

FCC Test Report

Equipment : 802.11b/g/n RTL8723BS Combo module
Brand Name : REALTEK
Model No. : RTL8723BS
FCC ID : TX2-RTL8723BS
Standard : 47 CFR FCC Part 15.247
Operating Band : 2400 MHz – 2483.5 MHz
Function : Point-to-multipoint; Point-to-point
Applicant /
Manufacturer : Realtek Semiconductor Corp.
No. 2,Innovation Road II, Hsinchu Science Park,
Hsinchu 300,Taiwan

This is a partial report for permissive change. The product sample received on Nov. 06, 2017 and completely tested on Nov. 09, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

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


Phoenix Chen / Assistant Manager





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PHOTOGRAPHS OF EUT v01



Summary of Test Result

Conformance Test Specifications				
Report Clause	Ref. Std. Clause	Description	Limit	Result
1.1.2	15.203	Antenna Requirement	FCC 15.203	Complied
3.1	15.247(b)	Maximum Conducted Output Power	Power [dBm]:30	Complied
3.2	15.247(d)	Emissions in Non-restricted Frequency Bands	Non-Restricted Bands: >30 dBc	Complied
3.3	15.247(d)	Emissions in Restricted Frequency Bands	Restricted Bands: FCC 15.209	Complied



Revision History

Report No.	Version	Description	Issued Date
FR780502-01AL	Rev. 01	Initial issue of report	Dec. 04, 2017

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.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	MDLINK	MBMC01551682G	Dipole Antenna	Reversed-SMA	2

1.1.3 EUT Information

Operational Condition	
EUT Power Type	From Host System
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)	0.642	1.925	401.875u	3k



1.1.5 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR431858AC

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Add dipole antenna 2. Update standard to ANSI C63.10-2013	1. Maximum Conducted Output Power is evaluated. 2. Emissions in Non-restricted Frequency Bands is evaluated. 3. Emissions in Restricted Frequency Bands is evaluated.

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 v04

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
RF Conducted	TH06-HY	Barry	24°C / 58%	07/Nov/2017
Radiated	03CH02-HY	Andy	22.5°C / 59%	09/Nov/2017

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)	3.6 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	2.1 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	2.6 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	2.9 dB	Confidence levels of 95%
Conducted Emission	1.3 dB	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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Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	6
2442MHz	6
2480MHz	6

2.3 The Worst Case Measurement Configuration

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

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

2.4 Support Equipment

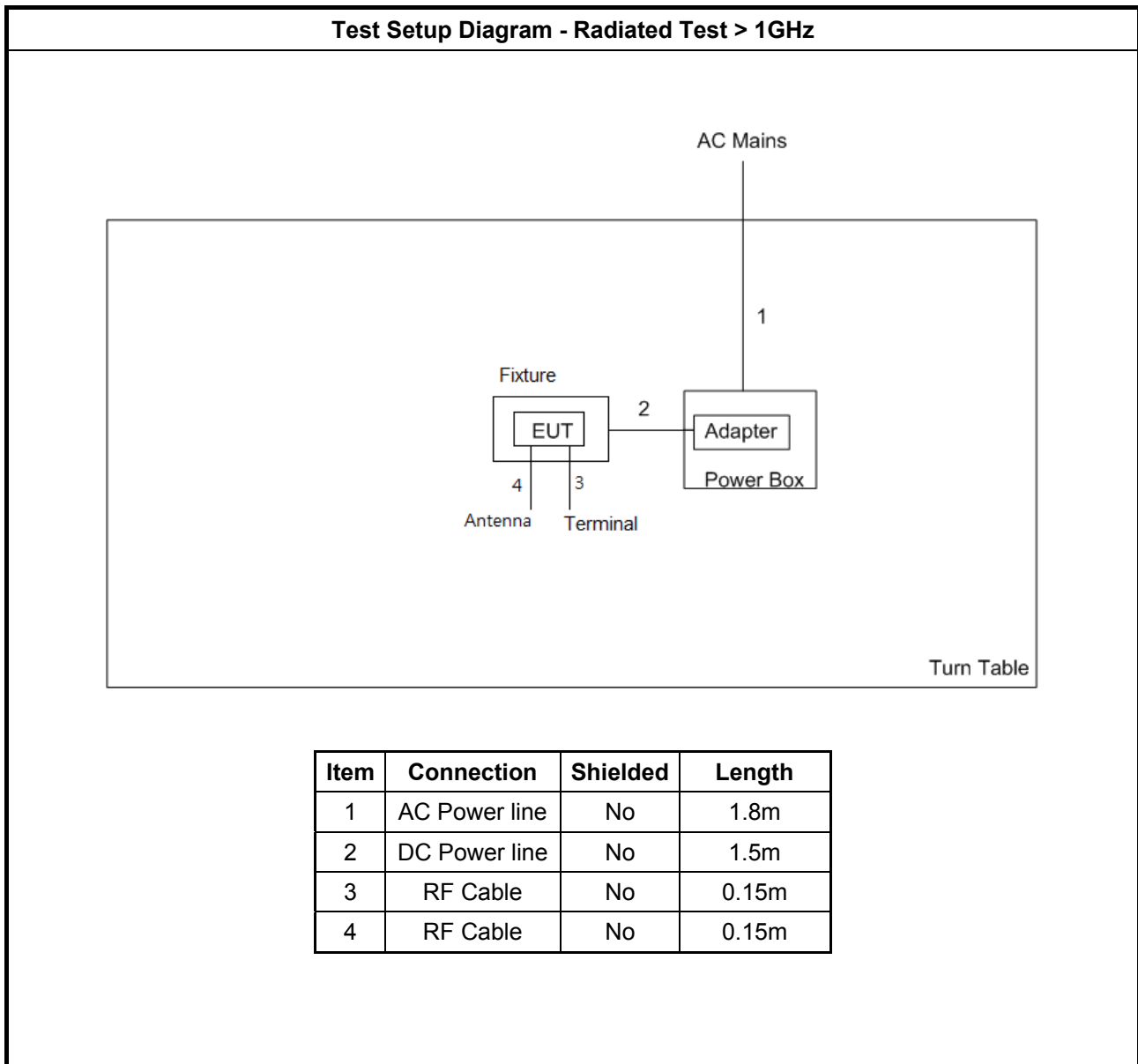
Support Equipment - RF Conducted				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	E5410	DoC
2	Adapter for Notebook	DELL	HA65NM130	DoC
3	Fixture	-	-	-

Note: Support equipment No.3 was provided by customer.

