

FCC Radio Test Report

FCC ID : TVE-240602
Equipment : Secured Wireless Access Point
Brand Name : FORTINET
Model Name : FortiAP 243Kxxxxxxxxxx, FAP-243Kxxxxxxxxxx,
FORTIAP-243Kxxxxxxxxxx (Where "x" can be
used as "A-Z", or "0-9", or "-", or blank for
software changes or marketing purposes only)
Applicant : Fortinet, Inc.
909 Kifer Road, Sunnyvale, CA 94086, USA
Manufacturer : Fortinet, Inc.
909 Kifer Road, Sunnyvale, CA 94086, USA
Standard : 47 CFR FCC Part 15.247

The product was received on May. 24, 2024, and testing was started from Jun. 07, 2024 and completed on Jun. 29, 2024. We, SPORTON INTERNATIONAL INC. Hsinhua 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 report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Hsinhua Laboratory, the test report shall not be reproduced except in full.



Approved by: Jackson Tsai

SPORTON INTERNATIONAL INC. Hsinhua Laboratory

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



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PHOTOGRAPHS OF EUT V01



TEL : 886-3-3273456
FAX : 886-3-3270973
Report Template No.: HE1-C10 Ver4.3
FCC ID: TVE-240602

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	15.247(a)	DTS Bandwidth	PASS	-
3.3	15.247(b)	Maximum Conducted Output Power	PASS	-
3.4	15.247(e)	Power Spectral Density	PASS	-
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.6	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and explanations:

None

Reviewed by: Barry Hsiao

Report Producer: Ann Hou

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number
2400-2483.5	LE	2402-2480	0-39 [40]

Band	Mode	BWch	Nant
2.4-2.4835GHz	BT-LE(125kbps)	1.0	1TX
2.4-2.4835GHz	BT-LE(500kbps)	1.0	1TX
2.4-2.4835GHz	BT-LE(1Mbps)	1.0	1TX
2.4-2.4835GHz	BT-LE(2Mbps)	2.0	1TX

Note:

- Bluetooth LE uses a GFSK (125kbps/500kbps/1Mbps/2Mbps) modulation.
- BWch is the nominal channel bandwidth.
- Bluetooth LE 125k/500k/1Mbps uses the same modulation, and 1Mbps was found to be the worst case scenario which was performed full test and recorded in this test report.

1.1.2 Antenna Information

Group	Ant.	Brand	Model Name	Antenna Type	Connector	Support
A	1	AWAN	7102A0668000	Dipole	Reverse SMA	2.4G+5G
	2	AWAN	7102A0668000	Dipole	Reverse SMA	2.4G+5G
	3	AWAN	7102A0669000	Dipole	Reverse SMA	2.4G+5G+6G
	4	AWAN	7102A0669000	Dipole	Reverse SMA	2.4G+5G+6G
	5	AWAN	7102A0667000	Dipole	Reverse SMA	6G
	6	AWAN	7102A0667000	Dipole	Reverse SMA	6G
-	7	Enrack	7102A1239000	PIFA	I-Pex	BT+Zigbee
B	8	Master Wave	7102A1334000	Dipole	Reverse SMA	2.4G+5G
	9	Master Wave	7102A1334000	Dipole	Reverse SMA	2.4G+5G
	10	Master Wave	7102A1335000	Dipole	Reverse SMA	2.4G+5G+6G
	11	Master Wave	7102A1335000	Dipole	Reverse SMA	2.4G+5G+6G
	12	Master Wave	7102A1333000	Dipole	Reverse SMA	6G
	13	Master Wave	7102A1333000	Dipole	Reverse SMA	6G

Ant.	Port	Gain (dBi)					Remark	
		2.4G	5G	6G	BT	Zigbee		
1	1	3.53	5.51	-	-	-	Radio 1 2.4G only 2*2	Radio 2 5G 2*2
2	2	3.40	5.34	-	-	-		
3	1	3.27	5.21	5.32	-	-	Radio 3 (Scan radio) 2.4G/5G/6G 2*2	
4	2	3.47	5.05	5.10	-	-		
5	1	-	-	5.20	-	-	Radio 2 6G 2*2	
6	2	-	-	5.03	-	-		
7	1	-	-	-	4.82	4.82	-	
8	1	3.19	5.14	-	-	-	Radio 1 2.4G only 2*2	Radio 2 5G 2*2
9	2	3.27	5.13	-	-	-		
10	1	3.13	5.03	4.66	-	-	Radio 3 (Scan radio) 2.4G/5G/6G 2*2	
11	2	3.03	5.03	4.82	-	-		
12	1	-	-	5.01	-	-	Radio 2 6G 2*2	
13	2	-	-	4.89	-	-		

Note 1: The EUT has thirteen antennas.

Note 2: EUT can match with above antennas for using. Higher gain in each group of antennas was used to perform the worst configuration and result of that was recorded as the final test result.

Note 3: Directional gain information

	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	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left\{ \sum_{i=1}^{N_{ANT}} E_{j,i} \right\}^2}{N_{ANT}} \right]$
BF	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left\{ \sum_{i=1}^{N_{ANT}} E_{j,i} \right\}^2}{N_{ANT}} \right]$	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left\{ \sum_{i=1}^{N_{ANT}} E_{j,i} \right\}^2}{N_{ANT}} \right]$

For 2.4GHz function:

< Radio 1>

For IEEE 802.11 b/g/n/VHT/ax/be mode (2TX/2RX)

Ant. 1 (port 1) and Ant. 2 (port 2) or Ant. 8 (port 1) and Ant. 9 (port 2) could transmit/receive simultaneously.

< Radio 3><Scan>

For IEEE 802.11 b/g/n/VHT/ax mode (2RX)

Ant. 3 (port 1) and Ant. 4 (port 2) or Ant. 10 (port 1) and Ant. 11 (port 2) can be used as receiving.

For 5GHz function:

< Radio 2>

For IEEE 802.11 a/n/ac/ax/be mode (2TX/2RX)

Ant. 1 (port 1) and Ant. 2 (port 2) or Ant. 8 (port 1) and Ant. 9 (port 2) could transmit/receive simultaneously.

< Radio 3><Scan>

For IEEE 802.11 a/n/ac/ax mode (2RX)

Ant. 3 (port 1) and Ant. 4 (port 2) or Ant. 10 (port 1) and Ant. 11 (port 2) can be used as receiving.

For 6GHz function:

< Radio 2>

For IEEE 802.11 ax/be mode (2TX/2RX)

Ant. 5 (port 1) and Ant. 6 (port 2) or Ant. 12 (port 1) and Ant. 13 (port 2) could transmit/receive simultaneously.

< Radio 3><Scan>

For IEEE 802.11 ax mode (2RX)

Ant. 3 (port 1) and Ant. 4 (port 2) or Ant. 10 (port 1) and Ant. 11 (port 2) can be used as receiving.

For Bluetooth function:

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Only Ant.7 can be used as transmitting/receiving.

For Zigbee function:

For IEEE 802.15.4 mode (1TX/1RX)

Only Ant.7 can be used as transmitting/receiving.

1.1.3 EUT Information

Operational Condition			
EUT Power Type	From AC Adapter / PoE		
EUT Function	☒ Point-to-multipoint	☐ Point-to-point	
Type of EUT			
☒	Stand-alone		
☐	Combined (EUT where the radio part is fully integrated within another device)		
	Combined Equipment - Brand Name / Model No.:		...
☐	Plug-in radio (EUT intended for a variety of host systems)		
	Host System - Brand Name / Model No.:		...
☐	Other:		

1.1.4 Mode Test Duty Cycle

Mode	DC	DCF (dB)	T (s)	VBW (Hz)_1/T
BT-LE(1Mbps)	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)
BT-LE(2Mbps)	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)

Note. If DC < 0.98, the DCF was added while measuring Output power and PSD.

**1.1.5 Table for Multiple Listing**

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

Brand Name	Model Name	Description
FORTINET	FortiAP 243Kxxxxxxxxx, FAP-243Kxxxxxxxxx, FORTIAP-243Kxxxxxxxxx (Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)	All the models are identical, the difference model served as marketing strategy.

From the above models, model: FAP-243K was selected as representative model for the test and its data was recorded in this report.

1.2 Testing Applied 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

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

- ♦ KDB 558074 D01 v05r02
- ♦ KDB 414788 D01 v01r01

1.3 Testing Location Information

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
☒ Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)			
	TEL: 886-3-327-3456		FAX: 886-3-327-0973	
Test site Designation No. TW3785 with FCC.				
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Wayne Chiu	22.4~22.8°C / 52~57%	29/Jun/2024
☒ Wenhua 3rd. (TAF: 3785)	ADD: No. 58, Aly. 75, Ln. 564, Wenhua 3rd Rd., Guishan Dist. Taoyuan City 333, Taiwan (R.O.C.)			
	TEL: 886-3-327-0868		FAX: 886-3-318-0287	
Test site Designation No. TW0036 with FCC.				
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
Radiated	03CH25-HY	Lego Lin	22.9~23.6°C / 59~63%	07/Jun/2024~15/Jun/2024
Radiated (Co-location)	03CH24-HY	Henry Ho	22.5~22.7°C / 52~53%	25/Jun/2024
RF Conducted	TH06-HY	Johnny Yu	22.6~23.2°C / 53~57%	17/Jun/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
AC Power-line Conducted Emissions	4.53 dB	Confidence levels of 95%
Bandwidth	3 MHz	Confidence levels of 95%
Maximum Conducted Output Power	2 dB	Confidence levels of 95%
Power Spectral Density	2 dB	Confidence levels of 95%
Emissions in Non-restricted Frequency Bands	0.14 dB	Confidence levels of 95%
Emissions in Restricted Frequency Bands	4.8 dB	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Test Software Version	Dos
-----------------------	-----

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	200
2440MHz	200
2480MHz	200
BT-LE(2Mbps)	-
2402MHz	198
2440MHz	200
2480MHz	189

2.2 The Worst Case Measurement Configuration

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	CTX
1	Adapter mode

The Worst Case Mode for Following Conformance Tests	
Tests Item	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains

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

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Test Condition	Radiated measurement
Operating Mode	CTX
1	Radio 1_2.4G+ Radio 2_5G+Bluetooth
2	Radio 1_2.4G+ Radio 2_5G+Zigbee
Refer to Sporton Test Report No.: FA411229-01 for Co-location RF Exposure Evaluation and Appendix G for Radiated Emission Co-location.	

2.3 Accessories

Accessories				
BRACKET,METAL CLIP CEILING,RVAQ-AP43	Brand Name	WNC	Model Name	6B.SRVAQ.00N
BRACKET,CEILING RAIL 1	Brand Name	WNC	Model Name	3S.005AL.111
BRACKET,CEILING RAIL 2	Brand Name	WNC	Model Name	3S.005AK.111
Antenna 1 for 2/5GHz*2	Brand Name	AWAN	Model Name	7102A0668000
Antenna 1 for 2/5/6GHz*2	Brand Name	AWAN	Model Name	7102A0669000
Antenna 1 for 6GHz*2	Brand Name	AWAN	Model Name	7102A0667000
Antenna 2 for 2/5GHz*2	Brand Name	Master Wave	Model Name	7102A1334000
Antenna 2 for 2/5/6GHz*2	Brand Name	Master Wave	Model Name	7102A1335000
Antenna 2.for 6GHz*2	Brand Name	Master Wave	Model Name	7102A1333000

Reminder: Regarding to more detail and other information, please refer to user manual.

