FCC Radio Test Report

FCC ID	:	**2BOYO-SPIR-10**
Equipment	:	**Wireless Motion Sensor**
Brand Name	:	**SKS**
Model Name	:	**SPIR-10-1**
Applicant	:	**TAIWAN SHIN KONG SECURITY CO.,LTD No. 128, Xing'ai Rd., Neihu Dist., Taipei City 114508, Taiwan**
Manufacturer	:	**TAIWAN SHIN KONG SECURITY CO.,LTD No. 128, Xing'ai Rd., Neihu Dist., Taipei City 114508, Taiwan**
Standard	:	**47 CFR FCC Part 15.247**

The product was received on Mar. 17, 2025, and testing was started from Apr. 10, 2025 and completed on Apr. 14, 2025. We, SPORTON INTERNATIONAL INC. Hsinhua 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 test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Hsinhua Laboratory, the test report shall not be reproduced except in full.

Approved by: Jackson Tsai

SPORTON INTERNATIONAL INC. Hsinhua Laboratory

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR531016	01	Initial issue of report	May 14, 2025

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 Required	Only employ battery power.
3.1	15.247(a)	20dB Bandwidth	PASS	-
3.1	15.247(a)	Carrier Frequency Separation	PASS	-
3.2	15.247(b)	Maximum Conducted Output Power	PASS	-
3.3	15.247(e)	Power Spectral Density	PASS	-
3.4	15.247(a)	Number of Hopping Frequencies and Hopping Bandedge	PASS	-
3.5	15.247(a)	Time of Occupancy (Dwell Time)	PASS	-
3.6	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.7	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)	Modulation	Ch. Frequency (MHz)	Channel Number
902-928 MHz	LoRa (125kHz)	902.3-914.9	64
902-928 MHz	LoRa (500kHz)	923.3-927.5	8

Band	Mode	BWch (MHz)	Nant
902-928MHz	LoRa (500kHz)	0.5	1TX
902-928MHz	LoRa (125kHz)	0.2	1TX

Note:
- 902-928 MHz Band uses as a hybrid system using DTS & FHSS.
- LoRa (125kHz) uses FHSS.
- LoRa (500kHz) uses DTS.
- BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Support	Gain (dBi)
1	B&T	BAT-ANT2-1503	chip patch	N/A	Lora	1.5

For LoRa function:
For LoRa mode (1TX/1RX)
Ant. 1 (port 1) could transmit/receive.

1.1.3 Type of EUT

Operational Condition		
EUT Power Type	From Battery	
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 Test Signal Duty Cycle

Mode	DC	DCF (dB)	T (s)	VBW (Hz)_1/T
LoRa (500kHz)	0.236	6.27	157.188m	10
LoRa (125kHz)	0.547	2.62	627.188m	10

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

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

- KDB 558074 D01 v05r02
- KDB 414788 D01 v01r01

1.3 Testing Location Information

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
☒ Hsinhua **(TAF:** 3785**)**	**ADD:** No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)			
	TEL: 886-3-327-3456		**FAX:** 886-3-327-0973	
Test site Designation No. TW3785 with FCC				
Test Condition	**Test Site No.**	**Test Engineer**	**Test Environment**	**Test Date**
RF Conducted	TH07-HY	Raven Chien	22.6~23.4°C / 52~55%	12/Apr/2025~14/Apr/2025
☒ Wen 33rd.St. **(TAF:** 3785**)**	**ADD:** No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)			
	TEL: 886-3-318-0787		**FAX:** 886-3-318-0287	
Test site Designation No. TW0008 with FCC.				
Test Condition	**Test Site No.**	**Test Engineer**	**Test Environment**	**Test Date**
Radiated	03CH09-HY	Edward Wang	22.2~23.4°C / 50~52%	10/Apr/2025~11/Apr/2025

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**
Bandwidth	3 MHz	Confidence levels of 95%
Maximum Conducted Output Power	2 dB	Confidence levels of 95%
Power Spectral Density	2 dB	Confidence levels of 95%
Emissions in Non-restricted Frequency Bands	0.14 dB	Confidence levels of 95%
Emissions in Restricted Frequency Bands	4.8 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 Condition

RF Conducted-DTS	Abbreviation	Remark
TX-DTS	Tnom	20°C
	Vnom	3V
TX-FHSS	Tnom	20°C
	Vnom	3V

2.2 Test Channel Mode

Test Software Version	Tera Term Version 4.76

Mode	Power Setting
LoRa (500kHz)	-
923.3MHz	22
927.5MHz	22
LoRa (125kHz)	-
902.3MHz	22
908.5MHz	22
914.9MHz	22

2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	RF Output Power, 20dB Bandwidth, Carrier Frequency Separation (ChS) Number of Hopping Frequencies (N), Hopping Bandedge Time of Occupancy (Dwell Time) Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains
	☒ Non-adaptive frequency hopping systems (Non-AFH) ☐ adaptive frequency hopping systems (AFH)

The Worst Case Mode for Following Conformance Tests			
Tests Item	Emissions in Restricted Frequency Bands		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
Operating Mode < 1GHz	CTX		
1	Battery mode		
Operating Mode > 1GHz	CTX		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
			
Worst Planes of EUT	V		

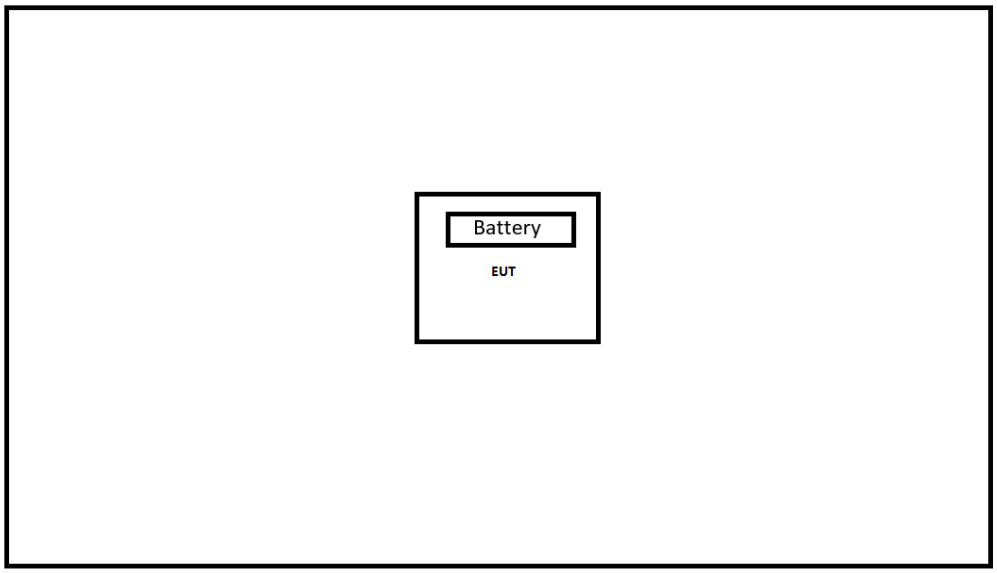
2.4 Support Equipment

Support Equipment – Conducted					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Notebook	DELL	E5410	-	-
2	Adapter for NB	DELL	HA65NM130	-	-
3	Battery	GP	CR123A	-	Customer provide

Support Equipment – Radiated					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Battery	GP	CR123A	-	-

2.5 Test Setup Diagram

Test Setup Diagram - Radiated Test



3 Transmitter Test Result

3.1 20dB Bandwidth and Carrier Frequency Separation

3.1.1 20dB Bandwidth and Carrier Frequency Separation Limit

20dB Bandwidth and Carrier Frequency Separation Limit for Frequency Hopping Systems
▪ 902-928 MHz Band:
N:Number of Hopping Frequencies; **ChS**: Hopping Channel Separation

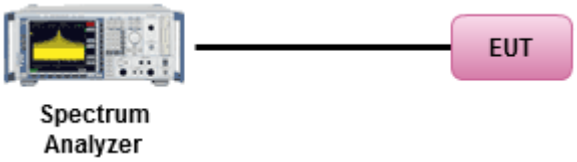
3.1.2 Measuring Instruments

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 6.9.2 for 20 dB bandwidth measurement.
☒ Refer as ANSI C63.10-2013, clause 7.8.2 for carrier frequency separation measurement.

