

FCC Test Report

FCC ID : SWX-UALITE
Equipment : UniFi Access
Brand Name : UBIQUITI
Model Name : UA-Lite
Applicant : Ubiquiti Networks, Inc
685 Third Avenue, 27th Floor New York,
New York 10017 USA
Manufacturer : Ubiquiti Networks, Inc
685 Third Avenue, 27th Floor New York,
New York 10017 USA
Standard : 47 CFR FCC Part 15.247

The product was received on Feb. 14, 2019, and testing was started from Feb. 15, 2019 and completed on Feb. 20, 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



Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	FCC 15.203
3.1	15.207	AC Power-line Conducted Emissions	PASS	FCC 15.207
3.2	15.247(a)	DTS Bandwidth	PASS	≥500kHz
3.3	15.247(b)	Maximum Conducted Output Power	PASS	Power [dBm]:30
3.4	15.247(e)	Power Spectral Density	PASS	PSD [dBm/3kHz]:8
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	Non-Restricted Bands: >30 dBc
3.6	15.247(d)	Emissions in Restricted Frequency Bands	PASS	Restricted Bands: FCC 15.209

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: Ben Tseng

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

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector
1	-	-	Internal antenna	Murata

Ant.	Port	Gain (dBi)
		BT
1	1	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 PoE
EUT Function	<input checked="" type="checkbox"/> Point-to-multipoint <input type="checkbox"/> Point-to-point
Type of EUT	
<input checked="" type="checkbox"/> Stand-alone	
<input type="checkbox"/> Combined (EUT where the radio part is fully integrated within another device)	
Combined Equipment - Brand Name / Model No.:	...
<input type="checkbox"/> Plug-in radio (EUT intended for a variety of host systems)	
Host System - Brand Name / Model No.:	...
<input type="checkbox"/> Other:	

1.1.4 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	0.626	2.034	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:

- ◆ 47 CFR FCC Part 15
- ◆ ANSI C63.10-2013
- ◆ KDB 558074 D01 v05r01

1.3 Testing Location Information

Testing Location			
<input checked="" type="checkbox"/>	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
Test site Designation No. TW1190 with FCC.			
<input type="checkbox"/>	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 site Designation No. TW0006 with FCC.			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Daniel	22.9~23.8°C / 53.7~55.0%	15/Feb/2019
RF Conducted	TH01-HY	Andy	21.7~23.6°C / 59.5~62.4%	20/Feb/2019
Radiated	03CH02-HY	Andy	22.5~23.2°C / 52.6~53.4%	15/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	120V


2.2 Test Channel Mode

Test Software	DoS
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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
1	PoE mode

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

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

2.4 Support Equipment

Support Equipment – AC Conduction				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Switch Hub	UBNT	UA-Hub	N/A
2	PoE	UBNT	US-48-PRO	N/A

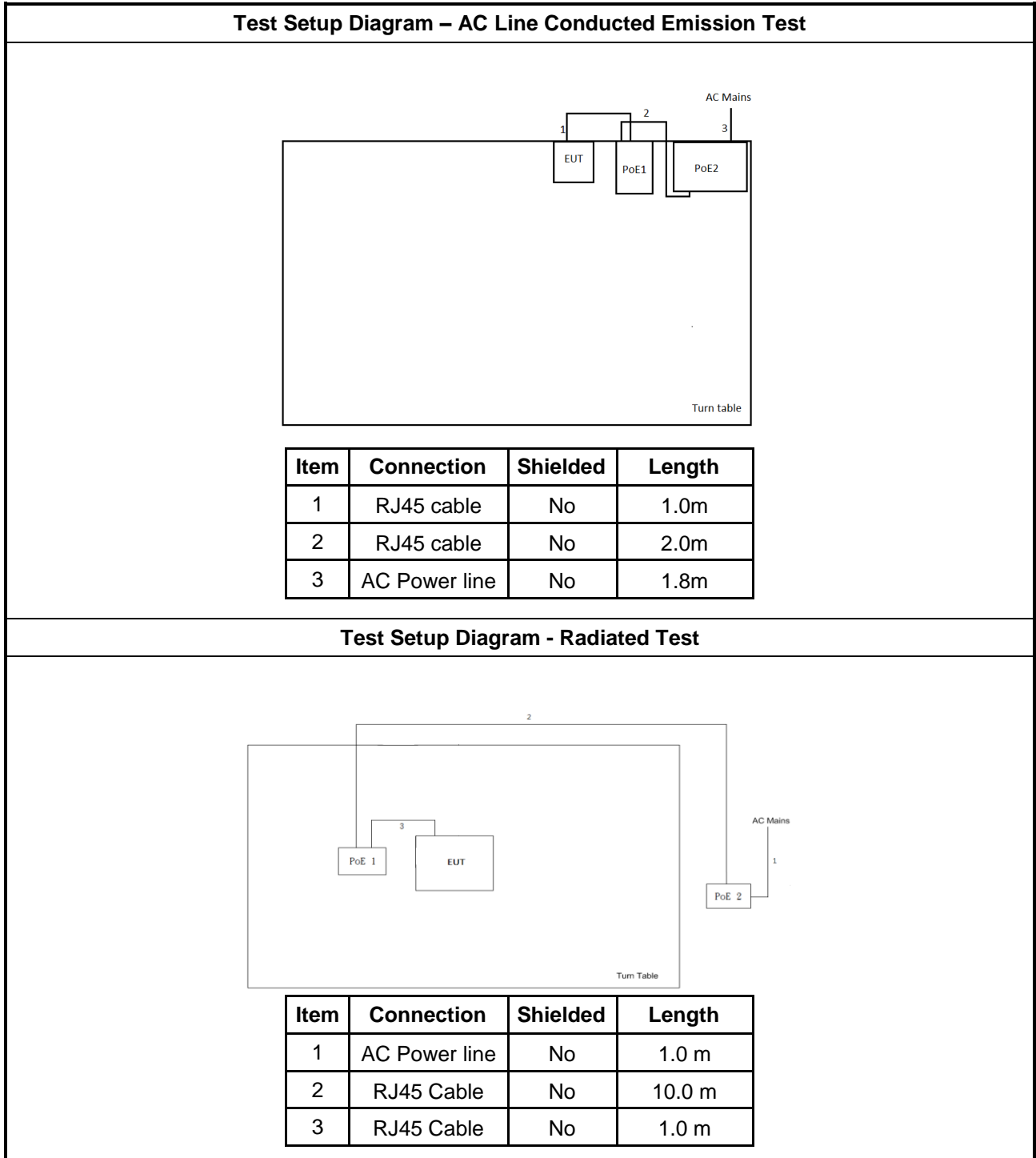
Note: Support equipment No.2 was provided by customer.

Support Equipment – RF Conducted				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5410	DoC
2	Adapter for Notebook	DELL	HA65NM130	DoC
3	AC Power Source	GW	APS-9102	N/A

Support Equipment – Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Switch Hub	UBNT	UA-Hub	N/A
2	PoE	UBNT	GP-H480-050G	N/A

Note: Support equipment No.2 was provided by customer.

2.5 Test Setup Diagram



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

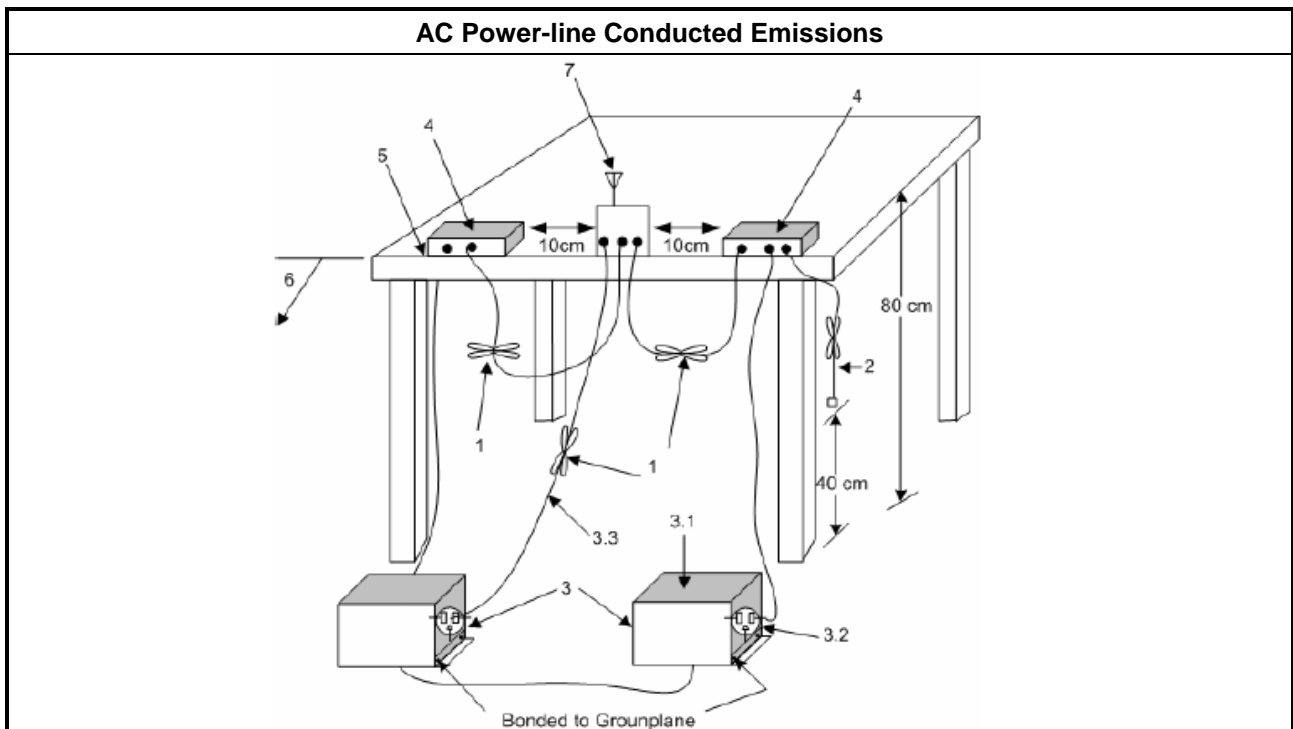
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

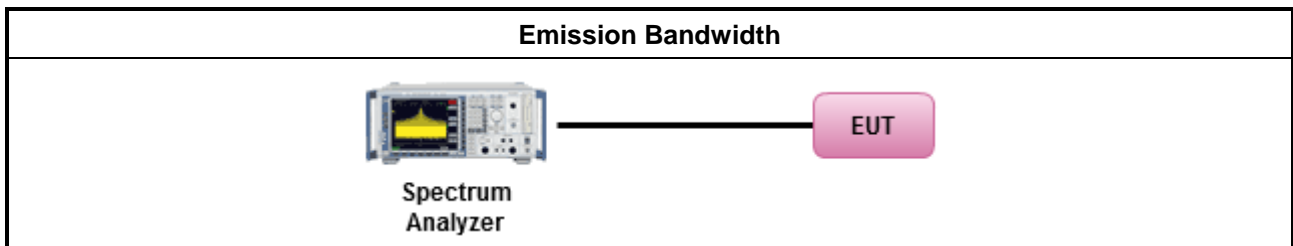
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method
<ul style="list-style-type: none"> ▪ For the emission bandwidth shall be measured using one of the options below:
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 8.2 (11.8 of ANSI C63.10) DTS bandwidth measurement.
<input type="checkbox"/> Refer as RSS-Gen, clause 6.7 for for occupied bandwidth testing.
<input type="checkbox"/> Refer as ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.

3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
	<ul style="list-style-type: none"> ▪ If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
	<ul style="list-style-type: none"> ▪ Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
	<ul style="list-style-type: none"> ▪ Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	<ul style="list-style-type: none"> ▪ Smart antenna system (SAS):
	<ul style="list-style-type: none"> - Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	<ul style="list-style-type: none"> - Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	<ul style="list-style-type: none"> - Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dB dBm
e.i.r.p. Power Limit:	
	<ul style="list-style-type: none"> ▪ 2400-2483.5 MHz Band
	<ul style="list-style-type: none"> ▪ Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
	<ul style="list-style-type: none"> ▪ Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
	<ul style="list-style-type: none"> ▪ Smart antenna system (SAS)
	<ul style="list-style-type: none"> - Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	<ul style="list-style-type: none"> - Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	<ul style="list-style-type: none"> - Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.	

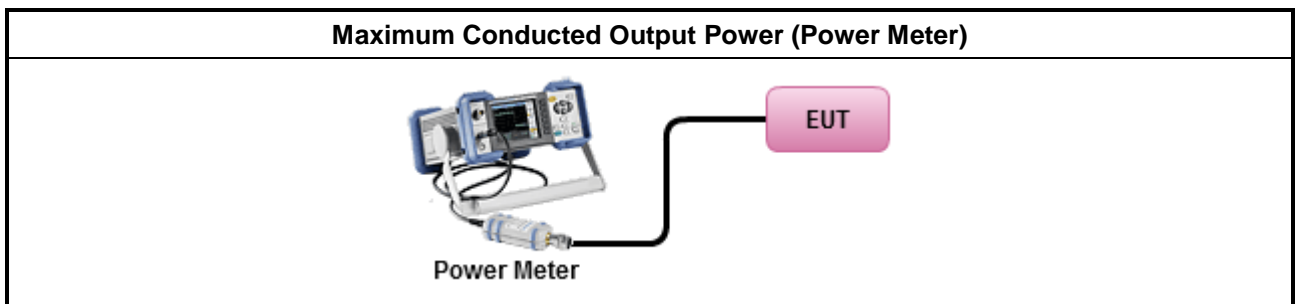
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> ▪ Maximum Peak Conducted Output Power 	
<input type="checkbox"/>	Refer as KDB 558074, clause 8.3.1.1 (11.9.1.1 of ANSI C63.10) RBW ≥ EBW method.
<input type="checkbox"/>	Refer as KDB 558074, clause 8.3.1.2 (11.9.1.2 of ANSI C63.10) integrated band power method.
<input type="checkbox"/>	Refer as KDB 558074, clause 8.3.1.3 (11.9.1.3 of ANSI C63.10) peak power meter.
<ul style="list-style-type: none"> ▪ Maximum Average Conducted Output Power 	
<input type="checkbox"/>	Refer as KDB 558074, clause 8.3.2.2 (11.9.2.2 of ANSI C63.10) using a spectrum analyzer.
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 8.3.2.3 (11.9.2.3 of ANSI C63.10) using a power meter.
<ul style="list-style-type: none"> ▪ For conducted measurement. 	
<ul style="list-style-type: none"> ▪ If the EUT supports multiple transmit chains using options given below: Refer as KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them. 	
<ul style="list-style-type: none"> ▪ If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$ 	

3.3.4 Test Setup



3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
<ul style="list-style-type: none"> Power Spectral Density (PSD) ≤ 8 dBm/3kHz

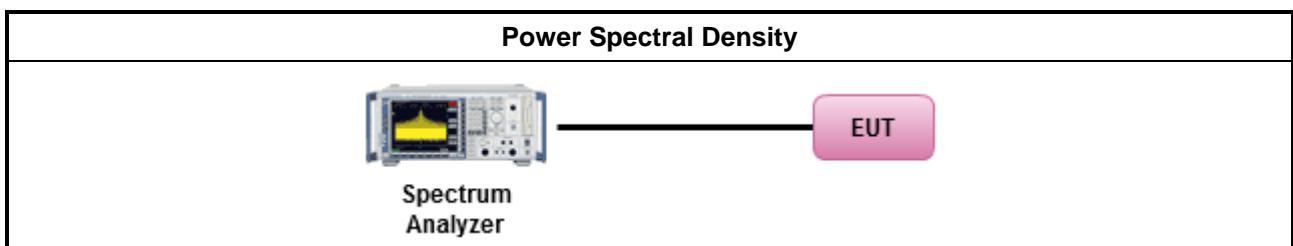
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method
<ul style="list-style-type: none"> Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).
<input checked="" type="checkbox"/> Refer as KDB 558074, clause 8.4 (11.10 of ANSI C63.10) Method PKPSD.
<ul style="list-style-type: none"> For conducted measurement. <ul style="list-style-type: none"> If The EUT supports multiple transmit chains using options given below: <ul style="list-style-type: none"> Measure and sum the spectra across the outputs. Refer as KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.

