Report No. : FR140145-01AA





RADIO TEST REPORT

FCC ID	÷	Z8H89FT0069
Equipment	÷	ePMP 6 GHz Force 4600C SM / ePMP 4600L 6 GHz 2x2 Access Point
Brand Name	÷	Cambium Networks
Model Name	đ	ePMP 6 GHz Force 4600C SM / ePMP 4600L 6 GHz 2x2 Access Point
Model Number		C068940P151A
Applicant	:	Cambium Networks Inc. 3800 Golf Road, Suite 360 Rolling Meadows, IL 60008, USA
Manufacturer	:	Cambium Networks, Ltd. Ashburton, TQ13 7UP, UK
Standard	;	47 CFR FCC Part 15.407

The product was received on Nov. 22, 2021, and testing was started from Dec. 09, 2021 and completed on Dec. 26, 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 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.)



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Photographs of EUT v01



History of this test report

Report No.	Version	Description	Issued Date
FR140145-01AA	01	Initial issue of report	Jan. 23, 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	15.207	AC Power-line Conducted Emissions	PASS	-	
3.2	15.407(a)	Emission Bandwidth	PASS	-	
3.3	15.407(a)	Maximum Output Power	PASS	-	
3.4	15.407(a)	Power Spectral Density	PASS	-	
3.5	15.407(b)	nwanted Emissions PASS -			
Note: Refe	erence to Sport	on Project No.: 140145-06.			

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: Sophia Shiung



1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5725-5850	a, n (HT20), ac (VHT20), ax (HEW20)	5745-5825	149-165 [5]
5725-5850	n (HT40), ac (VHT40), ax (HEW40)	5755-5795	151-159 [2]
5725-5850	ac (VHT80), ax (HEW80)	5775	155 [1]

Band	Mode	BWch (MHz)	Nant
5.725-5.85GHz	802.11a	20	2TX
5.725-5.85GHz	802.11n HT20	20	2TX
5.725-5.85GHz	802.11n HT20-BF	20	2TX
5.725-5.85GHz	802.11ac VHT20	20	2TX
5.725-5.85GHz	802.11ac VHT20-BF	20	2TX
5.725-5.85GHz	802.11ax HEW20	20	2TX
5.725-5.85GHz	802.11ax HEW20-BF	20	2TX
5.725-5.85GHz	802.11n HT40	40	2TX
5.725-5.85GHz	802.11n HT40-BF	40	2TX
5.725-5.85GHz	802.11ac VHT40	40	2TX
5.725-5.85GHz	802.11ac VHT40-BF	40	2TX
5.725-5.85GHz	802.11ax HEW40	40	2TX
5.725-5.85GHz	802.11ax HEW40-BF	40	2TX
5.725-5.85GHz	802.11ac VHT80	80	2TX
5.725-5.85GHz	802.11ac VHT80-BF	80	2TX
5.725-5.85GHz	802.11ax HEW80	80	2TX
5.725-5.85GHz	802.11ax HEW80-BF	80	2TX

Note:

• 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

 VHT20, VHT40, VHT80 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

• HEW20, HEW40, HEW80 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.

• BWch is the nominal channel bandwidth.



1.1.2 Antenna Information

For Dish Antenna:

Ant.	t. Port Brand		Port Brand Model Name		Connector	Gain (dBi)	
,		Drana		Antenna Type	•••••••	UNII3	UNII5&7
1	1	Cambium	ePMP 6GHz 2x2 Dish Antenna	Dish (Directional Ant.)	RP-SMA	25.21	29
I	2	Cambium	ePMP 6GHz 2x2 Dish Antenna	Dish (Directional Ant.)	RP-SMA	25.21	29

Note 1: The Dish antenna is cross polarization.

For Sector Antenna:

	nt. Ant. Port Brand						Gain (dBi)	
Ant.	СН	Port	Brand	Model Name	Antenna Type	Connector	UNII3&5	UNII7
	0	-	Cambium	ePMP 2x2 6GHz MU-MIMO Sector Antenna	Sector (Directional Ant.)	RP-SMA	18	18.73
	1	1	Cambium	ePMP 2x2 6GHz MU-MIMO	Sector	RP-SMA	18	18.73
1	1	i Cambium		Sector Antenna	(Directional Ant.)	RF-SIVIA	10	10.75
	2	2	Cambium	ePMP 2x2 6GHz MU-MIMO	Sector	RP-SMA	18	18.73
				Sector Antenna	(Directional Ant.)			
	3	_	Cambium	ePMP 2x2 6GHz MU-MIMO	Sector	RP-SMA	18	18.73
	5		Cambiam	Sector Antenna	(Directional Ant.)		10	10.70

Note 2: The Sector antenna has four CH ports. Only two CH ports (CH1 and CH2) were used for the EUT. The Sector antenna is cross polarization: CH 1 is vertical and CH 2 is horizontal.

Note 3: The above information was declared by manufacturer.

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.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11a	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ax HEW20	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ax HEW40	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)
802.11ax HEW80	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)

Note:

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



1.1.4 EUT Operational Condition

EUT Power Type		From PoE				
Beamforming Function		With beamforming	\boxtimes	Without beamforming		
		Outdoor P2M		Indoor P2M		
Function		Fixed P2P		Client		
		Point-to-multipoint	\boxtimes	Point-to-point		
Channel Puncturing Function		Supported	\boxtimes	Unsupported		
Support RU	\boxtimes	Full RU		Partial RU		
Test Software Version	QR	CT V4.0.00192.0				

Note: The above information was declared by manufacturer.

1.1.5 Table for Multiple Listing

Equipment Name / Model Name	Function	Support	
ePMP 6 GHz Force 4600C SM	Client	WLAN 5GHz UNII 3 / 6GHz UNII 5&7	
ePMP 4600L 6 GHz 2x2 Access Point	AP	WEAN SOF 2001 37 60 2001 5&7	

Note 1: From the above models, model: ePMP 4600L 6 GHz 2x2 Access Point 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.

1.1.6 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR140145-02 Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Add 6GHz for Standard Power (6SD), Fixed Client (6FC)	1. AC Power-line Conducted Emissions
and Standard Client (6FX) through SW change.	2. Unwanted Emissions < 1GHz
2. Add a new directional Sector Antenna for the EUT with	
the same antenna type but lower gain than the original.	All test items.
(Refer to section 1.1.2 for detailed information.)	



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 D01 v02r01
- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

	Testing Location Information
Test Lab. : Sportor	n 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	Remark
RF Conducted	TH03-CB	Ken Yeh	24.3-24.6 / 66-69	Nov. 27, 2023	For Sector Ant.
Radiated < 1GHz	03CH05-CB	Black Lu	22.5-23.6 / 56-57	Oct. 19, 2023~ Oct. 20, 2023	For Dish Ant.
Raulaleu < 1912	10CH01-CB	Tim Chen	23-24 / 60-62	Nov. 30, 2023~ Dec. 26, 2023	For Sector Ant.
Radiated > 1GHz	03CH02-CB	Jackson Peng	22-23 / 55-58	Nov. 22, 2023~ Nov. 25, 2023	For Sector Ant.
	CO01-CB	Peter Wu	21-23 / 55-57	Dec. 09, 2021	For Dish Ant.
AC Conduction	CO01-CB	Ryan Huang	21-22 / 60-61	Nov. 30, 2023~ Dec. 26, 2023	For Sector Ant.

Note 1: The tested sample with Dish antenna for WLAN 6GHz (AC Power-line Conducted Emissions) was received on Nov. 22, 2021.

Note 2: The tested sample with Dish antenna for WLAN 6GHz (except for AC Power-line Conducted Emissions) was received on Jul. 06, 2022.

Note 3: The tested sample with Sector antenna was received on Nov. 15, 2023.



1.4 Measurement Uncertainty

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

For other test sites

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.1 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.1 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.2 dB	Confidence levels of 95%
Conducted Emission	3.1 dB	Confidence levels of 95%
Output Power Measurement	0.8 dB	Confidence levels of 95%
Bandwidth Measurement	2.2%	Confidence levels of 95%

Test Site No.: 10CH01-CB

Test Items	Uncertainty	Remark
Radiated Emission (9kHz ~ 30MHz)	5.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.0 dB	Confidence levels of 95%



2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11a_Nss1,(6Mbps)_2TX	-
5745MHz	12.5
5785MHz	11.5
5825MHz	11
802.11ax HEW20_Nss1,(MCS0)_2TX	-
5745MHz	10
5785MHz	9.5
5825MHz	9.5
802.11ax HEW40_Nss1,(MCS0)_2TX	-
5755MHz	8
5795MHz	9
802.11ax HEW80_Nss1,(MCS0)_2TX	-
5775MHz	7.5

Note: Evaluated HEW20 / HEW40 / HEW80 mode only, due to similar modulation. The power setting of HT20 / HT40 / VHT20 / VHT40 / VHT80 mode are the same or lower than HEW20 / HEW40 / HEW80.

2.2 The Worst Case Measurement Configuration

1	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 + PoE + Dish antenna_WLAN 6GHz
2	EUT + PoE + Sector antenna_WLAN 6GHz
3	EUT + PoE + Sector antenna_WLAN 5GHz
Mode 2 generated the w	orst test result, so it was recorded in this report.

Th	e Worst Case Mode for Following Conformance Tests
Tests Item	Emission Bandwidth Maximum Output Power Power Spectral Density
Test Condition	Conducted measurement at transmit chains



	Th	e Wo	rst Case Mode for Follo	wing Conformance Test	S
	Tests Item	Unwa	anted Emissions		
Т	est Condition	If EU rega	rdless of spatial multiplex	enna assembly (multiple a king MIMO configuration), enna gain of each antenn	the radiated test should
		Norm	nal Link		
Opera	ting Mode < 1GHz	7	evaluating, EUT in Y ax w this same test configura	kis was the worst case, s tion.	so the measurement will
	1	EUT	in Y axis + PoE + Dish ar	ntenna_WLAN 6GHz	
	2	EUT	in Y axis + PoE + Sector	antenna_WLAN 6GHz	
	3	EUT	in Y axis + PoE + Sector	antenna_WLAN 5GHz	
Mode '	1 generated the wor	st test	t result, so it was recorded	d in this report.	
		СТХ			
Opera	ting Mode > 1GHz	/	evaluating, EUT in Y ax w this same test configura	kis was the worst case, s tion.	so the measurement will
	1	EUT	in Y axis + Sector antenn	а	
Note:	The PoE was for me	asure	ment only and would not	be marketed. Its informati	on is shown as below:
	Equipment		Brand Name	Model Name	FCC ID
	PoE		Cambium Networks	NET-P30-56IN	N/A

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

N/A



2.5 Support Equipment

For AC Conduction:

		Support Equ	ipment	
No.	Equipment	Brand Name	Model Name	FCC ID
А	PoE	Cambium Networks	NET-P30-56IN	N/A
В	ETH NB	DELL	E6430	N/A
С	SFP PC	ASUS	S300TA	TX2-RTL8821CE
D	GPS Simulator	WELNAVIGATE	GS-100	N/A
Е	Device	Cambium Networks	Force 4600C	Z8H89FT0069
F	Device NB	DELL	E6430	N/A
G	GPS ANT	Unictron	H2M3A023C20100	N/A

