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## TEST REPORT

(FULL COMPLIANCE)

**Report Number: 104106572MPK-003**

**Project Number: G104106572**

**Report Issue Date: February 20, 2020**

**Revision Issue Date: November 23, 2021**

**Product Designation: Implant Charger**

**Model Tested: 31102**

**Standards: FCC Part 18**

**for**

**Galvani Bioelectronics**

**Tested by:**

Intertek  
1365 Adams Court  
Menlo Park, CA 94025 USA

**Client:**

Galvani Bioelectronics  
269 E Grand Ave  
South San Francisco, CA 94080 USA

**Report prepared by**

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**Report reviewed by**

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**1 Introduction and Conclusion**

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

**2 Executive Test Plan and Test Summary**

Tests were performed to the following standards: FCC Part 18:

Radiated Emissions  
ANSI C63.4: 2014, FCC MP-5

AC Mains Conducted Emissions  
ANSI C63.4: 2014, FCC MP-5

## Test Plan

The EUT shall be tested according to the table below:

| <b>FCC Part 18<br/>Emissions Test Requirements<br/>Proposed Tests</b> |                                      |                             |
|-----------------------------------------------------------------------|--------------------------------------|-----------------------------|
| FCC Part 18 Subpart C                                                 | Radiated Emission, 9 kHz – 400 MHz   | Normal<br>@ 120V 60Hz       |
| FCC Part 18 Subpart C                                                 | Conducted Emission, 150 kHz – 30 MHz | Not Applicable <sup>1</sup> |

<sup>1</sup>The EUT transmits only in battery mode.

**Test Summary**

| Test Description                      | Reference<br>FCC | Pass/Fail Comments          |
|---------------------------------------|------------------|-----------------------------|
| <b>Radiated Emissions</b>             |                  |                             |
| FCC Part 18 Subpart C                 | 18.305           | Complies                    |
| <b>Conducted Emissions (AC Mains)</b> |                  |                             |
| FCC Part 18 Subpart C                 | 18.307           | Not Applicable <sup>1</sup> |

<sup>1</sup>The EUT transmits only in battery mode.

**3 Client Information, Environmental Conditions, Performance Level**

This EUT was tested at the request of:

**Client:** Galvani Bioelectronics  
269 E Grand Ave  
South San Francisco, CA 94080 USA

**Contact:** Rizwan Bashirullah  
**Telephone:** (919) 696-1039  
**Email:** Rizwan.x.bashirullah@galvani.bio

**4 Description of Equipment Under Test and Variant Models**

| Equipment Under Test |                        |              |               |
|----------------------|------------------------|--------------|---------------|
| Description          | Manufacturer           | Model Number | Serial Number |
| Implant Charger      | Galvani Bioelectronics | 31102        | 00000117      |

|                            |                  |                        |                  |
|----------------------------|------------------|------------------------|------------------|
| <b>Receive Date:</b>       | January 13, 2019 | <b>Test Started:</b>   | January 21, 2019 |
| <b>Received Condition:</b> | Good             | <b>Test Completed:</b> | January 29, 2019 |
| <b>Type:</b>               | Production       |                        |                  |

**Description of Equipment Under Test (provided by client)**

The Implant Charger is a wireless charger to charge the Implantable Pulse Generator (IPG). It only wirelessly charges in battery mode.

| Equipment Under Test Power Configuration |               |                 |                  |
|------------------------------------------|---------------|-----------------|------------------|
| Rated Voltage                            | Rated Current | Rated Frequency | Number of Phases |
| 3.8V <sub>DC</sub>                       | 395mA         | N/A             | N/A              |

**Operating modes of the EUT:**

| No. | Descriptions of EUT Exercising                    |
|-----|---------------------------------------------------|
| 1   | The Implant Charger was transmitting at 6.78 MHz. |

**Variant Models:**

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

Not Applicable.

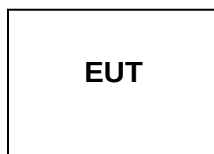
## **5 System Setup and Method**

No Support Equipment was used.

### **5.1 Method:**

Configuration as required by ANSI C63.4, FCC MP-5.

### **5.2 System Block Diagram**



**5.3 Justification:**

The EUT was configured in Table-Top configuration for testing, as specified by Galvani Bioelectronics.

**5.4 Software Exercise Program:**

The test mode firmware version 01.13.30 was used during testing. This information was provided by Galvani Bioelectronics.

**5.5 Modifications Required for Compliance:**

No modifications were installed by Intertek Testing Services during compliance testing in order to bring the product into compliance.

