

Report No.: FR382313AA

RADIO TEST REPORT

FCC ID : MSQ-RTAX7500

Equipment : Wireless Dual Band WiFi 6 Router

Brand Name : ASUS

Model Name : RT-AX1800S V2, RT-AX3000S

Applicant: ASUSTeK COMPUTER INC.

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

Standard : 47 CFR FCC Part 15.247

The product was received on Sep. 28, 2023, and testing was started from Jan. 20, 2024 and completed on Feb. 27, 2024. 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 : 01

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Photographs of EUT v01
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History of this test report

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Report No.	Version	Description	Issued Date
FR382313AA	01	Initial issue of report	Mar. 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: Muse Chan

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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

Cot	A 4	Po	ort	Drand	Madal Nama	Antonno Timo	Commonton	Coin (dDi)
Set	Ant.	2.4GHz	5GHz	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	1	1	N/A		U00T01S039N04305		MHF Plug	
1	2	2	1		U00T01S039N04308	РСВ	MHF Plug	
'	3	N/A	2		U00T01S039N04306		MHF Plug	Note 1
	4	N/A	3	RF Link	U00T01S039N04307		MHF Plug	
	1	-	N/A	KF LIIIK	U00T01S016N04814	PCB	MHF Plug	Note i
2	2	-	-		U00T01S016N04817		MHF Plug	
	3	N/A	ı		U00T01S016N04815		MHF Plug	
	4	N/A	1		U00T01S016N04816		MHF Plug	

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Note 1:

11010	iote 1.						
				Gain (dBi)			
Set	Ant.	W/I ANI 0 4011-		WLAN	5GHz		
		WLAN 2.4GHz	UNII 1	UNII 2A	UNII 2C	UNII 3	
	1	2.57	N/A	N/A	N/A	N/A	
100	2	2.55	2.54	2.45	2.50	2.57	
1 & 2 -	3	N/A	2.64	2.64	2.56	2.91	
	4	N/A	2.84	2.76	2.94	2.82	

Note 2: The above information was declared by manufacturer.

Note 3: The EUTs have two sets of antenna. The differences between set 1 and set 2 are just the length and design of the exterior, so only set 1 was selected to test all the test items.

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Note 4: Directional gain information

Type	Maximum Output Power Power Spectral Dens	
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	$Directional Gain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{stof}} \left\{ \sum_{k=1}^{N_{stof}} \mathbf{g}_{j,k} \right\}^{2}}{N_{ANT}} \right]$
BF	$Directional Gain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ext}} \left\{ \sum_{k=1}^{N_{ext}} \mathbf{g}_{j,k} \right\}^{2}}{N_{ANT}} \right]$	$Directional Gain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{min}} \left\{ \sum_{k=1}^{N_{min}} \mathbf{g}_{j,k} \right\}^{2}}{N_{ANT}} \right]$

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Ex.

Directional Gain = 10 - log
$$\frac{\left[\sum_{j=1}^{N_{ad}} \left\{ \sum_{k=1}^{N_{aNT}} \mathbf{g}_{j,k} \right\}^{2} \right]}{N_{ANT}}$$

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

5G UNII-3 G1 = 2.57 dBi; G2 = 2.91 dBi; G3 = 2.82 dB

2.4G DG = 5.57 dBi 5G UNII-1 DG = 7.54 dBi 5G UNII-2A DG = 7.39 dBi 5G UNII-2C DG = 7.44 dB 5G UNII-3 DG = 7.54 dBi

Note 5: For 2.4GHz function:

For IEEE 802.11 b/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 802.11 a/n/ac/ax (3TX/3RX):

Port 1~3 can be used as transmitting/receiving antenna.

Port 1~3 could transmit/receive simultaneously.

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1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11b_Nss 1,(1D)	0.972	0.12	10.525m	100
802.11g_Nss 1,(6D)	0.983	0.07	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ax HEW20-BF_Nss 1,(M0)	0.924	0.34	3.788m	300
802.11ax HEW40-BF_Nss 1,(M0)	0.861	0.65	1.925m	1k

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Note	:
•	DC is Duty Cycle.
•	DCF is Duty Cycle Factor.

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter					
	\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	\boxtimes	Point-to-multipoint		Point-to-point		
Support RU		Full RU		Partial RU		
Test Software Version	vare Version DOS [ver 6.1.7601]					

Note: The above information was declared by manufacturer.

1.1.5 Table for Multiple Listing

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

Model Name	Description
RT-AX1800S V2	All the models are identical, the different model names served as
RT-AX3000S	strategy for marketing.

Note 1: From the above models, model: RT-AX1800S V2 was selected as representative model for the test and its data was recorded in this report.

1.1.6 Table for EUT Information

EUT	Equipped Antenna
EUT 1	Set 1
EUT 2	Set 2

Note 1: From the above, EUT 1 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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Note 2: The above information was declared by manufacturer.

1.1.7 Table for EUT Supports Function

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

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Note 1: The AP Router (Master) mode was tested and recorded in this test report.

Note 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	Eason Chen	21.4-23 / 65-70	Jan. 27, 2024~ Feb. 07, 2024
Radiated Below 1G	03CH03-CB	Stim Sung	22.7-23.8 / 56-59	
	03CH05-CB		21.9-22.4 / 55-58	
Radiated Above 1G	03CH01-CB		21.6-22.7 / 56-59	Jan. 20, 2024~ Feb. 26, 2024
Radiated co-location emission	03CH03-CB		22.7-23.8 / 56-59	
AC Conduction	CO01-CB	Peter Wu	22-23 / 58-59	Feb. 27, 2024

1.4 Measurement Uncertainty

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

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	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
802.11b_Nss1,(1Mbps)_2TX
2412MHz
2417MHz
2437MHz
2457MHz
2462MHz
802.11g_Nss1,(6Mbps)_2TX
2412MHz
2417MHz
2437MHz
2457MHz
2462MHz
802.11ax HEW20-BF_Nss1,(MCS0)_2TX
2412MHz
2417MHz
2437MHz
2457MHz
2462MHz
802.11ax HEW40-BF_Nss1,(MCS0)_2TX
2422MHz
2437MHz
2452MHz

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Note:

- HEW20 / HEW40 covers HT20 / HT40 / VHT20 / VHT40 due to similar modulation. The power setting for HT20 / HT40 / VHT20 / VHT40 is the same or lower than HEW20 / HEW40.
- The EUT supports non-beamforming and beamforming modes. After evaluating, the beamforming mode was 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 1 + Adapter 1 + RJ-45 cable 1		
2	EUT 1 + Adapter 2 + RJ-45 cable 1		
For operating mode 1 is the worst case and it was record in this test report.			

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The Worst Case Mode for Following Conformance Tests		
Tests Item DTS Bandwidth Maximum Conducted Output Power Power Spectral Density		
Test Condition	Conducted measurement at transmit chains	
Operating Mode		
1	EUT 1	

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 use regardless of spatial multiplexing MIMO configuration), the radiated to be performed with highest antenna gain of each antenna type.			
	CTX		
Operating Mode < 1GHz	After evaluating, EUT in Y axis was the worst case from radiated emission above 1GHz, so the measurement will follow this same test configuration.		
1	EUT 1 in Y axis + Adapter 1 + RJ-45 cable 1_WLAN 2.4GHz		
2	EUT 1 in Y axis + Adapter 2 + RJ-45 cable 1_WLAN 2.4GHz		
Mode 1 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 will follow this same test mode.			
3	EUT 1 in Y axis + Adapter 1 + RJ-45 cable 1_WLAN 5GHz		
Mode 3 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4 will follow this same test mode.			
4	EUT 1 in Y axis + Adapter 1 + RJ-45 cable 2_WLAN 5GHz		
For operating mode 3 is the worst case and it was record in this test report.			

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	СТХ
Operating Mode > 1GHz	After evaluating, EUT in Y axis was the worst case, so the measurement will follow this same test configuration.
1	EUT 1 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		
	Normal Link		
Operating Mode	After evaluating, EUT in Y axis was the worst case from radiated emission above 1GHz, so the measurement will follow this same test configuration.		
1	EUT 1 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.: FA382313 for Co-location RF Exposure Evaluation.		

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 Win7 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 [ver 6.1.7601].
- 3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by Client and transmit duty cycle no less than 98%.

For Normal Link Mode:

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	Frecom	F18L10-120150SPAU	Input: 100-240V~50/60Hz, 0.6A Output: 12.0V, 1.5A, 18.0W
Adapter 2	AMC	AD-0181200150US-1	Input: 100-240V~50/60Hz,0.6A Output: 12V, 1.5A
Others			

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RJ-45 cable 1*1: Black, Non-shielded, 1.5m

RJ-45 cable 2*1: Blue, Non-shielded, 1m

Support Equipment 2.5

For AC Conduction:

	Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID		
Α	WAN NB	DELL	E6430	N/A		
В	LAN1 NB	DELL	E6430	N/A		
С	LAN4 NB	DELL	E6430	N/A		
D	2.4G NB	DELL	E6430	N/A		
Е	5G NB	DELL	E6430	N/A		

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

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

For Radiated (above 1GHz) <Beamforming mode>:

Support Equipment					
No. Equipment Brand Name Model Name FCC ID					
Α	NB	DELL	E4300	N/A	
В	Client	ASUS	RT-AX57M	N/A	
С	NB	DELL	E4300	N/A	

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For RF Conducted:

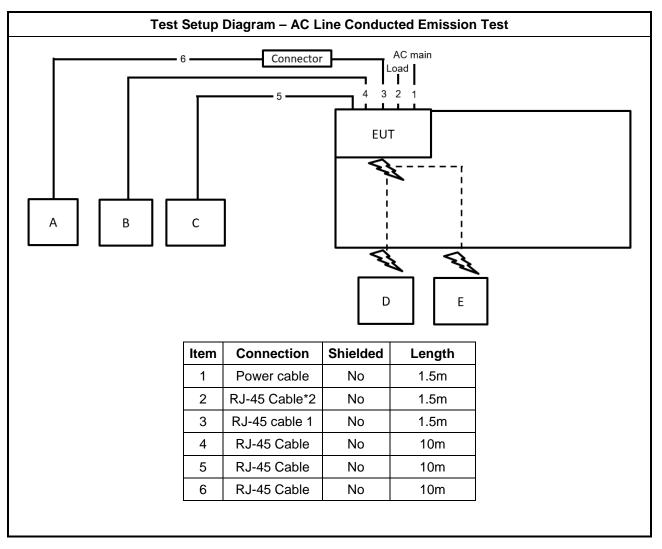
Support Equipment					
No. Equipment Brand Name Model Name FCC ID					
Α	Notebook	DELL	E4300	N/A	
В	Client	ASUS	RT-AX57M	N/A	

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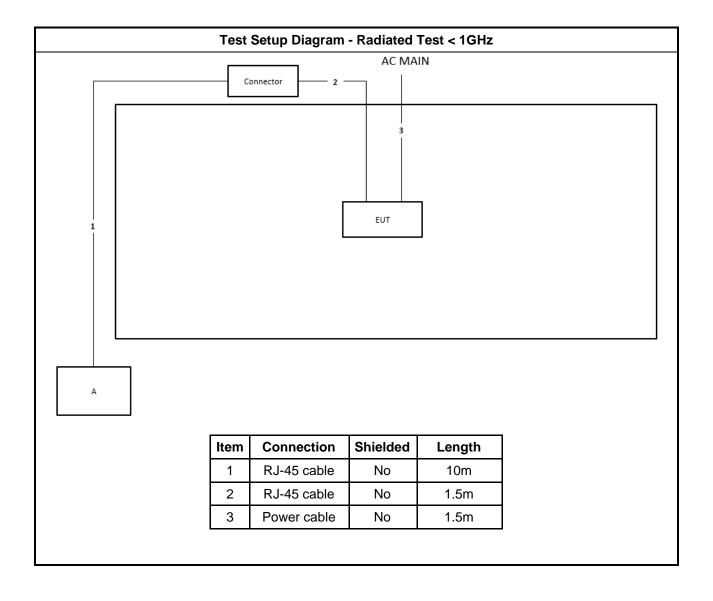


2.6 Test Setup Diagram



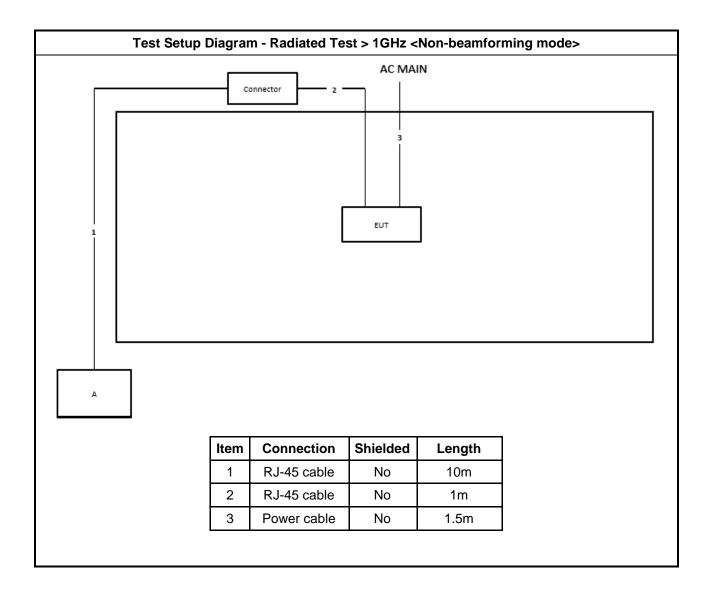
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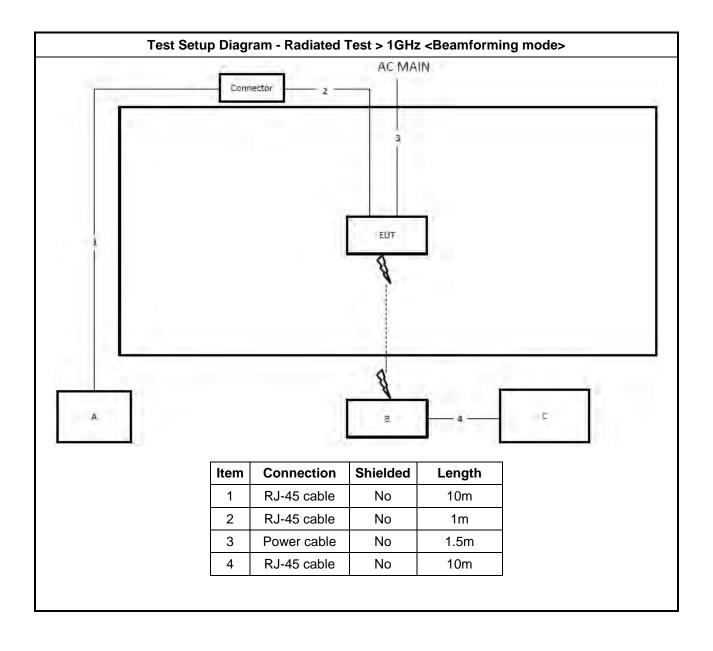


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3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

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

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3.1.2 Measuring Instruments

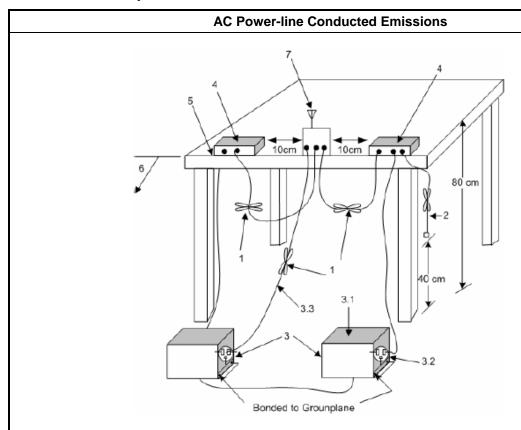
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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

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3.1.4 Test Setup



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

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- 2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 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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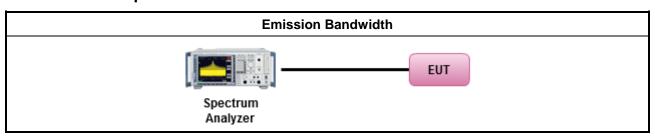
3.2.2 Measuring Instruments

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:					
		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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 P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, 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.

