

RF Test Report

Project Number: 5179386**Proposal: SUW-202405006470****Report Number: 5179386EMC12****Revision Level: 2****Client: Alarm.com Incorporated****Equipment Under Test: Premium Video Camera (LoRa Testing)****Model: ADC-V730****FCC ID: YL6-143V730****IC ID: 9111A-143V730****Applicable Standards: ANSI C63.10: 2013 (FCC Part 15 Subpart C, § 15.247)****Report issued on: 21 February 2025****Report Revised on: 28 February 2025****Test Result: Compliant**

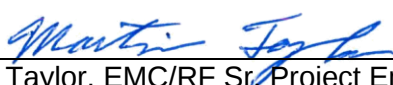
FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01

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Tested by:


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1 Summary of Test Results

Test Description	Test Specification		Test Result
Duty Cycle	ANSI C63.10	RSS-GEN	Reported
Occupied Bandwidth	15.247(a)(1)	RSS-247 5.1(a) RSS-GEN 6.7	Compliant
Peak Output Power	15.247(b)(2), (b)(3)	RSS-247 5.4(a), 5.4(d)	Compliant
Power Spectral Density	15.247(e)(f)	RSS-247 S5.2 (b)	Compliant
Conducted Spurious Emissions / Band Edge	15.247(d)	RSS-247 5.5	Compliant
Field Strength of Spurious Radiation	15.247(d), 15.35(b) 15.205, 15.209	RSS-247 5.5 RSS-GEN 8.9, 8.10	Compliant
Radiated Emissions at Band Edge / Restricted Bands	15.205, 15.209	RSS-GEN 8.9, 8.10	Compliant
Pseudo-Random Hop Sequence	15.247(a)(1)	RSS-247 5.1(a)	Compliant
Channel Separation	15.247(a)(1)	RSS-247 5.1(b)	Compliant
Number of Hopping Channels	15.247(a)(1)(iii)(h)	RSS-247 5.1(d)	Compliant
Dwell Time	15.247(a)(1)(i)(g)	RSS-247 5.1(d)	Compliant
AC Powerline Conducted Emissions	15.207	RSS-GEN 8.8	Compliant
Antenna Requirement	15.203	RSS-GEN 6.8	Compliant ⁽¹⁾

(1) The device uses a PCB trace antenna which cannot be replaced by the end user.

1.1 Modifications Required for Compliance

None

2 General Information

2.1 Client Information

Company Name: Alarm.com Incorporated
Address: 8281 Greensboro Drive, Suite 100
City, State, Zip, Country: Tysons, VA 22102, USA

2.2 Test Laboratory

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA
Type of lab: Testing Laboratory
Certificate Number: 3212.01
FCC Designation Number: US1126

2.3 General Information of EUT

Manufacturer: Premium Video Camera
Product Marketing Name (PMN): ADC-V730
Serial Number: 504074C00096 (Conducted Sample)
504074C0250 (Radiated Sample)

Type / Frequency Range: LoRa / 902 – 928 MHz
Modulation / Data Rate(s): CSS / 125kHz, 500 kHz
Antenna*:

	Frequency(MHz)	865	902	928
Ant.3	Peak Gain(dBi)	-0.4	-0.4	-0.5
	Efficiency(%)	41	43	40

Rated Voltage: 12 VDC
Test Voltage: 12 VDC

Sample Received Date: 06 August 2024
Dates of testing: 07 January 2025 through 20 February 2025

**Data was not measured; therefore, the lab is not responsible for accuracy. Data was obtained via customer, specification sheet, previous regulatory filing, or other means.*

2.4 Product Description

The EUT was running test mode firmware which allowed it to transmit on low, mid, and high channels in all necessary modulations and modes of operation. The worst-case data rates were tested. The LoRa was configured to operate at the following settings: Duty Cycle:4; Power Setting:3 for 125kHz / Duty Cycle:4; Power Setting:7 for 500kHz.

2.5 Firmware

- Firmware with >98% DC for 500kHz / >98% DC for 125 kHz (DTS)

```
/ # cat /adc/fw_version  
05005-53-g3661
```

2.6 Data Rate Analysis

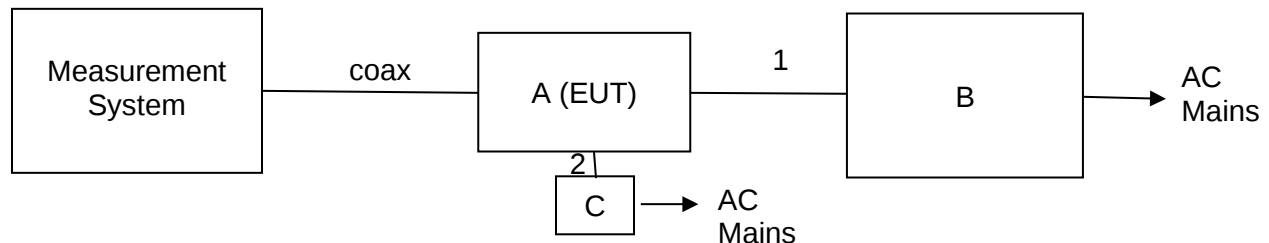
A data rate analysis was performed of the maximum output power and power spectral density measurements at mid channel on every modulation and spread factor used by the device. Final measurements were performed on the modulation families that were determined to be the worst-case.

- 500kHz data rate: 903 MHz & 914.2MHz utilized SF8. 926.9 MHz utilized SF as noted below:
- 125kHz data rate: Utilized SF noted below:

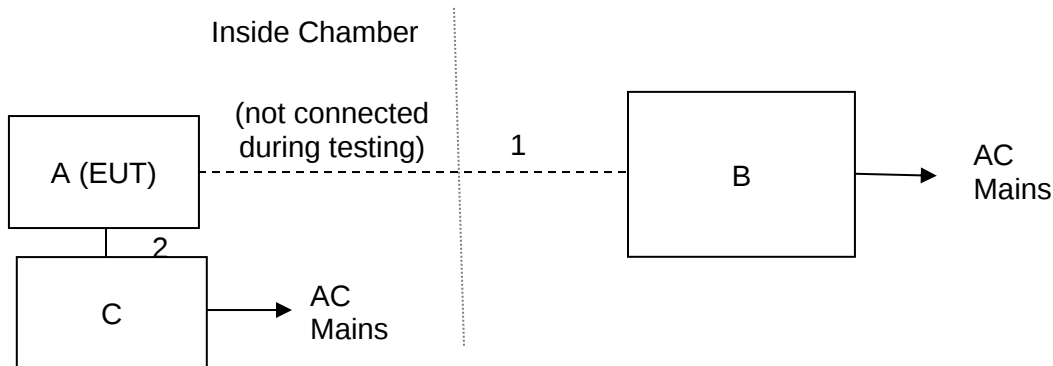
Conducted RF Tests: Spreading factor of 7 was determined to be worst-case.

Radiated Spurious Emissions Test: Spreading factor of 10 was determined to be worst-case.

2.7 EUT Connection Block Diagram – Conducted Measurements



2.8 EUT Connection Block Diagram – Radiated Measurements



2.9 System Configurations

Device Reference	Manufacturer	Description	Model Number	Serial Number
A	Alarm.com Incorporated	Premium Video Camera	V730	504074C00096 (Conducted Sample) 504074C0250 (Radiated Sample)
B	Lenovo	Laptop Computer	T440P	PB-00UTCU 14/02
C	Asian Power Devices Inc.	External AC/DC Adapter	WB-12G12FU	D3J120447000 (Conducted Sample) D3F230781700 (Radiated Sample)

2.10 Cable List

Cable reference	Port Name	Start	End	Cable Length (m)	Ferrite installed?	Shielded?
1	USB	EUT	Laptop Computer	1.0	N	N
2	DC Power Cable	EUT	External AC/DC Adapter	1.3	N	N

1 Duty Cycle

1.1 Test Result

Test Description	Test Specification		Test Result
Duty Cycle	ANSI C63.10	RSS-GEN	Reported

1.2 Test Methods

The DTS Duty Cycle measurements were performed using the procedure from ANSI C63.10 clause 11.6. Procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02 clause 6.

1.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions	Feb 4 2025	Feb 20 2025
Temperature:	22.86 °C	22.80°C
Relative Humidity:	28.3 %	19.6%
Atmospheric Pressure:	97.22 kPa	98.91 kPa

1.4 Test Equipment

Test End Date: 4-Feb-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Test End Date: 20-Feb-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025

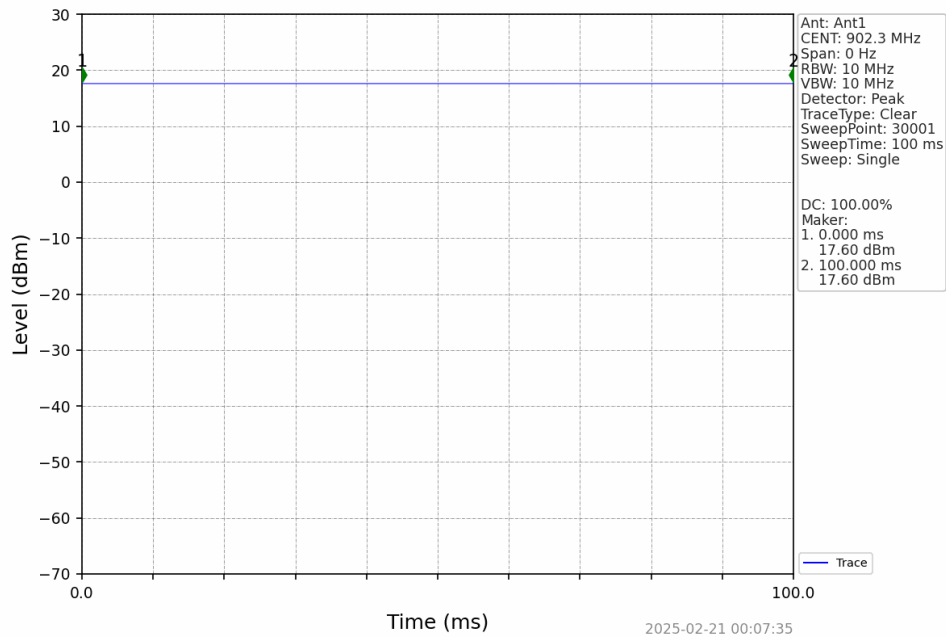
1.5 Test Data

DTS Test Mode used during testing:

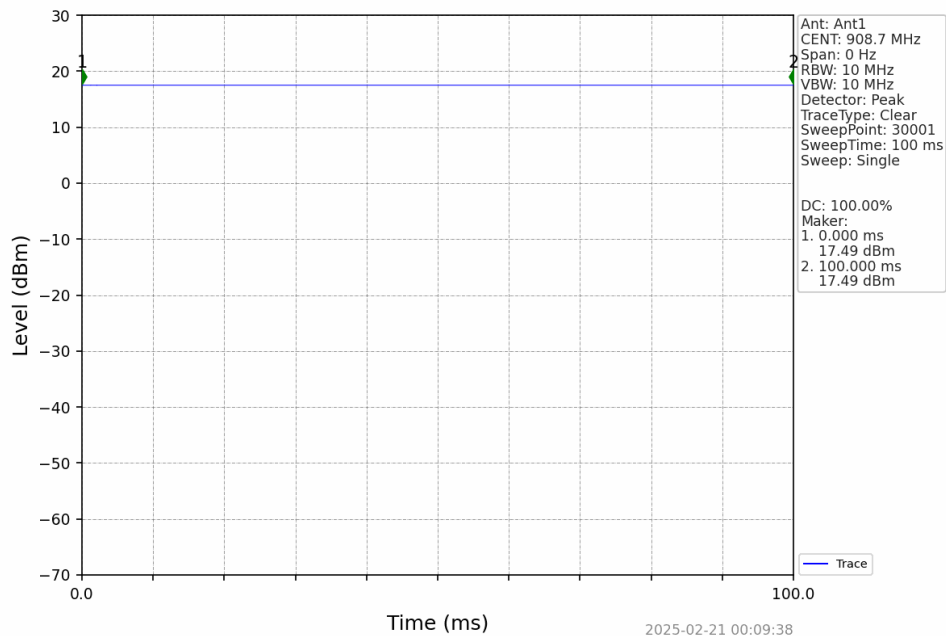
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
LoRa 125kHz BW	SISO	902.3	100.000	100.000	100.00	0.00	0.00
		908.7	100.000	100.000	100.00	0.00	0.00
		914.9	100.000	100.000	100.00	0.00	0.00
LoRa 500kHz	SISO	903	100.000	100.000	100.00	0.00	0.00
		914.2	100.000	100.000	100.00	0.00	0.00
		926.9	100.000	100.000	100.00	0.00	0.00

