

NCC Test Report

Equipment : Quake HDBTCAN Dongle
Brand Name : Harley Davidson
Model Name : 41000771
Applicant : 英屬維京群島商太古鼎翰有限公司
臺北市大安區敦化南路 2 段 230 號
Manufacturer : Harley Davidson Motor Company
11800 W. Capitol Drive, Wauwatosa, WI 53222, USA
Standard : LP0002 Section 3.10 (2018-01-10)

The product was received on Mar. 04, 2020, and testing was started from Apr. 09, 2020 and completed on Apr. 14, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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

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History of this test report

[illegible]

Summary of Test Result

Report Clause	Ref.Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	3.10.1.4	Antenna Requirement	PASS	-
3.1	2.3	AC Power-line Conducted Emissions	PASS	-
3.2	3.10.1.6	DTS Bandwidth	PASS	-
3.3	3.10.1.2	Maximum Conducted Output Power	PASS	-
3.4	3.10.1.6	Power Spectral Density	PASS	-
3.5	3.10.1.5	Emissions in Non-restricted Frequency Bands	PASS	-
3.6	3.10.1.5	Emissions in Restricted Frequency Bands	PASS	-
3.7	2.11	Receiver Radiated Unwanted Emissions	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: Ann Hou

1 General Description

1.1 Information

1.1.1 RF General Information

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

Band	Mode	BWch (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

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	Raytac	MDBT42Q	Chip	N/A	-1.6

Note 1: The EUT has one antenna.

For BT function:

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

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

1.1.3 EUT Information

Operational Condition			
EUT Power Type	From DC Power supply		
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)	0.632	1.99	395u	3k

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

1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ LP0002 (2018-01-10)
- ♦ ANSI C63.10-2013
- ♦ KDB 558074 D01 v05r02
- ♦ ANSI C63.4-2014
- ♦ KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location				
☒	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)		
		TEL : 886-3-327-3456	FAX : 886-3-327-0973	
☐	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)		
		TEL : 886-3-656-9065	FAX : 886-3-656-9085	
☒	Wen Shan	ADD : No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)		
		TEL : 886-3-318-0787	FAX : 886-3-318-0287	

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Jeff	21.6~22.4°C / 56~61%	14/Apr/2020
RF Conducted	TH06-HY	Raven	22.4~23.8°C / 51~66%	09/Apr/2020
Radiated	03CH09-HY	Ryan	22~22.6°C / 52~56%	10/Apr/2020

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 Condition

RF Conducted	Abbreviation	Remark
TnomVnom	Tnom	20°C
-	Vnom	16V

2.2 Test Channel Mode

Test Software	NA
---------------	----

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

2.3 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
Operating Mode	CTX/CRX
1	DC Power Supply 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 Receiver Radiated Spurious Emissions		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
Operating Mode < 1GHz	CTX/CRX		
1	DC Power Supply mode		
Operating Mode > 1GHz	CTX/CRX		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			
Worst Planes of EUT		V	

2.4 Support Equipment

Support Equipment – AC Conduction					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	DC Power Supply	GW	GPS-3030DD	-	-
2	Rockford BLE to CAN-BUS Adapter	Harley	001	-	Note 1
3	DC power cable(+)	MiSUMi	WTN1229-RED	-	-
4	DC power cable(-)	MiSUMi	WTN1229-BLACK	-	-
5	AC Power Cable	Power sync	PW-GPC180-3	-	-

Note 1: No.2 was provided by customer.

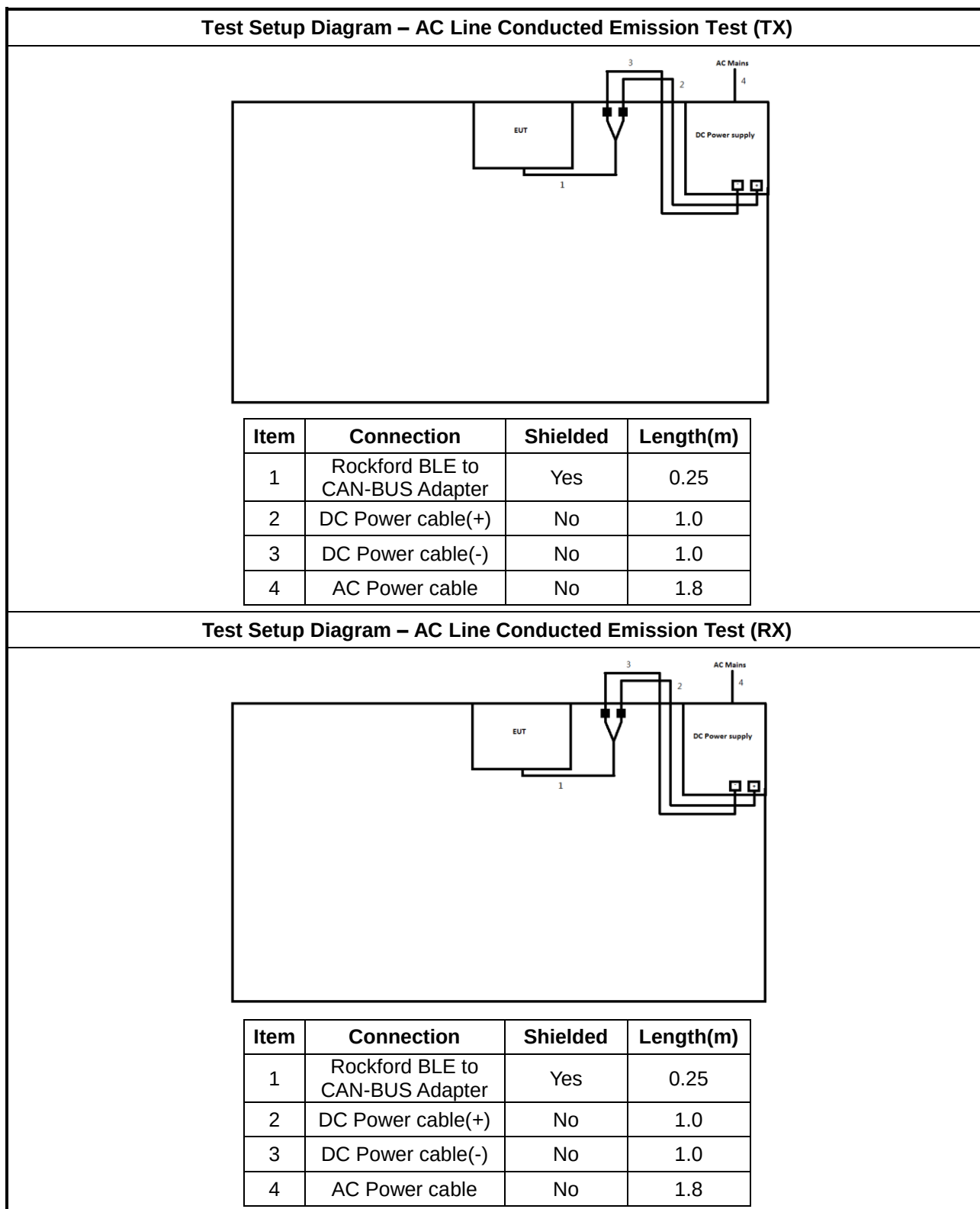
Support Equipment – Conducted					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	DC Power Supply	GW	GPS-3030DD	-	-
2	Fixture	AROUIINO	UNO-WIFI	-	Note 1
3	Rockford BLE to CAN-BUS Adapter	Harley	001	-	Note 1
4	Adapter	CUI INC	SMI24-12	-	Note 1
5	DC power cable(+)	MiSUMi	WTN1229-RED	-	-
6	DC power cable(-)	MiSUMi	WTN1229-BLACK	-	-

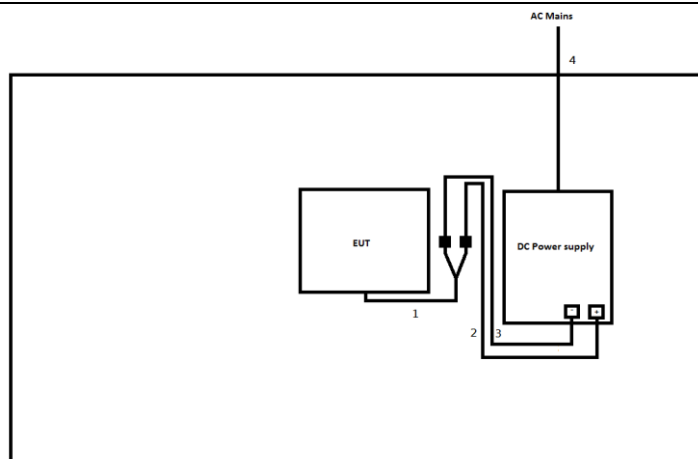
Note 1: No.2, 3, 4 was provided by customer.

Support Equipment – Radiated					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	DC Power Supply	GW	GPS-3030DD	-	-
2	Rockford BLE to CAN-BUS Adapter	Harley	001	-	Note 1
3	DC power cable(+)	MiSUMi	WTN1229-RED	-	-
4	DC power cable(-)	MiSUMi	WTN1229-BLACK	-	-
5	AC Power Cable	Power sync	PW-GPC180-3	-	-

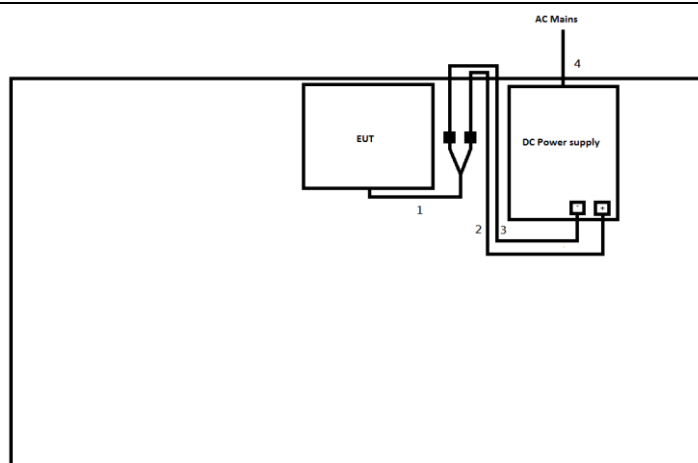
Note 1: No.2 was provided by customer.

2.5 Test Setup Diagram



Test Setup Diagram - Radiated Test (TX)


Item	Connection	Shielded	Length(m)
1	Rockford BLE to CAN-BUS Adapter	Yes	0.25
2	DC Power cable(+)	No	1.0
3	DC Power cable(-)	No	1.0
4	AC Power cable	No	1.8

Test Setup Diagram - Radiated Test (RX)


Item	Connection	Shielded	Length(m)
1	Rockford BLE to CAN-BUS Adapter	Yes	0.25
2	DC Power cable(+)	No	1.0
3	DC Power cable(-)	No	1.0
4	AC Power cable	No	1.8

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.		

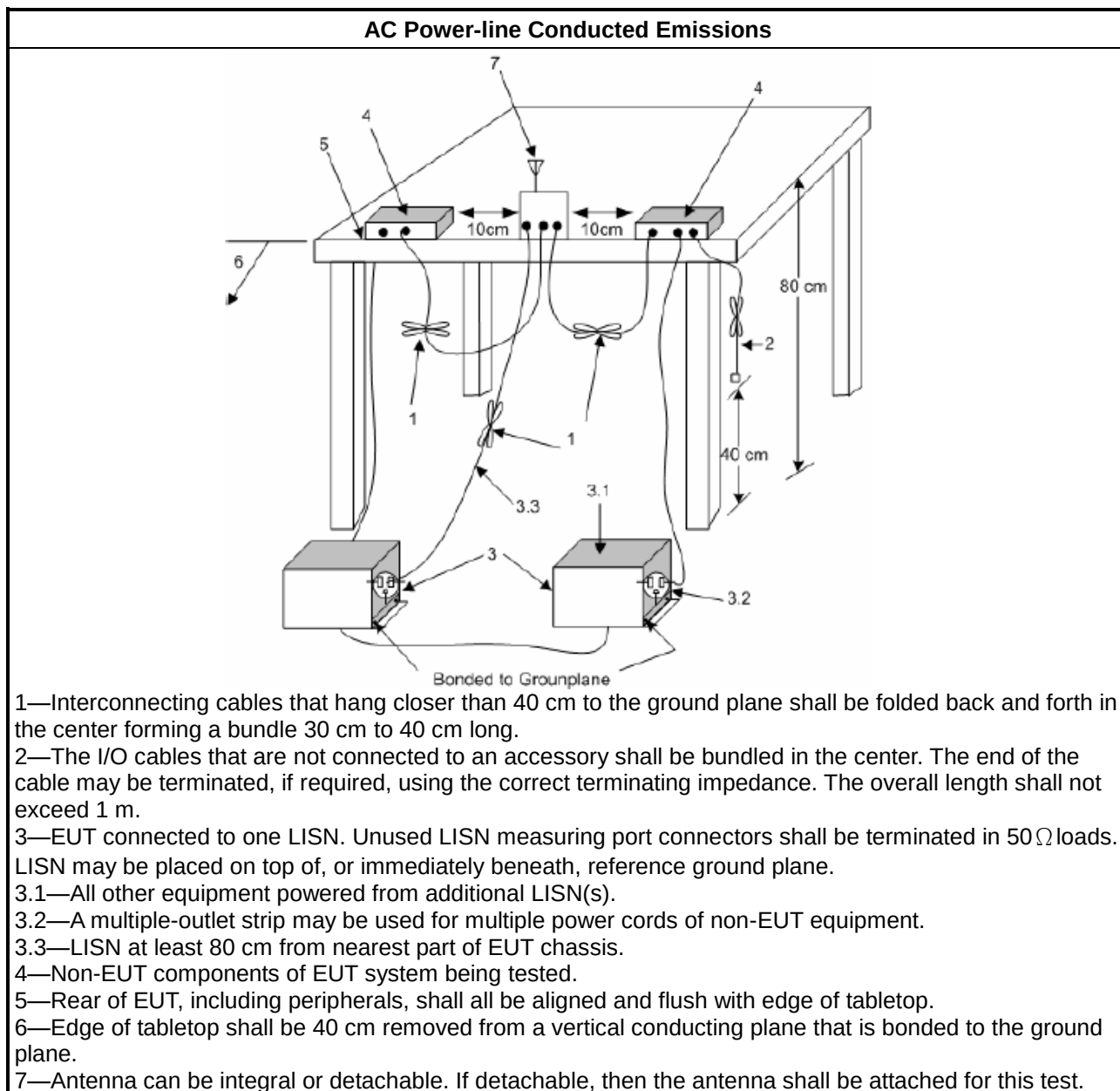
3.1.2 Measuring Instruments

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 Test Setup



3.1.5 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.

