





RADIO TEST REPORT

FCC ID : 2AYRA-08436

Equipment : Linksys Velop Pro 6E

Brand Name : LINKSYS

Model Name : MX6200, MX62EC, MX62WH, MX62MS, SPNMX62,

MX6203, MX6202, MX6201, MX62

Applicant : Linksys USA, Inc.

121 Theory, Irvine, CA. 92617, USA

Standard : 47 CFR FCC Part 15.247

The product was received on Nov. 28, 2022, and testing was started from Nov. 29, 2022 and completed on Feb. 16, 2023. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

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

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

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Report Version

: 02

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History of this test report

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Report No.	Version	Description	Issued Date
FR2N2822AA	01	Initial issue of report	Mar. 22, 2023
FR2N2822AA	02	Changing the address of Applicant to "121 Theory, Irvine, CA. 92617, USA" from "121 Theory, Suite 150, Irvine, CA. 92617, USA".	Mar. 30, 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	-

Declaration of Conformity:

- The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
- 2. The measurement uncertainty please refer to report "Measurement Uncertainty".

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen Report Producer: Cathy Chiu

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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	802.11ac VHT20	20	2TX
2.4-2.4835GHz	802.11ac 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	802.11ac VHT40	40	2TX
2.4-2.4835GHz	802.11ac VHT40-BF	40	2TX
2.4-2.4835GHz	802.11ax HEW40	40	2TX
2.4-2.4835GHz	802.11ax HEW40-BF	40	2TX

Note:

- 11b mode uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
- 11g, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.
- ◆ HEW20, HEW40 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.

BWch is the nominal channel bandwidth.

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1.1.2 Antenna Information

Ant.		Р	ort		Brand	Model Name	Antenna Type	Connector	Gain
AIII.	2.4GHz	5GHz	6GHz	Bluetooth	Biallu	Woder Name	Antenna Type	Connector	(dBi)
1	1	1	-	-	Galtronics	02102140-07691-4	PCB Antenna	I-PEX	
2	2	2	-	-	Galtronics	02102140-07691-3	PCB Antenna	I-PEX	
3	-	-	1	-	Galtronics	02102475-07691-3	PCB Antenna	I-PEX	Note1
4	-	-	2	-	Galtronics	02102475-07691-4	PCB Antenna	I-PEX	
5	-	-	-	1	Galtronics	02102073-07691	PCB Antenna	I-PEX	

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Note1:

	Antenna Gain (dBi)									
Ant.	WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6GHz UNII 5	WLAN 6GHz UNII 6	WLAN 6GHz UNII 7	WLAN 6GHz UNII 8	Bluetooth
1	2.626	3.600	3.535	3.323	3.333	-	-	-	-	-
2	2.626	3.600	3.535	3.323	3.333	-	-	-	-	-
3		-	-	-	-	3.076	3.246	3.429	3.429	-
4	-	-	-	-	-	3.076	3.246	3.429	3.429	-
5	-	-	-	-	-	-	-	-	-	2.562

Note2: The above information was declared by manufacturer.

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Note3: Directional gain information

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	DirectionalGain = 10-log $\frac{\left[\sum_{j=1}^{N_{obs}} \left\{\sum_{k=1}^{N_{obs}} \mathcal{E}_{j,k}\right\}^{2}\right]}{N_{obs}}$
BF	Expressional Gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{tot}} \left[\sum_{k=1}^{N_{tot}} S_{j,k} \right]^{2}}{N_{ster}} \right]$	DirectionalGate = $10 \cdot \log \frac{\sum_{j=1}^{N_{mil}} \left(\sum_{k=1}^{N_{mil}} \mathcal{E}_{j,k}\right)^{2}}{N_{sgr}}$

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Ex.

Directional Gain (NSS1) formula : $Directional Gain = 10 \cdot los \left[\sum_{j=1}^{p_{s}} \left\{ \sum_{k=1}^{N} g_{j,k} \right\}^{j} \right]$

NSS1(q1,1) = $10^{G1/20}$; NSS1(q1,2)= $10^{G2/20}$;

 $gj_k = (Nss1(g1,1) + Nss1(g1,2))^2$

 $DG = 10 \log[(Nss1(g1,1) + Nss1(g1,2))^{2} / N_{ANT}] \Rightarrow 10 \log[(10^{G1/20} + 10^{G2/20})^{2} / N_{ANT}] \Rightarrow 10 \log[(10^{G1/20} + 10^{G1/20})^{2} / N_{ANT}] \Rightarrow 10 \log[(10^{G1/20} + 10^{$

Where:

2.4G G1= 2.626 dBi ;2.4G G2= 2.626 dBi ;DG= 5.636dBi

5G UNII-1 G1= 3.6 dBi ;5G Band1 G2= 3.6 dBi ;DG= 6.610dBi

5G UNII-2A G1= 3.535 dBi ;5G Band2 G2= 3.535 dBi ;DG= 6.545dBi

5G UNII-2C G1= 3.323 dBi :5G Band3 G2= 3.323 dBi :DG= 6.333dBi

5G UNII-3 G1= 3.333 dBi ;5G Band4 G2= 3.333 dBi ;DG= 6.343dBi

6G UNII-5 G1= 3,076 dBi ;6.2G G2= 3.076 dBi ;DG= 6.086dBi

6G UNII-6 G1= 3.246 dBi ;6.4G G2= 3.246 dBi ;DG= 6.256dBi

6G UNII-7 G1= 3.429 dBi ;6.7G G2= 3.429 dBi ;DG= 6.439dBi

6G UNII-8 G1= 3.429 dBi ;7G G2= 3.429 dBi ;DG= 6.439dBi

<For 2.4GHz function>

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

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

Port 1 and Port 2 could transmit/receive simultaneously.

<For 5GHz function>

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

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

Port 1 and Port 2 could transmit/receive simultaneously.

<For 6GHz function>

For IEEE 802.11ax (2TX/2RX):

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

Port 1 and Port 2 could transmit/receive simultaneously.

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

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

Port 1 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	0.999	0.01	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11g	0.994	0.03	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ax HEW20-BF	0.97	0.13	3.745ms	10
802.11ax HEW40-BF	0.986	0.06	n/a (DC>=0.98)	n/a (DC>=0.98)

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N	~ +~	
N	()	

- 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 11n/VHT/ax in 2.4GHz, n/ac/ax in 5GHz and ax in 6GHz.				
Function	\boxtimes	Point-to-multipoint		Point-to-point	
Support RU	\boxtimes	Full RU		Partial RU	
Test Software Version	Non-beamforming: QRCT V4.0.209.0 Beamforming: 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
MX6200	
MX62EC	
MX62WH	
MX62MS	All the models are identical, the difference model for difference model
SPNMX62	served as marketing strategy.
MX6203	served as marketing strategy.
MX6202	
MX6201	
MX62	

Note 1: From the above models, model: MX6200 was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

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1.2 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	TH03-CB	Owen Hsu	16.5~17.5 / 61~64	Jan. 31, 2023~ Feb. 02, 2023
Radiated (below 1GHz)	10CH01-CB	Tim Chen	19~20 / 56~57	Feb. 15, 2023 ~ Feb. 16, 2023
Radiated	03CH01-CB	Ken Yeh	21.7~22 / 61~64	Nov. 29, 2022~ Feb. 13, 2023
(above 1GHz)	03CH03-CB	Ken Yeh	21.7~23.2 / 60~63	Nov. 29, 2022~ Feb. 13, 2023
Radiated (co-location)	03CH03-CB	Ken Yeh	21.7~23.2 / 60~63	Nov. 29, 2022~ Feb. 13, 2023
AC Conduction	CO01-CB	Tim Chen	22~23 / 56~57	Jan. 12, 2023

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1.4 Measurement Uncertainty

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

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

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	5.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.4 dB	Confidence levels of 95%
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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2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11b_Nss1,(1Mbps)_2TX	-
2412MHz	21.5
2417MHz	23.5
2437MHz	26
2457MHz	25
2462MHz	23
802.11g_Nss1,(6Mbps)_2TX	-
2412MHz	23
2437MHz	25
2462MHz	23
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-
2412MHz	24
2437MHz	27
2462MHz	24
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-
2422MHz	24
2437MHz	25
2452MHz	23

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Note:

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

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2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests			
Tests Item	AC power-line conducted emissions		
Condition AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz			
Operating Mode	Normal Link		
1	EUT + Adapter 3 + plug		
2	EUT + Adapter 4 + plug		
3	EUT + Adapter 1		
4	EUT + Adapter 2		
For operating mode 2 is the worst case and it was record in this test report.			

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

The Worst Case Mode for Following Conformance Tests				
Tests Item	Emissions in Restricted Frequency Bands			
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.			
After evaluating, the wors measurement will follow the	t case was found at Z axis from Radiated Emission test Above 1GHz. So the is same test configuration.			
Operating Mode < 1GHz	СТХ			
1	EUT in Z axis + WLAN 2.4GHz + Adapter 1			
2	EUT in Z axis + WLAN 2.4GHz + Adapter 2			
3	EUT in Z axis + WLAN 2.4GHz + Adapter 4 + plug			
4	EUT in Z axis + WLAN 2.4GHz + Adapter 3 + plug			
Mode 3 has been evaluate follow this same test mode	ed to be the worst case among Mode 1~4, thus measurement for Mode 5~7 will			
5	EUT in Z axis + WLAN 5GHz + Adapter 4 + plug			
6	EUT in Z axis + WLAN 6GHz + Adapter 4 + plug			
7	EUT in Z axis + Bluetooth + Adapter 4 + plug			
For operating mode 3 is th	e worst case and it was record in this test report.			

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Operating Mode > 1GHz	СТХ		
After evaluating, the worst case was found at Z axis, so it was selected to perform test and its test result was written in the report.			
1	EUT in Z axis		

The Worst Case Mode for Following Conformance Tests			
Tests Item Simultaneous Transmission Analysis - Radiated Emission Co-location			
Test Condition Radiated measurement			
Operating Mode Normal Link			
1 WLAN 2.4GHz + 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 Bluetooth + WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz			
Refer to Sporton Test Report No.: FA2N2822 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:

During the test, the following programs under WIN 10 were executed.

The program was executed as follows:

- 1. During the test, the EUT operation to normal function.
- 2. Executed command fixed test channel under DOS.
- 3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by 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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Accessories 2.4

Accessories					
Equipment Name	• • •		Rating		
Adapter 1	Ktec	KSA-30W-120250VU	Input: 100-240V~50/60Hz, 1.0A Output: 12.0V, 2.5A		
Adapter 2	APD	WA-30P12FU	Input: 100-240V~, 50-60Hz, 0.9A Max. Output: 12.0V, 2.5A		
Adapter 3	Ktec	KSA-30W-120250D5	Input: 100-240V~50/60Hz, 1.0A Output: 12.0V, 2.5A, 30.0W		
Adapter 4	APD	WA-30P12R	Input: 100-240V~, 50-60Hz, 0.9A Max. Output: 12.0V, 2.5A, 30.0W		
Others					
RJ-45 cable*1, non-shielded, 0.9m					
Plug 1*1 (Equip with Adapter 3 use only)					

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Plug 2*1 (Equip with Adapter 4 use only)

2.5 **Support Equipment**

For AC Conduction:

1017	For AC Conduction:						
	Support Equipment						
No.	Equipment	Brand Name	Model Name	FCC ID			
Α	LAN1 NB	DELL	T3400	N/A			
В	LAN2 NB	DELL	E6430	N/A			
С	2.4G NB	DELL	T3400	N/A			
D	5G NB	DELL	T3400	N/A			
Е	6G NB	DELL	T3400	N/A			
F	Smart phone	Samsung	Galaxy J2	N/A			

For Radiated Emission test below 1GHz:

Support Equipment						
No.	No. Equipment Brand Name Model Name FCC ID					
Α	Notebook	DELL	T3400	N/A		

For Radiated Emission test above 1GHz (Non-beamforming mode):

Support Equipment						
No. Equipment Brand Name Model Name FCC ID						
Α	Notebook	Lenovo	L440	N/A		

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For Radiated Emission test above 1GHz (Beamforming mode):

Support Equipment					
No.	Equipment	Brand Name	Model Name	FCC ID	
Α	Notebook	Lenovo	L440	N/A	
В	Notebook	DELL	E4300	N/A	
С	Client	Cybertan	Maple(MX6000s)	N/A	

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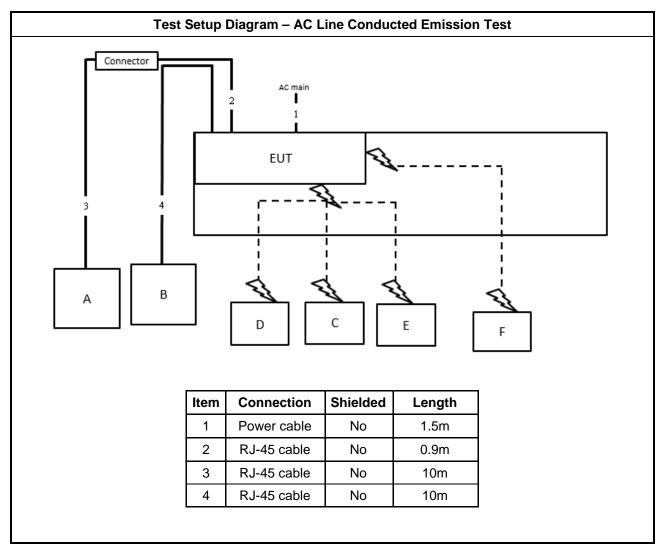
For RF Conducted:

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

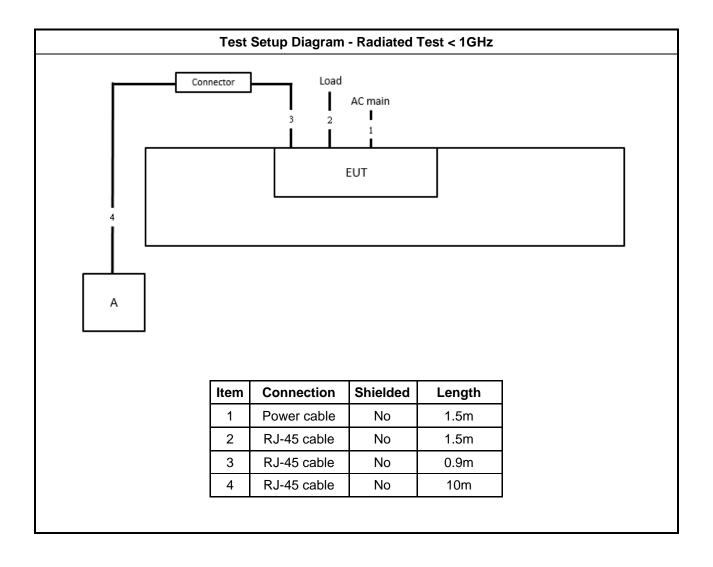
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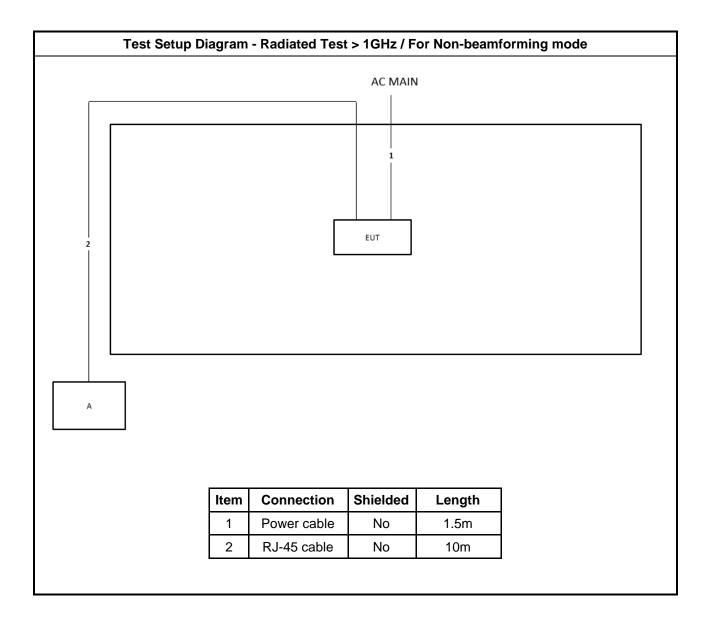
2.6 Test Setup Diagram



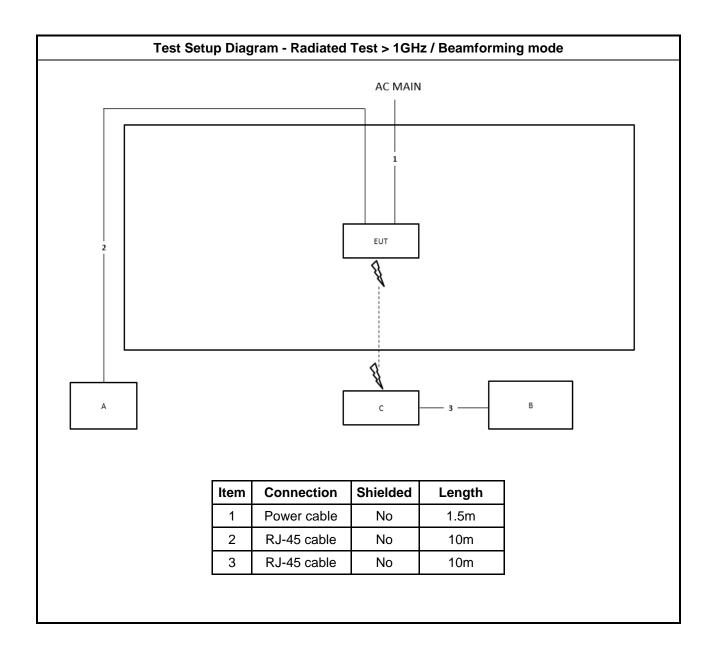
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3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

