

Report No.: FR031609-03AA



# FCC RADIO TEST REPORT

FCC ID : 2AWNEKDE20105

Equipment : Home Entertainment Hub

Brand Name : E1 by Ericsson

Model Name : KDE20105

Applicant : Ericsson AB

21-23 Torshamnsgatan Stockholm, 16480 Sweden

Manufacturer : CyberTAN Technology Inc.

No. 99. Park Avenue III Science-based Industrial

Park Hsinchu Taiwan 308

Standard: 47 CFR FCC Part 15.247

The product was received on Jan. 14, 2021, and testing was started from Jan. 14, 2021 and completed on Feb. 18, 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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Report Version : 01

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# History of this test report

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Report No.	Version	Description	Issued Date
FR031609-03AA	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: Vicky 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	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	2TX
2.4-2.4835GHz	802.11g	20	2TX
2.4-2.4835GHz	802.11g-BF	20	2TX
2.4-2.4835GHz	802.11n HT20	20	2TX
2.4-2.4835GHz	802.11n HT20-BF	20	2TX
2.4-2.4835GHz	VHT20	20	2TX
2.4-2.4835GHz	VHT20-BF	20	2TX
2.4-2.4835GHz	802.11n HT40	40	2TX
2.4-2.4835GHz	802.11n HT40-BF	40	2TX
2.4-2.4835GHz	VHT40	40	2TX
2.4-2.4835GHz	VHT40-BF	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.
- BWch is the nominal channel bandwidth.

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#### 1.1.2 Antenna Information

For WLAN 2.4GHz / WLAN 5GHz / Bluetooth / Zigbee function:

	Po	ort					(	ain (dBi	)
Ant.	WLAN 2.4GHz	WLAN 5GHz B1,B2	Brand	Model Name	Туре	Connector	WLAN 2.4GHz	WLAN 5GHz B1	WLAN 5GHz B2
1	1	1	Airgain	N2420DSRP	PCB	I-PEX	1.7	3.5	3.4
2	2	2	Airgain	N2420DSRL	PCB	I-PEX	2.0	3.6	3.7
	Port						Gain (dBi)		
Ant.	WLAN		Brand	Model Name	Type	Connector	WLAN	WLAN	
	WLAN 5GHz B3,B4	Zigbee	Dianu	Wiodei Naine	Type	Connector	5GHz	5GHz	Zigbee
	3GHZ B3,B4						В3	B4	
3	1	1	Airgain	N2420DSRK	PCB	I-PEX	4.1	4.1	1.8
	Po	ort					Gain (dBi)		)
A m4	VAZI A NI		Drand	Model Name	Time	Connector	WLAN	WLAN	
Ant.	WLAN	ВТ	Brand	woder warne	Type	Connector	5GHz	5GHz	вт
	5GHz B3,B4						В3	B4	
4	2	1	Airgain	N2420DSRK	PCB	I-PEX	4.7	3.9	1.5

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Note1: B1 means band 1, B2 means band 2, B3 means band 3, B4 means band 4 and BT means Bluetooth.

Note2: The above information was declared by manufacturer.

Note3: For WLAN 2.4GHz function (2TX/2RX):

The WLAN 2.4GHz supports the b, g, n, VHT.

Port 1 and Port 2 could transmit/receive simultaneously.

Note4: For WLAN 5GHz Band 1, Band 2 function (2TX/2RX):

The WLAN 5GHz Band 1, Band 2 supports the a, n, ac.

Port 1 and Port 2 could transmit/receive simultaneously.

Note5: For WLAN 5GHz Band 3, Band 4 function (2TX/2RX):

The WLAN 5GHz Band 3, Band 4 supports the a, n, ac.

Port 1 and Port 2 could transmit/receive simultaneously.

Note6: For Zigbee function (1TX/1RX):

Only Port 1 can be used as transmitting/receiving.

Note7: For Bluetooth function (1TX/1RX):

Only Port 1 can be used as transmitting/receiving.

## 1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11b	0.995	0.02	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11g-BF	0.9	0.46	1.522m	1k
VHT20-BF	0.911	0.4	1.98m	1k
VHT40-BF	0.895	0.48	1.78m	1k

#### Note:

DC is Duty Cycle.

DCF is Duty Cycle Factor.

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## 1.1.4 EUT Operational Condition

EUT Power Type	From power adapter					
Beamforming Function	$\boxtimes$	With beamforming		Without beamforming		
Beamforming Function	The	The product has beamforming function for g/n/VHT in 2.4GHz and a/n/ac in 5GH				
Function   Point-to-multipoint   Point-to-mu				Point-to-point		
Test Software Version	For Non-beamforming mode: QSPR(Version 5.0-00188) For beamforming mode: DOS [ver 6.1.7601]					

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Note: The above information was declared by manufacturer.

#### 1.1.5 Table for WWAN Module Information

The EUT was installed certified WWAN module, the WWAN module information and its correspond model name as below table:

WWAN Module		Model Name	FCC ID	Bands
1	Sierra	EM9190	N7NEM91	4G Band (LTE): 2,4,5,7,12,13,14,17,25,26,30,38,41,42,48,66,71 5G Band (NR): n2,n5,n41,n66,n71
2	Sierra	EM9191	N7NEM91	5G Band (EN-DC): EN-DC_5A_n2A,EN-DC_12A_n2A,EN-DC_2A_n5A,EN-DC_7A_n5 A,EN-DC_30A_n5A,EN-DC_66A_n5A,EN-DC_2A_n41A,EN-DC_66 A_n41A,EN-DC_5A_n66A,EN-DC_12A_n66A,EN-DC_13A_n66A,E N-DC_2A_n71A,EN-DC_7A_n71A,EN-DC_66A_n71A

Note: The above information was declared by manufacturer.

## 1.1.6 Table for EUT Supports Functions

Function	Support Type
AP	Master
Mesh	Master

Note: After evaluating, the "AP Mode" have been selected to test and recorded in the test report.

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## 1.2 Applicable Standards

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

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- 47 CFR FCC Part 15
- ANSI C63.10-2013

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	21.2-23.2 / 54-57	Jan. 27, 2021~ Feb. 04, 2021
Radiated (Co-Location)	03CH05-CB	Kevin Huang	22.6-23.6 / 54-57	Feb. 03, 2021
Radiated (Below 1GHz)	03CH03-CB	Kevin Huang	21.5-22.9 / 55-57	Feb. 06, 2021
Radiated (Above 1GHz)	03CH01-CB	Kevin Huang	20.4-21.4 / 55-57	Jan. 14, 2021~ Feb. 03, 2021
AC Conduction	CO01-CB	Ryo Fan	18~19 / 61~62	Jan. 21, 2021~ Feb. 18, 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 level (based on a coverage factor (k=2)

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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	25.5
2437MHz	25.5
2462MHz	25.5
802.11g-BF_Nss1,(6Mbps)_2TX	-
2412MHz	22
2417MHz	24.5
2437MHz	25.5
2457MHz	24.5
2462MHz	21
VHT20-BF_Nss1,(MCS0)_2TX	-
2412MHz	21.5
2417MHz	24.5
2437MHz	25.5
2457MHz	24.5
2462MHz	20.5
VHT40-BF_Nss1,(MCS0)_2TX	-
2422MHz	20.5
2437MHz	21
2452MHz	21

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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 VHT20 and VHT40.
- There are two modes of EUT, one is beamforming mode, and the other is non-beamforming mode for g/n/VHT in 2.4GHz and a/n/ac in 5GHz, 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	AC power-line conducted measurement for line and neutral			
Operating Mode Normal Link				
1	Normal link-EUT with WWAN module 1-LTE link Band 2 + Adapter with US cable			
2	Normal link-EUT with WWAN module 1-5G EN-DC_2A_n41A + Adapter with US cable			
Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 wil follow this same test mode.				
Normal link-EUT with WWAN module 2-LTE link Band 2 + Adapter with US cable				
For operating mode 1 is the worst case and it was record in this test report.				

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The Worst Case Mode for Following Conformance Tests			
Tests Item	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands		
Test Condition	Conducted measurement at transmit chains		

	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				
1	WLAN 2.4GHz + Adapter with US cable				
2	WLAN 5GHz Band 1, 2 + Adapter with US cable				
3	WLAN 5GHz Band 3, 4 + Adapter with US cable				
4	Bluetooth + Adapter with US cable				
5	Zigbee + Adapter with US cable				
For operating mode	For operating mode 3 is the worst case and it was record in this test report.				
Operating Mode > 1GHz CTX					

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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	Normal Link		
1. WLAN 2.4ĞHz + 2. WLAN 5GHz Ba	de of Radiated Emission Co-location as below: - WLAN 5GHz Band 1, 2 nd 3, 4 + Bluetooth + Zigbee e full function generated the worst case, thus the measurement will follow this same test		

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1 WLAN 2.4GHz + WLAN 5GHz Band 1, 2 + WLAN 5GHz Band 3, 4 + Bluetooth + Zigbee 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	WLAN 2.4GHz + WLAN 5GHz Band 1, 2 + WLAN 5GHz Band 3, 4 + Bluetooth + Zigbee + 4G LTE		
2 WLAN 2.4GHz + WLAN 5GHz Band 1, 2 + WLAN 5GHz Band 3, 4 + Bluetooth + Zight + 5G NR			
Refer to Sporton Test Report No.: FA031609-03 for Co-location RF Exposure Evaluation.			

Note: The EUT can only be used Z axis.

## 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 10 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 DOS.
- 3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by Wireless AP and transmit duty cycle no less than 98%.

#### For Normal Link:

During the test, the EUT operation to normal function.

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## 2.4 Accessories

Accessories						
Equipment Brand Model Name Name		Model Name	Rating	DC Power cable length		
Adapter	FSP	FSP100-A1AR3	INPUT: 100-240V~50-60Hz, 1.4A OUTPUT: 5V, 3A / 9V, 3A 12V, 3A / 15V, 3A 20V, 5.0A 100W MAX.	Non-Shielded 1.6m		
	Others					
HDMI cable*1: Shielded, 1.5m						
USB-C to USB-A cable*1: Shielded, 0.1m						
Power cable*1: Non-shielded, 1m						

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# 2.5 Support Equipment

#### For AC Conduction:

	Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID		
Α	TV	ASUS	VP28U	N/A		
В	Micro SD Card	Transcend	TS16GUSDHC10	N/A		
С	SIM Card	N/A	N/A	N/A		
D	LAN NB	DELL	E6430	N/A		
Е	WAN NB	DELL	E6430	N/A		
F	2.4G NB	DELL	E6430	N/A		
G	5G-1 NB	DELL	E6430	N/A		
Н	5G-2 NB	DELL	E6430	N/A		
I	Bluetooth Speaker	MARUS	MSK06C-RD	N/A		
J	Zigbee Device	N/A	N/A	N/A		
K	LTE+5G NR Base station	Anritsu	MT8821C	N/A		
L	Air Mouse	HENGCHUANGYU	HCY-57B	2AOBUHCY-57B		

## For Radiated (below 1GHz):

	1 of Italiatoa (bolon 10112).					
	Support Equipment					
No.	No. Equipment Brand Name Model Name FCC ID					
Н	NB	DELL	E4300	N/A		

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## For Radiated (above 1GHz):

For non-beamforming mode:

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

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For beamforming mode:

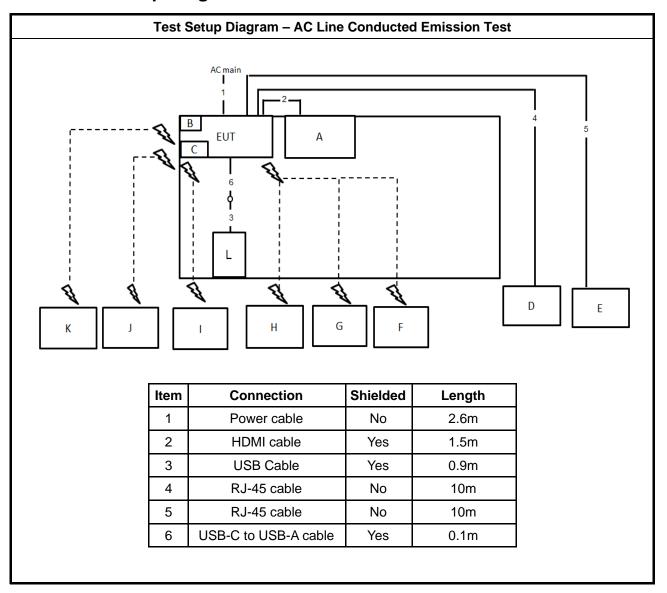
Support Equipment						
No.	No. Equipment Brand Name Model Name FCC ID					
F	Client	LINKSYS	EA8300	N/A		
G	NB	DELL	E4300	N/A		
Н	NB	DELL	E4300	N/A		

## For RF Conducted:

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

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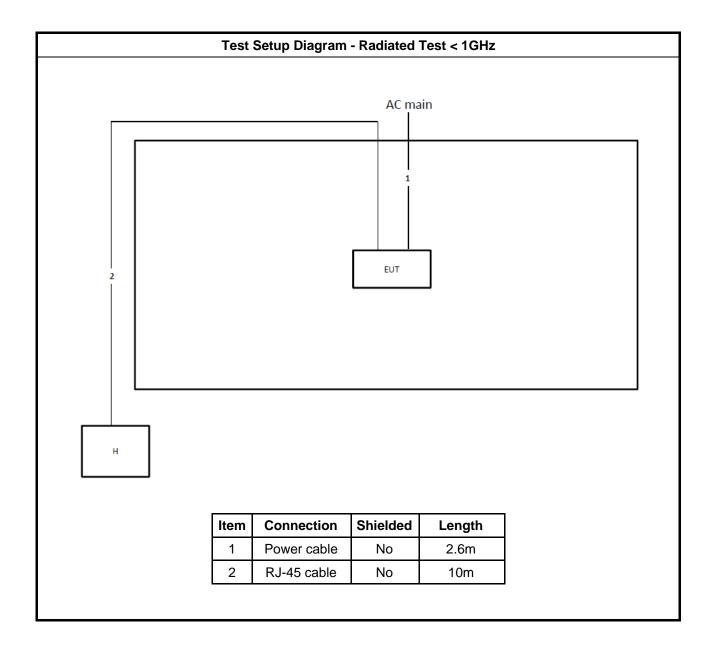
# 2.6 Test Setup Diagram



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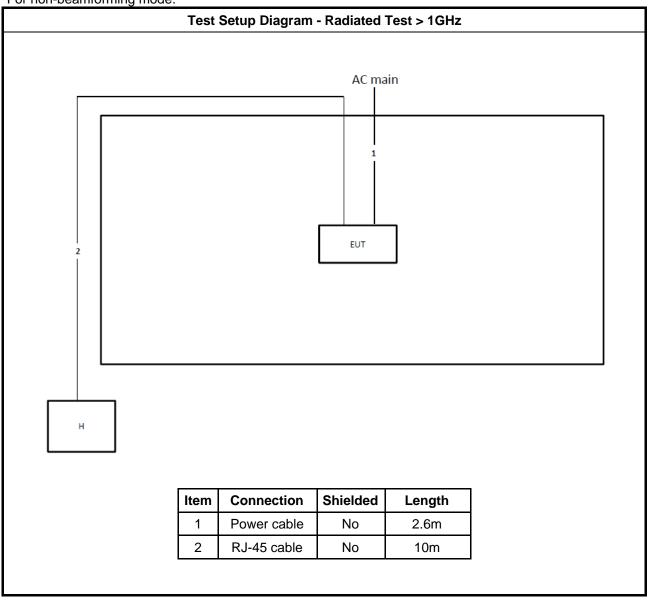
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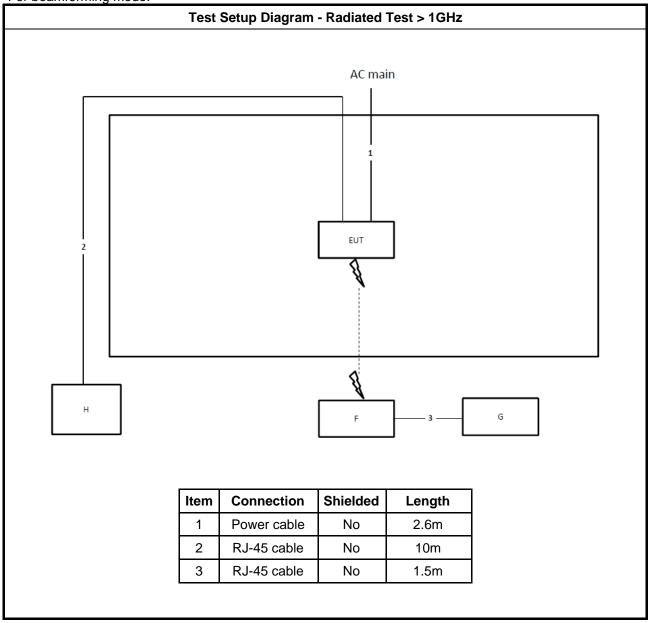
## For non-beamforming mode:



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## For beamforming mode:



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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

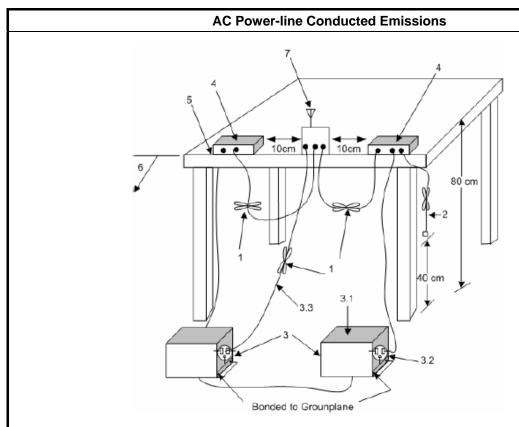
Refer a test equipment and calibration data table in this test report.

## 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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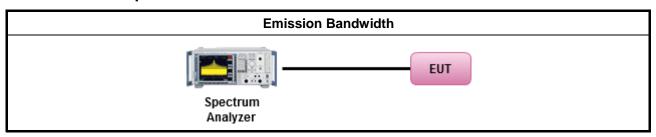
## 3.2.2 Measuring Instruments

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:							
	$\boxtimes$	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.

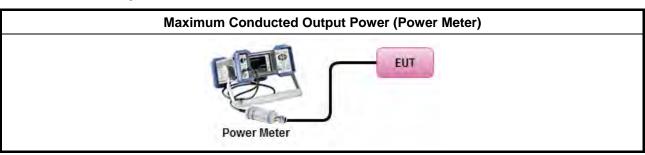
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## 3.3.3 Test Procedures

	Test Method					
•	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).				
		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

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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

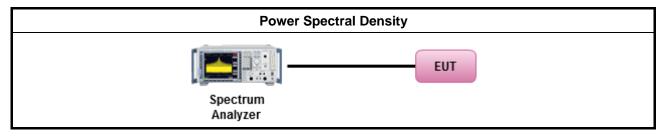
Refer a test equipment and calibration data table in this test report.

## 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.

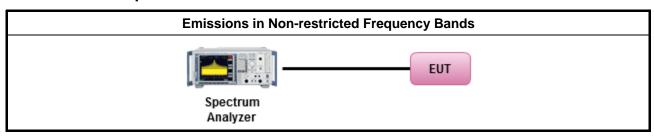
## 3.5.2 Measuring Instruments

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

#### 3.5.3 Test Procedures

Test Method	
<ul> <li>Refer as FCC KDB 558074, clause 8.5 for unwanted emissions into non-restricted bands.</li> </ul>	

#### 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

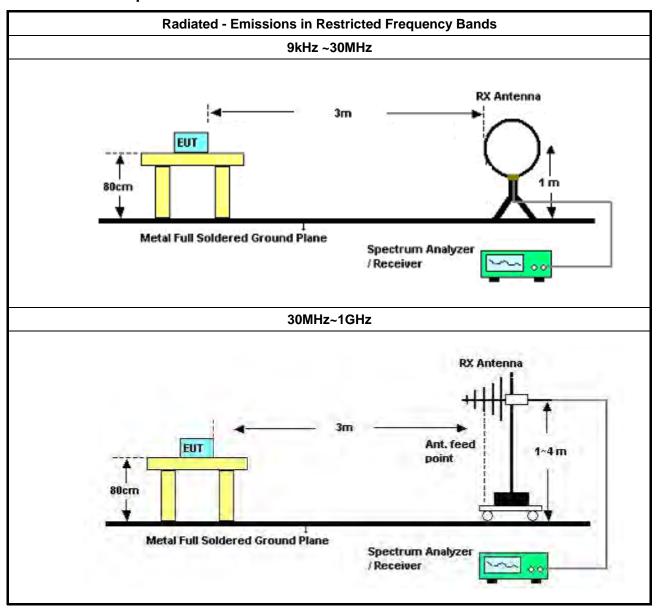
	Test Method					
•	The	average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].				
•		er as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency and highest frequency channel within the allowed operating band.				
•	For	the transmitter unwanted 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:					
<ul> <li>Refer as FCC KDB 558074 clause 8.7 &amp; C63.10 clause 11.13.1, When the performing average radiated measurements, emissions within 2 MHz of the authorized band edge measured using the marker-delta method described below.</li> </ul>						
	•	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).				
	<ul> <li>For conducted unwanted emissions into restricted bands (absolute emission limits).</li> <li>Devices with multiple transmit chains using options given below:         <ul> <li>(1) Measure and sum the spectra across the outputs or</li> <li>(2) Measure and add 10 log(N) dB</li> </ul> </li> </ul>					
<ul> <li>For FCC KDB 662911 The methodology described here may overestimate array gresulting in apparent failures to satisfy the out-of-band limits even if the device compliant. In such cases, compliance may be demonstrated by performing radiated the frequencies at which the apparent failures occurred.</li> </ul>						

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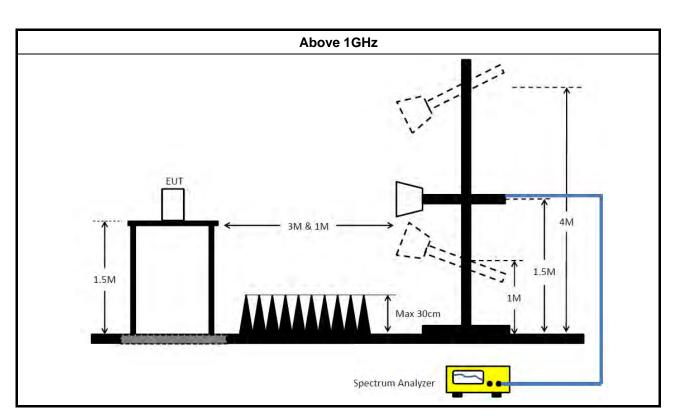
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## 3.6.4 Test Setup



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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	F.C.C.	FCC-LISN-50- 16-2	04083	150kHz ~ 100MHz	Jan. 06, 2021	Jan. 05, 2022	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Feb. 25, 2020	Feb. 24, 2021	Conduction (CO01-CB)
Pulse Limiter	Rohde& Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 31, 2020	Jan. 30, 2021	Conduction (CO01-CB)
Pulse Limiter	Rohde& Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 30, 2021	Jan. 29, 2022	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)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH03-CB	30 MHz ~ 1 GHz	Jan. 27, 2021	Jan. 26, 2022	Radiation (03CH03-CB)
Bilog Antenna with 6 dB attenuator	Schaffner & EMCI	CBL6112B & N-6-06	2928 & AT-N0608	20MHz ~ 2GHz	Feb. 28, 2020	Feb. 27, 2021	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8447D	2944A10259	9kHz ~ 1.3GHz	Jan. 11, 2021	Jan. 10, 2022	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 09, 2020	Jun. 08, 2021	Radiation (03CH03-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH03-CB)
RF Cable-low	Woken	RG402	Low Cable-02+29	30MHz ~ 1GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH03-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH05-CB	1GHz ~18GHz 3m	Nov. 08, 2020	Nov. 07, 2021	Radiation (03CH05-CB)
Horn Antenna	SCHWARZBE CK	BBHA9120D	BBHA 9120 D-1291	1GHz~18GHz	Sep. 05, 2020	Sep. 04, 2021	Radiation (03CH05-CB)

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Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC12630SE	980287	1GHz – 26.5GHz	Jul. 03, 2020	Jul. 02, 2021	Radiation (03CH05-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	18GHz ~ 40GHz Jul. 08, 2020		Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Nov. 10, 2020	Nov. 09, 2021	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-28	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+28	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH01-CB	1GHz ~18GHz 3m	May 29, 2020	May 28, 2021	Radiation (03CH01-CB)
Horn Antenna	ETS-LINDGRE N	3115	00075790	750MHz ~ 18GHz	Nov. 06, 2020	Nov. 05, 2021	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 07, 2021	Jan. 06, 2022	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Apr. 16, 2020	Apr. 15, 2021	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16	1 GHz ~ 18 GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16+17	1 GHz ~ 18 GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz Jul. 16, 2020 Jul. 1		Jul. 15, 2021	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH01-CB)

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Instrument	Brand	Model No.	Serial No.	Characteristics Calibration Date		Calibration Due Date	Remark
Test Software	SPORTON	SENSE	V5.10	- N.C.R.		N.C.R.	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Hz~40GHz May 05, 2020		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)

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

NCR means Non-Calibration required.

