

Medtronic MiniMed

REVISED TEST REPORT TO 109171-5

Simplera

Model: MMT-5100*

*(See Appendix A for Manufacturer Declaration)

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.247

(DTS 2400-2483.5MHz)

Report No.: 109171-5A

Date of issue: April 5, 2024



Test Certificate # 803.01

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Medtronic MiniMed
18000 Devonshire Street
Northridge, CA 91325

Representative: Jonathan Tabalujan
Customer Reference Number: 6000018023

DATE OF EQUIPMENT RECEIPT:

DATE(S) OF TESTING:

REPORT PREPARED BY:

Lisa Bevington
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 109171

December 4, 2023

December 4 & 5, 2023

Revision History

Original: Testing of Simplera Model: MMT-5100 to FCC Part 15 Subpart C Section 15.247 (DTS 2400-2483.5MHz).

Revision A: To update the calculated power and EIRP values that were inadvertently swapped in the columns on page 12.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
Canyon Park
22116 23rd Drive S.E., Suite A
Bothell, WA 98021

Software Versions

| CKC Laboratories Proprietary Software | Version |
|---------------------------------------|---------|
| EMITest Emissions | 5.03.20 |

Site Registration & Accreditation Information

| Location | *NIST CB # | FCC | Canada | Japan |
|--------------------------|------------|--------|--------|--------|
| Canyon Park, Bothell, WA | US0103 | US1024 | 3082C | A-0136 |
| Brea, CA | US0103 | US1024 | 3082D | A-0136 |
| Fremont, CA | US0103 | US1024 | 3082B | A-0136 |
| Mariposa, CA | US0103 | US1024 | 3082A | A-0136 |

*CKC's list of NIST designated countries can be found at: <https://standards.gov/cabs/designations.html>

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (DTS)

| Test Procedure | Description | Modifications | Results |
|----------------|------------------------------------|---------------|---------|
| 15.247(a)(2) | 6dB Bandwidth | NA | PASS |
| 15.247(b)(3) | Output Power | NA | PASS |
| 15.247(d) | RF Conducted Emissions & Band Edge | NA | NA1 |
| 15.247(d) | Radiated Emissions & Band Edge | NA | PASS |
| 15.247(e) | Power Spectral Density | NA | PASS |
| 15.207 | AC Conducted Emissions | NA | NA2 |

NA = Not Applicable

NA1 = Not applicable because EUT has an integral antenna.

NA2 = Not applicable because EUT is battery powered.

ISO/IEC 17025 Decision Rule

The equipment sample utilized for testing is selected by the manufacturer. The declaration of pass or fail herein is a binary statement for simple acceptance rule (ILAC G8) based upon assessment to the specification(s) listed above, without consideration of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions

No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions

None

EQUIPMENT UNDER TEST (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Under Test:

| Device | Manufacturer | Model # | S/N |
|----------|-------------------|----------|------------|
| Simplera | Medtronic MiniMed | MMT-5100 | B315000973 |

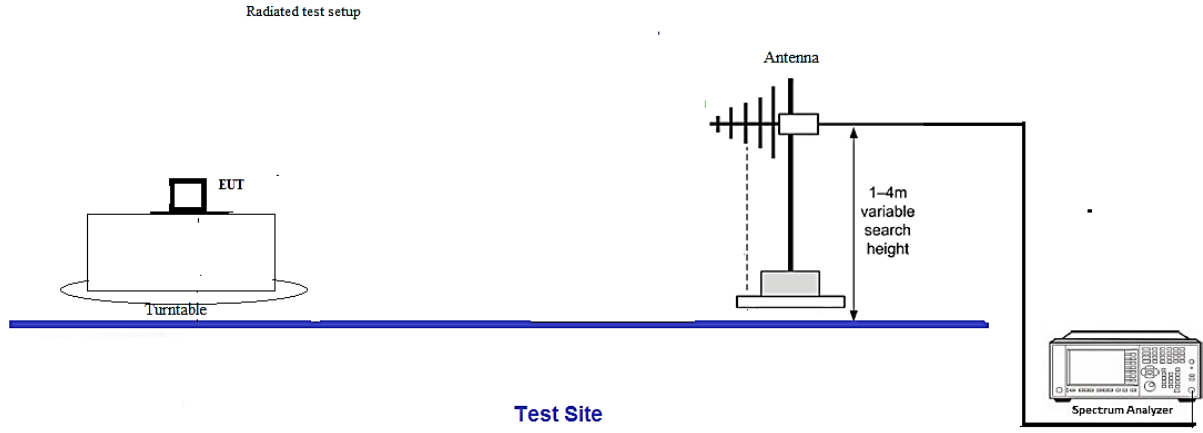
Support Equipment:

| Device | Manufacturer | Model # | S/N |
|--------|--------------|---------|-----|
| None | | | |

General Product Information:

| Product Information | Manufacturer-Provided Details |
|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Frequencies Tested: | 2402-2480 MHz |
| Equipment Type: | Stand-Alone Equipment |
| Type of Wideband System: | DTS |
| Maximum Duty Cycle: | 100% (Tested worst case) |
| Modulation Type(s): | GFSK |
| Number of TX Chains: | 1 |
| Beamforming Type: | NA |
| Antenna Type(s) and Gain: | Inverted F / -6 dBi |
| Antenna Connection Type: | Integral |
| Nominal Input Voltage: | 3VDC Internal Battery |
| Description of block Diagram: | EUT was setup in a standalone configuration and was tested in 3 orthogonal orientations. There is no cable attached to the equipment because the manufacturer declares the equipment is not allowed to transmit in this configuration. |
| GPI Data Software Description: | Synergy RF Utility 2.0A was used to send commands to units programmed with the RF Test App FW. |
| GPI Dat Software Settings: | +2 dBm power setting was used |
| GPI Data Type up or adjustments: | No adjustments to the units were made. They were "production" equivalent to keep it as consistent to what the customer facing configuration would be. |
| Firmware / Software Version(s): | Synergy RF Test App 2.3C (2P config) / Synergy RF Utility 2.0A |
| The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility. | |

Block Diagram of Test Setup(s)



FCC Part 15 Subpart C

15.247(a)(2) 6dB Bandwidth

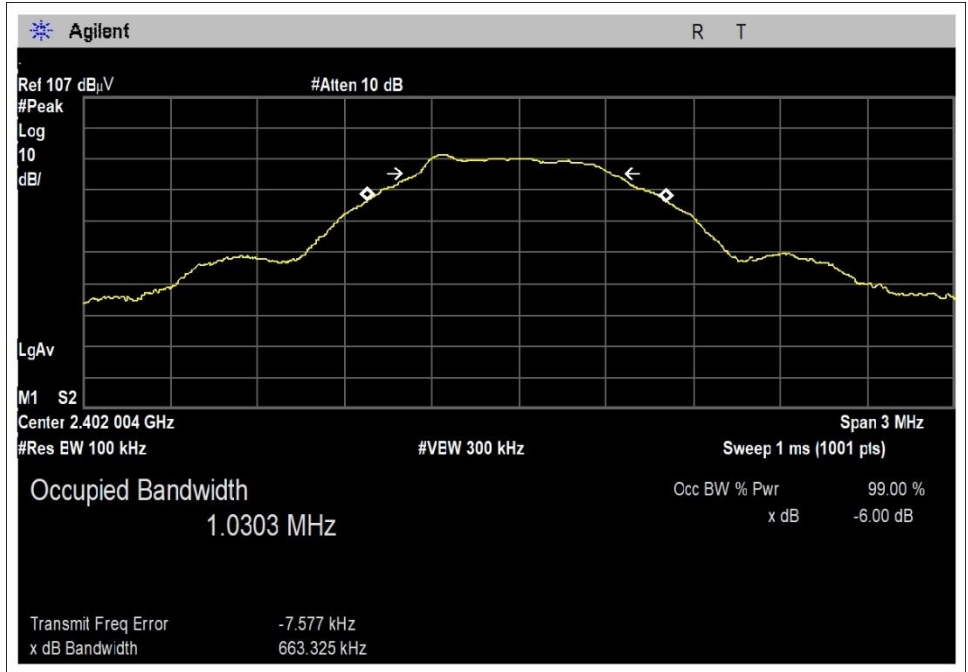
| Test Setup/Conditions | | | |
|-----------------------|---------------------------------------------------------------------------------------------------|----------------|-------------|
| Test Location: | Bothell Lab C3 | Test Engineer: | M. Harrison |
| Test Method: | ANSI C63.10 (2020), KDB 558074 | Test Date(s): | 12/4/2023 |
| Configuration: | 1 | | |
| Test Setup: | EUT is setup in a standalone tabletop configuration. It is transmitting on the described channel. | | |

| Environmental Conditions | | | |
|--------------------------|----|------------------------|----|
| Temperature (°C) | 19 | Relative Humidity (%): | 22 |

