

Report No. : FR382332-02AB



RADIO TEST REPORT

FCC ID	: MSQ-RTBE7000
Equipment	: BE7200 Dual Band Wi-Fi Router
Brand Name	: ASUS
Model Name	: RT-BE88U, RT-BE7200
Applicant	: ASUSTeK COMPUTER INC. 1F., No. 15, Lide Rd., Beitou, Taipei City 112, Taiwan
Standard	: 47 CFR FCC Part 15.407

The product was received on Aug. 01, 2024, and testing was started from Aug. 12, 2024 and completed on Aug. 20, 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.

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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

Histor	y of this test report3
Sumn	nary of Test Result4
1	General Description5
1.1	Information5
1.2	Applicable Standards
1.3	Testing Location Information
1.4	Measurement Uncertainty13
2	Test Configuration of EUT14
2.1	The Worst Case Measurement Configuration14
2.2	EUT Operation during Test15
2.3	Accessories15
2.4	Support Equipment15
2.5	Test Setup Diagram16
3	Transmitter Test Result18
3.1	Unwanted Emissions18
4	Test Equipment and Calibration Data22
Аррен	ndix A. Test Results of Unwanted Emissions

Appendix B. Test Photos

Photographs of EUT v01



History of this test report

Report No.	Version	Description	Issued Date
FR382332-02AB	01	Initial issue of report	Sep. 10, 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(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: 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
5150-5250	a, n (HT20), ac (VHT20),	5180-5240	36-48 [4]
5250-5350	ax (HEW20), be (EHT20)	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),	5190-5230	38-46 [2]
5250-5350	ax (HEW40), be (EHT40)	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	be (EHT80)	5290	58 [1]
5470-5725		5530-5690	106-138 [3]
5725-5850		5775	155 [1]
5150-5350	ac (VHT160),	5250	50 [1]
5470-5725	ax (HEW160), be (EHT160)	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	802.11be EHT20	20	4TX
5.15-5.25GHz	802.11be EHT20-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

TEL : 886-3-656-9065 FAX : 886-3-656-9085 Report Template No.: CB-A12_1 Ver1.4 Page Number : 5 of 22

Issued Date : Sep. 10, 2024

Report Version : 01



Band	Mode	BWch (MHz)	Nant
5.15-5.25GHz	802.11be EHT40	40	4TX
5.15-5.25GHz	802.11be EHT40-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
5.15-5.25GHz	802.11be EHT80	80	4TX
5.15-5.25GHz	802.11be EHT80-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
5.15-5.35GHz	802.11be EHT160	160	4TX
5.15-5.35GHz	802.11be EHT160-BF	160	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
5.15-5.35GHz	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	802.11be EHT20	20	4TX
5.25-5.35GHz	802.11be EHT20-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	802.11be EHT40	40	4TX
5.25-5.35GHz	802.11be EHT40-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
5.25-5.35GHz	802.11be EHT80	80	4TX
5.25-5.35GHz	802.11be EHT80-BF	80	4TX

Page Number: 6 of 22Issued Date: Sep. 10, 2024

Report Version : 01



Band	Mode	BWch (MHz)	Nant
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	802.11be EHT20	20	4TX
5.47-5.725GHz	802.11be EHT20-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	802.11be EHT40	40	4TX
5.47-5.725GHz	802.11be EHT40-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	802.11be EHT80	80	4TX
5.47-5.725GHz	802.11be EHT80-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
5.47-5.725GHz	802.11be EHT160	160	4TX
5.47-5.725GHz	802.11be EHT160-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	802.11be EHT20	20	4TX

Page Number: 7 of 22Issued Date: Sep. 10, 2024

Report Version : 01



Band	Mode	BWch (MHz)	Nant
5.725-5.85GHz	802.11be EHT20-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	802.11be EHT40	40	4TX
5.725-5.85GHz	802.11be EHT40-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
5.725-5.85GHz	802.11be EHT80	80	4TX
5.725-5.85GHz	802.11be EHT80-BF	80	4TX

Note:

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

• VHT20, VHT40, VHT80 and VHT160 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.

• HEW20, HEW40, HEW80 and HEW160 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.

• EHT20, EHT40, EHT80 and EHT160 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM modulation.

• BWch is the nominal channel bandwidth.



1.1.2 Antenna Information

A	Port		Brand	Model Name Antonna Type		Connector	
Ant.	2.4GHz	5GHz	Бгапо	Model Name	Model Name Antenna Type		Gain (dBi)
1	4	1				Reversed-SMA	
2	3	2			Dinala Antonna	Reversed-SMA	
3	2	3	w.gear	Reversed-SMA	Reversed-SMA	sed-SMA	
4	1	4			Reversed-SMA	Note 1	
1	4	1				Reversed-SMA	Note 1
2	3	2			Dinala Antonna	Reversed-SMA	
3	2	3	гзA	KEDPATT 13005BLB820 DI	Dipole Antenna	Reversed-SMA	
4	1	4				Reversed-SMA	
	2 3 4 1 2 3	Ant. 2.4GHz 1 4 2 3 3 2 4 1 1 4 2 3 3 2 4 1 1 4 2 3 3 2	Ant. 2.4GHz 5GHz 1 4 1 2 3 2 3 2 3 4 1 4 1 4 1 2 3 2 3 2 3 4 1 4 1 4 1 2 3 2 3 2 3 4 3 2 3 2 3	Ant. 2.4GHz 5GHz Brand 1 4 1	Ant. Image: Constraint of the sector of the s	Ant. $\overline{2.4GHz}$ $\overline{5GHz}$ \overline{Brand} $\overline{Model Name}$ $\overline{Antenna Type}$ 14123232341414141414123232341 $\overline{4}$ 14123232323 $\overline{2}$ 323	Ant. $\overline{2.4 \text{GHz}}$ $\overline{5 \text{GHz}}$ $\overline{\text{Brand}}$ $\overline{\text{Model Name}}$ $\overline{\text{Antenna Type}}$ $\overline{\text{Connector}}$ 141232323 $\overline{\text{C660-510411-A}}$ $\overline{\text{Dipole Antenna}}$ $\overline{\text{Reversed-SMA}}$ 3232 $\overline{\text{Reversed-SMA}}$ $\overline{\text{Reversed-SMA}}$ 4141 $\overline{\text{Reversed-SMA}}$ $\overline{\text{Reversed-SMA}}$ 141 $\overline{\text{Reversed-SMA}}$ $\overline{\text{Reversed-SMA}}$ 232 $\overline{3}$ $\overline{\text{Reversed-SMA}}$ 323 $\overline{\text{PSA}}$ $\text{Repolection Substrates of the set o$