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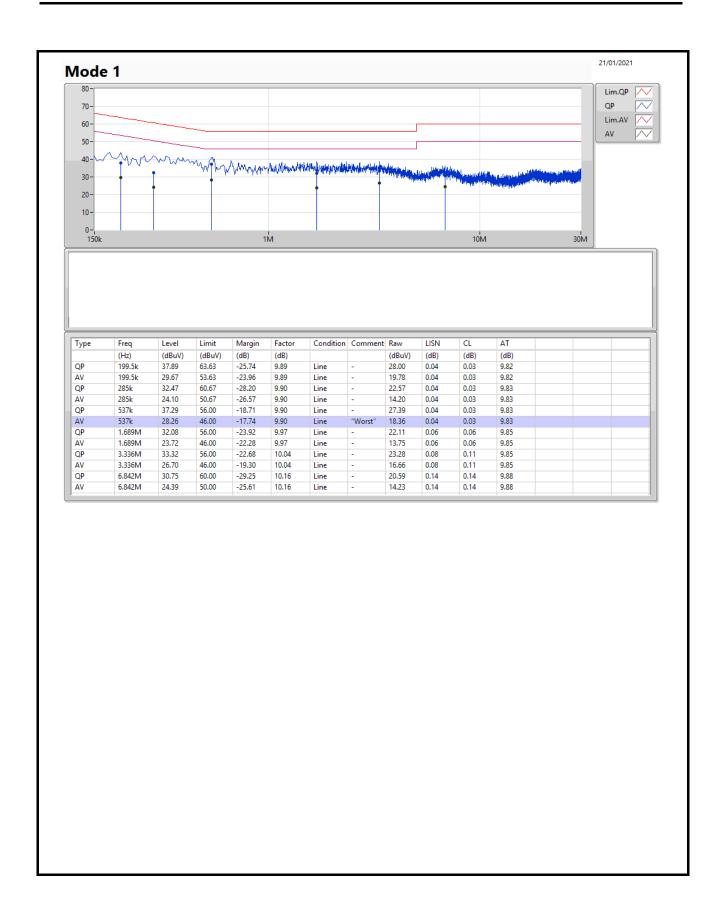
## AC Power Port Conducted Emission Result

Appendix A

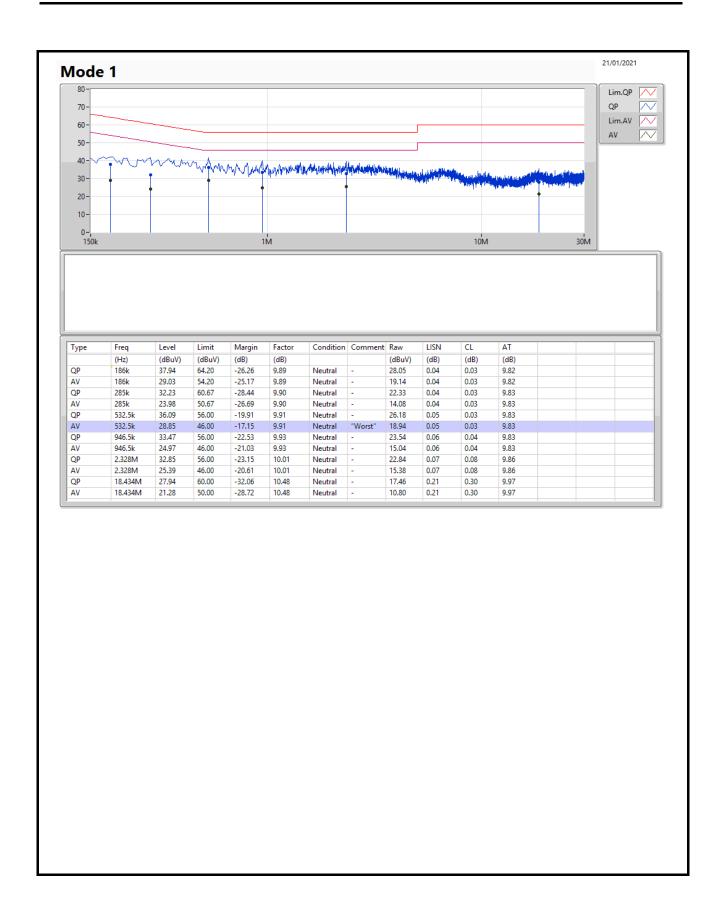
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	532.5k	28.85	46.00	-17.15	Neutral











**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	9.6M	15.417M	15M4G1D	8.55M	13.843M
802.11g-BF_Nss1,(6Mbps)_2TX	15.925M	18.341M	18M3D1D	15.05M	16.367M
VHT20-BF_Nss1,(MCS0)_2TX	16.85M	19.465M	19M5D1D	12.525M	17.566M
VHT40-BF_Nss1,(MCS0)_2TX	33.9M	36.732M	36M7D1D	19.3M	35.732M

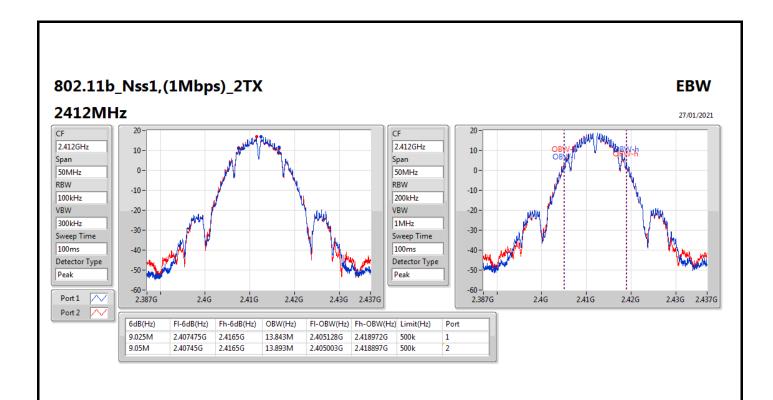
Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth; Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth;

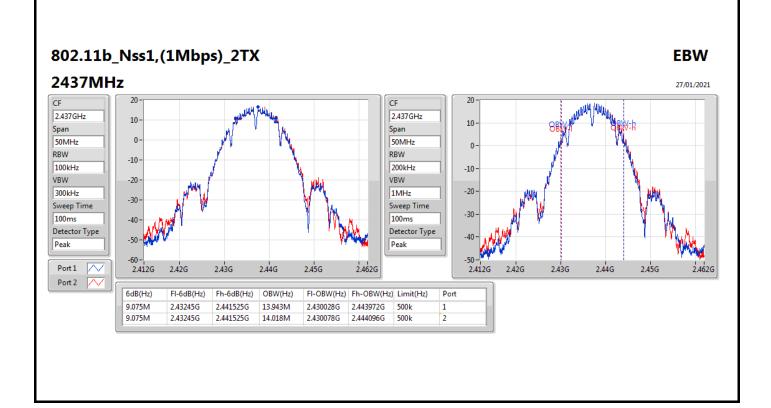


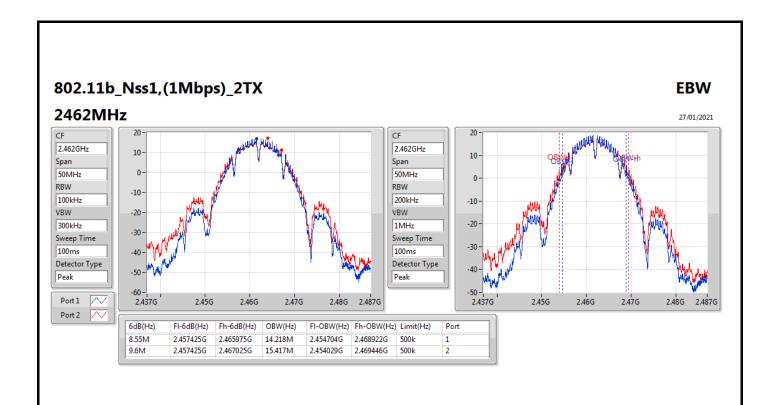
### Result

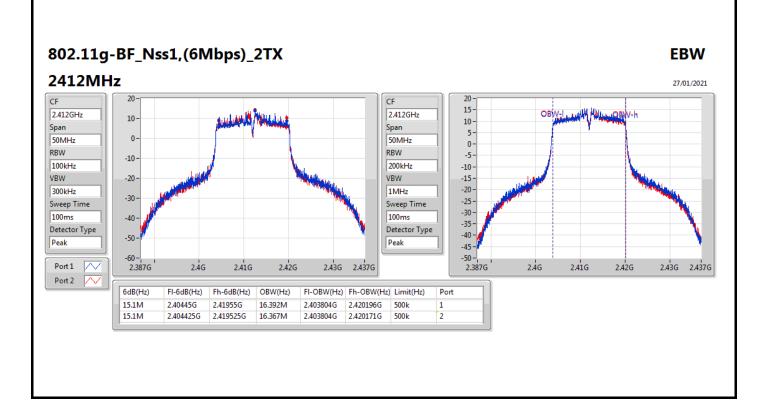
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	9.025M	13.843M	9.05M	13.893M
2437MHz	Pass	500k	9.075M	13.943M	9.075M	14.018M
2462MHz	Pass	500k	8.55M	14.218M	9.6M	15.417M
802.11g-BF_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	15.1M	16.392M	15.1M	16.367M
2437MHz	Pass	500k	15.05M	18.341M	15.625M	17.191M
2462MHz	Pass	500k	15.35M	16.367M	15.925M	16.417M
VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	15.775M	17.566M	15.025M	17.566M
2437MHz	Pass	500k	16.85M	19.465M	15.9M	18.091M
2462MHz	Pass	500k	12.525M	17.666M	16.7M	17.616M
VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	30.3M	36.082M	19.3M	35.732M
2437MHz	Pass	500k	33.75M	36.232M	25.55M	36.732M
2452MHz	Pass	500k	33.9M	35.782M	30M	36.432M

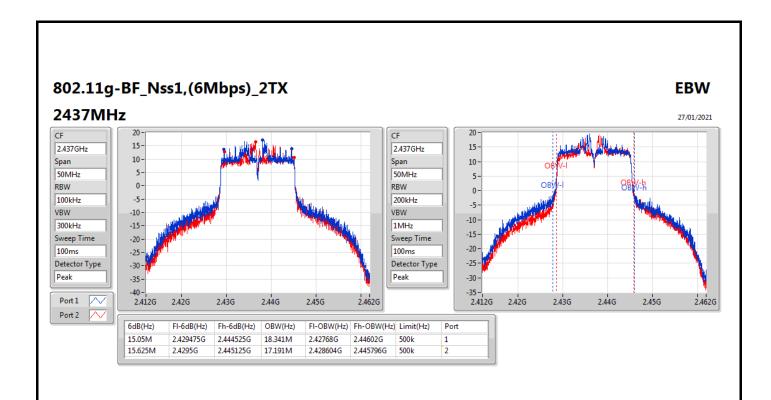
Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;

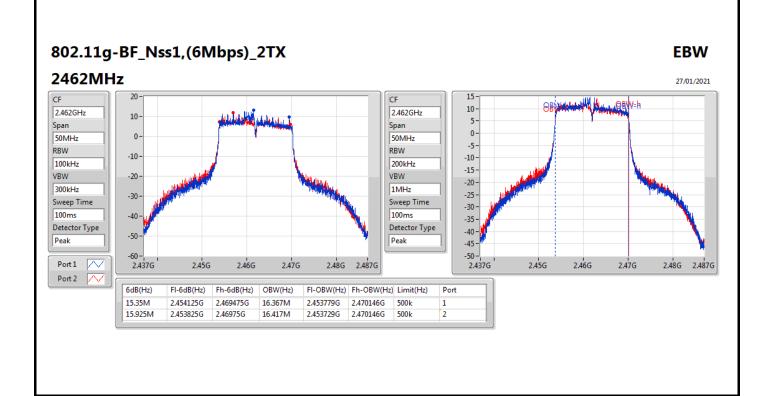


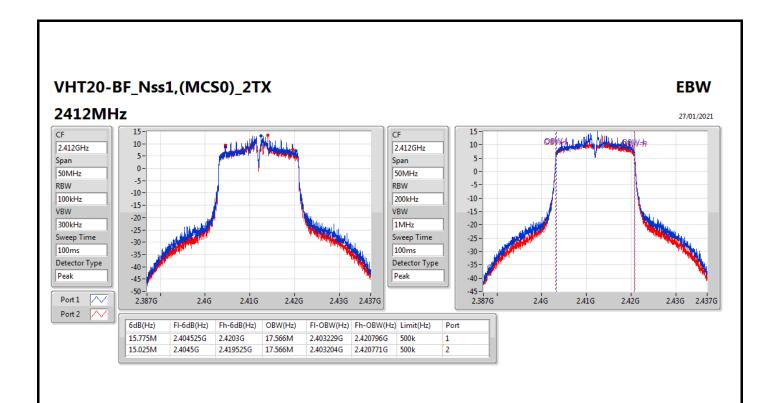


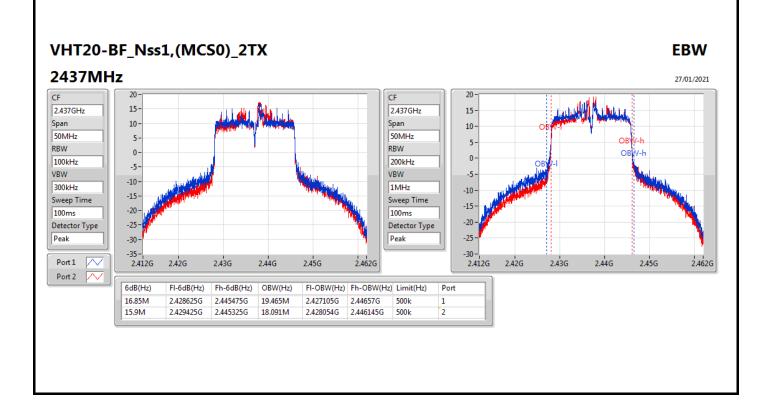


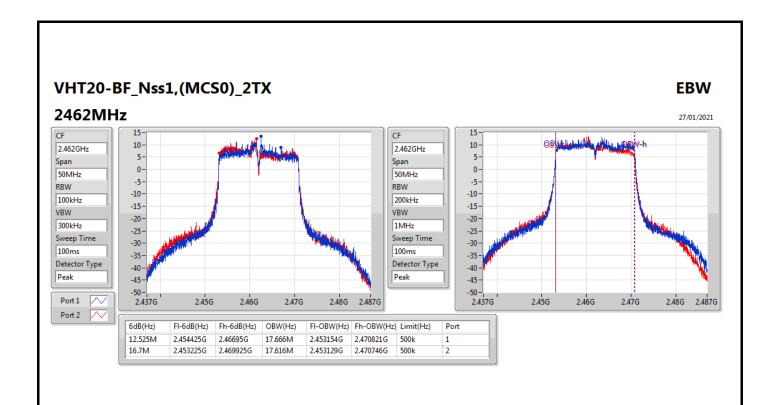


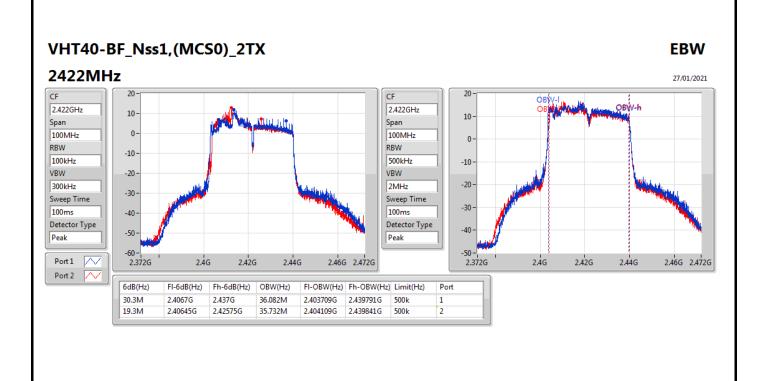


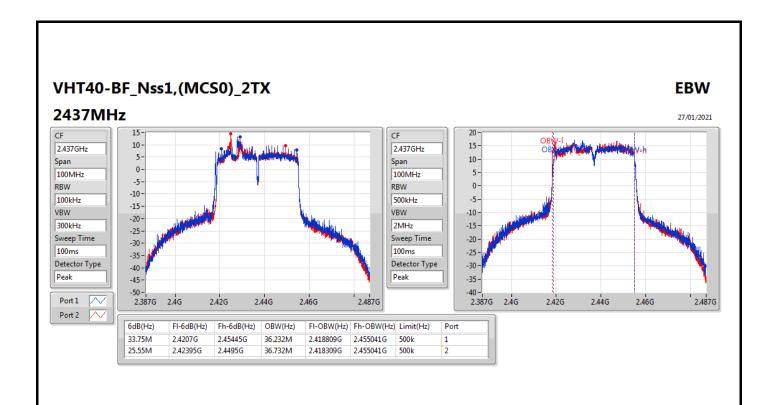


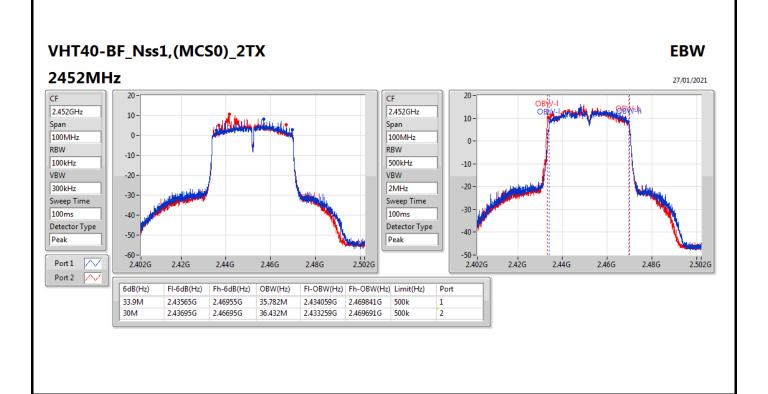














Average Power Appendix C

**Summary** 

Mode	Total Power	Total Power		
	(dBm)	(W)		
2.4-2.4835GHz	-	-		
802.11b_Nss1,(1Mbps)_2TX	29.66	0.92470		
802.11g-BF_Nss1,(6Mbps)_2TX	28.61	0.72611		
VHT20-BF_Nss1,(MCS0)_2TX	28.88	0.77268		
VHT40-BF_Nss1,(MCS0)_2TX	26.78	0.47643		



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	2.00	26.67	26.55	29.62	30.00
2437MHz	Pass	2.00	26.60	26.70	29.66	30.00
2462MHz	Pass	2.00	26.71	26.54	29.64	30.00
802.11g-BF_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	4.86	23.38	23.27	26.34	30.00
2417MHz	Pass	4.86	25.41	25.20	28.32	30.00
2437MHz	Pass	4.86	25.72	25.27	28.51	30.00
2457MHz	Pass	4.86	25.85	25.33	28.61	30.00
2462MHz	Pass	4.86	22.22	21.83	25.04	30.00
VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	4.86	22.59	22.23	25.42	30.00
2417MHz	Pass	4.86	25.58	24.77	28.20	30.00
2437MHz	Pass	4.86	25.72	25.13	28.45	30.00
2457MHz	Pass	4.86	25.98	25.75	28.88	30.00
2462MHz	Pass	4.86	21.79	21.64	24.73	30.00
VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	4.86	22.10	21.86	24.99	30.00
2437MHz	Pass	4.86	23.85	23.68	26.78	30.00
2452MHz	Pass	4.86	21.53	21.54	24.55	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	1.27						
802.11g-BF_Nss1,(6Mbps)_2TX	3.69						
VHT20-BF_Nss1,(MCS0)_2TX	1.32						
VHT40-BF_Nss1,(MCS0)_2TX	-1.83						

