# Multi-Tech Systems, Inc.

**(Int LoRa Ant): MTCAP3-L4G2D-A23UEA-D, MTCAP3-EN-A23UEA-D**

**(Ext LoRa Ant): MTCAP3-L4G2D-A23UEA-L, MTCAP3-EN-A23UEA-L**

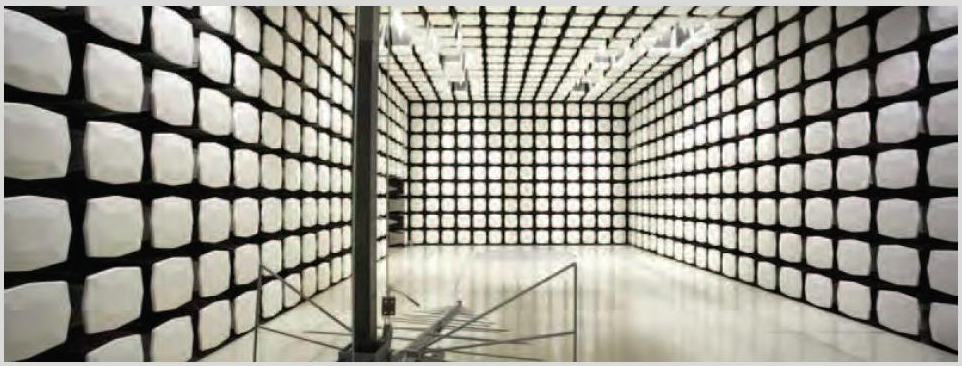
**FCC 15.247:2025**

**RSS-Gen Issue 5:2018+A1:2019+A2:2021**

**RSS-247 Issue 3:2023**

**LoRa DTS Transceiver**

**Report: MLTI0373.1 Rev. 01, Issue Date: August 8, 2025**



ACCREDITED
CERT #3310.05

*This report must not be used to claim product certification, approval, or endorsement by A2LA or any agency of the U.S. Government. This Report shall not be reproduced, except in full without written approval of the laboratory.*

# TABLE OF CONTENTS

| Section | Page Number |
|---|---|

# CERTIFICATE OF TEST

**Last Date of Test: May 20, 2025**
**Multi-Tech Systems, Inc.**
**EUT: (Int LoRa Ant): MTCAP3-L4G2D-A23UEA-D, MTCAP3-EN-A23UEA-D**
**(Ext LoRa Ant): MTCAP3-L4G2D-A23UEA-L, MTCAP3-EN-A23UEA-L**

## Radio Equipment Testing

### Standards

| Specification | Method |
|---|---|
| FCC 15.247:2025 | ANSI C63.10:2020<br>KDB 558074 |
| RSS-Gen Issue 5:2018+A1:2019+A2:2021 | |
| RSS-247 Issue 3:2023 | |

### Guidance

FCC KDB 558074 v05r02:2019

### Results

| Test Description | Result | FCC Section(s) | RSS Section(s) | ANSI C63.10 Section(s) | Comments |
|---|---|---|---|---|---|
| Powerline Conducted Emissions (Transmitter) | Pass | 15.207 | RSS-Gen 8.8 | 6.2 | |
| Spurious Radiated Emissions | Pass | 15.247(d), KDB 558074 - 8.6, 8.7 | RSS-247 5.5 | 6.5, 6.6, 11.12.1, 11.13.2 | |
| Duty Cycle | N/A | 15.247, KDB 558074 -6.0 | RSS-Gen 3.2 | 11.6 | |
| Output Power | Pass | 15.247(b), KDB 558074 - 8.3 | RSS-247 5.4(d) | 11.9.1.1 | |
| Equivalent Isotropic Radiated Power (EIRP) | Pass | 15.247(b), KDB 558074 - 8.3 | RSS-247 5.4(d) | 11.9.1.1 | |
| Band Edge Compliance | N/A | 15.247(d), KDB 558074 - 8.5 | RSS-247 5.5 | 11.11 | |
| DTS Bandwidth (6 dB) | Pass | 15.247(a), KDB 558074 - 8.2 | RSS-247 5.2(a) | 11.8.2 | |
| Occupied Bandwidth (99%) | N/A | KDB 558074 -2.1 | RSS-Gen 6.7 | 6.9.3 | |
| Spurious Conducted Emissions | Pass | 15.247(d), KDB 558074 - 8.5 | RSS-247 5.5 | 11.11 | |
| Power Spectral Density | Pass | 15.247(e), KDB 558074 - 8.4 | RSS-247 5.2(b) | 11.10.2 | |
| Powerline Conducted Emissions (Receiver) | N/A | 15.101, 15.107 | RSS-Gen 5.2 | ANSI C63.4 - 12.2.4 | Not included per FCC 15.101 as this will be covered under SDoC rules for the FCC. RSS-Gen section 7 stated receiver requirements only apply to standalone receivers operating in the 30-960 MHz band and this is not a standalone receiver. |
| Radiated Emissions for Receiver | N/A | 15.101, 15.109 | RSS-Gen 5.2 | ANSI C63.4 - 12.2.5 | |

### Deviations From Test Standards

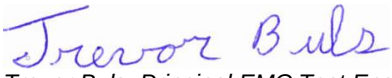
None

***Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.***

# CERTIFICATE OF TEST

element
2022.04.01

**Approved By:**



*Trevor Buls, Principal EMC Test Engineer*
*Signed for and on behalf of Element*

***Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.***

# REVISION HISTORY

| Revision Number | Description | Date (yyyy-mm-dd) | Page Number |
|---|---|---|---|
| 01 | Change "External LoRa Antenna: Monopole" to "External LoRa Antenna: Dipole" in the power settings and antenna document | 2025-08-08 | 13 |

# ACCREDITATIONS AND AUTHORIZATIONS

element
2025.02.07

## United States

**FCC** - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

**A2LA** - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

**FDA** - Recognized by the FDA as an Accreditation Scheme for Conformity Assessment (ASCA)-accredited testing laboratory for basic safety and essential performance.

## Canada

**ISED** - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

## European Union

**European Commission** – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

## United Kingdom

**BEIS** – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

## Australia/New Zealand

**ACMA** - Recognized by ACMA as a CAB for the acceptance of test data.

## Korea

**MSIT / RRA** - Recognized by KCC's RRA as a CAB for the acceptance of test data.

## Japan

**VCCI** - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

## Taiwan

**BSMI** – Recognized by BSMI as a CAB for the acceptance of test data.

**NCC** - Recognized by NCC as a CAB for the acceptance of test data.

## Singapore

**IDA** – Recognized by IDA as a CAB for the acceptance of test data.

## Israel

**MOC** – Recognized by MOC as a CAB for the acceptance of test data.

## Hong Kong

**OFCA** – Recognized by OFCA as a CAB for the acceptance of test data.

## SCOPE

For details on the Scopes of our Accreditations, please visit:

California Minnesota Oregon Washington

# FACILITIES

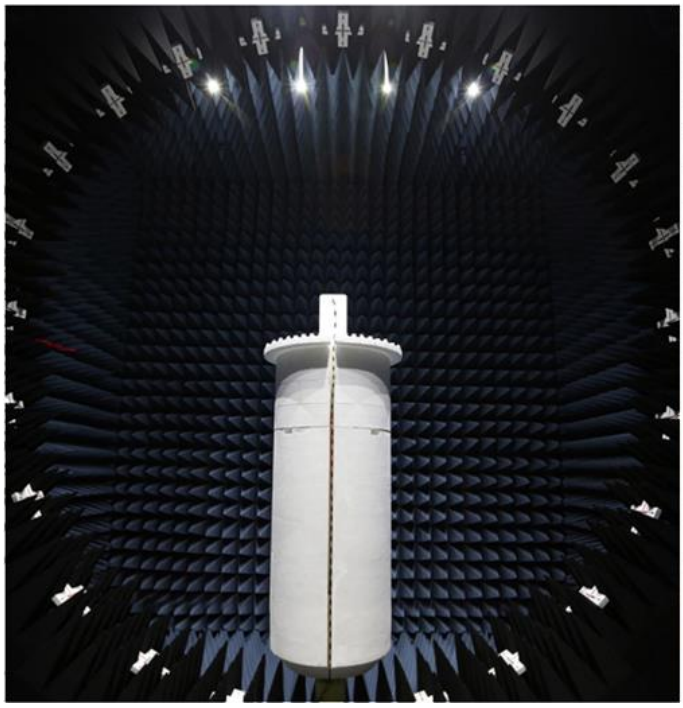
element
2025.01.03

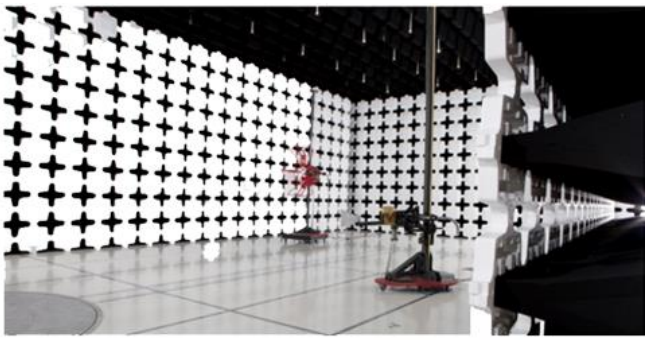
Testing was performed at the following location(s)

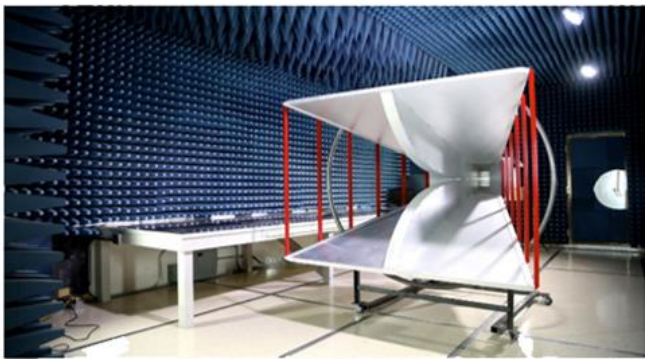
| | Location | Labs (1) | Address | A2LA (2) | ISED (3) | BSMI (4) | VCCI (5) | CAB (6) | FDA (7) |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | California | OC01-17 | 41 Tesla<br>Irvine, CA 92618<br>(949) 861-8918 | 3310.04 | 2834B | SL2-IN-E-1154R | A-0029 | US0158 | TL-55 |
| ☒ | Minnesota | MN01-11 | 9349 W Broadway Ave.<br>Brooklyn Park, MN 55445<br>(612) 638-5136 | 3310.05 | 2834E | SL2-IN-E-1152R | A-0109 | US0175 | TL-57 |
| ☐ | Oregon | EV01-12 | 6775 NE Evergreen Pkwy #400<br>Hillsboro, OR 97124<br>(503) 844-4066 | 3310.02 | 2834D | SL2-IN-E-1017 | A-0108 | US0017 | TL-56 |
| ☐ | Washington | NC01-05 | 19201 120th Ave NE<br>Bothell, WA 98011<br>(425) 984-6600 | 3310.06 | 2834F | SL2-IN-E-1153R | A-0110 | US0157 | TL-67 |
| ☐ | Offsite | N/A | See Product Description | N/A | N/A | N/A | N/A | N/A | N/A |

See data sheets for specific labs

(1) The lab designations denote individual rooms within each location. (OC01, OC02, OC03, etc.)
(2) A2LA Certificate No.
(3) ISED Company No.
(4) BSMI No.
(5) VCCI Site Filing No.
(6) CAB Identifier. Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MOC, NCC, OFCA
(7) FDA ASCA No.







# MEASUREMENT UNCERTAINTY

element
MU 2025-03-26

## Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation reported is based on statistical analysis that was performed by the laboratory. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (k=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable) and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Various Measurements

| Test | All Labs (+/-) |
|---|---|
| Frequency Accuracy (%) | 0.0007 |
| Amplitude Accuracy (dB) | 1.2 |
| Conducted Power (dB) | 1.2 |
| Radiated Power via Substitution (dB) | 0.7 |
| Temperature (degrees C) | 0.7 |
| Humidity (% RH) | 2.5 |
| Voltage (AC) (%) | 1 |
| Voltage (DC) (%) | 0.7 |

Field Strength Measurements (dB)

| Range | MN05 (+/-) |
|---|---|
| 10kHz-30MHz | 1.8 |
| 30MHz-1GHz 3m | 4.6 |
| 1GHz-6GHz | 5.1 |
| 6GHz-40GHz | 5.3 |

AC Powerline Conducted Emissions Measurements (dB)

| Range | MN03 (+/-) |
|---|---|
| 9kHz-150kHz LISN | 3.6 |
| 150kHz-30MHz LISN | 3.2 |
| 150kHz-30MHz CVP | 3 |
| 150kHz-30MHz Telecom-ISN | 4.4 |

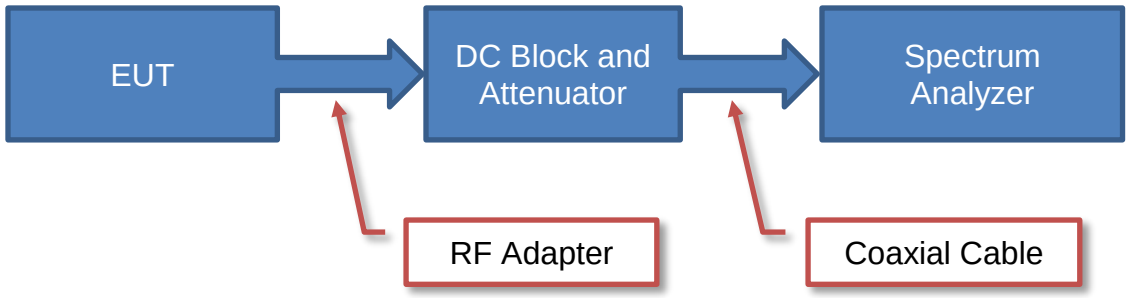
# TEST SETUP BLOCK DIAGRAMS

## Measurement Bandwidths

| Frequency Range (MHz) | Peak Data (kHz) | Quasi-Peak Data (kHz) | Average Data (kHz) |
|---|---|---|---|
| 0.01 - 0.15 | 1.0 | 0.2 | 0.2 |
| 0.15 - 30.0 | 10.0 | 9.0 | 9.0 |
| 30.0 - 1000 | 100.0 | 120.0 | 120.0 |
| Above 1000 | 1000.0 | N/A | 1000.0 |

*Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.*

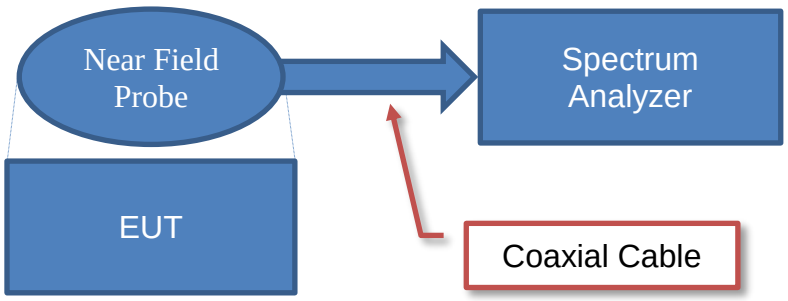
## Antenna Port Conducted Measurements




### Sample Calculation (logarithmic units)

| Measured Value | | Measured Level | | Reference Level Offset |
|---|---|---|---|---|
| **71.2** | = | 42.6 | + | 28.6 |

## Near Field Test Fixture Measurements

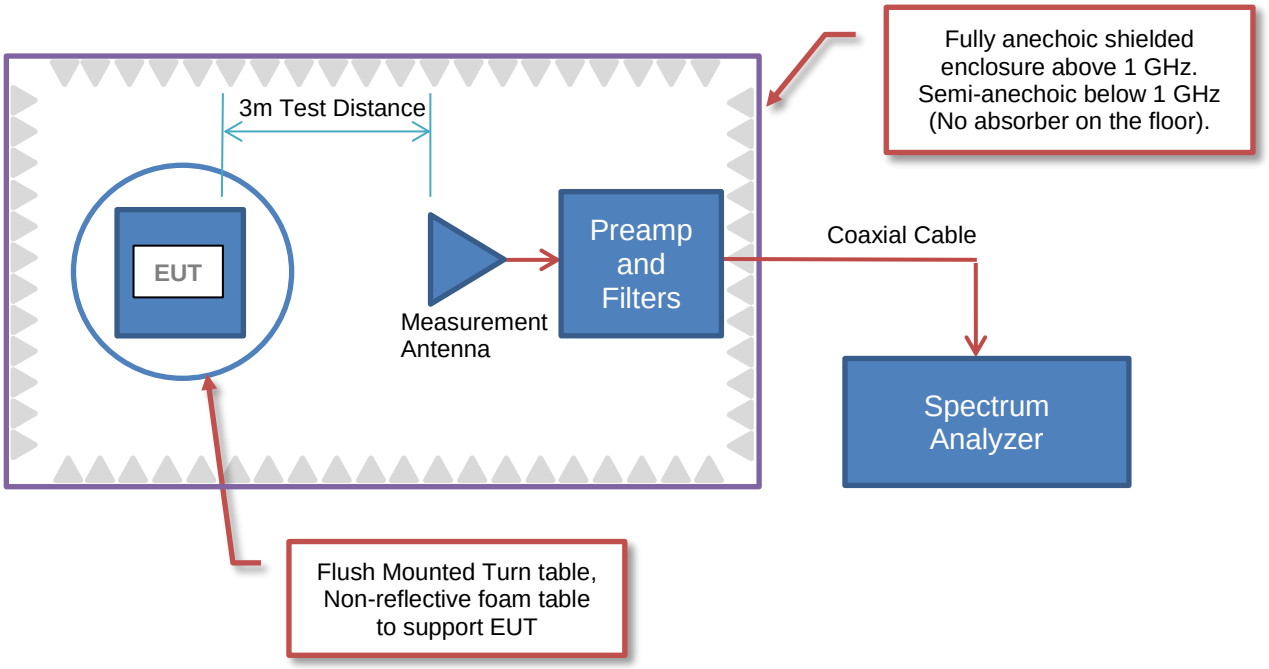



### Sample Calculation (logarithmic units)

| Measured Value | | Measured Level | | Reference Level Offset |
|---|---|---|---|---|
| **71.2** | = | 42.6 | + | 28.6 |

# TEST SETUP BLOCK DIAGRAMS

## Emissions Measurements




## Sample Calculation (logarithmic units)

**Radiated Emissions:**

| Measured Level (Amplitude) | | Factor: Antenna Factor | | Factor: Cable Factor | | Factor: Amplifier Gain | | Distance Adjustment Factor | | External Attenuation | | Field Strength |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 42.6 | + | 28.6 | + | 3.1 | - | 40.8 | + | 0.0 | + | 0.0 | = | **33.5** |

