

FCC Radio Test Report

FCC ID : TVE-240609

Equipment : Secured Network Extension Device

Brand Name : FORTINET

Model Name : FortiExtenderRugged 511Gxxxxxxxxxx,
FORTIEXTENDERRUGGED-511Gxxxxxxxxxx,
FER-511Gxxxxxxxxxx
(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 Apr. 02, 2024, and testing was started from Apr. 17, 2024 and completed on Jul. 10, 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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History of this test report

TEL : 886-3-3273456
FAX : 886-3-3270973
Report Template No.: HE1-C10 Ver4.3
FCC ID: TVE-240609

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: Julie Tseng

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(1Mbps)	1.0	1TX
2.4-2.4835GHz	BT-LE(2Mbps)	2.0	1TX

Note:

- ♦ Bluetooth LE uses a GFSK (1Mbps/2Mbps) modulation.
- ♦ BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Support
5	1	ADVANCED WIRELESS & ANTENNA Inc.	A8L8P-200000	Dipole	I-PEX	2.4G+5G
6	2	ADVANCED WIRELESS & ANTENNA Inc.	A8L8M-200000	Dipole	I-PEX	2.4G+5G
7	1	ADVANCED WIRELESS & ANTENNA Inc.	A8L8P-200000	Dipole	I-PEX	BT

Ant.	Port	Gain (dBi)			Remark
		2.4G	5G	BT	
5	1	4.84	4.34	-	Radio1_5G& Radio2_2.4G
6	2	5.25	4.94	-	
7	1	-	-	4.93	BT

For 2.4GHz function:

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

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

For 5GHz function:

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

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

For Bluetooth function:

For Bluetooth mode (1TX/1RX)

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

1.1.3 EUT Information

Operational Condition	
EUT Power Type	From 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)	0.856	0.68	2.139m	1k
BT-LE(2Mbps)	0.577	2.39	1.083m	1k

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	FortiExtenderRugged 511Gxxxxxxxxx, FORTIEXTENDERRUGGED-511Gxxxxxxxxxx, FER-511Gxxxxxxxxxx (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 for difference brand served as marketing strategy.

From the above models, model: FER-511G 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	Lego Lin	21.3~22.6°C / 52~55%	26/Apr/2024
RF Conducted	TH07-HY	Yuna Lin	22.8~23.8°C / 51~60%	22/Apr/2024~23/Apr/2024
Radiated (Co-location)	03CH03-HY	Edward Wang	22.2~24.5°C / 56~58%	10/Jul/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			
Test site Designation No. TW0036 with FCC.				
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
Radiated	03CH24-HY	AndyWang	20.6~24.5°C / 56~66%	17/Apr/2024~19/Apr/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	PuTTY Release 0.62
-----------------------	--------------------

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	60
2440MHz	60
2480MHz	60
BT-LE(2Mbps)	-
2402MHz	60
2440MHz	60
2480MHz	60

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	PoE 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	PoE mode
Operating Mode > 1GHz	CTX
Orthogonal Planes of EUT	Y Plane
	

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Test Condition	Radiated measurement
Operating Mode	CTX
1	Radio1_2.4G+Radio2_5G+Bluetooth+WWAN
Refer to Sporton Test Report No.: FA390701 for Co-location RF Exposure Evaluation and Appendix G for Radiated Emission Co-location.	

2.3 Accessories

Accessories				
Pole clamp	Brand Name	JIN GIAN DA FA	Model Name	6513A0083000

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

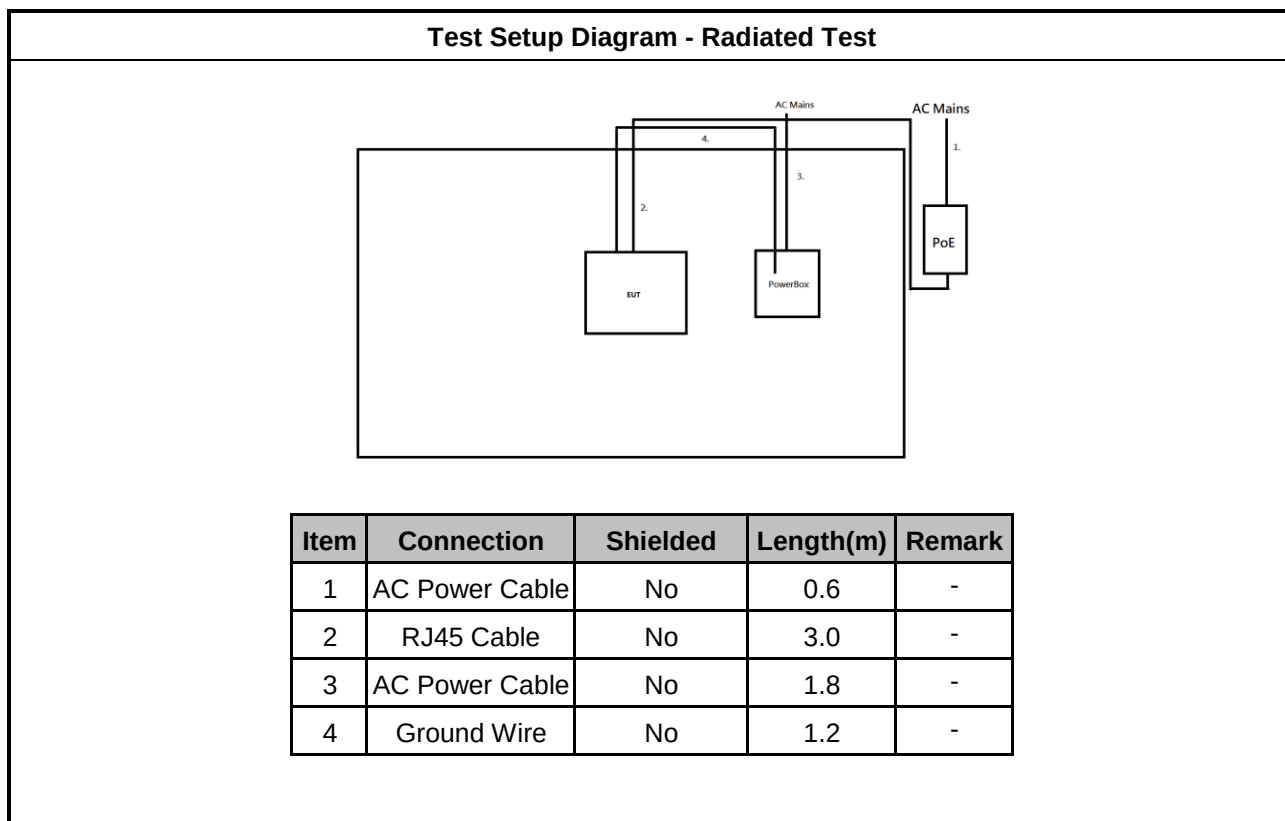
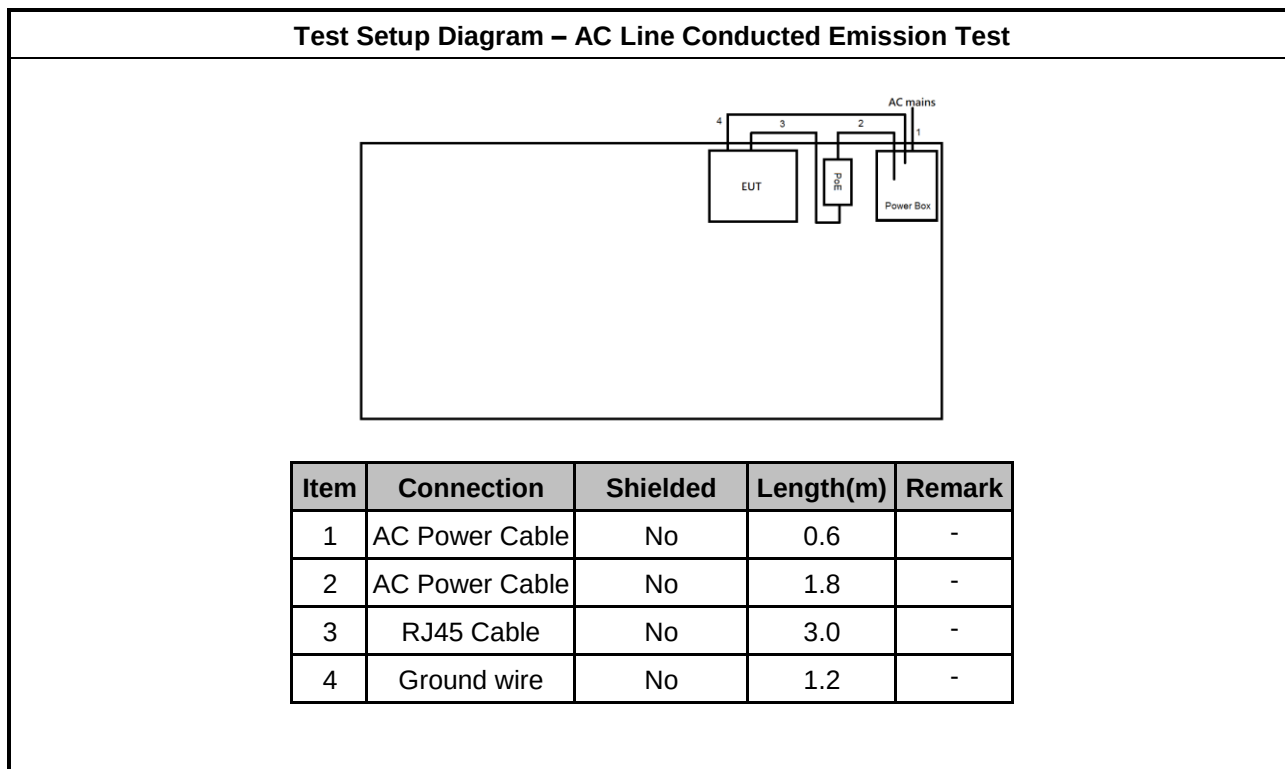
2.4 Support Equipment

Support Equipment – AC Conduction					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	PoE	EnGenius	EPA5006GAT	-	Provided by Customer
2	Ground wire	N/A	N/A	-	Provided by Customer

Support Equipment – Conducted					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	Notebook	DELL	E5410	-	-
2	Adapter for NB	DELL	HA65NM130	-	-

Support Equipment – Radiated					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	Ground wire	N/A	N/A	-	Provided by Customer
2	PoE	EnGenius	EPA5006GAT	-	Provided by Customer / Remote

