

Medtronic MiniMed

EMC TEST REPORT FOR

Simplera

Model: MMT-DSSOC*

*(See Appendix A for Manufacturers Declaration)

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.247

(DTS 2400-2483.5 MHz)

Report No.: 109793-3

Date of issue: May 16, 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: 6000019779

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:109793

April 15, 2024

April 15-16, 2024

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.

A handwritten signature in black ink that reads "Steve Behm".

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 2400-2483.5 MHz)

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 = The manufacturer declares this test not applicable because the EUT has an integral antenna.

NA2 = The manufacturer declares the EUT is battery operated.

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.

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-DSSOC	B352000339
Simplera	Medtronic MiniMed	MMT-DSSOC	B352000300
Simplera	Medtronic MiniMed	MMT-DSSOC	B352000611
Simplera	Medtronic MiniMed	MMT-DSSOC	B352000670
Simplera	Medtronic MiniMed	MMT-DSSOC	B352000609
Simplera	Medtronic MiniMed	MMT-DSSOC	B352000390
Simplera	Medtronic MiniMed	MMT-DSSOC	B352000361
Simplera	Medtronic MiniMed	MMT-DSSOC	B352000347
Simplera	Medtronic MiniMed	MMT-DSSOC	B352000687

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

General Product Information:

Description of EUT
Medical Device

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
Firmware / Software Version(s):	Sensor RF Test Utility 2.0A
Firmware / Software Description:	NA
Firmware / Software Setting(s):	NA
Tune-up or Adjustment(s):	NA
The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility.	

EUT Photo

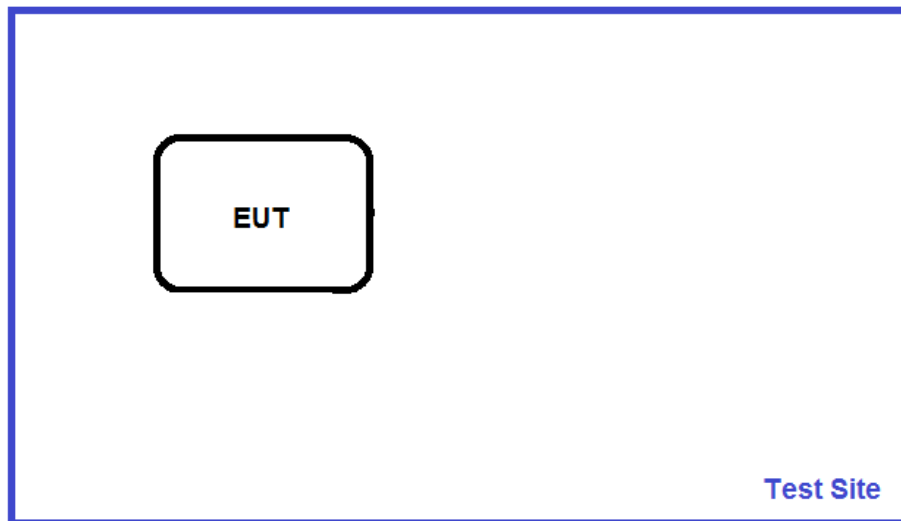


EUT

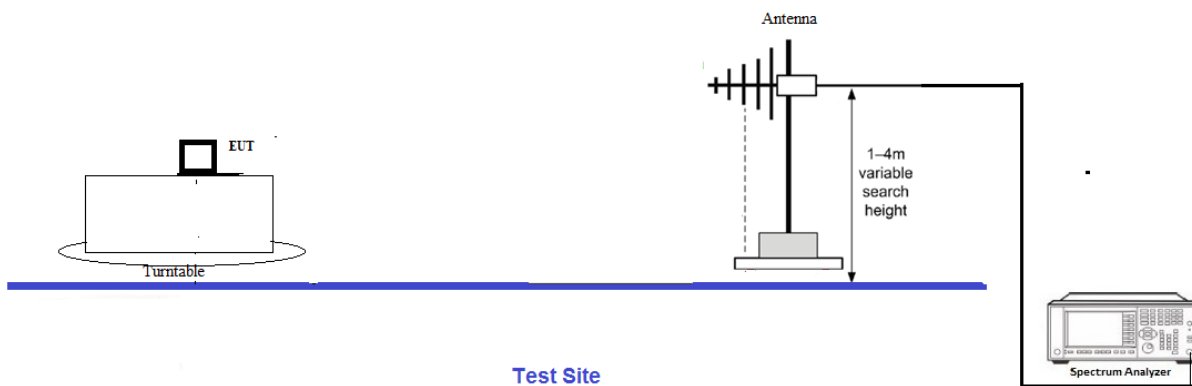
Block Diagram of Test Setup(s)

Config#	Setup Description of Block Diagram
1	EUT is on 1.5m foam block.

Test Setup Block Diagram



Radiated test setup



FCC Part 15 Subpart C

15.247(a)(2) 6dB Bandwidth

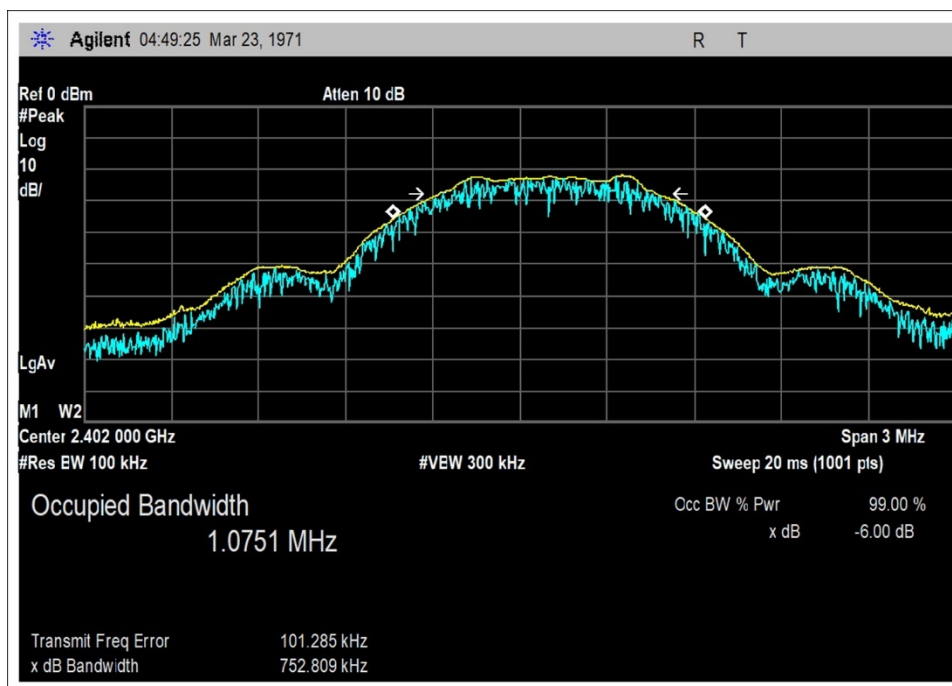
Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	C. Plumadore/S.Pittsford
Test Method:	ANSI C63.10 (2020), KDB 558074	Test Date(s):	4/15/2024
Configuration:	1		
Test Setup:	EUT is on 1.5m foam block transmitting continuously.		

