



# RADIO TEST REPORT

FCC ID

: TLZ-XM549

Equipment

: IEEE 802.11 1X1 a/b/g/n/ac/ax Wireless LAN +

Bluetooth 5.3 + 802.15.4 Tri-radio 12 x 12 LGA Module

**Brand Name** 

: AzureWave

**Model Name** 

: AW-XM549 , AW-XM549-I , AW-XM553 , AW-XM553-I

**Applicant** 

: AzureWave Technologies, Inc.

8F., No.94, Baozhong Rd., Xindian Dist., New Taipei

City, Taiwan 231

Manufacturer

: AzureWave Technologies, Inc.

8F., No.94, Baozhong Rd., Xindian Dist., New Taipei

City, Taiwan 231

Standard

: 47 CFR FCC Part 15.247

The product was received on Dec. 16, 2022, and testing was started from Dec. 16, 2022 and completed on Sep. 13, 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.)

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FAX: 886-3-656-9085

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Issued Date

: Oct. 12, 2023

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
FR2O0715AA	01	Initial issue of report	Oct. 12, 2023

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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: Viola Huang

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# 1 General Description

#### 1.1 Information

#### 1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
2400-2483.5	b, g, n (HT20), VHT20, 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	1TX
2.4-2.4835GHz	802.11g	20	1TX
2.4-2.4835GHz	802.11n HT20	20	1TX
2.4-2.4835GHz	VHT20	20	1TX
2.4-2.4835GHz	802.11ax HEW20	20	1TX
2.4-2.4835GHz	802.11n HT40	40	1TX
2.4-2.4835GHz	VHT40	40	1TX
2.4-2.4835GHz	802.11ax HEW40	40	1TX

#### 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)
1	1	MAG. LAYERS	MSA-4008-25GC1-A2	PIFA Antenna	I-PEX	Note1
2	1	CEL	0032-02-07-00-001	PIFA Antenna	I-PEX	inolei

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#### Note1:

A 4	Gain	(dBi)
Ant.	WLAN 2.4GHz/Bluetooth/Thread	WLAN 5GHz
1	2.98	5.16
2	1.30	4.30

Note 2: The above information was declared by manufacturer.

Note 3: The EUT has two antennas. Only the highest gain antenna was selected to test and record in this report.

Thus, Antenna 1 was selected to perform the test.

#### <For WLAN 2.4GHz function>

#### For IEEE 802.11b/g/n/VHT/ax (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.

#### <For WLAN 5GHz function>

#### For IEEE 802.11a/n/ac/ax (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.

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

Only Port 1 can be used as transmitting/receiving antenna.

#### <For Thread function> (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.

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#### 1.1.3 Test Mode of Partial RU

Mode	Partial RU		
802.11ax HEW20	26	52	106
802.11ax HEW40		242	

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# 1.1.4 Mode Test Duty Cycle

#### <Full RU>

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11b	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11g	0.991	0.04	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ax HEW20	0.917	0.38	3.904m	300
802.11ax HEW40	0.882	0.55	1.979m	1k

#### <Partial RU>

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
ax20,RU26	0.881	0.55	1.359m	1k
ax20,RU52	0.876	0.57	1.359m	1k
ax20,RU106	0.883	0.54	1.359m	1k
ax40,RU242	0.959	0.18	1.359m	1k

N	-+-	

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

# 1.1.5 EUT Operational Condition

EUT Power Type	From host system				
Beamforming Function		☐ With beamforming ☐ Without beamforming			
Function			Point-to-point		
Support RU	☐ Full RU ☐ Partial RU			Partial RU	
<b>Test Software Version</b>	DutApiMimoApApp(1.0.0.32)				

Note: The above information was declared by manufacturer.

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#### 1.1.6 Table for Multiple Listing

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

Model Name	Description
AW-XM549	
AW-XM549-I	
AW-XM553	All the models are identical, the difference model served as marketing strategy.
AW-XM553-I	

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Note 2: The above information was declared by manufacturer.

#### 1.1.7 Table for EUT Combination

EUT	Hardware Version	Description
1	01H	The difference between 01H and 02H is the layout of DC-DC power.
2	02H	All RF layouts are the same.

Note: The above information was declared by manufacturer.

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Note 1: From the above models, model: AW-XM549 was selected as representative model for the test and its data was recorded in this report.

# 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 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	Sean Ku	22.4~22.6 / 52~59	Dec. 20, 2022~Jan. 18, 2023
Radiated below 1GHz	03CH01-CB	Black Lu	22.7~24 / 57~61	Jun. 16, 2023 ~ Aug. 16, 2023
Radiated above 1GHz	03CH03-CB	Ederson Huang	22.7~24 / 57~61	Dec. 16, 2022~Jan. 17, 2023
AC Conduction	CO01-CB	Ryan Huang	22~23 / 50~51	Sep. 01, 2023~Sep. 13, 2023

# 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)

#### For test date before Jun. 01, 2023

Test Items	Uncertainty	Remark
Radiated Emission (1GHz ~ 18GHz)	5.2 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.7 dB	Confidence levels of 95%
Conducted Emission	3.2 dB	Confidence levels of 95%
Output Power Measurement	0.8 dB	Confidence levels of 95%
Power Density Measurement	3.2 dB	Confidence levels of 95%
Bandwidth Measurement	2.0 %	Confidence levels of 95%

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For test date after May 31, 2023

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%

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# 2 Test Configuration of EUT

# 2.1 Test Channel Mode

#### <Full RU>

Mode	Power Setting
802.11b_Nss1,(1Mbps)_1TX	-
2412MHz	16
2417MHz	19
2437MHz	19
2462MHz	17
802.11g_Nss1,(6Mbps)_1TX	-
2412MHz	17
2417MHz	18
2437MHz	22
2457MHz	18
2462MHz	17
802.11ax HEW20_Nss1,(MCS0)_1TX	-
2412MHz	15
2417MHz	18
2437MHz	21
2457MHz	17
2462MHz	16
802.11ax HEW40_Nss1,(MCS0)_1TX	-
2422MHz	15
2437MHz	17
2452MHz	16

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#### <Partial RU>

Mode	Power Setting
ax20,RU26_20MHz_Nss1,(MCS0)_1TX	-
2412MHz	4
2462MHz	6
ax20,RU52_20MHz_Nss1,(MCS0)_1TX	-
2412MHz	7
2462MHz	9
ax20,RU106_20MHz_Nss1,(MCS0)_1TX	-
2412MHz	9
2462MHz	10
ax40,RU242_40MHz_Nss1,(MCS0)_1TX	-
2422MHz	9
2452MHz	10

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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.

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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 2 + WLAN 2.4GHz + Bluetooth	
2	EUT 2 + WLAN 5GHz + Bluetooth	
3 EUT 2 + Thread		
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 + Thread	
For operating mode 3 is the worst case and it was record in this test report.		

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The Worst Case Mode for Following Conformance Tests		
Tests Item	DTS Bandwidth Emissions in Non-restricted Frequency Bands	
Test Condition Conducted measurement at transmit chains		
1	EUT 2 <full ru=""></full>	

The Worst Case Mode for Following Conformance Tests		
Tests Item Maximum Conducted Output Power Power Spectral Density		
Test Condition Conducted measurement at transmit chains		
1	EUT 2 <full ru=""></full>	
2	EUT 2 <partial ru=""></partial>	

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Th	e Worst Case Mode for Following Conformance Tests			
Tests Item	Emissions in Restricted Frequency Bands			
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.			
Operating Mode < 1GHz	Normal Link			
1	EUT 2 in X axis + WLAN 2.4GHz + Bluetooth			
2	EUT 2 in Y axis + WLAN 2.4GHz + Bluetooth			
3	EUT 2 in Z axis + WLAN 2.4GHz + Bluetooth			
Mode 3 has been evaluate this same test mode.	d to be the worst case among Mode 1~3, thus measurement for Mode 4 will follow			
4	EUT 2 in Z axis + WLAN 5GHz + Bluetooth			
Mode 4 has been evaluate this same test mode.	d to be the worst case among Mode 1~4, thus measurement for Mode 5 will follow			
5	EUT 1 in Z axis + WLAN 5GHz + Bluetooth			
	Mode 3 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 6~7 wil follow this same test mode.			
6	EUT 2 in Z axis + Thread			
7	EUT 1 in Z axis + Thread			
For operating mode 7 is th	For operating mode 7 is the worst case and it was record in this test report.			
	СТХ			
Operating Mode > 1GHz	The EUT was performed at X axis, Y axis and Z axis position. The worst-case was listed below, thus the measurement will follow this same test configuration.			
1	EUT 2 in X axis			

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Note: The WLAN and Bluetooth function can't work at the same time.

# 2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link Mode:

During the test, the EUT operation to normal function.

#### 2.4 Accessories

N/A

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# 2.5 Support Equipment

#### For AC Conduction:

	Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID		
Α	EUT NB	ACER	N16Q1	N/A		
В	Earphone	SHYARO CHI	MIC-04	N/A		
С	Mouse	Logitech	M-U0026	N/A		
D	Test Fixture	Azurewave	2460-14	N/A		
Е	Client NB	DELL	E6430	N/A		
F	Client	Azurewave	AW-XM549	N/A		
G	Test Fixture	Azurewave	2460-14	N/A		

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For Radiated (below 1GHz):

	Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID		
Α	Test Fixture	Azurewave	2460-14	N/A		
В	Notebook	DELL	E6230	N/A		
С	Client	Azurewave	AW-XM549	N/A		
D	Test Fixture	Azurewave	2460-14	N/A		
Е	Notebook	DELL	E6230	N/A		
F	Earphone	e-Power	S90W	N/A		
G	Mouse	Logitech	M-U0026	N/A		

For Radiated (above 1GHz):

	Support Equipment				
No.	No. Equipment Brand Name Model Name FCC ID				
Α	Notebook	DELL	E4300	N/A	
В	Notebook	ACER	JALA0	N/A	
С	Test Fixture	Azurewave	2510-l1	N/A	

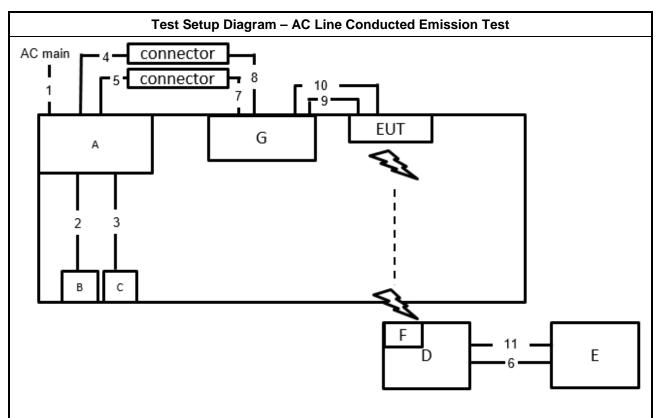
#### For RF Conducted:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
Α	Notebook	ACER	E4730	N/A
В	Notebook	DELL	E4300	N/A
С	Test Fixture	Azurewave	2510-I1	N/A

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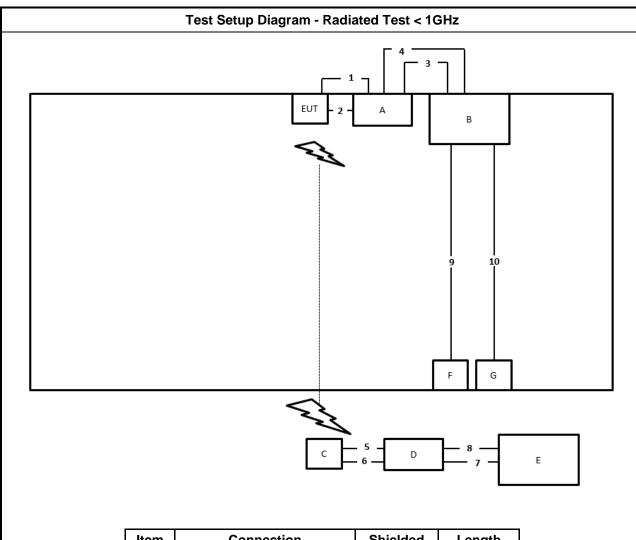
# 2.6 Test Setup Diagram



Item	Connection	Shielded	Length
1	1 Power cable		1.8m
2	Audio cable	No	1.2m
3	USB cable	Yes	1.8m
4	USB cable	Yes	1.7m
5	USB cable	Yes	1.7m
6	USB cable	Yes	0.5m
7	USB cable	Yes	0.5m
8	USB cable	Yes	0.5m
9	Type C to Micro USB cable	Yes	0.6m
10	Dupont cable	No	0.2m
11	USB cable	Yes	0.7m

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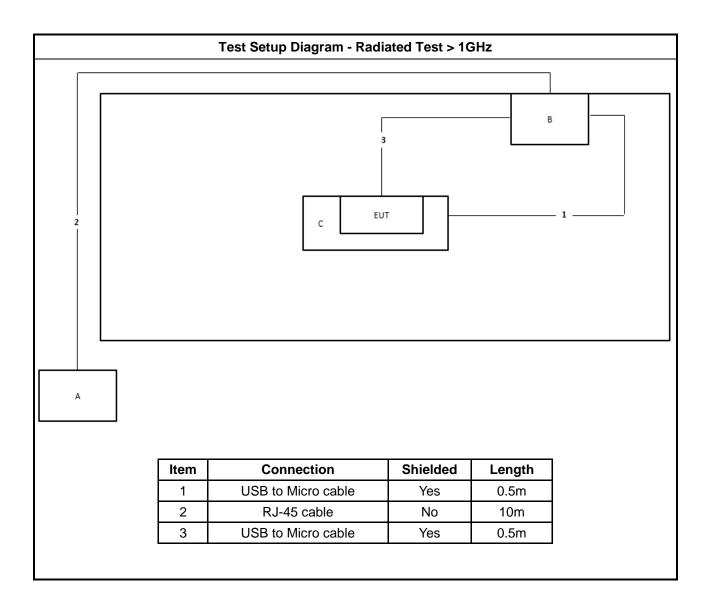




Item	Connection	Shielded	Length
1	USB to Type C cable	Yes	1m
2	Console cable*7	No	0.13m
3	USB to Type C cable	Yes	1m
4	Micro USB to Micro cable	Yes	0.12m
5	USB to Type C cable	Yes	1m
6	Console cable*7	No	0.13m
7	USB to Type C cable	Yes	1m
8	Micro USB to Micro cable	Yes	0.12m
9	Earphone	No	1m
10	Mouse	Yes	1m

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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 -				
0.5-5	56	46		
5-30 60 50				
Note 1: * Decreases with the logarithm of the frequency.				

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#### 3.1.2 Measuring Instruments

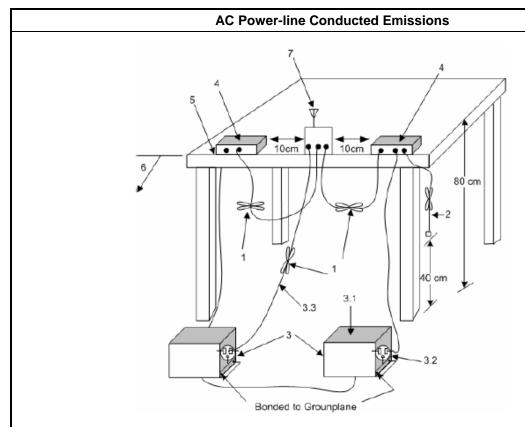
Refer a test equipment and calibration data table in this test report.

#### 3.1.3 Test Procedures

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

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#### 3.1.4 Test Setup



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

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

#### 3.1.5 Measurement Results Calculation

The measured Level is calculated using:

- a. Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- b. Margin = -Limit + Level

#### 3.1.6 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

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# 3.2 DTS Bandwidth

#### 3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit		
Systems using digital modulation techniques:		
■ 6 dB bandwidth ≥ 500 kHz.		

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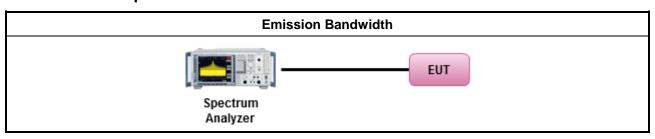
### 3.2.2 Measuring Instruments

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

#### 3.2.3 Test Procedures

	Test Method				
•	For the emission bandwidth shall be measured using one of the options below:				
		Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement.			
		Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement.			
		Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.			

# 3.2.4 Test Setup



#### 3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

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# 3.3 Maximum Conducted Output Power

#### 3.3.1 Maximum Conducted Output Power Limit

#### **Maximum Conducted Output Power Limit**

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

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 $P_{Out}$  = 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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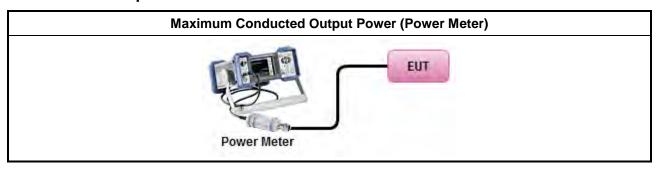
#### 3.3.3 Test Procedures

		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	v cycle ≥ 98% or external video / power trigger]
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1.
		Refer as FCC KDB 558074, clause $8.3.2.2$ & C63.10 clause $11.9.2.2.3$ Method AVGSA-1A. (alternative)
	duty	cycle < 98% and average over on/off periods with duty factor
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2.
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative)
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3
		Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-3A (alternative)
	Mea	surement using a power meter (PM)
		Refer as FCC KDB 558074, clause $8.3.2.3 \& C63.10$ clause $11.9.2.3.1$ Method AVGPM (using an RF average power meter).
		Refer as FCC KDB 558074, clause $8.3.2.3 \& C63.10$ clause $11.9.2.3.2$ Method AVGPM-G (using an gate RF average power meter).
•	For	conducted measurement.
	•	If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
	•	If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

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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

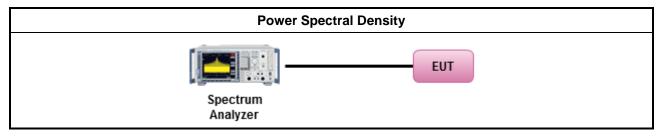
Refer a test equipment and calibration data table in this test report.

#### 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).				
	⊠ R	efer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD.			
•	For co	nducted 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.			

