FCC Test Report

FCC ID	:	**2AOXWRBA030**
Equipment	:	**RockBand Alert**
Brand Name	:	**RockBand**
Model Name	:	**RBA030**
Applicant	:	**AiCare Corporation** **3F., No.28, Ln. 260, Sec. 2, Zhongyi Rd., Guishan Dist., Taoyuan City 33378, Taiwan**
Manufacturer	:	**Hi-Professional Tech Co., Ltd.** **No. 28, Ln. 260, Sec. 2, Zhongyi Rd., Guishan Dist., Taoyuan City 33378, Taiwan (R.O.C.)**
Standard	:	**47 CFR FCC Part 15.247**

The product was received on Mar. 13, 2019, and testing was started from Mar. 18, 2019 and completed on Mar. 21, 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

History of this test report

Report No.	Version	Description	Issued Date
FR931324AL	01	Initial issue of report	Apr. 02, 2019

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	Not Required	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: 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	tomtech	BI09-01003	FPC antenna	Mini-IPEX	-8

Note 1: The EUT has one antenna.

For BT function:

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

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

1.1.3 EUT Information

Operational Condition				
EUT Power Type	From Battery			
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)	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)

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

1.2 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			
☒	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.			
☐	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	Dexter	22.2~24.3°C / 57~60%	19/Mar/2019~ 21/Mar/2019
Radiated	03CH09-HY	Jeff	24.0~24.6°C / 58.6~59.3%	18/Mar/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	3V

2.2 Test Channel Mode

Test Software	-

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

2.3 The Worst Case Measurement Configuration

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

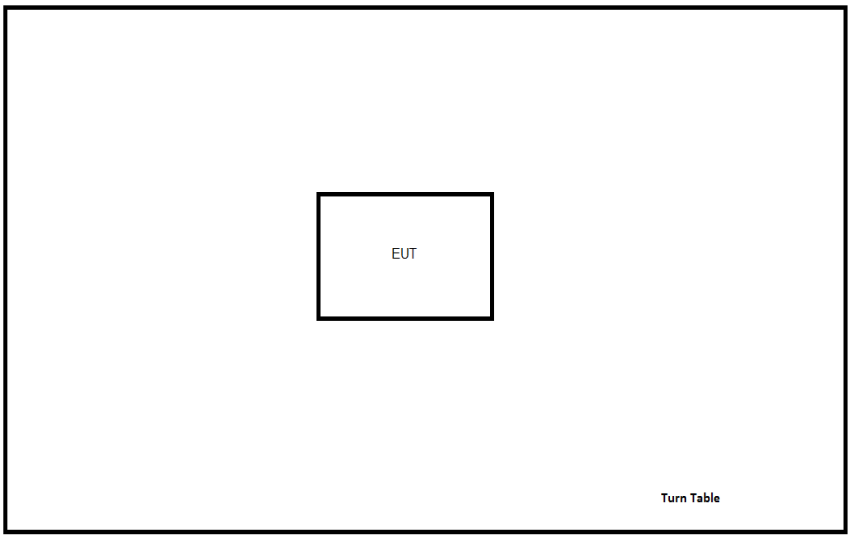
The Worst Case Mode for Following Conformance Tests			
Tests Item	Emissions in Restricted Frequency Bands		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
Operating Mode < 1GHz	CTX		
1	Battery mode		
Operating Mode > 1GHz	CTX		
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	DC Power Supply	GW	GPS-3030DD	-

2.5 Test Setup Diagram

Test Setup Diagram - Radiated Test



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Measuring Instruments

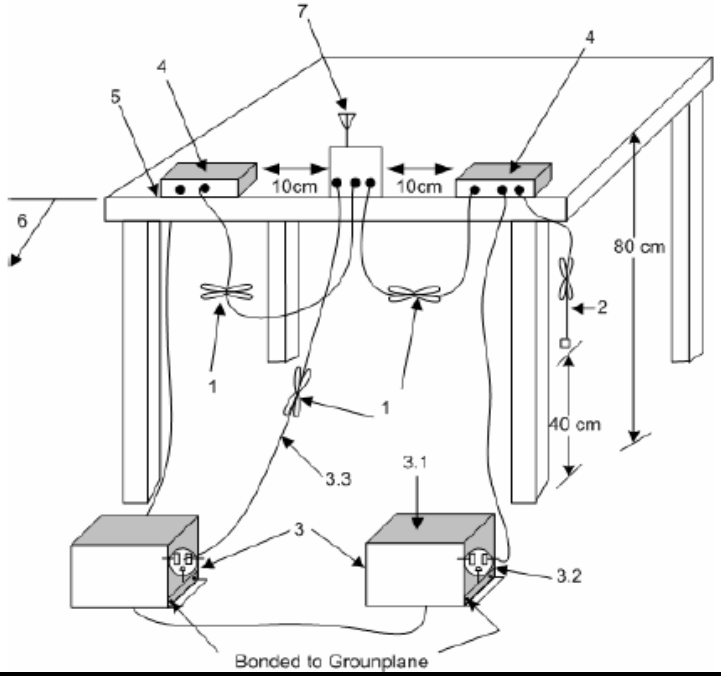
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 foray power-line conducted emissions.

3.1.4 Test Setup

AC Power-line Conducted Emissions



3.1.5 Test Result of AC Power-line Conducted Emissions

Please refer to FCC 15.207 which states, “Measurements to demonstrate compliance with the conducted limits are not required for devices employ Battery for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines”.
Therefore, for this device, AC Power Line Conducted Emissions investigation is not required.

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
Systems using digital modulation techniques:
▪ 6 dB bandwidth ≥ 500 kHz.

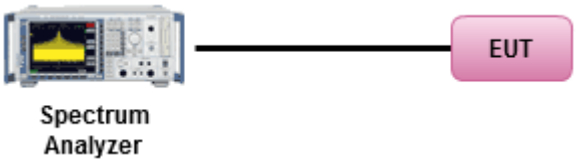
3.2.2 Measuring Instruments

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

Emission Bandwidth


3.2.5 Test Result of Emission Bandwidth

Refer as Appendix A

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit		
	▪ If G_{TX} ≤ 6 dBi, then P_{Out} ≤ 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 + 8dB dBm
e.i.r.p. Power Limit:		
▪ 2400-2483.5 MHz Band		
	▪ Point-to-multipoint systems (P2M): P_{eirp} ≤ 36 dBm (4 W)	
	▪ Point-to-point systems (P2P): P_{eirp} ≤ MAX(36, [P_{Out} + G_{TX}]) dBm	
	▪ Smart antenna system (SAS)	
		- Single beam: P_{eirp} ≤ MAX(36, P_{Out} + G_{TX}) dBm
		- Overlap beam: P_{eirp} ≤ MAX(36, P_{Out} + G_{TX}) dBm
		- Aggregate power on all beams: P_{eirp} ≤ 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: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup

Maximum Conducted Output Power (Power Meter)

3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
▪ Power Spectral Density (PSD)≤8 dBm/3kHz

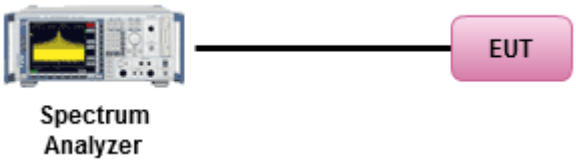
3.4.2 Measuring Instruments

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

Power Spectral Density
 Spectrum Analyzer

3.4.5 Test Result of Power Spectral Density

Refer as Appendix C

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.	

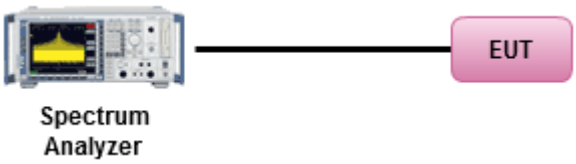
3.5.2 Measuring Instruments

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

Emissions in Non-restricted Frequency Bands


3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix D

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 below30 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.