Support Equipment - Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Fixture	-	-	-
2	Antenna	MDLINK	MBMC01551682G	-
3	AC adapter	Phihong	PSC15R-050	DoC

Note: Support equipment No.1 and 2 was provided by customer.

2.5 Test Setup Diagram



3 Transmitter Test Result

3.1 Maximum Conducted Output Power

3.1.1 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 $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ 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>P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.</p>	

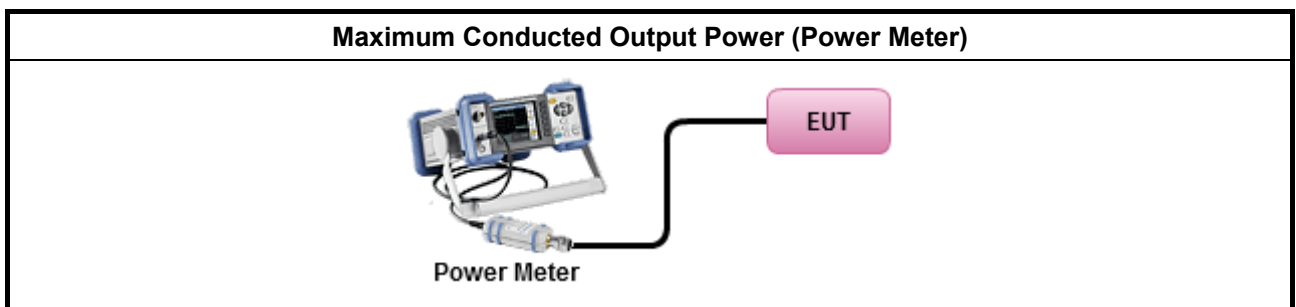
3.1.2 Measuring Instruments

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"> ▪ Maximum Peak Conducted Output Power 	
<input type="checkbox"/>	Refer as KDB 558074, clause 9.1.1 Option 1 (RBW ≥ EBW method).
<input type="checkbox"/>	Refer as KDB 558074, clause 9.1.2 Option 2 (integrated band power method)
<input type="checkbox"/>	Refer as KDB 558074, clause 9.1.3 Option 3 (peak power meter for VBW ≥ DTS BW)
<ul style="list-style-type: none"> ▪ Maximum Average Conducted Output Power 	
Duty cycle ≥ 98%	
<input type="checkbox"/>	Refer as KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
Duty cycle < 98%	
<input type="checkbox"/>	Refer as KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
RF power meter and average over on/off periods with duty factor or gated trigger	
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 9.2.3.1 Method AVGPM (using an RF average 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]) $EIRP_{total} = P_{total} + DG$ 	

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

Refer as Appendix A

3.2 Emissions in Non-restricted Frequency Bands

3.2.1 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.

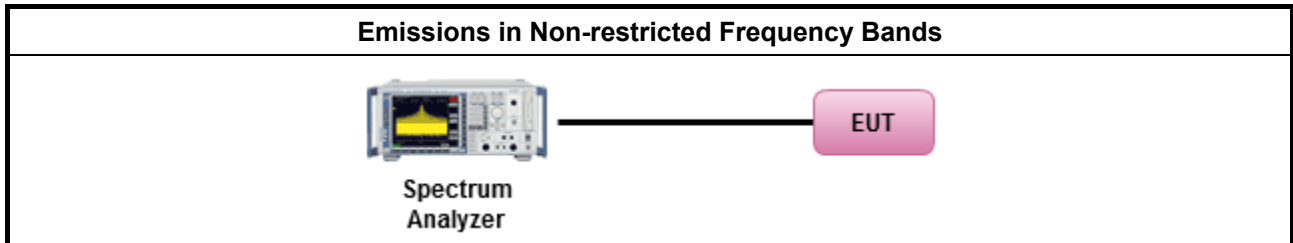
3.2.2 Measuring Instruments

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"> Refer as KDB 558074, clause 11 for unwanted emissions into non-restricted bands.

3.2.4 Test Setup



3.2.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix B

3.3 Emissions in Restricted Frequency Bands

3.3.1 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.

3.3.2 Measuring Instruments

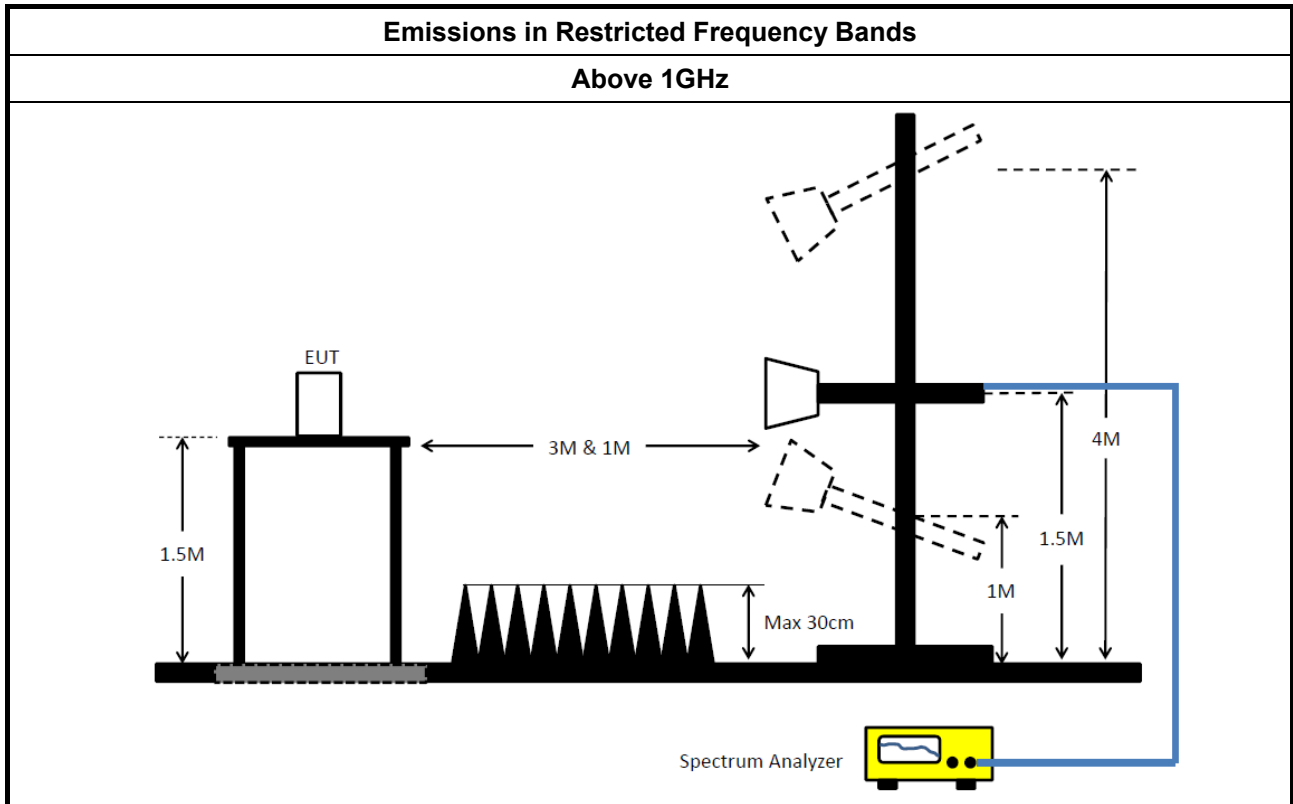
Refer a test equipment and calibration data table in this test report.



