

FCC Test Report

FCC ID : RYK-WPEA352ACNRB
Equipment : 802.11ac/b/g/n Mini PCIe Module
Brand Name : Sparklan
Model Name : WPEA-352ACNRB
WPEA-352ACNRBI
Applicant/ : SparkLAN Communications, Inc.
Manufacturer : 8F., No. 257, Sec. 2, Tiding Blvd., Neihu District,
Taipei City 11493, Taiwan
Standard : 47 CFR FCC Part 15.247

The product was received on May 21, 2020, and testing was started from May 22, 2020 and completed on May 23, 2020. . 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 variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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



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History of this test report

Report No.	Version	Description	Issued Date
FR8D0606-01AC	01	Initial issue of report	Jun. 30, 2020

Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
-	15.207	AC Power-line Conducted Emissions	Not Performed	Refer to 1.1.6
-	15.247(a)	DTS Bandwidth	Not Performed	Refer to 1.1.6
-	15.247(b)	Maximum Conducted Output Power	Not Performed	Refer to 1.1.6
-	15.247(e)	Power Spectral Density	Not Performed	Refer to 1.1.6
-	15.247(d)	Emissions in Non-restricted Frequency Bands	Not Performed	Refer to 1.1.6
3.1	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

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: Michelle Tsai

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
2400-2483.5	b, g, n (HT20)	2412-2462	1-11 [11]
2400-2483.5	n (HT40)	2422-2452	3-9 [7]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	3TX
2.4-2.4835GHz	802.11g	20	3TX
2.4-2.4835GHz	802.11n HT20	20	3TX
2.4-2.4835GHz	802.11n HT40	40	3TX

Note:

- ♦ 11b mode uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
- ♦ 11g, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- ♦ BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Brand	Model	Antenna Type	Connector
1	SparkLAN	AD-103AG	Dipole	I-Pex
2	SparkLAN	AD-301N	Dipole	I-Pex
3	SparkLAN	AD-302N	Dipole	I-Pex
4	SparkLAN	AD-303N	Dipole	I-Pex
5	SparkLAN	AD-305N	Dipole	I-Pex
6	SparkLAN	AD-300N	Dipole	I-Pex
7	Ethertronics	1000423	PIFA	I-Pex

Ant.	Gain (dBi)				
	2.4G	5G			
		U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
1	2.02	2.03			
2	4.4	5.2		5.8	
3	3.14	2.87			
4	3.14	3.45			
5	5	5.53			
6	3	5			
7	0.6	-			

Note 1: EUT can match with above antennas for using. The higher gain (Ant. 2/5) was used to perform the worst configuration and result of that was recorded as the final test result.

For 2.4 GHz function:

For IEEE 802.11b/g/n mode (3TX/3RX)

Ant. 5 could transmit/receive simultaneously.

For 5 GHz function:

For IEEE 802.11a/n/ac mode (3TX/3RX)

U-NII-1/ U-NII-2A

Ant. 5 could transmit/receive simultaneously.

U-NII-2C/ U-NII-3

Ant. 2 could transmit/receive simultaneously.

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
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) $\geq 1/T$
802.11b	0.997	0.01	n/a (DC $\geq$ 0.98)	n/a (DC $\geq$ 0.98)
802.11g	0.998	0.01	n/a (DC $\geq$ 0.98)	n/a (DC $\geq$ 0.98)

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

1.1.5 Table for Multiple Listing

Model Name	Description
WPEA-352ACNRB	Differences between all models are for different marketing requirement.
WPEA-352ACNRBI	

1.1.6 Table for Existing Change

This product is an extension of original one reported under Sporton project number: FR8D0606AC
Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
PIFA Antenna (Ethertronics/1000423) is added.	Radiated Emission data above 1GHz was evaluated Photographs of EUT

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

The following reference test guidance is not within the scope of accreditation of TAF:

- ♦ KDB 558074 D01 v05r02
- ♦ KDB 662911 D01 v02r01
- ♦ KDB 414788 D01 v01r01

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.			
☐	Wen Shan	ADD : No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)	
		TEL : 886-3-318-0787	FAX : 886-3-318-0287
Test site Designation No. TW1097 with FCC.			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
Radiated	03CH02-HY	Edward Wang	22.6~23.9°C/58~69%	22/May/2020~23/May/2020

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)	0.9 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.0 dB	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Test Software Version	ART-GUI 2.3
Mode	Power Setting
802.11b_Nss1,(1Mbps)_3TX	-
2437MHz	16
2457MHz	15
2462MHz	14.5
802.11g_Nss1,(6Mbps)_3TX	-
2412MHz	17

