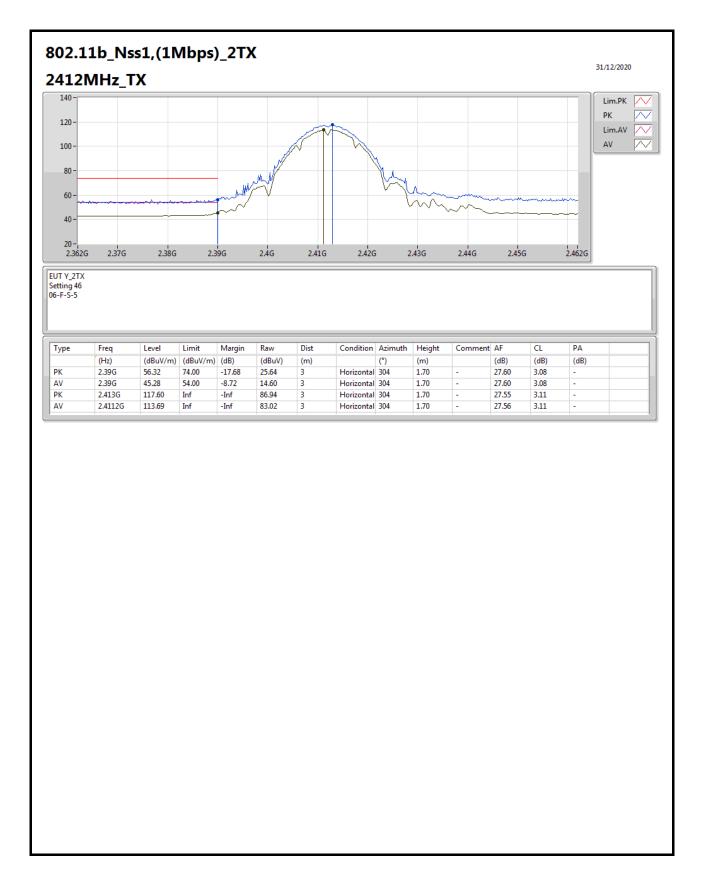
Appendix F.2

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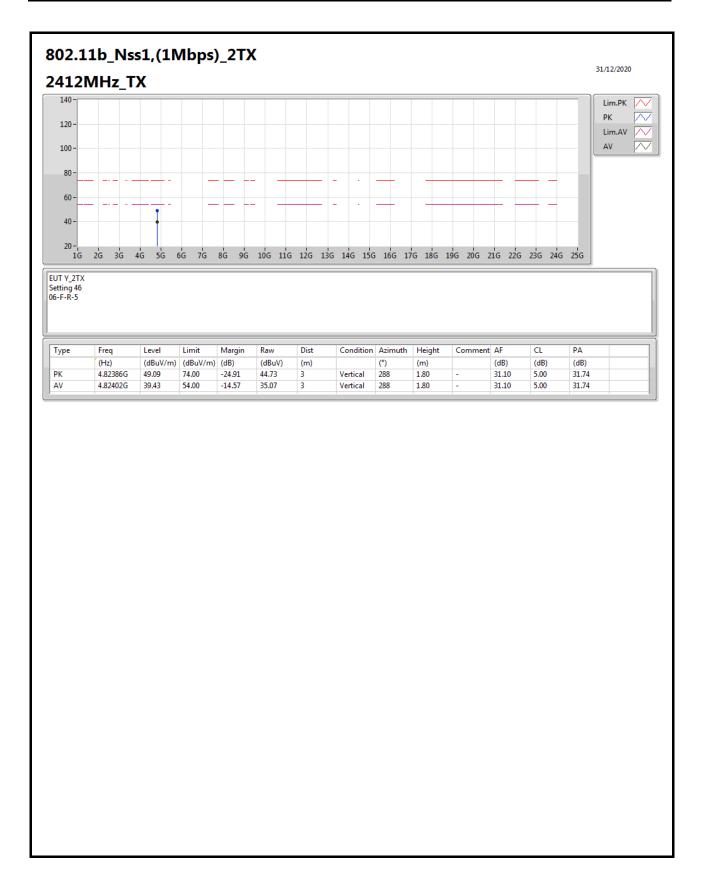
Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
802.11g_Nss1,(6Mbps)_2TX	Pass	AV	2.4835G	53.99	54.00	-0.01	3	Horizontal	314	2.25	-