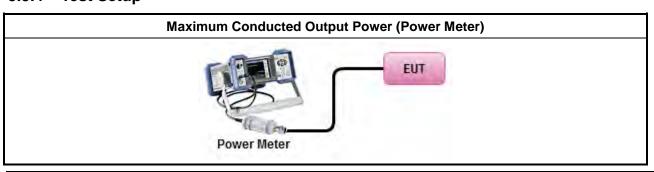
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3.3.3 Test Procedures

	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).				
		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

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Refer as Appendix C

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3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit

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

3.4.2 Measuring Instruments

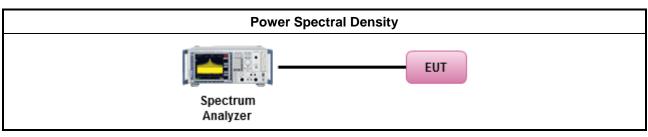
Refer a test equipment and calibration data table in this test report.

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

3.4.4 Test Setup



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3.4.5 Test Result of Power Spectral Density

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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.

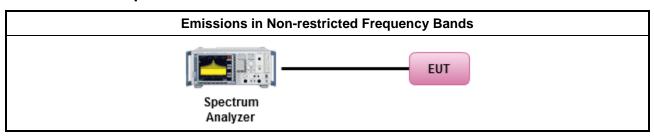
3.5.2 Measuring Instruments

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

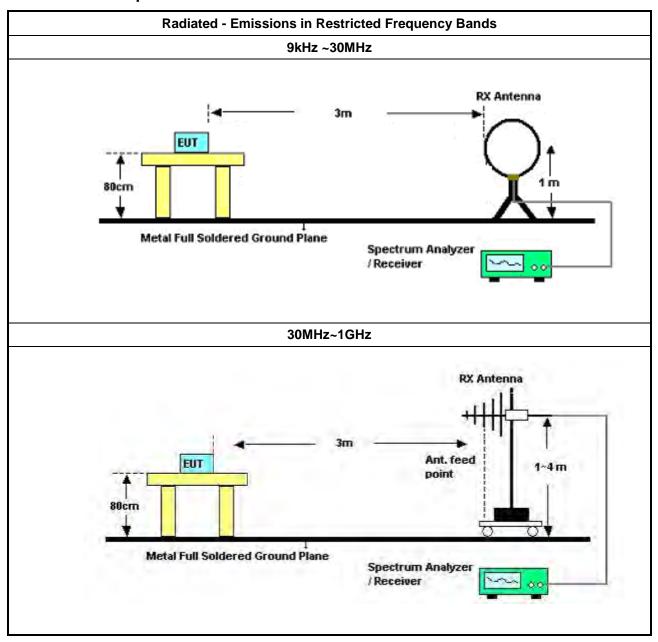
		Test Method									
•	The	average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].									
•	Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.										
•	For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



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Above 1GHz

SM & 1M

Amax 30cm

A

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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.

Spectrum Analyzer

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

					Calibration	Calibration	
Instrument	Brand	Model No.	Serial No.	Characteristics	Date	Due Date	Remark
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	May 18, 2023	May 17, 2024	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50 -16-2	04083	150kHz ~ 100MHz	Feb. 19, 2024	Feb. 18, 2025	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Apr. 27, 2023	Apr. 26, 2024	Conduction (CO01-CB)
Pulse Limiter	Rohde& Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 08, 2024	Feb. 07, 2025	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	Oct. 17, 2023	Oct. 16, 2024	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-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. 18, 2024	Jan. 17, 2025	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 6dB Attenator	Schaffner & EMCI	CBL6112B& N-6-06	2888&AT-N0605	30MHz ~ 1GHz	Jan. 18, 2024	Jan. 17, 2025	Radiation (03CH03-CB)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1370	1GHz~18GHz	Jun. 30, 2023	Jun. 29, 2024	Radiation (03CH03-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8447D	2944A10259	9kHz ~ 1.3GHz	Jan. 08, 2024	Jan. 07, 2025	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Jun. 30, 2023	Jun. 29, 2024	Radiation (03CH03-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 24, 2023	Nov. 23, 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)
RF Cable-high	Woken	RG402	High Cable-29	1GHz ~ 18GHz	Nov. 07, 2023	Nov. 06, 2024	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH03-CB)

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Instrument Brand Mode		Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)
Loop Antenna	Teseq	HLA 6121	65417	9kHz - 30 MHz	Oct. 13, 2023	Oct. 12, 2024	Radiation (03CH05-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 02, 2023	Aug. 01, 2024	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 24, 2023	Mar. 23, 2024	Radiation (03CH05-CB)
Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 03, 2023	May 02, 2024	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Apr. 18, 2023	Apr. 17, 2024	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 13, 2023	Jun. 12, 2024	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Dec. 06, 2023	Dec. 05, 2024	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH01-CB	1GHz ~18GHz 3m	May 05, 2023	May 04, 2024	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120D-01816	1GHz~18GHz	Dec. 20, 2023	Dec. 19, 2024	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02121	1GHz ~ 26.5GHz	May 18, 2023	May 17, 2024	Radiation (03CH01-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 24, 2023	Nov. 23, 2024	Radiation (03CH01-CB)
Signal Analyzer	R&S	FSV3044	101437	10kHz ~ 44GHz	Nov. 28, 2023	Nov. 27, 2024	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16	1 GHz ~ 18 GHz	Nov. 06, 2023	Nov. 05, 2024	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16+17	1 GHz ~ 18 GHz	Nov. 06, 2023	Nov. 05, 2024	Radiation (03CH01-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 29, 2023	May 28, 2024	Conducted (TH01-CB)
Switch	SPTCB	SP-SWI	SWI-01	1~26.5 GHz	Oct. 03, 2023	Oct. 02, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-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-08	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-30	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	1339408	300MHz~40GHz	Sep. 12, 2023	Sep. 11, 2024	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1517009	300MHz~40GHz	Sep. 12, 2023	Sep. 11, 2024	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)

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

NCR means Non-Calibration required.

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Conducted Emissions at Powerline

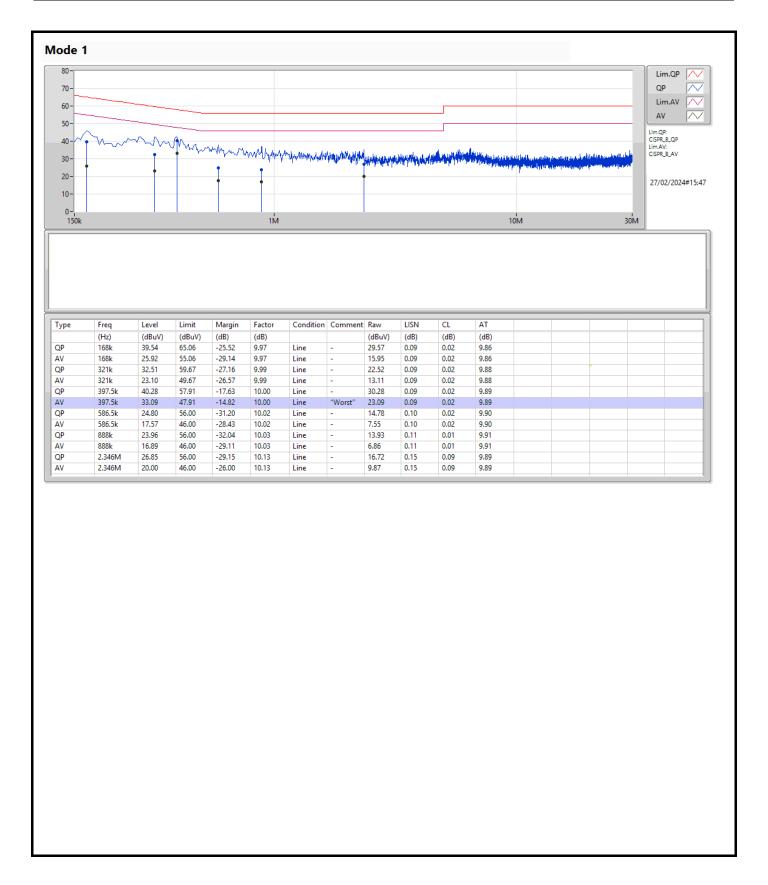
Appendix A

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	415.5k	40.23	47.53	-7.30	Neutral

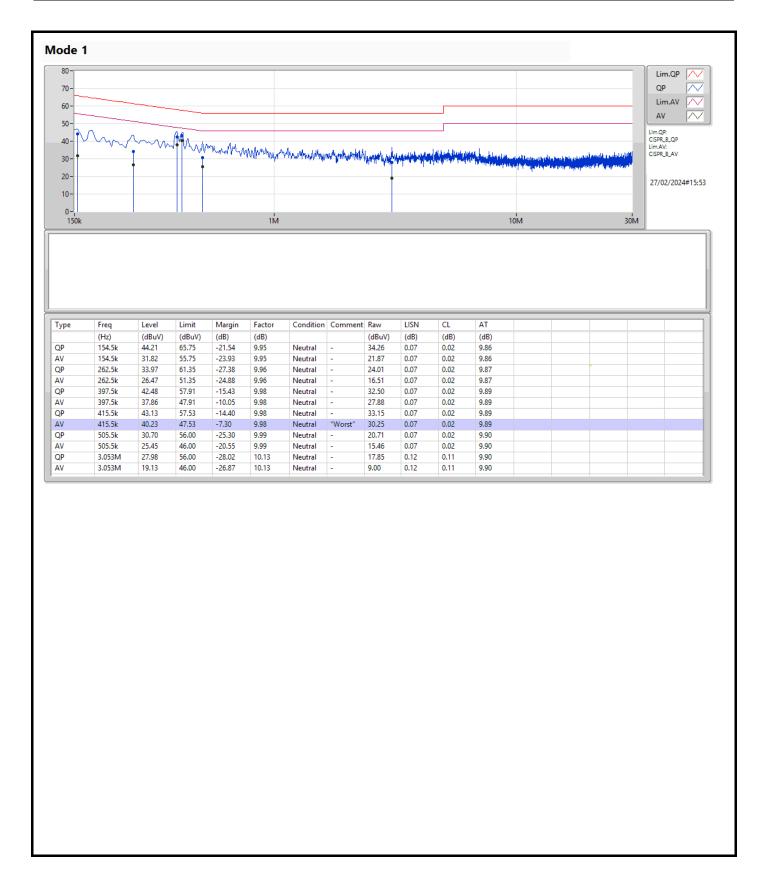
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Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
2.4-2.4835GHz	-	-	-	-	-
802.11b_Nss1,(1Mbps)_2TX	7.925M	13.018M	13M0G1D	6.8M	12.493M
802.11g_Nss1,(6Mbps)_2TX	16.35M	21.878M	21M9D1D	15.45M	16.34M
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	18.875M	19.054M	19M1D1D	13.4M	18.773M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	37.7M	37.764M	37M8D1D	32.8M	37.488M

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

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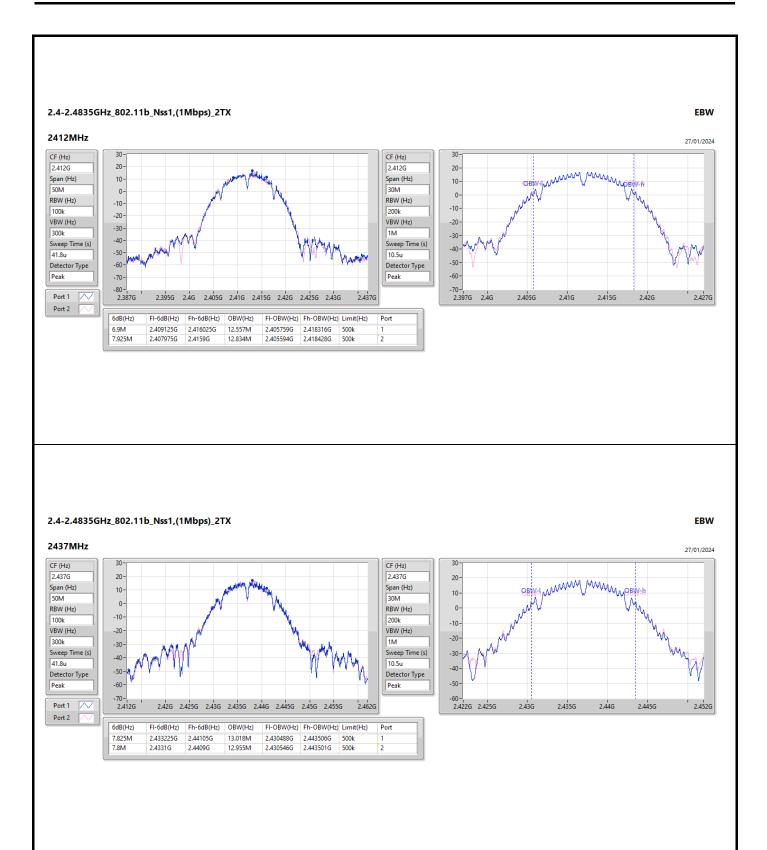
Result

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	6.9M	12.557M	7.925M	12.834M
2437MHz	Pass	500k	7.825M	13.018M	7.8M	12.955M
2462MHz	Pass	500k	7.55M	12.61M	6.8M	12.493M
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	16.3M	16.578M	15.45M	16.474M
2437MHz	Pass	500k	16.35M	19.654M	16.325M	21.878M
2462MHz	Pass	500k	16.325M	16.566M	16.275M	16.34M
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	18.35M	18.839M	18.875M	18.885M
2437MHz	Pass	500k	13.4M	18.928M	18.875M	19.054M
2462MHz	Pass	500k	17.75M	18.773M	15.575M	18.924M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	37.65M	37.764M	37.7M	37.605M
2437MHz	Pass	500k	33.55M	37.488M	32.8M	37.65M
2452MHz	Pass	500k	36.9M	37.635M	37.65M	37.606M