3.1.4 Test Setup

20dB Bandwidth and Carrier Frequency Separation
 Spectrum Analyzer

3.1.5 Test Result of 20dB Bandwidth

Refer as Appendix A

3.1.6 Test Result of Carrier Frequency Separation

Refer as Appendix A

3.2 Maximum Conducted Output Power

3.2.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
▪ 902-928 MHz Band:	
	▪ N ≥50 and hybrid system; Power 30dBm; EIRP 36dBm
	▪ 50 >N≥ 25; Power 24dBm; EIRP 30dBm
N:Number of Hopping Frequencies	

3.2.2 Measuring Instruments

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

3.2.3 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 FCC 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]) $EIRP_{total} = P_{total} + DG$

3.2.4 Test Setup

Maximum Conducted Output Power (Power Meter)


3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B

3.3 Power Spectral Density

3.3.1 Power Spectral Density Limit

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

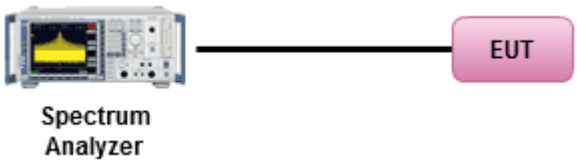
3.3.2 Measuring Instruments

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

3.3.3 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) Max. PSD.	
▪ For conducted measurement.		
	▪ If The EUT supports multiple transmit chains using options given below:	
		▪ Measure and sum the spectra across the outputs. Refer as FCC 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.

3.3.4 Test Setup

Power Spectral Density


3.3.5 Test Result of Power Spectral Density

Refer as Appendix C

3.4 Number of Hopping Frequencies and Hopping Bandedge

3.4.1 Number of Hopping Frequencies Limit

Number of Hopping Frequencies Limit
▪ 902-928 MHz Band:
▪ ChS ≥ MAX (20 dB bandwidth, 25 kHz); 20 dB bandwidth≤ 250 kHz.
▪ ChS ≥ MAX (20 dB bandwidth, 25 kHz); 20 dB bandwidth>250 kHz.
Note : **1. ChS** : Hopping Channel Separation **2.** There is no minimum number of hopping channels associated with this type of hybrid system.

3.4.2 Hopping Bandedge Limit

Refer clause 3.6.1 and clause 3.7.1

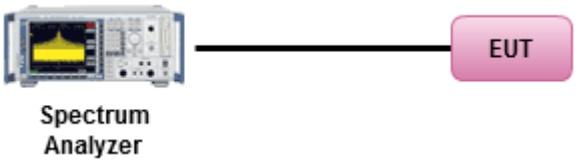
3.4.3 Measuring Instruments

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

3.4.4 Test Procedures

Test Method
☒ Refer as ANSI C63.10-2013, clause 7.8.3 for number of hopping frequencies measurement.
☒ Refer as ANSI C63.10-2013, clause 7.8.6 for hopping frequencies Bandedge measurement.

3.4.5 Test Setup

Number of Hopping Frequencies


3.4.6 Test Result of Number of Hopping Frequencies

Refer as Appendix D

3.4.7 Test Result of Number of Hopping Frequencies Bandedge

Refer as Appendix D

3.5 Time of Occupancy (Dwell Time)

3.5.1 Time of Occupancy (Dwell Time) Limit

20dB Bandwidth and Carrier Frequency Separation Limit for Frequency Hopping Systems	
▪ 902-928 MHz Band:	
	▪ N ≥50; 0.4s in 20s period
	▪ 50 >N≥ 25; 0.4s in 10s period
N:Number of Hopping Frequencies	

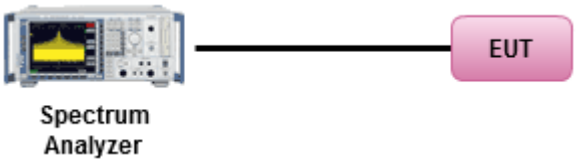
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 7.8.4 for dwell time measurement.

3.5.4 Test Setup

Time of Occupancy (Dwell Time)
 Spectrum Analyzer

3.5.5 Test Result of Time of Occupancy (Dwell Time)

Refer as Appendix E

3.6 Emissions in Non-restricted Frequency Bands

3.6.1 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 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 level.

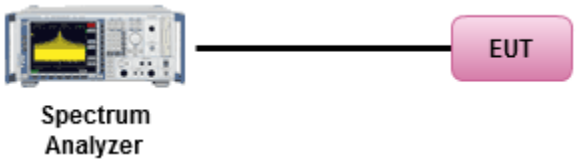
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 7.8.8 for unwanted emissions into non-restricted bands.

3.6.4 Test Setup

Emissions in Non-restricted Frequency Bands


3.6.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix F

3.7 Emissions in Restricted Frequency Bands

3.7.1 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.

3.7.2 Measuring Instruments

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

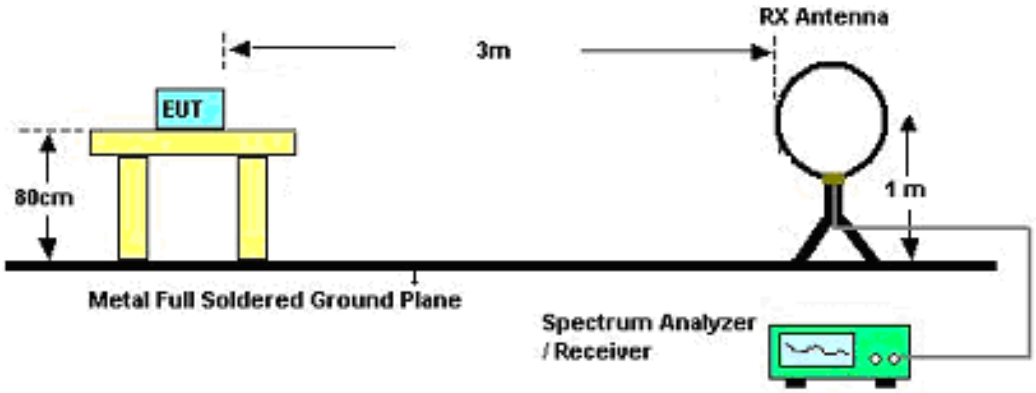
3.7.3 Test Procedures

Test Method	
▪ The average emission levels shall be measured in [hopping 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 ANSI C63.10, clause 4.1.4.2.1 QP value.
	▪ Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak.
	▪ Refer as ANSI C63.10, clause 4.1.4.2.4 average value of hopping pulsed emissions.
▪	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.

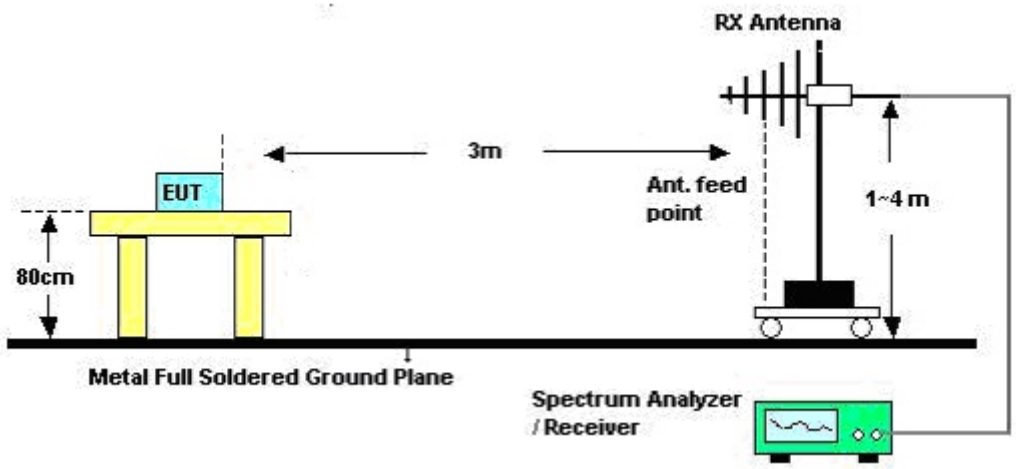
3.7.4 Measurement Results Calculation

The measured Level is calculated using:
Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)

