



RADIO TEST REPORT

FCC ID : N89-EWW631B1V1

Equipment : AX3000 Wireless Dual Band Wall Mount Access Point

Brand Name : SonicFi, CyberTAN

Model Name : EWW631-B1, RAP630W-311G, CAP630W-311G

Applicant : CyberTAN Technology Inc.

No. 99, Park Avenue III Science-based Industrial Park

Hsinchu Taiwan 308

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 Nov. 06, 2023, and testing was started from Nov. 10, 2023 and completed on Dec. 08, 2023. We, Sporton International Inc. Hsinchu 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. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

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

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Report Version : 02

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Appendix G. Test Results of Radiated Emission Co-location

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Appendix H. Test Photos

Photographs of EUT v02

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History of this test report

Report No.: FR3O2420AA

Report No.	Version	Description	Issued Date
FR3O2420AA	01	Initial issue of report	Dec. 25, 2023
FR3O2420AA	02	Adding two model names "RAP630W-311G" and " CAP630W-311G"	Jan. 26, 2024

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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	-

Conformity Assessment Condition:

- 1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
- 2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sam Chen

Report Producer: Sandy Chuang

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1 General Description

1.1 Information

1.1.1 RF General Information

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

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Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	2TX
2.4-2.4835GHz	802.11g	20	2TX
2.4-2.4835GHz	802.11n HT20	20	2TX
2.4-2.4835GHz	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 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

Ant.	Port		Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
Ant.	2.4GHz	5GHz	Dialiu	Woder Name	Antenna Type	Connector	Gaill (GBI)	
1	1	2	GALTRONICS	2102140-07905-1	PCB	I-PEX	Note 1	
2	2	1	GALTRONICS	2102140-07905-2	PCB	I-PEX	Note 1	

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Note 1:

Ant		Antenna Gain (dBi)							
Ant.	2.4GHz 5GHz UNII 1 5GHz UNII 2A 5GHz UNII 2C 5GHz UNI								
1	3.2	3.4	3.3	3.3	3.4				
2	3.3	3.6	3.6	4.0	4.0				

Note 2: The above information was declared by manufacturer.

For 2.4GHz function:

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

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

Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz function:

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

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

Port 1 and Port 2 could transmit/receive simultaneously.

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Note 3: Directional gain information

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	Directional Gain = $10 \cdot \log \left[\frac{\sum_{i=1}^{N_{SST}} \left\{ \sum_{k=1}^{N_{ANT}} \mathbf{g}_{i,k} \right\}^{2}}{N_{ANT}} \right]$
BF	Directiona lGain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SST}} \left\{ \sum_{k=1}^{N_{ANT}} \mathbf{g}_{j,k} \right\}^{2}}{N_{ANT}} \right]$	Directional Gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} \mathbf{g}_{j,k} \right\}^{2}}{N_{ANT}} \right]$

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Ex.

Directional Gain (NSS1) formula:
$$Directiona\ IGain = 10 \cdot log \left[\frac{\sum_{i=1}^{N_{ss}} \left\{ \sum_{k=1}^{N_{sNT}} \mathbf{g}_{i,k} \right\}^{2}}{N_{ANT}} \right]$$

$$\begin{split} & \text{NSS1}(\text{g1,1}) = \ 10^{\text{G1/20}} \ ; \, \text{NSS1}(\text{g1,2}) = \ 10^{\text{G2/20}} \ ; \, \text{NSS1}(\text{g1,2}) = \ 10^{\text{G3/20}}; \, \text{NSS1}(\text{g1,2}) = \ 10^{\text{G4/20}} \\ & \text{gj,k} = & (\text{Nss1}(\text{g1,1}) \ + \ \text{Nss1}(\text{g1,2}) \ + \ \text{Nss1}(\text{g1,3}) \ + \ \text{Nss1}(\text{g1,4}) \)^2 \\ & \text{DG} = & 10 \ \text{log}[(\text{Nss1}(\text{g1,1}) \ + \ \text{Nss1}(\text{g1,2}) \ + \ \text{Nss1}(\text{g1,3}) \ + \ \text{Nss1}(\text{g1,4}))^2 \ / \ N_{\text{ANT}}] => 10 \\ & \text{log}[(10^{\text{G1/20}} \ + \ 10^{\text{G2/20}} \ + \ 10^{\text{G3/20}} \ + \ 10^{\text{G4/20}} \)^2 \ / \ N_{\text{ANT}}] \end{split}$$
 Where ;

2.4G DG = 6.26 dBi 5G UNII-1 DG = 6.51 dBi 5G UNII-2A DG = 6.46 dBi 5G UNII-2C DG = 6.67 dB

5G UNII-3 DG = 6.72 dBi

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1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11b	0.935	0.29	12.634m	100
802.11g	0.92	0.36	1.977m	1k
802.11ax HEW20-BF	0.92	0.36	1.781m	1k
802.11ax HEW40-BF	0.963	0.16	1.78m	1k

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

1.1.4 EUT Operational Condition

EUT Power Type	From PoE			
	\boxtimes	With beamforming		Without beamforming
Beamforming Function	The product has beamforming function for n/VHT/ax in 2.4GHz and n/ac/ax in 5GHz.			
Function	☑ Point-to-multipoint ☐ Point-to-point		Point-to-point	
Support RU		Full RU		Partial RU
Test Software Version	<non-beamforming mode=""> QRCT: Version 4.0.00204.0 <beamforming mode=""> DOS [Version 6.1.7601]</beamforming></non-beamforming>			

Note: The above information was declared by manufacturer.

1.1.5 Table for Multiple Listing

Brand Name	Model Name	Description
CyberTAN	EWW631-B1, CAP630W-311G	All the models are identical, the difference brand
SonicFi	EWW631-B1, RAP630W-311G	name and model name served as marketing strategy.

Note:

- 1. From the above, brand name: CyberTAN / model name: EWW631-B1 was selected as representative for the test and its data was recorded in this report.
- 2. The above information was declared by manufacturer.

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1.2 Applicable Standards

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

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- 47 CFR FCC Part 15.247
- 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 Information

Test Lab.: Sporton International Inc. Hsinchu Laboratory

Hsinchu ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

(TAF: 3787) TEL: 886-3-656-9065 FAX: 886-3-656-9085

Test site Designation No. TW3787 with FCC.

Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH01-CB	Mason Chen	21~21.6 / 63~67	Nov. 16, 2023~ Nov. 20, 2023
Radiated below 1GHz	03CH03-CB	Mark Hsu	22.4-23.5 / 55-58	Nov. 16, 2023~ Dec. 08, 2023
Radiated above 1GHz	03CH01-CB	Mark Hsu	21.2-22.3 / 56-59	Nov. 16, 2023~ Dec. 08, 2023
	03CH03-CB	Mark Hsu	22.4-23.5 / 55-58	Nov. 16, 2023~ Dec. 08, 2023
	03CH04-CB	Mark Hsu	22.7-23.8 / 56-59	Nov. 16, 2023~ Dec. 08, 2023
Radiated Co-location	03CH02-CB	Mark Hsu	22-23 / 55-58	Nov. 16, 2023~ Dec. 08, 2023
AC Conduction	CO02-CB	Gray Lee	22~23 / 53~54	Nov. 10, 2023

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1.4 Measurement Uncertainty

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

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level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.1 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.1 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.2 dB	Confidence levels of 95%
Conducted Emission	3.1 dB	Confidence levels of 95%
Output Power Measurement	0.8 dB	Confidence levels of 95%
Power Density Measurement	3.1 dB	Confidence levels of 95%
Bandwidth Measurement	2.2%	Confidence levels of 95%

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2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11b_Nss1,(1Mbps)_2TX	-
2412MHz	24
2437MHz	26.5
2462MHz	25
802.11g_Nss1,(6Mbps)_2TX	-
2412MHz	22
2437MHz	24
2462MHz	21.5
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-
2412MHz	25
2437MHz	26
2462MHz	25
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-
2422MHz	24
2437MHz	24
2452MHz	23

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Note:

- Evaluated HEW20/HEW40 mode only due to the similar modulation. The power setting of HT20/HT40/VHT20/VHT40 mode are the same or lower than HEW20/HEW40.
- The EUT supports non-beamforming and beamforming mode, only beamforming mode has been selected to test.

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2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests		
Tests Item AC power-line conducted emissions		
Condition AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz		
Operating Mode	Normal Link	
1	EUT + PoE	

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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 Made for Following Conformance Tasts				
The Worst Case Mode for Following Conformance Tests				
Tests Item	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			
After evaluating, and the worst case was found at Y axis, so it was selected to perform test and its test resu was written in the report.				
1	EUT in Y axis + WLAN 2.4GHz + PoE			
2	EUT in Y axis + WLAN 5GHz + PoE			
For operating mode 2 is the worst case and it was record in this test report.				
Operating Mode > 1GHz CTX				
After evaluating, and the was written in the report.	After evaluating, and the worst case was found at Y axis, so it was selected to perform test and its test resul was written in the report.			
1	EUT in Y axis			

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The Worst Case Mode for Following Conformance Tests				
Tests Item Simultaneous Transmission Analysis - Radiated Emission Co-location				
Test Condition Radiated measurement				
Operating Mode	Normal Link			
After evaluating, and the worst case was found at Y axis, so it was selected to perform test and its test result was written in the report.				
1 EUT in Y axis + WLAN 2.4GHz + WLAN 5GHz				
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			
Refer to Sporton Test Report No.: FA3O2420 for Co-location RF Exposure Evaluation.			

Note: The PoE are for measurement only, would not be marketed.

The PoE information as below:

Power	Brand	Model
PoE	Microsemi	PD-9501-10GC/AC

2.3 EUT Operation during Test

For CTX Mode:

<non-beamforming mode>

The EUT was programmed to be in continuously transmitting mode.

<Beamforming 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 DOS 6.1.7601
- 3. Executed "Lantest" to link with the remote workstation to transmit and receive packet by device and transmit duty cycle no less than 98%.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

	Accessories	
Wall-mounted rack *1		

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2.5 Support Equipment

For AC Conduction:

	Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID		
Α	PoE	Microsemi	PD-9501-10GC/AC	N/A		
В	PoE in NB	DELL	E6430	N/A		
С	2.4G NB	DELL	E6430	N/A		
D	5G NB	DELL	E6430	N/A		
Е	LAN NB	DELL	E6430	N/A		
F	Device	CyberTAN	EWW631-A1	N/A		

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For Radiated Emission below 1GHz:

	Support Equipment					
No.	No. Equipment Brand Name Model Name FCC ID					
Α	Notebook	DELL	E4300	N/A		
В	PoE	Microsemi	PD-9501-10GC/AC	N/A		

For Radiated Emission above 1GHz and RF conducted: <Non-beamforming mode>

Support Equipment						
No.	Equipment	Brand Name	Model Name	FCC ID		
Α	Notebook	DELL	E4300	N/A		
В	PoE	Microsemi	PD-9501-10GC/AC	N/A		

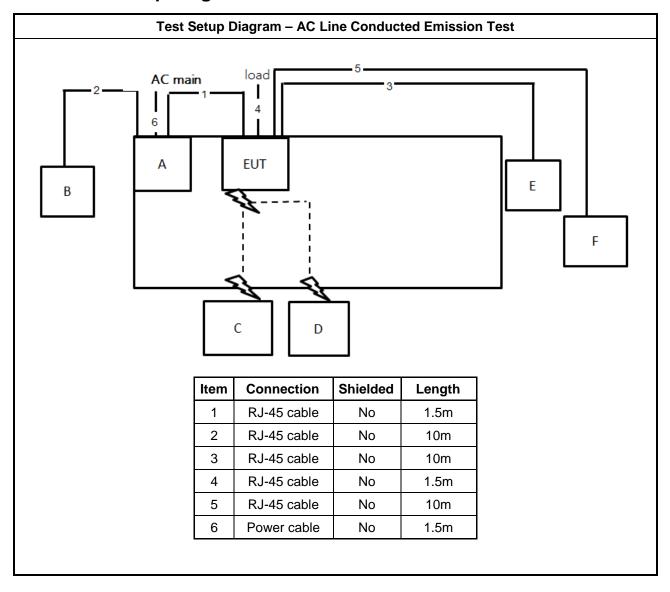
For Radiated Emission above 1GHz and RF conducted: <Beamforming mode>

Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	Notebook	DELL	E4300	N/A	
В	Device	Cybertan	EWW631-A1	N/A	
С	Notebook	DELL	E4300	N/A	
D	PoE	Microsemi	PD-9501-10GC/AC	N/A	

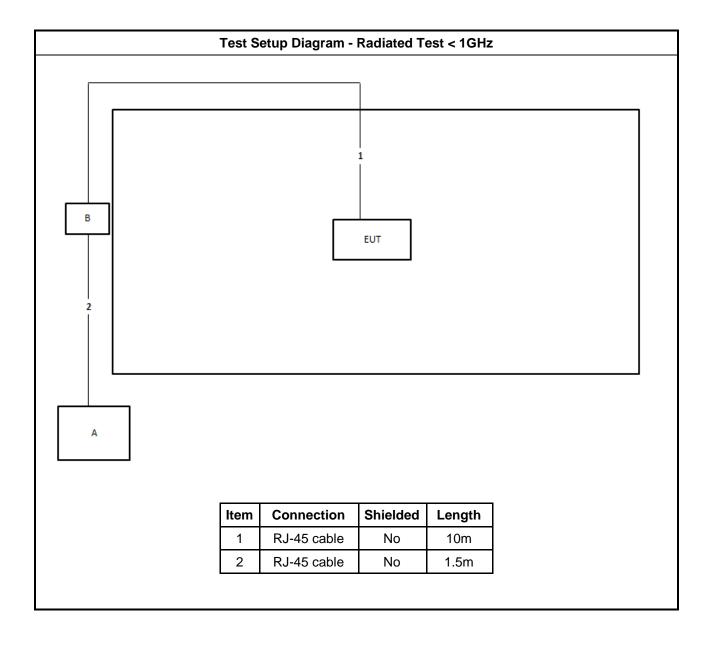
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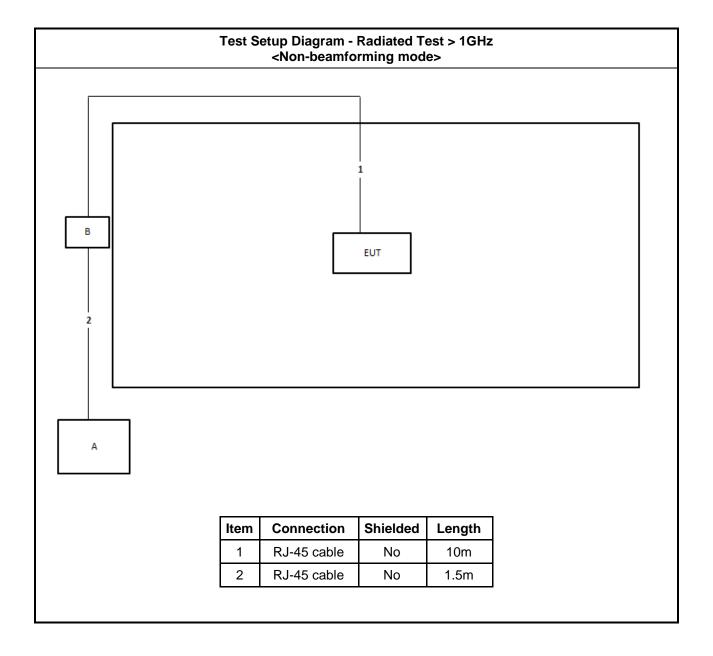
2.6 Test Setup Diagram



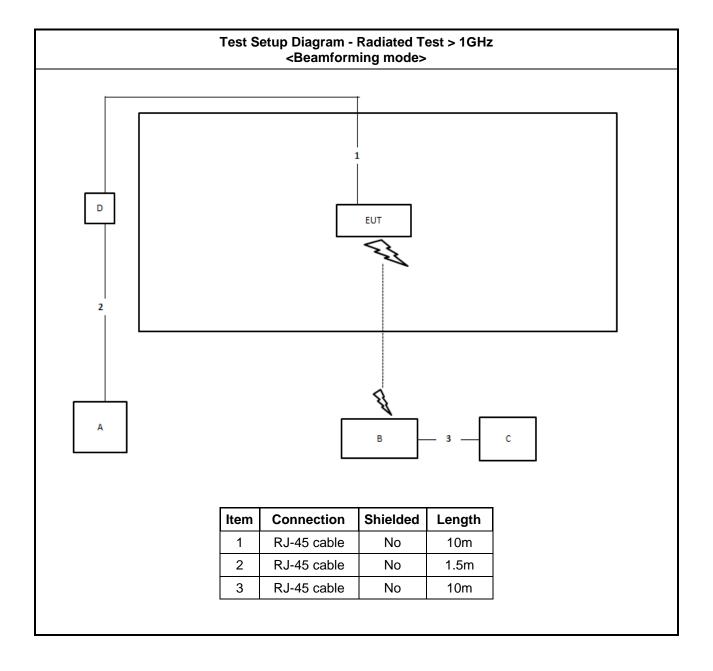
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3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

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

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3.1.2 Measuring Instruments

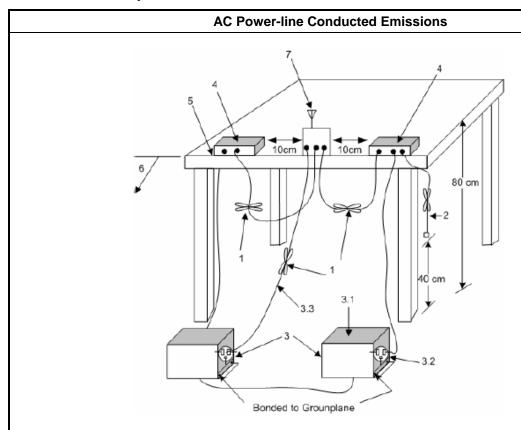
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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

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3.1.4 **Test Setup**



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

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- 2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 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.
- -Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

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

Test Result of AC Power-line Conducted Emissions 3.1.6

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

Emission Bandwidth				
Spectrum Analyzer	EUT			

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 $G_{TX} \le 6$ dBi, then $P_{Out} \le 30$ 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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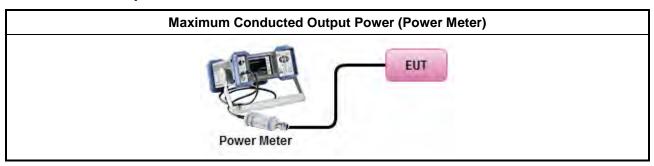
3.3.3 Test Procedures

		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)		
	Measurement using a power meter (PM)			
		Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.1 Method AVGPM (using an RF average power meter).		
	\boxtimes	Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.2 Method AVGPM-G (using an gate RF average power meter).		
•	For	conducted measurement.		
	•	If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.		
	•	If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + + P_n \\ \text{(calculated in linear unit [mW] and transfer to log unit [dBm])} \\ \text{EIRP}_{total} = P_{total} + DG$		

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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

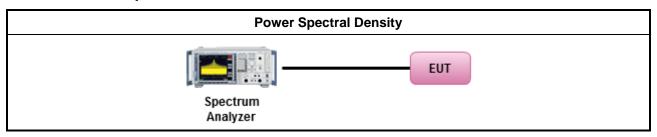
Refer a test equipment and calibration data table in this test report.