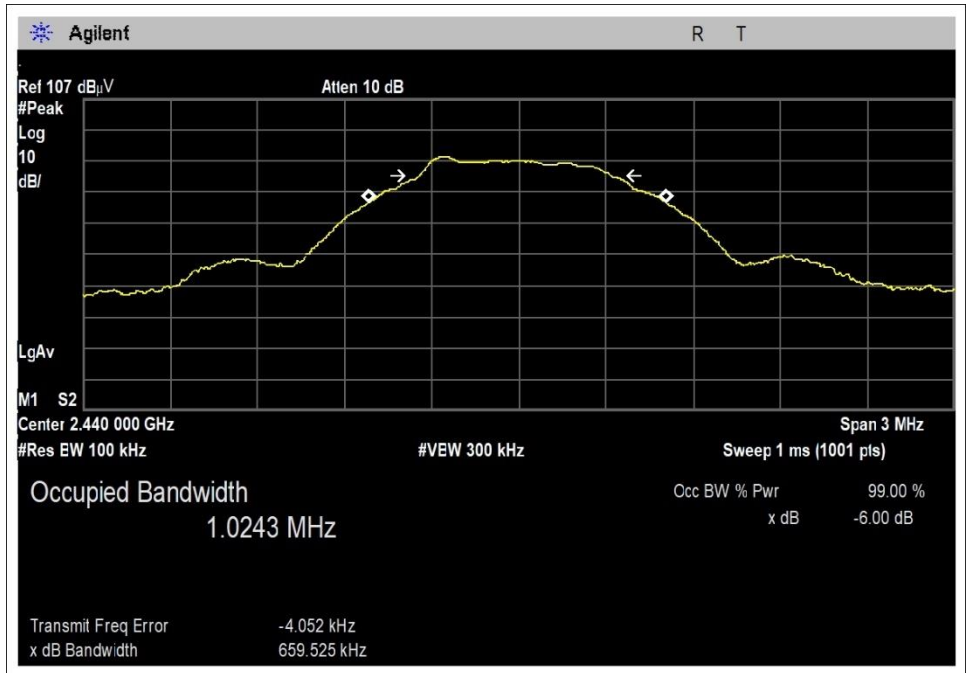
| Test Equipment | | | | | |
|----------------|-------------------|----------------|-------------------|-----------|-----------|
| Asset# | Description | Manufacturer | Model | Cal Date | Cal Due |
| 02374ANSI | Horn Antenna | Electrometrics | RGA-60 | 5/26/2023 | 5/26/2025 |
| 03540 | Preamp | HP | 83017A | 3/24/2023 | 3/24/2025 |
| 02673 | Spectrum Analyzer | Agilent | E4446A | 3/2/2023 | 3/2/2025 |
| P06011 | Cable | Andrew | Heliac | 5/20/2022 | 5/20/2024 |
| P06515 | Cable | Andrews | Heliac | 3/1/2023 | 3/1/2025 |
| P07504 | Cable | TMS | CLU40-KMKM-02.00F | 1/24/2023 | 1/24/2025 |

| Test Data Summary | | | | | |
|-------------------|--------------|------------|----------------|-------------|---------|
| Frequency (MHz) | Antenna Port | Modulation | Measured (kHz) | Limit (kHz) | Results |
| 2402 | 1 | GFSK | 663.33 | ≥500 | Pass |
| 2440 | 1 | GFSK | 659.53 | ≥500 | Pass |
| 2480 | 1 | GFSK | 675.05 | ≥500 | Pass |

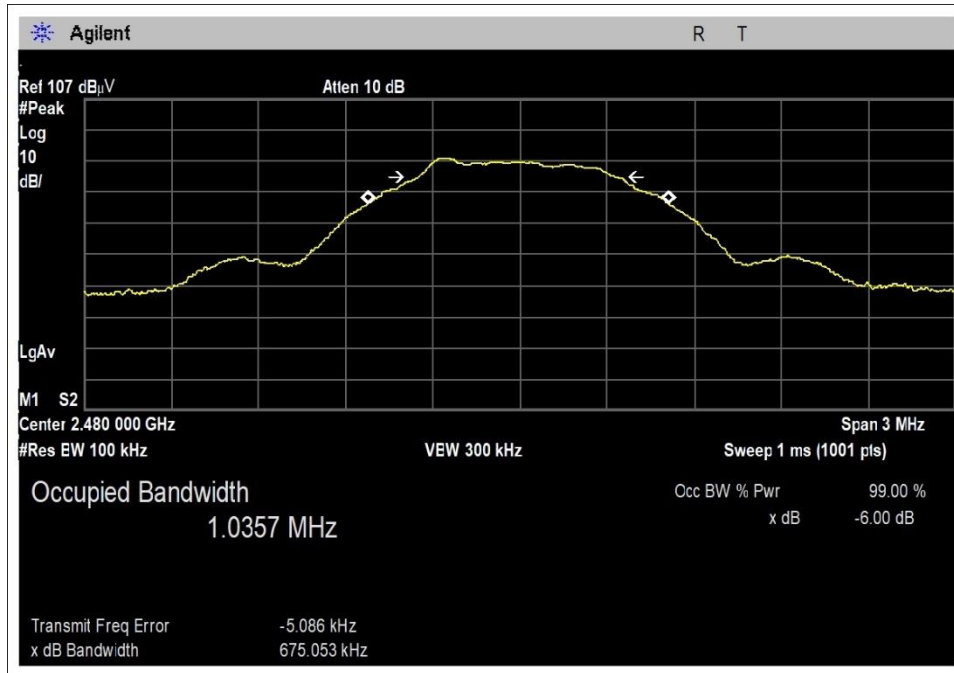
Plot(s)



Low Channel



Middle Channel



High Channel

Test Setup Photo(s)



Above 1GHz, View 1



Above 1GHz, View 2

15.247(b)(3) Output Power

| Test Data Summary - Radiated Measurement | | | | | | | |
|------------------------------------------|------------|------------------------|--------------------|-------|------------|-------|---------|
| Measurement Option: RBW > DTS Bandwidth | | | | | | | |
| Frequency (MHz) | Modulation | Ant. Type / Gain (dBi) | RF Conducted (dBm) | | EIRP (dBm) | | Results |
| | | | Calculated | Limit | Calculated | Limit | |
| 2402 | GFSK | Inverted F / -6 dBi | -2.92 | ≤ 30 | -8.92 | ≤36 | Pass |
| 2440 | GFSK | Inverted F / -6 dBi | -2.62 | ≤ 30 | -8.62 | ≤36 | Pass |
| 2480 | GFSK | Inverted F / -6 dBi | -2.72 | ≤ 30 | -8.72 | ≤36 | Pass |

EIRP is calculated as RF conducted power (dBm) + antenna gain (dBi)

For fixed point-to-point antennas, the limit is calculated in accordance with 15.247(c)(1): $Limit = 30 - Roundup\left(\frac{G-6}{3}\right)$

For all other antennas, the RF conducted power limit is calculated according to a maximum of 1W (30 dBm) conducted power with a maximum of 6dBi gain antenna in accordance with 15.247(b)
 $Limit = 30 - Roundup(G - 6)$

For directional beamforming antennas, the limit is calculated in accordance with 15.247(c)(2) and KDB 662911.

