Testing Laboratory
3787

RADIO TEST REPORT

FCC ID	:	MSQ-RTAXE4P00
Equipment	:	AXE11000 Tri Band WiFi Router
Brand Name	:	ASUS
Model Name	:	ET12, ZenWiFi ET12, ASUS ZenWiFi ET12
Applicant	:	ASUSTeK COMPUTER INC. 1F., No. 15, Lide Rd., Beitou, Taipei 112, Taiwan
Standard	:	47 CFR FCC Part 15.407

The product was received on Sep. 02, 2023, and testing was started from Sep. 02, 2023 and completed on Apr. 08, 2024. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this 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.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR0D2518-10AD	01	Initial issue of report	May 07, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.407(a)	Emission Bandwidth	PASS	-
3.2	15.407(a)	Maximum Output Power	PASS	-
3.3	15.407(a)	Power Spectral Density	PASS	-
3.4	15.407(b)	Unwanted Emissions	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: Vicky Huang

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5150-5250	a, n (HT20), ac (VHT20), ax (HEW20)	5180-5240	36-48 [4]
5250-5350		5260-5320	52-64 [4]
5470-5725		5500-5720	100-144 [12]
5725-5850		5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40), ax (HEW40)	5190-5230	38-46 [2]
5250-5350		5270-5310	54-62 [2]
5470-5725		5510-5710	102-142 [6]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80), ax (HEW80)	5210	42 [1]
5250-5350		5290	58 [1]
5470-5725		5530-5690	106-138 [3]
5725-5850		5775	155 [1]
5150-5350	ac (VHT160), ax (HEW160)	5250	50 [1]
5470-5725		5570	114 [1]

Band	Mode	BWch (MHz)	Nant
5.15-5.25GHz	802.11a	20	4TX
5.15-5.25GHz	802.11n HT20	20	4TX
5.15-5.25GHz	802.11n HT20-BF	20	4TX
5.15-5.25GHz	802.11ac VHT20	20	4TX
5.15-5.25GHz	802.11ac VHT20-BF	20	4TX
5.15-5.25GHz	802.11ax HEW20	20	4TX
5.15-5.25GHz	802.11ax HEW20-BF	20	4TX
5.15-5.25GHz	802.11n HT40	40	4TX
5.15-5.25GHz	802.11n HT40-BF	40	4TX
5.15-5.25GHz	802.11ac VHT40	40	4TX
5.15-5.25GHz	802.11ac VHT40-BF	40	4TX
5.15-5.25GHz	802.11ax HEW40	40	4TX
5.15-5.25GHz	802.11ax HEW40-BF	40	4TX
5.15-5.25GHz	802.11ac VHT80	80	4TX
5.15-5.25GHz	802.11ac VHT80-BF	80	4TX
5.15-5.25GHz	802.11ax HEW80	80	4TX

5.15-5.25GHz	802.11ax HEW80-BF	80	4TX
5.25-5.35GHz	802.11a	20	4TX
5.25-5.35GHz	802.11n HT20	20	4TX
5.25-5.35GHz	802.11n HT20-BF	20	4TX
5.25-5.35GHz	802.11ac VHT20	20	4TX
5.25-5.35GHz	802.11ac VHT20-BF	20	4TX
5.25-5.35GHz	802.11ax HEW20	20	4TX
5.25-5.35GHz	802.11ax HEW20-BF	20	4TX
5.25-5.35GHz	802.11n HT40	40	4TX
5.25-5.35GHz	802.11n HT40-BF	40	4TX
5.25-5.35GHz	802.11ac VHT40	40	4TX
5.25-5.35GHz	802.11ac VHT40-BF	40	4TX
5.25-5.35GHz	802.11ax HEW40	40	4TX
5.25-5.35GHz	802.11ax HEW40-BF	40	4TX
5.25-5.35GHz	802.11ac VHT80	80	4TX
5.25-5.35GHz	802.11ac VHT80-BF	80	4TX
5.25-5.35GHz	802.11ax HEW80	80	4TX
5.25-5.35GHz	802.11ax HEW80-BF	80	4TX
5.15-5.35GHz	802.11ac VHT160	160	4TX
5.15-5.35GHz	802.11ac VHT160-BF	160	4TX
5.15-5.35GHz	802.11ax HEW160	160	4TX
5.15-5.35GHz	802.11ax HEW160-BF	160	4TX
5.47-5.725GHz	802.11a	20	4TX
5.47-5.725GHz	802.11n HT20	20	4TX
5.47-5.725GHz	802.11n HT20-BF	20	4TX
5.47-5.725GHz	802.11ac VHT20	20	4TX
5.47-5.725GHz	802.11ac VHT20-BF	20	4TX
5.47-5.725GHz	802.11ax HEW20	20	4TX
5.47-5.725GHz	802.11ax HEW20-BF	20	4TX
5.47-5.725GHz	802.11n HT40	40	4TX
5.47-5.725GHz	802.11n HT40-BF	40	4TX
5.47-5.725GHz	802.11ac VHT40	40	4TX
5.47-5.725GHz	802.11ac VHT40-BF	40	4TX
5.47-5.725GHz	802.11ax HEW40	40	4TX
5.47-5.725GHz	802.11ax HEW40-BF	40	4TX
5.47-5.725GHz	802.11ac VHT80	80	4TX
5.47-5.725GHz	802.11ac VHT80-BF	80	4TX
5.47-5.725GHz	802.11ax HEW80	80	4TX
5.47-5.725GHz	802.11ax HEW80-BF	80	4TX
5.47-5.725GHz	802.11ac VHT160	160	4TX

5.47-5.725GHz	802.11ac VHT160-BF	160	4TX
5.47-5.725GHz	802.11ax HEW160	160	4TX
5.47-5.725GHz	802.11ax HEW160-BF	160	4TX
5.725-5.85GHz	802.11a	20	4TX
5.725-5.85GHz	802.11n HT20	20	4TX
5.725-5.85GHz	802.11n HT20-BF	20	4TX
5.725-5.85GHz	802.11ac VHT20	20	4TX
5.725-5.85GHz	802.11ac VHT20-BF	20	4TX
5.725-5.85GHz	802.11ax HEW20	20	4TX
5.725-5.85GHz	802.11ax HEW20-BF	20	4TX
5.725-5.85GHz	802.11n HT40	40	4TX
5.725-5.85GHz	802.11n HT40-BF	40	4TX
5.725-5.85GHz	802.11ac VHT40	40	4TX
5.725-5.85GHz	802.11ac VHT40-BF	40	4TX
5.725-5.85GHz	802.11ax HEW40	40	4TX
5.725-5.85GHz	802.11ax HEW40-BF	40	4TX
5.725-5.85GHz	802.11ac VHT80	80	4TX
5.725-5.85GHz	802.11ac VHT80-BF	80	4TX
5.725-5.85GHz	802.11ax HEW80	80	4TX
5.725-5.85GHz	802.11ax HEW80-BF	80	4TX

Note:
- 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40, VHT80, VHT160 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- HEW20, HEW40, HEW80, HEW160 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	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz	Bluetooth					
1	-	-	3	-	WHA YU	C660-510565-A	PIFA	I-PEX	Note1
2	-	-	2	-	WHA YU	C660-510565-A	PIFA	I-PEX	
3	-	-	1	-	WHA YU	C660-510565-A	PIFA	I-PEX	
4	-	-	4	-	WHA YU	C660-510565-A	PIFA	I-PEX	
5	3	2	-	-	WHA YU	C660-510565-A	PIFA	I-PEX	
6	4	1	-	-	WHA YU	C660-510565-A	PIFA	I-PEX	
7	1	4	-	-	WHA YU	C660-510565-A	PIFA	I-PEX	
8	2	3	-	-	WHA YU	C660-510565-A	PIFA	I-PEX	
9	-	-	-	1	YAGEO	ANT3216A063R2400A	Chip	N/A	

Note1:

Ant.	Port				Antenna Gain (dBi)									
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz	Bluetooth	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz				Bluetooth
						UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8	
1	-	-	3	-	-	-	-	-	-	0.97	0.81	1.07	1.14	-
2	-	-	2	-	-	-	-	-	-					-
3	-	-	1	-	-	-	-	-	-					-
4	-	-	4	-	-	-	-	-	-					-
5	3	2	-	-	3.03	3.63	3.43	3.18	4.44	-	-	-	-	-
6	4	1	-	-	2.13	4.04	3.59	2.73	3.14	-	-	-	-	-
7	1	4	-	-	2.34	2.76	3.12	3.17	3.46	-	-	-	-	-
8	2	3	-	-	3.67	4.17	4.44	4.41	4.94	-	-	-	-	-
9	-	-	-	1	-	-	-	-	-	-	-	-	-	1.69

Directional Gain (dBi)									
WLAN 2.4GHz		WLAN 5GHz UNII 1		WLAN 5GHz UNII 2A		WLAN 5GHz UNII 2C		WLAN 5GHz UNII 3	
4T1S	4T2S	4T1S	4T2S	4T1S	4T2S	4T1S	4T2S	4T1S	4T2S
6.66	3.67	4.32	4.17	5.3	4.44	4.83	4.41	5.09	4.94

Note2: The above information was declared by manufacturer.
WLAN 6GHz: The directional gain is calculated which follows the procedure of KDB 662911 D01.
WLAN 2.4GHz/5GHz: The directional gain is measured which follows the procedure of KDB 662911 D03.
For 2.4GHz function:
For IEEE 802.11b/g/n/VHT/ax (4TX/4RX):
Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.
For 5GHz function:
For IEEE 802.11a/n/ac/ax (4TX/4RX):
Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.
Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.
For 6GHz function:
For IEEE 802.11ax (4TX/4RX):
Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.
Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.
For Bluetooth Function:
For Bluetooth mode (1TX/1RX)
Only Port 1 can be use as transmit and receive antenna.

1.1.3 EUT Operational Condition

EUT Power Type	From Power Adapter			
Beamforming Function	☒	With beamforming	☐	Without beamforming
	The product has beamforming function for n/VHT/ax in 2.4GHz, n/ac/ax in 5GHz and ax in 6GHz.			
Weather Band	☒	With 5600~5650MHz	☐	Without 5600~5650MHz
Function	☐	Outdoor P2M	☒	Indoor P2M
	☐	Fixed P2P	☐	Client
TPC Function	☒	With TPC	☐	Without TPC
Support RU	☒	Full RU	☐	Partial RU
Test Software Version	accessMTool(ver 3.2.1.3)			

Note: The above information was declared by manufacturer.

