

Report No.: FR122333-02AA





RADIO TEST REPORT

FCC ID : 2AXJ4X60V3

Equipment : AX4300 Whole Home Mesh Wi-Fi 6 System

Brand Name : tp-link

Model Name : Deco X4300 Pro

Applicant : TP-Link Corporation Limited

Room 901, 9/F., New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong

Manufacturer : TP-Link Corporation Limited

Room 901, 9/F., New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong

Standard : 47 CFR FCC Part 15.247

The product was received on Apr. 21, 2022, and testing was started from Apr. 23, 2022 and completed on May 23, 2022. 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 variant 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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History of this test report

Report No.: FR122333-02AA

Report No.	Version	Description	Issued Date
FR122333-02AA	01	Initial issue of report	Apr. 29, 2022
FR122333-02AA	02	Adding description of Modifications and verification of Emissions in Restricted Frequency Bands above 1GHz	May 24, 2022

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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	-
2.1	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: Penny Kao

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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	VHT20	20	2TX
2.4-2.4835GHz	802.11ax HEW20	20	2TX
2.4-2.4835GHz	802.11n HT40	40	2TX
2.4-2.4835GHz	VHT40	40	2TX
2.4-2.4835GHz	802.11ax HEW40	40	2TX

Note:

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

1.1.2 Antenna Information

Ant.	Port		Brand	Model Name	Туре	Connector	Gain	(dBi)
	2.4GHz	5GHz					2.4GHz	5GHz
1	1	2	TP-Link	3101502756	PCB	I-PEX	1.93	0.90
2	2	1	TP-Link	3101502757	PCB	I-PEX	1.94	0.97
3	-	4	TP-Link	3101503632	PCB	I-PEX	-	0.97
4	-	3	TP-Link	3101503633	PCB	I-PEX	-	0.88

Note 1: The above information was declared by manufacturer.

Note 2:

For WLAN 2.4GHz, 11b/g/n/ax/VHT mode (2TX/2RX):

Port 1 and Port 2 could transmit/receive simultaneously.

For WLAN 5GHz, 11a/n/ac/ax mode (4TX/4RX):

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

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1.1.3 EUT Operational Condition

EUT Power Type		From power adapter			
Beamforming Function		With beamforming	\boxtimes	Without beamforming	
Function		Point-to-multipoint		Point-to-point	
Test Software Version		QPST[v2.7] \ QSPR (version 5.0-00196)			

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Note: The above information was declared by manufacturer.

1.1.4 Table for EUT Supports Functions

Function
AP Router
Mesh

Note: After evaluating, there is only AP Router mode was selected to test and record in the report.

1.1.5 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR122333AA. Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding LAN 3 (2.5Gbps) port via changing RJ-45	
interface and switching chip.	
(a.) Add PHY chip RTL8221B-CG(located U70)	
(b.) Move RJ-45 and signal transformer from	Emissions in Restricted Frequency Band
motherboard to daughter board	
(c.) Motherboard and daughter board connected by row	
pins(JC1 and JC2)	
2. Changing Model Name to "Deco X4300 Pro" from "Deco	
X60, Deco W6000".	After evaluating it decen't effect the test
3. Changing Equipment Name to "AX4300 Whole Home	After evaluating, it doesn't affect the test
Mesh Wi-Fi 6 System" from "AX3000 Whole Home Mesh	result of this test report.
Wi-Fi 6 System".	

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1.2 Applicable Standards

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

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- 47 CFR FCC Part 15
- ANSI C63.10-2013

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 558074 D01 v05r02
- FCC KDB 662911 D01 v02r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location 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.

Test site registered number IC 4086D with Industry Canada.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated Below 1GHz	03CH05-CB	Eason Chen	23.8-24.9 / 55-58	Apr. 23, 2022
Radiated Above 1GHz	03CH02-CB	RJ Huang	24.2-26.1 / 55-58	May 23, 2022

1.4 Measurement Uncertainty

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

Test Items	Uncertainty	Remark
Radiated Emission (9kHz ~ 30MHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.5 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.2 dB	Confidence levels of 95%

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1.5 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests								
Tests Item Emissions in Restricted Frequency Bands								
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.							
Operating Mode < 1GHz	Normal Link							
1	AP Router mode-EUT + Adapter							
Operating Mode > 1GHz	CTX							
1	EUT							

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Note: The EUT can only be used at Y axis position.

1.6 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.

