# Medtronic Inc.

## Interstim Model 3537 (PTM)

**Report #: MDTR0153**

Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

# Certificate of Test

**Last Date of Test: April 9, 2012**
**Medtronic Inc.**
**Model: Interstim Model 3537 (PTM)**

## Emissions

| Test Description | Specification | Test Method | Pass/Fail |
|---|---|---|---|
| Channel Spacing | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |
| Dwell Time | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |
| Number of Hopping Frequencies | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |
| Occupied Bandwidth | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |
| Output Power | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |
| Band Edge Compliance | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |
| Band Edge - Hopping Mode | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |
| Spurious Conducted Emissions | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |
| Power Spectral Density | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |
| Duty Cycle | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |
| Spurious Radiated Emissions | FCC 15.247:2012 | ANSI C63.10:2009 | **Pass** |

## Deviations From Test Standards

**None**

## Approved By:

*Tim O'Shea, Operations Manager*

**NVLAP Lab Code: 200881-0**

***Test Facility***

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
9349 W Broadway Ave.
Brooklyn Park, MN 55445

Phone: (763) 425-2281 Fax: (763) 424-3469

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834E-1).

***This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.***

***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. This Report may only be duplicated in its entirety. 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.***

# Revision History

| Revision Number | Description | Date | Page Number |
|---|---|---|---|
| 00 | None | | |

## 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 -** Accredited by A2LA to ISO / IEC Guide 65 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

**NVLAP -** Each laboratory is accredited by NVLAP to ISO 17025. The scope includes radio, ITE, and medical standards from around the world. See: http://www.nwemc.com/accreditations/

## Canada

**IC -** Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

## European Union

**European Commission –** Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

## Australia/New Zealand

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

## Korea

**KCC / 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.

## Hong Kong

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

## Vietnam

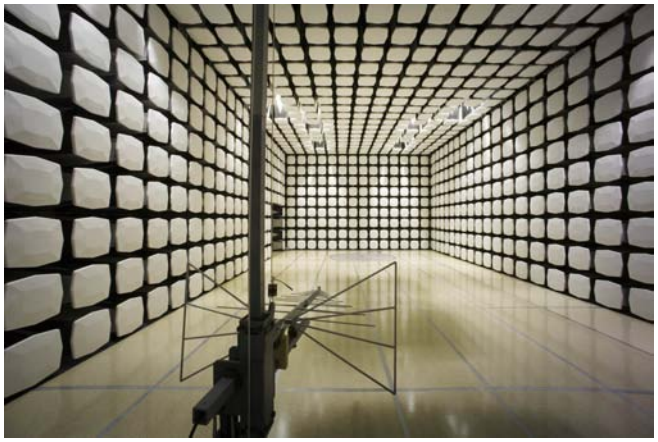
**MIC –** Recognized by MIC as a CAB for the acceptance of test data.

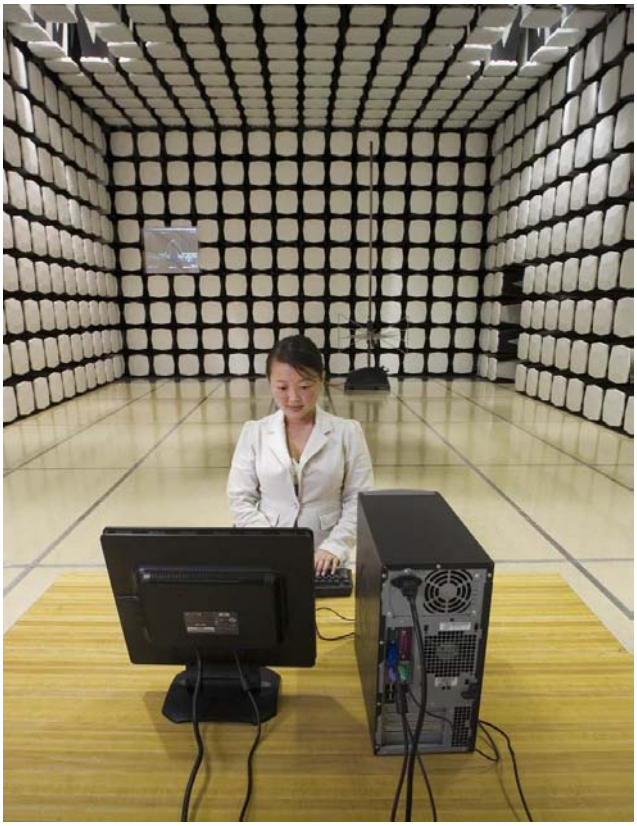
## Russia

**GOST –** Accredited by Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC to perform EMC and Hygienic testing for Information Technology products to GOST standards**.**

# Locations

| Oregon | California | New York | Minnesota | Washington |
|---|---|---|---|---|
| Labs EV01-EV12<br>22975 NW Evergreen Pkwy, #400<br>Hillsboro, OR 97124<br>(503) 844-4066 | Labs OC01-OC13<br>41 Tesla<br>Irvine, CA 92618<br>(949) 861-8918 | Labs WA01-WA04<br>4939 Jordan Rd.<br>Elbridge, NY 13060<br>(315) 685-0796 | Labs MN01-MN08<br>9349 W Broadway Ave.<br>Brooklyn Park, MN 55445<br>(763) 425-2281 | Labs SU01-SU07<br>14128 339th Ave. SE<br>Sultan, WA 98294<br>(360) 793-8675 |
| **VCCI** | | | | |
| C-1071, R-1025, G-84,<br>C-2687, T-1658, R-2318 | R-1943, G-85,<br>C-2766, T-1659, G-548 | | R-3125, G-86,<br>G-141, C-3464, T-1634 | R-871, G-83,<br>C-3265, T-1511 |
| **Industry Canada** | | | | |
| 2834D-1, 2834D-*2* | 2834B-1, 2834B-2, 2834B-3 | | 2834E-1 | 2834C-1 |





# Product Description

## Client and Equipment Under Test (EUT) Information

| | |
|---|---|
| **Company Name:** | Medtronic Inc. |
| **Address:** | 710 Medtronic Parkway, LS250 |
| **City, State, Zip:** | Fridley, MN 55432 |
| **Test Requested By:** | Paul Wood |
| **Model:** | Interstim Model 3537 (PTM) |
| **First Date of Test:** | April 09, 2012 |
| **Last Date of Test:** | April 09, 2012 |
| **Receipt Date of Samples:** | April 09, 2012 |
| **Equipment Design Stage:** | Production |
| **Equipment Condition:** | No Damage |

## Information Provided by the Party Requesting the Test

| **Functional Description of the EUT (Equipment Under Test):** |
|---|
| Bluetooth radio installed in Interstim medical device. |

| **Testing Objective:** |
|---|
| To demonstrate compliance to FCC 15.247 requirements. |

# Configurations

## Configuration 1 MDTR0153

| Software/Firmware Running during test | |
|---|---|
| **Description** | **Version** |
| ptm_ptm3_emi_emc_app_bt_telm_1_2.hex | 2.0 |

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Interstim PTM3 | Medtronic Inc. | 3537 | NLD001577N |

| Peripherals in test setup boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Laptop | Dell | Precision M4400 | 6356184841 |
| Laptop Supply | Dell | DA130PE1-00 | CN-OJU012-48661-9CS-2ZK1-A03 |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| SMA to L Coax | Yes | 0.3m | No | Interstim PTM3 | Measurement Cable |
| AC Power | No | 1.94m | No | Laptop Supply | AC Power |
| DC Power | No | 1.76m | Yes | Laptop | Laptop Supply |
| USB to PTM | No | 2.46m | No | Laptop | Interstim PTM3 |
| **PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.** | | | | | |

## Configuration 2 MDTR0153

| Software/Firmware Running during test | |
|---|---|
| **Description** | **Version** |
| ptm_ptm3_emi_emc_app_bt_telm_1_2.hex | 2.0 |

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Interstim PTM3 | Medtronic Inc. | 3537 | NLD001577N |

# Modifications

## Equipment Modifications

| Item | Date | Test | Modification | Note | Disposition of EUT |
|---|---|---|---|---|---|
| 1 | 4/9/2012 | Spurious Radiated Emissions | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 2 | 4/9/2012 | Power Spectral Density | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 3 | 4/9/2012 | Output Power | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 4 | 4/9/2012 | Occupied Bandwidth | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 5 | 4/9/2012 | Band Edge - Hopping Mode | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 6 | 4/9/2012 | Band Edge Compliance | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 7 | 4/9/2012 | Spurious Conducted Emissions | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 8 | 4/9/2012 | Duty Cycle | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 9 | 4/9/2012 | Channel Spacing | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 10 | 4/9/2012 | Dwell Time | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 11 | 4/9/2012 | Number of Hopping Frequencies | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | Scheduled testing was completed. |

# Channel Spacing

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.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Attenuator - 20db, 'SMA' | SM Electronics | SA26B-20 | RFW | 6/2/2011 | 12 |
| 40 GHz DC block | Fairview Microwave | SD3379 | AMI | 10/12/2011 | 12 |
| Signal Generator | Agilent | N5183A | TIA | 1/27/2012 | 12 |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Frequency Accuracy: +0.12/- 0.01) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

The channel carrier frequencies in the 2400-2483.5MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Or, if the output power is less than 125 mW, the channel separation can be 25 kHz or 2/3 of the 20dB bandwidth. The EUT was operated in pseudorandom hopping mode. The spectrum was scanned across two adjacent peaks. The separation between the peaks of these channels was measured.

