

# **FCC RADIO TEST REPORT**

FCC ID

: Q87-03564

Equipment

: Linksys Tri-Band Wireless-AC Router

**Brand Name** 

: Linksys

Model Name

: MR8300 V1.1/ MR8250 V1.1

Applicant

: Linksys LLC

121 Theory Drive Irvine, CA 92617, United States

Standard

: 47 CFR FCC Part 15.247

The product was received on Mar. 06, 2020, and testing was started from Mar. 06, 2020 and completed on Apr. 07, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

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

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

Report Template No.: CB-A10\_10 Ver1.2

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: Jun. 15, 2020

Report Version : 01

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# History of this test report

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Report No.	Version	Description	Issued Date
FR710901-06AA	01	Initial issue of report	Jun. 15, 2020

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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:**

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

Reviewed by: Sam Chen Report Producer: 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), VHT20	2412-2462	1-11 [11]
2400-2483.5	n (HT40), VHT40	2422-2452	3-9 [7]

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Band	Band Mode		Nant
2.4-2.4835GHz	802.11b	20	2
2.4-2.4835GHz	802.11g	20	2
2.4-2.4835GHz	802.11g-BF	20	2
2.4-2.4835GHz	802.11n HT20	20	2
2.4-2.4835GHz	802.11n HT20-BF	20	2
2.4-2.4835GHz	VHT20	20	2
2.4-2.4835GHz	VHT20-BF	20	2
2.4-2.4835GHz	802.11n HT40	40	2
2.4-2.4835GHz	802.11n HT40-BF	40	2
2.4-2.4835GHz	VHT40	40	2
2.4-2.4835GHz	VHT40-BF	40	2

## 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.

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#### 1.1.2 Antenna Information

Ant.	Port	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	1	FIT	ANEP5M2-CCG05-EH	Dipole Antenna	I-PEX	
2	2	FIT	ANEP5M2-CCG06-EH	Dipole Antenna	I-PEX	
3	1	FIT	ANEP5M2-CCG07-EH	Dipole Antenna	I-PEX	Note1
4	2	FIT	ANEP5M2-CCG08-EH	Dipole Antenna	I-PEX	
5	1	PSA	RFMTA271200NNAB003	PIFA Antenna	N/A	

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Note 1:

		Gain (dBi)					
Ant.	Port	WLAN 2.4GHz	WLAN 5GHz Band 1	WLAN 5GHz Band 2	WLAN 5GHz Band 3	WLAN 5GHz Band 4	Bluetooth
1	1	2.81	2.54	2.87	-	-	-
2	2	2.35	2.75	2.41	-	-	-
3	1	-	-	-	3.15	2.89	-
4	2	-	-	-	3.35	2.97	-
5	1	-	-	-	-	-	3.28

Note 2: The above information was declared by manufacturer.

Note 3:

#### For 2.4GHz function:

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

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

Ant. 1 (Port 1) and Ant. 2 (Port 2) could transmit/receive simultaneously.

#### For 5GHz function:

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

#### Band 1~Band 2

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

Ant. 1 (Port 1) and Ant. 2 (Port 2) could transmit/receive simultaneously.

#### Band 3~Band 4

Ant. 3 (Port 1) and Ant. 4 (Port 2) can be used as transmitting/receiving antenna.

Ant. 3 (Port 1) and Ant. 4 (Port 2) could transmit/receive simultaneously.

#### For Bluetooth function (1TX/1RX):

Only Ant. 5 (Port 1) can be used as transmitting/receiving antenna.

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## 1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11b	0.992	0.03	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11g-BF	0.964	0.16	2.085m	1k
VHT20-BF	0.976	0.11	1.759m	1k
VHT40-BF	0.915	0.39	1.693m	1k

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

## 1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter			
	☑ With beamforming   ☐ Without beamforming			
Beamforming Function	The product has beamforming function for 11g/11n/VHT in 2.4GHz and 11a/11n/11ac in 5GHz.			
Function	Point-to-multipoint Doint-to-point			
<b>Test Software Version</b>	QCA Tool version 3.0.187.0			

Note: The above information was declared by manufacturer.

## 1.1.5 Table for Multiple Listing

Model Name	Software Versions	Equip Adapter	LED Design	Support Function	Description
MR8300 V1.1	WLAN: 2.0.0.200811  Bluetooth: OpenWrt Chaos  Calmer 15.05.1 r35193 /  LuCl branch  (git-16.190.28508-c9d9415)	Adapter 1~3	Please refer to the photographs of EUT	Master (AP	All models are identical; different models serve as marketing strategy.
MR8250 V1.1		Adapter 1~3	Same as above	Router, Repeater, Bridge)	

Note: From the above models, model: MR8300 V1.1 was selected as representative model for the test and it's data was recorded in this report.

Note: Only AP Router mode has been selected to test and recorded in the test report from manufacturer requirement.

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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, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.		
		TEL	:	886-3-656-9065 FAX : 886-3-656-9085		

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH02-CB	Jay Luo	20.9~22.3°C / 47~48%	Mar. 19, 2020 ~ Mar. 27, 2020
Radiated below 1GHz	03CH05-CB	Cola Fan	21.3~23.2°C / 46~49%	Mar. 13, 2020 ~ Apr. 07, 2020
Radiated above 1GHz	03CH06-CB	Cola Fan	21~22.2°C / 45~49%	Mar. 06, 2020 ~ Apr. 07, 2020
AC Conduction	CO01-CB	Peter Wu	23~24°C / 55~58%	Mar. 14, 2020

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

## 1.4 Measurement Uncertainty

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

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	5.1 dB	Confidence levels of 95%
Conducted Emission	2.4 dB	Confidence levels of 95%
Output Power Measurement	1.5 dB	Confidence levels of 95%
Power Density Measurement	2.4 dB	Confidence levels of 95%
Bandwidth Measurement	2%	Confidence levels of 95%

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# 2 Test Configuration of EUT

## 2.1 Test Channel Mode

Mode	Power Setting
802.11b_Nss1,(1Mbps)_2TX	-
2412MHz	23.5
2437MHz	25
2462MHz	24.5
802.11g-BF_Nss1,(6Mbps)_2TX	-
2412MHz	19
2417MHz	20.5
2437MHz	24.5
2457MHz	21.5
2462MHz	19
VHT20-BF_Nss1,(MCS0)_2TX	-
2412MHz	18.5
2417MHz	20.5
2437MHz	25
2457MHz	21
2462MHz	19
VHT40-BF_Nss1,(MCS0)_2TX	-
2422MHz	17
2437MHz	19.5
2452MHz	18.5

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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.
- There are two modes of EUT for 802.11g/n/VHT in 2.4GHz and 11a/n/ac in 5GHz. One is beamforming mode, and the other is non-beamforming mode, after evaluating, beamforming mode has been evaluated to be the worst case, so it was selected to test and record in this test report.

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# 2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests			
Tests Item	Tests Item AC power-line conducted emissions		
Condition	Condition AC power-line conducted measurement for line and neutral		
Operating Mode Normal Link			
1 AP Router mode: EUT + Adapter 1			
2 AP Router mode: EUT + Adapter 2 + US plug			
3 AP Router mode: EUT + Adapter 3			
For operating mode 3 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	e 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	CTX	
WLAN 2.4GHz: The EUT was performed at Y axis and Z axis position for Emissions in Restricted Freq Bands above 1GHz test, and the worst case was found at Y axis. So the measurement will follow this test configuration. WLAN 5GHz/Bluetooth: The EUT was performed at Y axis and Z axis position for Emissions in Res Frequency Bands above 1GHz test, and the worst case was found at Z axis. So the measurement will this same test configuration.		
1	WLAN 2.4GHz: EUT in Y axis + Adapter 1	
2	WLAN 2.4GHz: EUT in Y axis + Adapter 2 + US plug	
3	WLAN 2.4GHz: EUT in Y axis + Adapter 3	
Mode 1 has been evaluate follow this same test mode	d to be the worst case among Mode 1~3, thus measurement for Mode 4~6 will .	
4	WLAN 5GHz: EUT in Z axis + Adapter 1	
5	Bluetooth BR+EDR: EUT in Z axis + Adapter 1	
6	Bluetooth LE: EUT in Z axis + Adapter 1	
For operating mode 1 is the	e worst case and it was record in this test report.	
Operating Mode > 1GHz CTX		
The EUT was performed measurement will follow th	at Y axis and Z axis position, and the worst case was found at Y axis. So the is same test configuration.	
1	EUT in Y axis	

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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	Operating Mode Normal Link		
The EUT was performed at Y axis and Z axis position for Emissions in Restricted Frequency Bands above 1GHz test, and the worst case was found at Y axis. So the measurement will follow this same test configuration.			
1 EUT in Y axis - WLAN 2.4GHz + WLAN 5GHz Band 1~2			
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	Operating Mode			
1 WLAN 2.4GHz + WLAN 5GHz Band 1~2 + WLAN 5GHz Band 3~4 + Bluetoo				
Refer to Sporton Test Report No.: FA710901-06 for Co-location RF Exposure Evaluation.				

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## 2.3 EUT Operation during Test

For CTX Mode:

non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

beamforming mode:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

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

The program was executed as follows:

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

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For Normal Link:

During the test, the EUT operation to normal function.

#### 2.4 Accessories

Accessories					
Equipment Name	Brand Name	Model Name	Rating		
Adapter 1 (Fixed plug)	Ktec	KSA-24W-120200HU	Input: 100-240V, 50/60Hz, 0.6A Output: 12V, 2.0A		
Adapter 2 (Interchangeable plug)	Ktec	KSA-24W-120200D5	Input: 100-240V, 50/60Hz, 0.6A Output: 12V, 2.0A		
Adapter 3 (Fixed plug)	APD	WB-24J12FU	Input: 100-240V, 50-60Hz, 0.7A Max. Output: 12V, 2A		
Others					
US plug*1 (for adapter 2 use only)					
RJ-45 cable*1, Non-shielded, 0.9m					

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# 2.5 Support Equipment

#### For AC Conduction:

	Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID		
Α	LAN1 NB	DELL	E6430	N/A		
В	WAN NB	DELL	E6430	N/A		
С	2.4G NB	DELL	E6430	N/A		
D	5G-1 NB	Apple	A1278	N/A		
Е	5G-2 NB	DELL	E6430	N/A		
F	Smart phone	Samsung	Galaxy J2	N/A		
G	Flash disk3.0	Transcend	JetFlash-700	N/A		

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For Radiated (below 1GHz) and Radiated (above 1GHz) / Non-beamforming mode:

Support Equipment						
No.	No. Equipment Brand Name Model Name FCC ID					
Α	NB	DELL	M4800	N/A		

For Radiated (above 1GHz) / Beamforming mode:

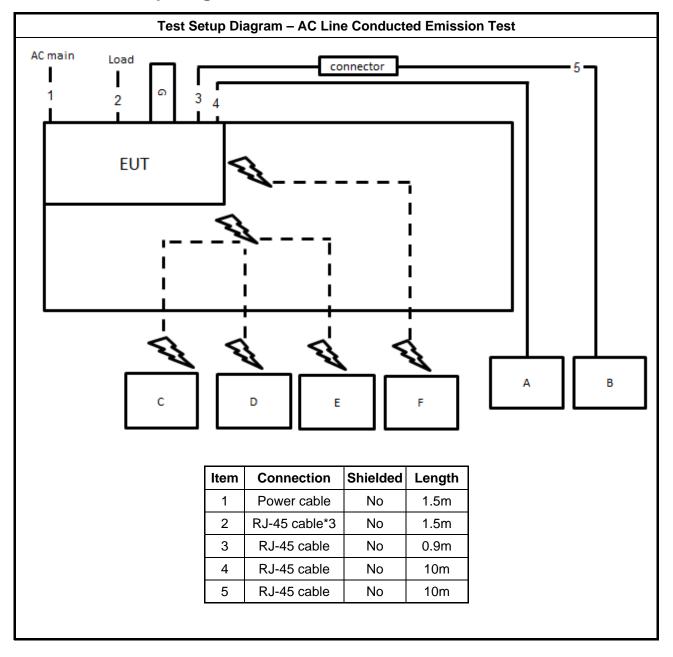
	Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID		
Α	NB	DELL	M4800	N/A		
В	Linksys Tri-Band Wireless-AC Router (RX Device)	Linksys	MR8300 V2	N/A		
С	NB	DELL	E4300	N/A		

#### For RF Conducted:

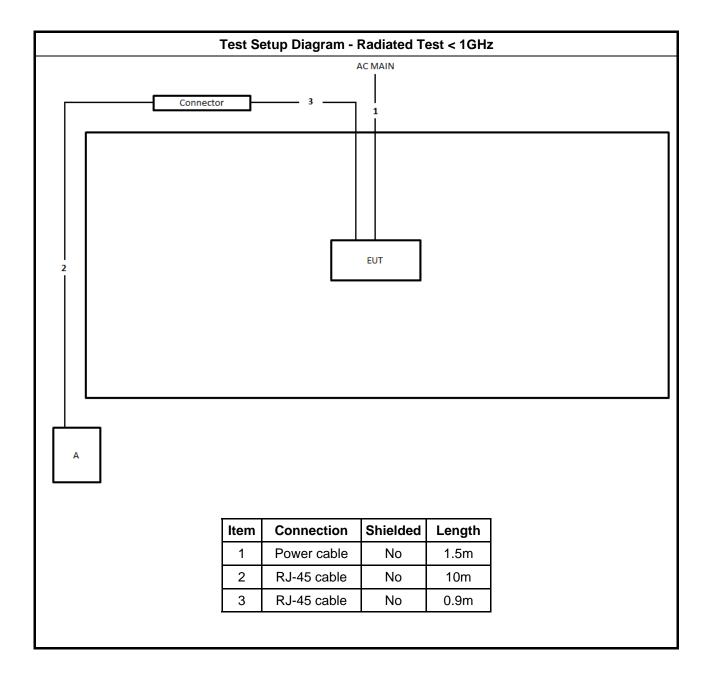
	Support Equipment						
No. Equipment Brand Name Model Nam				FCC ID			
Α	NB	DELL	E4300	N/A			

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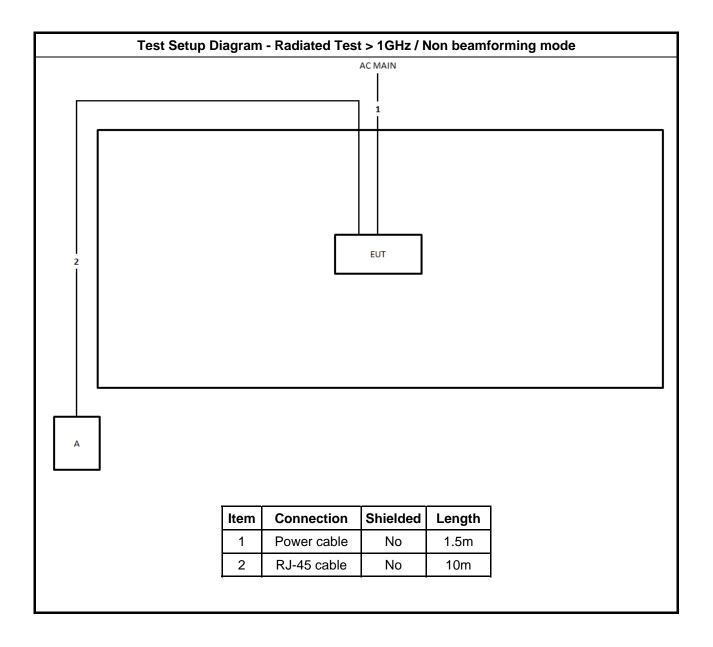
# 2.6 Test Setup Diagram



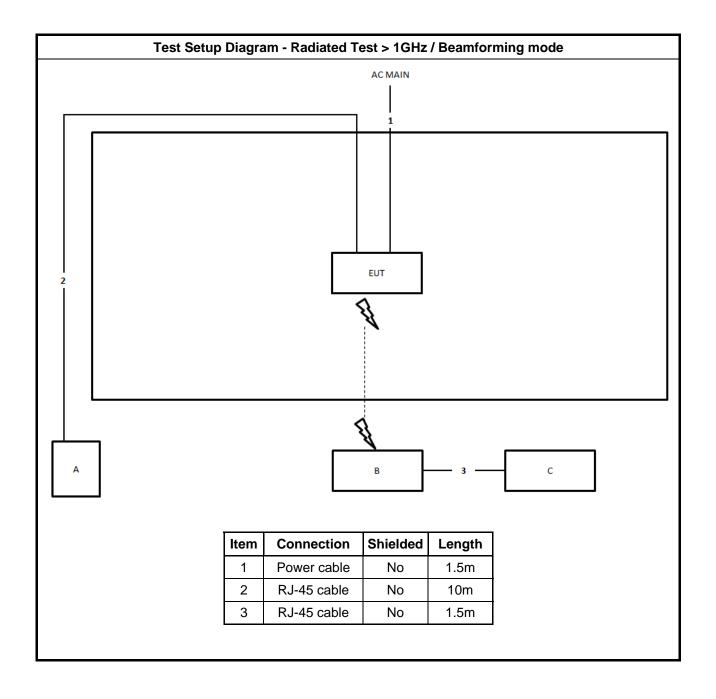
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## 3 Transmitter Test Result

## 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

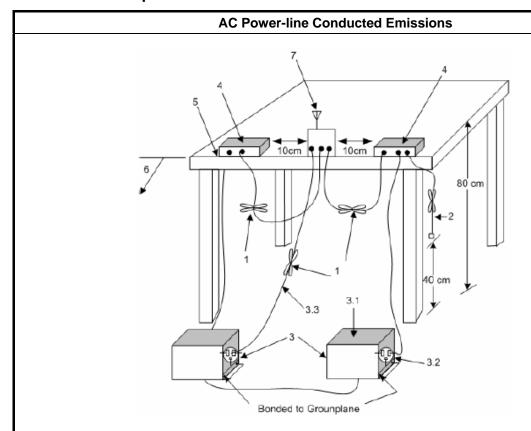
Refer a test equipment and calibration data table in this test report.

## 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  $\Omega$  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 (dBuV) = LISN Factor + Cable Loss + Read Level = Level
- b. Margin = Limit + (Read Level + LISN Factor + Cable Loss)

#### 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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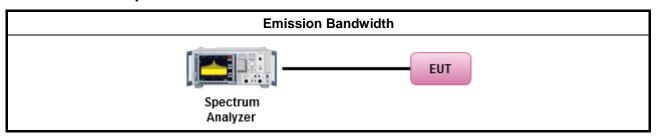
## 3.2.2 Measuring Instruments

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:						
	$\boxtimes$	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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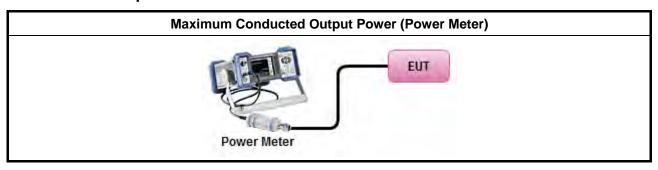
## 3.3.3 Test Procedures

		Test Method
•	Мах	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	/ 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

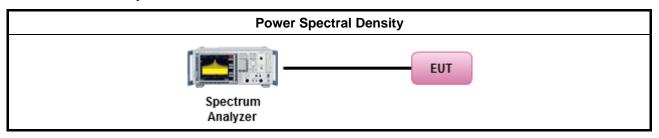
Refer a test equipment and calibration data table in this test report.

## 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).					
	$\boxtimes$	Ref	er as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD.			
•	For	cond	ucted measurement.			
	•	If Th	ne 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.

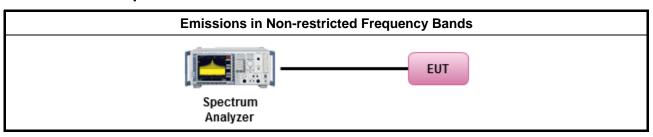
## 3.5.2 Measuring Instruments

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 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

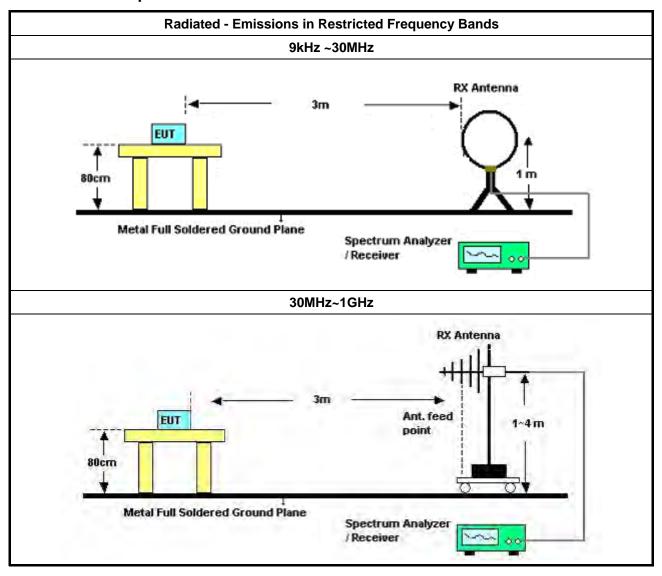
	Test Method					
•	The	average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].				
•		er as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency nnel and highest frequency channel within the allowed operating band.				
•	For	the transmitter unwanted emissions shall be measured using following options below:				
	<ul> <li>Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.</li> </ul>					
		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, therebe resulting in apparent failures to satisfy the out-of-band limits even if the device is actuall 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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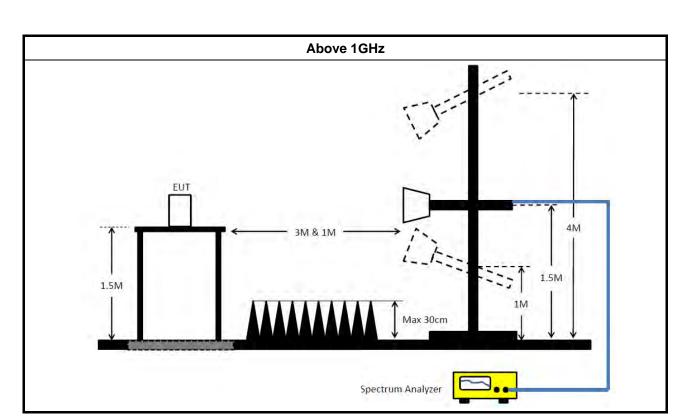
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## 3.6.4 Test Setup



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#### 3.6.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna Factor + Čable Loss + Read Level - Preamp Factor (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 10 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	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Feb. 26, 2020	Feb. 25, 2021	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50 -16-2	04083	150kHz ~ 100MHz	Dec. 25, 2019	Dec. 24, 2020	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Feb. 25, 2020	Feb. 24, 2021	Conduction (CO01-CB)
Impedance Stabilization Network	Teseq	ISN T800	24557	150kHz ~ 230MHz	Nov. 25, 2019	Nov. 24, 2020	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 21, 2019	May 20, 2020	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Bilog Antenna with 6dB Attenuator	Schaffner & EMCI	CBL6112 & N-6-06	2888 & AT-N0611	30MHz ~ 1GHz	Oct. 12, 2019	Oct. 11, 2020	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 29, 2019	Mar. 28, 2020	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 16, 2020	Mar. 15, 2021	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 01, 2019	Apr. 30, 2020	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Aug. 15, 2019	Aug. 14, 2020	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	LOW Cable-04+23	30MHz~1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1292	1GHz~18GHz	Jul. 17, 2019	Jul. 16, 2020	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 12, 2019	Jun. 11, 2020	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	May 08, 2019	May 07, 2020	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35- HG	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Oct. 21, 2019	Oct. 20, 2020	Radiation (03CH06-CB)
RF Cable-high	HUBER+SUHNE R	RG402	High Cable-05	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
RF Cable-high	HUBER+SUHNE R	RG402	High Cable-05+24	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSV40	101027	9kHz~40GHz	Jul. 02, 2019	Jul. 01, 2020	Conducted (TH02-CB)
Power Sensor	Anritsu	MA2411B	1126203	300MHz~40GHz	Sep. 11, 2019	Sep. 10, 2020	Conducted (TH02-CB)
Power Meter	Anritsu	ML2495A	1210004	300MHz~40GHz	Sep. 11, 2019	Sep. 10, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-01	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-02	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-3	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-04	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-05	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH02-CB)

