

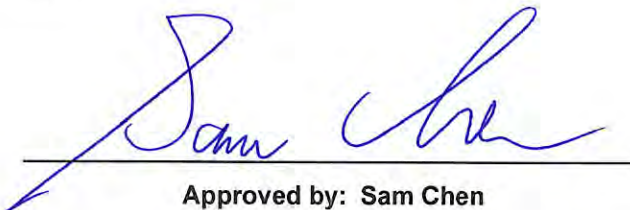


RADIO TEST REPORT

FCC ID : MSQ-RTBE7D00
Equipment : BE6800 Dual-band WiFi Router
Brand Name : ASUS
Model Name : RT-BE86U, RT-BE6800
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. 06, 2024, and testing was started from Aug. 12, 2024 and completed on Aug. 12, 2024. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

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



Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

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



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Photographs of EUT v01



History of this test report

Report No.	Version	Description	Issued Date
FR3N2202-02AB	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: Sandy Chuang



1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5150-5250	a, n (HT20), ac (VHT20), ax (HEW20), be (EHT20)	5180-5240	36-48 [4]
5250-5350		5260-5320	52-64 [4]
5470-5725		5500-5720	100-144 [12]
5725-5850		5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40), ax (HEW40), be (EHT40)	5190-5230	38-46 [2]
5250-5350		5270-5310	54-62 [2]
5470-5725		5510-5710	102-142 [6]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80), ax (HEW80), be (EHT80)	5210	42 [1]
5250-5350		5290	58 [1]
5470-5725		5530-5690	106-138 [3]
5725-5850		5775	155 [1]
5150-5350	ac (VHT160), ax (HEW160), be (EHT160)	5250	50 [1]
5470-5725		5570	114 [1]

Band	Mode	BWch (MHz)	Nant
5.15-5.25GHz	802.11a	20	4TX
5.15-5.25GHz	802.11n HT20	20	4TX
5.15-5.25GHz	802.11n HT20-BF	20	4TX
5.15-5.25GHz	802.11ac VHT20	20	4TX
5.15-5.25GHz	802.11ac VHT20-BF	20	4TX
5.15-5.25GHz	802.11ax HEW20	20	4TX
5.15-5.25GHz	802.11ax HEW20-BF	20	4TX
5.15-5.25GHz	802.11be 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
5.15-5.25GHz	802.11be EHT40	40	4TX



Band	Mode	BWch (MHz)	Nant
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
5.25-5.35GHz	802.11ac VHT20-BF	20	4TX
5.25-5.35GHz	802.11ax HEW20	20	4TX
5.25-5.35GHz	802.11ax HEW20-BF	20	4TX
5.25-5.35GHz	802.11be 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
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



Band	Mode	BWch (MHz)	Nant
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
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



Band	Mode	BWch (MHz)	Nant
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

Set	Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1~3	WALSIN	RFDPA141500SBLB807	Dipole	Reversed-SMA	Note 1
	4	INPAQ	RFPCA302604IM5B301	PCB	I-PEX	
2	1~3	WHA YU	C660-510490-A	Dipole	Reversed-SMA	
	4	WHA YU	C660-510579-A	PCB	I-PEX	

Note 1:

Set	Ant.	Port		Gain (dBi)				
		WLAN 2.4GHz	WLAN 5GHz	WLAN 2.4GHz	WLAN 5GHz			
					UNII 1	UNII 2A	UNII 2C	UNII 3
1	1	1	4	1.97	1.88	1.88	1.94	1.78
	2	2	3	1.97	1.88	1.88	1.94	1.78
	3	3	2	1.97	1.88	1.88	1.94	1.78
	4	-	1	-	1.99	1.99	1.99	1.99
2	1	1	4	1.95	1.87	1.87	1.93	1.72
	2	2	3	1.95	1.87	1.87	1.93	1.72
	3	3	2	1.95	1.87	1.87	1.93	1.72
	4	-	1	-	1.97	1.97	1.97	1.97

Note 2: Because Set 1 and Set 2 are composed of the same types of antennas, Set 1 with higher gain was selected to test.

Note 3: The above information was declared by manufacturer.

Note 4: Directional gain information of antenna Set 1

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

Ex.

Directional Gain (NSS1) formula :

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

$$NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2) = 10^{G2/20} ; NSS1(g1,3) = 10^{G3/20} ; NSS1(g1,4) = 10^{G4/20}$$

$$g_{j,k} = (NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2$$

$$DG = 10 \log \left[\frac{(NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2}{N_{ANT}} \right] \Rightarrow 10$$

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

Where;



2.4G G1= 1.97 dBi ;G2= 1.97 dBi ;G3= 1.97 dBi
5G UNII-1 G1 = 1.99 dBi; G2 = 1.88 dBi;G3 = 1.88 dBi; G4 = 1.88 dBi
5G UNII-2A G1= 1.99 dBi; G2 = 1.88 dBi;G3 = 1.88 dBi; G4 = 1.88 dBi
5G UNII-2C G1 = 1.99 dBi; G2 = 1.94 dBi;G3 = 1.94 dBi; G4 = 1.94 dBi
5G UNII-3 G1 = 1.99 dBi; G2 = 1.78 dBi;G3 = 1.78 dBi; G4 = 1.78 dBi

3T1S
2.4G DG = 6.74 dBi
3T2S
2.4G DG=3.73 dBi

The 5GHz bands support four antennas, there are three antennas that are vertical polarization, and the other antenna is horizontal polarization. Thus, the cross-polarized array gain was calculated to $10\log(3)$.

4T1S
5G UNII-1 DG = 6.65 dBi
5G UNII-2A DG = 6.65 dBi
5G UNII-2C DG = 6.71 dB
5G UNII-3 DG = 6.55 dBi
4T2S
5G UNII-1 DG = 3.64 dBi
5G UNII-3 DG = 3.54 dBi

Note 5: For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/ax/be (3TX/3RX):

Port 1~3 can be used as transmitting/receiving antenna.
Port 1~3 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11a/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	<input checked="" type="checkbox"/>	With beamforming	<input type="checkbox"/>	Without beamforming
	The product has beamforming function for n/VHT/ax/be in 2.4GHz and n/ac/ax/be in 5GHz.			
Weather Band	<input checked="" type="checkbox"/>	With 5600~5650MHz	<input type="checkbox"/>	Without 5600~5650MHz
Function	<input type="checkbox"/>	Outdoor P2M	<input checked="" type="checkbox"/>	Indoor P2M
	<input type="checkbox"/>	Fixed P2P	<input type="checkbox"/>	Client
	<input checked="" type="checkbox"/>	Point-to-multipoint	<input type="checkbox"/>	Point-to-point
TPC Function	<input checked="" type="checkbox"/>	With TPC	<input type="checkbox"/>	Without TPC
Channel Puncturing Function	<input type="checkbox"/>	Supported	<input checked="" type="checkbox"/>	Unsupported
Support RU	<input checked="" type="checkbox"/>	Full RU	<input type="checkbox"/>	Partial RU

Note: The above information was declared by manufacturer.

1.1.4 Table for Multiple Listing

Model Name	Description
RT-BE86U	All the models are identical; the different model names served as a strategy for marketing.
RT-BE6800	

Note 1: From the above models, model: RT-BE86U 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 EUT support Function

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

Note 1: The AP Router (Master) mode was tested and recorded in this test report.

