

Report No.: FR952922-10AA



FCC RADIO TEST REPORT

FCC ID : MSQ-RTAXJ300

Equipment : AX3000 Dual Band Wi-Fi Router, AX5400 Dual Band

Wi-Fi Router, Dual Band Wi-Fi Router

Brand Name : ASUS

: RT-AX58U, RT-AX82U, RT-AX3000, RT-AX5400, **Model Name**

TUF-AX3000, GS-AX3000, GS-AX5400

: ASUSTeK COMPUTER INC. **Applicant**

1F., No. 15, Lide Rd., Beitou, Taipei 112, Taiwan

: Datamax Electronics (DongGuan) Co., Ltd. Manufacturer (1)

> Niu Shan Foreign Economic Industrial Park, Dong Cheng District, Dong Guan City, Guang Dong, China

: Compal Networking (KunShan) Co., LTD. Manufacturer (2)

No. 520, Nabbang Rd., Economic & Technical

Development Zone Kunshan, Jiangsu Province China

: ARCADYAN TECHNOLOGY (VIETNAM) CO., LTD. Manufacturer (3)

Ba Thien Industrial Park, Ba Hien commune, Binh Xuyen

district, Vinh Phuc Province

Standard : 47 CFR FCC Part 15.247

The product was received on May 06, 2020, and testing was started from May 06, 2020 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 variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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Report Version : 01

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Appendix G. Test Photos

Photographs of EUT v01

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History of this test report

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Report No.	Version	Description	Issued Date
FR952922-10AA	01	Initial issue of report	Feb. 23, 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	-
Note: Refe	erence to Sport	ton Project No.: 952922-07, 952922-08.		

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: Wendy Pan

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1 General Description

1.1 Information

1.1.1 RF General Information

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

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Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	2TX
2.4-2.4835GHz	802.11g	20	2TX
2.4-2.4835GHz	802.11n HT20	20	2TX
2.4-2.4835GHz	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	802.11ax HEW20	20	2TX
2.4-2.4835GHz	802.11ax HEW20-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
2.4-2.4835GHz	802.11ax HEW40	40	2TX
2.4-2.4835GHz	802.11ax HEW40-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, 1024QAM modulation.
- HEW20, HEW40 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- BWch is the nominal channel bandwidth.

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1.1.2 Antenna Information

Set	Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
	1	PSA	RFDPA161314IMLB701	Dipole Antenna	I-PEX	
1	2	PSA	RFDPA161311IM5B702	Dipole Antenna	I-PEX	
1	3	PSA	RFDPA161310IM5B701	Dipole Antenna	I-PEX	
	4	PSA	RFDPA161316IMLB701	Dipole Antenna	I-PEX	
	1	M.gear	C660-510468-A	Dipole Antenna	I-PEX	
2	2	M.gear	C660-510469-A	Dipole Antenna	I-PEX	
	3	M.gear	C660-510470-A	Dipole Antenna	I-PEX	
	4	M.gear	C660-510471-A	Dipole Antenna	I-PEX	Note 1
	1	M.gear	C660-510472-A	Dipole Antenna	I-PEX	Note i
3	2	M.gear	C660-510473-A	Dipole Antenna	I-PEX	
3	3	M.gear	C660-510474-A	Dipole Antenna	I-PEX	
	4	M.gear	C660-510475-A	Dipole Antenna	I-PEX	
	1	PSA	RFDPA171314IMLB701	Dipole Antenna	I-PEX	
4	2	PSA	RFDPA171311IM5B702	Dipole Antenna	I-PEX	
4	3	PSA	RFDPA171310IM5B702	Dipole Antenna	I-PEX	
	4	PSA	RFDPA171316IMLB701	Dipole Antenna	I-PEX	

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Note 1:

Cot	A4	Port		2.4011-	5GHz	5GHz	5GHz	5GHz	
Set	Ant.	2.4G 2TX	5G 2TX	5G 4TX	2.4GHz	Band 1	Band 2	Band 3	Band 4
	1	2	-	2	1.71	1.75	1.89	1.88	1.70
1	2	-	1	1	-	1.93	1.93	1.92	1.95
	3	-	2	4	-	1.75	1.85	1.83	1.89
	4	1	-	3	1.63	1.92	1.88	1.90	1.87
	1	2	-	2	1.61	1.74	1.84	1.86	1.67
2	2	-	1	1	-	1.76	1.80	1.87	1.87
	3	-	2	4	-	1.66	1.72	1.69	1.84
	4	1	-	3	1.60	1.88	1.82	1.85	1.86
	1	2	-	2	1.70	1.71	1.85	1.85	1.68
3	2	-	1	1	-	1.68	1.73	1.80	1.85
3	3	-	2	4	-	1.63	1.74	1.76	1.77
	4	1	-	3	1.62	1.67	1.74	1.79	1.85
	1	2	-	2	1.7	1.74	1.74	1.82	1.68
4	2	-	1	1	-	1.86	1.90	1.64	1.90
4	3	-	2	4	-	1.48	1.60	1.46	1.88
	4	1	-	3	1.61	1.63	1.71	1.81	1.86

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Note 2: The above information was declared by manufacturer.

Note 3: The EUT has four sets of antennas and there are four antennas for each set.

Set 1~4 are the same type antenna. Only the highest gain Set 1 antenna was selected to test and record in this report.

For 2.4GHz WLAN function

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

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

Port 1 and port 2 could transmit/receive simultaneously.

For 5GHz WLAN function

IEEE 802.11a/n/ac/ax mode (2TX, 4TX/4RX):

For 2TX

Port 1 and port 2 can be used as transmitting antenna.

Port 1 and port 2 could transmit simultaneously.

For 4TX, 4RX

Port 1, port 2, port 3 and port 4 can be used as transmitting/receiving antenna.

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

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1.1.3 EUT Operational Condition

EUT Power Type	From power adapter					
Beamforming Function	\boxtimes	With beamforming		Without beamforming		
	For	For IEEE 802.11n/ax/VHT in 2.4GHz and IEEE 802.11n/ac/ax in 5GHz.				
Function		Point-to-multipoint		Point-to-point		
Test Software Version Mtool V3.1.0.3						

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Note: The above information was declared by manufacturer.

1.1.4 Table for Multiple Listing

The Equipment and model names in the following table are all refer to the identical product.

Equipment		Model Name	Description
AX5400 Dual Bar	Band Wi-Fi Router, nd Wi-Fi Router, Dual Vi-Fi Router	RT-AX58U, RT-AX82U, RT-AX3000, RT-AX5400, TUF-AX3000, GS-AX3000, GS-AX5400	All the equipment and model names are identical, the different equipment and model names served as marketing strategy.

Note 1: From the above table, equipment: AX3000 Dual Band Wi-Fi Router and model: RT-AX82U was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

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1.1.5 Table for SKU information

SKU	Material	5G PA	2G PA	Housing Size	Adapter
SKU 1	RJ-45 port was covered by plastic.	SKY85743	SKY85331	223.62mm x 129.48mm x 32.9mm	1 ~ 8
SKU 2	RJ-45 port was covered by metal.	SKY85743	SKY85331	264.82mm x 156.11mm x 54.97mm	1 ~ 8
SKU 3	RJ-45 port was covered by metal.	SKY85743	SKY85331	265.00mm x 158.39mm x 54.99mm	1 ~ 8
SKU 4	RJ-45 port was covered by metal.	SKY85743	SKY85331	275.50mm x 170.40mm x 65.00mm	1 ~ 8
SKU 5	RJ-45 port was covered by plastic.	QPF4516B	SKY85331	223.62mm x 129.48mm x 32.9mm	1 ~ 8
SKU 6	RJ-45 port was covered by plastic.	SKY85743	SKY85331	223.62mm x 129.48mm x 32.9mm	9
SKU 7	RJ-45 port was covered by plastic.	QPF4516B	SKY85331	223.62mm x 129.48mm x 32.9mm	9
SKU 8	RJ-45 port was covered by metal.	SKY85743	QPF4216B	275.50mm x 170.40mm x 65.00mm	1 ~ 8
SKU 9	RJ-45 port was covered by metal.	QPF4516B	QPF4216B	275.50mm x 170.40mm x 65.00mm	1 ~ 8
SKU 10	RJ-45 port was covered by plastic.	QPF4516B	QPF4216B	223.62mm x 129.48mm x 32.9mm	9

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Note1: The SKU 3 is same as SKU 2 except for the logo of housing, housing size and antenna appearance, Note2: The SKU 4 is same as SKU 2 except for the logo of housing, housing size, antenna appearance and design of light board.

Note3: The SKU 5 is same as SKU 1 except for 5G PA.

Note4: The SKU 6 is same as SKU 1 except for size of DC jack port and only equip with adapter 9.

Note5: The SKU 7 is same as SKU 5 except for size of DC jack port and only equip with adapter 9.

Note6: The SKU 8 is same as SKU 4 except for 2G PA.

Note7: The SKU 9 is same as SKU 4 except for 2G PA and 5G PA.

Note8: The SKU 10 is same as SKU 6 except for 2G PA and 5G PA.

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1.1.6 Table for EUT supports functions

Function	Support Type
AP Router	Master
Bridge	Slave without radar detection
Repeater	Master
Mesh	Master

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1.1.7 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR952922-06AA Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
 Adding four adapters (adapter 6~adapter 9). Note: Adapter 6~8 are matched with SKU 1~5 and SKU 8~9. Adapter 9 is matched with SKU 6, SKU 7 and SKU 10.(Refer to section 1.1.5 for detail information). 	Conducted Emissions. Emissions in Restricted Frequency Bands below 1GHz.
2. Adding the SKU 6~SKU 7.	Emissions in Restricted Frequency Bands below 1GHz.
 Adding the SKU 8~SKU 10 are matched with second source 2G PA (QPF4216B). (Refer to section 1.1.5 for detail information). 	 DTS Bandwidth. Maximum Conducted Output Power. Power Spectral Density. Emissions in Non-restricted Frequency Bands. Emissions in Restricted Frequency Bands.
4. Adding model name: GS-AX3000, GS-AX5400. (Refer to section 1.1.4 for detail information)	After evaluating, it is not necessary to re-test all test items.

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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	23.6-25.4 / 56-57	Nov. 24, 2020
Radiated<1GHz	03CH05-CB	Stim Sung	16.5-17.2 / 58-60	Jan. 13, 2021 ~ Feb. 18, 2021
Radiated>1GHz	03CH06-CB	Stim Sung	23.5-24.2 / 56-58	Nov. 20, 2020 ~ Nov. 23, 2020
AC Conduction (Test Mode: Mode 1 ~ Mode 3)	CO01-CB	Ryo Fan	21~22 / 59~60	May 06, 2020
AC Conduction (Test Mode: Mode 4)	CO01-CB	Ryo Fan	22~23 / 62~63	Jun. 30, 2020

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

For 2T1S

Mode	Power Setting
802.11b_Nss1,(1Mbps)_2TX	-
2412MHz	107
2437MHz	108
2462MHz	108
802.11g_Nss1,(6Mbps)_2TX	-
2412MHz	87
2417MHz	90
2437MHz	108
2457MHz	93
2462MHz	83
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-
2412MHz	82
2417MHz	93
2437MHz	107
2457MHz	93
2462MHz	85
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-
2422MHz	80
2427MHz	82
2437MHz	89
2452MHz	82

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For 2T2S

802.11ax HEW20_Nss2,(MCS0)_2TX	-
2412MHz	85
2417MHz	91
2437MHz	108
2457MHz	91
2462MHz	85
802.11ax HEW40_Nss2,(MCS0)_2TX	-
2422MHz	82
2437MHz	89
2452MHz	84

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Note: 1.HEW20/HEW40 covers HT20/HT40/VHT20/VHT40 , due to similar modulation. The power setting of HT20/HT40/VHT20/VHT4 are the same or lower than HEW20/HEW40.

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The EUT supports non-beamforming and beamforming mode, and the worst-case was beamforming mode. Thus beamforming mode was selected test.

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests				
Tests Item AC power-line conducted emissions				
Condition AC power-line conducted measurement for line and neutral				
Operating Mode Normal Link				
For mode 1~4: The EUT performed testing at AP Router, Bridge mode 2.4GHz, and Bridge mode 5GHz mode. For mode 1~3: The testing performed at SKU 1 and SKU 2. The SKU 2 + bridge (5GHz) mode has been evaluated to be the worst case. So the measurement will follow this same test configuration.				
1 Bridge mode 5GHz - SKU 2 + adapter 6				
2	Bridge mode 5GHz - SKU 2 + adapter 7			
3 Bridge mode 5GHz - SKU 2 + adapter 8				
4 Bridge mode 5GHz - SKU 6 + adapter 9				
For operating mode 2 is the worst case and it was record in this test report.				

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The Worst Case Mode for Following Conformance Tests		
Tests Item	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands	
Test Condition Conducted measurement at transmit chains		
Test Mode SKU 8		

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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	CTX			
	EUT performed testing at Adapter 1~5. Adapter 1 has been evaluated to be the rement will follow this same test configuration.			
1	SKU 6 (2.4GHz) + adapter 9			
2	SKU 7 (2.4GHz) + adapter 9			
3	SKU 10 (2.4GHz) + adapter 9			
4	SKU 8 (2.4GHz) + adapter 1			
5	SKU 9 (2.4GHz) + adapter 1			
	sting performed at SKU 1, 2, 4, 5, 8, 9. The SKU 2 has been evaluated to be the rement will follow this same test configuration.			
6	SKU 2 (2.4GHz) + adapter 6			
7	SKU 2 (2.4GHz) + adapter 7			
8	SKU 2 (2.4GHz) + adapter 8			
Mode 3 has been evaluated to be the worst case among Mode 1~8, thus measurement for Mode 9 will follow this same test mode.				
9	SKU 10 (5GHz) + adapter 9			
For operating mode 3 is th	e worst case and it was record in this test report.			
Operating Mode > 1GHz	СТХ			
1	SKU 8			

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The Worst Case Mode for Following Conformance Tests				
Tests Item Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation				
Operating Mode				
1 SKU 1: WLAN 2.4GHz + SKU 1: WLAN 5GHz				
2 SKU 1: WLAN 2.4GHz + SKU 5: WLAN 5GHz				
3 SKU 8: WLAN 2.4GHz + SKU 1: WLAN 5GHz				
4 SKU 8: WLAN 2.4GHz + SKU 5: WLAN 5GHz				
Refer to Sporton Test Report No.: FA952922-10 for Co-location RF Exposure Evaluation.				

Note: The EUT only use in Z axis.

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2.3 EUT Operation during Test

For CTX Mode:

non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

beamforming mode:

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 "LanTest20" to link with the remote workstation to transmit and receive packet by WLAN AP and transmit duty cycle no less than 98%.

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For Normal Link:

During the test, the EUT operation to normal function.

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2.4 Accessories

Accessories						
Equipment Name	Brand Name	Model Name	Rating			
Adapter 1	PI	AD2088320	INPUT: 100-240V ~ 50/60Hz, 0.8A OUTPUT: 19V, 1.75A			
Adapter 2	PI	AD2088320	INPUT: 100-240V ~ 50/60Hz, 0.8A OUTPUT: 19V, 1.75A			
Adapter 3	Delta	ADP-33AW B	INPUT: 100-240V ~ 1A, 50-60Hz OUTPUT: 19V, 1.75A			
Adapter 4	Delta	ADP-33AW B	INPUT: 100-240V ~ 1A, 50-60Hz OUTPUT: 19V, 1.75A			
Adapter 5	Delta	ADP-33AW Y	INPUT: 100-240V ~ 1A, 50-60Hz OUTPUT: 19V, 1.75A			
Adapter 6 (Fixed plug)	Delta	ADP-33AW Y	INPUT: 100-240V ~ 1.0A, 50-60Hz OUTPUT: 19V, 1.75A, 33.0W			
Adapter 7 (Interchangeable plug)	PI	AD2131M20	INPUT: 100-240V~50/60Hz, 0.8A OUTPUT: 19V, 1.75A, 33.0W			
Adapter 8 (Fixed plug)	PI	AD2131320	INPUT: 100-240V ~ 50/60Hz, 0.8A OUTPUT: 19V, 1.75A, 33.0W			
Adapter 9 (Fixed plug)	LEI	MU24B1120200-A1	INPUT: 100-240V ~ 50/60Hz, 0.7A OUTPUT: 12V, 2A			
	Other					
RJ-45 cable*1, Non-shielded, 1.5m						

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Note: 1.The difference between adapter 1 ~ adapter 2 are only different type.

2. The difference between adapter 3 ~ adapter 4 are only different country code.

3. Adapter 7 with EU plug performed the testing by manufacturer request.

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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	2.4G NB	DELL	E6430	N/A				
С	5G NB	DELL	E6430	N/A				
D	WAN NB	DELL	E6430	N/A				
Е	HDD3.0	WD	WDBACY5000AWT	N/A				
F	LAN4 NB	DELL	E6430	N/A				
G	Devcie	AUSU	RT-AX82U	MSQ-RTAXJ300				
Н	Device NB	DELL	E6430	N/A				

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For Radiated (below 1GHz) and For RF Conducted:

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

For Radiated (above 1GHz): (For non beamforming mode)

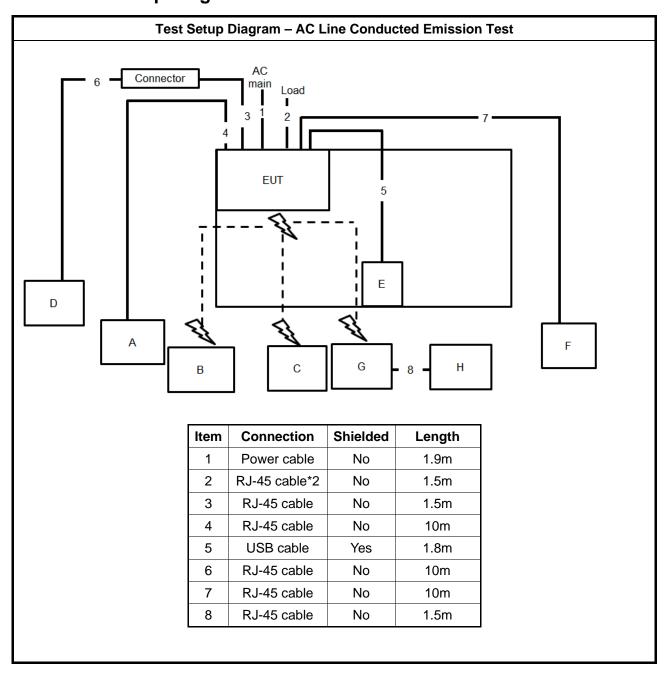
	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	NB	DELL	E4300	N/A	

(For beamforming mode)

	Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	NB	DELL	E4300	N/A	
В	Device	ASUS	RT-AX88U	N/A	
С	NB	DELL	E4300	N/A	

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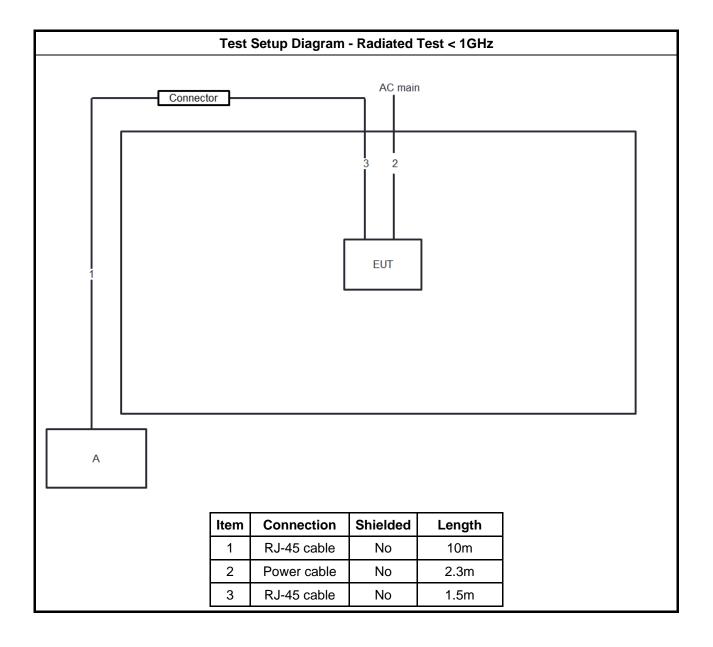
2.6 Test Setup Diagram



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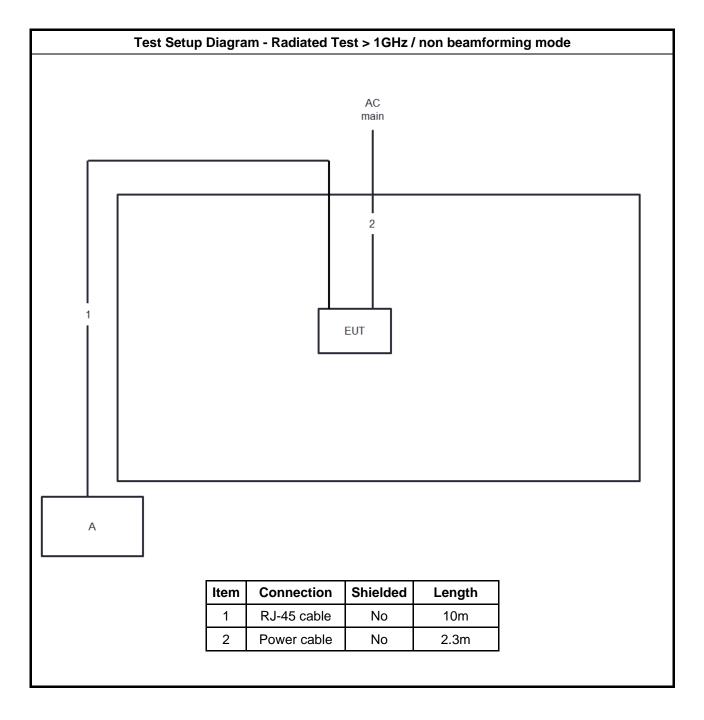
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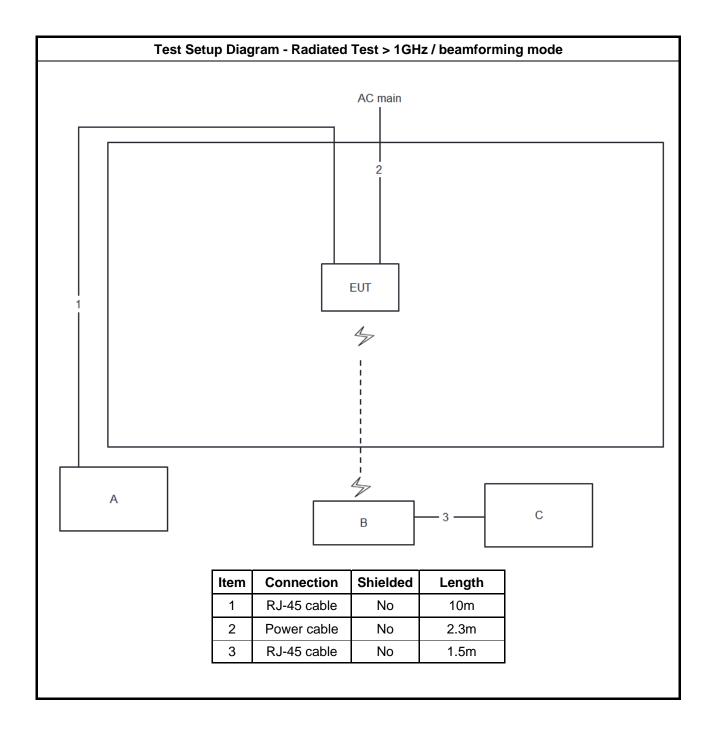
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3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

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

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3.1.2 Measuring Instruments

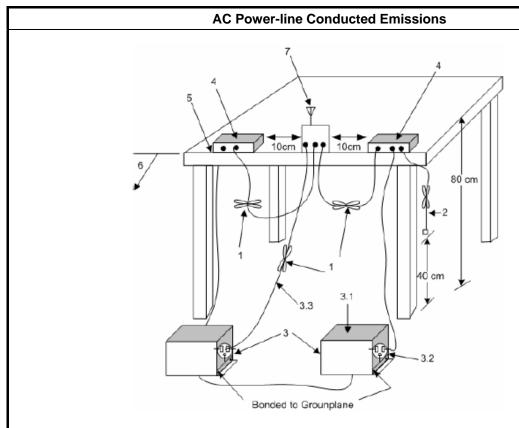
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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

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3.1.4 Test Setup



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

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

3.1.5 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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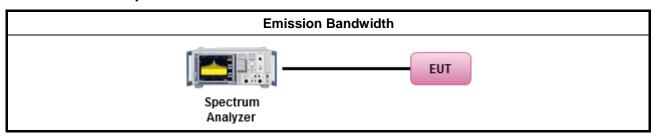
3.2.2 Measuring Instruments

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

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

3.3.2 Measuring Instruments

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

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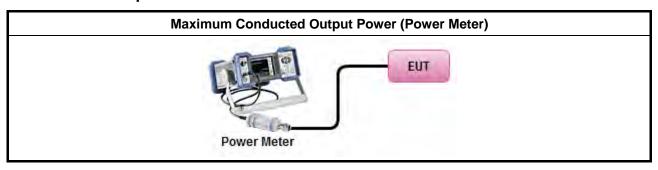
3.3.3 Test Procedures

		Test Method
•	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	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: $P_{total} = P_1 + P_2 + \ldots + P_n \\ \text{(calculated in linear unit [mW] and transfer to log unit [dBm])} \\ \text{EIRP}_{total} = P_{total} + DG$

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3.3.4 Test Setup



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3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

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3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

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

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3.4.2 Measuring Instruments

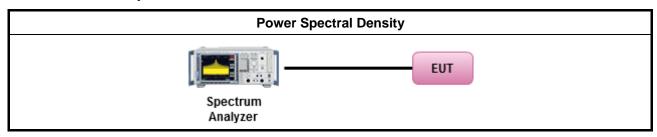
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

		Test Method	
•	Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).		
	\boxtimes	Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD.	
•	For	onducted measurement.	
	•	f The EUT supports multiple transmit chains using options given below:	
		Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.	
		Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,	
		Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.	

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3.4.4 Test Setup



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3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

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3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

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

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

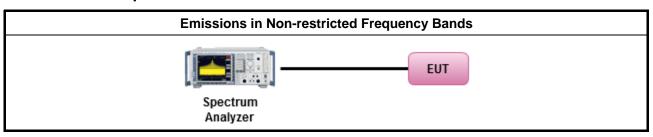
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method	
Refer as FCC KDB 558074, clause 8.5 for unwanted emissions into non-restricted bands.	

