# AS/NZS Test Report

| | | |
|---|---|---|
| **Equipment** | : | **LoRaWAN-enabled Gateway with Wi-Fi** |
| **Model No.** | : | **Sentrius RG191 Gateway** |
| **Brand Name** | : | **Laird Connectivity** |
| **Applicant** | : | **Laird Connectivity** |
| **Address** | : | **W66N220 Commerce Court, Cedarburg, Wisconsin 53012, USA** |
| **Standard** | : | **AS/NZS 4268:2017** |
| **Received Date** | : | **Feb. 25, 2019** |
| **Tested Date** | : | **May 08 ~ Jun. 19, 2019** |

**We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.**

**Reviewed by:** **Approved by:**

**James Fan / Assistant Manager** **Gary Chang / Manager**

Testing Laboratory 2732

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# Release Record

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| AR932202-01 | Rev. 01 | Initial issue | Jul. 25, 2019 |

# Summary of Test Results

| Ref. Std. Clause | Description | Measured | Result |
|---|---|---|---|
| 6.3 | Maximum EIRP | EIRP (dBm): 29.89 | Pass |
| Row 58 | Power Spectral Density | Meet the requirement of limit. | Pass |
| 6.4 | Transmitter Spurious Emissions | Meet the requirement of limit. | Pass |
| 6.5 | Emission Bandwidth | Meet the requirement of limit. | Pass |
| 6.6 | Operating Frequencies | Meet the requirement of limit. | Pass |
| 7.2 | Receiver Spurious Emissions | Meet the requirement of limit. | 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:** |
| The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification. |

# 1 General Description

## 1.1 Information

### 1.1.1 Specification of the Equipment under Test (EUT)

| RF General Information | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Country | Region | Frequency Range (MHz) | Type | Modulation | Test Channel Frequency (MHz) | SF | Physical bit rate (bit/s) | UL/DL | Channel Bandwidth (kHz) |
| AUSTRALIA | AS 923 | 915.4 ~ 927.7 | DTS | LoRa | 915.4, 921.6, 927.7 | 12 ~ 7 | 250 ~ 5470 | UL/DL | 125 |
| | | 915.5 ~ 927.6 | DTS | LoRa | 915.5, 921.6, 927.6 | 7 | 11000 | UL/DL | 250 |
| | AU 915 | 923.3 ~ 927.5 | DTS | LoRa | 923.3, 927.5 | 12 ~ 7 | 980 ~ 21900 | UL | 500 |
| | | 915.2 ~ 927.8 | DTS | LoRa | 915.2, 927.8 | 12 ~ 7 | 250 ~ 5470 | DL | 125 |
| | | 915.9 ~ 927.1 | DTS | LoRa | 915.9, 927.1 | 8 | 12500 | DL | 500 |
| Note: RF output power specifies that Maximum Peak Conducted Output Power. | | | | | | | | | |

### 1.1.2 Antenna Details

| Ant. No. | Brand / Model | Type | Connector | Gain (dBi) |
|---|---|---|---|---|
| 1 | LSR/001-0002 | Dipole | RP-SMA | 2 |

### 1.1.3 EUT Operational Condition

| | | | |
|---|---|---|---|
| **Power Supply Type** | 12Vdc from adapter | | |
| **Operational Voltage** | ☒ Vnom (12 Vdc) | ☒ Vmax (12.19 Vdc) | ☒ Vmin (11.81Vdc) |
| **Operational Climatic** | ☒ Tnom (20°C) | ☒ Tmax (70°C) | ☒ Tmin (-30°C) |

### 1.1.4 Accessories

| Accessories | | |
|---|---|---|
| **No.** | **Equipment** | **Description** |
| 1 | Adapter | Brand: MW<br>Model: GST25U12<br>Power Rating:<br>I/P: 100-240Vac, 50/60Hz, 0.6A<br>O/P: 12Vdc, 2.08A, 25W MAX<br>Power line: 1m non-shielded with two cores |
| 2 | RJ45 cable | Brand: BRIGHT PLUS CO., LTD<br>Model: WAS-G0736-1<br>1.81m non-shielded without core |

### 1.1.5 Test Tool and Duty Cycle

| **Test Tool** | By command | |
|---|---|---|
| **Duty Cycle and Duty Factor** | **Duty Cycle (%)** | **Duty Factor (dB)** |
| | 100 | 0 |

### 1.1.6 Power Index of Test Tool

| **Channel Bandwidth 125 kHz** | | | |
|---|---|---|---|
| **Modulation Mode** | **Test Frequency (MHz)** | | |
| | **915.4** | **921.6** | **927.7** |
| LoRa 125kHz | dig 0--mix 9--Pa3 | dig 0--mix 9--Pa3 | dig 0--mix 9--Pa3 |

| **Channel Bandwidth 250 kHz** | | | |
|---|---|---|---|
| **Modulation Mode** | **Test Frequency (MHz)** | | |
| | **915.5** | **921.6** | **927.6** |
| LoRa 250kHz | dig 0--mix 9--Pa3 | dig 0--mix 9--Pa3 | dig 0--mix 9--Pa3 |

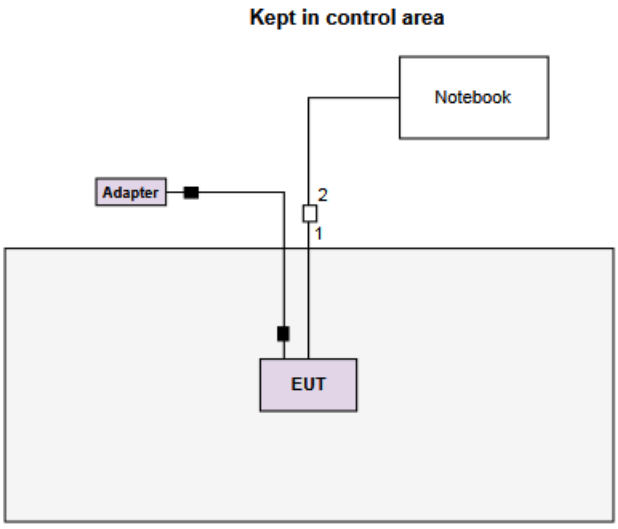
| **Channel Bandwidth 500 kHz** | | |
|---|---|---|
| **Modulation Mode** | **Test Frequency (MHz)** | |
| | **923.3** | **927.5** |
| LoRa 500kHz | dig 0--mix 9--Pa3 | dig 0--mix 9--Pa3 |

## 1.2 Local Support Equipment List

| Support Equipment List | | | | | |
|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **FCC ID** | **Remarks** |
| 1 | Notebook | DELL | Latitude E5470 | DoC | --- |
| 2 | AP | Buffalo Inc. | WRM-D2133HP | --- | Provided by applicant. |

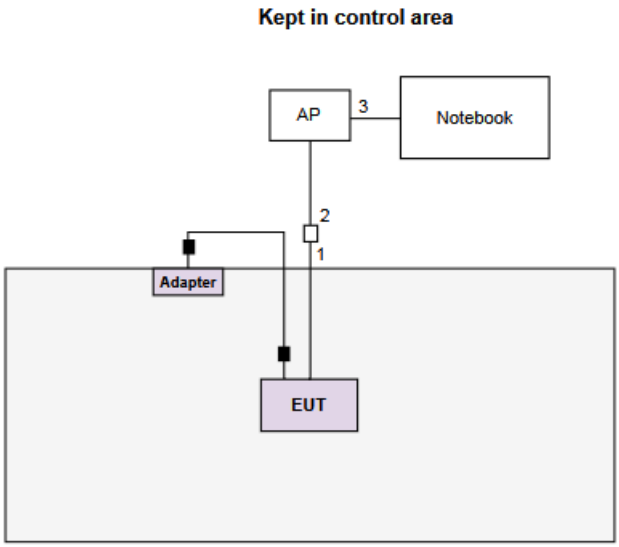
## 1.3 Test Setup Chart

**Test Setup Diagram (below 30 MHz)**




| No. | Signal cable / Length (m) |
|---|---|
| 1 | RJ45, 1.81m non-shielded. |
| 2 | RJ45, 10m non-shielded. |

**Test Setup Diagram (above 30 MHz)**




| No. | Signal cable / Length (m) |
|---|---|
| 1 | RJ45, 1.81m non-shielded. |
| 2 | RJ45, 10m non-shielded. |
| 3 | RJ45, 1.5m non-shielded. |

## 1.4 Test Equipment and Calibration Data

| Test Item | RF Conducted | | | | |
|---|---|---|---|---|---|
| Test Site | (TH01-WS) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | R&S | FSV40 | 101486 | Jan. 08, 2019 | Jan. 07, 2020 |
| TEMP&HUMIDITY CHAMBER | GIANT FORCE | GCT-225-40-SP-SD | MAF1212-002 | Dec. 05, 2018 | Dec. 04, 2019 |
| Power Sensor | Agilent | U2021XA | MY53480019 | Jan. 30, 2019 | Jan. 29, 2020 |
| AC POWER SOURCE | APC | AFC-500W | F312060012 | Nov. 29, 2018 | Nov. 28, 2019 |
| Measurement Software | Sporton | Sporton_1 | 1.3.30 | NA | NA |
| Measurement Software | Agilent | EN RF test | 1.1501125 | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

| Test Item | Radiated Emission | | | | |
|---|---|---|---|---|---|
| Test Site | 966 chamber1 / (03CH01-WS) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | R&S | FSV40 | 101498 | Dec. 27, 2018 | Dec. 26, 2019 |
| Receiver | R&S | ESR3 | 101658 | Dec. 11, 2018 | Dec. 10, 2019 |
| Bilog Antenna | SCHWARZBECK | VULB9168 | VULB9168-522 | Jul. 18, 2018 | Jul. 17, 2019 |
| Horn Antenna 1G-18G | SCHWARZBECK | BBHA 9120 D | BBHA 9120 D 1096 | Dec. 18, 2018 | Dec. 17, 2019 |
| Horn Antenna 18G-40G | SCHWARZBECK | BBHA 9170 | BBHA 9170517 | Nov. 15, 2018 | Nov. 14, 2019 |
| Loop Antenna | R&S | HFH2-Z2 | 100330 | Nov. 09, 2018 | Nov. 08, 2019 |
| Loop Antenna Cable | KOAX KABEL | 101354-BW | 101354-BW | Oct. 08, 2018 | Oct. 07, 2019 |
| Preamplifier | EMC | EMC02325 | 980225 | Jul. 20, 2018 | Jul. 19, 2019 |
| Preamplifier | Agilent | 83017A | MY39501308 | Oct. 04, 2018 | Oct. 03, 2019 |
| Preamplifier | EMC | EMC184045B | 980192 | Aug. 09, 2018 | Aug. 08, 2019 |
| RF Cable | EMC | EMC104-SM-SM-8000 | 181106 | Oct. 08, 2018 | Oct. 07, 2019 |
| RF Cable | HUBER+SUHNER | SUCOFLEX104 | MY16019/4 | Oct. 08, 2018 | Oct. 07, 2019 |
| RF Cable | HUBER+SUHNER | SUCOFLEX104 | MY16014/4 | Oct. 08, 2018 | Oct. 07, 2019 |
| LF cable 1M | EMC | EMCCFD400-NM-NM-1000 | 160502 | Oct. 08, 2018 | Oct. 07, 2019 |
| LF cable 3M | Woken | CFD400NL-LW | CFD400NL-001 | Oct. 08, 2018 | Oct. 07, 2019 |
| LF cable 10M | Woken | CFD400NL-LW | CFD400NL-002 | Oct. 08, 2018 | Oct. 07, 2019 |
| Measurement Software | AUDIX | e3 | 6.120210g | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

| Test Item | Radiated Emissions | | | | |
|---|---|---|---|---|---|
| **Test Site** | (10CH01-HY) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Receiver | Keysight | N9038A | MY54130031 | Nov. 06, 2018 | Nov. 05, 2019 |
| Loop Antenna | R&S | HFH2-Z2 | 100330 | Nov. 09, 2018 | Nov. 08, 2019 |
| RF Cable-R10m | Suhner Switzerland + Rosenberger | RG223/U + UAA220A-0 | CB022-DOOR | Nov. 11, 2018 | Nov. 10, 2019 |
| Turn Table | HD | DT 60 RPS | 1513/004/00 | NA | NA |
| Software | AUDIX | e3 | 6.120210g | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

## 1.5 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

AS/NZS 4268:2017

## 1.6 Deviation from Test Standard and Measurement Procedure

None

## 1.7 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).

| Measurement Uncertainty | |
|---|---|
| **Parameters** | **Uncertainty** |
| Radio Frequency | $\pm 1.4 \times 10^{-9}$ |
| RF Power Conducted | ±0.808 dB |
| RF Power Radiated | ±3.398 dB |
| Spurious Emission, Conducted | ±2.470 dB |
| Spurious Emission, Radiated | ±3.398 dB |
| Humidity | ±0.8 $^{o}$C |
| Temperature | ±4.7% |
| Time | ±0.1% |

# 2 Test Configuration

## 2.1 Testing Condition

| Testing Location | | |
|---|---|---|
| ☒ | ICC Lab | ADD : No.3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan (R.O.C.)<br>TEL : 886-3-271-8666 FAX : 886-3-318-0155 |
| ☒ | Sporton Lab | ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)<br>TEL : 886-3-327-3456 FAX : 886-3-327-0973 |

| Test Item | Test Site | Ambient Condition | Conducted / Radiated measurement | TX/RX test | Tested By |
|---|---|---|---|---|---|
| RF Conducted | TH01-WS | 25.2°C / 62% | Conducted | TX | Ryan Lee |
| Radiated Emission > 30 MHz | 03CH01-WS | 22-24°C / 64-66% | Radiated | TX<br>RX | Akun Chung<br>Aska Huang |
| Radiated Emission ≤ 30 MHz | 10CH01-HY* | 25°C / 65% | Radiated | TX<br>RX | Jack Li |

Note: * ICC lab subcontracts this test item to Sporton Lab (TAF:1190).

Sporton Lab is a TAF accreditation test firm and also is an approved provider of ICC lab.

## 2.2 The Worst Test Modes and Channel Details

| Test item | Configuration | Test Frequency (MHz) | Conducted / Radiated measurement | TX/RX test | SF | Mode |
|---|---|---|---|---|---|---|
| EIRP | LoRa 125 kHz<br>LoRa 250 kHz<br>LoRa 500 kHz | 915.4 / 921.6 / 927.7<br>915.5 / 921.6 / 927.6<br>923.3 / 927.5 | Conducted | TX | 12<br>7<br>12 | AS923 |
| Power Spectral Density | | | Conducted | | | |
| Emission Bandwidth | | | Conducted | | | |
| Operating Frequencies | | | Conducted | | | |
| Transmitter Spurious Emissions | | | Radiated | | | |

**NOTE:**

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Z-plane** result was found as the worst case and was shown in this report.

| Test item | Test Mode | Conducted / Radiated measurement | TX/RX test | SF | Mode |
|---|---|---|---|---|---|
| Receiver Spurious Emissions | LoRa RX | Radiated | RX | 12 | AS923 RX<br>AU915 RX |

**NOTE:**

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Z-plane** result was found as the worst case and was shown in this report.

# 3 Transmitter Test Results

## 3.1 Maximum EIRP & Power Spectral Density

### 3.1.1 Maximum EIRP & Power Spectral Density Limit

| Permitted Operating Frequency Band (MHz) | Maximum EIRP | Other Requirements |
|---|---|---|
| 915 to 928 | 1W (30dBm) | The radiated peak power spectral density in any 3 kHz is limited to 25 mW (14dBm) per 3 kHz. |

Note: Limit is from AS/NZS 4268:2017

### 3.1.2 Test Procedures

**Conducted Power**

A broadband RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

**ERIP**

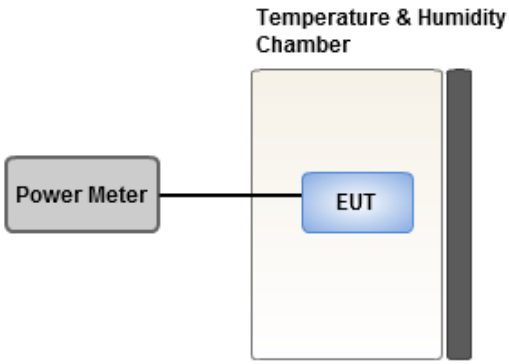
Antenna gain is added to measured conducted power

**Power Density**

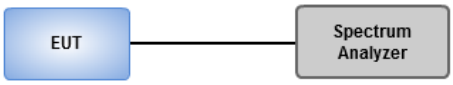
Set the RBW = 3 kHz, VBW = 10 kHz., Detector = RMS, Sweep time = auto couple,
Sweep time = auto couple.
Employ trace averaging (RMS) mode over a minimum of 100 traces.
Use the peak marker function to determine the maximum amplitude level.
Add antenna gain to measured Power density

### 3.1.3 Test Setup

**Conducted Power**




**Power Density**



### 3.1.4 Test Result of EIRP

**LoRa 125 kHz**

| Condition | Freqeuncy (MHz) | EIRP Power (dBm) | EIRP Limit (dBm) |
|---|---|---|---|
| $T_{nom}V_{nom}$ | 915.4 | 27.15 | 30 |
| $T_{min}V_{max}$ | 915.4 | 29.87 | 30 |
| $T_{min}V_{min}$ | 915.4 | 29.89 | 30 |
| $T_{max}V_{max}$ | 915.4 | 25.08 | 30 |
| $T_{max}V_{min}$ | 915.4 | 25.05 | 30 |
| $T_{nom}V_{nom}$ | 921.6 | 26.97 | 30 |
| $T_{min}V_{max}$ | 921.6 | 29.74 | 30 |
| $T_{min}V_{min}$ | 921.6 | 29.77 | 30 |
| $T_{max}V_{max}$ | 921.6 | 24.77 | 30 |
| $T_{max}V_{min}$ | 921.6 | 24.75 | 30 |
| $T_{nom}V_{nom}$ | 927.7 | 25.82 | 30 |
| $T_{min}V_{max}$ | 927.7 | 28.85 | 30 |
| $T_{min}V_{min}$ | 927.7 | 28.88 | 30 |
| $T_{max}V_{max}$ | 927.7 | 23.67 | 30 |
| $T_{max}V_{min}$ | 927.7 | 23.65 | 30 |

**LoRa 250 kHz**

| Condition | Freqeuncy (MHz) | EIRP Power (dBm) | EIRP Limit (dBm) |
|---|---|---|---|
| $T_{nom}V_{nom}$ | 915.5 | 27.16 | 30 |
| $T_{min}V_{max}$ | 915.5 | 29.70 | 30 |
| $T_{min}V_{min}$ | 915.5 | 29.72 | 30 |
| $T_{max}V_{max}$ | 915.5 | 25.10 | 30 |
| $T_{max}V_{min}$ | 915.5 | 25.08 | 30 |
| $T_{nom}V_{nom}$ | 921.6 | 26.93 | 30 |
| $T_{min}V_{max}$ | 921.6 | 29.47 | 30 |
| $T_{min}V_{min}$ | 921.6 | 29.49 | 30 |
| $T_{max}V_{max}$ | 921.6 | 24.90 | 30 |
| $T_{max}V_{min}$ | 921.6 | 24.88 | 30 |
| $T_{nom}V_{nom}$ | 927.6 | 25.74 | 30 |
| $T_{min}V_{max}$ | 927.6 | 28.63 | 30 |
| $T_{min}V_{min}$ | 927.6 | 28.65 | 30 |
| $T_{max}V_{max}$ | 927.6 | 23.68 | 30 |
| $T_{max}V_{min}$ | 927.6 | 23.66 | 30 |

**LoRa 500 kHz**

| Condition | Freqeuncy (MHz) | EIRP Power (dBm) | EIRP Limit (dBm) |
|---|---|---|---|
| $T_{nom}V_{nom}$ | 923.3 | 26.57 | 30 |
| $T_{min}V_{max}$ | 923.3 | 29.57 | 30 |
| $T_{min}V_{min}$ | 923.3 | 29.60 | 30 |
| $T_{max}V_{max}$ | 923.3 | 24.18 | 30 |
| $T_{max}V_{min}$ | 923.3 | 24.16 | 30 |
| $T_{nom}V_{nom}$ | 927.5 | 25.74 | 30 |
| $T_{min}V_{max}$ | 927.5 | 28.82 | 30 |
| $T_{min}V_{min}$ | 927.5 | 28.86 | 30 |
| $T_{max}V_{max}$ | 927.5 | 23.32 | 30 |
| $T_{max}V_{min}$ | 927.5 | 23.29 | 30 |

### 3.1.5 Test Result of Power Density

**LoRa 125 kHz**

| Modulation Mode | Freqeuncy (MHz) | EIRP Power Density (dBm/3kHz) | EIRP Limit (dBm/3kHz) |
|---|---|---|---|
| LoRa | 915.4 | 12.96 | 14 |
| LoRa | 921.6 | 12.09 | 14 |
| LoRa | 927.7 | 11.26 | 14 |

**LoRa 250 kHz**

| Modulation Mode | Freqeuncy (MHz) | EIRP Power Density (dBm/3kHz) | EIRP Limit (dBm/3kHz) |
|---|---|---|---|
| LoRa | 915.5 | 8.84 | 14 |
| LoRa | 921.6 | 8.86 | 14 |
| LoRa | 927.6 | 7.48 | 14 |

**LoRa 500 kHz**

| Modulation Mode | Freqeuncy (MHz) | EIRP Power Density (dBm/3kHz) | EIRP Limit (dBm/3kHz) |
|---|---|---|---|
| LoRa | 923.3 | 6.67 | 14 |
| LoRa | 927.5 | 5.94 | 14 |

## 3.2 Transmitter Spurious Emissions

### 3.2.1 Transmitter Spurious Emissions Limit

| Spurious Emissions Limit (Peak Power) | Frequency Range | Measurement Bandwidth |
|---|---|---|
| -56 dBW (2.5μW) e.i.r.p (59 dBμV/m at 10 metres) | < 150 kHz | 1 kHz |
| | 150 kHz – 30 MHz | 10 kHz |

Note: Limit is from "NEW ZEALAND https://gazette.govt.nz/notice/id/2015-go694 Table 2"

| 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:** Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit **Note 2:** Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade. | | | |

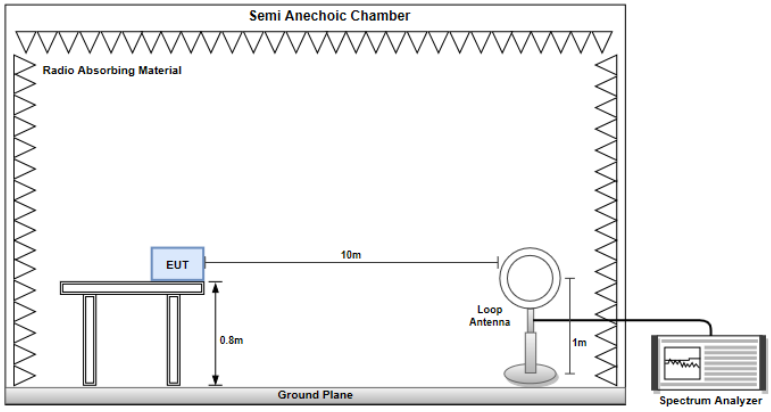
Note: Limit is from FCC Part 15.209

### 3.2.2 Test Procedures

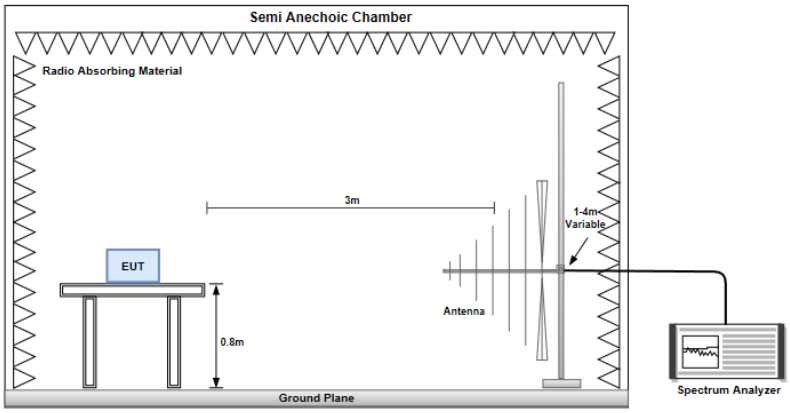
Reference to clause 6.2.1 of AS/NZS 4268:2017.