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

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3.1.2 Measuring Instruments

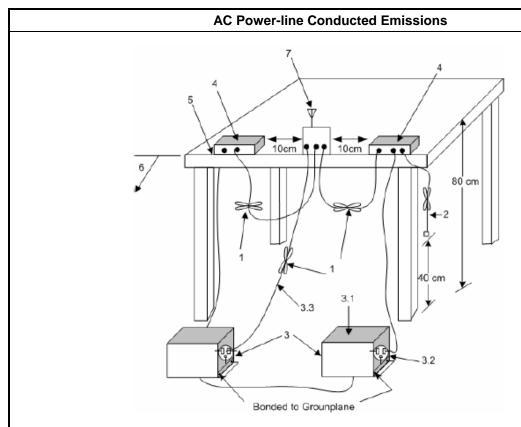
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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

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3.1.4 Test Setup



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

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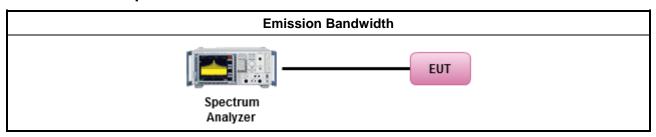
3.2.2 Measuring Instruments

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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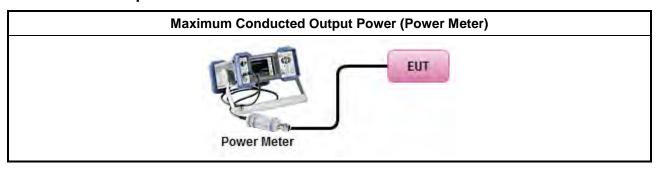
3.3.3 Test Procedures

	Test Method					
•	Max	mum 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	mum 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)				
	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

Refer as Appendix C

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3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

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

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3.4.2 Measuring Instruments

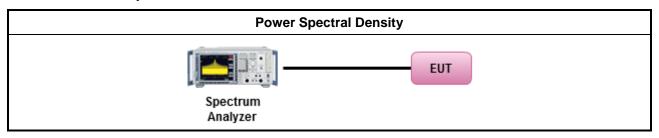
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

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

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3.4.4 Test Setup



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3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

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3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

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

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

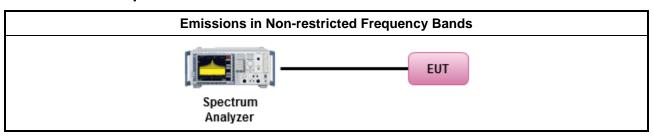
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

3.5.4 Test Setup



3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

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3.6 Emissions in Restricted Frequency Bands

3.6.1 Emissions in Restricted Frequency Bands Limit

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

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

3.6.2 Measuring Instruments

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

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3.6.3 Test Procedures

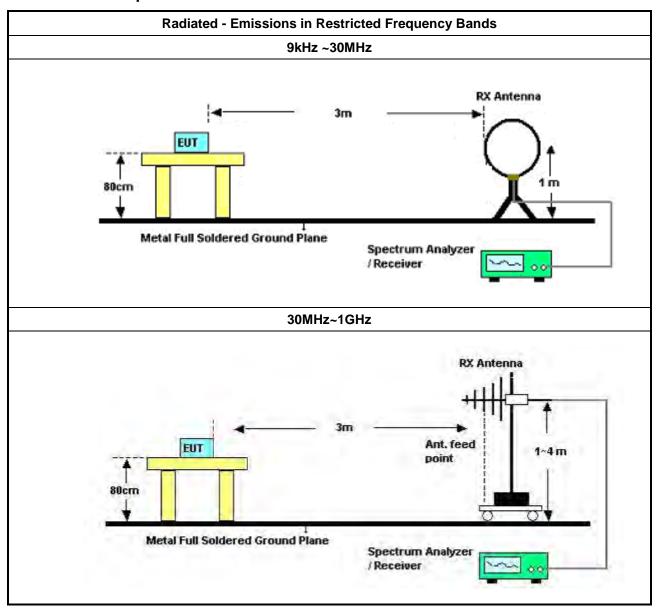
		Test Method						
•	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].							
•	Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.							
•	For the transmitter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

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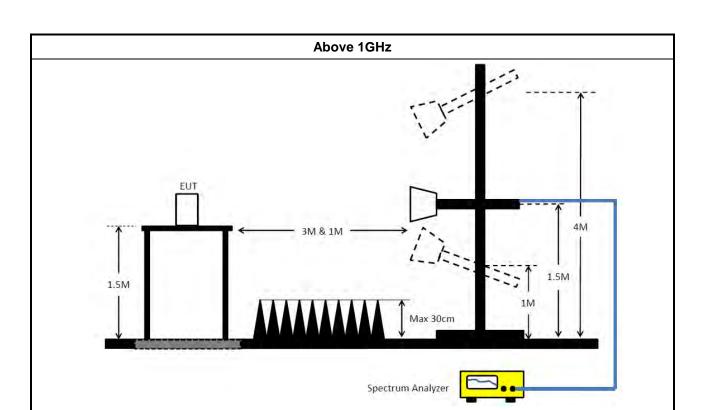
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3.6.4 Test Setup



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3.6.5 Measurement Results Calculation

The measured Level is calculated using:

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

3.6.6 Emissions in Restricted Frequency Bands (Below 30MHz)

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

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

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

3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

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4 Test Equipment and Calibration Data

		1		Τ	Г	Г	1
Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 22, 2022	Feb. 21, 2023	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-5 0-16-2	04083	150kHz ~ 100MHz	Feb. 09, 2022	Feb. 08, 2023	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Apr. 12, 2022	Apr. 11, 2023	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 10, 2022	Feb. 09, 2023	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)
10m Semi Anechoic Chamber NSA	TDK	SAC-10M	10CH01-CB	30MHz~1GHz 10m,3m Jan. 18, 2023		Jan. 17, 2024	Radiation (10CH01-CB)
Amplifier	Agilent	8447D	2944A10783	9kHz ~ 1.3GHz	Mar. 11, 2022	Mar. 10, 2023	Radiation (10CH01-CB)
Amplifier	Agilent	8447D	2944A10784	9kHz ~ 1.3GHz	Mar. 11, 2022	Mar. 10, 2023	Radiation (10CH01-CB)
Low Cable	Woken	SUCOFLEX 104	low cable-01	25MHz ~ 1GHz	Oct. 18, 2022	Oct. 17, 2023	Radiation (10CH01-CB)
Low Cable	Woken	SUCOFLEX 104	low cable-02	25MHz ~ 1GHz	Oct. 18, 2022	Oct. 17, 2023	Radiation (10CH01-CB)
EMI Test Receiver	Rohde&Schwarz	ESCI	100186	9kHz ~ 3GHz	Jul. 11, 2022	Jul. 10, 2023	Radiation (10CH01-CB)
Spectrum Analyzer	Rohde&Schwarz	FSV30	101026	9kHz ~ 30GHz	Apr. 22, 2022	Apr. 21, 2023	Radiation (10CH01-CB)
Bilog Antenna with 6dB Attenuator	Chase & EMCI	CBL6111A &N-6-06	1543 &AT-N0609	30MHz ~ 1GHz	Jun. 25, 2022	Jun. 24, 2023	Radiation (10CH01-CB)
Amplifier	EM	EM101	060703	10MHz ~ 1GHz	Oct. 19, 2022	Oct. 18, 2023	Radiation (10CH01-CB)
Low Cable	TITAN	T318E	low cable-03	30MHz ~ 1GHz	Oct. 18, 2022	Oct. 17, 2023	Radiation (10CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	May 14, 2022	May 13, 2023	Radiation (10CH01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (10CH01-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH01-CB	1GHz ~18GHz 3m	May 06, 2022	May 05, 2023	Radiation (03CH01-CB)
Horn Antenna	ETS-LINDGREN	3115	00075790	750MHz ~ 18GHz	Nov. 04, 2022	Nov. 03, 2023	Radiation (03CH01-CB)

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Calibration Calibration Instrument **Brand** Model No. Serial No. Characteristics Remark Date **Due Date** Radiation Horn Antenna Schwarzbeck **BBHA 9170** BBHA9170252 15GHz ~ 40GHz Aug. 22, 2022 Aug. 21, 2023 (03CH01-CB) Radiation Pre-Amplifier Agilent 8449B 3008A02121 1GHz ~ 26.5GHz May 19, 2022 May 18, 2023 (03CH01-CB) Spectrum Radiation R&S FSP40 100056 9kHz ~ 40GHz May 06, 2022 May 05, 2023 Analyzer (03CH01-CB) Radiation RG402 RF Cable-high Woken High Cable-16 1 GHz ~ 18 GHz Oct. 03, 2022 Oct. 02, 2023 (03CH01-CB) Radiation High RF Cable-high Woken RG402 1 GHz ~ 18 GHz Oct. 03, 2022 Oct. 02, 2023 Cable-16+17 (03CH01-CB) Radiation 1GHz ~ 40 GHz High Cable Woken WCA0929M 40G#5+7 Dec. 14, 2021 Dec. 13, 2022 (03CH01-CB) Radiation High Cable Woken WCA0929M 40G#5+6 1GHz ~ 40 GHz Dec. 07, 2022 Dec. 06, 2023 (03CH01-CB) Radiation High Cable Woken WCA0929M 40G#5 1GHz ~ 40 GHz Dec. 08, 2021 Dec. 07, 2022 (03CH01-CB) Radiation High Cable Woken WCA0929M 40G#5 1GHz ~ 40 GHz Dec. 07, 2022 Dec. 06, 2023 (03CH01-CB) Radiation Woken WCA0929M 40G#7 1GHz ~ 40 GHz High Cable Dec. 14, 2021 Dec. 13, 2022 (03CH01-CB) Radiation 1GHz ~ 40 GHz High Cable Woken WCA0929M 40G#6 Dec. 07, 2022 Dec. 06, 2023 (03CH01-CB) Radiation **Test Software SPORTON** SENSE V5.10 N.C.R. N.C.R. (03CH01-CB) 3m Semi 1GHz ~18GHz Anechoic Radiation TDK SAC-3M 03CH03-CB May 05, 2022 May 04, 2023 Chamber (03CH03-CB) VSWR **BBHA 9120 BBHA 9120 D** Radiation **SCHWARZBECK** Jun. 22, 2023 1GHz~18GHz Jun. 23, 2022 Horn Antenna D 1370 (03CH03-CB) Radiation Horn Antenna Schwarzbeck **BBHA 9170** BBHA9170252 15GHz ~ 40GHz Aug. 22, 2022 Aug. 21, 2023 (03CH03-CB) Radiation Pre-Amplifier 8449B 3008A02097 1GHz ~ 26.5GHz Jul. 01, 2022 Agilent Jun. 30, 2023 (03CH03-CB) Radiation SGH184 Pre-Amplifier SGH 20221107-3 18GHz ~ 40GHz Nov. 16, 2022 Nov. 15, 2023 (03CH03-CB) Spectrum Radiation R&S FSP40 100019 9kHz ~ 40GHz Jun. 10, 2022 Jun. 09, 2023 Analyzer (03CH03-CB) High Radiation 1GHz ~ 18GHz RF Cable-high Woken RG402 Oct. 03, 2022 Oct. 02, 2023 Cable-20+29 (03CH03-CB) Radiation RF Cable-high Woken RG402 High Cable-29 1GHz ~ 18GHz Oct. 03, 2022 Oct. 02, 2023 (03CH03-CB) Radiation 1GHz ~ 40 GHz WCA0929M High Cable Woken 40G#5+7 Dec. 14, 2021 Dec. 13, 2022 (03CH03-CB)

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Calibration Calibration Model No. Serial No. Characteristics Instrument Brand Remark **Date Due Date** Radiation High Cable Woken WCA0929M 40G#5+6 1GHz ~ 40 GHz Dec. 07, 2022 Dec. 06, 2023 (03CH03-CB) Radiation WCA0929M High Cable Woken 40G#5 1GHz ~ 40 GHz Dec. 08, 2021 Dec. 07, 2022 (03CH03-CB) Radiation High Cable Woken WCA0929M 40G#5 1GHz ~ 40 GHz Dec. 07, 2022 Dec. 06, 2023 (03CH03-CB) Radiation WCA0929M 40G#7 1GHz ~ 40 GHz Dec. 14, 2021 Dec. 13, 2022 High Cable Woken (03CH03-CB) Radiation Woken WCA0929M 40G#6 1GHz ~ 40 GHz Dec. 07, 2022 Dec. 06, 2023 High Cable (03CH03-CB) Radiation **SPORTON Test Software SENSE** V5.10 N.C.R. N.C.R. (03CH03-CB) Spectrum Conducted Dec. 30, 2022 Dec. 29, 2023 R&S FSV40 101028 9kHz~40GHz (TH03-CB) analyzer Conducted Power Sensor Anritsu MA2411B 1726195 300MHz~40GHz Sep. 04, 2022 Sep. 03, 2023 (TH03-CB) Conducted Anritsu ML2495A 1035008 300MHz~40GHz Power Meter Sep. 04, 2022 Sep. 03, 2023 (TH03-CB) Conducted RG402 High Cable-11 Oct. 02, 2023 RF Cable-high Woken 1 GHz -18 GHz Oct. 03, 2022 (TH03-CB) Conducted Woken RG402 High Cable-12 1 GHz -18 GHz Oct. 03, 2022 Oct. 02, 2023 RF Cable-high (TH03-CB) Conducted RG402 1 GHz -18 GHz RF Cable-high Woken High Cable-13 Oct. 03, 2022 Oct. 02, 2023 (TH03-CB) Conducted RF Cable-high Woken RG402 High Cable-14 1 GHz -18 GHz Oct. 03, 2022 Oct. 02, 2023 (TH03-CB) Conducted RF Cable-high Woken RG402 High Cable-15 1 GHz -18 GHz Oct. 03, 2022 Oct. 02, 2023 (TH03-CB) Conducted **SPTCB** SP-SWI SWI-03 Oct. 04, 2022 Switch 1 GHz -26.5 GHz Oct. 03, 2023 (TH03-CB) Conducted **SPORTON** Test Software SENSE V5.10 N.C.R. N.C.R. (TH03-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

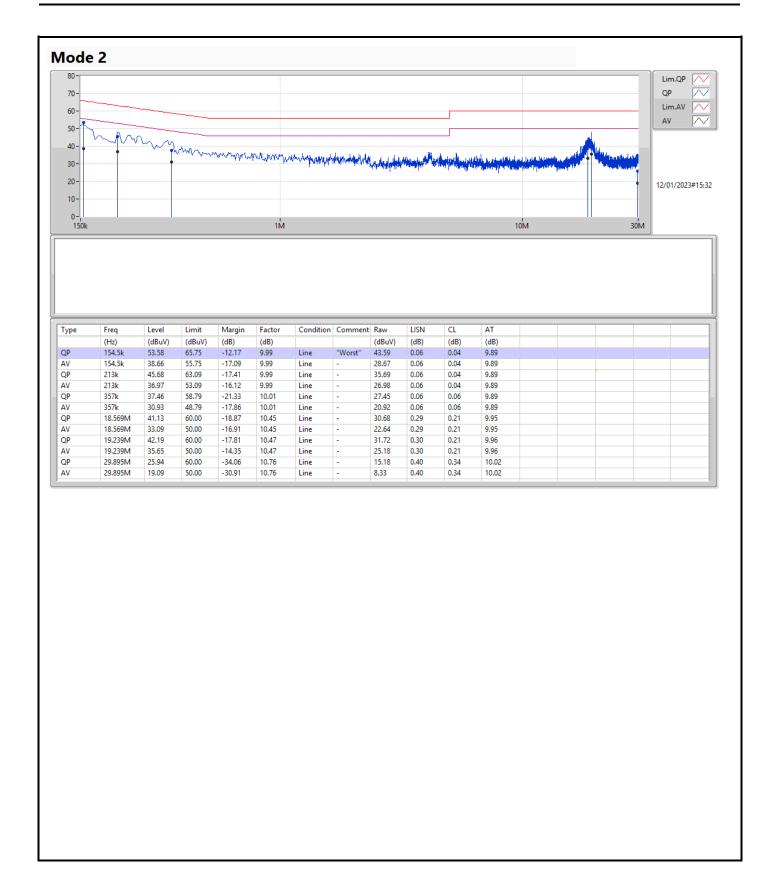
Appendix A

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 2	Pass	QP	154.5k	54.07	65.75	-11.68	Neutral