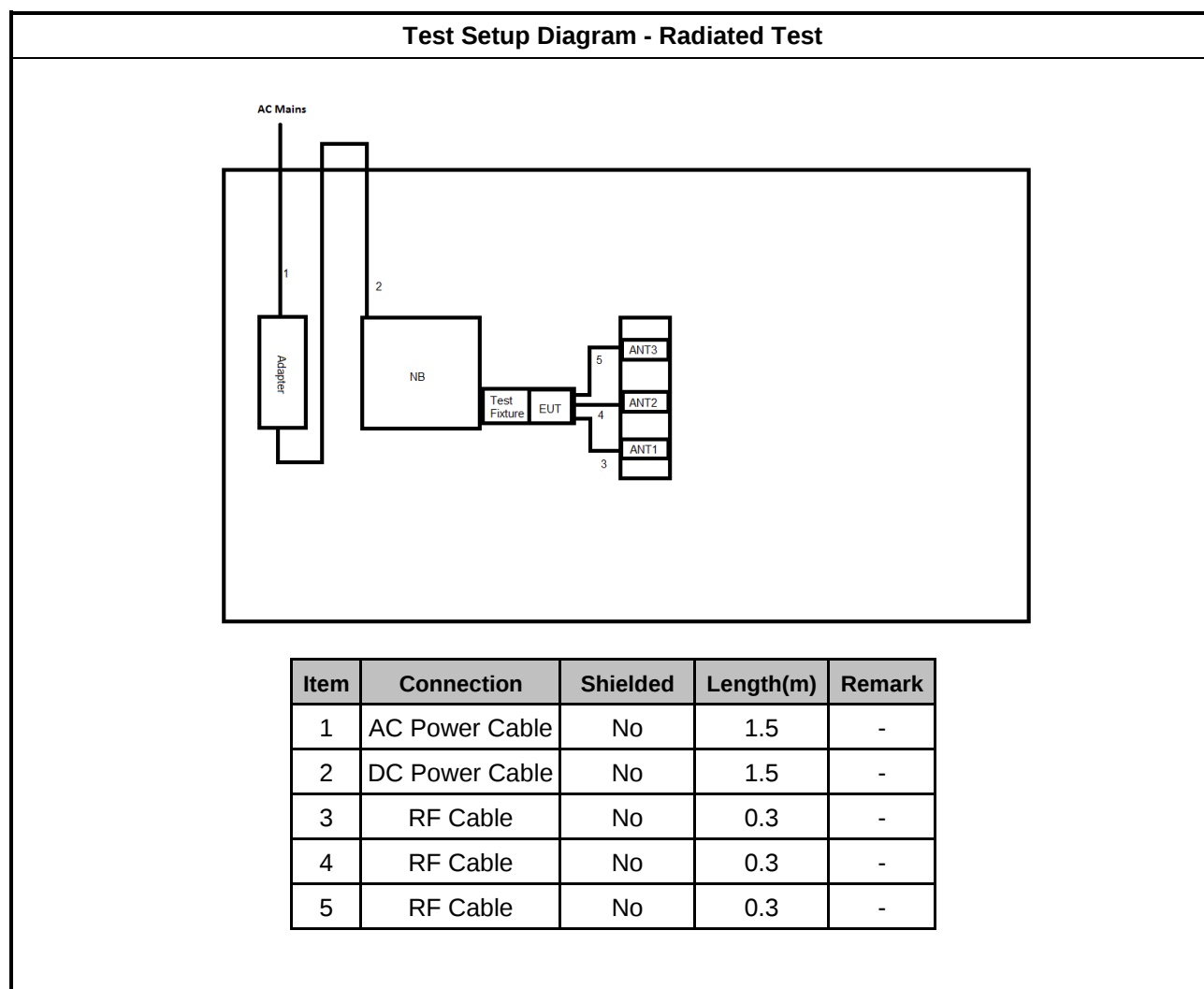
2.2 The Worst Case Measurement Configuration

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	Test fixture mode		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			
Worst Planes of EUT			V

2.3 Support Equipment

Support Equipment – Radiated Emission				
No.	Equipment	Brand Name	Model Name	FCC ID
1	Notebook	DELL	PP13S	-
2	Adapter for NB	Dell	LA90PM111	-
3	Test Fixture	-	-	-

2.4 Test Setup Diagram



3 Transmitter Test Result

3.1 Emissions in Restricted Frequency Bands

3.1.1 Emissions in Restricted Frequency Bands Limit

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

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

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

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

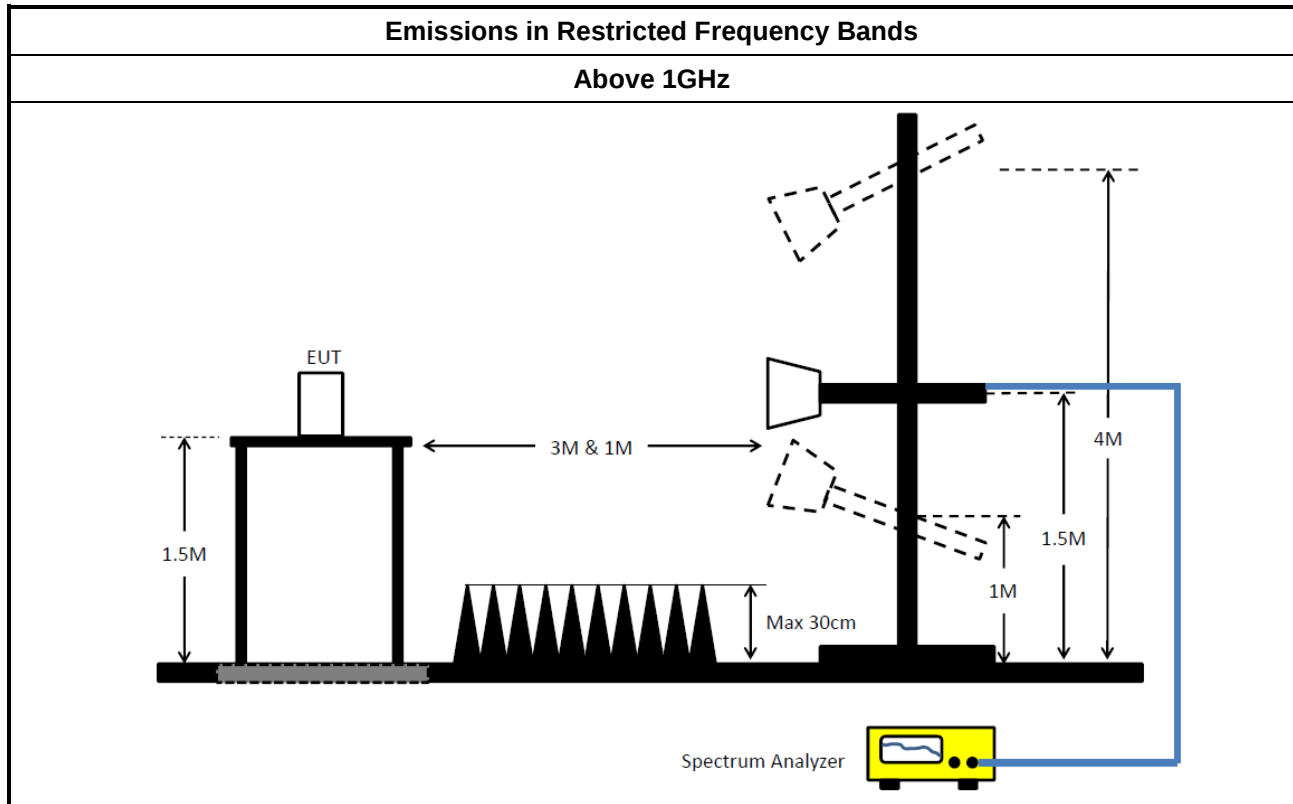
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

Test Method	
The average emission levels shall be measured in [duty cycle $\geq$ 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.
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 $f \geq 1$ GHz for peak measurement. For average measurement, refer as 1.1.4.
KDB 414788 Open-Field Test Sites and Chamber Correlation Justification.	
	Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in regulations; however, an attempt should be made to avoid making measurements in the near field.
	Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

3.1.4 Test Setup



3.1.5 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.