# Channel Spacing

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Interstim Model 3537 (PTM) | | | **Work Order:** | MDTR0153 |
| **Serial Number:** | NLD001577N | | | **Date:** | 04/09/12 |
| **Customer:** | Medtronic Inc. | | | **Temperature:** | 22.83°C |
| **Attendees:** | Paul Wood | | | **Humidity:** | 17% |
| **Project:** | None | | | **Barometric Pres.:** | 1019.5 |
| **Tested by:** | Trevor Buls | **Power:** | Battery | **Job Site:** | MN05 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Payload size was set to 1024. Tx/Rx Mode: PRBS9.

**DEVIATIONS FROM TEST STANDARD**

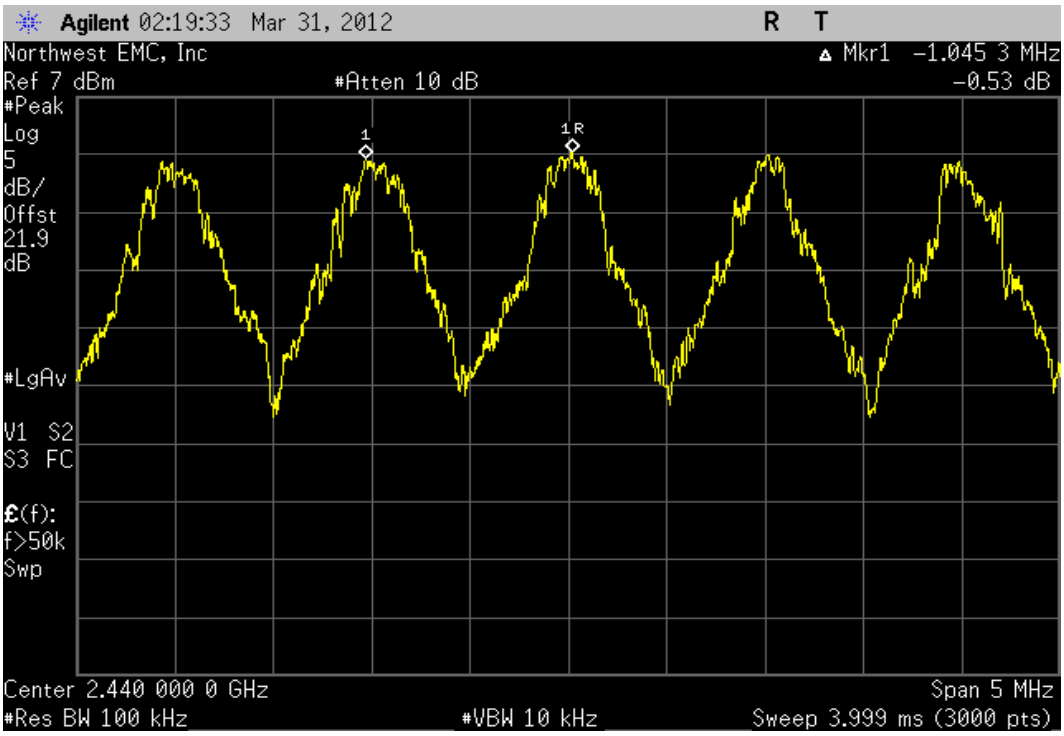
None

| Configuration # | 1 | Signature | Trevor Buls |
|---|---|---|---|

| | Value | Limit | Result |
|---|---|---|---|
| Hopping Mode | 1.0 MHz | ≥ 1 MHz | Pass |

# Channel Spacing

| Hopping Mode | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Value | Limit | Result |
| | | | | 1.0 MHz | ≥ 1 MHz | Pass |



# Dwell Time

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.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| 40 GHz DC block | Fairview Microwave | SD3379 | AMI | 10/12/2011 | 12 |
| Attenuator - 20db, 'SMA' | SM Electronics | SA26B-20 | RFW | 6/2/2011 | 12 |
| Signal Generator | Agilent | N5183A | TIA | 1/27/2012 | 12 |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Frequency Accuracy: +0.12/- 0.01) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

# Dwell Time

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Interstim Model 3537 (PTM) | | | **Work Order:** | MDTR0153 |
| **Serial Number:** | NLD001577N | | | **Date:** | 04/09/12 |
| **Customer:** | Medtronic Inc. | | | **Temperature:** | 22.83°C |
| **Attendees:** | Paul Wood | | | **Humidity:** | 17% |
| **Project:** | None | | | **Barometric Pres.:** | 1019.5 |
| **Tested by:** | Trevor Buls | **Power:** | Battery | **Job Site:** | MN05 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Payload size was set to DH5: 339, 2DH5, 3DH5: 986. Tx/Rx Mode: PRBS9. Limit is based on a time domain of 0.4 Seconds * Number of Hopping Channels (79) = 31.6 sec. Scale factor is based on 12.64 sec window * 2.5 = 31.6 sec.