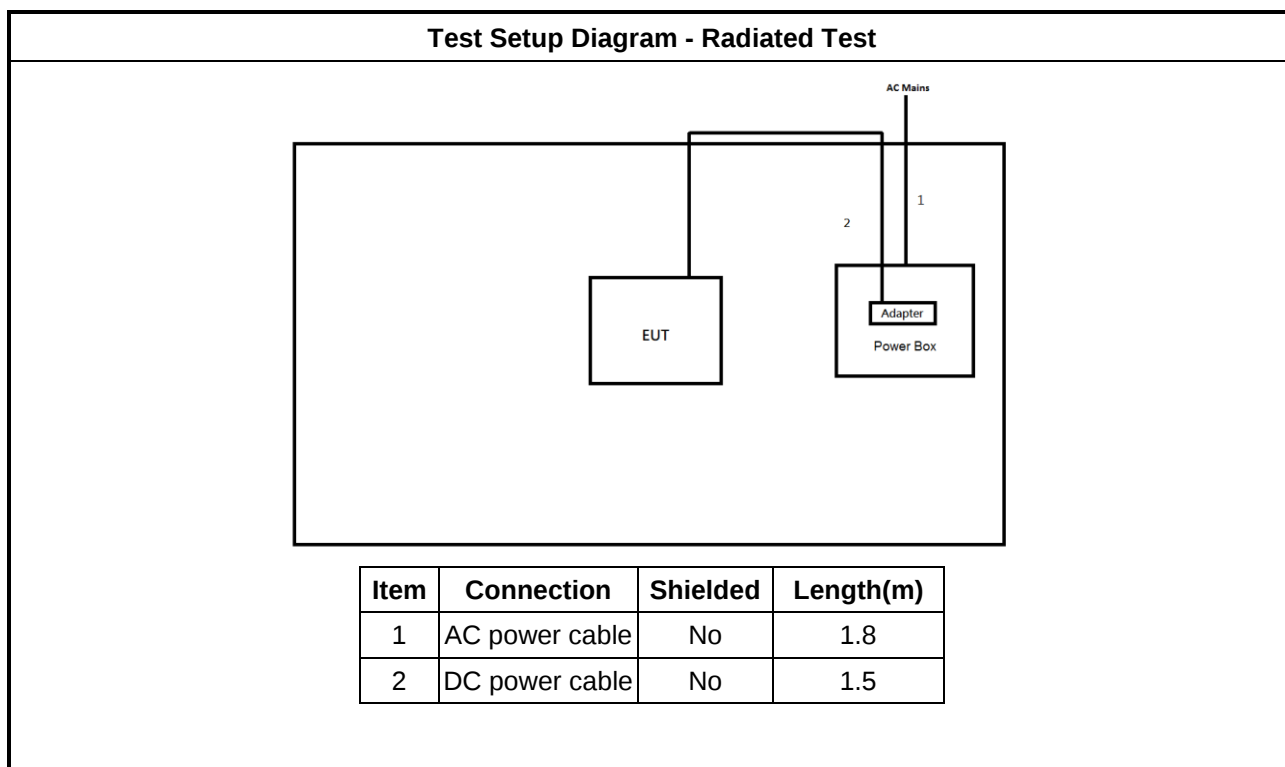
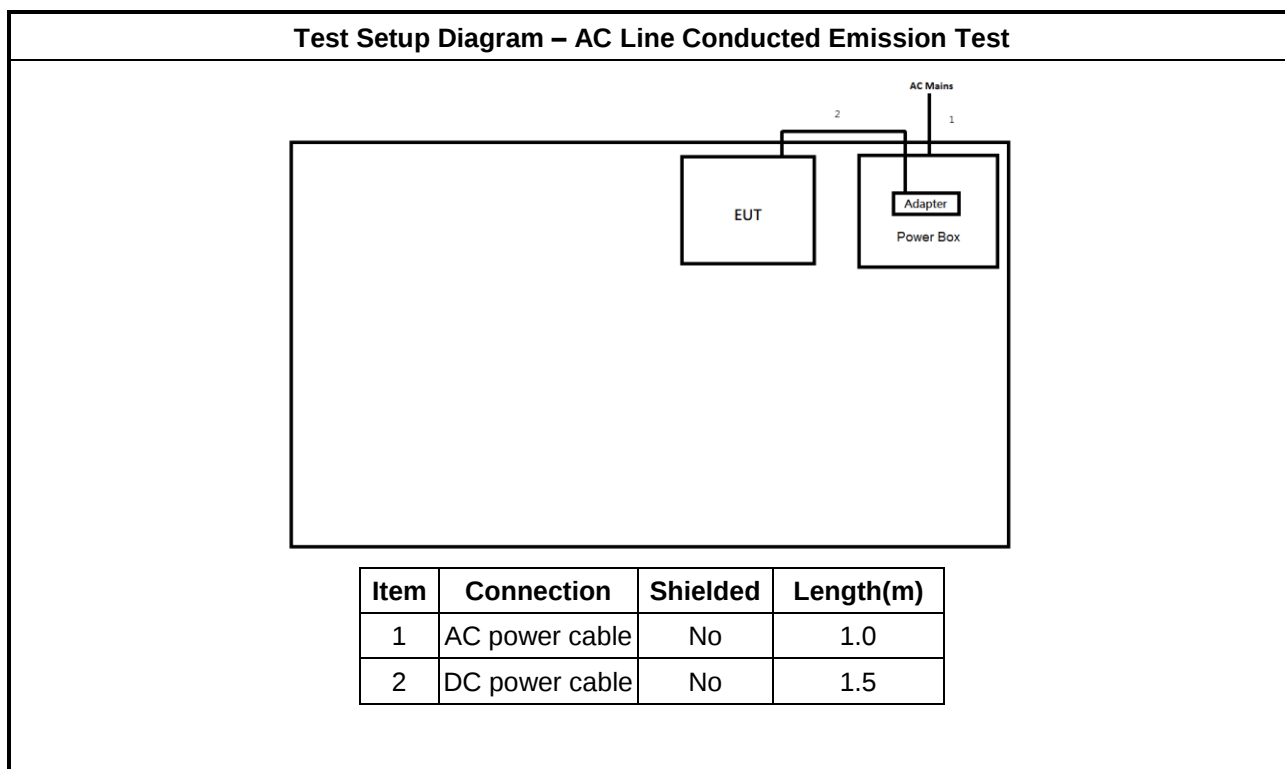
2.4 Support Equipment

Support Equipment – AC Conduction					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	AC Adapter	ASIAN POWER DEVICES INC.	WA-48A12R	-	Provided by Customer

Support Equipment – Conducted					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	Notebook	DELL	E5410	-	-
2	AC Adapter	ASIAN POWER DEVICES INC.	WA-48A12R	-	Provided by Customer

Support Equipment – Radiated					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	AC Adapter	ASIAN POWER DEVICES INC.	WA-48A12R	-	Provided by Customer

2.5 Test Setup Diagram



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

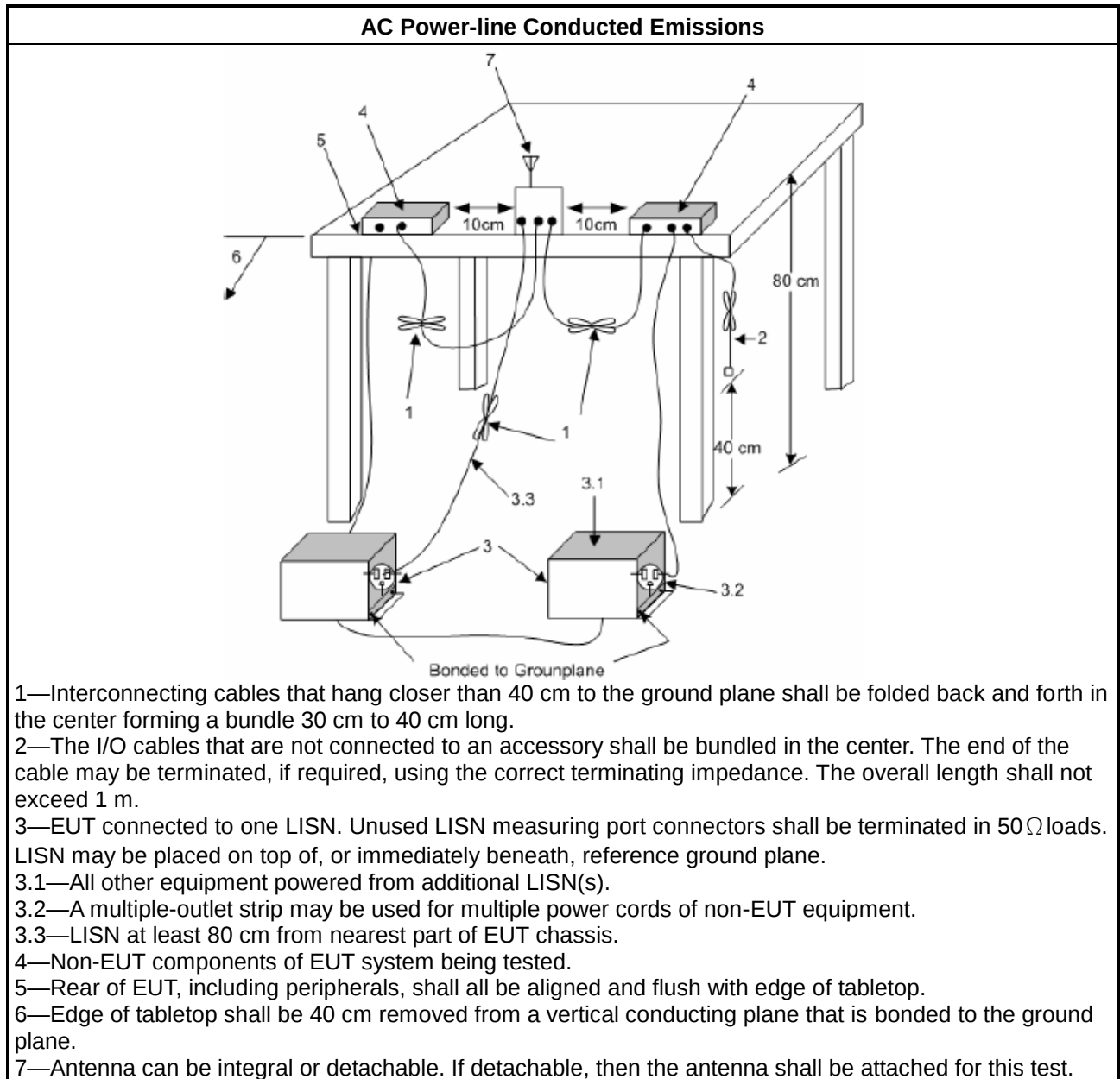
Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 foray power-line conducted emissions.

3.1.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + LISN(LISN Factor) + CL(Cable Loss) + AT(Attenuator).

3.1.5 Test Setup



3.1.6 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit	
Systems using digital modulation techniques:	
▪	6 dB bandwidth $\geq$ 500 kHz.

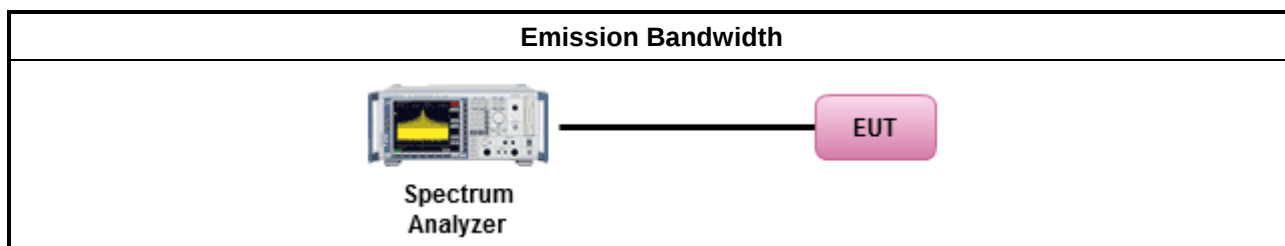
3.2.2 Measuring Instruments

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 KDB 558074, clause 8.2 (11.8 of ANSI C63.10) DTS bandwidth measurement.
☐	Refer as RSS-Gen, clause 6.7 for occupied bandwidth testing.
☐	Refer as ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
	If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
	Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
	Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	Smart antenna system (SAS):
	- Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	- Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	- Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dB dBm
e.i.r.p. Power Limit:	
	2400-2483.5 MHz Band
	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
	Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
	Smart antenna system (SAS)
	- Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	- Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	- Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.	

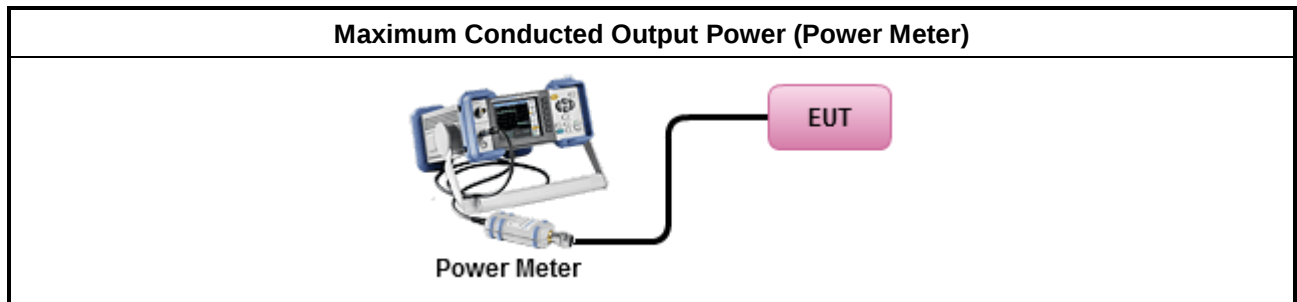
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
Maximum Peak Conducted Output Power	
☐	Refer as KDB 558074, clause 8.3.1.1 (11.9.1.1 of ANSI C63.10) RBW ≥ EBW method.
☐	Refer as KDB 558074, clause 8.3.1.2 (11.9.1.2 of ANSI C63.10) integrated band power method.
☐	Refer as KDB 558074, clause 8.3.1.3 (11.9.1.3 of ANSI C63.10) peak power meter.
Maximum Average Conducted Output Power	
☐	Refer as KDB 558074, clause 8.3.2.2 (11.9.2.2 of ANSI C63.10) using a spectrum analyzer.
☒	Refer as KDB 558074, clause 8.3.2.3 (11.9.2.3 of ANSI C63.10) using a power meter.
For conducted measurement.	
If the EUT supports multiple transmit chains using options given below: Refer as KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.	
If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$	

3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
Power Spectral Density (PSD) ≤ 8 dBm/3kHz

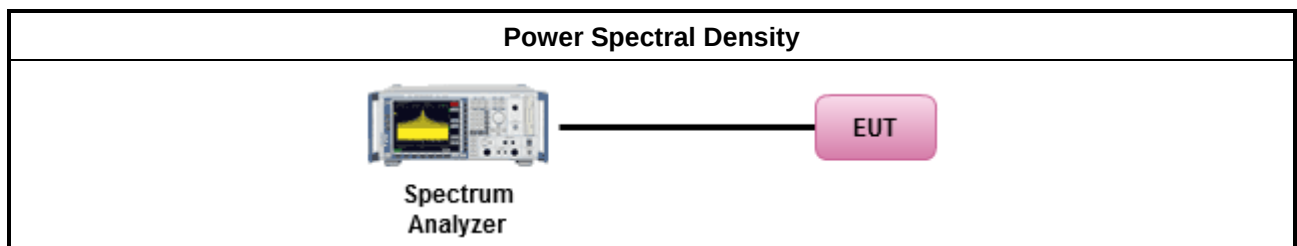
3.4.2 Measuring Instruments

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. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).
☒ Refer as KDB 558074, clause 8.4 (11.10 of ANSI C63.10) Max. PSD.
- For conducted measurement. - If The EUT supports multiple transmit chains using options given below: - Measure and sum the spectra across the outputs. Refer as 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.