1.1.4 Table for Multiple Listing

Brand Name	Model Name	Description
ASUS	ET12	All the models are identical, the different model names served as a marketing strategy.
	ZenWiFi ET12	
	ASUS ZenWiFi ET12	

Note1: From the above model: ET12 was selected as representative model for the test and its data was recorded in this report.

Note2: The above information was declared by manufacturer.

1.1.5 Table for Components Source Information

Items	Main Source	Second Source
Transceiver (2.5G LAN)	Brand: MAXLINEAR Model: GPY211	Brand: Broadcom Model: BCM50991
MLCC on the path of the CPU (Location: CA15,CA16,CA17,CA18,CB15,CB16, CB17,CB18,CE15,CE16,CE17,CE18)	Brand: MURATA Model: GRM0335C1E100JA01D	Brand: WALSIN Model: RF03N100J250CT
MLCC on the path of the CPU (Location: CA281,CA282,CB121,CB221,CB281, CB282,CB321,CB421,CC117,CC119, CC121,CC217,CC219,CC221,CC317, CC319,CC321,CC417,CC419,CC421, CE281,CE282)	Brand: WALSIN Model: RF03N1R0B250CT	Brand: MURATA Model: GRM0335C1E1R0BA01D

Note: The above information was declared by manufacturer.

1.1.6 Table for EUT Information

EUT	Transceiver (2.5G LAN)	MLCC on the path of the CPU (Location: CA15,CA16,CA17,CA18,CB15, CB16,CB17,CB18,CE15,CE16, CE17,CE18)	MLCC on the path of the CPU (Location: CA281,CA282,CB121,CB221,CB281, CB282,CB321,CB421,CC117,CC119, CC121,CC217,CC219,CC221,CC317,CC319, CC321,CC417,CC419,CC421,CE281, CE282)
EUT 1	Main Source	Main Source	Main Source
EUT 2	Second Source	Main Source	Main Source
EUT 3	Main Source	Second Source	Second Source

Note1: From the above, EUT 3 has been selected as representative mode for the test and its data was recorded in this report.
Note2: The above information was declared by manufacturer.

1.1.7 Table for EUT Supports Function

Function	Support Type	Remark
AP Router	Master	Support 2.4GHz/5GHz/6GHz
Bridge	Slave without radar detection	Support 2.4GHz/5GHz
Repeater	Master	Support 2.4GHz/5GHz
Mesh	Master	Support 2.4GHz/5GHz/6GHz

Note1: From the above, AP Router (Master) has been selected to test Unwanted Emissions below 1GHz.
Note2: The above information was declared by manufacturer.

1.1.8 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR0D2518-01

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Add the second source for MLCC on the path of the CPU (Location:CA15,CA16,CA17,CA18,CB15,CB16,CB17, CB18,CE15,CE16,CE17,CE18,CA281,CA282,CB121, CB221,CB281,CB282,CB321,CB421,CC117,CC119, CC121,CC217,CC219,CC221,CC317,CC319,CC321, CC417,CC419,CC421,CE281,CE282)	1. Unwanted Emissions below 1GHz test 2. Emission Bandwidth 3. Maximum Output Power 4. Power Spectral Density 5. Unwanted Emissions above 1GHz test (For above item 2~5: Evaluating the affected frequencies only.)
2. Removing Manufacturer name and address.	After evaluating, it does not affect the test.

1.2 Applicable Standards

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

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 789033 D02 v02r01

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

- FCC KDB 662911 D03 v01
- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location Information	
Test Lab.：Sporton International Inc. Hsinchu Laboratory	
Hsinchu (TAF: 3787)	ADD: 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 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	Richard Pai	23~24.1 / 62~66	Jan. 25, 2024~ Mar. 08, 2024
Radiated<1GHz	03CH05-CB	Roy Mai	21.9-22.4 / 55-58	Apr. 08, 2024
Radiated>1GHz	03CH06-CB	Stim Sung	21.4-22.5 / 55-58	Sep. 02, 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)

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

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode
802.11ax HEW80-BF_Nss1,(MCS0)_4TX
5210MHz
5775MHz
802.11ax HEW160-BF_Nss1,(MCS0)_4TX
5250MHz Straddle 5.15-5.25GHz
5250MHz Straddle 5.25-5.35GHz

- Note1: There are two modes of EUT for n/VHT/ax in 2.4GHz and n/ac/ax in 5GHz. One is beamforming mode, and the other is non-beamforming mode, after evaluating, beamforming mode has been evaluated to be the worst case, so it was selected to test and record in this test report.
- Note2: Evaluated HEW80/HEW160 mode only, due to similar modulation. The power setting of VHT80/VHT160 mode are the same or lower than HEW80/HEW160.

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emission Bandwidth Maximum Output Power Power Spectral Density
Test Condition	Conducted measurement at transmit chains
1	EUT 3

The Worst Case Mode for Following Conformance Tests	
Tests Item	Unwanted Emissions
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. The EUT was performed at X axis, Y axis and Z axis position for Unwanted Emissions above 1GHz test, and the worst case was found at Y axis. So the measurement will follow this same test configuration. 2. There are two Adapters, after evaluating, Adapter 1 has been evaluated to be the worst case, thus measurement will follow this same test configuration.
1	EUT 3 in Y axis + Adapter 1
Operating Mode > 1GHz	The EUT was performed at X axis, Y axis and Z axis position, and the worst case was found at Y axis. So the measurement will follow this same test configuration.
	CTX - EUT 3 in Y axis

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
Operating Mode	
1	EUT 3-WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz + Bluetooth
Refer to Sporton Test Report No.: FA0D2518-10 for Co-location RF Exposure Evaluation.	

2.3 EUT Operation during Test

For CTX Mode:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN 7 were executed.
The program was executed as follows:
1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS(ver 6.1.7601).
3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by RX Device and transmit duty cycle no less than 98%.

For Normal Link Mode:

During the test, the EUT operation to normal function.

2.4 Accessories

Accessories				
Equipment Name	**Brand Name**	**Model Name**	**Rating**	**Remark**
Adapter 1	DELTA	ADP-45FE F	INPUT: 100-240V~1.2A, 50-60Hz OUTPUT: 19.0V, 2.37A, 45.0W	With the DC Power cable: Non-shielded, 1.5m
Adapter 2	AcBel	ADH011	INPUT: 100-240V~1.4A, 50-60Hz OUTPUT: 19.5V, 2.31A, 45.0W	With the DC Power cable: Non-shielded, 1.5m
Others				
Power cable*1: Non-shielded, 0.9m RJ-45 cable*1: Non-shielded, 1.5m				

2.5 Support Equipment

For Radiated (below 1GHz):

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	NB	DELL	E4300	N/A
B	2.4G NB	DELL	E4300	N/A
C	5G NB	DELL	E4300	N/A
D	WLAN module	Intel	AX210NGW	PD9AX210NG
E	6G NB	DELL	E4300	N/A
F	2.5G LAN PC	DELL	E4300	N/A
G	2.5G WAN PC	DELL	E4300	N/A

For Radiated (above 1GHz):

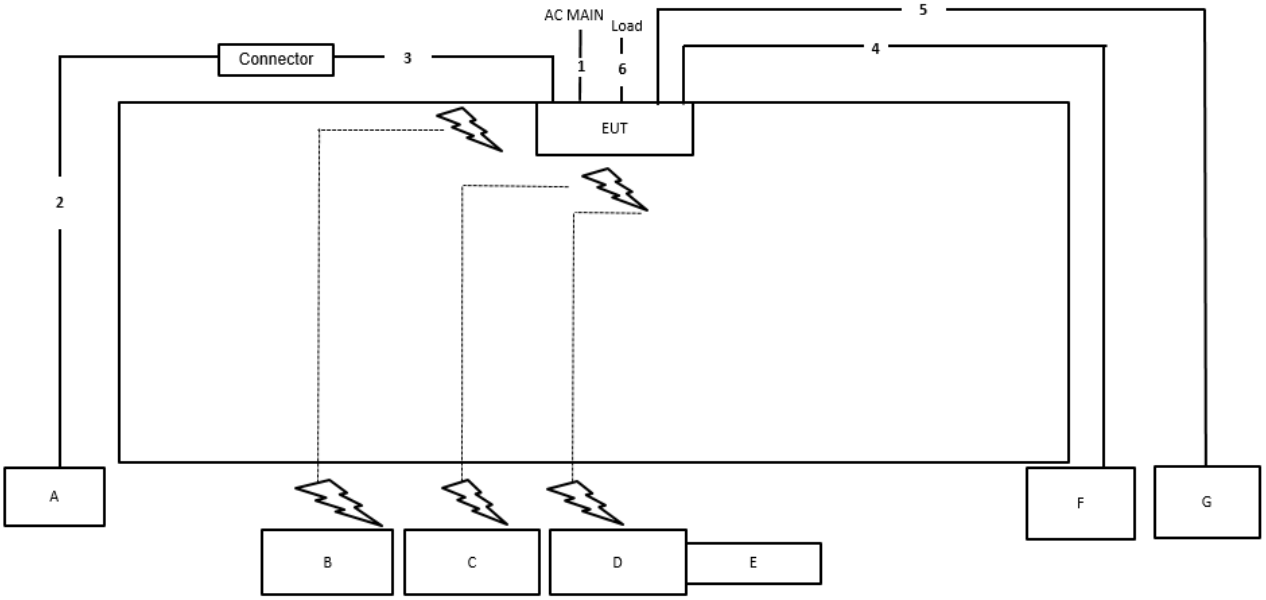
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	NB	DELL	E4300	N/A
B	RX Device	ASUS	ET12	MSQ-RTAXE4P00
C	NB	DELL	E4300	N/A

For RF Conducted:

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

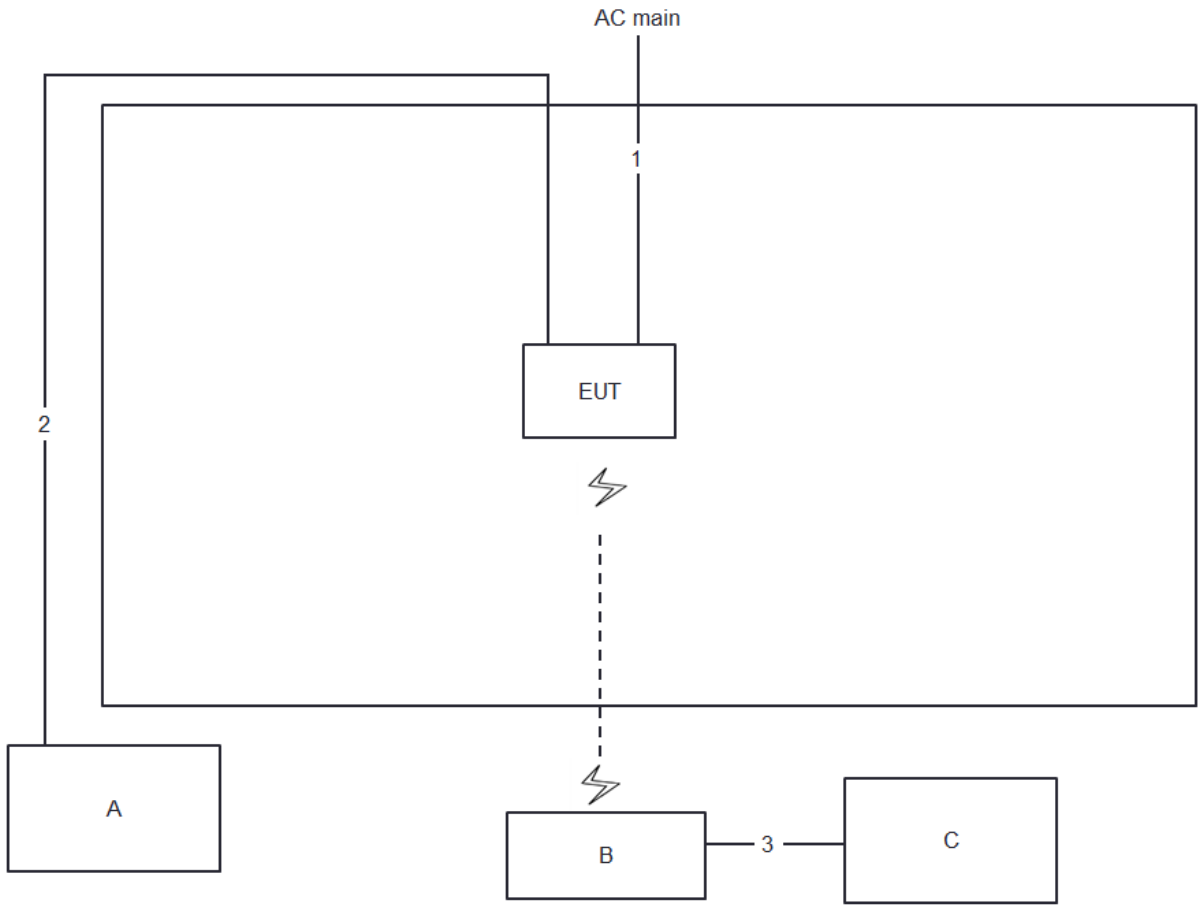
2.6 Test Setup Diagram

Test Setup Diagram - Radiated Test < 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	2.4m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1.5m
4	RJ-45 cable	No	10m
5	RJ-45 cable	No	10m
6	RJ-45 cable	No	1.5m

Test Setup Diagram - Radiated Test > 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	2.4m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1.5m

3 Transmitter Test Result

3.1 Emission Bandwidth

3.1.1 Emission Bandwidth Limit

Emission Bandwidth Limit
UNII Devices
☒ For the 5.15-5.25 GHz band, N/A
☒ For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
☒ For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
☒ For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.
☐ For the 5.85-5.895 GHz band, 6 dB emission bandwidth ≥ 500kHz.
LE-LAN Devices
☐ For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☐ For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
☐ For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
☐ For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.

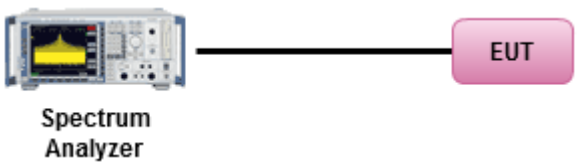
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

Test Method	
▪	For the emission bandwidth shall be measured using one of the options below:
	☒ Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.
	☐ Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
	☐ Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.

3.1.4 Test Setup

Emission Bandwidth


3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A

3.2 Maximum Output Power

3.2.1 Limit

Maximum Output Power Limit	
UNII Devices	
☒	For the 5.15-5.25 GHz band:
	▪ Outdoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6). e.i.r.p. at any elevation angle above 30 degrees ≤ 125mW [21dBm]
	▪ Indoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6)
	▪ Point-to-point AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W If G_{TX} > 23 dBi, then P_{Out} = 30 – (G_{TX} – 23).
	▪ Mobile or Portable Client: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).
☒	For the 5.25-5.35 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).
☒	For the 5.47-5.725 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).
☒	For the 5.725-5.85 GHz band:
	▪ Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6).
	▪ Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W.
Maximum EIRP Limit	
☐	For the 5.85-5.895 GHz band:
	▪ Indoor AP & subordinate device < 36 dBm
	▪ Client device < 30 dBm
LE-LAN Devices	
☐	For the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☐	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
☐	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
☐	For the 5.725-5.85 GHz band:
	▪ Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6).
	▪ Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the

	lesser of 1 W.
P_{Out} = maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.	

3.2.2 Measuring Instruments

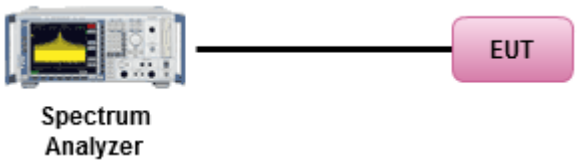
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
▪ Maximum Conducted Output Power	
	Average over on/off periods with duty factor
	☒ Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).
	☐ Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
	Wideband RF power meter and average over on/off periods with duty factor
	☒ Refer as FCC KDB 789033, clause E Method PM-G (using an 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]) $EIRP_{total} = P_{total} + DG$

3.2.4 Test Setup

For Straddle channel Mode:

RF Output Power (Spectrum Analyzer)


For Other Mode:

RF Output Power (Power Meter)


3.2.5 Test Result of Maximum Output Power

Refer as Appendix B

3.3 Power Spectral Density

3.3.1 Limit

Peak Power Spectral Density Limit	
UNII Devices	
☒	For the 5.15-5.25 GHz band:
	▪ Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 6 dBi, then P_{Out} = 17 – (G_{TX} – 6).
	▪ Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 6 dBi, then P_{Out} = 17 – (G_{TX} – 6).
	▪ Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 23 dBi, then P_{Out} = 17 – (G_{TX} – 23).
	▪ Mobile or Portable Client: the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6)..
☒	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6).
☒	For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6).
☒	For the 5.725-5.85 GHz band:
	▪ Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If G_{TX} > 6 dBi, then PPSD= 30 – (G_{TX} – 6).
	▪ Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
EIRP Power Spectral Density Limit	
☐	For the 5.85-5.895 GHz band:
	▪ Indoor AP & subordinate device < 20dBm/MHz
	▪ Client device < 14dBm/MHz
LE-LAN Devices	
☐	For the 5.15-5.25 GHz band, the e.i.r.p. peak power spectral density (PPSD) ≤ 10 dBm/MHz.
☐	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.
	▪ e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below: -13 dBW/MHz for 0° ≤ θ < 8° ; -13 − 0.716 (θ-8) dBW/MHz for 8° ≤ θ < 40° -35.9 − 1.22 (θ-40) dBW/MHz for 40° ≤ θ ≤ 45° ; -42 dBW/MHz for θ > 45°
☐	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.
☐	For the 5.725-5.85 GHz band:
	▪ Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If G_{TX} > 6 dBi, then PPSD= 30 – (G_{TX} – 6).
	▪ Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
PPSD = peak power spectral density that he same method as used to determine the conducted output	

power shall be used to determine the power spectral density. And power spectral density in dBm/MHz G_{TX} = the maximum transmitting antenna directional gain in dBi.

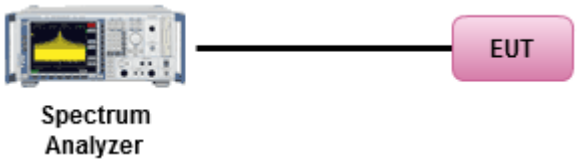
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method		
▪ Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:		
	☐ Refer as FCC KDB 789033, F)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth	
	[duty cycle ≥ 98% or external video / power trigger]	
	☒ Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).	
	☐ Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)	
	duty cycle < 98% and average over on/off periods with duty factor	
	☒ Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).	
	☐ Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)	
▪ For conducted measurement.		
	▪ If the EUT supports multiple transmit chains using options given below:	
		☒ Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.
		☐ Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,
		☐ Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.
	▪	If multiple transmit chains, EIRP PPSD calculation could be following as methods: $PPSD_{total} = PPSD_1 + PPSD_2 + \ldots + PPSD_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = PPSD_{total} + DG$

3.3.4 Test Setup

Power Spectral Density


3.3.5 Test Result of Power Spectral Density

Refer as Appendix C

3.4 Unwanted Emissions

3.4.1 Transmitter Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz 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

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.

Un-restricted band emissions above 1GHz Limit	
Operating Band	**Limit**
☒ 5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
☒ 5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
☒ 5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
☒ 5.725 - 5.85 GHz	all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
☐ 5.85 - 5.895 GHz	(i) For an indoor access point or subordinate device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of 15 dBm/MHz and shall decrease linearly to an e.i.r.p. of - 7 dBm/MHz at or above 5.925 GHz. (ii) For a client device, all emissions at or above 5.895 GHz shall not exceed an e.i.r.p. of -5 dBm/MHz and shall decrease linearly to an e.i.r.p. of -27 dBm/MHz at or above 5.925 GHz. (iii) For a client device or indoor access point or subordinate device, all emissions below 5.725 GHz shall not exceed an e.i.r.p. of -27 dBm/MHz at 5.65 GHz increasing linearly to 10 dBm/ MHz at 5.7 GHz, and from 5.7 GHz increasing linearly to a level of 15.6 dBm/MHz at 5.72 GHz, and from 5.72 GHz increasing linearly to a level of 27 dBm/MHz at 5.725 GHz.
Note 1: 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).	