Note 1:

		Port			Gain (dBi)			Cable lo	oss(dB)		Net Ga	in (dBi)		
Set	Ant.	2.4GHz	5GHz	2.4GHz	5GHz UNII 1/ UNII 2A	5GHz UNII 2C	5GHz UNII 3	2.4GHz	5GHz	2.4GHz	5GHz UNII 1/ UNII 2A	5GHz UNII 2C	5GHz UNII 3	
	1	4	1					0.51	0.86	1.43	1.47	1.49	1.08	
1	2	3	2	1 0 1	0.00	0.05	1.04	0.41	0.73	1.53	1.6	1.62	1.21	
1	3	2	3	1.94	2.33	2.35	2.35 1.94	0.61	1.12	1.33	1.21	1.23	0.82	
	4	1	4					0.69	1.2	1.25	1.13	1.15	0.74	
	1	4	1					0.51	0.86	1.34	1.38	1.46	1	
	2	3	2	1.85	2.24	4 2.32	2.32	00 4 00	0.41	0.73	1.44	1.51	1.59	1.13
2	3	2	3	C0.1	2.24			1.86	0.61	1.12	1.24	1.12	1.2	0.74
	4	1	4					0.69	1.2	1.16	1.04	1.12	0.66	

Note 2: The above information was declared by manufacturer.

Note 3: There's only set 1 selected to test and recorded in the report due to the same antenna type and highest gain.



Note 4: Directional gain information

Туре	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT \leq 4	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{AST}} g_{j,k} \right\}^2}{N_{ANT}} \right]$
BF	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^{2}}{N_{ANT}}\right]$	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{AST}} \left\{\sum_{k=1}^{N_{AST}} g_{j,k}\right\}^{2}}{N_{ANT}}\right]$

Ex.

Directional Gain (NSS1) formula :

Directiona lGain = 10 · log
$$\frac{\sum_{j=1}^{N_{cos}} \left\{\sum_{k=1}^{N_{cos}} g_{j,k}\right\}^{2}}{N_{ANT}}$$

NSS1(g1,1) = $10^{G1/20}$; NSS1(g1,2)= $10^{G2/20}$; NSS1(g1,2)= $10^{G3/20}$; NSS1(g1,2)= $10^{G4/20}$

 $g_{j,k} = (Nss1(g_{1,1}) + Nss1(g_{1,2}) + Nss1(g_{1,3}) + Nss1(g_{1,4}))^2$

 $\mathsf{DG} = 10 \, \mathsf{log}[(\mathsf{Nss1}(\mathsf{g1,1}) \ + \ \mathsf{Nss1}(\mathsf{g1,2}) \ + \ \mathsf{Nss1}(\mathsf{g1,3}) \ + \ \mathsf{Nss1}(\mathsf{g1,4}))^2 \ / \ \mathsf{N_{ANT}}] \Longrightarrow 10$

 $\log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / N_{ANT}]$

Where ;

2.4G G1= 1.43 dBi ;G2= 1.53 dBi ;G3= 1.33 dBi ;G4= 1.25 dBi 5G UNII-1 G1 = 1.47 dBi; G2 = 1.60 dBi;G3 = 1.21 dBi; G4 = 1.13 dBi 5G UNII-2A G1 = 1.47 dBi; G2 = 1.60 dBi;G3 = 1.21 dBi; G4 = 1.13 dBi 5G UNII-2C G1 = 1.49 dBi; G2 = 1.62 dBi;G3 = 1.23 dBi; G4 = 1.15 dBi 5G UNII-3 G1 = 1.08 dBi; G2 = 1.21 dBi;G3 = 0.82 dBi; G4 = 0.74 dBi

Nss1

2.4G DG = 7.41 dBi 5G UNII-1 DG = 7.38 dBi 5G UNII-2A DG = 7.38 dBi 5G UNII-2C DG = 7.40 dB 5G UNII-3 DG = 6.99 dBi

Nss2 2.4G DG = 4.40 dBi 5G UNII-1 DG = 4.37 dBi 5G UNII-2A DG = 4.37 dBi 5G UNII-2C DG = 4.39 dB 5G UNII-3 DG = 3.98 dBi

Note 5: For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/ax/be (4TX/4RX):

Port 1~4 can be used as transmitting/receiving antenna. Port 1~4 could transmit/receive simultaneously.



For 5GHz function:

For IEEE 802.11 a/n/ac/ax/be (4TX/4RX):

Port 1~4 can be used as transmitting/receiving antenna.

Port 1~4 could transmit/receive simultaneously.

