FCC Test Report

FCC ID	:	**BKMAE-WLU5630**
Equipment	:	**WLAN / BT Module**
Brand Name	:	**EPSON**
Model Name	:	**WLU5630B-D101(RoHS)**
Applicant	:	**SEIKO EPSON CORPORATION** **3-3-5 Owa Suwa-shi, Nagano-ken 392-8502 Japan**
Manufacturer	:	**SEIKO EPSON CORPORATION** **3-3-5 Owa Suwa-shi, Nagano-ken 392-8502 Japan**
Standard	:	**47 CFR FCC Part 15.247**

The product was received on Jan. 16, 2019, and testing was started from Jan. 24, 2019 and completed on Feb. 13, 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.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR8D2146AL	01	Initial issue of report	Mar. 04, 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: Jackson 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

Ant.	Brand	Model Name	Antenna Type	Connector
1	EPSON	WLU5630B-D101(RoHS)	Printed Antenna	I-PEX

Ant.	Port	Gain (dBi)			
		2.4G	U-NII-1	U-NII-3	BT
1	1	1.92	1.42	2.21	-
2	2	2.22	2.11	2.00	2.22

For 2.4GHz function:

For IEEE 802.11 b/g/n mode (1TX/1RX)

Support diversity function and pre-tested on each single chain, the worst case was Ant. 2(port 2) and it was record in this test report.

For BT function:

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

Ant. 2 (port 2) 1could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11 a/an mode (1TX/1RX)

Support diversity function and pre-tested on each single chain, the worst case was Ant. 1(port 1) and it was record in this test report.

1.1.3 EUT Information

Operational Condition				
EUT Power Type	From Host System			
EUT Function	☒	Point-to-multipoint	☐	Point-to-point
Beamforming Function	☐	With beamforming	☒	Without beamforming
Software / Firmware Version				MP EPSON 01

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)	0.626	2.034	391.25u	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 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	TH01-HY	Gary	23.1~23.8°C / 61~61.8%	28/Jan/2019~31/Jan/2019
Radiated	03CH09-HY	Kevin	21~23°C / 45~49%	24/Jan/2019~13/Feb/2019
AC Conduction	CO04-HY	Daniel	23.1~23.8°C / 61~61.8%	28/Jan/2019~31/Jan/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	5V

2.2 Test Channel Mode

Test Software Version	BlueTool_MI_1.9 .4.5

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	default
2440MHz	dafault
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	USB 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	USB mode		
Operating Mode > 1GHz	CTX		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
			
Worst Planes of EUT			V

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Test Condition	Radiated measurement
Operating Mode	CTX
1	WLAN 2.4G + BT BR/EDR
2	WLAN 2.4G + BT LE
3	WLAN 5G + BT BR/EDR
4	WLAN 5G + BT LE
Refer to Appendix G for Radiated Emission Co-location.	

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Operating Mode	CTX
1	WLAN 2.4G + Bluetooth
2	WLAN 5G + Bluetooth
Refer to Sporton Test Report No.: FA8D2146 for Co-location RF Exposure Evaluation.	

2.4 Support Equipment

Support Equipment – AC Conduction				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	P40F	-
2	Adapter	DELL	LA65NS2-01	-
3	Test fixture	-	-	-

Note.Support equipment No.1,2,3 was provided by customer.

Support Equipment – RF Conducted				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	ASUS	ASUSPRO	-
2	Adapter for NB	ASUS	ADP-90YD B	-
3	Test Fixture	-	-	-

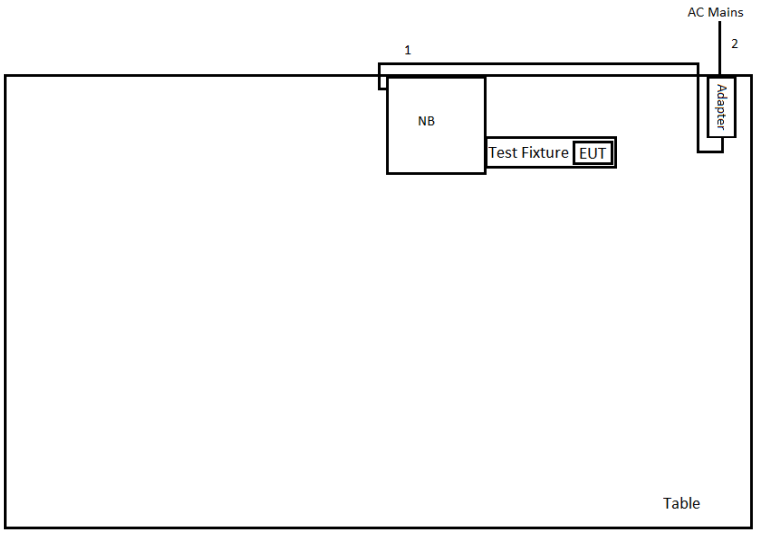
Note.Support equipment No.1,2,3 was provided by customer.

Support Equipment – Radiated Emission				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	ASUS	ASUSPRO	-
2	Adapter	ASUS	ADP-90YD	-
3	Test fixture	-	-	-

Note.Support equipment No.1,2,3 was provided by customer.

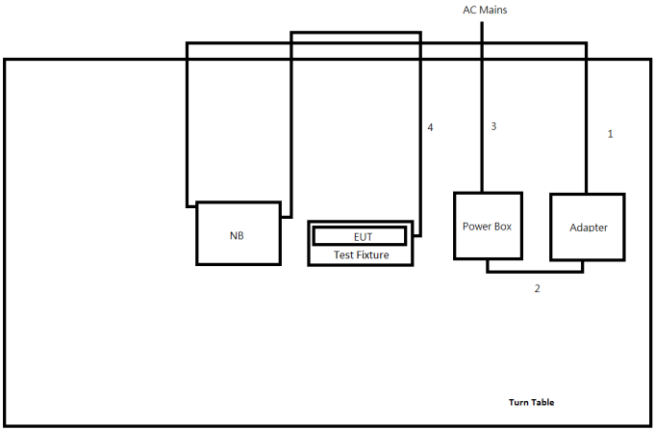
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	DC Power line	No	1.8	-
2	AC Power line	No	1.8	-

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)	Remark
1	DC Power line	No	1.8	-
2	AC Power line	No	0.75	-
3	AC Power line	No	1.8	-
4	USB cable	No	1.8	-

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

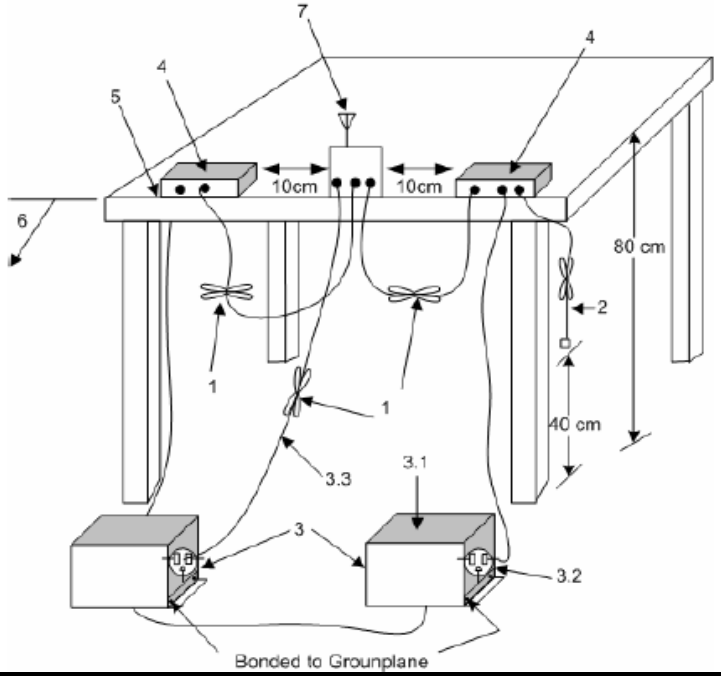
Refer a test equipment and calibration data table in this test report.

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.

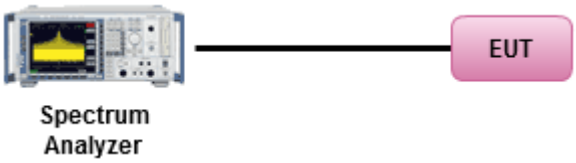
3.2.2 Measuring Instruments

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} ≤ 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.			

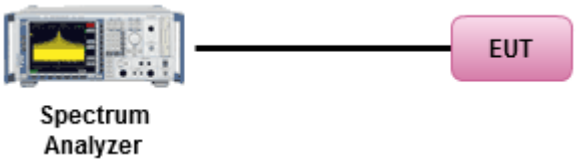
3.3.2 Measuring Instruments

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 (Spectrum Analyzer)
 Spectrum Analyzer

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

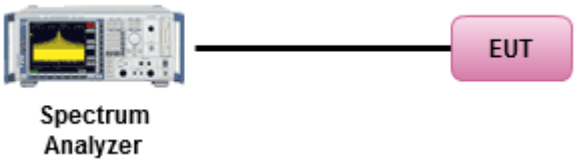
3.4.2 Measuring Instruments

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.	

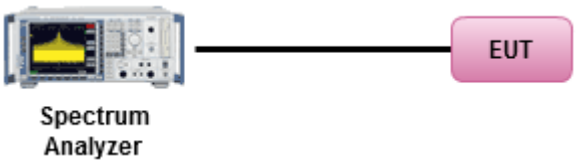
3.5.2 Measuring Instruments

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.