Environmental Conditions			
Temperature (°C)	21.1	Relative Humidity (%):	40.9

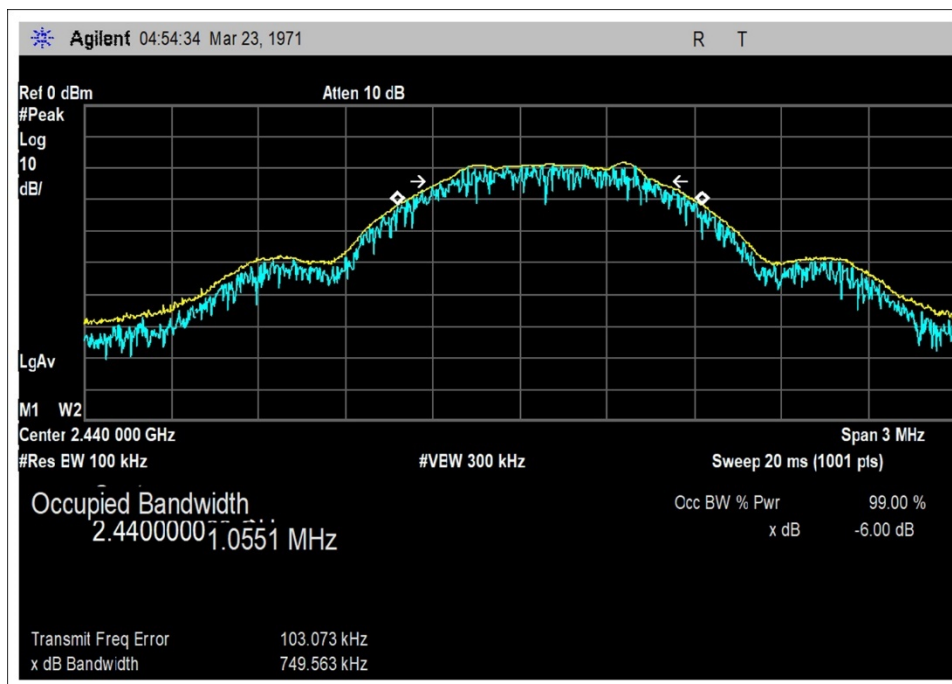
Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02673	Spectrum Analyzer	Agilent	E4446A	3/2/2023	3/2/2025
P06011	Cable	Andrew	Helix	11/16/2023	11/16/2025
P07504	Cable	TMS	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
03540	Preamplifier	HP	83017A	3/24/2023	3/24/2025
02374ANSI	Horn Antenna	Electrometrics	RGA-60	5/26/2023	5/26/2025
P06515	Cable	Andrews	Helix	2/28/2024	2/28/2026

Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
2402	1	GFSK	752.809	≥500	Pass
2440	1	GFSK	749.563	≥500	Pass
2480	1	GFSK	754.640	≥500	Pass

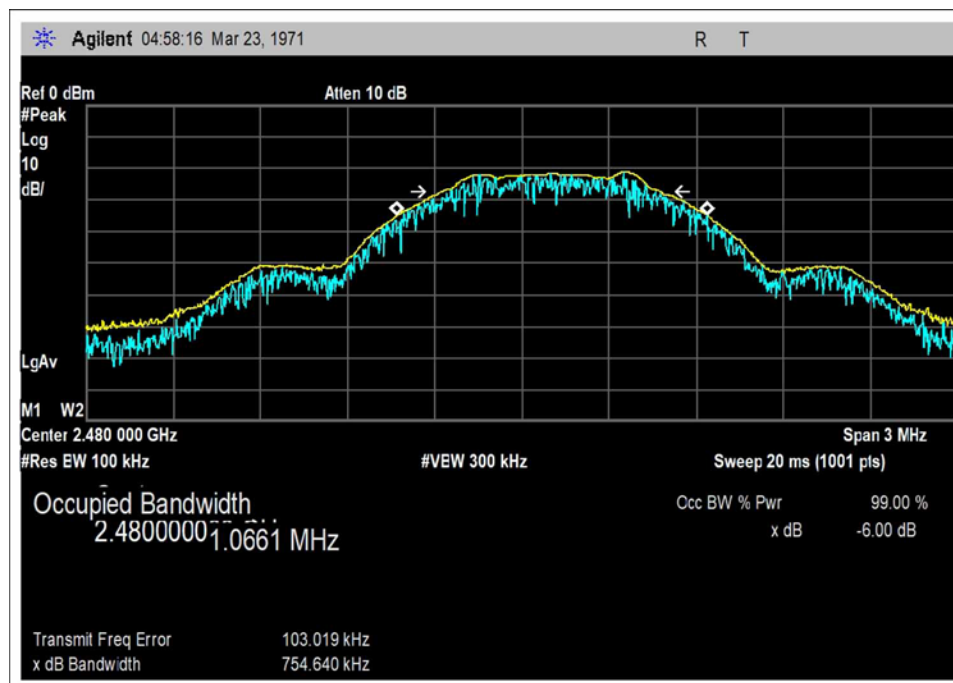
Plot(s)



Low Channel



Middle Channel



High Channel

Test Setup Photo(s)



Above 1GHz, Overall Test Setup

15.247(b)(3) Output Power

Test Setup / Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	S. Pittsford/C. Plumadore
Test Method:	ANSI C63.10 (2020), KDB 558074	Test Date(s):	4/15/2024
Configuration:	1		
Test Setup:	EUT is setup in a Tabletop configuration. It is 150cm high on a Styrofoam table. X, Y, and Z axis investigated; worst-case data provided.		

Environmental Conditions			
Temperature (°C)	21.1	Relative Humidity (%):	40.9

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02673	Spectrum Analyzer	Agilent	E4446A	3/2/2023	3/2/2025
P06011	Cable	Andrew	HeliAx	11/16/2023	11/16/2025
P07504	Cable	TMS	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
03540	Preamp	HP	83017A	3/24/2023	3/24/2025
02374ANSI	Horn Antenna	Electrometrics	RGA-60	5/26/2023	5/26/2025
P06515	Cable	Andrews	HeliAx	2/28/2024	2/28/2026

Test Data Summary - Voltage Variations

This equipment is battery powered. Power output tests were performed using a fresh battery.

Test Data Summary - RF Conducted Measurement							
Measurement Option: RBW > DTS Bandwidth							
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	RF Conducted (dBm)		EIRP (dBm)		Results
			Measured	Limit	Calculated	Limit	
2402	GFSK	Inverted F / -6 dBi	0.8	≤30	-5.2	≤36	Pass
2440	GFSK	Inverted F / -6 dBi	2.0	≤30	-4.0	≤36	Pass
2480	GFSK	Inverted F / -6 dBi	-0.3	≤30	-6.3	≤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.