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

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

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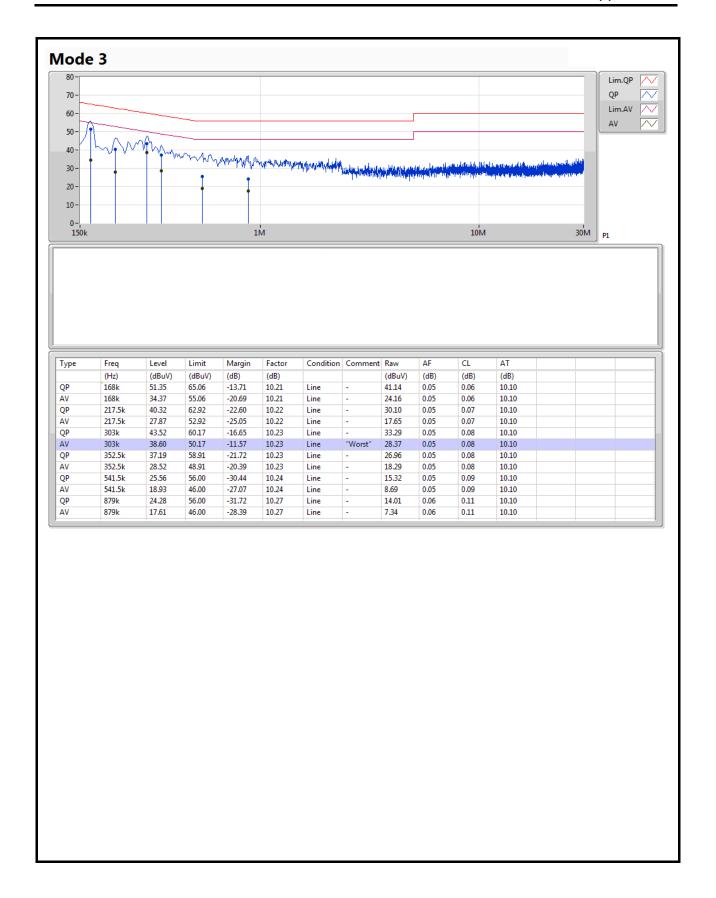
## AC Power Port Conducted Emission Result

Appendix A

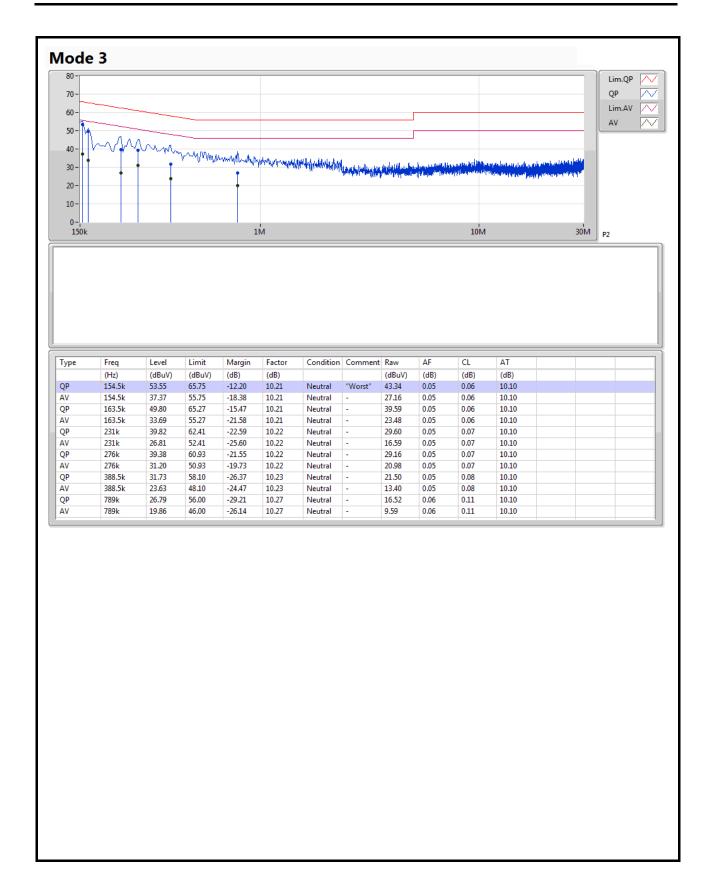
**Summary** 

Mode	Result	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition
Mode 3	Pass	AV	303k	38.60	50.17	-11.57	10.23	Line











**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	13.393M	13M4G1D	7.575M	12.969M
802.11g-BF_Nss1,(6Mbps)_2TX	16.35M	17.016M	17M0D1D	16.3M	16.367M
VHT20-BF_Nss1,(MCS0)_2TX	17.55M	19.265M	19M3D1D	16.275M	17.541M
VHT40-BF_Nss1,(MCS0)_2TX	32.55M	35.882M	35M9D1D	28.8M	35.632M

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;

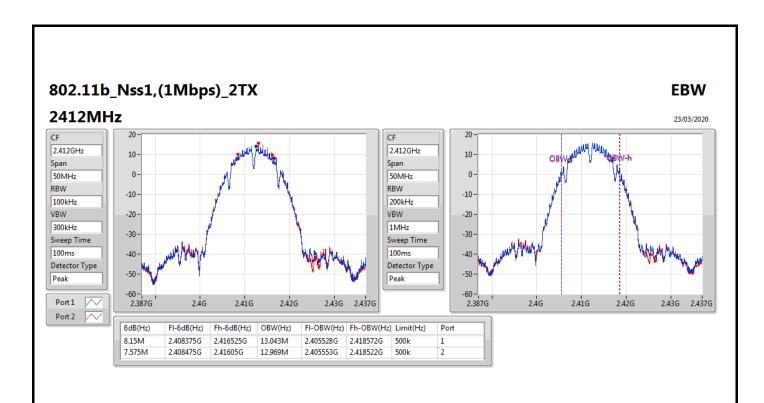


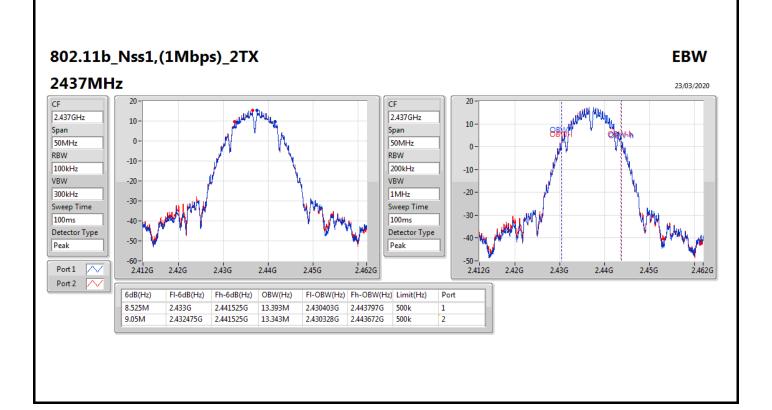
### Result

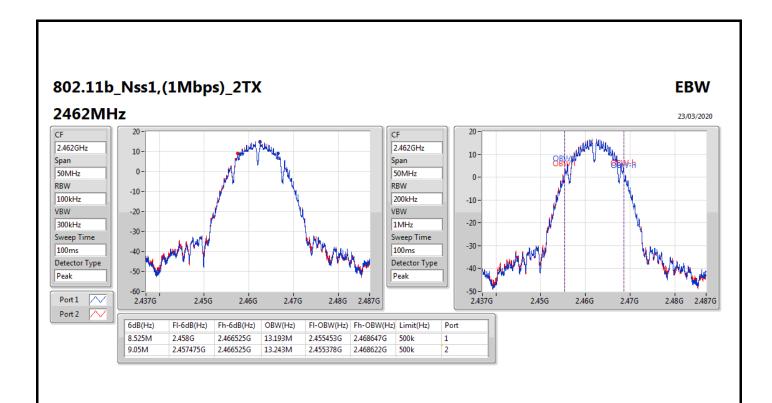
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	8.15M	13.043M	7.575M	12.969M
2437MHz	Pass	500k	8.525M	13.393M	9.05M	13.343M
2462MHz	Pass	500k	8.525M	13.193M	9.05M	13.243M
802.11g-BF_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	16.3M	16.392M	16.325M	16.367M
2437MHz	Pass	500k	16.325M	16.842M	16.3M	17.016M
2462MHz	Pass	500k	16.3M	16.367M	16.35M	16.392M
VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	17.325M	17.666M	16.275M	17.541M
2437MHz	Pass	500k	17.3M	18.416M	16.725M	19.265M
2462MHz	Pass	500k	17.55M	17.666M	17.525M	17.566M
VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	32.55M	35.732M	31.3M	35.882M
2437MHz	Pass	500k	28.8M	35.782M	31.35M	35.832M
2452MHz	Pass	500k	31.25M	35.832M	31.3M	35.632M

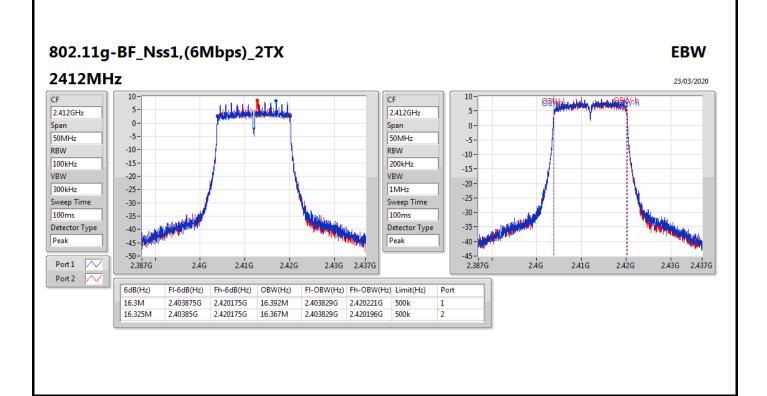
Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;

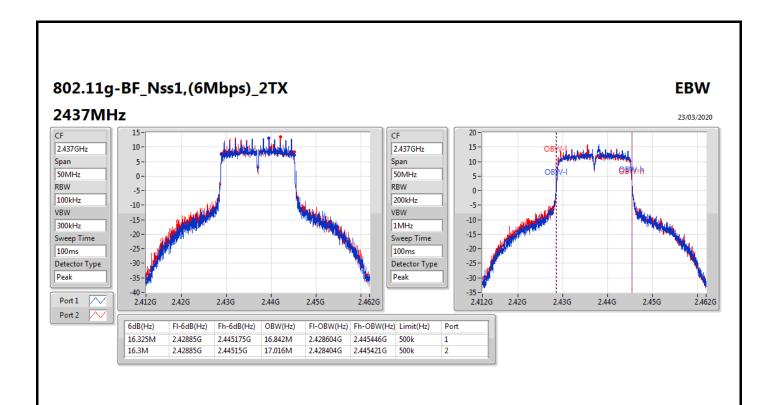
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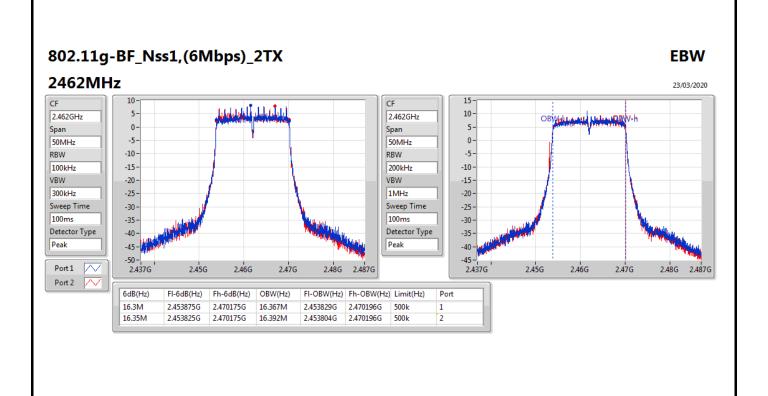


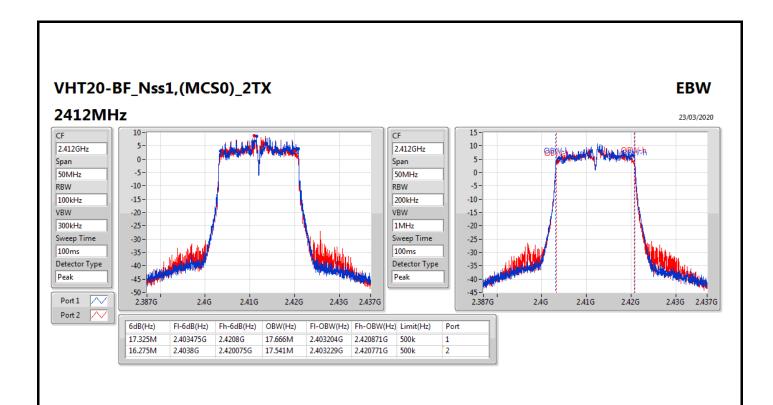


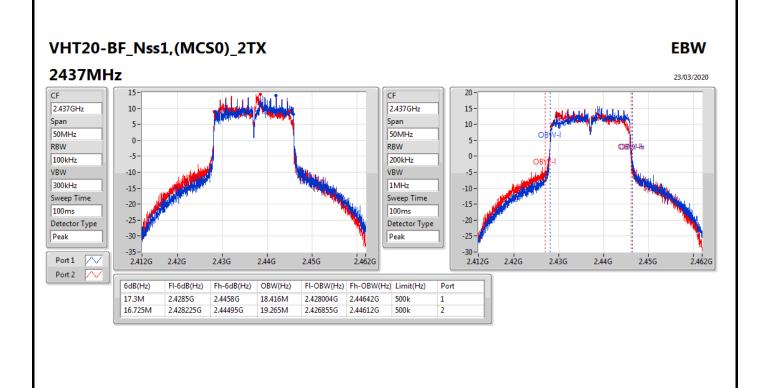


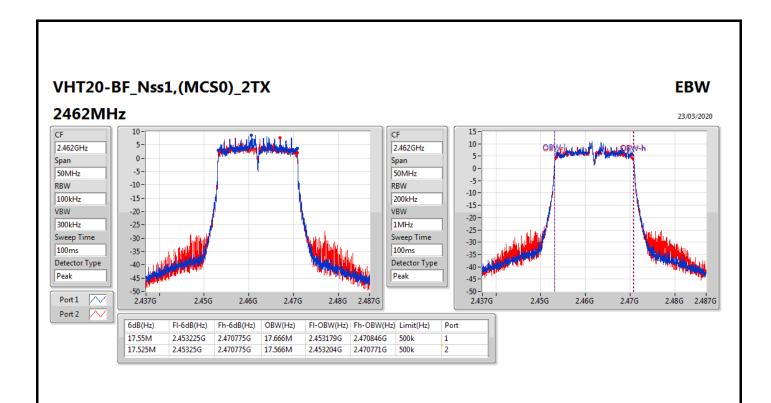


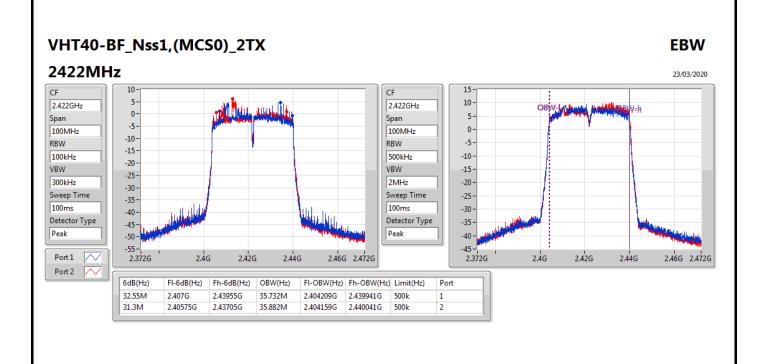


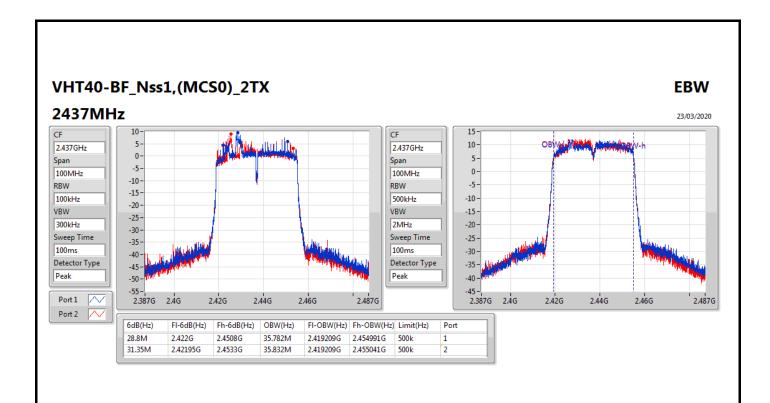


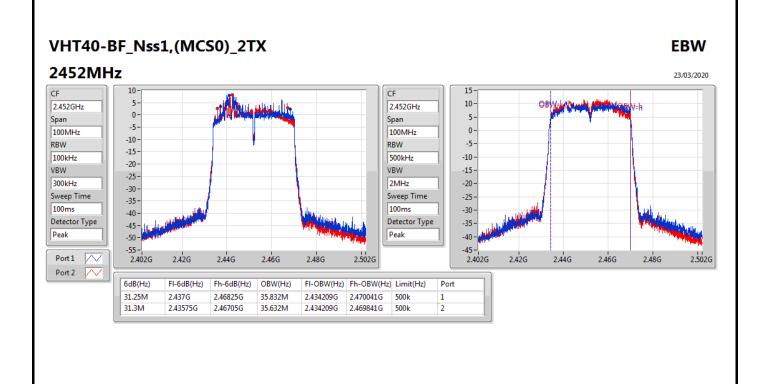














Average Power Appendix C

**Summary** 

Mode	Total Power	Total Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	28.25	0.66834
802.11g-BF_Nss1,(6Mbps)_2TX	27.19	0.52360
VHT20-BF_Nss1,(MCS0)_2TX	27.55	0.56885
VHT40-BF_Nss1,(MCS0)_2TX	22.53	0.17906



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	2.81	23.83	23.76	26.81	30.00
2437MHz	Pass	2.81	25.09	25.38	28.25	30.00
2462MHz	Pass	2.81	24.58	24.84	27.72	30.00
802.11g-BF_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.59	19.32	19.38	22.36	30.00
2417MHz	Pass	5.59	20.51	20.62	23.58	30.00
2437MHz	Pass	5.59	24.09	24.27	27.19	30.00
2457MHz	Pass	5.59	21.57	21.75	24.67	30.00
2462MHz	Pass	5.59	19.03	19.31	22.18	30.00
VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.59	18.69	18.84	21.78	30.00
2417MHz	Pass	5.59	20.67	20.83	23.76	30.00
2437MHz	Pass	5.59	24.28	24.78	27.55	30.00
2457MHz	Pass	5.59	20.94	21.26	24.11	30.00
2462MHz	Pass	5.59	19.23	19.34	22.30	30.00
VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	5.59	16.85	17.14	20.01	30.00
2437MHz	Pass	5.59	19.33	19.71	22.53	30.00
2452MHz	Pass	5.59	18.67	18.82	21.76	30.00

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



Page No.