**Conducted Emissions:**

| Measured Level (Amplitude) | | Factor: Transducer Factor | | Factor: Cable Factor | | External Attenuation | | Adjusted Level |
|---|---|---|---|---|---|---|---|---|
| 26.7 | + | 0.3 | + | 0.1 | + | 20.0 | = | **47.1** |

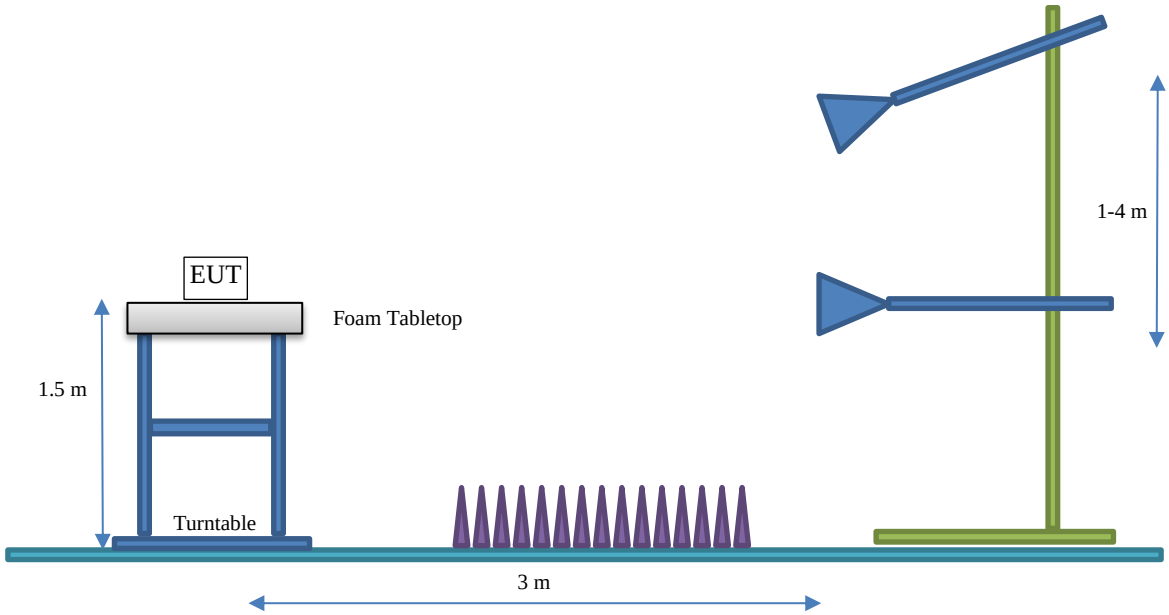
**Radiated Power (ERP/EIRP) – Substitution Method:**

| Measured Level into Substitution Antenna (Amplitude dBm) | | Substitution Antenna Factor (dBi) | | EIRP to ERP (if applicable) | | Measured power (dBm ERP/EIRP) |
|---|---|---|---|---|---|---|
| 10.0 | + | 6.0 | - | 2.15 | = | **13.9/16.0** |

# TEST SETUP BLOCK DIAGRAMS

## Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



# PRODUCT DESCRIPTION

## Client and Equipment under Test (EUT) Information

| | |
|---|---|
| **Company Name:** | Multi-Tech Systems, Inc. |
| **Address:** | 2205 Woodale Dr |
| **City, State, Zip:** | Mounds View, MN 55112 |
| **Test Requested By:** | Tim Gunn |
| **EUT:** | (Int LoRa Ant): MTCAP3-L4G2D-A23UEA-D, MTCAP3-EN-A23UEA-D<br>(Ext LoRa Ant): MTCAP3-L4G2D-A23UEA-L, MTCAP3-EN-A23UEA-L |
| **First Date of Test:** | March 21, 2025 |
| **Last Date of Test:** | May 20, 2025 |
| **Receipt Date of Samples:** | March 21, 2025 |
| **Equipment Design Stage:** | Production |
| **Equipment Condition:** | No Damage |
| **Purchase Authorization:** | Verified |

## Information Provided by the Party Requesting the Test

| **Functional Description of the EUT:** |
|---|
| The MultiTech Conduit® AP conveniently provides deep in-building connectivity and improved performance for network operators and enterprises connecting thousands of IoT assets by harnessing the power of the LoRaWAN® protocol. Easy to deploy, the Conduit AP access point extends LoRa® connectivity in commercial buildings like hotels, convention centers, offices and retail facilities providing coverage in difficult to reach areas cell tower or rooftop deployments may not penetrate. The Conduit AP offers a development environment for software developers and IT professionals alike. mPower™ edge intelligence features an easy-to-use graphical interface set-up and includes a built-in LoRa Network Server and Packet Forwarder to connect locally clustered assets on a private LoRaWAN network directly to your choice of IoT data platforms. The Conduit AP extends complex processing to the edge to reduce upstream communication and operational costs. The Conduit AP provides Ethernet IP backhaul or optional 4G-LTE IP backhaul.<br>The four listed models are similar. –L indicates an external LoRa antenna, -D indicates an internal LoRa antenna, and –EN- indicates the cell module is depopulated. |

| **Testing Objective:** |
|---|
| Seeking to demonstrate compliance of the LoRa radio with operation under FCC 15.247:2025 and RSS-Gen Issue 5:2018+A1:2019+A2:2021, RSS-247 Issue 3:2023 specifications under technology category Other. |

# POWER SETTINGS AND ANTENNAS

The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

## ANTENNA GAIN (dBi)

| Type | Provided by: | Frequency Range (MHz) | Gain (dBi) |
|---|---|---|---|
| Internal LoRa Antenna: Ceramic Chip | Kyocera AVX M620720 | 900-928 | 2.06 |
| External LoRa Antenna: Dipole | Quectel YEIN002BA (Q8-D0958-S1) | 900-928 | 2.5 |

The EUT was tested using the power settings provided by the manufacturer which were based upon:

☒ Test software settings
☐ Rated power settings

## Firmware:

7.1.0-DEV

## SETTINGS FOR ALL TESTS IN THIS REPORT

| Channel | Power Setting |
|---|---|
| Low Channel (923.3 MHz) | PA1 PWID 14 |
| Mid Channel (925.1 MHz) | PA1 PWID 13 |
| High Channel (927.5 MHz) | PA1 PWID 14 |

# CONFIGURATIONS

## Configuration MLTI0373-1

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| MultiTech Conduit MTCAP3 Series | Multi-Tech Systems, Inc | MTCAP3-L4G2D-A23UEA-L | 5399780K |

| Peripherals in Test Setup Boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| DongSong Power Supply | DongSong | DYS818-050250W-K | PN:DYS818-050250-24C18A |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| DC Power cable | No | 1.5 m | Yes | MultiTech Conduit | DongSong Power Supply |
| Ethernet cable | No | 20 m | No | MultiTech Conduit | Laptop PC |

## Configuration MLTI0373-2

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| MultiTech Conduit MTCAP3 Series | Multi-Tech Systems, Inc | MTCAP3-L4G2D-A23UEA-L | 5399780K |
| Antenna | Quectel | Q8-D0958-S1 | N/A |

| Peripherals in Test Setup Boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| DongSong Power Supply | DongSong | DYS818-050250W-K | PN:DYS818-050250-24C18A |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| DC Power cable | No | 1.5 m | Yes | MultiTech Conduit | DongSong Power Supply |
| Ethernet cable | No | 20 m | No | MultiTech Conduit | Laptop PC |

# CONFIGURATIONS

**Configuration MLTI0373-3**

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Antenna | Quectel | Q8-D0958-S1 | N/A |
| MultiTech Conduit MTCAP3 Series | Multi-Tech Systems, Inc | MTCAP3-EN-A23UEA-L | 99999609 |

| Peripherals in Test Setup Boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| DongSong Power Supply | DongSong | DYS818-050250W-K | PN:DYS818-050250-24C18A |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| DC Power cable | No | 1.5 m | Yes | MultiTech Conduit | DongSong Power Supply |
| Ethernet cable | No | 20 m | No | MultiTech Conduit | Laptop PC |

**Configuration MLTI0373-4**

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| MultiTech Conduit MTCAP3 Series | Multi-Tech Systems, Inc | MTCAP3-EN-A23UEA-D | 99999614 |

| Peripherals in Test Setup Boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| DongSong Power Supply | DongSong | DYS818-050250W-K | PN:DYS818-050250-24C18A |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| DC Power cable | No | 1.5 m | Yes | MultiTech Conduit | DongSong Power Supply |
| Ethernet cable | No | 20 m | No | MultiTech Conduit | Laptop PC |

# CONFIGURATIONS

**Configuration MLTI0373-5**

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| MultiTech Conduit MTCAP3 Series | Multi-Tech Systems, Inc | MTCAP3-L4G2D-A23UEA-D | 5399794K |

| Peripherals in Test Setup Boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| DongSong Power Supply | DongSong | DYS818-050250W-K | PN:DYS818-050250-24C18A |

| Remote Equipment Outside of Test Setup Boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Laptop PC | Lenovo Company | ThinkPad | EQ ID 13513 |
| AC Adapter | Lenovo Company | ADLX90NLT2A | 11S45N0307Z1ZL437C86V |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| DC Power cable | No | 1.5 m | Yes | MultiTech Conduit | DongSong Power Supply |
| Ethernet cable | No | 20 m | No | MultiTech Conduit | Laptop PC |
| AC Power cable | No | 1.0 m | No | AC Adapter | AC Mains |
| DC Power cable | No | 1.6 m | Yes | AC Adapter | Laptop PC |

# MODIFICATIONS

## Equipment Modifications

| Item | Date | Test | Modification | Note | Disposition of EUT |
|---|---|---|---|---|---|
| 1 | 2025-03-21 | Spurious Conducted Emissions | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 2 | 2025-03-21 | DTS Bandwidth (6 dB) | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 3 | 2025-03-21 | Equivalent Isotropic Radiated Power (EIRP) | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 4 | 2025-03-21 | Occupied Bandwidth (99%) | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 5 | 2025-03-21 | Output Power | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 6 | 2025-03-21 | Power Spectral Density | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 7 | 2025-03-26 | Spurious Radiated Emissions (SRD Internal) | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 8 | 2025-03-26 | Spurious Radiated Emissions (SRD External) | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 9 | 2025-04-02 | Powerline Conducted Emissions (Transmitter) | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Element following the test. |
| 10 | 2025-05-20 | Band Edge Compliance | Tested as delivered to test Station. | No EMI suppression devices were added or modified during this test. | Scheduled testing was completed. |

# POWERLINE CONDUCTED EMISSIONS

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network.

Measurements are made using a LISN (Line Impedance Stabilization Network). The 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50 Ω. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Receiver | Gauss Instruments | TDEMI 30M | ARS | 2024-05-07 | 2025-05-07 |
| Cable - Conducted Cable Assembly | Northwest EMC | MNC, HGN, TYK, VAE | MNCA | 2025-02-14 | 2026-02-14 |
| LISN | Solar Electronics | 9252-50-R-24-BNC | LIY | 2025-03-30 | 2026-03-30 |

## CONFIGURATIONS INVESTIGATED

MLTI0373-2

## MODES INVESTIGATED

Transmitting LoRa Mid Ch 925.1 MHz

# POWERLINE CONDUCTED EMISSIONS

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 5399780K | Date: | 2025-04-02 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 22.5°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 29.5% |
| Customer Project: | None | Bar. Pressure (PMSL): | 992 mb |
| Tested By: | Marcelo Aguayo | Job Site: | MN03 |
| Power: | 110VAC/60Hz | Configuration: | MLTI0373-2 |

## TEST PARAMETERS

| | | | | | |
|---|---|---|---|---|---|
| Run #: | 161 | Line: | High Line | Add. Ext. Attenuation (dB): | 0 |

## COMMENTS

Mid channel was chosen based on the difference between power measurements on all channels being less than <0.3 dB.

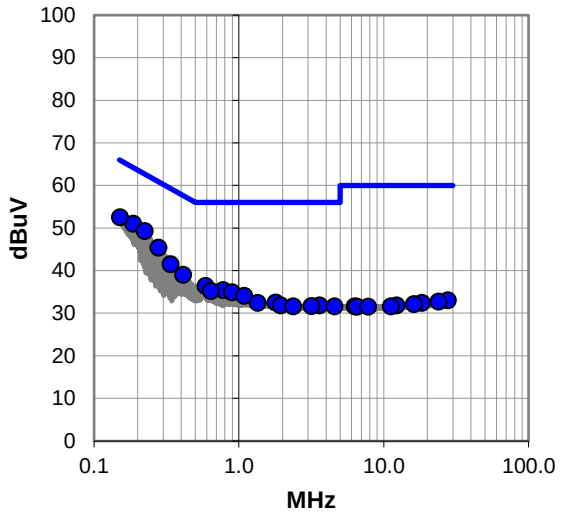
## EUT OPERATING MODES

Transmitting LoRa Mid Ch 925.1 MHz

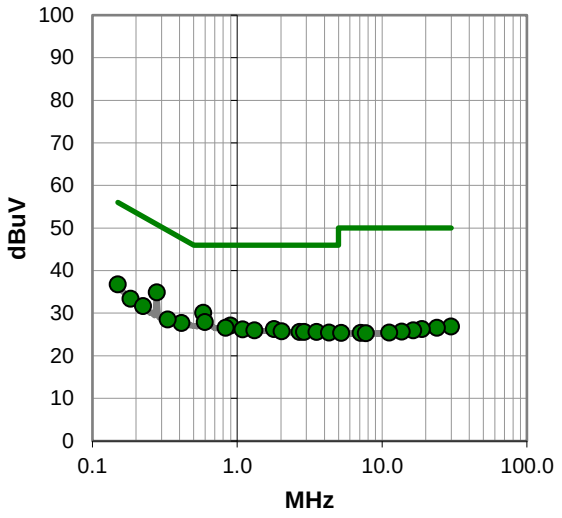
## DEVIATIONS FROM TEST STANDARD

None

**Quasi Peak Data - vs - Quasi Peak Limit**




**Average Data - vs - Average Limit**



# POWERLINE CONDUCTED EMISSIONS

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## RESULTS - Run #161

Quasi Peak Data - vs - Quasi Peak Limit

| Freq (MHz) | Amp. (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Margin (dB) |
|---|---|---|---|---|---|
| 0.187 | 30.1 | 20.9 | 51.0 | 64.2 | -13.2 |
| 0.152 | 31.4 | 21.1 | 52.5 | 65.9 | -13.4 |
| 0.223 | 28.5 | 20.8 | 49.3 | 62.7 | -13.4 |
| 0.278 | 24.8 | 20.6 | 45.4 | 60.9 | -15.5 |
| 0.338 | 20.9 | 20.6 | 41.5 | 59.3 | -17.8 |
| 0.411 | 18.4 | 20.6 | 39.0 | 57.6 | -18.6 |
| 0.589 | 15.7 | 20.7 | 36.4 | 56.0 | -19.6 |
| 0.777 | 14.7 | 20.7 | 35.4 | 56.0 | -20.6 |
| 0.640 | 14.4 | 20.8 | 35.2 | 56.0 | -20.8 |
| 0.896 | 14.2 | 20.7 | 34.9 | 56.0 | -21.1 |
| 1.088 | 13.4 | 20.7 | 34.1 | 56.0 | -21.9 |
| 1.795 | 11.8 | 20.7 | 32.5 | 56.0 | -23.5 |
| 1.345 | 11.7 | 20.7 | 32.4 | 56.0 | -23.6 |
| 1.947 | 11.1 | 20.7 | 31.8 | 56.0 | -24.2 |
| 3.600 | 10.9 | 20.9 | 31.8 | 56.0 | -24.2 |
| 3.170 | 10.9 | 20.8 | 31.7 | 56.0 | -24.3 |
| 2.365 | 10.9 | 20.7 | 31.6 | 56.0 | -24.4 |
| 4.561 | 10.7 | 20.9 | 31.6 | 56.0 | -24.4 |
| 27.755 | 10.4 | 22.6 | 33.0 | 60.0 | -27.0 |
| 23.943 | 10.4 | 22.3 | 32.7 | 60.0 | -27.3 |
| 18.319 | 10.6 | 21.8 | 32.4 | 60.0 | -27.6 |
| 16.137 | 10.4 | 21.7 | 32.1 | 60.0 | -27.9 |
| 12.282 | 10.4 | 21.4 | 31.8 | 60.0 | -28.2 |
| 6.288 | 10.7 | 20.9 | 31.6 | 60.0 | -28.4 |
| 11.204 | 10.3 | 21.3 | 31.6 | 60.0 | -28.4 |

Average Data - vs - Average Limit

| Freq (MHz) | Amp. (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Margin (dB) |
|---|---|---|---|---|---|
| 0.582 | 9.4 | 20.7 | 30.1 | 46.0 | -15.9 |
| 0.278 | 14.3 | 20.6 | 34.9 | 50.9 | -16.0 |
| 0.597 | 7.2 | 20.7 | 27.9 | 46.0 | -18.1 |
| 0.898 | 6.4 | 20.7 | 27.1 | 46.0 | -18.9 |
| 0.150 | 15.7 | 21.1 | 36.8 | 56.0 | -19.2 |
| 0.832 | 5.9 | 20.7 | 26.6 | 46.0 | -19.4 |
| 1.795 | 5.6 | 20.7 | 26.3 | 46.0 | -19.7 |
| 1.090 | 5.5 | 20.7 | 26.2 | 46.0 | -19.8 |
| 0.411 | 7.1 | 20.6 | 27.7 | 47.6 | -19.9 |
| 1.313 | 5.3 | 20.7 | 26.0 | 46.0 | -20.0 |
| 2.027 | 5.1 | 20.7 | 25.8 | 46.0 | -20.2 |
| 2.692 | 4.9 | 20.7 | 25.6 | 46.0 | -20.4 |
| 2.892 | 4.9 | 20.7 | 25.6 | 46.0 | -20.4 |
| 3.522 | 4.7 | 20.9 | 25.6 | 46.0 | -20.4 |
| 4.291 | 4.6 | 20.9 | 25.5 | 46.0 | -20.5 |
| 0.184 | 12.4 | 21.0 | 33.4 | 54.3 | -20.9 |
| 0.332 | 7.9 | 20.6 | 28.5 | 49.4 | -20.9 |
| 0.223 | 10.9 | 20.8 | 31.7 | 52.7 | -21.0 |
| 29.894 | 4.0 | 22.9 | 26.9 | 50.0 | -23.1 |
| 23.933 | 4.3 | 22.3 | 26.6 | 50.0 | -23.4 |
| 18.809 | 4.5 | 21.8 | 26.3 | 50.0 | -23.7 |
| 16.391 | 4.3 | 21.7 | 26.0 | 50.0 | -24.0 |
| 13.669 | 4.3 | 21.4 | 25.7 | 50.0 | -24.3 |
| 11.166 | 4.2 | 21.3 | 25.5 | 50.0 | -24.5 |
| 5.216 | 4.5 | 20.9 | 25.4 | 50.0 | -24.6 |

## CONCLUSION

Pass

Tested By

# POWERLINE CONDUCTED EMISSIONS

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 5399780K | Date: | 2025-04-02 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 22.5°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 29.5% |
| Customer Project: | None | Bar. Pressure (PMSL): | 992 mb |
| Tested By: | Marcelo Aguayo | Job Site: | MN03 |
| Power: | 110VAC/60Hz | Configuration: | MLTI0373-2 |

## TEST PARAMETERS

| | | | | | |
|---|---|---|---|---|---|
| Run #: | 162 | Line: | Neutral | Add. Ext. Attenuation (dB): | 0 |

## COMMENTS

Mid channel was chosen based on the difference between power measurements on all channels being less than <0.3 dB.