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

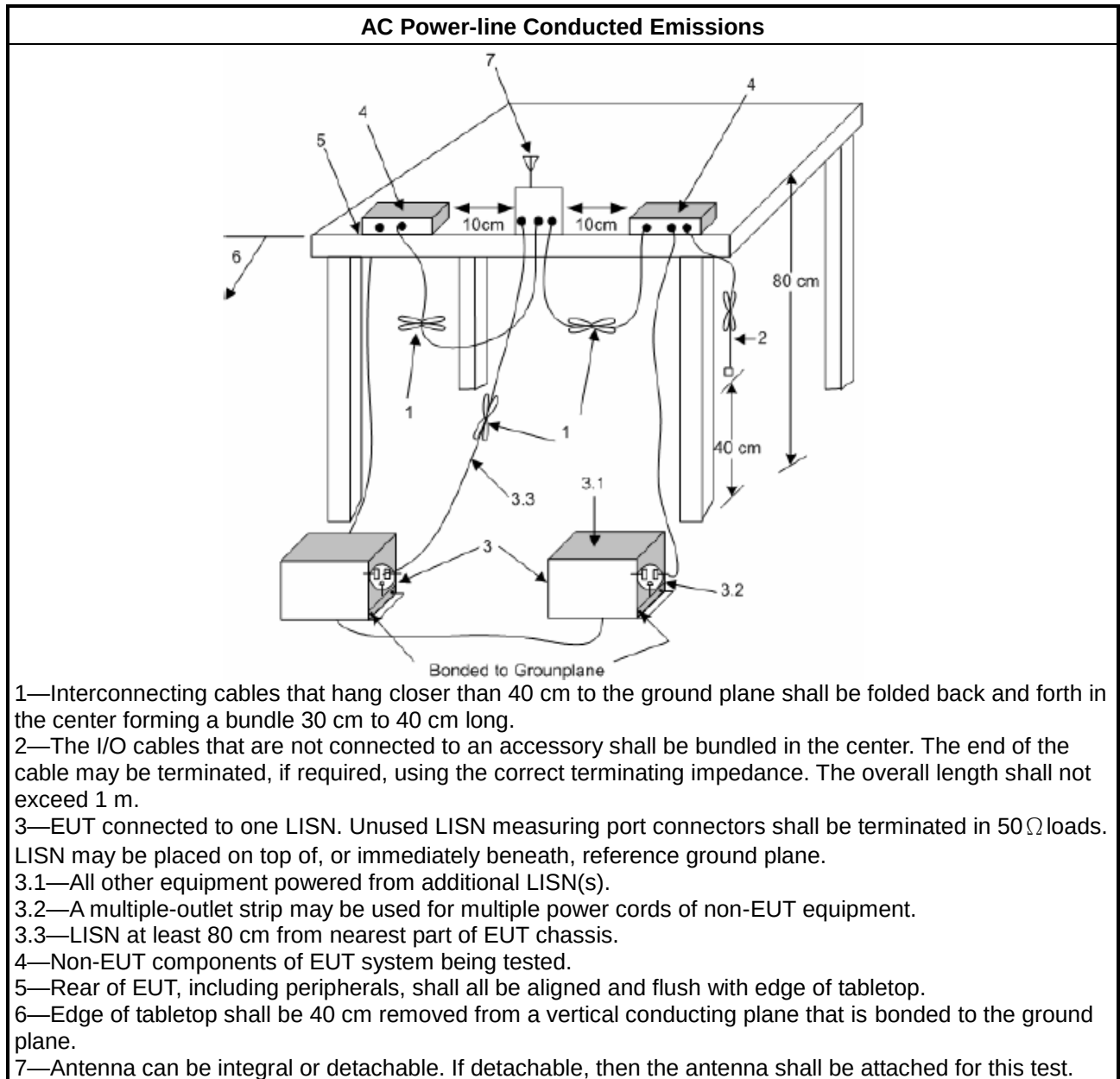
Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 foray power-line conducted emissions.

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.

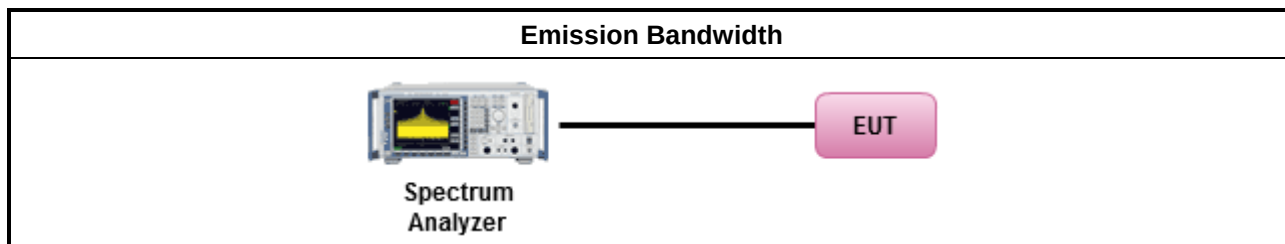
3.2.2 Measuring Instruments

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.	

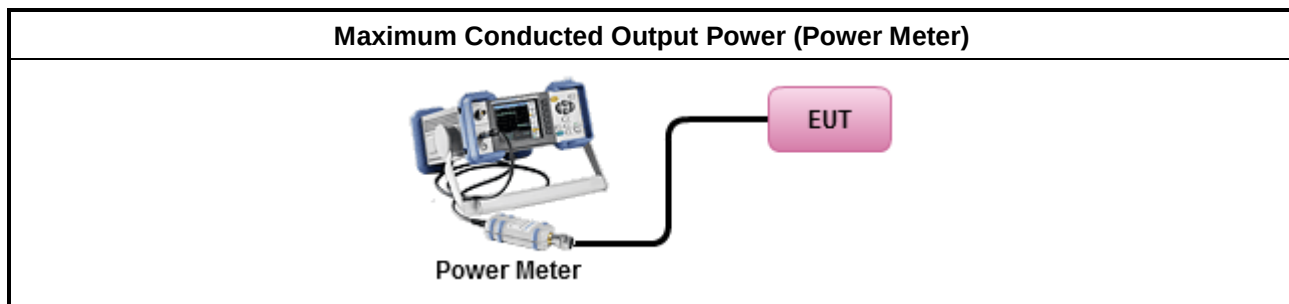
3.3.2 Measuring Instruments

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

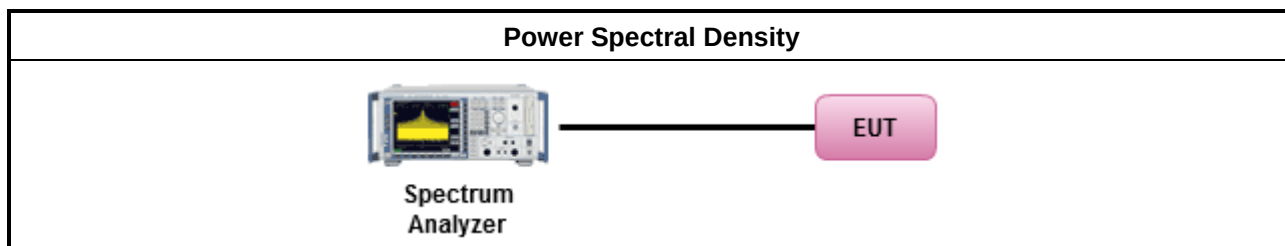
3.4.2 Measuring Instruments

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.	

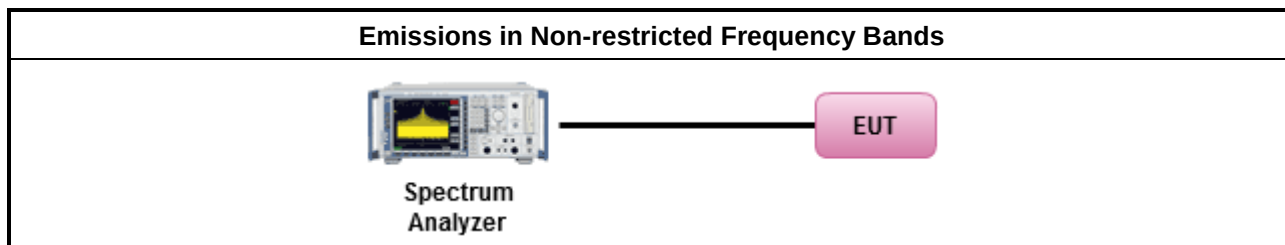
3.5.2 Measuring Instruments

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

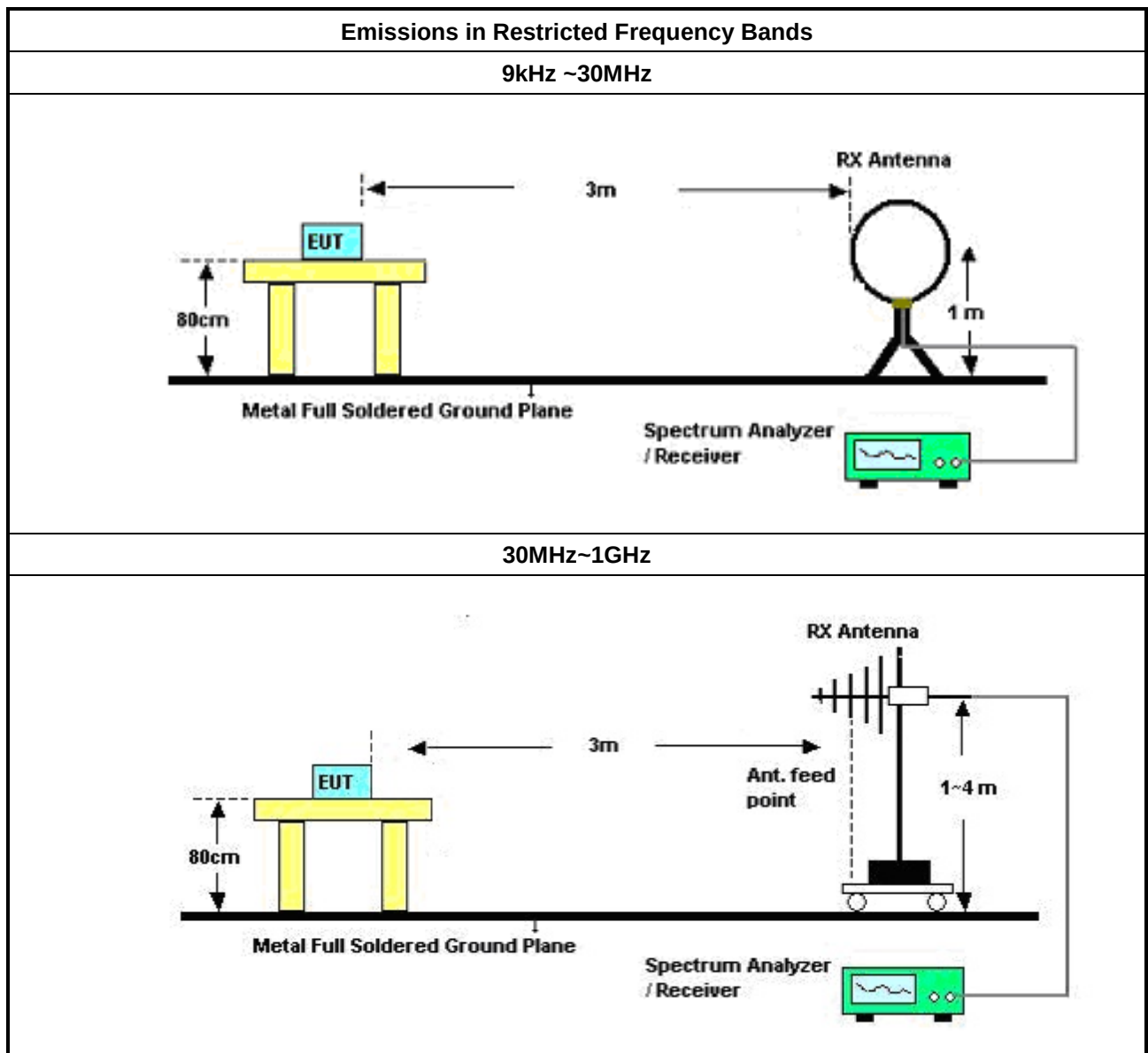
Test Method	
The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].	
Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.	
For the transmitter unwanted 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.