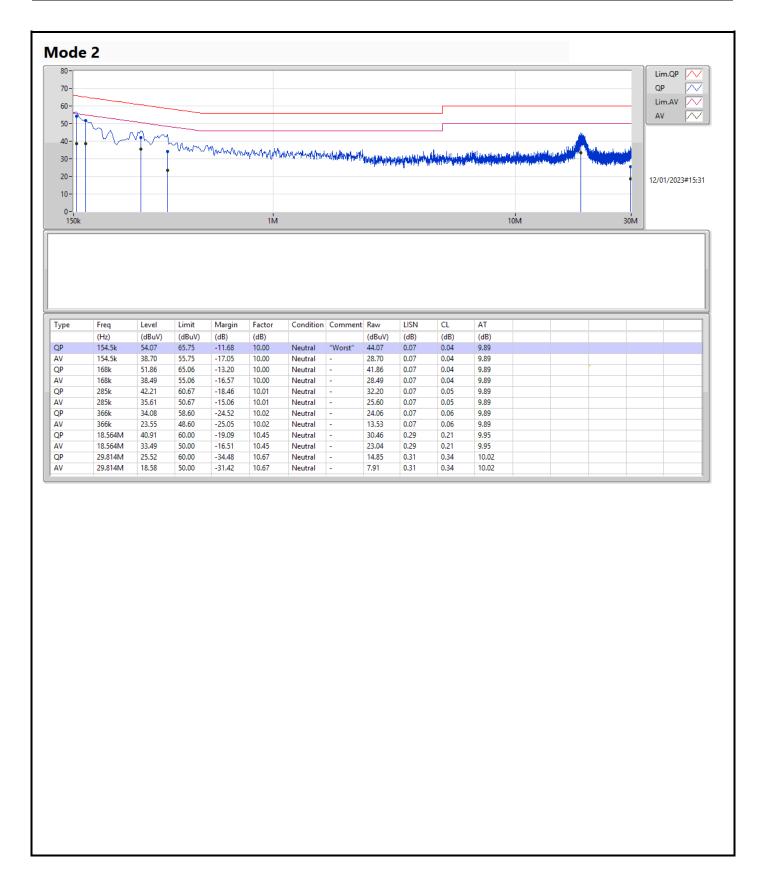
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Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
2.4-2.4835GHz	=	-	=	i i	-
802.11b_Nss1,(1Mbps)_2TX	8.025M	13.192M	13M2G1D	7.1M	12.982M
802.11g_Nss1,(6Mbps)_2TX	15.05M	16.274M	16M3D1D	14.95M	16.245M
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	15M	18.819M	18M8D1D	13.75M	18.781M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	36.75M	37.575M	37M6D1D	16.65M	37.353M

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

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Result

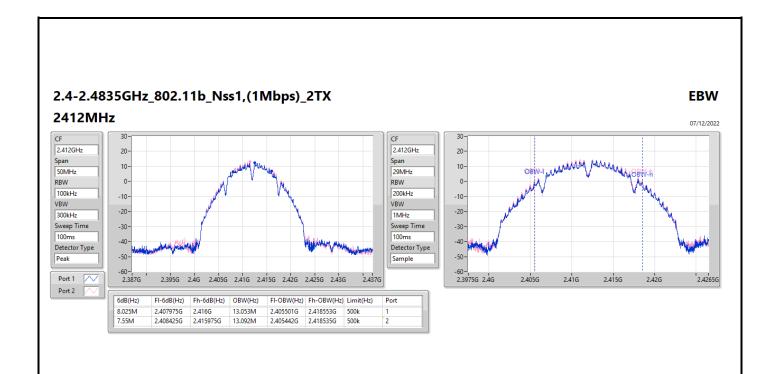
Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	8.025M	13.053M	7.55M	13.092M
2437MHz	Pass	500k	7.1M	12.982M	7.55M	13.045M
2462MHz	Pass	500k	7.575M	13.091M	7.1M	13.192M
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	15.05M	16.27M	14.95M	16.271M
2437MHz	Pass	500k	15.025M	16.25M	14.95M	16.257M
2462MHz	Pass	500k	15M	16.245M	15.025M	16.274M
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	13.75M	18.819M	14.975M	18.804M
2437MHz	Pass	500k	13.8M	18.799M	13.775M	18.797M
2462MHz	Pass	500k	15M	18.806M	15M	18.781M
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	23.25M	37.484M	31.35M	37.353M
2437MHz	Pass	500k	35.1M	37.473M	36.75M	37.544M
2452MHz	Pass	500k	16.65M	37.575M	33.1M	37.561M

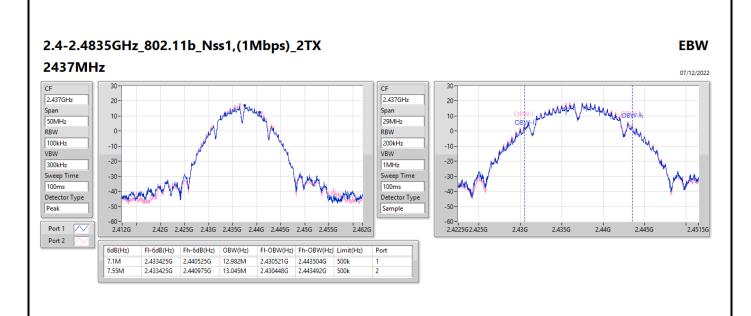
Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth

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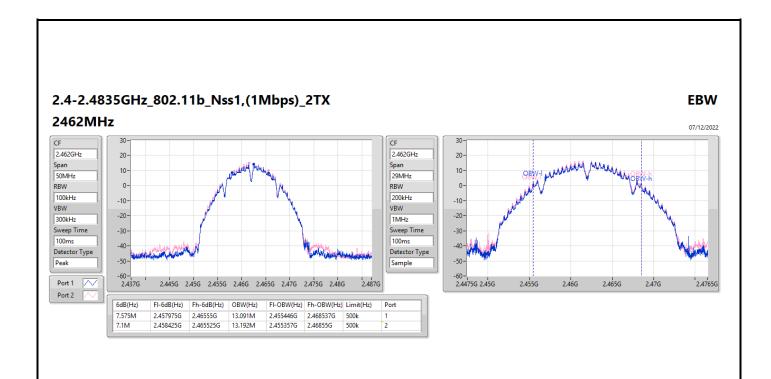
Report No. : FR2N2822AA

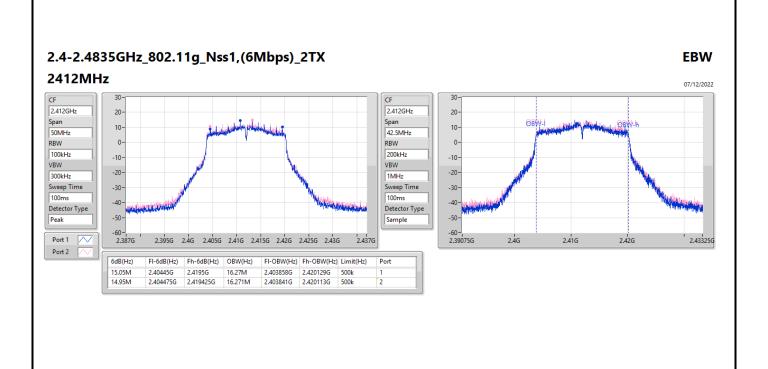




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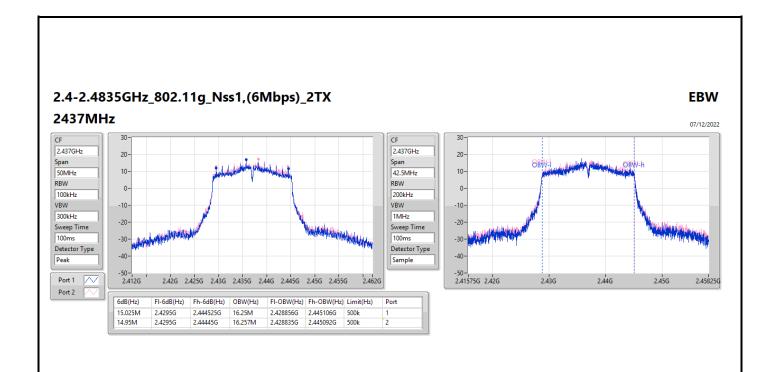
Report No. : FR2N2822AA

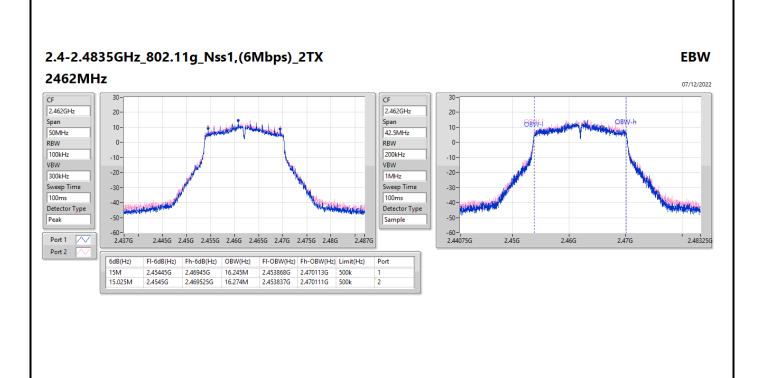




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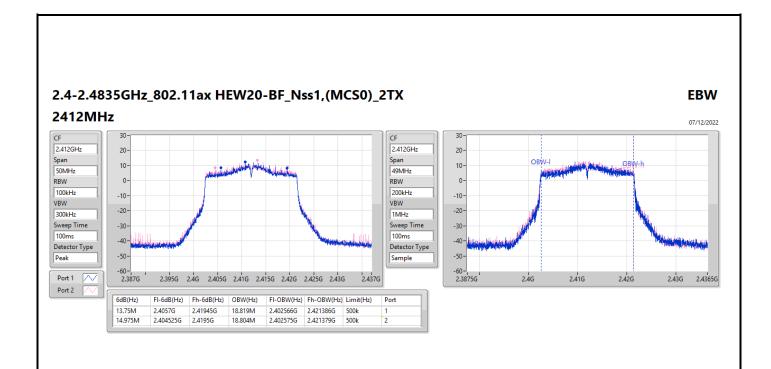
Report No. : FR2N2822AA

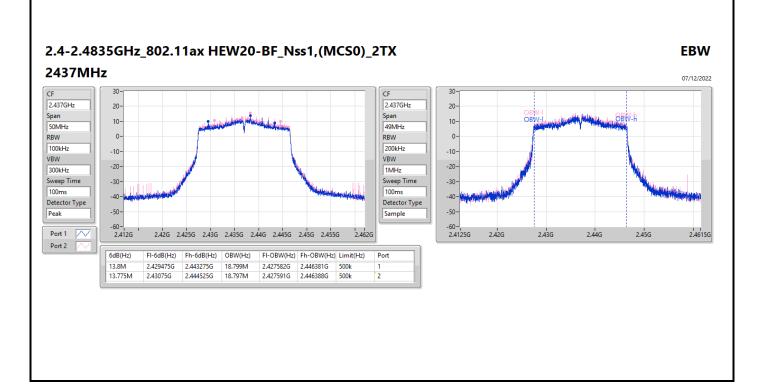




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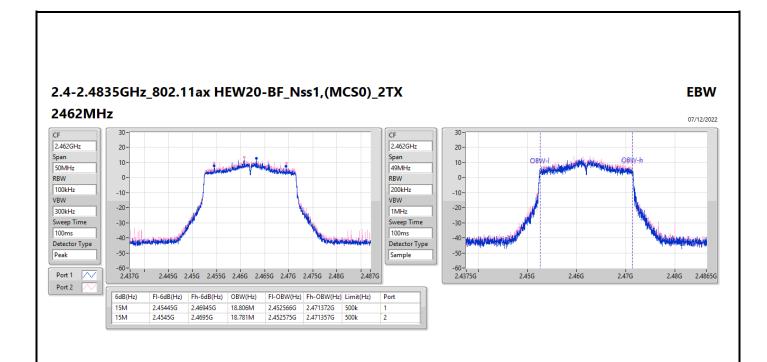
Report No. : FR2N2822AA

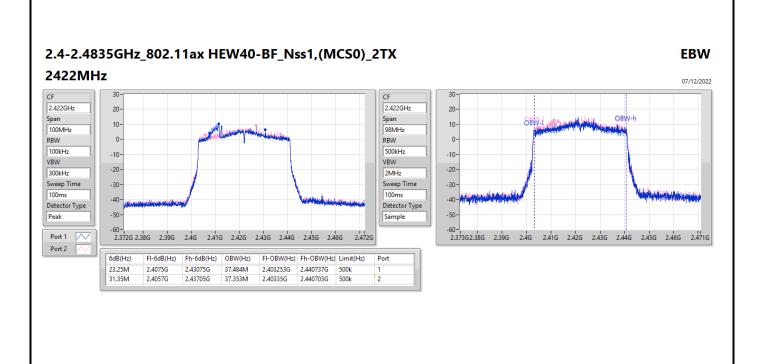




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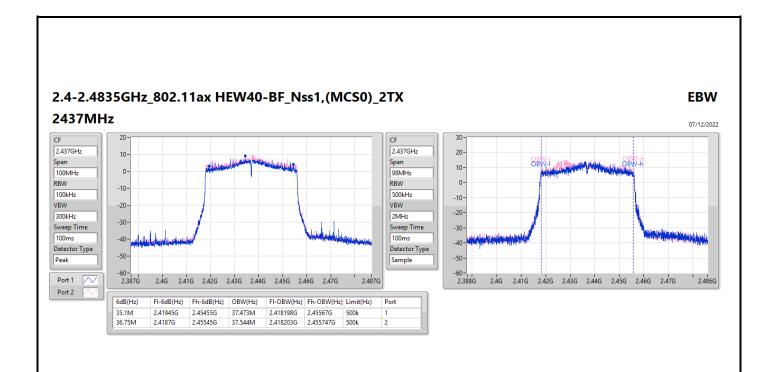
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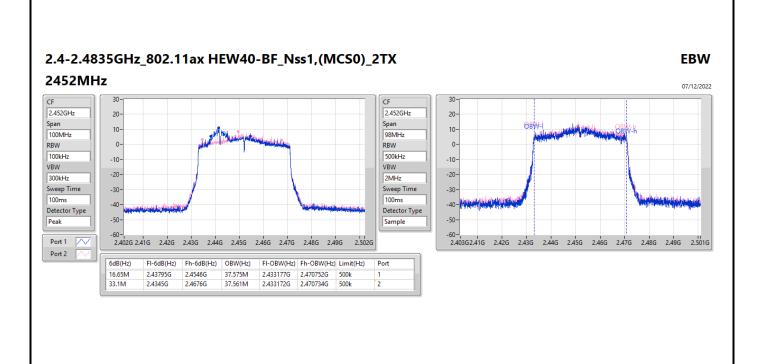




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Average Power Appendix C

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz		-
802.11b_Nss1,(1Mbps)_2TX	29.64	0.92045
802.11g_Nss1,(6Mbps)_2TX	28.89	0.77446
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	27.51	0.56364
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	25.46	0.35156

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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	2.626	21.75	22.50	25.15	30.00
2417MHz	Pass	2.626	23.61	24.47	27.07	30.00
2437MHz	Pass	2.626	26.23	26.99	29.64	30.00
2457MHz	Pass	2.626	25.14	26.05	28.63	30.00
2462MHz	Pass	2.626	23.11	24.01	26.59	30.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	2.626	23.28	24.20	26.77	30.00
2417MHz						
2437MHz	Pass	2.626	25.39	26.32	28.89	30.00
2457MHz						
2462MHz	Pass	2.626	23.24	24.16	26.73	30.00
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.636	21.25	21.92	24.61	30.00
2417MHz						
2437MHz	Pass	5.636	24.01	24.94	27.51	30.00
2457MHz						
2462MHz	Pass	5.636	21.01	21.98	24.53	30.00
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	5.636	21.07	21.86	24.49	30.00
2437MHz	Pass	5.636	21.87	22.96	25.46	30.00
2452MHz	Pass	5.636	19.85	21.01	23.48	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	5.28
802.11g_Nss1,(6Mbps)_2TX	2.37
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	1.22
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-0.43

RBW = 3kHz;

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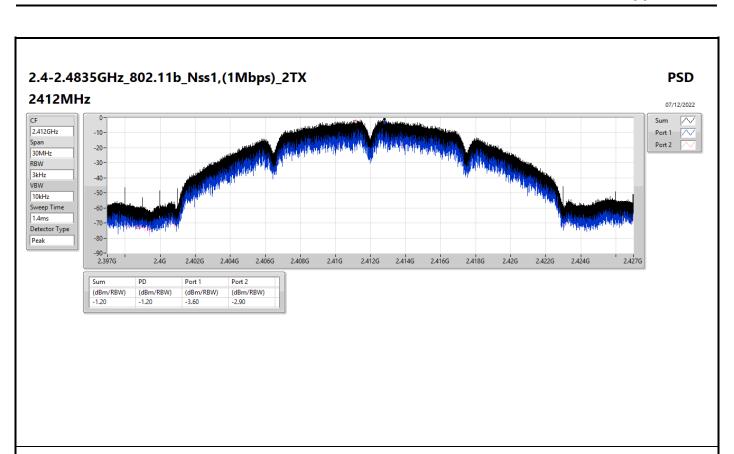
Appendix D **PSD**