For Radiated < 1GHz:

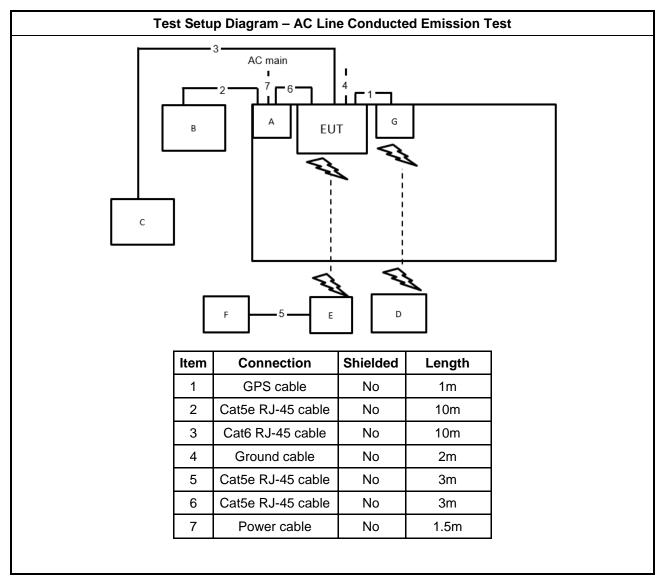
		Support Equ	ipment	
No.	Equipment	Brand Name	Model Name	FCC ID
А	GPS ANT	Unictron	H2M3A023C20100	N/A
В	Device	Cambium Networks	Force 4600C	Z8H89FT0069
С	Device NB	DELL	E6430	N/A
D	PoE	Cambium Networks	NET-P30-56IN	N/A
Е	ETH NB	DELL	E6430	N/A
F	SFP PC	ASUS	S300TA	TX2-RTL8821CE
G	GPS Simulator	WELNAVIGATE	GS-100	N/A

For Radiated > 1GHz and RF Conducted:

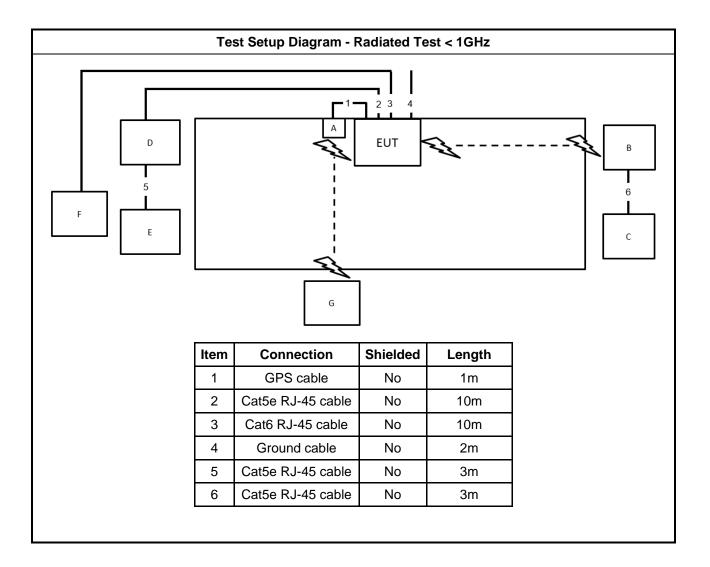
		Support Equ	ipment	
No.	Equipment	Brand Name	Model Name	FCC ID
А	Notebook	DELL	E4300	N/A
В	PoE	Cambium Networks	NET-P30-56IN	N/A



2.6 Test Setup Diagram

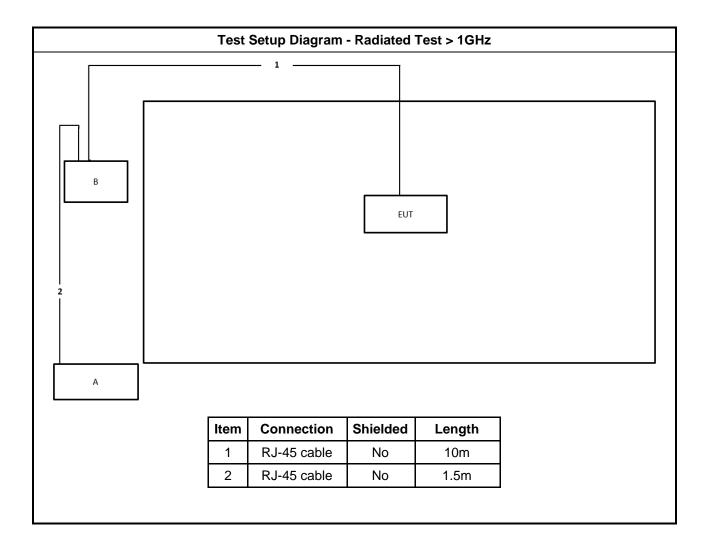














3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

Average 56 - 46 *
56 - 16 *
50 - 40
46
50
-

Note 1. Debledded with the logarithm of the nequ

3.1.2 Measuring Instruments

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

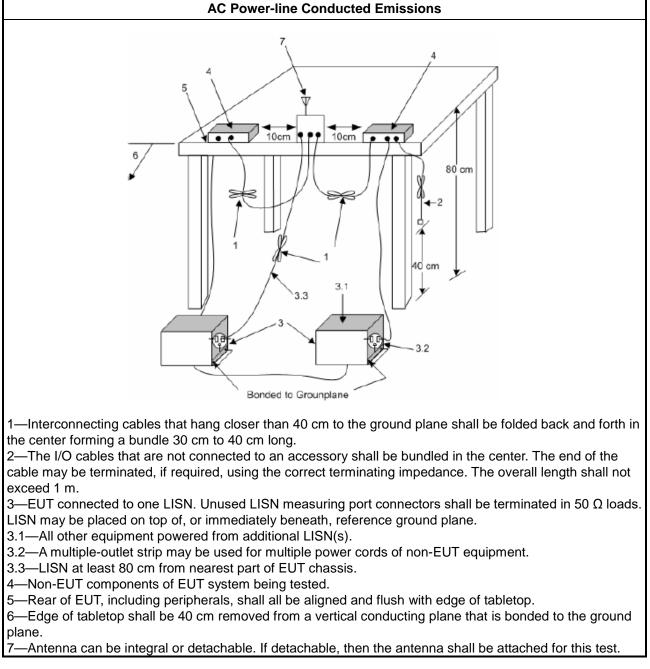
3.1.3 Test Procedures

Test Method

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



3.1.4 Test Setup



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



3.2 Emission Bandwidth

3.2.1 Emission Bandwidth Limit

	Emission Bandwidth Limit					
UN	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, 26 dB emission bandwidth ,N/A. 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 \geq 500kHz.					

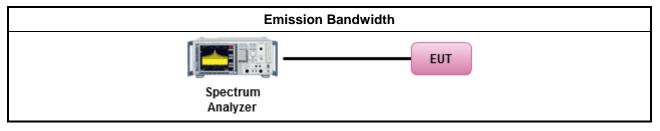
3.2.2 Measuring Instruments

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 789033 D02, clause C f	or EBW and clause D for OBW measurement.				
Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.		upied bandwidth testing.				
	Refer as IC RSS-Gen, clause 4.6 for bandw	idth testing.				

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B



3.3 Maximum Output Power

3.3.1 Limit

	Maximum Output Power Limit						
UNI	I Devices						
	For the 5.15-5.25 GHz band:						
	 Outdoor AP: the maximum conducted output power (Pout) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then Pout = 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 $P_{Out} = 24 - (G_{TX} - 6)$.						
\square	For the 5.725-5.85 GHz band:						
	 Point-to-multipoint systems (P2M): the maximum conducted output power (Pout) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then Pout = 30 - (G_{TX} - 6). 						
	 Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. 						
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. 						
	= maximum conducted output power in dBm, = 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						
	Average over on/off periods with duty factor						
	Refer as FCC KDB 789033 D02, clause E Method SA-2 (spectral trace averaging).						
	Refer as FCC KDB 789033 D02, clause E Method SA-2 Alt. (RMS detection with slow sweet speed)						
	Wid	eband RF power meter and average over on/off periods with duty factor					
	\square	Refer as FCC KDB 789033 D02, clause E Method PM-G (using an RF average power meter).					
\square	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 approach, measured all transmit ports individually. Sum the power (in linear power units of all ports for each individual sample and save them. 							
	•	If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP _{total} = P _{total} + DG					
	For r	adiated measurement.					
	 Refer as FCC KDB 789033 D02 clause II A.1.F "Antenna-port Conducted versus Radiated Testin 						
	•	Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.					
	•	Refer as FCC KDB 412172 D01 clause 2.2 for EIRP calculation.					
	•						

3.3.4 Test Setup

Conducted Measurement (Power Meter)	
Power Meter	

3.3.5 Test Result of Maximum Output Power

Refer as Appendix C



3.4 Power Spectral Density

3.4.1 Limit

	Peak Power Spectral Density Limit						
UNI	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) \leq 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) \leq 11 dBm/MHz. If G _{TX} > 6 dBi, then PPSD= 11 - (G _{TX} - 6).						
\square	For the 5.725-5.85 GHz band:						
	• Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) \leq 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. 						
LE-	LAN Devices						
	For the 5.15-5.25 GHz band, the e.i.r.p. peak power spectral density (PPSD) \leq 10 dBm/MHz.						
	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) \leq 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) \leq 11 dBm/MHz.						
	For the 5.725-5.85 GHz band:						
	• Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) \leq 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. 						
pow	SD = peak power spectral density that he same method as used to determine the conducted output ver shall be used to determine the power spectral density. And power spectral density in dBm/MHz = the maximum transmitting antenna directional gain in dBi.						

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 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 D02, F)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth				
	[duty	v cycle ≥ 98% or external video / power trigger]				
	\square	Refer as FCC KDB 789033 D02, clause E Method SA-1 (spectral trace averaging).				
		Refer as FCC KDB 789033 D02, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)				
	duty	cycle < 98% and average over on/off periods with duty factor				
	\boxtimes	Refer as FCC KDB 789033 D02, clause E Method SA-2 (spectral trace averaging).				
		Refer as FCC KDB 789033 D02, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)				
\boxtimes	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 + + PPSD _n (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP _{total} = PPSD _{total} + DG				



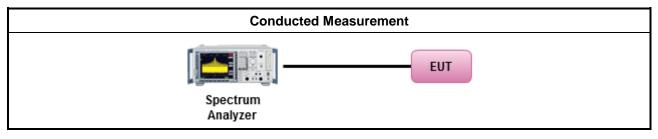
	For radiated measurement.	
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Refer as FCC KDB 789033 D02 clause II A.1.F "Antenna-port Conducted versus Radiated Testing"

• Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.