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

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3.4.4 Test Setup



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3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

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3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

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

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

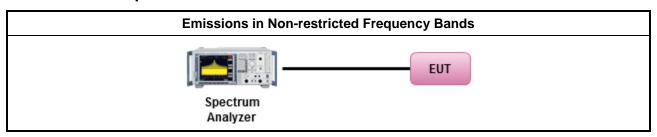
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

3.5.4 Test Setup



3.5.5 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.

3.5.6 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

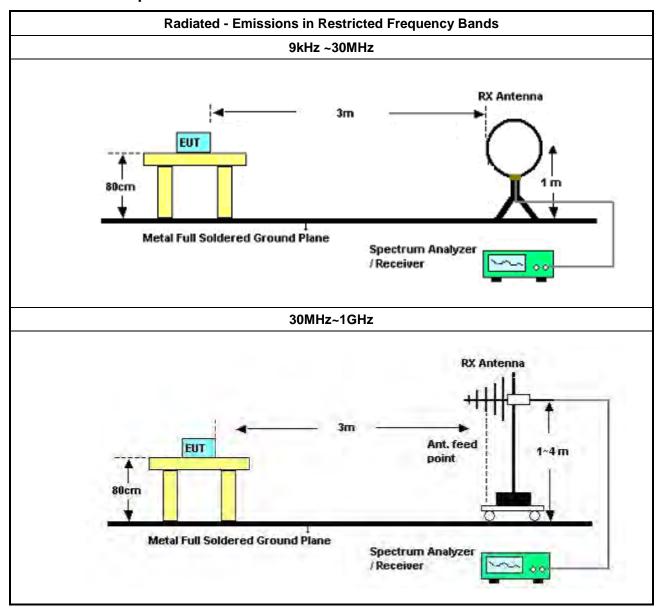
Test Method										
•	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].									
•	Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.									
•	For 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	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 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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Test Setup 3.6.4



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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
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Apr. 06, 2023	Apr. 05, 2024	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Dec. 20, 2022	Dec. 19, 2023	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	May 18, 2023	May 17, 2024	Conduction (CO02-CB)
Pulse Limiter	Schwarzbeck	VTSD 9561F-N	00378	9kHz ~ 30MHz	Oct. 17, 2023	Oct. 16, 2024	Conduction (CO02-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO02-CB)
Loop Antenna	Teseq	HLA 6121	65417	9kHz - 30 MHz	Oct. 13, 2023	Oct. 12, 2024	Radiation (03CH03-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH03-CB	30 MHz ~ 1 GHz	Jan. 17, 2023	Jan. 16, 2024	Radiation (03CH03-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH03-CB	1GHz ~18GHz 3m	May 04, 2023	May 03, 2024	Radiation (03CH03-CB)
Bilog Antenna with 6 dB attenuator	Schaffner & EMCI	CBL6112B & N-6-06	2928 & AT-N0608	20MHz ~ 2GHz	Feb. 19, 2023	Feb. 18, 2024	Radiation (03CH03-CB)
Horn Antenna	ETS · Lindgren	3115	6821	750MHz~18GHz	Feb. 03, 2023	Feb. 02, 2024	Radiation (03CH03-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Jun. 30, 2023	Jun. 29, 2024	Radiation (03CH03-CB)
Pre-Amplifier	SGH	SGH184	20230109-3	18~40GHz	Jan. 13, 2023	Jan. 12, 2024	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 12, 2023	Jun. 11, 2024	Radiation (03CH03-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 13, 2023	Jun. 12, 2024	Radiation (03CH03-CB)
RF Cable-low	Woken	RG402	Low Cable-02+29	30MHz ~ 1GHz	Nov. 07, 2023	Nov. 06, 2024	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+29	1GHz ~ 18GHz	Nov. 07, 2023	Nov. 06, 2024	Radiation (03CH03-CB)

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Calibration Calibration Model No. Instrument **Brand** Serial No. Characteristics Remark Date **Due Date** Radiation RF Cable-high Woken RG402 High Cable-29 1GHz ~ 18GHz Nov. 07, 2023 Nov. 06, 2024 (03CH03-CB) Radiation WCA0929M 40G#5+6 1GHz ~ 40 GHz Oct. 02, 2023 High Cable Woken Oct. 01, 2024 (03CH03-CB) Radiation High Cable Woken WCA0929M 40G#5 1GHz ~ 40 GHz Oct. 02, 2023 Oct. 01, 2024 (03CH03-CB) Radiation 1GHz ~ 40 GHz High Cable Woken WCA0929M 40G#6 Oct. 02, 2023 Oct. 01, 2024 (03CH03-CB) Radiation Test Software **SPORTON** SENSE V5.10 N.C.R. N.C.R. (03CH03-CB) 3m Semi 1GHz ~18GHz Radiation Anechoic TDK SAC-3M 03CH01-CB May 05, 2023 May 04, 2024 (03CH01-CB) 3m Chamber VSWR Radiation Horn Antenna **ETS-LINDGREN** 3115 00075790 750MHz ~ 18GHz Oct. 30, 2023 Oct. 29, 2024 (03CH01-CB) Radiation Horn Antenna Schwarzbeck **BBHA 9170** BBHA9170252 15GHz ~ 40GHz Sep. 04, 2023 Sep. 03, 2024 (03CH01-CB) Radiation Pre-Amplifier Agilent 8449B 3008A02121 1GHz ~ 26.5GHz May 18, 2023 May 17, 2024 (03CH01-CB) Radiation 18~40GHz SGH SGH184 20230109-3 Jan. 13, 2023 Jan. 12, 2024 Pre-Amplifier (03CH01-CB) Radiation R&S FSV3044 101536 10kHz ~ 44GHz Jul. 24, 2023 Jul. 23, 2024 Signal Analyzer (03CH01-CB) Radiation Woken RG402 High Cable-16 1 GHz ~ 18 GHz Nov. 06, 2023 Nov. 05, 2024 RF Cable-high (03CH01-CB) High Radiation RF Cable-high Woken RG402 1 GHz ~ 18 GHz Nov. 06, 2023 Nov. 05, 2024 Cable-16+17 (03CH01-CB) Radiation Oct. 02, 2023 Oct. 01, 2024 High Cable WCA0929M 40G#5+6 1GHz ~ 40 GHz Woken (03CH01-CB) Radiation High Cable Woken WCA0929M 40G#5 1GHz ~ 40 GHz Oct. 02, 2023 Oct. 01, 2024 (03CH01-CB) Radiation WCA0929M 1GHz ~ 40 GHz Oct. 02, 2023 Oct. 01, 2024 High Cable Woken 40G#6 (03CH01-CB) Radiation **SPORTON** Test Software SENSE V5.10 N.C.R. N.C.R. (03CH01-CB) 3m Semi Radiation Anechoic RIKEN SAC-3M 03CH02-CB 1GHz ~18GHz Mar. 25, 2023 Mar. 24, 2024 (03CH02-CB) Chamber VSWR Radiation **EMCO** 9610-4976 1GHz ~ 18GHz Horn Antenna 3115 Apr. 18, 2023 Apr. 17, 2024 (03CH02-CB)

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Calibration Calibration Instrument **Brand** Model No. Serial No. Characteristics Remark Date **Due Date** Radiation Schwarzbeck **BBHA 9170** BBHA9170252 15GHz ~ 40GHz Horn Antenna Sep. 04, 2023 Sep. 03, 2024 (03CH02-CB) Radiation Pre-Amplifier 83017A MY39501305 1GHz ~ 26.5GHz Jun. 30, 2023 Jun. 29, 2024 Agilent (03CH02-CB) Radiation Pre-Amplifier SGH **SGH184** 20230109-3 18~40GHz Jan. 13, 2023 Jan. 12, 2024 (03CH02-CB) Radiation Spectrum FSP40 9kHz ~ 40GHz R&S 100019 Jun. 12, 2023 Jun. 11, 2024 Analyzer (03CH02-CB) Radiation RF Cable-high Woken RG402 High Cable-18 1GHz ~ 18GHz Oct. 02, 2023 Oct. 01, 2024 (03CH02-CB) Radiation High 1GHz ~ 18GHz RF Cable-high Woken RG402 Oct. 02, 2023 Oct. 01, 2024 Cable-18+19 (03CH02-CB) Radiation High Cable Woken WCA0929M 40G#5+6 1GHz ~ 40 GHz Oct. 02, 2023 Oct. 01, 2024 (03CH02-CB) Radiation High Cable Woken WCA0929M 40G#5 1GHz ~ 40 GHz Oct. 02, 2023 Oct. 01, 2024 (03CH02-CB) Radiation 1GHz ~ 40 GHz WCA0929M Oct. 02, 2023 Oct. 01, 2024 High Cable Woken 40G#6 (03CH02-CB) Radiation **Test Software SPORTON** SENSE V5.10 N.C.R. N.C.R. (03CH02-CB) 3m Semi 1GHz ~18GHz Radiation Anechoic TDK SAC-3M 03CH04-CB Feb. 23, 2023 Feb. 22, 2024 (03CH04-CB) 3m Chamber VSWR Radiation Horn Antenna ETS · Lindgren 3115 00143147 750MHz~18GHz Oct. 04, 2023 Oct. 03, 2024 (03CH04-CB) Radiation Horn Antenna Schwarzbeck **BBHA 9170** BBHA9170252 15GHz ~ 40GHz Sep. 04, 2023 Sep. 03, 2024 (03CH04-CB) 0.5GHz ~ Radiation Pre-Amplifier 83017A MY53270063 Agilent Jun. 30, 2023 Jun. 29, 2024 26.5GHz (03CH04-CB) Radiation Pre-Amplifier SGH **SGH184** 20230109-3 18~40GHz Jan. 13, 2023 Jan. 12, 2024 (03CH04-CB) Spectrum Radiation FSP40 100142 9kHz~40GHz Mar. 21, 2023 Mar. 20, 2024 R&S (03CH04-CB Analyzer Radiation 1GHz - 18GHz RF Cable-high Woken RG402 High Cable-21 Oct. 02, 2023 Oct. 01, 2024 (03CH04-CB) Radiation High RF Cable-high Woken RG402 1GHz - 18GHz Oct. 02, 2023 Oct. 01, 2024 (03CH04-CB) Cable-21+67 Radiation WCA0929M 40G#5+6 1GHz ~ 40 GHz Oct. 02, 2023 Oct. 01, 2024 High Cable Woken (03CH04-CB

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Calibration Calibration Model No. Characteristics Instrument **Brand** Serial No. Remark Date **Due Date** Radiation High Cable Woken WCA0929M 40G#5 1GHz ~ 40 GHz Oct. 02, 2023 Oct. 01, 2024 (03CH04-CB) Radiation High Cable WCA0929M 40G#6 1GHz ~ 40 GHz Oct. 02, 2023 Oct. 01, 2024 Woken (03CH04-CB) Radiation **Test Software SPORTON** SENSE V5.10 N.C.R. N.C.R. (03CH04-CB) Spectrum Conducted FSV40 9kHz~40GHz May 28, 2024 R&S 100979 May 29, 2023 analyzer (TH01-CB) Conducted Oct. 03, 2023 Switch **SPTCB** SP-SWI **SWI-01** 1~26.5 GHz Oct. 02, 2024 (TH01-CB) Conducted RG402 1 GHz - 18 GHz Oct. 02, 2023 Oct. 01, 2024 RF Cable-high Woken High Cable-06 (TH01-CB) Conducted RF Cable-high Woken RG402 High Cable-07 1 GHz - 18 GHz Oct. 02, 2023 Oct. 01, 2024 (TH01-CB) Conducted RF Cable-high Woken RG402 High Cable-08 1 GHz - 18 GHz Oct. 02, 2023 Oct. 01, 2024 (TH01-CB) Conducted RG402 High Cable-09 1 GHz - 18 GHz Oct. 02, 2023 Oct. 01, 2024 RF Cable-high Woken (TH01-CB) Conducted RF Cable-high Woken RG402 High Cable-10 1 GHz - 18 GHz Oct. 02, 2023 Oct. 01, 2024 (TH01-CB) Conducted RF Cable-high Woken RG402 High Cable-30 1 GHz - 18 GHz Oct. 02, 2023 Oct. 01, 2024 (TH01-CB) Conducted Power Sensor Agilent E9327A US40442088 50MHz~18GHz Feb. 22, 2023 Feb. 21, 2024 (TH01-CB) Conducted 50MHz~18GHz Power Meter Agilent E4416A GB41291199 Feb. 22, 2023 Feb. 21, 2024 (TH01-CB) Conducted

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

SENSE

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

SPORTON

Test Software

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V5.10

N.C.R.

N.C.R.

(TH01-CB)



Conducted Emissions at Powerline

Appendix A

Summary

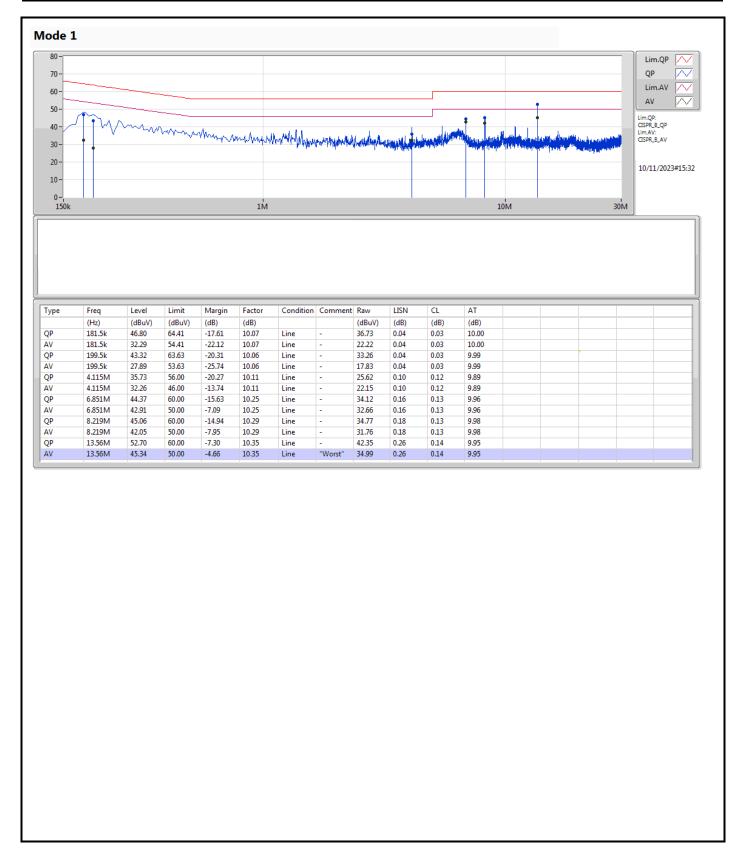
Mode	Result	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	13.56M	46.11	50.00	-3.89	Neutral

Sporton International Inc. Hsinchu Laboratory

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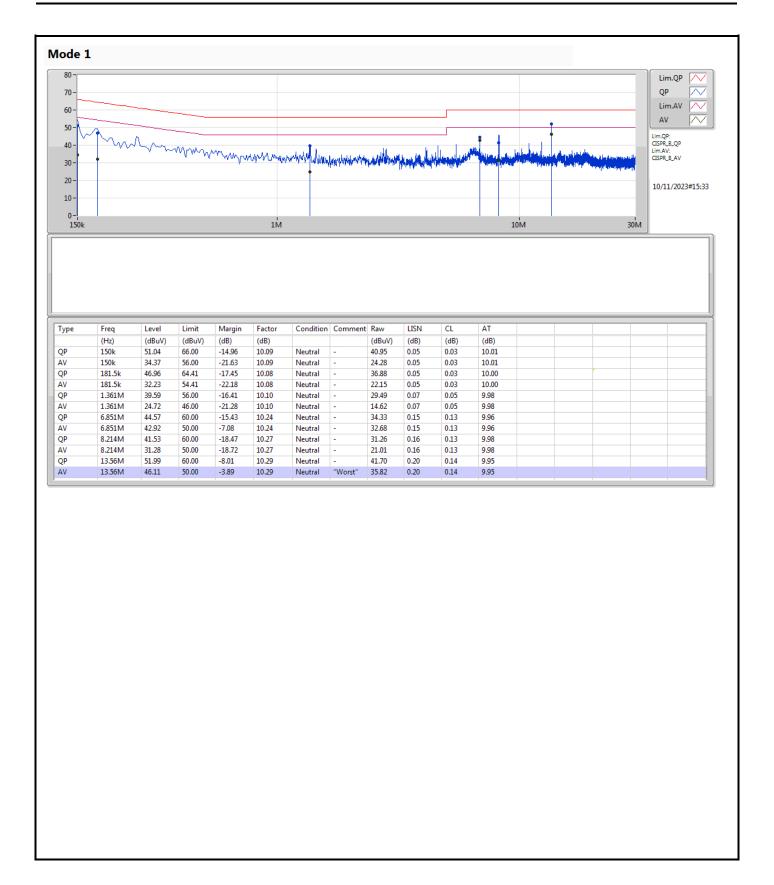
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Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
2.4-2.4835GHz	ū	-	÷	ï	-
802.11b_Nss1,(1Mbps)_2TX	9.05M	13.827M	13M8G1D	6.775M	12.767M
802.11g_Nss1,(6Mbps)_2TX	16.3M	16.319M	16M3D1D	15.025M	16.222M
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	18.55M	18.838M	18M8D1D	13.025M	18.716M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	36.15M	37.696M	37M7D1D	19.05M	37.477M