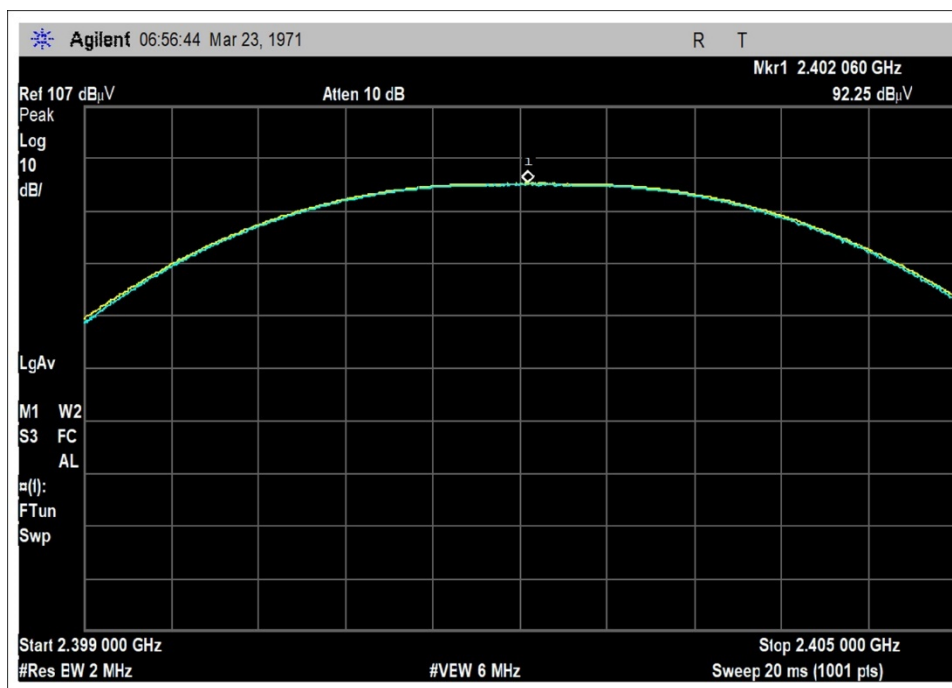
Conducted RF output power calculated in accordance with ANSI C63.10.

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

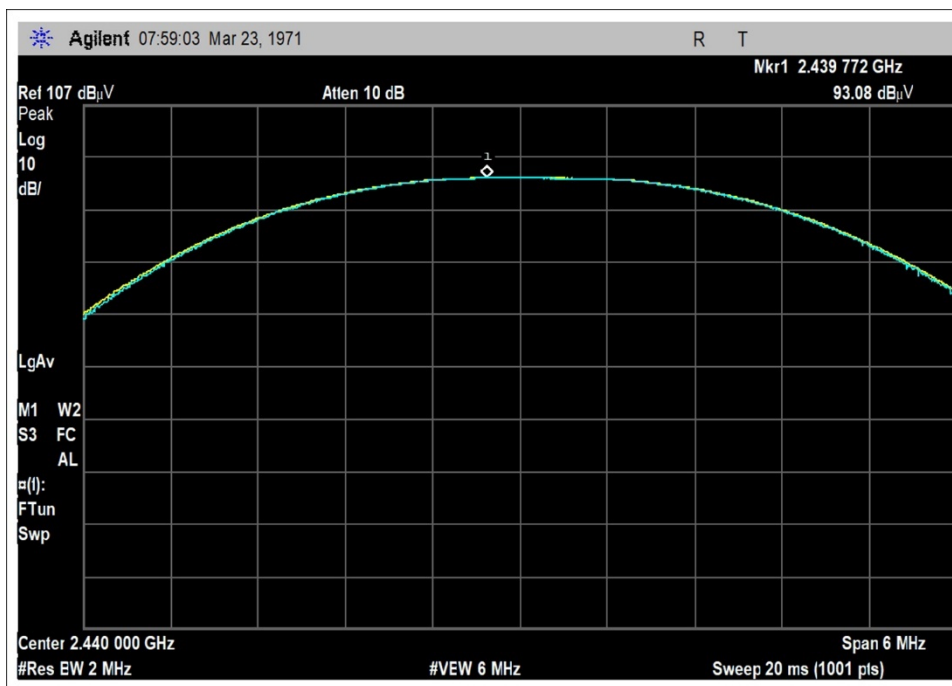
Or equivalently, in logarithmic form:

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

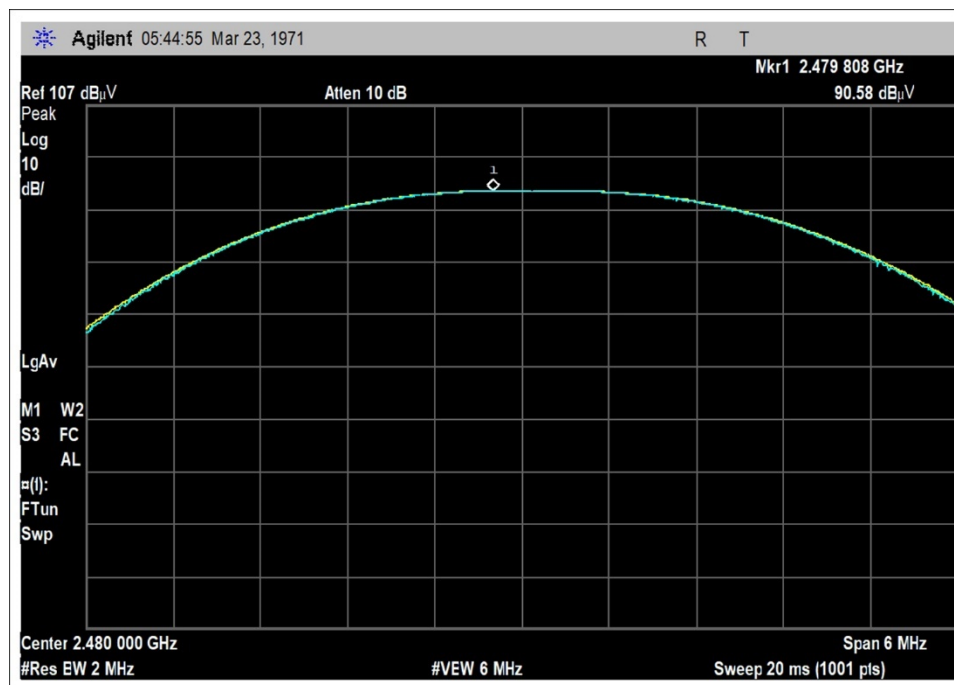
Plots



Low Channel



Middle Channel



High Channel

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717
 Customer: **Medtronic MiniMed**
 Specification: **15.247(b) Power Output (2400-2483.5 MHz DTS)**
 Work Order #: **109793** Date: 4/15/2024
 Test Type: **Radiated Scan** Time: 12:05:40
 Tested By: C. Plumadore Sequence#: 1
 Software: EMITest 5.03.20