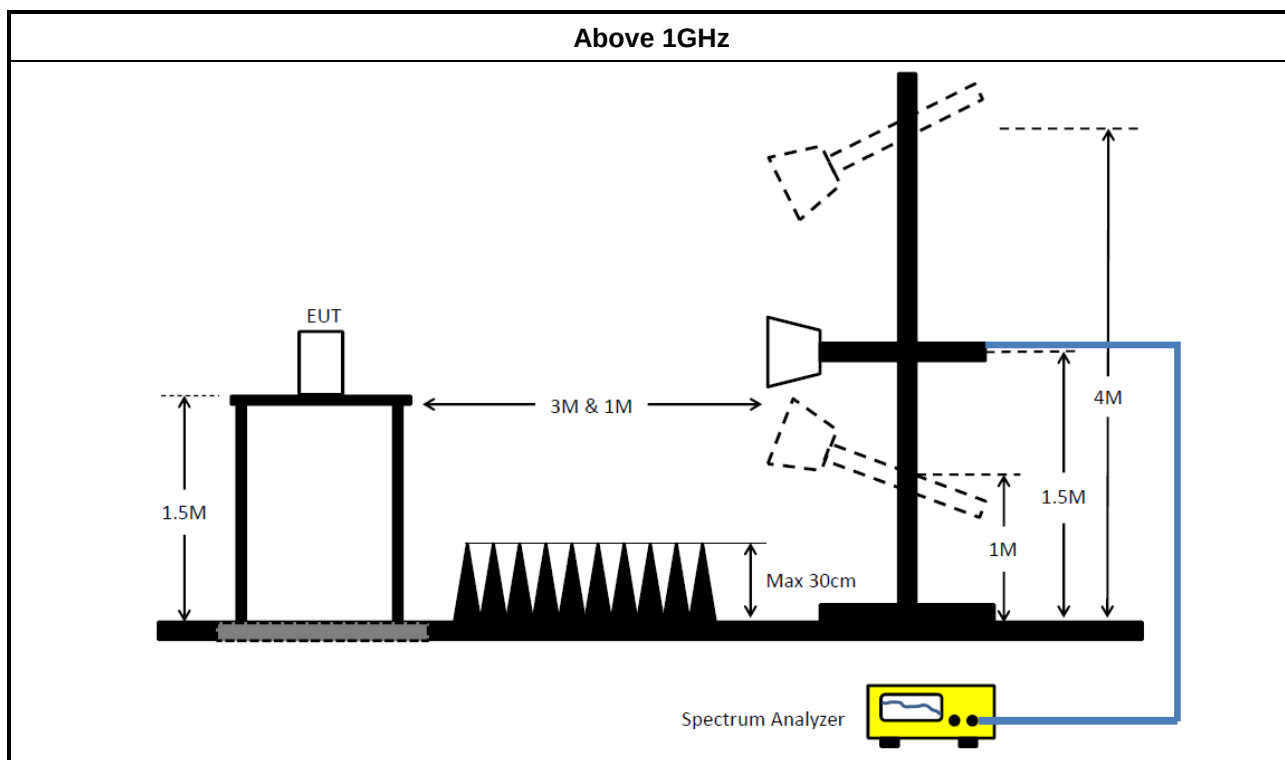
3.6.4 Measurement Results Calculation

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	16/May/2023	15/May/2024
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
Impuls Begrenzer 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	101515	9kHz~40GHz	02/Feb/2024	01/Feb/2025
SMB100A Signal Generator	R&S	SMB100A	181147	100kHz~40GHz	20/Oct/2023	19/Oct/2024
Power Meter	Anritsu	ML2495A	1517010	300MHz~40GHz	15/Dec/2023	14/Dec/2024
Pulse Sensor	Anritsu	MA2411B	1339407	300MHz~40GHz	15/Dec/2023	14/Dec/2024
SENSE-15247_FS	Sporton	V5.11.18	N/A	N/A	N/A	N/A

Instrument for Radiated Test (03CH24-HY)

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
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH24-HY	1GHz~18GHz 3m	03/Aug/2023	02/Aug/2024
EMI Test Receiver	ROHDE & SCHWARZ	ESR	102318	9kHz~3.6GHz	27/Dec/2023	26/Dec/2024
Signal Analyzer	ROHDE&SCHWARZ	FSV3044	101345	10Hz~44GHz	10/Aug/2023	09/Aug/2024
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	19/Mar/2024	18/Mar/2025
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	02744	1GHz~18GHz	17/Aug/2023	16/Aug/2024
RF Cable	HUBER+SUHNER	SUOFLEX 104	CB002	9kHz~1GHz	21/Jul/2023	20/Jul/2024
RF Cable	HUBER+SUHNER	SUOFLEX 102	CB001	1GHz~40GHz	21/Jul/2023	20/Jul/2024
Pre-Amplifier	Aglient	8447D	2944A06292	30MHz~1GHz	26/Apr/2023	25/Apr/2024
Amplifier	EM	EM01G18G	060870	1GHz ~18GHz	10/Aug/2023	09/Aug/2024
Bilog Antenna & 6dB Attenuator	TESEQ & VGT	CBL 6111D & VFA 04002-06	63537/001	30MHz~1GHz	31/May/2023	30/May/2024
Preamplifier	SGH	PRAMP 903	20230515-2	25MHz~3GHz	25/May/2023	24/May/2024
Amplifier	EM	EM18G40GA	060874	18GHz ~40GHz	15/Apr/2024	14/Apr/2025
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	01248	18GHz ~ 40GHz	21/Aug/2023	20/Aug/2024

Instrument for Radiated Test (03CH03-HY)

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz~18GHz 3m	28/Jul/2023	27/Jul/2024
Signal Analyzer	R&S	FSV40	101500	10Hz~40GHz	26/Oct/2023	25/Oct/2024
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	02267	1GHz~18GHz	04/Oct/2023	03/Oct/2024
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170154	18GHz ~ 40GHz	04/Jun/2024	03/Jun/2025
RF CABLE 5+8 m	HUBER+SUHNER	SUOFLEX 104	03CH03-cabl e-03	1GHz~40GHz	20/Feb/2024	19/Feb/2025
Microwave Preamplifier	Agilent	8449B	3008A02326	1GHz~26.5GHz	26/Jul/2023	25/Jul/2024
Amplifier	EMC INSTRUMENTS	EM18G40G	060604	18GHz ~ 40GHz	19/Apr/2024	18/Apr/2025
SENSE-EMI	Sporton	V5.11.6	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	AV	515.002k	42.80	46.00	-3.20	Line

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	189.837k	40.19	64.05	-23.86	Line
Mode 1	Pass	AV	189.837k	25.13	54.05	-28.92	Line
Mode 1	Pass	QP	277.385k	33.37	60.89	-27.52	Line
Mode 1	Pass	AV	277.385k	26.69	50.89	-24.20	Line
Mode 1	Pass	QP	455.055k	37.37	56.78	-19.41	Line
Mode 1	Pass	AV	455.055k	31.52	46.78	-15.26	Line
Mode 1	Pass	QP	515.002k	47.47	56.00	-8.53	Line
Mode 1	Pass	AV	515.002k	42.80	46.00	-3.20	Line
Mode 1	Pass	QP	1.305M	34.08	56.00	-21.92	Line
Mode 1	Pass	AV	1.305M	29.81	46.00	-16.19	Line
Mode 1	Pass	QP	10.323M	39.41	60.00	-20.59	Line
Mode 1	Pass	AV	10.323M	34.25	50.00	-15.75	Line
Mode 1	Pass	QP	155.487k	46.68	65.69	-19.01	Neutral
Mode 1	Pass	AV	155.487k	30.22	55.69	-25.47	Neutral
Mode 1	Pass	QP	167.071k	44.31	65.10	-20.79	Neutral
Mode 1	Pass	AV	167.071k	27.10	55.10	-28.00	Neutral
Mode 1	Pass	QP	523.291k	46.61	56.00	-9.39	Neutral
Mode 1	Pass	AV	523.291k	40.92	46.00	-5.08	Neutral
Mode 1	Pass	QP	5.216M	30.59	60.00	-29.41	Neutral
Mode 1	Pass	AV	5.216M	24.08	50.00	-25.92	Neutral
Mode 1	Pass	QP	10.873M	38.14	60.00	-21.86	Neutral
Mode 1	Pass	AV	10.873M	32.97	50.00	-17.03	Neutral
Mode 1	Pass	QP	16.668M	33.19	60.00	-26.81	Neutral
Mode 1	Pass	AV	16.668M	28.23	50.00	-21.77	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	189.837k	40.19	64.05	-23.86	9.82	Line	-	30.37	0.04	0.09	9.69						
AV	189.837k	25.13	54.05	-28.92	9.82	Line	-	15.31	0.04	0.09	9.69						
QP	277.385k	33.37	60.89	-27.52	9.86	Line	-	23.51	0.04	0.10	9.72						
AV	277.385k	26.69	50.89	-24.20	9.86	Line	-	16.83	0.04	0.10	9.72						
QP	455.055k	37.37	56.78	-19.41	9.94	Line	-	27.43	0.05	0.12	9.77						
AV	455.055k	31.52	46.78	-15.26	9.94	Line	-	21.58	0.05	0.12	9.77						
QP	515.002k	47.47	56.00	-8.53	9.93	Line	-	37.54	0.05	0.11	9.77						
AV	515.002k	42.80	46.00	-3.20	9.93	Line	-	32.87	0.05	0.11	9.77						
QP	1.305M	34.08	56.00	-21.92	9.96	Line	-	24.12	0.06	0.10	9.80						
AV	1.305M	29.81	46.00	-16.19	9.96	Line	-	19.85	0.06	0.10	9.80						
QP	10.323M	39.41	60.00	-20.59	10.05	Line	-	29.36	0.21	0.05	9.79						
AV	10.323M	34.25	50.00	-15.75	10.05	Line	-	24.20	0.21	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	155.487k	46.68	65.69	-19.01	9.88	Neutral	-	36.80	0.06	0.07	9.75						
AV	155.487k	30.22	55.69	-25.47	9.88	Neutral	-	20.34	0.06	0.07	9.75						
QP	167.071k	44.31	65.10	-20.79	9.86	Neutral	-	34.45	0.06	0.07	9.73						
AV	167.071k	27.10	55.10	-28.00	9.86	Neutral	-	17.24	0.06	0.07	9.73						
QP	523.291k	46.61	56.00	-9.39	9.95	Neutral	-	36.66	0.07	0.11	9.77						
AV	523.291k	40.92	46.00	-5.08	9.95	Neutral	-	30.97	0.07	0.11	9.77						
QP	5.216M	30.59	60.00	-29.41	10.02	Neutral	-	20.57	0.17	0.06	9.79						
AV	5.216M	24.08	50.00	-25.92	10.02	Neutral	-	14.06	0.17	0.06	9.79						
QP	10.873M	38.14	60.00	-21.86	10.14	Neutral	-	28.00	0.28	0.06	9.80						
AV	10.873M	32.97	50.00	-17.03	10.14	Neutral	-	22.83	0.28	0.06	9.80						
QP	16.668M	33.19	60.00	-26.81	10.29	Neutral	-	22.90	0.36	0.10	9.83						
AV	16.668M	28.23	50.00	-21.77	10.29	Neutral	-	17.94	0.36	0.10	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)	653.75k	1.034M	1M03F1D	640k	1.015M
BT-LE(2Mbps)	1.4M	2.038M	2M04F1D	1.33M	2.017M