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# 3.4.4 Test Setup



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# 3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

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# 3.5 Emissions in Non-restricted Frequency Bands

#### 3.5.1 Emissions in Non-restricted Frequency Bands Limit

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

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

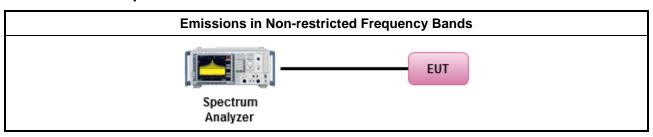
#### 3.5.2 Measuring Instruments

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

#### 3.5.3 Test Procedures

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

#### 3.5.4 Test Setup



#### 3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

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# 3.6 Emissions in Restricted Frequency Bands

#### 3.6.1 Emissions in Restricted Frequency Bands Limit

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

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

#### 3.6.2 Measuring Instruments

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

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#### 3.6.3 Test Procedures

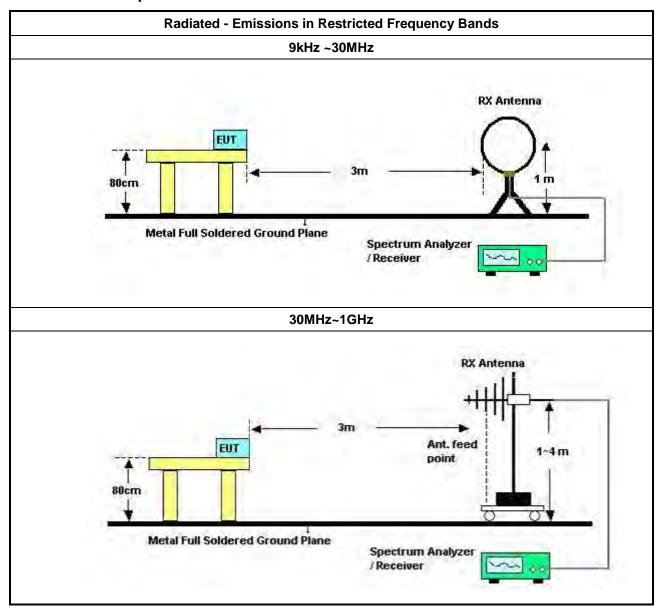
		Test Method							
•	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].								
•		er as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency and highest frequency channel within the allowed operating band.							
•	For the transmitter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

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#### **Test Setup** 3.6.4



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Above 1GHz

BUT

3M & 1M

1.5M

Max 30cm

Spectrum Analyzer

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#### 3.6.5 Measurement Results Calculation

The measured Level is calculated using:

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

#### 3.6.6 Emissions in Restricted Frequency Bands (Below 30MHz)

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

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

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

#### 3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

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# 4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics Calibration Date		Calibration Due Date	Remark	
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz Feb. 20, 2023		Feb. 19, 2024	Conduction (CO01-CB)	
LISN	F.C.C.	FCC-LISN-50- 16-2	04083	150kHz ~ 100MHz	Feb. 16, 2023	Feb. 15, 2024	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. 09, 2023	Feb. 08, 2024	Conduction (CO01-CB)	
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	Oct. 18, 2022	Oct. 17, 2023	Conduction (CO01-CB)	
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)	
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 23, 2023	Mar. 22, 2024	Radiation (03CH01-CB)	
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH01-CB	30 MHz ~ 1 GHz	30 MHz ~ 1 GHz Jan. 16, 2023		Radiation (03CH01-CB)	
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Feb. 19, 2023	Feb. 18, 2024	Radiation (03CH01-CB)	
Pre-Amplifier	SGH	SGH0301	20230109-2	10M~1GHz	Jan. 13, 2023	Jan. 12, 2024	Radiation (03CH01-CB)	
Signal Analyzer	R&S	FSV3044	101437	10kHz ~ 44GHz	Nov. 29, 2022	Nov. 29, 2023	Radiation (03CH01-CB)	
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 17, 2022	Jun. 16, 2023	Radiation (03CH01-CB)	
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 13, 2023	Jun. 12, 2024	Radiation (03CH01-CB)	
RF Cable-low	Woken	RG402	Low Cable-16+17	30 MHz ~ 1 GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH01-CB)	
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH01-CB)	
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH03-CB	1GHz ~18GHz 3m	May 05, 2022	May 04, 2023	Radiation (03CH03-CB)	
Horn Antenna	ETS·Lindgren	3115	6821	750MHz~18GHz Jan. 21, 2022		Jan. 20, 2023	Radiation (03CH03-CB)	
Horn Antenna	ETS-LINDGRE N	3115	00075790	750MHz ~ 18GHz	Nov. 04, 2022	Nov. 03, 2023	Radiation (03CH03-CB)	
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2022	Aug. 21, 2023	Radiation (03CH03-CB)	
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Jul. 01, 2022	Jun. 30, 2023	Radiation (03CH03-CB)	

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		_	T			Calibration	
Instrument	Brand	Model No.	Serial No.	Characteristics	cteristics Calibration Date		Remark
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 16, 2022 Nov. 15, 2023		Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 10, 2022	Jun. 09, 2023	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+29	1GHz ~ 18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-29	1GHz ~ 18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#6	1GHz ~ 40 GHz	Hz ~ 40 GHz Dec. 07, 2022		Radiation (03CH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 27, 2022	May 26, 2023	Conducted (TH01-CB)
Switch	SPTCB	SP-SWI	SWI-01	1 GHz –26.5 GHz	Oct. 04, 2022	Oct. 03, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 18 GHz	GHz – 18 GHz Oct. 03, 2022		Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-30	1 GHz – 18 GHz Oct. 03, 2022		Oct. 02, 2023	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Feb. 21, 2022	Feb. 20, 2023	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Feb. 21, 2022	Feb. 20, 2023	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.

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

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# **Conducted Emissions at Powerline**

Appendix A

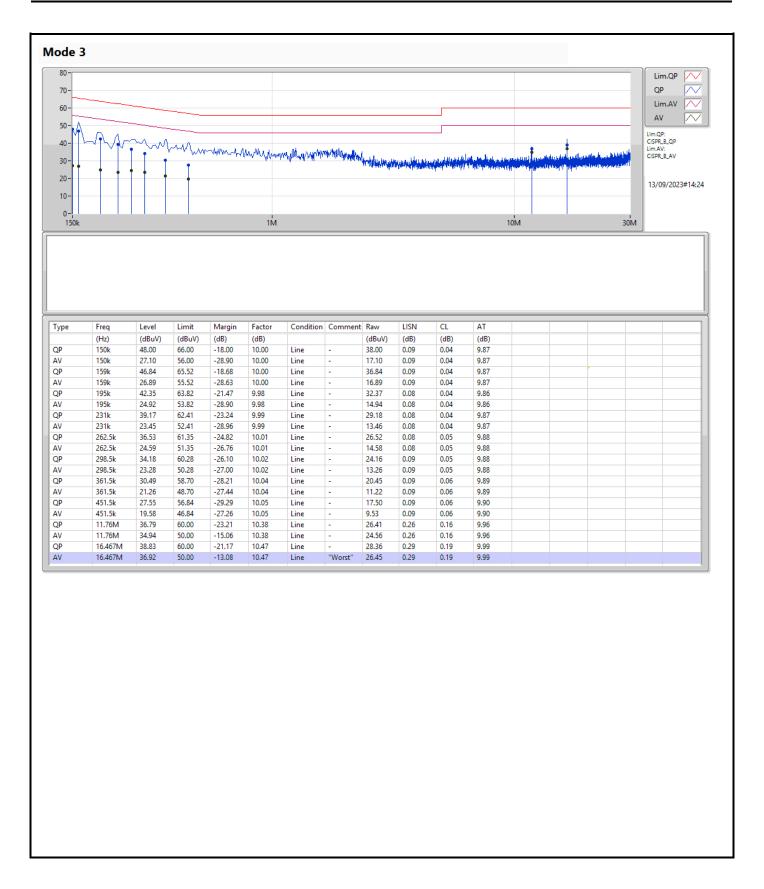
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 3	Pass	AV	16.463M	40.53	50.00	-9.47	Neutral

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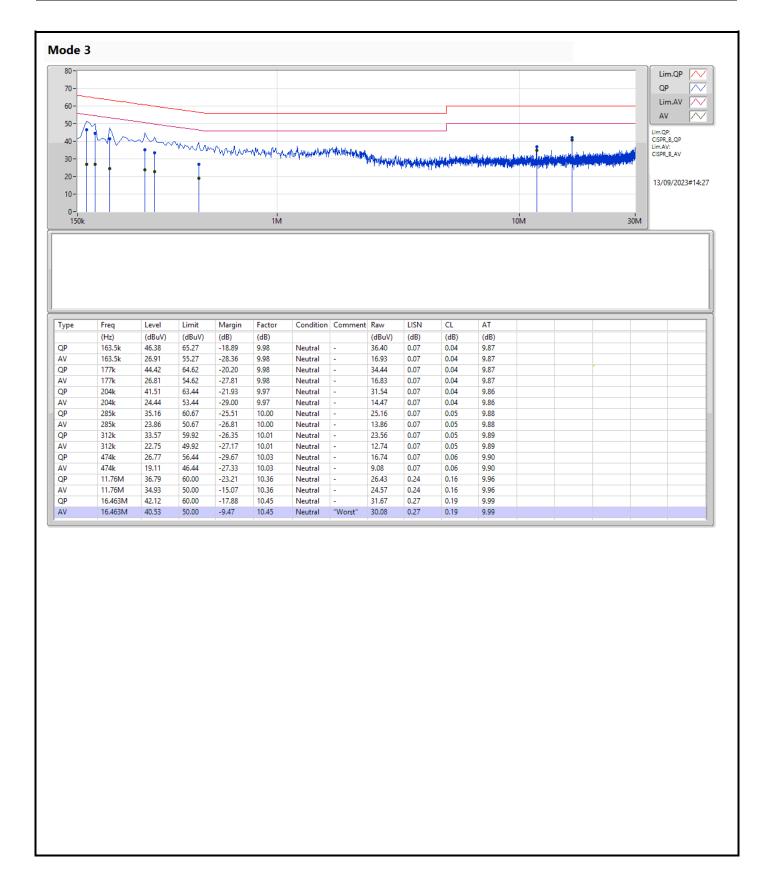




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## Summary

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)_1TX	10.05M	13.493M	13M5G1D	10.05M	13.435M
802.11g_Nss1,(6Mbps)_1TX	16.35M	24.978M	25M0D1D	16.3M	16.524M
802.11ax HEW20_Nss1,(MCS0)_1TX	18.3M	24.12M	24M1D1D	17.9M	18.758M
802.11ax HEW40_Nss1,(MCS0)_1TX	36.7M	37.564M	37M6D1D	36.4M	37.417M

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

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#### Result

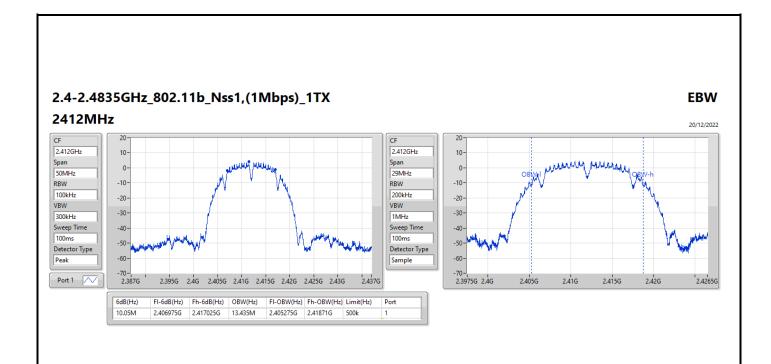
Mode	Result	Limit	Port 1-N dB	Port 1-OBW
		(Hz)	(Hz)	(Hz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	10.05M	13.435M
2437MHz	Pass	500k	10.05M	13.478M
2462MHz	Pass	500k	10.05M	13.493M
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	16.325M	16.524M
2437MHz	Pass	500k	16.35M	24.978M
2462MHz	Pass	500k	16.3M	16.545M
802.11ax HEW20_Nss1,(MCS0)_1TX	-	-	-	-
2412MHz	Pass	500k	18.3M	18.758M
2437MHz	Pass	500k	17.9M	24.12M
2462MHz	Pass	500k	17.975M	18.758M
802.11ax HEW40_Nss1,(MCS0)_1TX	-	-	-	-
2422MHz	Pass	500k	36.4M	37.417M
2437MHz	Pass	500k	36.65M	37.564M
2452MHz	Pass	500k	36.7M	37.515M

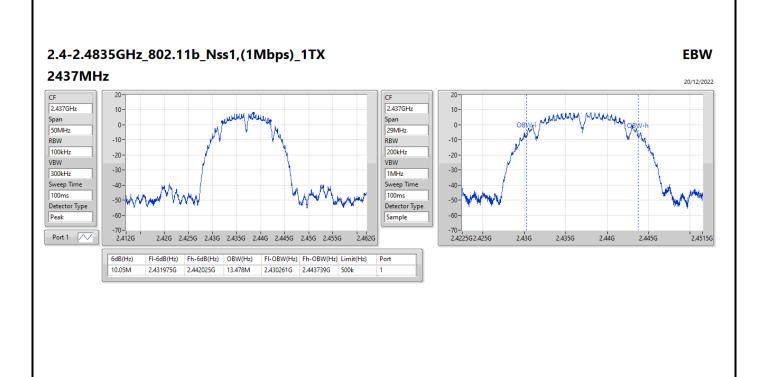
Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth

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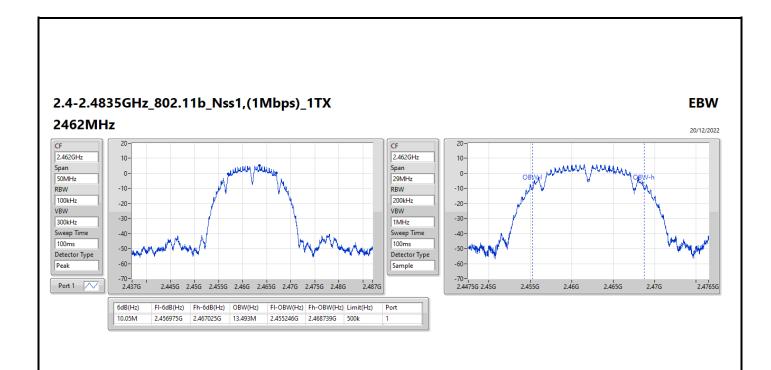
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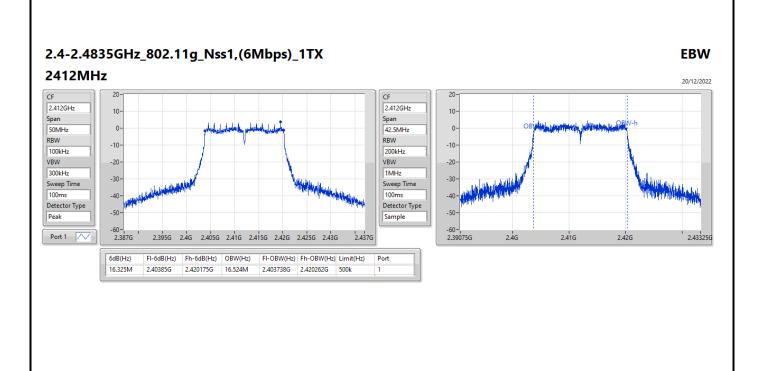




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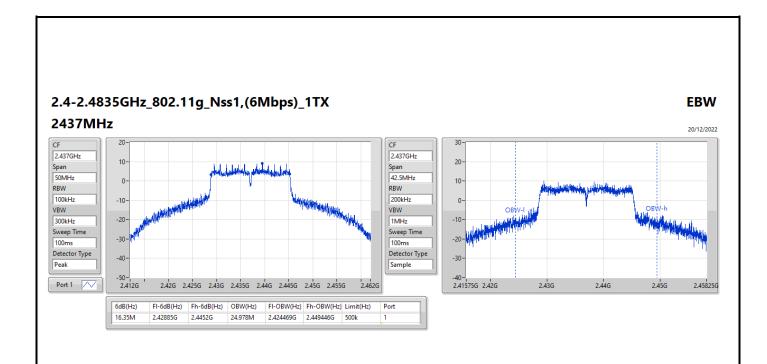
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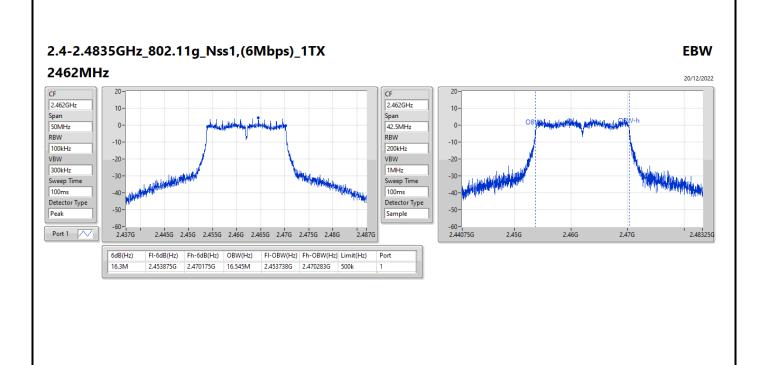




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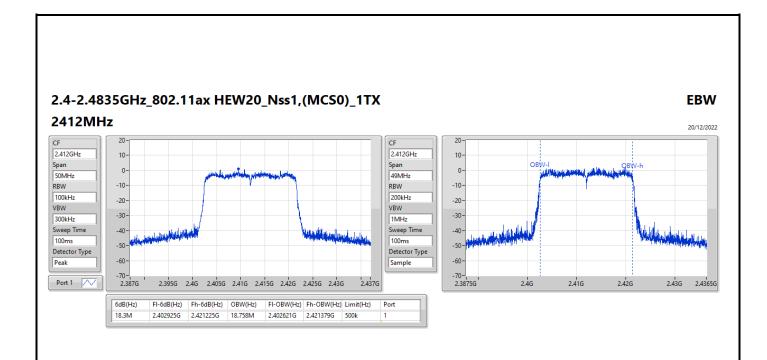
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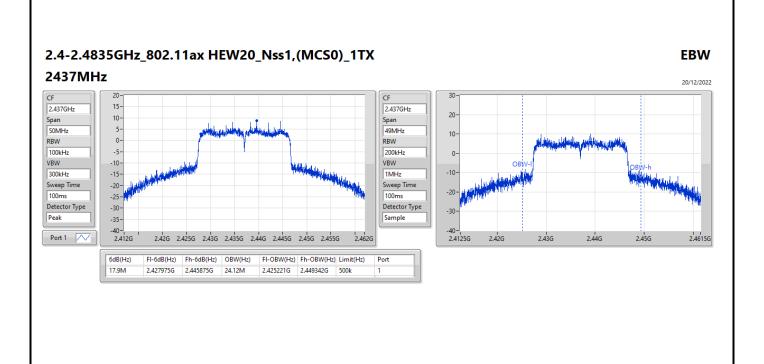




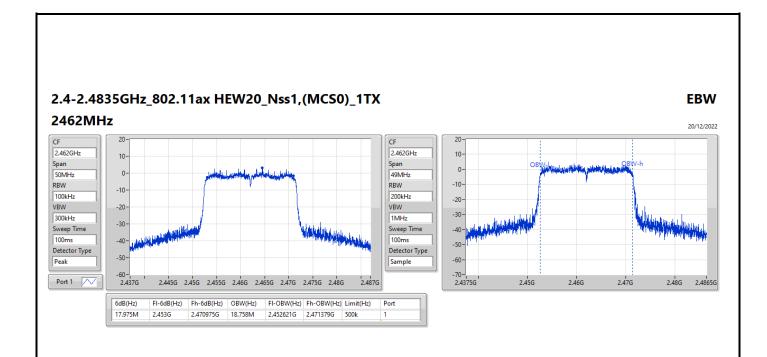
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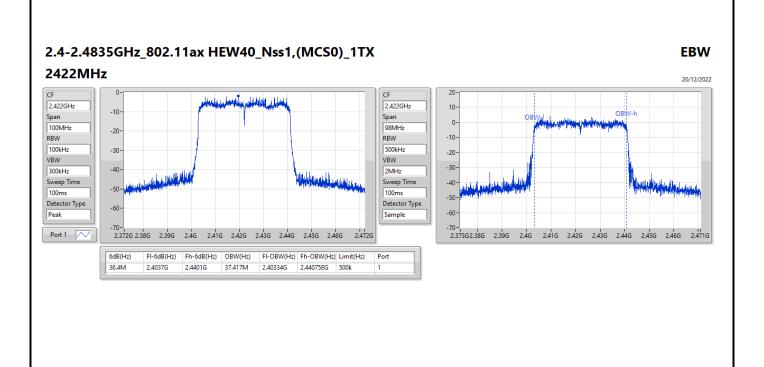
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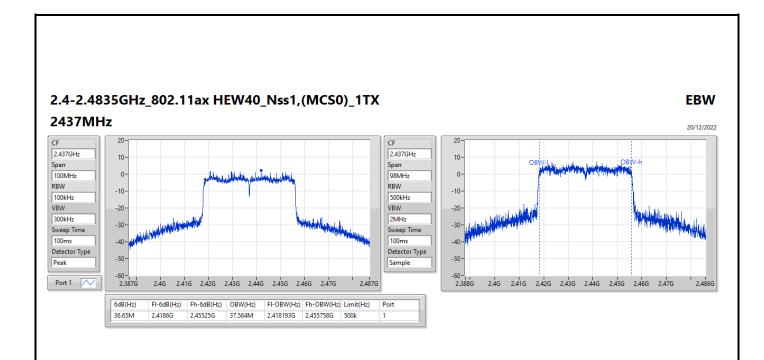


