FCC Test Report

FCC ID	:	**PPQ-WCBN3514A**
Equipment	:	**Wi-Fi (11a/b/g/n/ac 2Tx2R)+BT (V4.2LE) SDIO Combo Module**
Brand Name	:	**LITE-ON**
Model Name	:	**WCBN3514A**
Applicant	:	**LITE-ON Technology Corp. Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C**
Manufacturer	:	**LITE-ON TECHNOLOGY (Changzhou) CO., LTD A9 Building,No.88 Yanghu Road, Wujin Hi-Tech Industrial Development Zone ,Changzhou City,Jiangsu Province 213100 China**
Standard	:	**47 CFR FCC Part 15.247**

The product was received on Jan. 04, 2019, and testing was started from Apr. 08, 2019 and completed on Apr. 27, 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.

Allen Lin

Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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

Table of Contents

HISTORY OF THIS TEST REPORT 3

SUMMARY OF TEST RESULT 4

1 GENERAL DESCRIPTION 5

1.1 Information 5
1.2 Testing Applied Standards 9
1.3 Testing Location Information 9
1.4 Measurement Uncertainty 9

2 TEST CONFIGURATION OF EUT 10

2.1 Test Condition 10
2.2 Test Channel Mode 10
2.3 The Worst Case Measurement Configuration 11
2.4 Support Equipment 12
2.5 Test Setup Diagram 13

3 TRANSMITTER TEST RESULT 15

3.1 AC Power-line Conducted Emissions 15
3.2 DTS Bandwidth 16
3.3 Maximum Conducted Output Power 17
3.4 Power Spectral Density 19
3.5 Emissions in Non-restricted Frequency Bands 20
3.6 Emissions in Restricted Frequency Bands 21

4 TEST EQUIPMENT AND CALIBRATION DATA 25

APPENDIX A. TEST RESULTS OF AC POWER-LINE CONDUCTED EMISSIONS

APPENDIX B. TEST RESULTS OF DTS BANDWIDTH

APPENDIX C. TEST RESULTS OF MAXIMUM CONDUCTED OUTPUT POWER

APPENDIX D. TEST RESULTS OF POWER SPECTRAL DENSITY

APPENDIX E. TEST RESULTS OF EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

APPENDIX F. TEST RESULTS OF EMISSIONS IN RESTRICTED FREQUENCY BANDS

APPENDIX G. TEST PHOTOS

PHOTOGRAPHS OF EUT V01

History of this test report

Report No.	Version	Description	Issued Date
FR910405AL	01	Initial issue of report	May 30, 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	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: Sam Tsai

Report Producer: Debby Hung

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

Group.	Ant.	Project	Brand	P/N	Antenna Type	Connector
1	1	-	Walsin	RFMTA401020IMLB701	PIFA	Mini i-Pex
	2					
	3					
2	4	(Sparrow 10 inch)	Shenzhen South Star Technology Co., LTD	N12-4140-R0A	PIFA	N/A
	5			N12-4141-R0A		
	6			N14-0594-R0A		
3	7	(Sparrow 8 inch)	Shenzhen South Star Technology Co., LTD	N12-4142-R0A	PIFA	N/A
	8			N12-4143-R0A		
	9			N14-0595-R0A		
4	10	-	INPAQ	EAA65404602	PIFA	N/A
	11			EAA65404601		
	12			EAA65404701		
5	13	-	Airgain	N2420SDAR-T6-G120U4LI (Rev B)	PIFA	Mini i-Pex
	14			N2420DCB3-T10-G200U4LI (Rev B)		
	15			N2410MST-T-G85U4LI (Rev G)		

Group.	Ant.	Port	Gain (dBi)		
			2.4G	5G	BT
1	1	1	3.52	4.18	-
	2	2	3.52	4.18	-
	3	1	-	-	3.52
2	4	1	2.97	4.04	-
	5	2	3.41	4.05	-
	6	1	-	-	3.31
3	7	1	3.35	3.97	-
	8	2	3.35	3.86	-
	9	1	-	-	2.86
4	10	1	2.99	3.46	-
	11	2	3.06	3.23	-
	12	1	-	-	2.74
5	13	1	4.00	4.80	-
	14	2	4.00	4.30	-
	15	1	-	-	2.70

Note : EUT can match with above antennas for using. Higher gain in each type of antenna was used to perform the worst configuration and result of that was recorded as the final test result.

For 2.4GHz function:

For IEEE 802.11 b/g/n mode (2TX/2RX)

Ant 1, 2, 4, 5, 7, 8, 10, 11, 13, 14 could transmit/receive.

For BT function:

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

Ant 3, 6, 9, 12, 15 could transmit/receive.

For 5GHz function:

For IEEE 802.11 a/n/ac mode (2TX/2RX)

Ant 1, 2, 4, 5, 7, 8, 10, 11, 13, 14 could transmit/receive.

1.1.3 EUT Information

Operational Condition				
EUT Power Type	From AC Adapter			
EUT Function	☒	Point-to-multipoint	☐	Point-to-point

Type of EUT		
☒	Stand-alone	
☐	Combined (EUT where the radio part is fully integrated within another device)	
	Combined Equipment - Brand Name / Model No.:	…
☐	Plug-in radio (EUT intended for a variety of host systems)	
	Host System - Brand Name / Model No.:	…
☐	Other:	

1.1.4 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	0.666	1.765	416.25u	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 v05r02

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
AC Conduction	CO04-HY	Lego	23.1~25.1°C / 54.1~56.3%	09/Apr/2019
RF Conducted	TH01-HY	Clara	23.2~24.5°C / 62.9~65.6%	23/Apr/2019
Radiated	03CH02-HY	Patrick	21.2~23.4°C / 53.9~57.8%	08/Apr/2019~27/Apr/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	110V

2.2 Test Channel Mode

Test Software Version	QCARCT 3.0.197.0

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

2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral
Operating Mode	CTX
1	Adapter 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	Adapter mode
Operating Mode > 1GHz	CTX
Orthogonal Planes of EUT	**Z Plane**
Worst Planes of EUT	V

2.4 Support Equipment

Support Equipment – AC Conduction				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Fixture	LITE-ON	WCBN3510A_EVB	-
2	AC adapter	AOBAOLIKE	ABLK-01	-

Note.Support equipment No.1 was provided by customer.

Support Equipment – RF Conducted				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5410	R33002 / DOC
2	Adapter for NB	DELL	HA65NM130	R35737 / DOC
3	Fixture	LITE-ON	WCBN3510A_EVB	-
4	AC adapter	AOBAOLIKE	ABLK-01	-

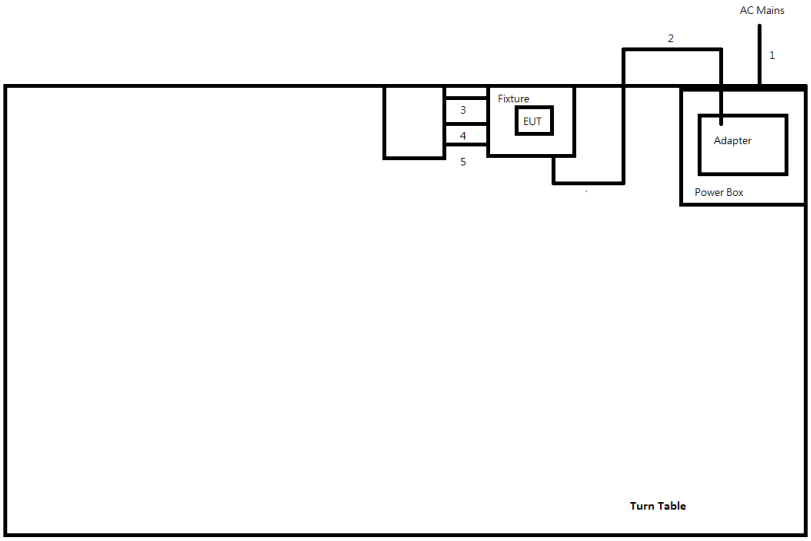
Note.Support equipment No.3 was provided by customer.

Support Equipment – Radiated Emission				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Fixture	LITE-ON	WCBN3510A_EVB	-
2	AC adapter	AOBAOLIKE	ABLK-01	-

Note.Support equipment No.1 was provided by customer.

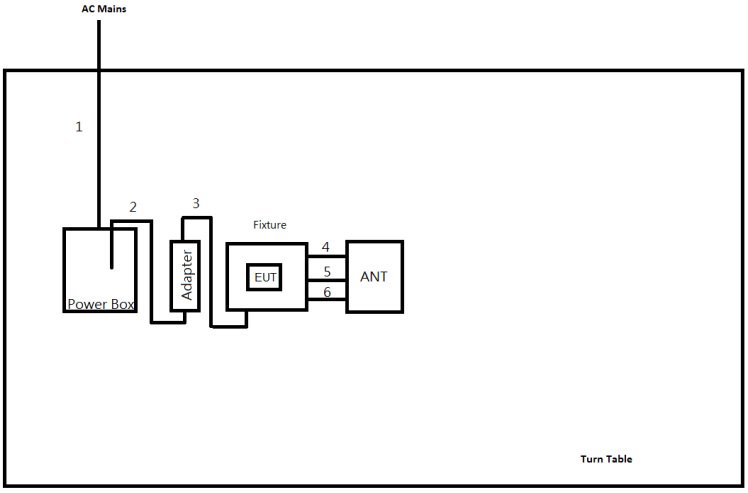
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.8	-
2	AC Power line	No	1.4	-
3	ANT Cable	No	0.11	-
4	ANT Cable	No	0.11	-
5	ANT Cable	No	0.23	-

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.8	-
2	AC Power line	No	0.4	-
3	DC Power line	No	0.42	-
4	ANT Cable	No	0.11	-
5	ANT Cable	No	0.11	-
6	ANT Cable	No	0.23	-

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

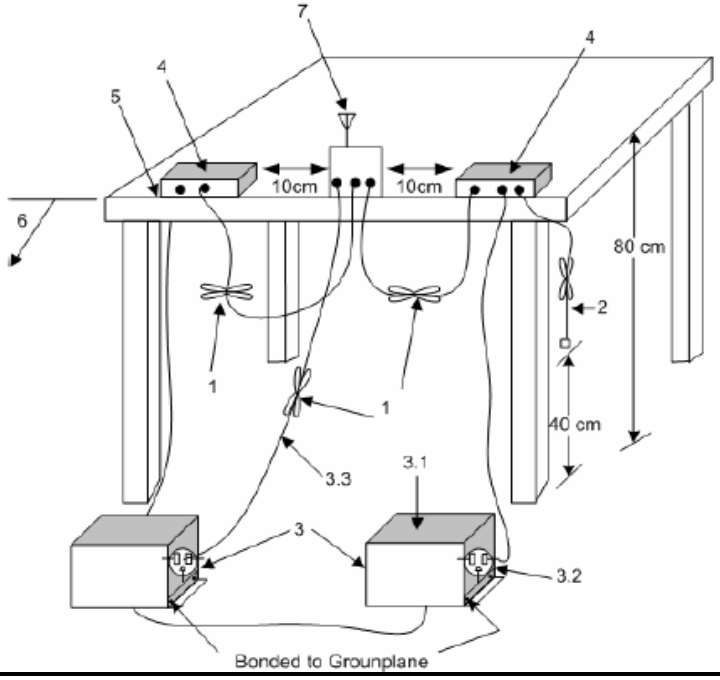
Refer a test equipment and calibration data table in this test report.