1.7 Accessories

	Accessories										
No.	o. Equipment Name Brand Name Model Name Rating										
1	Adapter	TP-Link	T120200-2B4	Input: 100-240V~ 50/60Hz, 0.8A Output: 12V, 2A							

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1.8 Support Equipment

For Radiated (below 1GHz):

Support Equipment									
No.	Equipment	Brand Name	Model Name	FCC ID					
Α	LAN Notebook	DELL	E4300	N/A					
В	WiFi 2.4G Notebook	DELL	E4300	N/A					
С	WiFi 5G Notebook	DELL	E4300	N/A					
D	WLAN AP	D-LINK	DIR860L	KA2IR860LA1					
Е	WLAN module	Intel	AX210NGW	PD9AX210NG					
F	WLAN module	Intel	AX210NGW	PD9AX210NG					

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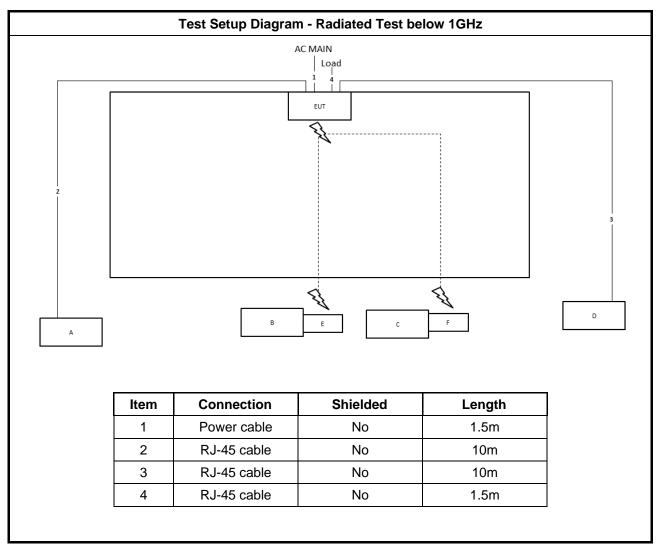
For Radiated (above 1GHz):

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

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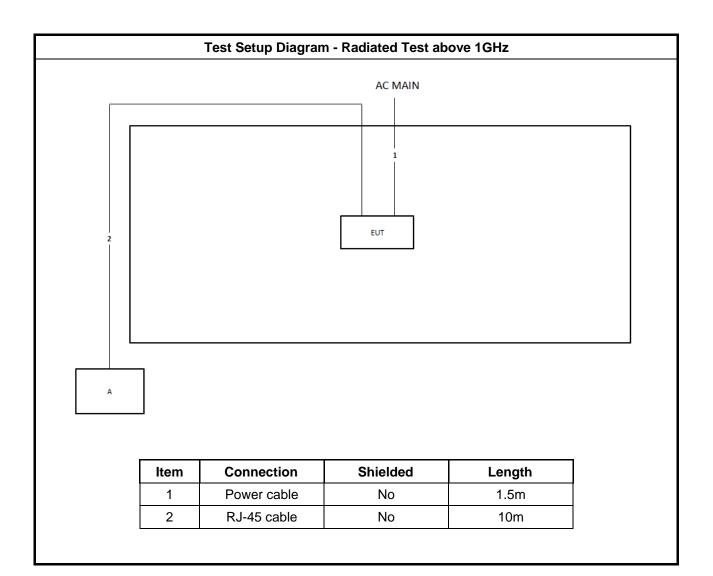


1.9 Test Setup Diagram



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2 Transmitter Test Result

2.1 Emissions in Restricted Frequency Bands

2.1.1 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.

2.1.2 Measuring Instruments

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

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2.1.3 Test Procedures

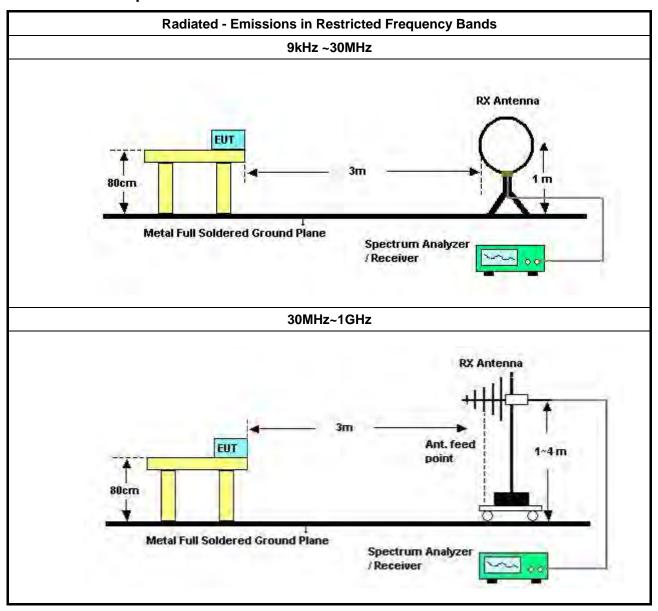
		Test Method								
•	The	average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].								
•		er as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency and highest frequency channel within the allowed operating band.								
•	For the transmitter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