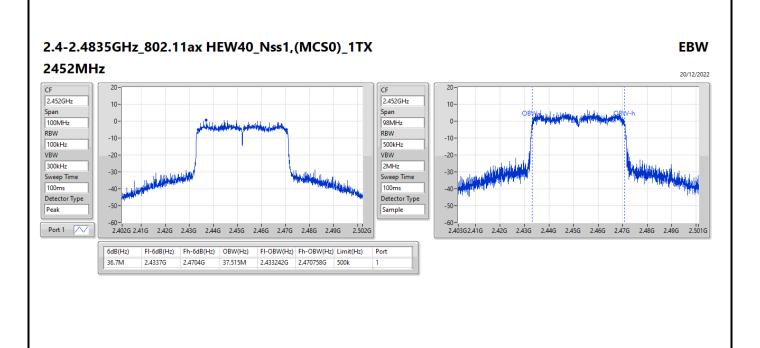


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# Average Power\_Full RU

Appendix C.1

Summary

Mode	Total Power	Total Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	18.23	0.06653
802.11g_Nss1,(6Mbps)_1TX	20.58	0.11429
802.11ax HEW20_Nss1,(MCS0)_1TX	20.29	0.10691
802.11ax HEW40_Nss1,(MCS0)_1TX	16.84	0.04831

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Result

Mode	Result	DG	Port 1	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.98	14.49	14.49	30.00
2417MHz	Pass	2.98	17.87	17.87	30.00
2437MHz	Pass	2.98	18.23	18.23	30.00
2462MHz	Pass	2.98	15.93	15.93	30.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.98	15.76	15.76	30.00
2417MHz	Pass	2.98	16.81	16.81	30.00
2437MHz	Pass	2.98	20.58	20.58	30.00
2457MHz	Pass	2.98	17.06	17.06	30.00
2462MHz	Pass	2.98	16.01	16.01	30.00
802.11ax HEW20_Nss1,(MCS0)_1TX	-	-	-	-	-
2412MHz	Pass	2.98	13.40	13.40	30.00
2417MHz	Pass	2.98	16.61	16.61	30.00
2437MHz	Pass	2.98	20.29	20.29	30.00
2457MHz	Pass	2.98	16.04	16.04	30.00
2462MHz	Pass	2.98	15.16	15.16	30.00
802.11ax HEW40_Nss1,(MCS0)_1TX	-	-	-	-	-
2422MHz	Pass	2.98	13.57	13.57	30.00
2437MHz	Pass	2.98	16.84	16.84	30.00
2452MHz	Pass	2.98	15.73	15.73	30.00

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



# Average Power\_Partial RU

Appendix C.2

Summary

Mode	Total Power	Total Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
ax20,RU106_20MHz_Nss1,(MCS0)_1TX	9.42	0.00875
ax20,RU26_20MHz_Nss1,(MCS0)_1TX	5.18	0.00330
ax20,RU52_20MHz_Nss1,(MCS0)_1TX	8.19	0.00659
ax40,RU242_40MHz_Nss1,(MCS0)_1TX	9.52	0.00895

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## Result

Mode	Result	DG	Port 1	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)
ax20,RU26_20MHz_Nss1,(MCS0)_1TX	-	-	-	4	-
2412MHz	Pass	2.98	3.33	3.33	30.00
2462MHz	Pass	2.98	5.18	5.18	30.00
ax20,RU52_20MHz_Nss1,(MCS0)_1TX	-	-	-	4	-
2412MHz	Pass	2.98	6.44	6.44	30.00
2462MHz	Pass	2.98	8.19	8.19	30.00
ax20,RU106_20MHz_Nss1,(MCS0)_1TX	-	-	-	-	=
2412MHz	Pass	2.98	8.60	8.60	30.00
2462MHz	Pass	2.98	9.42	9.42	30.00
ax40,RU242_40MHz_Nss1,(MCS0)_1TX	-	-	-	-	=
2422MHz	Pass	2.98	8.68	8.68	30.00
2452MHz	Pass	2.98	9.52	9.52	30.00

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

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PSD\_Full RU Appendix D.1

## Summary

Mode	PD
	(dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_1TX	-6.92
802.11g_Nss1,(6Mbps)_1TX	-6.45
802.11ax HEW20_Nss1,(MCS0)_1TX	-7.18
802.11ax HEW40_Nss1,(MCS0)_1TX	-13.47

RBW = 3kHz;

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Appendix D.1 PSD\_Full RU

#### Result

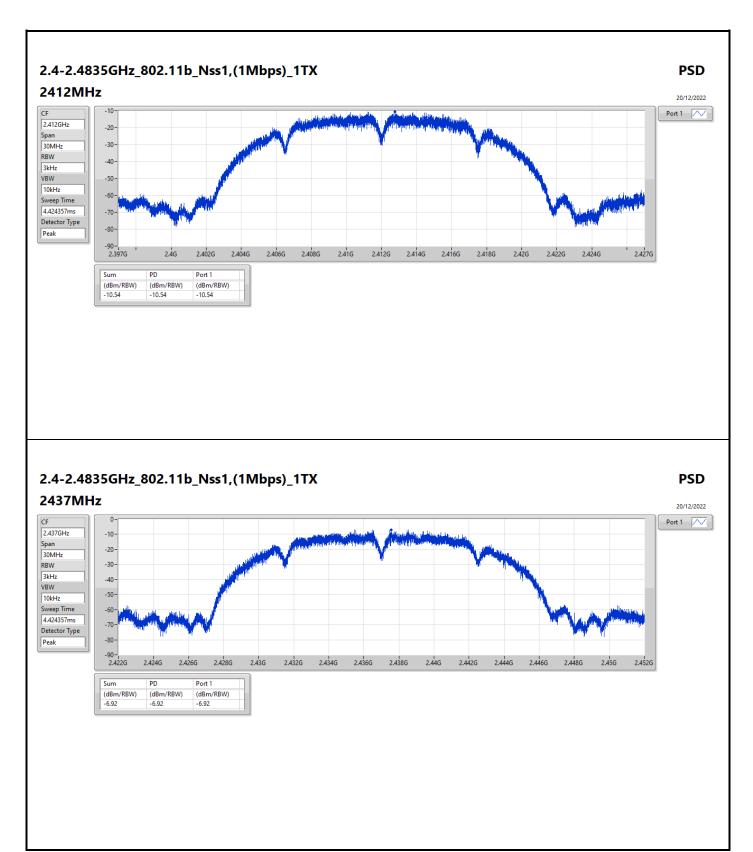
Mode	Result	DG	Port 1	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11b_Nss1,(1Mbps)_1TX	-		-	-	T.
2412MHz	Pass	2.98	-10.54	-10.54	8.00
2437MHz	Pass	2.98	-6.92	-6.92	8.00
2462MHz	Pass	2.98	-9.89	-9.89	8.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.98	-10.75	-10.75	8.00
2437MHz	Pass	2.98	-6.45	-6.45	8.00
2462MHz	Pass	2.98	-11.32	-11.32	8.00
802.11ax HEW20_Nss1,(MCS0)_1TX	-	-	-	-	-
2412MHz	Pass	2.98	-14.85	-14.85	8.00
2437MHz	Pass	2.98	-7.18	-7.18	8.00
2462MHz	Pass	2.98	-12.49	-12.49	8.00
802.11ax HEW40_Nss1,(MCS0)_1TX	-	-	-	-	-
2422MHz	Pass	2.98	-17.20	-17.20	8.00
2437MHz	Pass	2.98	-13.47	-13.47	8.00
2452MHz	Pass	2.98	-14.31	-14.31	8.00

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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;

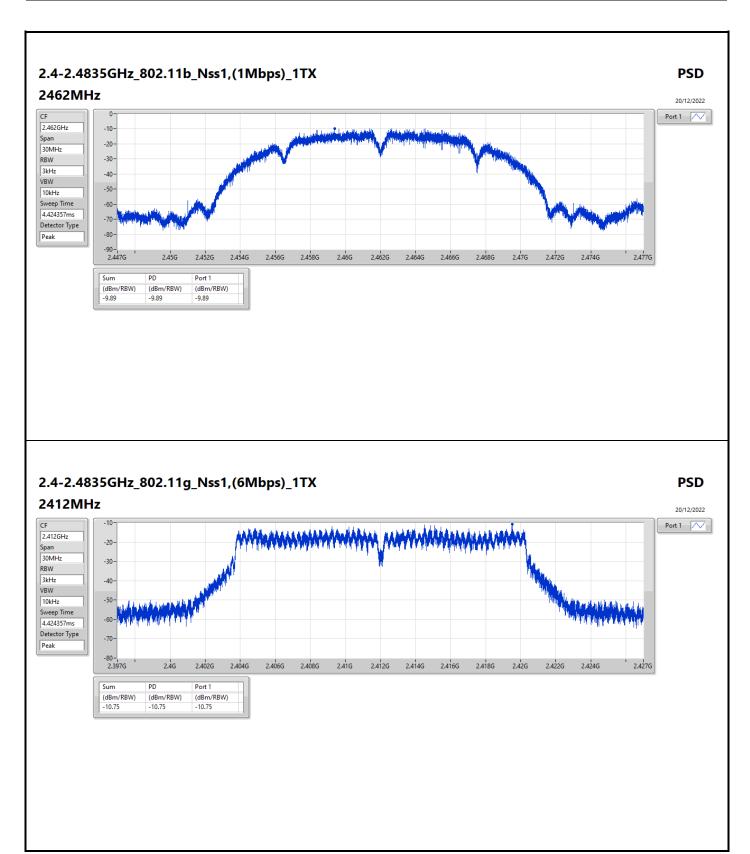




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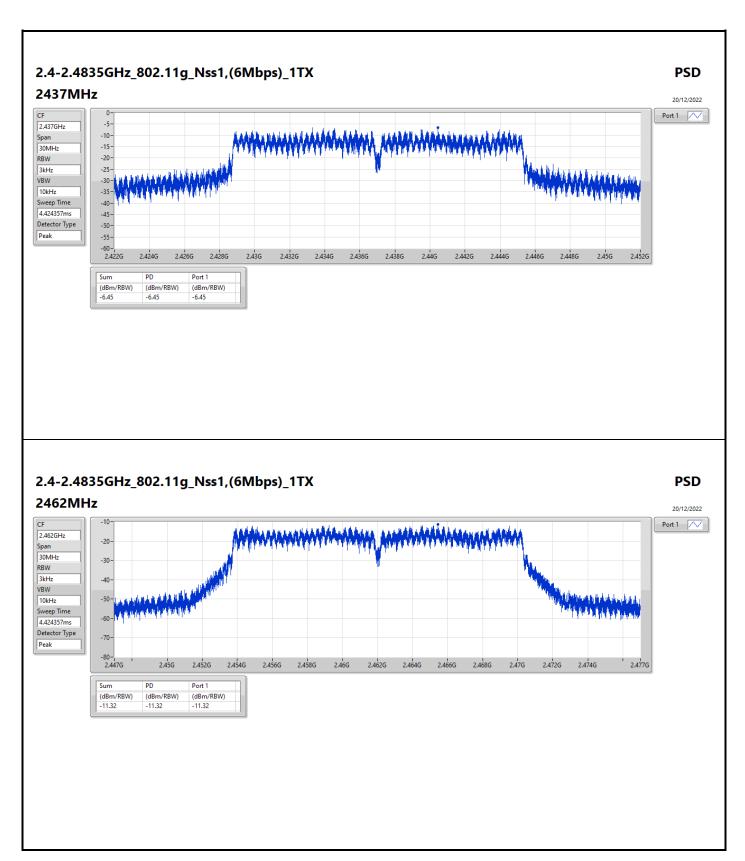




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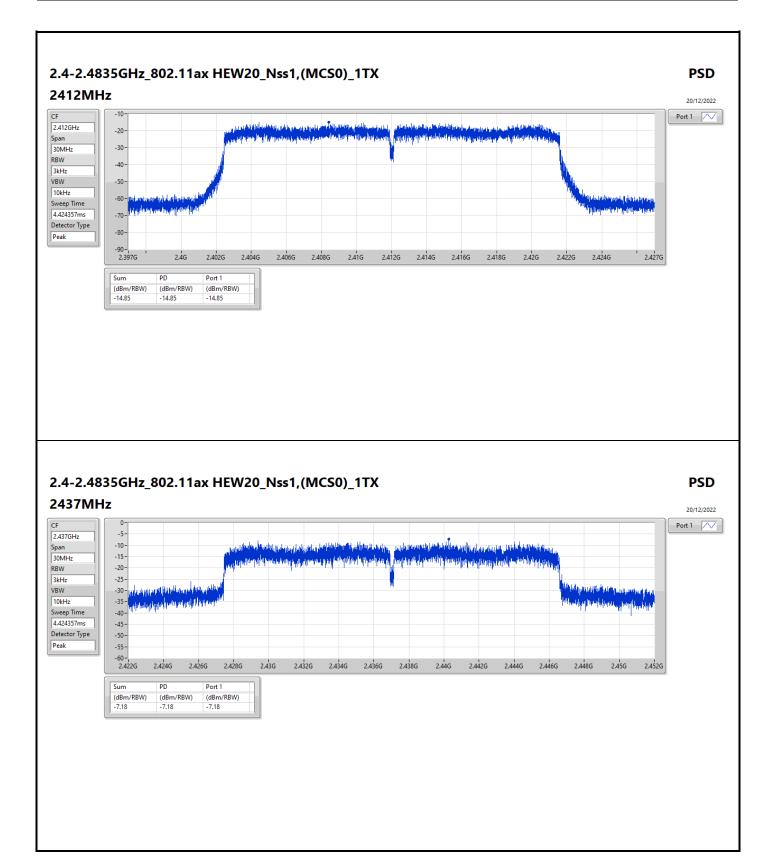


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Appendix D.1

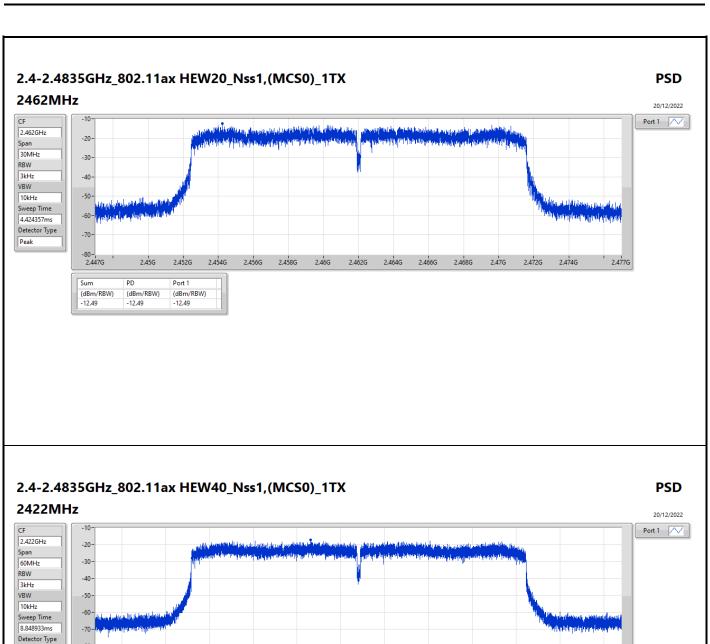




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Appendix D.1





2.41G

2.415G

2.42G

2.425G

2.43G

2.435G

2.44G

2.445G

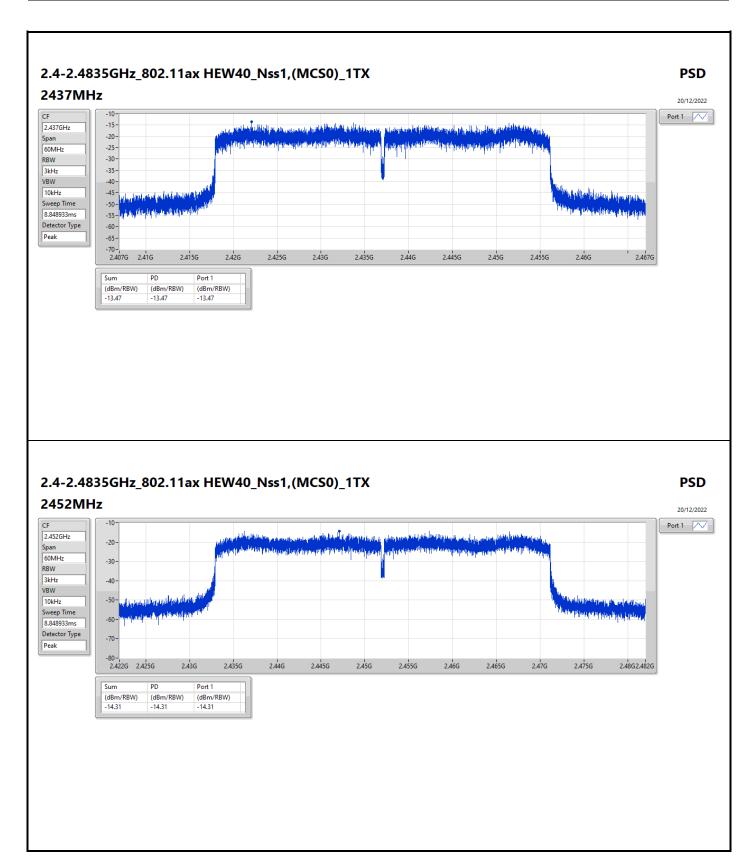
2.45G2.452G

Peak

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PSD\_Partial RU Appendix D.2

## Summary

Mode	PD
	(dBm/RBW)
2.4-2.4835GHz	-
ax20,RU106_20MHz_Nss1,(MCS0)_1TX	-14.20
ax20,RU26_20MHz_Nss1,(MCS0)_1TX	-13.12
ax20,RU52_20MHz_Nss1,(MCS0)_1TX	-12.76
ax40,RU242_40MHz_Nss1,(MCS0)_1TX	-17.88

RBW = 3kHz;

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PSD\_Partial RU Appendix D.2