• Refer as FCC KDB 412172 D01 clause 2.2 for EIRP calculation.

3.4.4 Test Setup



3.4.5 Test Result of Power Spectral Density

Refer as Appendix D



3.5 Unwanted Emissions

3.5.1 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	0.009~0.490 2400/F(kHz)		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.p27 dBm [68.2 dBuV/m@3m]				
🔲 5.25 - 5.35 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]				
🔲 5.47 - 5.725 GHz	e.i.r.p27 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.				
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).					

3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method

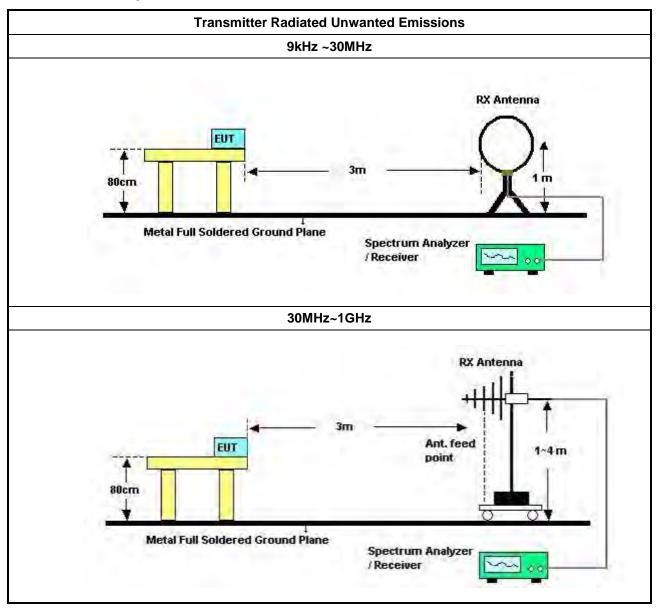
- Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, 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 D02, clause G)2) for unwanted emissions into non-restricted bands.
 - Refer as FCC KDB 789033 D02, clause G)1) for unwanted emissions into restricted bands.
 - Refer as FCC KDB 789033 D02, G)6) Method AD (Trace Averaging).
 - Refer as FCC KDB 789033 D02, 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 D02, clause G)5) measurement procedure peak limit.
 - Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.

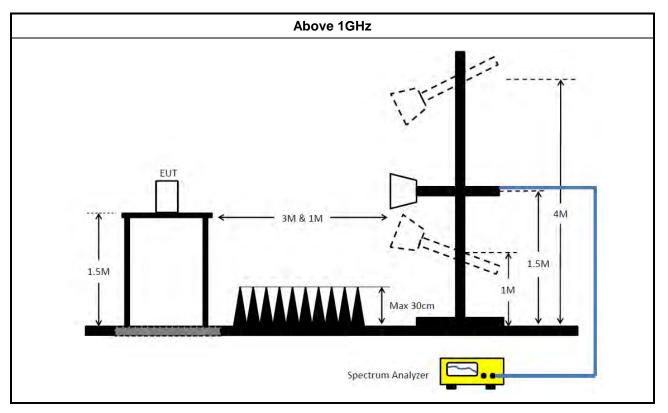


Test Method					
•	 For radiated measurement. 				
	• Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.				
	• Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.				
	 Refer as ANSI C63.10, clause 6.6 for radiated 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 				

3.5.4 Test Setup

has no need to be reported.





3.5.5 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.

3.5.6 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.

3.5.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix E



4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Mar. 03, 2021	Mar. 02, 2022	Conduction (CO01-CB)
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 20, 2023	Feb. 19, 2024	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50- 16-2	04083	150kHz ~ 100MHz	Jan. 06, 2021	Jan. 05, 2022	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50- 16-2	04083	150kHz ~ 100MHz	Feb. 16, 2023	Feb. 15, 2024	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Mar. 07, 2021	Mar. 06, 2022	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Apr. 27, 2023	Apr. 26, 2024	Conduction (CO01-CB)
Pulse Limiter	Rohde& Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 30, 2021	Jan. 29, 2022	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 09, 2023	Feb. 08, 2024	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 19, 2021	May 18, 2022	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	Oct. 17, 2023	Oct. 16, 2024	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6121	65417	9kHz - 30 MHz	Oct. 13, 2023	Oct. 12, 2024	Radiation (10CH01-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. 10, 2023	Mar. 09, 2024	Radiation (10CH01-CB)
Amplifier	Agilent	8447D	2944A10784	9kHz ~ 1.3GHz	Mar. 10, 2023	Mar. 09, 2024	Radiation (10CH01-CB)
Low Cable	Woken	SUCOFLEX 104	low cable-01	25MHz ~ 1GHz	Oct. 17, 2023	Oct. 16, 2024	Radiation (10CH01-CB)
Low Cable	Woken	SUCOFLEX 104	low cable-02	25MHz ~ 1GHz	Oct. 17, 2023	Oct. 16, 2024	Radiation (10CH01-CB)
EMI Test Receiver	Rohde&Schwarz	ESCI	100186	9kHz ~ 3GHz	Jul. 11, 2023	Jul. 10, 2024	Radiation (10CH01-CB)
Spectrum Analyzer	Rohde&Schwarz	FSV30	101026	9kHz ~ 30GHz	Apr. 19, 2023	Apr. 18, 2024	Radiation (10CH01-CB)
Bilog Antenna with 6dB Attenator	Schaffner & EMCI	CBL6112B& N-6-06	2888&AT-N060 5	30MHz ~ 1GHz	Jan. 19, 2023	Jan. 18, 2024	Radiation (10CH01-CB)

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Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Amplifier	EM	EM101	060703	10MHz ~ 1GHz	Oct. 18, 2023	Oct. 17, 2024	Radiation (10CH01-CB)
Low Cable	TITAN	T318E	low cable-03	30MHz ~ 1GHz	Nov. 23, 2023	Nov. 22, 2024	Radiation (10CH01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (10CH01-CB)
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 23, 2023	Mar. 22, 2024	Radiation (03CH05-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1GHz	Aug. 02, 2023	Aug. 01, 2024	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 24, 2023	Mar. 23, 2024	Radiation (03CH05-CB)
Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 03, 2023	May 02, 2024	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Apr. 18, 2023	Apr. 17, 2024	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 13, 2023	Jun. 12, 2024	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH05-CB)
Test Software	SPORTON	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. 25, 2023	Mar. 24, 2024	Radiation (03CH02-CB)
Horn Antenna	EMCO	3115	9610-4976	1GHz ~ 18GHz	Apr. 18, 2023	Apr. 17, 2024	Radiation (03CH02-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH02-CB)
Pre-Amplifier	Agilent	83017A	MY39501305	1GHz ~ 26.5GHz	Jun. 30, 2023	Jun. 29, 2024	Radiation (03CH02-CB)
Pre-Amplifier	SGH	SGH184	20230109-3	18~40GHz	Jan. 13, 2023	Jan. 12, 2024	Radiation (03CH02-CB)
Signal Analyzer	R&S	FSV3044	101437	10kHz ~ 44GHz	Nov. 29, 2022	Nov. 29, 2023	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18	1GHz ~ 18GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18+19	1GHz ~ 18GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH02-CB)

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Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
High Cable	Woken	WCA0929M	40G#6	1GHz ~ 40 GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH02-CB)
Spectrum analyzer	R&S	FSV40	101028	9kHz~40GHz	Dec. 30, 2022	Dec. 29, 2023	Conducted (TH03-CB)
Power Sensor	Anritsu	MA2411B	1726195	300MHz~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Conducted (TH03-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Conducted (TH03-CB)
RF Cable	Woken	RG402	High Cable-11	30MHz –18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable	Woken	RG402	High Cable-12	30MHz –18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable	Woken	RG402	High Cable-13	30MHz –18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-14	1 GHz –18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-15	1 GHz –18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH03-CB)
Switch	SPTCB	SP-SWI	SWI-03	1 ~26.5 GHz	Oct. 03, 2023	Oct. 02, 2024	Conducted (TH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH03-CB)

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

NCR means Non-Calibration required.



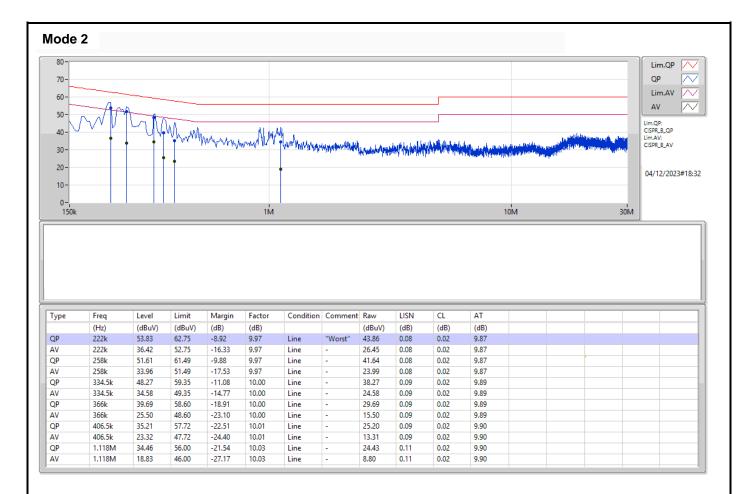
Conducted Emissions at Powerline

Appendix A

Summary							
Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV)	(dBuV)	(dB)	
Mode 2	Pass	QP	244.5k	54.80	61.95	-7.15	Neutral

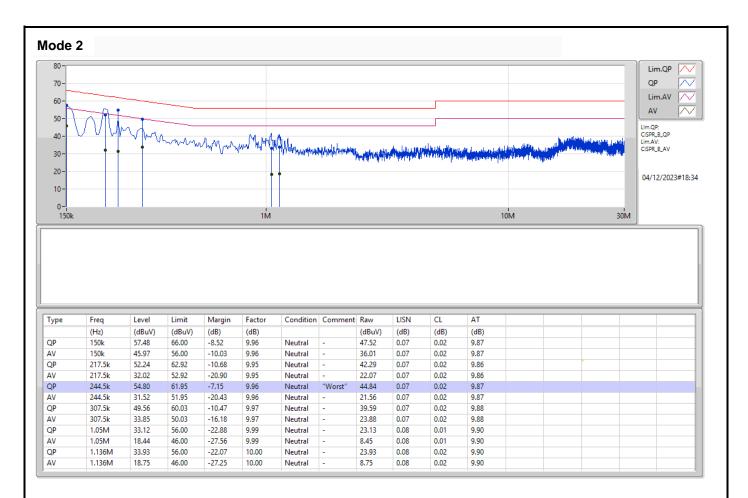


Appendix A











Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
5.725-5.85GHz	-	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	16.555M	24.67M	24M7D1D	16.28M	16.583M
802.11ax HEW20_Nss1,(MCS0)_2TX	19.14M	19.133M	19M1D1D	18.865M	18.997M
802.11ax HEW40_Nss1,(MCS0)_2TX	38.17M	37.99M	38M0D1D	37.84M	37.828M
802.11ax HEW80_Nss1,(MCS0)_2TX	78.32M	77.74M	77M7D1D	78.1M	77.099M