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

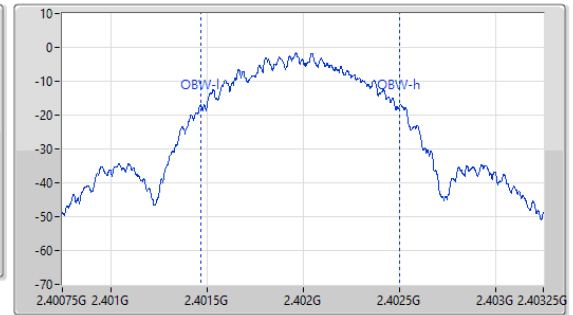
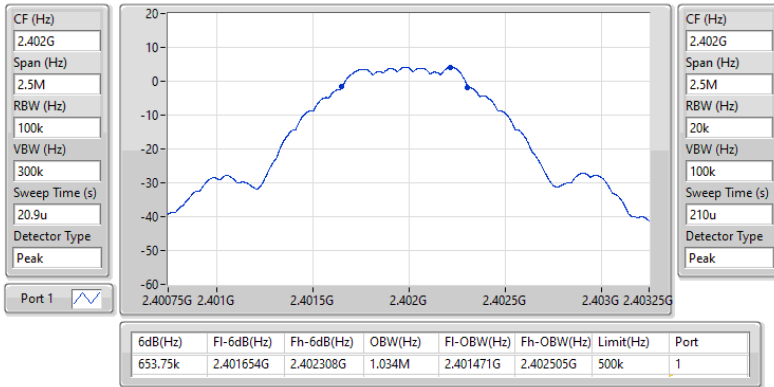
**Result**

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	653.75k	1.034M
2440MHz	Pass	500k	642.5k	1.015M
2480MHz	Pass	500k	640k	1.025M
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	500k	1.4M	2.028M
2440MHz	Pass	500k	1.38M	2.017M
2480MHz	Pass	500k	1.33M	2.038M

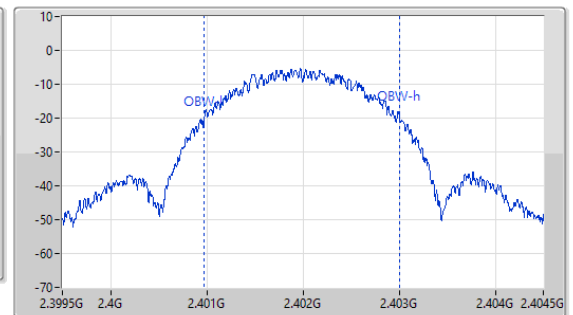
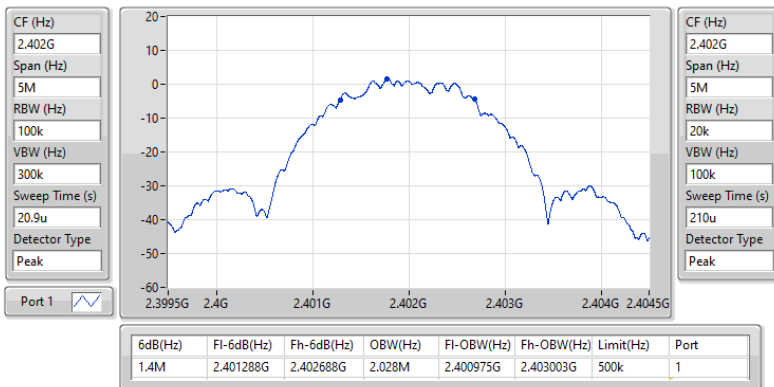
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

2.4-2.4835GHz_BT-LE(1Mbps)
EBW-DTS
2402MHz

23/04/2024


2.4-2.4835GHz_BT-LE(2Mbps)
EBW-DTS
2402MHz

23/04/2024





Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	5.04	0.00319
BT-LE(2Mbps)	5.02	0.00318

**Result**

Mode	Result	DG (dBi)	Total Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.93	5.04	30.00
2440MHz	Pass	4.93	4.88	30.00
2480MHz	Pass	4.93	4.74	30.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	4.93	5.02	30.00
2440MHz	Pass	4.93	4.75	30.00
2480MHz	Pass	4.93	4.72	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)	-10.95
BT-LE(2Mbps)	-13.82

RBW = 3kHz;

Result

Mode	Result	DG (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.93	-10.95	8.00
2440MHz	Pass	4.93	-11.35	8.00
2480MHz	Pass	4.93	-11.48	8.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	4.93	-13.82	8.00
2440MHz	Pass	4.93	-13.90	8.00
2480MHz	Pass	4.93	-14.39	8.00

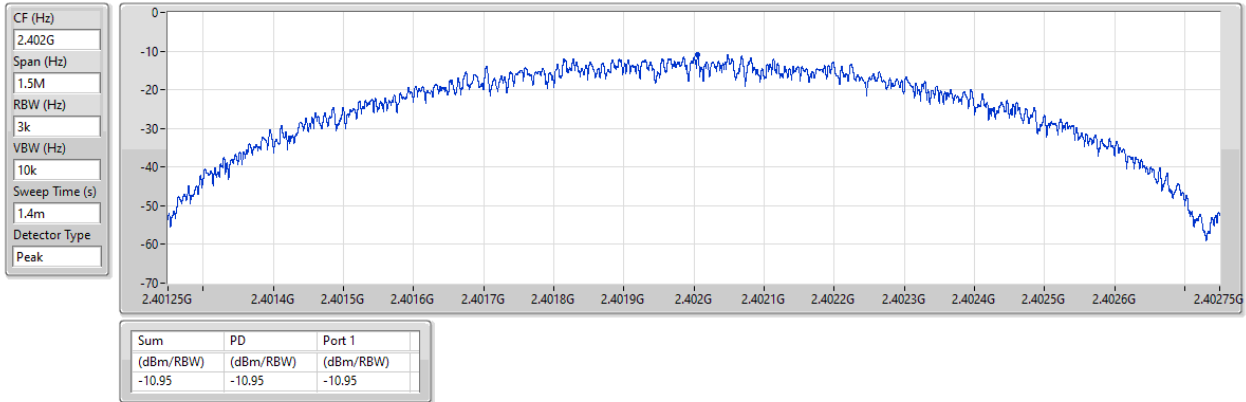
DG = Directional Gain; RBW = 3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;
Inf = There's no restriction for the limit.

2.4-2.4835GHz_BT-LE(1Mbps)

PSD

2402MHz

23/04/2024

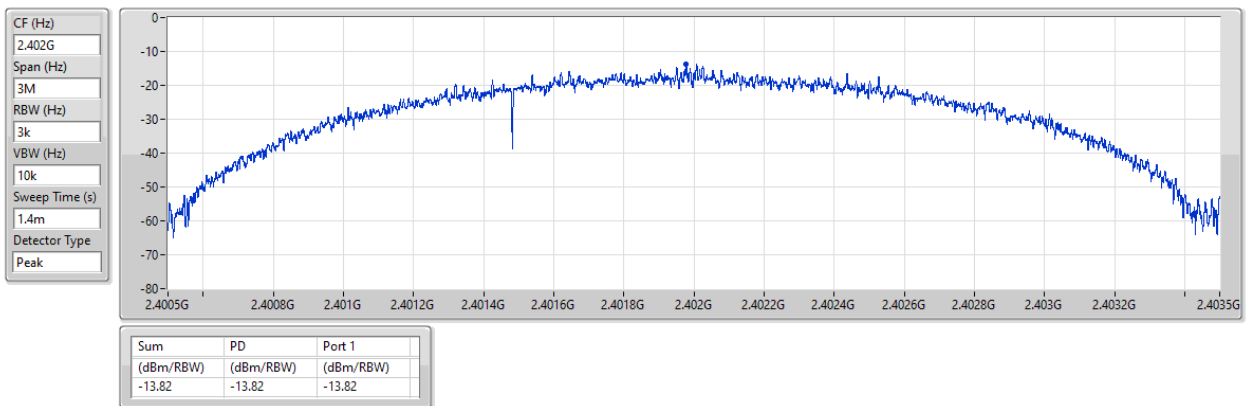


2.4-2.4835GHz_BT-LE(2Mbps)