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

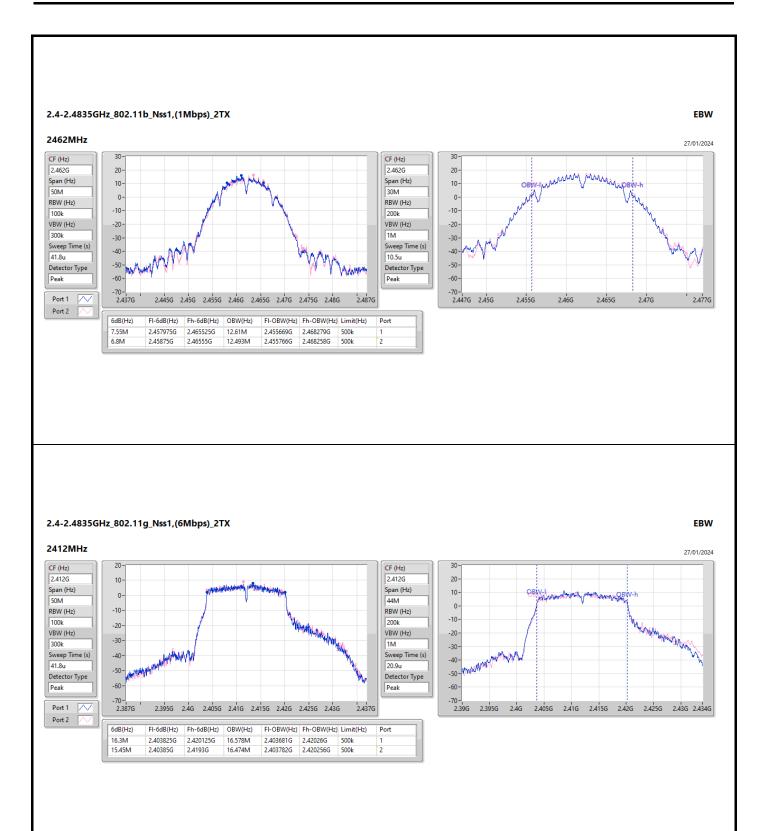
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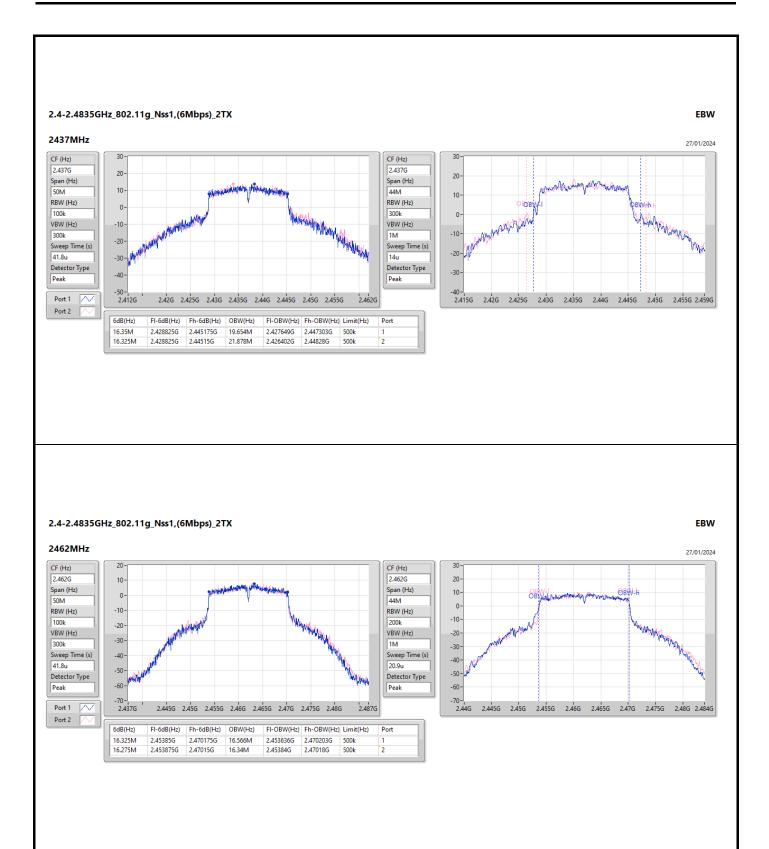
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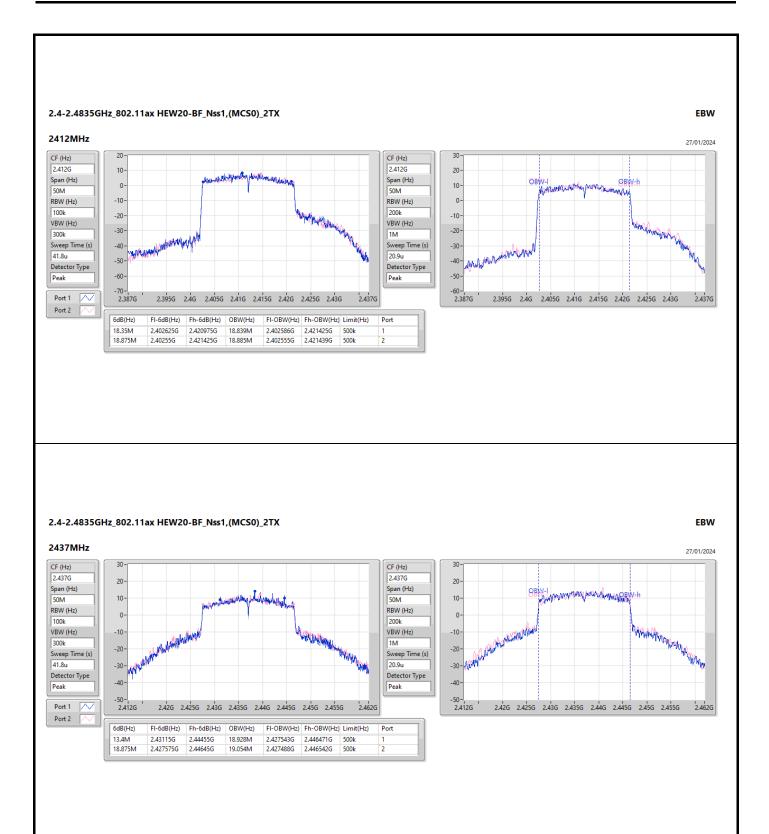
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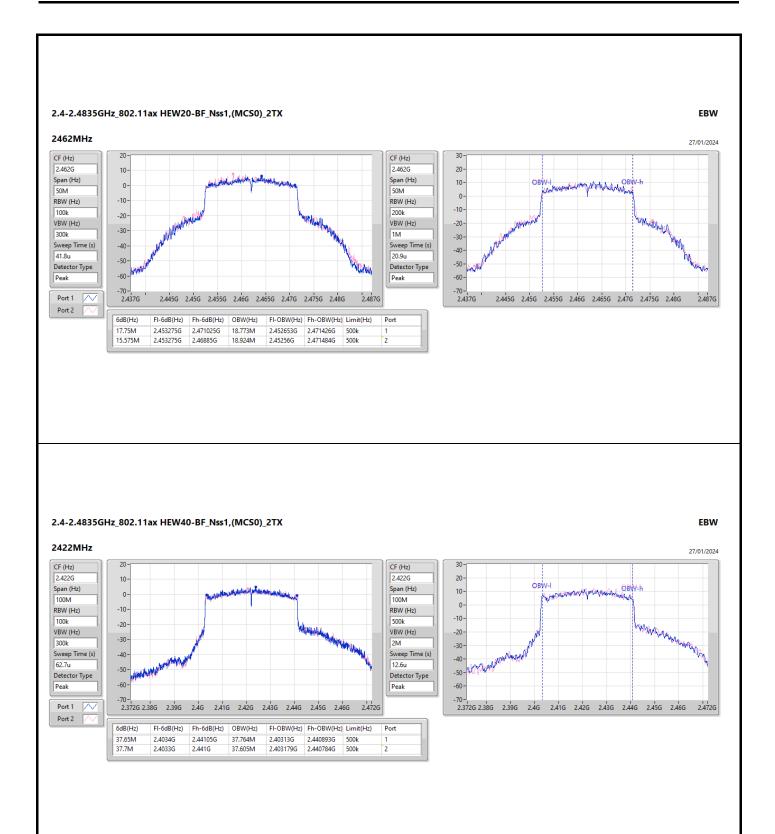
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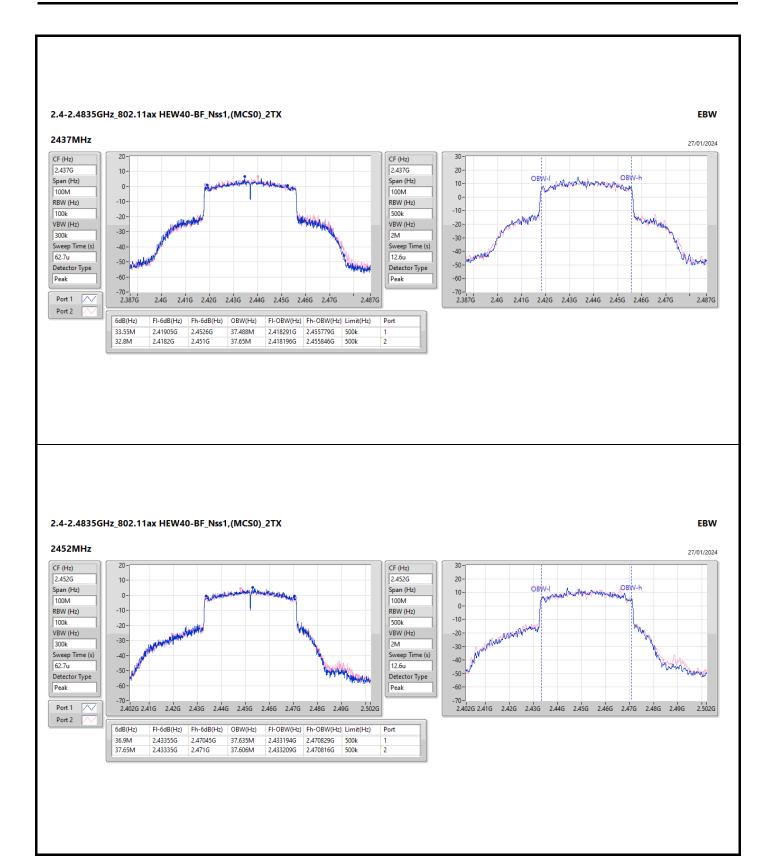
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Average Power Appendix C

Summary

Mode	Total Power	Total Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	29.68	0.92897
802.11g_Nss1,(6Mbps)_2TX	29.98	0.99541
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	28.50	0.70795
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	24.93	0.31117

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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	2.57	25.21	25.10	28.17	30.00
2417MHz	Pass	2.57	26.35	26.28	29.33	30.00
2437MHz	Pass	2.57	26.63	26.71	29.68	30.00
2457MHz	Pass	2.57	26.42	26.56	29.50	30.00
2462MHz	Pass	2.57	25.49	25.51	28.51	30.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	2.57	21.41	21.42	24.43	30.00
2417MHz	Pass	2.57	23.55	23.57	26.57	30.00
2437MHz	Pass	2.57	26.90	27.03	29.98	30.00
2457MHz	Pass	2.57	23.36	23.56	26.47	30.00
2462MHz	Pass	2.57	21.21	21.26	24.25	30.00
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.57	22.30	22.13	25.23	30.00
2417MHz	Pass	5.57	23.27	23.27	26.28	30.00
2437MHz	Pass	5.57	25.43	25.55	28.50	30.00
2457MHz	Pass	5.57	22.87	23.06	25.98	30.00
2462MHz	Pass	5.57	20.24	20.33	23.30	30.00
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	5.57	21.06	21.05	24.07	30.00
2437MHz	Pass	5.57	21.90	21.94	24.93	30.00
2452MHz	Pass	5.57	21.26	21.22	24.25	30.00

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

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Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_2TX	4.85
802.11g_Nss1,(6Mbps)_2TX	3.37
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	0.79
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-5.09

RBW = 3kHz;

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Appendix D **PSD**

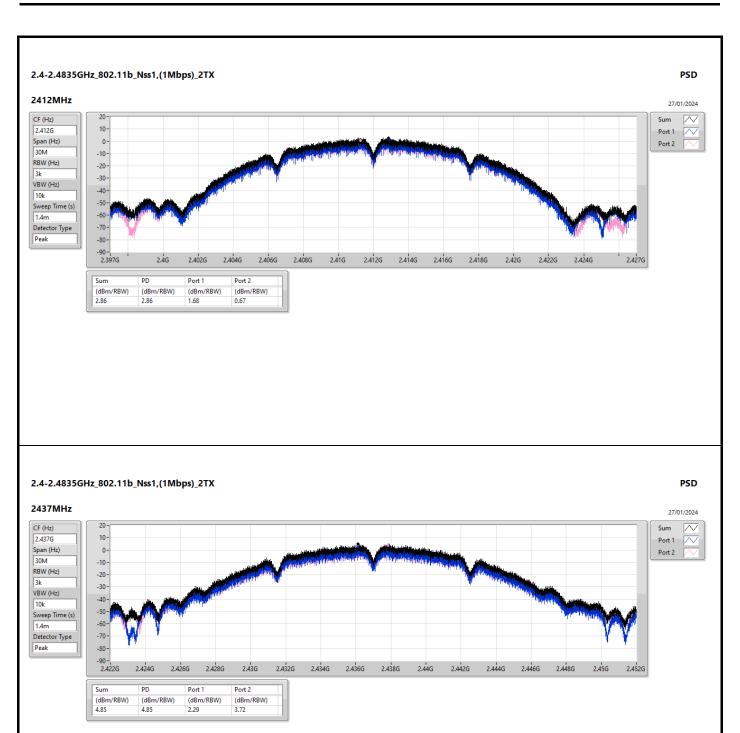
Result

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	5.57	1.68	0.67	2.86	8.00
2437MHz	Pass	5.57	2.29	3.72	4.85	8.00
2462MHz	Pass	5.57	1.37	1.87	3.40	8.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.57	-4.36	-3.91	-2.03	8.00
2437MHz	Pass	5.57	1.68	2.24	3.37	8.00
2462MHz	Pass	5.57	-4.49	-3.66	-1.61	8.00
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.57	-3.81	-4.26	-3.02	8.00
2437MHz	Pass	5.57	-1.40	-1.93	0.79	8.00
2462MHz	Pass	5.57	-5.81	-6.63	-4.77	8.00
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	5.57	-8.95	-8.13	-6.74	8.00
2437MHz	Pass	5.57	-7.93	-7.62	-5.09	8.00
2452MHz	Pass	5.57	-8.69	-8.24	-6.72	8.00

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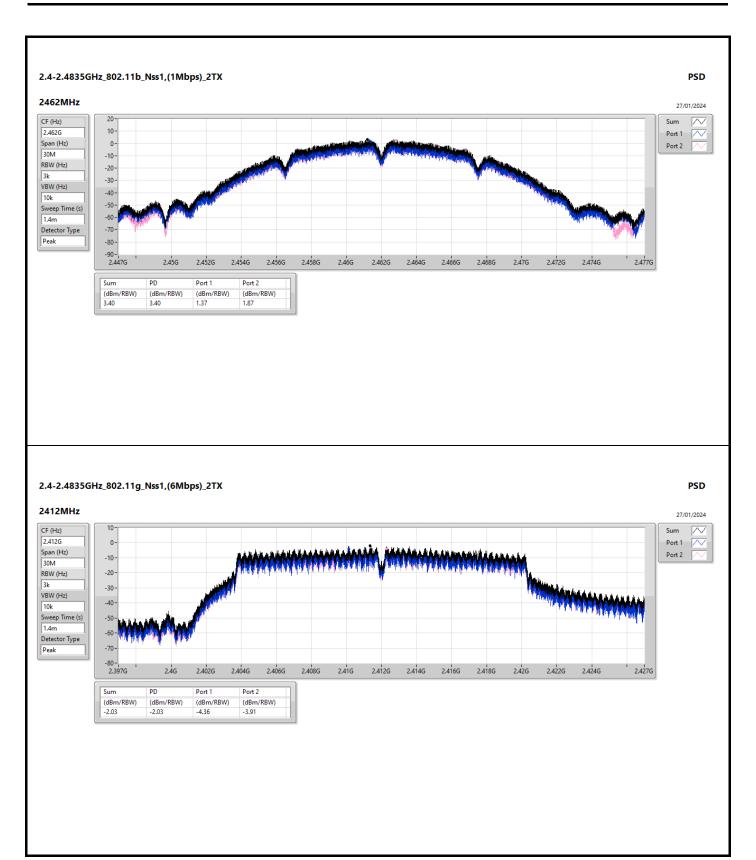
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DG = Directional Gain; RBW = 3kHz; PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;