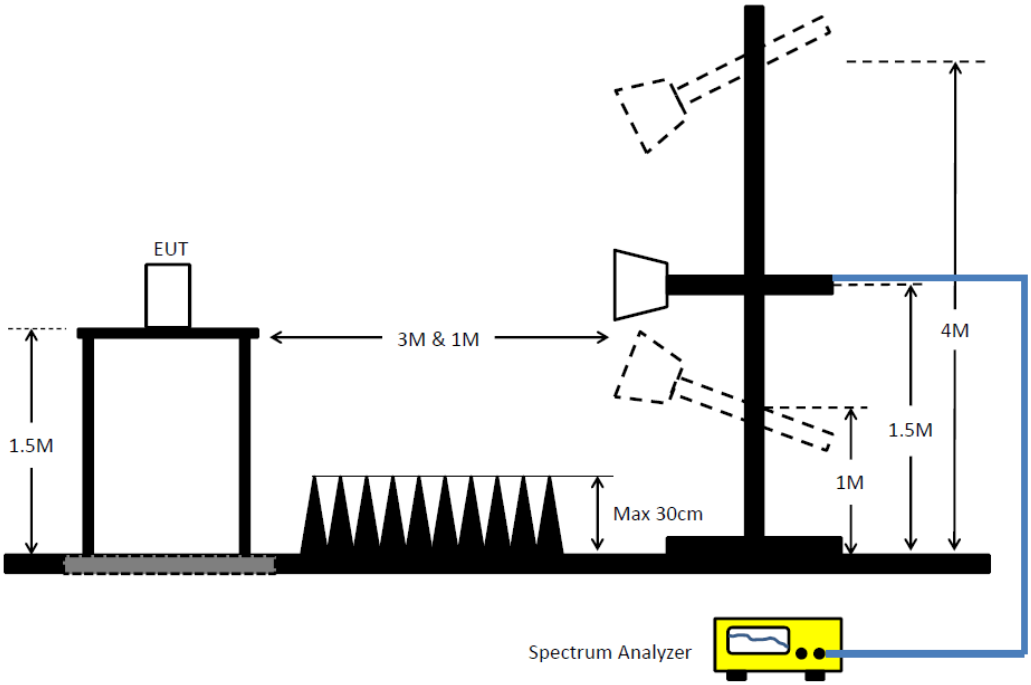
3.7.5 Test Setup

Emissions in Restricted Frequency Bands
9kHz ~30MHz


30MHz~1GHz



Above 1GHz



3.7.6 Test Result of Emissions in Restricted Frequency Bands (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.7.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix G

4 Test Equipment and Calibration Data

Instrument for Conducted Test

Instrument	Manufacturer/ Brand Name	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV 40	101515	10Hz~40GHz	23/Jan/2025	22/Jan/2026
SMB100A Signal Generator	R&S	SMB100A	181147	100kHz~40GHz	16/Oct/2024	15/Oct/2025
Power Meter	Anritsu	ML2495A	1517010	300MHz~40GHz	18/Dec/2024	17/Dec/2025
Pulse Sensor	Anritsu	MA2411B	1339407	300MHz~40GHz	18/Dec/2024	17/Dec/2025
SENSE-15247_FS	Sporton	V5.11.23	N/A	N/A	N/A	N/A

Instrument for Radiated Test

Instrument	Manufacturer/ Brand Name	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz~1GHz 3m	07/Mar/2025	06/Mar/2026
Site V.S.W.R	TDK	SAC-3M	03CH09-HY	1GHz~18GHz 3m	06/Mar/2025	05/Mar/2026
Signal Analyzer	R&S	FSV40	101500	10Hz-40GHz	01/Nov/2024	31/Oct/2025
Amplifier	EMC	EMC9135	980232	9kHz~1GHz	09/Apr/2025	08/Apr/2026
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1531	1GHz ~ 18GHz	20/Dec/2024	19/Dec/2025
Microwave Preamplifier	Agilent	8449B	3008A02096	1GHz~26.5GHz	19/Jul/2024	18/Jul/2025
Bilog Antenna & 5dB Attenuator	TESEQ & MTJ	CBL6111D&M TJ6102-05	35418 & 3	30MHz~1GHz	26/Aug/2024	25/Aug/2025
RF Cable-R03m	Jye Bao	RG142	03CH09-cable-01	9kHz~1GHz	19/Feb/2025	18/Feb/2026
RF CABLE 5m+3m+1m	HUBER+ SUHNER	SUCOFLEX1 04	03CH09-cable-02	1GHz~40GHz	07/Oct/2024	06/Oct/2025
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	20/Jan/2025	19/Mar/2026
EMI Test Receiver	R&S	ESR3	102052	9kHz~3.6GHz	03/May/2024	02/May/2025
SENSE-15247_FS	Sporton	V5.11.23	NA	NA	NA	NA

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
902-928MHz	-	-	-	-	-
LoRa (125kHz)	146.85k	127.186k	127KF1D	142.45k	125.937k

Max-N dB = Maximum 20dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 20dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth

Result

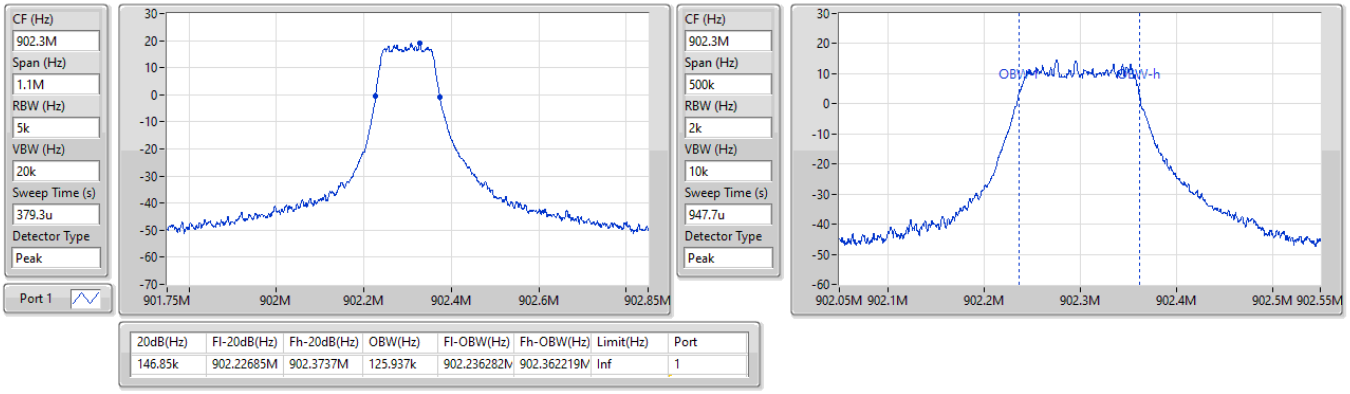
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
LoRa (125kHz)	-	-	-	-
902.3MHz	Pass	Inf	146.85k	125.937k
908.5MHz	Pass	Inf	142.45k	127.186k
914.9MHz	Pass	Inf	142.45k	126.187k

Port X-N dB = Port X 20dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

902-928MHz_LoRa (125kHz) **EBW-FS**

902.3MHz

12/04/2025



20dB(Hz)	Fl-20dB(Hz)	Fh-20dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
146.85k	902.22685M	902.3737M	125.937k	902.236282M	902.362219M	Inf	1

Summary

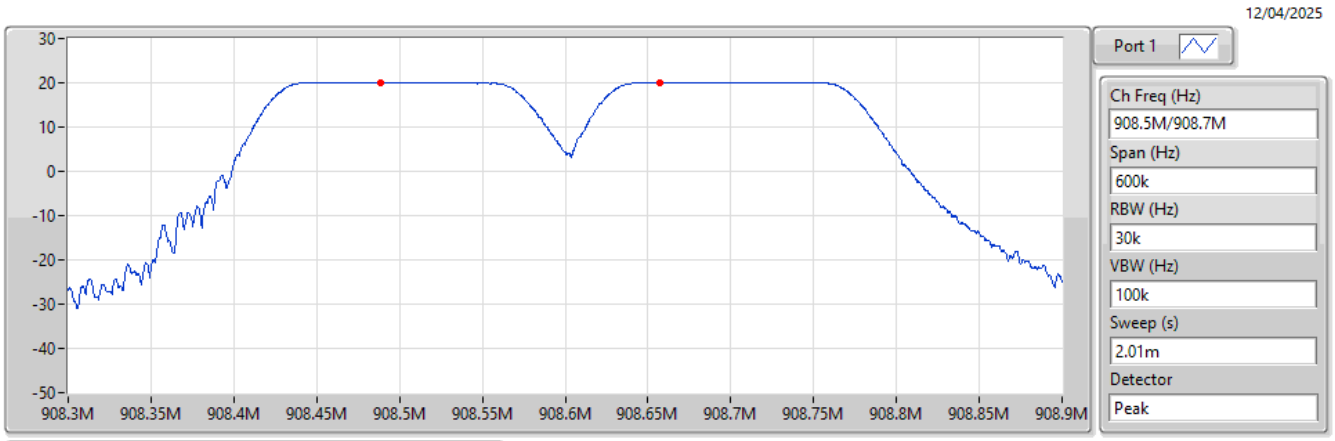
Mode	Max-Space (Hz)	Min-Space (Hz)
902-928MHz	-	-
LoRa (125kHz)	214.5k	168k

Result

Mode	Result	Fl (Hz)	Fh (Hz)	Ch.Space (Hz)	Limit (Hz)
LoRa (125kHz)	-	-	-	-	-
902.3MHz	Pass	902.2788M	902.4933M	214.5k	146.85k
908.5MHz	Pass	908.489M	908.657M	168k	142.45k
914.9MHz	Pass	914.6635M	914.8585M	195k	142.45k

