



FCC Radio Test Report

FCC ID : TVE-2417T212
Equipment : Secured Wireless Access Point
Brand Name : FORTINET
Model Name : FortiAP 221Exxxxxx, FORTIAP-221Exxxxxx, FAP-221E++xxxxxx, FortiAP 223Exxxxxx, FORTIAP-223Exxxxxx, FAP-223E++xxxxxx, (where “x” can be used as “A-Z”, or “0-9”, or “-“, or blank for software changes or marketing purposes only)
Applicant : Fortinet, Inc.
899 Kifer Road, Sunnyvale, CA 94086, USA
Manufacturer : Fortinet, Inc.
899 Kifer Road, Sunnyvale, CA 94086, USA
Standard : 47 CFR FCC Part 15.247

The product was received on Apr. 30, 2021, and testing was started from May 11, 2021 and completed on Jun. 18, 2021. 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: Allen Lin

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



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: Sam Tsai

Report Producer: Michelle Tsai

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 (MHz)	Nant
2.4-2.4835GHz	BT-LE(1Mbps)	1.0	1TX

Note:

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

1.1.2 Antenna Information

Internal Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Antenna Gain (dBi)		
					2.4GHz	5GHz	BLE
1	Senao	5718A0268300	PIFA	I-Pex	4.24	-	-
2	Senao	5718A0268300	PIFA	I-Pex	4.11	-	-
3	Senao	5718A0268300	PIFA	I-Pex	-	5.05	-
4	Senao	5718A0268300	PIFA	I-Pex	-	5.06	-
5	Senao	5718A0642300	Dipole	I-Pex	-	-	4.33

External Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Antenna Gain (dBi)			Cable Loss
					2.4GHz	5GHz	BLE	
1	YONG-SHUN	7102A0485000	Dipole	Reverse SMA	5	-	-	0.5
2	YONG-SHUN	7102A0485000	Dipole	Reverse SMA	5	-	-	0.5
3	YONG-SHUN	7102A0485000	Dipole	Reverse SMA	-	5	-	0.8
4	YONG-SHUN	7102A0485000	Dipole	Reverse SMA	-	5	-	0.7
5	Senao	5718A0642300	Dipole	I-Pex	-	-	4.33	-

For 2.4GHz function:

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

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

For BT function:

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

Ant. 5 (port 1) could transmit/receive.

For 5GHz function:

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

Ant. 3 (port 1) and Ant. 4 (port 2) could transmit/receive simultaneously.

1.1.3 EUT Information

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

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

1.1.5 Table for Multiple Listing

Sample No.	Model Name	Description
1	FortiAP 221Exxxxxx FORTIAP-221Exxxxxx FAP-221E++xxxxxx	FAP-221E++ indicates that it comes with internal antennas and FAP-223E++ indicates that the access point comes with external antenna connectors. Series models serve different marketing.
2	FortiAP 223Exxxxxx FORTIAP-223Exxxxxx FAP-223E++xxxxxx	
where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only.		

Note: Sample 1 configuration was pretested and found to be the worst case and measured during the test.

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				
<input checked="" type="checkbox"/>	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	Billy Wang	20.1~21.9°C / 58~61%	21/May/2021
RF Conducted	TH06-HY	Johnny Yu	20.1~26.9°C / 50~60%	17/May/2021~18/Jun/2021
Radiated	03CH02-HY	Tony Chang	20.6~25.9°C / 51~63%	11/May/2021~18/Jun/2021
<input type="checkbox"/>	Wen 33rd.St. (TAF: 3785)	ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)		
		TEL: 886-3-318-0787	FAX: 886-3-318-0287	
Test site Designation No. TW0008 with FCC.				

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
Conducted Emission (150kHz ~ 30MHz)	0.9 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.0 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 6.1
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Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	0x9
2440MHz	0xc
2480MHz	0xc

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
2	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	Adapter Mode		
2	PoE Mode		
Operating Mode > 1GHz	CTX		
1	PoE Mode		
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
Operating Mode	CTX
1	WLAN 2.4G+ WLAN 5G+ Bluetooth
Refer to Sporton Test Report No.: FA142904 for Co-location RF Exposure Evaluation.	



2.3 Accessories

Accessories				
BRACKET CEILING MOUNT LOCK	Brand Name	MOST Technique Co., LTD.	Model Name	ABS PA757

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

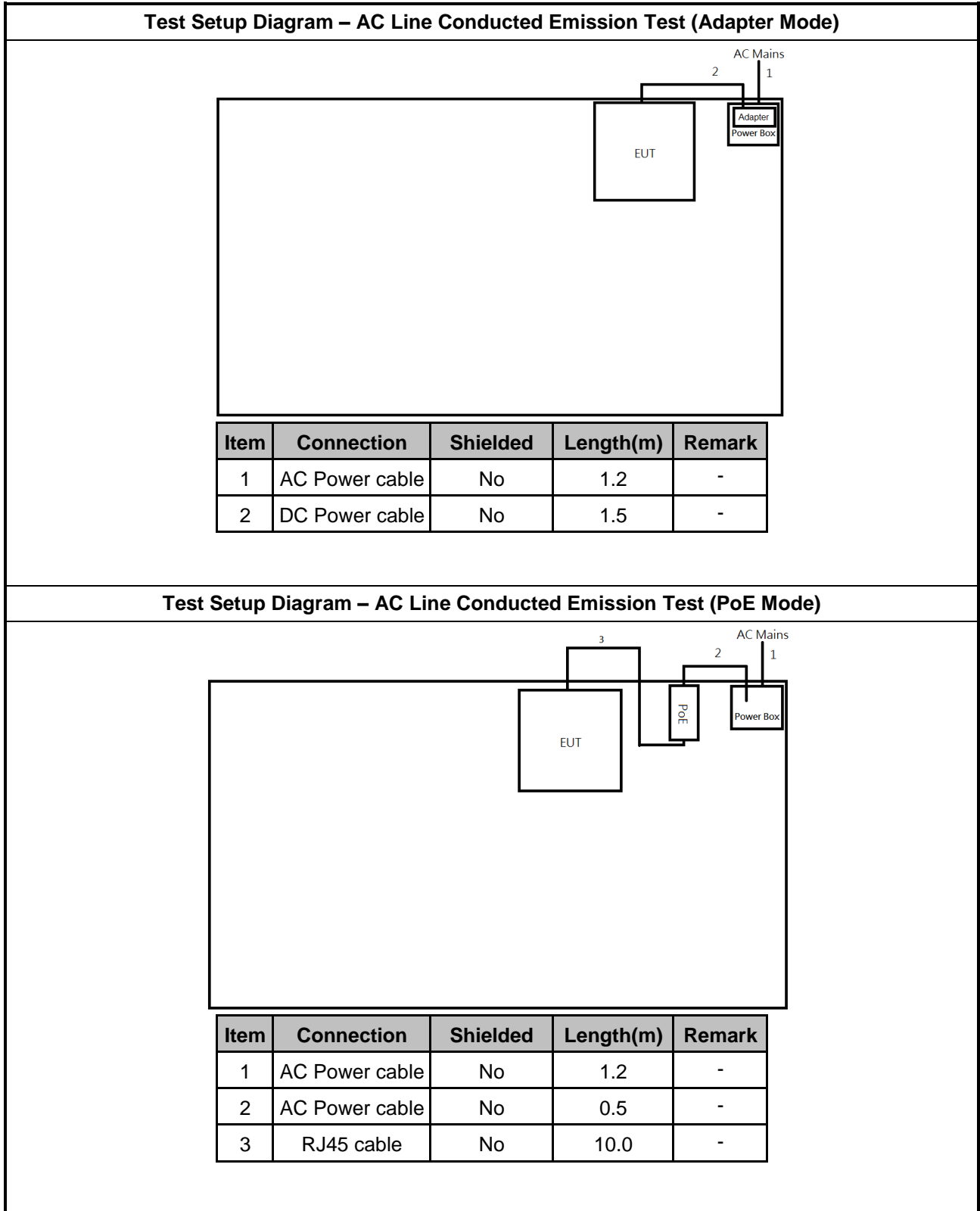
2.4 Support Equipment

Support Equipment – AC Conduction					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	Adapter	APD	WA-30J12R	-	-
2	PoE	EnGenius	EPA5006GAT	-	Provided by Customer
3	RJ45 Cable	Power Sync	CAT-6E-10	-	-

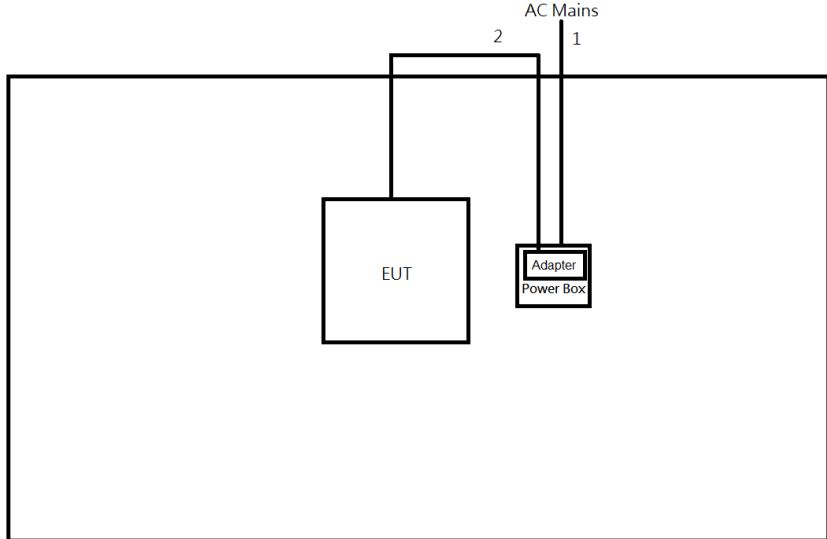
Support Equipment – Radiated					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	Adapter	APD	WA-30J12R	-	-
2	RJ45 Cable	Power Sync	CAT-6E-10	-	-
3	PoE	EnGenius	EPA5006GAT	-	Provided by Customer/ Remote
4	Notebook	HP	5220m	-	Remote

Support Equipment – Conducted					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	Notebook	DELL	E5410	-	-
2	Adapter for NB	DELL	HA65NM130	-	-
3	AC Adapter	APD	WA-30J12R	-	-

2.5 Test Setup Diagram

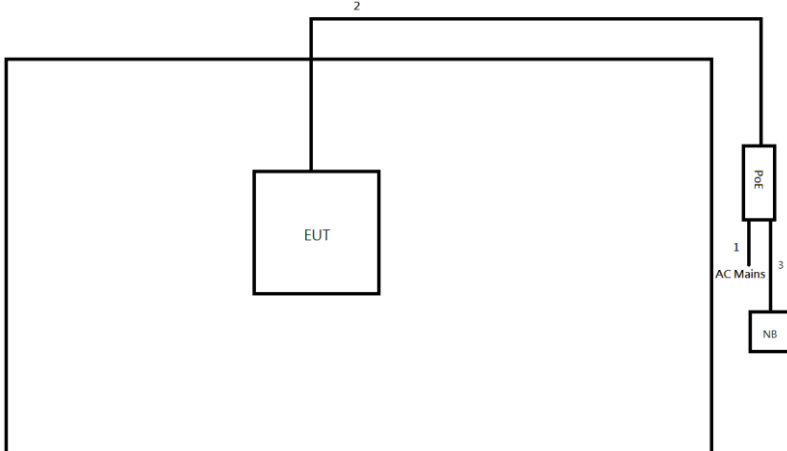


Test Setup Diagram – Radiated Test (Adapter Mode)



Item	Connection	Shielded	Length(m)	Remark
1	AC Power cable	No	1.8	-
2	DC Power cable	No	1.5	-

Test Setup Diagram – Radiated Test (PoE Mode)



Item	Connection	Shielded	Length(m)	Remark
1	AC Power cable	No	0.5	-
2	RJ45 cable	No	10.0	-
3	RJ45 cable	No	1.0	-

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

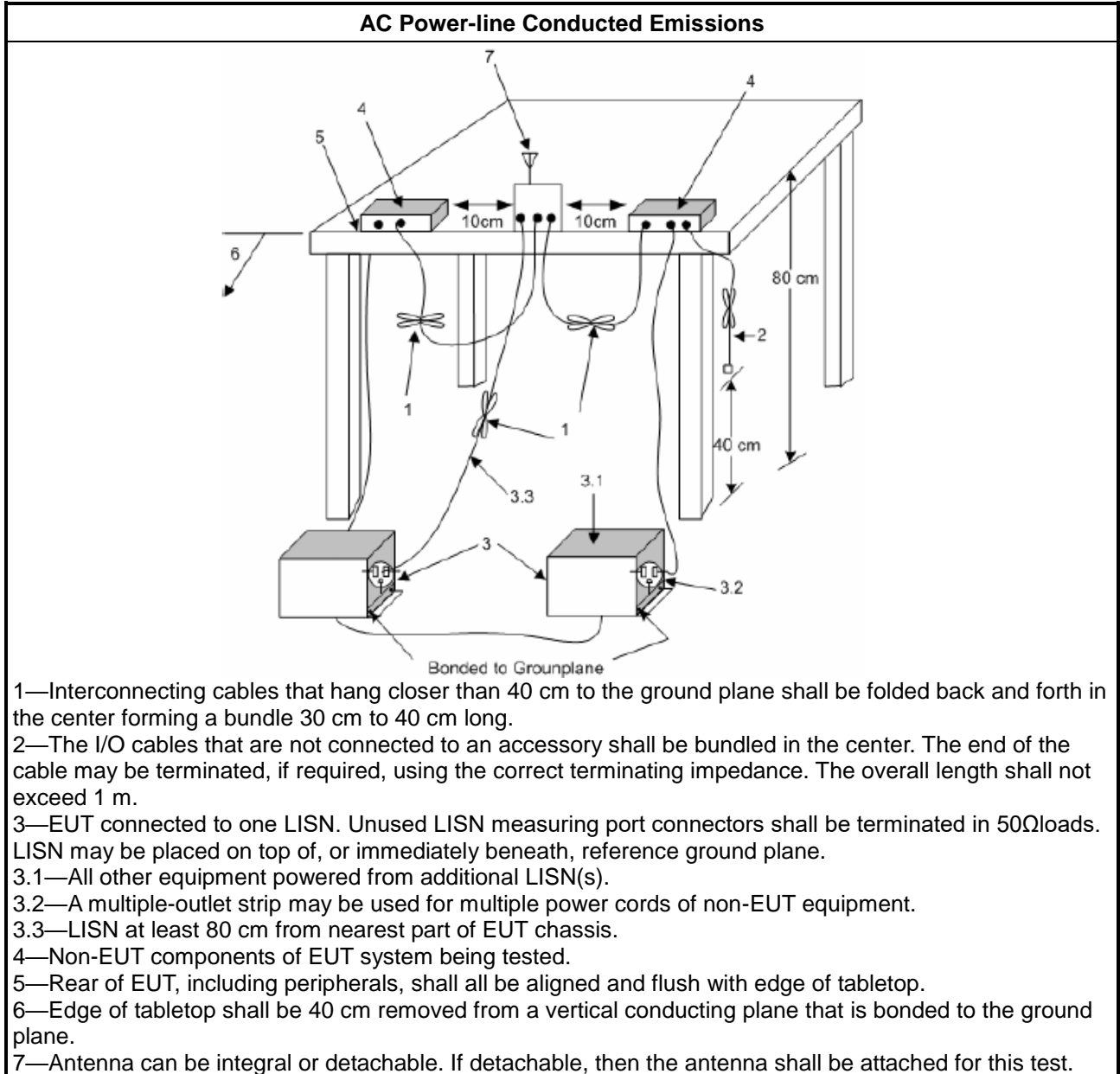
Test Method
<ul style="list-style-type: none"> Refer as ANSI C63.10-2013, clause 6.2 foray power-line conducted emissions.