**DEVIATIONS FROM TEST STANDARD**

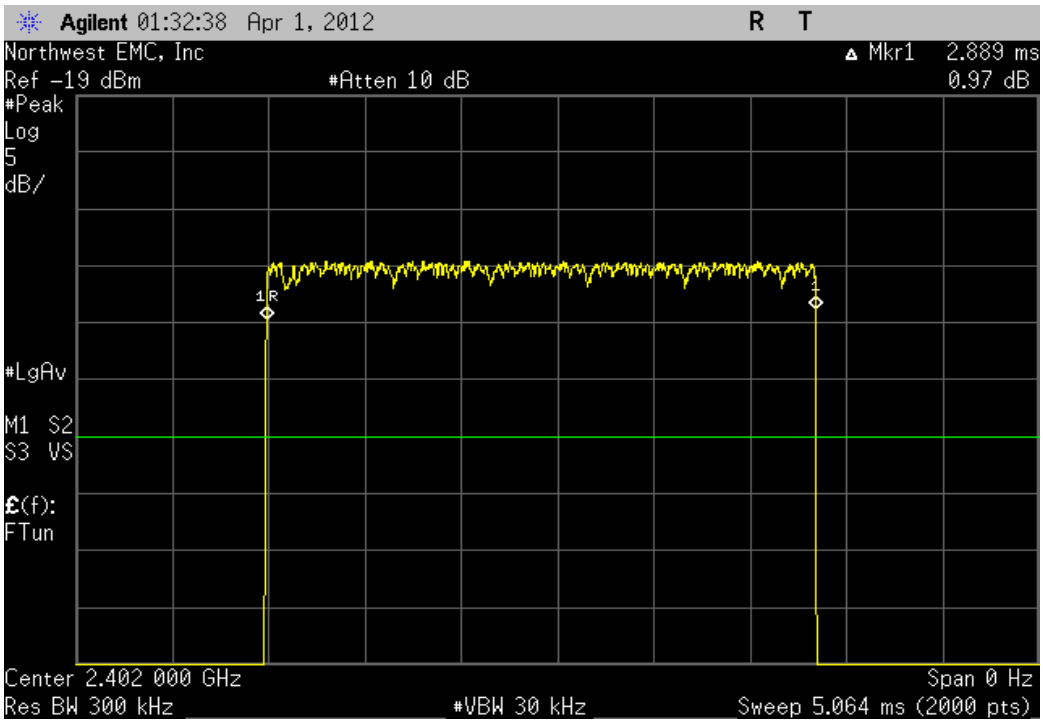
None

| Configuration # | 1 | Signature | Trevor Buls |
|---|---|---|---|

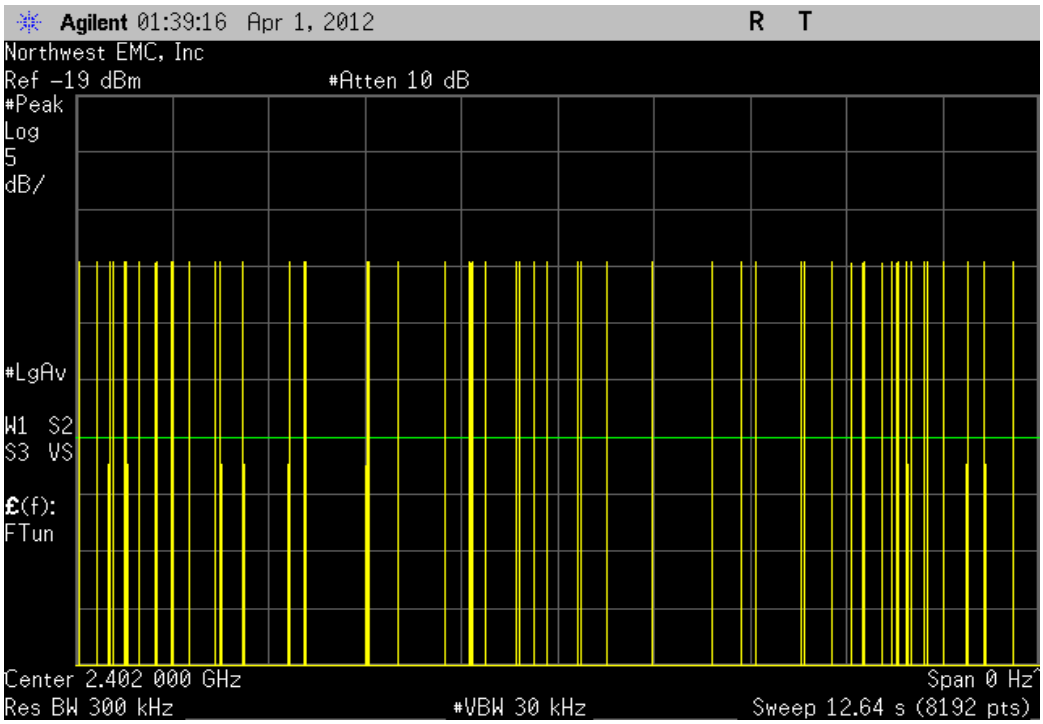
| | | Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
|---|---|---|---|---|---|---|---|---|
| DH5, GFSK | | | | | | | | |
| | Low Channel | 2.889 | 1 | N/A | N/A | 2.889 | 400 | Pass |
| | Low Channel | 2.889 | 50 | 144.45 | 2.5 | 361.125 | 400 | Pass |
| | Mid Channel | 2.892 | 1 | N/A | N/A | 2.892 | 400 | Pass |
| | Mid Channel | 2.892 | 47 | 135.924 | 2.5 | 339.81 | 400 | Pass |
| | High Channel | 2.889 | 1 | N/A | N/A | 2.889 | 400 | Pass |
| | High Channel | 2.889 | 52 | 150.228 | 2.5 | 375.57 | 400 | Pass |
| 2DH5, 4-DQPSK | | | | | | | | |
| | Low Channel | 2.892 | 1 | N/A | N/A | 2.892 | 400 | Pass |
| | Low Channel | 2.892 | 51 | 147.492 | 2.5 | 368.73 | 400 | Pass |
| | Mid Channel | 2.895 | 1 | N/A | N/A | 2.895 | 400 | Pass |
| | Mid Channel | 2.895 | 47 | 136.065 | 2.5 | 340.1625 | 400 | Pass |
| | High Channel | 2.892 | 1 | N/A | N/A | 2.892 | 400 | Pass |
| | High Channel | 2.892 | 45 | 130.14 | 2.5 | 325.35 | 400 | Pass |
| 3DH5, 8-DPSK | | | | | | | | |
| | Low Channel | 2.803 | 1 | N/A | N/A | 2.803 | 400 | Pass |
| | Low Channel | 2.803 | 46 | 128.938 | 2.5 | 322.345 | 400 | Pass |
| | Mid Channel | 2.803 | 1 | N/A | N/A | 2.803 | 400 | Pass |
| | Mid Channel | 2.803 | 48 | 134.544 | 2.5 | 336.36 | 400 | Pass |
| | High Channel | 2.803 | 1 | N/A | N/A | 2.803 | 400 | Pass |
| | High Channel | 2.803 | 52 | 145.756 | 2.5 | 364.39 | 400 | Pass |

# Dwell Time

| DH5, GFSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.889 | 1 | N/A | N/A | 2.889 | 400 | Pass |

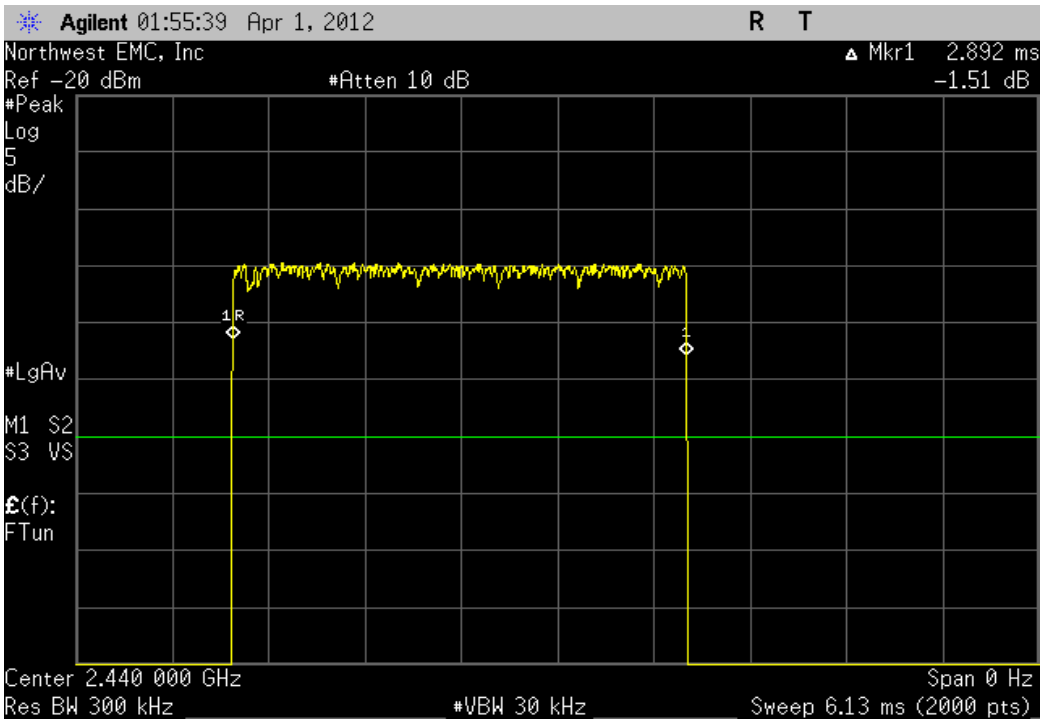



| DH5, GFSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.889 | 50 | 144.45 | 2.5 | 361.125 | 400 | Pass |

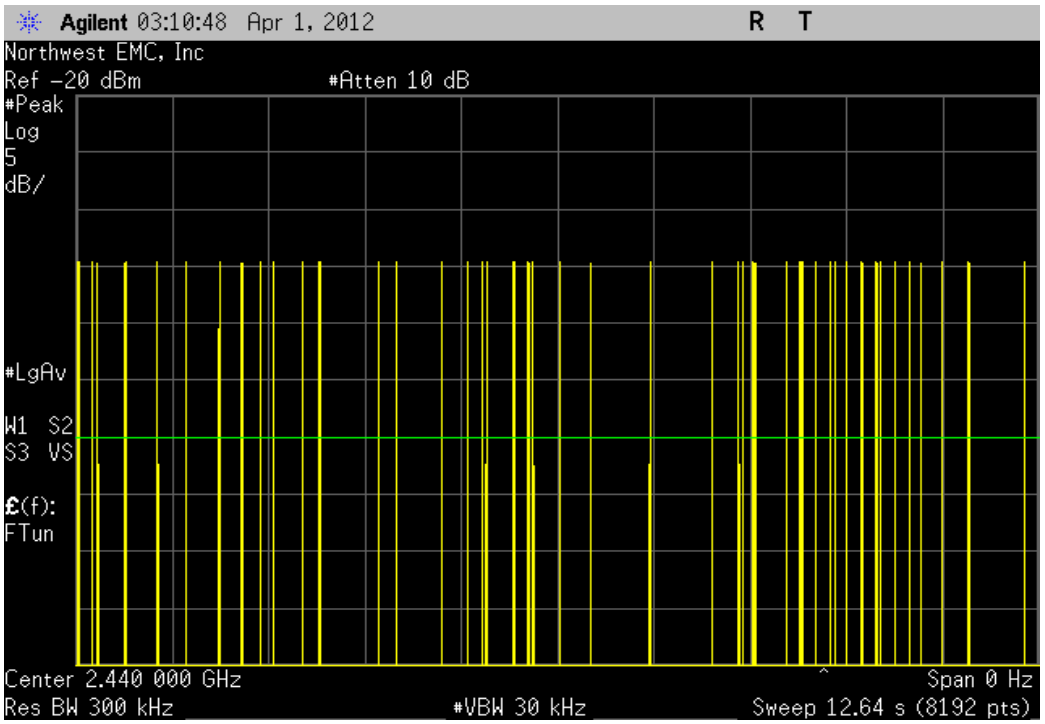


# Dwell Time

| DH5, GFSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.892 | 1 | N/A | N/A | 2.892 | 400 | Pass |