### 3.2.3 Test Setup

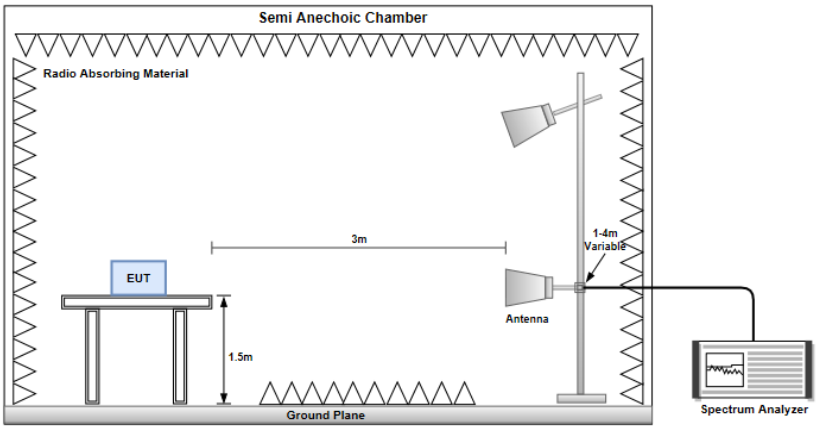
**Below 30MHz**




**Below 1GHz**



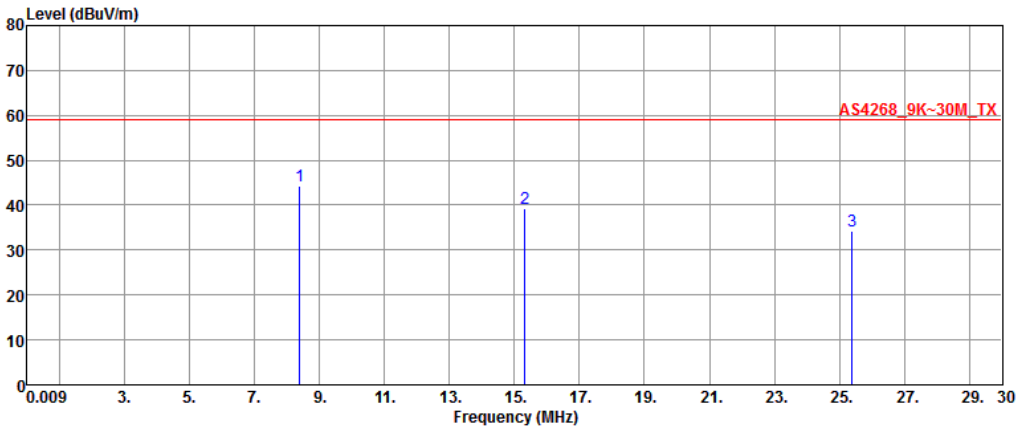

**Above 1 GHz**



### 3.2.4 Transmitter Spurious Emissions (≤ 30MHz)

**LoRa 125 kHz**

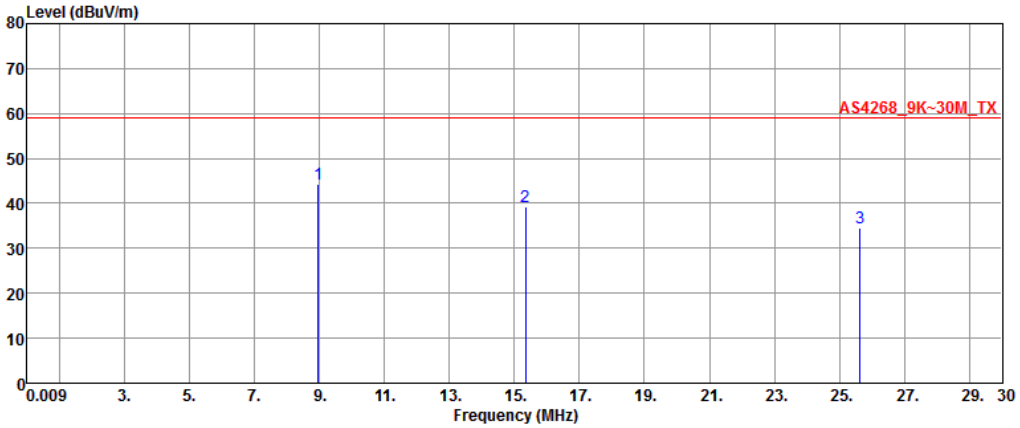
| **Modulation** | LoRa | **Test Freq. (MHz)** | 915.4 |
|---|---|---|---|
| **Frequency** | 9kHz~30MHz | **Loop** | open |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.39 | 44.26 | 59.00 | -14.74 | 20.17 | 24.09 |
| 2 | 15.33 | 39.35 | 59.00 | -19.65 | 21.23 | 18.12 |
| 3 | 25.39 | 34.33 | 59.00 | -24.67 | 22.07 | 12.26 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

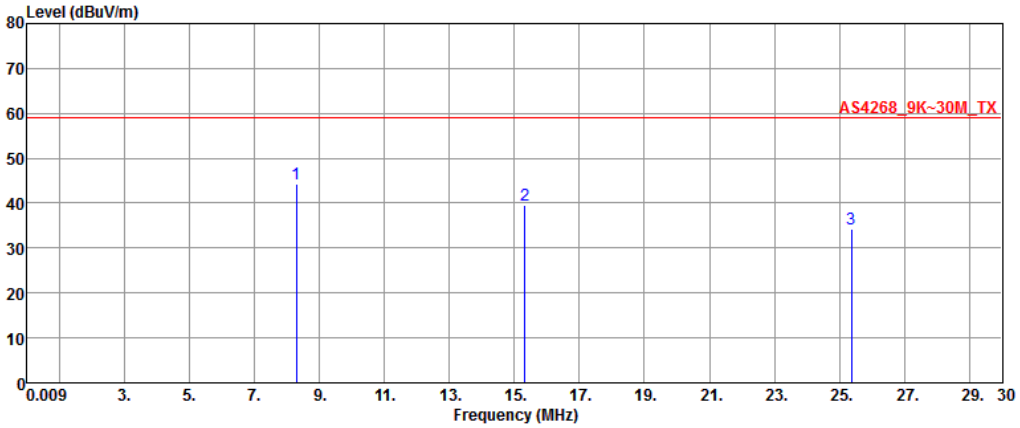
| Modulation | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Frequency | 9kHz~30MHz | Loop | open |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.95 | 44.26 | 59.00 | -14.74 | 20.23 | 24.03 |
| 2 | 15.35 | 39.27 | 59.00 | -19.73 | 21.24 | 18.03 |
| 3 | 25.64 | 34.54 | 59.00 | -24.46 | 22.08 | 12.46 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| Modulation | LoRa | Test Freq. (MHz) | 927.7 |
|---|---|---|---|
| Frequency | 9kHz~30MHz | Loop | open |

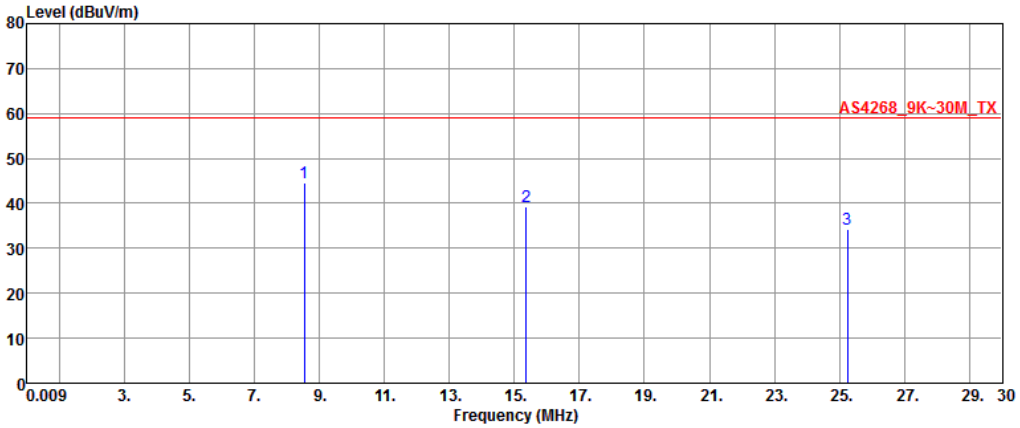



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.29 | 44.24 | 59.00 | -14.76 | 20.16 | 24.08 |
| 2 | 15.33 | 39.41 | 59.00 | -19.59 | 21.23 | 18.18 |
| 3 | 25.37 | 34.37 | 59.00 | -24.63 | 22.05 | 12.32 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

**LoRa 250 kHz**

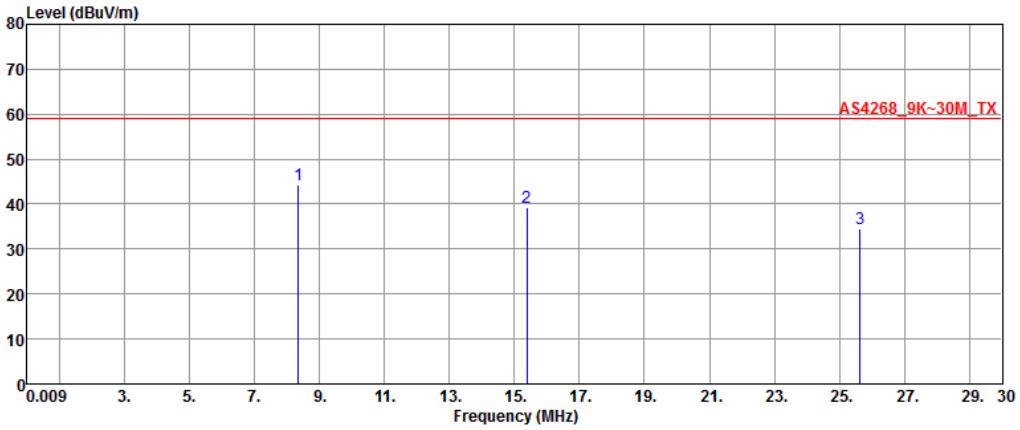
| **Modulation** | LoRa | **Test Freq. (MHz)** | 915.5 |
|---|---|---|---|
| **Frequency** | 9kHz~30MHz | **Loop** | open |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.52 | 44.48 | 59.00 | -14.52 | 20.19 | 24.29 |
| 2 | 15.36 | 39.14 | 59.00 | -19.86 | 21.24 | 17.90 |
| 3 | 25.25 | 34.26 | 59.00 | -24.74 | 22.05 | 12.21 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

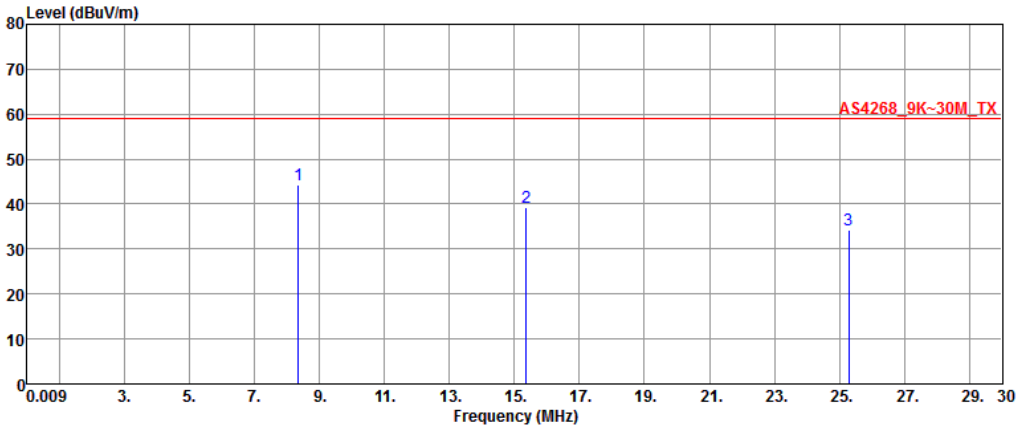
| Modulation | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Frequency | 9kHz~30MHz | Loop | open |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.35 | 44.24 | 59.00 | -14.76 | 20.17 | 24.07 |
| 2 | 15.38 | 39.36 | 59.00 | -19.64 | 21.24 | 18.12 |
| 3 | 25.63 | 34.59 | 59.00 | -24.41 | 22.07 | 12.52 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| Modulation | LoRa | Test Freq. (MHz) | 927.6 |
|---|---|---|---|
| Frequency | 9kHz~30MHz | Loop | open |

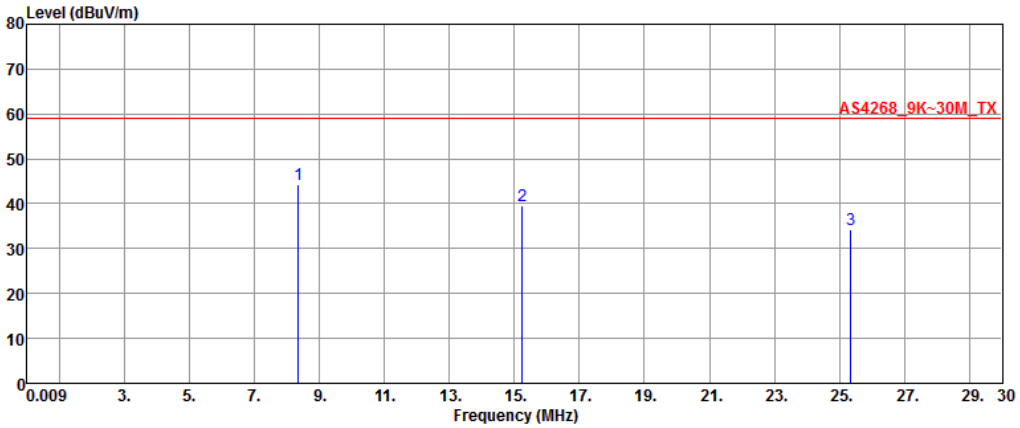



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.35 | 44.21 | 59.00 | -14.79 | 20.17 | 24.04 |
| 2 | 15.36 | 39.26 | 59.00 | -19.74 | 21.24 | 18.02 |
| 3 | 25.30 | 34.22 | 59.00 | -24.78 | 22.05 | 12.17 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

**LoRa 500 kHz**

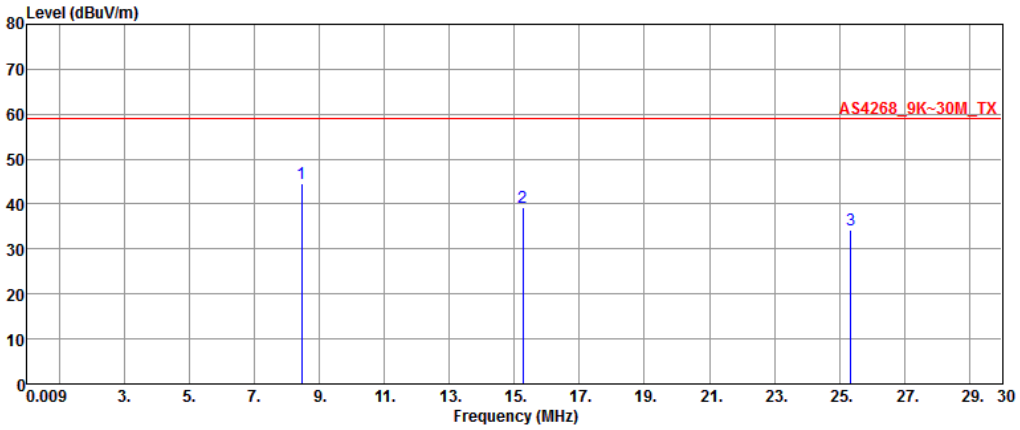
| **Modulation** | LoRa | **Test Freq. (MHz)** | 923.3 |
|---|---|---|---|
| **Frequency** | 9kHz~30MHz | **Loop** | open |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.36 | 44.37 | 59.00 | -14.63 | 20.17 | 24.20 |
| 2 | 15.25 | 39.65 | 59.00 | -19.35 | 21.22 | 18.43 |
| 3 | 25.35 | 34.14 | 59.00 | -24.86 | 22.05 | 12.09 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| Modulation | LoRa | Test Freq. (MHz) | 927.5 |
|---|---|---|---|
| Frequency | 9kHz~30MHz | Loop | open |



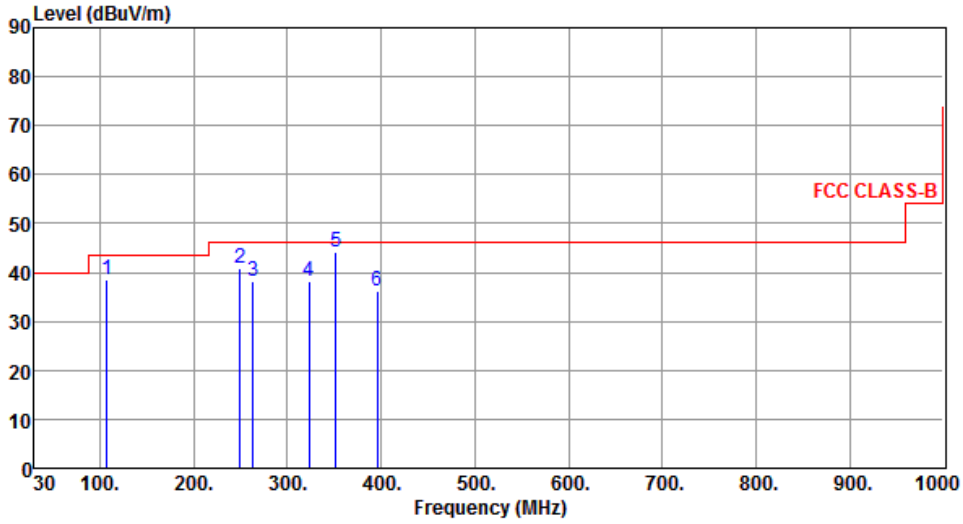

| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.45 | 44.71 | 59.00 | -14.29 | 20.19 | 24.52 |
| 2 | 15.26 | 39.26 | 59.00 | -19.74 | 21.22 | 18.04 |
| 3 | 25.35 | 34.37 | 59.00 | -24.63 | 22.05 | 12.32 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

### 3.2.5 Transmitter Spurious Emissions (Below 1GHz)

**LoRa 125 kHz**

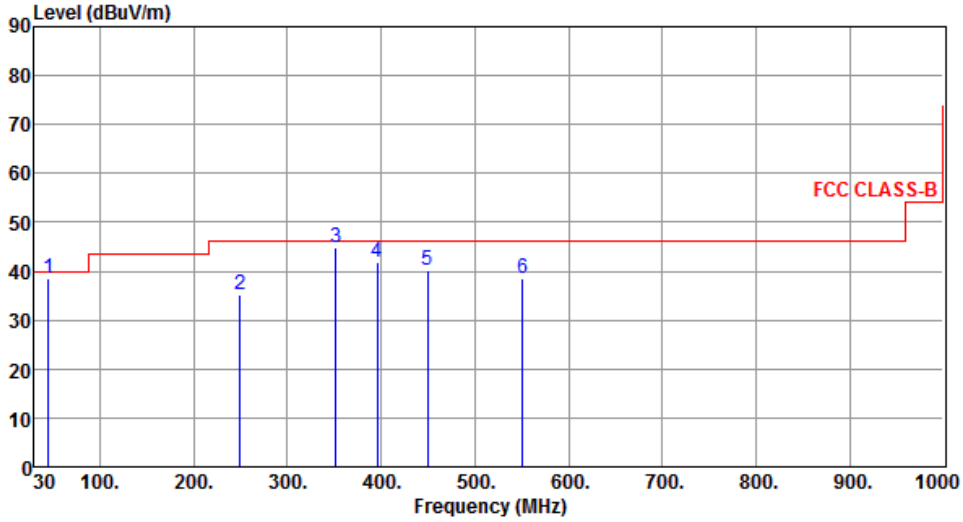
| **Modulation Mode** | LoRa | **Test Freq. (MHz)** | 915.4 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 107.85 | 38.57 | 43.50 | -4.93 | 50.34 | -11.77 | Peak | --- | --- |
| 2 | 249.22 | 40.90 | 46.00 | -5.10 | 50.29 | -9.39 | Peak | --- | --- |
| 3 | 263.77 | 38.19 | 46.00 | -7.81 | 47.06 | -8.87 | Peak | --- | --- |
| 4 | 322.94 | 38.28 | 46.00 | -7.72 | 45.45 | -7.17 | Peak | --- | --- |
| 5 | 352.04 | 44.18 | 46.00 | -1.82 | 50.59 | -6.41 | QP | 100 | 168 |
| 6 | 395.69 | 36.15 | 46.00 | -9.85 | 41.34 | -5.19 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

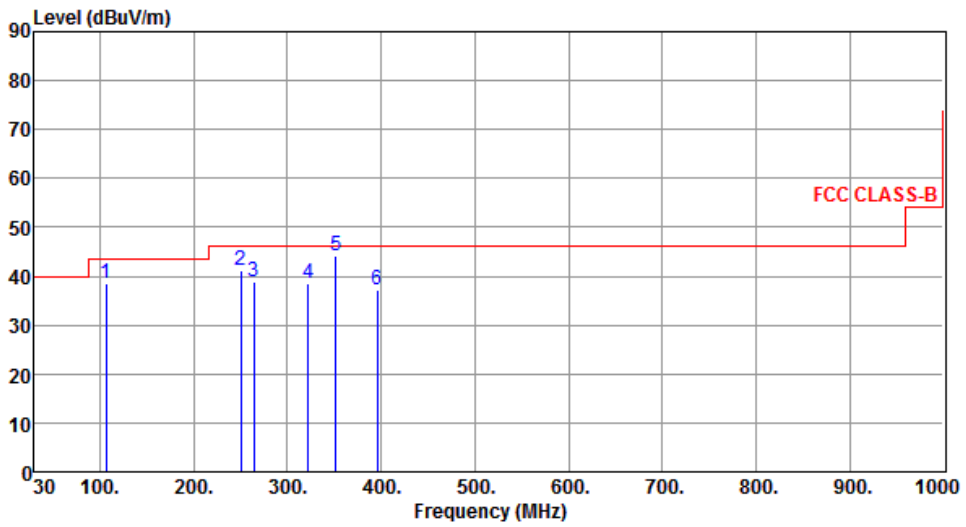
| Modulation Mode | LoRa | Test Freq. (MHz) | 915.4 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 44.82 | 38.69 | 40.00 | -1.31 | 46.55 | -7.86 | QP | 107 | 344 |
| 2 | 249.22 | 35.22 | 46.00 | -10.78 | 44.61 | -9.39 | Peak | --- | --- |
| 3 | 352.04 | 44.74 | 46.00 | -1.26 | 51.15 | -6.41 | QP | 154 | 69 |
| 4 | 395.69 | 41.97 | 46.00 | -4.03 | 47.16 | -5.19 | Peak | --- | --- |
| 5 | 450.01 | 40.27 | 46.00 | -5.73 | 44.17 | -3.90 | Peak | --- | --- |
| 6 | 550.89 | 38.52 | 46.00 | -7.48 | 40.21 | -1.69 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

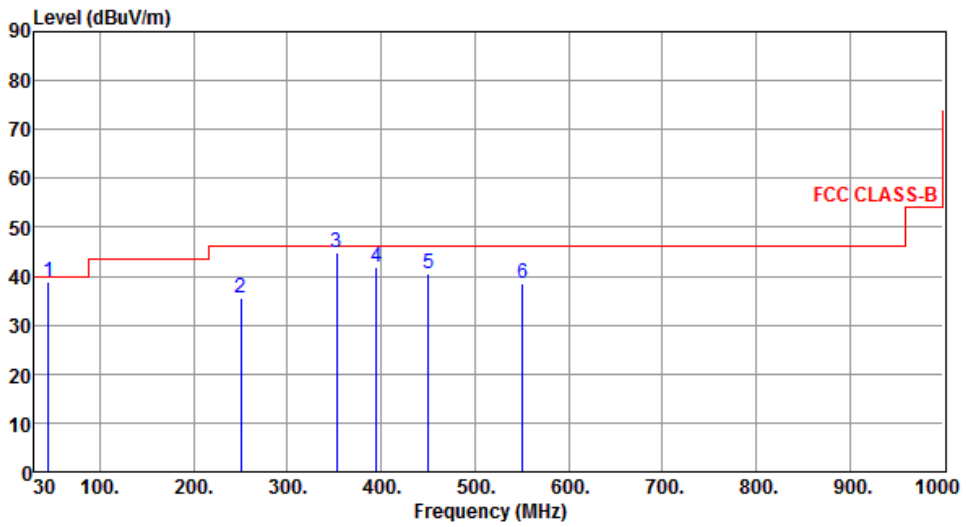
| Modulation Mode | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 106.84 | 38.66 | 43.50 | -4.84 | 50.54 | -11.88 | Peak | --- | --- |
| 2 | 250.24 | 41.23 | 46.00 | -4.77 | 50.58 | -9.35 | Peak | --- | --- |
| 3 | 264.24 | 38.85 | 46.00 | -7.15 | 47.69 | -8.84 | Peak | --- | --- |
| 4 | 321.89 | 38.63 | 46.00 | -7.37 | 45.83 | -7.20 | Peak | --- | --- |
| 5 | 352.00 | 44.28 | 46.00 | -1.72 | 50.69 | -6.41 | QP | 100 | 169 |
| 6 | 395.85 | 37.22 | 46.00 | -8.78 | 42.40 | -5.18 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

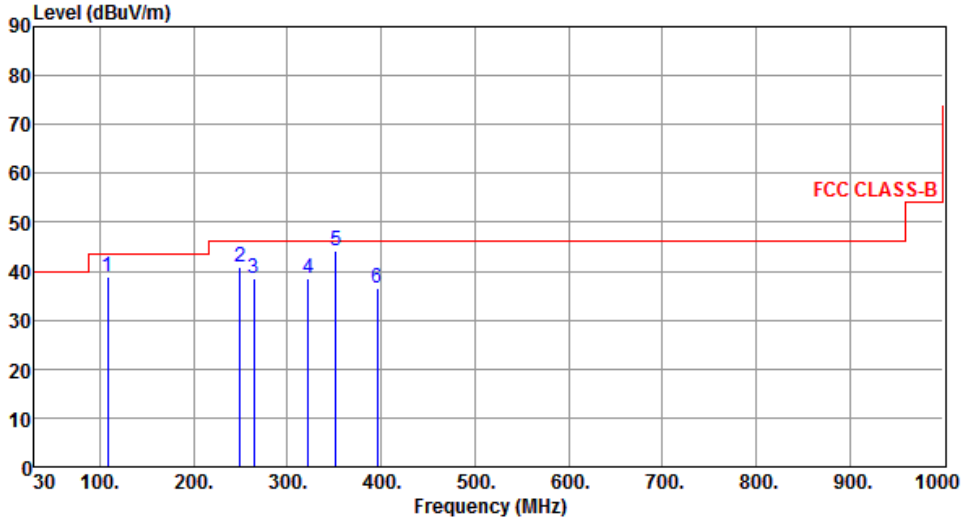
| Modulation Mode | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 44.96 | 38.74 | 40.00 | -1.26 | 46.58 | -7.84 | QP | 109 | 335 |
| 2 | 250.54 | 35.37 | 46.00 | -10.63 | 44.71 | -9.34 | Peak | --- | --- |
| 3 | 352.17 | 44.82 | 46.00 | -1.18 | 51.23 | -6.41 | QP | 150 | 71 |
| 4 | 395.41 | 41.85 | 46.00 | -4.15 | 47.04 | -5.19 | Peak | --- | --- |
| 5 | 450.28 | 40.42 | 46.00 | -5.58 | 44.31 | -3.89 | Peak | --- | --- |
| 6 | 550.96 | 38.63 | 46.00 | -7.37 | 40.32 | -1.69 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

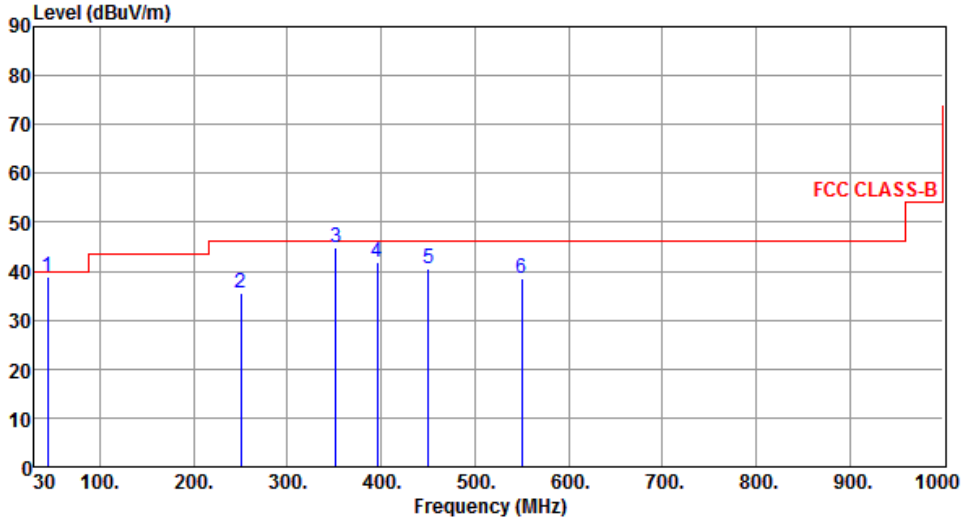
| Modulation Mode | LoRa | Test Freq. (MHz) | 927.7 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 108.44 | 38.95 | 43.50 | -4.55 | 50.61 | -11.66 | Peak | --- | --- |
| 2 | 249.85 | 40.88 | 46.00 | -5.12 | 50.25 | -9.37 | Peak | --- | --- |
| 3 | 264.24 | 38.54 | 46.00 | -7.46 | 47.38 | -8.84 | Peak | --- | --- |
| 4 | 322.45 | 38.54 | 46.00 | -7.46 | 45.73 | -7.19 | Peak | --- | --- |
| 5 | 352.00 | 44.25 | 46.00 | -1.75 | 50.66 | -6.41 | QP | 100 | 165 |
| 6 | 395.85 | 36.37 | 46.00 | -9.63 | 41.55 | -5.18 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| Modulation Mode | LoRa | Test Freq. (MHz) | 927.7 |
|---|---|---|---|
| Polarization | Vertical | | |