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

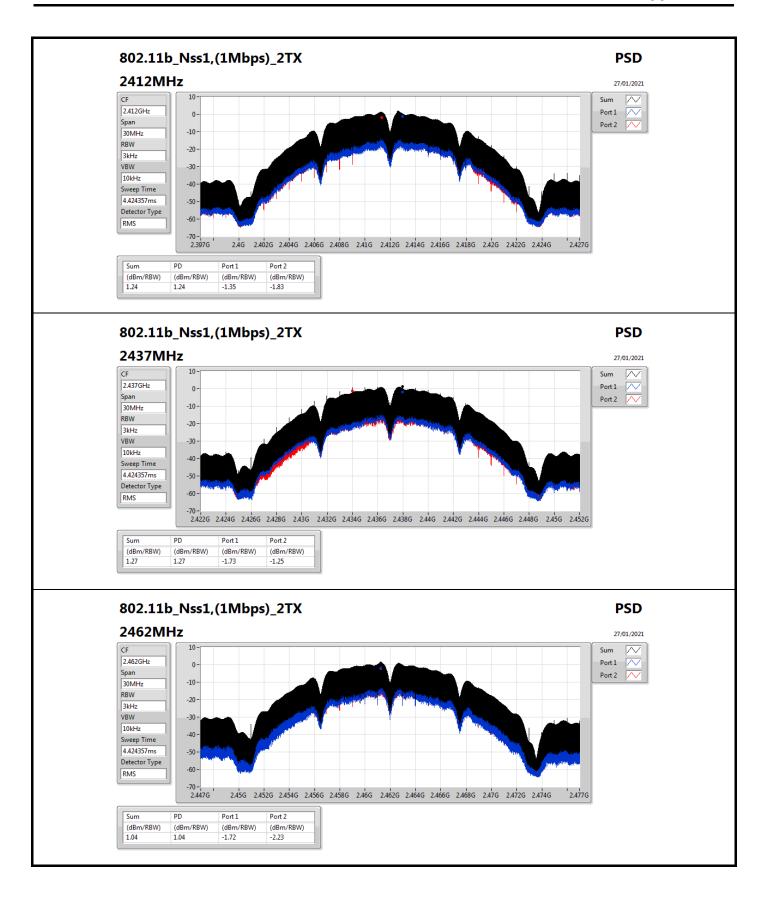


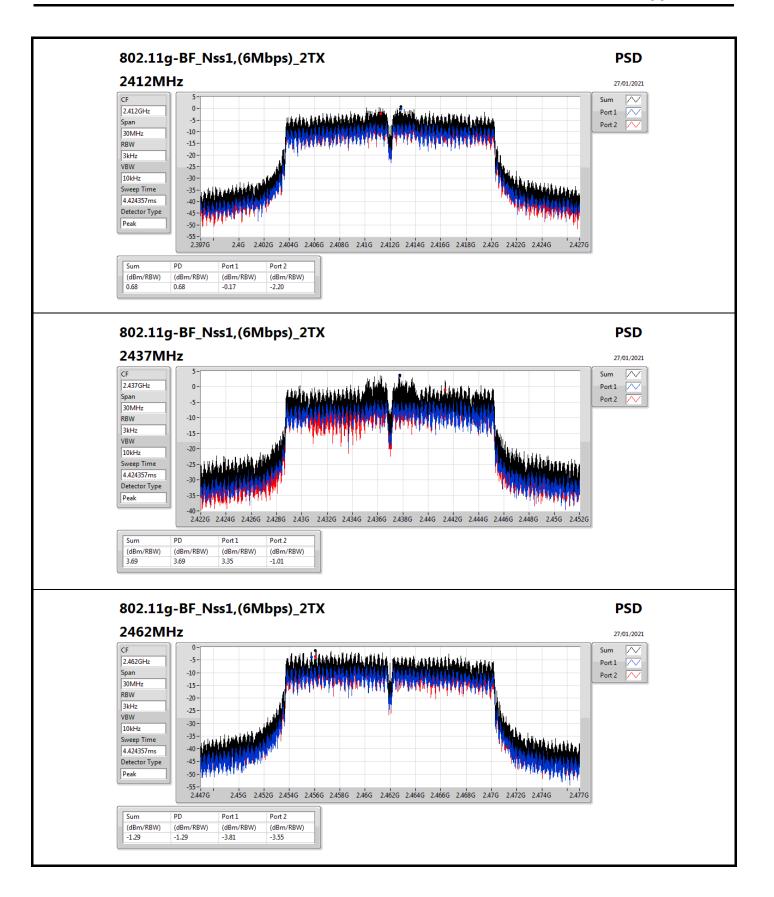
Appendix D **PSD** 

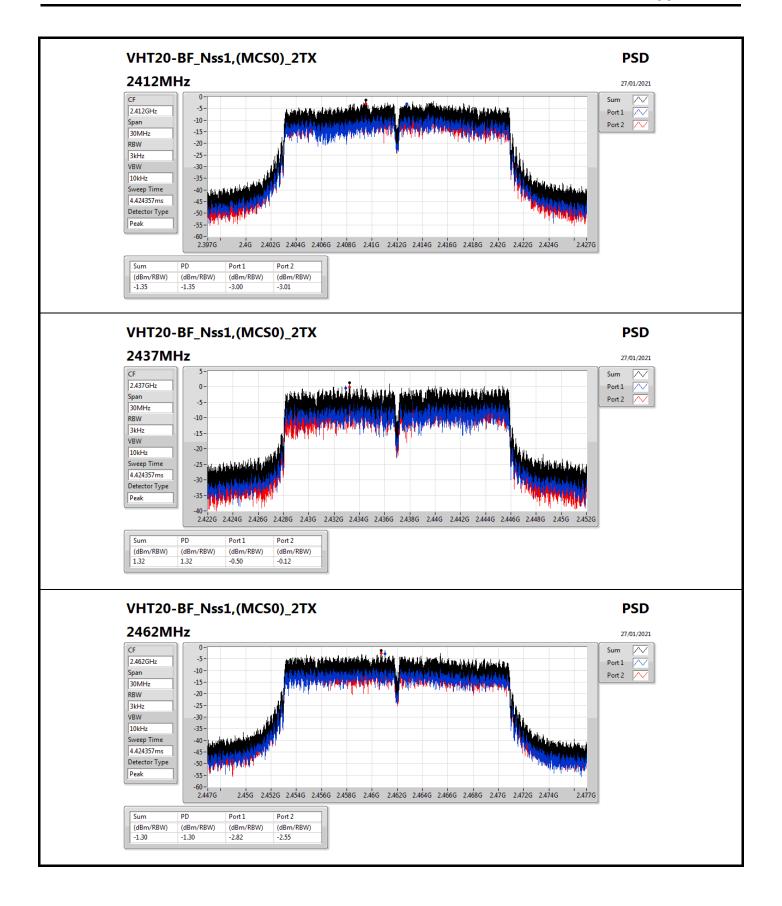
### Result

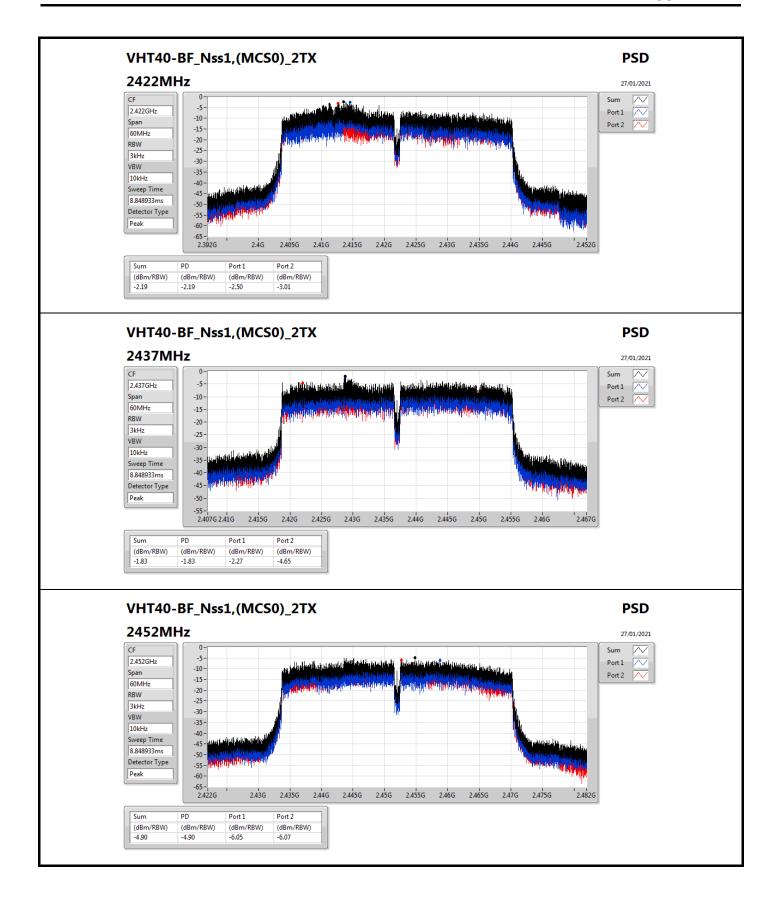
Mode	Result	DG	Port 1	Port 2	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11b_Nss1,(1Mbps)_2TX	=	-	-	-	-	-
2412MHz	Pass	4.86	-1.35	-1.83	1.24	8.00
2437MHz	Pass	4.86	-1.73	-1.25	1.27	8.00
2462MHz	Pass	4.86	-1.72	-2.23	1.04	8.00
802.11g-BF_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	4.86	-0.17	-2.20	0.68	8.00
2437MHz	Pass	4.86	3.35	-1.01	3.69	8.00
2462MHz	Pass	4.86	-3.81	-3.55	-1.29	8.00
VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	4.86	-3.00	-3.01	-1.35	8.00
2437MHz	Pass	4.86	-0.50	-0.12	1.32	8.00
2462MHz	Pass	4.86	-2.82	-2.55	-1.30	8.00
VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	4.86	-2.50	-3.01	-2.19	8.00
2437MHz	Pass	4.86	-2.27	-4.65	-1.83	8.00
2452MHz	Pass	4.86	-6.05	-6.07	-4.90	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	2.43749G	16.67	-13.33	749.39M	-47.94	2.399G	-20.28	2.4G	-36.09	2.48394G	-46.77	7.23514G	-29.99	2
802.11g-BF_Nss1,(6Mbps)_2TX	Pass	2.43499G	18.33	-11.67	729.58M	-47.71	2.39824G	-16.98	2.4G	-20.02	2.48494G	-46.77	7.23795G	-36.38	1
VHT20-BF_Nss1,(MCS0)_2TX	Pass	2.43599G	19.39	-10.61	759.58M	-48.07	2.3992G	-21.86	2.4G	-25.24	2.51232G	-46.90	7.23514G	-36.74	2
VHT40-BF_Nss1,(MCS0)_2TX	Pass	2.42647G	13.23	-16.77	837.23M	-47.67	2.39956G	-21.76	2.4G	-23.48	2.4839G	-34.56	15.1672G	-40.66	1



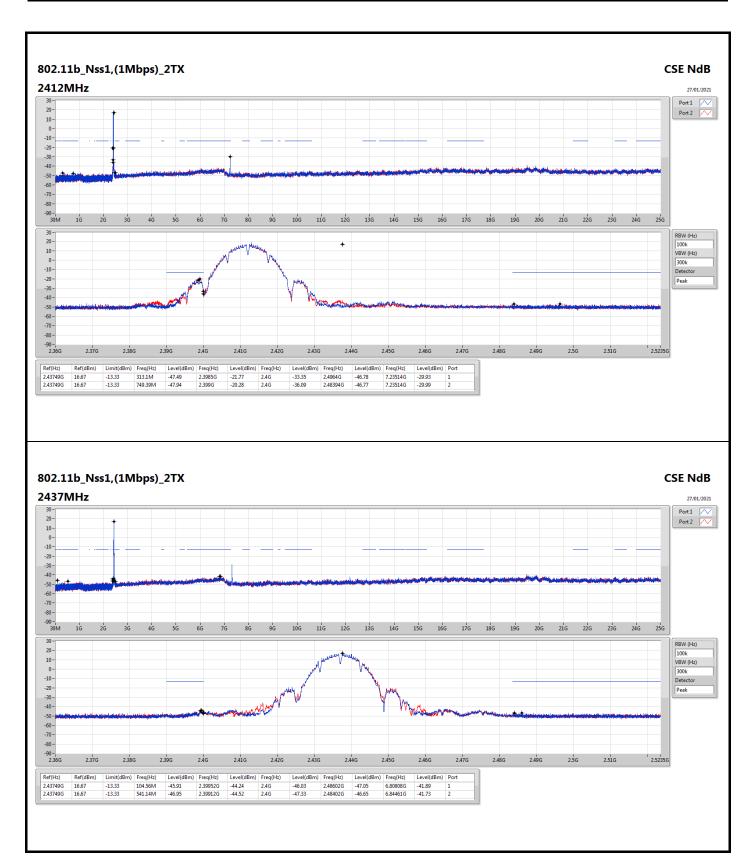
## CSE(Non-restricted Band)

# Appendix E

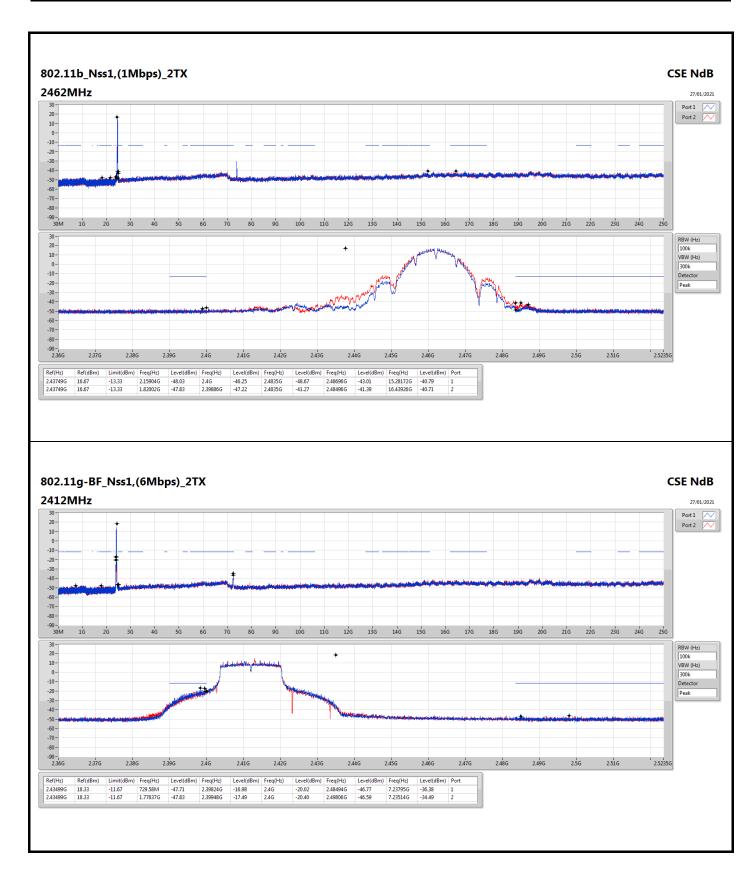
### Result

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	2.43749G	16.67	-13.33	313.1M	-47.49	2.3985G	-21.77	2.4G	-33.35	2.4964G	-46.78	7.23514G	-29.93	1
2412MHz	Pass	2.43749G	16.67	-13.33	749.39M	-47.94	2.399G	-20.28	2.4G	-36.09	2.48394G	-46.77	7.23514G	-29.99	2
2437MHz	Pass	2.43749G	16.67	-13.33	104.56M	-45.91	2.39952G	-44.24	2.4G	-46.03	2.48602G	-47.05	6.80808G	-41.89	1
2437MHz	Pass	2.43749G	16.67	-13.33	541.14M	-46.95	2.39912G	-44.52	2.4G	-47.33	2.48402G	-46.65	6.84461G	-41.73	2
2462MHz	Pass	2.43749G	16.67	-13.33	2.15904G	-48.03	2.4G	-46.25	2.4835G	-48.67	2.48696G	-43.01	15.28172G	-40.79	1
2462MHz	Pass	2.43749G	16.67	-13.33	1.82002G	-47.83	2.39886G	-47.22	2.4835G	-41.27	2.48496G	-41.39	16.43926G	-40.71	2
802.11g-BF_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43499G	18.33	-11.67	729.58M	-47.71	2.39824G	-16.98	2.4G	-20.02	2.48494G	-46.77	7.23795G	-36.38	1
2412MHz	Pass	2.43499G	18.33	-11.67	1.77837G	-47.83	2.39948G	-17.49	2.4G	-20.40	2.49806G	-46.59	7.23514G	-34.49	2
2437MHz	Pass	2.43499G	18.33	-11.67	519.01M	-48.22	2.39888G	-39.17	2.4G	-42.39	2.48958G	-46.07	16.82136G	-41.87	1
2437MHz	Pass	2.43499G	18.33	-11.67	2.12729G	-47.60	2.39978G	-39.30	2.4G	-43.27	2.49558G	-46.26	24.85952G	-41.08	2
2462MHz	Pass	2.43499G	18.33	-11.67	2.15059G	-48.21	2.39058G	-47.12	2.4835G	-33.60	2.48388G	-34.04	16.50669G	-41.46	1
2462MHz	Pass	2.43499G	18.33	-11.67	1.97002G	-47.62	2.3982G	-48.13	2.4835G	-37.12	2.48418G	-35.28	16.78203G	-40.33	2
VHT20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-		-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43599G	19.39	-10.61	1.82381G	-46.57	2.3976G	-22.16	2.4G	-21.88	2.50516G	-46.90	7.23795G	-39.61	1
2412MHz	Pass	2.43599G	19.39	-10.61	759.58M	-48.07	2.3992G	-21.86	2.4G	-25.24	2.51232G	-46.90	7.23514G	-36.74	2
2437MHz	Pass	2.43599G	19.39	-10.61	394.65M	-47.64	2.39978G	-38.15	2.4G	-40.24	2.48718G	-44.79	6.77156G	-41.69	1
2437MHz	Pass	2.43599G	19.39	-10.61	307.27M	-46.75	2.39862G	-39.04	2.4G	-43.27	2.48384G	-45.85	6.71818G	-40.99	2
2462MHz	Pass	2.43599G	19.39	-10.61	364.06M	-46.99	2.4G	-46.20	2.4835G	-36.46	2.48392G	-36.23	23.1794G	-41.24	1
2462MHz	Pass	2.43599G	19.39	-10.61	767.74M	-46.68	2.39672G	-47.40	2.4835G	-39.06	2.4835G	-37.54	16.76517G	-41.51	2
VHT40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.42647G	13.23	-16.77	2.12735G	-47.82	2.39664G	-26.24	2.4G	-29.96	2.53206G	-47.22	16.78544G	-41.45	1
2422MHz	Pass	2.42647G	13.23	-16.77	2.12077G	-48.29	2.39392G	-27.89	2.4G	-28.08	2.48358G	-45.82	7.24712G	-40.99	2
2437MHz	Pass	2.42647G	13.23	-16.77	837.23M	-47.67	2.39956G	-21.76	2.4G	-23.48	2.4839G	-34.56	15.1672G	-40.66	1
2437MHz	Pass	2.42647G	13.23	-16.77	878.16M	-47.06	2.39796G	-22.17	2.4G	-25.13	2.4835G	-36.37	6.8657G	-41.12	2
2452MHz	Pass	2.42647G	13.23	-16.77	559.85M	-47.67	2.39944G	-45.86	2.4835G	-33.40	2.48362G	-32.36	16.41804G	-41.74	1
2452MHz	Pass	2.42647G	13.23	-16.77	946.29M	-47.72	2.39768G	-45.40	2.4835G	-37.69	2.48422G	-34.25	6.94142G	-40.96	2