Note 2: The USB ports of the EUT support storage function and WWAN function. During the operation of WWAN function, the 10G WAN/LAN port will fix to WAN function.

Note 3: The above information was declared by manufacturer.



1.1.6 Table for Component Source

Source	5G RF chip (location: UF1)	
	Brand Name	Model Name
Main source	BROADCOM	BCM6726
Second source	BROADCOM	BCM67263

Note:
The chipset BCM6726 and BCM67263 products use the same silicon die. The RF SoC design is the same for both chipsets.

Note: The above information was declared by manufacturer.

1.1.7 Table for EUT Information

5G RF chip (location: UF1)	
EUT	Source
1	Main source
2	Second source

Note: 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: FR3N2202-01AB. Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
Adding the EUT 2. (Please refer to section 1.1.6 & 1.1.7 for detail information).	Unwanted Emissions (Only the worst-case mode/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 662911 D01 v02r01
- ♦ FCC KDB 412172 D01 v01r01
- ♦ FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

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

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated < 1GHz	03CH06-CB	KJ Chang	22.8~24.3 / 60~65	Aug. 12, 2024
Radiated > 1GHz	03CH01-CB	KJ Chang	22-23 / 55-58	Aug. 12, 2024
	03CH03-CB		21.8-22.9 / 59-61	

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.
Operating Mode < 1GHz	CTX
	According to the original test report, "EUT in Y axis + Adapter 2 + Power cable 1_WLAN 2.4GHz" has been evaluated to be the worst case, so the measurement will follow this same test configuration
1	EUT 2 in Y axis + Adapter 2 + Power cable 1_WLAN 2.4GHz
Operating Mode > 1GHz	CTX
	After evaluating, EUT in Y axis was the worst case, so the measurement will follow this same test configuration.
1	EUT 2 in Y 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.: FA3N2202-02 for Co-location RF Exposure Evaluation.	