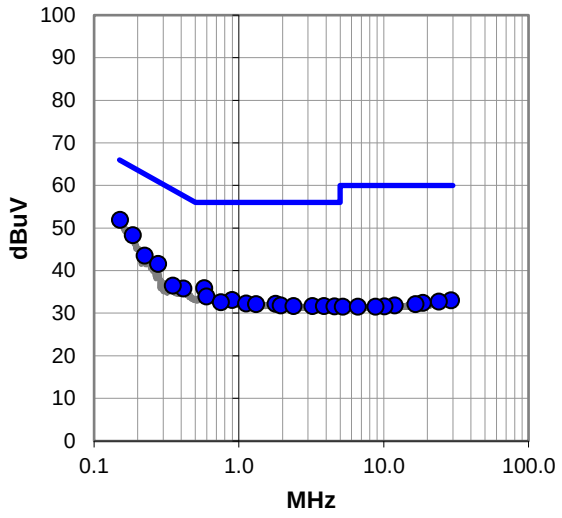
## EUT OPERATING MODES

Transmitting LoRa Mid Ch 925.1 MHz

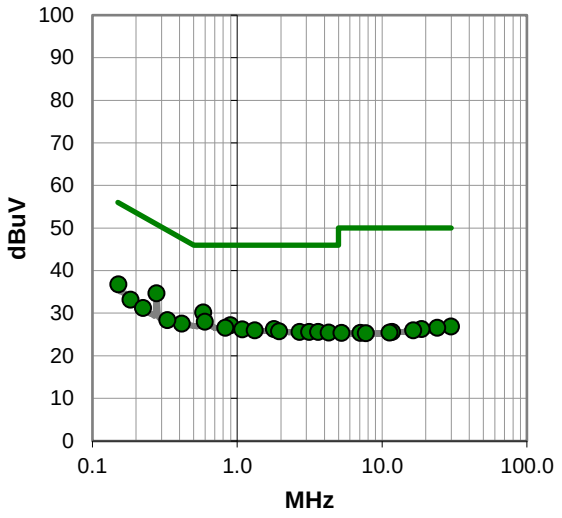
## DEVIATIONS FROM TEST STANDARD

None

**Quasi Peak Data - vs - Quasi Peak Limit**




**Average Data - vs - Average Limit**



# POWERLINE CONDUCTED EMISSIONS

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## RESULTS - Run #162

Quasi Peak Data - vs - Quasi Peak Limit

| Freq (MHz) | Amp. (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Margin (dB) |
|---|---|---|---|---|---|
| 0.152 | 30.8 | 21.1 | 51.9 | 65.9 | -14.0 |
| 0.185 | 27.4 | 20.9 | 48.3 | 64.3 | -16.0 |
| 0.223 | 22.7 | 20.8 | 43.5 | 62.7 | -19.2 |
| 0.277 | 21.0 | 20.6 | 41.6 | 60.9 | -19.3 |
| 0.577 | 15.2 | 20.7 | 35.9 | 56.0 | -20.1 |
| 0.414 | 15.1 | 20.7 | 35.8 | 57.6 | -21.8 |
| 0.597 | 13.2 | 20.7 | 33.9 | 56.0 | -22.1 |
| 0.350 | 15.9 | 20.6 | 36.5 | 59.0 | -22.5 |
| 0.898 | 12.4 | 20.7 | 33.1 | 56.0 | -22.9 |
| 0.750 | 11.8 | 20.8 | 32.6 | 56.0 | -23.4 |
| 1.125 | 11.6 | 20.7 | 32.3 | 56.0 | -23.7 |
| 1.796 | 11.5 | 20.7 | 32.2 | 56.0 | -23.8 |
| 1.311 | 11.4 | 20.7 | 32.1 | 56.0 | -23.9 |
| 1.944 | 11.1 | 20.7 | 31.8 | 56.0 | -24.2 |
| 2.379 | 11.0 | 20.7 | 31.7 | 56.0 | -24.3 |
| 3.224 | 10.9 | 20.8 | 31.7 | 56.0 | -24.3 |
| 3.862 | 10.8 | 20.9 | 31.7 | 56.0 | -24.3 |
| 4.573 | 10.7 | 20.9 | 31.6 | 56.0 | -24.4 |
| 29.127 | 10.2 | 22.8 | 33.0 | 60.0 | -27.0 |
| 23.962 | 10.4 | 22.3 | 32.7 | 60.0 | -27.3 |
| 18.600 | 10.6 | 21.8 | 32.4 | 60.0 | -27.6 |
| 16.569 | 10.4 | 21.7 | 32.1 | 60.0 | -27.9 |
| 11.874 | 10.4 | 21.4 | 31.8 | 60.0 | -28.2 |
| 10.086 | 10.4 | 21.2 | 31.6 | 60.0 | -28.4 |
| 5.229 | 10.6 | 20.9 | 31.5 | 60.0 | -28.5 |

Average Data - vs - Average Limit

| Freq (MHz) | Amp. (dBuV) | Factor (dB) | Adjusted (dBuV) | Spec. Limit (dBuV) | Margin (dB) |
|---|---|---|---|---|---|
| 0.582 | 9.5 | 20.7 | 30.2 | 46.0 | -15.8 |
| 0.277 | 14.1 | 20.6 | 34.7 | 50.9 | -16.2 |
| 0.597 | 7.3 | 20.7 | 28.0 | 46.0 | -18.0 |
| 0.898 | 6.5 | 20.7 | 27.2 | 46.0 | -18.8 |
| 0.152 | 15.7 | 21.1 | 36.8 | 55.9 | -19.1 |
| 0.829 | 5.9 | 20.7 | 26.6 | 46.0 | -19.4 |
| 1.795 | 5.6 | 20.7 | 26.3 | 46.0 | -19.7 |
| 1.081 | 5.5 | 20.7 | 26.2 | 46.0 | -19.8 |
| 0.414 | 6.9 | 20.7 | 27.6 | 47.6 | -20.0 |
| 1.320 | 5.3 | 20.7 | 26.0 | 46.0 | -20.0 |
| 1.943 | 5.1 | 20.7 | 25.8 | 46.0 | -20.2 |
| 2.692 | 4.9 | 20.7 | 25.6 | 46.0 | -20.4 |
| 3.142 | 4.8 | 20.8 | 25.6 | 46.0 | -20.4 |
| 3.621 | 4.7 | 20.9 | 25.6 | 46.0 | -20.4 |
| 4.286 | 4.6 | 20.9 | 25.5 | 46.0 | -20.5 |
| 0.184 | 12.2 | 21.0 | 33.2 | 54.3 | -21.1 |
| 0.330 | 7.8 | 20.6 | 28.4 | 49.5 | -21.1 |
| 0.223 | 10.4 | 20.8 | 31.2 | 52.7 | -21.5 |
| 29.897 | 4.0 | 22.9 | 26.9 | 50.0 | -23.1 |
| 23.979 | 4.3 | 22.3 | 26.6 | 50.0 | -23.4 |
| 18.731 | 4.5 | 21.8 | 26.3 | 50.0 | -23.7 |
| 16.418 | 4.3 | 21.7 | 26.0 | 50.0 | -24.0 |
| 11.742 | 4.2 | 21.4 | 25.6 | 50.0 | -24.4 |
| 11.226 | 4.2 | 21.3 | 25.5 | 50.0 | -24.5 |
| 5.248 | 4.5 | 20.9 | 25.4 | 50.0 | -24.6 |

## CONCLUSION

Pass

Tested By

# SPURIOUS RADIATED EMISSIONS (SRD Internal)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. A reference preview scan (pre-scan) is included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of 10*log(1/dc).

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Antenna - Double Ridge | ETS Lindgren | 3115 | AIP | 2024-08-02 | 2026-08-02 |
| Cable | ESM Cable Corp. | Double Ridge Guide Horn Cables | MNI | 2024-11-26 | 2025-11-26 |
| Amplifier - Pre-Amplifier | Miteq | AMF-3D-00100800-32-13P | AVT | 2025-01-08 | 2026-01-08 |
| Attenuator | Fairview Microwave | SA18H-20 | VAF | 2024-08-25 | 2025-08-25 |
| Filter - High Pass | Micro-Tronics | HPM50108 | LFM | 2024-08-25 | 2025-08-25 |
| Antenna - Standard Gain | ETS Lindgren | 3160-07 | AXP | NCR | NCR |
| Cable | ESM Cable Corp. | Standard Gain Horn Cables | MNJ | 2024-11-26 | 2025-11-26 |
| Amplifier - Pre-Amplifier | Miteq | AMF-6F-08001200-30-10P | AVV | 2025-01-08 | 2026-01-08 |
| Antenna - Standard Gain | ETS Lindgren | 3160-08 | AIQ | 2025-02-04 | 2026-02-04 |
| Amplifier - Pre-Amplifier | Miteq | AMF-6F-12001800-30-10P | AVW | 2025-01-08 | 2026-01-08 |
| Analyzer - Spectrum Analyzer | Agilent | E4446A | AAT | 2025-01-08 | 2026-01-08 |
| Antenna - Loop | ETS Lindgren | 6502 | AOB | 2023-06-12 | 2025-06-12 |
| Cable | ESM Cable Corp. | Bilog Cables | MNH | 2024-11-26 | 2025-11-26 |
| Antenna - Biconilog | ETS Lindgren | 3142D | AXO | 2023-10-02 | 2025-10-02 |
| Amplifier - Pre-Amplifier | Miteq | AM-1616-1000 | AVO | 2024-10-09 | 2025-10-09 |

## FREQUENCY RANGE INVESTIGATED

9 kHz TO 18000 MHz

# SPURIOUS RADIATED EMISSIONS (SRD Internal)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## POWER INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

MLTI0373-5

## MODES INVESTIGATED

LoRa Radio Transmitting, CSS, Low Ch 923.3MHz, Mid Ch 925.1MHz, High Ch 927.5MHz 500KHz, 12 SF, PWID 14

# SPURIOUS RADIATED EMISSIONS (SRD Internal)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-D | Work Order: | MLTI0373 |
| Serial Number: | 5399794k | Date: | 2025-03-26 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 22.7°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 27.7% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1021 mb |
| Tested By: | Marcelo Aguayo | Job Site: | MN05 |
| Power: | 110VAC/60Hz | Configuration: | MLTI0373-5 |

## TEST PARAMETERS

| | | | | | |
|---|---|---|---|---|---|
| Run #: | 38 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |

## COMMENTS

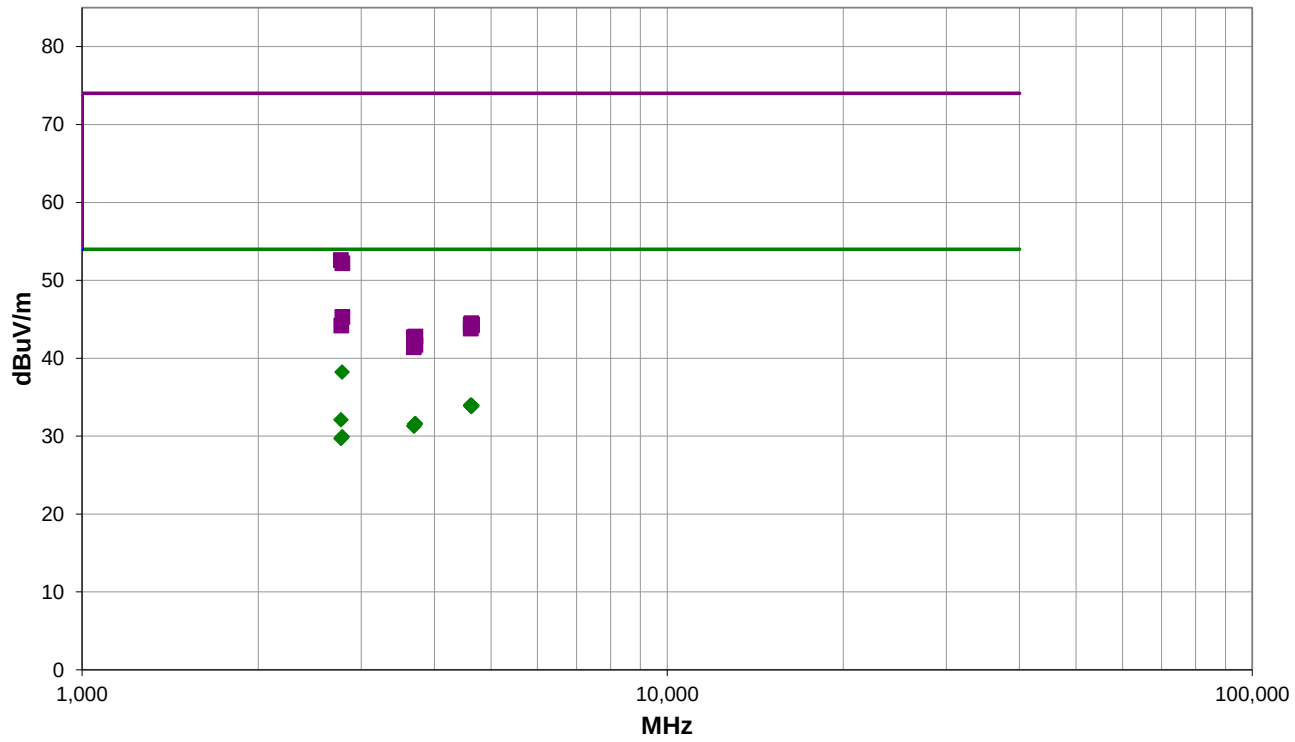
Internal antenna unit

## EUT OPERATING MODES

LoRa Radio Transmitting, CSS, Low Ch 923.3MHz, Mid Ch 925.1MHz, High Ch 927.5MHz 500KHz, 12 SF, PWID 14

## DEVIATIONS FROM TEST STANDARD

None




**Run #: 38** ■ PK ◆ AV ● QP

# SPURIOUS RADIATED EMISSIONS (SRD Internal)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## RESULTS - Run #38

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/ Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2783.042 | 40.3 | -2.1 | 1.5 | 173.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 38.2 | 54.0 | -15.8 | EUT Horz, High Ch |
| 4618.067 | 30.0 | 4.0 | 1.06 | 252.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 34.0 | 54.0 | -20.0 | EUT Horz, Low Ch |
| 4616.542 | 30.0 | 3.9 | 1.5 | 342.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 33.9 | 54.0 | -20.1 | EUT Horz, Low Ch |
| 4639.125 | 29.8 | 4.1 | 1.29 | 156.9 | 3.0 | 0.0 | Horz | AV | 0.0 | 33.9 | 54.0 | -20.1 | EUT Horz, High Ch |
| 4635.925 | 29.8 | 4.1 | 1.5 | 329.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 33.9 | 54.0 | -20.1 | EUT Horz, High Ch |
| 4625.367 | 29.7 | 4.1 | 3.24 | 149.9 | 3.0 | 0.0 | Horz | AV | 0.0 | 33.8 | 54.0 | -20.2 | EUT Horz, Mid Ch |
| 4627.092 | 29.7 | 4.1 | 1.5 | 214.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 33.8 | 54.0 | -20.2 | EUT Horz, Mid Ch |
| 2767.833 | 54.6 | -2.0 | 1.5 | 307.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 52.6 | 74.0 | -21.4 | EUT Horz, Low Ch |
| 2784.200 | 54.3 | -2.1 | 1.5 | 173.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 52.2 | 74.0 | -21.8 | EUT Horz, High Ch |
| 2770.517 | 34.1 | -2.0 | 3.86 | 156.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 32.1 | 54.0 | -21.9 | EUT Horz, Low Ch |
| 3710.050 | 30.6 | 1.0 | 2.73 | 182.9 | 3.0 | 0.0 | Horz | AV | 0.0 | 31.6 | 54.0 | -22.4 | EUT Horz, High Ch |
| 3710.367 | 30.6 | 1.0 | 2.13 | 337.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.6 | 54.0 | -22.4 | EUT Horz, High Ch |
| 3702.642 | 30.6 | 0.9 | 1.5 | 346.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 31.5 | 54.0 | -22.5 | EUT Horz, Mid Ch |
| 3702.292 | 30.6 | 0.9 | 1.5 | 0.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.5 | 54.0 | -22.5 | EUT Horz, Mid Ch |
| 3692.975 | 30.5 | 0.8 | 1.5 | 45.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 31.3 | 54.0 | -22.7 | EUT Horz, Low Ch |
| 3693.225 | 30.5 | 0.8 | 1.5 | 325.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.3 | 54.0 | -22.7 | EUT Horz, Low Ch |
| 2783.958 | 32.0 | -2.1 | 1.5 | 322.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 29.9 | 54.0 | -24.1 | EUT Horz, High Ch |
| 2771.067 | 31.7 | -2.0 | 1.5 | 307.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 29.7 | 54.0 | -24.3 | EUT Horz, Low Ch |
| 2783.800 | 47.4 | -2.1 | 1.5 | 322.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 45.3 | 74.0 | -28.7 | EUT Horz, High Ch |
| 4625.458 | 40.4 | 4.1 | 1.5 | 214.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 44.5 | 74.0 | -29.5 | EUT Horz, Mid Ch |
| 4623.150 | 40.2 | 4.1 | 3.24 | 149.9 | 3.0 | 0.0 | Horz | PK | 0.0 | 44.3 | 74.0 | -29.7 | EUT Horz, Mid Ch |
| 4614.233 | 40.4 | 3.9 | 1.06 | 252.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 44.3 | 74.0 | -29.7 | EUT Horz, Low Ch |
| 4638.725 | 40.2 | 4.1 | 1.29 | 156.9 | 3.0 | 0.0 | Horz | PK | 0.0 | 44.3 | 74.0 | -29.7 | EUT Horz, High Ch |
| 2772.283 | 46.2 | -2.0 | 3.86 | 156.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 44.2 | 74.0 | -29.8 | EUT Horz, Low Ch |
| 4635.883 | 40.1 | 4.1 | 1.5 | 329.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 44.2 | 74.0 | -29.8 | EUT Horz, High Ch |
| 4615.792 | 39.9 | 3.9 | 1.5 | 342.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 43.8 | 74.0 | -30.2 | EUT Horz, Low Ch |
| 3710.233 | 41.8 | 1.0 | 2.13 | 337.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 42.8 | 74.0 | -31.2 | EUT Horz, High Ch |
| 3691.008 | 41.9 | 0.8 | 1.5 | 325.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 42.7 | 74.0 | -31.3 | EUT Horz, Low Ch |
| 3702.658 | 41.4 | 0.9 | 1.5 | 346.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 42.3 | 74.0 | -31.7 | EUT Horz, Mid Ch |
| 3698.567 | 41.3 | 0.8 | 1.5 | 0.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 42.1 | 74.0 | -31.9 | EUT Horz, Mid Ch |
| 3710.058 | 40.7 | 1.0 | 2.73 | 182.9 | 3.0 | 0.0 | Horz | PK | 0.0 | 41.7 | 74.0 | -32.3 | EUT Horz, High Ch |
| 3690.717 | 40.6 | 0.8 | 1.5 | 45.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 41.4 | 74.0 | -32.6 | EUT Horz, Low Ch |