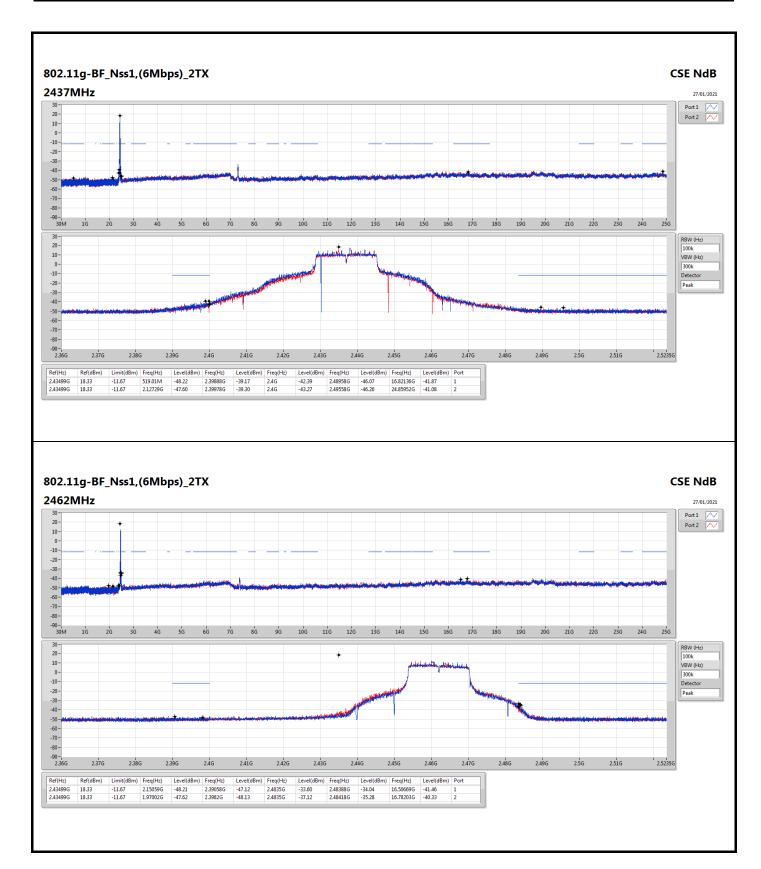




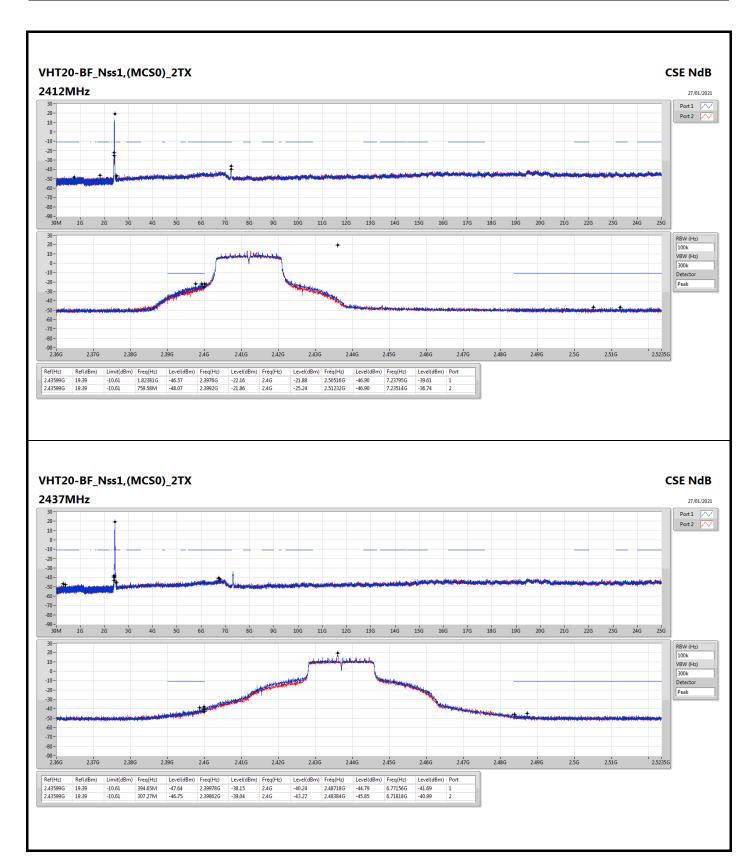




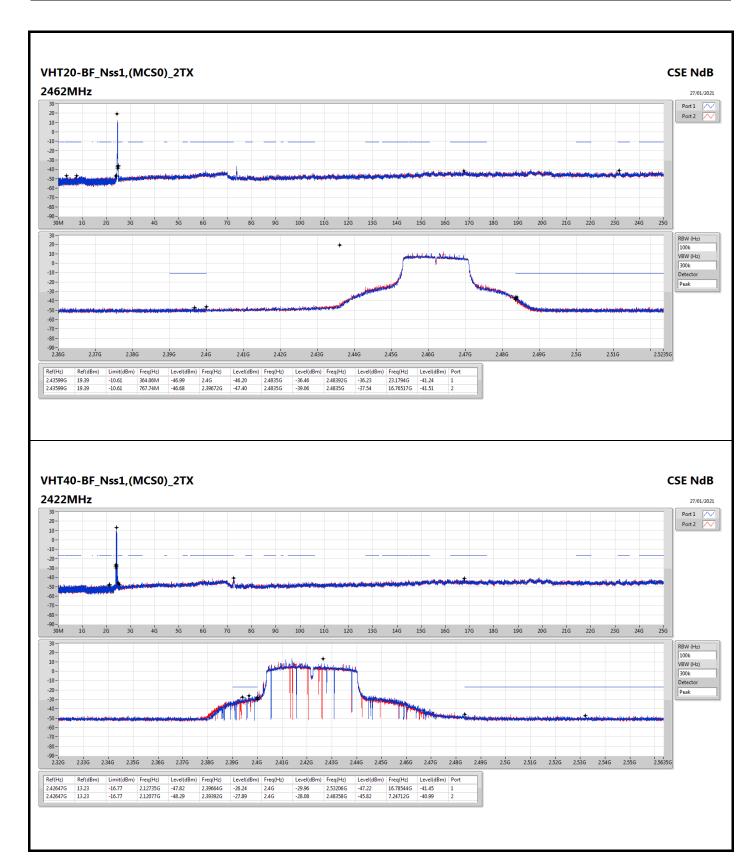




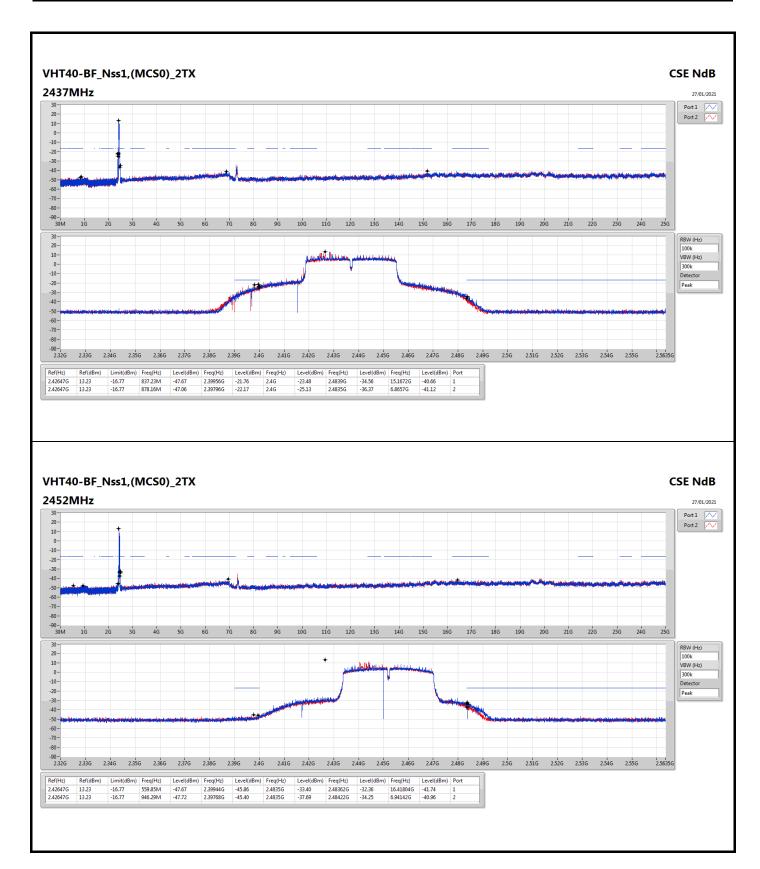














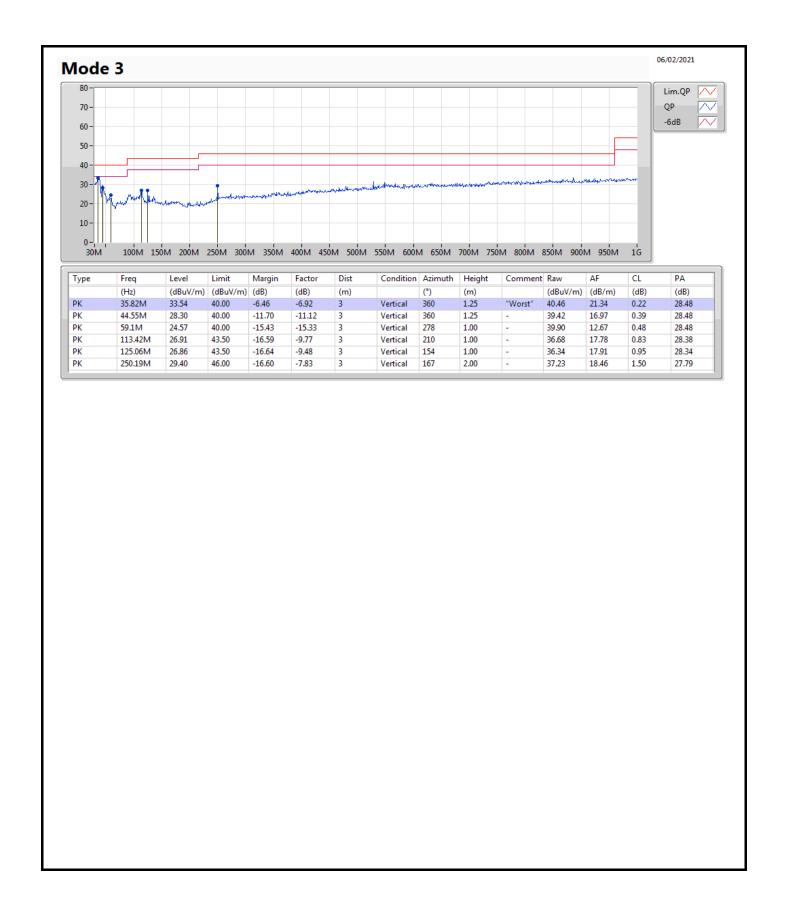
### Radiated Emissions below 1GHz

Appendix F.1

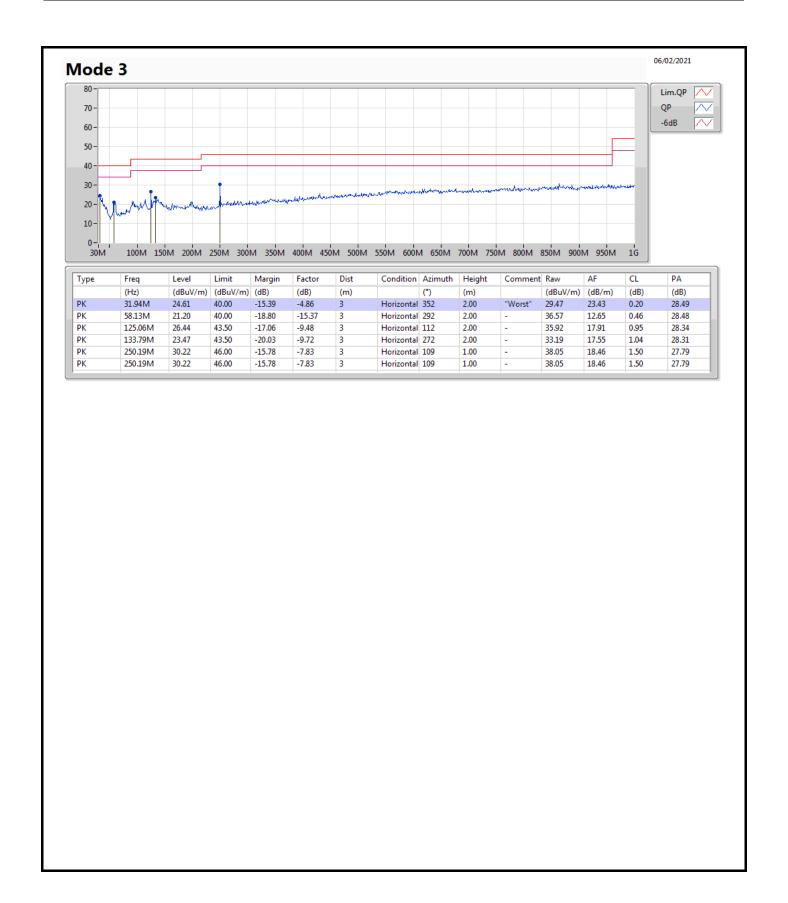
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 3	Pass	PK	35.82M	33.54	40.00	-6.46	Vertical











### RSE TX above 1GHz

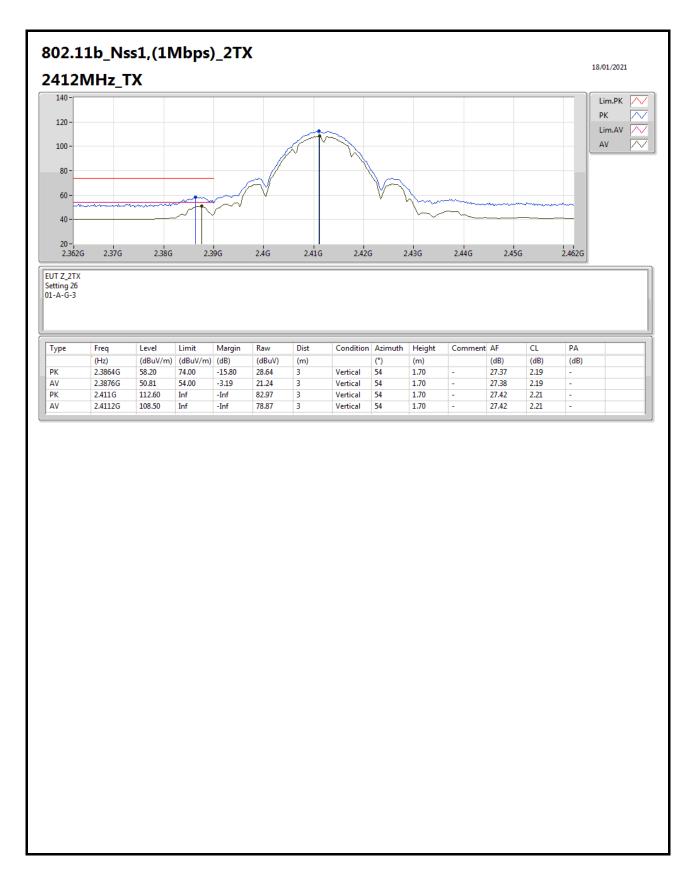
Appendix F.2

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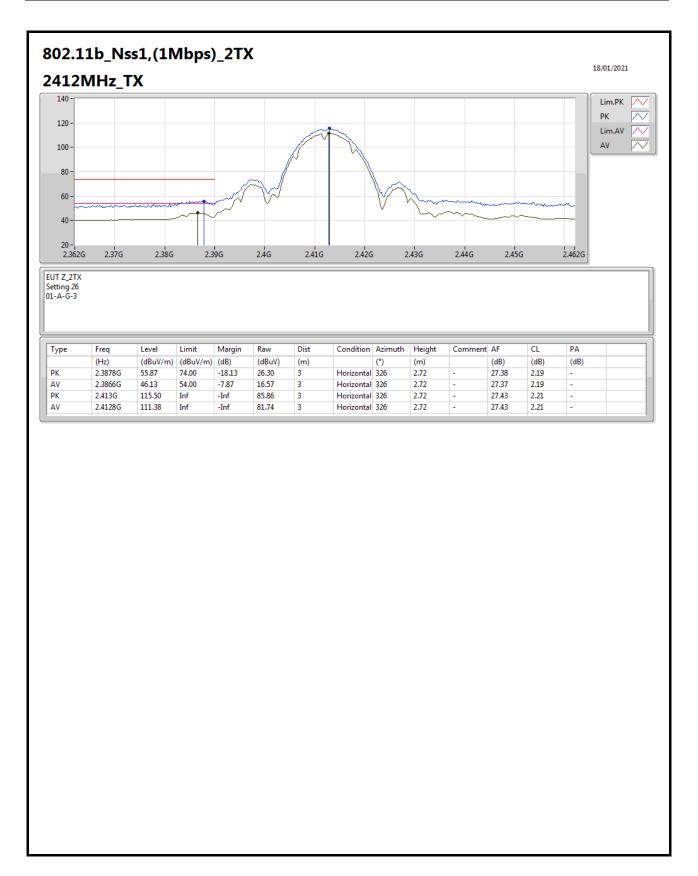
**Summary** 

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	53.84	54.00	-0.16	3	Horizontal	307	2.62	-

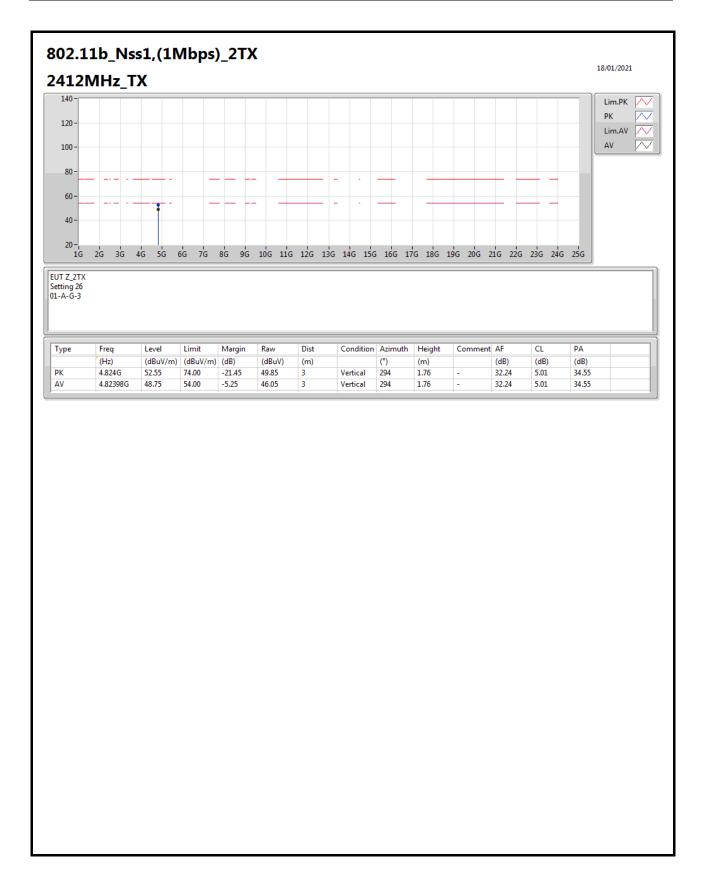




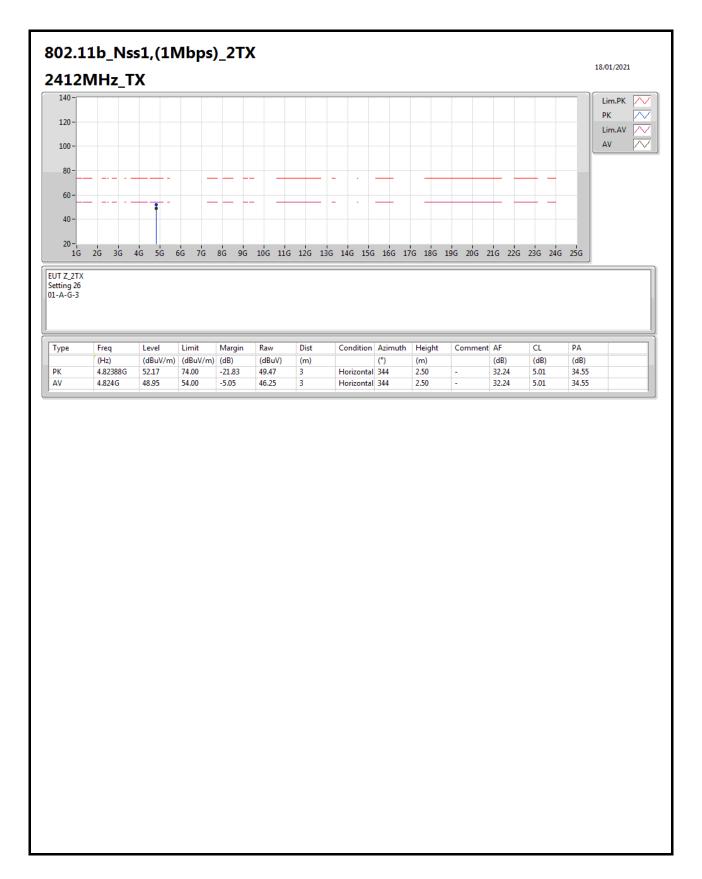




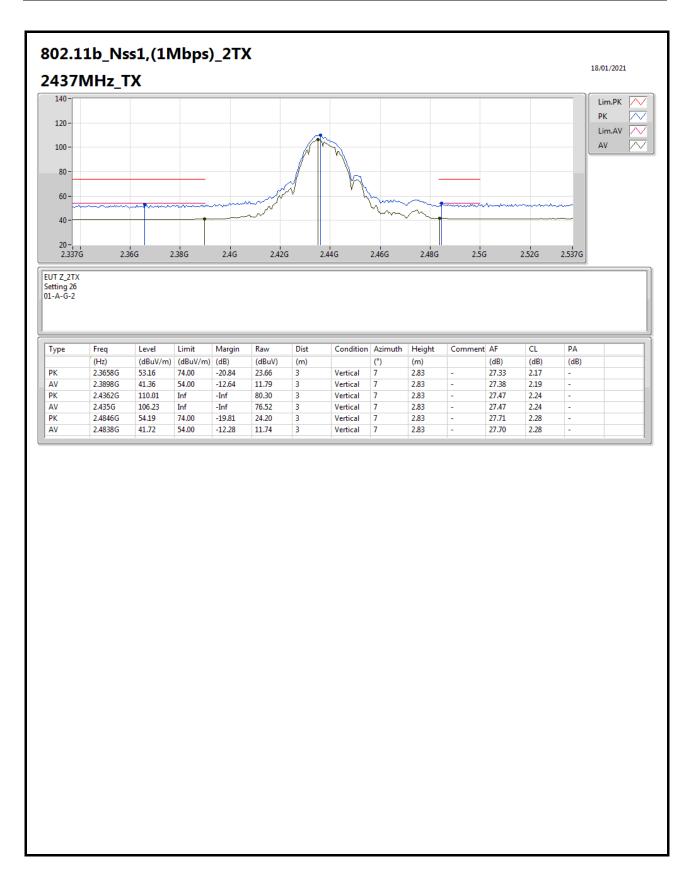


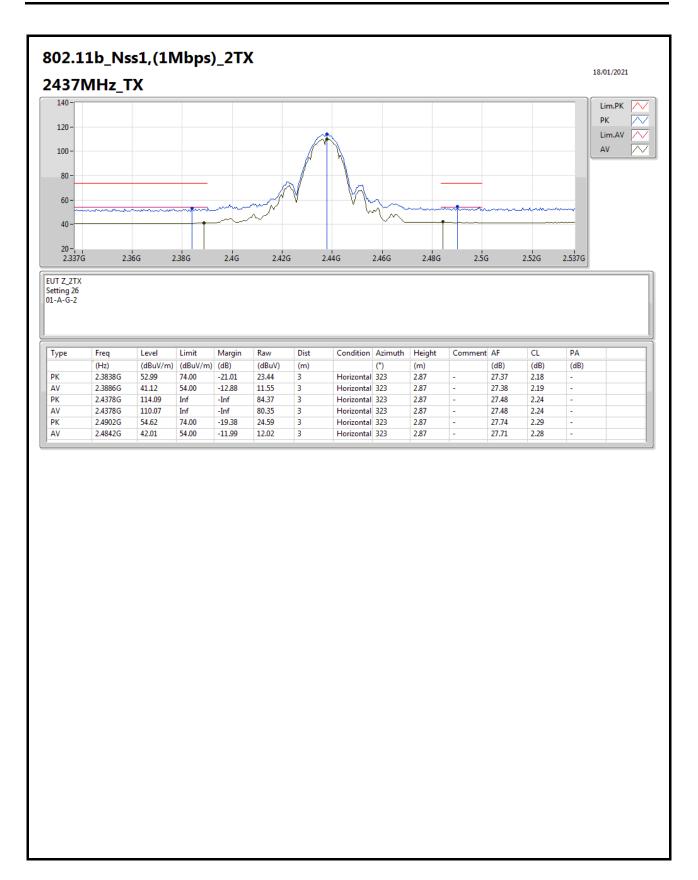






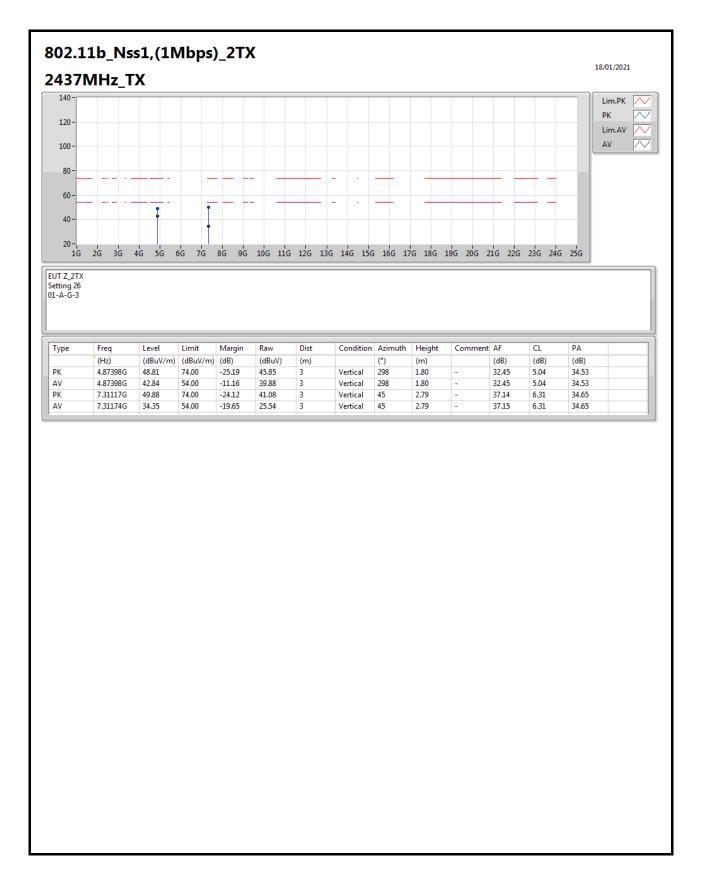




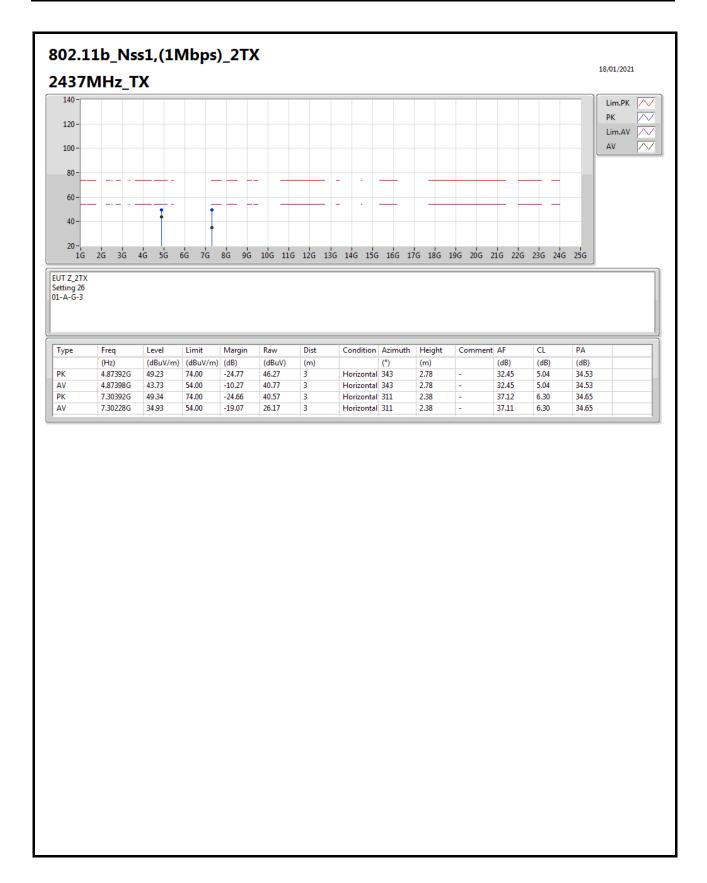


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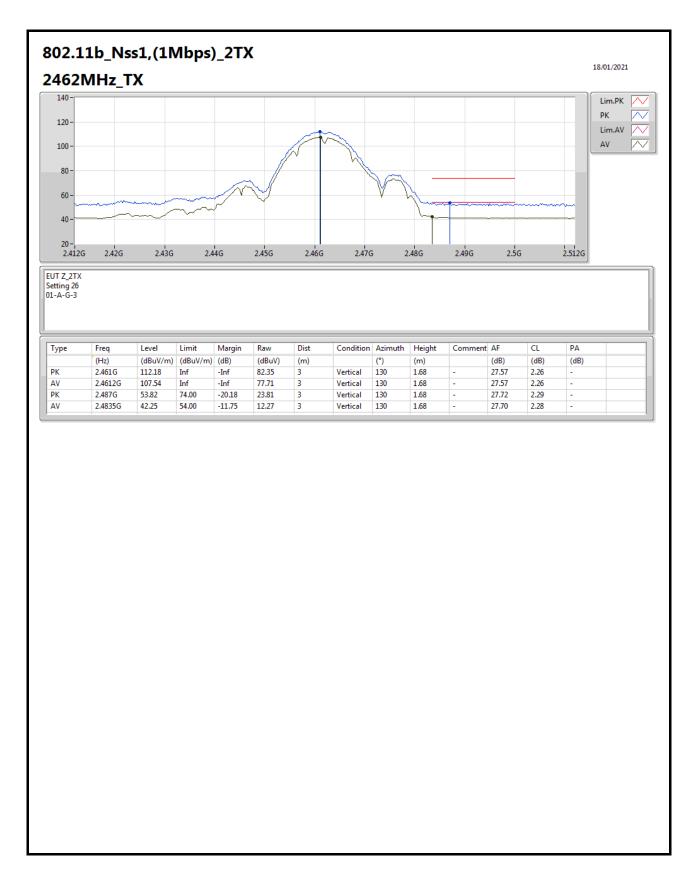