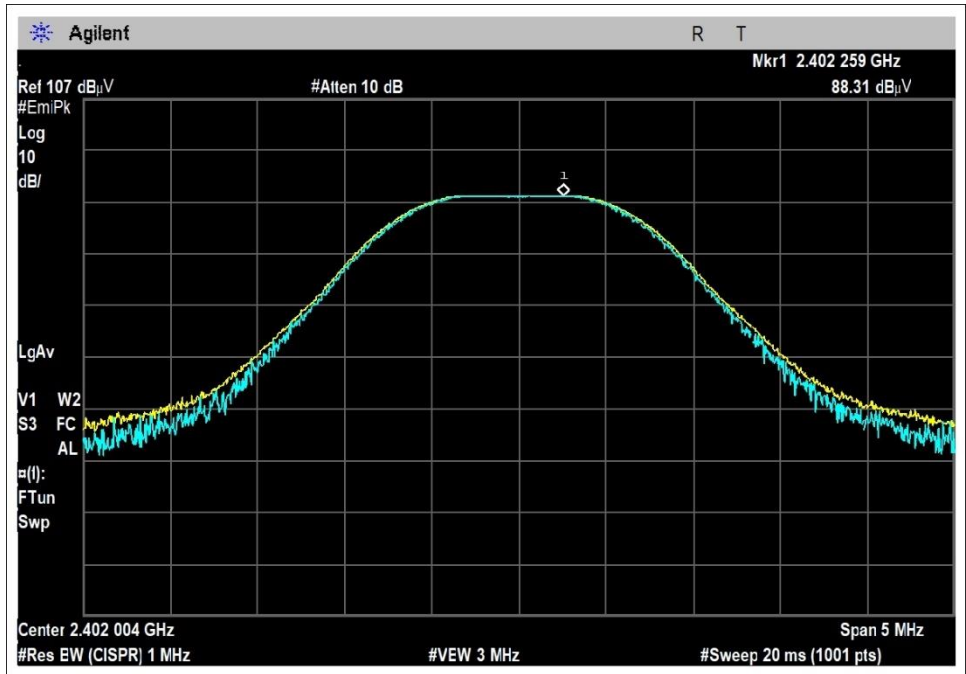
Conducted RF output power calculated in accordance with ANSI C63.10.

$$P(W) = \frac{(E \cdot d)^2}{30 G}$$

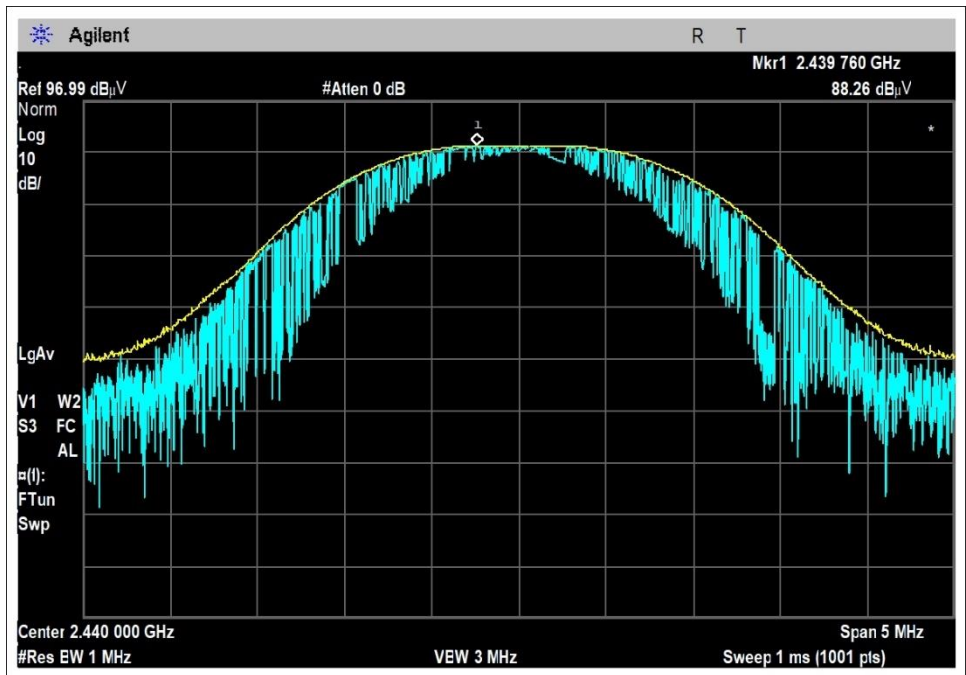
Or equivalently, in logarithmic form:

$$P(dBm) = E(dBuV/m) + 20LOG(d) - G - 104.77$$

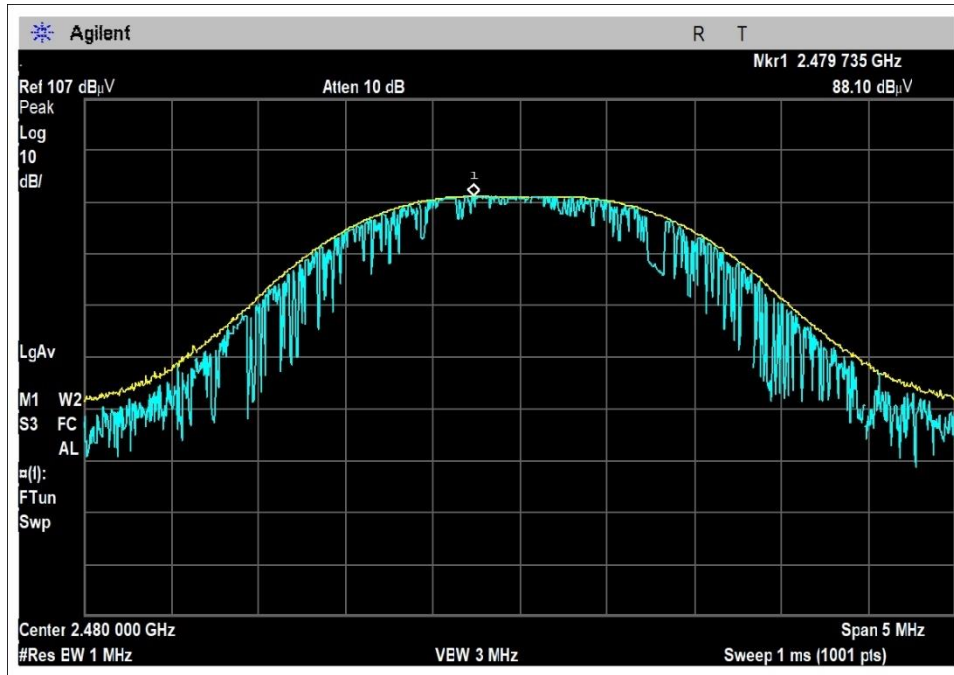
Plots



Low Channel



Middle Channel



High Channel

Test Setup / Conditions / Data

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Medtronic Minimed**
 Specification: **15.247(b) Power Output (2400-2483.5 MHz DTS)**
 Work Order #: **109171** Date: 12/4/2023
 Test Type: **Radiated Scan** Time: 14:16:51
 Tested By: Matt Harrison Sequence#: 5
 Software: EMITest 5.03.20

Equipment Tested:

| Device | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 | | | |

Support Equipment:

| Device | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 | | | |

Test Conditions / Notes:

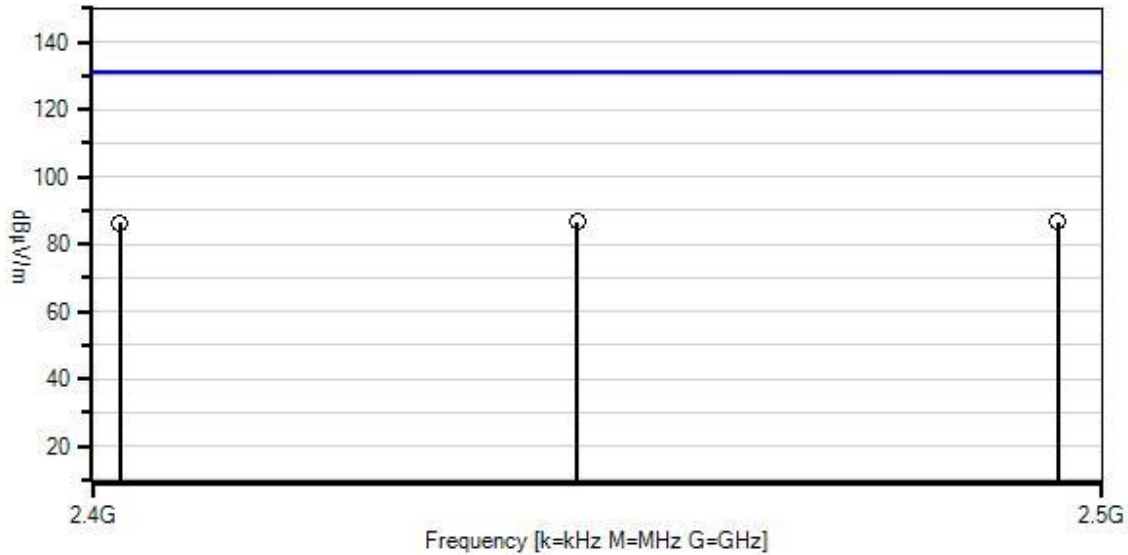
Test Environment Conditions:
 Temperature: 19°C
 Humidity: 43%
 Pressure: 101.2kPa

 Test Method: ANSI C63.10

 Frequency Range: Fundamental

 Setup: EUT is setup in a Tabletop configuration. It is 150cm high on a Styrofoam. X, Y, and Z axis investigated, worst-case data provided.

Medtronic Minimed WO#: 109171 Sequence#: 5 Date: 12/4/2023
 15.247(b) Power Output (2400-2483.5 MHz DTS) Test Distance: 3 Meters Horiz



— Readings
 × QP Readings
 ▼ Ambient
 ○ Peak Readings
 * Average Readings
 Software Version: 5.03.20
 1 - 15.247(b) Power Output (2400-2483.5 MHz DTS)

Test Equipment:

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|----|-------------|-------------------|-------------------|------------------|--------------|
| T1 | AN02673 | Spectrum Analyzer | E4446A | 3/2/2023 | 3/2/2025 |
| T2 | AN03540 | Preamp | 83017A | 3/24/2023 | 3/24/2025 |
| T3 | AN02374ANSI | Horn Antenna | RGA-60 | 5/26/2023 | 5/26/2025 |
| T4 | ANP06515 | Cable | Heliac | 3/1/2023 | 3/1/2025 |
| T5 | ANP07504 | Cable | CLU40-KMKM-02.00F | 1/24/2023 | 1/24/2025 |
| T6 | ANP06011 | Cable | Heliac | 11/16/2023 | 11/16/2025 |

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

| # | Freq | Rdng | T1 | T2 | T3 | T4 | Dist | Corr | Spec | Margin | Polar |
|---|-----------|------|------|-------|-------|------|-------|--------|--------|--------|-------|
| | MHz | dBμV | T5 | T6 | | | Table | dBμV/m | dBμV/m | dB | Ant |
| 1 | 2479.735M | 88.1 | +0.0 | -34.6 | +29.0 | +2.9 | +0.0 | 86.6 | 131.2 | -44.6 | Horiz |
| | | | +0.5 | +0.7 | | | 340 | | Y-Axis | | 177 |
| 2 | 2439.760M | 88.3 | +0.0 | -34.6 | +28.8 | +2.8 | +0.0 | 86.5 | 131.2 | -44.7 | Horiz |
| | | | +0.5 | +0.7 | | | 330 | | Y-Axis | | 163 |
| 3 | 2402.259M | 88.3 | +0.0 | -34.6 | +28.6 | +2.8 | +0.0 | 86.3 | 131.2 | -44.9 | Horiz |
| | | | +0.5 | +0.7 | | | 330 | | Y-Axis | | 106 |

Test Setup Photo(s)



Above 1GHz; View 1



Above 1GHz; View 2



X Axis



Y Axis



Z Axis

15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Medtronic Minimed**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **109171** Date: 12/5/2023
 Test Type: **Radiated Scan** Time: 9:29:19 AM
 Tested By: Matt Harrison Sequence#: 14
 Software: EMITest 5.03.20

Equipment Tested:

| Device | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 | | | |

Support Equipment:

| Device | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 | | | |

Test Conditions / Notes:

Test Environment Conditions:
 Temperature: 19°C
 Humidity: 43%
 Pressure: 101.2kPa

 Test Method: ANSI C63.10

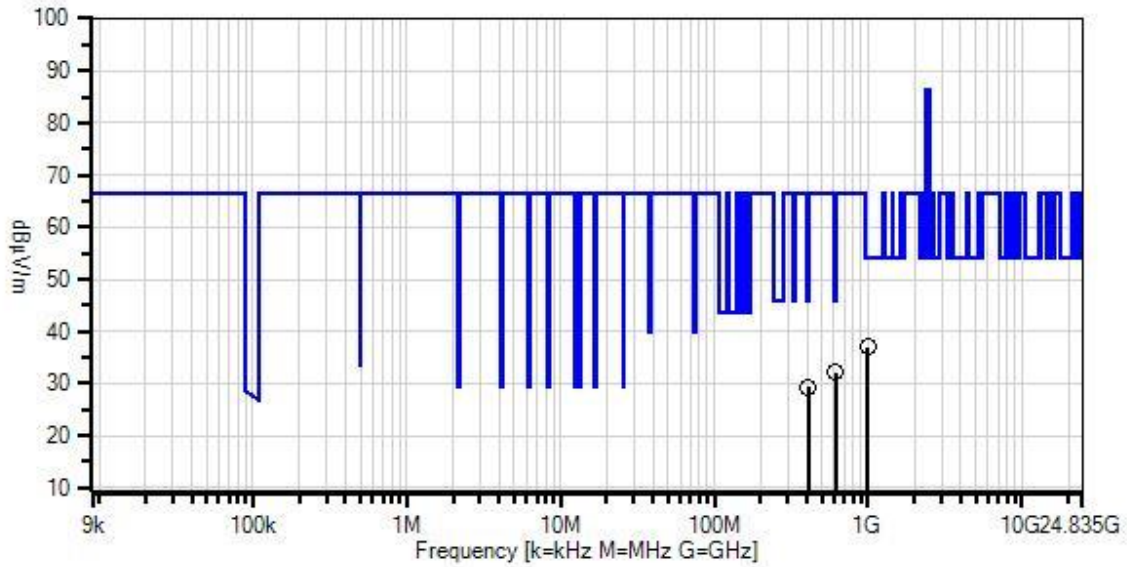
 Frequency Range: 9kHz-1000MHz

 Setup: EUT is setup in a Tabletop configuration. It is 150cm high on a Styrofoam. X, Y, and Z axis investigated; worst-case data provided. EUT is in Transmit Mode.

 Note:

 No EUT emissions found within 20dB of the limit below 30MHz

Medtronic Minimed WD#: 109171 Sequence#: 14 Date: 12/5/2023
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



— Readings
 × QP Readings
 ▼ Ambient
 — 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
 ○ Peak Readings
 * Average Readings
 Software Version: 5.03.20

Test Equipment:

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------|------------------|--------------|
| | AN02673 | Spectrum Analyzer | E4446A | 3/2/2023 | 3/2/2025 |
| T1 | ANP06011 | Cable | Heliac | 11/16/2023 | 11/16/2025 |
| T2 | AN02307 | Preamp | 8447D | 8/9/2023 | 8/9/2025 |
| T3 | AN03628 | Biconilog Antenna | 3142E | 6/1/2023 | 6/1/2025 |
| T4 | ANP05333 | Cable | Heliac | 8/8/2023 | 8/8/2025 |
| T5 | ANP05360 | Cable | RG214 | 8/8/2023 | 8/8/2025 |
| | AN00052 | Loop Antenna | 6502 | 5/11/2022 | 5/11/2024 |
| | ANP06515 | Cable | Heliac | 3/1/2023 | 3/1/2025 |