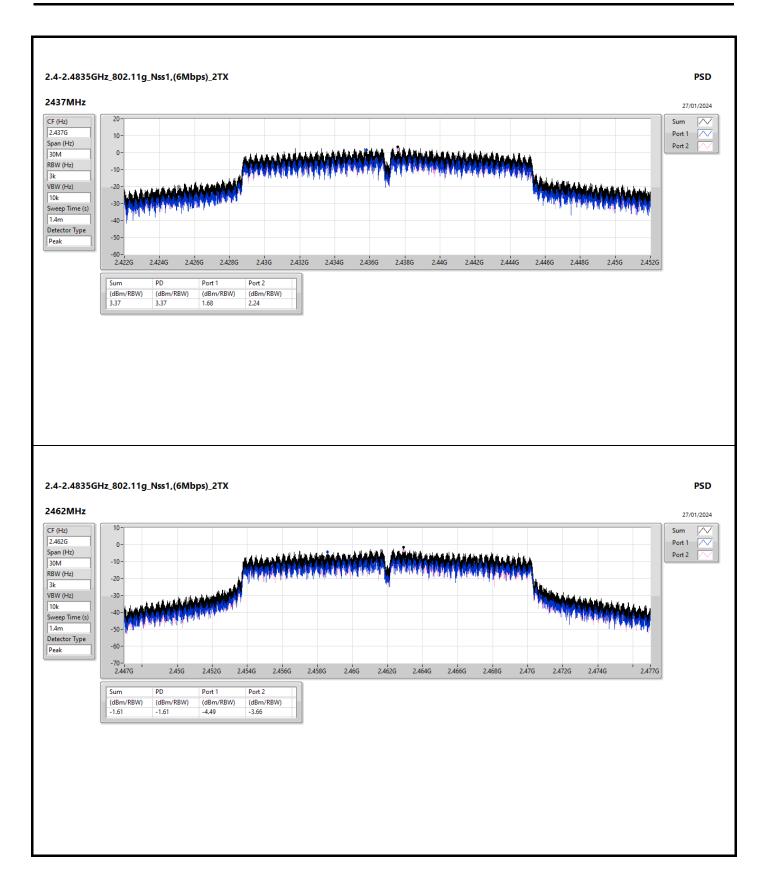
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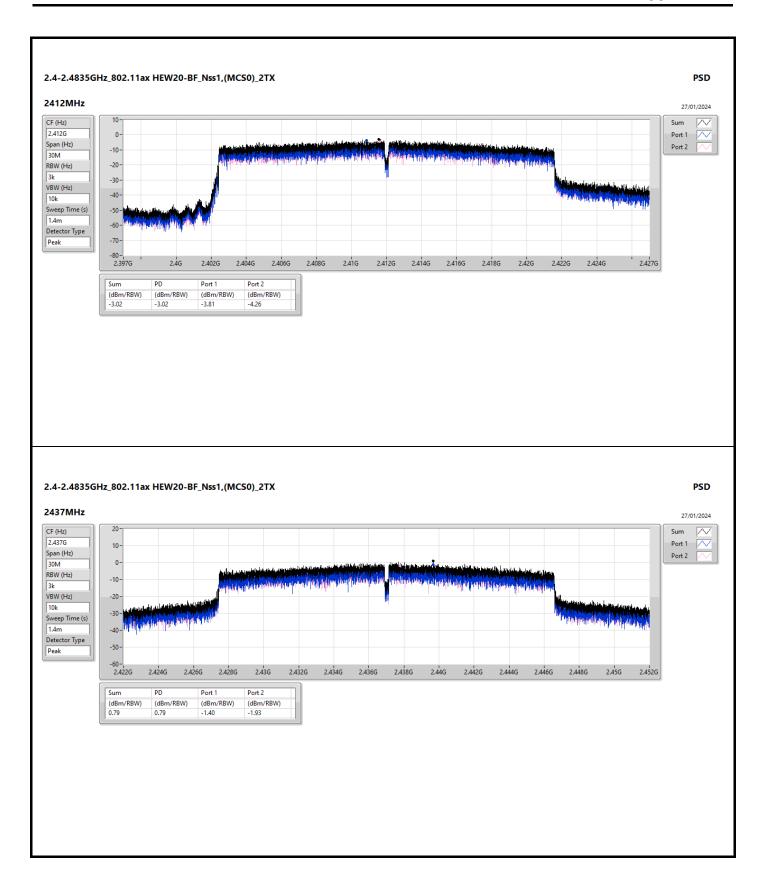
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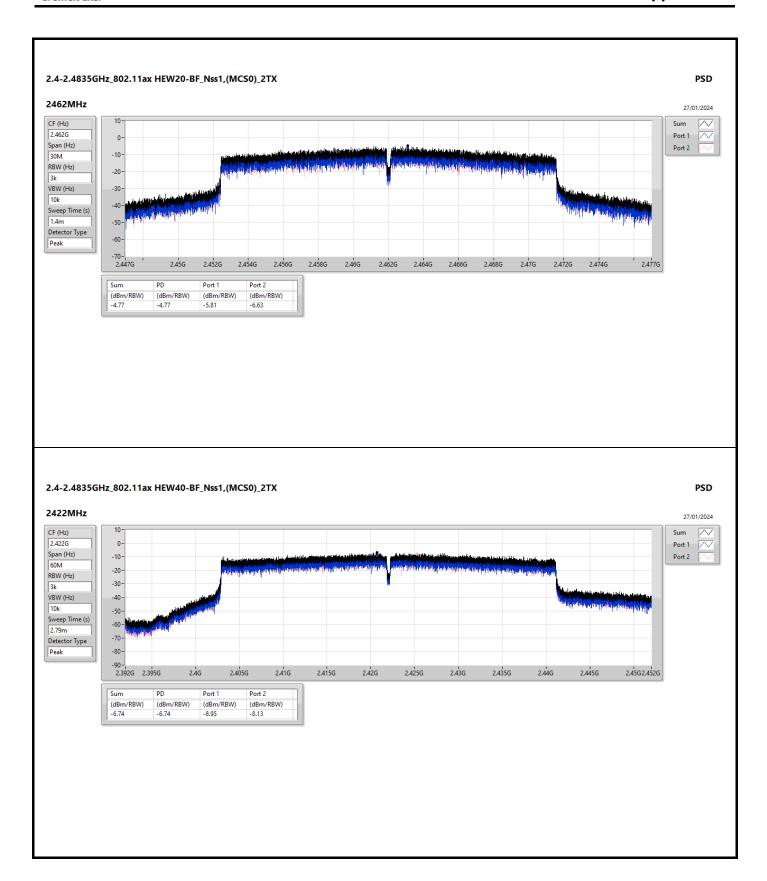
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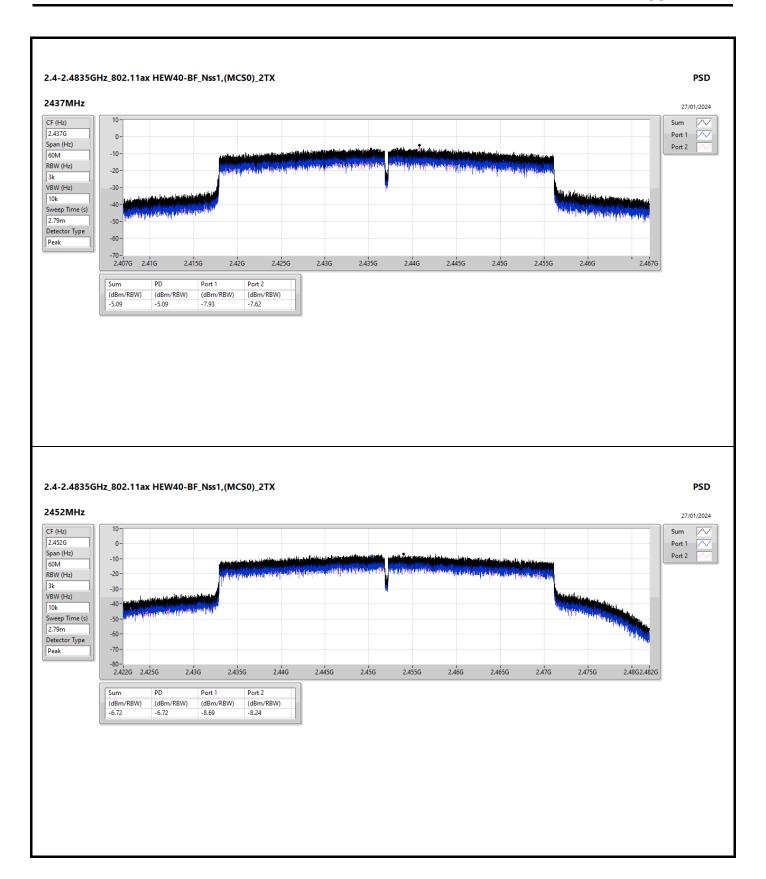
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CSE (NdB Down) Appendix E

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	2.43758G	17.95	-12.05	2.30758G	-52.14	2.39904G	-31.87	2.4G	-36.11	2.51558G	-51.47	7.23795G	-30.52	1
802.11g_Nss1,(6Mbps)_2TX	Pass	2.43824G	16.79	-13.21	196.6M	-53.56	2.39984G	-33.96	2.4G	-36.28	2.51774G	-51.74	7.22952G	-36.02	1
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	Pass	2.43824G	15.36	-14.64	2.18758G	-53.20	2.39672G	-31.19	2.4G	-35.06	2.50966G	-51.88	7.23233G	-37.87	2
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	Pass	2.44075G	8.93	-21.07	2.19405G	-53.17	2.39952G	-28.03	2.4G	-27.51	2.50174G	-51.47	7.24712G	-43.10	2

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CSE (NdB Down) Appendix E

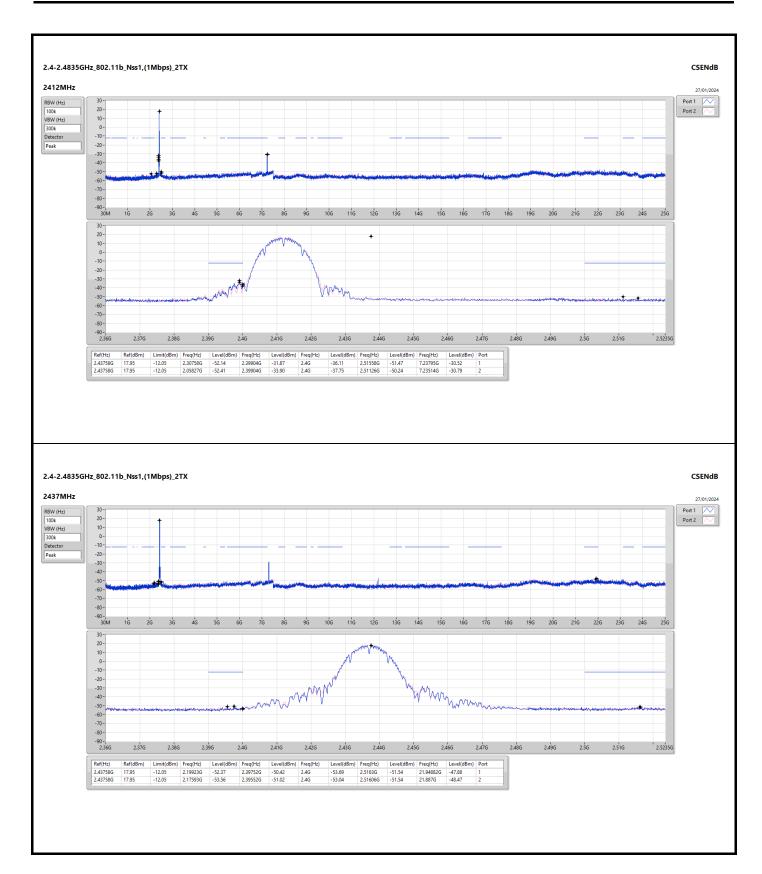
Result

Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
802.11b_Nss1,(1Mbps)_2TX	-			-					-	-	-		-		
2412MHz	Pass	2.43758G	17.95	-12.05	2.30758G	-52.14	2.39904G	-31.87	2.4G	-36.11	2.51558G	-51.47	7.23795G	-30.52	1
2412MHz	Pass	2.43758G	17.95	-12.05	2.05827G	-52.41	2.39904G	-33.90	2.4G	-37.75	2.51126G	-50.24	7.23514G	-30.79	2
2437MHz	Pass	2.43758G	17.95	-12.05	2.19923G	-52.37	2.39752G	-50.42	2.4G	-53.69	2.5163G	-51.54	21.94882G	-47.88	1
2437MHz	Pass	2.43758G	17.95	-12.05	2.17593G	-53.56	2.39552G	-51.02	2.4G	-53.04	2.51606G	-51.54	21.887G	-48.47	2
2462MHz	Pass	2.43758G	17.95	-12.05	2.12467G	-53.07	2.39472G	-53.16	2.4G	-53.70	2.50918G	-52.11	21.68753G	-48.01	1
2462MHz	Pass	2.43758G	17.95	-12.05	2.30292G	-51.85	2.39416G	-52.92	2.4G	-54.28	2.50902G	-51.41	21.99939G	-48.44	2
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43824G	16.79	-13.21	196.6M	-53.56	2.39984G	-33.96	2.4G	-36.28	2.51774G	-51.74	7.22952G	-36.02	1
2412MHz	Pass	2.43824G	16.79	-13.21	1.95691G	-53.23	2.39992G	-35.04	2.4G	-36.74	2.50614G	-51.57	7.23233G	-37.53	2
2437MHz	Pass	2.43824G	16.79	-13.21	2.08972G	-52.07	2.39944G	-34.69	2.4G	-34.42	2.50262G	-46.23	6.94294G	-47.40	1
2437MHz	Pass	2.43824G	16.79	-13.21	2.08972G	-52.93	2.39992G	-35.01	2.4G	-35.75	2.50262G	-45.00	21.49929G	-48.55	2
2462MHz	Pass	2.43824G	16.79	-13.21	2.12351G	-53.26	2.39456G	-52.96	2.4G	-54.11	2.50198G	-51.16	21.90386G	-48.73	1
2462MHz	Pass	2.43824G	16.79	-13.21	2.18875G	-52.04	2.39992G	-52.66	2.4G	-53.92	2.50438G	-51.95	21.96005G	-48.69	2
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43824G	15.36	-14.64	2.17127G	-53.31	2.39696G	-33.10	2.4G	-36.11	2.5071G	-51.41	7.23514G	-38.12	1
2412MHz	Pass	2.43824G	15.36	-14.64	2.18758G	-53.20	2.39672G	-31.19	2.4G	-35.06	2.50966G	-51.88	7.23233G	-37.87	2
2437MHz	Pass	2.43824G	15.36	-14.64	2.11302G	-53.06	2.39984G	-38.47	2.4G	-40.72	2.51582G	-49.90	21.57233G	-47.78	1
2437MHz	Pass	2.43824G	15.36	-14.64	1.95575G	-53.34	2.4G	-39.51	2.4G	-38.02	2.50022G	-50.55	21.76619G	-48.75	2
2462MHz	Pass	2.43824G	15.36	-14.64	2.14331G	-52.14	2.39912G	-52.45	2.4G	-54.78	2.52206G	-51.57	21.58638G	-48.46	1
2462MHz	Pass	2.43824G	15.36	-14.64	1.74022G	-53.12	2.39688G	-53.30	2.4G	-55.53	2.50134G	-50.89	21.52738G	-48.36	2
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.44075G	8.93	-21.07	2.06238G	-53.01	2.4G	-28.59	2.4G	-27.70	2.52942G	-50.32	7.24992G	-42.11	1
2422MHz	Pass	2.44075G	8.93	-21.07	2.19405G	-53.17	2.39952G	-28.03	2.4G	-27.51	2.50174G	-51.47	7.24712G	-43.10	2
2437MHz	Pass	2.44075G	8.93	-21.07	43.74M	-53.64	2.4G	-34.85	2.4G	-34.54	2.5019G	-51.63	21.99912G	-47.87	1
2437MHz	Pass	2.44075G	8.93	-21.07	2.01429G	-53.07	2.39984G	-35.10	2.4G	-35.44	2.50094G	-51.01	21.61209G	-49.01	2
2452MHz	Pass	2.44075G	8.93	-21.07	1.76697G	-53.69	2.39584G	-51.18	2.4G	-50.71	2.50446G	-51.07	21.63172G	-48.58	1
2452MHz	Pass	2.44075G	8.93	-21.07	1.93986G	-53.55	2.39744G	-51.40	2.4G	-51.80	2.51214G	-50.41	21.65135G	-49.02	2