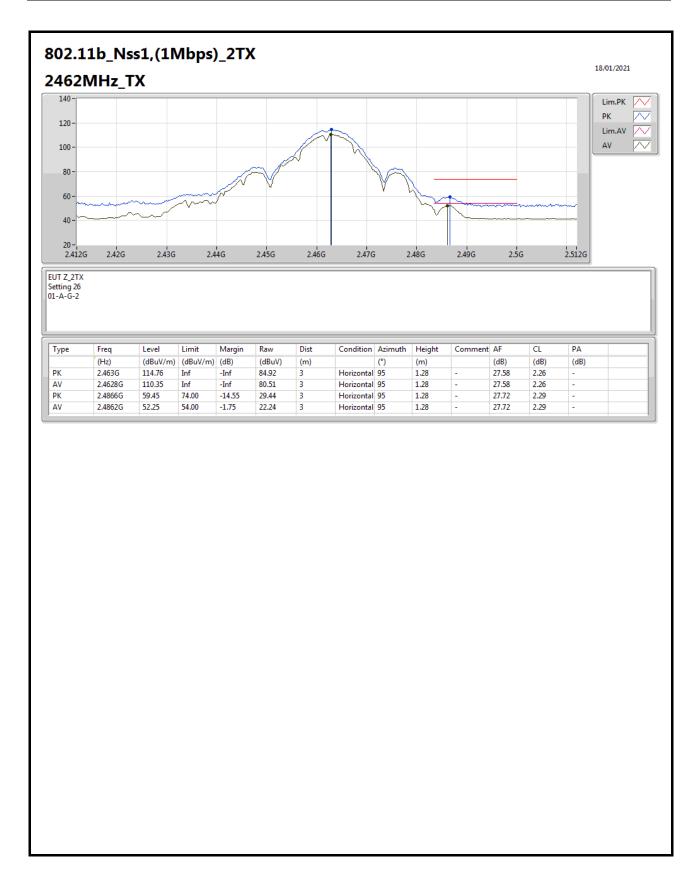




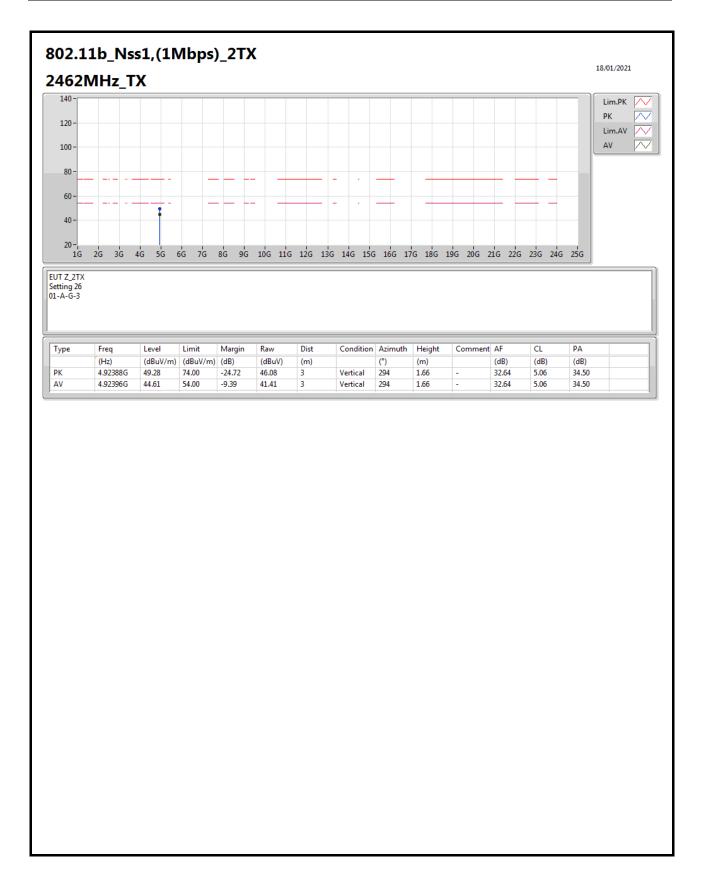




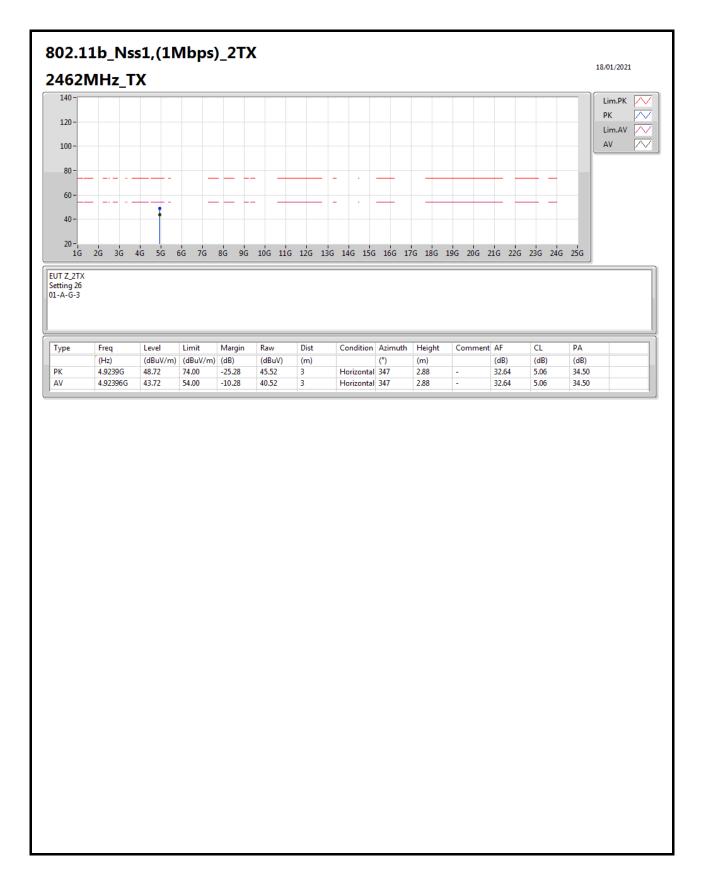




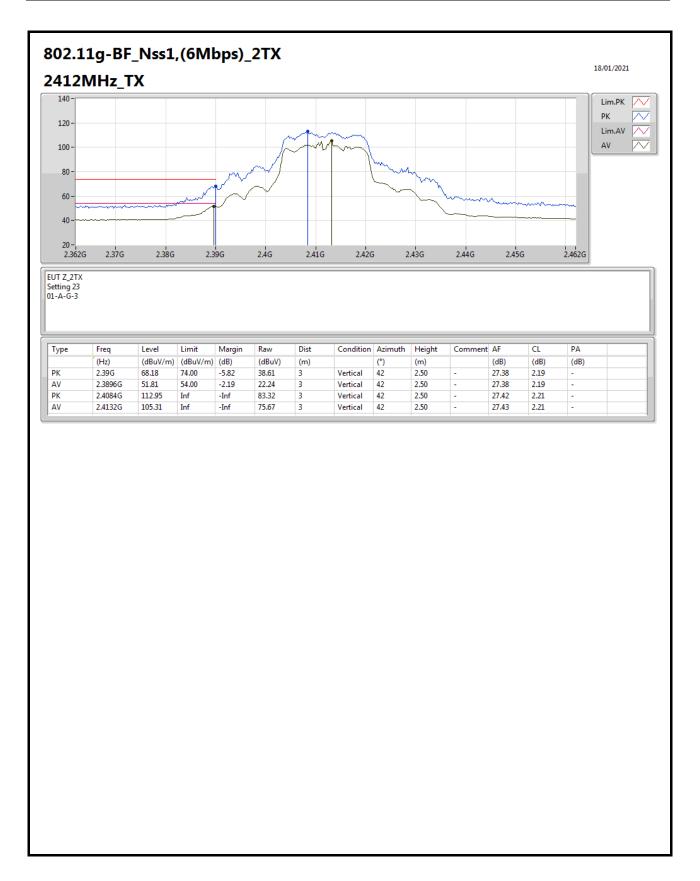




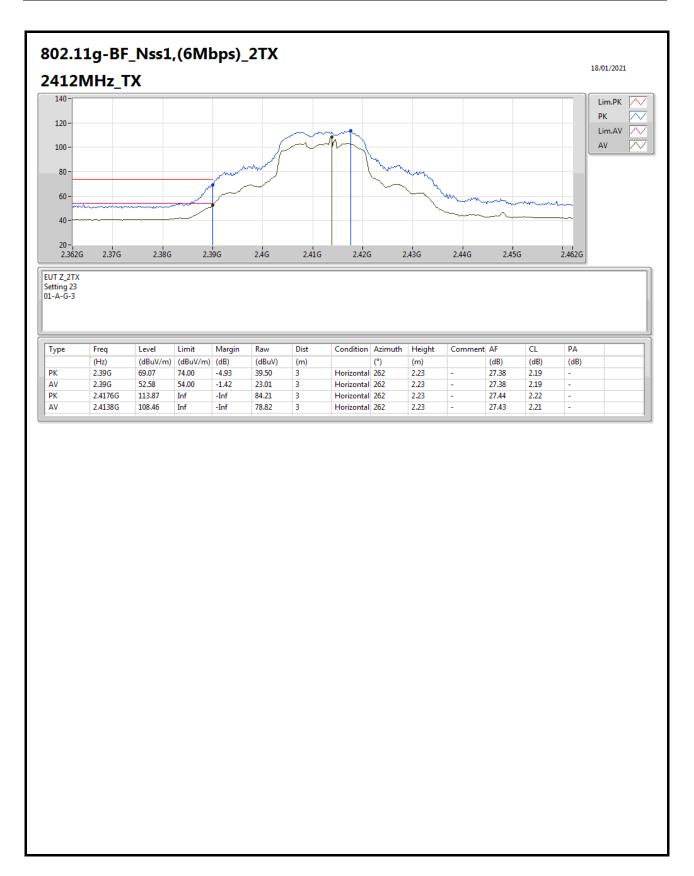




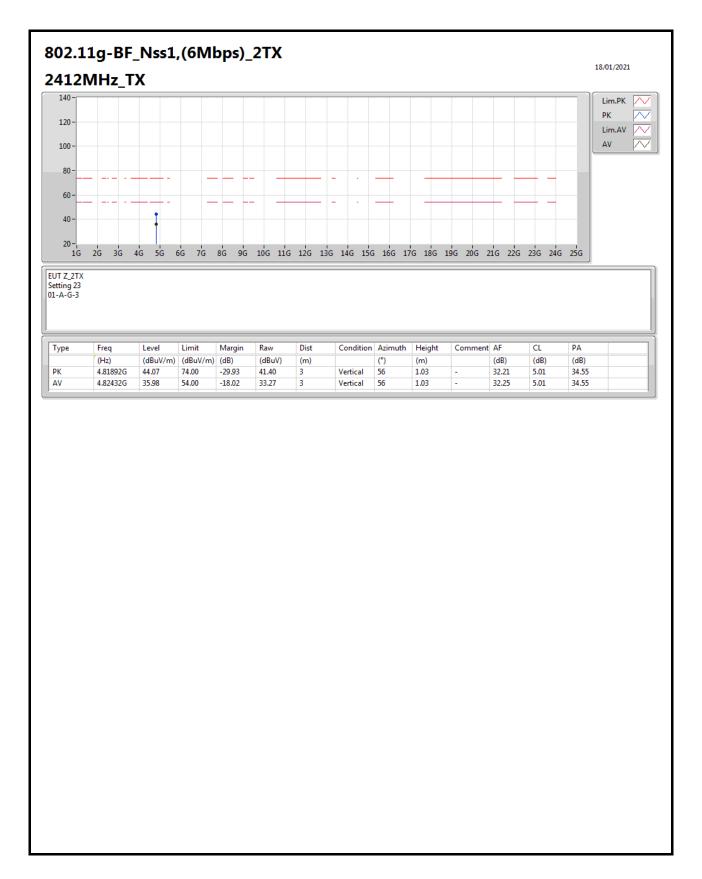




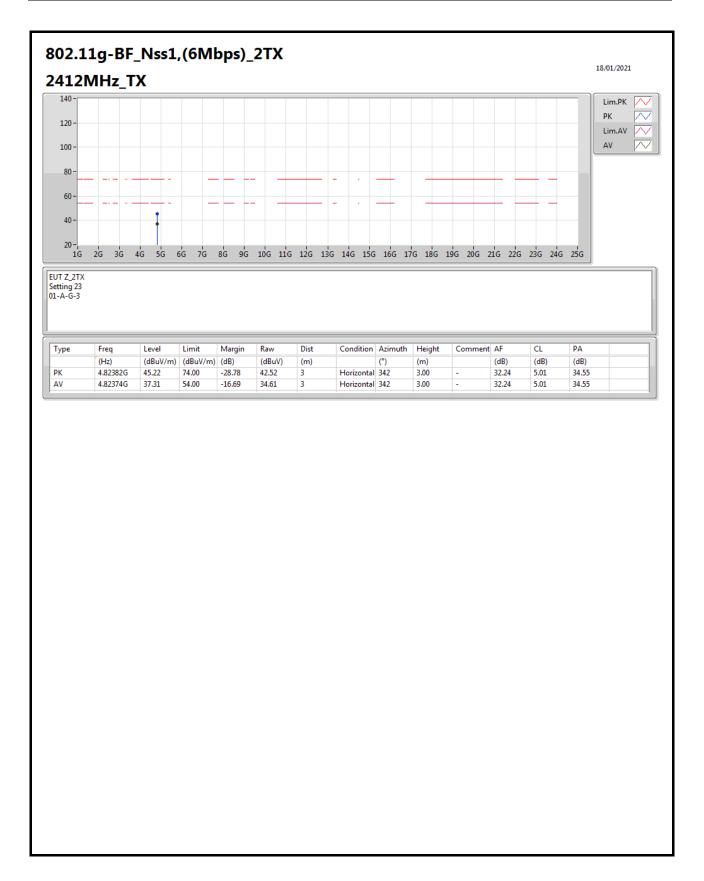




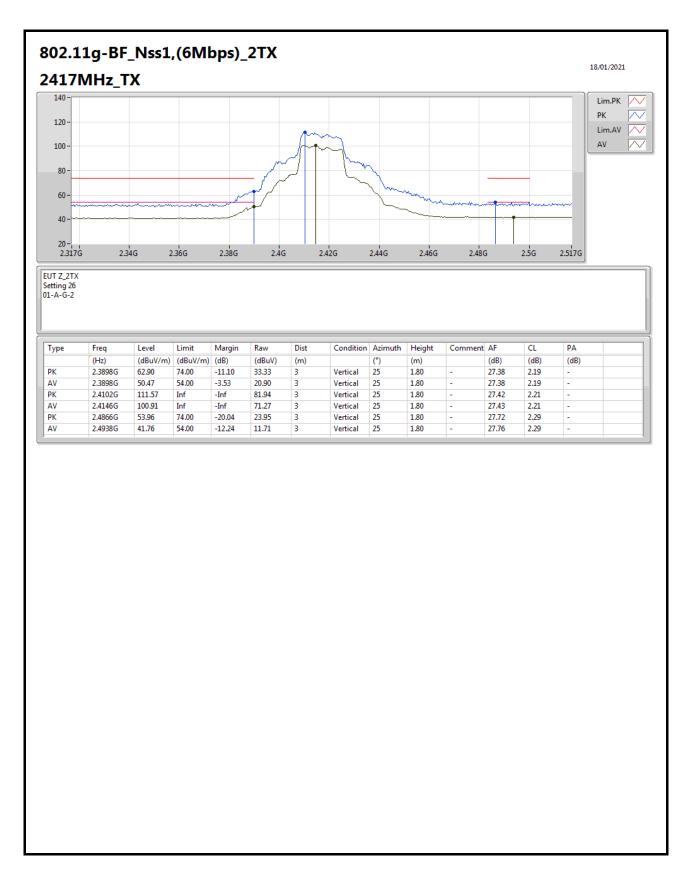




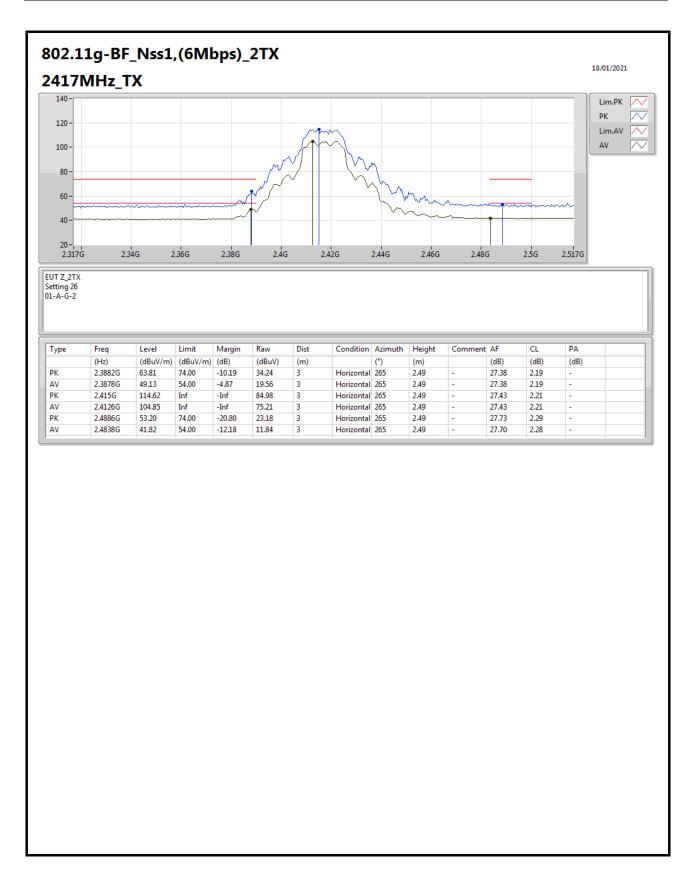




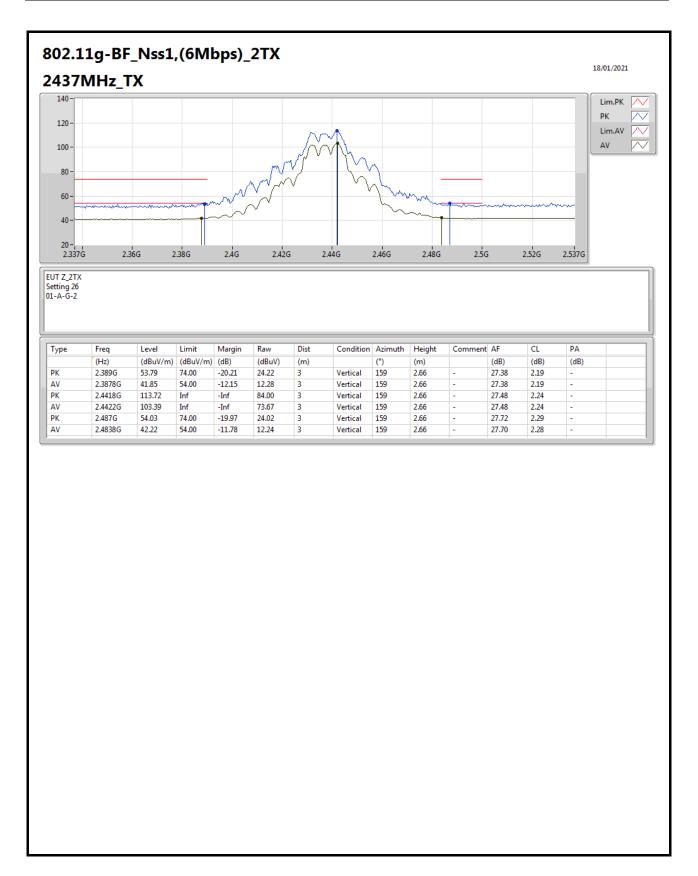




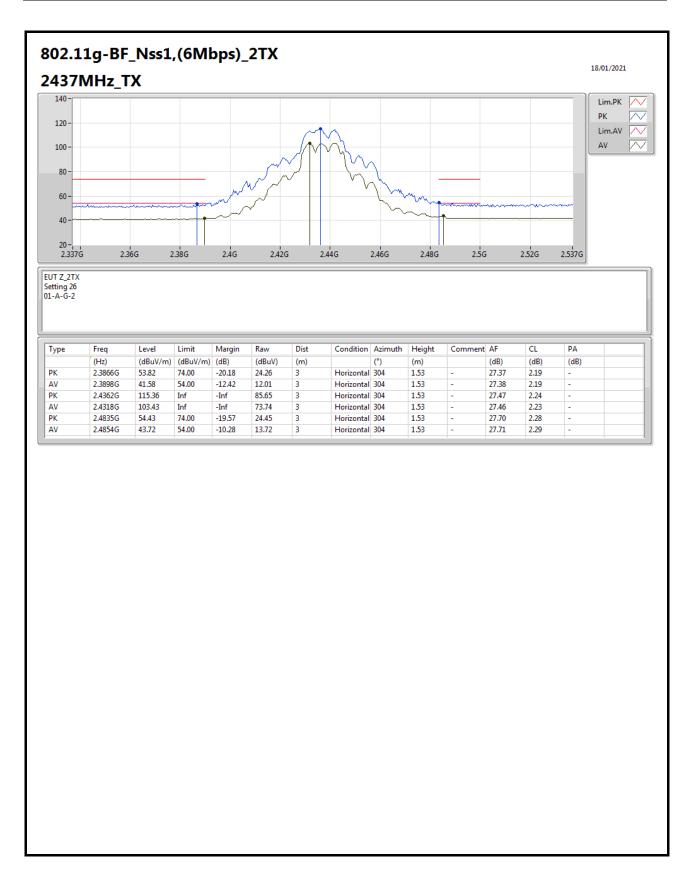




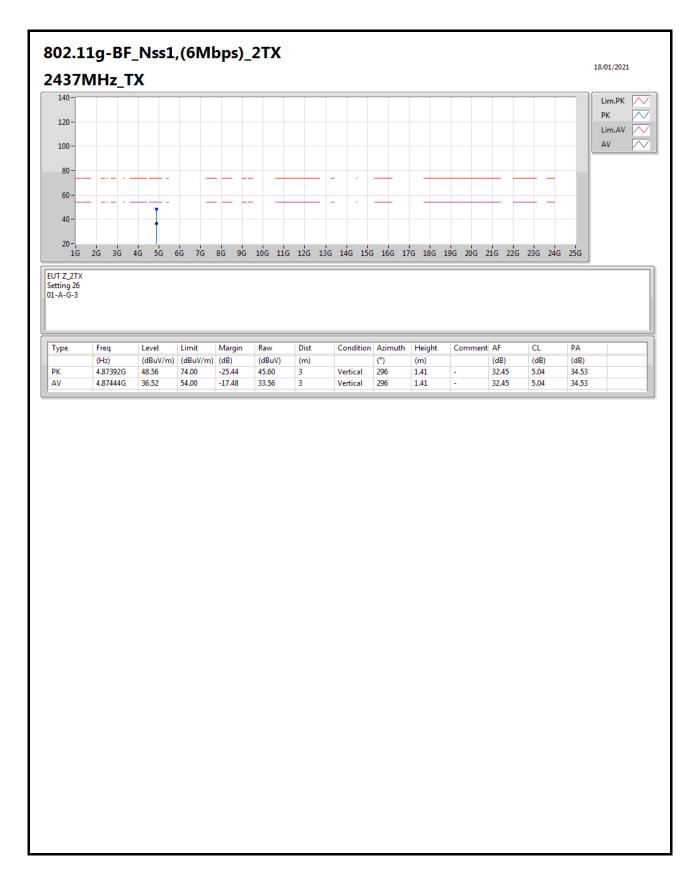




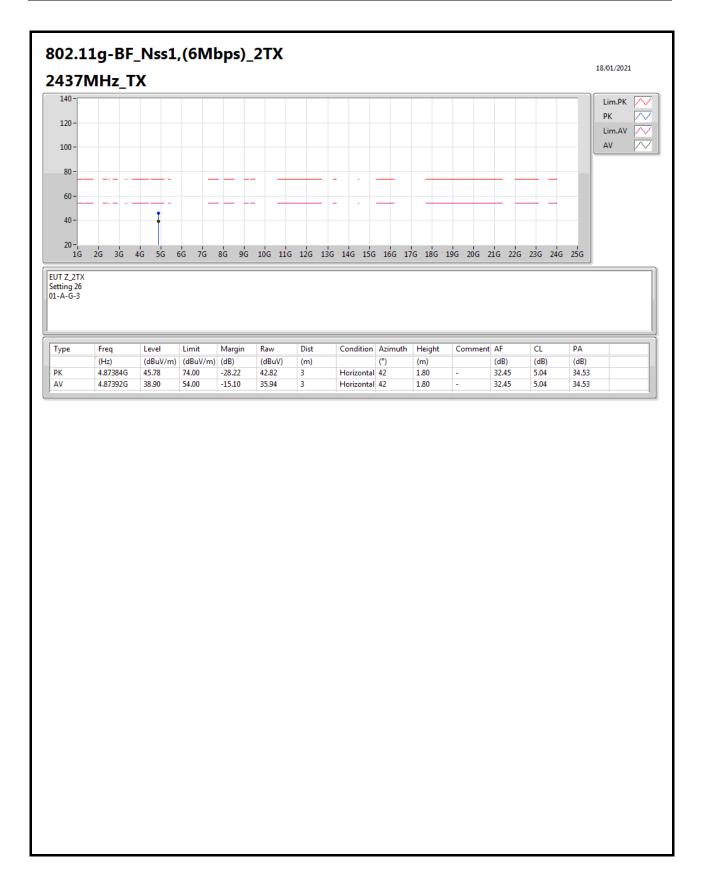




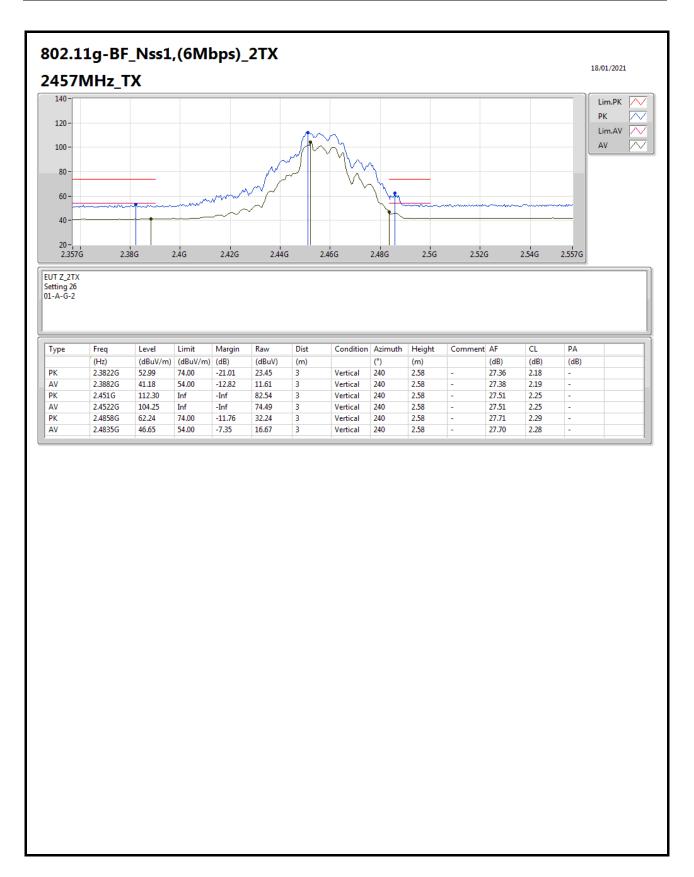