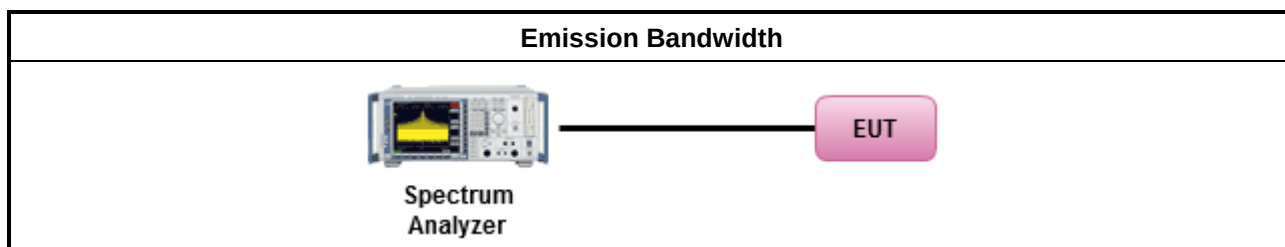
3.2.2 Measuring Instruments

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.	

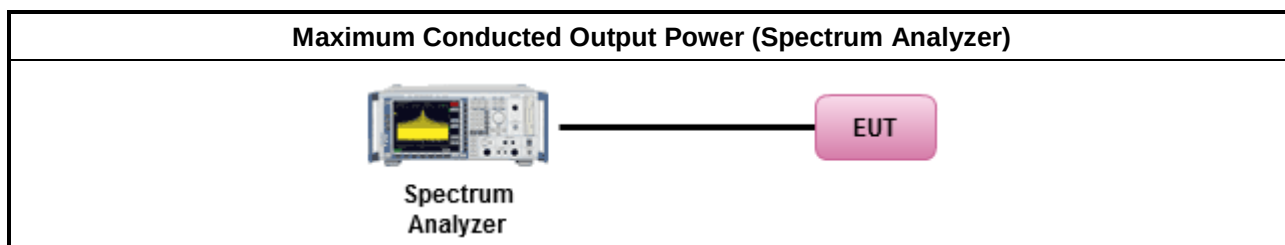
3.3.2 Measuring Instruments

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

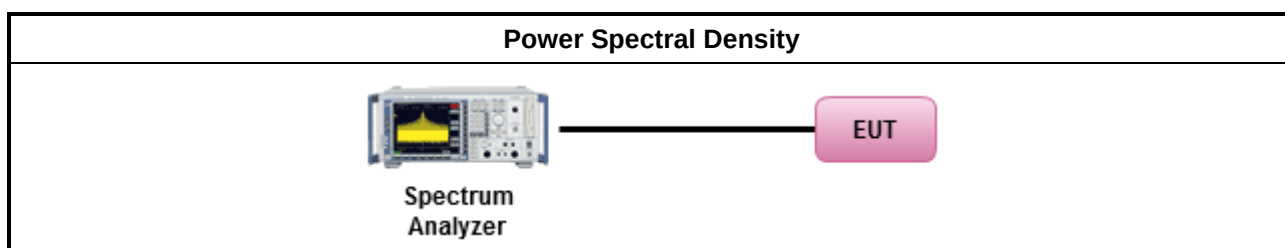
3.4.2 Measuring Instruments

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.	

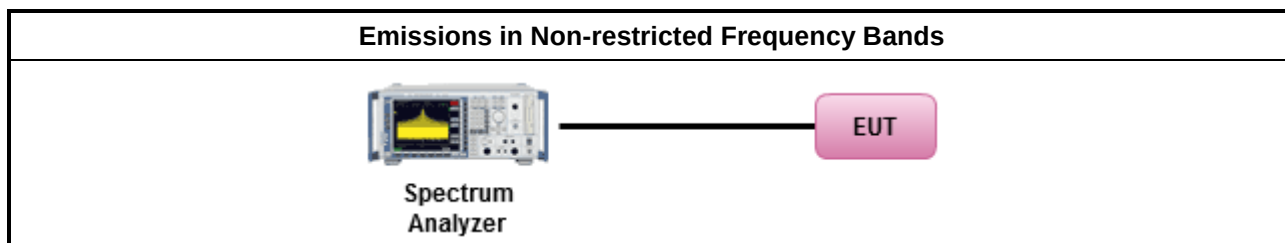
3.5.2 Measuring Instruments

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.

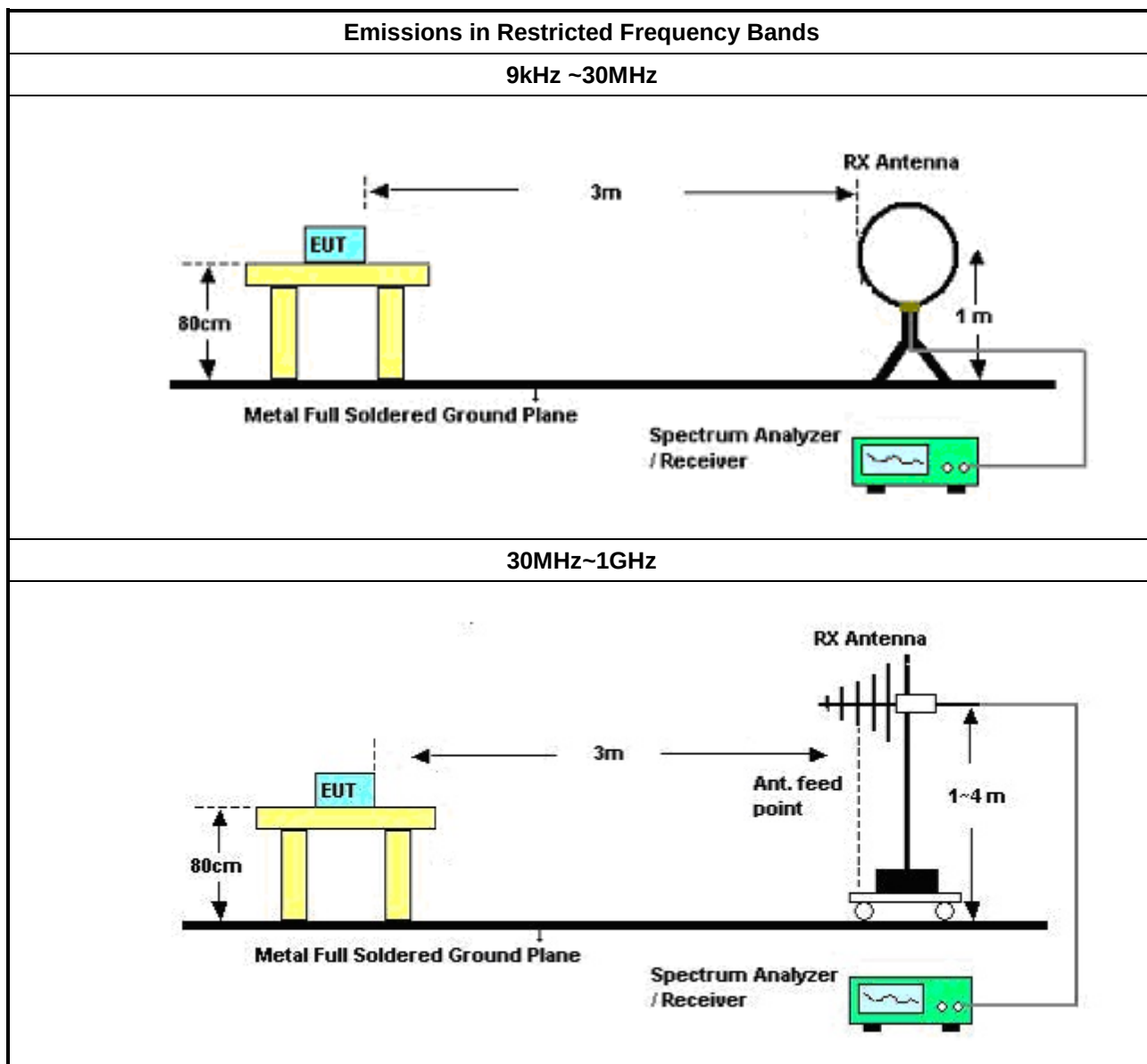
3.6.2 Measuring Instruments

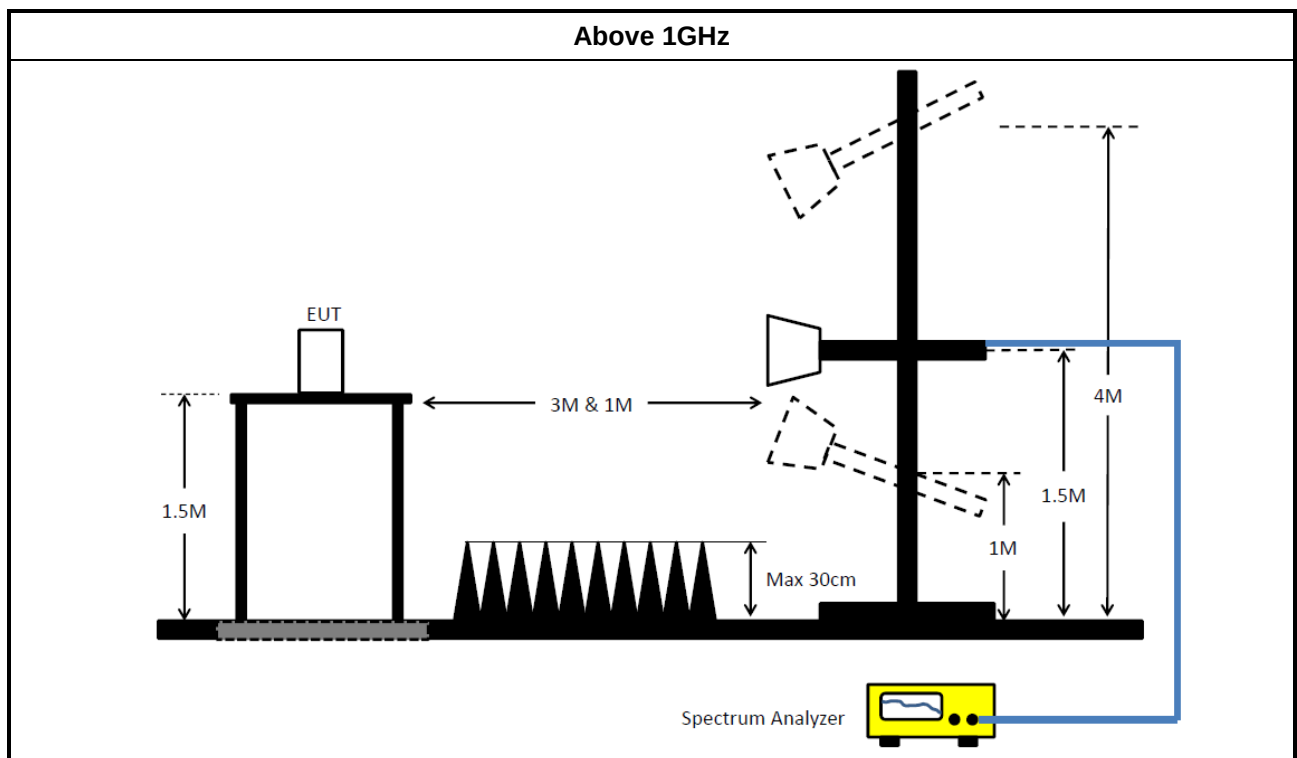
Refer a test equipment and calibration data table in this test report.

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 LP0002 5.5.2: 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 Test Setup





3.6.5 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.

3.6.6 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

3.7 Receiver Radiated Spurious Emissions

3.7.1 Receiver in Radiated Spurious Emissions Limit

Restricted Spurious 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.