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:
<ul style="list-style-type: none"> ▪ 6 dB bandwidth \geq 500 kHz.

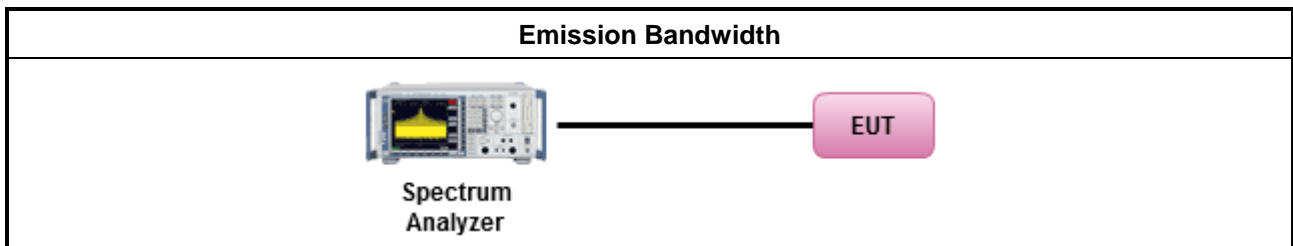
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method
<ul style="list-style-type: none"> ▪ For the emission bandwidth shall be measured using one of the options below:
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 8.2 (11.8 of ANSI C63.10) DTS bandwidth measurement.
<input type="checkbox"/> Refer as RSS-Gen, clause 6.7 for occupied bandwidth testing.
<input type="checkbox"/> 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	
	<ul style="list-style-type: none"> ▪ If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
	<ul style="list-style-type: none"> ▪ Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
	<ul style="list-style-type: none"> ▪ Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	<ul style="list-style-type: none"> ▪ Smart antenna system (SAS):
	<ul style="list-style-type: none"> - Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	<ul style="list-style-type: none"> - Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	<ul style="list-style-type: none"> - 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:	
	<ul style="list-style-type: none"> ▪ 2400-2483.5 MHz Band
	<ul style="list-style-type: none"> ▪ Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
	<ul style="list-style-type: none"> ▪ Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
	<ul style="list-style-type: none"> ▪ Smart antenna system (SAS)
	<ul style="list-style-type: none"> - Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	<ul style="list-style-type: none"> - Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	<ul style="list-style-type: none"> - 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.	

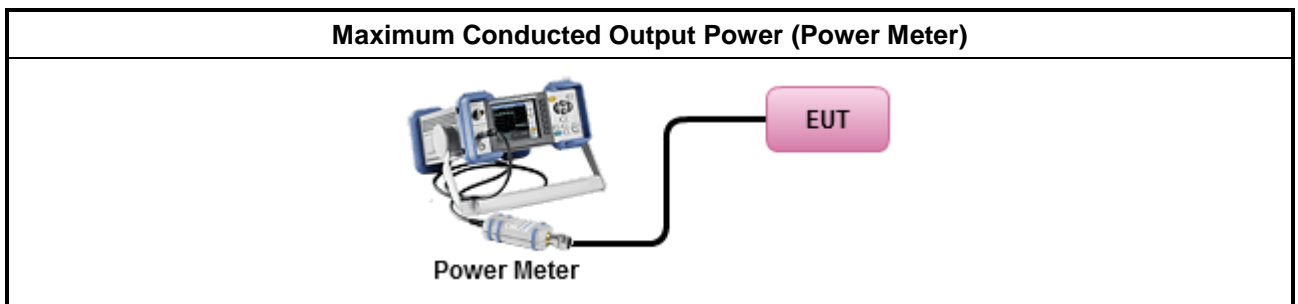
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> ▪ Maximum Peak Conducted Output Power 	
<input type="checkbox"/>	Refer as KDB 558074, clause 8.3.1.1 (11.9.1.1 of ANSI C63.10) RBW ≥ EBW method.
<input type="checkbox"/>	Refer as KDB 558074, clause 8.3.1.2 (11.9.1.2 of ANSI C63.10) integrated band power method.
<input type="checkbox"/>	Refer as KDB 558074, clause 8.3.1.3 (11.9.1.3 of ANSI C63.10) peak power meter.
<ul style="list-style-type: none"> ▪ Maximum Average Conducted Output Power 	
<input type="checkbox"/>	Refer as KDB 558074, clause 8.3.2.2 (11.9.2.2 of ANSI C63.10) using a spectrum analyzer.
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 8.3.2.3 (11.9.2.3 of ANSI C63.10) using a power meter.
<ul style="list-style-type: none"> ▪ For conducted measurement. 	
<ul style="list-style-type: none"> ▪ 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. 	
<ul style="list-style-type: none"> ▪ 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
<ul style="list-style-type: none"> ▪ Power Spectral Density (PSD) ≤ 8 dBm/3kHz

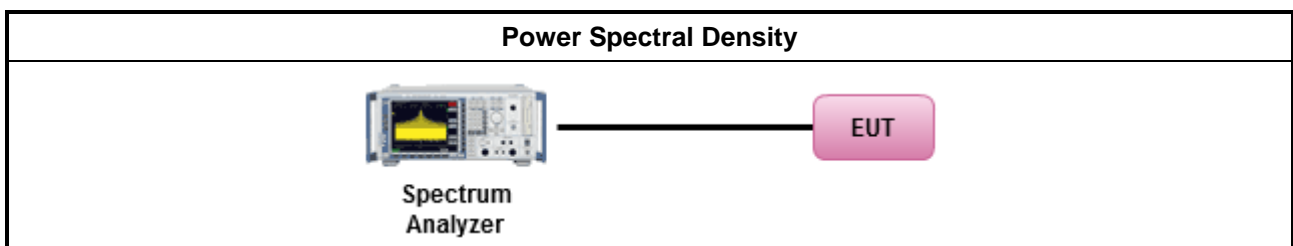
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method	
	<ul style="list-style-type: none"> ▪ 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).
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 8.4 (11.10 of ANSI C63.10) Max. PSD.
	<ul style="list-style-type: none"> ▪ For conducted measurement.
	<ul style="list-style-type: none"> ▪ If The EUT supports multiple transmit chains using options given below:
	<ul style="list-style-type: none"> ▪ 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.

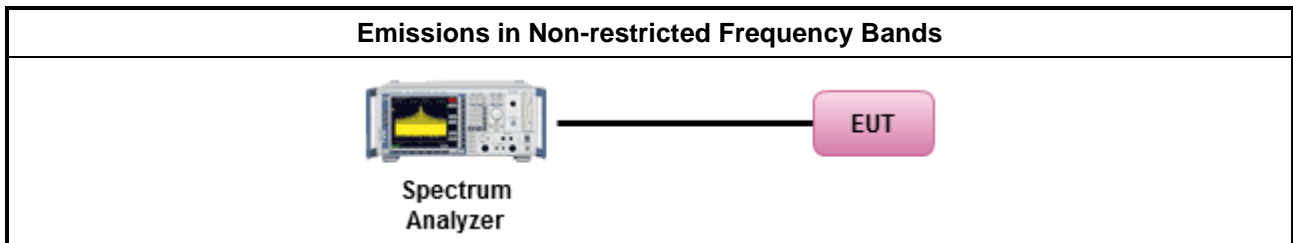
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method
<ul style="list-style-type: none"> 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

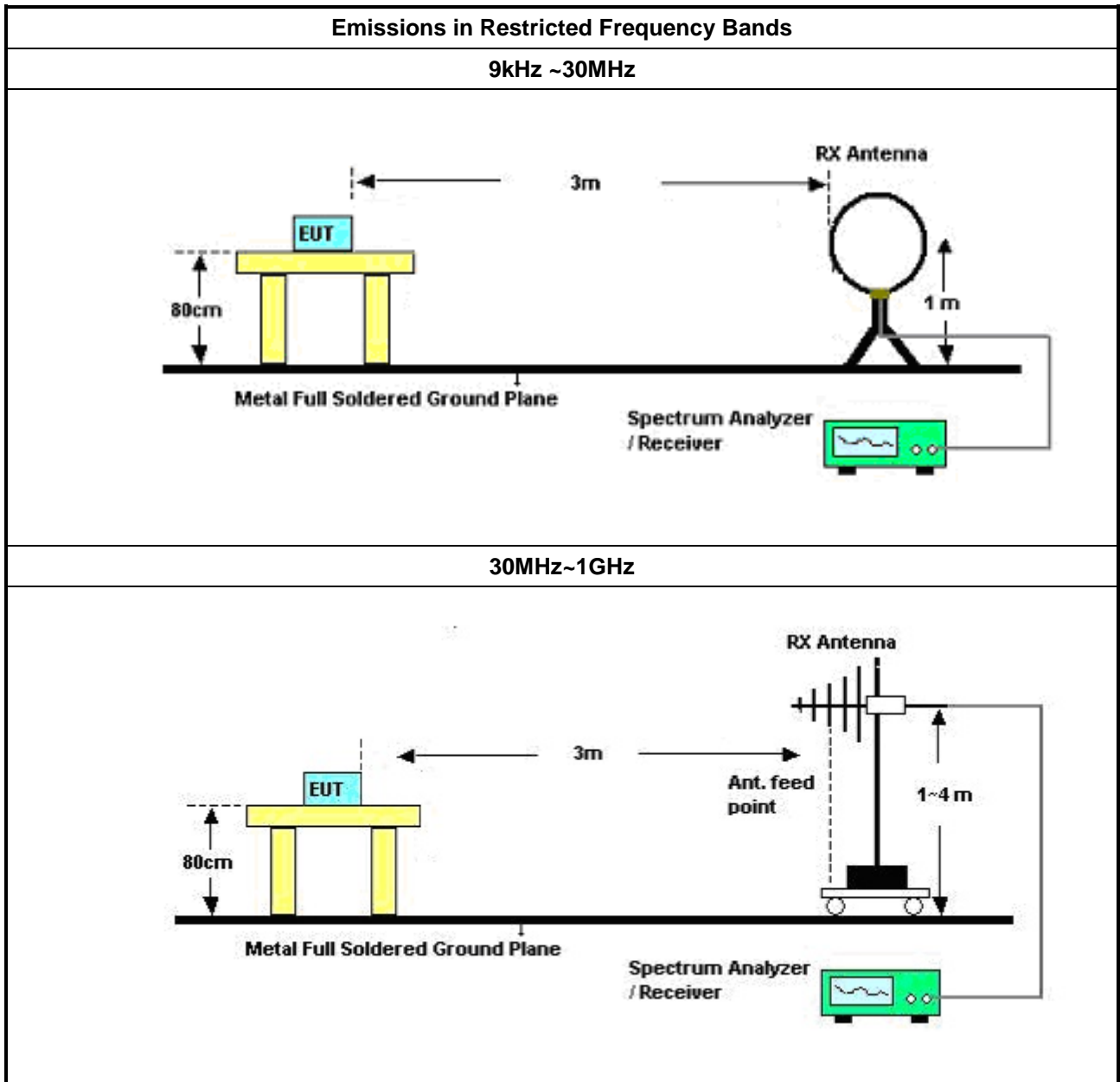
Test Method	
	<ul style="list-style-type: none"> ▪ The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
	<ul style="list-style-type: none"> ▪ Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
	<ul style="list-style-type: none"> ▪ For the transmitter unwanted emissions shall be measured using following options below: <ul style="list-style-type: none"> ▪ Refer as KDB 558074, clause 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.
	<ul style="list-style-type: none"> ▪ For the transmitter band-edge emissions shall be measured using following options below: <ul style="list-style-type: none"> ▪ 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.
	<ul style="list-style-type: none"> ▪ Use the following spectrum analyzer settings: <ul style="list-style-type: none"> ▪ 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.
	<ul style="list-style-type: none"> ▪ KDB 414788 Open-Field Test Sites and Chamber Correlation Justification. <ul style="list-style-type: none"> ▪ 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.

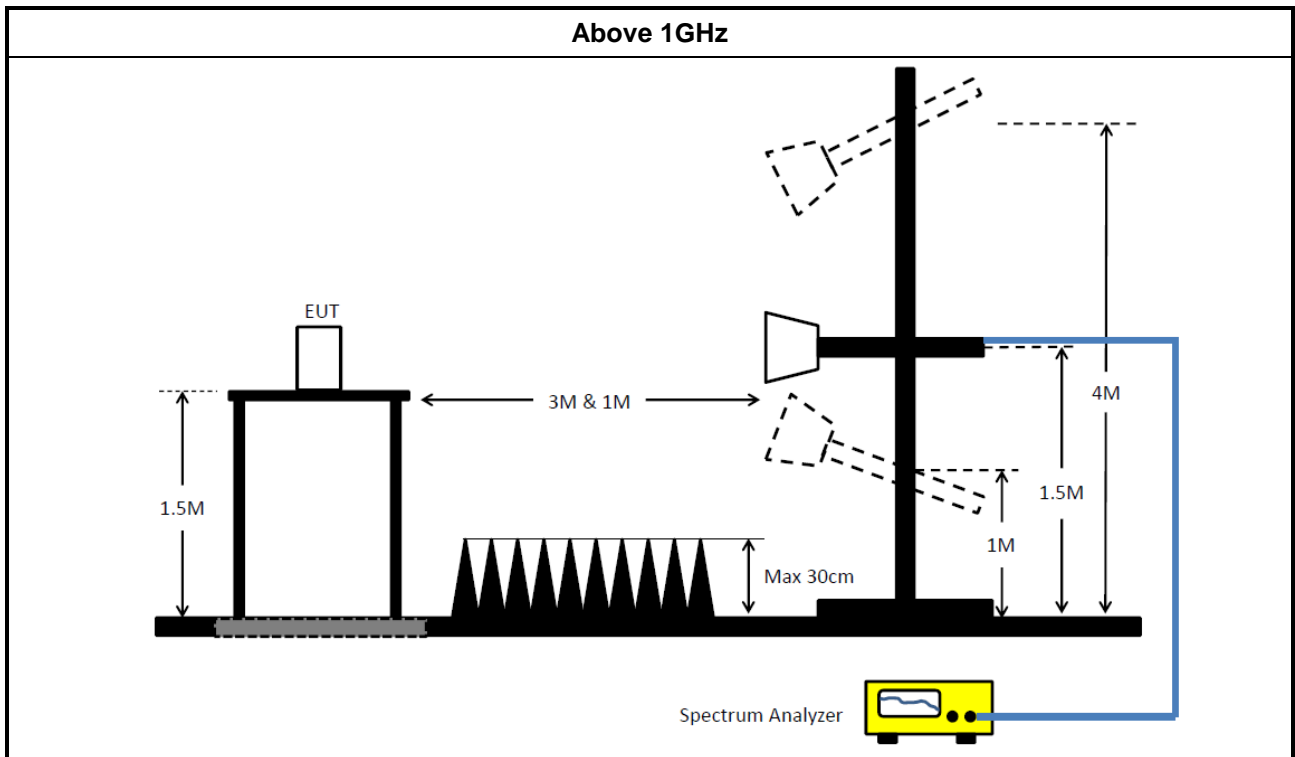
3.6.4 Measurement Results Calculation

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	ESR3	102051	9kHz ~ 3.6GHz	29/May/2020	28/May/2021
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	11/Nov/2020	10/Nov/2021
RF Cable 5m	TITAN	TITAN	CO04-cable-01	0.1MHz~200MHz	03/Mar/2021	02/Mar/2022
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9kHz ~ 30MHz	21/Sep/2020	20/Sep/2021