3.5.4 Test Setup



3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

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3.6 Emissions in Restricted Frequency Bands

3.6.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit				
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)	
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300	
0.490~1.705	24000/F(kHz)	33.8 - 23	30	
1.705~30.0	30	29	30	
30~88	100	40	3	
88~216	150	43.5	3	
216~960	200	46	3	
Above 960	500	54	3	

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- Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
- Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT
- Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

3.6.2 Measuring Instruments

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

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3.6.3 Test Procedures

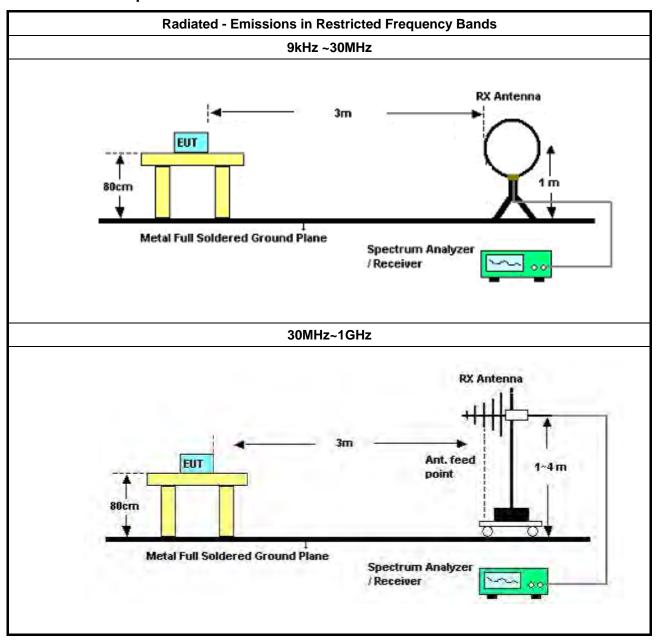
		Test Method	
•	The	average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].	
•	 Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band. 		
•	For	the transmitter unwanted emissions shall be measured using following options below:	
	•	Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.	
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle ≥98%).	
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).	
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW≥1/T).	
		Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.	
		Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.	
		Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.	
•	For	the transmitter band-edge emissions shall be measured using following options below:	
	•	Refer as FCC KDB 558074 clause 8.7 & C63.10 clause 11.13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.	
	•	Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.	
	•	Refer as FCC KDB 558074, clause 8.7 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).	
	•	For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB	
	•	For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.	

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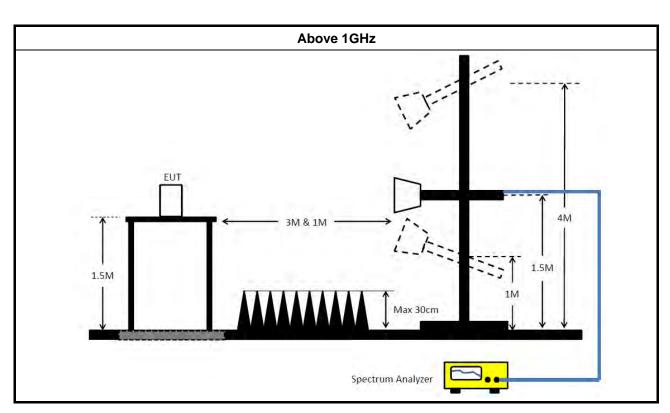
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3.6.4 Test Setup



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3.6.5 Measurement Results Calculation

The measured Level is calculated using:

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

3.6.6 Emissions in Restricted Frequency Bands (Below 30MHz)

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

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

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

3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

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4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	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)
Pulse Limiter	Rohde&Schwa rz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 31, 2020	Jan. 30, 2021	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 21, 2019	May 20, 2020	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 20, 2020	May 19, 2021	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH05-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 10, 2020	Aug. 09, 2021	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 27, 2020	Mar. 26, 2021	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 28, 2020	Apr. 27, 2021	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Nov. 10, 2020	Nov. 09, 2021	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 05, 2020	Oct. 04, 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	03CH06-CB	1GHz ~18GHz 3m	Oct. 02, 2020	Oct. 01, 2021	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBE CK	BBHA9120D	BBHA 9120D-1292	1GHz~18GHz	Jul. 22, 2020	Jul. 21, 2021	Radiation (03CH06-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	May 07, 2020	May 06, 2021	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH06-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	May 12, 2020	May 11, 2021	Radiation (03CH06-CB)

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Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-05	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+24	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 05, 2020	May 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-28	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)

Report No. : FR952922-10AA

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

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

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Report Template No.: CB-A10_10 Ver1.2 Report Version : 01



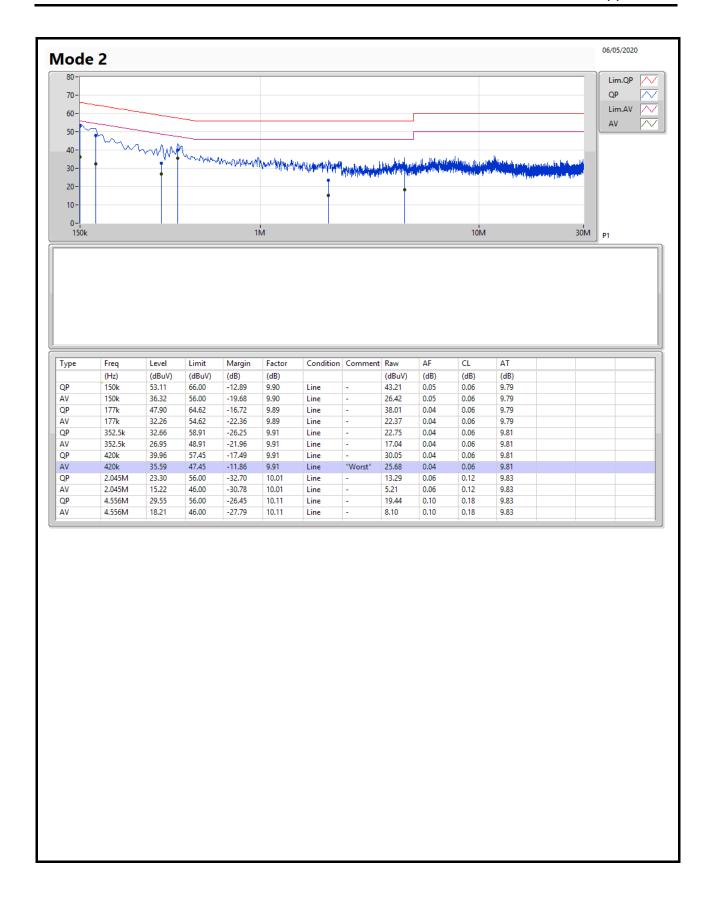
AC Power Port Conducted Emission Result

Appendix A

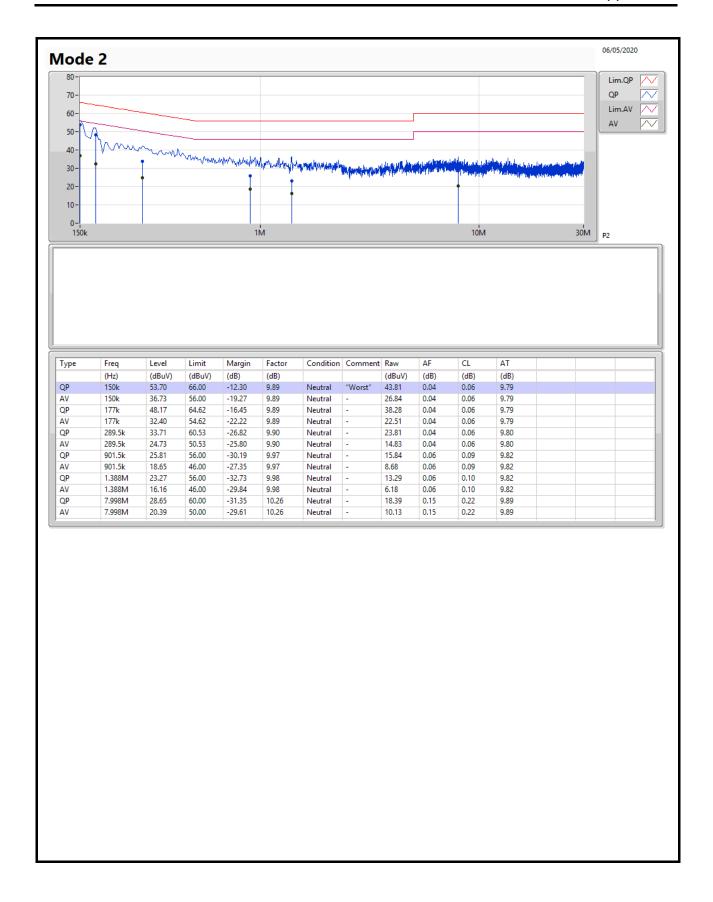
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Factor	Condition
			(Hz)	(dBuV)	(dBuV)	(dB)	(dB)	
Mode 2	Pass	AV	420k	35.59	47.45	-11.86	9.91	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	7.525M	11.269M	11M3G1D	6.55M	10.47M
802.11g_Nss1,(6Mbps)_2TX	16.325M	20.34M	20M3D1D	16.325M	16.692M
802.11ax HEW20_Nss2,(MCS0)_2TX	18.95M	20.94M	20M9D1D	18.875M	19.04M
802.11ax HEW40_Nss2,(MCS0)_2TX	37.65M	37.681M	37M7D1D	37.4M	37.531M

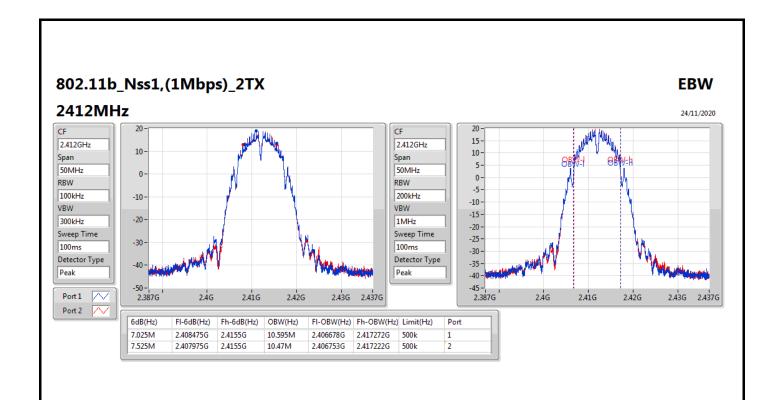
Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth; Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth;

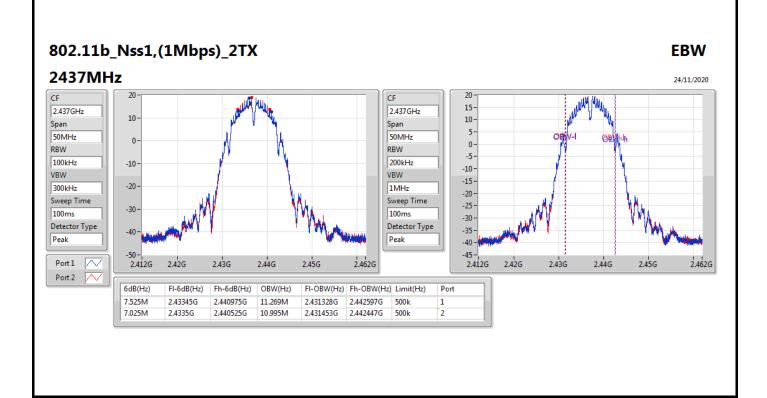


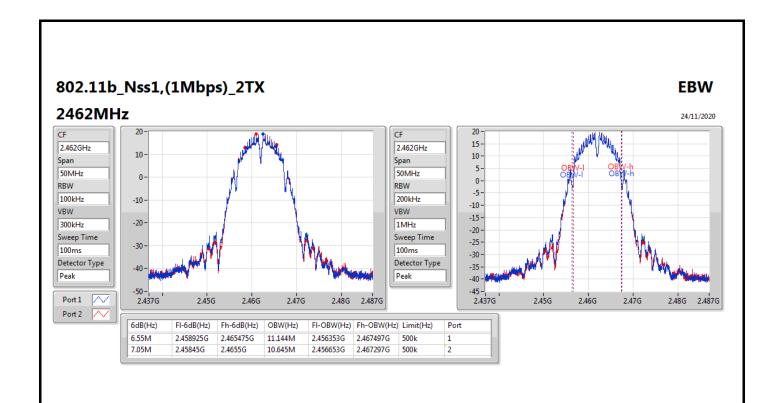
Result

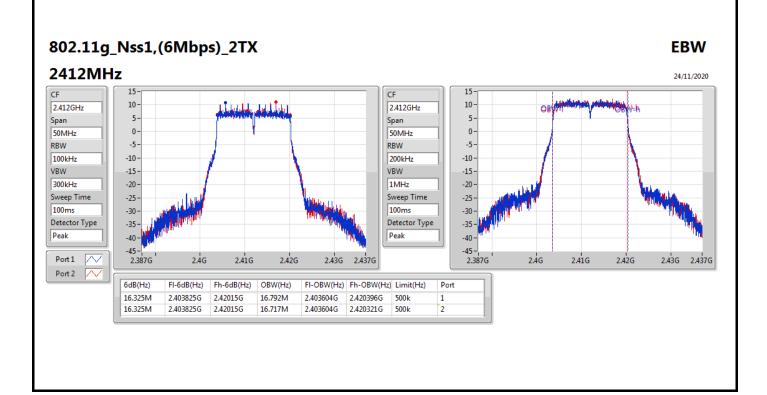
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	7.025M	10.595M	7.525M	10.47M
2437MHz	Pass	500k	7.525M	11.269M	7.025M	10.995M
2462MHz	Pass	500k	6.55M	11.144M	7.05M	10.645M
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	16.325M	16.792M	16.325M	16.717M
2437MHz	Pass	500k	16.325M	19.94M	16.325M	20.34M
2462MHz	Pass	500k	16.325M	16.792M	16.325M	16.692M
802.11ax HEW20_Nss2,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	18.9M	19.04M	18.875M	19.065M
2437MHz	Pass	500k	18.925M	20.915M	18.925M	20.94M
2462MHz	Pass	500k	18.95M	19.065M	18.95M	19.065M
802.11ax HEW40_Nss2,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	37.55M	37.531M	37.45M	37.581M
2437MHz	Pass	500k	37.6M	37.631M	37.45M	37.681M
2452MHz	Pass	500k	37.65M	37.631M	37.4M	37.631M

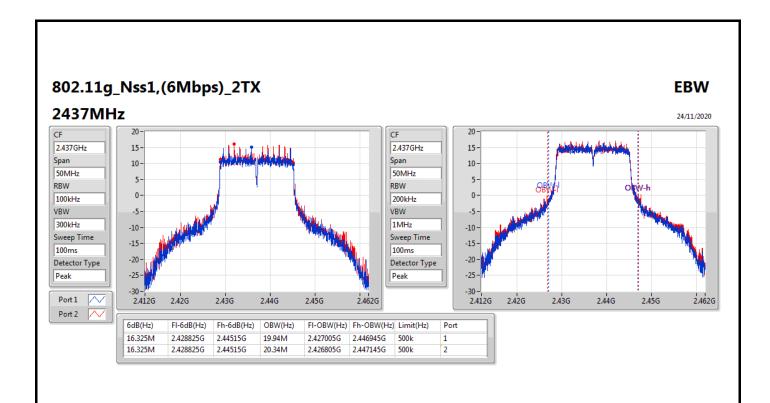
Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;

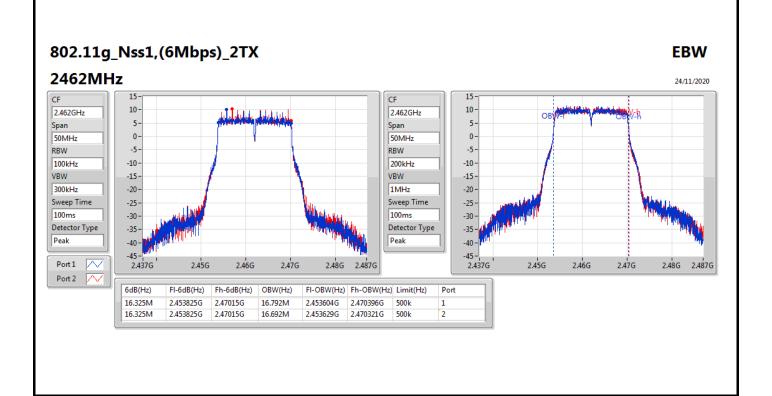


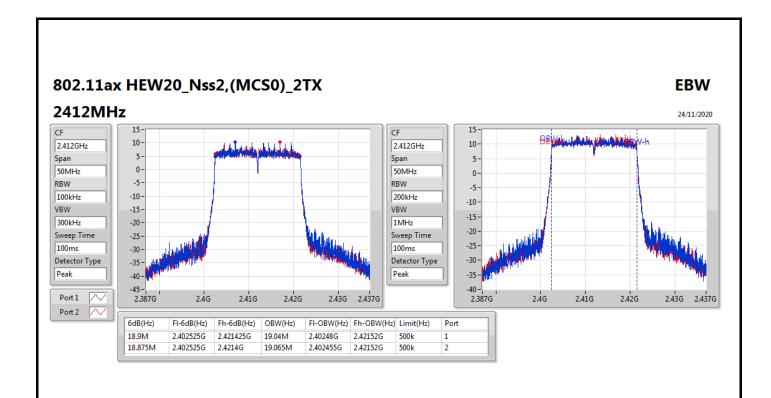


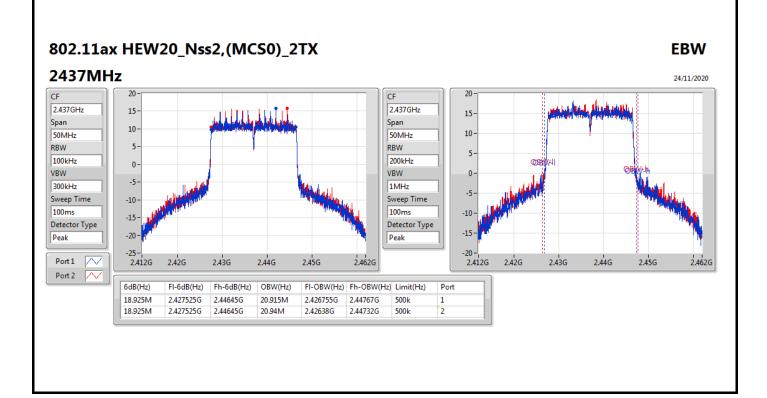


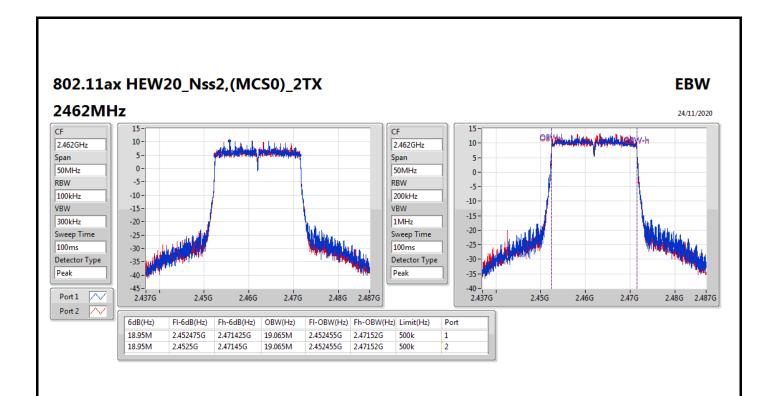


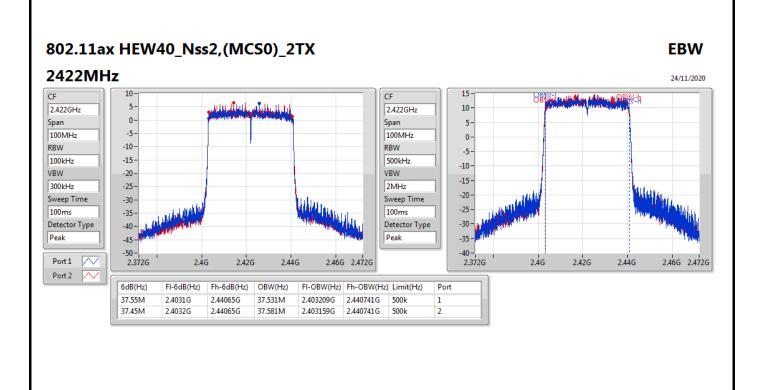


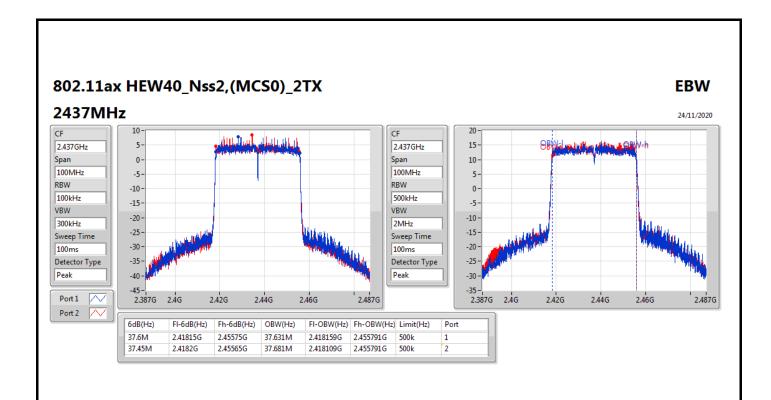


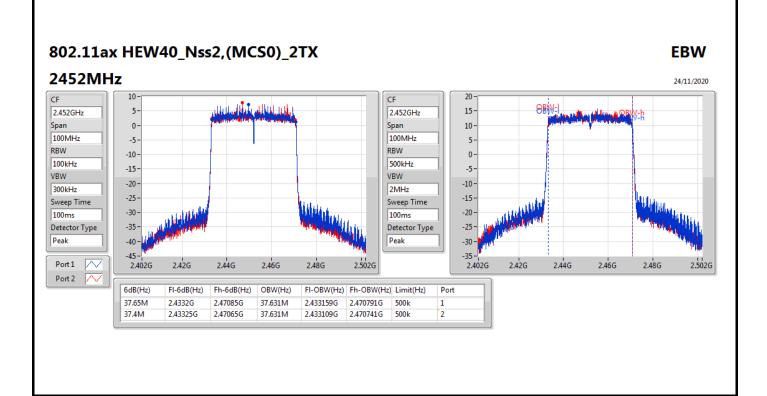














Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
2.4-2.4835GHz	-	-	-	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	19.025M	22.264M	22M3D1D	18.85M	18.991M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	37.7M	37.631M	37M6D1D	37.4M	37.481M

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;

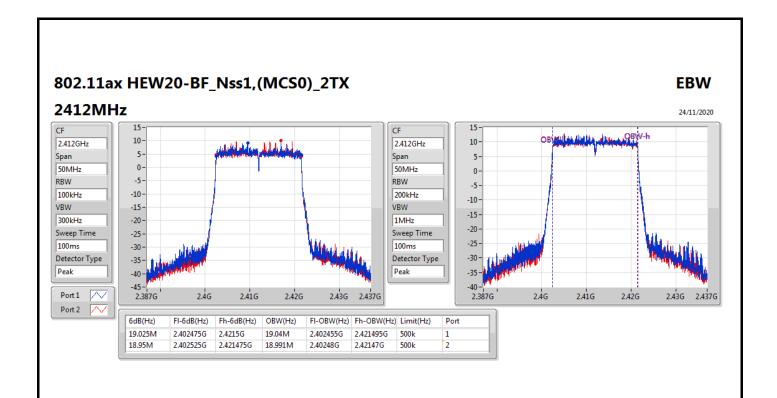
: 1 of 5

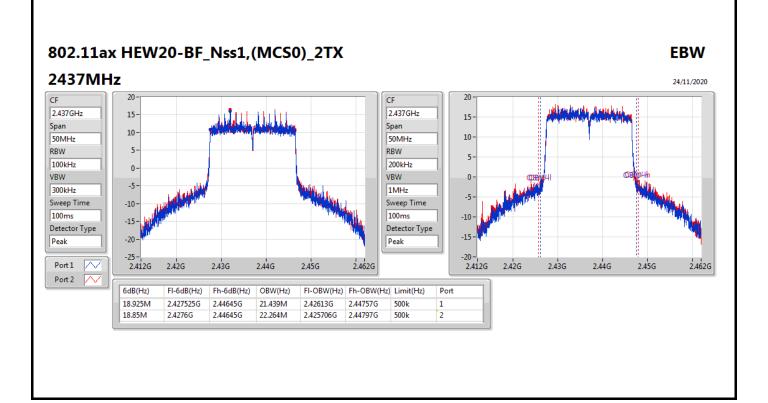


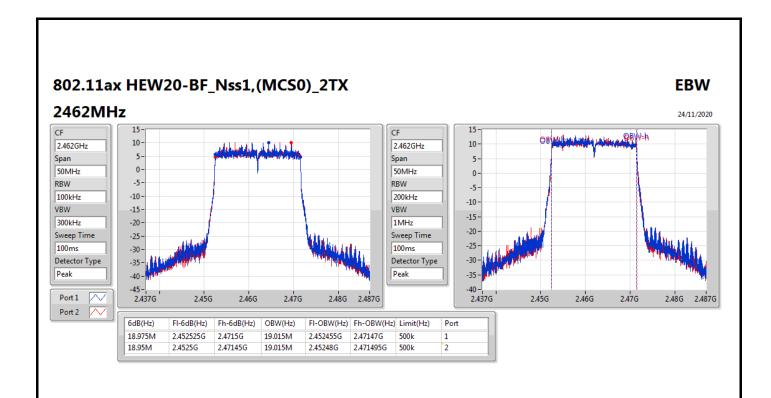
Result

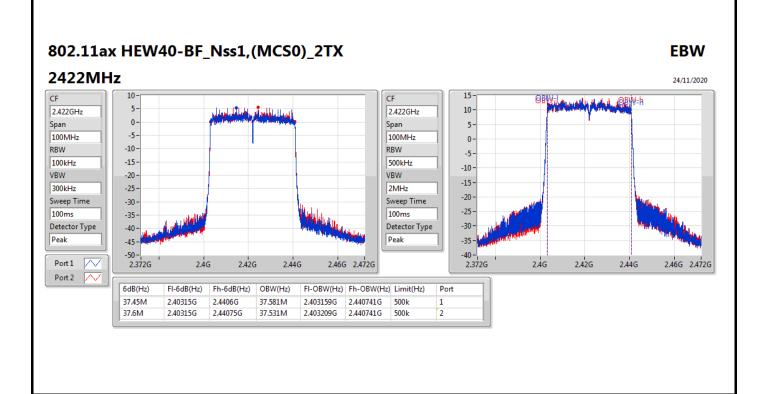
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	19.025M	19.04M	18.95M	18.991M
2437MHz	Pass	500k	18.925M	21.439M	18.85M	22.264M
2462MHz	Pass	500k	18.975M	19.015M	18.95M	19.015M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	37.45M	37.581M	37.6M	37.531M
2437MHz	Pass	500k	37.55M	37.631M	37.45M	37.581M
2452MHz	Pass	500k	37.4M	37.581M	37.7M	37.481M