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Test Setup 2.1.4

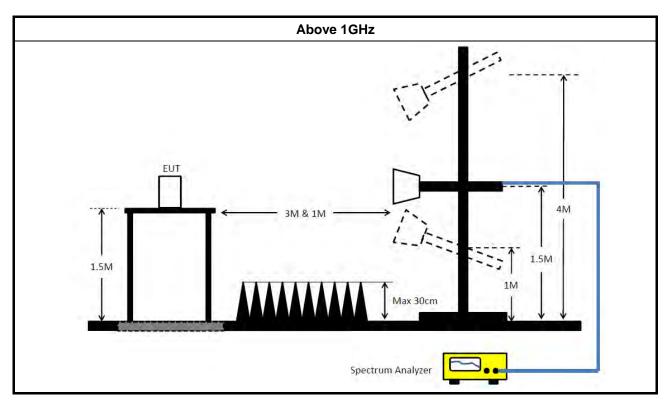


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2.1.5 Measurement Results Calculation

The measured Level is calculated using:

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

2.1.6 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.

2.1.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix A

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3 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 18, 2022	Mar. 17, 2023	Radiation (03CH05-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 09, 2021	Aug. 08, 2022	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 25, 2022	Mar. 24, 2023	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 27, 2021	Apr. 26, 2022	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Mar. 14, 2022	Mar. 13, 2023	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 21, 2021	Jun. 20, 2022	Radiation (03CH05-CB)
RF Cable-low	Woken	Voken RG402 Cab		30MHz~1GHz Oct. 13, 20.		Oct. 12, 2022	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	SENSE V5.10 -		N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	RIKEN	SAC-3M	03CH02-CB	1GHz ~18GHz	Mar. 26, 2022	Mar. 25, 2023	Radiation (03CH02-CB)
Horn Antenna	EMCO	3115	9610-4976	1GHz ~ 18GHz	Apr. 19, 2022	Apr. 18, 2023	Radiation (03CH02-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	15GHz ~ 40GHz Aug. 05, 2021		Radiation (03CH02-CB)
Pre-Amplifier	Agilent	83017A	MY39501305	1GHz ~ 26.5GHz	Jul. 12, 2021	Jul. 11, 2022	Radiation (03CH02-CB)
Spectrum analyzer	R&S	FSU	100015	9kHz~26GHz	Oct. 25, 2021	Oct. 24, 2022	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18	1GHz ~ 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18+19	1GHz ~ 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#5+7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 08, 2021	Dec. 07, 2022	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH02-CB)

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

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

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Radiated Emissions below 1GHz