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	19/Oct/2020	18/Oct/2021
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	20/Oct/2020	19/Oct/2021
Pulse Sensor	Anritsu	MA2411B	1027452	300MHz~40GHz	25/Mar/2021	24/Mar/2022
Power Meter	Anritsu	ML2495A	1124009	300MHz~40GHz	25/Mar/2021	24/Mar/2022

Instrument for Radiated Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz~1GHz 3m	04/Aug/2020	03/Aug/2021
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz~18GHz 3m	02/Aug/2020	01/Aug/2021
Signal Analyzer	R&S	FSP40	100593	9kHz~40GHz	12/Mar/2021	11/Mar/2022
Amplifier	Agilent	8447D	2944A11149	100kHz~1.3GHz	30/Jun/2020	29/Jun/2021
Microwave Preamplifier	Agilent	8449B	3008A02373	1GHz~18GHz	23/Oct/2020	22/Oct/2021
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112B / MTJ6102-05	2723 / 2	30MHz~1GHz	06/Sep/2020	05/Sep/2021
Double Ridged Guide Horn Antenna	SCHWARZBEC	BBHA 9120 D	BBHA 9120 D 01543	1GHz~18GHz	09/Jun/2020	08/Jun/2021
RF Cable	MVE	400LL	MVE-1-0802	9kHz~30MHz	05/May/2021	04/May/2022
RF Cable	MVE	400LL	MVE-1-0802	30MHz~1GHz	05/May/2021	04/May/2022
RF Cable-R03m	HUBER+SUHNER	SUCOFLEX104	805193/4+805192 /4	1GHz~40GHz	06/Apr/2021	05/Apr/2022
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	15GHz~40GHz	11/Mar/2021	10/Mar/2022
Microwave Preamplifier	EMC INSTRUMENTS	EM18G40G	060604	18GHz~40GHz	09/Mar/2021	08/Mar/2022
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	16/Mar/2021	15/Mar/2022
EMI Test Receiver	R&S	ESR3	102052	9kHz~3.6GHz	19/Apr/2021	18/Apr/2022



Summary

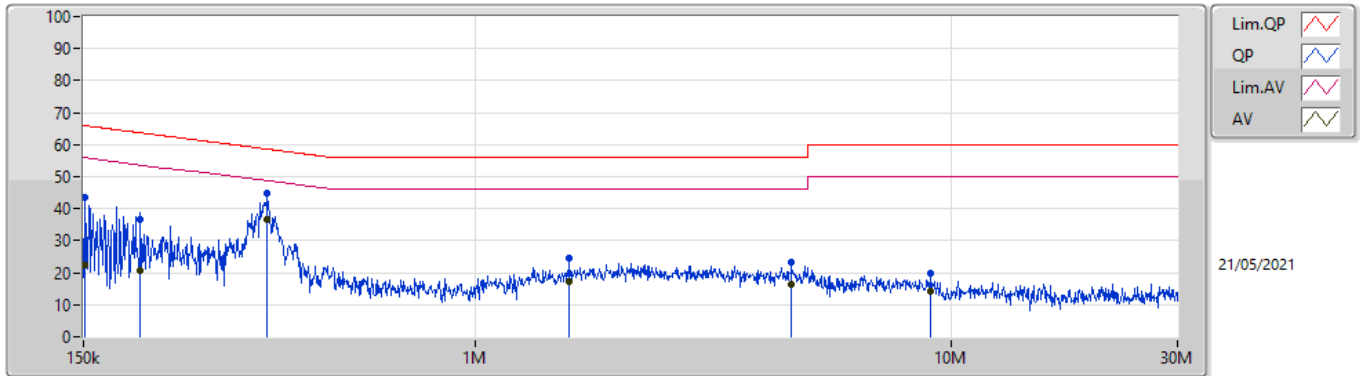
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	363.895k	36.68	48.64	-11.96	Line
Mode 2	Pass	AV	926.114k	29.63	46.00	-16.37	Line



Mode config

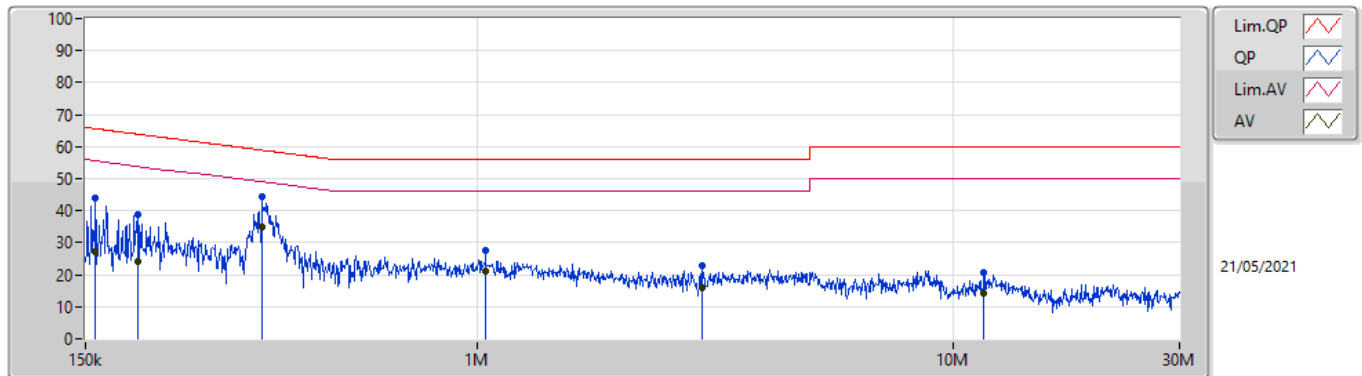
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition	Comments
Mode 1	Pass	QP	150.6k	43.67	65.96	-22.29	Line	-
Mode 1	Pass	AV	150.6k	22.60	55.96	-33.36	Line	-
Mode 1	Pass	QP	197.568k	36.72	63.71	-26.99	Line	-
Mode 1	Pass	AV	197.568k	20.67	53.71	-33.04	Line	-
Mode 1	Pass	QP	363.895k	44.76	58.64	-13.88	Line	-
Mode 1	Pass	AV	363.895k	36.68	48.64	-11.96	Line	-
Mode 1	Pass	QP	1.575M	24.39	56.00	-31.61	Line	-
Mode 1	Pass	AV	1.575M	17.22	46.00	-28.78	Line	-
Mode 1	Pass	QP	4.628M	23.40	56.00	-32.60	Line	-
Mode 1	Pass	AV	4.628M	16.51	46.00	-29.49	Line	-
Mode 1	Pass	QP	9.049M	19.99	60.00	-40.01	Line	-
Mode 1	Pass	AV	9.049M	14.08	50.00	-35.92	Line	-
Mode 1	Pass	QP	157.361k	43.84	65.60	-21.76	Neutral	-
Mode 1	Pass	AV	157.361k	27.17	55.60	-28.43	Neutral	-
Mode 1	Pass	QP	193.664k	38.85	63.88	-25.03	Neutral	-
Mode 1	Pass	AV	193.664k	24.00	53.88	-29.88	Neutral	-
Mode 1	Pass	QP	353.867k	44.24	58.87	-14.63	Neutral	-
Mode 1	Pass	AV	353.867k	34.87	48.87	-14.00	Neutral	-
Mode 1	Pass	QP	1.04M	27.53	56.00	-28.47	Neutral	-
Mode 1	Pass	AV	1.04M	20.94	46.00	-25.06	Neutral	-
Mode 1	Pass	QP	2.971M	22.69	56.00	-33.31	Neutral	-
Mode 1	Pass	AV	2.971M	15.95	46.00	-30.05	Neutral	-
Mode 1	Pass	QP	11.637M	20.54	60.00	-39.46	Neutral	-
Mode 1	Pass	AV	11.637M	14.41	50.00	-35.59	Neutral	-
Mode 2	Pass	QP	155.487k	43.02	65.69	-22.67	Line	-
Mode 2	Pass	AV	155.487k	26.57	55.69	-29.12	Line	-
Mode 2	Pass	QP	218.303k	32.71	62.88	-30.17	Line	-
Mode 2	Pass	AV	218.303k	17.57	52.88	-35.31	Line	-
Mode 2	Pass	QP	295.68k	23.08	60.36	-37.28	Line	-
Mode 2	Pass	AV	295.68k	14.44	50.36	-35.92	Line	-
Mode 2	Pass	QP	926.114k	34.09	56.00	-21.91	Line	-
Mode 2	Pass	AV	926.114k	29.63	46.00	-16.37	Line	-
Mode 2	Pass	QP	1.454M	27.72	56.00	-28.28	Line	-
Mode 2	Pass	AV	1.454M	24.28	46.00	-21.72	Line	-
Mode 2	Pass	QP	12.504M	27.65	60.00	-32.35	Line	-
Mode 2	Pass	AV	12.504M	22.18	50.00	-27.82	Line	-
Mode 2	Pass	QP	151.202k	44.24	65.92	-21.68	Neutral	-
Mode 2	Pass	AV	151.202k	26.34	55.92	-29.58	Neutral	-
Mode 2	Pass	QP	189.08k	37.00	64.07	-27.07	Neutral	-
Mode 2	Pass	AV	189.08k	19.87	54.07	-34.20	Neutral	-
Mode 2	Pass	QP	241.214k	30.09	62.06	-31.97	Neutral	-
Mode 2	Pass	AV	241.214k	19.56	52.06	-32.50	Neutral	-
Mode 2	Pass	QP	725.952k	26.18	56.00	-29.82	Neutral	-
Mode 2	Pass	AV	725.952k	24.42	46.00	-21.58	Neutral	-
Mode 2	Pass	QP	926.114k	32.81	56.00	-23.19	Neutral	-
Mode 2	Pass	AV	926.114k	28.54	46.00	-17.46	Neutral	-
Mode 2	Pass	QP	12.554M	30.13	60.00	-29.87	Neutral	-
Mode 2	Pass	AV	12.554M	24.71	50.00	-25.29	Neutral	-

Conducted Emissions at Powerline_Mode 1



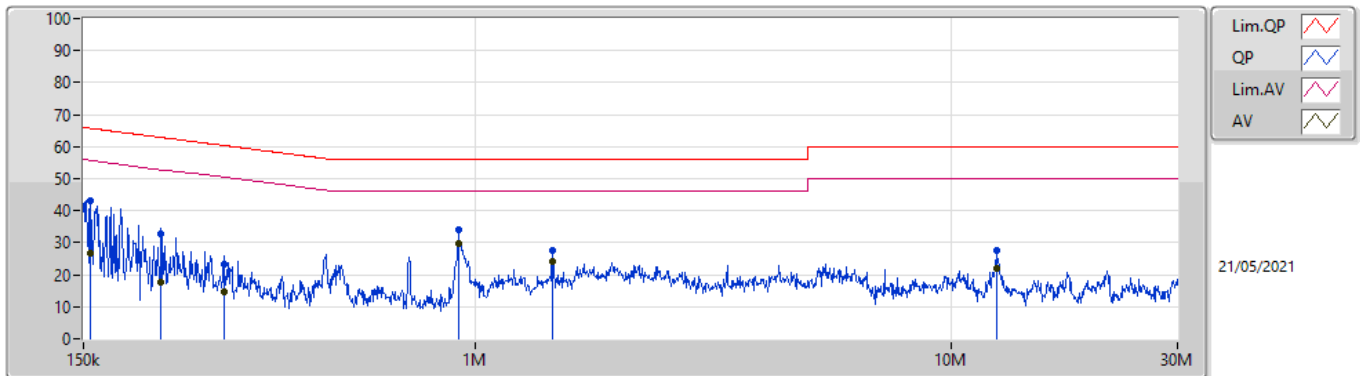
Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)
QP	150.6k	43.67	65.96	-22.29	19.63	Line	-	24.04	9.69	0.04	9.90
AV	150.6k	22.60	55.96	-33.36	19.63	Line	-	2.97	9.69	0.04	9.90
QP	197.568k	36.72	63.71	-26.99	19.62	Line	-	17.10	9.68	0.04	9.90
AV	197.568k	20.67	53.71	-33.04	19.62	Line	-	1.05	9.68	0.04	9.90
QP	363.895k	44.76	58.64	-13.88	19.63	Line	-	25.13	9.67	0.06	9.90
AV	363.895k	36.68	48.64	-11.96	19.63	Line	-	17.05	9.67	0.06	9.90
QP	1.575M	24.39	56.00	-31.61	19.57	Line	-	4.82	9.68	0.09	9.80
AV	1.575M	17.22	46.00	-28.78	19.57	Line	-	-2.35	9.68	0.09	9.80
QP	4.628M	23.40	56.00	-32.60	19.74	Line	-	3.66	9.69	0.15	9.90
AV	4.628M	16.51	46.00	-29.49	19.74	Line	-	-3.23	9.69	0.15	9.90
QP	9.049M	19.99	60.00	-40.01	19.81	Line	-	0.18	9.72	0.19	9.90
AV	9.049M	14.08	50.00	-35.92	19.81	Line	-	-5.73	9.72	0.19	9.90

Conducted Emissions at Powerline_Mode 1



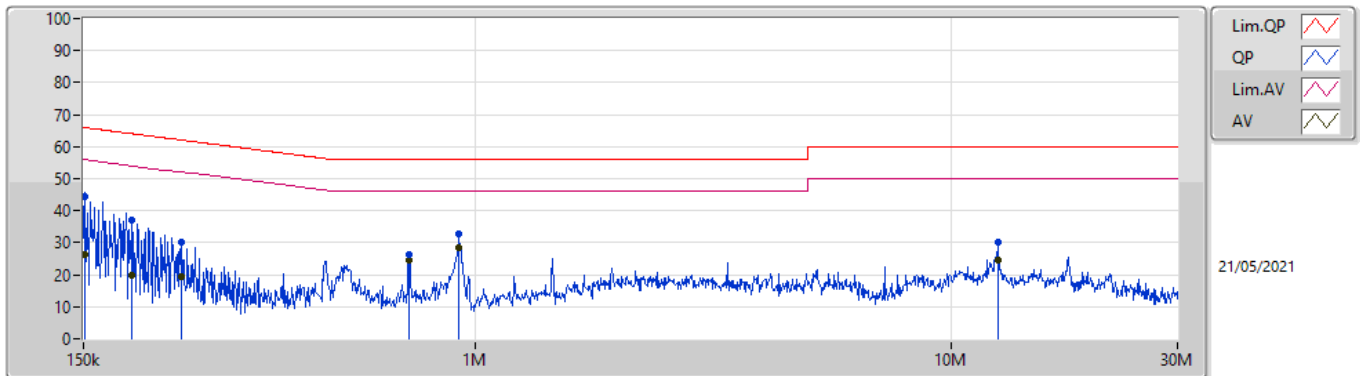
Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)
QP	157.361k	43.84	65.60	-21.76	19.63	Neutral	-	24.21	9.69	0.04	9.90
AV	157.361k	27.17	55.60	-28.43	19.63	Neutral	-	7.54	9.69	0.04	9.90
QP	193.664k	38.85	63.88	-25.03	19.62	Neutral	-	19.23	9.68	0.04	9.90
AV	193.664k	24.00	53.88	-29.88	19.62	Neutral	-	4.38	9.68	0.04	9.90
QP	353.867k	44.24	58.87	-14.63	19.63	Neutral	-	24.61	9.67	0.06	9.90
AV	353.867k	34.87	48.87	-14.00	19.63	Neutral	-	15.24	9.67	0.06	9.90
QP	1.04M	27.53	56.00	-28.47	19.55	Neutral	-	7.98	9.67	0.08	9.80
AV	1.04M	20.94	46.00	-25.06	19.55	Neutral	-	1.39	9.67	0.08	9.80
QP	2.971M	22.69	56.00	-33.31	19.67	Neutral	-	3.02	9.69	0.12	9.86
AV	2.971M	15.95	46.00	-30.05	19.67	Neutral	-	-3.72	9.69	0.12	9.86
QP	11.637M	20.54	60.00	-39.46	19.85	Neutral	-	0.69	9.73	0.22	9.90
AV	11.637M	14.41	50.00	-35.59	19.85	Neutral	-	-5.44	9.73	0.22	9.90