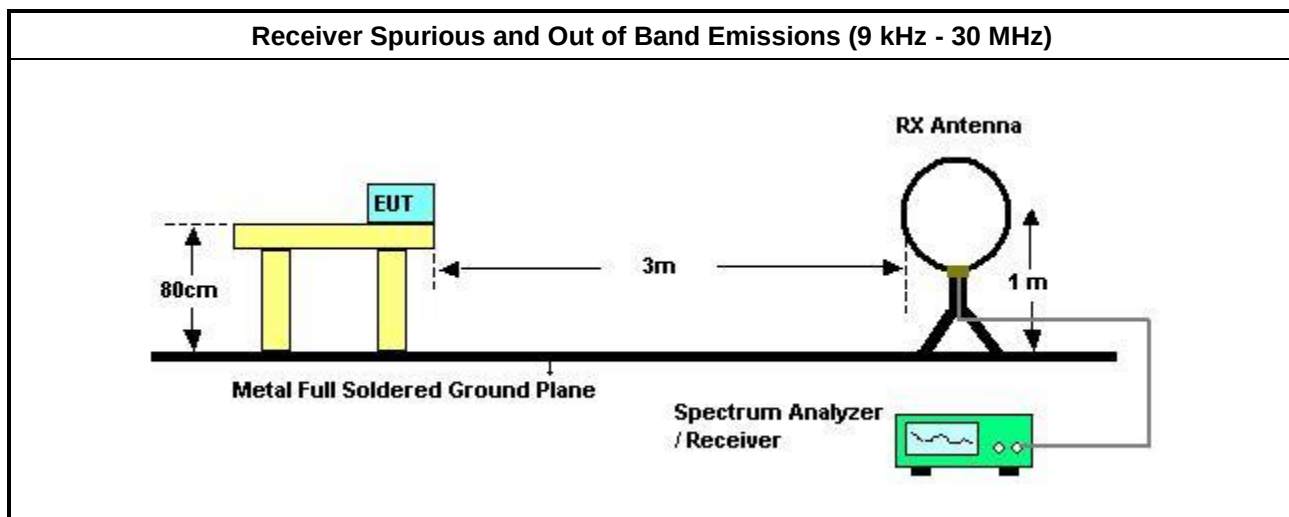
3.7.2 Measuring Instruments

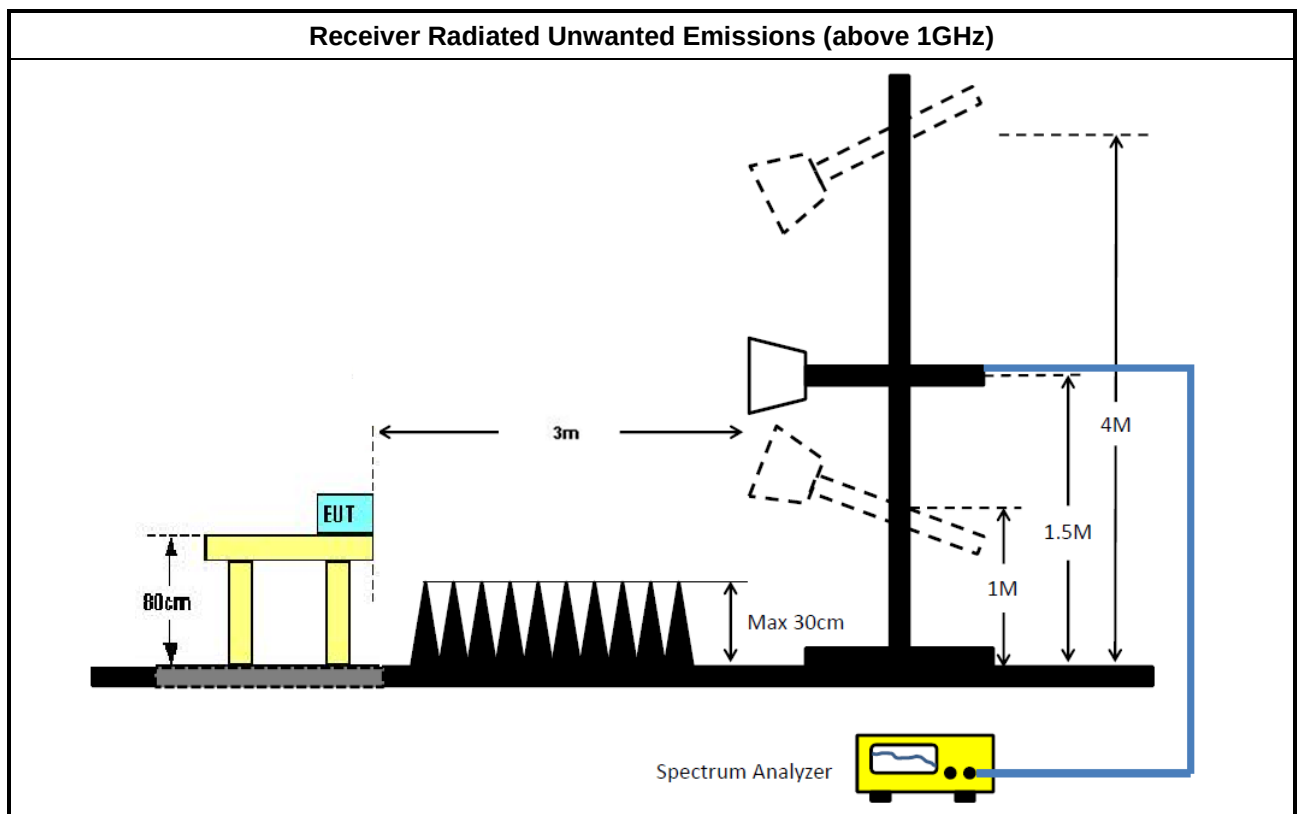
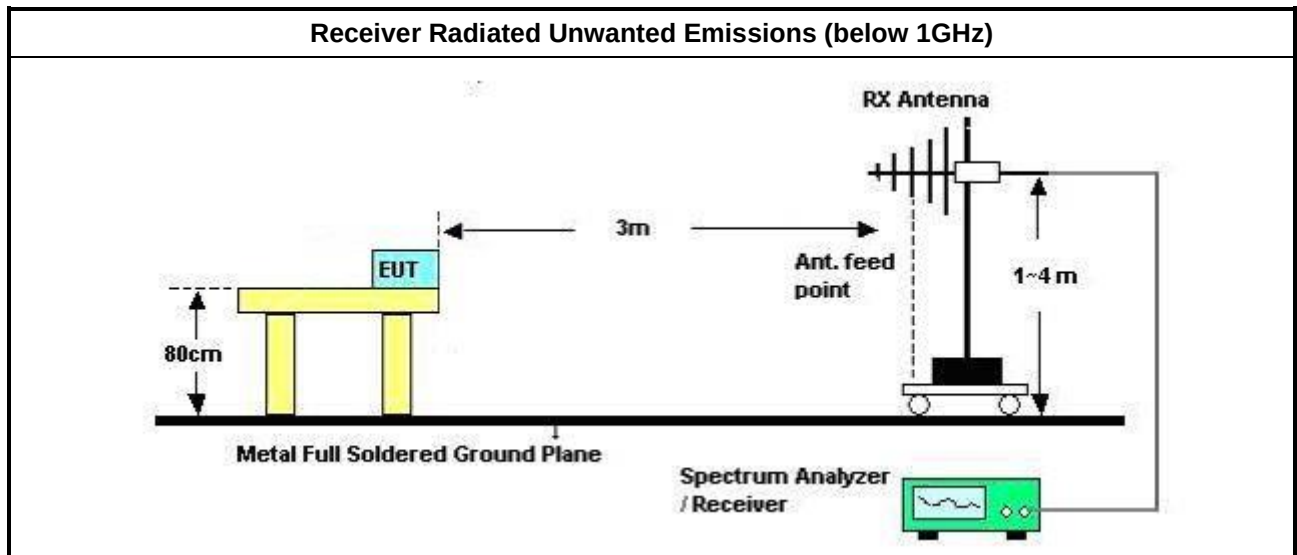
Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

Test Method	
☒	The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is higher, to at least 3 times the highest tuneable or local oscillator frequency, whichever is higher, without exceeding 40 GHz.
☒	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).
☒	For radiated measurement, refer as ANSI C63.4, clause 8.3.
☒	Refer as ANSI C63.4, clause 8.3.1.1 and 8.3.2.1 for radiated emissions from below 30 MHz.
☒	Refer as ANSI C63.4, clause 8.3.1.1 and 8.3.2.1 for radiated emissions from 30 MHz-1 GHz. For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the QP-Limit so that the QP level does not need to be reported in addition.
☒	Refer as ANSI C63.4, clause 8.3.1.2 and 8.3.2.2 for radiated emissions from above 1 GHz. For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
☒	All amplitude of spurious emissions that are attenuated by more than 30 dB below the permissible value has no need to be reported.

3.7.4 Test Setup





3.7.5 Receiver Radiated Unwanted Emissions (Below 30MHz)

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

3.7.6 Test Result of Receiver Radiated Unwanted Emissions

Refer as Appendix G

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
EMC Receiver	R&S	ESR3	102051	9kHz ~ 3.6GHz	28/May/2019	27/May/2020
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	04/Nov/2019	05/Nov/2020
RF Cable-CON	MTJ	RG142	CB002-CO	9kHz ~ 200MHz	12/Sep/2019	11/Sep/2020
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9 kHz ~ 30 MHz	24/Sep/2019	23/Sep/2020

NCR: Non-Calibration Require

Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101029	10kHz ~ 40GHz	01/Oct/2019	30/Sep/2020
Pulse Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	18/Mar/2020	17/Mar/2021
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	18/Mar/2020	17/Mar/2021
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	12/Nov/2018	10/Nov/2020
CABLE 0.2m	HUBER	329022/4	RF Cable - 02	30 to 1000MHz 1 to 18GHz	02/Jan/2020	01/Jan/2021
CABLE 0.2m	HUBER	329013/3	RF Cable - 18	30 to 1000MHz 1 to 18GHz	02/Jan/2020	01/Jan/2021
CABLE 0.5m	HUBER	MY39476/4	RF Cable - 47	30 to 1000MHz 1 to 18GHz	02/Jan/2020	01/Jan/2021

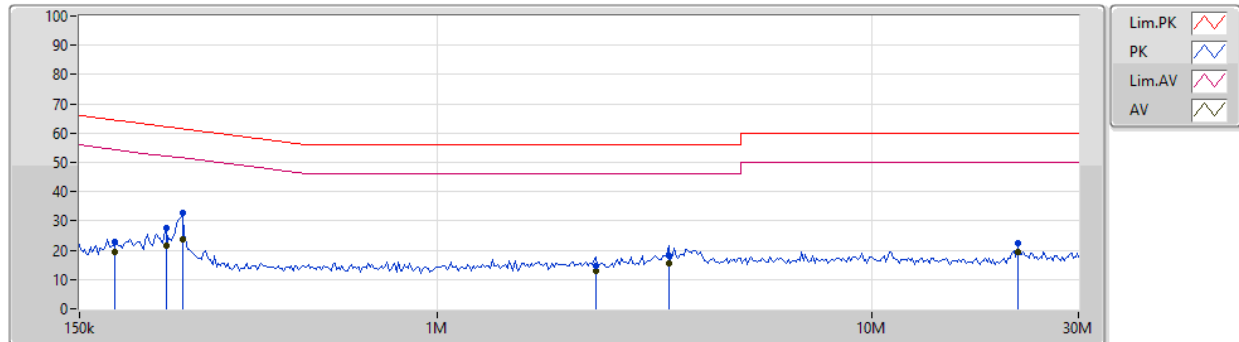
Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz ~ 1GHz	27/Mar/2020	26/Mar/2021
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	1GHz ~ 18GHz	26/Mar/2020	25/Mar/2021
Microwave Preamplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	04/Sep/2019	03/Sep/2020
Amplifier	EMC	EMC9135	980232	9kHz~1GHz	22/Apr/2019	21/Apr/2020
EMI Test Receiver	R&S	ESR3	102051	9kHz ~ 3.6GHz	28/May/2019	27/May/2020
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200885	10Hz ~ 44GHz	07/Aug/2019	06/Aug/2020
Bilog Antenna & 5dB Attenuator	TESEQ & MTJ	CBL6111D & MTJ6102-05	35418 / 3	30MHz~1GHz	11/Oct/2019	10/Oct/2020
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA9120 D 1534	1GHz~18GHz	22/May/2019	21/May/2020
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170339	18GHz~40GHz	19/Apr/2019	18/Apr/2020
Preamplifier	MITEQ	TTA1840-35-HG	1864481	18GHz ~ 40GHz	05/Aug/2019	04/Aug/2020
Loop Antenna	TESEQ	HLA 6120	31244	9k-30MHz	15/Mar/2019	14/Mar/2020
RF Cable-low	Jye Bao	RG142	CB028	9kHz ~ 1GHz	18/Feb/2019	17/Feb/2020
RF Cable-high	HUBER+SUHNER	SUCOFLEX104	SN 556626/4 + 556627	1GHz ~ 40GHz	14/Mar/2018	13/Mar/2019

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	DC Power Supply mode (TX)		

14/04/2020

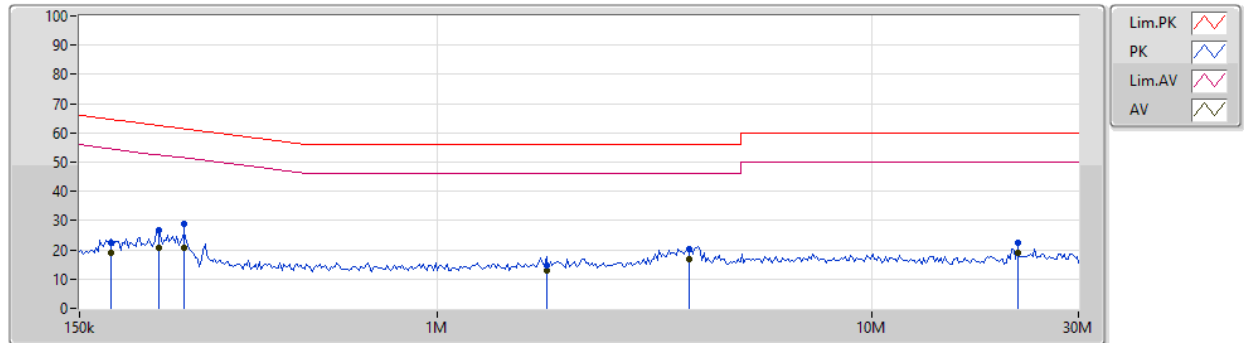


Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	181.216k	23.03	64.43	-41.40	19.62	Neutral	-	3.41	9.64	0.11	9.87			
AV	181.216k	19.47	54.43	-34.96	19.62	Neutral	-	-0.15	9.64	0.11	9.87			
QP	237.069k	27.75	62.20	-34.45	19.63	Neutral	-	8.12	9.64	0.12	9.87			
AV	237.069k	21.60	52.20	-30.60	19.63	Neutral	-	1.97	9.64	0.12	9.87			
QP	259.279k	32.82	61.45	-28.63	19.63	Neutral	-	13.19	9.64	0.12	9.87			
AV	259.279k	23.57	51.45	-27.88	19.63	Neutral	"Worst"	3.94	9.64	0.12	9.87			
QP	2.315M	14.51	56.00	-41.49	19.68	Neutral	-	-5.17	9.65	0.16	9.87			
AV	2.315M	13.00	46.00	-33.00	19.68	Neutral	-	-6.68	9.65	0.16	9.87			
QP	3.412M	18.22	56.00	-37.78	19.72	Neutral	-	-1.50	9.66	0.18	9.88			
AV	3.412M	15.52	46.00	-30.48	19.72	Neutral	-	-4.20	9.66	0.18	9.88			
QP	21.716M	22.58	60.00	-37.42	19.98	Neutral	-	2.60	9.71	0.38	9.89			
AV	21.716M	19.51	50.00	-30.49	19.98	Neutral	-	-0.47	9.71	0.38	9.89			

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	DC Power Supply mode (TX)		