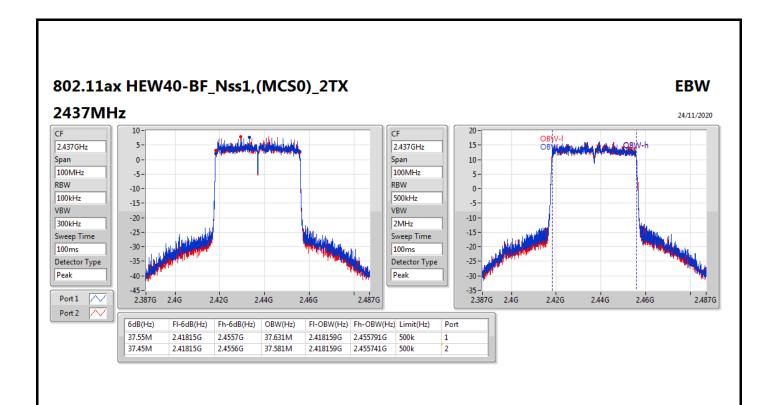
Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;

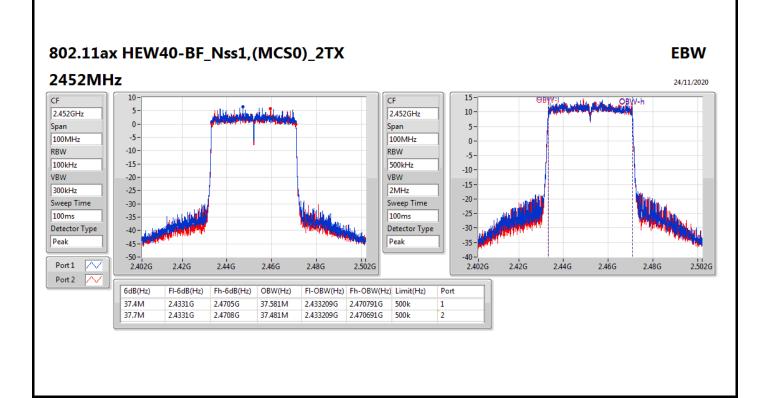














Summary

Mode	Total Power	Total Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	29.86	0.96828
802.11g_Nss1,(6Mbps)_2TX	29.87	0.97051
802.11ax HEW20_Nss2,(MCS0)_2TX	29.98	0.99541
802.11ax HEW40_Nss2,(MCS0)_2TX	25.89	0.38815



Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	1.71	26.65	26.92	29.80	30.00
2437MHz	Pass	1.71	26.77	26.92	29.86	30.00
2462MHz	Pass	1.71	26.61	26.94	29.79	30.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	1.71	22.39	22.41	25.41	30.00
2417MHz	Pass	1.71	23.24	23.21	26.24	30.00
2437MHz	Pass	1.71	26.64	27.06	29.87	30.00
2457MHz	Pass	1.71	24.01	24.24	27.14	30.00
2462MHz	Pass	1.71	21.67	21.62	24.66	30.00
802.11ax HEW20_Nss2,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	1.71	22.15	22.21	25.19	30.00
2417MHz	Pass	1.71	23.47	23.59	26.54	30.00
2437MHz	Pass	1.71	26.89	27.05	29.98	30.00
2457MHz	Pass	1.71	23.17	23.43	26.31	30.00
2462MHz	Pass	1.71	22.16	22.31	25.25	30.00
802.11ax HEW40_Nss2,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	1.71	21.23	21.34	24.30	30.00
2437MHz	Pass	1.71	22.83	22.93	25.89	30.00
2452MHz	Pass	1.71	21.73	21.90	24.83	30.00

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



Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	29.88	0.97275
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	25.92	0.39084

Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	=	-	-
2412MHz	Pass	4.72	21.56	21.51	24.55	30.00
2417MHz	Pass	4.72	23.94	24.15	27.06	30.00
2437MHz	Pass	4.72	26.70	27.04	29.88	30.00
2457MHz	Pass	4.72	23.89	23.92	26.92	30.00
2462MHz	Pass	4.72	21.98	21.91	24.96	30.00
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	4.72	20.40	20.62	23.52	30.00
2427MHz	Pass	4.72	20.94	21.27	24.12	30.00
2437MHz	Pass	4.72	22.79	23.03	25.92	30.00
2452MHz	Pass	4.72	20.79	20.94	23.88	30.00

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



Summary

Mode	PD
	(dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_2TX	6.96
802.11g_Nss1,(6Mbps)_2TX	4.32
802.11ax HEW20_Nss2,(MCS0)_2TX	2.66
802.11ax HEW40_Nss2,(MCS0)_2TX	-4.80

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

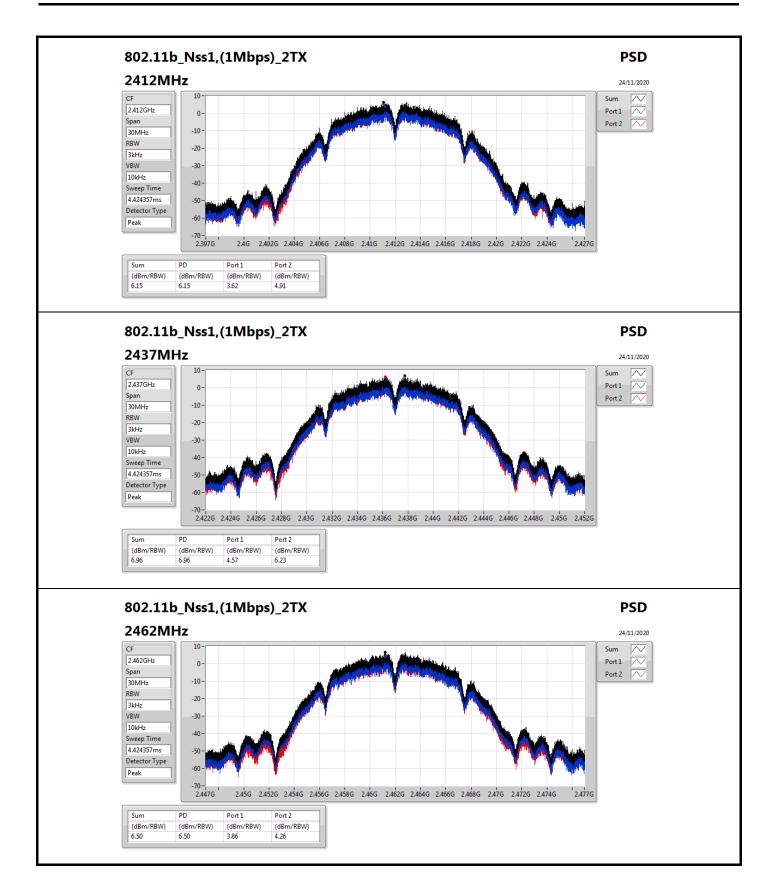


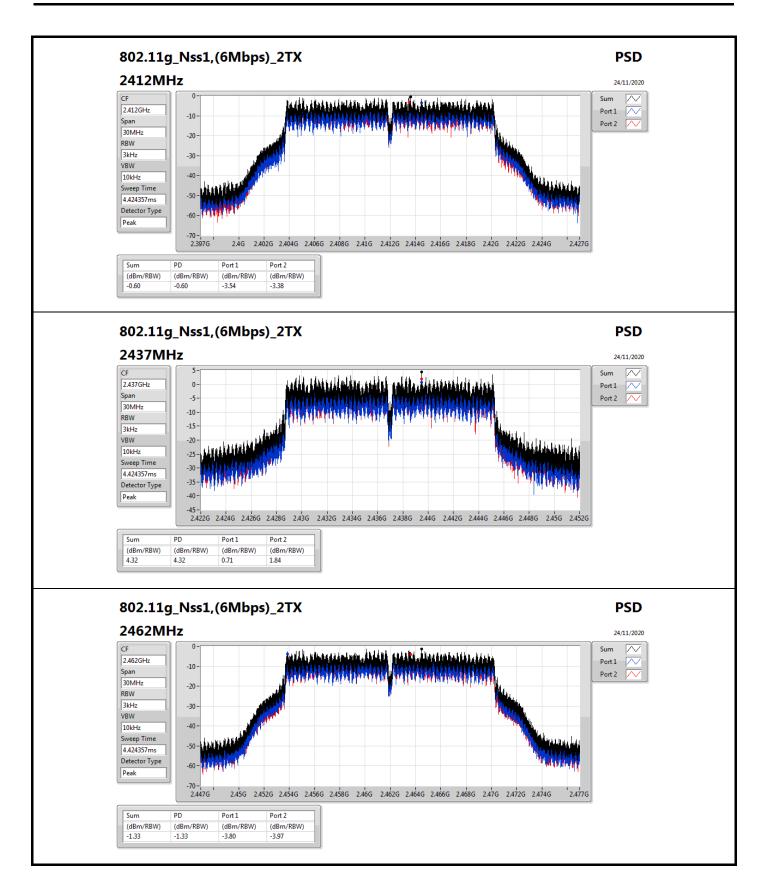
Appendix D.1 **PSD**

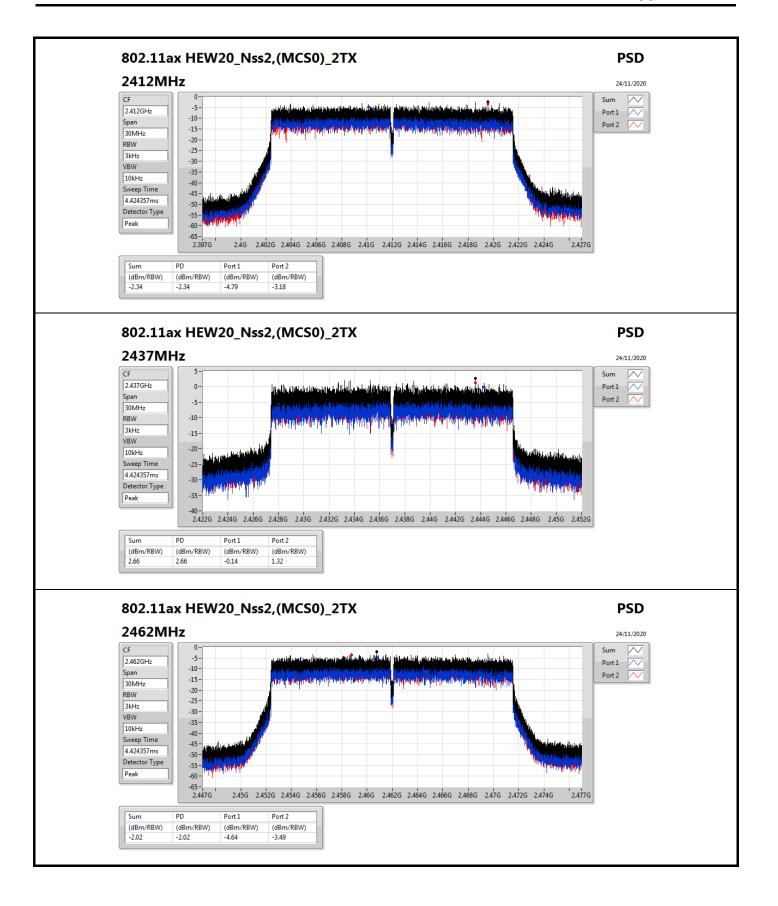
Result

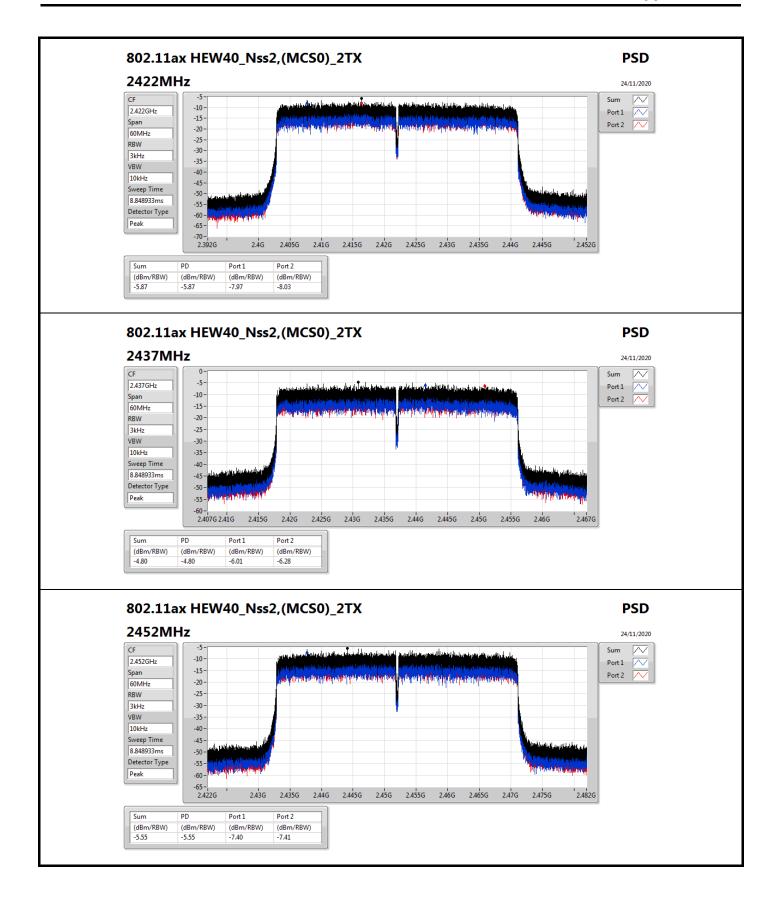
Mode	Result	DG	Port 1	Port 2	PD	PD Limit	
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-	
2412MHz	Pass	4.72	3.62	4.91	6.15	8.00	
2437MHz	Pass	4.72	4.57	6.23	6.96	8.00	
2462MHz	Pass	4.72	3.86	4.26	6.50	8.00	
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	
2412MHz	Pass	4.72	-3.54	-3.38	-0.60	8.00	
2437MHz	Pass	4.72	0.71	1.84	4.32	8.00	
2462MHz	Pass	4.72	-3.80	-3.97	-1.33	8.00	
802.11ax HEW20_Nss2,(MCS0)_2TX	-	-	-	-	-	-	
2412MHz	Pass	1.71	-4.79	-3.18	-2.34	8.00	
2437MHz	Pass	1.71	-0.14	1.32	2.66	8.00	
2462MHz	Pass	1.71	-4.64	-3.49	-2.02	8.00	
802.11ax HEW40_Nss2,(MCS0)_2TX	=	-	-	-	-	-	
2422MHz	Pass	1.71	-7.97	-8.03	-5.87	8.00	
2437MHz	Pass	1.71	-6.01	-6.28	-4.80	8.00	
2452MHz	Pass	1.71	-7.40	-7.41	-5.55	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;











Summary

Mode	PD
	(dBm/RBW)
2.4-2.4835GHz	
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	3.09
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-3.31

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



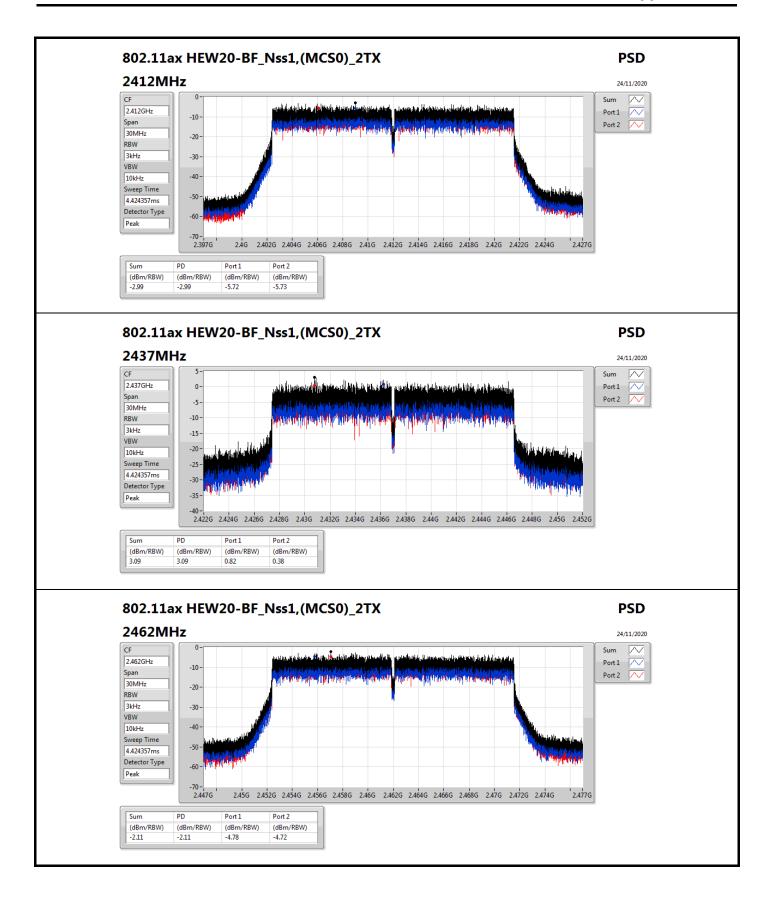
Appendix D.2 **PSD**

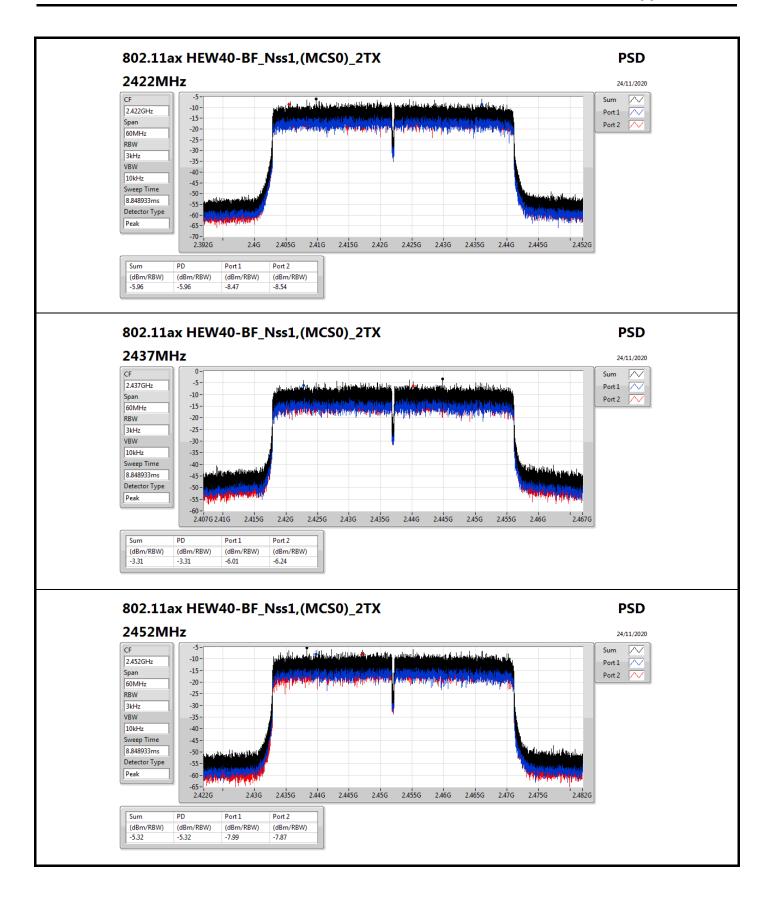
Result

Mode	Result	DG	Port 1	Port 2	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	4.72	-5.72	-5.73	-2.99	8.00
2437MHz	Pass	4.72	0.82	0.38	3.09	8.00
2462MHz	Pass	4.72	-4.78	-4.72	-2.11	8.00
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	4.72	-8.47	-8.54	-5.96	8.00
2437MHz	Pass	4.72	-6.01	-6.24	-3.31	8.00
2452MHz	Pass	4.72	-7.99	-7.87	-5.32	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.1

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	2.43599G	19.28	-10.72	2.30437G	-49.09	2.39998G	-33.02	2.4G	-33.95	2.4845G	-47.30	7.23514G	-42.91	1
802.11g_Nss1,(6Mbps)_2TX	Pass	2.44196G	16.23	-13.77	2.30932G	-50.18	2.39978G	-24.19	2.4G	-28.74	2.48976G	-47.27	16.47298G	-46.78	2
802.11ax HEW20_Nss2,(MCS0)_2TX	Pass	2.43073G	15.85	-14.15	2.30525G	-50.26	2.39938G	-24.38	2.4G	-26.12	2.48786G	-48.60	6.92327G	-46.96	1
802.11ax HEW40_Nss2,(MCS0)_2TX	Pass	2.43198G	8.94	-21.06	2.30483G	-48.97	2.399G	-29.01	2.4G	-31.02	2.48358G	-34.88	16.51339G	-45.48	1



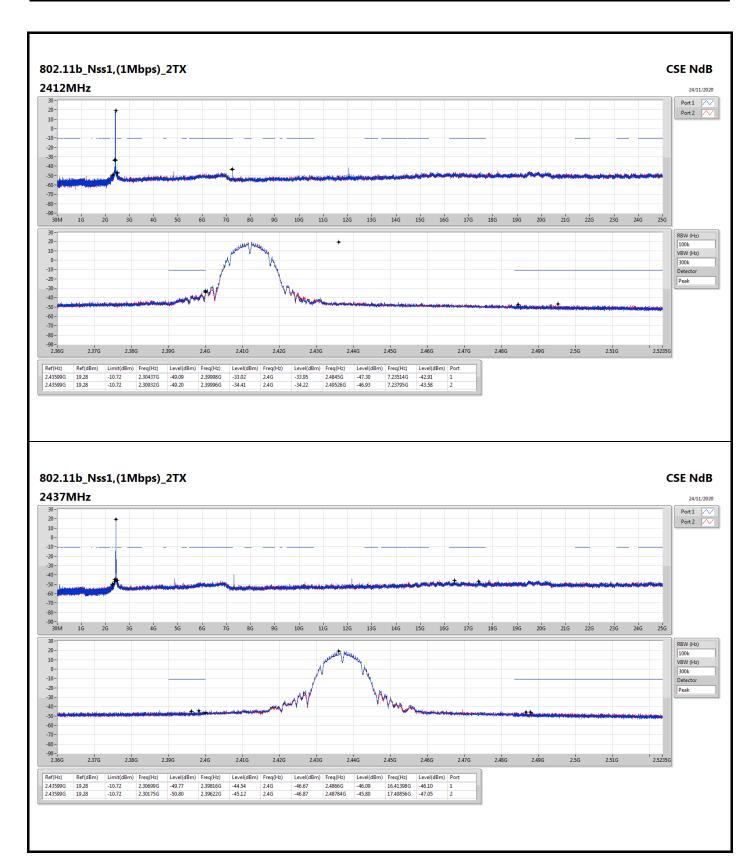
CSE(Non-restricted Band)