Conducted Emissions at Powerline_Mode 2



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)
QP	155.487k	43.02	65.69	-22.67	19.63	Line	-	23.39	9.69	0.04	9.90
AV	155.487k	26.57	55.69	-29.12	19.63	Line	-	6.94	9.69	0.04	9.90
QP	218.303k	32.71	62.88	-30.17	19.62	Line	-	13.09	9.68	0.04	9.90
AV	218.303k	17.57	52.88	-35.31	19.62	Line	-	-2.05	9.68	0.04	9.90
QP	295.68k	23.08	60.36	-37.28	19.62	Line	-	3.46	9.67	0.05	9.90
AV	295.68k	14.44	50.36	-35.92	19.62	Line	-	-5.18	9.67	0.05	9.90
QP	926.114k	34.09	56.00	-21.91	19.56	Line	-	14.53	9.67	0.08	9.81
AV	926.114k	29.63	46.00	-16.37	19.56	Line	-	10.07	9.67	0.08	9.81
QP	1.454M	27.72	56.00	-28.28	19.57	Line	-	8.15	9.68	0.09	9.80
AV	1.454M	24.28	46.00	-21.72	19.57	Line	-	4.71	9.68	0.09	9.80
QP	12.504M	27.65	60.00	-32.35	19.83	Line	-	7.82	9.70	0.23	9.90
AV	12.504M	22.18	50.00	-27.82	19.83	Line	-	2.35	9.70	0.23	9.90

Conducted Emissions at Powerline_Mode 2



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)
QP	151.202k	44.24	65.92	-21.68	19.63	Neutral	-	24.61	9.69	0.04	9.90
AV	151.202k	26.34	55.92	-29.58	19.63	Neutral	-	6.71	9.69	0.04	9.90
QP	189.08k	37.00	64.07	-27.07	19.62	Neutral	-	17.38	9.68	0.04	9.90
AV	189.08k	19.87	54.07	-34.20	19.62	Neutral	-	0.25	9.68	0.04	9.90
QP	241.214k	30.09	62.06	-31.97	19.63	Neutral	-	10.46	9.68	0.05	9.90
AV	241.214k	19.56	52.06	-32.50	19.63	Neutral	-	-0.07	9.68	0.05	9.90
QP	725.952k	26.18	56.00	-29.82	19.57	Neutral	-	6.61	9.67	0.07	9.83
AV	725.952k	24.42	46.00	-21.58	19.57	Neutral	-	4.85	9.67	0.07	9.83
QP	926.114k	32.81	56.00	-23.19	19.56	Neutral	-	13.25	9.67	0.08	9.81
AV	926.114k	28.54	46.00	-17.46	19.56	Neutral	-	8.98	9.67	0.08	9.81
QP	12.554M	30.13	60.00	-29.87	19.87	Neutral	-	10.26	9.74	0.23	9.90
AV	12.554M	24.71	50.00	-25.29	19.87	Neutral	-	4.84	9.74	0.23	9.90



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)	717.5k	1.056M	1M06F1D	685k	1.044M

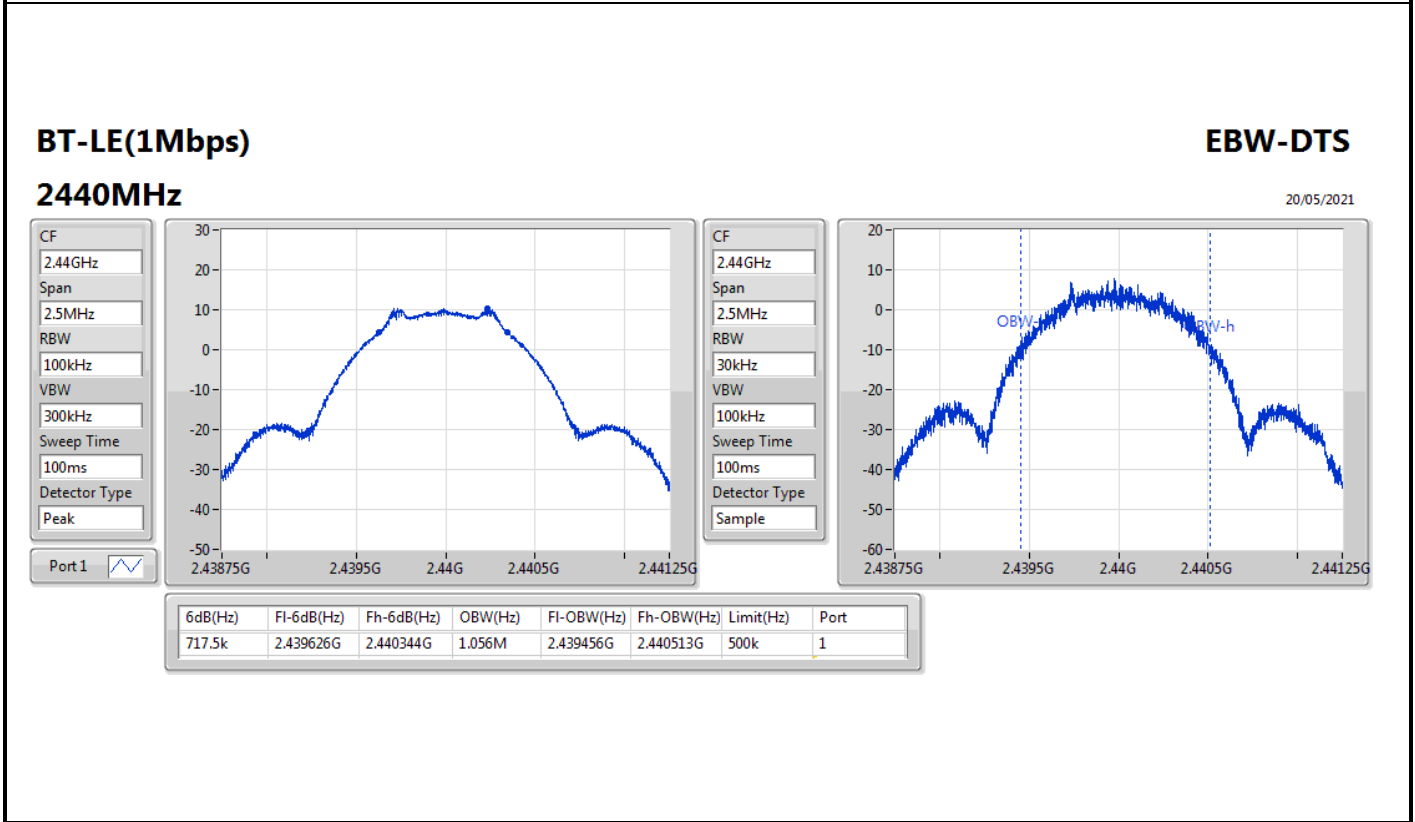
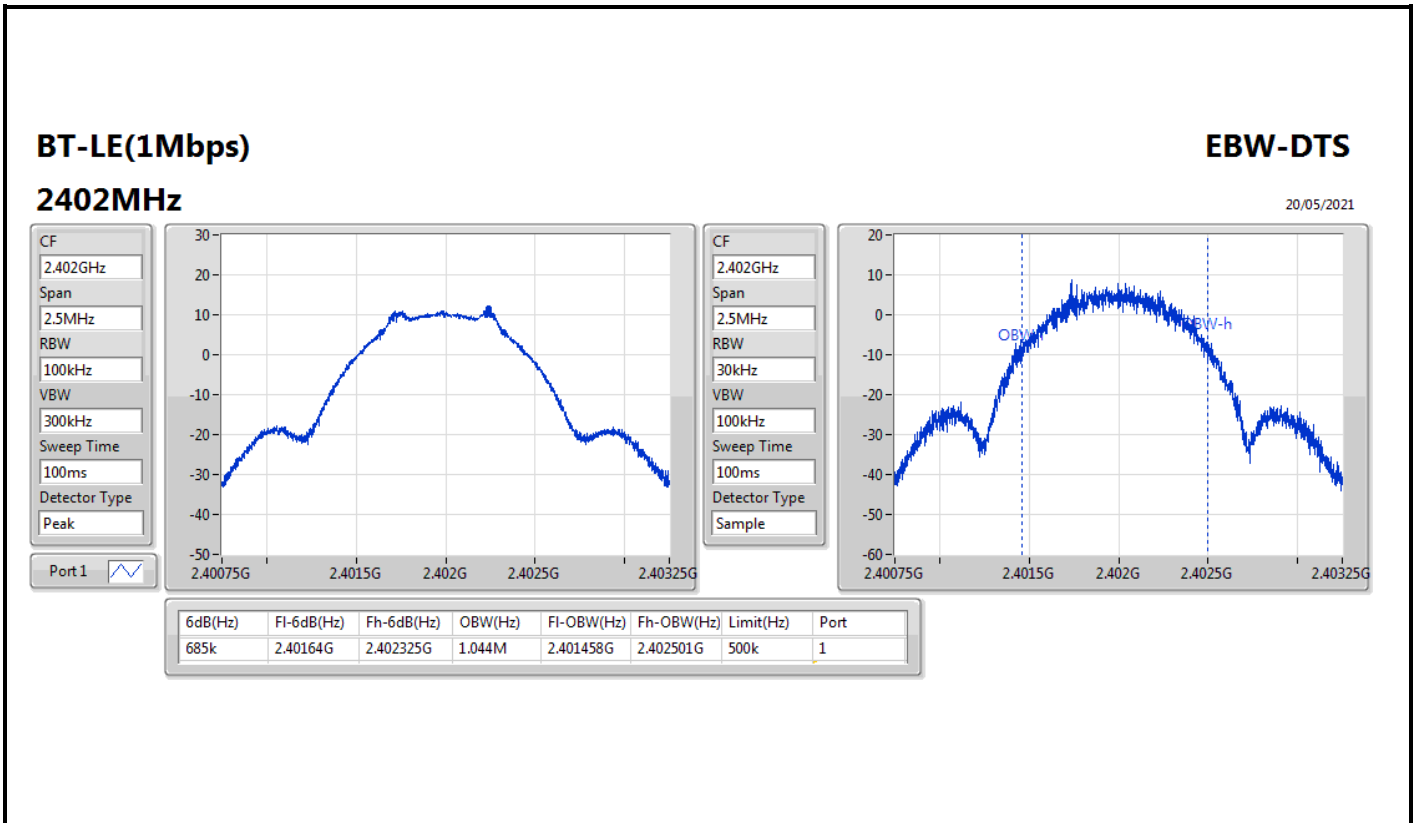
Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth

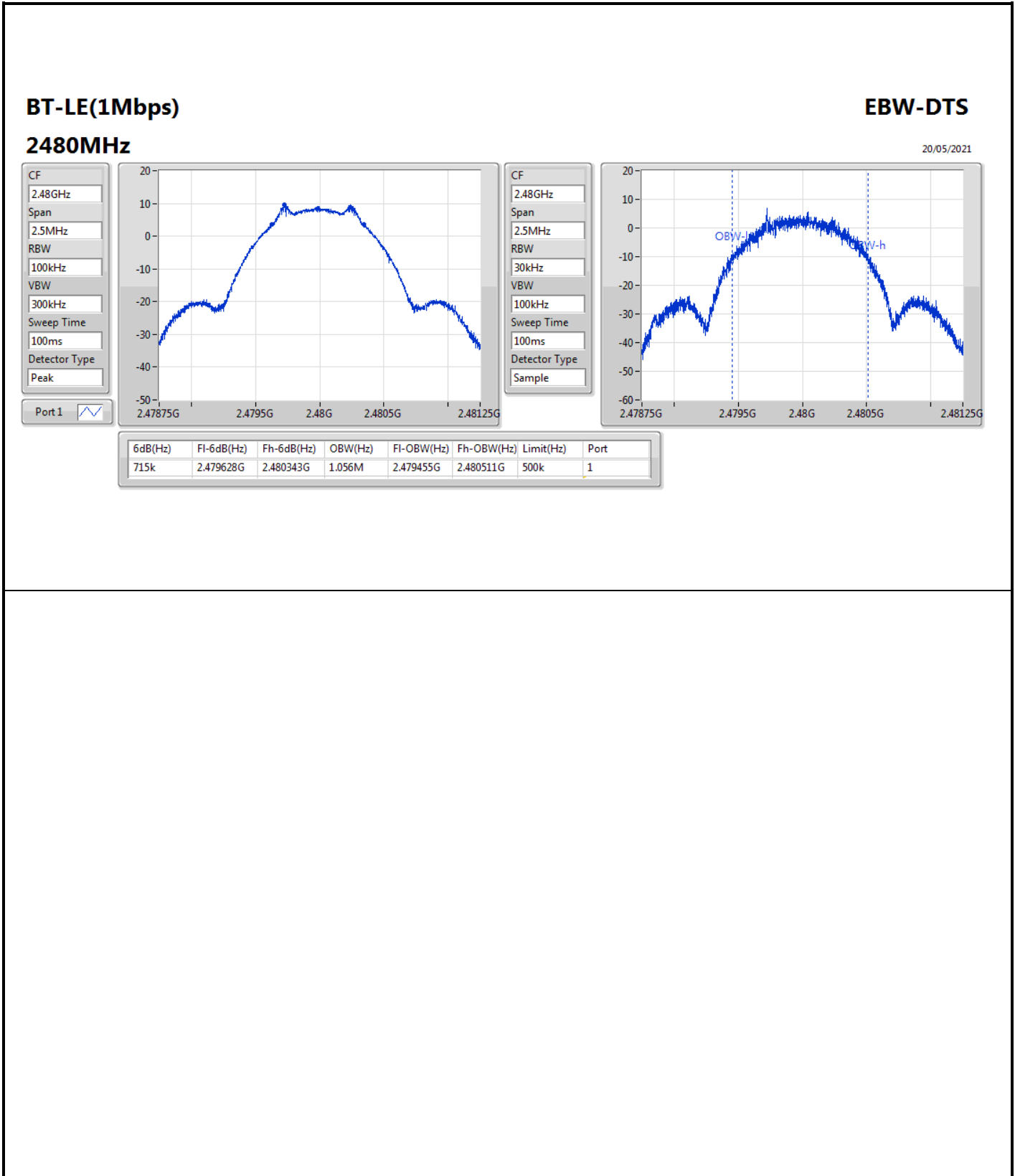


Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	685k	1.044M
2440MHz	Pass	500k	717.5k	1.056M
2480MHz	Pass	500k	715k	1.056M