## CONCLUSION

Pass

Tested By

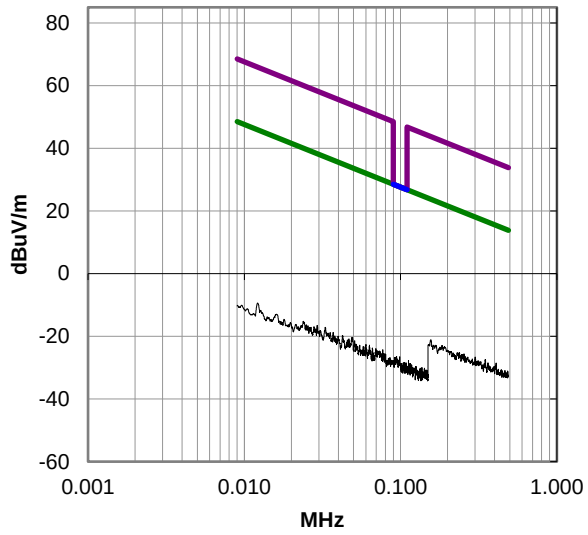
# SPURIOUS RADIATED EMISSIONS (SRD Internal)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

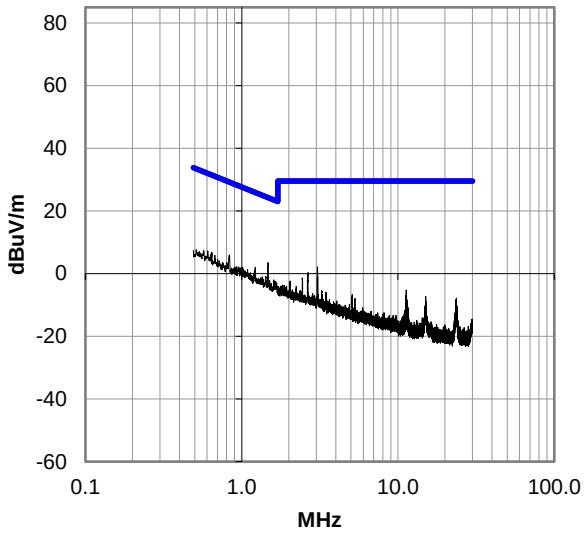
## PRESCAN DATA

Radiated spurious emissions from the EUT are initially reviewed with Pre-scans (Preview scans). Pre-scans are performed, with the EUT transmitting on the lowest applicable data rate, for both vertical and horizontal polarizations. The Pre-scan plots below are shown with a peak detector and RBW for the following frequency ranges: 9 kHz RBW (< 30 MHz); 120 kHz RBW (30 - 1000 MHz); 1 MHz RBW (> 1 GHz). In the case where unintentional emissions are observed, an ambient or idle pre-scan with the radio off, will be shown for comparison.

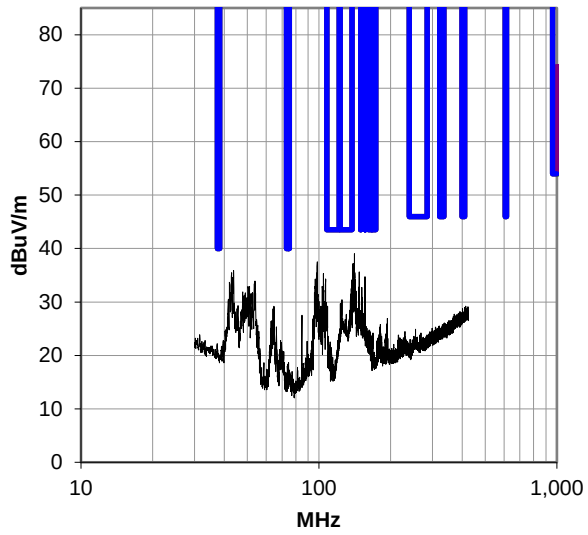
0.09-0.49 MHz, Run 258



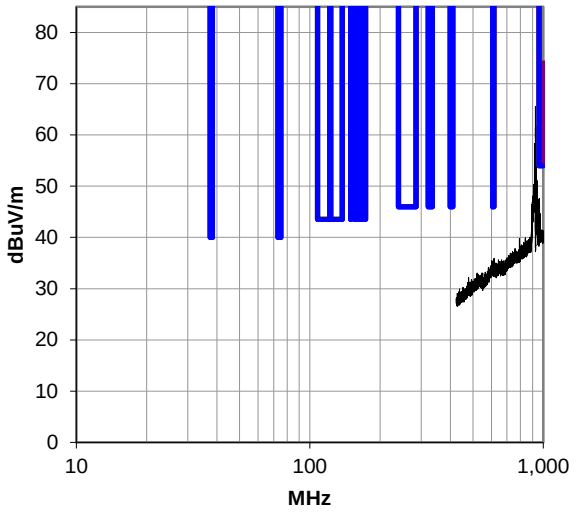

0.49-30 MHz, Run 259




30-425 MHz, Run 244



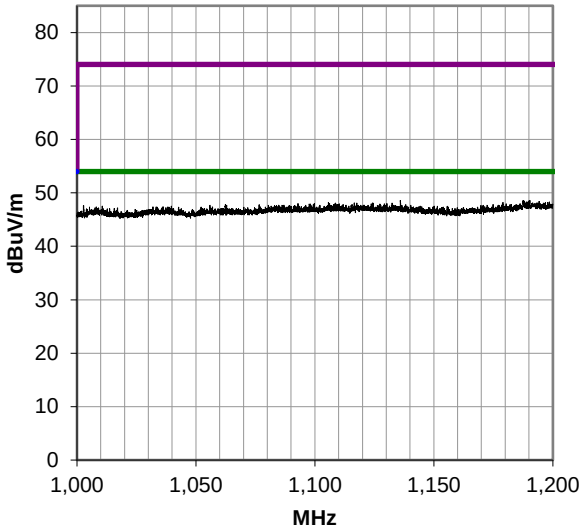

425-1000 MHz, Run 243



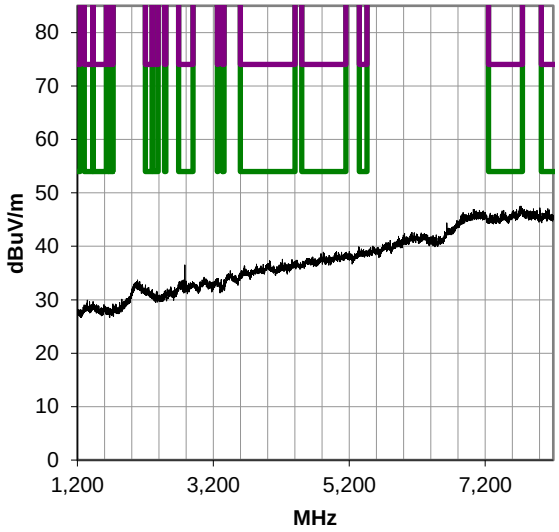
# SPURIOUS RADIATED EMISSIONS (SRD Internal)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

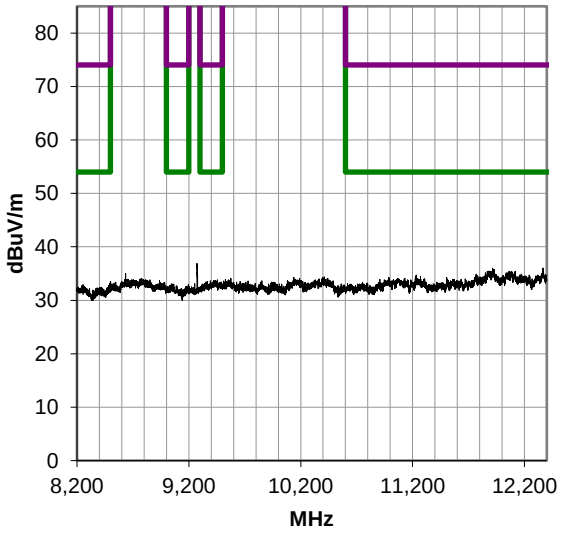
1000-1200 MHz, Run 29




1200-8200 MHz, Run 30




8200-12400 MHz, Run 31



# SPURIOUS RADIATED EMISSIONS (Model Variants)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. A reference preview scan (pre-scan) is included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of 10*log(1/dc).

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Antenna - Double Ridge | ETS Lindgren | 3115 | AIP | 2024-08-02 | 2026-08-02 |
| Cable | ESM Cable Corp. | Double Ridge Guide Horn Cables | MNI | 2024-11-26 | 2025-11-26 |
| Amplifier - Pre-Amplifier | Miteq | AMF-3D-00100800-32-13P | AVT | 2025-01-08 | 2026-01-08 |
| Attenuator | Fairview Microwave | SA18H-20 | VAF | 2024-08-25 | 2025-08-25 |
| Filter - High Pass | Micro-Tronics | HPM50108 | LFM | 2024-08-25 | 2025-08-25 |
| Antenna - Standard Gain | ETS Lindgren | 3160-07 | AXP | NCR | NCR |
| Cable | ESM Cable Corp. | Standard Gain Horn Cables | MNJ | 2024-11-26 | 2025-11-26 |
| Amplifier - Pre-Amplifier | Miteq | AMF-6F-08001200-30-10P | AVV | 2025-01-08 | 2026-01-08 |
| Antenna - Standard Gain | ETS Lindgren | 3160-08 | AIQ | 2025-02-04 | 2026-02-04 |
| Amplifier - Pre-Amplifier | Miteq | AMF-6F-12001800-30-10P | AVW | 2025-01-08 | 2026-01-08 |
| Analyzer - Spectrum Analyzer | Agilent | E4446A | AAT | 2025-01-08 | 2026-01-08 |

## FREQUENCY RANGE INVESTIGATED

1 GHz TO 18000 MHz

## POWER INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

MLTI0373-3
MLTI0373-4

# SPURIOUS RADIATED EMISSIONS (Model Variants)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## MODES INVESTIGATED

Transmitting LoRa Low Ch 923.3 MHz PA 1 PWID 14, Mid Ch 925.1 MHz PA 1 PWID 13 and High Ch 927.5 MHz PA 1 PWID 14

# SPURIOUS RADIATED EMISSIONS (Model Variants)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-EN-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 99999609 | Date: | 2025-03-31 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 21.8°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 27.8% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1018 mb |
| Tested By: | Marcelo Aguayo | Job Site: | MN05 |
| Power: | 110VAC/60Hz | Configuration: | MLTI0373-3 |

## TEST PARAMETERS

| | | | | | |
|---|---|---|---|---|---|
| Run #: | 121 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |

## COMMENTS

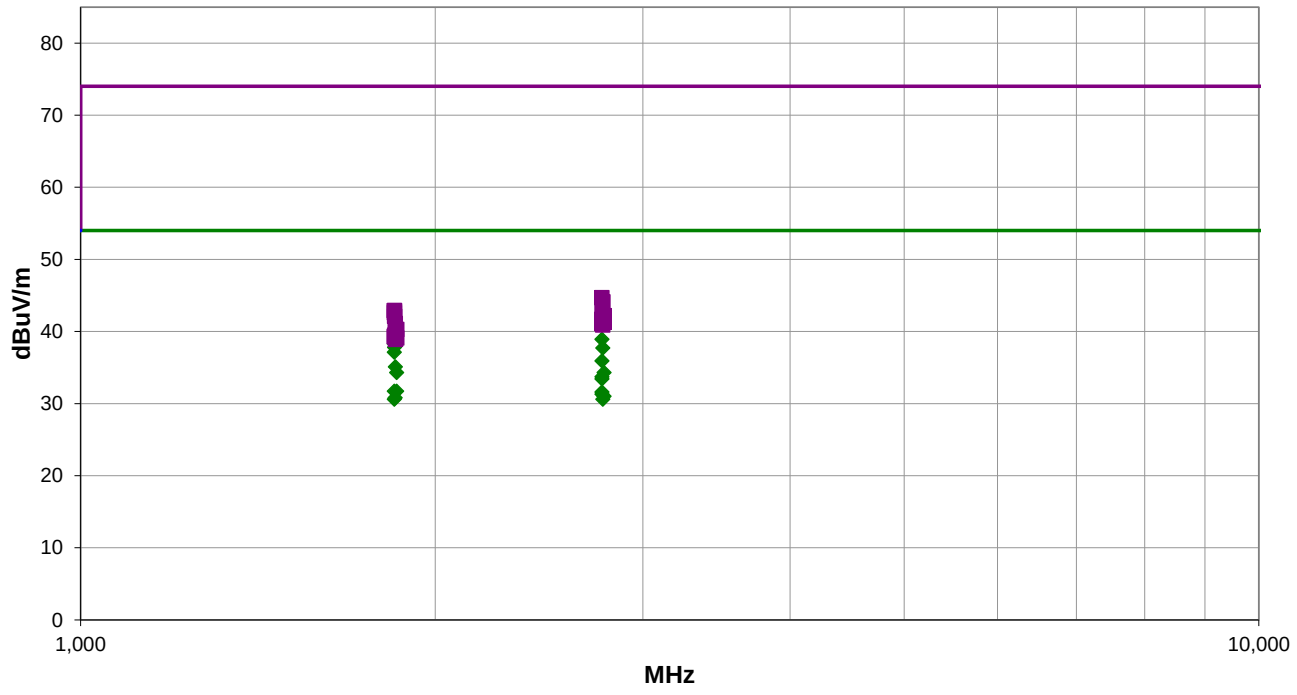
None

## EUT OPERATING MODES

Transmitting LoRa Low Ch 923.3 MHz PA 1 PWID 14, Mid Ch 925.1 MHz PA 1 PWID 13 and High Ch 927.5 MHz PA 1 PWID 14

## DEVIATIONS FROM TEST STANDARD

None




**Run #: 121** PK AV QP

# SPURIOUS RADIATED EMISSIONS (Model Variants)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## RESULTS - Run #121

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/ Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2770.192 | 40.9 | -2.0 | 2.9 | 221.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 38.9 | 54.0 | -15.1 | EUT Horz, Low Ch |
| 1847.008 | 42.9 | -4.5 | 4.0 | 304.9 | 3.0 | 0.0 | Horz | AV | 0.0 | 38.4 | 54.0 | -15.6 | EUT On Side, Low Ch |
| 1846.508 | 42.8 | -4.5 | 1.5 | 311.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 38.3 | 54.0 | -15.7 | EUT Vert, Low Ch |
| 1846.925 | 42.3 | -4.5 | 3.5 | 184.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 37.8 | 54.0 | -16.2 | EUT Horz, Low Ch |
| 2774.700 | 39.8 | -2.1 | 2.4 | 231.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 37.7 | 54.0 | -16.3 | EUT Horz, Mid Ch |
| 1846.425 | 41.6 | -4.5 | 1.5 | 20.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 37.1 | 54.0 | -16.9 | EUT Vert, Low Ch |
| 2770.550 | 37.9 | -2.0 | 1.5 | 155.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 35.9 | 54.0 | -18.1 | EUT On Side, Low Ch |
| 1849.892 | 39.6 | -4.5 | 2.7 | 180.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 35.1 | 54.0 | -18.9 | EUT Horz, Mid Ch |
| 1854.642 | 38.8 | -4.5 | 1.0 | 246.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 34.3 | 54.0 | -19.7 | EUT Horz, High Ch |
| 2782.017 | 36.4 | -2.1 | 1.0 | 116.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 34.3 | 54.0 | -19.7 | EUT Horz, High Ch |
| 2770.025 | 35.7 | -2.0 | 1.5 | 0.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 33.7 | 54.0 | -20.3 | EUT Vert, Low Ch |
| 2770.342 | 35.4 | -2.0 | 1.6 | 134.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 33.4 | 54.0 | -20.6 | EUT Vert, Low Ch |
| 1854.525 | 36.2 | -4.5 | 1.5 | 15.1 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.7 | 54.0 | -22.3 | EUT Horz, High Ch |
| 1846.658 | 36.2 | -4.5 | 1.5 | 181.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.7 | 54.0 | -22.3 | EUT Horz, Low Ch |
| 2770.033 | 33.6 | -2.0 | 1.5 | 96.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.6 | 54.0 | -22.4 | EUT Horz, Low Ch |
| 2770.042 | 33.3 | -2.0 | 3.8 | 228.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.3 | 54.0 | -22.7 | EUT On Side, Low Ch |
| 2782.275 | 33.1 | -2.1 | 1.0 | 23.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 31.0 | 54.0 | -23.0 | EUT Horz, High Ch |
| 1849.733 | 35.3 | -4.5 | 1.5 | 98.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 30.8 | 54.0 | -23.2 | EUT Horz, Mid Ch |
| 1846.625 | 35.1 | -4.5 | 1.5 | 37.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 30.6 | 54.0 | -23.4 | EUT On Side, Low Ch |
| 2775.158 | 32.7 | -2.1 | 1.5 | 34.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 30.6 | 54.0 | -23.4 | EUT Horz, Mid Ch |
| 2769.683 | 46.7 | -2.0 | 2.9 | 221.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 44.7 | 74.0 | -29.3 | EUT Horz, Low Ch |
| 2775.125 | 46.2 | -2.1 | 2.4 | 231.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 44.1 | 74.0 | -29.9 | EUT Horz, Mid Ch |
| 2770.225 | 45.6 | -2.0 | 1.5 | 155.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 43.6 | 74.0 | -30.4 | EUT On Side, Low Ch |
| 1846.400 | 47.4 | -4.5 | 1.5 | 311.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 42.9 | 74.0 | -31.1 | EUT Vert, Low Ch |
| 1846.533 | 47.4 | -4.5 | 4.0 | 304.9 | 3.0 | 0.0 | Horz | PK | 0.0 | 42.9 | 74.0 | -31.1 | EUT On Side, Low Ch |
| 1846.067 | 47.1 | -4.5 | 3.5 | 184.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 42.6 | 74.0 | -31.4 | EUT Horz, Low Ch |
| 2782.367 | 44.3 | -2.1 | 1.0 | 116.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 42.2 | 74.0 | -31.8 | EUT Horz, High Ch |
| 1847.117 | 46.6 | -4.5 | 1.5 | 20.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 42.1 | 74.0 | -31.9 | EUT Vert, Low Ch |
| 2769.442 | 43.7 | -2.0 | 1.5 | 0.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 41.7 | 74.0 | -32.3 | EUT Vert, Low Ch |
| 2770.517 | 43.6 | -2.0 | 1.6 | 134.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 41.6 | 74.0 | -32.4 | EUT Vert, Low Ch |
| 2782.492 | 43.4 | -2.1 | 1.0 | 23.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 41.3 | 74.0 | -32.7 | EUT Horz, High Ch |
| 2770.592 | 43.3 | -2.0 | 3.8 | 228.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 41.3 | 74.0 | -32.7 | EUT On Side, Low Ch |
| 2769.083 | 43.1 | -2.0 | 1.5 | 96.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 41.1 | 74.0 | -32.9 | EUT Horz, Low Ch |
| 1849.542 | 45.6 | -4.5 | 2.7 | 180.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 41.1 | 74.0 | -32.9 | EUT Horz, Mid Ch |
| 2774.300 | 43.0 | -2.1 | 1.5 | 34.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 40.9 | 74.0 | -33.1 | EUT Horz, Mid Ch |
| 1854.958 | 44.8 | -4.5 | 1.0 | 246.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 40.3 | 74.0 | -33.7 | EUT Horz, High Ch |
| 1846.792 | 44.0 | -4.5 | 1.5 | 37.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 39.5 | 74.0 | -34.5 | EUT On Side, Low Ch |
| 1845.783 | 43.9 | -4.6 | 1.5 | 181.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 39.3 | 74.0 | -34.7 | EUT Horz, Low Ch |
| 1854.850 | 43.6 | -4.5 | 1.5 | 15.1 | 3.0 | 0.0 | Vert | PK | 0.0 | 39.1 | 74.0 | -34.9 | EUT Horz, High Ch |
| 1849.858 | 43.4 | -4.5 | 1.5 | 98.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 38.9 | 74.0 | -35.1 | EUT Horz, Mid Ch |