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

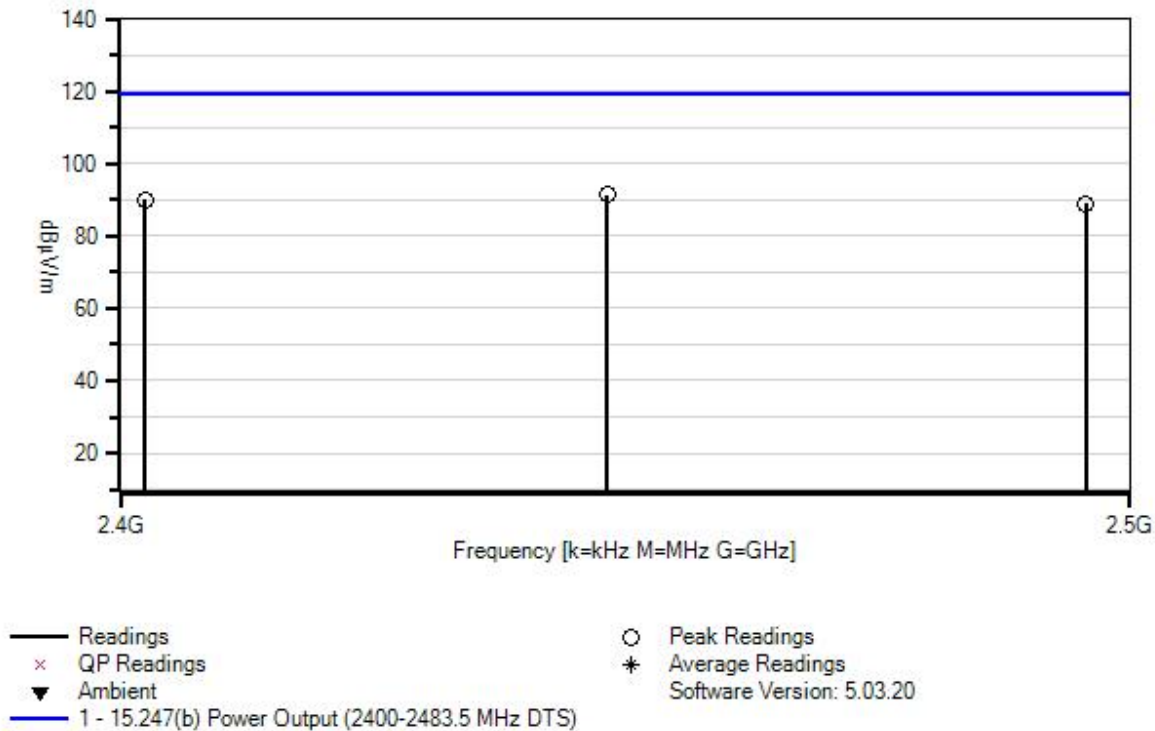
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

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

Medtronic MiniMed W/O#: 109793 Sequence#: 1 Date: 4/15/2024
15.247(b) Power Output (2400-2483.5 MHz DTS) Test Distance: 3 Meters Horiz



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03540	Preamp	83017A	3/24/2023	3/24/2025
T2	AN02374ANSI	Horn Antenna	RGA-60	5/26/2023	5/26/2025
T3	ANP06011	Cable	Heliac	11/16/2023	11/16/2025
T4	ANP06515	Cable	Heliac	2/28/2024	2/28/2026
T5	ANP07504	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	T5								
			dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	2439.886M	93.1	-34.6 +0.5	+28.8	+0.7	+2.7	+0.0	91.2	119.2	-28.0	Horiz
2	2402.060M	92.2	-34.6 +0.5	+28.6	+0.7	+2.6	+0.0	90.0	119.2	-29.2	Horiz
3	2479.808M	90.6	-34.6 +0.5	+29.0	+0.7	+2.7	+0.0	88.9	119.2	-30.3	Horiz

Test Setup Photo(s)



X Axis, 1.5m



Y Axis, 1.5m



Z Axis, 1.5m

15.247(d) Radiated Emissions & Band Edge

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	C. Plumadore/S. Pittsford
Test Method:	ANSI C63.10 (2020), KDB 558074	Test Date(s):	4/15/2024
Configuration:	1		

Environmental Conditions			
Temperature (°C)	21.6	Relative Humidity (%):	41

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717
 Customer: **Medtronic MiniMed**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **109793** Date: 4/16/2024
 Test Type: **Radiated Scan** Time: 12:11:01
 Tested By: C. Plumadore Sequence#: 3
 Software: EMITest 5.03.20

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

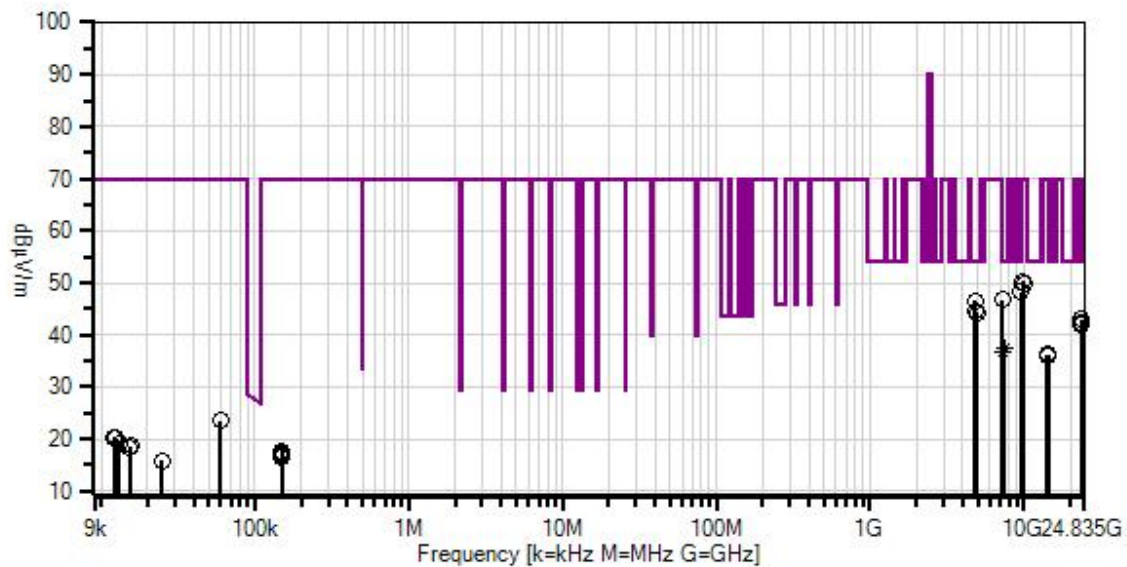
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