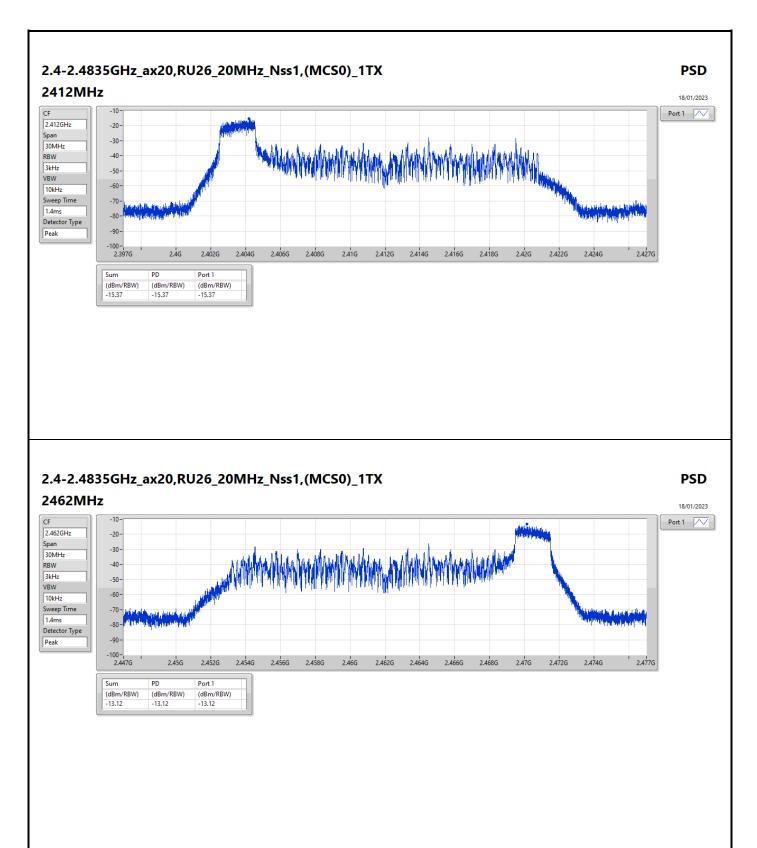
#### Result

Mode	Result	DG	Port 1	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
ax20,RU26_20MHz_Nss1,(MCS0)_1TX	-	-	-	=	-
2412MHz	Pass	2.98	-15.37	-15.37	8.00
2462MHz	Pass	2.98	-13.12	-13.12	8.00
ax20,RU52_20MHz_Nss1,(MCS0)_1TX	-	-	=	-	-
2412MHz	Pass	2.98	-15.57	-15.57	8.00
2462MHz	Pass	2.98	-12.76	-12.76	8.00
ax20,RU106_20MHz_Nss1,(MCS0)_1TX	-	-	=	-	-
2412MHz	Pass	2.98	-14.86	-14.86	8.00
2462MHz	Pass	2.98	-14.20	-14.20	8.00
ax40,RU242_40MHz_Nss1,(MCS0)_1TX	-	-	=	-	=
2422MHz	Pass	2.98	-17.88	-17.88	8.00
2452MHz	Pass	2.98	-18.12	-18.12	8.00

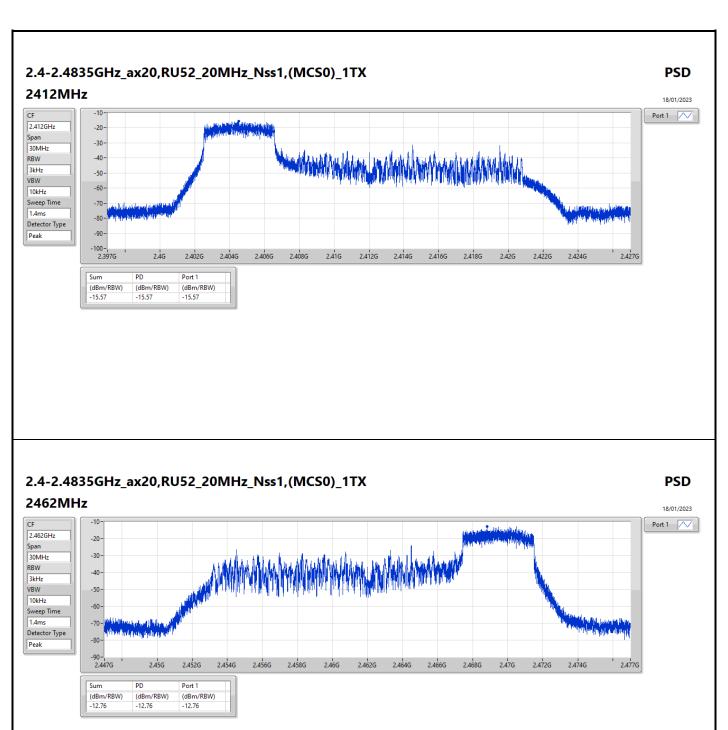
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DG = Directional Gain; RBW = 3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;



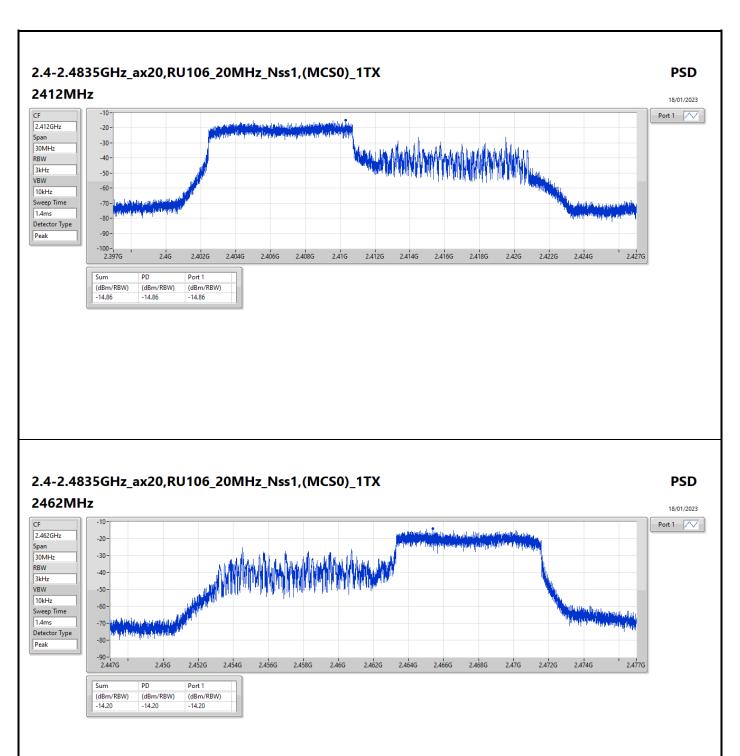






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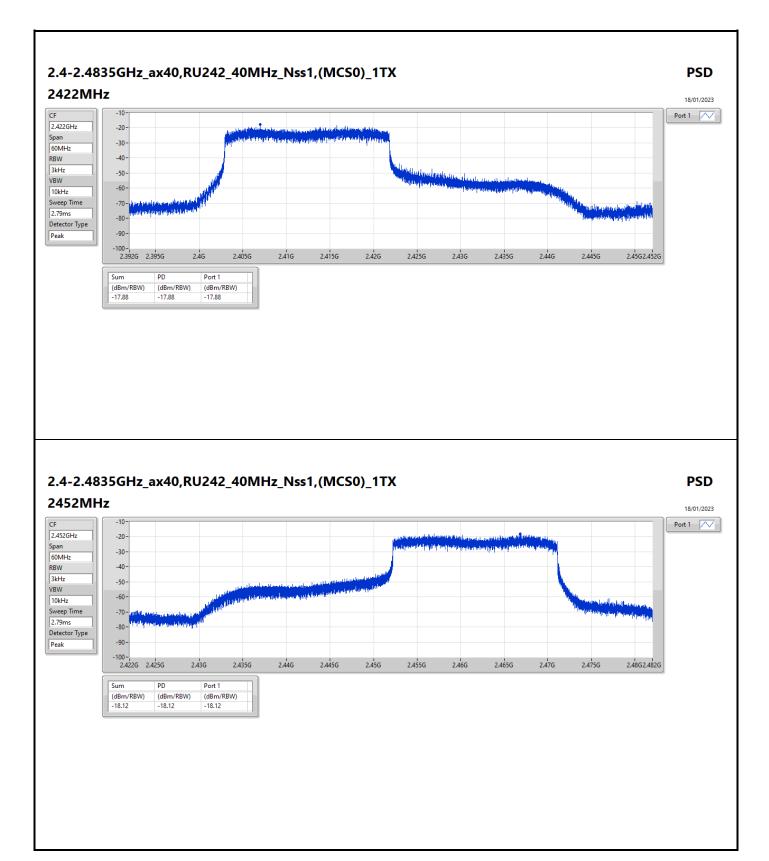




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CSE (NdB Down) Appendix E

## 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)_1TX	Pass	2.43958G	7.40	-22.60	860.65M	-52.00	2.39504G	-44.98	2.4G	-52.45	2.50414G	-52.36	7.23514G	-44.58	1
802.11g_Nss1,(6Mbps)_1TX	Pass	2.43958G	9.23	-20.77	2.03031G	-52.73	2.39896G	-31.53	2.4G	-31.59	2.51726G	-51.22	7.23795G	-41.74	1
802.11ax HEW20_Nss1,(MCS0)_1TX	Pass	2.43457G	7.99	-22.01	2.30991G	-52.02	2.39712G	-35.30	2.4G	-36.53	2.50382G	-43.11	6.40912G	-47.84	1
802.11ax HEW40_Nss1,(MCS0)_1TX	Pass	2.44208G	2.11	-27.89	1.74178G	-52.91	2.39936G	-30.34	2.4G	-33.37	2.50542G	-43.76	16.91445G	-47.36	1

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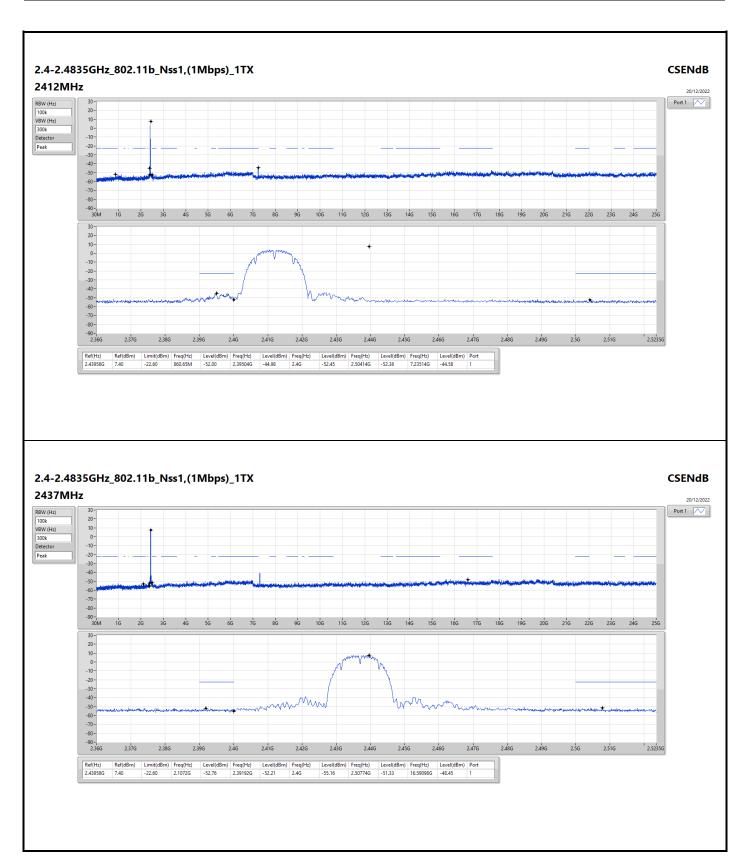
CSE (NdB Down) Appendix E

## 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)_1TX	-	-	-	-	-	-	-	-		-	-	-	-	-	-
2412MHz	Pass	2.43958G	7.40	-22.60	860.65M	-52.00	2.39504G	-44.98	2.4G	-52.45	2.50414G	-52.36	7.23514G	-44.58	1
2437MHz	Pass	2.43958G	7.40	-22.60	2.1072G	-52.76	2.39192G	-52.21	2.4G	-55.16	2.50774G	-51.33	16.59098G	-48.45	1
2462MHz	Pass	2.43958G	7.40	-22.60	2.16428G	-53.03	2.4G	-52.83	2.4G	-54.54	2.50526G	-51.37	15.32949G	-48.08	1
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43958G	9.23	-20.77	2.03031G	-52.73	2.39896G	-31.53	2.4G	-31.59	2.51726G	-51.22	7.23795G	-41.74	1
2437MHz	Pass	2.43958G	9.23	-20.77	1.97555G	-52.92	2.39896G	-33.87	2.4G	-35.81	2.50134G	-43.19	24.53361G	-48.20	1
2462MHz	Pass	2.43958G	9.23	-20.77	890.94M	-52.51	2.394G	-51.35	2.4G	-53.72	2.50006G	-49.01	17.61928G	-48.11	1
802.11ax HEW20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-	-		-	-	-	-	-	-
2412MHz	Pass	2.43457G	7.99	-22.01	2.01633G	-52.99	2.39944G	-38.07	2.4G	-40.72	2.52326G	-52.42	6.99632G	-47.94	1
2437MHz	Pass	2.43457G	7.99	-22.01	2.30991G	-52.02	2.39712G	-35.30	2.4G	-36.53	2.50382G	-43.11	6.40912G	-47.84	1
2462MHz	Pass	2.43457G	7.99	-22.01	2.30991G	-52.94	2.39704G	-52.48	2.4G	-54.85	2.5007G	-50.44	6.8727G	-47.77	1
802.11ax HEW40_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.44208G	2.11	-27.89	955.16M	-53.50	2.39344G	-38.83	2.4G	-44.02	2.52206G	-51.35	16.32829G	-46.65	1
2437MHz	Pass	2.44208G	2.11	-27.89	1.74178G	-52.91	2.39936G	-30.34	2.4G	-33.37	2.50542G	-43.76	16.91445G	-47.36	1
2452MHz	Pass	2.44208G	2.11	-27.89	2.30283G	-52.22	2.39616G	-42.28	2.4G	-45.89	2.5003G	-40.73	17.68009G	-47.72	1

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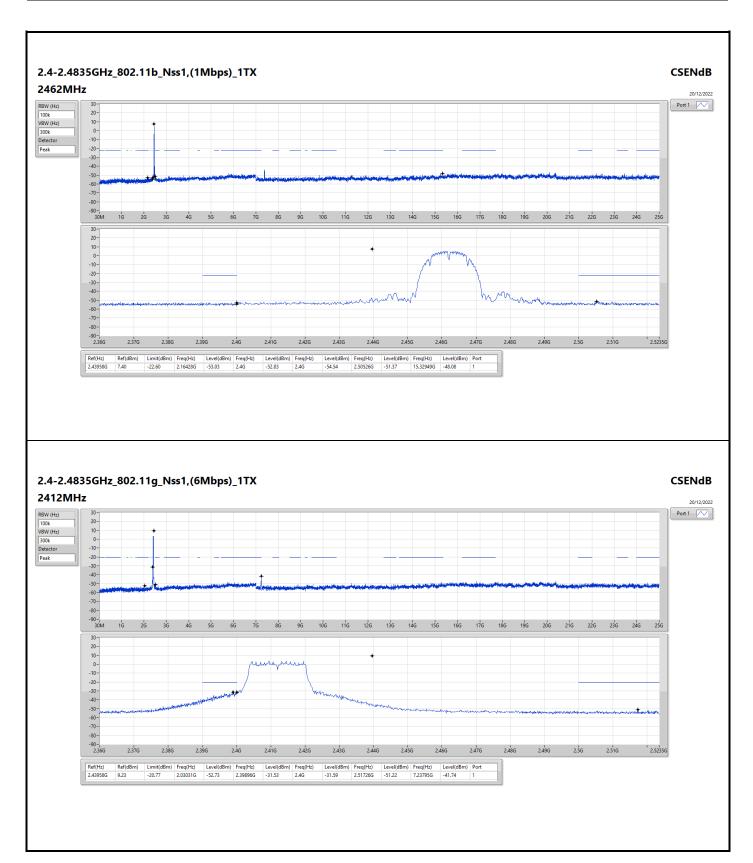




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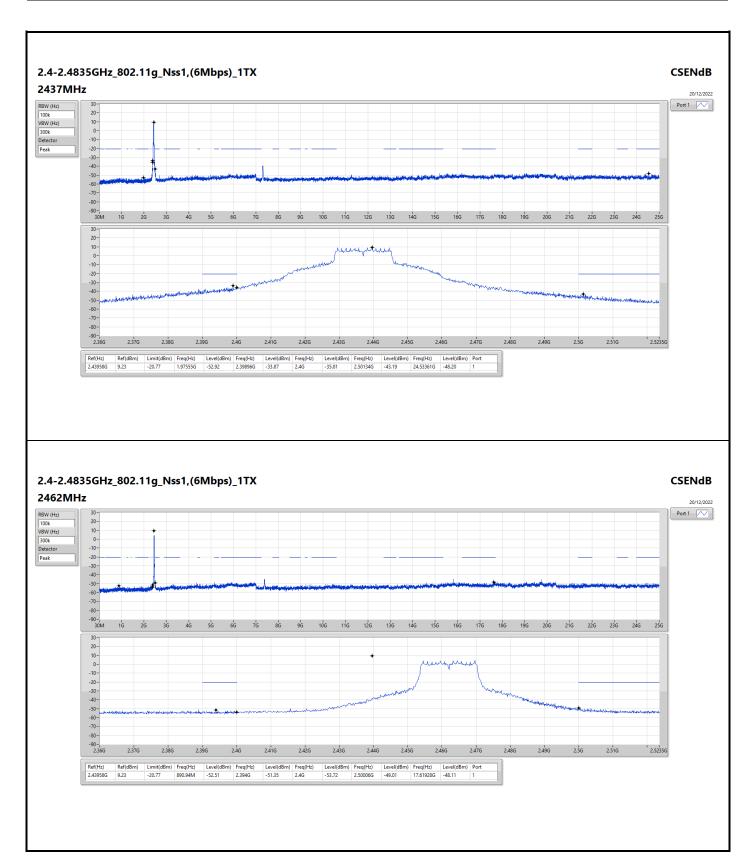




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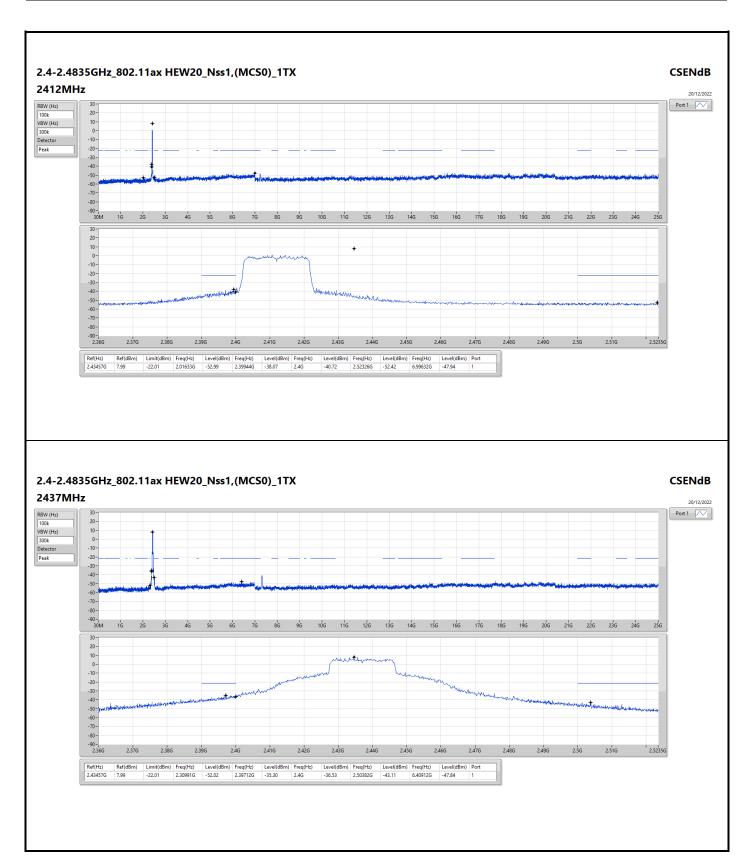