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/be in 2.4GHz and n/ac/ax/be in 5GHz.			
Weather Band	\boxtimes	With 5600~5650MHz U Without 5600~5650MHz			
		Outdoor P2M	\boxtimes	Indoor P2M	
Function		Fixed P2P		Client	
	\square	Point-to-multipoint		Point-to-point	
TPC Function	\boxtimes	With TPC		Without TPC	
		Supported Static Puncturing			
Channel Puncturing Function		Supported Dynamic Puncturing			
		Unsupported			
Support RU	\boxtimes	Sull RU		Partial RU	
Test Software Version		For Radiated (Non-beamforming) mode: Mtool 3.3.0.6 For Radiated (beamforming) mode: DOS [ver 6.1.7601]			

Note: The above information was declared by manufacturer.

1.1.4 Table for Multiple Listing

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

Brand Name	Model Name	Description	
ASUS	RT-BE88U	All the models are identical; the different model names served as	
A303	RT-BE7200	marketing strategy.	

Note 1: From the above models, model: RT-BE88U 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.



1.1.5 Table for Component Source

Courses	5G RF chip (Location: UF1)		
Source	Brand Name	Model Name	
Main source	BROADCOM	BCM6726	
Second source	BROADCOM	BCM67263	
Note: The chipset model "BCM6726" and "BCM67263" use the same silicon die. The RF SoC design is			
the same for both chipsets. There is no difference in radio parameters between them.			

Note: The above information was declared by manufacturer.

1.1.6 Table for EUT Information

EUT	5G RF Chip (Location: UF1)
1	Main source
2	Second source

Note 1: From the above EUTs, EUT 2 was selected to test Unwanted Emissions. Note 2: The above information was declared by manufacturer.

1.1.7 Table for EUT Supports Functions

Function	Support Type	
AP Router	Master	
Bridge	Slave without radar detection	
Repeater	Master	
Mesh	Master	

Note 1: After evaluating, AP Router mode was selected to test and recorded in the report. Note 2: The USB port on this device supports both storage and WWAN functionality.

Note 3: 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: FR382332AB.

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

Modifications	Performance Checking	
Add EUT 2 (Please refer to section 1.1.5 & 1.1.6 for	Unwanted Emissions (Only the worst-case mode /	
detailed information.)	frequency was selected for testing.)	



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 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location Information				
Test Lab. : Sporton International Inc. Hsinchu Laboratory				
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)			
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085			
Test site Designation No. TW3787 with FCC.				
Conformity Assessment Body Identifier (CABID) TW3787 with ISED.				

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated < 1GHz	03CH06-CB	Gordon Hung	22~23 / 55~58	Aug. 12, 2024~ Aug. 20, 2024
Radiated > 1GHz	03CH02-CB	Gordon Hung	21.9~22.4 / 55~58	Aug. 12, 2024~ Aug. 20, 2024

1.4 Measurement Uncertainty

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

Test Items	Uncertainty	Remark
Radiated Emission (9kHz ~ 30MHz)	4.1 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.0 dB	Confidence levels of 95%



2 Test Configuration of EUT

2.1 The Worst Case Measurement Configuration

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.			
	СТХ			
Operating Mode < 1GHz	 After evaluating, EUT in Z axis was the worst case, so the measurement will follow this same test configuration. The EUT performed the test with RJ-45 cable 1~3; the worst case was found at RJ-45 cable 2. Thus, the measurement will follow this same test configuration. The EUT performed the test with Adapter 1 and Adapter 2; the worst case was found at Adapter 1. Thus, the measurement will follow this same test configuration. The EUT performed the test at WLAN 2.4GHz and WLAN 5GHz; the worst case was found at WLAN 2.4GHz. Thus, the measurement will follow this same test case was found at WLAN 2.4GHz. Thus, the measurement will follow this same test configuration. 			
1	EUT 2 in Z axis + Adapter 1 with power cord + RJ-45 cable 2_WLAN 2.4GHz			
Operating Mode > 1GHz	CTX After evaluating, EUT in Z axis was the worst case, so the measurement wi follow this same test configuration.			
1	EUT 2 in Z axis (Only the worst-case mode / frequency was selected for testing.)			

The Worst Case Mode for Following Conformance Tests		
Tests Item Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation		
Operating Mode		
1 WLAN 2.4GHz + WLAN 5GHz		
2 WLAN 2.4GHz + WLAN 5GHz + WWAN		
Refer to Sporton Test Report No.: FA382332-02 for Co-location RF Exposure Evaluation.		



2.2 EUT Operation during Test

Non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

Beamforming 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 Client and transmit duty cycle no less than 98%.

2.3 Accessories

Accessories					
Equipment Name	t Brand Model Name Name		Rating	DC Power Line	
Adapter 1	ACBEL	ADH011	Input: 100-240V~1.4A, 50-60Hz Output: 19.5V, 2.31A, 45.0W MAX.	Non-shielded,1.5m	
Adapter 2	LEADER	MU60B3120500-A1	Input: 100V-240V~50/60Hz, 1.5A Output: 12.0V, 5.0A	-	
Others					
Power cord*1: Non-shielded, 0.8m for Adapter 1 use					
RJ-45 cable 1*1: Shielded, 1.5m					
RJ-45 cable 2*1: Shielded, 1.5m					
RJ-45 cable 3*1: Shielded, 1.5m					

2.4 Support Equipment

For Radiated < 1GHz:

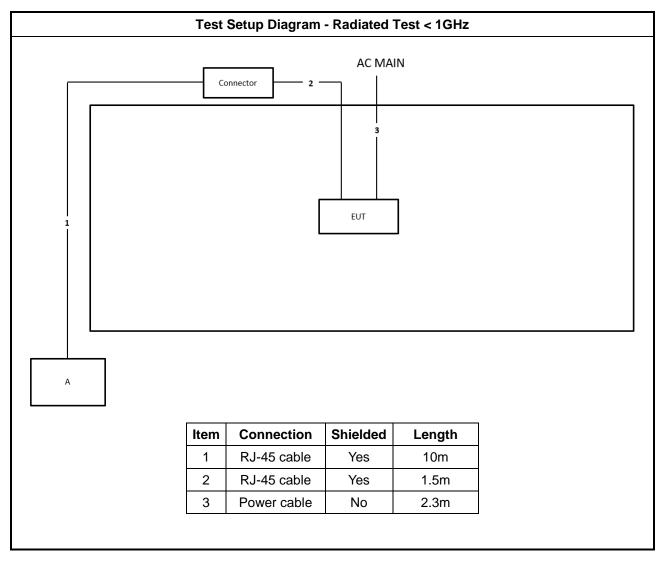
		Support Equ	ipment	
No.	Equipment	Brand Name	Model Name	FCC ID
А	NB	DELL	E4300	N/A

For Radiated > 1GHz (Beamforming mode):

		Support Equ	ipment	
No.	Equipment	Brand Name	Model Name	FCC ID
А	NB	DELL	E4300	N/A
В	Device	ASUS	RT-BE88U	MSQ-RTBE7000
С	NB	DELL	E4300	N/A

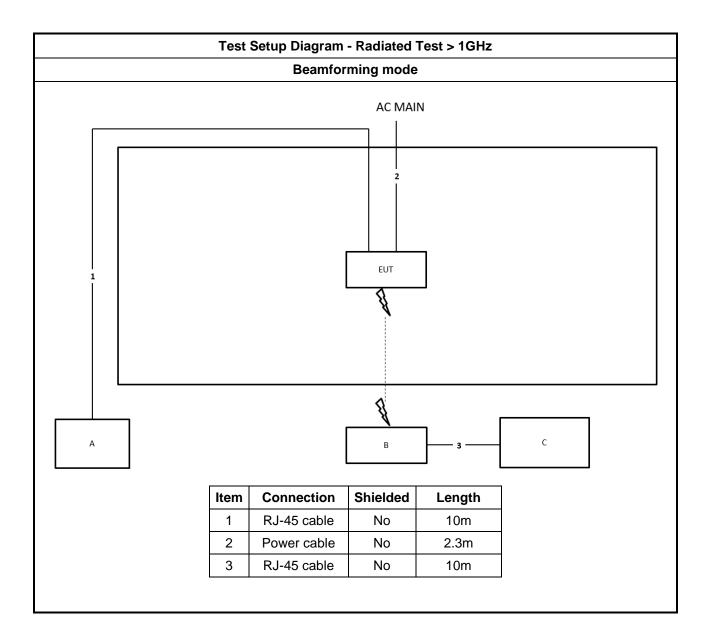


2.5 Test Setup Diagram











3 Transmitter Test Result

3.1 Unwanted Emissions

3.1.1 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.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.
performed in the ne equipment. When be extrapolated to	y be performed at a distance other than the limit distance provided they are not ear field and the emissions to be measured can be detected by the measurement performing measurements at a distance other than that specified, the results shall the specified distance using an extrapolation factor of 20 dB/decade (inverse of field-strength measurements, inverse of linear distance-squared for power-density

3.1.2 Measuring Instruments

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

3.1.3 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:

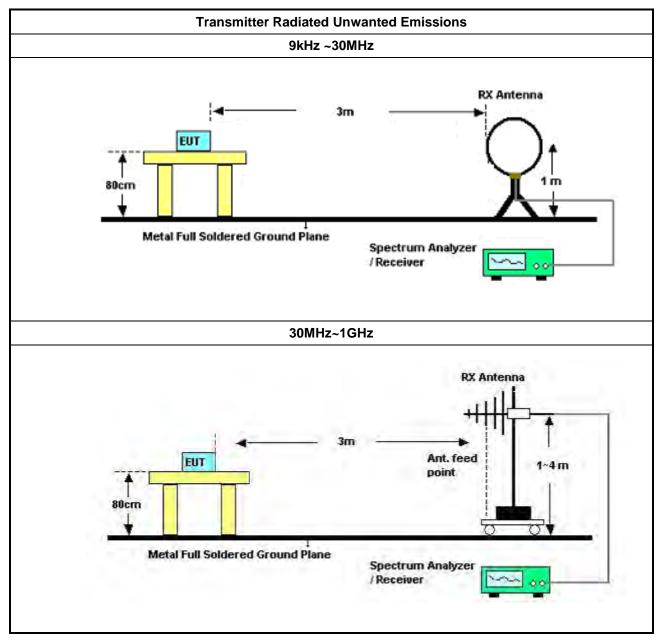
- Refer as FCC KDB 789033 D02, clause G)2) for unwanted emissions into non-restricted bands.
 - Refer as FCC KDB 789033 D02, clause G)1) for unwanted emissions into restricted bands.
 - Refer as FCC KDB 789033 D02, G)6) Method AD (Trace Averaging).
 - Refer as FCC KDB 789033 D02, G)6) Method VB (Reduced 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.