: 1 of 6

**Summary** 

Mode	PD
	(dBm/RBW)
2.4-2.4835GHz	·
802.11b_Nss1,(1Mbps)_2TX	1.64
802.11g-BF_Nss1,(6Mbps)_2TX	-0.34
VHT20-BF_Nss1,(MCS0)_2TX	1.36
VHT40-BF_Nss1,(MCS0)_2TX	-7.85

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



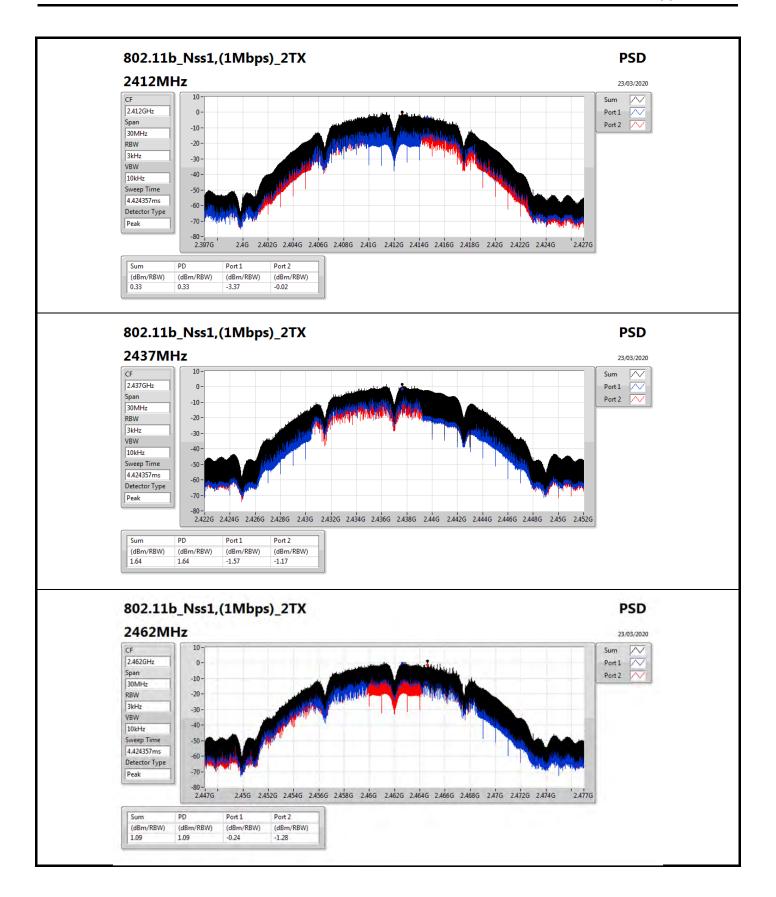
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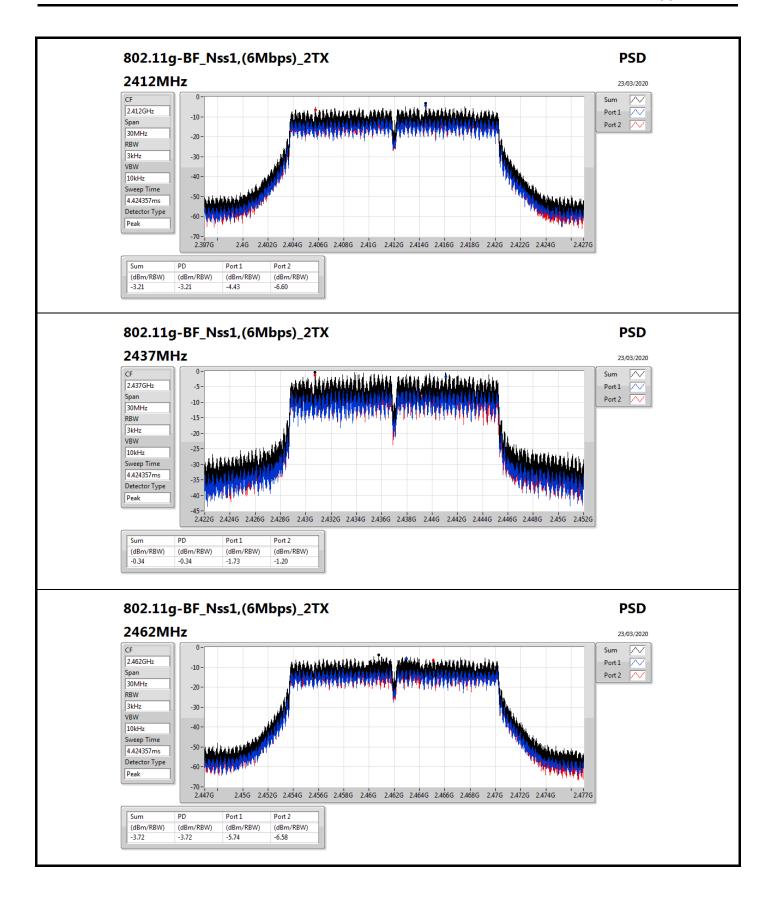
: 2 of 6

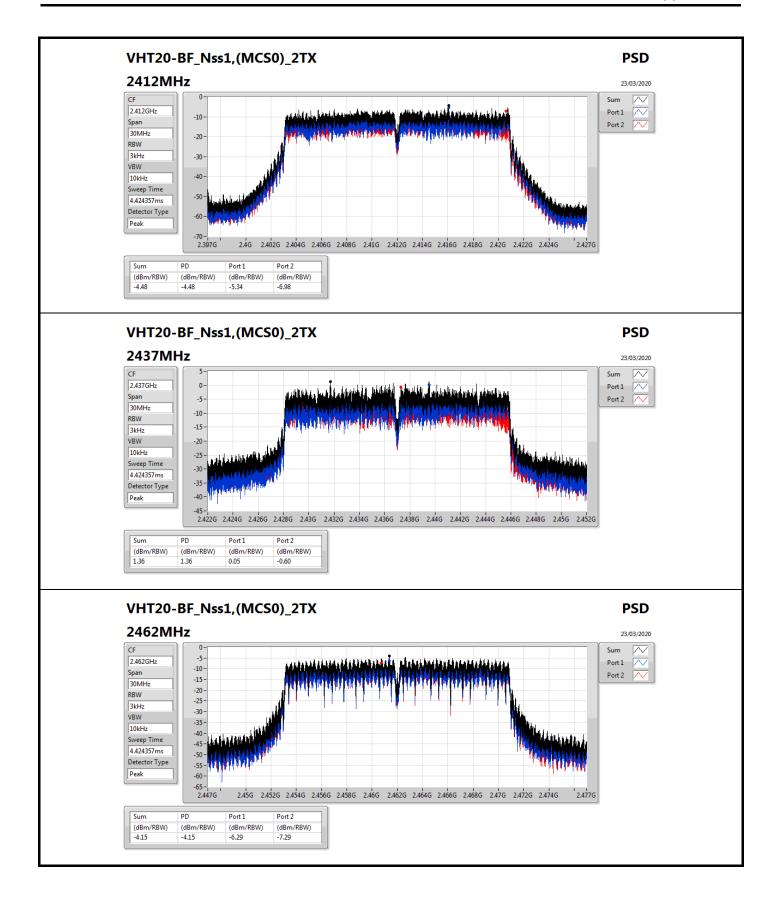
### Result

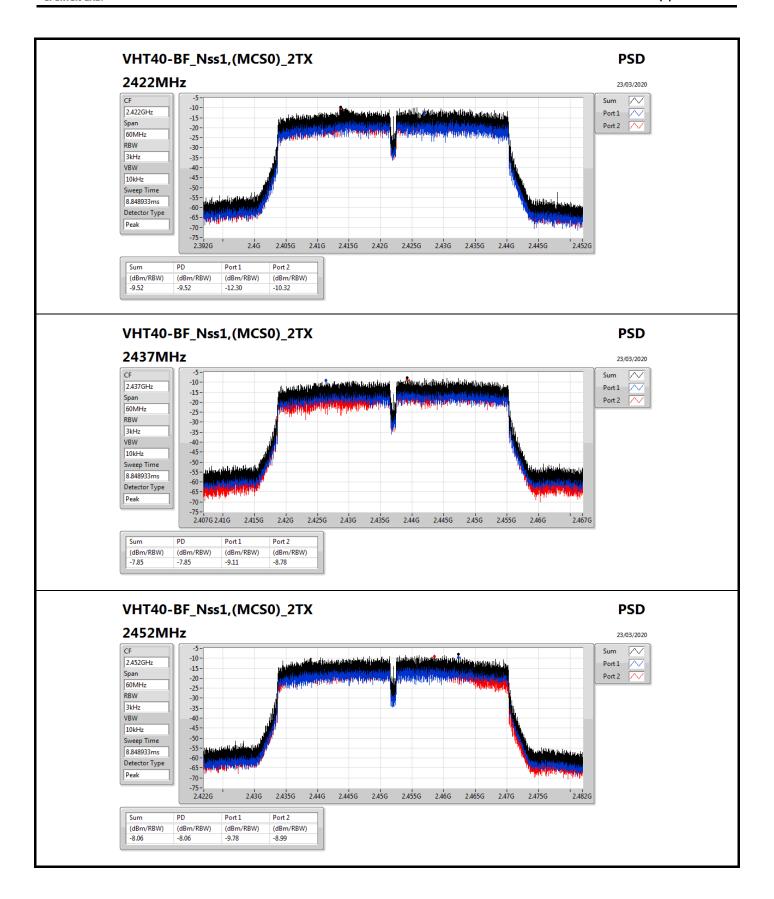
Mode	Result	DG	Port 1	Port 2	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.59	-3.37	-0.02	0.33	8.00
2437MHz	Pass	5.59	-1.57	-1.17	1.64	8.00
2462MHz	Pass	5.59	-0.24	-1.28	1.09	8.00
802.11g-BF_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.59	-4.43	-6.60	-3.21	8.00
2437MHz	Pass	5.59	-1.73	-1.20	-0.34	8.00
2462MHz	Pass	5.59	-5.74	-6.58	-3.72	8.00
VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.59	-5.34	-6.98	-4.48	8.00
2437MHz	Pass	5.59	0.05	-0.60	1.36	8.00
2462MHz	Pass	5.59	-6.29	-7.29	-4.15	8.00
VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	5.59	-12.30	-10.32	-9.52	8.00
2437MHz	Pass	5.59	-9.11	-8.78	-7.85	8.00
2452MHz	Pass	5.59	-9.78	-8.99	-8.06	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

**Summary** 

				_		_	_	_			_				
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	2.43649G	15.42	-14.58	940.16M	-48.62	2.39748G	-35.25	2.4G	-41.48	2.4888G	-46.79	16.51512G	-36.02	2
802.11g-BF_Nss1,(6Mbps)_2TX	Pass	2.43753G	15.39	-14.61	1.71576G	-47.30	2.4G	-33.29	2.4G	-34.89	2.49602G	-45.94	16.50107G	-37.70	1
VHT20-BF_Nss1,(MCS0)_2TX		2.442G	14.21	-15.79	2.11739G	-47.71	2.39988G	-30.80	2.4G	-38.30	2.5118G	-46.53	24.27513G	-36.36	2
VHT40-BF_Nss1,(MCS0)_2TX	Pass	2.42797G	11.34	-18.66	2.16285G	-48.01	2.39576G	-37.67	2.4G	-42.60	2.56002G	-43.49	24.07449G	-37.58	1



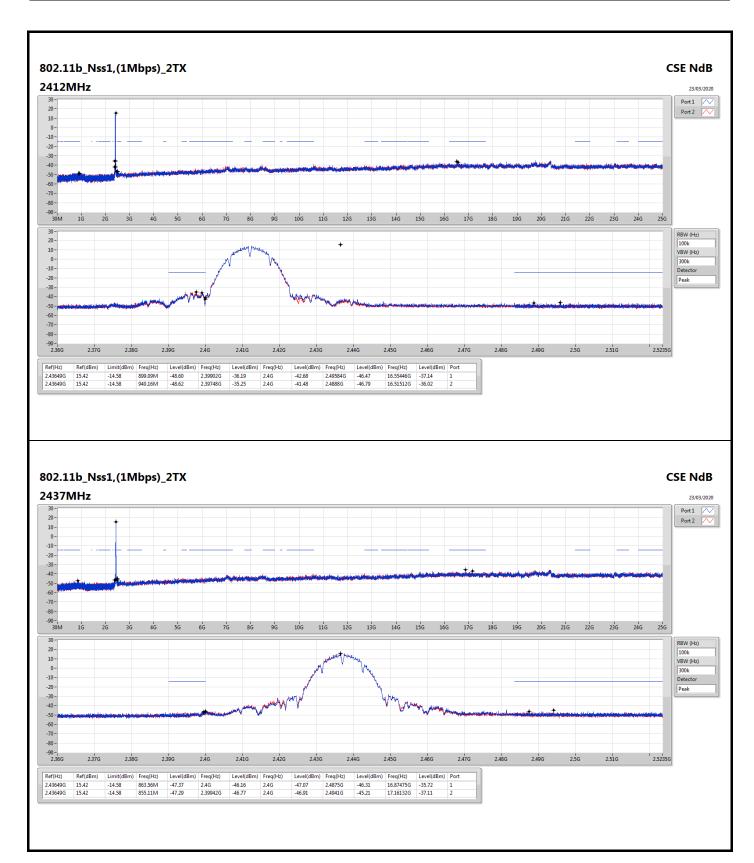
Appendix E



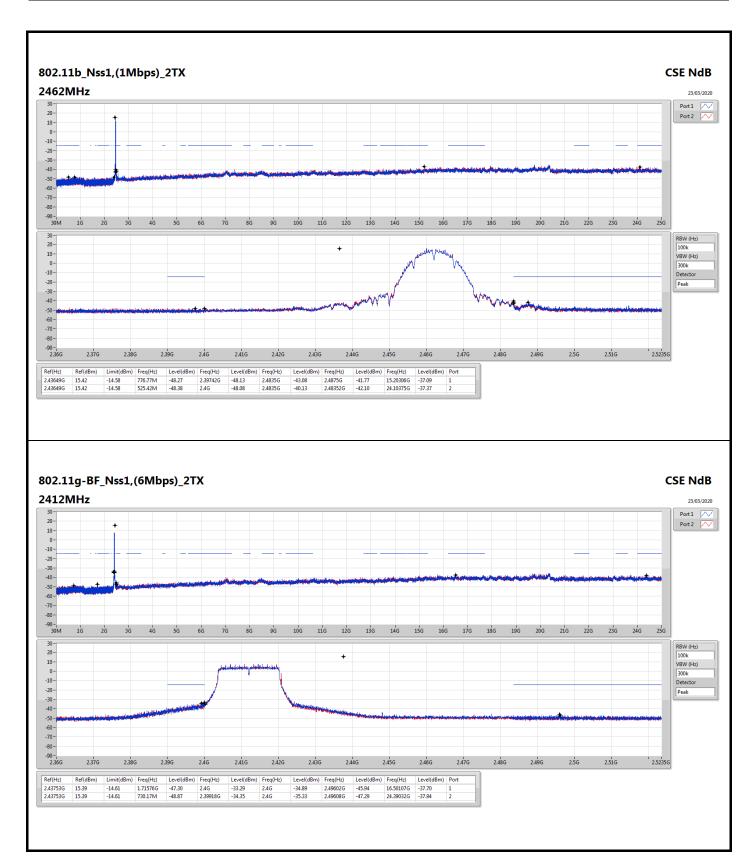
## Result

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	2.43649G	15.42	-14.58	899.09M	-48.60	2.39902G	-36.19	2.4G	-42.68	2.49584G	-46.47	16.55446G	-37.14	1
2412MHz	Pass	2.43649G	15.42	-14.58	940.16M	-48.62	2.39748G	-35.25	2.4G	-41.48	2.4888G	-46.79	16.51512G	-36.02	2
2437MHz	Pass	2.43649G	15.42	-14.58	863.56M	-47.37	2.4G	-46.16	2.4G	-47.07	2.4875G	-46.31	16.87475G	-35.72	1
2437MHz	Pass	2.43649G	15.42	-14.58	855.11M	-47.29	2.39942G	-46.77	2.4G	-46.91	2.4941G	-45.21	17.16132G	-37.11	2
2462MHz	Pass	2.43649G	15.42	-14.58	776.77M	-48.27	2.39742G	-48.13	2.4835G	-43.08	2.4875G	-41.77	15.20306G	-37.09	1
2462MHz	Pass	2.43649G	15.42	-14.58	525.42M	-48.38	2.4G	-48.08	2.4835G	-40.13	2.48352G	-42.10	24.10375G	-37.37	2
802.11g-BF_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43753G	15.39	-14.61	1.71576G	-47.30	2.4G	-33.29	2.4G	-34.89	2.49602G	-45.94	16.50107G	-37.70	1
2412MHz	Pass	2.43753G	15.39	-14.61	730.17M	-48.87	2.39918G	-34.35	2.4G	-35.33	2.49608G	-47.29	24.39032G	-37.94	2
2437MHz	Pass	2.43753G	15.39	-14.61	794.82M	-48.81	2.39926G	-39.46	2.4G	-41.89	2.484G	-45.56	24.41842G	-36.98	1
2437MHz	Pass	2.43753G	15.39	-14.61	688.23M	-48.50	2.3998G	-37.91	2.4G	-38.60	2.48382G	-42.13	17.50409G	-37.73	2
2462MHz	Pass	2.43753G	15.39	-14.61	654.44M	-47.96	2.39482G	-47.46	2.4835G	-43.54	2.4836G	-41.08	24.11499G	-37.42	1
2462MHz	Pass	2.43753G	15.39	-14.61	950.35M	-48.79	2.39954G	-47.53	2.4835G	-44.95	2.48386G	-42.12	17.63614G	-36.85	2
VHT20-BF_Nss1,(MCS0)_2TX	-	-		-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.442G	14.21	-15.79	865.6M	-48.63	2.39704G	-35.25	2.4G	-36.21	2.4959G	-46.26	16.87755G	-37.67	1
2412MHz	Pass	2.442G	14.21	-15.79	2.11739G	-47.71	2.39988G	-30.80	2.4G	-38.30	2.5118G	-46.53	24.27513G	-36.36	2
2437MHz	Pass	2.442G	14.21	-15.79	632.31M	-48.19	2.3981G	-38.43	2.4G	-40.63	2.4845G	-41.23	24.0897G	-36.90	1
2437MHz	Pass	2.442G	14.21	-15.79	848.41M	-48.65	2.39952G	-36.91	2.4G	-38.79	2.48574G	-39.89	24.39032G	-36.39	2
2462MHz	Pass	2.442G	14.21	-15.79	827.44M	-48.71	2.3967G	-47.88	2.4835G	-44.42	2.4841G	-41.91	16.84946G	-37.20	1
2462MHz	Pass	2.442G	14.21	-15.79	1.99856G	-47.62	2.3902G	-47.14	2.4835G	-43.95	2.48434G	-39.33	17.12199G	-37.23	2
VHT40-BF_Nss1,(MCS0)_2TX	-	-		-	-	-	-	-	-		-	-	-	-	
2422MHz	Pass	2.42797G	11.34	-18.66	2.16285G	-48.01	2.39576G	-37.67	2.4G	-42.60	2.56002G	-43.49	24.07449G	-37.58	1
2422MHz	Pass	2.42797G	11.34	-18.66	762.8M	-48.88	2.39948G	-37.71	2.4G	-42.08	2.4961G	-46.56	16.8836G	-38.03	2
2437MHz	Pass	2.42797G	11.34	-18.66	704.12M	-48.39	2.39952G	-41.05	2.4G	-42.89	2.48574G	-41.67	16.77141G	-37.28	1
2437MHz	Pass	2.42797G	11.34	-18.66	891.04M	-48.49	2.39952G	-38.26	2.4835G	-44.81	2.4901G	-43.43	16.97334G	-37.50	2
2452MHz	Pass	2.42797G	11.34	-18.66	775.11M	-48.67	2.39992G	-44.67	2.4835G	-43.65	2.48698G	-40.70	17.66046G	-37.72	1
2452MHz	Pass	2.42797G	11.34	-18.66	904.78M	-47.92	2.39916G	-45.90	2.4835G	-45.30	2.48478G	-42.75	16.83872G	-37.70	2