3.1.6 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix A

4 Test Equipment and Calibration Data

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	1GHz~18GHz 3m	29/Aug/2019	28/Aug/2020
Microwave Preamplifier	Agilent	8449B	3008A02373	1GHz~26.5GHz	16/Oct/2019	15/Oct/2020
Spectrum Analyzer	Rohde & Schwarz	FSP40	100593	9kHz - 40GHz	27/Dec/2020	26/Dec/2021
RF Cable-high 6m	SUHNER	SUCOFLEX104	10567868 / SN805193/4	1GHz~40GHz	08/Apr/2020	07/Apr/2021
RF Cable-high 7m	SUHNER	SUCOFLEX104	10567868 / SN805192/4	1GHz~40GHz	08/Apr/2020	07/Apr/2021
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	18GHz~40GHz	13/Mar/2020	12/Mar/2021
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 01543	1GHz~18GHz	03/Jun/2019	02/Jun/2020
Preamplifier	MITEQ	TTA1840-35-HG	1864481	18GHz~40GHz	05/Aug/2019	04/Aug/2020



Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
802.11b_Nss1,(1Mbps)_3TX	Pass	AV	4.87396G	53.48	54.00	-0.52	3	Horizontal	261	1.00	-
802.11g_Nss1,(6Mbps)_3TX	Pass	AV	2.3884G	52.87	54.00	-1.13	3	Horizontal	297	1.16	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
802.11b_Nss1,(1Mbps)_3TX	-	-	-	-	-	-	-	-	-	-	-
2437MHz	Pass	AV	2.3574G	45.33	54.00	-8.67	3	Vertical	21	1.59	-
2437MHz	Pass	AV	2.4362G	92.00	Inf	-Inf	3	Vertical	21	1.59	-
2437MHz	Pass	AV	2.497G	45.82	54.00	-8.18	3	Vertical	21	1.59	-
2437MHz	Pass	PK	2.3682G	57.10	74.00	-16.90	3	Vertical	21	1.59	-
2437MHz	Pass	PK	2.4362G	95.76	Inf	-Inf	3	Vertical	21	1.59	-
2437MHz	Pass	PK	2.4926G	57.44	74.00	-16.56	3	Vertical	21	1.59	-
2437MHz	Pass	AV	2.343G	45.37	54.00	-8.63	3	Horizontal	221	3.00	-
2437MHz	Pass	AV	2.4362G	101.90	Inf	-Inf	3	Horizontal	221	3.00	-
2437MHz	Pass	AV	2.4946G	45.80	54.00	-8.20	3	Horizontal	221	3.00	-
2437MHz	Pass	PK	2.3606G	57.55	74.00	-16.45	3	Horizontal	221	3.00	-
2437MHz	Pass	PK	2.4378G	105.56	Inf	-Inf	3	Horizontal	221	3.00	-
2437MHz	Pass	PK	2.4978G	58.04	74.00	-15.96	3	Horizontal	221	3.00	-
2437MHz	Pass	AV	4.87396G	49.05	54.00	-4.95	3	Vertical	305	1.00	-
2437MHz	Pass	PK	4.87408G	52.25	74.00	-21.75	3	Vertical	305	1.00	-
2437MHz	Pass	AV	4.87396G	53.48	54.00	-0.52	3	Horizontal	261	1.00	-
2437MHz	Pass	PK	4.874G	56.10	74.00	-17.90	3	Horizontal	261	1.00	-
2457MHz	Pass	AV	2.4562G	99.38	Inf	-Inf	3	Vertical	355	1.87	-
2457MHz	Pass	AV	2.4984G	45.81	54.00	-8.19	3	Vertical	355	1.87	-
2457MHz	Pass	PK	2.456G	103.04	Inf	-Inf	3	Vertical	355	1.87	-
2457MHz	Pass	PK	2.4946G	57.61	74.00	-16.39	3	Vertical	355	1.87	-
2457MHz	Pass	AV	2.4562G	100.89	Inf	-Inf	3	Horizontal	193	1.52	-
2457MHz	Pass	AV	2.4992G	45.86	54.00	-8.14	3	Horizontal	193	1.52	-
2457MHz	Pass	PK	2.4576G	104.64	Inf	-Inf	3	Horizontal	193	1.52	-
2457MHz	Pass	PK	2.487G	57.58	74.00	-16.42	3	Horizontal	193	1.52	-
2457MHz	Pass	AV	4.91396G	50.15	54.00	-3.85	3	Vertical	306	1.08	-
2457MHz	Pass	PK	4.91404G	53.01	74.00	-20.99	3	Vertical	306	1.08	-
2457MHz	Pass	AV	4.91396G	53.36	54.00	-0.64	3	Horizontal	53	1.00	-
2457MHz	Pass	PK	4.91396G	55.92	74.00	-18.08	3	Horizontal	53	1.00	-
2462MHz	Pass	AV	2.4636G	101.21	Inf	-Inf	3	Vertical	265	2.68	-
2462MHz	Pass	AV	2.4962G	45.91	54.00	-8.09	3	Vertical	265	2.68	-
2462MHz	Pass	PK	2.4636G	104.73	Inf	-Inf	3	Vertical	265	2.68	-
2462MHz	Pass	PK	2.4932G	58.17	74.00	-15.83	3	Vertical	265	2.68	-
2462MHz	Pass	AV	2.4632G	103.28	Inf	-Inf	3	Horizontal	254	2.68	-
2462MHz	Pass	AV	2.4878G	45.97	54.00	-8.03	3	Horizontal	254	2.68	-
2462MHz	Pass	PK	2.463G	107.17	Inf	-Inf	3	Horizontal	254	2.68	-
2462MHz	Pass	PK	2.497G	57.89	74.00	-16.11	3	Horizontal	254	2.68	-
2462MHz	Pass	AV	4.92396G	50.22	54.00	-3.78	3	Vertical	304	1.11	-
2462MHz	Pass	PK	4.92392G	53.09	74.00	-20.91	3	Vertical	304	1.11	-
2462MHz	Pass	AV	4.92396G	53.27	54.00	-0.73	3	Horizontal	50	1.05	-
2462MHz	Pass	PK	4.92396G	55.88	74.00	-18.12	3	Horizontal	50	1.05	-
802.11g_Nss1,(6Mbps)_3TX	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	AV	2.387G	48.27	54.00	-5.73	3	Vertical	9	1.04	-
2412MHz	Pass	AV	2.4166G	100.96	Inf	-Inf	3	Vertical	9	1.04	-
2412MHz	Pass	PK	2.388G	61.70	74.00	-12.30	3	Vertical	9	1.04	-
2412MHz	Pass	PK	2.4166G	111.39	Inf	-Inf	3	Vertical	9	1.04	-
2412MHz	Pass	AV	2.3884G	52.87	54.00	-1.13	3	Horizontal	297	1.16	-
2412MHz	Pass	AV	2.4172G	104.84	Inf	-Inf	3	Horizontal	297	1.16	-