Note: Manufacturer stated that operational duty cycle of 500 kHz can be 100%

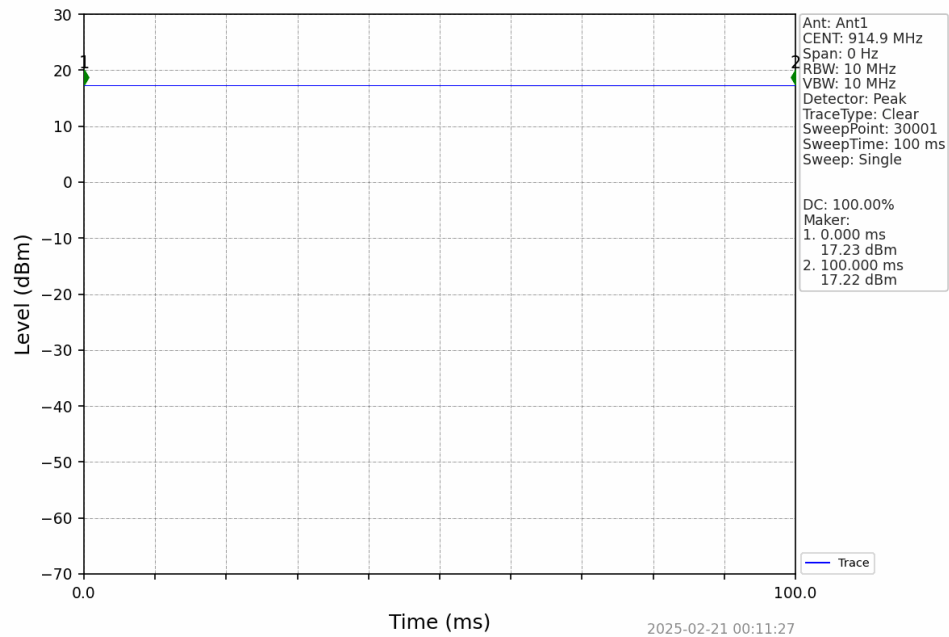
LoRa 125kHz BW_LCH_902.3MHz_Ant1_NTNV



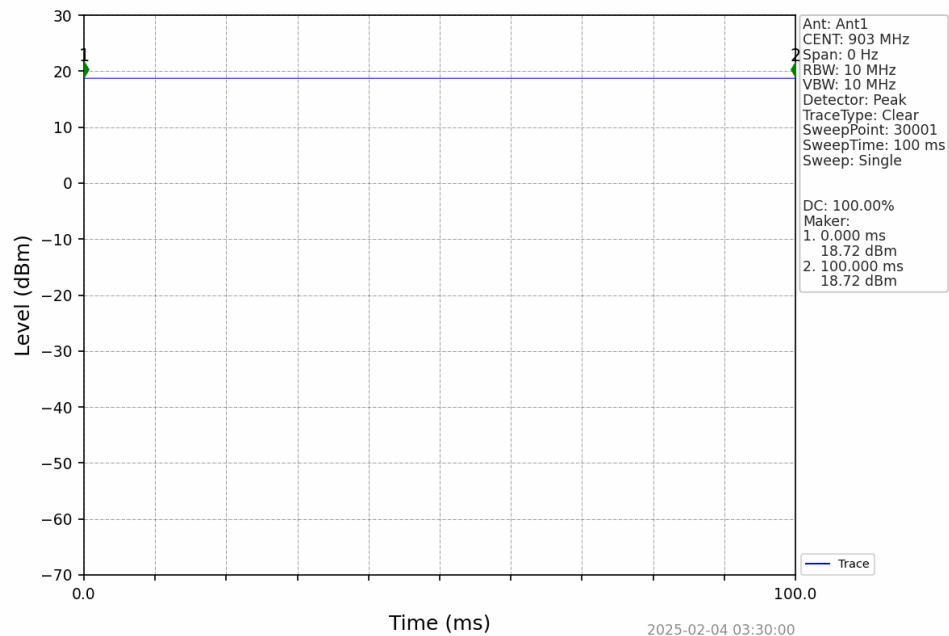
LoRa 125kHz BW_MCH_908.7MHz_Ant1_NTNV



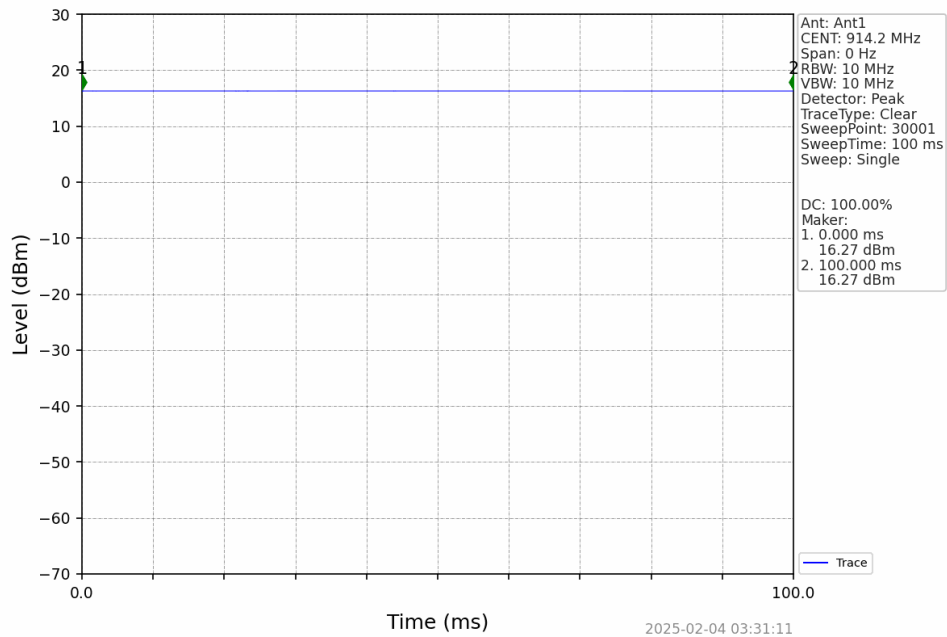
LoRa 125kHz BW_HCH_914.9MHz_Ant1_NTNV



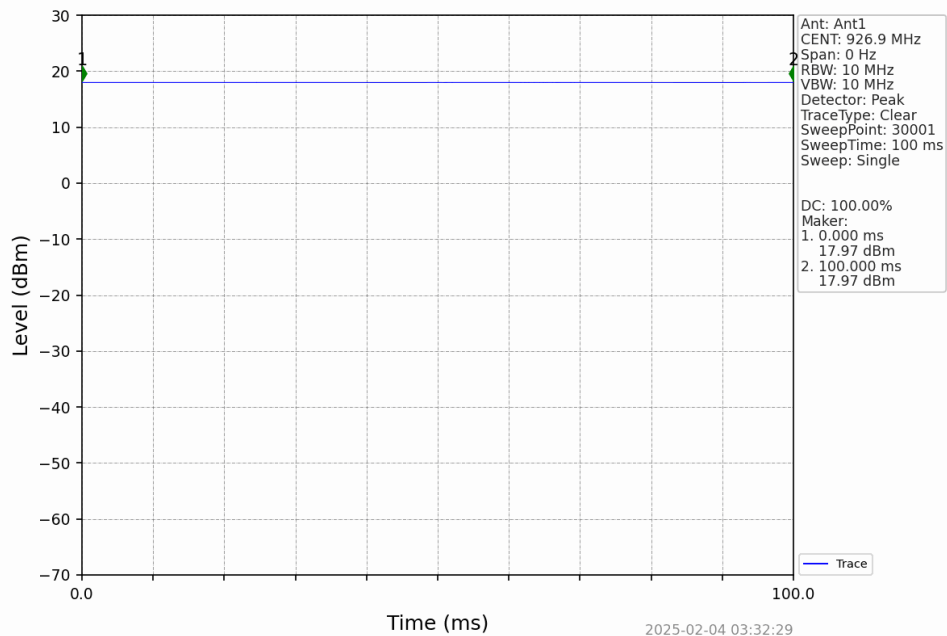
LoRa 500kHz LCH_903MHz_Ant1_NTNV



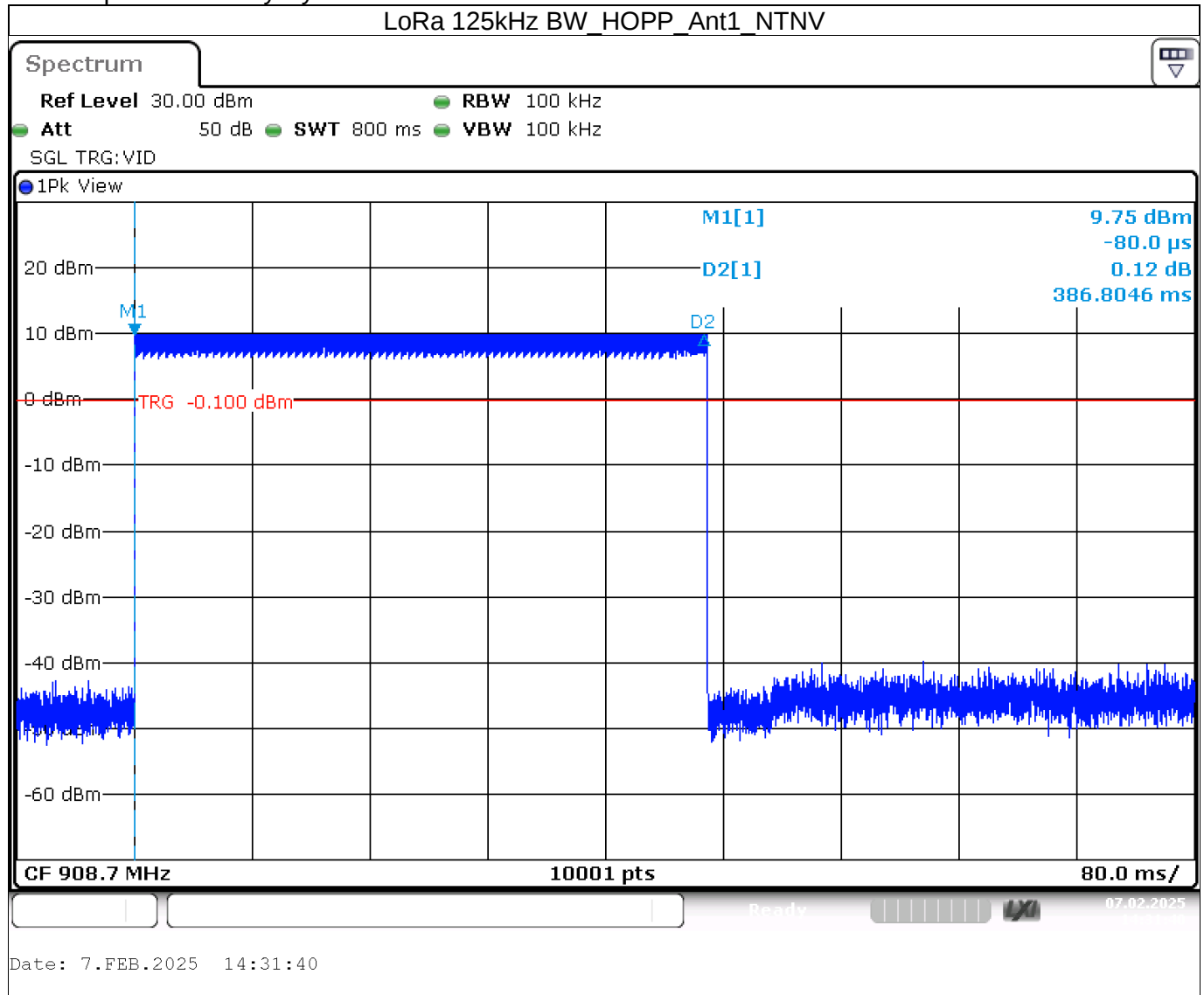
LoRa 500kHz_MCH_914.2MHz_Ant1_NTNV



LoRa 500kHz_HCH_926.9MHz_Ant1_NTNV



FHSS Operational Duty Cycle: 125 kHz



2 Occupied Bandwidth

2.1 Test Result

Test Description	Basic Standards	Test Result
6db Bandwidth 99% Bandwidth 20dB Bandwidth	ANSI C63.10:2013 15.247(a)(1) RSS-247 5.1(a) RSS-GEN 6.7	Compliant

2.2 Test Method

Occupied bandwidth measurements were taken using the methods defined in ANSI C63.10, Clause 6.9. Measurements were recorded using both 6dB OBW and 99% OBW function of the measurement receiver.

2.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions	Feb 4 2025	Feb 20 2025
Temperature:	22.86 °C	22.80°C
Relative Humidity:	28.3 %	19.6%
Atmospheric Pressure:	97.22 kPa	98.91 kPa

2.4 Test Equipment

Test End Date: 4-Feb-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Test End Date: 20-Feb-2025

Tester: SGM

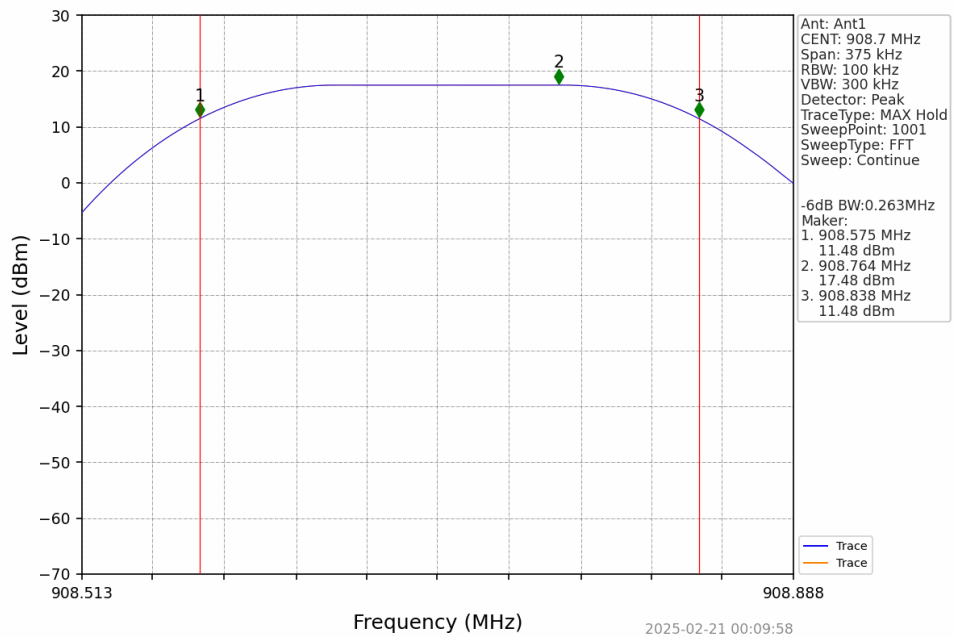
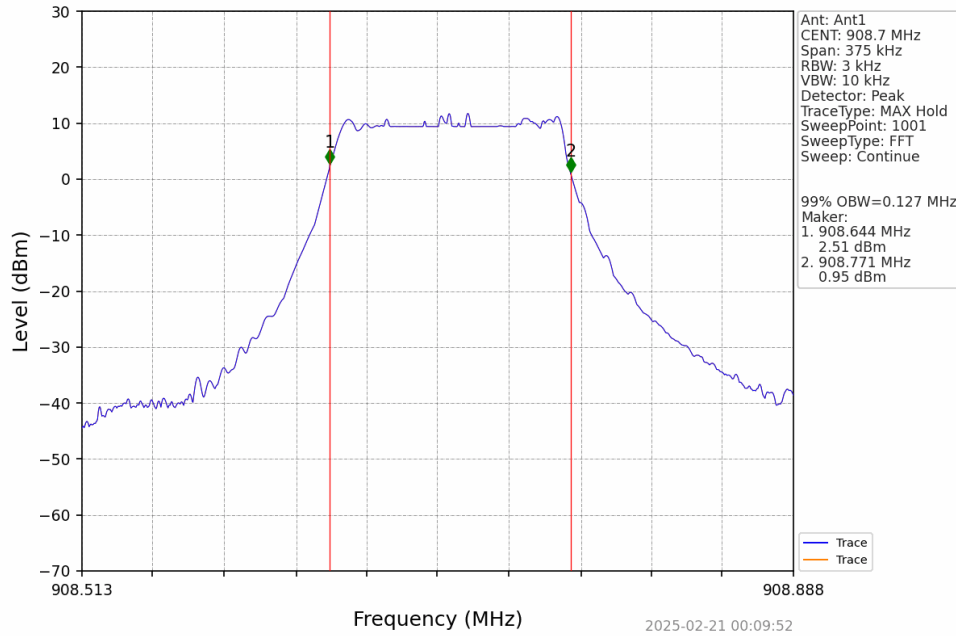
Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025

2.5 Test Data – 6dB Bandwidth / 99% Bandwidth

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
LoRa 125kHz BW	SISO	902.3	1	0.128	/	Reported
		908.7	1	0.127	/	Reported
		914.9	1	0.127	/	Reported
LoRa 500kHz	SISO	903	1	0.503	/	Reported
		914.2	1	0.502	/	Reported
		926.9	1	0.503	/	Reported

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
LoRa 125kHz BW	SISO	902.3	1	0.262	/	Reported
		908.7	1	0.263	/	Reported
		914.9	1	0.263	/	Reported
LoRa 500kHz	SISO	903	1	0.617	≥ 0.5	Pass
		914.2	1	0.616	≥ 0.5	Pass
		926.9	1	0.617	≥ 0.5	Pass

Representative Plot 125kHz BW



3 Peak Output Power

3.1 Test Result

Test Description	Test Specification	Test Result
Peak Output Power	ANSI C63.10:2013 15.247(b)(2), (b)(3) RSS-247 5.4(a), 5.4(d)	Compliant

3.2 Test Method

Output power measurements were taken using the methods defined in ANSI C63.10, Clause 7.8.5 for FHSS devices and Clause 11.9 for DTS devices.

Limit

§15.247(b)(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under [paragraph \(a\)\(1\)\(i\)](#) of this section.

§15.247(b)(3): For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions	Feb 4 2025	Feb 20 2025
Temperature:	22.86 °C	22.80°C
Relative Humidity:	28.3 %	19.6%
Atmospheric Pressure:	97.22 kPa	98.91 kPa

3.4 Test Equipment

Test End Date: 4-Feb-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Test End Date: 20-Feb-2025

Tester: SGM

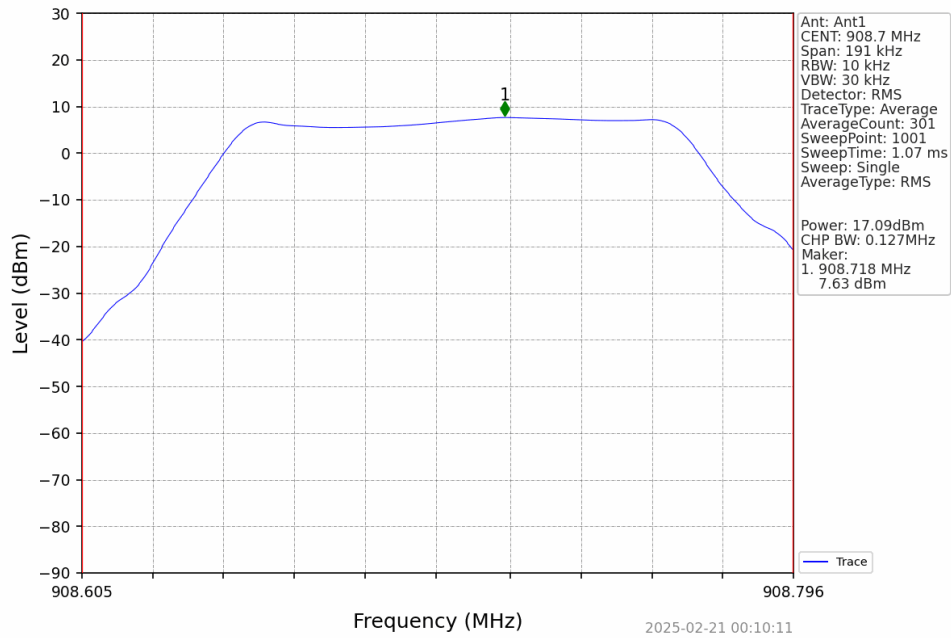
Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025

3.5 Test Data

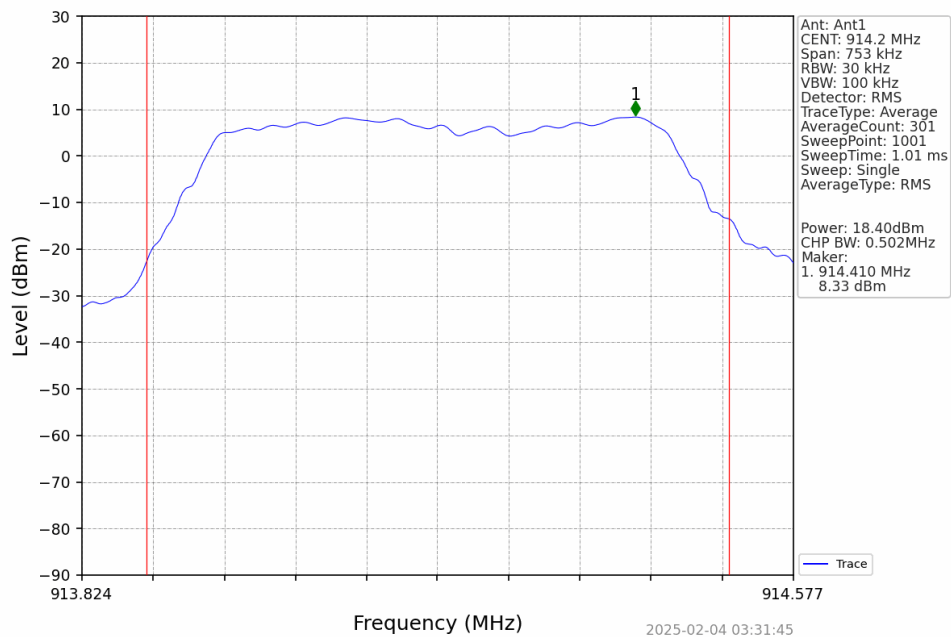
Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
LoRa 125kHz BW	SISO	902.3	17.38	<=30	Pass
		908.7	17.09	<=30	Pass
		914.9	17.17	<=30	Pass
LoRa 500kHz	SISO	903	18.48	<=30	Pass
		914.2	18.40	<=30	Pass
		926.9	17.61	<=30	Pass
Note1: Antenna Gain: Ant1: 0.10dBi;					

Representative Plot

125 kHz BW



500 kHz BW



4 Power Spectral Density

4.1 Test Result

Test Description	Test Specification		Test Result
Power Spectral Density	15.247(e)(f)	RSS-247 S5.2 (b)	Compliant

4.2 Test Method

Peak power spectral density measurements were performed using the procedures from ANSI C63.10, Clause 11.10.2. Alternatively, the Average power spectral density measurement may also be performed using the procedures from ANSI C63.10, Clause 11.10.3 through Clause 11.10.8. These procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

The LoRa 125kHz & 500 kHz modulation was used for this test.

Limit

The maximum limit is 8 dBm / 3 kHz.