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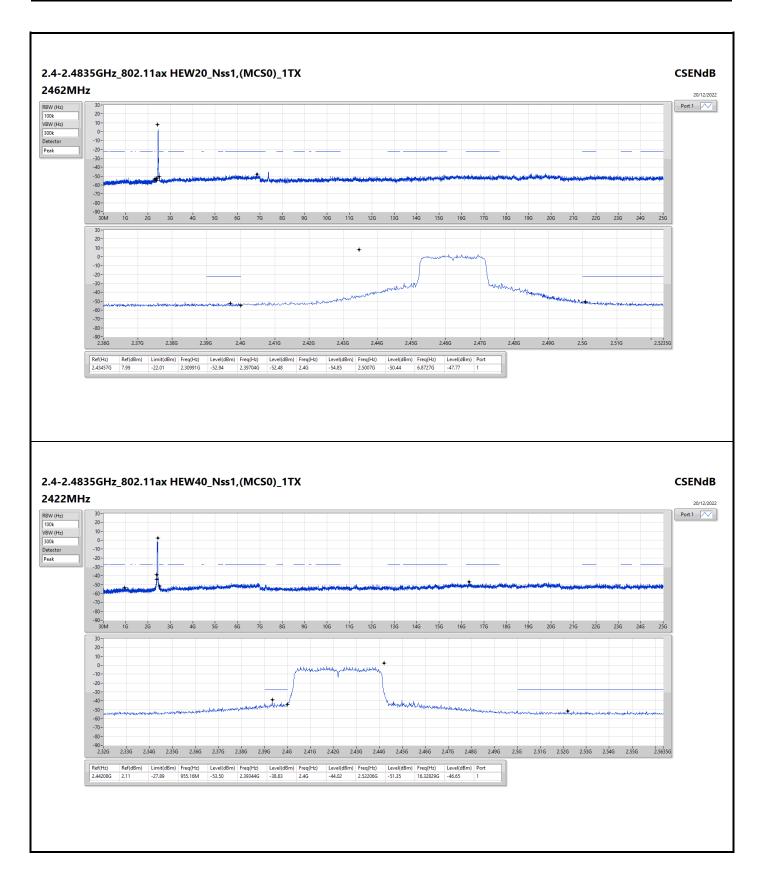




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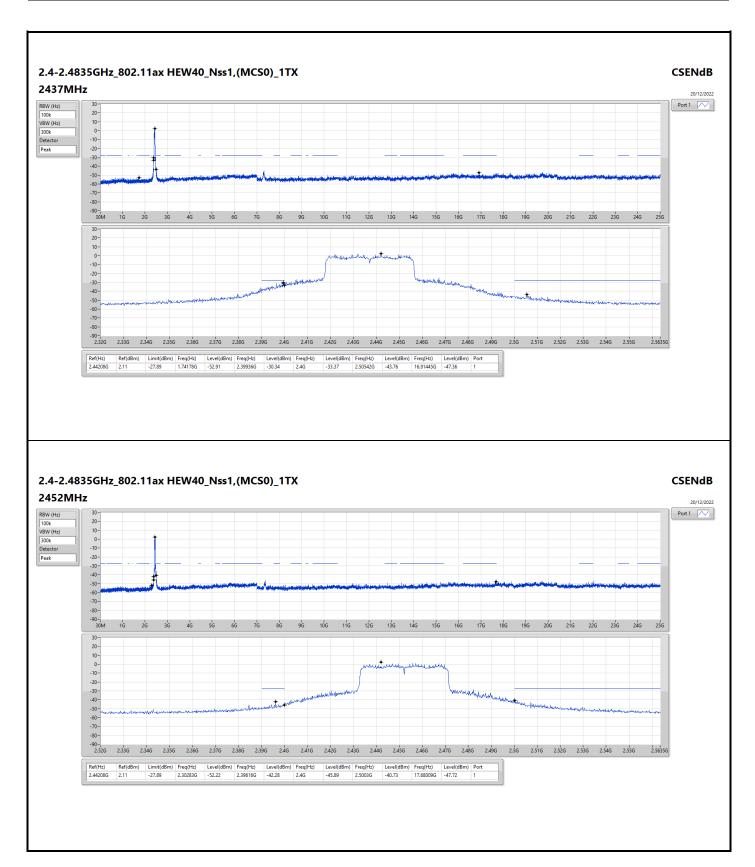




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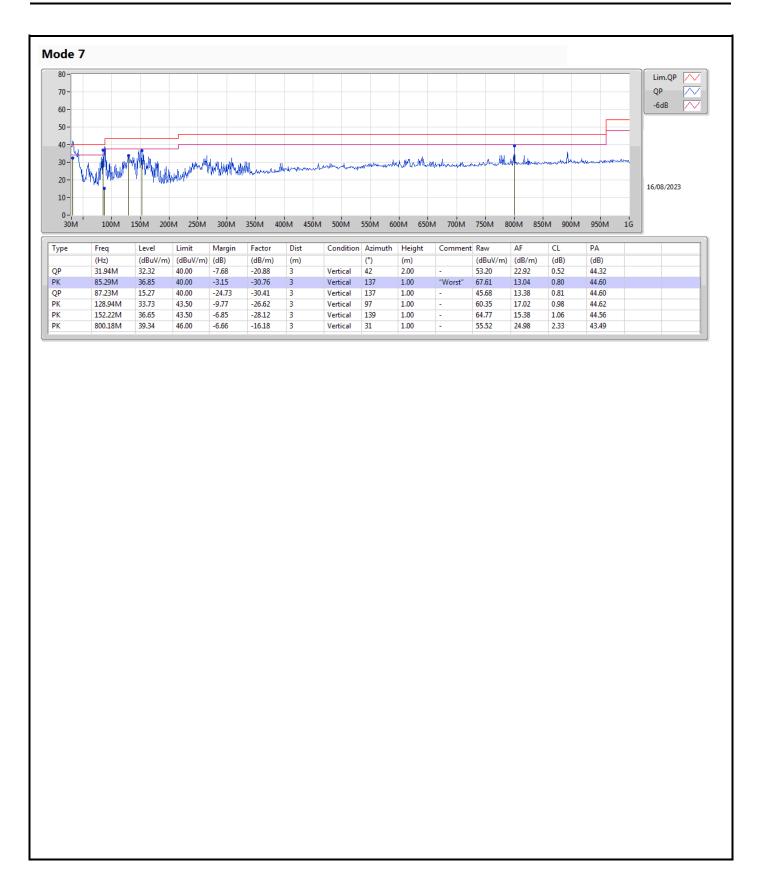
## Radiated Emissions below 1GHz

Appendix F.1

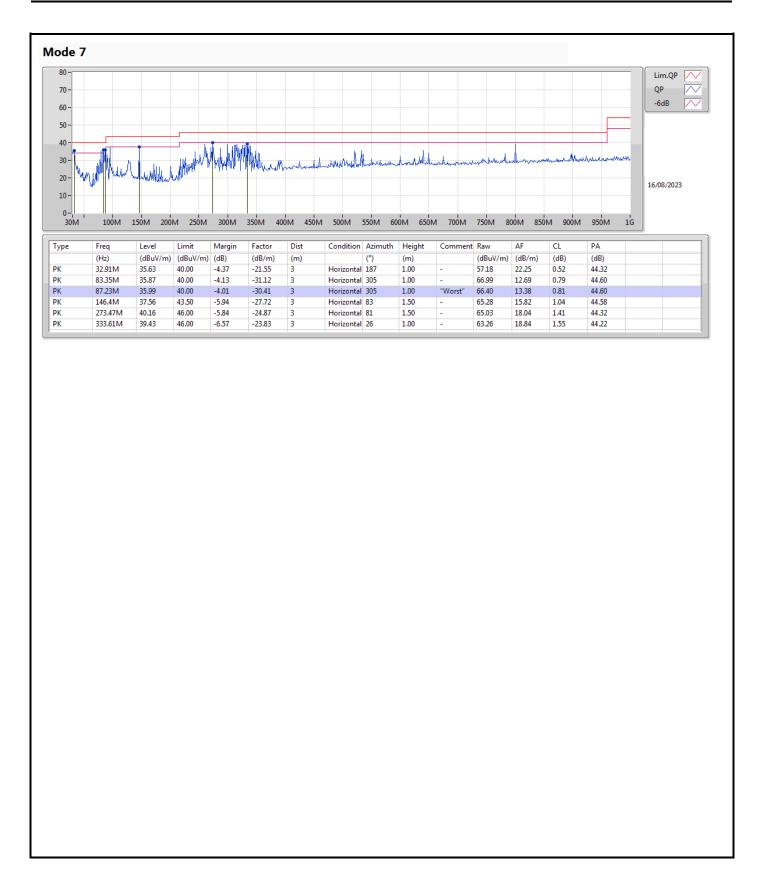
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 7	Pass	PK	85.29M	36.85	40.00	-3.15	Vertical

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## RSE TX above 1GHz

Appendix F.2

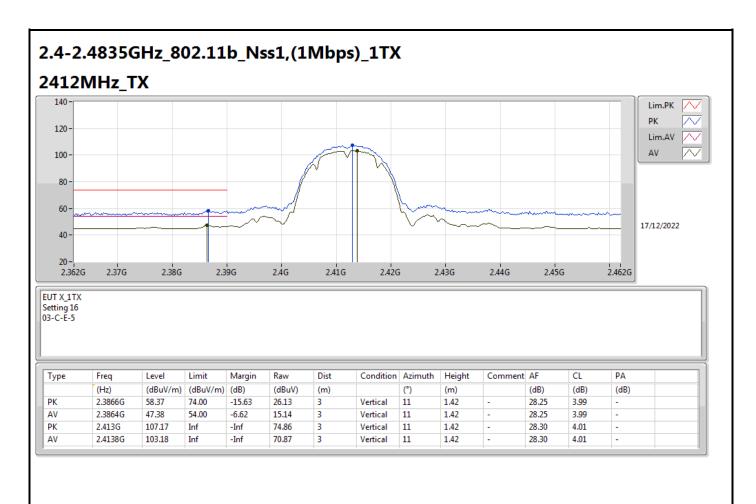
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth	Height (m)	Comments
2.4-2.4835GHz	-	-	- (112)	(ubuviii)	(ubuviii)	- (ub)	-	-	-	-	-
802.11b_Nss1,(1Mbps)_1TX	Pass	AV	4.82406G	52.90	54.00	-1.10	3	Horizontal	69	2.12	-

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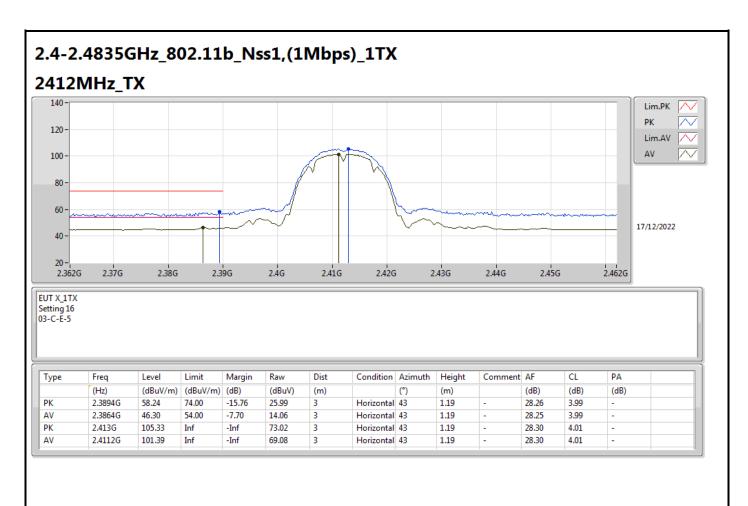




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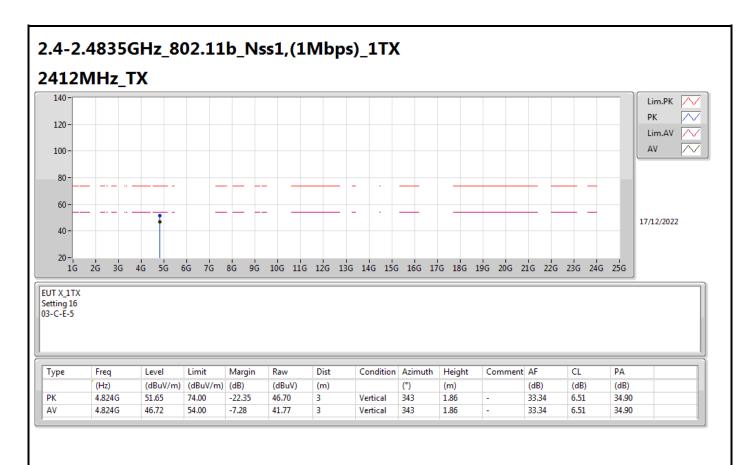




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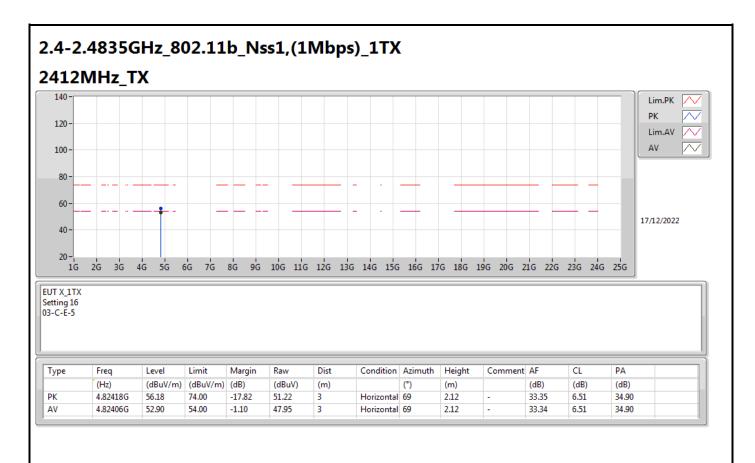




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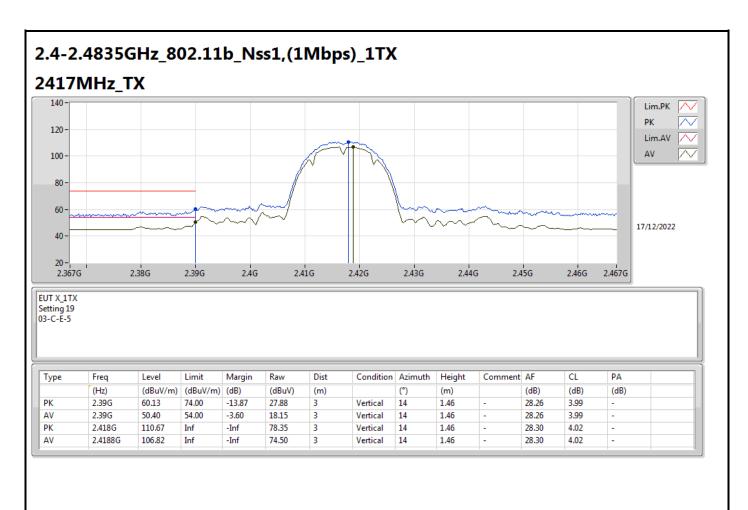




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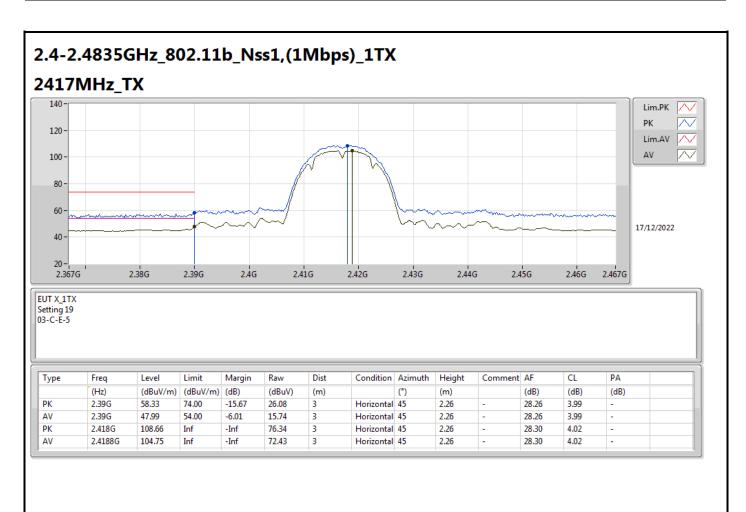




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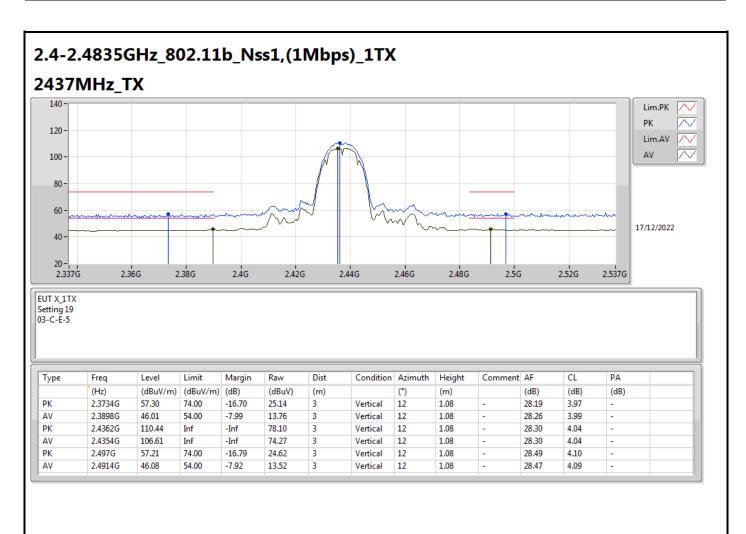




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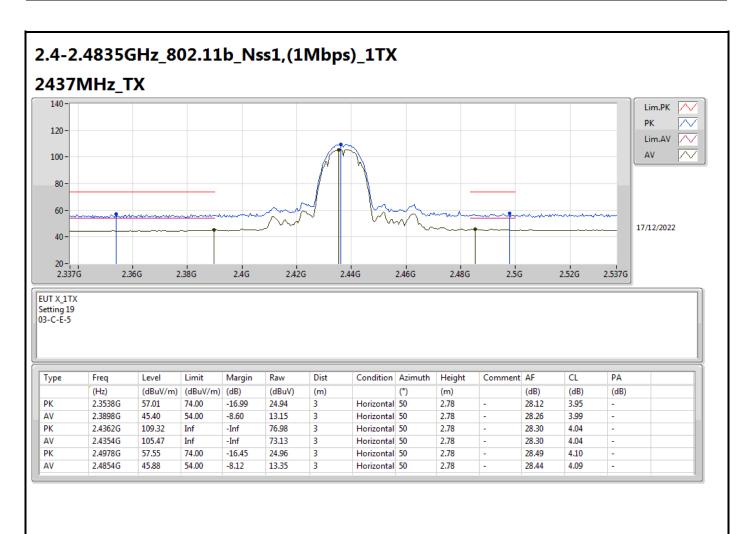




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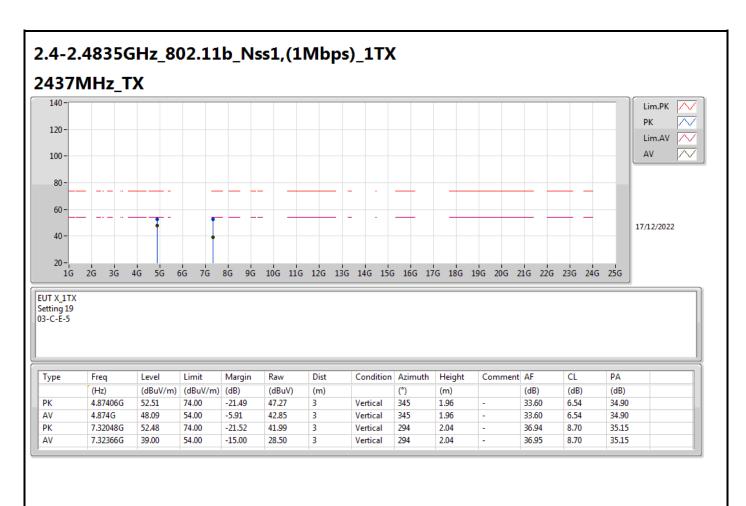