3.4.4 Test Setup



3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30
Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak level. Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average level.	

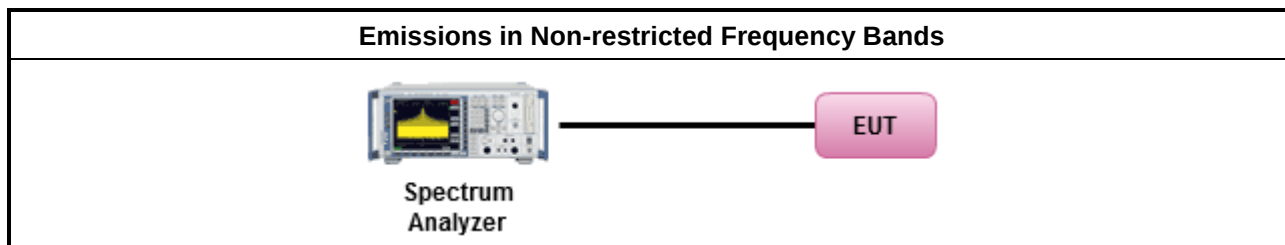
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method
Refer as KDB 558074, clause 8.5 (11.11 of ANSI C63.10) for non-restricted frequency bands.

3.5.4 Test Setup



3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

3.6 Emissions in Restricted Frequency Bands

3.6.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

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.

3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

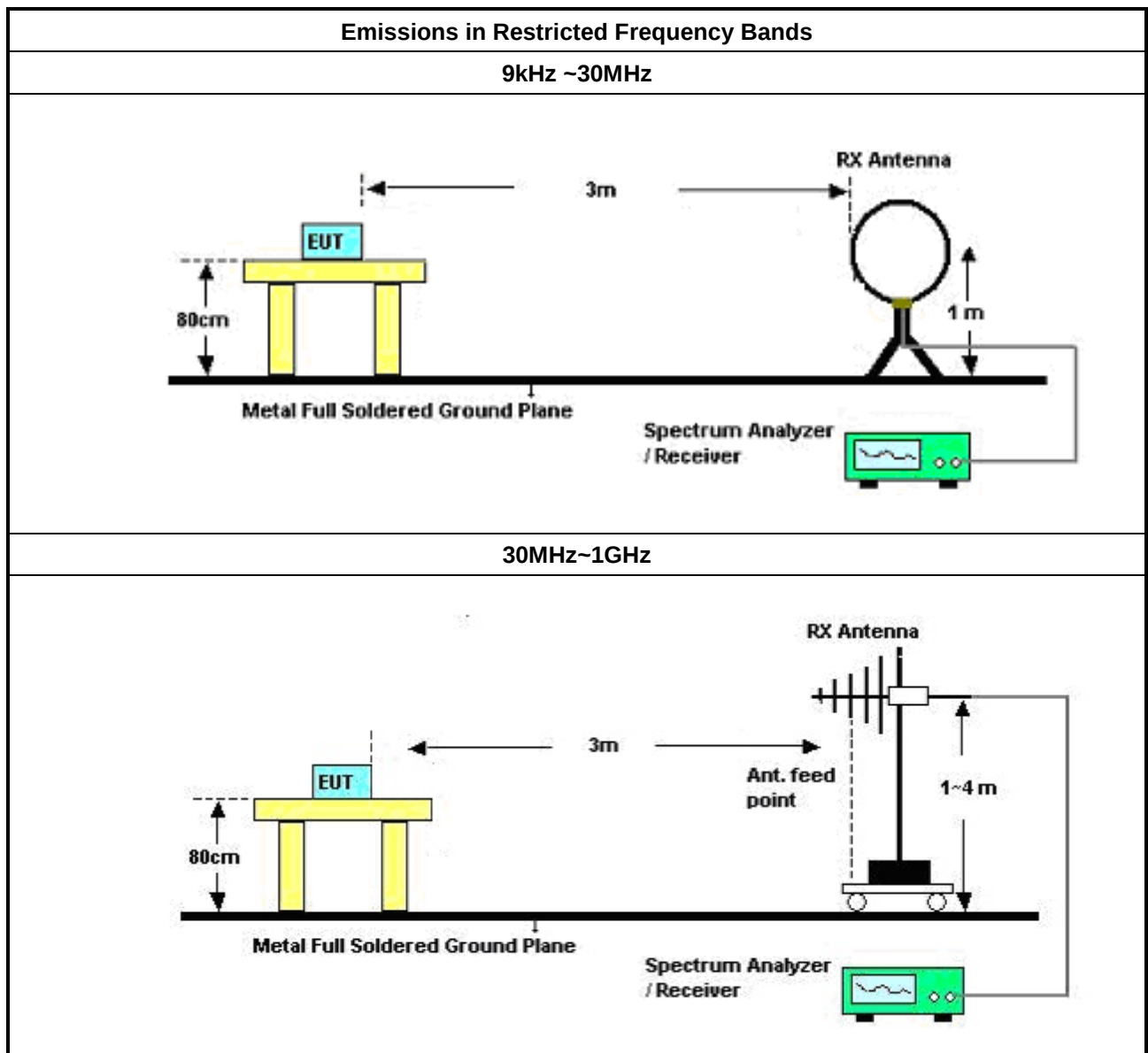
Test Method	
	The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].
	Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
	For the transmitter unwanted emissions shall be measured using following options below:
	Refer as KDB 558074, clause 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.
	For the transmitter band-edge emissions shall be measured using following options below:
	Refer as KDB 558074 clause 8.7.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.
	Refer as KDB 558074, clause 8.7.2 (6.10.6 of ANSI C63.10) for marker-delta method for band-edge measurements.
	Refer as KDB 558074, clause 8.7.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels.
	Use the following spectrum analyzer settings:
	Set RBW=100 kHz for $f < 1$ GHz; VBW=3 * RBW; Sweep = auto; Detector function = peak; Trace = max hold.
	Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement. For average measurement, refer as 1.1.4.
	KDB 414788 Open-Field Test Sites and Chamber Correlation Justification.
	Based on FCC 15.31(f)(2): measurements may be performed at a distance closer than that specified in regulations; however, an attempt should be made to avoid making measurements in the near field.
	Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

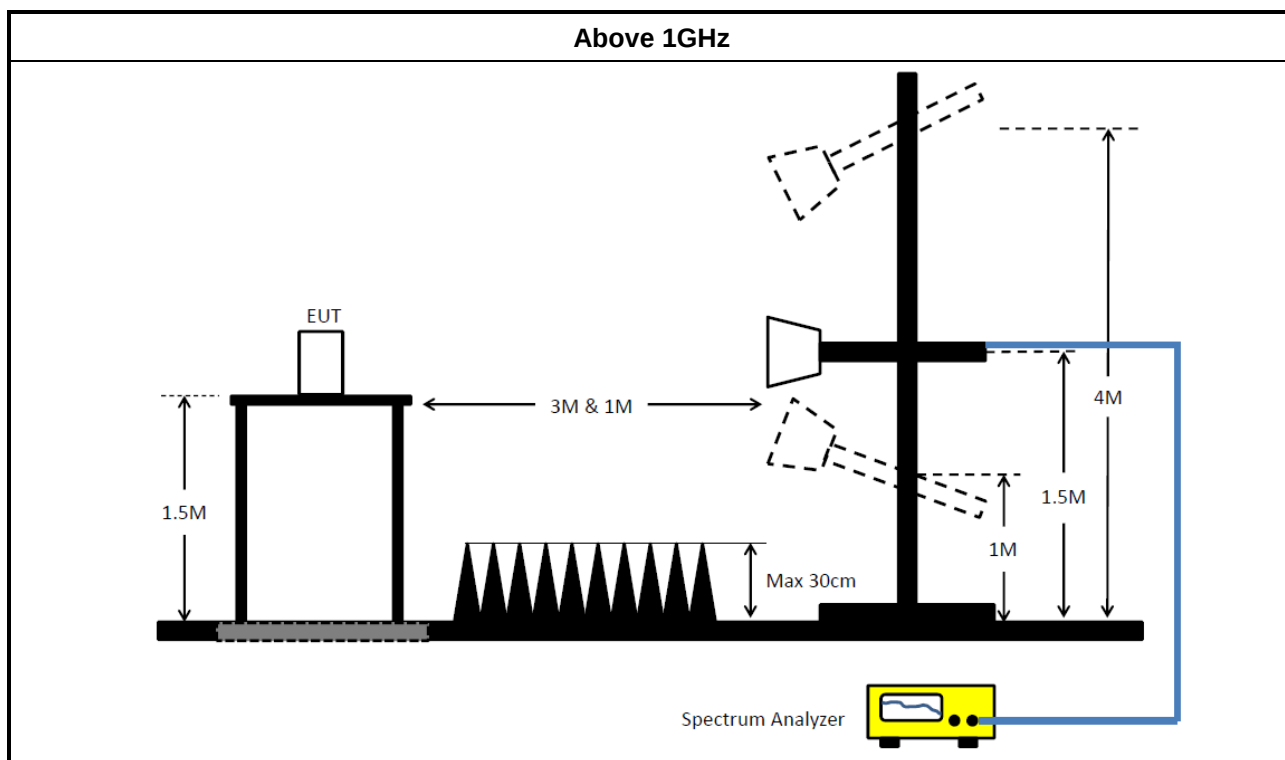
3.6.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamplifier Factor)

3.6.5 Test Setup





3.6.6 Test Result of Emissions in Restricted Frequency Bands (Below 30MHz)

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

3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR	102051	9kHz ~ 3.6GHz	17/May/2024	16/May/2025
LISN(Artificial Mains Network)	SCHWARZBECK	NSLK 8127	8127477	9kHz ~ 30MHz	12/Apr/2024	11/Apr/2025
RF Cable 5m	TITAN	TITAN	CO04-cable-01	9 kHz~200MHz	27/Feb/2024	26/Feb/2025
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9kHz ~ 30MHz	18/Oct/2023	17/Oct/2024
Software	Sporton	SENSE-EMI	V5.11.3	-	NCR	NCR

NCR: No Calibration Required

Instrument for Conducted Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV 40	101029	10Hz~40GHz	30/Oct/2023	29/Oct/2024
SMB100A Signal Generator	R&S	SMB100A	181147	100kHz~40GHz	20/Oct/2023	19/Oct/2024
Power Meter	Anritsu	ML2495A	1124009	300MHz~40GHz	01/Apr/2024	31/Mar/2025
Pulse Sensor	Anritsu	MA2411B	1027452	300MHz~40GHz	02/Apr/2024	01/Apr/2025
SENSE-15247_FS	Sporton	V5.11.18	N/A	N/A	N/A	N/A

Instrument for Radiated Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH25-HY	30MHz~1GHz 3m	03/Aug/2023	02/Aug/2024
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH25-HY	1GHz~18GHz 3m	09/Aug/2023	08/Aug/2024
EMI Test Receiver	ROHDE & SCHWARZ	ESR	102318	9kHz~3.6GHz	27/Dec/2023	26/Dec/2024
Signal Analyzer	ROHDE&SCHWARZ	FSV3044	101410	10Hz~44GHz	17/Nov/2023	16/Nov/2024
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	19/Mar/2024	18/Mar/2025
Bilog Antenna & 6dB Attenuator	TESEQ & VGT	CBL 6111D & VFA 04002-06	63537/001	30MHz~1GHz	30/May/2024	29/May/2025
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	02876	1GHz~18GHz	12/Jul/2023	11/Jul/2024
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	01248	18GHz~40GHz	21/Aug/2023	20/Aug/2024
RF Cable	HUBER+SUHNER	SUOFLEX 104	CB007	9kHz~1GHz	24/Apr/2024	23/Apr/2025
RF Cable	HUBER+SUHNER	SUOFLEX 104	CB007	1GHz~40GHz	23/Apr/2024	22/Apr/2025
Preamplifier	SGH	PRAMP 903	20230515-1	25MHz~3GHz	24/May/2024	23/May/2025
Preamplifier	SGH	PRAMP 118-H	20230515-3	1GHz ~18GHz	24/May/2024	23/May/2025
Amplifier	EM	EM18G40GA	060874	18GHz ~ 40GHz	15/Apr/2024	14/Apr/2025
SENSE-15247-FS	Sporton	V5.11.18	NA	NA	NA	NA

**Instrument for Radiated Test (Co-location)**

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH24-HY	30MHz~1GHz 3m	17/Aug/2023	16/Aug/2024
Signal Analyzer	ROHDE&SCHWARZ	FSV3044	101345	10Hz~44GHz	10/Aug/2023	09/Aug/2024
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	02744	1GHz~18GHz	17/Aug/2023	16/Aug/2024
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	01248	18GHz~40GHz	21/Aug/2023	20/Aug/2024
RF Cable	HUBER+SUHNER	SUOFLEX 102	CB001	1GHz~40GHz	19/Jun/2024	18/Jun/2025
Amplifier	EM	EM01G18G	060870	1GHz ~18GHz	10/Aug/2023	09/Aug/2024
Microwave Premplifier	EMC INSTRUMENTS	EM18G40G	060604	18GHz ~ 40GHz	19/Apr/2024	18/Apr/2025
SENSE-EMI	Sporton	V5.11	N/A	N/A	N/A	N/A