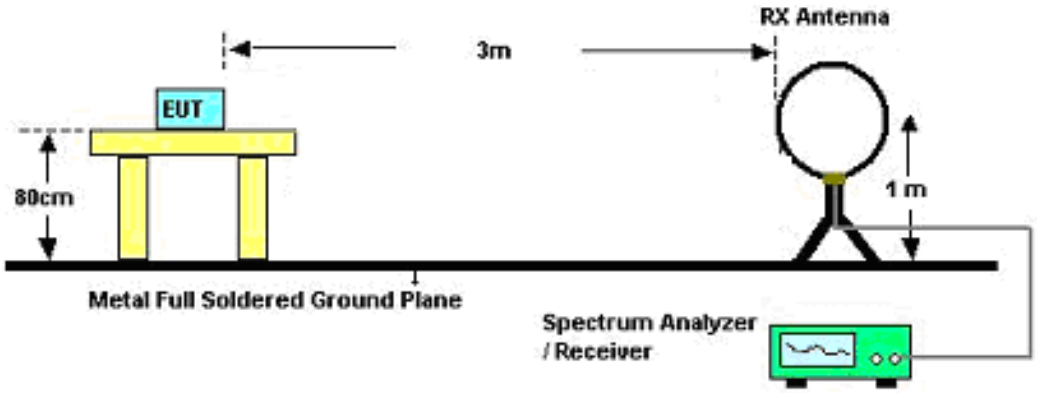
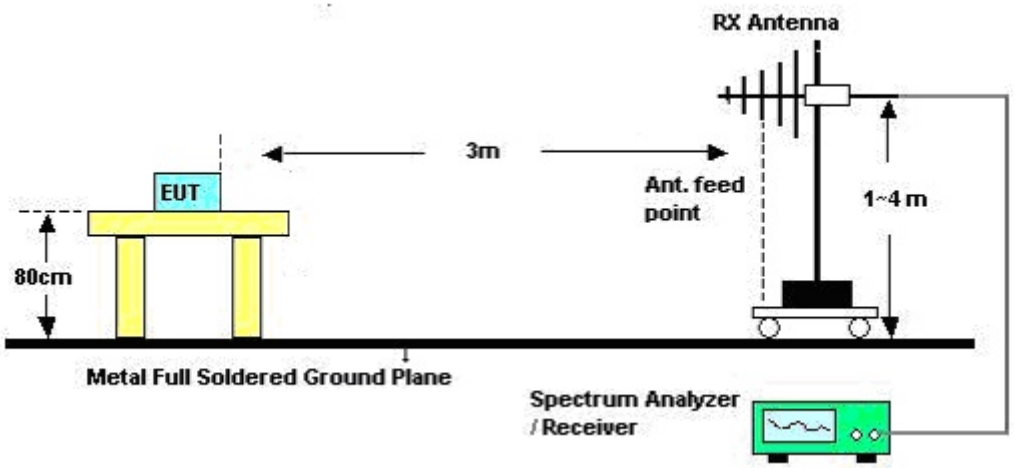
3.6.2 Measuring Instruments

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

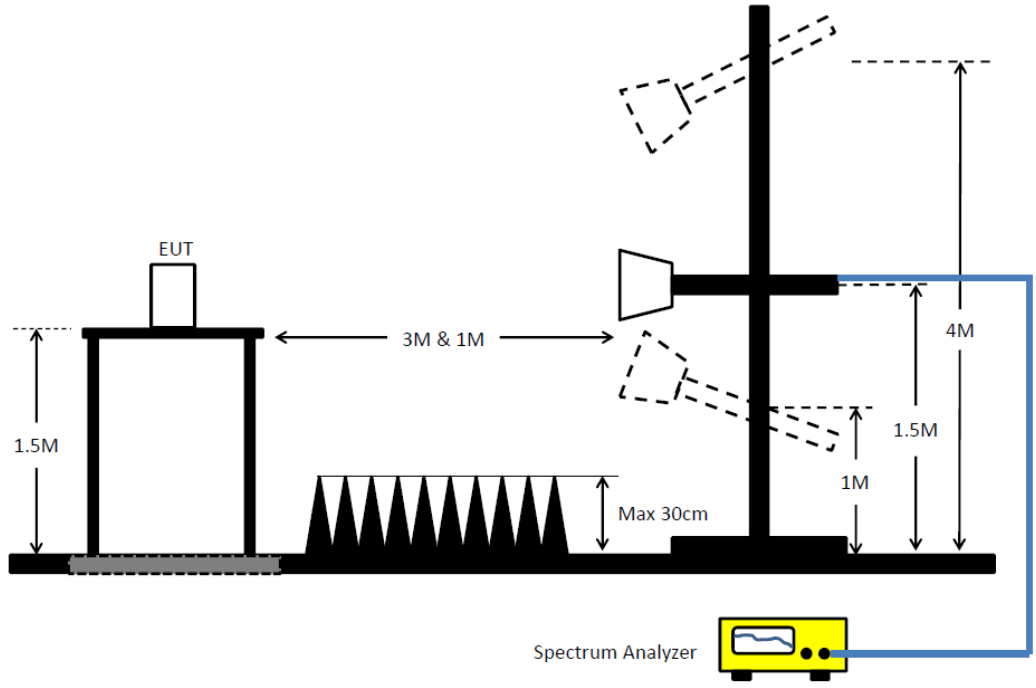
3.6.3 Test Procedures

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 Puls e Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9 kHz ~ 30 MHz	12/Oct/2018	11/Oct/2019

NCR : Non-Calibration Require

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	BBHA9170614	18GHz~40GHz	09/Feb/2018	08/Feb/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
RF Cable-R03m	Jye Bao	RG142	CB031	9kHz ~ 1GHz	1/Feb/2018	31/Jan/2019
RF Cable-high	HUBER+SUHNER	SUCOFLEX104	SN 556626/4 + 556627	1GHz ~ 40GHz	14/Mar/2018	13/Mar/2019

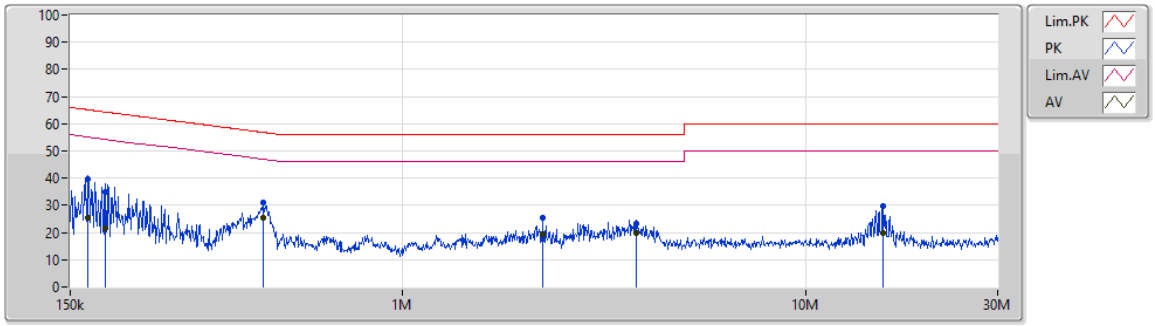
Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	10Hz~40GHz	05/Feb/2018	04/Feb/2019
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	05/Feb/2018	04/Feb/2019
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	05/Feb/2018	04/Feb/2019
Cable 0.2m	HUBER	MY10710/4	RF Cable - 01	30MHz ~18G	10/Jan/2019	09/Jan/2020
Cable 0.2m	HUBER	MY10711/4	RF Cable - 02	30MHz ~18G	10/Jan/2019	09/Jan/2020
Cable 0.5m	HUBER	MY39470/4	RF Cable - 29	30MHz ~18G	10/Jan/2019	09/Jan/2020
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	12/Nov/2018	10/Nov/2020

AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Neutral
Operating Function	USB Mode		

AC Conduction

13/02/2019

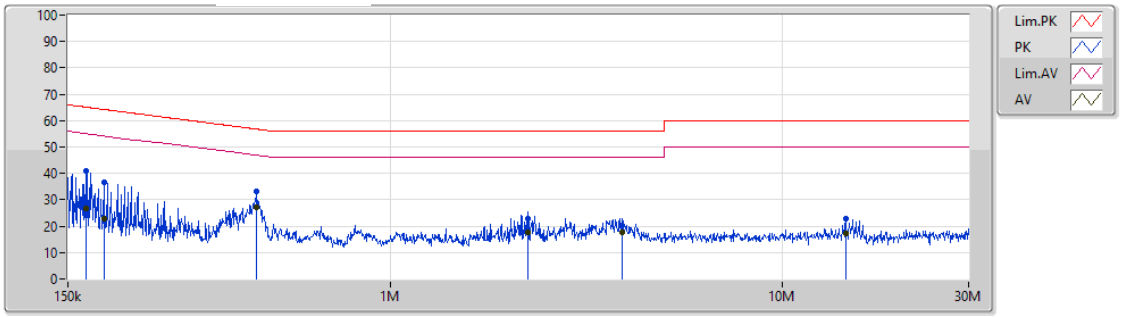


Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	165.743k	39.80	65.18	-25.38	19.48	Neutral	-	20.32	9.60	0.01	9.87
AV	165.743k	25.34	55.18	-29.84	19.48	Neutral	-	5.86	9.60	0.01	9.87
QP	183.137k	34.70	64.34	-29.64	19.47	Neutral	-	15.23	9.59	0.01	9.87
AV	183.137k	21.76	54.34	-32.58	19.47	Neutral	-	2.29	9.59	0.01	9.87
QP	451.436k	31.04	56.84	-25.80	19.48	Neutral	-	11.56	9.59	0.01	9.88
AV	451.436k	25.57	46.84	-21.27	19.48	Neutral	"Worst"	6.09	9.59	0.01	9.88
QP	2.229M	25.51	56.00	-30.49	19.53	Neutral	-	5.98	9.61	0.03	9.89
AV	2.229M	19.19	46.00	-26.81	19.53	Neutral	-	-0.34	9.61	0.03	9.89
QP	3.805M	23.35	56.00	-32.65	19.54	Neutral	-	3.81	9.61	0.04	9.89
AV	3.805M	19.88	46.00	-26.12	19.54	Neutral	-	0.34	9.61	0.04	9.89
QP	15.636M	29.62	60.00	-30.38	19.67	Neutral	-	9.95	9.68	0.09	9.90
AV	15.636M	19.70	50.00	-30.30	19.67	Neutral	-	0.03	9.68	0.09	9.90

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

AC Conduction

13/02/2019



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	166.406k	40.89	65.14	-24.25	19.48	Line	-	21.41	9.60	0.01	9.87
AV	166.406k	26.56	55.14	-28.58	19.48	Line	-	7.08	9.60	0.01	9.87
QP	185.344k	36.49	64.24	-27.75	19.48	Line	-	17.01	9.60	0.01	9.87
AV	185.344k	23.02	54.24	-31.22	19.48	Line	-	3.54	9.60	0.01	9.87
QP	453.242k	33.07	56.82	-23.75	19.48	Line	-	13.59	9.59	0.01	9.88
AV	453.242k	27.26	46.82	-19.56	19.48	Line	"Worst"	7.78	9.59	0.01	9.88
QP	2.247M	22.92	56.00	-33.08	19.55	Line	-	3.37	9.62	0.04	9.89
AV	2.247M	17.86	46.00	-28.14	19.55	Line	-	-1.69	9.62	0.04	9.89
QP	3.913M	20.40	56.00	-35.60	19.57	Line	-	0.83	9.63	0.05	9.89
AV	3.913M	17.66	46.00	-28.34	19.57	Line	-	-1.91	9.63	0.05	9.89
QP	14.552M	22.64	60.00	-37.36	19.64	Line	-	3.00	9.65	0.09	9.90
AV	14.552M	17.19	50.00	-32.81	19.64	Line	-	-2.45	9.65	0.09	9.90