PSD

2402MHz

23/04/2024



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	2.40217G	5.13	-24.87	2.13325G	-53.91	2.4G	-41.51	2.4G	-42.39	2.50126G	-53.03	21.51023G	-43.85	1
BT-LE(2Mbps)	Pass	2.402G	4.80	-25.20	2.3095G	-54.11	2.4G	-28.45	2.4G	-28.69	2.50106G	-53.10	21.62271G	-44.18	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	2.40217G	5.13	-24.87	2.13325G	-53.91	2.4G	-41.51	2.4G	-42.39	2.50126G	-53.03	21.51023G	-43.85	1
2440MHz	Pass	2.40217G	5.13	-24.87	1.88415G	-54.73	2.3966G	-52.19	2.4G	-55.46	2.50114G	-53.26	21.53273G	-44.58	1
2480MHz	Pass	2.40217G	5.13	-24.87	1.92528G	-54.37	2.392G	-51.56	2.4G	-57.42	2.50014G	-50.65	21.61709G	-44.02	1
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.402G	4.80	-25.20	2.3095G	-54.11	2.4G	-28.45	2.4G	-28.69	2.50106G	-53.10	21.62271G	-44.18	1
2440MHz	Pass	2.402G	4.80	-25.20	1.95935G	-54.51	2.39648G	-52.32	2.4G	-57.36	2.50026G	-53.22	21.6902G	-43.32	1
2480MHz	Pass	2.402G	4.80	-25.20	1.96875G	-54.96	2.39796G	-52.11	2.4G	-57.06	2.50266G	-52.34	21.99953G	-43.60	1

2.4-2.4835GHz_BT-LE(1Mbps)

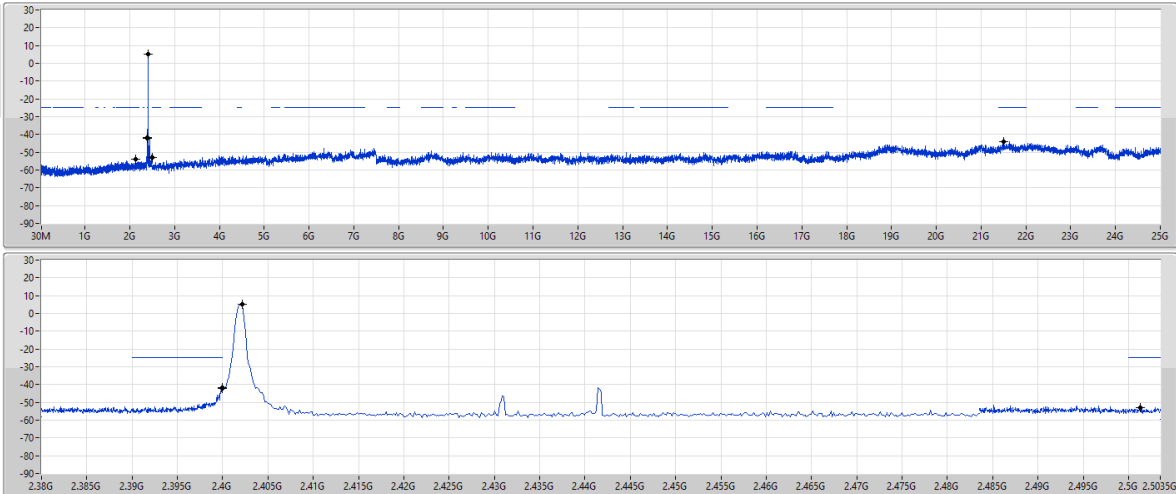
CSEndB-DTS

2402MHz

23/04/2024

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
2.40217G	5.13	-24.87	2.13325G	-53.91	2.4G	-41.51	2.4G	-42.39	2.50126G	-53.03	2.151023G	-43.85	1

2.4-2.4835GHz_BT-LE(2Mbps)

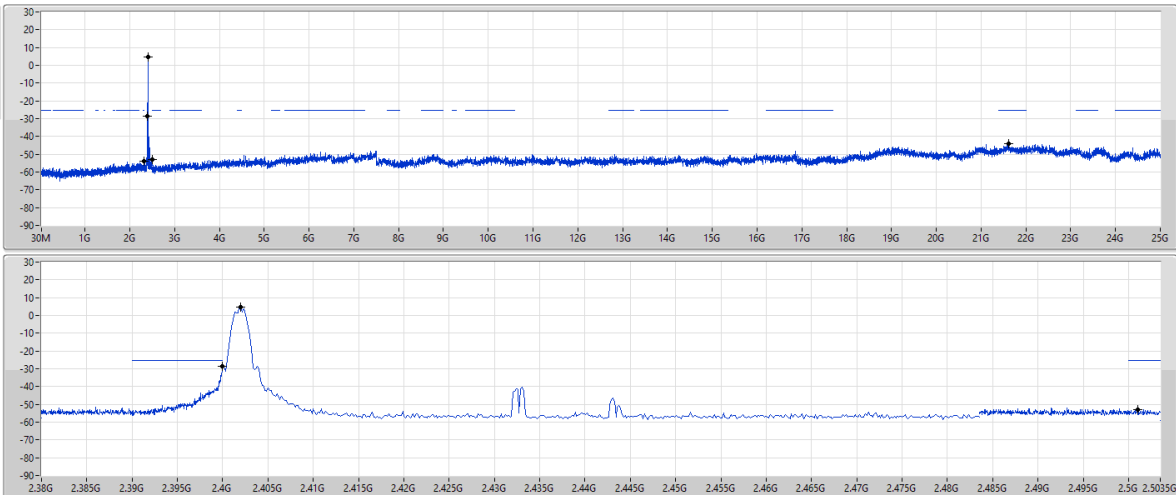
CSEndB-DTS

2402MHz

23/04/2024

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
2.402G	4.80	-25.20	2.3095G	-54.11	2.4G	-28.45	2.4G	-28.69	2.50106G	-53.10	2.162271G	-44.18	1



Summary

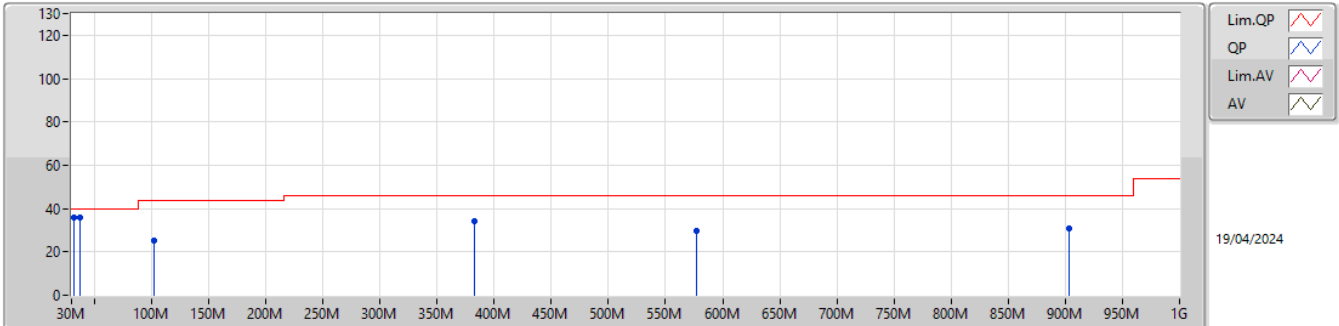
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-
BT-LE(2Mbps)	Pass	PK	31.94M	36.03	40.00	-3.97	3	Vertical	0	1.00

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	31.94M	36.03	40.00	-3.97	3	Vertical	0	1.00
2440MHz	Pass	PK	37.76M	35.62	40.00	-4.38	3	Vertical	0	1.00
2440MHz	Pass	PK	101.78M	25.47	43.50	-18.03	3	Vertical	0	1.00
2440MHz	Pass	PK	383.08M	34.40	46.00	-11.60	3	Vertical	0	1.00
2440MHz	Pass	PK	577.08M	29.66	46.00	-16.34	3	Vertical	0	1.00
2440MHz	Pass	PK	903M	30.99	46.00	-15.01	3	Vertical	0	1.00
2440MHz	Pass	PK	101.78M	26.24	43.50	-17.26	3	Horizontal	360	1.00
2440MHz	Pass	PK	117.3M	24.37	43.50	-19.13	3	Horizontal	360	1.00
2440MHz	Pass	PK	383.08M	33.15	46.00	-12.85	3	Horizontal	360	1.00
2440MHz	Pass	PK	520.82M	26.49	46.00	-19.51	3	Horizontal	360	1.00
2440MHz	Pass	PK	577.08M	29.27	46.00	-16.73	3	Horizontal	360	1.00
2440MHz	Pass	QP	35.82M	28.99	40.00	-11.01	3	Horizontal	335	2.28

2.4-2.4835GHz_BT-LE(2Mbps)

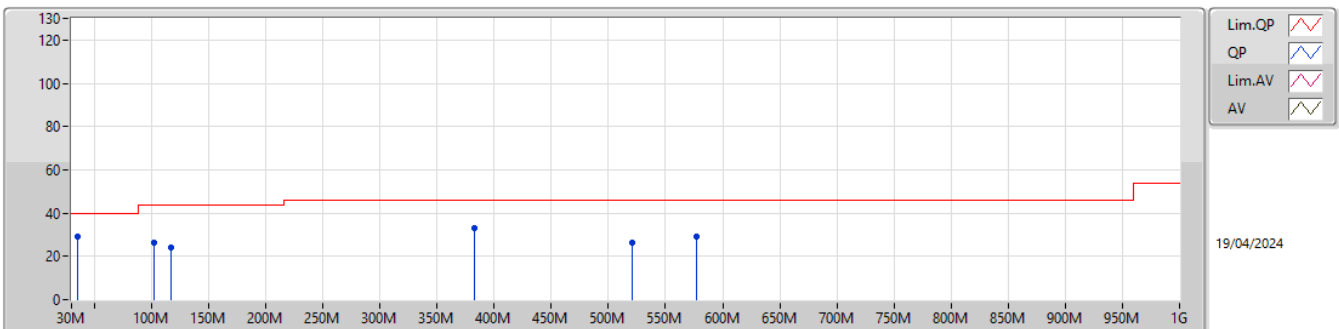
2440MHz_TX



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	31.94M	36.03	40.00	-3.97	-19.17	3	Vertical	0	1.00	55.20	24.52	0.43	44.12
PK	37.76M	35.62	40.00	-4.38	-22.16	3	Vertical	0	1.00	57.78	21.57	0.46	44.19
PK	101.78M	25.47	43.50	-18.03	-27.05	3	Vertical	0	1.00	52.52	16.52	0.76	44.33
PK	383.08M	34.40	46.00	-11.60	-20.93	3	Vertical	0	1.00	55.33	21.52	1.44	43.89
PK	577.08M	29.66	46.00	-16.34	-15.81	3	Vertical	0	1.00	45.47	26.06	1.76	43.63
PK	903M	30.99	46.00	-15.01	-11.58	3	Vertical	0	1.00	42.57	29.50	2.20	43.28

2.4-2.4835GHz_BT-LE(2Mbps)