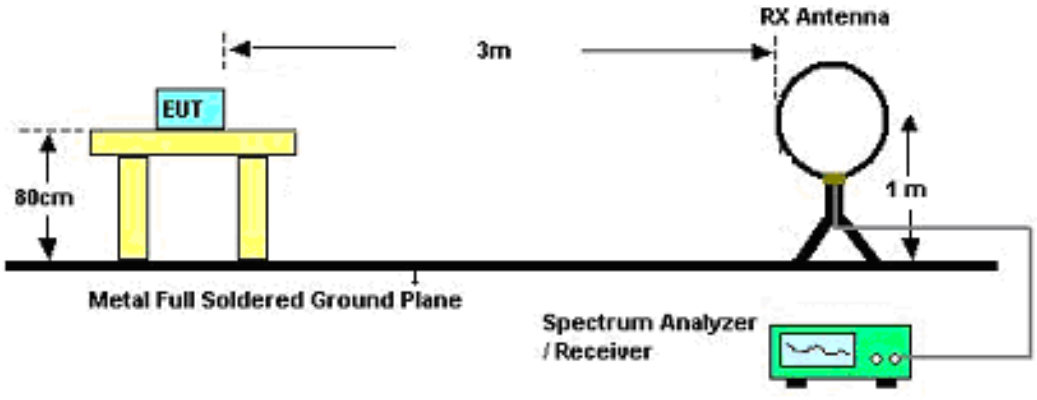
3.6.2 Measuring Instruments

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

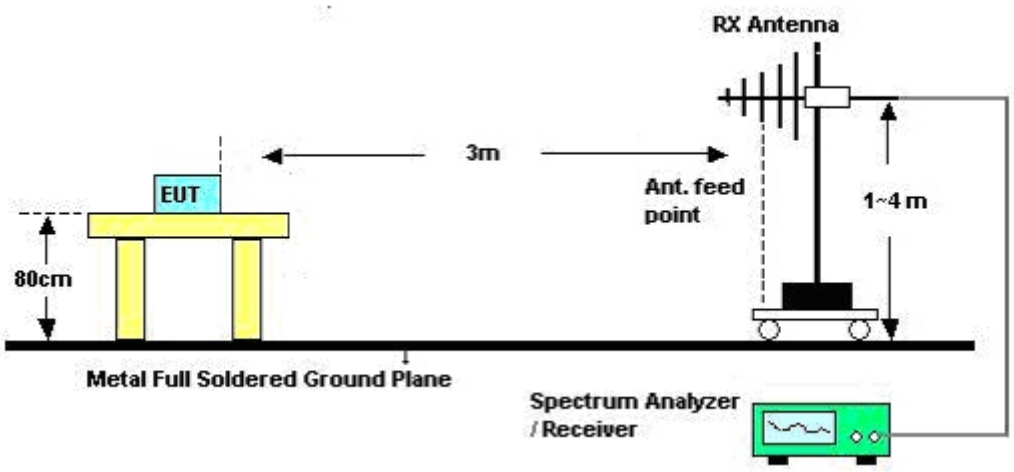
3.6.3 Test Procedures

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 ≥ 1 GHz for peak measurement. For average measurement, refer as 1.1.4.

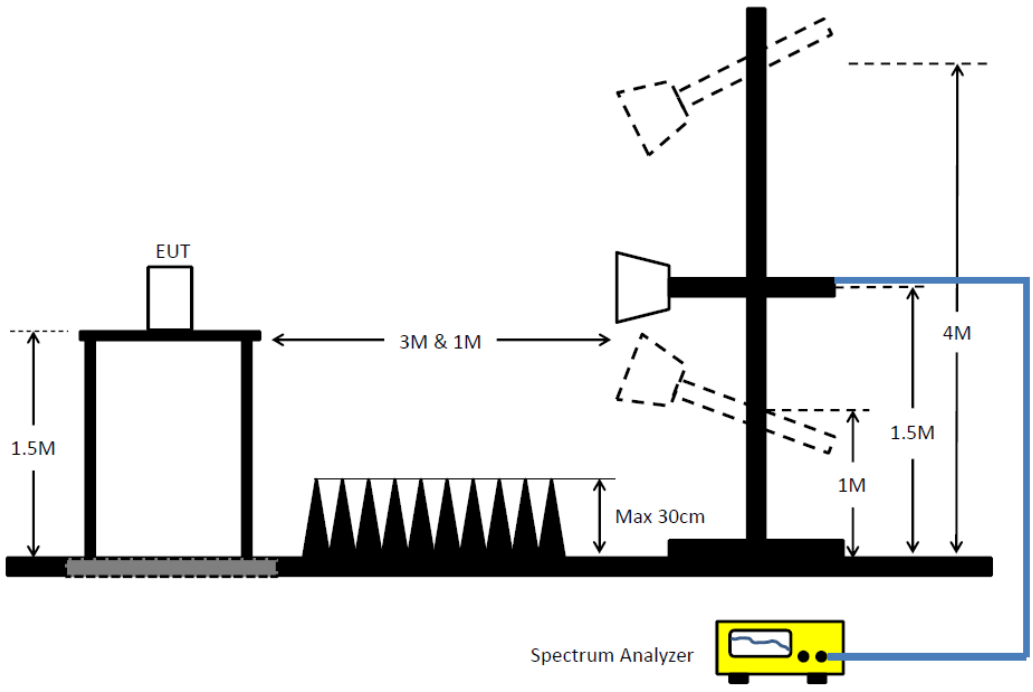
3.6.4 Test Setup

Emissions in Restricted Frequency Bands
9kHz ~30MHz


30MHz~1GHz



Above 1GHz



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 E

4 Test Equipment and Calibration Data

Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	100593	9kHz - 40GHz	27/Dec/2018	26/Dec/2019
Signal Generator	R&S	SMB100A	177785	10MHz~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 0.2m	HUBER	MY37960/4	RF Cable - 17	30MHz~26G	11/Jan/2019	10/Jan/2020
Cable 0.2m	HUBER	MY37963/4	RF Cable - 22	30MHz~26G	11/Jan/2019	10/Jan/2020
Cable 0.5m	HUBER	MY33066/4	RF Cable - 30	30MHz~26G	11/Jan/2019	10/Jan/2020

Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz ~ 1GHz	23/Apr/2018	22/Apr/2019
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	1GHz ~ 18GHz	14/Jun/2018	13/Jun/2019
Microwave Preamplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	10/May/2018	09/May/2019
Amplifier	EMC	EMC9135	980232	9KHz~1GHz	27/Apr/2018	26/Apr/2019
EMI Test Receiver	R&S	ESR3	102052	9kHz ~ 3.6GHz	10/Apr/2018	09/Apr/2019
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200885	10Hz ~ 44GHz	31/Jul/2018	30/Jul/2019
Bilog Antenna & 5dB Attenuator	TESEQ & MTJ	CBL6111D & MTJ6102-05	35418 / 3	30MHz~1GHz	02/Oct/2018	03/Oct/2019
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA9120 D 1534	1GHz~18GHz	30/Apr/2018	29/Apr/2019
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170339	15GHz ~ 40GHz	11/Apr/2018	10/Apr/2019
Preamplifier	MITEQ	TTA1840-35-HG	1864481	18GHz ~ 40GHz	24/Aug/2018	23/Aug/2019
Loop Antenna	TESEQ	HLA 6120	31244	9k-30MHz	29/Mar/2018	28/Mar/2019
LF-CABLE-2019 0218	Jye Bao	RG142	CB028	9kHz ~ 1GHz	18/Feb/2019	17/Feb/2020
RF Cable-high	HUBER+ SUHNER	SUCOFLEX104	SN 556626/4 + 556627	1GHz ~ 40GHz	02/Mar/2019	01/Mar/2020

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)	725k	1.061M	1M06F1D	696.25k	1.051M

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;