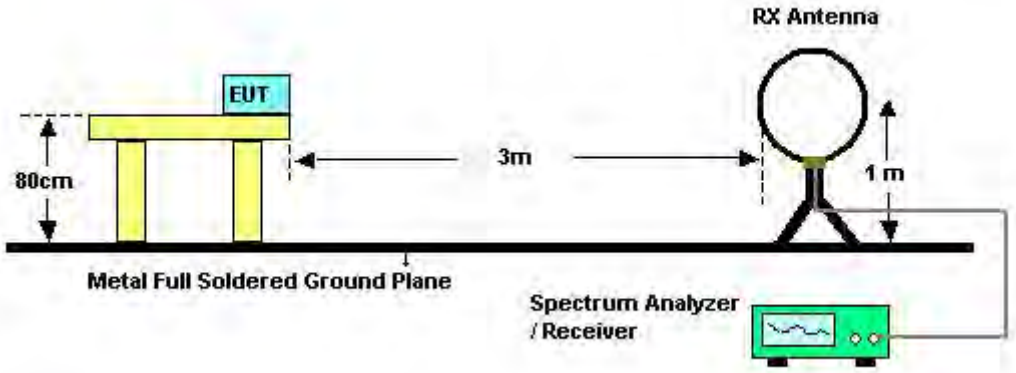
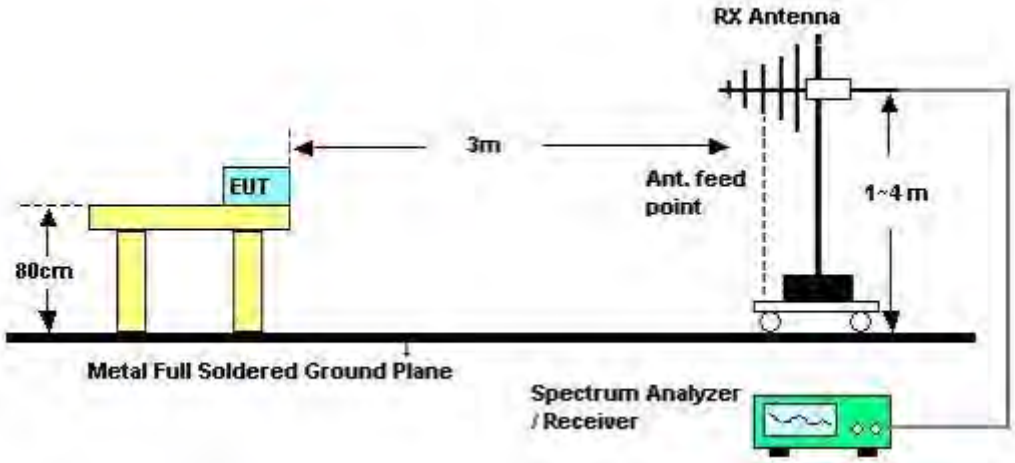
3.4.2 Measuring Instruments

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

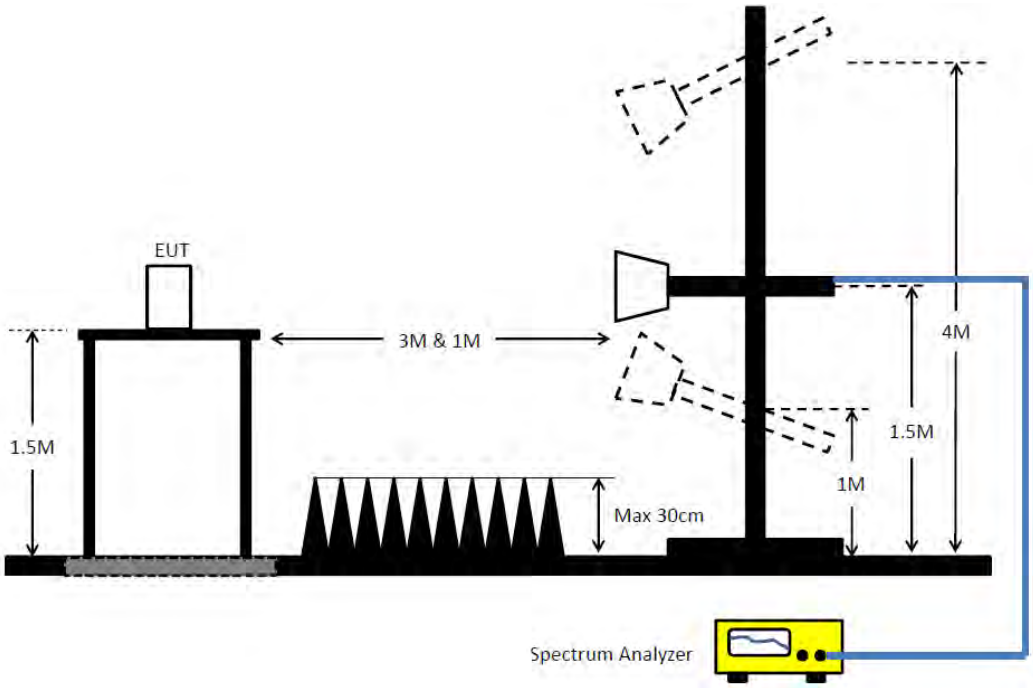
3.4.3 Test Procedures

Test Method		
▪ 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. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. 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).		
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].		
▪ For the transmitter unwanted emissions shall be measured using following options below:		
	▪ Refer as FCC KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.	
	▪ Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.	
		☐ Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
		☒ Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
		☐ 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 789033, clause G)5) measurement procedure peak limit.
		☐ Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.
▪ For radiated measurement.		
	▪ Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.	
	▪ Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.	
	▪ Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.	
▪ The any unwanted emissions level shall not exceed the fundamental emission level.		
▪ All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.		

3.4.4 Test Setup

Transmitter Radiated Unwanted Emissions
9kHz ~30MHz

30MHz~1GHz


Above 1GHz



3.4.5 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.

3.4.6 Transmitter Unwanted Emissions (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.

3.4.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix D

4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 02, 2023	Aug. 01, 2024	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 23, 2024	Mar. 22, 2025	Radiation (03CH05-CB)
Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 03, 2023	May 02, 2024	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Apr. 18, 2023	Apr. 17, 2024	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 13, 2023	Jun. 12, 2024	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Dec. 06, 2023	Dec. 05, 2024	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6121	65417	9kHz - 30 MHz	Oct. 13, 2023	Oct. 12, 2024	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH06-CB	1GHz ~18GHz 3m	Sep. 30, 2022	Sep. 29, 2023	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1292	1GHz~18GHz	Jul. 31, 2023	Jul. 30, 2024	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 28, 2023	Jun. 27, 2024	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	Aug. 01, 2023	Jul. 31, 2024	Radiation (03CH06-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 16, 2022	Nov. 15, 2023	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Dec. 21, 2022	Dec. 20, 2023	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+68	1GHz~18GHz	Aug. 15, 2023	Aug. 14, 2024	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 29, 2023	May 28, 2024	Conducted (TH01-CB)
Switch	SPTCB	SP-SWI	SWI-01	1~26.5 GHz	Oct. 03, 2023	Oct. 02, 2024	Conducted (TH01-CB)

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-30	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Mar. 01, 2024	Feb. 28, 2025	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Mar. 04, 2024	Mar. 03, 2025	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.
N.C.R. means Non-Calibration required.

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
5.15-5.25GHz	-	-	-	-	-
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	89.52M	77.577M	77M6D1D	85.2M	77.46M
802.11ax HEW160-BF_Nss1,(MCS0)_4TX	83.92M	78.201M	78M2D1D	83.44M	77.881M
5.25-5.35GHz	-	-	-	-	-
802.11ax HEW160-BF_Nss1,(MCS0)_4TX	84.4M	78.201M	78M2D1D	83.52M	77.961M
5.725-5.85GHz	-	-	-	-	-
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	75.96M	77.46M	77M5D1D	75.12M	77.225M

Max-N dB = Maximum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;
Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;
Min-OBW = Minimum 99% occupied bandwidth

Result

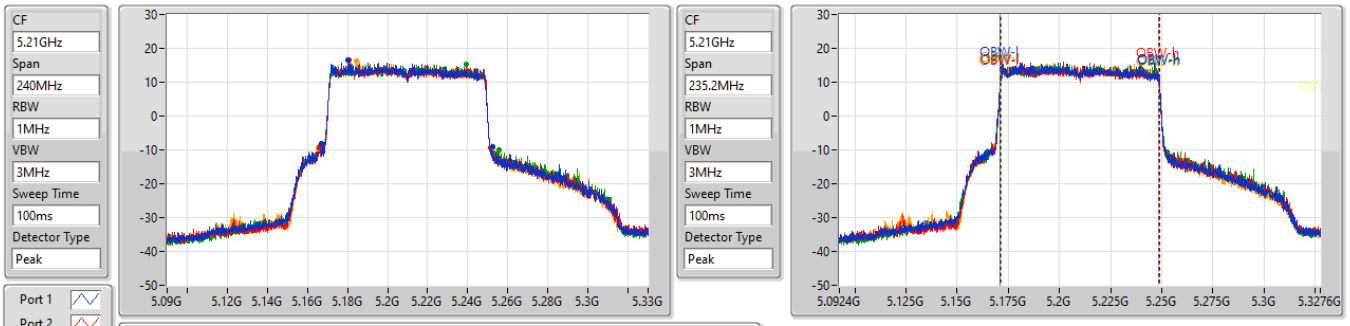
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)	Port 3-N dB (Hz)	Port 3-OBW (Hz)	Port 4-N dB (Hz)	Port 4-OBW (Hz)
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5210MHz	Pass	Inf	85.44M	77.577M	85.2M	77.46M	89.52M	77.46M	87M	77.46M
5775MHz	Pass	500k	75.84M	77.46M	75.96M	77.46M	75.12M	77.46M	75.84M	77.225M
802.11ax HEW160-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	Inf	83.92M	77.961M	83.76M	78.201M	83.44M	77.881M	83.6M	77.961M
5250MHz Straddle 5.25-5.35GHz	Pass	Inf	84.4M	77.961M	84.4M	78.201M	83.52M	78.041M	83.76M	78.121M

Port X-N dB = Port X 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band
Port X-OBW = Port X 99% occupied bandwidth

