FCC Test Report

FCC ID	:	**2AS8G-WM110-00-00-A**
Equipment	:	**2.4G wireless audio transceiver**
Brand Name	:	**MACmike**
Model Name	:	**WM110-Tx-xxx-xx (x=A-Z, a-z, 0-9)**
Applicant	:	**SHYH FONG INDUSTRIAL CO., LTD. No. 12, Ln. 57, Dongshun St., Shulin Dist., New Taipei City 238, Taiwan (R.O.C.)**
Manufacturer	:	**SHYH FONG INDUSTRIAL CO., LTD. No. 12, Ln. 57, Dongshun St., Shulin Dist., New Taipei City 238, Taiwan (R.O.C.)**
Standard	:	**47 CFR FCC Part 15.247**

The product was received on Mar. 28, 2019, and testing was started from Apr. 26, 2019 and completed on May 23, 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 7
1.3 Testing Location Information 7
1.4 Measurement Uncertainty 7

2 TEST CONFIGURATION OF EUT 8

2.1 Test Condition 8
2.2 Test Channel Mode 8
2.3 The Worst Case Measurement Configuration 9
2.4 Accessories and Support Equipment 10
2.5 Test Setup Diagram 11

3 TRANSMITTER TEST RESULT 13

3.1 AC Power-line Conducted Emissions 13
3.2 DTS Bandwidth 14
3.3 Maximum Conducted Output Power 15
3.4 Power Spectral Density 17
3.5 Emissions in Non-restricted Frequency Bands 18
3.6 Emissions in Restricted Frequency Bands 19

4 TEST EQUIPMENT AND CALIBRATION DATA 23

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
FR932020AZ	01	Initial issue of report	Jun. 03, 2019
FR932020AZ	02	1. Revise Equipment 2. Revise Channel list	Jun. 06, 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)	Mode	Ch. Frequency (MHz)	Channel Number
2400-2483.5	SRD	2402-2480	00-19 [40]

Band	Modulation	BWch (MHz)	Nant
2.4-2.4835GHz	GFSK	2	1TX

Note:.
- BWch is the nominal channel bandwidth.

Channel	Freq.(MHz)
00	2402 / 2442
01	2404 / 2444
02	2406 / 2446
03	2408 / 2448
04	2410 / 2450
05	2412 / 2452
06	2414 / 2454
07	2416 / 2456
08	2418 / 2458
09	2420 / 2460
10	2422 / 2462
11	2424 / 2464
12	2426 / 2466
13	2428 / 2468
14	2430 / 2470
15	2432 / 2472
16	2434 / 2474
17	2436 / 2476
18	2438 / 2478
19	2440 / 2480

Note. Regarding to more detail and other information, please refer to Applicant.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Cortec.Technology Inc.	AN2400-06304BF	Dipole Antenna	I-PEX	2

For GFSK function:

For 2.4G SRD GFSK mode (1TX/1RX)

Ant. 1 could transmit/receive simultaneously.

1.1.3 EUT Information

Operational Condition				
EUT Power Type	From Battery & USB			
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
GFSK	0.151	8.21	590.625u	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	CO01-HY	Jeff	23.2~23.8°C / 55.2~57.1%	30/Apr/2019
RF Conducted	TH06-HY	Dexter	25.2~26.3°C / 55~58%	02/May/2019
Radiated	03CH02-HY	Edwarad	25.3~27.1°C / 55.1~66.8%	30/Apr/2019~24/May/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	3.7V

2.2 Test Channel Mode

Test Software	N/A

Mode	Power Setting
GFSK	-
2402MHz	4
2442MHz	7
2480MHz	3

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		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
Worst Planes of EUT		V	

2.4 Accessories and Support Equipment

Accessories				
Battery	Brand Name	RPC Corporation.	Model Name	IP602035P
	Power Rating	3.7 Vdc, 480 mAh	Type	Lithium Polymer Battery
USB 3.0 Cable	Brand Name	Fullglory Technology Co., Ltd.	Model Name	FAAJ-A500K
	Signal Line	0.3 meter,non-shielded cable, w/o ferrite core		
3.5mm Audio Cable	Brand Name	Fullglory Technology Co., Ltd.	Model Name	FAAP-A499J
	Signal Line	0.3 meter, non-shielded cable, w/o ferrite core		
6.5mm to 3.5mm Audio Jack	Brand Name	FUAN GEE MECHANICAL INDUSTRIAL CO., LTD	Model Name	AD6232
2.4G Wireless Microphone Receiver	Brand Name	MACmike	Model Name	WM110-R

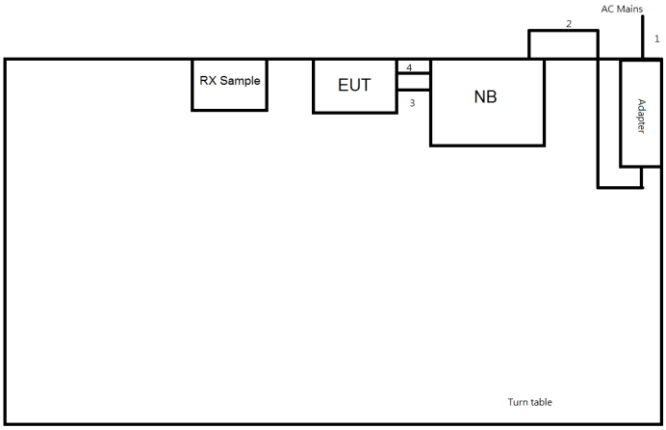
Reminder: Regarding to more detail and other information, please refer to user manual.

Support Equipment – AC Conduction				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5520	-
2	AC Adapter for NB	DELL	LA90PM111	-

Support Equipment – Radiated Emission				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5520	-
2	AC Adapter for NB	DELL	LA90PM111	-

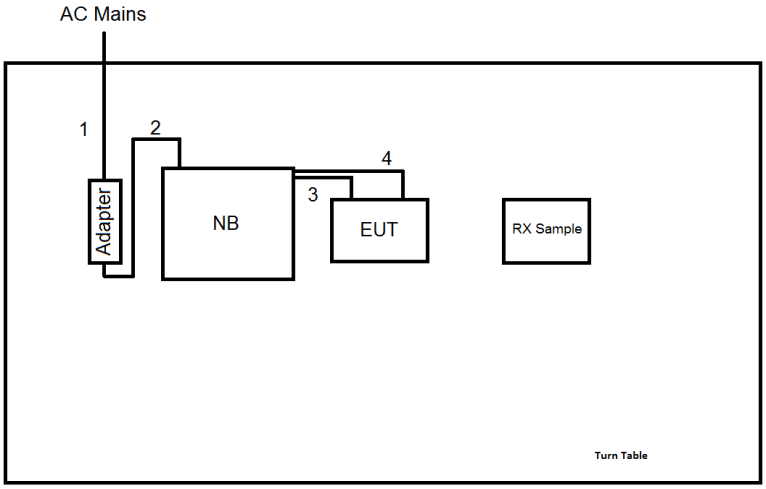
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.5	-
2	DC Power line	No	1.5	-
3	USB 3.0 Cable	No	0.3	-
4	3.5mm Audio Cable	No	0.3	-

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.5	-
2	DC Power line	No	1.5	-
3	USB 3.0 Cable	No	0.3	-
4	3.5mm Audio Cable	No	0.3	-

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

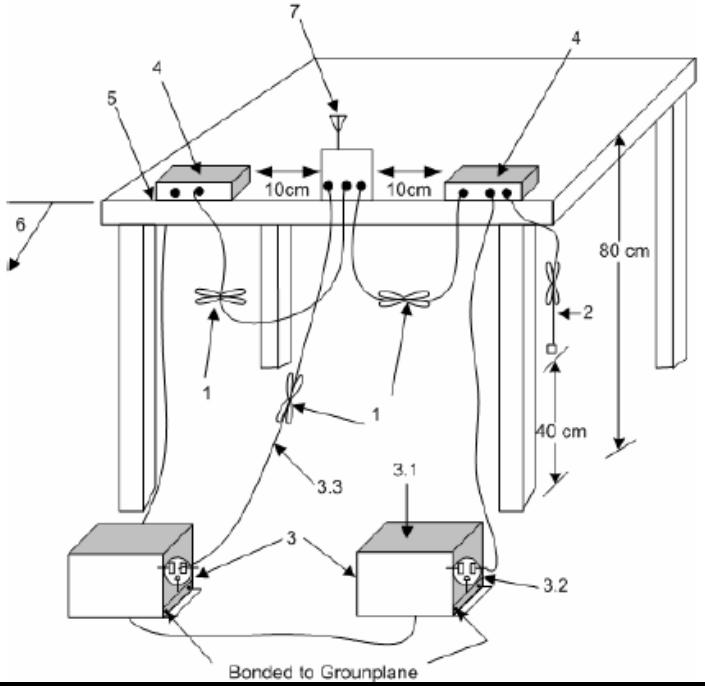
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
☒ Refer as ANSI C63.10-2013, clause 6.2 for AC 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.