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

Refer as Appendix A

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

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

3.2.2 Measuring Instruments

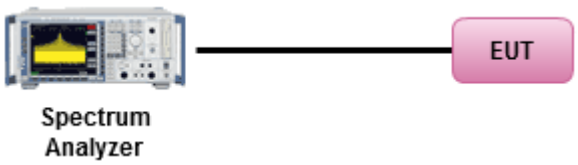
Refer a test equipment and calibration data table in this test report.

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 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 B

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit			
	▪ If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)		
	▪ Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)$ dBm		
	▪ Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3$ dBm		
	▪ Smart antenna system (SAS):		
		- Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3$ dBm	
		- Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3$ dBm	
		- Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3 + 8$dB dBm	
e.i.r.p. Power Limit:			
▪ 2400-2483.5 MHz Band			
	▪ Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)		
	▪ Point-to-point systems (P2P): $P_{eirp} \leq MAX(36, [P_{Out} + G_{TX}])$ dBm		
	▪ Smart antenna system (SAS)		
		- Single beam: $P_{eirp} \leq MAX(36, P_{Out} + G_{TX})$ dBm	
		- Overlap beam: $P_{eirp} \leq MAX(36, P_{Out} + G_{TX})$ dBm	
		- Aggregate power on all beams: $P_{eirp} \leq MAX(36, [P_{Out} + G_{TX} + 8])$ 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 C

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

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

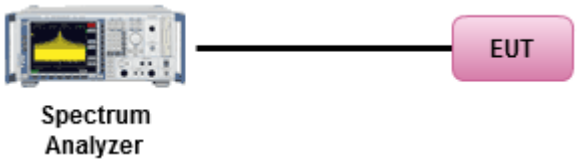
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method		
▪ Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).		
	☒ Refer as KDB 558074, clause 8.4 (11.10 of ANSI C63.10) Method PKPSD.	
▪ For conducted measurement.		
	▪ If The EUT supports multiple transmit chains using options given below:	
		▪ Measure and sum the spectra across the outputs. Refer as KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.

3.4.4 Test Setup

Power Spectral Density


3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	**Limit (dB)**
Peak output power procedure	20
Average output power procedure	30
Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level. Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.	

3.5.2 Measuring Instruments

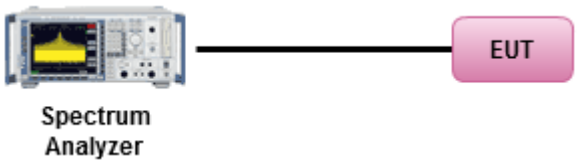
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method
▪ Refer as KDB 558074, clause 8.5 (11.11 of ANSI C63.10) for non-restricted frequency bands.

3.5.4 Test Setup

Emissions in Non-restricted Frequency Bands



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 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.

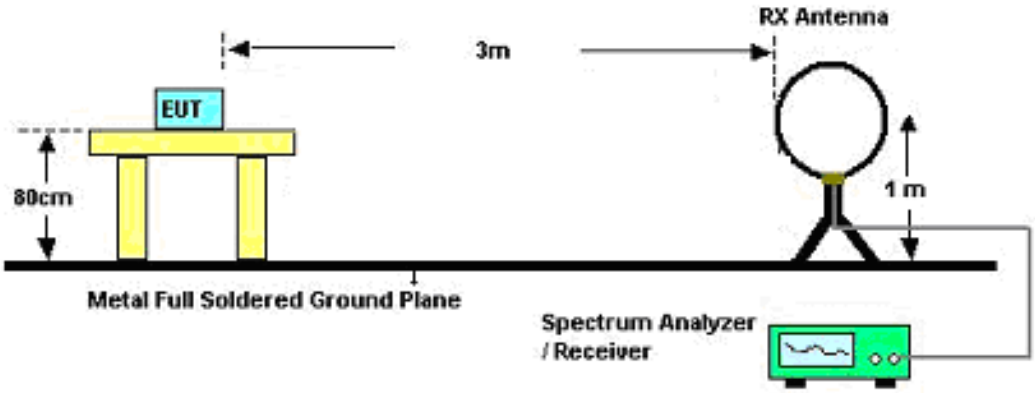
3.6.3 Test Procedures

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.

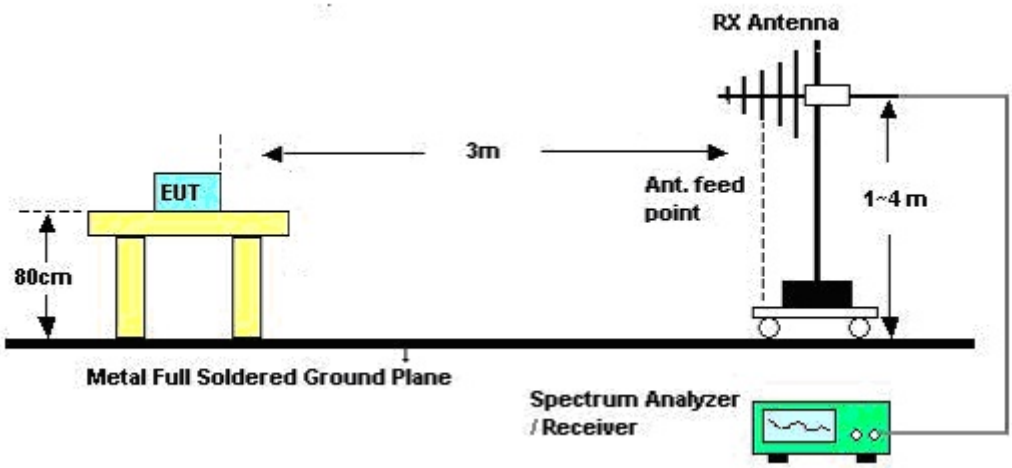
3.6.4 Test Setup

Emissions in Restricted Frequency Bands

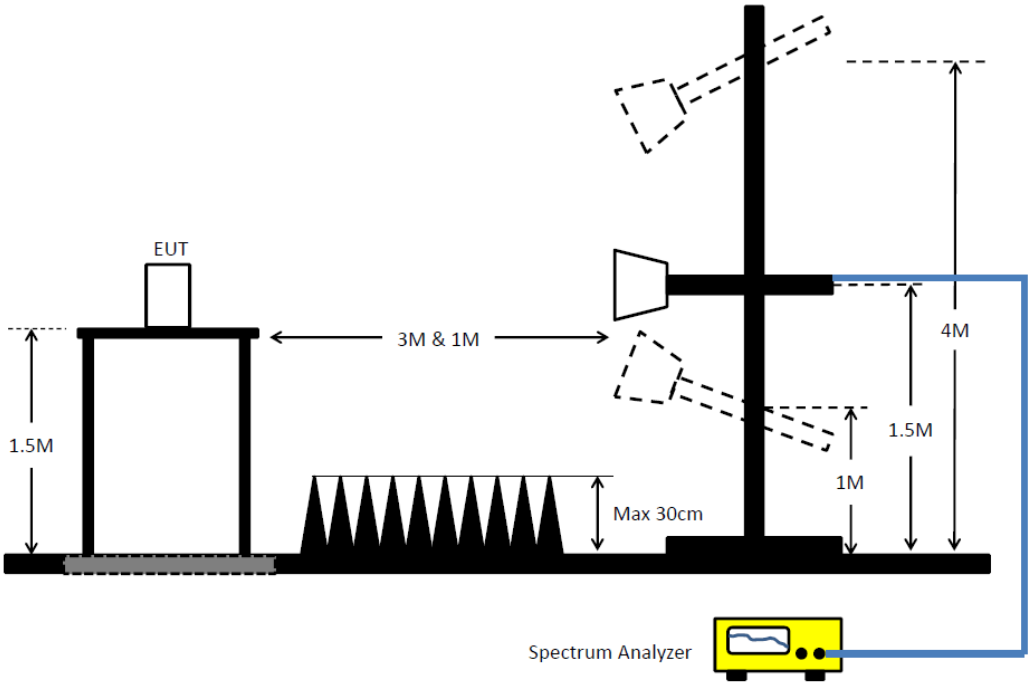
9kHz ~30MHz



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 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	101013	10Hz~40GHz	13/Mar/2019	12/Mar/2020
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	12/Nov/2018	10/Nov/2020
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	19/Feb/2019	18/Feb/2020
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	19/Feb/2019	18/Feb/2020
Cable 0.2m	HUBER	MY10710/4	RF Cable - 01	30MHz~18G	11/Jan/2019	10/Jan/2020
Cable 0.2m	HUBER	MY10711/4	RF Cable - 02	30MHz~18G	11/Jan/2019	10/Jan/2020
Cable 0.5m	HUBER	MY10714/4	RF Cable – 05	30MHz~18G	11/Jan/2019	10/Jan/2020