# SPURIOUS RADIATED EMISSIONS (Model Variants)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

**CONCLUSION**

Pass

Tested By

# SPURIOUS RADIATED EMISSIONS (Model Variants)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-EN-A23UEA-D | Work Order: | MLTI0373 |
| Serial Number: | 99999614 | Date: | 2025-03-31 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 21.9°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 27.4% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1019 mb |
| Tested By: | Marcelo Aguayo | Job Site: | MN05 |
| Power: | 110VAC/60Hz | Configuration: | MLTI0373-4 |

## TEST PARAMETERS

| | | | | | |
|---|---|---|---|---|---|
| Run #: | 137 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |

## COMMENTS

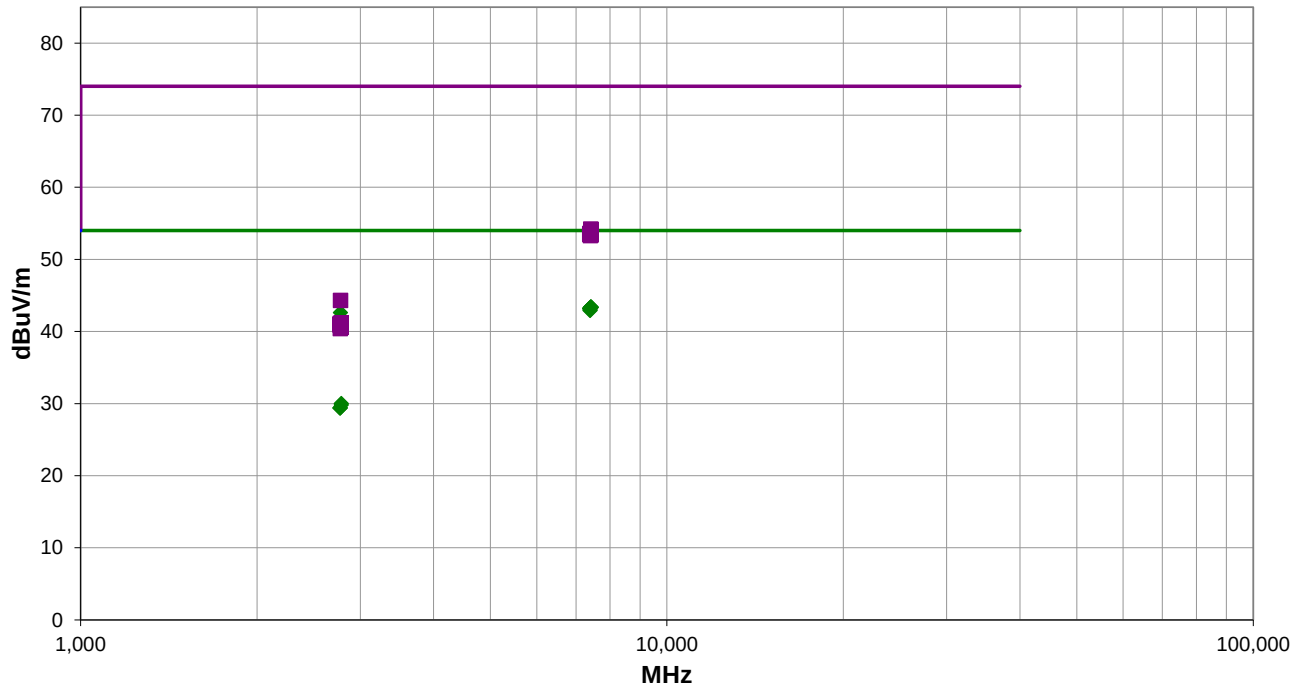
None

## EUT OPERATING MODES

Transmitting LoRa Low Ch 923.3 MHz PA 1 PWID 14, Mid Ch 925.1 MHz PA 1 PWID 13 and High Ch 927.5 MHz PA 1 PWID 14

## DEVIATIONS FROM TEST STANDARD

None




**Run #: 137** PK AV QP

# SPURIOUS RADIATED EMISSIONS (Model Variants)

element
WTD.2025.03.25.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## RESULTS - Run #137

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/ Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7421.458 | 29.8 | 13.6 | 1.5 | 239.9 | 3.0 | 0.0 | Horz | AV | 0.0 | 43.4 | 54.0 | -10.6 | EUT Horz, High Ch |
| 7422.425 | 29.8 | 13.6 | 1.5 | 196.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 43.4 | 54.0 | -10.6 | EUT Horz, High Ch |
| 7421.333 | 29.7 | 13.6 | 1.5 | 23.9 | 3.0 | 0.0 | Horz | AV | 0.0 | 43.3 | 54.0 | -10.7 | EUT Vert, High Ch |
| 7422.492 | 29.7 | 13.6 | 1.5 | 31.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 43.3 | 54.0 | -10.7 | EUT Vert, High Ch |
| 7422.017 | 29.7 | 13.6 | 1.5 | 9.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 43.3 | 54.0 | -10.7 | EUT On Side, High Ch |
| 7422.275 | 29.7 | 13.6 | 1.5 | 213.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 43.3 | 54.0 | -10.7 | EUT On Side, High Ch |
| 7383.950 | 29.8 | 13.4 | 3.6 | 94.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 43.2 | 54.0 | -10.8 | EUT Horz, Low Ch |
| 7385.592 | 29.8 | 13.4 | 3.5 | 56.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 43.2 | 54.0 | -10.8 | EUT Horz, Low Ch |
| 7400.158 | 29.5 | 13.5 | 1.5 | 204.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 43.0 | 54.0 | -11.0 | EUT Horz, Mid Ch |
| 7398.608 | 29.4 | 13.5 | 1.7 | 99.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 42.9 | 54.0 | -11.1 | EUT Horz, Mid Ch |
| 2775.192 | 44.7 | -2.1 | 3.3 | 236.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 42.6 | 54.0 | -11.4 | EUT Horz, Mid Ch |
| 7417.833 | 40.6 | 13.6 | 1.5 | 23.9 | 3.0 | 0.0 | Horz | PK | 0.0 | 54.2 | 74.0 | -19.8 | EUT Vert, High Ch |
| 7422.083 | 40.5 | 13.6 | 1.5 | 239.9 | 3.0 | 0.0 | Horz | PK | 0.0 | 54.1 | 74.0 | -19.9 | EUT Horz, High Ch |
| 7420.117 | 40.4 | 13.6 | 1.5 | 196.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 54.0 | 74.0 | -20.0 | EUT Horz, High Ch |
| 7421.192 | 40.2 | 13.6 | 1.5 | 213.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 53.8 | 74.0 | -20.2 | EUT On Side, High Ch |
| 7400.608 | 40.1 | 13.5 | 1.7 | 99.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 53.6 | 74.0 | -20.4 | EUT Horz, Mid Ch |
| 7386.917 | 40.1 | 13.5 | 3.5 | 56.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 53.6 | 74.0 | -20.4 | EUT Horz, Low Ch |
| 7422.308 | 39.9 | 13.6 | 1.5 | 9.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 53.5 | 74.0 | -20.5 | EUT On Side, High Ch |
| 7384.092 | 40.1 | 13.4 | 3.6 | 94.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 53.5 | 74.0 | -20.5 | EUT Horz, Low Ch |
| 7421.875 | 39.8 | 13.6 | 1.5 | 31.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 53.4 | 74.0 | -20.6 | EUT Vert, High Ch |
| 7401.300 | 39.8 | 13.5 | 1.5 | 204.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 53.3 | 74.0 | -20.7 | EUT Horz, Mid Ch |
| 2784.517 | 32.1 | -2.1 | 1.5 | 62.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 30.0 | 54.0 | -24.0 | EUT Horz, High Ch |
| 2783.583 | 31.9 | -2.1 | 2.0 | 184.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 29.8 | 54.0 | -24.2 | EUT Horz, High Ch |
| 2773.408 | 31.5 | -2.1 | 1.5 | 275.9 | 3.0 | 0.0 | Horz | AV | 0.0 | 29.4 | 54.0 | -24.6 | EUT Horz, Mid Ch |
| 2770.483 | 31.4 | -2.0 | 1.5 | 113.9 | 3.0 | 0.0 | Horz | AV | 0.0 | 29.4 | 54.0 | -24.6 | EUT Horz, Low Ch |
| 2770.117 | 31.4 | -2.0 | 1.5 | 258.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 29.4 | 54.0 | -24.6 | EUT Horz, Low Ch |
| 2774.658 | 46.4 | -2.1 | 3.3 | 236.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 44.3 | 74.0 | -29.7 | EUT Horz, Mid Ch |
| 2782.758 | 43.3 | -2.1 | 1.5 | 62.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 41.2 | 74.0 | -32.8 | EUT Horz, High Ch |
| 2769.708 | 43.1 | -2.0 | 1.5 | 113.9 | 3.0 | 0.0 | Horz | PK | 0.0 | 41.1 | 74.0 | -32.9 | EUT Horz, Low Ch |
| 2768.458 | 42.9 | -2.0 | 1.5 | 258.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 40.9 | 74.0 | -33.1 | EUT Horz, Low Ch |
| 2783.458 | 42.7 | -2.1 | 2.0 | 184.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 40.6 | 74.0 | -33.4 | EUT Horz, High Ch |
| 2774.200 | 42.5 | -2.1 | 1.5 | 275.9 | 3.0 | 0.0 | Horz | PK | 0.0 | 40.4 | 74.0 | -33.6 | EUT Horz, Mid Ch |

## CONCLUSION

Pass

Tested By

# SPURIOUS RADIATED EMISSIONS (SRD External)

element
WTD.2024.12.31.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. A reference preview scan (pre-scan) is included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of 10*log(1/dc).

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Antenna - Double Ridge | ETS Lindgren | 3115 | AIP | 2024-08-02 | 2026-08-02 |
| Cable | ESM Cable Corp. | Double Ridge Guide Horn Cables | MNI | 2024-11-26 | 2025-11-26 |
| Amplifier - Pre-Amplifier | Miteq | AMF-3D-00100800-32-13P | AVT | 2025-01-08 | 2026-01-08 |
| Attenuator | Fairview Microwave | SA18H-20 | VAF | 2024-08-25 | 2025-08-25 |
| Filter - High Pass | Micro-Tronics | HPM50108 | LFM | 2024-08-25 | 2025-08-25 |
| Antenna - Standard Gain | ETS Lindgren | 3160-07 | AXP | NCR | NCR |
| Cable | ESM Cable Corp. | Standard Gain Horn Cables | MNJ | 2024-11-26 | 2025-11-26 |
| Amplifier - Pre-Amplifier | Miteq | AMF-6F-08001200-30-10P | AVV | 2025-01-08 | 2026-01-08 |
| Antenna - Biconilog | ETS Lindgren | 3142D | AXO | 2023-10-02 | 2025-10-02 |
| Cable | ESM Cable Corp. | Bilog Cables | MNH | 2024-11-26 | 2025-11-26 |
| Amplifier - Pre-Amplifier | Miteq | AM-1616-1000 | AVO | 2024-10-09 | 2025-10-09 |
| Filter - Low Pass | Micro-Tronics | LPM50004 | LFK | 2024-08-25 | 2025-08-25 |
| Attenuator | Fairview Microwave | SA18E-10 | TYA | 2024-08-25 | 2025-08-25 |
| Antenna - Loop | ETS Lindgren | 6502 | AOB | 2023-06-12 | 2025-06-12 |
| Analyzer - Spectrum Analyzer | Agilent | E4446A | AAT | 2025-01-08 | 2026-01-08 |

# SPURIOUS RADIATED EMISSIONS (SRD External)

element
WTD.2024.12.31.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## FREQUENCY RANGE INVESTIGATED

9 kHz TO 18000 MHz

## POWER INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

MLTI0373-2

## MODES INVESTIGATED

LoRa Radio Transmitting, CSS, High Ch 927.5 MHz, 500KHz, 12 SF, PWID 14
LoRa Radio Transmitting, CSS, Low Ch 923.2 MHz, 500KHz, 12 SF, PWID 14
LoRa Radio Transmitting, CSS, Mid Ch 925.1 MHz, 500KHz, 12 SF, PWID 14

# SPURIOUS RADIATED EMISSIONS (SRD External)

element
WTD.2024.12.31.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 5399780K | Date: | 2025-03-26 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 22.1°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 27.2% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1022 mb |
| Tested By: | Arnauld Dedry | Job Site: | MN05 |
| Power: | 110VAC/60Hz | Configuration: | MLTI0373-2 |

## TEST PARAMETERS

| | | | | | |
|---|---|---|---|---|---|
| Run #: | 11 | Test Distance (m): | 3 | Ant. Height(s) (m): | 1 to 4(m) |

## COMMENTS

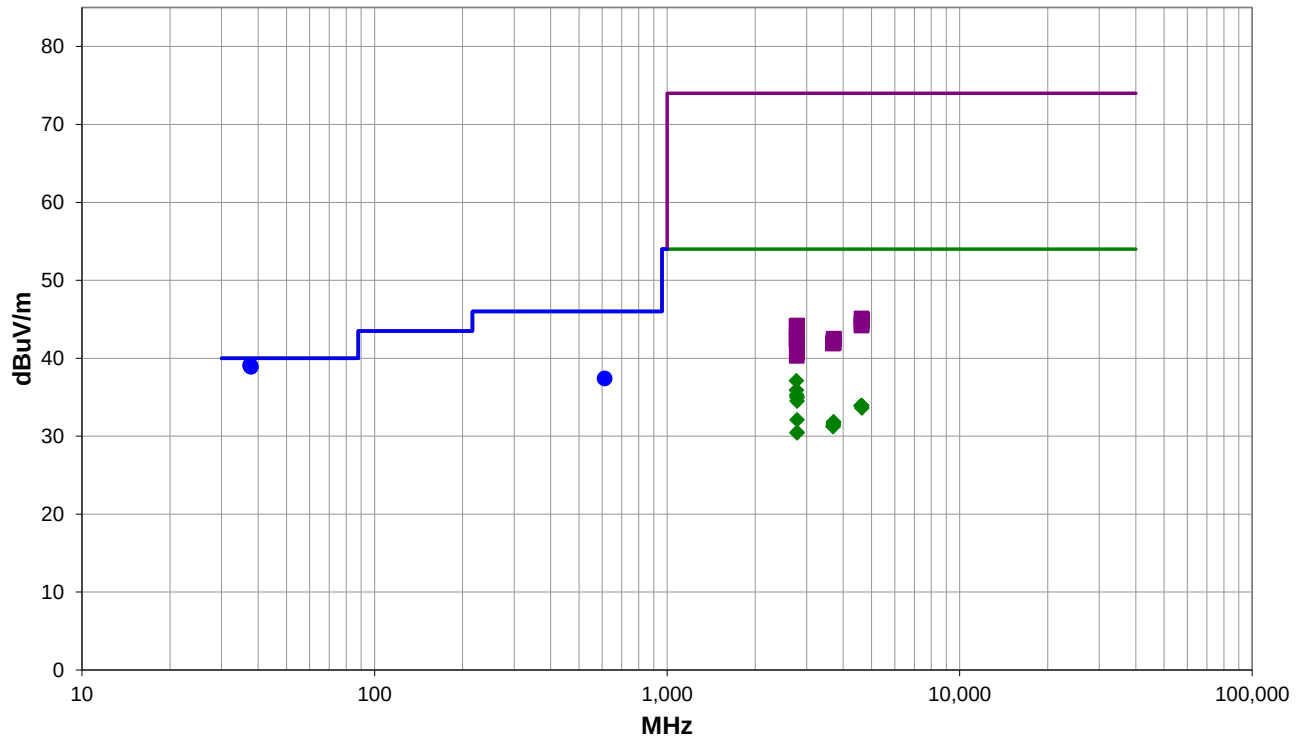
None

## EUT OPERATING MODES

LoRa Radio Transmitting, CSS, Low Ch 923.3MHz, Mid Ch 925.1MHz & High Ch 927.0MHz, 500KHz, 12 SF, PWID 14