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

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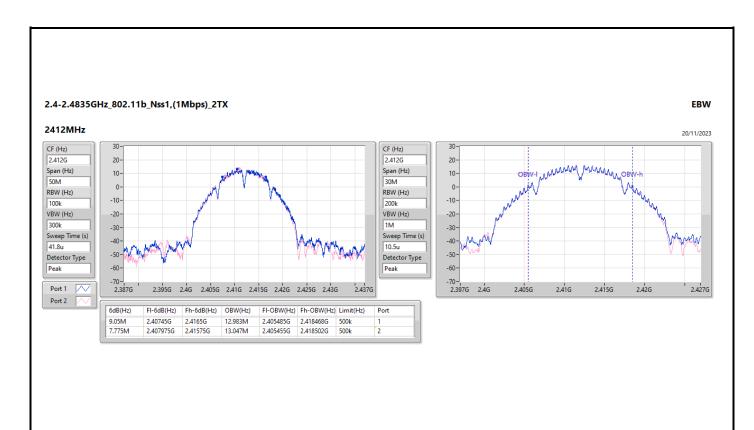
Result

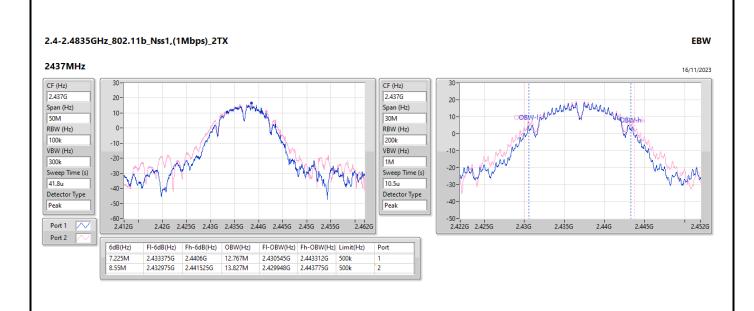
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	=
2412MHz	Pass	500k	9.05M	12.983M	7.775M	13.047M
2437MHz	Pass	500k	7.225M	12.767M	8.55M	13.827M
2462MHz	Pass	500k	7.95M	13.02M	6.775M	13.109M
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	16.3M	16.293M	15.3M	16.253M
2437MHz	Pass	500k	15.95M	16.316M	15.025M	16.319M
2462MHz	Pass	500k	16.025M	16.222M	15.7M	16.274M
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	18.55M	18.813M	13.025M	18.838M
2437MHz	Pass	500k	18.025M	18.754M	15.225M	18.778M
2462MHz	Pass	500k	17.65M	18.732M	16.65M	18.716M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	32.65M	37.5M	30.05M	37.477M
2437MHz	Pass	500k	33.85M	37.547M	27M	37.5M
2452MHz	Pass	500k	36.15M	37.696M	19.05M	37.576M

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

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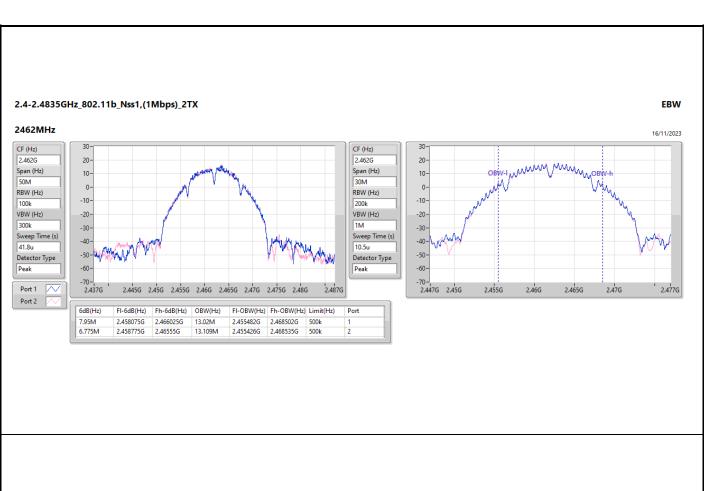
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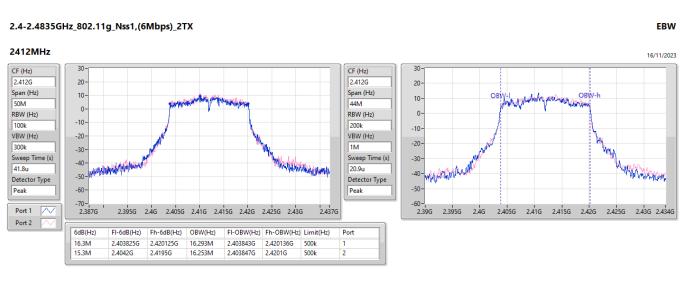




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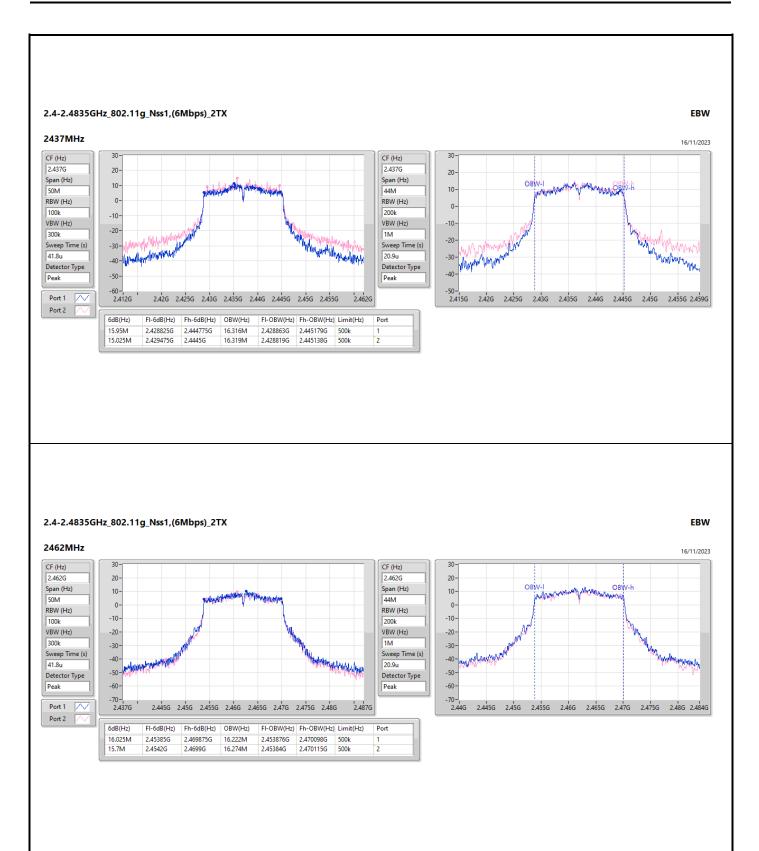
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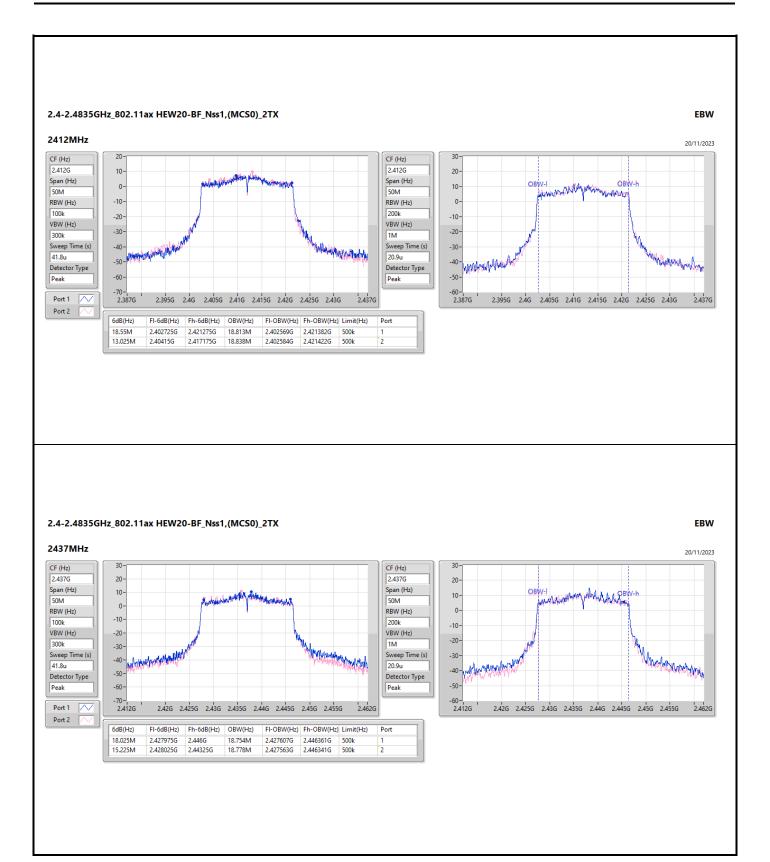
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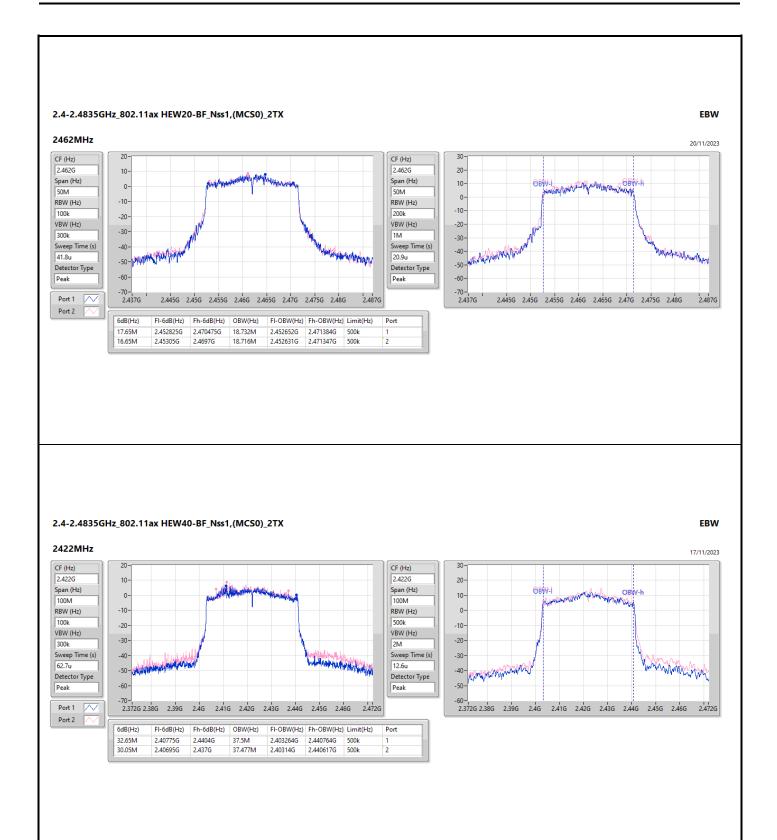
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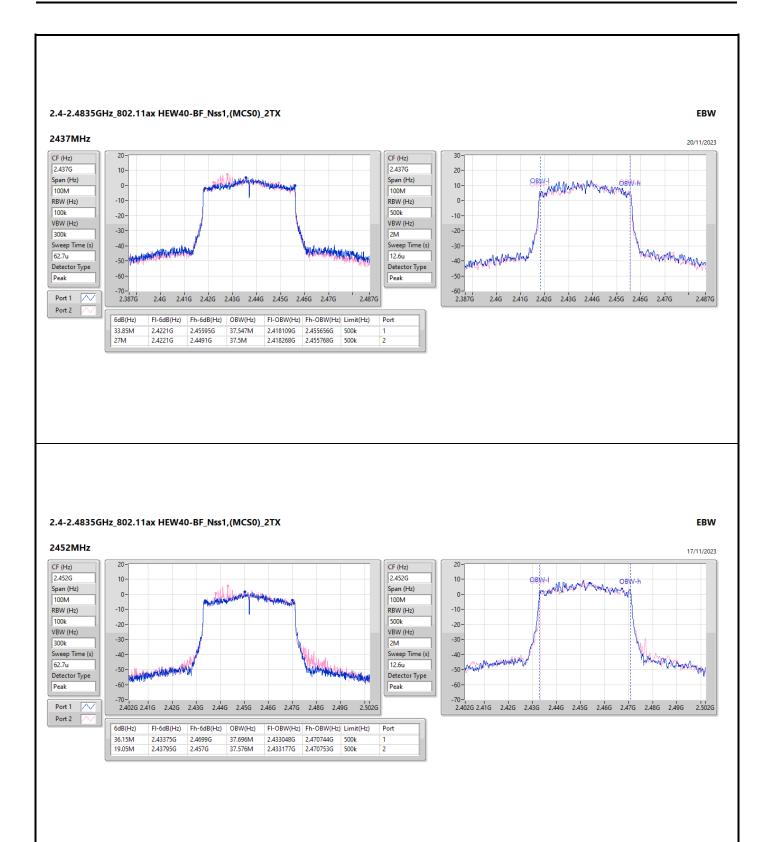
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Appendix C Average Power

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	29.42	0.87498
802.11g_Nss1,(6Mbps)_2TX	27.15	0.51880
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	25.20	0.33113
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	24.24	0.26546

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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	3.30	23.92	24.37	27.16	30.00
2437MHz	Pass	3.30	26.26	26.55	29.42	30.00
2462MHz	Pass	3.30	25.15	25.09	28.13	30.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	3.30	21.85	22.85	25.39	30.00
2437MHz	Pass	3.30	23.79	24.47	27.15	30.00
2462MHz	Pass	3.30	22.19	21.45	24.85	30.00
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.26	20.91	21.56	24.26	29.74
2437MHz	Pass	6.26	22.52	21.84	25.20	29.74
2462MHz	Pass	6.26	21.73	20.98	24.38	29.74
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	6.26	20.76	21.44	24.12	29.74
2437MHz	Pass	6.26	21.30	21.15	24.24	29.74
2452MHz	Pass	6.26	20.19	20.47	23.34	29.74

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	3.09
802.11g_Nss1,(6Mbps)_2TX	0.13
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-0.64
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-2.56

RBW = 3kHz;

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Appendix D **PSD**

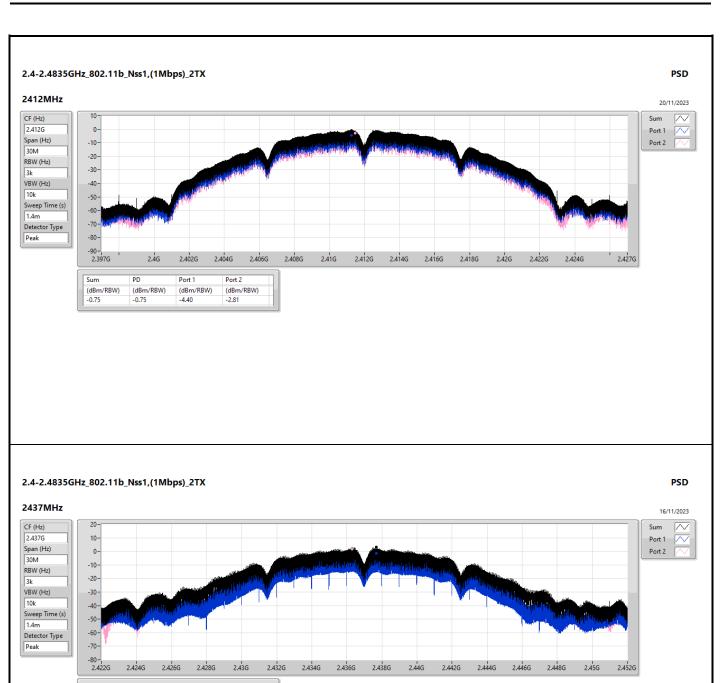
Result

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	6.26	-4.40	-2.81	-0.75	7.74
2437MHz	Pass	6.26	-1.58	1.68	3.09	7.74
2462MHz	Pass	6.26	-2.25	-2.15	0.76	7.74
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.26	-4.91	-3.66	-2.05	7.74
2437MHz	Pass	6.26	-2.15	-1.80	0.13	7.74
2462MHz	Pass	6.26	-5.18	-4.54	-2.20	7.74
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.26	-4.30	-3.99	-2.21	7.74
2437MHz	Pass	6.26	-2.56	-3.30	-0.64	7.74
2462MHz	Pass	6.26	-4.30	-4.31	-1.70	7.74
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	6.26	-6.76	-2.85	-2.56	7.74
2437MHz	Pass	6.26	-7.38	-5.56	-5.21	7.74
2452MHz	Pass	6.26	-8.10	-8.03	-5.71	7.74

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



Sum

3.09

(dBm/RBW)

PD

(dBm/RBW)

Port 1

-1.58

(dBm/RBW)

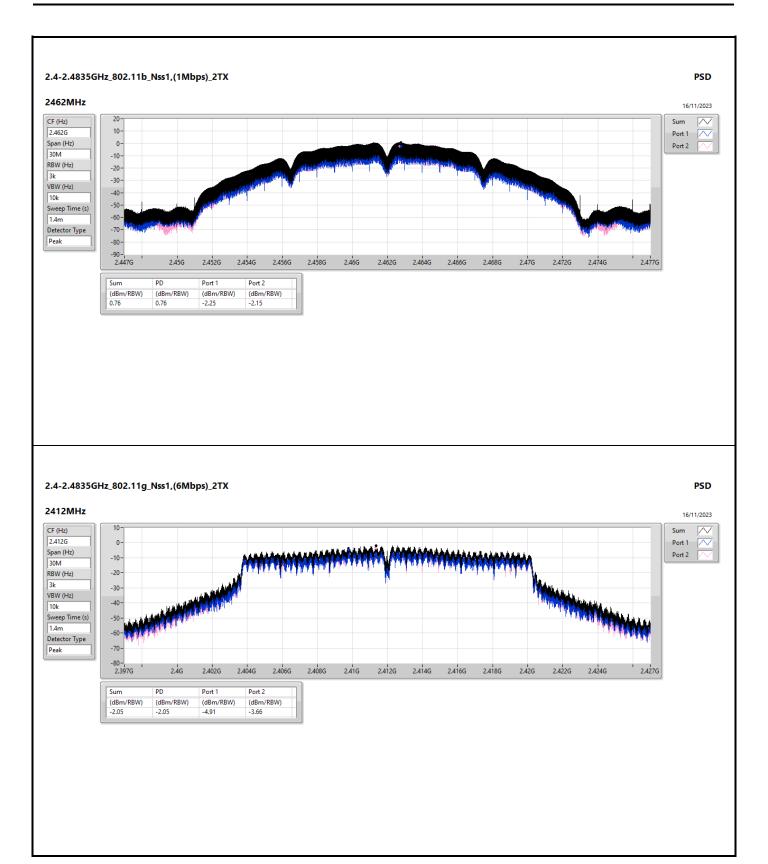
Port 2

1.68

(dBm/RBW)