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	718.75k	1.068M	1M07F1D	717.5k	1.055M

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;

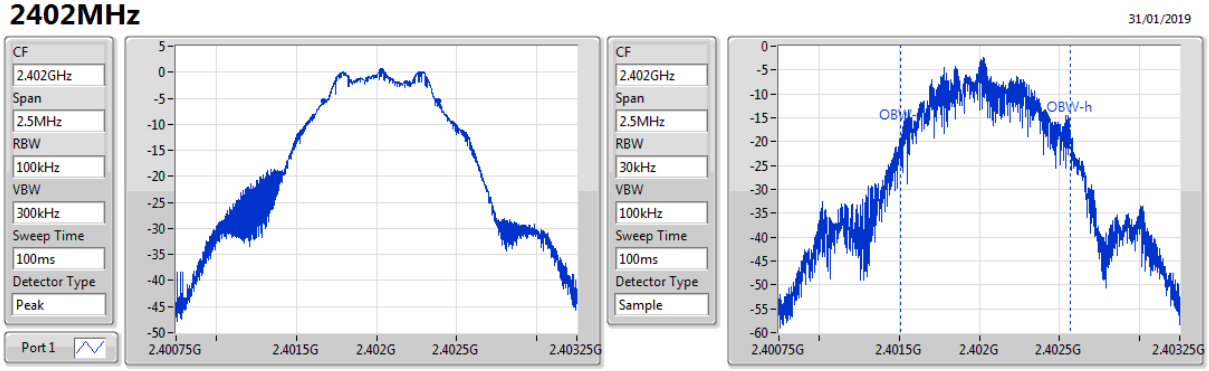
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	717.5k	1.056M
2440MHz	Pass	500k	718.75k	1.055M
2480MHz	Pass	500k	718.75k	1.068M

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

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

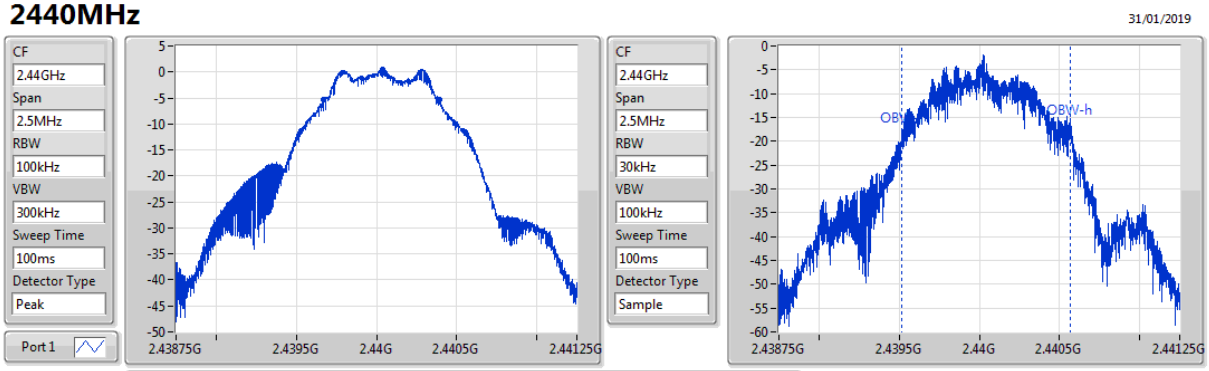
2402MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
717.5k	2.401668G	2.402385G	1.056M	2.401511G	2.402568G	500k	1

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

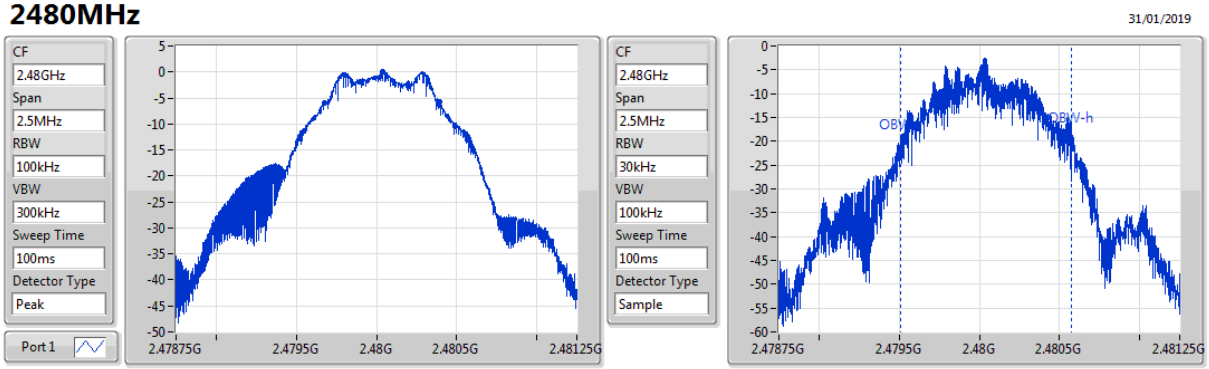
2440MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
718.75k	2.439673G	2.440391G	1.055M	2.439514G	2.440569G	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
718.75k	2.479676G	2.480395G	1.068M	2.47951G	2.480578G	500k	1

Summary

Mode	Power	Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	0.53	0.00113

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	2.22	0.39	30.00
2440MHz	Pass	2.22	0.53	30.00
2480MHz	Pass	2.22	0.09	30.00

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-13.46

RBW=3kHz.

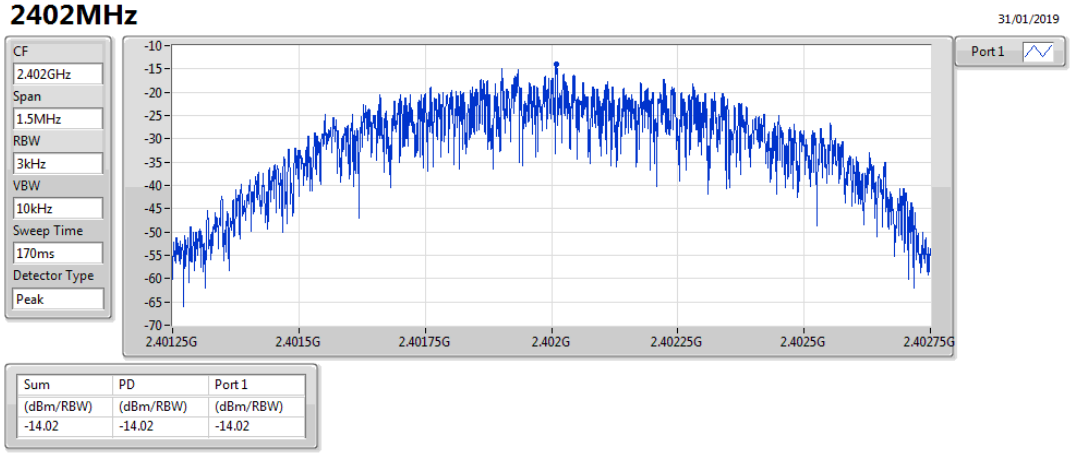
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	2.22	-14.02	8.00
2440MHz	Pass	2.22	-13.46	8.00
2480MHz	Pass	2.22	-14.02	8.00

RBW=3kHz.

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

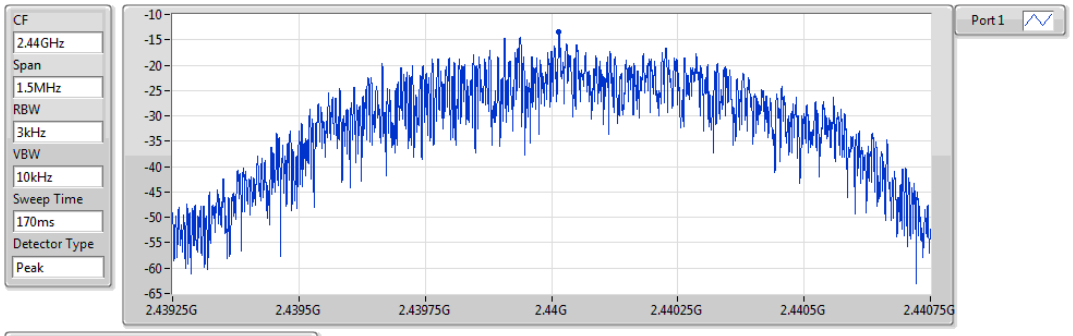
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-14.02	-14.02	-14.02

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

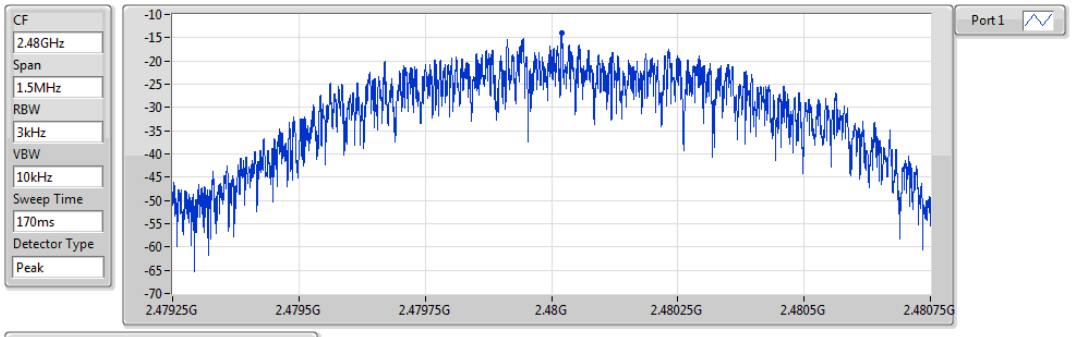
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-13.46	-13.46	-13.46