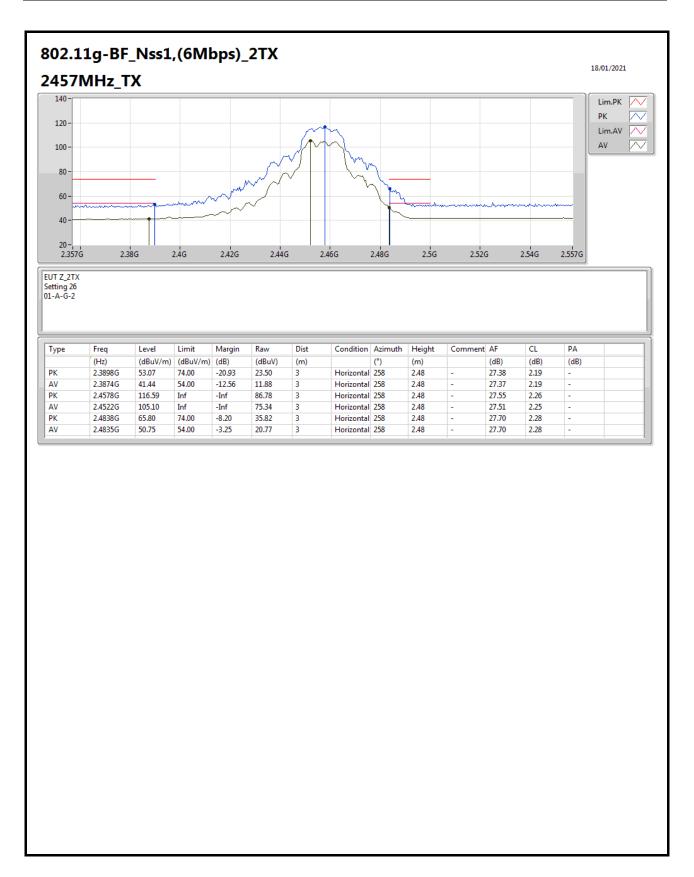




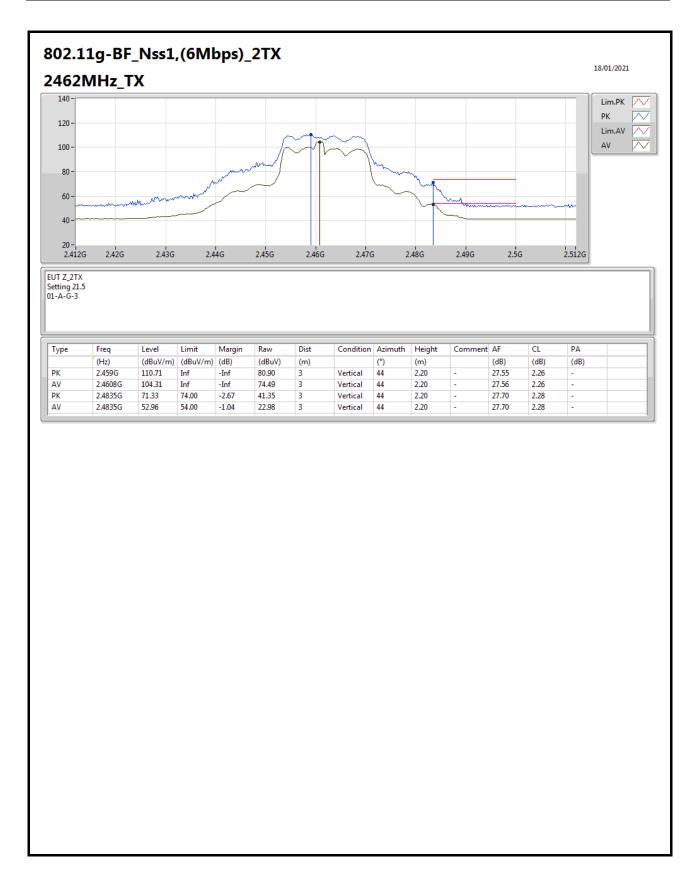




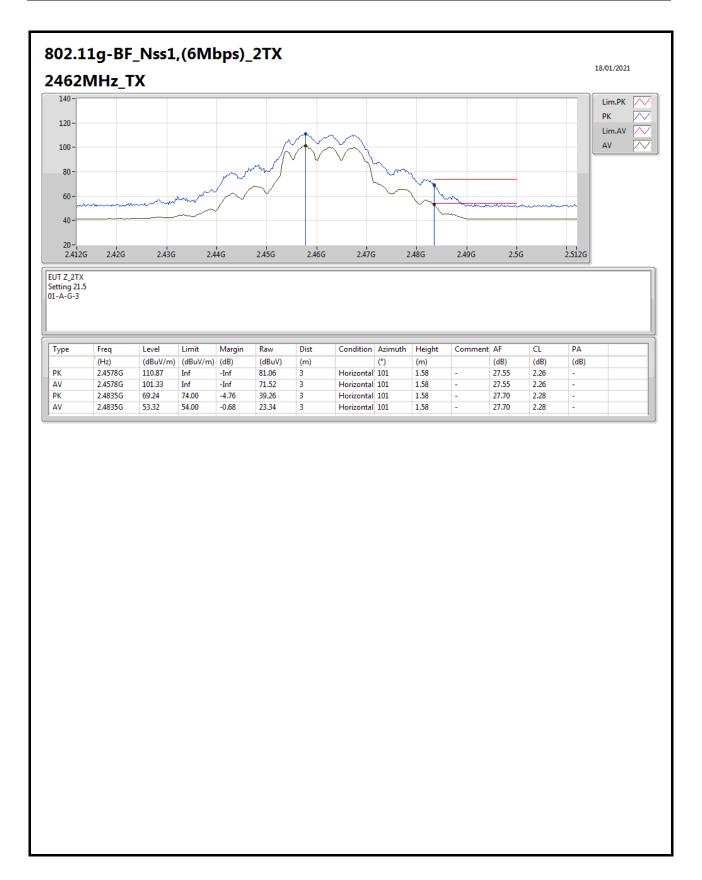




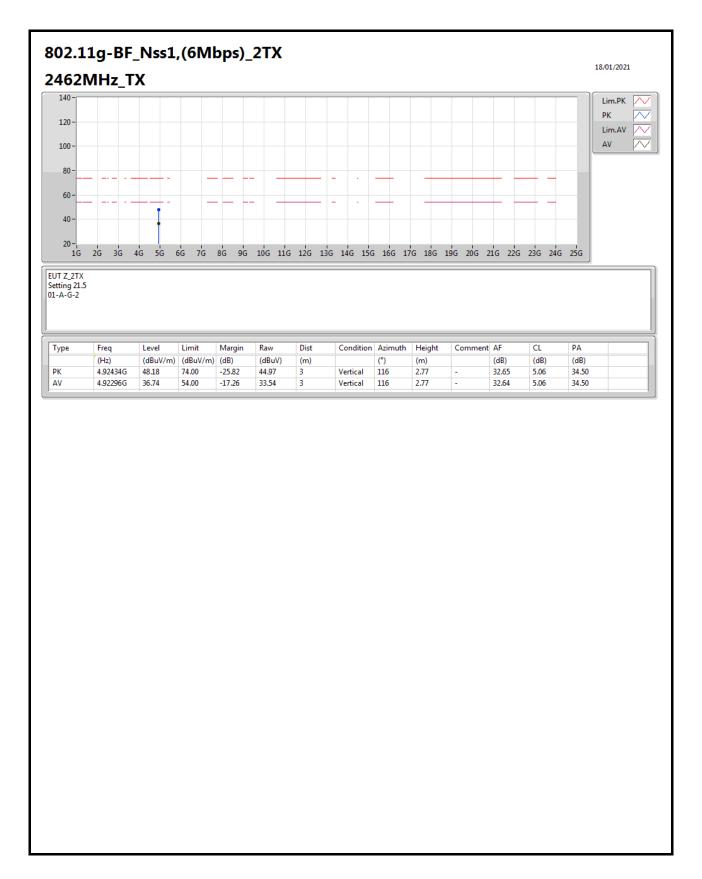




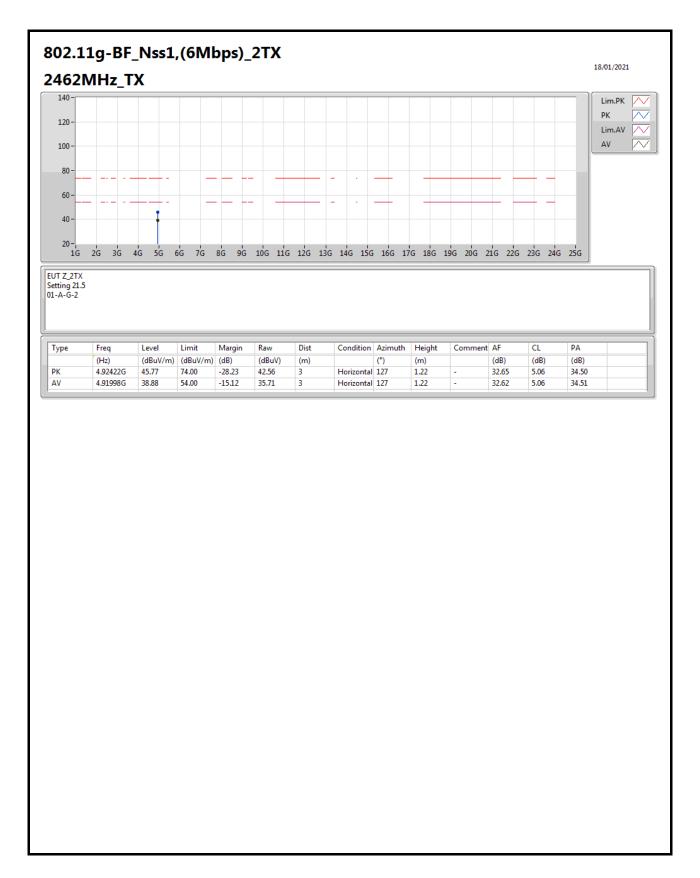




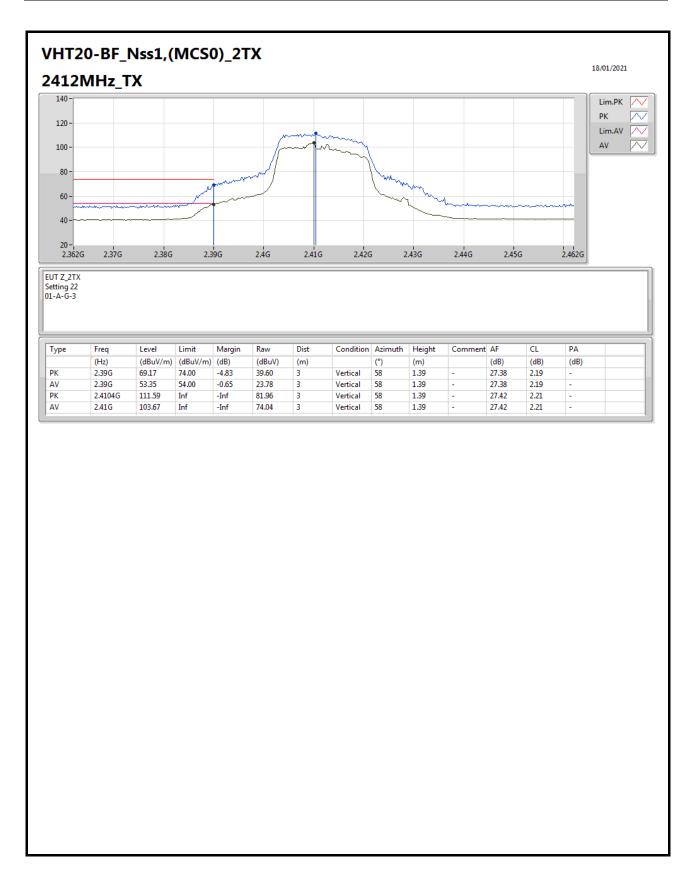




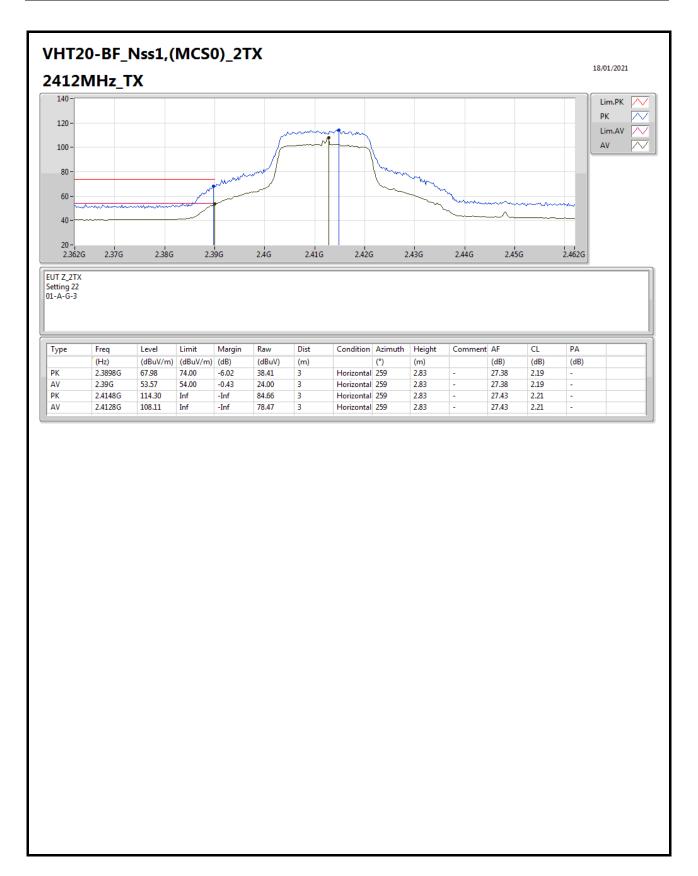




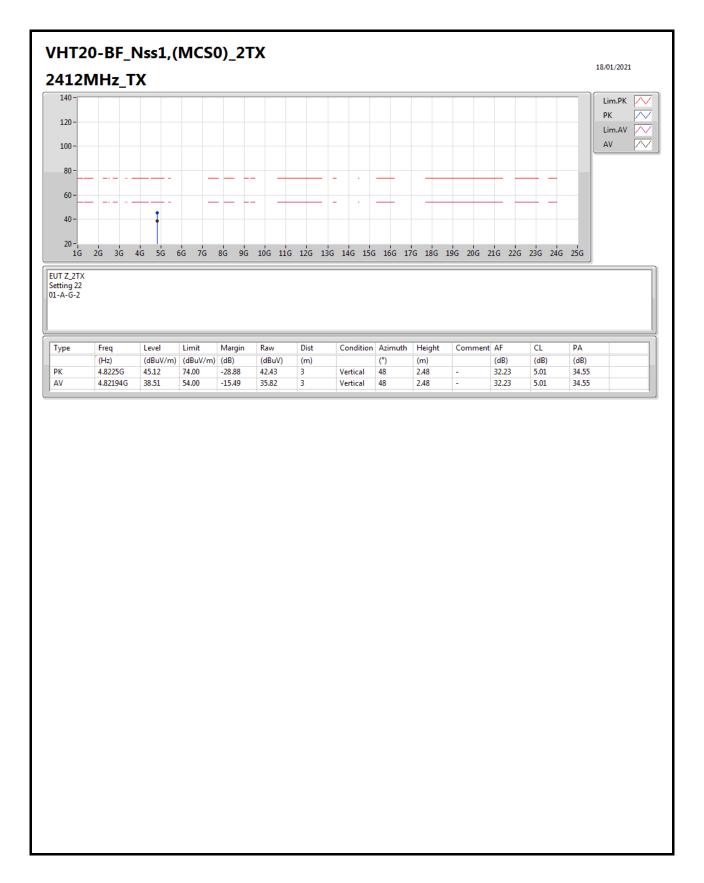




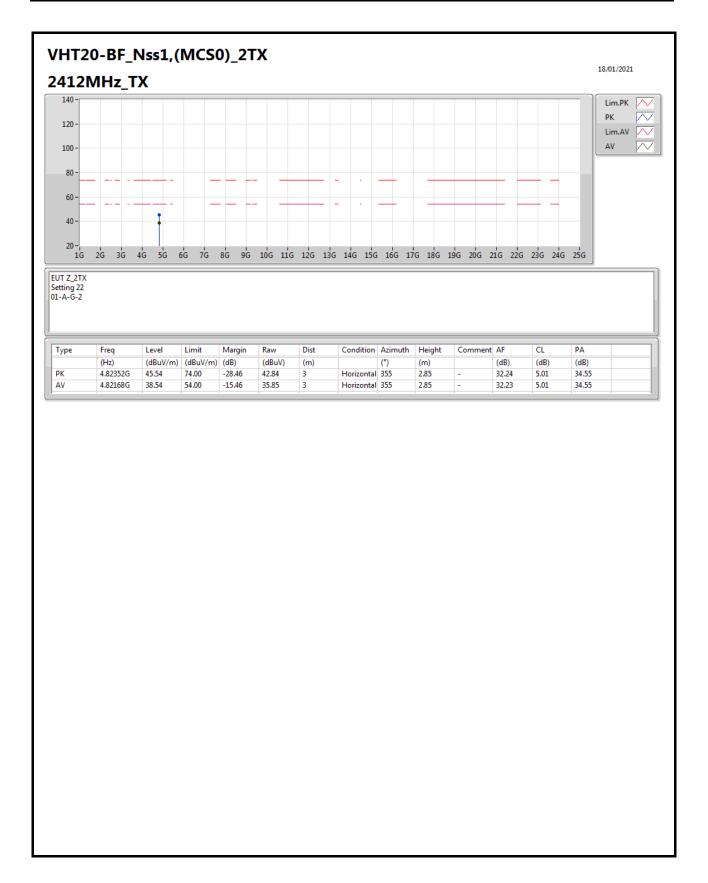




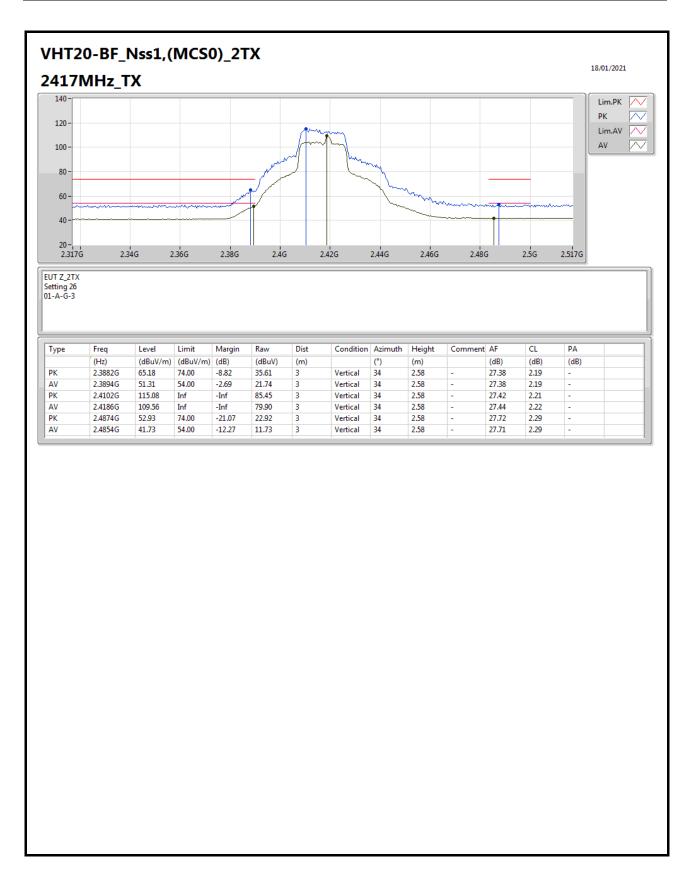




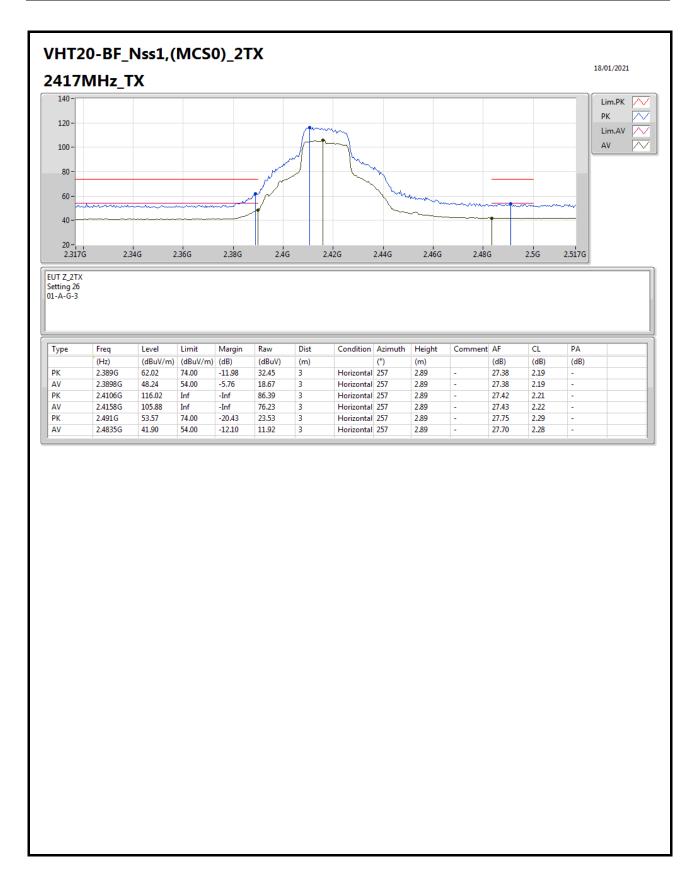




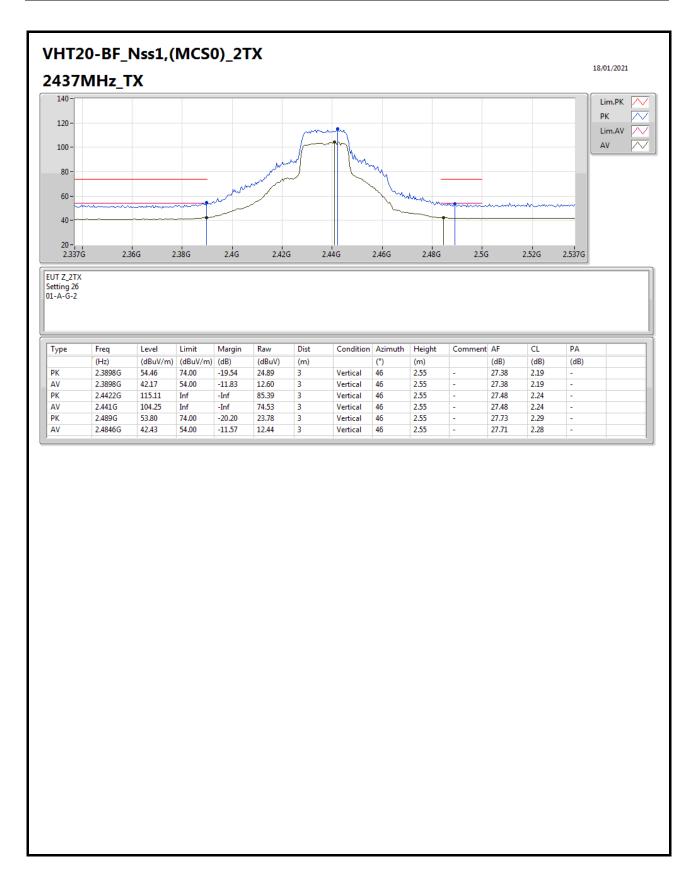




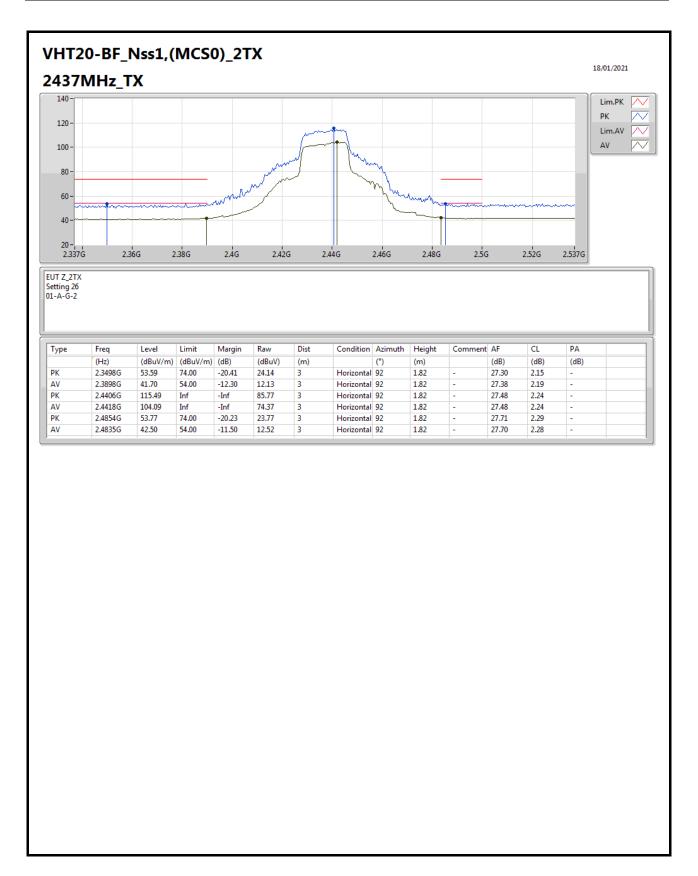




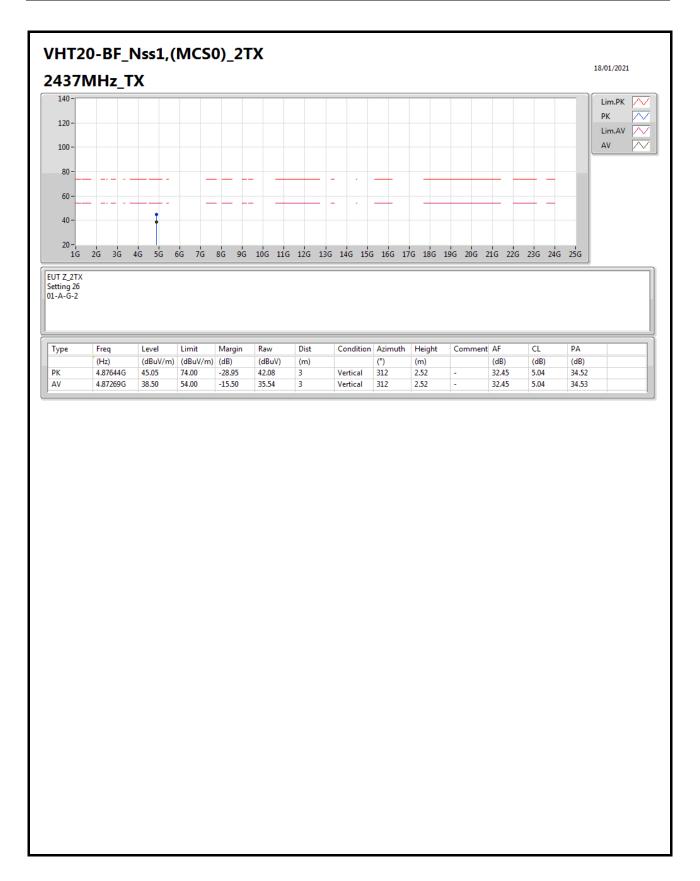