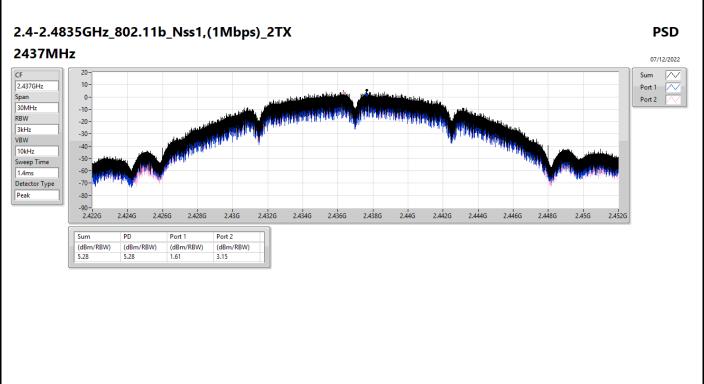
Result

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	5.636	-3.60	-2.90	-1.20	8.00
2417MHz						
2437MHz	Pass	5.636	1.61	3.15	5.28	8.00
2457MHz						
2462MHz	Pass	5.636	-1.33	-2.87	0.71	8.00
802.11g_Nss1,(6Mbps)_2TX	-	-	=	-	-	-
2412MHz	Pass	5.636	-2.59	-1.26	-0.13	8.00
2417MHz						
2437MHz	Pass	5.636	0.96	0.18	2.37	8.00
2457MHz						
2462MHz	Pass	5.636	-0.58	-1.21	0.72	8.00
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.636	-2.49	-1.58	-0.19	8.00
2417MHz						
2437MHz	Pass	5.636	-1.15	-1.35	1.22	8.00
2457MHz						
2462MHz	Pass	5.636	-4.19	-3.08	-1.66	8.00
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	5.636	-0.51	-5.63	-0.43	8.00
2437MHz	Pass	5.636	-6.06	-2.22	-2.05	8.00
2452MHz	Pass	5.636	-8.59	-7.72	-5.62	8.00

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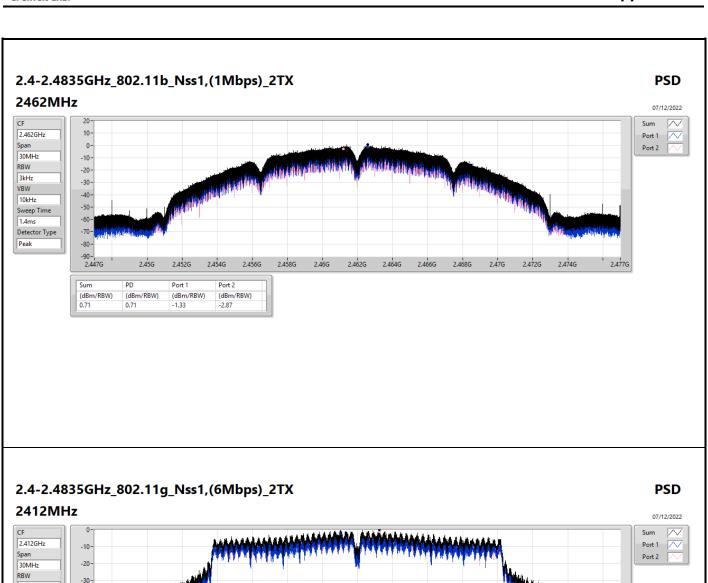
DG = Directional Gain; RBW = 3kHz; PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

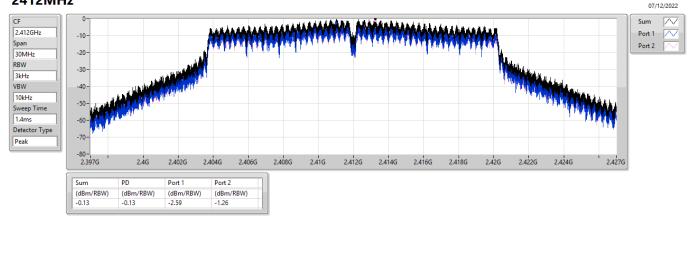




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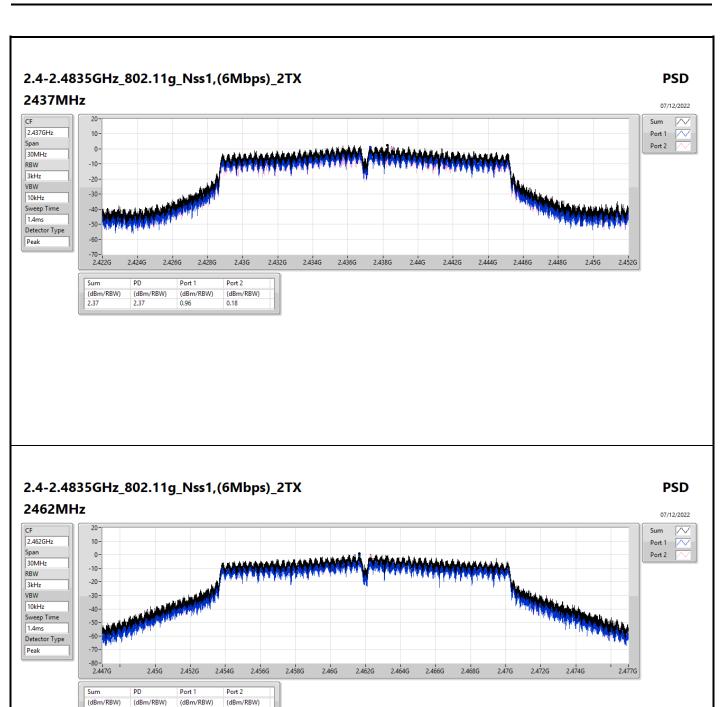
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0.72

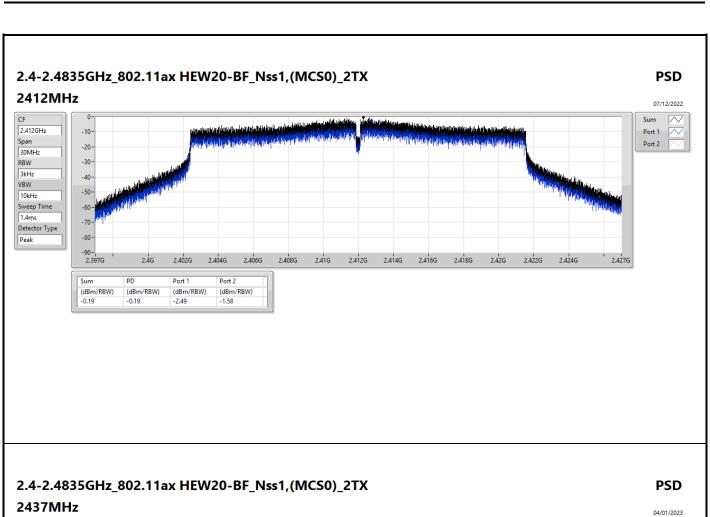
0.72

-1.21

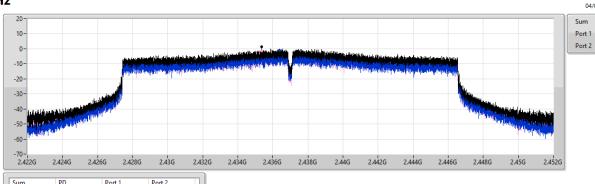
-0.58

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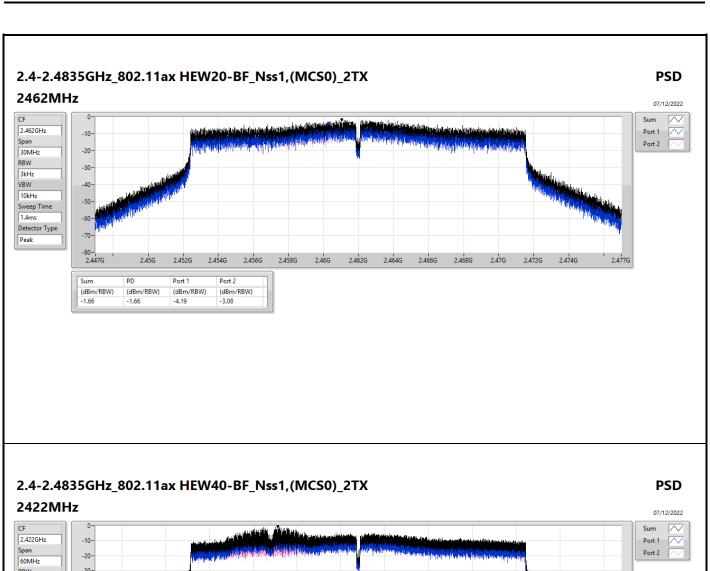
 Sum
 PD
 Port 1
 Port 2

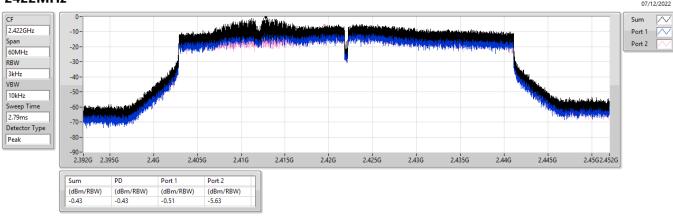
 (dBm/RBW)
 (dBm/RBW)
 (dBm/RBW)
 (dBm/RBW)

 1.22
 1.22
 -1.15
 -1.35

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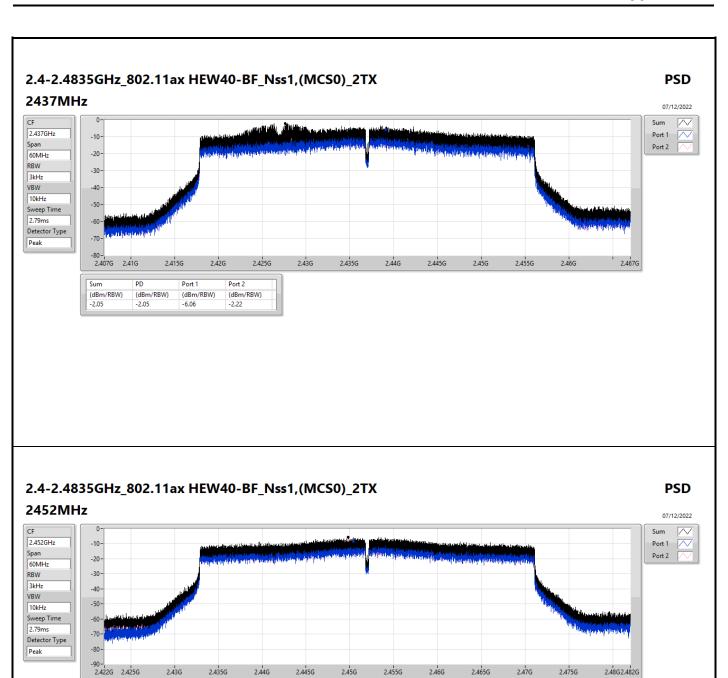
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Sum

-5.62

Port 2

(dBm/RBW) -7.72

Port 1

-8.59

(dBm/RBW)

-5.62

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CSE (NdB Down) Appendix E

Summary

Mode	Result	Ref	Ref	Limit	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Freq	Level	Port
		(Hz)	(dBm)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	(Hz)	(dBm)	
2.4-2.4835GHz		-	-	-	-			-	-	-		-	-	-	
802.11b_Nss1,(1Mbps)_2TX	Pass	2.43641G	17.68	-12.32	2.30525G	-52.00	2.398G	-39.04	2.4G	-38.54	2.5059G	-48.51	21.57233G	-49.10	2
802.11g_Nss1,(6Mbps)_2TX	Pass	2.43824G	17.29	-12.71	2.30059G	-53.61	2.4G	-26.73	2.4G	-24.87	2.50222G	-48.50	21.61448G	-48.99	1
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	Pass	2.43574G	14.58	-15.42	1.74954G	-50.19	2.39984G	-26.08	2.4G	-26.53	2.5087G	-46.11	21.69034G	-43.63	2
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	Pass	2.42789G	13.32	-16.68	2.012G	-49.92	2.4G	-31.21	2.4G	-31.10	2.51438G	-46.57	21.63172G	-44.04	2

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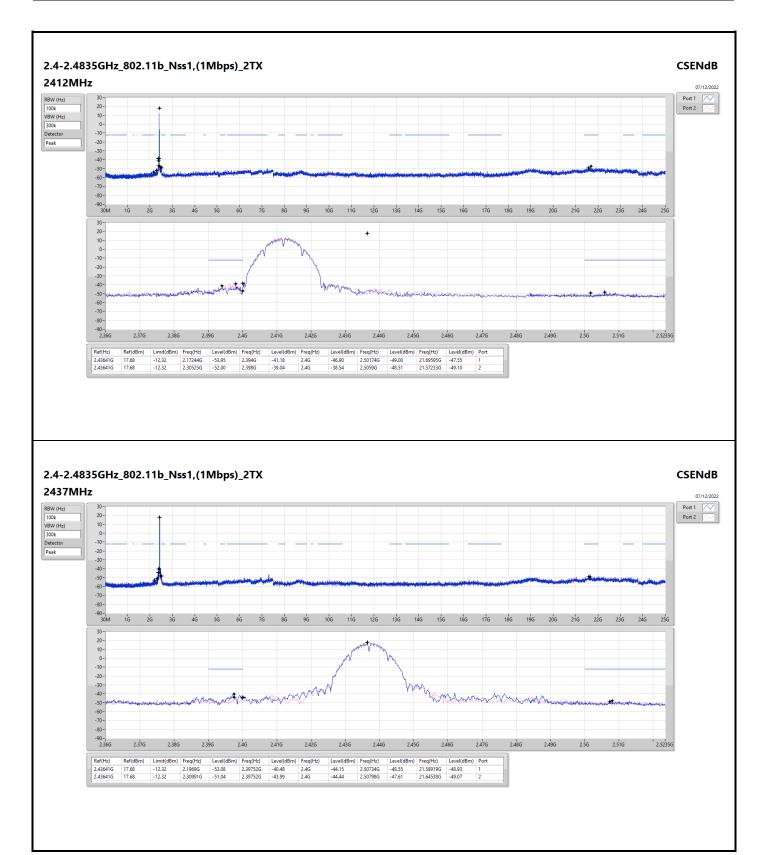
CSE (NdB Down) Appendix E

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	2.43641G	17.68	-12.32	2.17244G	-53.95	2.394G	-41.18	2.4G	-46.90	2.50174G	-49.00	21.69595G	-47.55	1
2412MHz	Pass	2.43641G	17.68	-12.32	2.30525G	-52.00	2.398G	-39.04	2.4G	-38.54	2.5059G	-48.51	21.57233G	-49.10	2
2437MHz	Pass	2.43641G	17.68	-12.32	2.1969G	-53.08	2.39752G	-40.48	2.4G	-44.15	2.50734G	-48.55	21.58919G	-48.93	1
2437MHz	Pass	2.43641G	17.68	-12.32	2.30991G	-51.04	2.39752G	-43.99	2.4G	-44.44	2.50798G	-47.61	21.64538G	-49.07	2
2462MHz	Pass	2.43641G	17.68	-12.32	2.11069G	-54.00	2.39744G	-49.00	2.4G	-50.41	2.51806G	-48.00	21.45433G	-47.77	1
2462MHz	Pass	2.43641G	17.68	-12.32	2.00002G	-52.71	2.4G	-46.62	2.4G	-48.91	2.51198G	-47.19	21.56952G	-48.46	2
802.11g_Nss1,(6Mbps)_2TX	-	-	-	,	-	-		-	-	-	-	-		-	-
2412MHz	Pass	2.43824G	17.29	-12.71	2.30059G	-53.61	2.4G	-26.73	2.4G	-24.87	2.50222G	-48.50	21.61448G	-48.99	1
2412MHz	Pass	2.43824G	17.29	-12.71	2.30525G	-52.79	2.39992G	-26.01	2.4G	-26.04	2.5007G	-47.15	21.93196G	-49.66	2
2437MHz	Pass	2.43824G	17.29	-12.71	1.7542G	-53.16	2.39984G	-38.55	2.4G	-40.90	2.50982G	-47.91	21.87577G	-48.97	1
2437MHz	Pass	2.43824G	17.29	-12.71	2.30758G	-51.89	2.39952G	-39.36	2.4G	-41.23	2.50574G	-45.92	21.69314G	-48.25	2
2462MHz	Pass	2.43824G	17.29	-12.71	1.87886G	-54.39	2.39376G	-49.90	2.4G	-52.56	2.50006G	-48.07	21.66224G	-48.40	1
2462MHz	Pass	2.43824G	17.29	-12.71	2.30758G	-53.51	2.39552G	-46.36	2.4G	-47.51	2.50262G	-45.98	21.96848G	-49.07	2
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.43574G	14.58	-15.42	2.08506G	-49.84	2.4G	-27.75	2.4G	-26.44	2.50286G	-46.41	21.98534G	-42.68	1
2412MHz	Pass	2.43574G	14.58	-15.42	1.74954G	-50.19	2.39984G	-26.08	2.4G	-26.53	2.5087G	-46.11	21.69034G	-43.63	2
2437MHz	Pass	2.43574G	14.58	-15.42	697.55M	-49.22	2.39768G	-44.20	2.4G	-46.70	2.50478G	-46.27	13.41617G	-45.57	1
2437MHz	Pass	2.43574G	14.58	-15.42	2.30758G	-49.71	2.39832G	-38.18	2.4G	-46.57	2.51046G	-45.35	21.99096G	-44.29	2
2462MHz	Pass	2.43574G	14.58	-15.42	1.80663G	-49.64	2.39856G	-46.54	2.4G	-49.50	2.50934G	-46.15	21.46838G	-43.99	1
2462MHz	Pass	2.43574G	14.58	-15.42	2.15147G	-49.32	2.4G	-46.09	2.4G	-48.91	2.50246G	-44.95	23.33112G	-45.00	2
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.42789G	13.32	-16.68	1.94902G	-49.76	2.39984G	-34.80	2.4G	-31.94	2.52734G	-39.81	13.40874G	-46.23	1
2422MHz	Pass	2.42789G	13.32	-16.68	2.012G	-49.92	2.4G	-31.21	2.4G	-31.10	2.51438G	-46.57	21.63172G	-44.04	2
2437MHz	Pass	2.42789G	13.32	-16.68	2.17001G	-48.40	2.39792G	-34.89	2.4G	-44.31	2.51326G	-44.45	21.56161G	-44.52	1
2437MHz	Pass	2.42789G	13.32	-16.68	2.3097G	-46.93	2.39456G	-39.02	2.4G	-42.77	2.50302G	-45.63	21.52795G	-44.22	2
2452MHz	Pass	2.42789G	13.32	-16.68	2.07726G	-49.60	2.4G	-48.46	2.4G	-48.86	2.55838G	-46.21	21.95985G	-43.85	1
2452MHz	Pass	2.42789G	13.32	-16.68	1.87689G	-49.57	2.392G	-45.69	2.4G	-44.61	2.50238G	-46.61	21.94583G	-44.02	2