2.2 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

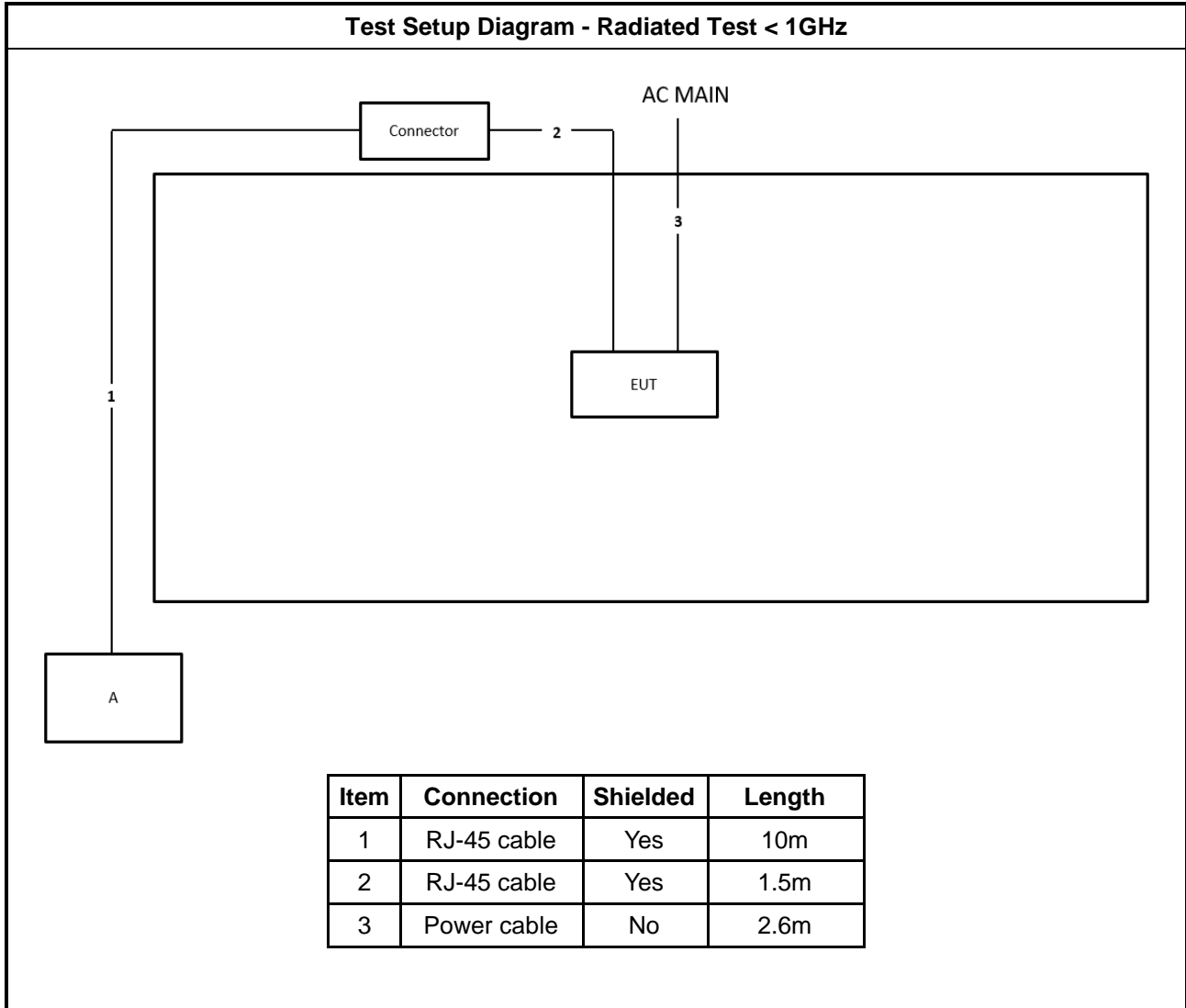
2.3 Accessories

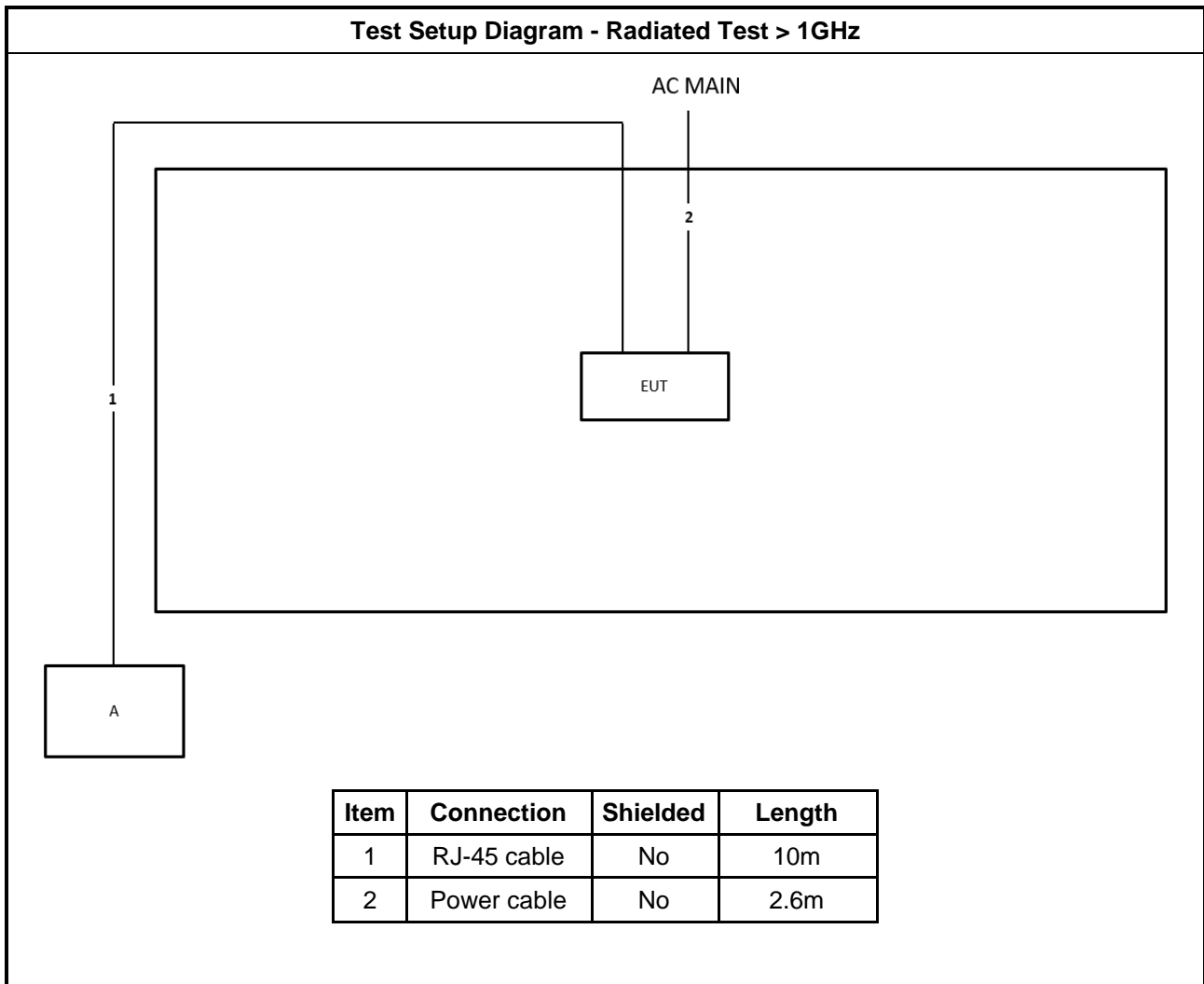
Accessories				
Power	Brand	Model	Rating	Remark
Adapter 1	LEI	MU60B3120500-A1	Input: 100-240V~50/60Hz, 1.5A Output: 12.0V, 5.0A	-
Adapter 2	AcBel	ADH011	Input: 100-240V, 1.4A, 50-60Hz Output: 19.5V, 2.31A, 45.0W MAX.	DC power cable: Non-shielded, 1.8m
Adapter 3	AcBel	ADK008	Input: 100-240V, 1.4A, 50-60Hz Output: 19.5V, 2.31A, 45.0W MAX.	DC power cable: Non-shielded, 1.8m
Others				
Power cable 1 (For Adapter 2 use only)*1: Non-shielded, 0.8m				
Power cable 2 (For Adapter 3 use only)*1: Non-shielded, 0.8m				
RJ-45 cable*1: Shielded, 1.5m				

2.4 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	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
<input checked="" type="checkbox"/> 5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
<input checked="" type="checkbox"/> 5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
<input checked="" type="checkbox"/> 5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
<input checked="" type="checkbox"/> 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).

3.1.2 Measuring Instruments

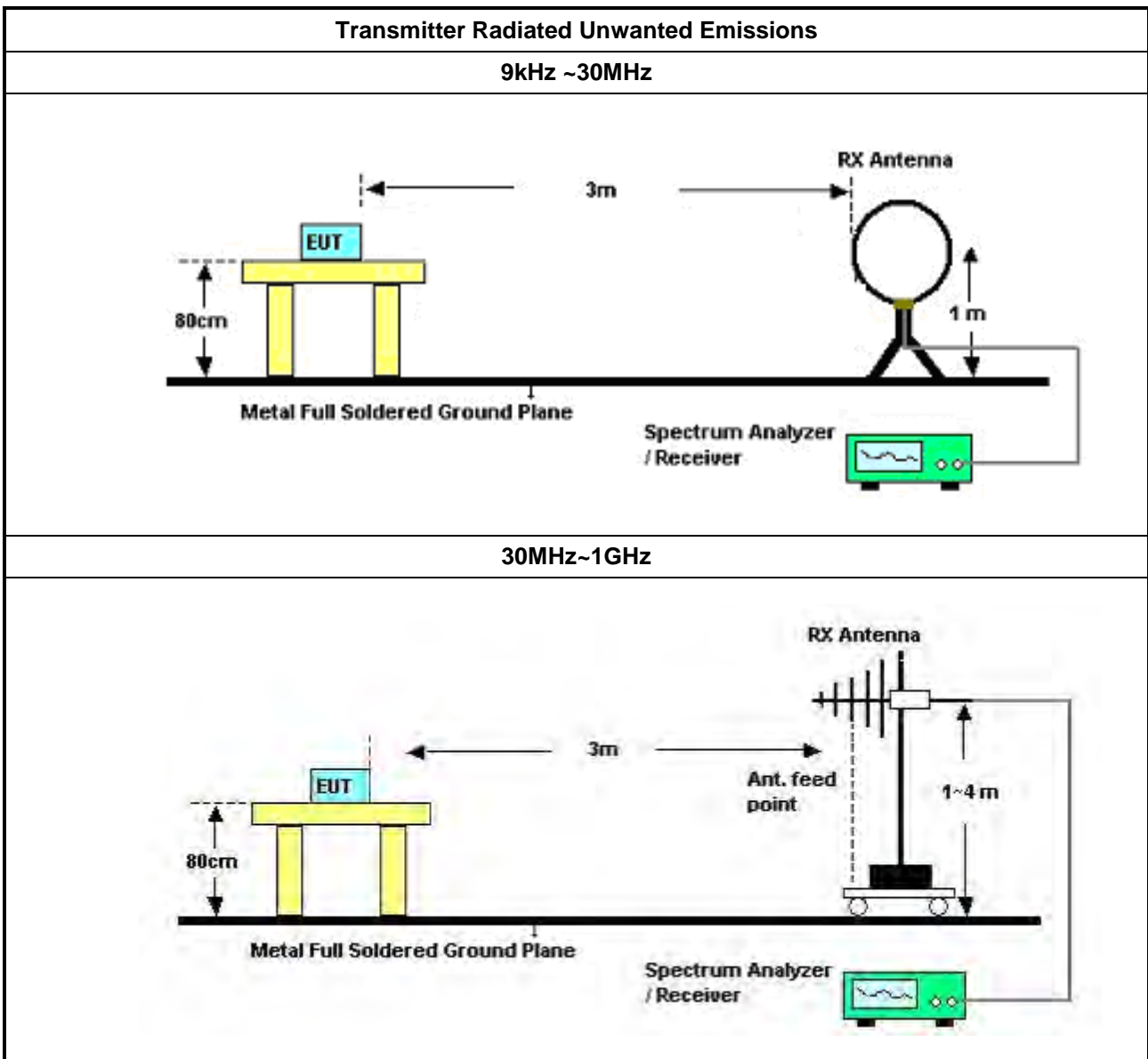
Refer a test equipment and calibration data table in this test report.