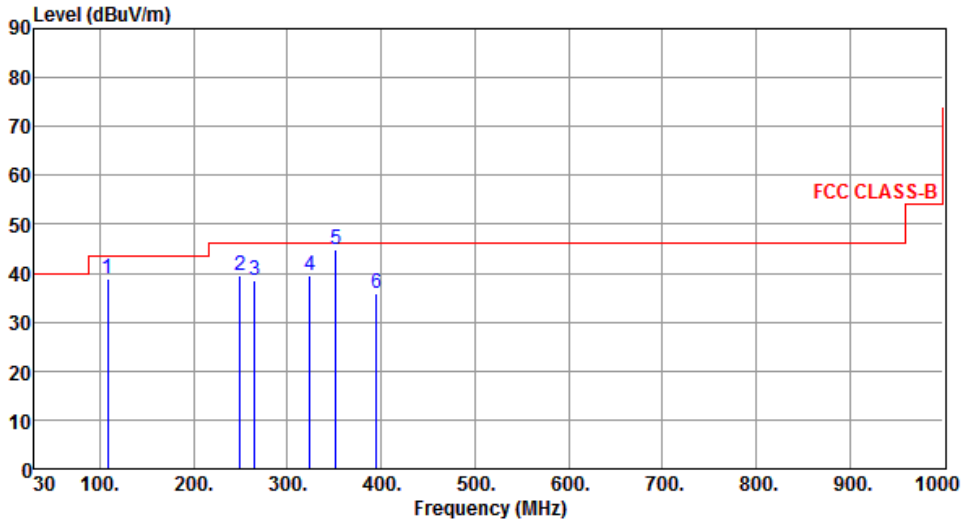



| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 44.23 | 38.74 | 40.00 | -1.26 | 46.66 | -7.92 | QP | 105 | 345 |
| 2 | 250.21 | 35.41 | 46.00 | -10.59 | 44.76 | -9.35 | Peak | --- | --- |
| 3 | 352.11 | 44.69 | 46.00 | -1.31 | 51.10 | -6.41 | QP | 148 | 67 |
| 4 | 395.74 | 41.88 | 46.00 | -4.12 | 47.07 | -5.19 | Peak | --- | --- |
| 5 | 450.24 | 40.39 | 46.00 | -5.61 | 44.29 | -3.90 | Peak | --- | --- |
| 6 | 550.47 | 38.65 | 46.00 | -7.35 | 40.36 | -1.71 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

**LoRa 250 kHz**

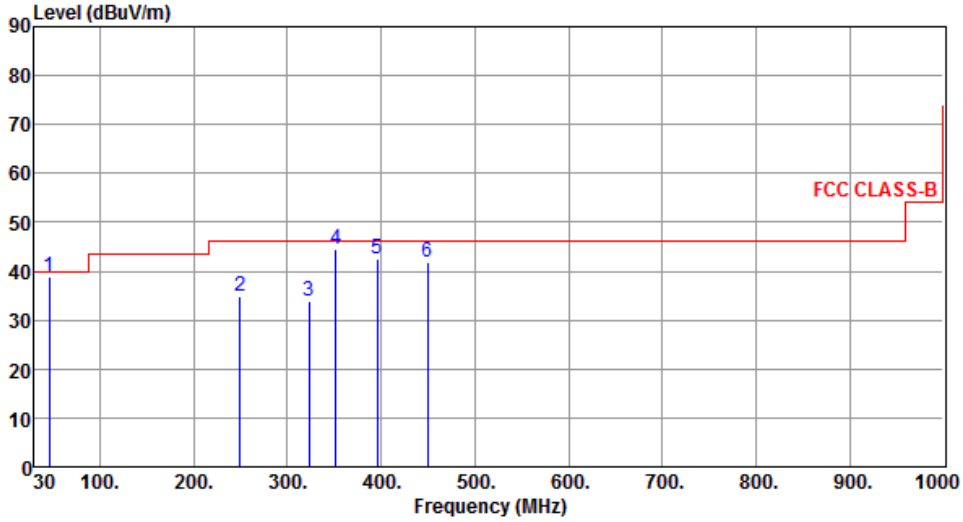
| **Modulation Mode** | LoRa | **Test Freq. (MHz)** | 915.5 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 107.86 | 38.96 | 43.50 | -4.54 | 50.72 | -11.76 | Peak | --- | --- |
| 2 | 249.85 | 39.57 | 46.00 | -6.43 | 48.94 | -9.37 | Peak | --- | --- |
| 3 | 264.84 | 38.54 | 46.00 | -7.46 | 47.36 | -8.82 | Peak | --- | --- |
| 4 | 324.21 | 39.42 | 46.00 | -6.58 | 46.57 | -7.15 | Peak | --- | --- |
| 5 | 352.00 | 44.85 | 46.00 | -1.15 | 51.26 | -6.41 | QP | 100 | 157 |
| 6 | 395.45 | 35.82 | 46.00 | -10.18 | 41.01 | -5.19 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

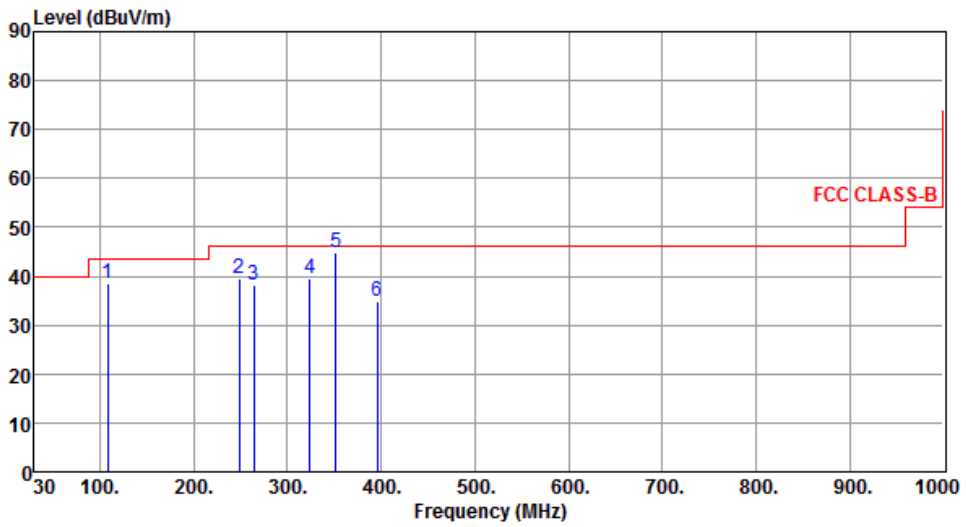
| Modulation Mode | LoRa | Test Freq. (MHz) | 915.5 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 45.63 | 38.74 | 40.00 | -1.26 | 46.52 | -7.78 | QP | 107 | 341 |
| 2 | 249.45 | 34.84 | 46.00 | -11.16 | 44.22 | -9.38 | Peak | --- | --- |
| 3 | 322.85 | 33.74 | 46.00 | -12.26 | 40.92 | -7.18 | Peak | --- | --- |
| 4 | 352.00 | 44.45 | 46.00 | -1.55 | 50.86 | -6.41 | QP | 157 | 61 |
| 5 | 395.54 | 42.57 | 46.00 | -3.43 | 47.76 | -5.19 | Peak | --- | --- |
| 6 | 449.45 | 41.85 | 46.00 | -4.15 | 45.77 | -3.92 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

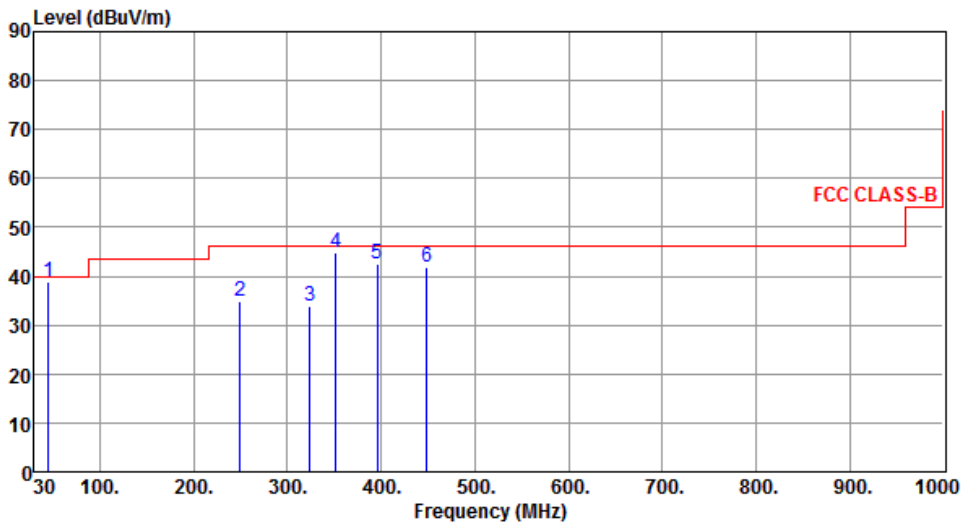
| Modulation Mode | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 108.45 | 38.41 | 43.50 | -5.09 | 50.07 | -11.66 | Peak | --- | --- |
| 2 | 248.85 | 39.54 | 46.00 | -6.46 | 48.93 | -9.39 | Peak | --- | --- |
| 3 | 264.24 | 38.18 | 46.00 | -7.82 | 47.02 | -8.84 | Peak | --- | --- |
| 4 | 323.85 | 39.42 | 46.00 | -6.58 | 46.57 | -7.15 | Peak | --- | --- |
| 5 | 352.00 | 44.75 | 46.00 | -1.25 | 51.16 | -6.41 | QP | 100 | 155 |
| 6 | 396.25 | 34.88 | 46.00 | -11.12 | 40.06 | -5.18 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

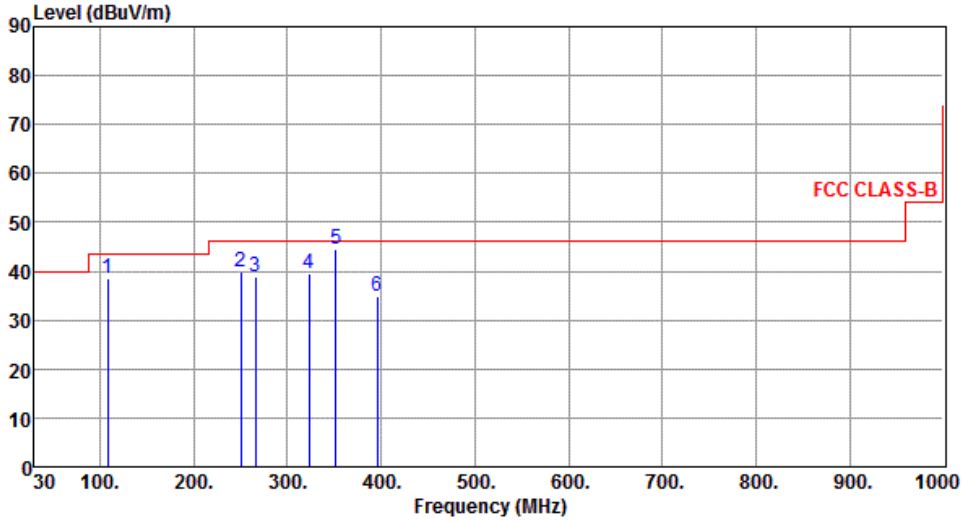
| Modulation Mode | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 45.37 | 38.71 | 40.00 | -1.29 | 46.51 | -7.80 | QP | 107 | 352 |
| 2 | 249.85 | 34.88 | 46.00 | -11.12 | 44.25 | -9.37 | Peak | --- | --- |
| 3 | 323.63 | 33.74 | 46.00 | -12.26 | 40.90 | -7.16 | Peak | --- | --- |
| 4 | 352.00 | 44.87 | 46.00 | -1.13 | 51.28 | -6.41 | QP | 148 | 62 |
| 5 | 395.54 | 42.44 | 46.00 | -3.56 | 47.63 | -5.19 | Peak | --- | --- |
| 6 | 448.85 | 41.86 | 46.00 | -4.14 | 45.79 | -3.93 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

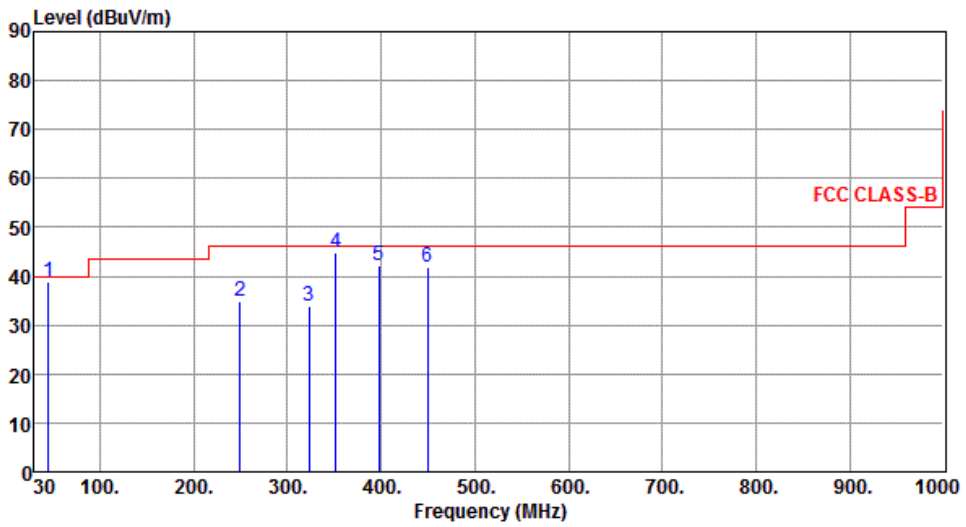
| Modulation Mode | LoRa | Test Freq. (MHz) | 927.6 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 108.54 | 38.66 | 43.50 | -4.84 | 50.30 | -11.64 | Peak | --- | --- |
| 2 | 250.21 | 39.88 | 46.00 | -6.12 | 49.23 | -9.35 | Peak | --- | --- |
| 3 | 265.54 | 38.74 | 46.00 | -7.26 | 47.53 | -8.79 | Peak | --- | --- |
| 4 | 323.41 | 39.41 | 46.00 | -6.59 | 46.57 | -7.16 | Peak | --- | --- |
| 5 | 352.00 | 44.52 | 46.00 | -1.48 | 50.93 | -6.41 | QP | 100 | 162 |
| 6 | 396.24 | 34.88 | 46.00 | -11.12 | 40.06 | -5.18 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| Modulation Mode | LoRa | Test Freq. (MHz) | 927.6 |
|---|---|---|---|
| Polarization | Vertical | | |

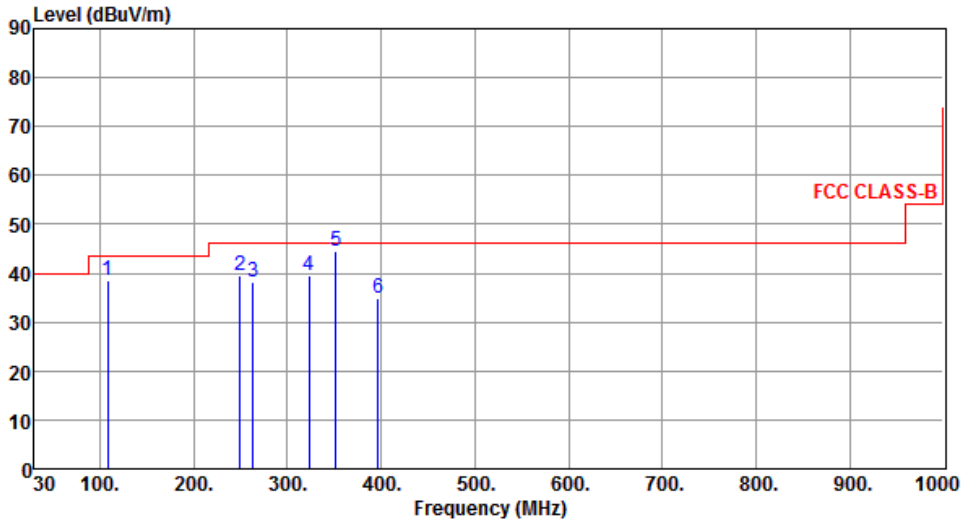



| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 45.36 | 38.74 | 40.00 | -1.26 | 46.54 | -7.80 | QP | 108 | 352 |
| 2 | 249.67 | 34.81 | 46.00 | -11.19 | 44.19 | -9.38 | Peak | --- | --- |
| 3 | 323.55 | 33.74 | 46.00 | -12.26 | 40.90 | -7.16 | Peak | --- | --- |
| 4 | 352.00 | 44.88 | 46.00 | -1.12 | 51.29 | -6.41 | QP | 148 | 63 |
| 5 | 397.21 | 42.14 | 46.00 | -3.86 | 47.30 | -5.16 | Peak | --- | --- |
| 6 | 449.82 | 41.88 | 46.00 | -4.12 | 45.79 | -3.91 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

**LoRa 500 kHz**

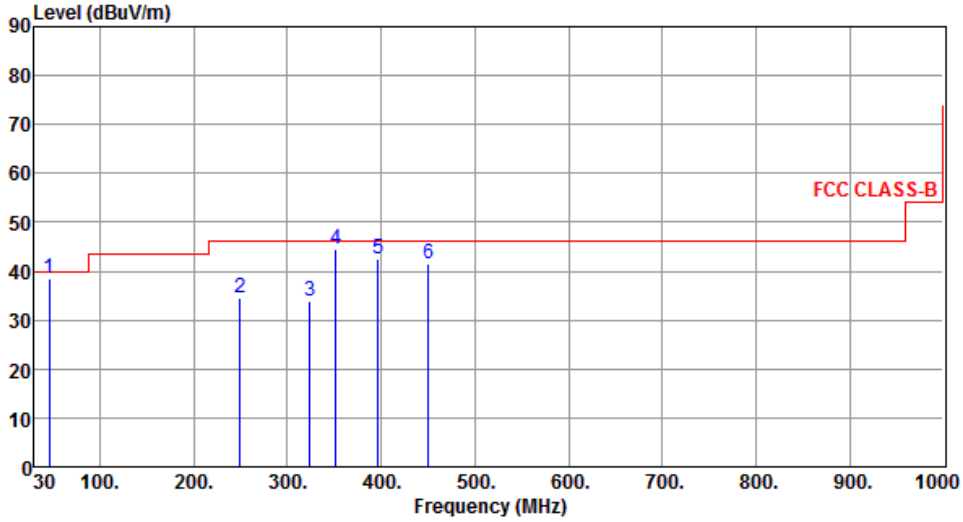
| **Modulation Mode** | LoRa | **Test Freq. (MHz)** | 923.3 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 107.89 | 38.55 | 43.50 | -4.95 | 50.31 | -11.76 | Peak | --- | --- |
| 2 | 249.58 | 39.63 | 46.00 | -6.37 | 49.01 | -9.38 | Peak | --- | --- |
| 3 | 263.58 | 38.25 | 46.00 | -7.75 | 47.13 | -8.88 | Peak | --- | --- |
| 4 | 323.52 | 39.45 | 46.00 | -6.55 | 46.61 | -7.16 | Peak | --- | --- |
| 5 | 352.00 | 44.62 | 46.00 | -1.38 | 51.03 | -6.41 | QP | 100 | 155 |
| 6 | 396.54 | 34.84 | 46.00 | -11.16 | 40.01 | -5.17 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

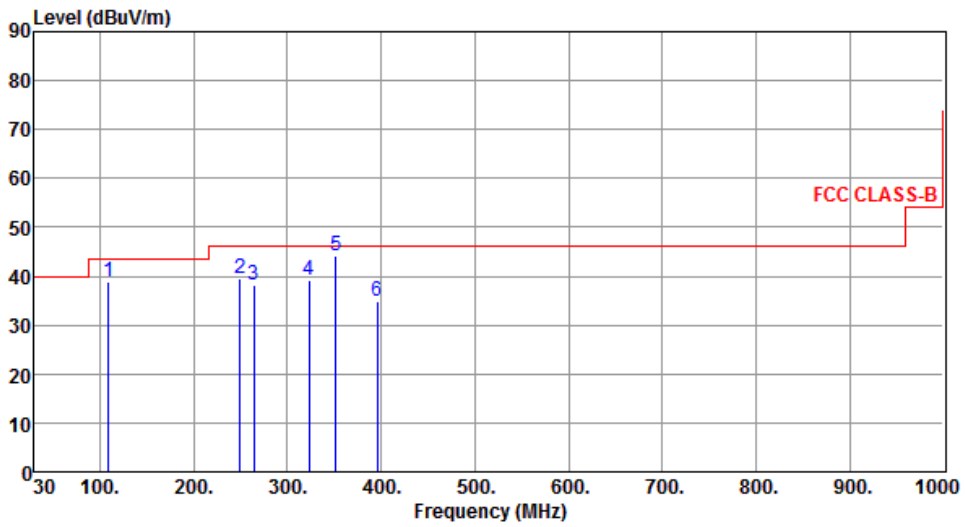
| Modulation Mode | LoRa | Test Freq. (MHz) | 923.3 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 45.63 | 38.54 | 40.00 | -1.46 | 46.32 | -7.78 | QP | 102 | 335 |
| 2 | 249.85 | 34.69 | 46.00 | -11.31 | 44.06 | -9.37 | Peak | --- | --- |
| 3 | 323.84 | 33.97 | 46.00 | -12.03 | 41.12 | -7.15 | Peak | --- | --- |
| 4 | 352.00 | 44.41 | 46.00 | -1.59 | 50.82 | -6.41 | QP | 162 | 58 |
| 5 | 396.54 | 42.47 | 46.00 | -3.53 | 47.64 | -5.17 | Peak | --- | --- |
| 6 | 450.21 | 41.57 | 46.00 | -4.43 | 45.47 | -3.90 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

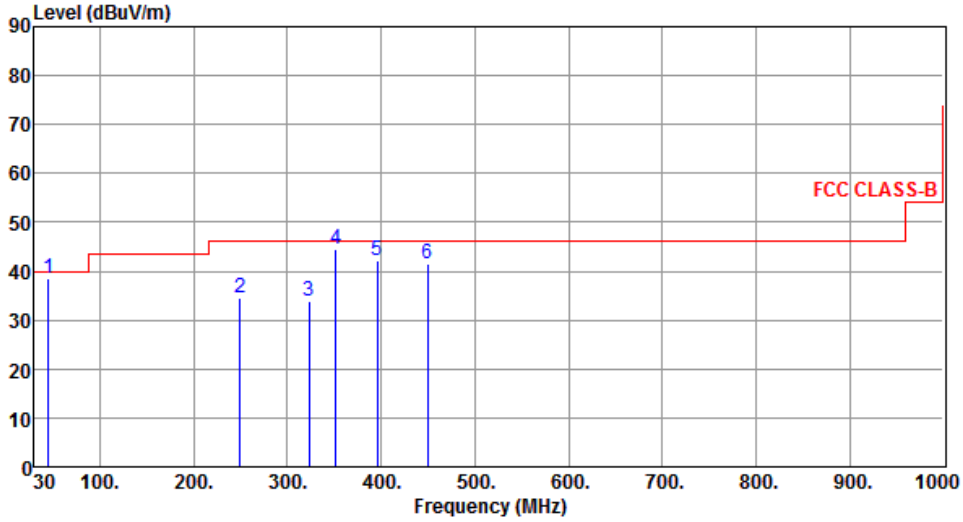
| Modulation Mode | LoRa | Test Freq. (MHz) | 927.5 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 108.96 | 38.74 | 43.50 | -4.76 | 50.30 | -11.56 | Peak | --- | --- |
| 2 | 249.60 | 39.36 | 46.00 | -6.64 | 48.74 | -9.38 | Peak | --- | --- |
| 3 | 264.00 | 38.06 | 46.00 | -7.94 | 46.92 | -8.86 | Peak | --- | --- |
| 4 | 323.20 | 39.23 | 46.00 | -6.77 | 46.40 | -7.17 | Peak | --- | --- |
| 5 | 352.00 | 44.21 | 46.00 | -1.79 | 50.62 | -6.41 | QP | 100 | 158 |
| 6 | 396.00 | 34.97 | 46.00 | -11.03 | 40.15 | -5.18 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| Modulation Mode | LoRa | Test Freq. (MHz) | 927.5 |
|---|---|---|---|
| Polarization | Vertical | | |



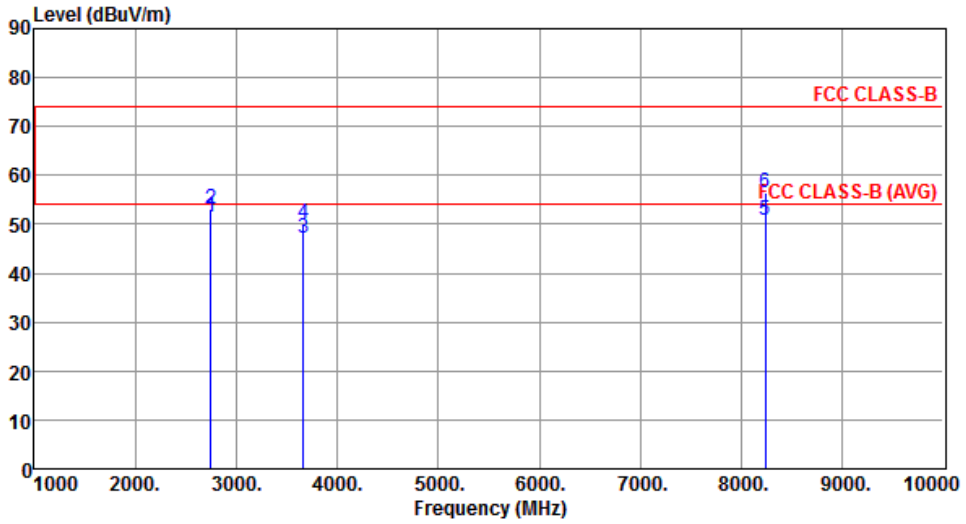

| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 45.28 | 38.63 | 40.00 | -1.37 | 46.44 | -7.81 | QP | 105 | 348 |
| 2 | 249.60 | 34.52 | 46.00 | -11.48 | 43.90 | -9.38 | Peak | --- | --- |
| 3 | 323.20 | 33.89 | 46.00 | -12.11 | 41.06 | -7.17 | Peak | --- | --- |
| 4 | 352.00 | 44.57 | 46.00 | -1.43 | 50.98 | -6.41 | QP | 154 | 63 |
| 5 | 396.00 | 42.28 | 46.00 | -3.72 | 47.46 | -5.18 | Peak | --- | --- |
| 6 | 449.60 | 41.45 | 46.00 | -4.55 | 45.37 | -3.92 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

### 3.2.6 Transmitter Spurious Emissions (Above 1GHz)

**LoRa 125 kHz**

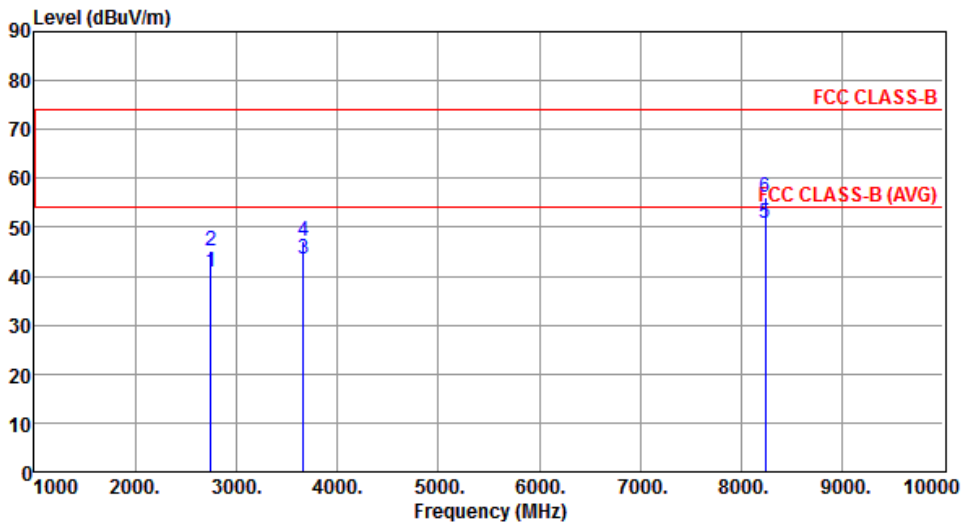
| **Modulation Mode** | LoRa | **Test Freq. (MHz)** | 915.4 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2746.20 | 51.32 | 54.00 | -2.68 | 53.68 | -2.36 | Average | 242 | 2 |
| 2 | 2746.20 | 53.01 | 74.00 | -20.99 | 55.37 | -2.36 | Peak | 242 | 2 |
| 3 | 3661.60 | 47.25 | 54.00 | -6.75 | 46.95 | 0.30 | Average | 125 | 311 |
| 4 | 3661.60 | 50.18 | 74.00 | -23.82 | 49.88 | 0.30 | Peak | 125 | 311 |
| 5 | 8238.60 | 50.87 | 54.00 | -3.13 | 41.68 | 9.19 | Average | 125 | 321 |
| 6 | 8238.60 | 56.48 | 74.00 | -17.52 | 47.29 | 9.19 | Peak | 125 | 321 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