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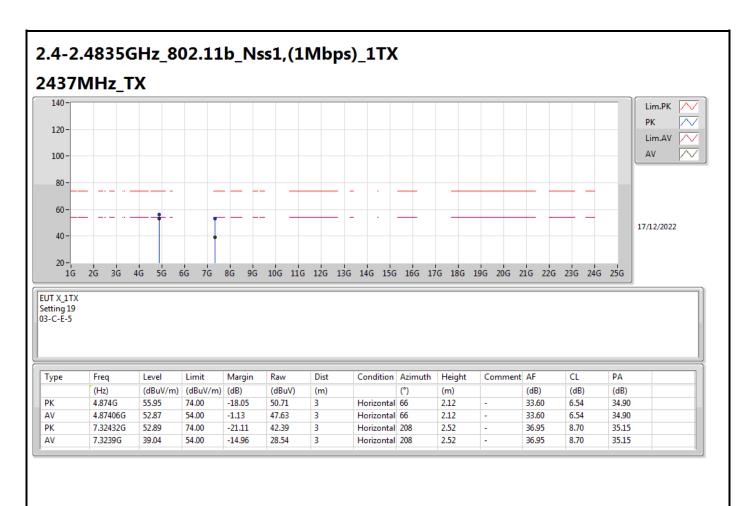




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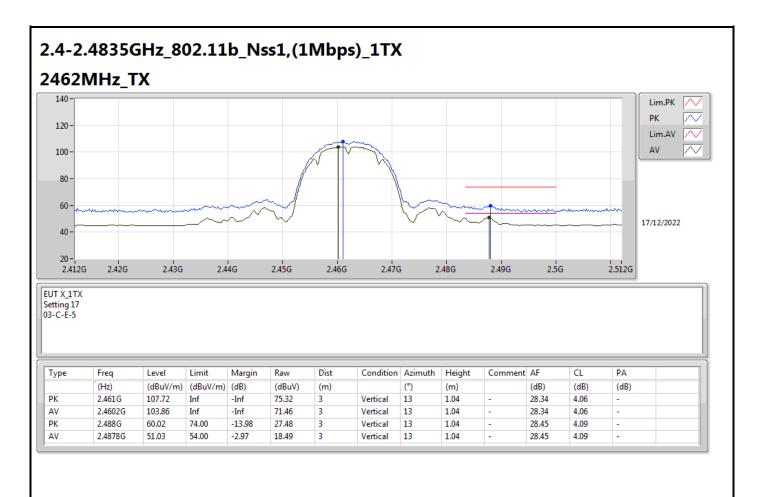




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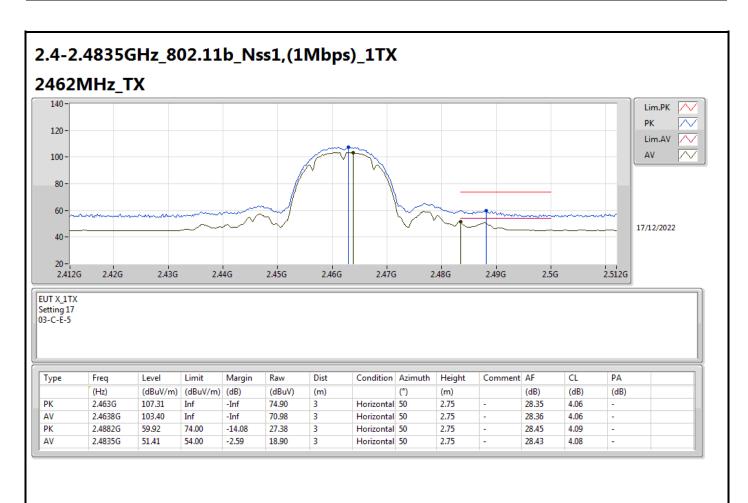




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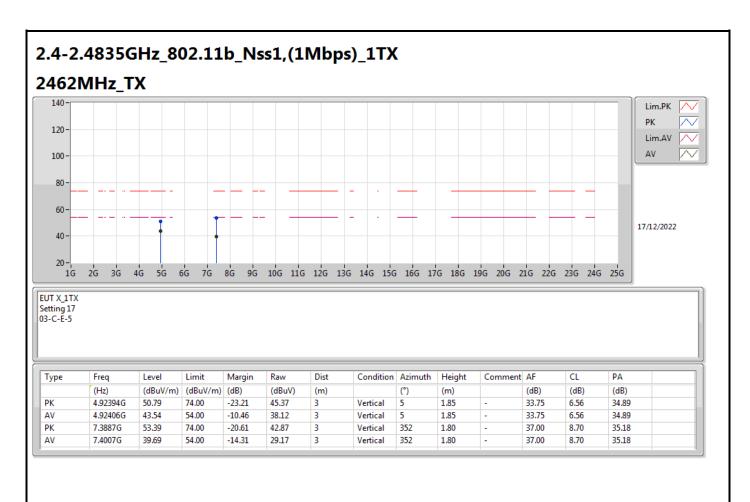




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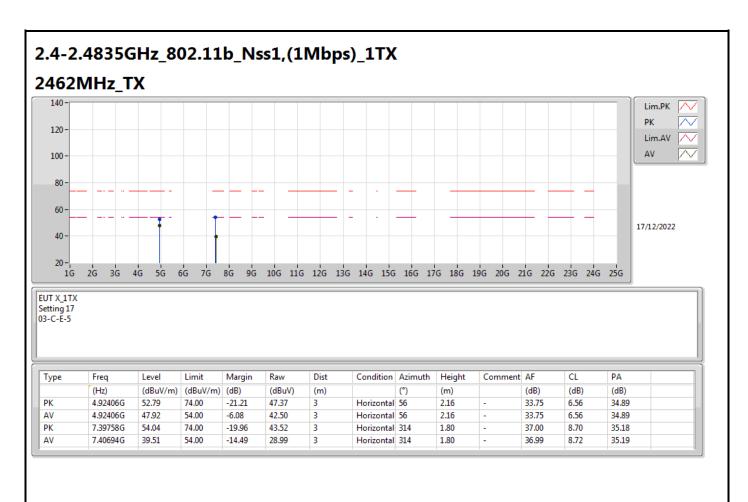




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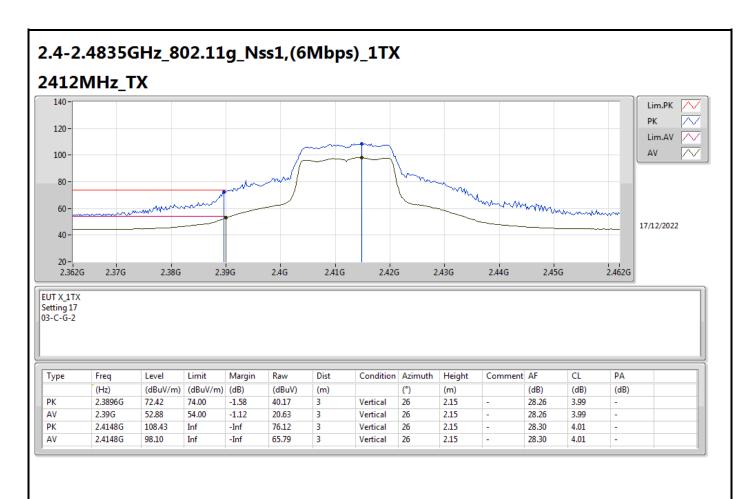




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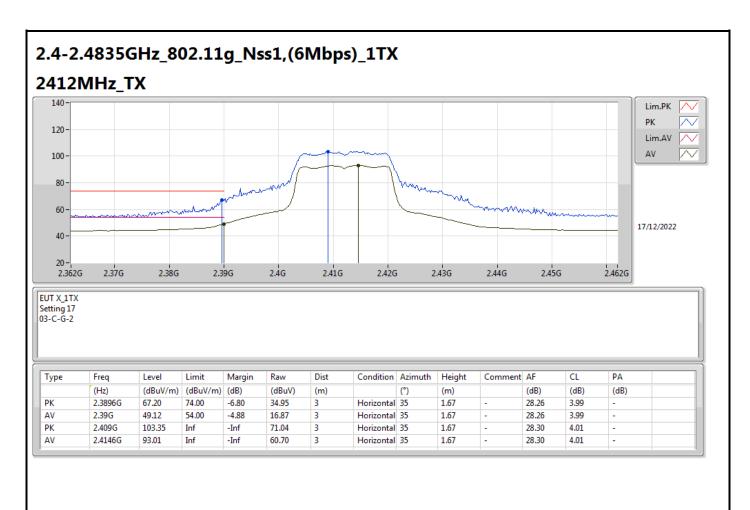




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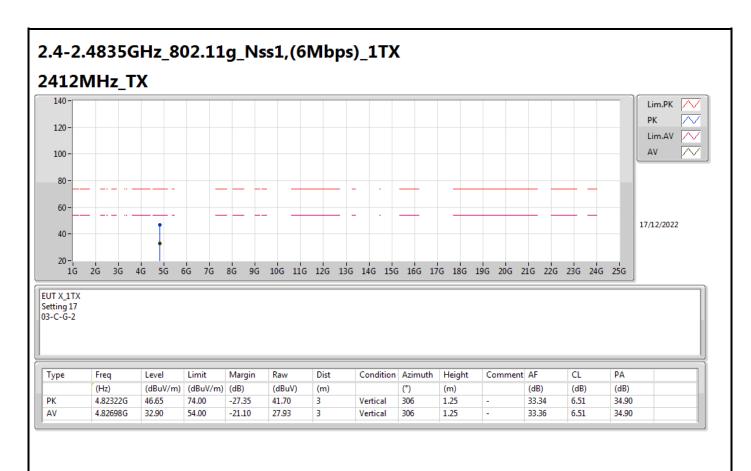




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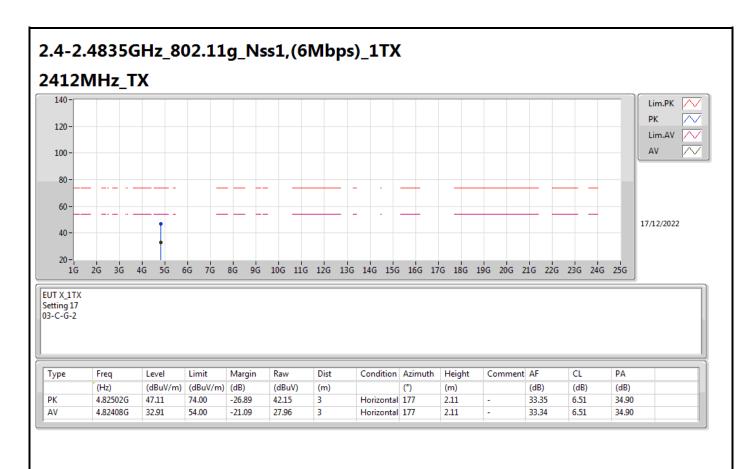




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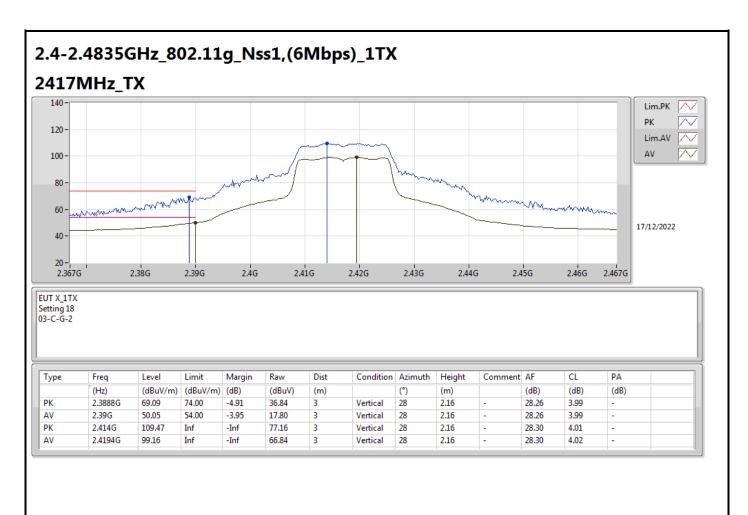




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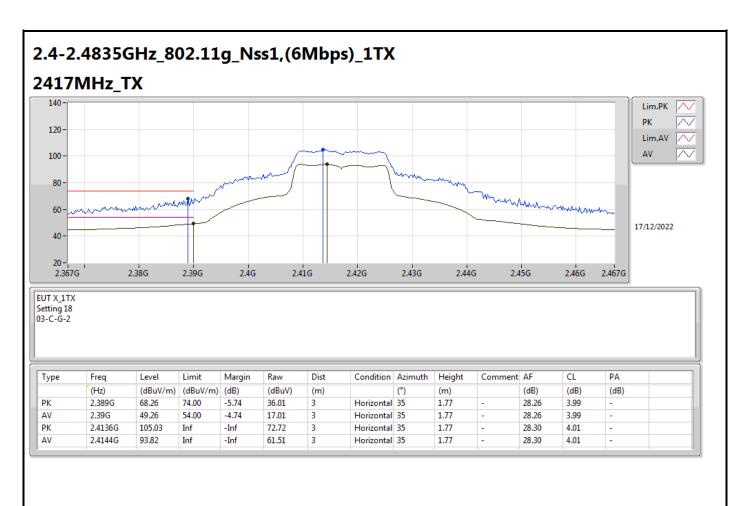




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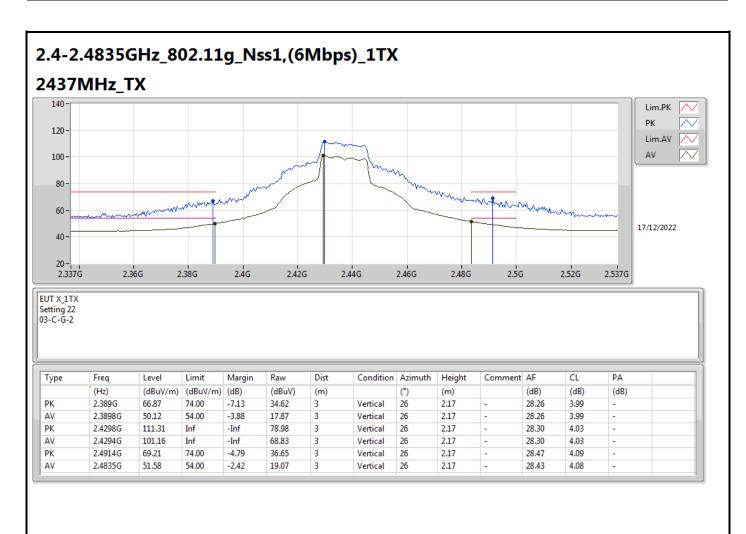




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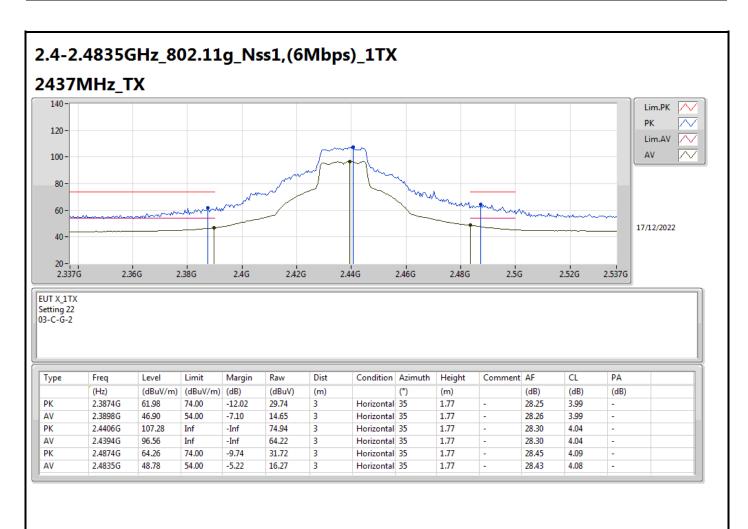




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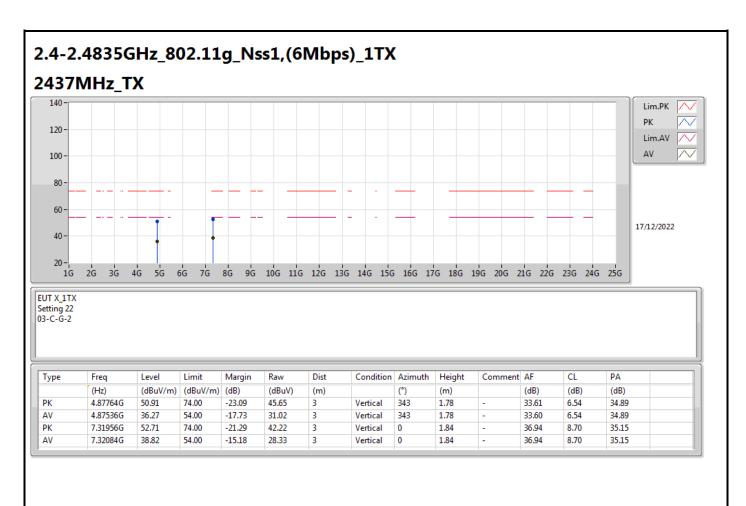




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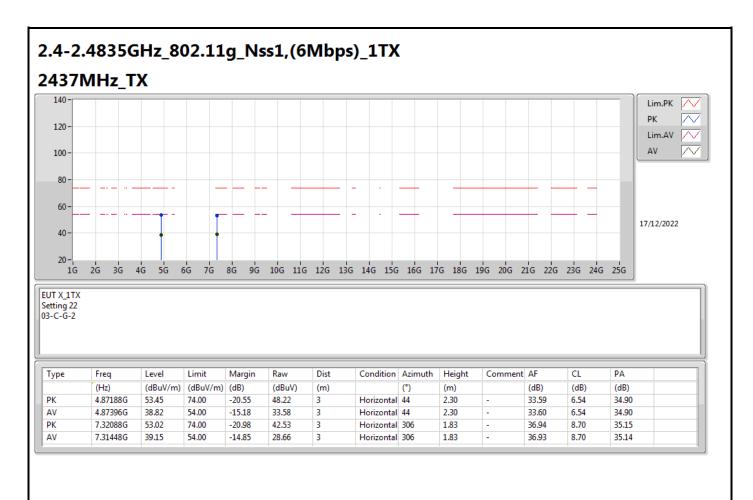




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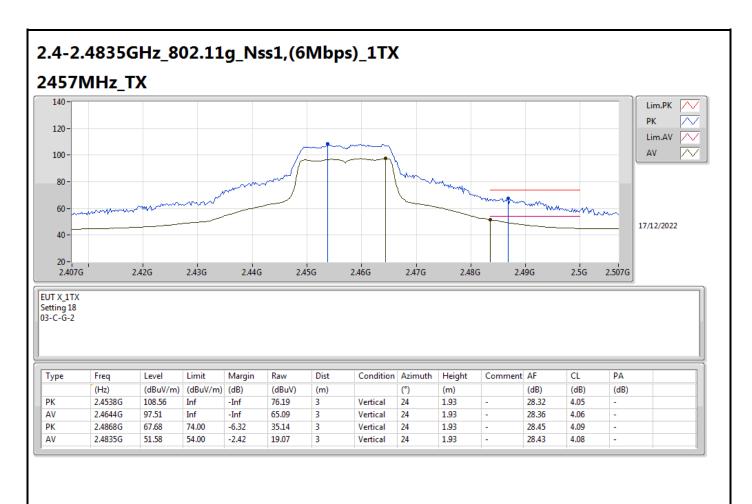