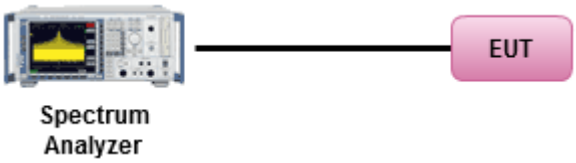
3.2.2 Measuring Instruments

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

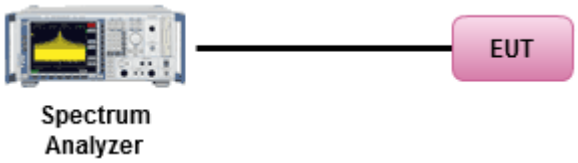
3.4.2 Measuring Instruments

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

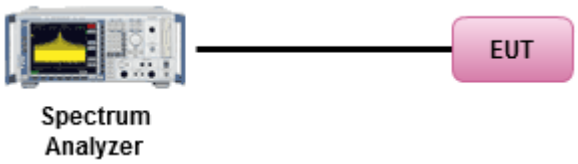
Refer a test equipment and calibration data table in this test report.

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 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.

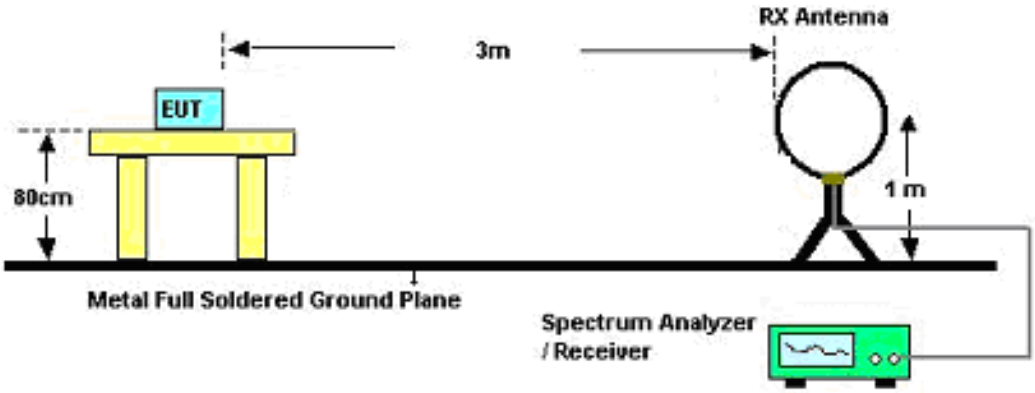
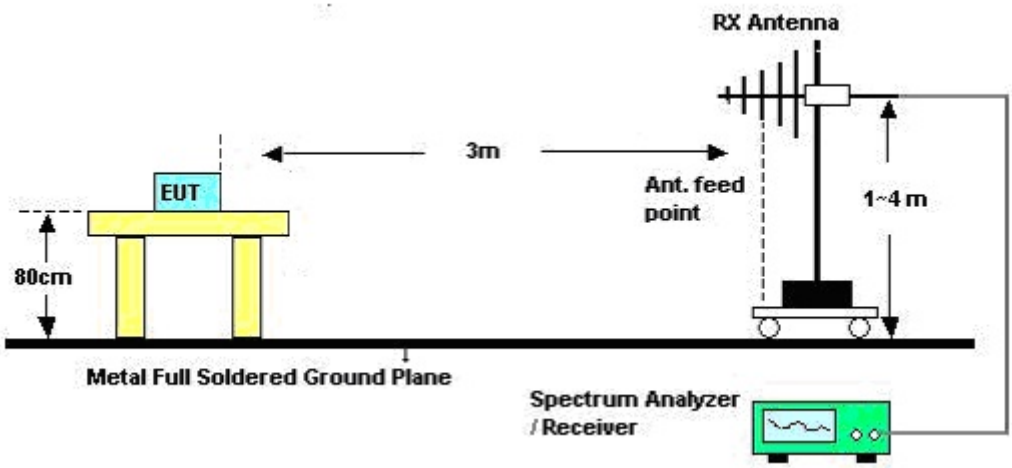
3.6.2 Measuring Instruments

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

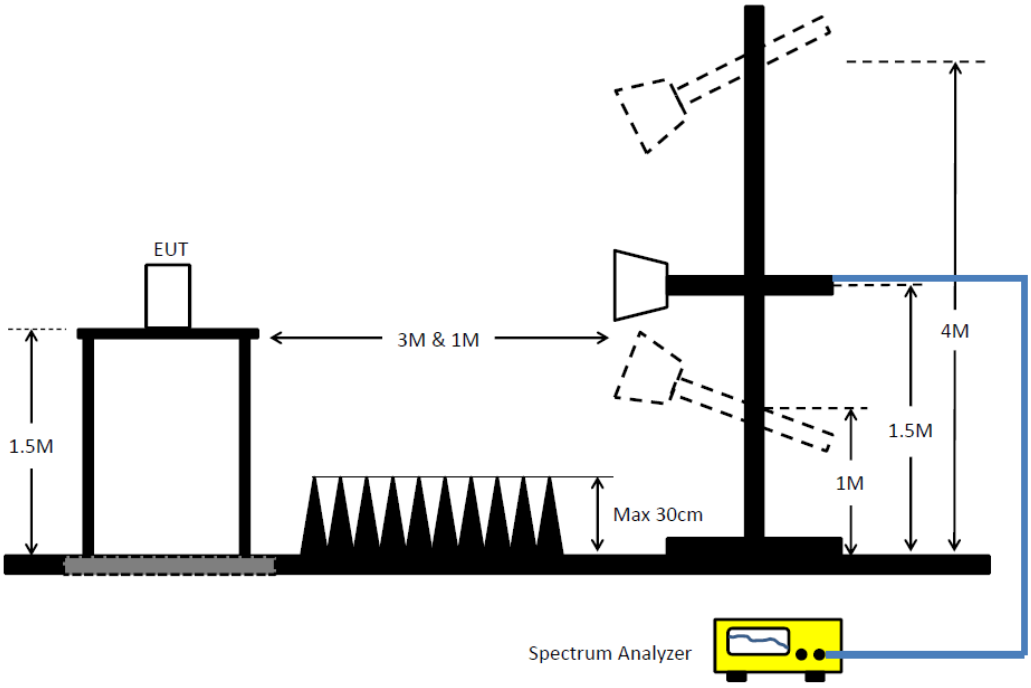
3.6.3 Test Procedures

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	ESR3	102052	9kHz ~ 3.6GHz	09/Apr/2019	08/Apr/2020
LISN	R&S	ENV 216	101274	9kHz ~ 30MHz	12/Jun/2018	11/Jun/2019
RF Cable-CON	MTJ	RG142	CB001-CO	9kHz ~ 30MHz	17/Sep/2018	16/Sep/2019
AC POWER	APC	AFC-11003G	F308010045	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Puls e Limiter	SCHWARZBEC K	VTSD 9561F	9495	9kHz ~ 30MHz	11/Oct/2018	10/Oct/2019
EMC Receiver	R&S	ESR3	102052	9kHz ~ 3.6GHz	09/Apr/2019	08/Apr/2020

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	101029	10Hz~40GHz	11/Sep/2018	10/Sep/2019
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~1G	11/Jan/2019	10/Jan/2020
Cable 0.2m	HUBER	MY10710/4	RF Cable - 01	1G~18G	11/Jan/2019	10/Jan/2020
Cable 0.5m	HUBER	MY10714/4	RF Cable – 05	30MHz~1G	11/Jan/2019	10/Jan/2020

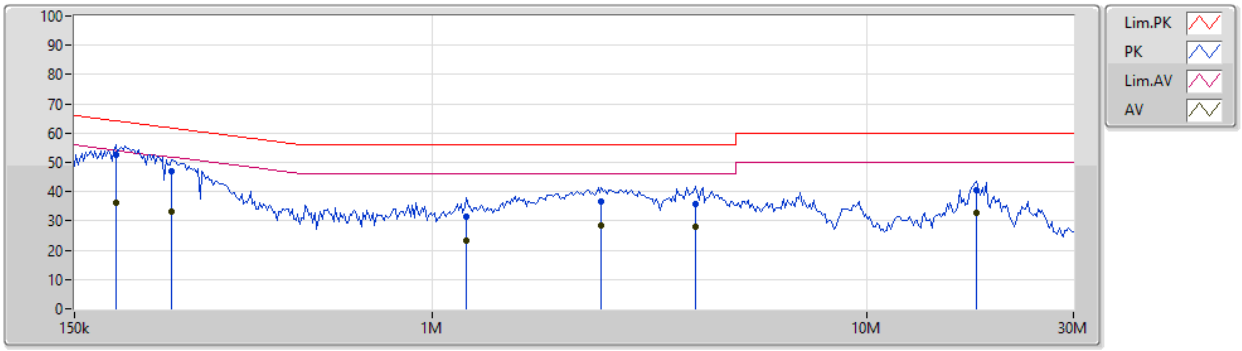
Instrument for Radiated Test

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	ESU-26	100422	20Hz ~ 26.5GHz	25/Oct/2018	24/Oct/2019
Loop Antenna	TESEQ	HLA 6120	31244	9k-30MHz	15/Mar/2019	14/Mar/2020
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170339	18GHz ~ 40GHz	19/Apr/2019	18/Apr/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	USB Mode		