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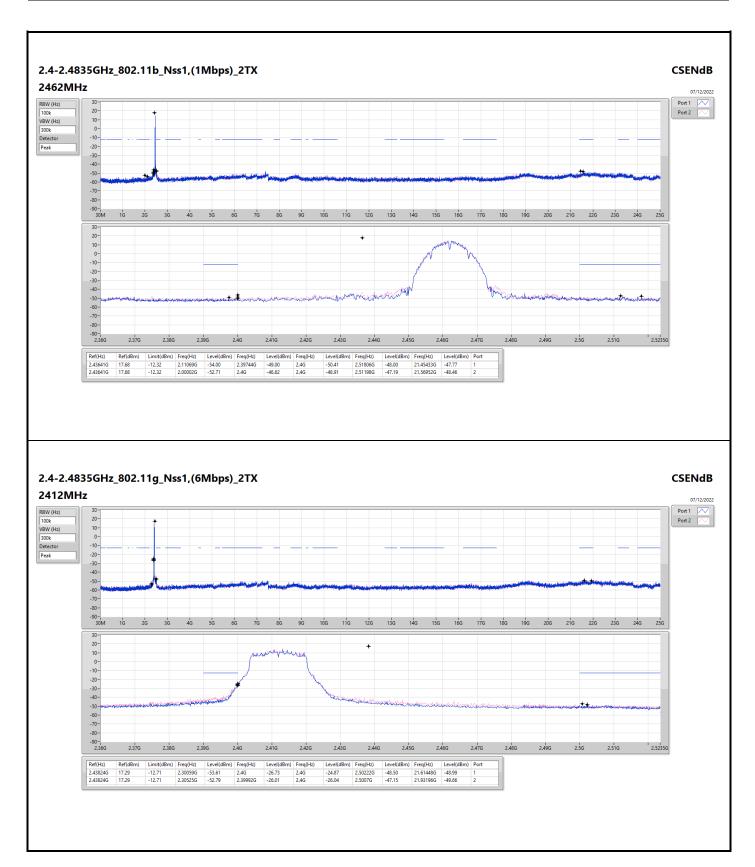




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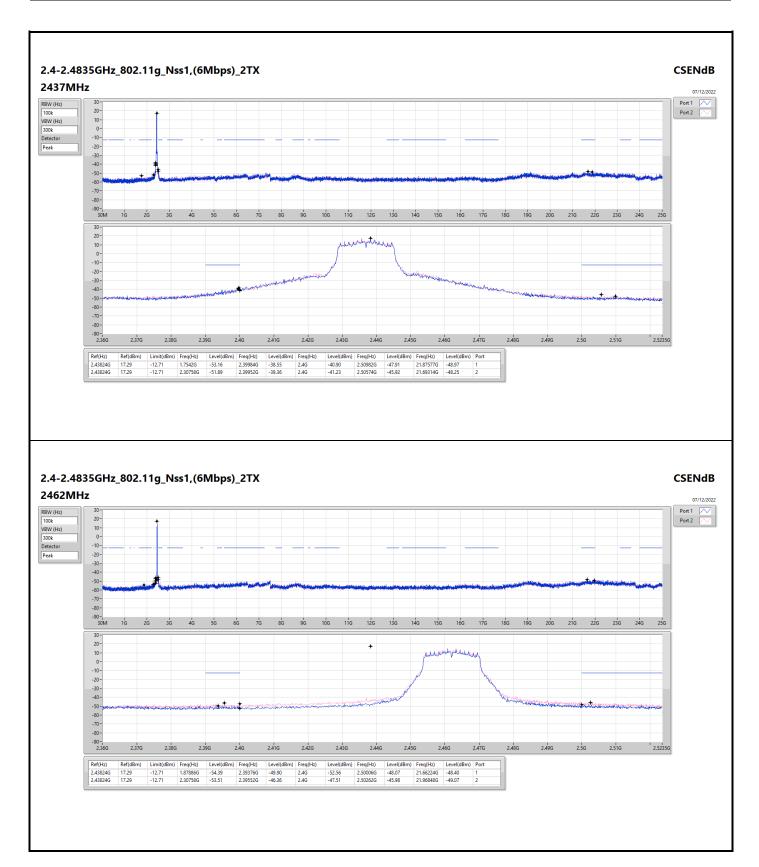




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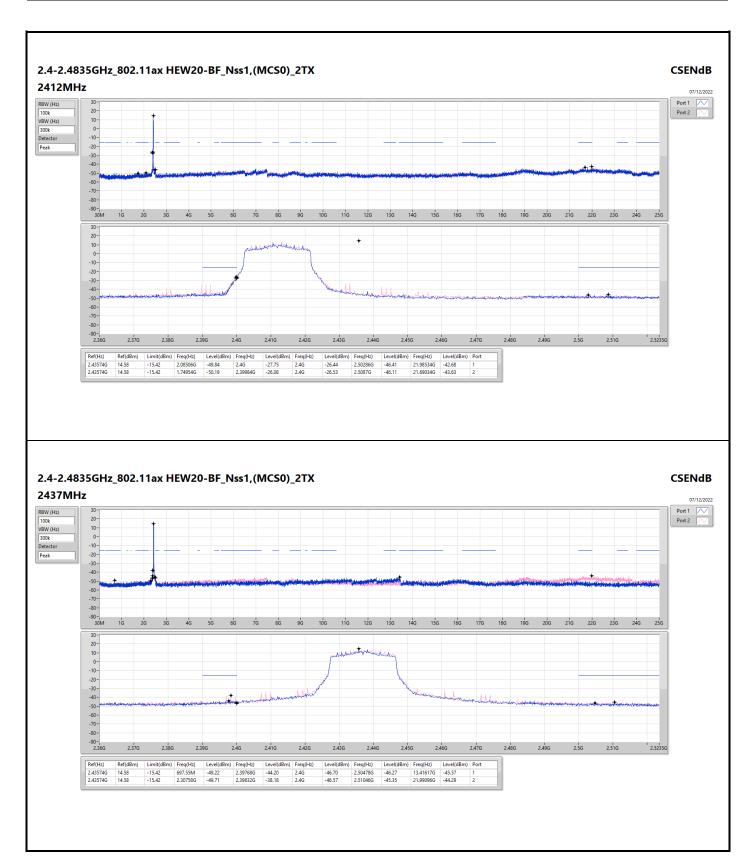




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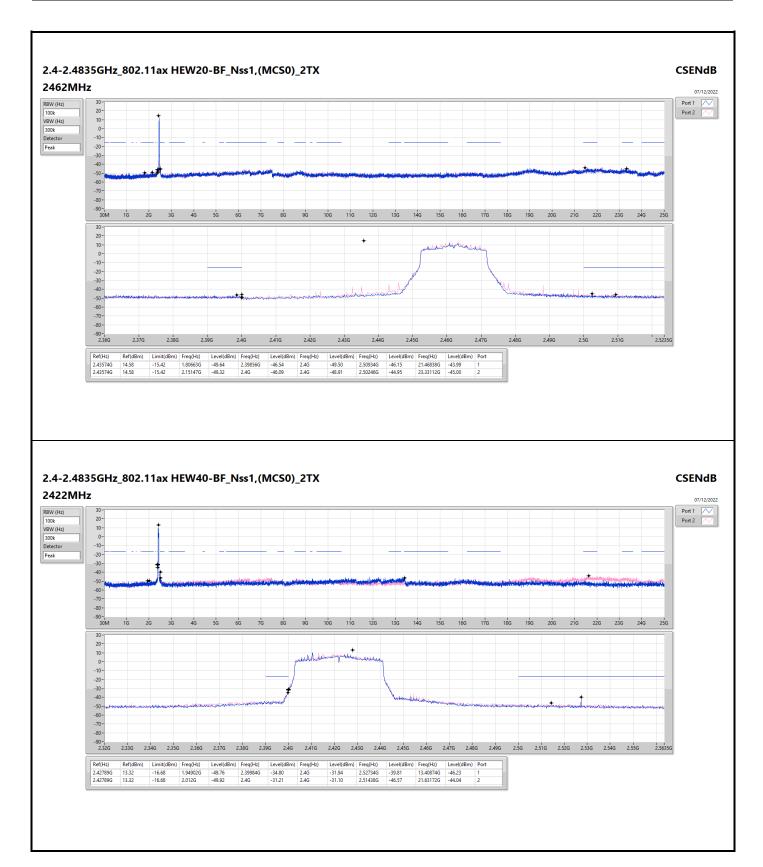




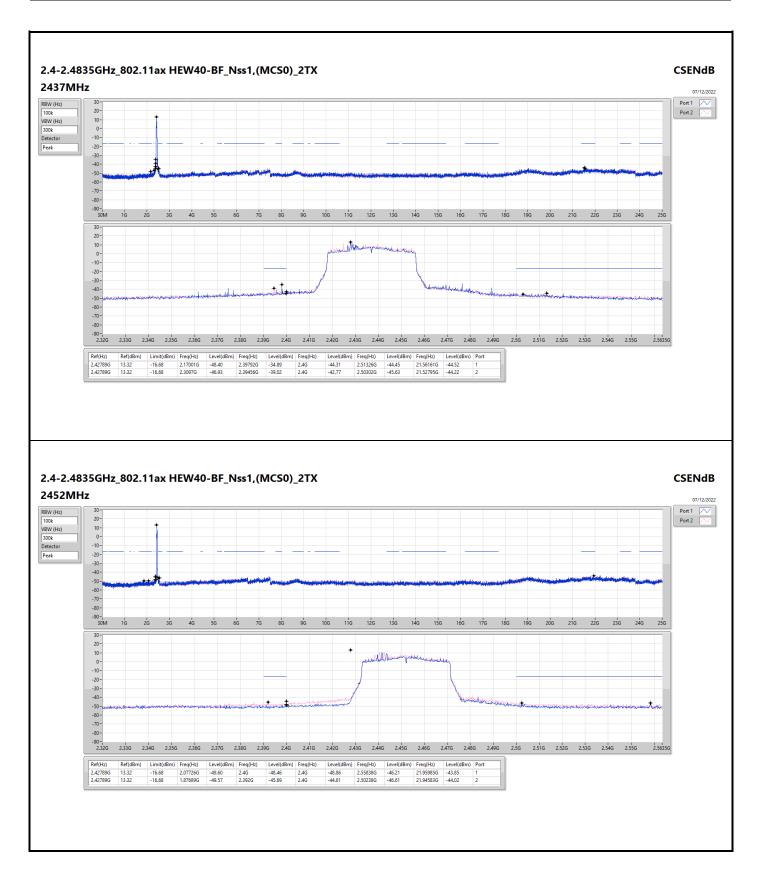
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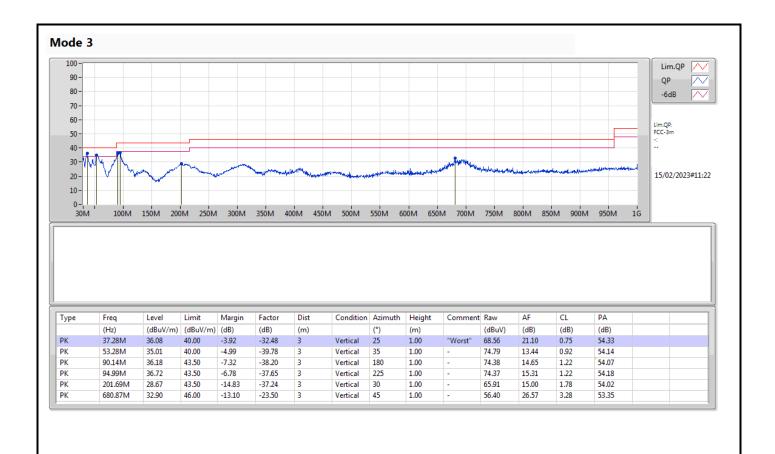
Radiated Emissions below 1GHz

Appendix F.1

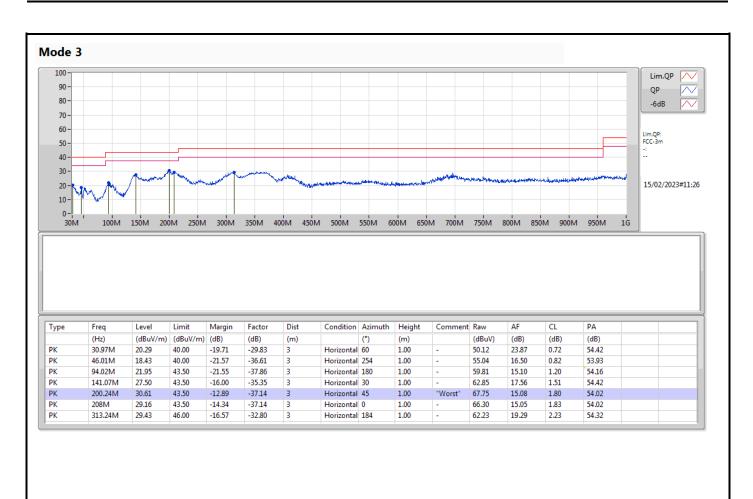
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 3	Pass	PK	37.28M	36.08	40.00	-3.92	Vertical

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RSE TX above 1GHz_Bandedge

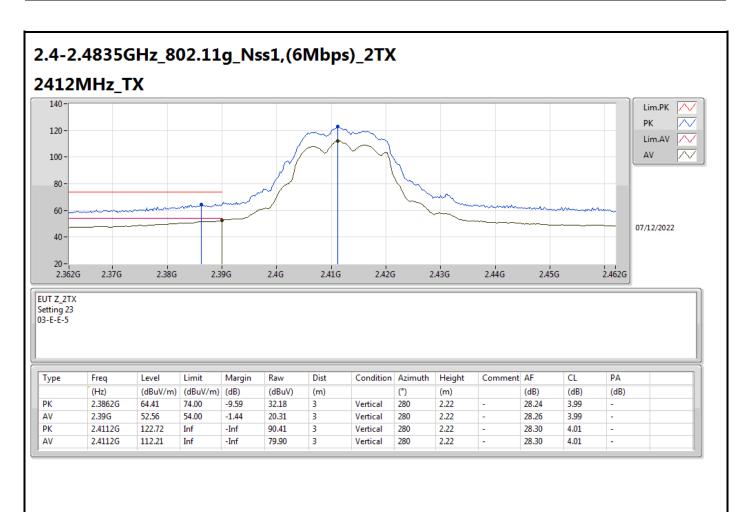
Appendix F.2

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	-	-	-	-	-	-	-	-	-	-	-
802.11b_Nss1,(1Mbps)_2TX	Pass	AV	2.3852G	52.98	54.00	-1.02	3	Vertical	282	2.22	-