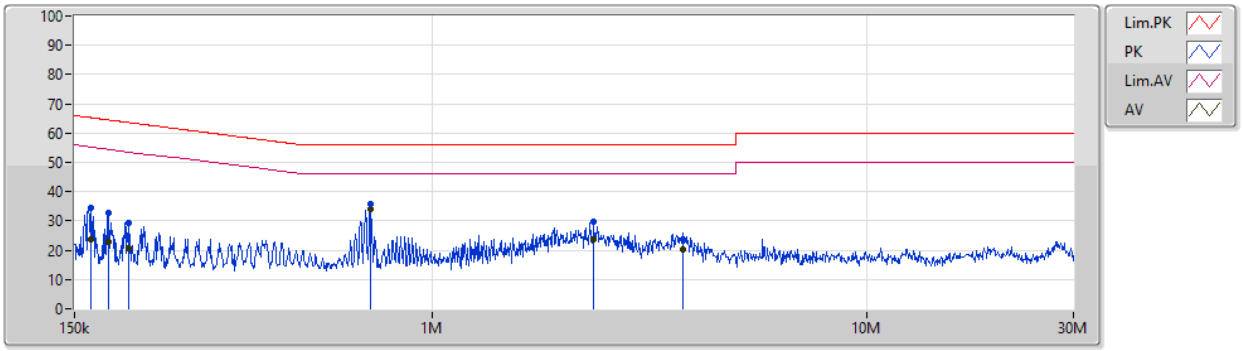
Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	19/Oct/2018	18/Oct/2019
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz ~ 18GHz 3m	17/Oct/2018	16/Oct/2019
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	27Jul/2018	02/Jul/2019
Microwave Preamplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	23/Oct/2018	22/Oct/2019
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	102051	9kHz ~ 3.6GHz	03/May/2018	02/May/2019
Loop Antenna	TESEQ	HLA 6120	31244	9k-30MHz	15/Mar/2019	14/Mar/2020
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	15GHz ~ 40GHz	22/Mar/2019	21/Mar/2020
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	Adapter Mode		

AC Conduction_Mode 1

09/04/2019

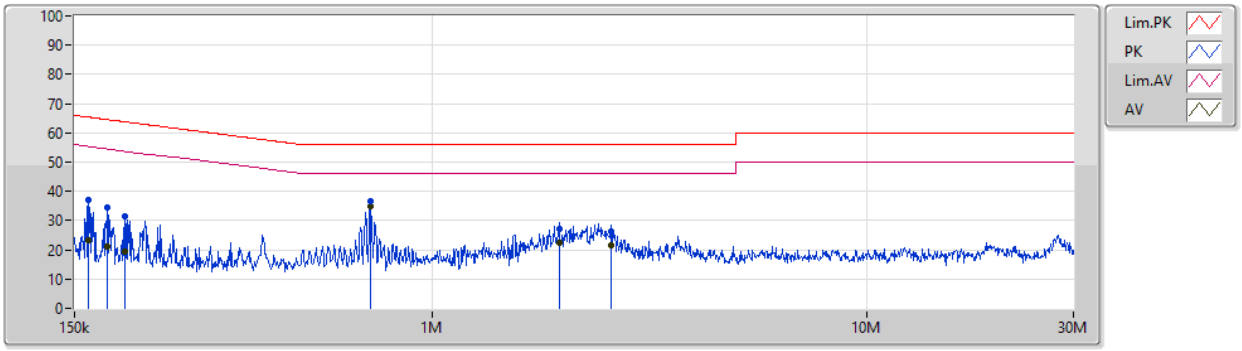


Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	163.769k	34.40	65.27	-30.87	19.48	Neutral	-	14.92	9.60	0.01	9.87
AV	163.769k	23.50	55.27	-31.77	19.48	Neutral	-	4.02	9.60	0.01	9.87
QP	180.236k	32.67	64.47	-31.80	19.47	Neutral	-	13.20	9.59	0.01	9.87
AV	180.236k	22.66	54.47	-31.81	19.47	Neutral	-	3.19	9.59	0.01	9.87
QP	199.949k	29.52	63.61	-34.09	19.47	Neutral	-	10.05	9.59	0.01	9.87
AV	199.949k	20.85	53.61	-32.76	19.47	Neutral	-	1.38	9.59	0.01	9.87
QP	720.179k	35.69	56.00	-20.31	19.49	Neutral	-	16.20	9.59	0.02	9.88
AV	720.179k	34.08	46.00	-11.92	19.49	Neutral	"Worst"	14.59	9.59	0.02	9.88
QP	2.357M	29.79	56.00	-26.21	19.54	Neutral	-	10.25	9.61	0.04	9.89
AV	2.357M	23.77	46.00	-22.23	19.54	Neutral	-	4.23	9.61	0.04	9.89
QP	3.79M	23.86	56.00	-32.14	19.54	Neutral	-	4.32	9.61	0.04	9.89
AV	3.79M	20.42	46.00	-25.58	19.54	Neutral	-	0.88	9.61	0.04	9.89

AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Line
Operating Function	Adapter Mode		

AC Conduction_Mode 1

09/04/2019



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	161.82k	37.26	65.37	-28.11	19.48	Line	-	17.78	9.60	0.01	9.87
AV	161.82k	23.22	55.37	-32.15	19.48	Line	-	3.74	9.60	0.01	9.87
QP	178.803k	34.39	64.55	-30.16	19.48	Line	-	14.91	9.60	0.01	9.87
AV	178.803k	21.24	54.55	-33.31	19.48	Line	-	1.76	9.60	0.01	9.87
QP	195.997k	31.38	63.78	-32.40	19.48	Line	-	11.90	9.60	0.01	9.87
AV	195.997k	19.58	53.78	-34.20	19.48	Line	-	0.10	9.60	0.01	9.87
QP	720.179k	36.77	56.00	-19.23	19.50	Line	-	17.27	9.60	0.02	9.88
AV	720.179k	35.00	46.00	-11.00	19.50	Line	"Worst"	15.50	9.60	0.02	9.88
QP	1.962M	27.25	56.00	-28.75	19.54	Line	-	7.71	9.62	0.03	9.89
AV	1.962M	22.60	46.00	-23.40	19.54	Line	-	3.06	9.62	0.03	9.89
QP	2.584M	26.27	56.00	-29.73	19.55	Line	-	6.72	9.62	0.04	9.89
AV	2.584M	21.45	46.00	-24.55	19.55	Line	-	1.90	9.62	0.04	9.89

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	668.75k	1.064M	1M06F1D	657.5k	1.059M

Max-N dB = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

Result

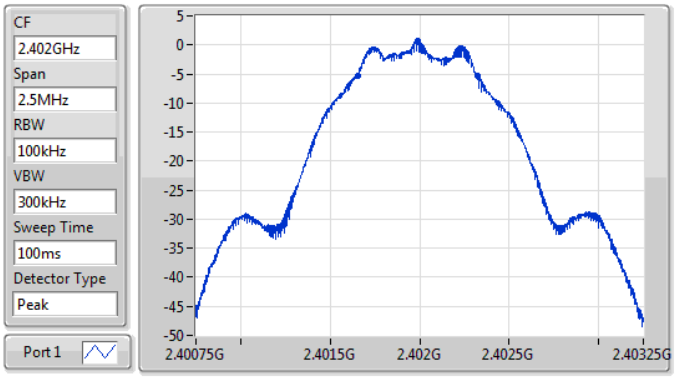
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	668.75k	1.064M
2440MHz	Pass	500k	657.5k	1.059M
2480MHz	Pass	500k	665k	1.059M

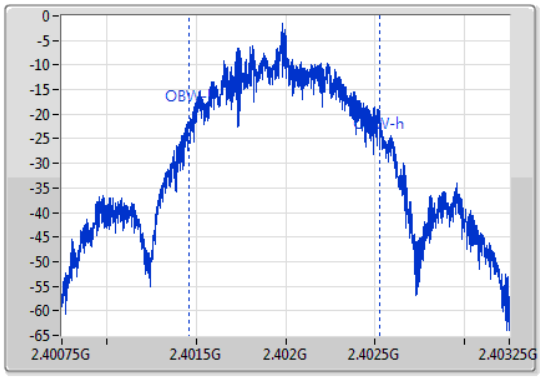
Port X-N dB = Port **X** 6dB down bandwidth; **Port X-OBW** = Port **X** 99% occupied bandwidth;

BT-LE(1Mbps) EBW

2402MHz

23/04/2019



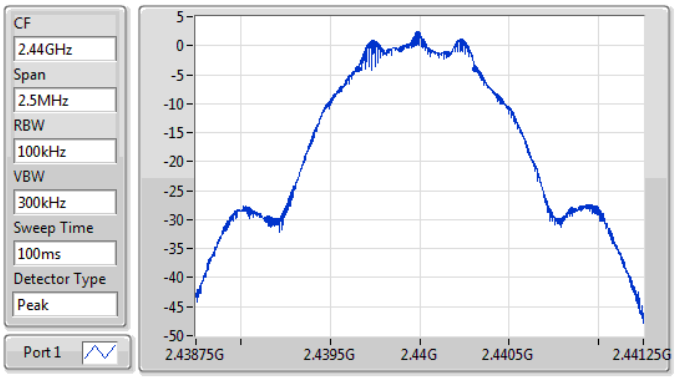


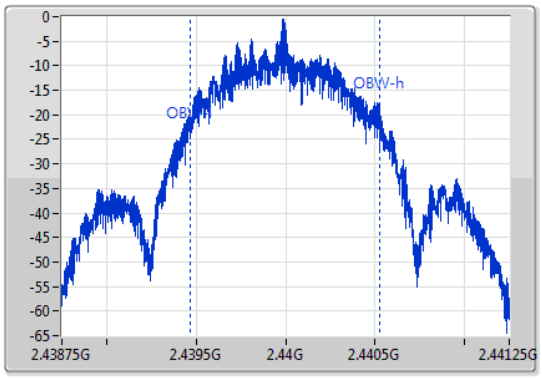
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
668.75k	2.401654G	2.402323G	1.064M	2.401463G	2.402527G	500k	1