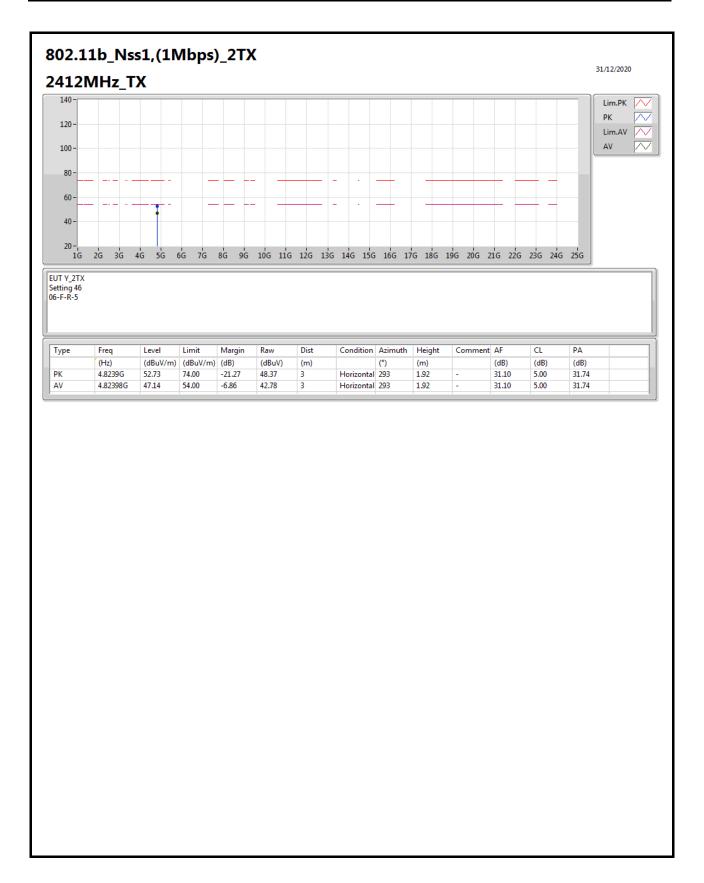




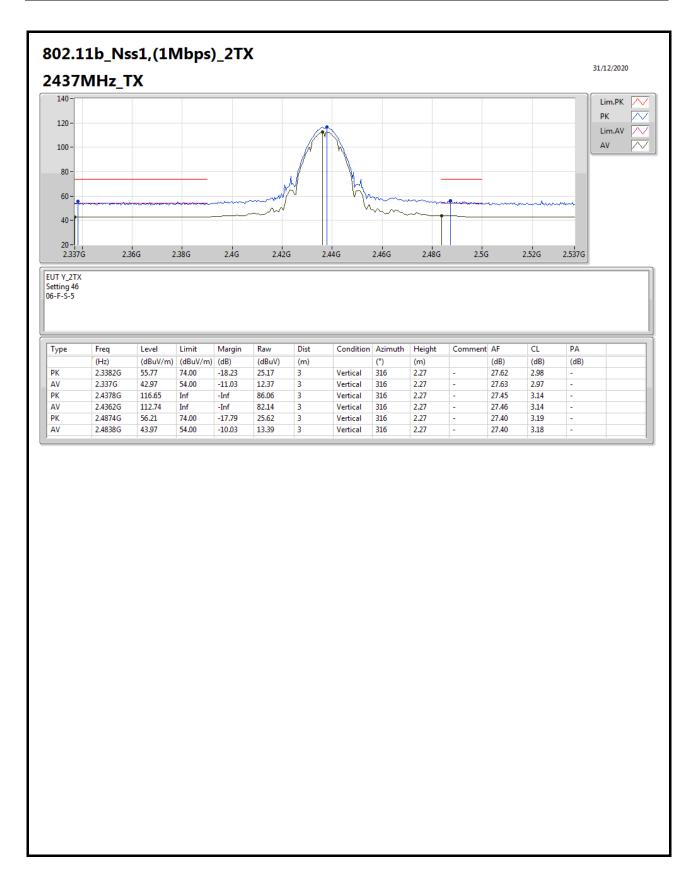




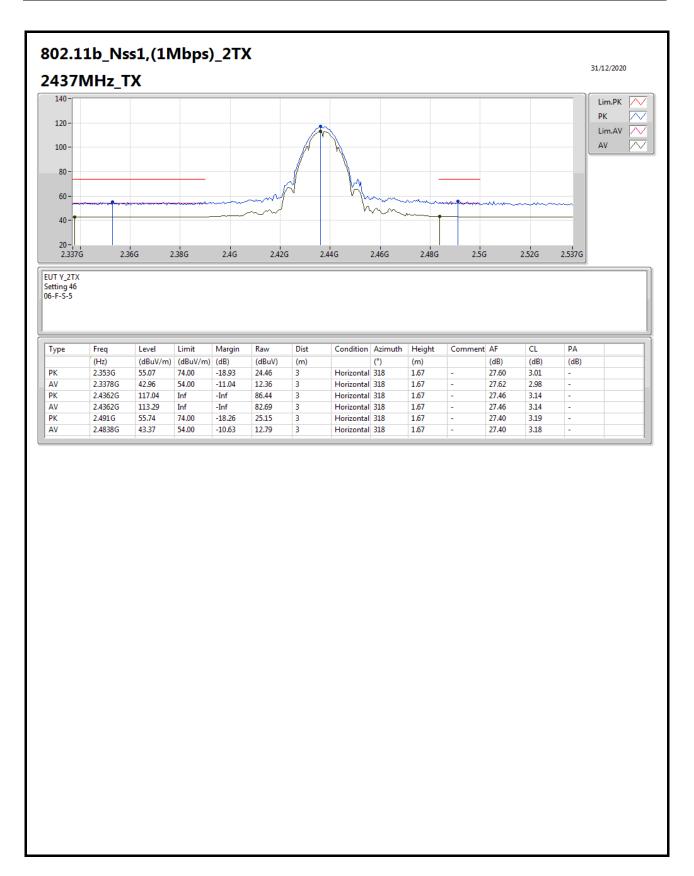




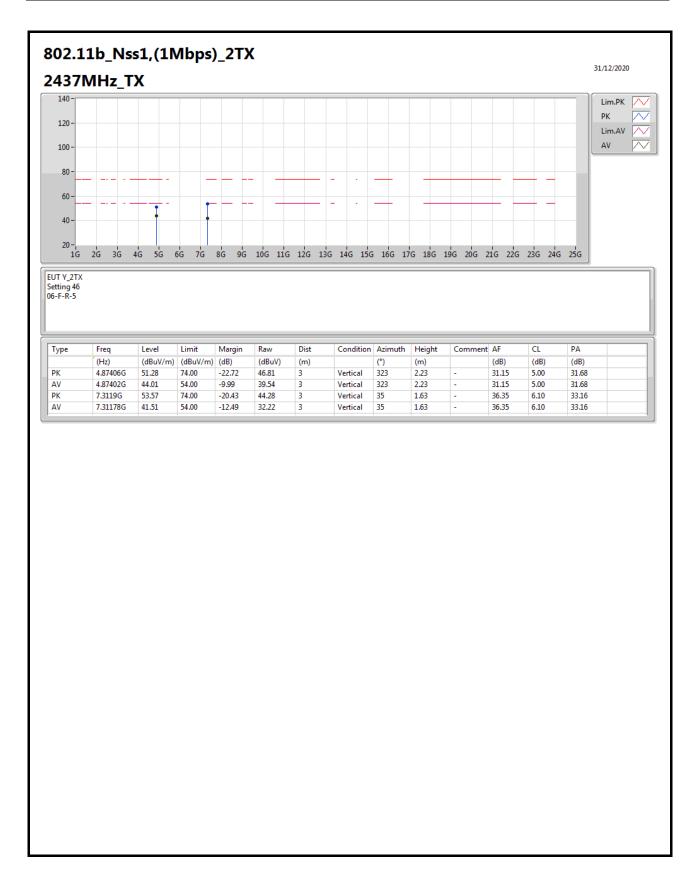






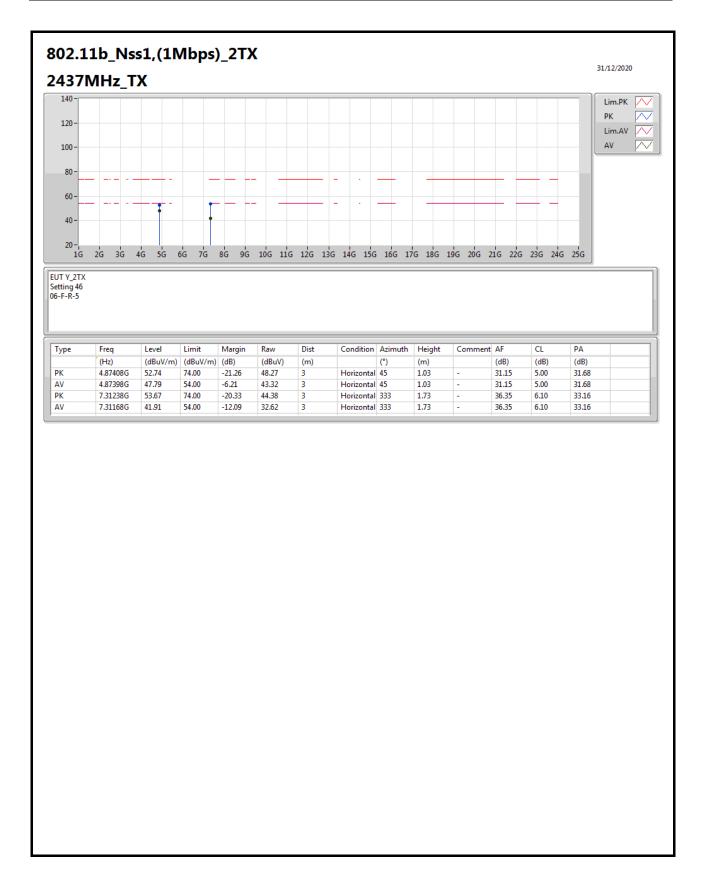


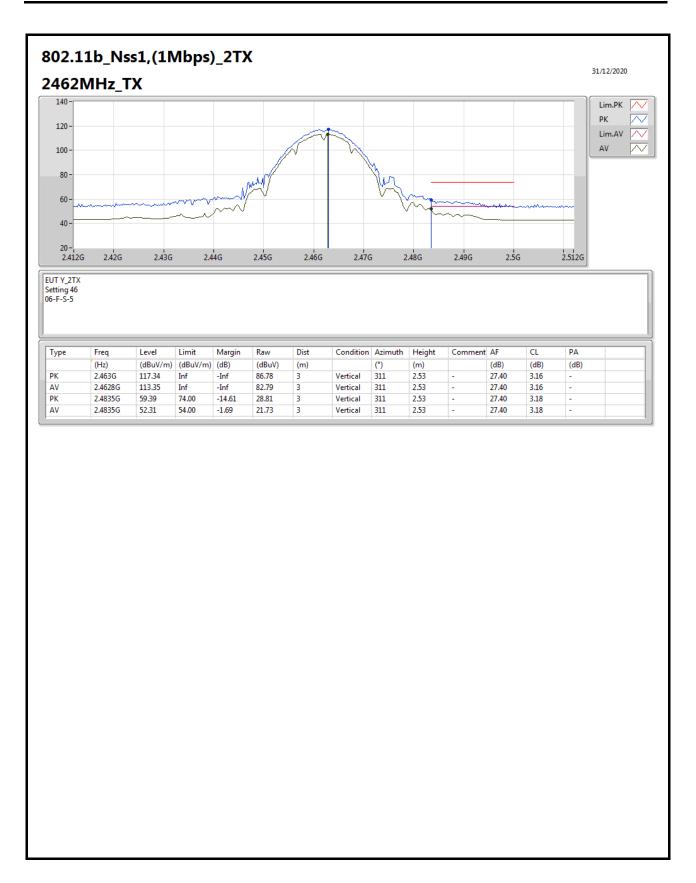




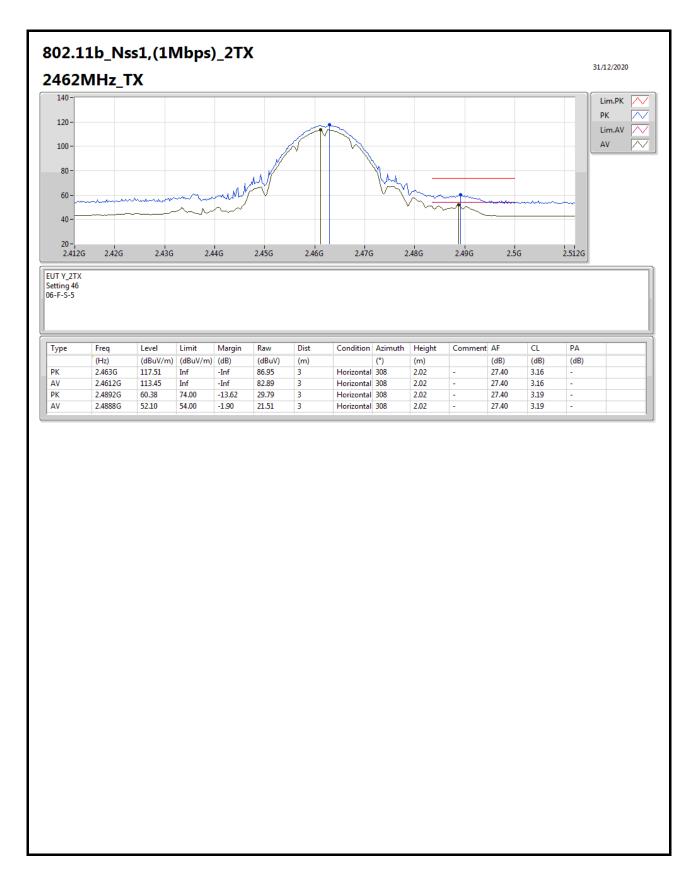
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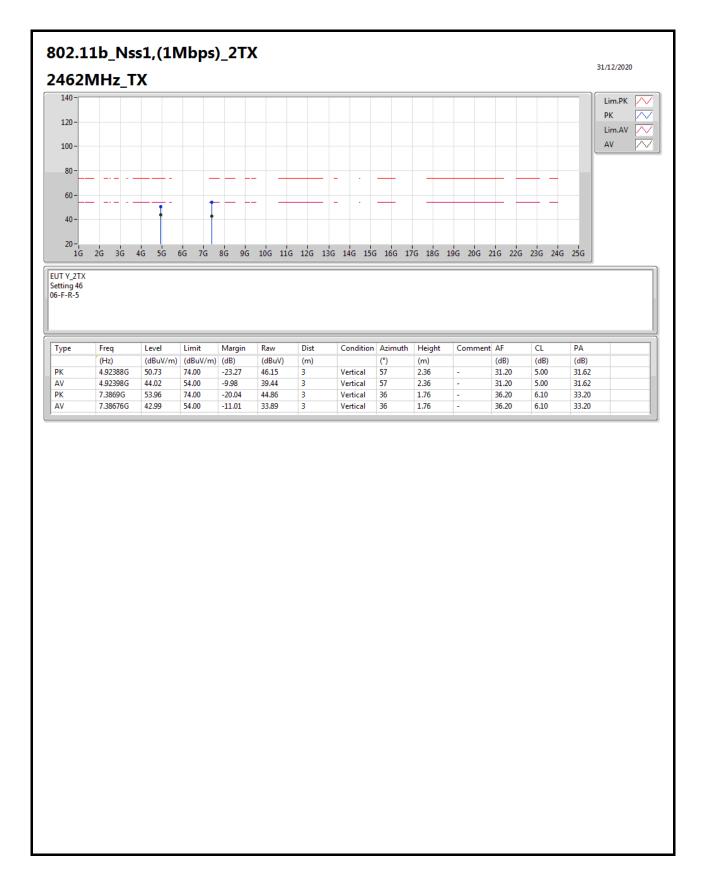