	•	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.
ſ	•	The any unwanted emissions level shall not exceed the fundamental emission level.
- 11		

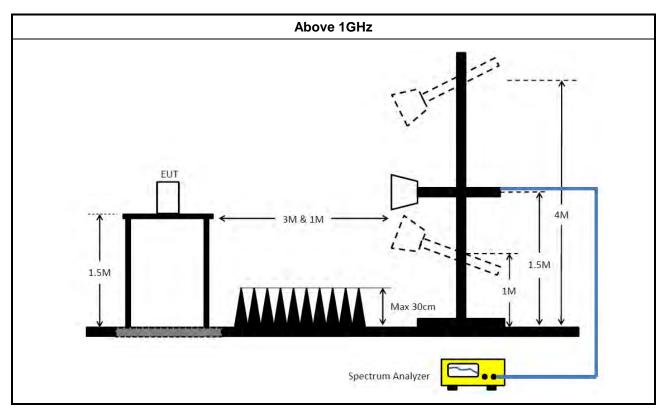
 All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.1.4 Test Setup









3.1.5 Measurement Results Calculation

The measured Level is calculated using:

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

3.1.6 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.

3.1.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix A



4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Loop Antenna	Teseq	HLA 6121	65417	9kHz - 30 MHz	Oct. 13, 2023	Oct. 12, 2024	Radiation (03CH06-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH06-CB	30 MHz ~ 1 GHz	Aug. 02, 2024	Aug. 01, 2025	Radiation (03CH06-CB)
Bilog Antenna with 6 dB attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37878 & AT-N0606	20MHz ~ 2GHz	Jul. 29, 2024	Jul. 28, 2025	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	Nov. 03, 2023	Nov. 02, 2024	Radiation (03CH06-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	Apr. 26, 2024	Apr. 25, 2025	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESR7	102172	9kHz ~ 7GHz	Oct. 20, 2023	Oct. 19, 2024	Radiation (03CH06-CB)
RF Cable-low	Woken	RG402	Low Cable-24+68	30MHz~1GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE-EMI	V5.11.8	30MHz-40GHz	N.C.R.	N.C.R.	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	RIKEN	SAC-3M	03CH02-CB	1GHz ~18GHz	Mar. 24, 2024	Mar. 23, 2025	Radiation (03CH02-CB)
Horn Antenna	EMCO	3115	9610-4976	1GHz ~ 18GHz	Apr. 12, 2024	Apr. 11, 2025	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. 29, 2024	Jun. 28, 2025	Radiation (03CH02-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 24, 2023	Nov. 23, 2024	Radiation (03CH02-CB)
Signal Analyzer	R&S	FSV40	101903	9kHz ~ 40GHz	Jun. 11, 2024	Jun. 10, 2025	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18	1GHz ~ 18GHz	Jun. 20, 2024	Jun. 19, 2025	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18+19	1GHz ~ 18GHz	Jun. 20, 2024	Jun. 19, 2025	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH02-CB)
Test Software	SPORTON	SENSE-15407 _NII	V5.11.19	5.15GHz- 7.115GHz	N.C.R.	N.C.R.	Radiation (03CH02-CB)

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

NCR means Non-Calibration required.

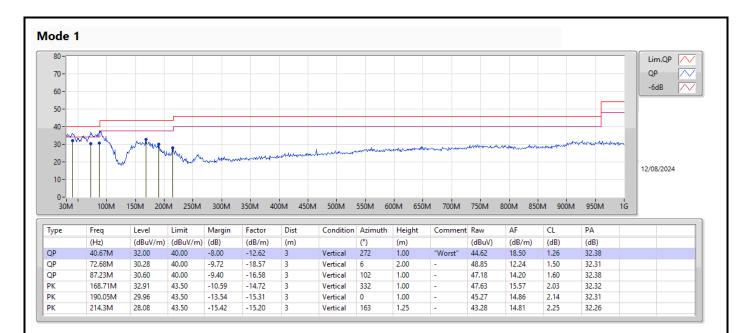


Radiated Emissions below 1GHz

Summary							
Mode	Result	Туре	Freq	Level	Limit	Margin	Condition
			(Hz)	(dBuV/m)	(dBuV/m)	(dB)	
Mode 1	Pass	QP	40.67M	32.00	40.00	-8.00	Vertical

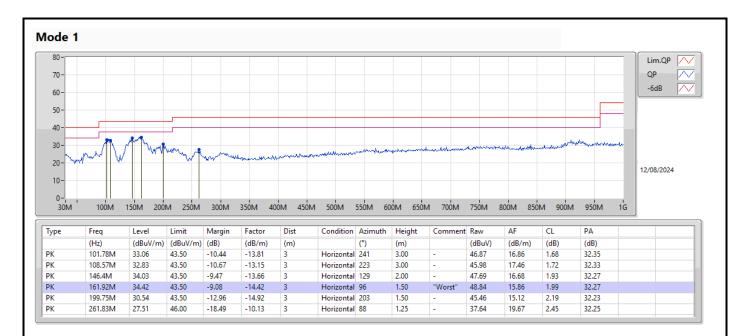


Radiated Emissions below 1GHz





Radiated Emissions below 1GHz





RSE TX above 1GHz

Appendix A.2

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
5.25-5.35GHz	-	-	-		-	-	-		-	-	-
802.11be EHT160-BF_Nss2,(MCS0)_4TX	Pass	AV	5.1356G	52.85	54.00	-1.15	3	Vertical	40	1.80	-