AC Conduction_Mode 1

30/04/2019

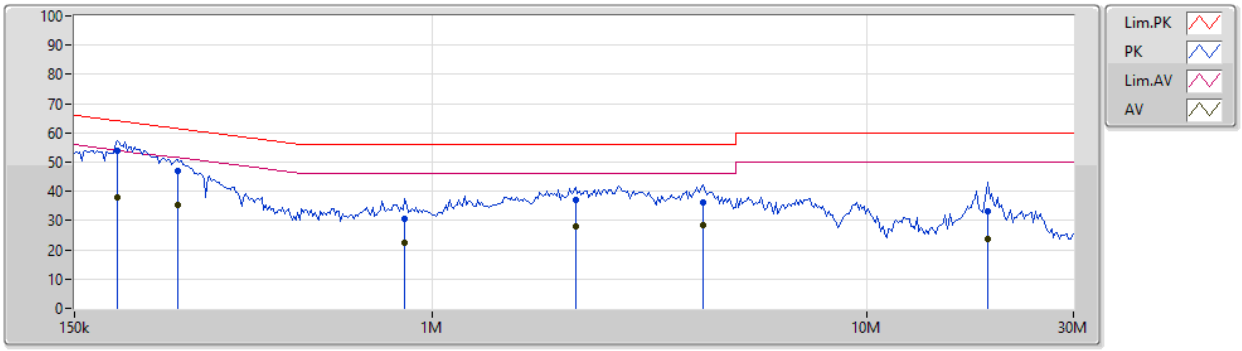


Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	186.707k	52.46	64.18	-11.72	19.51	Neutral	"Worst"	32.95	9.64	0.01	9.86
AV	186.707k	36.05	54.18	-18.13	19.51	Neutral	-	16.54	9.64	0.01	9.86
QP	251.653k	46.93	61.70	-14.77	19.51	Neutral	-	27.42	9.64	0.01	9.86
AV	251.653k	33.05	51.70	-18.65	19.51	Neutral	-	13.54	9.64	0.01	9.86
QP	1.2M	31.53	56.00	-24.47	19.52	Neutral	-	12.01	9.64	0.02	9.86
AV	1.2M	23.42	46.00	-22.58	19.52	Neutral	-	3.90	9.64	0.02	9.86
QP	2.457M	36.73	56.00	-19.27	19.56	Neutral	-	17.17	9.65	0.04	9.87
AV	2.457M	28.49	46.00	-17.51	19.56	Neutral	-	8.93	9.65	0.04	9.87
QP	4.041M	35.73	56.00	-20.27	19.59	Neutral	-	16.14	9.66	0.05	9.88
AV	4.041M	28.11	46.00	-17.89	19.59	Neutral	-	8.52	9.66	0.05	9.88
QP	17.975M	40.42	60.00	-19.58	19.76	Neutral	-	20.66	9.71	0.10	9.95
AV	17.975M	32.56	50.00	-17.44	19.76	Neutral	-	12.80	9.71	0.10	9.95

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

AC Conduction_Mode 1

30/04/2019



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	188.574k	53.76	64.11	-10.35	19.48	Line	"Worst"	34.28	9.61	0.01	9.86
AV	188.574k	38.02	54.11	-16.09	19.48	Line	-	18.54	9.61	0.01	9.86
QP	259.279k	47.00	61.45	-14.45	19.48	Line	-	27.52	9.61	0.01	9.86
AV	259.279k	35.18	51.45	-16.27	19.48	Line	-	15.70	9.61	0.01	9.86
QP	864.277k	30.57	56.00	-25.43	19.49	Line	-	11.08	9.61	0.02	9.86
AV	864.277k	22.54	46.00	-23.46	19.49	Line	-	3.05	9.61	0.02	9.86
QP	2.137M	36.93	56.00	-19.07	19.52	Line	-	17.41	9.62	0.03	9.87
AV	2.137M	27.85	46.00	-18.15	19.52	Line	-	8.33	9.62	0.03	9.87
QP	4.205M	36.19	56.00	-19.81	19.56	Line	-	16.63	9.63	0.05	9.88
AV	4.205M	28.35	46.00	-17.65	19.56	Line	-	8.79	9.63	0.05	9.88
QP	19.081M	33.34	60.00	-26.66	19.69	Line	-	13.65	9.63	0.11	9.95
AV	19.081M	23.80	50.00	-26.20	19.69	Line	-	4.11	9.63	0.11	9.95

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
GFSK	1.1M	2.106M	2M11F1D	1.085M	2.089M

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

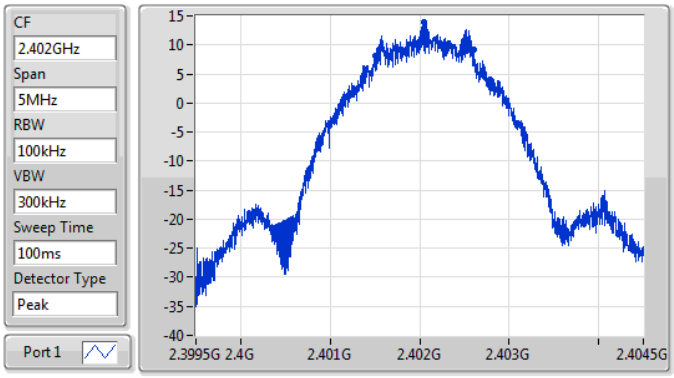
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
GFSK	-	-	-	-
2402MHz	Pass	500k	1.1M	2.089M
2442MHz	Pass	500k	1.098M	2.101M
2480MHz	Pass	500k	1.085M	2.106M

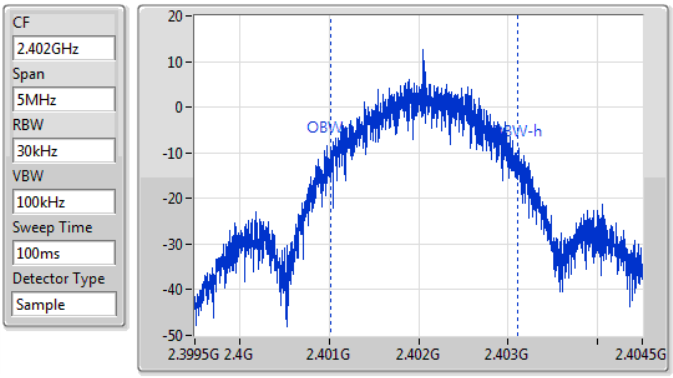
Port X-N dB = Port **X** 6dB down bandwidth; **Port X-OBW** = Port **X** 99% occupied bandwidth;

GFSK **EBW**

2402MHz

02/05/2019



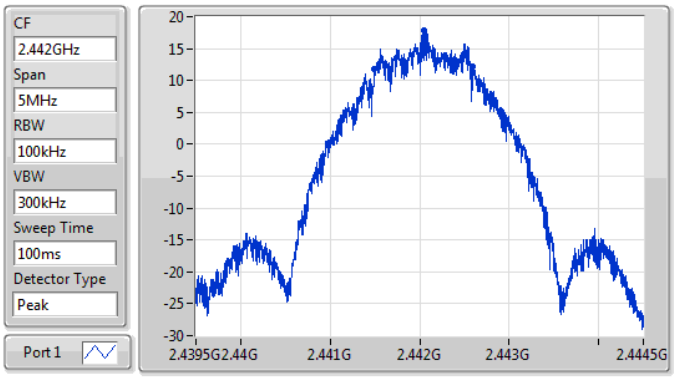


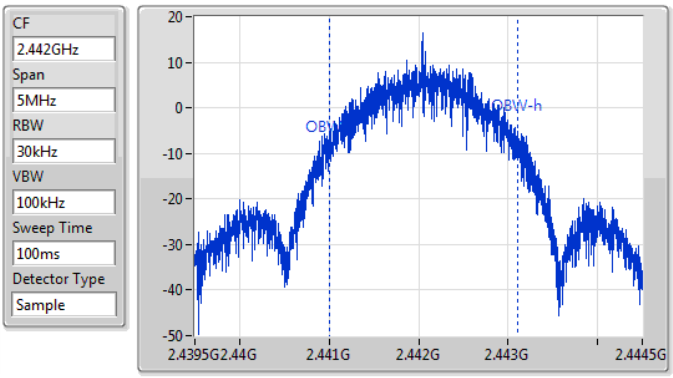
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.1M	2.4015G	2.4026G	2.089M	2.401013G	2.403102G	500k	1