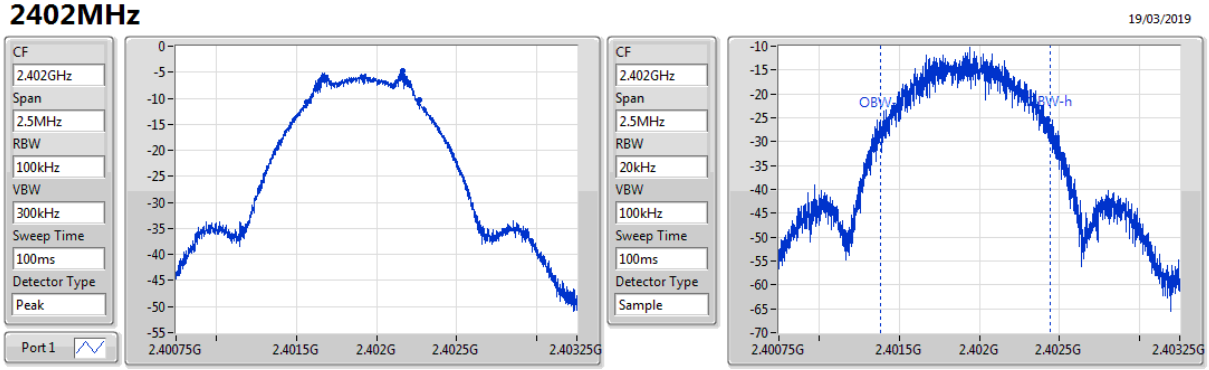
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	500k	698.75k	1.057M
2440MHz_TnomVnom	Pass	500k	696.25k	1.051M
2480MHz_TnomVnom	Pass	500k	725k	1.061M

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

BT-LE(1Mbps) **EBW**

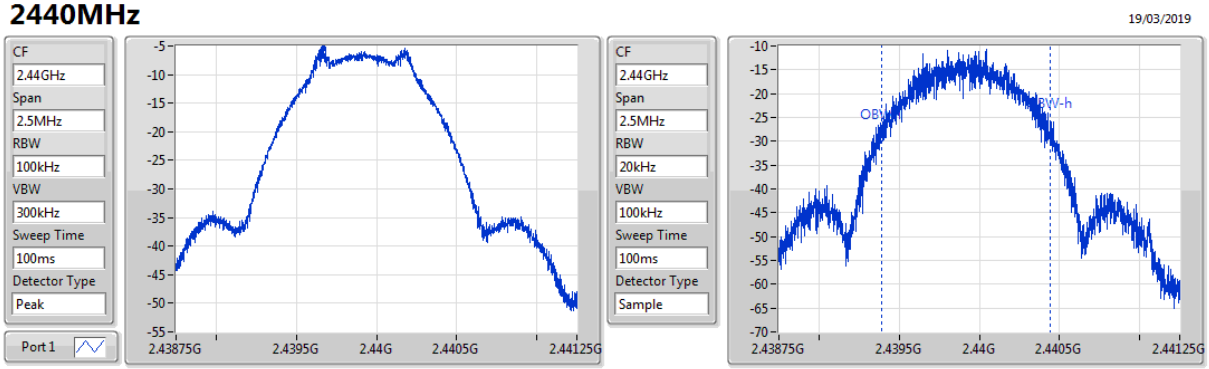
2402MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
698.75k	2.401568G	2.402266G	1.057M	2.401385G	2.402442G	500k	1

BT-LE(1Mbps) **EBW**

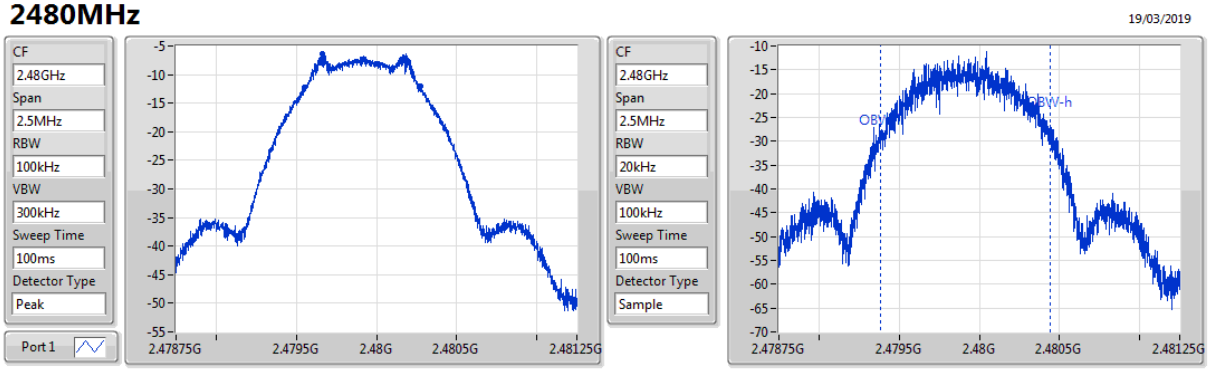
2440MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
696.25k	2.43957G	2.440266G	1.051M	2.43939G	2.440441G	500k	1

BT-LE(1Mbps) **EBW**

2480MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
725k	2.479549G	2.480274G	1.061M	2.479384G	2.480445G	500k	1

Summary

Mode	Power	Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	-4.52	0.00035

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	-8.00	-4.52	30.00
2440MHz_TnomVnom	Pass	-8.00	-5.03	30.00
2480MHz_TnomVnom	Pass	-8.00	-5.91	30.00

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-18.96

RBW=3kHz.

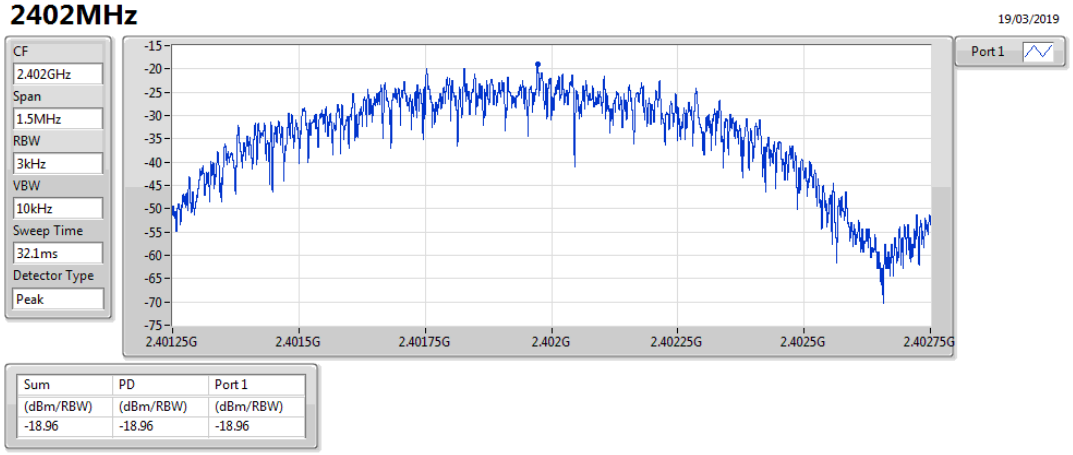
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	-8.00	-18.96	8.00
2440MHz_TnomVnom	Pass	-8.00	-20.20	8.00
2480MHz_TnomVnom	Pass	-8.00	-19.67	8.00

RBW=3kHz.

BT-LE(1Mbps) **PSD**

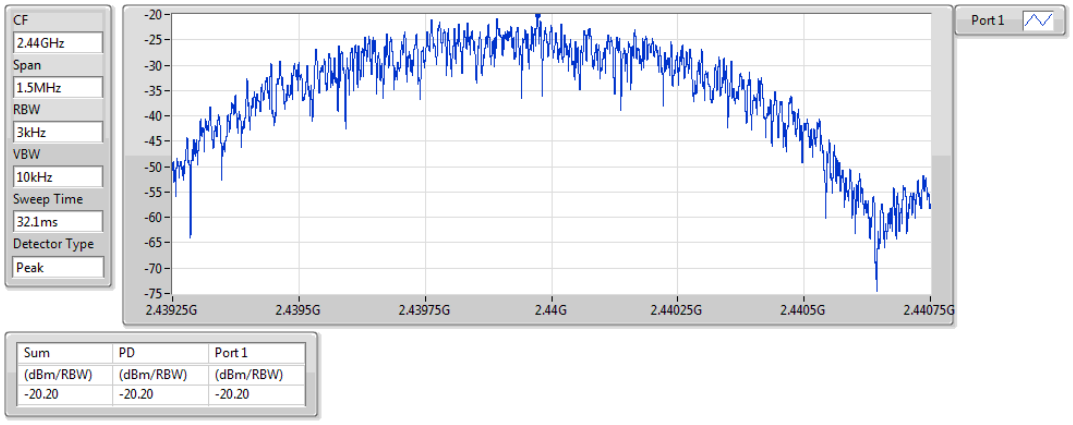
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-18.96	-18.96	-18.96

