

NCC Test Report

Equipment : 智慧平板燈
Brand Name : UBIQUITI
Model Name : ULED-AT
Applicant : 香港商優比快科技有限公司台灣分公司
臺北市信義區松仁路 107 號 12 樓
Manufacturer : Ubiquiti Networks, Inc.
685 Third Avenue, 27th Floor New York,
New York 10017 USA
Standard : LP0002 Section 3.10 (2018-01-10)

The product was received on Jan. 29, 2019, and testing was started from Feb. 01, 2019 and completed on Feb. 12, 2019. 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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PHOTOGRAPHS OF EUT V01	

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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	LP0002-2.2
3.1	2.3	AC Power-line Conducted Emissions	PASS	LP0002-2.3
3.2	3.10.1.6	DTS Bandwidth	PASS	≥500kHz
3.3	3.10.1.2	Maximum Conducted Output Power	PASS	Power [dBm]:30
3.4	3.10.1.6	Power Spectral Density	PASS	PSD [dBm/3kHz]:8
3.5	3.10.1.5	Emissions in Non-restricted Frequency Bands	PASS	Non-Restricted Bands: >30 dBc
3.6	3.10.1.5	Emissions in Restricted Frequency Bands	PASS	Restricted Bands: LP0002-2.8
3.7	2.11	Receiver Radiated Unwanted Emissions	PASS	Restricted Bands: LP0002-2.8

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: Jackson Tsai

Report Producer: Jenny Yang

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 for DSSS.
- ♦ BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	-	-	Internal antenna	I-PEX	3.5

Note 1: The EUT has two antennas.

For BT function:

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

Only Ant. 1 (port 1) can be used as transmitting/receiving antenna.

1.1.3 EUT Information

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

1.1.4 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	0.622	2.062	405u	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 v05r01
- ♦ ANSI C63.4-2014

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

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Daniel	22.8°C / 53.5%	12/Feb/2019
RF Conducted	TH01-HY	Barry	24.8°C / 52.4%	11/Feb/2019
Radiated	03CH02-HY	Lego	24.1°C / 54.2%	02/Feb/2019

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)	3.54 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	1.6 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.9 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.3 dB	Confidence levels of 95%
Temperature	0.7 °C	Confidence levels of 95%
Humidity	4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Condition

RF Conducted	Abbreviation	Remark
TnomVnom	Tnom	20°C
-	Vnom	48V

2.2 Test Channel Mode

Test Software	DoS
---------------	-----

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	08
2440MHz	08
2480MHz	08

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

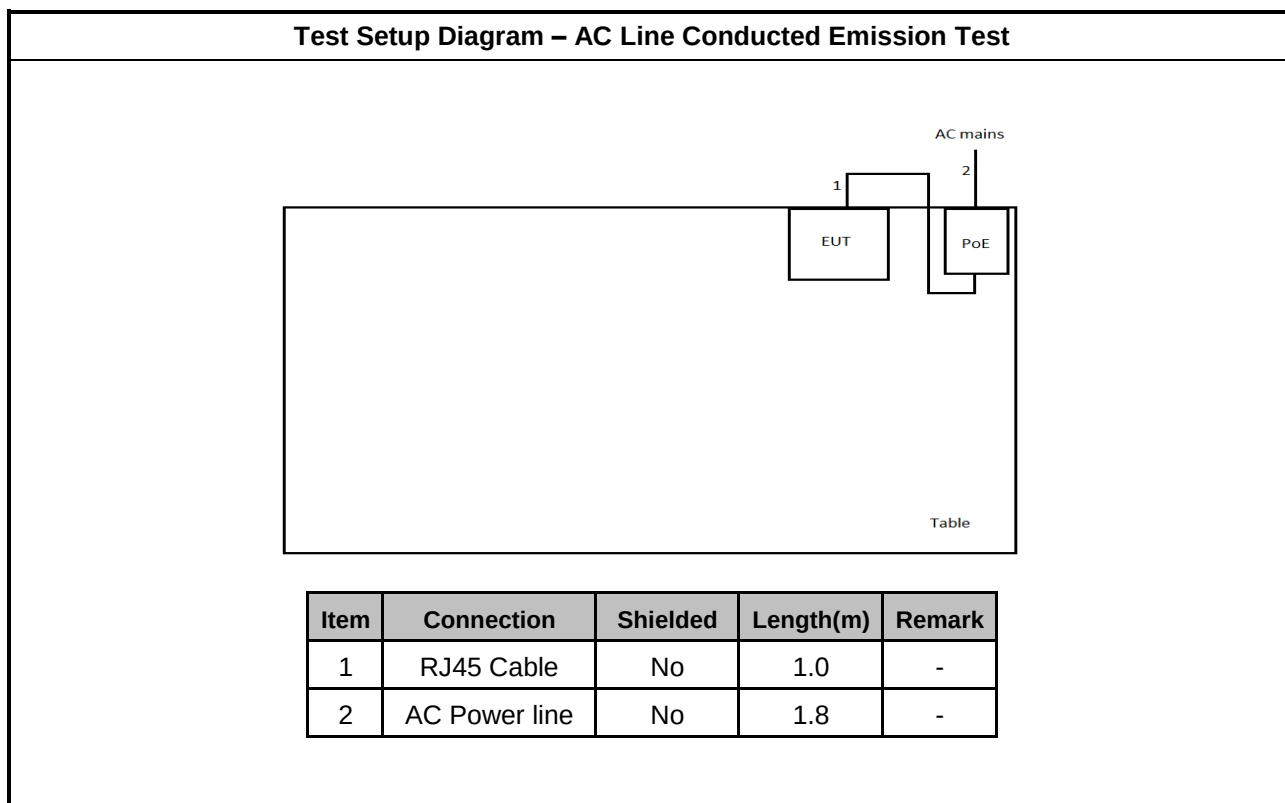
2.4 Support Equipment

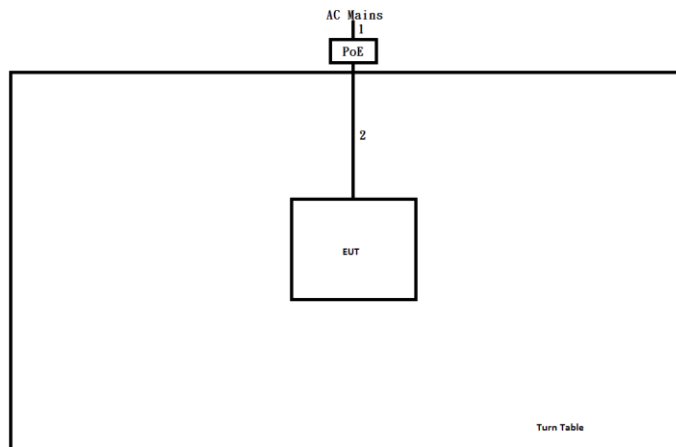
Support Equipment – AC Conduction				
No.	Equipment	Brand Name	Model Name	FCC ID
1	PoE	Ruckus	GRT-480125A	-

Support Equipment – RF Conducted				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5410	R33002
2	Adapter for NB	DELL	HA65NM130	R35737
3	PoE	Ruckus	GRT-480125A	-

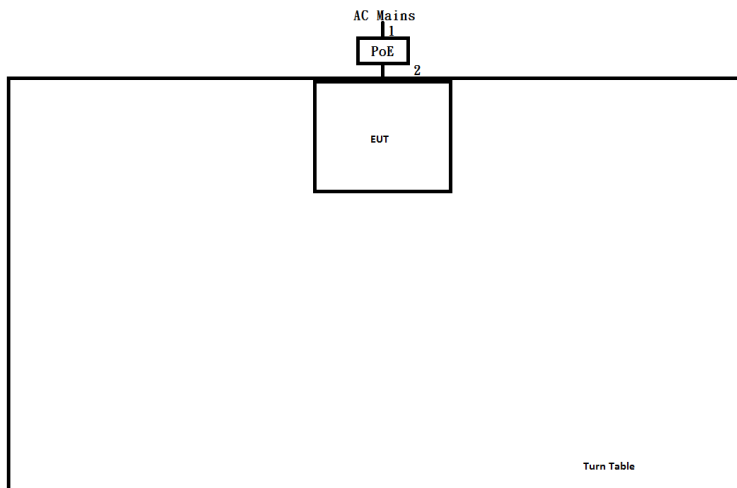
Support Equipment – Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	PoE	Ruckus	GRT-480125A	-

2.5 Test Setup Diagram



Test Setup Diagram - Radiated Test - TX


Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.5	-
2	RJ45 Cable	No	10	-

Test Setup Diagram - Radiated Test - RX


Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.5	-
2	RJ45 Cable	No	10	-

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.

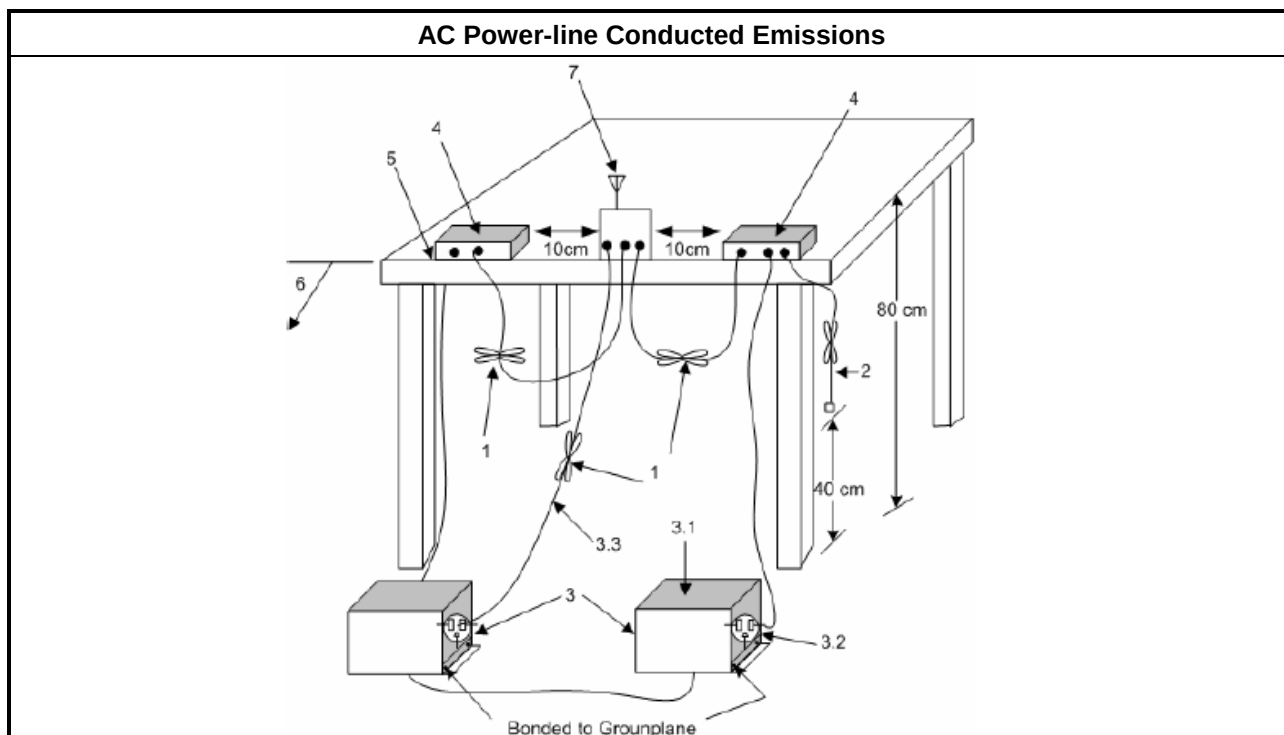
3.1.2 Measuring Instruments

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 for AC 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.

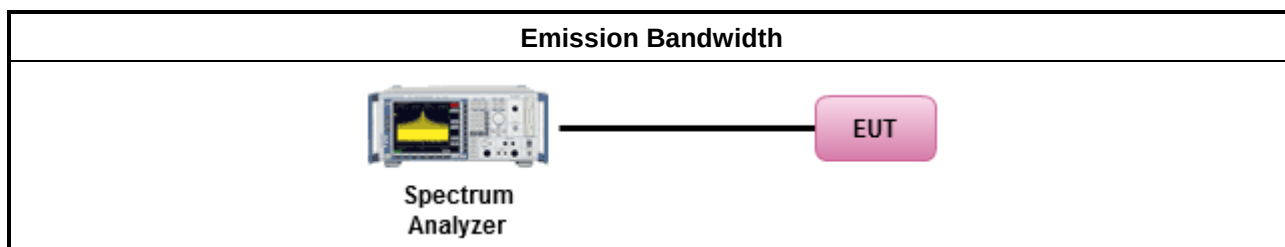
3.2.2 Measuring Instruments

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.	