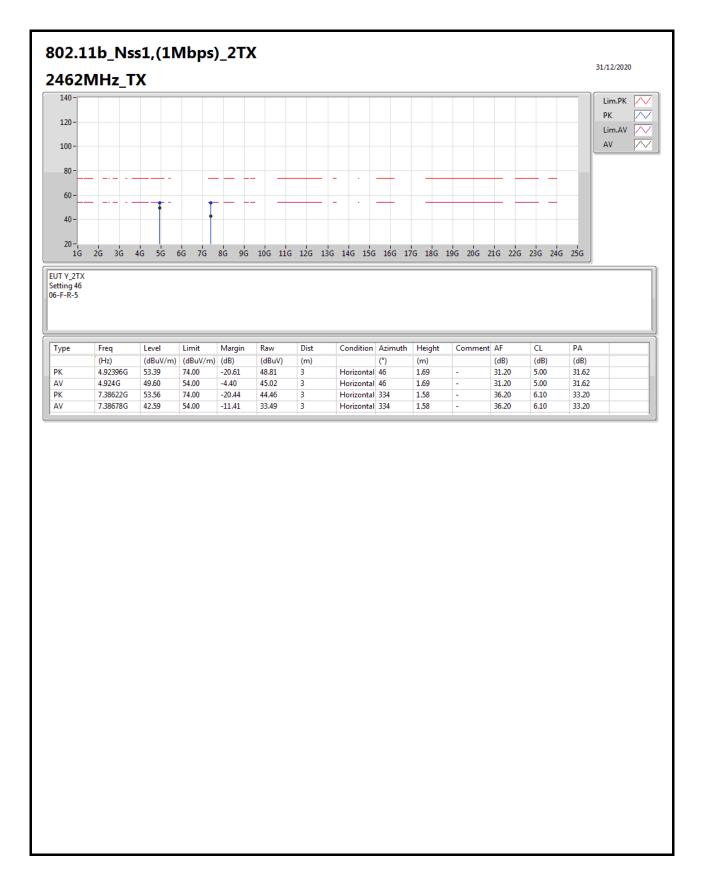


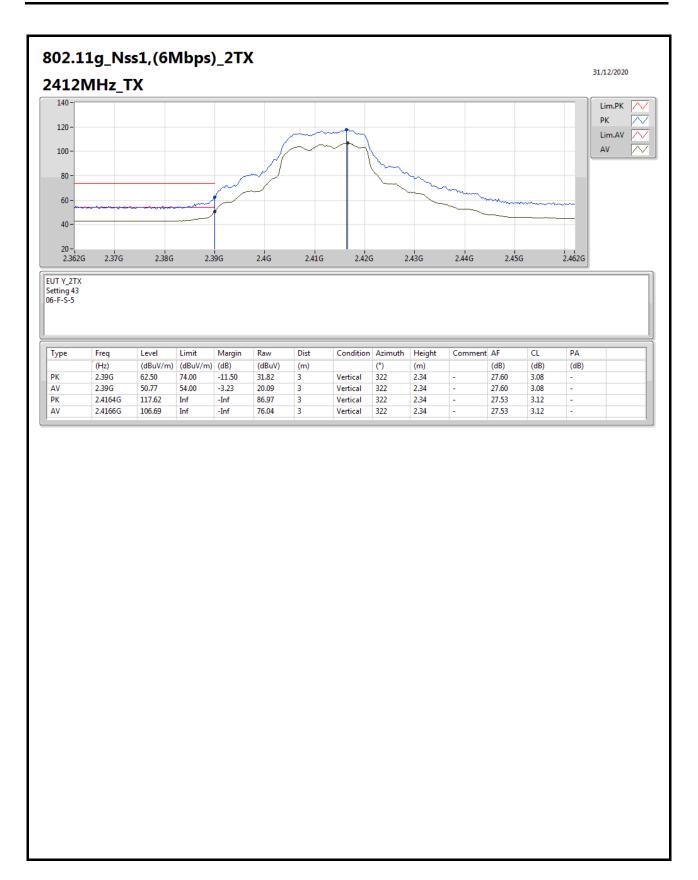




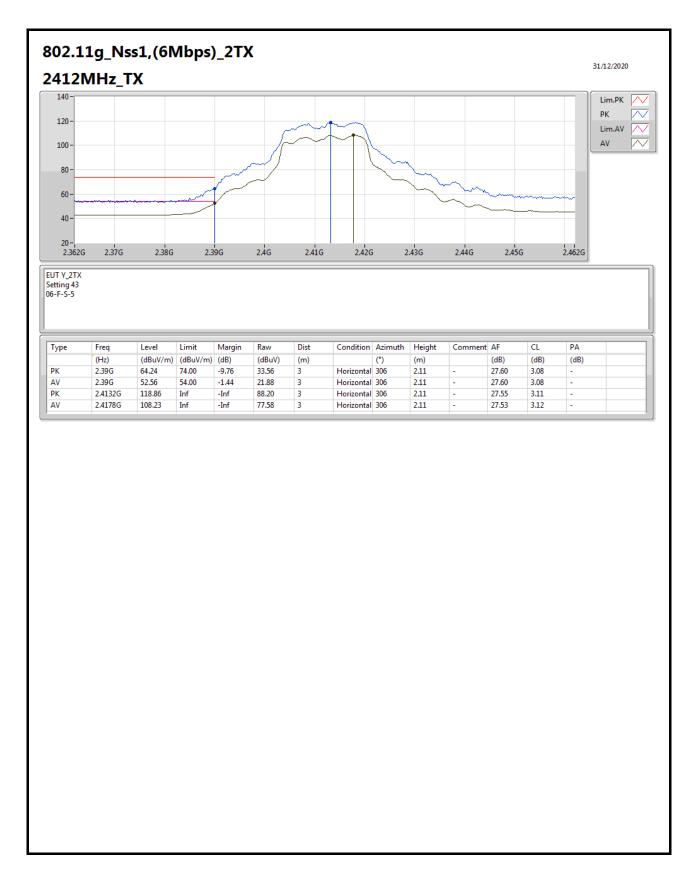




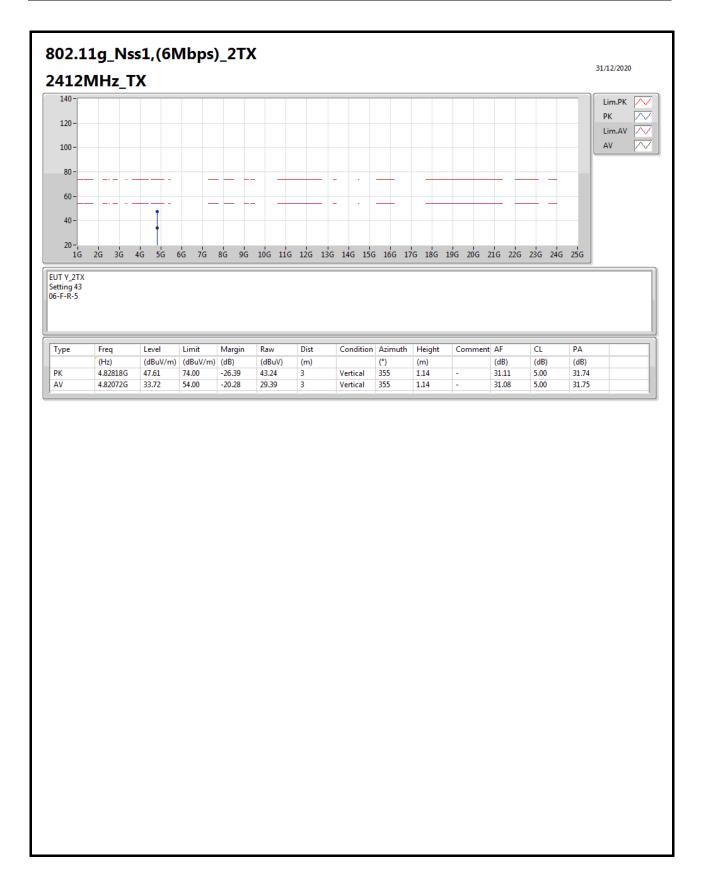




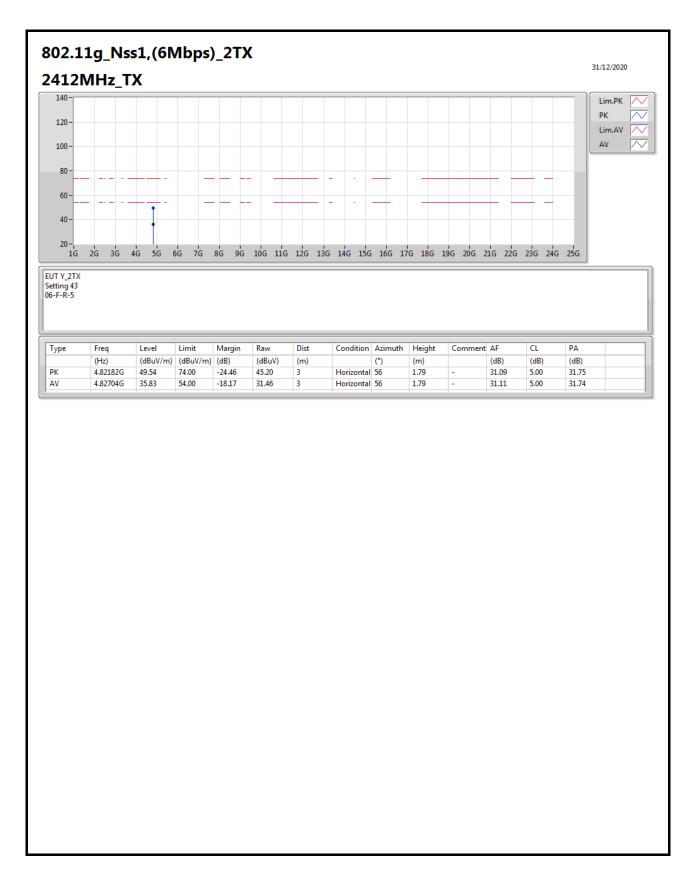




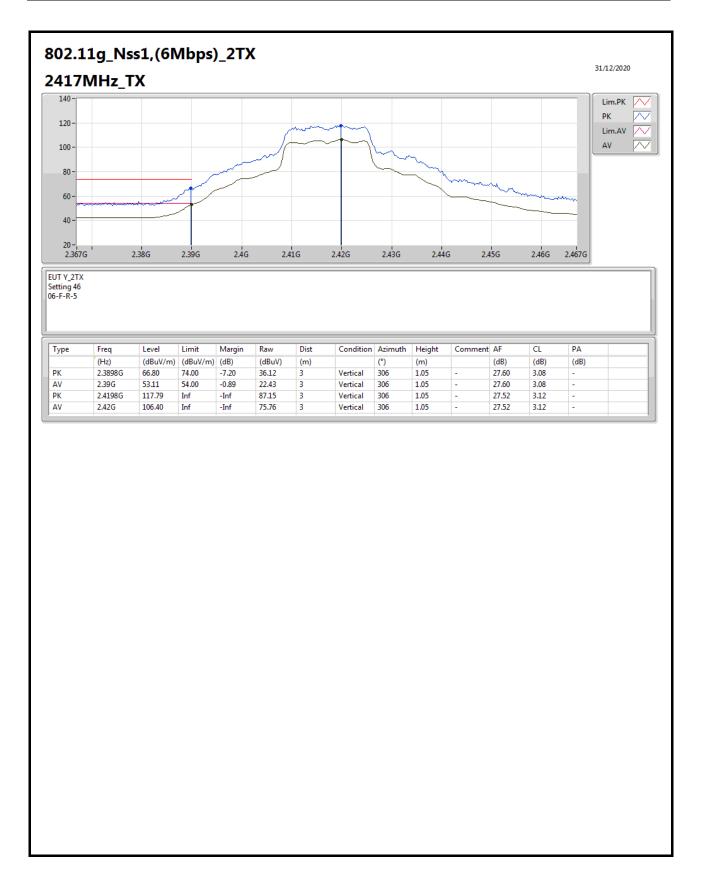




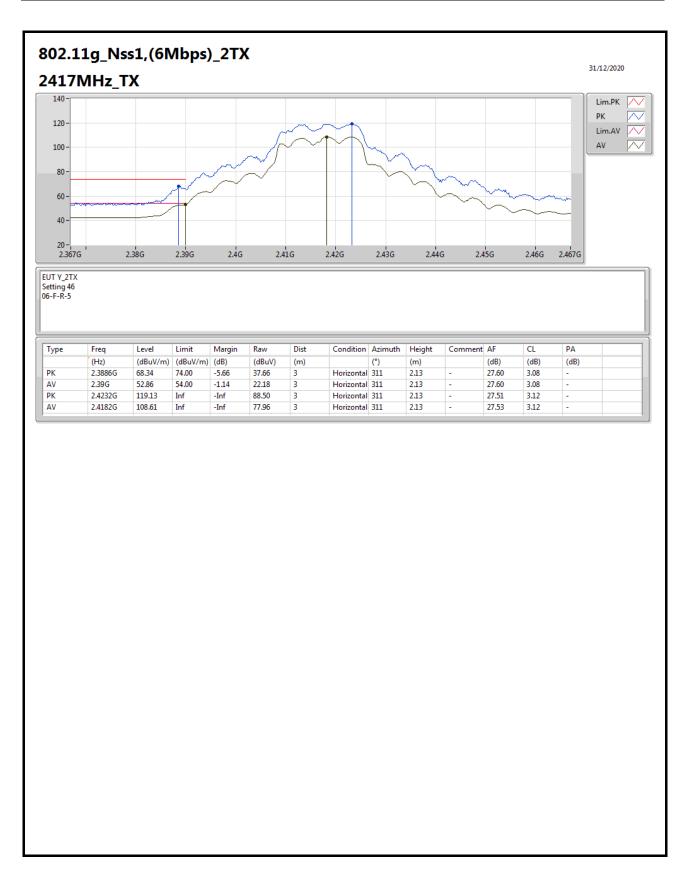




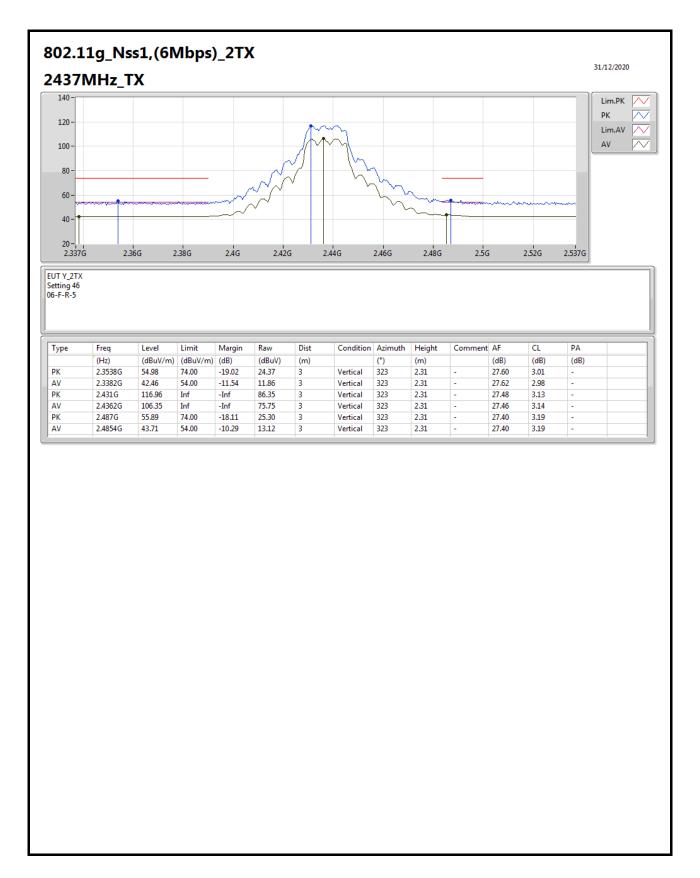


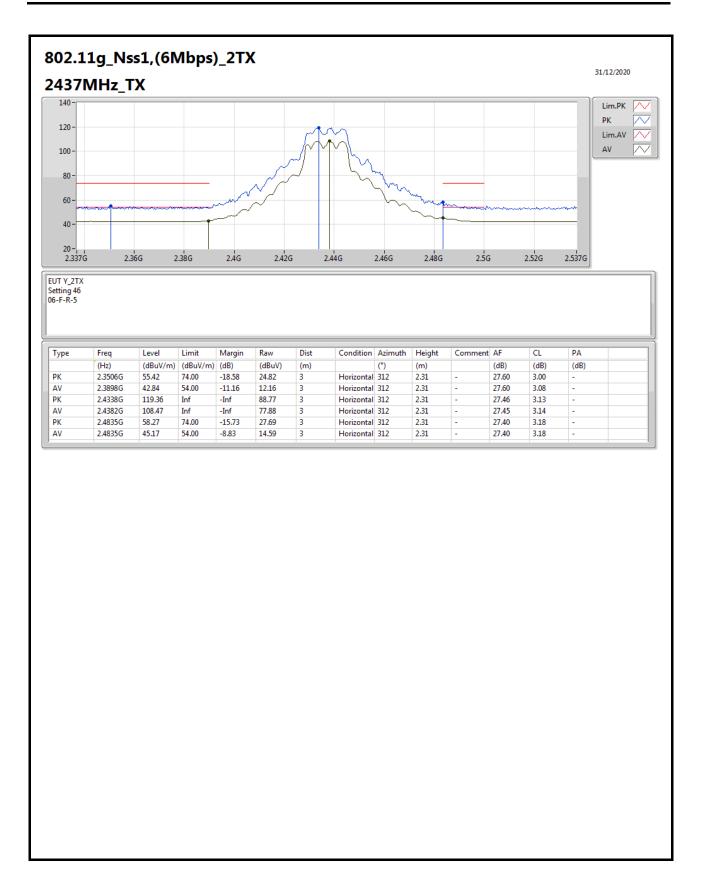