GFSK **EBW**

2442MHz

02/05/2019



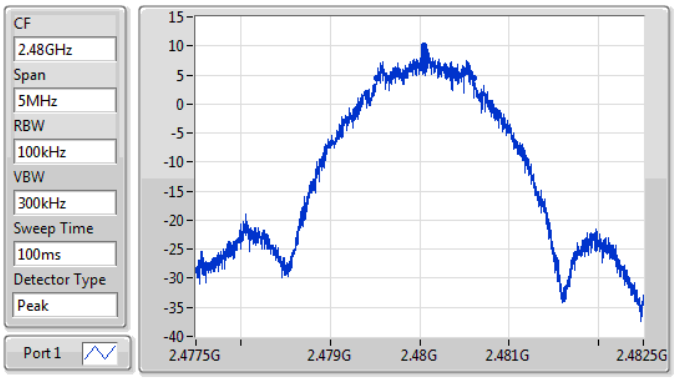


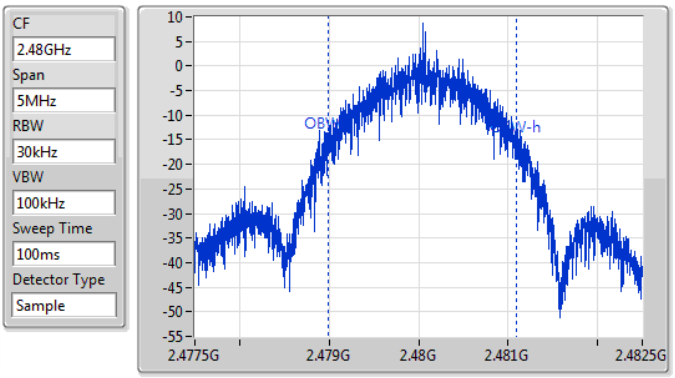
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.098M	2.441498G	2.442595G	2.101M	2.441003G	2.443104G	500k	1

GFSK **EBW**

2480MHz

02/05/2019





6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.085M	2.479515G	2.4806G	2.106M	2.478993G	2.481099G	500k	1

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
GFSK	18.24	0.06668

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
GFSK	-	-	-	-
2402MHz	Pass	2.00	14.38	30.00
2442MHz	Pass	2.00	18.24	30.00
2480MHz	Pass	2.00	10.64	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
GFSK	2.58

RBW=3 kHz.

Result

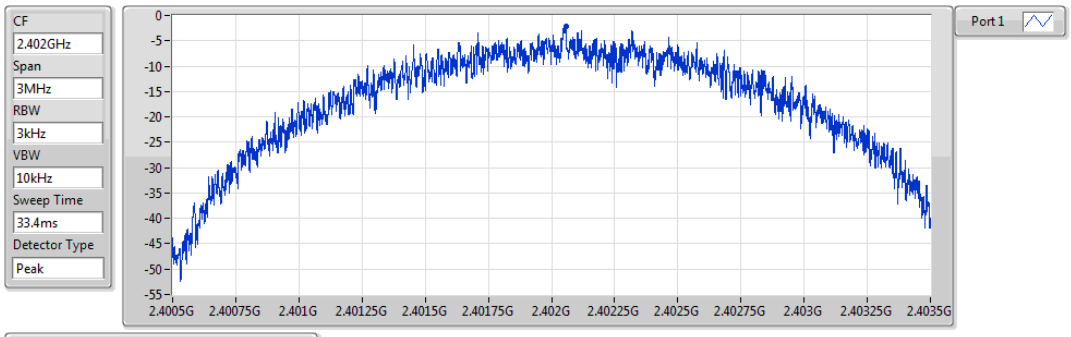
Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
GFSK	-	-	-	-
2402MHz	Pass	2.00	-2.12	8.00
2442MHz	Pass	2.00	2.58	8.00
2480MHz	Pass	2.00	-4.74	8.00

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;

GFSK **PSD**

2402MHz

02/05/2019

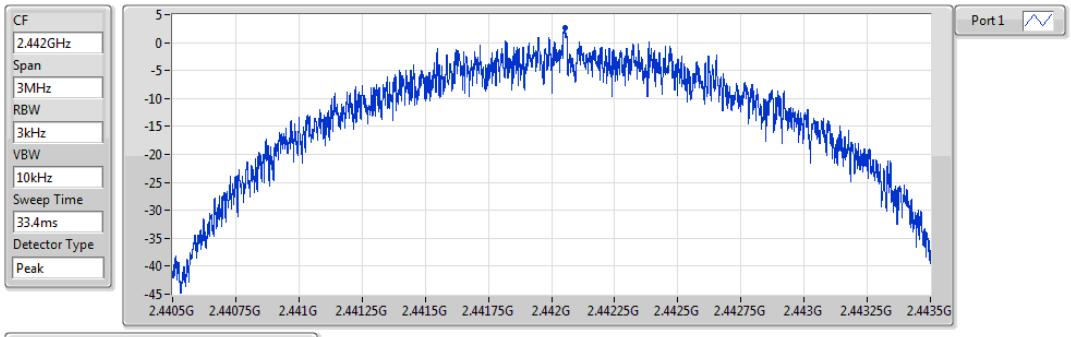


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-2.12	-2.12	-2.12

GFSK **PSD**

2442MHz

02/05/2019

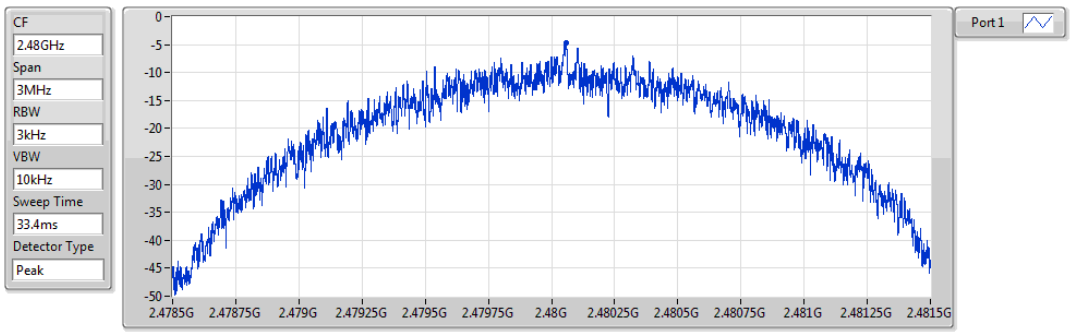


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
2.58	2.58	2.58

GFSK **PSD**

2480MHz

02/05/2019



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-4.74	-4.74	-4.74

Summary

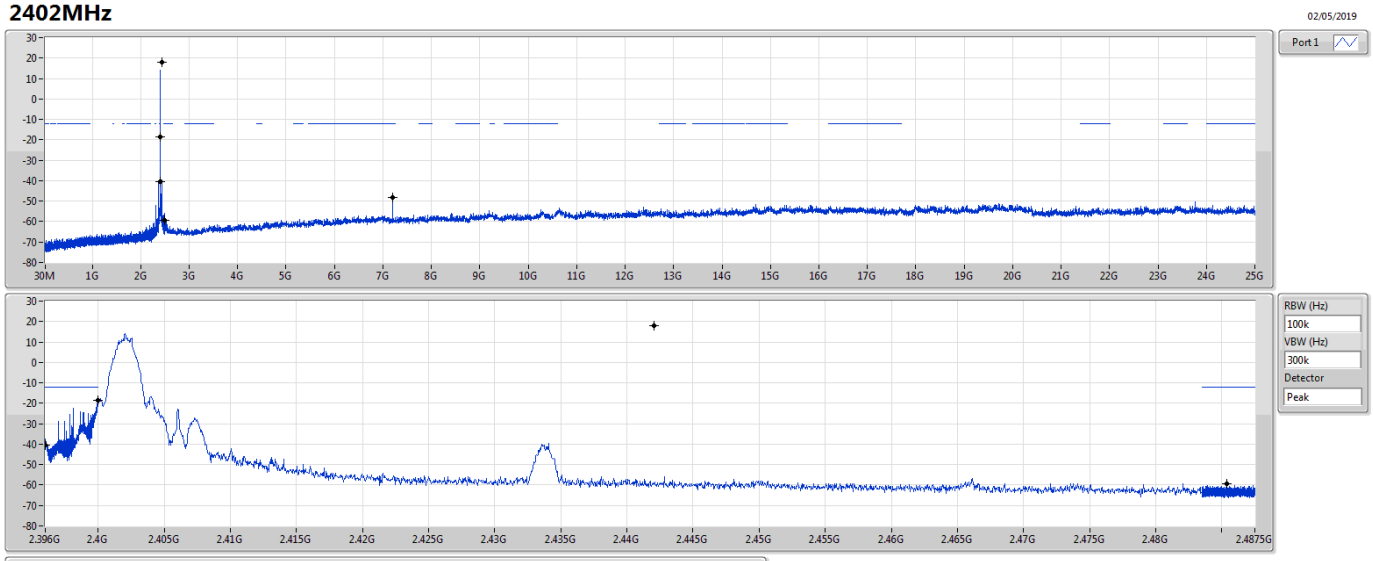
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
GFSK	Pass	2.44204G	17.78	-12.22	2.396G	-40.46	2.39997G	-18.54	2.48538G	-59.52	7.20668G	-48.12	1

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
GFSK	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.44204G	17.78	-12.22	2.396G	-40.46	2.39997G	-18.54	2.48538G	-59.52	7.20668G	-48.12	1
2442MHz	Pass	2.44204G	17.78	-12.22	2.39186G	-57.61	2.39949G	-54.99	2.48607G	-53.78	23.41005G	-51.61	1
2480MHz	Pass	2.44204G	17.78	-12.22	2.3957G	-63.27	2.3981G	-61.02	2.48405G	-34.88	2.51001G	-46.05	1