## DEVIATIONS FROM TEST STANDARD

None




**Run #: 11** ■ PK ◆ AV ● QP

# SPURIOUS RADIATED EMISSIONS (SRD External)

element
WTD.2024.12.31.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

## RESULTS - Run #11

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/ Transducer | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37.527 | 42.4 | -3.3 | 1.0 | 91.0 | 3.0 | 0.0 | Vert | QP | 0.0 | 39.1 | 40.0 | -0.9 | Eut Vert, High Ch |
| 37.798 | 42.3 | -3.4 | 1.0 | 58.0 | 3.0 | 0.0 | Vert | QP | 0.0 | 38.9 | 40.0 | -1.1 | Eut Vert, Mid Ch |
| 611.635 | 16.6 | 10.8 | 2.0 | 195.0 | 3.0 | 10.0 | Vert | QP | 0.0 | 37.4 | 46.0 | -8.6 | EUT Vert, Low Ch |
| 2772.800 | 45.0 | -2.0 | 1.5 | 56.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 43.0 | 54.0 | -11.0 | Eut Vert, Mid Ch |
| 2770.308 | 39.1 | -2.0 | 3.2 | 73.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 37.1 | 54.0 | -16.9 | Eut on Side, Low Ch |
| 2769.980 | 37.9 | -2.0 | 3.9 | 48.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 35.9 | 54.0 | -18.1 | Eut Vert, Low Ch |
| 2775.470 | 37.4 | -2.1 | 3.2 | 80.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 35.3 | 54.0 | -18.7 | Eut On Side, Mid Ch |
| 2781.875 | 37.2 | -2.1 | 1.9 | 202.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 35.1 | 54.0 | -18.9 | Eut On Side, High Ch |
| 2781.992 | 37.0 | -2.1 | 1.2 | 87.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 34.9 | 54.0 | -19.1 | Eut Horz, High Ch |
| 2781.817 | 36.6 | -2.1 | 4.0 | 175.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 34.5 | 54.0 | -19.5 | Eut Vert, High Ch |
| 4625.710 | 29.8 | 4.1 | 1.5 | 286.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 33.9 | 54.0 | -20.1 | Eut Vert, High Ch |
| 4627.833 | 29.8 | 4.1 | 1.5 | 173.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 33.9 | 54.0 | -20.1 | Eut Vert, Mid Ch |
| 4614.920 | 30.0 | 3.9 | 1.5 | 34.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 33.9 | 54.0 | -20.1 | Eut On Side, Mid Ch |
| 4614.700 | 30.0 | 3.9 | 1.5 | 307.9 | 3.0 | 0.0 | Horz | AV | 0.0 | 33.9 | 54.0 | -20.1 | Eut on Side, Low Ch |
| 4613.290 | 30.0 | 3.9 | 1.5 | 92.9 | 3.0 | 0.0 | Vert | AV | 0.0 | 33.9 | 54.0 | -20.1 | Eut Vert, Low Ch |
| 4635.042 | 29.5 | 4.1 | 1.5 | 72.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 33.6 | 54.0 | -20.4 | Eut On Side, High Ch |
| 2782.150 | 34.2 | -2.1 | 4.0 | 325.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 32.1 | 54.0 | -21.9 | Eut On Side, High Ch |
| 3710.333 | 30.8 | 1.0 | 1.5 | 253.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 31.8 | 54.0 | -22.2 | Eut On Side, High Ch |
| 3709.170 | 30.8 | 1.0 | 1.5 | 357.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.8 | 54.0 | -22.2 | Eut Vert, High Ch |
| 3706.690 | 30.8 | 0.9 | 2.3 | 153.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 31.7 | 54.0 | -22.3 | Eut On Side, Mid Ch |
| 3705.260 | 30.6 | 0.9 | 1.5 | 177.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.5 | 54.0 | -22.5 | Eut Vert, Low Ch |
| 3702.608 | 30.4 | 0.9 | 1.5 | 279.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 31.3 | 54.0 | -22.7 | Eut Vert, Mid Ch |
| 3694.142 | 30.4 | 0.8 | 3.3 | 15.0 | 3.0 | 0.0 | Horz | AV | 0.0 | 31.2 | 54.0 | -22.8 | Eut on Side, Low Ch |
| 2782.717 | 32.6 | -2.1 | 1.6 | 336.9 | 3.0 | 0.0 | Horz | AV | 0.0 | 30.5 | 54.0 | -23.5 | Eut Vert, High Ch |
| 2782.183 | 32.5 | -2.1 | 1.5 | 306.0 | 3.0 | 0.0 | Vert | AV | 0.0 | 30.4 | 54.0 | -23.6 | Eut Horz, High Ch |
| 4622.540 | 41.0 | 4.1 | 1.5 | 92.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 45.1 | 74.0 | -28.9 | Eut Vert, Low Ch |
| 4626.880 | 40.9 | 4.1 | 1.5 | 286.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 45.0 | 74.0 | -29.0 | Eut Vert, High Ch |
| 4635.000 | 40.7 | 4.1 | 1.5 | 72.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 44.8 | 74.0 | -29.2 | Eut On Side, High Ch |
| 4624.580 | 40.7 | 4.1 | 1.5 | 34.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 44.8 | 74.0 | -29.2 | Eut On Side, Mid Ch |
| 4623.667 | 40.3 | 4.1 | 1.5 | 173.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 44.4 | 74.0 | -29.6 | Eut Vert, Mid Ch |
| 2782.217 | 46.3 | -2.1 | 1.9 | 202.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 44.2 | 74.0 | -29.8 | Eut On Side, High Ch |
| 4617.317 | 40.2 | 4.0 | 1.5 | 307.9 | 3.0 | 0.0 | Horz | PK | 0.0 | 44.2 | 74.0 | -29.8 | Eut on Side, Low Ch |
| 2770.342 | 46.1 | -2.0 | 3.2 | 73.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 44.1 | 74.0 | -29.9 | Eut on Side, Low Ch |
| 2782.192 | 44.8 | -2.1 | 1.2 | 87.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 42.7 | 74.0 | -31.3 | Eut Horz, High Ch |
| 3718.500 | 41.5 | 1.0 | 1.5 | 357.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 42.5 | 74.0 | -31.5 | Eut Vert, High Ch |
| 2782.250 | 44.5 | -2.1 | 4.0 | 175.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 42.4 | 74.0 | -31.6 | Eut Vert, High Ch |
| 3705.940 | 41.5 | 0.9 | 2.3 | 153.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 42.4 | 74.0 | -31.6 | Eut On Side, Mid Ch |
| 2769.890 | 44.4 | -2.0 | 3.9 | 48.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 42.4 | 74.0 | -31.6 | Eut Vert, Low Ch |
| 2775.300 | 44.3 | -2.1 | 3.2 | 80.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 42.2 | 74.0 | -31.8 | Eut On Side, Mid Ch |
| 3712.392 | 41.0 | 1.0 | 1.5 | 253.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 42.0 | 74.0 | -32.0 | Eut On Side, High Ch |

# SPURIOUS RADIATED EMISSIONS (SRD External)

element
WTD.2024.12.31.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

| Freq (MHz) | Amplitude (dBuV) | Factor (dB/m) | Antenna Height (meters) | Azimuth (degrees) | Test Distance (meters) | External Attenuation (dB) | Polarity/ Transducer | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3702.325 | 41.1 | 0.9 | 1.5 | 279.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 42.0 | 74.0 | -32.0 | Eut Vert, Mid Ch |
| 2783.467 | 44.0 | -2.1 | 1.5 | 306.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 41.9 | 74.0 | -32.1 | Eut Horz, High Ch |
| 3694.008 | 41.1 | 0.8 | 3.3 | 15.0 | 3.0 | 0.0 | Horz | PK | 0.0 | 41.9 | 74.0 | -32.1 | Eut on Side, Low Ch |
| 3688.010 | 41.1 | 0.8 | 1.5 | 177.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 41.9 | 74.0 | -32.1 | Eut Vert, Low Ch |
| 2781.575 | 43.5 | -2.1 | 4.0 | 325.0 | 3.0 | 0.0 | Vert | PK | 0.0 | 41.4 | 74.0 | -32.6 | Eut On Side, High Ch |
| 2782.267 | 42.8 | -2.1 | 1.6 | 336.9 | 3.0 | 0.0 | Horz | PK | 0.0 | 40.7 | 74.0 | -33.3 | Eut Vert, High Ch |
| 2775.250 | 42.4 | -2.1 | 1.5 | 56.9 | 3.0 | 0.0 | Vert | PK | 0.0 | 40.3 | 74.0 | -33.7 | Eut Vert, Mid Ch |

**CONCLUSION**

Pass

Tested By

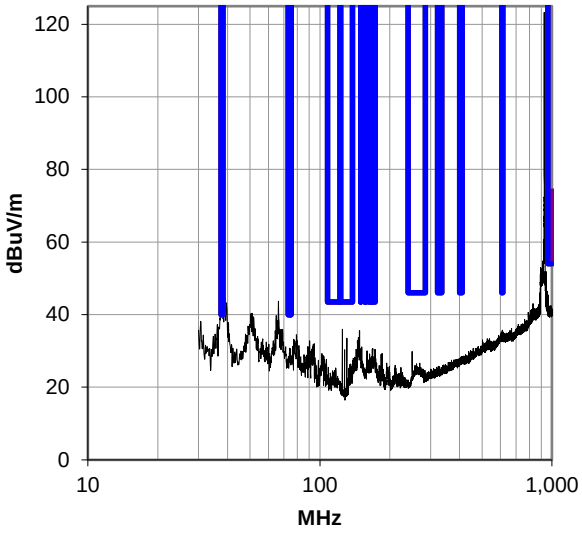
# SPURIOUS RADIATED EMISSIONS (SRD External)

element
WTD.2024.12.31.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

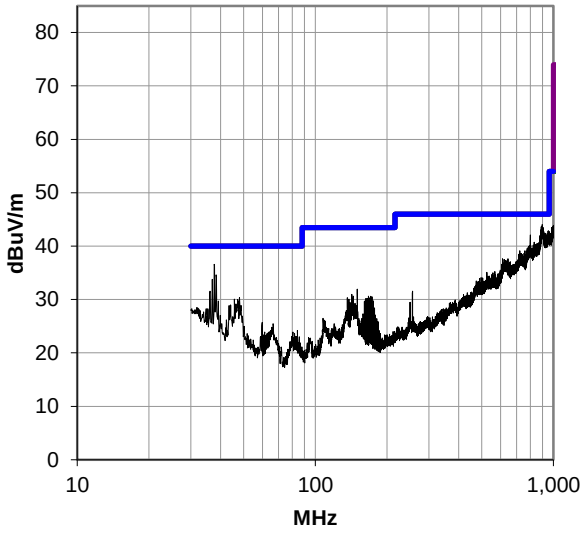
## PRESCAN DATA

Radiated spurious emissions from the EUT are initially reviewed with Pre-scans (Preview scans). Pre-scans are performed, with the EUT transmitting on the lowest applicable data rate, for both vertical and horizontal polarizations. The Pre-scan plots below are shown with a peak detector and RBW for the following frequency ranges: 9 kHz RBW (< 30 MHz); 120 kHz RBW (30 - 1000 MHz); 1 MHz RBW (> 1 GHz). In the case where unintentional emissions are observed, an ambient or idle pre-scan with the radio off, will be shown for comparison.

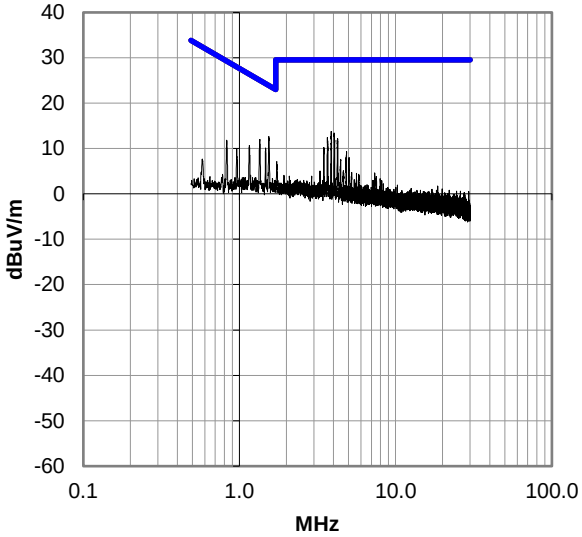
External Antenna, 30-1000 MHz, Run 52
Transmit On



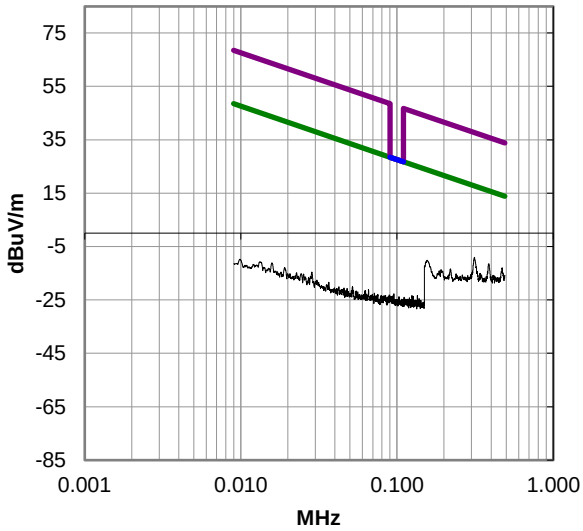

External Antenna, 30-1000 MHz, Run 1
Transmit Off




External Antenna, 0.49-30 MHz, Run 55



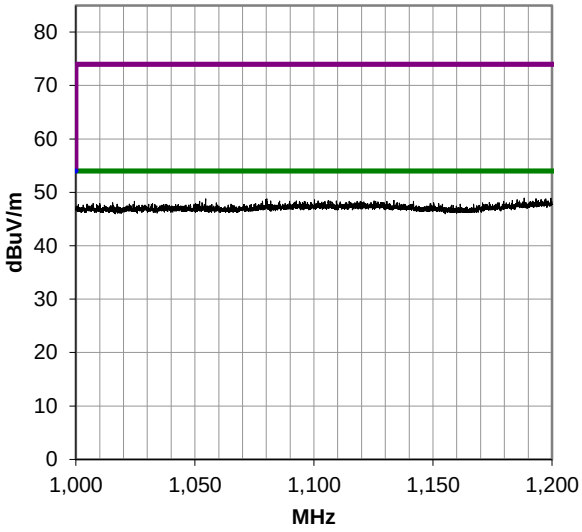

External Antenna, 0.009-0.49 MHz, Run 56



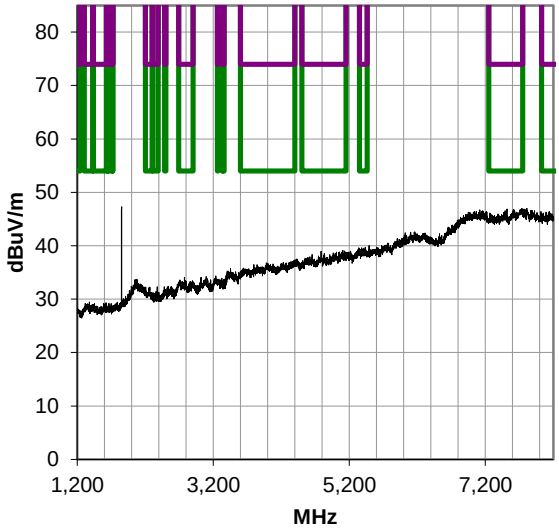
# SPURIOUS RADIATED EMISSIONS (SRD External)

element
WTD.2024.12.31.0
EmiR5 2024.05.24.5
PSA-ESCI 2024.11.22.0

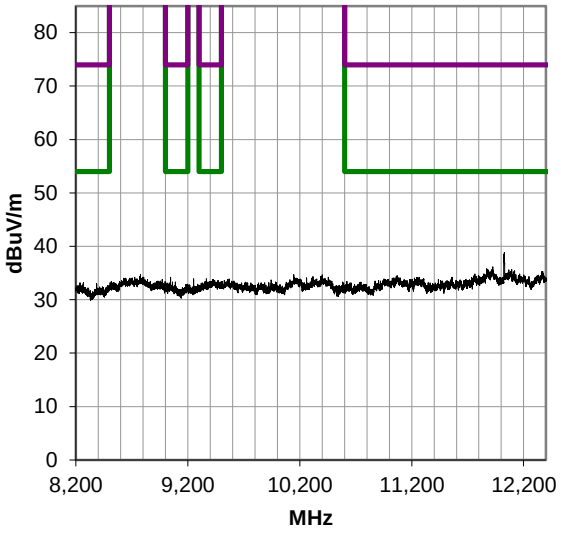
External Antenna, 1000-1200 MHz, Run 4




External Antenna, 1200-8200 MHz, Run 5




External Antenna, 8200-12400 MHz, Run 6



# DUTY CYCLE

element
2023/09/26

## TEST DESCRIPTION

The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum.

The test software provided for operation in a fixed, single channel mode allows the EUT to operate continuously at 100% Duty Cycle.

# OUTPUT POWER

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

## TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

Prior to measuring output power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method AVGSA-2 in section 11.9.2.2.4 of ANSI C63.10:2020 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Attenuator | Fairview Microwave | SA18S5W-20 | RFX | 2024-05-27 | 2025-05-27 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFM | 2024-05-22 | 2025-05-22 |
| Cable | Micro-Coax | UFD150A-1-0720-200200 | MNL | 2024-08-28 | 2025-08-28 |
| Block - DC | Fairview Microwave | SD3379 | ANH | 2024-08-28 | 2025-08-28 |
| Generator - Signal | Agilent | N5182A | TIF | 2023-07-27 | 2026-07-27 |

# OUTPUT POWER

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 5399780K | Date: | 2025-03-21 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 23.2°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 27.6% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1001 mbar |
| Tested By: | Arnauld Dedry, Christopher Heintzelman | Job Site: | MN11 |
| Power: | 120VAC/60Hz | Configuration: | MLTI0373-1 |

## COMMENTS

The RBw was increased above 5% of the measured OBW, but less than or equal to 1 MHz. The increased RBW would not impact the results since the measured OBW is less than the RBw value used during this testing.