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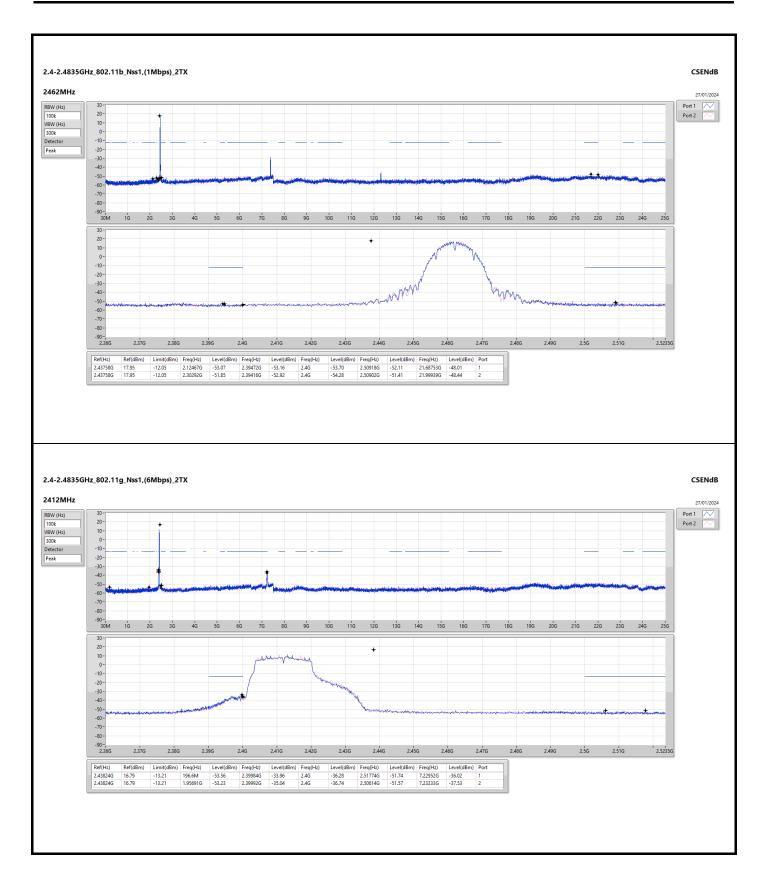
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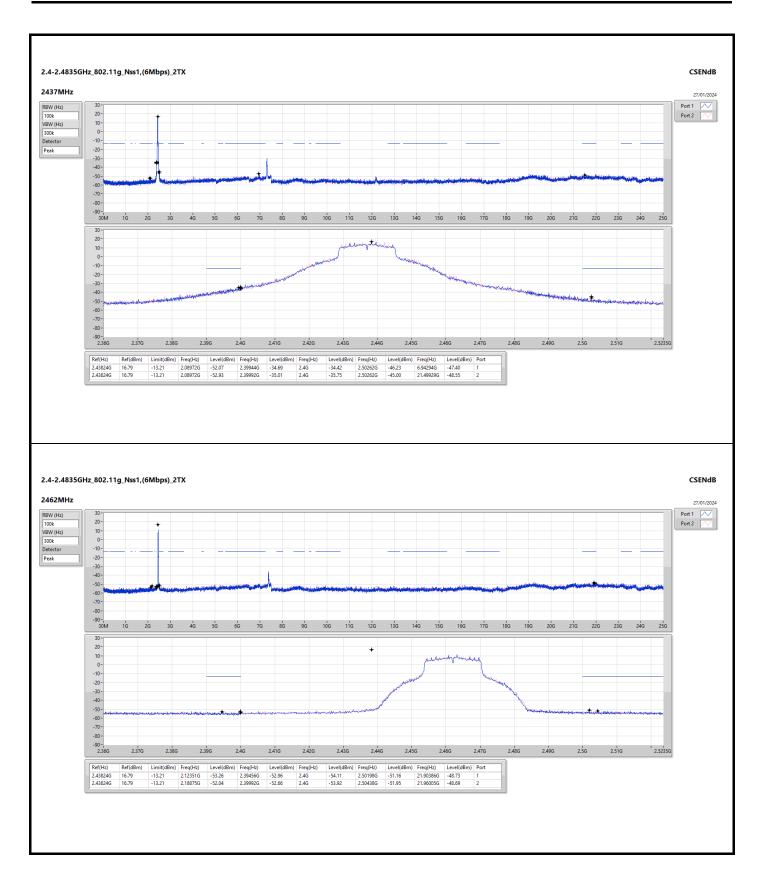
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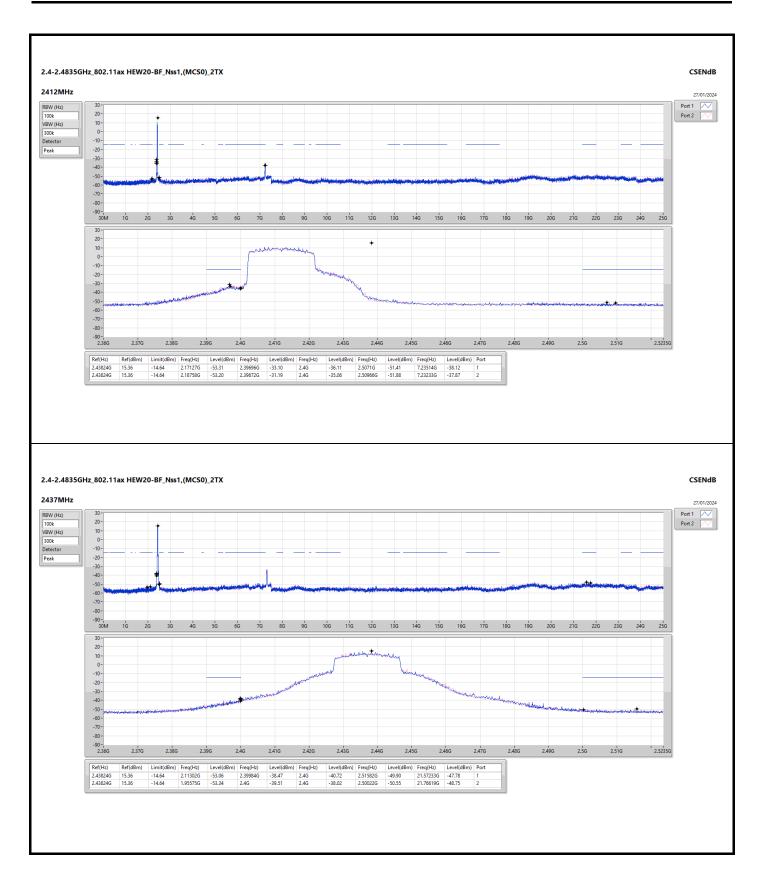
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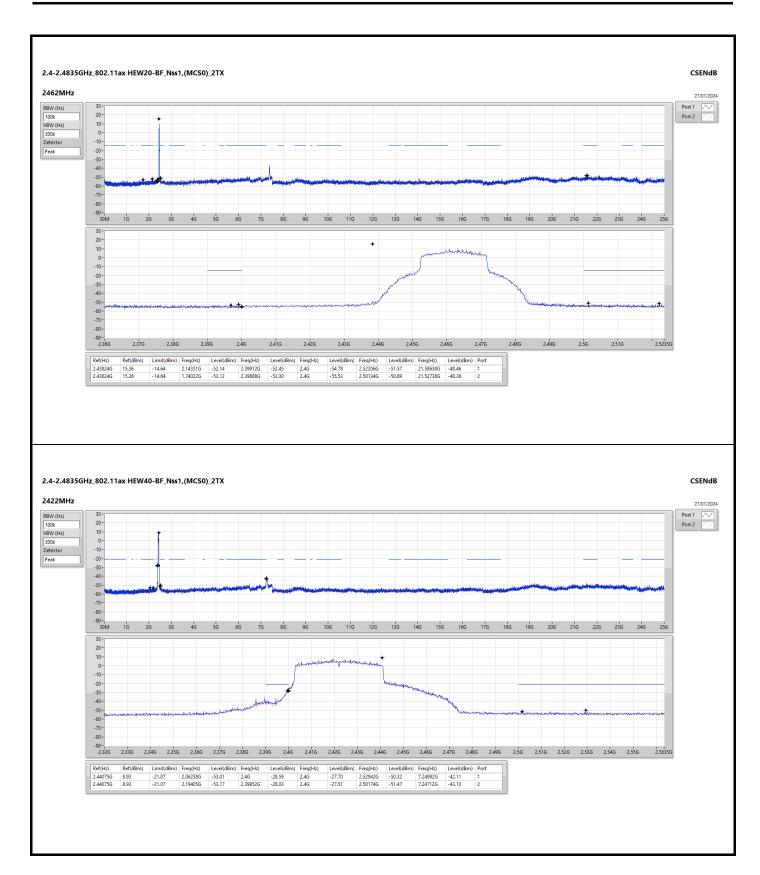
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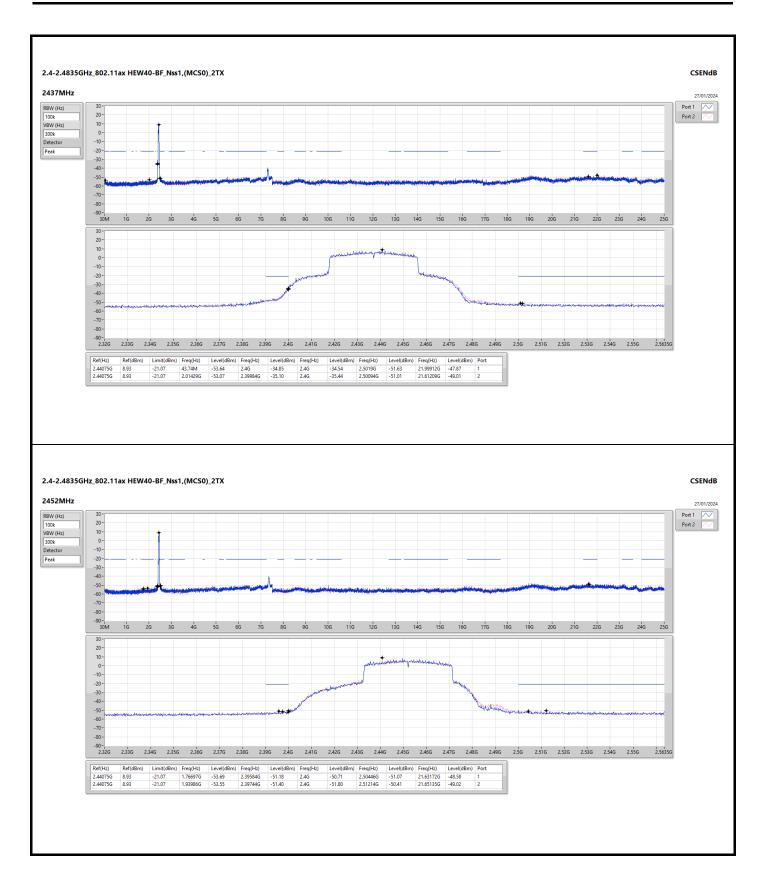
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Radiated Emissions below 1GHz

Appendix F.1

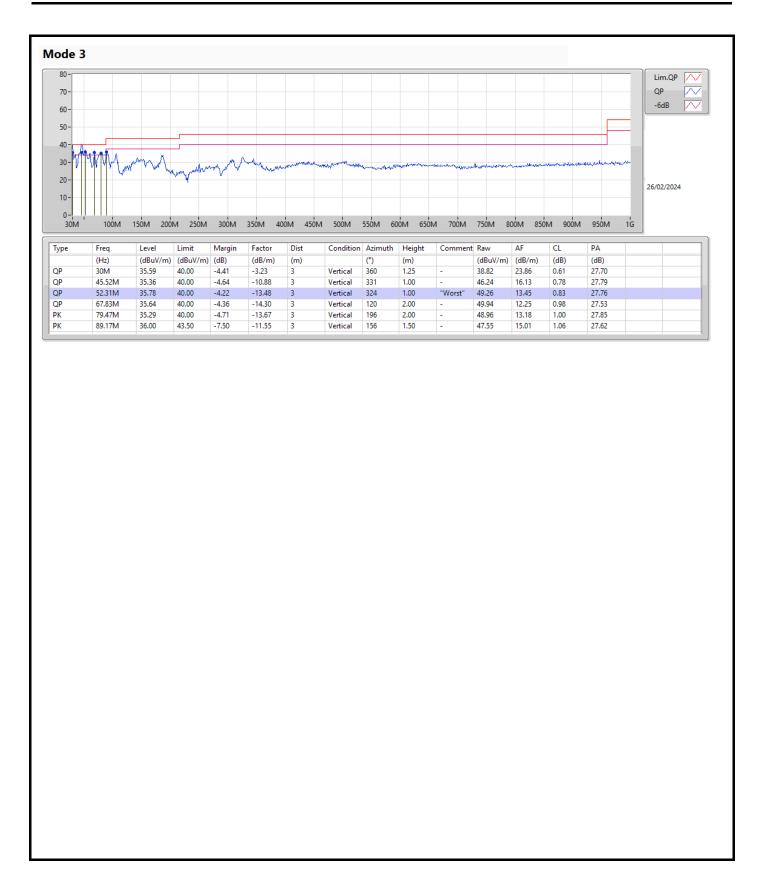
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 3	Pass	QP	52.31M	35.78	40.00	-4.22	Vertical

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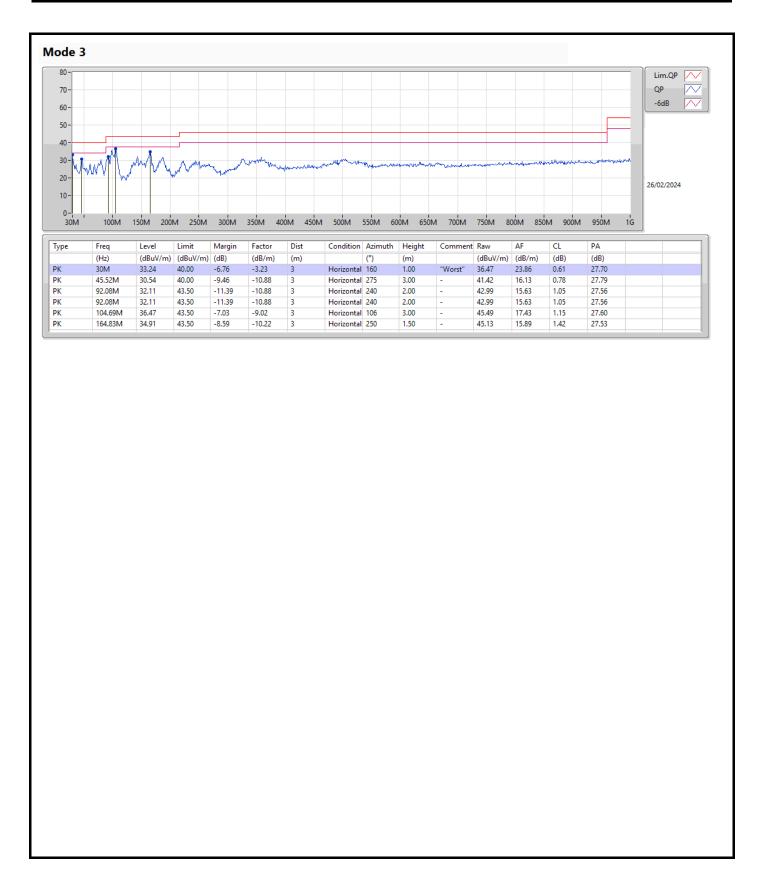
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RSE TX above 1GHz

Appendix F.2

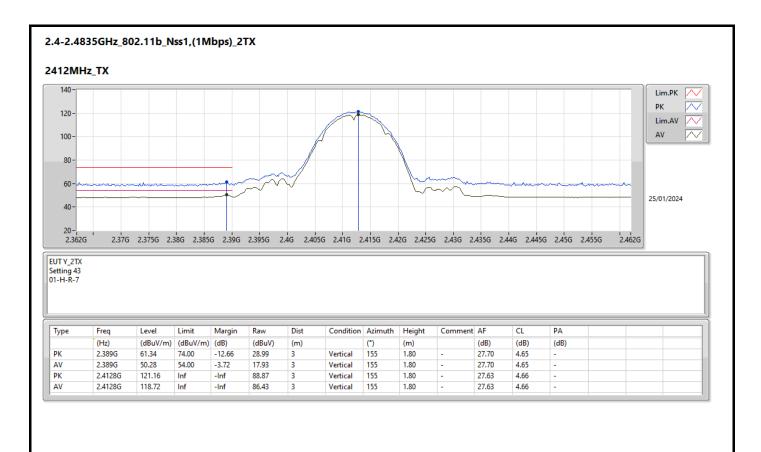
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	Pass	AV	2.484G	52.93	54.00	-1.07	3	Vertical	219	2.95	-

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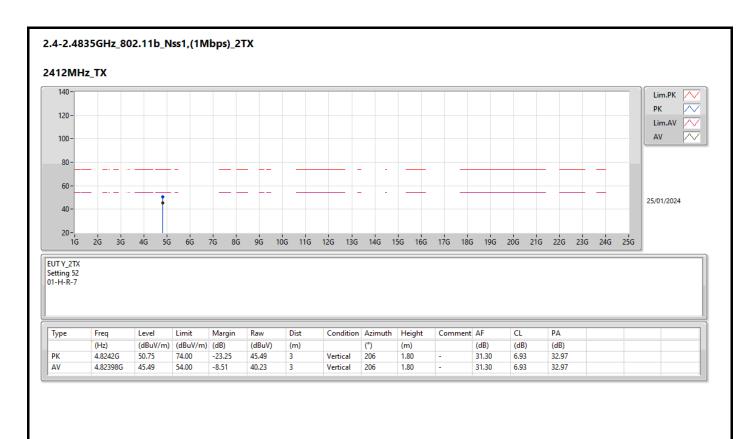
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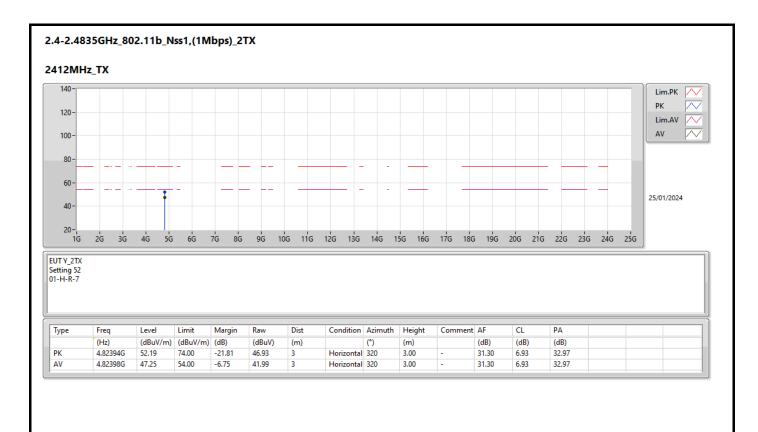
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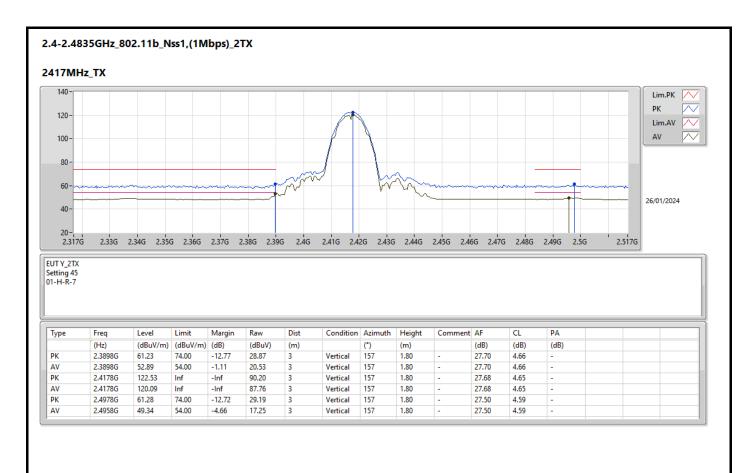