5.15-5.25GHz_802.11ax HEW80-BF_Nss1,(MCS0)_4TX EBW

5210MHz

08/03/2024

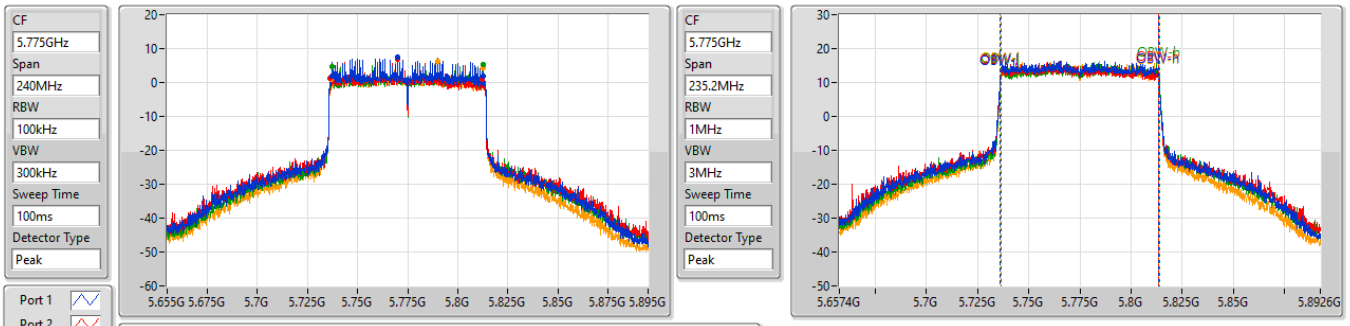


26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
85.44M	5.16716G	5.2526G	77.577M	5.171211G	5.248789G	Inf	1
85.2M	5.16608G	5.25128G	77.46M	5.171211G	5.248671G	Inf	2
89.52M	5.16608G	5.2556G	77.46M	5.171329G	5.248789G	Inf	3
87M	5.1656G	5.2526G	77.46M	5.171211G	5.248671G	Inf	4

5.725-5.85GHz_802.11ax HEW80-BF_Nss1,(MCS0)_4TX EBW

5775MHz

08/03/2024

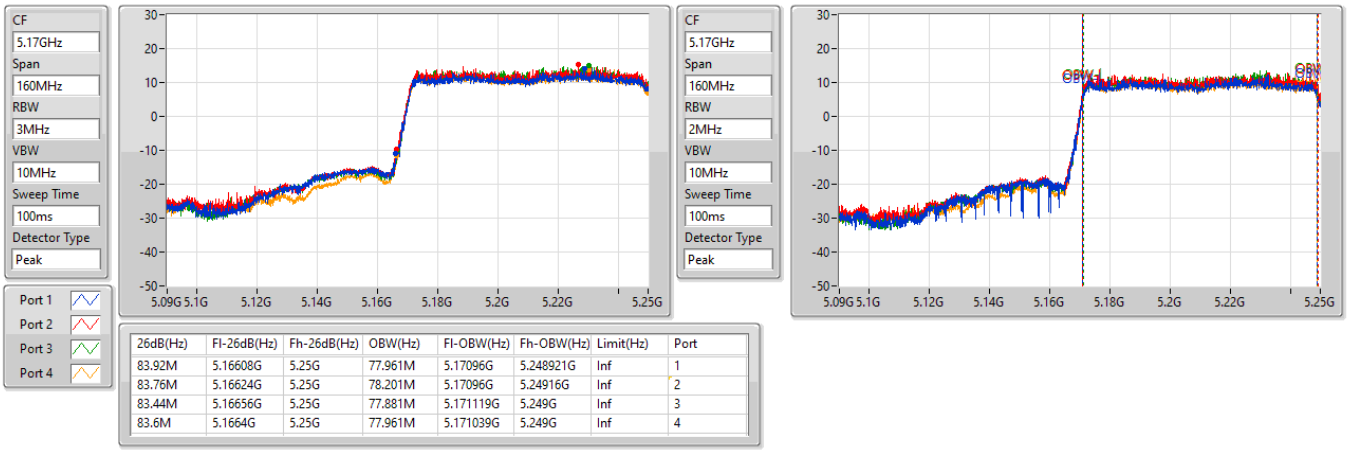


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
75.84M	5.73708G	5.81292G	77.46M	5.736211G	5.813671G	500k	1
75.96M	5.73648G	5.81244G	77.46M	5.736211G	5.813671G	500k	2
75.12M	5.73744G	5.81256G	77.46M	5.736329G	5.813789G	500k	3
75.84M	5.73672G	5.81256G	77.225M	5.736329G	5.813554G	500k	4

5.15-5.25GHz_802.11ax HEW160-BF_Nss1,(MCS0)_4TX EBW

5250MHz Straddle 5.15-5.25GHz

08/03/2024

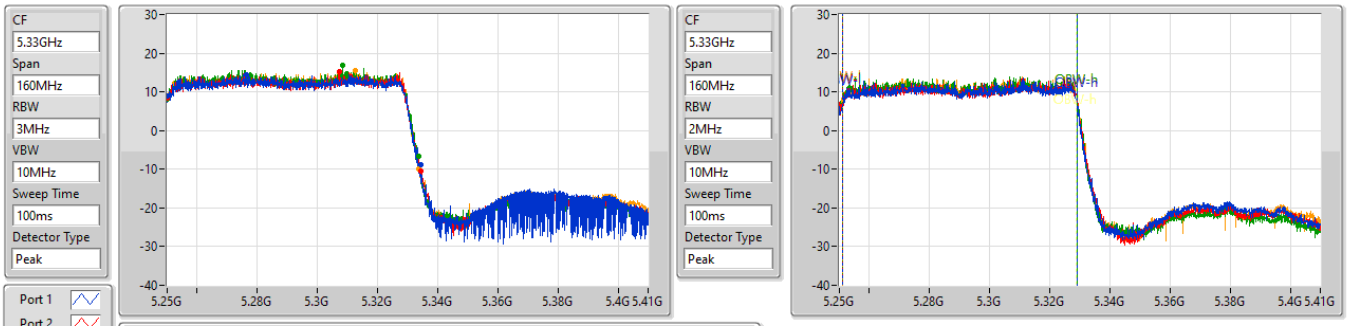


26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
83.92M	5.16608G	5.25G	77.961M	5.17096G	5.248921G	Inf	1
83.76M	5.16624G	5.25G	78.201M	5.17096G	5.24916G	Inf	2
83.44M	5.16656G	5.25G	77.881M	5.171119G	5.249G	Inf	3
83.6M	5.1664G	5.25G	77.961M	5.171039G	5.249G	Inf	4

5.25-5.35GHz_802.11ax HEW160-BF_Nss1,(MCS0)_4TX EBW

5250MHz Straddle 5.25-5.35GHz

08/03/2024



26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
84.4M	5.25G	5.3344G	77.961M	5.251159G	5.32912G	Inf	1
84.4M	5.25G	5.3344G	78.201M	5.251079G	5.32928G	Inf	2
83.52M	5.25G	5.33352G	78.041M	5.251079G	5.32912G	Inf	3
83.76M	5.25G	5.33376G	78.121M	5.251079G	5.3292G	Inf	4

Summary

Mode	Total Power (dBm)	Total Power (W)
5.15-5.25GHz	-	-
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	28.10	0.64565
802.11ax HEW160-BF_Nss1,(MCS0)_4TX	21.49	0.14093
5.25-5.35GHz	-	-
802.11ax HEW160-BF_Nss1,(MCS0)_4TX	22.68	0.18535
5.725-5.85GHz	-	-
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	28.63	0.72946

Result

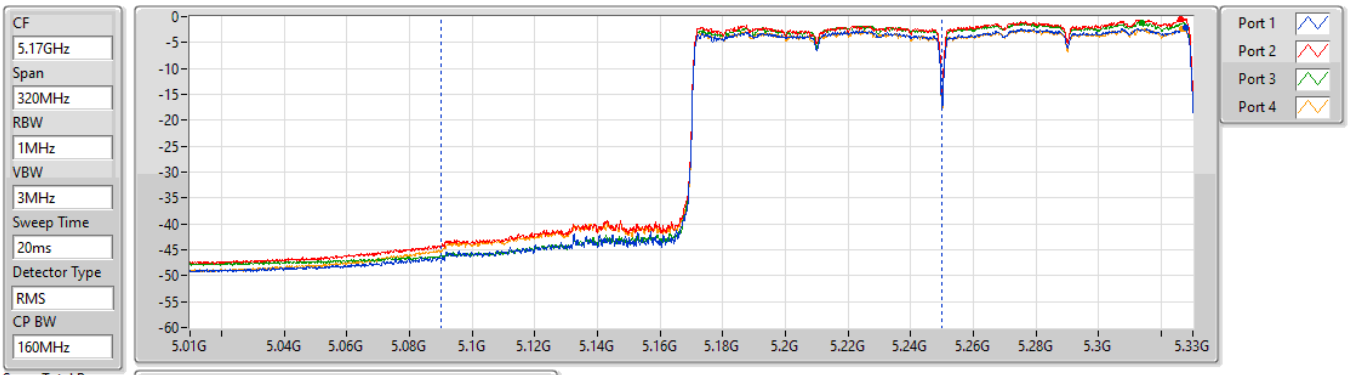
Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Port 3 (dBm)	Port 4 (dBm)	Total Power (dBm)	Power Limit (dBm)
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5210MHz	Pass	4.32	22.1	22.06	22.08	22.06	28.10	30.00
5775MHz	Pass	5.09	23.19	22.35	22.39	22.46	28.63	30.00
802.11ax HEW160-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	4.32	14.95	16.05	15.86	14.9	21.49	30.00
5250MHz Straddle 5.25-5.35GHz	Pass	5.30	16.29	16.41	17.03	16.85	22.68	23.98