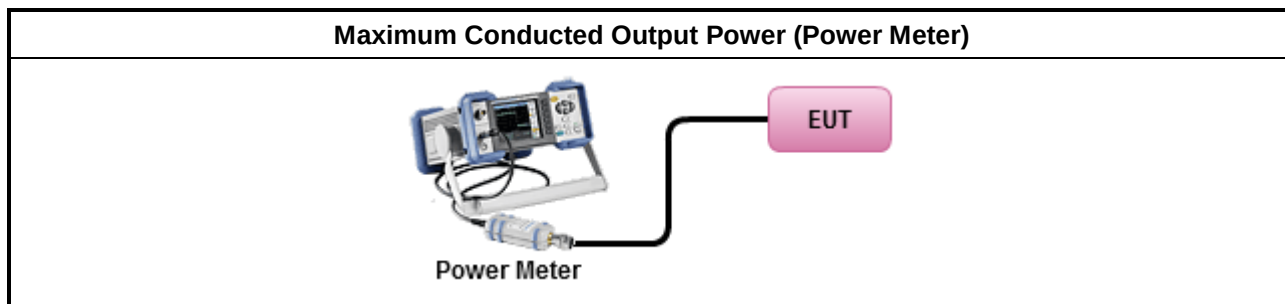
3.3.2 Measuring Instruments

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

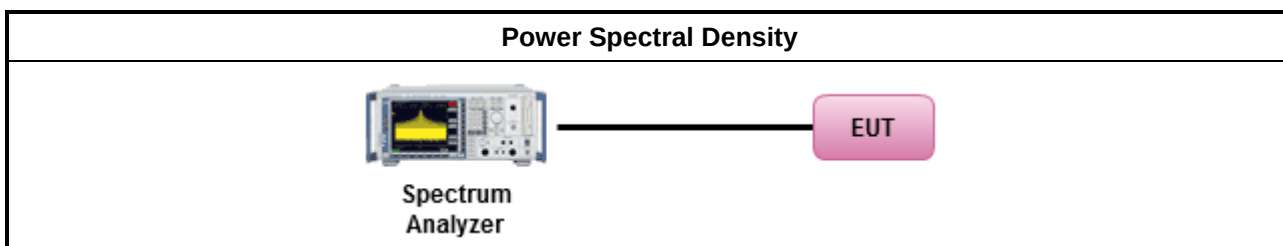
3.4.2 Measuring Instruments

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) Method PKPSD.
▪	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 PSD 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 PSD level.	

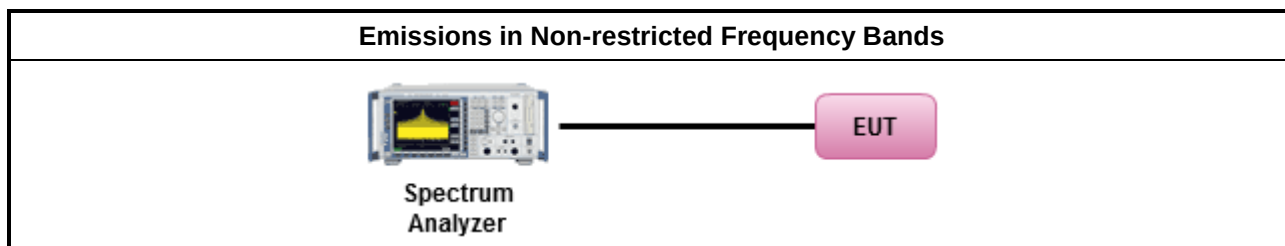
3.5.2 Measuring Instruments

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.

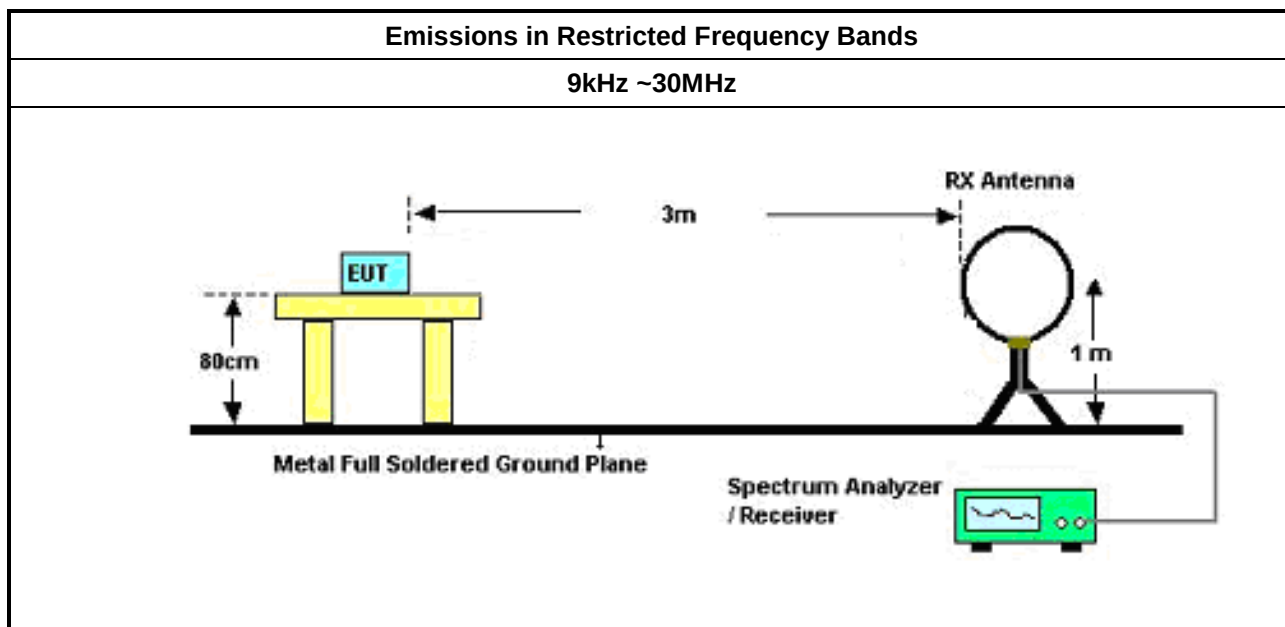
3.6.2 Measuring Instruments

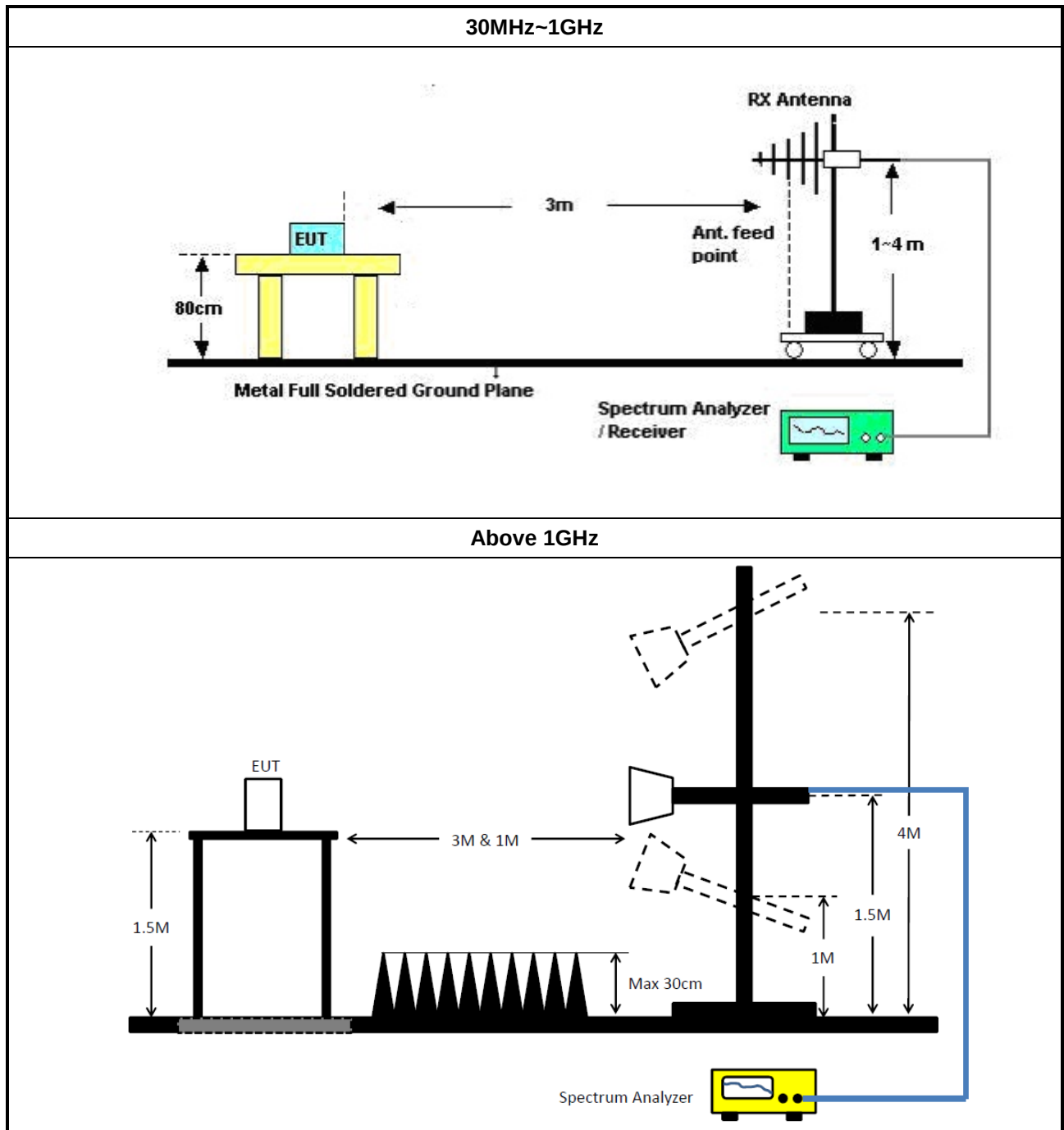
Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Test Method	
The average emission levels shall be measured in [duty cycle ≥ 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 (i.e., 1 MHz).
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.

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.