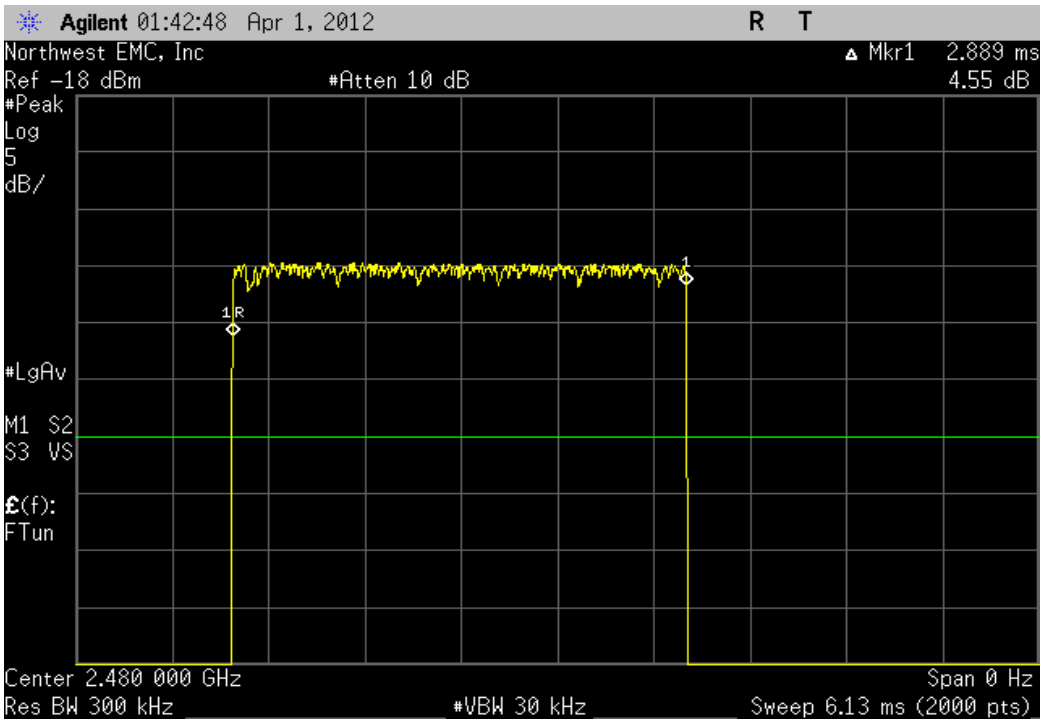



| DH5, GFSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.892 | 47 | 135.924 | 2.5 | 339.81 | 400 | Pass |

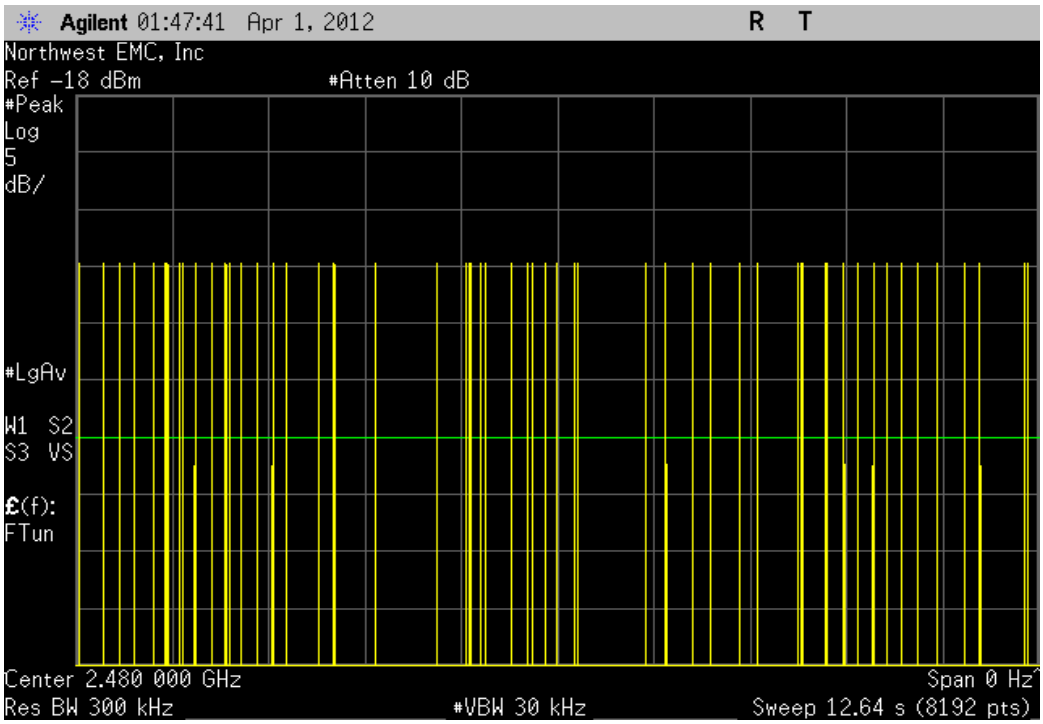


# Dwell Time

| DH5, GFSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.889 | 1 | N/A | N/A | 2.889 | 400 | Pass |

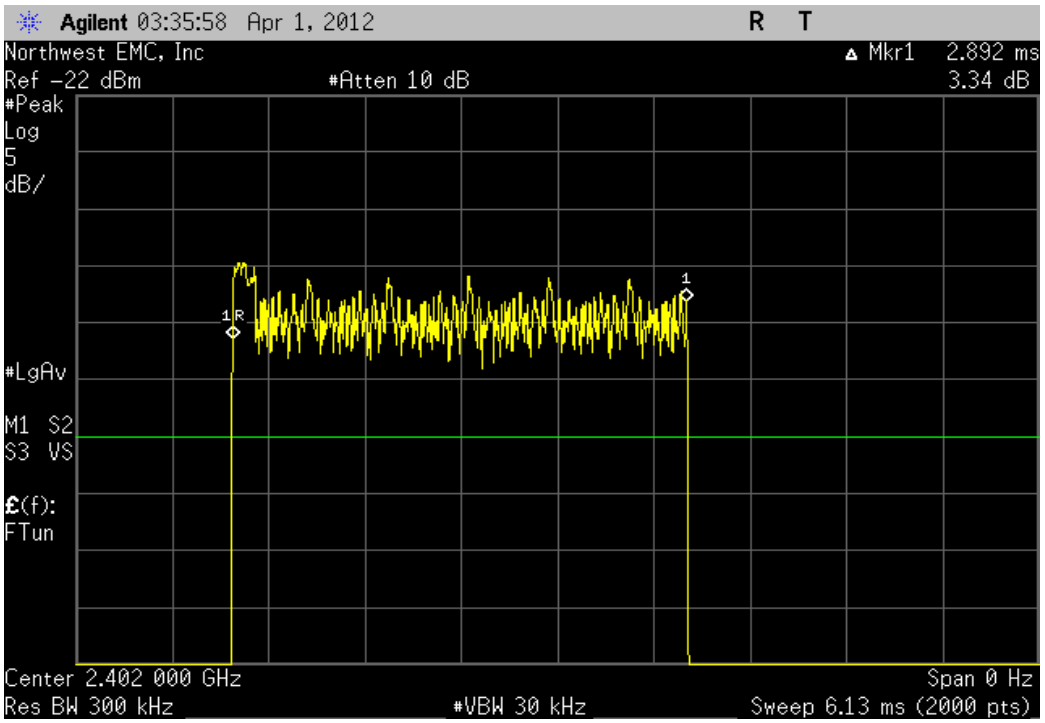



| DH5, GFSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.889 | 52 | 150.228 | 2.5 | 375.57 | 400 | Pass |

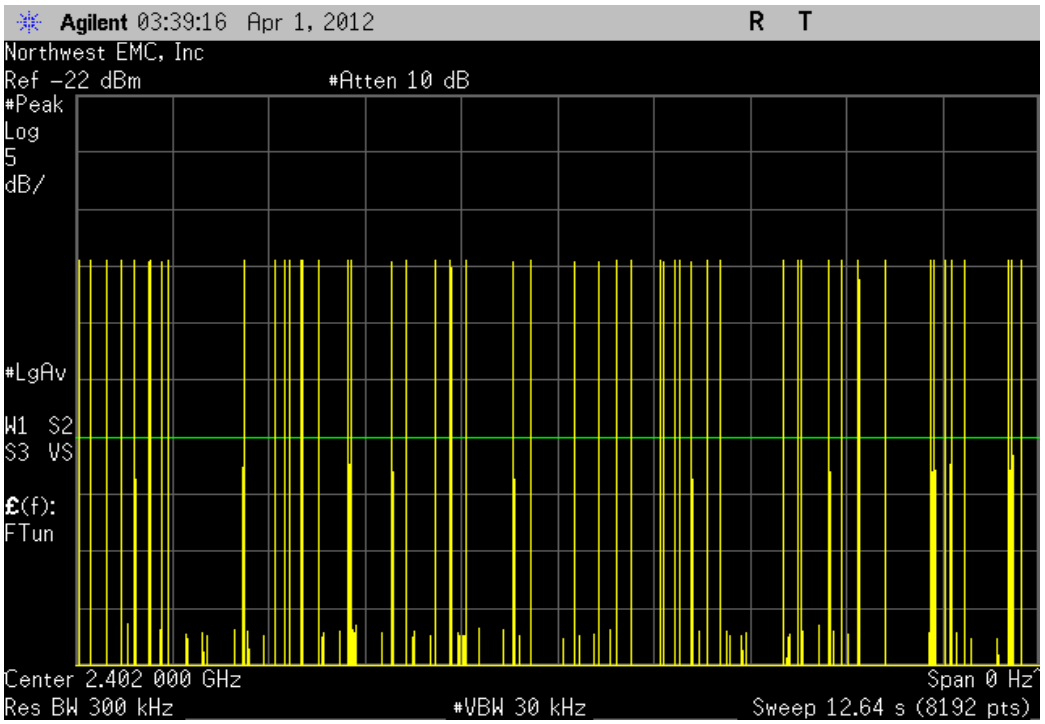


# Dwell Time

| 2DH5, 4-DQPSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.892 | 1 | N/A | N/A | 2.892 | 400 | Pass |