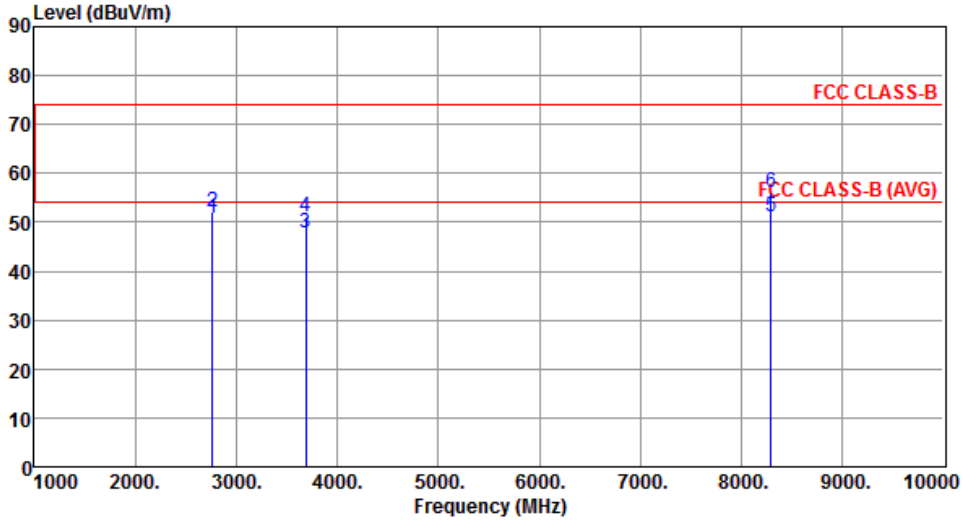
| Modulation Mode | LoRa | Test Freq. (MHz) | 915.4 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2746.20 | 40.87 | 54.00 | -13.13 | 43.23 | -2.36 | Average | 121 | 251 |
| 2 | 2746.20 | 45.01 | 74.00 | -28.99 | 47.37 | -2.36 | Peak | 121 | 251 |
| 3 | 3661.60 | 43.35 | 54.00 | -10.65 | 43.05 | 0.30 | Average | 132 | 328 |
| 4 | 3661.60 | 47.24 | 74.00 | -26.76 | 46.94 | 0.30 | Peak | 132 | 328 |
| 5 | 8238.60 | 50.71 | 54.00 | -3.29 | 41.52 | 9.19 | Average | 201 | 358 |
| 6 | 8238.60 | 56.00 | 74.00 | -18.00 | 46.81 | 9.19 | Peak | 201 | 358 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

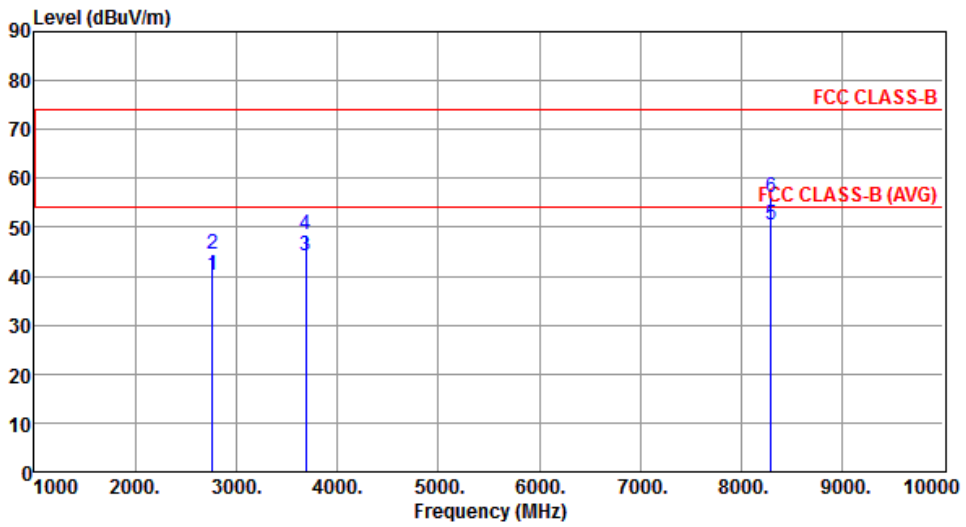
| Modulation Mode | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2764.80 | 50.71 | 54.00 | -3.29 | 52.94 | -2.23 | Average | 213 | 358 |
| 2 | 2764.80 | 52.19 | 74.00 | -21.81 | 54.42 | -2.23 | Peak | 213 | 358 |
| 3 | 3686.40 | 47.89 | 54.00 | -6.11 | 47.61 | 0.28 | Average | 100 | 311 |
| 4 | 3686.40 | 51.21 | 74.00 | -22.79 | 50.93 | 0.28 | Peak | 100 | 311 |
| 5 | 8294.40 | 51.13 | 54.00 | -2.87 | 41.98 | 9.15 | Average | 150 | 51 |
| 6 | 8294.40 | 56.13 | 74.00 | -17.87 | 46.98 | 9.15 | Peak | 150 | 51 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

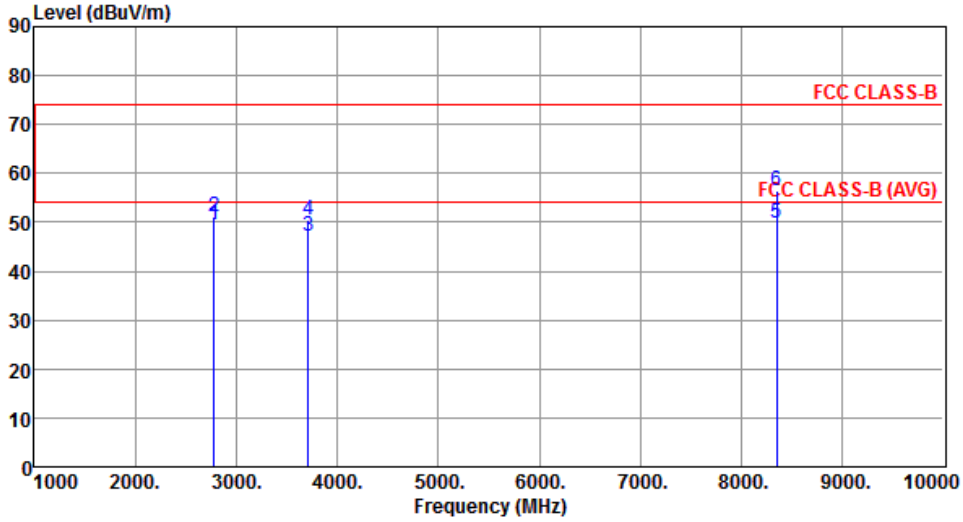
| Modulation Mode | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2764.80 | 40.19 | 54.00 | -13.81 | 42.42 | -2.23 | Average | 168 | 217 |
| 2 | 2764.80 | 44.53 | 74.00 | -29.47 | 46.76 | -2.23 | Peak | 168 | 217 |
| 3 | 3686.40 | 44.29 | 54.00 | -9.71 | 44.01 | 0.28 | Average | 132 | 351 |
| 4 | 3686.40 | 48.45 | 74.00 | -25.55 | 48.17 | 0.28 | Peak | 132 | 351 |
| 5 | 8294.40 | 50.47 | 54.00 | -3.53 | 41.32 | 9.15 | Average | 199 | 2 |
| 6 | 8294.40 | 56.17 | 74.00 | -17.83 | 47.02 | 9.15 | Peak | 199 | 2 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

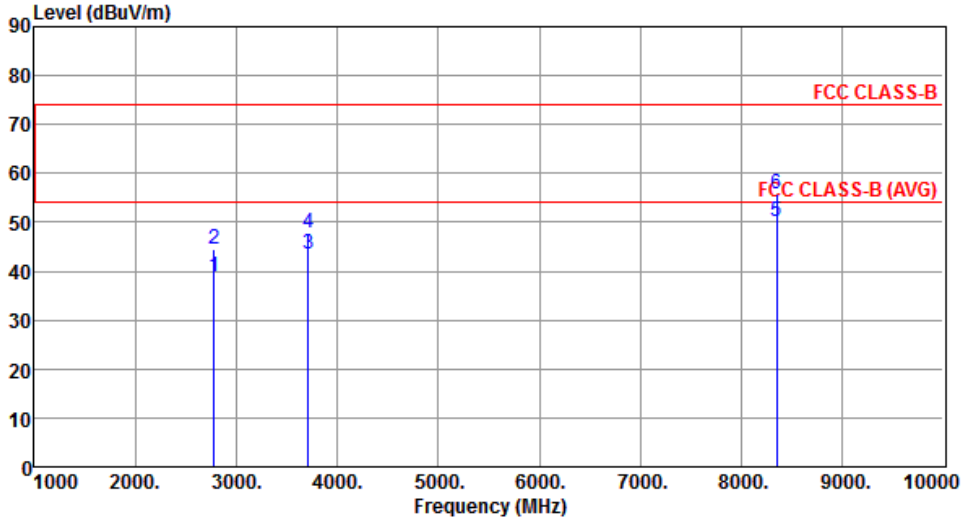
| Modulation Mode | LoRa | Test Freq. (MHz) | 927.7 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2783.10 | 49.60 | 54.00 | -4.40 | 51.69 | -2.09 | Average | 235 | 352 |
| 2 | 2783.10 | 51.28 | 74.00 | -22.72 | 53.37 | -2.09 | Peak | 235 | 352 |
| 3 | 3710.80 | 47.18 | 54.00 | -6.82 | 46.87 | 0.31 | Average | 112 | 308 |
| 4 | 3710.80 | 50.50 | 74.00 | -23.50 | 50.19 | 0.31 | Peak | 112 | 308 |
| 5 | 8349.30 | 49.89 | 54.00 | -4.11 | 40.82 | 9.07 | Average | 175 | 7 |
| 6 | 8349.30 | 56.43 | 74.00 | -17.57 | 47.36 | 9.07 | Peak | 175 | 7 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| Modulation Mode | LoRa | Test Freq. (MHz) | 927.7 |
|---|---|---|---|
| Polarization | Vertical | | |

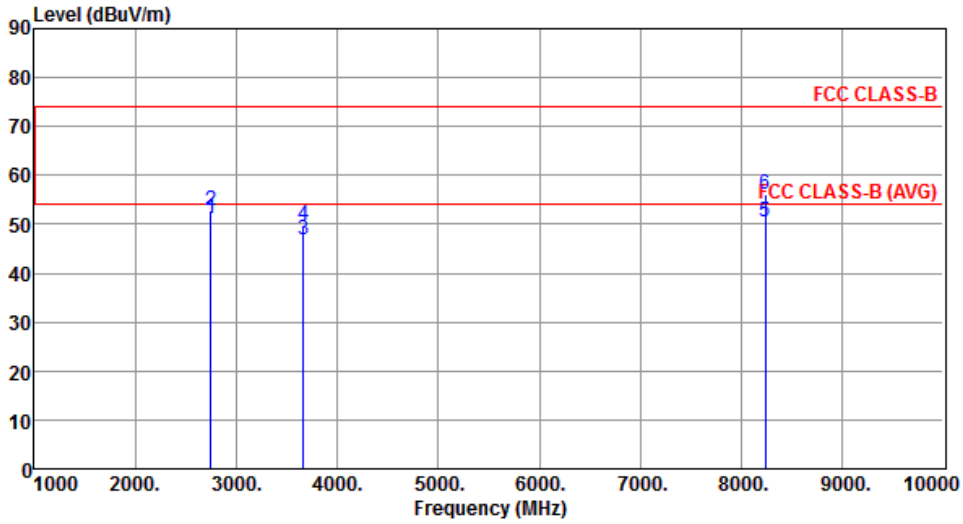



| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2783.10 | 38.93 | 54.00 | -15.07 | 41.02 | -2.09 | Average | 158 | 199 |
| 2 | 2783.10 | 44.56 | 74.00 | -29.44 | 46.65 | -2.09 | Peak | 158 | 199 |
| 3 | 3710.80 | 43.63 | 54.00 | -10.37 | 43.32 | 0.31 | Average | 125 | 232 |
| 4 | 3710.80 | 47.83 | 74.00 | -26.17 | 47.52 | 0.31 | Peak | 125 | 232 |
| 5 | 8349.30 | 50.16 | 54.00 | -3.84 | 41.09 | 9.07 | Average | 185 | 3 |
| 6 | 8349.30 | 55.93 | 74.00 | -18.07 | 46.86 | 9.07 | Peak | 185 | 3 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

**LoRa 250 kHz**

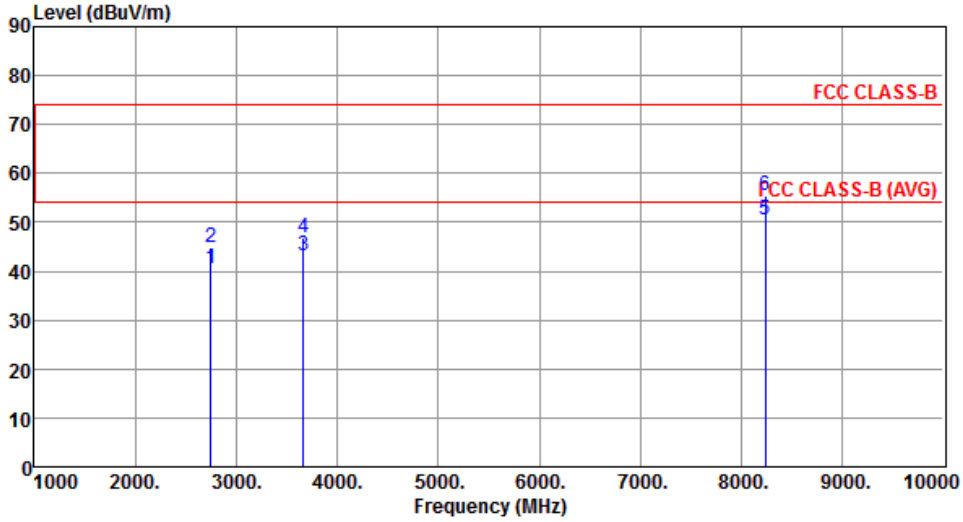
| **Modulation Mode** | LoRa | **Test Freq. (MHz)** | 915.5 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2746.50 | 51.01 | 54.00 | -2.99 | 53.36 | -2.35 | Average | 235 | 3 |
| 2 | 2746.50 | 52.71 | 74.00 | -21.29 | 55.06 | -2.35 | Peak | 235 | 3 |
| 3 | 3662.00 | 46.91 | 54.00 | -7.09 | 46.61 | 0.30 | Average | 130 | 305 |
| 4 | 3662.00 | 49.82 | 74.00 | -24.18 | 49.52 | 0.30 | Peak | 130 | 305 |
| 5 | 8239.50 | 50.43 | 54.00 | -3.57 | 41.25 | 9.18 | Average | 127 | 325 |
| 6 | 8239.50 | 56.13 | 74.00 | -17.87 | 46.95 | 9.18 | Peak | 127 | 325 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

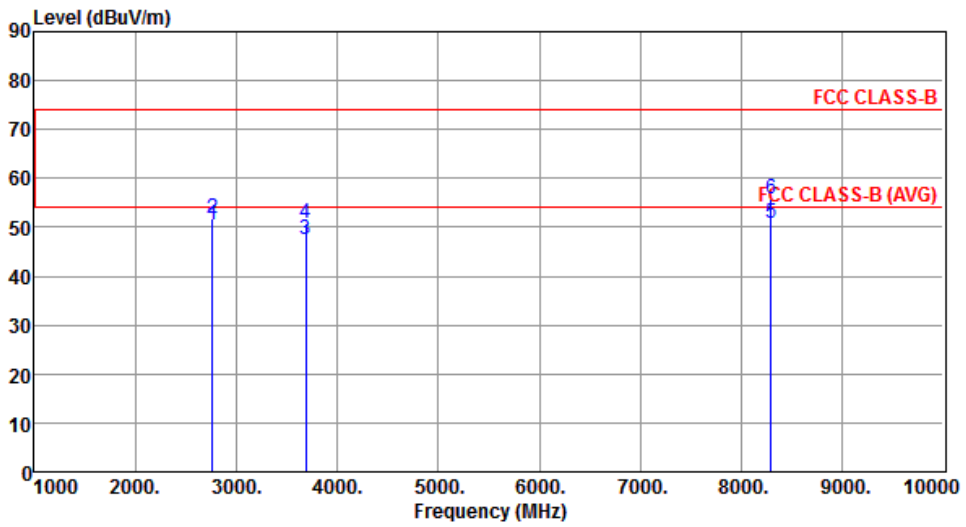
| Modulation Mode | LoRa | Test Freq. (MHz) | 915.5 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2746.50 | 40.56 | 54.00 | -13.44 | 42.91 | -2.35 | Average | 126 | 258 |
| 2 | 2746.50 | 44.74 | 74.00 | -29.26 | 47.09 | -2.35 | Peak | 126 | 258 |
| 3 | 3662.00 | 43.01 | 54.00 | -10.99 | 42.71 | 0.30 | Average | 135 | 332 |
| 4 | 3662.00 | 46.95 | 74.00 | -27.05 | 46.65 | 0.30 | Peak | 135 | 332 |
| 5 | 8239.50 | 50.41 | 54.00 | -3.59 | 41.23 | 9.18 | Average | 208 | 2 |
| 6 | 8239.50 | 55.45 | 74.00 | -18.55 | 46.27 | 9.18 | Peak | 208 | 2 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

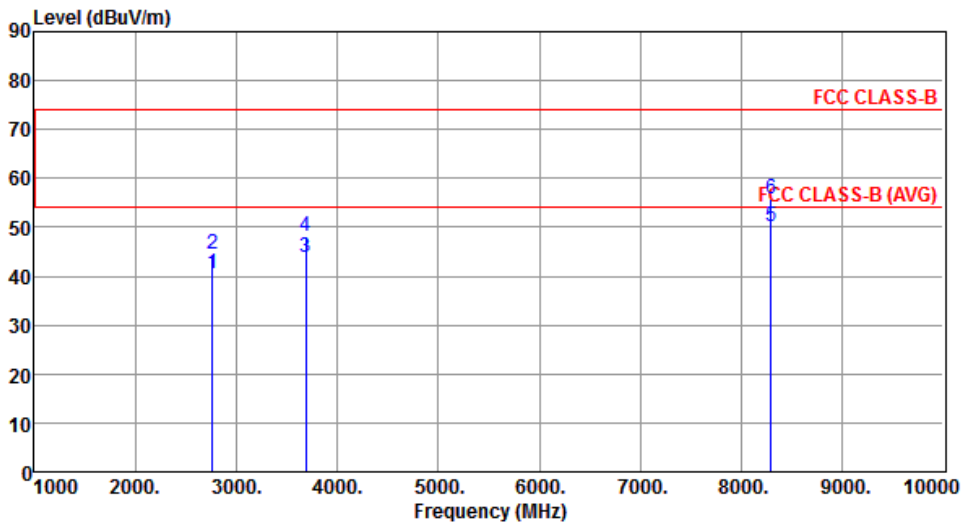
| Modulation Mode | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2764.80 | 50.37 | 54.00 | -3.63 | 52.60 | -2.23 | Average | 215 | 355 |
| 2 | 2764.80 | 51.85 | 74.00 | -22.15 | 54.08 | -2.23 | Peak | 215 | 355 |
| 3 | 3686.40 | 47.45 | 54.00 | -6.55 | 47.17 | 0.28 | Average | 100 | 318 |
| 4 | 3686.40 | 50.85 | 74.00 | -23.15 | 50.57 | 0.28 | Peak | 100 | 318 |
| 5 | 8294.40 | 50.71 | 54.00 | -3.29 | 41.56 | 9.15 | Average | 150 | 62 |
| 6 | 8294.40 | 55.74 | 74.00 | -18.26 | 46.59 | 9.15 | Peak | 150 | 62 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

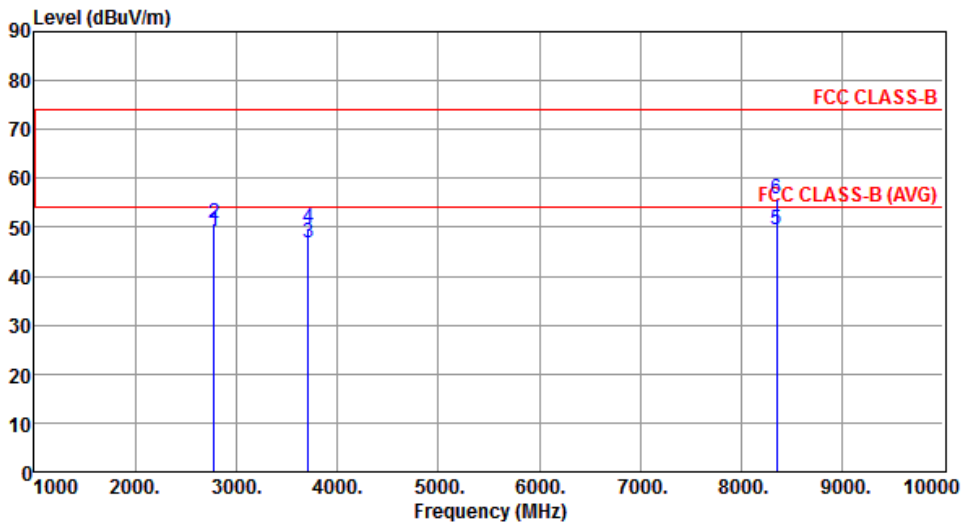
| Modulation Mode | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2764.80 | 40.58 | 54.00 | -13.42 | 42.81 | -2.23 | Average | 172 | 223 |
| 2 | 2764.80 | 44.53 | 74.00 | -29.47 | 46.76 | -2.23 | Peak | 172 | 223 |
| 3 | 3686.40 | 43.85 | 54.00 | -10.15 | 43.57 | 0.28 | Average | 135 | 348 |
| 4 | 3686.40 | 48.01 | 74.00 | -25.99 | 47.73 | 0.28 | Peak | 135 | 348 |
| 5 | 8294.40 | 50.05 | 54.00 | -3.95 | 40.90 | 9.15 | Average | 202 | 3 |
| 6 | 8294.40 | 55.65 | 74.00 | -18.35 | 46.50 | 9.15 | Peak | 202 | 3 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

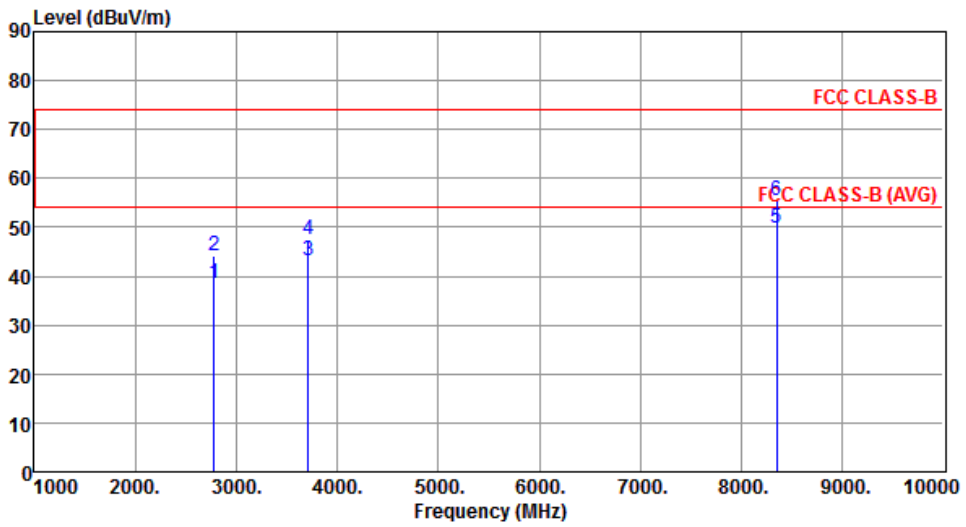
| Modulation Mode | LoRa | Test Freq. (MHz) | 927.6 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2782.80 | 49.15 | 54.00 | -4.85 | 51.24 | -2.09 | Average | 241 | 348 |
| 2 | 2782.80 | 50.75 | 74.00 | -23.25 | 52.84 | -2.09 | Peak | 241 | 348 |
| 3 | 3710.40 | 46.75 | 54.00 | -7.25 | 46.44 | 0.31 | Average | 122 | 311 |
| 4 | 3710.40 | 49.95 | 74.00 | -24.05 | 49.64 | 0.31 | Peak | 122 | 311 |
| 5 | 8348.40 | 49.35 | 54.00 | -4.65 | 40.28 | 9.07 | Average | 178 | 12 |
| 6 | 8348.40 | 55.92 | 74.00 | -18.08 | 46.85 | 9.07 | Peak | 178 | 12 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| Modulation Mode | LoRa | Test Freq. (MHz) | 927.6 |
|---|---|---|---|
| Polarization | Vertical | | |

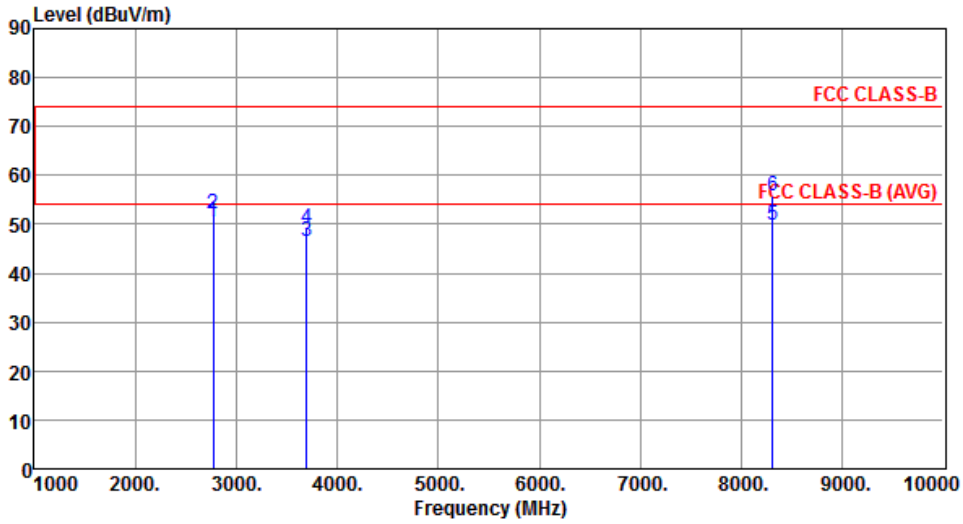



| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2782.80 | 38.45 | 54.00 | -15.55 | 40.54 | -2.09 | Average | 162 | 188 |
| 2 | 2782.80 | 44.06 | 74.00 | -29.94 | 46.15 | -2.09 | Peak | 162 | 188 |
| 3 | 3710.40 | 43.18 | 54.00 | -10.82 | 42.87 | 0.31 | Average | 132 | 138 |
| 4 | 3710.40 | 47.45 | 74.00 | -26.55 | 47.14 | 0.31 | Peak | 132 | 138 |
| 5 | 8348.40 | 49.69 | 54.00 | -4.31 | 40.62 | 9.07 | Average | 186 | 5 |
| 6 | 8348.40 | 55.54 | 74.00 | -18.46 | 46.47 | 9.07 | Peak | 186 | 5 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