Appendix E.1

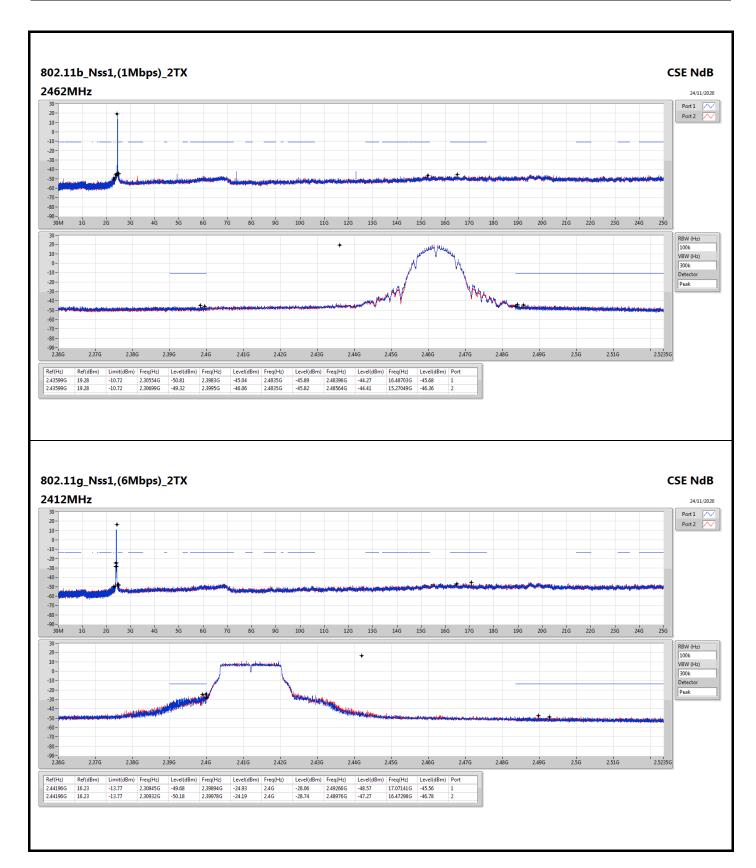
Result

Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-		-	-		-	-	-	-	-
2412MHz	Pass	2.43599G	19.28	-10.72	2.30437G	-49.09	2.39998G	-33.02	2.4G	-33.95	2.4845G	-47.30	7.23514G	-42.91	1
2412MHz	Pass	2.43599G	19.28	-10.72	2.30932G	-49.20	2.39996G	-34.41	2.4G	-34.22	2.49526G	-46.93	7.23795G	-43.58	2
2437MHz	Pass	2.43599G	19.28	-10.72	2.30699G	-49.77	2.39816G	-44.54	2.4G	-46.67	2.4866G	-46.09	16.41398G	-46.10	1
2437MHz	Pass	2.43599G	19.28	-10.72	2.30175G	-50.80	2.39622G	-45.12	2.4G	-46.87	2.48784G	-45.80	17.40856G	-47.05	2
2462MHz	Pass	2.43599G	19.28	-10.72	2.30554G	-50.81	2.3983G	-45.04	2.4835G	-45.89	2.48396G	-44.27	16.48703G	-45.68	1
2462MHz	Pass	2.43599G	19.28	-10.72	2.30699G	-49.32	2.3995G	-46.06	2.4835G	-45.82	2.48564G	-44.41	15.27049G	-46.36	2
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.44196G	16.23	-13.77	2.30845G	-49.68	2.39894G	-24.93	2.4G	-28.06	2.49266G	-48.57	17.07141G	-45.56	1
2412MHz	Pass	2.44196G	16.23	-13.77	2.30932G	-50.18	2.39978G	-24.19	2.4G	-28.74	2.48976G	-47.27	16.47298G	-46.78	2
2437MHz	Pass	2.44196G	16.23	-13.77	2.30816G	-47.84	2.39666G	-34.23	2.4G	-34.99	2.48422G	-37.05	24.76681G	-46.49	1
2437MHz	Pass	2.44196G	16.23	-13.77	2.30059G	-50.45	2.3995G	-32.47	2.4G	-36.21	2.48416G	-35.32	6.76875G	-46.11	2
2462MHz	Pass	2.44196G	16.23	-13.77	2.1238G	-50.84	2.39806G	-47.09	2.4835G	-36.64	2.48354G	-35.02	16.82136G	-46.91	1
2462MHz	Pass	2.44196G	16.23	-13.77	2.30146G	-50.29	2.39506G	-47.73	2.4835G	-35.74	2.4836G	-33.13	3.28208G	-45.37	2
802.11ax HEW20_Nss2,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43073G	15.85	-14.15	2.30525G	-50.26	2.39938G	-24.38	2.4G	-26.12	2.48786G	-48.60	6.92327G	-46.96	1
2412MHz	Pass	2.43073G	15.85	-14.15	2.30554G	-49.51	2.39952G	-25.49	2.4G	-28.04	2.49108G	-48.16	16.41117G	-46.13	2
2437MHz	Pass	2.43073G	15.85	-14.15	2.30466G	-49.50	2.39966G	-30.62	2.4G	-31.38	2.48568G	-35.99	16.47579G	-45.72	1
2437MHz	Pass	2.43073G	15.85	-14.15	2.30816G	-49.65	2.39962G	-30.87	2.4G	-32.23	2.48356G	-35.33	6.06074G	-46.73	2
2462MHz	Pass	2.43073G	15.85	-14.15	2.3067G	-51.73	2.39518G	-46.80	2.4835G	-33.09	2.48364G	-30.72	15.28172G	-46.80	1
2462MHz	Pass	2.43073G	15.85	-14.15	2.13603G	-49.41	2.3939G	-47.33	2.4835G	-31.23	2.4839G	-30.20	3.28208G	-45.54	2
802.11ax HEW40_Nss2,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.43198G	8.94	-21.06	2.30512G	-50.72	2.3976G	-31.82	2.4G	-35.98	2.48842G	-47.63	17.12198G	-45.82	1
2422MHz	Pass	2.43198G	8.94	-21.06	2.30454G	-49.91	2.39928G	-33.83	2.4G	-36.74	2.48698G	-47.76	24.85136G	-46.35	2
2437MHz	Pass	2.43198G	8.94	-21.06	2.30483G	-48.97	2.399G	-29.01	2.4G	-31.02	2.48358G	-34.88	16.51339G	-45.48	1
2437MHz	Pass	2.43198G	8.94	-21.06	2.30082G	-50.34	2.39872G	-30.22	2.4G	-34.14	2.48474G	-34.44	15.09429G	-45.31	2
2452MHz	Pass	2.43198G	8.94	-21.06	2.3034G	-49.62	2.39984G	-41.97	2.4835G	-32.82	2.4849G	-29.27	24.46433G	-46.60	1
2452MHz	Pass	2.43198G	8.94	-21.06	223.79M	-49.40	2.3986G	-41.92	2.4835G	-34.92	2.48606G	-32.61	3.26745G	-45.06	2

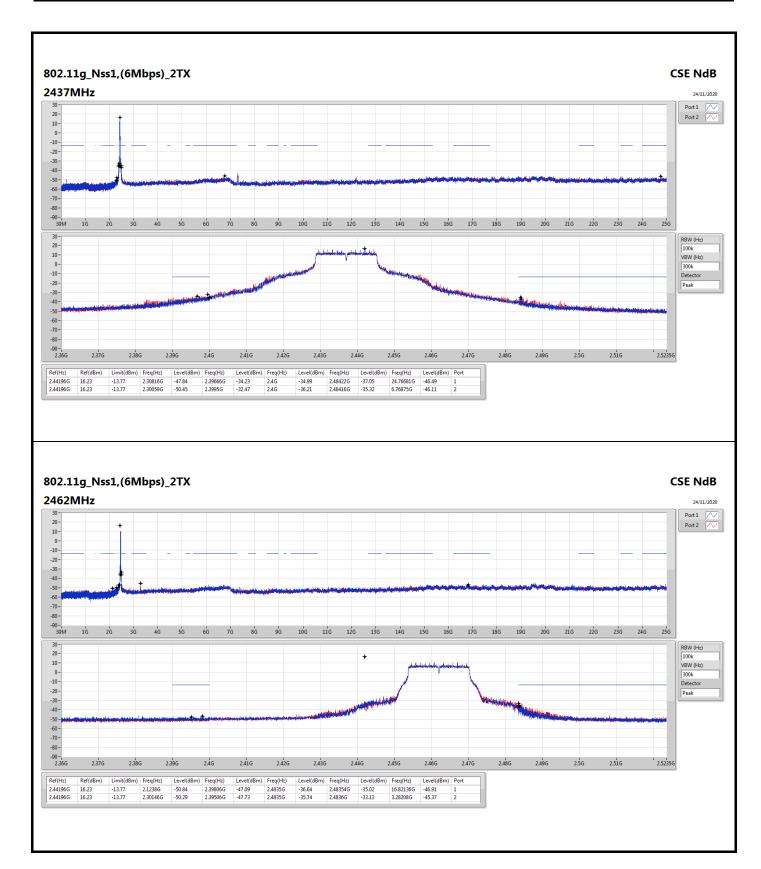




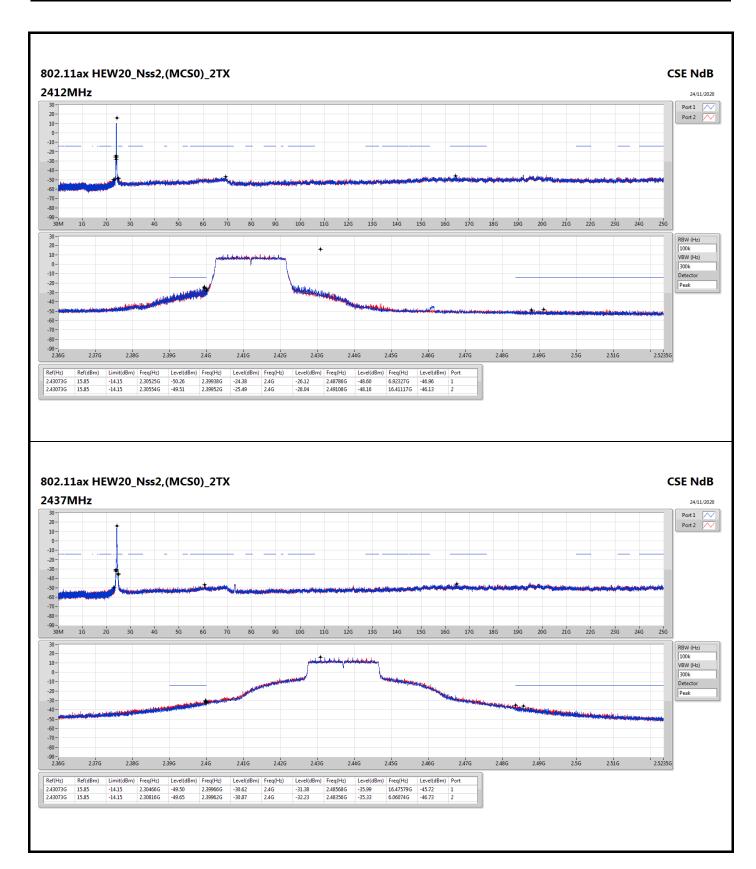




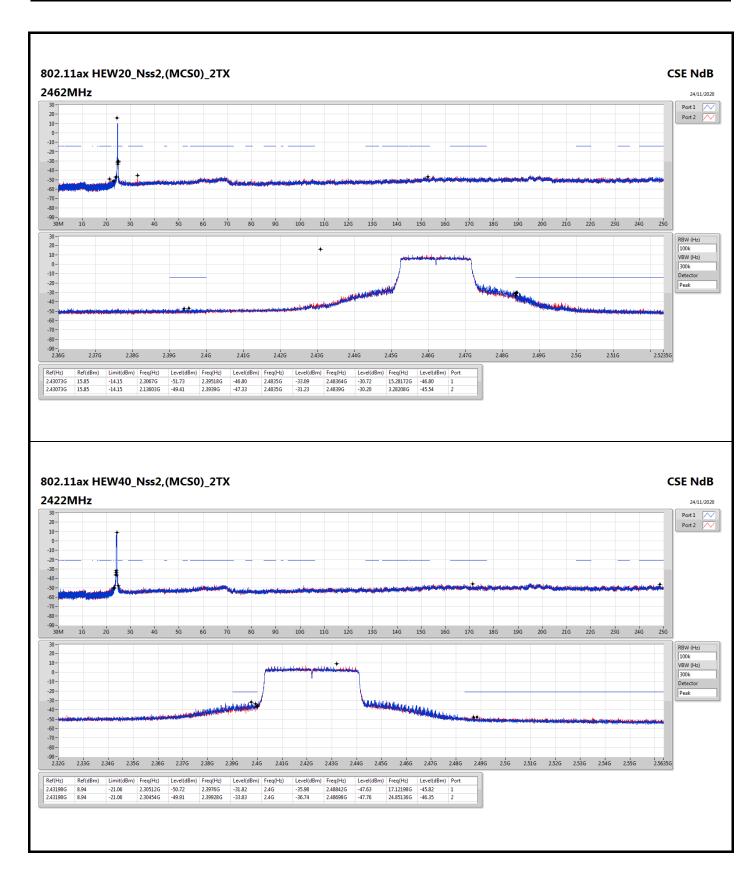




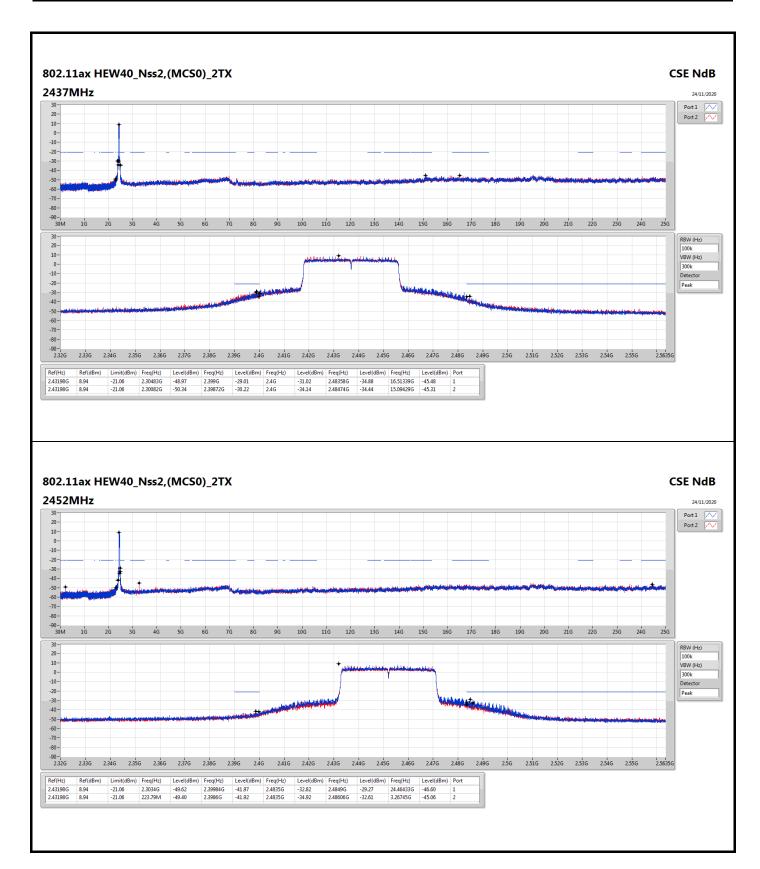














CSE(Non-restricted Band)

Appendix E.2

Summary

4																
	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		-	-	-	-	-	-	-	-	-	-	-		-	-
	802.11ax HEW20-BF_Nss1,(MCS0)_2TX	Pass	2.442G	16.44	-13.56	2.30292G	-49.83	2.39404G	-28.21	2.4G	-28.09	2.4938G	-49.01	24.4409G	-46.40	1
	802.11ax HEW40-BF_Nss1,(MCS0)_2TX	Pass	2.44196G	8.29	-21.71	2.30626G	-49.49	2.39696G	-29.46	2.4G	-33.06	2.4855G	-36.75	16.80787G	-45.99	1



CSE(Non-restricted Band)

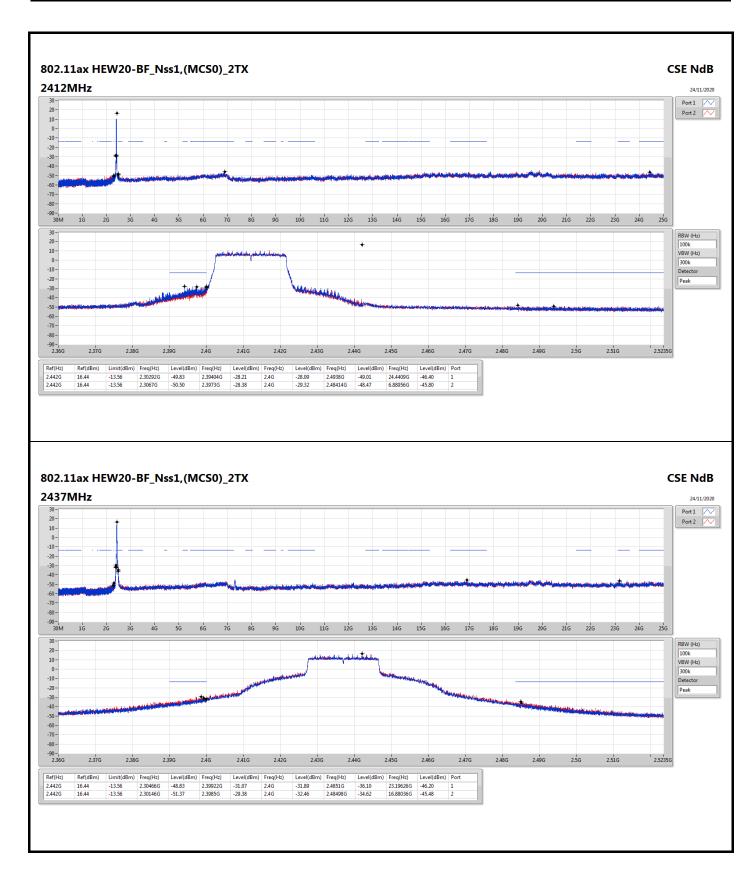
Appendix E.2

Result

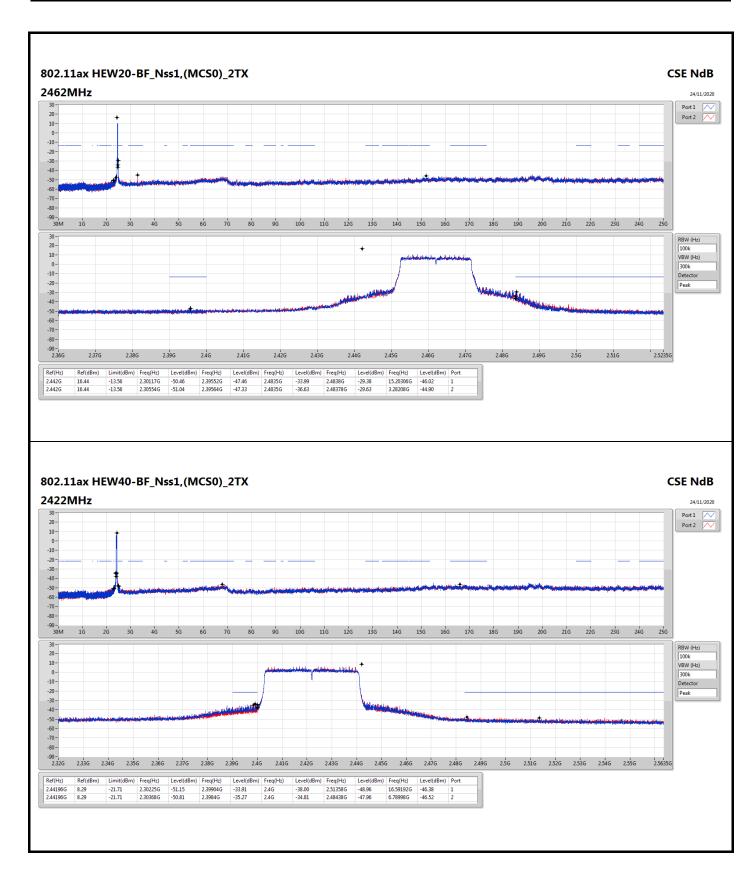
Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.442G	16.44	-13.56	2.30292G	-49.83	2.39404G	-28.21	2.4G	-28.09	2.4938G	-49.01	24.4409G	-46.40	1
2412MHz	Pass	2.442G	16.44	-13.56	2.3067G	-50.50	2.3973G	-28.38	2.4G	-29.32	2.48414G	-48.47	6.88956G	-45.80	2
2437MHz	Pass	2.442G	16.44	-13.56	2.30466G	-48.83	2.39922G	-31.07	2.4G	-31.89	2.4851G	-36.10	23.19626G	-46.20	1
2437MHz	Pass	2.442G	16.44	-13.56	2.30146G	-51.37	2.3985G	-29.38	2.4G	-32.46	2.48498G	-34.62	16.88036G	-45.48	2
2462MHz	Pass	2.442G	16.44	-13.56	2.30117G	-50.46	2.39552G	-47.46	2.4835G	-33.99	2.4838G	-29.38	15.20306G	-46.02	1
2462MHz	Pass	2.442G	16.44	-13.56	2.30554G	-51.04	2.39564G	-47.33	2.4835G	-36.63	2.48378G	-29.63	3.28208G	-44.90	2
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.44196G	8.29	-21.71	2.30225G	-51.15	2.39904G	-33.91	2.4G	-38.00	2.51358G	-48.96	16.59192G	-46.38	1
2422MHz	Pass	2.44196G	8.29	-21.71	2.30368G	-50.81	2.3984G	-35.27	2.4G	-34.81	2.48438G	-47.96	6.78998G	-46.52	2
2437MHz	Pass	2.44196G	8.29	-21.71	2.30626G	-49.49	2.39696G	-29.46	2.4G	-33.06	2.4855G	-36.75	16.80787G	-45.99	1
2437MHz	Pass	2.44196G	8.29	-21.71	2.30912G	-50.28	2.39944G	-30.67	2.4G	-34.29	2.48694G	-36.75	24.41385G	-46.77	2
2452MHz	Pass	2.44196G	8.29	-21.71	2.30025G	-51.57	2.39968G	-44.22	2.4835G	-38.23	2.48526G	-34.89	23.13777G	-46.19	1
2452MHz	Pass	2.44196G	8.29	-21.71	2.18317G	-50.70	2.39184G	-45.50	2.4835G	-39.85	2.48382G	-36.00	3.26745G	-45.93	2

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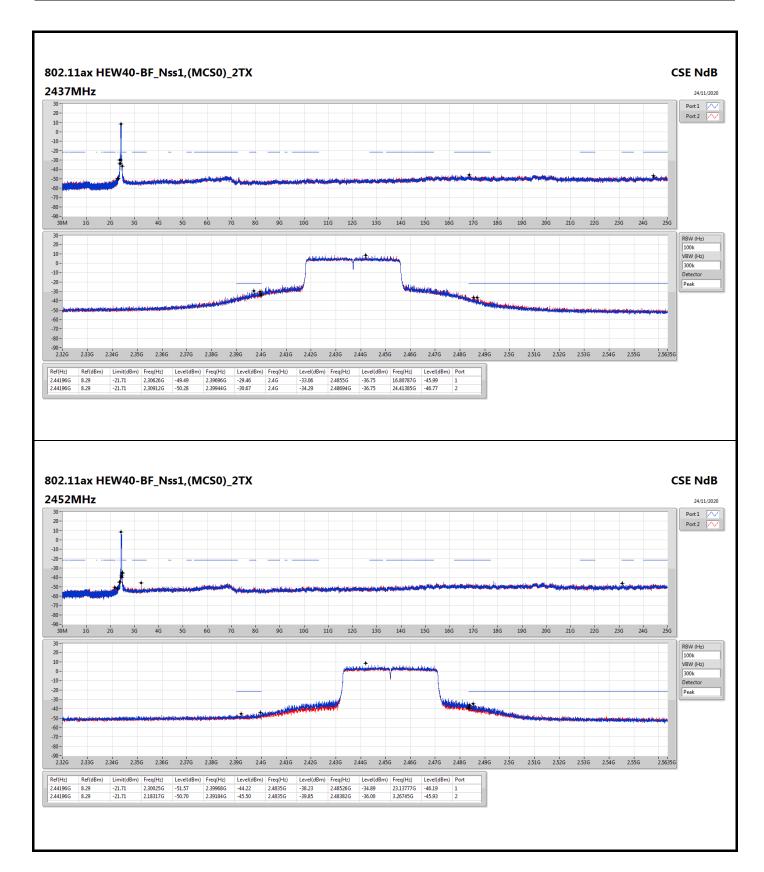














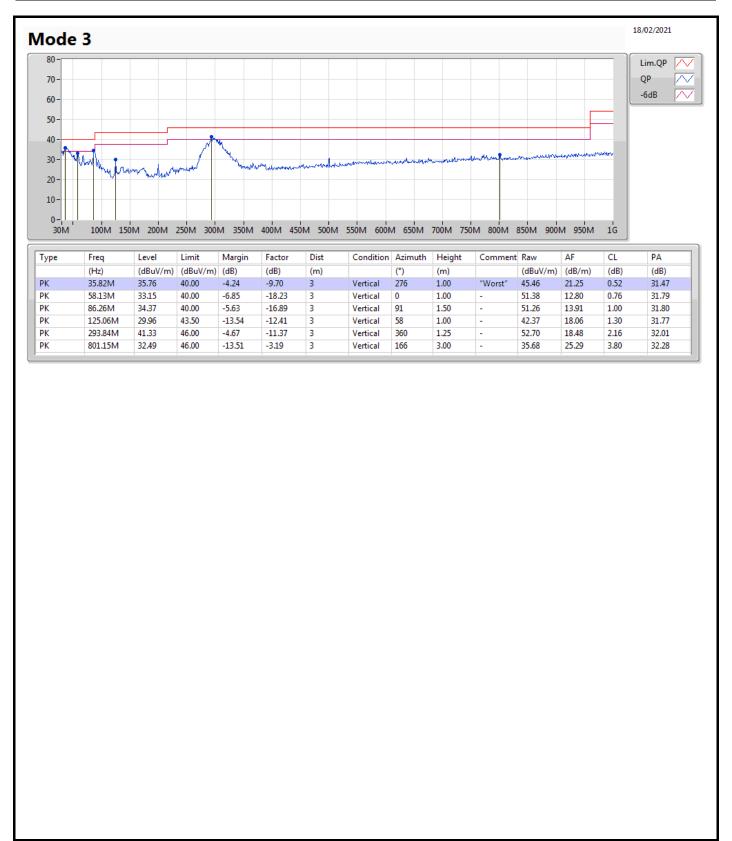
Radiated Emissions below 1GHz

Appendix F.1

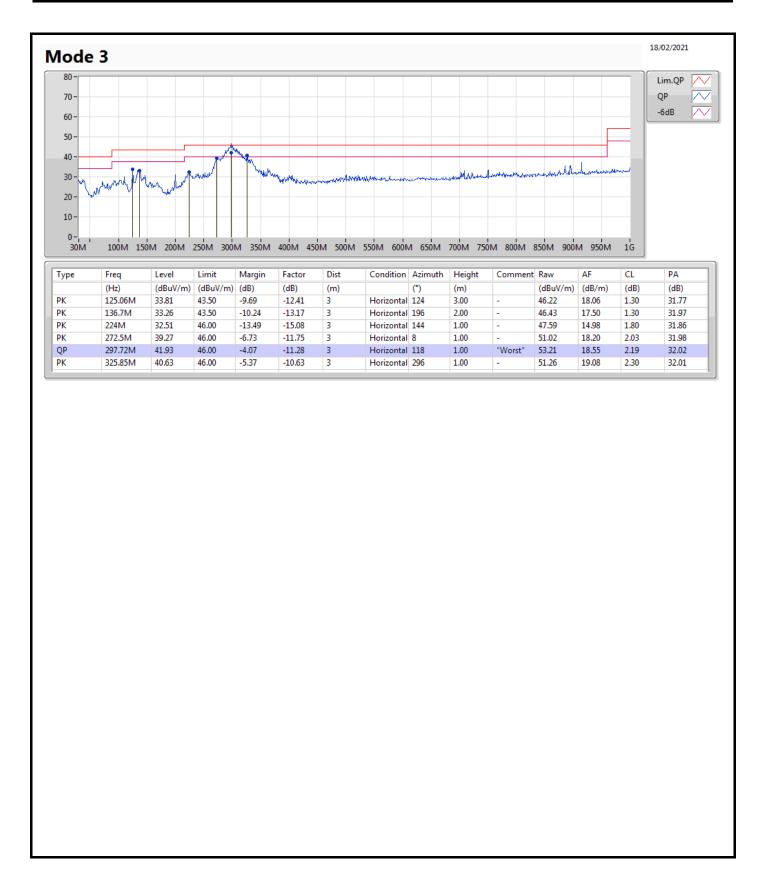
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	
Mode 3	Pass	QP	297.72M	41.93	46.00	-4.07	Horizontal