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

| # | Freq MHz | Rdng dBμV | T1 T5 dB | T2 dB | T3 dB | T4 dB | Dist Table | Corr dBμV/m | Spec dBμV/m | Margin dB | Polar Ant |
|---|-------------|--------------|----------------|----------|----------|----------|---------------|----------------|----------------|--------------|--------------|
| 1 | 609.581M | 29.1 | +0.3 +2.3 | -27.9 | +27.2 | +1.2 | +0.0 | 32.2 | 46.0 | -13.8 | Horiz |
| 2 | 407.900M | 29.9 | +0.3 +1.6 | -27.5 | +24.1 | +1.0 | +0.0 | 29.4 | 46.0 | -16.6 | Horiz |
| 3 | 988.354M | 28.9 | +0.4 +2.6 | -26.8 | +30.3 | +1.6 | +0.0 | 37.0 | 54.0 | -17.0 | Horiz |

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Medtronic Minimed**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **109171** Date: 12/4/2023
 Test Type: **Radiated Scan** Time: 15:32:08
 Tested By: Matt Harrison Sequence#: 11
 Software: EMITest 5.03.20

Equipment Tested:

| Device | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 | | | |

Support Equipment:

| Device | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 | | | |

Test Conditions / Notes:

Test Environment Conditions:
 Temperature: 19°C
 Humidity: 43%
 Pressure: 101.2kPa

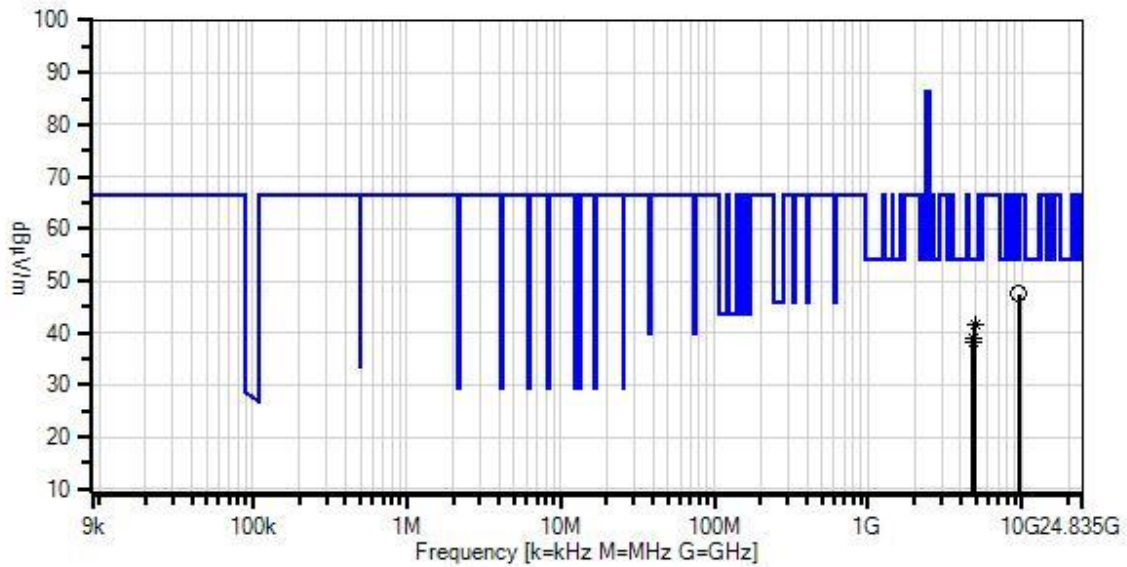
 Test Method: ANSI C63.10

 Frequency Range: 1-25GHz

 Setup: EUT is setup in a Tabletop configuration. It is 150cm high on a styrofoam. X, Y, and Z axis investigated, worst-case data provided.

 No EUT Emissions found within 20dB of the limit above 18GHz

Medtronic Minimed W/O#: 109171 Sequence#: 11 Date: 12/4/2023
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



- Readings
 - × QP Readings
 - ▼ Ambient
 - 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
 - Peak Readings
 - * Average Readings
- Software Version: 5.03.20

Test Equipment:

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|----|-------------|---------------------|-------------------------|------------------|--------------|
| | AN02673 | Spectrum Analyzer | E4446A | 3/2/2023 | 3/2/2025 |
| T1 | AN03540 | Preamp | 83017A | 3/24/2023 | 3/24/2025 |
| T2 | AN02374ANSI | Horn Antenna | RGA-60 | 5/26/2023 | 5/26/2025 |
| T3 | ANP06515 | Cable | Heliac | 3/1/2023 | 3/1/2025 |
| T4 | ANP07504 | Cable | CLU40-KMKM-02.00F | 1/24/2023 | 1/24/2025 |
| T5 | ANP06011 | Cable | Heliac | 11/16/2023 | 11/16/2025 |
| | AN02741 | Active Horn Antenna | AMFW-5F-12001800-20-10P | 5/26/2023 | 5/26/2025 |
| | AN02742 | Active Horn Antenna | AMFW-5F-18002650-20-10P | 11/18/2022 | 11/18/2024 |
| | AN02763-69 | Waveguide | Multiple | 3/11/2022 | 3/11/2024 |
| | ANP07505 | Cable | CLU40-KMKM-02.00F | 1/24/2023 | 1/24/2025 |
| | ANP07900 | Cable | CLU40-KMKM-10.00F | 8/8/2023 | 8/8/2025 |
| | ANP07901 | Cable | CLU40-KMKM-10.00F | 8/8/2023 | 8/8/2025 |
| | ANP07212 | Cable | 32026-29801-29801-18 | 5/1/2023 | 5/1/2025 |

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

| # | Freq MHz | Rdng dB μ V | T1 T5 dB | T2 dB | T3 dB | T4 dB | Dist Table | Corr dB μ V/m | Spec dB μ V/m | Margin dB | Polar Ant |
|---|------------------|--------------------|----------------|----------|----------|----------|---------------|----------------------|----------------------|--------------|--------------|
| 1 | 4960.330M Ave | 34.8 | -33.8 +1.1 | +33.7 | +4.4 | +1.2 | +0.0 | 41.4 | 54.0 | -12.6 | Horiz |
| ^ | 4960.330M | 43.5 | -33.8 +1.1 | +33.7 | +4.4 | +1.2 | +0.0 | 50.1 | 54.0 | -3.9 | Horiz |
| 3 | 4880.460M Ave | 32.6 | -33.8 +1.2 | +33.4 | +4.3 | +1.3 | +0.0 | 39.0 | 54.0 | -15.0 | Horiz |
| ^ | 4880.460M | 42.3 | -33.8 +1.2 | +33.4 | +4.3 | +1.3 | +0.0 | 48.7 | 54.0 | -5.3 | Horiz |
| 5 | 4803.650M Ave | 32.0 | -33.8 +1.3 | +33.1 | +4.2 | +1.5 | +0.0 | 38.3 | 54.0 | -15.7 | Vert |
| ^ | 4803.650M | 42.2 | -33.8 +1.3 | +33.1 | +4.2 | +1.5 | +0.0 | 48.5 | 54.0 | -5.5 | Vert |
| 7 | 9607.385M | 35.1 | -34.5 +1.5 | +37.9 | +6.4 | +1.0 | +0.0 | 47.4 | 66.3 | -18.9 | Horiz |