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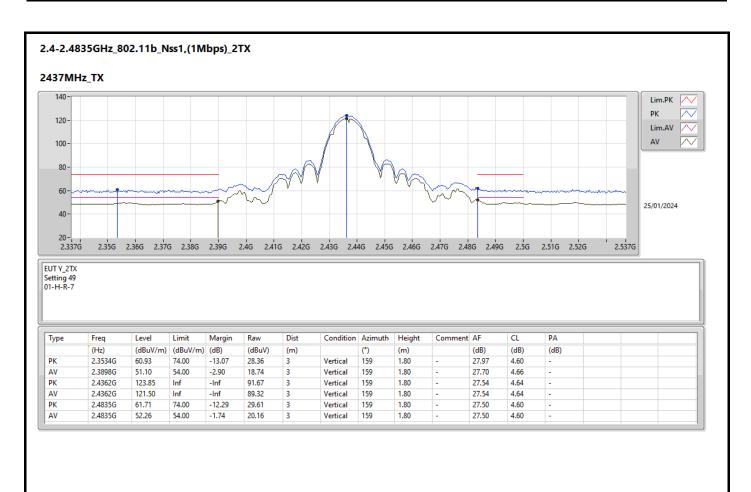
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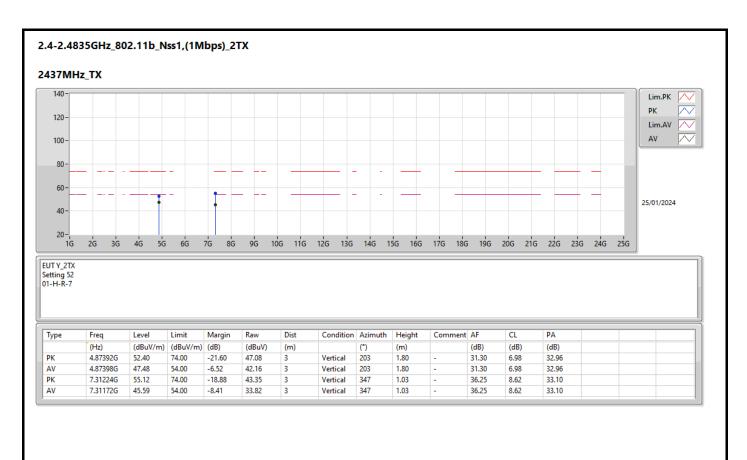
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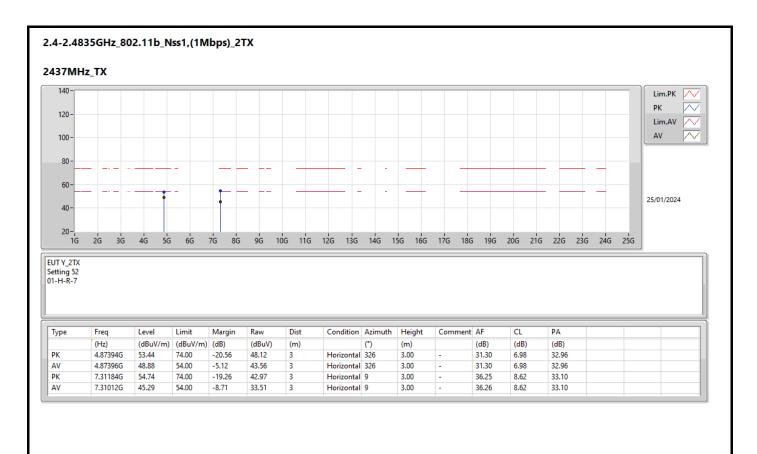




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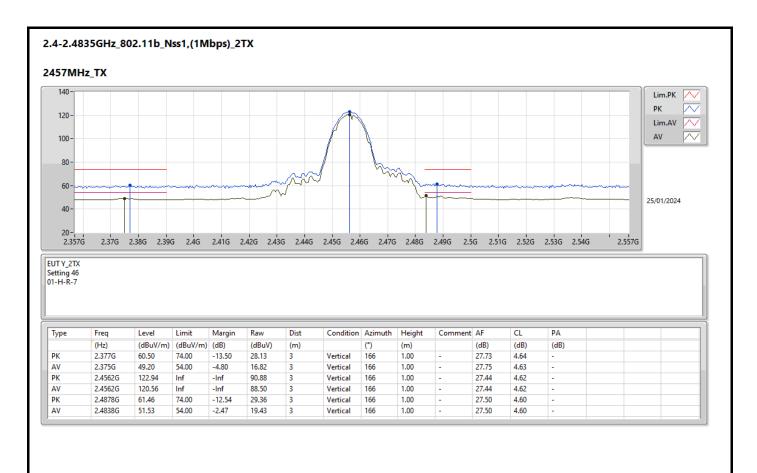


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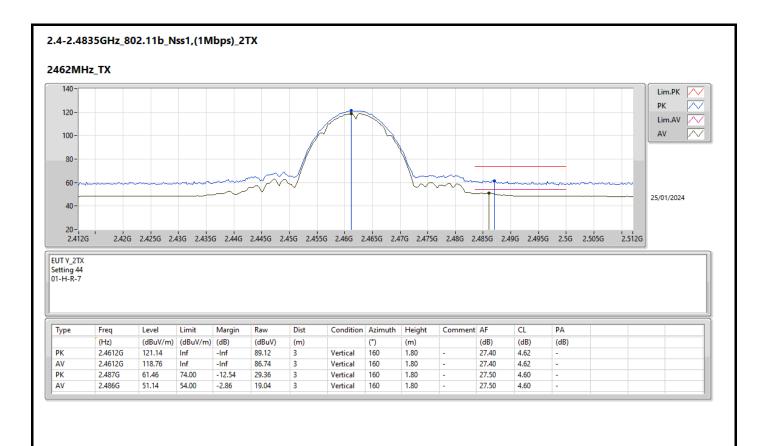




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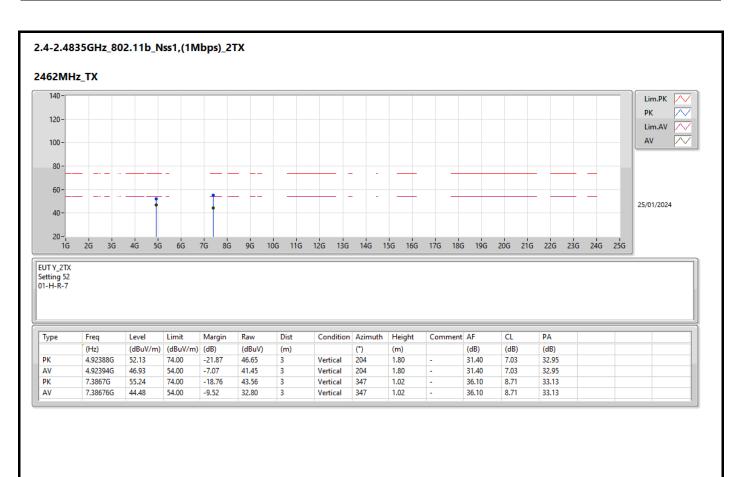




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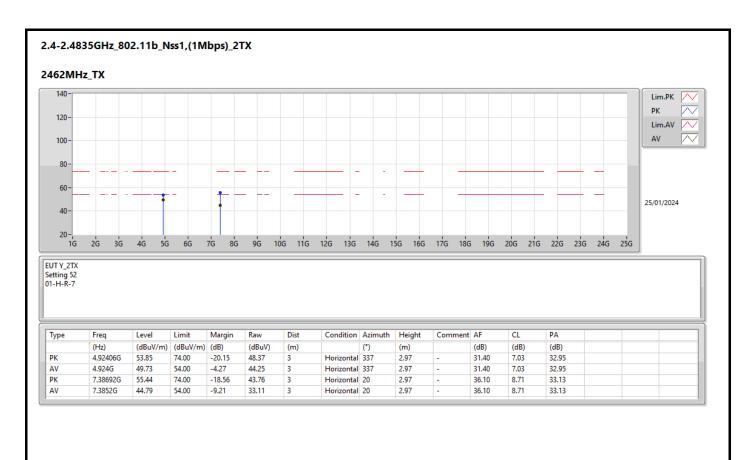


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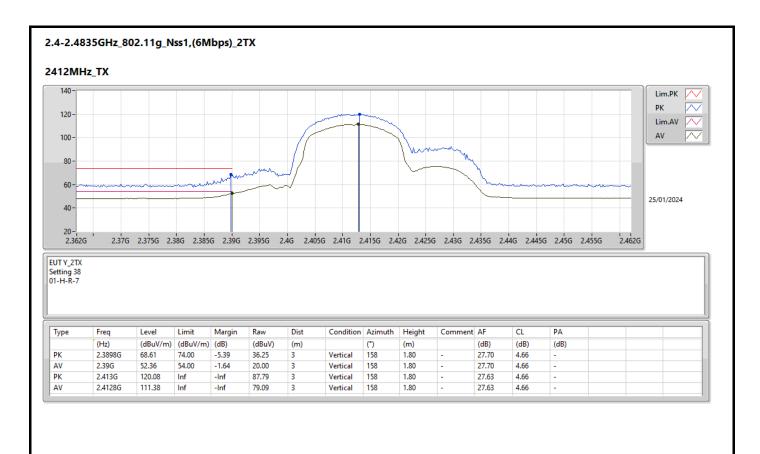
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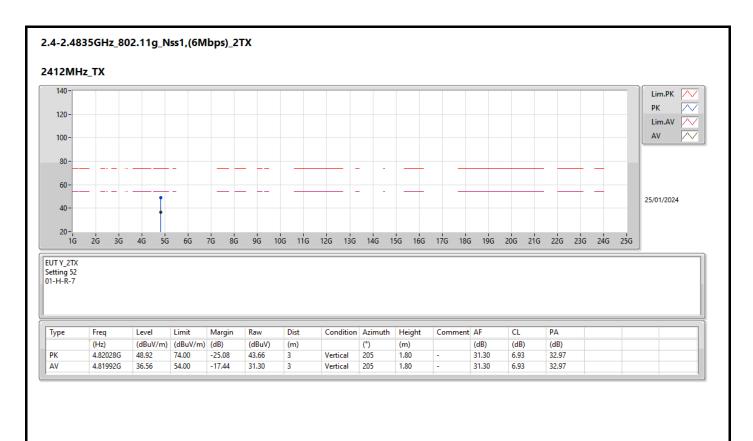


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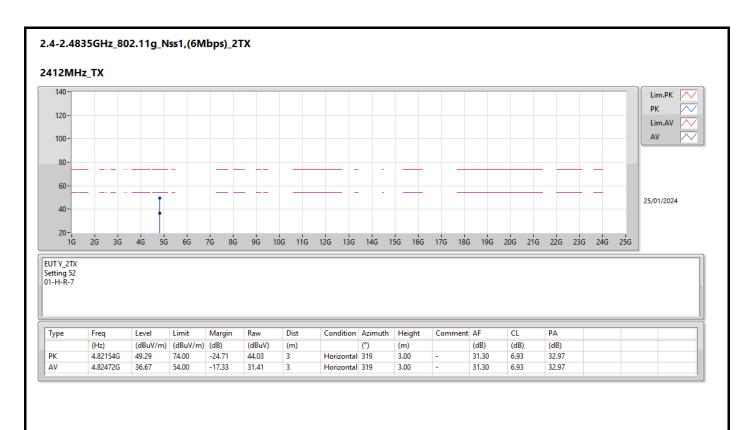




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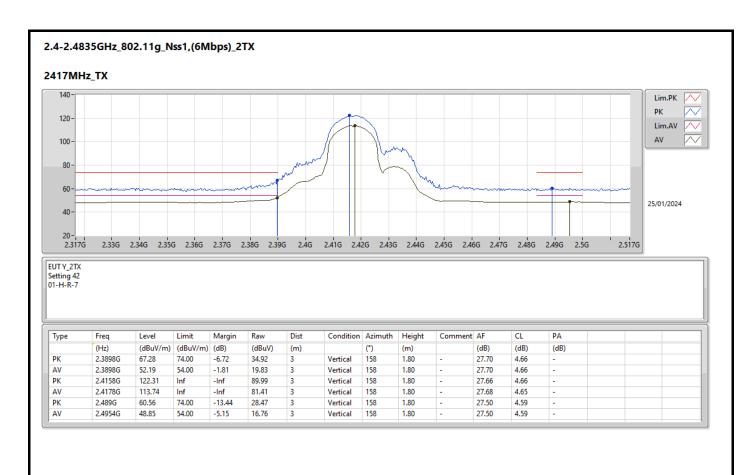
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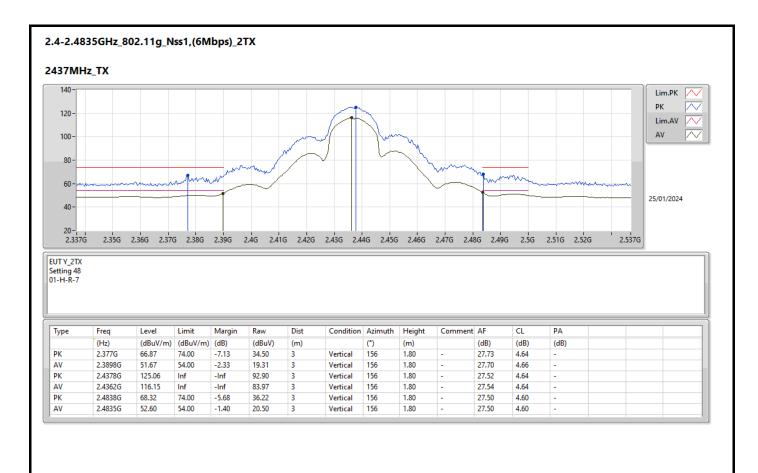
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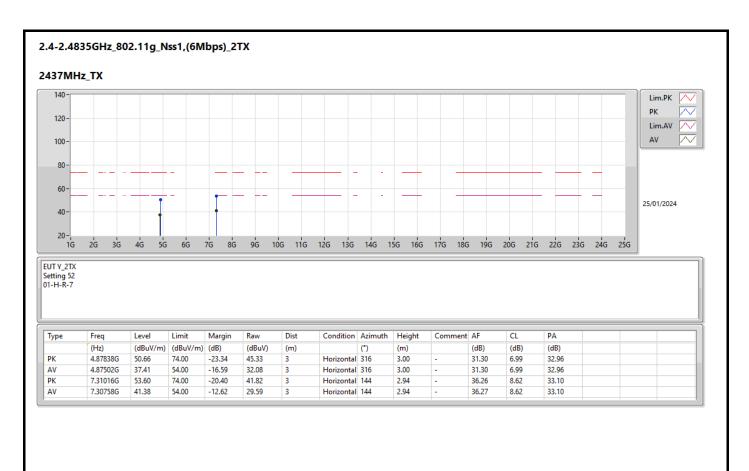