4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions	Feb 4 2025	Feb 20 2025
Temperature:	22.86 °C	22.80°C
Relative Humidity:	28.3 %	19.6%
Atmospheric Pressure:	97.22 kPa	98.91 kPa

4.4 Test Equipment

Test End Date: 4-Feb-2025

Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Test End Date: 20-Feb-2025

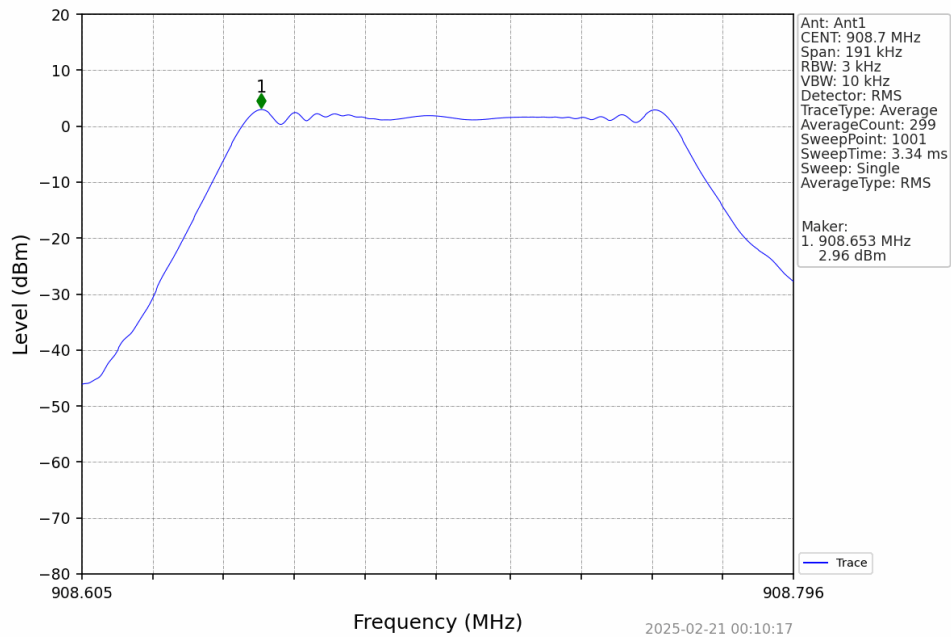
Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025

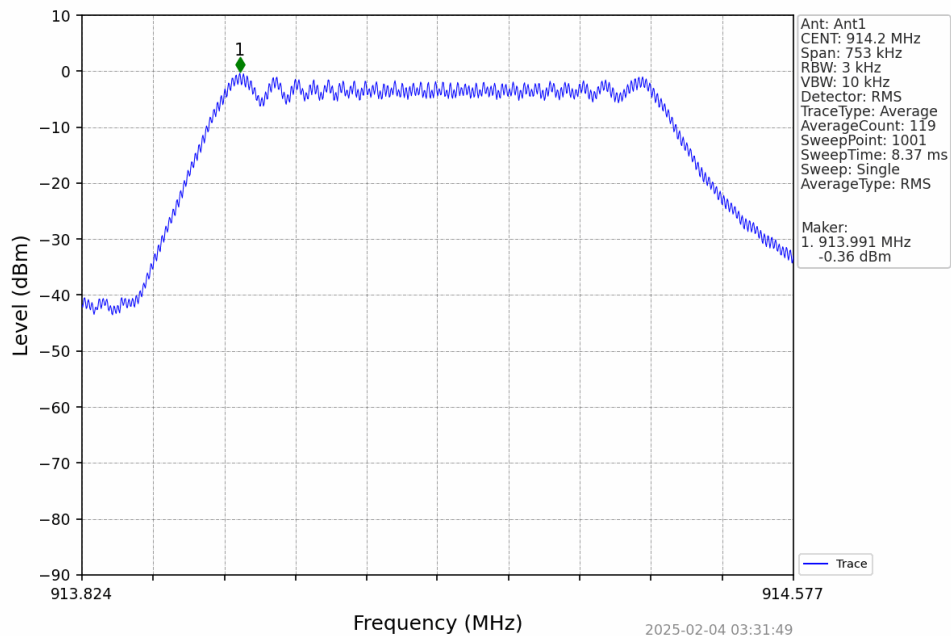
4.5 Test Data

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
LoRa 125kHz BW	SISO	902.3	3.41	<=8	Pass
		908.7	2.96	<=8	Pass
		914.9	2.87	<=8	Pass
LoRa 500kHz	SISO	903	-0.26	<=8	Pass
		914.2	-0.36	<=8	Pass
		926.9	-1.07	<=8	Pass
Note1: Antenna Gain: Ant1: 0.10dBi:					

LoRa 125kHz BW_MCH_908.7MHz_Ant1_NTNV



LoRa 500kHz MCH_914.2MHz_Ant1_NTNV



5 Conducted Spurious Emissions / Band Edge

5.1 Test Result

Test Description	Test Specification	Test Result
Conducted Spurious and Band Edge Emissions	ANSI C63.10:2013 15.247(d) RSS-247 5.5	Compliant

5.2 Test Method

Conducted spurious emissions measurements were taken using the methods defined in ANSI C63.10, Clauses 5.5, 5.6, & 6.7. Authorized band edge measurements were recorded using the methods in clause 6.10.4. 125 kHz & 500 kHz LoRa modulation types were used for spurious measurements. Band edge measurements were also recorded using each modulation.

The limit is 20 dB below the measured peak power or 30 dB below the measured average power.

5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions	Feb 4 2025	Feb 20 2025
Temperature:	22.86 °C	22.80°C
Relative Humidity:	28.3 %	19.6%
Atmospheric Pressure:	97.22 kPa	98.91 kPa

5.4 Test Equipment

Test End Date: 4-Feb-2025

Tester: SGM

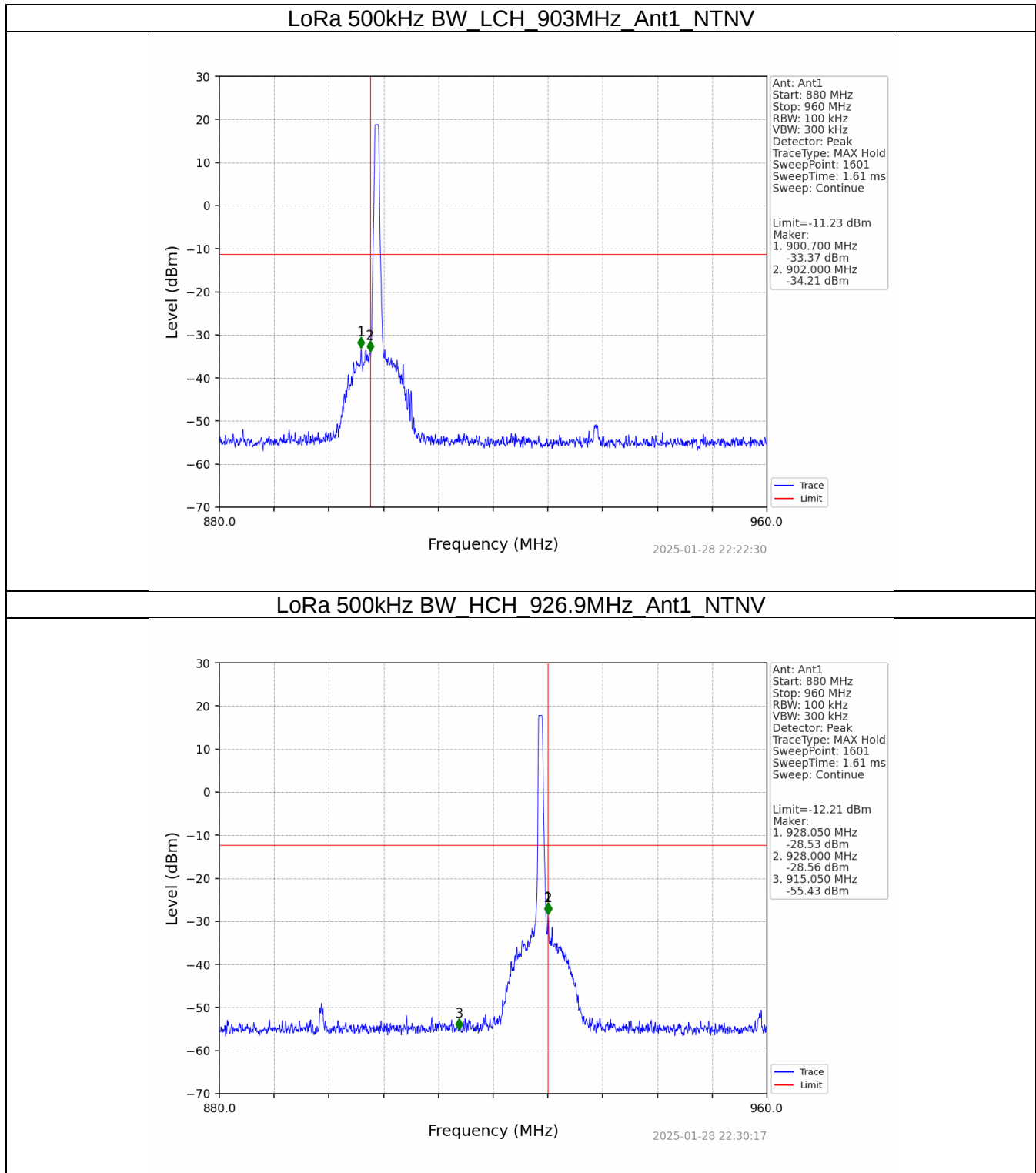
Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

Test End Date: 20-Feb-2025

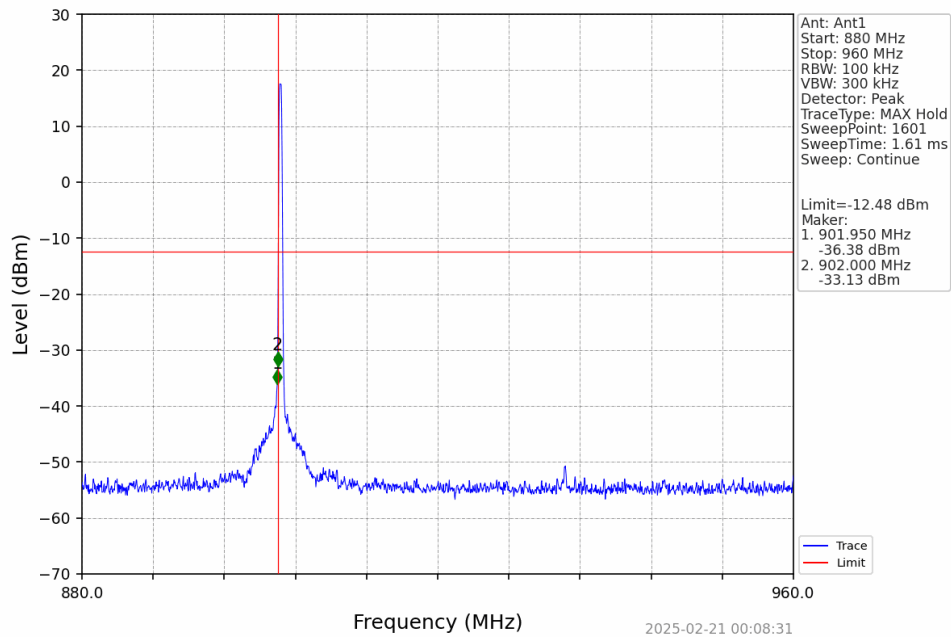
Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20109	20-Mar-2024	20-Mar-2025

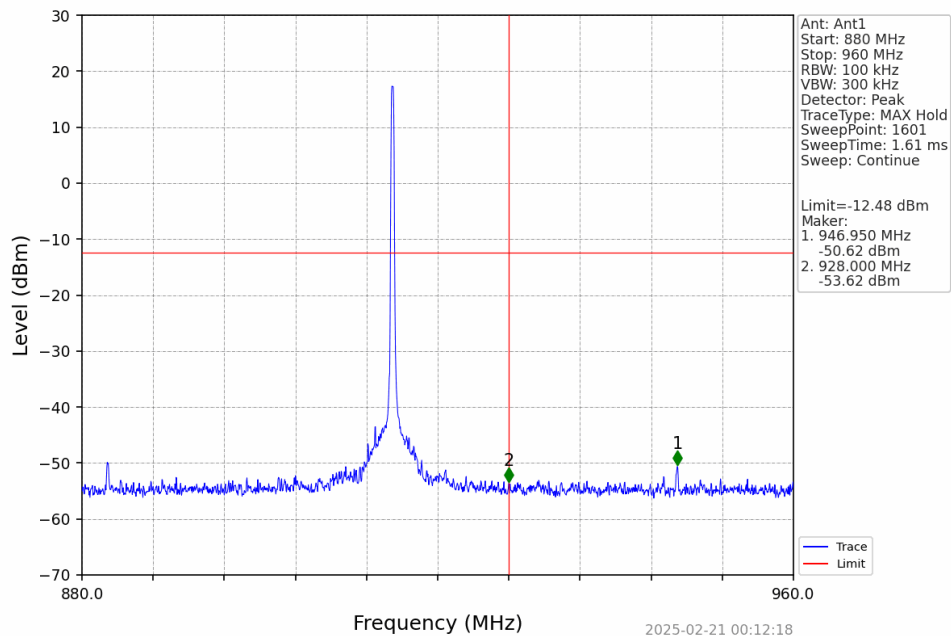
5.5 Test Data - Band Edge - Conducted Spurious Emissions



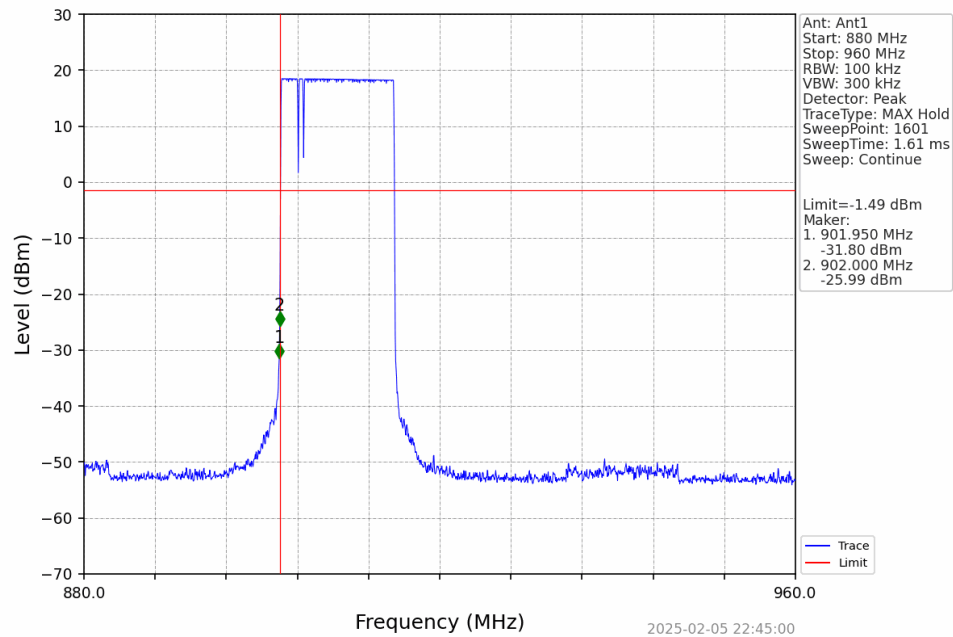
LoRa 125kHz BW_LCH_902.3MHz_Ant1_NTNV



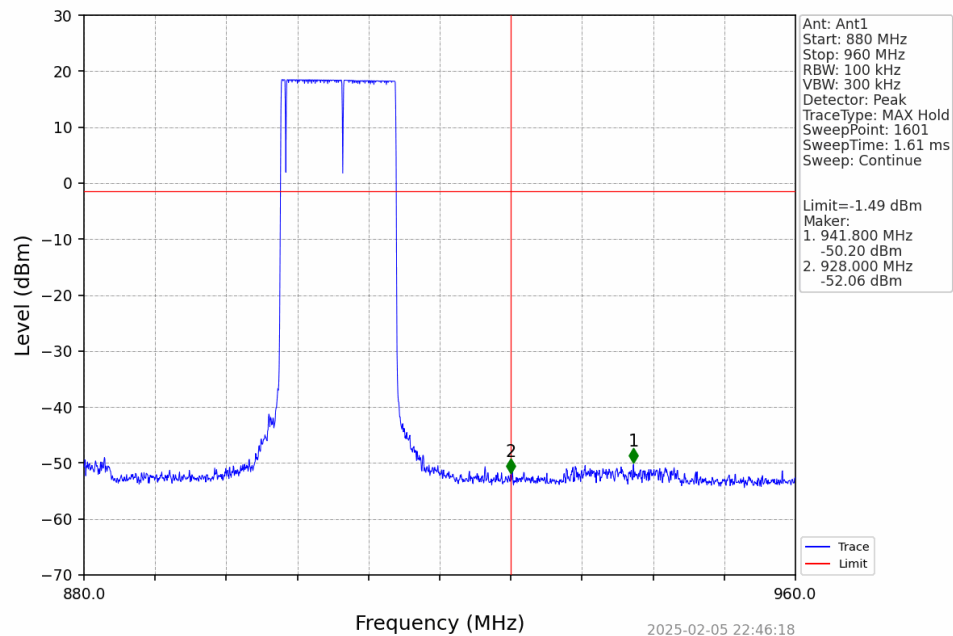
LoRa 125kHz BW_HCH_914.9MHz_Ant1_NTNV



LoRa 125kHz BW_HOPP_Ant1_NTNV



LoRa 125kHz BW_HOPP_Ant1_NTNV



6 Field Strength of Spurious Radiation

6.1 Test Result

Test Description	Test Specification		Test Result
Radiated Spurious Emissions	15.247(d), 15.35(b) 15.205, 15.209	RSS-247 5.5 RSS-GEN 8.9, 8.10	Compliant

6.2 Test Method

The measurement methods defined in ANSI C63.10: 2013 were used.

Lowest, middle, and highest channels were investigated – the device was commanded to continuously transmit on low, middle, and high channels.