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



EBW

Result

Mode	Result	Limit	Port 1-N dB	Port 1-OBW	Port 2-N dB	Port 2-OBW
		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5745MHz	Pass	500k	16.555M	24.67M	16.5M	16.685M
5785MHz	Pass	500k	16.445M	20.713M	16.28M	16.583M
5825MHz	Pass	500k	16.5M	18.978M	16.5M	16.667M
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5745MHz	Pass	500k	18.865M	19.084M	19.085M	18.997M
5785MHz	Pass	500k	18.92M	19.116M	19.14M	19.032M
5825MHz	Pass	500k	19.085M	19.133M	19.03M	19.014M
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5755MHz	Pass	500k	38.06M	37.828M	38.17M	37.969M
5795MHz	Pass	500k	37.84M	37.99M	38.17M	37.844M
802.11ax HEW80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5775MHz	Pass	500k	78.1M	77.74M	78.32M	77.099M

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



EBW



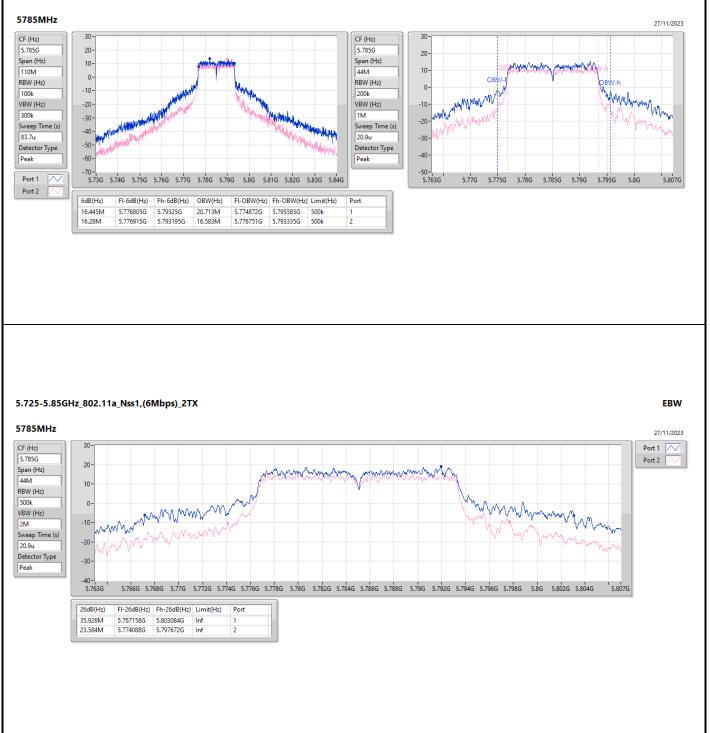
5.725-5.85GHz_802.11a_Nss1,(6Mbps)_2TX





EBW

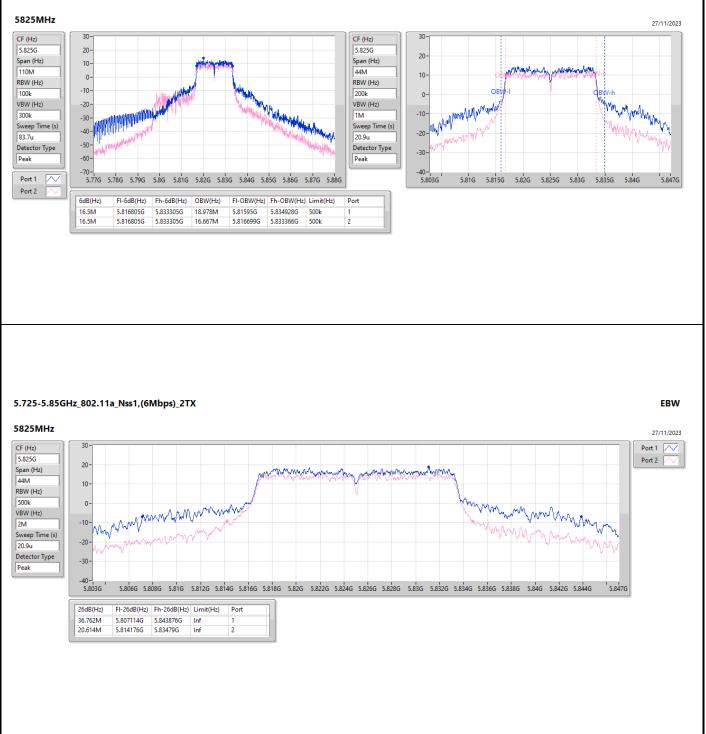






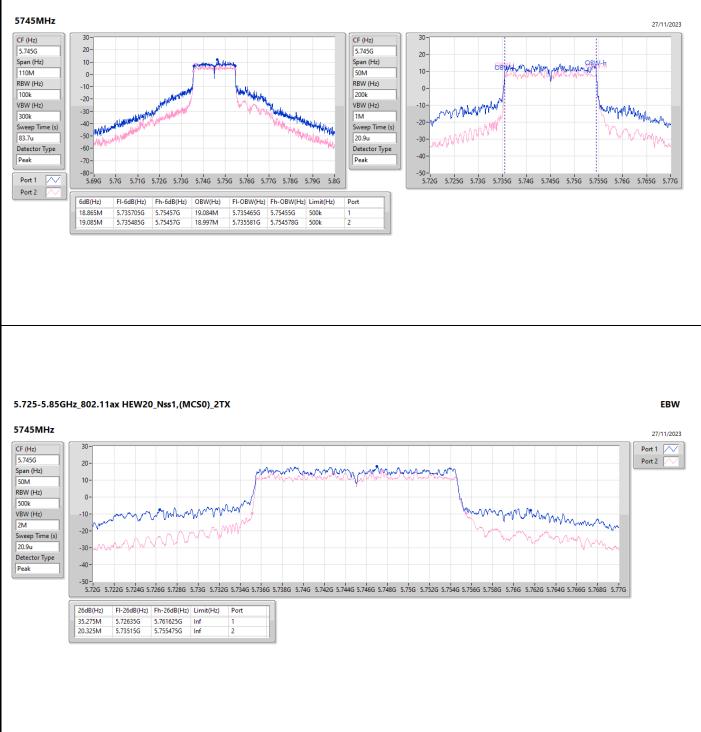
EBW





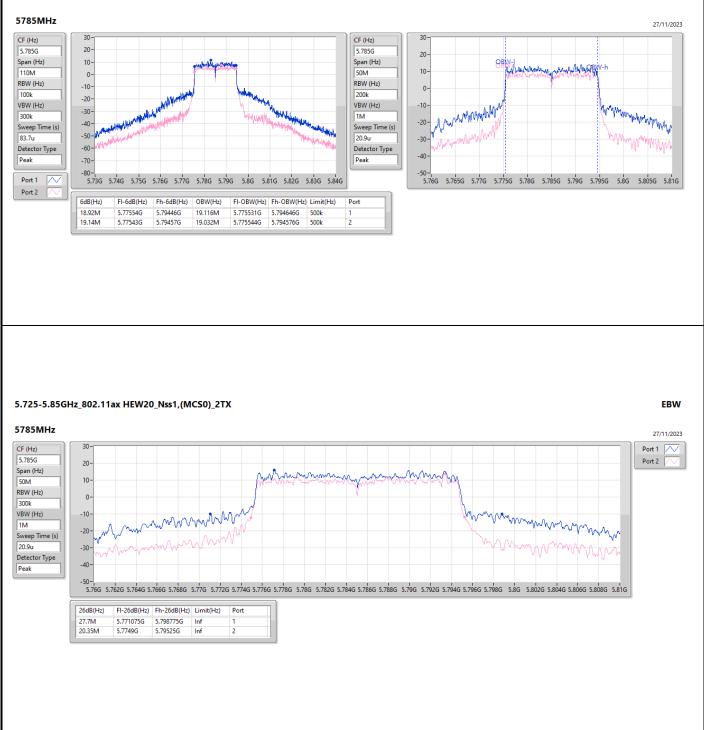


5.725-5.85GHz_802.11ax HEW20_Nss1,(MCS0)_2TX



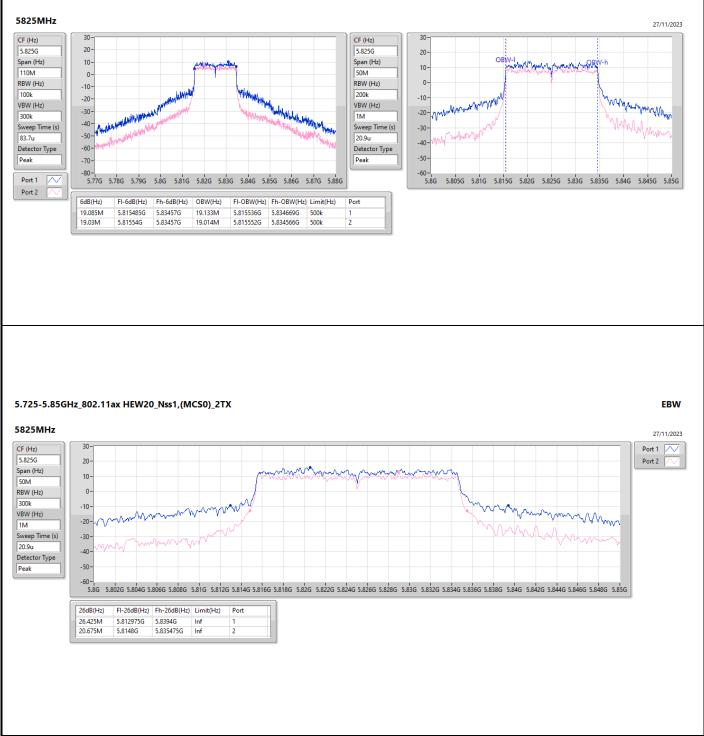


5.725-5.85GHz_802.11ax HEW20_Nss1,(MCS0)_2TX



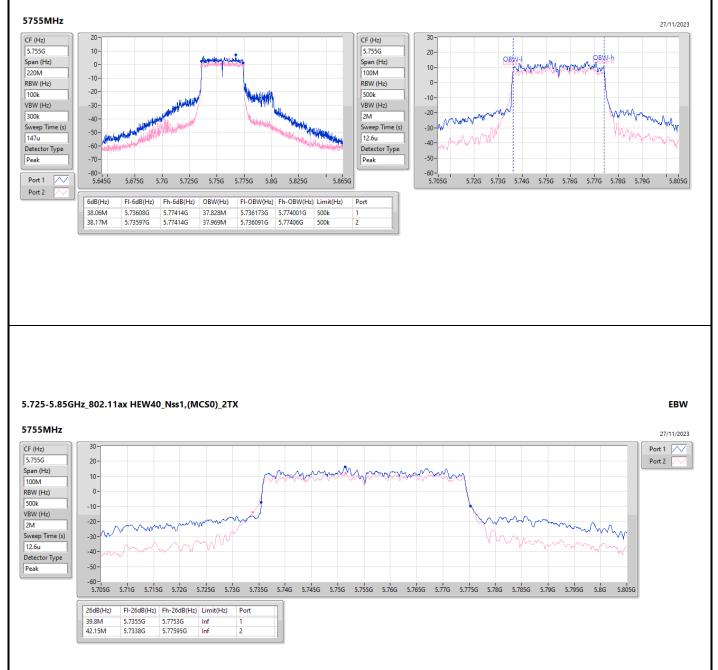


5.725-5.85GHz_802.11ax HEW20_Nss1,(MCS0)_2TX



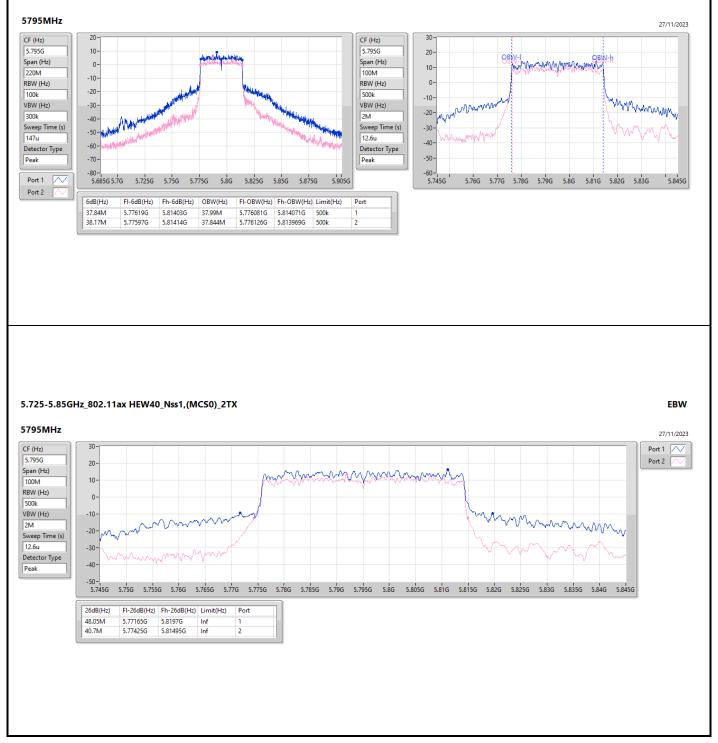


5.725-5.85GHz_802.11ax HEW40_Nss1,(MCS0)_2TX



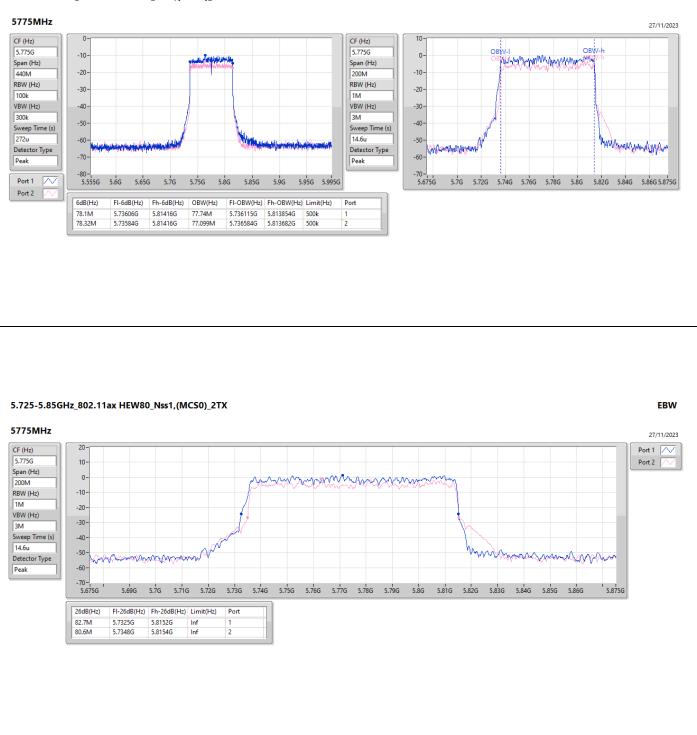


5.725-5.85GHz_802.11ax HEW40_Nss1,(MCS0)_2TX





5.725-5.85GHz_802.11ax HEW80_Nss1,(MCS0)_2TX





Average Power

Appendix C

Summary

Mode	Total Power	Total Power	EIRP	EIRP
	(dBm)	(W)	(dBm)	(W)
5.725-5.85GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	28.88	0.77268	46.88	48.75285
802.11ax HEW20_Nss1,(MCS0)_2TX	27.22	0.52723	45.22	33.26596
802.11ax HEW40_Nss1,(MCS0)_2TX	26.52	0.44875	44.52	28.31392
802.11ax HEW80_Nss1,(MCS0)_2TX	11.53	0.01422	29.53	0.89743



Average Power

Appendix C

Result