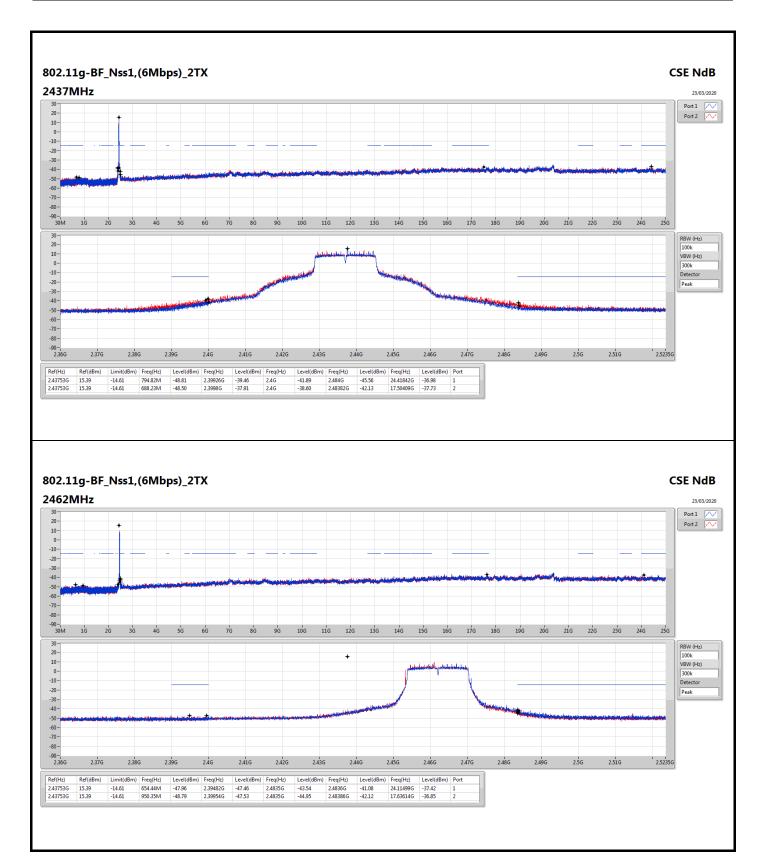




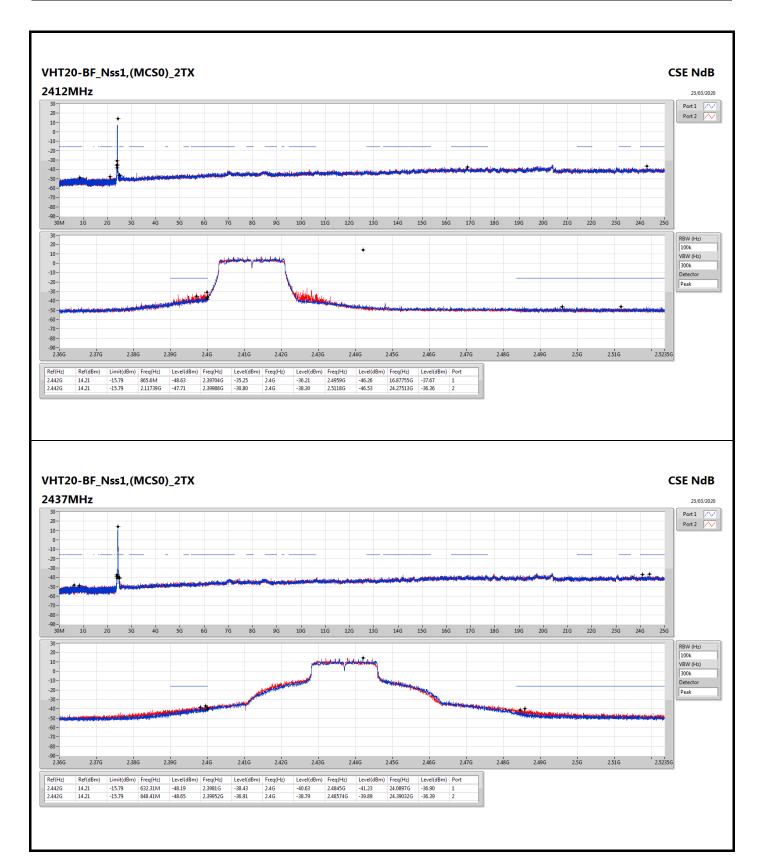




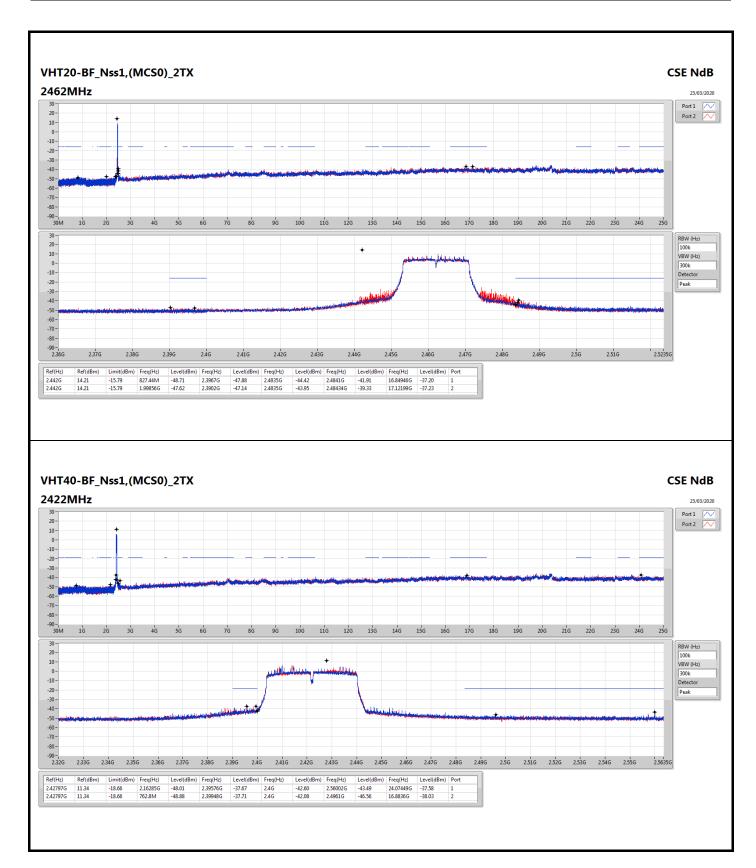




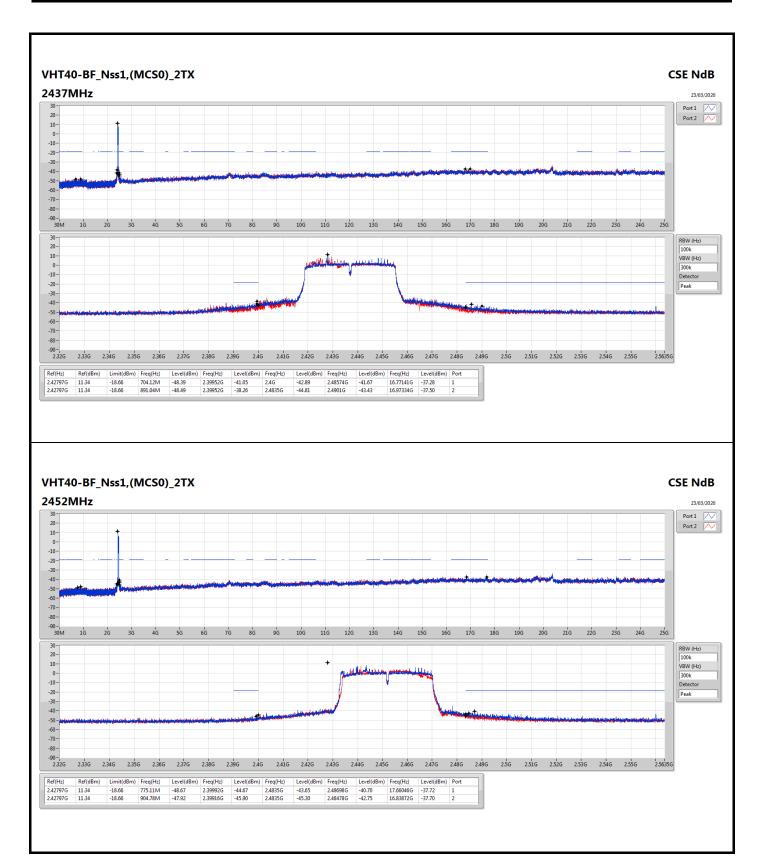




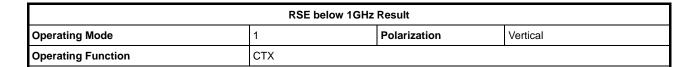


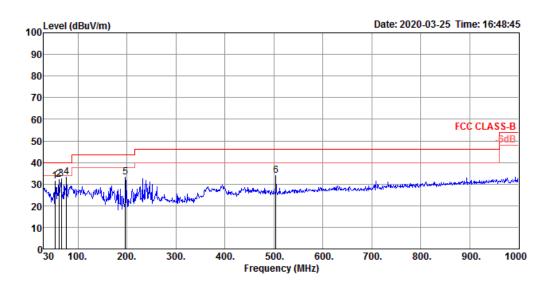










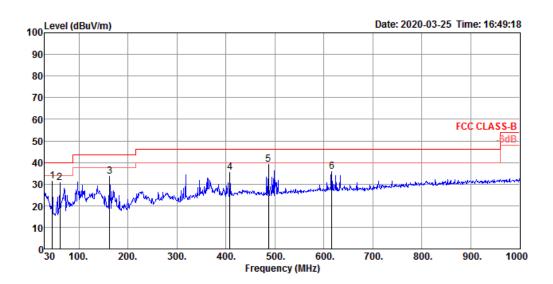


	Freq	Level						Preamp Factor		T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	53.28	31.24	40.00	-8.76	48.06	0.92	14.04	31.78	100	191	Peak	VERTICAL
2	61.04	32.25	40.00	-7.75	50.50	1.00	12.60	31.85	200	94	Peak	VERTICAL
3	65.89	32.44	40.00	-7.56	50.71	1.00	12.60	31.87	100	196	Peak	VERTICAL
4	76.56	33.03	40.00	-6.97	50.70	1.14	13.06	31.87	125	233	Peak	VERTICAL
5	196.84	33.26	43.50	-10.24	47.51	1.73	15.97	31.95	100	108	Peak	VERTICAL
6	504.33	33.87	46.00	-12.13	39.50	2.95	23.89	32.47	100	102	Peak	VERTICAL

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit. Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)



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



	Freq	Level		Over Limit						T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	45.52	31.46	40.00	-8.54	45.39	0.90	16.78	31.61	125	32	Peak	HORIZONTAL
2	61.04	30.49	40.00	-9.51	48.74	1.00	12.60	31.85	300	273	Peak	HORIZONTAL
3	162.89	33.42	43.50	-10.08	47.28	1.62	16.36	31.84	100	102	Peak	HORIZONTAL
4	408.30	35.36	46.00	-10.64	42.38	2.60	22.59	32.21	100	236	Peak	HORIZONTAL
5	486.87	39.23	46.00	-6.77	45.17	2.89	23.61	32.44	300	113	Peak	HORIZONTAL
6	615.88	35.67	46.00	-10.33	39.65	3.29	25.11	32.38	100	248	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.)



# RSE TX above 1GHz

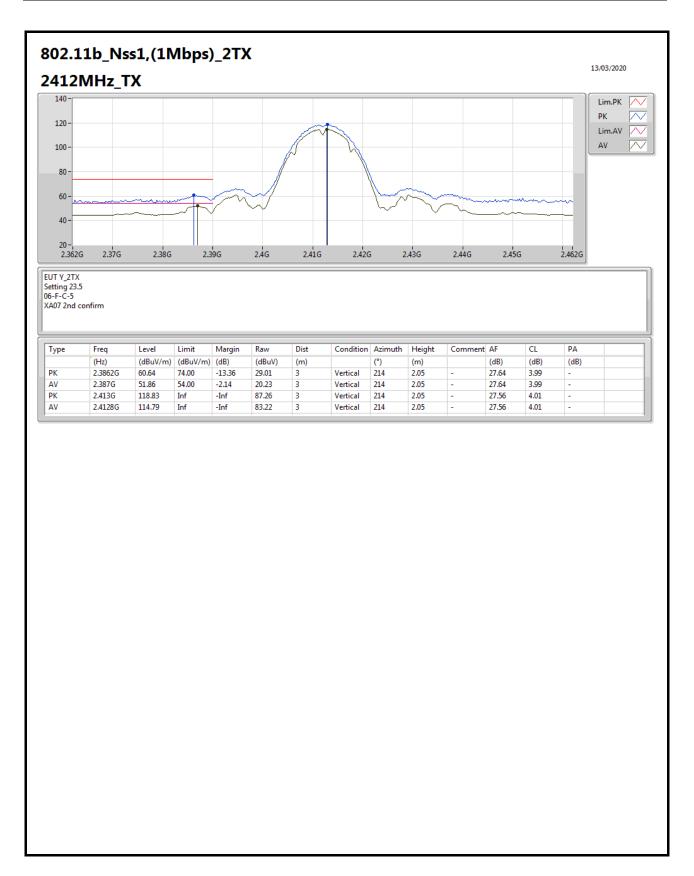
Appendix F.2

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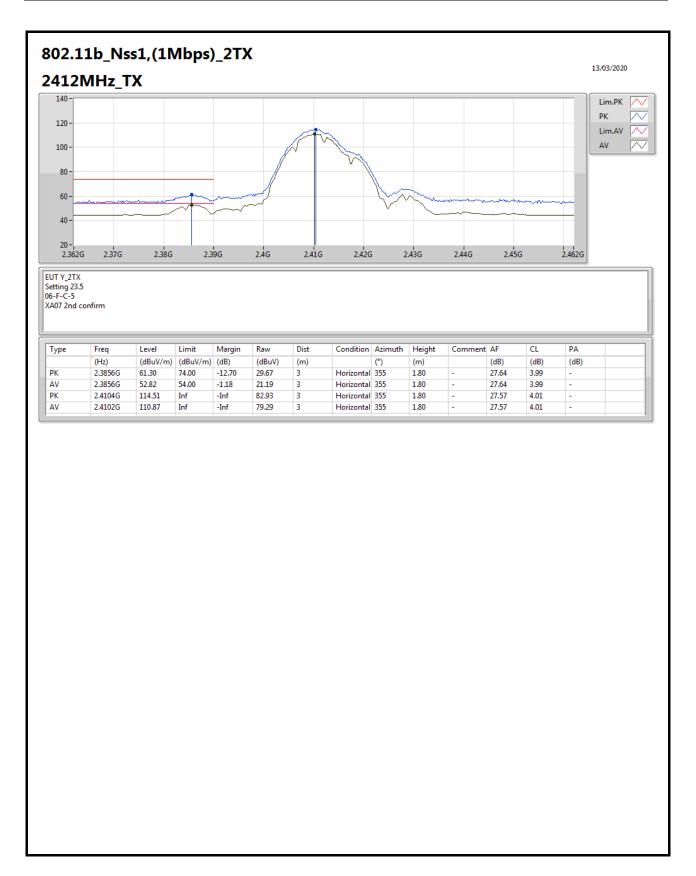
**Summary** 

Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
VHT20-BF_Nss1,(MCS0)_2TX	Pass	AV	2.4835G	52.98	54.00	-1.02	3	Vertical	217	1.99	-

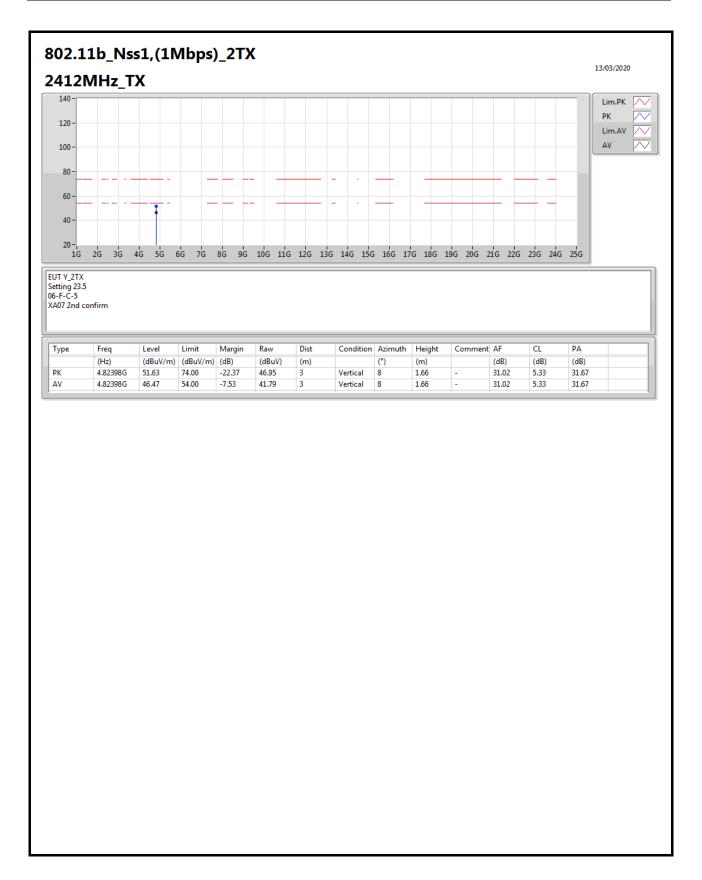




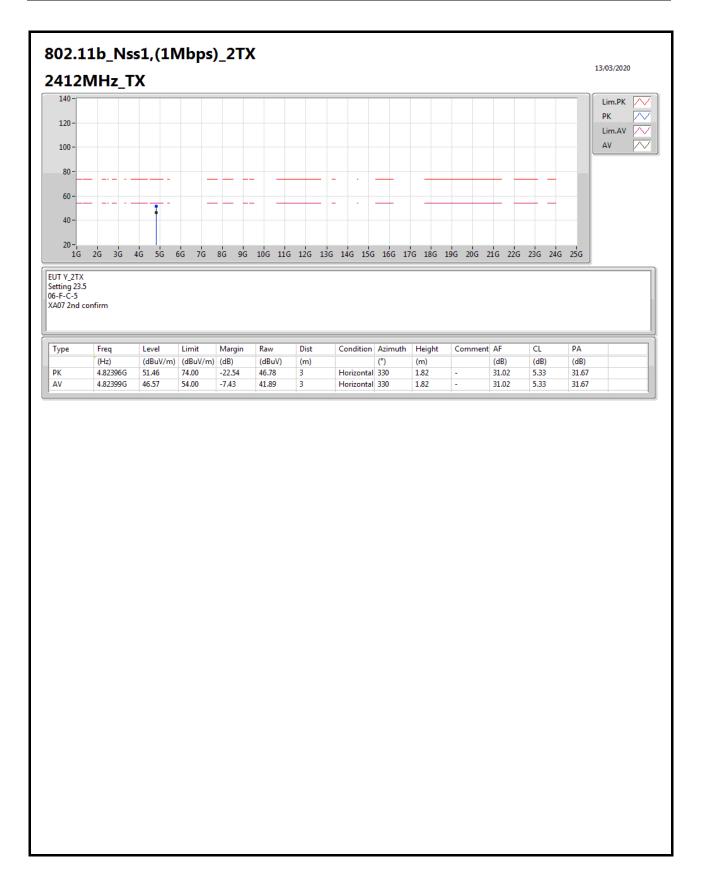




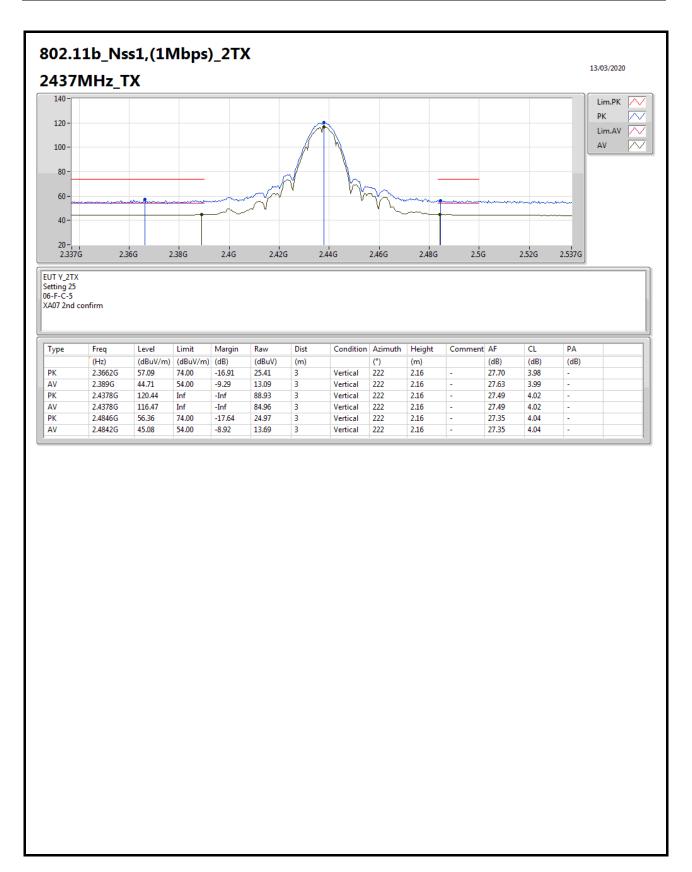




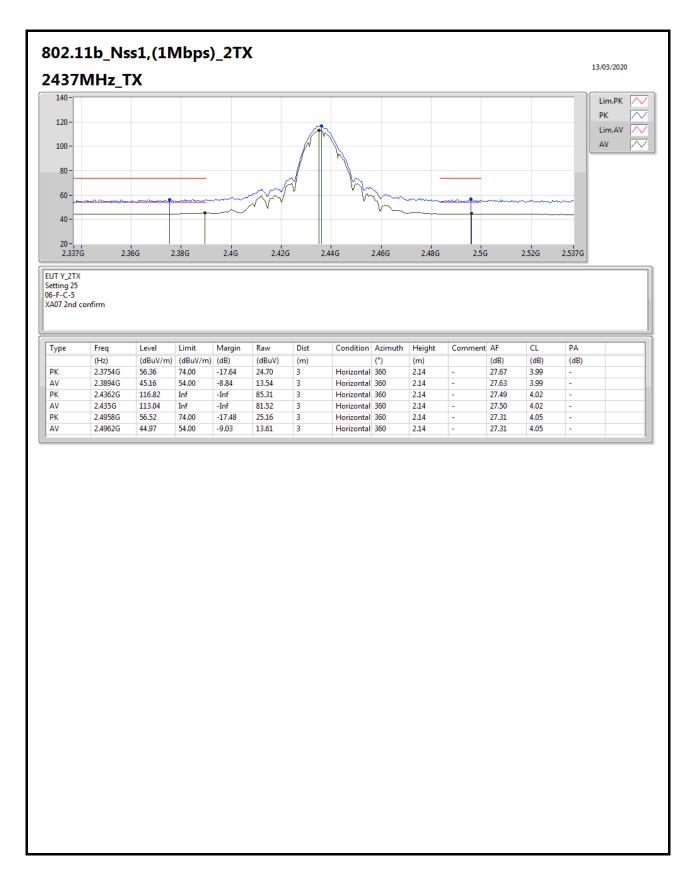






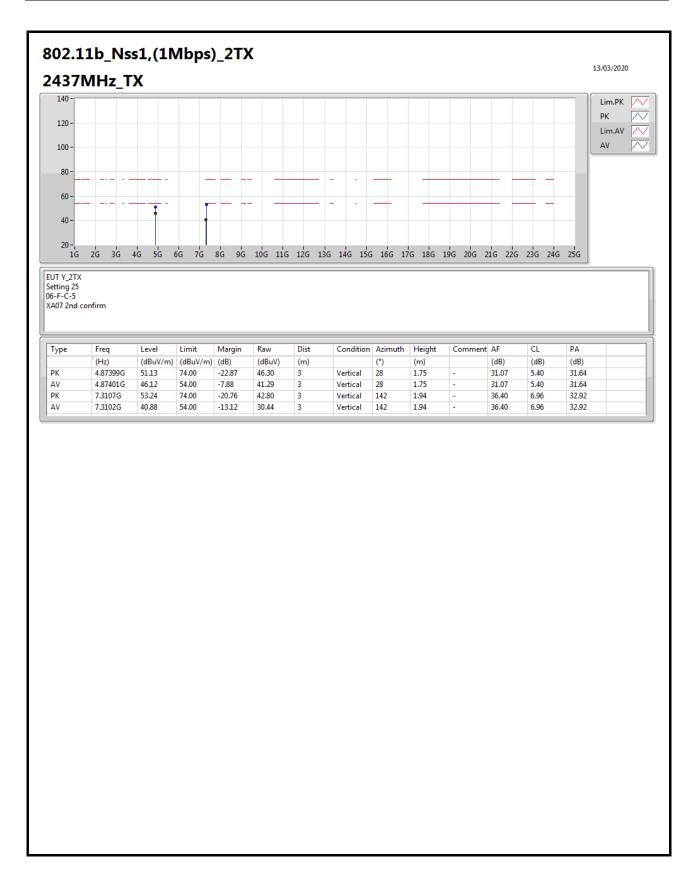




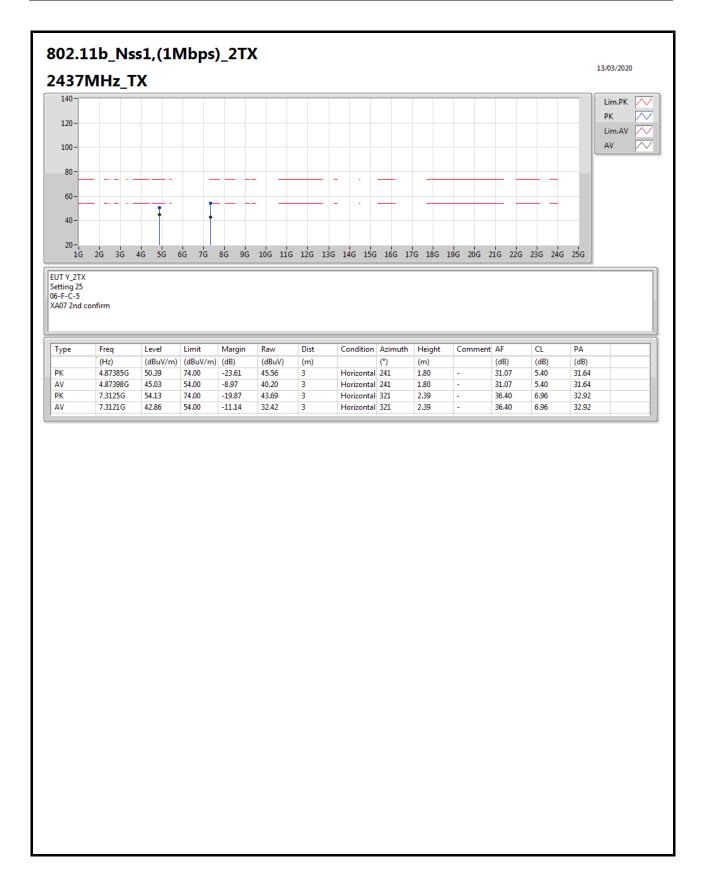


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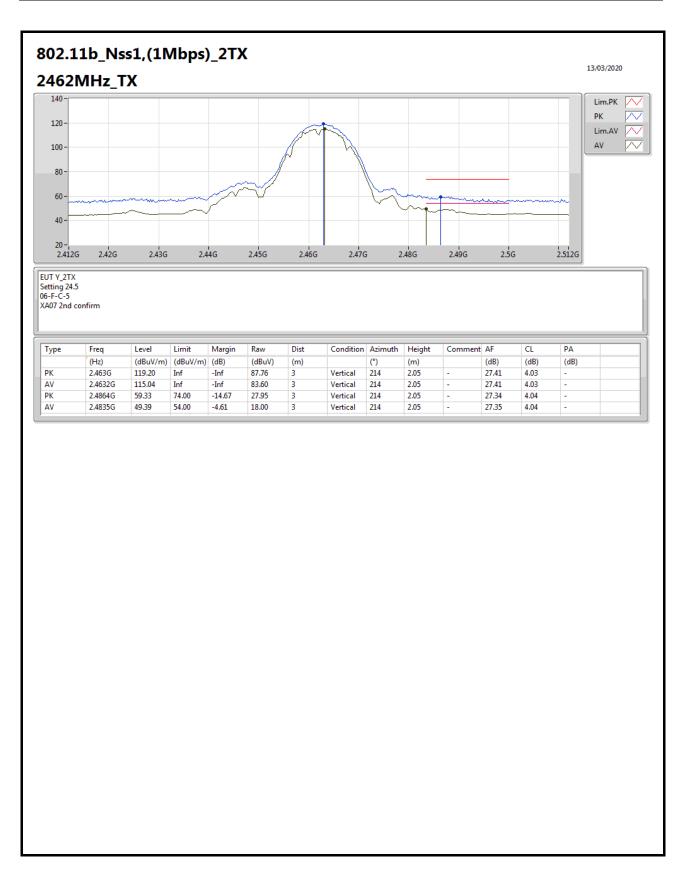