**LoRa 500 kHz**

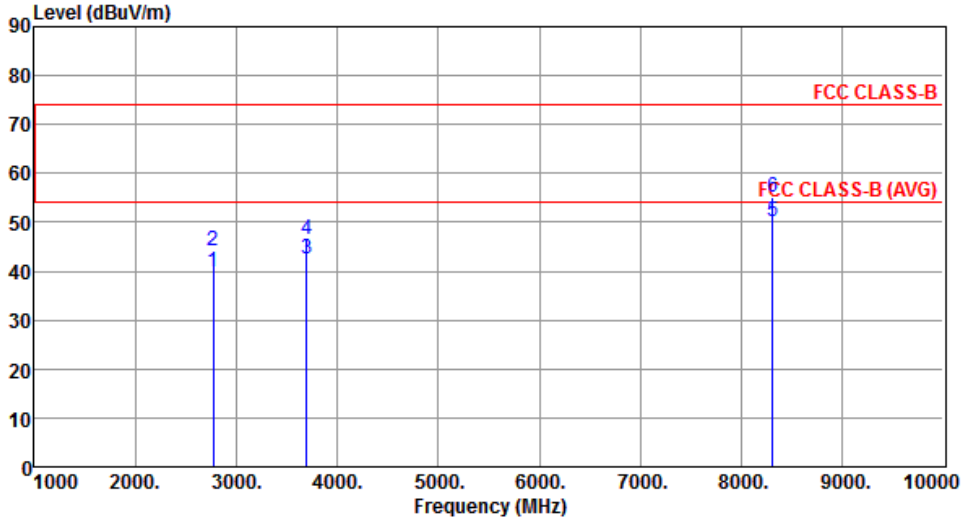
| **Modulation Mode** | LoRa | **Test Freq. (MHz)** | 923.3 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2769.90 | 50.54 | 54.00 | -3.46 | 52.73 | -2.19 | Average | 237 | 5 |
| 2 | 2769.90 | 52.23 | 74.00 | -21.77 | 54.42 | -2.19 | Peak | 237 | 5 |
| 3 | 3693.20 | 46.48 | 54.00 | -7.52 | 46.21 | 0.27 | Average | 125 | 318 |
| 4 | 3693.20 | 49.28 | 74.00 | -24.72 | 49.01 | 0.27 | Peak | 125 | 318 |
| 5 | 8309.70 | 49.98 | 54.00 | -4.02 | 40.85 | 9.13 | Average | 132 | 332 |
| 6 | 8309.70 | 55.74 | 74.00 | -18.26 | 46.61 | 9.13 | Peak | 132 | 332 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

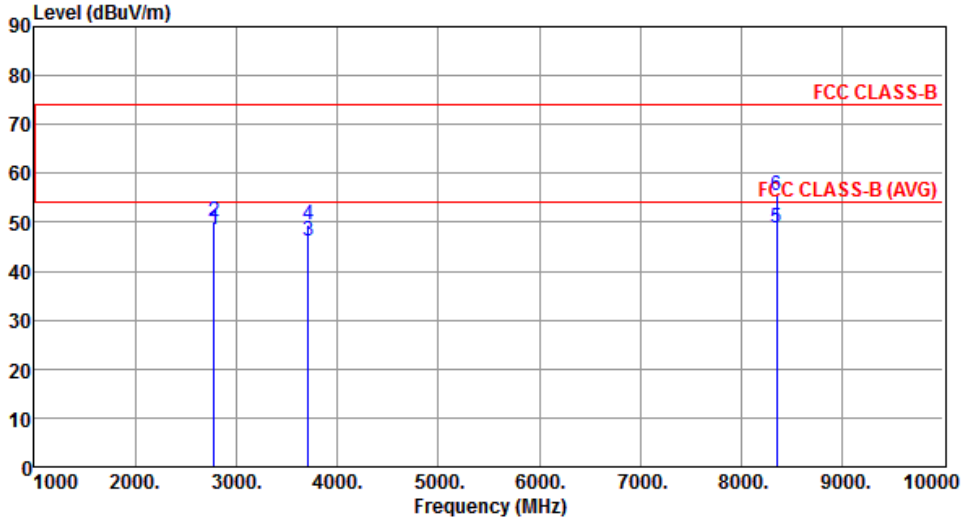
| Modulation Mode | LoRa | Test Freq. (MHz) | 923.3 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2769.90 | 40.01 | 54.00 | -13.99 | 42.20 | -2.19 | Average | 132 | 262 |
| 2 | 2769.90 | 44.21 | 74.00 | -29.79 | 46.40 | -2.19 | Peak | 132 | 262 |
| 3 | 3693.20 | 42.51 | 54.00 | -11.49 | 42.24 | 0.27 | Average | 141 | 328 |
| 4 | 3693.20 | 46.47 | 74.00 | -27.53 | 46.20 | 0.27 | Peak | 141 | 328 |
| 5 | 8309.70 | 50.01 | 54.00 | -3.99 | 40.88 | 9.13 | Average | 209 | 5 |
| 6 | 8309.70 | 55.01 | 74.00 | -18.99 | 45.88 | 9.13 | Peak | 209 | 5 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

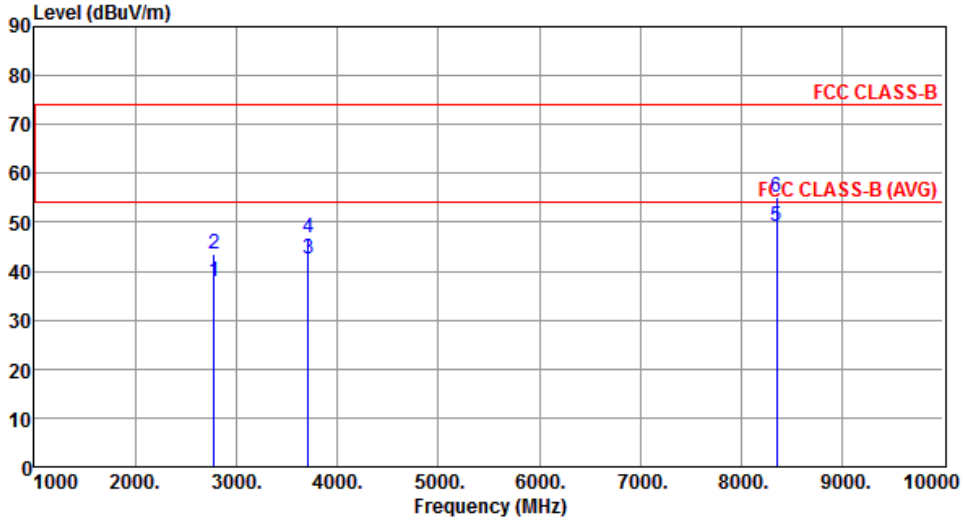
| Modulation Mode | LoRa | Test Freq. (MHz) | 927.5 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2782.50 | 48.65 | 54.00 | -5.35 | 50.74 | -2.09 | Average | 252 | 352 |
| 2 | 2782.50 | 50.24 | 74.00 | -23.76 | 52.33 | -2.09 | Peak | 252 | 352 |
| 3 | 3710.00 | 46.23 | 54.00 | -7.77 | 45.93 | 0.30 | Average | 128 | 320 |
| 4 | 3710.00 | 49.45 | 74.00 | -24.55 | 49.15 | 0.30 | Peak | 128 | 320 |
| 5 | 8347.50 | 48.88 | 54.00 | -5.12 | 39.80 | 9.08 | Average | 189 | 23 |
| 6 | 8347.50 | 55.47 | 74.00 | -18.53 | 46.39 | 9.08 | Peak | 189 | 23 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| Modulation Mode | LoRa | Test Freq. (MHz) | 927.5 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2782.50 | 37.96 | 54.00 | -16.04 | 40.05 | -2.09 | Average | 177 | 192 |
| 2 | 2782.50 | 43.52 | 74.00 | -30.48 | 45.61 | -2.09 | Peak | 177 | 192 |
| 3 | 3710.00 | 42.65 | 54.00 | -11.35 | 42.35 | 0.30 | Average | 142 | 142 |
| 4 | 3710.00 | 46.96 | 74.00 | -27.04 | 46.66 | 0.30 | Peak | 142 | 142 |
| 5 | 8347.50 | 49.12 | 54.00 | -4.88 | 40.04 | 9.08 | Average | 192 | 6 |
| 6 | 8347.50 | 55.00 | 74.00 | -19.00 | 45.92 | 9.08 | Peak | 192 | 6 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

## 3.3 Emissions in Non-Restricted Frequency Bands

### 3.3.1 Emissions in Non-Restricted Frequency Bands Limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz.

Note: Limit is from FCC Part 15.247

### 3.3.2 Test Procedures

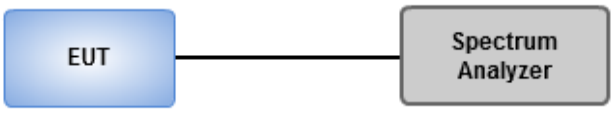
**Reference level measurement**

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

**Emission level measurement**

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 10GHz
4. Use the peak marker function to determine the maximum amplitude level

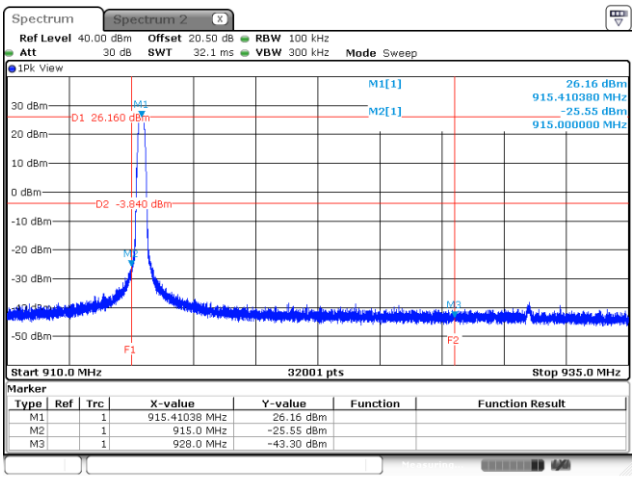
### 3.3.3 Test Setup



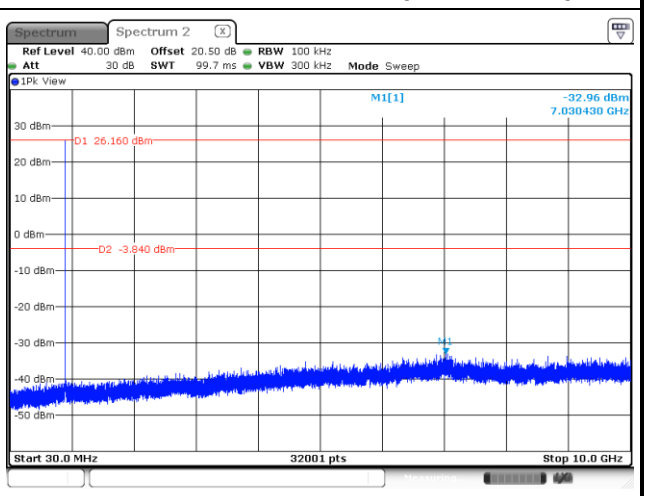
### 3.3.4 Test Result of Emissions in non-restricted Frequency Bands

**LoRa 125 kHz**

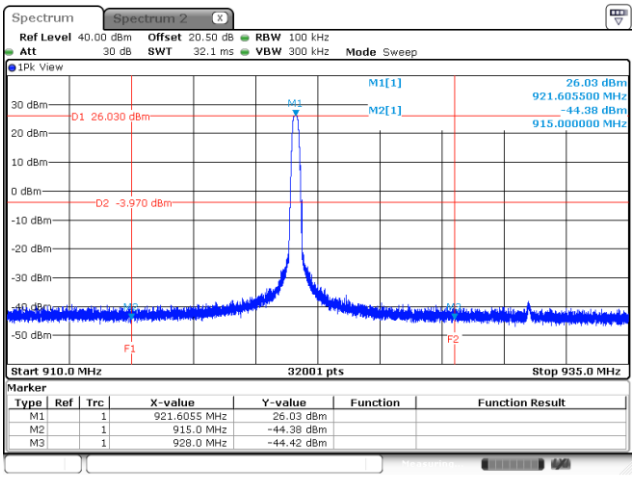
**915.4MHz / 910MHz~935MHz (down 30dBc)**



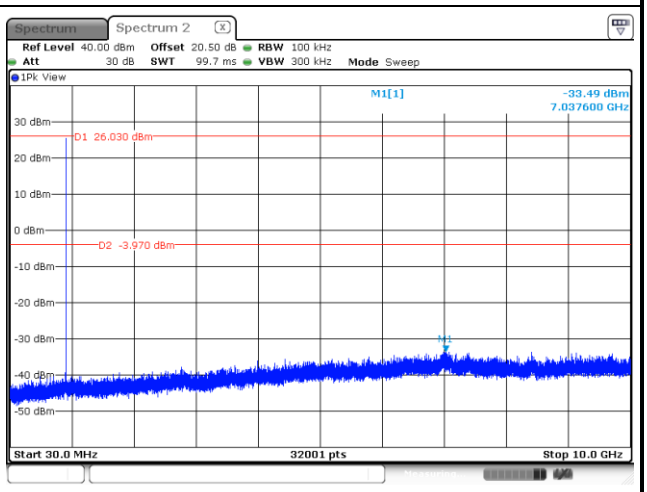

**915.4MHz / 30MHz~10GHz (down 30dBc)**



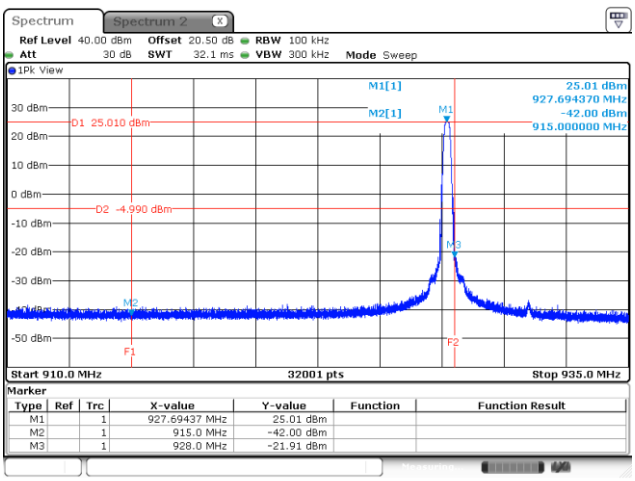

**921.6MHz / 910MHz~935MHz (down 30dBc)**



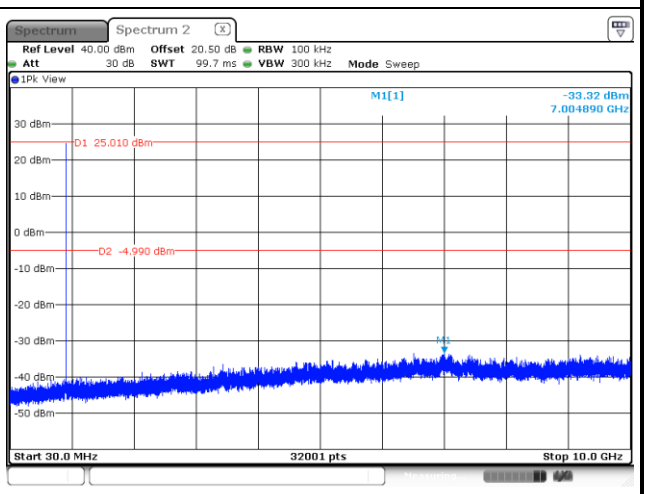

**921.6MHz / 30MHz~10GHz (down 30dBc)**




**927.7MHz / 910MHz~935MHz (down 30dBc)**

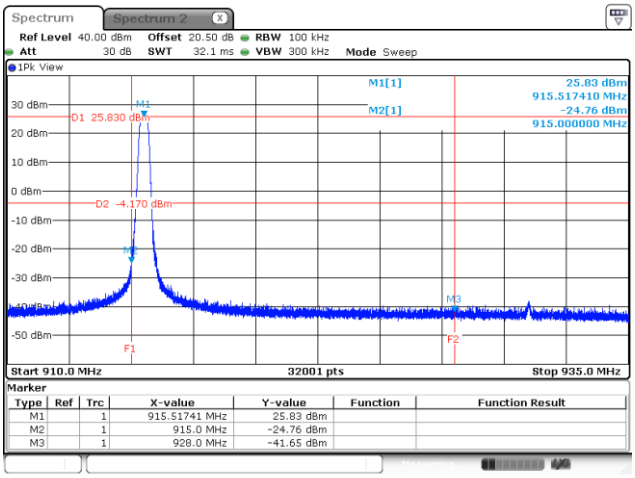



**927.7MHz / 30MHz~10GHz (down 30dBc)**

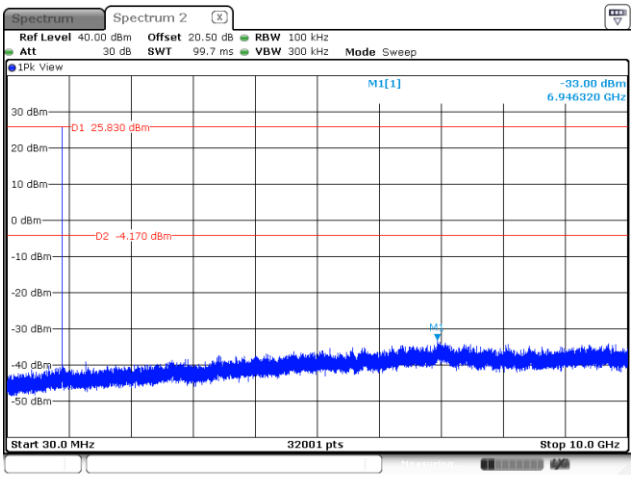


## LoRa 250 kHz

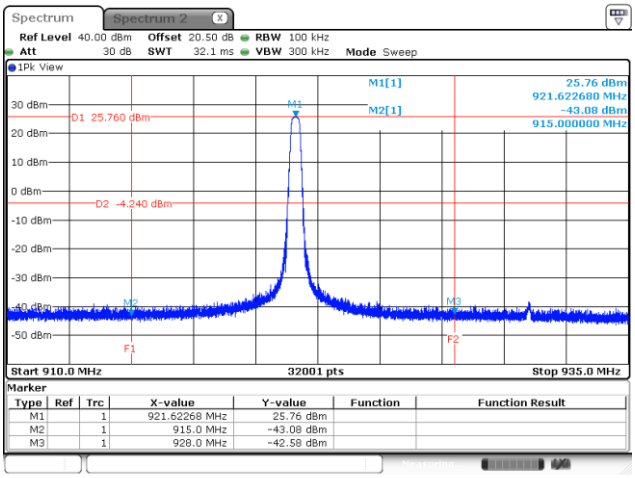
### 915.5MHz / 910MHz~935MHz (down 30dBc)



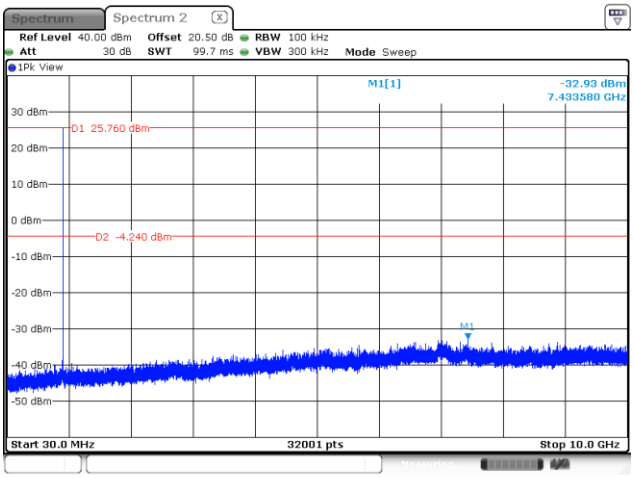

### 915.5MHz / 30MHz~10GHz (down 30dBc)



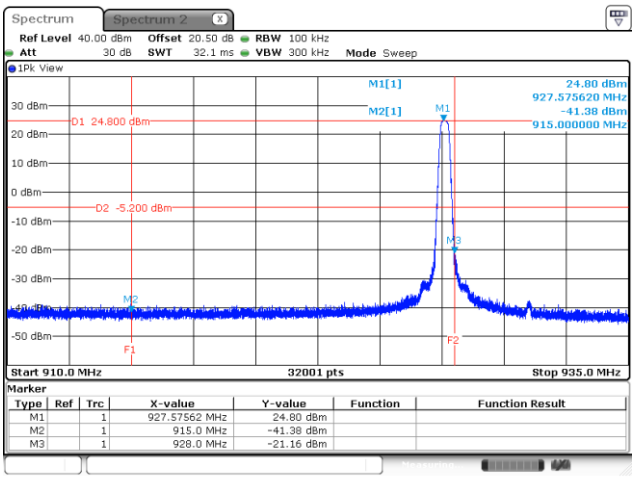

### 921.6MHz / 910MHz~935MHz (down 30dBc)



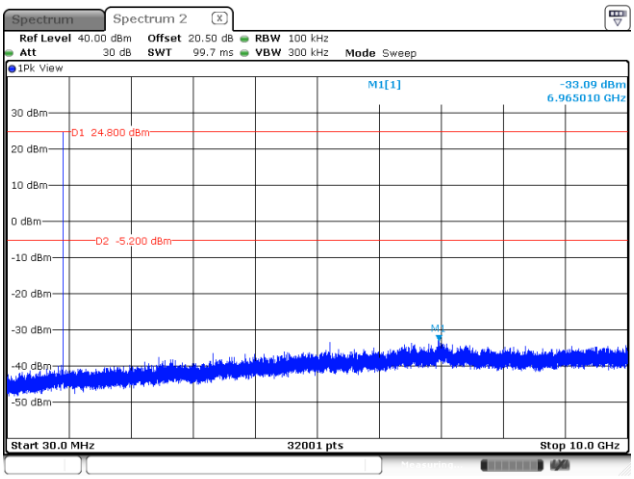

### 921.6MHz / 30MHz~10GHz (down 30dBc)



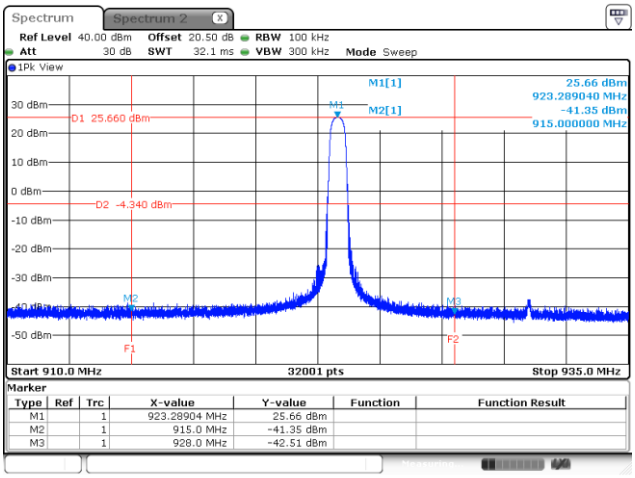
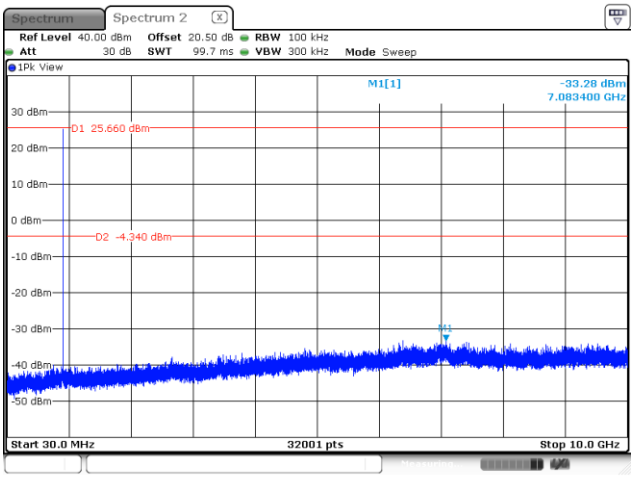
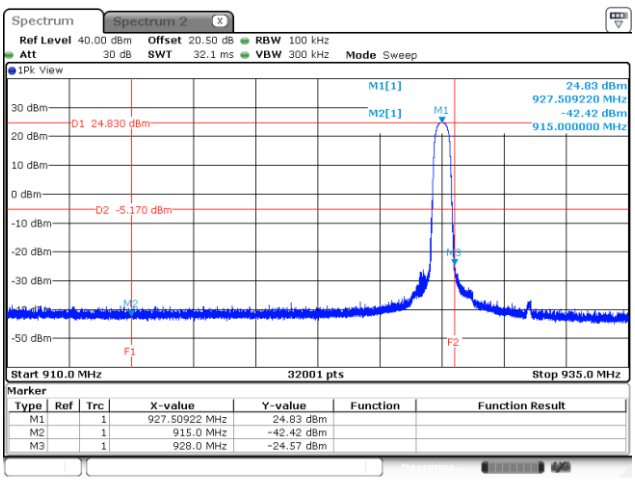
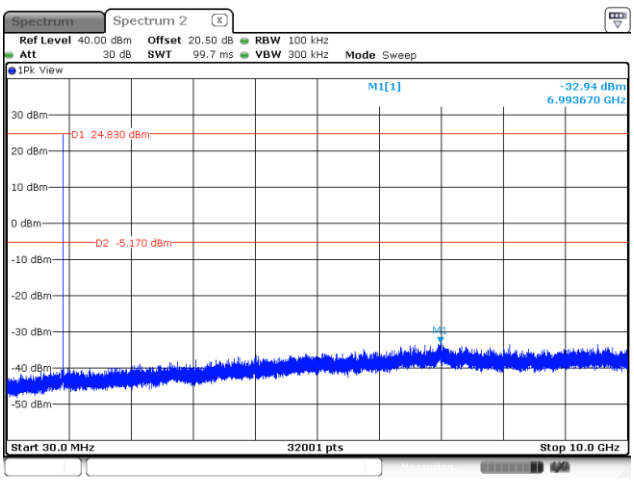

### 927.6MHz / 910MHz~935MHz (down 30dBc)




### 927.6MHz / 30MHz~10GHz (down 30dBc)



## LoRa 500 kHz

| 923.3MHz / 910MHz~935MHz (down 30dBc) | 923.3MHz / 30MHz~10GHz (down 30dBc) |
|---|---|
|  |  |
| **927.5MHz / 910MHz~935MHz (down 30dBc)** | **927.5MHz / 30MHz~10GHz (down 30dBc)** |
|  |  |

## 3.4 Emission Bandwidth

### 3.4.1 Limit of Emission Bandwidth

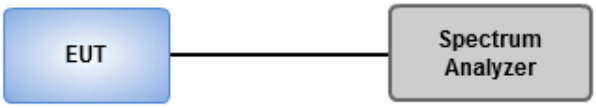
The upper and lower frequency limits of the transmitter 99% emission power bandwidth shall at all times remain within the operating frequency limits(915 ~ 928 MHz).