902-928MHz_LoRa (125kHz) Channel Separation-FS

908.5M/908.7MHz



Fl(Hz)	Fh(Hz)	Ch.Space(Hz)	Limit(Hz)
908.489M	908.657M	168k	142.45k

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
902-928MHz	-	-	-	-	-
LoRa (500kHz)	615.625k	511.619k	512KF1D	611.25k	507.246k

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

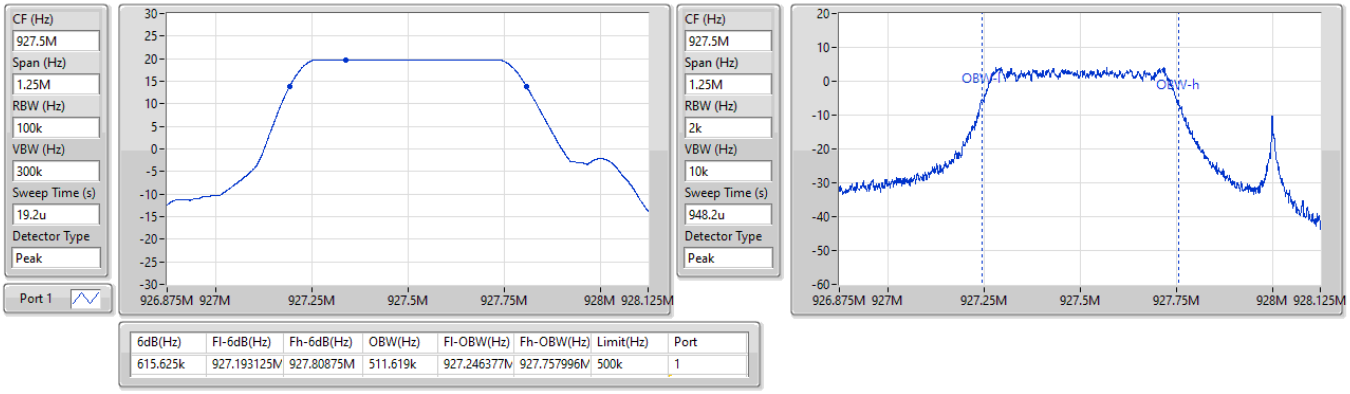
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
LoRa (500kHz)	-	-	-	-
923.3MHz	Pass	500k	611.25k	507.246k
927.5MHz	Pass	500k	615.625k	511.619k

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

902-928MHz_LoRa (500kHz) **EBW-DTS**

927.5MHz

14/04/2025



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
615.625k	927.193125M	927.80875M	511.619k	927.246377M	927.757996M	500k	1

Summary

Mode	Total Power (dBm)	Total Power (W)
902-928MHz	-	-
LoRa (125kHz)	20.14	0.10328

Result

Mode	Result	DG (dBi)	Total Power (dBm)	Power Limit (dBm)
LoRa (125kHz)	-	-	-	-
902.3MHz	Pass	1.50	20.14	30.00
908.5MHz	Pass	1.50	20.11	30.00
914.9MHz	Pass	1.50	20.09	30.00

DG = Directional Gain; Port X = Port X output power;
Inf = There's no restriction for the limit.

Summary

Mode	Total Power (dBm)	Total Power (W)
902-928MHz	-	-
LoRa (125kHz)	20.00	0.10000

Result

Mode	Result	DG (dBi)	Total Power (dBm)	Power Limit (dBm)
LoRa (125kHz)	-	-	-	-
902.3MHz	Pass	1.50	20.00	30.00
908.5MHz	Pass	1.50	19.99	30.00
914.9MHz	Pass	1.50	19.96	30.00

DG = Directional Gain; Port X = Port X output power;
Inf = There's no restriction for the limit.

Summary

Mode	Total Power (dBm)	Total Power (W)
902-928MHz	-	-
LoRa (500kHz)	20.10	0.10233

Result

Mode	Result	DG (dBi)	Total Power (dBm)	Power Limit (dBm)
LoRa (500kHz)	-	-	-	-
923.3MHz	Pass	1.50	20.10	30.00
927.5MHz	Pass	1.50	20.08	30.00

DG = Directional Gain; Port X = Port X output power;
Inf = There's no restriction for the limit.

Summary

Mode	Total Power (dBm)	Total Power (W)
902-928MHz	-	-
LoRa (500kHz)	19.88	0.09727

Result

Mode	Result	DG (dBi)	Total Power (dBm)	Power Limit (dBm)
LoRa (500kHz)	-	-	-	-
923.3MHz	Pass	1.50	19.88	30.00
927.5MHz	Pass	1.50	19.72	30.00

DG = Directional Gain; Port X = Port X output power;
Inf = There's no restriction for the limit.

Summary

Mode	PD (dBm/RBW)
902-928MHz	-
LoRa (500kHz)	6.88

RBW = 3kHz;

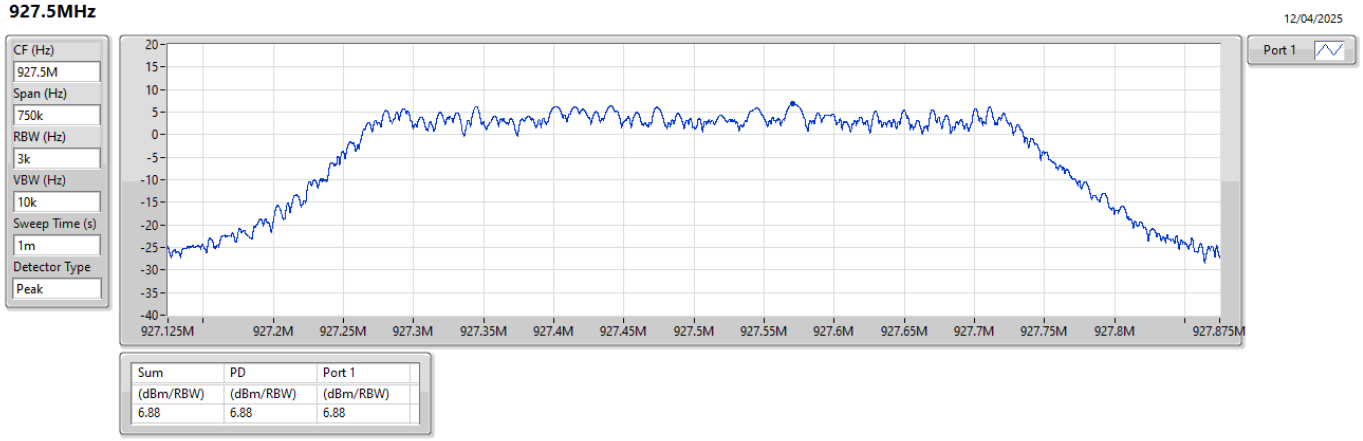
Result

Mode	Result	DG (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
LoRa (500kHz)	-	-	-	-
923.3MHz	Pass	1.50	6.22	8.00
927.5MHz	Pass	1.50	6.88	8.00

DG = Directional Gain; RBW = 3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;
Inf = There's no restriction for the limit.

902-928MHz_LoRa (500kHz) PSD

927.5MHz



Summary

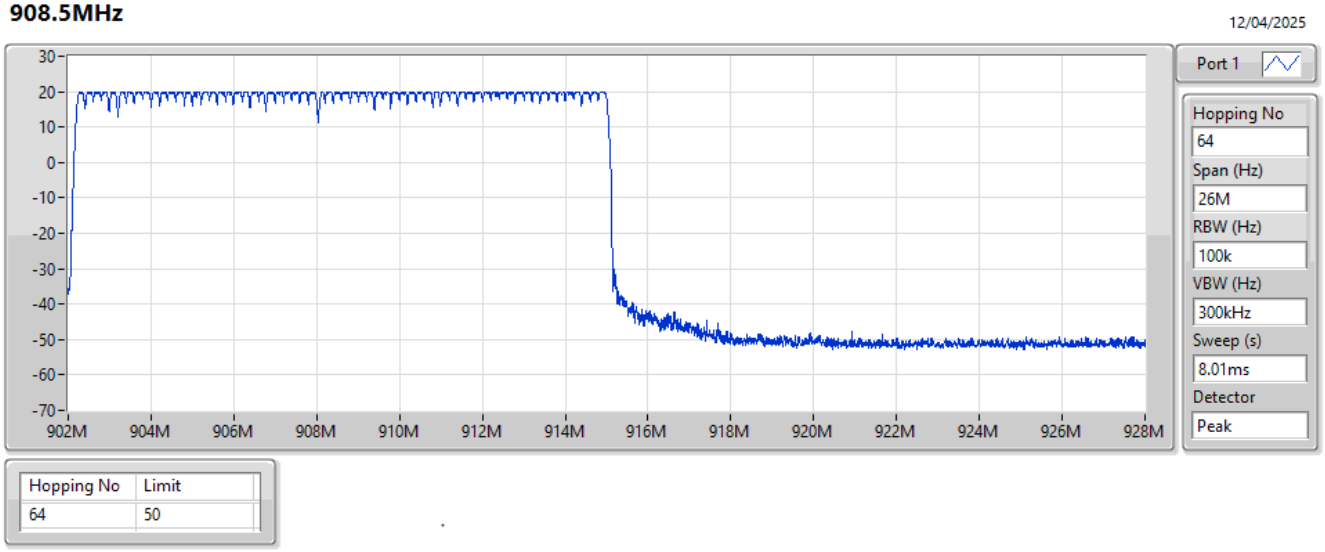
Mode 902-928MHz	Max-Hop No -
LoRa (125kHz)	64