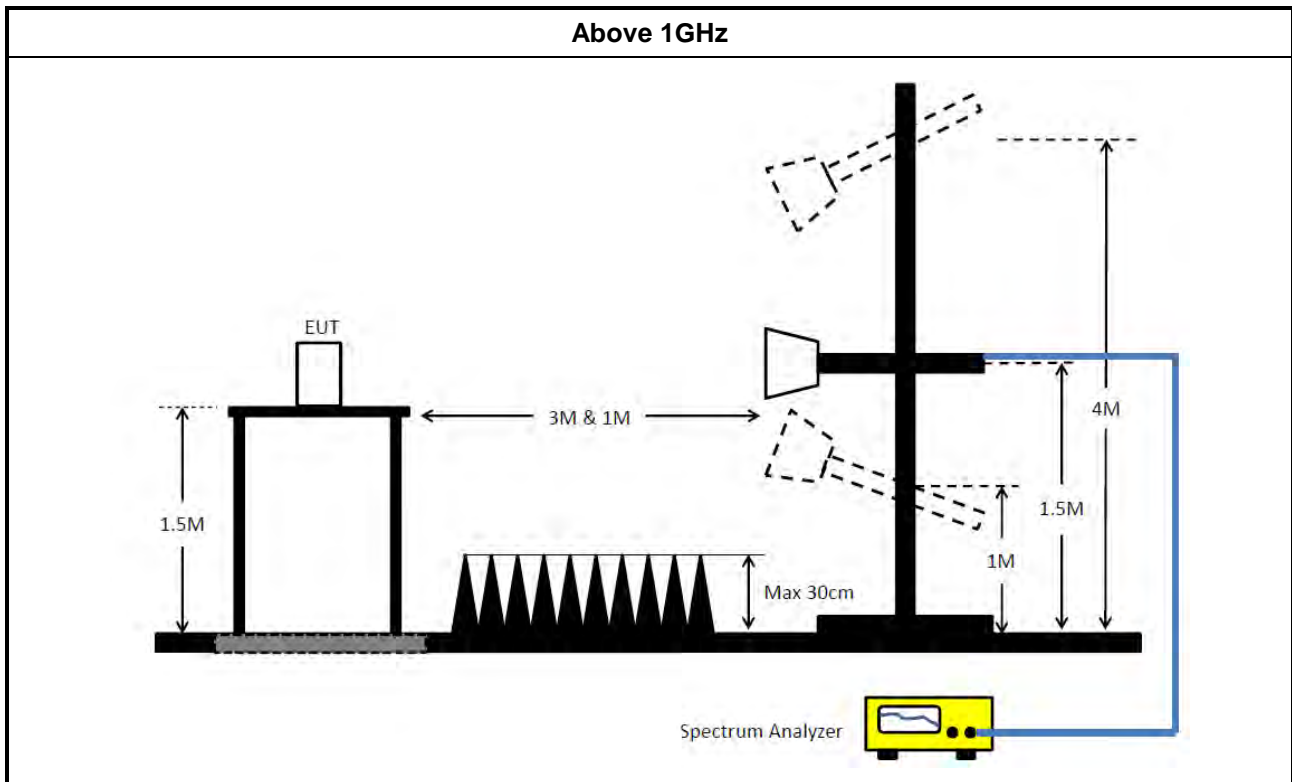
3.1.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> 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). 	
<ul style="list-style-type: none"> The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor]. 	
<ul style="list-style-type: none"> For the transmitter unwanted emissions shall be measured using following options below: <ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> <input type="checkbox"/> Refer as FCC KDB 789033 D02, G)6) Method AD (Trace Averaging). <input checked="" type="checkbox"/> Refer as FCC KDB 789033 D02, G)6) Method VB (Reduced VBW). <input type="checkbox"/> Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time. <input type="checkbox"/> Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions. <input checked="" type="checkbox"/> Refer as FCC KDB 789033 D02, clause G)5) measurement procedure peak limit. <input type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit. 	

- For radiated measurement.
 - Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.
 - Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.
 - Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.
- The any unwanted emissions level shall not exceed the fundamental emission level.
- All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.1.4 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)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	Jul. 31, 2024	Jul. 30, 2025	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	30MHz-40GHz	N.C.R.	N.C.R.	Radiation (03CH06-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH01-CB	1GHz ~18GHz 3m	May 04, 2024	May 03, 2025	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120D-01816	1GHz~18GHz	Dec. 20, 2023	Dec. 19, 2024	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02121	1GHz ~ 26.5GHz	May 17, 2024	May 16, 2025	Radiation (03CH01-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 24, 2023	Nov. 23, 2024	Radiation (03CH01-CB)
Signal Analyzer	R&S	FSV3044	101437	10kHz ~ 44GHz	Nov. 28, 2023	Nov. 27, 2024	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16	1 GHz ~ 18 GHz	Nov. 06, 2023	Nov. 05, 2024	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16+17	1 GHz ~ 18 GHz	Nov. 06, 2023	Nov. 05, 2024	Radiation (03CH01-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH01-CB)
Test Software	SPORTON	SENSE-15407_NII	V5.11.19	5.15GHz-7.115G Hz	N.C.R.	N.C.R.	Radiation (03CH01-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH03-CB	1GHz ~18GHz 3m	May 03, 2024	May 02, 2025	Radiation (03CH03-CB)
Horn Antenna	ETS · Lindgren	3115	6821	750MHz~18GHz	Jan. 24, 2024	Jan. 23, 2025	Radiation (03CH03-CB)



Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Jun. 29, 2024	Jun. 28, 2025	Radiation (03CH03-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 24, 2023	Nov. 23, 2024	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 11, 2024	Jun. 10, 2025	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+29	1GHz ~ 18GHz	Feb. 29, 2024	Feb. 28, 2025	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-29	1GHz ~ 18GHz	Feb. 29, 2024	Feb. 28, 2025	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE-15407_NII	V5.11.19	5.15GHz-7.115G Hz	N.C.R.	N.C.R.	Radiation (03CH03-CB)

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

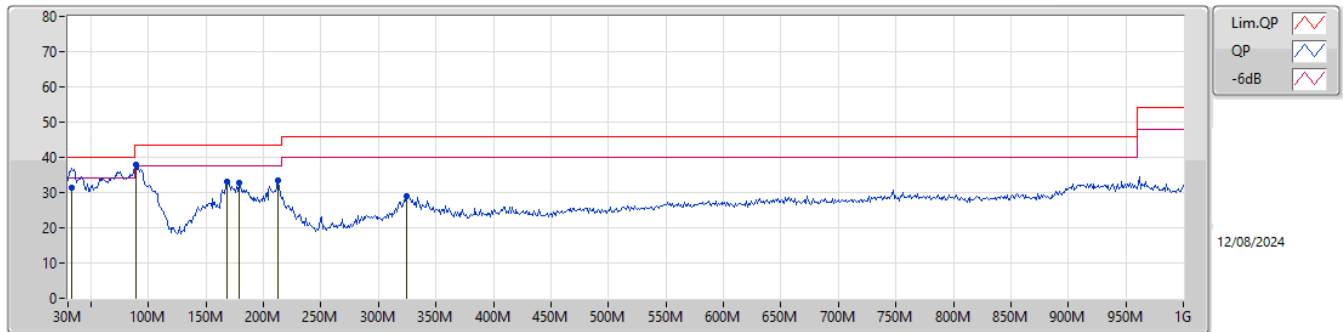
NCR means Non-Calibration required.