BT-LE(1Mbps) EBW

2440MHz

23/04/2019



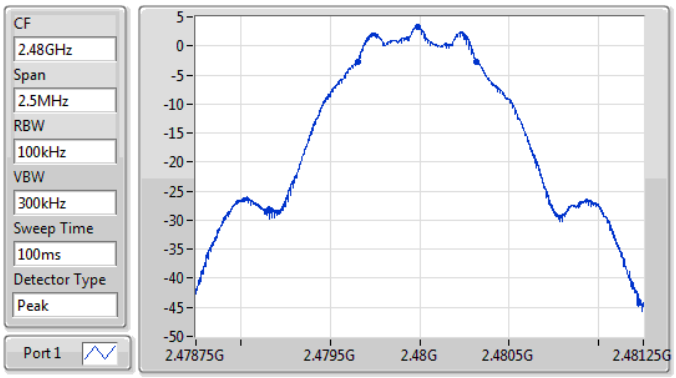


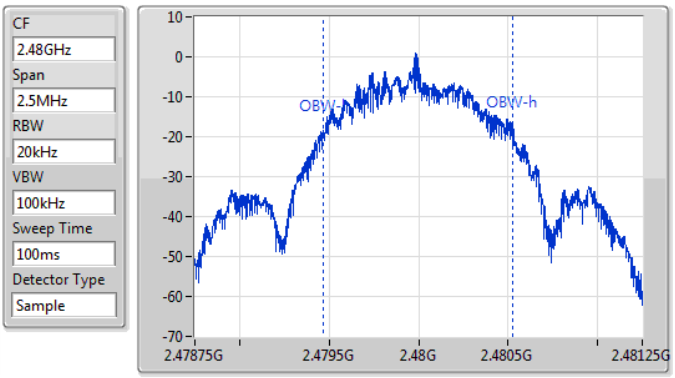
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
657.5k	2.439655G	2.440313G	1.059M	2.439468G	2.440527G	500k	1

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

2480MHz

23/04/2019





6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
665k	2.479654G	2.480319G	1.059M	2.479465G	2.480525G	500k	1

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	3.64	0.00231

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.52	1.52	30.00
2440MHz	Pass	3.52	2.52	30.00
2480MHz	Pass	3.52	3.64	30.00

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

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	2.60	0.00182

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.52	0.05	30.00
2440MHz	Pass	3.52	1.21	30.00
2480MHz	Pass	3.52	2.60	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-11.51

RBW=3 kHz.

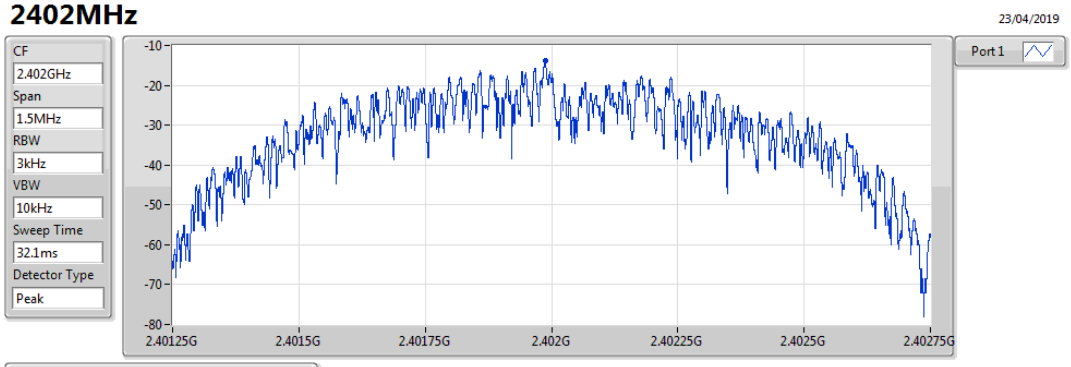
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.52	-13.90	8.00
2440MHz	Pass	3.52	-12.75	8.00
2480MHz	Pass	3.52	-11.51	8.00

DG = Directional Gain; RBW=3 kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

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

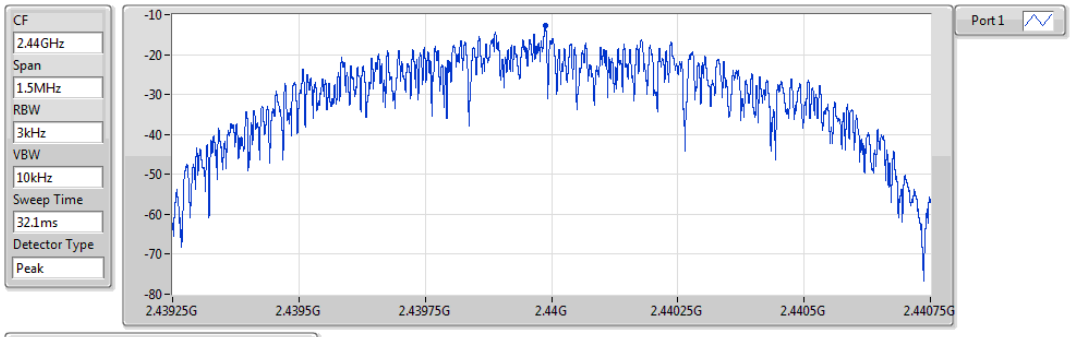
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-13.90	-13.90	-13.90

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

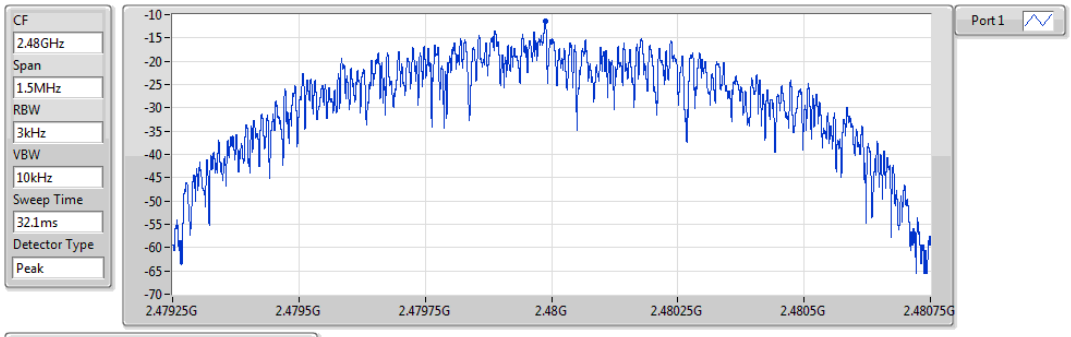
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-12.75	-12.75	-12.75

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

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.51	-11.51	-11.51

Summary

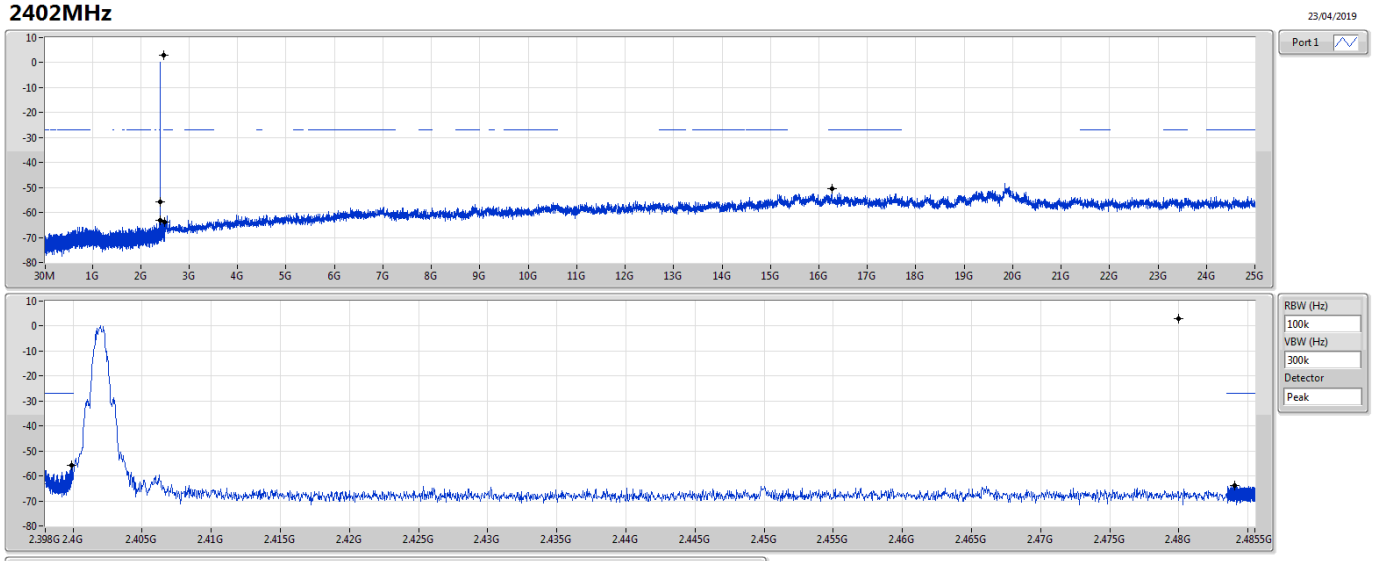
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.47999G	2.92	-27.08	2.3977G	-63.22	2.39989G	-55.81	2.48402G	-63.70	16.26437G	-50.64	1

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	2.47999G	2.92	-27.08	2.3977G	-63.22	2.39989G	-55.81	2.48402G	-63.70	16.26437G	-50.64	1
2440MHz	Pass	2.47999G	2.92	-27.08	2.11118G	-64.90	2.39823G	-63.15	2.48412G	-63.66	16.66401G	-51.18	1
2480MHz	Pass	2.47999G	2.92	-27.08	2.02445G	-65.24	2.39895G	-64.05	2.48357G	-59.86	17.51956G	-52.64	1