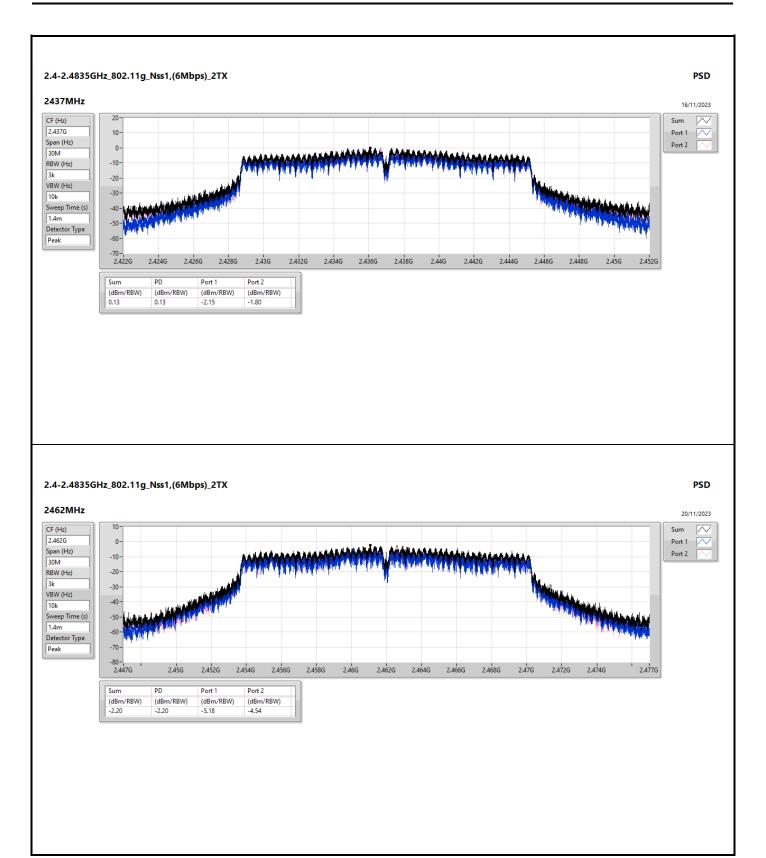
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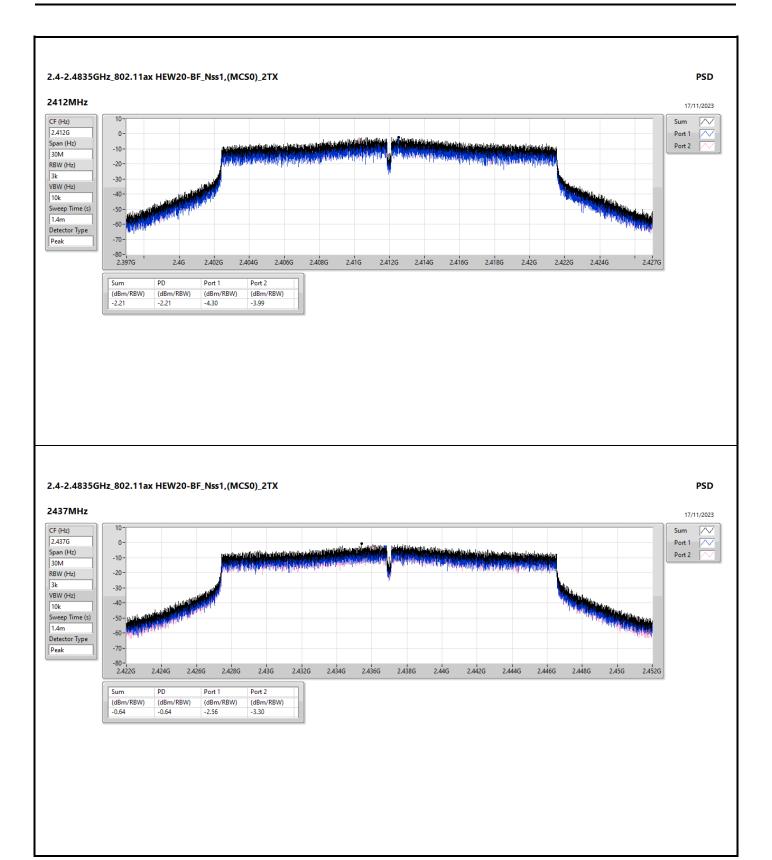
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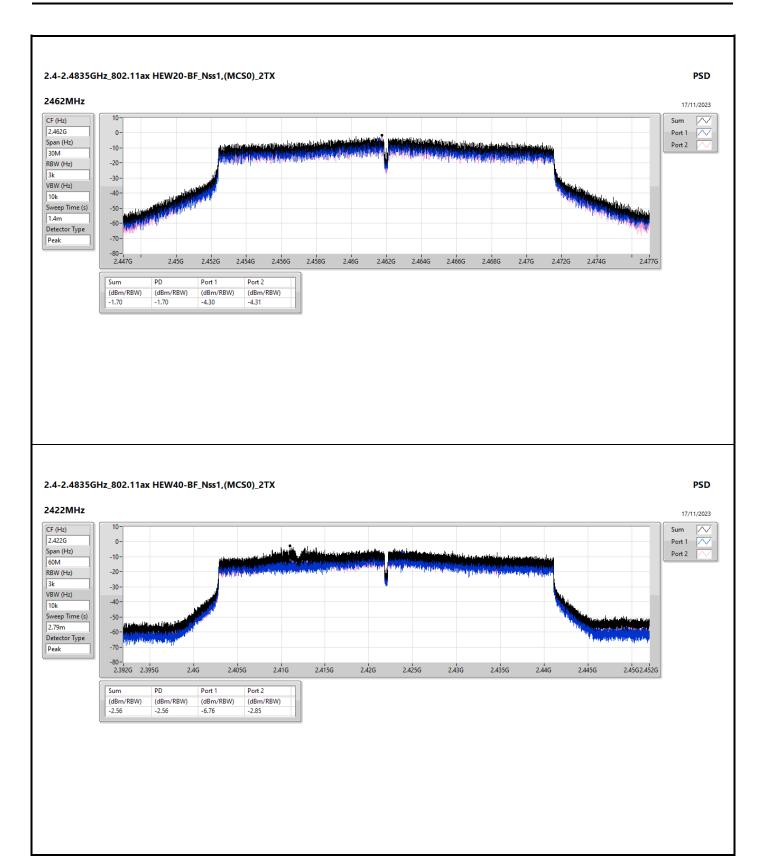
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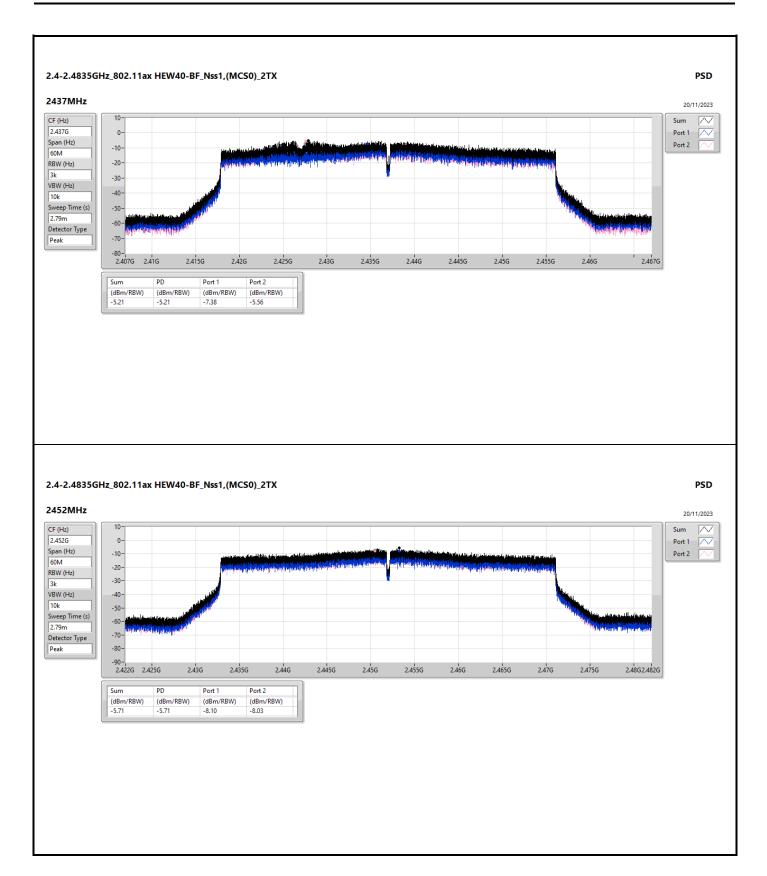
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CSE (NdB Down) Appendix E

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	2.43641G	17.62	-12.38	57.96M	-49.33	2.39752G	-30.48	2.4G	-36.95	2.50782G	-43.02	21.73248G	-43.09	2
802.11g_Nss1,(6Mbps)_2TX	Pass	2.43574G	15.87	-14.13	2.17477G	-49.93	2.39952G	-27.76	2.4G	-26.27	2.51198G	-45.73	7.23514G	-37.73	1
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	Pass	2.43574G	13.51	-16.49	2.10836G	-49.66	2.4G	-26.29	2.4G	-26.61	2.51302G	-45.77	7.23233G	-36.62	2
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	Pass	2.40935G	10.83	-19.17	1.88147G	-48.34	2.4G	-34.11	2.4G	-30.31	2.5283G	-40.01	21.98229G	-43.03	1

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CSE (NdB Down) Appendix E

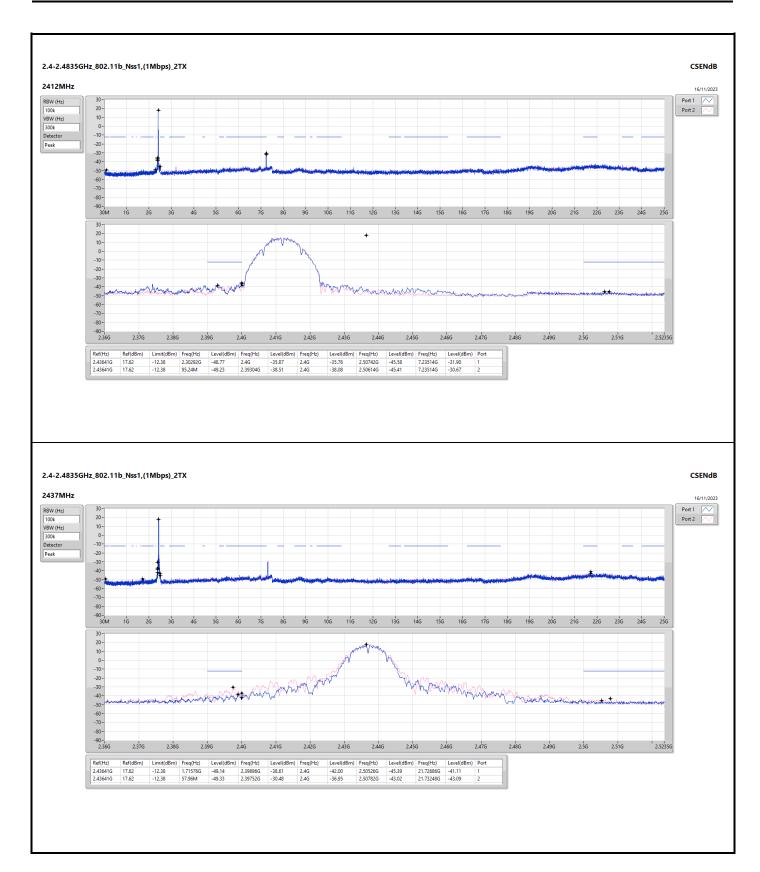
Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Port								
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43641G	17.62	-12.38	2.30292G	-48.77	2.4G	-35.87	2.4G	-35.76	2.50742G	-45.58	7.23514G	-31.90	1
2412MHz	Pass	2.43641G	17.62	-12.38	95.24M	-49.23	2.39304G	-38.51	2.4G	-38.08	2.50614G	-45.41	7.23514G	-30.67	2
2437MHz	Pass	2.43641G	17.62	-12.38	1.71576G	-49.14	2.39896G	-38.61	2.4G	-42.00	2.50526G	-45.39	21.72686G	-41.11	1
2437MHz	Pass	2.43641G	17.62	-12.38	57.96M	-49.33	2.39752G	-30.48	2.4G	-36.95	2.50782G	-43.02	21.73248G	-43.09	2
2462MHz	Pass	2.43641G	17.62	-12.38	1.91614G	-49.28	2.39232G	-44.87	2.4G	-48.69	2.50206G	-41.62	21.85891G	-43.21	1
2462MHz	Pass	2.43641G	17.62	-12.38	2.11885G	-49.27	2.39416G	-45.58	2.4G	-48.94	2.51366G	-44.95	21.55548G	-41.89	2
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43574G	15.87	-14.13	2.17477G	-49.93	2.39952G	-27.76	2.4G	-26.27	2.51198G	-45.73	7.23514G	-37.73	1
2412MHz	Pass	2.43574G	15.87	-14.13	1.88701G	-49.74	2.39984G	-28.79	2.4G	-27.03	2.50982G	-45.88	7.23233G	-34.69	2
2437MHz	Pass	2.43574G	15.87	-14.13	2.11885G	-48.70	2.39952G	-39.54	2.4G	-43.25	2.50278G	-45.65	21.82519G	-42.42	1
2437MHz	Pass	2.43574G	15.87	-14.13	33.5M	-49.00	2.39952G	-34.60	2.4G	-36.89	2.50166G	-44.77	21.70438G	-42.65	2
2462MHz	Pass	2.43574G	15.87	-14.13	2.1538G	-49.80	2.39008G	-46.57	2.4G	-49.27	2.50198G	-43.50	21.8842G	-42.75	1
2462MHz	Pass	2.43574G	15.87	-14.13	2.30175G	-49.14	2.39056G	-45.38	2.4G	-47.48	2.50758G	-44.91	21.69034G	-42.95	2
802.11ax HEW20-BF_Nss1,(MCS0)_2TX				-				٠	-	-	-		-		-
2412MHz	Pass	2.43574G	13.51	-16.49	2.04895G	-49.47	2.39992G	-27.43	2.4G	-26.33	2.5091G	-45.18	7.23233G	-39.36	1
2412MHz	Pass	2.43574G	13.51	-16.49	2.10836G	-49.66	2.4G	-26.29	2.4G	-26.61	2.51302G	-45.77	7.23233G	-36.62	2
2437MHz	Pass	2.43574G	13.51	-16.49	2.30408G	-48.81	2.39728G	-41.81	2.4G	-44.74	2.50126G	-44.61	21.88981G	-42.83	1
2437MHz	Pass	2.43574G	13.51	-16.49	2.02681G	-49.63	2.39408G	-45.07	2.4G	-46.54	2.50342G	-45.43	21.91791G	-42.50	2
2462MHz	Pass	2.43574G	13.51	-16.49	2.12933G	-49.32	2.39264G	-45.46	2.4G	-49.10	2.5007G	-43.64	21.68472G	-43.02	1
2462MHz	Pass	2.43574G	13.51	-16.49	2.08739G	-48.18	2.39448G	-45.92	2.4G	-49.08	2.50894G	-44.11	21.75776G	-42.57	2
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-		-	-		-	-	-	-	-		-		-
2422MHz	Pass	2.40935G	10.83	-19.17	1.88147G	-48.34	2.4G	-34.11	2.4G	-30.31	2.5283G	-40.01	21.98229G	-43.03	1
2422MHz	Pass	2.40935G	10.83	-19.17	1.9078G	-48.95	2.39952G	-32.52	2.4G	-31.47	2.50142G	-46.90	21.64013G	-42.94	2
2437MHz	Pass	2.40935G	10.83	-19.17	1.86544G	-49.20	2.39952G	-40.88	2.4G	-45.06	2.50606G	-39.32	21.70744G	-43.25	1
2437MHz	Pass	2.40935G	10.83	-19.17	2.30397G	-49.36	2.3904G	-32.38	2.4G	-45.05	2.51294G	-43.95	21.65696G	-42.99	2
2452MHz	Pass	2.40935G	10.83	-19.17	1.80819G	-48.58	2.39744G	-48.10	2.4G	-49.13	2.54398G	-48.41	21.66257G	-42.63	1
2452MHz	Pass	2.40935G	10.83	-19.17	52.9M	-49.18	2.39328G	-45.77	2.4G	-48.88	2.51454G	-46.80	21.86169G	-41.50	2