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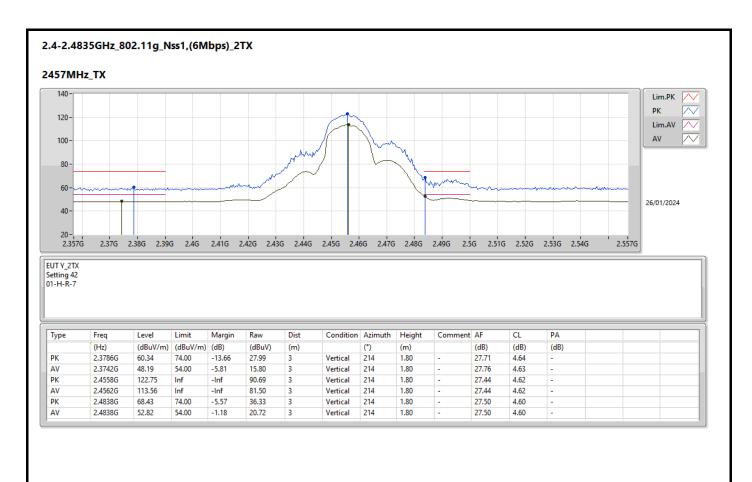
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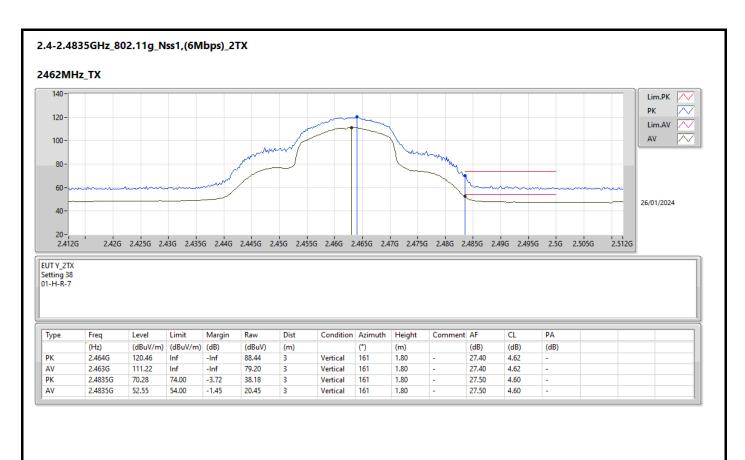




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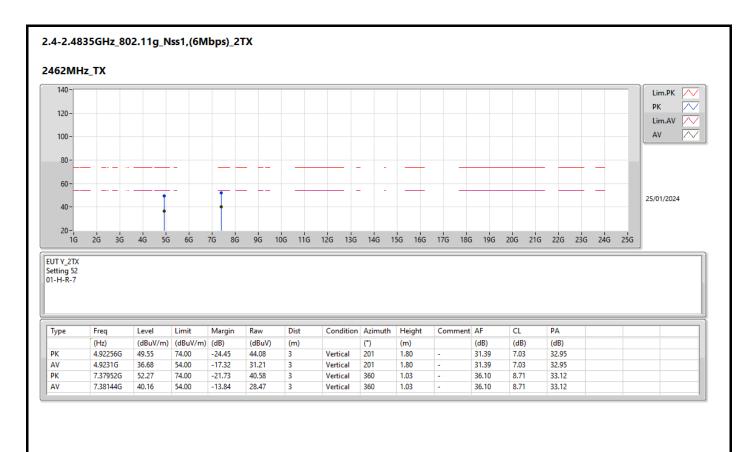
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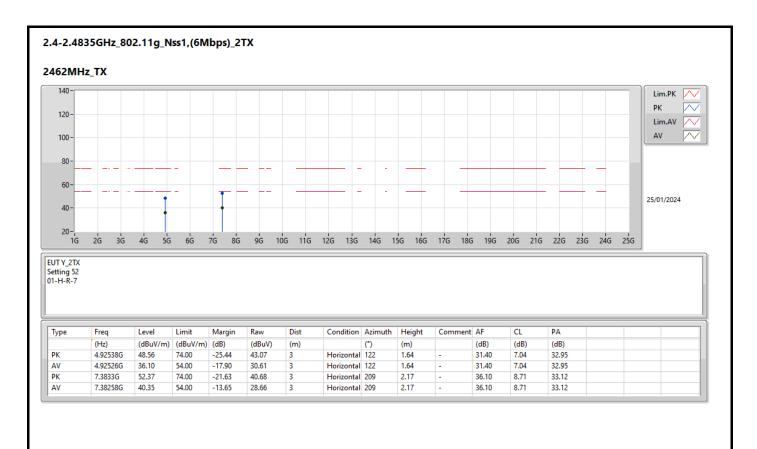
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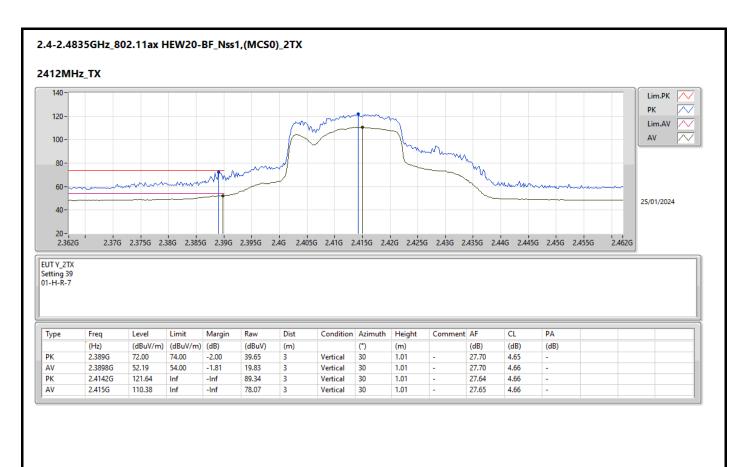
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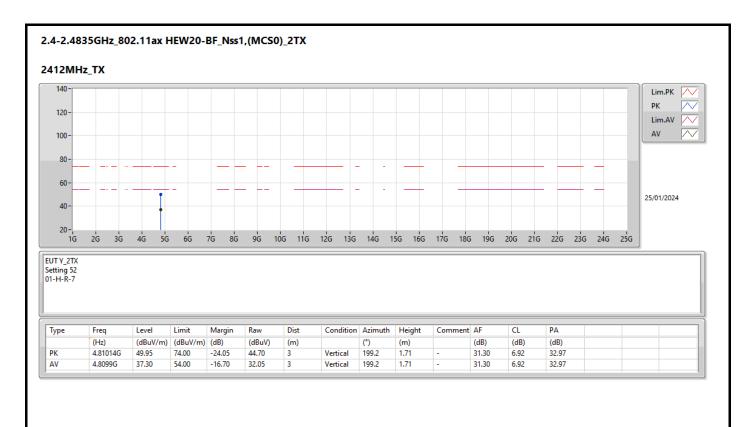




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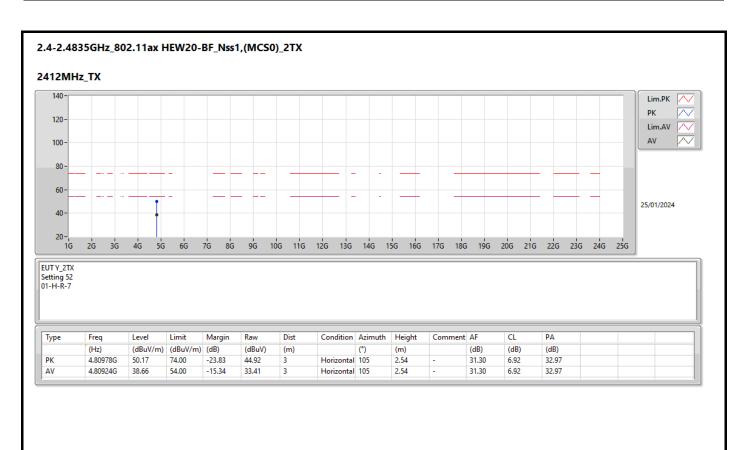




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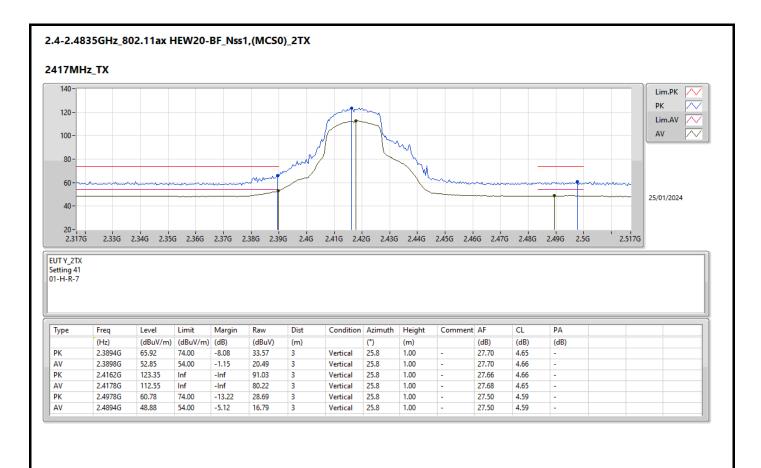
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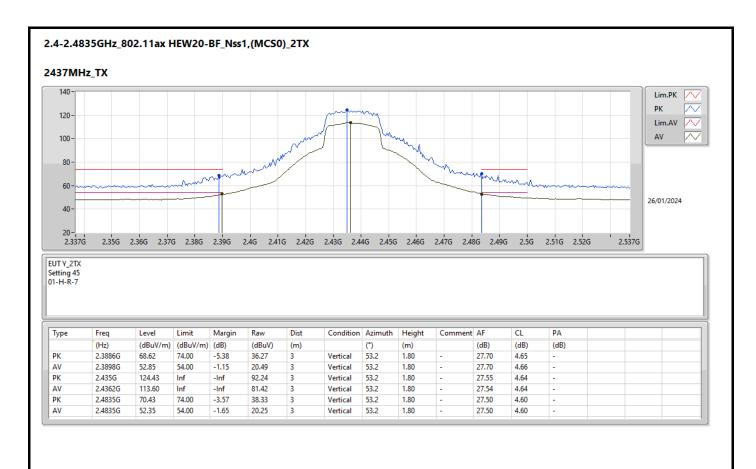




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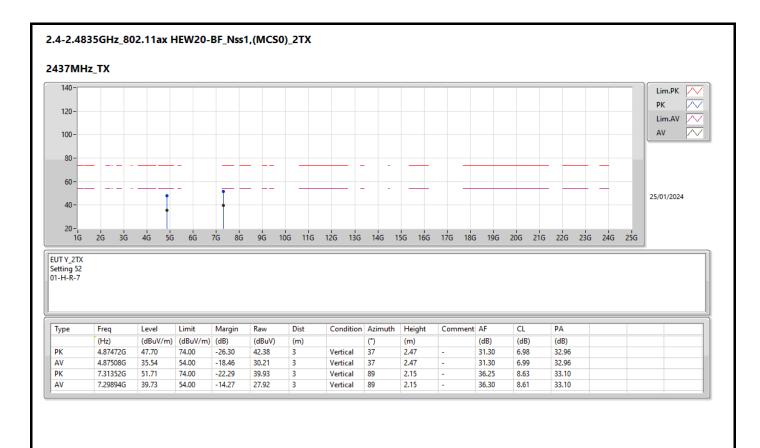
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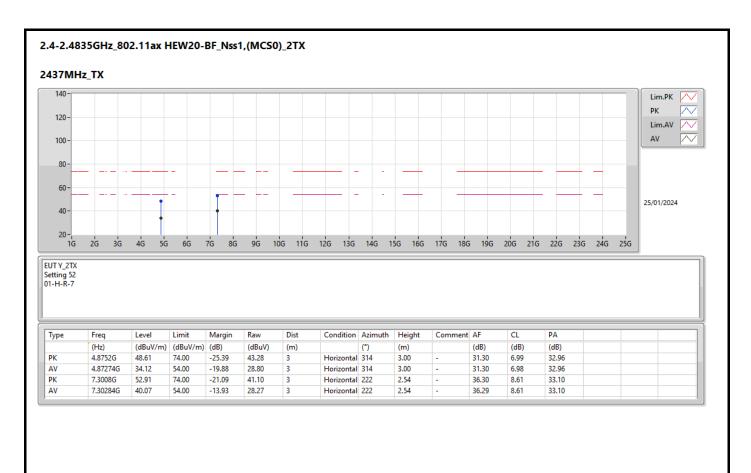




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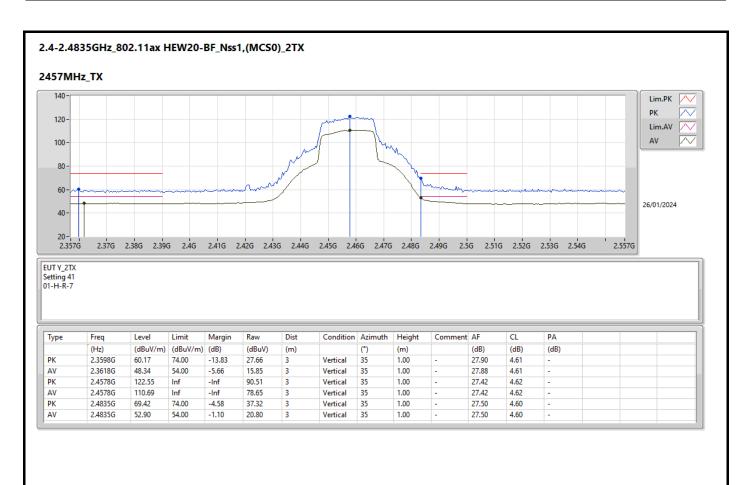




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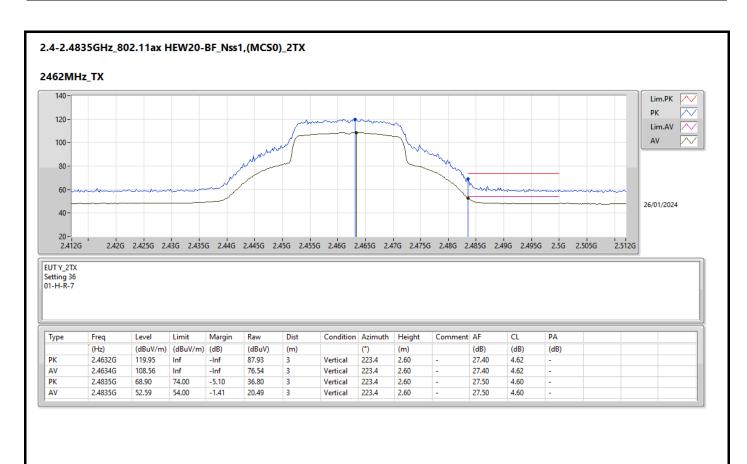




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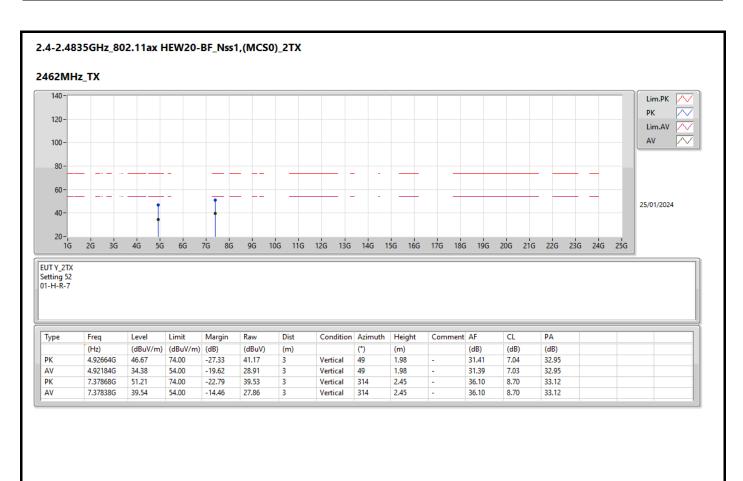




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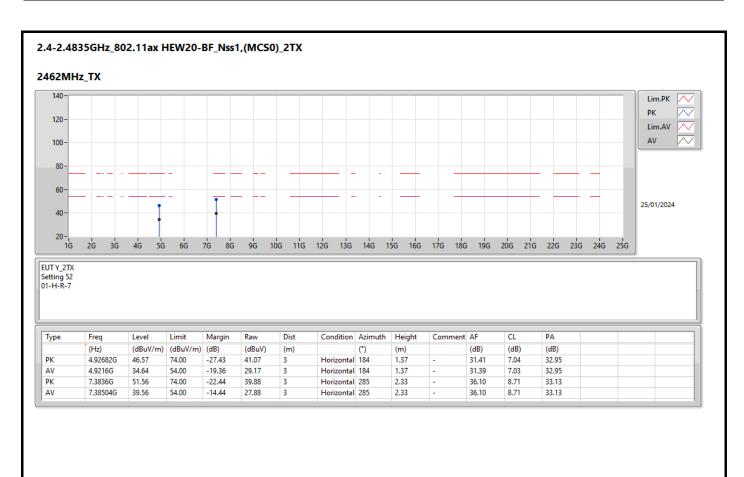