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

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-14.02	-14.02	-14.02

Summary

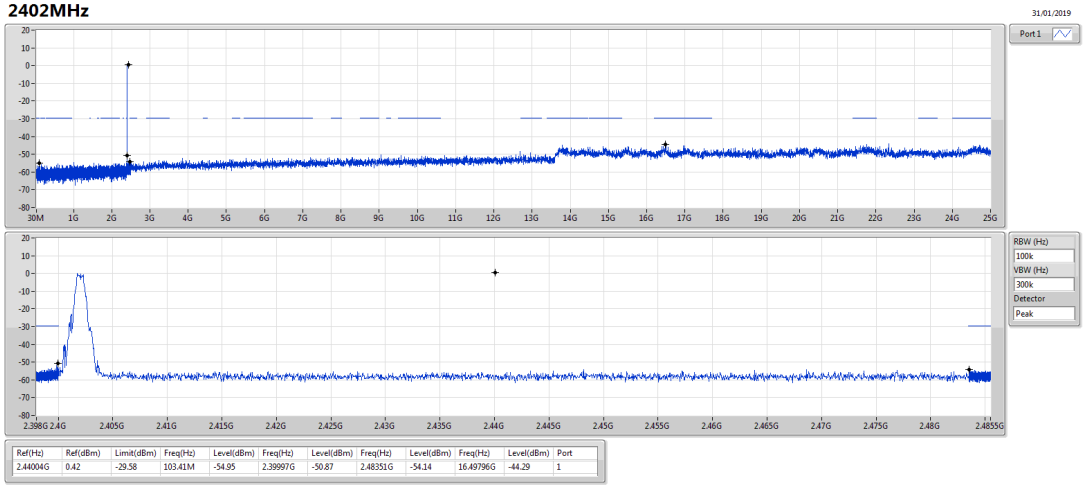
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.44004G	0.42	-29.58	2.15439G	-55.27	2.39868G	-53.40	2.48417G	-54.21	24.7045G	-43.88	1

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	2.44004G	0.42	-29.58	103.41M	-54.95	2.39997G	-50.87	2.48351G	-54.14	16.49796G	-44.29	1
2440MHz	Pass	2.44004G	0.42	-29.58	2.09371G	-55.12	2.39959G	-54.59	2.48413G	-53.59	21.80294G	-44.07	1
2480MHz	Pass	2.44004G	0.42	-29.58	2.15439G	-55.27	2.39868G	-53.40	2.48417G	-54.21	24.7045G	-43.88	1

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

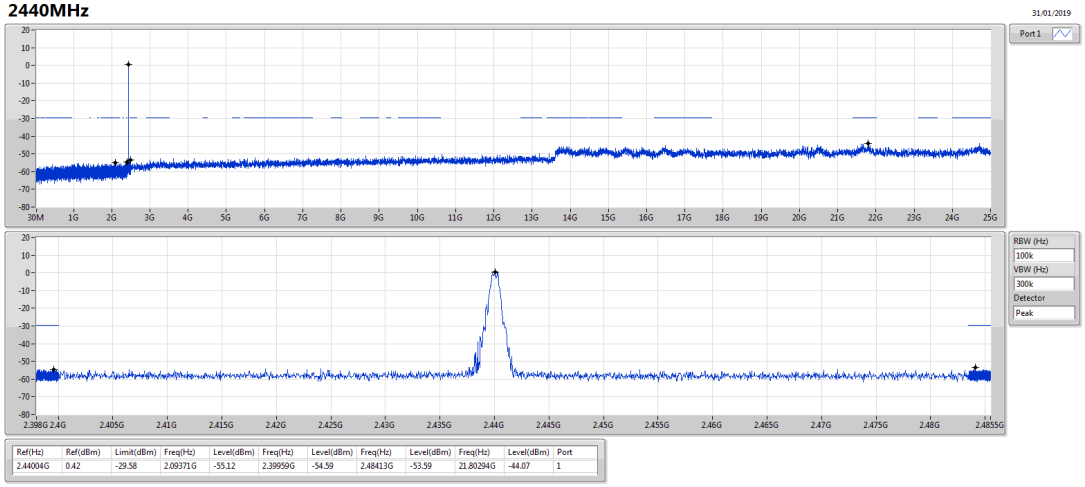
2402MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44004G	0.42	-29.58	103.41M	-54.95	2.39997G	-50.87	2.48351G	-54.14	16.49796G	-44.29	1

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

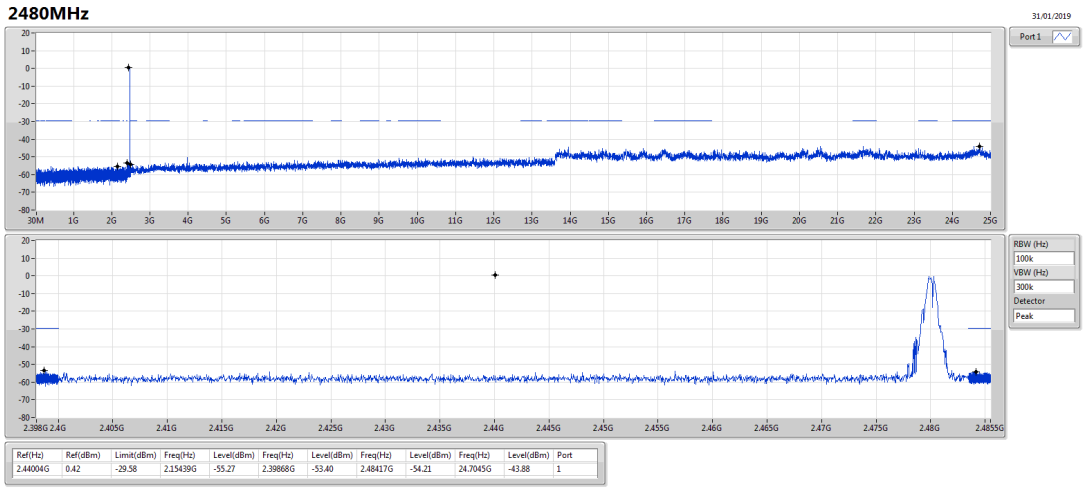
2440MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44004G	0.42	-29.58	2.09371G	-55.12	2.39959G	-54.59	2.48413G	-53.59	21.80294G	-44.07	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
2.44004G	0.42	-29.58	2.15439G	-55.27	2.39868G	-53.40	2.48417G	-54.21	24.7045G	-43.88	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	801.26M	41.97	46.00	-4.03	-8.12	3	Horizontal	0	3.00	-

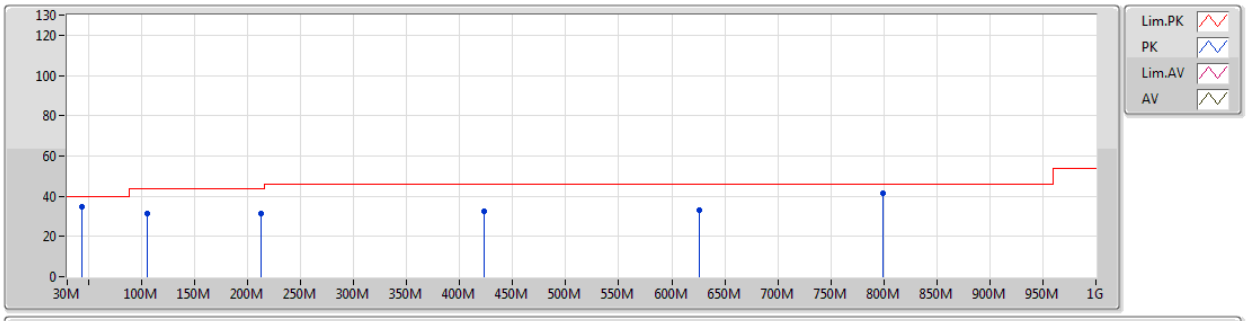
Result

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	44.16M	34.58	40.00	-5.42	-20.57	3	Vertical	360	3.00	-
2440MHz	Pass	PK	105.45M	31.22	43.50	-12.28	-20.48	3	Vertical	360	3.00	-
2440MHz	Pass	PK	212.79M	31.57	43.50	-11.93	-20.94	3	Vertical	360	3.00	-
2440MHz	Pass	PK	422.83M	32.38	46.00	-13.62	-13.20	3	Vertical	360	3.00	-
2440MHz	Pass	PK	625.64M	32.99	46.00	-13.01	-10.19	3	Vertical	360	3.00	-
2440MHz	Pass	PK	799.33M	41.23	46.00	-4.77	-8.13	3	Vertical	360	3.00	-
2440MHz	Pass	PK	41.64M	27.19	40.00	-12.81	-19.21	3	Horizontal	0	3.00	-
2440MHz	Pass	PK	105.45M	36.94	43.50	-6.56	-20.48	3	Horizontal	0	3.00	-
2440MHz	Pass	PK	260.44M	37.26	46.00	-8.74	-15.68	3	Horizontal	0	3.00	-
2440MHz	Pass	PK	450.22M	33.00	46.00	-13.00	-12.87	3	Horizontal	0	3.00	-
2440MHz	Pass	PK	603.17M	33.58	46.00	-12.42	-10.79	3	Horizontal	0	3.00	-
2440MHz	Pass	PK	801.26M	41.97	46.00	-4.03	-8.12	3	Horizontal	0	3.00	-

BT-LE(1Mbps)

2440MHz_USB

01/02/2019

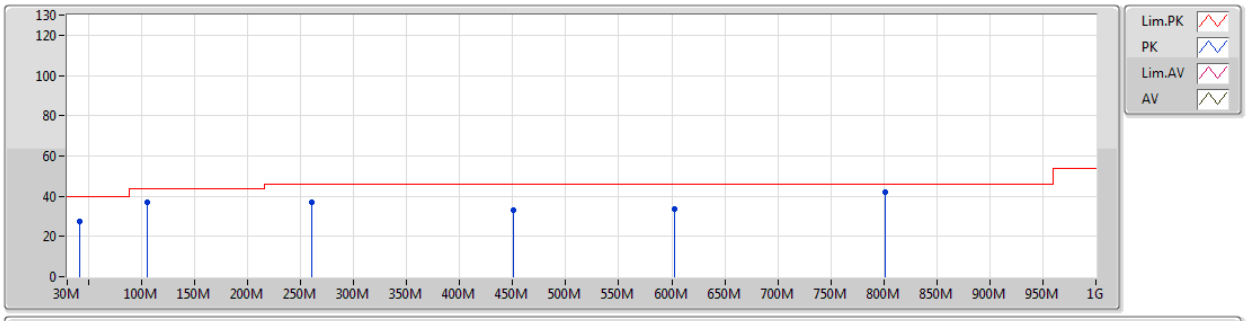


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
PK	44.16M	34.58	40.00	-5.42	-20.57	3	Vertical	360	3.00	-
PK	105.45M	31.22	43.50	-12.28	-20.48	3	Vertical	360	3.00	-
PK	212.79M	31.57	43.50	-11.93	-20.94	3	Vertical	360	3.00	-
PK	422.83M	32.38	46.00	-13.62	-13.20	3	Vertical	360	3.00	-
PK	625.64M	32.99	46.00	-13.01	-10.19	3	Vertical	360	3.00	-
PK	799.33M	41.23	46.00	-4.77	-8.13	3	Vertical	360	3.00	-

BT-LE(1Mbps)