## 6 FCC Part 18

### 6.1 Electromagnetic Radiated Disturbance

#### 6.1.1 Test Limits

#### FCC Part 18

**Table 8-1a Limits for Electromagnetic Radiated Disturbance for FCC Part 18**

| Equipment                                           | Operating Frequency                        | RF Power generated by equipment (watts) | Field strength limit (uV/m)                                                         | Distance (meters)                  |
|-----------------------------------------------------|--------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------|
| Any type unless otherwise specified (miscellaneous) | Any ISM frequency                          | Below 500<br>500 or more                | 25<br>$25 \times \text{SQRT}(\text{power}/500)$                                     | 300<br><sup>1</sup> 300            |
|                                                     | Any non-ISM Frequency                      | Below 500<br>500 or more                | 15<br>$15 \times \text{SQRT}(\text{power}/500)$                                     | 300<br><sup>1</sup> 300            |
| Industrial heaters and RF stabilized arc welders    | On or below 5,725 MHz<br>Above 5,725 MHz   | Any<br>Any                              | 10<br>( <sup>2</sup> )                                                              | 1600<br>( <sup>2</sup> )           |
| Medical diathermy                                   | Any ISM frequency<br>Any non-ISM frequency | Any<br>Any                              | 25<br>15                                                                            | 300<br>300                         |
| Ultrasonic                                          | Below 490 kHz                              | Below 500<br>500 or more                | $2,400/F(\text{kHz})$<br>$2,400/F(\text{kHz}) \times \text{SQRT}(\text{power}/500)$ | 300<br><sup>3</sup> 300            |
|                                                     | 490 to 1,600 kHz<br>Above 1,600 kHz        | Any<br>Any                              | $24,000/F(\text{kHz})$<br>15                                                        | 30<br>30                           |
| Induction cooking ranges                            | Below 90 khz<br>On or above 90 kHz         | Any<br>Any                              | 1,500<br>300                                                                        | <sup>4</sup> 30<br><sup>4</sup> 30 |

<sup>1</sup>Field strength may not exceed 10 uV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.

<sup>2</sup>Reduced to the greatest extent possible.

<sup>3</sup>Field strength may not exceed 10 uV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.

<sup>4</sup>Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

### 6.1.2 Test Procedure

Measurements are conducted with a quasi-peak detector instrument in the frequency range of 9 kHz to 1000 MHz. The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.

Measurements of the radiated field are made with the antenna located at a distance of 10 meter from the EUT for 150kHz to 30MHz and 10 meter for 30 to 1000MHz. If the field-strength measurements at 10m cannot be made because of high ambient noise level or for other reasons, measurements may be made at a closer distance, for example 1m. An appropriate distance correction factor (DCF) should be used to normalize the measured data to the specified distance for determining compliance.

The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings by rotating the turntable.

The antenna-to-EUT polarization (Parallel and Perpendicular) is varied during the measurements to find the maximum field-strength readings.

Equipment setup for radiated disturbance tests followed the guidelines of MP-5.

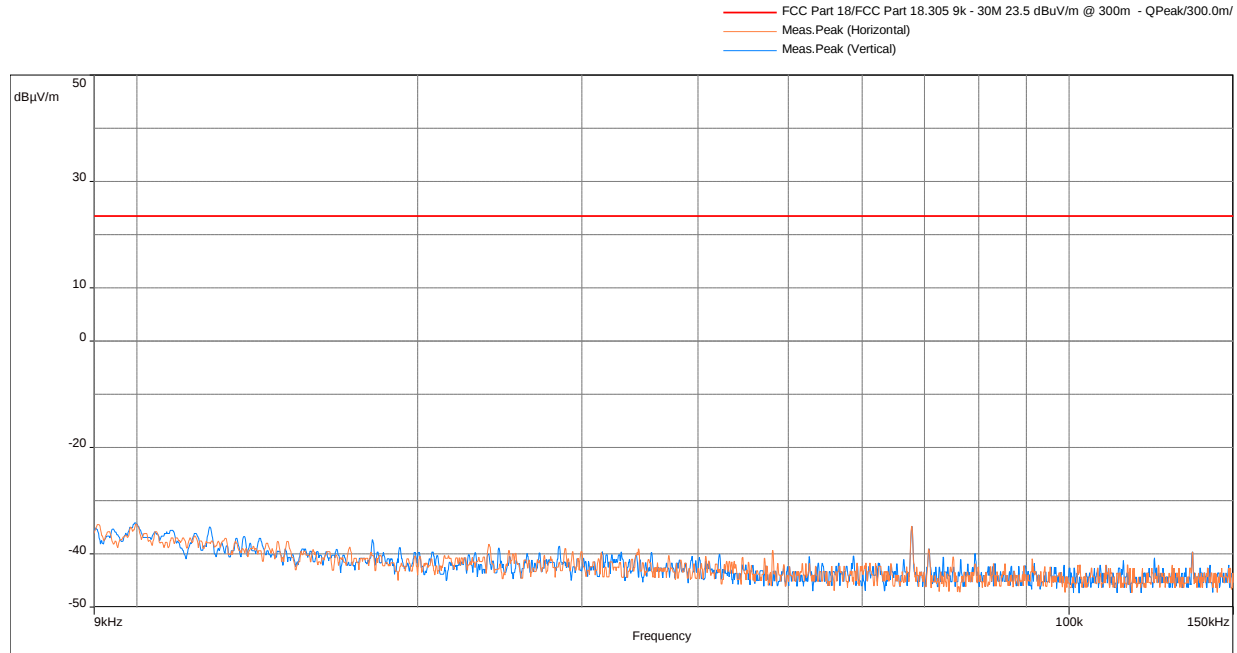
|                   |                       |
|-------------------|-----------------------|
| <b>Tested By:</b> | Aaron Chang           |
| <b>Test Date:</b> | January 21 & 29, 2020 |