BT-LE(1Mbps) **PSD**

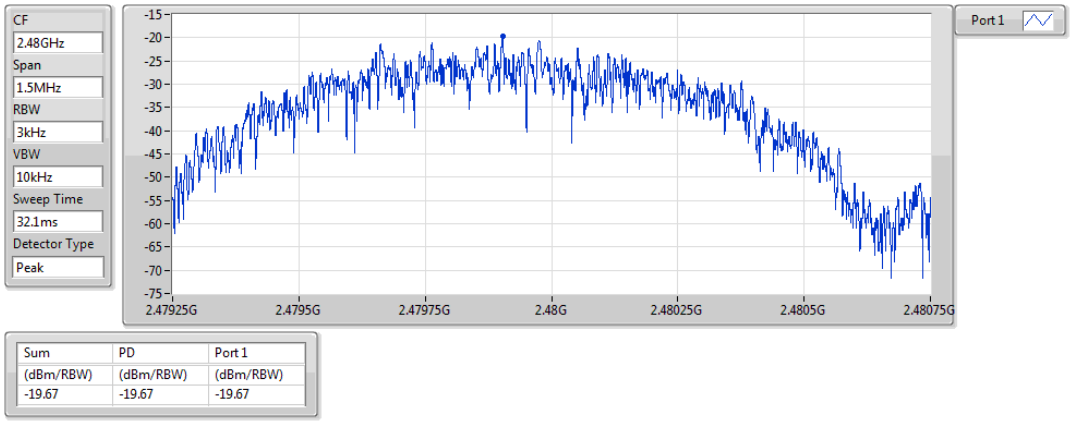
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-20.20	-20.20	-20.20

BT-LE(1Mbps) **PSD**

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-19.67	-19.67	-19.67

Summary

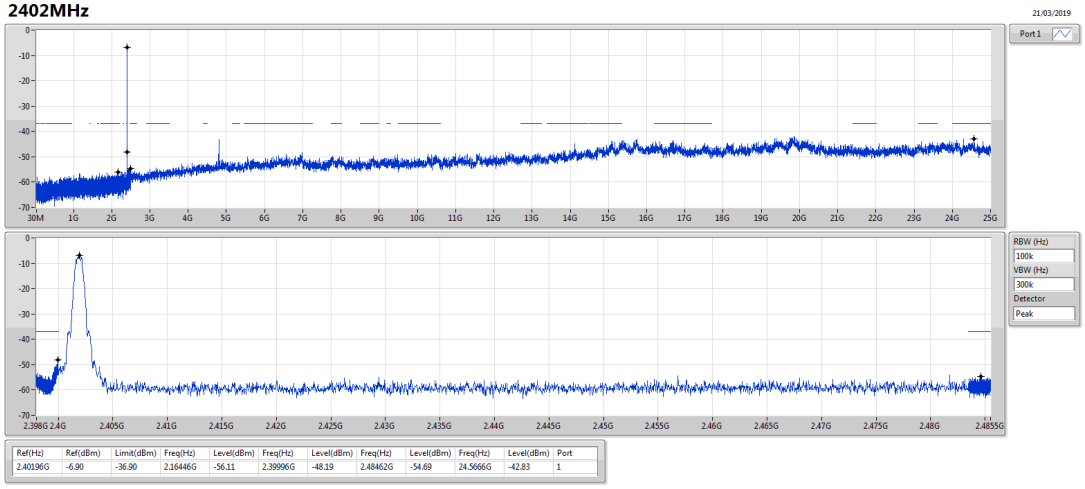
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.40196G	-6.90	-36.90	2.16446G	-56.11	2.39996G	-48.19	2.48462G	-54.69	24.5666G	-42.83	1

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	2.40196G	-6.90	-36.90	2.16446G	-56.11	2.39996G	-48.19	2.48462G	-54.69	24.5666G	-42.83	1
2440MHz_TnomVnom	Pass	2.40196G	-6.90	-36.90	1.89983G	-55.55	2.39968G	-54.79	2.48518G	-54.05	24.48217G	-43.03	1
2480MHz_TnomVnom	Pass	2.40196G	-6.90	-36.90	2.39208G	-55.47	2.39885G	-54.33	2.48521G	-54.15	24.11912G	-43.39	1

BT-LE(1Mbps) **CSE NdB**

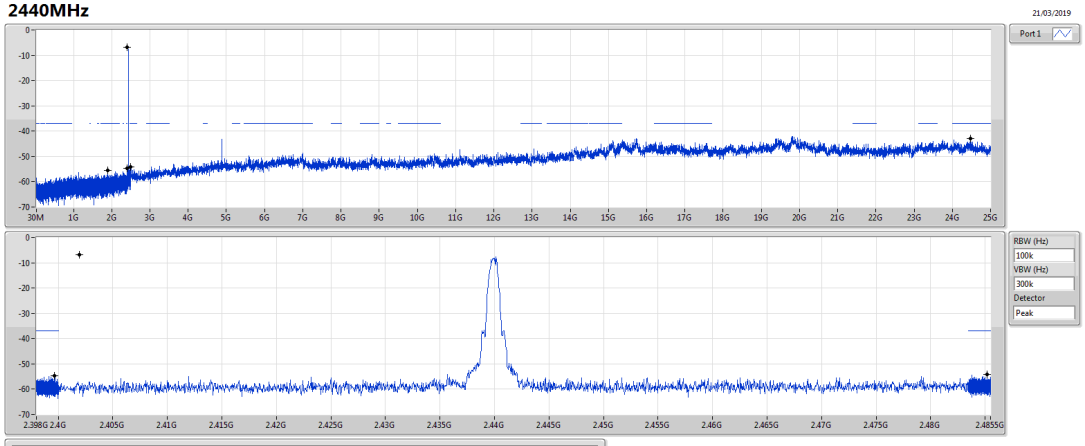
2402MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40196G	-6.90	-36.90	2.16446G	-56.11	2.39996G	-48.19	2.48462G	-54.69	24.5666G	-42.83	1

BT-LE(1Mbps) **CSE NdB**

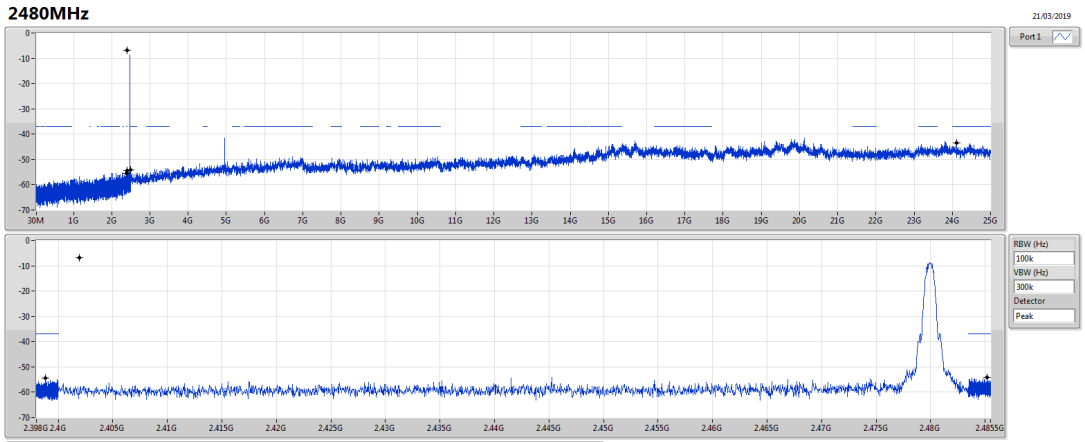
2440MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40196G	-6.90	-36.90	1.89983G	-55.55	2.39968G	-54.79	2.48518G	-54.05	24.48217G	-43.03	1

BT-LE(1Mbps) **CSE NdB**

2480MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40196G	-6.90	-36.90	2.39208G	-55.47	2.39885G	-54.33	2.48521G	-54.15	24.11912G	-43.39	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	PK	237.58M	42.83	46.00	-3.17	-18.87	3	Vertical	360	1.00	-