Conducted Emissions at Powerline

Appendix A

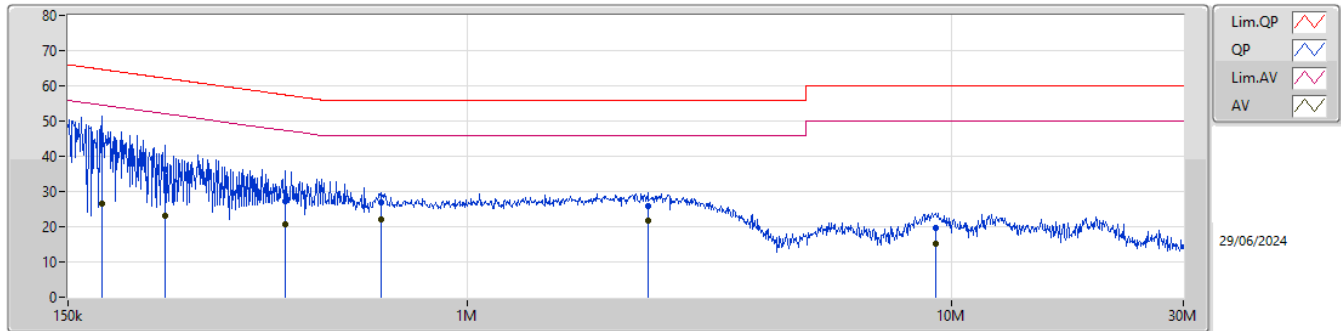
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	175.97k	43.47	64.68	-21.21	Line

Result

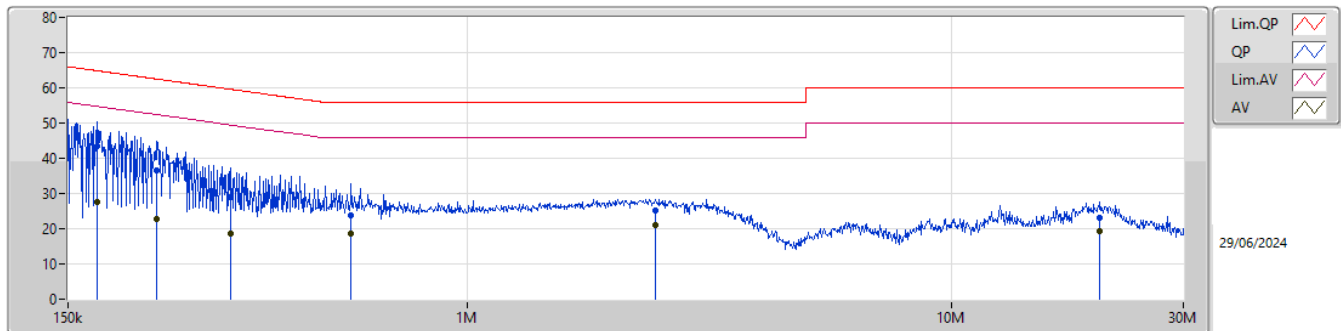
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition	Comments
Mode 1	Pass	QP	175.97k	43.47	64.68	-21.21	Line	-
Mode 1	Pass	AV	175.97k	26.61	54.68	-28.07	Line	-
Mode 1	Pass	QP	238.343k	36.16	62.16	-26.00	Line	-
Mode 1	Pass	AV	238.343k	23.09	52.16	-29.07	Line	-
Mode 1	Pass	QP	421.816k	27.18	57.41	-30.23	Line	-
Mode 1	Pass	AV	421.816k	20.86	47.41	-26.55	Line	-
Mode 1	Pass	QP	662.266k	26.98	56.00	-29.02	Line	-
Mode 1	Pass	AV	662.266k	22.11	46.00	-23.89	Line	-
Mode 1	Pass	QP	2.357M	25.78	56.00	-30.22	Line	-
Mode 1	Pass	AV	2.357M	21.78	46.00	-24.22	Line	-
Mode 1	Pass	QP	9.269M	19.53	60.00	-40.47	Line	-
Mode 1	Pass	AV	9.269M	15.22	50.00	-34.78	Line	-
Mode 1	Pass	QP	171.806k	43.33	64.87	-21.54	Neutral	-
Mode 1	Pass	AV	171.806k	27.52	54.87	-27.35	Neutral	-
Mode 1	Pass	QP	228.103k	36.71	62.52	-25.81	Neutral	-
Mode 1	Pass	AV	228.103k	22.76	52.52	-29.76	Neutral	-
Mode 1	Pass	QP	324.114k	28.97	59.59	-30.62	Neutral	-
Mode 1	Pass	AV	324.114k	18.50	49.59	-31.09	Neutral	-
Mode 1	Pass	QP	575.907k	23.69	56.00	-32.31	Neutral	-
Mode 1	Pass	AV	575.907k	18.48	46.00	-27.52	Neutral	-
Mode 1	Pass	QP	2.443M	25.08	56.00	-30.92	Neutral	-
Mode 1	Pass	AV	2.443M	21.06	46.00	-24.94	Neutral	-
Mode 1	Pass	QP	20.188M	23.22	60.00	-36.78	Neutral	-
Mode 1	Pass	AV	20.188M	19.20	50.00	-30.80	Neutral	-

Conducted Emissions at Powerline_Mode 1



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)						
QP	175.97k	43.47	64.68	-21.21	9.84	Line	-	33.63	0.04	0.08	9.72						
AV	175.97k	26.61	54.68	-28.07	9.84	Line	-	16.77	0.04	0.08	9.72						
QP	238.343k	36.16	62.16	-26.00	9.84	Line	-	26.32	0.04	0.10	9.70						
AV	238.343k	23.09	52.16	-29.07	9.84	Line	-	13.25	0.04	0.10	9.70						
QP	421.816k	27.18	57.41	-30.23	9.93	Line	-	17.25	0.05	0.12	9.76						
AV	421.816k	20.86	47.41	-26.55	9.93	Line	-	10.93	0.05	0.12	9.76						
QP	662.266k	26.98	56.00	-29.02	9.94	Line	-	17.04	0.06	0.10	9.78						
AV	662.266k	22.11	46.00	-23.89	9.94	Line	-	12.17	0.06	0.10	9.78						
QP	2.357M	25.78	56.00	-30.22	9.98	Line	-	15.80	0.08	0.10	9.80						
AV	2.357M	21.78	46.00	-24.22	9.98	Line	-	11.80	0.08	0.10	9.80						
QP	9.269M	19.53	60.00	-40.47	10.04	Line	-	9.49	0.20	0.05	9.79						
AV	9.269M	15.22	50.00	-34.78	10.04	Line	-	5.18	0.20	0.05	9.79						

Conducted Emissions at Powerline_Mode 1



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)						
QP	171.806k	43.33	64.87	-21.54	9.86	Neutral	-	33.47	0.06	0.08	9.72						
AV	171.806k	27.52	54.87	-27.35	9.86	Neutral	-	17.66	0.06	0.08	9.72						
QP	228.103k	36.71	62.52	-25.81	9.86	Neutral	-	26.85	0.06	0.10	9.70						
AV	228.103k	22.76	52.52	-29.76	9.86	Neutral	-	12.90	0.06	0.10	9.70						
QP	324.114k	28.97	59.59	-30.62	9.92	Neutral	-	19.05	0.07	0.11	9.74						
AV	324.114k	18.50	49.59	-31.09	9.92	Neutral	-	8.58	0.07	0.11	9.74						
QP	575.907k	23.69	56.00	-32.31	9.96	Neutral	-	13.73	0.07	0.11	9.78						
AV	575.907k	18.48	46.00	-27.52	9.96	Neutral	-	8.52	0.07	0.11	9.78						
QP	2.443M	25.08	56.00	-30.92	10.00	Neutral	-	15.08	0.10	0.10	9.80						
AV	2.443M	21.06	46.00	-24.94	10.00	Neutral	-	11.06	0.10	0.10	9.80						
QP	20.188M	23.22	60.00	-36.78	10.34	Neutral	-	12.88	0.39	0.12	9.83						
AV	20.188M	19.20	50.00	-30.80	10.34	Neutral	-	8.86	0.39	0.12	9.83						



Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	726.25k	1.047M	1M05F1D	673.75k	1.046M
BT-LE(2Mbps)	1.353M	2.114M	2M11F1D	1.323M	2.104M

Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth

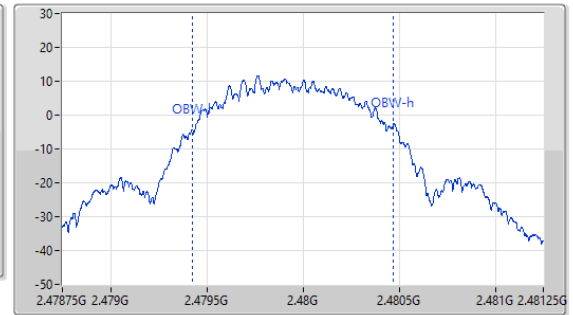
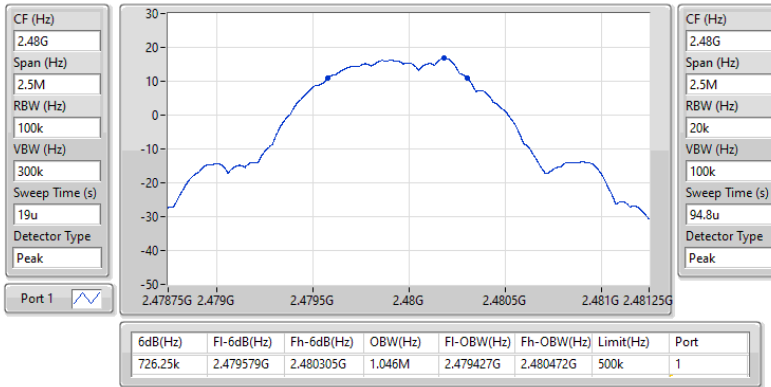
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	673.75k	1.047M
2440MHz	Pass	500k	718.75k	1.046M
2480MHz	Pass	500k	726.25k	1.046M
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	500k	1.323M	2.104M
2440MHz	Pass	500k	1.325M	2.114M
2480MHz	Pass	500k	1.353M	2.111M

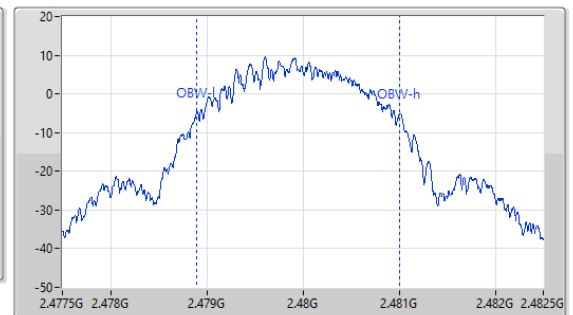
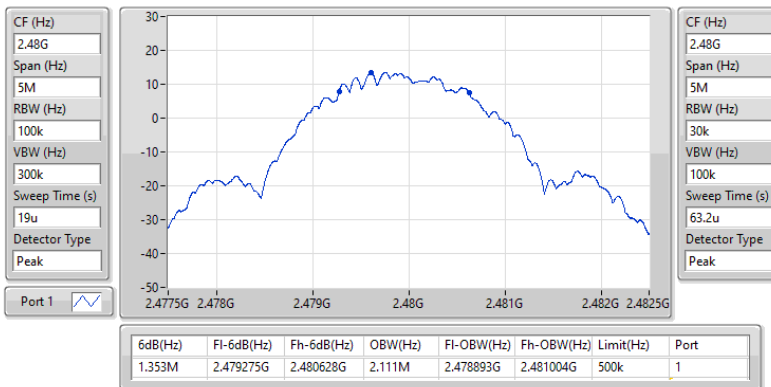
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

2.4-2.4835GHz_BT-LE(1Mbps)
EBW-DTS
2480MHz

17/06/2024


2.4-2.4835GHz_BT-LE(2Mbps)
EBW-DTS
2480MHz

17/06/2024





Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	17.89	0.06152
BT-LE(2Mbps)	17.81	0.06039

**Result**

Mode	Result	DG (dBi)	Total Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.82	17.85	30.00
2440MHz	Pass	4.82	17.83	30.00
2480MHz	Pass	4.82	17.89	30.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	4.82	17.64	30.00
2440MHz	Pass	4.82	17.81	30.00
2480MHz	Pass	4.82	16.99	30.00

DG = Directional Gain; Port X = Port X output power;
Inf = There's no restriction for the limit.



Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	0.35
BT-LE(2Mbps)	0.37

RBW = 3kHz;

Result

Mode	Result	DG (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.82	0.19	8.00
2440MHz	Pass	4.82	0.19	8.00
2480MHz	Pass	4.82	0.35	8.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	4.82	0.14	8.00
2440MHz	Pass	4.82	0.37	8.00
2480MHz	Pass	4.82	-0.51	8.00

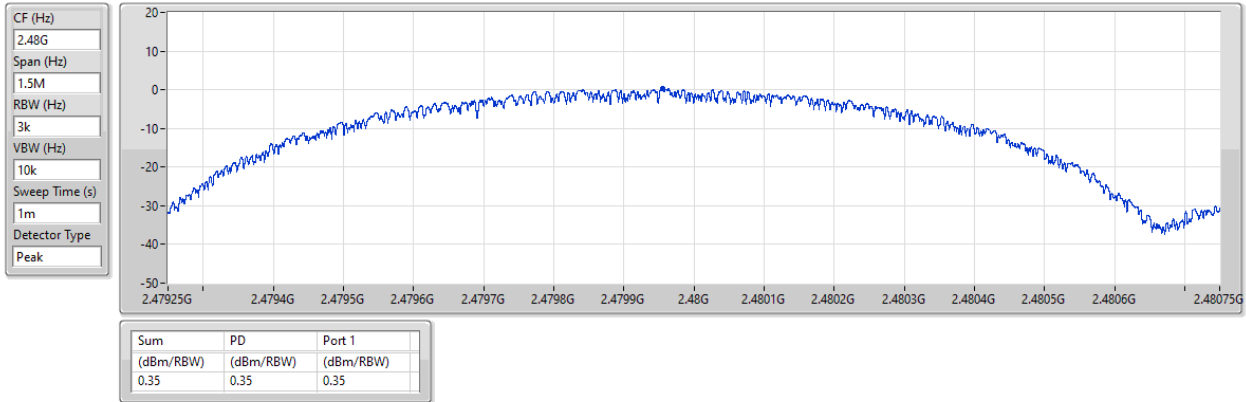
DG = Directional Gain; RBW = 3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;
Inf = There's no restriction for the limit.