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

5.15-5.25GHz_802.11ax HEW160-BF_Nss1,(MCS0)_4TX AV Power

5250MHz Straddle 5.15-5.25GHz_TnomVnom

08/03/2024

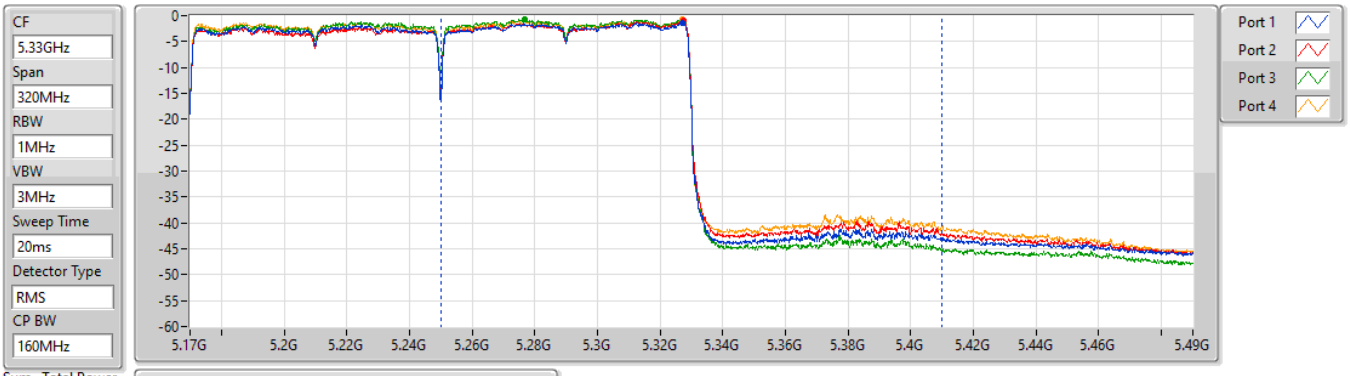


Sum(dBm)	P1(dBm)	P2(dBm)	P3(dBm)	P4(dBm)
21.49	14.95	16.05	15.86	14.90

5.25-5.35GHz_802.11ax HEW160-BF_Nss1,(MCS0)_4TX AV Power

5250MHz Straddle 5.25-5.35GHz_TnomVnom

08/03/2024



Sum(dBm)	P1(dBm)	P2(dBm)	P3(dBm)	P4(dBm)
22.68	16.29	16.41	17.03	16.85

Summary

Mode	PD (dBm/RBW)
5.15-5.25GHz	-
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	9.1
802.11ax HEW160-BF_Nss1,(MCS0)_4TX	2.2
5.25-5.35GHz	-
802.11ax HEW160-BF_Nss1,(MCS0)_4TX	3.42
5.725-5.85GHz	-
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	8.06

RBW = 500kHz for 5.725-5.85GHz band / 1MHz for other band;

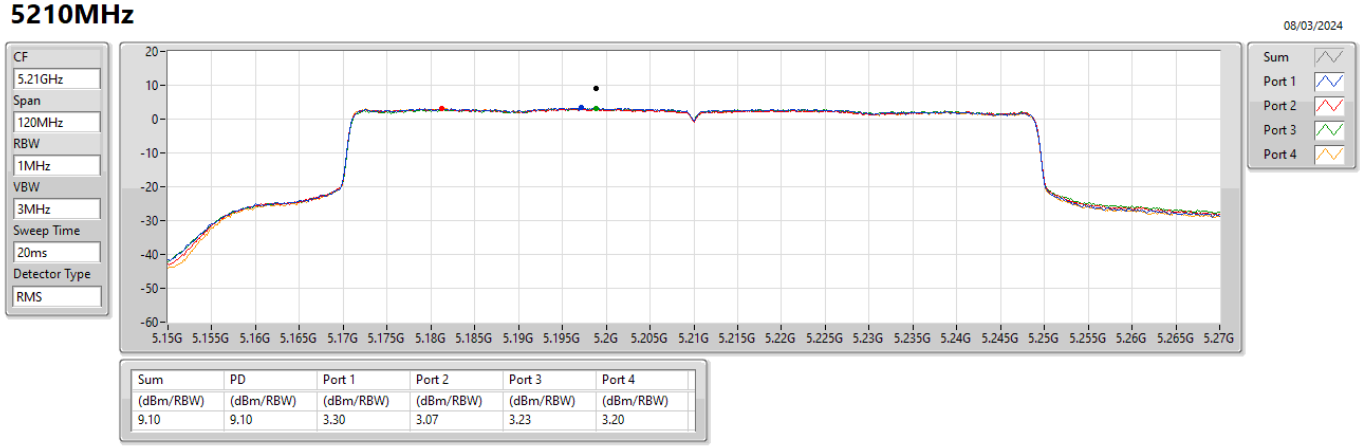
Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	Port 3 (dBm/RBW)	Port 4 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5210MHz	Pass	4.32	3.3	3.07	3.23	3.2	9.10	17.00
5775MHz	Pass	5.09	2.81	1.93	2	2.06	8.06	30.00
802.11ax HEW160-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	4.32	-4.23	-3.23	-3.3	-4.32	2.20	17.00
5250MHz Straddle 5.25-5.35GHz	Pass	5.30	-2.76	-2.66	-2.16	-2.25	3.42	11.00

DG = Directional Gain; RBW = 500kHz for 5.725-5.85GHz band / 1MHz for other band;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

5.15-5.25GHz_802.11ax HEW80-BF_Nss1,(MCS0)_4TX PSD

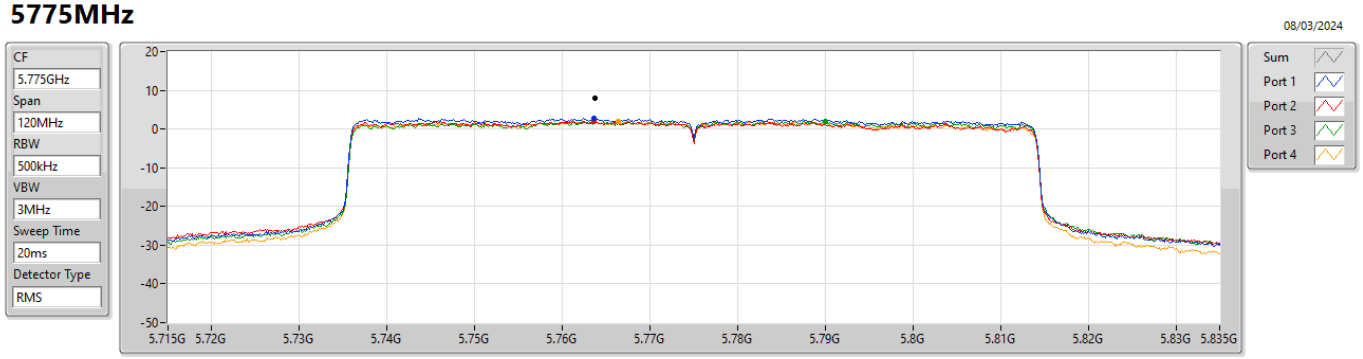
5210MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
9.10	9.10	3.30	3.07	3.23	3.20

5.725-5.85GHz_802.11ax HEW80-BF_Nss1,(MCS0)_4TX PSD

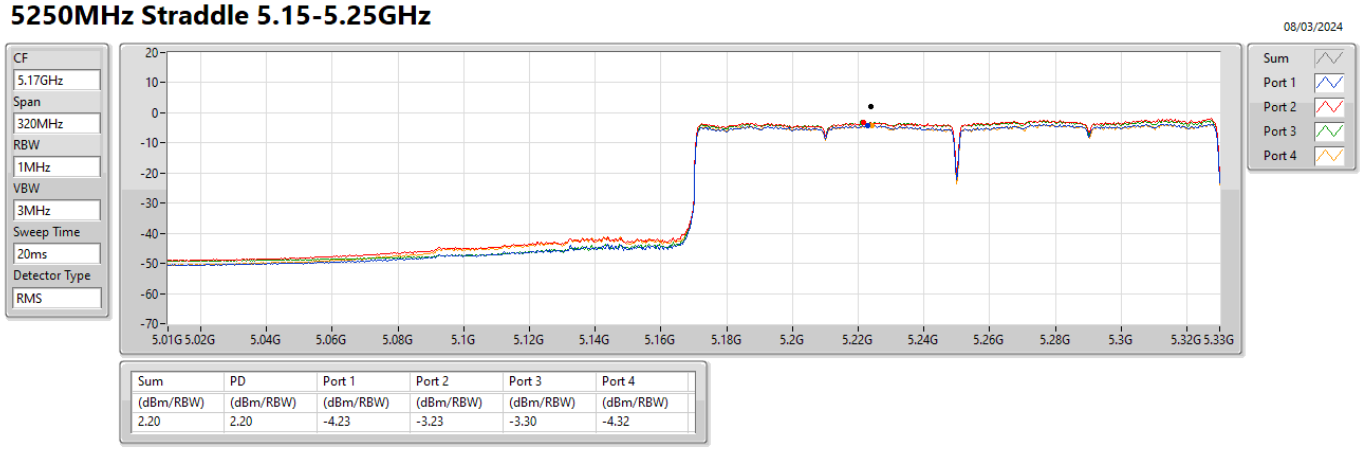
5775MHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
8.06	8.06	2.81	1.93	2.00	2.06

5.15-5.25GHz_802.11ax HEW160-BF_Nss1,(MCS0)_4TX **PSD**

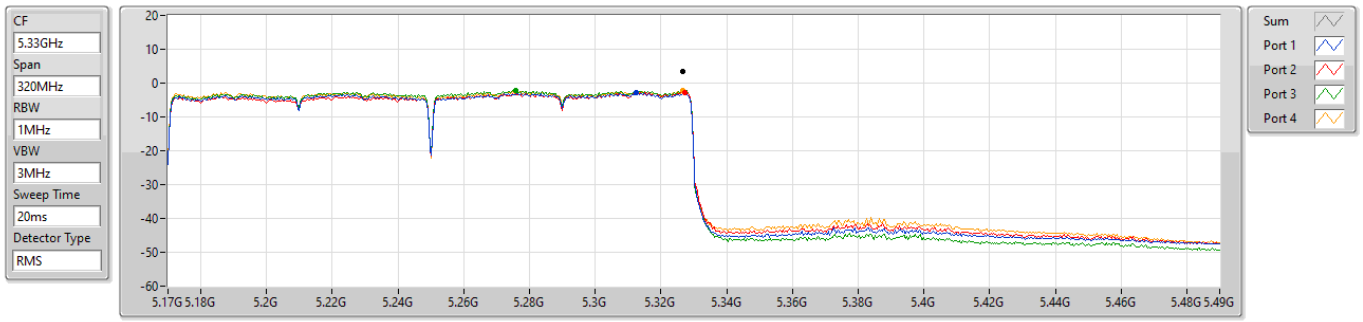
5250MHz Straddle 5.15-5.25GHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
2.20	2.20	-4.23	-3.23	-3.30	-4.32