GFSK **CSE NdB**

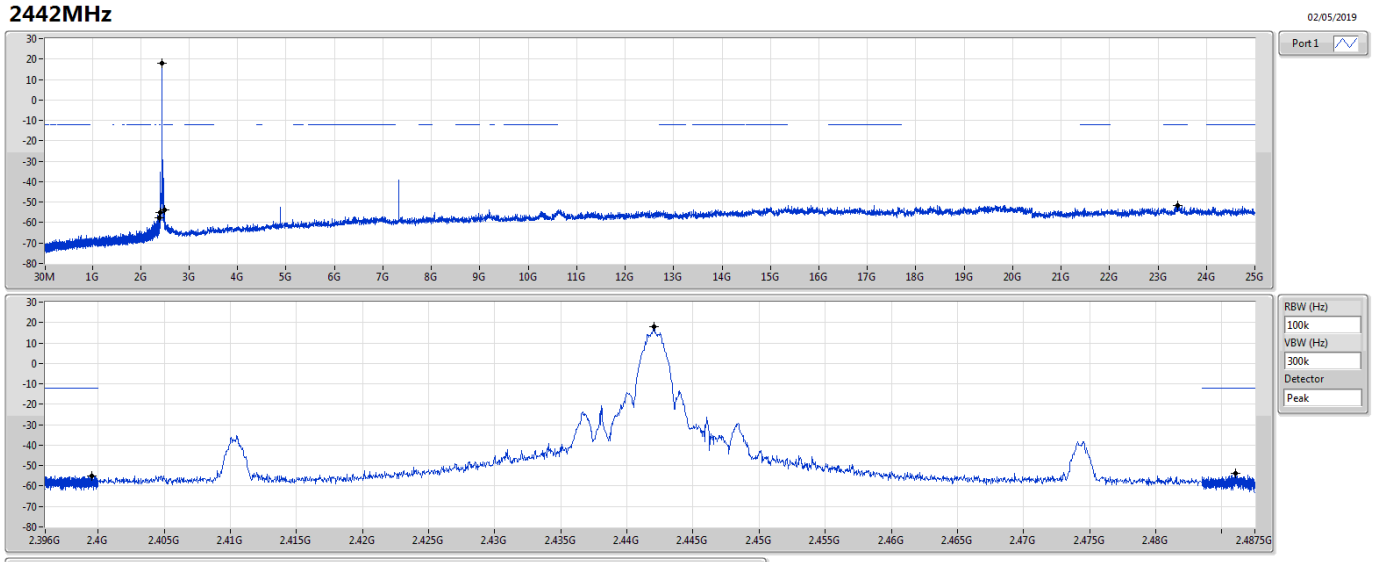
2402MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44204G	17.78	-12.22	2.396G	-40.46	2.39997G	-18.54	2.48538G	-59.52	7.20668G	-48.12	1

GFSK **CSE NdB**

2442MHz

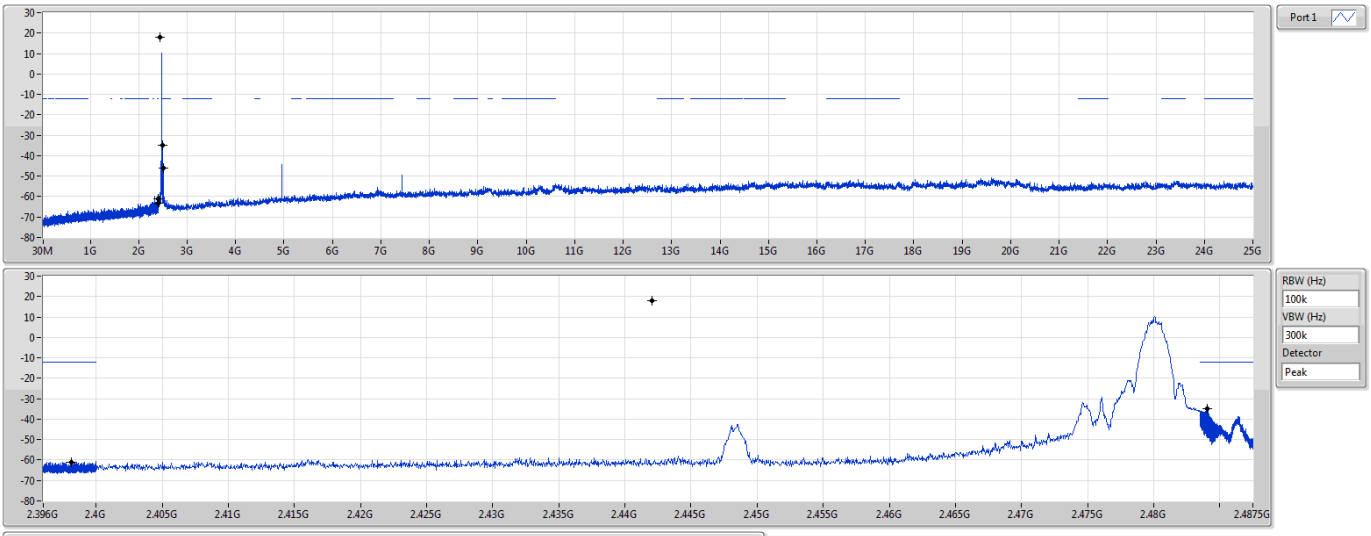


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44204G	17.78	-12.22	2.39186G	-57.61	2.39949G	-54.99	2.48607G	-53.78	23.41005G	-51.61	1

GFSK **CSE NdB**

2480MHz

02/05/2019



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44204G	17.78	-12.22	2.3957G	-63.27	2.3981G	-61.02	2.48405G	-34.88	2.51001G	-46.05	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	-	-	-	-	-	-	-	-	-	-	-	-
GFSK	Pass	PK	551.55M	42.97	46.00	-3.03	-4.92	3	Horizontal	360	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
GFSK	-	-	-	-	-	-	-	-	-	-	-	-
2442MHz_USB	Pass	PK	96.07M	25.17	43.50	-18.33	-15.82	3	Vertical	360	3.00	-
2442MHz_USB	Pass	PK	187.45M	31.63	43.50	-11.87	-16.50	3	Vertical	360	3.00	-
2442MHz_USB	Pass	PK	239.46M	33.80	46.00	-12.20	-13.89	3	Vertical	360	3.00	-
2442MHz_USB	Pass	PK	503.75M	39.86	46.00	-6.14	-6.22	3	Vertical	360	3.00	-
2442MHz_USB	Pass	PK	551.55M	41.69	46.00	-4.31	-4.92	3	Vertical	360	3.00	-
2442MHz_USB	Pass	PK	600.75M	36.64	46.00	-9.36	-4.70	3	Vertical	360	3.00	-
2442MHz_USB	Pass	PK	143.87M	36.20	43.50	-7.30	-14.69	3	Horizontal	360	3.00	-
2442MHz_USB	Pass	PK	164.96M	36.24	43.50	-7.26	-15.77	3	Horizontal	360	3.00	-
2442MHz_USB	Pass	PK	503.75M	41.90	46.00	-4.10	-6.22	3	Horizontal	360	3.00	-
2442MHz_USB	Pass	PK	551.55M	42.97	46.00	-3.03	-4.92	3	Horizontal	360	3.00	-
2442MHz_USB	Pass	PK	600.75M	38.40	46.00	-7.60	-4.70	3	Horizontal	360	3.00	-
2442MHz_USB	Pass	QP	235.25M	40.73	46.00	-5.27	-14.36	3	Horizontal	334	0.99	-

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	-	-	-	-	-	-	-	-	-	-	-	-
GFSK	Pass	PK	2.4836G	73.38	74.00	-0.62	31.30	3	Vertical	239	1.10	-