2.4-2.4835GHz_BT-LE(1Mbps)

PSD

2480MHz

17/06/2024

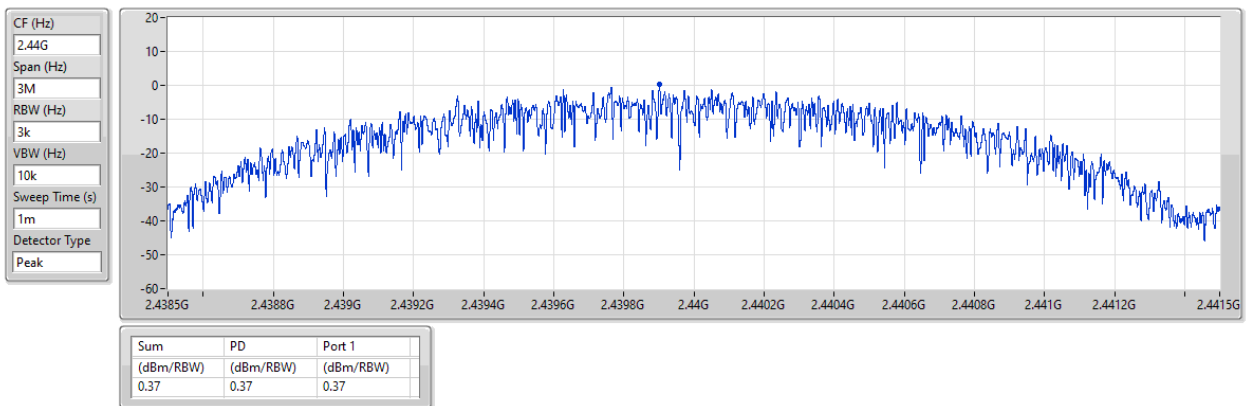


2.4-2.4835GHz_BT-LE(2Mbps)

PSD

2440MHz

17/06/2024





Summary

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.48033G	16.98	-13.02	2.0416G	-55.68	2.4G	-34.63	2.4G	-34.26	2.50034G	-53.27	16.26011G	-42.10	1
BT-LE(2Mbps)	Pass	2.44008G	15.00	-15.00	2.13443G	-55.68	2.39996G	-16.81	2.4G	-15.52	2.50194G	-53.60	17.01374G	-41.95	1

Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.48033G	16.98	-13.02	2.0416G	-55.68	2.4G	-34.63	2.4G	-34.26	2.50034G	-53.27	16.26011G	-42.10	1
2440MHz	Pass	2.48033G	16.98	-13.02	811.38M	-56.40	2.39508G	-54.23	2.4G	-56.05	2.50138G	-53.44	24.92689G	-41.28	1
2480MHz	Pass	2.48033G	16.98	-13.02	1.90295G	-55.19	2.3936G	-54.20	2.4G	-54.16	2.50266G	-53.32	16.3051G	-41.58	1
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.44008G	15.00	-15.00	2.13443G	-55.68	2.39996G	-16.81	2.4G	-15.52	2.50194G	-53.60	17.01374G	-41.95	1
2440MHz	Pass	2.44008G	15.00	-15.00	2.17203G	-55.36	2.39864G	-53.54	2.4G	-56.51	2.50258G	-53.64	16.25167G	-42.17	1
2480MHz	Pass	2.44008G	15.00	-15.00	859.55M	-54.65	2.39168G	-53.90	2.4G	-56.96	2.50214G	-54.31	23.33526G	-41.72	1

2.4-2.4835GHz_BT-LE(1Mbps)

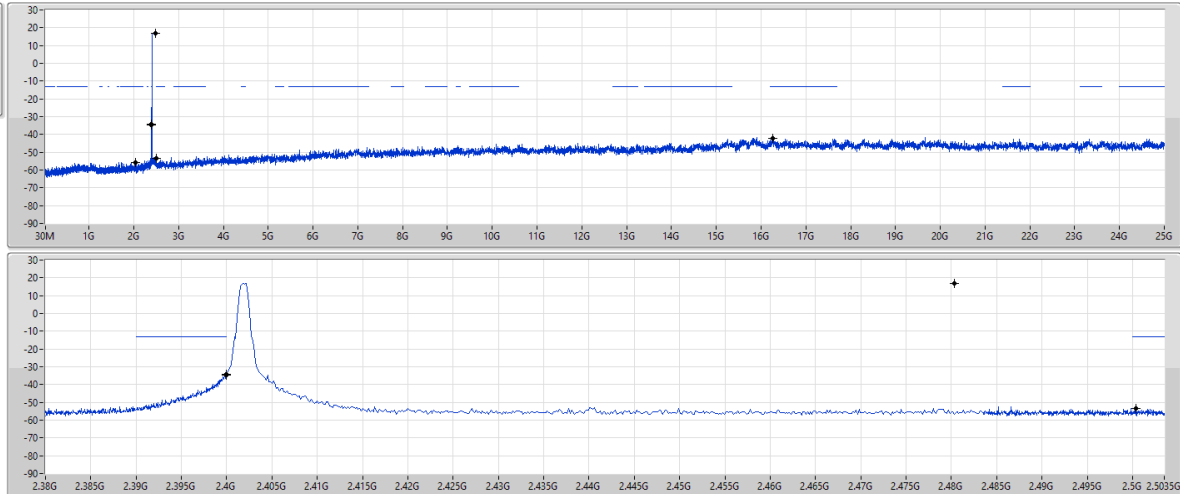
CSEndB-DTS

2402MHz

17/06/2024

RBW (Hz)
100k
VBW (Hz)
300k
Detector
Peak

Port 1



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.48033G	16.98	-13.02	2.0416G	-55.68	2.4G	-34.63	2.4G	-34.26	2.50034G	-53.27	16.26011G	-42.10	1

2.4-2.4835GHz_BT-LE(2Mbps)

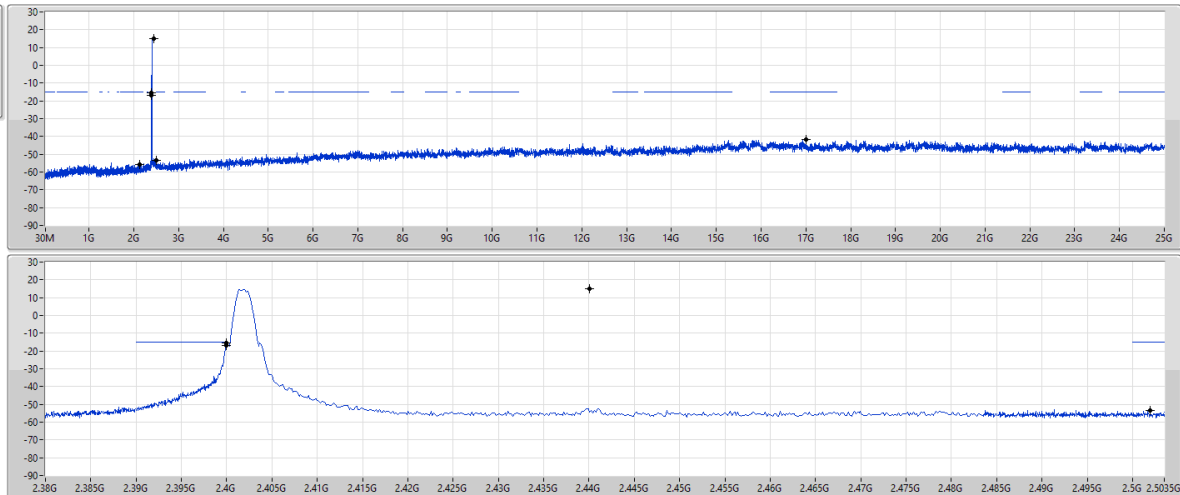
CSEndB-DTS

2402MHz

17/06/2024

RBW (Hz)
100k
VBW (Hz)
300k
Detector
Peak

Port 1



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44008G	15.00	-15.00	2.13443G	-55.68	2.39996G	-16.81	2.4G	-15.52	2.50194G	-53.60	17.01374G	-41.95	1



Summary

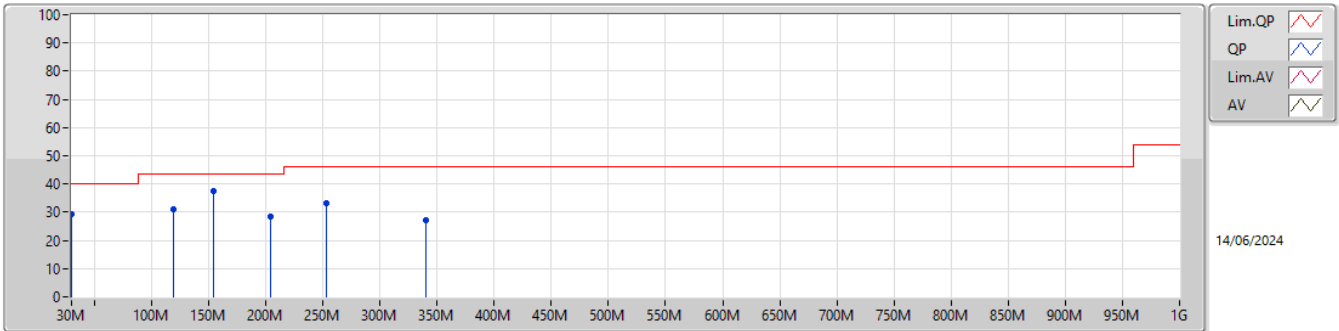
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-
BT-LE(2Mbps)	Pass	PK	154.16M	37.64	43.50	-5.86	3	Vertical	360	1.00

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-
2440MHz_Adapter	Pass	PK	30M	29.46	40.00	-10.54	3	Vertical	360	1.00
2440MHz_Adapter	Pass	PK	119.24M	30.88	43.50	-12.62	3	Vertical	360	1.00
2440MHz_Adapter	Pass	PK	154.16M	37.64	43.50	-5.86	3	Vertical	360	1.00
2440MHz_Adapter	Pass	PK	204.6M	28.53	43.50	-14.97	3	Vertical	360	1.00
2440MHz_Adapter	Pass	PK	253.1M	33.07	46.00	-12.93	3	Vertical	360	1.00
2440MHz_Adapter	Pass	PK	340.4M	27.29	46.00	-18.71	3	Vertical	360	1.00
2440MHz_Adapter	Pass	PK	30M	23.27	40.00	-16.73	3	Horizontal	0	1.00
2440MHz_Adapter	Pass	PK	119.24M	25.93	43.50	-17.57	3	Horizontal	0	1.00
2440MHz_Adapter	Pass	PK	154.16M	36.04	43.50	-7.46	3	Horizontal	0	1.00
2440MHz_Adapter	Pass	PK	251.16M	33.64	46.00	-12.36	3	Horizontal	0	1.00
2440MHz_Adapter	Pass	PK	340.4M	29.18	46.00	-16.82	3	Horizontal	0	1.00
2440MHz_Adapter	Pass	PK	402.48M	25.29	46.00	-20.71	3	Horizontal	0	1.00

2.4-2.4835GHz_BT-LE(2Mbps)

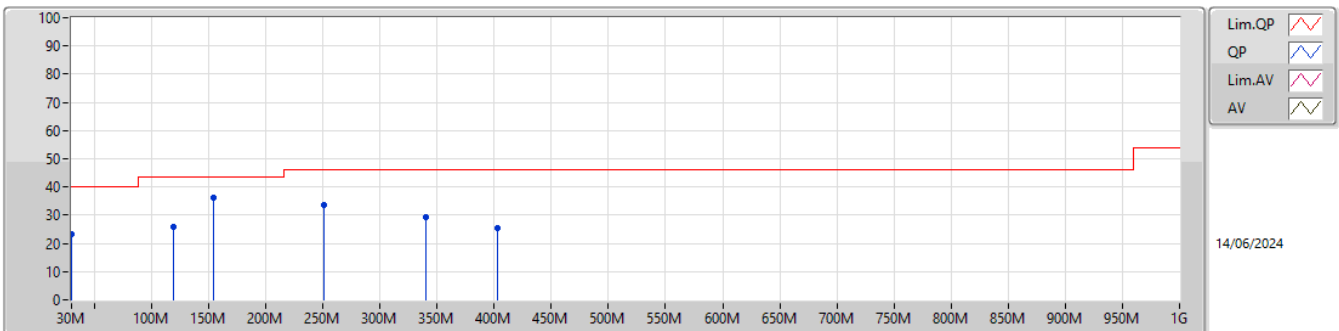
2440MHz_Adapter



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	30M	29.46	40.00	-10.54	-19.10	3	Vertical	360	1.00	48.56	24.72	0.45	44.27
PK	119.24M	30.88	43.50	-12.62	-26.21	3	Vertical	360	1.00	57.09	17.51	0.83	44.55
PK	154.16M	37.64	43.50	-5.86	-26.53	3	Vertical	360	1.00	64.17	17.05	0.98	44.56
PK	204.6M	28.53	43.50	-14.97	-28.09	3	Vertical	360	1.00	56.62	15.26	1.12	44.47
PK	253.1M	33.07	46.00	-12.93	-24.16	3	Vertical	360	1.00	57.23	19.05	1.15	44.36
PK	340.4M	27.29	46.00	-18.71	-22.63	3	Vertical	360	1.00	49.92	20.25	1.28	44.16