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

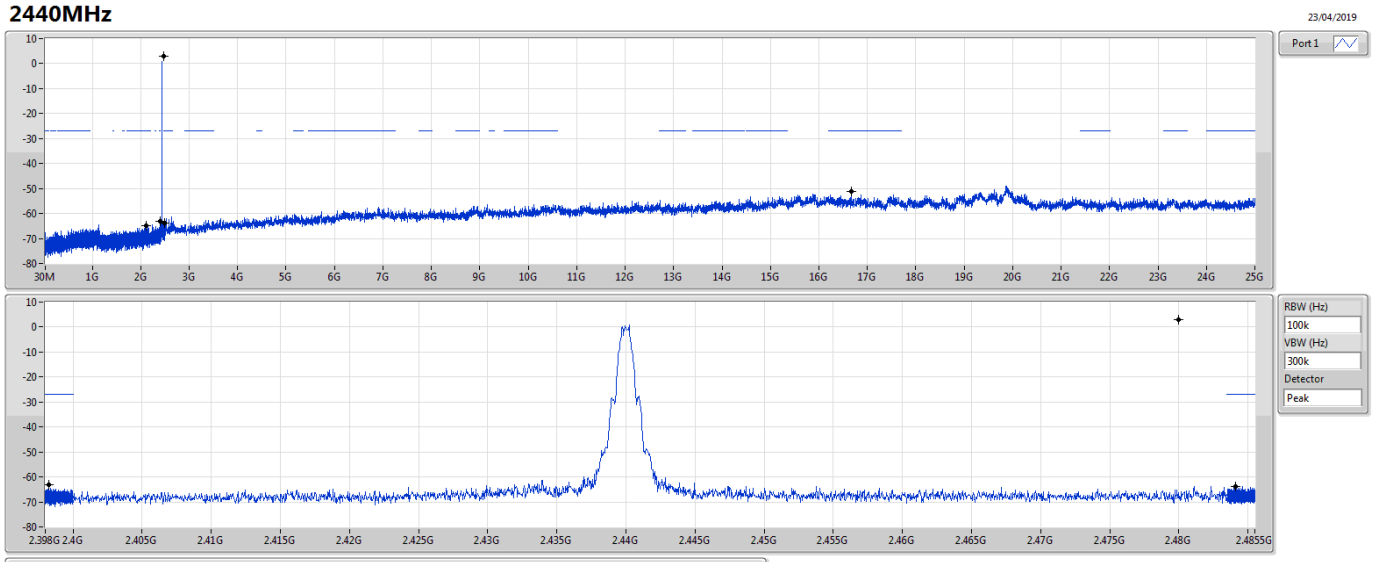
2402MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.47999G	2.92	-27.08	2.3977G	-63.22	2.39989G	-55.81	2.48402G	-63.70	16.26437G	-50.64	1

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

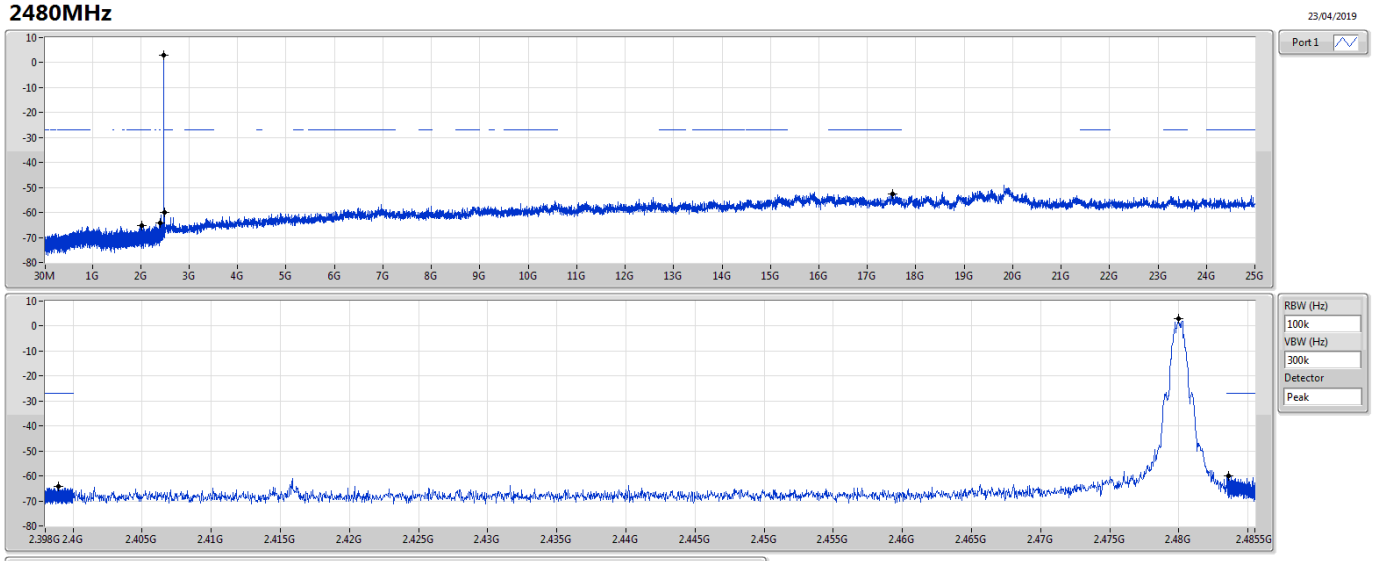
2440MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.47999G	2.92	-27.08	2.11118G	-64.90	2.39823G	-63.15	2.48412G	-63.66	16.66401G	-51.18	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
2.47999G	2.92	-27.08	2.02445G	-65.24	2.39895G	-64.05	2.48357G	-59.86	17.51956G	-52.64	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	107.6M	39.41	43.50	-4.09	-9.47	3	Vertical	360	1.00	-

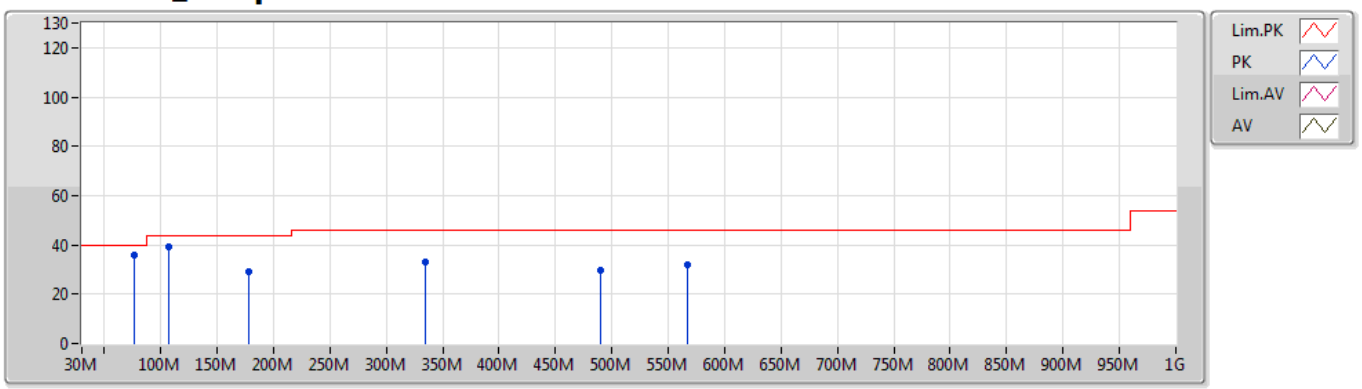
Result

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	76.56M	35.77	40.00	-4.23	-15.15	3	Vertical	360	1.00	-
2440MHz	Pass	PK	107.6M	39.41	43.50	-4.09	-9.47	3	Vertical	360	1.00	-
2440MHz	Pass	PK	177.44M	28.94	43.50	-14.56	-10.94	3	Vertical	360	1.00	-
2440MHz	Pass	PK	334.58M	33.20	46.00	-12.80	-5.40	3	Vertical	360	1.00	-
2440MHz	Pass	PK	489.78M	29.59	46.00	-16.41	-2.36	3	Vertical	360	1.00	-
2440MHz	Pass	PK	567.38M	31.94	46.00	-14.06	-1.10	3	Vertical	360	1.00	-
2440MHz	Pass	PK	117.3M	31.39	43.50	-12.11	-8.93	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	177.44M	29.35	43.50	-14.15	-10.94	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	237.58M	32.36	46.00	-13.64	-8.46	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	332.64M	36.01	46.00	-9.99	-5.41	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	501.42M	32.42	46.00	-13.58	-2.38	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	709M	33.99	46.00	-12.01	-0.01	3	Horizontal	0	1.00	-

BT-LE(1Mbps)

27/04/2019

2440MHz_Adapter

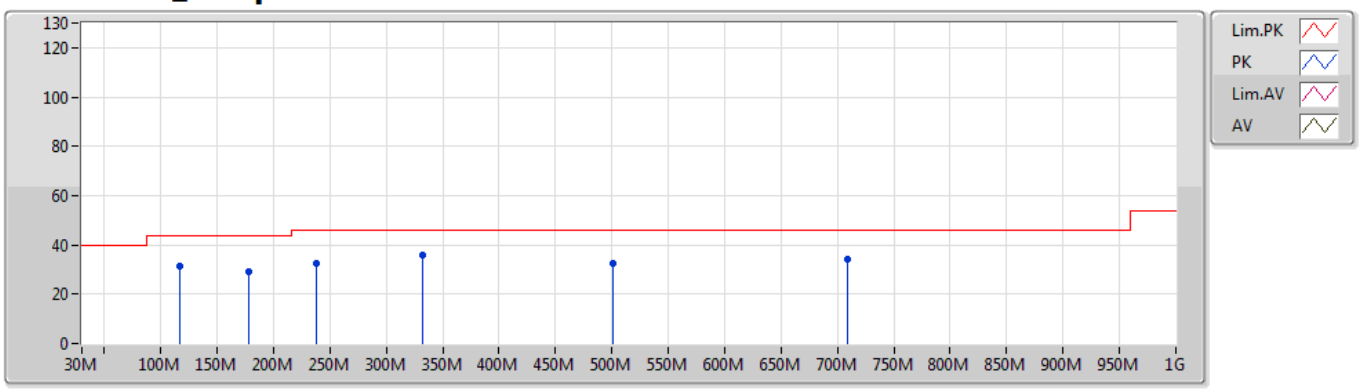


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
PK	76.56M	35.77	40.00	-4.23	-15.15	3	Vertical	360	1.00	-
PK	107.6M	39.41	43.50	-4.09	-9.47	3	Vertical	360	1.00	-
PK	177.44M	28.94	43.50	-14.56	-10.94	3	Vertical	360	1.00	-
PK	334.58M	33.20	46.00	-12.80	-5.40	3	Vertical	360	1.00	-
PK	489.78M	29.59	46.00	-16.41	-2.36	3	Vertical	360	1.00	-
PK	567.38M	31.94	46.00	-14.06	-1.10	3	Vertical	360	1.00	-

BT-LE(1Mbps)