Result

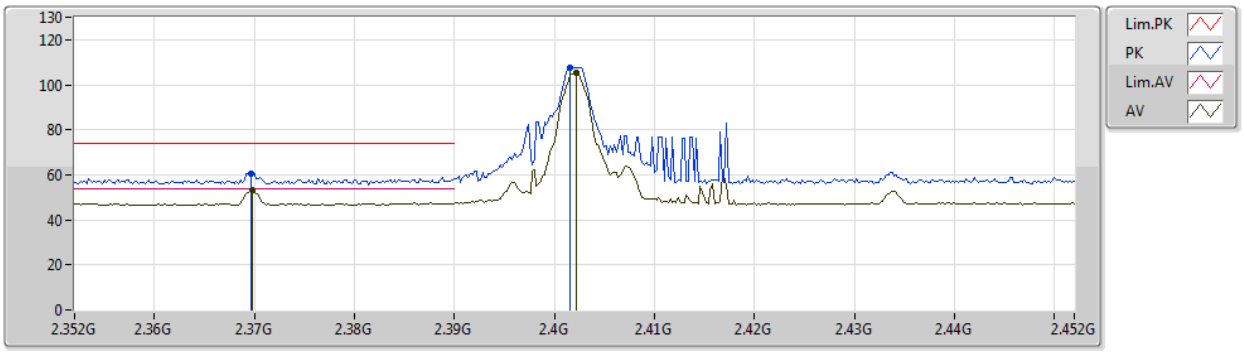
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
GFSK	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz_TX	Pass	AV	2.3698G	53.32	54.00	-0.68	30.89	3	Vertical	235	1.35	-
2402MHz_TX	Pass	AV	2.4022G	105.42	Inf	-Inf	31.00	3	Vertical	235	1.35	-
2402MHz_TX	Pass	PK	2.3696G	60.61	74.00	-13.39	30.88	3	Vertical	235	1.35	-
2402MHz_TX	Pass	PK	2.4016G	107.59	Inf	-Inf	30.99	3	Vertical	235	1.35	-
2402MHz_TX	Pass	AV	2.3864G	47.30	54.00	-6.70	30.94	3	Horizontal	358	2.69	-
2402MHz_TX	Pass	AV	2.402G	90.97	Inf	-Inf	31.00	3	Horizontal	358	2.69	-
2402MHz_TX	Pass	PK	2.3816G	58.25	74.00	-15.75	30.93	3	Horizontal	358	2.69	-
2402MHz_TX	Pass	PK	2.4016G	93.31	Inf	-Inf	30.99	3	Horizontal	358	2.69	-
2402MHz_TX	Pass	AV	4.80508G	42.33	54.00	-11.67	1.62	3	Vertical	350	2.54	-
2402MHz_TX	Pass	PK	4.80424G	51.92	74.00	-22.08	1.62	3	Vertical	350	2.54	-
2402MHz_TX	Pass	AV	4.80501G	41.44	54.00	-12.56	1.62	3	Horizontal	359	2.51	-
2402MHz_TX	Pass	PK	4.80415G	52.96	74.00	-21.04	1.62	3	Horizontal	359	2.51	-
2442MHz_TX	Pass	AV	2.3812G	47.54	54.00	-6.46	30.93	3	Vertical	236	1.05	-
2442MHz_TX	Pass	AV	2.4424G	110.83	Inf	-Inf	31.15	3	Vertical	236	1.05	-
2442MHz_TX	Pass	AV	2.4956G	47.85	54.00	-6.15	31.35	3	Vertical	236	1.05	-
2442MHz_TX	Pass	PK	2.3604G	58.58	74.00	-15.42	30.85	3	Vertical	236	1.05	-
2442MHz_TX	Pass	PK	2.4416G	113.10	Inf	-Inf	31.15	3	Vertical	236	1.05	-
2442MHz_TX	Pass	PK	2.4844G	59.49	74.00	-14.51	31.31	3	Vertical	236	1.05	-
2442MHz_TX	Pass	AV	2.3428G	47.05	54.00	-6.95	30.79	3	Horizontal	130	2.99	-
2442MHz_TX	Pass	AV	2.442G	104.13	Inf	-Inf	31.15	3	Horizontal	130	2.99	-
2442MHz_TX	Pass	AV	2.4944G	47.83	54.00	-6.17	31.33	3	Horizontal	130	2.99	-
2442MHz_TX	Pass	PK	2.3576G	58.58	74.00	-15.42	30.84	3	Horizontal	132	2.99	-
2442MHz_TX	Pass	PK	2.4416G	105.62	Inf	-Inf	31.15	3	Horizontal	132	2.99	-
2442MHz_TX	Pass	PK	2.4928G	58.53	74.00	-15.47	31.33	3	Horizontal	131	2.99	-
2442MHz_TX	Pass	AV	4.88496G	45.75	54.00	-8.25	1.82	3	Vertical	0	2.70	-
2442MHz_TX	Pass	AV	7.32482G	52.16	54.00	-1.84	7.51	3	Vertical	36	1.00	-
2442MHz_TX	Pass	PK	4.88508G	52.78	74.00	-21.22	1.82	3	Vertical	0	2.70	-
2442MHz_TX	Pass	PK	7.32646G	68.74	74.00	-5.26	7.50	3	Vertical	36	1.00	-
2442MHz_TX	Pass	AV	4.88498G	46.08	54.00	-7.92	1.82	3	Horizontal	349	2.37	-
2442MHz_TX	Pass	AV	7.32478G	48.36	54.00	-5.64	7.51	3	Horizontal	57	1.91	-
2442MHz_TX	Pass	PK	4.88454G	54.29	74.00	-19.71	1.82	3	Horizontal	349	2.37	-
2442MHz_TX	Pass	PK	7.3267G	65.85	74.00	-8.15	7.50	3	Horizontal	57	1.91	-
2480MHz_TX	Pass	AV	2.48G	98.83	Inf	-Inf	31.28	3	Vertical	239	1.10	-
2480MHz_TX	Pass	AV	2.4835G	52.59	54.00	-1.41	31.30	3	Vertical	239	1.10	-
2480MHz_TX	Pass	PK	2.4796G	101.09	Inf	-Inf	31.28	3	Vertical	239	1.10	-
2480MHz_TX	Pass	PK	2.4836G	73.38	74.00	-0.62	31.30	3	Vertical	239	1.10	-
2480MHz_TX	Pass	AV	2.48G	90.92	Inf	-Inf	31.28	3	Horizontal	180	2.58	-
2480MHz_TX	Pass	AV	2.4835G	48.54	54.00	-5.46	31.30	3	Horizontal	180	2.58	-
2480MHz_TX	Pass	PK	2.4796G	93.15	Inf	-Inf	31.28	3	Horizontal	180	2.58	-
2480MHz_TX	Pass	PK	2.4836G	66.26	74.00	-7.74	31.30	3	Horizontal	180	2.58	-
2480MHz_TX	Pass	AV	4.961G	43.43	54.00	-10.57	2.02	3	Vertical	164	1.50	-
2480MHz_TX	Pass	AV	7.43928G	39.10	54.00	-14.90	7.80	3	Vertical	111	2.26	-
2480MHz_TX	Pass	PK	4.96046G	51.18	74.00	-22.82	2.02	3	Vertical	164	1.50	-
2480MHz_TX	Pass	PK	7.43982G	53.24	74.00	-20.76	7.81	3	Vertical	154	2.26	-
2480MHz_TX	Pass	AV	4.9592G	38.46	54.00	-15.54	2.02	3	Horizontal	32	1.15	-
2480MHz_TX	Pass	AV	7.43886G	39.68	54.00	-14.32	7.80	3	Horizontal	55	1.18	-
2480MHz_TX	Pass	PK	4.96072G	48.47	74.00	-25.53	2.02	3	Horizontal	32	1.15	-

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2480MHz_TX	Pass	PK	7.43958G	57.68	74.00	-16.32	7.80	3	Horizontal	55	1.18	-

GFSK

2402MHz_TX

01/05/2019

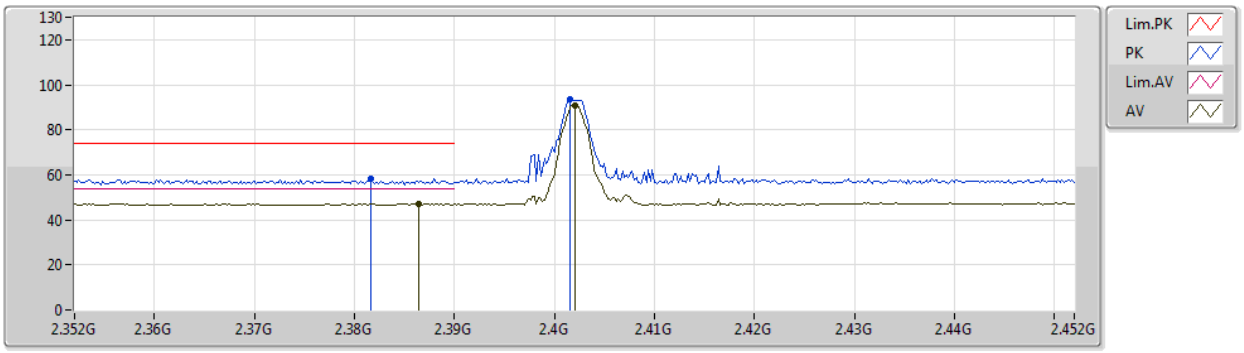


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3698G	53.32	54.00	-0.68	30.89	3	Vertical	235	1.35	-
AV	2.4022G	105.42	Inf	-Inf	31.00	3	Vertical	235	1.35	-
PK	2.3696G	60.61	74.00	-13.39	30.88	3	Vertical	235	1.35	-
PK	2.4016G	107.59	Inf	-Inf	30.99	3	Vertical	235	1.35	-

GFSK

2402MHz_TX

01/05/2019

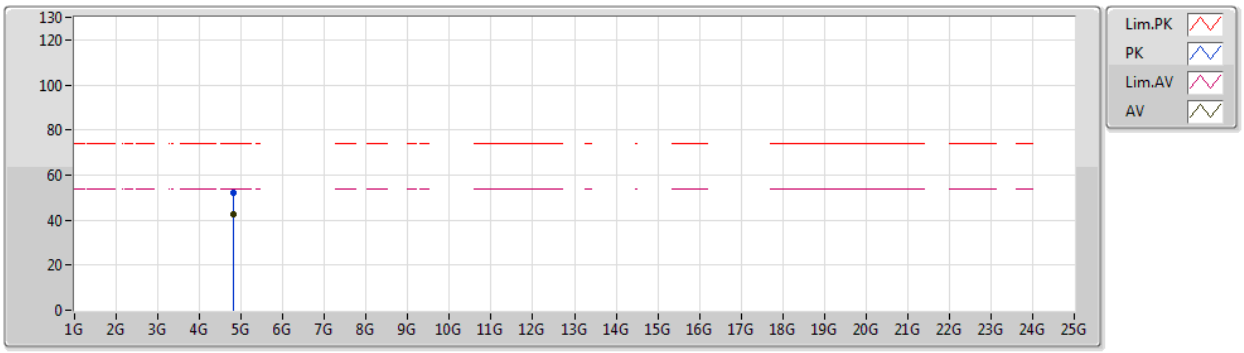


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3864G	47.30	54.00	-6.70	30.94	3	Horizontal	358	2.69	-
AV	2.402G	90.97	Inf	-Inf	31.00	3	Horizontal	358	2.69	-
PK	2.3816G	58.25	74.00	-15.75	30.93	3	Horizontal	358	2.69	-
PK	2.4016G	93.31	Inf	-Inf	30.99	3	Horizontal	358	2.69	-