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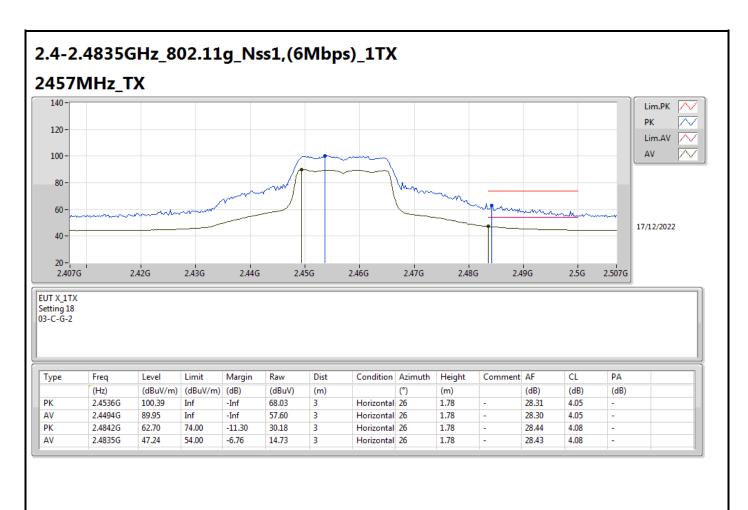




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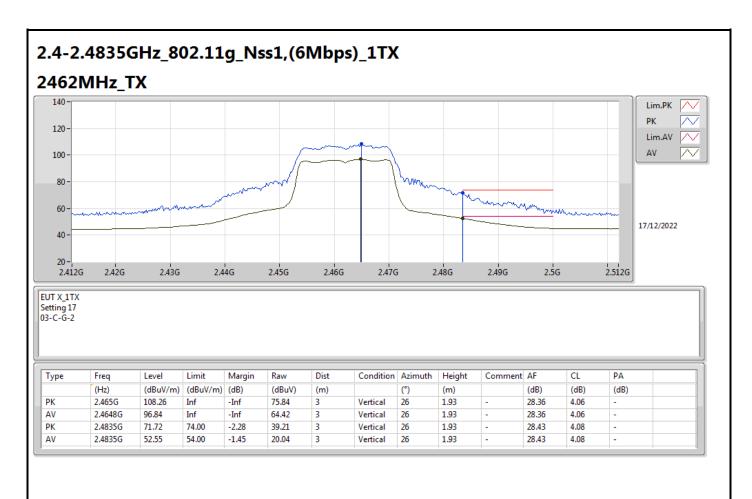




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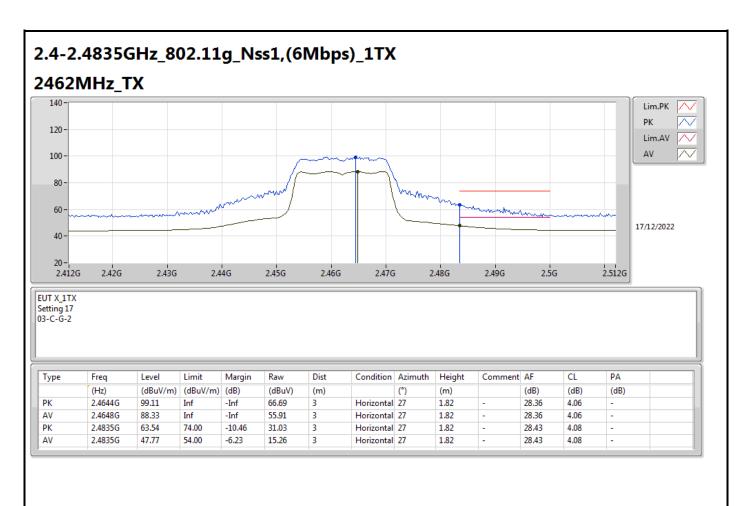




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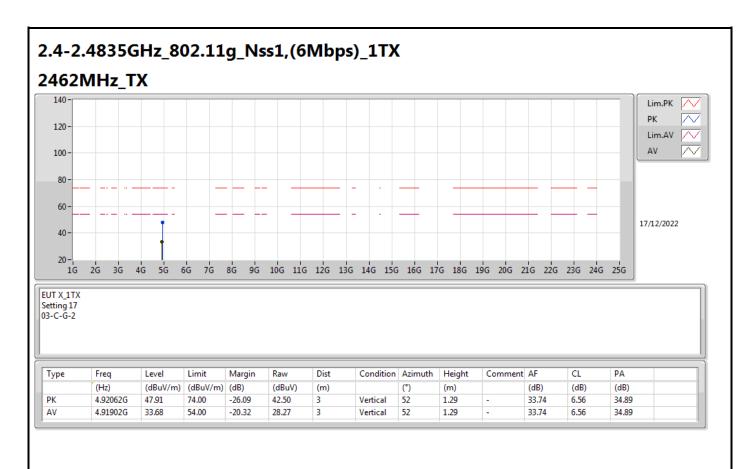




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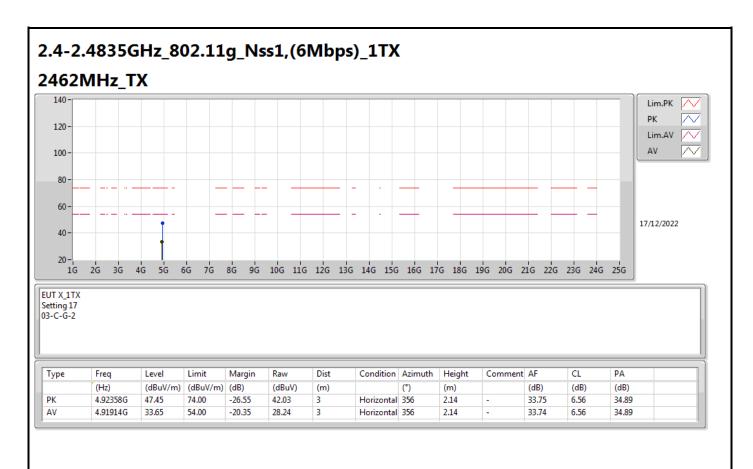




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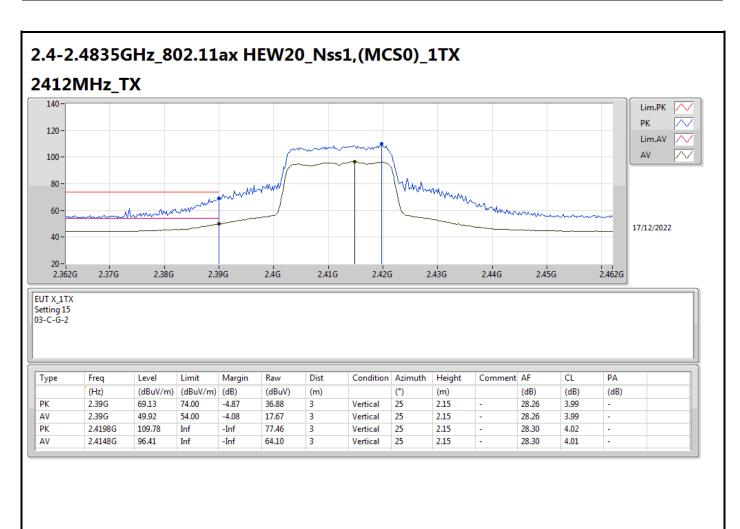




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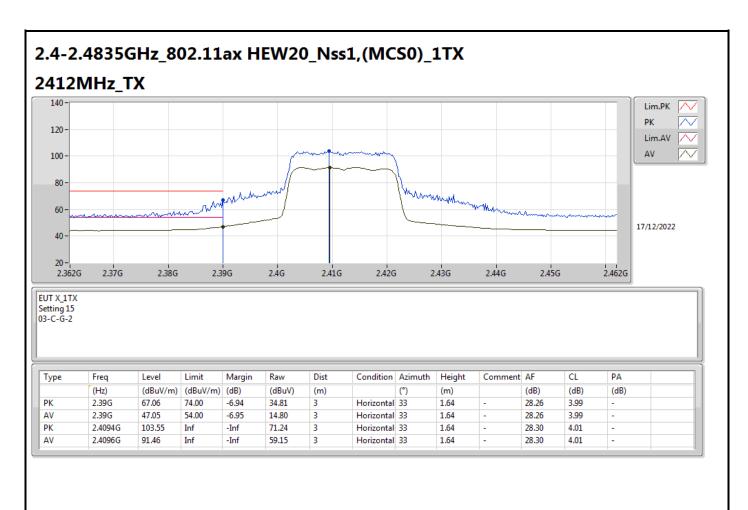




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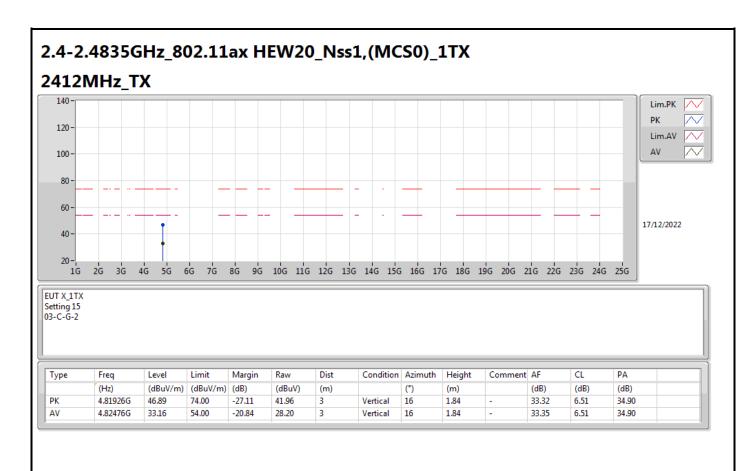




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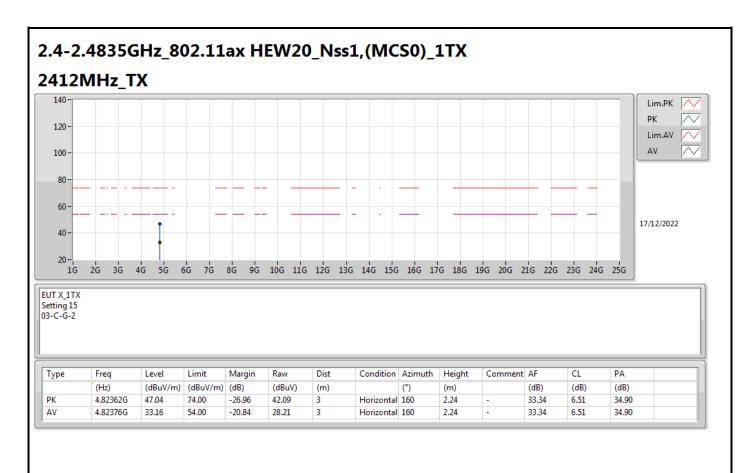




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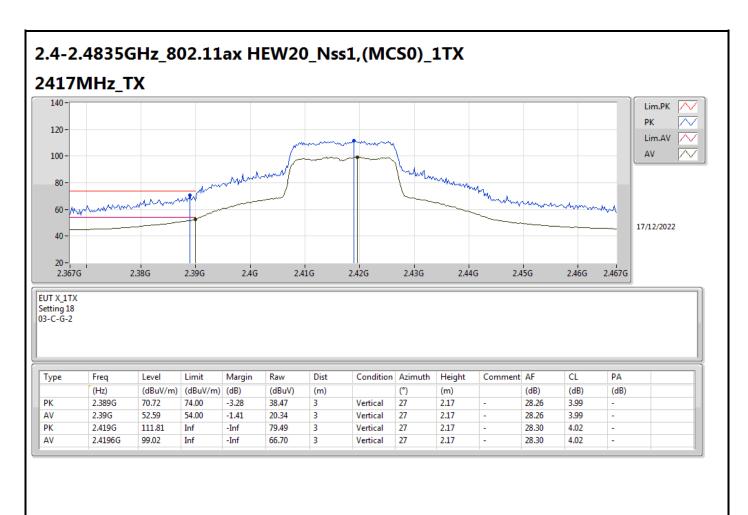




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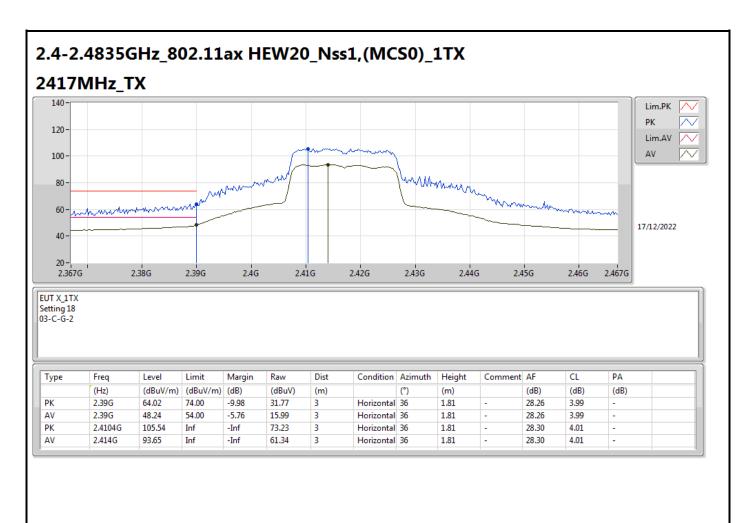




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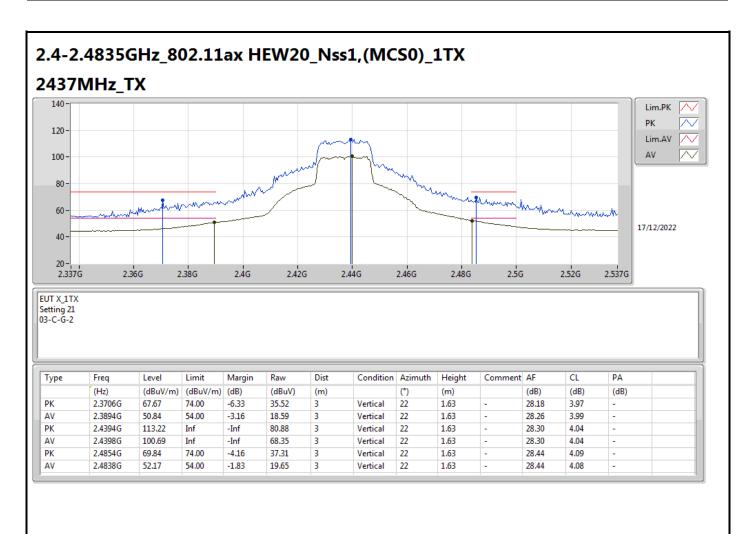




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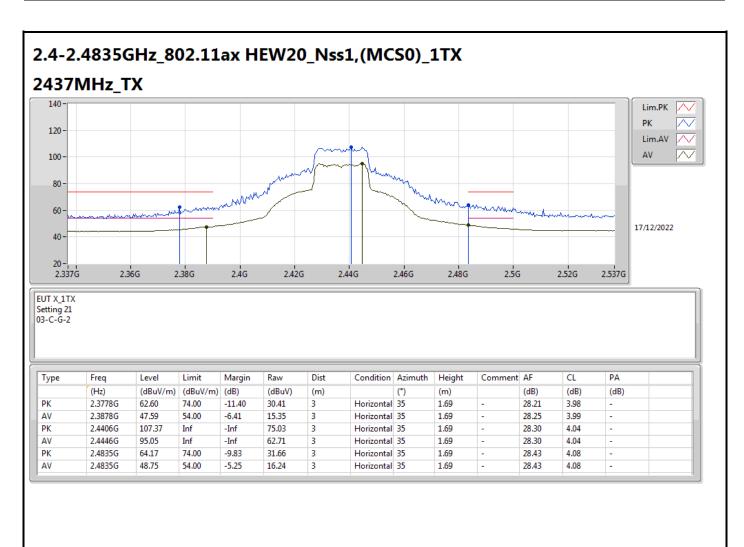




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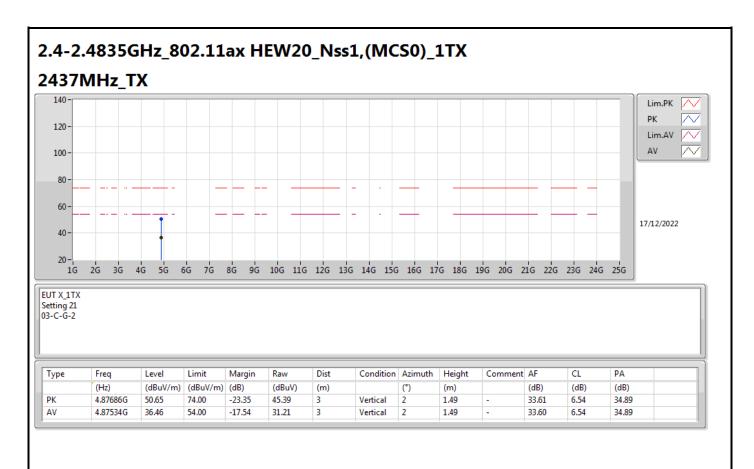




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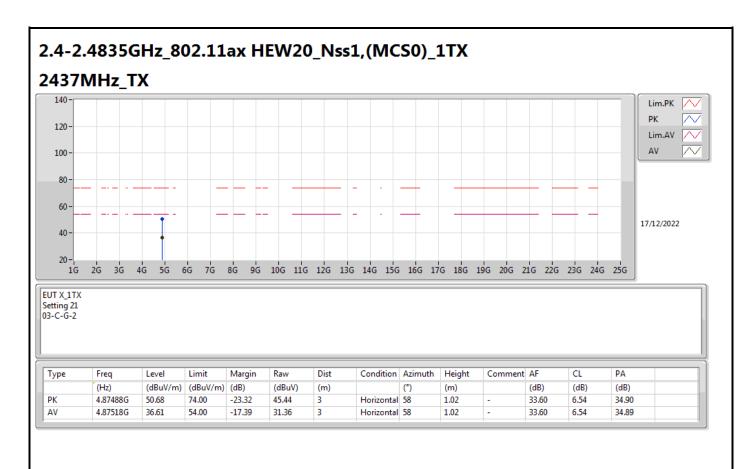




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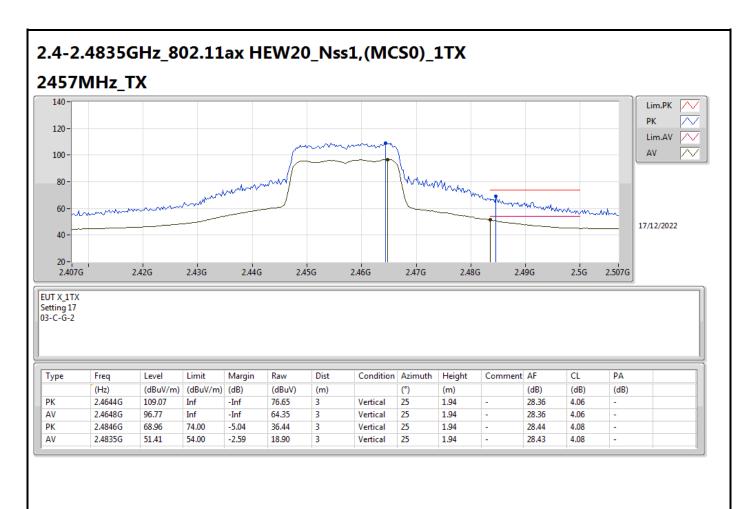




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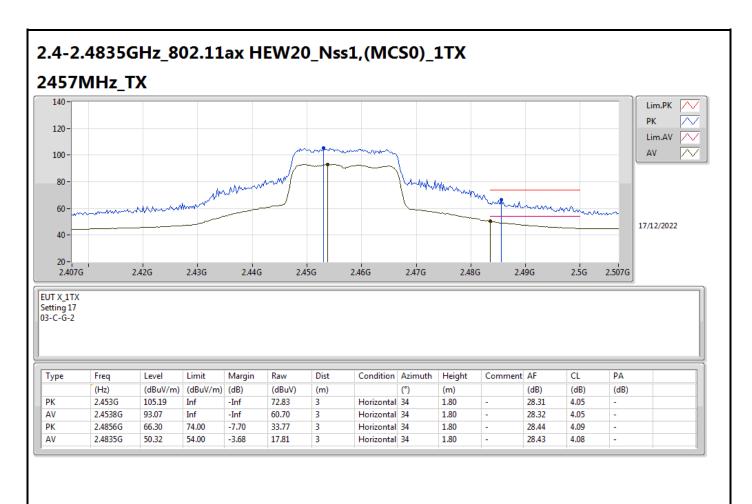