17.9°C, 55.5% RH, 29.3inHg

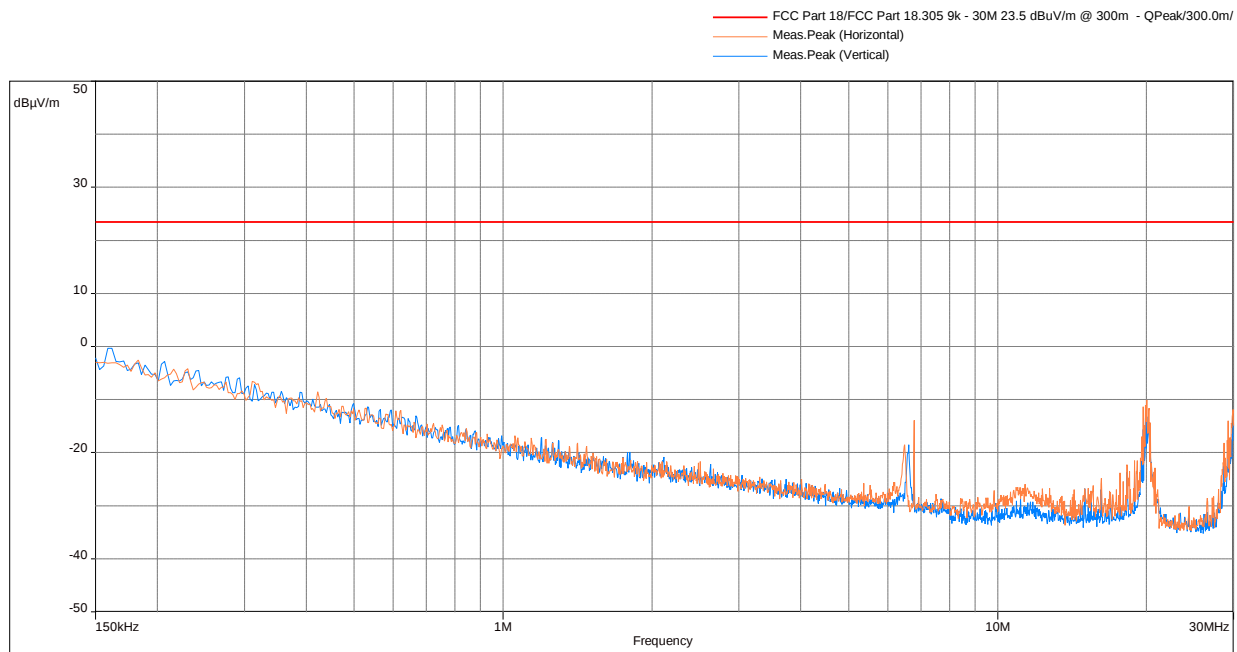
### 6.1.3 Test Results

#### FCC Part 18 Radiated Disturbances

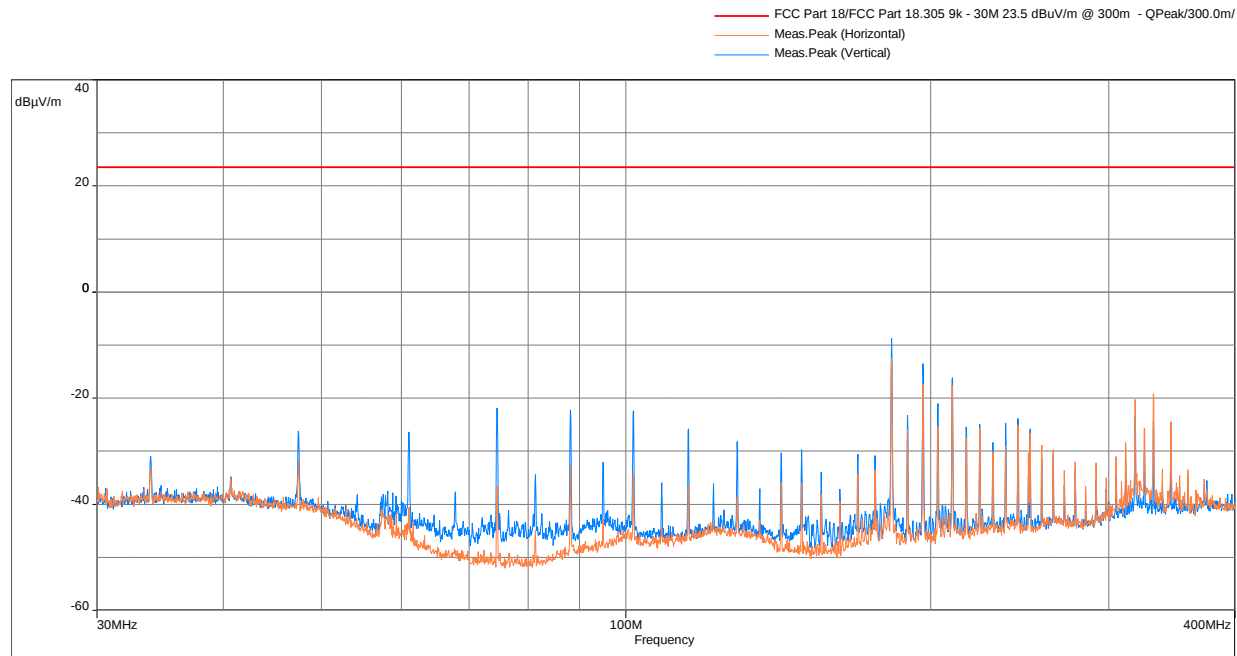
##### Radiated Spurious Emissions 9 - 150 kHz, Peak Scan vs QP Limit



##### Radiated Spurious Emissions 150 kHz – 30 MHz, Peak Scan vs QP Limit



Radiated Spurious Emissions 30 - 400 MHz, Peak Scan vs QP Limit



DCF: Distance Correction Factor to normalize from 10m to 300m

Note 1: The RF frequency for the Implant Charger is 6.78 MHz. The RF power generated is less than 500W therefore the limit chosen is 15uV (23.5dBuV/m).

Note 2: The EUT was tested in X,Y and Z orientation. The worst-case data is presented.

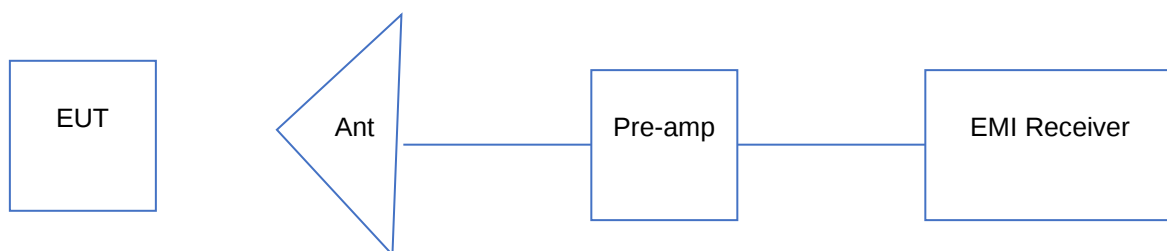
| Frequency MHz | QP@10m dB(μV/m) | Limit@10m dB(μV/m) | Margin (dB) | Height (m) | Angle (°) | Polarization | Correction (dB) |
|---------------|-----------------|--------------------|-------------|------------|-----------|--------------|-----------------|
| 6.780         | -13.91          | 23.5               | -37.41      | 1          | 225.5     | Horizontal   | 14.47           |
| 20.015        | -10.08          | 23.5               | -33.58      | 1          | 286.25    | Horizontal   | 14.89           |
| 29.910        | -11.87          | 23.5               | -35.37      | 1          | 122.75    | Horizontal   | 13.21           |
| 183.069       | -12.43          | 23.5               | -35.93      | 3.98       | 258.25    | Horizontal   | -14.89          |
| 183.069       | -8.69           | 23.5               | -32.19      | 1          | 119.75    | Vertical     | -14.89          |
| 196.574       | -14.68          | 23.5               | -38.18      | 1          | 160.5     | Vertical     | -14.31          |
| 196.611       | -17.38          | 23.5               | -40.88      | 3.98       | 62.5      | Horizontal   | -14.31          |
| 210.215       | -16.71          | 23.5               | -40.21      | 1          | 156.75    | Vertical     | -13.66          |

Note: The "Correction" column contains factors for cable, antenna, preamp and distance correction factor (DCF). DCF is calculated by  $20\log(10/300) = -29.5\text{dB}$ .