27/04/2019

2440MHz_Adapter



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
PK	117.3M	31.39	43.50	-12.11	-8.93	3	Horizontal	0	1.00	-
PK	177.44M	29.35	43.50	-14.15	-10.94	3	Horizontal	0	1.00	-
PK	237.58M	32.36	46.00	-13.64	-8.46	3	Horizontal	0	1.00	-
PK	332.64M	36.01	46.00	-9.99	-5.41	3	Horizontal	0	1.00	-
PK	501.42M	32.42	46.00	-13.58	-2.38	3	Horizontal	0	1.00	-
PK	709M	33.99	46.00	-12.01	-0.01	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	2.4835G	49.04	54.00	-4.96	32.19	3	Horizontal	68	1.22	-

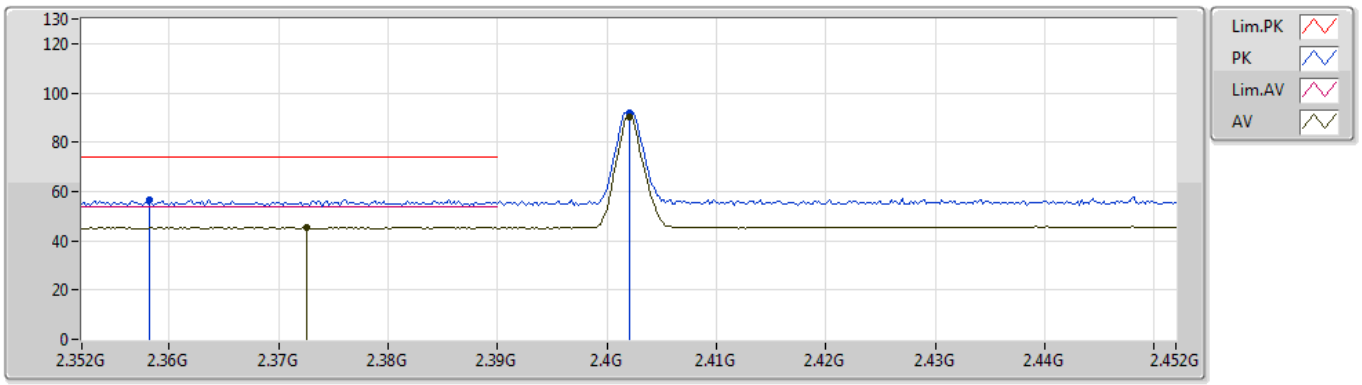
Result

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	2.3726G	45.44	54.00	-8.56	31.79	3	Vertical	113	1.05	-
2402MHz	Pass	AV	2.402G	90.41	Inf	-Inf	31.89	3	Vertical	113	1.05	-
2402MHz	Pass	PK	2.3582G	56.42	74.00	-17.58	31.74	3	Vertical	113	1.05	-
2402MHz	Pass	PK	2.402G	91.96	Inf	-Inf	31.89	3	Vertical	113	1.05	-
2402MHz	Pass	AV	2.368G	45.38	54.00	-8.62	31.77	3	Horizontal	63	1.16	-
2402MHz	Pass	AV	2.402G	97.96	Inf	-Inf	31.89	3	Horizontal	63	1.16	-
2402MHz	Pass	PK	2.3556G	56.58	74.00	-17.42	31.73	3	Horizontal	63	1.16	-
2402MHz	Pass	PK	2.402G	99.48	Inf	-Inf	31.89	3	Horizontal	63	1.16	-
2402MHz	Pass	AV	4.81042G	30.57	54.00	-23.43	3.46	3	Vertical	104	2.38	-
2402MHz	Pass	PK	4.81618G	43.04	74.00	-30.96	3.47	3	Vertical	104	2.38	-
2402MHz	Pass	AV	4.79518G	30.85	54.00	-23.15	3.42	3	Horizontal	120	2.31	-
2402MHz	Pass	PK	4.79944G	43.13	74.00	-30.87	3.43	3	Horizontal	120	2.31	-
2440MHz	Pass	AV	2.38G	45.40	54.00	-8.60	31.82	3	Vertical	115	1.01	-
2440MHz	Pass	AV	2.44G	87.05	Inf	-Inf	32.04	3	Vertical	115	1.01	-
2440MHz	Pass	AV	2.4916G	45.79	54.00	-8.21	32.22	3	Vertical	115	1.01	-
2440MHz	Pass	PK	2.3448G	56.25	74.00	-17.75	31.70	3	Vertical	115	1.01	-
2440MHz	Pass	PK	2.44G	88.57	Inf	-Inf	32.04	3	Vertical	115	1.01	-
2440MHz	Pass	PK	2.4868G	56.87	74.00	-17.13	32.20	3	Vertical	115	1.01	-
2440MHz	Pass	AV	2.3624G	45.28	54.00	-8.72	31.76	3	Horizontal	65	1.14	-
2440MHz	Pass	AV	2.44G	96.83	Inf	-Inf	32.04	3	Horizontal	65	1.14	-
2440MHz	Pass	AV	2.484G	45.81	54.00	-8.19	32.19	3	Horizontal	65	1.14	-
2440MHz	Pass	PK	2.3504G	56.33	74.00	-17.67	31.71	3	Horizontal	65	1.14	-
2440MHz	Pass	PK	2.4396G	98.30	Inf	-Inf	32.04	3	Horizontal	65	1.14	-
2440MHz	Pass	PK	2.4844G	57.08	74.00	-16.92	32.19	3	Horizontal	65	1.14	-
2440MHz	Pass	AV	4.87664G	30.54	54.00	-23.46	3.62	3	Vertical	104	1.64	-
2440MHz	Pass	PK	4.88756G	43.16	74.00	-30.84	3.65	3	Vertical	104	1.64	-
2440MHz	Pass	AV	4.8752G	30.68	54.00	-23.32	3.62	3	Horizontal	162	2.16	-
2440MHz	Pass	PK	4.86932G	42.69	74.00	-31.31	3.60	3	Horizontal	162	2.16	-
2480MHz	Pass	AV	2.48G	86.20	Inf	-Inf	32.17	3	Vertical	101	1.50	-
2480MHz	Pass	AV	2.4835G	45.92	54.00	-8.08	32.19	3	Vertical	101	1.50	-
2480MHz	Pass	PK	2.48G	87.87	Inf	-Inf	32.17	3	Vertical	101	1.50	-
2480MHz	Pass	PK	2.495G	57.34	74.00	-16.66	32.23	3	Vertical	101	1.50	-
2480MHz	Pass	AV	2.48G	96.74	Inf	-Inf	32.17	3	Horizontal	68	1.22	-
2480MHz	Pass	AV	2.4835G	49.04	54.00	-4.96	32.19	3	Horizontal	68	1.22	-
2480MHz	Pass	PK	2.48G	98.38	Inf	-Inf	32.17	3	Horizontal	68	1.22	-
2480MHz	Pass	PK	2.4835G	57.00	74.00	-17.00	32.19	3	Horizontal	68	1.22	-
2480MHz	Pass	AV	4.96966G	30.97	54.00	-23.03	3.85	3	Vertical	211	1.50	-
2480MHz	Pass	PK	4.94944G	43.27	74.00	-30.73	3.79	3	Vertical	211	1.50	-
2480MHz	Pass	AV	4.96996G	30.91	54.00	-23.09	3.85	3	Horizontal	98	2.30	-
2480MHz	Pass	PK	4.96474G	43.33	74.00	-30.67	3.84	3	Horizontal	98	2.30	-

BT-LE(1Mbps)

2402MHz_TX

27/04/2019

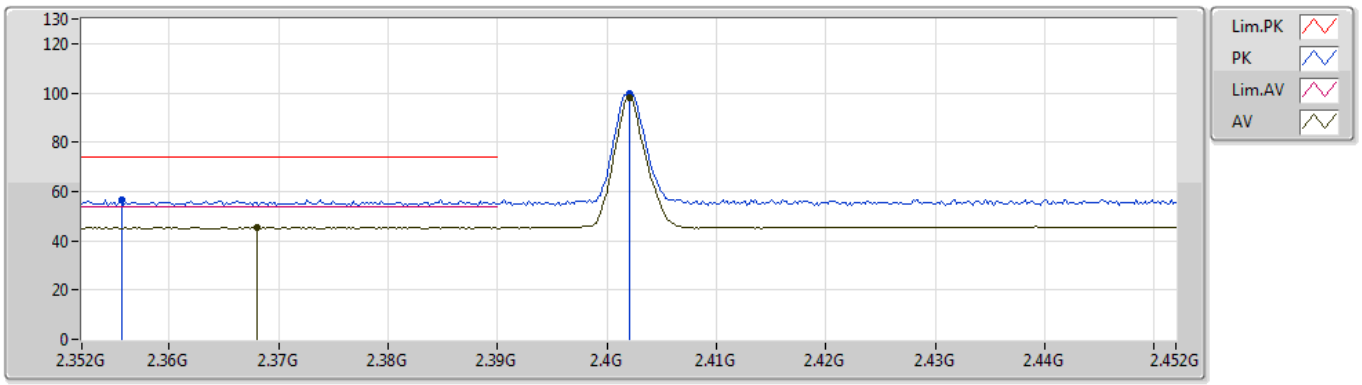


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3726G	45.44	54.00	-8.56	31.79	3	Vertical	113	1.05	-
AV	2.402G	90.41	Inf	-Inf	31.89	3	Vertical	113	1.05	-
PK	2.3582G	56.42	74.00	-17.58	31.74	3	Vertical	113	1.05	-
PK	2.402G	91.96	Inf	-Inf	31.89	3	Vertical	113	1.05	-

BT-LE(1Mbps)