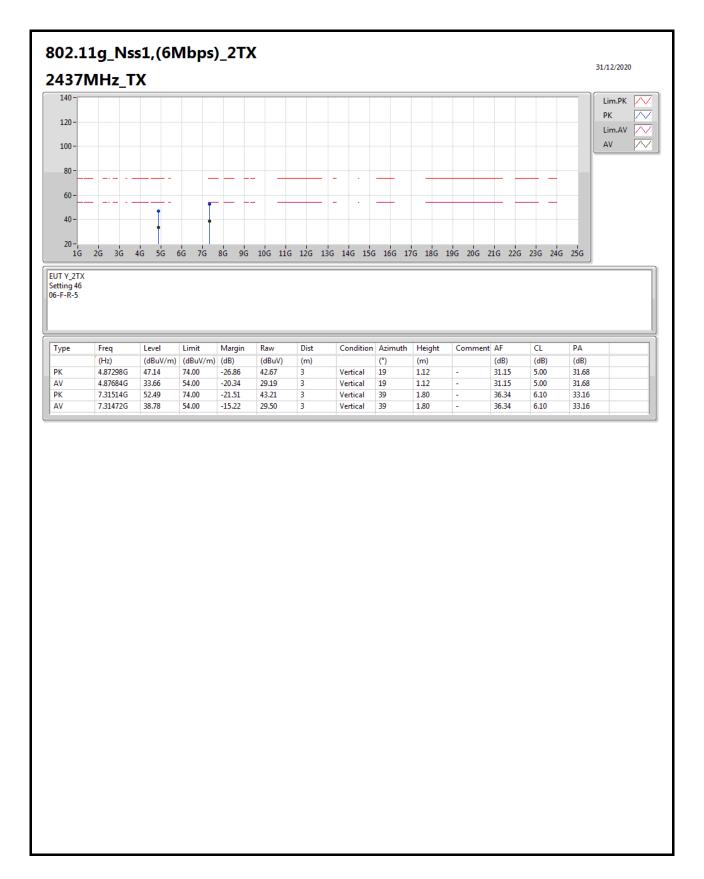




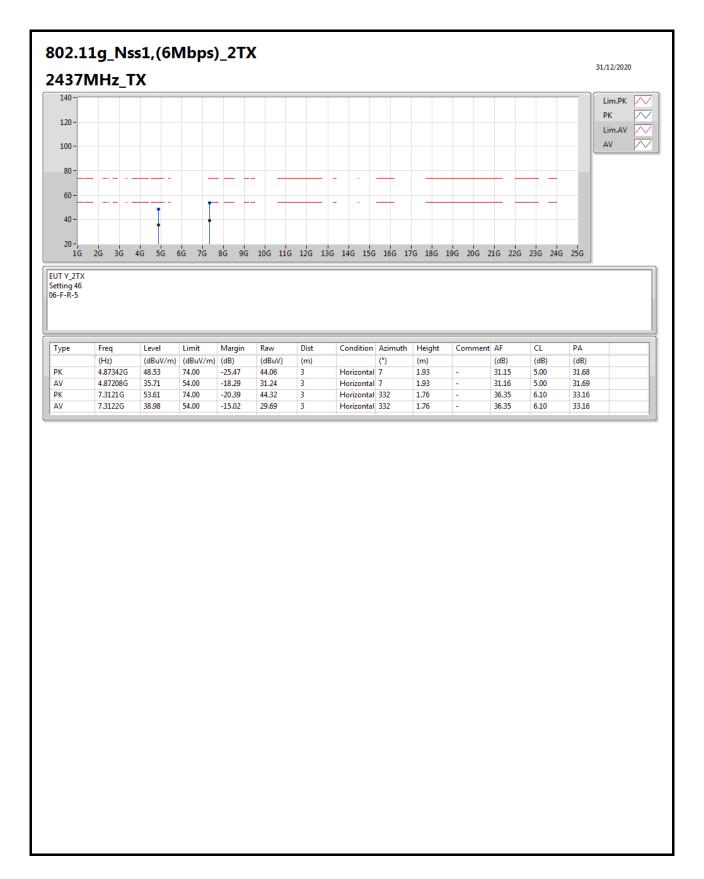




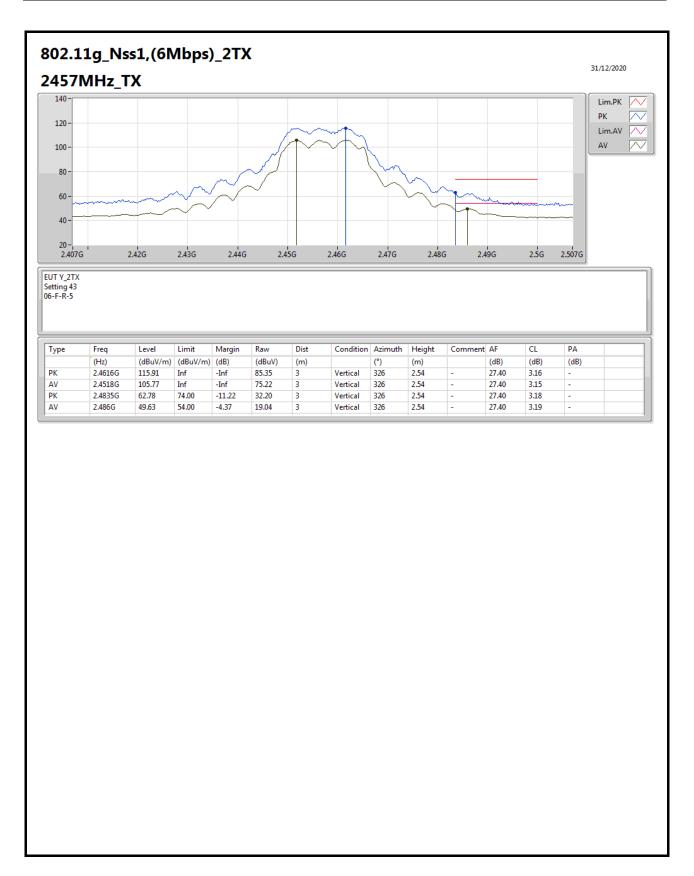




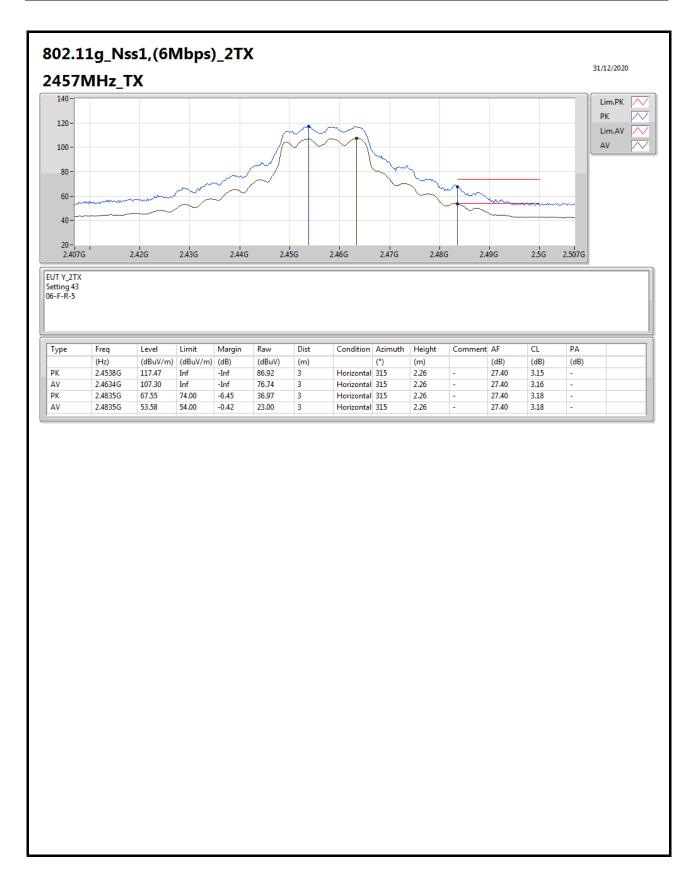




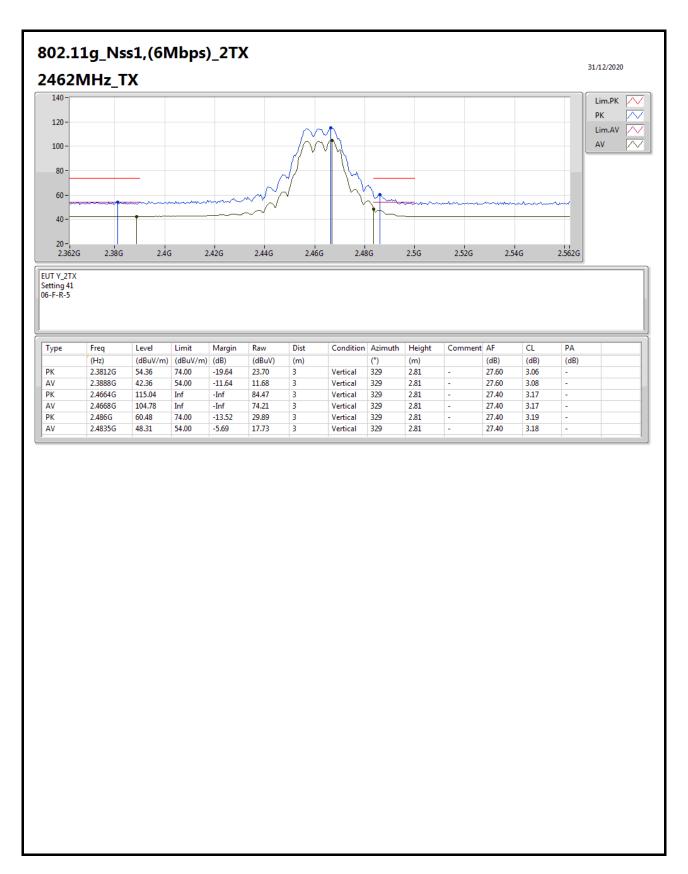


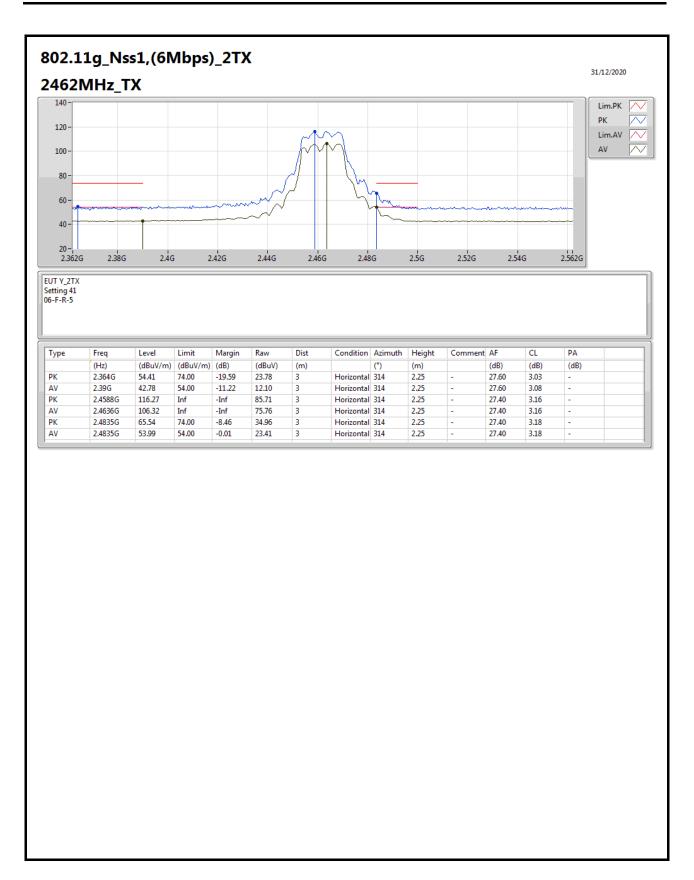




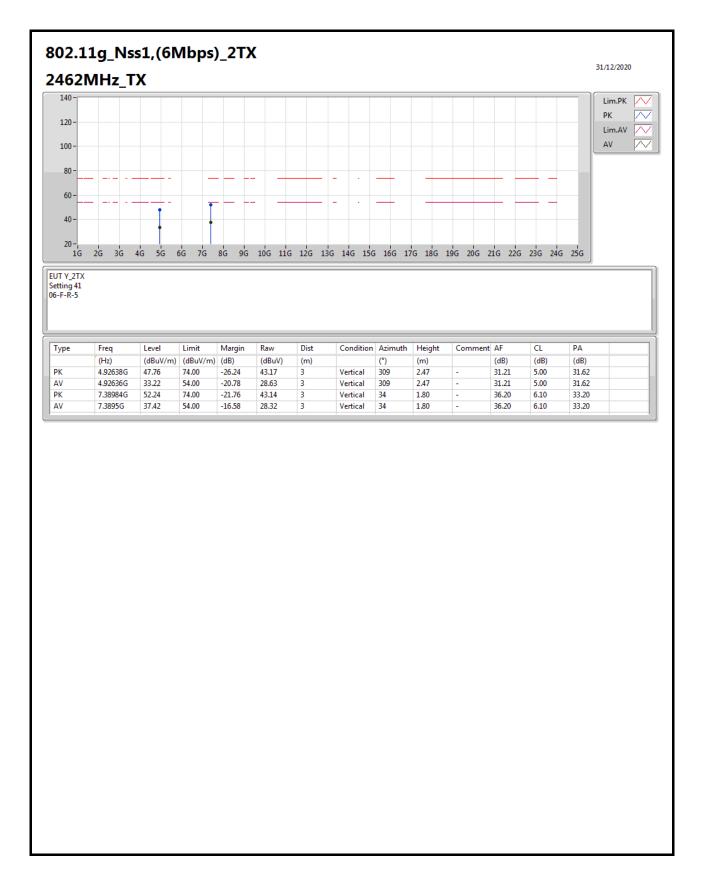




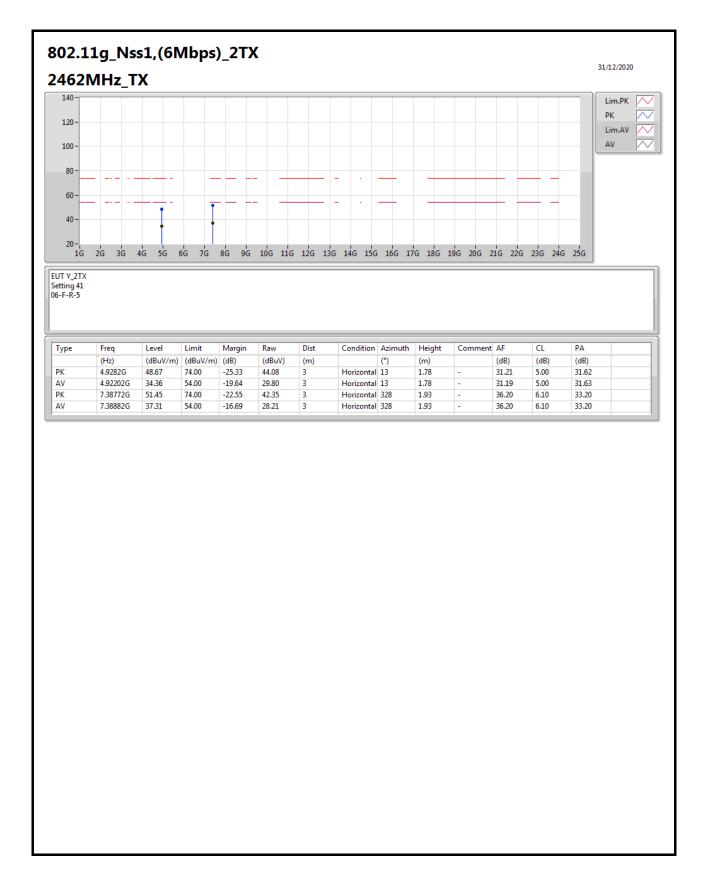




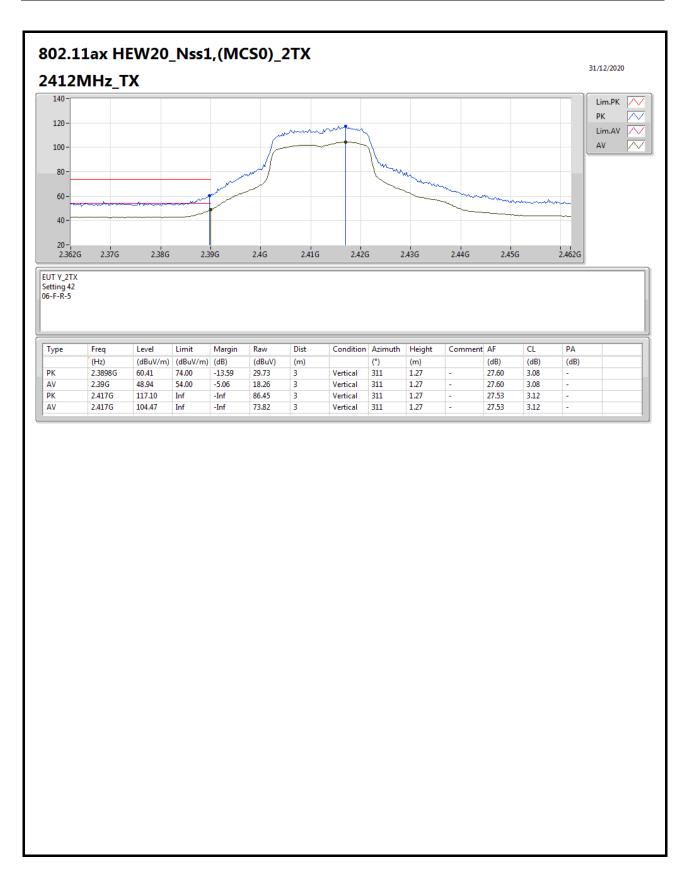