Note: Limit is from AS/NZS 4268:2017

### 3.4.2 Test Procedures

Reference to clause 6.2.1 of AS/NZS 4268:2017.

### 3.4.3 Test Setup



### 3.4.4 Test Result of Emission Bandwidth

**Summary**

| Mode | OBW (Hz) | ITU-Code |
|---|---|---|
| 915-928MHz | - | - |
| LoRa (125kHz) | 125.219k | 125KF1D |
| 915-928MHz | - | - |
| LoRa (250kHz) | 256.686k | 257KF1D |
| 915-928MHz | - | - |
| LoRa (500kHz) | 490.377k | 490KF1D |

**OBW** = Minimum 99% occupied bandwidth;

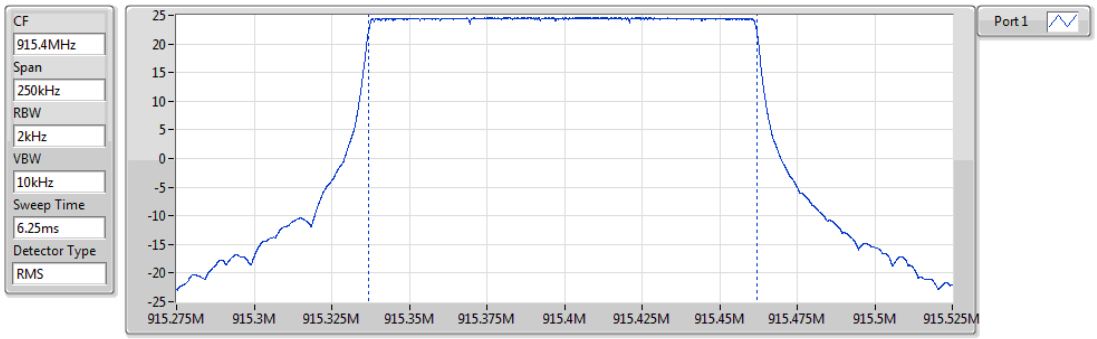
**Result**

| Mode | Result | OBW (Hz) | Fl-OBW (Hz) | Fh-OBW (Hz) | $F_L$ Limit (Hz) | $F_H$ Limit (Hz) |
|---|---|---|---|---|---|---|
| LoRa (125kHz) | - | - | - | - | - | - |
| 915.4MHz_TnomVnom | Pass | 125.219k | 915.336766M | 915.461985M | 915M | 928M |
| 921.6MHz_TnomVnom | Pass | 125.094k | 921.536891M | 921.661985M | 915M | 928M |
| 927.7MHz_TnomVnom | Pass | 125.219k | 927.636766M | 927.761985M | 915M | 928M |
| LoRa (250kHz) | - | - | - | - | - | - |
| 915.5MHz_TnomVnom | Pass | 256.561k | 915.370782M | 915.627343M | 915M | 928M |
| 921.6MHz_TnomVnom | Pass | 256.436k | 921.470907M | 921.727343M | 915M | 928M |
| 927.6MHz_TnomVnom | Pass | 256.311k | 927.471032M | 927.727343M | 915M | 928M |
| LoRa (500kHz) | - | - | - | - | - | - |
| 923.3MHz_TnomVnom | Pass | 490.377k | 923.053812M | 923.544189M | 915M | 928M |
| 927.5MHz_TnomVnom | Pass | 490.127k | 927.253812M | 927.743939M | 915M | 928M |

**fl-OBW** = fl lower edge 99% occupied bandwidth; **fh-OBW** = fh higher edge 99% occupied bandwidth; **OBW** = 99% occupied bandwidth; **N dB** = 6dB down bandwidth;

**LoRa (125kHz)** **EBW**

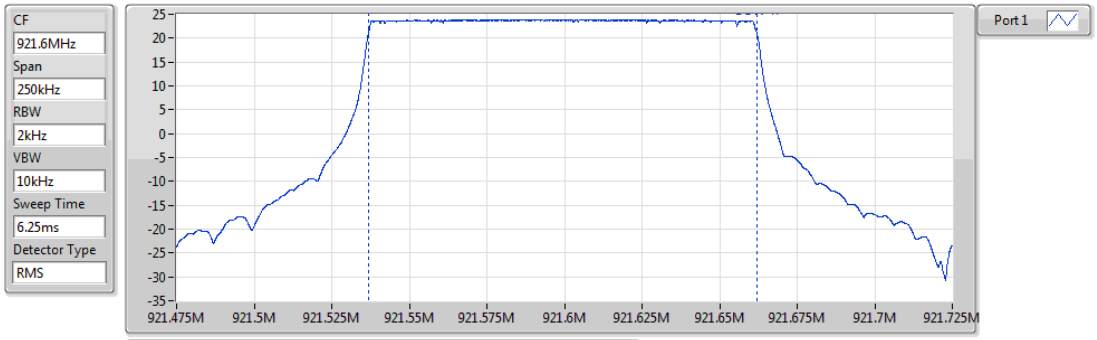
**915.4MHz_TnomVnom**




| OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Fl-Limit(Hz) | Fh-Limit(Hz) |
|---|---|---|---|---|---|
| 125.219k | 915.336766M | 915.461985M | 13M | 915M | 928M |

**LoRa (125kHz)** **EBW**

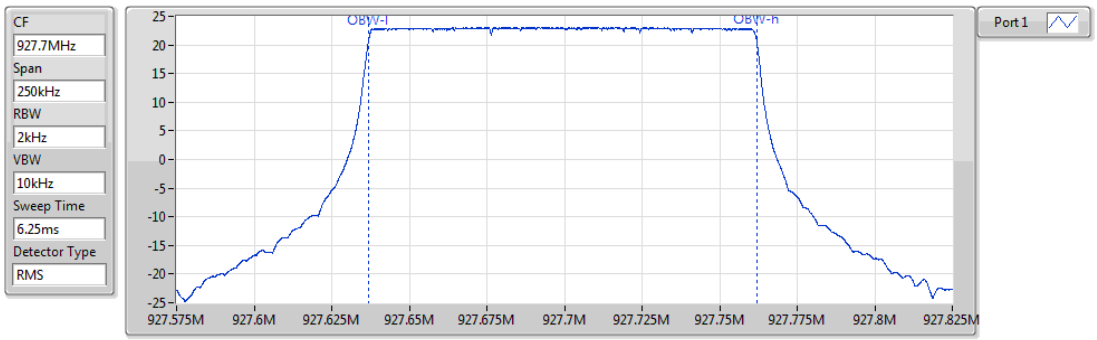
**921.6MHz_TnomVnom**




| OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Fl-Limit(Hz) | Fh-Limit(Hz) |
|---|---|---|---|---|---|
| 125.094k | 921.536891M | 921.661985M | 13M | 915M | 928M |

**LoRa (125kHz)** **EBW**

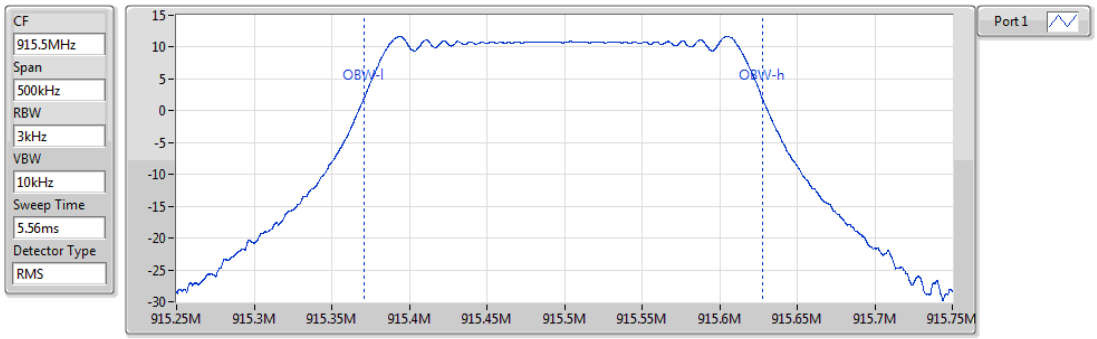
**927.7MHz_TnomVnom**




| OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Fl-Limit(Hz) | Fh-Limit(Hz) |
|---|---|---|---|---|---|
| 125.219k | 927.636766M | 927.761985M | 13M | 915M | 928M |

**LoRa (250kHz)** **EBW**

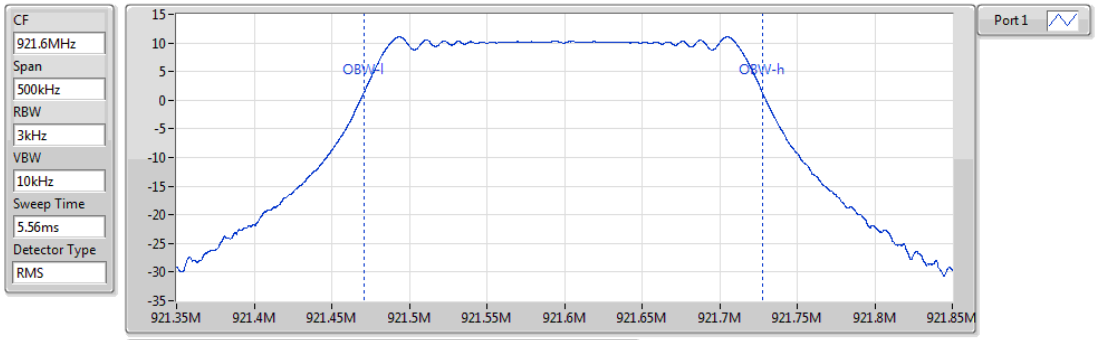
**915.5MHz_TnomVnom**




| OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Fl-Limit(Hz) | Fh-Limit(Hz) |
|---|---|---|---|---|---|
| 256.561k | 915.370782M | 915.627343M | 13M | 915M | 928M |

**LoRa (250kHz)** **EBW**

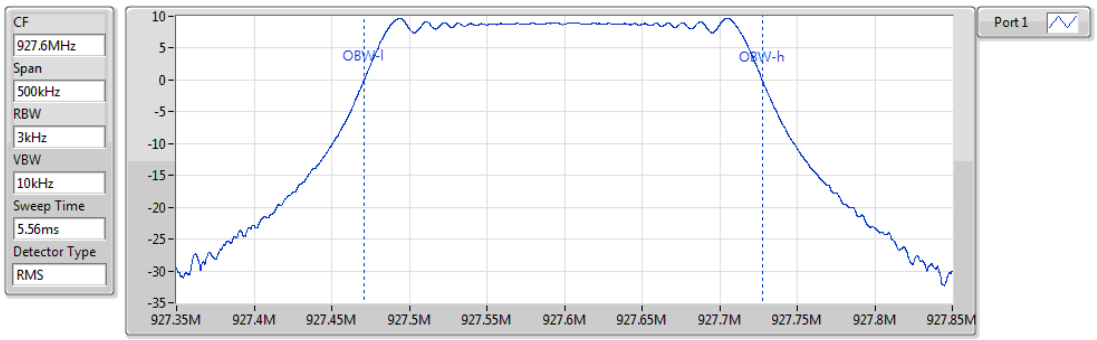
**921.6MHz_TnomVnom**




| OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Fl-Limit(Hz) | Fh-Limit(Hz) |
|---|---|---|---|---|---|
| 256.436k | 921.470907M | 921.727343M | 13M | 915M | 928M |

**LoRa (250kHz)** **EBW**

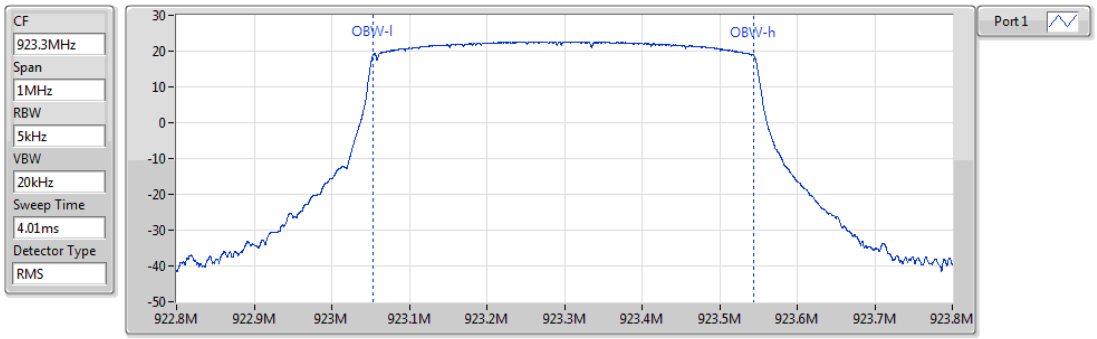
**927.6MHz_TnomVnom**




| OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Fl-Limit(Hz) | Fh-Limit(Hz) |
|---|---|---|---|---|---|
| 256.311k | 927.471032M | 927.727343M | 13M | 915M | 928M |

**LoRa (500kHz)** **EBW**

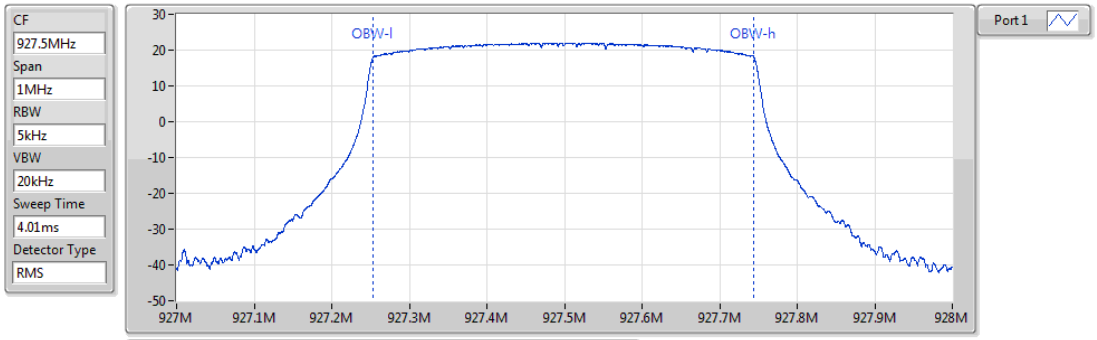
**923.3MHz_TnomVnom**




| OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Fl-Limit(Hz) | Fh-Limit(Hz) |
|---|---|---|---|---|---|
| 490.377k | 923.053812M | 923.544189M | 13M | 915M | 928M |

**LoRa (500kHz)** **EBW**

**927.5MHz_TnomVnom**




| OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Fl-Limit(Hz) | Fh-Limit(Hz) |
|---|---|---|---|---|---|
| 490.127k | 927.253812M | 927.743939M | 13M | 915M | 928M |

## 3.5 Operating Frequencies

### 3.5.1 Limit of Operating Frequencies

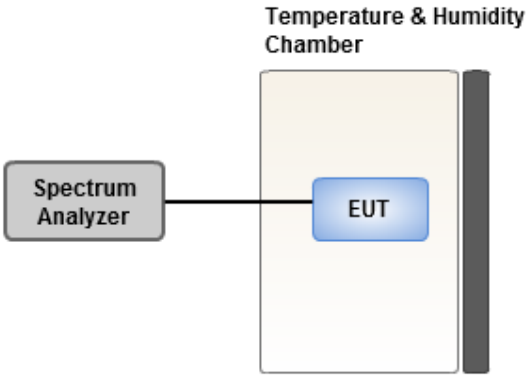
The upper and lower frequency limits of the transmitter 99% emission power bandwidth shall at all times remain within the operating frequency limits(915 ~ 928 MHz).

Note: Limit is from AS/NZS 4268:2017

### 3.5.2 Test Procedures

Reference to clause 6.2.1 of AS/NZS 4268:2017.

### 3.5.3 Test Setup



### 3.5.4 Test Result of Operating Frequencies

**LoRa 125 kHz**

| Condition | Freqeuncy (MHz) | $F_L$ (MHz) | $F_H$ (MHz) | $F_L$ Limit (MHz) | $F_H$ Limit (MHz) |
|---|---|---|---|---|---|
| $T_{nom}V_{nom}$ | 915.4 | 915.337 | - | 915 | 928 |
| $T_{min}V_{max}$ | 915.4 | 915.336 | - | 915 | 928 |
| $T_{min}V_{min}$ | 915.4 | 915.336 | - | 915 | 928 |
| $T_{max}V_{max}$ | 915.4 | 915.338 | - | 915 | 928 |
| $T_{max}V_{min}$ | 915.4 | 915.338 | - | 915 | 928 |
| $T_{nom}V_{nom}$ | 927.7 | - | 927.762 | 915 | 928 |
| $T_{min}V_{max}$ | 927.7 | - | 927.763 | 915 | 928 |
| $T_{min}V_{min}$ | 927.7 | - | 927.763 | 915 | 928 |
| $T_{max}V_{max}$ | 927.7 | - | 927.761 | 915 | 928 |
| $T_{max}V_{min}$ | 927.7 | - | 927.761 | 915 | 928 |

**LoRa 250 kHz**

| Condition | Freqeuncy (MHz) | $F_L$ (MHz) | $F_H$ (MHz) | $F_L$ Limit (MHz) | $F_H$ Limit (MHz) |
|---|---|---|---|---|---|
| $T_{nom}V_{nom}$ | 915.5 | 915.371 | - | 915 | 928 |
| $T_{min}V_{max}$ | 915.5 | 915.370 | - | 915 | 928 |
| $T_{min}V_{min}$ | 915.5 | 915.370 | - | 915 | 928 |
| $T_{max}V_{max}$ | 915.5 | 915.372 | - | 915 | 928 |
| $T_{max}V_{min}$ | 915.5 | 915.372 | - | 915 | 928 |
| $T_{nom}V_{nom}$ | 927.6 | - | 927.727 | 915 | 928 |
| $T_{min}V_{max}$ | 927.6 | - | 927.728 | 915 | 928 |
| $T_{min}V_{min}$ | 927.6 | - | 927.728 | 915 | 928 |
| $T_{max}V_{max}$ | 927.6 | - | 927.726 | 915 | 928 |
| $T_{max}V_{min}$ | 927.6 | - | 927.726 | 915 | 928 |

**LoRa 500 kHz**

| Condition | Freqeuncy (MHz) | $F_L$(MHz) | $F_H$ (MHz) | $F_L$ Limit (MHz) | $F_H$ Limit (MHz) |
|---|---|---|---|---|---|
| $T_{nom}V_{nom}$ | 923.3 | 923.054 | - | 915 | 928 |
| $T_{min}V_{max}$ | 923.3 | 923.053 | - | 915 | 928 |
| $T_{min}V_{min}$ | 923.3 | 923.053 | - | 915 | 928 |
| $T_{max}V_{max}$ | 923.3 | 923.055 | - | 915 | 928 |
| $T_{max}V_{min}$ | 923.3 | 923.055 | - | 915 | 928 |
| $T_{nom}V_{nom}$ | 927.5 | - | 927.744 | 915 | 928 |
| $T_{min}V_{max}$ | 927.5 | - | 927.745 | 915 | 928 |
| $T_{min}V_{min}$ | 927.5 | - | 927.745 | 915 | 928 |
| $T_{max}V_{max}$ | 927.5 | - | 927.743 | 915 | 928 |
| $T_{max}V_{min}$ | 927.5 | - | 927.743 | 915 | 928 |

# 4 Receiver Test Results

## 4.1 Receiver Spurious Emissions

### 4.1.1 Receiver Spurious Emissions Limits

| Spurious Emissions Limit (Peak Power) | Frequency Range | Measurement Bandwidth |
|---|---|---|
| -56 dBW (2.5μW) e.i.r.p (59 dBμV/m at 10 metres) | < 150 kHz | 1 kHz |
| | 150 kHz – 30 MHz | 10 kHz |

Note: Limit is from "NEW ZEALAND https://gazette.govt.nz/notice/id/2015-go694 Table 2"

| Restricted Band Emissions Limit | | | |
|---|---|---|---|
| **Frequency Range (MHz)** | **Field Strength (uV/m)** | **Field Strength (dBuV/m)** | **Measure Distance (m)** |
| 30~88 | 100 | 40 | 3 |
| 88~216 | 150 | 43.5 | 3 |
| 216~960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |
| **Note 1:** Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit **Note 2:** Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade. | | | |

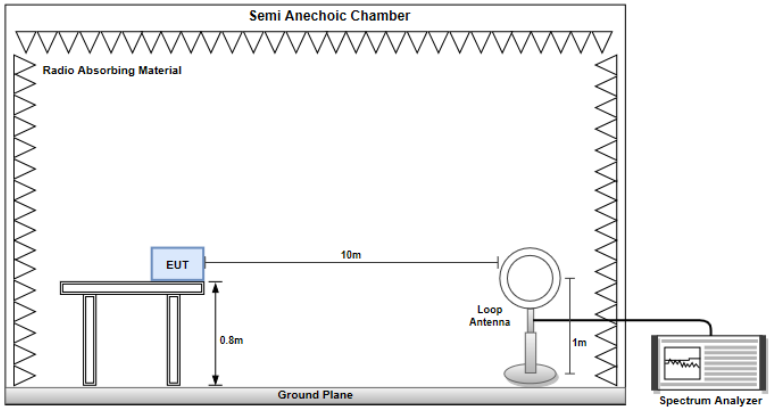
Note: Limit is from FCC Part 15.109

### 4.1.2 Test Procedures

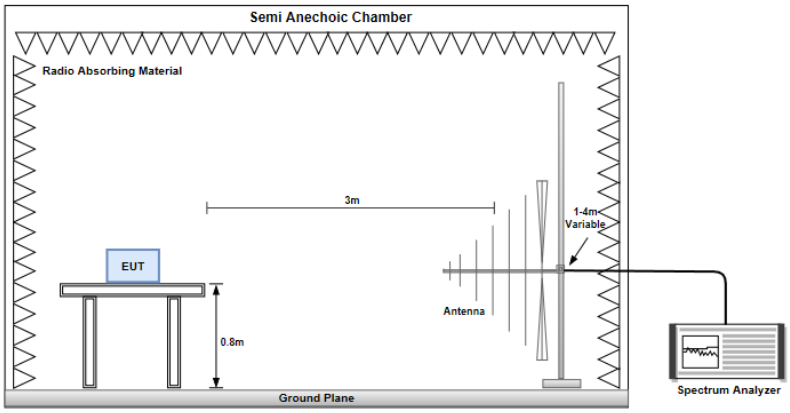
Reference to clause 7.2.1 of AS/NZS 4268:2017.

### 4.1.3 Test Setup

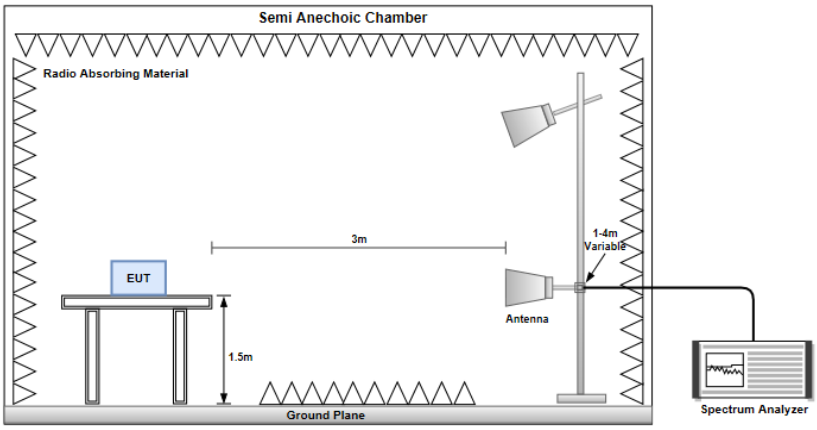
**Below 30MHz**




**Below 1GHz**



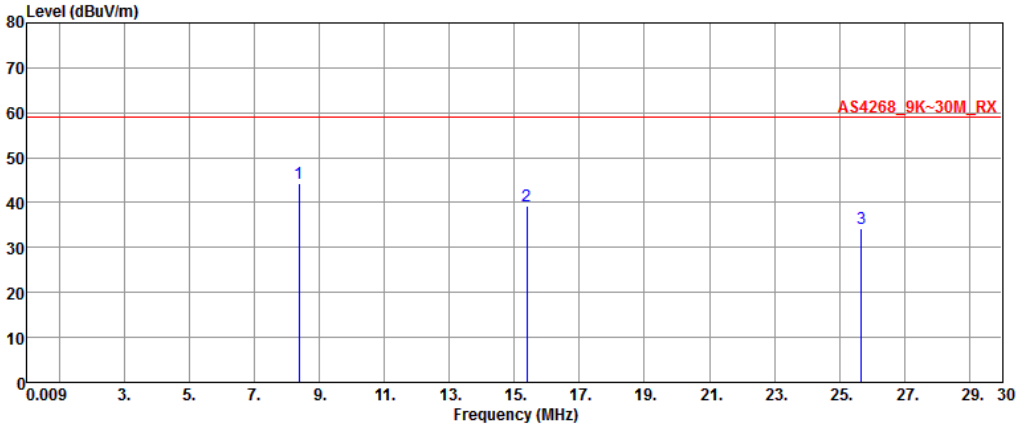

**Above 1 GHz**



### 4.1.4 Receiver Spurious Emissions (≤ 30MHz)

**For AS923 - LoRa 125 kHz**

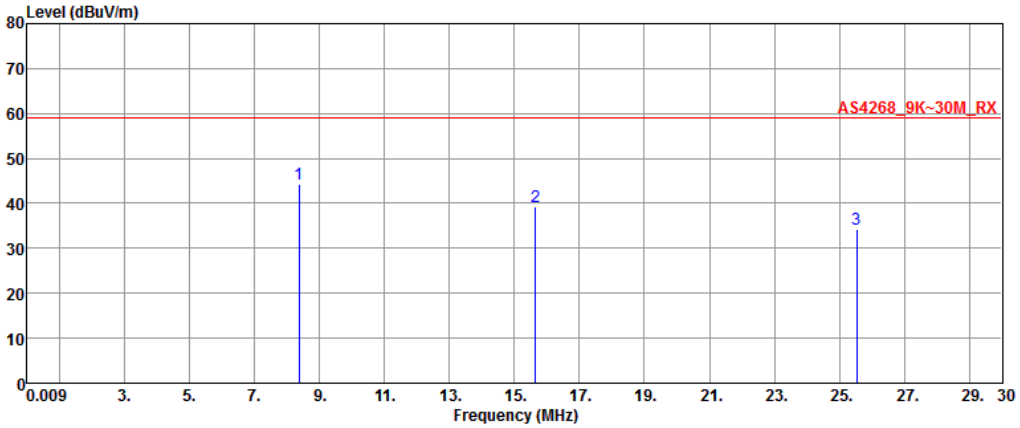
| **Modulation** | LoRa | **Test Freq. (MHz)** | 915.4 |
|---|---|---|---|
| **Frequency** | 9kHz~30MHz | **Loop** | open |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.37 | 44.36 | 59.00 | -14.64 | 20.17 | 24.19 |
| 2 | 15.39 | 39.32 | 59.00 | -19.68 | 21.24 | 18.08 |
| 3 | 25.67 | 34.37 | 59.00 | -24.63 | 22.08 | 12.29 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