3.4.4 Test Setup



3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	Limit (dB)
Peak output power procedure	20
Average output power procedure	30

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak 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.

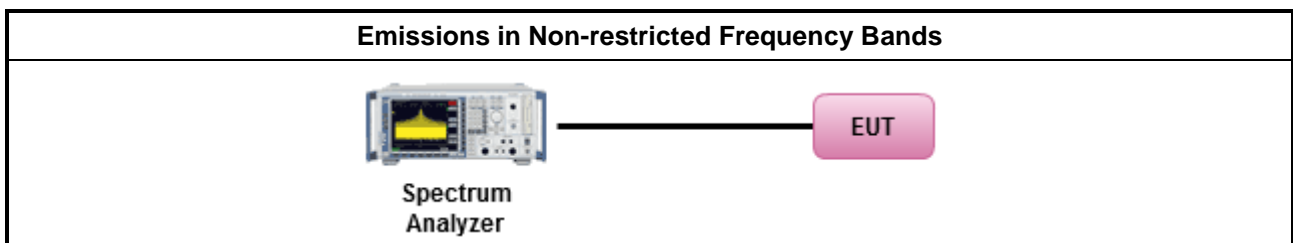
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method
<ul style="list-style-type: none"> Refer as KDB 558074, clause 8.5 (11.11 of ANSI C63.10) for non-restricted frequency bands.

3.5.4 Test Setup



3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

3.6 Emissions in Restricted Frequency Bands

3.6.1 Emissions in Restricted Frequency Bands Limit

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

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB / decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

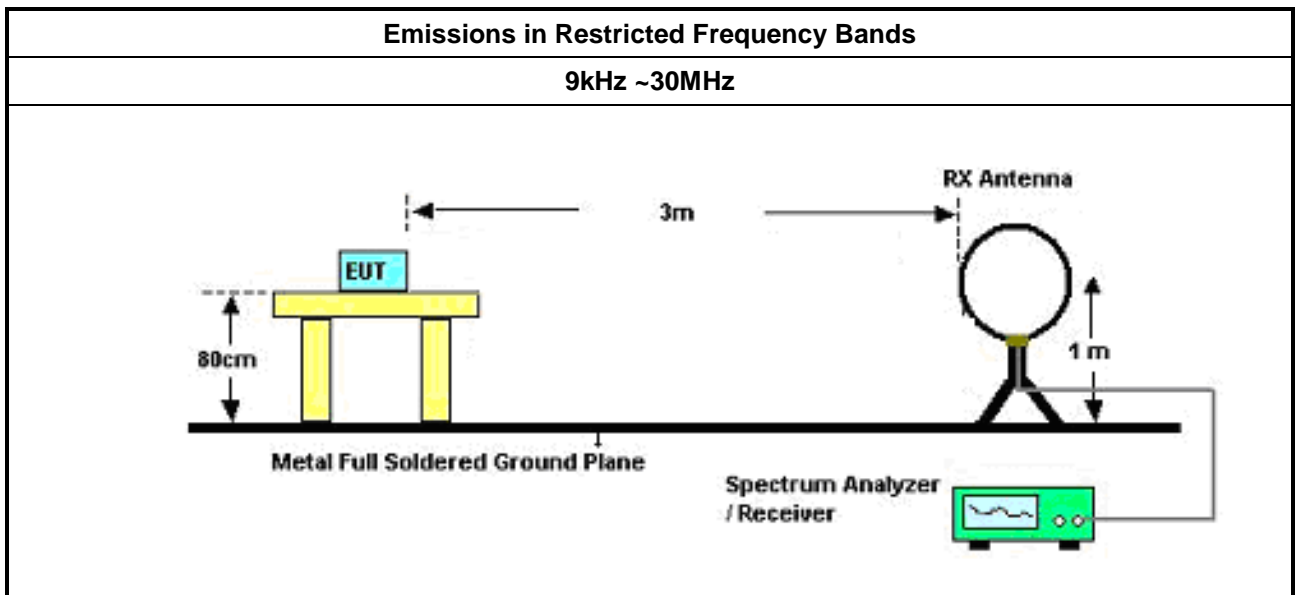
3.6.2 Measuring Instruments

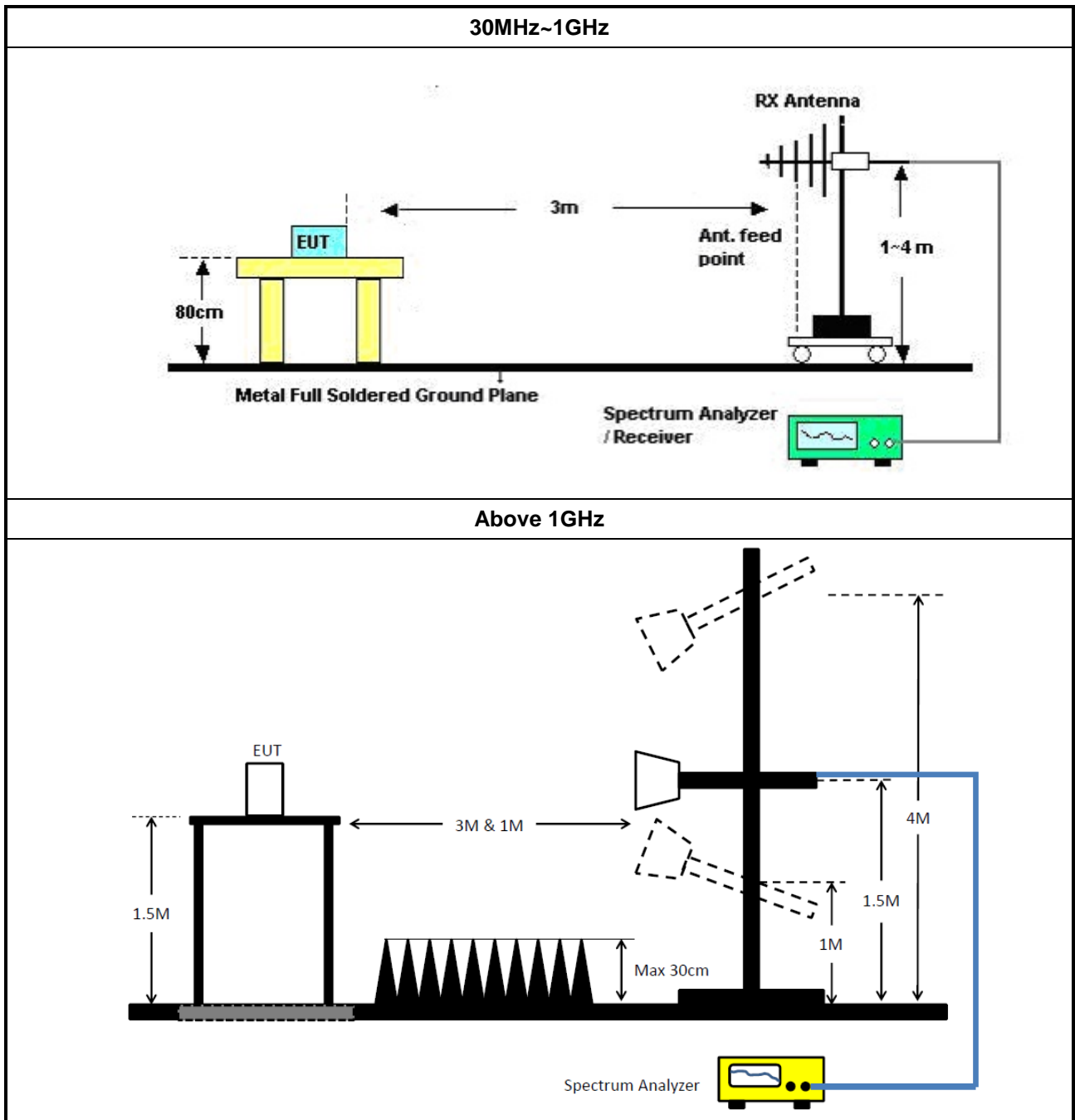
Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

Test Method	
	<ul style="list-style-type: none"> ▪ The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
	<ul style="list-style-type: none"> ▪ Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
	<ul style="list-style-type: none"> ▪ For the transmitter unwanted emissions shall be measured using following options below: <ul style="list-style-type: none"> ▪ Refer as KDB 558074, clause 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.
	<ul style="list-style-type: none"> ▪ For the transmitter band-edge emissions shall be measured using following options below: <ul style="list-style-type: none"> ▪ Refer as KDB 558074 clause 8.7.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below. ▪ Refer as KDB 558074, clause 8.7.2 (6.10.6 of ANSI C63.10) for marker-delta method for band-edge measurements. ▪ Refer as KDB 558074, clause 8.7.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
	<ul style="list-style-type: none"> ▪ Use the following spectrum analyzer settings: <ul style="list-style-type: none"> ▪ Set RBW=100 kHz for $f < 1$ GHz; VBW=3 * RBW; Sweep = auto; Detector function = peak; Trace = max hold. ▪ Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement. For average measurement, refer as 1.1.4.

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

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
Spectrum Analyzer	R&S	FSV 40	101500	10Hz ~ 40GHz	18/Jul/2018	17/Jul/2019
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	27/Feb/2018	26/Feb/2019
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	27/Feb/2018	26/Feb/2019
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
Cable 0.5m	HUBER	MY39470/4	RF Cable - 29	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	27/Jul/2018	02/Jul/2019
Microwave Preampfier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	23/Oct/2018	22/Oct/2019
Signal Analyzer	R&S	FSV40	101500	10Hz ~ 40GHz	18/Jul/2018	17/Jul/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
EMI Test Receiver	R&S	ESR3	102052	9kHz ~ 3.6GHz	10/Apr/2018	09/Apr/2019
Loop Antenna	TESEQ	HLA 6120	31244	9k ~ 30MHz	29/Mar/2018	28/Mar/2019
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	15GHz ~ 40GHz	12/Mar/2018	11/Mar/2019
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 01543	1GHz ~ 18GHz	11/May/2018	10/May/2019

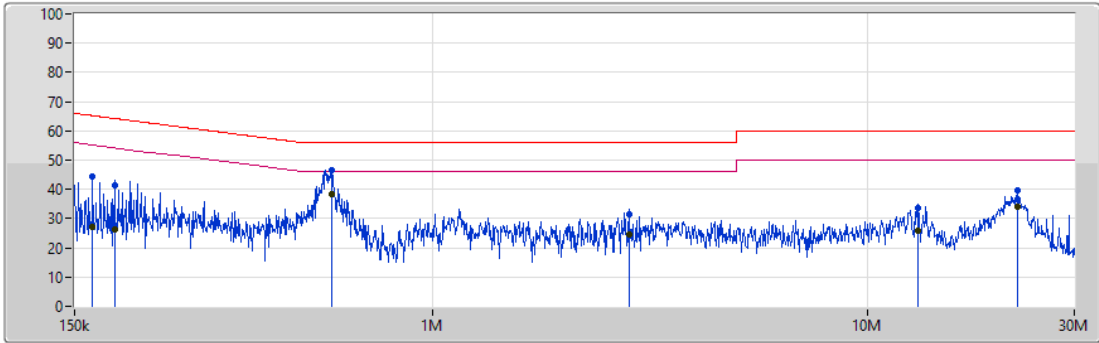


AC Power-line Conducted Emissions Result

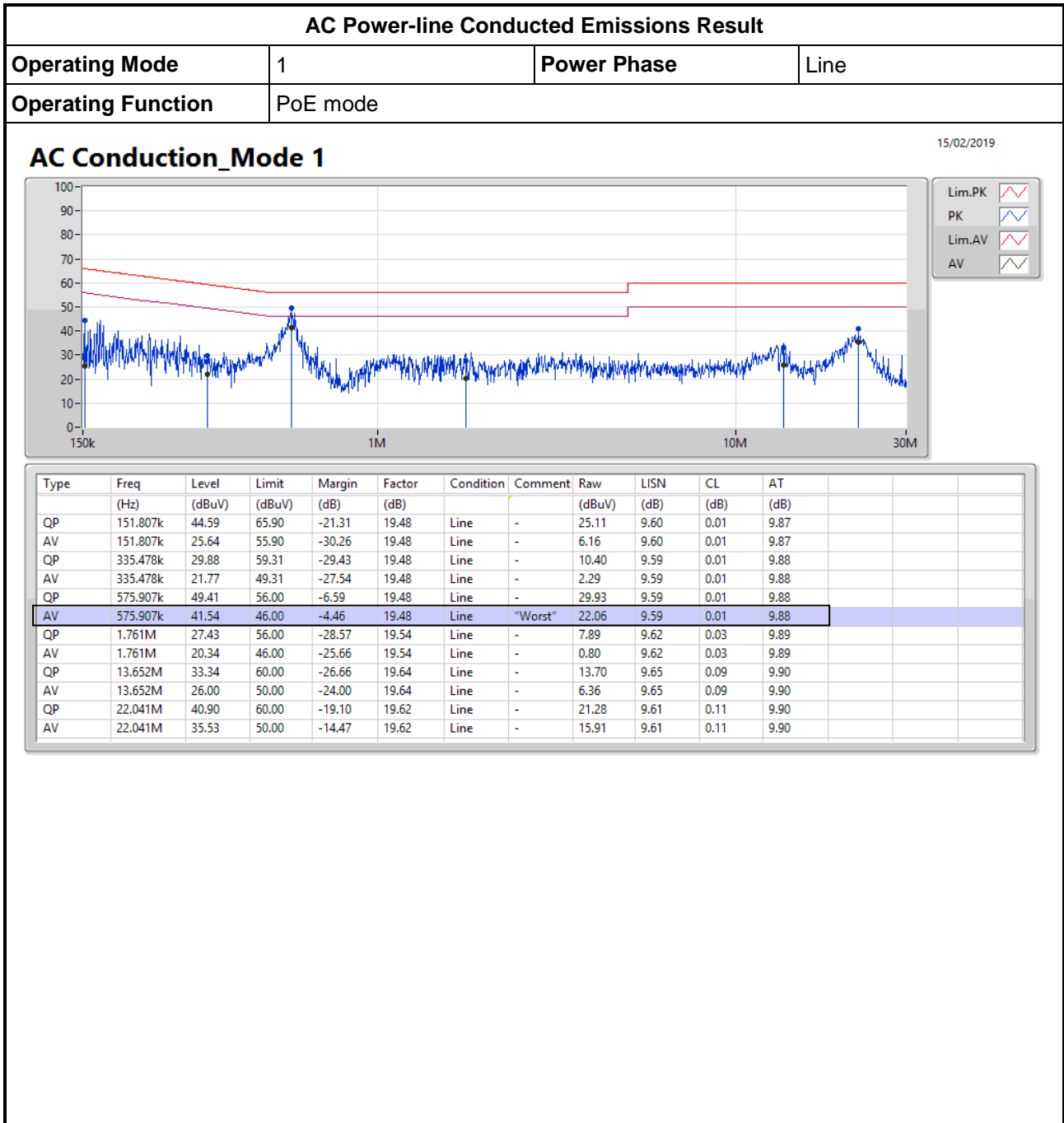
Operating Mode	1	Power Phase	Neutral
Operating Function	PoE mode		