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







Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	11.84	0.01528



Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.33	11.84	30.00
2440MHz	Pass	4.33	10.88	30.00
2480MHz	Pass	4.33	9.83	30.00

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



Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-0.34

RBW = 3kHz;



Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.33	-0.34	8.00
2440MHz	Pass	4.33	-1.03	8.00
2480MHz	Pass	4.33	-3.02	8.00

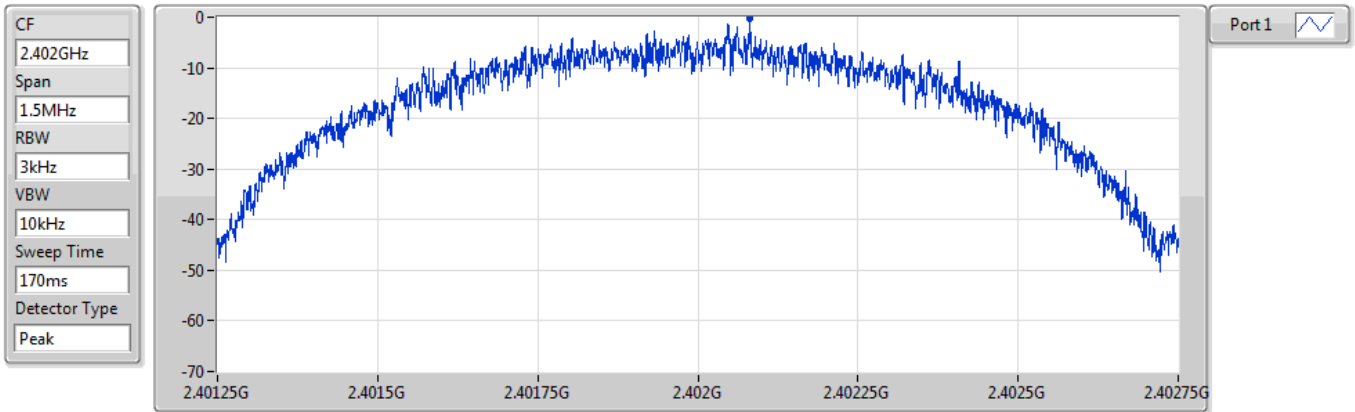
DG = Directional Gain; RBW = 3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

BT-LE(1Mbps)

PSD

2402MHz

20/05/2021



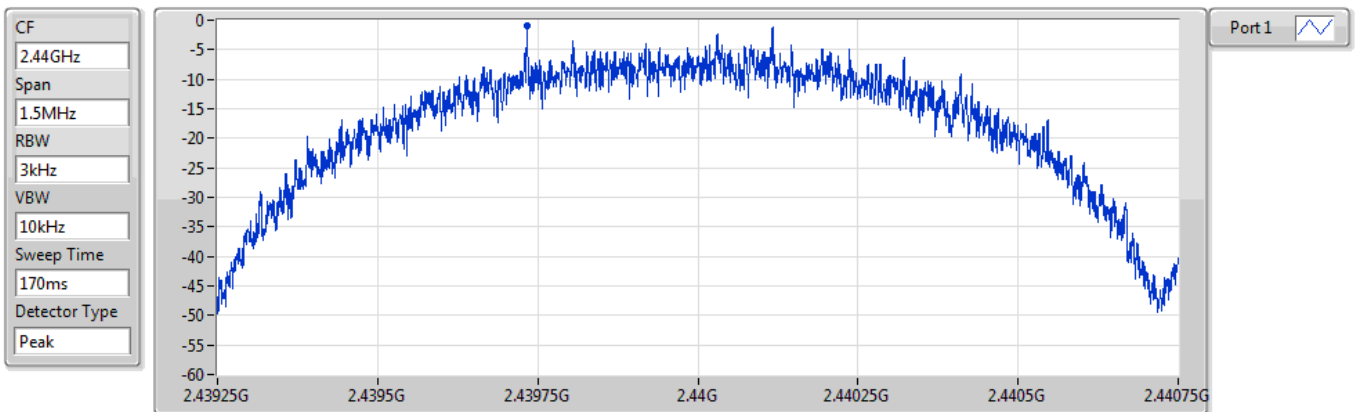
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-0.34	-0.34	-0.34

BT-LE(1Mbps)

PSD

2440MHz

20/05/2021



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-1.03	-1.03	-1.03

BT-LE(1Mbps)

PSD

2480MHz

20/05/2021

CF
2.48GHz

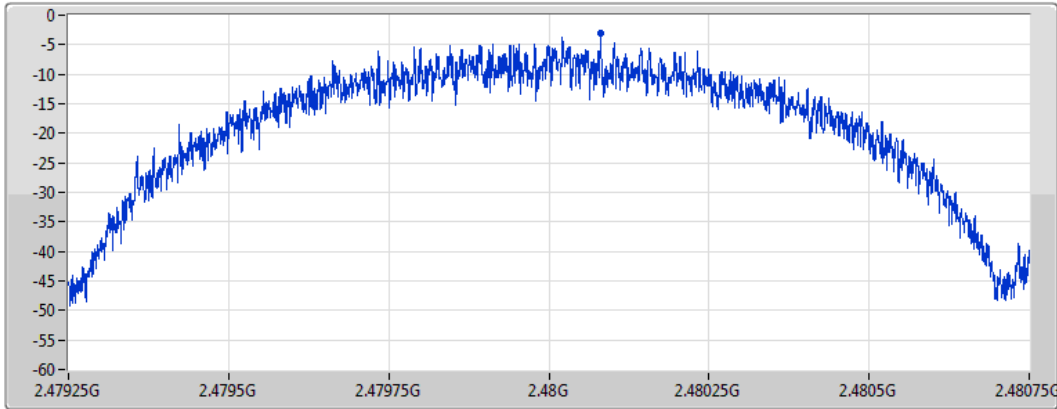
Span
1.5MHz


RBW
3kHz

VBW
10kHz

Sweep Time
170ms

Detector Type
Peak



Port 1 

Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-3.02	-3.02	-3.02



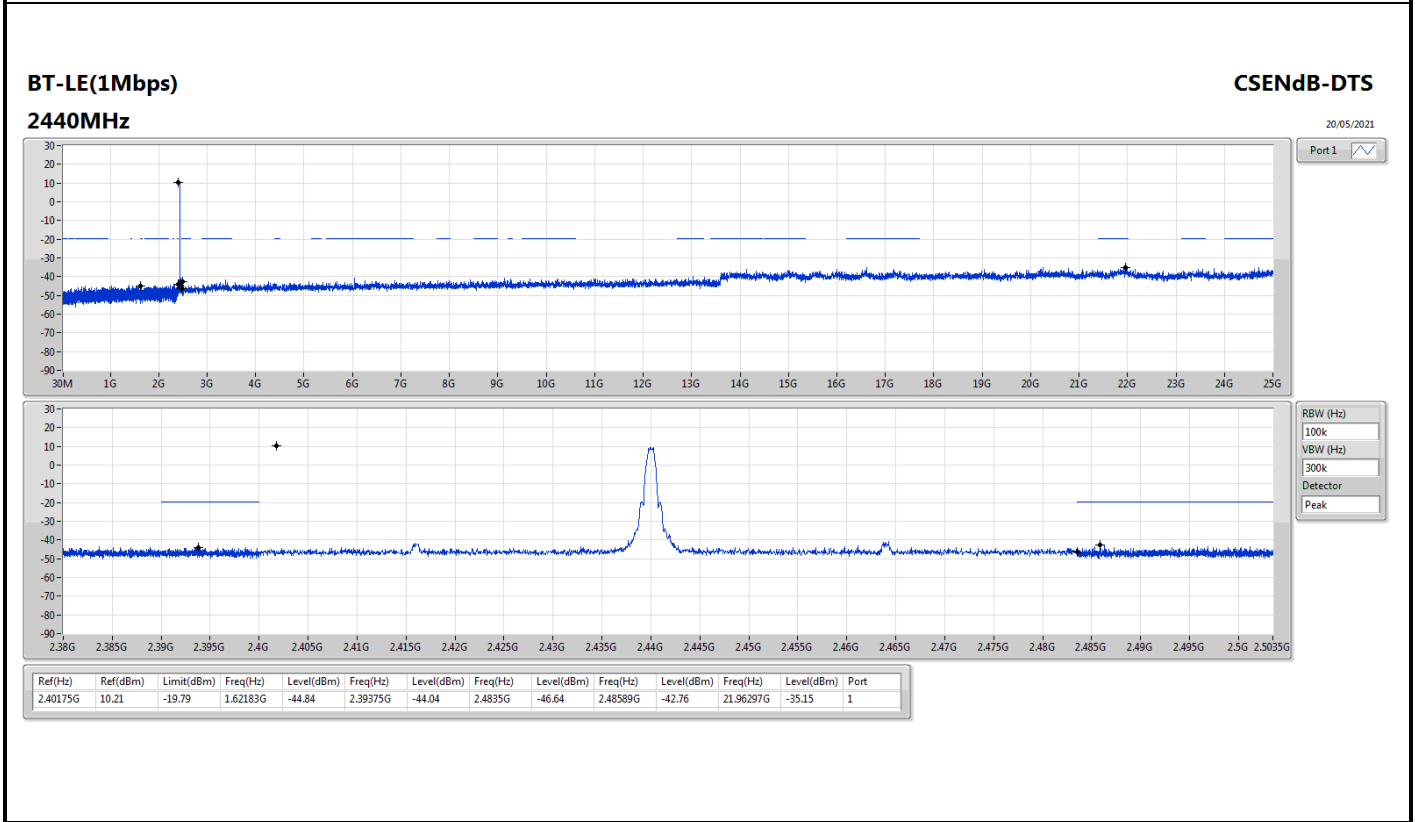
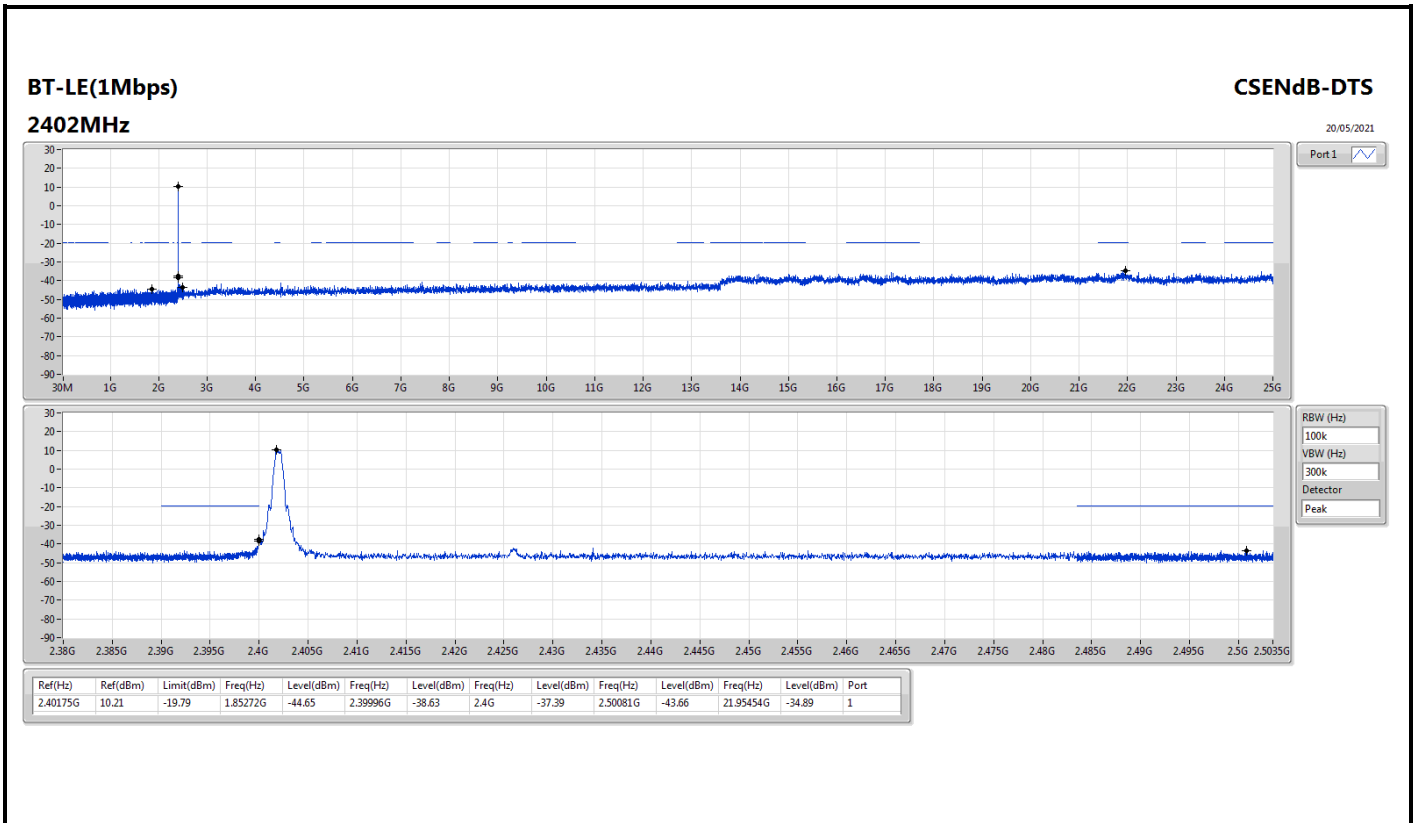
Summary