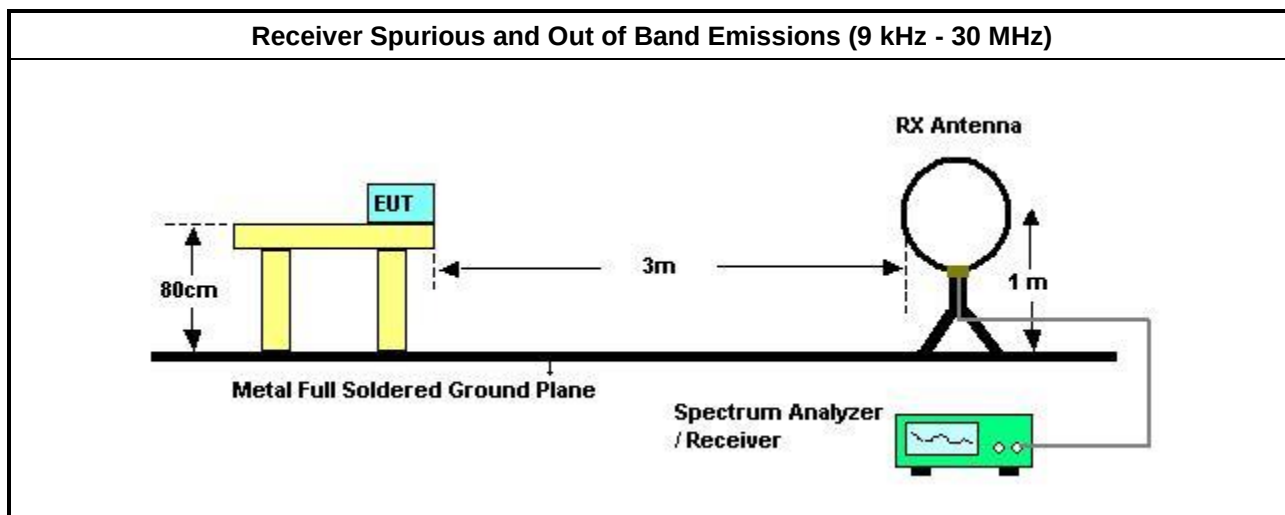
3.7.2 Measuring Instruments

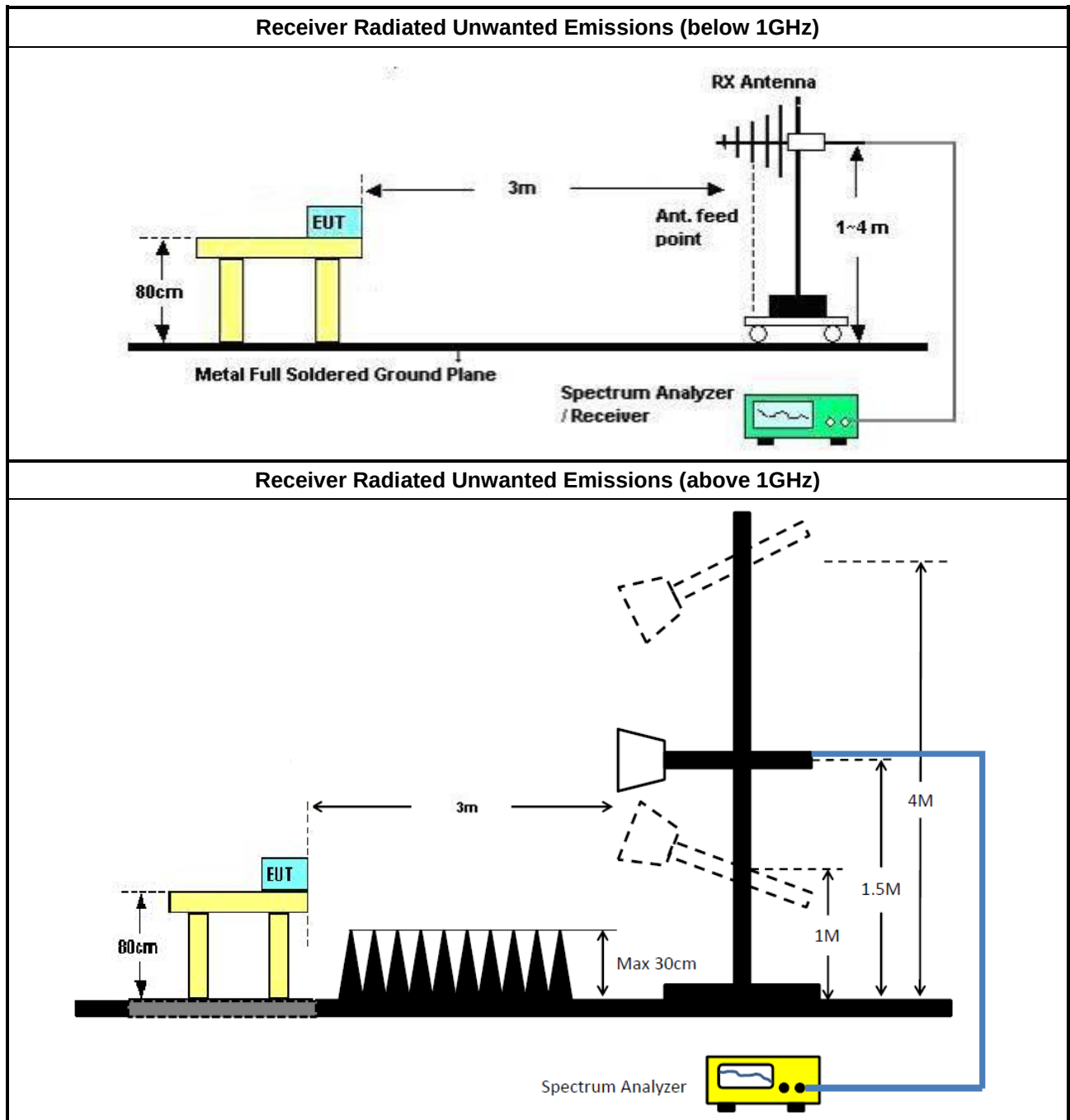
Refer a test equipment and calibration data table in this test report.

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	ESR	102051	9KHz ~ 3.6GHz	03/May/2018	02/May/2019
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	08/Nov/2018	07/Nov/2019
RF Cable-CON	MTJ	RG142	CB002-CO	9kHz ~ 200MHz	17/Sep/2018	16/Sep/2019
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	12/Oct/2018	11/Oct/2019

NCR : Non-Calibration Require

Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV40	101500	10Hz ~ 40GHz	18/Jul/2018	17/Jul/2019
Power Sensor	Anritsu	MA2411B	1339407	300MHz ~ 40GHz	17/Nov/2018	16/Nov/2019
Power Meter	Anritsu	ML2495A	1517010	300MHz ~ 40GHz	17/Nov/2018	16/Nov/2019
CABLE 0.5m	HUBER	MY37963/4	RF Cable - 22	30MHz ~18G	10/Jan/2019	09/Jan/2020
Cable 0.2m	HUBER	MY10710/4	RF Cable - 01	30MHz ~18G	10/Jan/2019	09/Jan/2020
Cable 0.2m	HUBER	MY10711/4	RF Cable - 02	30MHz ~18G	10/Jan/2019	09/Jan/2020
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	12/Nov/2018	10/Nov/2020

Instrument for Radiated Test

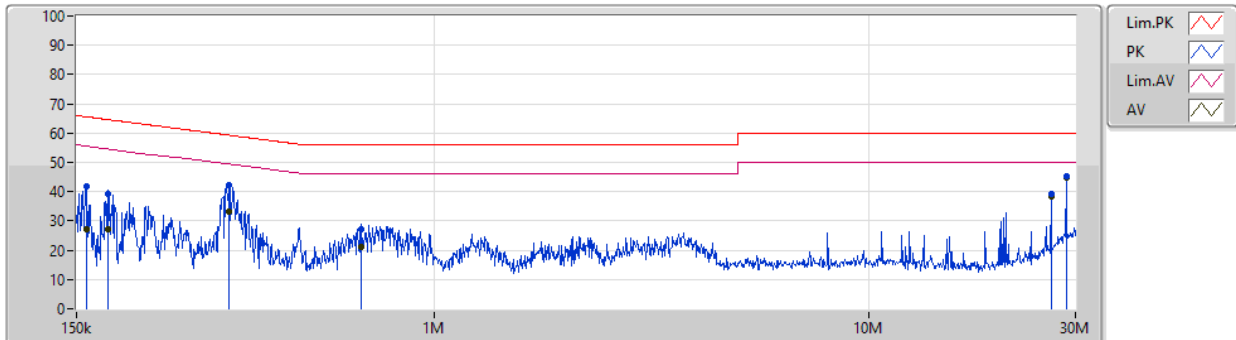
Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	19/Oct/2018	18/Oct/2019
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz ~ 18GHz 3m	17/Oct/2018	16/Oct/2019
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	27Jul/2018	02/Jul/2019
Microwave Preamplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	23/Oct/2018	22/Oct/2019
Spectrum Analyzer	Rohde & Schwarz	FSP40	100593	9KHz - 40GHz	27/Dec/2018	26/Dec/2019
EMI Test Receiver	R&S	ESR3	102052	9kHz ~ 3.6GHz	10/Apr/2018	09/Apr/2019
RF Cable-R03m	Jye Bao	RG142	CB017	9kHz ~ 1GHz	18/Jan/2019	17/Jan/2020
RF Cable-high	SUHNER	SUCOFLEX104	MY34918/4	1GHz ~ 40GHz	18/Jan/2019	17/Jan/2020
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112B / MTJ6102-05	2723 / 2	30MHz ~ 1GHz	08/Sep/2018	07/Sep/2019
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120D	BBHA 9120 D 1531	1GHz ~ 18GHz	18/Apr/2018	17/Apr/2019
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	15GHz ~ 40GHz	12/Mar/2018	11/Mar/2019

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	PoE Mode - TX		

AC Conduction

12/02/2019



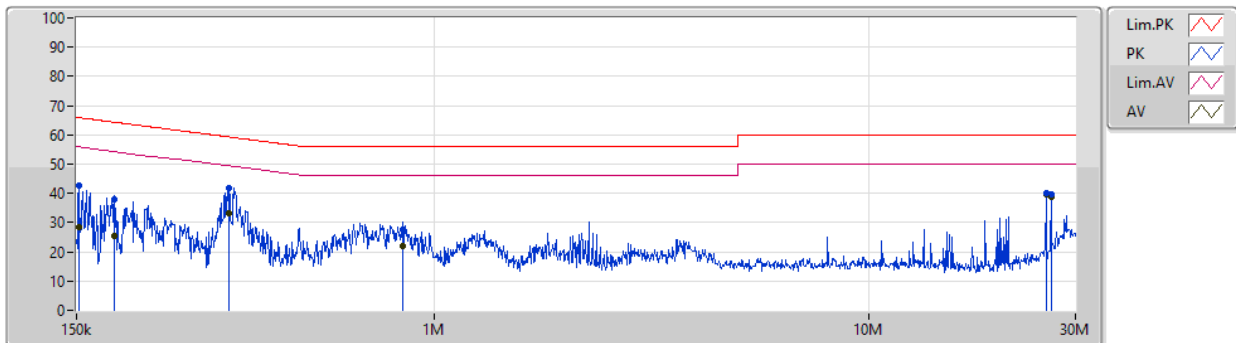
Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	158.622k	41.67	65.54	-23.87	19.48	Neutral	-	22.19	9.60	0.01	9.87			
AV	158.622k	26.94	55.54	-28.60	19.48	Neutral	-	7.46	9.60	0.01	9.87			
QP	177.381k	39.06	64.60	-25.54	19.47	Neutral	-	19.59	9.59	0.01	9.87			
AV	177.381k	27.33	54.60	-27.27	19.47	Neutral	-	7.86	9.59	0.01	9.87			
QP	337.314k	42.10	59.27	-17.17	19.48	Neutral	-	22.62	9.59	0.01	9.88			
AV	337.314k	33.38	49.27	-15.89	19.48	Neutral	-	13.90	9.59	0.01	9.88			
QP	678.32k	27.29	56.00	-28.71	19.48	Neutral	-	7.81	9.59	0.01	9.88			
AV	678.32k	21.08	46.00	-24.92	19.48	Neutral	-	1.60	9.59	0.01	9.88			
QP	26.378M	39.23	60.00	-20.77	19.69	Neutral	-	19.54	9.67	0.12	9.90			
AV	26.378M	38.46	50.00	-11.54	19.69	Neutral	-	18.77	9.67	0.12	9.90			
QP	28.574M	45.20	60.00	-14.80	19.70	Neutral	-	25.50	9.67	0.13	9.90			
AV	28.574M	44.69	50.00	-5.31	19.70	Neutral	"Worst"	24.99	9.67	0.13	9.90			