14/04/2020

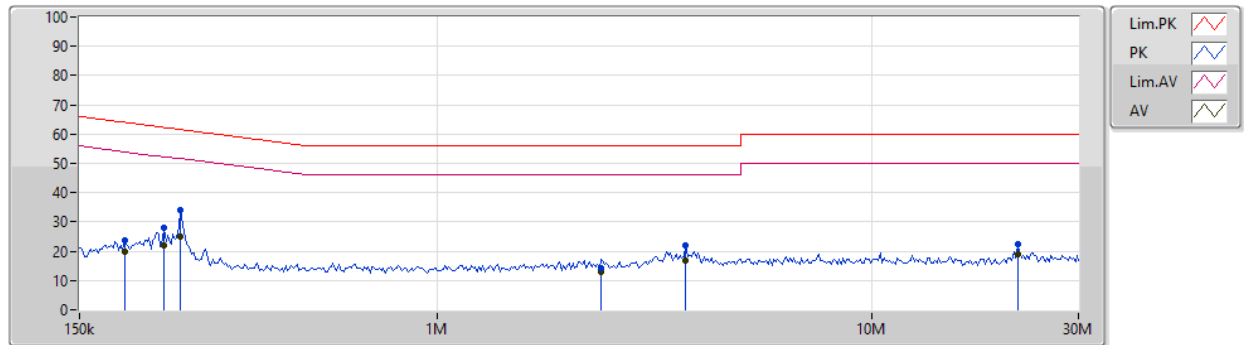


Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	177.646k	22.27	64.59	-42.32	19.63	Line	-	2.64	9.65	0.11	9.87			
AV	177.646k	19.08	54.59	-35.51	19.63	Line	-	-0.55	9.65	0.11	9.87			
QP	227.818k	26.52	62.52	-36.00	19.64	Line	-	6.88	9.65	0.12	9.87			
AV	227.818k	20.69	52.52	-31.83	19.64	Line	-	1.05	9.65	0.12	9.87			
QP	261.871k	29.09	61.37	-32.28	19.64	Line	-	9.45	9.65	0.12	9.87			
AV	261.871k	20.81	51.37	-30.56	19.64	Line	-	1.17	9.65	0.12	9.87			
QP	1.787M	14.84	56.00	-41.16	19.66	Line	-	-4.82	9.65	0.14	9.87			
AV	1.787M	13.05	46.00	-32.95	19.66	Line	-	-6.61	9.65	0.14	9.87			
QP	3.807M	20.10	56.00	-35.90	19.72	Line	-	0.38	9.66	0.18	9.88			
AV	3.807M	17.02	46.00	-28.98	19.72	Line	"Worst"	-2.70	9.66	0.18	9.88			
QP	21.716M	22.31	60.00	-37.69	19.88	Line	-	2.43	9.61	0.38	9.89			
AV	21.716M	19.07	50.00	-30.93	19.88	Line	-	-0.81	9.61	0.38	9.89			

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	DC Power Supply mode (RX)		

14/04/2020

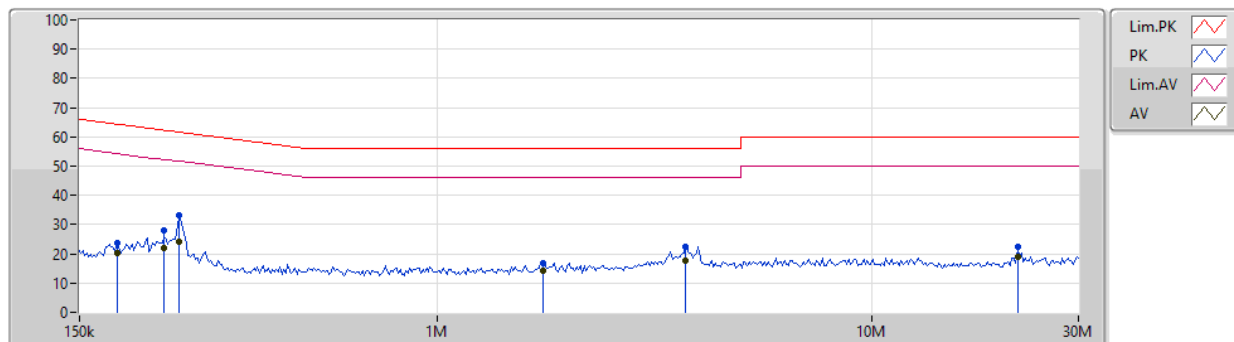


Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	190.46k	23.55	64.01	-40.46	19.62	Neutral	-	3.93	9.64	0.11	9.87			
AV	190.46k	19.80	54.01	-34.21	19.62	Neutral	-	0.18	9.64	0.11	9.87			
QP	234.722k	28.23	62.27	-34.04	19.63	Neutral	-	8.60	9.64	0.12	9.87			
AV	234.722k	21.98	52.27	-30.29	19.63	Neutral	-	2.35	9.64	0.12	9.87			
QP	256.712k	34.12	61.54	-27.42	19.63	Neutral	-	14.49	9.64	0.12	9.87			
AV	256.712k	25.09	51.54	-26.45	19.63	Neutral	"Worst"	5.46	9.64	0.12	9.87			
QP	2.385M	14.36	56.00	-41.64	19.68	Neutral	-	-5.32	9.65	0.16	9.87			
AV	2.385M	12.94	46.00	-33.06	19.68	Neutral	-	-6.74	9.65	0.16	9.87			
QP	3.732M	22.05	56.00	-33.95	19.72	Neutral	-	2.33	9.66	0.18	9.88			
AV	3.732M	16.82	46.00	-29.18	19.72	Neutral	-	-2.90	9.66	0.18	9.88			
QP	21.716M	22.22	60.00	-37.78	19.98	Neutral	-	2.24	9.71	0.38	9.89			
AV	21.716M	19.15	50.00	-30.85	19.98	Neutral	-	-0.83	9.71	0.38	9.89			

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	DC Power Supply mode (RX)		

14/04/2020



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	183.029k	23.81	64.34	-40.53	19.63	Line	-	4.18	9.65	0.11	9.87			
AV	183.029k	20.32	54.34	-34.02	19.63	Line	-	0.69	9.65	0.11	9.87			
QP	234.722k	28.07	62.27	-34.20	19.64	Line	-	8.43	9.65	0.12	9.87			
AV	234.722k	22.09	52.27	-30.18	19.64	Line	-	2.45	9.65	0.12	9.87			
QP	254.17k	33.20	61.62	-28.42	19.64	Line	-	13.56	9.65	0.12	9.87			
AV	254.17k	24.02	51.62	-27.60	19.64	Line	"Worst"	4.38	9.65	0.12	9.87			
QP	1.752M	16.80	56.00	-39.20	19.66	Line	-	-2.86	9.65	0.14	9.87			
AV	1.752M	14.14	46.00	-31.86	19.66	Line	-	-5.52	9.65	0.14	9.87			
QP	3.732M	22.42	56.00	-33.58	19.72	Line	-	2.70	9.66	0.18	9.88			
AV	3.732M	17.64	46.00	-28.36	19.72	Line	-	-2.08	9.66	0.18	9.88			
QP	21.716M	22.28	60.00	-37.72	19.88	Line	-	2.40	9.61	0.38	9.89			
AV	21.716M	18.80	50.00	-31.20	19.88	Line	-	-1.08	9.61	0.38	9.89			

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)	670k	1.047M	1M05F1D	668.75k	1.043M

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;

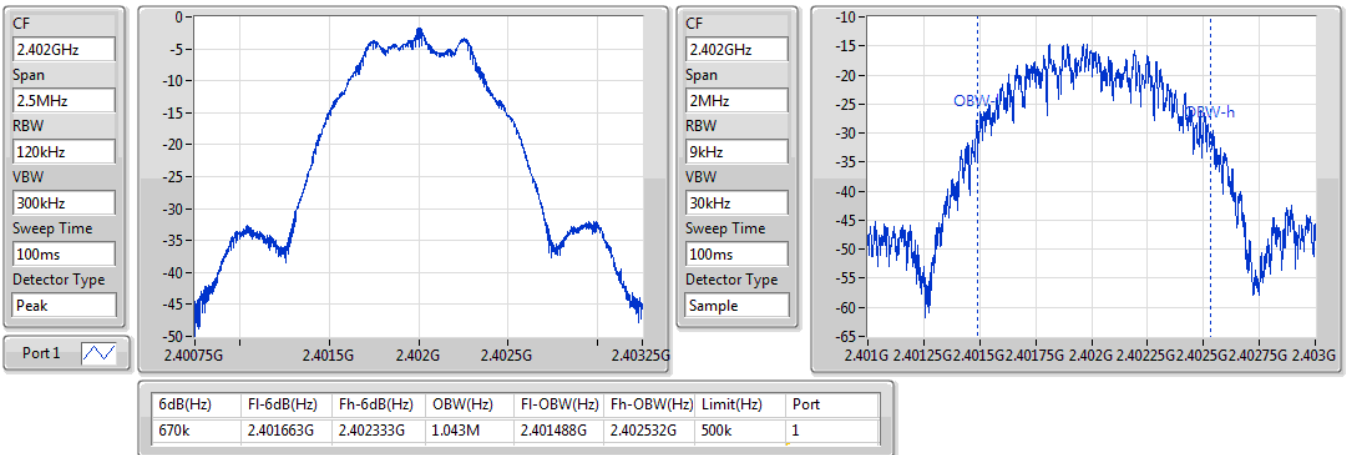
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	670k	1.043M
2440MHz	Pass	500k	670k	1.047M
2480MHz	Pass	500k	668.75k	1.045M

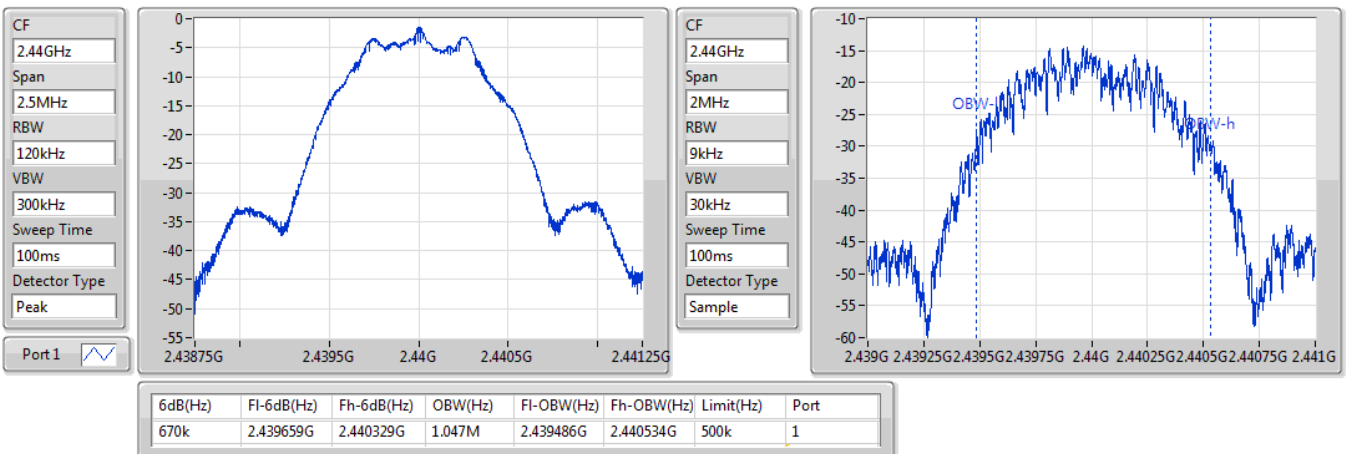
Port X-N dB = Port X 6dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;

BT-LE(1Mbps)
2402MHz

09/04/2020


BT-LE(1Mbps)
2440MHz

09/04/2020

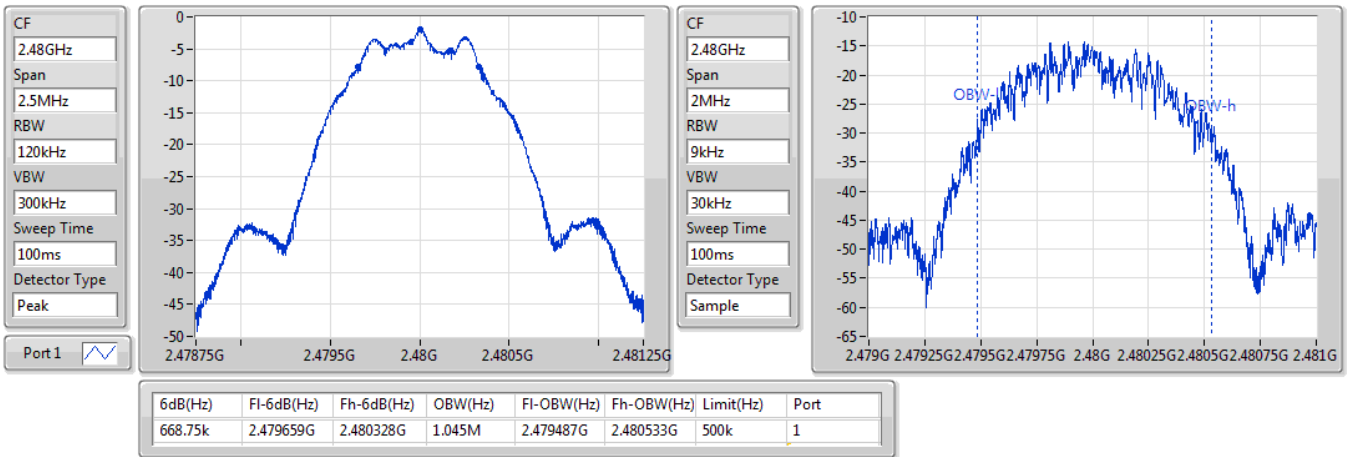


BT-LE(1Mbps)

2480MHz

EBW

09/04/2020





Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	-0.58	0.00087



Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	-1.60	-1.04	30.00
2440MHz	Pass	-1.60	-0.72	30.00
2480MHz	Pass	-1.60	-0.58	30.00

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



Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-17.38

RBW=3 kHz.



Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	-1.60	-17.98	8.00
2440MHz	Pass	-1.60	-17.38	8.00
2480MHz	Pass	-1.60	-17.59	8.00

DG = Directional Gain; RBW=3 kHz;

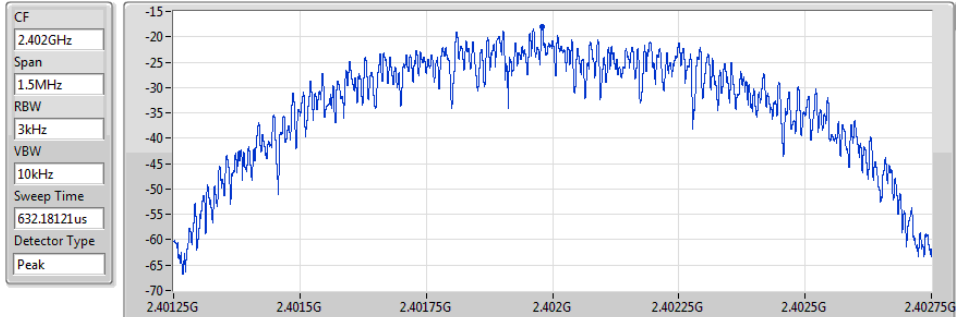
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

BT-LE(1Mbps)

PSD

2402MHz

09/04/2020



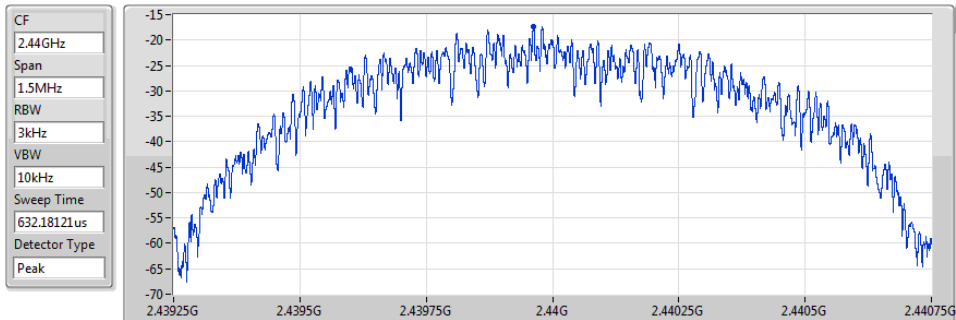
Sum	PD	Port 1
(dBm/Hz)	(dBm/Hz)	(dBm/Hz)
-17.98	-17.98	-17.98

BT-LE(1Mbps)

PSD

2440MHz

09/04/2020



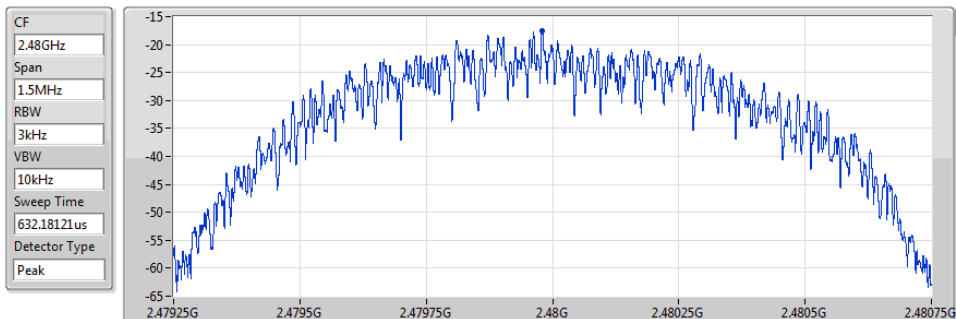
Sum	PD	Port 1
(dBm/Hz)	(dBm/Hz)	(dBm/Hz)
-17.38	-17.38	-17.38

BT-LE(1Mbps)

PSD

2480MHz

09/04/2020



Sum	PD	Port 1
(dBm/Hz)	(dBm/Hz)	(dBm/Hz)
-17.59	-17.59	-17.59



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	2.48003G	-1.97	-31.97	2.08096G	-54.54	2.39967G	-50.48	2.4G	-52.51	2.49768G	-52.97	23.33245G	-41.94	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	2.48003G	-1.97	-31.97	2.08096G	-54.54	2.39967G	-50.48	2.4G	-52.51	2.49768G	-52.97	23.33245G	-41.94	1
2440MHz	Pass	2.48003G	-1.97	-31.97	2.00723G	-54.89	2.39701G	-53.62	2.4835G	-56.47	2.49233G	-52.50	21.72957G	-42.37	1
2480MHz	Pass	2.48003G	-1.97	-31.97	2.10211G	-54.70	2.39923G	-53.89	2.4835G	-52.83	2.48715G	-53.01	24.47133G	-41.61	1

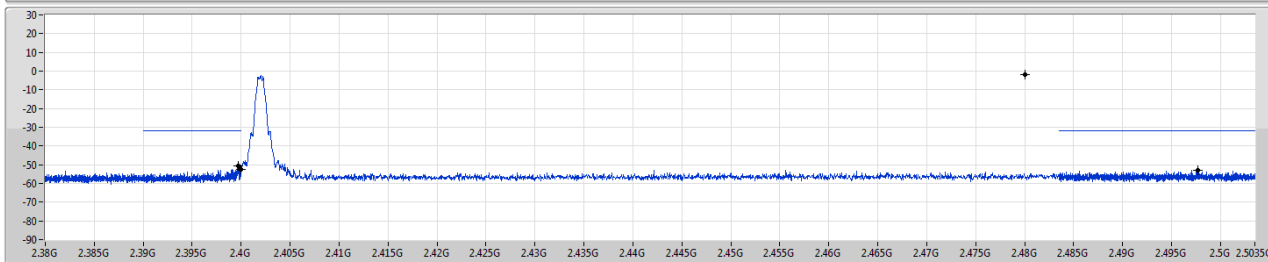
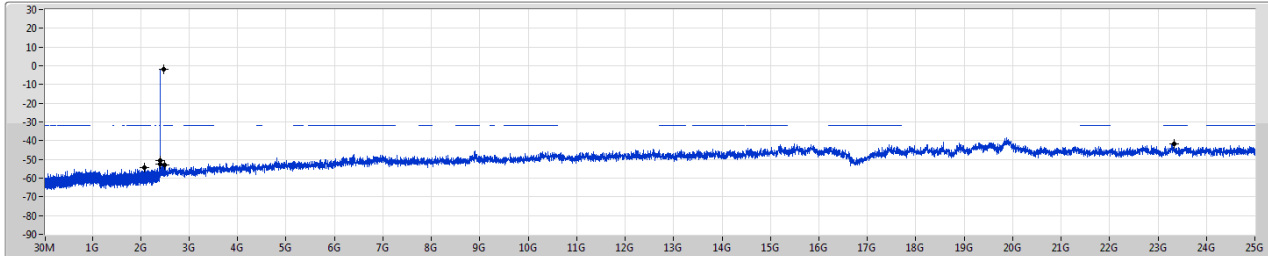
BT-LE(1Mbps)

2402MHz

CSE NdB

09/04/2020

Port1



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

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
2.48003G	-1.97	-31.97	2.08096G	-54.54	2.39967G	-50.48	2.4G	-52.51	2.49768G	-52.97	23.3245G	-41.94	1

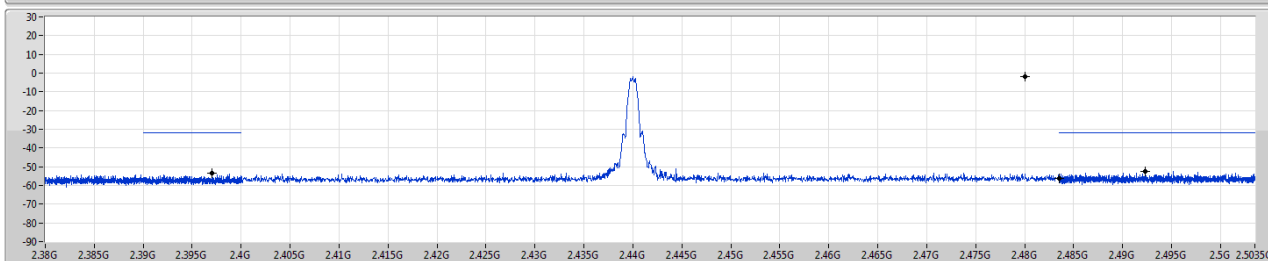
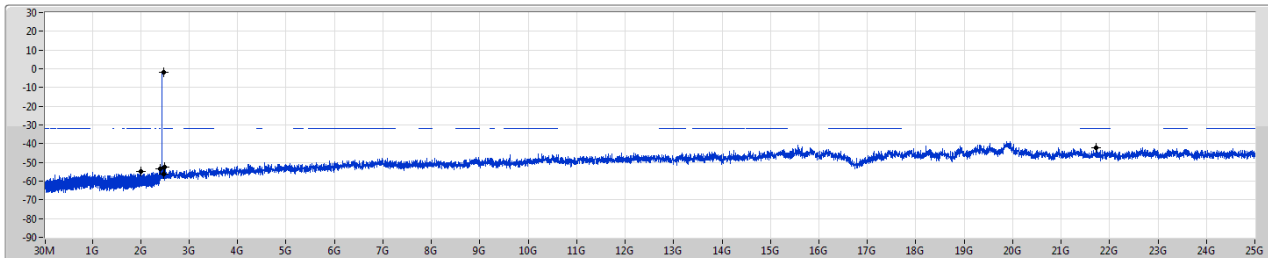
BT-LE(1Mbps)

2440MHz

CSE NdB

09/04/2020

Port1



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

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
2.48003G	-1.97	-31.97	2.00723G	-54.89	2.39701G	-53.62	2.4835G	-56.47	2.49233G	-52.50	21.72957G	-42.37	1

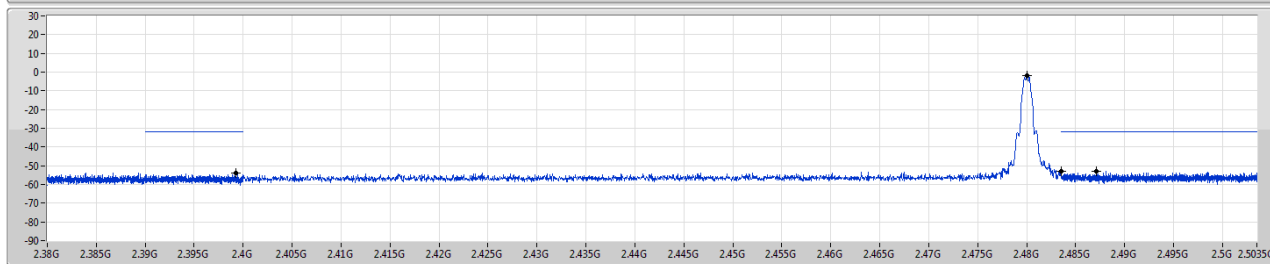
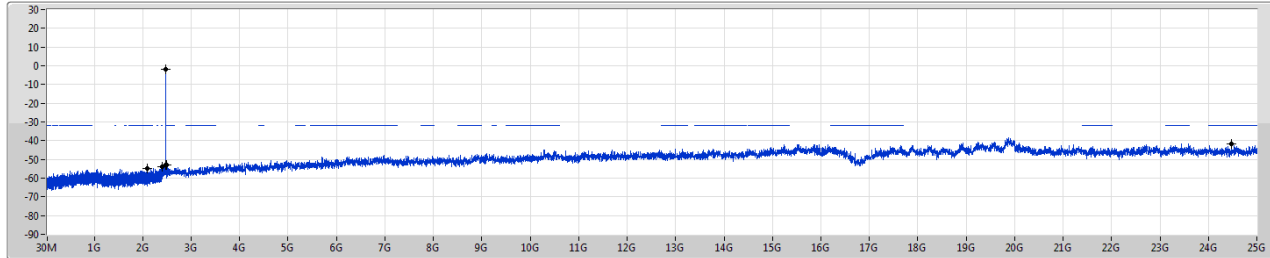
BT-LE(1Mbps)

2480MHz

CSE NdB

09/04/2020

Port 1



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

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
2.48003G	-1.97	-31.97	2.10211G	-54.70	2.39923G	-53.89	2.4835G	-52.83	2.48715G	-53.01	2.47133G	-41.61	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	747.8M	39.26	46.00	-6.74	3	Vertical	360	1.00	-

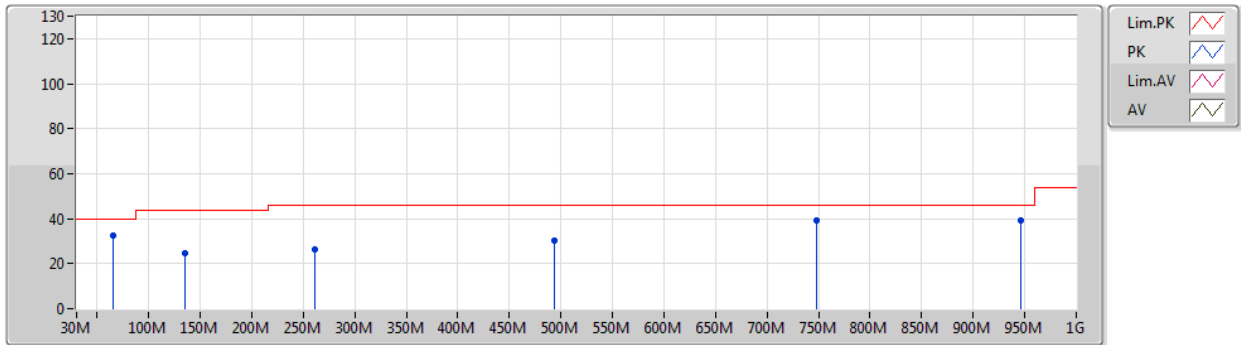
Result

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	64.92M	32.22	40.00	-7.78	3	Vertical	360	1.00	-
2440MHz	Pass	PK	134.76M	24.47	43.50	-19.03	3	Vertical	360	1.00	-
2440MHz	Pass	PK	260.86M	26.10	46.00	-19.90	3	Vertical	360	1.00	-
2440MHz	Pass	PK	493.66M	30.43	46.00	-15.57	3	Vertical	360	1.00	-
2440MHz	Pass	PK	747.8M	39.26	46.00	-6.74	3	Vertical	360	1.00	-
2440MHz	Pass	PK	945.68M	39.07	46.00	-6.93	3	Vertical	360	1.00	-
2440MHz	Pass	PK	64.92M	23.38	40.00	-16.62	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	109.54M	23.63	43.50	-19.87	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	256.98M	24.81	46.00	-21.19	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	437.4M	29.10	46.00	-16.90	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	683.78M	33.35	46.00	-12.65	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	868.08M	36.81	46.00	-9.19	3	Horizontal	0	1.00	-

BT-LE(1Mbps)