3.3.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> ▪ 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 12 for unwanted emissions into restricted bands.
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 12.2.5.3 (ANSI C63.10, clause 4.1.4.2.3), Reduced VBW \geq 1/T.
<input checked="" type="checkbox"/>	Refer as KDB 558074, clause 12.2.4 measurement procedure peak limit.
<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 13.1, 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.
	<ul style="list-style-type: none"> ▪ Refer as KDB 558074, clause 13.2 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.
	<ul style="list-style-type: none"> ▪ Refer as KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
<ul style="list-style-type: none"> ▪ For conducted and cabinet radiation measurement, refer as KDB 558074, clause 12.2.2. 	
	<ul style="list-style-type: none"> ▪ For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB
	<ul style="list-style-type: none"> ▪ For KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.

3.3.4 Test Setup



3.3.5 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.

3.3.6 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix C



4 Test Equipment and Calibration Data

Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSP40	100305	9kHz - 40GHz	30/Dec/2016	29/Dec/2017
3m Semi Anechoic	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz ~ 18GHz	12/Dec/2016	11/Dec/2017
Amplifier	Ketsight	8449B	3008A02602	1GHz-26.5GHz	19/Sep/2017	18/Sep/2018
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA9120D 01531	1GHz-18GHz	11/May/2017	10/May/2018
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz-40GHz	06/Feb/2017	05/Feb/2018
Amplifier	MITEQ	JS44-18004000-3 3-8P	1840917	18GHz-40GHz	06/Feb/2017	05/Feb/2018
RF Cable-high	SUHNER	SUCOFLEX104	MY34918/4	1GHz ~ 40GHz	26/Jan/2017	25/Jan/2018
Bluetooth Tester	ROHDE & SCHWARZ	CBT	100959	-	02/Mar/2016	01/Mar/2018

Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	10Hz ~ 40GHz	30/Dec/2016	29/Dec/2017
Power Sensor	Anritsu	MA2411B	1027452	300MHz ~ 40GHz	24/Feb/2017	23/Feb/2018
Power Meter	Anritsu	ML2495A	1124009	300MHz ~ 40GHz	24/Feb/2017	23/Feb/2018
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	27/Jul/2017	26/Jul/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY677/3	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY678/3	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_104	MY10717/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
Bluetooth Tester	ROHDE & SCHWARZ	CBT	101021	2.4GHz	28/Apr/2017	27/Apr/2018



Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	3.91	0.00246

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	2	2.08	30.00
2442MHz	Pass	2	2.20	30.00
2480MHz	Pass	2	1.89	30.00