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	PoE Mode - TX		

AC Conduction

12/02/2019



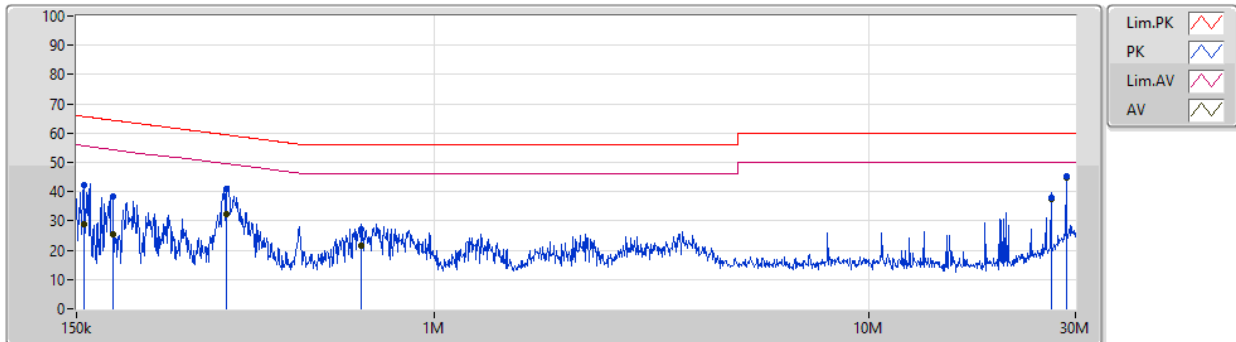
Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	151.807k	42.67	65.90	-23.23	19.48	Line	-	23.19	9.60	0.01	9.87			
AV	151.807k	28.36	55.90	-27.54	19.48	Line	-	8.88	9.60	0.01	9.87			
QP	183.137k	37.93	64.34	-26.41	19.48	Line	-	18.45	9.60	0.01	9.87			
AV	183.137k	25.27	54.34	-29.07	19.48	Line	-	5.79	9.60	0.01	9.87			
QP	337.314k	41.98	59.27	-17.29	19.48	Line	-	22.50	9.59	0.01	9.88			
AV	337.314k	33.29	49.27	-15.98	19.48	Line	-	13.81	9.59	0.01	9.88			
QP	848.248k	27.66	56.00	-28.34	19.50	Line	-	8.16	9.60	0.02	9.88			
AV	848.248k	21.77	46.00	-24.23	19.50	Line	-	2.27	9.60	0.02	9.88			
QP	25.644M	40.28	60.00	-19.72	19.59	Line	-	20.69	9.57	0.12	9.90			
AV	25.644M	39.52	50.00	-10.48	19.59	Line	"Worst"	19.93	9.57	0.12	9.90			
QP	26.378M	39.59	60.00	-20.41	19.59	Line	-	20.00	9.57	0.12	9.90			
AV	26.378M	38.77	50.00	-11.23	19.59	Line	-	19.18	9.57	0.12	9.90			

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	PoE Mode - RX		

AC Conduction

12/02/2019



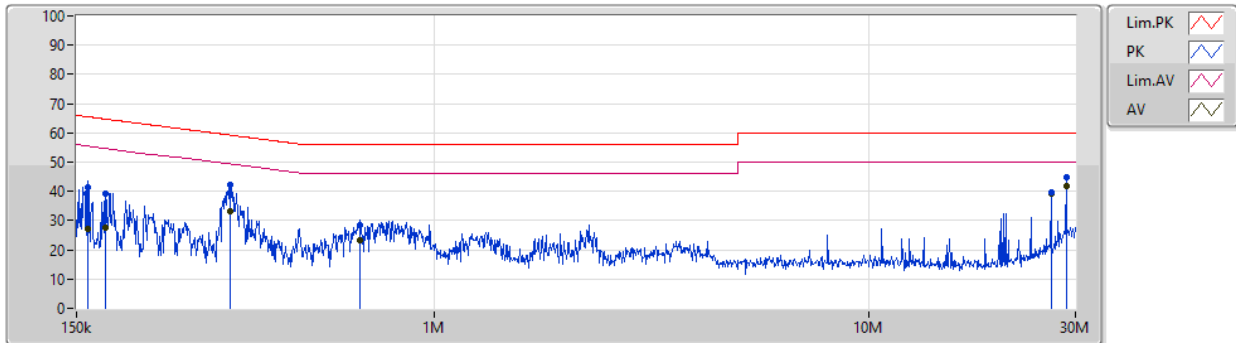
Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	156.109k	42.44	65.67	-23.23	19.48	Neutral	-	22.96	9.60	0.01	9.87			
AV	156.109k	28.84	55.67	-26.83	19.48	Neutral	-	9.36	9.60	0.01	9.87			
QP	181.681k	38.39	64.41	-26.02	19.47	Neutral	-	18.92	9.59	0.01	9.87			
AV	181.681k	25.23	54.41	-29.18	19.47	Neutral	-	5.76	9.59	0.01	9.87			
QP	333.299k	40.96	59.37	-18.41	19.48	Neutral	-	21.48	9.59	0.01	9.88			
AV	333.299k	32.38	49.37	-16.99	19.48	Neutral	-	12.90	9.59	0.01	9.88			
QP	678.32k	27.26	56.00	-28.74	19.48	Neutral	-	7.78	9.59	0.01	9.88			
AV	678.32k	21.34	46.00	-24.66	19.48	Neutral	-	1.86	9.59	0.01	9.88			
QP	26.378M	38.14	60.00	-21.86	19.69	Neutral	-	18.45	9.67	0.12	9.90			
AV	26.378M	37.38	50.00	-12.62	19.69	Neutral	-	17.69	9.67	0.12	9.90			
QP	28.575M	45.23	60.00	-14.77	19.70	Neutral	-	25.53	9.67	0.13	9.90			
AV	28.575M	44.77	50.00	-5.23	19.70	Neutral	"Worst"	25.07	9.67	0.13	9.90			

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Operating Function	PoE Mode - RX		

AC Conduction

12/02/2019



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	159.256k	41.51	65.50	-23.99	19.48	Line	-	22.03	9.60	0.01	9.87			
AV	159.256k	27.09	55.50	-28.41	19.48	Line	-	7.61	9.60	0.01	9.87			
QP	174.571k	39.38	64.74	-25.36	19.48	Line	-	19.90	9.60	0.01	9.87			
AV	174.571k	27.52	54.74	-27.22	19.48	Line	-	8.04	9.60	0.01	9.87			
QP	338.664k	42.24	59.23	-16.99	19.48	Line	-	22.76	9.59	0.01	9.88			
AV	338.664k	33.25	49.23	-15.98	19.48	Line	-	13.77	9.59	0.01	9.88			
QP	672.926k	28.66	56.00	-27.34	19.49	Line	-	9.17	9.60	0.01	9.88			
AV	672.926k	23.11	46.00	-22.89	19.49	Line	-	3.62	9.60	0.01	9.88			
QP	26.378M	39.77	60.00	-20.23	19.59	Line	-	20.18	9.57	0.12	9.90			
AV	26.378M	39.40	50.00	-10.60	19.59	Line	-	19.81	9.57	0.12	9.90			
QP	28.571M	44.70	60.00	-15.30	19.57	Line	-	25.13	9.54	0.13	9.90			
AV	28.571M	41.75	50.00	-8.25	19.57	Line	"Worst"	22.18	9.54	0.13	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)	640k	995.752k	996KF1D	638.75k	955.772k

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;

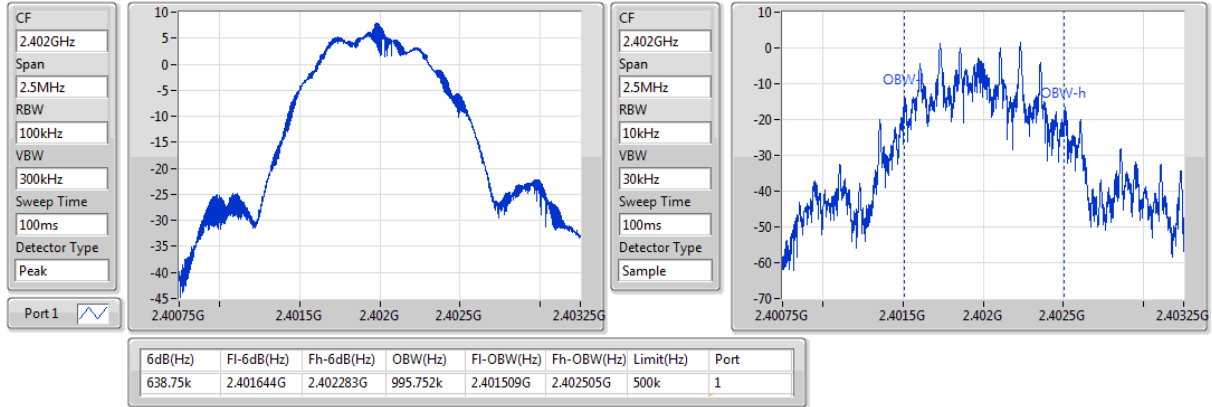
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	638.75k	995.752k
2440MHz	Pass	500k	640k	955.772k
2480MHz	Pass	500k	638.75k	959.52k

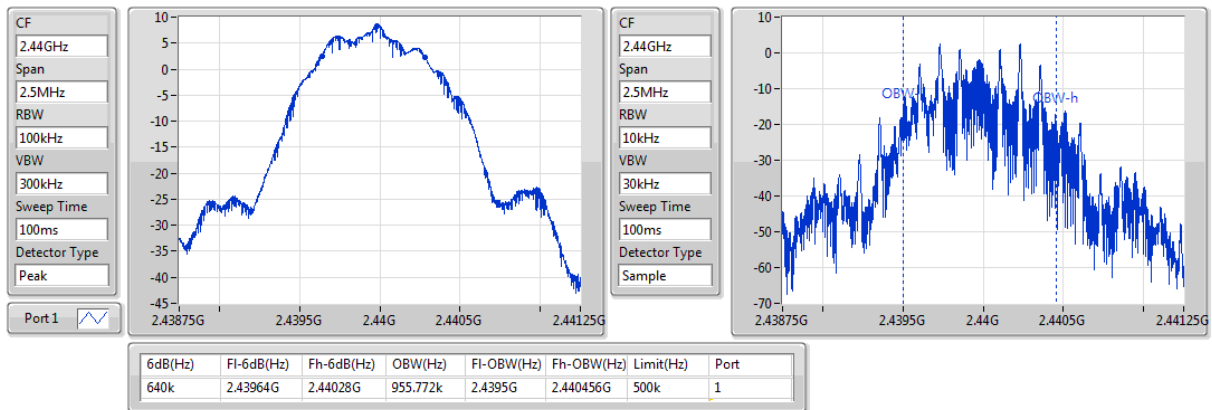
Port X-N dB = Port X 6dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;

BT-LE(1Mbps)
EBW
2402MHz

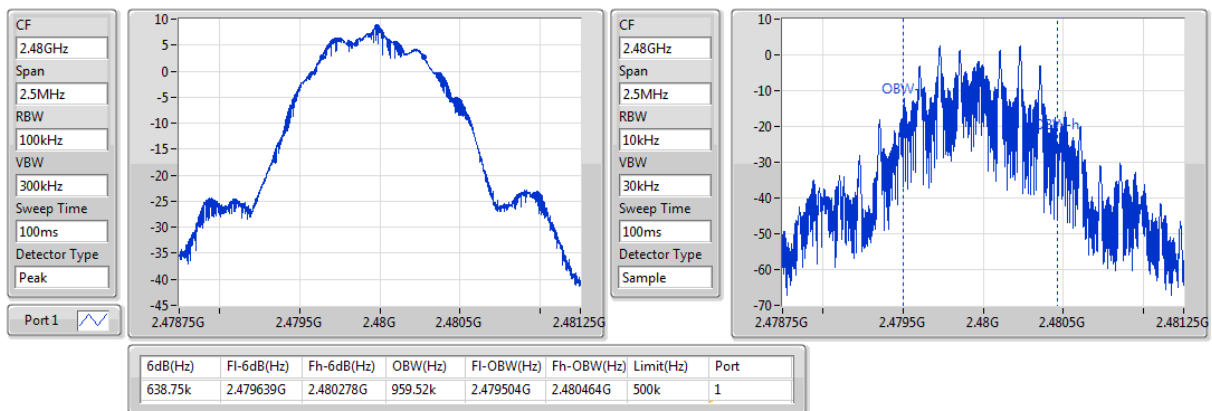
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BT-LE(1Mbps)
EBW
2440MHz

11/02/2019


BT-LE(1Mbps)
EBW
2480MHz

11/02/2019



Summary

Mode	Power	Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	8.22	0.00664

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.50	7.31	30.00
2440MHz	Pass	3.50	8.02	30.00
2480MHz	Pass	3.50	8.22	30.00

**Summary**

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	1.76

RBW=3kHz.

Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.50	0.76	8.00
2440MHz	Pass	3.50	1.63	8.00
2480MHz	Pass	3.50	1.76	8.00

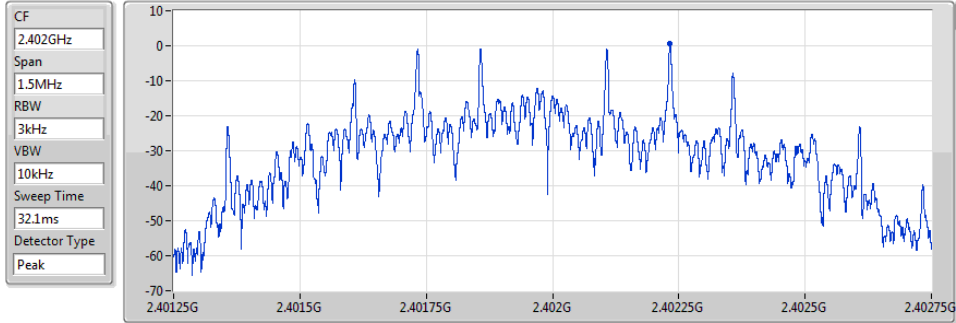
RBW=3kHz.