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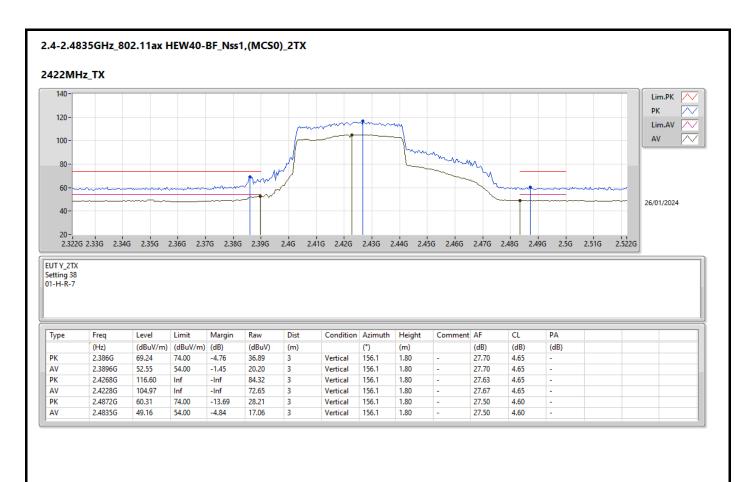
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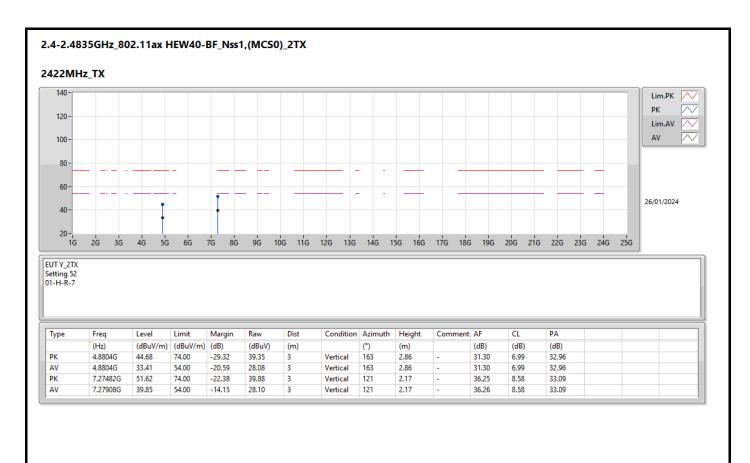




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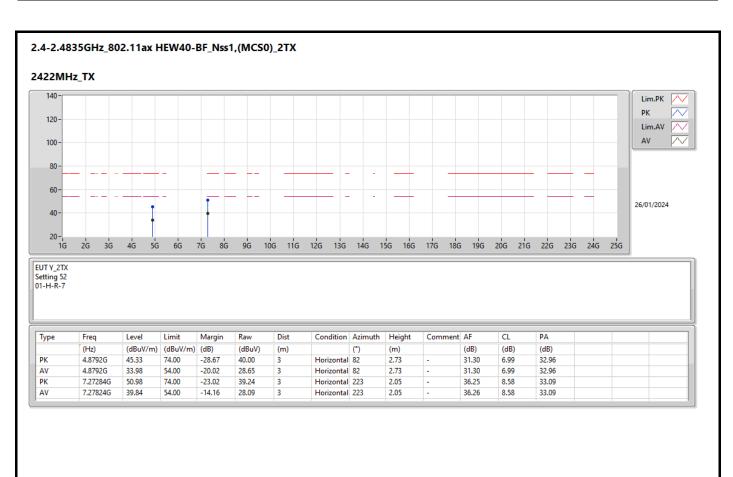




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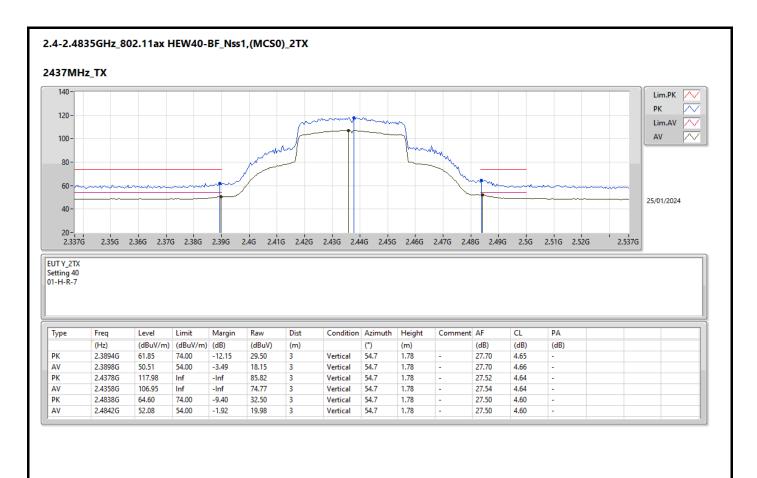




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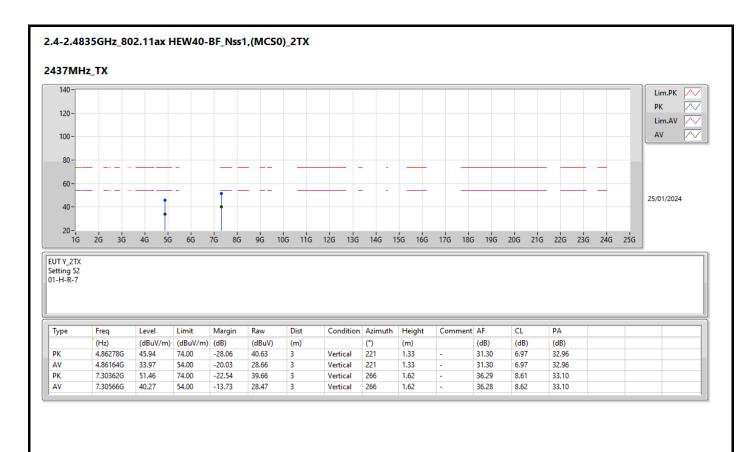




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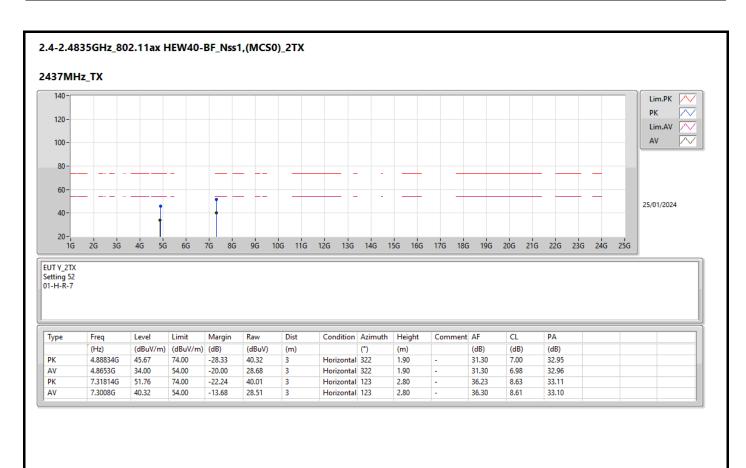
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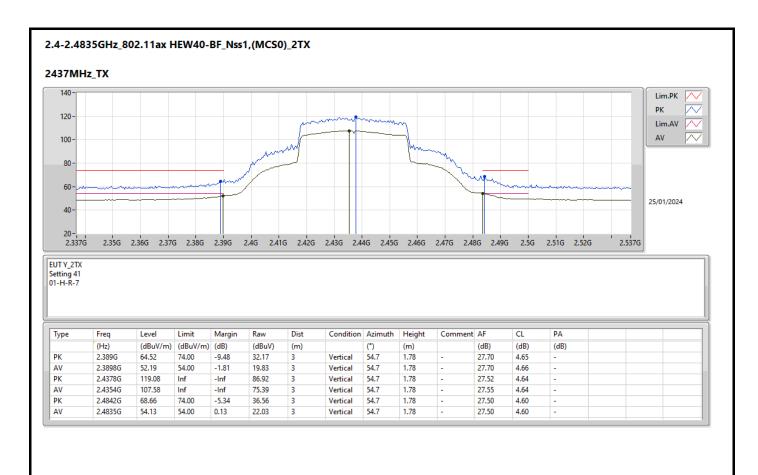
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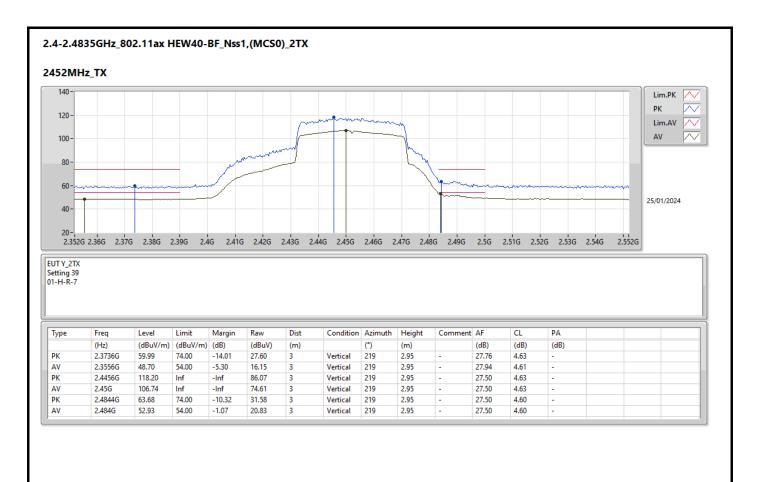




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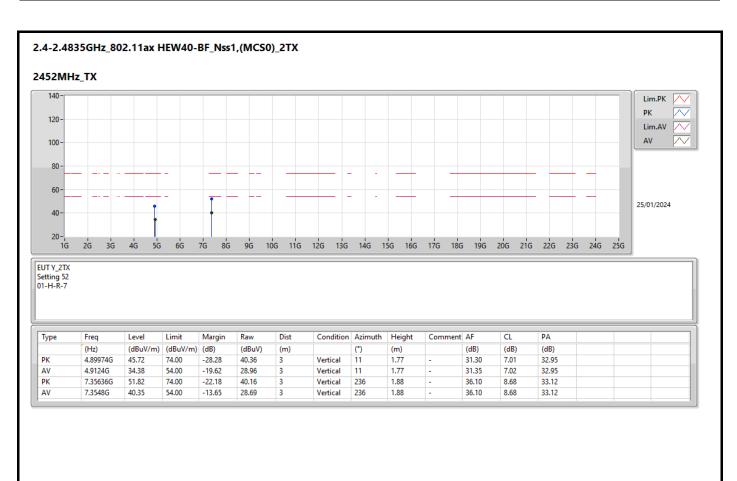




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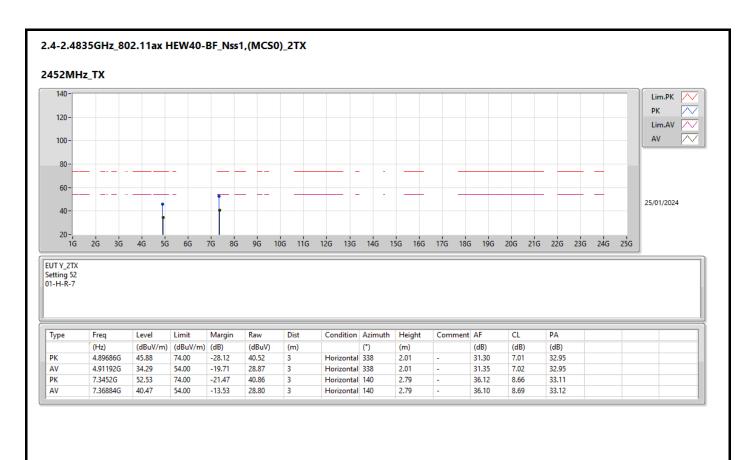




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Radiated Emission Co-location

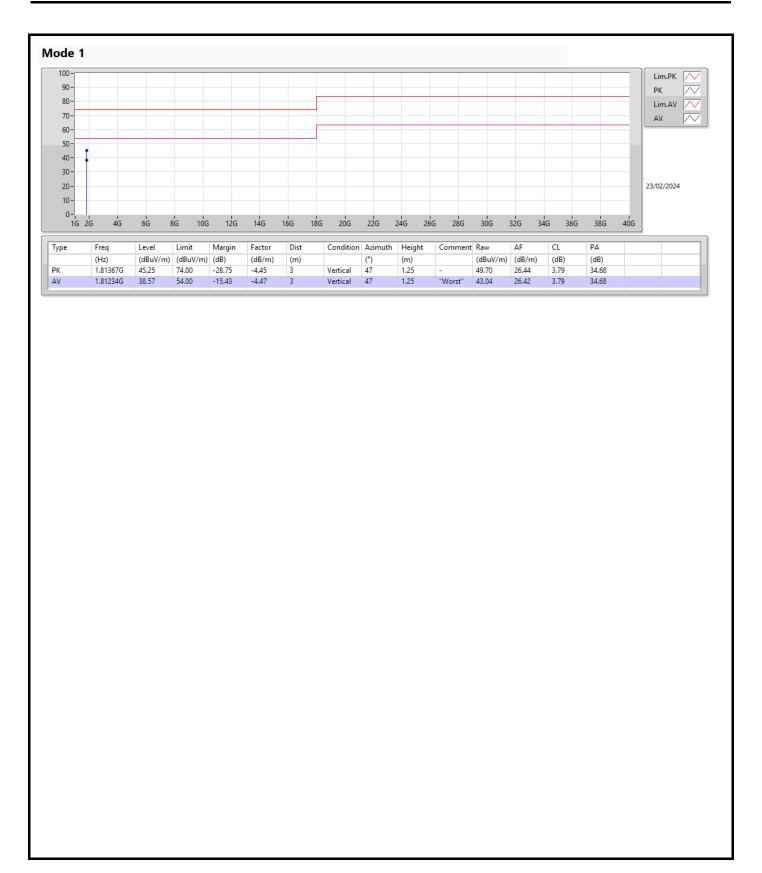
Appendix G

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	AV	1.81234G	38.57	54.00	-15.43	Vertical

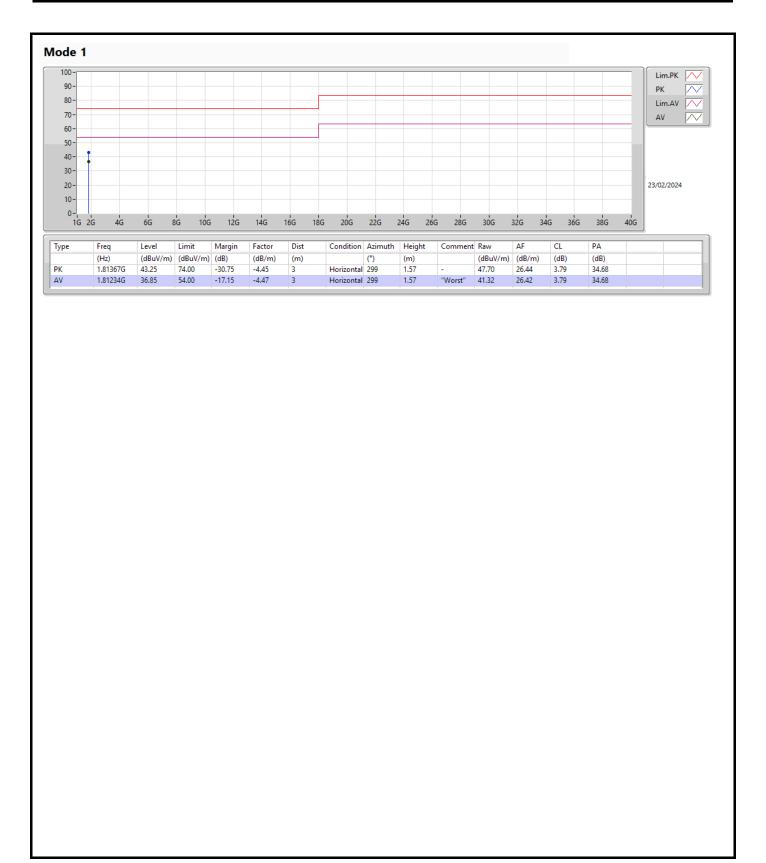
Sporton International Inc. Hsinchu Laboratory

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