Summary

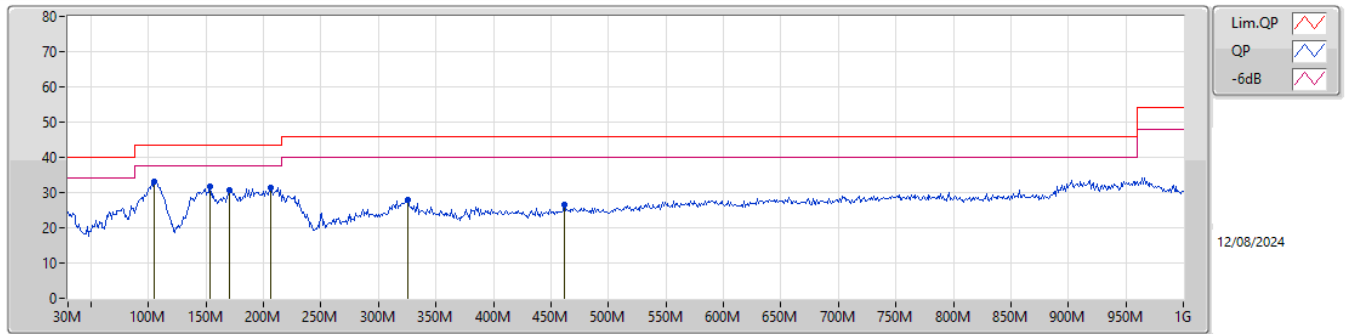
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	PK	89.17M	38.06	43.50	-5.44	Vertical

Mode 1



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB/m)	CL (dB)	PA (dB)
QP	32.91M	31.22	40.00	-8.78	-8.56	3	Vertical	91	1.00	-	39.78	22.68	1.17	32.41
PK	89.17M	38.06	43.50	-5.44	-16.18	3	Vertical	42	1.25	"Worst"	54.24	14.58	1.62	32.38
PK	168.71M	33.17	43.50	-10.33	-14.72	3	Vertical	166	1.00	-	47.89	15.57	2.03	32.32
PK	178.41M	32.90	43.50	-10.60	-15.15	3	Vertical	317	1.00	-	48.05	15.16	2.08	32.39
PK	212.36M	33.53	43.50	-9.97	-15.17	3	Vertical	199	1.25	-	48.70	14.85	2.24	32.26
PK	324.88M	28.94	46.00	-17.06	-9.71	3	Vertical	226	2.00	-	38.65	19.50	2.69	31.90

Mode 1



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB/m)	CL (dB)	PA (dB)
PK	104.69M	33.10	43.50	-10.40	-13.62	3	Horizontal	88	3.00	"Worst"	46.72	17.02	1.70	32.34
PK	153.19M	31.83	43.50	-11.67	-14.09	3	Horizontal	245	2.00	-	45.92	16.22	1.95	32.26
PK	170.65M	30.76	43.50	-12.74	-14.76	3	Horizontal	277	1.50	-	45.52	15.53	2.04	32.33
PK	206.54M	31.41	43.50	-12.09	-14.81	3	Horizontal	227	1.25	-	46.22	15.21	2.22	32.24
PK	325.85M	28.07	46.00	-17.93	-9.69	3	Horizontal	62	1.00	-	37.76	19.51	2.69	31.89
PK	461.65M	26.66	46.00	-19.34	-6.16	3	Horizontal	93	2.00	-	32.82	22.76	3.14	32.06

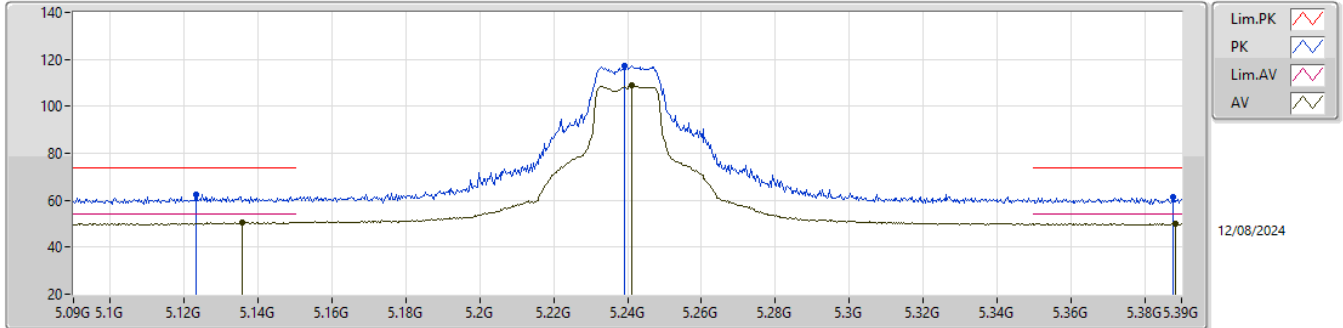


Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
5.725-5.85GHz	-	-	-	-	-	-	-	-	-	-	-
802.11a_Nss1,(6Mbps)_4TX	Pass	PK	5.591G	66.65	68.20	-1.55	3	Horizontal	360	3.00	-

5.15-5.25GHz_802.11a_Nss1,(6Mbps)_4TX

5240MHz_TX

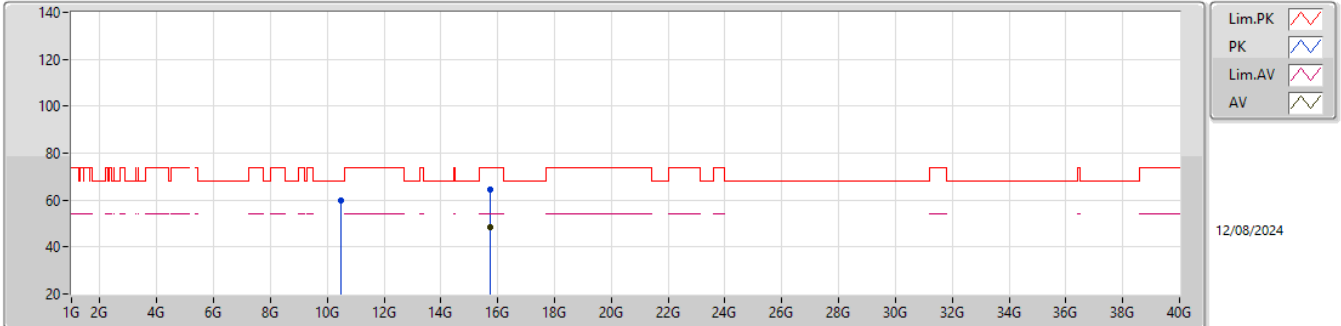


EUT_Y_4TX
Setting 98
01-1-G-5-10

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	5.1233G	62.57	74.00	-11.43	55.92	3	Vertical	325	1.80	-	31.99	7.21	32.55
AV	5.1356G	50.63	54.00	-3.37	43.91	3	Vertical	325	1.80	-	32.04	7.23	32.55
PK	5.2391G	117.23	Inf	-Inf	110.96	3	Vertical	325	1.80	-	31.49	7.30	32.52
AV	5.2412G	108.96	Inf	-Inf	102.71	3	Vertical	325	1.80	-	31.47	7.30	32.52
PK	5.3876G	61.14	74.00	-12.86	54.79	3	Vertical	325	1.80	-	31.48	7.36	32.49
AV	5.3885G	49.98	54.00	-4.02	43.63	3	Vertical	325	1.80	-	31.48	7.36	32.49