2.4-2.4835GHz_BT-LE(2Mbps)

2440MHz_Adapter



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	30M	23.27	40.00	-16.73	-19.10	3	Horizontal	0	1.00	42.37	24.72	0.45	44.27
PK	119.24M	25.93	43.50	-17.57	-26.21	3	Horizontal	0	1.00	52.14	17.51	0.83	44.55
PK	154.16M	36.04	43.50	-7.46	-26.53	3	Horizontal	0	1.00	62.57	17.05	0.98	44.56
PK	251.16M	33.64	46.00	-12.36	-24.44	3	Horizontal	0	1.00	58.08	18.78	1.15	44.37
PK	340.4M	29.18	46.00	-16.82	-22.63	3	Horizontal	0	1.00	51.81	20.25	1.28	44.16
PK	402.48M	25.29	46.00	-20.71	-20.50	3	Horizontal	0	1.00	45.79	22.07	1.45	44.02



Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4835G	50.53	54.00	-3.47	3	Horizontal	56	2.10
BT-LE(2Mbps)	Pass	AV	2.4835G	44.19	54.00	-9.81	3	Horizontal	54	2.11

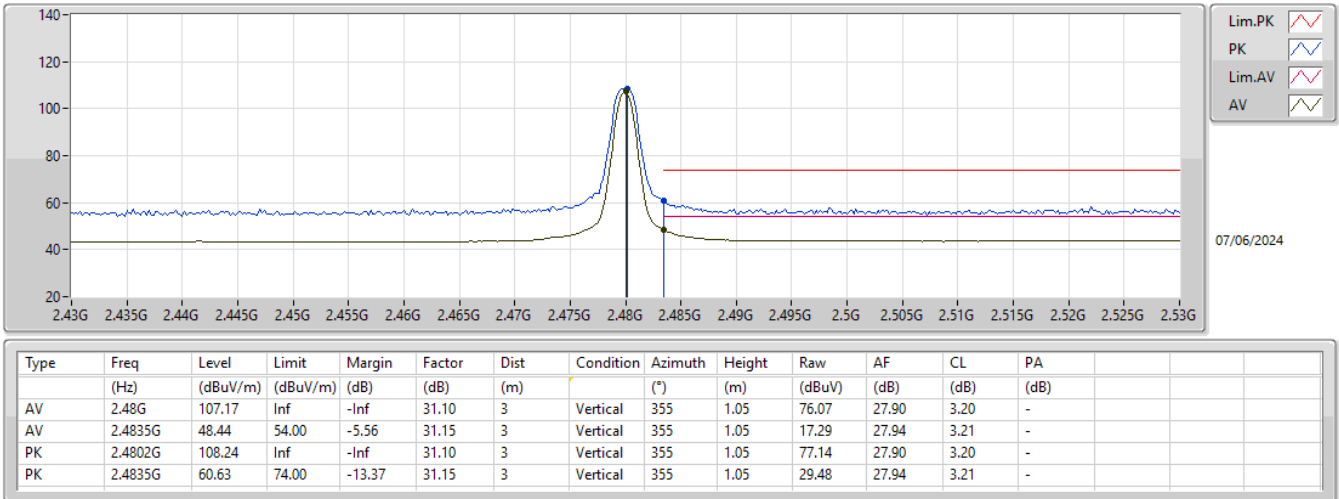
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.386G	43.02	54.00	-10.98	3	Vertical	13	1.12
2402MHz	Pass	AV	2.402G	106.79	Inf	-Inf	3	Vertical	13	1.12
2402MHz	Pass	PK	2.3668G	56.95	74.00	-17.05	3	Vertical	13	1.12
2402MHz	Pass	PK	2.4022G	107.88	Inf	-Inf	3	Vertical	13	1.12
2402MHz	Pass	AV	2.3898G	43.19	54.00	-10.81	3	Horizontal	64	1.16
2402MHz	Pass	AV	2.402G	110.16	Inf	-Inf	3	Horizontal	64	1.16
2402MHz	Pass	PK	2.389G	57.14	74.00	-16.86	3	Horizontal	64	1.16
2402MHz	Pass	PK	2.4022G	111.23	Inf	-Inf	3	Horizontal	64	1.16
2402MHz	Pass	AV	4.80388G	31.33	54.00	-22.67	3	Vertical	20	1.31
2402MHz	Pass	PK	4.80388G	43.08	74.00	-30.92	3	Vertical	20	1.31
2402MHz	Pass	AV	4.80387G	30.81	54.00	-23.19	3	Horizontal	0	2.08
2402MHz	Pass	PK	4.80432G	43.24	74.00	-30.76	3	Horizontal	0	2.08
2440MHz	Pass	AV	2.382G	42.92	54.00	-11.08	3	Vertical	14	1.00
2440MHz	Pass	AV	2.44G	108.00	Inf	-Inf	3	Vertical	14	1.00
2440MHz	Pass	AV	2.494G	43.64	54.00	-10.36	3	Vertical	14	1.00
2440MHz	Pass	PK	2.3724G	56.64	74.00	-17.36	3	Vertical	14	1.00
2440MHz	Pass	PK	2.4396G	109.11	Inf	-Inf	3	Vertical	14	1.00
2440MHz	Pass	PK	2.4872G	56.68	74.00	-17.32	3	Vertical	14	1.00
2440MHz	Pass	AV	2.3628G	43.04	54.00	-10.96	3	Horizontal	46	2.00
2440MHz	Pass	AV	2.44G	110.05	Inf	-Inf	3	Horizontal	46	2.00
2440MHz	Pass	AV	2.5G	43.72	54.00	-10.28	3	Horizontal	46	2.00
2440MHz	Pass	PK	2.3864G	56.36	74.00	-17.64	3	Horizontal	46	2.00
2440MHz	Pass	PK	2.4396G	111.14	Inf	-Inf	3	Horizontal	46	2.00
2440MHz	Pass	PK	2.488G	56.83	74.00	-17.17	3	Horizontal	46	2.00
2440MHz	Pass	AV	4.88002G	28.22	54.00	-25.78	3	Vertical	312	1.66
2440MHz	Pass	AV	7.32038G	39.08	54.00	-14.92	3	Vertical	360	1.50
2440MHz	Pass	PK	4.87922G	41.25	74.00	-32.75	3	Vertical	312	1.66
2440MHz	Pass	PK	7.31902G	51.10	74.00	-22.90	3	Vertical	360	1.50
2440MHz	Pass	AV	4.88009G	27.48	54.00	-26.52	3	Horizontal	62	1.05
2440MHz	Pass	AV	7.31927G	37.74	54.00	-16.26	3	Horizontal	340	1.50
2440MHz	Pass	PK	4.88017G	41.75	74.00	-32.25	3	Horizontal	62	1.05
2440MHz	Pass	PK	7.31899G	49.94	74.00	-24.06	3	Horizontal	340	1.50
2480MHz	Pass	AV	2.48G	107.17	Inf	-Inf	3	Vertical	355	1.05
2480MHz	Pass	AV	2.4835G	48.44	54.00	-5.56	3	Vertical	355	1.05
2480MHz	Pass	PK	2.4802G	108.24	Inf	-Inf	3	Vertical	355	1.05
2480MHz	Pass	PK	2.4835G	60.63	74.00	-13.37	3	Vertical	355	1.05
2480MHz	Pass	AV	2.48G	110.14	Inf	-Inf	3	Horizontal	56	2.10
2480MHz	Pass	AV	2.4835G	50.53	54.00	-3.47	3	Horizontal	56	2.10
2480MHz	Pass	PK	2.4796G	111.21	Inf	-Inf	3	Horizontal	56	2.10
2480MHz	Pass	PK	2.4835G	63.48	74.00	-10.52	3	Horizontal	56	2.10
2480MHz	Pass	AV	4.95993G	30.60	54.00	-23.40	3	Vertical	27	1.32
2480MHz	Pass	AV	7.44039G	40.73	54.00	-13.27	3	Vertical	46	2.24
2480MHz	Pass	PK	4.95978G	43.45	74.00	-30.55	3	Vertical	27	1.32
2480MHz	Pass	PK	7.4389G	52.80	74.00	-21.20	3	Vertical	46	2.24
2480MHz	Pass	AV	4.95991G	31.46	54.00	-22.54	3	Horizontal	59	1.11
2480MHz	Pass	AV	7.44033G	38.84	54.00	-15.16	3	Horizontal	343	1.20
2480MHz	Pass	PK	4.96013G	43.49	74.00	-30.51	3	Horizontal	59	1.11
2480MHz	Pass	PK	7.44063G	50.48	74.00	-23.52	3	Horizontal	343	1.20
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.389G	43.14	54.00	-10.86	3	Vertical	23	3.00
2402MHz	Pass	AV	2.402G	105.33	Inf	-Inf	3	Vertical	23	3.00
2402MHz	Pass	PK	2.3604G	56.91	74.00	-17.09	3	Vertical	23	3.00
2402MHz	Pass	PK	2.4024G	108.16	Inf	-Inf	3	Vertical	23	3.00
2402MHz	Pass	AV	2.3898G	43.32	54.00	-10.68	3	Horizontal	57	1.93
2402MHz	Pass	AV	2.402G	108.02	Inf	-Inf	3	Horizontal	57	1.93
2402MHz	Pass	PK	2.3552G	56.81	74.00	-17.19	3	Horizontal	57	1.93
2402MHz	Pass	PK	2.4024G	110.86	Inf	-Inf	3	Horizontal	57	1.93
2402MHz	Pass	AV	4.8048G	29.40	54.00	-24.60	3	Vertical	18	1.50
2402MHz	Pass	PK	4.805G	42.36	74.00	-31.64	3	Vertical	18	1.50
2402MHz	Pass	AV	4.80476G	29.49	54.00	-24.51	3	Horizontal	360	2.07

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
2402MHz	Pass	PK	4.80481G	42.22	74.00	-31.78	3	Horizontal	360	2.07
2440MHz	Pass	AV	2.382G	42.93	54.00	-11.07	3	Vertical	25	1.00
2440MHz	Pass	AV	2.44G	106.35	Inf	-Inf	3	Vertical	25	1.00
2440MHz	Pass	AV	2.4996G	43.74	54.00	-10.26	3	Vertical	25	1.00
2440MHz	Pass	PK	2.3884G	57.14	74.00	-16.86	3	Vertical	25	1.00
2440MHz	Pass	PK	2.4396G	109.23	Inf	-Inf	3	Vertical	25	1.00
2440MHz	Pass	PK	2.4984G	57.15	74.00	-16.85	3	Vertical	25	1.00
2440MHz	Pass	AV	2.3632G	42.98	54.00	-11.02	3	Horizontal	55	1.99
2440MHz	Pass	AV	2.44G	108.66	Inf	-Inf	3	Horizontal	55	1.99
2440MHz	Pass	AV	2.4996G	43.76	54.00	-10.24	3	Horizontal	55	1.99
2440MHz	Pass	PK	2.3824G	56.98	74.00	-17.02	3	Horizontal	55	1.99
2440MHz	Pass	PK	2.4396G	111.54	Inf	-Inf	3	Horizontal	55	1.99
2440MHz	Pass	PK	2.4988G	57.03	74.00	-16.97	3	Horizontal	55	1.99
2440MHz	Pass	AV	4.88094G	28.03	54.00	-25.97	3	Vertical	310	1.55
2440MHz	Pass	AV	7.32096G	38.91	54.00	-15.09	3	Vertical	360	1.50
2440MHz	Pass	PK	4.87839G	41.93	74.00	-32.07	3	Vertical	310	1.55
2440MHz	Pass	PK	7.31841G	51.37	74.00	-22.63	3	Vertical	360	1.50
2440MHz	Pass	AV	4.88158G	27.11	54.00	-26.89	3	Horizontal	36	1.50
2440MHz	Pass	AV	7.31868G	39.23	54.00	-14.77	3	Horizontal	338	1.38
2440MHz	Pass	PK	4.87956G	41.69	74.00	-32.31	3	Horizontal	36	1.50
2440MHz	Pass	PK	7.31833G	50.79	74.00	-23.21	3	Horizontal	338	1.38
2478MHz	Pass	AV	2.478G	93.31	Inf	-Inf	3	Vertical	356	1.02
2478MHz	Pass	AV	2.4836G	43.82	54.00	-10.18	3	Vertical	356	1.02
2478MHz	Pass	PK	2.4776G	96.14	Inf	-Inf	3	Vertical	356	1.02
2478MHz	Pass	PK	2.4978G	57.06	74.00	-16.94	3	Vertical	356	1.02
2478MHz	Pass	AV	2.478G	96.35	Inf	-Inf	3	Horizontal	54	2.11
2478MHz	Pass	AV	2.4835G	44.19	54.00	-9.81	3	Horizontal	54	2.11
2478MHz	Pass	PK	2.4784G	99.15	Inf	-Inf	3	Horizontal	54	2.11
2478MHz	Pass	PK	2.484G	57.63	74.00	-16.37	3	Horizontal	54	2.11
2478MHz	Pass	AV	4.95491G	29.20	54.00	-24.80	3	Vertical	24	1.25
2478MHz	Pass	AV	7.43505G	32.92	54.00	-21.08	3	Vertical	45	2.17
2478MHz	Pass	PK	4.95586G	42.65	74.00	-31.35	3	Vertical	24	1.25
2478MHz	Pass	PK	7.43568G	47.04	74.00	-26.96	3	Vertical	45	2.17
2478MHz	Pass	AV	4.95682G	29.17	54.00	-24.83	3	Horizontal	60	1.11
2478MHz	Pass	AV	7.43518G	32.42	54.00	-21.58	3	Horizontal	341	1.27
2478MHz	Pass	PK	4.95702G	42.35	74.00	-31.65	3	Horizontal	60	1.11
2478MHz	Pass	PK	7.43609G	46.13	74.00	-27.87	3	Horizontal	341	1.27
2480MHz	Pass	AV	2.386G	43.02	54.00	-10.98	3	Vertical	13	1.12
2480MHz	Pass	AV	2.402G	106.79	Inf	-Inf	3	Vertical	13	1.12
2480MHz	Pass	PK	2.3668G	56.95	74.00	-17.05	3	Vertical	13	1.12
2480MHz	Pass	PK	2.4022G	107.88	Inf	-Inf	3	Vertical	13	1.12
2480MHz	Pass	AV	2.3898G	43.19	54.00	-10.81	3	Horizontal	64	1.16
2480MHz	Pass	AV	2.402G	110.16	Inf	-Inf	3	Horizontal	64	1.16
2480MHz	Pass	PK	2.389G	57.14	74.00	-16.86	3	Horizontal	64	1.16
2480MHz	Pass	PK	2.4022G	111.23	Inf	-Inf	3	Horizontal	64	1.16
2480MHz	Pass	AV	4.80388G	31.33	54.00	-22.67	3	Vertical	20	1.31
2480MHz	Pass	PK	4.80388G	43.08	74.00	-30.92	3	Vertical	20	1.31
2480MHz	Pass	AV	4.80387G	30.81	54.00	-23.19	3	Horizontal	0	2.08
2480MHz	Pass	PK	4.80432G	43.24	74.00	-30.76	3	Horizontal	0	2.08