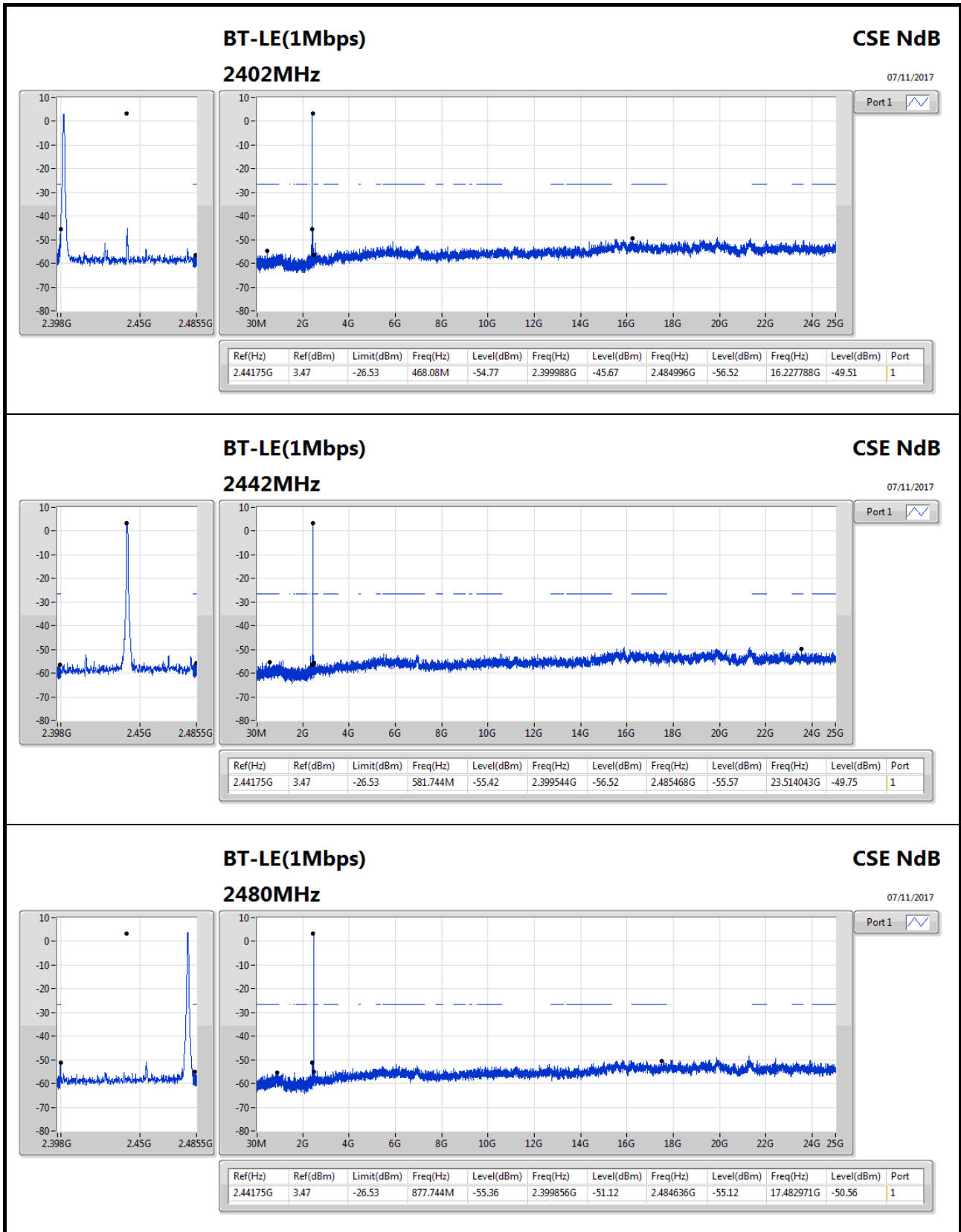


Summary

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	2.44175G	3.47	-26.53	468.08M	-54.77	2.399988G	-45.67	2.484996G	-56.52	16.227788G	-49.51	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	2.44175G	3.47	-26.53	468.08M	-54.77	2.399988G	-45.67	2.484996G	-56.52	16.227788G	-49.51	1
2442MHz	Pass	2.44175G	3.47	-26.53	581.744M	-55.42	2.399544G	-56.52	2.485468G	-55.57	23.514043G	-49.75	1
2480MHz	Pass	2.44175G	3.47	-26.53	877.744M	-55.36	2.399856G	-51.12	2.484636G	-55.12	17.482971G	-50.56	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	AV	2.5212G	49.16	54.00	-4.84	33.23	3	Vertical	133	2.65	-



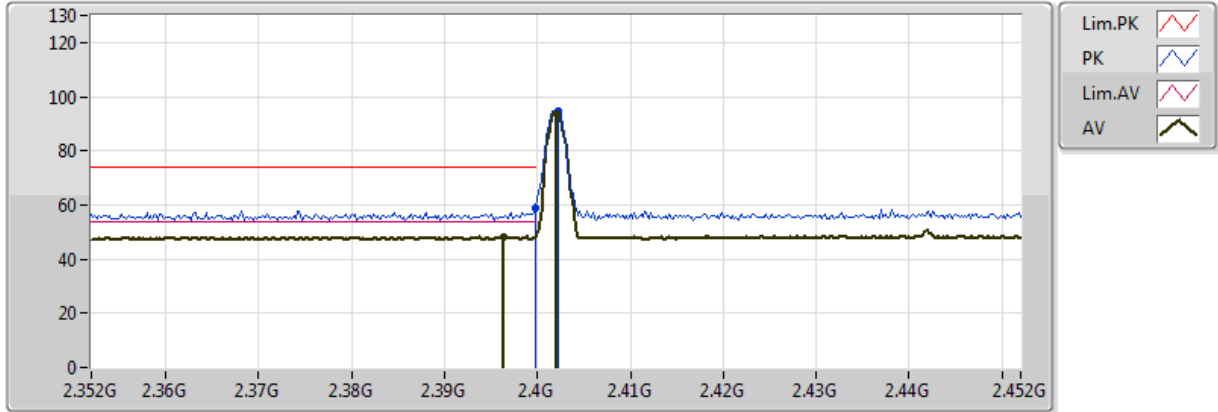
Result

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	2.3934G	47.98	54.00	-6.02	32.73	3	Horizontal	187	3.14	-
2402MHz	Pass	AV	2.402G	88.81	Inf	-Inf	32.77	3	Horizontal	187	3.14	-
2402MHz	Pass	PK	2.367G	57.49	74.00	-16.51	32.63	3	Horizontal	187	3.14	-
2402MHz	Pass	PK	2.4018G	89.74	Inf	-Inf	32.77	3	Horizontal	187	3.14	-
2402MHz	Pass	AV	2.3964G	48.23	54.00	-5.77	32.75	3	Vertical	230	1.23	-
2402MHz	Pass	AV	2.402G	93.79	Inf	-Inf	32.77	3	Vertical	230	1.23	-
2402MHz	Pass	PK	2.3998G	58.97	74.00	-15.03	32.76	3	Vertical	230	1.23	-
2402MHz	Pass	PK	2.4022G	94.66	Inf	-Inf	32.77	3	Vertical	230	1.23	-
2402MHz	Pass	AV	4.804G	34.67	54.00	-19.33	4.10	3	Horizontal	207	1.78	-
2402MHz	Pass	PK	4.804G	45.80	74.00	-28.20	4.10	3	Horizontal	207	1.78	-
2402MHz	Pass	AV	4.804G	34.83	54.00	-19.17	4.10	3	Vertical	188	188	-
2402MHz	Pass	PK	4.804G	46.90	74.00	-27.10	4.10	3	Vertical	188	188	-
2442MHz	Pass	AV	2.39G	48.02	54.00	-5.98	32.72	3	Horizontal	283	1.93	-
2442MHz	Pass	AV	2.442G	89.42	Inf	-Inf	32.93	3	Horizontal	283	1.93	-
2442MHz	Pass	AV	2.524G	49.02	54.00	-4.98	33.24	3	Horizontal	283	1.93	-
2442MHz	Pass	PK	2.3968G	56.99	74.00	-17.01	32.75	3	Horizontal	283	1.93	-
2442MHz	Pass	PK	2.4416G	90.46	Inf	-Inf	32.93	3	Horizontal	283	1.93	-
2442MHz	Pass	PK	2.5232G	58.49	74.00	-15.51	33.24	3	Horizontal	283	1.93	-
2442MHz	Pass	AV	2.396G	47.95	54.00	-6.05	32.74	3	Vertical	87	1.34	-
2442MHz	Pass	AV	2.442G	96.29	Inf	-Inf	32.93	3	Vertical	87	1.34	-
2442MHz	Pass	AV	2.522G	49.08	54.00	-4.92	33.23	3	Vertical	87	1.34	-
2442MHz	Pass	PK	2.3972G	57.64	74.00	-16.36	32.75	3	Vertical	87	1.34	-
2442MHz	Pass	PK	2.4416G	97.21	Inf	-Inf	32.93	3	Vertical	87	1.34	-
2442MHz	Pass	PK	2.5376G	58.39	74.00	-15.61	33.29	3	Vertical	87	1.34	-
2442MHz	Pass	AV	4.884G	34.36	54.00	-19.64	4.30	3	Horizontal	358	1.23	-
2442MHz	Pass	PK	4.884G	45.07	74.00	-28.93	4.30	3	Horizontal	358	1.23	-
2442MHz	Pass	AV	4.884G	35.19	54.00	-18.81	4.30	3	Vertical	122	122	-
2442MHz	Pass	PK	4.884G	45.51	74.00	-28.49	4.30	3	Vertical	122	122	-
2480MHz	Pass	AV	2.48G	89.82	Inf	-Inf	33.08	3	Horizontal	183	3.69	-
2480MHz	Pass	AV	2.5198G	49.00	54.00	-5.00	33.23	3	Horizontal	183	3.69	-
2480MHz	Pass	PK	2.4798G	90.72	Inf	-Inf	33.08	3	Horizontal	183	3.69	-
2480MHz	Pass	PK	2.4864G	58.41	74.00	-15.59	33.11	3	Horizontal	183	3.69	-
2480MHz	Pass	AV	2.48G	96.54	Inf	-Inf	33.08	3	Vertical	133	2.65	-
2480MHz	Pass	AV	2.5212G	49.16	54.00	-4.84	33.23	3	Vertical	133	2.65	-
2480MHz	Pass	PK	2.4798G	97.40	Inf	-Inf	33.08	3	Vertical	133	2.65	-
2480MHz	Pass	PK	2.5066G	58.79	74.00	-15.21	33.18	3	Vertical	133	2.65	-
2480MHz	Pass	AV	4.96G	34.72	54.00	-19.28	4.49	3	Horizontal	219	2.23	-
2480MHz	Pass	PK	4.96G	46.17	74.00	-27.83	4.49	3	Horizontal	219	2.23	-
2480MHz	Pass	AV	4.96G	35.25	54.00	-18.75	4.49	3	Vertical	309	1.22	-
2480MHz	Pass	PK	4.96G	46.22	74.00	-27.78	4.49	3	Vertical	309	1.22	-