RSE TX above 1GHz

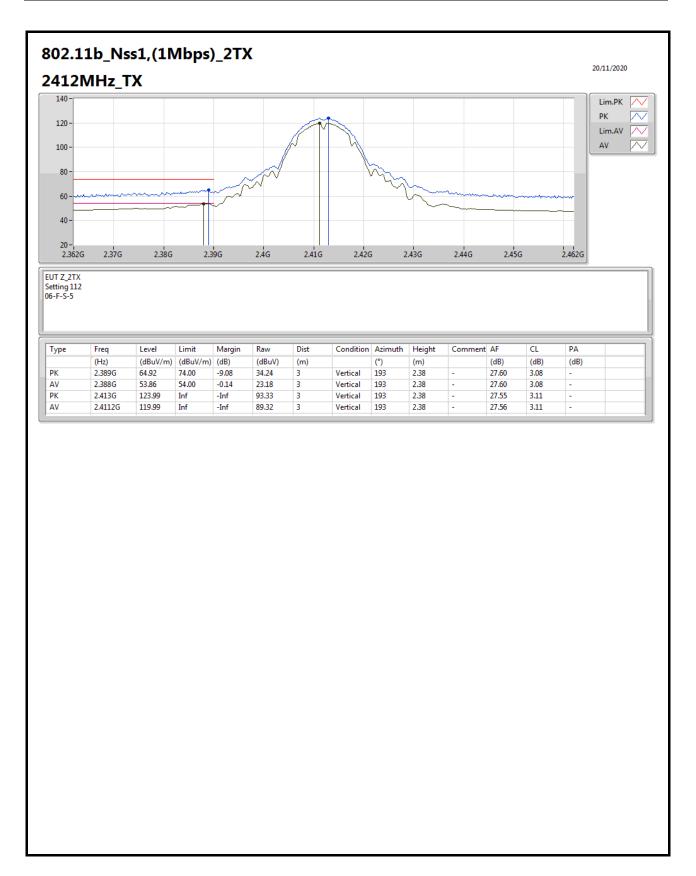
Appendix F.2

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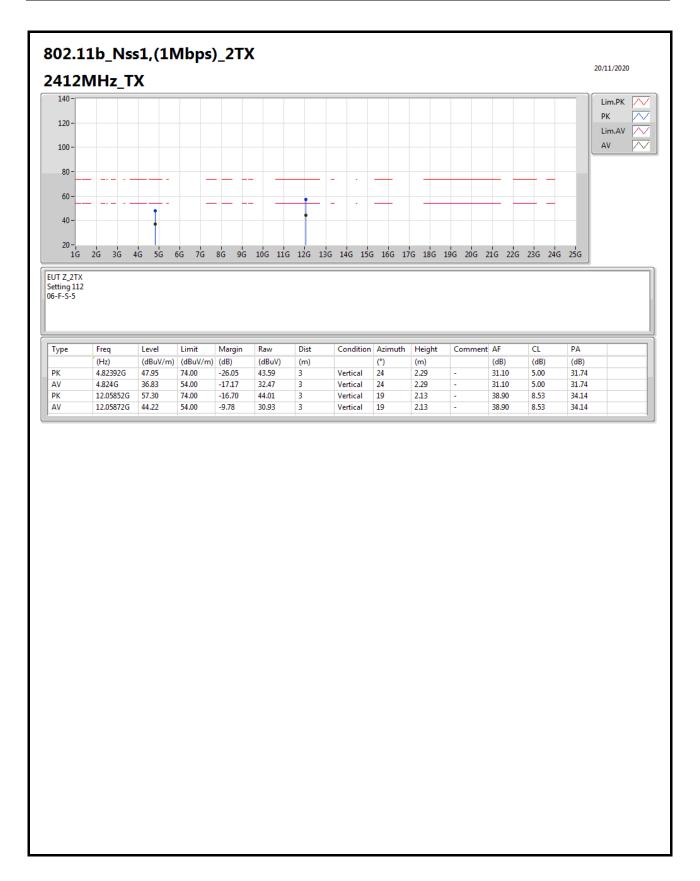
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
802.11ax HEW20_Nss2,(MCS0)_2TX	Pass	AV	2.4835G	53.99	54.00	-0.01	3	Vertical	179	2.64	-