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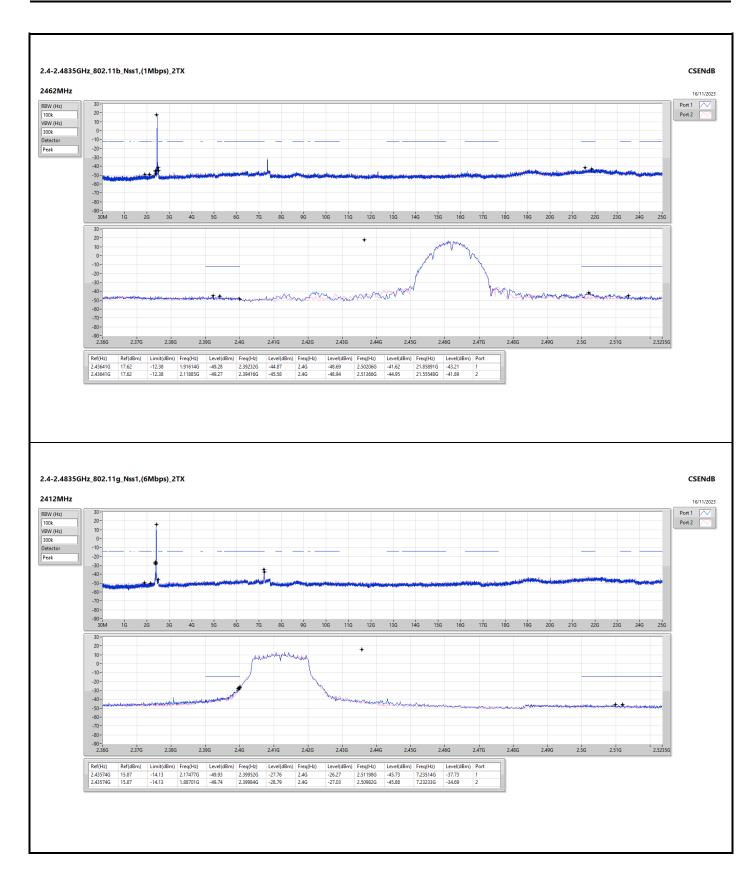
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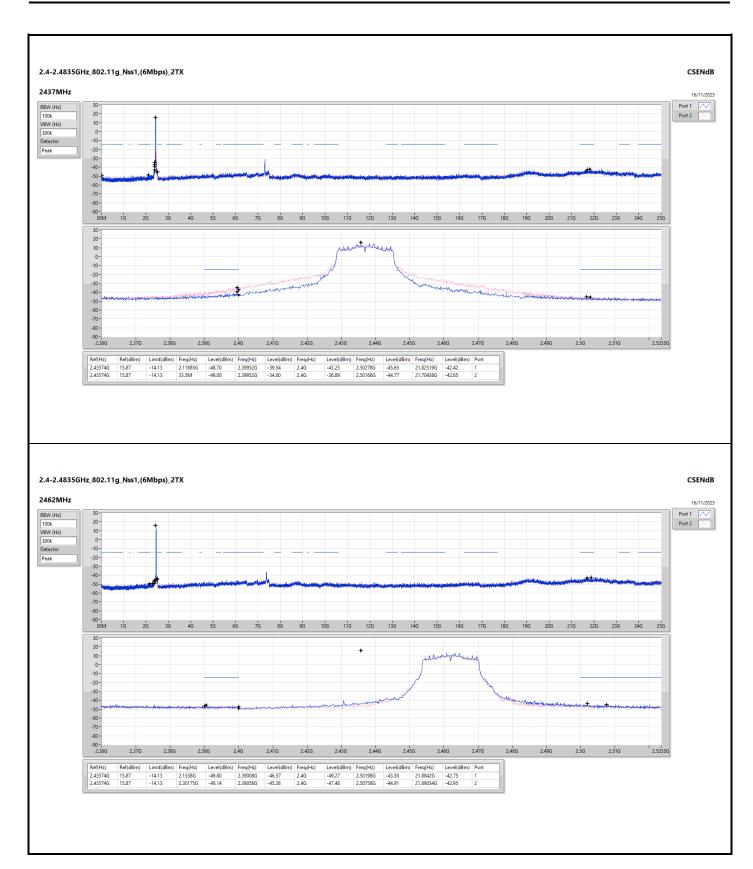
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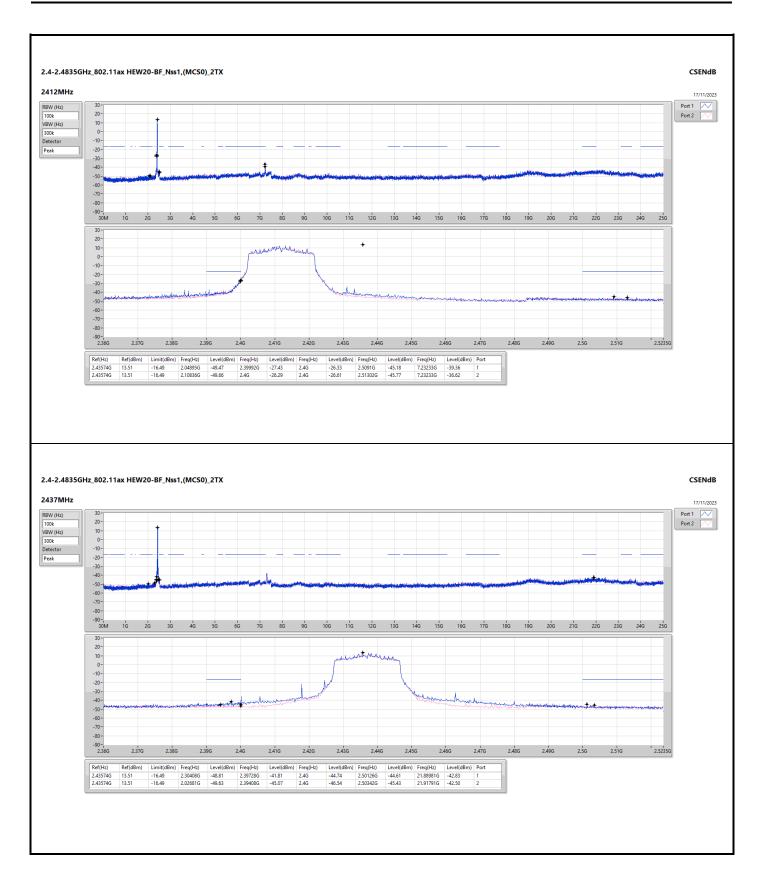
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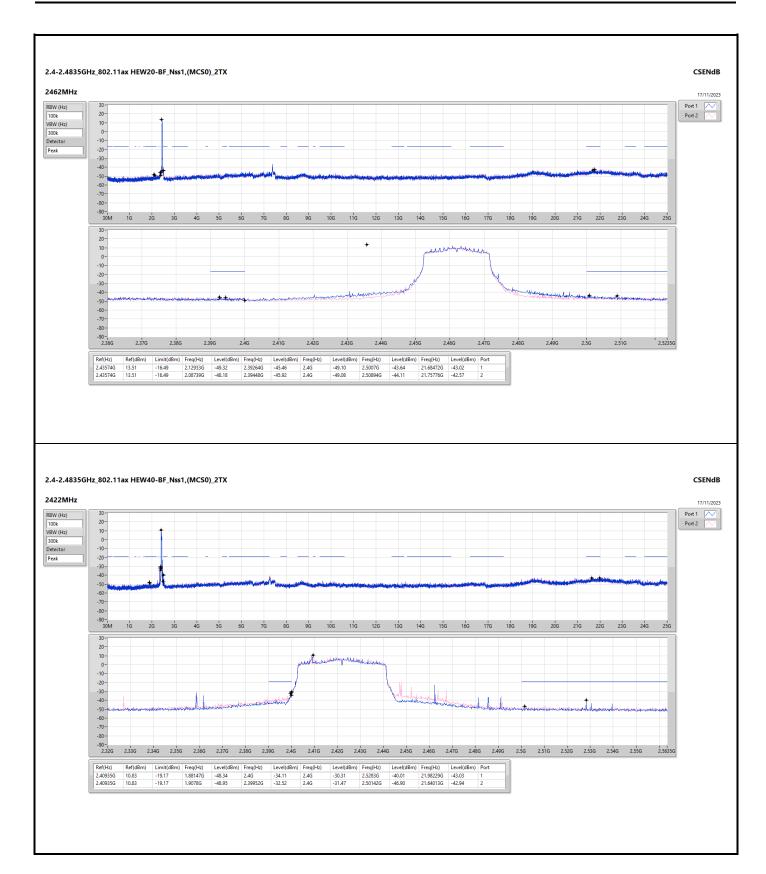
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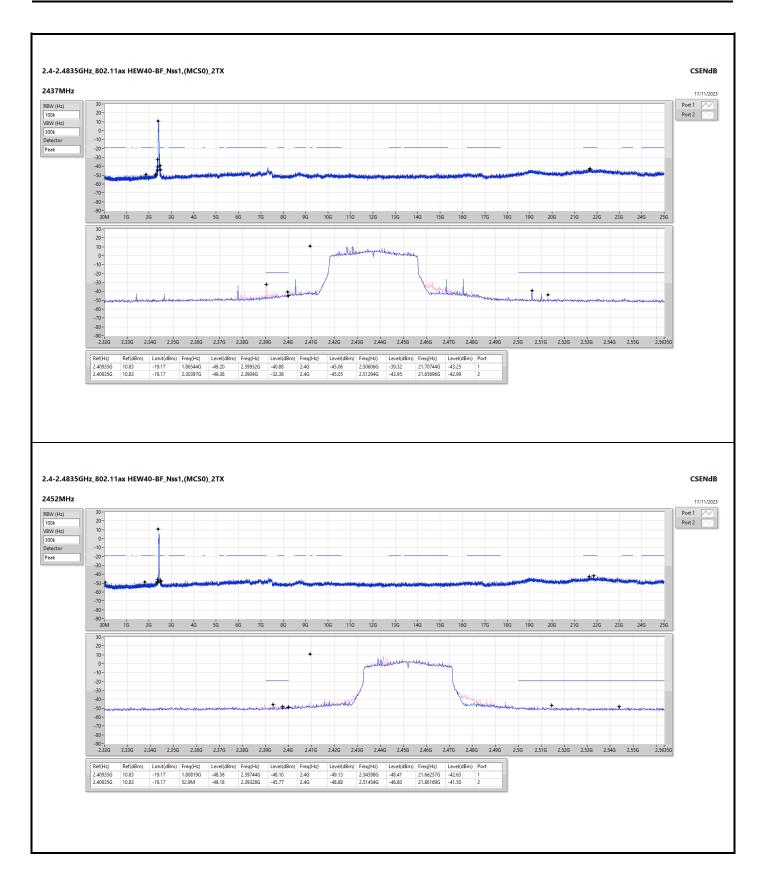
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Radiated Emissions below 1GHz

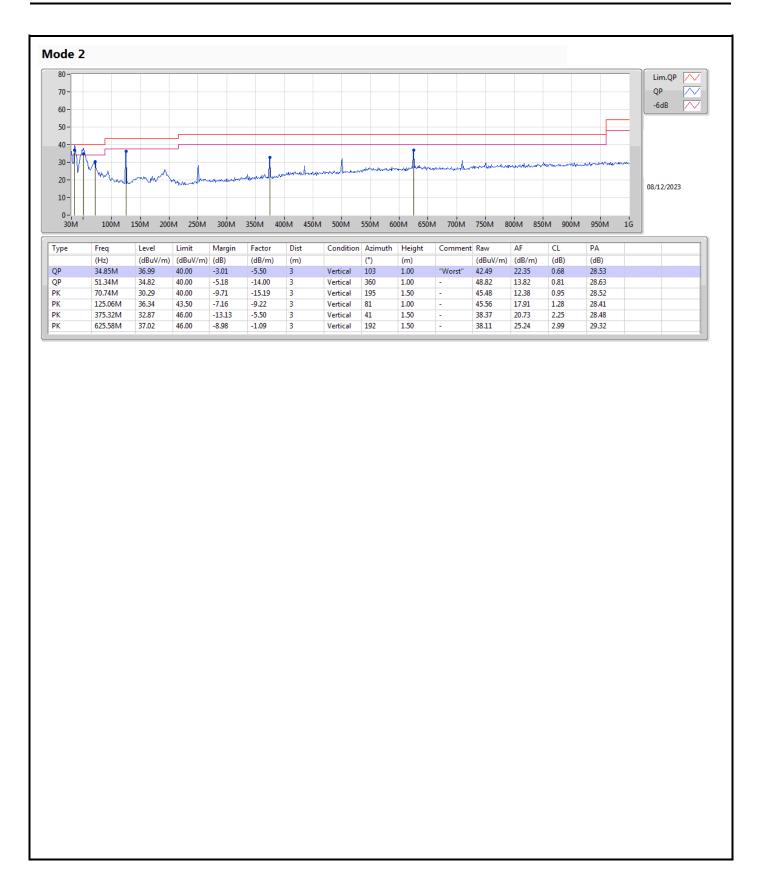
Appendix F.1

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 2	Pass	QP	34.85M	36.99	40.00	-3.01	Vertical

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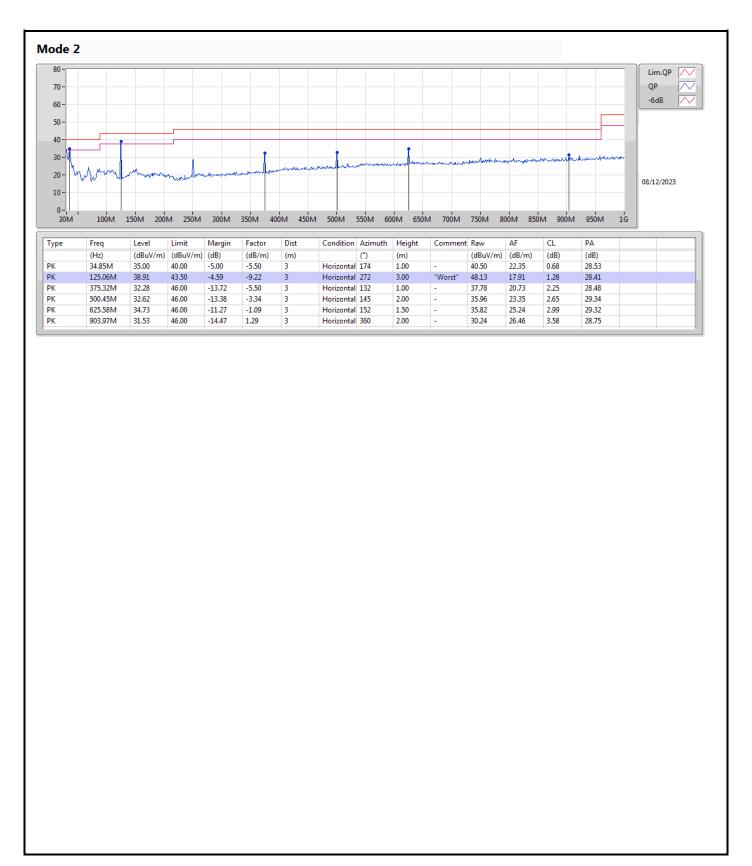
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RSE TX above 1GHz

Appendix F.2

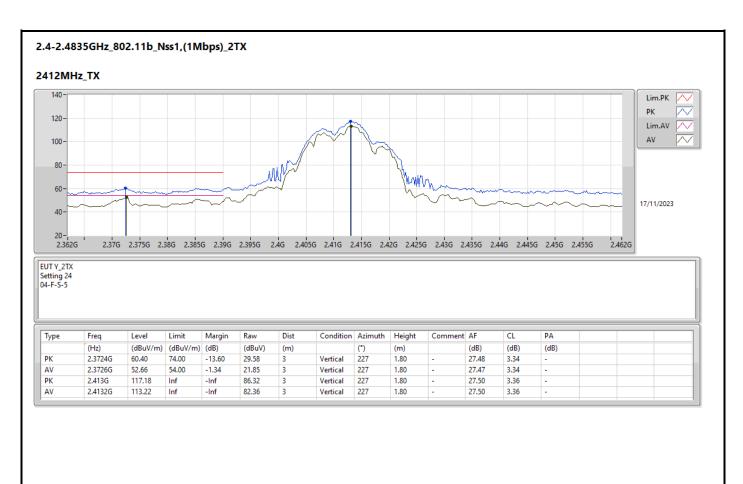
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth	Height (m)	Comments
2.4-2.4835GHz	-	-	(HZ) -	(ubuv/iii)	(ubuv/iii)	(uв) -	-	-	-	- (111)	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	Pass	AV	2.4842G	52.89	54.00	-1.11	3	Vertical	183	1.50	-

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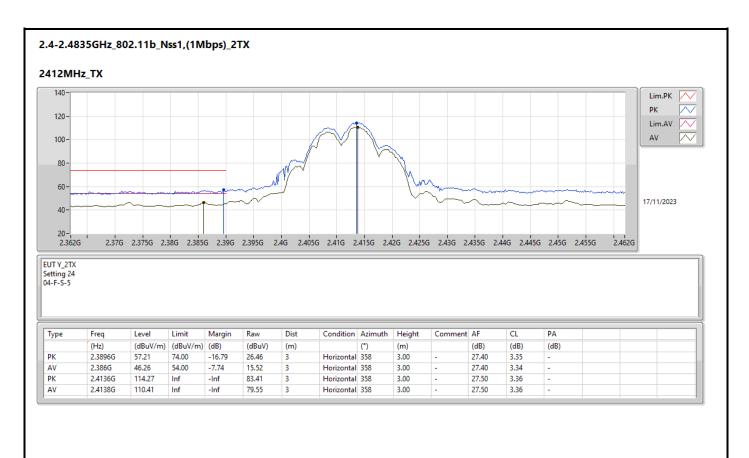




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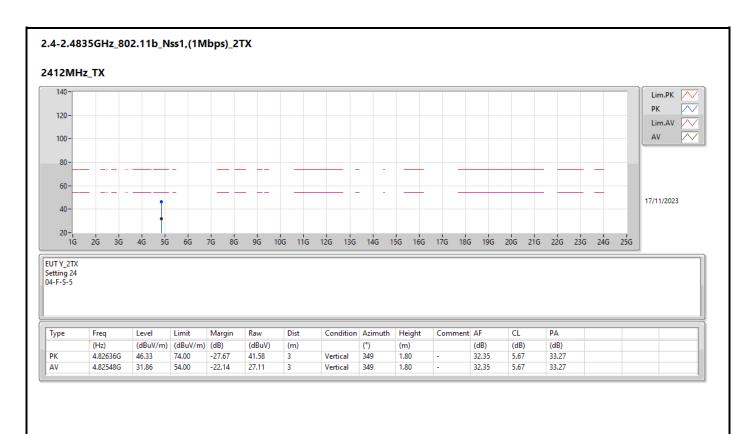




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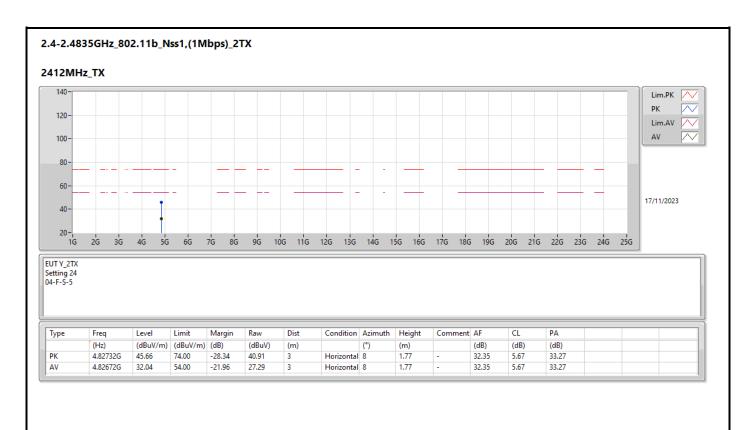