Test distance:

- 9k to 30 MHz – Near field prescan to determine if there were any emissions
- 30 to 1000 MHz - The EUT to measurement antenna distance was 3 meters
- 1 to 18 GHz - The EUT to measurement antenna distance was 3 meters
- 18 to 26 GHz - The EUT to measurement antenna distance was 3 meters

Limits within restricted bands of operation:

Frequency	Limits ⁽¹⁾		Peak Limits dBuV/m
	Microvolts/m	dBuV/m	
30 - 88 MHz	100	40 ⁽²⁾	--
88 - 216 MHz	150	43.5 ⁽²⁾	--
216 - 960 MHz	200	46 ⁽²⁾	--
960 - 1000 MHz	500	54 ⁽²⁾	--
1 - 40 GHz	500	54 ⁽³⁾	74

(1) These limits are applicable to emissions outside of the intentional transmit frequency band.

(2) Quasi-peak limit

(3) Average limit

6.3 Test Site

SGS EMC Laboratory, San Diego, CA

Environmental Conditions

- Temperature: 17.9 - 20.1°C
- Relative Humidity: 55.2 - 60.3 %
- Atmospheric Pressure: 101.59 - 102.07 kPa

6.4 Test Equipment

Equipment list: (San Diego RSE Testing)

Asset No.	Type of Equipment	Model	Serial No.	Manufacturer	Cal Date	Cal Due Date
Radiated Emission < 1 GHz						
2017	EMI Receiver	N9038B	MY59050132	Keysight	10/24/2023	04/24/2025
2034	Biconilog Antenna 26M-6000MHz	3142E	00243882	ETS Lindgren	06/29/2023	06/29/2025
Radiated Emission > 1 GHz						
2017	EMI Receiver	N9038B	MY59050132	Keysight	10/24/2023	04/24/2025
-	Pre-Amplifier	LNA18G	00152	Schwarzbeck	NCR	NCR
-	High Pass Filter	HPM17669	G006	Micro-Tronics	NCR	NCR
2042	DRG Horn Antenna 1G-18GHz	3117	00259209	ETS Lindgren	05/26/2023	05/26/2025
Miscellaneous						
2036	Temp/Humidity Data Logger	GSP-8	CMA231100002	Elitech	09/07/2024	09/07/2025
-	Test Software	TILE!	V7.9.3.7	ETS Lindgren	N/A	

6.5 Test Data

6.5.1 9kHz to 30MHz

No emissions were detected in the 9kHz to 30MHz frequency range within 20 dB of the limit.

6.5.2 30 MHz to 1 GHz

No discernable differences between channels and EUT azimuths. Worst Case provided below:
Data 908.7MHz, 125kHz, SF10, 4/7

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - Alarm.Com / V730

Serial # - N/A

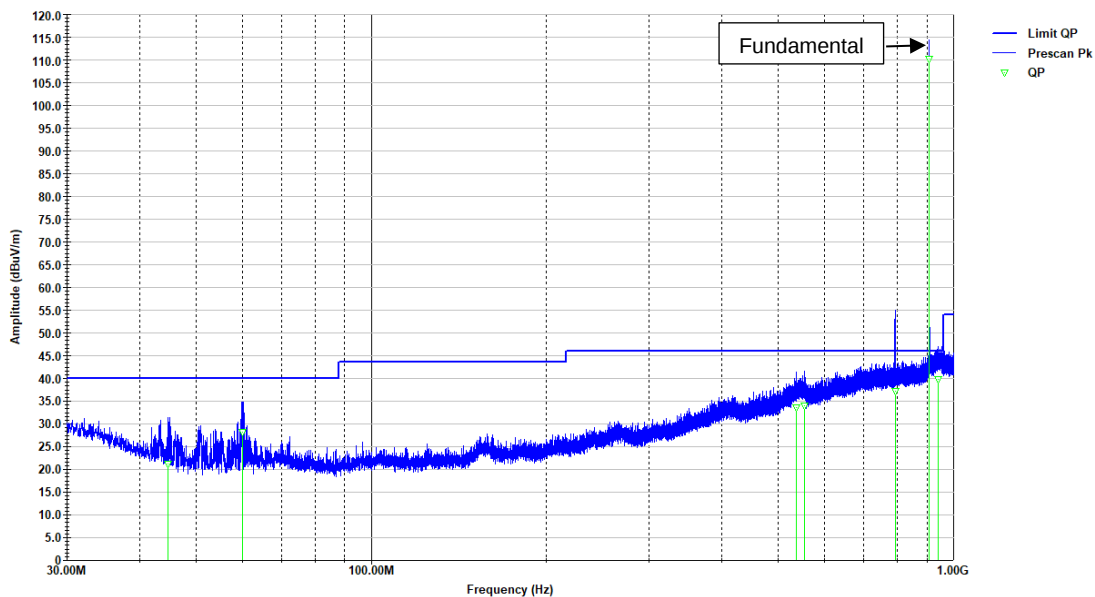
Test Mode - TX

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 125 kHz BW, 908.7 MHz, SF10

PWR 4/7, 1.5 nH



908_7_SF10_125k_FCC_15-247_RE_30M-1GHz.til

Last Data Update 06:30:39 PM, Wednesday, February 05, 2025

QuasiPeak Data

Freq. (MHz)	Final QP (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
44.768	21.23	-29.2	-18.77	40	328	316
60.143	28.22	-30.4	-11.78	40	248	1
536.874	33.57	-14.08	-12.45	46.02	137	85
554.94	33.96	-13.51	-12.06	46.02	308	299
793.56	37.25	-11.57	-8.77	46.02	153	244
908.723	110.2	-9.86	64.18	46.02	138	380
940.466	39.8	-8.3	-6.22	46.02	320	14

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - Alarm.Com / V730

Serial # - N/A

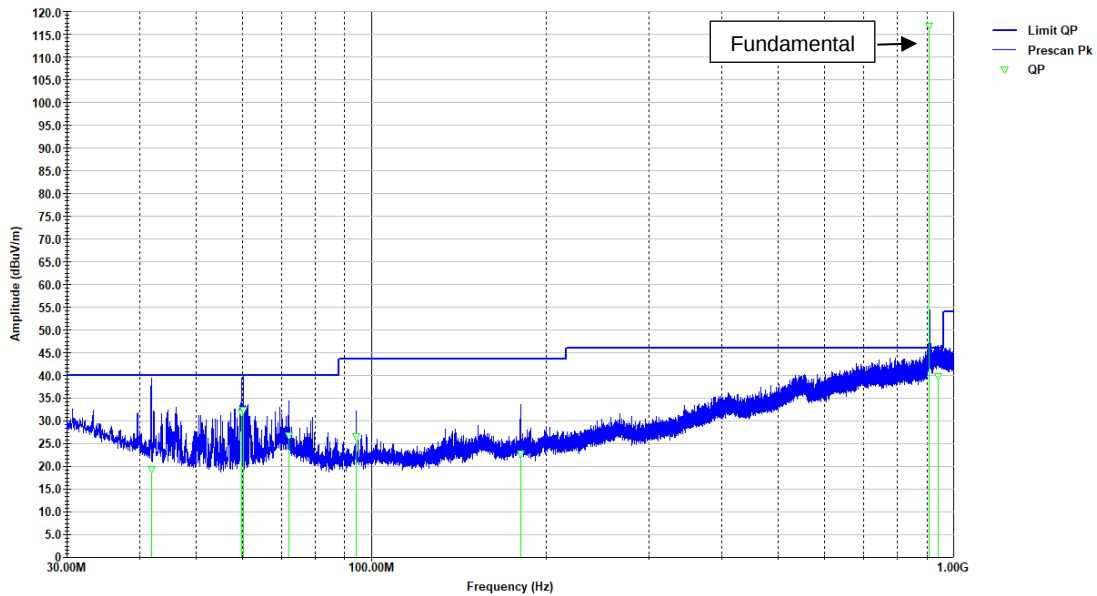
Test Mode - TX

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 125 kHz BW, 908.7 MHz, SF10

PWR 4/7, 1.5 nH



908_7_SF10_125k_FCC_15-247_RE_30M-1GHz.ttl

Last Data Update 06:15:16 PM, Wednesday, February 05, 2025

QuasiPeak Data

Freq. (MHz)	Final QP (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
41.858	19.46	-27.99	-20.54	40	161	380
59.925	31.86	-30.42	-8.14	40	106	194
60.288	32.44	-30.39	-7.56	40	122	163
72.171	26.8	-30.19	-13.2	40	100	-12
94.141	26.64	-30.04	-16.88	43.52	122	210
180.399	22.72	-27.24	-20.8	43.52	100	230
908.626	116.68	-9.87	70.66	46.02	114	9
939.884	39.85	-8.3	-6.17	46.02	378	68

Data 903MHz, 500kHz, SF8, 4/7

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal QP

Customer / Model # - Alarm.Com / V730

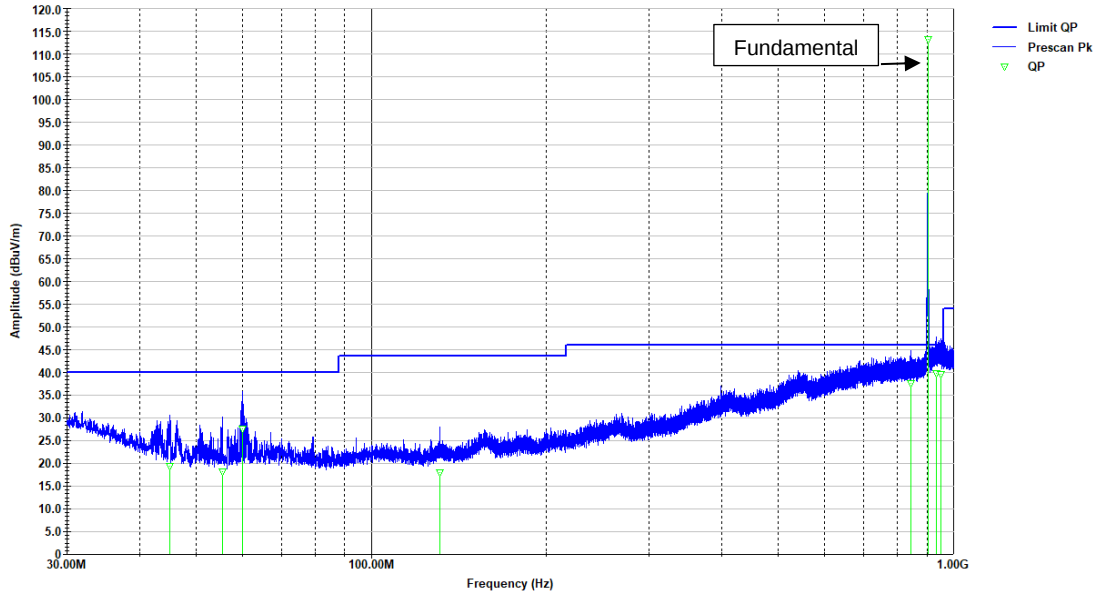
Serial # - N/A

Test Mode - TX

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 500 kHz BW, 903 MHz, SF8, PWR 4/7,
1.5nH



903 SF8 500k FCC 15-247 RE 30M-1GHz.til

Last Data Update 08:59:31 PM, Wednesday, February 05, 2025

QuasiPeak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
45.108	19.36	-29.32	-20.64	40	153	366
55.535	18.15	-30.64	-21.85	40	279	-20
59.973	27.69	-30.41	-12.31	40	224	25
131.05	18.05	-29.93	-25.47	43.52	249	-6
845.115	37.56	-11.11	-8.46	46.02	176	380
902.903	113.18	-10.17	67.16	46.02	149	250
934.84	39.79	-8.36	-6.23	46.02	287	135
950.36	39.69	-8.39	-6.33	46.02	138	164

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical QP

Customer / Model # - Alarm.Com / V730

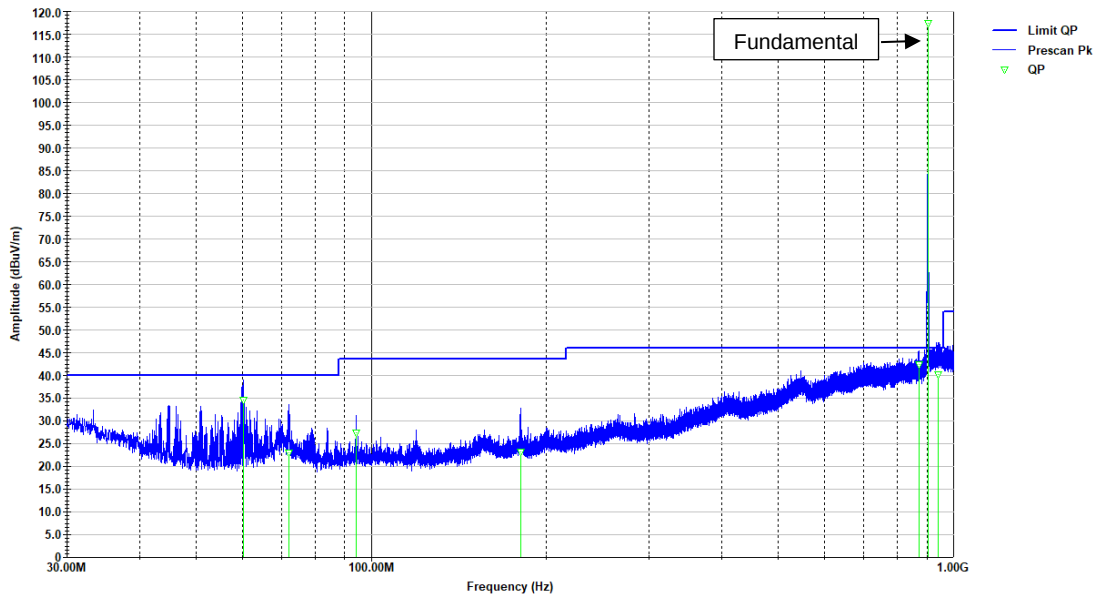
Serial # - N/A

Test Mode - TX

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 500 kHz BW, 903 MHz, SF8, PWR 4/7, 1.5nH



903 SF8 500k FCC 15-247 RE 30M-1GHz.ttl

Last Data Update 08:43:33 PM, Wednesday, February 05, 2025

QuasiPeak Data

Freq. (MHz)	Final QP (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
60.191	34.52	-30.4	-5.48	40	114	-9
72.219	23.09	-30.19	-16.91	40	249	87
94.117	27.38	-30.04	-16.14	43.52	100	283
180.447	23.25	-27.24	-20.27	43.52	100	46
870.942	42.45	-11.15	-3.57	46.02	114	25
902.83	117.39	-10.17	71.37	46.02	114	-20
939.448	40.19	-8.3	-5.83	46.02	186	323

6.5.3 1 GHz to 10 GHz

125kHz BW – Data 902.3MHz, 125kHz, SF10, 4/3

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

Client/Model - Alarm.Com / V730

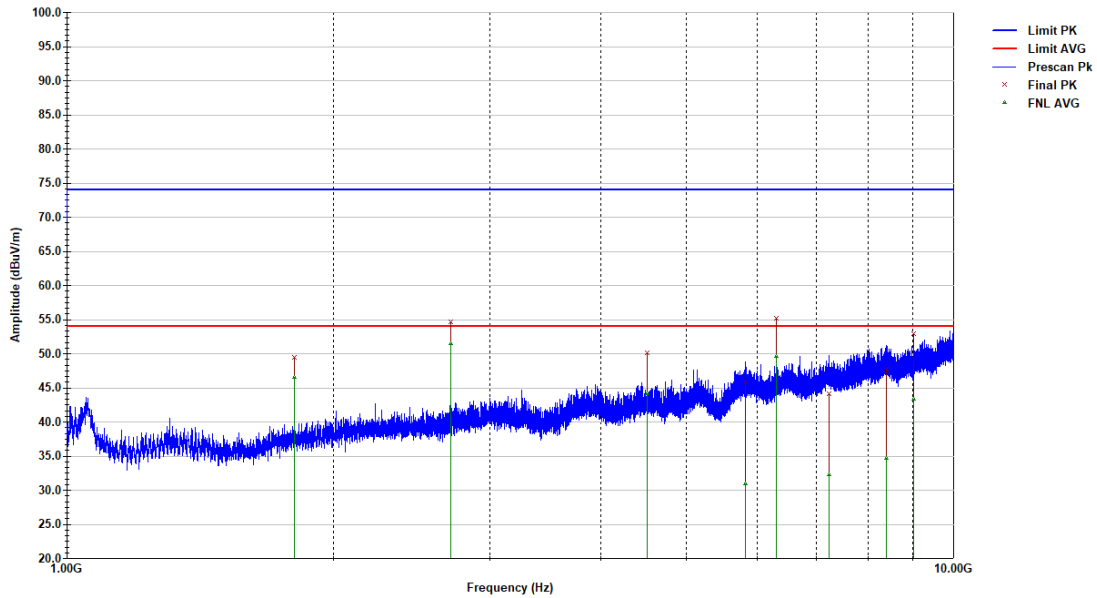
Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 125 kHz BW, 902.3 MHz, SF10, PWR 4/3

1.5nH, >98DC



902_3_SF10_4_3_1_5nH_RECISPR_SW1A_NC_3117_2042_w_lambda_Ina_AVG_1G-18G_06Feb2024.til

Last Data Update 12:37:52 PM, Friday, February 07, 2025

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1804.525	49.45	-3.4	-24.55	74	164	237
2706.8	54.71	1.15	-19.29	74	179	181
4511.35	50.11	5.77	-23.89	74	150	225
5816.525	45.78	9.33	-28.22	74	301	207
6316.325	55.24	10.46	-18.76	74	201	177
7230.925	44.15	12.5	-29.85	74	171	0
8393.3	47.74	15.67	-26.26	74	179	148
9022.725	52.96	17.22	-21.04	74	150	282

Average

Freq. (MHz)	Final AVG (dBµV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Ant. Height (cm)	Azimuth (deg.)
1804.525	46.54	0.00	-3.4	-7.46	54	164	237
2706.8	51.51	0.00	1.15	-2.49	54	179	181
4511.35	44.08	0.00	5.77	-9.92	54	150	225
5816.525	30.91	0.00	9.33	-23.09	54	301	207
6316.325	49.61	0.00	10.46	-4.39	54	201	177
7230.925	32.31	0.00	12.5	-21.69	54	171	0
8393.3	34.71	0.00	15.67	-19.29	54	179	148
9022.725	43.33	0.00	17.22	-10.67	54	150	282