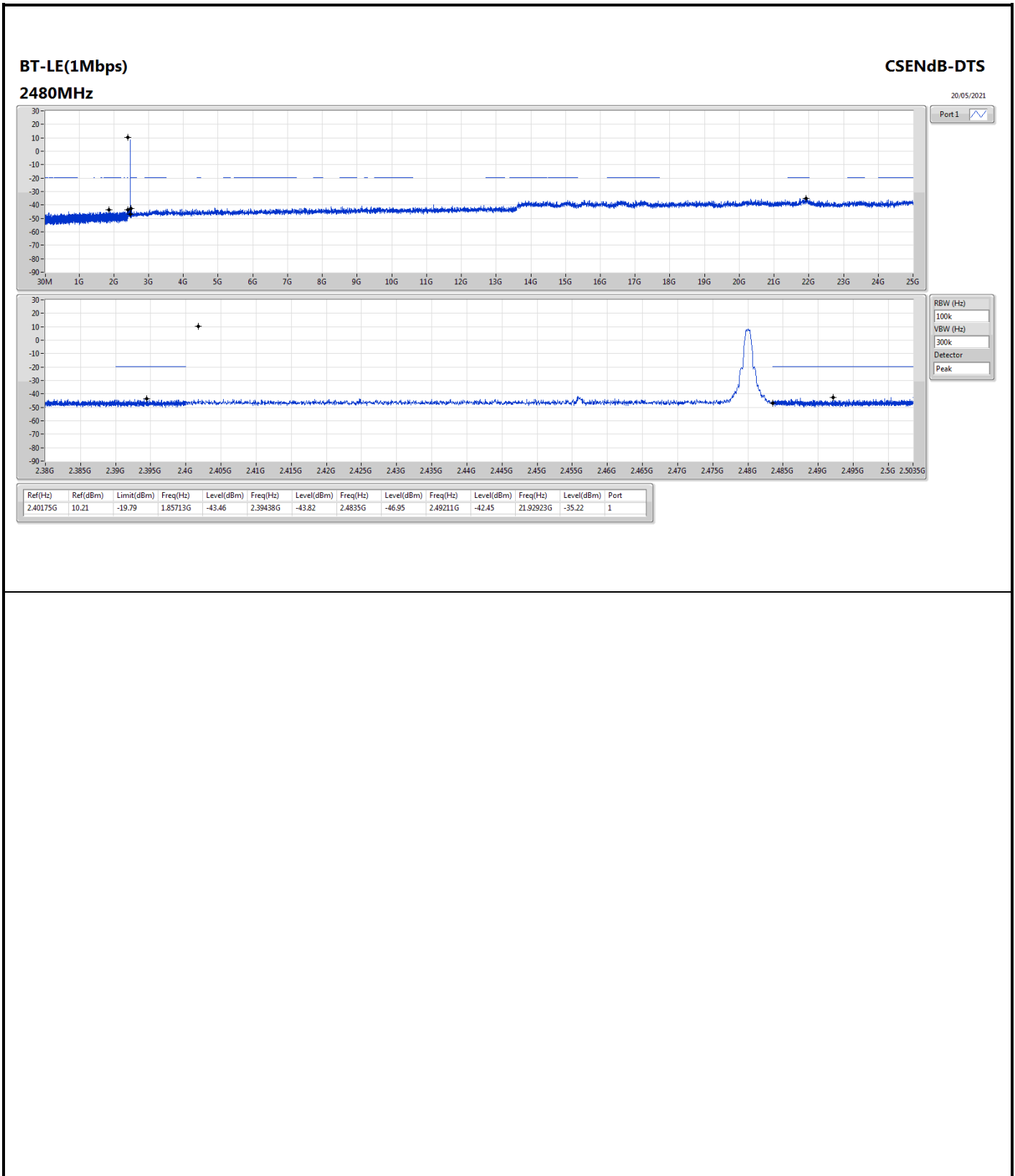
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.40175G	10.21	-19.79	1.85272G	-44.65	2.39996G	-38.63	2.4G	-37.39	2.50081G	-43.66	21.95454G	-34.89	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	2.40175G	10.21	-19.79	1.85272G	-44.65	2.39996G	-38.63	2.4G	-37.39	2.50081G	-43.66	21.95454G	-34.89	1
2440MHz	Pass	2.40175G	10.21	-19.79	1.62183G	-44.84	2.39375G	-44.04	2.4835G	-46.64	2.48589G	-42.76	21.96297G	-35.15	1
2480MHz	Pass	2.40175G	10.21	-19.79	1.85713G	-43.46	2.39438G	-43.82	2.4835G	-46.95	2.49211G	-42.45	21.92923G	-35.22	1







Summary

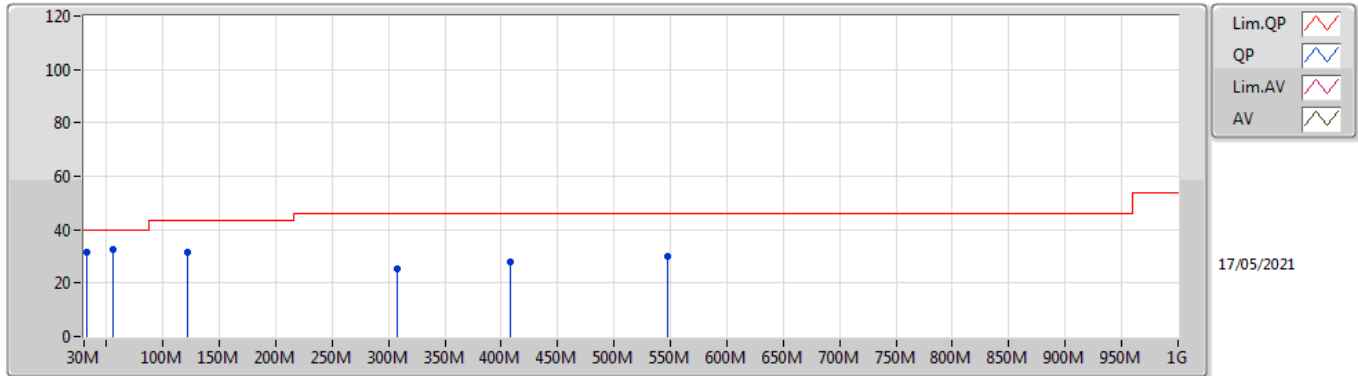
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	PK	37.76M	32.84	40.00	-7.16	3	Vertical	360	1.00	-



Result

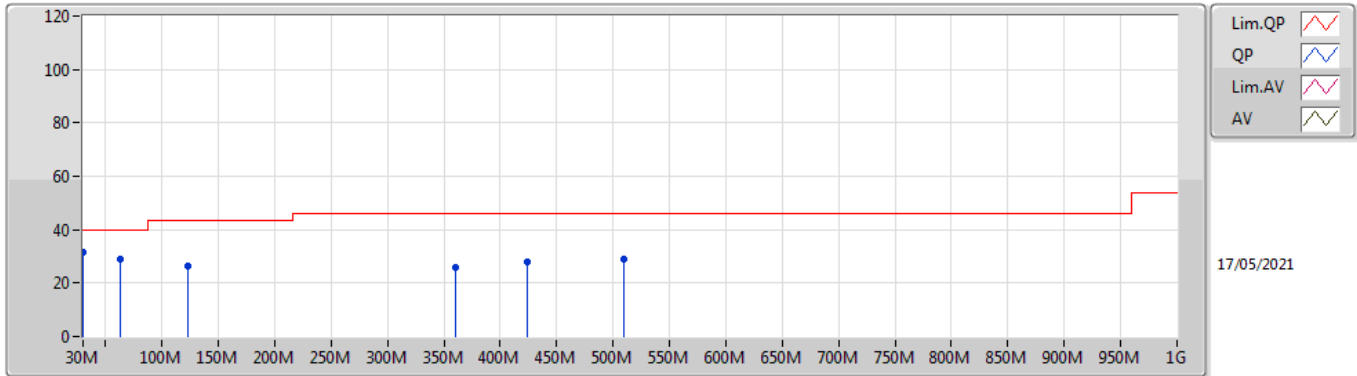
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	31.94M	31.58	40.00	-8.42	3	Vertical	0	1.00	-
2440MHz	Pass	PK	55.22M	32.60	40.00	-7.40	3	Vertical	0	1.00	-
2440MHz	Pass	PK	121.18M	31.67	43.50	-11.83	3	Vertical	0	1.00	-
2440MHz	Pass	PK	307.42M	25.14	46.00	-20.86	3	Vertical	0	1.00	-
2440MHz	Pass	PK	408.3M	28.14	46.00	-17.86	3	Vertical	0	1.00	-
2440MHz	Pass	PK	547.98M	29.83	46.00	-16.17	3	Vertical	0	1.00	-
2440MHz	Pass	PK	30M	31.31	40.00	-8.69	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	62.98M	29.07	40.00	-10.93	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	123.12M	26.13	43.50	-17.37	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	359.8M	25.83	46.00	-20.17	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	423.82M	27.95	46.00	-18.05	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	509.18M	29.04	46.00	-16.96	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	37.76M	32.84	40.00	-7.16	3	Vertical	360	1.00	-
2440MHz	Pass	PK	165.8M	25.21	43.50	-18.29	3	Vertical	360	1.00	-
2440MHz	Pass	PK	260.86M	26.30	46.00	-19.70	3	Vertical	360	1.00	-
2440MHz	Pass	PK	301.6M	25.58	46.00	-20.42	3	Vertical	360	1.00	-
2440MHz	Pass	PK	406.36M	29.13	46.00	-16.87	3	Vertical	360	1.00	-
2440MHz	Pass	PK	563.5M	30.49	46.00	-15.51	3	Vertical	360	1.00	-
2440MHz	Pass	PK	35.82M	29.94	40.00	-10.06	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	49.4M	29.45	40.00	-10.55	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	134.76M	25.62	43.50	-17.88	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	334.58M	27.53	46.00	-18.47	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	416.06M	30.39	46.00	-15.61	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	515M	29.24	46.00	-16.76	3	Horizontal	0	1.00	-

BT-LE(1Mbps)
2440MHz_Adapter



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	31.94M	31.58	40.00	-8.42	-4.18	3	Vertical	0	1.00	-	35.76	22.03	0.88	27.09
PK	55.22M	32.60	40.00	-7.40	-14.58	3	Vertical	0	1.00	-	47.18	12.11	1.10	27.79
PK	121.18M	31.67	43.50	-11.83	-8.72	3	Vertical	0	1.00	-	40.39	17.43	1.55	27.70
PK	307.42M	25.14	46.00	-20.86	-6.02	3	Vertical	0	1.00	-	31.16	18.67	2.39	27.08
PK	408.3M	28.14	46.00	-17.86	-3.50	3	Vertical	0	1.00	-	31.64	21.52	2.77	27.79
PK	547.98M	29.83	46.00	-16.17	-1.32	3	Vertical	0	1.00	-	31.15	23.85	3.19	28.36

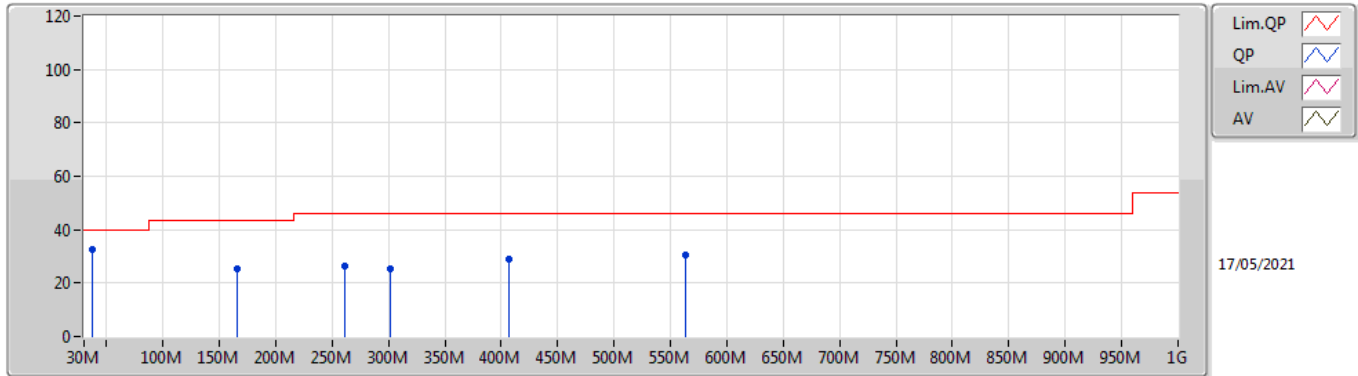
BT-LE(1Mbps)
2440MHz_Adapter



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	30M	31.31	40.00	-8.69	-3.03	3	Horizontal	360	1.00	-	34.34	23.32	0.86	27.21
PK	62.98M	29.07	40.00	-10.93	-15.03	3	Horizontal	360	1.00	-	44.10	11.61	1.16	27.80
PK	123.12M	26.13	43.50	-17.37	-8.75	3	Horizontal	360	1.00	-	34.88	17.39	1.56	27.70
PK	359.8M	25.83	46.00	-20.17	-4.94	3	Horizontal	360	1.00	-	30.77	19.87	2.59	27.40
PK	423.82M	27.95	46.00	-18.05	-3.11	3	Horizontal	360	1.00	-	31.06	21.96	2.82	27.89
PK	509.18M	29.04	46.00	-16.96	-2.37	3	Horizontal	360	1.00	-	31.41	22.82	3.10	28.29

BT-LE(1Mbps)

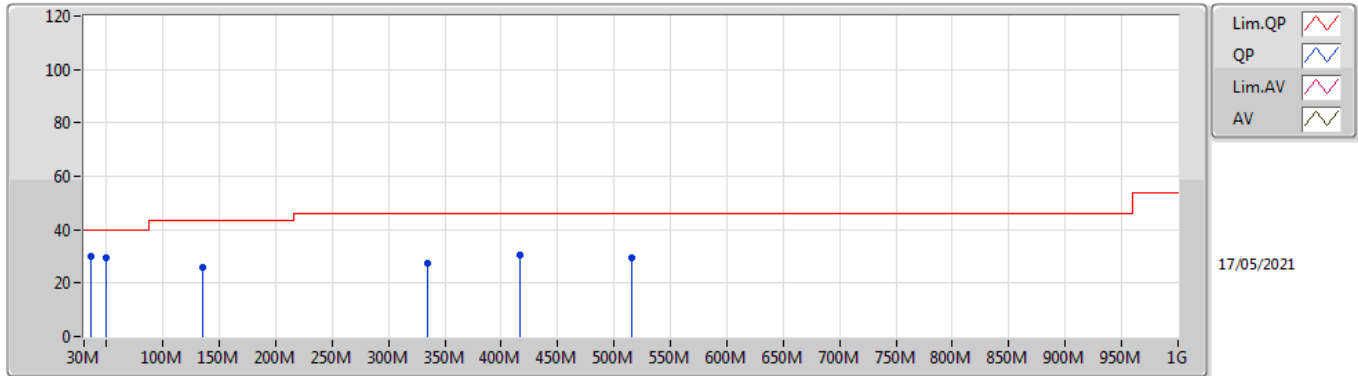
2440MHz_PoE



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	37.76M	32.84	40.00	-7.16	-7.13	3	Vertical	360	1.00	-	39.97	19.08	0.94	27.15
PK	165.8M	25.21	43.50	-18.29	-10.79	3	Vertical	360	1.00	-	36.00	14.92	1.80	27.51
PK	260.86M	26.30	46.00	-19.70	-6.10	3	Vertical	360	1.00	-	32.40	18.75	2.20	27.05
PK	301.6M	25.58	46.00	-20.42	-6.21	3	Vertical	360	1.00	-	31.79	18.47	2.37	27.05
PK	406.36M	29.13	46.00	-16.87	-3.61	3	Vertical	360	1.00	-	32.74	21.40	2.76	27.77
PK	563.5M	30.49	46.00	-15.51	-1.03	3	Vertical	360	1.00	-	31.52	24.08	3.24	28.35

BT-LE(1Mbps)

2440MHz_PoE



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	35.82M	29.94	40.00	-10.06	-6.08	3	Horizontal	0	1.00	-	36.02	19.97	0.92	26.97
PK	49.4M	29.45	40.00	-10.55	-13.23	3	Horizontal	0	1.00	-	42.68	13.40	1.06	27.69
PK	134.76M	25.62	43.50	-17.88	-9.32	3	Horizontal	0	1.00	-	34.94	16.71	1.61	27.64
PK	334.58M	27.53	46.00	-18.47	-5.77	3	Horizontal	0	1.00	-	33.30	18.97	2.49	27.23
PK	416.06M	30.39	46.00	-15.61	-3.21	3	Horizontal	0	1.00	-	33.60	21.84	2.79	27.84
PK	515M	29.24	46.00	-16.76	-2.36	3	Horizontal	0	1.00	-	31.60	22.83	3.11	28.30



Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4835G	51.23	54.00	-2.77	3	Horizontal	2	1.40	-

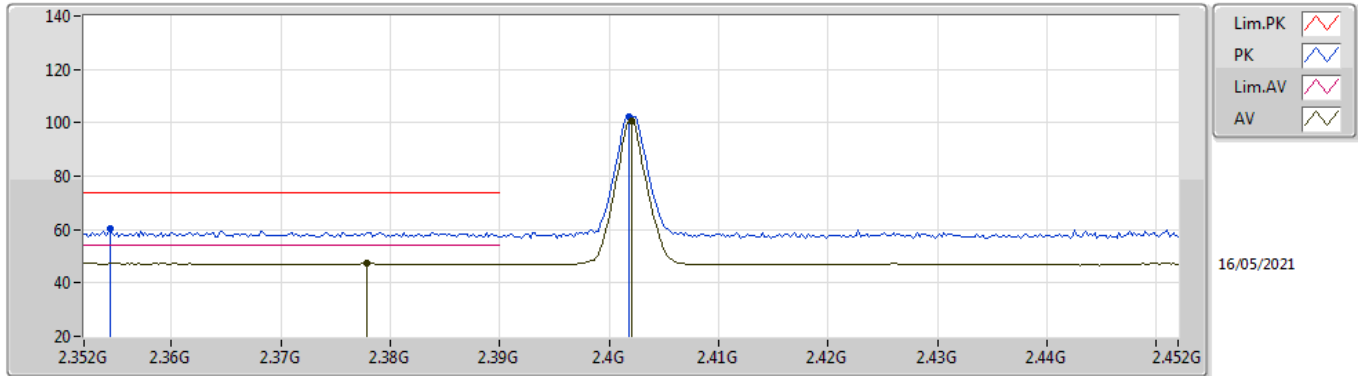


Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.3778G	47.42	54.00	-6.58	3	Vertical	295	2.62	-
2402MHz	Pass	AV	2.402G	100.88	Inf	-Inf	3	Vertical	295	2.62	-
2402MHz	Pass	PK	2.3544G	60.35	74.00	-13.65	3	Vertical	295	2.62	-
2402MHz	Pass	PK	2.4018G	102.47	Inf	-Inf	3	Vertical	295	2.62	-
2402MHz	Pass	AV	2.378G	50.63	54.00	-3.37	3	Horizontal	7	1.04	-
2402MHz	Pass	AV	2.402G	110.54	Inf	-Inf	3	Horizontal	7	1.04	-
2402MHz	Pass	PK	2.3778G	61.02	74.00	-12.98	3	Horizontal	7	1.04	-
2402MHz	Pass	PK	2.4018G	112.14	Inf	-Inf	3	Horizontal	7	1.04	-
2402MHz	Pass	AV	4.80387G	32.28	54.00	-21.72	3	Vertical	215	2.12	-
2402MHz	Pass	PK	4.80354G	45.72	74.00	-28.28	3	Vertical	215	2.12	-
2402MHz	Pass	AV	4.80412G	32.60	54.00	-21.40	3	Horizontal	157	1.50	-
2402MHz	Pass	PK	4.80434G	44.80	74.00	-29.20	3	Horizontal	157	1.50	-
2440MHz	Pass	AV	2.3404G	47.30	54.00	-6.70	3	Vertical	310	1.15	-
2440MHz	Pass	AV	2.44G	95.39	Inf	-Inf	3	Vertical	310	1.15	-
2440MHz	Pass	AV	2.5G	46.91	54.00	-7.09	3	Vertical	310	1.15	-
2440MHz	Pass	PK	2.3576G	59.22	74.00	-14.78	3	Vertical	310	1.15	-
2440MHz	Pass	PK	2.4396G	96.90	Inf	-Inf	3	Vertical	310	1.15	-
2440MHz	Pass	PK	2.4876G	58.75	74.00	-15.25	3	Vertical	310	1.15	-
2440MHz	Pass	AV	2.3508G	47.36	54.00	-6.64	3	Horizontal	3	1.00	-
2440MHz	Pass	AV	2.44G	106.21	Inf	-Inf	3	Horizontal	3	1.00	-
2440MHz	Pass	AV	2.488G	46.94	54.00	-7.06	3	Horizontal	3	1.00	-
2440MHz	Pass	PK	2.3788G	58.72	74.00	-15.28	3	Horizontal	3	1.00	-
2440MHz	Pass	PK	2.4404G	107.80	Inf	-Inf	3	Horizontal	3	1.00	-
2440MHz	Pass	PK	2.4972G	57.74	74.00	-16.26	3	Horizontal	3	1.00	-
2440MHz	Pass	AV	4.88028G	31.46	54.00	-22.54	3	Vertical	282	3.00	-
2440MHz	Pass	PK	4.87949G	44.81	74.00	-29.19	3	Vertical	282	3.00	-
2440MHz	Pass	AV	4.88015G	31.80	54.00	-22.20	3	Horizontal	207	1.25	-
2440MHz	Pass	PK	4.87992G	45.81	74.00	-28.19	3	Horizontal	207	1.25	-
2480MHz	Pass	AV	2.48G	93.29	Inf	-Inf	3	Vertical	288	2.73	-
2480MHz	Pass	AV	2.4835G	47.42	54.00	-6.58	3	Vertical	288	2.73	-
2480MHz	Pass	PK	2.4802G	94.93	Inf	-Inf	3	Vertical	288	2.73	-
2480MHz	Pass	PK	2.4966G	58.38	74.00	-15.62	3	Vertical	288	2.73	-
2480MHz	Pass	AV	2.48G	103.37	Inf	-Inf	3	Horizontal	2	1.40	-
2480MHz	Pass	AV	2.4835G	51.23	54.00	-2.77	3	Horizontal	2	1.40	-
2480MHz	Pass	PK	2.4798G	105.00	Inf	-Inf	3	Horizontal	2	1.40	-
2480MHz	Pass	PK	2.4835G	59.47	74.00	-14.53	3	Horizontal	2	1.40	-
2480MHz	Pass	AV	4.96035G	30.95	54.00	-23.05	3	Vertical	7	1.84	-
2480MHz	Pass	PK	4.9595G	44.98	74.00	-29.02	3	Vertical	7	1.84	-
2480MHz	Pass	AV	4.95954G	31.38	54.00	-22.62	3	Horizontal	314	1.50	-
2480MHz	Pass	PK	4.96042G	45.18	74.00	-28.82	3	Horizontal	314	1.50	-

BT-LE(1Mbps)

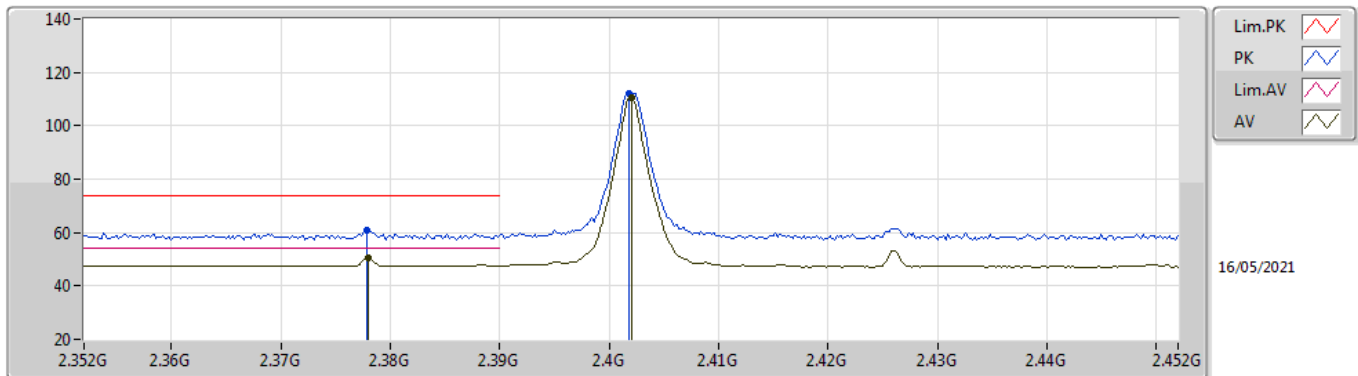
2402MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3778G	47.42	54.00	-6.58	34.89	3	Vertical	295	2.62	-	12.53	27.64	7.25	-
AV	2.402G	100.88	Inf	-Inf	34.85	3	Vertical	295	2.62	-	66.03	27.59	7.26	-
PK	2.3544G	60.35	74.00	-13.65	34.93	3	Vertical	295	2.62	-	25.42	27.69	7.24	-
PK	2.4018G	102.47	Inf	-Inf	34.85	3	Vertical	295	2.62	-	67.62	27.59	7.26	-

BT-LE(1Mbps)

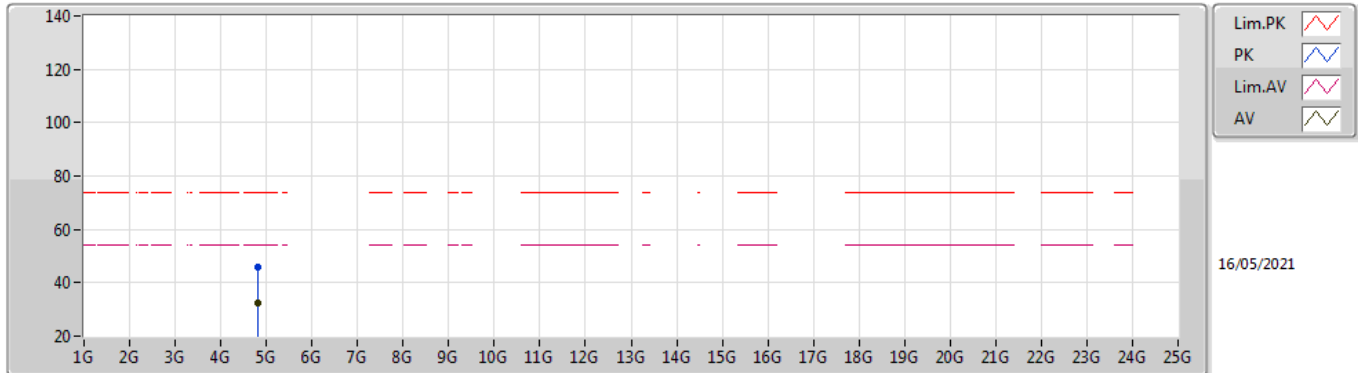
2402MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.378G	50.63	54.00	-3.37	34.89	3	Horizontal	7	1.04	-	15.74	27.64	7.25	-
AV	2.402G	110.54	Inf	-Inf	34.85	3	Horizontal	7	1.04	-	75.69	27.59	7.26	-
PK	2.3778G	61.02	74.00	-12.98	34.89	3	Horizontal	7	1.04	-	26.13	27.64	7.25	-
PK	2.4018G	112.14	Inf	-Inf	34.85	3	Horizontal	7	1.04	-	77.29	27.59	7.26	-

BT-LE(1Mbps)

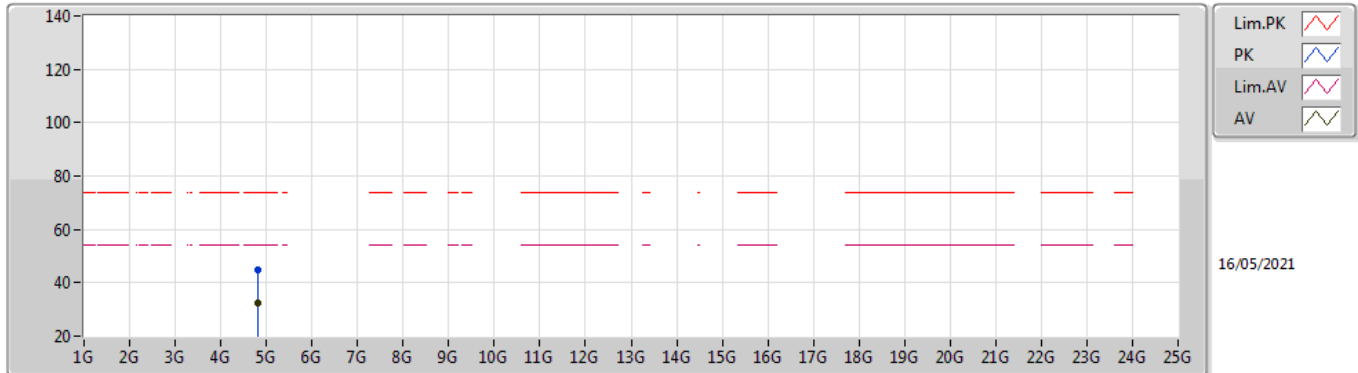
2402MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.80387G	32.28	54.00	-21.72	5.53	3	Vertical	215	2.12	-	26.75	30.92	8.90	34.29
PK	4.80354G	45.72	74.00	-28.28	5.52	3	Vertical	215	2.12	-	40.20	30.91	8.90	34.29

BT-LE(1Mbps)

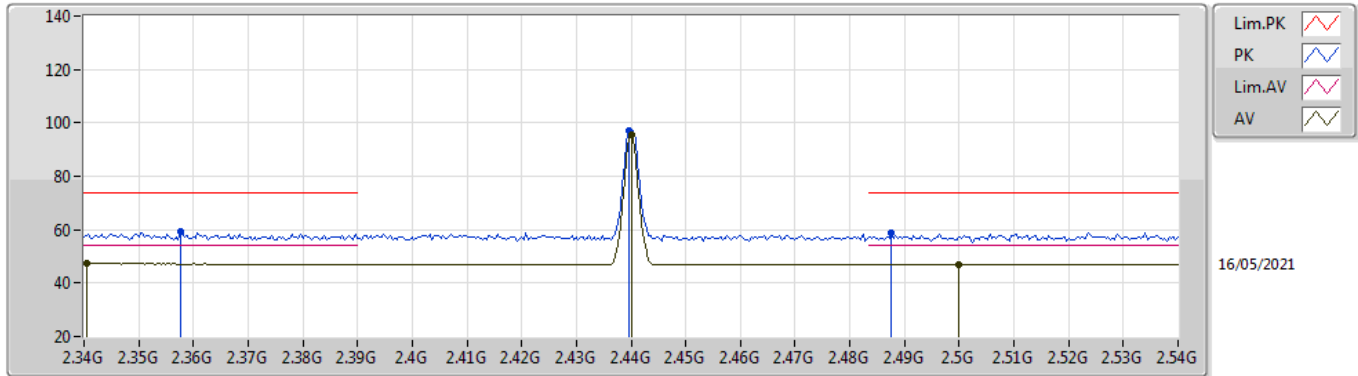
2402MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.80412G	32.60	54.00	-21.40	5.53	3	Horizontal	157	1.50	-	27.07	30.92	8.90	34.29
PK	4.80434G	44.80	74.00	-29.20	5.53	3	Horizontal	157	1.50	-	39.27	30.92	8.90	34.29

BT-LE(1Mbps)