Band Edge

Band Edge Summary

Limit applied at restricted bands: 15.209

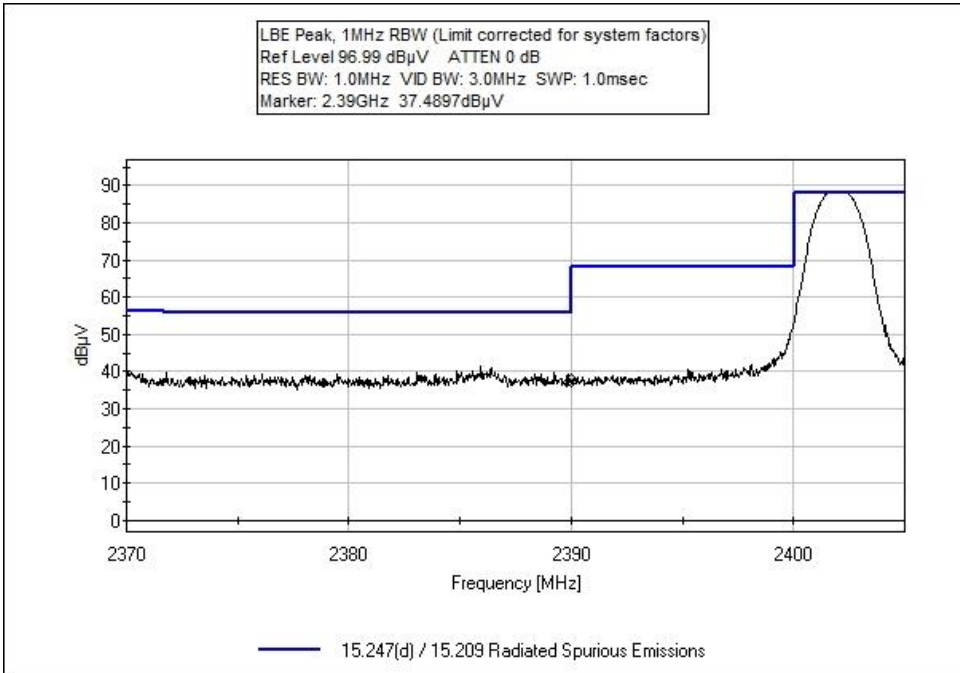
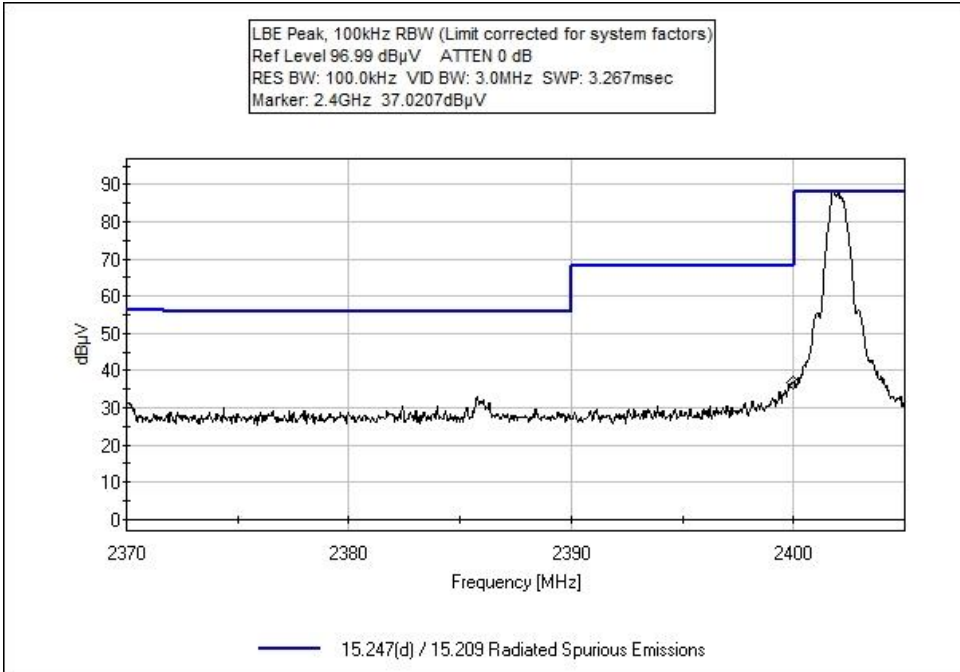
Limit applied for other than restricted bands: Max Power/100kHz - 20dB.

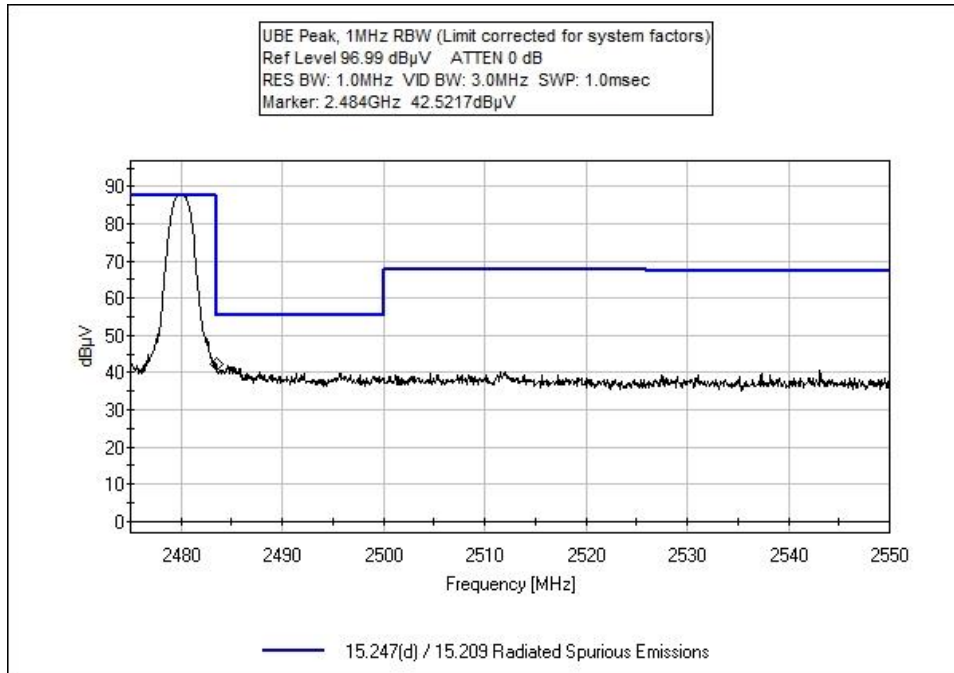
| Frequency (MHz) | Modulation | Ant. Type / Gain (dBi) | Average (dBuV/m @3m) | | Peak (dBuV/m @3m) | | Results |
|-----------------|------------|------------------------|----------------------|-------|-------------------|-------|---------|
| | | | Measured | Limit | Measured | Limit | |
| 2390.0 | GFSK | Inverted F / -6 dBi | NA1 | ≤54 | 35.4 | ≤74.0 | Pass |
| 2400.0 | GFSK | Inverted F / -6 dBi | NA2 | NA2 | 35.0 | ≤66.3 | Pass |
| 2483.5 | GFSK | Inverted F / -6 dBi | NA1 | ≤54 | 41.0 | ≤74.0 | Pass |

NA1: Peak measurement meets average limit.

NA2: Average limit not applicable when applying 20dBc limit.

Band Edge Plots





Test Setup / Conditions / Data

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Medtronic Minimed**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **109171** Date: 12/4/2023
 Test Type: **Radiated Scan** Time: 13:31:35
 Tested By: Matt Harrison Sequence#: 9
 Software: EMITest 5.03.20

Equipment Tested:

| Device | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 | | | |

Support Equipment:

| Device | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 | | | |

Test Conditions / Notes:

Test Environment Conditions:
 Temperature: 19°C
 Humidity: 43%
 Pressure: 101.2kPa

 Test Method: ANSI C63.10

 Frequency Range: Fundamental

 Setup: EUT is setup in a Tabletop configuration. It is 150cm high on a Styrofoam. X, Y, and Z axis investigated, worst-case data provided.