2440MHz_USB

01/02/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
PK	41.64M	27.19	40.00	-12.81	-19.21	3	Horizontal	0	3.00	-
PK	105.45M	36.94	43.50	-6.56	-20.48	3	Horizontal	0	3.00	-
PK	260.44M	37.26	46.00	-8.74	-15.68	3	Horizontal	0	3.00	-
PK	450.22M	33.00	46.00	-13.00	-12.87	3	Horizontal	0	3.00	-
PK	603.17M	33.58	46.00	-12.42	-10.79	3	Horizontal	0	3.00	-
PK	801.26M	41.97	46.00	-4.03	-8.12	3	Horizontal	0	3.00	-

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	2.3608G	46.41	54.00	-7.59	30.67	3	Horizontal	178	1.61	-

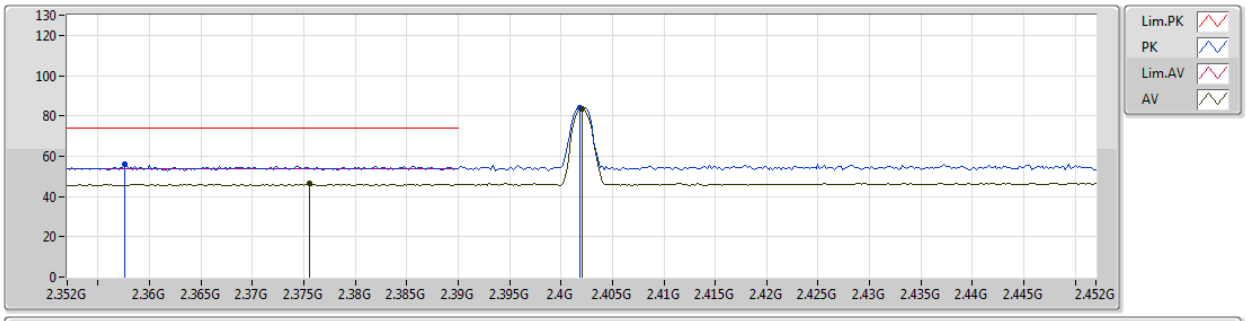
Result

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	2.3756G	46.24	54.00	-7.76	30.72	3	Vertical	45	1.00	-
2402MHz	Pass	AV	2.402G	83.38	Inf	-Inf	30.82	3	Vertical	45	1.00	-
2402MHz	Pass	PK	2.3576G	55.79	74.00	-18.21	30.66	3	Vertical	45	1.00	-
2402MHz	Pass	PK	2.4018G	84.19	Inf	-Inf	30.82	3	Vertical	45	1.00	-
2402MHz	Pass	AV	2.3608G	46.41	54.00	-7.59	30.67	3	Horizontal	178	1.61	-
2402MHz	Pass	AV	2.402G	93.43	Inf	-Inf	30.82	3	Horizontal	178	1.61	-
2402MHz	Pass	PK	2.3524G	56.48	74.00	-17.52	30.65	3	Horizontal	178	1.61	-
2402MHz	Pass	PK	2.4022G	94.15	Inf	-Inf	30.82	3	Horizontal	178	1.61	-
2402MHz	Pass	AV	4.79404G	33.94	54.00	-20.06	2.06	3	Vertical	227	1.50	-
2402MHz	Pass	PK	4.7971G	44.16	74.00	-29.84	2.07	3	Vertical	227	1.50	-
2402MHz	Pass	AV	4.8046G	33.82	54.00	-20.18	2.08	3	Horizontal	332	1.50	-
2402MHz	Pass	PK	4.80418G	43.34	74.00	-30.66	2.08	3	Horizontal	332	1.50	-
2440MHz	Pass	AV	2.3696G	43.83	54.00	-10.17	30.70	3	Vertical	171	1.00	-
2440MHz	Pass	AV	2.44G	86.61	Inf	-Inf	30.95	3	Vertical	171	1.00	-
2440MHz	Pass	AV	2.4892G	44.72	54.00	-9.28	31.13	3	Vertical	171	1.00	-
2440MHz	Pass	PK	2.372G	55.15	74.00	-18.85	30.71	3	Vertical	171	1.00	-
2440MHz	Pass	PK	2.4404G	87.69	Inf	-Inf	30.95	3	Vertical	171	1.00	-
2440MHz	Pass	PK	2.4984G	56.05	74.00	-17.95	31.17	3	Vertical	171	1.00	-
2440MHz	Pass	AV	2.3608G	44.02	54.00	-9.98	30.67	3	Horizontal	179	1.28	-
2440MHz	Pass	AV	2.44G	93.88	Inf	-Inf	30.95	3	Horizontal	179	1.28	-
2440MHz	Pass	AV	2.488G	44.53	54.00	-9.47	31.13	3	Horizontal	179	1.28	-
2440MHz	Pass	PK	2.3488G	56.60	74.00	-17.40	30.63	3	Horizontal	179	1.28	-
2440MHz	Pass	PK	2.4404G	94.91	Inf	-Inf	30.95	3	Horizontal	179	1.28	-
2440MHz	Pass	PK	2.4896G	55.72	74.00	-18.28	31.13	3	Horizontal	179	1.28	-
2440MHz	Pass	AV	4.88576G	33.92	54.00	-20.08	2.29	3	Vertical	166	1.90	-
2440MHz	Pass	PK	4.88096G	44.77	74.00	-29.23	2.27	3	Vertical	166	1.90	-
2440MHz	Pass	AV	4.8947G	33.88	54.00	-20.12	2.31	3	Horizontal	341	1.30	-
2440MHz	Pass	PK	4.88216G	44.96	74.00	-29.04	2.27	3	Horizontal	341	1.30	-
2480MHz	Pass	AV	2.48G	83.65	Inf	-Inf	31.09	3	Vertical	170	1.98	-
2480MHz	Pass	AV	2.4996G	44.55	54.00	-9.45	31.17	3	Vertical	170	1.98	-
2480MHz	Pass	PK	2.4804G	84.83	Inf	-Inf	31.10	3	Vertical	170	1.98	-
2480MHz	Pass	PK	2.4926G	56.10	74.00	-17.90	31.14	3	Vertical	170	1.98	-
2480MHz	Pass	AV	2.48G	94.38	Inf	-Inf	31.09	3	Horizontal	179	1.26	-
2480MHz	Pass	AV	2.4986G	44.64	54.00	-9.36	31.17	3	Horizontal	179	1.26	-
2480MHz	Pass	PK	2.4798G	95.42	Inf	-Inf	31.09	3	Horizontal	179	1.26	-
2480MHz	Pass	PK	2.487G	56.71	74.00	-17.29	31.12	3	Horizontal	179	1.26	-
2480MHz	Pass	AV	4.97074G	33.47	54.00	-20.53	2.49	3	Vertical	206	1.50	-
2480MHz	Pass	PK	4.97062G	44.65	74.00	-29.35	2.49	3	Vertical	206	1.50	-
2480MHz	Pass	AV	4.97182G	33.67	54.00	-20.33	2.49	3	Horizontal	315	1.65	-
2480MHz	Pass	PK	4.9651G	43.57	74.00	-30.43	2.48	3	Horizontal	315	1.65	-

BT-LE(1Mbps)

2402MHz_TX

01/02/2019

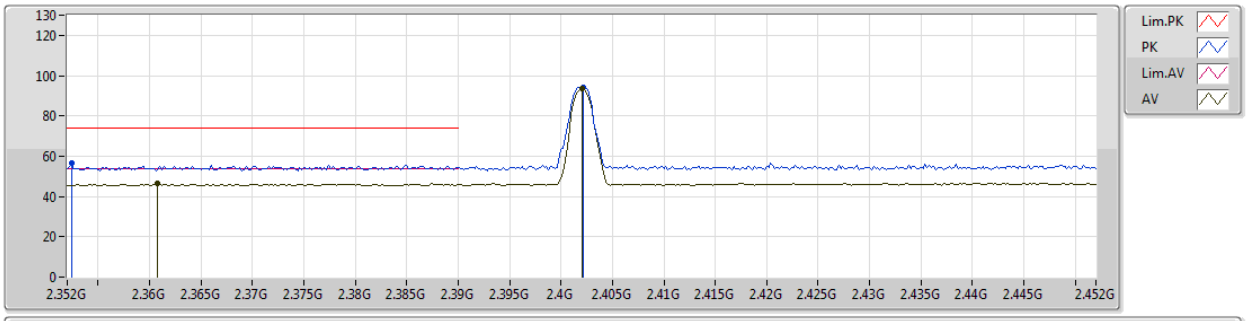


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3756G	46.24	54.00	-7.76	30.72	3	Vertical	45	1.00	-
AV	2.402G	83.38	Inf	-Inf	30.82	3	Vertical	45	1.00	-
PK	2.3576G	55.79	74.00	-18.21	30.66	3	Vertical	45	1.00	-
PK	2.4018G	84.19	Inf	-Inf	30.82	3	Vertical	45	1.00	-

BT-LE(1Mbps)

2402MHz_TX

01/02/2019

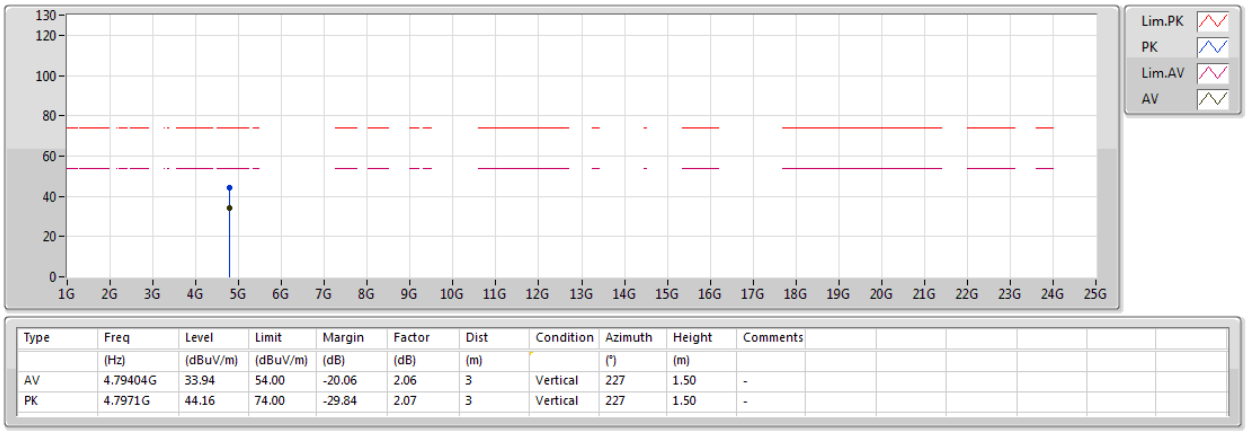


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3608G	46.41	54.00	-7.59	30.67	3	Horizontal	178	1.61	-
AV	2.402G	93.43	Inf	-Inf	30.82	3	Horizontal	178	1.61	-
PK	2.3524G	56.48	74.00	-17.52	30.65	3	Horizontal	178	1.61	-
PK	2.4022G	94.15	Inf	-Inf	30.82	3	Horizontal	178	1.61	-