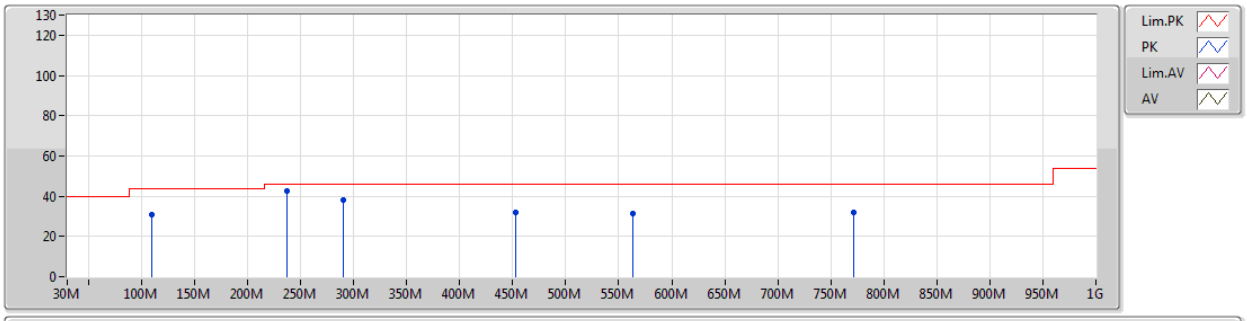
Result

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	109.54M	30.58	43.50	-12.92	-19.79	3	Vertical	360	1.00	-
2440MHz	Pass	PK	237.58M	42.83	46.00	-3.17	-18.87	3	Vertical	360	1.00	-
2440MHz	Pass	PK	289.96M	38.36	46.00	-7.64	-16.86	3	Vertical	360	1.00	-
2440MHz	Pass	PK	452.92M	31.97	46.00	-14.03	-12.55	3	Vertical	360	1.00	-
2440MHz	Pass	PK	563.5M	31.65	46.00	-14.35	-9.99	3	Vertical	360	1.00	-
2440MHz	Pass	PK	771.08M	31.82	46.00	-14.18	-7.75	3	Vertical	360	1.00	-
2440MHz	Pass	PK	53.28M	27.87	40.00	-12.13	-24.39	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	270.56M	32.95	46.00	-13.05	-16.37	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	289.96M	38.16	46.00	-7.84	-16.86	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	334.58M	29.54	46.00	-16.46	-15.86	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	571.26M	30.43	46.00	-15.57	-10.26	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	771.08M	31.12	46.00	-14.88	-7.75	3	Horizontal	0	1.00	-

BT-LE(1Mbps)

2440MHz_Battery

18/03/2019

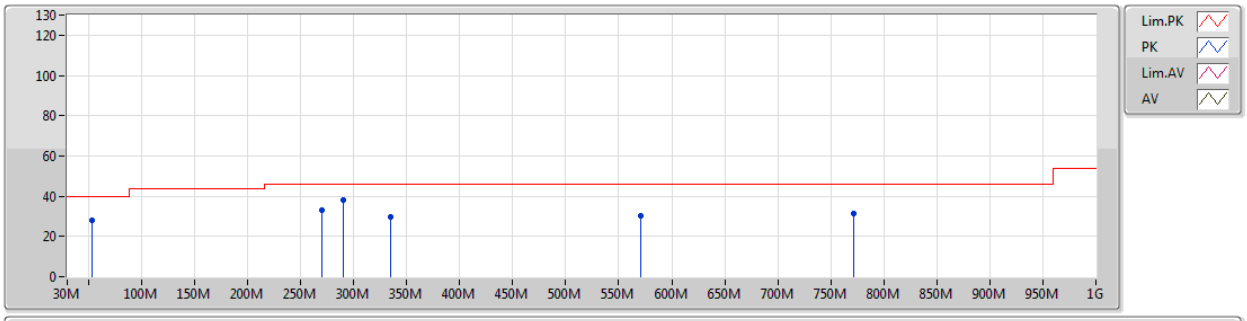


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
PK	109.54M	30.58	43.50	-12.92	-19.79	3	Vertical	360	1.00	-
PK	237.58M	42.83	46.00	-3.17	-18.87	3	Vertical	360	1.00	-
PK	289.96M	38.36	46.00	-7.64	-16.86	3	Vertical	360	1.00	-
PK	452.92M	31.97	46.00	-14.03	-12.55	3	Vertical	360	1.00	-
PK	563.5M	31.65	46.00	-14.35	-9.99	3	Vertical	360	1.00	-
PK	771.08M	31.82	46.00	-14.18	-7.75	3	Vertical	360	1.00	-

BT-LE(1Mbps)

2440MHz_Battery

18/03/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
PK	53.28M	27.87	40.00	-12.13	-24.39	3	Horizontal	0	1.00	-
PK	270.56M	32.95	46.00	-13.05	-16.37	3	Horizontal	0	1.00	-
PK	289.96M	38.16	46.00	-7.84	-16.86	3	Horizontal	0	1.00	-
PK	334.58M	29.54	46.00	-16.46	-15.86	3	Horizontal	0	1.00	-
PK	571.26M	30.43	46.00	-15.57	-10.26	3	Horizontal	0	1.00	-
PK	771.08M	31.12	46.00	-14.88	-7.75	3	Horizontal	0	1.00	-

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	4.8795G	53.12	54.00	-0.88	2.27	3	Horizontal	341	2.69	-