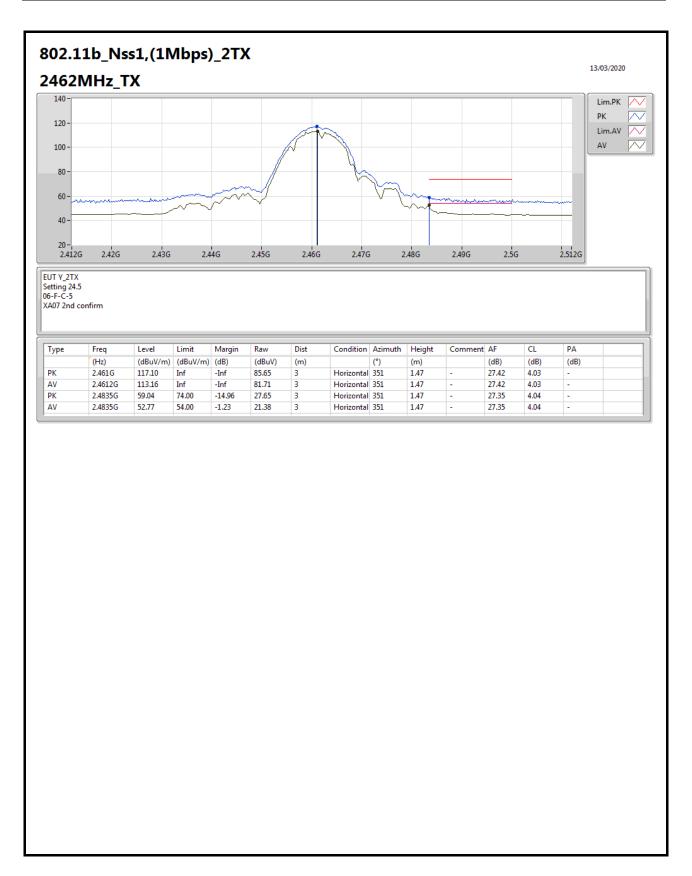






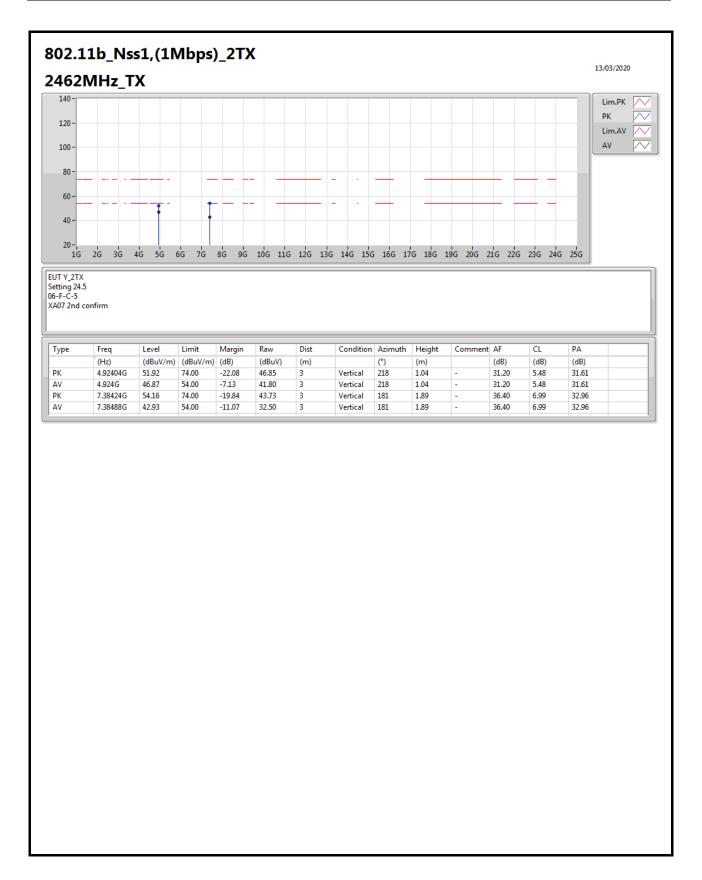






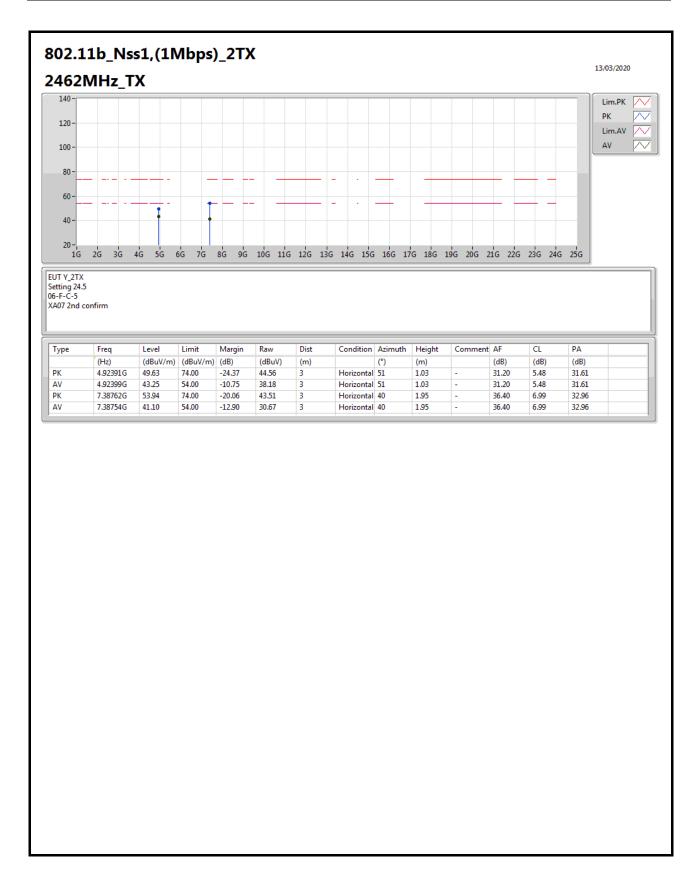
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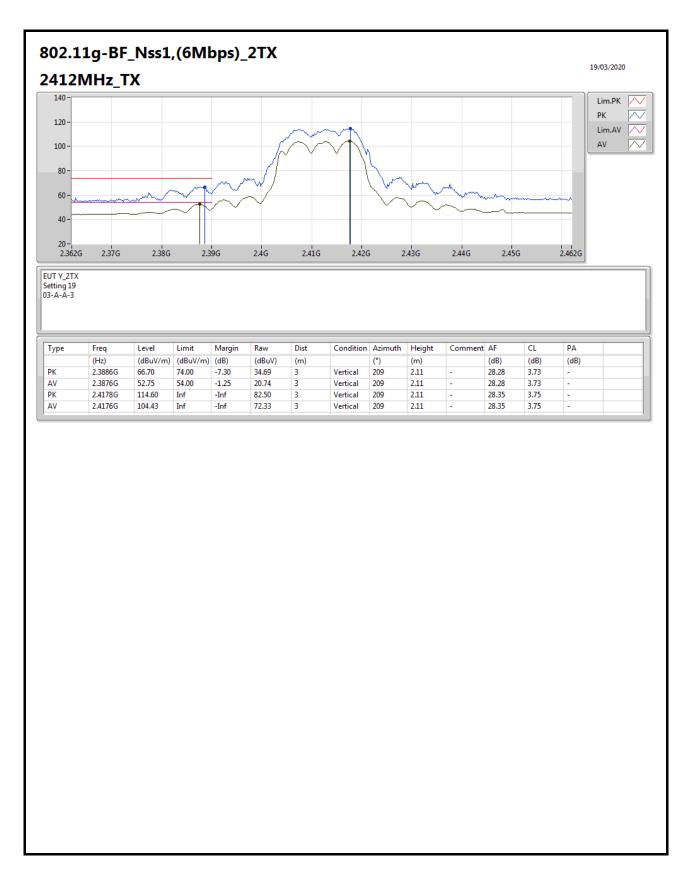


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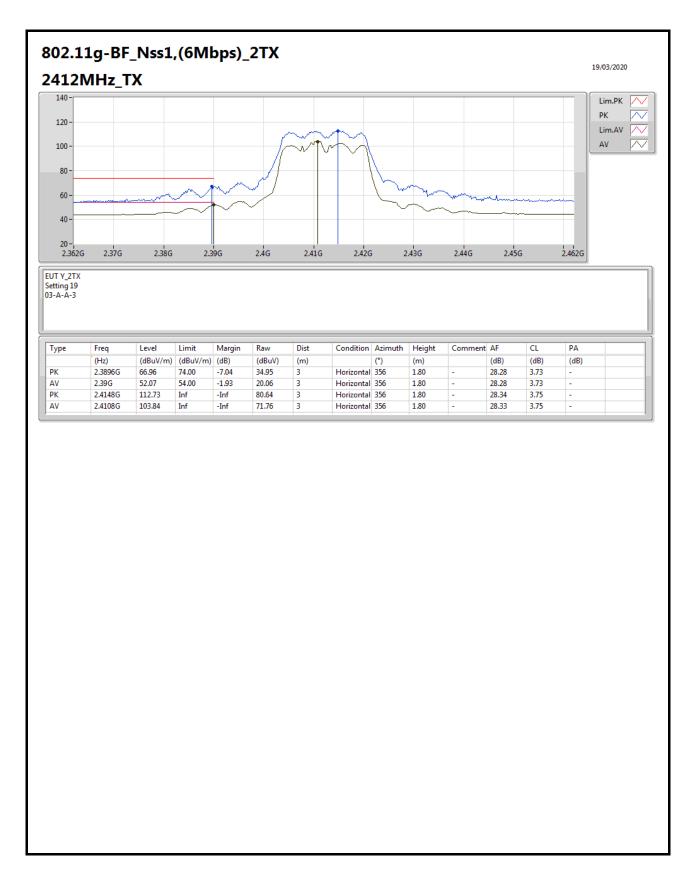






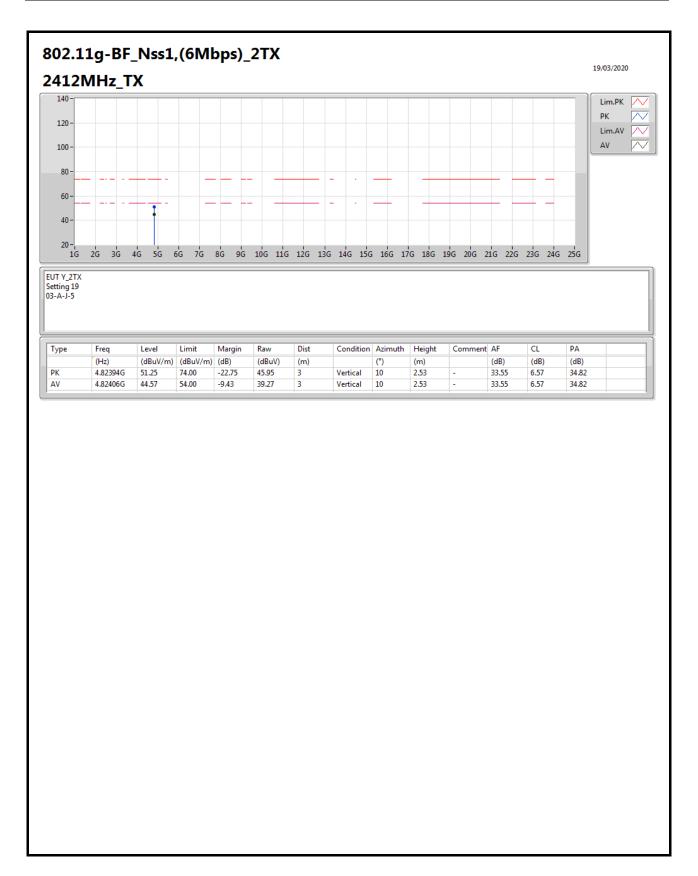






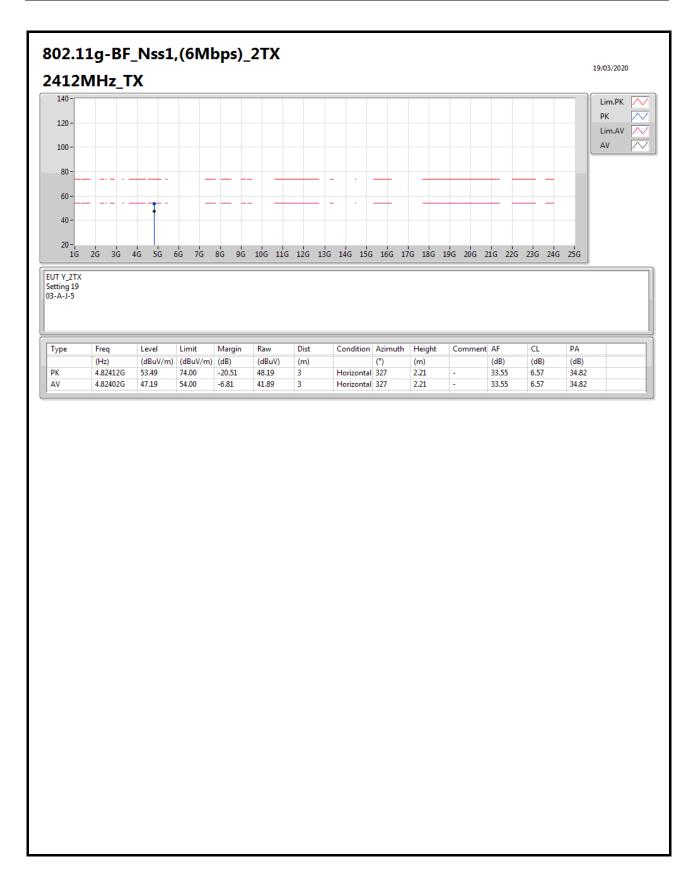
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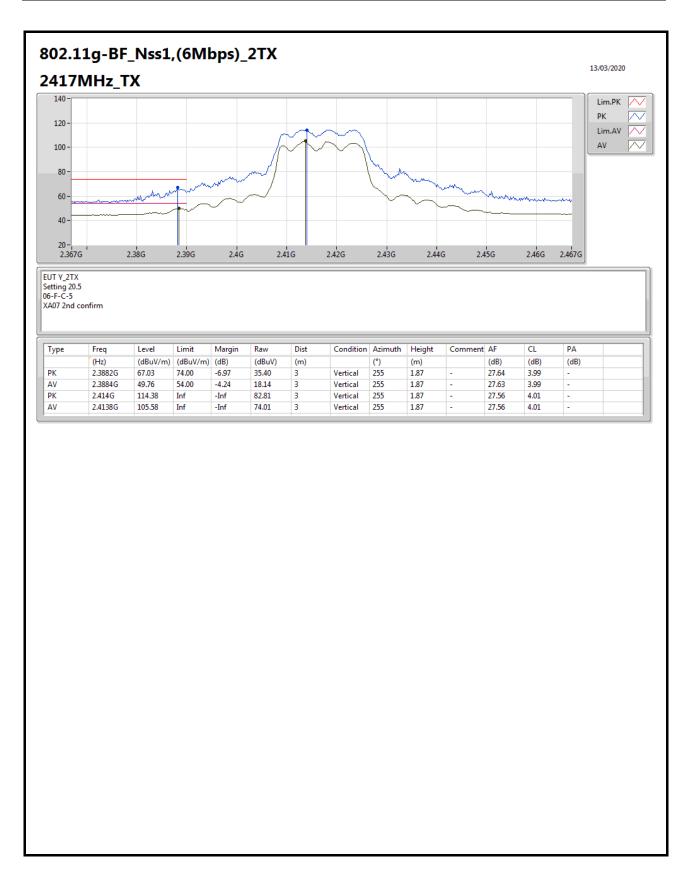
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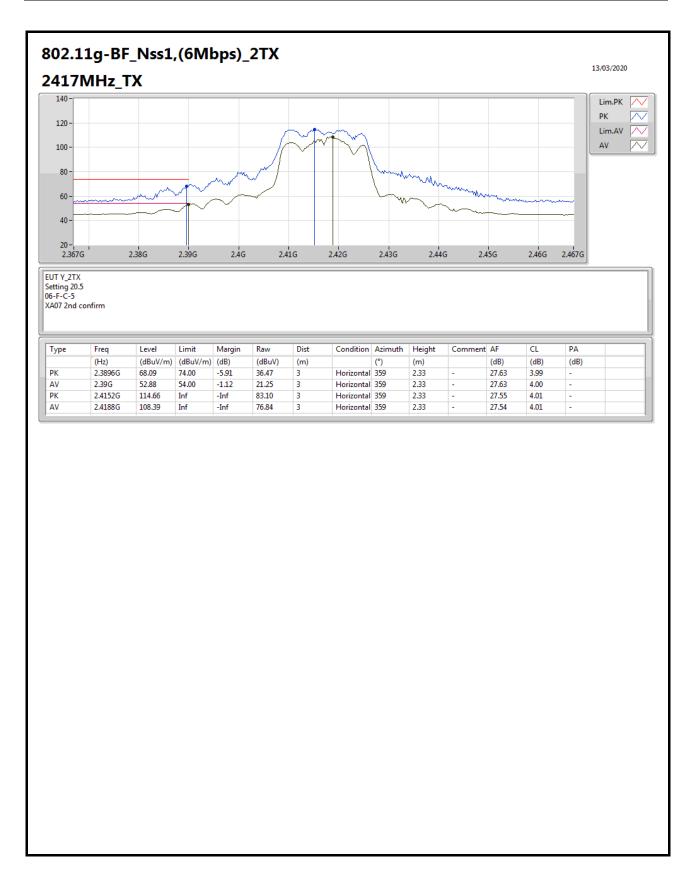
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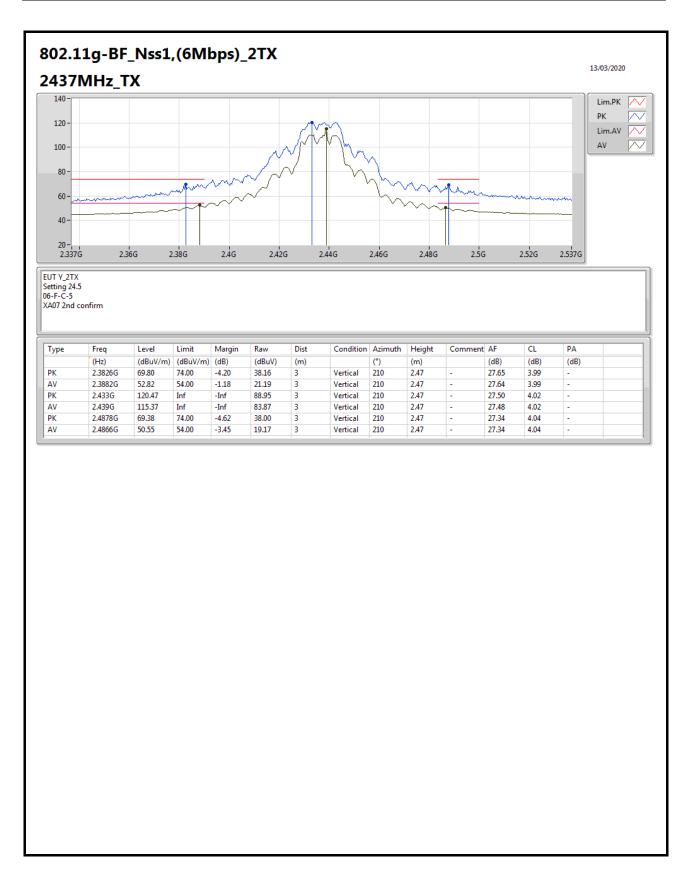


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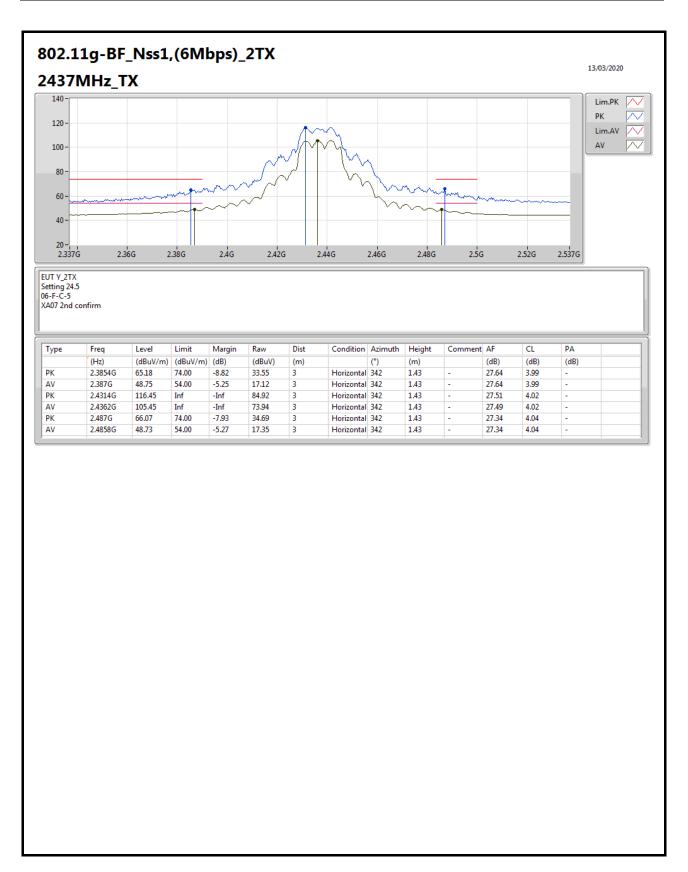