2402MHz_TX

27/04/2019

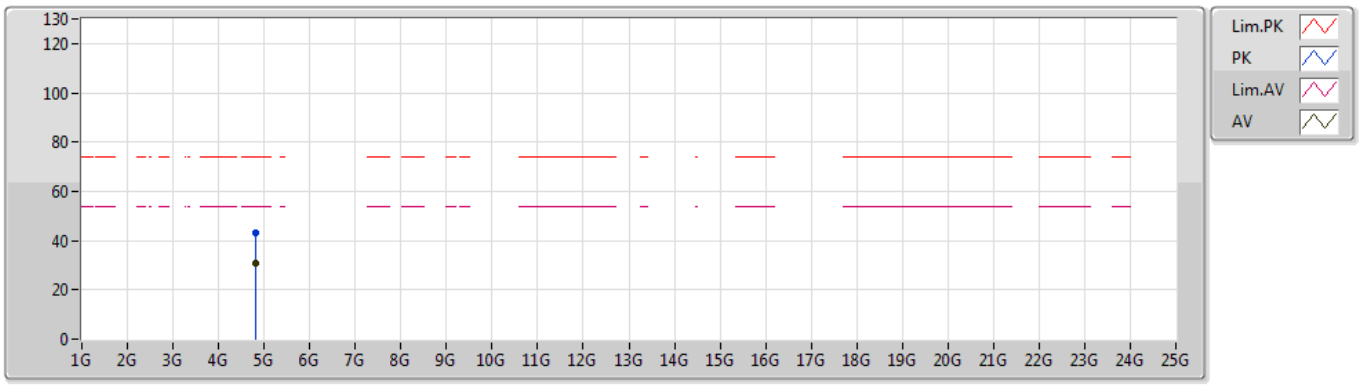


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.368G	45.38	54.00	-8.62	31.77	3	Horizontal	63	1.16	-
AV	2.402G	97.96	Inf	-Inf	31.89	3	Horizontal	63	1.16	-
PK	2.3556G	56.58	74.00	-17.42	31.73	3	Horizontal	63	1.16	-
PK	2.402G	99.48	Inf	-Inf	31.89	3	Horizontal	63	1.16	-

BT-LE(1Mbps)

2402MHz_TX

27/04/2019

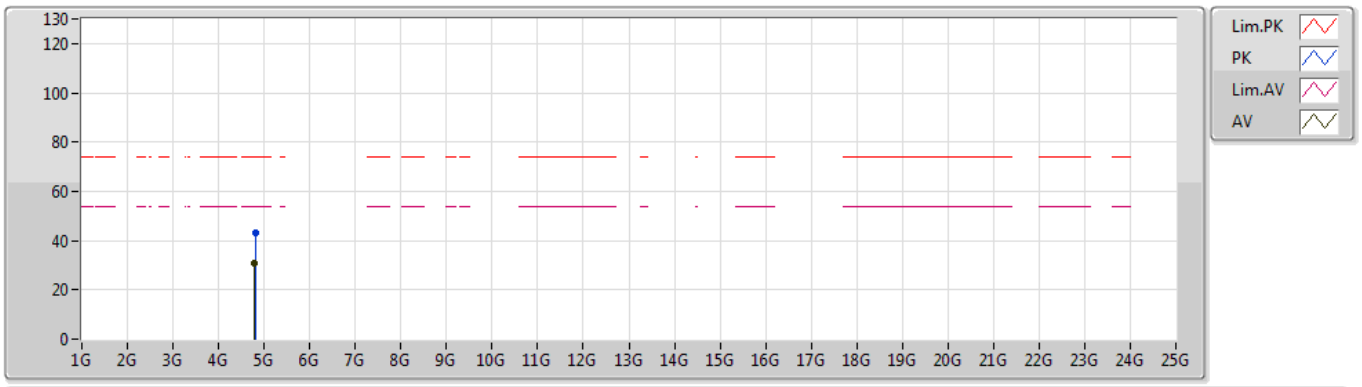


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.81042G	30.57	54.00	-23.43	3.46	3	Vertical	104	2.38	-
PK	4.81618G	43.04	74.00	-30.96	3.47	3	Vertical	104	2.38	-

BT-LE(1Mbps)

2402MHz_TX

27/04/2019

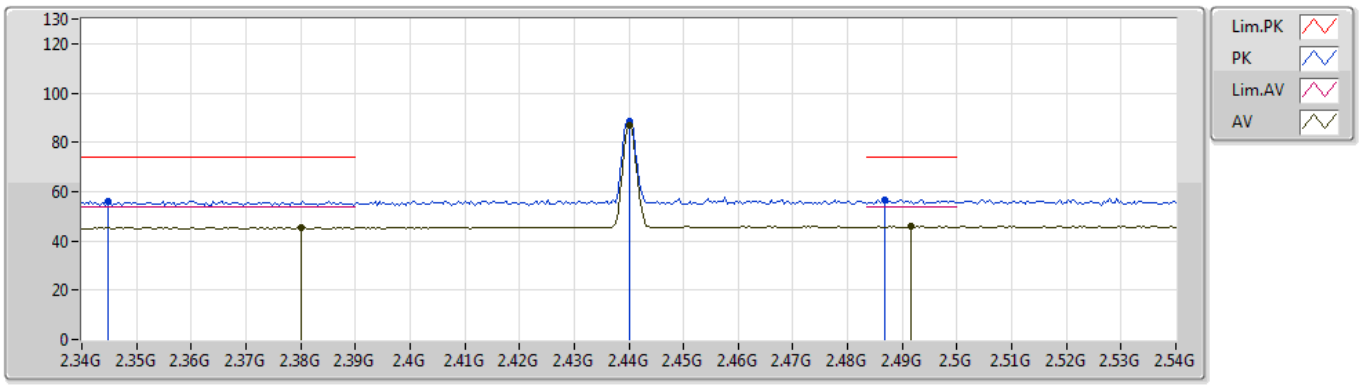


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.79518G	30.85	54.00	-23.15	3.42	3	Horizontal	120	2.31	-
PK	4.79944G	43.13	74.00	-30.87	3.43	3	Horizontal	120	2.31	-

BT-LE(1Mbps)

2440MHz_TX

27/04/2019

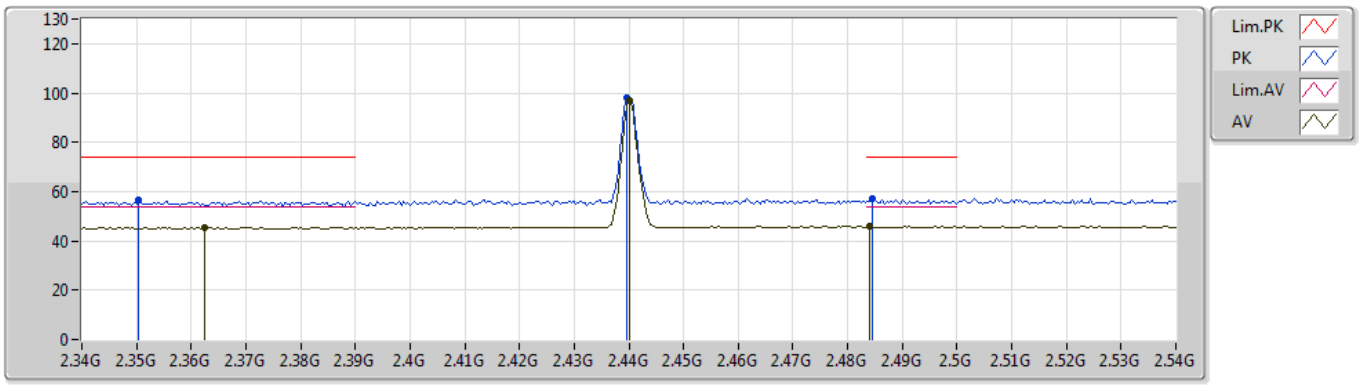


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.38G	45.40	54.00	-8.60	31.82	3	Vertical	115	1.01	-
AV	2.44G	87.05	Inf	-Inf	32.04	3	Vertical	115	1.01	-
AV	2.4916G	45.79	54.00	-8.21	32.22	3	Vertical	115	1.01	-
PK	2.3448G	56.25	74.00	-17.75	31.70	3	Vertical	115	1.01	-
PK	2.44G	88.57	Inf	-Inf	32.04	3	Vertical	115	1.01	-
PK	2.4868G	56.87	74.00	-17.13	32.20	3	Vertical	115	1.01	-

BT-LE(1Mbps)

2440MHz_TX

27/04/2019

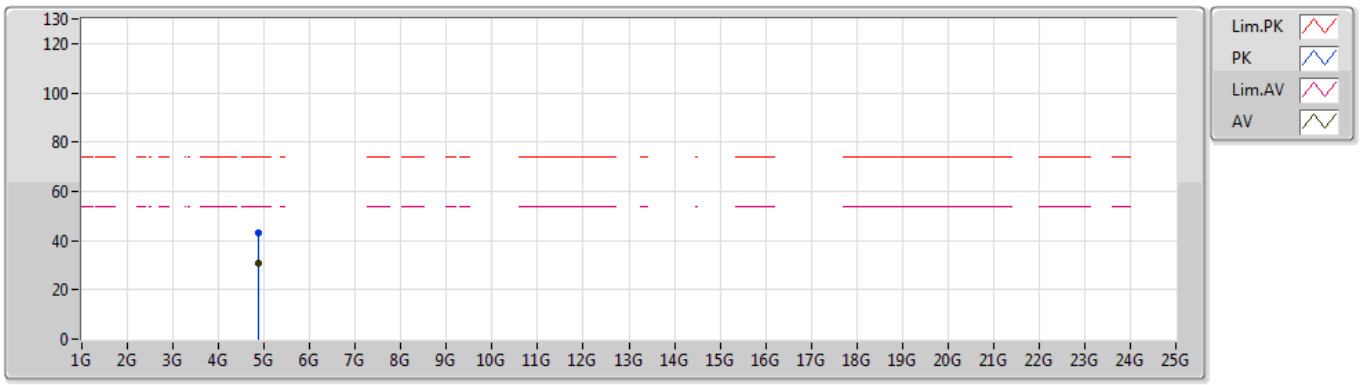


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3624G	45.28	54.00	-8.72	31.76	3	Horizontal	65	1.14	-
AV	2.44G	96.83	Inf	-Inf	32.04	3	Horizontal	65	1.14	-
AV	2.484G	45.81	54.00	-8.19	32.19	3	Horizontal	65	1.14	-
PK	2.3504G	56.33	74.00	-17.67	31.71	3	Horizontal	65	1.14	-
PK	2.4396G	98.30	Inf	-Inf	32.04	3	Horizontal	65	1.14	-
PK	2.4844G	57.08	74.00	-16.92	32.19	3	Horizontal	65	1.14	-

BT-LE(1Mbps)