Result

Mode LoRa (125kHz)	Result -	Hopping No -	Limit -
908.5MHz	Pass	64	50

902-928MHz_LoRa (125kHz) **Hopping-FS**

908.5MHz

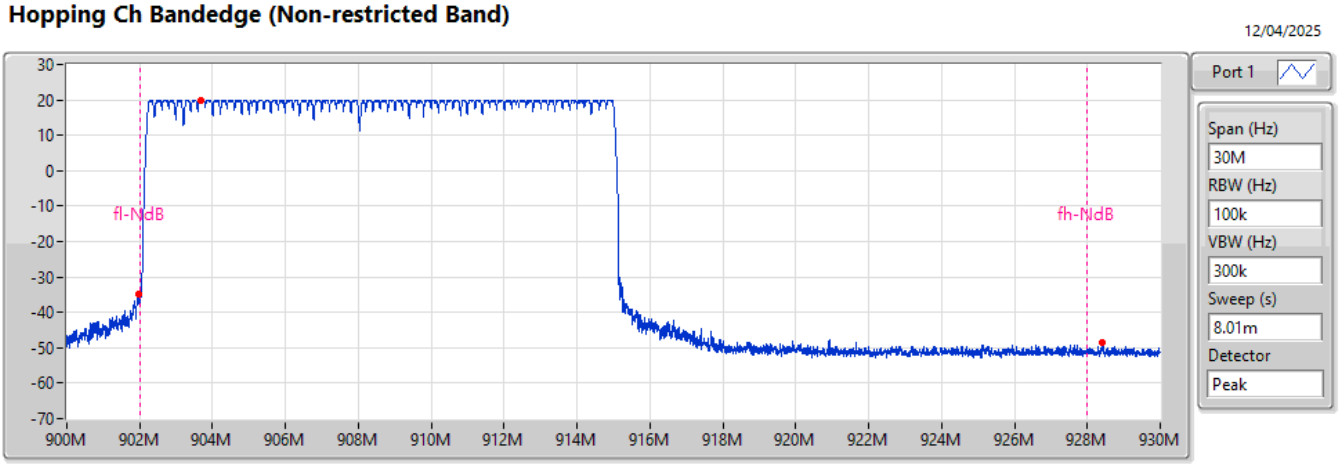


Hopping No	Limit
64	50

902-928MHz_LoRa (125kHz)

908.5MHz

Hopping Ch Bandedge (Non-restricted Band)



Limit(dBm)	Ref(Hz)	Ref(dBm)	BE-l(Hz)	BE-l(dBm)	BE-h(Hz)	BE-h(dBm)
-0.24	903.67125M	19.76	901.95375M	-34.92	928.425M	-48.59

Summary

Mode	Dwell (s)
902-928MHz	-
LoRa (125kHz)	53.59375m

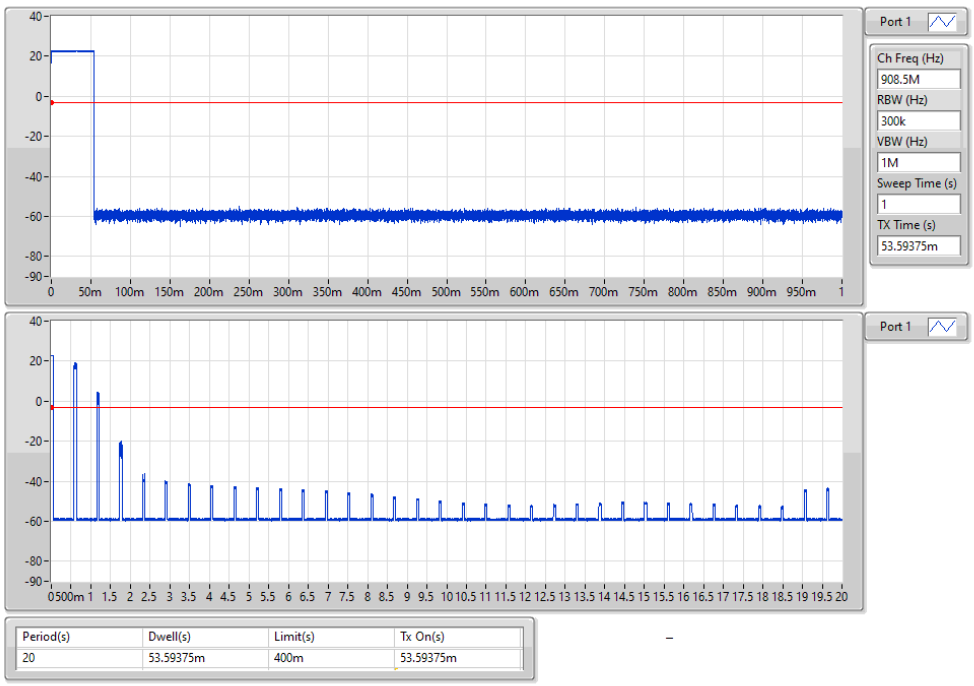
Result

Mode	Result	Period (s)	Dwell (s)	Limit (s)	Tx On (s)
LoRa (125kHz)	-	-	-	-	-
908.5MHz	Pass	20	53.59375m	400m	53.59375m

902-928MHz_LoRa (125kHz) **Dwell-FS**

908.5MHz

14/04/2025



Period(s)	Dwell(s)	Limit(s)	Tx On(s)
20	53.59375m	400m	53.59375m

Summary

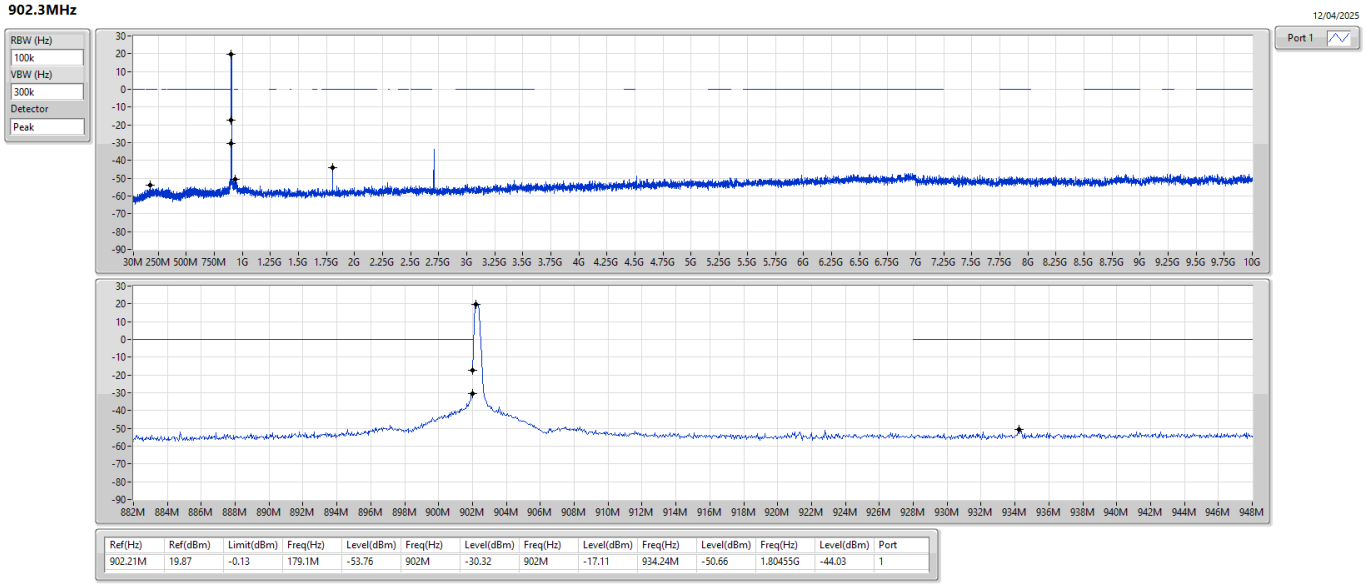
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
902-928MHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LoRa (125kHz)	Pass	902.21M	19.87	-0.13	179.1M	-53.76	902M	-30.32	902M	-17.11	934.24M	-50.66	1.80455G	-44.03	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)	Freq (Hz)	Level (dBm)	Port
LoRa (125kHz)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
902.3MHz	Pass	902.21M	19.87	-0.13	179.1M	-53.76	902M	-30.32	902M	-17.11	934.24M	-50.66	1.80455G	-44.03	1
908.5MHz	Pass	908.45M	19.83	-0.17	876.89M	-54.18	901.92M	-51.95	902M	-52.41	940.52M	-51.01	1.81699G	-43.96	1
914.9MHz	Pass	914.84M	19.79	-0.21	483.69M	-54.35	882.84M	-52.85	928M	-55.12	946.92M	-50.67	1.82944G	-44.23	1