BT-LE(1Mbps)

PSD

2402MHz

11/02/2019



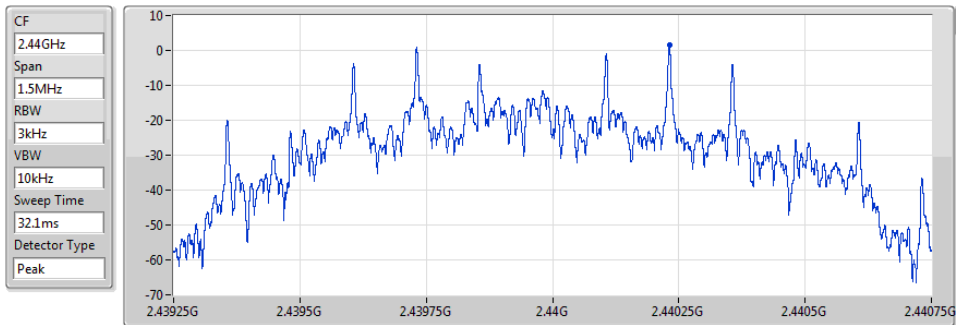
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
0.76	0.76	0.76

BT-LE(1Mbps)

PSD

2440MHz

11/02/2019



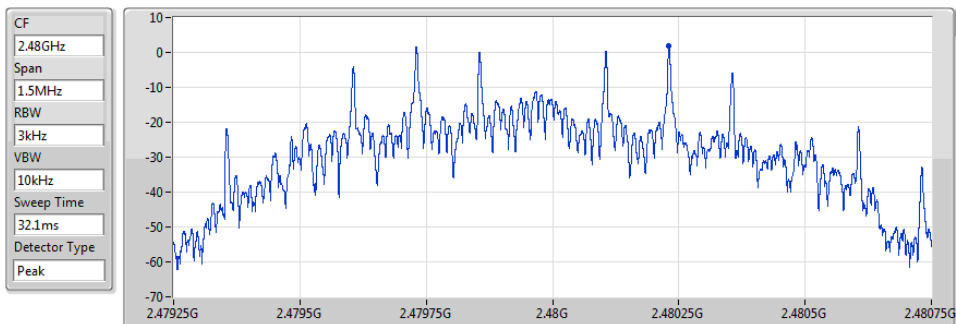
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
1.63	1.63	1.63

BT-LE(1Mbps)

PSD

2480MHz

11/02/2019



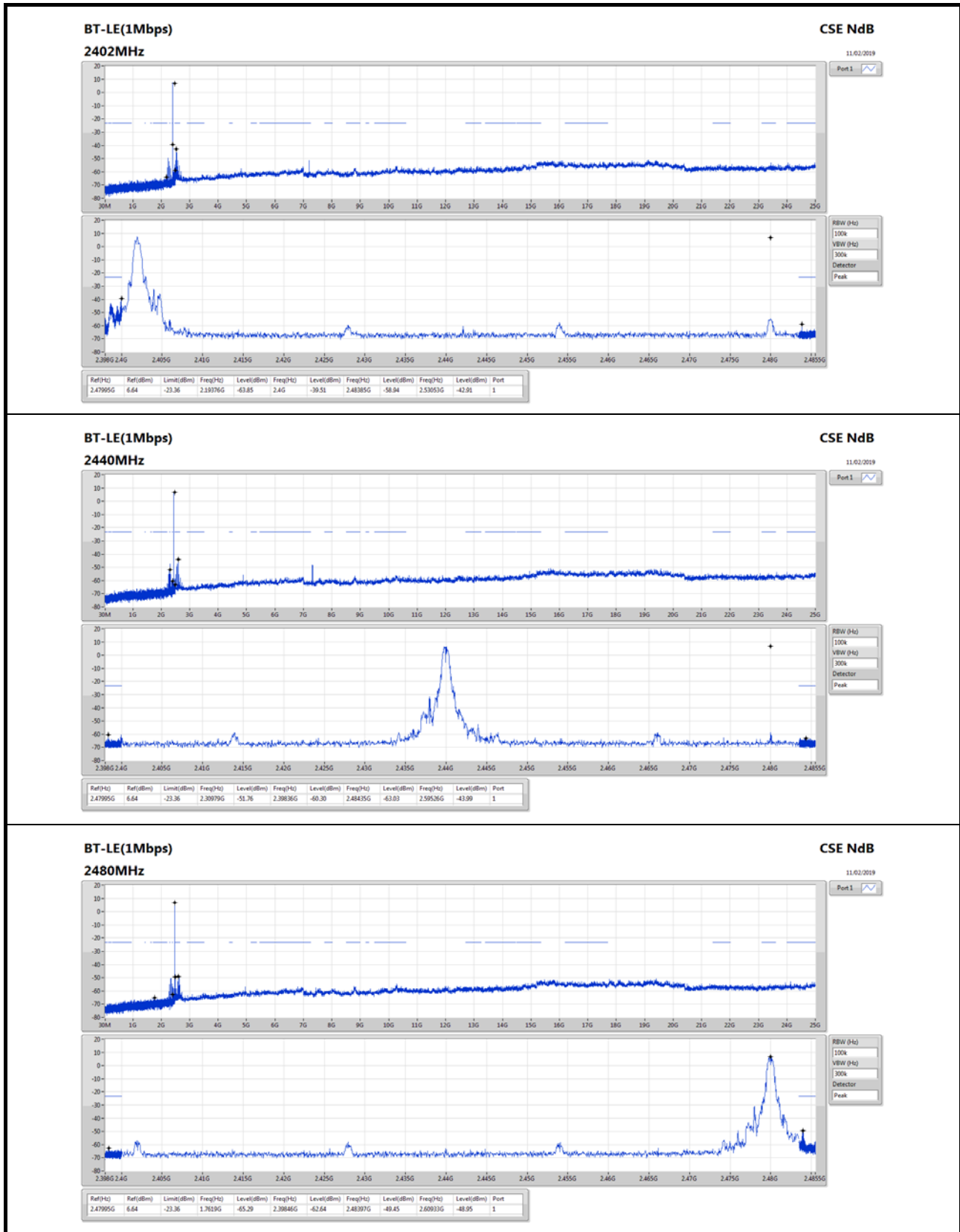
Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
1.76	1.76	1.76

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)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.47995G	6.64	-23.36	2.19376G	-63.85	2.4G	-39.51	2.48385G	-58.94	2.53053G	-42.91	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)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.47995G	6.64	-23.36	2.19376G	-63.85	2.4G	-39.51	2.48385G	-58.94	2.53053G	-42.91	1
2440MHz	Pass	2.47995G	6.64	-23.36	2.30979G	-51.76	2.39836G	-60.30	2.48435G	-63.03	2.59526G	-43.99	1
2480MHz	Pass	2.47995G	6.64	-23.36	1.7619G	-65.29	2.39846G	-62.64	2.48397G	-49.45	2.60933G	-48.95	1



Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	QP	37.76M	36.19	40.00	-3.81	-8.64	3	Vertical	131	1.76	-

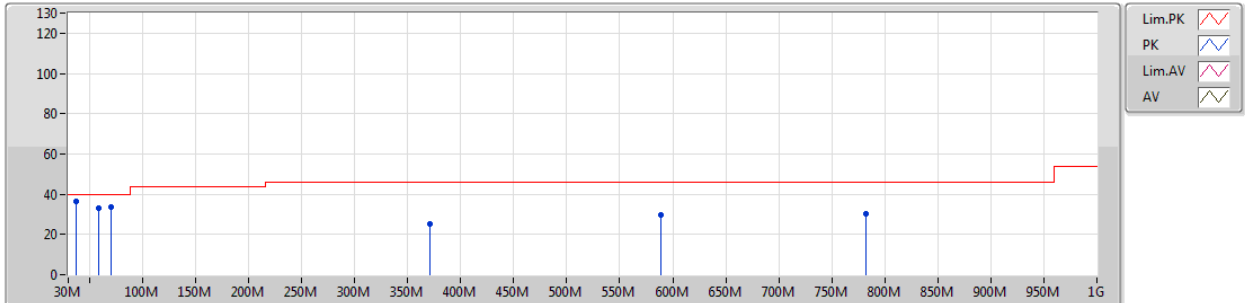
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	70.74M	33.73	40.00	-6.27	-15.31	3	Vertical	360	1.00	-
2440MHz	Pass	PK	371.44M	25.05	46.00	-20.95	-4.50	3	Vertical	360	1.00	-
2440MHz	Pass	PK	588.72M	29.49	46.00	-16.51	-1.26	3	Vertical	360	1.00	-
2440MHz	Pass	PK	782.72M	30.34	46.00	-15.66	1.20	3	Vertical	360	1.00	-
2440MHz	Pass	QP	37.76M	36.19	40.00	-3.81	-8.64	3	Vertical	131	1.76	-
2440MHz	Pass	QP	59.1M	33.13	40.00	-6.87	-15.39	3	Vertical	217	1.55	-
2440MHz	Pass	PK	33.88M	33.31	40.00	-6.69	-6.69	3	Horizontal	0	2.00	-
2440MHz	Pass	PK	59.1M	31.81	40.00	-8.19	-15.39	3	Horizontal	0	2.00	-
2440MHz	Pass	PK	138.64M	24.88	43.50	-18.62	-9.58	3	Horizontal	0	2.00	-
2440MHz	Pass	PK	590.66M	31.74	46.00	-14.26	-1.23	3	Horizontal	0	2.00	-
2440MHz	Pass	PK	738.1M	29.97	46.00	-16.03	0.72	3	Horizontal	0	2.00	-
2440MHz	Pass	PK	786.6M	31.27	46.00	-14.73	1.20	3	Horizontal	0	2.00	-

BT-LE(1Mbps)

02/02/2019

2440MHz_PoE

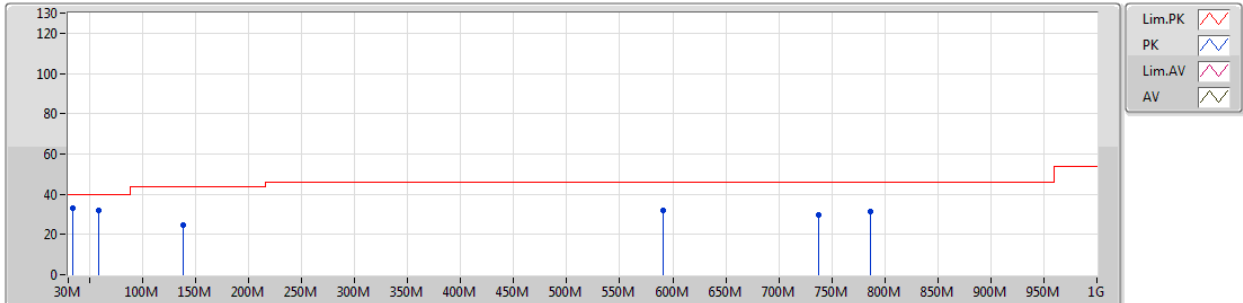


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	70.74M	33.73	40.00	-6.27	-15.31	3	Vertical	360	1.00	-
PK	371.44M	25.05	46.00	-20.95	-4.50	3	Vertical	360	1.00	-
PK	588.72M	29.49	46.00	-16.51	-1.26	3	Vertical	360	1.00	-
PK	782.72M	30.34	46.00	-15.66	1.20	3	Vertical	360	1.00	-
QP	37.76M	36.19	40.00	-3.81	-8.64	3	Vertical	131	1.76	-
QP	59.1M	33.13	40.00	-6.87	-15.39	3	Vertical	217	1.55	-

BT-LE(1Mbps)

2440MHz_PoE

02/02/2019



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	33.88M	33.31	40.00	-6.69	-6.69	3	Horizontal	0	2.00	-
PK	59.1M	31.81	40.00	-8.19	-15.39	3	Horizontal	0	2.00	-
PK	138.64M	24.88	43.50	-18.62	-9.58	3	Horizontal	0	2.00	-
PK	590.66M	31.74	46.00	-14.26	-1.23	3	Horizontal	0	2.00	-
PK	738.1M	29.97	46.00	-16.03	0.72	3	Horizontal	0	2.00	-
PK	786.6M	31.27	46.00	-14.73	1.20	3	Horizontal	0	2.00	-