2440MHz_TX



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	101.78M	26.24	43.50	-17.26	-27.05	3	Horizontal	360	1.00	53.29	16.52	0.76	44.33
PK	117.3M	24.37	43.50	-19.13	-25.82	3	Horizontal	360	1.00	50.19	17.67	0.81	44.30
PK	383.08M	33.15	46.00	-12.85	-20.93	3	Horizontal	360	1.00	54.08	21.52	1.44	43.89
PK	520.82M	26.49	46.00	-19.51	-17.75	3	Horizontal	360	1.00	44.24	24.28	1.68	43.71
PK	577.08M	29.27	46.00	-16.73	-15.81	3	Horizontal	360	1.00	45.08	26.06	1.76	43.63
QP	35.82M	28.99	40.00	-11.01	-21.36	3	Horizontal	335	2.28	50.35	22.36	0.45	44.17



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	46.30	54.00	-7.70	3	Horizontal	264	2.49
BT-LE(2Mbps)	Pass	AV	2.4835G	53.54	54.00	-0.46	3	Horizontal	263	2.49

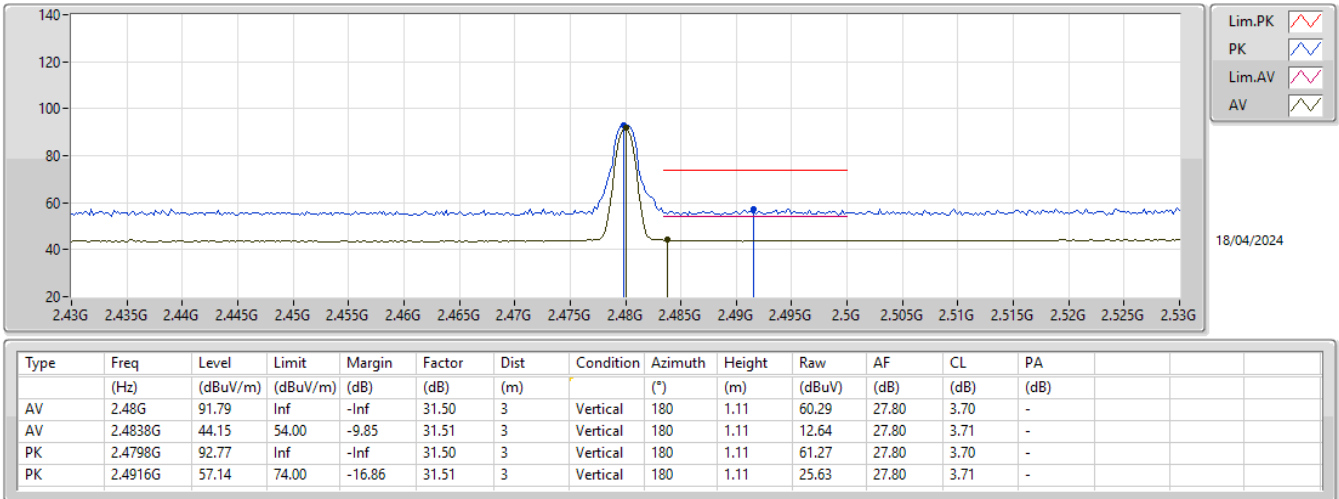
Result

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	2.3854G	43.81	54.00	-10.19	3	Vertical	184	1.17
2402MHz	Pass	AV	2.402G	95.88	Inf	-Inf	3	Vertical	184	1.17
2402MHz	Pass	PK	2.3836G	57.44	74.00	-16.56	3	Vertical	184	1.17
2402MHz	Pass	PK	2.4022G	96.85	Inf	-Inf	3	Vertical	184	1.17
2402MHz	Pass	AV	2.369G	43.90	54.00	-10.10	3	Horizontal	270	2.37
2402MHz	Pass	AV	2.402G	102.69	Inf	-Inf	3	Horizontal	270	2.37
2402MHz	Pass	PK	2.3636G	57.92	74.00	-16.08	3	Horizontal	270	2.37
2402MHz	Pass	PK	2.4022G	103.61	Inf	-Inf	3	Horizontal	270	2.37
2402MHz	Pass	AV	4.80407G	28.16	54.00	-25.84	3	Vertical	133	1.50
2402MHz	Pass	PK	4.80475G	41.98	74.00	-32.02	3	Vertical	133	1.50
2402MHz	Pass	AV	4.80464G	28.28	54.00	-25.72	3	Horizontal	280	1.50
2402MHz	Pass	PK	4.80327G	41.65	74.00	-32.35	3	Horizontal	280	1.50
2440MHz	Pass	AV	2.3884G	43.81	54.00	-10.19	3	Vertical	184	1.10
2440MHz	Pass	AV	2.44G	94.98	Inf	-Inf	3	Vertical	184	1.10
2440MHz	Pass	AV	2.4868G	44.01	54.00	-9.99	3	Vertical	184	1.10
2440MHz	Pass	PK	2.3888G	56.26	74.00	-17.74	3	Vertical	184	1.10
2440MHz	Pass	PK	2.4396G	95.89	Inf	-Inf	3	Vertical	184	1.10
2440MHz	Pass	PK	2.488G	56.40	74.00	-17.60	3	Vertical	184	1.10
2440MHz	Pass	AV	2.3884G	43.65	54.00	-10.35	3	Horizontal	264	2.36
2440MHz	Pass	AV	2.44G	102.35	Inf	-Inf	3	Horizontal	264	2.36
2440MHz	Pass	AV	2.5G	43.92	54.00	-10.08	3	Horizontal	264	2.36
2440MHz	Pass	PK	2.374G	56.67	74.00	-17.33	3	Horizontal	264	2.36
2440MHz	Pass	PK	2.4396G	103.25	Inf	-Inf	3	Horizontal	264	2.36
2440MHz	Pass	PK	2.4896G	57.03	74.00	-16.97	3	Horizontal	264	2.36
2440MHz	Pass	AV	4.87788G	28.82	54.00	-25.18	3	Vertical	343	1.54
2440MHz	Pass	AV	7.32034G	38.82	54.00	-15.18	3	Vertical	186	1.00
2440MHz	Pass	PK	4.87156G	42.09	74.00	-31.91	3	Vertical	343	1.54
2440MHz	Pass	PK	7.32071G	51.28	74.00	-22.72	3	Vertical	186	1.00
2440MHz	Pass	AV	4.87853G	28.84	54.00	-25.16	3	Horizontal	78	1.31
2440MHz	Pass	AV	7.32052G	37.32	54.00	-16.68	3	Horizontal	300	1.50
2440MHz	Pass	PK	4.88041G	41.81	74.00	-32.19	3	Horizontal	78	1.31
2440MHz	Pass	PK	7.31932G	49.89	74.00	-24.11	3	Horizontal	300	1.50
2480MHz	Pass	AV	2.48G	91.79	Inf	-Inf	3	Vertical	180	1.11
2480MHz	Pass	AV	2.4838G	44.15	54.00	-9.85	3	Vertical	180	1.11
2480MHz	Pass	PK	2.4798G	92.77	Inf	-Inf	3	Vertical	180	1.11
2480MHz	Pass	PK	2.4916G	57.14	74.00	-16.86	3	Vertical	180	1.11
2480MHz	Pass	AV	2.48G	102.18	Inf	-Inf	3	Horizontal	264	2.49
2480MHz	Pass	AV	2.4835G	46.30	54.00	-7.70	3	Horizontal	264	2.49
2480MHz	Pass	PK	2.4802G	103.06	Inf	-Inf	3	Horizontal	264	2.49
2480MHz	Pass	PK	2.4835G	65.06	74.00	-8.94	3	Horizontal	264	2.49
2480MHz	Pass	AV	4.95885G	29.40	54.00	-24.60	3	Vertical	53	1.13
2480MHz	Pass	AV	7.44046G	40.53	54.00	-13.47	3	Vertical	339	1.37
2480MHz	Pass	PK	4.95867G	43.91	74.00	-30.09	3	Vertical	53	1.13
2480MHz	Pass	PK	7.44064G	51.73	74.00	-22.27	3	Vertical	339	1.37
2480MHz	Pass	AV	4.9596G	29.33	54.00	-24.67	3	Horizontal	65	2.00
2480MHz	Pass	AV	7.43938G	38.31	54.00	-15.69	3	Horizontal	307	1.58
2480MHz	Pass	PK	4.95805G	42.70	74.00	-31.30	3	Horizontal	65	2.00
2480MHz	Pass	PK	7.44026G	50.57	74.00	-23.43	3	Horizontal	307	1.58
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.385G	43.74	54.00	-10.26	3	Vertical	185	1.16
2402MHz	Pass	AV	2.402G	93.80	Inf	-Inf	3	Vertical	185	1.16
2402MHz	Pass	PK	2.3888G	56.64	74.00	-17.36	3	Vertical	185	1.16
2402MHz	Pass	PK	2.4024G	96.65	Inf	-Inf	3	Vertical	185	1.16
2402MHz	Pass	AV	2.3896G	43.92	54.00	-10.08	3	Horizontal	254	2.36
2402MHz	Pass	AV	2.402G	100.73	Inf	-Inf	3	Horizontal	254	2.36
2402MHz	Pass	PK	2.3636G	57.71	74.00	-16.29	3	Horizontal	254	2.36
2402MHz	Pass	PK	2.4024G	103.61	Inf	-Inf	3	Horizontal	254	2.36
2402MHz	Pass	AV	4.80882G	28.08	54.00	-25.92	3	Vertical	200	2.52
2402MHz	Pass	PK	4.80716G	41.26	74.00	-32.74	3	Vertical	200	2.52
2402MHz	Pass	AV	4.80476G	28.04	54.00	-25.96	3	Horizontal	268	2.18