902-928MHz_LoRa (125kHz) CSENdB-FS

902.3MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
902.21M	19.87	-0.13	179.1M	-53.76	902M	-30.32	902M	-17.11	934.24M	-50.66	1.80455G	-44.03	1

Summary

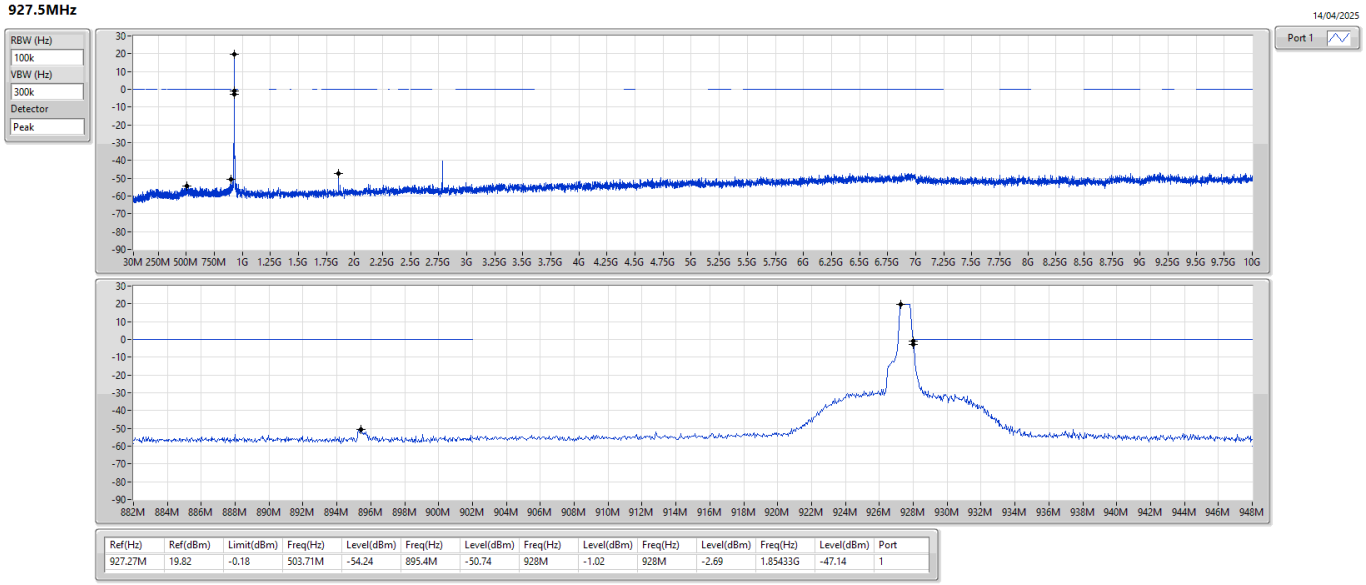
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
902-928MHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LoRa (500kHz)	Pass	927.27M	19.82	-0.18	503.71M	-54.24	895.4M	-50.74	928M	-1.02	928M	-2.69	1.85433G	-47.14	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)	Freq (Hz)	Level (dBm)	Port
LoRa (500kHz)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
923.3MHz	Pass	923.11M	19.85	-0.15	539.92M	-54.11	891.2M	-51.05	928M	-36.35	928.2M	-35.88	1.84641G	-44.46	1
927.5MHz	Pass	927.27M	19.82	-0.18	503.71M	-54.24	895.4M	-50.74	928M	-1.02	928M	-2.69	1.85433G	-47.14	1

902-928MHz_LoRa (500kHz) CSENdB-DTS

927.5MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
927.27M	19.82	-0.18	503.71M	-54.24	895.4M	-50.74	928M	-1.02	928M	-2.69	1.85433G	-47.14	1

Summary

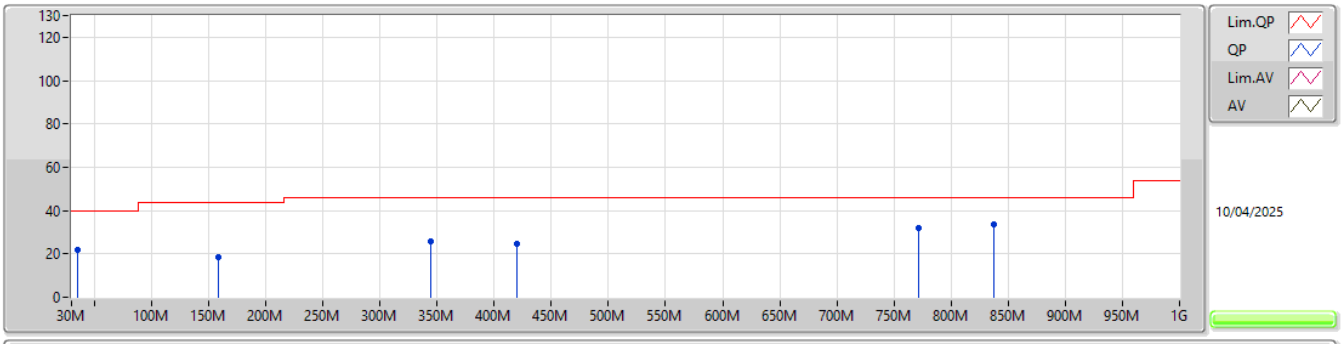
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
902-928MHz	-	-	-	-	-	-	-	-	-	-
LoRa (125kHz)	Pass	PK	870.02M	41.99	46.00	-4.01	3	Horizontal	0	1.00

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)
LoRa (125kHz)	-	-	-	-	-	-	-	-	-
902.3MHz_TX	Pass	PK	35.82M	21.70	40.00	-18.30	3	Vertical	360
902.3MHz_TX	Pass	PK	158.04M	18.27	43.50	-25.23	3	Vertical	360
902.3MHz_TX	Pass	PK	344.28M	26.01	46.00	-19.99	3	Vertical	360
902.3MHz_TX	Pass	PK	419.94M	24.41	46.00	-21.59	3	Vertical	360
902.3MHz_TX	Pass	PK	771.08M	31.91	46.00	-14.09	3	Vertical	360
902.3MHz_TX	Pass	PK	837.04M	33.73	46.00	-12.27	3	Vertical	360
902.3MHz_TX	Pass	PK	31.94M	20.13	40.00	-19.87	3	Horizontal	0
902.3MHz_TX	Pass	PK	227.88M	19.71	46.00	-26.29	3	Horizontal	0
902.3MHz_TX	Pass	PK	346.22M	36.79	46.00	-9.21	3	Horizontal	0
902.3MHz_TX	Pass	PK	654.68M	26.56	46.00	-19.44	3	Horizontal	0
902.3MHz_TX	Pass	PK	840.92M	40.44	46.00	-5.56	3	Horizontal	0
902.3MHz_TX	Pass	PK	870.02M	41.99	46.00	-4.01	3	Horizontal	0

902-928MHz_LoRa (125kHz)

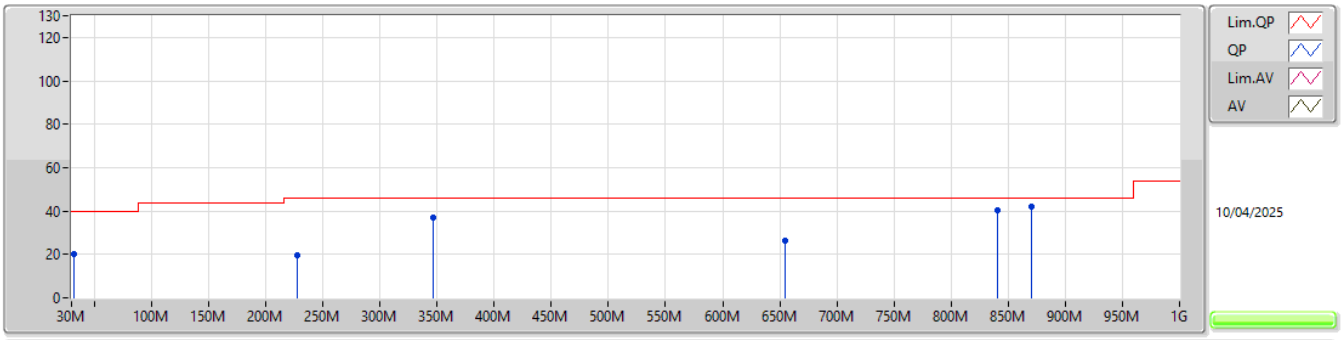
902.3MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)
PK	35.82M	21.70	40.00	-18.30	-15.92	3	Vertical	360	1.00	37.62	20.56	0.68	37.16
PK	158.04M	18.27	43.50	-25.23	-19.33	3	Vertical	360	1.00	37.60	15.63	1.43	36.39
PK	344.28M	26.01	46.00	-19.99	-14.92	3	Vertical	360	1.00	40.93	19.30	2.24	36.46
PK	419.94M	24.41	46.00	-21.59	-12.74	3	Vertical	360	1.00	37.15	21.43	2.47	36.64
PK	771.08M	31.91	46.00	-14.09	-6.65	3	Vertical	360	1.00	38.56	27.23	3.54	37.42
PK	837.04M	33.73	46.00	-12.27	-5.74	3	Vertical	360	1.00	39.47	27.98	3.74	37.46