Remark :

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Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)

8D0606-01

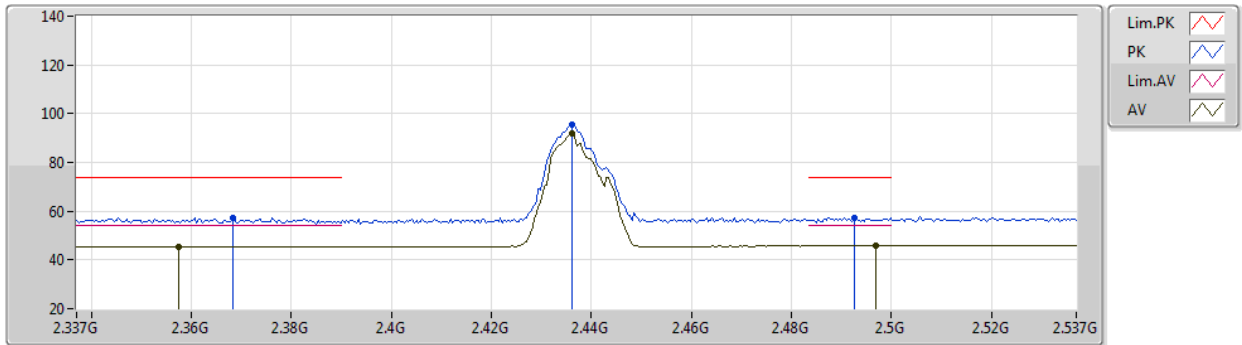


Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2412MHz	Pass	PK	2.388G	68.06	74.00	-5.94	3	Horizontal	297	1.16	-
2412MHz	Pass	PK	2.417G	115.31	Inf	-Inf	3	Horizontal	297	1.16	-
2412MHz	Pass	AV	4.82334G	34.53	54.00	-19.47	3	Vertical	142	2.72	-
2412MHz	Pass	PK	4.82742G	48.64	74.00	-25.36	3	Vertical	142	2.72	-
2412MHz	Pass	AV	4.82184G	35.77	54.00	-18.23	3	Horizontal	39	2.28	-
2412MHz	Pass	PK	4.82274G	49.91	74.00	-24.09	3	Horizontal	39	2.28	-

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2437MHz_TX

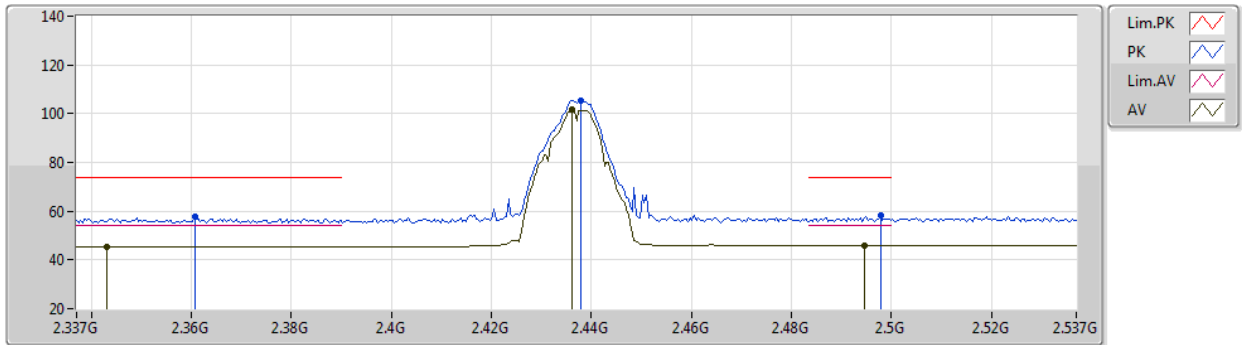


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3574G	45.33	54.00	-8.67	33.20	3	Vertical	21	1.59	-	12.13	27.27	5.93	-
AV	2.4362G	92.00	Inf	-Inf	33.51	3	Vertical	21	1.59	-	58.49	27.51	6.00	-
AV	2.497G	45.82	54.00	-8.18	33.77	3	Vertical	21	1.59	-	12.05	27.69	6.08	-
PK	2.3682G	57.10	74.00	-16.90	33.24	3	Vertical	21	1.59	-	23.86	27.30	5.94	-
PK	2.4362G	95.76	Inf	-Inf	33.51	3	Vertical	21	1.59	-	62.25	27.51	6.00	-
PK	2.4926G	57.44	74.00	-16.56	33.75	3	Vertical	21	1.59	-	23.69	27.68	6.07	-

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2437MHz_TX

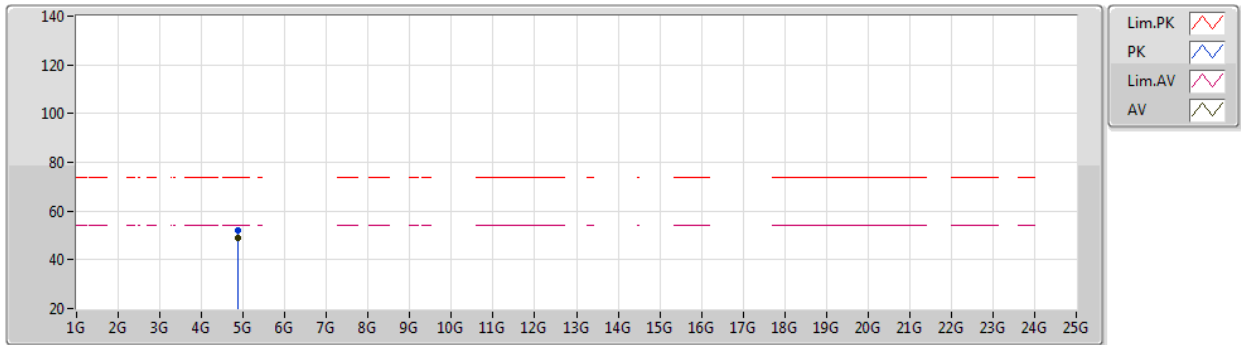


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.343G	45.37	54.00	-8.63	33.15	3	Horizontal	221	3.00	-	12.22	27.23	5.92	-
AV	2.4362G	101.90	Inf	-Inf	33.51	3	Horizontal	221	3.00	-	68.39	27.51	6.00	-
AV	2.4946G	45.80	54.00	-8.20	33.75	3	Horizontal	221	3.00	-	12.05	27.68	6.07	-
PK	2.3606G	57.55	74.00	-16.45	33.21	3	Horizontal	221	3.00	-	24.34	27.28	5.93	-
PK	2.4378G	105.56	Inf	-Inf	33.52	3	Horizontal	221	3.00	-	72.04	27.51	6.01	-
PK	2.4978G	58.04	74.00	-15.96	33.77	3	Horizontal	221	3.00	-	24.27	27.69	6.08	-