Test Equipment:

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|----|-------------|-------------------|-------------------|------------------|--------------|
| T1 | AN02673 | Spectrum Analyzer | E4446A | 3/2/2023 | 3/2/2025 |
| T2 | AN03540 | Preamp | 83017A | 3/24/2023 | 3/24/2025 |
| T3 | AN02374ANSI | Horn Antenna | RGA-60 | 5/26/2023 | 5/26/2025 |
| T4 | ANP06515 | Cable | Helix | 3/1/2023 | 3/1/2025 |
| T5 | ANP07504 | Cable | CLU40-KMKM-02.00F | 1/24/2023 | 1/24/2025 |
| T6 | ANP06011 | Cable | Helix | 11/16/2023 | 11/16/2025 |

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

| # | Freq MHz | Rdng dB μ V | T1 T5 dB | T2 T6 dB | T3 dB | T4 dB | Dist Table | Corr dB μ V/m | Spec dB μ V/m | Margin dB | Polar Ant |
|---|-------------|--------------------|----------------|----------------|----------|----------|---------------|----------------------|----------------------|--------------|--------------|
| 1 | 2483.500M | 42.5 | +0.0 +0.5 | -34.6 +0.7 | +29.0 | +2.9 | +0.0 | 41.0 | 54.0 1MHz RBW | -13.0 | Horiz |
| 2 | 2390.000M | 37.5 | +0.0 +0.5 | -34.6 +0.7 | +28.5 | +2.8 | +0.0 | 35.4 | 54.0 1MHz RBW | -18.6 | Horiz |
| 3 | 2400.000M | 37.0 | +0.0 +0.5 | -34.6 +0.7 | +28.6 | +2.8 | +0.0 | 35.0 | 66.3 100kHz RBW | -31.3 | Horiz |

Test Setup Photo(s)



Below 1GHz; View 1



Below 1GHz; View 2



Above 1GHz, View 1



Above 1GHz, View 2



X Axis



Y Axis



Z Axis

15.247(e) Power Spectral Density

| Test Data Summary - Radiated Measurement | | | | | | |
|------------------------------------------|------------|------------------------|-----------------------------|-----------------------|------------------|---------|
| Measurement Method: PKPSD | | | | | | |
| Frequency (MHz) | Modulation | Ant. Type / Gain (dBi) | Field Strength (dBuV/m @3m) | Calculated (dBm/3kHz) | Limit (dBm/3kHz) | Results |
| 2402 | GFSK | Inverted F / -6 dBi | 71.2 | -18.0 | ≤8 | Pass |
| 2440 | GFSK | Inverted F / -6 dBi | 71.9 | -17.3 | ≤8 | Pass |
| 2480 | GFSK | Inverted F / -6 dBi | 71.7 | -17.5 | ≤8 | Pass |

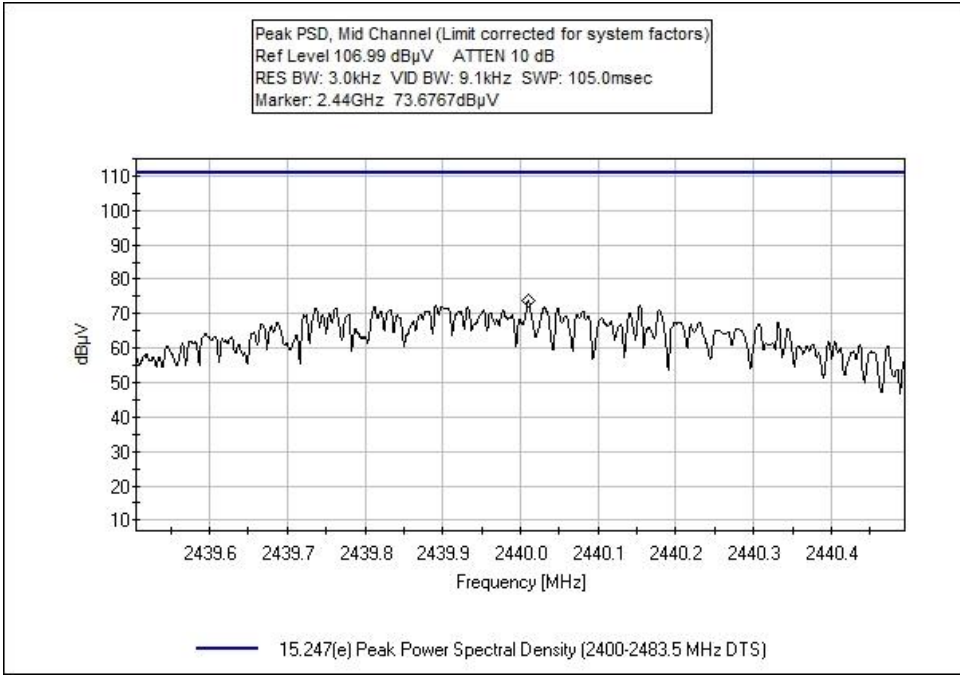
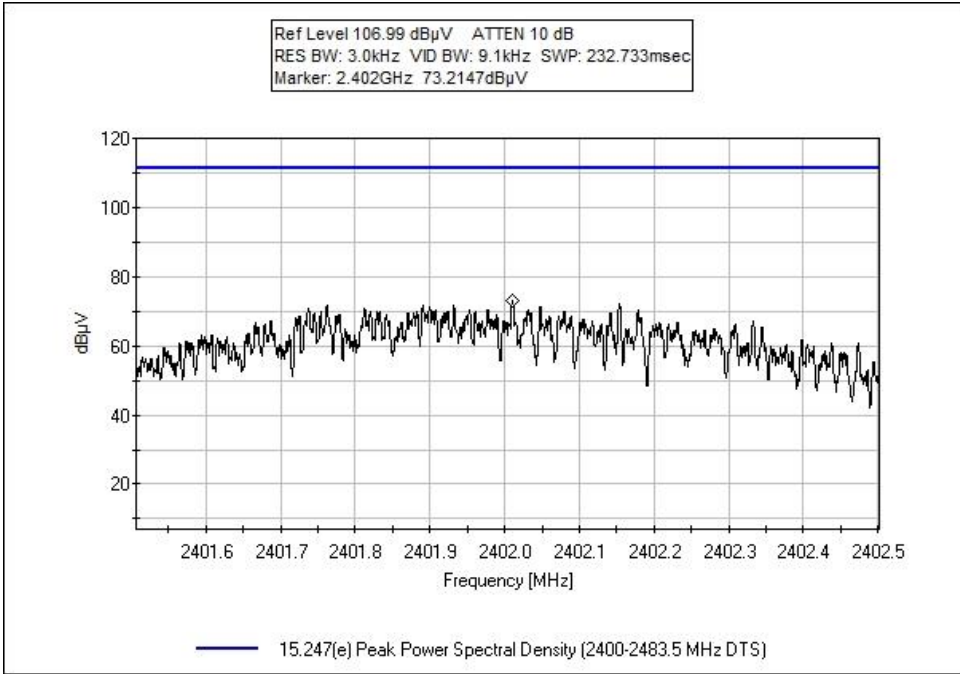
Conducted RF output power calculated in accordance with ANSI C63.10.

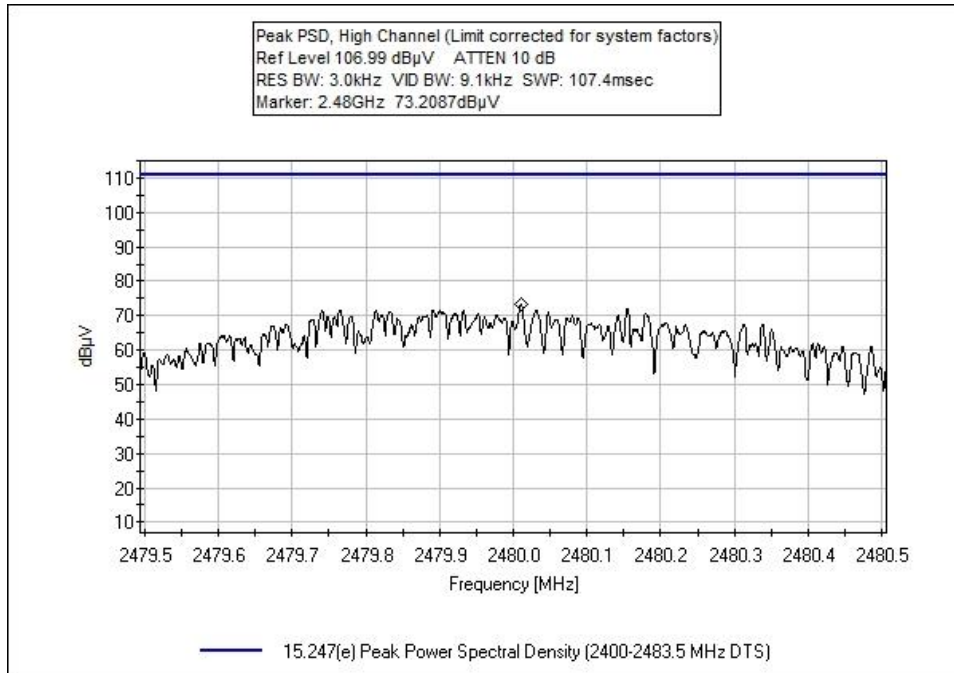
$$P(W) = \frac{(E \cdot d)^2}{30 G}$$

Or equivalently, in logarithmic form:

$$P(dBm) = E(dBuV/m) + 20LOG(d) - G - 104.77$$

Plots





Test Setup / Conditions / Data

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)
 Customer: **Medtronic Minimed**
 Specification: **15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**
 Work Order #: **109171** Date: 12/4/2023
 Test Type: **Radiated Scan** Time: 13:21:17
 Tested By: Matt Harrison Sequence#: 7
 Software: EMITest 5.03.20