2440MHz_DC power supply

10/04/2020

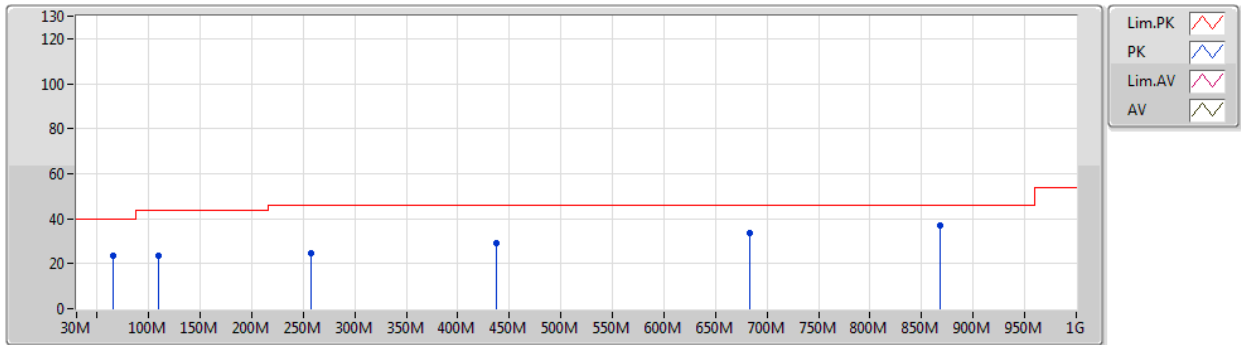


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	64.92M	32.22	40.00	-7.78	-25.49	3	Vertical	360	1.00	-	57.71	10.92	0.64	37.05
PK	134.76M	24.47	43.50	-19.03	-19.07	3	Vertical	360	1.00	-	43.54	16.63	0.93	36.63
PK	260.86M	26.10	46.00	-19.90	-15.94	3	Vertical	360	1.00	-	42.04	19.17	1.32	36.43
PK	493.66M	30.43	46.00	-15.57	-12.17	3	Vertical	360	1.00	-	42.60	22.86	1.87	36.90
PK	747.8M	39.26	46.00	-6.74	-8.04	3	Vertical	360	1.00	-	47.30	27.04	2.35	37.43
PK	945.68M	39.07	46.00	-6.93	-5.04	3	Vertical	360	1.00	-	44.11	29.66	2.61	37.31

BT-LE(1Mbps)

2440MHz_DC power supply

10/04/2020



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	64.92M	23.38	40.00	-16.62	-25.49	3	Horizontal	0	1.00	-	48.87	10.92	0.64	37.05
PK	109.54M	23.63	43.50	-19.87	-19.99	3	Horizontal	0	1.00	-	43.62	15.90	0.85	36.74
PK	256.98M	24.81	46.00	-21.19	-16.37	3	Horizontal	0	1.00	-	41.18	18.75	1.31	36.43
PK	437.4M	29.10	46.00	-16.90	-13.01	3	Horizontal	0	1.00	-	42.11	21.94	1.79	36.74
PK	683.78M	33.35	46.00	-12.65	-9.67	3	Horizontal	0	1.00	-	43.02	25.42	2.25	37.34
PK	868.08M	36.81	46.00	-9.19	-6.90	3	Horizontal	0	1.00	-	43.71	28.08	2.52	37.50



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	2.495G	43.44	54.00	-10.56	3	Horizontal	190	2.01	-

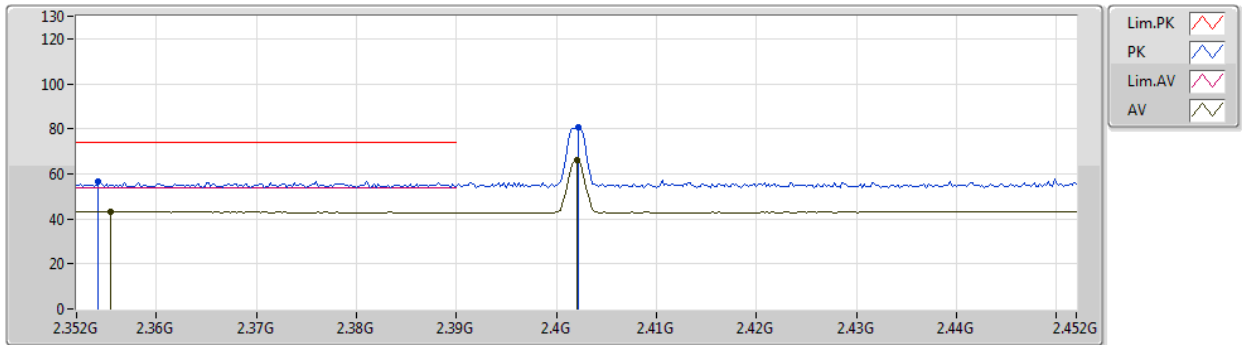
Result

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	2.3554G	42.98	54.00	-11.02	3	Vertical	221	1.52	-
2402MHz	Pass	AV	2.402G	65.88	Inf	-Inf	3	Vertical	221	1.52	-
2402MHz	Pass	PK	2.3542G	56.52	74.00	-17.48	3	Vertical	221	1.52	-
2402MHz	Pass	PK	2.4022G	80.43	Inf	-Inf	3	Vertical	221	1.52	-
2402MHz	Pass	AV	2.3524G	42.96	54.00	-11.04	3	Horizontal	49	2.00	-
2402MHz	Pass	AV	2.402G	62.06	Inf	-Inf	3	Horizontal	49	2.00	-
2402MHz	Pass	PK	2.387G	56.86	74.00	-17.14	3	Horizontal	49	2.00	-
2402MHz	Pass	PK	2.4022G	74.92	Inf	-Inf	3	Horizontal	49	2.00	-
2402MHz	Pass	AV	4.80382G	33.12	54.00	-20.88	3	Vertical	42	1.00	-
2402MHz	Pass	PK	4.8033G	46.44	74.00	-27.56	3	Vertical	42	1.00	-
2402MHz	Pass	AV	4.80398G	37.18	54.00	-16.82	3	Horizontal	196	1.94	-
2402MHz	Pass	PK	4.80394G	48.72	74.00	-25.28	3	Horizontal	196	1.94	-
2440MHz	Pass	AV	2.34G	43.19	54.00	-10.81	3	Vertical	220	1.38	-
2440MHz	Pass	AV	2.44G	67.17	Inf	-Inf	3	Vertical	220	1.38	-
2440MHz	Pass	AV	2.4872G	43.43	54.00	-10.57	3	Vertical	220	1.38	-
2440MHz	Pass	PK	2.3656G	56.40	74.00	-17.60	3	Vertical	220	1.38	-
2440MHz	Pass	PK	2.4404G	80.12	Inf	-Inf	3	Vertical	220	1.38	-
2440MHz	Pass	PK	2.4835G	56.22	74.00	-17.78	3	Vertical	220	1.38	-
2440MHz	Pass	AV	2.3496G	43.17	54.00	-10.83	3	Horizontal	191	1.99	-
2440MHz	Pass	AV	2.44G	63.30	Inf	-Inf	3	Horizontal	191	1.99	-
2440MHz	Pass	AV	2.4976G	43.39	54.00	-10.61	3	Horizontal	191	1.99	-
2440MHz	Pass	PK	2.3636G	57.00	74.00	-17.00	3	Horizontal	191	1.99	-
2440MHz	Pass	PK	2.4396G	74.84	Inf	-Inf	3	Horizontal	191	1.99	-
2440MHz	Pass	PK	2.4835G	56.20	74.00	-17.80	3	Horizontal	191	1.99	-
2440MHz	Pass	AV	4.87993G	32.78	54.00	-21.22	3	Vertical	66	1.50	-
2440MHz	Pass	PK	4.87962G	46.00	74.00	-28.00	3	Vertical	66	1.50	-
2440MHz	Pass	AV	4.87998G	36.32	54.00	-17.68	3	Horizontal	200	1.78	-
2440MHz	Pass	PK	4.87954G	49.02	74.00	-24.98	3	Horizontal	200	1.78	-
2480MHz	Pass	AV	2.48G	66.98	Inf	-Inf	3	Vertical	217	2.84	-
2480MHz	Pass	AV	2.493G	43.39	54.00	-10.61	3	Vertical	217	2.84	-
2480MHz	Pass	PK	2.4802G	79.77	Inf	-Inf	3	Vertical	217	2.84	-
2480MHz	Pass	PK	2.4914G	56.61	74.00	-17.39	3	Vertical	217	2.84	-
2480MHz	Pass	AV	2.48G	63.51	Inf	-Inf	3	Horizontal	190	2.01	-
2480MHz	Pass	AV	2.495G	43.44	54.00	-10.56	3	Horizontal	190	2.01	-
2480MHz	Pass	PK	2.4798G	74.87	Inf	-Inf	3	Horizontal	190	2.01	-
2480MHz	Pass	PK	2.4942G	57.08	74.00	-16.92	3	Horizontal	190	2.01	-
2480MHz	Pass	AV	4.95987G	33.11	54.00	-20.89	3	Vertical	44	1.33	-
2480MHz	Pass	PK	4.96011G	46.18	74.00	-27.82	3	Vertical	44	1.33	-
2480MHz	Pass	AV	4.9599G	35.42	54.00	-18.58	3	Horizontal	221	1.31	-
2480MHz	Pass	PK	4.96011G	47.93	74.00	-26.07	3	Horizontal	221	1.31	-

BT-LE(1Mbps)

2402MHz_TX

10/04/2020

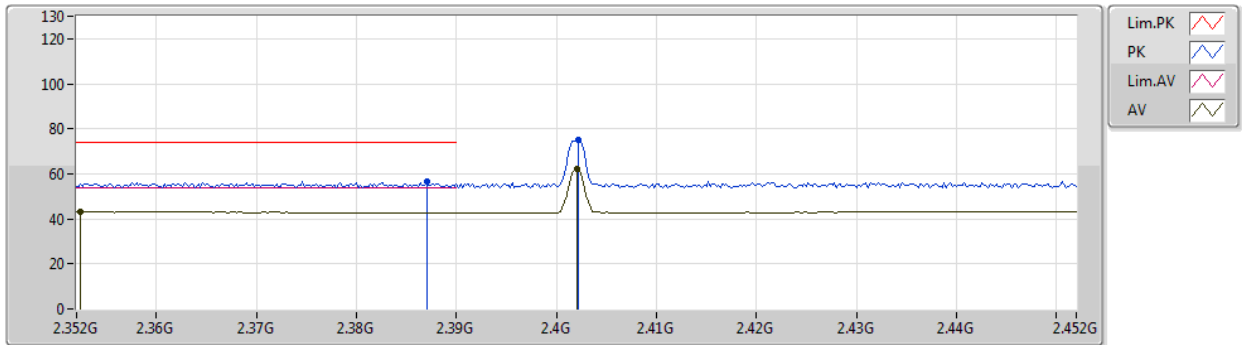


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3554G	42.98	54.00	-11.02	31.74	3	Vertical	221	1.52	-	11.24	27.78	3.96	-
AV	2.402G	65.88	Inf	-Inf	31.60	3	Vertical	221	1.52	-	34.28	27.60	4.00	-
PK	2.3542G	56.52	74.00	-17.48	31.74	3	Vertical	221	1.52	-	24.78	27.78	3.96	-
PK	2.4022G	80.43	Inf	-Inf	31.60	3	Vertical	221	1.52	-	48.83	27.60	4.00	-

BT-LE(1Mbps)

2402MHz_TX

10/04/2020

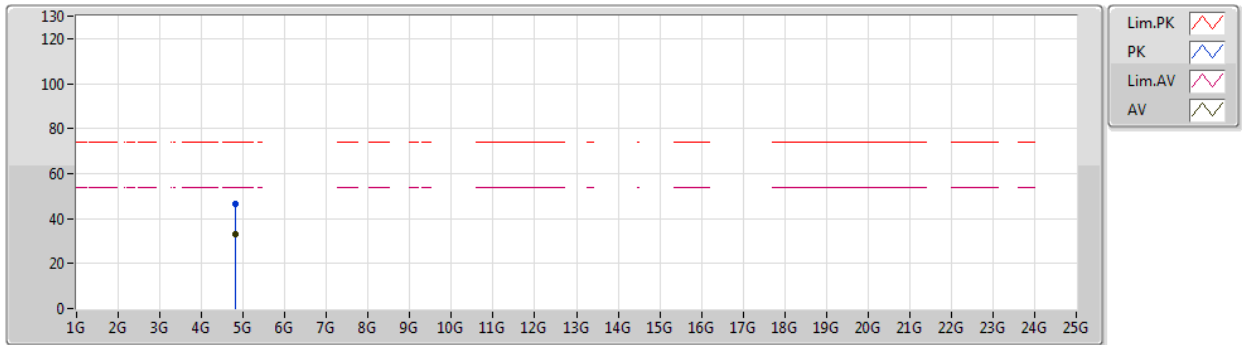


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3524G	42.96	54.00	-11.04	31.75	3	Horizontal	49	2.00	-	11.21	27.79	3.96	-
AV	2.402G	62.06	Inf	-Inf	31.60	3	Horizontal	49	2.00	-	30.46	27.60	4.00	-
PK	2.387G	56.86	74.00	-17.14	31.64	3	Horizontal	49	2.00	-	25.22	27.65	3.99	-
PK	2.4022G	74.92	Inf	-Inf	31.60	3	Horizontal	49	2.00	-	43.32	27.60	4.00	-

BT-LE(1Mbps)

2402MHz_TX

10/04/2020

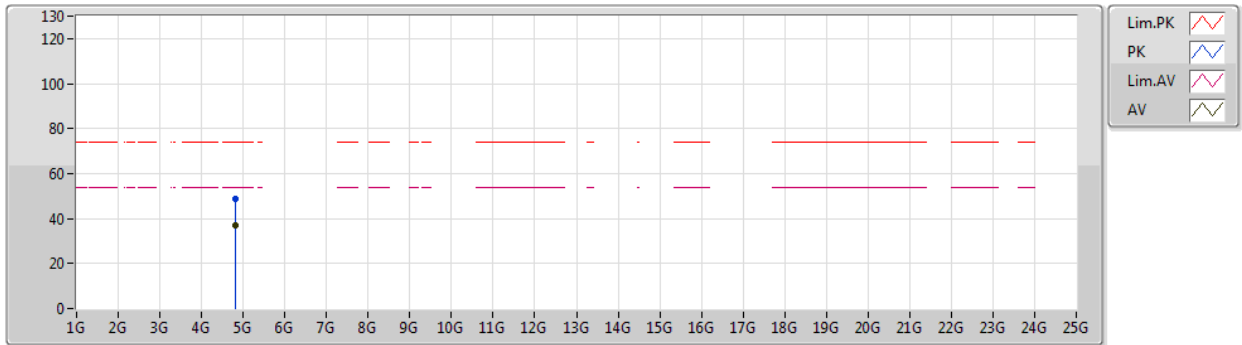


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.80382G	33.12	54.00	-20.88	3.70	3	Vertical	42	1.00	-	29.42	31.10	6.65	34.05
PK	4.8033G	46.44	74.00	-27.56	3.70	3	Vertical	42	1.00	-	42.74	31.10	6.65	34.05