5.15-5.25GHz_802.11a_Nss1,(6Mbps)_4TX

5240MHz_TX

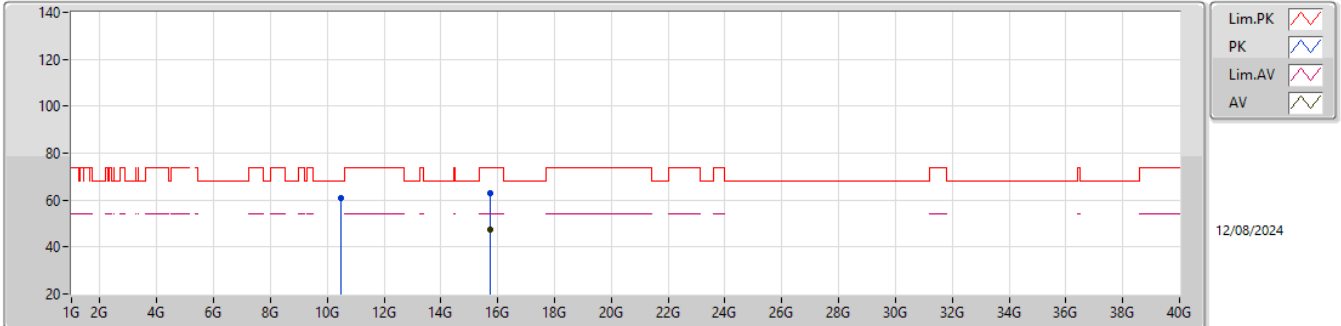


EUT_Y_4TX
Setting 98
01-I-G-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	10.482G	59.91	68.20	-8.29	76.30	3	Vertical	69	1.80	-	39.46	10.29	66.14
PK	15.72415G	64.33	74.00	-9.67	76.56	3	Vertical	81	1.80	-	37.90	12.67	62.80
AV	15.71785G	48.39	54.00	-5.61	60.62	3	Vertical	81	1.80	-	37.90	12.67	62.80

5.15-5.25GHz_802.11a_Nss1,(6Mbps)_4TX

5240MHz_TX

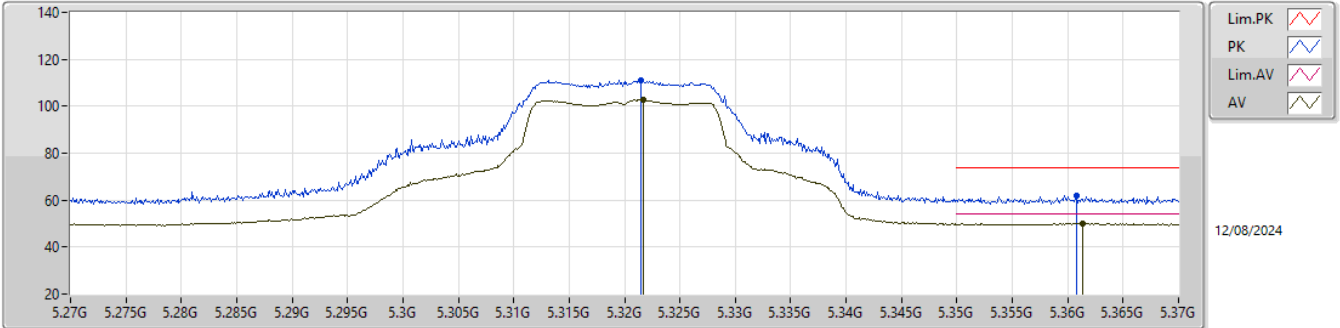


EUT_Y_4TX
Setting 98
01-I-G-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	10.48545G	60.88	68.20	-7.32	77.25	3	Horizontal	9	1.80	-	39.47	10.29	66.13
PK	15.7217G	62.77	74.00	-11.23	75.00	3	Horizontal	316	1.80	-	37.90	12.67	62.80
AV	15.7159G	47.43	54.00	-6.57	59.66	3	Horizontal	316	1.80	-	37.90	12.67	62.80

5.25-5.35GHz_802.11a_Nss1,(6Mbps)_4TX

5320MHz_TX

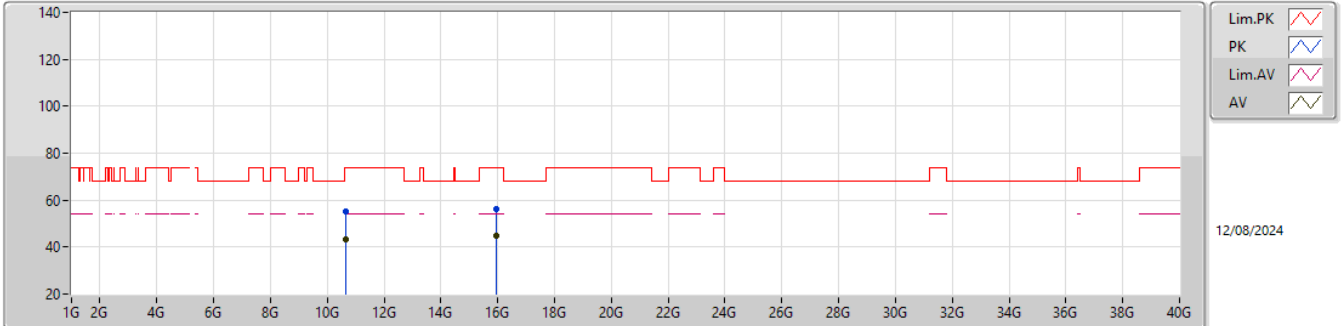


EUT_Y_4TX
Setting 75
01-1-G-5-10

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	5.3215G	110.95	Inf	-Inf	104.78	3	Vertical	321	1.80	-	31.34	7.33	32.50
AV	5.3217G	102.66	Inf	-Inf	96.49	3	Vertical	321	1.80	-	31.34	7.33	32.50
PK	5.3608G	62.07	74.00	-11.93	55.79	3	Vertical	321	1.80	-	31.42	7.35	32.49
AV	5.3613G	50.17	54.00	-3.83	43.89	3	Vertical	321	1.80	-	31.42	7.35	32.49