**Result:** **Complies by 8.69dB**

#### 6.1.4 Test Configuration Photograph

The following photographs show the testing configurations used.



Electromagnetic Radiated Disturbance Setup Photograph

## 6.2 AC Mains Line-Conducted Disturbance

### 6.2.1 Test Limits

#### **FCC Part 18**

For the following equipment, when designed to be connected to the public utility (AC) power line the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies shall not exceed the limits in the following tables. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN).

**Table 8-2a Limits for Conducted Disturbance at the Mains Ports for all Induction cooking ranges and ultrasonic equipment:**

| Frequency of emission (MHz) | Conducted limit (dBuV) |           |
|-----------------------------|------------------------|-----------|
|                             | Quasi-Peak             | Average   |
| 0.009-0.05                  | 110                    | --        |
| 0.05-0.15                   | 90-80*                 | --        |
| 0.15-0.5                    | 66 to 56*              | 56 to 46* |
| 0.5-5                       | 56                     | 46        |
| 5-30                        | 60                     | 50        |

\*Decreases with the logarithm of the frequency.

**Table 8-2b Limits for Conducted Disturbance at the Mains Ports for all other part 18 consumer devices:**

| Frequency of emission (MHz) | Conducted limit (dBuV) |           |
|-----------------------------|------------------------|-----------|
|                             | Quasi-Peak             | Average   |
| 0.15-0.5                    | 66 to 56*              | 56 to 46* |
| 0.5-5                       | 56                     | 46        |
| 5-30                        | 60                     | 50        |

\*Decreases with the logarithm of the frequency.

**Table 8-2c Limits for Conducted Disturbance at the Mains Ports for RF lighting devices:**

| Frequency (MHz)         | Maximum RF line voltage measured with a 50 $\mu$ H/50 ohm LISN ( $\mu$ V) |
|-------------------------|---------------------------------------------------------------------------|
| Non-consumer equipment: |                                                                           |
| 0.45 to 1.6             | 1,000                                                                     |
| 1.6 to 30               | 3,000                                                                     |
| Consumer equipment:     |                                                                           |
| 0.45 to 2.51            | 250                                                                       |
| 2.51 to 3.0             | 3,000                                                                     |
| 3.0 to 30               | 250                                                                       |

**Test Procedure**

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.

The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.

The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Floor standing EUTs are placed on a horizontal metal ground plane and isolated from the ground plane by 3 to 12 mm of insulating material. The metal ground plane extends at least 0.5m beyond the boundaries of the EUT and has minimum dimensions of 2m by 2m.

Equipment setup for conducted disturbance tests followed the guidelines of FCC-MP5.

**6.2.2 Test Results**

Not Applicable. The EUT transmits in battery mode only.

**7 List of Test Equipment**

| Equipment            | Manufacturer      | Model/Type | Asset #   | Cal Int | Cal Due  |
|----------------------|-------------------|------------|-----------|---------|----------|
| EMI Receiver         | Rohde and Schwarz | ESU40      | ITS 00961 | 12      | 11/07/20 |
| BI-Log Antenna       | Antenna Research  | LPB-2513/A | ITS 00355 | 12      | 04/24/20 |
| Pre-Amplifier        | Sonoma Instrument | 310N       | ITS 00415 | 12      | 04/17/20 |
| Passive Loop Antenna | EMCO              | 6512       | ITS 01598 | 12      | 10/22/20 |

**8 Revision History**

| Revision Level | Date              | Report Number    | Prepared By | Reviewed By | Notes                                                        |
|----------------|-------------------|------------------|-------------|-------------|--------------------------------------------------------------|
| 1              | February 20, 2020 | 104106572MPK-003 | AC          | KV          | Original Issue                                               |
| 2              | November 11, 2021 | 104106572MPK-003 | AC          | KV          | Updated report with test mode firmware version.              |
| 2              | November 23, 2021 | 104106572MPK-003 | AC          | KV          | Updated section 6.1.3 with distance correction factor (DCF). |