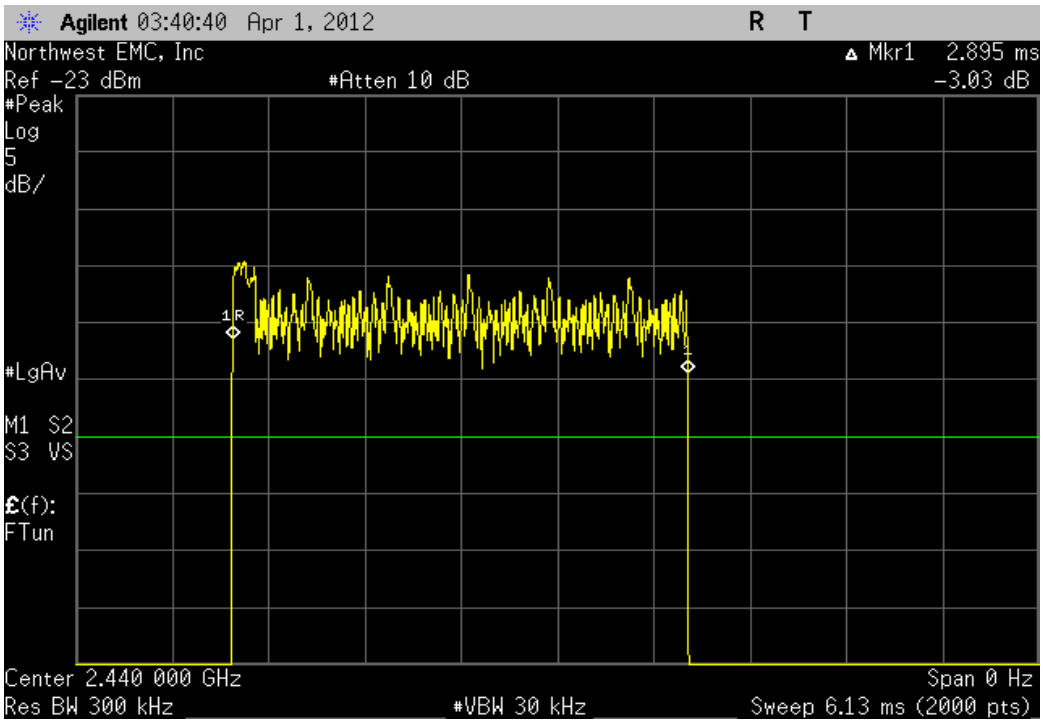



| 2DH5, 4-DQPSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.892 | 51 | 147.492 | 2.5 | 368.73 | 400 | Pass |

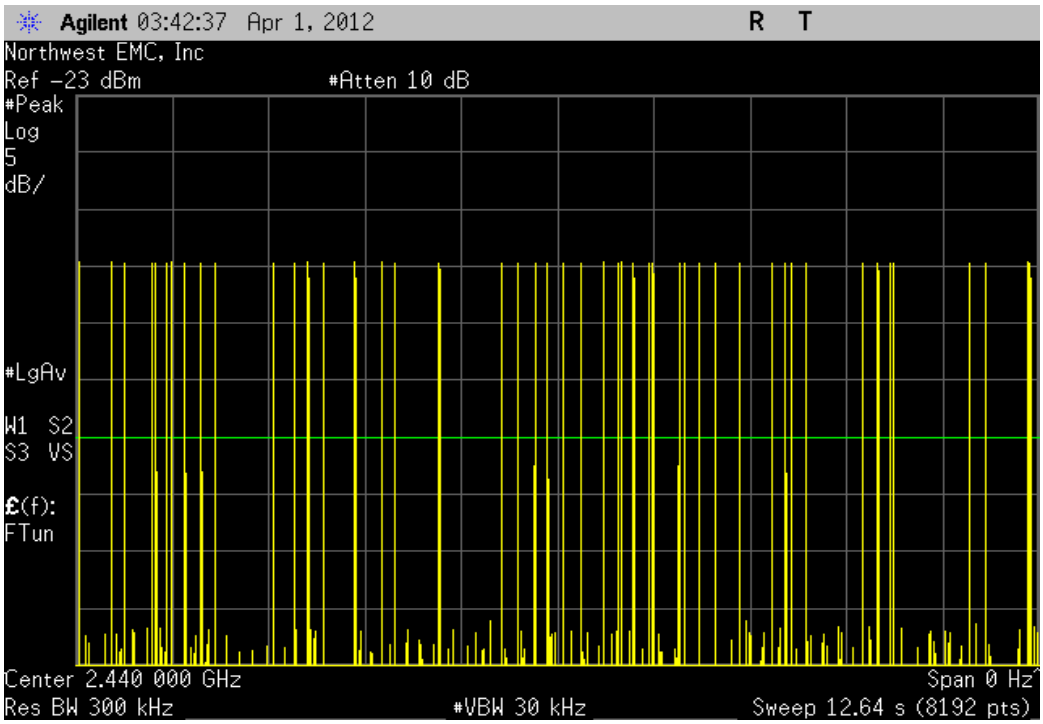


# Dwell Time

| 2DH5, 4-DQPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.895 | 1 | N/A | N/A | 2.895 | 400 | Pass |

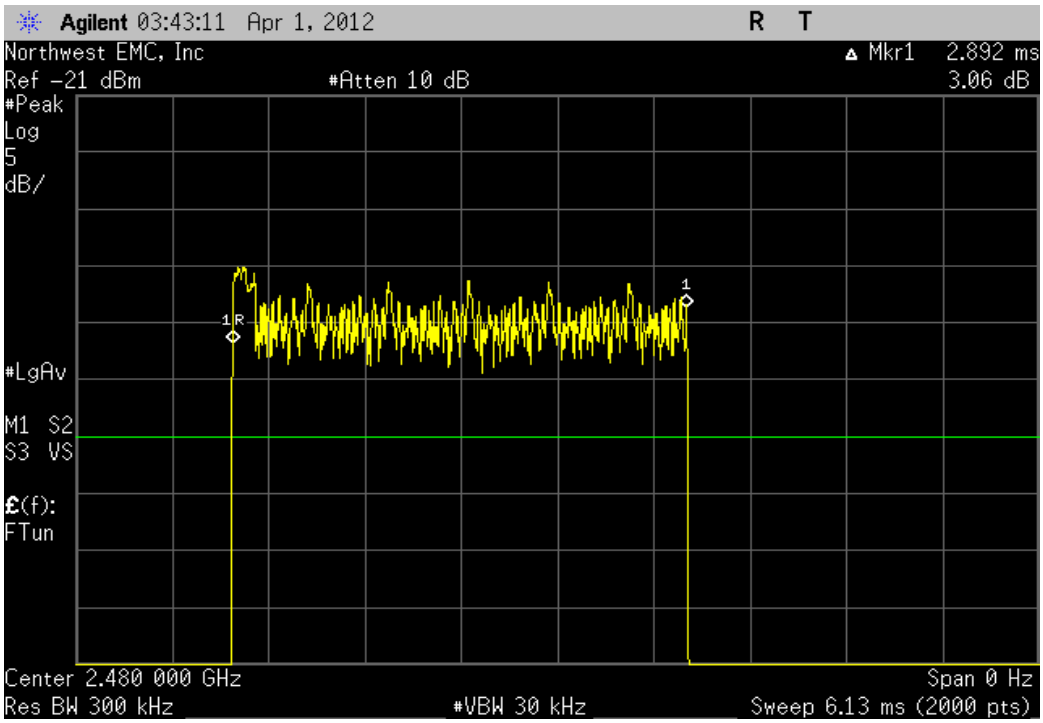



| 2DH5, 4-DQPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.895 | 47 | 136.065 | 2.5 | 340.1625 | 400 | Pass |