AC Conduction_Mode 1

15/02/2019



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)
QP	165.082k	44.39	65.20	-20.81	19.48	Neutral	-	24.91	9.60	0.01	9.87
AV	165.082k	27.33	55.20	-27.87	19.48	Neutral	-	7.85	9.60	0.01	9.87
QP	185.344k	41.46	64.24	-22.78	19.47	Neutral	-	21.99	9.59	0.01	9.87
AV	185.344k	26.47	54.24	-27.77	19.47	Neutral	-	7.00	9.59	0.01	9.87
QP	587.518k	46.40	56.00	-9.60	19.48	Neutral	-	26.92	9.59	0.01	9.88
AV	587.518k	38.56	46.00	-7.44	19.48	Neutral	"Worst"	19.08	9.59	0.01	9.88
QP	2.832M	31.35	56.00	-24.65	19.54	Neutral	-	11.81	9.61	0.04	9.89
AV	2.832M	24.66	46.00	-21.34	19.54	Neutral	-	5.12	9.61	0.04	9.89
QP	13.117M	33.48	60.00	-26.52	19.65	Neutral	-	13.83	9.67	0.08	9.90
AV	13.117M	25.90	50.00	-24.10	19.65	Neutral	-	6.25	9.67	0.08	9.90
QP	22.218M	39.80	60.00	-20.20	19.69	Neutral	-	20.11	9.68	0.11	9.90
AV	22.218M	34.01	50.00	-15.99	19.69	Neutral	-	14.32	9.68	0.11	9.90





Summary

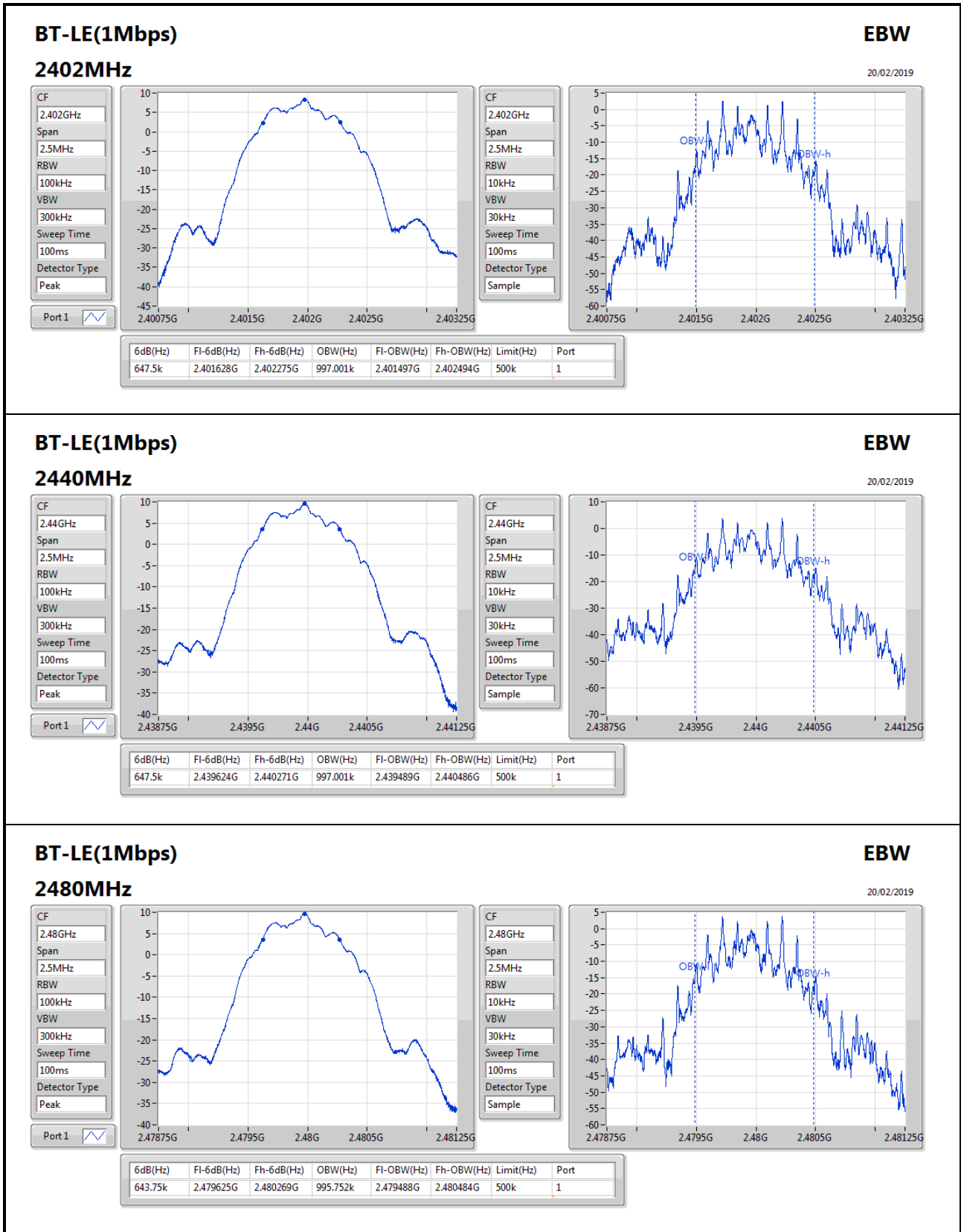
Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	647.5k	997.001k	997KF1D	643.75k	995.752k

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_TnomVnom	Pass	500k	647.5k	997.001k
2440MHz_TnomVnom	Pass	500k	647.5k	997.001k
2480MHz_TnomVnom	Pass	500k	643.75k	995.752k

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





Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	9.37	0.00865

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.60	8.34	30.00
2440MHz_TnomVnom	Pass	1.60	9.12	30.00
2480MHz_TnomVnom	Pass	1.60	9.37	30.00



Summary

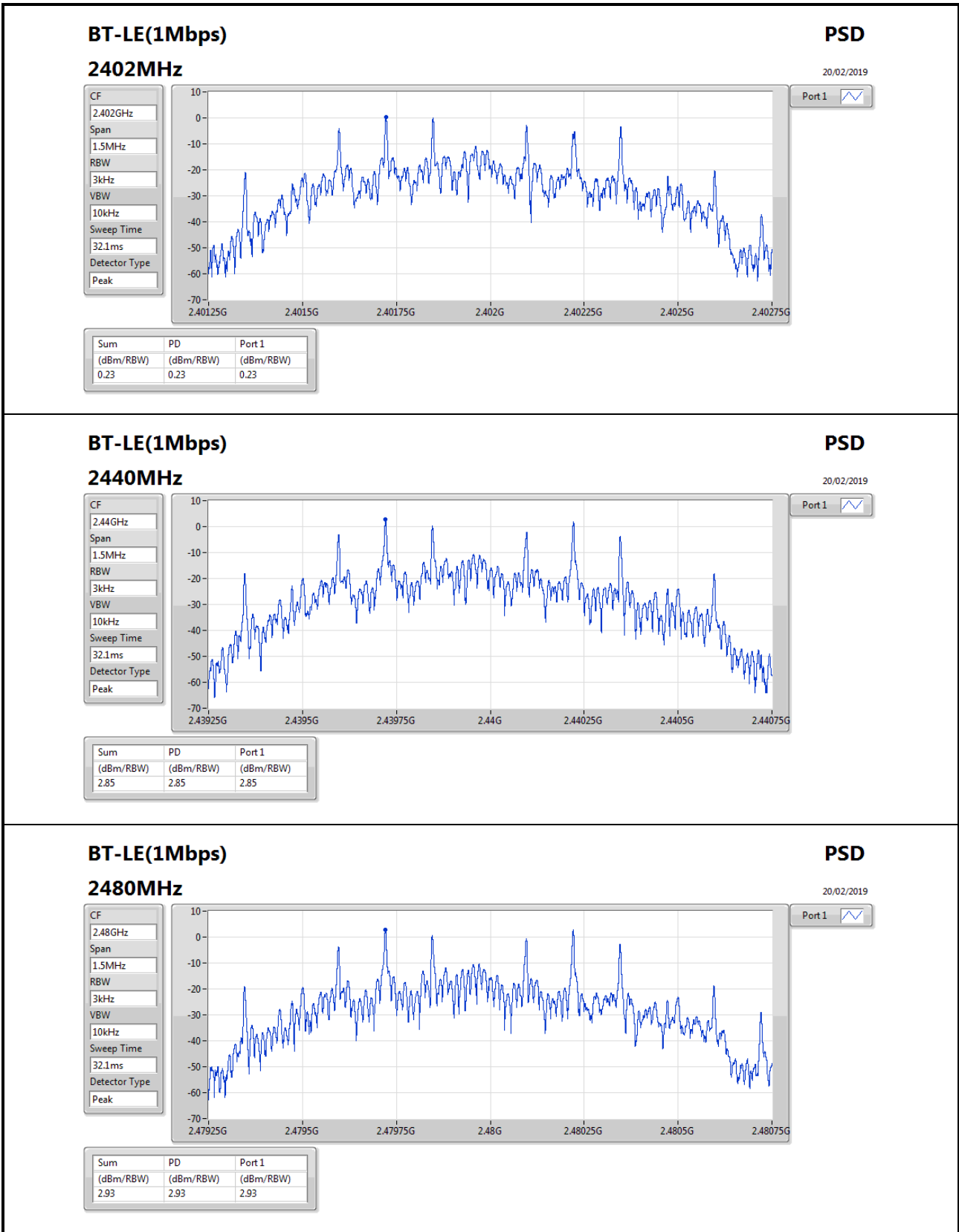
Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	2.93

RBW=3kHz.

Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.60	0.23	8.00
2440MHz_TnomVnom	Pass	1.60	2.85	8.00
2480MHz_TnomVnom	Pass	1.60	2.93	8.00

RBW=3kHz.



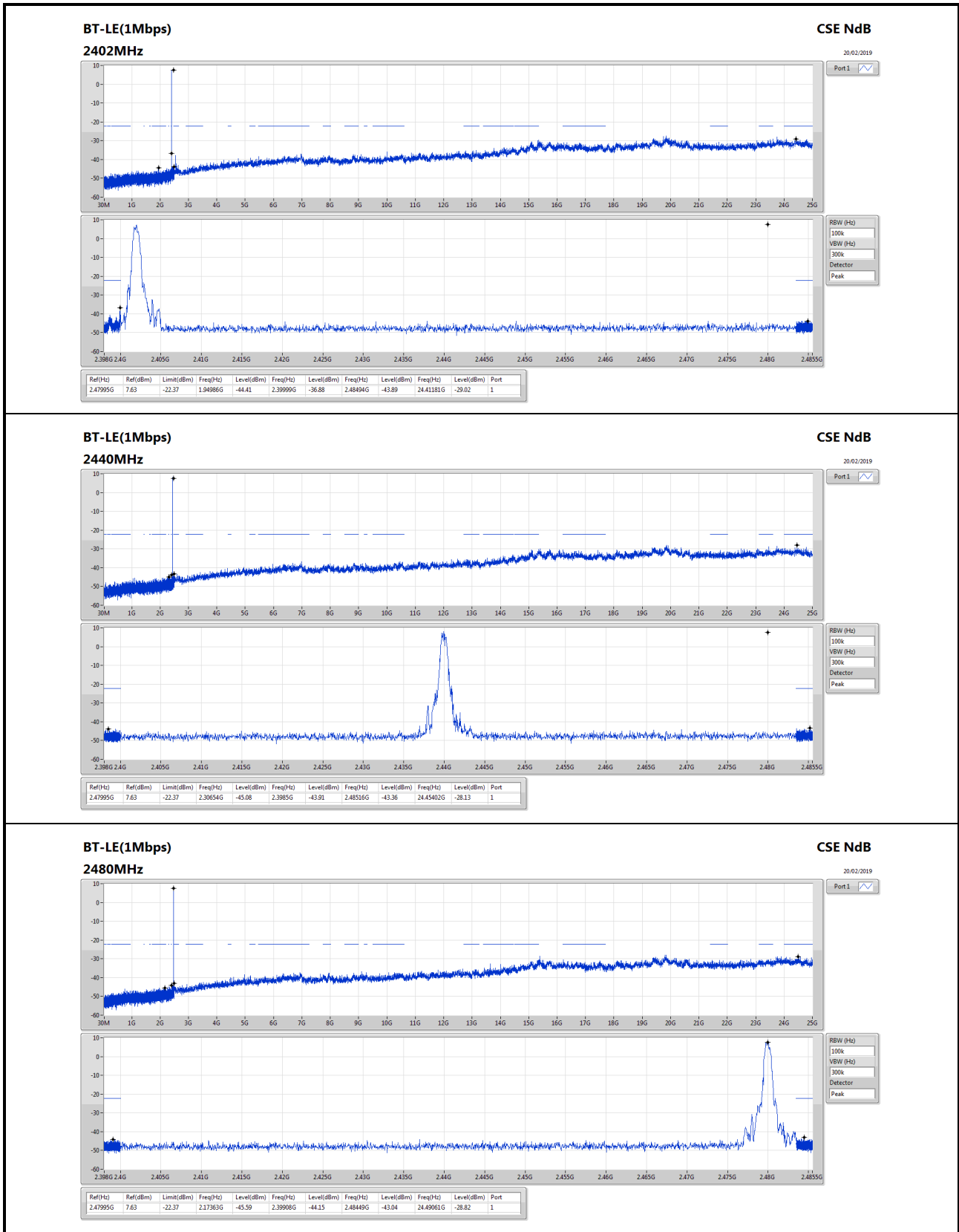


Summary

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	7.63	-22.37	2.30654G	-45.08	2.3985G	-43.91	2.48516G	-43.36	24.45402G	-28.13	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_TnomVnom	Pass	2.47995G	7.63	-22.37	1.94986G	-44.41	2.39999G	-36.88	2.48494G	-43.89	24.41181G	-29.02	1
2440MHz_TnomVnom	Pass	2.47995G	7.63	-22.37	2.30654G	-45.08	2.3985G	-43.91	2.48516G	-43.36	24.45402G	-28.13	1
2480MHz_TnomVnom	Pass	2.47995G	7.63	-22.37	2.17363G	-45.59	2.39908G	-44.15	2.48449G	-43.04	24.49061G	-28.82	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	-	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	QP	784.66M	42.77	46.00	-3.23	1.19	3	Horizontal	282	1.62	-