**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4835G	49.92	54.00	-4.08	32.29	3	Vertical	85	2.24	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.37G	45.24	54.00	-8.76	31.94	3	Vertical	83	2.17	-
2402MHz	Pass	AV	2.402G	95.74	Inf	-Inf	32.04	3	Vertical	83	2.17	-
2402MHz	Pass	PK	2.3618G	56.74	74.00	-17.26	31.91	3	Vertical	83	2.17	-
2402MHz	Pass	PK	2.4022G	97.75	Inf	-Inf	32.05	3	Vertical	83	2.17	-
2402MHz	Pass	AV	2.368G	45.25	54.00	-8.75	31.93	3	Horizontal	164	2.82	-
2402MHz	Pass	AV	2.402G	92.38	Inf	-Inf	32.04	3	Horizontal	164	2.82	-
2402MHz	Pass	PK	2.3892G	56.08	74.00	-17.92	32.00	3	Horizontal	164	2.82	-
2402MHz	Pass	PK	2.4022G	94.35	Inf	-Inf	32.05	3	Horizontal	164	2.82	-
2402MHz	Pass	AV	4.8044G	37.31	54.00	-16.69	3.44	3	Vertical	74	1.02	-
2402MHz	Pass	PK	4.80381G	47.96	74.00	-26.04	3.44	3	Vertical	74	1.02	-
2402MHz	Pass	AV	4.80423G	35.38	54.00	-18.62	3.44	3	Horizontal	161	2.99	-
2402MHz	Pass	PK	4.80455G	46.84	74.00	-27.16	3.44	3	Horizontal	161	2.99	-
2440MHz	Pass	AV	2.3724G	45.23	54.00	-8.77	31.94	3	Vertical	84	2.40	-
2440MHz	Pass	AV	2.44G	97.91	Inf	-Inf	32.16	3	Vertical	84	2.40	-
2440MHz	Pass	AV	2.4856G	45.14	54.00	-8.86	32.30	3	Vertical	84	2.40	-
2440MHz	Pass	PK	2.3448G	56.16	74.00	-17.84	31.85	3	Vertical	84	2.40	-
2440MHz	Pass	PK	2.4396G	99.80	Inf	-Inf	32.16	3	Vertical	84	2.40	-
2440MHz	Pass	PK	2.4972G	55.98	74.00	-18.02	32.33	3	Vertical	84	2.40	-
2440MHz	Pass	AV	2.342G	45.03	54.00	-8.97	31.84	3	Horizontal	162	2.45	-
2440MHz	Pass	AV	2.44G	94.36	Inf	-Inf	32.16	3	Horizontal	162	2.45	-
2440MHz	Pass	AV	2.498G	45.29	54.00	-8.71	32.34	3	Horizontal	162	2.45	-
2440MHz	Pass	PK	2.3848G	55.99	74.00	-18.01	31.98	3	Horizontal	162	2.45	-
2440MHz	Pass	PK	2.4396G	96.27	Inf	-Inf	32.16	3	Horizontal	162	2.45	-
2440MHz	Pass	PK	2.4908G	56.03	74.00	-17.97	32.31	3	Horizontal	162	2.45	-
2440MHz	Pass	AV	4.87964G	38.36	54.00	-15.64	3.62	3	Vertical	43	2.92	-
2440MHz	Pass	AV	7.31932G	47.98	54.00	-6.02	9.21	3	Vertical	292	2.20	-
2440MHz	Pass	PK	4.87938G	48.72	74.00	-25.28	3.62	3	Vertical	43	2.92	-
2440MHz	Pass	PK	7.31914G	58.26	74.00	-15.74	9.21	3	Vertical	292	2.20	-
2440MHz	Pass	AV	4.87982G	36.39	54.00	-17.61	3.62	3	Horizontal	11	1.01	-
2440MHz	Pass	AV	7.31915G	43.73	54.00	-10.27	9.21	3	Horizontal	196	1.01	-
2440MHz	Pass	PK	4.88002G	47.40	74.00	-26.60	3.62	3	Horizontal	11	1.01	-
2440MHz	Pass	PK	7.31926G	54.82	74.00	-19.18	9.21	3	Horizontal	196	1.01	-
2480MHz	Pass	AV	2.48G	97.88	Inf	-Inf	32.28	3	Vertical	85	2.24	-
2480MHz	Pass	AV	2.4835G	49.92	54.00	-4.08	32.29	3	Vertical	85	2.24	-
2480MHz	Pass	PK	2.4798G	99.77	Inf	-Inf	32.28	3	Vertical	85	2.24	-
2480MHz	Pass	PK	2.4835G	59.78	74.00	-14.22	32.29	3	Vertical	85	2.24	-
2480MHz	Pass	AV	2.48G	95.12	Inf	-Inf	32.28	3	Horizontal	164	2.93	-
2480MHz	Pass	AV	2.4835G	48.43	54.00	-5.57	32.29	3	Horizontal	164	2.93	-
2480MHz	Pass	PK	2.48G	97.09	Inf	-Inf	32.28	3	Horizontal	164	2.93	-
2480MHz	Pass	PK	2.4835G	59.19	74.00	-14.81	32.29	3	Horizontal	164	2.93	-
2480MHz	Pass	AV	4.96048G	38.14	54.00	-15.86	3.83	3	Vertical	90	1.01	-
2480MHz	Pass	AV	7.43928G	46.24	54.00	-7.76	9.49	3	Vertical	292	2.33	-
2480MHz	Pass	PK	4.96048G	48.18	74.00	-25.82	3.83	3	Vertical	90	1.01	-
2480MHz	Pass	PK	7.44084G	56.35	74.00	-17.65	9.51	3	Vertical	292	2.33	-
2480MHz	Pass	AV	4.97368G	33.54	54.00	-20.46	3.86	3	Horizontal	62	1.50	-
2480MHz	Pass	AV	7.43919G	44.27	54.00	-9.73	9.49	3	Horizontal	122	1.01	-
2480MHz	Pass	PK	4.97146G	46.53	74.00	-27.47	3.86	3	Horizontal	62	1.50	-



RSE TX above 1GHz Result

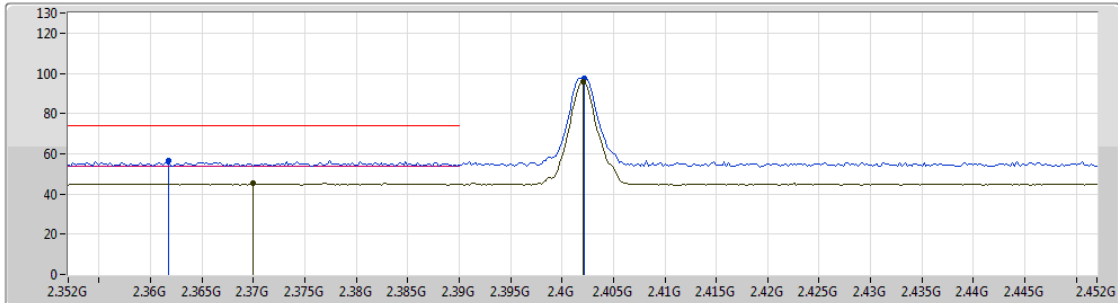
Appendix F.2

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2480MHz	Pass	PK	7.43926G	55.17	74.00	-18.83	9.49	3	Horizontal	122	1.01	-

BT-LE(1Mbps)

2402MHz_TX

01/02/2019

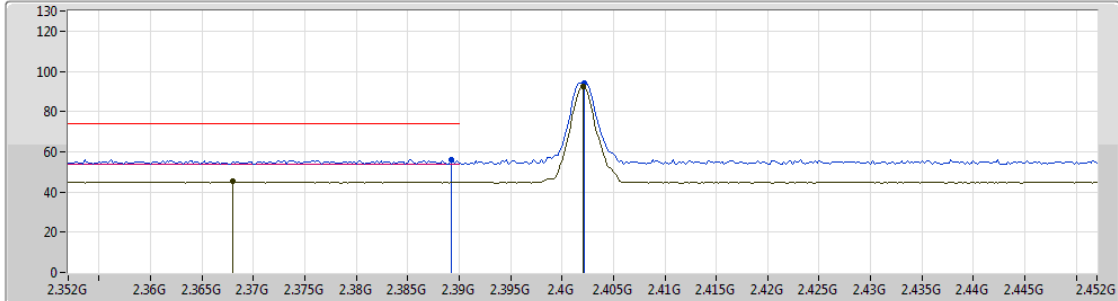


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments								
AV	2.37G	45.24	54.00	-8.76	31.94	3	Vertical	83	2.17	-								
AV	2.402G	95.74	Inf	-Inf	32.04	3	Vertical	83	2.17	-								
PK	2.3618G	56.74	74.00	-17.26	31.91	3	Vertical	83	2.17	-								
PK	2.4022G	97.75	Inf	-Inf	32.05	3	Vertical	83	2.17	-								

BT-LE(1Mbps)

2402MHz_TX

01/02/2019

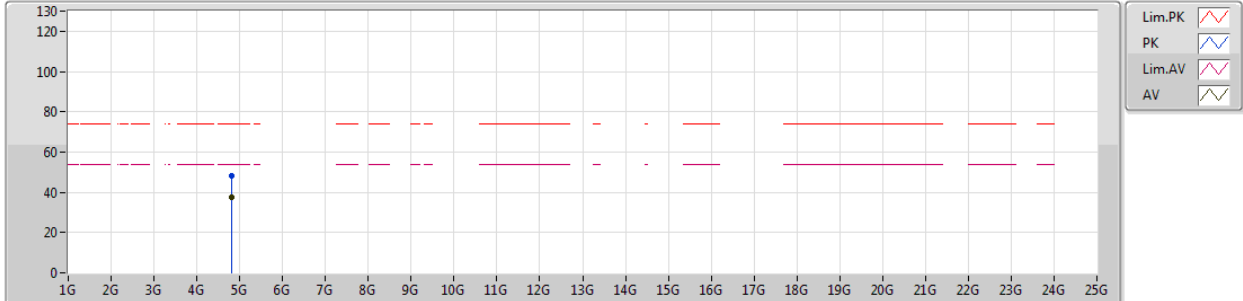


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.368G	45.25	54.00	-8.75	31.93	3	Horizontal	164	2.82	-
AV	2.402G	92.38	Inf	-Inf	32.04	3	Horizontal	164	2.82	-
PK	2.3892G	56.08	74.00	-17.92	32.00	3	Horizontal	164	2.82	-
PK	2.4022G	94.35	Inf	-Inf	32.05	3	Horizontal	164	2.82	-

BT-LE(1Mbps)

2402MHz_TX

01/02/2019

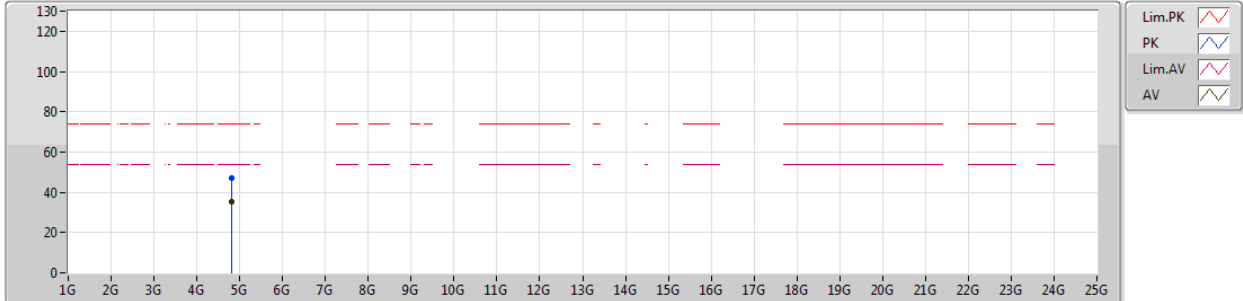


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.8044G	37.31	54.00	-16.69	3.44	3	Vertical	74	1.02	-
PK	4.80381G	47.96	74.00	-26.04	3.44	3	Vertical	74	1.02	-

BT-LE(1Mbps)