902-928MHz_LoRa (125kHz)

902.3MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)
PK	31.94M	20.13	40.00	-19.87	-14.06	3	Horizontal	0	1.00	34.19	22.53	0.63	37.22
PK	227.88M	19.71	46.00	-26.29	-19.43	3	Horizontal	0	1.00	39.14	15.05	1.77	36.25
PK	346.22M	36.79	46.00	-9.21	-14.83	3	Horizontal	0	1.00	51.62	19.39	2.25	36.47
PK	654.68M	26.56	46.00	-19.44	-8.76	3	Horizontal	0	1.00	35.32	25.27	3.22	37.25
PK	840.92M	40.44	46.00	-5.56	-5.61	3	Horizontal	0	1.00	46.05	28.09	3.75	37.45
PK	870.02M	41.99	46.00	-4.01	-5.73	3	Horizontal	0	1.00	47.72	27.89	3.83	37.45

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
902-928MHz	-	-	-	-	-	-	-	-	-	-
LoRa (125kHz)	Pass	AV	5.451G	52.55	54.00	-1.45	3	Vertical	193	1.50
LoRa (500kHz)	Pass	AV	8.34655G	43.53	54.00	-10.47	3	Vertical	320	2.22

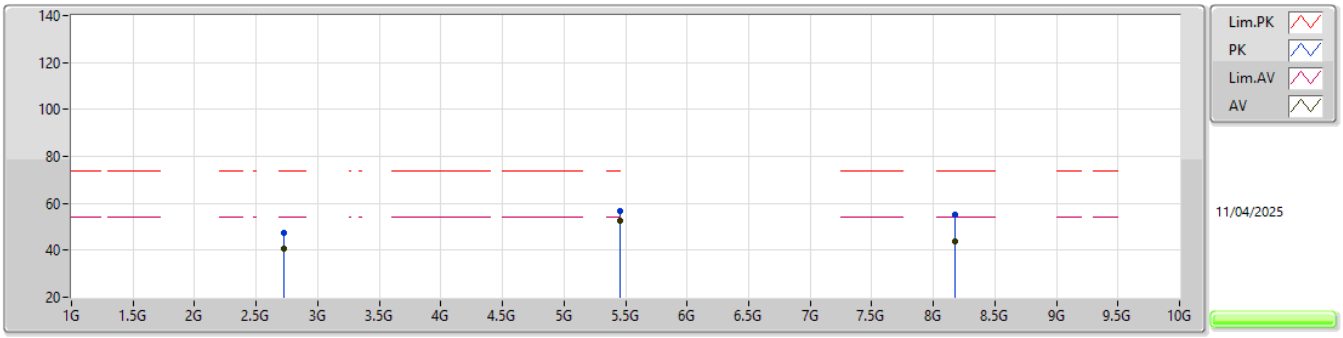
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
LoRa (125kHz)	-	-	-	-	-	-	-	-	-	-
902.3MHz_TX	Pass	AV	2.7069G	37.81	54.00	-16.19	3	Vertical	237	1.50
902.3MHz_TX	Pass	AV	5.41378G	52.28	54.00	-1.72	3	Vertical	193	1.25
902.3MHz_TX	Pass	AV	8.12084G	42.25	54.00	-11.75	3	Vertical	327	1.00
902.3MHz_TX	Pass	PK	2.70676G	46.24	74.00	-27.76	3	Vertical	237	1.50
902.3MHz_TX	Pass	PK	5.41398G	56.66	74.00	-17.34	3	Vertical	193	1.25
902.3MHz_TX	Pass	PK	8.12035G	54.74	74.00	-19.26	3	Vertical	327	1.00
902.3MHz_TX	Pass	AV	2.70699G	38.65	54.00	-15.35	3	Horizontal	343	1.50
902.3MHz_TX	Pass	AV	5.41378G	46.91	54.00	-7.09	3	Horizontal	308	1.00
902.3MHz_TX	Pass	AV	8.12054G	41.11	54.00	-12.89	3	Horizontal	261	1.30
902.3MHz_TX	Pass	PK	2.70696G	46.76	74.00	-27.24	3	Horizontal	343	1.50
902.3MHz_TX	Pass	PK	5.41399G	53.60	74.00	-20.40	3	Horizontal	308	1.00
902.3MHz_TX	Pass	PK	8.12042G	54.82	74.00	-19.18	3	Horizontal	261	1.30
908.5MHz_TX	Pass	AV	2.72539G	40.63	54.00	-13.37	3	Vertical	110	2.68
908.5MHz_TX	Pass	AV	5.451G	52.55	54.00	-1.45	3	Vertical	193	1.50
908.5MHz_TX	Pass	AV	8.17648G	43.57	54.00	-10.43	3	Vertical	318	2.23
908.5MHz_TX	Pass	PK	2.72557G	47.46	74.00	-26.54	3	Vertical	110	2.68
908.5MHz_TX	Pass	PK	5.45084G	56.64	74.00	-17.36	3	Vertical	193	1.50
908.5MHz_TX	Pass	PK	8.17687G	55.22	74.00	-18.78	3	Vertical	318	2.23
908.5MHz_TX	Pass	AV	2.72548G	37.04	54.00	-16.96	3	Horizontal	341	1.50
908.5MHz_TX	Pass	AV	5.45097G	46.00	54.00	-8.00	3	Horizontal	207	1.31
908.5MHz_TX	Pass	AV	8.17637G	42.04	54.00	-11.96	3	Horizontal	278	1.14
908.5MHz_TX	Pass	PK	2.72542G	46.01	74.00	-27.99	3	Horizontal	341	1.50
908.5MHz_TX	Pass	PK	5.45134G	52.72	74.00	-21.28	3	Horizontal	207	1.31
908.5MHz_TX	Pass	PK	8.1759G	54.49	74.00	-19.51	3	Horizontal	278	1.14
914.9MHz_TX	Pass	AV	2.74467G	38.28	54.00	-15.72	3	Vertical	103	2.65
914.9MHz_TX	Pass	AV	8.23409G	44.83	54.00	-9.17	3	Vertical	324	2.29
914.9MHz_TX	Pass	PK	2.74466G	46.30	74.00	-27.70	3	Vertical	103	2.65
914.9MHz_TX	Pass	PK	8.2338G	55.84	74.00	-18.16	3	Vertical	324	2.29
914.9MHz_TX	Pass	AV	2.74466G	34.46	54.00	-19.54	3	Horizontal	349	1.50
914.9MHz_TX	Pass	AV	8.23407G	42.11	54.00	-11.89	3	Horizontal	200	1.00
914.9MHz_TX	Pass	PK	2.74465G	45.22	74.00	-28.78	3	Horizontal	349	1.50
914.9MHz_TX	Pass	PK	8.23368G	54.18	74.00	-19.82	3	Horizontal	200	1.00
LoRa (500kHz)	-	-	-	-	-	-	-	-	-	-
923.3MHz_TX	Pass	AV	2.76972G	32.31	54.00	-21.69	3	Vertical	108	2.93
923.3MHz_TX	Pass	AV	8.31027G	42.54	54.00	-11.46	3	Vertical	317	2.18
923.3MHz_TX	Pass	PK	2.77041G	44.68	74.00	-29.32	3	Vertical	108	2.93
923.3MHz_TX	Pass	PK	8.30893G	55.93	74.00	-18.07	3	Vertical	317	2.18
923.3MHz_TX	Pass	AV	2.76915G	30.40	54.00	-23.60	3	Horizontal	348	1.50
923.3MHz_TX	Pass	AV	8.30895G	41.83	54.00	-12.17	3	Horizontal	277	2.15
923.3MHz_TX	Pass	PK	2.77026G	43.79	74.00	-30.21	3	Horizontal	348	1.50
923.3MHz_TX	Pass	PK	8.30892G	53.89	74.00	-20.11	3	Horizontal	277	2.15
927.5MHz_TX	Pass	AV	2.78238G	30.88	54.00	-23.12	3	Vertical	110	2.79
927.5MHz_TX	Pass	AV	8.34655G	43.53	54.00	-10.47	3	Vertical	320	2.22
927.5MHz_TX	Pass	PK	2.78273G	43.64	74.00	-30.36	3	Vertical	110	2.79