AV

5.2088G

111.97

Inf

-Inf

102.13

3

Vertical

70

1.78

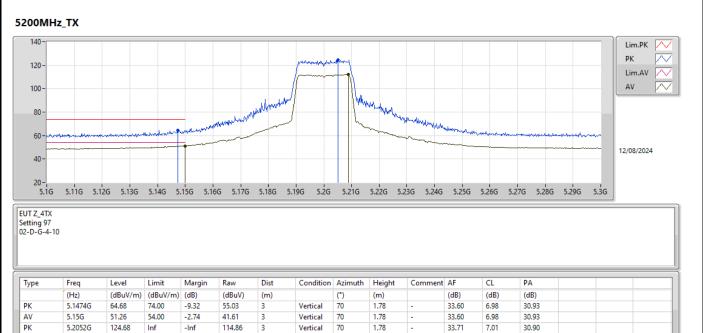
33.72

7.01

30.89

Appendix A.2

5.15-5.25GHz_802.11be EHT20-BF_Nss2,(MCS0)_4TX





РК

AV

5.208G

5.2068G

112.49

99.14

Inf

Inf

-Inf

-Inf

102.65

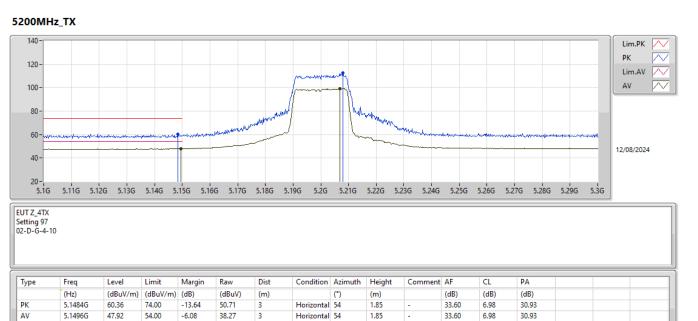
89.31

3

3

Appendix A.2





Horizontal 54

Horizontal 54

1.85

1.85

33.72

33.71

7.01

7.01

30.89

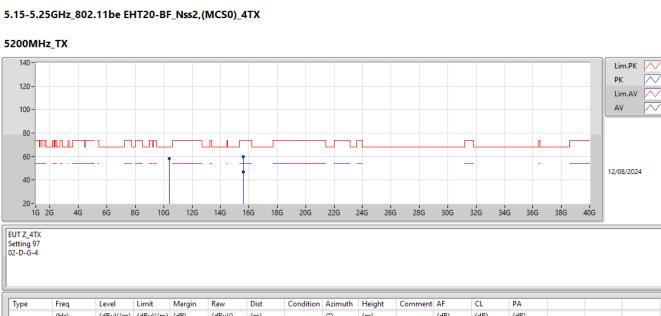
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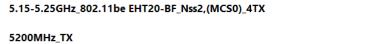
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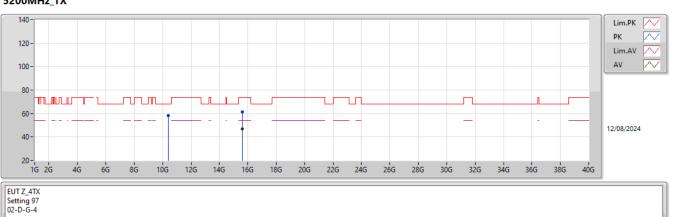
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Туре	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA		
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)		
РК	10.40726G	58.14	68.20	-10.06	39.09	3	Vertical	253	2.07	-	38.49	11.07	30.51		
РК	15.59952G	60.04	74.00	-13.96	42.26	3	Vertical	224	2.01	-	37.90	11.85	31.97		
AV	15.5996G	46.95	54.00	-7.05	29.17	3	Vertical	224	2.01	-	37.90	11.85	31.97		







Тур	e	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		10.39924G	58.31	68.20	-9.89	39.26	3	Horizontal	101	1.80	-	38.50	11.06	30.51	
PK		15.59716G	61.48	74.00	-12.52	43.69	3	Horizontal	347	2.08	-	37.91	11.85	31.97	
AV		15.59058G	46.91	54.00	-7.09	29.11	3	Horizontal	347	2.08	-	37.92	11.85	31.97	



AV

РК

AV

5.4538G

5.5016G

5.4948G

49.45

112.93

100.89

54.00

Inf

Inf

-4.55

-Inf

-Inf

39.06

102.26

90.26

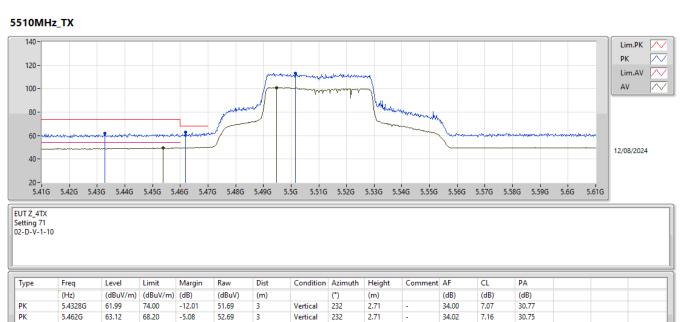
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3