Mode	Result	DG	Port 1	Port 2	Total Power	Power Limit	EIRP	EIRP Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
5745MHz	Pass	18.00	26.70	24.83	28.88	30.00	46.88	Inf
5785MHz	Pass	18.00	26.13	24.24	28.30	30.00	46.30	Inf
5825MHz	Pass	18.00	26.16	24.28	28.33	30.00	46.33	Inf
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5745MHz	Pass	18.00	25.01	23.22	27.22	30.00	45.22	Inf
5785MHz	Pass	18.00	24.88	22.99	27.05	30.00	45.05	Inf
5825MHz	Pass	18.00	24.92	22.98	27.07	30.00	45.07	Inf
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5755MHz	Pass	18.00	23.00	21.12	25.17	30.00	43.17	Inf
5795MHz	Pass	18.00	24.41	22.36	26.52	30.00	44.52	Inf
802.11ax HEW80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5775MHz	Pass	18.00	9.36	7.47	11.53	30.00	29.53	Inf

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



Summary

Mode	PD (dBm/RBW)
5.725-5.85GHz	-
802.11a_Nss1,(6Mbps)_2TX	14.01
802.11ax HEW20_Nss1,(MCS0)_2TX	12.07
802.11ax HEW40_Nss1,(MCS0)_2TX	8.48
802.11ax HEW80_Nss1,(MCS0)_2TX	-9.57

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

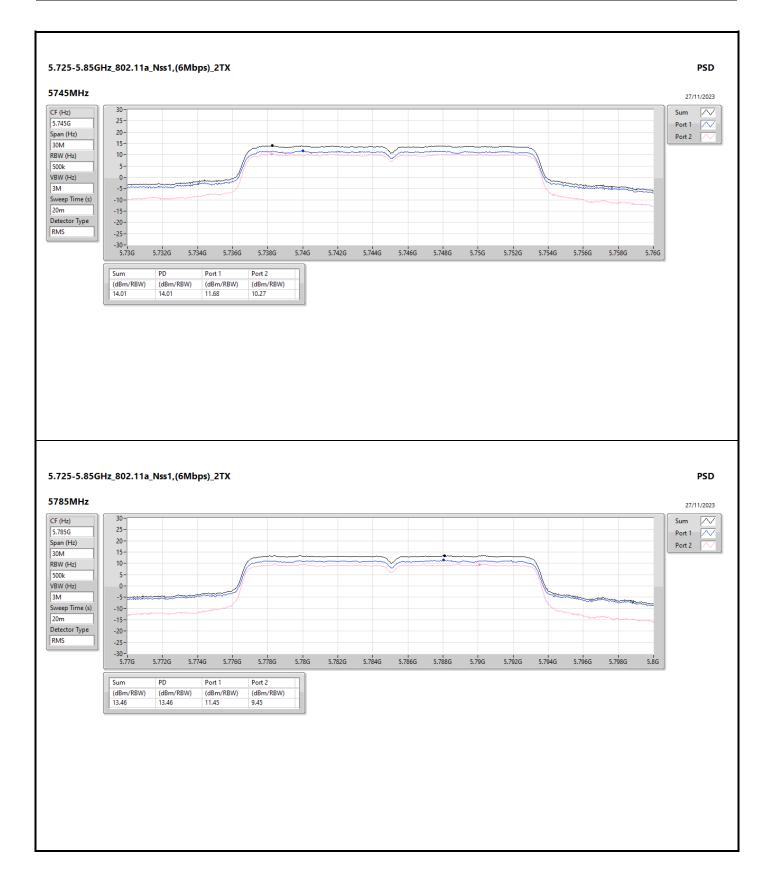


Result

Mode	Result	DG	Port 1	Port 2	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
5745MHz	Pass	18.00	11.68	10.27	14.01	18.00
5785MHz	Pass	18.00	11.45	9.45	13.46	18.00
5825MHz	Pass	18.00	11.52	9.68	13.51	18.00
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5745MHz	Pass	18.00	10.00	8.03	12.07	18.00
5785MHz	Pass	18.00	9.86	7.39	11.75	18.00
5825MHz	Pass	18.00	10.00	7.58	11.88	18.00
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5755MHz	Pass	18.00	5.55	2.98	7.38	18.00
5795MHz	Pass	18.00	6.70	3.97	8.48	18.00
802.11ax HEW80_Nss1,(MCS0)_2TX	-	-	-	-	-	-
5775MHz	Pass	18.00	-11.10	-14.55	-9.57	18.00

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;









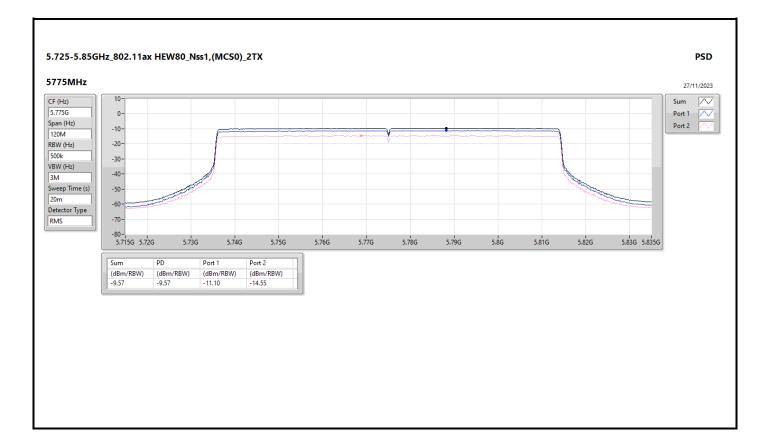












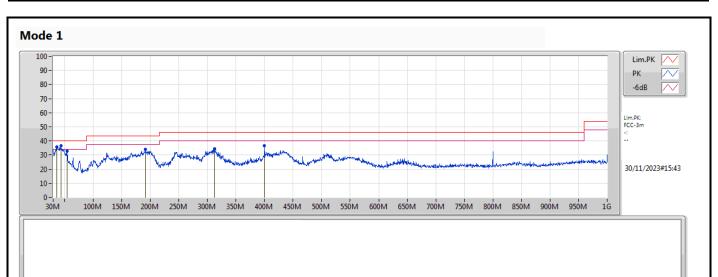


Radiated Emissions below 1GHz

Summary							
Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	
Mode 1	Pass	PK	43.58M	36.57	40.00	-3.43	Vertical