BT-LE(1Mbps)

2402MHz_TX

09/11/2017

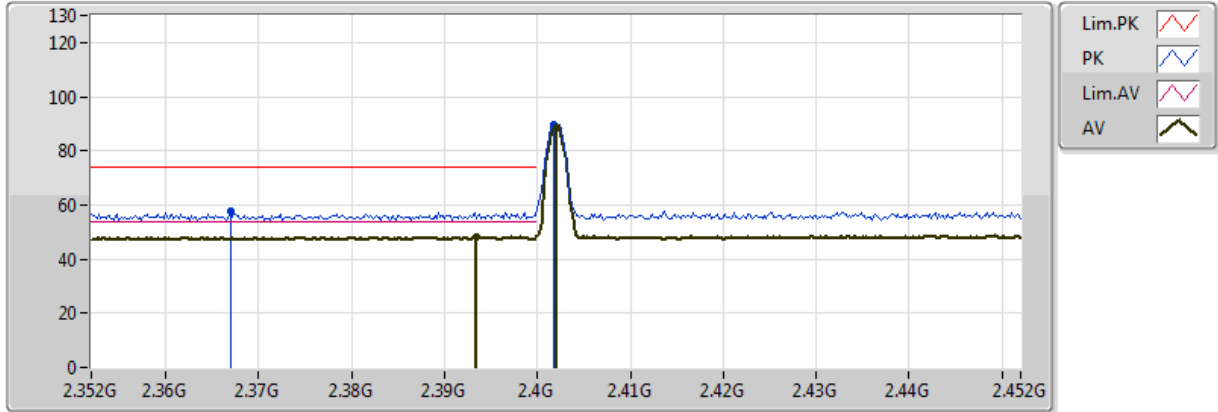


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3964G	48.23	54.00	-5.77	32.75	3	Vertical	230	1.23	-	15.48	27.01	5.74	-
AV	2.402G	93.79	Inf	-Inf	32.77	3	Vertical	230	1.23	-	61.02	27.03	5.74	-
PK	2.3998G	58.97	74.00	-15.03	32.76	3	Vertical	230	1.23	-	26.21	27.02	5.74	-
PK	2.4022G	94.66	Inf	-Inf	32.77	3	Vertical	230	1.23	-	61.89	27.03	5.74	-

BT-LE(1Mbps)

2402MHz_TX

09/11/2017

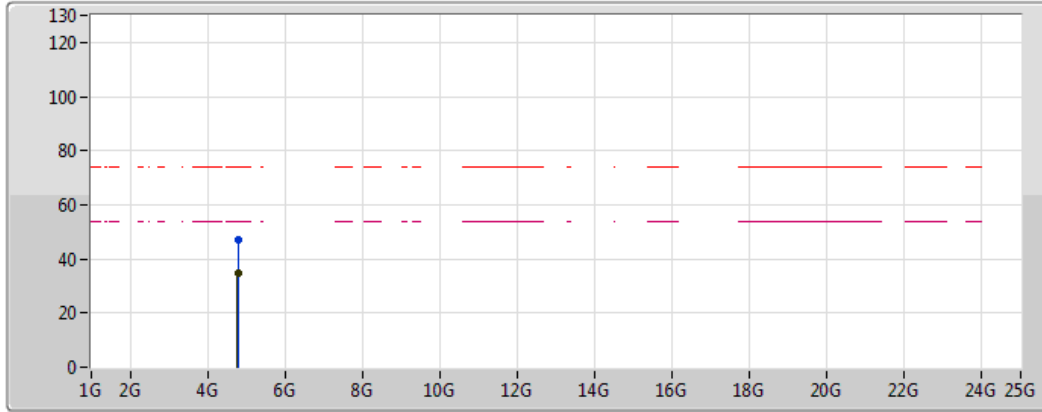


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3934G	47.98	54.00	-6.02	32.73	3	Horizontal	187	3.14	-	15.25	27.00	5.73	-
AV	2.402G	88.81	Inf	-Inf	32.77	3	Horizontal	187	3.14	-	56.04	27.03	5.74	-
PK	2.367G	57.49	74.00	-16.51	32.63	3	Horizontal	187	3.14	-	24.86	26.93	5.70	-
PK	2.4018G	89.74	Inf	-Inf	32.77	3	Horizontal	187	3.14	-	56.97	27.03	5.74	-





BT-LE(1Mbps)

2402MHz_TX

10/11/2017



Legend for the spectrum plot:

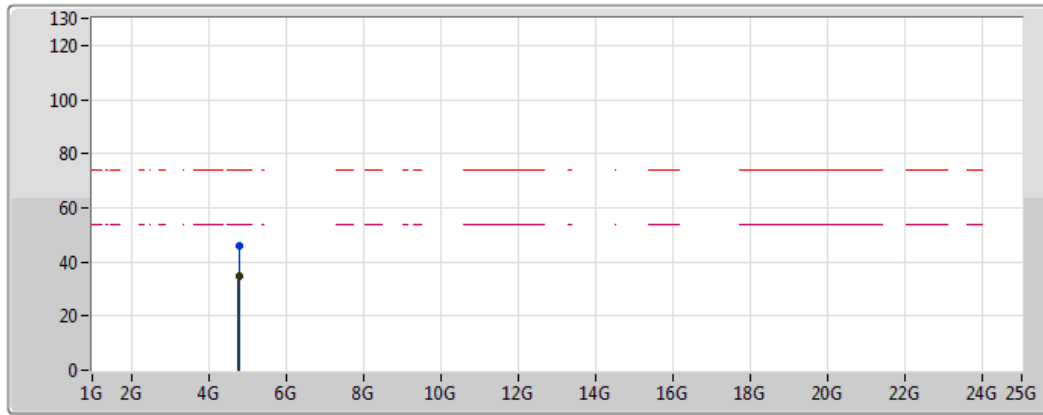
- Lim.PK 
- PK 
- Lim.AV 
- AV 

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.804G	34.83	54.00	-19.17	4.10	3	Vertical	188	188	-	30.73	31.19	8.08	35.17
PK	4.804G	46.90	74.00	-27.10	4.10	3	Vertical	188	188	-	42.80	31.19	8.08	35.17

BT-LE(1Mbps)

2402MHz_TX

10/11/2017



Legend for plot:

- Lim.PK: Red dashed line
- PK: Blue solid line
- Lim.AV: Magenta dashed line
- AV: Green solid line

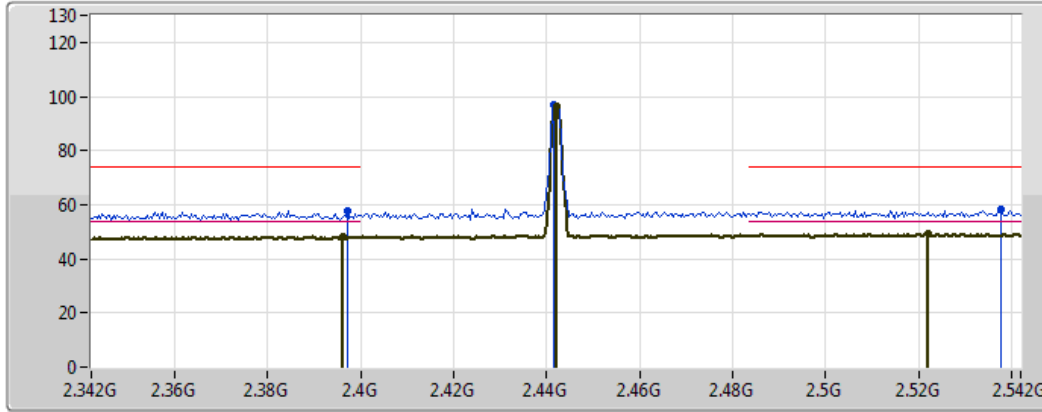
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.804G	34.67	54.00	-19.33	4.10	3	Horizontal	207	1.78	-	30.57	31.19	8.08	35.17
PK	4.804G	45.80	74.00	-28.20	4.10	3	Horizontal	207	1.78	-	41.70	31.19	8.08	35.17



BT-LE(1Mbps)

2442MHz_TX

09/11/2017



Legend for plot:

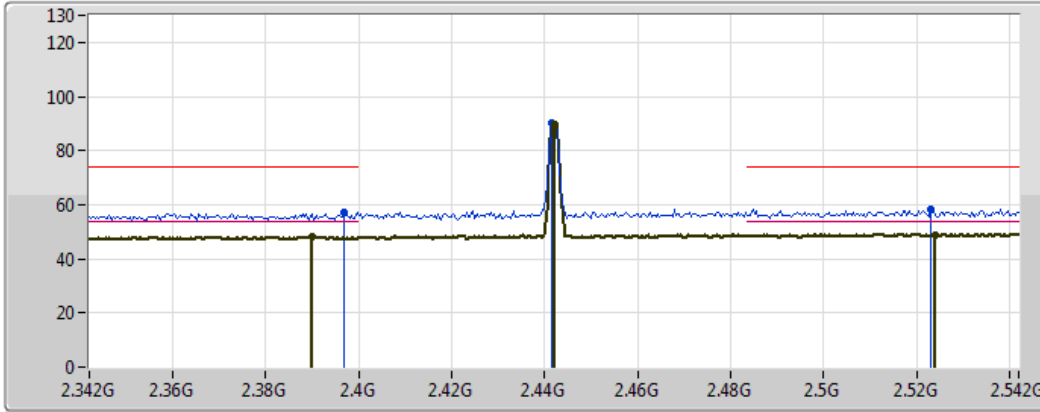
- Lim.PK (Red line)
- PK (Blue line)
- Lim.AV (Green line)
- AV (Black line)

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.396G	47.95	54.00	-6.05	32.74	3	Vertical	87	1.34	-	15.21	27.01	5.74	-
AV	2.442G	96.29	Inf	-Inf	32.93	3	Vertical	87	1.34	-	63.37	27.14	5.79	-
AV	2.522G	49.08	54.00	-4.92	33.23	3	Vertical	87	1.34	-	15.85	27.36	5.88	-
PK	2.3972G	57.64	74.00	-16.36	32.75	3	Vertical	87	1.34	-	24.89	27.01	5.74	-
PK	2.4416G	97.21	Inf	-Inf	32.93	3	Vertical	87	1.34	-	64.28	27.14	5.79	-
PK	2.5376G	58.39	74.00	-15.61	33.29	3	Vertical	87	1.34	-	25.10	27.40	5.89	-

BT-LE(1Mbps)

2442MHz_TX

09/11/2017



Legend for plot series:

- Lim.PK: Red line with a peak icon
- PK: Blue line with a peak icon
- Lim.AV: Red line with a peak icon
- AV: Green line with a peak icon