BT-LE(1Mbps)

2402MHz_TX

10/04/2020

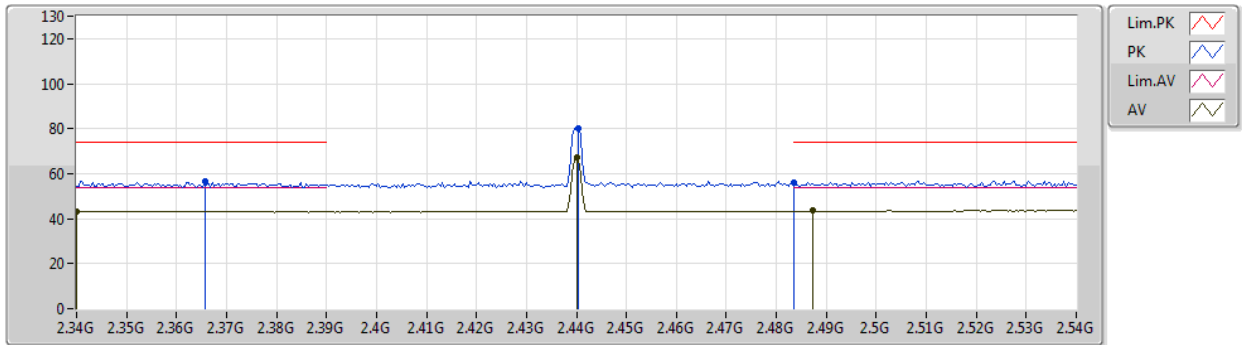


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.80398G	37.18	54.00	-16.82	3.70	3	Horizontal	196	1.94	-	33.48	31.10	6.65	34.05
PK	4.80394G	48.72	74.00	-25.28	3.70	3	Horizontal	196	1.94	-	45.02	31.10	6.65	34.05

BT-LE(1Mbps)

2440MHz_TX

10/04/2020

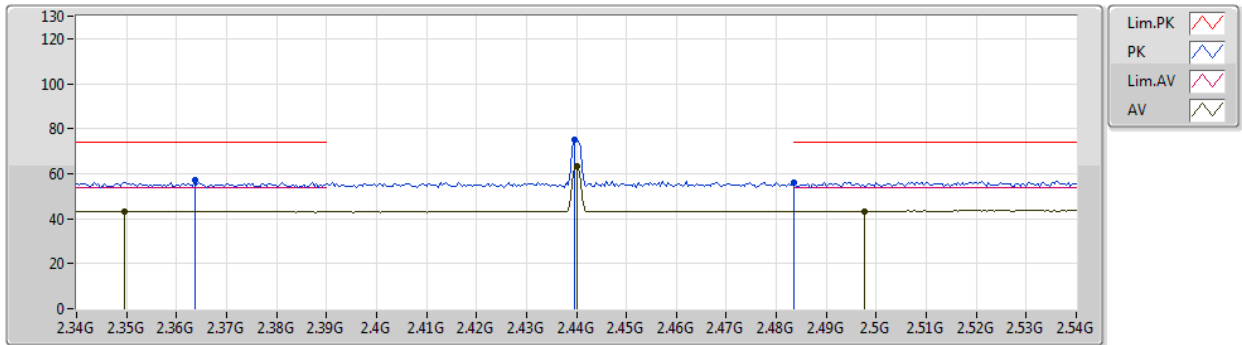


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.34G	43.19	54.00	-10.81	31.79	3	Vertical	220	1.38	-	11.40	27.84	3.95	-
AV	2.44G	67.17	Inf	-Inf	31.60	3	Vertical	220	1.38	-	35.57	27.56	4.04	-
AV	2.4872G	43.43	54.00	-10.57	31.60	3	Vertical	220	1.38	-	11.83	27.51	4.09	-
PK	2.3656G	56.40	74.00	-17.60	31.71	3	Vertical	220	1.38	-	24.69	27.74	3.97	-
PK	2.4404G	80.12	Inf	-Inf	31.60	3	Vertical	220	1.38	-	48.52	27.56	4.04	-
PK	2.4835G	56.22	74.00	-17.78	31.61	3	Vertical	220	1.38	-	24.61	27.52	4.09	-

BT-LE(1Mbps)

2440MHz_TX

10/04/2020

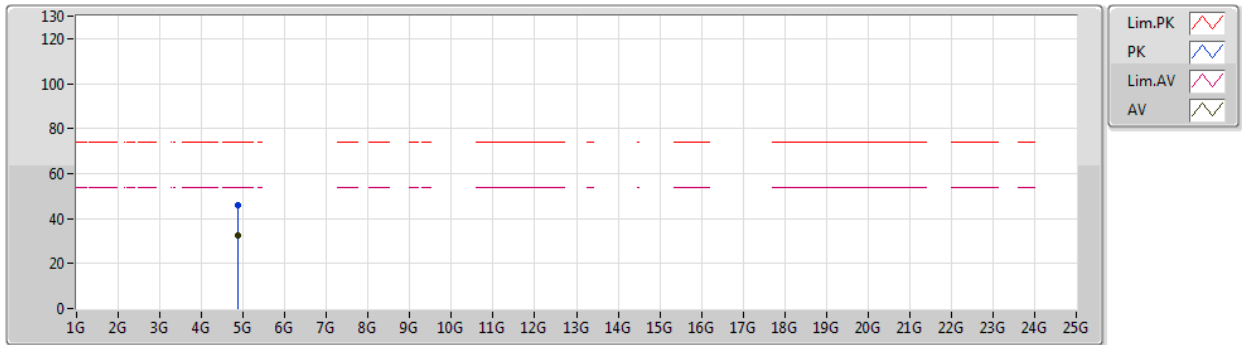


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3496G	43.17	54.00	-10.83	31.76	3	Horizontal	191	1.99	-	11.41	27.80	3.96	-
AV	2.44G	63.30	Inf	-Inf	31.60	3	Horizontal	191	1.99	-	31.70	27.56	4.04	-
AV	2.4976G	43.39	54.00	-10.61	31.60	3	Horizontal	191	1.99	-	11.79	27.50	4.10	-
PK	2.3636G	57.00	74.00	-17.00	31.72	3	Horizontal	191	1.99	-	25.28	27.75	3.97	-
PK	2.4396G	74.84	Inf	-Inf	31.60	3	Horizontal	191	1.99	-	43.24	27.56	4.04	-
PK	2.4835G	56.20	74.00	-17.80	31.61	3	Horizontal	191	1.99	-	24.59	27.52	4.09	-

BT-LE(1Mbps)

2440MHz_TX

10/04/2020

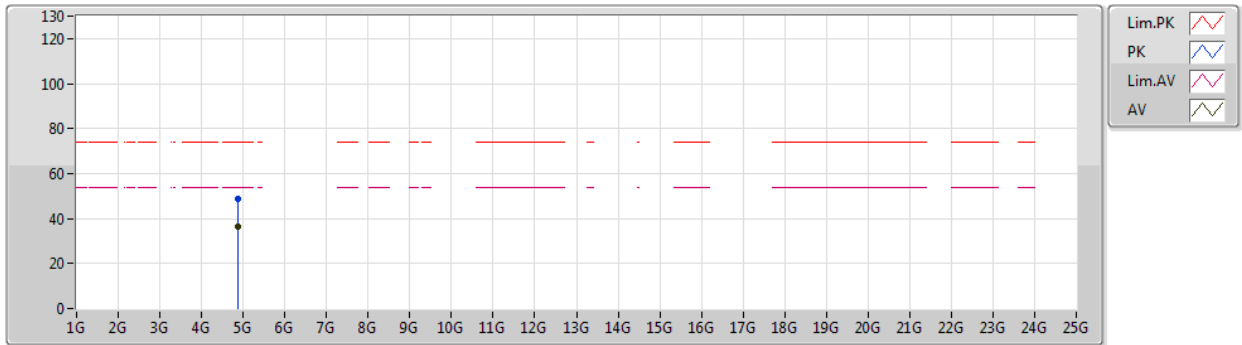


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.87993G	32.78	54.00	-21.22	3.76	3	Vertical	66	1.50	-	29.02	31.10	6.71	34.05
PK	4.87962G	46.00	74.00	-28.00	3.76	3	Vertical	66	1.50	-	42.24	31.10	6.71	34.05

BT-LE(1Mbps)

2440MHz_TX

10/04/2020

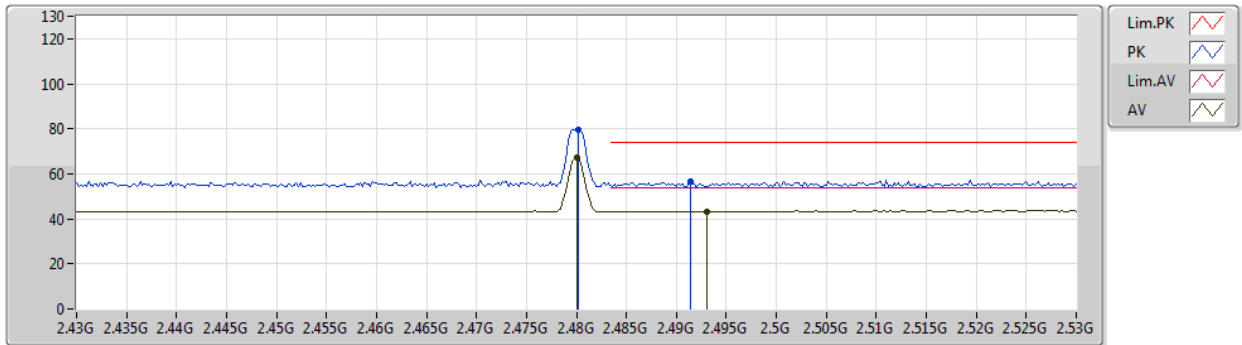


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.87998G	36.32	54.00	-17.68	3.76	3	Horizontal	200	1.78	-	32.56	31.10	6.71	34.05
PK	4.87954G	49.02	74.00	-24.98	3.76	3	Horizontal	200	1.78	-	45.26	31.10	6.71	34.05

BT-LE(1Mbps)

2480MHz_TX

10/04/2020

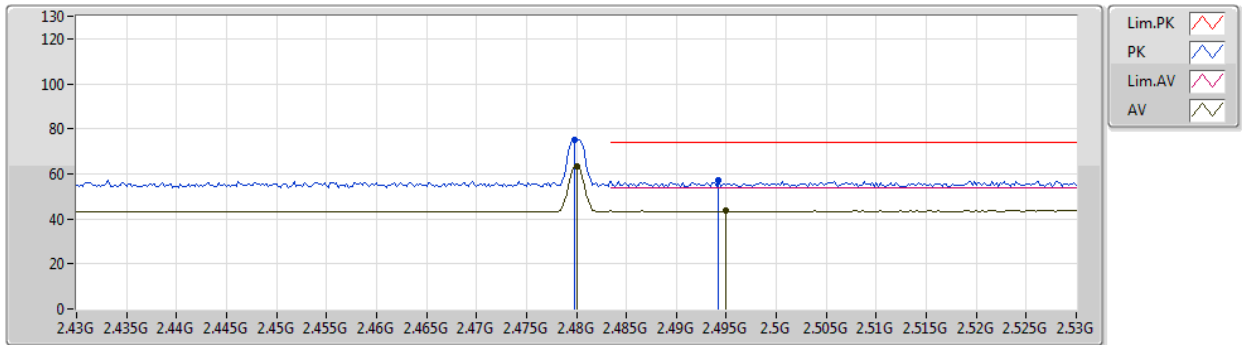


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	66.98	Inf	-Inf	31.60	3	Vertical	217	2.84	-	35.38	27.52	4.08	-
AV	2.493G	43.39	54.00	-10.61	31.61	3	Vertical	217	2.84	-	11.78	27.51	4.10	-
PK	2.4802G	79.77	Inf	-Inf	31.60	3	Vertical	217	2.84	-	48.17	27.52	4.08	-
PK	2.4914G	56.61	74.00	-17.39	31.61	3	Vertical	217	2.84	-	25.00	27.51	4.10	-

BT-LE(1Mbps)

2480MHz_TX

10/04/2020

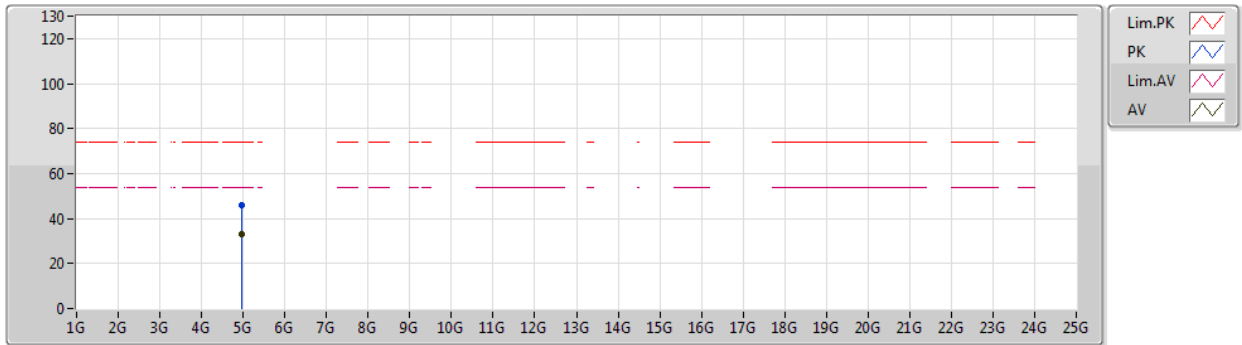


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	63.51	Inf	-Inf	31.60	3	Horizontal	190	2.01	-	31.91	27.52	4.08	-
AV	2.495G	43.44	54.00	-10.56	31.60	3	Horizontal	190	2.01	-	11.84	27.50	4.10	-
PK	2.4798G	74.87	Inf	-Inf	31.60	3	Horizontal	190	2.01	-	43.27	27.52	4.08	-
PK	2.4942G	57.08	74.00	-16.92	31.61	3	Horizontal	190	2.01	-	25.47	27.51	4.10	-