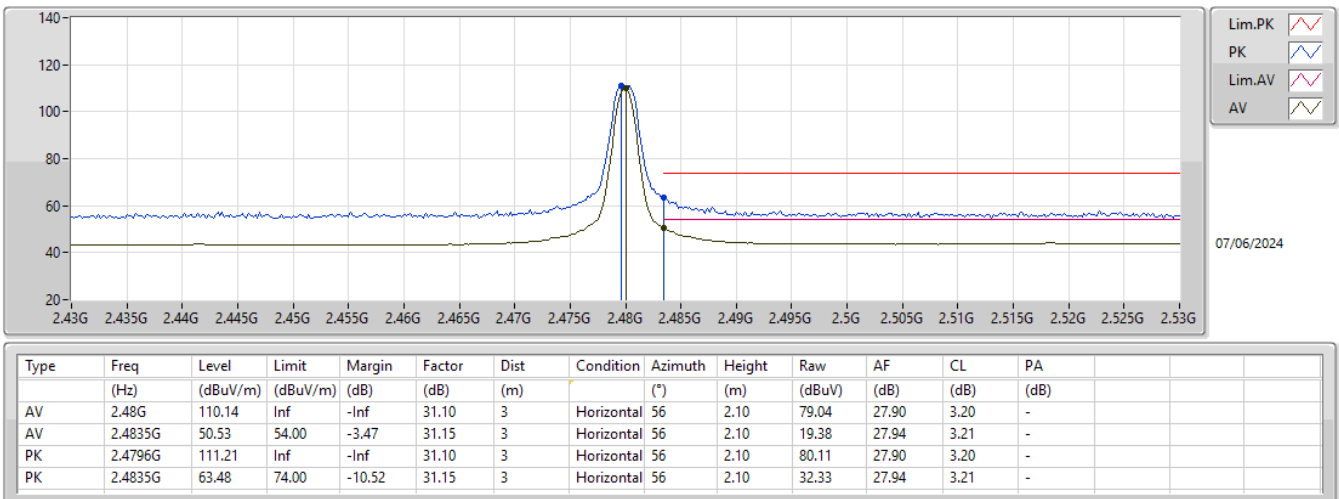
2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX



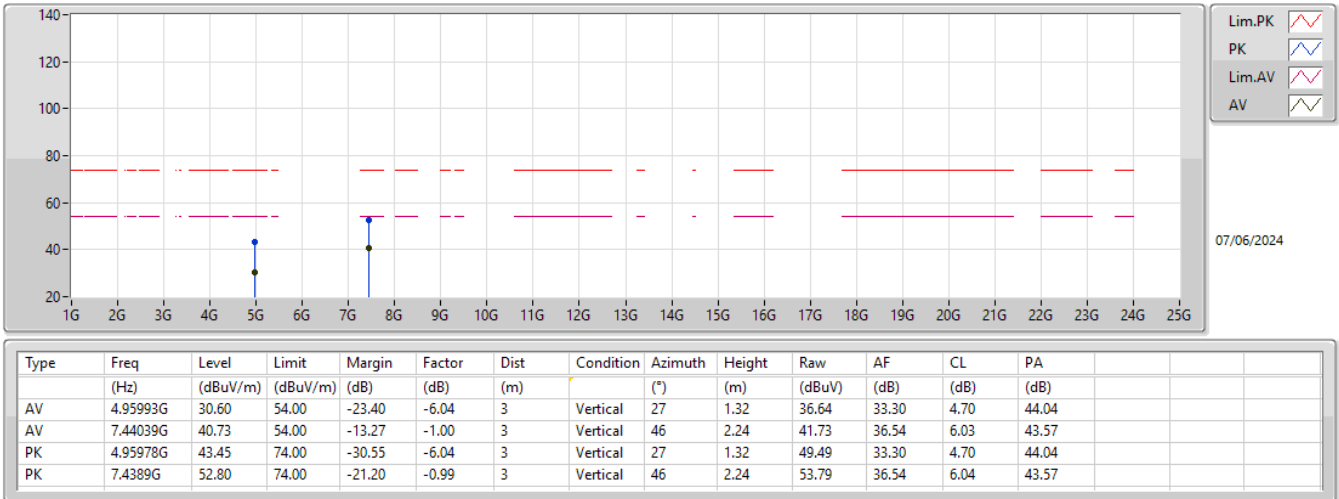
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2480MHz_TX



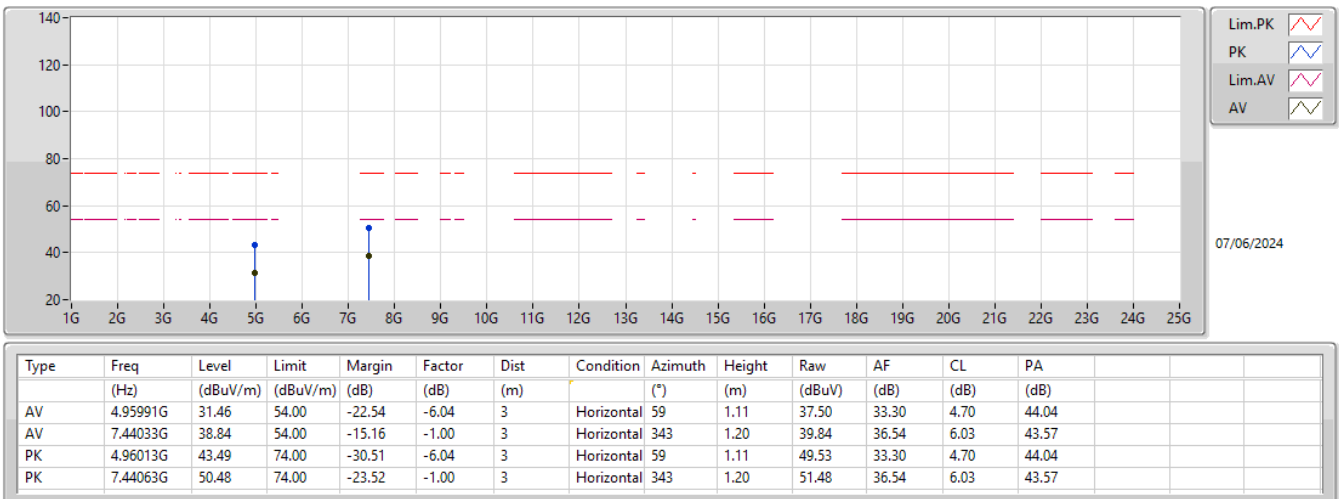
2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX



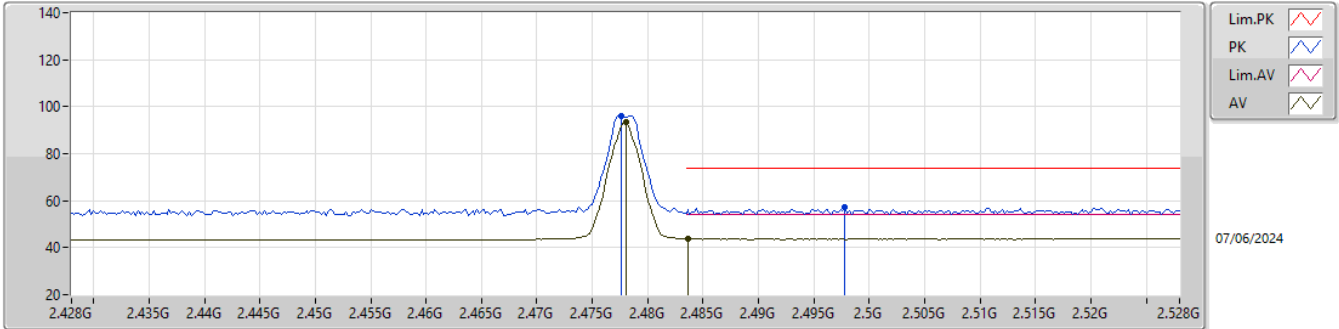
2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX



2.4-2.4835GHz_BT-LE(2Mbps)

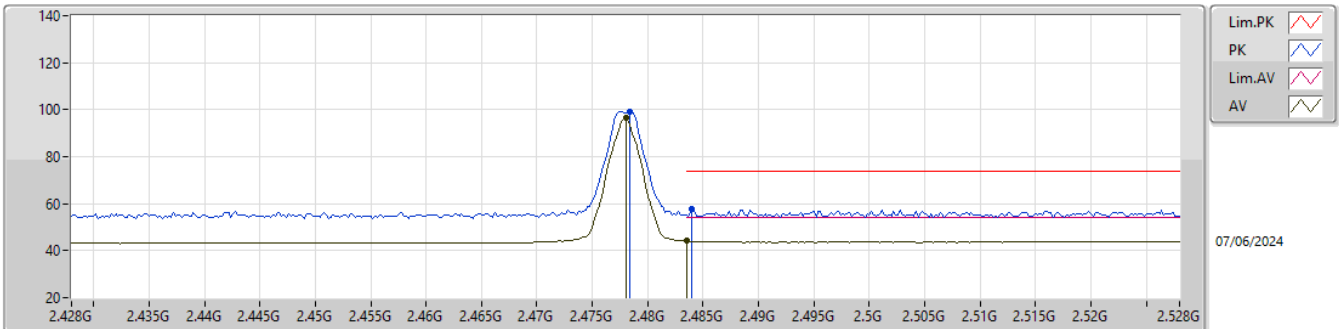
2478MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)
AV	2.478G	93.31	Inf	-Inf	31.08	3	Vertical	356	1.02	62.23	27.88	3.20	-
AV	2.4836G	43.82	54.00	-10.18	31.15	3	Vertical	356	1.02	12.67	27.94	3.21	-
PK	2.4776G	96.14	Inf	-Inf	31.08	3	Vertical	356	1.02	65.06	27.88	3.20	-
PK	2.4978G	57.06	74.00	-16.94	31.29	3	Vertical	356	1.02	25.77	28.08	3.21	-

2.4-2.4835GHz_BT-LE(2Mbps)

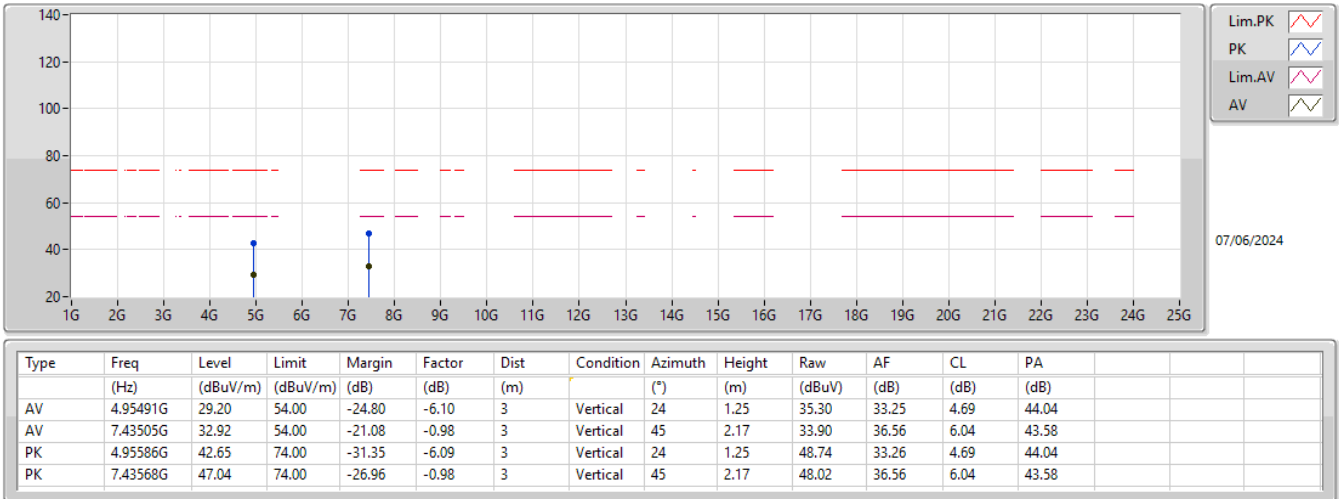
2478MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)
AV	2.478G	96.35	Inf	-Inf	31.08	3	Horizontal	54	2.11	65.27	27.88	3.20	-
AV	2.4835G	44.19	54.00	-9.81	31.15	3	Horizontal	54	2.11	13.04	27.94	3.21	-
PK	2.4784G	99.15	Inf	-Inf	31.08	3	Horizontal	54	2.11	68.07	27.88	3.20	-
PK	2.484G	57.63	74.00	-16.37	31.15	3	Horizontal	54	2.11	26.48	27.94	3.21	-