BT-LE(1Mbps)

2402MHz_TX

01/02/2019

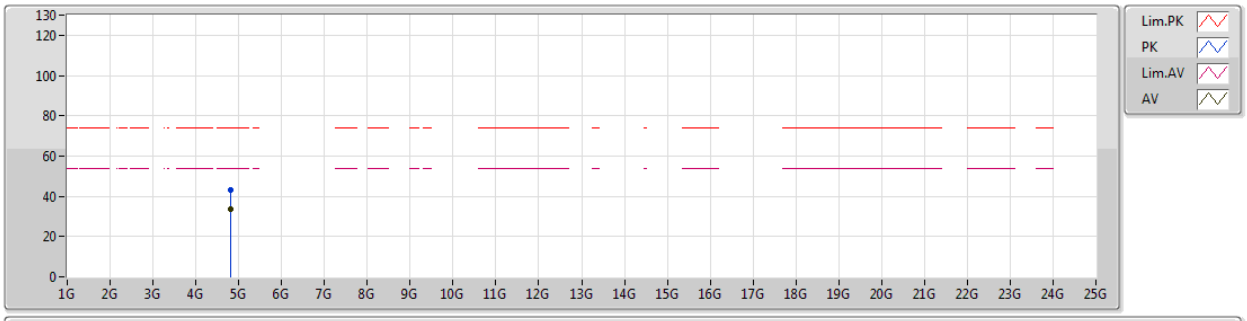


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.79404G	33.94	54.00	-20.06	2.06	3	Vertical	227	1.50	-
PK	4.7971G	44.16	74.00	-29.84	2.07	3	Vertical	227	1.50	-

BT-LE(1Mbps)

2402MHz_TX

01/02/2019

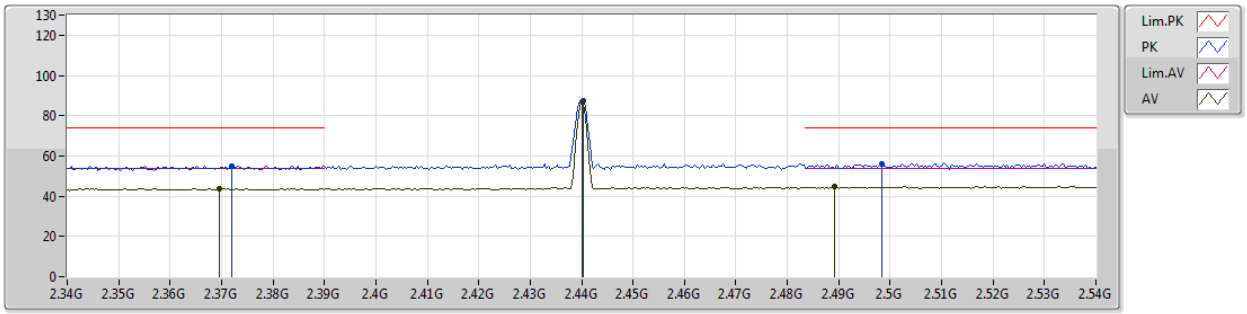


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.8046G	33.82	54.00	-20.18	2.08	3	Horizontal	332	1.50	-
PK	4.80418G	43.34	74.00	-30.66	2.08	3	Horizontal	332	1.50	-

BT-LE(1Mbps)

2440MHz_TX

01/02/2019

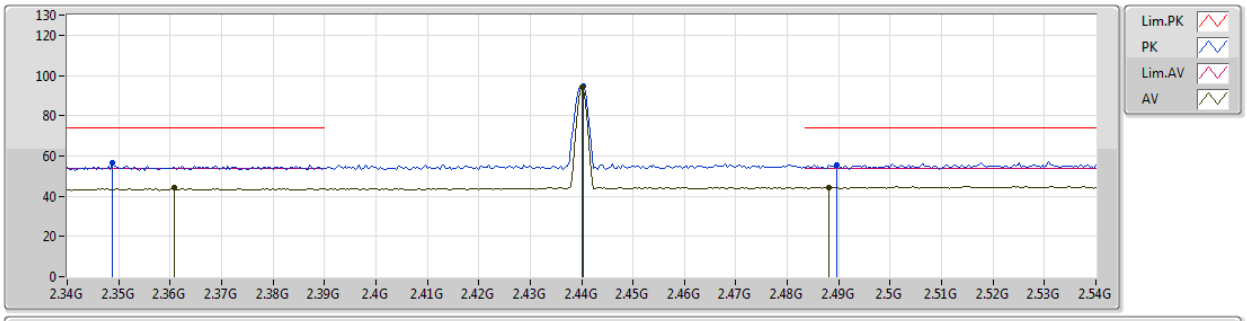


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3696G	43.83	54.00	-10.17	30.70	3	Vertical	171	1.00	-
AV	2.44G	86.61	Inf	-Inf	30.95	3	Vertical	171	1.00	-
AV	2.4892G	44.72	54.00	-9.28	31.13	3	Vertical	171	1.00	-
PK	2.372G	55.15	74.00	-18.85	30.71	3	Vertical	171	1.00	-
PK	2.4404G	87.69	Inf	-Inf	30.95	3	Vertical	171	1.00	-
PK	2.4984G	56.05	74.00	-17.95	31.17	3	Vertical	171	1.00	-

BT-LE(1Mbps)

2440MHz_TX

01/02/2019

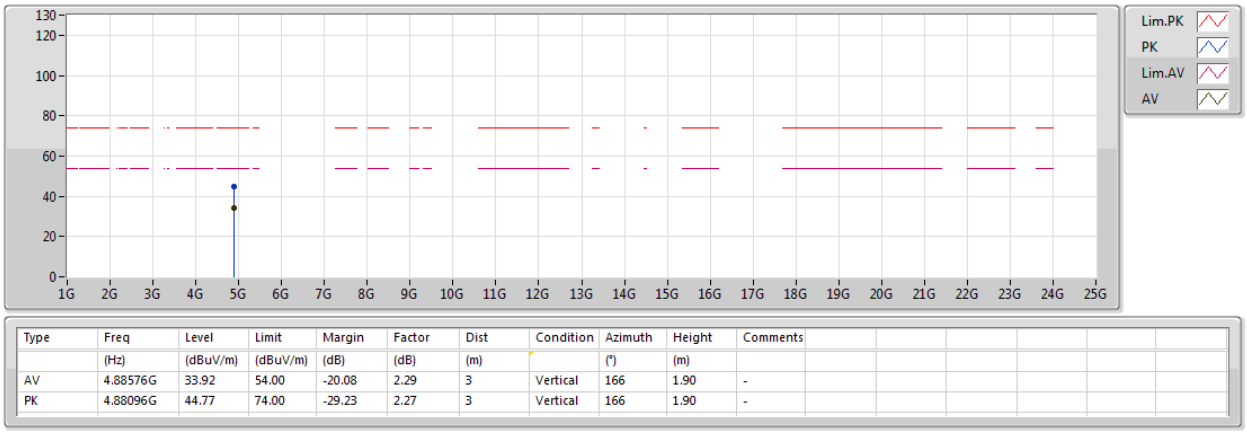


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3608G	44.02	54.00	-9.98	30.67	3	Horizontal	179	1.28	-
AV	2.44G	93.88	Inf	-Inf	30.95	3	Horizontal	179	1.28	-
AV	2.488G	44.53	54.00	-9.47	31.13	3	Horizontal	179	1.28	-
PK	2.3488G	56.60	74.00	-17.40	30.63	3	Horizontal	179	1.28	-
PK	2.4404G	94.91	Inf	-Inf	30.95	3	Horizontal	179	1.28	-
PK	2.4896G	55.72	74.00	-18.28	31.13	3	Horizontal	179	1.28	-

BT-LE(1Mbps)

2440MHz_TX

01/02/2019

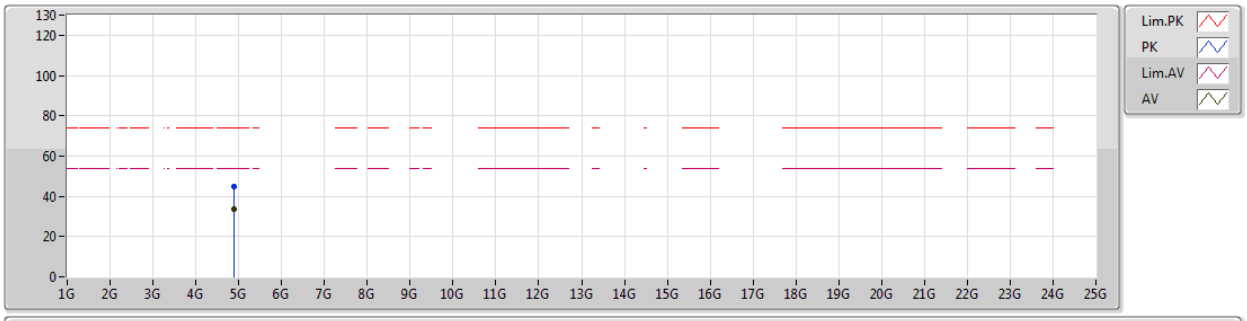


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.88576G	33.92	54.00	-20.08	2.29	3	Vertical	166	1.90	-
PK	4.88096G	44.77	74.00	-29.23	2.27	3	Vertical	166	1.90	-

BT-LE(1Mbps)

2440MHz_TX

01/02/2019

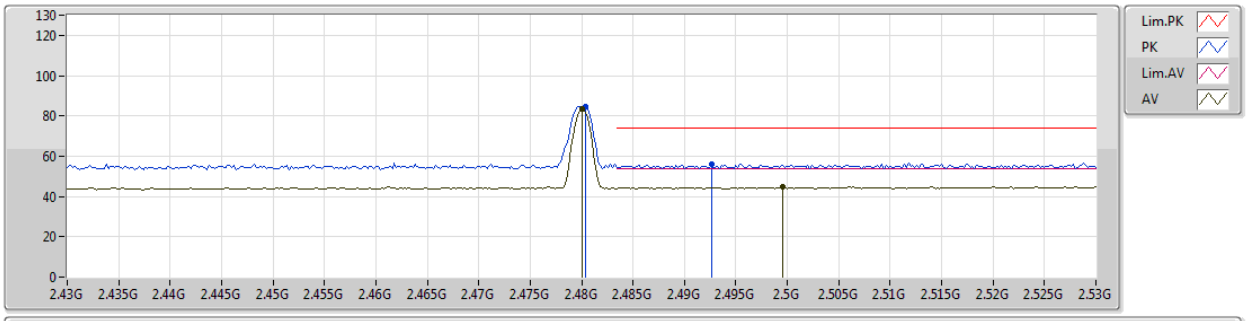


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.8947G	33.88	54.00	-20.12	2.31	3	Horizontal	341	1.30	-
PK	4.88216G	44.96	74.00	-29.04	2.27	3	Horizontal	341	1.30	-