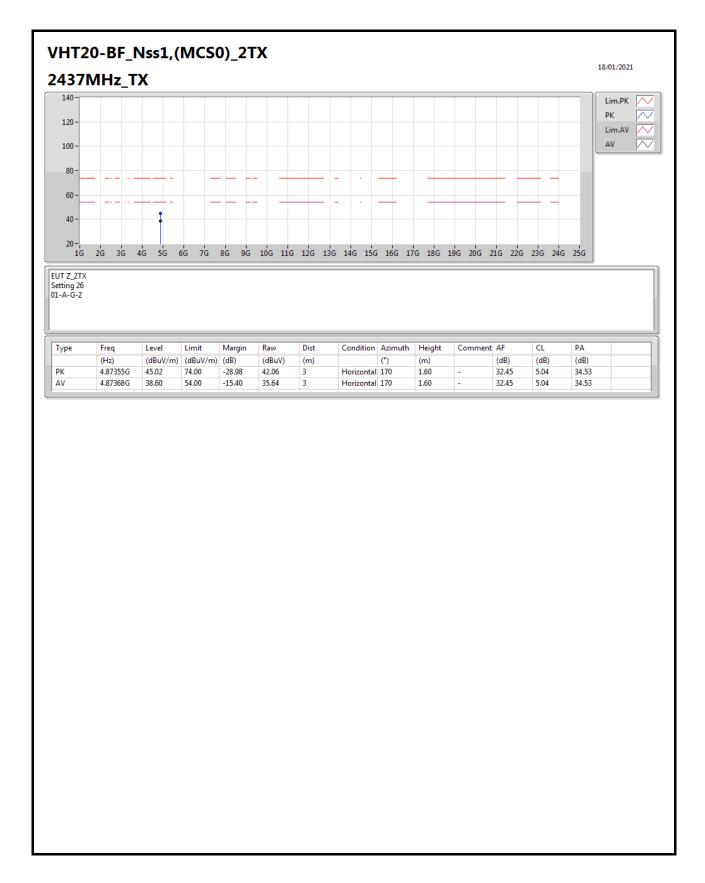




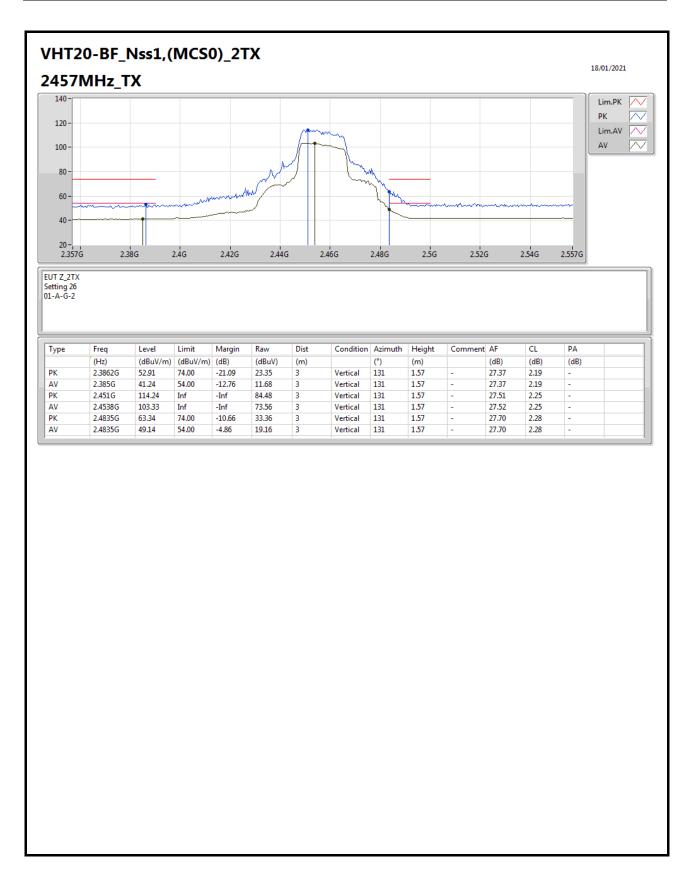




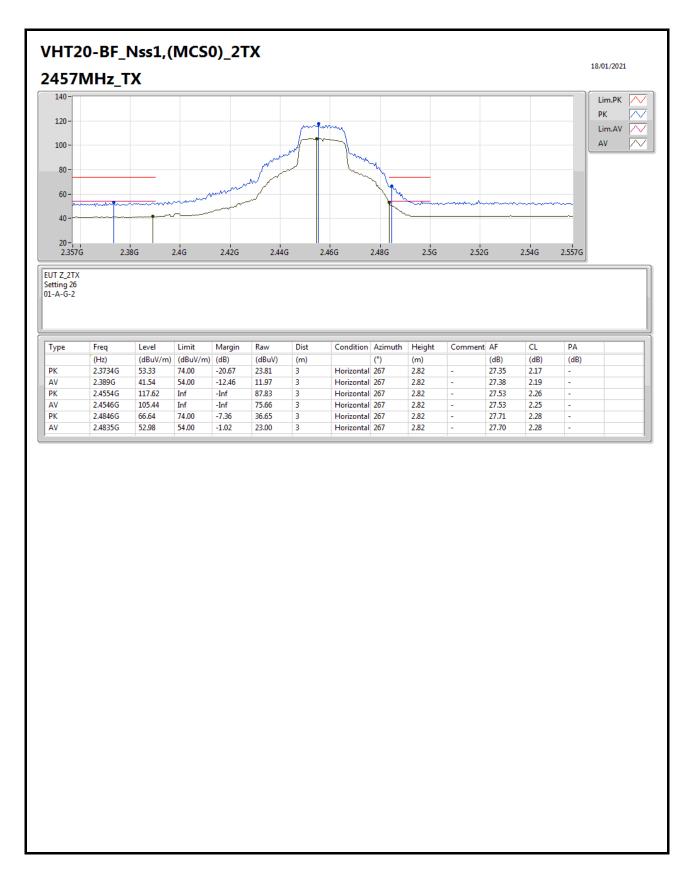




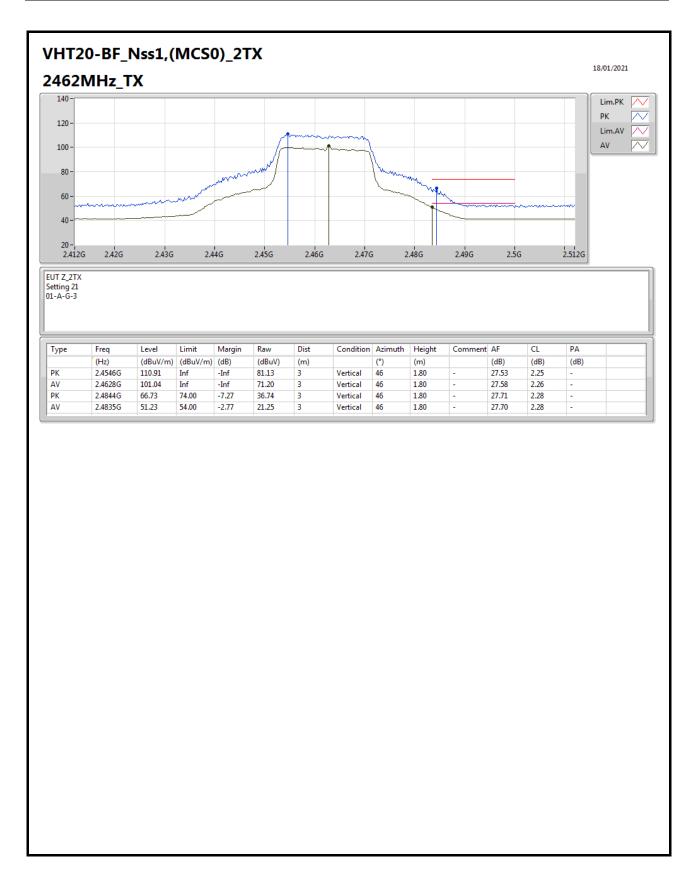




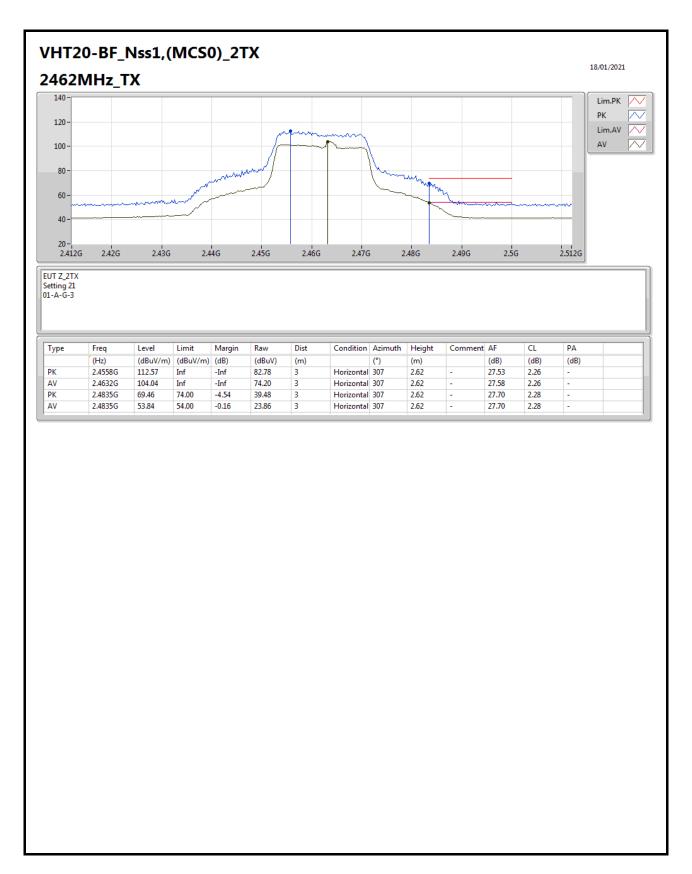




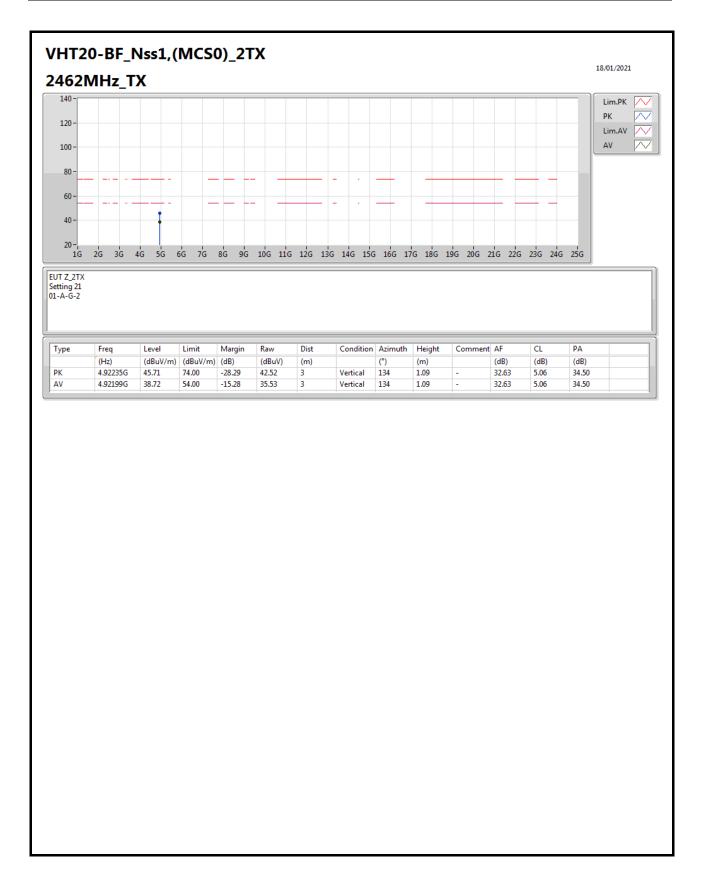




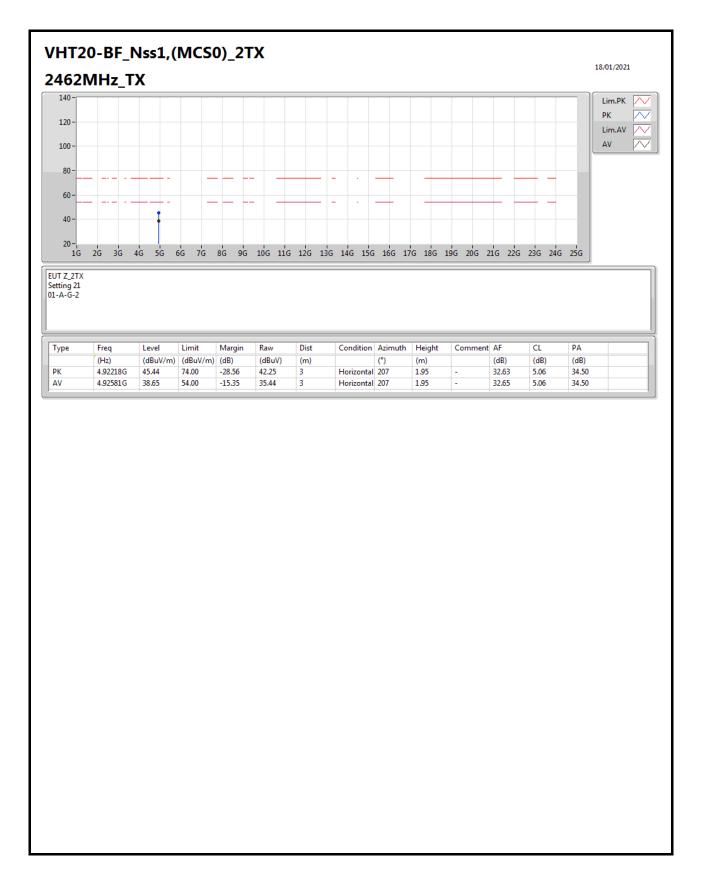




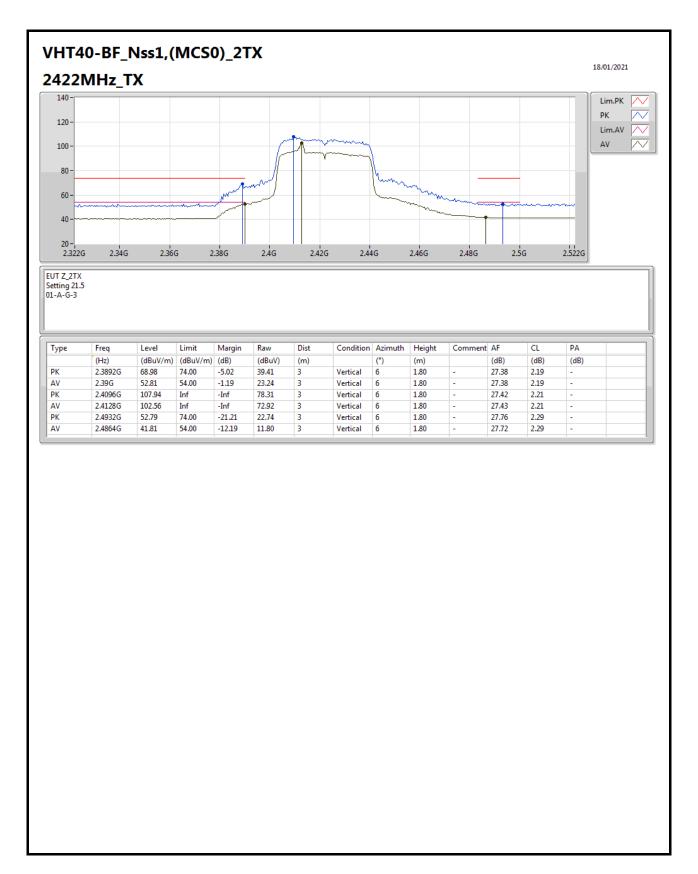






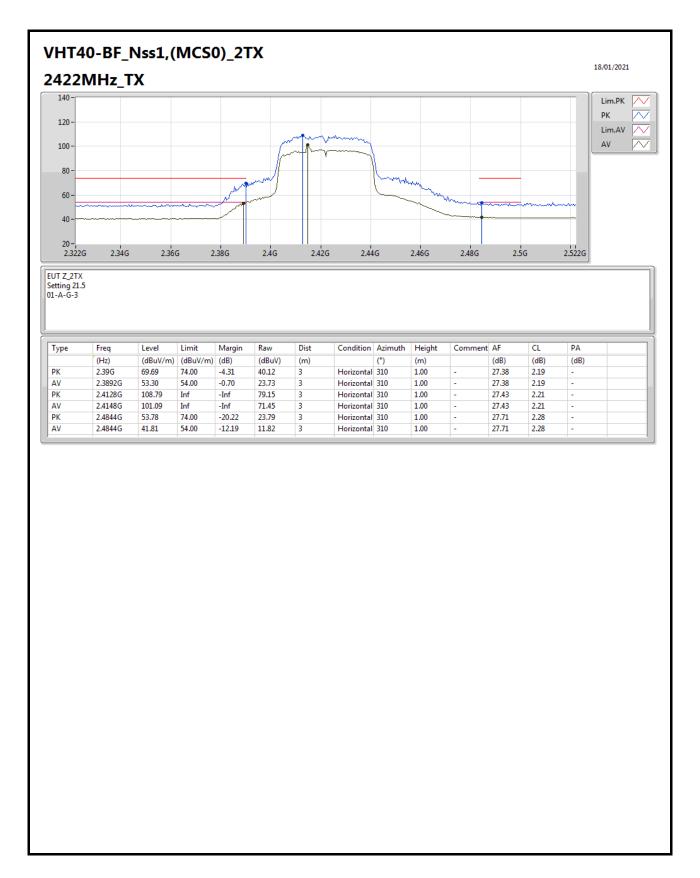




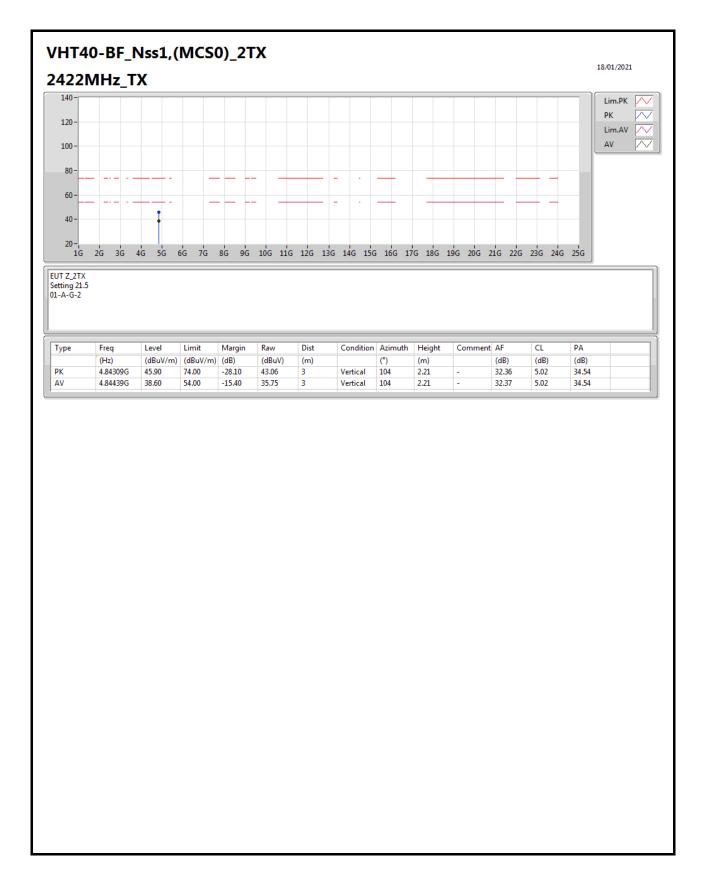


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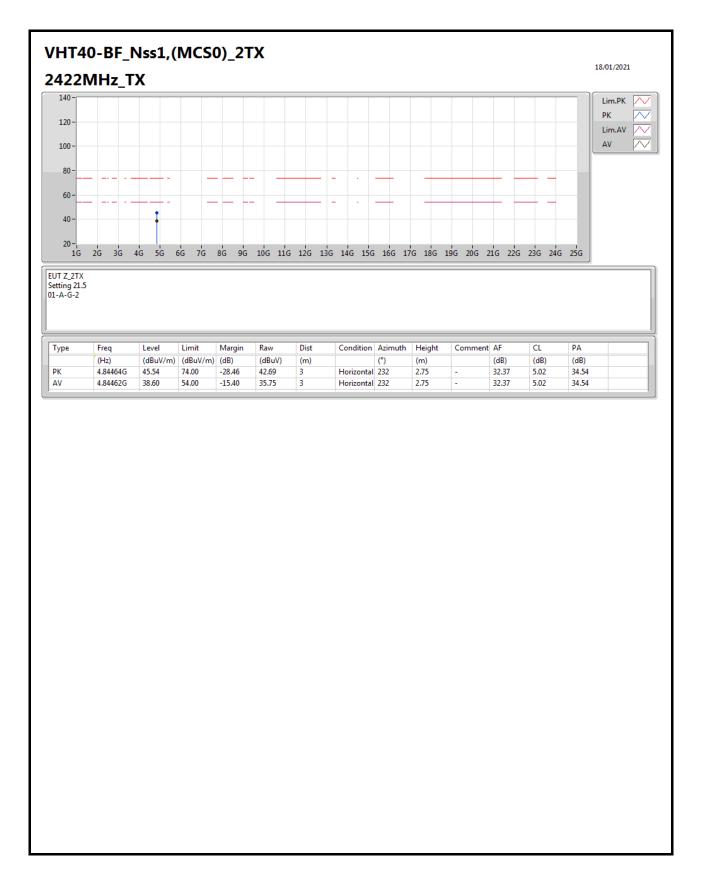




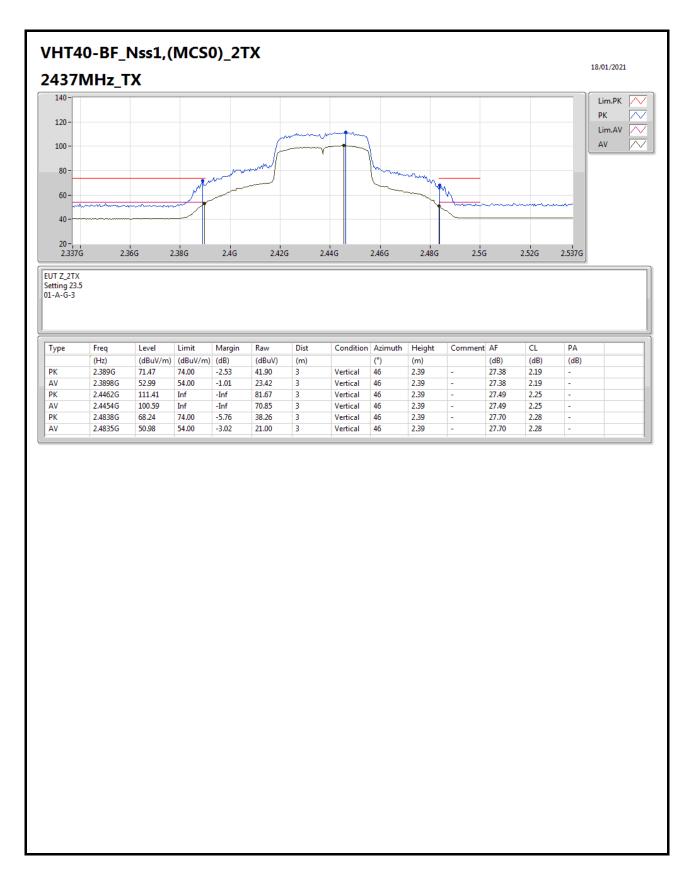






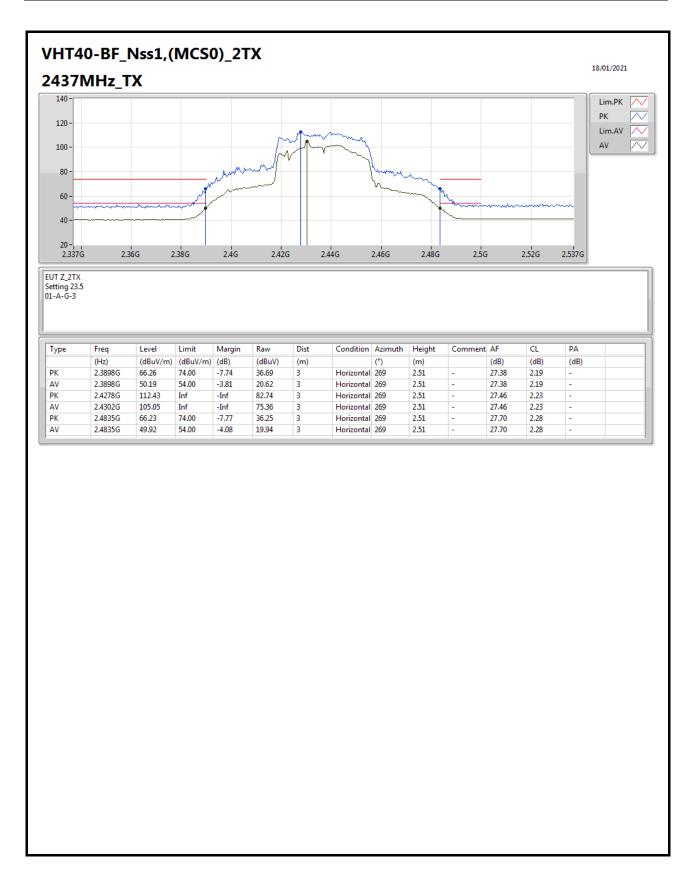