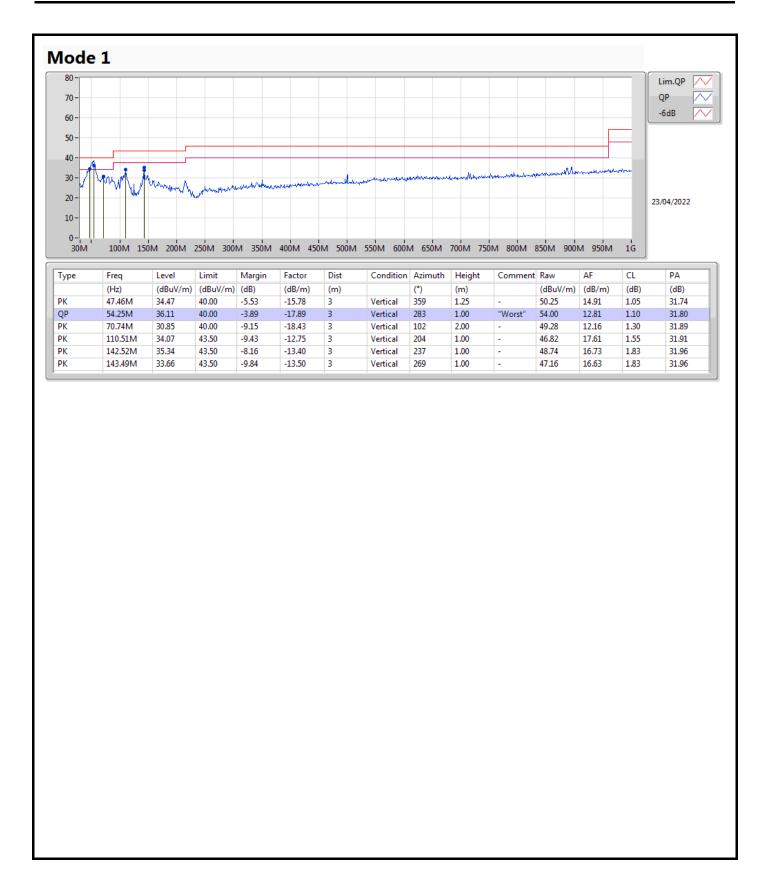
Appendix A.1

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	54.25M	36.11	40.00	-3.89	Vertical

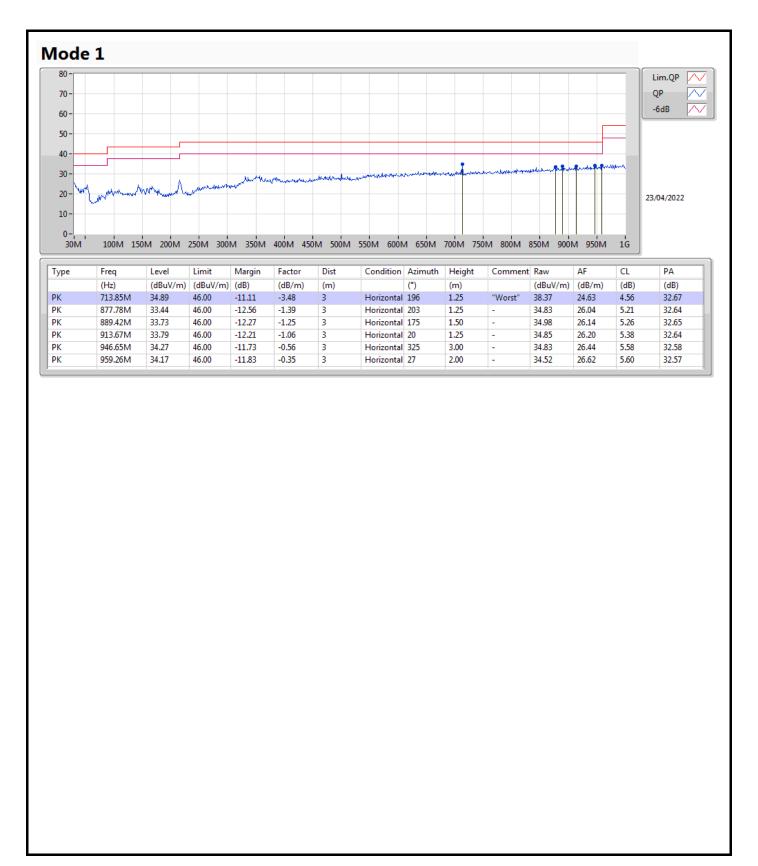
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RSE TX above 1GHz

Appendix A.2

Summary

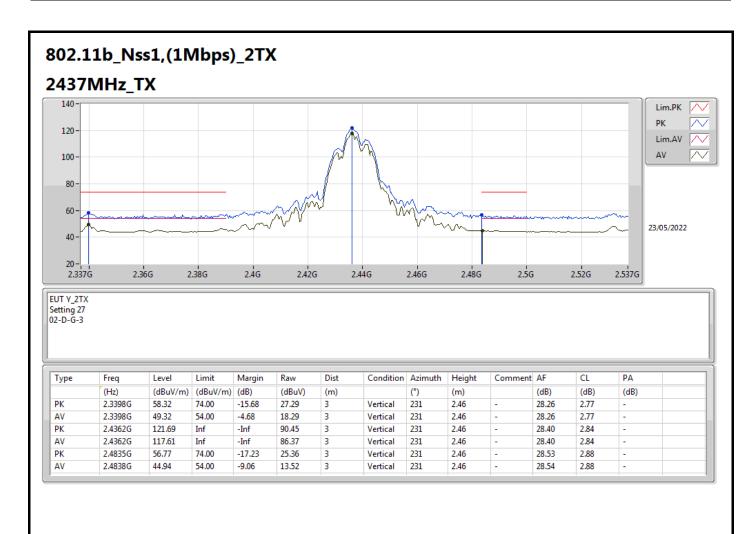
Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
802.11b_Nss1,(1Mbps)_2TX	Pass	AV	7.31012G	50.92	54.00	-3.08	3	Horizontal	8	2.06	-