5.25-5.35GHz_802.11ax HEW160-BF_Nss1,(MCS0)_4TX **PSD**

5250MHz Straddle 5.25-5.35GHz

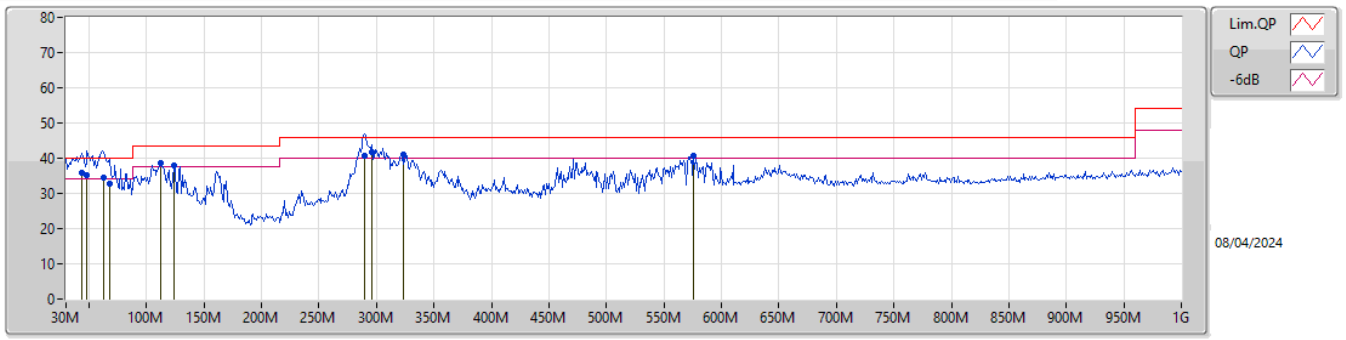


Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.42	3.42	-2.76	-2.66	-2.16	-2.25

Summary

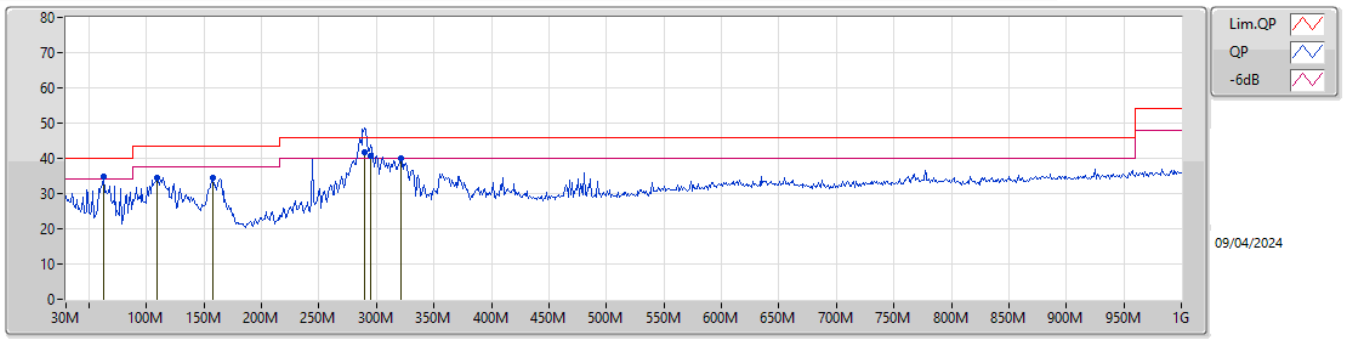
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	43.58M	35.99	40.00	-4.01	Vertical

Mode 1



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
QP	43.58M	35.99	40.00	-4.01	-13.49	3	Vertical	350	1.00	"Worst"	49.48	17.10	1.21	31.80
QP	48.43M	35.07	40.00	-4.93	-15.68	3	Vertical	261	1.25	-	50.75	14.92	1.26	31.86
QP	62.98M	34.38	40.00	-5.62	-17.95	3	Vertical	143	1.25	-	52.33	12.57	1.41	31.93
QP	67.83M	32.85	40.00	-7.15	-17.94	3	Vertical	60	1.00	-	50.79	12.51	1.46	31.91
PK	112.45M	38.52	43.50	-4.98	-12.18	3	Vertical	324	1.00	-	50.70	17.92	1.86	31.96
PK	124.09M	37.76	43.50	-5.74	-11.82	3	Vertical	258	1.00	-	49.58	18.20	1.96	31.98
QP	289.96M	40.79	46.00	-5.21	-10.10	3	Vertical	193	2.00	-	50.89	18.93	3.07	32.10
QP	295.78M	41.73	46.00	-4.27	-9.94	3	Vertical	174	1.50	-	51.67	19.07	3.10	32.11
PK	323.91M	40.89	46.00	-5.11	-9.24	3	Vertical	201	1.50	-	50.13	19.63	3.27	32.14
PK	576.11M	40.57	46.00	-5.43	-3.63	3	Vertical	47	1.25	-	44.20	24.35	4.51	32.49

Mode 1



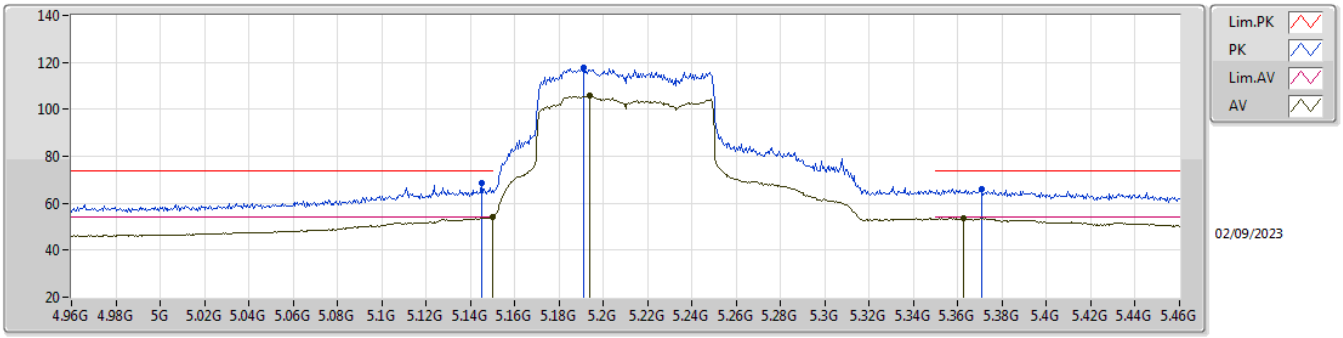
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	62.98M	34.79	40.00	-5.21	-17.95	3	Horizontal	0	1.50	-	52.74	12.57	1.41	31.93
PK	109.54M	34.59	43.50	-8.91	-12.38	3	Horizontal	63	3.00	-	46.97	17.74	1.84	31.96
PK	158.04M	34.48	43.50	-9.02	-13.79	3	Horizontal	355	3.00	-	48.27	16.04	2.21	32.04
QP	289.96M	41.83	46.00	-4.17	-10.10	3	Horizontal	292	1.25	"Worst"	51.93	18.93	3.07	32.10
QP	294.81M	40.84	46.00	-5.16	-9.96	3	Horizontal	241	1.00	-	50.80	19.05	3.10	32.11
PK	321M	40.05	46.00	-5.95	-9.30	3	Horizontal	206	1.25	-	49.35	19.58	3.26	32.14

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
5.15-5.25GHz	-	-	-	-	-	-	-	-	-	-	-
802.11ax HEW80-BF_Nss1,(MCS0)_4TX	Pass	AV	5.15G	53.91	54.00	-0.09	3	Vertical	249.5	1.80	-

5.15-5.25GHz_802.11ax HEW80-BF_Nss1,(MCS0)_4TX

5210MHz_TX

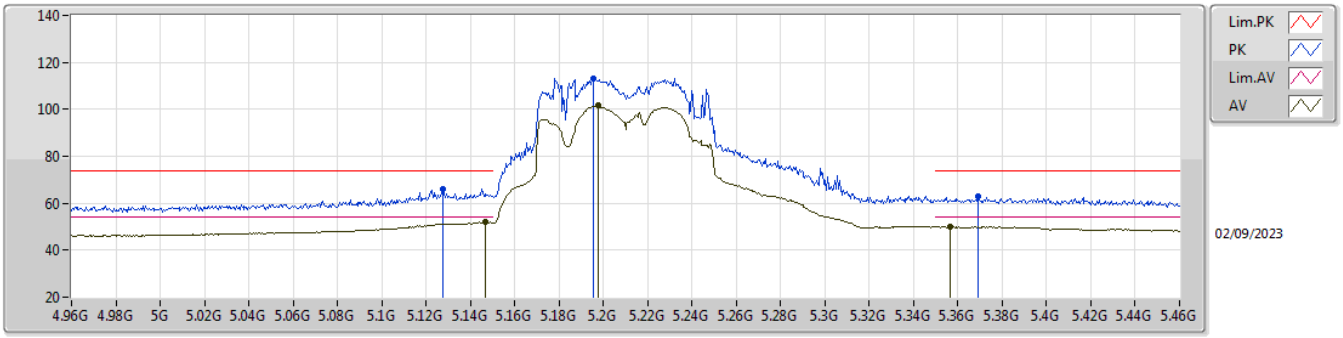


EUT Y_4TX
Setting 87
06-C-S-5-10

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	5.145G	68.85	74.00	-5.15	61.12	3	Vertical	249.5	1.80	-	32.10	6.99	31.36
AV	5.15G	53.91	54.00	-0.09	46.17	3	Vertical	249.5	1.80	-	32.10	7.00	31.36
PK	5.191G	117.51	Inf	-Inf	109.96	3	Vertical	249.5	1.80	-	31.85	7.08	31.38
AV	5.194G	105.81	Inf	-Inf	98.26	3	Vertical	249.5	1.80	-	31.84	7.09	31.38
PK	5.3705G	65.87	74.00	-8.13	58.11	3	Vertical	249.5	1.80	-	31.54	7.70	31.48
AV	5.3625G	53.64	54.00	-0.36	45.93	3	Vertical	249.5	1.80	-	31.52	7.67	31.48