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2437MHz_TX

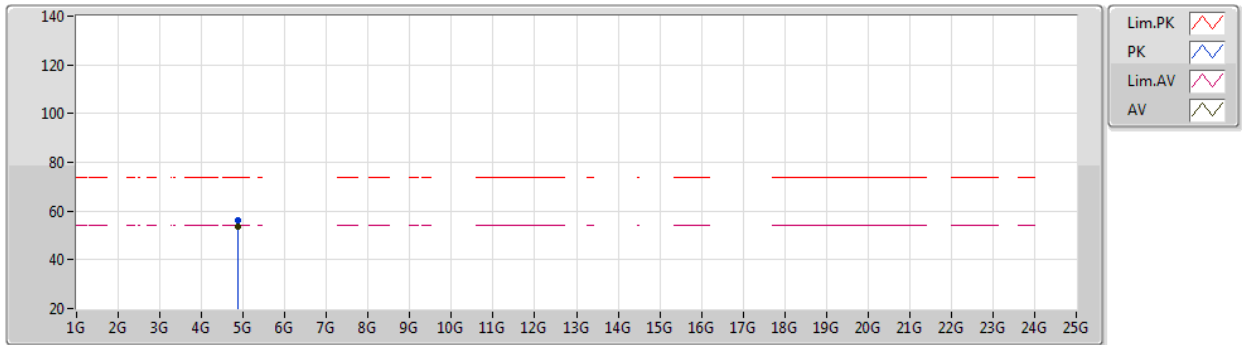


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.87396G	49.05	54.00	-4.95	5.90	3	Vertical	305	1.00	-	43.15	31.47	8.30	33.87
PK	4.87408G	52.25	74.00	-21.75	5.90	3	Vertical	305	1.00	-	46.35	31.47	8.30	33.87

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2437MHz_TX

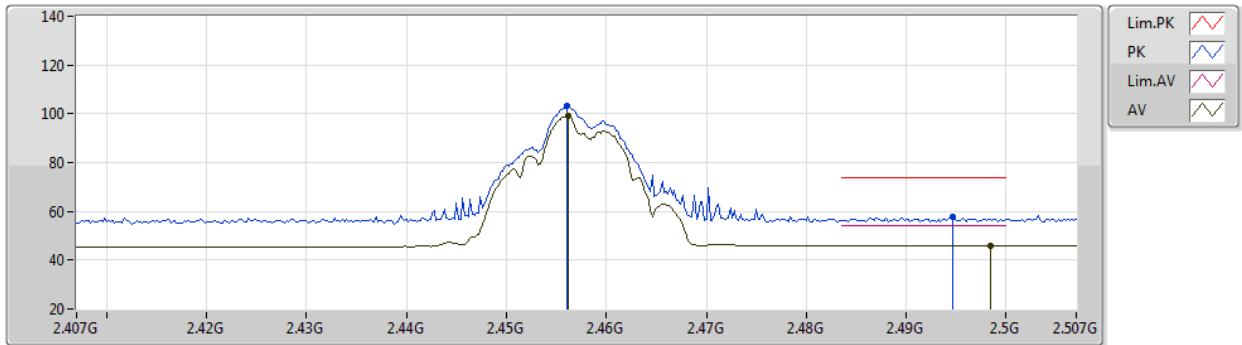


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.87396G	53.48	54.00	-0.52	5.90	3	Horizontal	261	1.00	-	47.58	31.47	8.30	33.87
PK	4.874G	56.10	74.00	-17.90	5.90	3	Horizontal	261	1.00	-	50.20	31.47	8.30	33.87

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2457MHz_TX

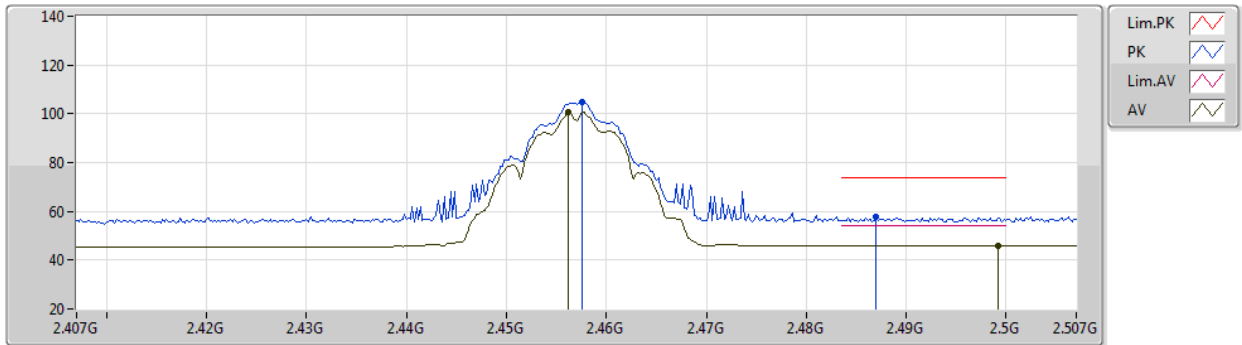


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.4562G	99.38	Inf	-Inf	33.60	3	Vertical	355	1.87	-	65.78	27.57	6.03	-
AV	2.4984G	45.81	54.00	-8.19	33.78	3	Vertical	355	1.87	-	12.03	27.70	6.08	-
PK	2.456G	103.04	Inf	-Inf	33.60	3	Vertical	355	1.87	-	69.44	27.57	6.03	-
PK	2.4946G	57.61	74.00	-16.39	33.75	3	Vertical	355	1.87	-	23.86	27.68	6.07	-