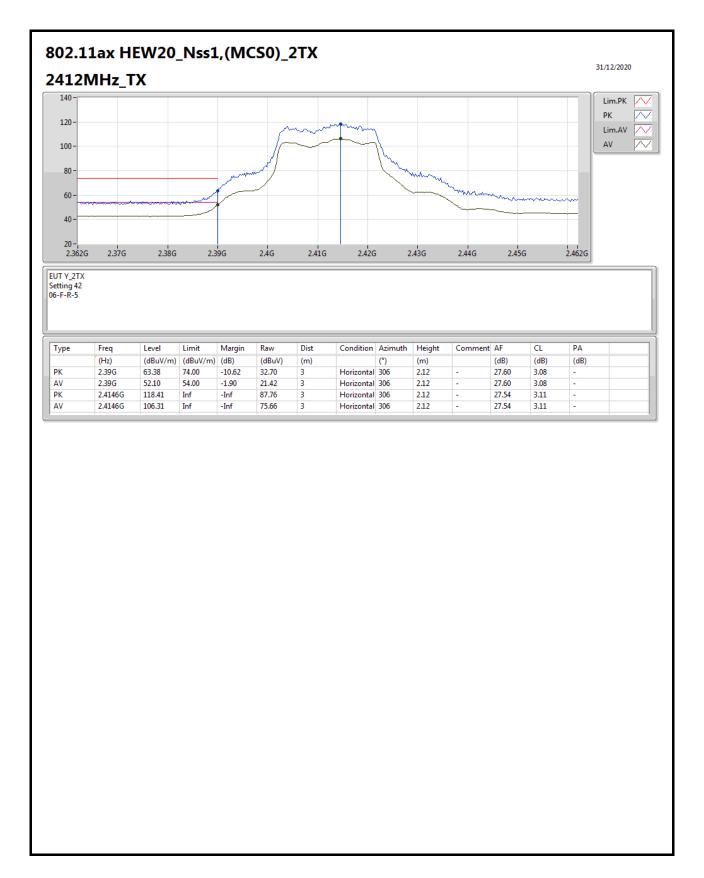




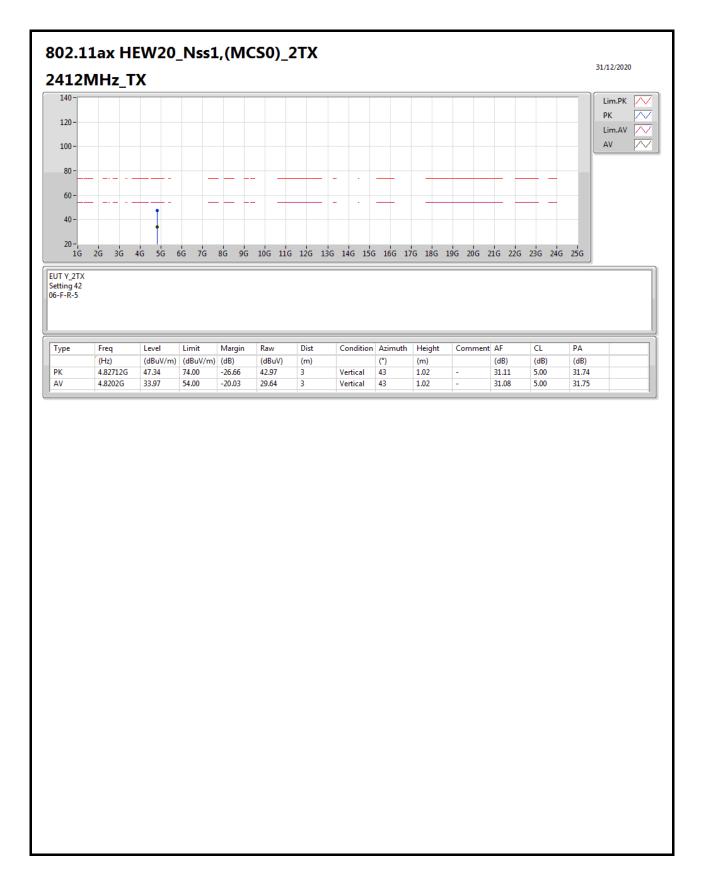




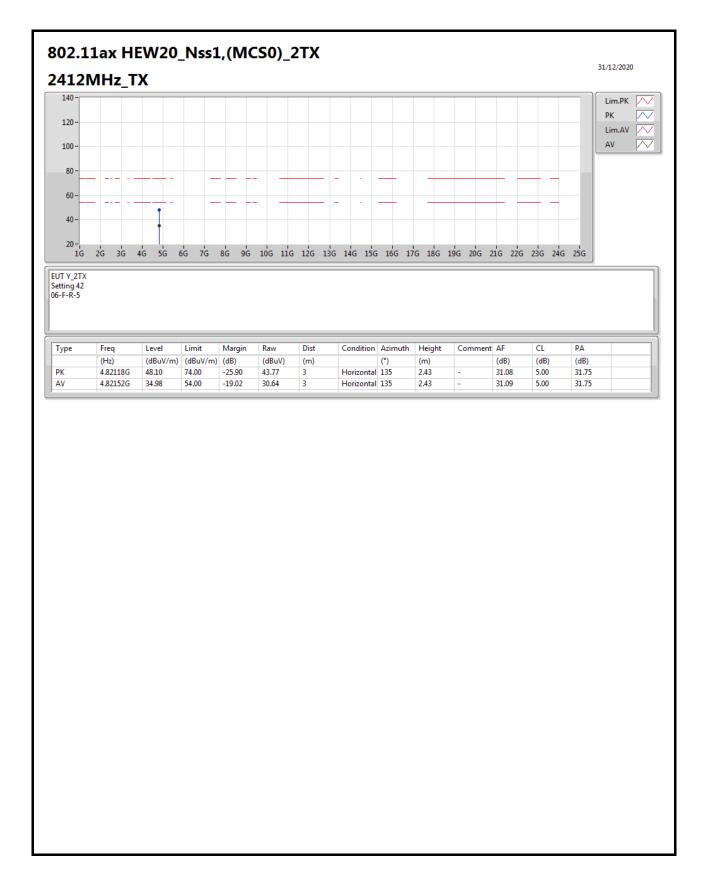




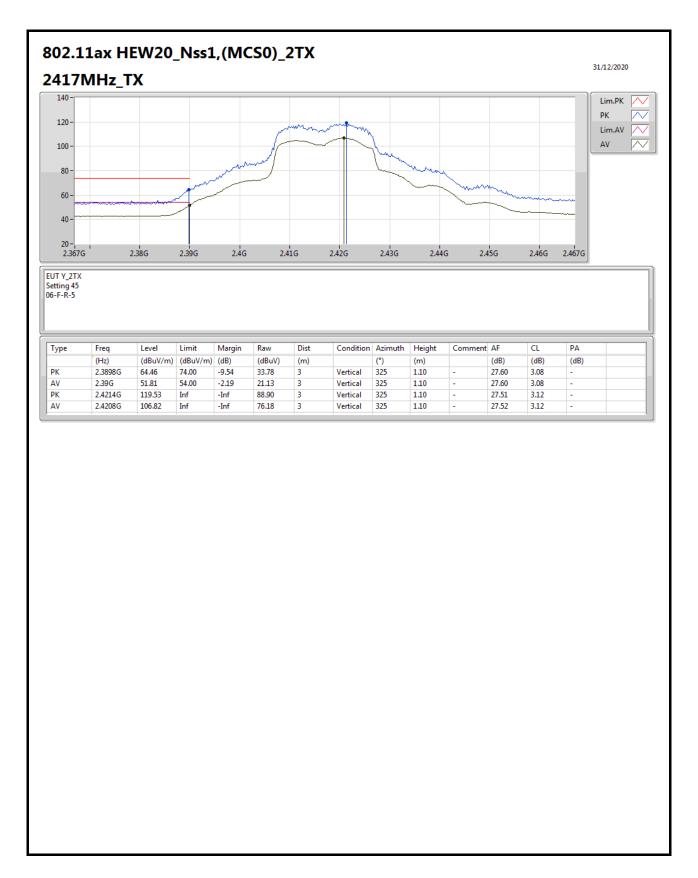




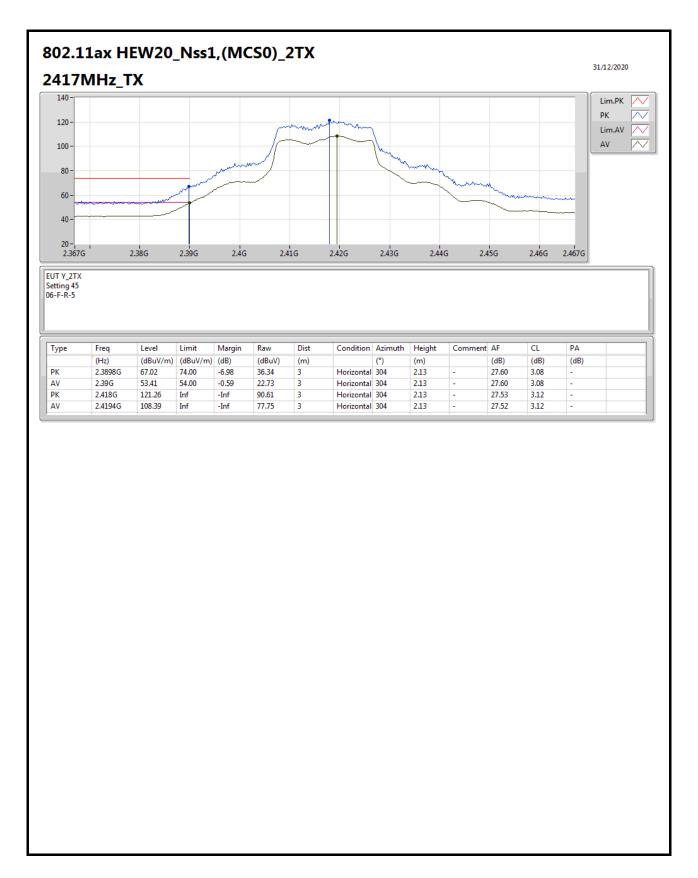




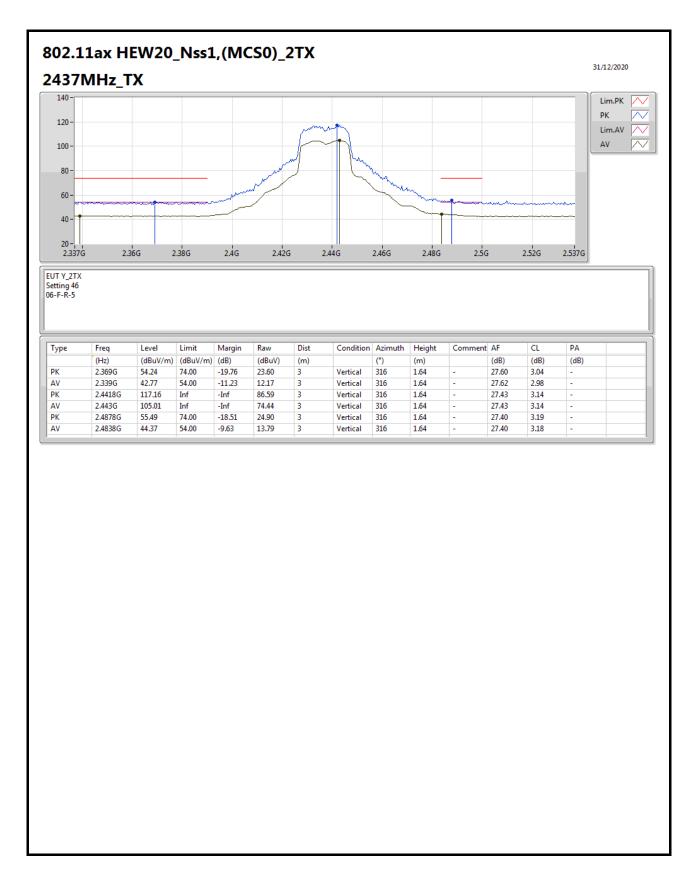




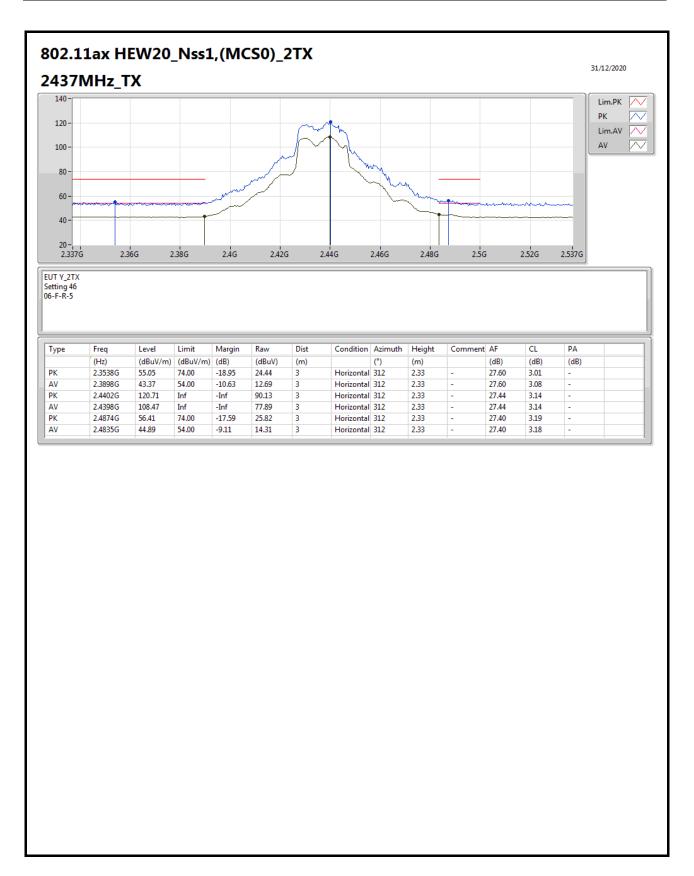




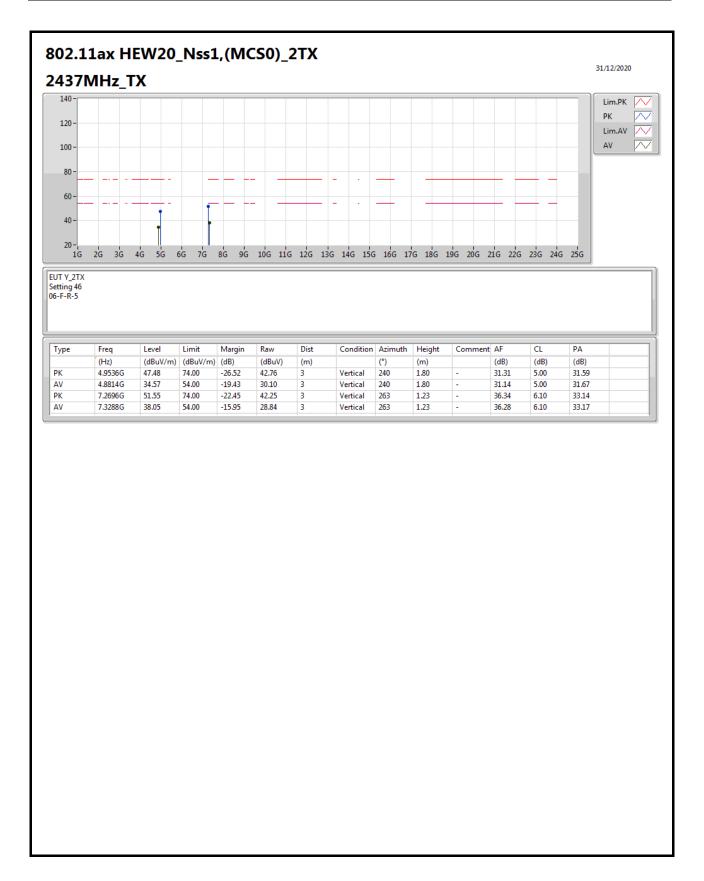




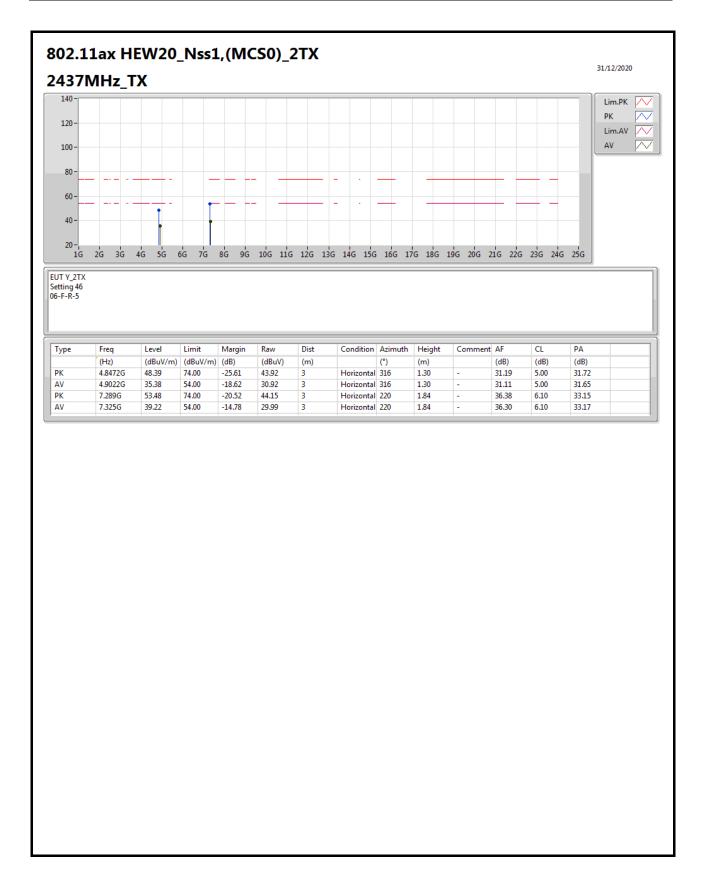