5.15-5.25GHz_802.11ax HEW80-BF_Nss1,(MCS0)_4TX

5210MHz_TX

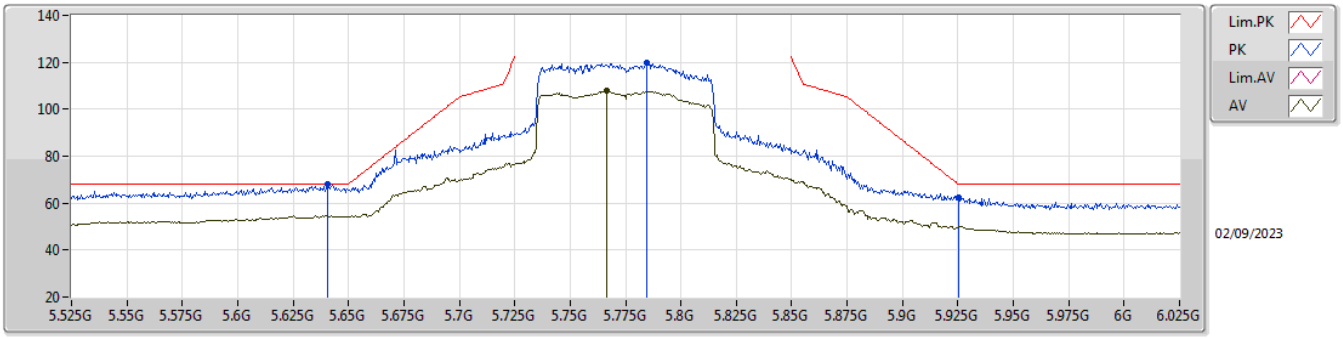


EUT Y_4TX
Setting 87
06-C-S-5-10

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	5.1275G	66.04	74.00	-7.96	58.34	3	Horizontal	274.4	1.80	-	32.10	6.95	31.35
AV	5.1465G	51.93	54.00	-2.07	44.20	3	Horizontal	274.4	1.80	-	32.10	6.99	31.36
PK	5.1955G	113.10	Inf	-Inf	105.57	3	Horizontal	274.4	1.80	-	31.83	7.09	31.39
AV	5.1975G	101.55	Inf	-Inf	94.03	3	Horizontal	274.4	1.80	-	31.82	7.09	31.39
PK	5.369G	63.08	74.00	-10.92	55.33	3	Horizontal	274.4	1.80	-	31.54	7.69	31.48
AV	5.3565G	50.03	54.00	-3.97	42.34	3	Horizontal	274.4	1.80	-	31.51	7.65	31.47

5.725-5.85GHz_802.11ax HEW80-BF_Nss1,(MCS0)_4TX

5775MHz_TX

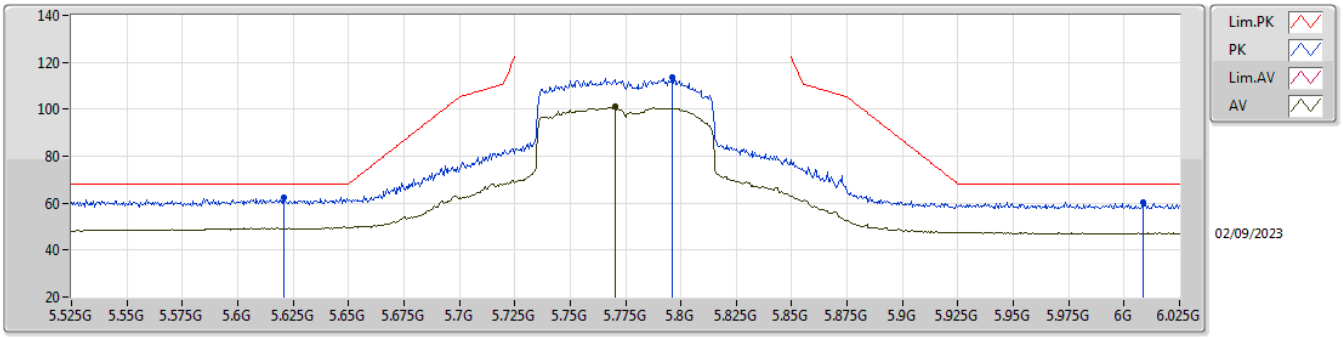


EUT Y_4TX
Setting 89
06-C-S-5-10

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	5.6405G	68.08	68.20	-0.12	60.93	3	Vertical	258	2.24	-	31.72	7.00	31.57
PK	5.7845G	120.06	Inf	-Inf	112.37	3	Vertical	258	2.24	-	32.27	7.00	31.58
AV	5.7665G	107.75	Inf	-Inf	100.10	3	Vertical	258	2.24	-	32.23	7.00	31.58
PK	5.9255G	62.52	68.20	-5.68	54.63	3	Vertical	258	2.24	-	32.55	6.94	31.60

5.725-5.85GHz_802.11ax HEW80-BF_Nss1,(MCS0)_4TX

5775MHz_TX

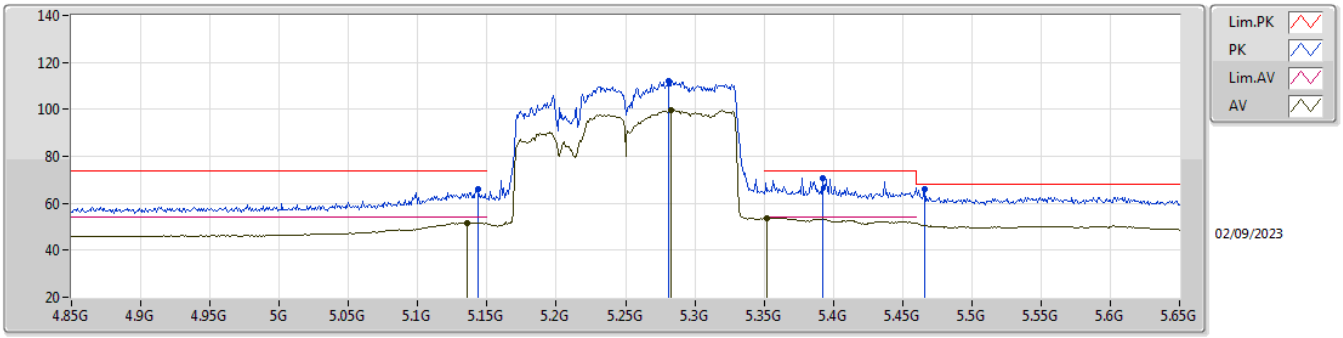


EUT Y_4TX
Setting 89
06-C-S-5-10

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	5.621G	62.50	68.20	-5.70	55.30	3	Horizontal	257	2.38	-	31.76	7.00	31.56
PK	5.796G	113.41	Inf	-Inf	105.71	3	Horizontal	257	2.38	-	32.29	7.00	31.59
AV	5.7705G	100.99	Inf	-Inf	93.33	3	Horizontal	257	2.38	-	32.24	7.00	31.58
PK	6.0085G	60.49	68.20	-7.71	52.64	3	Horizontal	257	2.38	-	32.52	6.92	31.59

5.25-5.35GHz_802.11ax HEW160-BF_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX

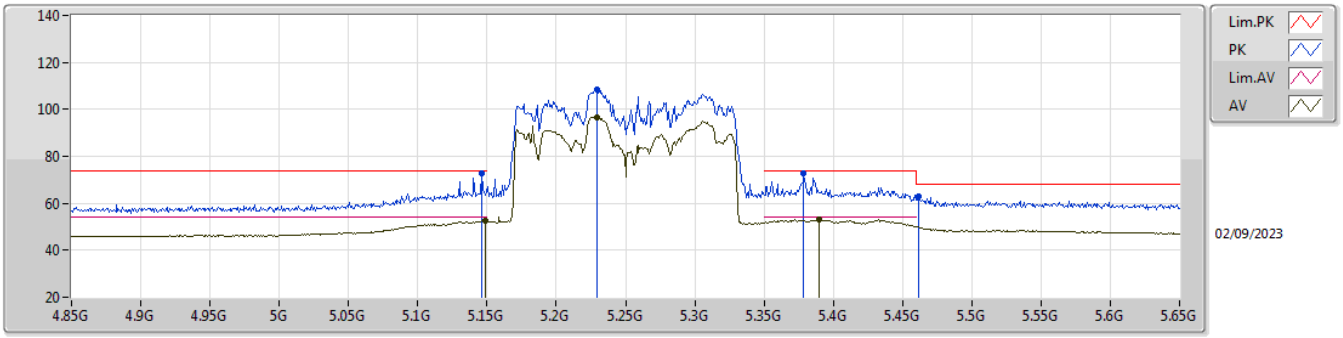


EUT Y_4TX
Setting 73
06-C-S-5-10

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	5.1436G	66.25	74.00	-7.75	58.52	3	Vertical	108	1.80	-	32.10	6.99	31.36
AV	5.1356G	51.76	54.00	-2.24	44.04	3	Vertical	108	1.80	-	32.10	6.97	31.35
PK	5.2812G	112.25	Inf	-Inf	104.76	3	Vertical	108	1.80	-	31.54	7.38	31.43
AV	5.2828G	99.52	Inf	-Inf	92.03	3	Vertical	108	1.80	-	31.53	7.39	31.43
PK	5.3924G	70.60	74.00	-3.40	62.74	3	Vertical	108	1.80	-	31.58	7.77	31.49
AV	5.3524G	53.79	54.00	-0.21	46.13	3	Vertical	108	1.80	-	31.50	7.63	31.47
PK	5.466G	66.13	68.20	-2.07	58.29	3	Vertical	108	1.80	-	31.83	7.54	31.53

5.25-5.35GHz_802.11ax HEW160-BF_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX



EUT Y_4TX
Setting 73
06-C-S-5-10

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	5.146G	72.92	74.00	-1.08	65.19	3	Horizontal	276	1.72	-	32.10	6.99	31.36
AV	5.1484G	52.45	54.00	-1.55	44.71	3	Horizontal	276	1.72	-	32.10	7.00	31.36
PK	5.2292G	108.33	Inf	-Inf	100.85	3	Horizontal	276	1.72	-	31.68	7.20	31.40
AV	5.2292G	96.75	Inf	-Inf	89.27	3	Horizontal	276	1.72	-	31.68	7.20	31.40
PK	5.3788G	72.62	74.00	-1.38	64.81	3	Horizontal	276	1.72	-	31.56	7.73	31.48
AV	5.39G	52.99	54.00	-1.01	45.14	3	Horizontal	276	1.72	-	31.58	7.76	31.49
PK	5.4612G	62.80	68.20	-5.40	54.95	3	Horizontal	276	1.72	-	31.82	7.56	31.53