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2457MHz_TX

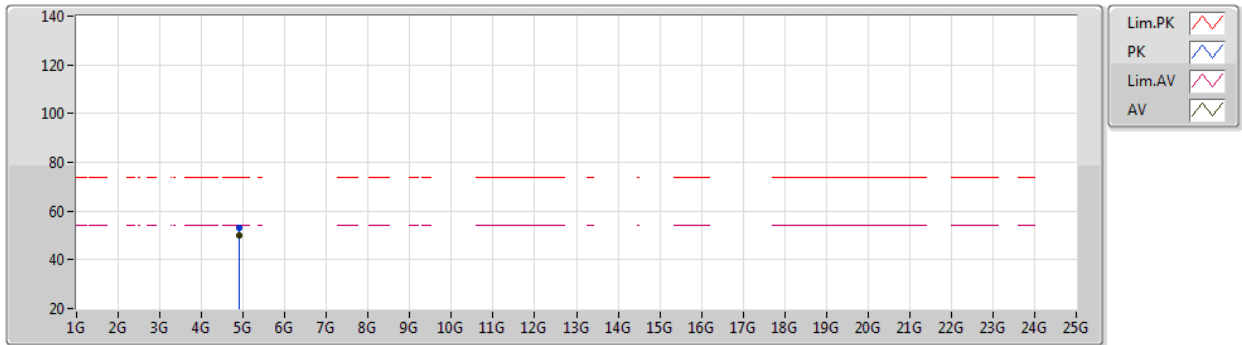


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.4562G	100.89	Inf	-Inf	33.60	3	Horizontal	193	1.52	-	67.29	27.57	6.03	-
AV	2.4992G	45.86	54.00	-8.14	33.78	3	Horizontal	193	1.52	-	12.08	27.70	6.08	-
PK	2.4576G	104.64	Inf	-Inf	33.60	3	Horizontal	193	1.52	-	71.04	27.57	6.03	-
PK	2.487G	57.58	74.00	-16.42	33.72	3	Horizontal	193	1.52	-	23.86	27.66	6.06	-

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2457MHz_TX

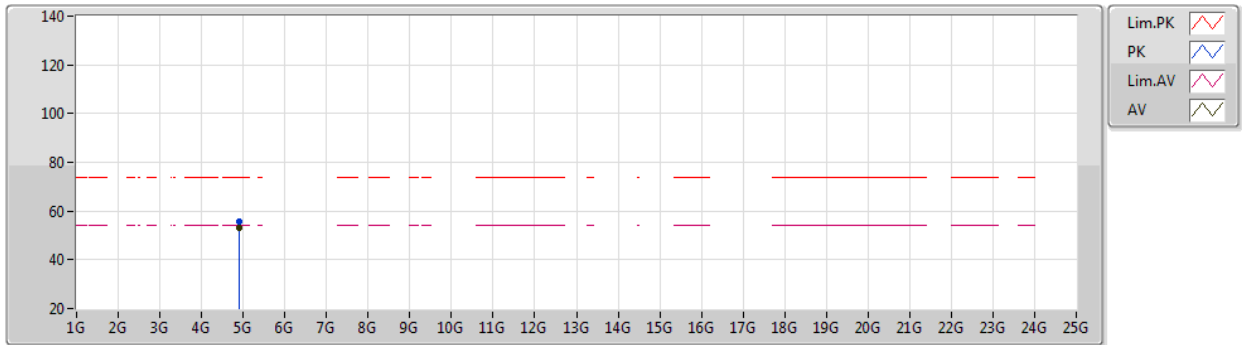


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.91396G	50.15	54.00	-3.85	6.02	3	Vertical	306	1.08	-	44.13	31.55	8.32	33.85
PK	4.91404G	53.01	74.00	-20.99	6.02	3	Vertical	306	1.08	-	46.99	31.55	8.32	33.85

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2457MHz_TX

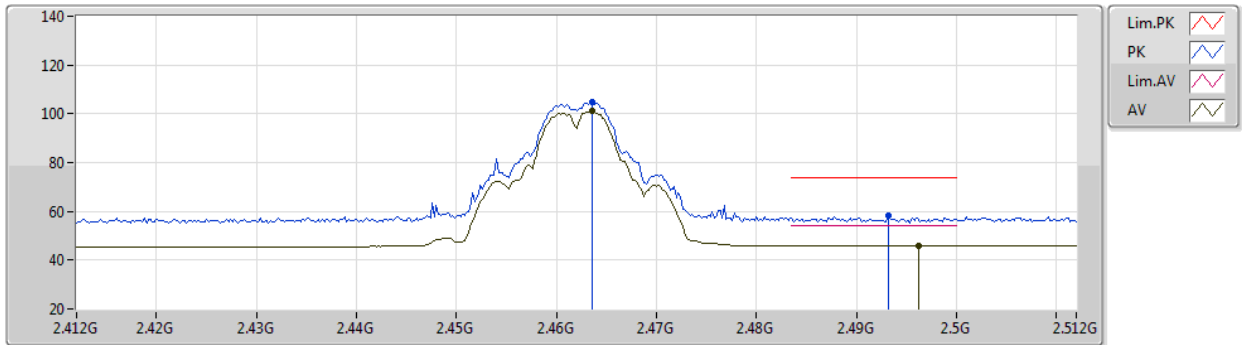


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.91396G	53.36	54.00	-0.64	6.02	3	Horizontal	53	1.00	-	47.34	31.55	8.32	33.85
PK	4.91396G	55.92	74.00	-18.08	6.02	3	Horizontal	53	1.00	-	49.90	31.55	8.32	33.85

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2462MHz_TX

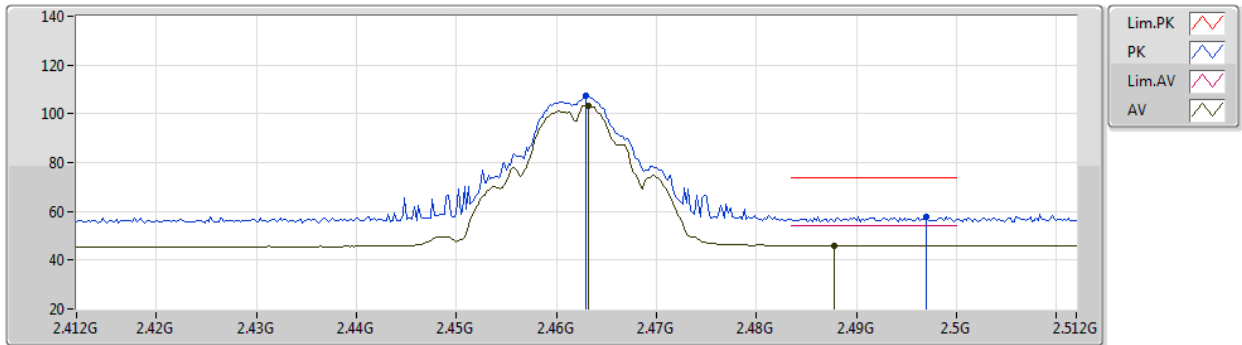


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.4636G	101.21	Inf	-Inf	33.63	3	Vertical	265	2.68	-	67.58	27.59	6.04	-
AV	2.4962G	45.91	54.00	-8.09	33.77	3	Vertical	265	2.68	-	12.14	27.69	6.08	-
PK	2.4636G	104.73	Inf	-Inf	33.63	3	Vertical	265	2.68	-	71.10	27.59	6.04	-
PK	2.4932G	58.17	74.00	-15.83	33.75	3	Vertical	265	2.68	-	24.42	27.68	6.07	-