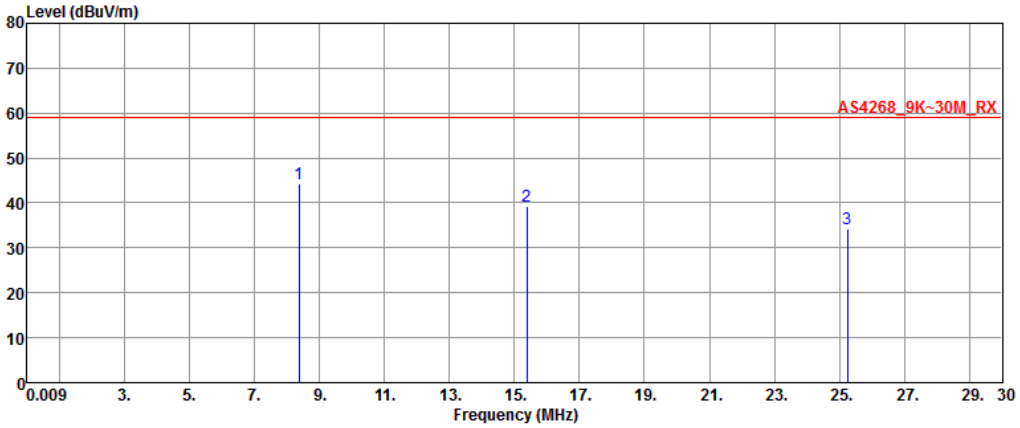
| Modulation | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Frequency | 9kHz~30MHz | Loop | open |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.37 | 44.37 | 59.00 | -14.63 | 20.17 | 24.20 |
| 2 | 15.64 | 39.24 | 59.00 | -19.76 | 21.28 | 17.96 |
| 3 | 25.54 | 34.26 | 59.00 | -24.74 | 22.07 | 12.19 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| Modulation | LoRa | Test Freq. (MHz) | 927.7 |
|---|---|---|---|
| Frequency | 9kHz~30MHz | Loop | open |

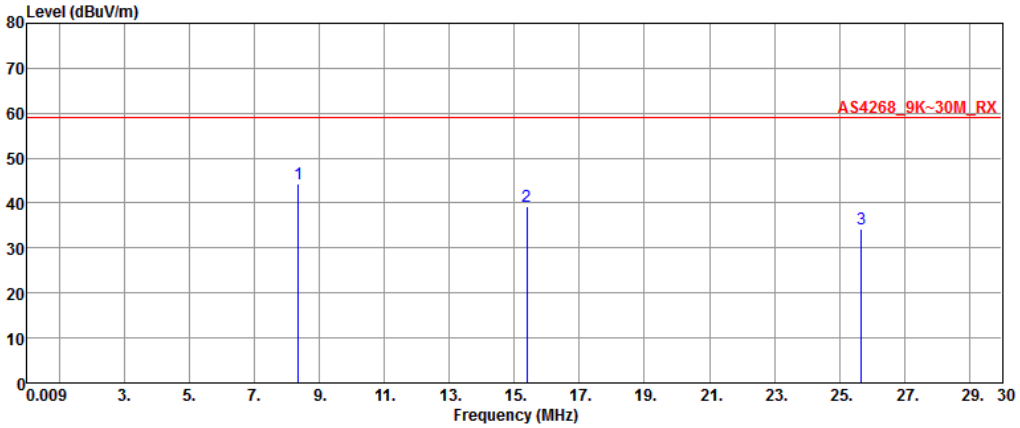



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.36 | 44.24 | 59.00 | -14.76 | 20.17 | 24.07 |
| 2 | 15.38 | 39.22 | 59.00 | -19.78 | 21.24 | 17.98 |
| 3 | 25.25 | 34.25 | 59.00 | -24.75 | 22.05 | 12.20 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

**For AS923 - LoRa 250 kHz**

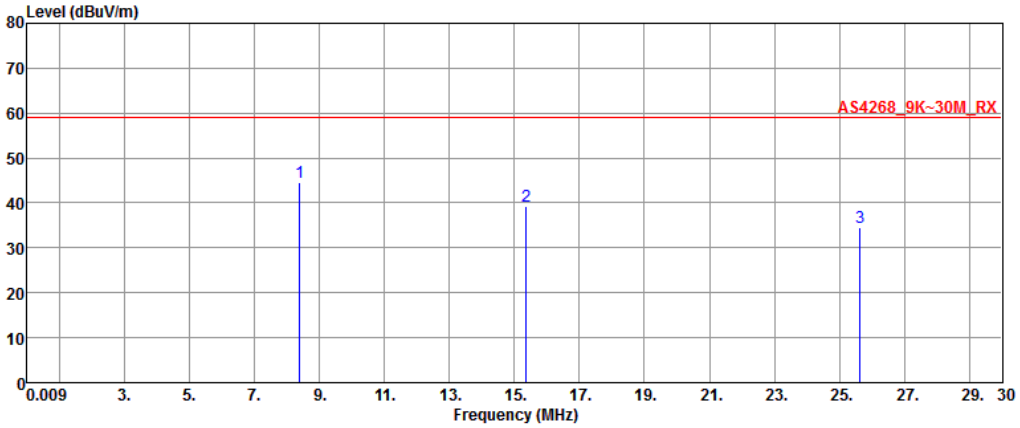
| | | | |
|---|---|---|---|
| **Modulation** | LoRa | **Test Freq. (MHz)** | 915.5 |
| **Frequency** | 9kHz~30MHz | **Loop** | open |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.34 | 44.26 | 59.00 | -14.74 | 20.17 | 24.09 |
| 2 | 15.38 | 39.15 | 59.00 | -19.85 | 21.24 | 17.91 |
| 3 | 25.68 | 34.26 | 59.00 | -24.74 | 22.08 | 12.18 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

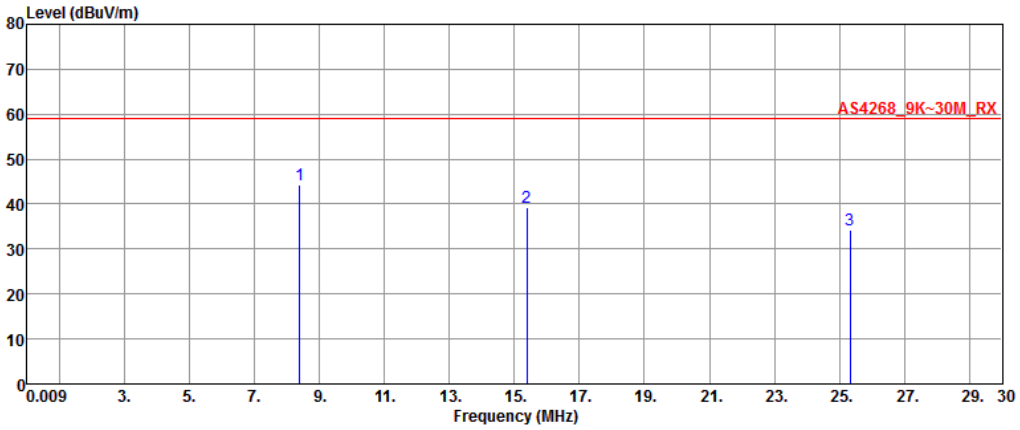
| Modulation | LoRa | Test Freq. (MHz) | 921.6 |
|---|---|---|---|
| Frequency | 9kHz~30MHz | Loop | open |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.39 | 44.62 | 59.00 | -14.38 | 20.17 | 24.45 |
| 2 | 15.35 | 39.24 | 59.00 | -19.76 | 21.24 | 18.00 |
| 3 | 25.64 | 34.50 | 59.00 | -24.50 | 22.08 | 12.42 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| Modulation | LoRa | Test Freq. (MHz) | 927.6 |
|---|---|---|---|
| Frequency | 9kHz~30MHz | Loop | open |

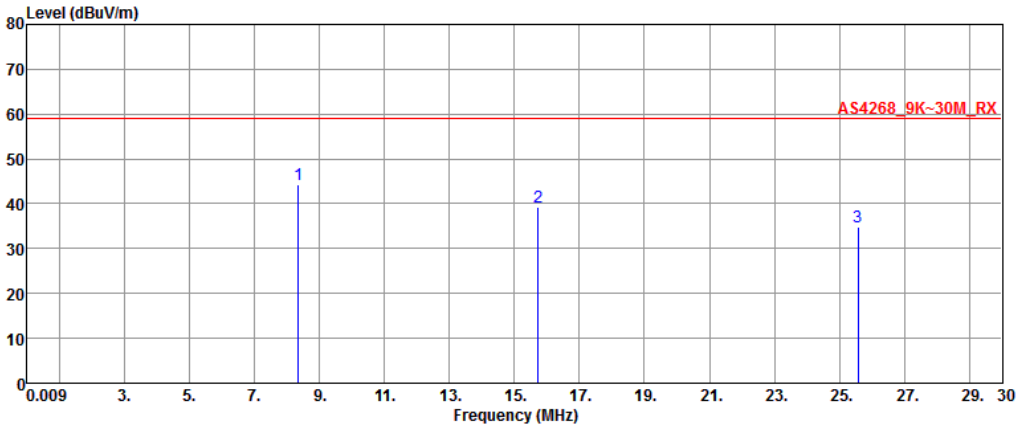



| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.39 | 44.33 | 59.00 | -14.67 | 20.17 | 24.16 |
| 2 | 15.39 | 39.22 | 59.00 | -19.78 | 21.24 | 17.98 |
| 3 | 25.32 | 34.37 | 59.00 | -24.63 | 22.05 | 12.32 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

**For AU915 - LoRa RX Mode**

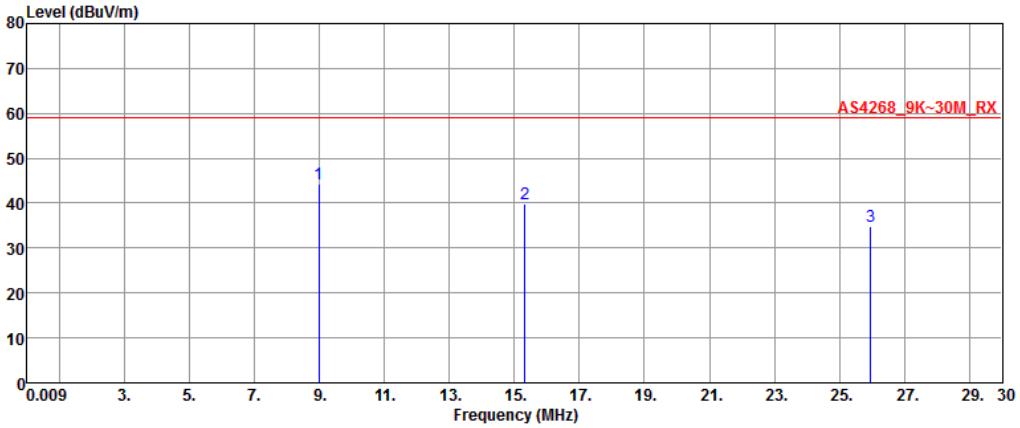
| **Modulation** | LoRa RX Mode | | |
|---|---|---|---|
| **Frequency** | 9kHz~30MHz | **Loop** | open |




| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.36 | 44.33 | 59.00 | -14.67 | 20.17 | 24.16 |
| 2 | 15.72 | 39.35 | 59.00 | -19.65 | 21.29 | 18.06 |
| 3 | 25.58 | 34.82 | 59.00 | -24.18 | 22.07 | 12.75 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

| **Modulation** | LoRa RX Mode | | |
|---|---|---|---|
| **Frequency** | 9kHz~30MHz | **Loop** | open |



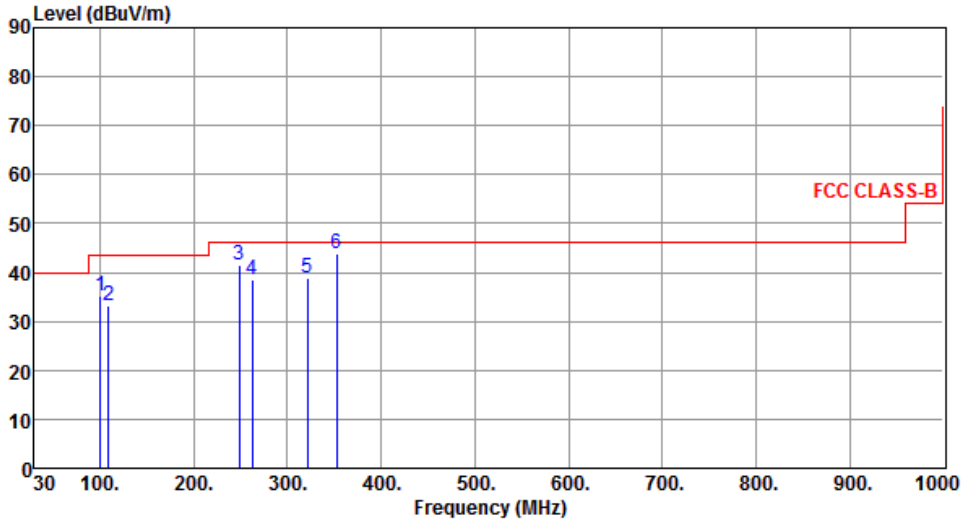

| | Freq. | Measured value | Limit | Margin | Factor | Reading |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dB | dBuV |
| 1 | 8.99 | 44.33 | 59.00 | -14.67 | 20.23 | 24.10 |
| 2 | 15.33 | 39.84 | 59.00 | -19.16 | 21.23 | 18.61 |
| 3 | 25.97 | 34.76 | 59.00 | -24.24 | 22.09 | 12.67 |

Note 1: Measured Value (dBm) = Reading (dBm) + Factor (dB)
Note 2: Margin (dB) = Measured Value (dBm) – Limit (dBm)

### 4.1.5 Receiver Spurious Emissions (Below 1GHz)

**For AS923 - LoRa RX Mode**

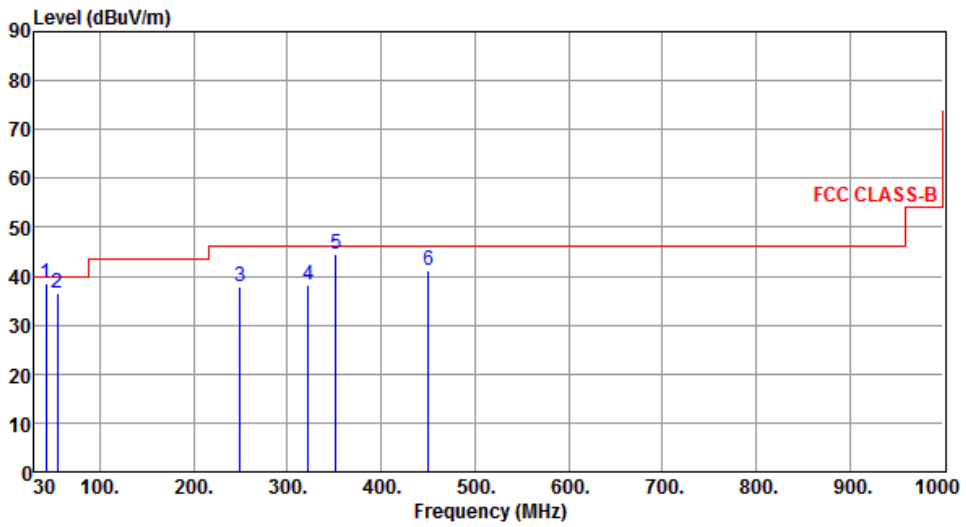
| **Modulation Mode** | LoRa RX |
|---|---|
| **Polarization** | Horizontal |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 100.73 | 35.11 | 43.50 | -8.39 | 47.93 | -12.82 | Peak | --- | --- |
| 2 | 109.56 | 33.08 | 43.50 | -10.42 | 44.57 | -11.49 | Peak | --- | --- |
| 3 | 248.64 | 41.57 | 46.00 | -4.43 | 50.97 | -9.40 | Peak | --- | --- |
| 4 | 262.73 | 38.68 | 46.00 | -7.32 | 47.59 | -8.91 | Peak | --- | --- |
| 5 | 321.76 | 38.77 | 46.00 | -7.23 | 45.97 | -7.20 | Peak | --- | --- |
| 6 | 352.16 | 43.75 | 46.00 | -2.25 | 50.16 | -6.41 | QP | 100 | 172 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| | |
|---|---|
| **Modulation Mode** | LoRa RX |
| **Polarization** | Vertical |

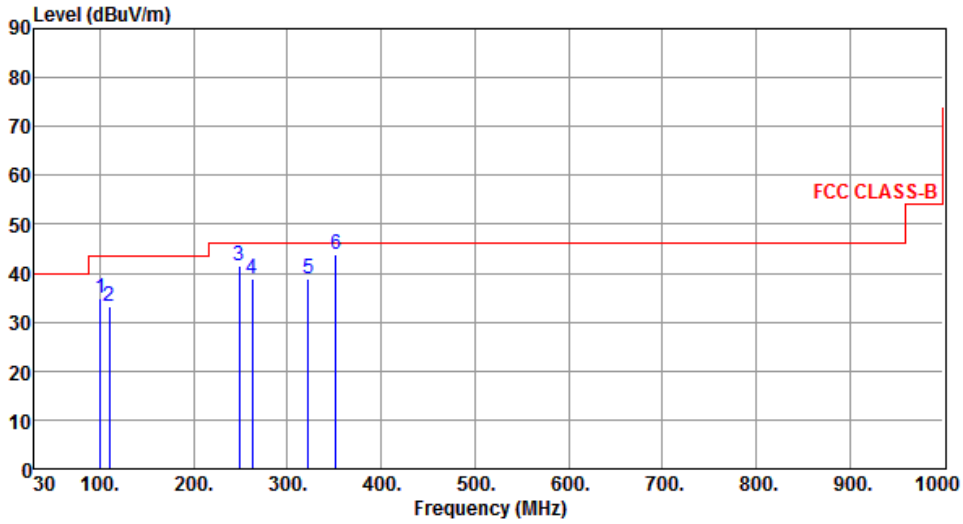



| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 42.58 | 38.68 | 40.00 | -1.32 | 46.60 | -7.92 | QP | 100 | 341 |
| 2 | 54.53 | 36.48 | 40.00 | -3.52 | 44.52 | -8.04 | Peak | --- | --- |
| 3 | 249.53 | 37.92 | 46.00 | -8.08 | 47.30 | -9.38 | Peak | --- | --- |
| 4 | 321.85 | 38.11 | 46.00 | -7.89 | 45.31 | -7.20 | Peak | --- | --- |
| 5 | 352.04 | 44.48 | 46.00 | -1.52 | 50.89 | -6.41 | QP | 151 | 58 |
| 6 | 450.11 | 41.34 | 46.00 | -4.66 | 45.24 | -3.90 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

**For AU915 - LoRa RX Mode**

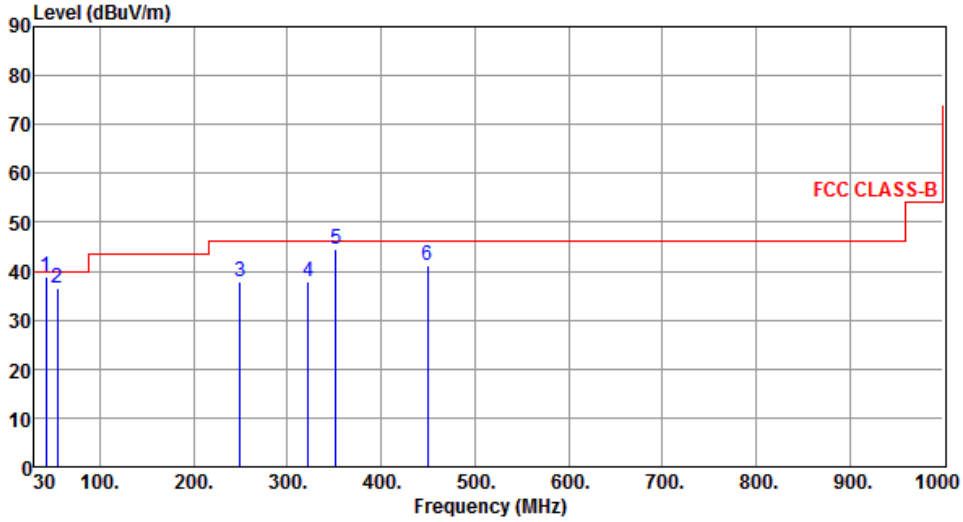
| | |
|---|---|
| **Modulation Mode** | LoRa RX |
| **Polarization** | Horizontal |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 100.85 | 34.88 | 43.50 | -8.62 | 47.68 | -12.80 | Peak | --- | --- |
| 2 | 109.66 | 33.24 | 43.50 | -10.26 | 44.72 | -11.48 | Peak | --- | --- |
| 3 | 248.52 | 41.63 | 46.00 | -4.37 | 51.03 | -9.40 | Peak | --- | --- |
| 4 | 262.85 | 38.74 | 46.00 | -7.26 | 47.65 | -8.91 | Peak | --- | --- |
| 5 | 321.85 | 38.85 | 46.00 | -7.15 | 46.05 | -7.20 | Peak | --- | --- |
| 6 | 352.10 | 43.88 | 46.00 | -2.12 | 50.29 | -6.41 | QP | 100 | 174 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| | |
|---|---|
| **Modulation Mode** | LoRa RX |
| **Polarization** | Vertical |



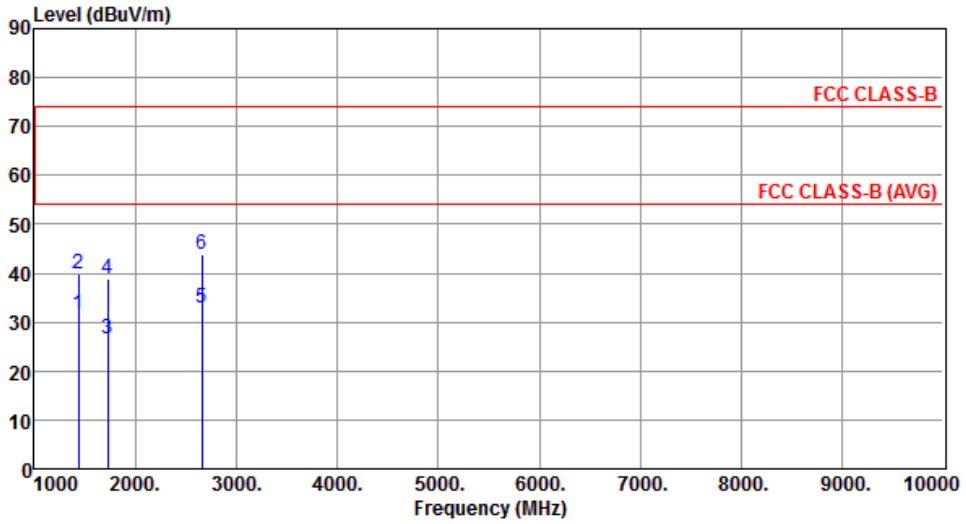

| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 42.61 | 38.74 | 40.00 | -1.26 | 46.66 | -7.92 | QP | 105 | 344 |
| 2 | 54.66 | 36.55 | 40.00 | -3.45 | 44.59 | -8.04 | Peak | --- | --- |
| 3 | 249.22 | 37.95 | 46.00 | -8.05 | 47.34 | -9.39 | Peak | --- | --- |
| 4 | 321.97 | 37.77 | 46.00 | -8.23 | 44.97 | -7.20 | Peak | --- | --- |
| 5 | 352.04 | 44.66 | 46.00 | -1.34 | 51.07 | -6.41 | QP | 152 | 59 |
| 6 | 450.01 | 41.23 | 46.00 | -4.77 | 45.13 | -3.90 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

### 4.1.6 Receiver Spurious Emissions (Above 1GHz)

**For AS923 - LoRa RX Mode**

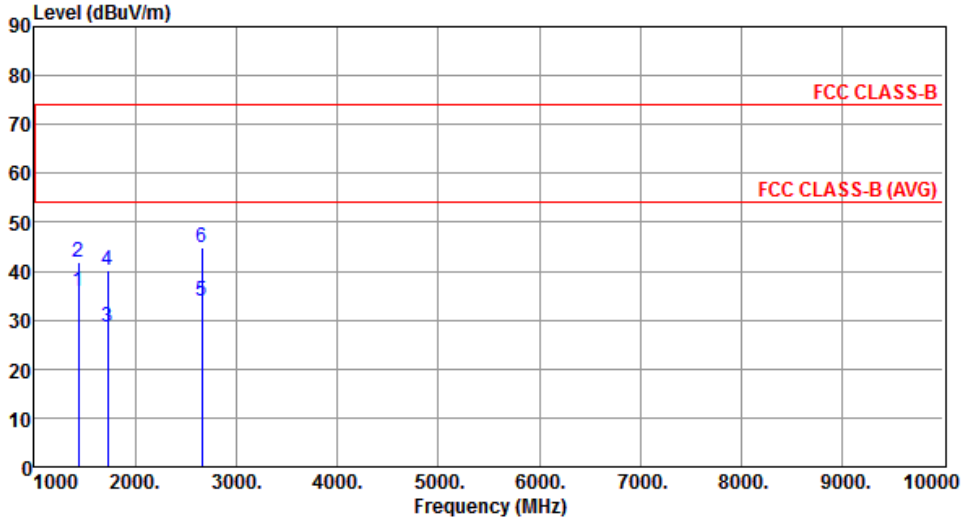
| **Modulation Mode** | LoRa RX |
|---|---|
| **Polarization** | Horizontal |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1440.00 | 31.64 | 54.00 | -22.36 | 38.52 | -6.88 | Average | 100 | 6 |
| 2 | 1440.00 | 39.95 | 74.00 | -34.05 | 46.83 | -6.88 | Peak | 100 | 6 |
| 3 | 1728.00 | 26.58 | 54.00 | -27.42 | 33.42 | -6.84 | Average | 100 | 61 |
| 4 | 1728.00 | 38.83 | 74.00 | -35.17 | 45.67 | -6.84 | Peak | 100 | 61 |
| 5 | 2660.00 | 32.88 | 54.00 | -21.12 | 35.63 | -2.75 | Average | 100 | 251 |
| 6 | 2660.00 | 43.97 | 74.00 | -30.03 | 46.72 | -2.75 | Peak | 100 | 251 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| | |
|---|---|
| **Modulation Mode** | LoRa RX |
| **Polarization** | Vertical |

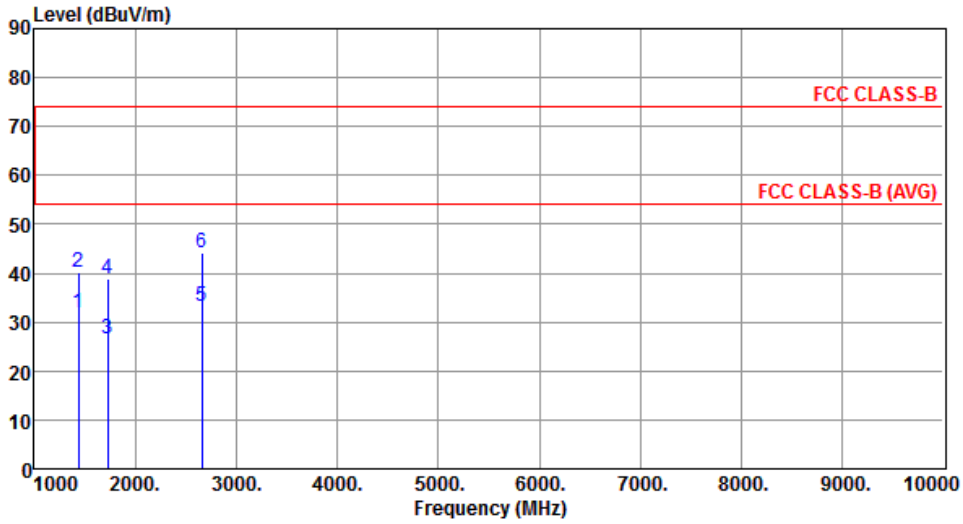



| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1440.00 | 35.87 | 54.00 | -18.13 | 42.75 | -6.88 | Average | 100 | 26 |
| 2 | 1440.00 | 41.85 | 74.00 | -32.15 | 48.73 | -6.88 | Peak | 100 | 26 |
| 3 | 1728.00 | 28.62 | 54.00 | -25.38 | 35.46 | -6.84 | Average | 100 | 215 |
| 4 | 1728.00 | 40.28 | 74.00 | -33.72 | 47.12 | -6.84 | Peak | 100 | 215 |
| 5 | 2660.00 | 34.00 | 54.00 | -20.00 | 36.75 | -2.75 | Average | 100 | 65 |
| 6 | 2660.00 | 44.98 | 74.00 | -29.02 | 47.73 | -2.75 | Peak | 100 | 65 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