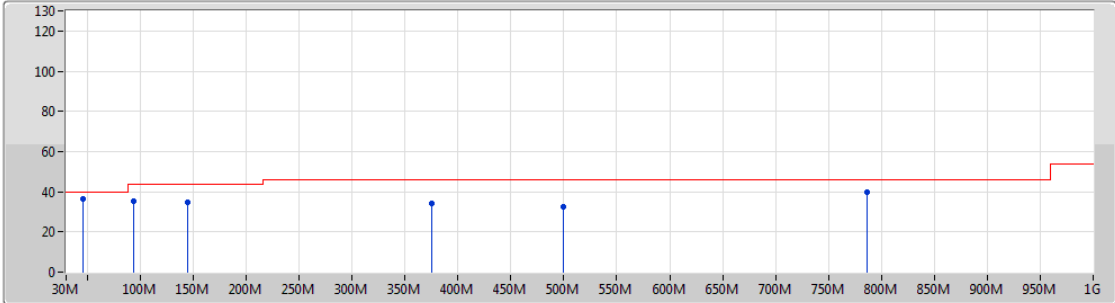
Result

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	94.02M	35.41	43.50	-8.09	-11.53	3	Vertical	0	1.00	-
2440MHz	Pass	PK	144.46M	34.64	43.50	-8.86	-9.91	3	Vertical	0	1.00	-
2440MHz	Pass	PK	375.32M	34.21	46.00	-11.79	-4.48	3	Vertical	0	1.00	-
2440MHz	Pass	PK	499.48M	32.27	46.00	-13.73	-2.38	3	Vertical	0	1.00	-
2440MHz	Pass	PK	786.6M	39.52	46.00	-6.48	1.20	3	Vertical	0	1.00	-
2440MHz	Pass	QP	45.52M	36.40	40.00	-3.60	-12.12	3	Vertical	223	1.76	-
2440MHz	Pass	PK	37.76M	34.44	40.00	-5.56	-8.64	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	146.4M	37.52	43.50	-5.98	-10.01	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	260.86M	31.24	46.00	-14.76	-5.80	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	375.32M	34.52	46.00	-11.48	-4.48	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	980.6M	48.31	54.00	-5.69	3.94	3	Horizontal	360	1.00	-
2440MHz	Pass	QP	784.66M	42.77	46.00	-3.23	1.19	3	Horizontal	282	1.62	-

BT-LE(1Mbps)

2440MHz_PoE

15/02/2019

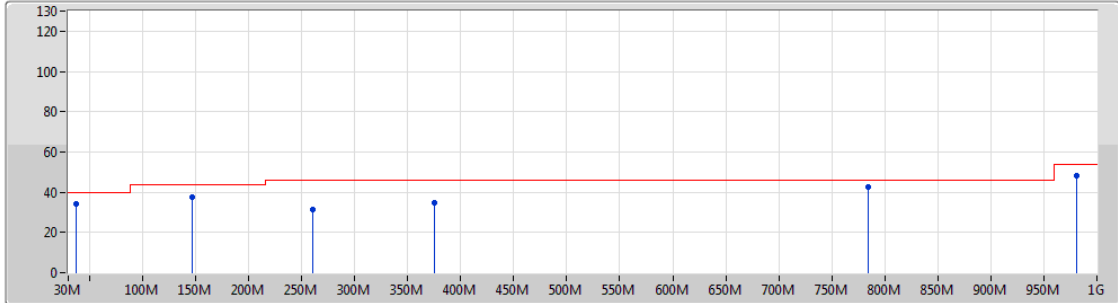


Type	Freq [Hz]	Level [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Factor [dB]	Dist [m]	Condition	Azimuth [°]	Height [m]	Comments
PK	94.02M	35.41	43.50	-8.09	-11.53	3	Vertical	0	1.00	-
PK	144.46M	34.64	43.50	-8.86	-9.91	3	Vertical	0	1.00	-
PK	375.32M	34.21	46.00	-11.79	-4.48	3	Vertical	0	1.00	-
PK	499.48M	32.27	46.00	-13.73	-2.38	3	Vertical	0	1.00	-
PK	786.6M	39.52	46.00	-6.48	1.20	3	Vertical	0	1.00	-
QP	45.52M	36.40	40.00	-3.60	-12.12	3	Vertical	223	1.76	-

BT-LE(1Mbps)

2440MHz_PoE

15/02/2019



- Lim.PK
- PK
- Lim.AV
- AV

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	37.76M	34.44	40.00	-5.56	-8.64	3	Horizontal	360	1.00	-
PK	146.4M	37.52	43.50	-5.98	-10.01	3	Horizontal	360	1.00	-
PK	260.86M	31.24	46.00	-14.76	-5.80	3	Horizontal	360	1.00	-
PK	375.32M	34.52	46.00	-11.48	-4.48	3	Horizontal	360	1.00	-
PK	980.6M	48.31	54.00	-5.69	3.94	3	Horizontal	360	1.00	-
QP	784.66M	42.77	46.00	-3.23	1.19	3	Horizontal	282	1.62	-



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	2.3424G	45.57	54.00	-8.43	31.84	3	Vertical	196	1.04	-



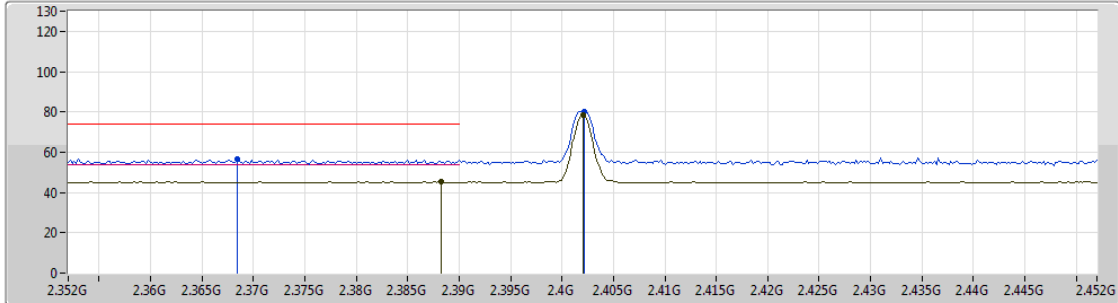
Result

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	2.3882G	45.24	54.00	-8.76	32.00	3	Vertical	198	1.06	-
2402MHz	Pass	AV	2.402G	78.26	Inf	-Inf	32.04	3	Vertical	198	1.06	-
2402MHz	Pass	PK	2.3684G	56.51	74.00	-17.49	31.93	3	Vertical	198	1.06	-
2402MHz	Pass	PK	2.4022G	80.37	Inf	-Inf	32.05	3	Vertical	198	1.06	-
2402MHz	Pass	AV	2.3852G	45.56	54.00	-8.44	31.99	3	Horizontal	151	2.99	-
2402MHz	Pass	AV	2.402G	77.73	Inf	-Inf	32.04	3	Horizontal	151	2.99	-
2402MHz	Pass	PK	2.3598G	56.93	74.00	-17.07	31.90	3	Horizontal	151	2.99	-
2402MHz	Pass	PK	2.4022G	79.83	Inf	-Inf	32.05	3	Horizontal	151	2.99	-
2402MHz	Pass	AV	4.80158G	32.80	54.00	-21.20	3.43	3	Vertical	353	1.18	-
2402MHz	Pass	PK	4.80493G	45.29	74.00	-28.71	3.44	3	Vertical	353	1.18	-
2402MHz	Pass	AV	4.80569G	33.13	54.00	-20.87	3.44	3	Horizontal	30	1.64	-
2402MHz	Pass	PK	4.80596G	45.30	74.00	-28.70	3.44	3	Horizontal	30	1.64	-
2440MHz	Pass	AV	2.3424G	45.57	54.00	-8.43	31.84	3	Vertical	196	1.04	-
2440MHz	Pass	AV	2.44G	79.29	Inf	-Inf	32.16	3	Vertical	196	1.04	-
2440MHz	Pass	AV	2.4956G	45.40	54.00	-8.60	32.33	3	Vertical	196	1.04	-
2440MHz	Pass	PK	2.3492G	57.11	74.00	-16.89	31.87	3	Vertical	196	1.04	-
2440MHz	Pass	PK	2.4396G	81.34	Inf	-Inf	32.16	3	Vertical	196	1.04	-
2440MHz	Pass	PK	2.4835G	56.02	74.00	-17.98	32.29	3	Vertical	196	1.04	-
2440MHz	Pass	AV	2.3616G	45.52	54.00	-8.48	31.91	3	Horizontal	154	2.99	-
2440MHz	Pass	AV	2.44G	80.85	Inf	-Inf	32.16	3	Horizontal	154	2.99	-
2440MHz	Pass	AV	2.4835G	45.40	54.00	-8.60	32.29	3	Horizontal	154	2.99	-
2440MHz	Pass	PK	2.3628G	56.23	74.00	-17.77	31.91	3	Horizontal	154	2.99	-
2440MHz	Pass	PK	2.4396G	82.87	Inf	-Inf	32.16	3	Horizontal	154	2.99	-
2440MHz	Pass	PK	2.4916G	56.16	74.00	-17.84	32.31	3	Horizontal	154	2.99	-
2440MHz	Pass	AV	4.88001G	33.33	54.00	-20.67	3.62	3	Vertical	91	1.74	-
2440MHz	Pass	PK	4.87858G	46.06	74.00	-27.94	3.62	3	Vertical	91	1.74	-
2440MHz	Pass	AV	4.88238G	33.14	54.00	-20.86	3.63	3	Horizontal	337	1.28	-
2440MHz	Pass	PK	4.87936G	45.31	74.00	-28.69	3.62	3	Horizontal	337	1.28	-
2480MHz	Pass	AV	2.48G	80.25	Inf	-Inf	32.28	3	Vertical	193	1.21	-
2480MHz	Pass	AV	2.4992G	45.42	54.00	-8.58	32.34	3	Vertical	193	1.21	-
2480MHz	Pass	PK	2.4798G	82.29	Inf	-Inf	32.28	3	Vertical	193	1.21	-
2480MHz	Pass	PK	2.4936G	55.91	74.00	-18.09	32.32	3	Vertical	193	1.21	-
2480MHz	Pass	AV	2.48G	82.23	Inf	-Inf	32.28	3	Horizontal	151	2.69	-
2480MHz	Pass	AV	2.4996G	45.46	54.00	-8.54	32.34	3	Horizontal	151	2.69	-
2480MHz	Pass	PK	2.4798G	84.22	Inf	-Inf	32.28	3	Horizontal	151	2.69	-
2480MHz	Pass	PK	2.4998G	56.96	74.00	-17.04	32.34	3	Horizontal	151	2.69	-
2480MHz	Pass	AV	4.96041G	34.46	54.00	-19.54	3.83	3	Vertical	27	2.18	-
2480MHz	Pass	PK	4.96043G	46.63	74.00	-27.37	3.83	3	Vertical	27	2.18	-
2480MHz	Pass	AV	4.96041G	34.96	54.00	-19.04	3.83	3	Horizontal	63	1.92	-
2480MHz	Pass	PK	4.96052G	47.26	74.00	-26.74	3.83	3	Horizontal	63	1.92	-

BT-LE(1Mbps)

2402MHz_TX

15/02/2019

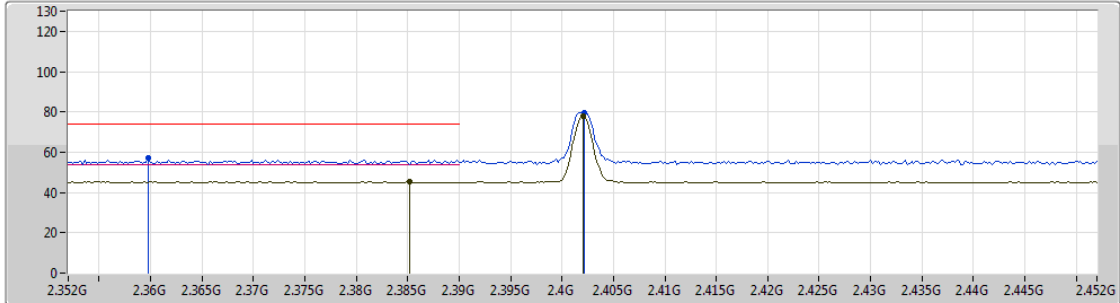


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3882G	45.24	54.00	-8.76	32.00	3	Vertical	198	1.06	-
AV	2.402G	78.26	Inf	-Inf	32.04	3	Vertical	198	1.06	-
PK	2.3684G	56.51	74.00	-17.49	31.93	3	Vertical	198	1.06	-
PK	2.4022G	80.37	Inf	-Inf	32.05	3	Vertical	198	1.06	-

BT-LE(1Mbps)

2402MHz_TX

15/02/2019



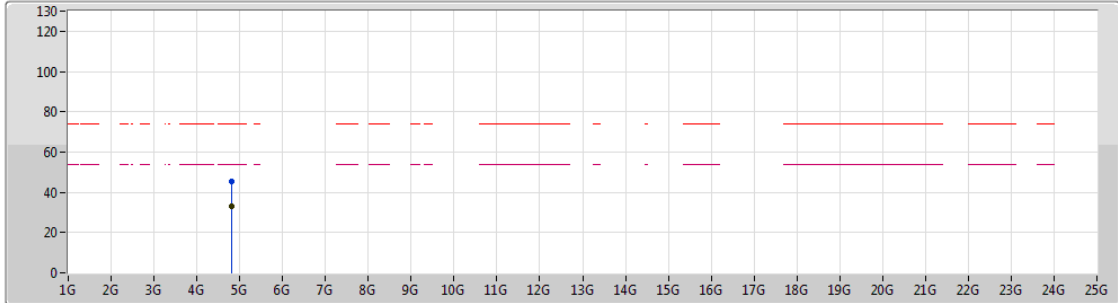
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3852G	45.56	54.00	-8.44	31.99	3	Horizontal	151	2.99	-
AV	2.402G	77.73	Inf	-Inf	32.04	3	Horizontal	151	2.99	-
PK	2.3598G	56.93	74.00	-17.07	31.90	3	Horizontal	151	2.99	-
PK	2.4022G	79.83	Inf	-Inf	32.05	3	Horizontal	151	2.99	-



BT-LE(1Mbps)