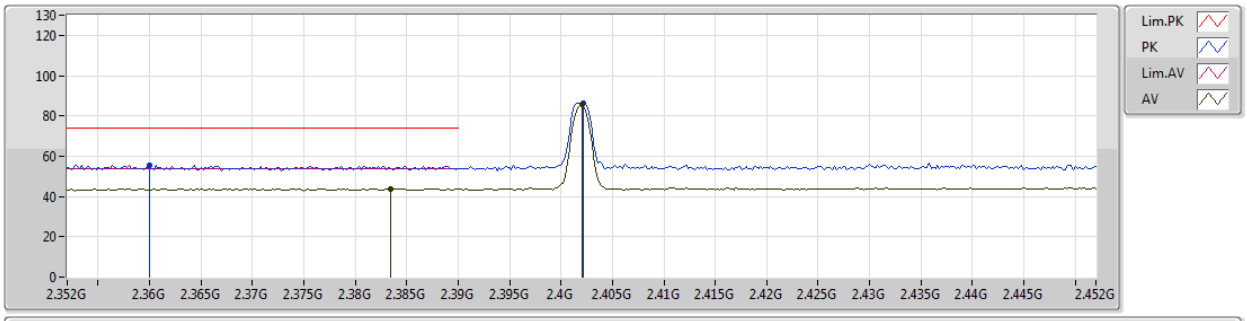
Result

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	2.3834G	43.78	54.00	-10.22	30.75	3	Vertical	156	1.16	-
2402MHz	Pass	AV	2.402G	85.64	Inf	-Inf	30.82	3	Vertical	156	1.16	-
2402MHz	Pass	PK	2.36G	55.54	74.00	-18.46	30.67	3	Vertical	156	1.16	-
2402MHz	Pass	PK	2.4022G	86.49	Inf	-Inf	30.82	3	Vertical	156	1.16	-
2402MHz	Pass	AV	2.3542G	43.94	54.00	-10.06	30.65	3	Horizontal	183	1.08	-
2402MHz	Pass	AV	2.402G	69.82	Inf	-Inf	30.82	3	Horizontal	183	1.08	-
2402MHz	Pass	PK	2.3582G	56.06	74.00	-17.94	30.66	3	Horizontal	183	1.08	-
2402MHz	Pass	PK	2.4022G	71.40	Inf	-Inf	30.82	3	Horizontal	183	1.08	-
2402MHz	Pass	AV	4.80349G	47.88	54.00	-6.12	2.08	3	Vertical	325	1.04	-
2402MHz	Pass	PK	4.80337G	53.13	74.00	-20.87	2.08	3	Vertical	325	1.04	-
2402MHz	Pass	AV	4.80396G	51.79	54.00	-2.21	2.08	3	Horizontal	335	1.03	-
2402MHz	Pass	PK	4.80331G	56.34	74.00	-17.66	2.08	3	Horizontal	335	1.03	-
2440MHz	Pass	AV	2.368G	43.90	54.00	-10.10	30.70	3	Vertical	142	1.30	-
2440MHz	Pass	AV	2.44G	83.86	Inf	-Inf	30.95	3	Vertical	142	1.30	-
2440MHz	Pass	AV	2.4844G	44.57	54.00	-9.43	31.12	3	Vertical	142	1.30	-
2440MHz	Pass	PK	2.346G	55.29	74.00	-18.71	30.62	3	Vertical	142	1.30	-
2440MHz	Pass	PK	2.44G	84.73	Inf	-Inf	30.95	3	Vertical	142	1.30	-
2440MHz	Pass	PK	2.4928G	55.64	74.00	-18.36	31.14	3	Vertical	142	1.30	-
2440MHz	Pass	AV	2.3776G	43.86	54.00	-10.14	30.73	3	Horizontal	212	1.05	-
2440MHz	Pass	AV	2.44G	68.89	Inf	-Inf	30.95	3	Horizontal	212	1.05	-
2440MHz	Pass	AV	2.488G	44.63	54.00	-9.37	31.13	3	Horizontal	212	1.05	-
2440MHz	Pass	PK	2.368G	55.90	74.00	-18.10	30.70	3	Horizontal	212	1.05	-
2440MHz	Pass	PK	2.4404G	70.77	Inf	-Inf	30.95	3	Horizontal	212	1.05	-
2440MHz	Pass	PK	2.4844G	56.37	74.00	-17.63	31.12	3	Horizontal	212	1.05	-
2440MHz	Pass	AV	4.87948G	48.55	54.00	-5.45	2.27	3	Vertical	320	1.05	-
2440MHz	Pass	PK	4.87942G	53.69	74.00	-20.31	2.27	3	Vertical	320	1.05	-
2440MHz	Pass	AV	4.8795G	53.12	54.00	-0.88	2.27	3	Horizontal	341	2.69	-
2440MHz	Pass	PK	4.87934G	57.65	74.00	-16.35	2.27	3	Horizontal	341	2.69	-
2480MHz	Pass	AV	2.48G	84.14	Inf	-Inf	31.09	3	Vertical	164	1.12	-
2480MHz	Pass	AV	2.498G	44.96	54.00	-9.04	31.16	3	Vertical	164	1.12	-
2480MHz	Pass	PK	2.4796G	85.07	Inf	-Inf	31.09	3	Vertical	164	1.12	-
2480MHz	Pass	PK	2.4974G	56.35	74.00	-17.65	31.16	3	Vertical	164	1.12	-
2480MHz	Pass	AV	2.48G	69.48	Inf	-Inf	31.09	3	Horizontal	194	1.01	-
2480MHz	Pass	AV	2.4968G	45.15	54.00	-8.85	31.16	3	Horizontal	194	1.01	-
2480MHz	Pass	PK	2.4796G	71.18	Inf	-Inf	31.09	3	Horizontal	194	1.01	-
2480MHz	Pass	PK	2.4922G	56.06	74.00	-17.94	31.14	3	Horizontal	194	1.01	-
2480MHz	Pass	AV	4.9599G	47.27	54.00	-6.73	2.47	3	Vertical	323	1.01	-
2480MHz	Pass	PK	4.95922G	52.81	74.00	-21.19	2.46	3	Vertical	323	1.01	-
2480MHz	Pass	AV	4.9599G	53.00	54.00	-1.00	2.47	3	Horizontal	350	1.25	-
2480MHz	Pass	PK	4.95929G	57.51	74.00	-16.49	2.46	3	Horizontal	350	1.25	-

BT-LE(1Mbps)

2402MHz_TX

18/03/2019

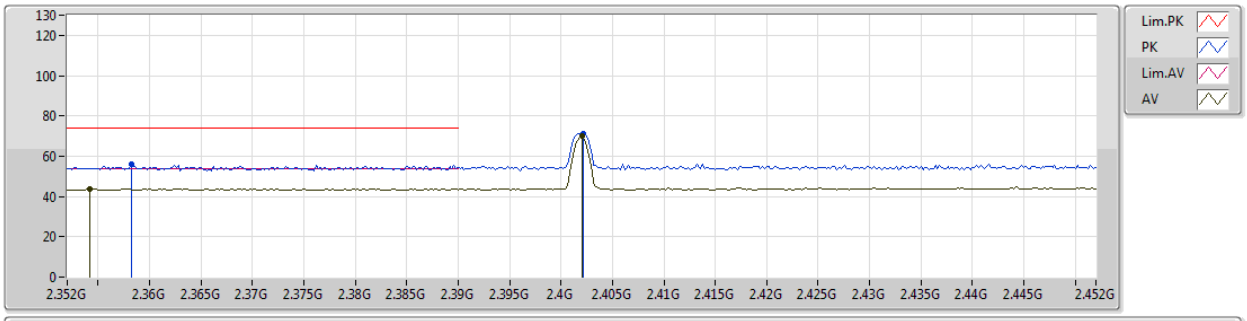


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3834G	43.78	54.00	-10.22	30.75	3	Vertical	156	1.16	-
AV	2.402G	85.64	Inf	-Inf	30.82	3	Vertical	156	1.16	-
PK	2.36G	55.54	74.00	-18.46	30.67	3	Vertical	156	1.16	-
PK	2.4022G	86.49	Inf	-Inf	30.82	3	Vertical	156	1.16	-

BT-LE(1Mbps)

2402MHz_TX

18/03/2019

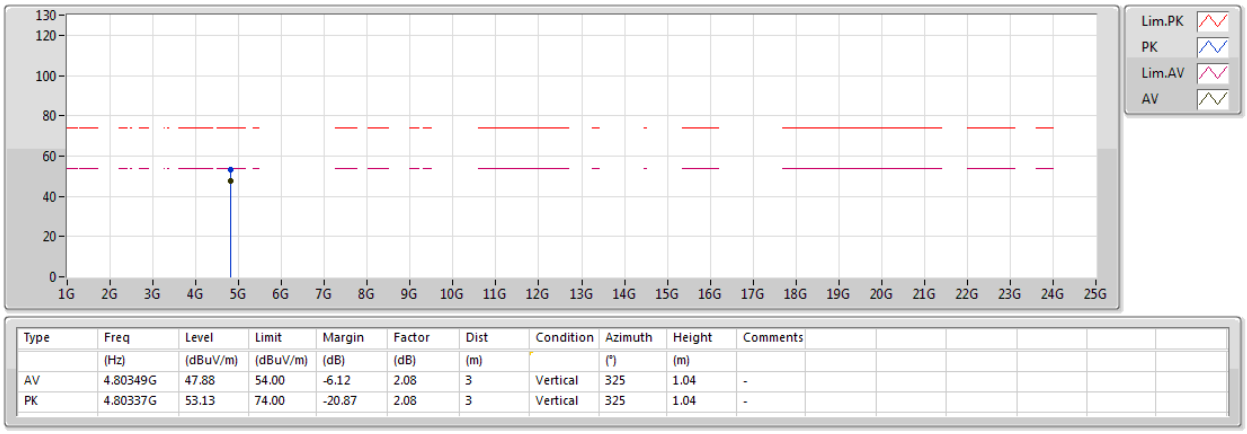


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3542G	43.94	54.00	-10.06	30.65	3	Horizontal	183	1.08	-
AV	2.402G	69.82	Inf	-Inf	30.82	3	Horizontal	183	1.08	-
PK	2.3582G	56.06	74.00	-17.94	30.66	3	Horizontal	183	1.08	-
PK	2.4022G	71.40	Inf	-Inf	30.82	3	Horizontal	183	1.08	-

BT-LE(1Mbps)