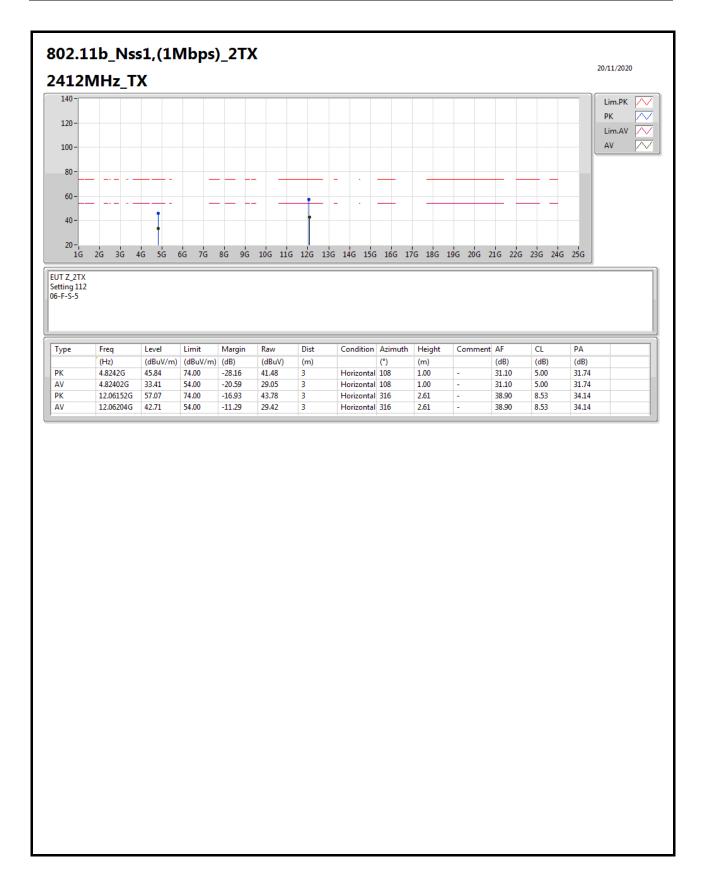




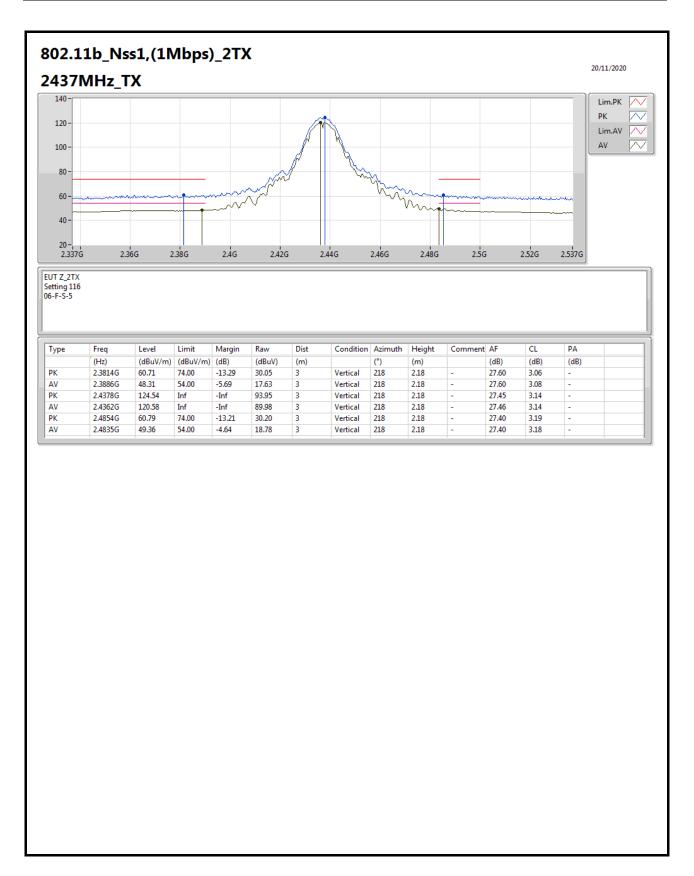




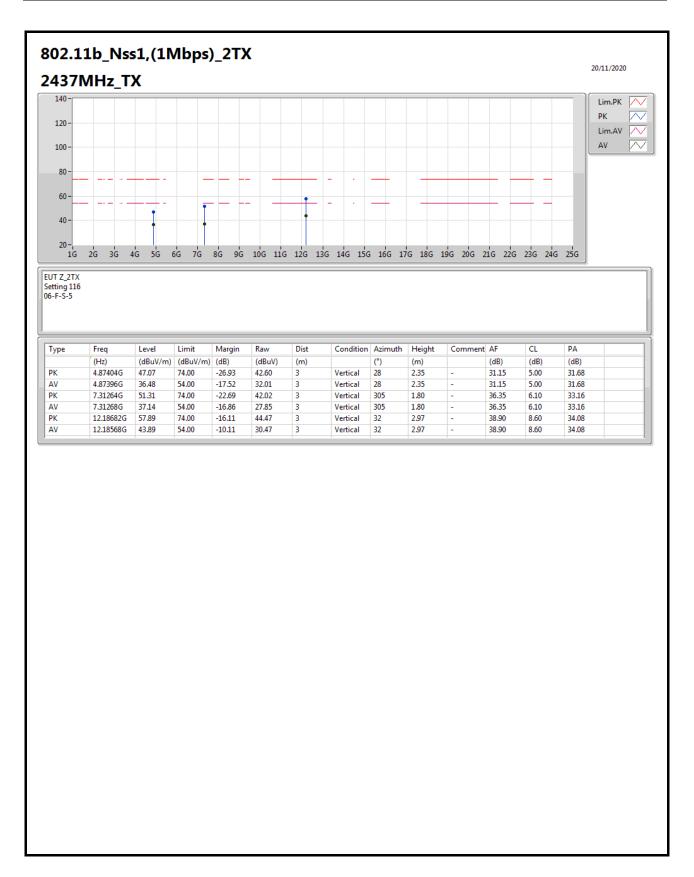




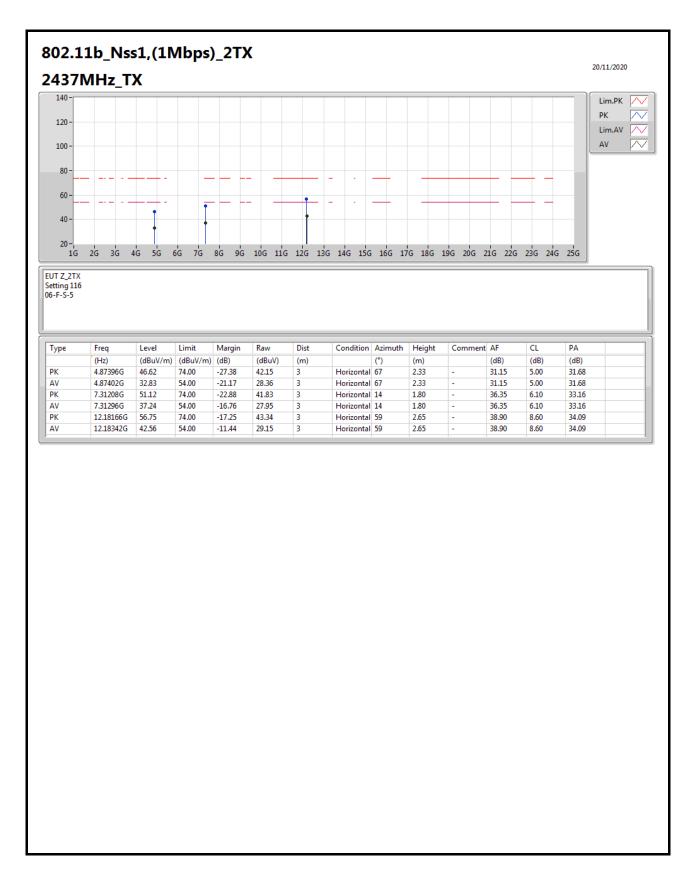




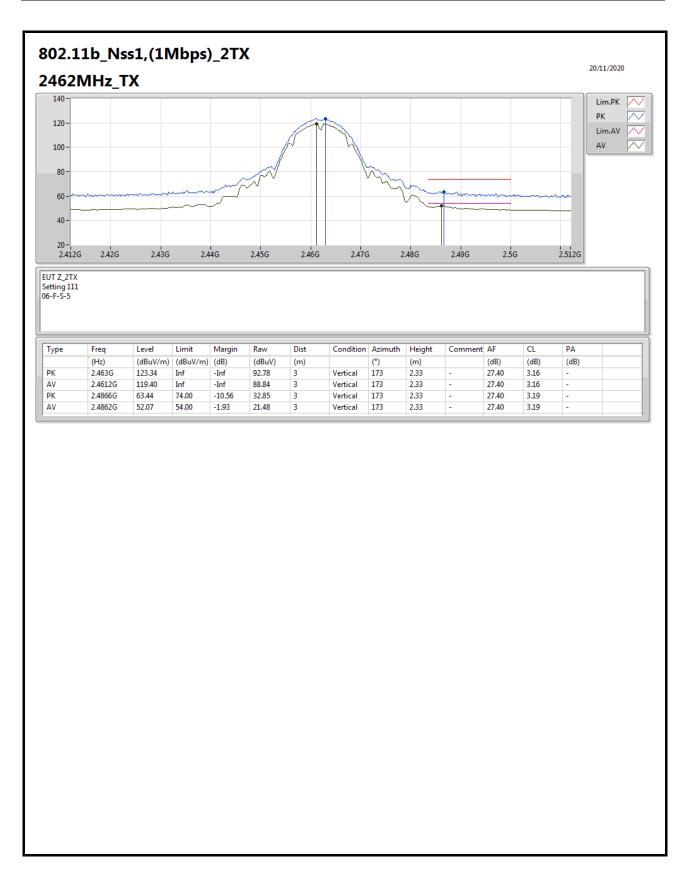




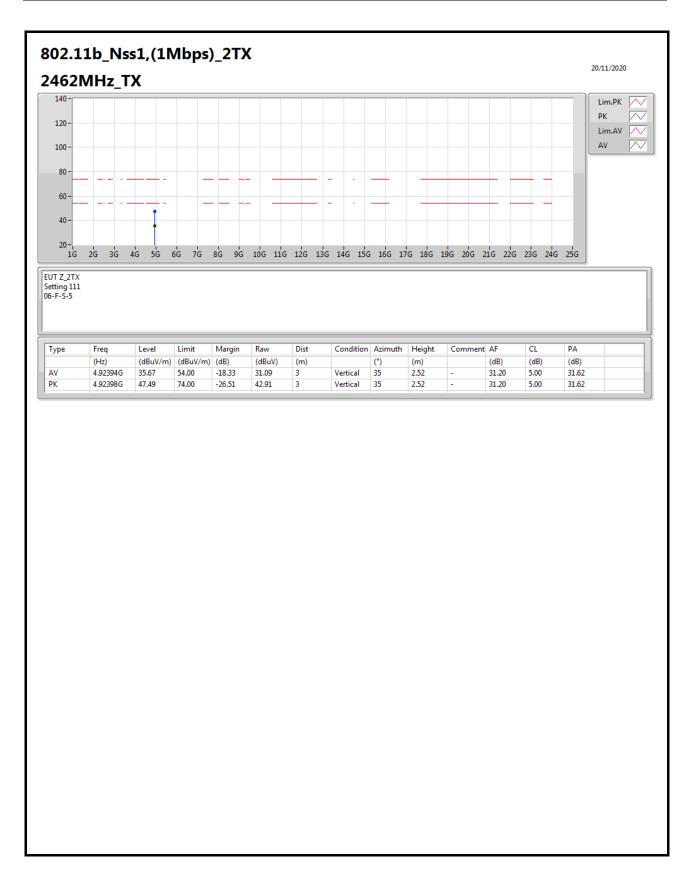




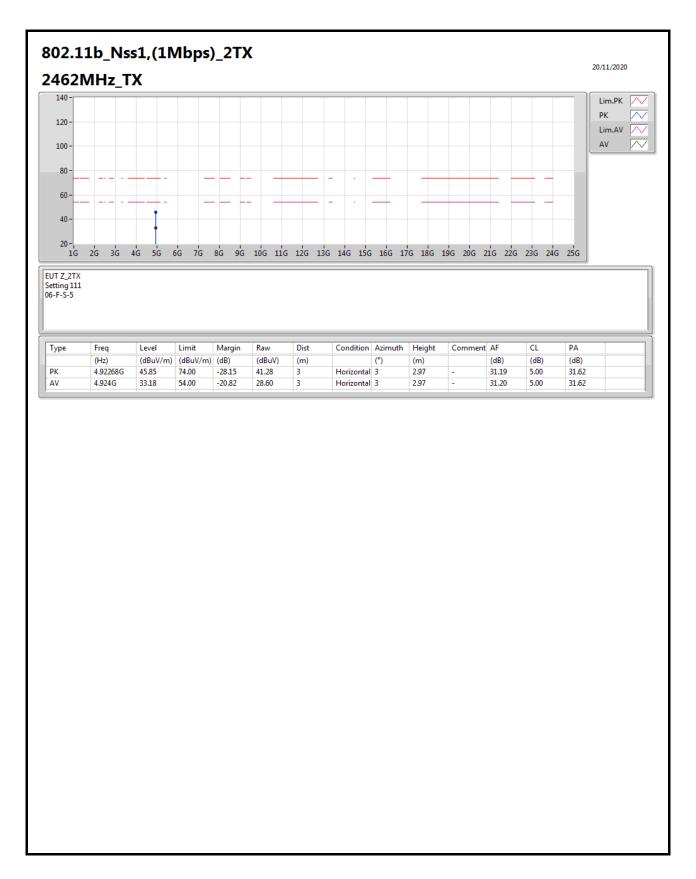




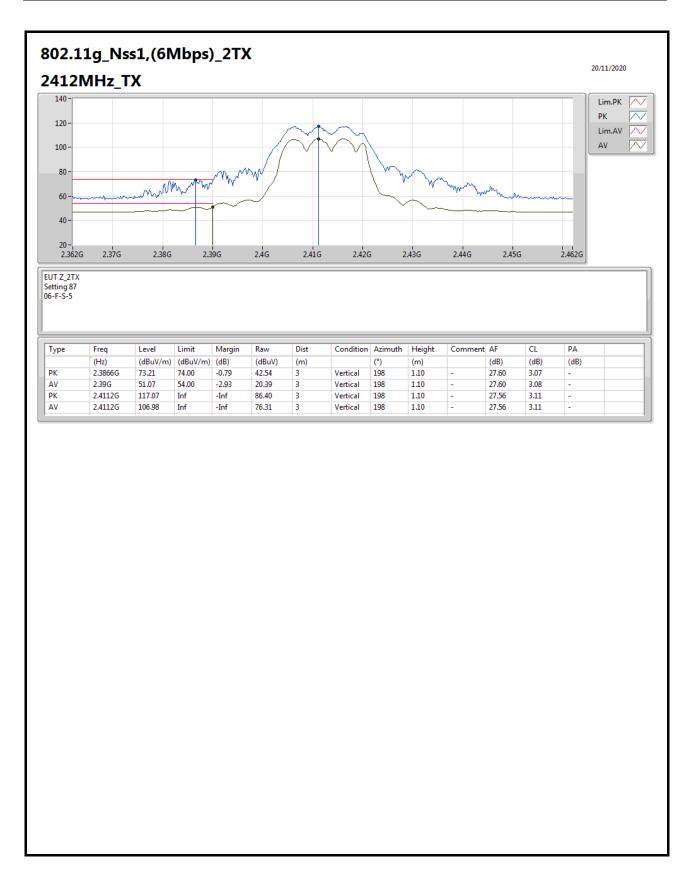




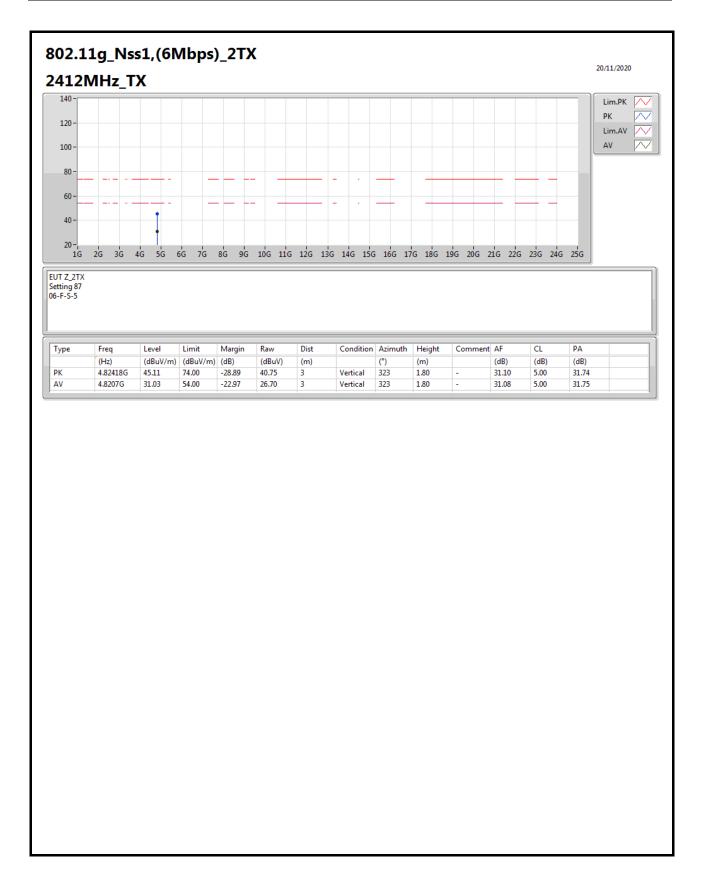




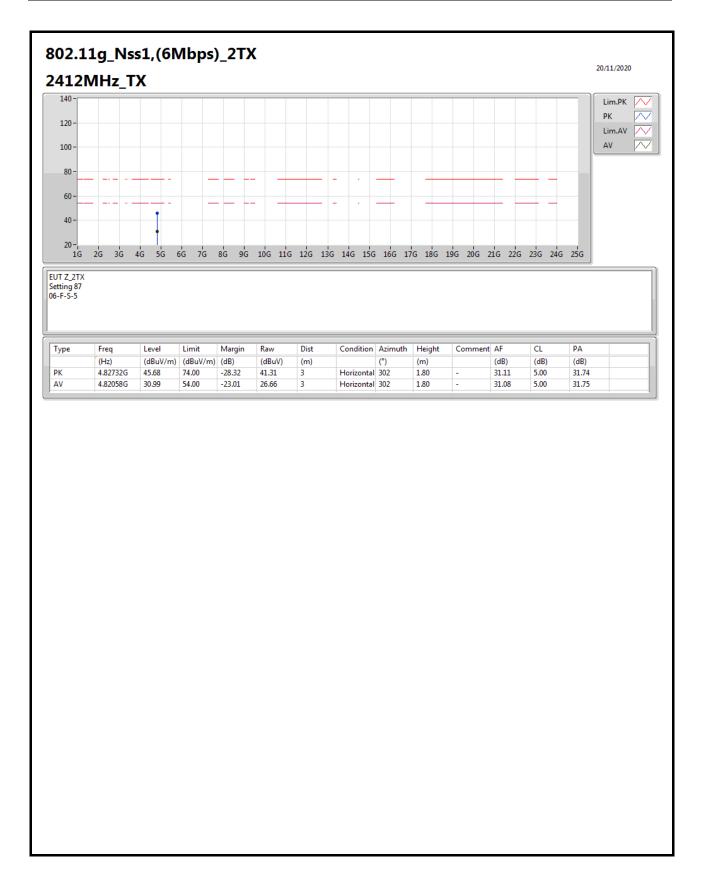




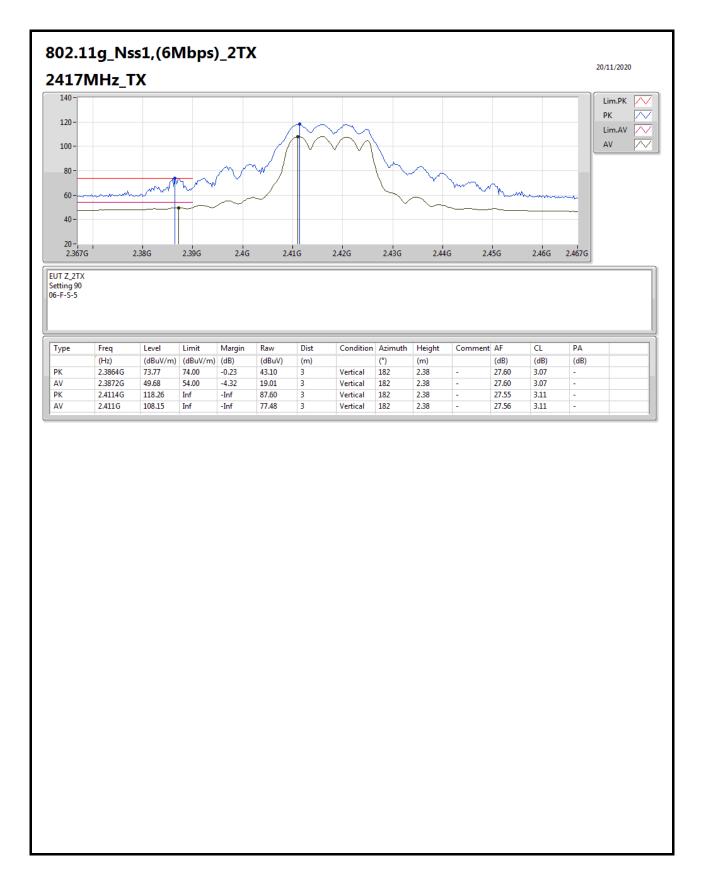




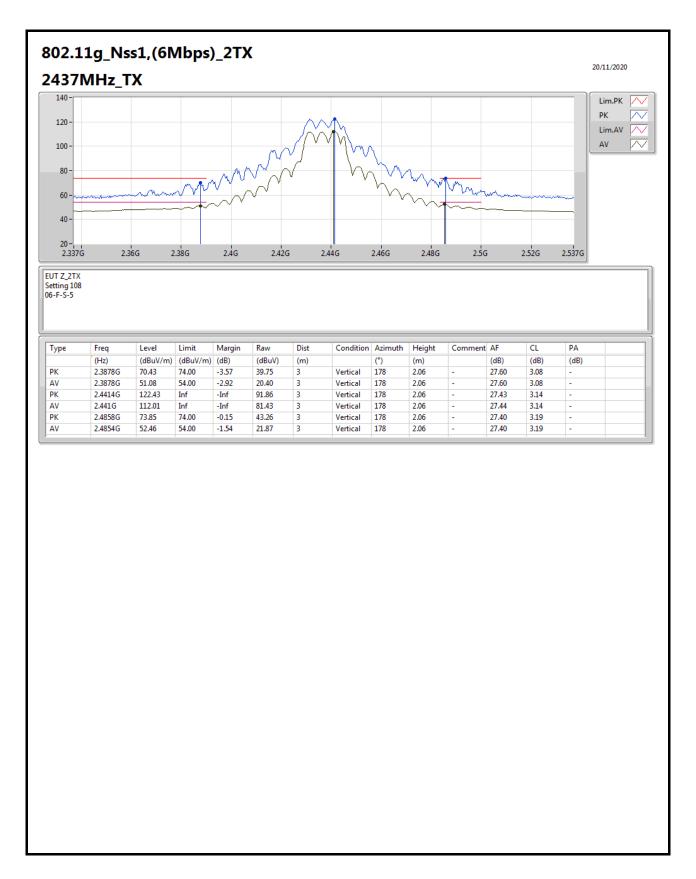




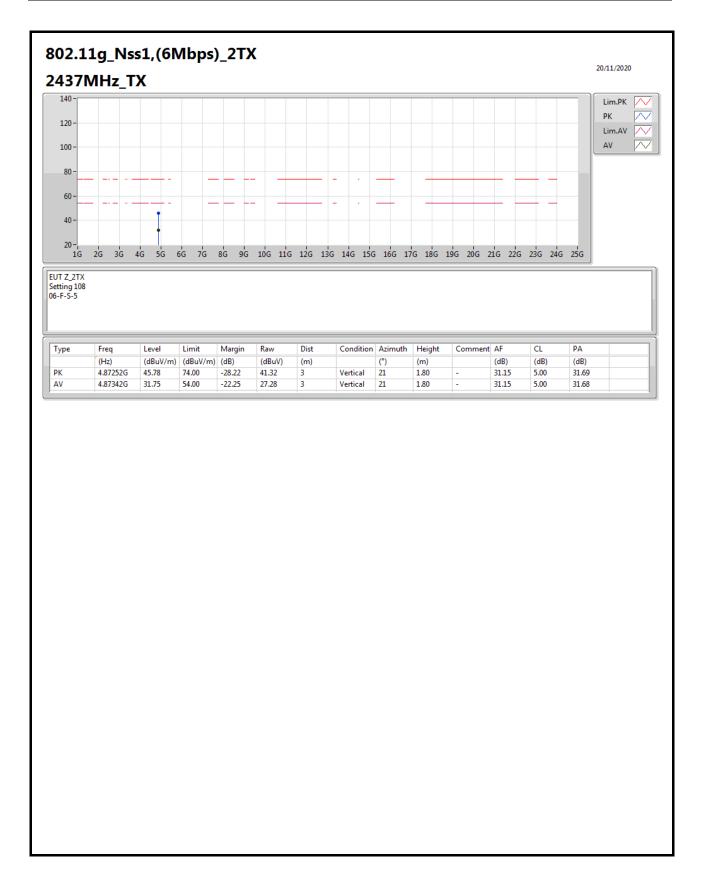




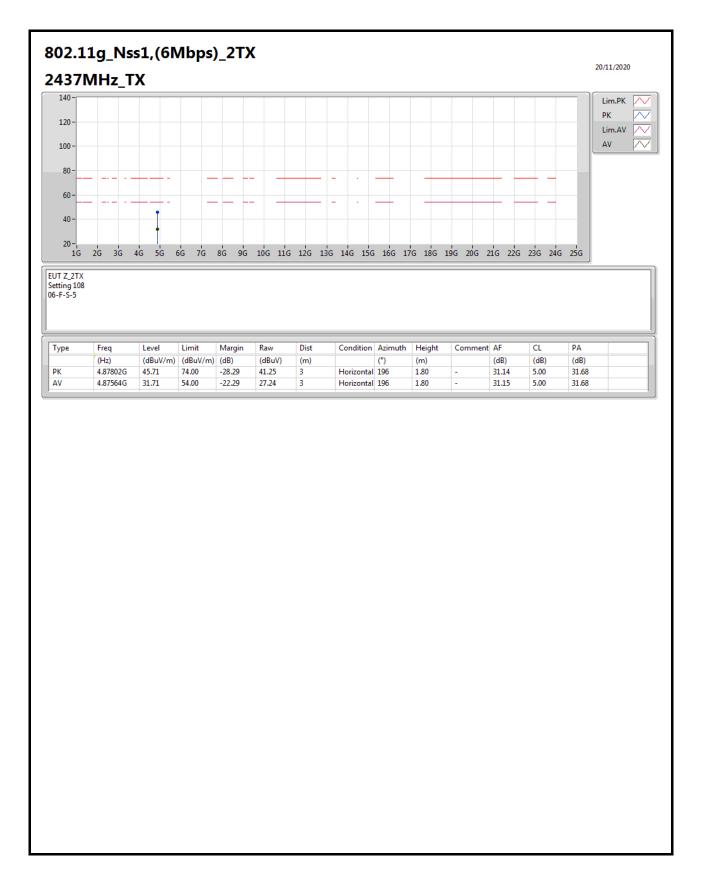


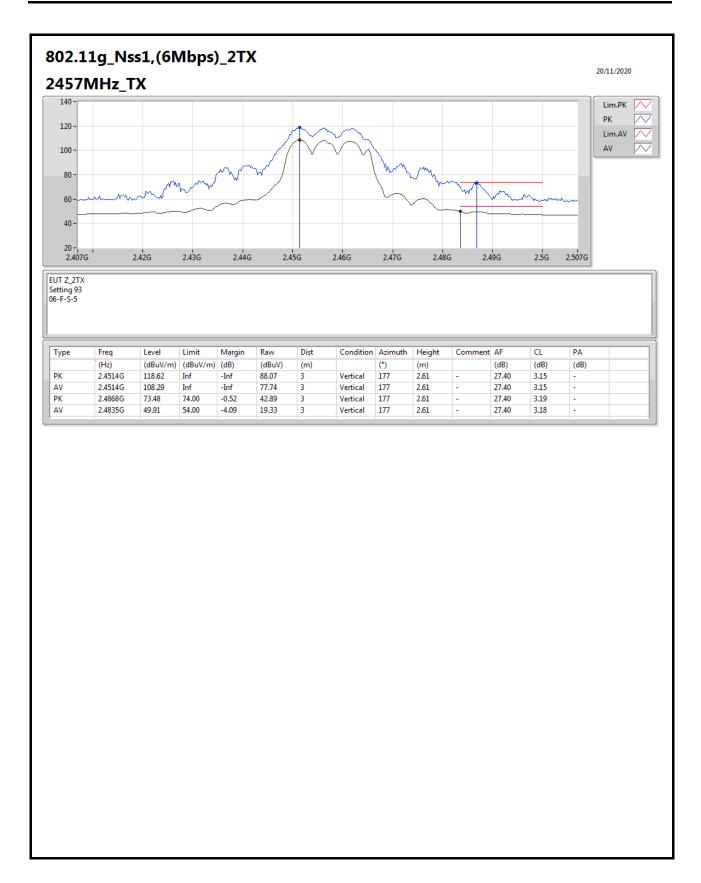




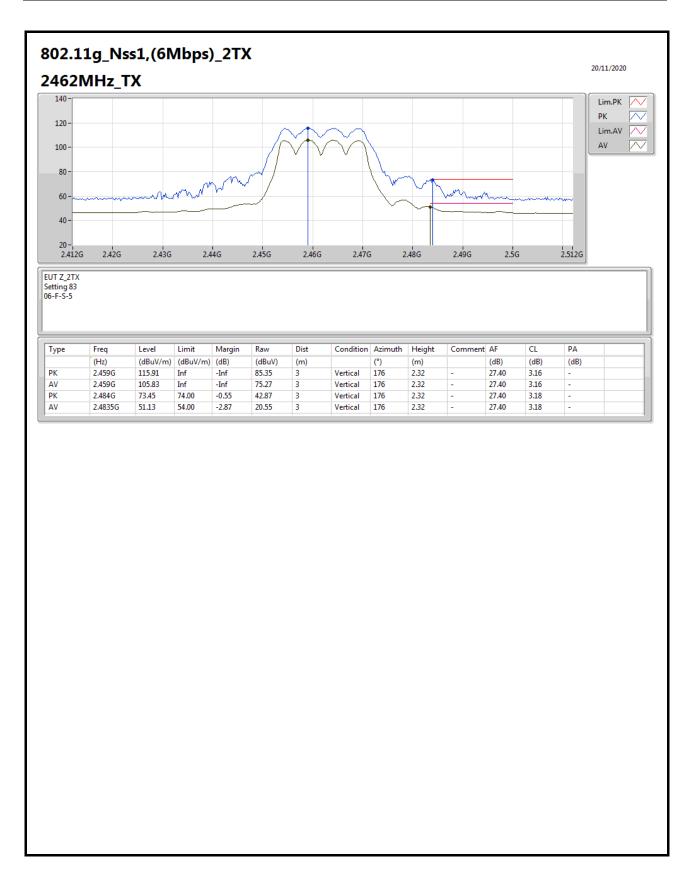




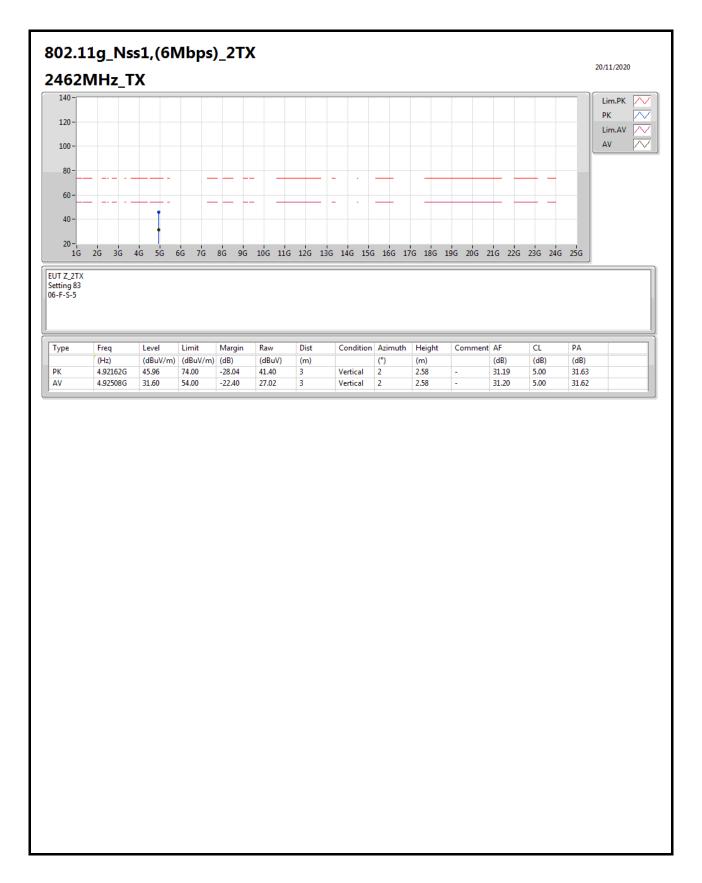




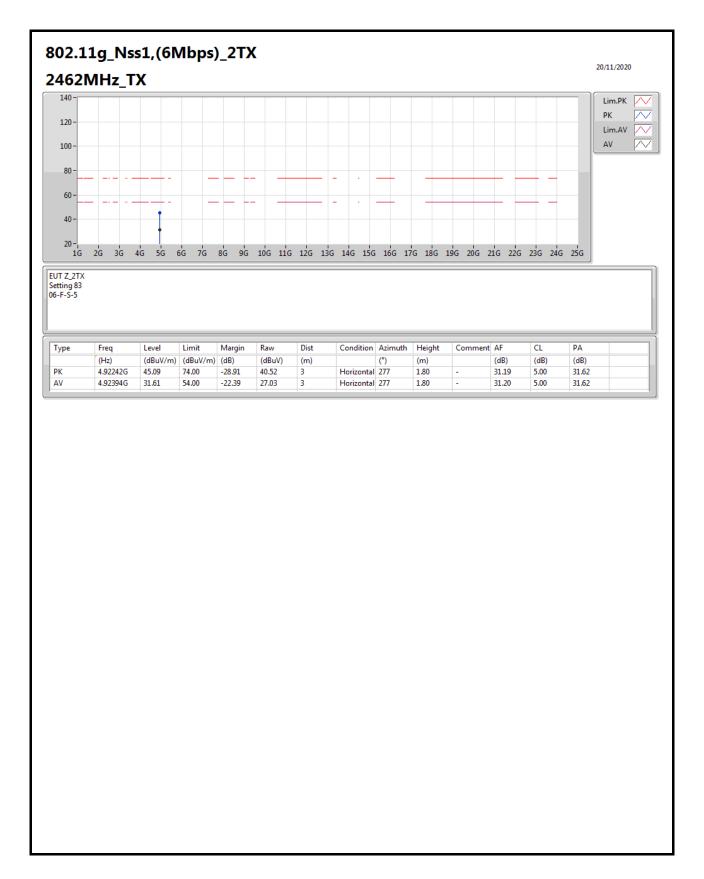




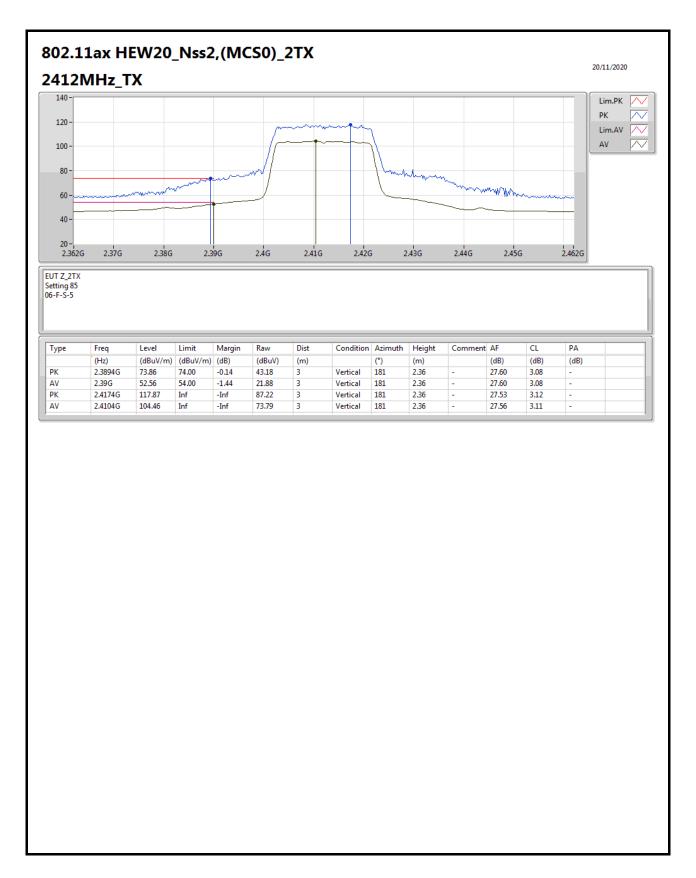




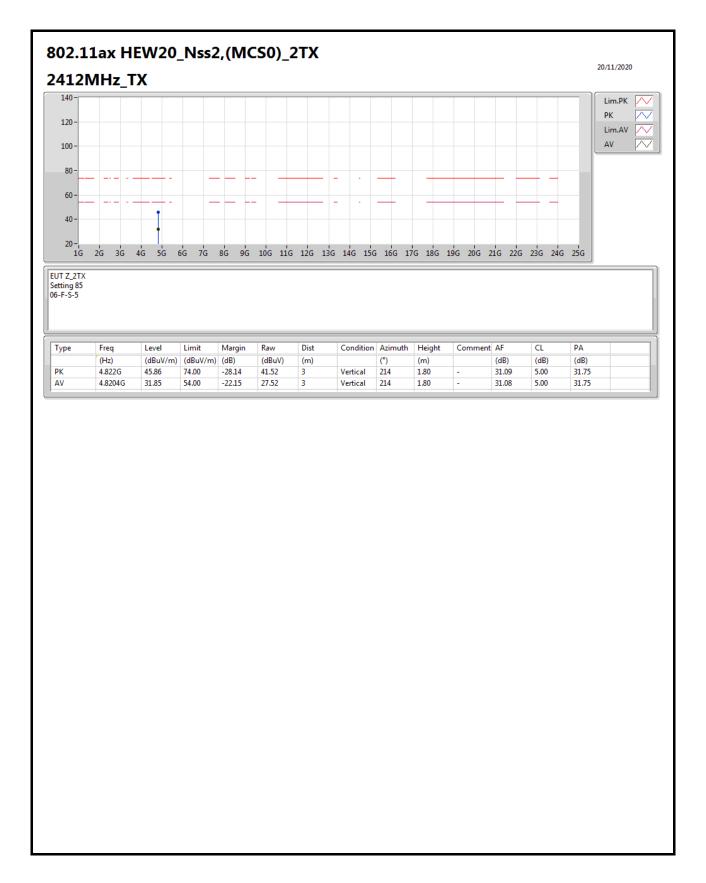




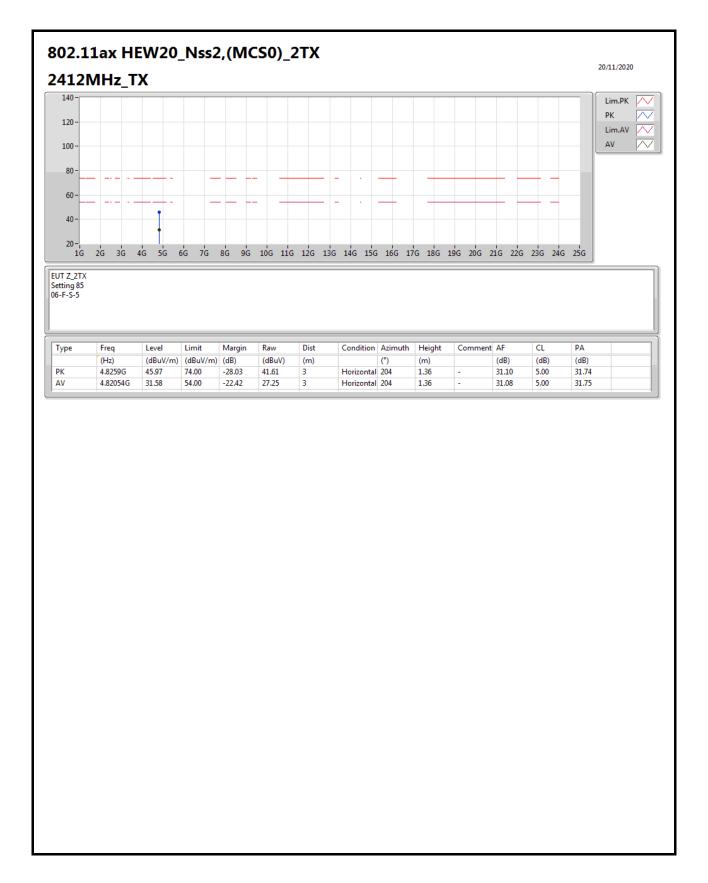




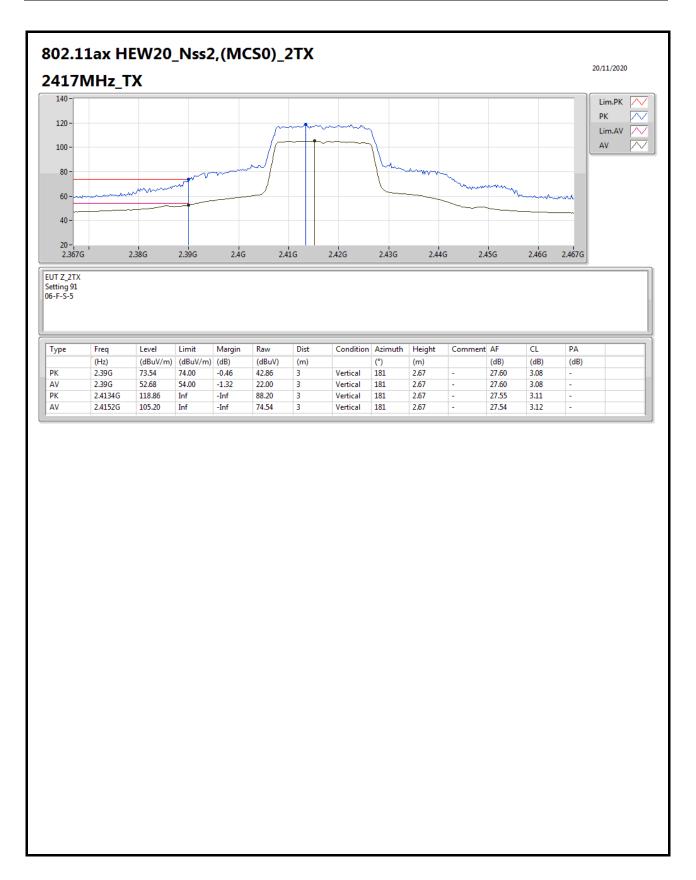




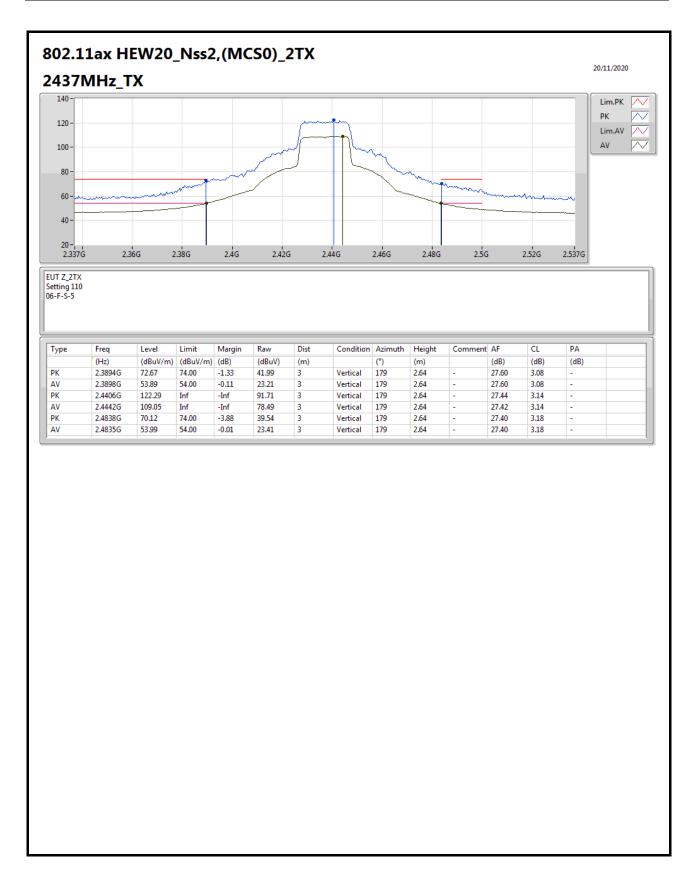






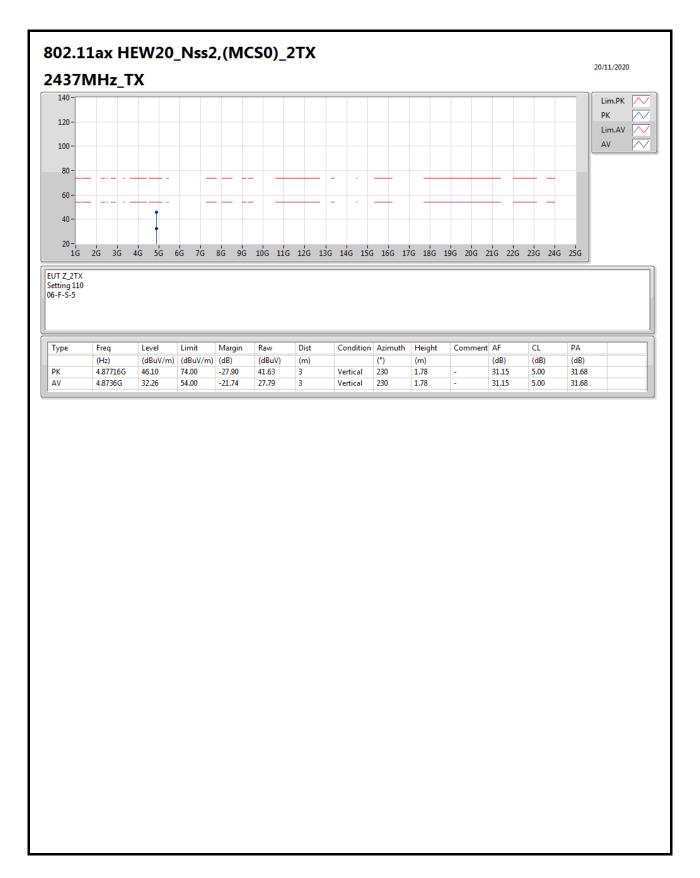




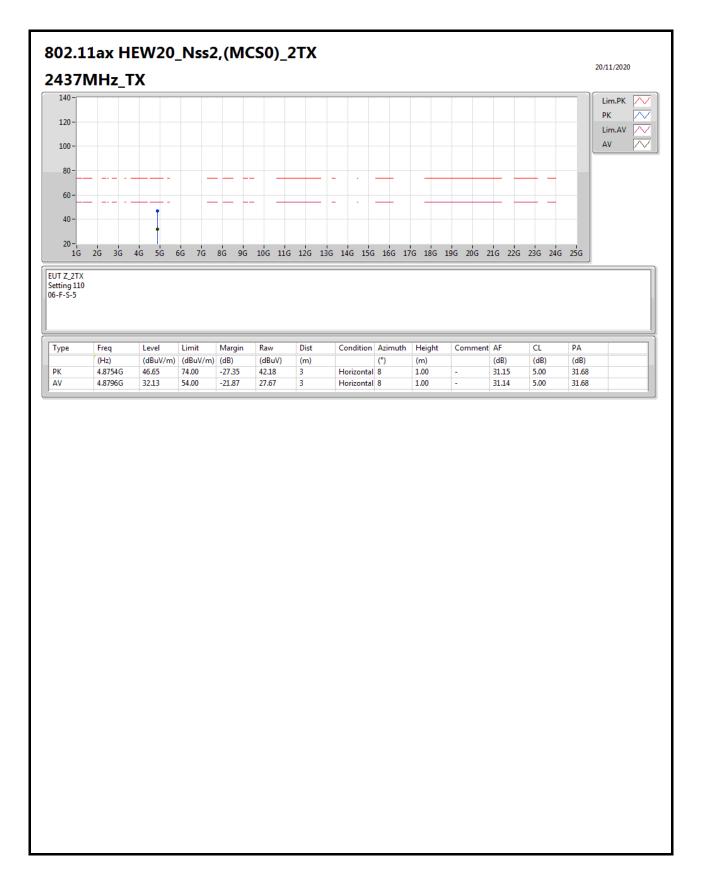


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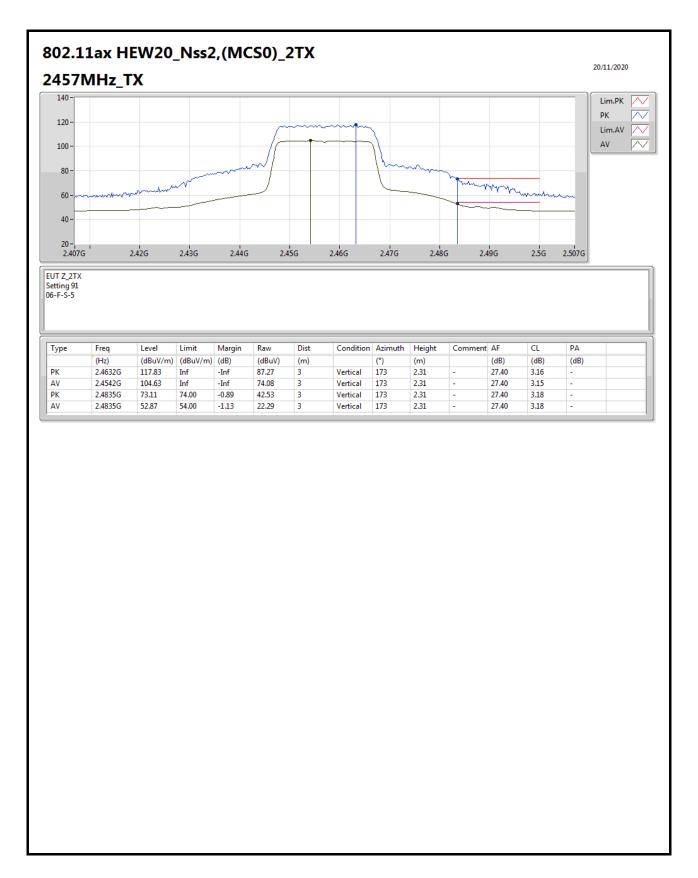