5.25-5.35GHz_802.11a_Nss1,(6Mbps)_4TX

5320MHz_TX

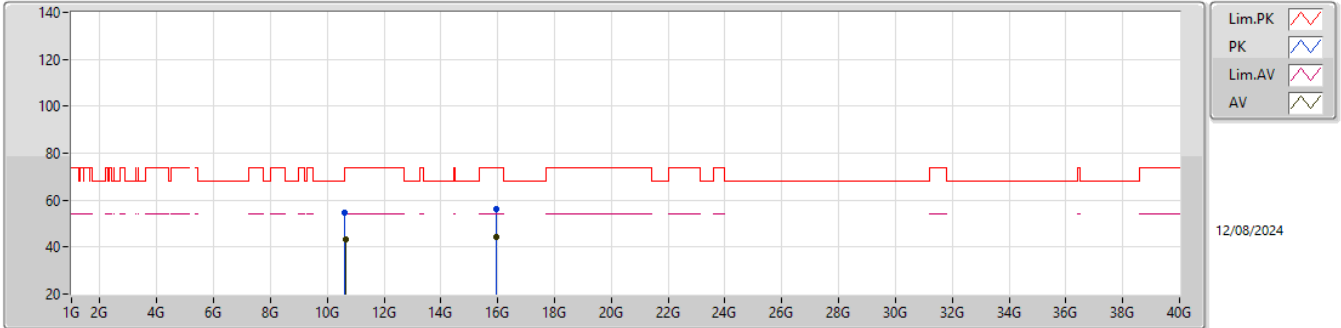


EUT_Y_4TX
Setting 75
01-I-G-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	10.63415G	54.94	74.00	-19.06	71.22	3	Vertical	339	1.58	-	39.60	10.37	66.25
AV	10.6416G	43.25	54.00	-10.75	59.53	3	Vertical	339	1.58	-	39.60	10.37	66.25
PK	15.9582G	56.33	74.00	-17.67	69.31	3	Vertical	154	1.80	-	37.18	12.78	62.94
AV	15.9614G	44.74	54.00	-9.26	57.73	3	Vertical	154	1.80	-	37.18	12.78	62.95

5.25-5.35GHz_802.11a_Nss1,(6Mbps)_4TX

5320MHz_TX

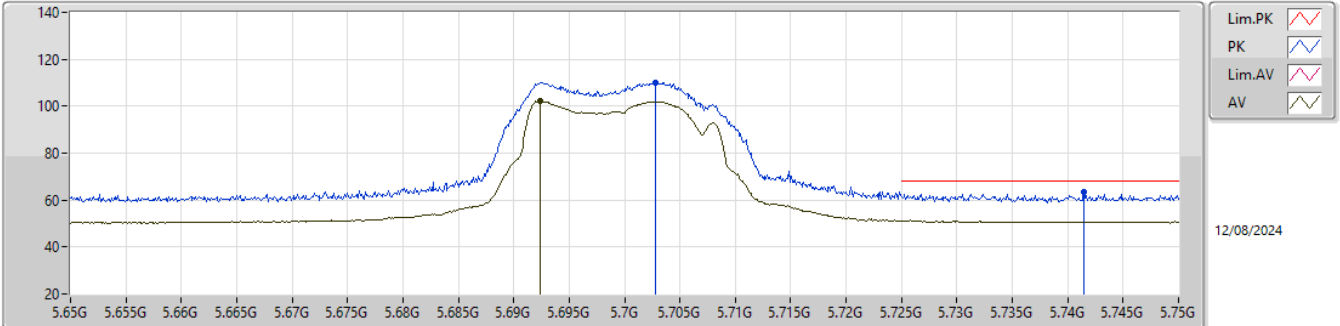


EUT_Y_4TX
Setting 75
01-I-G-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	10.62635G	54.74	74.00	-19.26	71.02	3	Horizontal	356	1.80	-	39.60	10.36	66.24
AV	10.6405G	43.39	54.00	-10.61	59.67	3	Horizontal	356	1.80	-	39.60	10.37	66.25
PK	15.96305G	56.10	74.00	-17.90	69.10	3	Horizontal	358	1.73	-	37.17	12.78	62.95
AV	15.9573G	44.55	54.00	-9.45	57.52	3	Horizontal	358	1.73	-	37.19	12.78	62.94

5.47-5.725GHz_802.11a_Nss1,(6Mbps)_4TX

5700MHz_TX

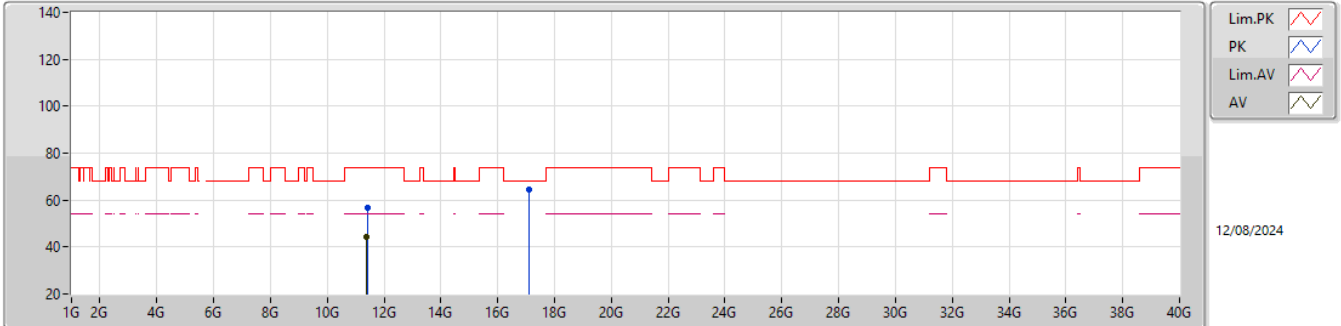


EUT_Y_4TX
Setting 73
01-I-G-5-10

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	5.7028G	110.12	Inf	-Inf	103.01	3	Vertical	206	1.80	-	32.01	7.55	32.45
AV	5.6924G	102.18	Inf	-Inf	95.11	3	Vertical	206	1.80	-	31.97	7.55	32.45
PK	5.7415G	63.30	68.20	-4.90	56.11	3	Vertical	206	1.80	-	32.08	7.56	32.45

5.47-5.725GHz_802.11a_Nss1,(6Mbps)_4TX

5700MHz_TX

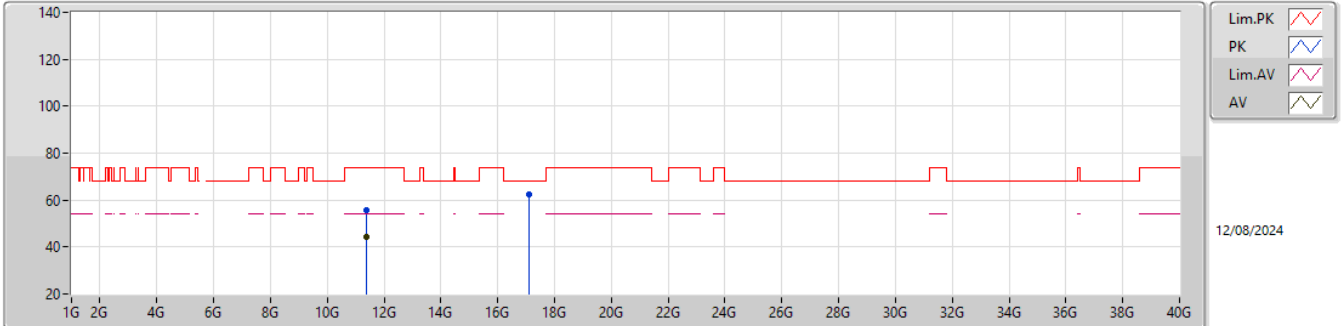


EUT_Y_4TX
Setting 73
01-I-G-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	11.4018G	56.90	74.00	-17.10	72.29	3	Vertical	33	1.80	-	40.00	10.79	66.18
AV	11.3988G	44.50	54.00	-9.50	59.89	3	Vertical	33	1.80	-	40.00	10.79	66.18
PK	17.0912G	64.48	68.20	-3.72	74.02	3	Vertical	332	1.80	-	40.32	13.15	63.01