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

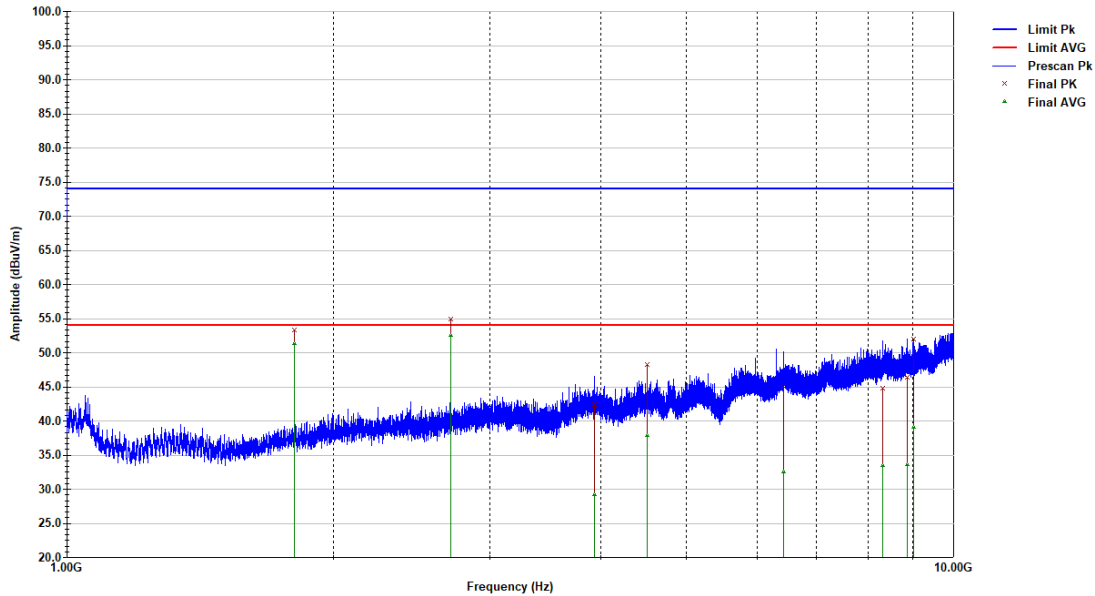
Client/Model - Alarm.Com / V730

Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 125 kHz BW, 902.3 MHz, SF10, PWR 4/3
1.5nH, >98DC



902_3 SF10 4-3 1_5nH RECISPR SW1A NC 3117 2042 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 12:21:11 PM, Friday, February 07, 2025

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1804.525	53.31	-3.4	-20.69	74	236	182
2706.8	54.93	1.15	-19.07	74	277	173
3931.65	42.4	4	-31.6	74	279	303
4510.925	48.25	5.77	-25.75	74	387	205
6437.875	45.09	10.75	-28.91	74	256	134
8309.575	44.76	15.62	-29.24	74	241	185
8872.275	46.36	16.69	-27.64	74	163	116
9022.3	51.97	17.22	-22.03	74	155	226

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1804.525	51.38	0.00	-3.4	-2.62	54	236	182
2706.8	52.53	0.00	1.15	-1.47	54	277	173
3931.65	29.23	0.00	4	-24.77	54	279	303
4510.925	37.81	0.00	5.77	-16.19	54	387	205
6437.875	32.48	0.00	10.75	-21.52	54	256	134
8309.575	33.48	0.00	15.62	-20.52	54	241	185
8872.275	33.61	0.00	16.69	-20.39	54	163	116
9022.3	39.08	0.00	17.22	-14.92	54	155	226

Data 908.7MHz, 125kHz, SF10, 4/3

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

Client/Model - Alarm.Com / V730

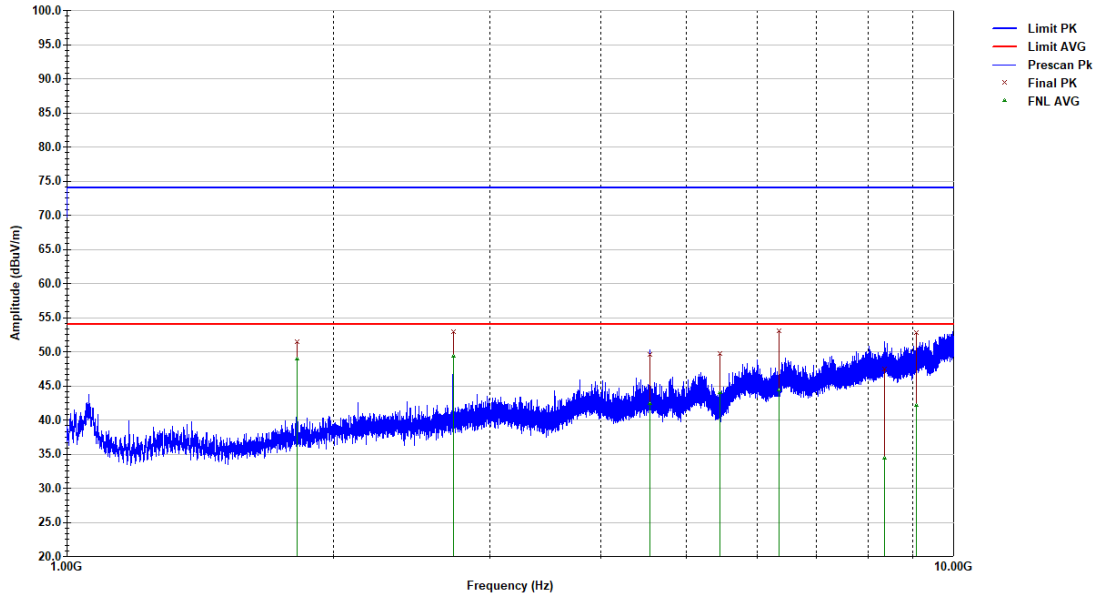
Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 125 kHz BW, 908.7 MHz, SF10, PWR 4/3

1.5nH, >98DC



908_7_SF10_4_3_1_5nH_RECISPR_SW1A_NC_3117_2042_w_lambda_Ina_AVG_1G-18G_06Feb2024.til

Last Data Update 01:36:53 PM, Friday, February 07, 2025

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1817.275	51.5	-3.21	-22.5	74	150	228
2725.925	52.97	1.27	-21.03	74	219	205
4543.225	49.62	5.84	-24.38	74	150	213
5452.3	49.68	7.93	-24.32	74	270	160
6360.525	53.09	10.6	-20.91	74	209	170
8360.575	47.42	15.66	-26.58	74	393	212
9086.475	52.8	17.33	-21.2	74	239	257

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1817.275	48.9	0.00	-3.21	-5.1	54	150	228
2725.925	49.35	0.00	1.27	-4.65	54	219	205
4543.225	42.39	0.00	5.84	-11.61	54	150	213
5452.3	43.97	0.00	7.93	-10.03	54	270	160
6360.525	44.33	0.00	10.6	-9.67	54	209	170
8360.575	34.39	0.00	15.66	-19.61	54	393	212
9086.475	42.06	0.00	17.33	-11.94	54	239	257

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

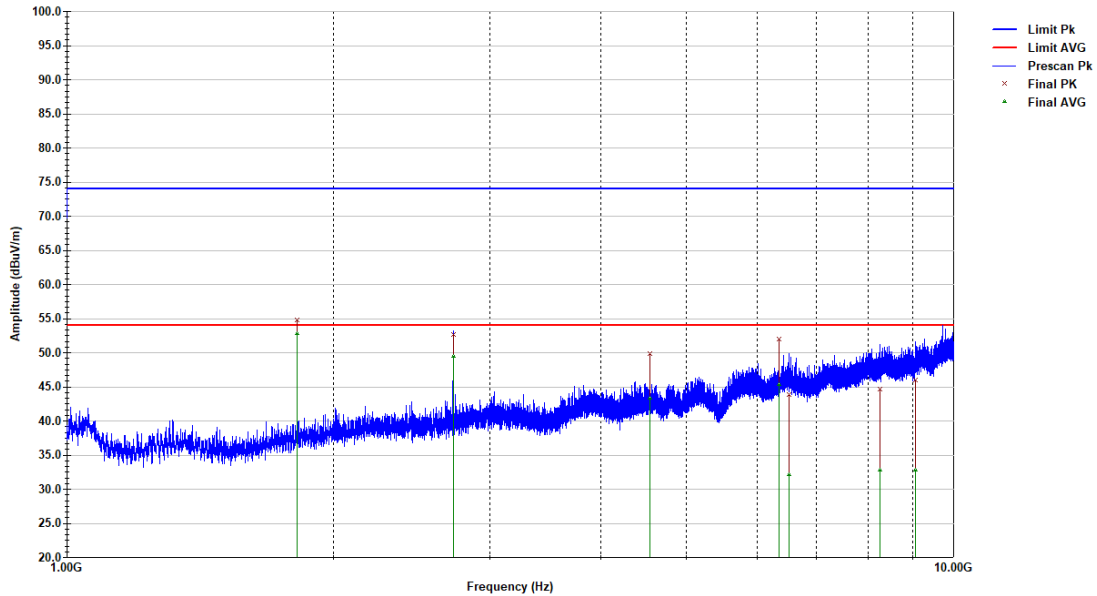
Client/Model - Alarm.Com / V730

Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 125 kHz BW, 908.7 MHz, SF10, PWR 4/3
1.5nH, >98DC



908_7_SF10 4-3 1_5nH RECISPR SW1A NC 3117 2042 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 01:11:50 PM, Friday, February 07, 2025

Peak Data

	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1817.275	54.78	-3.21	-19.22	74	277	198
2725.925	52.67	1.27	-21.33	74	269	192
4543.65	49.86	5.84	-24.14	74	334	199
6360.95	51.96	10.6	-22.04	74	186	206
6514.8	43.83	10.98	-30.17	74	210	147
8267.5	44.63	15.55	-29.37	74	373	300
9048.65	46.05	17.26	-27.95	74	155	-20

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1817.275	52.8	0.00	-3.21	-1.2	54	277	198
2725.925	49.51	0.00	1.27	-4.49	54	269	192
4543.65	43.33	0.00	5.84	-10.67	54	334	199
6360.95	45.29	0.00	10.6	-8.71	54	186	206
6514.8	32.07	0.00	10.98	-21.93	54	210	147
8267.5	32.78	0.00	15.55	-21.22	54	373	300
9048.65	32.79	0.00	17.26	-21.21	54	155	-20

Data 914.9MHz, 125kHz, SF10, 4/3

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

Client/Model - Alarm.Com / V730

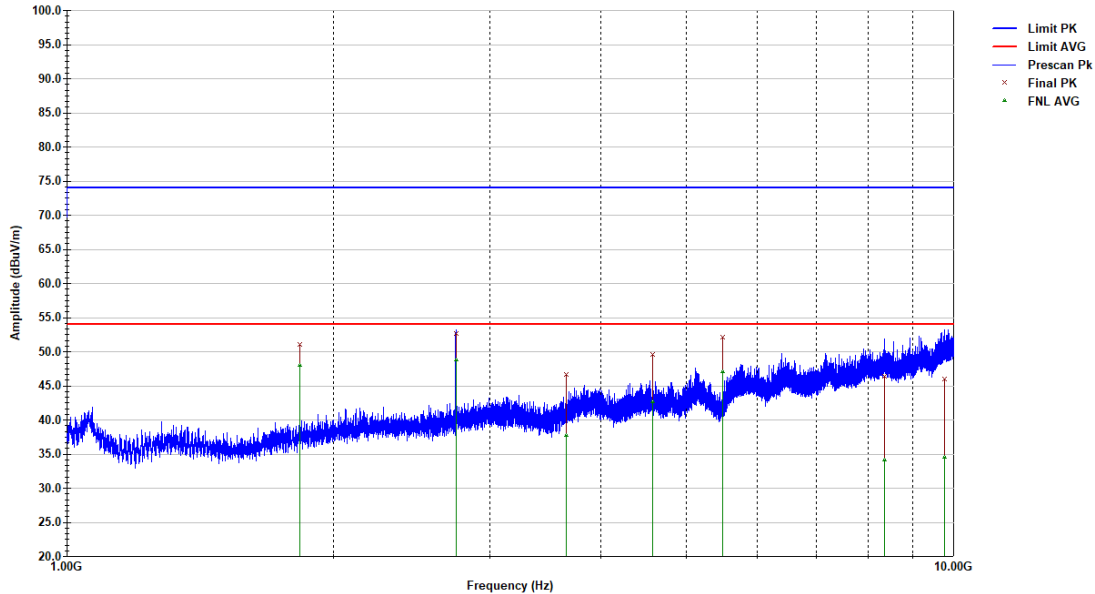
Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 125 kHz BW, 914.9 MHz, SF10, PWR 4/3

1.5nH, >98DC



914_9 SF10 4:3 1_5nH RECISPR SW1A NC 3117 2042 w lambda lna AVG 1G-18G 06Feb2024.til

Last Data Update 02:34:22 PM, Friday, February 07, 2025

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1829.6	51.08	-3.09	-22.92	74	195	228
2744.625	52.61	1.35	-21.39	74	150	193
3659.65	46.65	3.17	-27.35	74	393	187
4574.25	49.65	5.8	-24.35	74	201	184
5489.275	52.08	7.94	-21.92	74	248	172
8347.825	46.46	15.66	-27.54	74	339	158
9759.675	45.93	19.15	-28.07	74	354	158

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1829.6	47.95	0.00	-3.09	-6.05	54	195	228
2744.625	48.86	0.00	1.35	-5.14	54	150	193
3659.65	37.67	0.00	3.17	-16.33	54	393	187
4574.25	42.6	0.00	5.8	-11.4	54	201	184
5489.275	47.11	0.00	7.94	-6.89	54	248	172
8347.825	34.14	0.00	15.66	-19.86	54	339	158
9759.675	34.56	0.00	19.15	-19.44	54	354	158

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

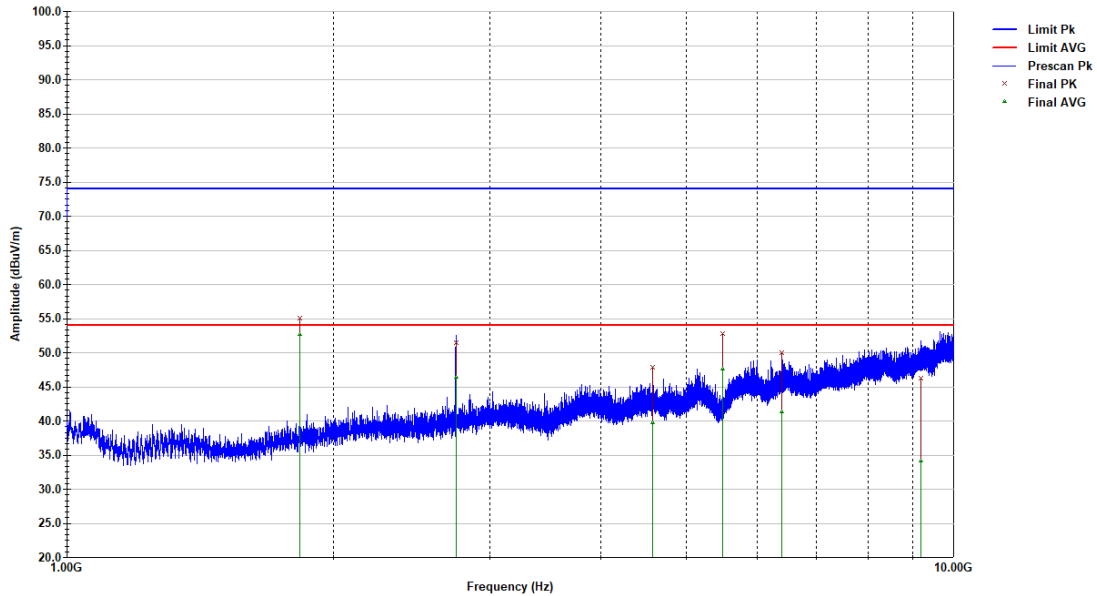
Client/Model - Alarm.Com / V730

Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 125 kHz BW, 914.9 MHz, SF10, PWR 4/3
1.5nH, >98DC



914_9_SF10 4-3 1_5nH RECISPR SW1A NC 3117 2042 w lambda Ina AVG 1G-18G 06Feb2024.ttl

Last Data Update 02:07:36 PM, Friday, February 07, 2025

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1829.6	55.05	-3.09	-18.95	74	261	198
2745.05	51.51	1.36	-22.49	74	309	173
4574.675	47.9	5.8	-26.1	74	279	214
5489.275	52.78	7.94	-21.22	74	150	192
6404.3	50.03	10.68	-23.97	74	178	218
9183.8	46.21	17.49	-27.79	74	388	87

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1829.6	52.69	0.00	-3.09	-1.31	54	261	198
2745.05	46.42	0.00	1.36	-7.58	54	309	173
4574.675	39.69	0.00	5.8	-14.31	54	279	214
5489.275	47.55	0.00	7.94	-6.45	54	150	192
6404.3	41.37	0.00	10.68	-12.63	54	178	218
9183.8	34.07	0.00	17.49	-19.93	54	388	87