2402MHz_TX

01/02/2019

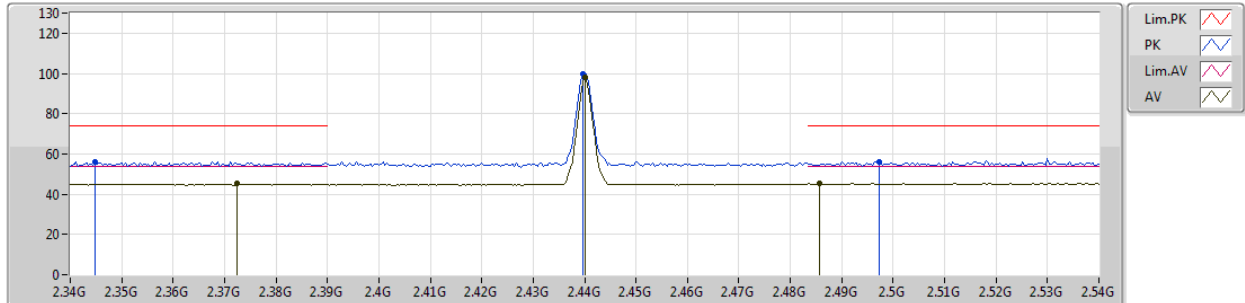


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.80423G	35.38	54.00	-18.62	3.44	3	Horizontal	161	2.99	-
PK	4.80455G	46.84	74.00	-27.16	3.44	3	Horizontal	161	2.99	-

BT-LE(1Mbps)

2440MHz_TX

02/02/2019

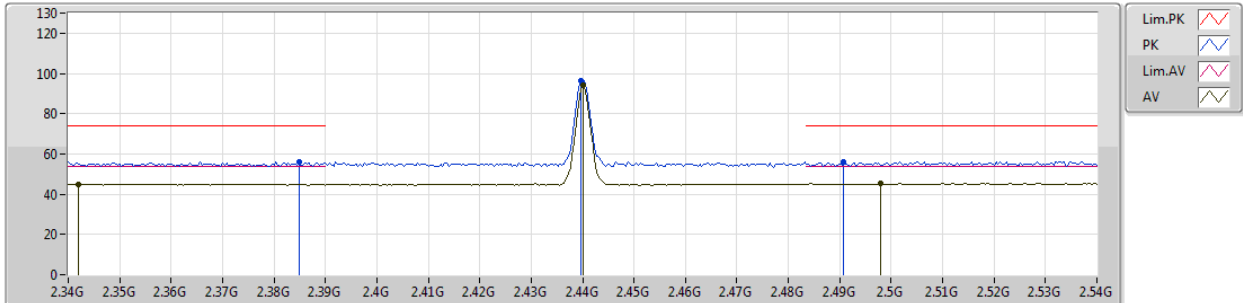


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3724G	45.23	54.00	-8.77	31.94	3	Vertical	84	2.40	-
AV	2.44G	97.91	Inf	-Inf	32.16	3	Vertical	84	2.40	-
AV	2.4856G	45.14	54.00	-8.86	32.30	3	Vertical	84	2.40	-
PK	2.3448G	56.16	74.00	-17.84	31.85	3	Vertical	84	2.40	-
PK	2.4396G	99.80	Inf	-Inf	32.16	3	Vertical	84	2.40	-
PK	2.4972G	55.98	74.00	-18.02	32.33	3	Vertical	84	2.40	-

BT-LE(1Mbps)

2440MHz_TX

02/02/2019

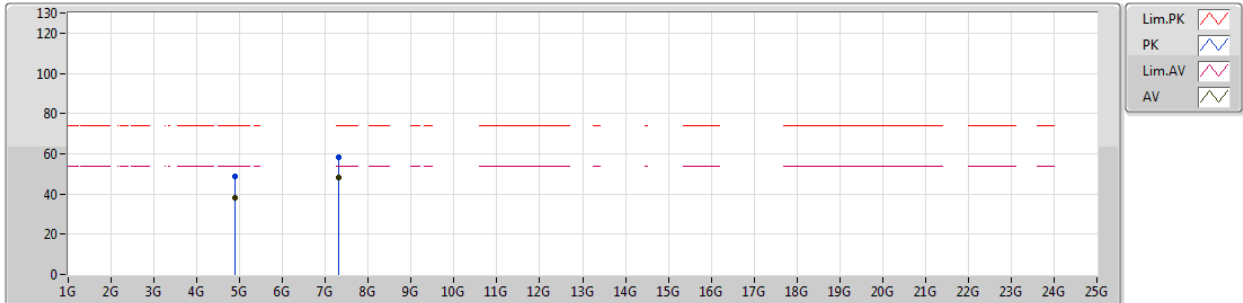


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.342G	45.03	54.00	-8.97	31.84	3	Horizontal	162	2.45	-
AV	2.44G	94.36	Inf	-Inf	32.16	3	Horizontal	162	2.45	-
AV	2.498G	45.29	54.00	-8.71	32.34	3	Horizontal	162	2.45	-
PK	2.3848G	55.99	74.00	-18.01	31.98	3	Horizontal	162	2.45	-
PK	2.4396G	96.27	Inf	-Inf	32.16	3	Horizontal	162	2.45	-
PK	2.4908G	56.03	74.00	-17.97	32.31	3	Horizontal	162	2.45	-

BT-LE(1Mbps)

2440MHz_TX

02/02/2019

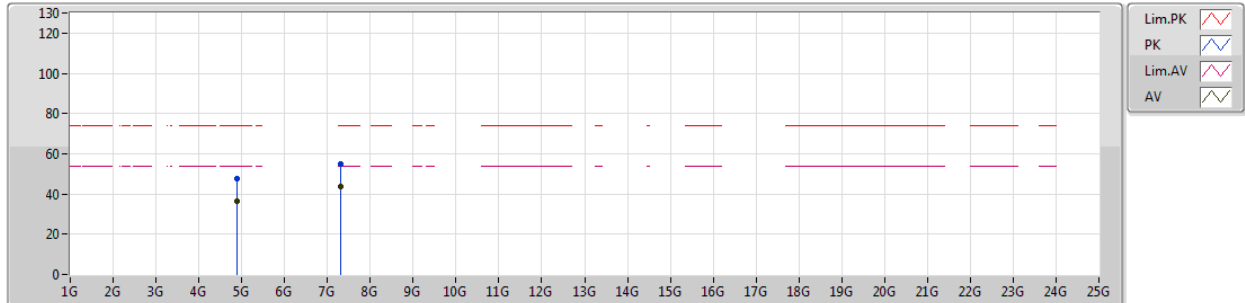


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.87964G	38.36	54.00	-15.64	3.62	3	Vertical	43	2.92	-
AV	7.31932G	47.98	54.00	-6.02	9.21	3	Vertical	292	2.20	-
PK	4.87938G	48.72	74.00	-25.28	3.62	3	Vertical	43	2.92	-
PK	7.31914G	58.26	74.00	-15.74	9.21	3	Vertical	292	2.20	-

BT-LE(1Mbps)

2440MHz_TX

02/02/2019

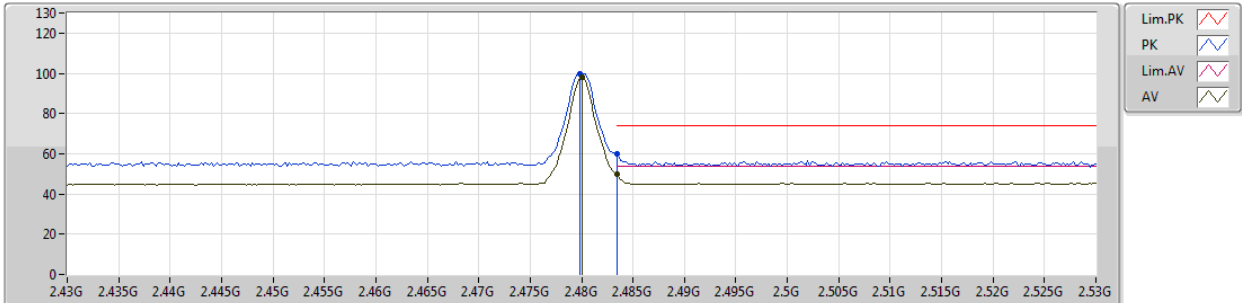


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.87982G	36.39	54.00	-17.61	3.62	3	Horizontal	11	1.01	-
AV	7.31915G	43.73	54.00	-10.27	9.21	3	Horizontal	196	1.01	-
PK	4.88002G	47.40	74.00	-26.60	3.62	3	Horizontal	11	1.01	-
PK	7.31926G	54.82	74.00	-19.18	9.21	3	Horizontal	196	1.01	-

BT-LE(1Mbps)

2480MHz_TX

02/02/2019

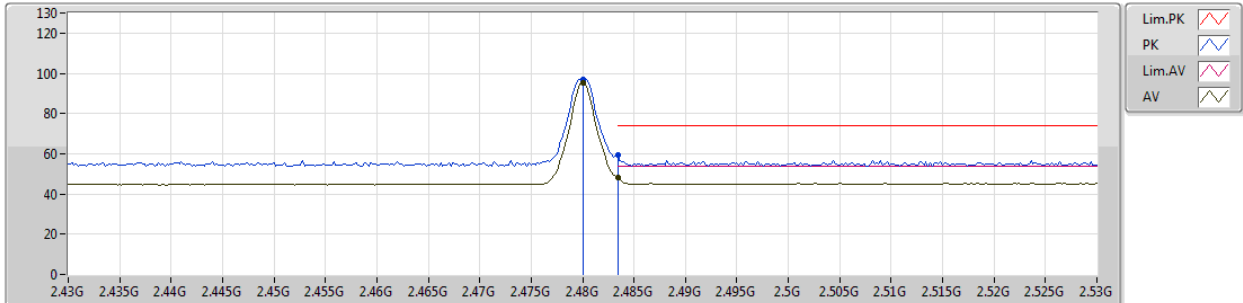


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.48G	97.88	Inf	-Inf	32.28	3	Vertical	85	2.24	-
AV	2.4835G	49.92	54.00	-4.08	32.29	3	Vertical	85	2.24	-
PK	2.4798G	99.77	Inf	-Inf	32.28	3	Vertical	85	2.24	-
PK	2.4835G	59.78	74.00	-14.22	32.29	3	Vertical	85	2.24	-

BT-LE(1Mbps)

2480MHz_TX

02/02/2019

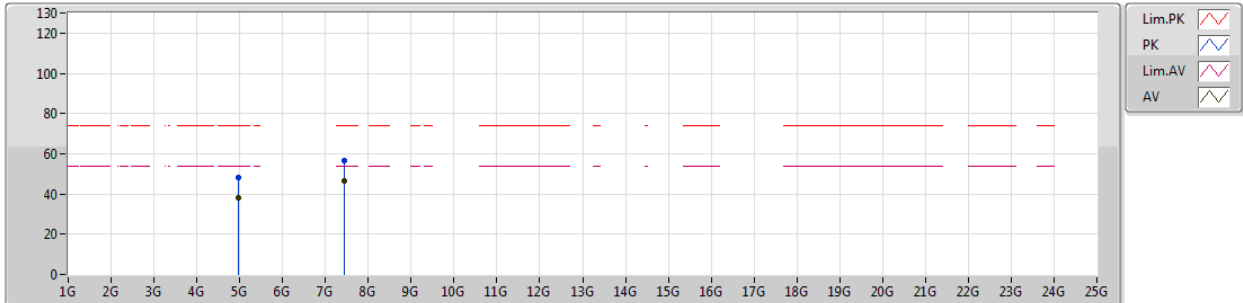


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.48G	95.12	Inf	-Inf	32.28	3	Horizontal	164	2.93	-
AV	2.4835G	48.43	54.00	-5.57	32.29	3	Horizontal	164	2.93	-
PK	2.48G	97.09	Inf	-Inf	32.28	3	Horizontal	164	2.93	-
PK	2.4835G	59.19	74.00	-14.81	32.29	3	Horizontal	164	2.93	-

BT-LE(1Mbps)