2402MHz_TX

18/03/2019

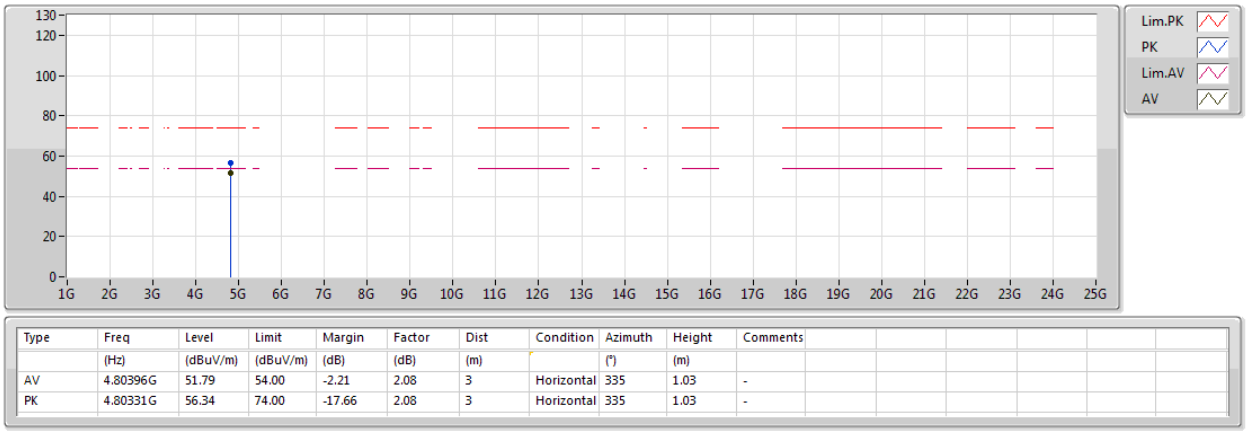


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.80349G	47.88	54.00	-6.12	2.08	3	Vertical	325	1.04	-
PK	4.80337G	53.13	74.00	-20.87	2.08	3	Vertical	325	1.04	-

BT-LE(1Mbps)

2402MHz_TX

18/03/2019

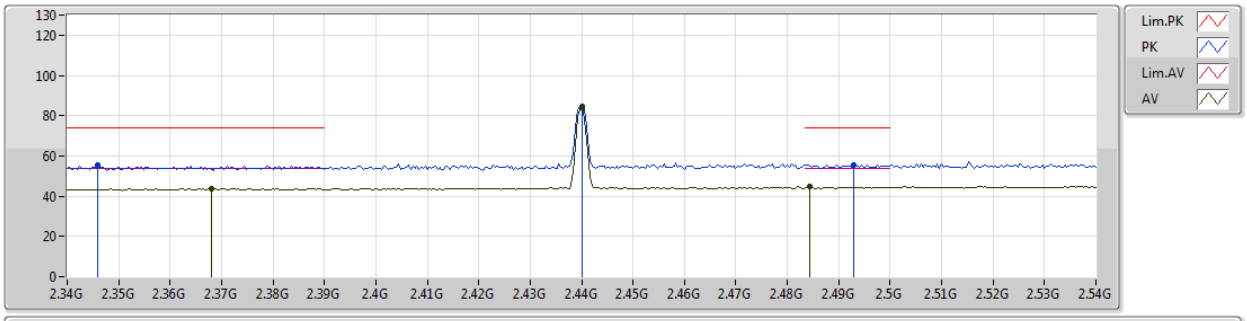


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.80396G	51.79	54.00	-2.21	2.08	3	Horizontal	335	1.03	-
PK	4.80331G	56.34	74.00	-17.66	2.08	3	Horizontal	335	1.03	-

BT-LE(1Mbps)

2440MHz_TX

18/03/2019

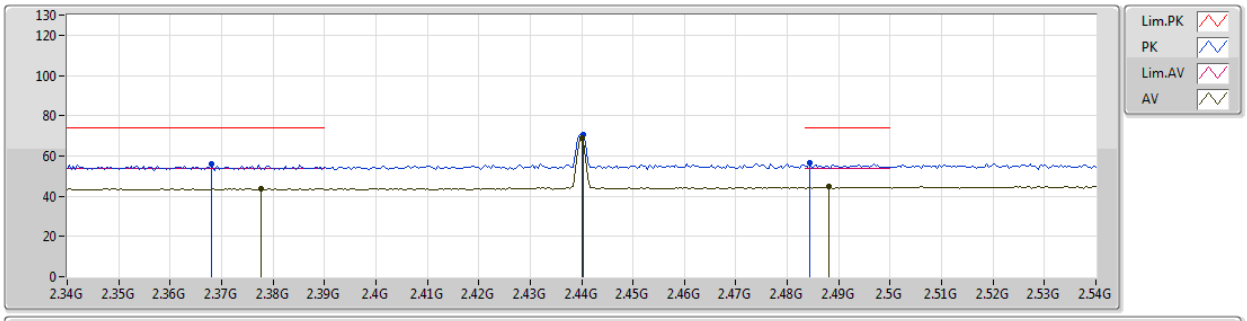


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.368G	43.90	54.00	-10.10	30.70	3	Vertical	142	1.30	-
AV	2.44G	83.86	Inf	-Inf	30.95	3	Vertical	142	1.30	-
AV	2.4844G	44.57	54.00	-9.43	31.12	3	Vertical	142	1.30	-
PK	2.346G	55.29	74.00	-18.71	30.62	3	Vertical	142	1.30	-
PK	2.44G	84.73	Inf	-Inf	30.95	3	Vertical	142	1.30	-
PK	2.4928G	55.64	74.00	-18.36	31.14	3	Vertical	142	1.30	-

BT-LE(1Mbps)

2440MHz_TX

18/03/2019

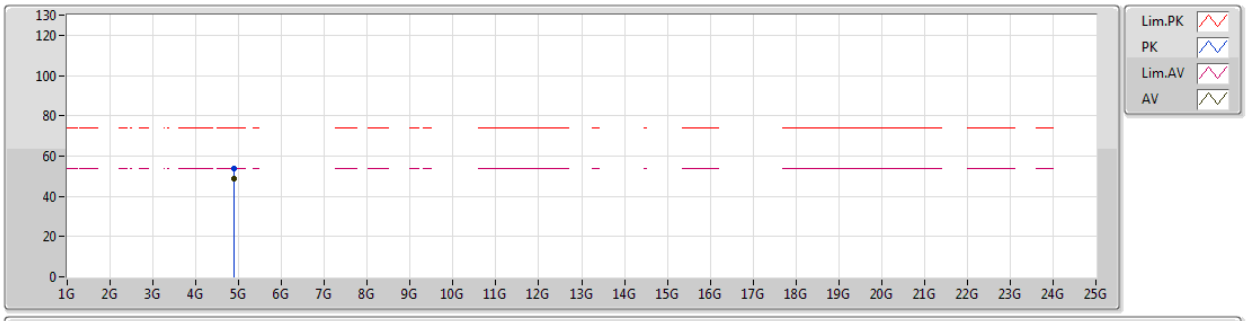


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3776G	43.86	54.00	-10.14	30.73	3	Horizontal	212	1.05	-
AV	2.44G	68.89	Inf	-Inf	30.95	3	Horizontal	212	1.05	-
AV	2.488G	44.63	54.00	-9.37	31.13	3	Horizontal	212	1.05	-
PK	2.368G	55.90	74.00	-18.10	30.70	3	Horizontal	212	1.05	-
PK	2.4404G	70.77	Inf	-Inf	30.95	3	Horizontal	212	1.05	-
PK	2.4844G	56.37	74.00	-17.63	31.12	3	Horizontal	212	1.05	-

BT-LE(1Mbps)