Equipment Tested:

| Device | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 | | | |

Support Equipment:

| Device | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 | | | |

Test Conditions / Notes:

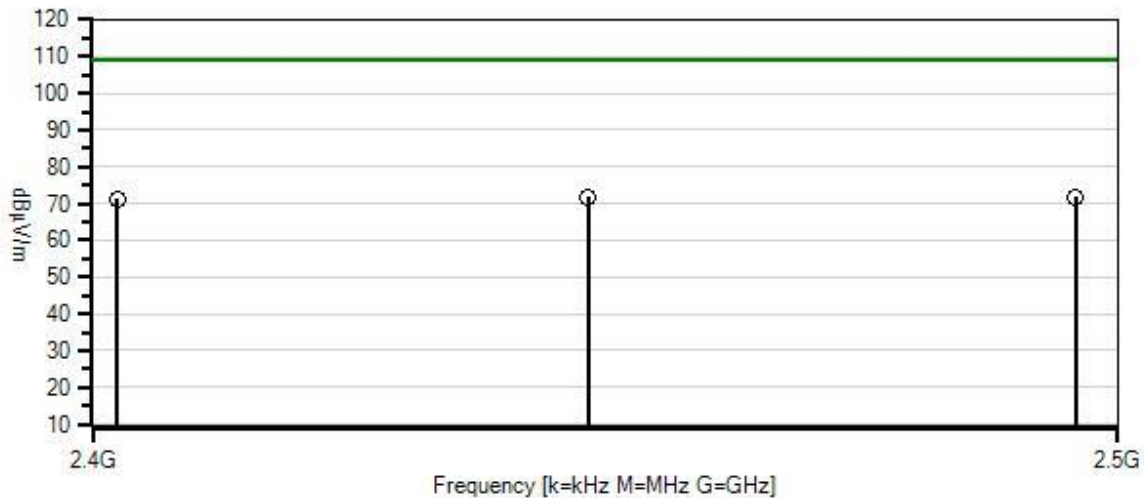
Test Environment Conditions:
 Temperature: 19°C
 Humidity: 43%
 Pressure: 101.2kPa

 Test Method: ANSI C63.10

 Frequency Range: Fundamental

 Setup: EUT is setup in a Tabletop configuration. It is 150cm high on a Styrofoam. X, Y, and Z axis investigated, worst-case data provided.

Medtronic Minimed W/O#: 109171 Sequence#: 7 Date: 12/4/2023
 15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS) Test Distance: 3 Meters Horiz



- Readings
- Peak Readings
- × QP Readings
- * Average Readings
- ▼ Ambient
- Software Version: 5.03.20
- 1 - 15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)

Test Equipment:

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|----|-------------|-------------------|-------------------|------------------|--------------|
| | AN02673 | Spectrum Analyzer | E4446A | 3/2/2023 | 3/2/2025 |
| T1 | AN03540 | Preamp | 83017A | 3/24/2023 | 3/24/2025 |
| T2 | AN02374ANSI | Horn Antenna | RGA-60 | 5/26/2023 | 5/26/2025 |
| T3 | ANP06515 | Cable | Heliac | 3/1/2023 | 3/1/2025 |
| T4 | ANP07504 | Cable | CLU40-KMKM-02.00F | 1/24/2023 | 1/24/2025 |
| T5 | ANP06011 | Cable | Heliac | 11/16/2023 | 11/16/2025 |

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

| # | Freq | Rdng | T1 | T2 | T3 | T4 | Dist | Corr | Spec | Margin | Polar |
|---|-----------|------|---------------|-------|------|------|-------|--------|--------|--------|-------|
| | MHz | dBµV | T5 | | | | Table | dBµV/m | dBµV/m | dB | Ant |
| 1 | 2440.010M | 73.7 | -34.6 +0.7 | +28.8 | +2.8 | +0.5 | +0.0 | 71.9 | 109.2 | -37.3 | Horiz |
| 2 | 2480.010M | 73.2 | -34.6 +0.7 | +29.0 | +2.9 | +0.5 | +0.0 | 71.7 | 109.2 | -37.5 | Horiz |
| 3 | 2402.011M | 73.2 | -34.6 +0.7 | +28.6 | +2.8 | +0.5 | +0.0 | 71.2 | 109.2 | -38.0 | Horiz |

Test Setup Photo(s)



Above 1GHz; View 1



Above 1GHz; View 2

Appendix A: Manufacturer Declaration

The following model has been tested: **Glucose Sensor Transmitter, RF ID: 033686**

RF ID: 033686 represents the hardware of our disposable all-in-one sensor, and transmitter medical device for Continuous Glucose Monitoring (CGM). The Glucose Sensor Transmitter (GST) platform includes a variety of different brand names and model numbers supporting different use cases.

The manufacturer declares that the following models are identical electrically or any differences between them do not affect their RF and EMC characteristics, and therefore meet the level of testing equivalent to the tested model.

| Glucose Sensor Transmitter (GST) | Brand name | Configuration |
|----------------------------------|---------------------|---------------|
| RF ID: 033686 | Disposable Sensor 5 | MMT-5100CLX |
| | Simplera™ | MMT-5100J |
| | Simplera Sync™ | MMT-5120 |

Note: The products identified in the table above have the same hardware but different software and firmware to function as components in different CGM systems. The GST models are used in a clinical (MMT-5100CLX), standalone (MMT-5100J), or integrated CGM insulin pump (MMT-5120) system.

All models above communicate with a compatible network device via Bluetooth Low Energy to provide glucose information for diabetes management. The software and firmware do not affect product radio or electromagnetic compatibility performance or compliance. Hardware documentation such as schematics, block diagram, printed circuit board and component layouts are identical between these models.

Additional configuration identifiers (e.g., A, B, 1, 2...) may be added to the base configuration number for inventory management/distribution purposes and pertain to different regions (US vs. OUS), packages (1-pack vs. 5-pack), and user guide language bundles.

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

| Uncertainty Value | Parameter |
|-------------------|---------------------------|
| 4.73 dB | Radiated Emissions |
| 3.34 dB | Mains Conducted Emissions |
| 3.30 dB | Disturbance Power |

Uncertainties reported are worst case for all CKC Laboratories’ sites and represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

| SAMPLE CALCULATIONS | | |
|---------------------|---------------------|----------|
| | Meter reading | (dBµV) |
| + | Antenna Factor | (dB/m) |
| + | Cable Loss | (dB) |
| - | Distance Correction | (dB) |
| - | Preamplifier Gain | (dB) |
| = | Corrected Reading | (dBµV/m) |

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

| MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE | | | |
|-------------------------------------------------------------------|----------------------------|-------------------------|--------------------------|
| TEST | BEGINNING FREQUENCY | ENDING FREQUENCY | BANDWIDTH SETTING |
| CONDUCTED EMISSIONS | 150 kHz | 30 MHz | 9 kHz |
| RADIATED EMISSIONS | 9 kHz | 150 kHz | 200 Hz |
| RADIATED EMISSIONS | 150 kHz | 30 MHz | 9 kHz |
| RADIATED EMISSIONS | 30 MHz | 1000 MHz | 120 kHz |
| RADIATED EMISSIONS | 1000 MHz | >1 GHz | 1 MHz |

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point, the measuring device is set into the linear mode and the scan time is reduced.