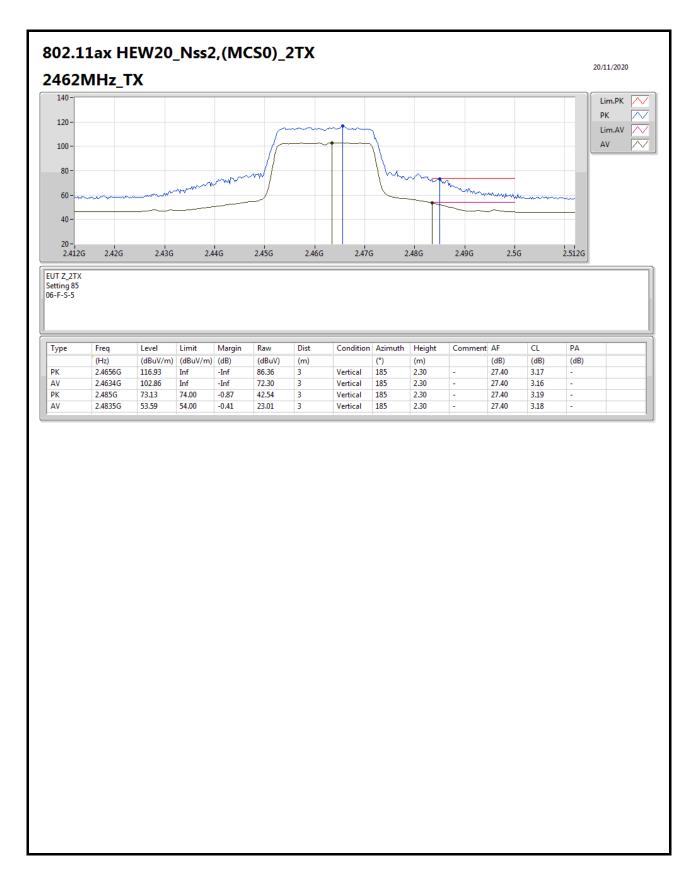


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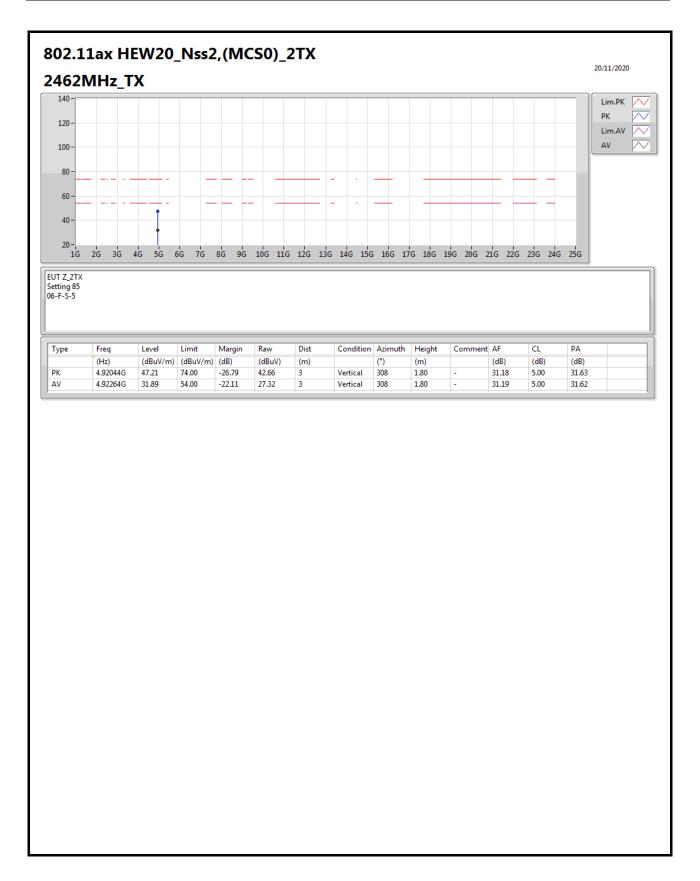