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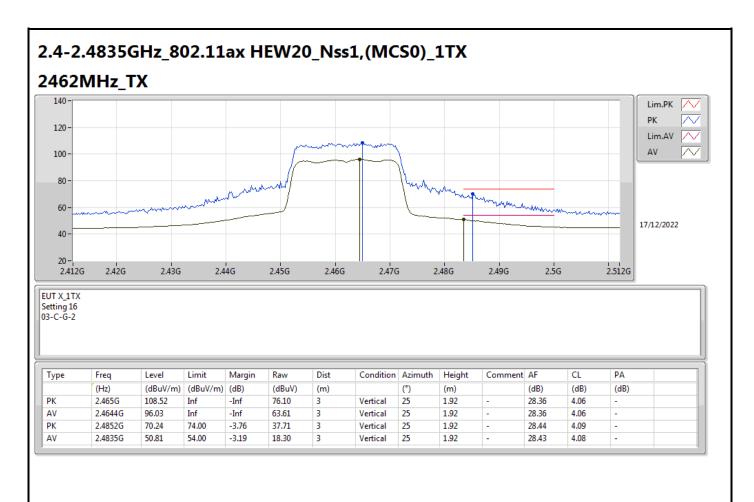




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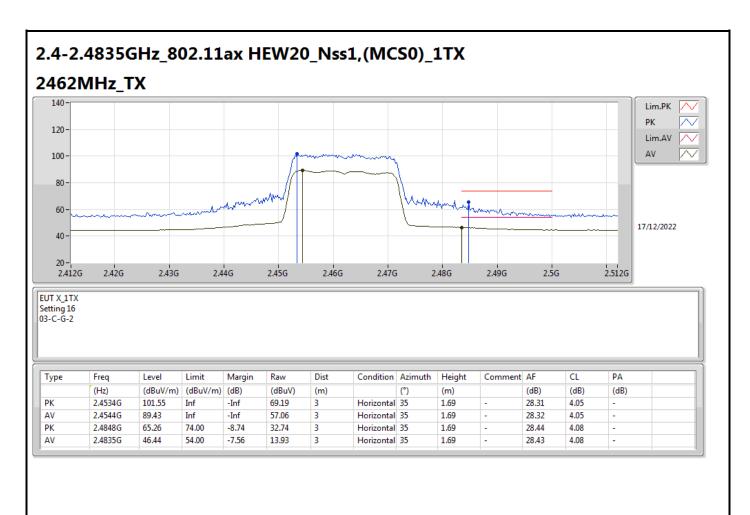




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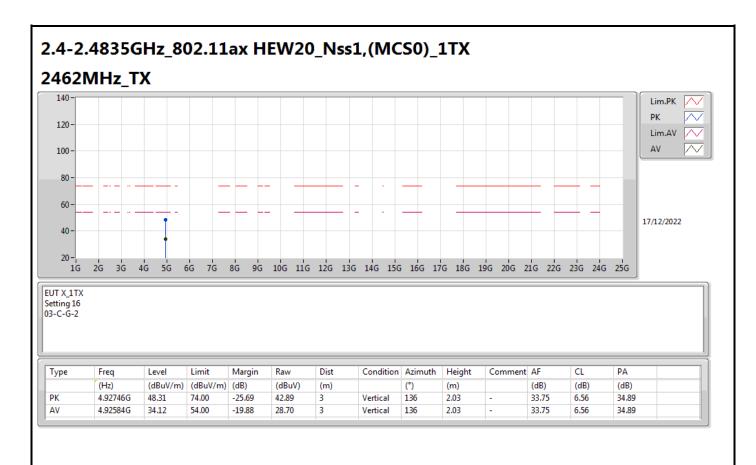




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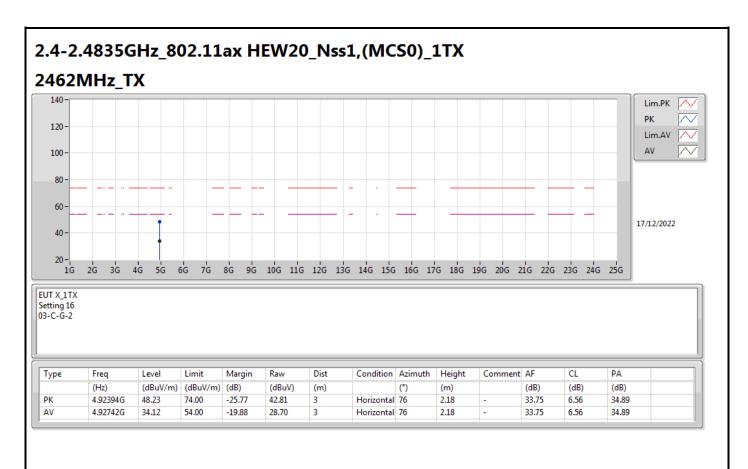




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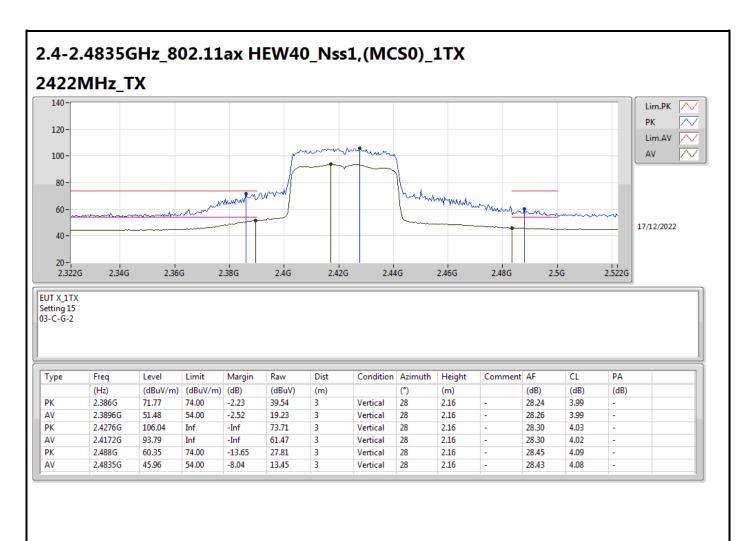




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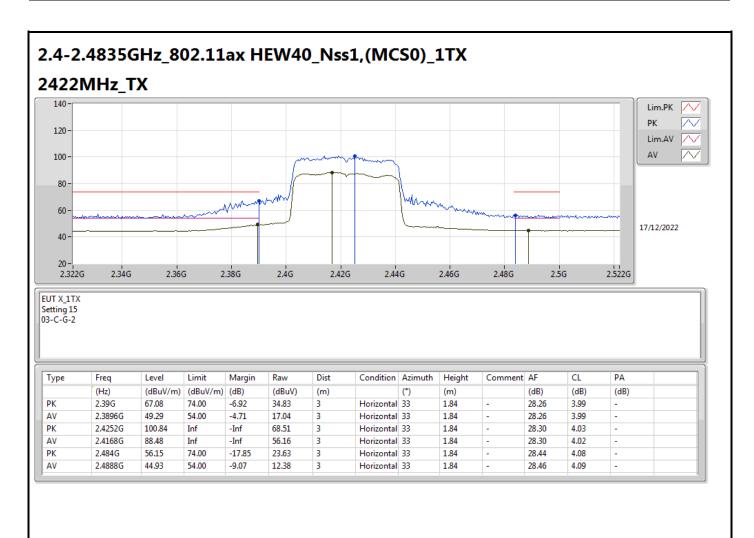




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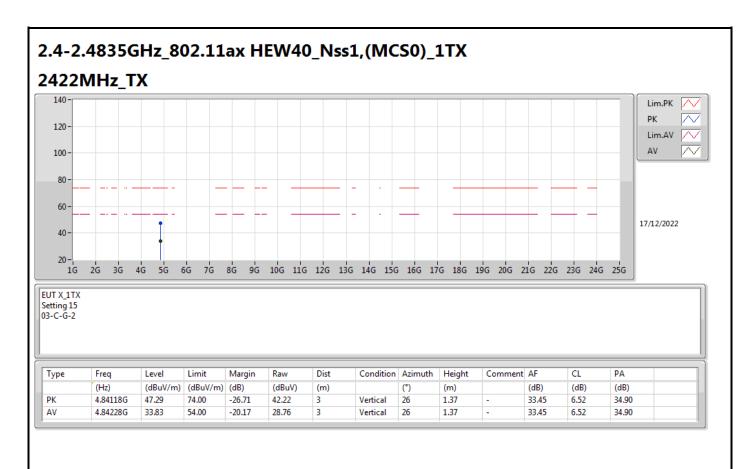




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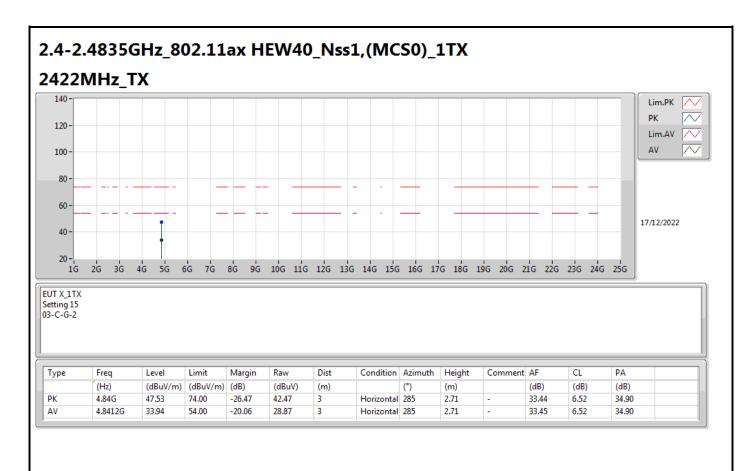




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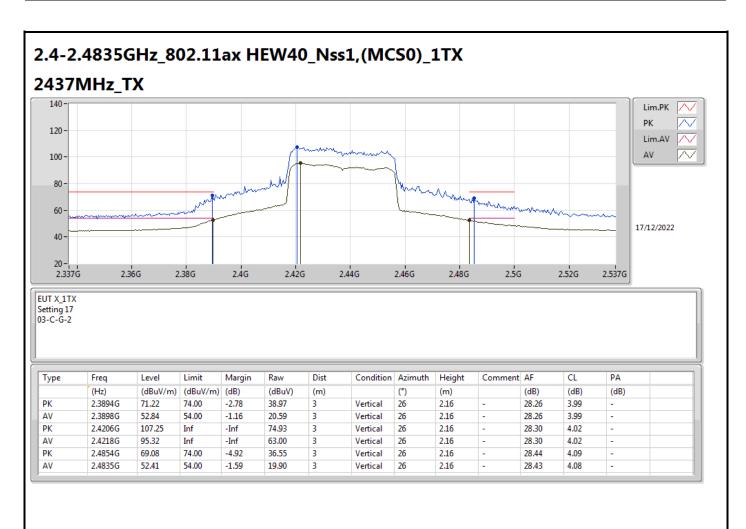




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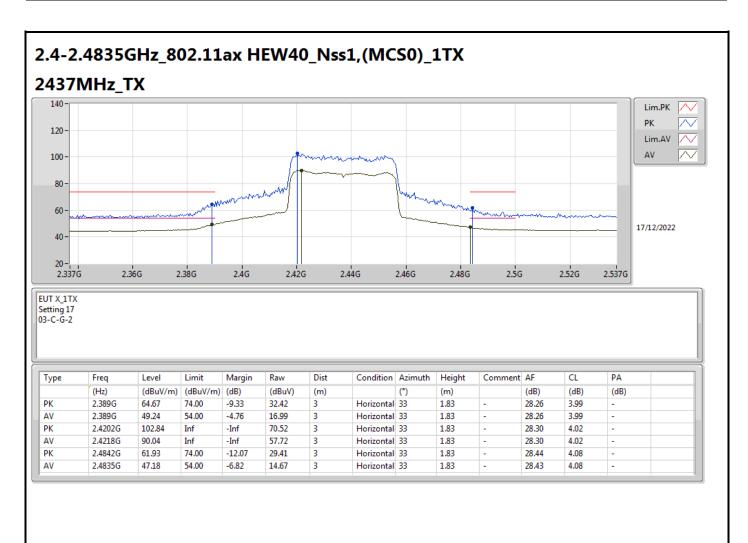




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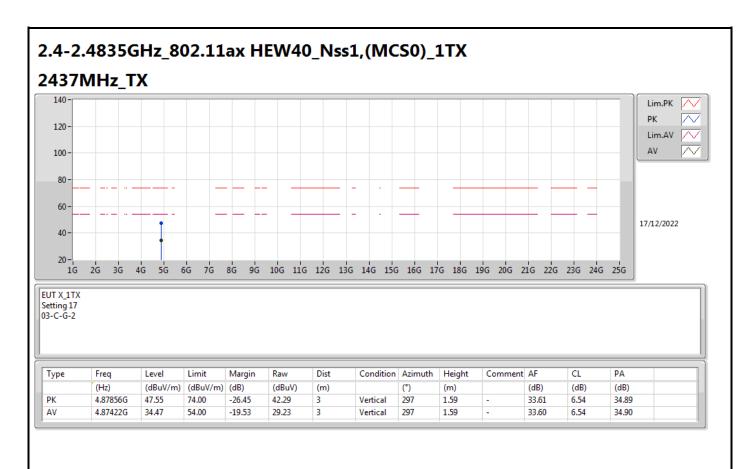




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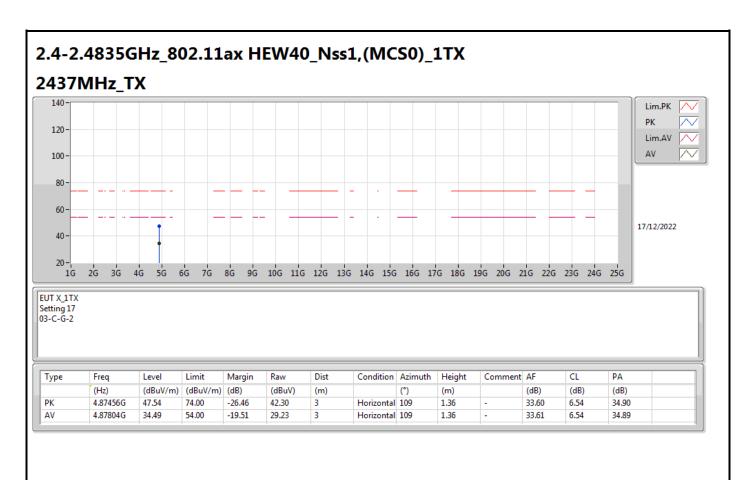




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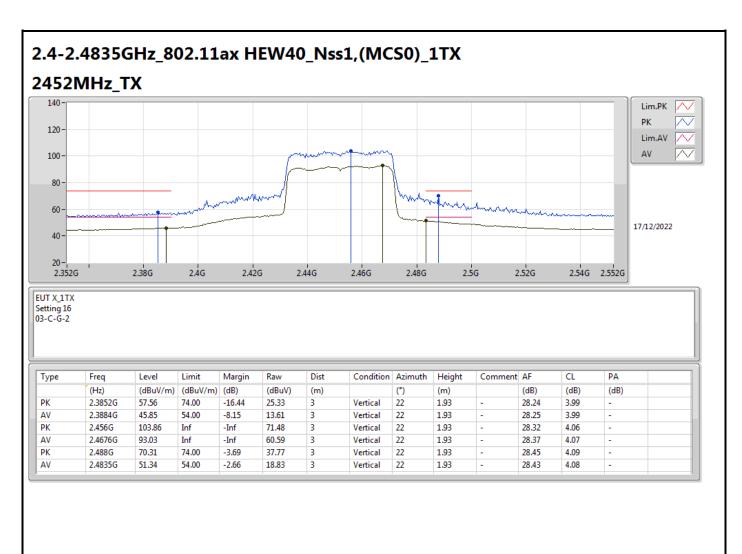




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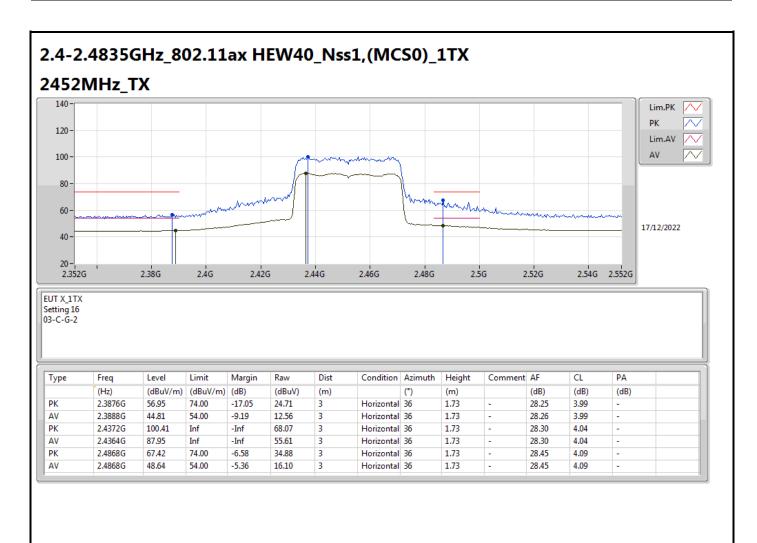




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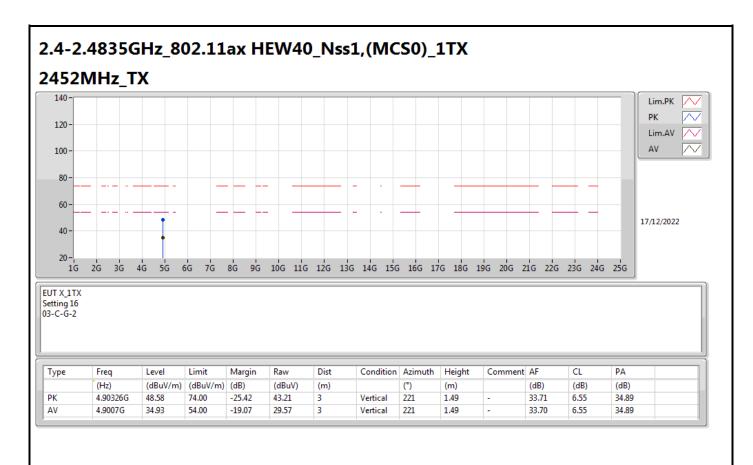




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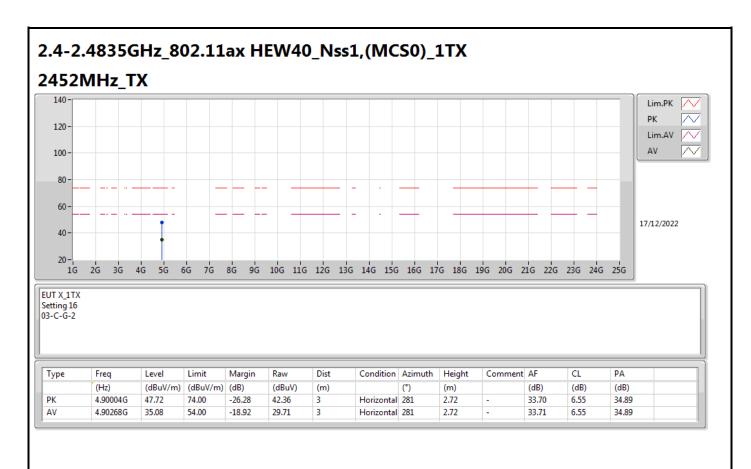




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