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

Medtronic MiniMed W/O#: 109793 Sequence#: 3 Date: 4/16/2024
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03540	Preamp	83017A	3/24/2023	3/24/2025
T2	AN02374ANSI	Horn Antenna	RGA-60	5/26/2023	5/26/2025
T3	ANP06011	Cable	Heliac	11/16/2023	11/16/2025
T4	ANP06515	Cable	Heliac	2/28/2024	2/28/2026
T5	ANP07504	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
T6	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026
T7	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	5/26/2023	5/26/2025
T8	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	11/18/2022	11/18/2024
T9	ANP07900	Cable	CLU40-KMKM-10.00F	8/8/2023	8/8/2025
T10	ANP07901	Cable	CLU40-KMKM-10.00F	8/8/2023	8/8/2025

T11	ANP07212	Cable	32026-29801-29801-18	5/1/2023	5/1/2025
T12	ANP07505	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
T13	AN02763-69	Waveguide	Multiple	1/9/2024	1/9/2026
T14	AN00052	Loop Antenna	6502	5/11/2022	5/11/2024

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9 T13	T2 T6 T10 T14	T3 T7 T11	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	4804.325M	41.6	-33.8 +0.3 +0.0 +0.0	+33.1 +0.0 +0.0 +0.0	+1.3 +0.0 +0.0 +0.0	+4.0 +0.0 +0.0 +0.0	+0.0	46.5	54.0 low	-7.5	Horiz
2	4880.000M	39.3	-33.8 +0.4 +0.0 +0.0	+33.4 +0.0 +0.0 +0.0	+1.2 +0.0 +0.0 +0.0	+3.9 +0.0 +0.0 +0.0	+0.0	44.4	54.0 Mid	-9.6	Horiz
3	4960.905M	38.9	-33.8 +0.5 +0.0 +0.0	+33.7 +0.0 +0.0 +0.0	+1.1 +0.0 +0.0 +0.0	+3.9 +0.0 +0.0 +0.0	+0.0	44.3	54.0 high	-9.7	Horiz
4	7442.090M Ave	27.8	-35.1 +0.7 +0.0 +0.0	+37.4 +0.0 +0.0 +0.0	+1.5 +0.0 +0.0 +0.0	+5.1 +0.0 +0.0 +0.0	+0.0	37.4	54.0 high	-16.6	Horiz
^	7442.090M	39.1	-35.1 +0.7 +0.0 +0.0	+37.4 +0.0 +0.0 +0.0	+1.5 +0.0 +0.0 +0.0	+5.1 +0.0 +0.0 +0.0	+0.0	48.7	54.0 high	-5.3	Horiz
6	7320.000M Ave	27.5	-35.1 +0.6 +0.0 +0.0	+37.2 +0.0 +0.0 +0.0	+1.5 +0.0 +0.0 +0.0	+5.0 +0.0 +0.0 +0.0	+0.0	36.7	54.0 mid	-17.3	Horiz
^	7320.000M	38.7	-35.1 +0.6 +0.0 +0.0	+37.2 +0.0 +0.0 +0.0	+1.5 +0.0 +0.0 +0.0	+5.0 +0.0 +0.0 +0.0	+0.0	47.9	54.0 Mid	-6.1	Horiz
8	9760.000M	38.7	-34.4 +0.8 +0.0 +0.0	+38.0 +0.0 +0.0 +0.0	+1.4 +0.0 +0.0 +0.0	+5.8 +0.0 +0.0 +0.0	+0.0	50.3	70.0 Mid	-19.7	Horiz
9	9919.555M	37.9	-34.4 +0.9 +0.0 +0.0	+38.2 +0.0 +0.0 +0.0	+1.4 +0.0 +0.0 +0.0	+5.8 +0.0 +0.0 +0.0	+0.0	49.8	70.0 high	-20.2	Horiz

10	9609.200M	36.6	-34.5 +0.9 +0.0 +0.0	+37.9 +0.0 +0.0 +0.0	+1.5 +0.0 +0.0 +0.0	+5.9 +0.0 +0.0 +0.0	+0.0	48.3	70.0 low	-21.7	Horiz
11	7206.480M	38.1	-35.0 +0.6 +0.0 +0.0	+36.7 +0.0 +0.0 +0.0	+1.4 +0.0 +0.0 +0.0	+4.9 +0.0 +0.0 +0.0	+0.0	46.7	70.0 low	-23.3	Horiz
12	23544.000 M	40.5	+0.0 +0.0 +5.7 +2.5	+0.0 +0.0 +5.7 +0.0	+0.0 +0.0 +1.6 +0.0	+0.0 -14.5 +1.5 +0.0	+0.0	43.0	70.0 mid	-27.0	Horiz
13	23495.000 M	39.9	+0.0 +0.0 +5.7 +2.5	+0.0 +0.0 +5.7 +0.0	+0.0 +0.0 +1.6 +0.0	+0.0 -14.7 +1.5 +0.0	+0.0	42.2	70.0 low	-27.8	Horiz
14	23509.000 M	39.4	+0.0 +0.0 +5.7 +2.5	+0.0 +0.0 +5.7 +0.0	+0.0 +0.0 +1.6 +0.0	+0.0 -14.6 +1.5 +0.0	+0.0	41.8	70.0 high	-28.2	Horiz
15	14408.000 M	41.9	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+1.7 -14.7 +0.0 +0.0	+7.4 +0.0 +0.0 +0.0	+0.0	36.3	70.0 low	-33.7	Horiz
16	14176.000 M	42.3	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+1.6 -15.0 +0.0 +0.0	+7.2 +0.0 +0.0 +0.0	+0.0	36.1	70.0 Mid	-33.9	Horiz
17	14224.000 M	41.9	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+1.6 -15.0 +0.0 +0.0	+7.3 +0.0 +0.0 +0.0	+0.0	35.8	70.0 high	-34.2	Horiz
18	60.000k	53.9	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +9.6	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	-40.0	23.5	70.0 Mid	-46.5	perp
19	12.571k	45.2	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +15.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	-40.0	20.2	70.0 Mid	-49.8	perp
20	12.146k	45.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +15.1	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	-40.0	20.1	70.0 low	-49.9	paral
21	13.138k	44.4	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +14.8	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	-40.0	19.2	70.0 high	-50.8	paral
22	15.547k	44.7	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +13.9	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	-40.0	18.6	70.0 Mid	-51.4	Paral

23	15.406k	44.5	+0.0	+0.0	+0.0	+0.0	-40.0	18.5	70.0	-51.5	perp
			+0.0	+0.0	+0.0	+0.0			low		
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+14.0							
24	150.000k	48.3	+0.0	+0.0	+0.0	+0.0	-40.0	17.7	70.0	-52.3	paral
			+0.0	+0.0	+0.0	+0.0			low		
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+9.4							
25	150.000k	47.8	+0.0	+0.0	+0.0	+0.0	-40.0	17.2	70.0	-52.8	paral
			+0.0	+0.0	+0.0	+0.0			high		
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+9.4							
26	150.000k	47.6	+0.0	+0.0	+0.0	+0.0	-40.0	17.0	70.0	-53.0	Paral
			+0.0	+0.0	+0.0	+0.0			Mid		
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+9.4							
27	150.000k	47.2	+0.0	+0.0	+0.0	+0.0	-40.0	16.6	70.0	-53.4	perp
			+0.0	+0.0	+0.0	+0.0			high		
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+9.4							
28	150.000k	47.0	+0.0	+0.0	+0.0	+0.0	-40.0	16.4	70.0	-53.6	perp
			+0.0	+0.0	+0.0	+0.0			low		
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+9.4							
29	24.757k	44.0	+0.0	+0.0	+0.0	+0.0	-40.0	15.9	70.0	-54.1	perp
			+0.0	+0.0	+0.0	+0.0			high		
			+0.0	+0.0	+0.0	+0.0					
			+0.0	+11.9							