Data 903MHz, 500kHz, SF8, 4/7

SGS NA, San Diego Regulatory Lab

Client/Model - Alarm.Com / V730

Test Mode - TX, 1 GHz HPF

Operator - AG

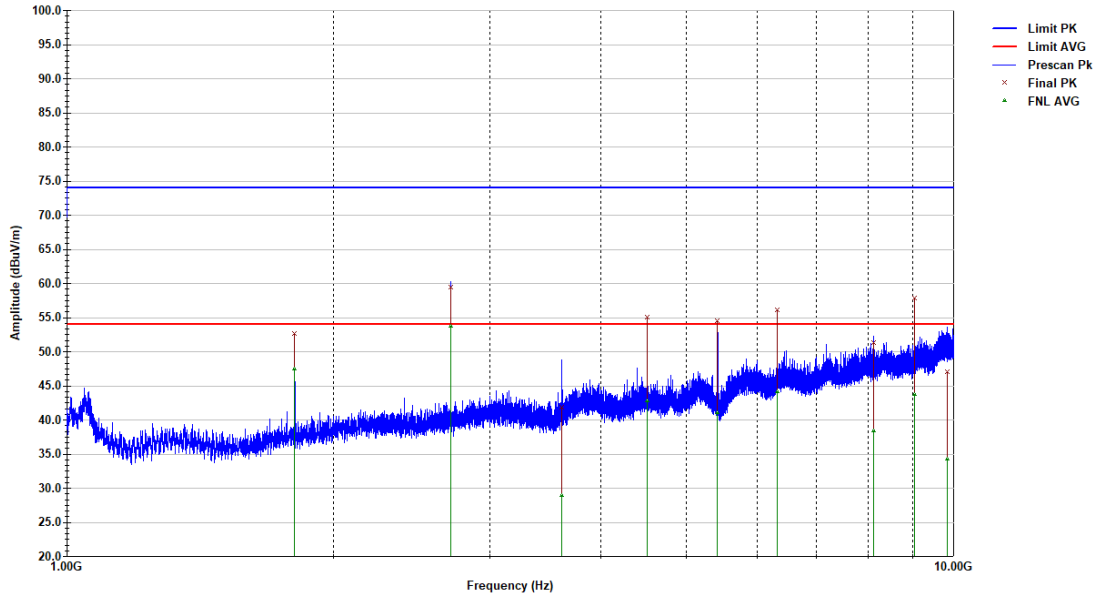
Standard - FCC 15.247

Comments - LoRa, 500 kHz BW, 903 MHz, SF8, PWR 4/7

1.5nH, >98DC

Radiated Emissions

Horizontal AVG



903 SF8 4.7 1.5nH RECISPR SW1A NC 3117 2042 w lambda lna AVG 1G-18G 06Feb2024.til

Last Data Update 05:35:45 PM, Thursday, February 06, 2025

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
1805.8	52.67	-3.38	-21.33	74	164	242
2708.925	59.46	1.16	-14.54	74	180	193
3611.625	41.88	2.85	-32.12	74	347	380
4513.9	55.05	5.78	-18.95	74	254	176
5416.6	54.52	7.87	-19.48	74	324	152
6322.275	56.17	10.48	-17.83	74	232	170
8125.55	51.38	15.4	-22.62	74	301	118
9030.375	57.81	17.23	-16.19	74	333	241
9826.825	47.09	19.12	-26.91	74	225	237

Average

Freq. (MHz)	Final AVG (dBuV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
1805.8	47.52	0.00	-3.38	-6.48	54	164	242
2708.925	53.76	0.00	1.16	-0.24	54	180	193
3611.625	28.95	0.00	2.85	-25.05	54	347	380
4513.9	42.84	0.00	5.78	-11.16	54	254	176
5416.6	41	0.00	7.87	-13	54	324	152
6322.275	44.17	0.00	10.48	-9.83	54	232	170

8125.55	38.42	0.00	15.4	-15.58	54	301	118
9030.375	43.75	0.00	17.23	-10.25	54	333	241
9826.825	34.24	0.00	19.12	-19.76	54	225	237

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

Client/Model - Alarm.Com / V730

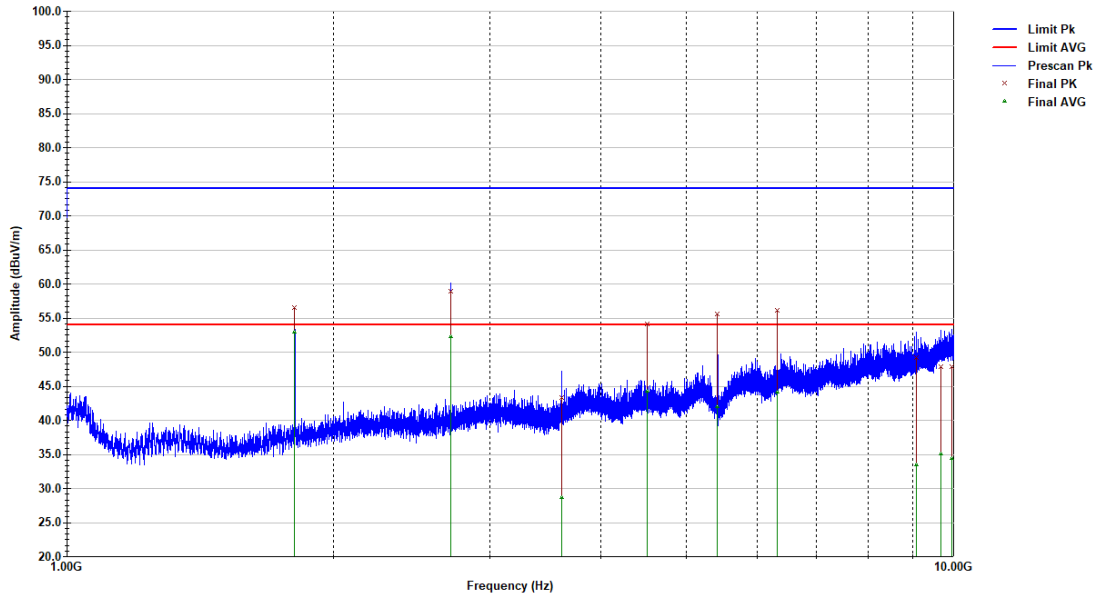
Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 500 kHz BW, 903 MHz, SF8, PWR 4/7

1.5nH, >98DC



903 SF8 4-7 1_5nH RECISPR SW1A NC 3117 2042 w lambda Ina AVG 1G-18G 06Feb2024.til

Last Data Update 04:53:36 PM, Thursday, February 06, 2025

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1805.8	56.55	-3.38	-17.45	74	240	160
2708.5	58.97	1.16	-15.03	74	277	162
3610.775	43.33	2.84	-30.67	74	240	-20
4514.325	54.06	5.78	-19.94	74	388	190
5416.6	55.55	7.87	-18.45	74	150	188
6321.85	56.13	10.48	-17.87	74	150	205
9081.375	49.18	17.32	-24.82	74	400	140
9682.326	47.9	18.7	-26.1	74	241	297
9944.55	47.91	19.46	-26.09	74	233	98

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1805.8	52.94	0.00	-3.38	-1.06	54	240	160
2708.5	52.26	0.00	1.16	-1.74	54	277	162
3610.775	28.71	0.00	2.84	-25.29	54	240	-20
4514.325	44.27	0.00	5.78	-9.73	54	388	190
5416.6	41.96	0.00	7.87	-12.04	54	150	188
6321.85	44.12	0.00	10.48	-9.88	54	150	205
9081.375	33.42	0.00	17.32	-20.58	54	400	140
9682.326	35.09	0.00	18.7	-18.91	54	241	297
9944.55	34.42	0.00	19.46	-19.58	54	233	98

Data 914.2MHz, 500kHz, SF8, 4/7

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

Client/Model - Alarm.Com / V730

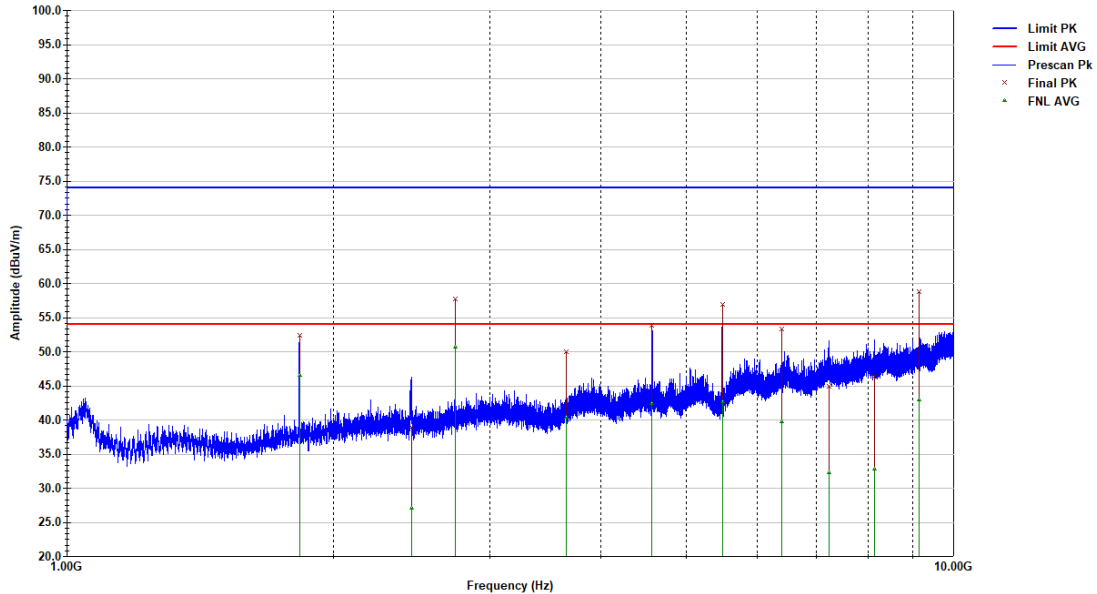
Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 500 kHz BW, 914.2 MHz, SF8, PWR 4/7

1.5nH, >98DC



914.2 SF8 4.7 1_5nH RECISPR SW1A NC 3117 2042 w lambda lna AVG 1G-18G 06Feb2024.til

Last Data Update 04:18:05 PM, Thursday, February 06, 2025

Peak Data

Freq. (MHz)	Final PK (dBuV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Ant. Height (cm)	Azimuth (deg.)
1828.75	52.38	-3.09	-21.62	74	197	242
2447.125	38.96	-0.3	-35.04	74	164	108
2742.925	57.78	1.35	-16.22	74	150	172
3657.1	50.02	3.17	-23.98	74	271	147
4570	53.85	5.8	-20.15	74	232	176
5483.75	56.87	7.93	-17.13	74	248	164
6398.775	53.31	10.67	-20.69	74	255	177
7237.725	44.94	12.52	-29.06	74	255	-17
8142.55	46.36	15.41	-27.64	74	271	20
9144.275	58.78	17.42	-15.22	74	400	235

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1828.75	46.54	0.00	-3.09	-7.46	54	197	242
2447.125	27.01	0.00	-0.3	-26.99	54	164	108
2742.925	50.72	0.00	1.35	-3.28	54	150	172
3657.1	40.46	0.00	3.17	-13.54	54	271	147
4570	42.44	0.00	5.8	-11.56	54	232	176
5483.75	42.63	0.00	7.93	-11.37	54	248	164
6398.775	39.71	0.00	10.67	-14.29	54	255	177
7237.725	32.25	0.00	12.52	-21.75	54	255	-17
8142.55	32.76	0.00	15.41	-21.24	54	271	20
9144.275	42.99	0.00	17.42	-11.01	54	400	235

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

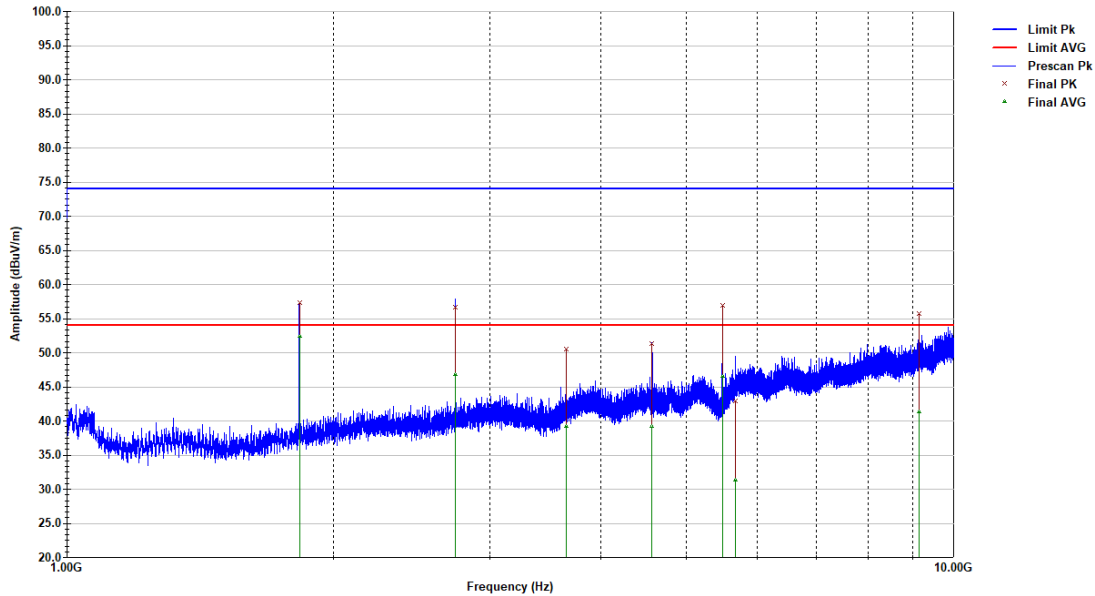
Client/Model - Alarm.Com / V730

Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 500 kHz BW, 914.2 MHz, SF8, PWR 4/7
1.5nH, >98DC



914.2 SF8 4.7 1_5nH RECISPR SW1A NC 3117 2042 w lambda lna AVG 1G-18G 06Feb2024.til

Last Data Update 03:53:26 PM, Thursday, February 06, 2025

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1828.75	57.26	-3.09	-16.74	74	156	138
2743.35	56.63	1.35	-17.37	74	285	162
3657.525	50.49	3.17	-23.51	74	241	155
4570	51.38	5.8	-22.62	74	400	214
5484.6	56.96	7.93	-17.04	74	150	199
5680.95	42.92	9.06	-31.08	74	256	193
9143	55.73	17.42	-18.27	74	150	247

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1828.75	52.43	0.00	-3.09	-1.57	54	156	138
2743.35	46.81	0.00	1.35	-7.19	54	285	162
3657.525	39.2	0.00	3.17	-14.8	54	241	155
4570	39.13	0.00	5.8	-14.87	54	400	214
5484.6	46.52	0.00	7.93	-7.48	54	150	199
5680.95	31.33	0.00	9.06	-22.67	54	256	193
9143	41.37	0.00	17.42	-12.63	54	150	247

Data 926.9MHz, 500kHz, SF10, 4/7

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Horizontal AVG

Client/Model - Alarm.Com / V730

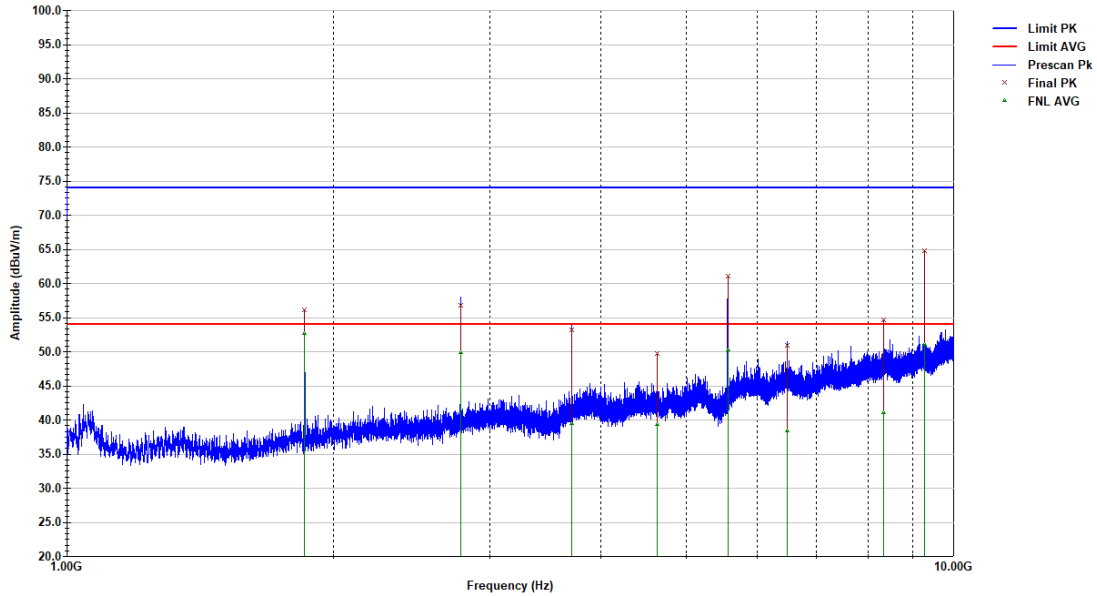
Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 500 kHz BW, 926.9 MHz, SF10, PWR 4/7

1.5nH, >98dB



926_9 SF10 4-7 1_5nH RECISPR SW1A NC 3117 2042 w lambda lna AVG 1G-18G 06Feb2024_2.til

Last Data Update 03:00:11 PM, Thursday, February 06, 2025

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1853.825	56.11	-2.87	-17.89	74	156	249
2781.175	56.76	1.44	-17.24	74	188	209
3706.4	53.23	3.21	-20.77	74	309	159
4634.6	49.75	6.33	-24.25	74	150	230
5562.375	61.01	8.17	-12.99	74	303	175
6487.6	51	10.89	-23	74	155	129
8343.15	54.63	15.66	-19.37	74	294	106
9268.799	64.76	17.88	-9.24	74	386	236

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1853.825	52.62	0.00	-2.87	-1.38	54	156	249
2781.175	49.84	0.00	1.44	-4.16	54	188	209
3706.4	39.44	0.00	3.21	-14.56	54	309	159
4634.6	39.39	0.00	6.33	-14.61	54	150	230
5562.375	50.21	0.00	8.17	-3.79	54	303	175
6487.6	38.34	0.00	10.89	-15.66	54	155	129
8343.15	41.1	0.00	15.66	-12.9	54	294	106
9268.799	51.03	0.00	17.88	-2.97	54	386	236