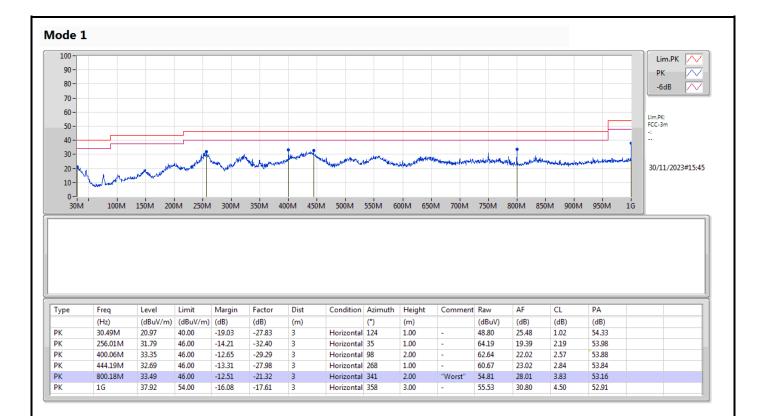
Radiated Emissions below 1GHz



Туре	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA	
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)	
PK	36.79M	35.97	40.00	-4.03	-30.61	3	Vertical	354	1.00	-	66.58	22.91	1.02	54.54	
PK	43.58M	36.57	40.00	-3.43	-33.82	3	Vertical	11	1.00	"Worst"	70.39	19.48	1.08	54.38	
РК	54.74M	32.91	40.00	-7.09	-39.69	3	Vertical	267	1.00	-	72.60	13.50	1.16	54.35	
РК	191.99M	34.14	43.50	-9.36	-37.06	3	Vertical	218	1.00	-	71.20	14.83	1.90	53.79	
PK	312.27M	34.58	46.00	-11.42	-32.56	3	Vertical	97	1.00	-	67.14	19.35	2.33	54.24	
PK	400.06M	36.57	46.00	-9.43	-29.29	3	Vertical	219	2.00	-	65.86	22.02	2.57	53.88	



Radiated Emissions below 1GHz





RSE TX above 1GHz

Appendix E.2

Summary

Mode	Result	Туре	Freq	Level	Limit	Margin	Dist	Condition	Azimuth	Height	Comments
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(m)		(°)	(m)	
5.725-5.85GHz	-	-				-	-	-		-	-
802.11ax HEW40_Nss1,(MCS0)_2TX	Pass	PK	5.655G	71.49	71.90	-0.41	3	Vertical	12	1.65	-



PK

AV PK 5.7485G

5.7485G

5.937G

131.69

121.35

64.23

Inf

Inf

68.20

-Inf

-Inf

-3.97

123.73

113.39

55.82

3

3

3

Vertical

Vertical

Vertical 10

10

10

1.66

1.66

1.66

32.19

32.19

32.57

7.35

7.35

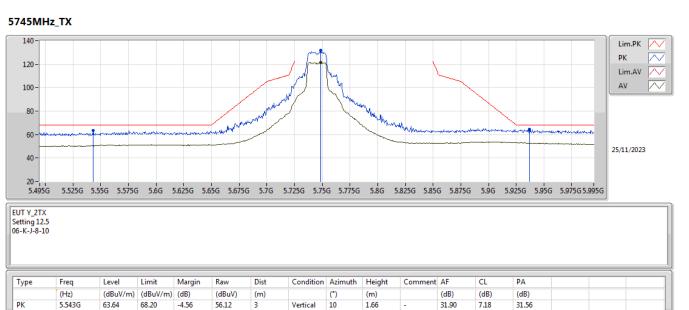
7.44

31.58

31.58

31.60

Appendix E.2







Туре	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)		
РК	5.61G	62.44	68.20	-5.76	54.99	3	Horizontal	23	1.72	-	31.78	7.23	31.56		
РК	5.751G	128.51	Inf	-Inf	120.54	3	Horizontal	23	1.72	-	32.20	7.35	31.58		
AV	5.752G	120.80	Inf	-Inf	112.83	3	Horizontal	23	1.72	-	32.20	7.35	31.58		
РК	5.944G	64.63	68.20	-3.57	56.19	3	Horizontal	23	1.72	-	32.59	7.45	31.60		











PK

AV

5.781G

5.778G

5.9685G

131.00

121.57

65.38

Inf

Inf

68.20

-Inf

-Inf

-2.82

122.95

113.52

56.97

3

3

3

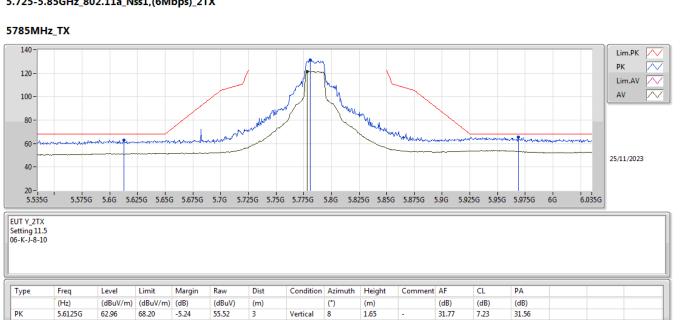
Vertical 8

Vertical

Vertical 8

8

5.725-5.85GHz_802.11a_Nss1,(6Mbps)_2TX



1.65

1.65

1.65

32.26

32.26

32.56

7.37

7.37

7.46

31.58

31.58

31.61



PK

AV PK

5.7815G

5.781G

5.94G

127.63

119.66

64.71

Inf

Inf

68.20

-Inf

-Inf

-3.49

119.58

111.61

56.28

3

3

3

Horizontal 15

Horizontal 15

Horizontal 15

1.70

1.70

1.70

32.26

32.26

32.58

7.37

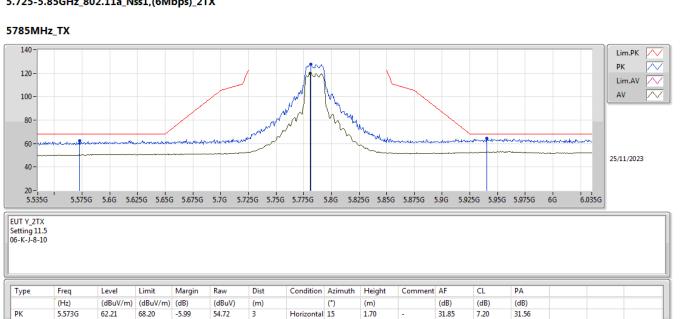
7.37

7.45

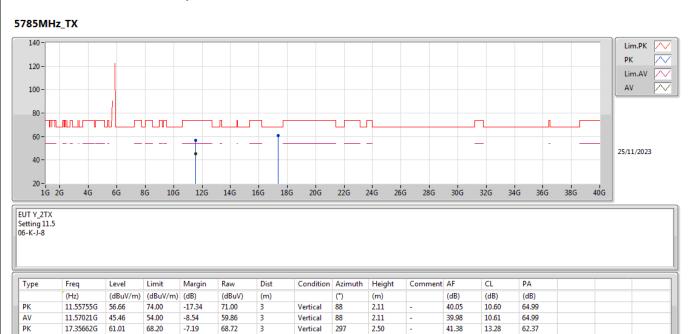
31.58

31.58

31.60













PK

AV PK 5.821G

5.82G

5.9265G

130.49

120.96

67.75

Inf

Inf

68.20

-Inf

-Inf

-0.45

122.38

112.85

59.36

3

3

3

Vertical

Vertical

Vertical 10

10

10

1.64

1.64

1.64

32.30

32.30

32.55

7.40

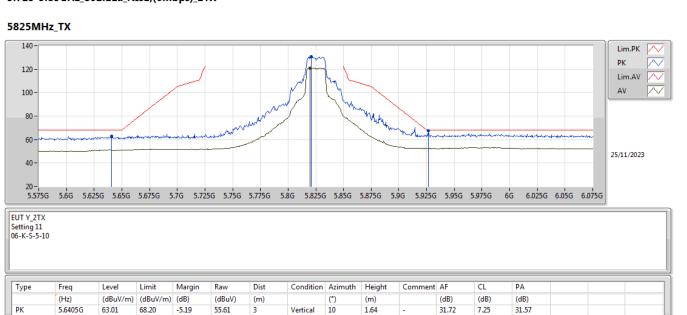
7.40

7.44

31.59

31.59

31.60





5.725-5.85GHz_802.11a_Nss1,(6Mbps)_2TX

6.0525G

65.11

68.20

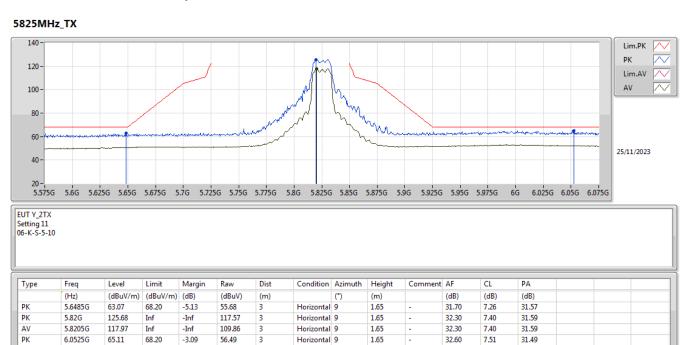
-3.09

56.49

3

Horizontal 9

1.65



32.60

7.51

31.49



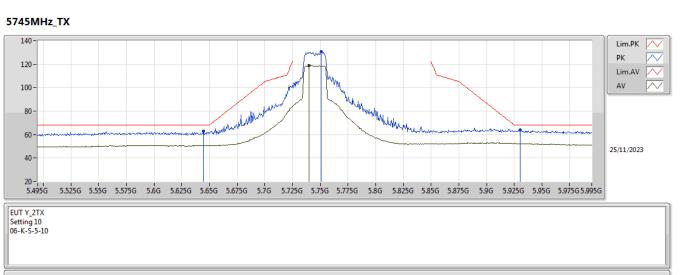








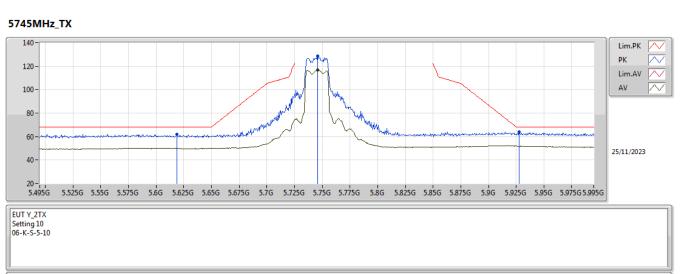
5.725-5.85GHz_802.11ax HEW20_Nss1,(MCS0)_2TX