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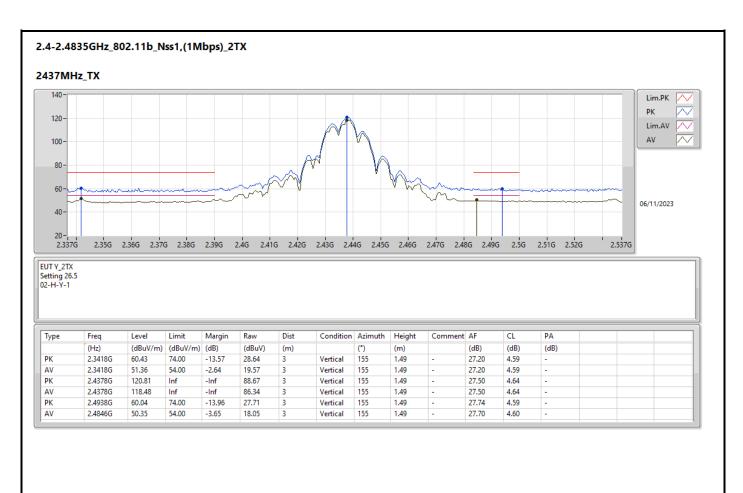




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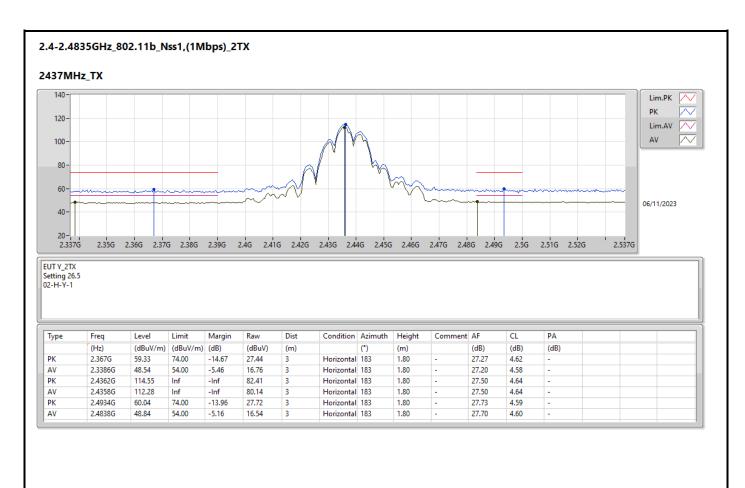




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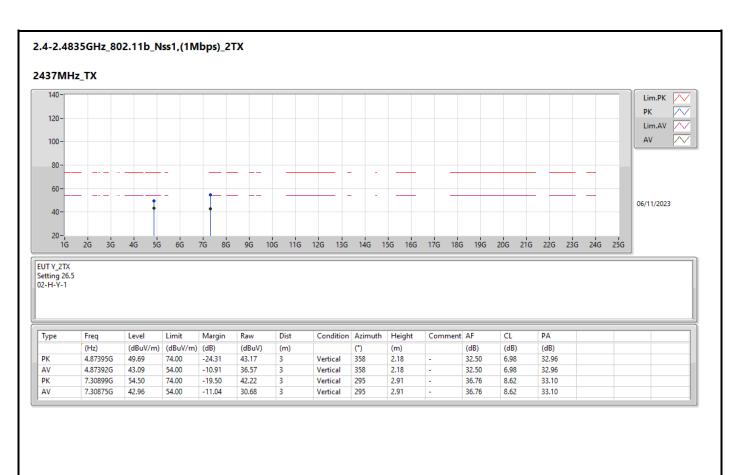




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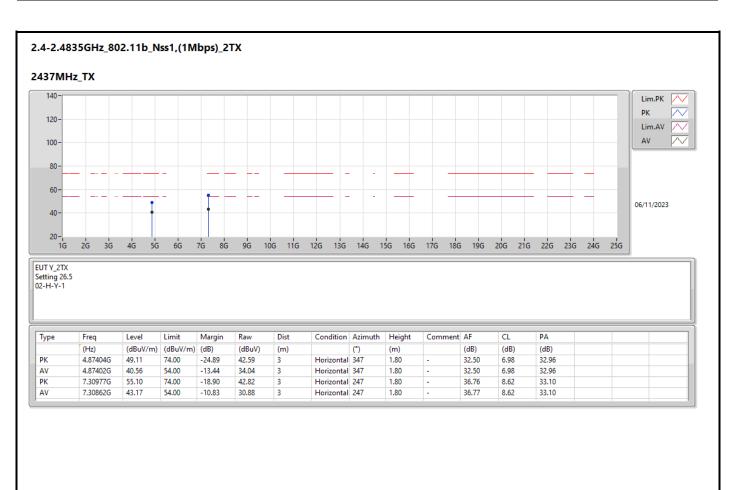




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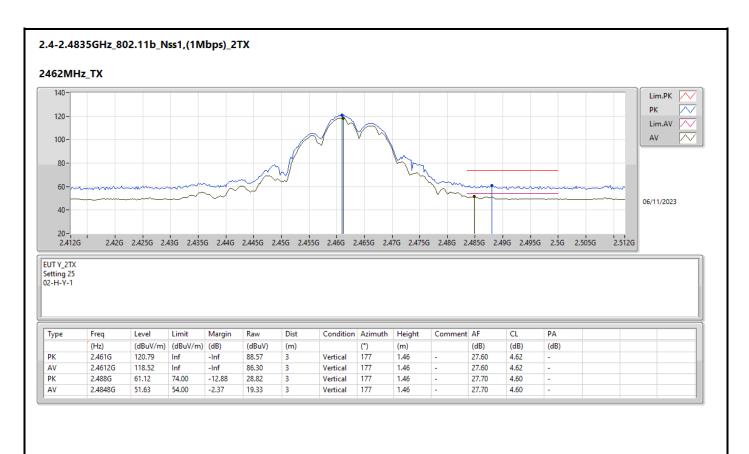




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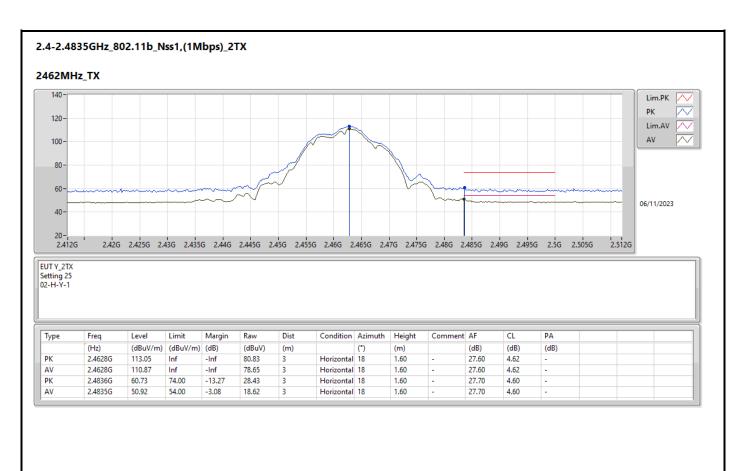




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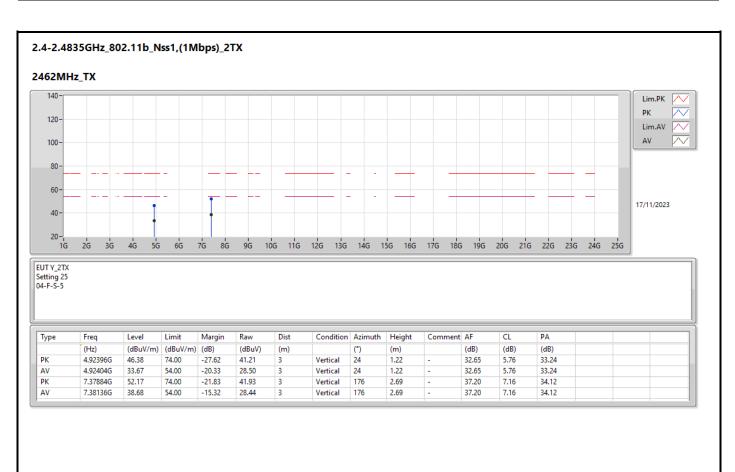




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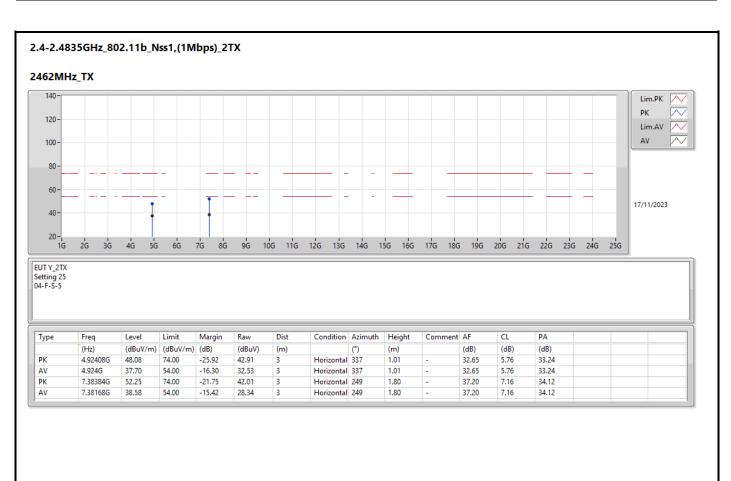




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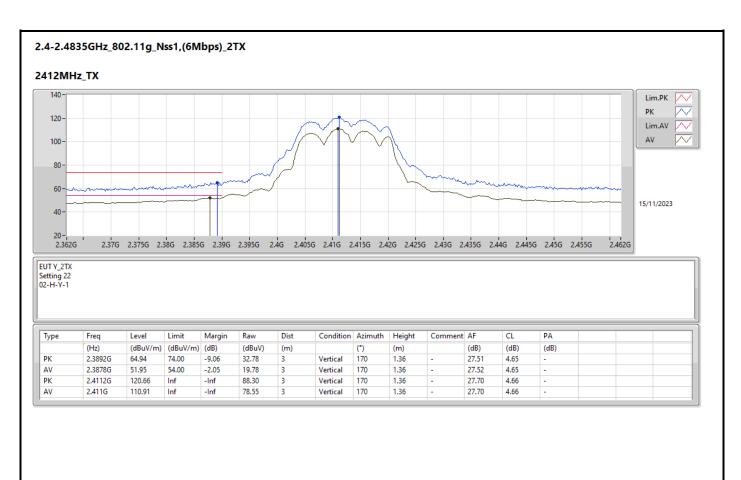




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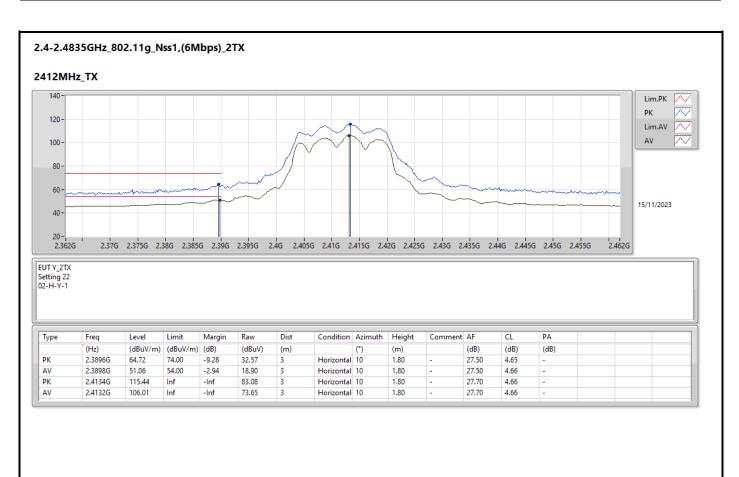




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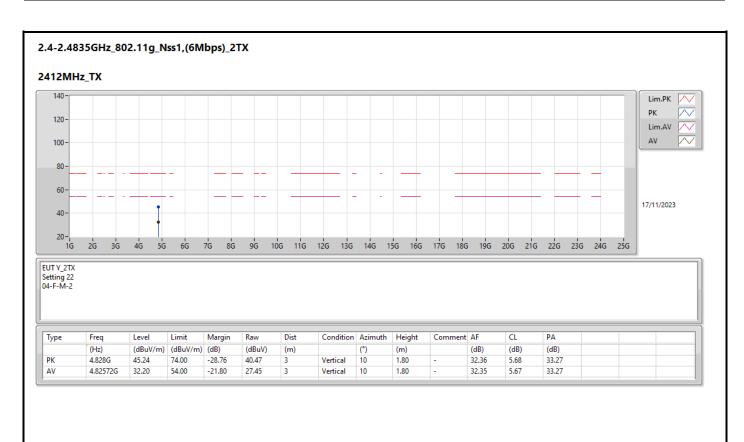




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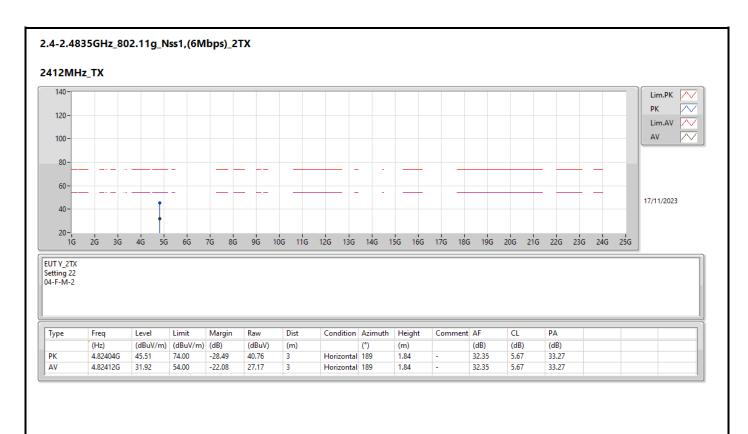




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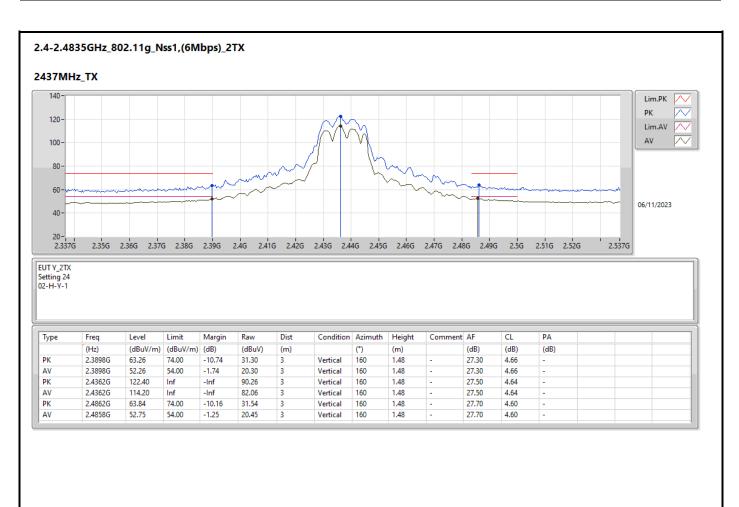




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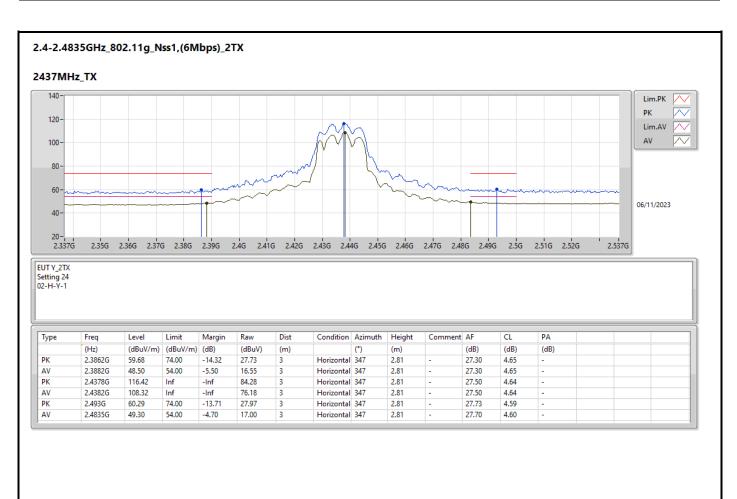




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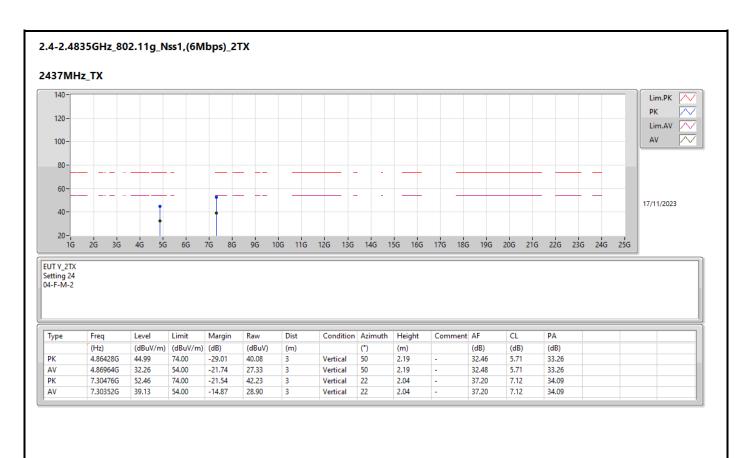




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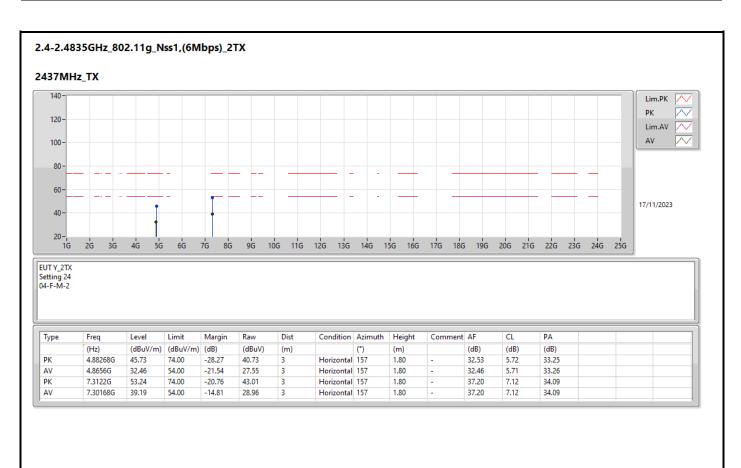