Band Edge

Band Edge Summary

Limit applied at restricted bands: 15.209

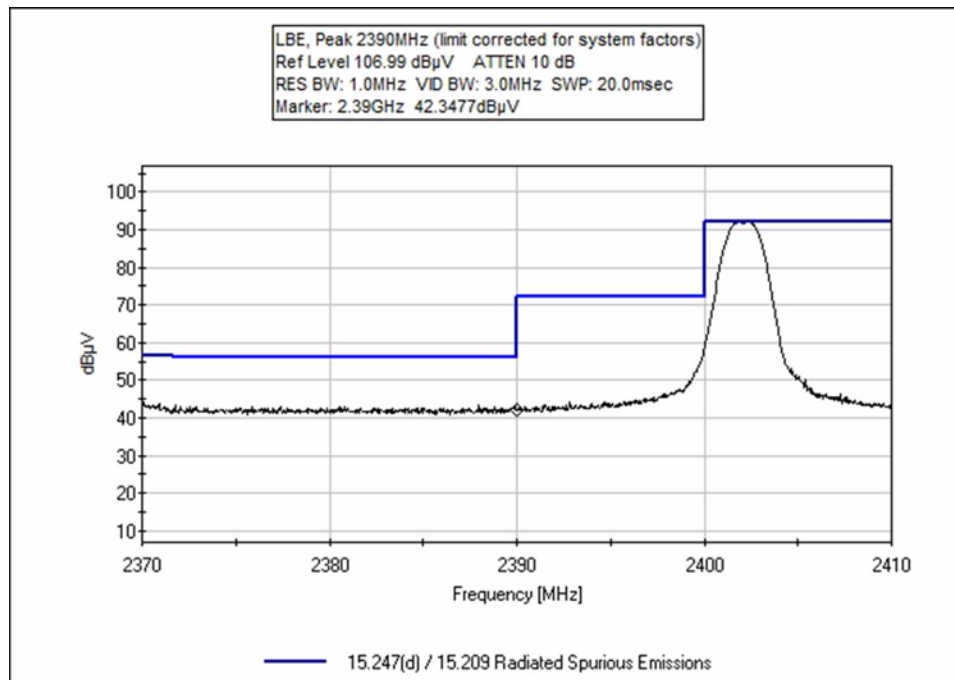
Limit applied for other than restricted bands: Max Power/100kHz - 20dB.

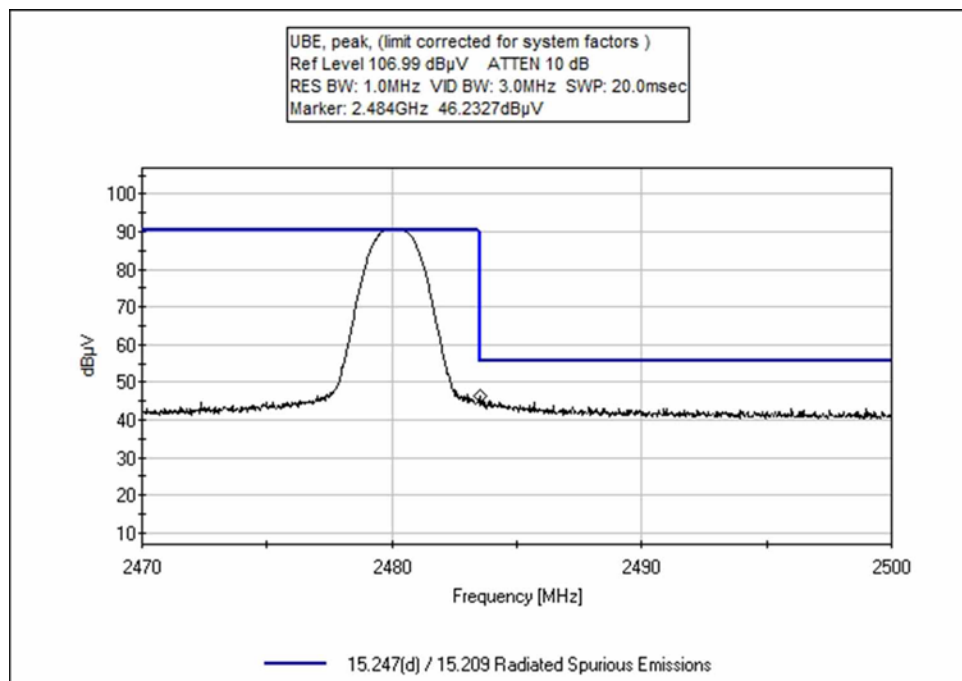
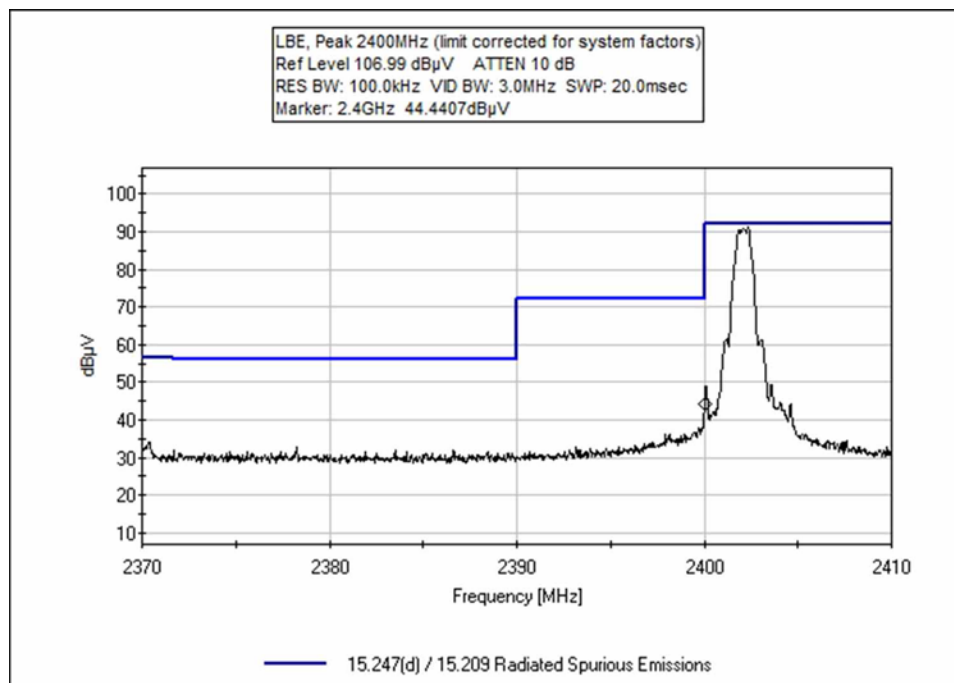
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Average (dBuV/m @3m)		Peak (dBuV/m @3m)		Results
			Measured	Limit	Measured	Limit	
2390.0	GFSK	Inverted F / - 6 dBi	NA1	≤54	40.0	≤74	Pass
2400.0	GFSK	Inverted F / - 6 dBi	NA2	NA2	42.2	≤70	Pass
2483.5	GFSK	Inverted F / - 6 dBi	NA1	≤54	44.5	≤74	Pass