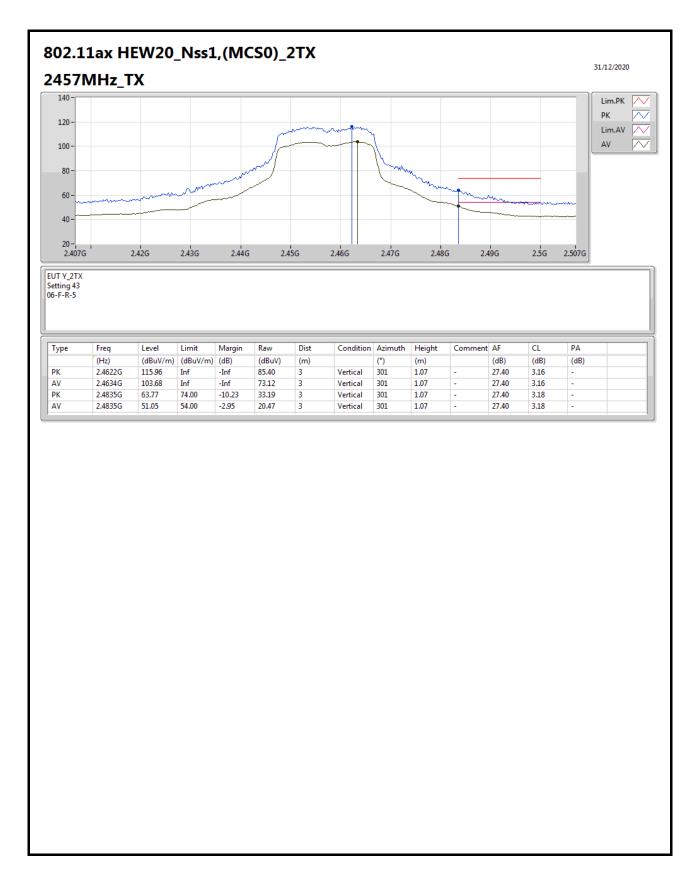




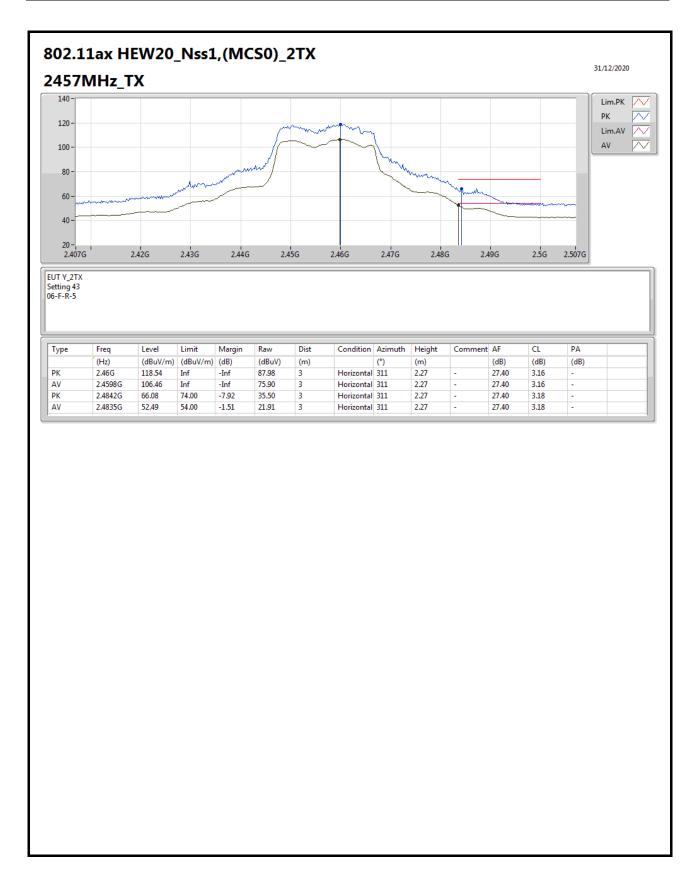




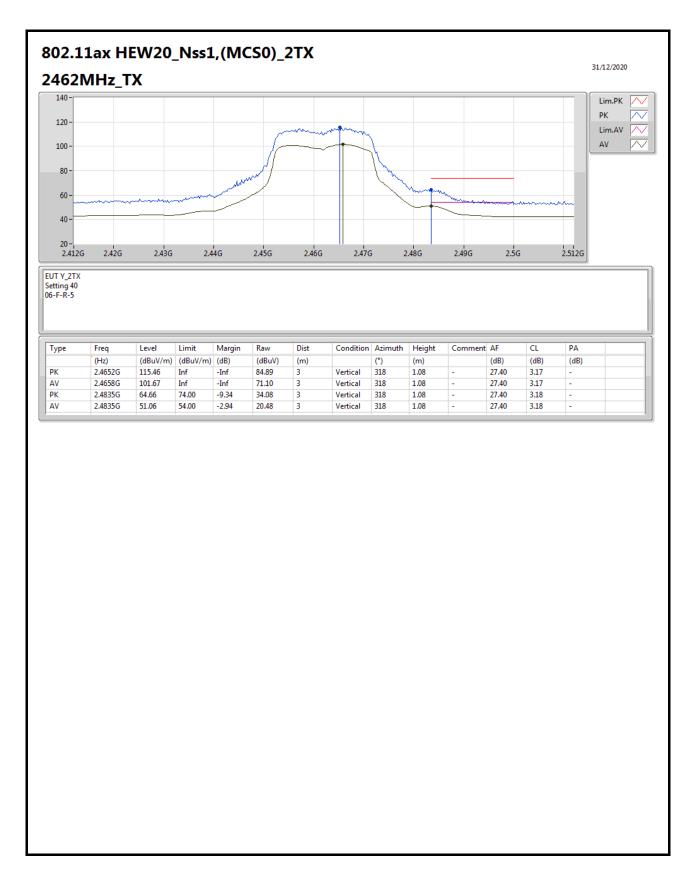




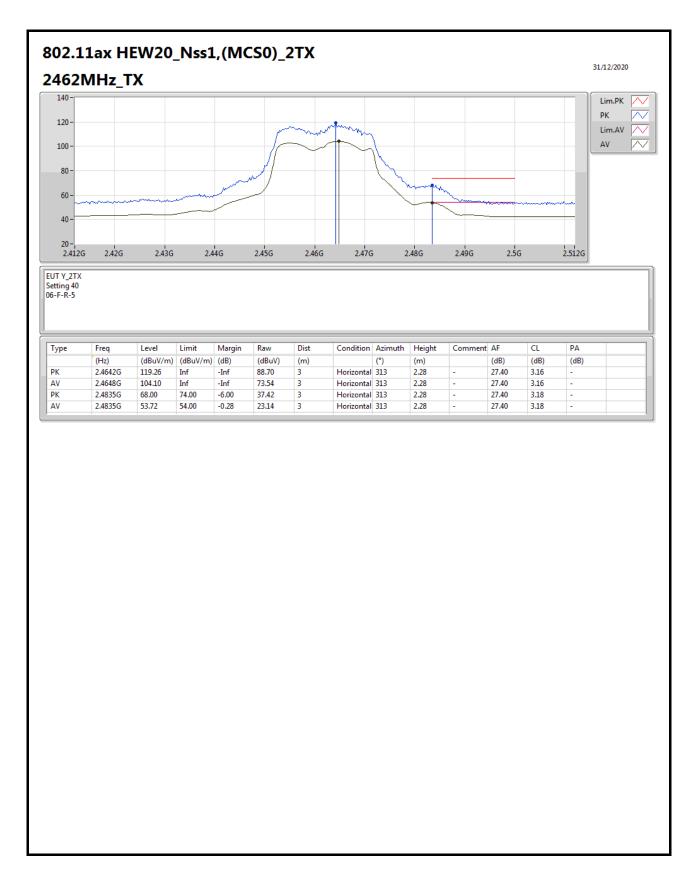




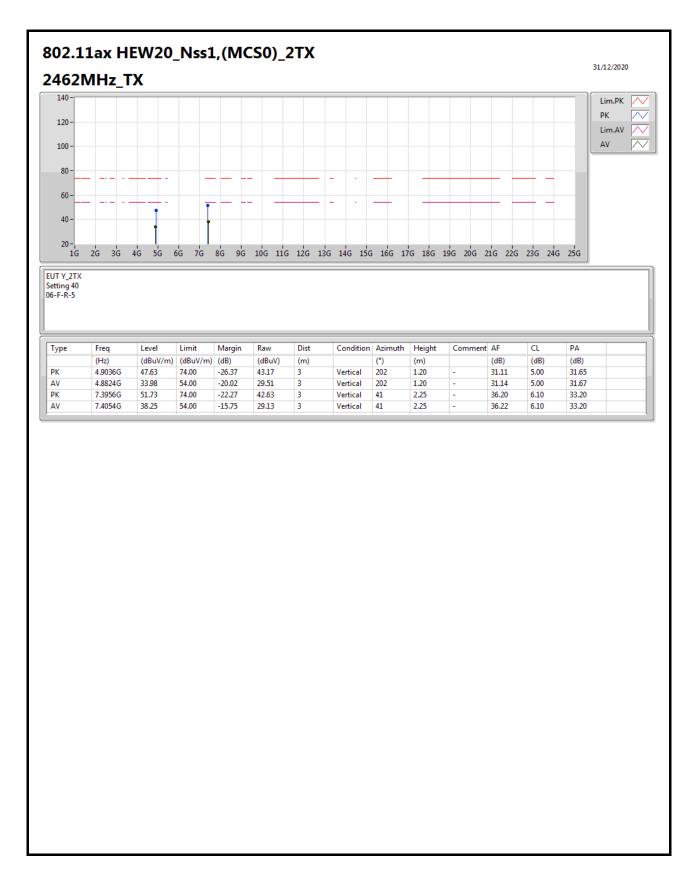




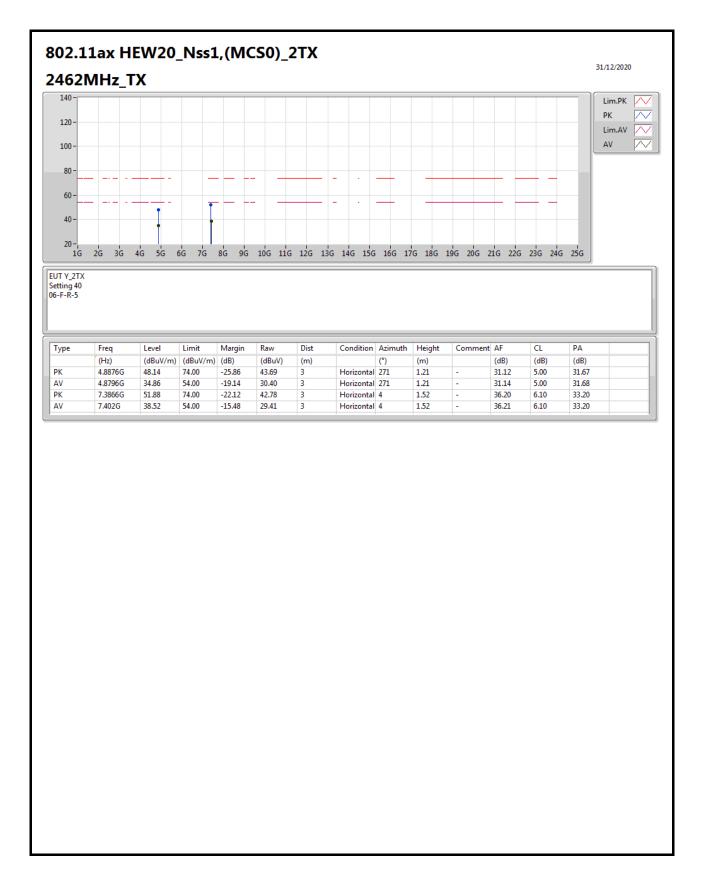




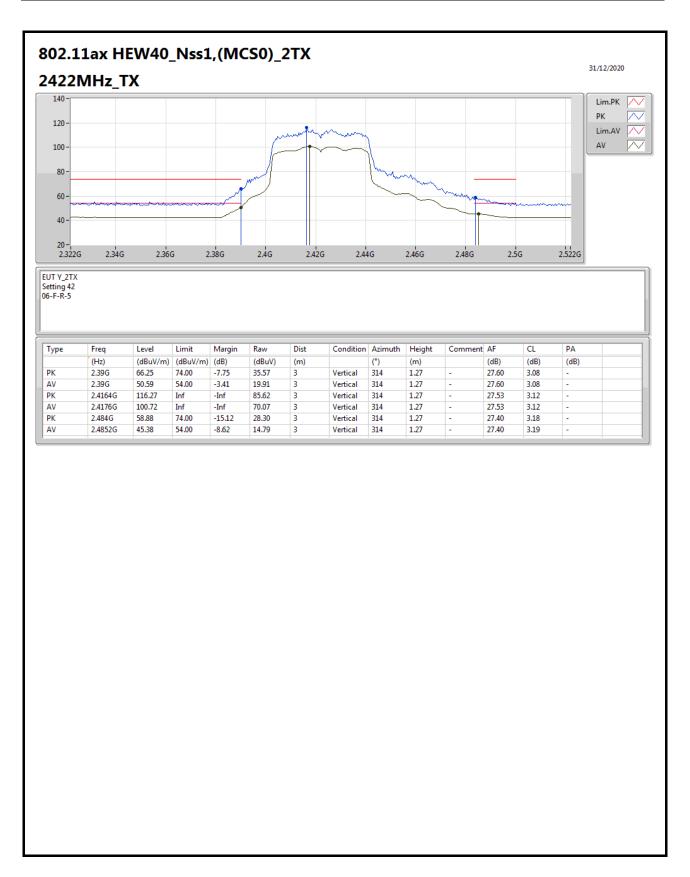




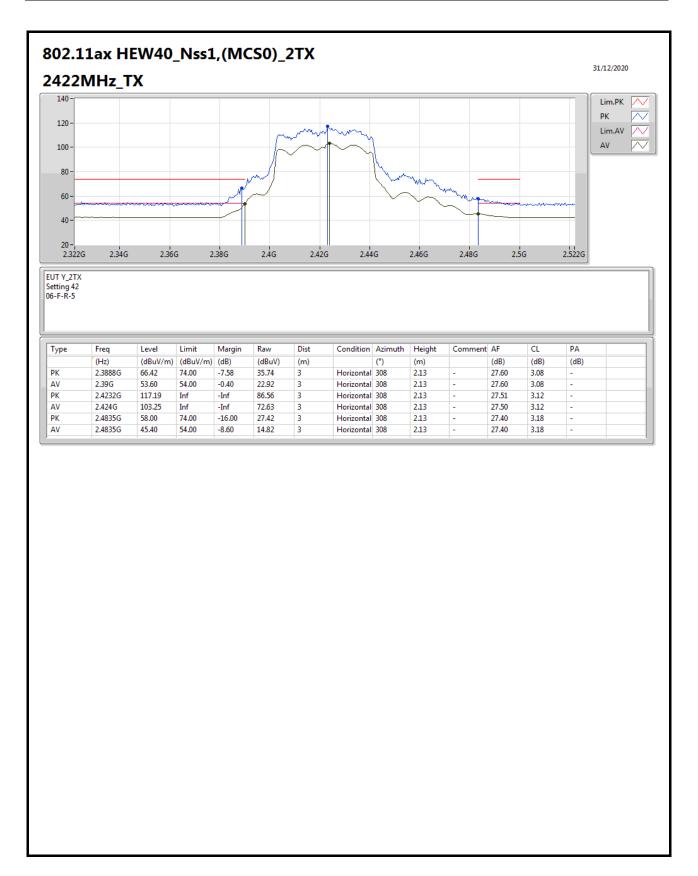




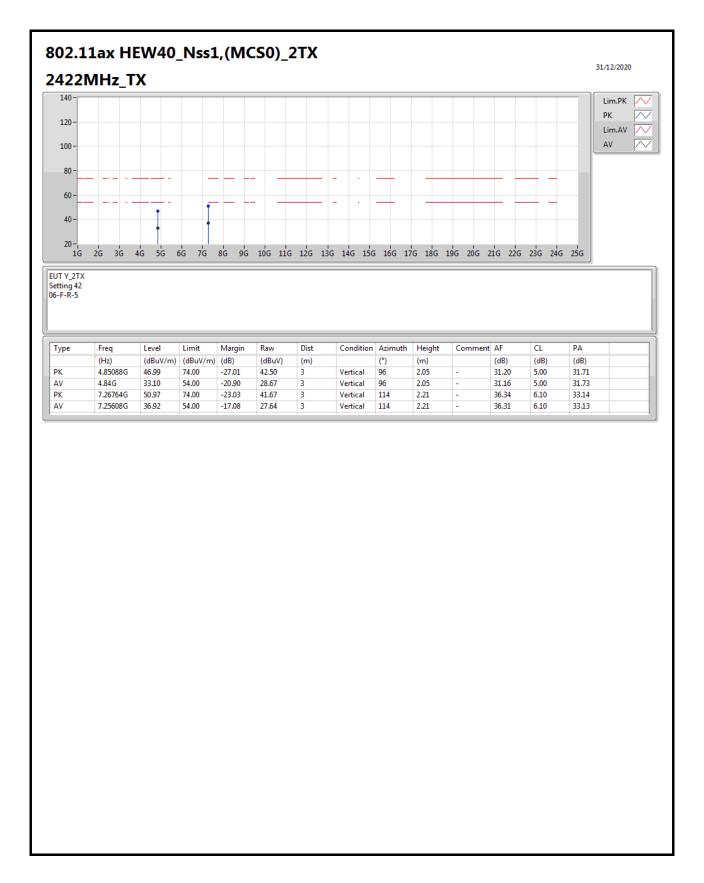




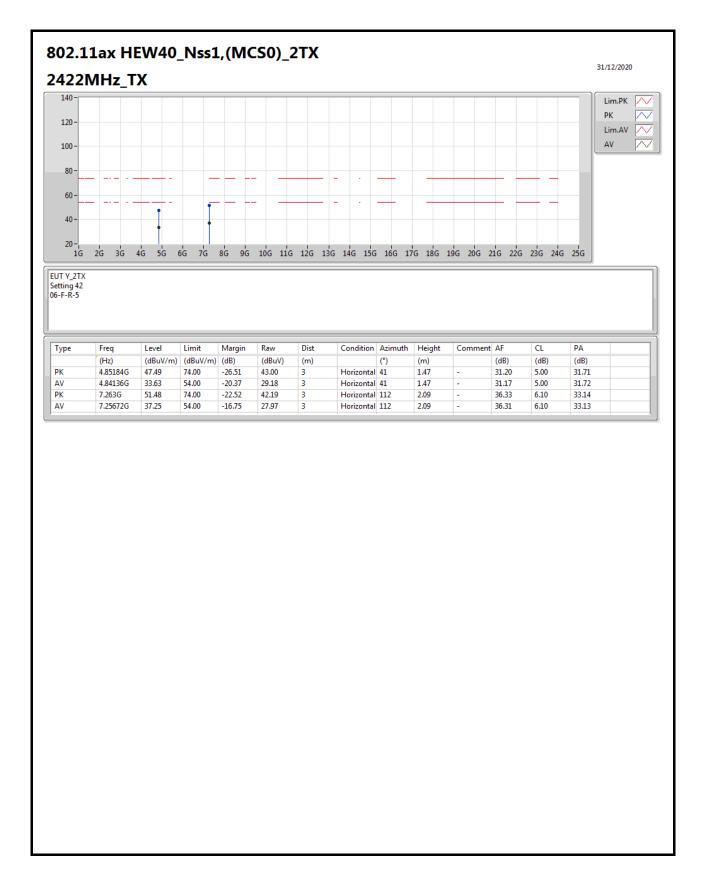