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2462MHz_TX

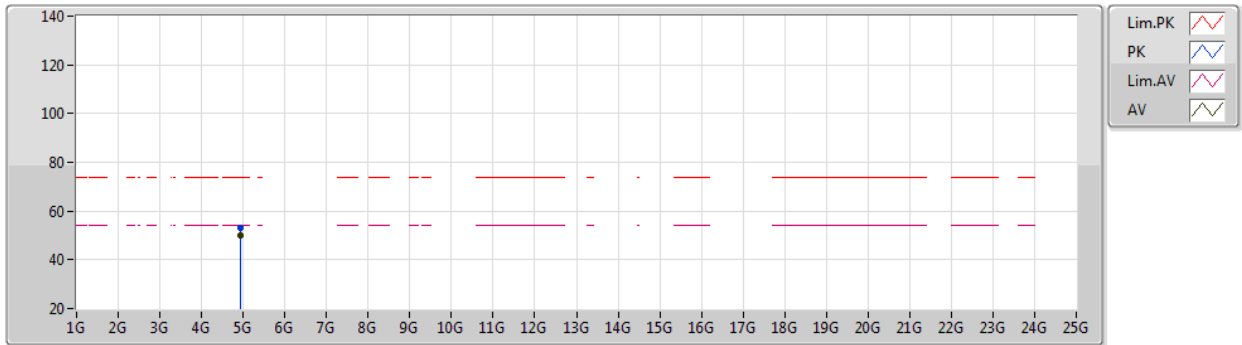


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.4632G	103.28	Inf	-Inf	33.63	3	Horizontal	254	2.68	-	69.65	27.59	6.04	-
AV	2.4878G	45.97	54.00	-8.03	33.73	3	Horizontal	254	2.68	-	12.24	27.66	6.07	-
PK	2.463G	107.17	Inf	-Inf	33.63	3	Horizontal	254	2.68	-	73.54	27.59	6.04	-
PK	2.497G	57.89	74.00	-16.11	33.77	3	Horizontal	254	2.68	-	24.12	27.69	6.08	-

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2462MHz_TX

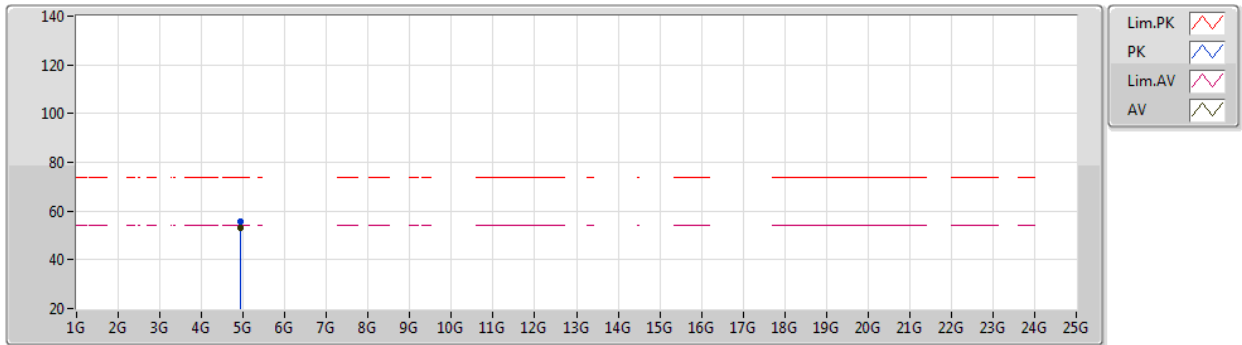


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.92396G	50.22	54.00	-3.78	6.04	3	Vertical	304	1.11	-	44.18	31.56	8.33	33.85
PK	4.92392G	53.09	74.00	-20.91	6.04	3	Vertical	304	1.11	-	47.05	31.56	8.33	33.85

802.11b_Nss1,(1Mbps)_3TX

23/05/2020

2462MHz_TX

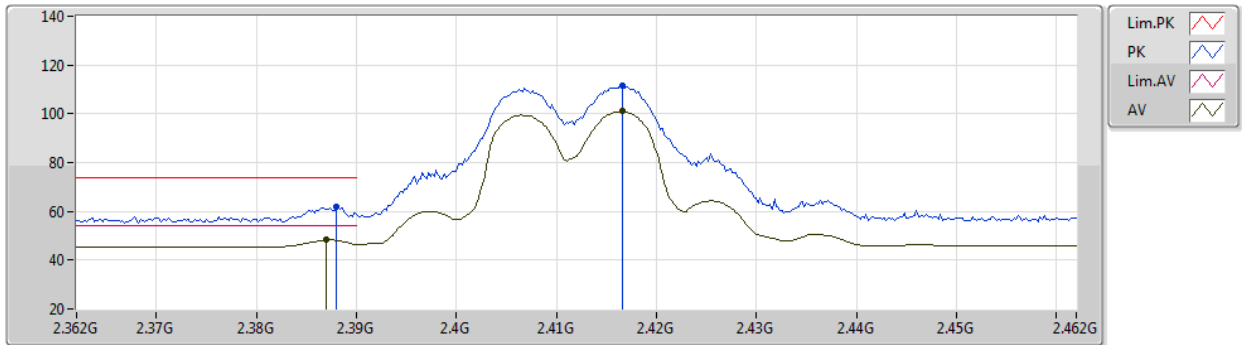


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.92396G	53.27	54.00	-0.73	6.04	3	Horizontal	50	1.05	-	47.23	31.56	8.33	33.85
PK	4.92396G	55.88	74.00	-18.12	6.04	3	Horizontal	50	1.05	-	49.84	31.56	8.33	33.85