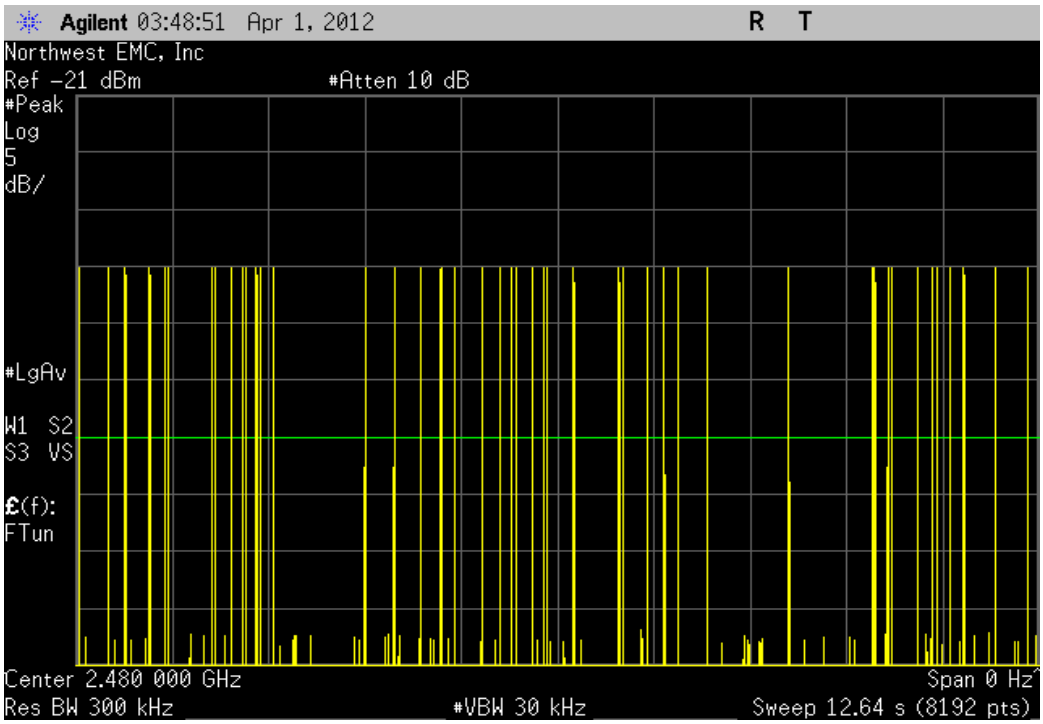


# Dwell Time

| 2DH5, 4-DQPSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.892 | 1 | N/A | N/A | 2.892 | 400 | Pass |

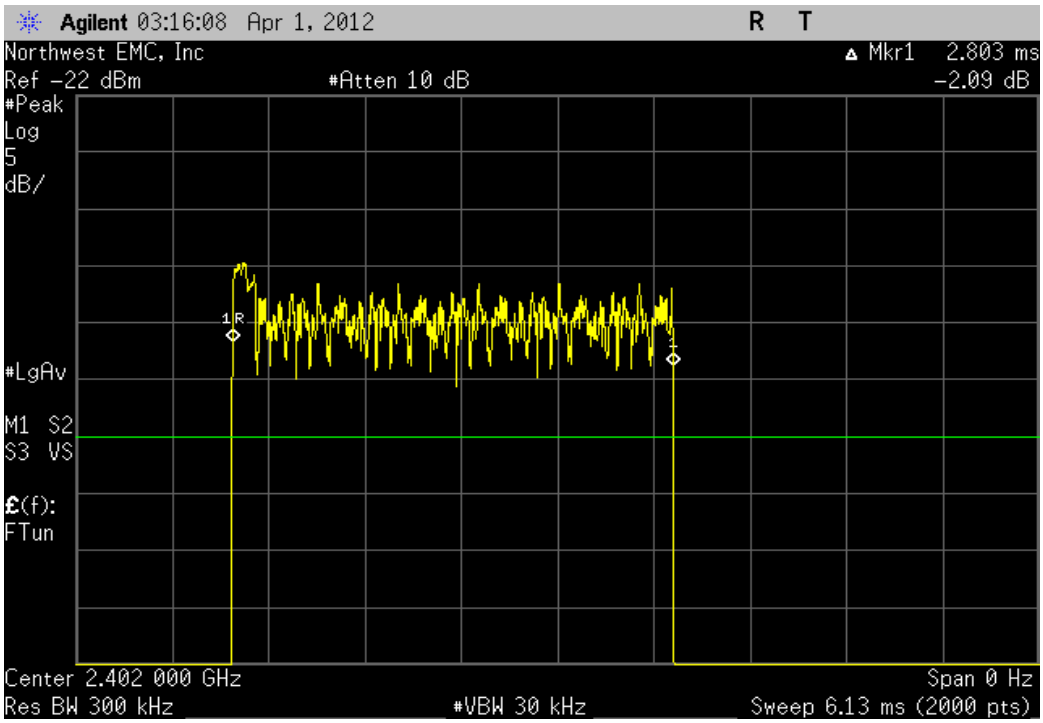



| 2DH5, 4-DQPSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.892 | 45 | 130.14 | 2.5 | 325.35 | 400 | Pass |

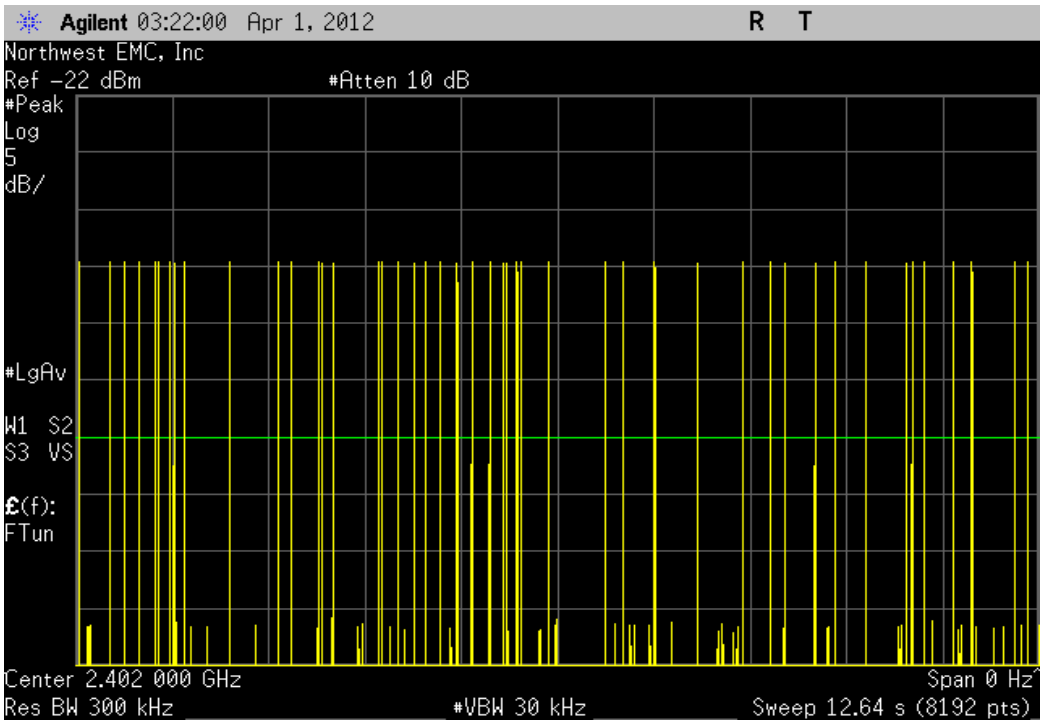


# Dwell Time

| 3DH5, 8-DPSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.803 | 1 | N/A | N/A | 2.803 | 400 | Pass |