BT-LE(1Mbps)

2480MHz_TX

01/02/2019

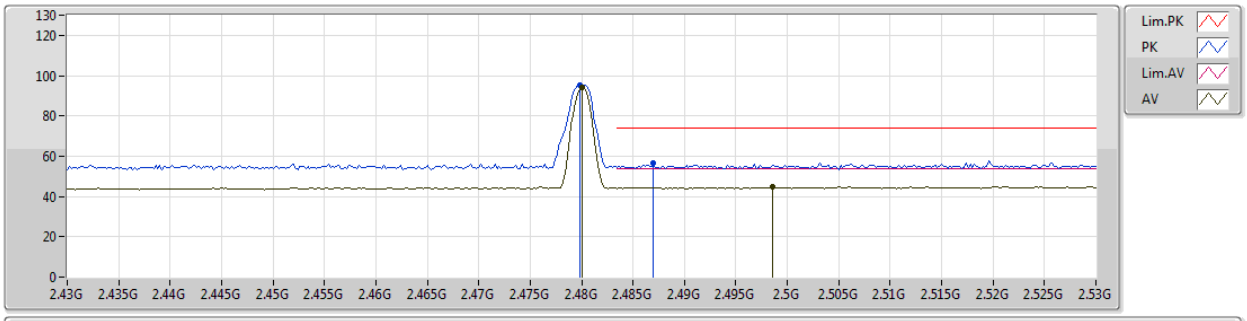


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.48G	83.65	Inf	-Inf	31.09	3	Vertical	170	1.98	-
AV	2.4996G	44.55	54.00	-9.45	31.17	3	Vertical	170	1.98	-
PK	2.4804G	84.83	Inf	-Inf	31.10	3	Vertical	170	1.98	-
PK	2.4926G	56.10	74.00	-17.90	31.14	3	Vertical	170	1.98	-

BT-LE(1Mbps)

2480MHz_TX

01/02/2019

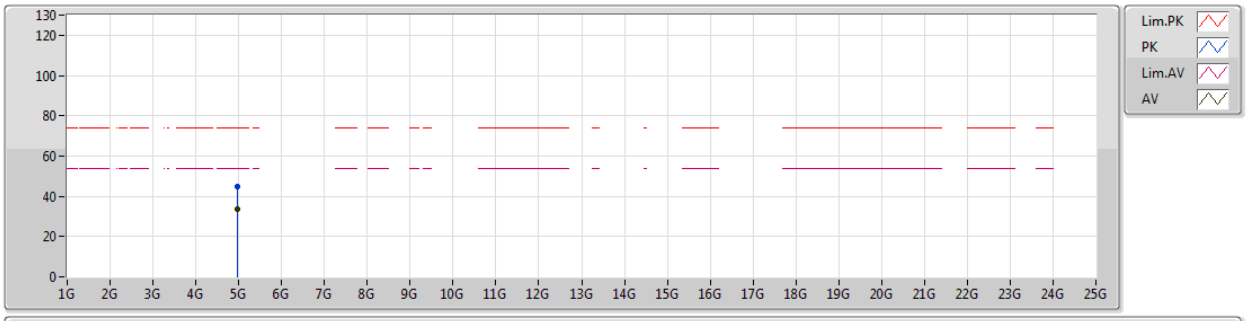


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.48G	94.38	Inf	-Inf	31.09	3	Horizontal	179	1.26	-
AV	2.4986G	44.64	54.00	-9.36	31.17	3	Horizontal	179	1.26	-
PK	2.4798G	95.42	Inf	-Inf	31.09	3	Horizontal	179	1.26	-
PK	2.487G	56.71	74.00	-17.29	31.12	3	Horizontal	179	1.26	-

BT-LE(1Mbps)

2480MHz_TX

01/02/2019

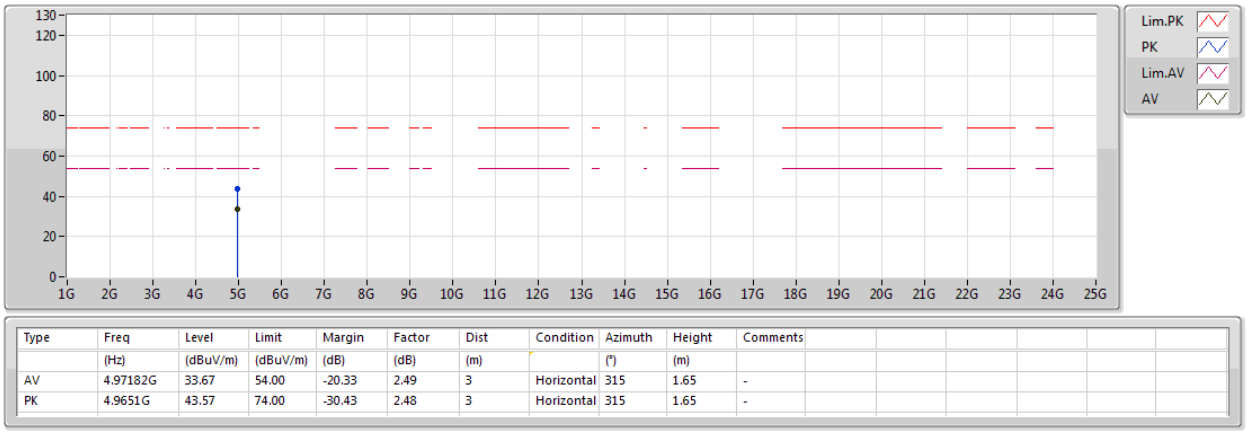


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.97074G	33.47	54.00	-20.53	2.49	3	Vertical	206	1.50	-
PK	4.97062G	44.65	74.00	-29.35	2.49	3	Vertical	206	1.50	-

BT-LE(1Mbps)

2480MHz_TX

01/02/2019



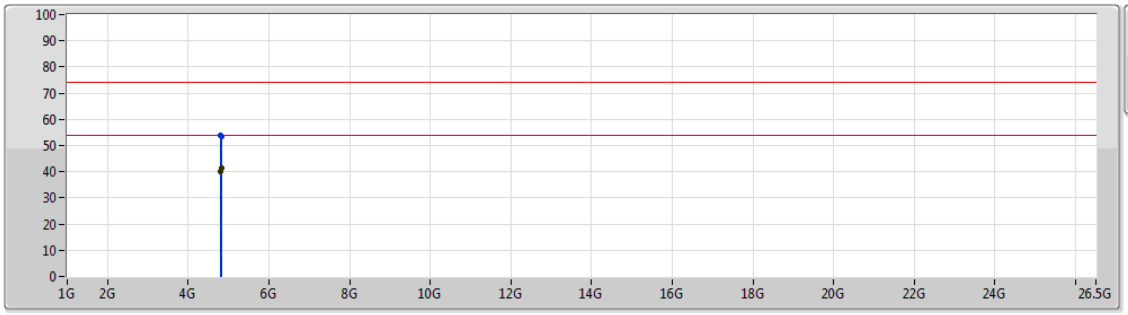
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.97182G	33.67	54.00	-20.33	2.49	3	Horizontal	315	1.65	-
PK	4.9651G	43.57	74.00	-30.43	2.48	3	Horizontal	315	1.65	-

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
Mode 1	Pass	AV	4.8241G	41.42	54.00	-12.58	12.66	3	Vertical	189	1.44	-
Mode 2	Pass	AV	4.82457G	41.97	54.00	-12.03	2.13	3	Vertical	224	1.44	-
Mode 3	Pass	AV	10.36G	43.17	54.00	-10.83	12.63	3	Horizontal	154	1.96	-
Mode 4	Pass	AV	10.36G	43.62	54.00	-10.38	12.63	3	Horizontal	258	2.54	-

Mode 1

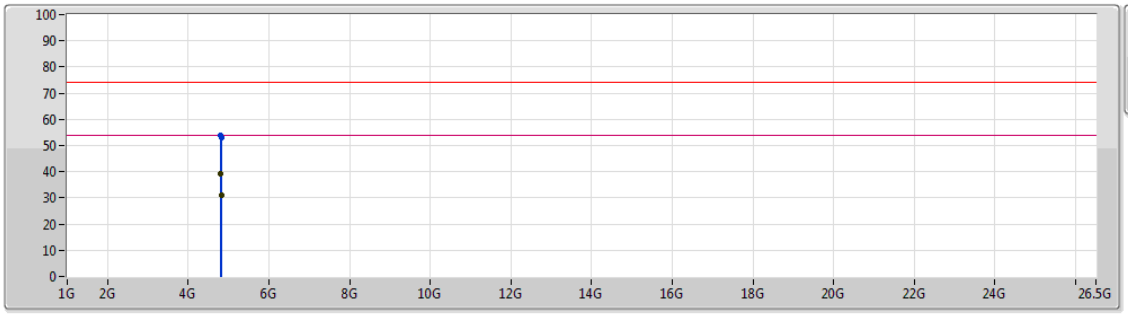
13/02/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.80871G	39.92	54.00	-14.08	2.08	3	Vertical	212	1.55	-	37.84	31.19	5.19	34.30
AV	4.8241G	41.42	54.00	-12.58	12.66	3	Vertical	189	1.44	-	28.76	39.42	8.00	34.76
PK	4.80876G	53.95	74.00	-20.05	2.08	3	Vertical	212	1.55	-	51.87	31.19	5.19	34.30
PK	4.82011G	53.62	74.00	-20.38	12.66	3	Vertical	189	1.44	-	40.96	39.42	8.00	34.76