BT-LE(1Mbps)

2480MHz_TX

10/04/2020

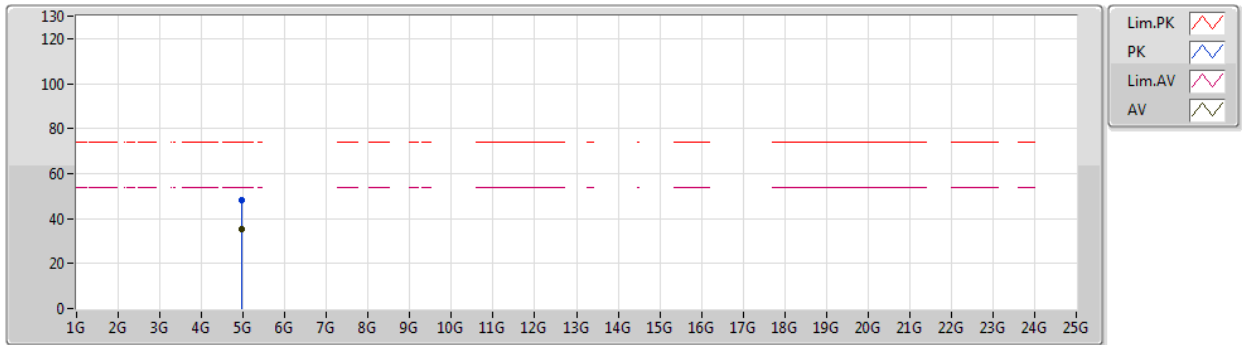


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.95987G	33.11	54.00	-20.89	4.07	3	Vertical	44	1.33	-	29.04	31.34	6.77	34.04
PK	4.96011G	46.18	74.00	-27.82	4.07	3	Vertical	44	1.33	-	42.11	31.34	6.77	34.04

BT-LE(1Mbps)

2480MHz_TX

10/04/2020



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	4.9599G	35.42	54.00	-18.58	4.07	3	Horizontal	221	1.31	-	31.35	31.34	6.77	34.04
PK	4.96011G	47.93	74.00	-26.07	4.07	3	Horizontal	221	1.31	-	43.86	31.34	6.77	34.04



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	728.4M	42.25	46.00	-3.75	3	Vertical	360	1.00	-

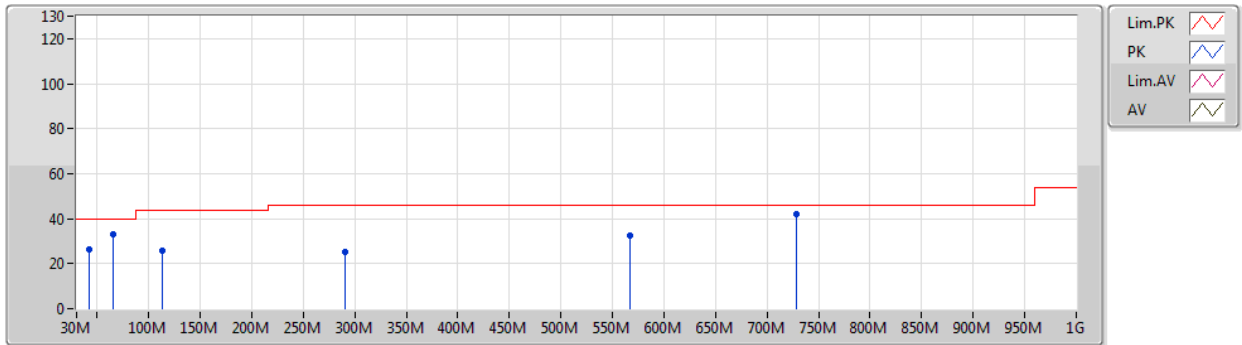
Result

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	41.64M	26.28	40.00	-13.72	3	Vertical	360	1.00	-
2440MHz	Pass	PK	64.92M	33.03	40.00	-6.97	3	Vertical	360	1.00	-
2440MHz	Pass	PK	113.42M	25.52	43.50	-17.98	3	Vertical	360	1.00	-
2440MHz	Pass	PK	289.96M	25.20	46.00	-20.80	3	Vertical	360	1.00	-
2440MHz	Pass	PK	567.38M	32.56	46.00	-13.44	3	Vertical	360	1.00	-
2440MHz	Pass	PK	728.4M	42.25	46.00	-3.75	3	Vertical	360	1.00	-
2440MHz	Pass	PK	35.82M	28.19	40.00	-11.81	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	101.78M	24.59	43.50	-18.91	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	255.04M	25.69	46.00	-20.31	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	501.42M	30.28	46.00	-15.72	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	730.34M	41.12	46.00	-4.88	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	871.96M	36.68	46.00	-9.32	3	Horizontal	0	1.00	-

BT-LE(1Mbps)RX

2440MHz_DC power supply

10/04/2020

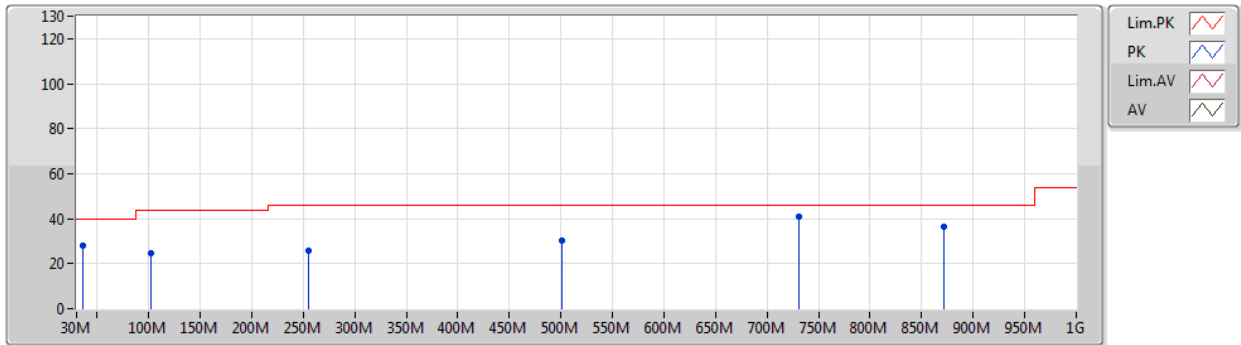


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	41.64M	26.28	40.00	-13.72	-18.94	3	Vertical	360	1.00	-	45.22	17.75	0.55	37.24
PK	64.92M	33.03	40.00	-6.97	-25.49	3	Vertical	360	1.00	-	58.52	10.92	0.64	37.05
PK	113.42M	25.52	43.50	-17.98	-19.72	3	Vertical	360	1.00	-	45.24	16.15	0.86	36.73
PK	289.96M	25.20	46.00	-20.80	-16.91	3	Vertical	360	1.00	-	42.11	18.15	1.41	36.47
PK	567.38M	32.56	46.00	-13.44	-9.95	3	Vertical	360	1.00	-	42.51	25.13	2.04	37.12
PK	728.4M	42.25	46.00	-3.75	-8.63	3	Vertical	360	1.00	-	50.88	26.45	2.32	37.40

BT-LE(1Mbps)RX

2440MHz_DC power supply

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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	28.19	40.00	-11.81	-16.10	3	Horizontal	0	1.00	-	44.29	20.67	0.52	37.29
PK	101.78M	24.59	43.50	-18.91	-20.80	3	Horizontal	0	1.00	-	45.39	15.15	0.82	36.77
PK	255.04M	25.69	46.00	-20.31	-16.68	3	Horizontal	0	1.00	-	42.37	18.44	1.31	36.43
PK	501.42M	30.28	46.00	-15.72	-12.10	3	Horizontal	0	1.00	-	42.38	22.94	1.88	36.92
PK	730.34M	41.12	46.00	-4.88	-8.53	3	Horizontal	0	1.00	-	49.65	26.55	2.32	37.40
PK	871.96M	36.68	46.00	-9.32	-6.95	3	Horizontal	0	1.00	-	43.63	28.03	2.52	37.50



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	5.82336G	33.70	54.00	-20.30	3	Horizontal	0	1.00	-

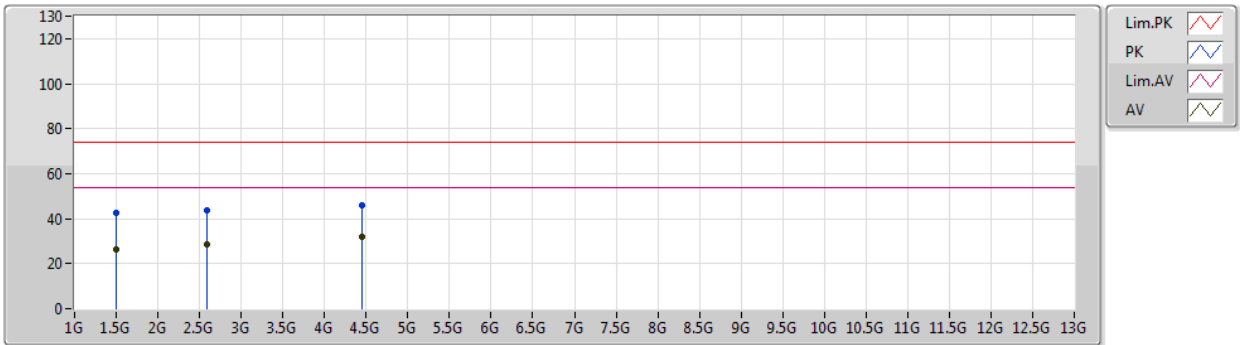
Result

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	AV	1.50322G	26.47	54.00	-27.53	3	Vertical	360	1.00	-
2440MHz	Pass	AV	2.58756G	28.79	54.00	-25.21	3	Vertical	360	1.00	-
2440MHz	Pass	AV	4.45304G	31.76	54.00	-22.24	3	Vertical	360	1.00	-
2440MHz	Pass	PK	1.504G	42.43	74.00	-31.57	3	Vertical	360	1.00	-
2440MHz	Pass	PK	2.584G	43.48	74.00	-30.52	3	Vertical	360	1.00	-
2440MHz	Pass	PK	4.456G	45.76	74.00	-28.24	3	Vertical	360	1.00	-
2440MHz	Pass	AV	1.47698G	25.98	54.00	-28.02	3	Horizontal	0	1.00	-
2440MHz	Pass	AV	3.5222G	30.34	54.00	-23.66	3	Horizontal	0	1.00	-
2440MHz	Pass	AV	5.82336G	33.70	54.00	-20.30	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	1.48G	39.67	74.00	-34.33	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	3.52G	44.23	74.00	-29.77	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	5.824G	47.54	74.00	-26.46	3	Horizontal	0	1.00	-

BT-LE(1Mbps)RX

10/04/2020

2440MHz_RX

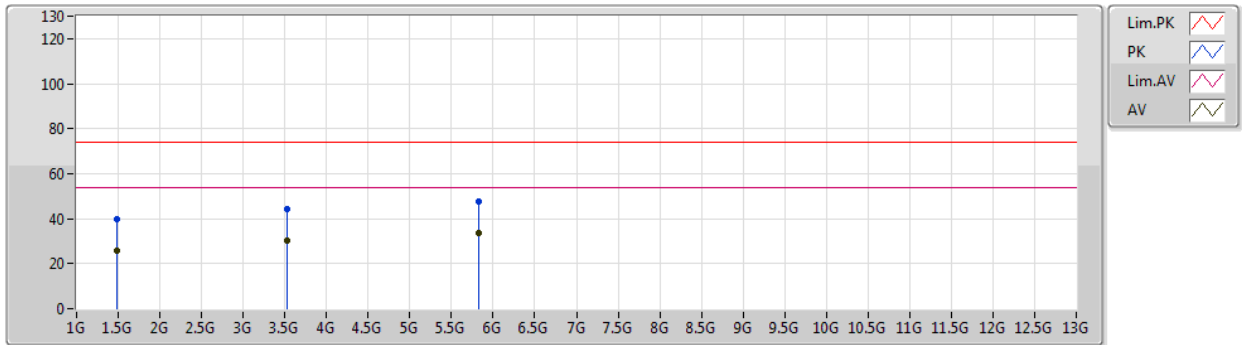


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	1.50322G	26.47	54.00	-27.53	-4.98	3	Vertical	360	1.00	-	31.45	25.39	3.65	34.02
AV	2.58756G	28.79	54.00	-25.21	-1.37	3	Vertical	360	1.00	-	30.16	27.68	4.94	33.99
AV	4.45304G	31.76	54.00	-22.24	2.67	3	Vertical	360	1.00	-	29.09	30.46	6.27	34.06
PK	1.504G	42.43	74.00	-31.57	-4.99	3	Vertical	360	1.00	-	47.42	25.38	3.65	34.02
PK	2.584G	43.48	74.00	-30.52	-1.38	3	Vertical	360	1.00	-	44.86	27.67	4.94	33.99
PK	4.456G	45.76	74.00	-28.24	2.69	3	Vertical	360	1.00	-	43.07	30.47	6.28	34.06

BT-LE(1Mbps)RX

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2440MHz_RX



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	1.47698G	25.98	54.00	-28.02	-4.93	3	Horizontal	0	1.00	-	30.91	25.52	3.62	34.07
AV	3.5222G	30.34	54.00	-23.66	0.54	3	Horizontal	0	1.00	-	29.80	28.79	5.77	34.02
AV	5.82336G	33.70	54.00	-20.30	5.27	3	Horizontal	0	1.00	-	28.43	32.17	7.18	34.08
PK	1.48G	39.67	74.00	-34.33	-4.93	3	Horizontal	0	1.00	-	44.60	25.50	3.63	34.06
PK	3.52G	44.23	74.00	-29.77	0.53	3	Horizontal	0	1.00	-	43.70	28.78	5.77	34.02
PK	5.824G	47.54	74.00	-26.46	5.27	3	Horizontal	0	1.00	-	42.27	32.17	7.18	34.08