2480MHz_TX

02/02/2019

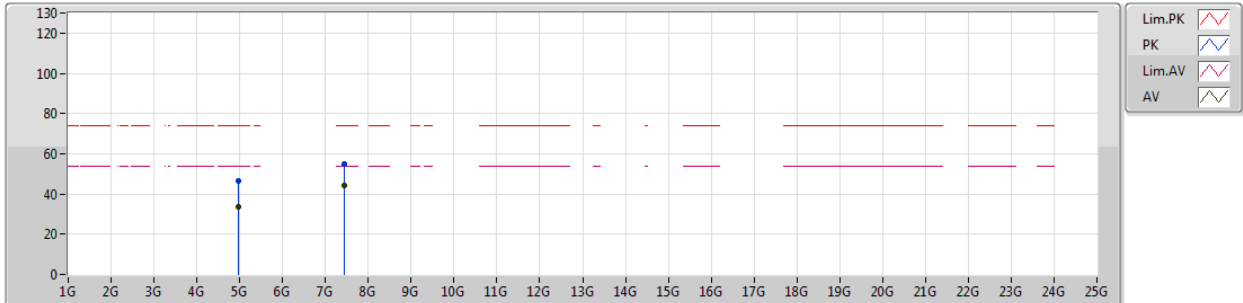


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.96048G	38.14	54.00	-15.86	3.83	3	Vertical	90	1.01	-
AV	7.43928G	46.24	54.00	-7.76	9.49	3	Vertical	292	2.33	-
PK	4.96048G	48.18	74.00	-25.82	3.83	3	Vertical	90	1.01	-
PK	7.44084G	56.35	74.00	-17.65	9.51	3	Vertical	292	2.33	-

BT-LE(1Mbps)

2480MHz_TX

02/02/2019



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments								
AV	4.97368G	33.54	54.00	-20.46	3.86	3	Horizontal	62	1.50	-								
AV	7.43919G	44.27	54.00	-9.73	9.49	3	Horizontal	122	1.01	-								
PK	4.97146G	46.53	74.00	-27.47	3.86	3	Horizontal	62	1.50	-								
PK	7.43926G	55.17	74.00	-18.83	9.49	3	Horizontal	122	1.01	-								

**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	QP	37.76M	36.86	40.00	-3.14	-8.64	3	Vertical	152	1.55	-

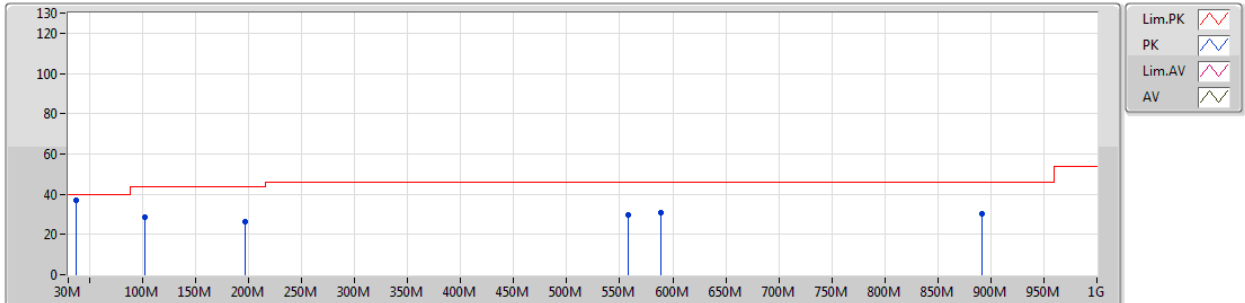
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	101.78M	28.62	43.50	-14.88	-10.04	3	Vertical	0	2.00	-
2440MHz	Pass	PK	196.84M	26.30	43.50	-17.20	-10.75	3	Vertical	0	2.00	-
2440MHz	Pass	PK	557.68M	29.58	46.00	-16.42	-0.94	3	Vertical	0	2.00	-
2440MHz	Pass	PK	588.72M	30.71	46.00	-15.29	-1.26	3	Vertical	0	2.00	-
2440MHz	Pass	PK	891.36M	29.99	46.00	-16.01	2.28	3	Vertical	0	2.00	-
2440MHz	Pass	QP	37.76M	36.86	40.00	-3.14	-8.64	3	Vertical	152	1.55	-
2440MHz	Pass	PK	35.82M	33.90	40.00	-6.10	-7.68	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	62.98M	26.27	40.00	-13.73	-15.54	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	144.46M	25.34	43.50	-18.16	-9.91	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	249.22M	28.84	46.00	-17.16	-7.05	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	375.32M	28.35	46.00	-17.65	-4.48	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	588.72M	28.27	46.00	-17.73	-1.26	3	Horizontal	360	1.00	-

BT-LE(1Mbps)RX

2440MHz_PoE

02/02/2019

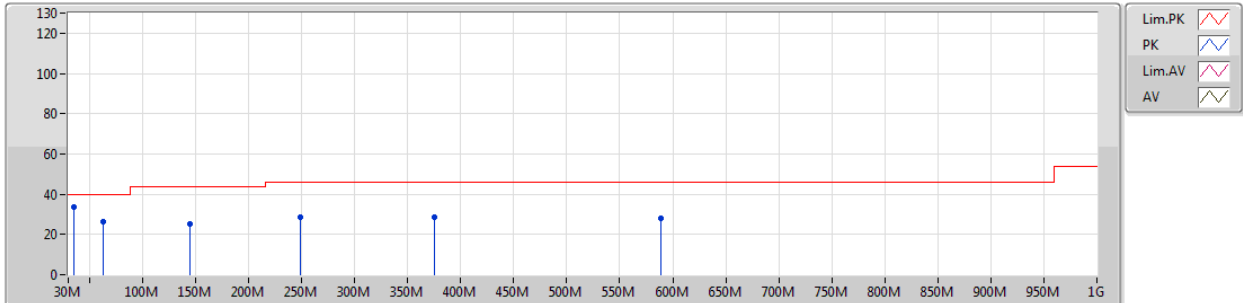


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments										
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)											
PK	101.78M	28.62	43.50	-14.88	-10.04	3	Vertical	0	2.00	-										
PK	196.84M	26.30	43.50	-17.20	-10.75	3	Vertical	0	2.00	-										
PK	557.68M	29.58	46.00	-16.42	-0.94	3	Vertical	0	2.00	-										
PK	588.72M	30.71	46.00	-15.29	-1.26	3	Vertical	0	2.00	-										
PK	891.36M	29.99	46.00	-16.01	2.28	3	Vertical	0	2.00	-										
QP	37.76M	36.86	40.00	-3.14	-8.64	3	Vertical	152	1.55	-										

BT-LE(1Mbps)RX

2440MHz_PoE

02/02/2019



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	35.82M	33.90	40.00	-6.10	-7.68	3	Horizontal	360	1.00	-
PK	62.98M	26.27	40.00	-13.73	-15.54	3	Horizontal	360	1.00	-
PK	144.46M	25.34	43.50	-18.16	-9.91	3	Horizontal	360	1.00	-
PK	249.22M	28.84	46.00	-17.16	-7.05	3	Horizontal	360	1.00	-
PK	375.32M	28.35	46.00	-17.65	-4.48	3	Horizontal	360	1.00	-
PK	588.72M	28.27	46.00	-17.73	-1.26	3	Horizontal	360	1.00	-



RSE RX above 1GHz Result

Appendix G.2

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	5.36G	35.62	54.00	-18.38	4.41	3	Horizontal	176	1.82	-

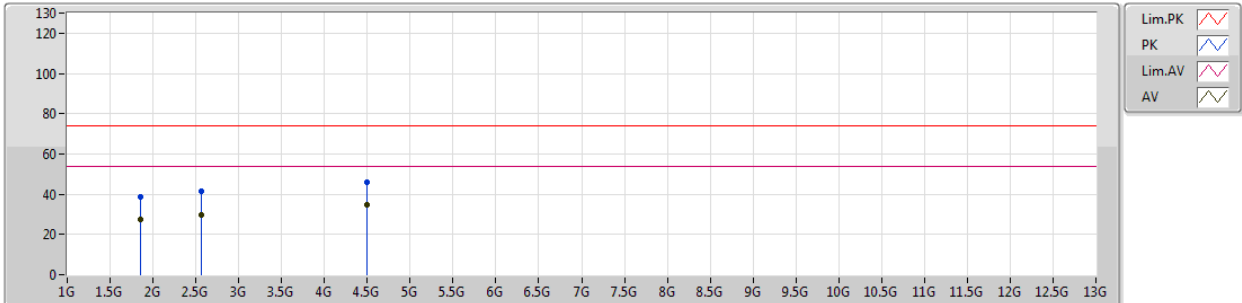
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	AV	1.85G	27.58	54.00	-26.42	-4.01	3	Vertical	52	2.36	-
2440MHz	Pass	AV	2.56G	29.83	54.00	-24.17	-2.06	3	Vertical	226	2.21	-
2440MHz	Pass	AV	4.5G	34.77	54.00	-19.23	2.53	3	Vertical	263	1.53	-
2440MHz	Pass	PK	1.85G	38.90	74.00	-35.10	-4.01	3	Vertical	52	2.36	-
2440MHz	Pass	PK	2.56G	41.69	74.00	-32.31	-2.06	3	Vertical	226	2.21	-
2440MHz	Pass	PK	4.5G	45.85	74.00	-28.15	2.53	3	Vertical	263	1.53	-
2440MHz	Pass	AV	2.4G	30.08	54.00	-23.92	-2.46	3	Horizontal	144	1.63	-
2440MHz	Pass	AV	3.69G	31.58	54.00	-22.42	0.33	3	Horizontal	57	2.08	-
2440MHz	Pass	AV	5.36G	35.62	54.00	-18.38	4.41	3	Horizontal	176	1.82	-
2440MHz	Pass	PK	2.4G	40.99	74.00	-33.01	-2.46	3	Horizontal	144	1.63	-
2440MHz	Pass	PK	3.69G	42.56	74.00	-31.44	0.33	3	Horizontal	57	2.08	-
2440MHz	Pass	PK	5.36G	46.00	74.00	-28.00	4.41	3	Horizontal	176	1.82	-

BT-LE(1Mbps)RX

2440MHz_RX

02/02/2019

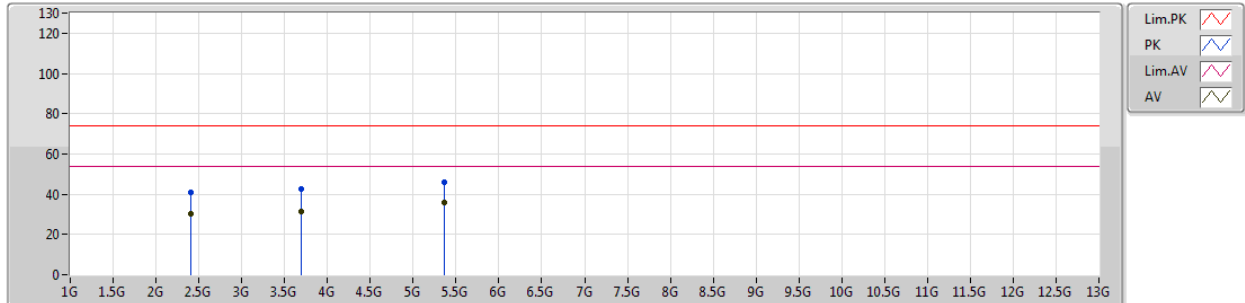


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	1.85G	27.58	54.00	-26.42	-4.01	3	Vertical	52	2.36	-
AV	2.56G	29.83	54.00	-24.17	-2.06	3	Vertical	226	2.21	-
AV	4.5G	34.77	54.00	-19.23	2.53	3	Vertical	263	1.53	-
PK	1.85G	38.90	74.00	-35.10	-4.01	3	Vertical	52	2.36	-
PK	2.56G	41.69	74.00	-32.31	-2.06	3	Vertical	226	2.21	-
PK	4.5G	45.85	74.00	-28.15	2.53	3	Vertical	263	1.53	-

BT-LE(1Mbps)RX

02/02/2019

2440MHz_RX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.4G	30.08	54.00	-23.92	-2.46	3	Horizontal	144	1.63	-
AV	3.69G	31.58	54.00	-22.42	0.33	3	Horizontal	57	2.08	-
AV	5.36G	35.62	54.00	-18.38	4.41	3	Horizontal	176	1.82	-
PK	2.4G	40.99	74.00	-33.01	-2.46	3	Horizontal	144	1.63	-
PK	3.69G	42.56	74.00	-31.44	0.33	3	Horizontal	57	2.08	-
PK	5.36G	46.00	74.00	-28.00	4.41	3	Horizontal	176	1.82	-