SGS NA, San Diego Regulatory Lab

Radiated Emissions

Vertical AVG

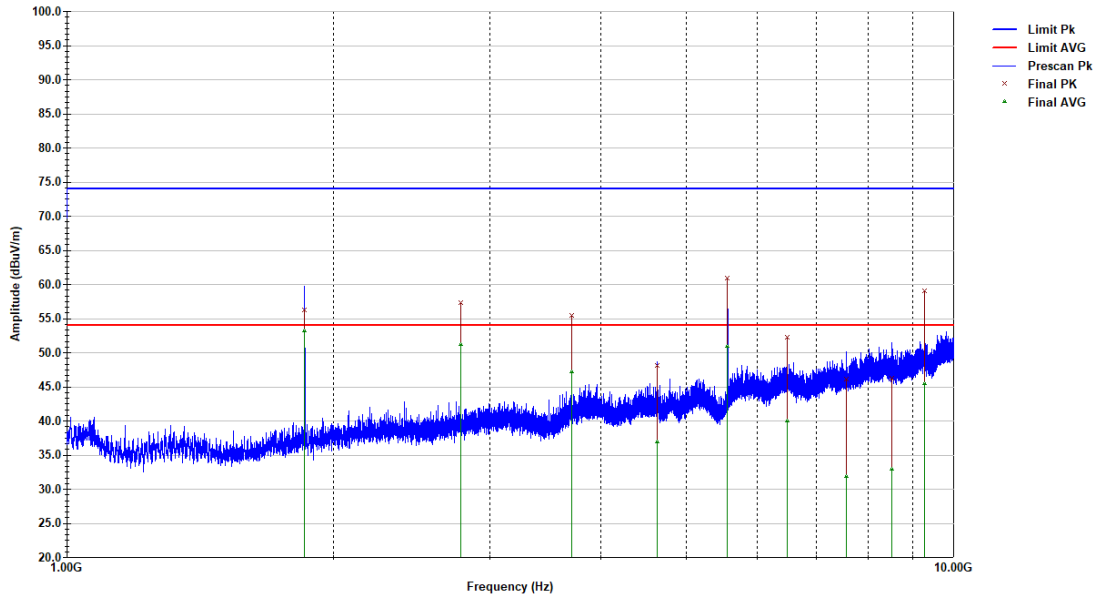
Client/Model - Alarm.Com / V730

Test Mode - TX, 1 GHz HPF

Operator - AG

Standard - FCC 15.247

Comments - LoRa, 500 kHz BW, 926.9 MHz, SF10, PWR 4/7
1.5nH, >98DC



926_9 SF10 4-7 1_5nH RECISPR SW1A NC 3117 2042 w lambda Ina AVG 1G-18G 06Feb2024_2.til

Last Data Update 03:26:50 PM, Thursday, February 06, 2025

Peak Data

Freq. (MHz)	Final PK (dBμV/m)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1853.825	56.28	-2.87	-17.72	74	156	337
2780.325	57.26	1.44	-48.89	74	301	380
3708.1	55.44	3.22	-18.56	74	357	163
4635.025	48.2	6.34	-25.8	74	248	216
5561.1	60.98	8.17	-13.02	74	155	196
6487.6	52.29	10.89	-21.71	74	150	205
7571.35	46.19	13.69	-27.81	74	366	342
8516.55	46.21	16.13	-27.79	74	225	211
9269.225	59.03	17.89	-14.97	74	202	248

Average

Freq. (MHz)	Final AVG (dBμV/m)	Duty Cycle Corr. (dB)	Total Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Ant. Height (cm)	Azimuth (deg.)
1853.825	53.15	0.00	-2.87	-0.85	54	156	337
2780.325	51.16	0.00	1.44	-2.84	54	301	380
3708.1	47.19	0.00	3.22	-6.81	54	357	163
4635.025	36.95	0.00	6.34	-17.05	54	248	216
5561.1	50.95	0.00	8.17	-3.05	54	155	196
6487.6	40.02	0.00	10.89	-13.98	54	150	205
7571.35	31.87	0.00	13.69	-22.13	54	366	342
8516.55	32.99	0.00	16.13	-21.01	54	225	211
9269.225	45.46	0.00	17.89	-8.54	54	202	248

7 Pseudo-Random Hop Sequence

7.1 Test Result

Test Description	Test Specification	Test Result
Pseudo-Random Hop Sequence	ANSI C63.10:2013 15.247(a)(1) RSS-247 5.1(a)	Compliant ⁽¹⁾

Note (1): The theory of operation states that the device is LoRa and operates using a pseudo-random hopping technique @ 125 kHz modulation.

7.2 Test Method

Compliance is demonstrated by Manufacturer's declaration or is stated in the Theory of Operation.

Requirement

The hopset shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset, while the long-term distribution appears evenly distributed.

8 Channel Separation

8.1 Test Result

Test Description	Test Specification	Test Result
Channel Separation	ANSI C63.10:2013 15.247(a)(1) RSS-247 5.1(b)	Compliant

8.2 Test Method

Measurements were taken using the methods defined in ANSI C63.10, Clause 7.8.2. The test data was measured using a spectrum analyzer with Peak detector (max hold) and a resolution bandwidth of 100 kHz. The trace was allowed to stabilize until all channels were displayed.

Requirement

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the -20 dB bandwidth of the hopping channel, whichever is greater.

8.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.86 °C

Relative Humidity: 28.3 %

Atmospheric Pressure: 97.22 kPa

8.4 Test Equipment

Test End Date: 2-Feb-2025

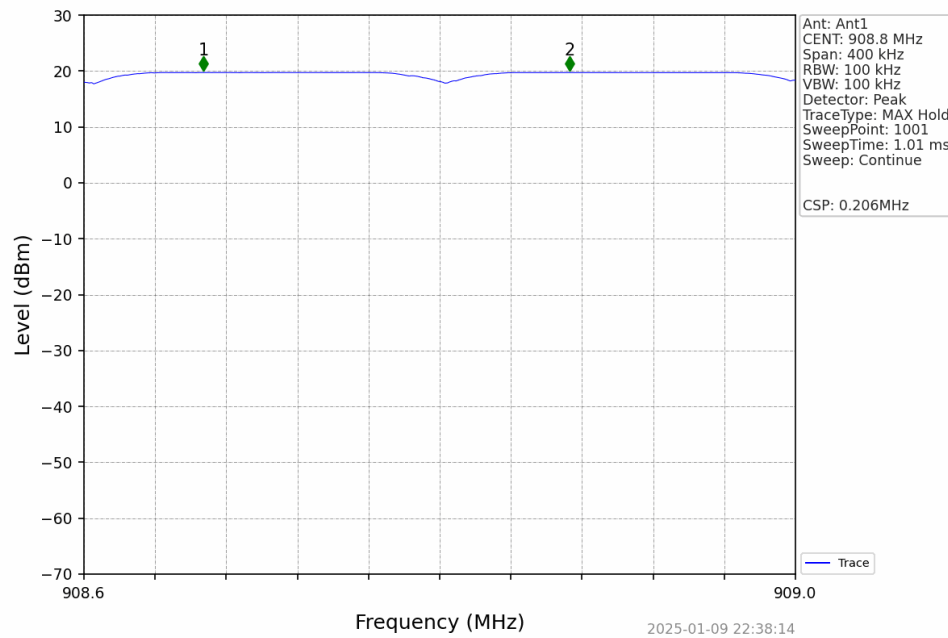
Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

8.5 Test Data – 125 kHz Modulation

Ant1						
Mode	TX Type	Frequency (MHz)	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
LoRa 125kHz BW	SISO	HOPP	0.200	0.146	≥ 0.146	Pass

Sample Plot



9 Number of Hopping Channels

9.1 Test Result

Test Description	Test Specification	Test Result
Number of Hopping Channels	ANSI C63.10:2013 15.247(a)(1)(iii)(h) RSS-247 5.1(d)	Compliant

9.2 Test Method

Measurements were taken using the methods defined in ANSI C63.10, Clause 7.8.3. The test data was measured using a spectrum analyzer with Peak detector (max hold) and a resolution bandwidth of 30 kHz. The trace was allowed to stabilize until all channels were displayed.

Requirement

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

9.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.86 °C
Relative Humidity: 28.3 %
Atmospheric Pressure: 97.22 kPa

9.4 Test Equipment

Test End Date: 2-Feb-2025

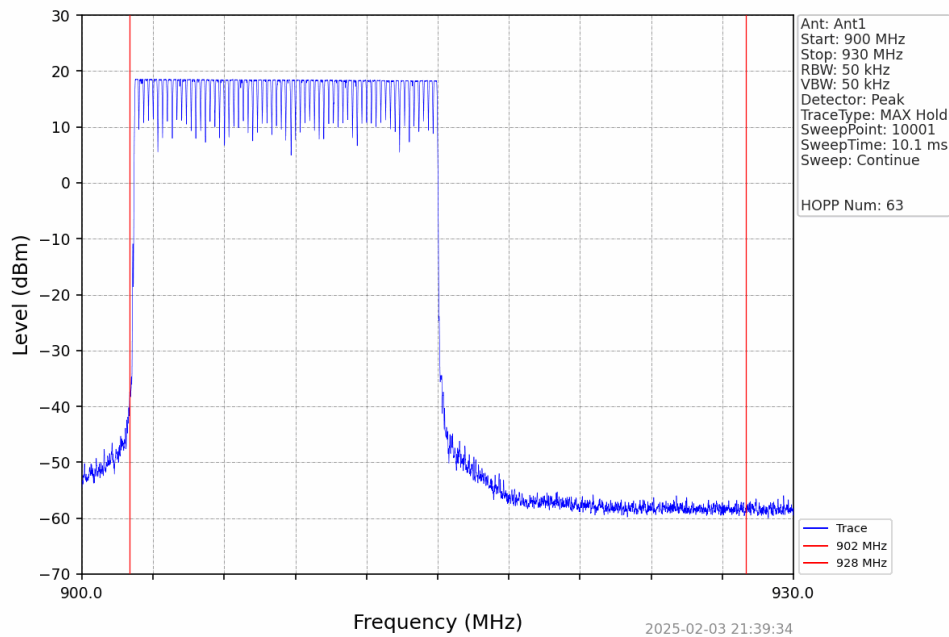
Tester: SGM

Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

9.5 Test Data - 125 kHz Modulation

Mode	TX Type	Frequency (MHz)	Num of Hopping Frequencies		Verdict
			ANT1	Limit	
LoRa 125kHz BW	SISO	HOPP	63	>=50	Pass

Sample Plot



10 Dwell Time

10.1 Test Result

Test Description	Test Specification	Test Result
Dwell Time	ANSI C63.10:2013 15.247(a)(1)(i)(g) RSS-247 5.1(d)	Compliant

10.2 Test Method

Measurements were taken using the methods defined in ANSI C63.10, Clause 7.8.4. For each packet type and data rate, the pulse width of the packet was measured, and the pulses were counted over the total observation period.

Requirement

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

For the purposes of this section, hybrid systems are those that employ a combination of both frequency hopping and digital modulation techniques. The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned-off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4. (Example: 0.4 X 8 hopping frequencies = 1 hop every 3.2 seconds.)