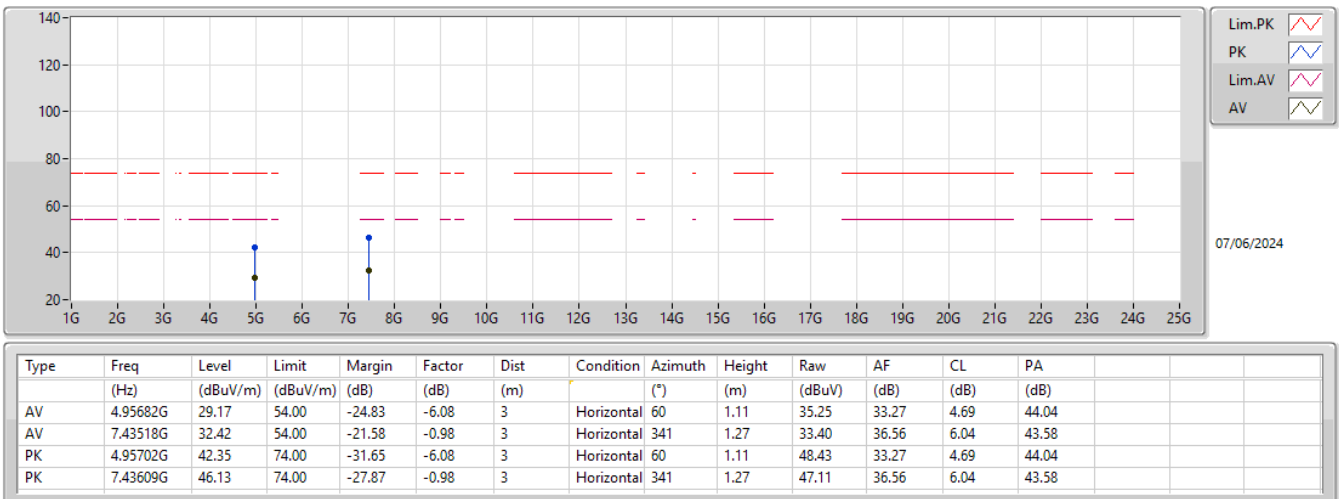
2.4-2.4835GHz_BT-LE(2Mbps)

2478MHz_TX



2.4-2.4835GHz_BT-LE(2Mbps)

2478MHz_TX





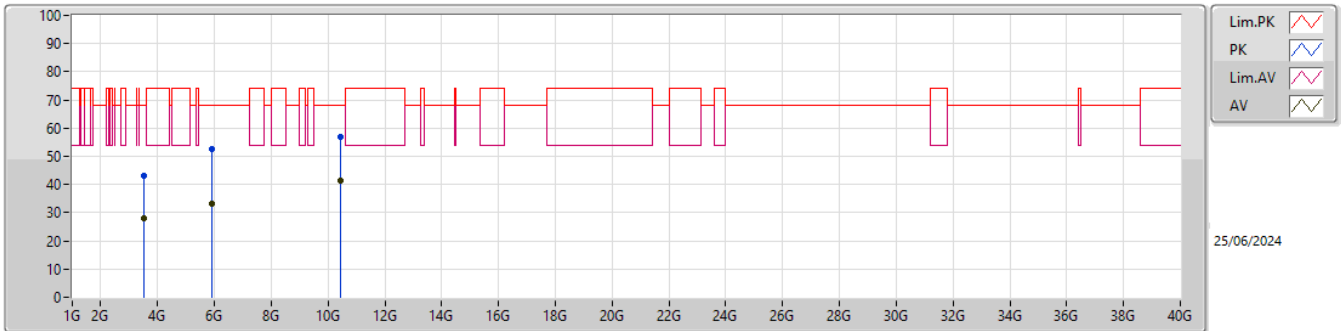
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	PK	10.15519G	57.30	68.20	-10.90	Horizontal
Mode 2	Pass	PK	10.4542G	56.87	68.20	-11.33	Vertical

Result

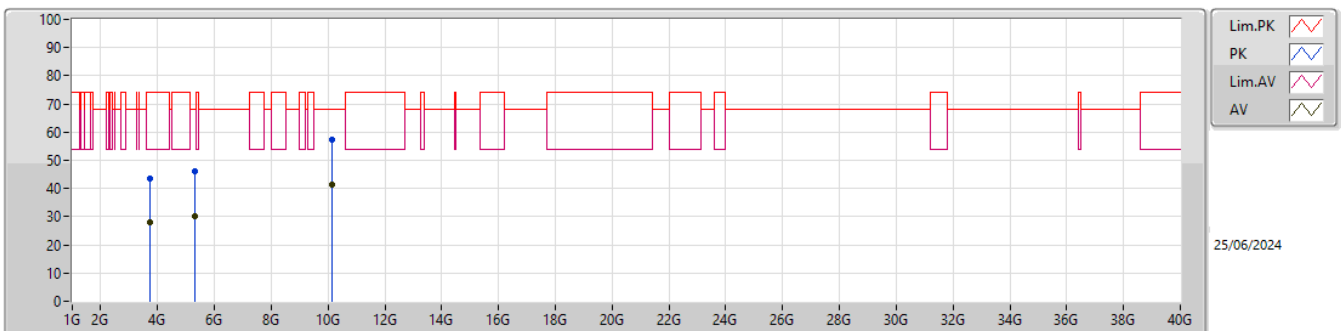
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
Mode 1	Pass	AV	3.52555G	27.81	68.20	-40.39	3	Vertical	46	1.81
Mode 1	Pass	AV	5.8998G	33.02	68.20	-35.18	3	Vertical	249	1.81
Mode 1	Pass	AV	10.42568G	41.20	68.20	-27.00	3	Vertical	54	1.18
Mode 1	Pass	PK	3.52555G	43.15	68.20	-25.05	3	Vertical	46	1.81
Mode 1	Pass	PK	5.8998G	52.78	68.20	-15.42	3	Vertical	249	1.81
Mode 1	Pass	PK	10.42568G	57.04	68.20	-11.16	3	Vertical	54	1.18
Mode 1	Pass	AV	3.75029G	28.09	54.00	-25.91	3	Horizontal	58	2.12
Mode 1	Pass	AV	5.29941G	29.97	68.20	-38.23	3	Horizontal	99	2.38
Mode 1	Pass	AV	10.15519G	41.41	68.20	-26.79	3	Horizontal	129	2.11
Mode 1	Pass	PK	3.75029G	43.42	74.00	-30.58	3	Horizontal	58	2.12
Mode 1	Pass	PK	5.29941G	45.93	68.20	-22.27	3	Horizontal	99	2.38
Mode 1	Pass	PK	10.15519G	57.30	68.20	-10.90	3	Horizontal	129	2.11
Mode 2	Pass	AV	3.07287G	27.63	68.20	-40.57	3	Vertical	103	1.93
Mode 2	Pass	AV	7.79388G	37.12	68.20	-31.08	3	Vertical	222	1.36
Mode 2	Pass	AV	10.4542G	41.33	68.20	-26.87	3	Vertical	147	2.45
Mode 2	Pass	PK	3.07287G	43.50	68.20	-24.70	3	Vertical	103	1.93
Mode 2	Pass	PK	7.79388G	53.06	68.20	-15.14	3	Vertical	222	1.36
Mode 2	Pass	PK	10.4542G	56.87	68.20	-11.33	3	Vertical	147	2.45
Mode 2	Pass	AV	3.06823G	27.85	68.20	-40.35	3	Horizontal	177	2.41
Mode 2	Pass	AV	6.48987G	33.96	68.20	-34.24	3	Horizontal	227	2.31
Mode 2	Pass	AV	10.05356G	40.64	68.20	-27.56	3	Horizontal	255	1.52
Mode 2	Pass	PK	3.06823G	43.18	68.20	-25.02	3	Horizontal	177	2.41
Mode 2	Pass	PK	6.48987G	55.32	68.20	-12.88	3	Horizontal	227	2.31
Mode 2	Pass	PK	10.05356G	55.92	68.20	-12.28	3	Horizontal	255	1.52

Radiated Emissions above 1GHz_Mode 1



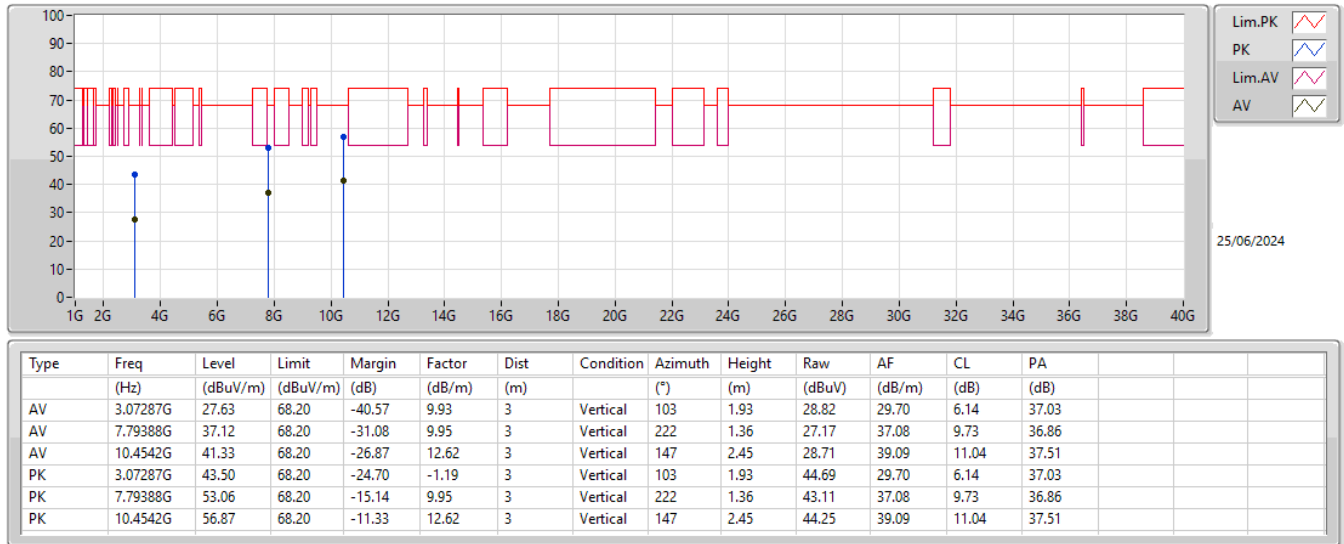
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Raw (dBuV)	AF (dB/m)	CL (dB)	PA (dB)
AV	3.52555G	27.81	68.20	-40.39	-1.03	3	Vertical	46	1.81	28.84	29.65	6.63	37.31
AV	5.8998G	33.02	68.20	-35.18	5.85	3	Vertical	249	1.81	27.17	34.50	8.39	37.04
AV	10.42568G	41.20	68.20	-27.00	12.63	3	Vertical	54	1.18	28.57	39.10	11.05	37.52
PK	3.52555G	43.15	68.20	-25.05	-1.03	3	Vertical	46	1.81	44.18	29.65	6.63	37.31
PK	5.8998G	52.78	68.20	-15.42	5.85	3	Vertical	249	1.81	46.93	34.50	8.39	37.04
PK	10.42568G	57.04	68.20	-11.16	12.63	3	Vertical	54	1.18	44.41	39.10	11.05	37.52

Radiated Emissions above 1GHz_Mode 1



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Raw (dBuV)	AF (dB/m)	CL (dB)	PA (dB)
AV	3.75029G	28.09	54.00	-25.91	-0.42	3	Horizontal	58	2.12	28.51	30.20	6.83	37.45
AV	5.29941G	29.97	68.20	-38.23	3.73	3	Horizontal	99	2.38	26.24	33.00	8.01	37.28
AV	10.15519G	41.41	68.20	-26.79	12.54	3	Horizontal	129	2.11	28.87	39.00	11.12	37.58
PK	3.75029G	43.42	74.00	-30.58	-0.42	3	Horizontal	58	2.12	43.84	30.20	6.83	37.45
PK	5.29941G	45.93	68.20	-22.27	3.73	3	Horizontal	99	2.38	42.20	33.00	8.01	37.28
PK	10.15519G	57.30	68.20	-10.90	12.54	3	Horizontal	129	2.11	44.76	39.00	11.12	37.58

Radiated Emissions above 1GHz_Mode 2



Radiated Emissions above 1GHz_Mode 2