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
2402MHz	Pass	PK	4.80834G	41.69	74.00	-32.31	3	Horizontal	268	2.18
2440MHz	Pass	AV	2.3776G	43.61	54.00	-10.39	3	Vertical	183	1.11
2440MHz	Pass	AV	2.44G	92.96	Inf	-Inf	3	Vertical	183	1.11
2440MHz	Pass	AV	2.4928G	44.03	54.00	-9.97	3	Vertical	183	1.11
2440MHz	Pass	PK	2.3852G	56.64	74.00	-17.36	3	Vertical	183	1.11
2440MHz	Pass	PK	2.4396G	95.83	Inf	-Inf	3	Vertical	183	1.11
2440MHz	Pass	PK	2.4932G	57.71	74.00	-16.29	3	Vertical	183	1.11
2440MHz	Pass	AV	2.3856G	43.69	54.00	-10.31	3	Horizontal	263	2.37
2440MHz	Pass	AV	2.44G	100.60	Inf	-Inf	3	Horizontal	263	2.37
2440MHz	Pass	AV	2.4992G	43.99	54.00	-10.01	3	Horizontal	263	2.37
2440MHz	Pass	PK	2.3728G	57.52	74.00	-16.48	3	Horizontal	263	2.37
2440MHz	Pass	PK	2.4396G	103.49	Inf	-Inf	3	Horizontal	263	2.37
2440MHz	Pass	PK	2.4872G	56.83	74.00	-17.17	3	Horizontal	263	2.37
2440MHz	Pass	AV	4.87761G	29.01	54.00	-24.99	3	Vertical	201	2.73
2440MHz	Pass	AV	7.32122G	38.14	54.00	-15.86	3	Vertical	186	1.00
2440MHz	Pass	PK	4.88001G	42.01	74.00	-31.99	3	Vertical	201	2.73
2440MHz	Pass	PK	7.31982G	50.93	74.00	-23.07	3	Vertical	186	1.00
2440MHz	Pass	AV	4.8768G	28.98	54.00	-25.02	3	Horizontal	116	2.43
2440MHz	Pass	AV	7.32126G	38.09	54.00	-15.91	3	Horizontal	283	1.76
2440MHz	Pass	PK	4.88468G	42.12	74.00	-31.88	3	Horizontal	116	2.43
2440MHz	Pass	PK	7.31868G	50.67	74.00	-23.33	3	Horizontal	283	1.76
2480MHz	Pass	AV	2.48G	89.53	Inf	-Inf	3	Vertical	174	1.50
2480MHz	Pass	AV	2.4835G	45.60	54.00	-8.40	3	Vertical	174	1.50
2480MHz	Pass	PK	2.4794G	92.34	Inf	-Inf	3	Vertical	174	1.50
2480MHz	Pass	PK	2.4835G	58.45	74.00	-15.55	3	Vertical	174	1.50
2480MHz	Pass	AV	2.48G	100.30	Inf	-Inf	3	Horizontal	263	2.49
2480MHz	Pass	AV	2.4835G	53.54	54.00	-0.46	3	Horizontal	263	2.49
2480MHz	Pass	PK	2.4804G	103.08	Inf	-Inf	3	Horizontal	263	2.49
2480MHz	Pass	PK	2.4836G	65.92	74.00	-8.08	3	Horizontal	263	2.49
2480MHz	Pass	AV	4.95614G	29.33	54.00	-24.67	3	Vertical	79	2.76
2480MHz	Pass	AV	7.43862G	39.72	54.00	-14.28	3	Vertical	338	1.37
2480MHz	Pass	PK	4.95718G	43.15	74.00	-30.85	3	Vertical	79	2.76
2480MHz	Pass	PK	7.44136G	51.48	74.00	-22.52	3	Vertical	338	1.37
2480MHz	Pass	AV	4.95772G	29.49	54.00	-24.51	3	Horizontal	304	2.17
2480MHz	Pass	AV	7.43878G	37.70	54.00	-16.30	3	Horizontal	305	1.57
2480MHz	Pass	PK	4.96314G	42.41	74.00	-31.59	3	Horizontal	304	2.17
2480MHz	Pass	PK	7.44136G	49.64	74.00	-24.36	3	Horizontal	305	1.57

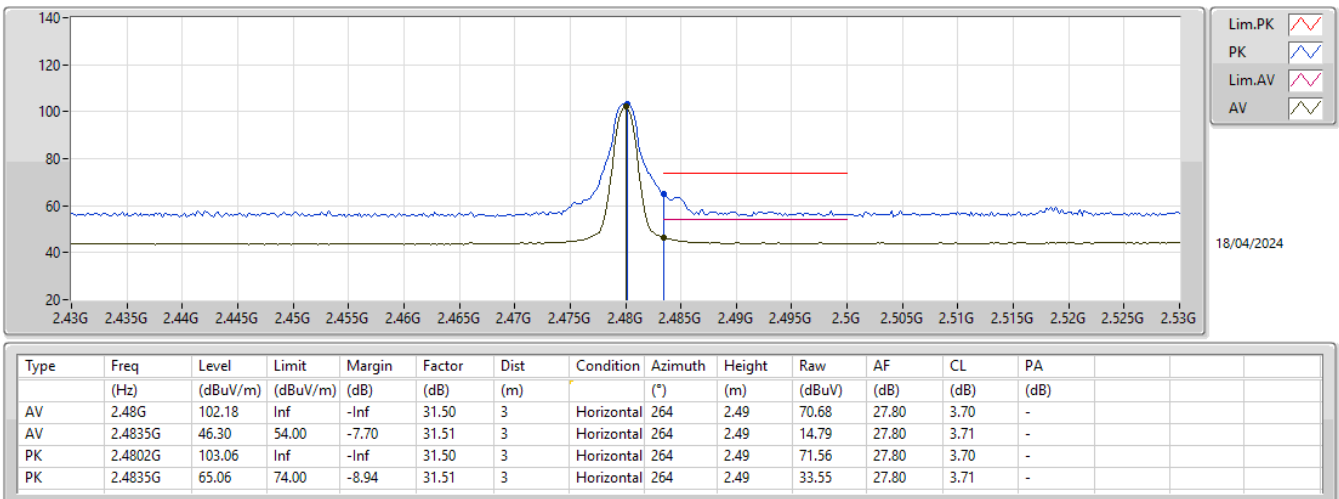
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2480MHz_TX



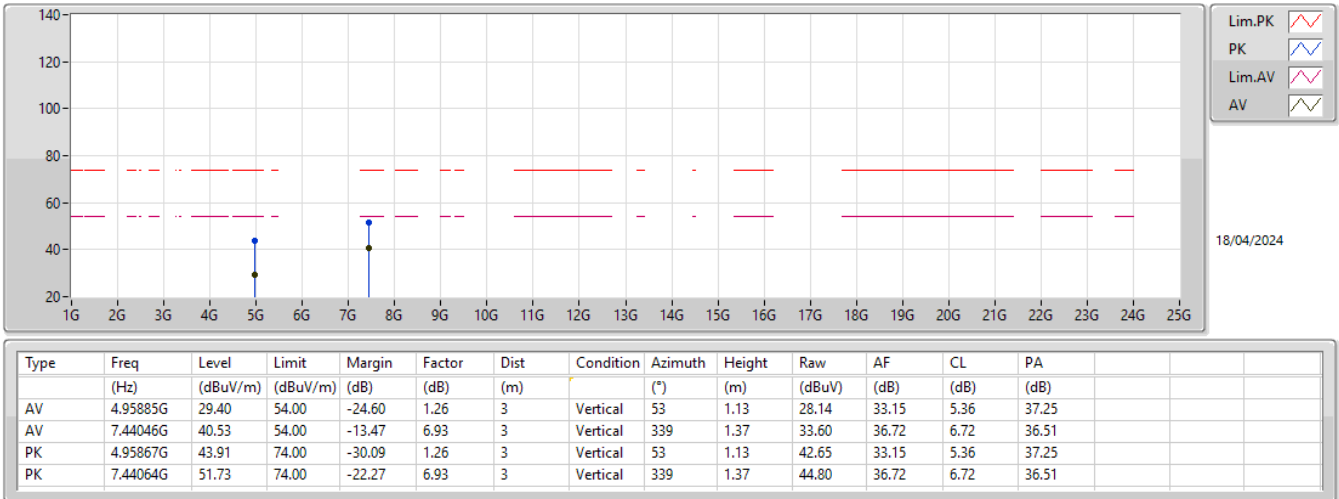
2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX



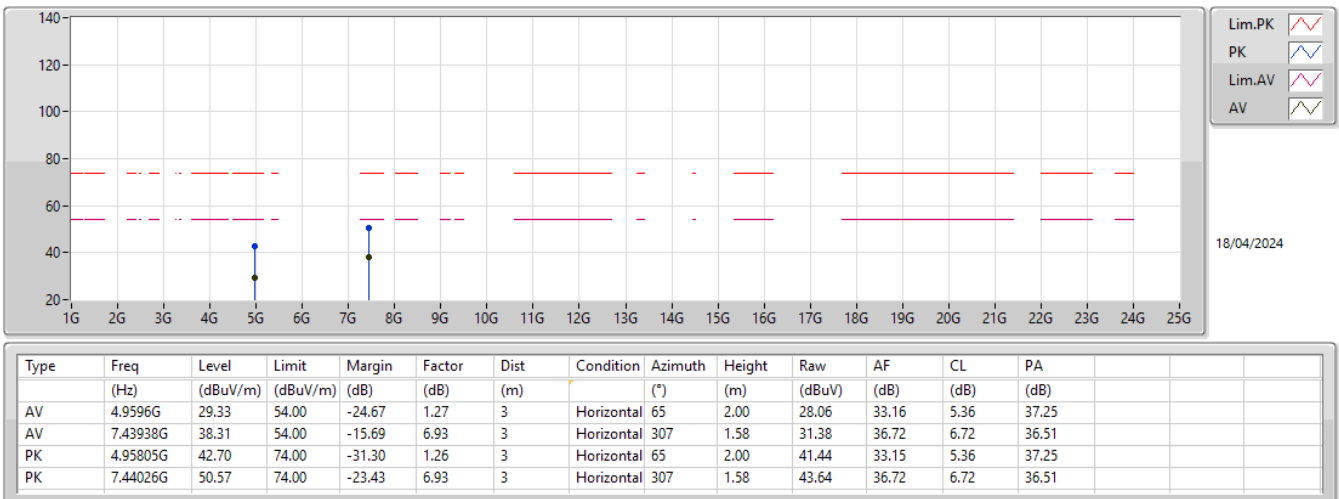
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2480MHz_TX



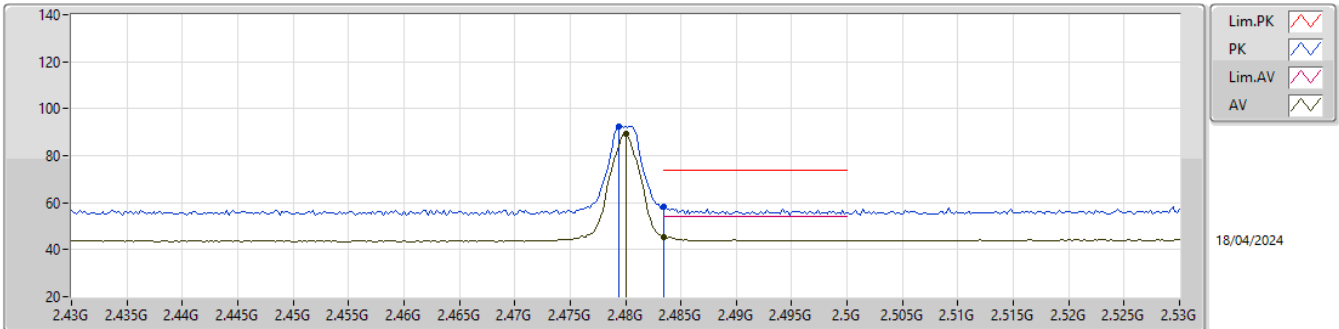
2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX



2.4-2.4835GHz_BT-LE(2Mbps)