2402MHz_TX

15/02/2019



Lim.PK
 PK
 Lim.AV
 AV

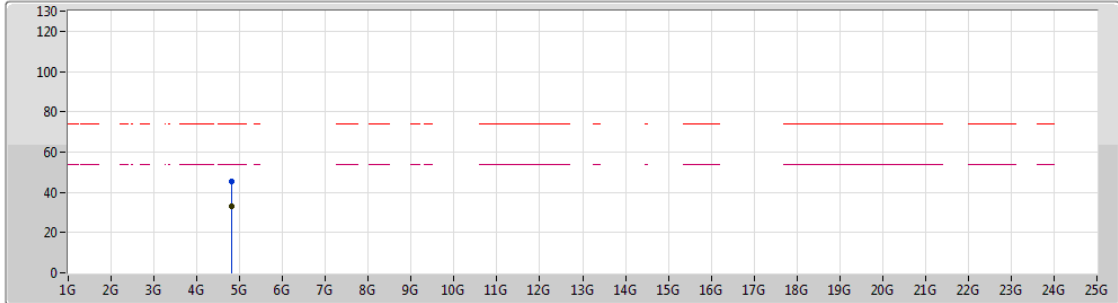
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.80158G	32.80	54.00	-21.20	3.43	3	Vertical	353	1.18	-
PK	4.80493G	45.29	74.00	-28.71	3.44	3	Vertical	353	1.18	-



BT-LE(1Mbps)

2402MHz_TX

15/02/2019



Legend for the spectrum plot:

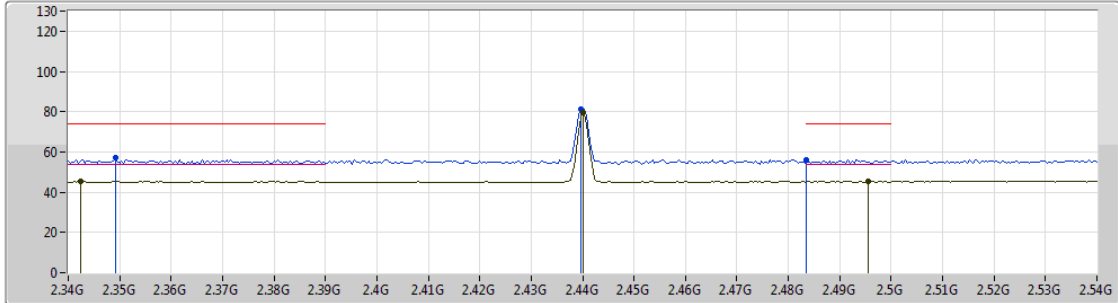
- Lim.PK
- PK
- Lim.AV
- AV





Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.80569G	33.13	54.00	-20.87	3.44	3	Horizontal	30	1.64	-
PK	4.80596G	45.30	74.00	-28.70	3.44	3	Horizontal	30	1.64	-

BT-LE(1Mbps)

2440MHz_TX

15/02/2019



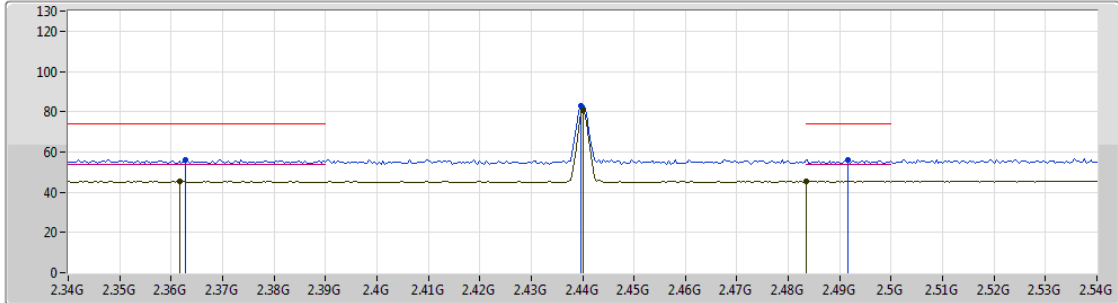
Lim.PK 
 PK 
 Lim.AV 
 AV 





Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3424G	45.57	54.00	-8.43	31.84	3	Vertical	196	1.04	-
AV	2.44G	79.29	Inf	-Inf	32.16	3	Vertical	196	1.04	-
AV	2.4956G	45.40	54.00	-8.60	32.33	3	Vertical	196	1.04	-
PK	2.3492G	57.11	74.00	-16.89	31.87	3	Vertical	196	1.04	-
PK	2.4396G	81.34	Inf	-Inf	32.16	3	Vertical	196	1.04	-
PK	2.4835G	56.02	74.00	-17.98	32.29	3	Vertical	196	1.04	-

BT-LE(1Mbps)

2440MHz_TX

15/02/2019



Lim.PK 
 PK 
 Lim.AV 
 AV 

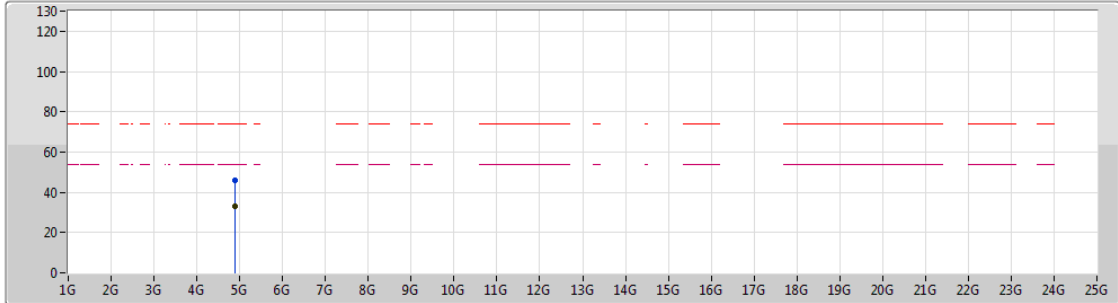
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3616G	45.52	54.00	-8.48	31.91	3	Horizontal	154	2.99	-
AV	2.44G	80.85	Inf	-Inf	32.16	3	Horizontal	154	2.99	-
AV	2.4835G	45.40	54.00	-8.60	32.29	3	Horizontal	154	2.99	-
PK	2.3628G	56.23	74.00	-17.77	31.91	3	Horizontal	154	2.99	-
PK	2.4396G	82.87	Inf	-Inf	32.16	3	Horizontal	154	2.99	-
PK	2.4916G	56.16	74.00	-17.84	32.31	3	Horizontal	154	2.99	-



BT-LE(1Mbps)

2440MHz_TX

15/02/2019



Legend for plot:

- Lim.PK
- PK
- Lim.AV
- AV

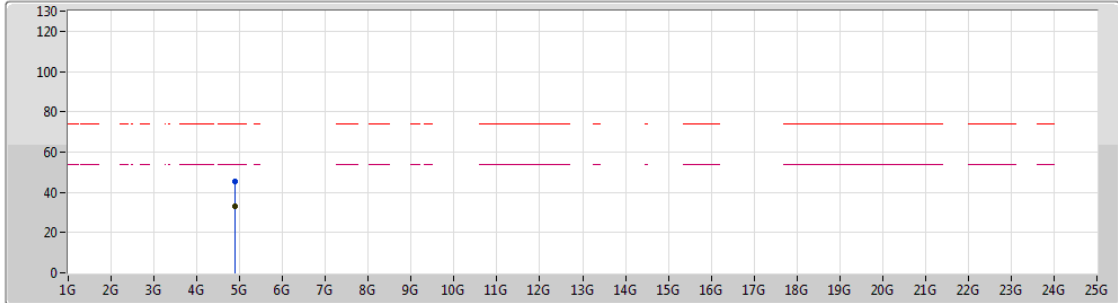
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.88001G	33.33	54.00	-20.67	3.62	3	Vertical	91	1.74	-
PK	4.87858G	46.06	74.00	-27.94	3.62	3	Vertical	91	1.74	-



BT-LE(1Mbps)

2440MHz_TX

15/02/2019



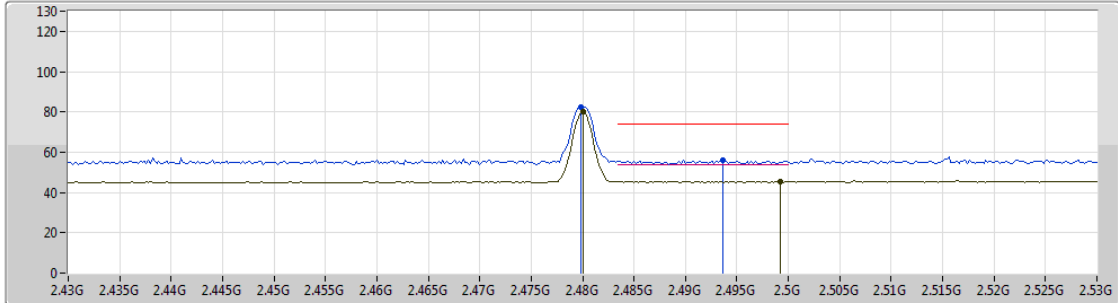
Lim.PK
 PK
 Lim.AV
 AV

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.88238G	33.14	54.00	-20.86	3.63	3	Horizontal	337	1.28	-
PK	4.87936G	45.31	74.00	-28.69	3.62	3	Horizontal	337	1.28	-

BT-LE(1Mbps)

2480MHz_TX

15/02/2019

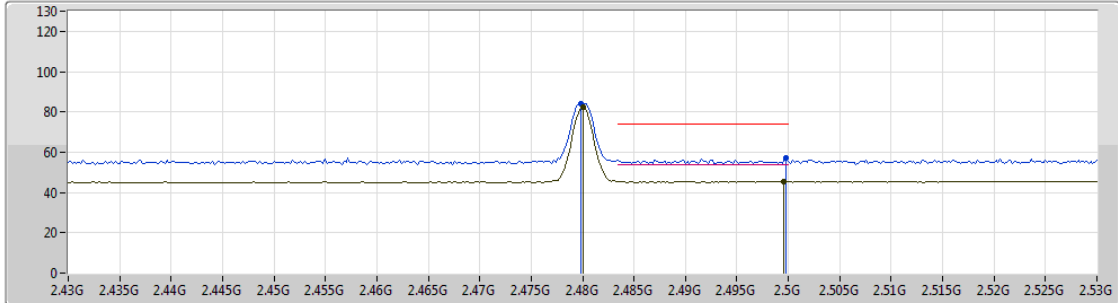




Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.48G	80.25	Inf	-Inf	32.28	3	Vertical	193	1.21	-
AV	2.4992G	45.42	54.00	-8.58	32.34	3	Vertical	193	1.21	-
PK	2.4798G	82.29	Inf	-Inf	32.28	3	Vertical	193	1.21	-
PK	2.4936G	55.91	74.00	-18.09	32.32	3	Vertical	193	1.21	-

BT-LE(1Mbps)

2480MHz_TX

15/02/2019



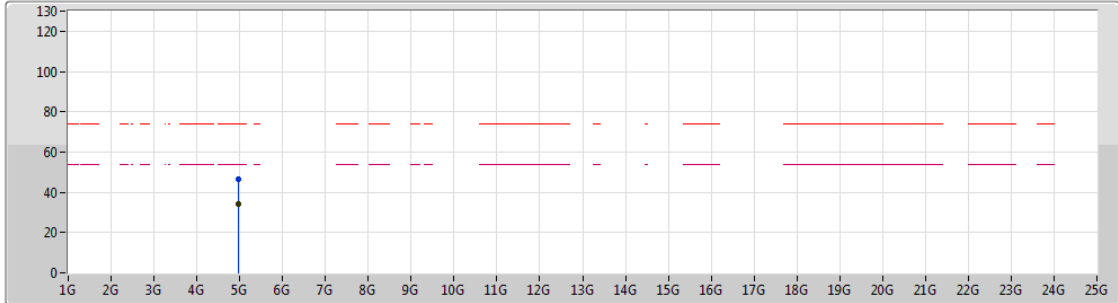
Lim.PK 
 PK 
 Lim.AV 
 AV 


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.48G	82.23	Inf	-Inf	32.28	3	Horizontal	151	2.69	-
AV	2.4996G	45.46	54.00	-8.54	32.34	3	Horizontal	151	2.69	-
PK	2.4798G	84.22	Inf	-Inf	32.28	3	Horizontal	151	2.69	-
PK	2.4998G	56.96	74.00	-17.04	32.34	3	Horizontal	151	2.69	-

BT-LE(1Mbps)

2480MHz_TX

15/02/2019



Lim.PK 
 PK 
 Lim.AV 
 AV 

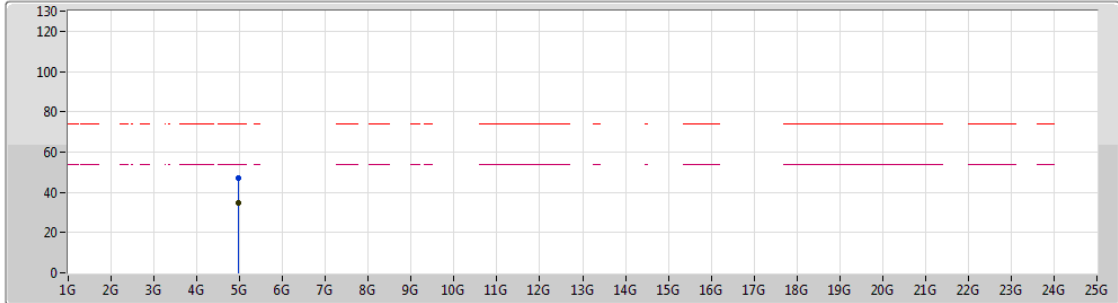
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.96041G	34.46	54.00	-19.54	3.83	3	Vertical	27	2.18	-
PK	4.96043G	46.63	74.00	-27.37	3.83	3	Vertical	27	2.18	-



BT-LE(1Mbps)

2480MHz_TX

15/02/2019



Legend for the spectrum plot:

- Lim.PK (Red dashed line)
- PK (Blue line with peak marker)
- Lim.AV (Magenta dashed line)
- AV (Black line with average marker)

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.96041G	34.96	54.00	-19.04	3.83	3	Horizontal	63	1.92	-
PK	4.96052G	47.26	74.00	-26.74	3.83	3	Horizontal	63	1.92	-

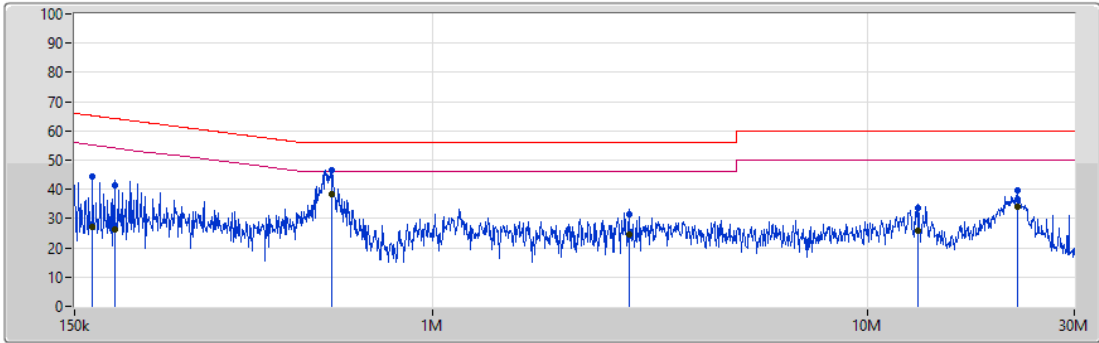


AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Neutral
Operating Function	PoE mode		