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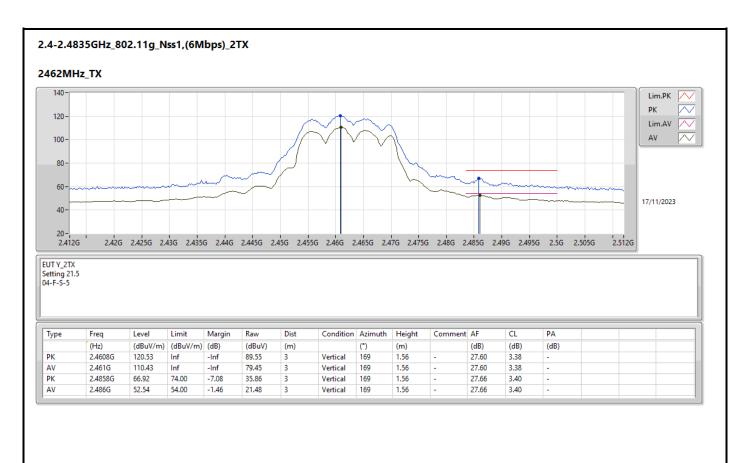




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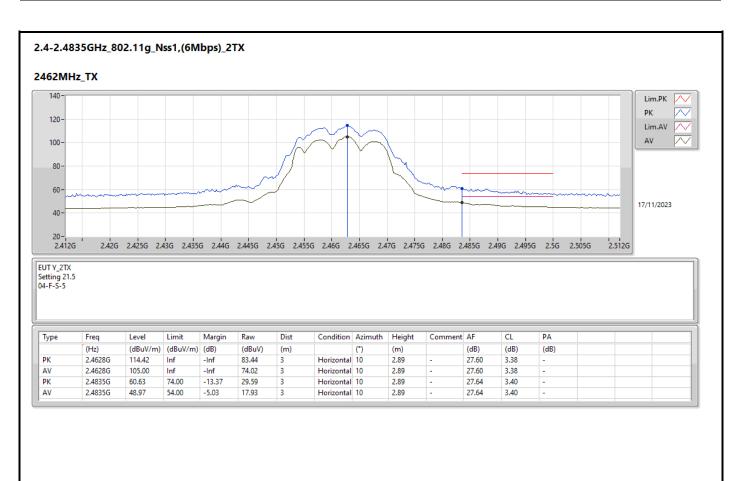




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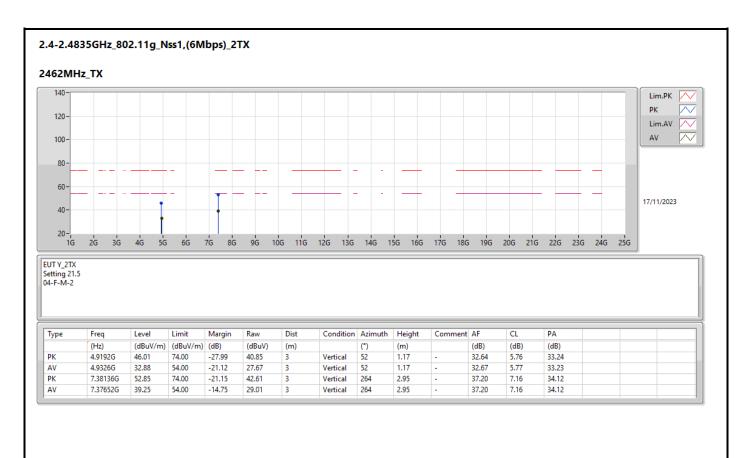




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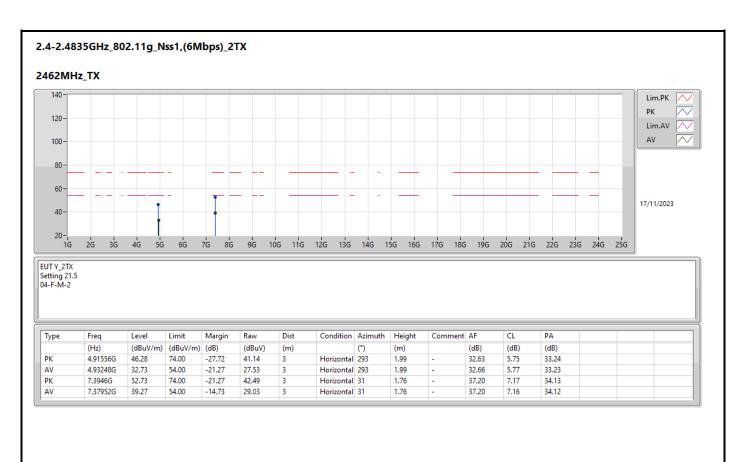




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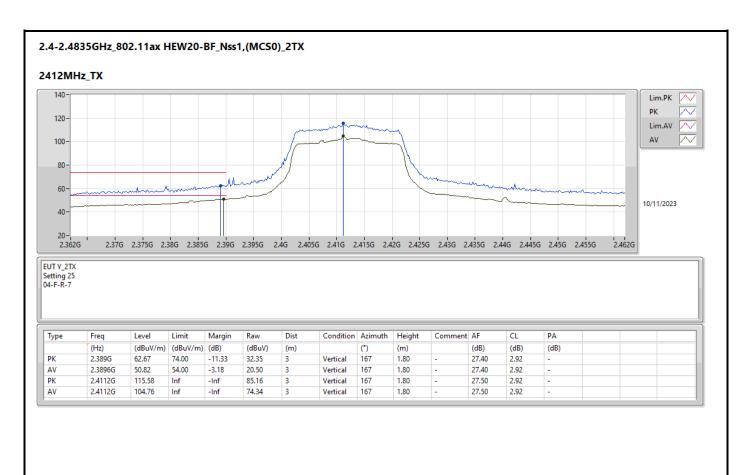




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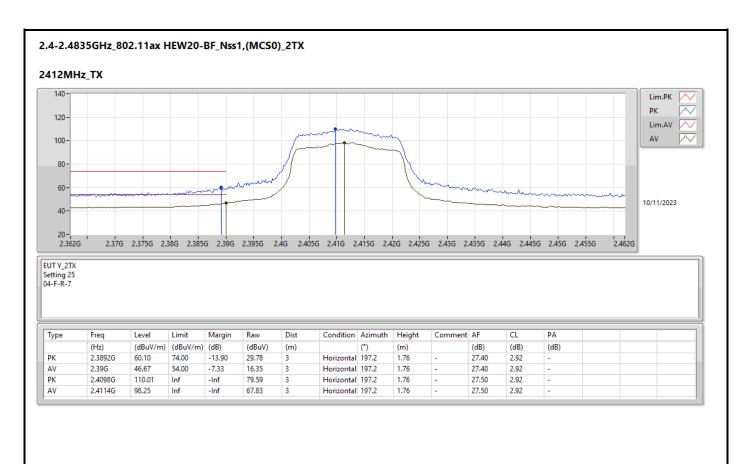




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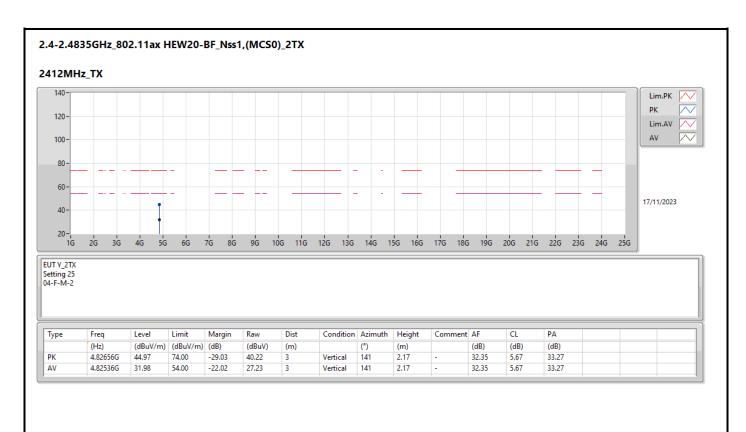




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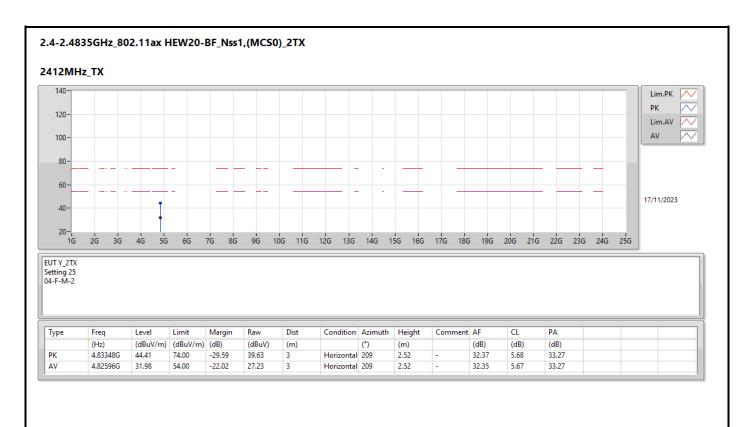




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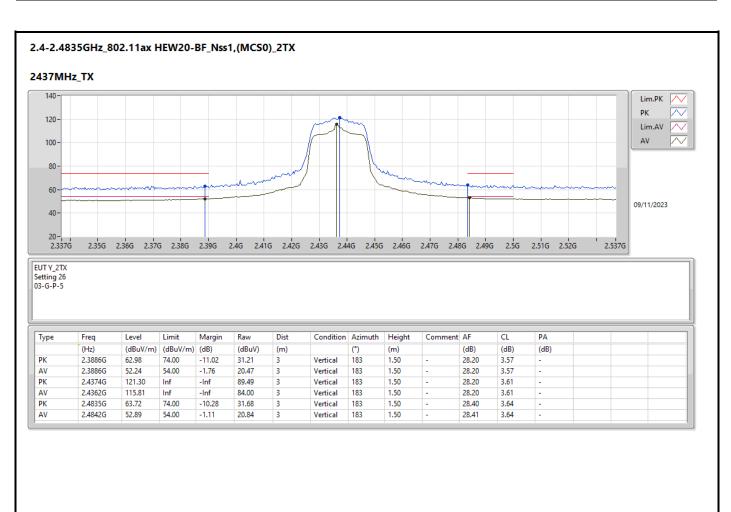




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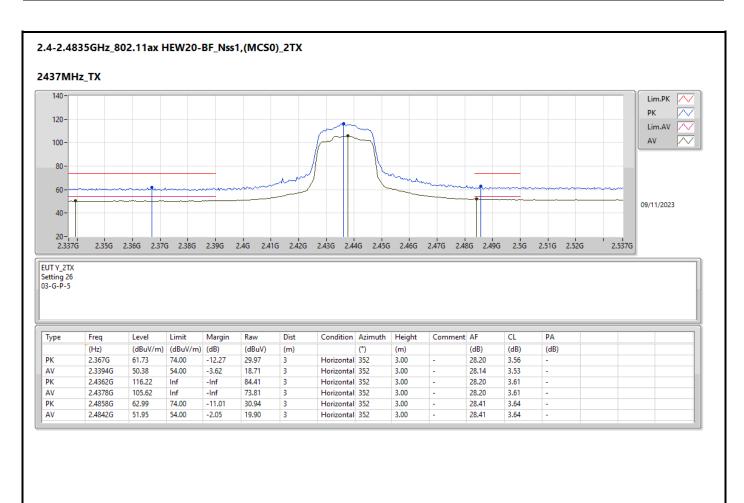




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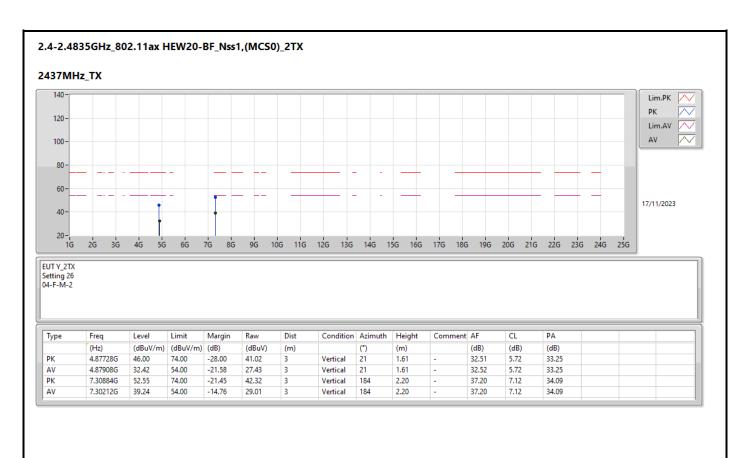




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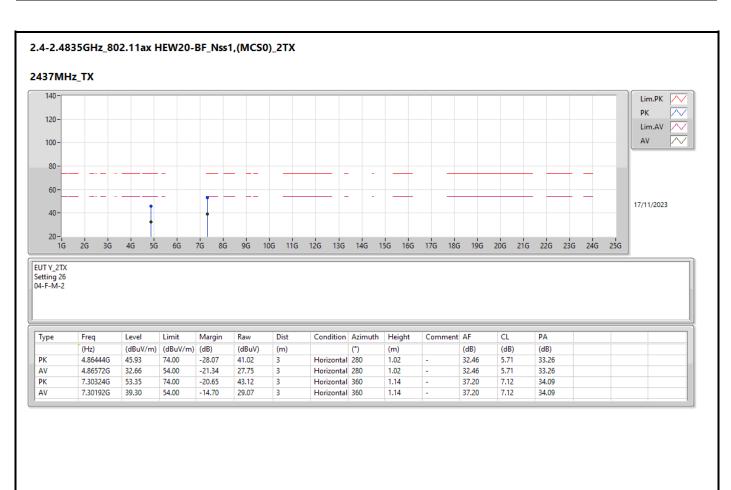




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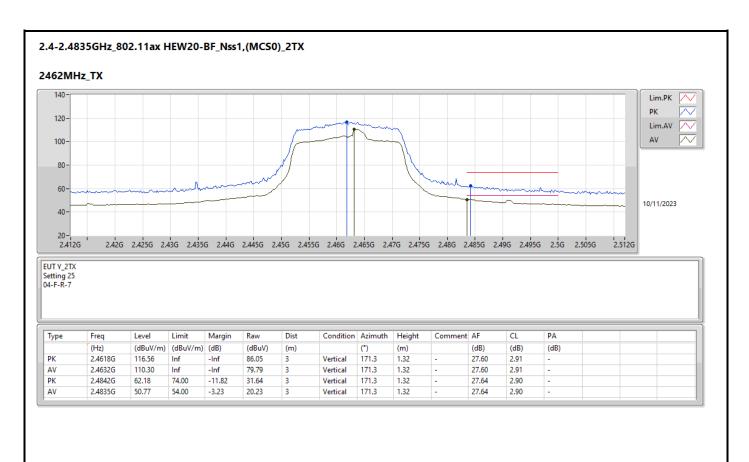




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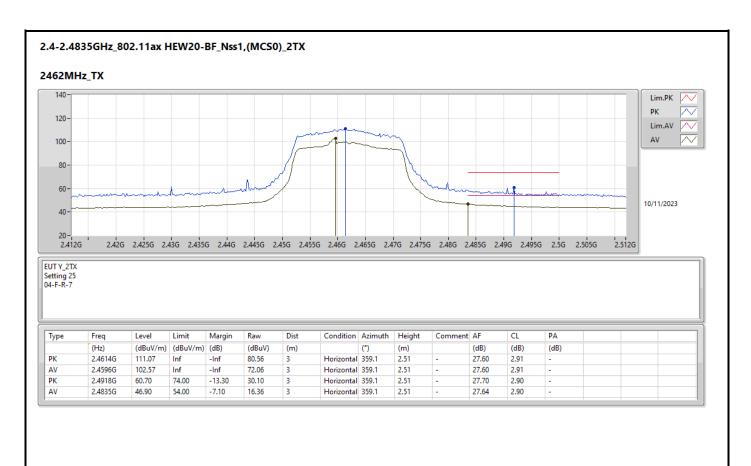




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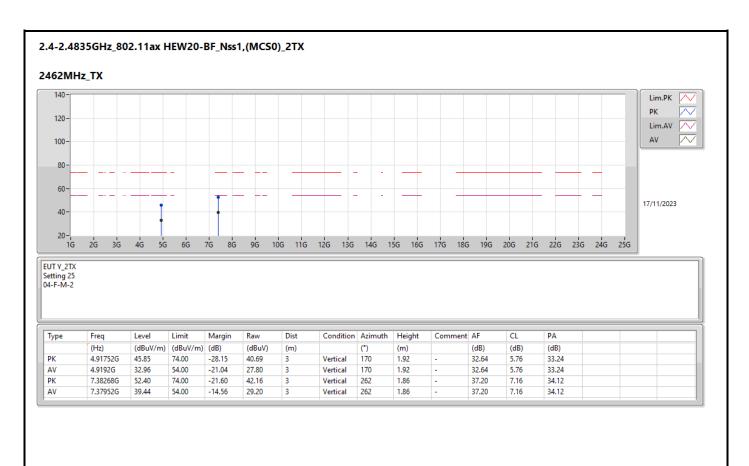




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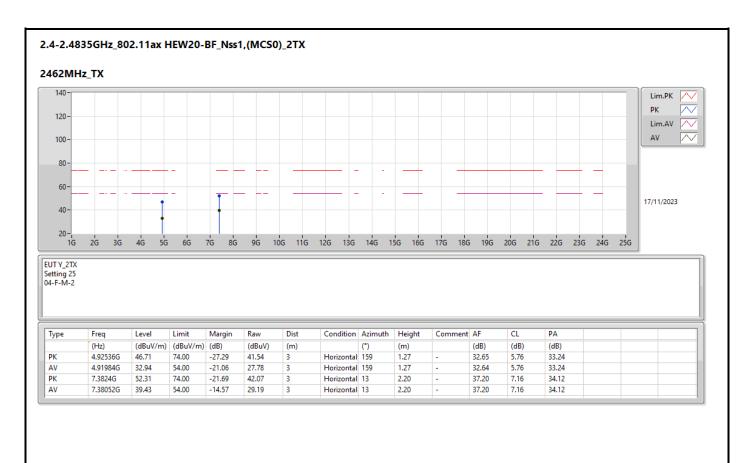