Mode 1

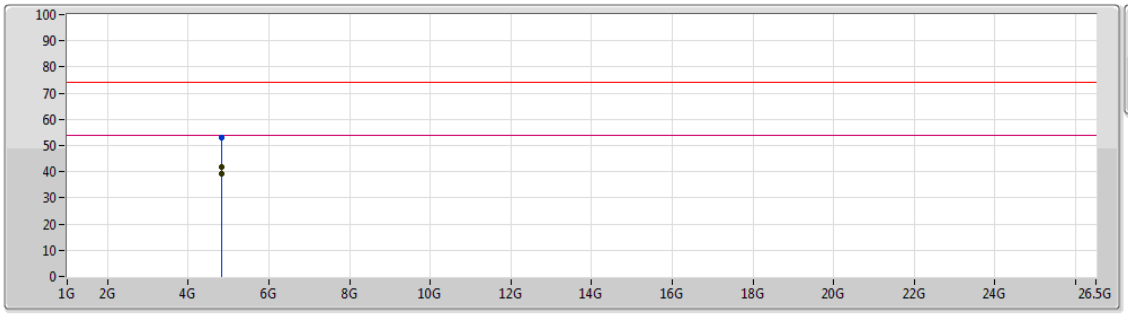
13/02/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.80871G	39.30	54.00	-14.70	2.09	3	Horizontal	85	1.71	-	37.21	31.19	5.20	34.30
AV	4.8241G	31.14	54.00	-22.86	2.13	3	Horizontal	162	1.50	-	29.01	31.22	5.20	34.29
PK	4.8088G	53.90	74.00	-20.10	2.09	3	Horizontal	85	1.71	-	51.81	31.19	5.20	34.30
PK	4.82425G	53.04	74.00	-20.96	2.13	3	Horizontal	162	1.50	-	50.91	31.22	5.20	34.29

Mode 2

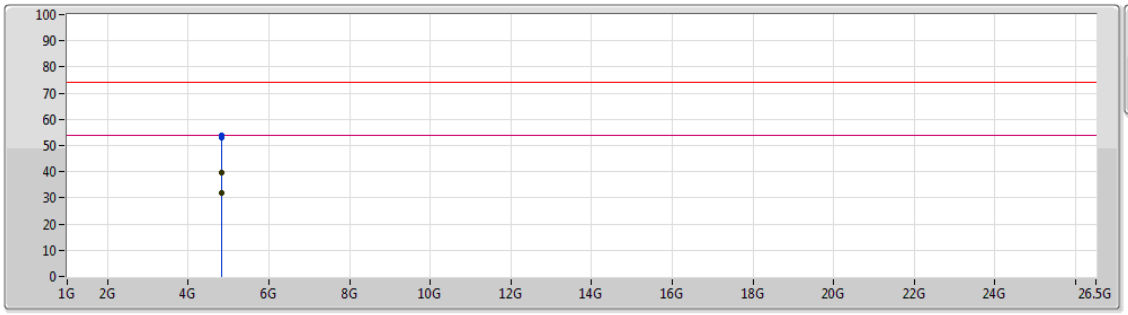
13/02/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.826717G	39.12	54.00	-14.88	2.14	3	Vertical	159	1.55	-	36.98	31.22	5.21	34.29
AV	4.82457G	41.97	54.00	-12.03	2.13	3	Vertical	224	1.44	-	39.84	31.22	5.20	34.29
PK	4.82655G	53.16	74.00	-20.84	2.14	3	Vertical	159	1.55	-	51.02	31.22	5.21	34.29
PK	4.82321G	53.22	74.00	-20.78	2.13	3	Vertical	224	1.44	-	51.09	31.22	5.20	34.29

Mode 2

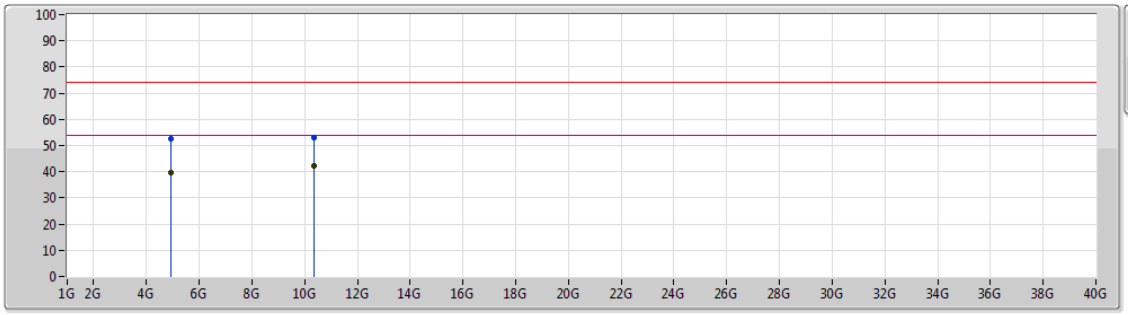
13/02/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.82671G	39.58	54.00	-14.42	2.14	3	Horizontal	196	2.02	-	37.44	31.22	5.21	34.29
AV	4.824G	31.71	54.00	-22.29	2.13	3	Horizontal	311	1.91	-	29.58	31.22	5.20	34.29
PK	4.82596G	54.02	74.00	-19.98	2.14	3	Horizontal	196	2.02	-	51.88	31.22	5.21	34.29
PK	4.8252G	52.91	74.00	-21.09	2.14	3	Horizontal	311	1.91	-	50.77	31.22	5.21	34.29

Mode 3

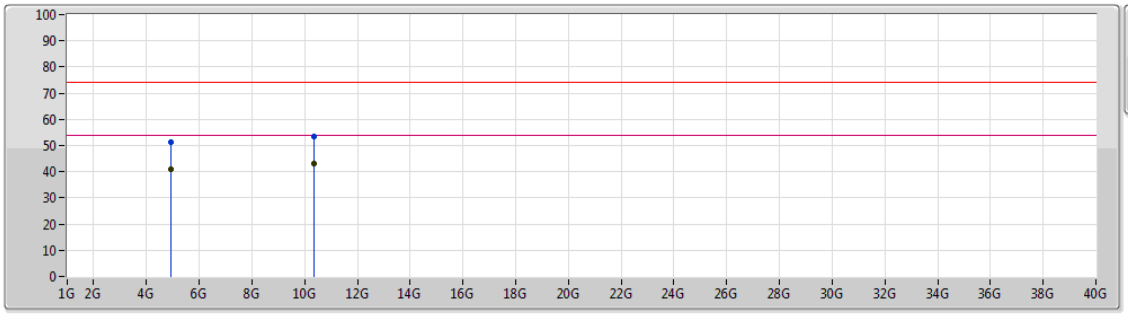
13/02/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.948G	39.55	54.00	-14.45	2.44	3	Vertical	265	2.16	-	37.11	31.42	5.28	34.26
AV	10.36G	42.45	54.00	-11.55	12.63	3	Vertical	111	1.32	-	29.82	39.40	8.00	34.77
PK	4.94817G	52.69	74.00	-21.31	2.44	3	Vertical	265	2.16	-	50.25	31.42	5.28	34.26
PK	10.3654G	53.11	74.00	-20.89	12.64	3	Vertical	111	1.32	-	40.47	39.41	8.00	34.77

Mode 3

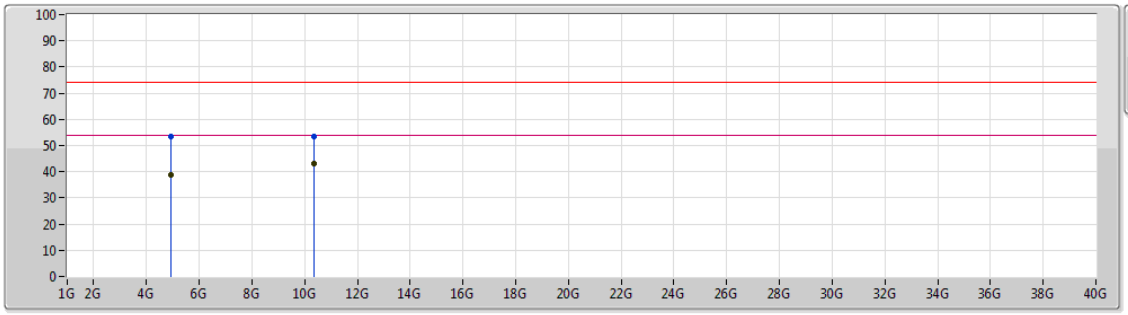
13/02/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.948G	41.15	54.00	-12.85	2.44	3	Horizontal	332	1.50	-	38.71	31.42	5.28	34.26
AV	10.36G	43.17	54.00	-10.83	12.63	3	Horizontal	154	1.96	-	30.54	39.40	8.00	34.77
PK	4.94852G	51.15	74.00	-22.85	2.44	3	Horizontal	332	1.50	-	48.71	31.42	5.28	34.26
PK	10.3656G	53.58	74.00	-20.42	12.64	3	Horizontal	154	1.96	-	40.94	39.41	8.00	34.77

Mode 4

13/02/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.920G	38.71	54.00	-15.29	2.36	3	Vertical	117	2.16	-	36.35	31.37	5.26	34.27
AV	10.36G	43.16	54.00	-10.84	12.63	3	Vertical	292	1.32	-	30.53	39.40	8.00	34.77
PK	4.92006G	53.29	74.00	-20.71	2.36	3	Vertical	117	2.16	-	50.93	31.37	5.26	34.27
PK	10.3602G	53.41	74.00	-20.59	12.63	3	Vertical	292	1.32	-	40.78	39.40	8.00	34.77

Mode 4

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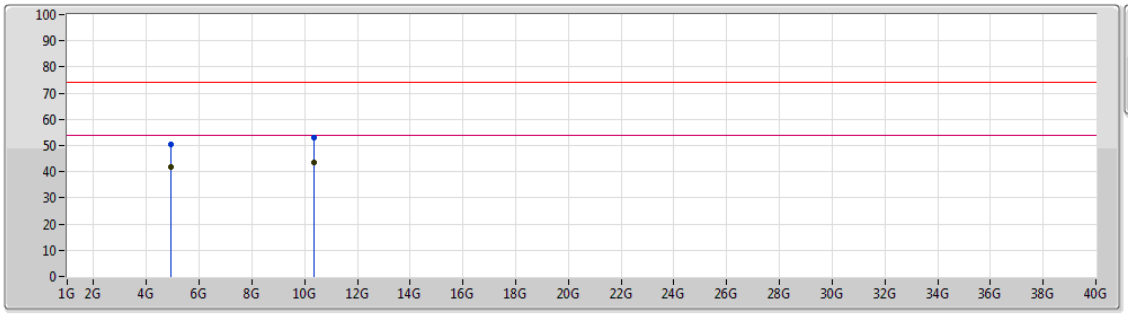

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.920G	41.81	54.00	-12.19	2.36	3	Horizontal	51	1.99	-	39.45	31.37	5.26	34.27
AV	10.36G	43.62	54.00	-10.38	12.63	3	Horizontal	258	2.54	-	30.99	39.40	8.00	34.77
PK	4.92034G	50.52	74.00	-23.48	2.36	3	Horizontal	51	1.99	-	48.16	31.37	5.26	34.27
PK	10.3622G	52.87	74.00	-21.13	12.64	3	Horizontal	258	2.54	-	40.23	39.41	8.00	34.77