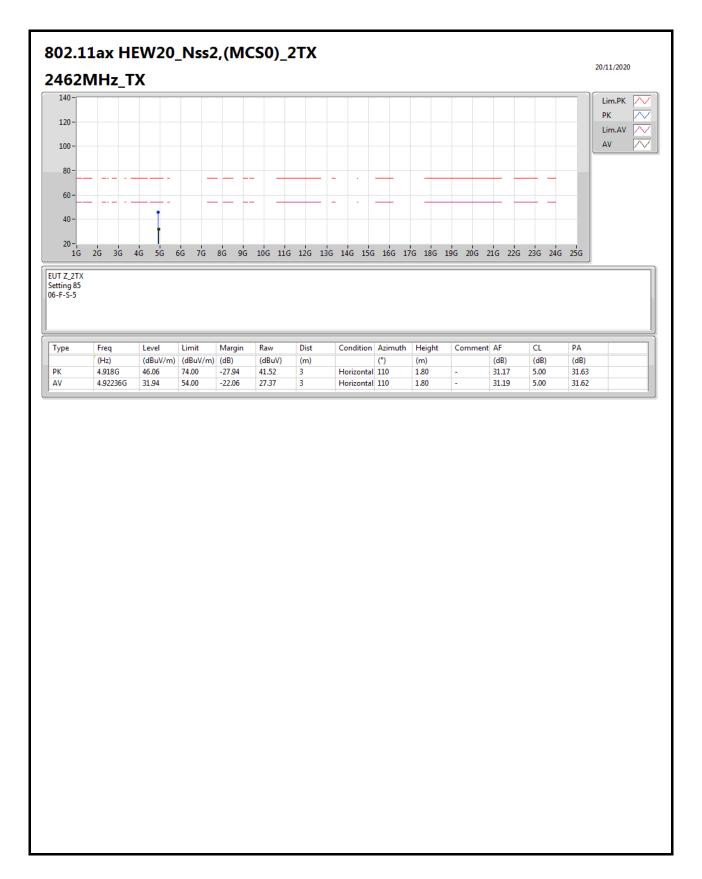




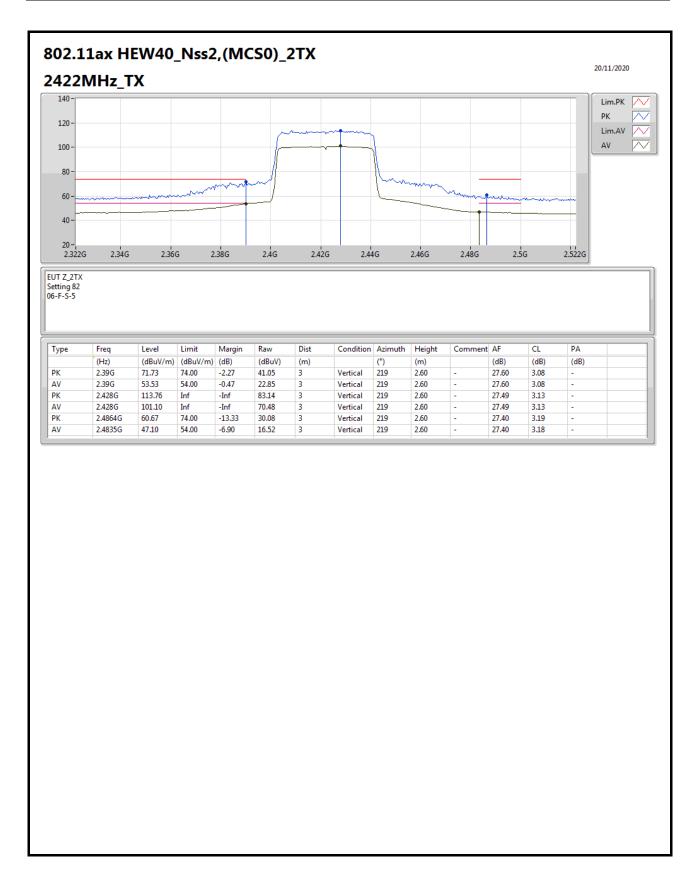




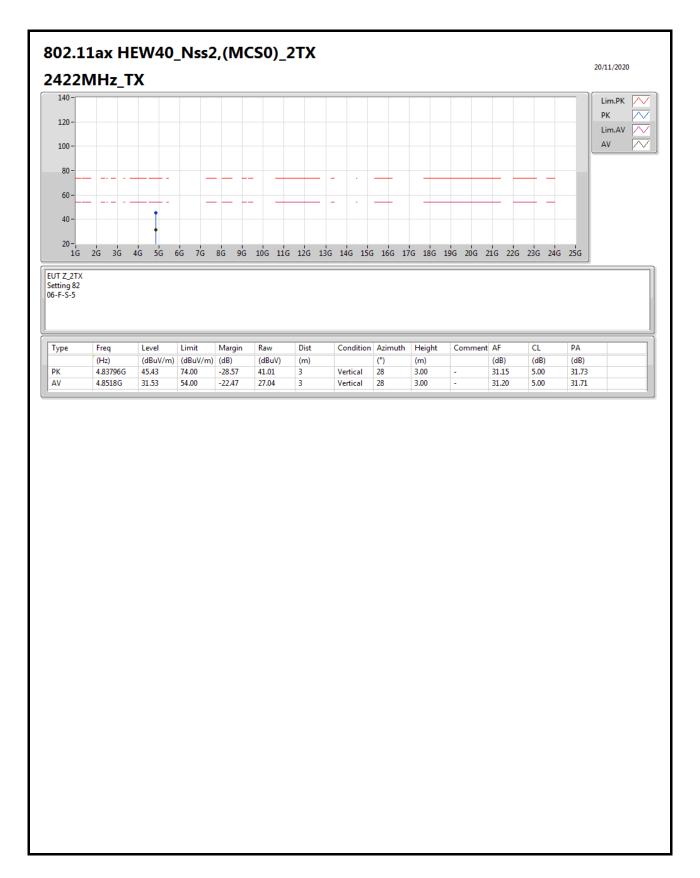




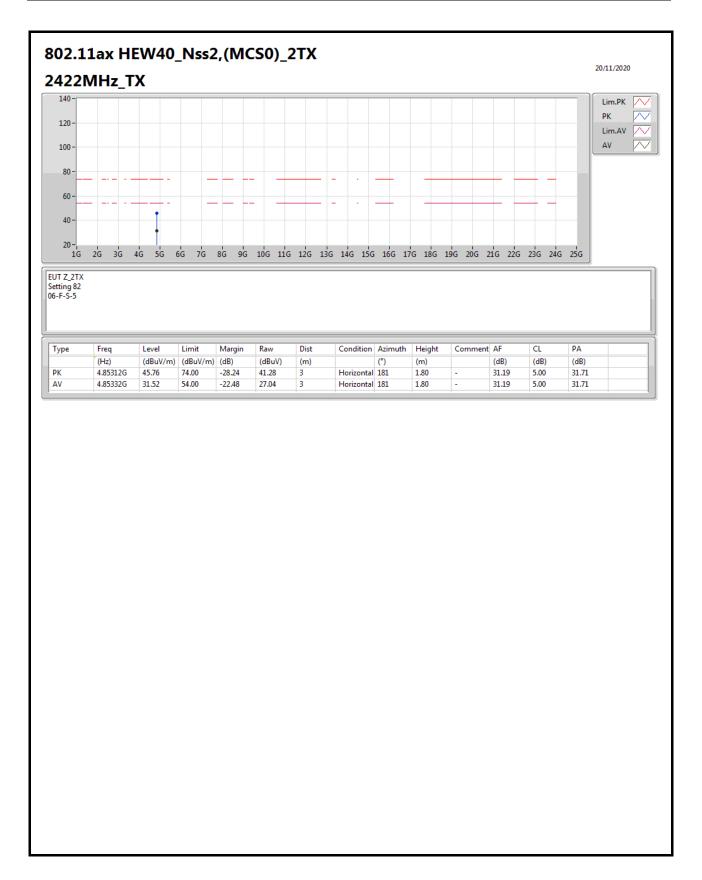




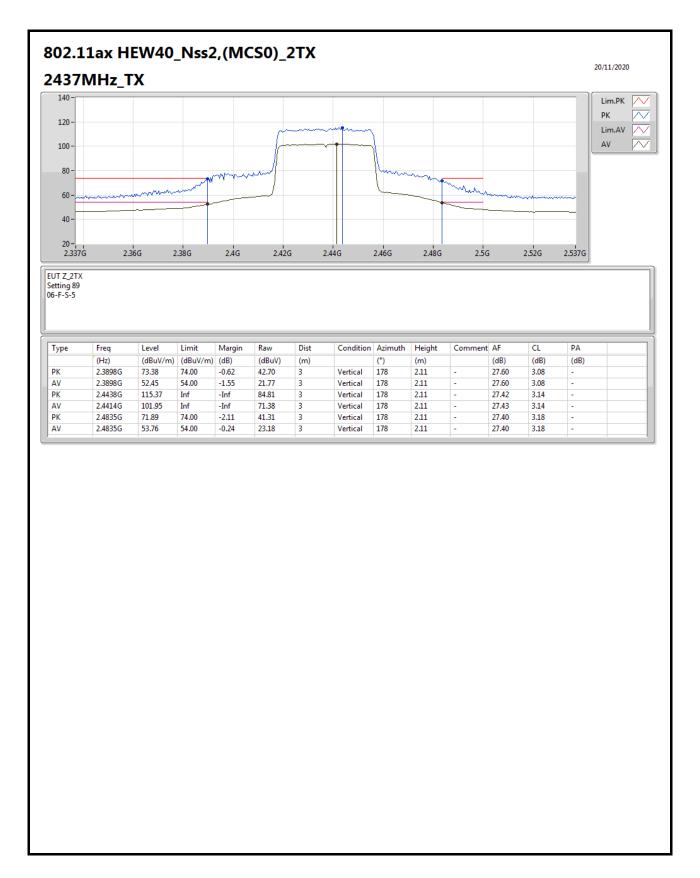




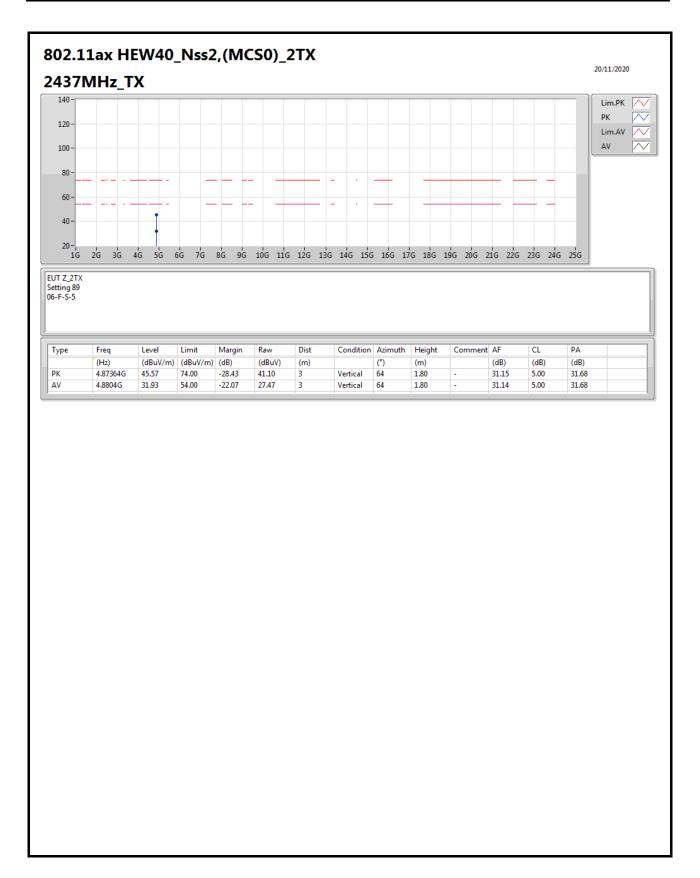




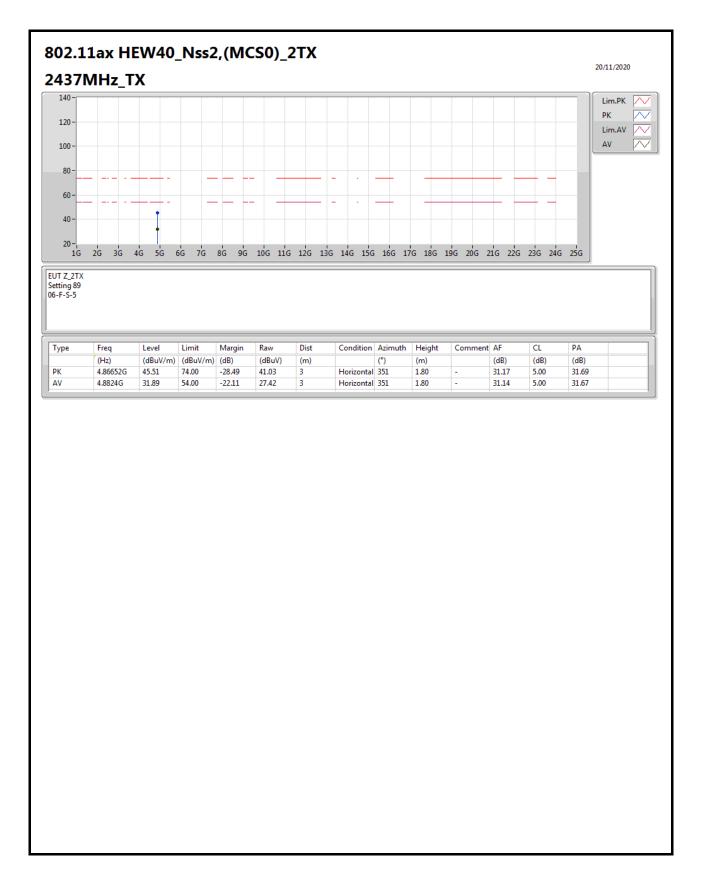




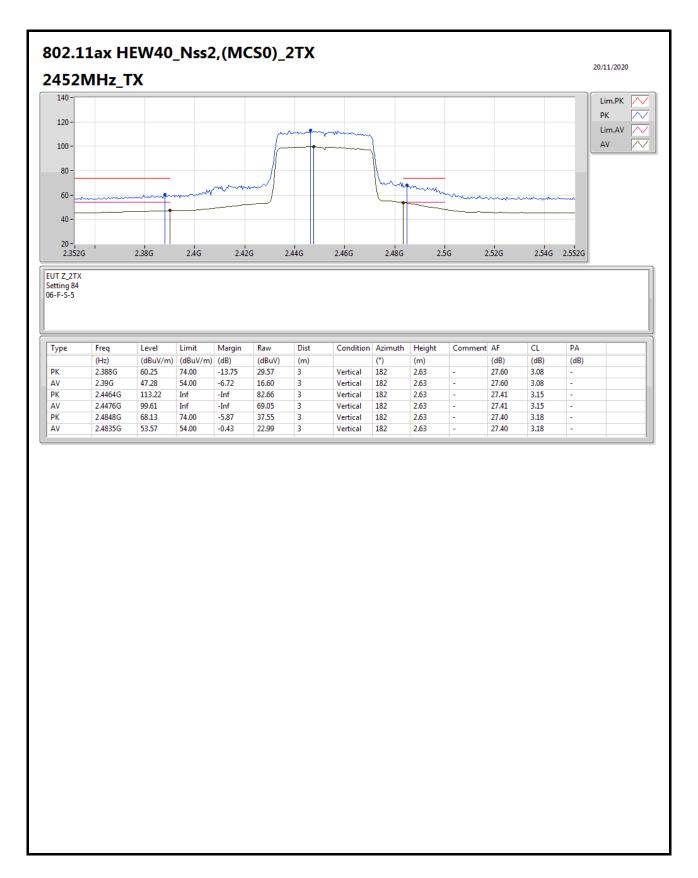




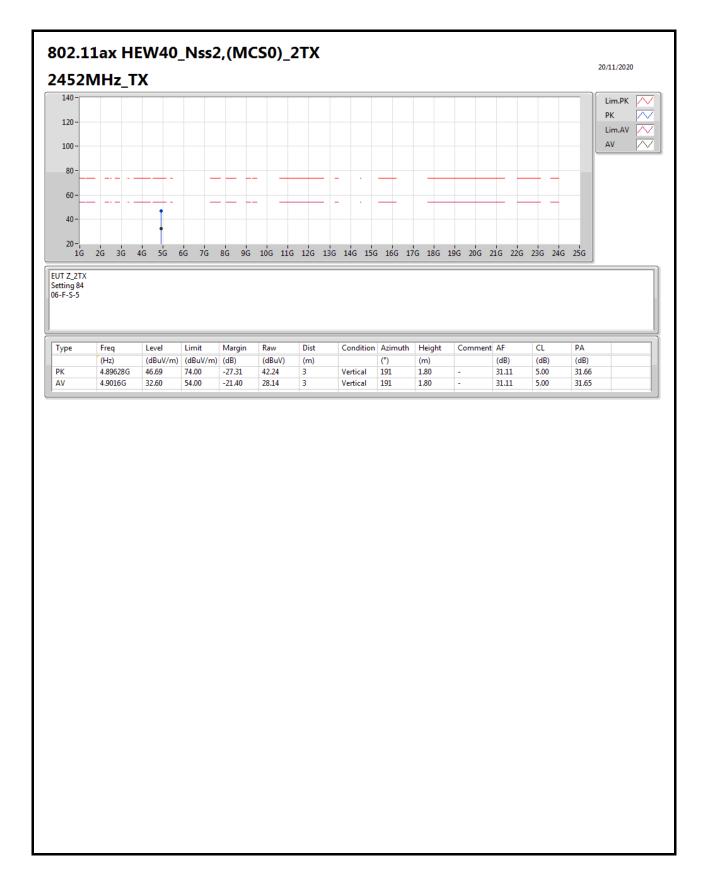




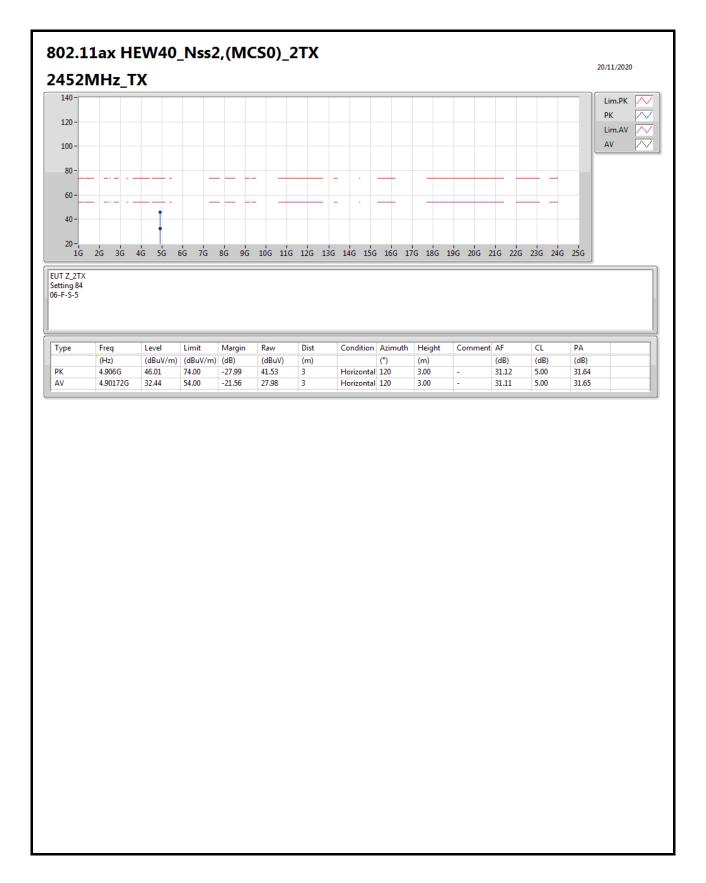














RSE TX above 1GHz

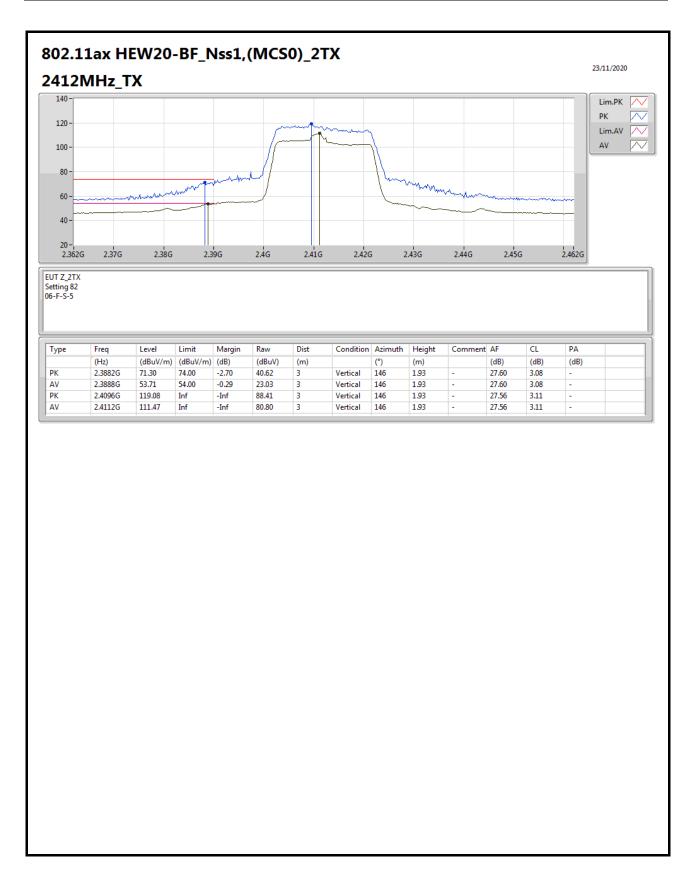
Appendix F.3

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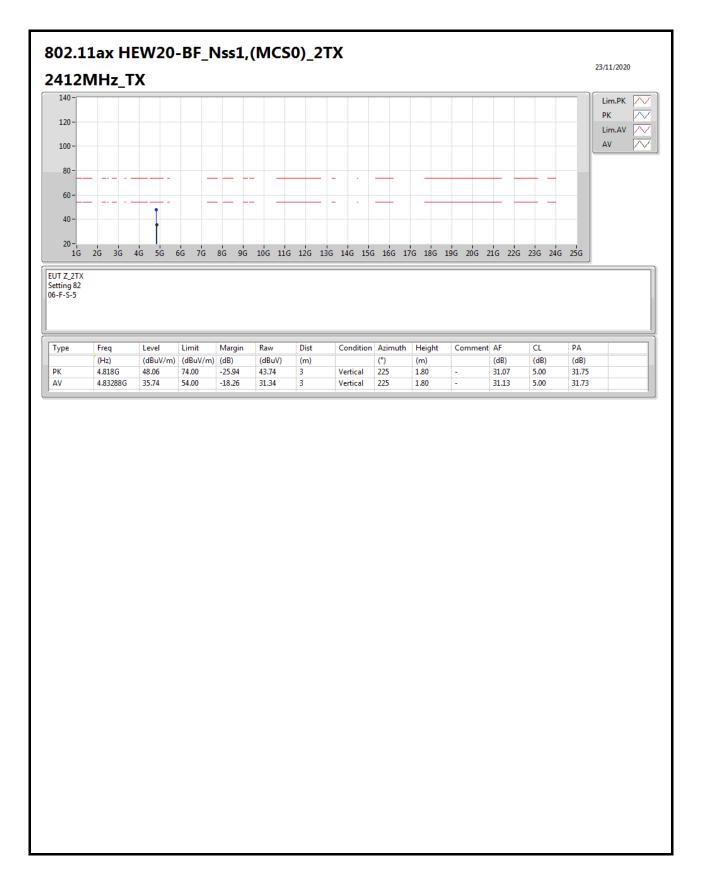
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	Pass	AV	2.4835G	53.93	54.00	-0.07	3	Vertical	210	2.22	-

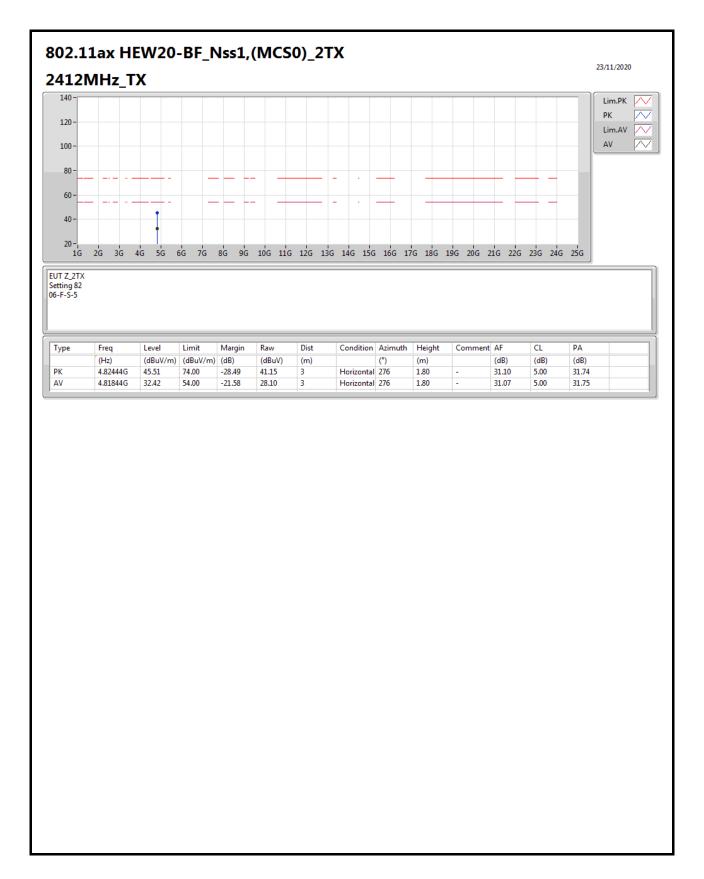






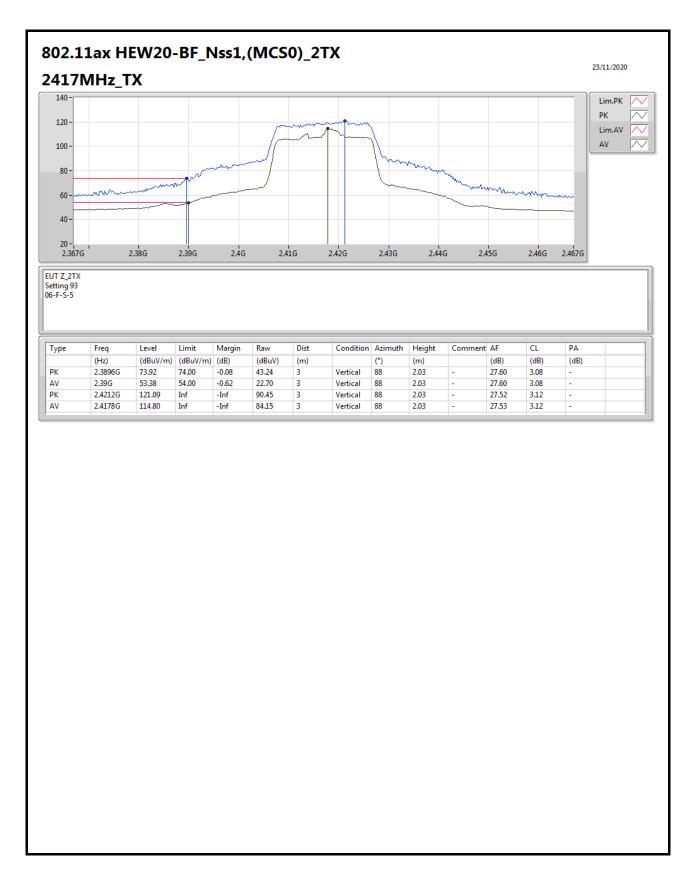




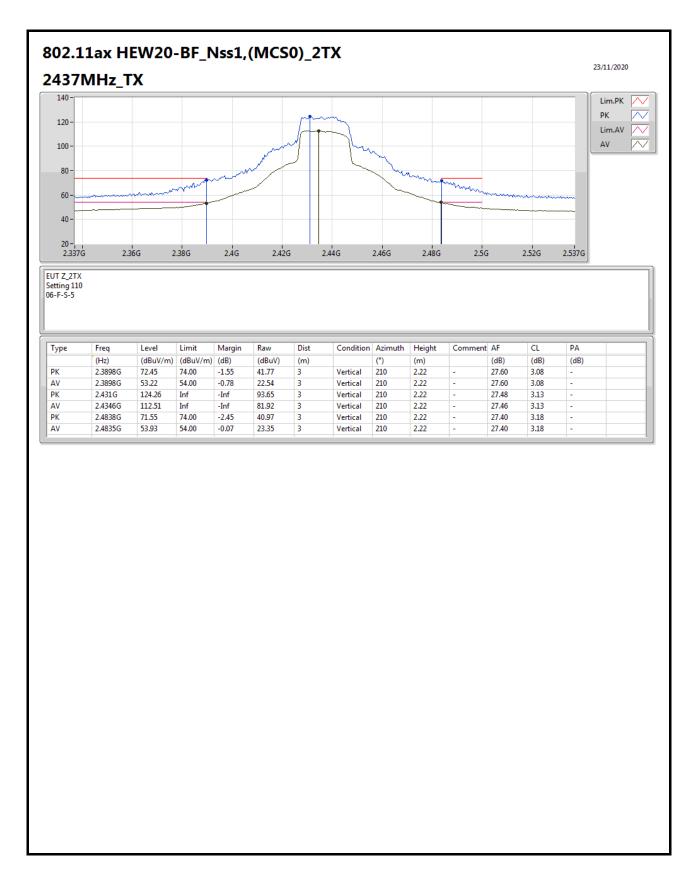


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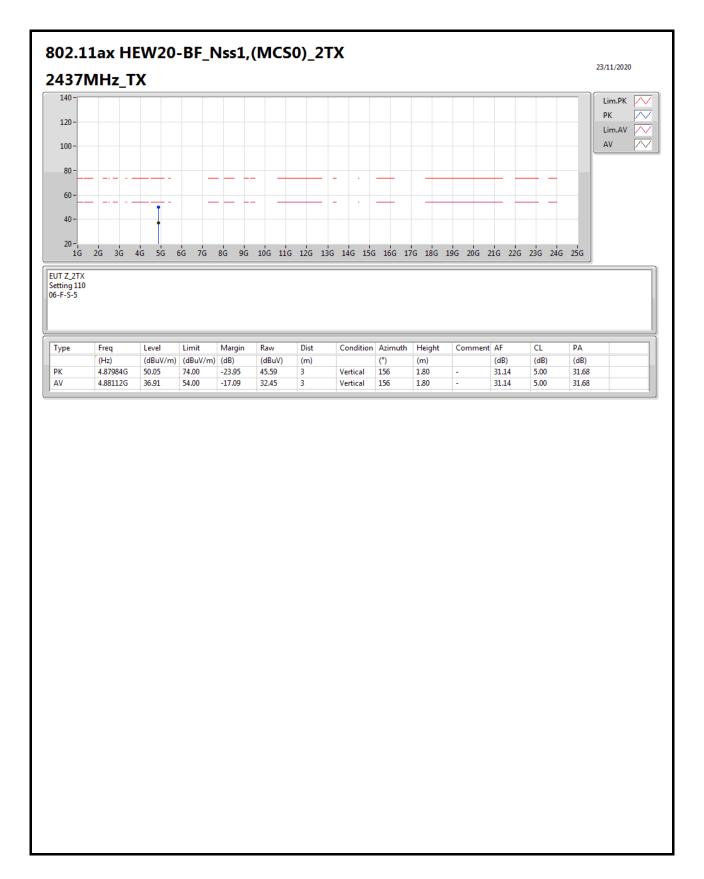




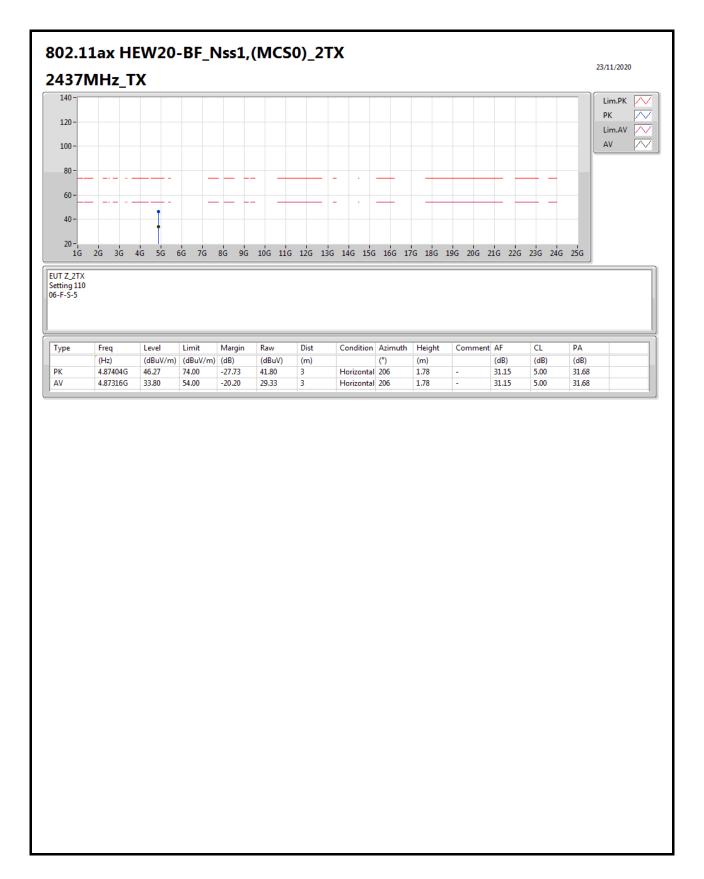




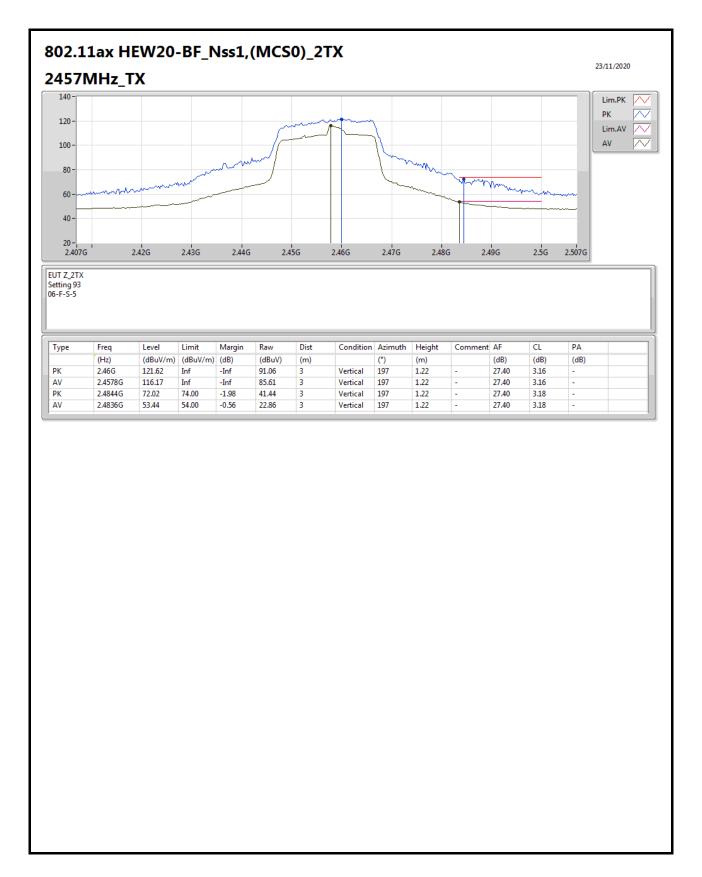




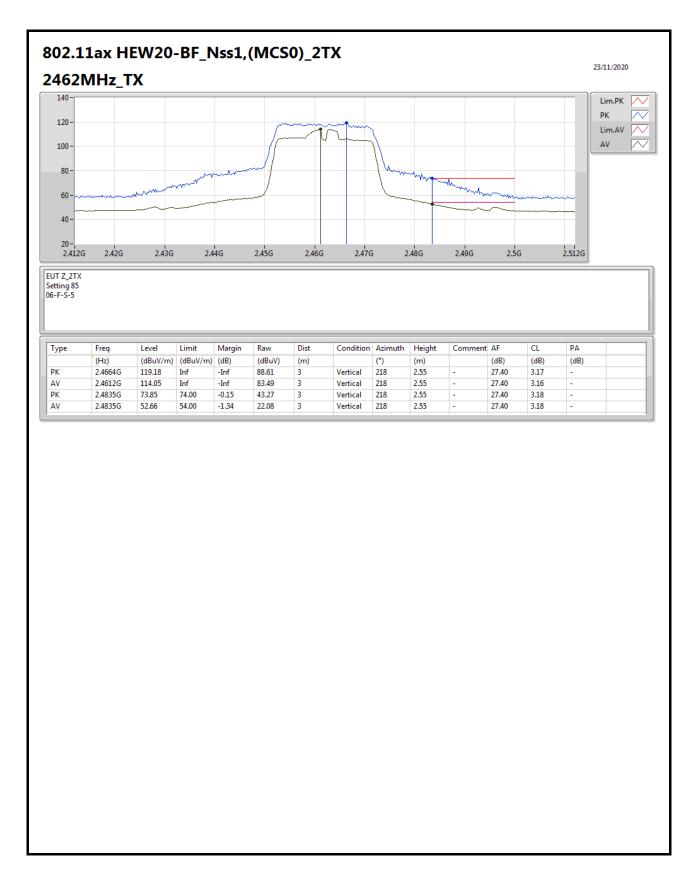




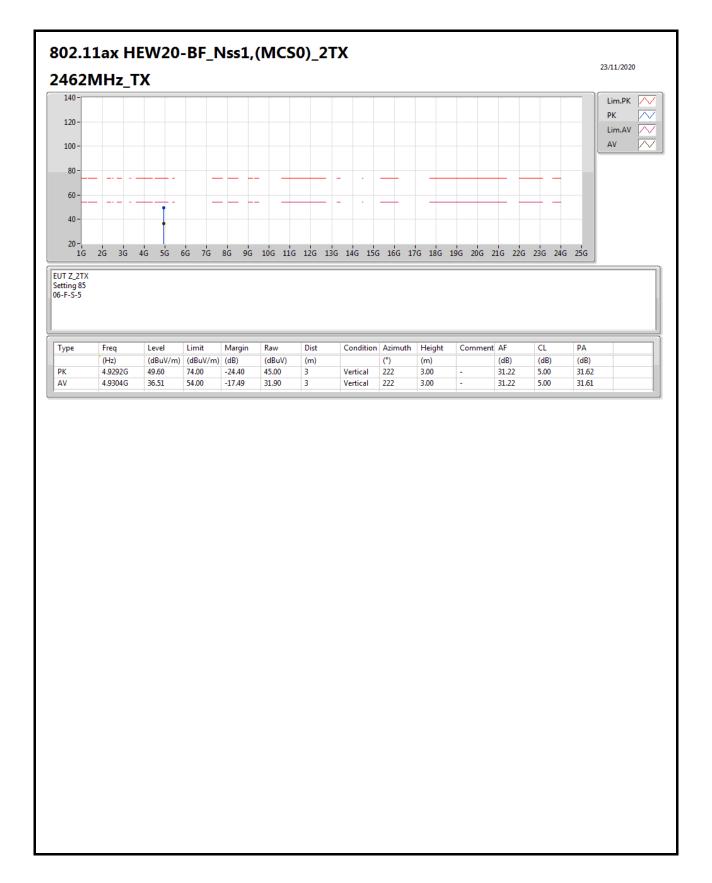




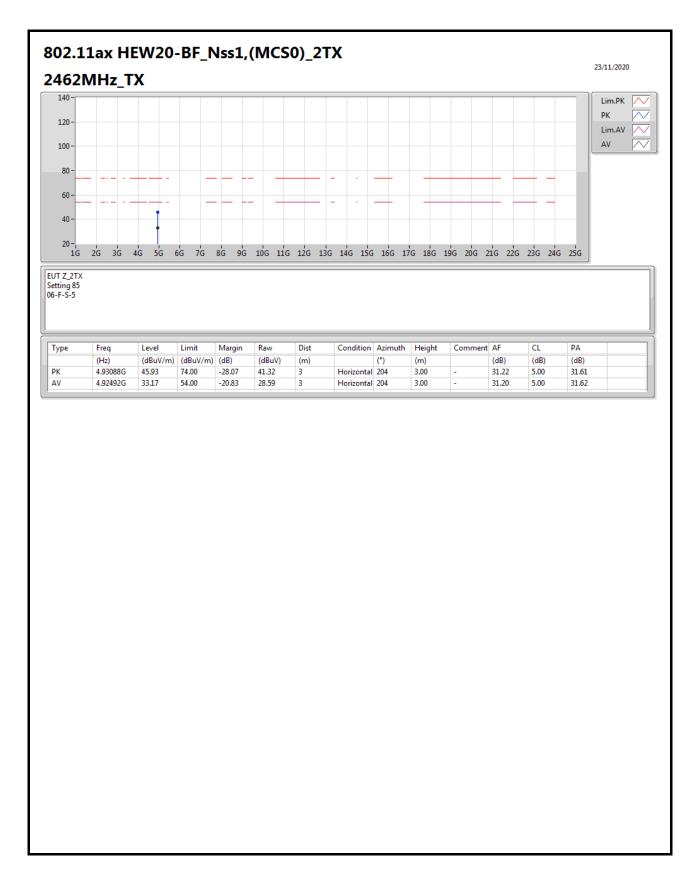




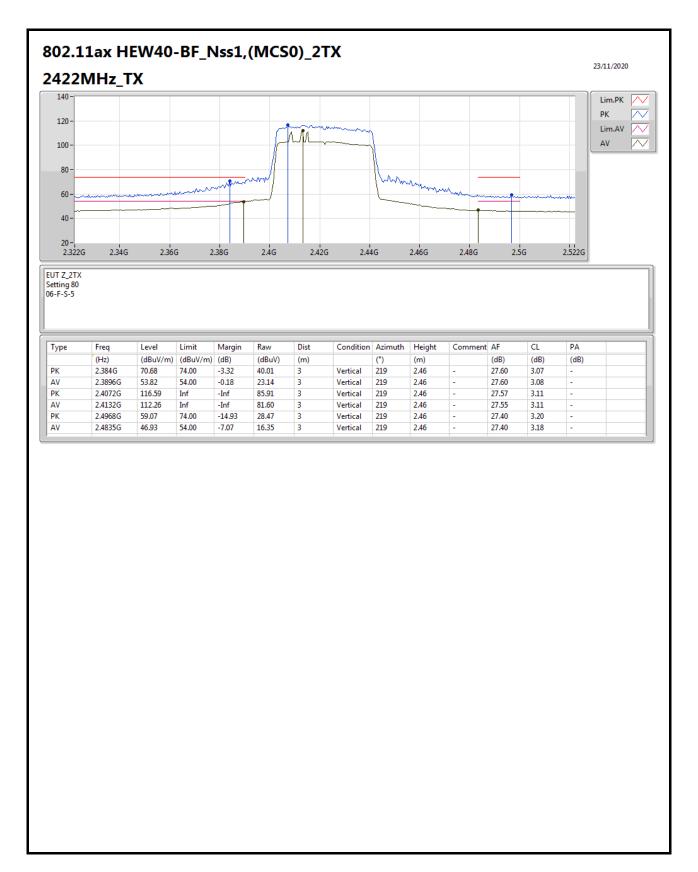




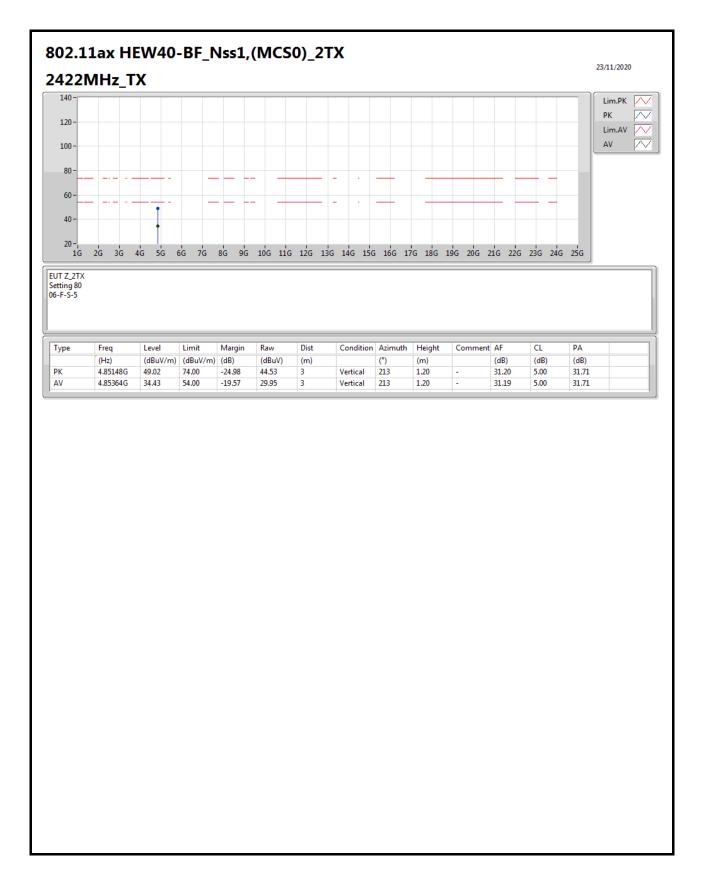












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