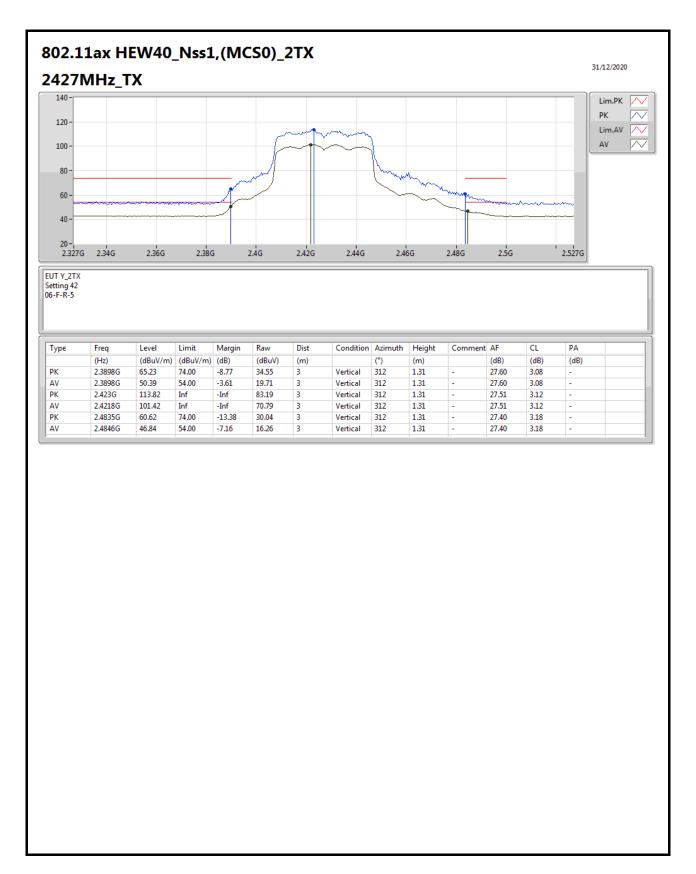




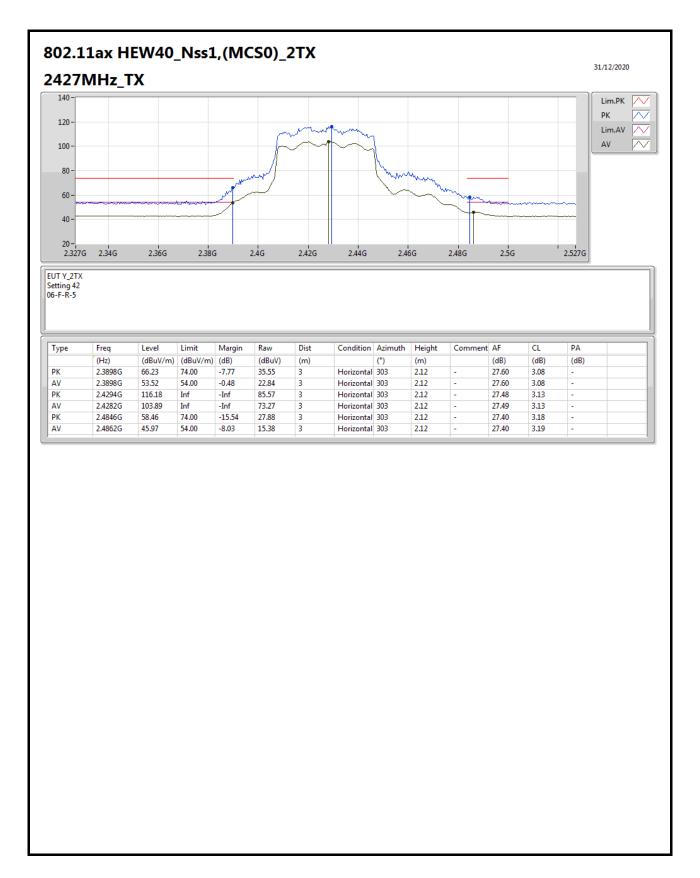




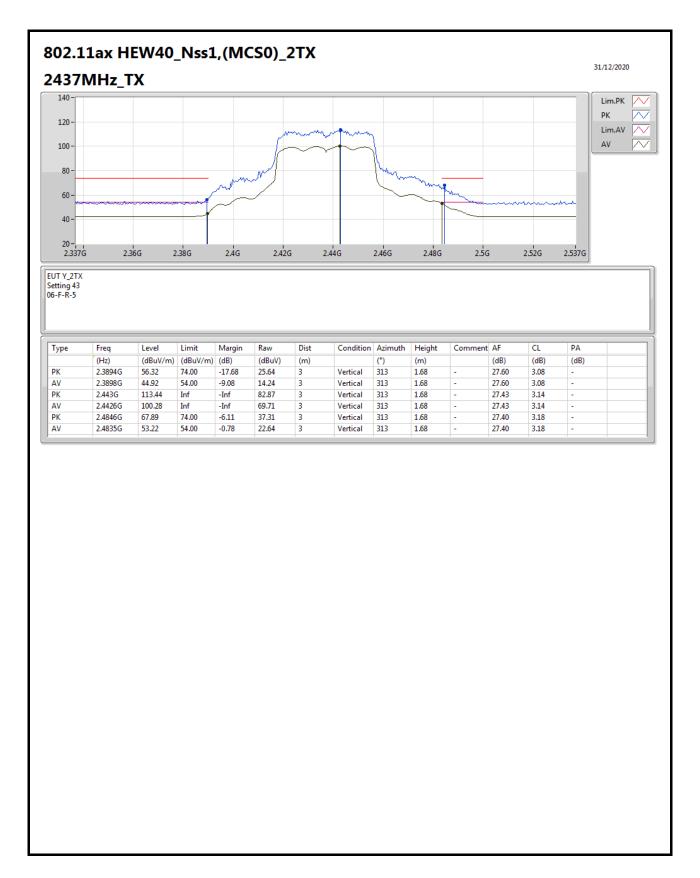




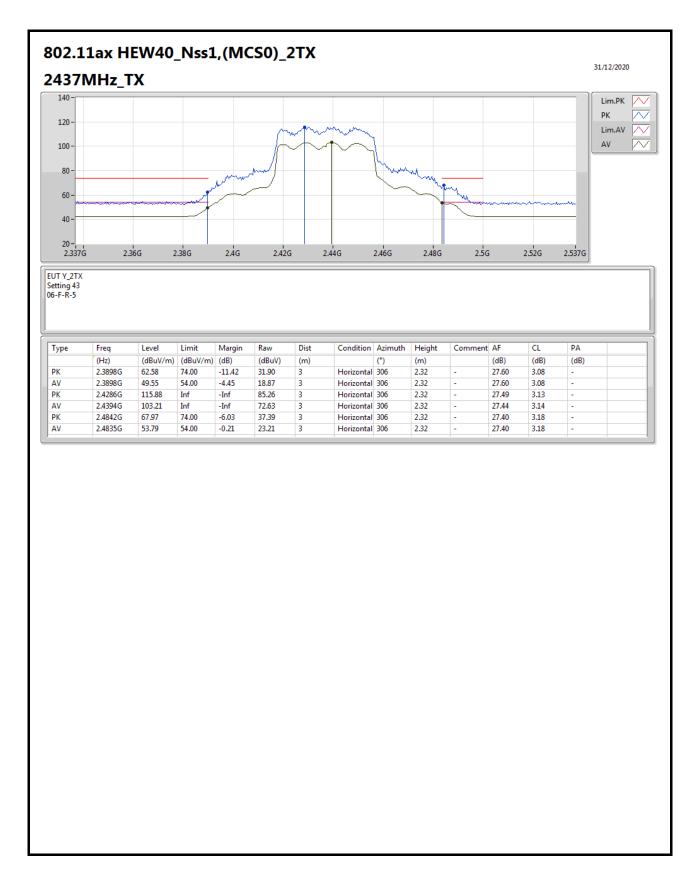




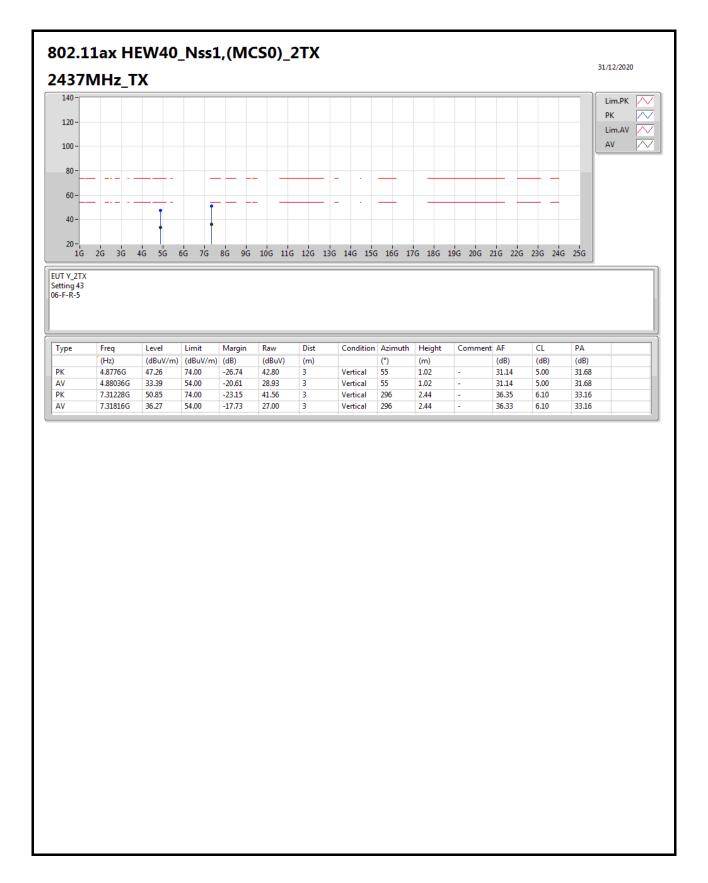






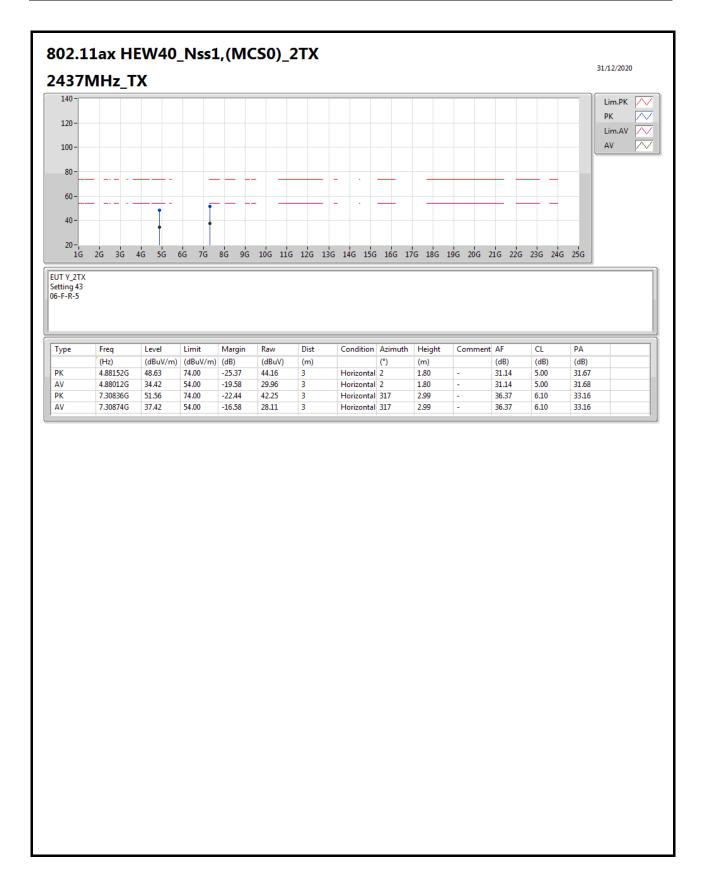




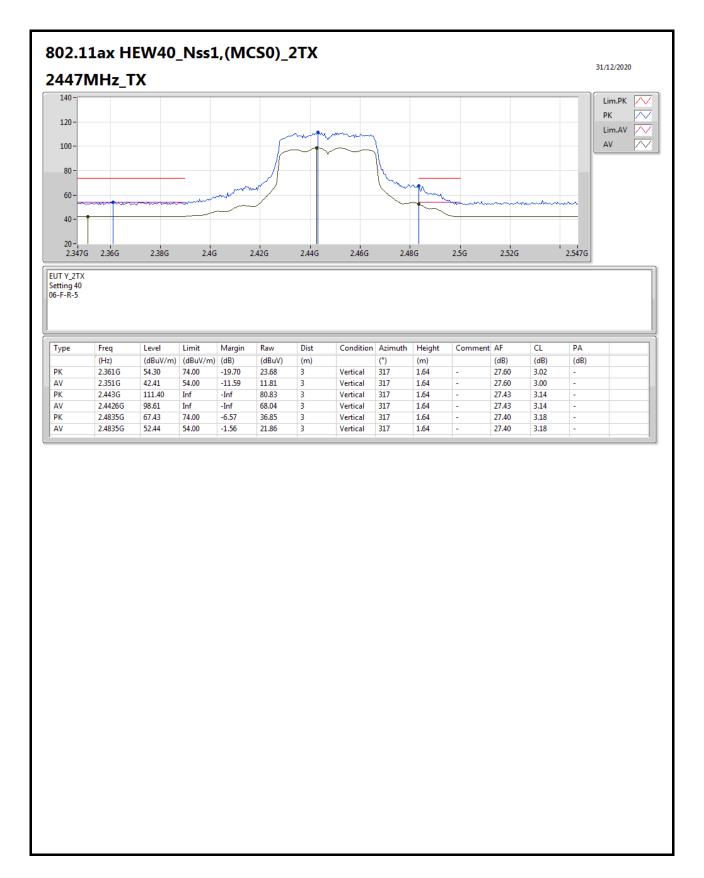


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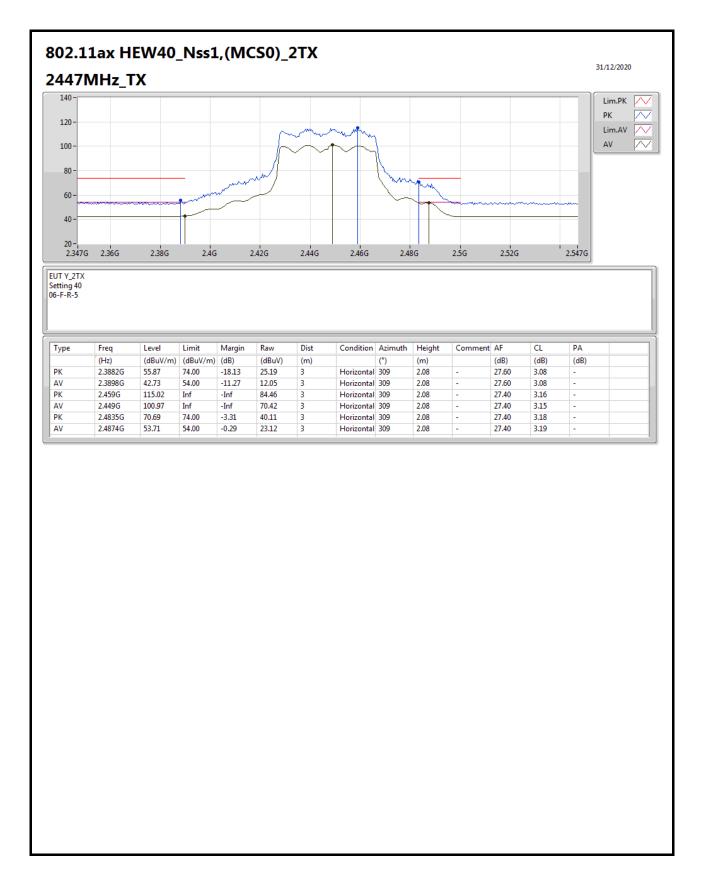