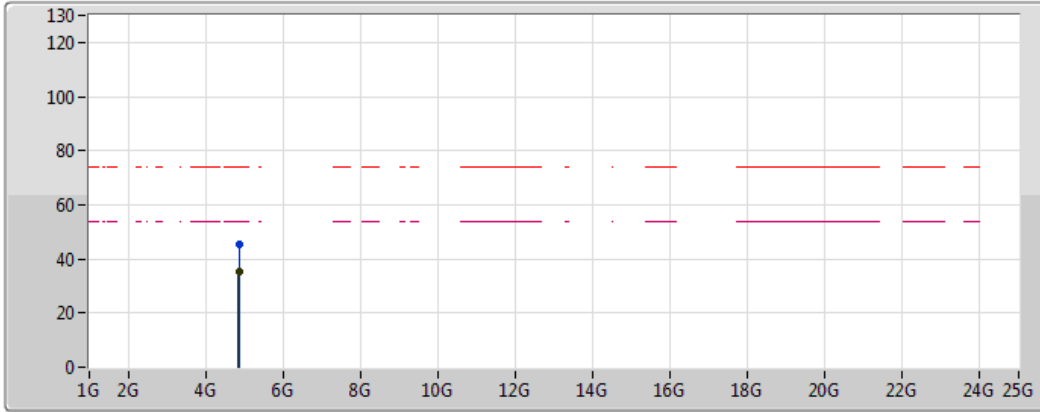
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.39G	48.02	54.00	-5.98	32.72	3	Horizontal	283	1.93	-	15.30	26.99	5.73	-
AV	2.442G	89.42	Inf	-Inf	32.93	3	Horizontal	283	1.93	-	56.49	27.14	5.79	-
AV	2.524G	49.02	54.00	-4.98	33.24	3	Horizontal	283	1.93	-	15.78	27.36	5.88	-
PK	2.3968G	56.99	74.00	-17.01	32.75	3	Horizontal	283	1.93	-	24.24	27.01	5.74	-
PK	2.4416G	90.46	Inf	-Inf	32.93	3	Horizontal	283	1.93	-	57.54	27.14	5.79	-
PK	2.5232G	58.49	74.00	-15.51	33.24	3	Horizontal	283	1.93	-	25.26	27.36	5.88	-



BT-LE(1Mbps)

2442MHz_TX

10/11/2017



Legend for plot:

- Lim.PK: Red dashed line with triangle marker
- PK: Blue solid line with circle marker
- Lim.AV: Magenta dashed line with triangle marker
- AV: Green solid line with triangle marker

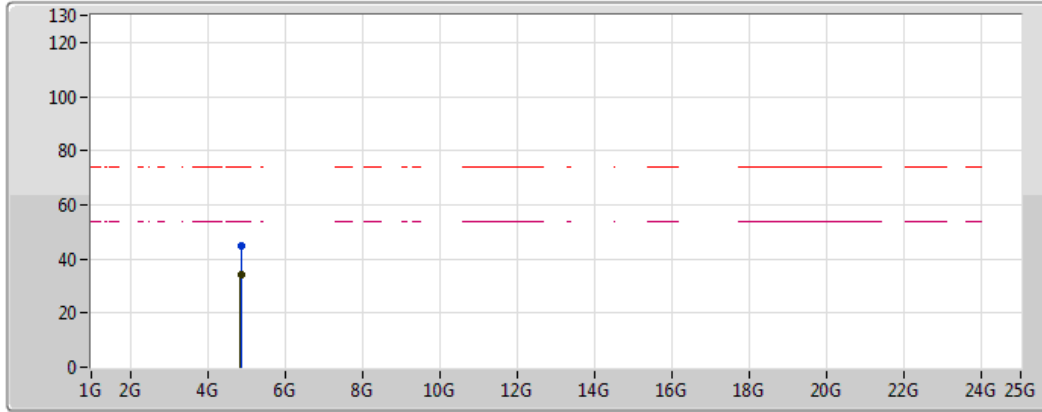
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.884G	35.19	54.00	-18.81	4.30	3	Vertical	122	122	-	30.89	31.31	8.18	35.20
PK	4.884G	45.51	74.00	-28.49	4.30	3	Vertical	122	122	-	41.21	31.31	8.18	35.20



BT-LE(1Mbps)

2442MHz_TX

10/11/2017



Legend for the spectrum plot:

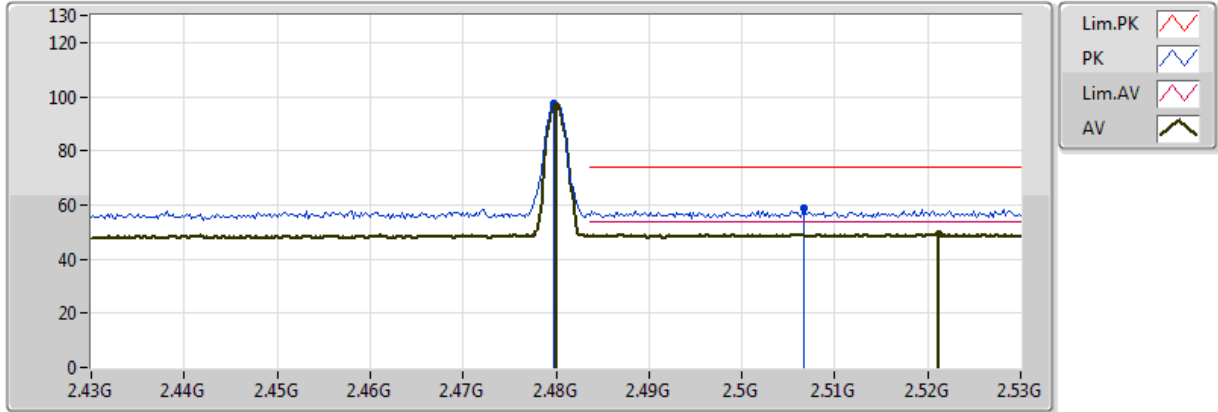
- Lim.PK: Red dashed line
- PK: Blue line with a peak marker
- Lim.AV: Magenta dashed line
- AV: Green line with a peak marker

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.884G	34.36	54.00	-19.64	4.30	3	Horizontal	358	1.23	-	30.06	31.31	8.18	35.20
PK	4.884G	45.07	74.00	-28.93	4.30	3	Horizontal	358	1.23	-	40.77	31.31	8.18	35.20

BT-LE(1Mbps)