2440MHz_TX

18/03/2019

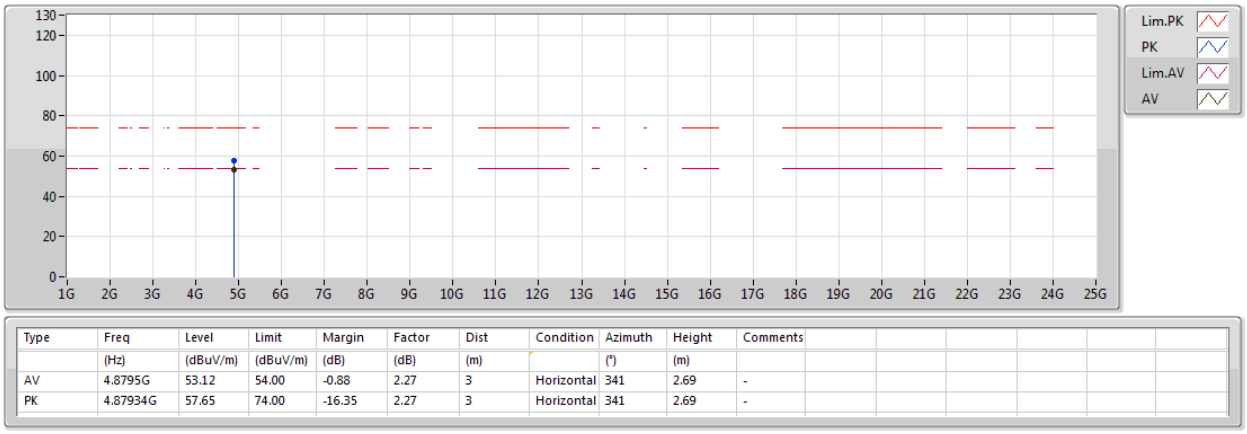


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.87948G	48.55	54.00	-5.45	2.27	3	Vertical	320	1.05	-
PK	4.87942G	53.69	74.00	-20.31	2.27	3	Vertical	320	1.05	-

BT-LE(1Mbps)

2440MHz_TX

18/03/2019

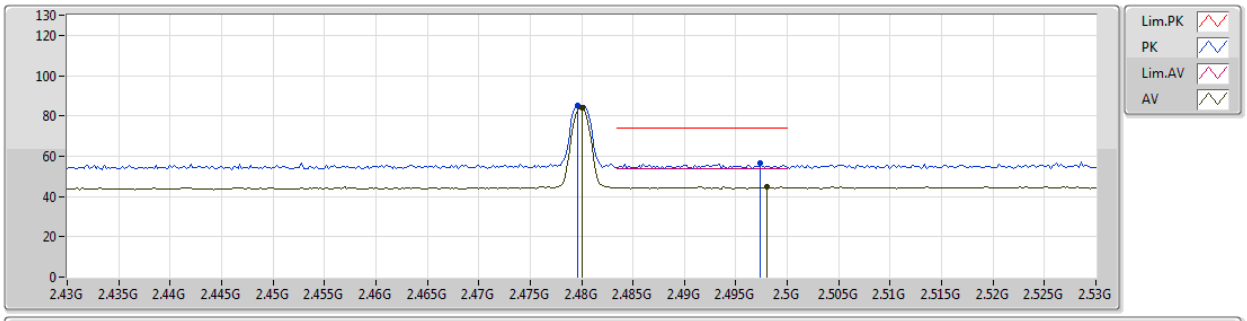


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.8795G	53.12	54.00	-0.88	2.27	3	Horizontal	341	2.69	-
PK	4.87934G	57.65	74.00	-16.35	2.27	3	Horizontal	341	2.69	-

BT-LE(1Mbps)

2480MHz_TX

18/03/2019

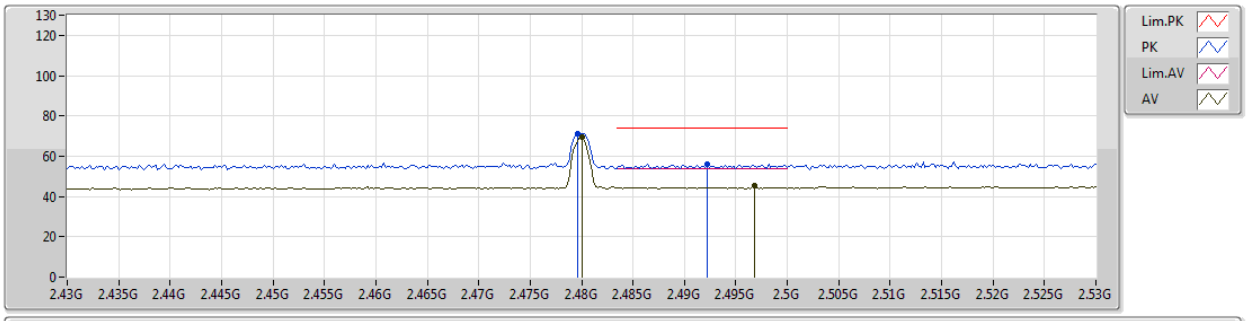


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.48G	84.14	Inf	-Inf	31.09	3	Vertical	164	1.12	-
AV	2.498G	44.96	54.00	-9.04	31.16	3	Vertical	164	1.12	-
PK	2.4796G	85.07	Inf	-Inf	31.09	3	Vertical	164	1.12	-
PK	2.4974G	56.35	74.00	-17.65	31.16	3	Vertical	164	1.12	-

BT-LE(1Mbps)

2480MHz_TX

18/03/2019

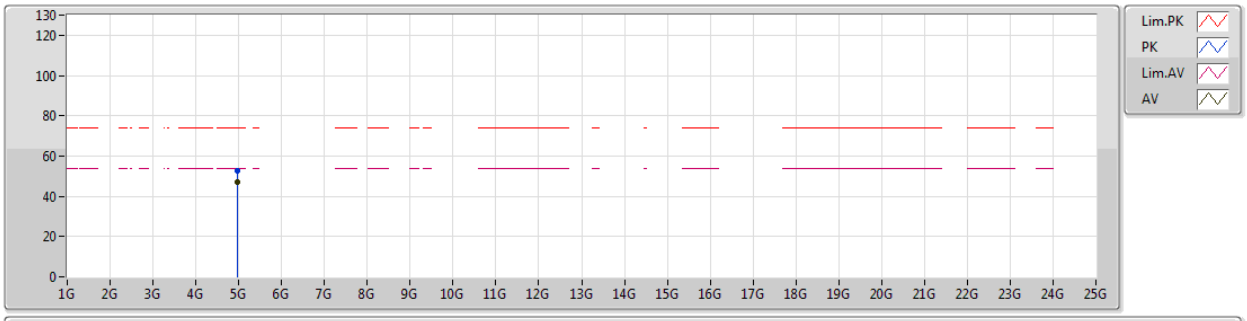


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.48G	69.48	Inf	-Inf	31.09	3	Horizontal	194	1.01	-
AV	2.4968G	45.15	54.00	-8.85	31.16	3	Horizontal	194	1.01	-
PK	2.4796G	71.18	Inf	-Inf	31.09	3	Horizontal	194	1.01	-
PK	2.4922G	56.06	74.00	-17.94	31.14	3	Horizontal	194	1.01	-

BT-LE(1Mbps)

2480MHz_TX

18/03/2019

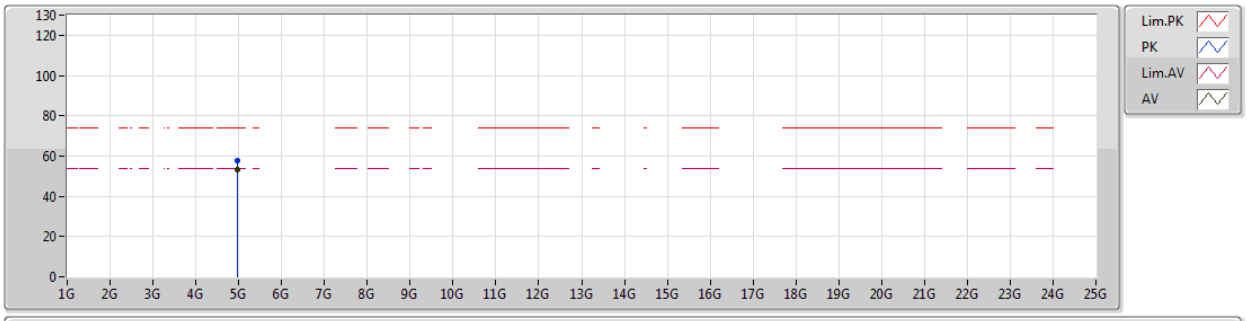


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.9599G	47.27	54.00	-6.73	2.47	3	Vertical	323	1.01	-
PK	4.95922G	52.81	74.00	-21.19	2.46	3	Vertical	323	1.01	-

BT-LE(1Mbps)

2480MHz_TX

18/03/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.9599G	53.00	54.00	-1.00	2.47	3	Horizontal	350	1.25	-
PK	4.95929G	57.51	74.00	-16.49	2.46	3	Horizontal	350	1.25	-