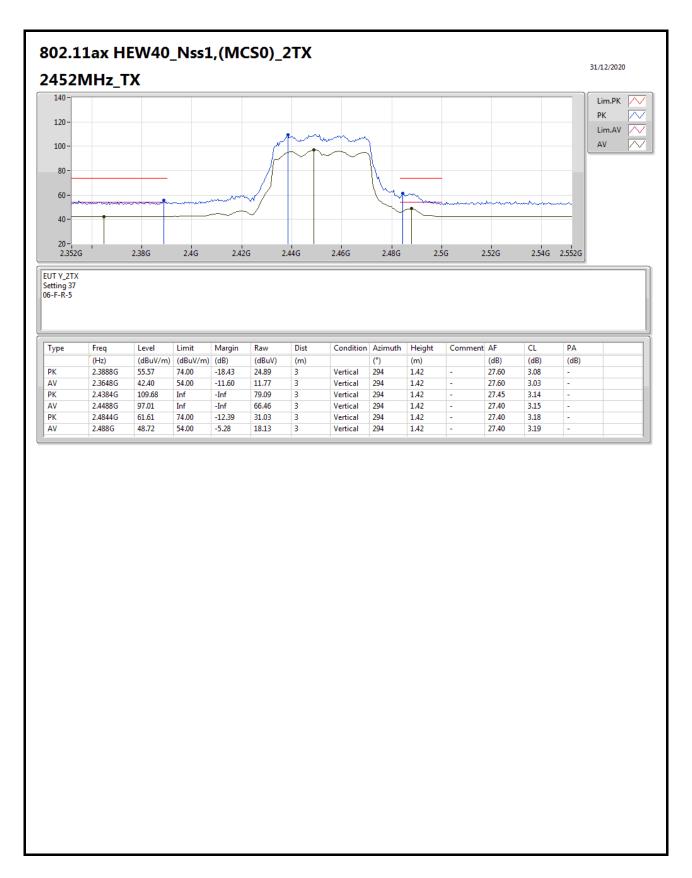




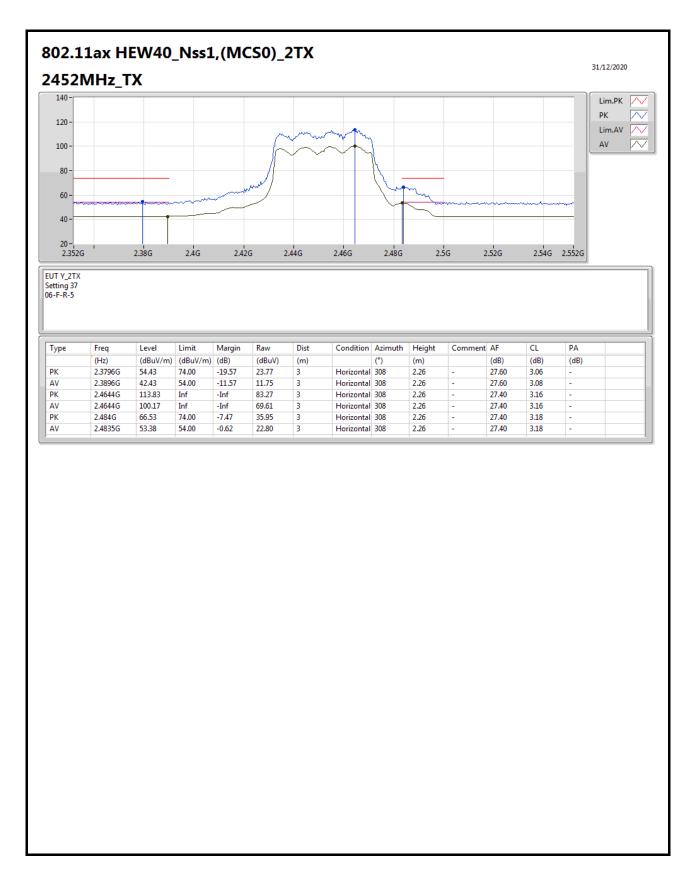






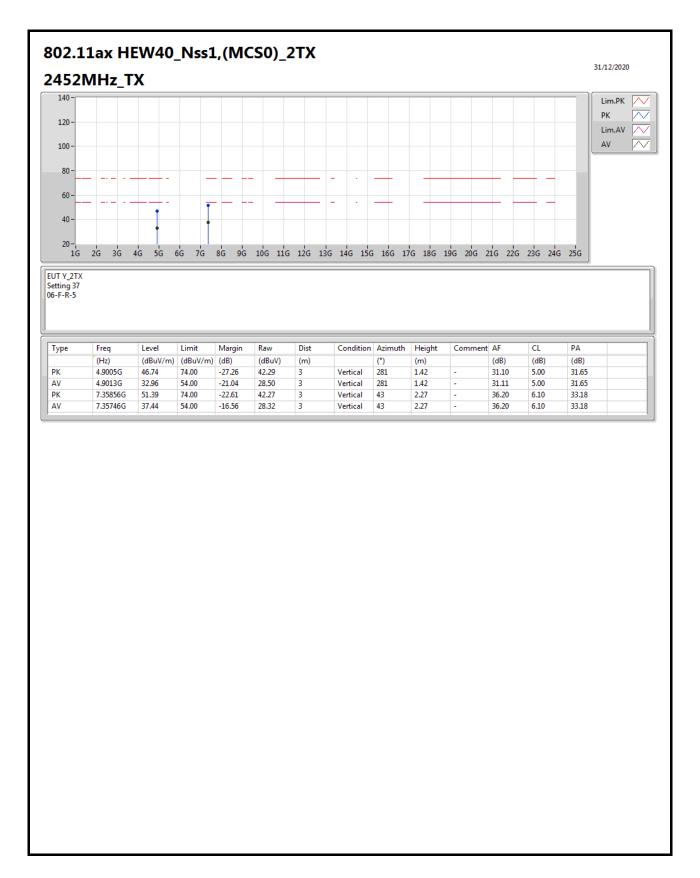




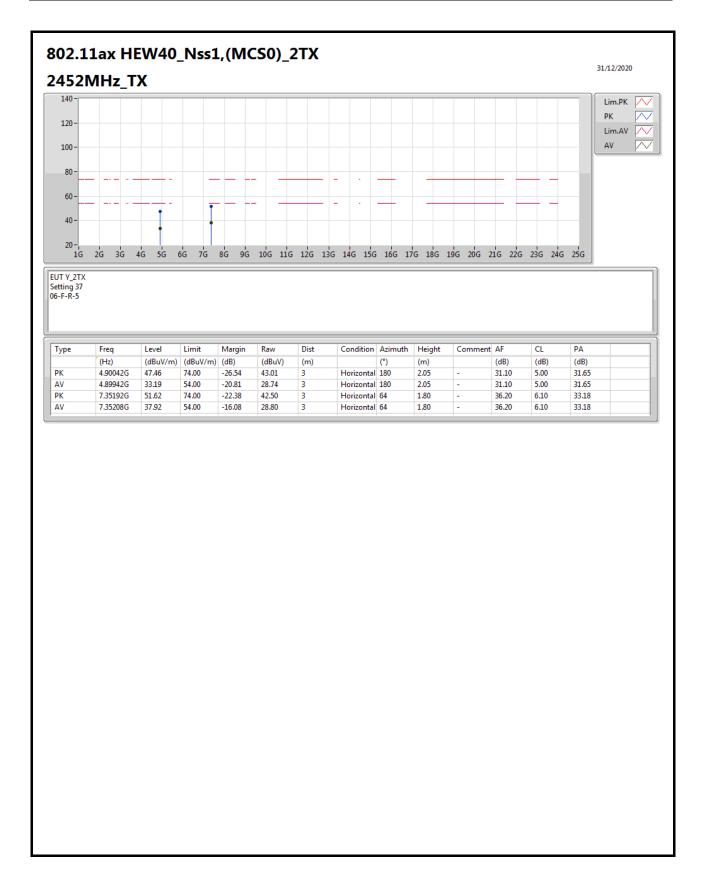


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## Radiated Emissions above 1GHz

Appendix G

Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	
Mode 1	Pass	AV	1.29724G	21.81	54.00	-32.19	Vertical