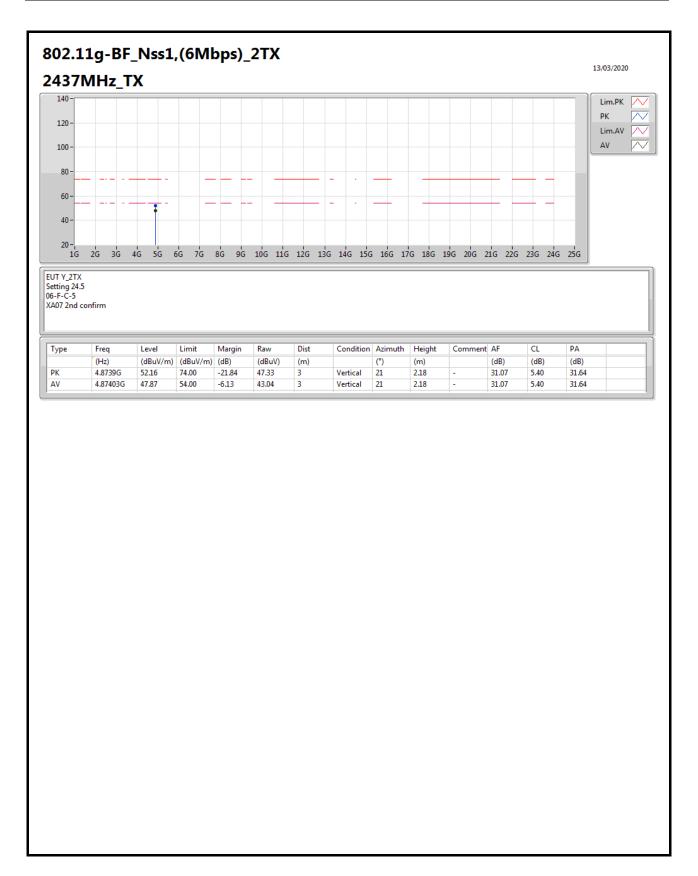




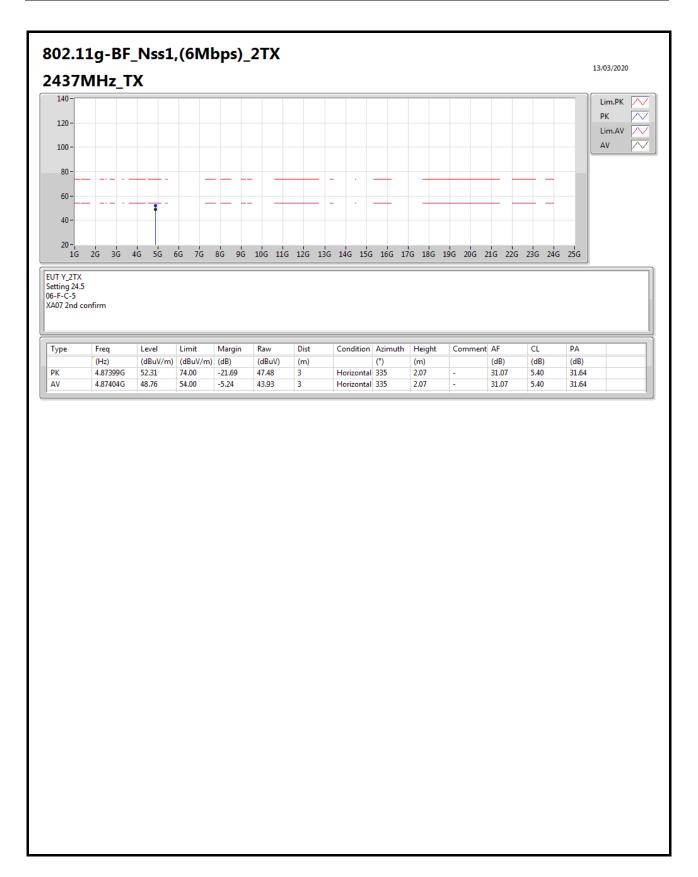


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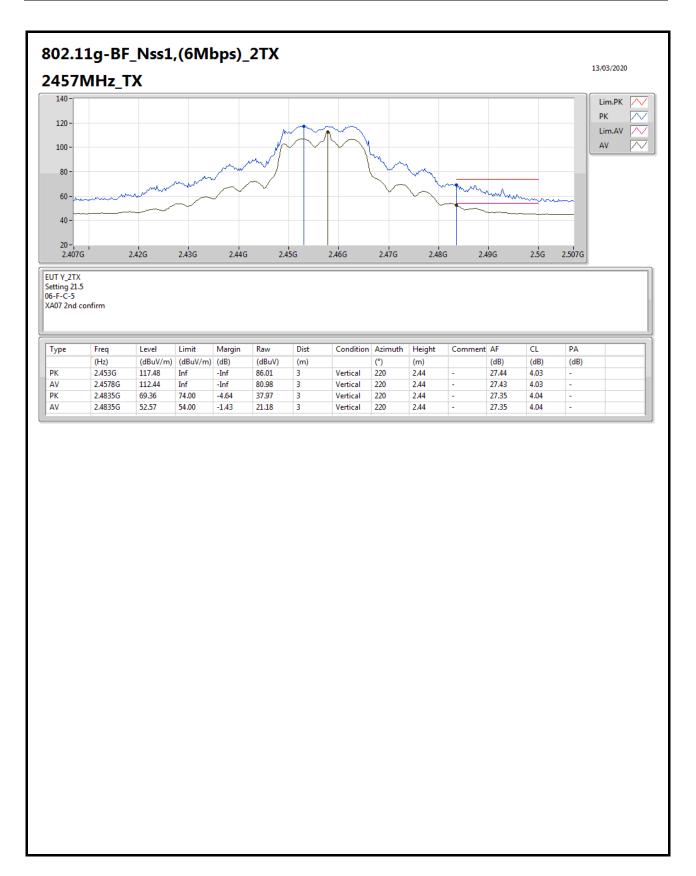




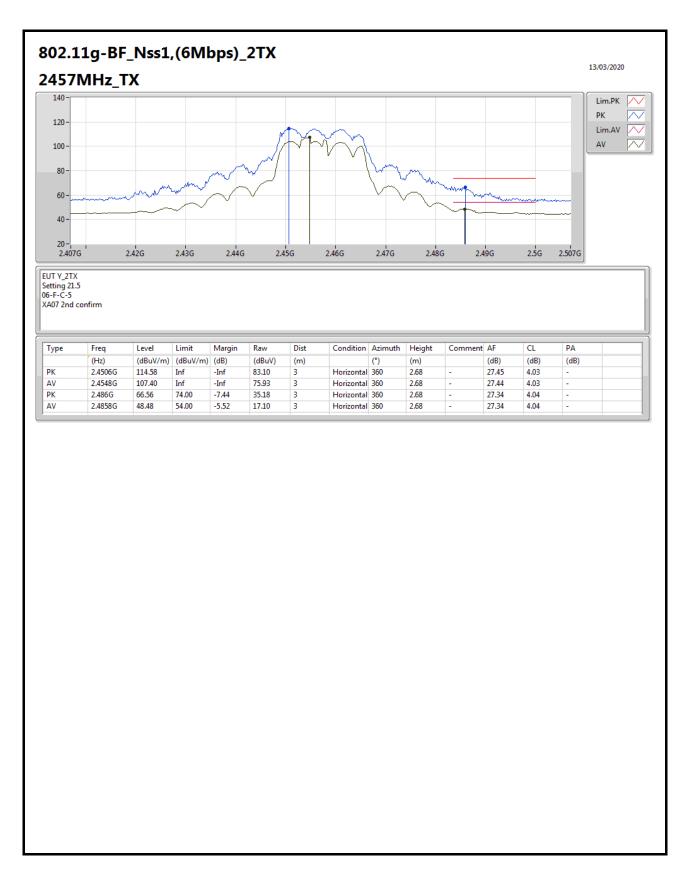




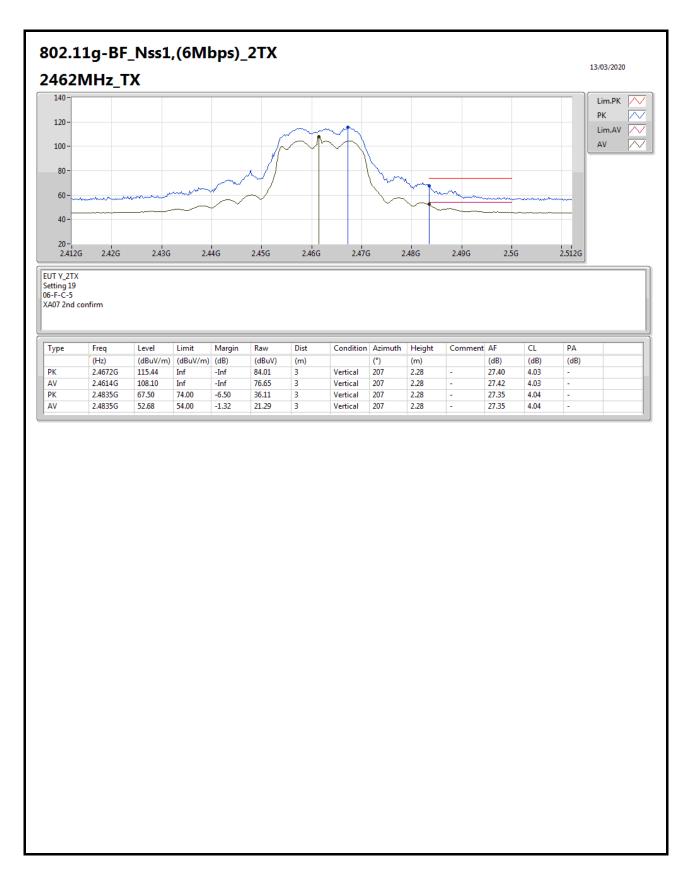




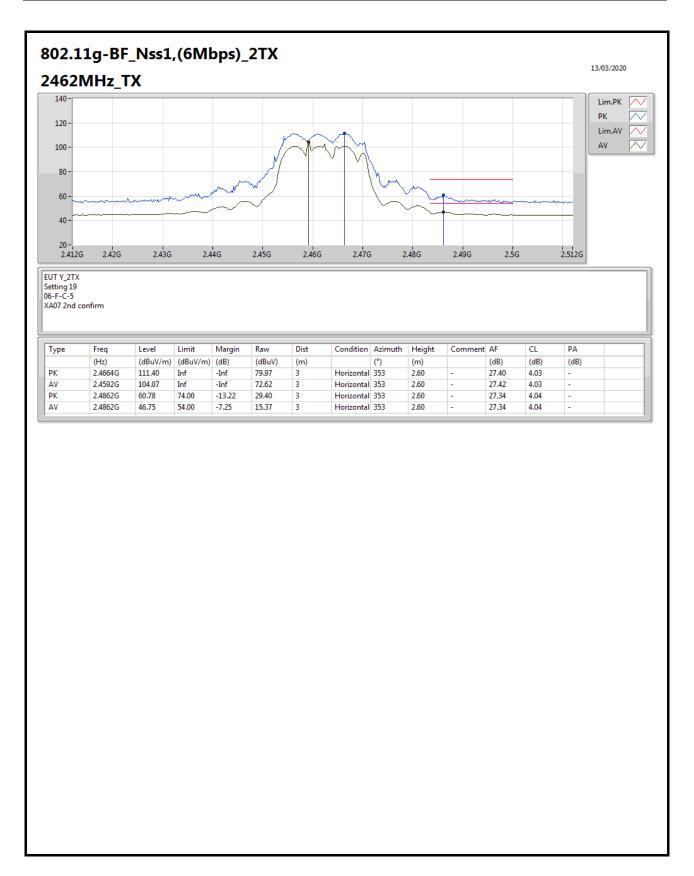




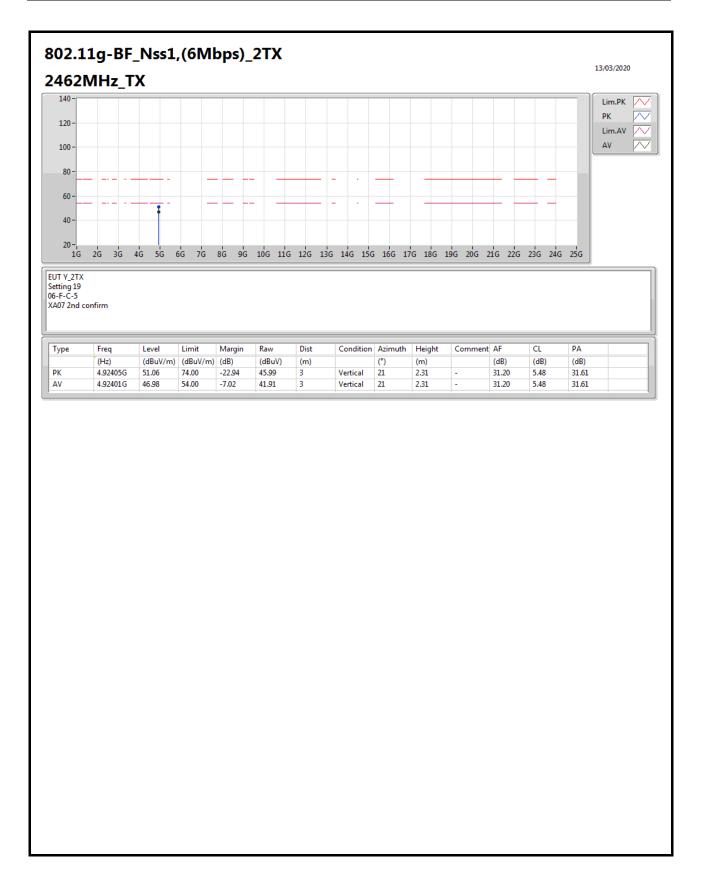






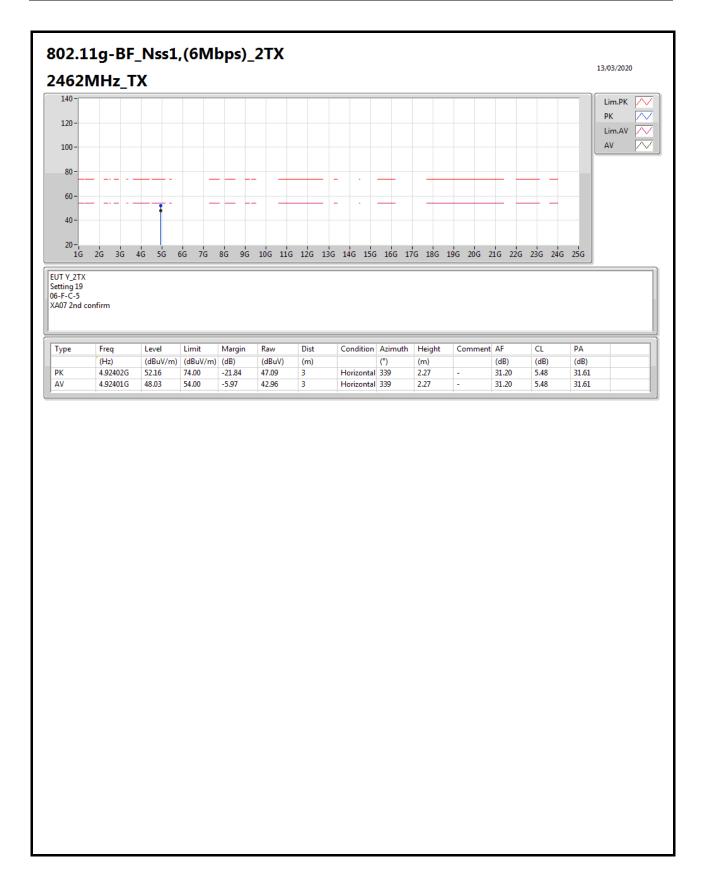




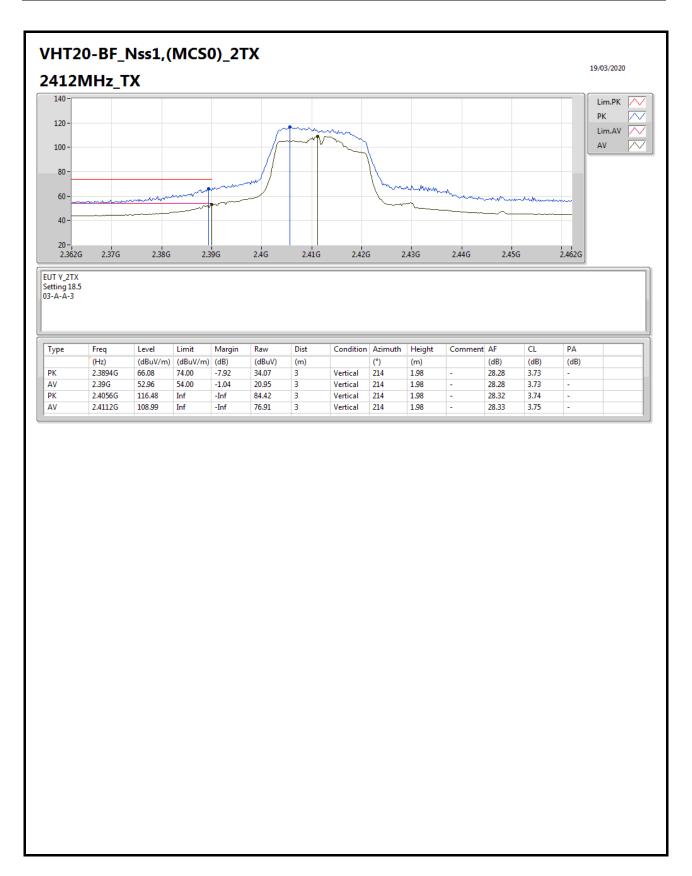


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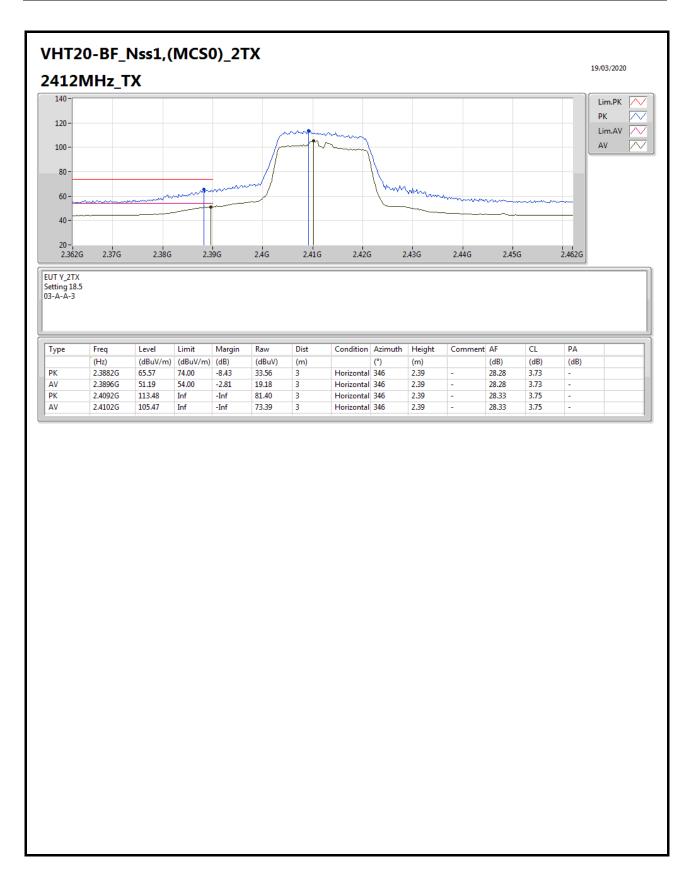






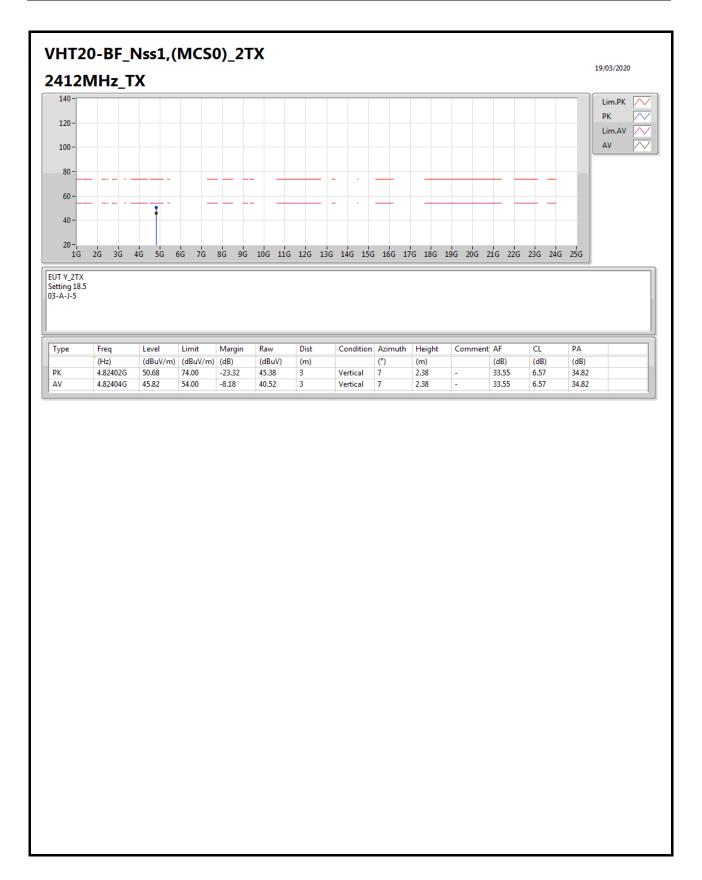




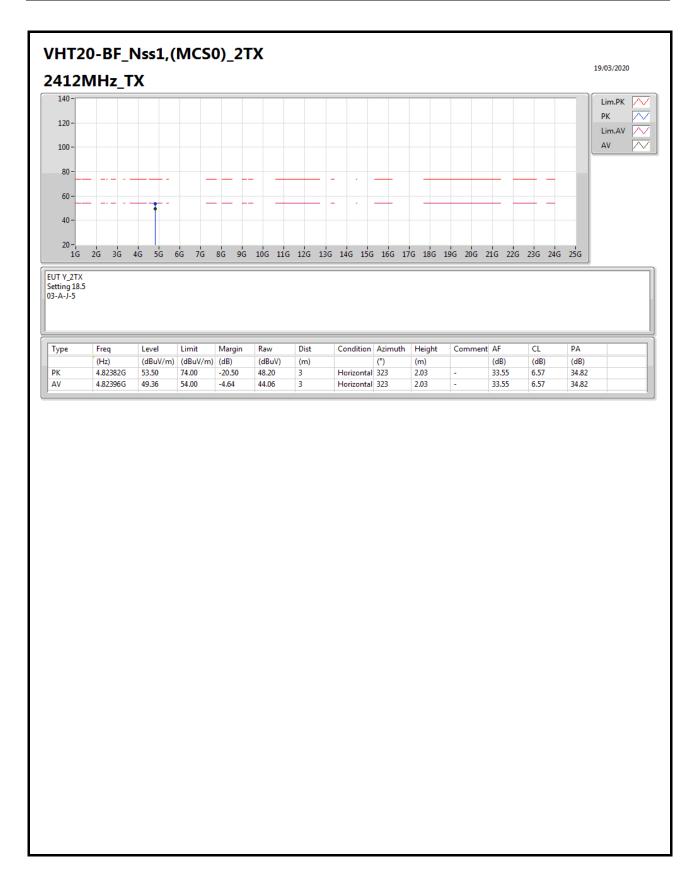


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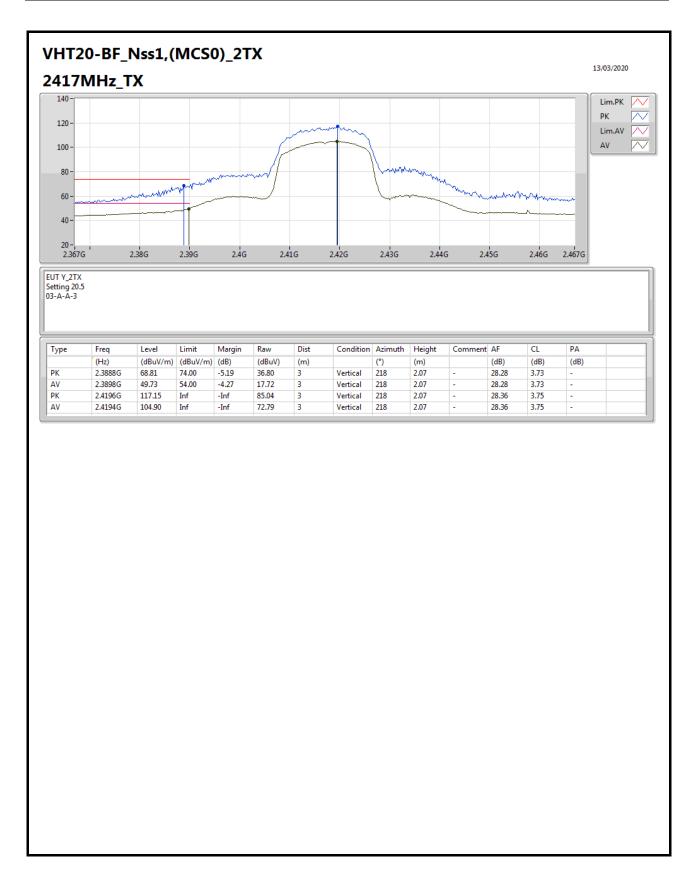