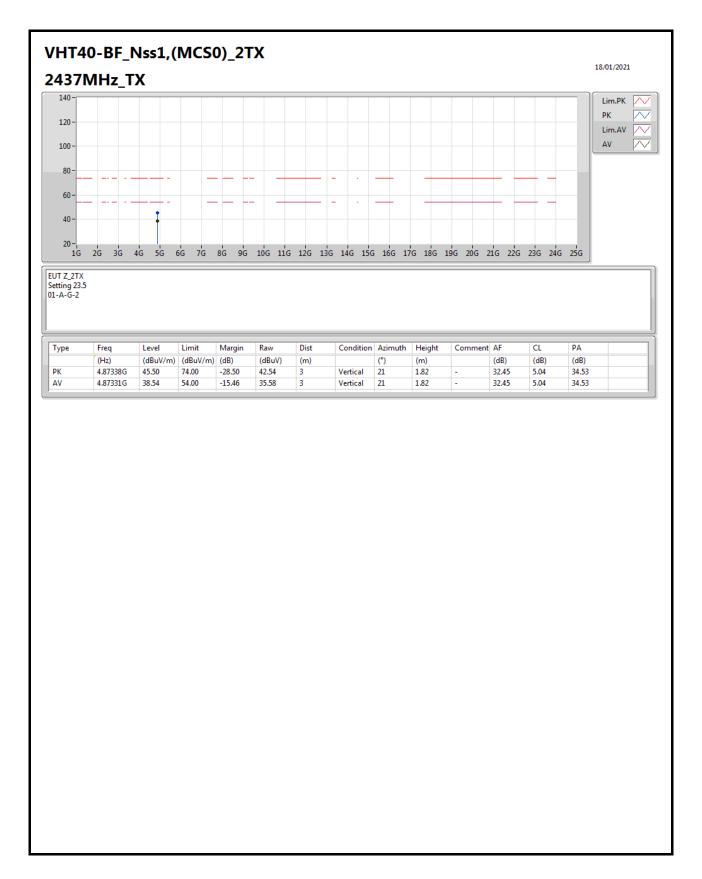
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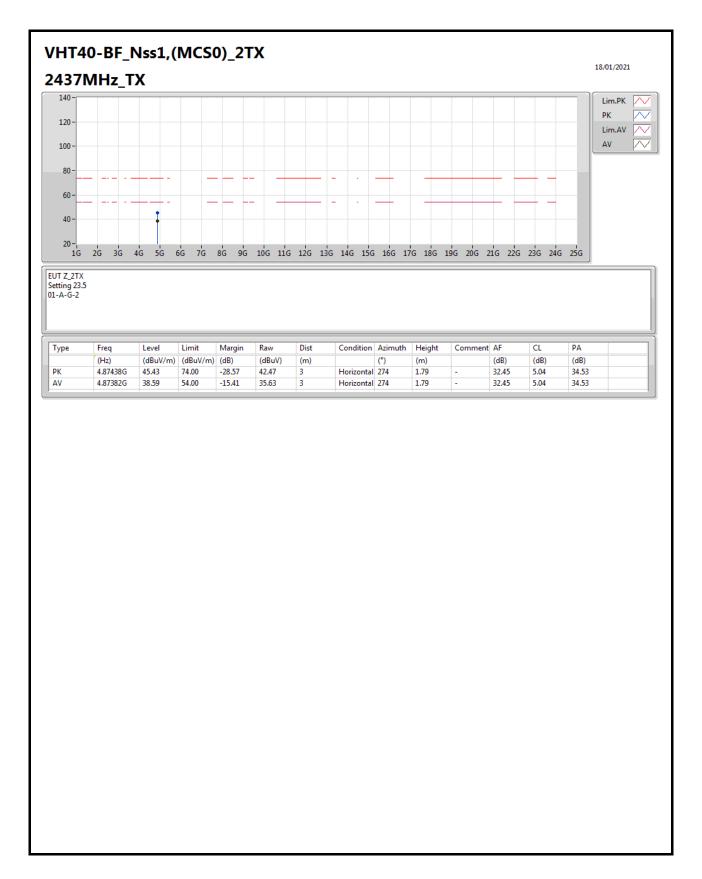
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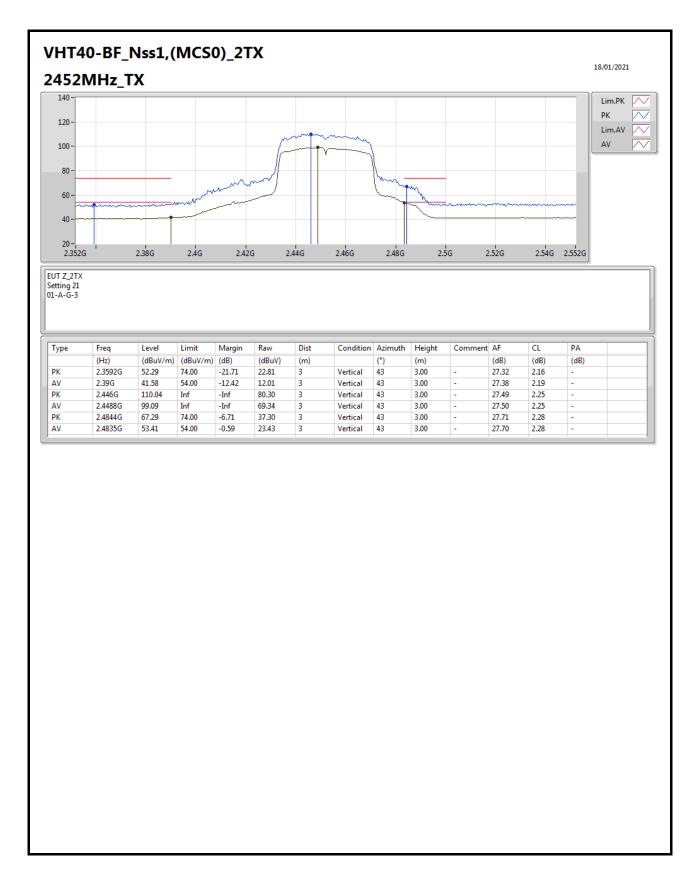


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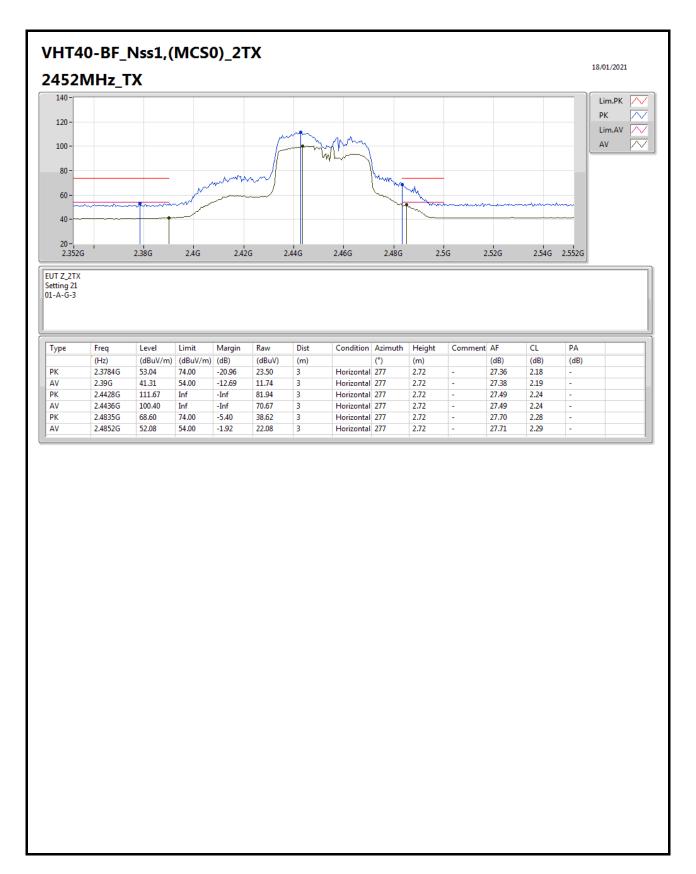




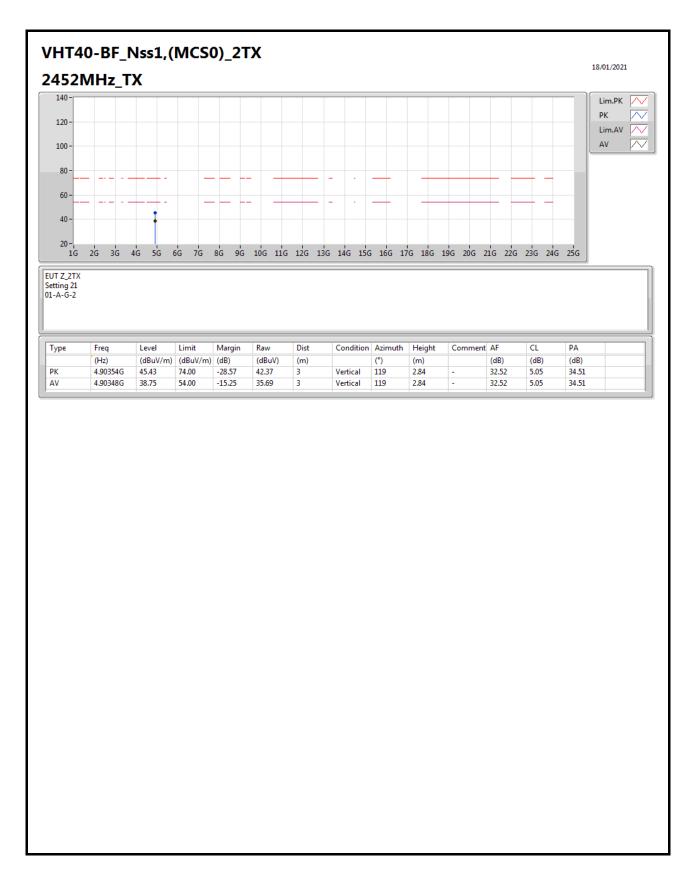


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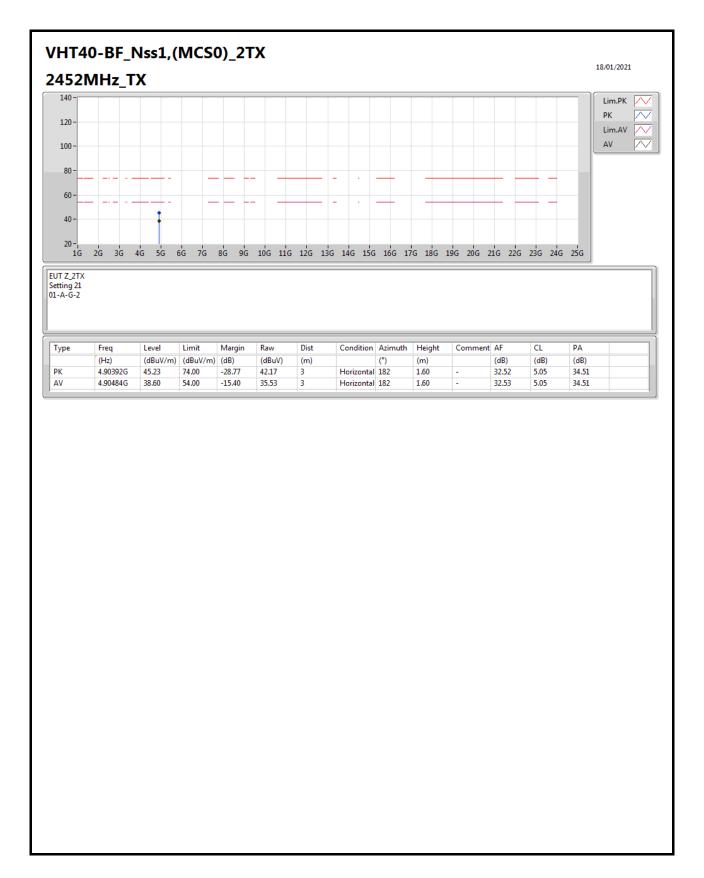






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## RSE Co-location Result

Appendix G

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	AV	3.68737G	37.12	54.00	-16.88	Vertical