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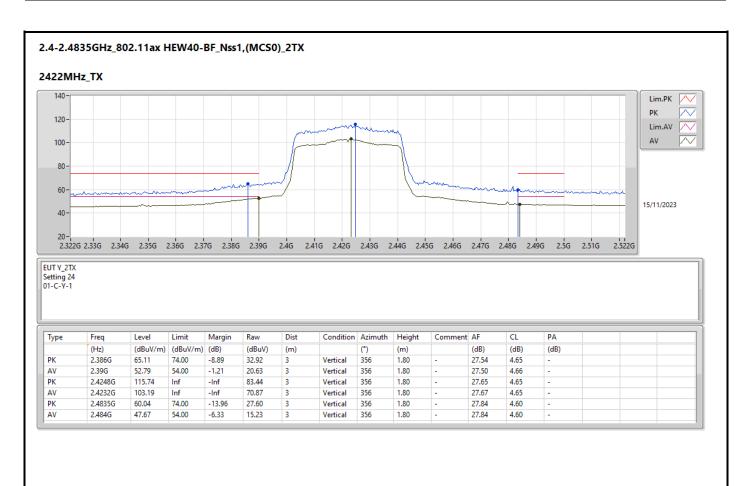




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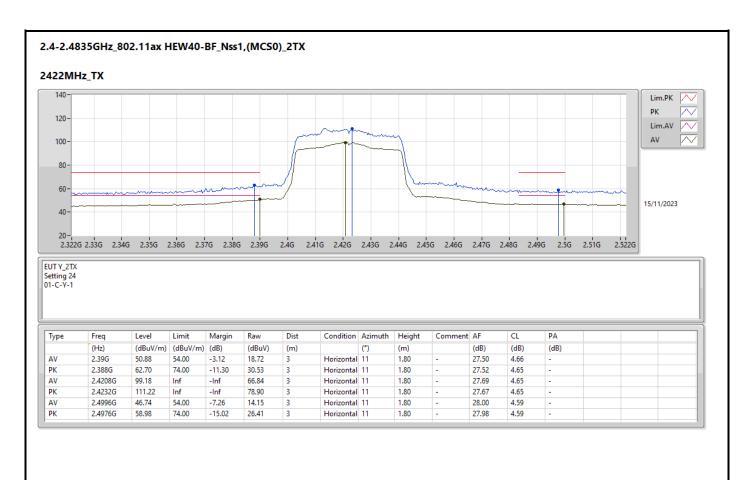




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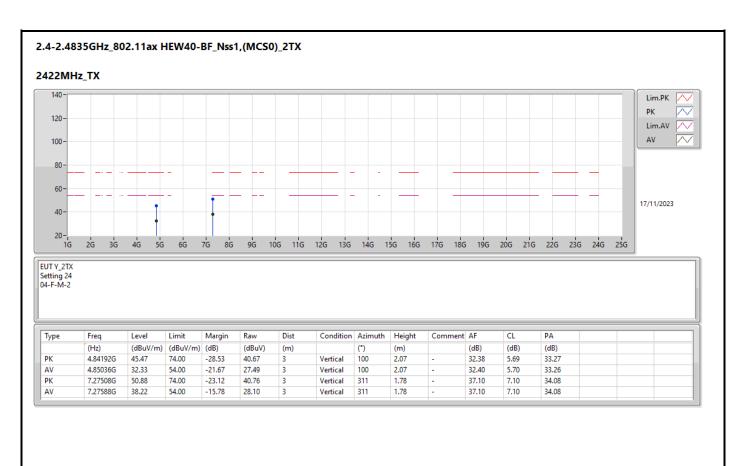




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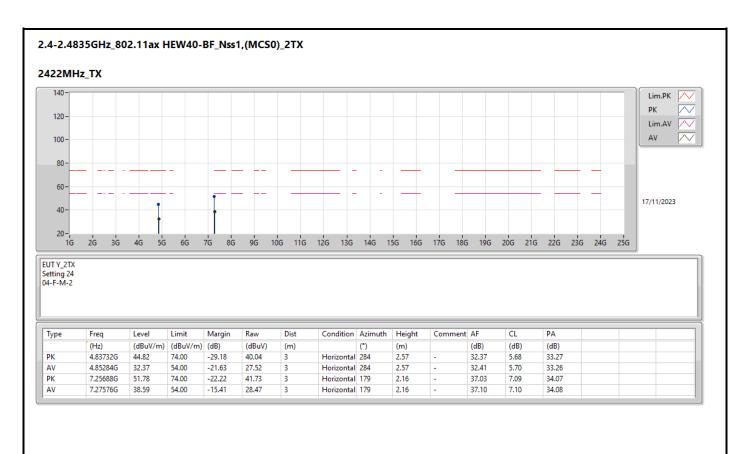




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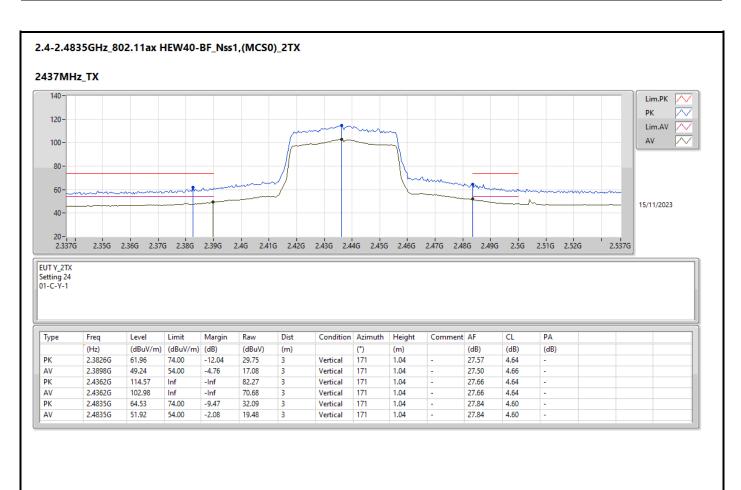




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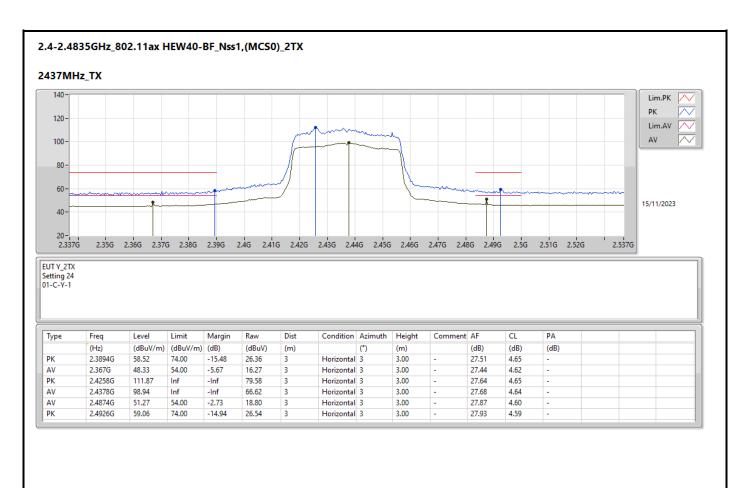




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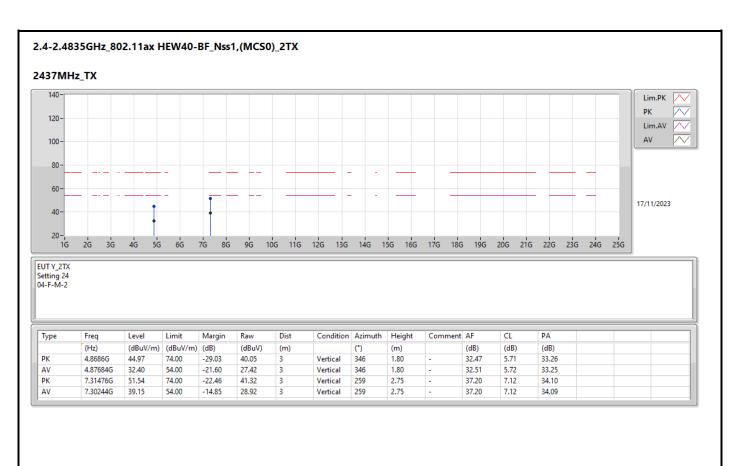




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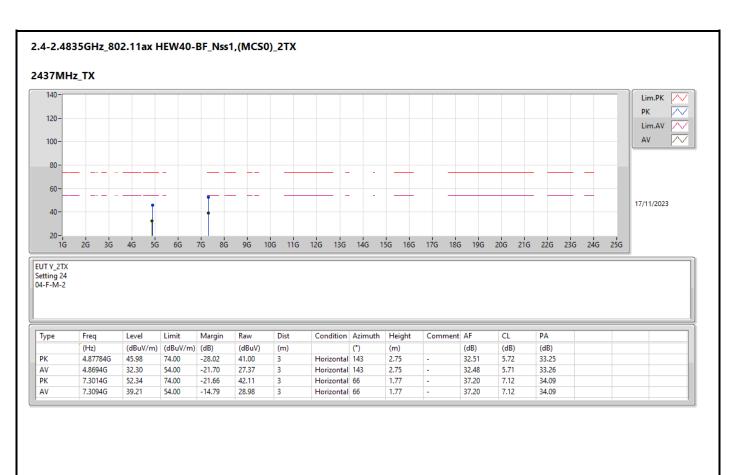




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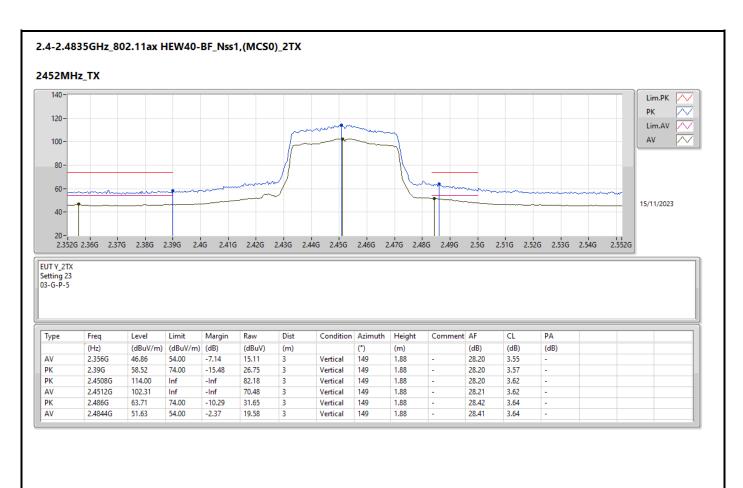




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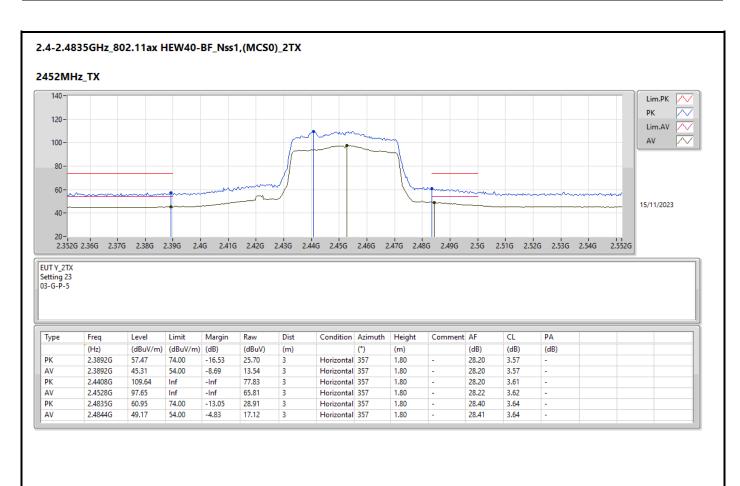




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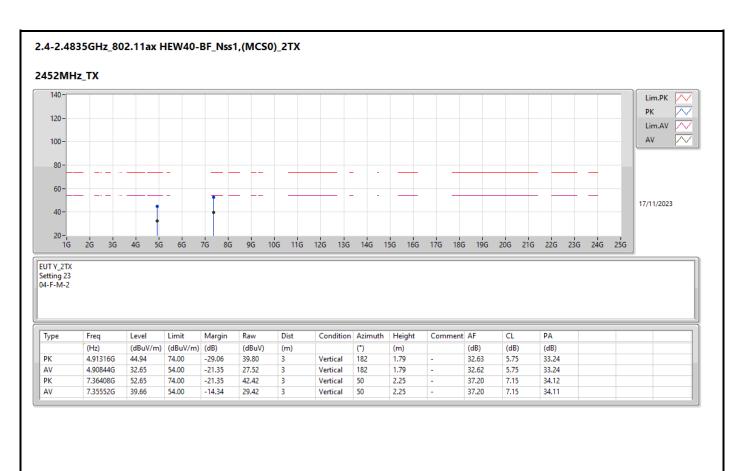




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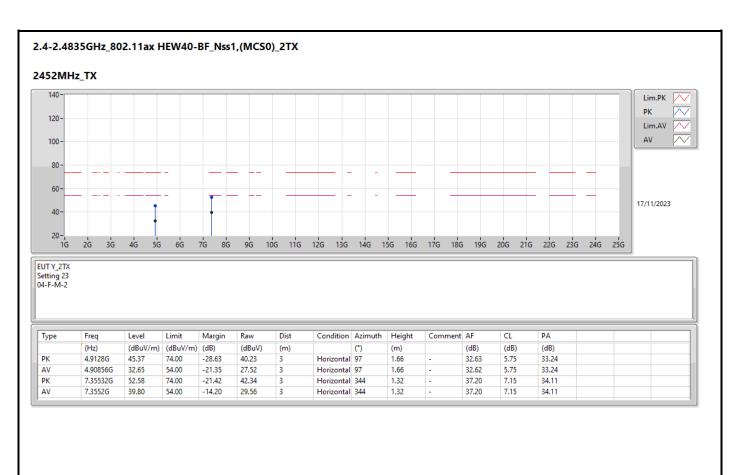




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Radiated Emission Co-location

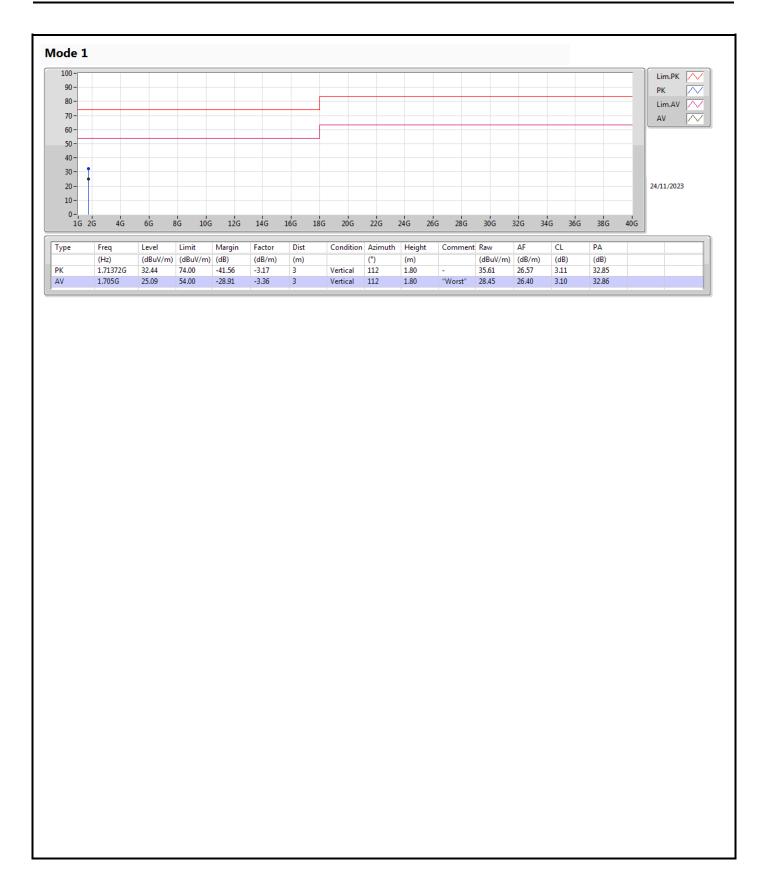
Appendix G

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	AV	1.705G	25.09	54.00	-28.91	Vertical

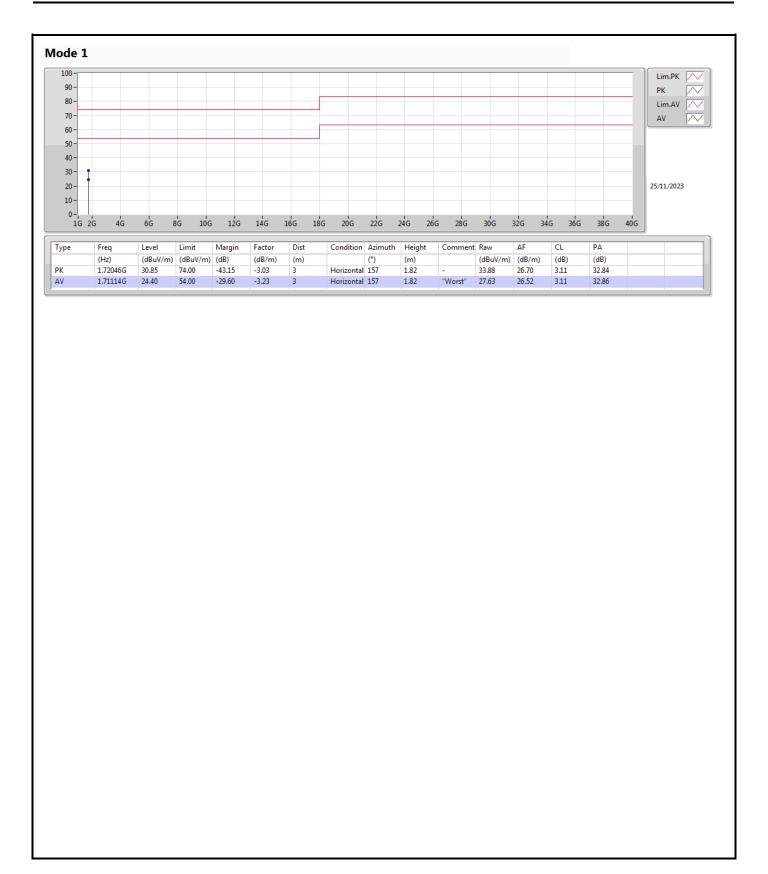
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