2480MHz_TX

09/11/2017

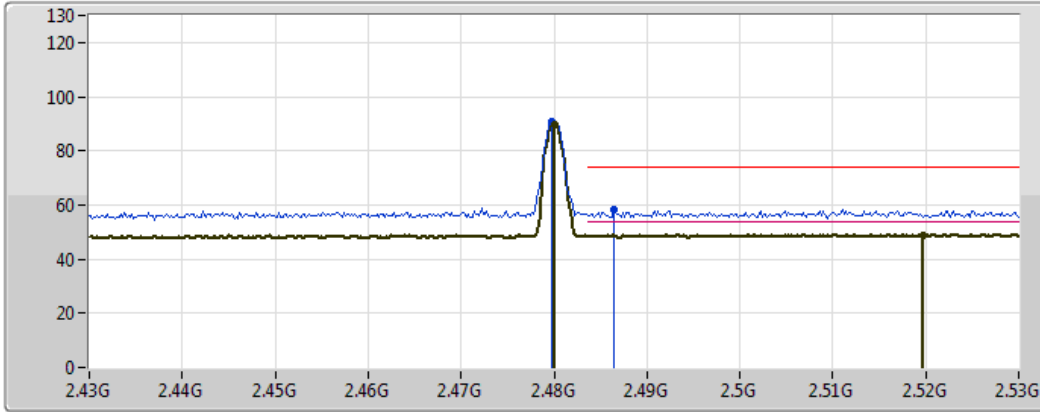


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	96.54	Inf	-Inf	33.08	3	Vertical	133	2.65	-	63.46	27.24	5.84	-
AV	2.5212G	49.16	54.00	-4.84	33.23	3	Vertical	133	2.65	-	15.93	27.36	5.88	-
PK	2.4798G	97.40	Inf	-Inf	33.08	3	Vertical	133	2.65	-	64.32	27.24	5.84	-
PK	2.5066G	58.79	74.00	-15.21	33.18	3	Vertical	133	2.65	-	25.61	27.32	5.87	-

BT-LE(1Mbps)

2480MHz_TX

09/11/2017



Legend for plot:

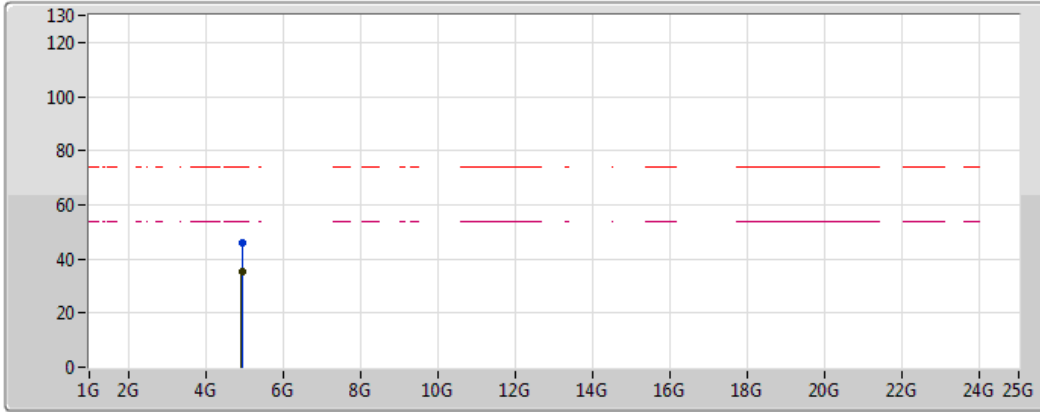
- Lim.PK (Red line)
- PK (Blue line)
- Lim.AV (Pink line)
- AV (Green line)

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	89.82	Inf	-Inf	33.08	3	Horizontal	183	3.69	-	56.74	27.24	5.84	-
AV	2.5198G	49.00	54.00	-5.00	33.23	3	Horizontal	183	3.69	-	15.77	27.35	5.88	-
PK	2.4798G	90.72	Inf	-Inf	33.08	3	Horizontal	183	3.69	-	57.65	27.24	5.84	-
PK	2.4864G	58.41	74.00	-15.59	33.11	3	Horizontal	183	3.69	-	25.30	27.26	5.84	-

BT-LE(1Mbps)

2480MHz_TX

10/11/2017



Legend for plot:

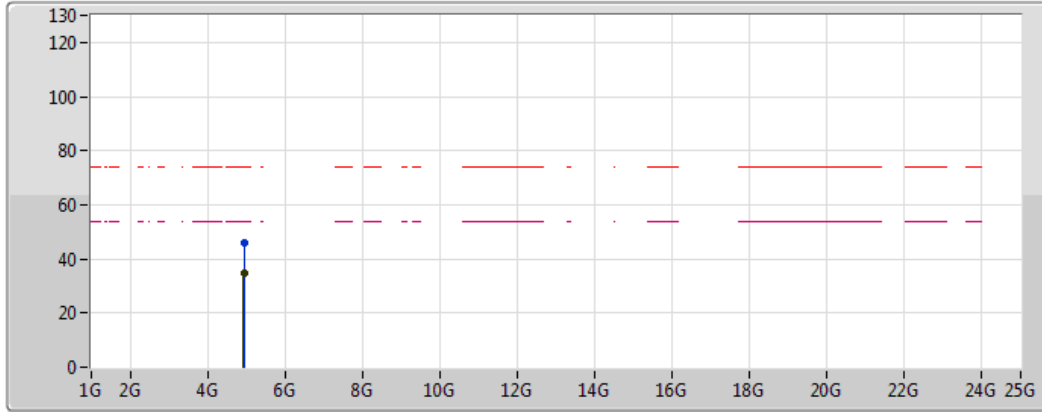
- Lim.PK: Red dashed line with peak icon
- PK: Blue line with peak icon
- Lim.AV: Magenta dashed line with average icon
- AV: Green line with average icon

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.96G	35.25	54.00	-18.75	4.49	3	Vertical	309	1.22	-	30.76	31.44	8.27	35.21
PK	4.96G	46.22	74.00	-27.78	4.49	3	Vertical	309	1.22	-	41.73	31.44	8.27	35.21

BT-LE(1Mbps)

2480MHz_TX

10/11/2017



Legend for the spectrum plot:

- Lim.PK: Red dashed line with a peak icon
- PK: Blue solid line with a peak icon
- Lim.AV: Magenta dashed line with a peak icon
- AV: Green solid line with a peak icon

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.96G	34.72	54.00	-19.28	4.49	3	Horizontal	219	2.23	-	30.23	31.44	8.27	35.21
PK	4.96G	46.17	74.00	-27.83	4.49	3	Horizontal	219	2.23	-	41.68	31.44	8.27	35.21