Туре	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	5.6445G	63.00	68.20	-5.20	55.60	3	Vertical	11	1.65	-	31.71	7.26	31.57		
PK	5.751G	130.63	Inf	-Inf	122.66	3	Vertical	11	1.65	-	32.20	7.35	31.58		
AV	5.74G	118.68	Inf	-Inf	110.78	3	Vertical	11	1.65	-	32.14	7.34	31.58		
PK	5.9305G	63.97	68.20	-4.23	55.57	3	Vertical	11	1.65	-	32.56	7.44	31.60		

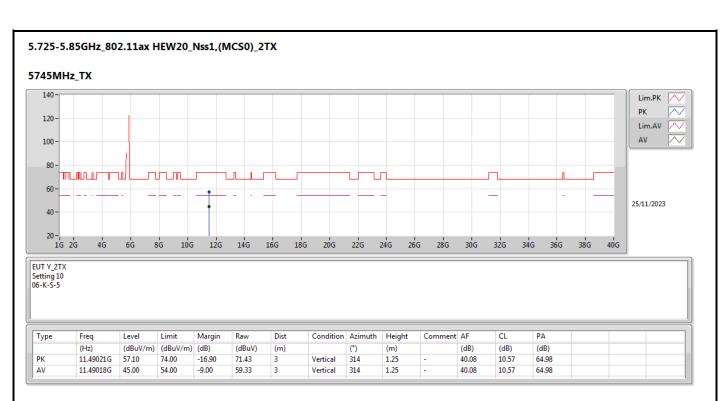


5.725-5.85GHz_802.11ax HEW20_Nss1,(MCS0)_2TX

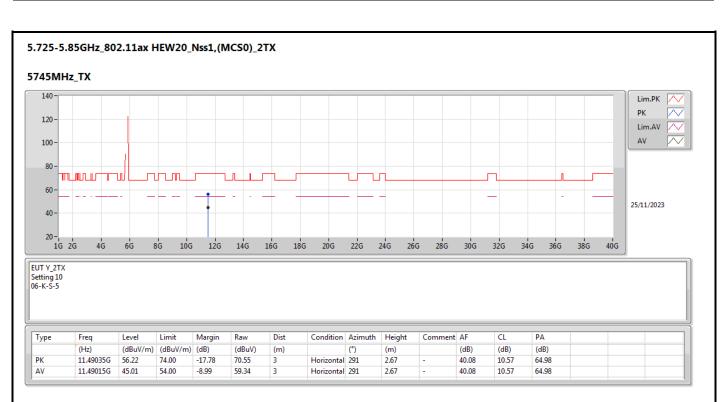


Туре	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA	
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)	
РК	5.6185G	62.05	68.20	-6.15	54.61	3	Horizontal	11	1.65	-	31.76	7.24	31.56	
PK	5.746G	128.59	Inf	-Inf	120.65	3	Horizontal	11	1.65	-	32.18	7.34	31.58	
AV	5.746G	116.78	Inf	-Inf	108.84	3	Horizontal	11	1.65	-	32.18	7.34	31.58	
PK	5.9275G	63.76	68.20	-4.44	55.37	3	Horizontal	11	1.65	-	32.55	7.44	31.60	











5.725-5.85GHz_802.11ax HEW20_Nss1,(MCS0)_2TX

68.20

-3.14

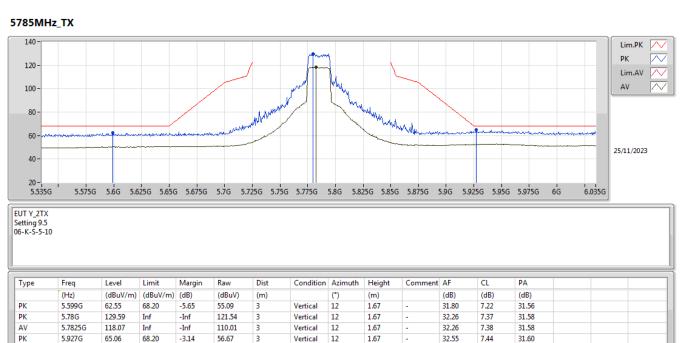
56.67

3

Vertical 12

65.06

5.927G



1.67

32.55

7.44

31.60



5.9515G

63.12

68.20

-5.08

54.67

3

Horizontal 21

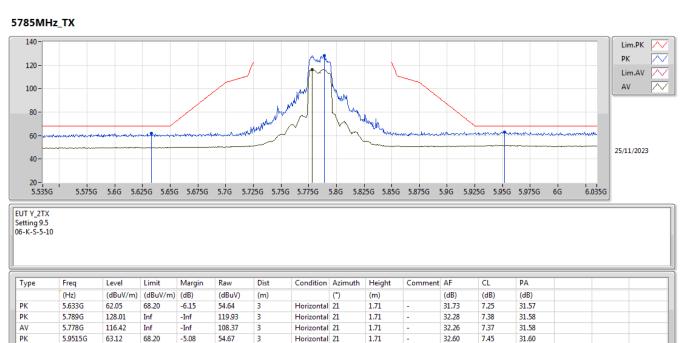
1.71

32.60

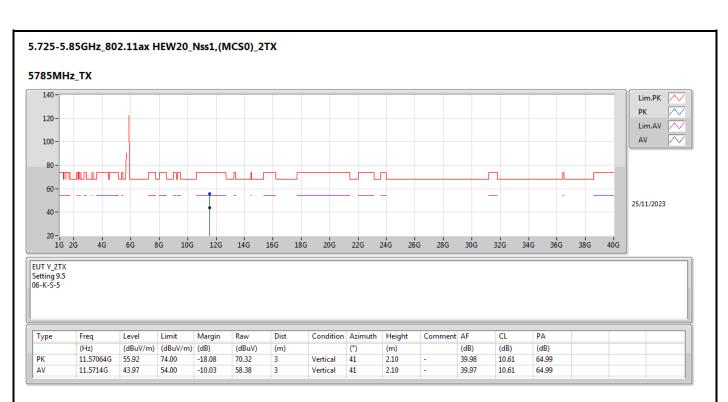
7.45

31.60

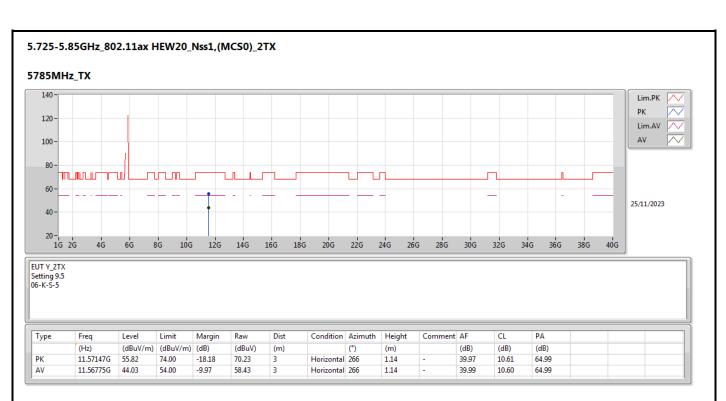
5.725-5.85GHz_802.11ax HEW20_Nss1,(MCS0)_2TX



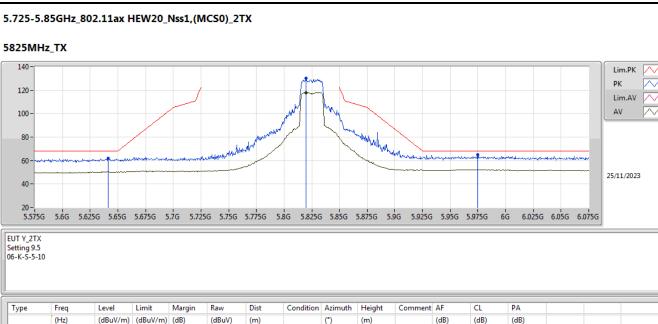






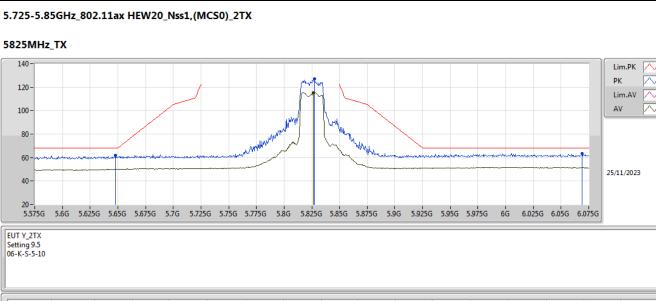






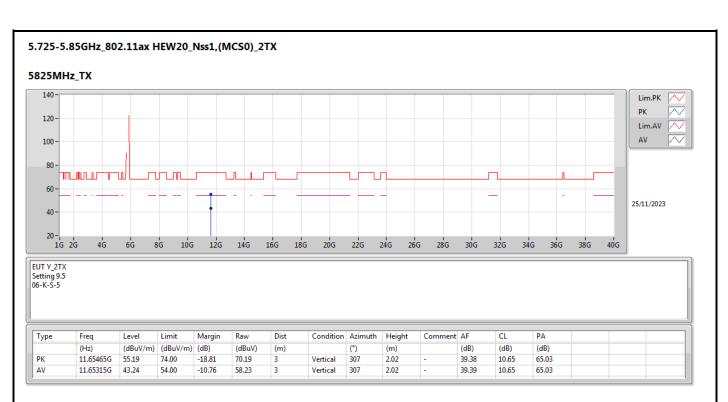
1.76-														
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)	
PK	5.641G	61.98	68.20	-6.22	54.58	3	Vertical	2	1.66	-	31.72	7.25	31.57	
PK	5.82G	130.13	Inf	-Inf	122.02	3	Vertical	2	1.66	-	32.30	7.40	31.59	
AV	5.82G	117.97	Inf	-Inf	109.86	3	Vertical	2	1.66	-	32.30	7.40	31.59	
PK	5.975G	64.87	68.20	-3.33	56.47	3	Vertical	2	1.66	-	32.55	7.46	31.61	
,	1	1	1	1	1	1	1	1	1	1	1	1		 _



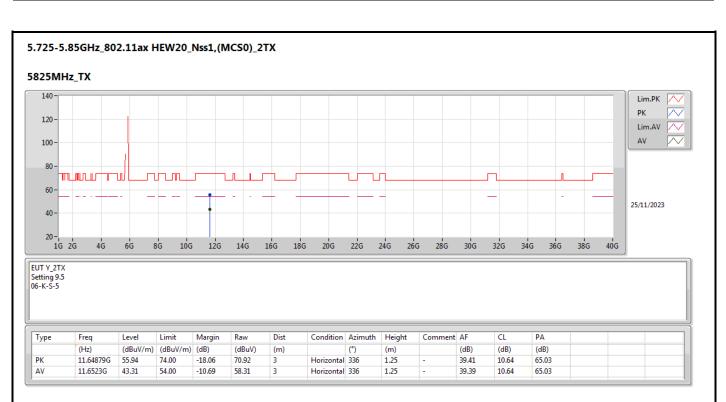


Туре	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA		
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)		
РК	5.648G	62.05	68.20	-6.15	54.66	3	Horizontal	16	1.69	-	31.70	7.26	31.57		
РК	5.8275G	127.29	Inf	-Inf	119.18	3	Horizontal	16	1.69	-	32.30	7.40	31.59		
AV	5.8265G	115.27	Inf	-Inf	107.16	3	Horizontal	16	1.69	-	32.30	7.40	31.59		
PK	6.069G	63.66	68.20	-4.54	54.99	3	Horizontal	16	1.69	-	32.60	7.53	31.46		