10.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.14 °C

Relative Humidity: 24.6 %

Atmospheric Pressure: 98.48 kPa

10.4 Test Equipment

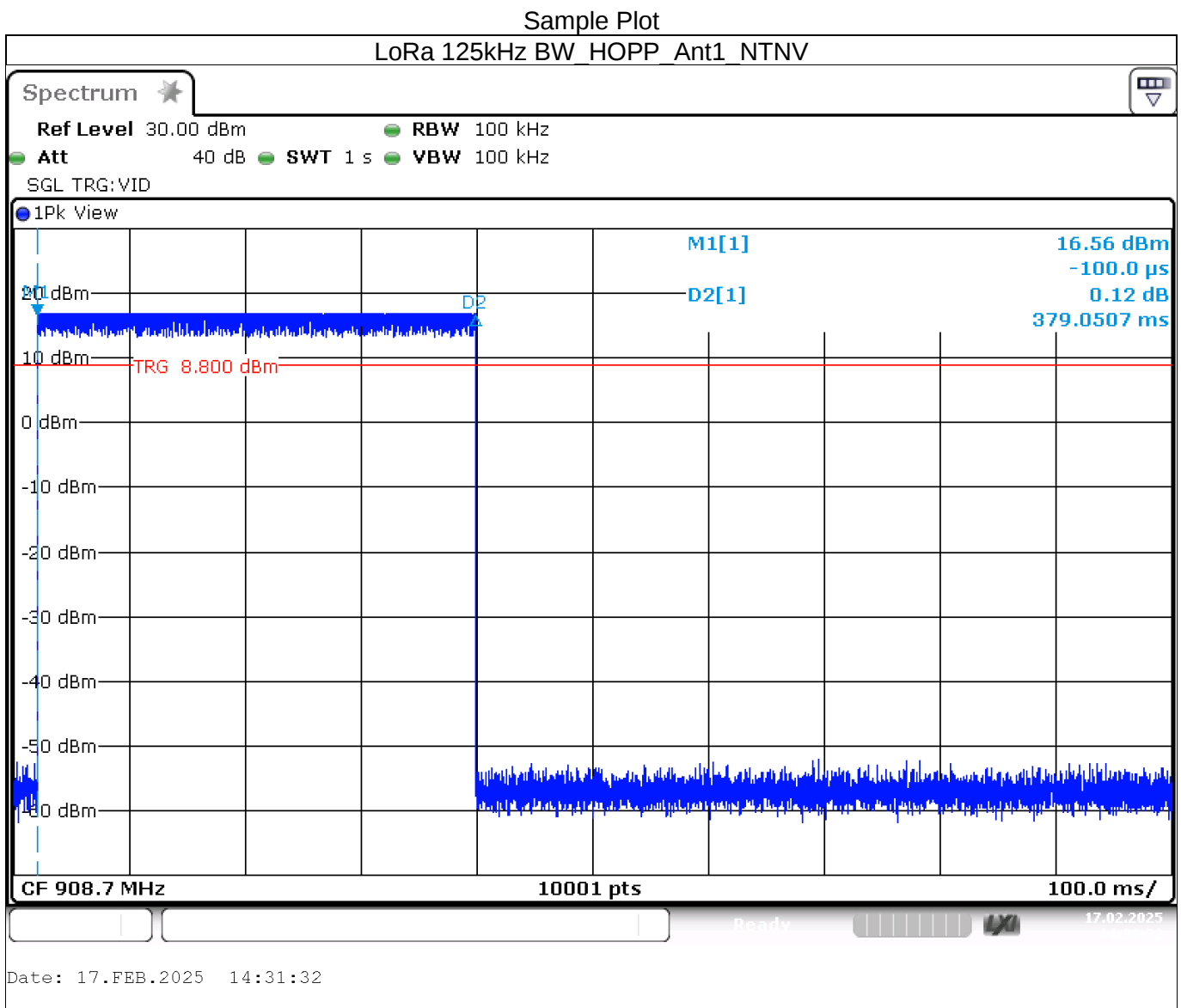
Test End Date: 17-Feb-2025

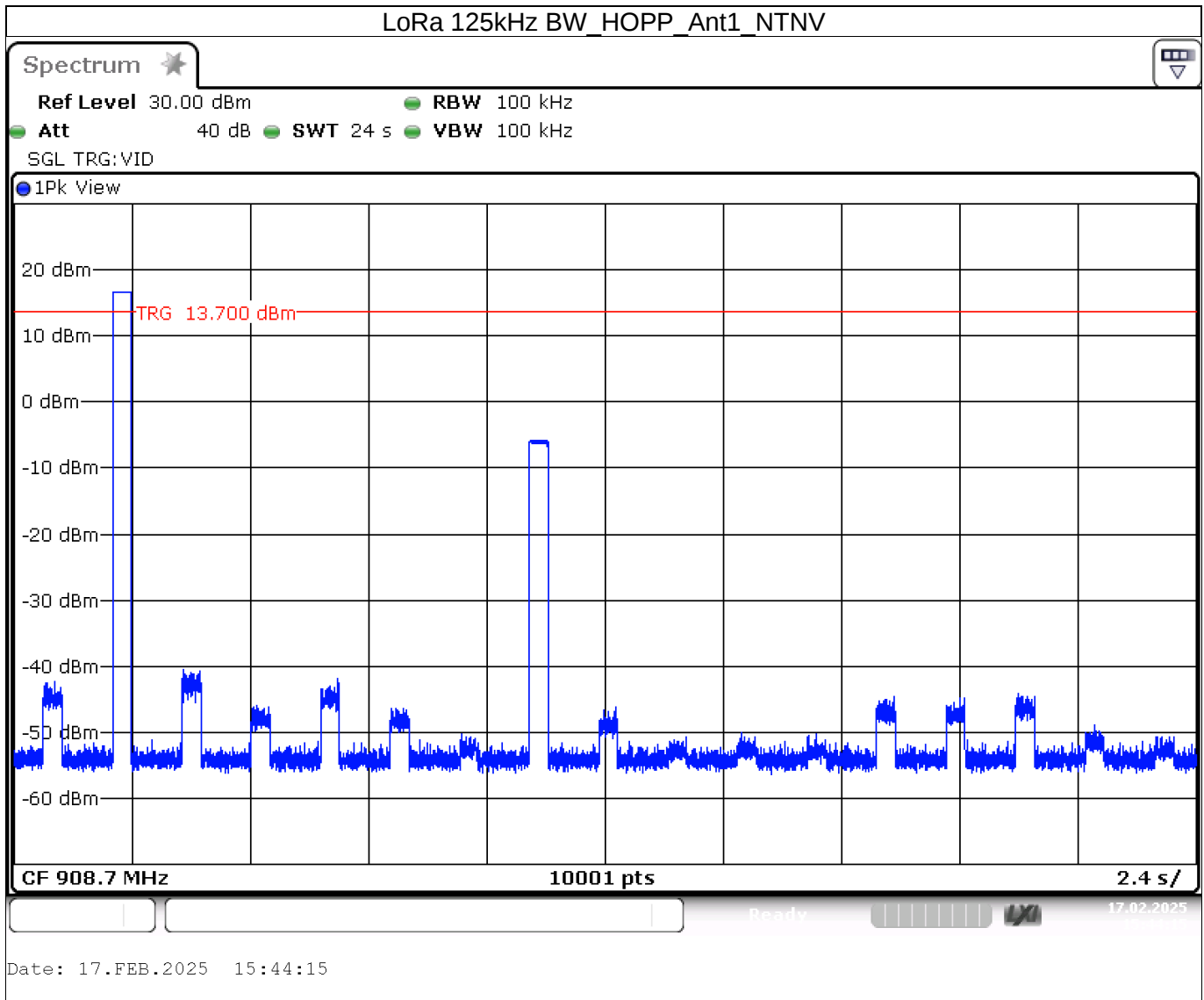
Tester: SGM

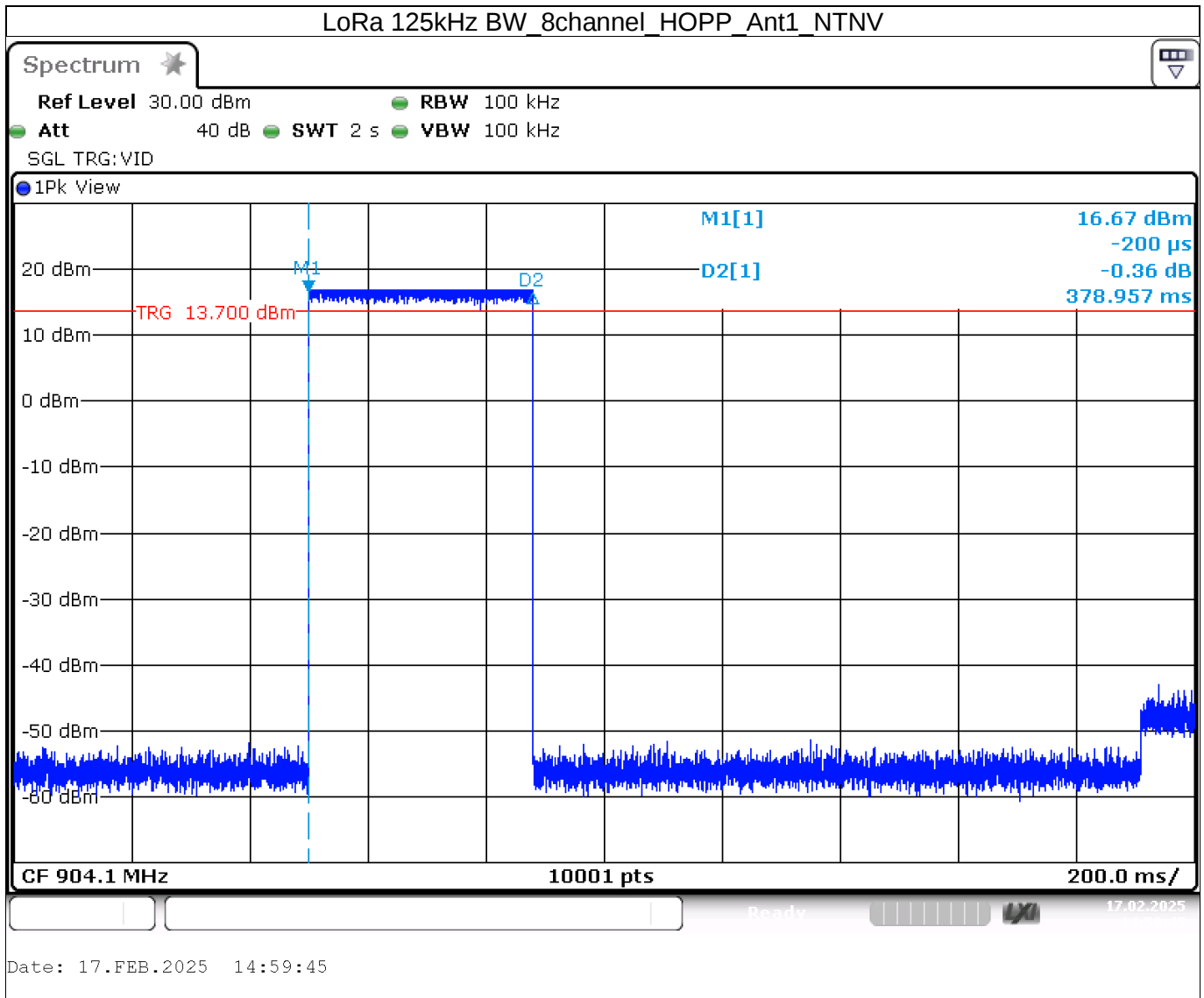
Equipment	Manufacturer	Model	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	TELEDYNE STORM MICROWAVE	084-0505-059	20108	20-Mar-2024	20-Mar-2025
TSTPASS SWITCHBOX	TSTPASS	SB2	23009	8-Apr-2024	8-Apr-2025
SIGNAL ANALYZER (TS8997)	ROHDE & SCHWARZ	FSV30	B085749	3-Jan-2024	26-Feb-2025

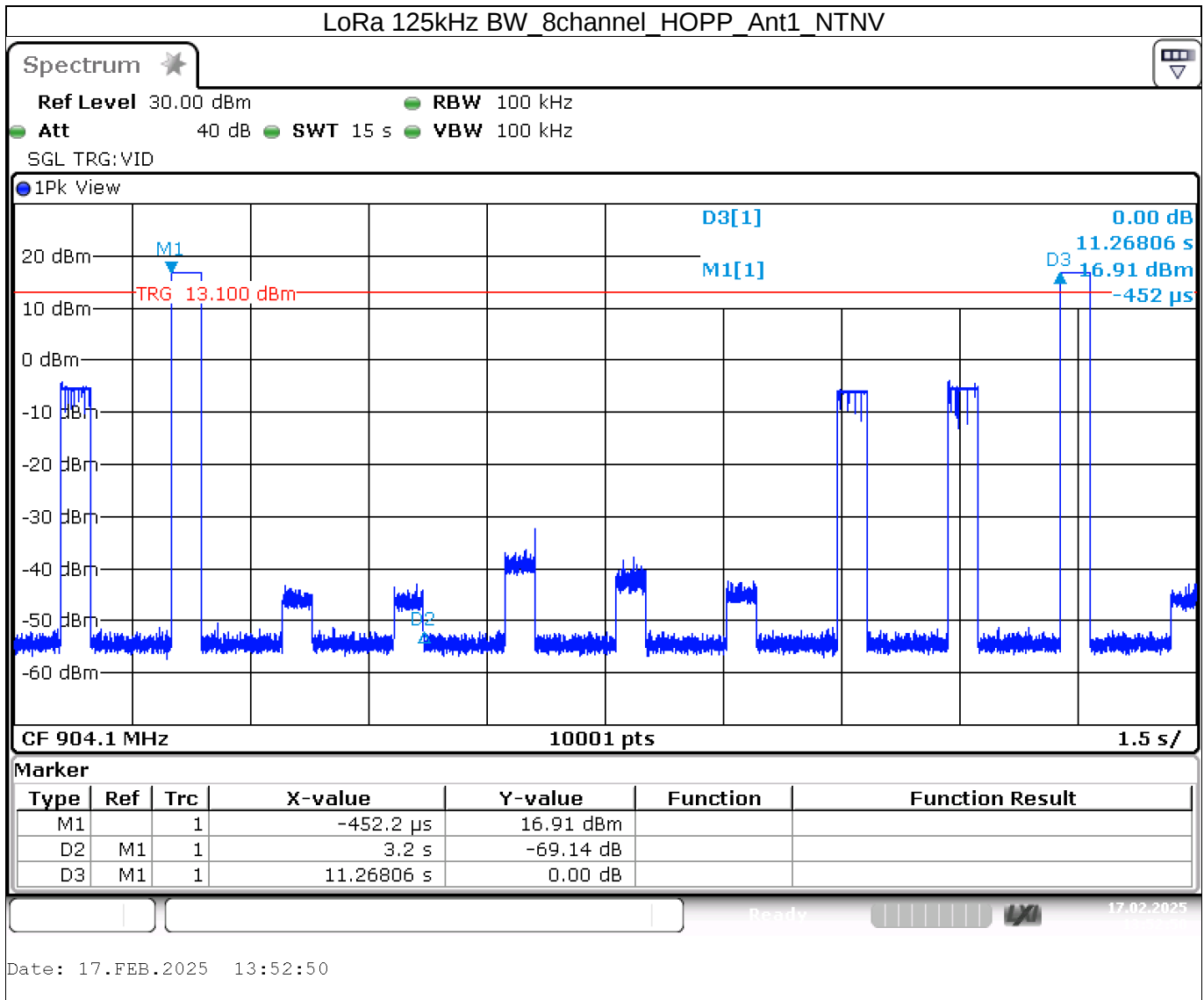
10.5 Test Data - 125 kHz Modulation

Ant1								
Mode	TX Type	Frequency (MHz)	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time	Limit (ms)	Verdict
LoRa 125kHz BW 64 Channel	SISO	HOPP	379.0507	20.000	1	379.0507ms	<=400	PASS
LoRa 125kHz BW 8 Channel	SISO	HOPP	378.957	15	1	378.957	<=400	PASS









11 AC Powerline Conducted Emissions

11.1 Test Result

Test Description	Test Specification		Test Result
AC Powerline Conducted Emissions	15.207	RSS-GEN S8.8	Complies

11.2 Test Method

With the receiver's resolution bandwidth was set to 9 kHz, exploratory scans were performed over the measuring frequency range (0.15 MHz to 30 MHz) using a max hold mode incorporating a Peak detector and Average detector and using the TILE! software. The final test data was measured using a Quasi-Peak detector and Average detector and compared against the limits indicated in the table below.

Frequency Range	Limits (dBuV)
0.15 to 0.5 MHz	Avg 56 to 46 QP 66 to 56
0.5 to 5 MHz	Avg 46 Pk 56
5 to 30 MHz	Avg 50 Pk 60

11.3 Additional information

None.

11.4 Test Site and Environmental Condition

Conducted Emissions Testing Site, San Diego, CA

Environmental Conditions

Temperature: 20 – 25 °C



Relative Humidity: 35 – 50 %

11.5 Test Setup Photographs

Test setup photographs are located in a separate report (208949-9).

11.6 Test Equipment

Test Dates: December 12, 2024

Tester:

Andreas Gillmeier

Asset No.	Type of Equipment	Model	Serial No.	Manufacturer	Cal Date	Cal Due Date
Radiated Emission < 1 GHz						
2017	EMI Receiver	N9038B	MY59050132	Keysight	10/24/2023	01/24/2025
2027	LISN	EMV216	101535	Rohde&Schwarz	01/29/2024	01/29/2025
Miscellaneous						
2036	Temp/Humidity Data Logger	GSP-8	CMA231100002	Elitech	07/09/2024	07/09/2025
-	Test Software	TILE!	V7.8.1.7	ETS Lindgren	N/A	

11.7 Test Data

Conducted Emissions Line 1

SGS NA, San Diego Regulatory Lab

Conducted Emissions

Line 1 Results

Model - Alarm.com / V730

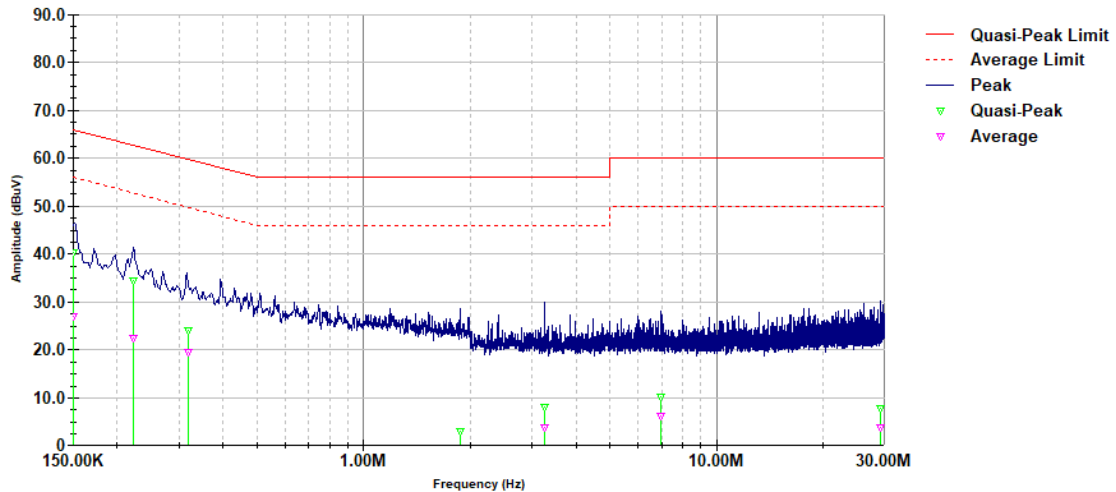
Serial # - N/A

Test Mode - 120V AC / 60 Hz, LISN 1

Operator - AG

Standard - FCC Part 15 Class B

Comments - LoRa, SF8, 914.2 MHz, 1.5n



LoRa_Tx_CISPR LISN 2024-02-06_New.tif

Last Data Update 12:20:24 PM, Thursday, December 12, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV)	Total Corr. (dB)	Margin (dB)	Limit (dBμV)
0.15	40.44	9.48	25.56	66
0.222	34.38	9.49	29.56	63.94
0.31875	24.12	9.51	37.06	61.18
1.88475	2.92	9.56	53.08	56
3.255	8.02	9.63	47.98	56
6.93375	10.09	9.83	49.91	60
29.24775	7.75	10.36	52.25	60

Average Data

Freq. (MHz)	Final AVG (dBμV)	Total Corr. (dB)	Margin (dB)	Limit (dBμV)
0.1545	27.06	9.48	28.94	56
0.1635	22.58	9.49	31.37	53.94
0.168	19.52	9.51	31.66	51.18
0.204	-1.75	9.56	47.75	46
0.50325	3.7	9.63	42.3	46
4.9875	6.24	9.83	43.76	50
15.1605	3.88	10.36	46.12	50

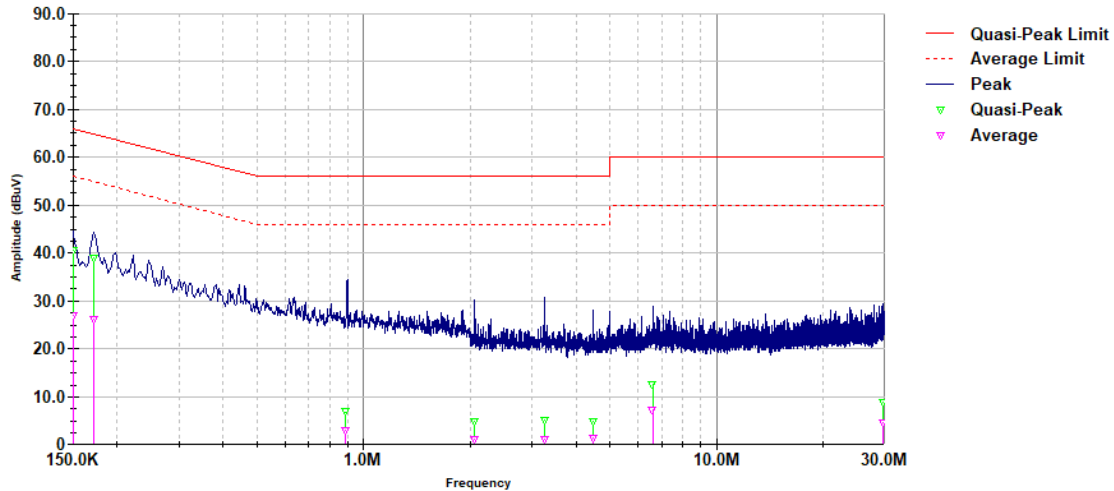
Conducted Emissions Neutral

SGS NA, San Diego Regulatory Lab

Conducted Emissions

Neutral Line Results

Model - Alarm.com / V730
Serial # - N/A
Test Mode - 120V AC / 60 Hz, LISN 1
Operator - AG
Standard - FCC Part 15 Class B
Comments - LoRa, SF8, 914.2 MHz, 1.5n



LoRa_Tx_CISPR LISN 2024-02-06_New.ttl

Last Data Update 12:17:54 PM, Thursday, December 12, 2024

Quasi-Peak Data

Freq. (MHz)	Final QP (dBμV)	Total Corr. (dB)	Margin (dB)	Limit (dBμV)
0.15	40.55	9.49	25.45	66
0.1725	38.98	9.5	26.38	65.36
0.89025	6.89	9.6	49.11	56
2.05575	4.91	9.65	51.09	56
3.246	5.08	9.71	50.92	56
4.461	4.98	9.75	51.02	56
6.5895	12.63	9.88	47.37	60
29.55825	8.89	10.52	51.11	60

Average Data

Freq. (MHz)	Final AVG (dBμV)	Total Corr. (dB)	Margin (dB)	Limit (dBμV)
0.15	27.067	9.49	28.93	56
0.1725	26.222	9.5	29.14	55.36
0.89025	3.058	9.6	42.94	46
2.05575	1.165	9.65	44.84	46
3.246	1.051	9.71	44.95	46
4.461	1.482	9.75	44.52	46
6.5895	7.265	9.88	42.74	50
29.55825	4.563	10.52	45.44	50

12 Antenna Requirement

12.1 Test Result

Test Description	Test Specification		Test Result
Antenna Requirement	15.203	RSS-GEN S6.8	Compliant

12.2 Applicable Requirement

Measurements were made using the radiated methods defined in ANSI C63.10, Section 11.12.2. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

12.3 Antenna Connection/Construction

The antennas are integral and not upgradable. The EUT has a tight construction and to access the antennas the device has to be opened which is affecting the warranty.

Additionally the user guide states "Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."

13 Measurement Uncertainty

The measurement uncertainty figures are be calculated in accordance with TR 100 028-1 [2] and correspond to an expansion factor (coverage factor) $k = 2$ (which provide confidence levels of 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Parameter	Expanded Uncertainty for Normal k factor equal to 2	
	Required	Laboratory Actual
Radio Frequency	$\pm 1 \times 10^{-5}$	$\pm 9.8 \times 10^{-8}$
total RF power, conducted	± 1.5 dB	± 1.2 dB
RF power density, conducted	± 3 dB	± 0.7 dB
spurious emissions, conducted	± 3 dB	± 2.1 dB
all emissions, radiated	± 6 dB	± 4.8 dB
temperature	$\pm 1^{\circ}\text{C}$	$\pm 0.5^{\circ}\text{C}$
humidity	± 5 %	$\pm 3.5\%$
DC and low frequency voltages	± 3 %	$\pm 0.4\%$

14 Revision History

Revision Level	Description of changes	Revision Date
Draft	Draft Release	20 February 2025
0	Initial Release	21 February 2025
1	Updated Test Report Number to EMC12	24 February 2025
2	Added Conducted Emissions section and Antenna Section 2.3	28 February 2025