AC Conduction_Mode 1

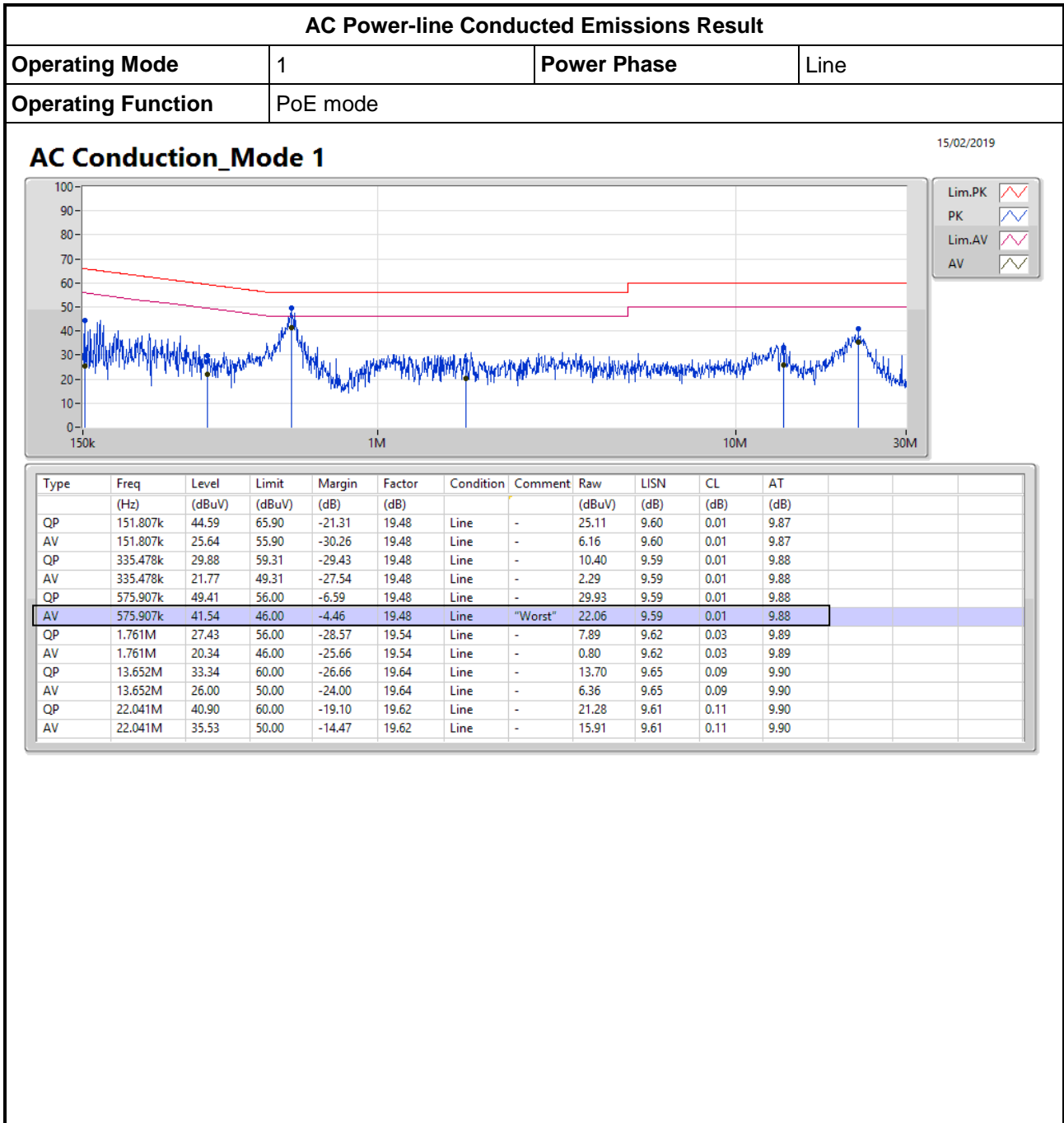
15/02/2019



Legend for graph:

- Lim.PK (Red line)
- PK (Blue line)
- Lim.AV (Magenta line)
- AV (Green line)

Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)
QP	165.082k	44.39	65.20	-20.81	19.48	Neutral	-	24.91	9.60	0.01	9.87
AV	165.082k	27.33	55.20	-27.87	19.48	Neutral	-	7.85	9.60	0.01	9.87
QP	185.344k	41.46	64.24	-22.78	19.47	Neutral	-	21.99	9.59	0.01	9.87
AV	185.344k	26.47	54.24	-27.77	19.47	Neutral	-	7.00	9.59	0.01	9.87
QP	587.518k	46.40	56.00	-9.60	19.48	Neutral	-	26.92	9.59	0.01	9.88
AV	587.518k	38.56	46.00	-7.44	19.48	Neutral	"Worst"	19.08	9.59	0.01	9.88
QP	2.832M	31.35	56.00	-24.65	19.54	Neutral	-	11.81	9.61	0.04	9.89
AV	2.832M	24.66	46.00	-21.34	19.54	Neutral	-	5.12	9.61	0.04	9.89
QP	13.117M	33.48	60.00	-26.52	19.65	Neutral	-	13.83	9.67	0.08	9.90
AV	13.117M	25.90	50.00	-24.10	19.65	Neutral	-	6.25	9.67	0.08	9.90
QP	22.218M	39.80	60.00	-20.20	19.69	Neutral	-	20.11	9.68	0.11	9.90
AV	22.218M	34.01	50.00	-15.99	19.69	Neutral	-	14.32	9.68	0.11	9.90





Summary

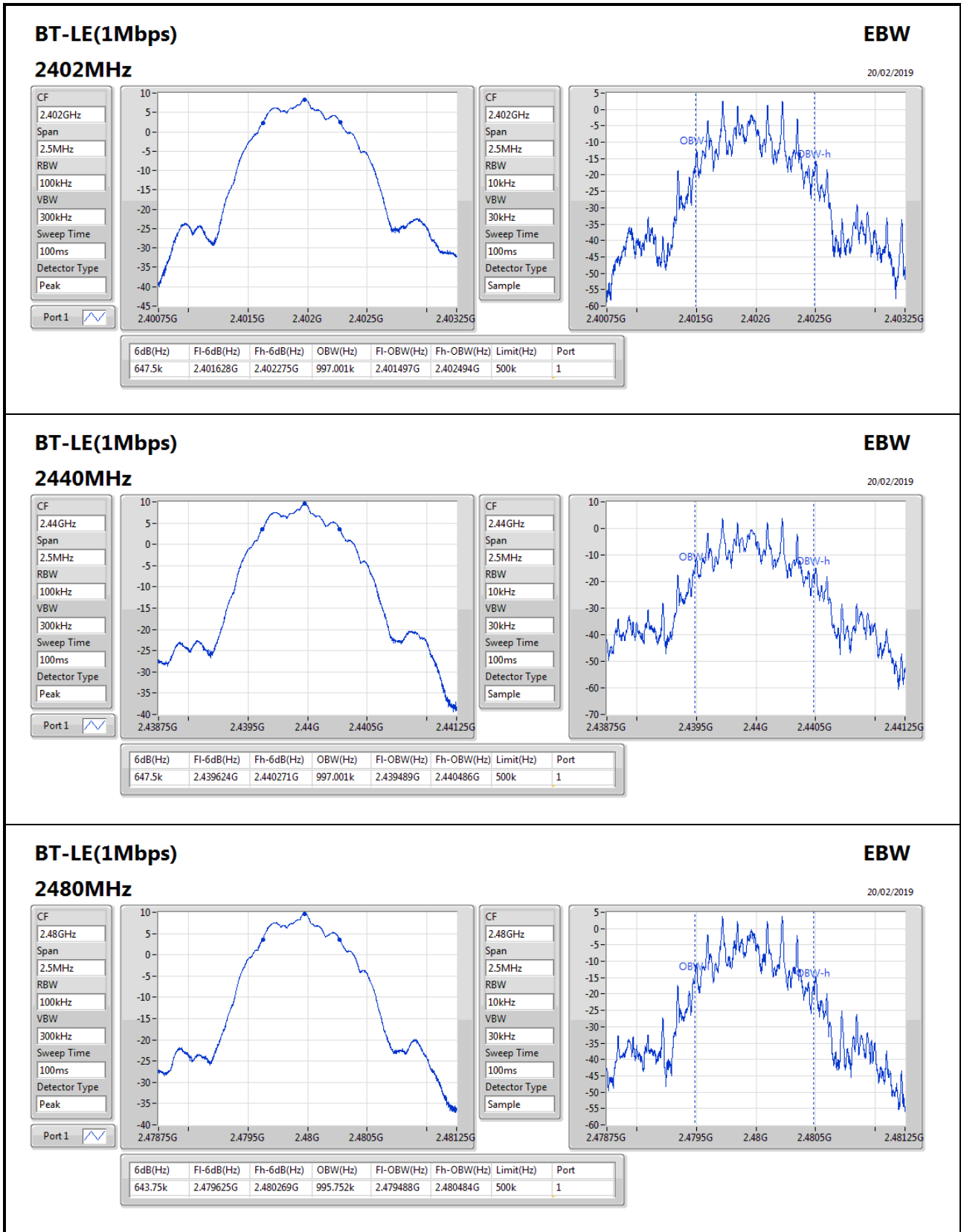
Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	647.5k	997.001k	997KF1D	643.75k	995.752k

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_TnomVnom	Pass	500k	647.5k	997.001k
2440MHz_TnomVnom	Pass	500k	647.5k	997.001k
2480MHz_TnomVnom	Pass	500k	643.75k	995.752k

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





Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	9.37	0.00865

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.60	8.34	30.00
2440MHz_TnomVnom	Pass	1.60	9.12	30.00
2480MHz_TnomVnom	Pass	1.60	9.37	30.00



Summary

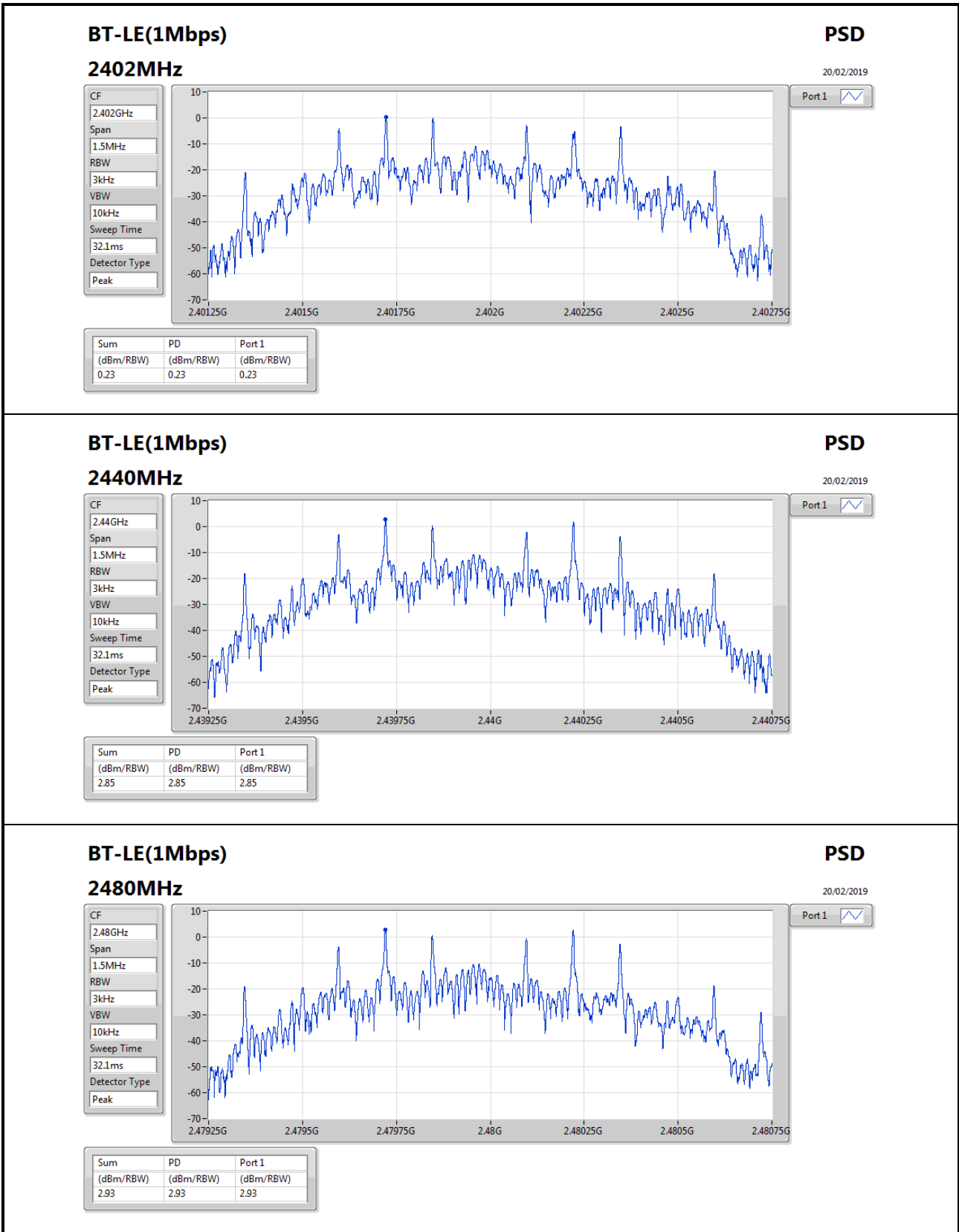
Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	2.93

RBW=3kHz.

Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	1.60	0.23	8.00
2440MHz_TnomVnom	Pass	1.60	2.85	8.00
2480MHz_TnomVnom	Pass	1.60	2.93	8.00

RBW=3kHz.