GFSK

2402MHz_TX

01/05/2019

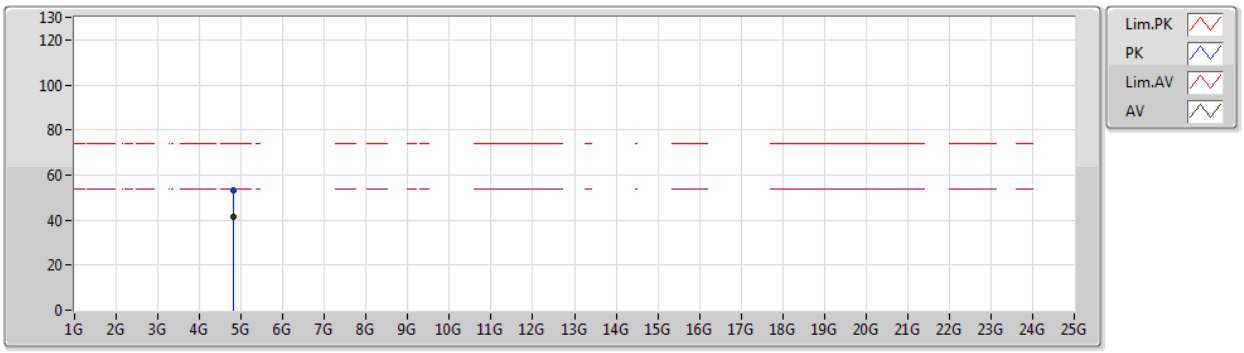


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.80508G	42.33	54.00	-11.67	1.62	3	Vertical	350	2.54	-
PK	4.80424G	51.92	74.00	-22.08	1.62	3	Vertical	350	2.54	-

GFSK

2402MHz_TX

01/05/2019

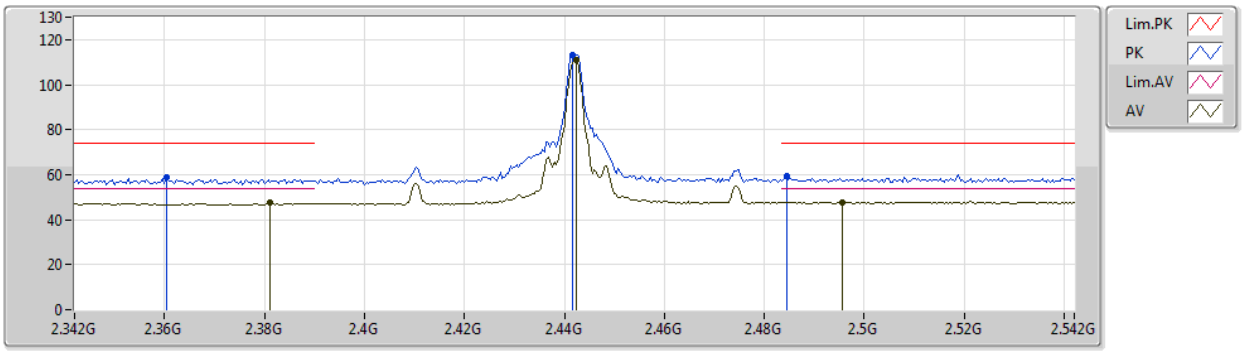


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.80501G	41.44	54.00	-12.56	1.62	3	Horizontal	359	2.51	-
PK	4.80415G	52.96	74.00	-21.04	1.62	3	Horizontal	359	2.51	-

GFSK

2442MHz_TX

01/05/2019

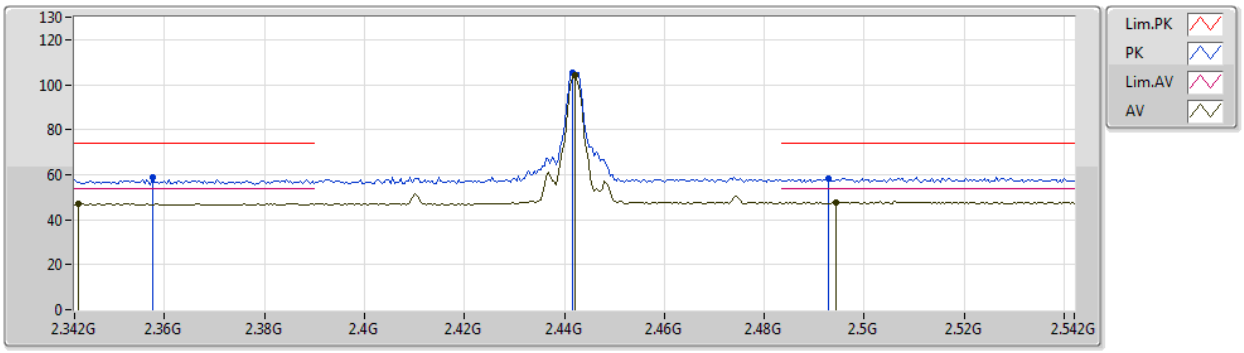


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3812G	47.54	54.00	-6.46	30.93	3	Vertical	236	1.05	-
AV	2.4424G	110.83	Inf	-Inf	31.15	3	Vertical	236	1.05	-
AV	2.4956G	47.85	54.00	-6.15	31.35	3	Vertical	236	1.05	-
PK	2.3604G	58.58	74.00	-15.42	30.85	3	Vertical	236	1.05	-
PK	2.4416G	113.10	Inf	-Inf	31.15	3	Vertical	236	1.05	-
PK	2.4844G	59.49	74.00	-14.51	31.31	3	Vertical	236	1.05	-

GFSK

2442MHz_TX

01/05/2019

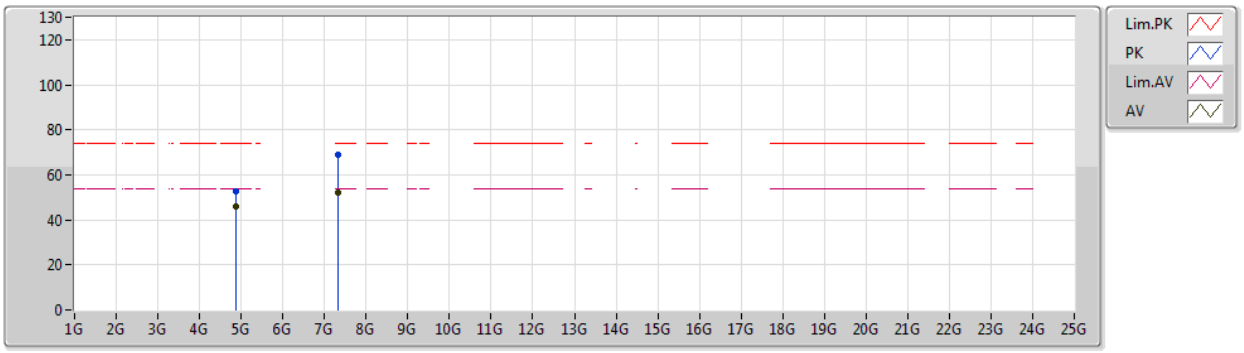


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.3428G	47.05	54.00	-6.95	30.79	3	Horizontal	130	2.99	-
AV	2.442G	104.13	Inf	-Inf	31.15	3	Horizontal	130	2.99	-
AV	2.4944G	47.83	54.00	-6.17	31.33	3	Horizontal	130	2.99	-
PK	2.3576G	58.58	74.00	-15.42	30.84	3	Horizontal	132	2.99	-
PK	2.4416G	105.62	Inf	-Inf	31.15	3	Horizontal	132	2.99	-
PK	2.4928G	58.53	74.00	-15.47	31.33	3	Horizontal	131	2.99	-