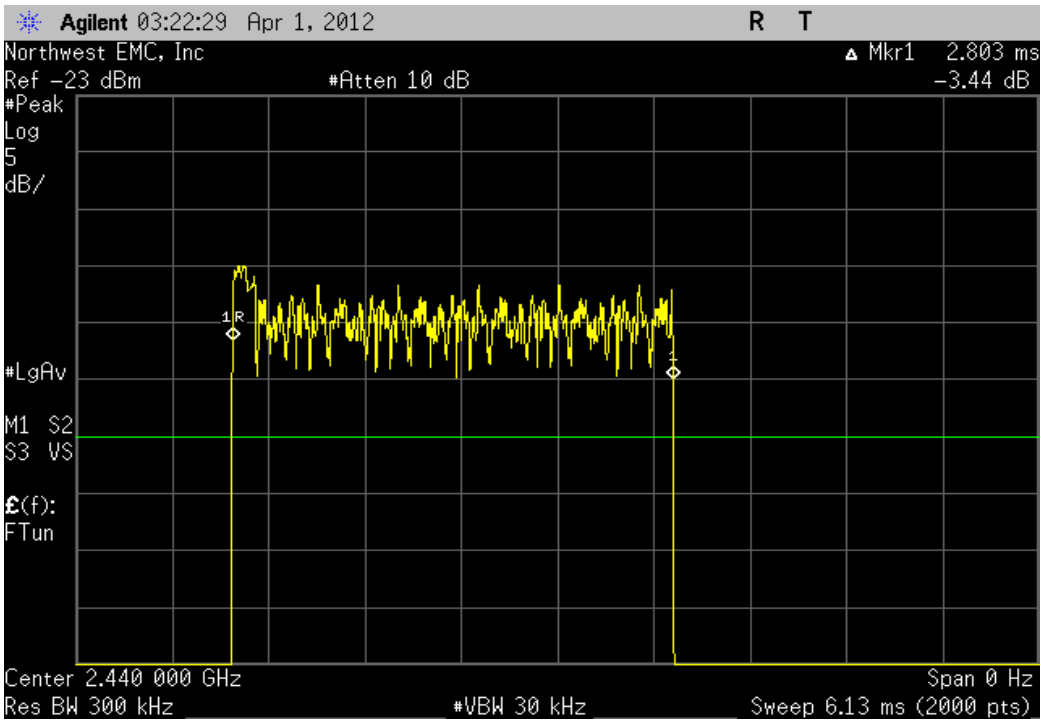



| 3DH5, 8-DPSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.803 | 46 | 128.938 | 2.5 | 322.345 | 400 | Pass |

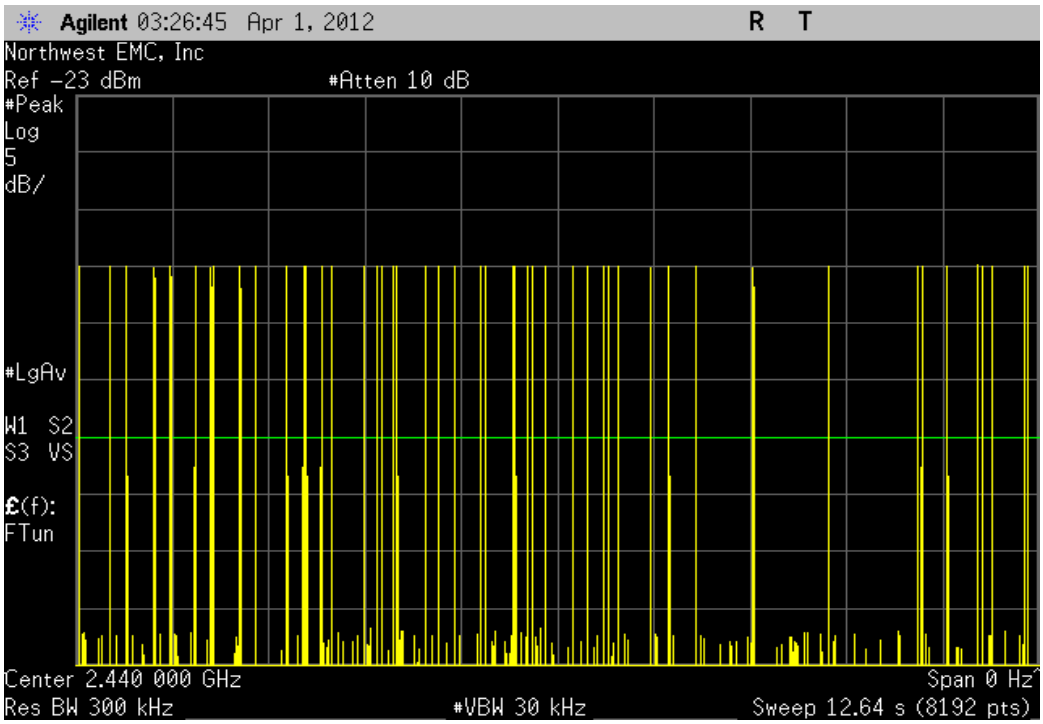


# Dwell Time

| 3DH5, 8-DPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.803 | 1 | N/A | N/A | 2.803 | 400 | Pass |

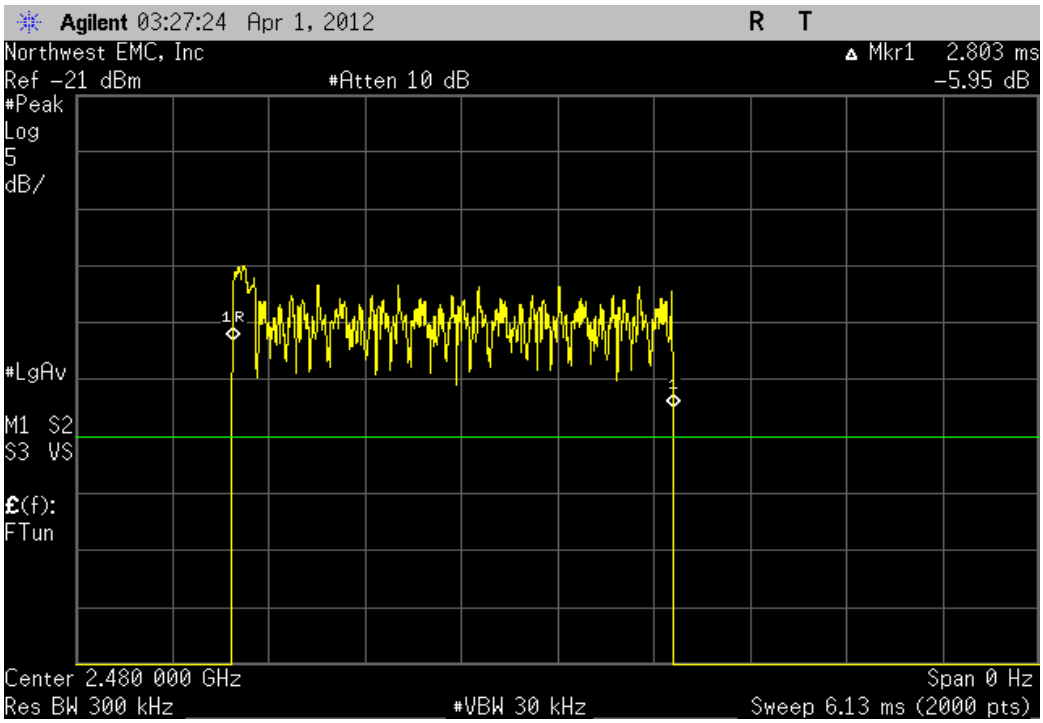



| 3DH5, 8-DPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.803 | 48 | 134.544 | 2.5 | 336.36 | 400 | Pass |

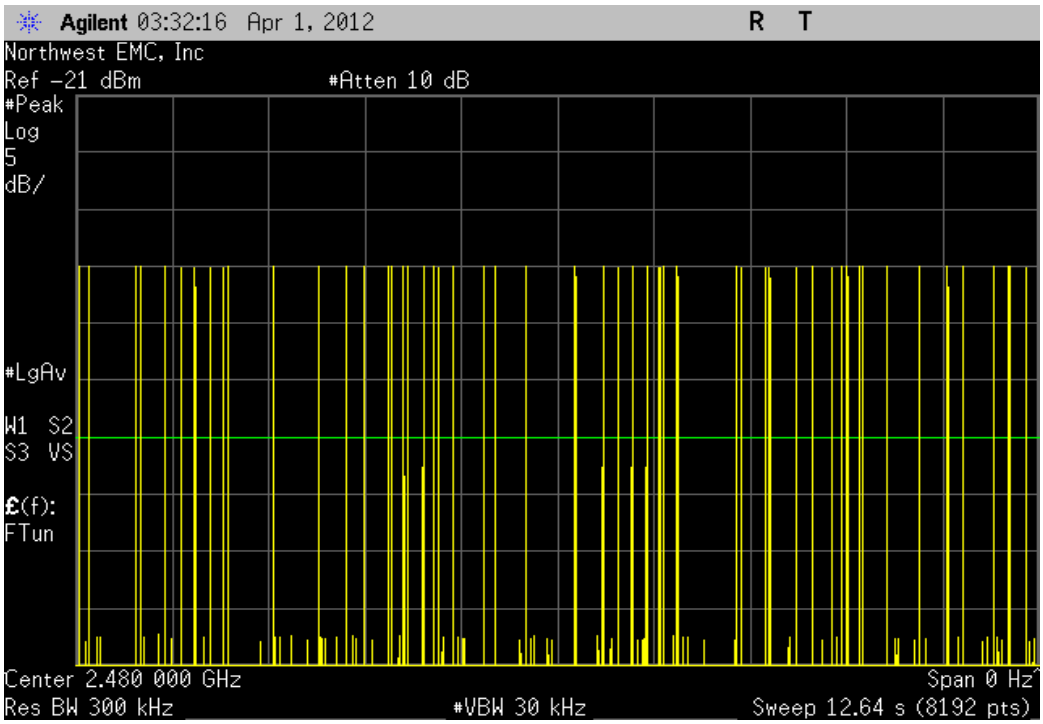


# Dwell Time

| 3DH5, 8-DPSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.803 | 1 | N/A | N/A | 2.803 | 400 | Pass |




| 3DH5, 8-DPSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Width (mS) | Number of Pulses | Worst Case High Time (mS) | Scale Factor | On Time (mS) During 31.6 S | Limit (mS) | Result |
| 2.803 | 52 | 145.756 | 2.5 | 364.39 | 400 | Pass |