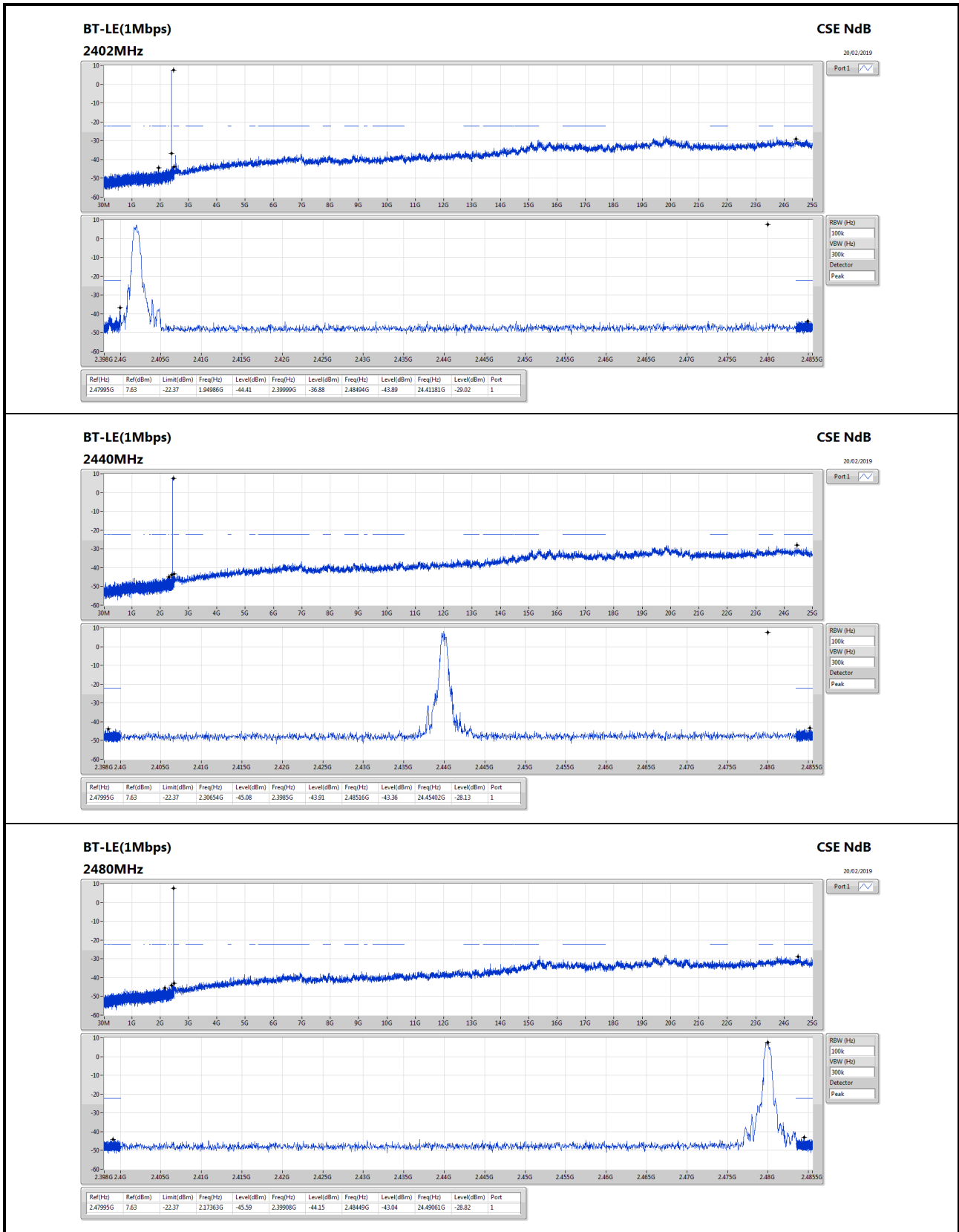


Summary

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	7.63	-22.37	2.30654G	-45.08	2.3985G	-43.91	2.48516G	-43.36	24.45402G	-28.13	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_TnomVnom	Pass	2.47995G	7.63	-22.37	1.94986G	-44.41	2.39999G	-36.88	2.48494G	-43.89	24.41181G	-29.02	1
2440MHz_TnomVnom	Pass	2.47995G	7.63	-22.37	2.30654G	-45.08	2.3985G	-43.91	2.48516G	-43.36	24.45402G	-28.13	1
2480MHz_TnomVnom	Pass	2.47995G	7.63	-22.37	2.17363G	-45.59	2.39908G	-44.15	2.48449G	-43.04	24.49061G	-28.82	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	-	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	QP	784.66M	42.77	46.00	-3.23	1.19	3	Horizontal	282	1.62	-



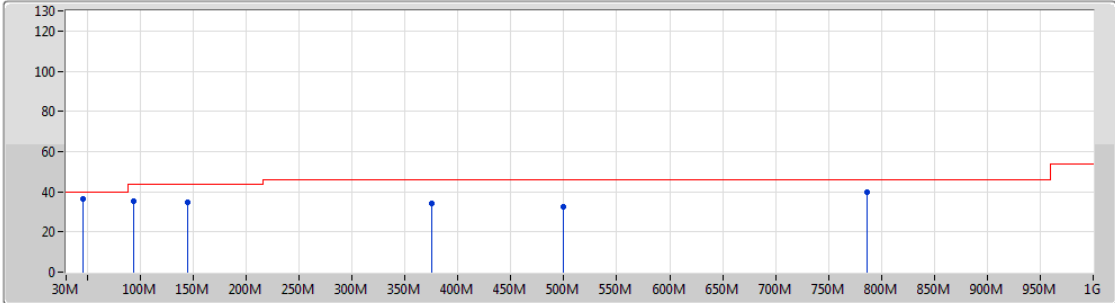
Result

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	94.02M	35.41	43.50	-8.09	-11.53	3	Vertical	0	1.00	-
2440MHz	Pass	PK	144.46M	34.64	43.50	-8.86	-9.91	3	Vertical	0	1.00	-
2440MHz	Pass	PK	375.32M	34.21	46.00	-11.79	-4.48	3	Vertical	0	1.00	-
2440MHz	Pass	PK	499.48M	32.27	46.00	-13.73	-2.38	3	Vertical	0	1.00	-
2440MHz	Pass	PK	786.6M	39.52	46.00	-6.48	1.20	3	Vertical	0	1.00	-
2440MHz	Pass	QP	45.52M	36.40	40.00	-3.60	-12.12	3	Vertical	223	1.76	-
2440MHz	Pass	PK	37.76M	34.44	40.00	-5.56	-8.64	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	146.4M	37.52	43.50	-5.98	-10.01	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	260.86M	31.24	46.00	-14.76	-5.80	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	375.32M	34.52	46.00	-11.48	-4.48	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	980.6M	48.31	54.00	-5.69	3.94	3	Horizontal	360	1.00	-
2440MHz	Pass	QP	784.66M	42.77	46.00	-3.23	1.19	3	Horizontal	282	1.62	-




BT-LE(1Mbps)

2440MHz_PoE

15/02/2019



Legend for the plot:

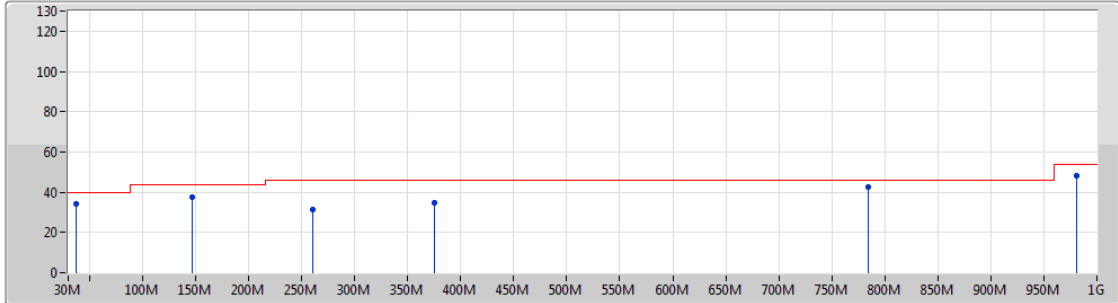
- Lim.PK 
- PK 
- Lim.AV 
- AV 

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	94.02M	35.41	43.50	-8.09	-11.53	3	Vertical	0	1.00	-
PK	144.46M	34.64	43.50	-8.86	-9.91	3	Vertical	0	1.00	-
PK	375.32M	34.21	46.00	-11.79	-4.48	3	Vertical	0	1.00	-
PK	499.48M	32.27	46.00	-13.73	-2.38	3	Vertical	0	1.00	-
PK	786.6M	39.52	46.00	-6.48	1.20	3	Vertical	0	1.00	-
QP	45.52M	36.40	40.00	-3.60	-12.12	3	Vertical	223	1.76	-

BT-LE(1Mbps)

2440MHz_PoE

15/02/2019



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
PK	37.76M	34.44	40.00	-5.56	-8.64	3	Horizontal	360	1.00	-
PK	146.4M	37.52	43.50	-5.98	-10.01	3	Horizontal	360	1.00	-
PK	260.86M	31.24	46.00	-14.76	-5.80	3	Horizontal	360	1.00	-
PK	375.32M	34.52	46.00	-11.48	-4.48	3	Horizontal	360	1.00	-
PK	980.6M	48.31	54.00	-5.69	3.94	3	Horizontal	360	1.00	-
QP	784.66M	42.77	46.00	-3.23	1.19	3	Horizontal	282	1.62	-



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	2.3424G	45.57	54.00	-8.43	31.84	3	Vertical	196	1.04	-



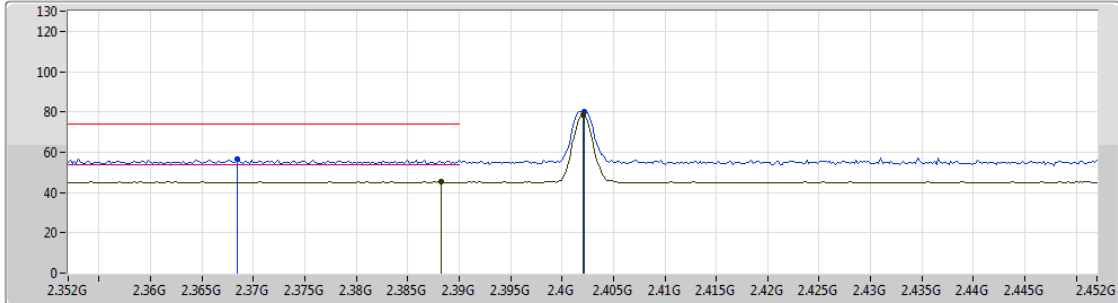
Result




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	2.3882G	45.24	54.00	-8.76	32.00	3	Vertical	198	1.06	-
2402MHz	Pass	AV	2.402G	78.26	Inf	-Inf	32.04	3	Vertical	198	1.06	-
2402MHz	Pass	PK	2.3684G	56.51	74.00	-17.49	31.93	3	Vertical	198	1.06	-
2402MHz	Pass	PK	2.4022G	80.37	Inf	-Inf	32.05	3	Vertical	198	1.06	-
2402MHz	Pass	AV	2.3852G	45.56	54.00	-8.44	31.99	3	Horizontal	151	2.99	-
2402MHz	Pass	AV	2.402G	77.73	Inf	-Inf	32.04	3	Horizontal	151	2.99	-
2402MHz	Pass	PK	2.3598G	56.93	74.00	-17.07	31.90	3	Horizontal	151	2.99	-
2402MHz	Pass	PK	2.4022G	79.83	Inf	-Inf	32.05	3	Horizontal	151	2.99	-
2402MHz	Pass	AV	4.80158G	32.80	54.00	-21.20	3.43	3	Vertical	353	1.18	-
2402MHz	Pass	PK	4.80493G	45.29	74.00	-28.71	3.44	3	Vertical	353	1.18	-
2402MHz	Pass	AV	4.80569G	33.13	54.00	-20.87	3.44	3	Horizontal	30	1.64	-
2402MHz	Pass	PK	4.80596G	45.30	74.00	-28.70	3.44	3	Horizontal	30	1.64	-
2440MHz	Pass	AV	2.3424G	45.57	54.00	-8.43	31.84	3	Vertical	196	1.04	-
2440MHz	Pass	AV	2.44G	79.29	Inf	-Inf	32.16	3	Vertical	196	1.04	-
2440MHz	Pass	AV	2.4956G	45.40	54.00	-8.60	32.33	3	Vertical	196	1.04	-
2440MHz	Pass	PK	2.3492G	57.11	74.00	-16.89	31.87	3	Vertical	196	1.04	-
2440MHz	Pass	PK	2.4396G	81.34	Inf	-Inf	32.16	3	Vertical	196	1.04	-
2440MHz	Pass	PK	2.4835G	56.02	74.00	-17.98	32.29	3	Vertical	196	1.04	-
2440MHz	Pass	AV	2.3616G	45.52	54.00	-8.48	31.91	3	Horizontal	154	2.99	-
2440MHz	Pass	AV	2.44G	80.85	Inf	-Inf	32.16	3	Horizontal	154	2.99	-
2440MHz	Pass	AV	2.4835G	45.40	54.00	-8.60	32.29	3	Horizontal	154	2.99	-
2440MHz	Pass	PK	2.3628G	56.23	74.00	-17.77	31.91	3	Horizontal	154	2.99	-
2440MHz	Pass	PK	2.4396G	82.87	Inf	-Inf	32.16	3	Horizontal	154	2.99	-
2440MHz	Pass	PK	2.4916G	56.16	74.00	-17.84	32.31	3	Horizontal	154	2.99	-
2440MHz	Pass	AV	4.88001G	33.33	54.00	-20.67	3.62	3	Vertical	91	1.74	-
2440MHz	Pass	PK	4.87858G	46.06	74.00	-27.94	3.62	3	Vertical	91	1.74	-
2440MHz	Pass	AV	4.88238G	33.14	54.00	-20.86	3.63	3	Horizontal	337	1.28	-
2440MHz	Pass	PK	4.87936G	45.31	74.00	-28.69	3.62	3	Horizontal	337	1.28	-
2480MHz	Pass	AV	2.48G	80.25	Inf	-Inf	32.28	3	Vertical	193	1.21	-
2480MHz	Pass	AV	2.4992G	45.42	54.00	-8.58	32.34	3	Vertical	193	1.21	-
2480MHz	Pass	PK	2.4798G	82.29	Inf	-Inf	32.28	3	Vertical	193	1.21	-
2480MHz	Pass	PK	2.4936G	55.91	74.00	-18.09	32.32	3	Vertical	193	1.21	-
2480MHz	Pass	AV	2.48G	82.23	Inf	-Inf	32.28	3	Horizontal	151	2.69	-
2480MHz	Pass	AV	2.4996G	45.46	54.00	-8.54	32.34	3	Horizontal	151	2.69	-
2480MHz	Pass	PK	2.4798G	84.22	Inf	-Inf	32.28	3	Horizontal	151	2.69	-
2480MHz	Pass	PK	2.4998G	56.96	74.00	-17.04	32.34	3	Horizontal	151	2.69	-
2480MHz	Pass	AV	4.96041G	34.46	54.00	-19.54	3.83	3	Vertical	27	2.18	-
2480MHz	Pass	PK	4.96043G	46.63	74.00	-27.37	3.83	3	Vertical	27	2.18	-
2480MHz	Pass	AV	4.96041G	34.96	54.00	-19.04	3.83	3	Horizontal	63	1.92	-
2480MHz	Pass	PK	4.96052G	47.26	74.00	-26.74	3.83	3	Horizontal	63	1.92	-

BT-LE(1Mbps)

2402MHz_TX

15/02/2019



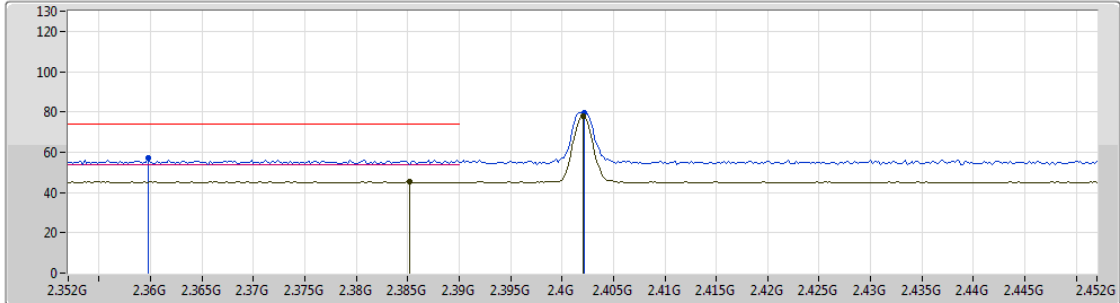
Lim.PK 
 PK 
 Lim.AV 
 AV 

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3882G	45.24	54.00	-8.76	32.00	3	Vertical	198	1.06	-
AV	2.402G	78.26	Inf	-Inf	32.04	3	Vertical	198	1.06	-
PK	2.3684G	56.51	74.00	-17.49	31.93	3	Vertical	198	1.06	-
PK	2.4022G	80.37	Inf	-Inf	32.05	3	Vertical	198	1.06	-