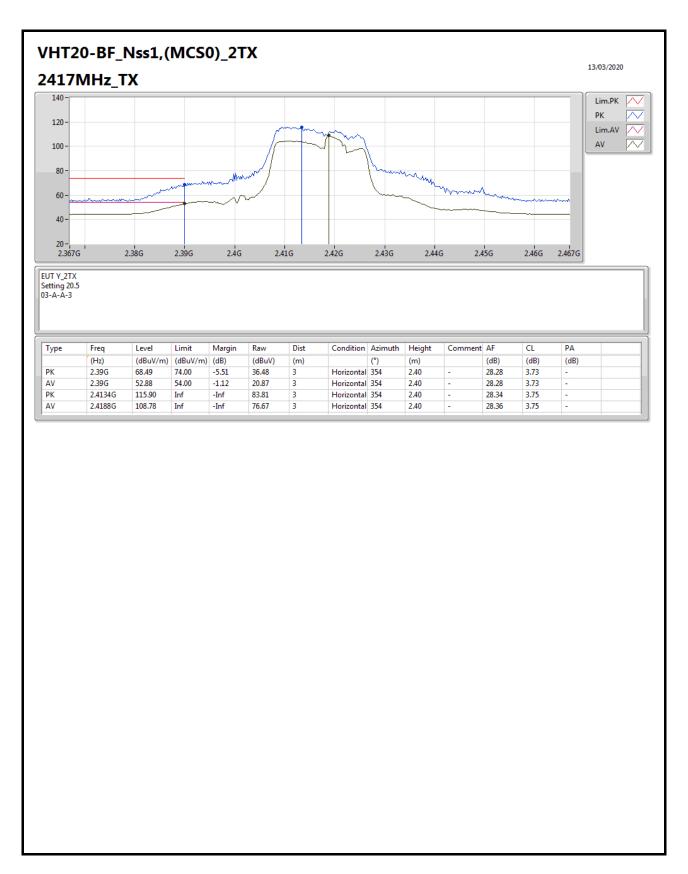




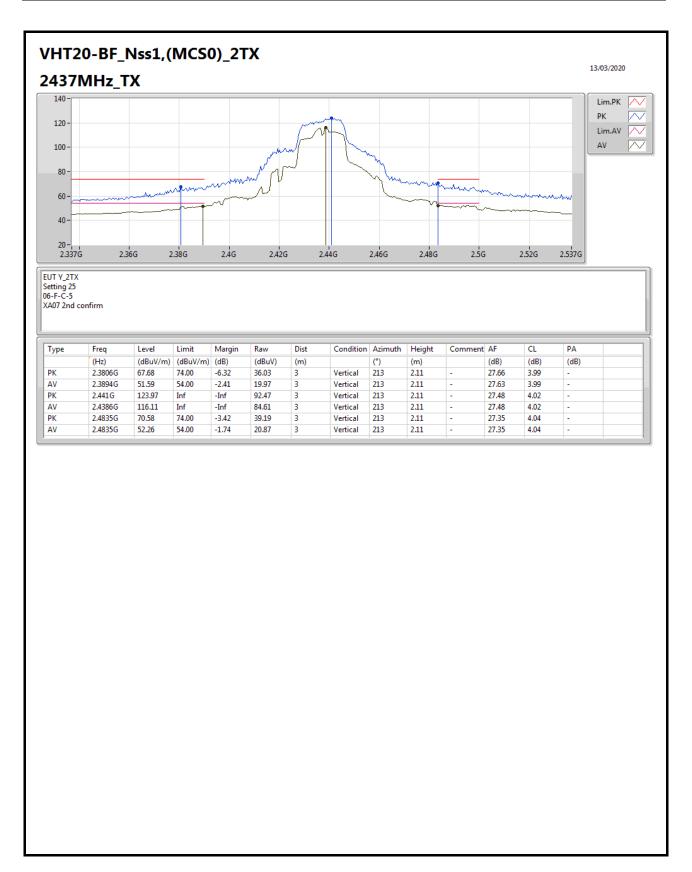




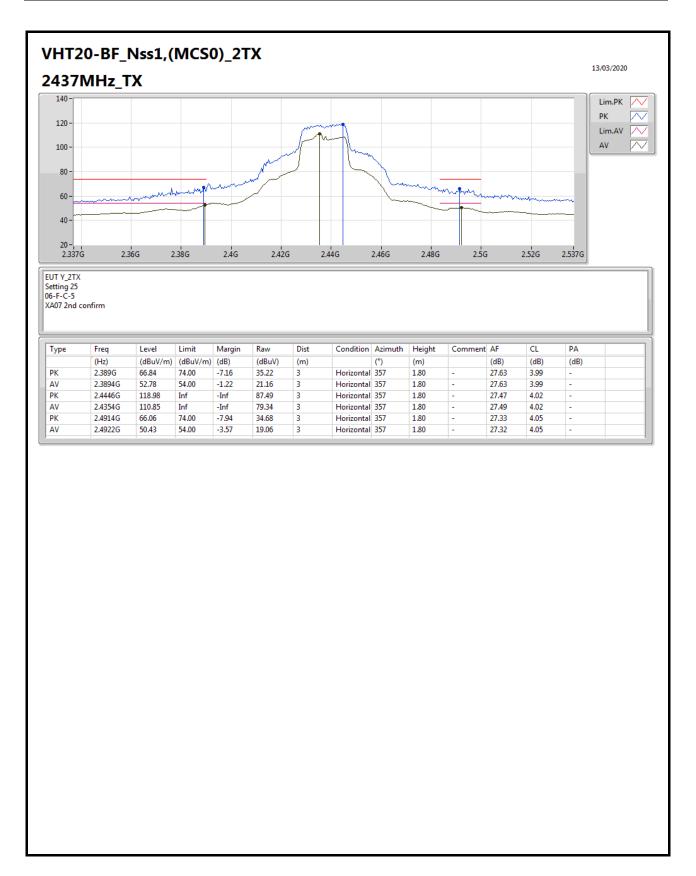




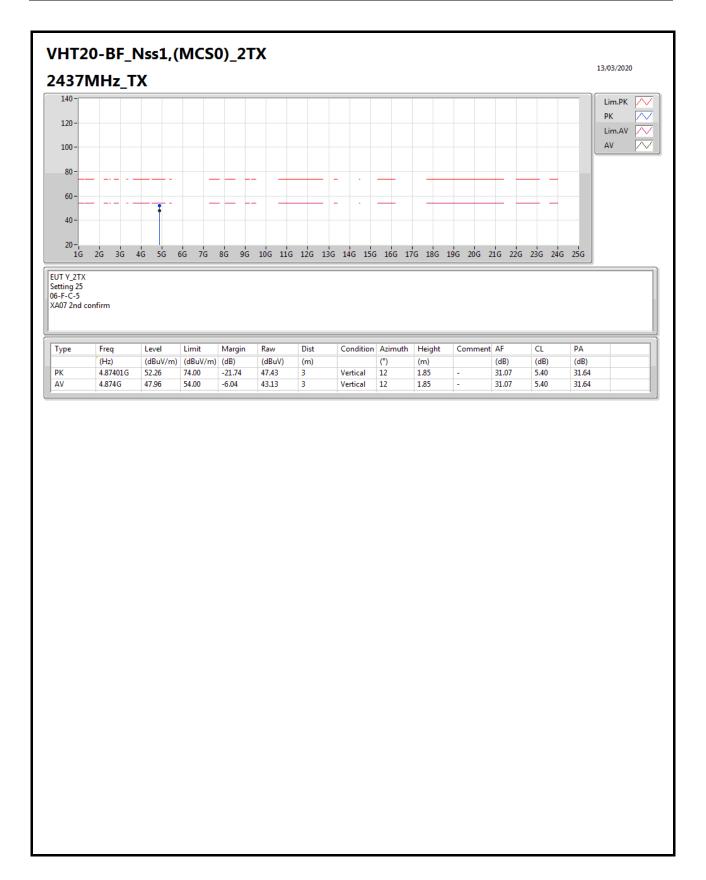




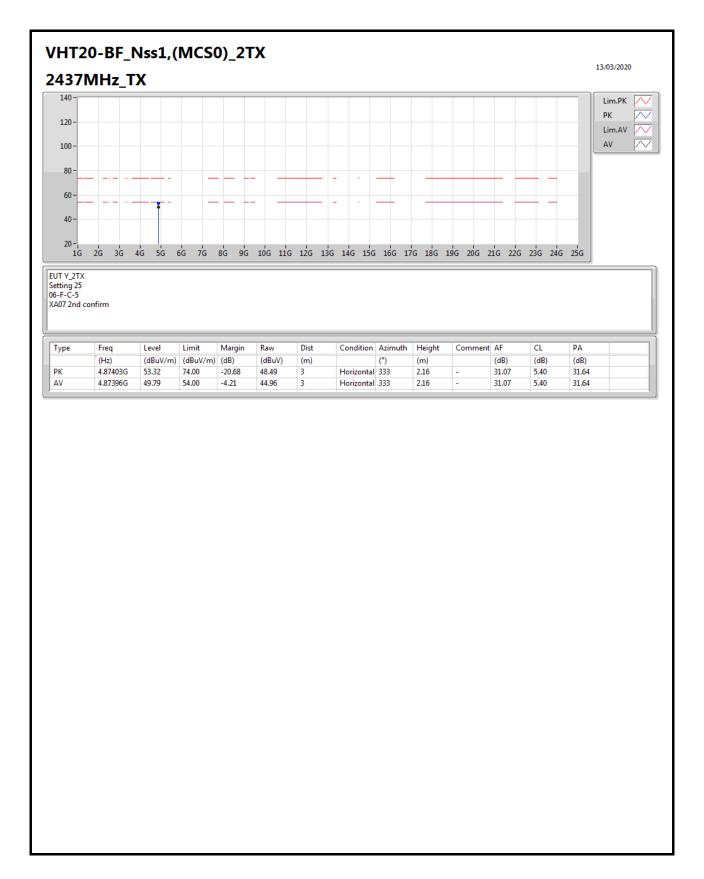






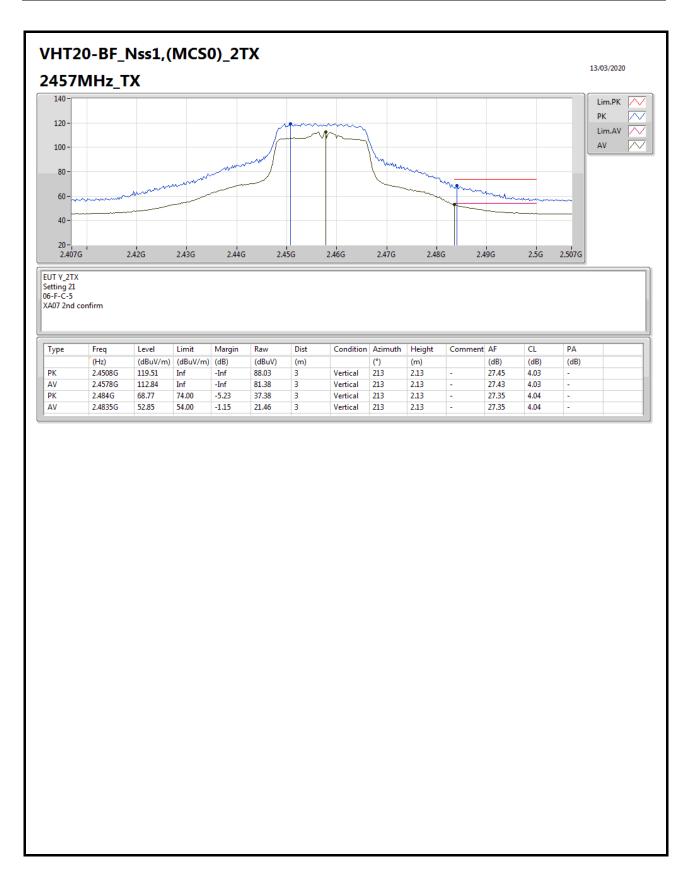




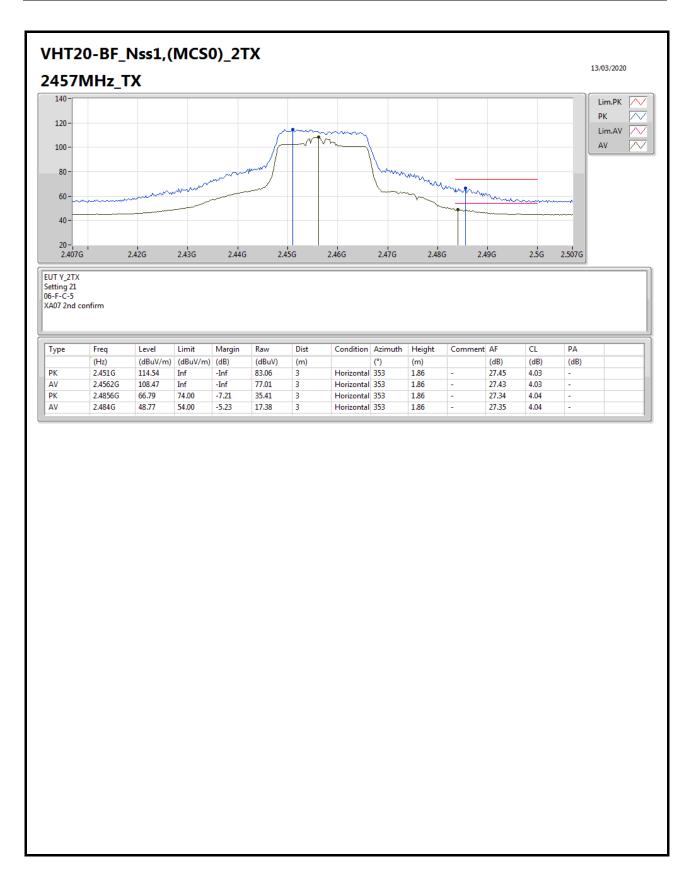


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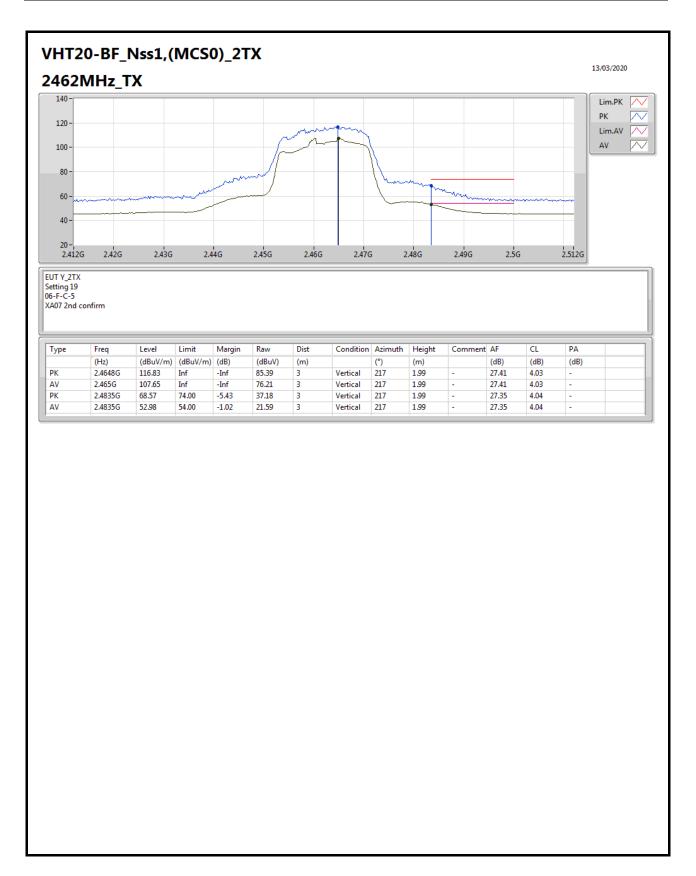






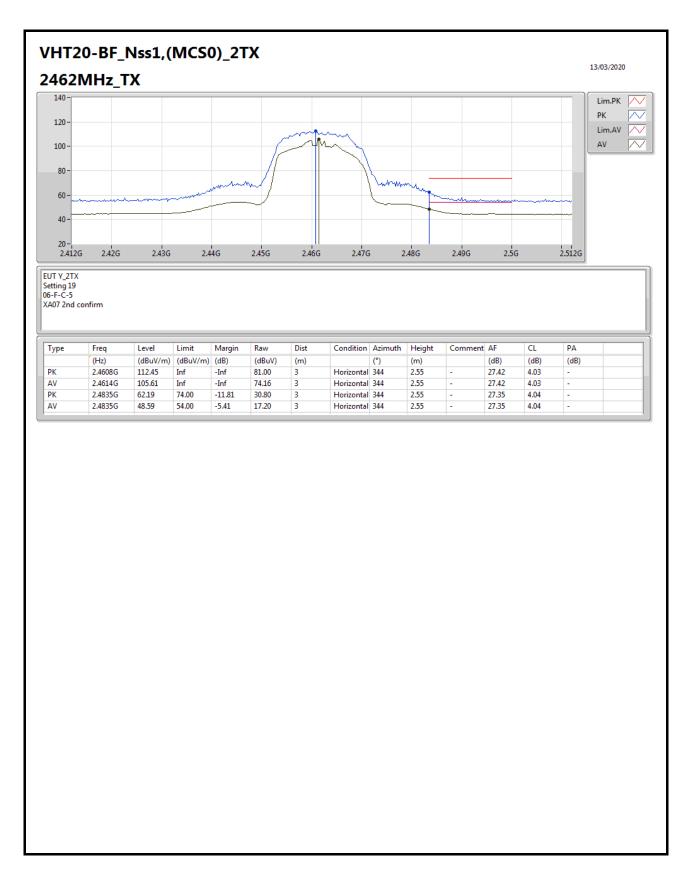






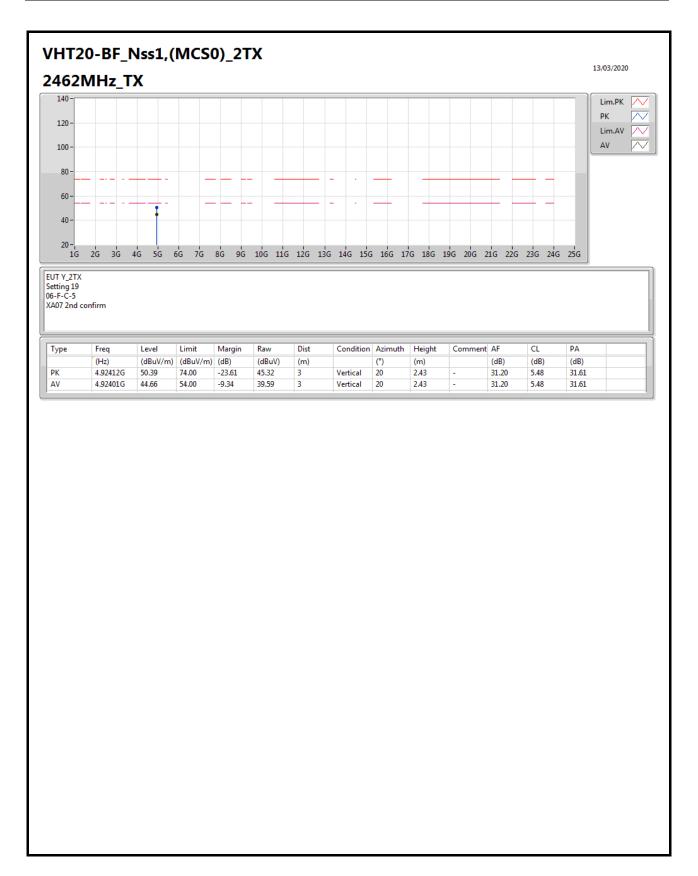
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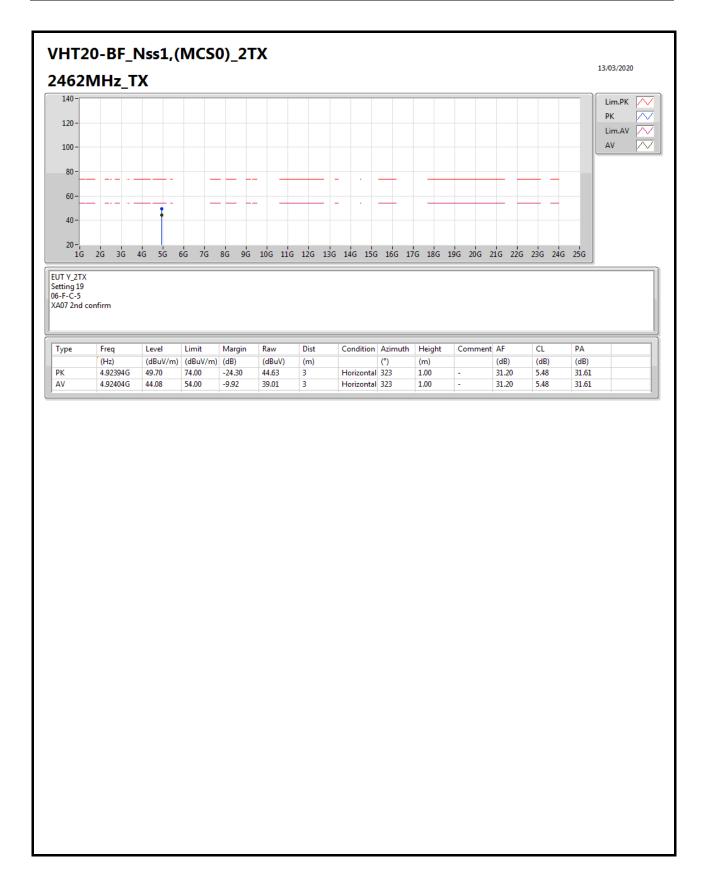
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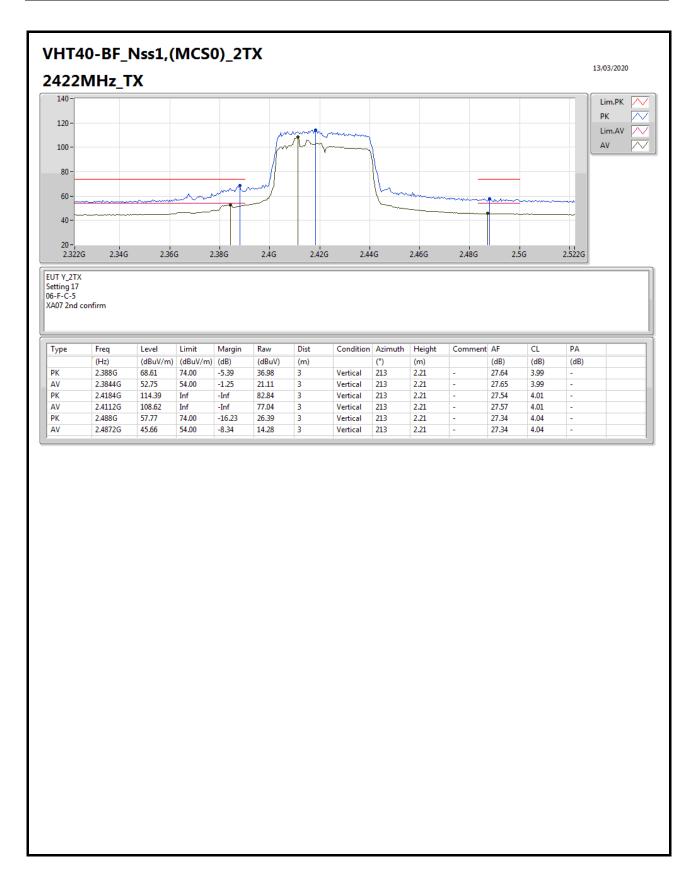