2440MHz_TX

27/04/2019

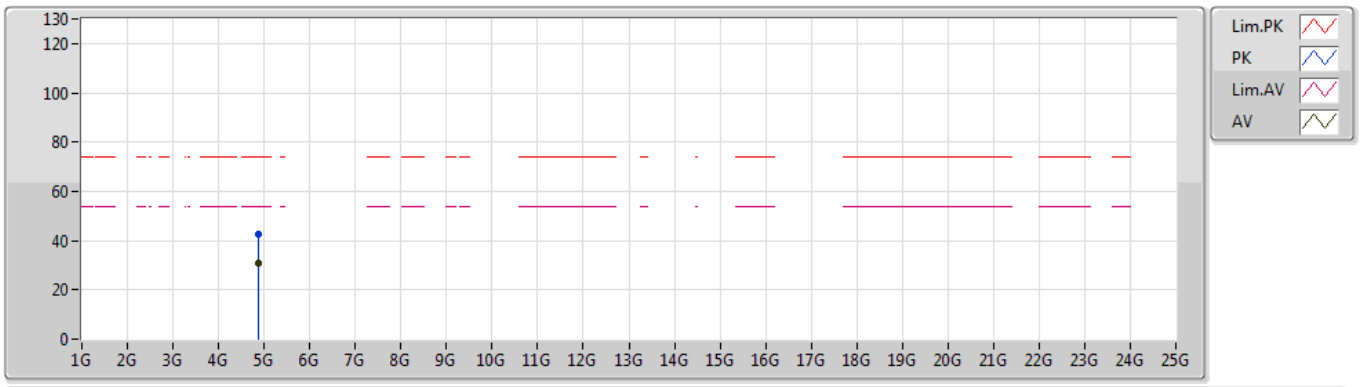


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.87664G	30.54	54.00	-23.46	3.62	3	Vertical	104	1.64	-
PK	4.88756G	43.16	74.00	-30.84	3.65	3	Vertical	104	1.64	-

BT-LE(1Mbps)

2440MHz_TX

27/04/2019

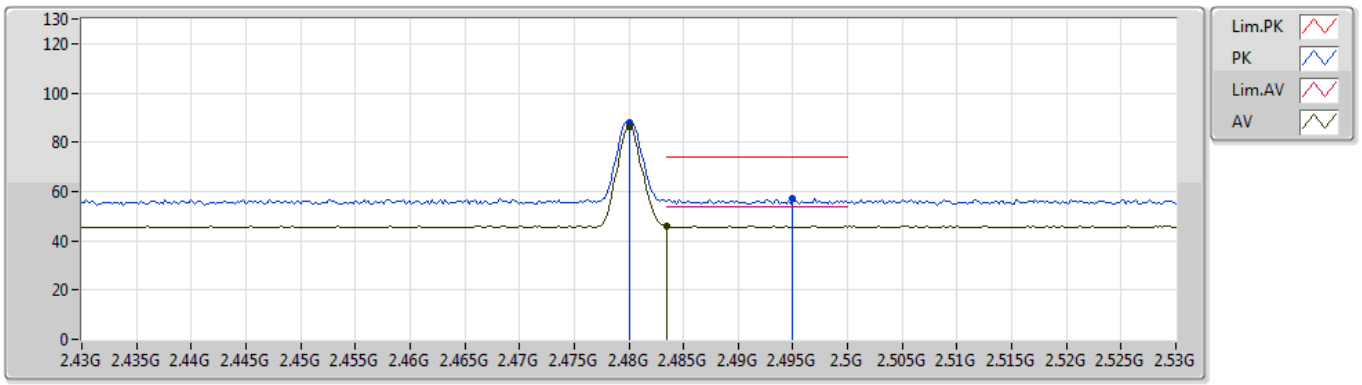


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.8752G	30.68	54.00	-23.32	3.62	3	Horizontal	162	2.16	-
PK	4.86932G	42.69	74.00	-31.31	3.60	3	Horizontal	162	2.16	-

BT-LE(1Mbps)

2480MHz_TX

27/04/2019

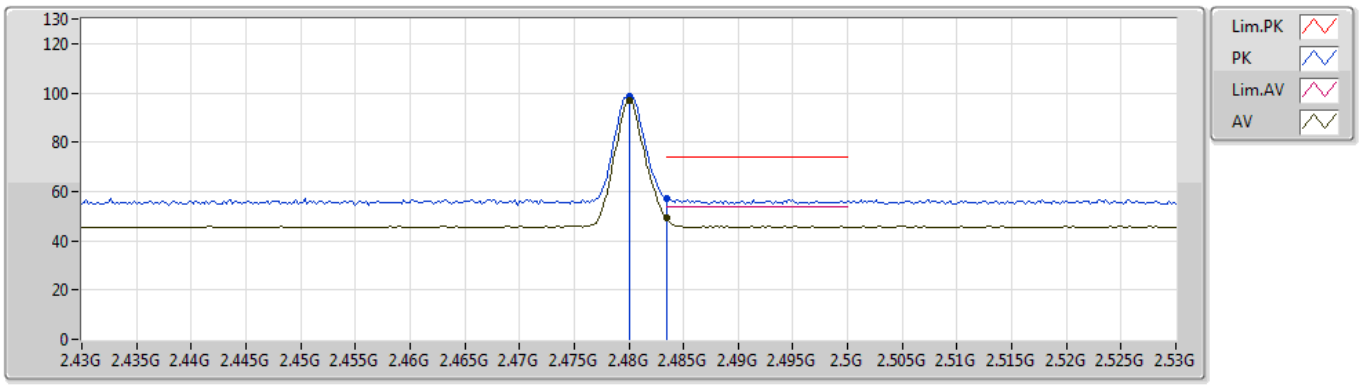


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.48G	86.20	Inf	-Inf	32.17	3	Vertical	101	1.50	-
AV	2.4835G	45.92	54.00	-8.08	32.19	3	Vertical	101	1.50	-
PK	2.48G	87.87	Inf	-Inf	32.17	3	Vertical	101	1.50	-
PK	2.495G	57.34	74.00	-16.66	32.23	3	Vertical	101	1.50	-

BT-LE(1Mbps)

2480MHz_TX

27/04/2019

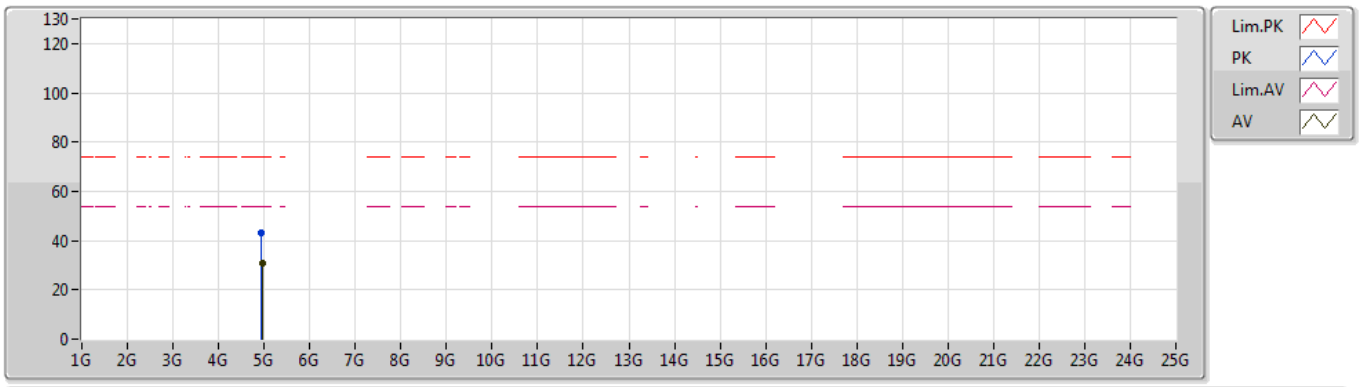


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.48G	96.74	Inf	-Inf	32.17	3	Horizontal	68	1.22	-
AV	2.4835G	49.04	54.00	-4.96	32.19	3	Horizontal	68	1.22	-
PK	2.48G	98.38	Inf	-Inf	32.17	3	Horizontal	68	1.22	-
PK	2.4835G	57.00	74.00	-17.00	32.19	3	Horizontal	68	1.22	-

BT-LE(1Mbps)

2480MHz_TX

27/04/2019

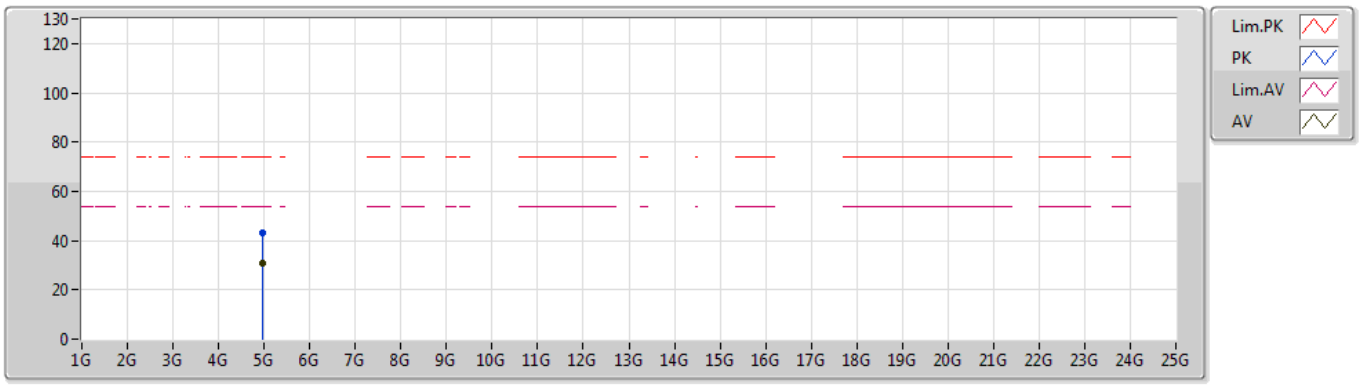


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.96966G	30.97	54.00	-23.03	3.85	3	Vertical	211	1.50	-
PK	4.94944G	43.27	74.00	-30.73	3.79	3	Vertical	211	1.50	-

BT-LE(1Mbps)

2480MHz_TX

27/04/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.96996G	30.91	54.00	-23.09	3.85	3	Horizontal	98	2.30	-
PK	4.96474G	43.33	74.00	-30.67	3.84	3	Horizontal	98	2.30	-