## DEVIATIONS FROM TEST STANDARD

None

## CONCLUSION

Pass

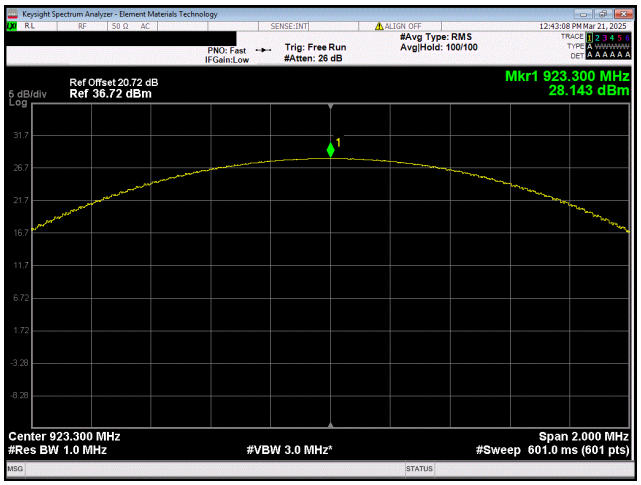
Tested By

## TEST RESULTS

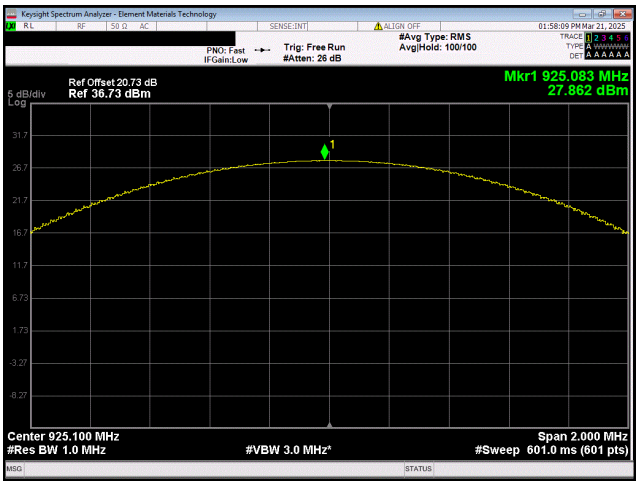
| | Avg Cond Pwr (dBm) | Duty Cycle Factor (dB) | Out Pwr (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| LoRa CSS | | | | | |
| Low Channel, 923.3 MHz | 28.143 | 0 | 28.1 | 30 | Pass |
| Mid Channel, 925.1 MHz | 27.862 | 0 | 27.9 | 30 | Pass |
| High Channel, 927.5 MHz | 27.823 | 0 | 27.8 | 30 | Pass |

# OUTPUT POWER

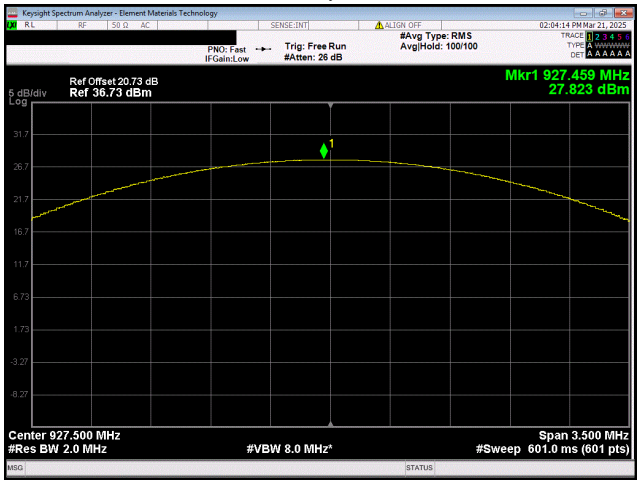
element
TbtTx 2024.10.31.2
WTD.2024.12.31.0




**LoRa CSS**
**Low Channel, 923.3 MHz**




**LoRa CSS**
**Mid Channel, 925.1 MHz**




**LoRa CSS**
**High Channel, 927.5 MHz**

# EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

## TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

Prior to measuring output power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method AVGSA-2 in section 11.9.2.2.4 of ANSI C63.10:2020 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

Equivalent Isotropic Radiated Power (EIRP) = Max Measured Power + Antenna gain (dBi)

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Attenuator | Fairview Microwave | SA18S5W-20 | RFX | 2024-05-27 | 2025-05-27 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFM | 2024-05-22 | 2025-05-22 |
| Cable | Micro-Coax | UFD150A-1-0720-200200 | MNL | 2024-08-28 | 2025-08-28 |
| Block - DC | Fairview Microwave | SD3379 | ANH | 2024-08-28 | 2025-08-28 |
| Generator - Signal | Agilent | N5182A | TIF | 2023-07-27 | 2026-07-27 |

# EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 5399780K | Date: | 2025-03-21 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 21.4°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 24.6% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1010 mbar |
| Tested By: | Arnauld Dedry, Christopher Heintzelman | Job Site: | MN11 |
| Power: | 120VAC/60Hz | Configuration: | MLTI0373-1 |

## COMMENTS

The highest antenna gain used for this project was used for the EIRP calculation.

## DEVIATIONS FROM TEST STANDARD

None

## CONCLUSION

Pass

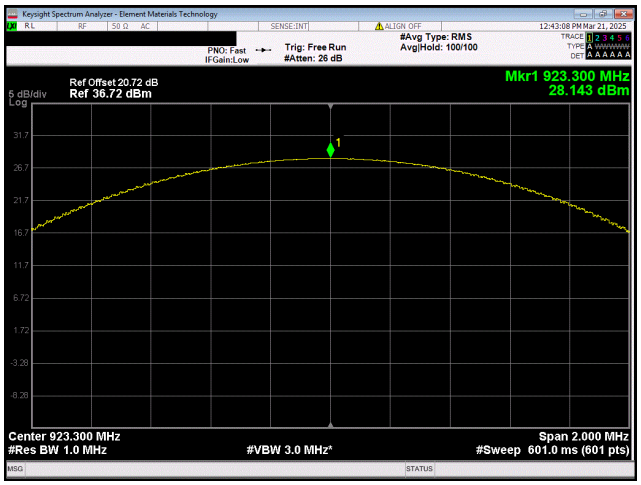
Tested By

## TEST RESULTS

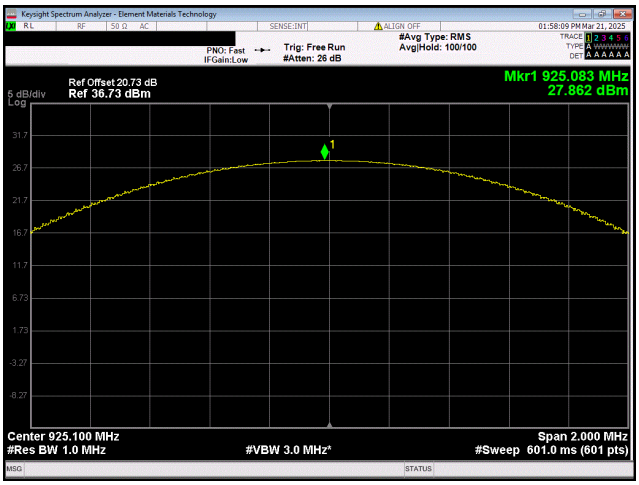
| | Avg Cond Pwr (dBm) | Duty Cycle Factor (dB) | Out Pwr (dBm) | Antenna Gain (dBi) | EIRP (dBm) | EIRP Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|
| LoRa CSS | | | | | | | |
| Low Channel, 923.3 MHz | 28.143 | 0 | 28.1 | 2.5 | 30.6 | 36 | Pass |
| Mid Channel, 925.1 MHz | 27.862 | 0 | 27.9 | 2.5 | 30.4 | 36 | Pass |
| High Channel, 927.5 MHz | 27.823 | 0 | 27.8 | 2.5 | 30.3 | 36 | Pass |

# EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

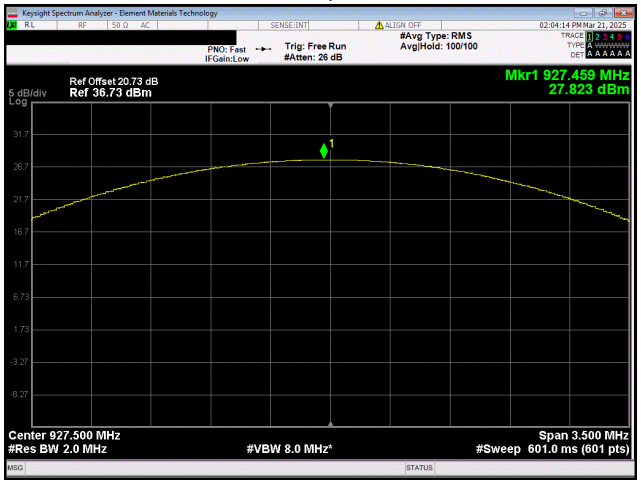
element
TbtTx 2024.10.31.2
WTD.2024.12.31.0




**LoRa CSS**
**Low Channel, 923.3 MHz**




**LoRa CSS**
**Mid Channel, 925.1 MHz**




**LoRa CSS**
**High Channel, 927.5 MHz**

# BAND EDGE COMPLIANCE

element
TbtTx 2025.05.09.0 beta
WTD.2025.03.25.0

## TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge. The analyzer screen captures for this test show an example of the emission mask for the test mode also used during the radiated spurious emissions at the restricted band edges test.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Generator - Signal | Keysight | N5182B | TFX | 2023-05-14 | 2026-05-14 |
| Analyzer - Spectrum Analyzer | Agilent | N9010A | AFI | 2024-09-03 | 2025-09-03 |
| Cable | Micro-Coax | UFD150A-1-0720-200200 | MNL | 2024-08-28 | 2025-08-28 |
| Block - DC | Fairview Microwave | SD3379 | ANH | 2024-08-28 | 2025-08-28 |
| Attenuator | Fairview Microwave | SA18S5W-20 | RFX | 2024-05-27 | 2025-05-27 |

# BAND EDGE COMPLIANCE

element
TbtTx 2025.05.09.0 beta
WTD.2025.03.25.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 5399780K | Date: | 2025-05-20 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 22.3°C |
| Attendees: | Marcus Glass | Relative Humidity: | 38.5% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1007 mbar |
| Tested By: | Christopher Heintzelman | Job Site: | MN11 |
| Power: | 110VAC/60Hz | Configuration: | MLTI0373-1 |

## COMMENTS

Reference level offset includes measurement cable, 20dB attenuator, and DC block.

## DEVIATIONS FROM TEST STANDARD

None

## CONCLUSION

Pass

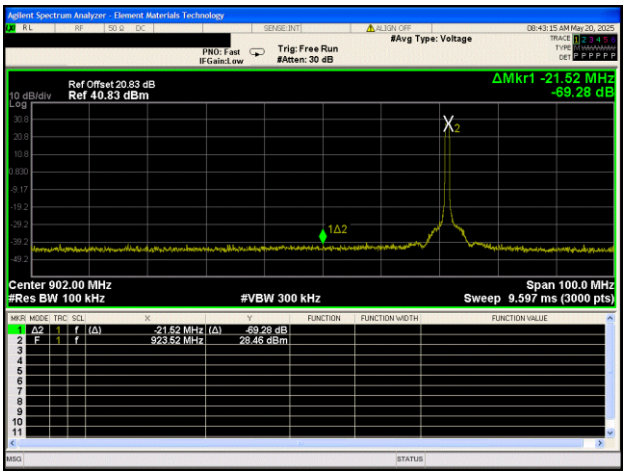
Tested By

## TEST RESULTS

| | Value (dBc) | Limit ≤ (dBc) | Result |
|---|---|---|---|
| Normal Test Conditions | | | |
| LoRa, CSS, 500 kHz BW, Low Channel, 923.3 MHz | -69.28 | -30 | Pass |
| LoRa, CSS, 500 kHz BW, High Channel, 927.5 MHz | -38.09 | -30 | Pass |

# BAND EDGE COMPLIANCE

element
TbtTx 2025.05.09.0 beta
WTD.2025.03.25.0




**Normal Test Conditions**
**LoRa, CSS, 500 kHz BW, Low Channel, 923.3 MHz**


**Normal Test Conditions**
**LoRa, CSS, 500 kHz BW, High Channel, 927.5 MHz**

# DTS BANDWIDTH

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

## TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The EUT was set to the channels and modes listed in the datasheet.

The 6dB DTS bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Attenuator | Fairview Microwave | SA18S5W-20 | RFX | 2024-05-27 | 2025-05-27 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFM | 2024-05-22 | 2025-05-22 |
| Cable | Micro-Coax | UFD150A-1-0720-200200 | MNL | 2024-08-28 | 2025-08-28 |
| Block - DC | Fairview Microwave | SD3379 | ANH | 2024-08-28 | 2025-08-28 |
| Generator - Signal | Agilent | N5182A | TIF | 2023-07-27 | 2026-07-27 |

# DTS BANDWIDTH

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 5399780K | Date: | 2025-03-21 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 23.2°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 27.7% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1001 mbar |
| Tested By: | Arnauld Dedry, Christopher Heintzelman | Job Site: | MN11 |
| Power: | 120VAC/60Hz | Configuration: | MLTI0373-1 |

## COMMENTS

None

## DEVIATIONS FROM TEST STANDARD

None

## CONCLUSION

Pass

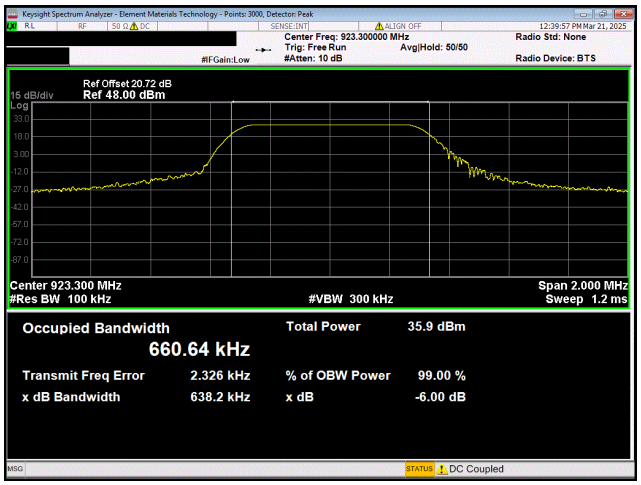
Tested By

## TEST RESULTS

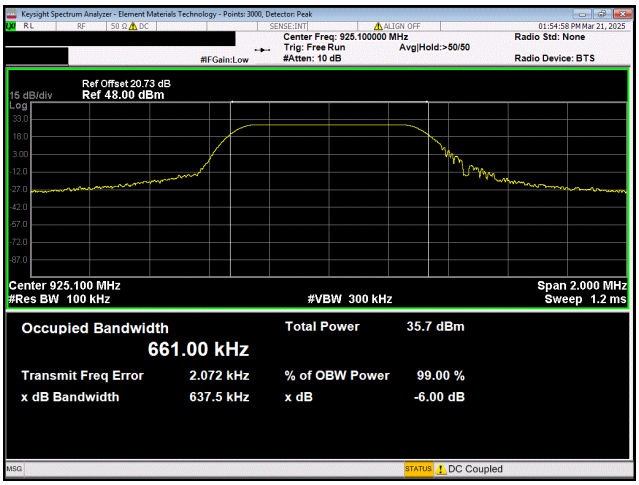
| | Value | Limit (>) | Result |
|---|---|---|---|
| LoRa CSS | | | |
| Low Channel, 923.3 MHz | 638.151 kHz | 500 kHz | Pass |
| Mid Channel, 925.1 MHz | 637.506 kHz | 500 kHz | Pass |
| High Channel, 927.5 MHz | 636.762 kHz | 500 kHz | Pass |

# DTS BANDWIDTH

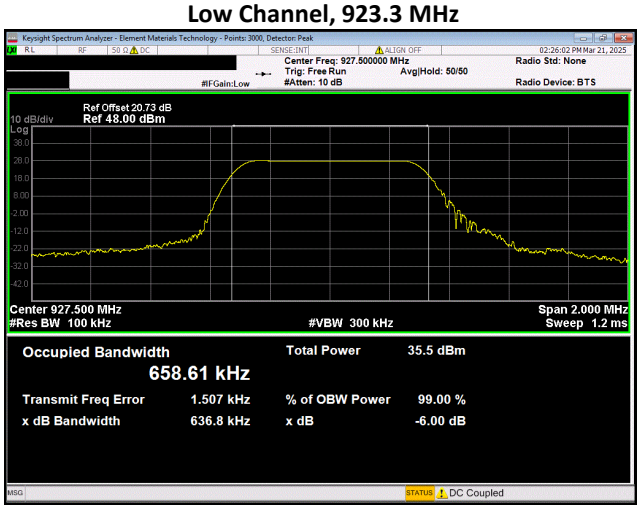
element
TbtTx 2024.10.31.2
WTD.2024.12.31.0




**LoRa CSS**
**Low Channel, 923.3 MHz**




**LoRa CSS**
**Mid Channel, 925.1 MHz**




**LoRa CSS**
**High Channel, 927.5 MHz**

# OCCUPIED BANDWIDTH

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

## TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The 99% occupied bandwidth was measured with the EUT configured for continuous modulated operation.

Per ANSI C63.10:2020, 6.9.3, the spectrum analyzer was configured as follows:

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto to prevent video filtering or averaging. A sample detector was used unless the device was not able to be operated in a continuous transmit mode, in which case a peak detector was used.