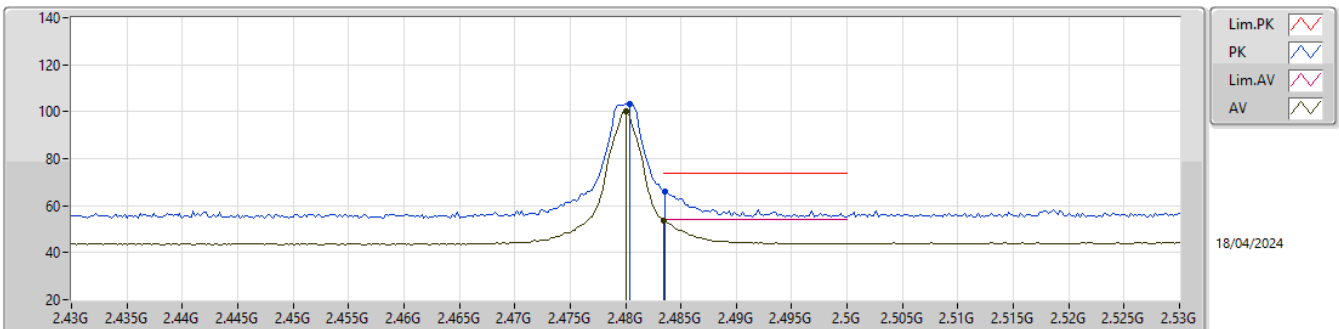
2480MHz_TX



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)
AV	2.48G	89.53	Inf	-Inf	31.50	3	Vertical	174	1.50	58.03	27.80	3.70	-
AV	2.4835G	45.60	54.00	-8.40	31.51	3	Vertical	174	1.50	14.09	27.80	3.71	-
PK	2.4794G	92.34	Inf	-Inf	31.49	3	Vertical	174	1.50	60.85	27.79	3.70	-
PK	2.4835G	58.45	74.00	-15.55	31.51	3	Vertical	174	1.50	26.94	27.80	3.71	-

2.4-2.4835GHz_BT-LE(2Mbps)

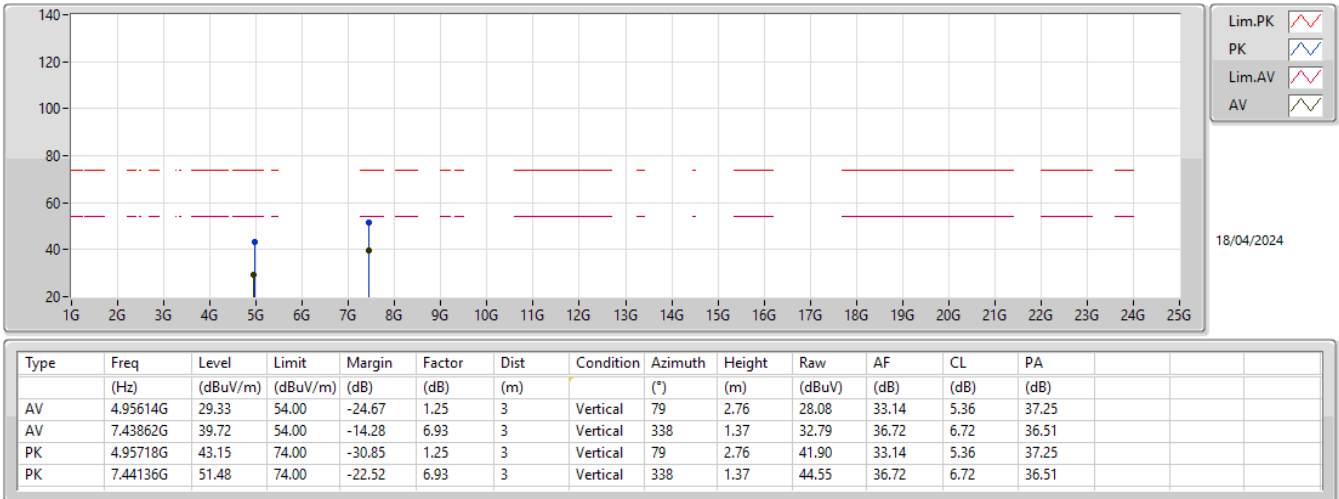
2480MHz_TX



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)
AV	2.48G	100.30	Inf	-Inf	31.50	3	Horizontal	263	2.49	68.80	27.80	3.70	-
AV	2.4835G	53.54	54.00	-0.46	31.51	3	Horizontal	263	2.49	22.03	27.80	3.71	-
PK	2.4804G	103.08	Inf	-Inf	31.50	3	Horizontal	263	2.49	71.58	27.80	3.70	-
PK	2.4836G	65.92	74.00	-8.08	31.51	3	Horizontal	263	2.49	34.41	27.80	3.71	-

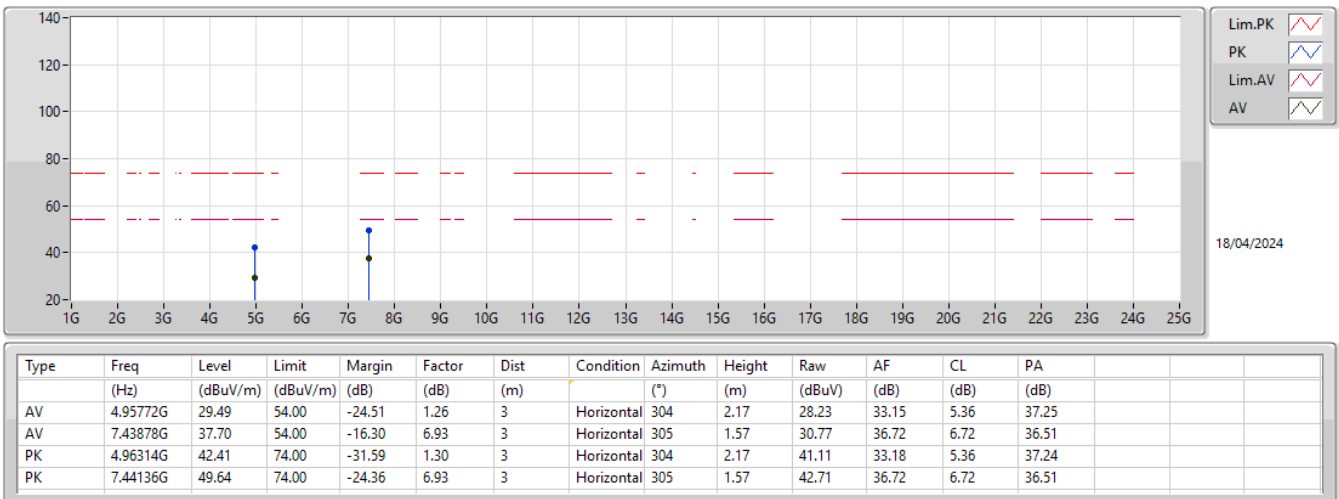
2.4-2.4835GHz_BT-LE(2Mbps)

2480MHz_TX



2.4-2.4835GHz_BT-LE(2Mbps)

2480MHz_TX





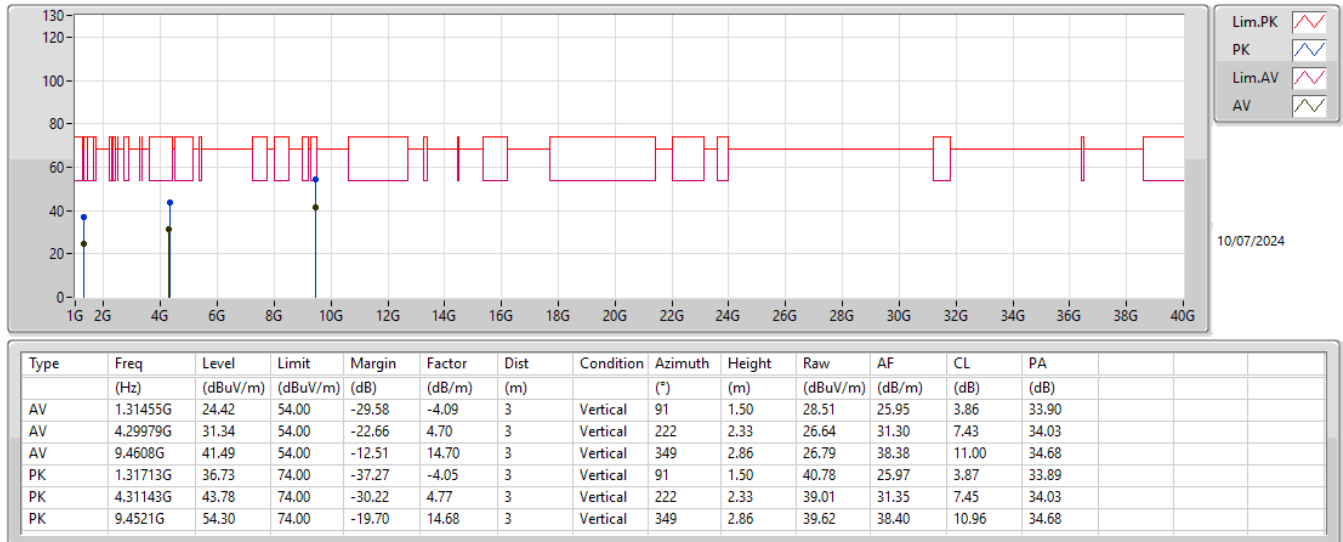
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	AV	9.4608G	41.49	54.00	-12.51	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	1.31455G	24.42	54.00	-29.58	3	Vertical	91	1.50
Mode 1	Pass	AV	4.29979G	31.34	54.00	-22.66	3	Vertical	222	2.33
Mode 1	Pass	AV	9.4608G	41.49	54.00	-12.51	3	Vertical	349	2.86
Mode 1	Pass	PK	1.31713G	36.73	74.00	-37.27	3	Vertical	91	1.50
Mode 1	Pass	PK	4.31143G	43.78	74.00	-30.22	3	Vertical	222	2.33
Mode 1	Pass	PK	9.4521G	54.30	74.00	-19.70	3	Vertical	349	2.86
Mode 1	Pass	AV	1.31537G	24.51	54.00	-29.49	3	Horizontal	238	1.50
Mode 1	Pass	AV	4.29876G	31.44	54.00	-22.56	3	Horizontal	245	2.43
Mode 1	Pass	AV	9.45776G	41.42	54.00	-12.58	3	Horizontal	254	3.00
Mode 1	Pass	PK	1.31258G	37.20	74.00	-36.80	3	Horizontal	238	1.50
Mode 1	Pass	PK	4.29972G	44.69	74.00	-29.31	3	Horizontal	245	2.43
Mode 1	Pass	PK	9.45991G	54.74	74.00	-19.26	3	Horizontal	254	3.00

Radiated Emissions above 1GHz_Mode 1



Radiated Emissions above 1GHz_Mode 1