GFSK

2442MHz_TX

01/05/2019

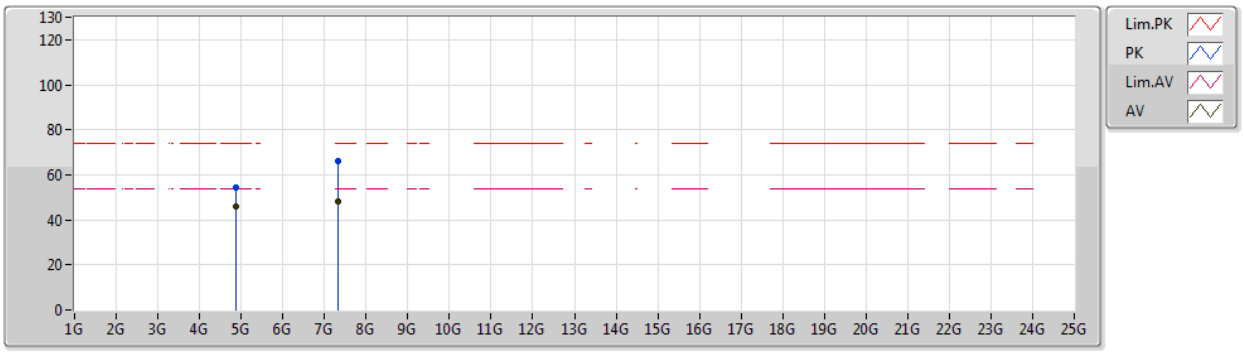


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.88496G	45.75	54.00	-8.25	1.82	3	Vertical	0	2.70	-
AV	7.32482G	52.16	54.00	-1.84	7.51	3	Vertical	36	1.00	-
PK	4.88508G	52.78	74.00	-21.22	1.82	3	Vertical	0	2.70	-
PK	7.32646G	68.74	74.00	-5.26	7.50	3	Vertical	36	1.00	-

GFSK

2442MHz_TX

01/05/2019

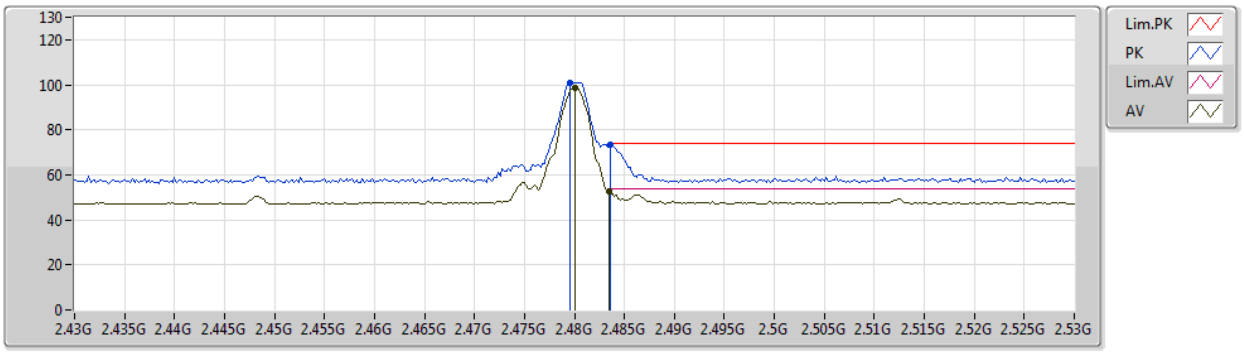


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.88498G	46.08	54.00	-7.92	1.82	3	Horizontal	349	2.37	-
AV	7.32478G	48.36	54.00	-5.64	7.51	3	Horizontal	57	1.91	-
PK	4.88454G	54.29	74.00	-19.71	1.82	3	Horizontal	349	2.37	-
PK	7.3267G	65.85	74.00	-8.15	7.50	3	Horizontal	57	1.91	-

GFSK

2480MHz_TX

01/05/2019

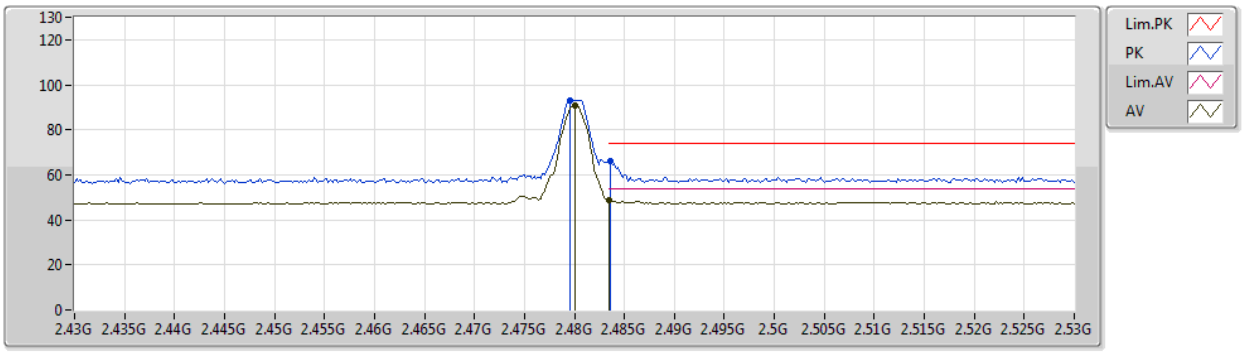


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.48G	98.83	Inf	-Inf	31.28	3	Vertical	239	1.10	-
AV	2.4835G	52.59	54.00	-1.41	31.30	3	Vertical	239	1.10	-
PK	2.4796G	101.09	Inf	-Inf	31.28	3	Vertical	239	1.10	-
PK	2.4836G	73.38	74.00	-0.62	31.30	3	Vertical	239	1.10	-

GFSK

2480MHz_TX

01/05/2019

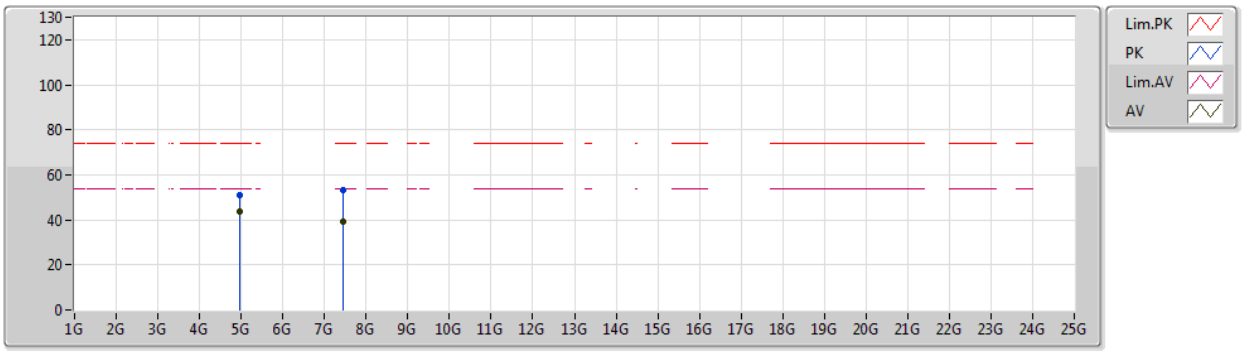


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	2.48G	90.92	Inf	-Inf	31.28	3	Horizontal	180	2.58	-
AV	2.4835G	48.54	54.00	-5.46	31.30	3	Horizontal	180	2.58	-
PK	2.4796G	93.15	Inf	-Inf	31.28	3	Horizontal	180	2.58	-
PK	2.4836G	66.26	74.00	-7.74	31.30	3	Horizontal	180	2.58	-

GFSK

2480MHz_TX

01/05/2019

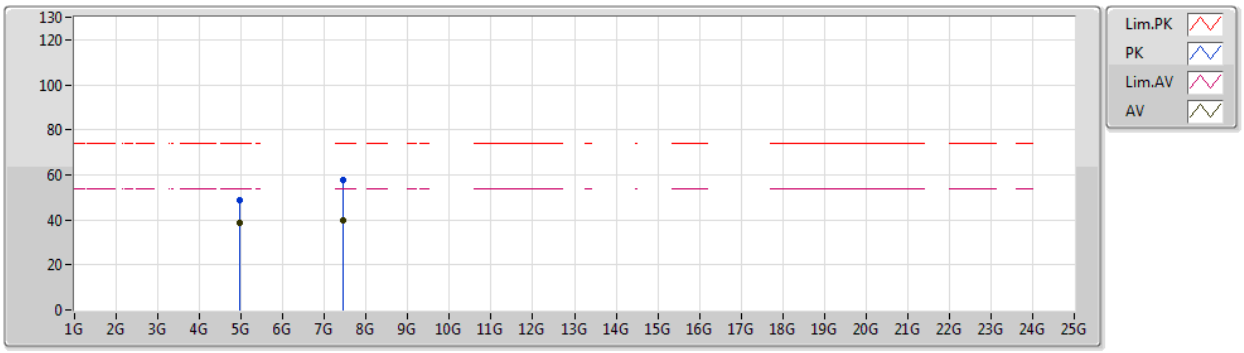


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.961G	43.43	54.00	-10.57	2.02	3	Vertical	164	1.50	-
AV	7.43928G	39.10	54.00	-14.90	7.80	3	Vertical	111	2.26	-
PK	4.96046G	51.18	74.00	-22.82	2.02	3	Vertical	164	1.50	-
PK	7.43982G	53.24	74.00	-20.76	7.81	3	Vertical	154	2.26	-

GFSK

2480MHz_TX

01/05/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	
AV	4.9592G	38.46	54.00	-15.54	2.02	3	Horizontal	32	1.15	-
AV	7.43886G	39.68	54.00	-14.32	7.80	3	Horizontal	55	1.18	-
PK	4.96072G	48.47	74.00	-25.53	2.02	3	Horizontal	32	1.15	-
PK	7.43958G	57.68	74.00	-16.32	7.80	3	Horizontal	55	1.18	-