AV PK 5.762G

5.9285G

113.72

64.44

Inf

68.20

-Inf

-3.76

105.72

56.04

3

3

Vertical

Vertical 12

12

1.65

1.65

32.22

32.56

7.36

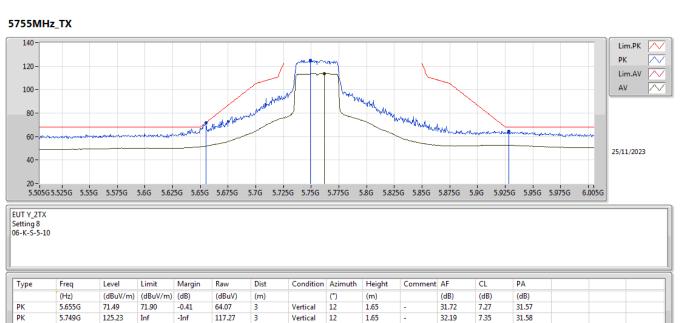
7.44

31.58

31.60

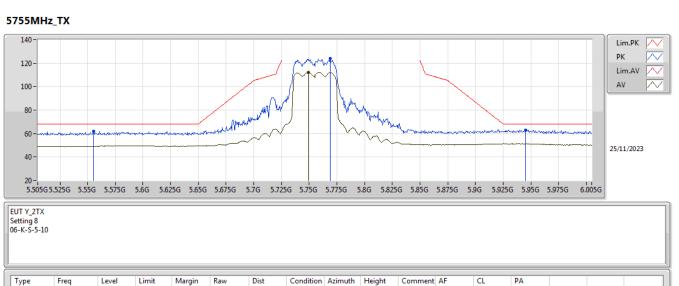
Appendix E.2

5.725-5.85GHz_802.11ax HEW40_Nss1,(MCS0)_2TX



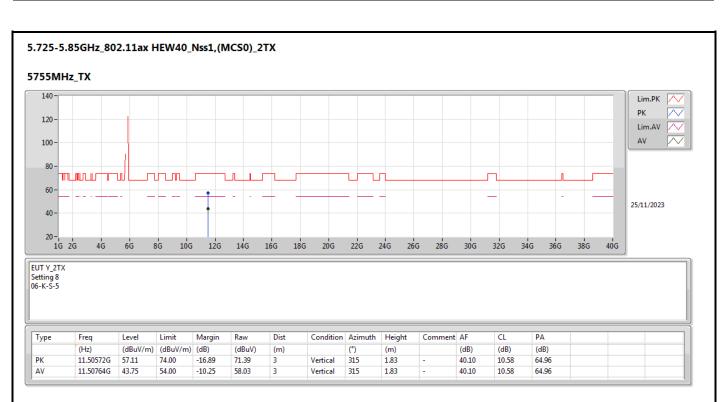


5.725-5.85GHz_802.11ax HEW40_Nss1,(MCS0)_2TX

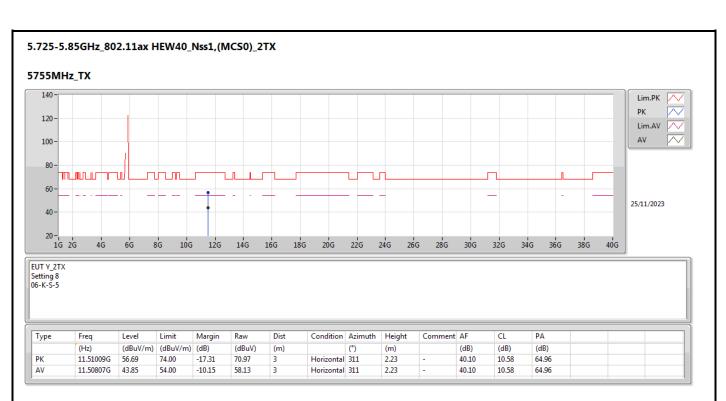


Туре	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA		
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)		
PK	5.5555G	61.98	68.20	-6.22	54.46	3	Horizontal	25	1.71	-	31.89	7.19	31.56		
РК	5.769G	123.92	Inf	-Inf	115.90	3	Horizontal	25	1.71	-	32.24	7.36	31.58		
AV	5.7495G	112.30	Inf	-Inf	104.33	3	Horizontal	25	1.71	-	32.20	7.35	31.58		
PK	5.9455G	63.07	68.20	-5.13	54.63	3	Horizontal	25	1.71	-	32.59	7.45	31.60		
1															



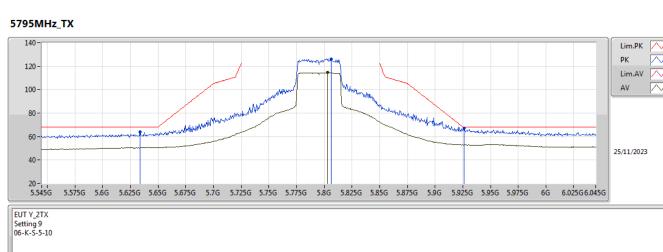








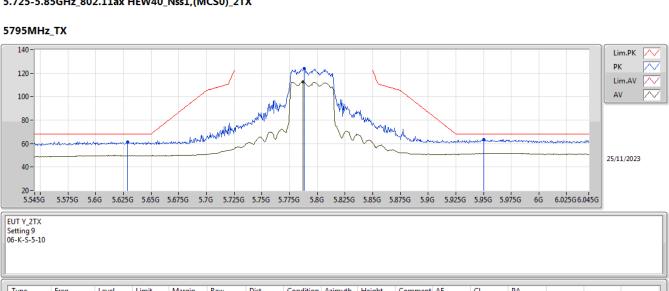
5.725-5.85GHz_802.11ax HEW40_Nss1,(MCS0)_2TX



Туре	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	5.6335G	63.88	68.20	-4.32	56.47	3	Vertical	13	1.67	-	31.73	7.25	31.57		
PK	5.8065G	126.07	Inf	-Inf	117.97	3	Vertical	13	1.67	-	32.30	7.39	31.59		
AV	5.803G	114.54	Inf	-Inf	106.44	3	Vertical	13	1.67	-	32.30	7.39	31.59		
РК	5.926G	67.13	68.20	-1.07	58.74	3	Vertical	13	1.67	-	32.55	7.44	31.60		

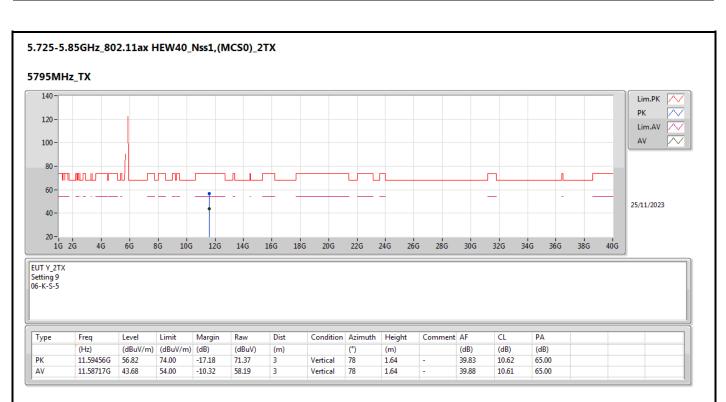


5.725-5.85GHz_802.11ax HEW40_Nss1,(MCS0)_2TX

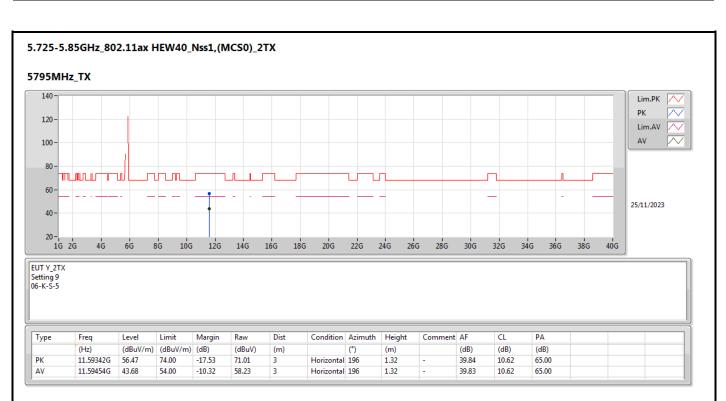


Туре	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA		
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)		
PK	5.629G	61.46	68.20	-6.74	54.05	3	Horizontal	17	1.70	-	31.74	7.24	31.57		
PK	5.788G	124.02	Inf	-Inf	115.94	3	Horizontal	17	1.70	-	32.28	7.38	31.58		
AV	5.787G	112.38	Inf	-Inf	104.31	3	Horizontal	17	1.70	-	32.27	7.38	31.58		
PK	5.95G	63.62	68.20	-4.58	55.17	3	Horizontal	17	1.70	-	32.60	7.45	31.60		











AV PK 5.784G

5.961G

94.89

62.64

Inf

68.20

-Inf

-5.56

86.82

54.22

3

3

Vertical

Vertical 11

11

1.69

1.69

32.27

32.58

7.38

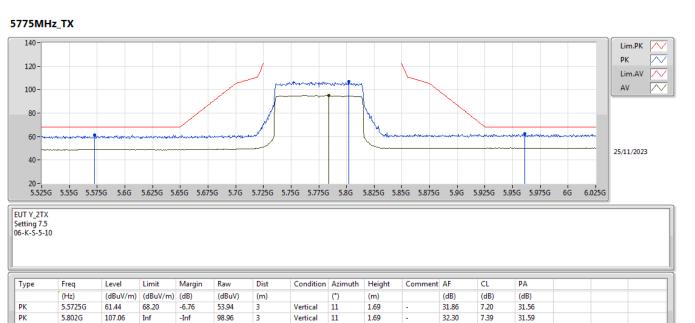
7.45

31.58

31.61

Appendix E.2

5.725-5.85GHz_802.11ax HEW80_Nss1,(MCS0)_2TX





AV PK 5.758G

6.0105G

93.84

62.11

Inf

68.20

-Inf

-6.09

85.85

53.70

3

3

Horizontal 20

Horizontal 20

1.70

1.70

32.22

32.52

7.35

7.48

31.58

31.59

Appendix E.2

5.725-5.85GHz_802.11ax HEW80_Nss1,(MCS0)_2TX