BT-LE(1Mbps)

2402MHz_TX

15/02/2019



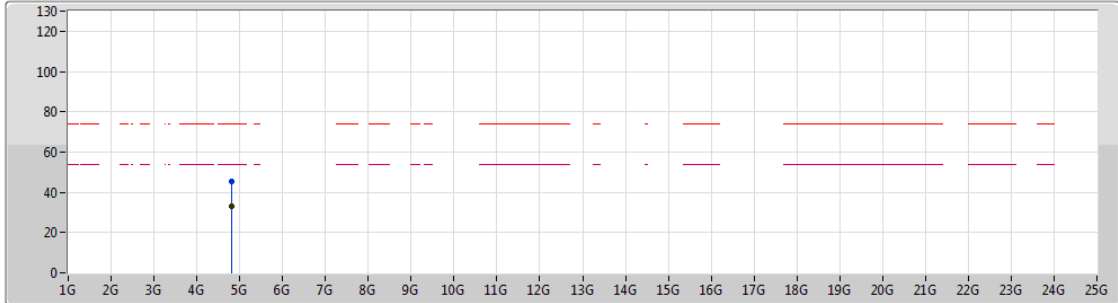
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3852G	45.56	54.00	-8.44	31.99	3	Horizontal	151	2.99	-
AV	2.402G	77.73	Inf	-Inf	32.04	3	Horizontal	151	2.99	-
PK	2.3598G	56.93	74.00	-17.07	31.90	3	Horizontal	151	2.99	-
PK	2.4022G	79.83	Inf	-Inf	32.05	3	Horizontal	151	2.99	-



BT-LE(1Mbps)

2402MHz_TX

15/02/2019



Legend for plot:

- Lim.PK
- PK
- Lim.AV
- AV

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.80158G	32.80	54.00	-21.20	3.43	3	Vertical	353	1.18	-
PK	4.80493G	45.29	74.00	-28.71	3.44	3	Vertical	353	1.18	-



BT-LE(1Mbps)

2402MHz_TX

15/02/2019



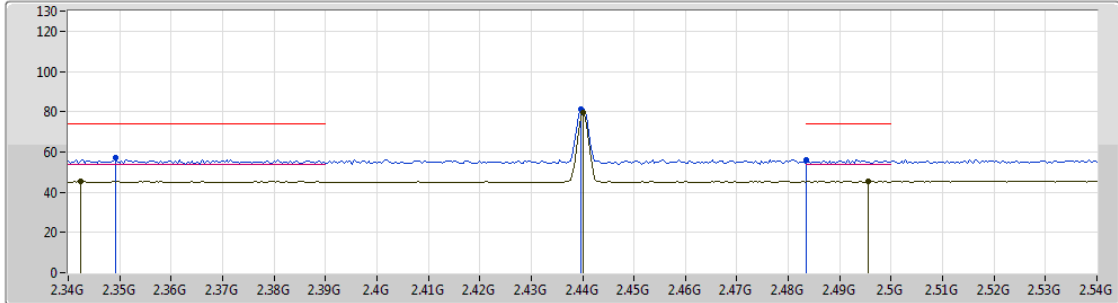
Lim.PK
 PK
 Lim.AV
 AV

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.80569G	33.13	54.00	-20.87	3.44	3	Horizontal	30	1.64	-
PK	4.80596G	45.30	74.00	-28.70	3.44	3	Horizontal	30	1.64	-

BT-LE(1Mbps)

2440MHz_TX

15/02/2019

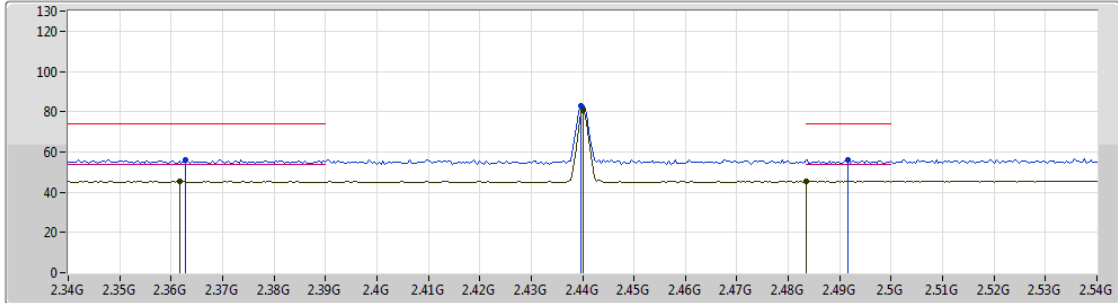




Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3424G	45.57	54.00	-8.43	31.84	3	Vertical	196	1.04	-
AV	2.44G	79.29	Inf	-Inf	32.16	3	Vertical	196	1.04	-
AV	2.4956G	45.40	54.00	-8.60	32.33	3	Vertical	196	1.04	-
PK	2.3492G	57.11	74.00	-16.89	31.87	3	Vertical	196	1.04	-
PK	2.4396G	81.34	Inf	-Inf	32.16	3	Vertical	196	1.04	-
PK	2.4835G	56.02	74.00	-17.98	32.29	3	Vertical	196	1.04	-

BT-LE(1Mbps)

2440MHz_TX

15/02/2019



Lim.PK 
 PK 
 Lim.AV 
 AV 

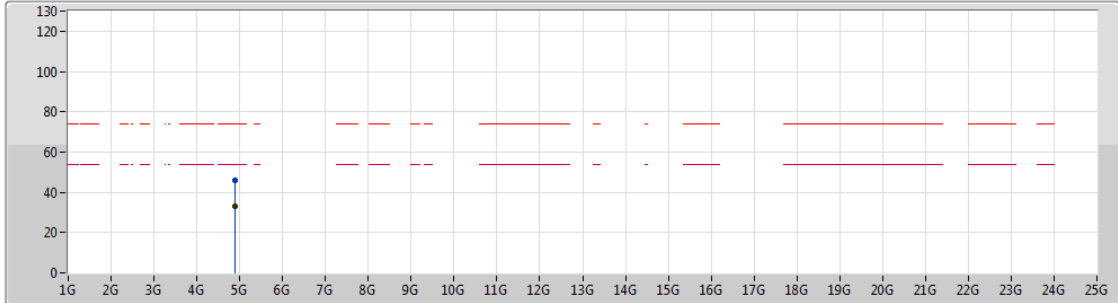
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.3616G	45.52	54.00	-8.48	31.91	3	Horizontal	154	2.99	-
AV	2.44G	80.85	Inf	-Inf	32.16	3	Horizontal	154	2.99	-
AV	2.4835G	45.40	54.00	-8.60	32.29	3	Horizontal	154	2.99	-
PK	2.3628G	56.23	74.00	-17.77	31.91	3	Horizontal	154	2.99	-
PK	2.4396G	82.87	Inf	-Inf	32.16	3	Horizontal	154	2.99	-
PK	2.4916G	56.16	74.00	-17.84	32.31	3	Horizontal	154	2.99	-



BT-LE(1Mbps)

2440MHz_TX

15/02/2019



Lim.PK
 PK
 Lim.AV
 AV

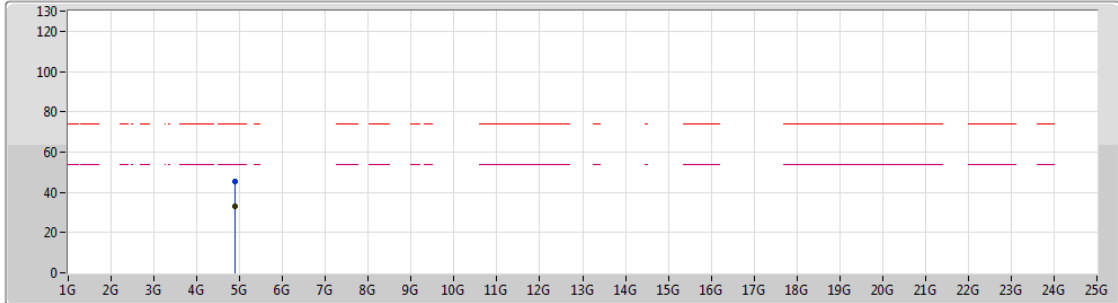
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.88001G	33.33	54.00	-20.67	3.62	3	Vertical	91	1.74	-
PK	4.87858G	46.06	74.00	-27.94	3.62	3	Vertical	91	1.74	-



BT-LE(1Mbps)

2440MHz_TX

15/02/2019



Legend for the plot:

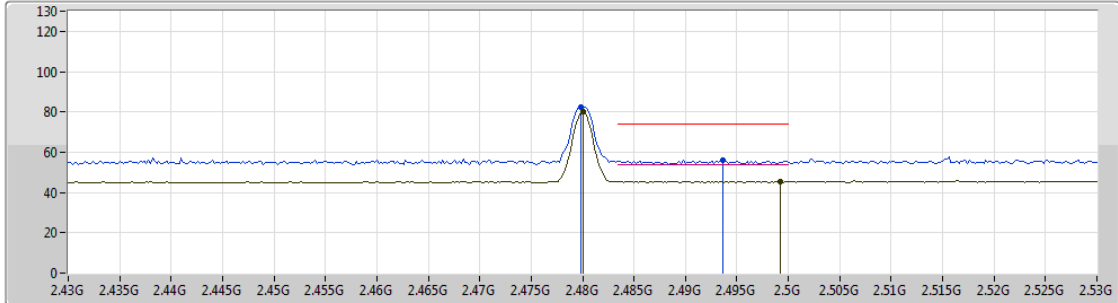
- Lim.PK
- PK
- Lim.AV
- AV




Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.88238G	33.14	54.00	-20.86	3.63	3	Horizontal	337	1.28	-
PK	4.87936G	45.31	74.00	-28.69	3.62	3	Horizontal	337	1.28	-

BT-LE(1Mbps)

2480MHz_TX

15/02/2019



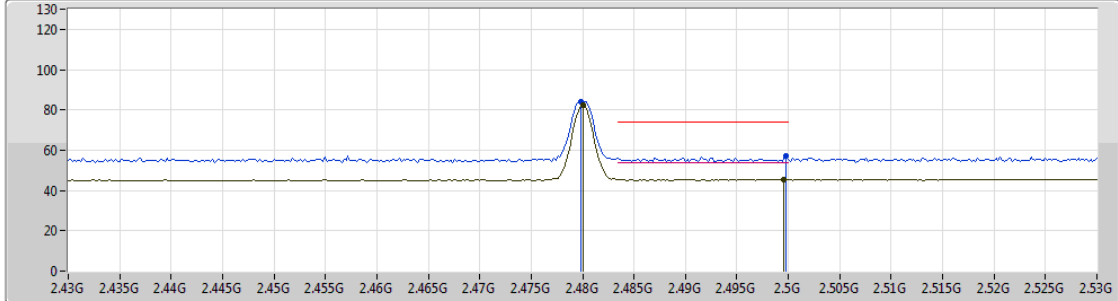
Lim.PK 
 PK 
 Lim.AV 
 AV 

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.48G	80.25	Inf	-Inf	32.28	3	Vertical	193	1.21	-
AV	2.4992G	45.42	54.00	-8.58	32.34	3	Vertical	193	1.21	-
PK	2.4798G	82.29	Inf	-Inf	32.28	3	Vertical	193	1.21	-
PK	2.4936G	55.91	74.00	-18.09	32.32	3	Vertical	193	1.21	-

BT-LE(1Mbps)

2480MHz_TX

15/02/2019



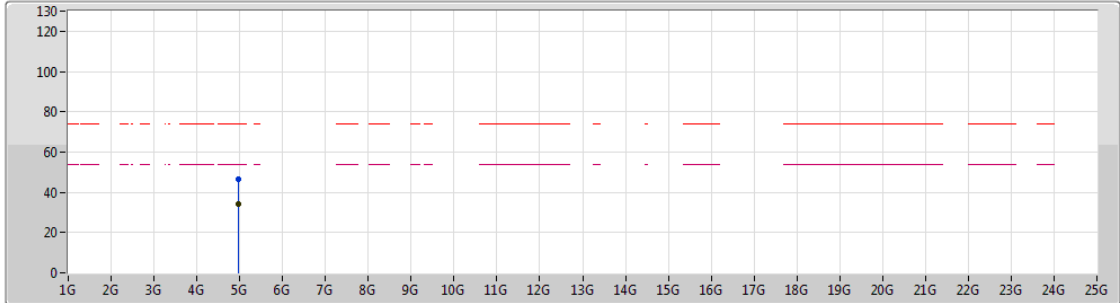
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	2.48G	82.23	Inf	-Inf	32.28	3	Horizontal	151	2.69	-
AV	2.4996G	45.46	54.00	-8.54	32.34	3	Horizontal	151	2.69	-
PK	2.4798G	84.22	Inf	-Inf	32.28	3	Horizontal	151	2.69	-
PK	2.4998G	56.96	74.00	-17.04	32.34	3	Horizontal	151	2.69	-



BT-LE(1Mbps)

2480MHz_TX

15/02/2019



Legend for plot:

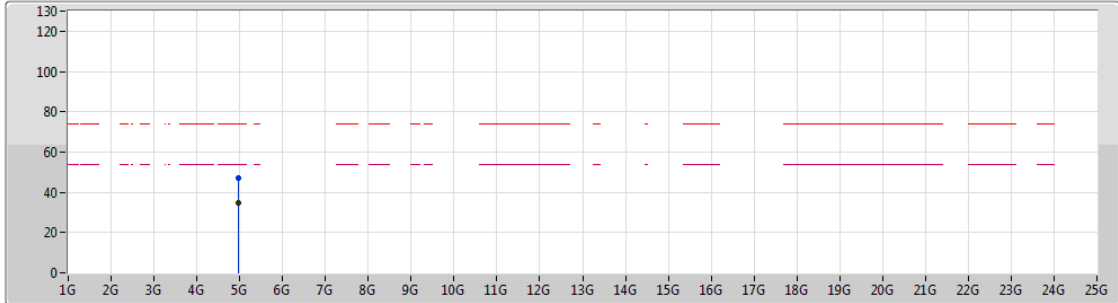
- Lim.PK (Red dashed line)
- PK (Blue line)
- Lim.AV (Magenta dashed line)
- AV (Black line)

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.96041G	34.46	54.00	-19.54	3.83	3	Vertical	27	2.18	-
PK	4.96043G	46.63	74.00	-27.37	3.83	3	Vertical	27	2.18	-

BT-LE(1Mbps)

2480MHz_TX

15/02/2019



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
AV	4.96041G	34.96	54.00	-19.04	3.83	3	Horizontal	63	1.92	-
PK	4.96052G	47.26	74.00	-26.74	3.83	3	Horizontal	63	1.92	-