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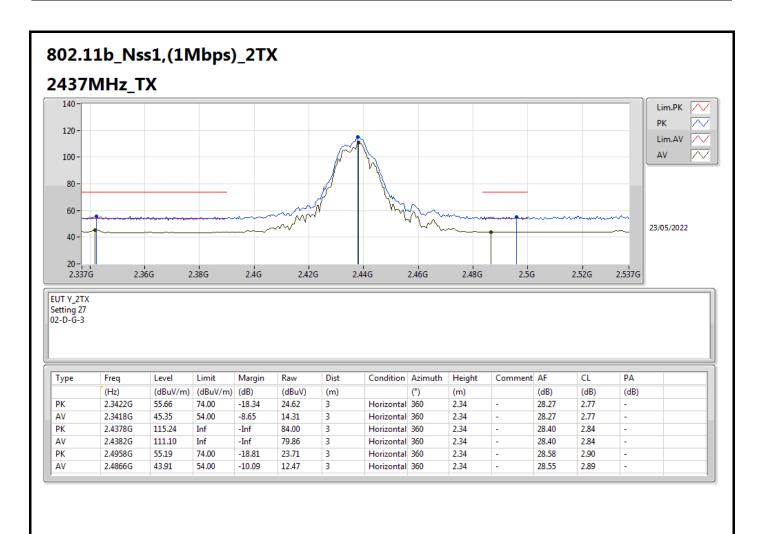
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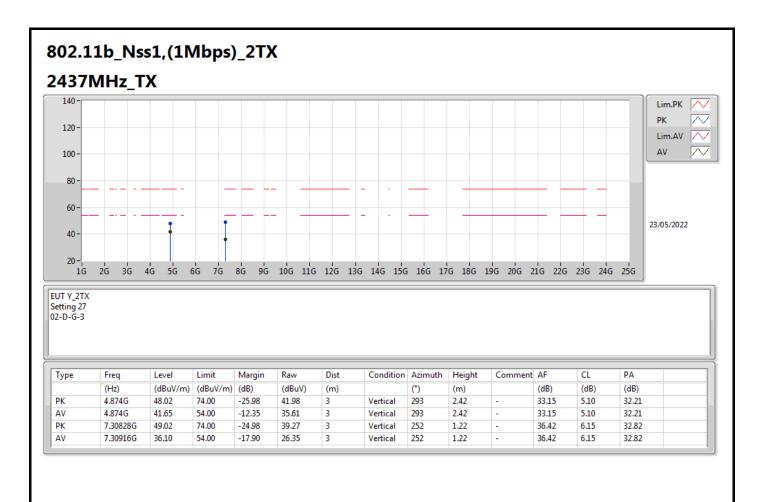


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Appendix A.2



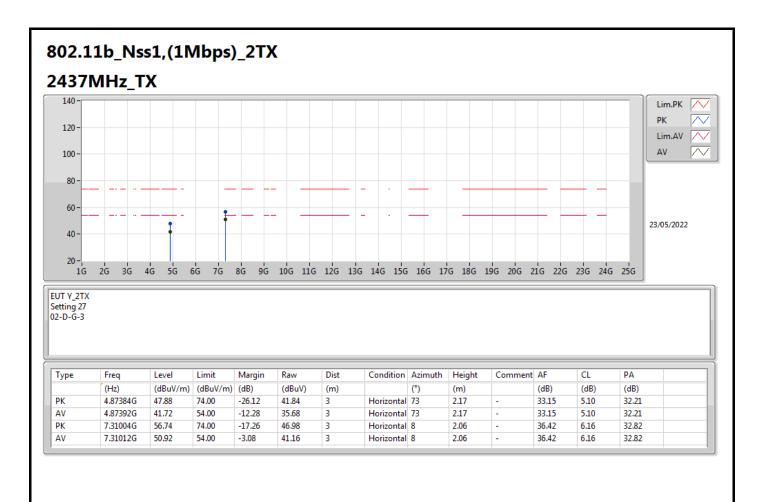


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