802.11g_Nss1,(6Mbps)_3TX

22/05/2020

2412MHz_TX

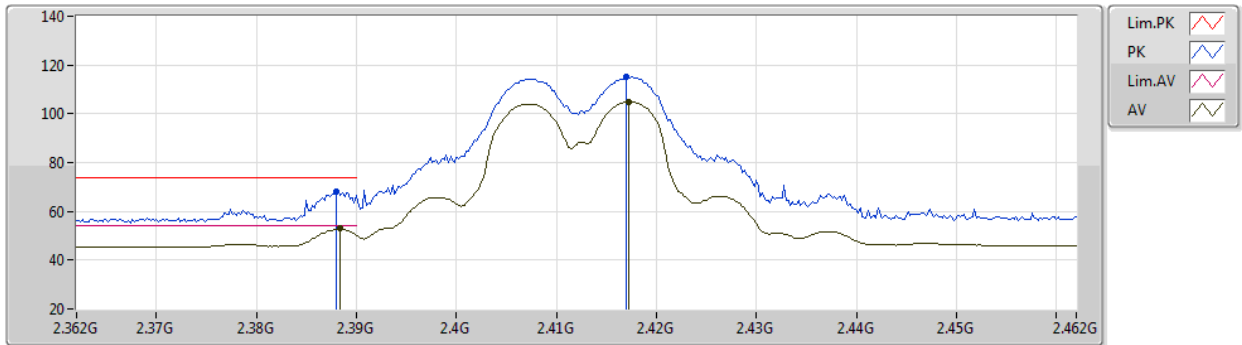


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.387G	48.27	54.00	-5.73	33.31	3	Vertical	9	1.04	-	14.96	27.36	5.95	-
AV	2.4166G	100.96	Inf	-Inf	33.43	3	Vertical	9	1.04	-	67.53	27.45	5.98	-
PK	2.388G	61.70	74.00	-12.30	33.31	3	Vertical	9	1.04	-	28.39	27.36	5.95	-
PK	2.4166G	111.39	Inf	-Inf	33.43	3	Vertical	9	1.04	-	77.96	27.45	5.98	-

802.11g_Nss1,(6Mbps)_3TX

22/05/2020

2412MHz_TX

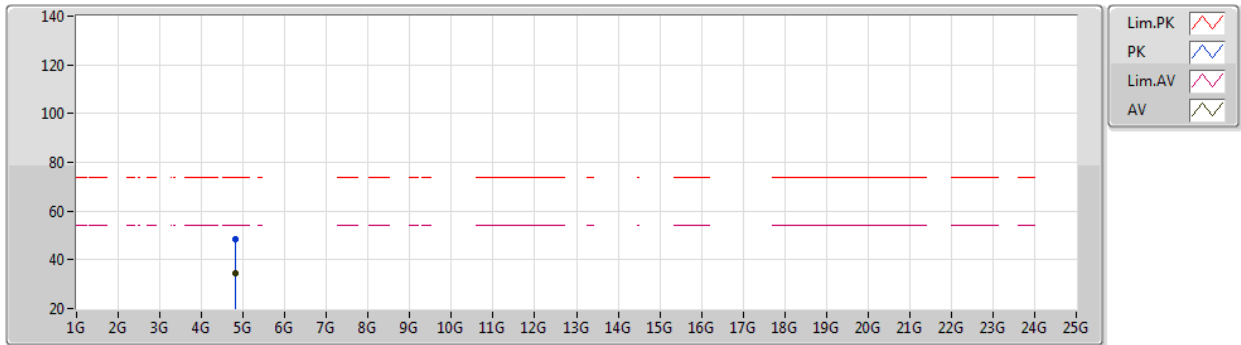


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.3884G	52.87	54.00	-1.13	33.32	3	Horizontal	297	1.16	-	19.55	27.37	5.95	-
AV	2.4172G	104.84	Inf	-Inf	33.43	3	Horizontal	297	1.16	-	71.41	27.45	5.98	-
PK	2.388G	68.06	74.00	-5.94	33.31	3	Horizontal	297	1.16	-	34.75	27.36	5.95	-
PK	2.417G	115.31	Inf	-Inf	33.43	3	Horizontal	297	1.16	-	81.88	27.45	5.98	-

802.11g_Nss1,(6Mbps)_3TX

22/05/2020

2412MHz_TX

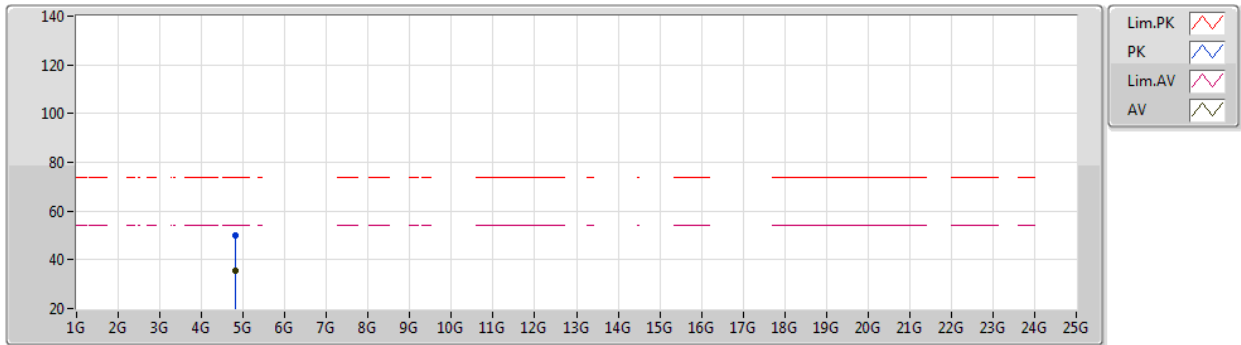


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.82334G	34.53	54.00	-19.47	5.75	3	Vertical	142	2.72	-	28.78	31.38	8.27	33.90
PK	4.82742G	48.64	74.00	-25.36	5.76	3	Vertical	142	2.72	-	42.88	31.39	8.27	33.90

802.11g_Nss1,(6Mbps)_3TX

22/05/2020

2412MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.82184G	35.77	54.00	-18.23	5.74	3	Horizontal	39	2.28	-	30.03	31.38	8.26	33.90
PK	4.82274G	49.91	74.00	-24.09	5.74	3	Horizontal	39	2.28	-	44.17	31.38	8.26	33.90