3

Appendix A.2

5.47-5.725GHz_802.11be EHT40-BF_Nss2,(MCS0)_4TX



Vertical

Vertical

Vertical

232

232

232

2.71

2.71

2.71

34.01

34.10

34.09

7.14

7.30

7.27

30.76

30.73

30.73



PK

AV

5.496G

5.4944G

104.79

89.06

Inf

Inf

-Inf

-Inf

94.15

78.43

3

3

Horizontal 186

Horizontal 186

1.80

1.80

34.09

34.09

7.28

7.27

30.73

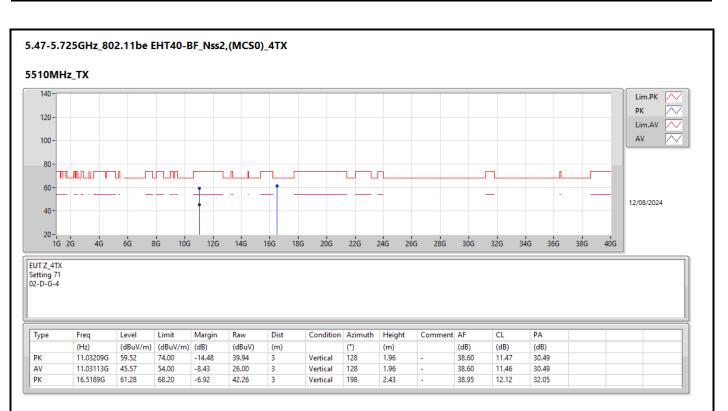
30.73

Appendix A.2

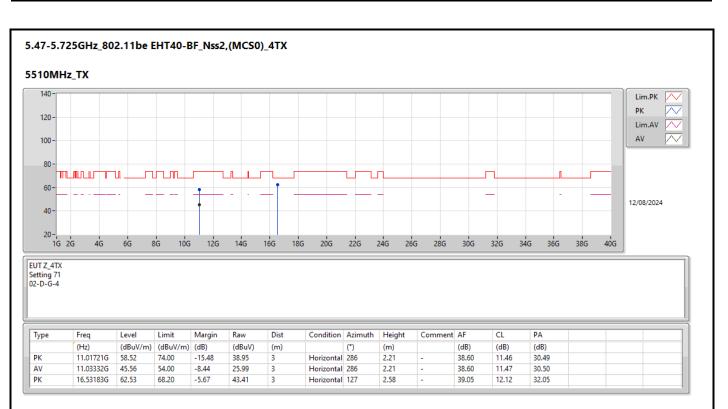
5.47-5.725GHz_802.11be EHT40-BF_Nss2,(MCS0)_4TX





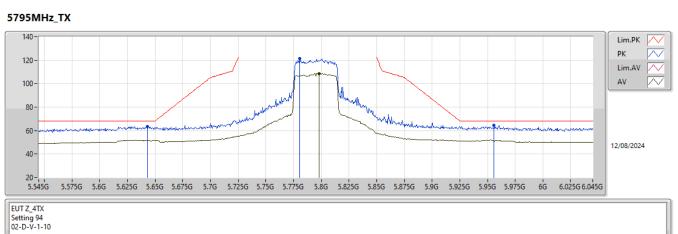








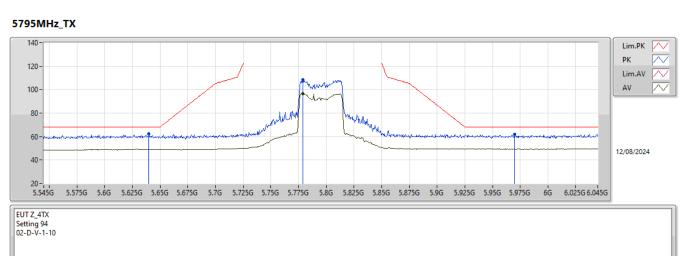
5.725-5.85GHz_802.11be EHT40-BF_Nss2,(MCS0)_4TX



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	5.643G	63.50	68.20	-4.70	52.54	3	Vertical	294	2.31	-	34.00	7.66	30.70		
РК	5.7805G	121.23	Inf	-Inf	110.05	3	Vertical	294	2.31	-	34.06	7.78	30.66		
AV	5.798G	108.59	Inf	-Inf	97.35	3	Vertical	294	2.31	-	34.10	7.80	30.66		
РК	5.956G	64.43	68.20	-3.77	52.94	3	Vertical	294	2.31	-	34.21	7.90	30.62		



5.725-5.85GHz_802.11be EHT40-BF_Nss2,(MCS0)_4TX



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	5.64G	62.58	68.20	-5.62	51.62	3	Horizontal	183	2.75	-	34.00	7.66	30.70		
РК	5.779G	108.66	Inf	-Inf	97.48	3	Horizontal	183	2.75	-	34.06	7.78	30.66		
AV	5.779G	96.42	Inf	-Inf	85.24	3	Horizontal	183	2.75	-	34.06	7.78	30.66		
PK	5.97G	62.15	68.20	-6.05	50.62	3	Horizontal	183	2.75	-	34.24	7.91	30.62		



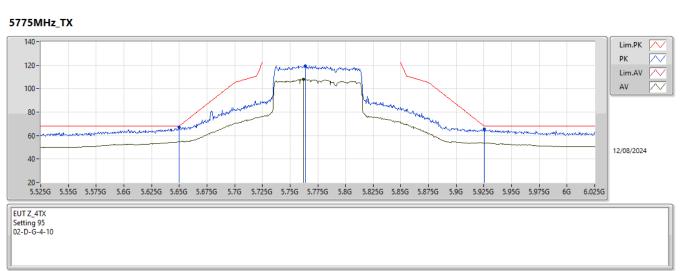








5.725-5.85GHz_802.11be EHT80-BF_Nss2,(MCS0)_4TX



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	5.65G	66.94	68.20	-1.26	55.96	3	Vertical	308	2.05	-	34.00	7.67	30.69		
РК	5.764G	119.45	Inf	-Inf	108.32	3	Vertical	308	2.05	-	34.03	7.77	30.67		
AV	5.762G	108.05	Inf	-Inf	96.93	3	Vertical	308	2.05	-	34.02	7.77	30.67		
PK	5.9255G	65.72	68.20	-2.48	54.27	3	Vertical	308	2.05	-	34.20	7.88	30.63		