Notes:

NA1	Peak measurement meets average limit.
NA2	Average limit not applicable when applying 20dBc limit.
NA3	Peak limit not applicable when applying 30dBc limit.

Band Edge Plots





Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717
 Customer: **Medtronic MiniMed**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **109793** Date: 4/15/2024
 Test Type: **Radiated Scan** Time: 11:26:43
 Tested By: C. Plumadore Sequence#: 2
 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:

BE Data

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03540	Preamp	83017A	3/24/2023	3/24/2025
T2	AN02374ANSI	Horn Antenna	RGA-60	5/26/2023	5/26/2025
T3	ANP06011	Cable	Heliac	11/16/2023	11/16/2025
T4	ANP06515	Cable	Heliac	2/28/2024	2/28/2026
T5	ANP07504	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
T6	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026

Measurement Data:

Reading listed by margin.

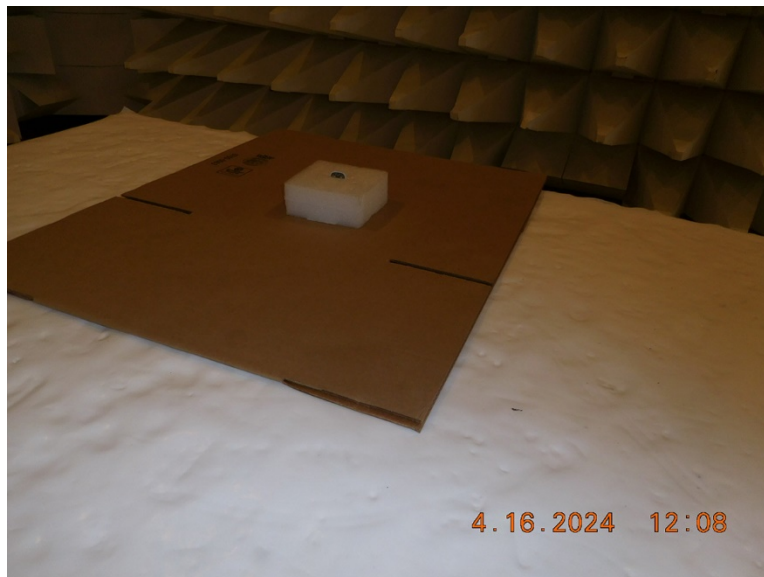
Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	2483.500M	46.2	-34.6 +0.5	+29.0 +0.0	+0.7	+2.7	+0.0	44.5	54.0	-9.5	Horiz
2	2390.000M	42.3	-34.6 +0.5	+28.5 +0.0	+0.7	+2.6	+0.0	40.0	54.0	-14.0	Horiz
3	2400.000M	44.4	-34.6 +0.5	+28.6 +0.0	+0.7	+2.6	+0.0	42.2	70.0	-27.8	Horiz

Test Setup Photo(s)



Below 1GHz, X Axis



Below 1GHz, Y Axis



Below 1GHz, Z Axis



X Axis, 1.5m



Y Axis, 1.5m



Z Axis, 1.5m

15.247(e) Power Spectral Density

Test Setup / Conditions / Data			
Test Location:	Bothell Lab C3	Test Engineer:	C. Plumadore/S. Pittsford
Test Method:	ANSI C63.10 (2020), KDB 558074	Test Date(s):	4/15/2024
Configuration:	1		
Test Setup:	EUT is setup in a Tabletop configuration. It is 150cm high on a Styrofoam table. X, Y, and Z axis investigated; worst-case data provided.		

Environmental Conditions			
Temperature (°C)	21.6	Relative Humidity (%):	41

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02673	Spectrum Analyzer	Agilent	E4446A	3/2/2023	3/2/2025
P06011	Cable	Andrew	Heliac	11/16/2023	11/16/2025
P07504	Cable	TMS	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
03540	Preamp	HP	83017A	3/24/2023	3/24/2025
02374ANSI	Horn Antenna	Electrometrics	RGA-60	5/26/2023	5/26/2025
P06515	Cable	Andrews	Heliac	2/28/2024	2/28/2026

PSD 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	-6	73.0	-16.2	≤8	Pass
2440	GFSK	-6	74.5	-14.7	≤8	Pass
2480	GFSK	-6	72.3	-16.9	≤8	Pass

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

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

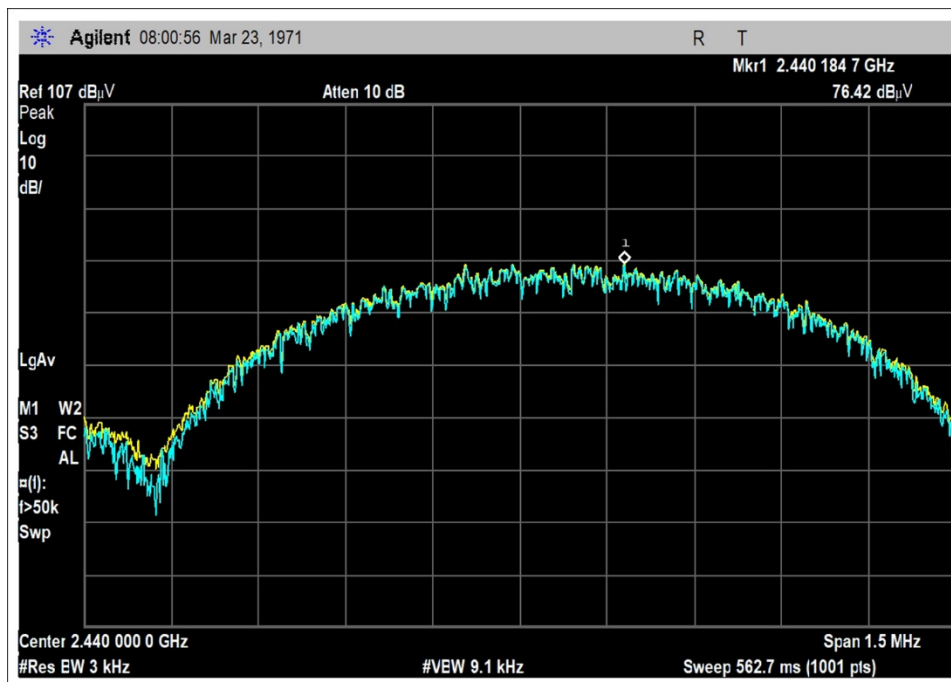
Or equivalently, in logarithmic form:

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

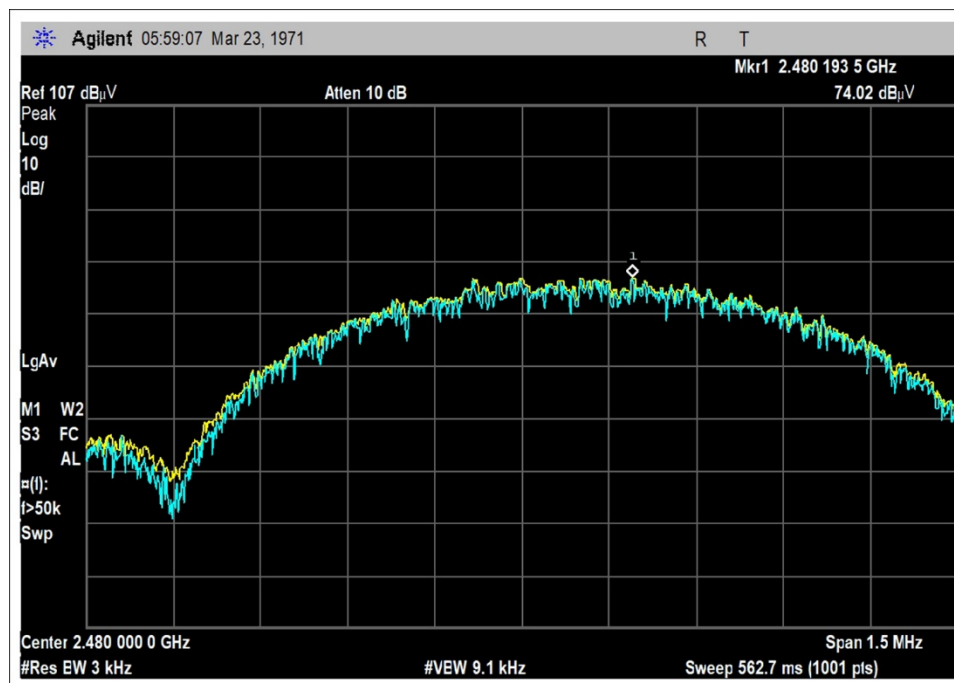
Plots



Low Channel



Middle Channel



High Channel

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717
 Customer: **Medtronic MiniMed**
 Specification: **15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**
 Work Order #: **109793** Date: 4/15/2024
 Test Type: **Radiated Scan** Time: 12:07:36
 Tested By: C. Plumadore Sequence#: 2
 Software: EMITest 5.03.20

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

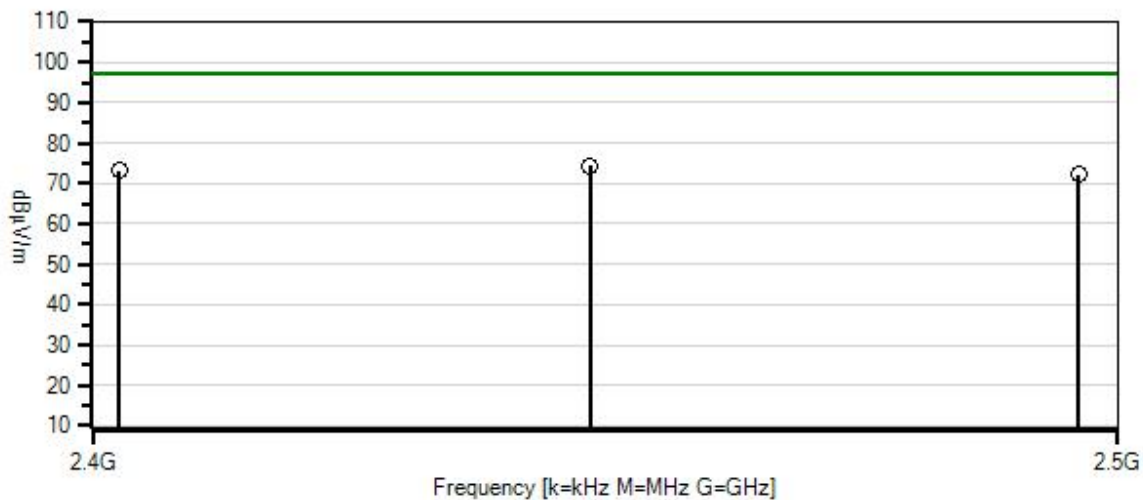
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

PSD Data

Medtronic MiniMed W/O#: 109793 Sequence#: 2 Date: 4/15/2024
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
T1	AN03540	Preamp	83017A	3/24/2023	3/24/2025
T2	AN02374ANSI	Horn Antenna	RGA-60	5/26/2023	5/26/2025
T3	ANP06011	Cable	Heliac	11/16/2023	11/16/2025
T4	ANP06515	Cable	Heliac	2/28/2024	2/28/2026
T5	ANP07504	Cable	CLU40-KMKM-02.00F	1/19/2024	1/19/2026
	AN02673	Spectrum Analyzer	E4446A	3/8/2024	3/8/2026

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	2440.185M	76.4	-34.6 +0.5	+28.8	+0.7	+2.7	+0.0	74.5	97.2	-22.7	Horiz
2	2402.183M	75.2	-34.6 +0.5	+28.6	+0.7	+2.6	+0.0	73.0	97.2	-24.2	Horiz
3	2480.194M	74.0	-34.6 +0.5	+29.0	+0.7	+2.7	+0.0	72.3	97.2	-24.9	Horiz

Test Setup Photo(s)



X Axis, 1.5m



Y Axis, 1.5m



Z Axis, 1.5m

APPENDIX A: Manufacturer Declaration

The following model has been tested by CKC Laboratories:
Simplera, Glucose Sensor Transmitter, MMT-DSSOC

MMT-DSSOC represents the hardware of our disposable all-in-one server, sensor, and transmitter medical device for Continuous Glucose Monitoring (CGM). The Glucose Sensor Transmitter 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	Brand name	Configuration
MMT-DSSOC	Simplera™	MMT-5100JX
		MMT-5200
		MMT-5200CLX

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.

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 and user guide language bundles.

Supplemental Information

Measurement Uncertainty

Uncertainty Value	Parameter
5.77 dB	Radiated Emissions
0.673 dB	RF Conducted Measurements
5.77×10^{-10}	Frequency Deviation
0.00005 s	Time Deviation
3.18 dB	Mains Conducted Emissions

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 $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ 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	($\text{dB}\mu\text{V}$)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	($\text{dB}\mu\text{V}/\text{m}$)

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.

End of Report