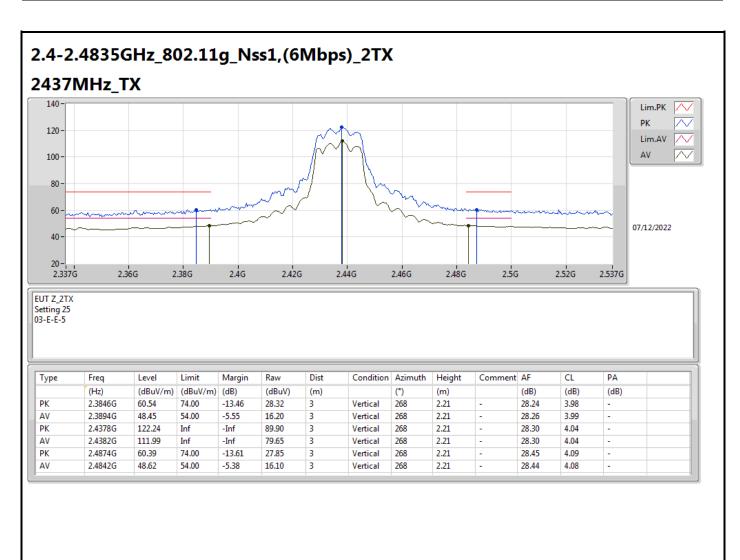
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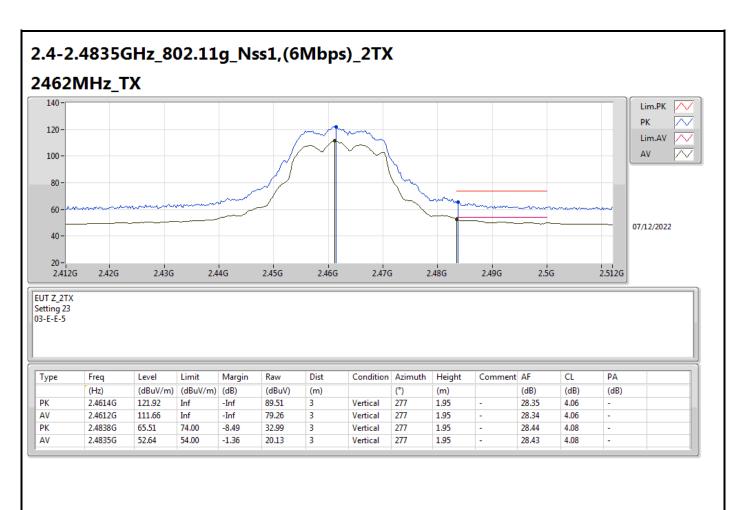
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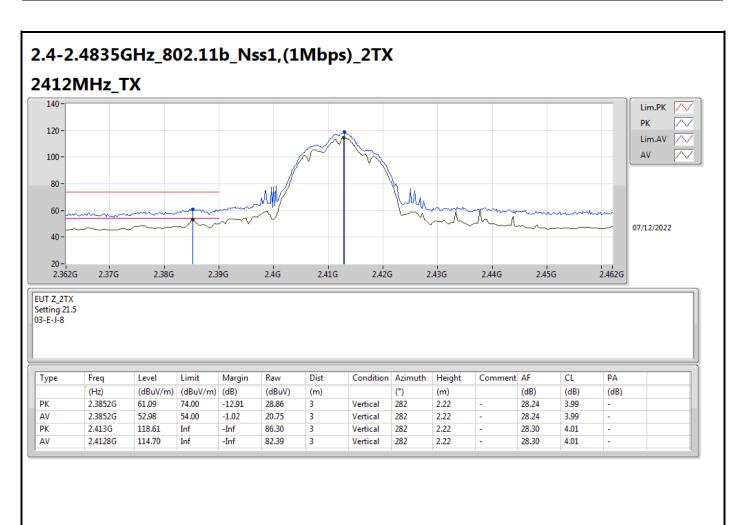
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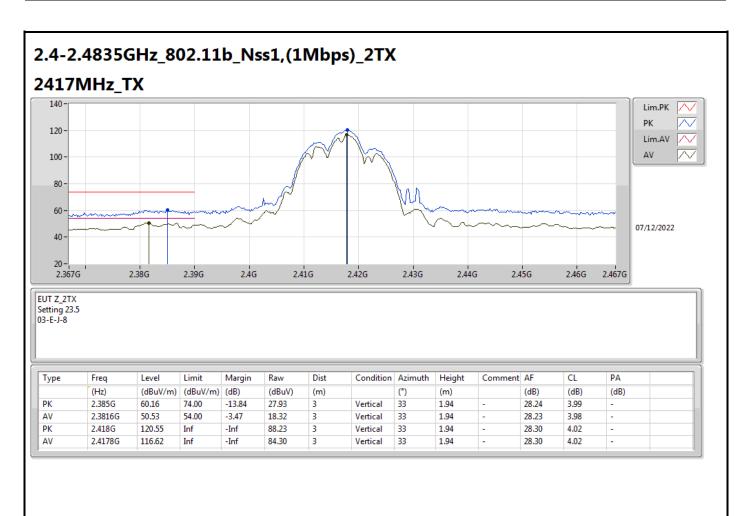




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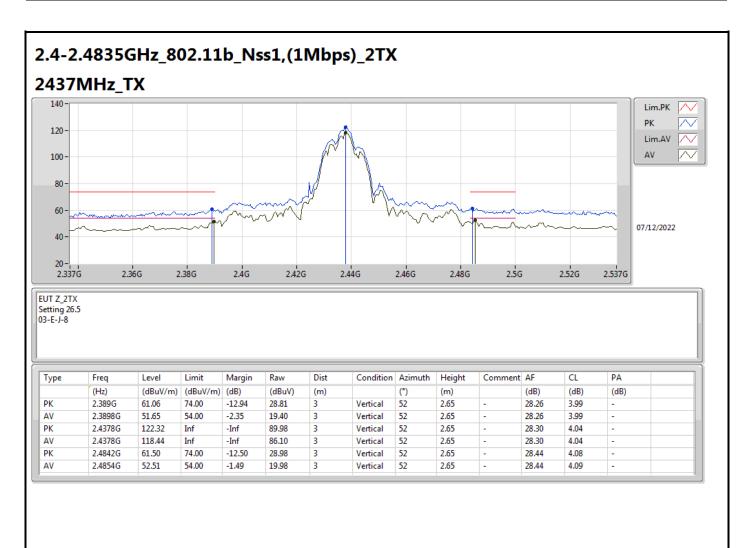




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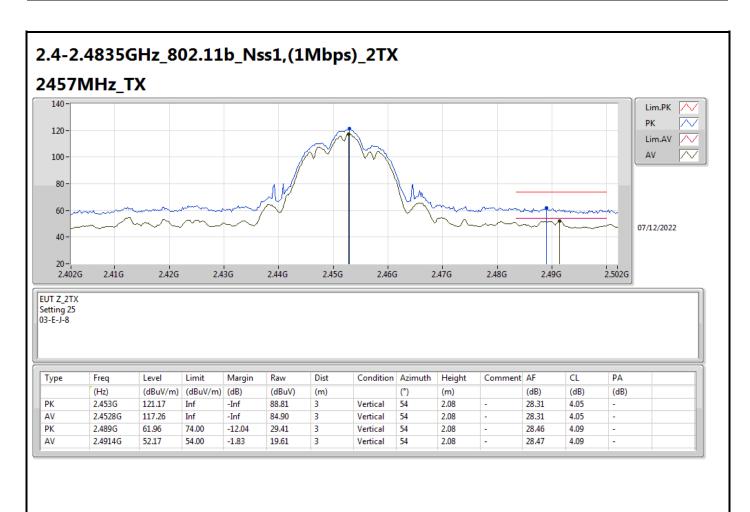
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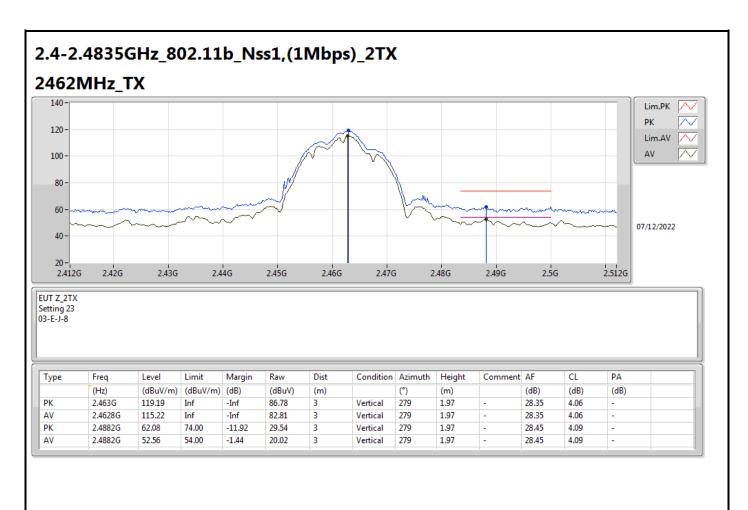
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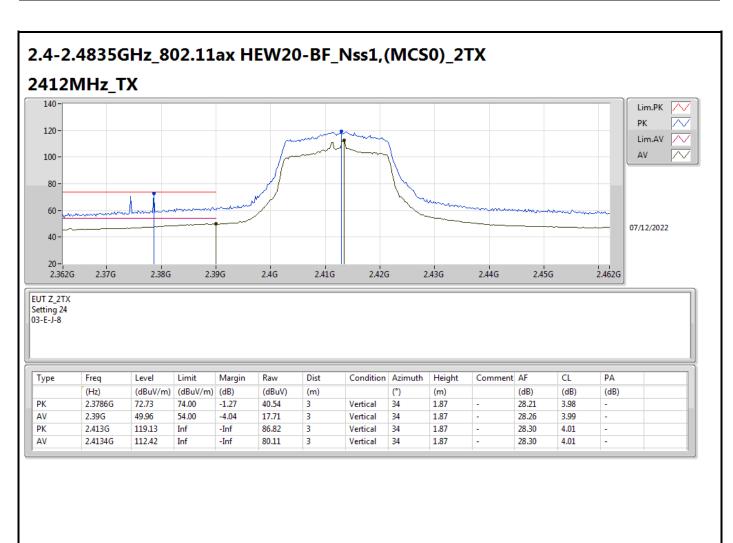
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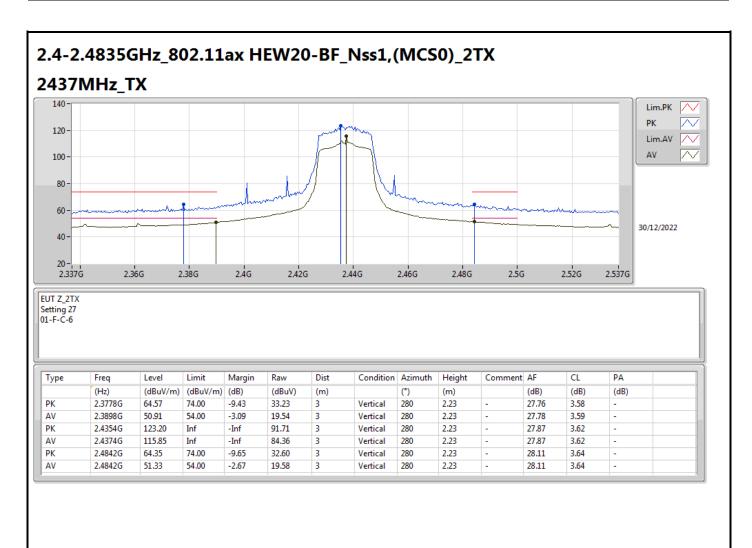




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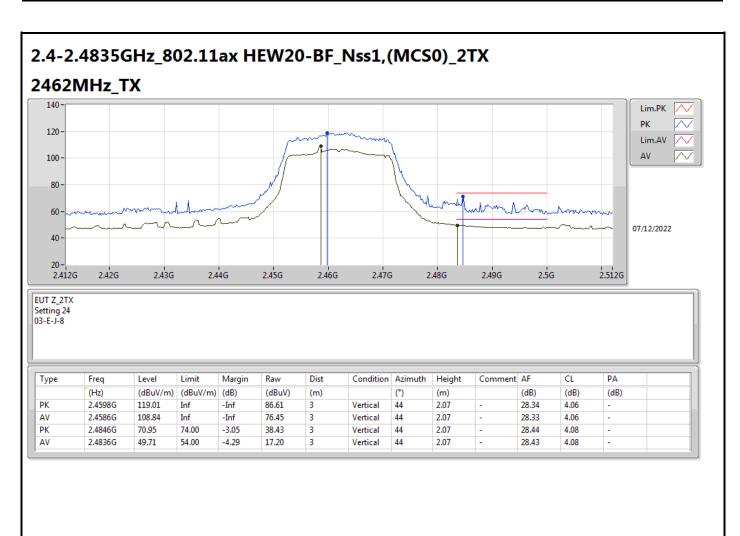
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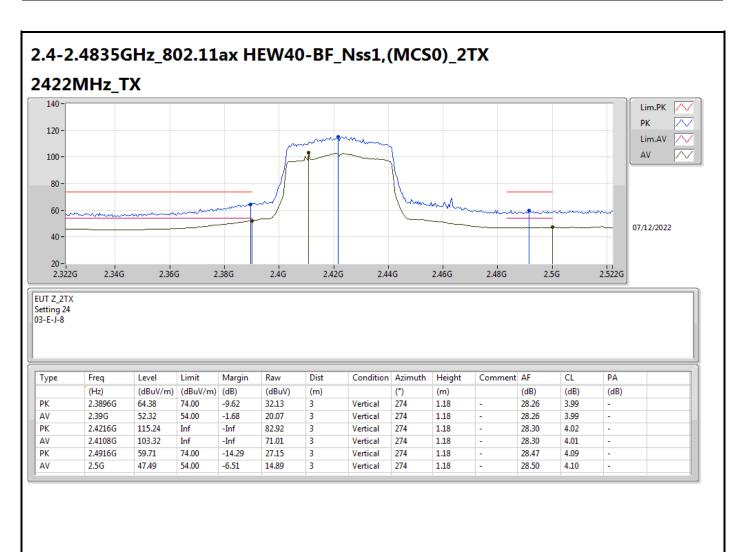




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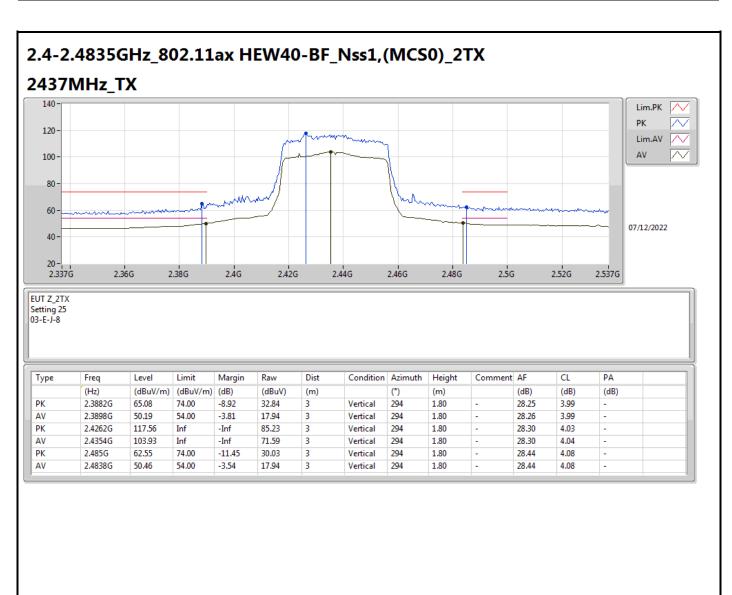




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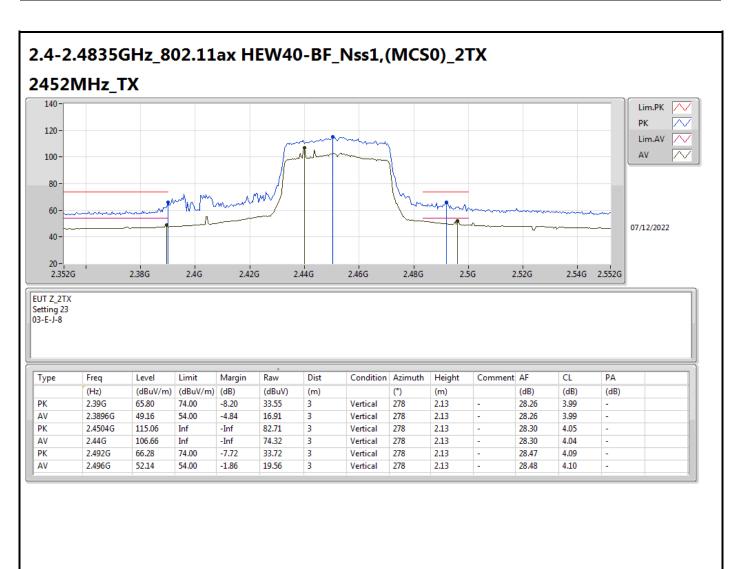