**For AU915 - LoRa RX Mode**

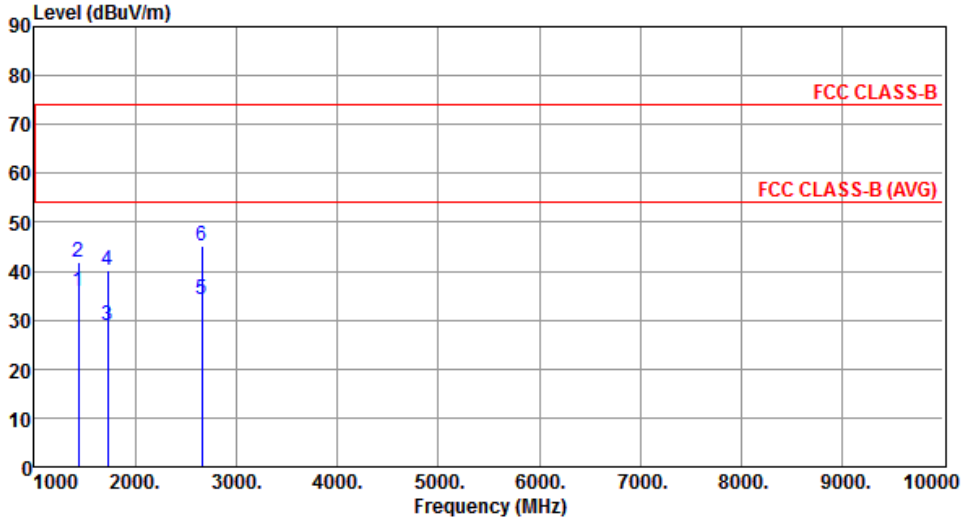
| **Modulation Mode** | LoRa RX |
|---|---|
| **Polarization** | Horizontal |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1440.00 | 31.75 | 54.00 | -22.25 | 38.63 | -6.88 | Average | 100 | 8 |
| 2 | 1440.00 | 40.07 | 74.00 | -33.93 | 46.95 | -6.88 | Peak | 100 | 8 |
| 3 | 1728.00 | 26.72 | 54.00 | -27.28 | 33.56 | -6.84 | Average | 100 | 58 |
| 4 | 1728.00 | 38.73 | 74.00 | -35.27 | 45.57 | -6.84 | Peak | 100 | 58 |
| 5 | 2660.00 | 33.13 | 54.00 | -20.87 | 35.88 | -2.75 | Average | 100 | 258 |
| 6 | 2660.00 | 44.14 | 74.00 | -29.86 | 46.89 | -2.75 | Peak | 100 | 258 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| | |
|---|---|
| **Modulation Mode** | LoRa RX |
| **Polarization** | Vertical |

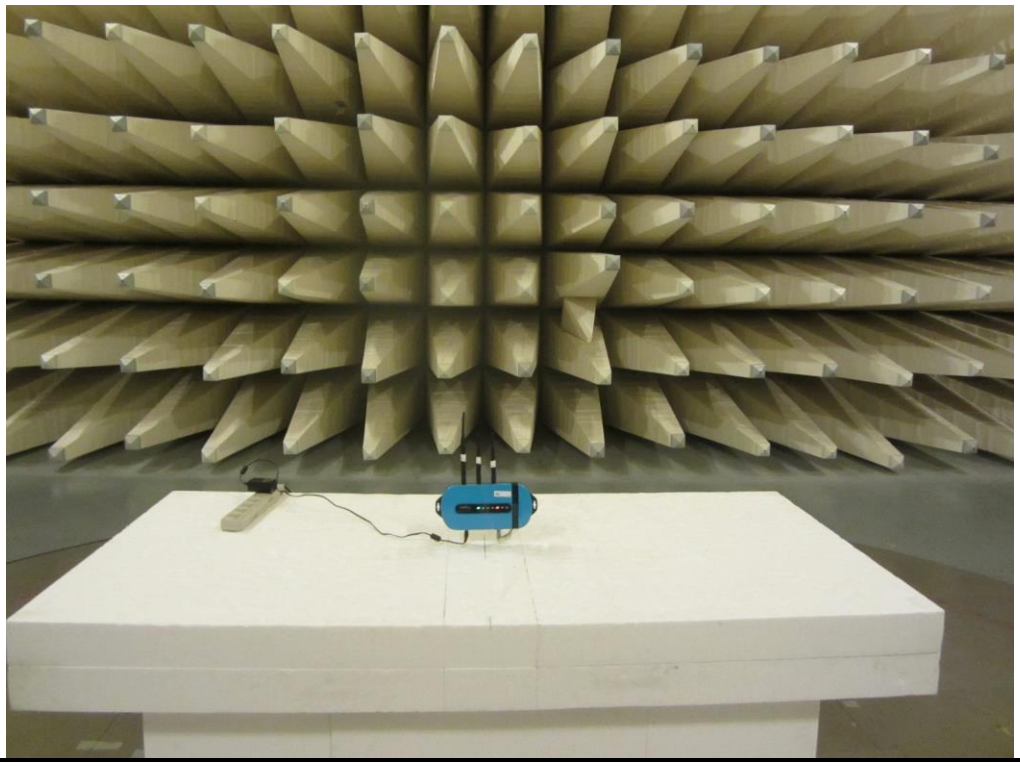


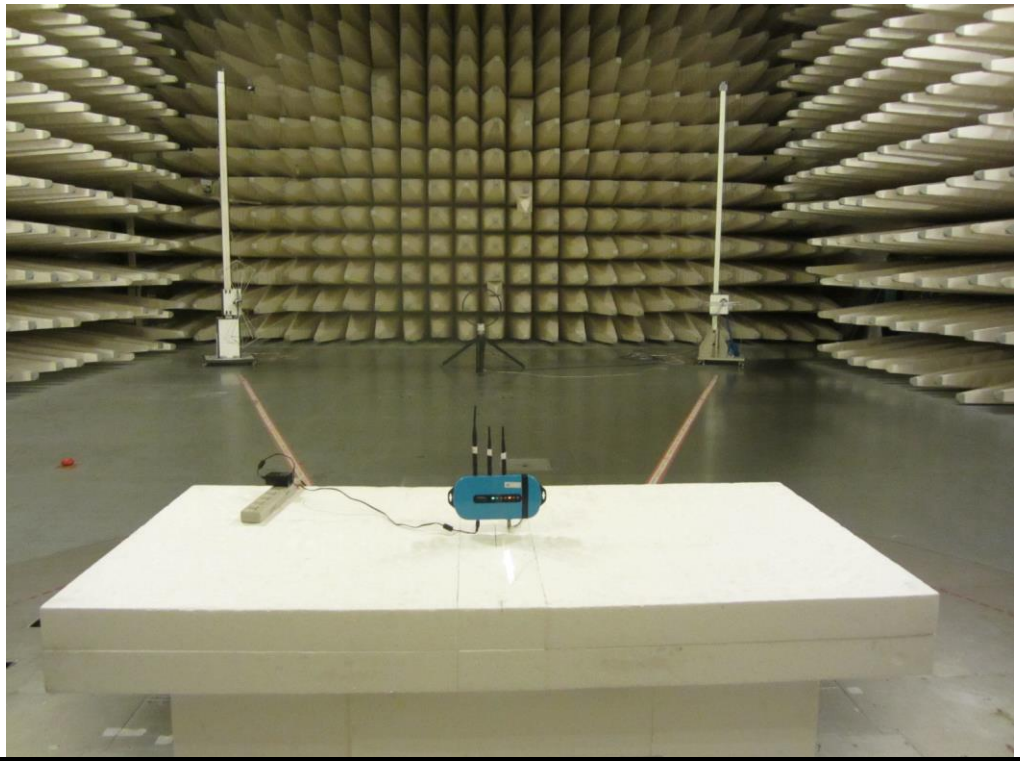

| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1440.00 | 35.94 | 54.00 | -18.06 | 42.82 | -6.88 | Average | 100 | 23 |
| 2 | 1440.00 | 41.97 | 74.00 | -32.03 | 48.85 | -6.88 | Peak | 100 | 23 |
| 3 | 1728.00 | 28.76 | 54.00 | -25.24 | 35.60 | -6.84 | Average | 100 | 217 |
| 4 | 1728.00 | 40.14 | 74.00 | -33.86 | 46.98 | -6.84 | Peak | 100 | 217 |
| 5 | 2660.00 | 34.14 | 54.00 | -19.86 | 36.89 | -2.75 | Average | 100 | 60 |
| 6 | 2660.00 | 45.13 | 74.00 | -28.87 | 47.88 | -2.75 | Peak | 100 | 60 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

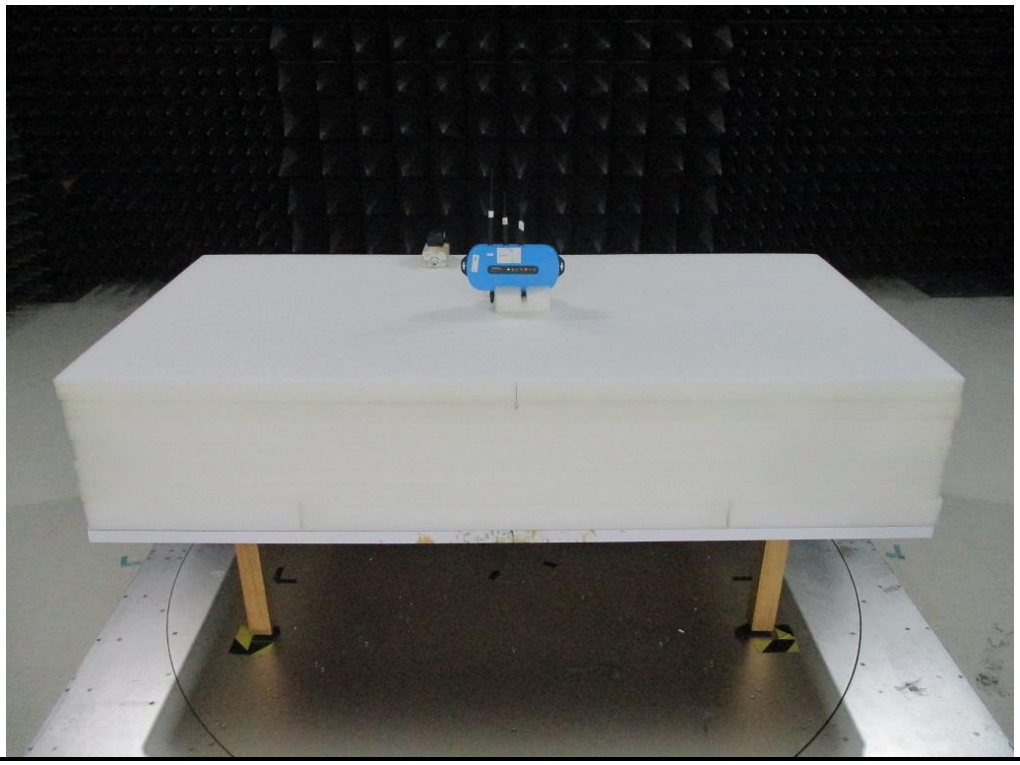
# 5 Photographs of the Test Configuration

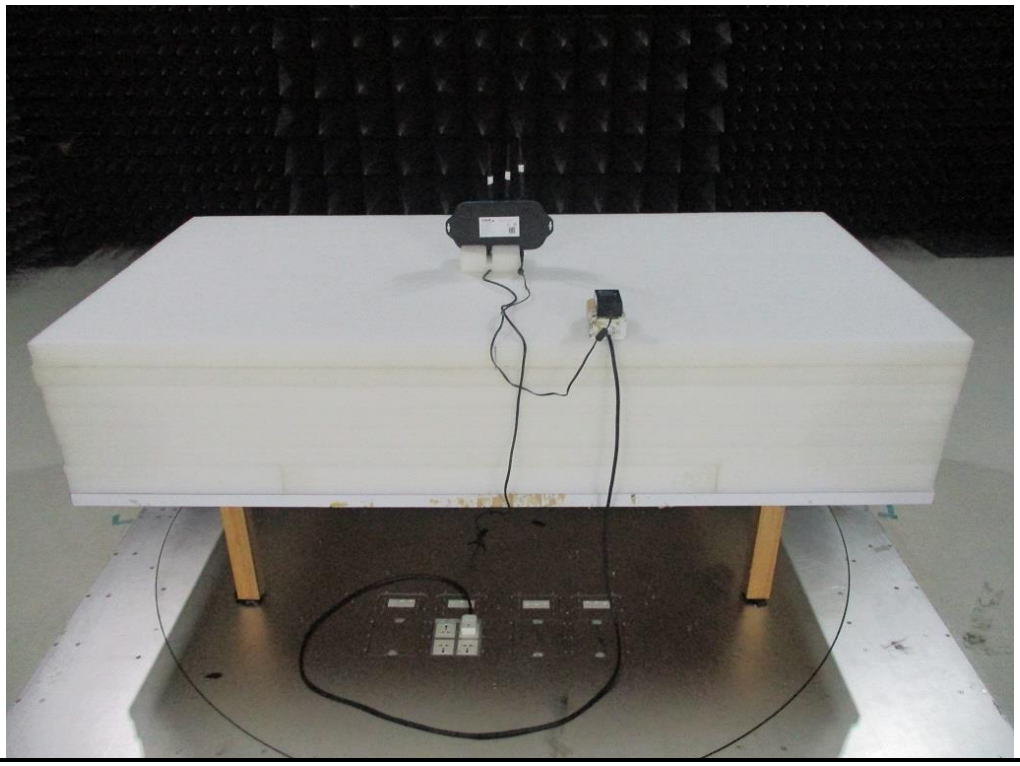
**Spurious Emission below 30MHz Test**



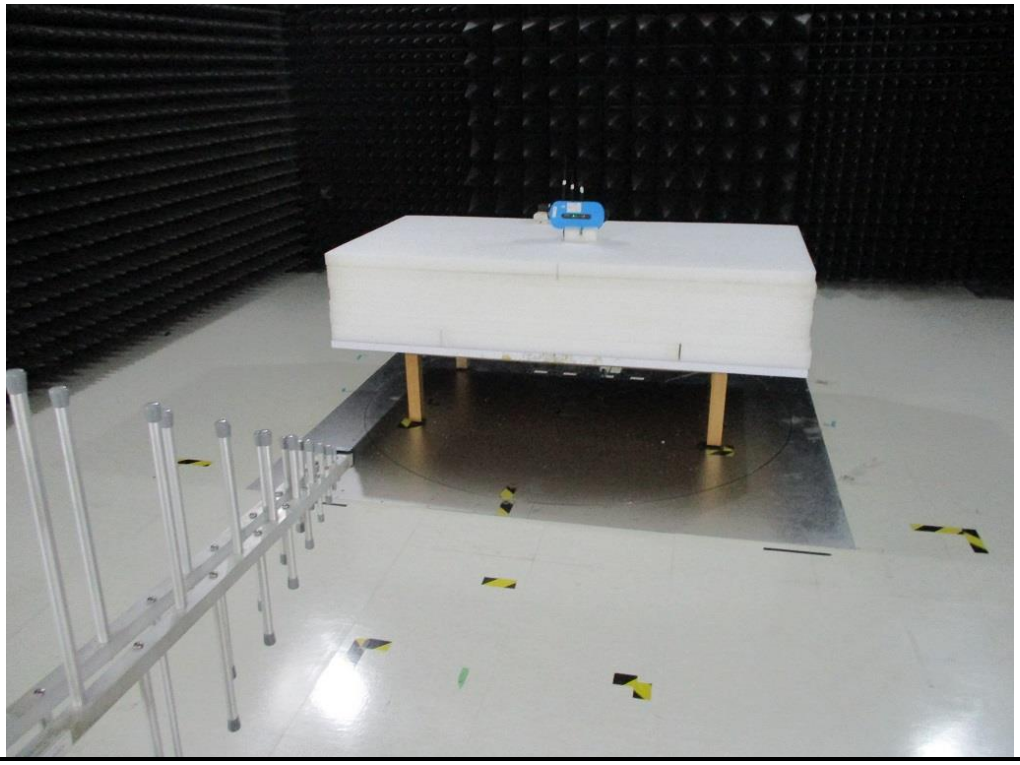


**Spurious Emission Below 1GHz Test**

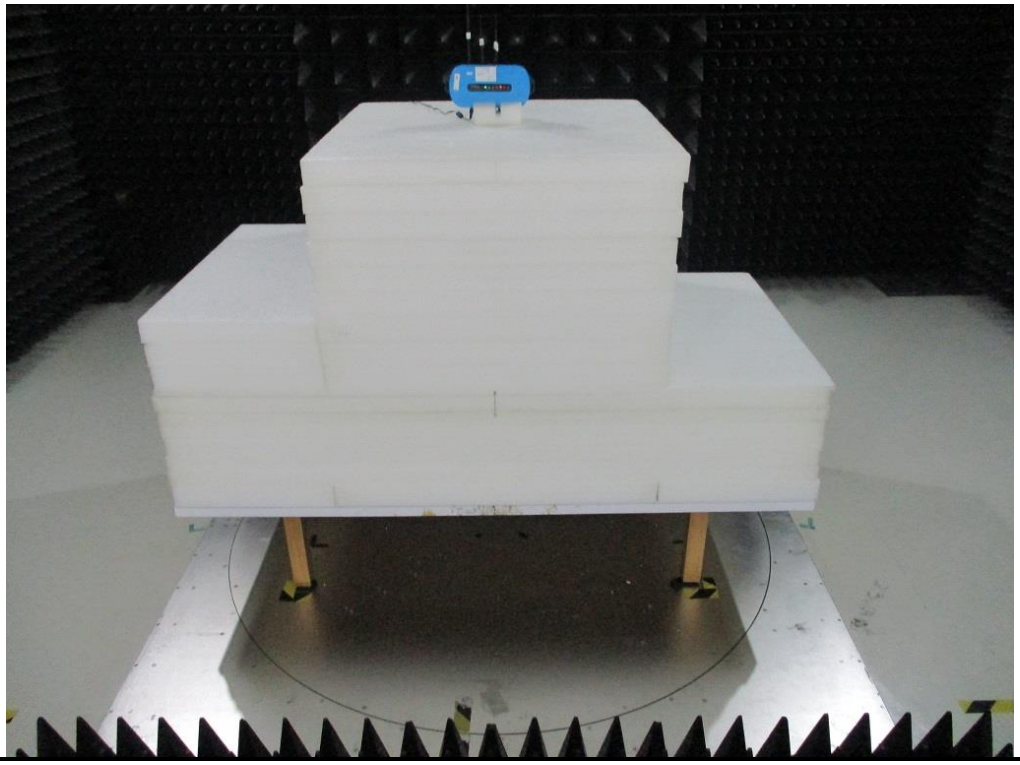


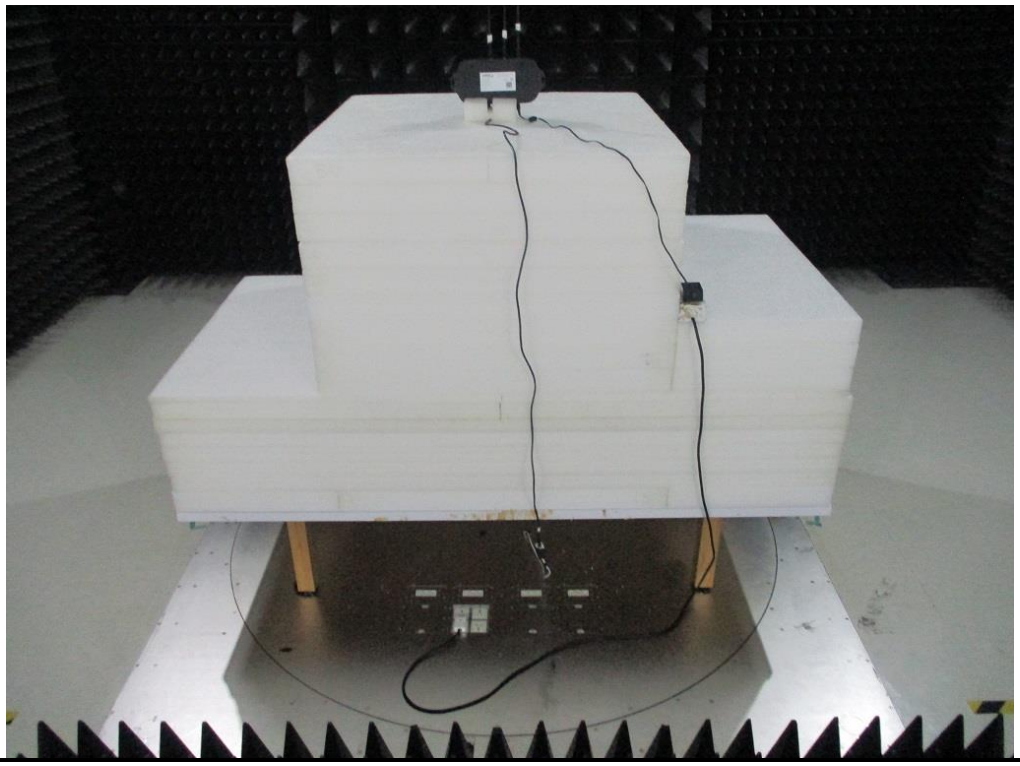


**Spurious Emission Below 1GHz Test**

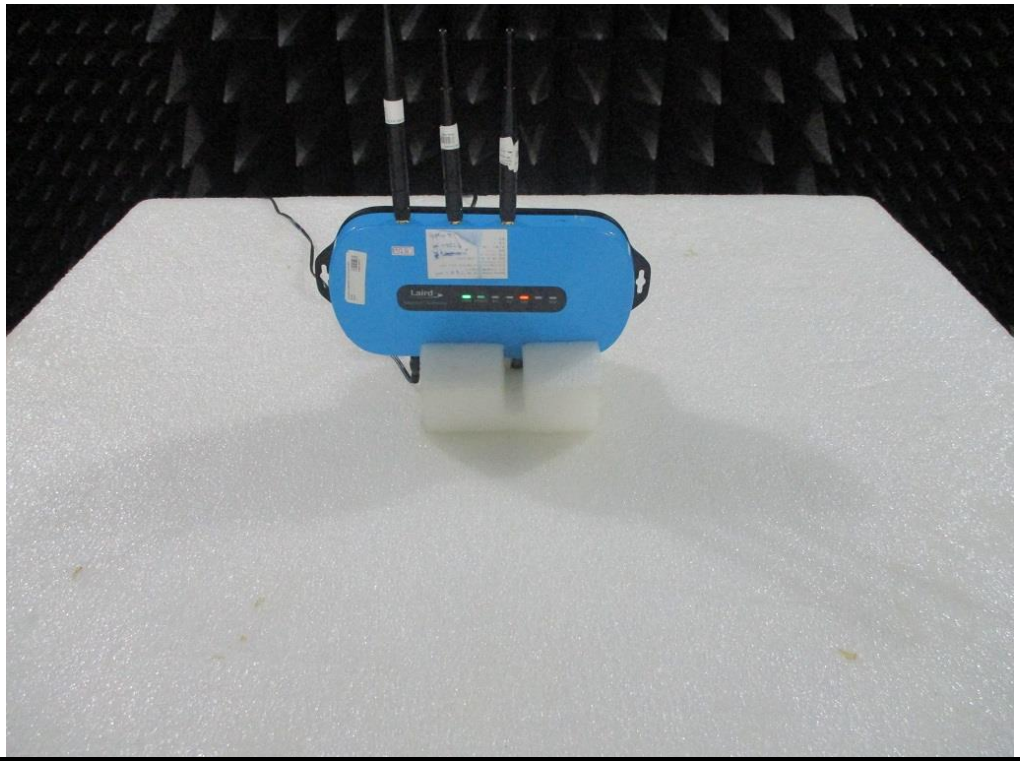


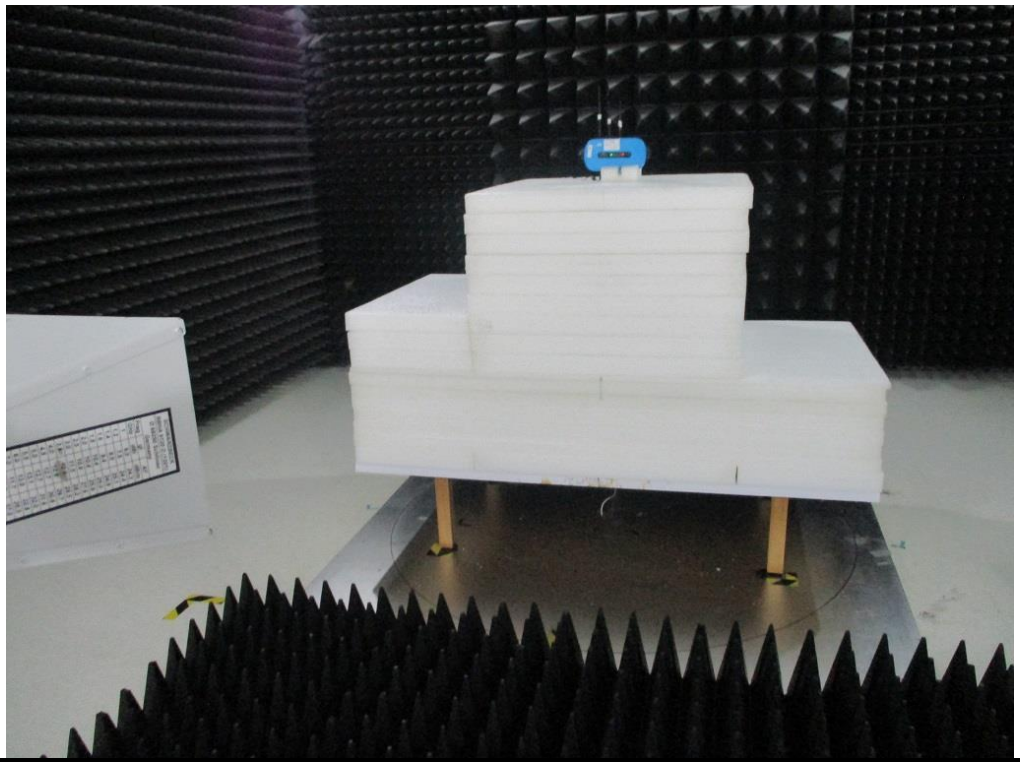
**Spurious Emission Above 1GHz Test**





**Spurious Emission Above 1GHz Test**





# 6 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website http://www.icertifi.com.tw.

| **Linkou** | **Kwei Shan** | **Kwei Shan Site II** |
|---|---|---|
| Tel: 886-2-2601-1640 | Tel: 886-3-271-8666 | Tel: 886-3-271-8640 |
| No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C. | No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C. | No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.. |

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

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