РК

AV PK 5.751G

5.7675G

5.996G

111.93

94.21

64.03

Inf

Inf

68.20

-Inf

-Inf

-4.17

100.84

83.07

52.42

3

3

3

Horizontal 58

Horizontal 58

Horizontal 58

1.80

1.80

1.80

34.00

34.04

34.29

7.76

7.77

7.93

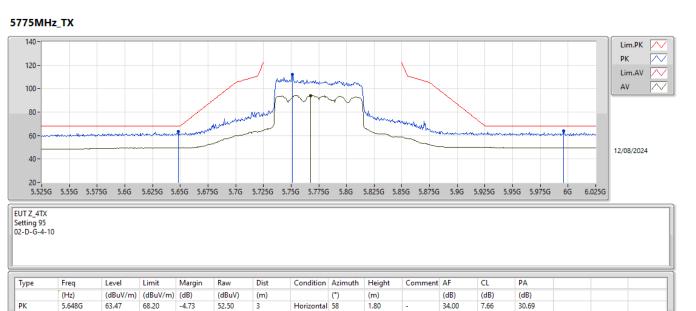
30.67

30.67

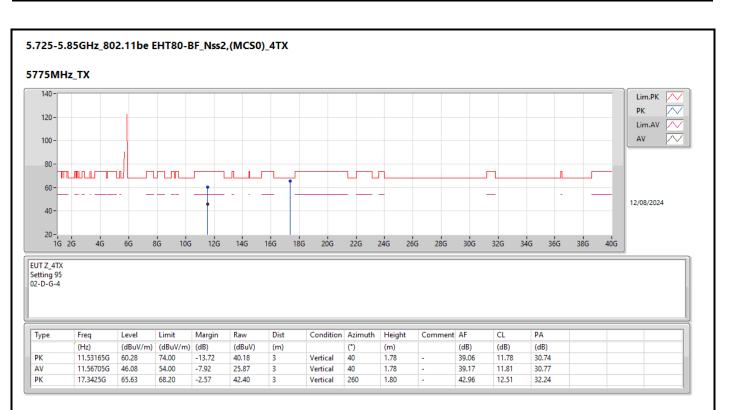
30.61

Appendix A.2

5.725-5.85GHz_802.11be EHT80-BF_Nss2,(MCS0)_4TX



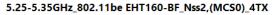


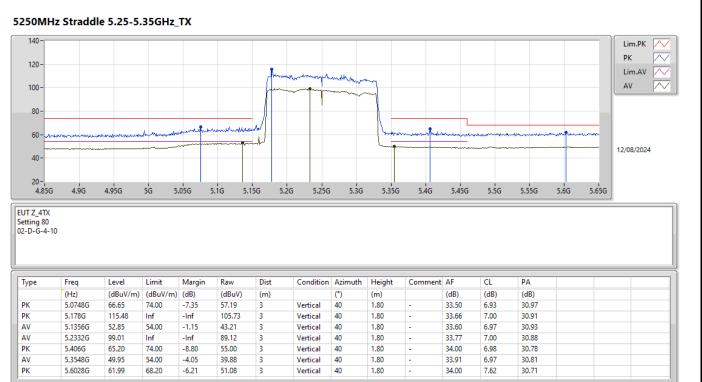




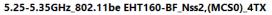


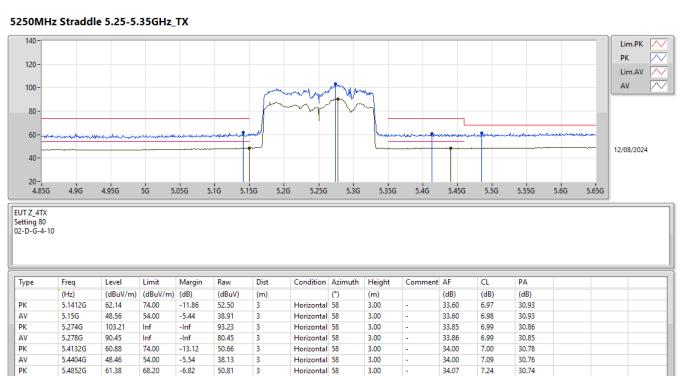






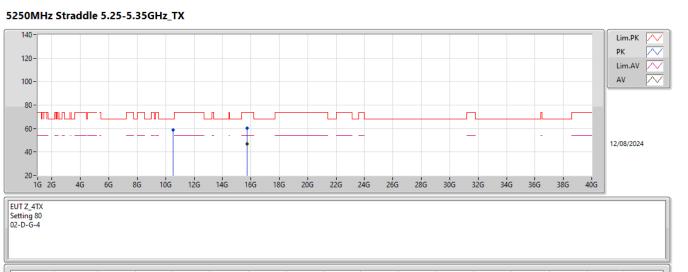












ľ	Туре	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA		
Γ		(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)		
1	РК	10.51119G	59.01	68.20	-9.19	39.85	3	Vertical	195	2.69	-	38.52	11.13	30.49		
Π	РК	15.74409G	60.22	74.00	-13.78	42.92	3	Vertical	339	1.21	-	37.51	11.86	32.07		
7	AV	15.74292G	46.81	54.00	-7.19	29.51	3	Vertical	339	1.21	-	37.51	11.86	32.07		







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	10.51041G	57.77	68.20	-10.43	38.61	3	Horizontal	221	2.10	-	38.52	11.13	30.49		
PK	15.76413G	60.82	74.00	-13.18	43.57	3	Horizontal	350	1.19	-	37.47	11.86	32.08		
AV	15.75393G	46.80	54.00	-7.20	29.52	3	Horizontal	350	1.19	-	37.49	11.86	32.07		