5.47-5.725GHz_802.11a_Nss1,(6Mbps)_4TX

5700MHz_TX

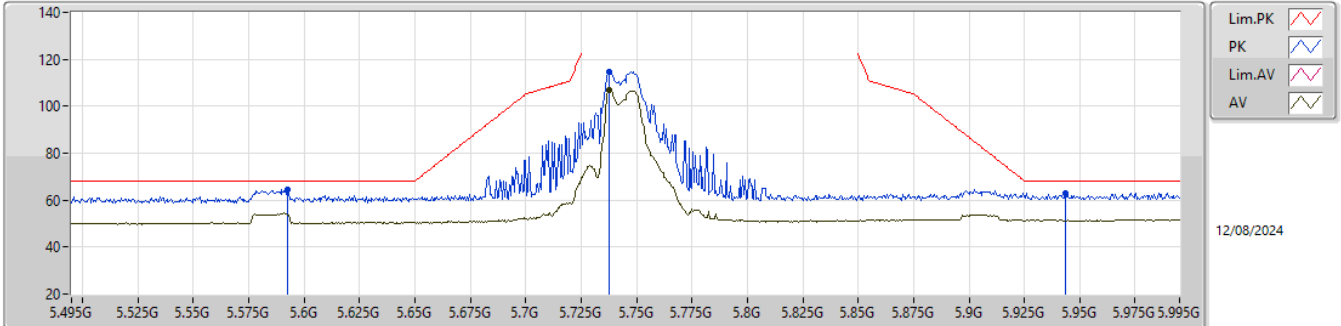


EUT_Y_4TX
Setting 73
01-I-G-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	11.39445G	55.84	74.00	-18.16	71.25	3	Horizontal	52	1.80	-	39.99	10.79	66.19
AV	11.3949G	44.31	54.00	-9.69	59.72	3	Horizontal	52	1.80	-	39.99	10.79	66.19
PK	17.09365G	62.38	68.20	-5.82	71.93	3	Horizontal	50	1.23	-	40.31	13.16	63.02

5.725-5.85GHz_802.11a_Nss1,(6Mbps)_4TX

5745MHz_TX

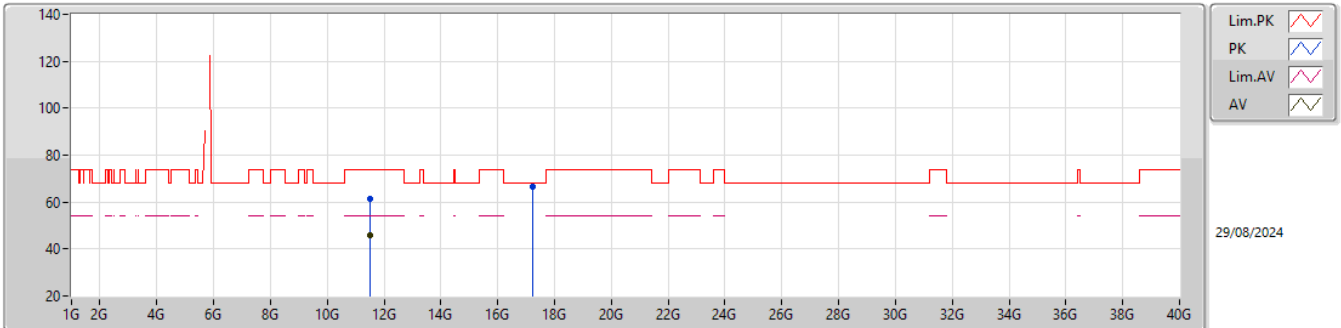


EUT_Y_4TX
 Setting 98
 01-I-G-5-10

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	5.5925G	64.64	68.20	-3.56	57.88	3	Vertical	208	1.80	-	31.71	7.51	32.46
PK	5.7375G	114.67	Inf	-Inf	107.48	3	Vertical	208	1.80	-	32.08	7.56	32.45
AV	5.7375G	106.96	Inf	-Inf	99.77	3	Vertical	208	1.80	-	32.08	7.56	32.45
PK	5.9435G	63.04	68.20	-5.16	55.43	3	Vertical	208	1.80	-	32.40	7.65	32.44

5.725-5.85GHz_802.11a_Nss1,(6Mbps)_4TX

5745MHz_TX

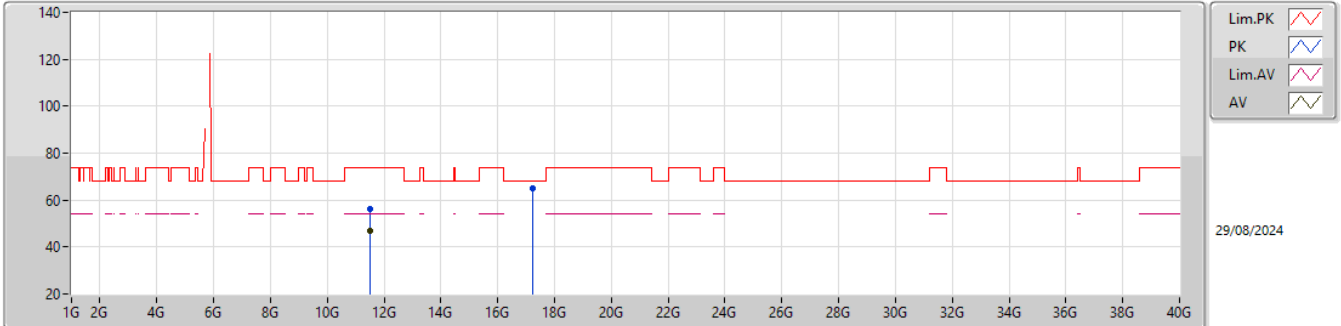


EUT_Y_4TX
Setting 93
03-E-R-7

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	11.4924G	61.13	74.00	-12.87	77.10	3	Vertical	32	1.51	-	38.87	11.24	66.08
AV	11.48814G	45.65	54.00	-8.35	61.64	3	Vertical	32	1.51	-	38.85	11.24	66.08
PK	17.23026G	66.62	68.20	-1.58	75.35	3	Vertical	328	2.54	-	40.78	13.59	63.10

5.725-5.85GHz_802.11a_Nss1,(6Mbps)_4TX

5745MHz_TX



EUT_Y_4TX
Setting 93
03-E-R-7

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	11.4924G	56.20	74.00	-17.80	72.17	3	Horizontal	43	2.44	-	38.87	11.24	66.08
AV	11.48814G	47.11	54.00	-6.89	63.10	3	Horizontal	43	2.44	-	38.85	11.24	66.08
PK	17.23026G	65.21	68.20	-2.99	73.94	3	Horizontal	292	1.80	-	40.78	13.59	63.10