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RSE TX above 1GHz_Harmonic

Appendix F.3

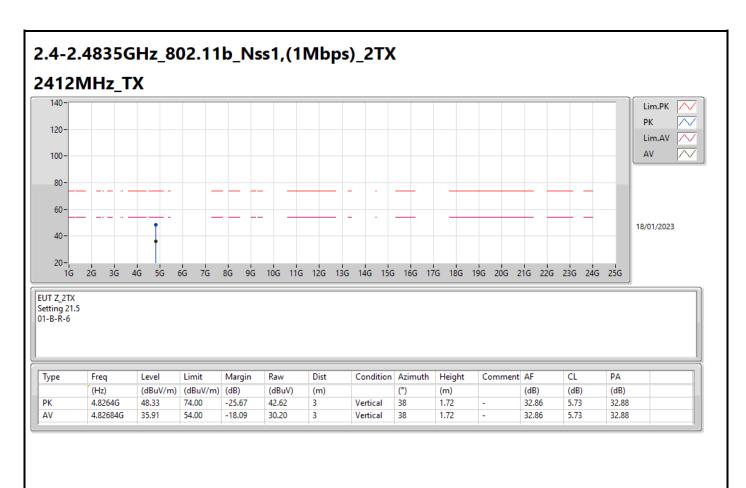
Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
802.11b_Nss1,(1Mbps)_2TX	Pass	AV	4.87696G	43.06	54.00	-10.94	3	Vertical	46	1.80	-

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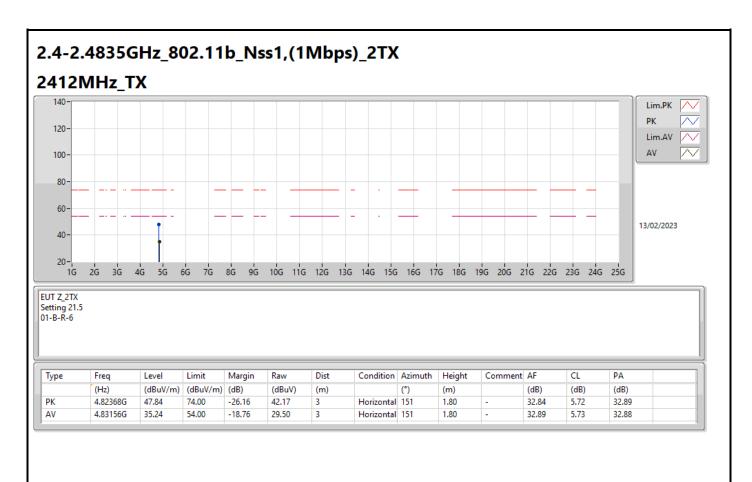




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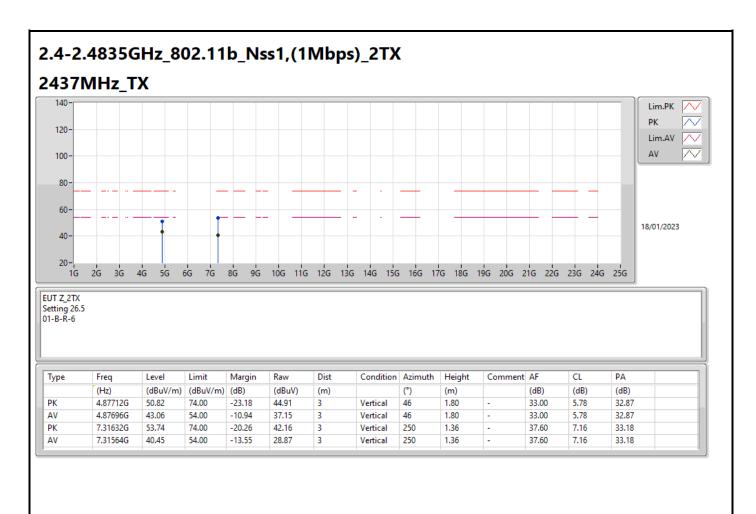




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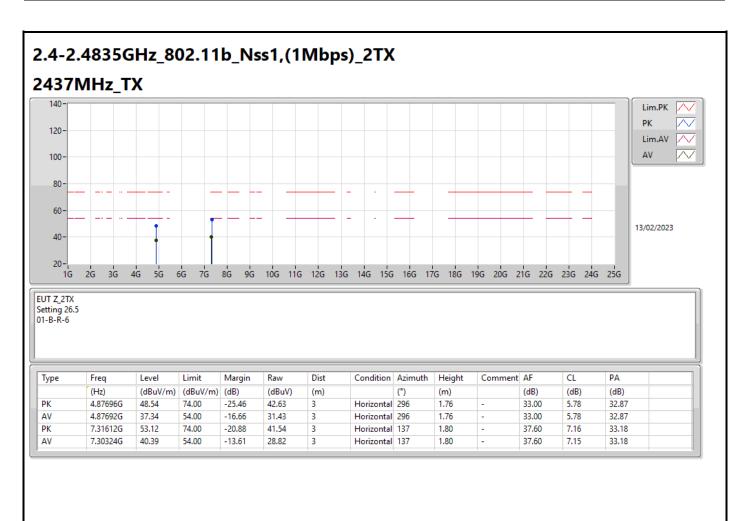
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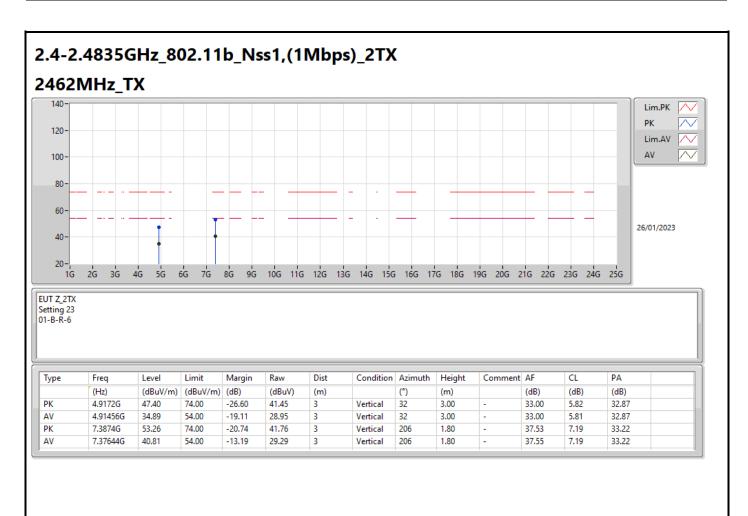




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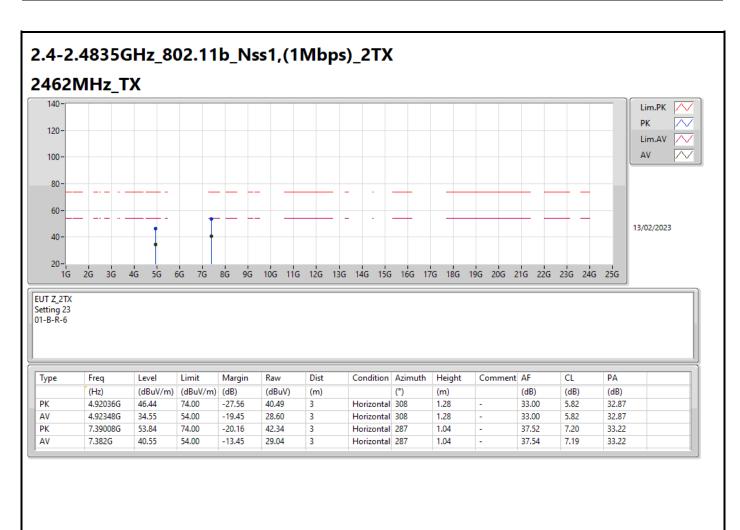




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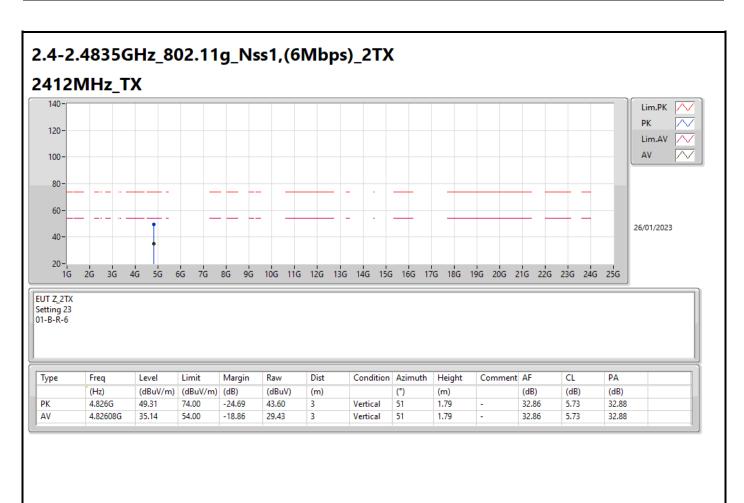




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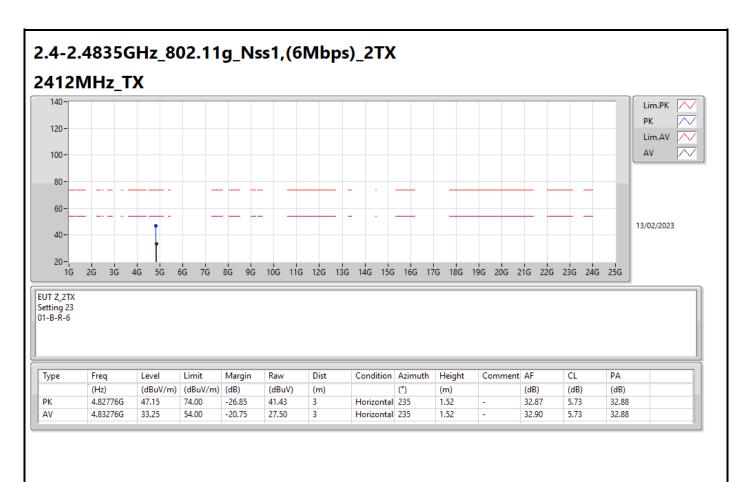




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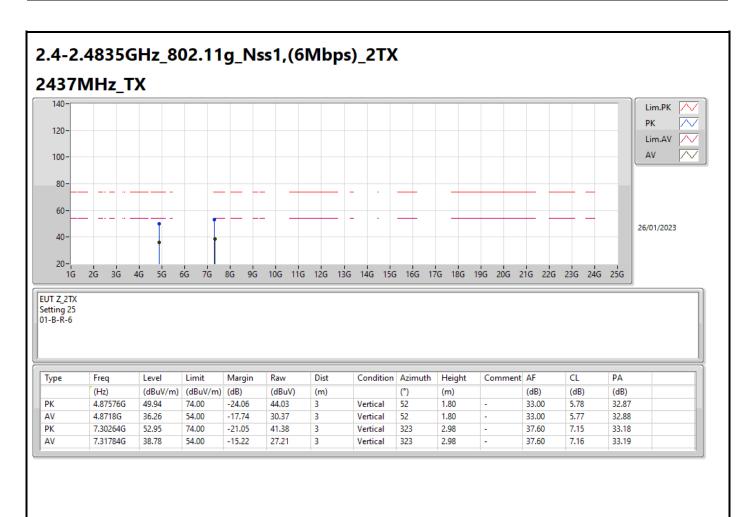




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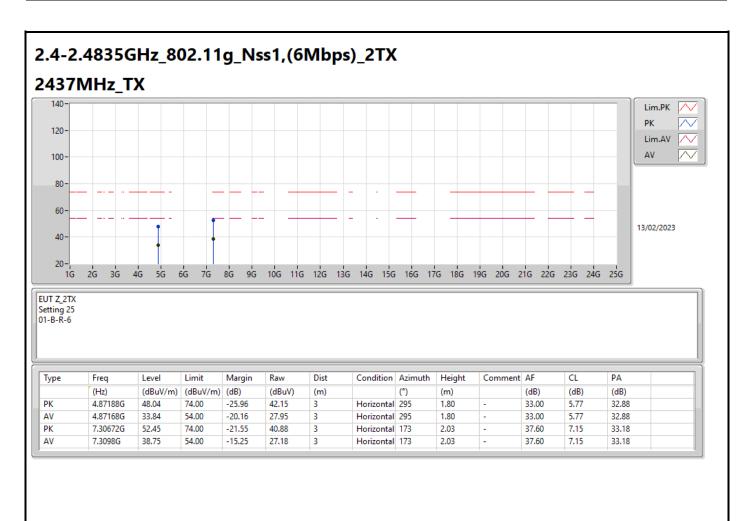




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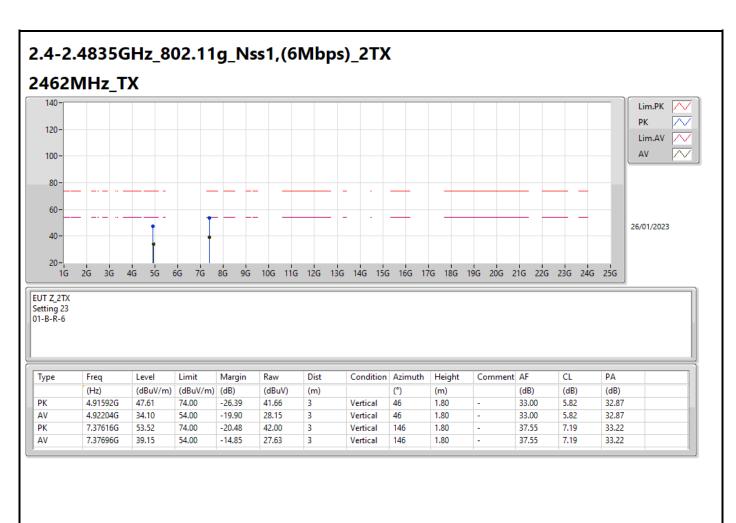




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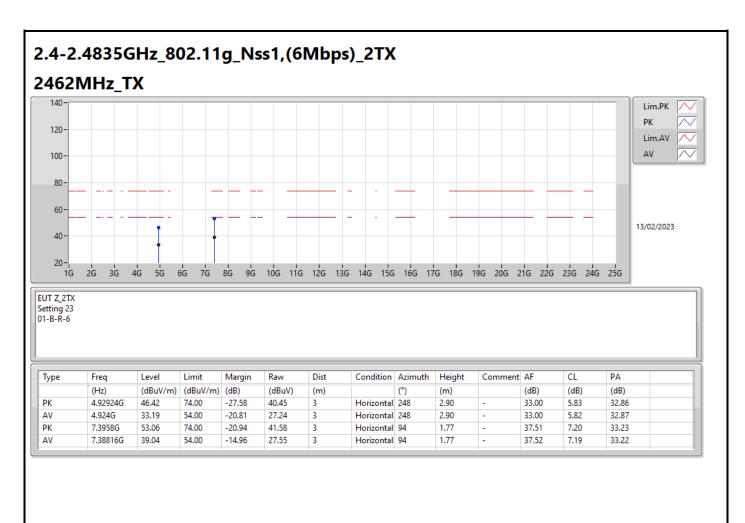




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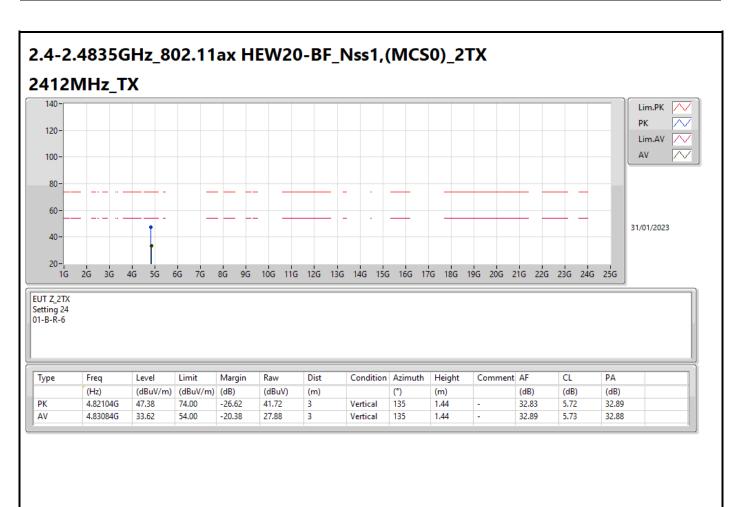




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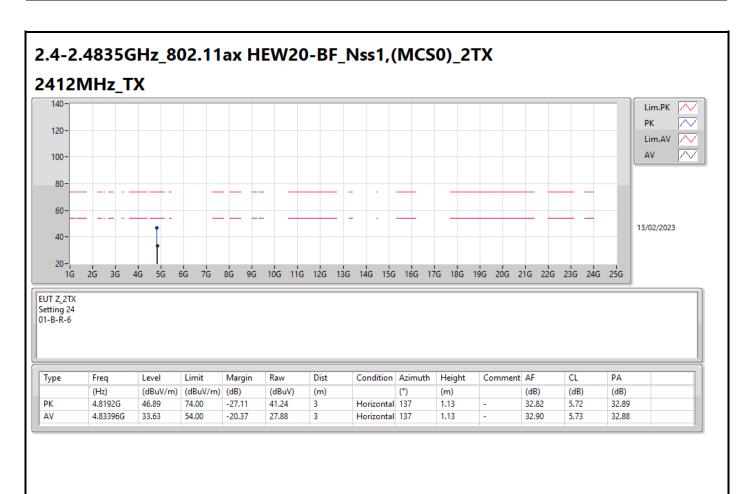