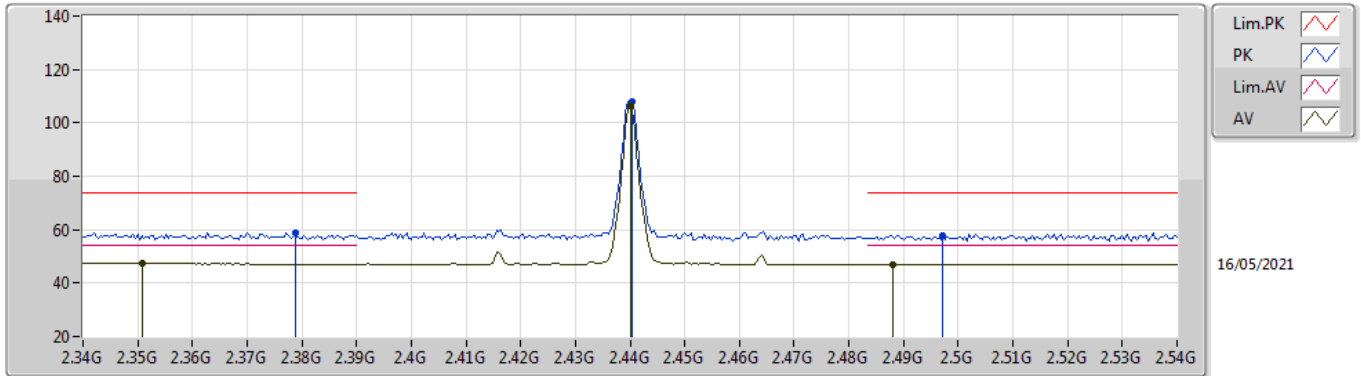
2440MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3404G	47.30	54.00	-6.70	34.97	3	Vertical	310	1.15	-	12.33	27.74	7.23	-
AV	2.44G	95.39	Inf	-Inf	34.73	3	Vertical	310	1.15	-	60.66	27.44	7.29	-
AV	2.5G	46.91	54.00	-7.09	34.74	3	Vertical	310	1.15	-	12.17	27.40	7.34	-
PK	2.3576G	59.22	74.00	-14.78	34.92	3	Vertical	310	1.15	-	24.30	27.68	7.24	-
PK	2.4396G	96.90	Inf	-Inf	34.73	3	Vertical	310	1.15	-	62.17	27.44	7.29	-
PK	2.4876G	58.75	74.00	-15.25	34.73	3	Vertical	310	1.15	-	24.02	27.40	7.33	-

BT-LE(1Mbps)

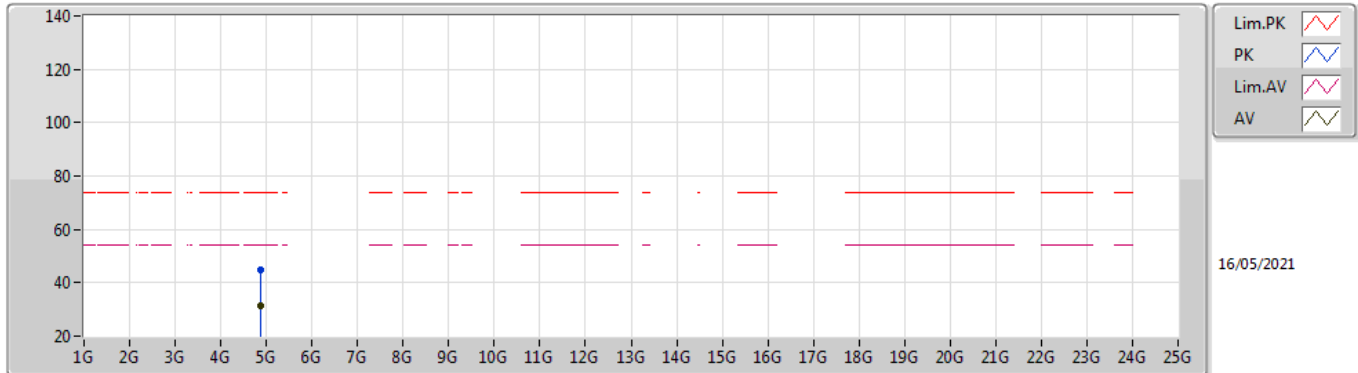
2440MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3508G	47.36	54.00	-6.64	34.94	3	Horizontal	3	1.00	-	12.42	27.70	7.24	-
AV	2.44G	106.21	Inf	-Inf	34.73	3	Horizontal	3	1.00	-	71.48	27.44	7.29	-
AV	2.488G	46.94	54.00	-7.06	34.73	3	Horizontal	3	1.00	-	12.21	27.40	7.33	-
PK	2.3788G	58.72	74.00	-15.28	34.89	3	Horizontal	3	1.00	-	23.83	27.64	7.25	-
PK	2.4404G	107.80	Inf	-Inf	34.73	3	Horizontal	3	1.00	-	73.07	27.44	7.29	-
PK	2.4972G	57.74	74.00	-16.26	34.74	3	Horizontal	3	1.00	-	23.00	27.40	7.34	-

BT-LE(1Mbps)

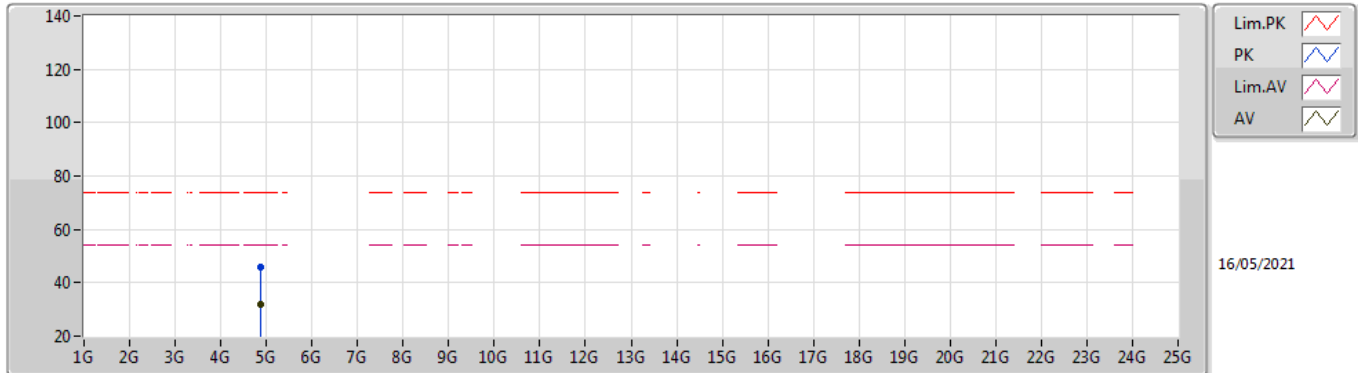
2440MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.88028G	31.46	54.00	-22.54	5.74	3	Vertical	282	3.00	-	25.72	31.04	8.96	34.26
PK	4.87949G	44.81	74.00	-29.19	5.74	3	Vertical	282	3.00	-	39.07	31.04	8.96	34.26

BT-LE(1Mbps)

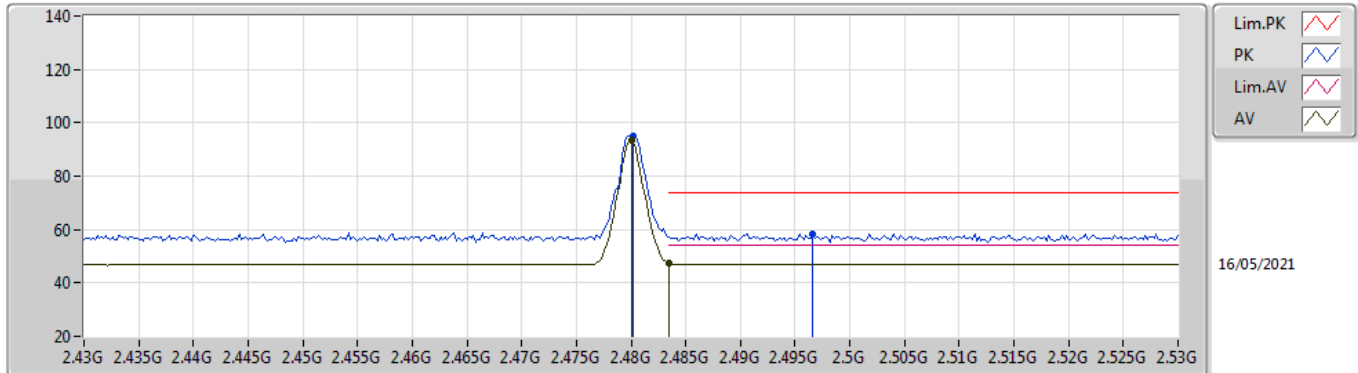
2440MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.88015G	31.80	54.00	-22.20	5.74	3	Horizontal	207	1.25	-	26.06	31.04	8.96	34.26
PK	4.87992G	45.81	74.00	-28.19	5.74	3	Horizontal	207	1.25	-	40.07	31.04	8.96	34.26

BT-LE(1Mbps)

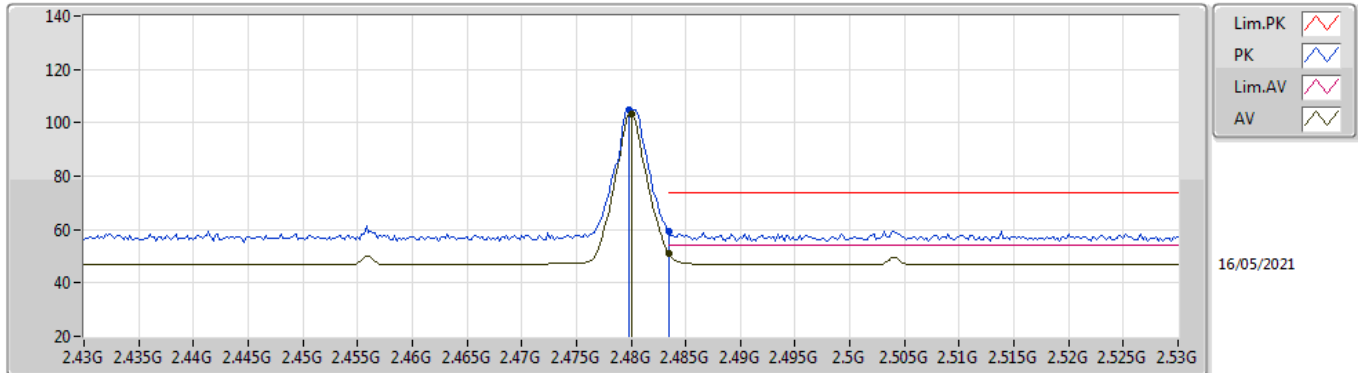
2480MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	93.29	Inf	-Inf	34.72	3	Vertical	288	2.73	-	58.57	27.40	7.32	-
AV	2.4835G	47.42	54.00	-6.58	34.73	3	Vertical	288	2.73	-	12.69	27.40	7.33	-
PK	2.4802G	94.93	Inf	-Inf	34.72	3	Vertical	288	2.73	-	60.21	27.40	7.32	-
PK	2.4966G	58.38	74.00	-15.62	34.74	3	Vertical	288	2.73	-	23.64	27.40	7.34	-

BT-LE(1Mbps)

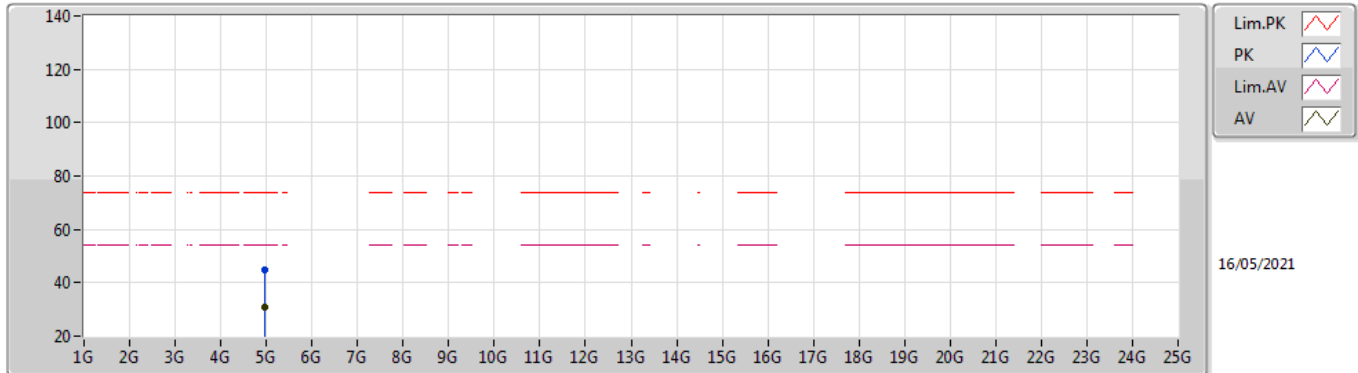
2480MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	103.37	Inf	-Inf	34.72	3	Horizontal	2	1.40	-	68.65	27.40	7.32	-
AV	2.4835G	51.23	54.00	-2.77	34.73	3	Horizontal	2	1.40	-	16.50	27.40	7.33	-
PK	2.4798G	105.00	Inf	-Inf	34.72	3	Horizontal	2	1.40	-	70.28	27.40	7.32	-
PK	2.4835G	59.47	74.00	-14.53	34.73	3	Horizontal	2	1.40	-	24.74	27.40	7.33	-

BT-LE(1Mbps)

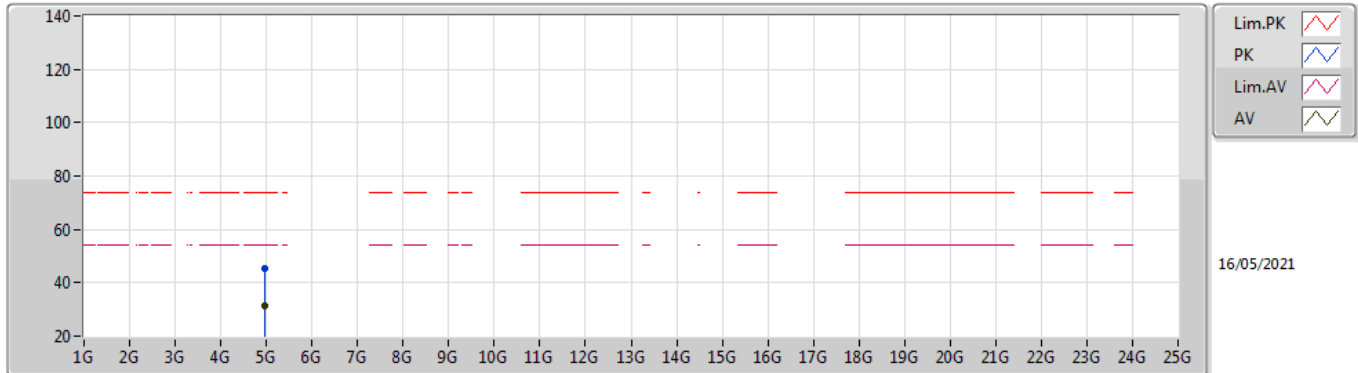
2480MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.96035G	30.95	54.00	-23.05	6.01	3	Vertical	7	1.84	-	24.94	31.22	9.02	34.23
PK	4.9595G	44.98	74.00	-29.02	6.01	3	Vertical	7	1.84	-	38.97	31.22	9.02	34.23

BT-LE(1Mbps)

2480MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.95954G	31.38	54.00	-22.62	6.01	3	Horizontal	314	1.50	-	25.37	31.22	9.02	34.23
PK	4.96042G	45.18	74.00	-28.82	6.01	3	Horizontal	314	1.50	-	39.17	31.22	9.02	34.23