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
927.5MHz_TX	Pass	PK	8.3474G	57.45	74.00	-16.55	3	Vertical	320	2.22
927.5MHz_TX	Pass	AV	2.7835G	29.85	54.00	-24.15	3	Horizontal	138	1.50
927.5MHz_TX	Pass	AV	8.3479G	40.77	54.00	-13.23	3	Horizontal	274	1.13
927.5MHz_TX	Pass	PK	2.782G	43.41	74.00	-30.59	3	Horizontal	138	1.50
927.5MHz_TX	Pass	PK	8.34752G	54.57	74.00	-19.43	3	Horizontal	274	1.13

902-928MHz_LoRa (125kHz)

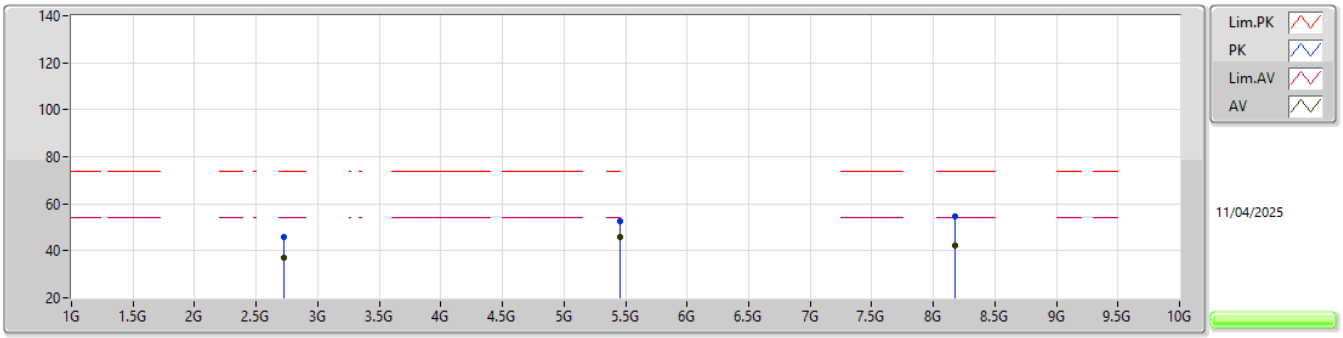
908.5MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)
AV	2.72539G	40.63	54.00	-13.37	-1.03	3	Vertical	110	2.68	41.66	28.35	6.12	35.50
AV	5.451G	52.55	54.00	-1.45	5.37	3	Vertical	193	1.50	47.18	32.70	8.07	35.40
AV	8.17648G	43.57	54.00	-10.43	10.67	3	Vertical	318	2.23	32.90	36.75	9.41	35.49
PK	2.72557G	47.46	74.00	-26.54	-1.04	3	Vertical	110	2.68	48.50	28.34	6.12	35.50
PK	5.45084G	56.64	74.00	-17.36	5.37	3	Vertical	193	1.50	51.27	32.70	8.07	35.40
PK	8.17687G	55.22	74.00	-18.78	10.67	3	Vertical	318	2.23	44.55	36.75	9.41	35.49

902-928MHz_LoRa (125kHz)

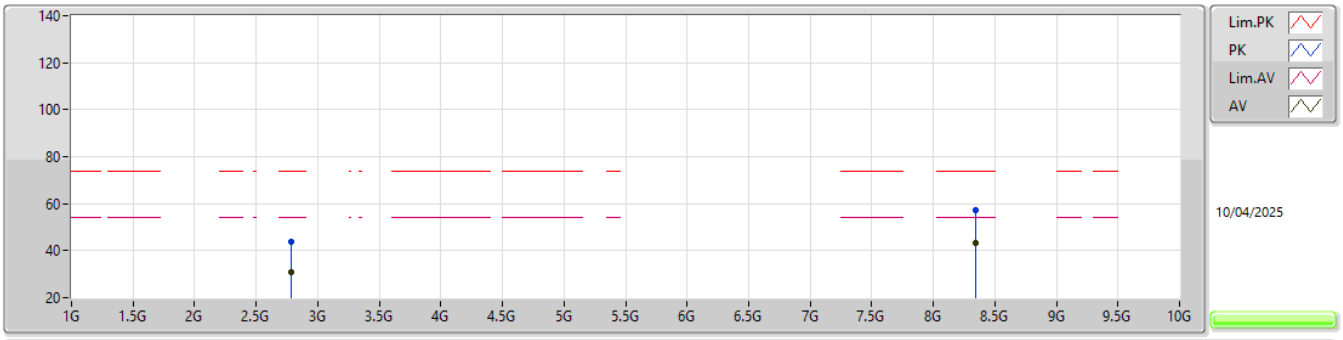
908.5MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)
AV	2.72548G	37.04	54.00	-16.96	-1.03	3	Horizontal	341	1.50	38.07	28.35	6.12	35.50
AV	5.45097G	46.00	54.00	-8.00	5.37	3	Horizontal	207	1.31	40.63	32.70	8.07	35.40
AV	8.17637G	42.04	54.00	-11.96	10.67	3	Horizontal	278	1.14	31.37	36.75	9.41	35.49
PK	2.72542G	46.01	74.00	-27.99	-1.03	3	Horizontal	341	1.50	47.04	28.35	6.12	35.50
PK	5.45134G	52.72	74.00	-21.28	5.37	3	Horizontal	207	1.31	47.35	32.70	8.07	35.40
PK	8.1759G	54.49	74.00	-19.51	10.67	3	Horizontal	278	1.14	43.82	36.75	9.41	35.49

902-928MHz_LoRa (500kHz)

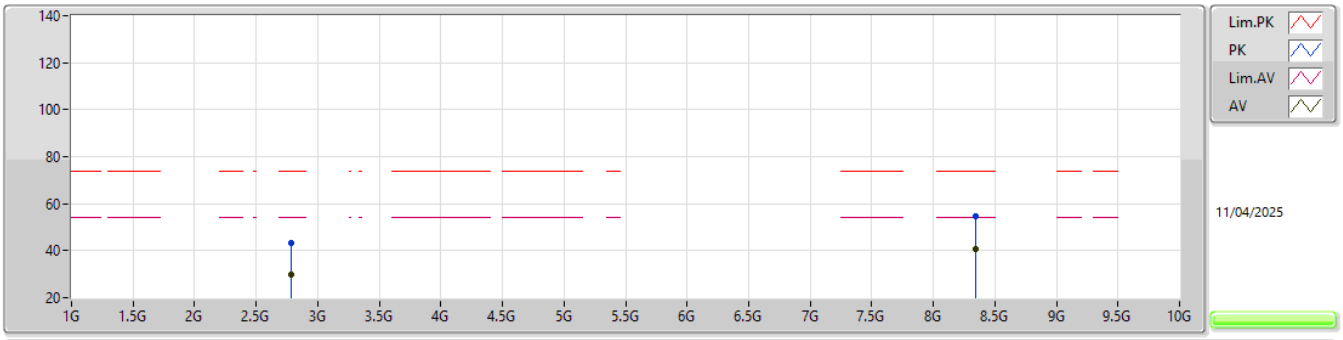
927.5MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)
AV	2.78238G	30.88	54.00	-23.12	-0.99	3	Vertical	110	2.79	31.87	28.32	6.20	35.51
AV	8.34655G	43.53	54.00	-10.47	10.79	3	Vertical	320	2.22	32.74	36.79	9.64	35.64
PK	2.78273G	43.64	74.00	-30.36	-0.98	3	Vertical	110	2.79	44.62	28.33	6.20	35.51
PK	8.3474G	57.45	74.00	-16.55	10.79	3	Vertical	320	2.22	46.66	36.79	9.64	35.64

902-928MHz_LoRa (500kHz)

927.5MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)	(dBuV)	(dB)	(dB)	(dB)
AV	2.7835G	29.85	54.00	-24.15	-0.96	3	Horizontal	138	1.50	30.81	28.34	6.21	35.51
AV	8.3479G	40.77	54.00	-13.23	10.80	3	Horizontal	274	1.13	29.97	36.80	9.64	35.64
PK	2.782G	43.41	74.00	-30.59	-0.99	3	Horizontal	138	1.50	44.40	28.32	6.20	35.51
PK	8.34752G	54.57	74.00	-19.43	10.80	3	Horizontal	274	1.13	43.77	36.80	9.64	35.64