The spectrum analyzer occupied bandwidth measurement function was used to sum the power of the transmission in linear terms to obtain the 99% bandwidth.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Attenuator | Fairview Microwave | SA18S5W-20 | RFX | 2024-05-27 | 2025-05-27 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFM | 2024-05-22 | 2025-05-22 |
| Cable | Micro-Coax | UFD150A-1-0720-200200 | MNL | 2024-08-28 | 2025-08-28 |
| Generator - Signal | Agilent | N5182A | TIF | 2023-07-27 | 2026-07-27 |
| Block - DC | Fairview Microwave | SD3379 | ANH | 2024-08-28 | 2025-08-28 |

# OCCUPIED BANDWIDTH

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 5399780K | Date: | 2025-03-21 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 23.2°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 27.7% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1001 mbar |
| Tested By: | Arnauld Dedry, Christopher Heintzelman | Job Site: | MN11 |
| Power: | 120VAC/60Hz | Configuration: | MLTI0373-1 |

## COMMENTS

None

## DEVIATIONS FROM TEST STANDARD

None

## CONCLUSION

Pass

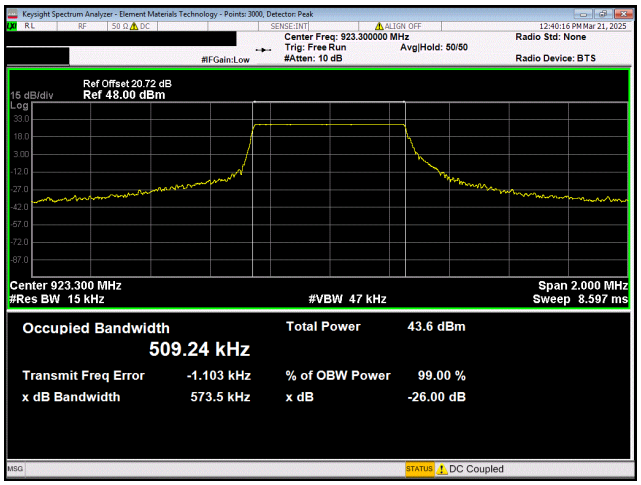
Tested By

## TEST RESULTS

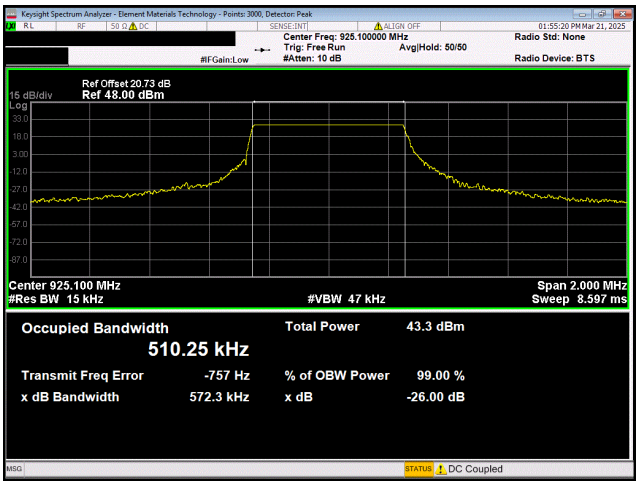
| | Value | Limit | Result |
|---|---|---|---|
| LoRa CSS | | | |
| Low Channel, 923.3 MHz | 509.236 kHz | N/A | N/A |
| Mid Channel, 925.1 MHz | 510.251 kHz | N/A | N/A |
| High Channel, 927.5 MHz | 512.172 kHz | N/A | N/A |

# OCCUPIED BANDWIDTH

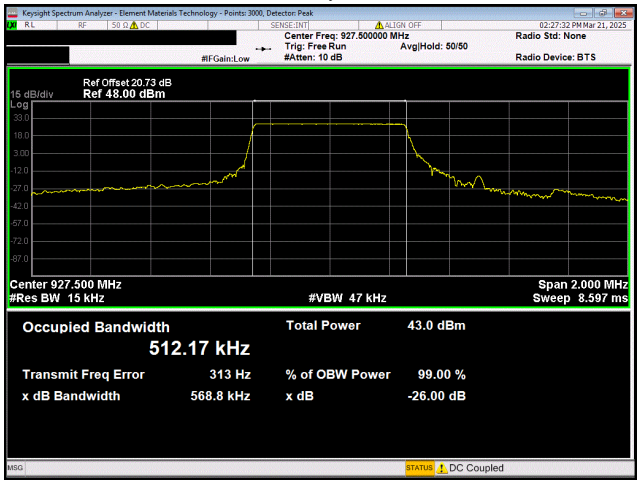
element
TbtTx 2024.10.31.2
WTD.2024.12.31.0




**LoRa CSS**
**Low Channel, 923.3 MHz**




**LoRa CSS**
**Mid Channel, 925.1 MHz**




**LoRa CSS**
**High Channel, 927.5 MHz**

# SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

## TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the fundamental was measured with a 100 kHz resolution bandwidth and the highest value was recorded. The rest of the spectrum was then measured with a 100 kHz resolution bandwidth and the highest value was found. The difference between the value found on the fundamental and the rest of the spectrum was compared against the limit to determine compliance.

The reference level offset for the fundamental screen capture was based on a measured value of the loss between the spectrum analyzer and the EUT which was verified at the time of test. The remaining screen capture(s) use an internal transducer factor on the analyzer to correct the displayed trace based on the cable loss over frequency. The reference level offset for the additional screen capture(s) is then based on the expected attenuator value and any other losses.

Fundamental Offset = Ref Lvl Offset showing measured composite factor of all losses

Remaining Screen capture(s) Offset = “Internal” cable loss factor not shown on screen capture + Ref Lvl Offset showing expected attenuator value and any other losses

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Attenuator | Fairview Microwave | SA18S5W-20 | RFX | 2024-05-27 | 2025-05-27 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFM | 2024-05-22 | 2025-05-22 |
| Cable | Micro-Coax | UFD150A-1-0720-200200 | MNL | 2024-08-28 | 2025-08-28 |
| Block - DC | Fairview Microwave | SD3379 | ANH | 2024-08-28 | 2025-08-28 |
| Generator - Signal | Agilent | N5182A | TIF | 2023-07-27 | 2026-07-27 |

# SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 5399780K | Date: | 2025-03-21 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 23.2°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 27.7% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1001 mbar |
| Tested By: | Arnauld Dedry, Christopher Heintzelman | Job Site: | MN11 |
| Power: | 120VAC/60Hz | Configuration: | MLTI0373-1 |

## COMMENTS

None

## DEVIATIONS FROM TEST STANDARD

None

## CONCLUSION

Pass

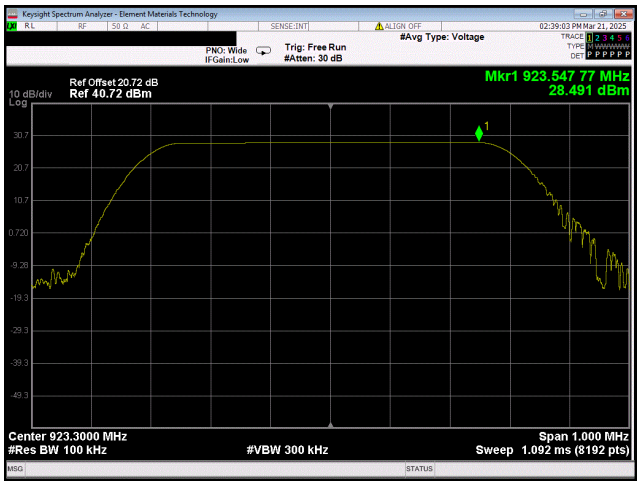
Tested By

## TEST RESULTS

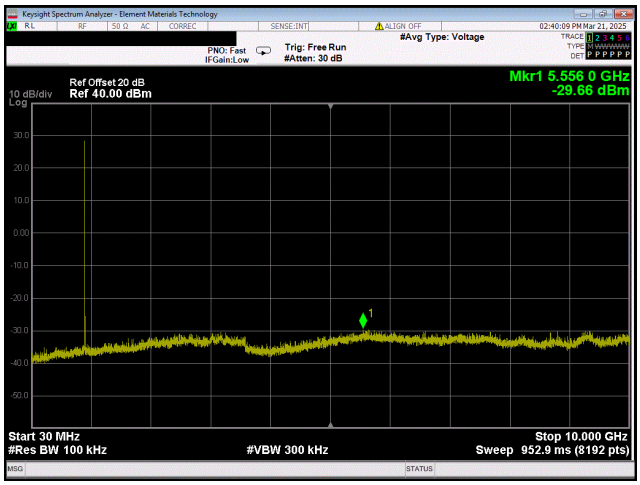
| | Frequency Range | Measured Freq (MHz) | Max Value (dBc) | Limit ≤ (dBc) | Result |
|---|---|---|---|---|---|
| LoRa CSS | | | | | |
| Low Channel, 923.3 MHz | Fundamental | 923.55 | N/A | N/A | N/A |
| | 30 MHz - 10 GHz | 5556.04 | -58.16 | -30 | Pass |
| Mid Channel, 925.1 MHz | Fundamental | 924.85 | N/A | N/A | N/A |
| | 30 MHz - 10 GHz | 5597.43 | -57.47 | -30 | Pass |
| High Channel, 927.5 MHz | Fundamental | 927.25 | N/A | N/A | N/A |
| | 30 MHz - 10 GHz | 5772.7 | -57.17 | -30 | Pass |

# SPURIOUS CONDUCTED EMISSIONS

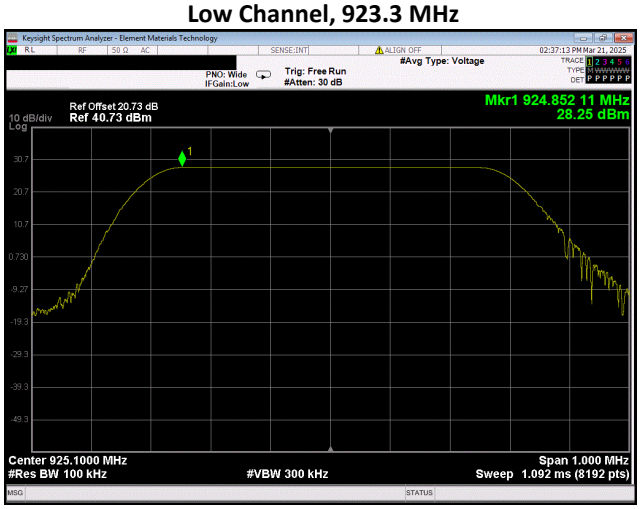
element
TbtTx 2024.10.31.2
WTD.2024.12.31.0



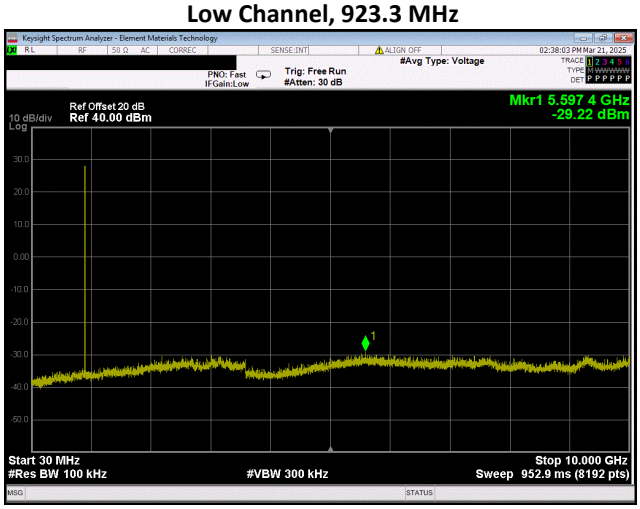

**LoRa CSS**
**Low Channel, 923.3 MHz**



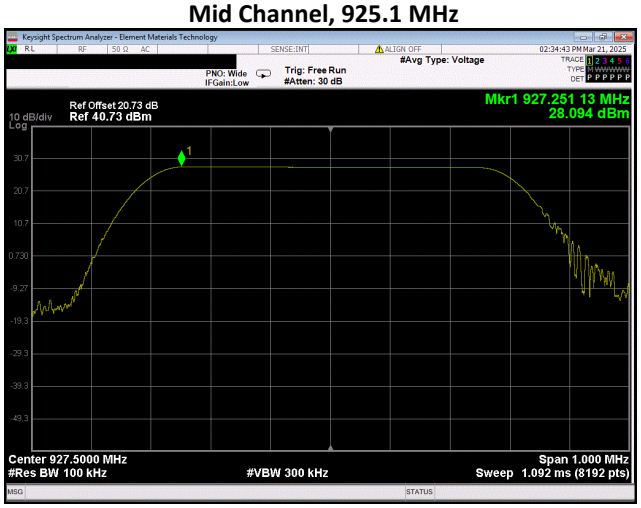

**LoRa CSS**
**Low Channel, 923.3 MHz**



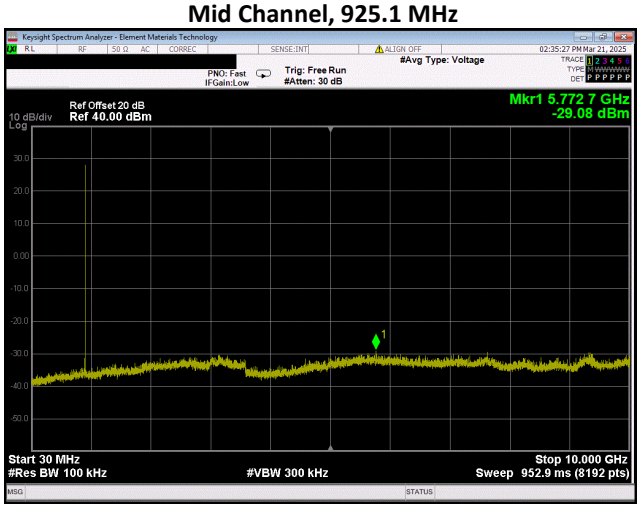

**LoRa CSS**
**Mid Channel, 925.1 MHz**




**LoRa CSS**
**Mid Channel, 925.1 MHz**




**LoRa CSS**
**High Channel, 927.5 MHz**




**LoRa CSS**
**High Channel, 927.5 MHz**

# POWER SPECTRAL DENSITY

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

## TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The power spectral density was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

The method AVGPSD-1 in section 11.10.3 of ANSI C63.10:2020 was used to make the measurement. This method uses trace averaging and RMS detection across the full power of the burst. This method is allowed as the same method has been used to determine the conducted output power.

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|---|---|---|---|---|---|
| Attenuator | Fairview Microwave | SA18S5W-20 | RFX | 2024-05-27 | 2025-05-27 |
| Analyzer - Spectrum Analyzer | Keysight | N9010A | AFM | 2024-05-22 | 2025-05-22 |
| Cable | Micro-Coax | UFD150A-1-0720-200200 | MNL | 2024-08-28 | 2025-08-28 |
| Block - DC | Fairview Microwave | SD3379 | ANH | 2024-08-28 | 2025-08-28 |
| Generator - Signal | Agilent | N5182A | TIF | 2023-07-27 | 2026-07-27 |

# POWER SPECTRAL DENSITY

element
TbtTx 2024.10.31.2
WTD.2024.12.31.0

| | | | |
|---|---|---|---|
| EUT: | MTCAP3-L4G2D-A23UEA-L | Work Order: | MLTI0373 |
| Serial Number: | 5399780K | Date: | 2025-03-21 |
| Customer: | Multi-Tech Systems, Inc. | Temperature: | 21.4°C |
| Attendees: | Michael Bendzick, Marcus Glass | Relative Humidity: | 24.8% |
| Customer Project: | None | Bar. Pressure (PMSL): | 1010 mbar |
| Tested By: | Arnauld Dedry, Christopher Heintzelman | Job Site: | MN11 |
| Power: | 120VAC/60Hz | Configuration: | MLTI0373-1 |

## COMMENTS

None

## DEVIATIONS FROM TEST STANDARD

None

## CONCLUSION

Pass

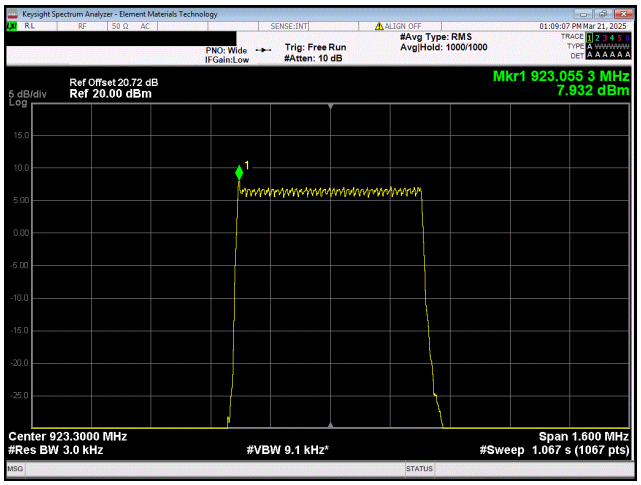
Tested By

## TEST RESULTS

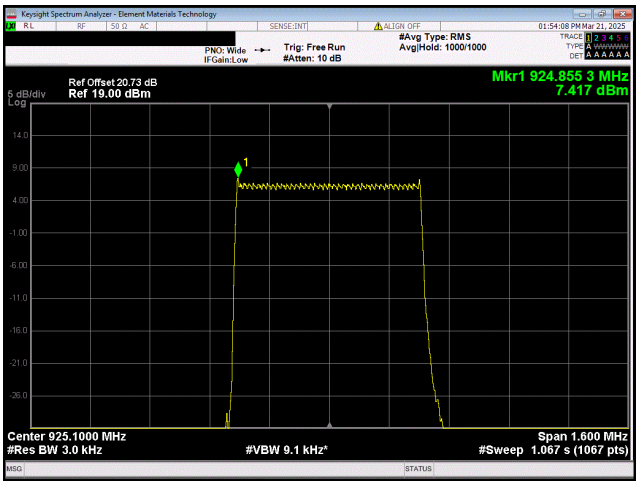
| | Value dBm/100kHz | Duty Cycle Factor (dB) | Value dBm/3kHz | Limit ≤ (dBm / 3 kHz) | Results |
|---|---|---|---|---|---|
| LoRa CSS | | | | | |
| Low Channel, 923.3 MHz | 7.932 | 0 | 7.9 | 8 | Pass |
| Mid Channel, 925.1 MHz | 7.417 | 0 | 7.4 | 8 | Pass |
| High Channel, 927.5 MHz | 7.987 | 0 | 8 | 8 | Pass |

# POWER SPECTRAL DENSITY

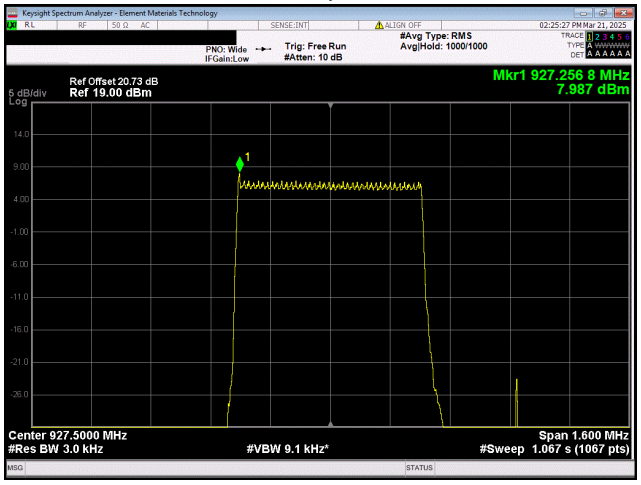
element
TbtTx 2024.10.31.2
WTD.2024.12.31.0




**LoRa CSS**
**Low Channel, 923.3 MHz**




**LoRa CSS**
**Mid Channel, 925.1 MHz**




**LoRa CSS**
**High Channel, 927.5 MHz**

End of Test Report