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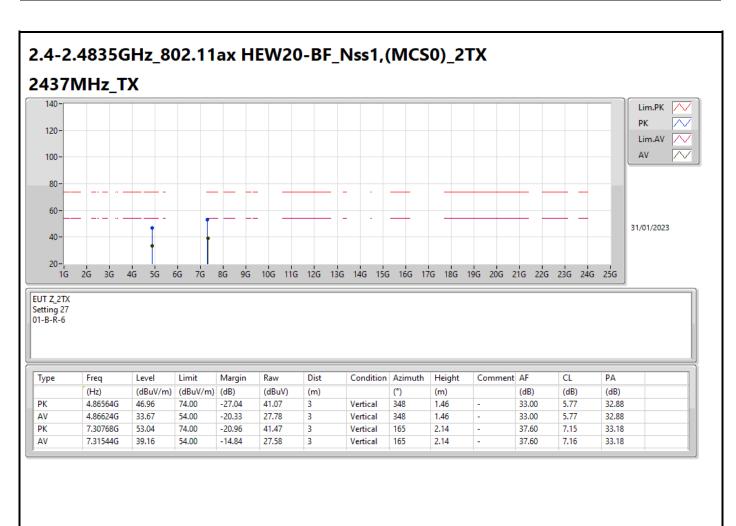




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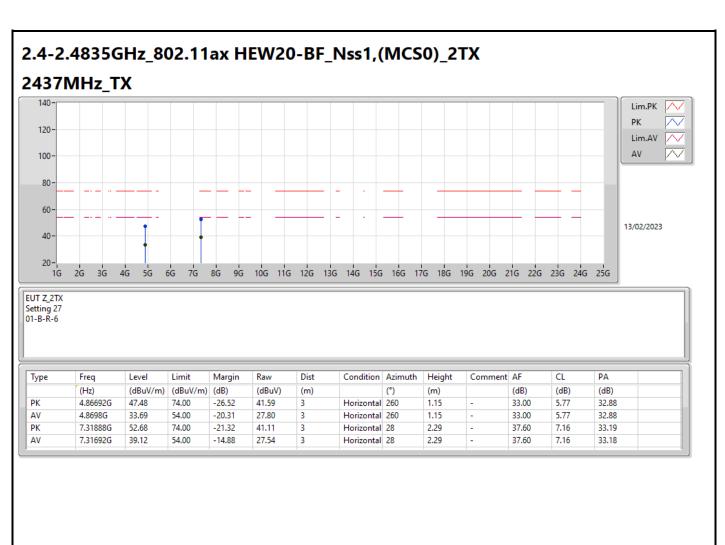




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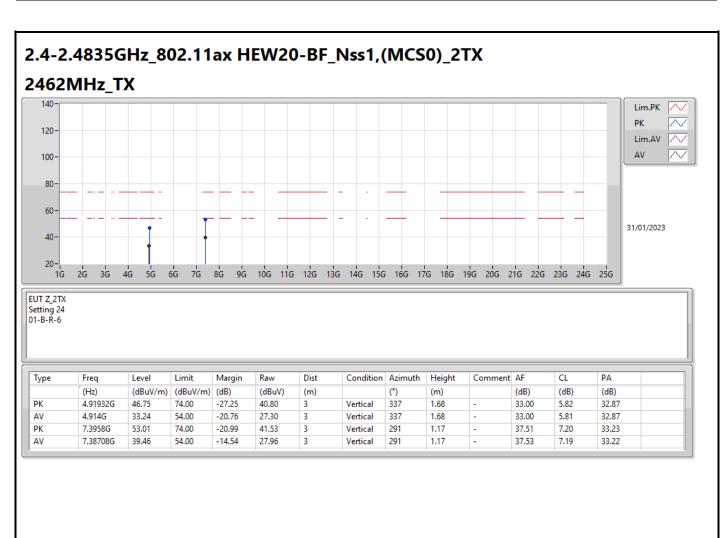
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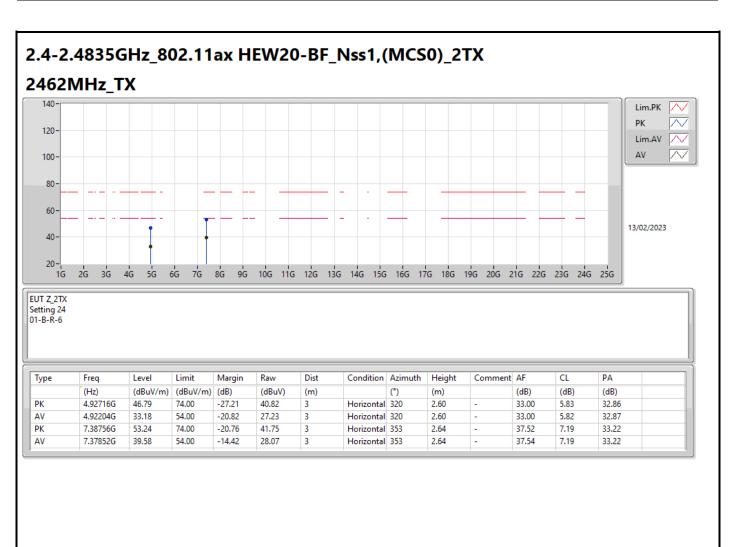




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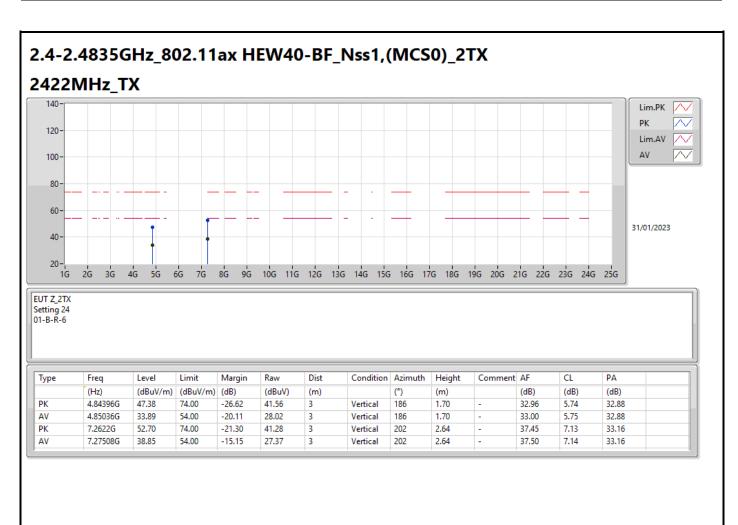




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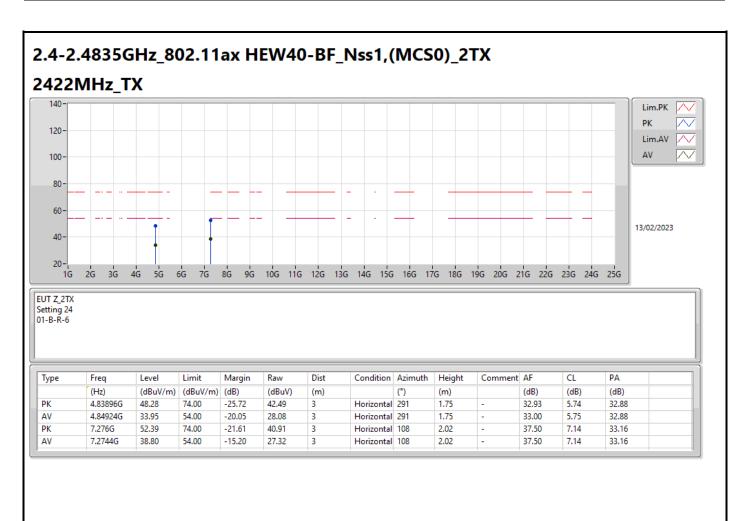




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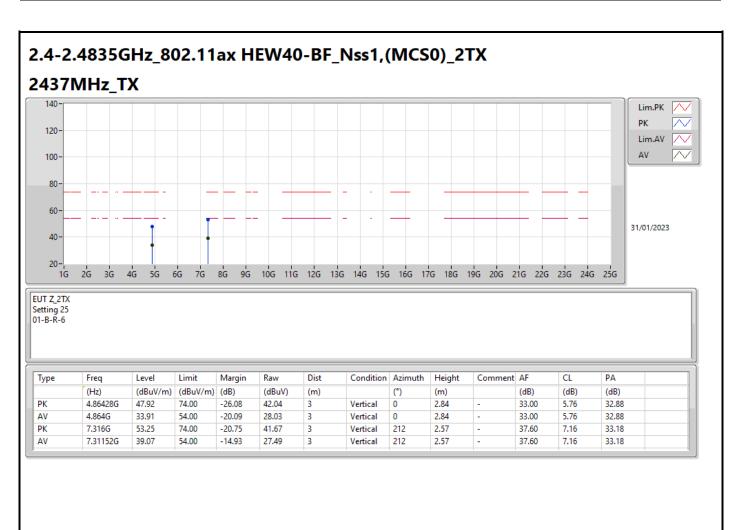
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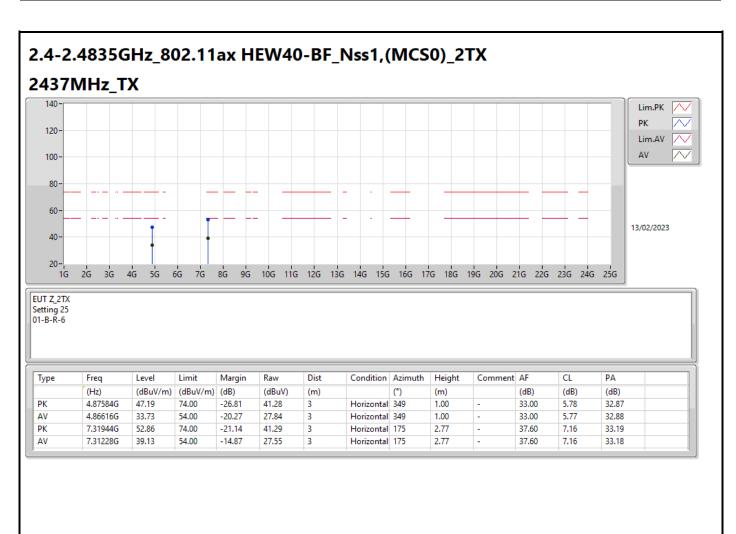




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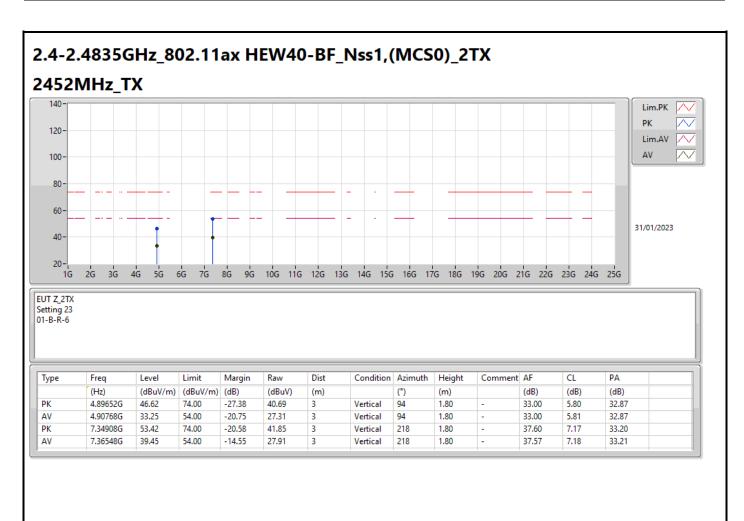




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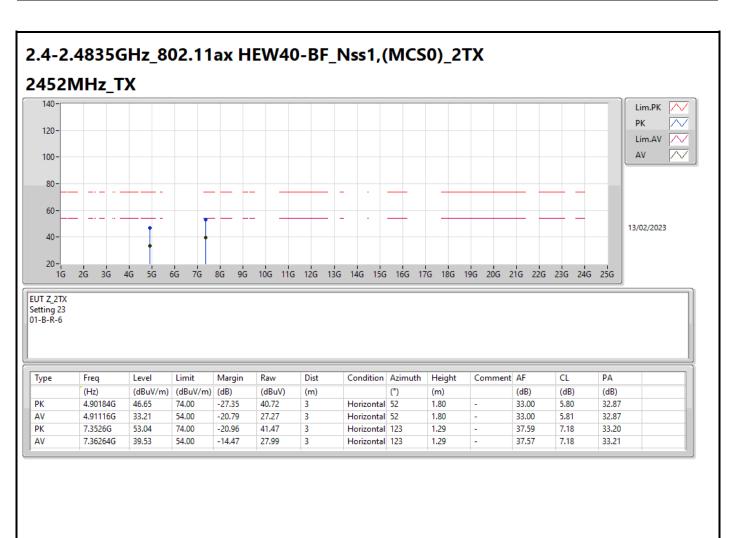




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Radiated Emissions above 1GHz_ Co-location

Appendix G

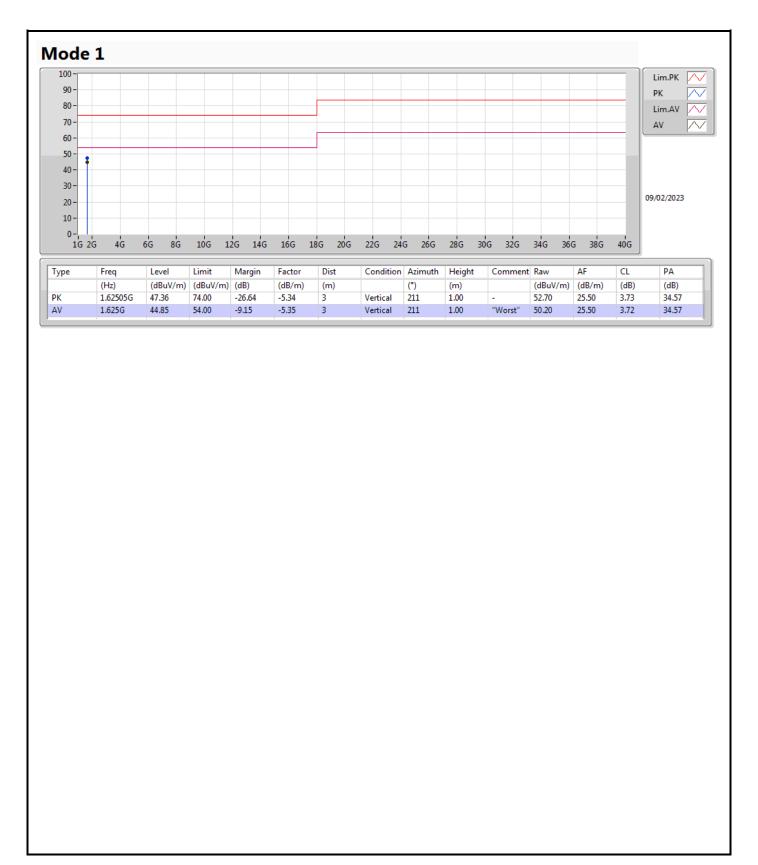
Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition	
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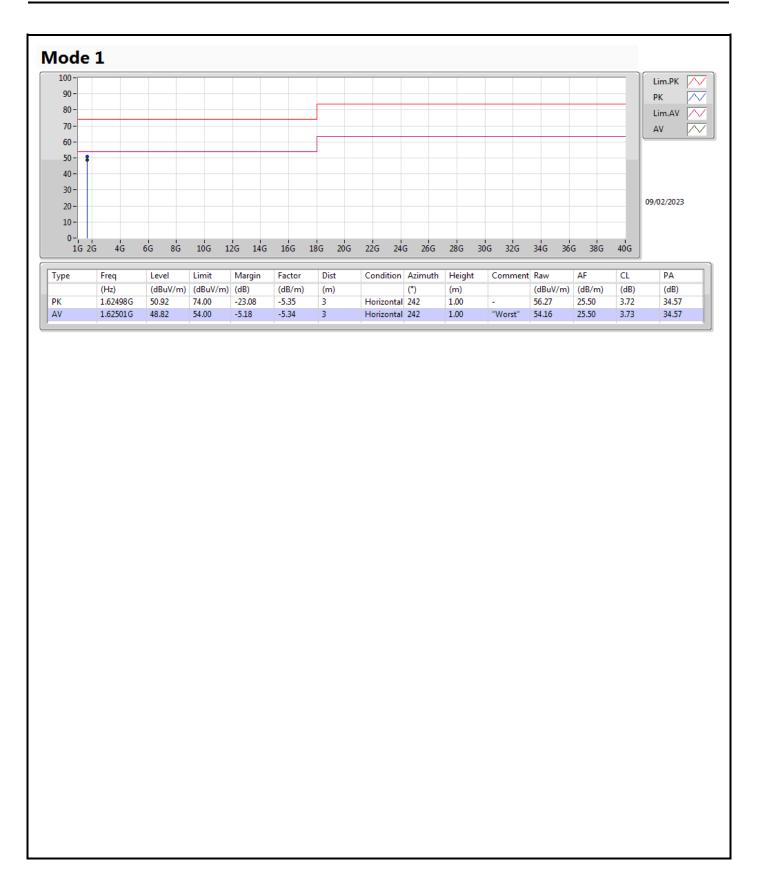
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