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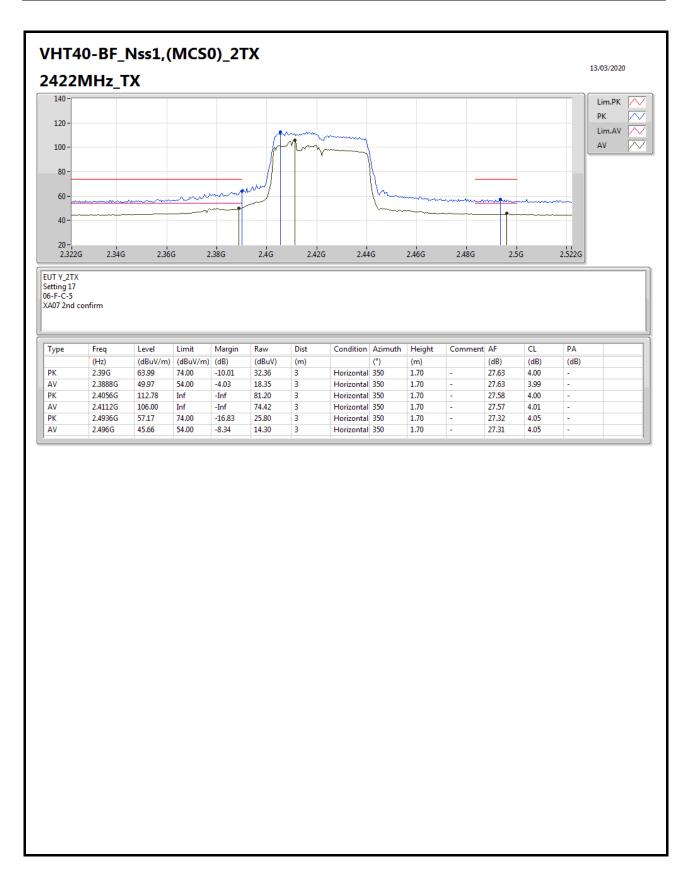






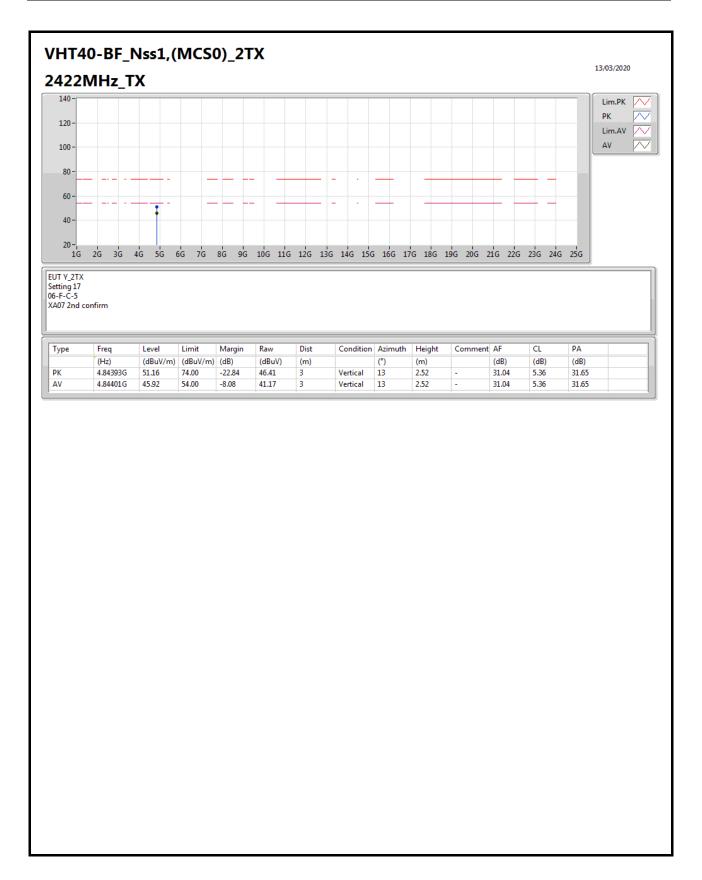
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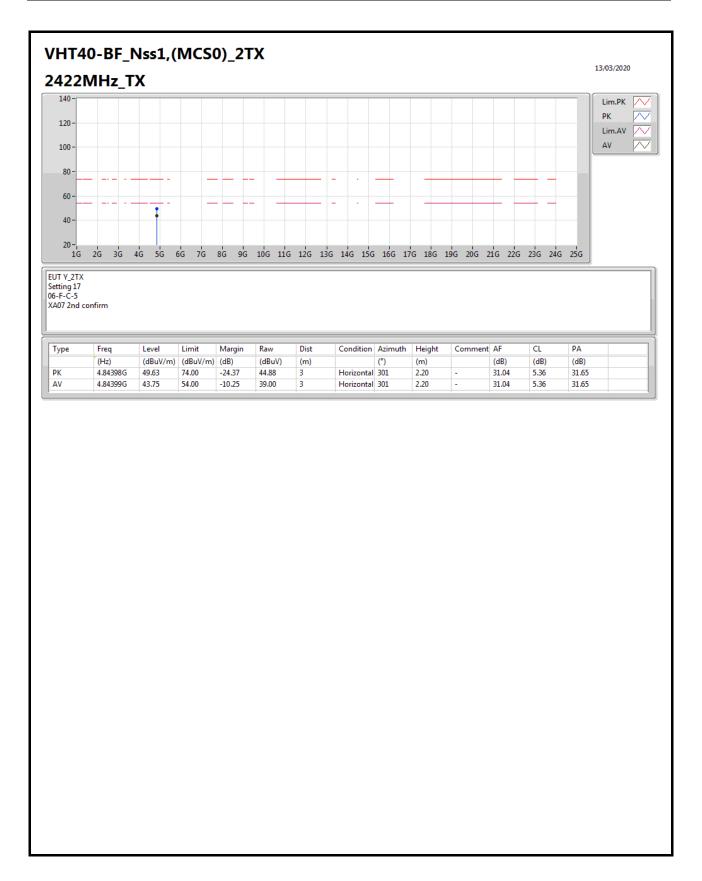
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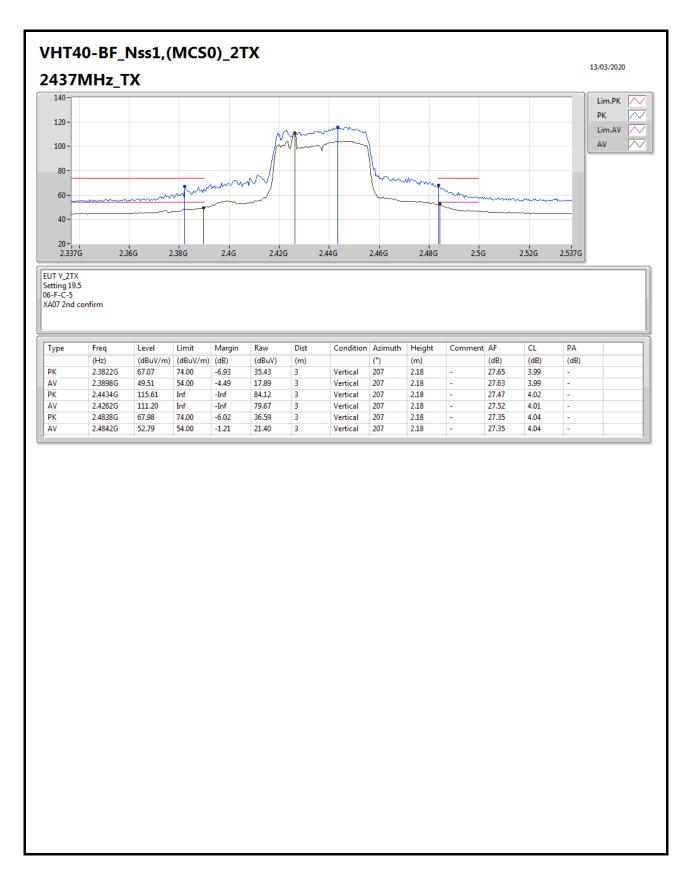
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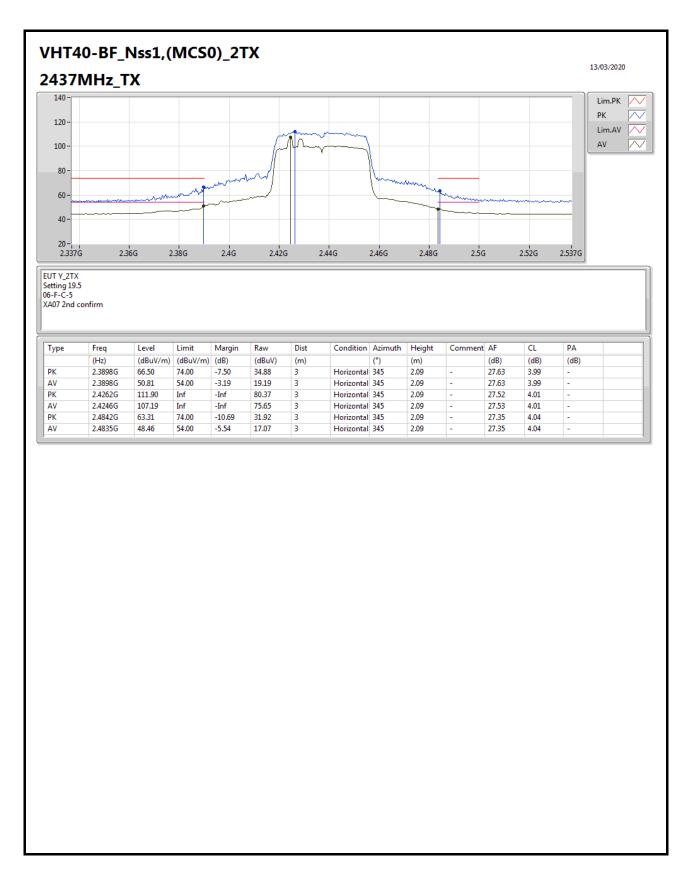
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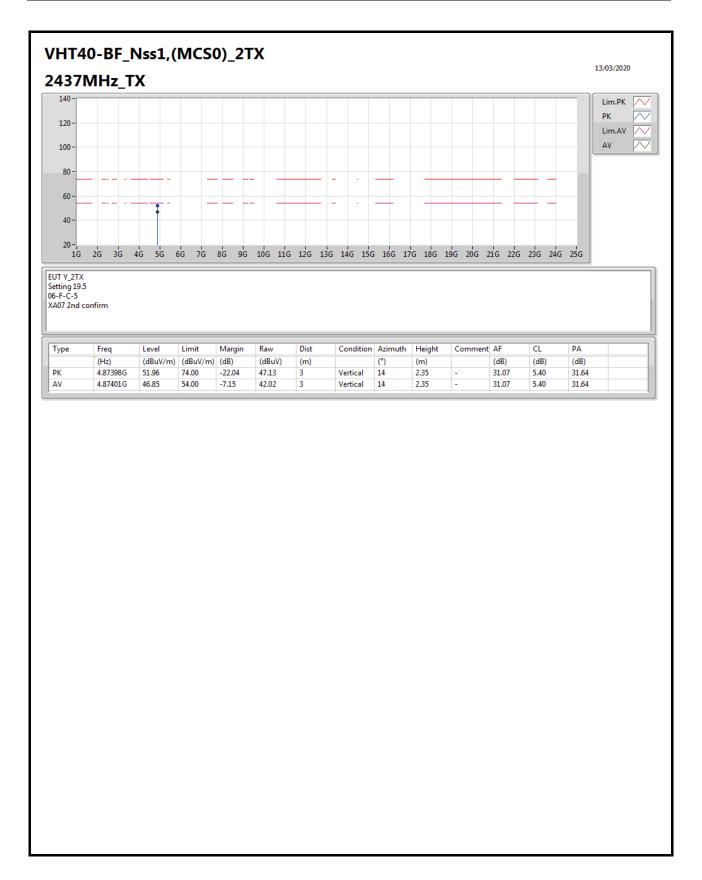
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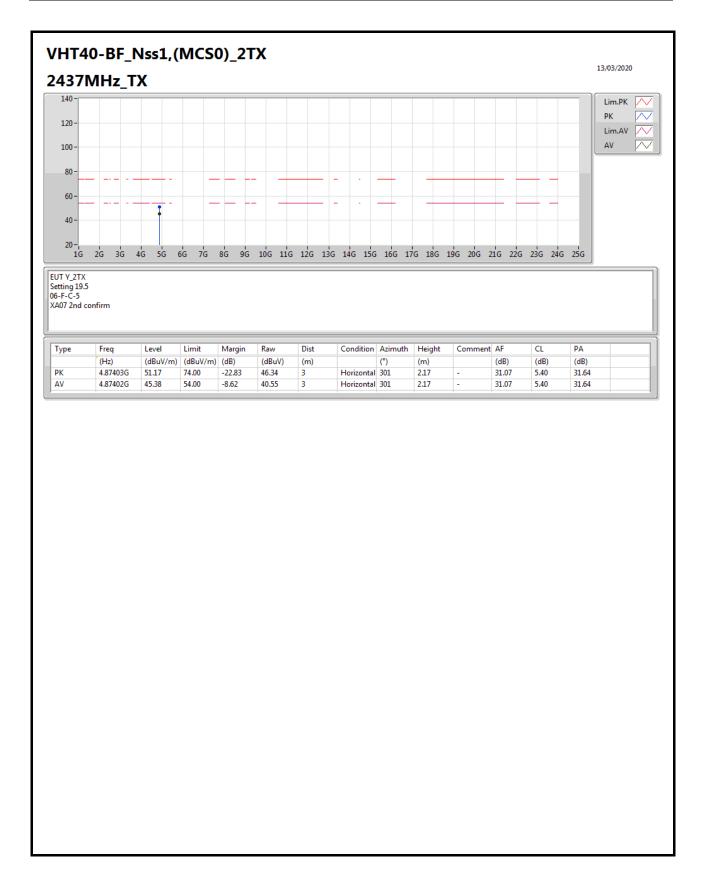
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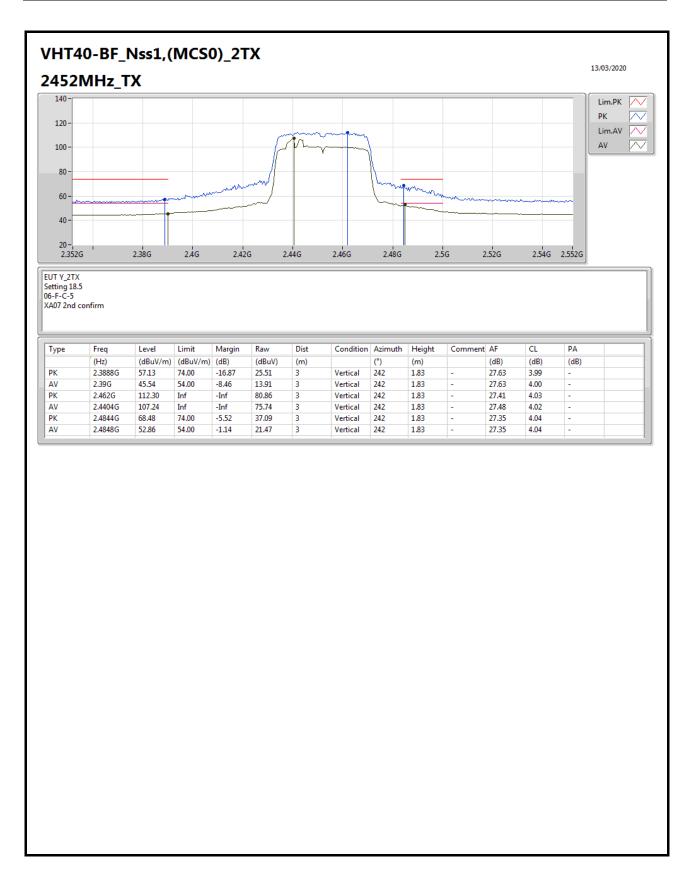
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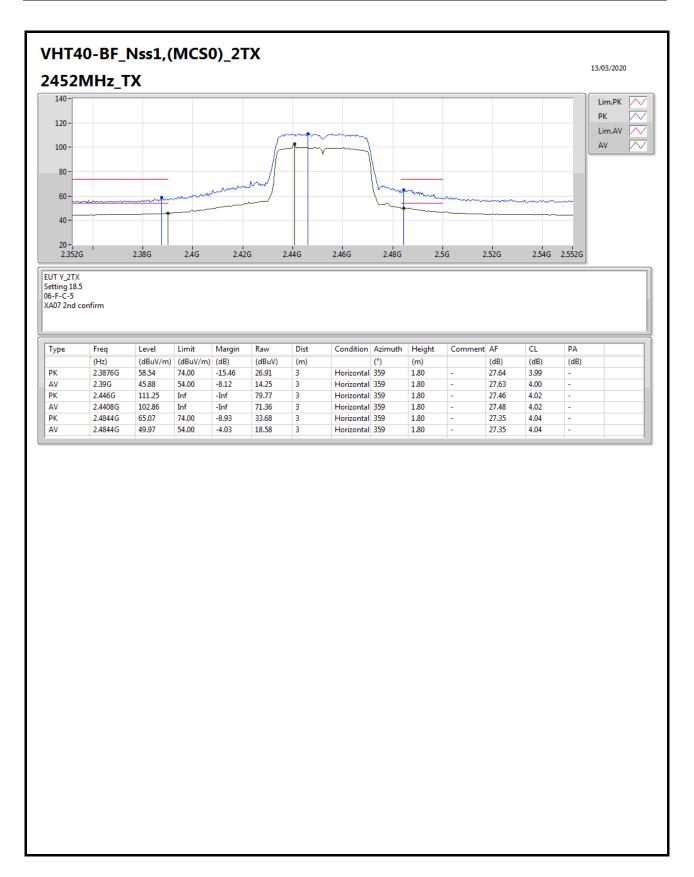
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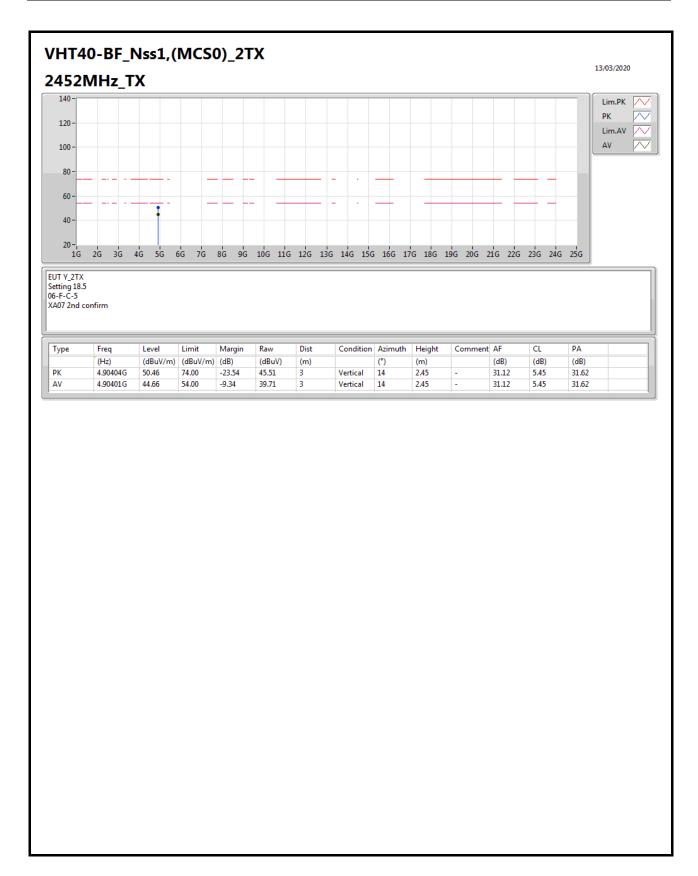
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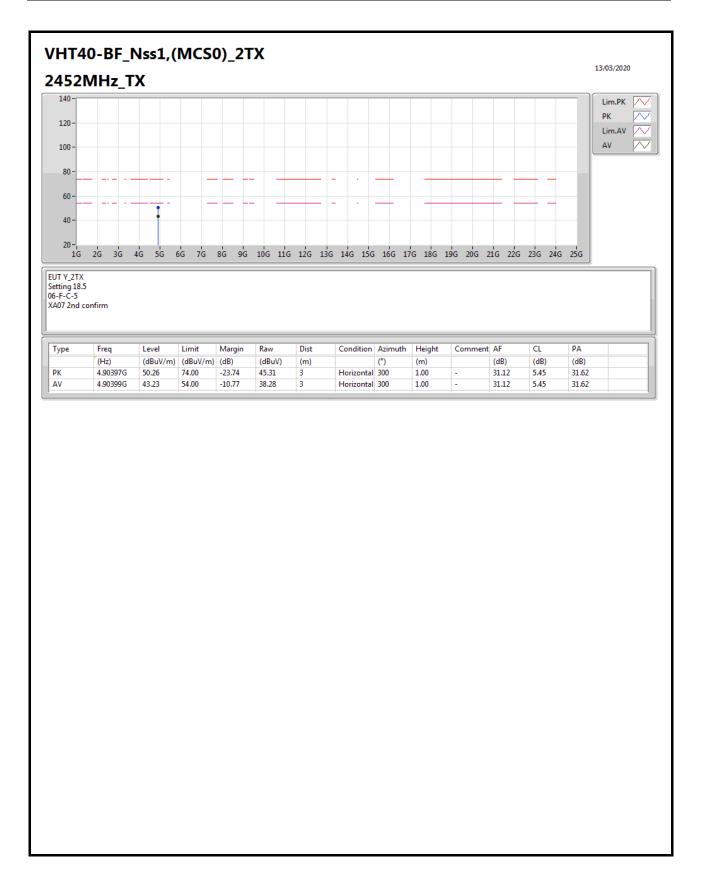
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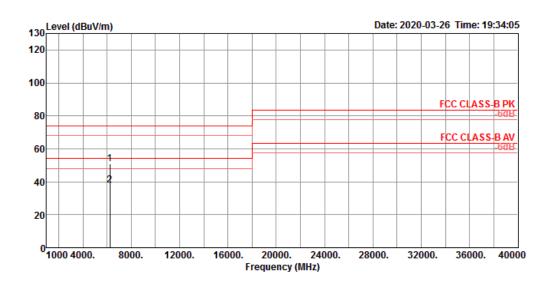
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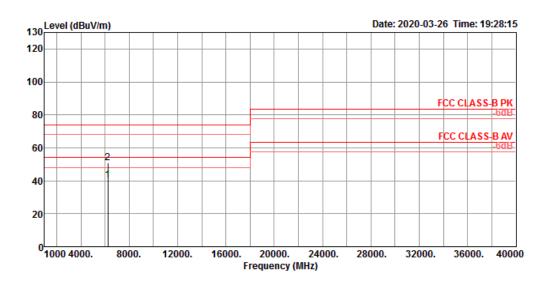
RSE Co-location Result								
Operating Mode	1	Polarization	Horizontal					
Operating Function	Normal Link							



	Freq	Level						Preamp Factor		T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	6249.74	50.64	74.00	-23.36	43.37	7.22	34.90	34.85	100	168	Peak	HORIZONTAL
2	6250 10	37 02	54 00	-16 02	30 71	7 22	3/1 0/0	3/1 25	100	168	Average	HODIZONIAL



RSE Co-location Result								
Operating Mode	1	Polarization	Vertical					
Operating Function	Normal Link							



	Freq	Level				CableAntenna Loss Factor					emark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	6249.91	40.42	54.00	-13.58	33.15	7.22	34.90	34.85	122	167 Av	/erage	VERTICAL
2	6249.97	50.99	74.00	-23.01	43.72	7.22	34.90	34.85	122	167 Pa	ak	VERTICAL