# Number of Hopping Frequencies

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.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Attenuator - 20db, 'SMA' | SM Electronics | SA26B-20 | RFW | 6/2/2011 | 12 |
| 40 GHz DC block | Fairview Microwave | SD3379 | AMI | 10/12/2011 | 12 |
| Signal Generator | Agilent | N5183A | TIA | 1/27/2012 | 12 |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Frequency Accuracy: +0.12/- 0.01) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

The number of hopping frequencies was measured across the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

# Number of Hopping Frequencies

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Interstim Model 3537 (PTM) | | | **Work Order:** | MDTR0153 |
| **Serial Number:** | NLD001577N | | | **Date:** | 04/09/12 |
| **Customer:** | Medtronic Inc. | | | **Temperature:** | 22.83°C |
| **Attendees:** | Paul Wood | | | **Humidity:** | 17% |
| **Project:** | None | | | **Barometric Pres.:** | 1019.5 |
| **Tested by:** | Trevor Buls | **Power:** | Battery | **Job Site:** | MN05 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Payload size was set to 1024. Tx/Rx Mode: PRBS9.

**DEVIATIONS FROM TEST STANDARD**

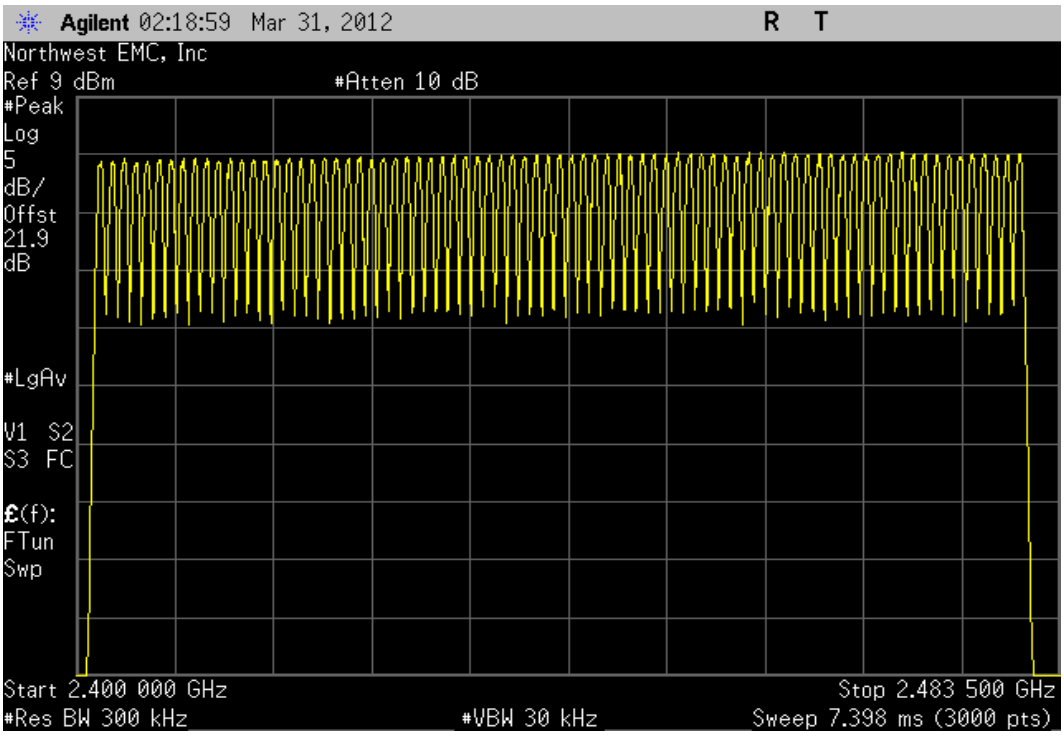
None

| Configuration # | 1 | Signature | Trevor Buls |
|---|---|---|---|

| | Number of Channels | Limit | Result |
|---|---|---|---|
| Hopping Mode | 79 | ≥ 15 | Pass |

# Number of Hopping Frequencies

| Hopping Mode | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Number of Channels | Limit | Result |
| | | | | 79 | ≥ 15 | Pass |



# Occupied Bandwidth

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.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| 40 GHz DC block | Fairview Microwave | SD3379 | AMI | 10/12/2011 | 12 |
| Attenuator - 20db, 'SMA' | SM Electronics | SA26B-20 | RFW | 6/2/2011 | 12 |
| Signal Generator | Agilent | N5183A | TIA | 1/27/2012 | 12 |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Frequency Accuracy: +0.12/- 0.01) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

The 20 dB occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting in a no hop mode at its maximum data rate for each of the three different modulations available.

# Occupied Bandwidth

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Interstim Model 3537 (PTM) | | | **Work Order:** | MDTR0153 |
| **Serial Number:** | NLD001577N | | | **Date:** | 04/09/12 |
| **Customer:** | Medtronic Inc. | | | **Temperature:** | 22.83°C |
| **Attendees:** | Paul Wood | | | **Humidity:** | 17% |
| **Project:** | None | | | **Barometric Pres.:** | 1019.5 |
| **Tested by:** | Trevor Buls | **Power:** | Battery | **Job Site:** | MN05 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Payload size was set to 1024. Tx/Rx Mode: PRBS9.

**DEVIATIONS FROM TEST STANDARD**

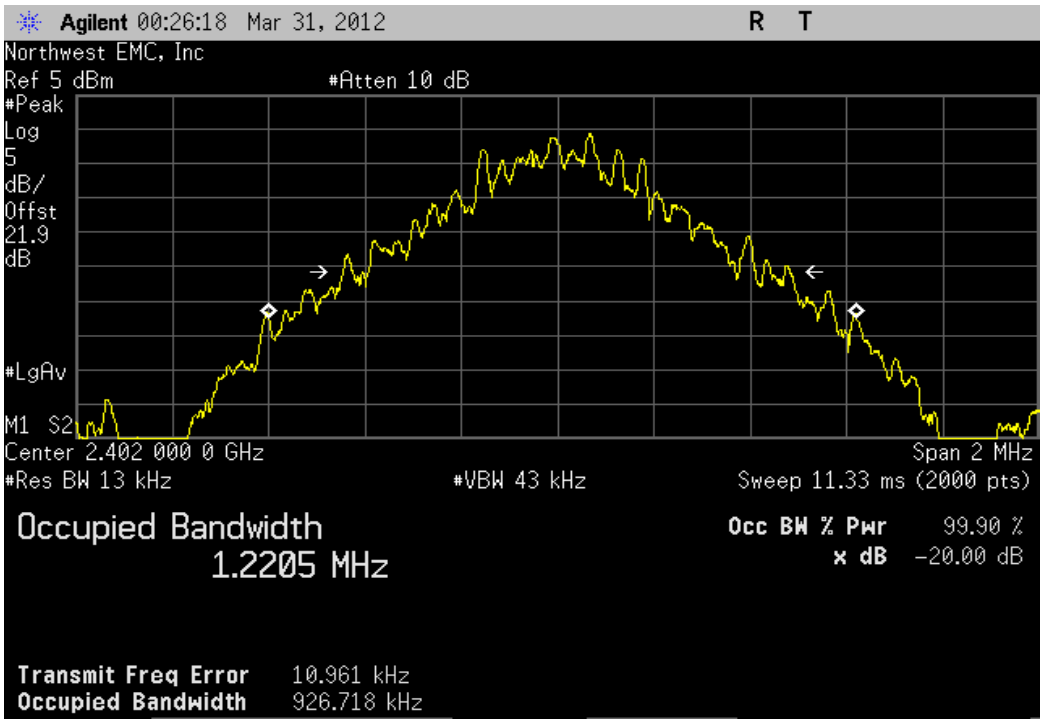
None

| Configuration # | 1 | Signature Trevor Buls |
|---|---|---|

| | | Value | Limit | Result |
|---|---|---|---|---|
| DH5, GFSK | | | | |
| | Low Channel | 926.718 kHz | < 1.5 MHz | Pass |
| | Mid Channel | 928.512 kHz | < 1.5 MHz | Pass |
| | High Channel | 927.258 kHz | < 1.5 MHz | Pass |
| 2DH5, 4-DQPSK | | | | |
| | Low Channel | 1.331 MHz | < 1.5 MHz | Pass |
| | Mid Channel | 1.317 MHz | < 1.5 MHz | Pass |
| | High Channel | 1.32 MHz | < 1.5 MHz | Pass |
| 3DH5, 8-DPSK | | | | |
| | Low Channel | 1.318 MHz | < 1.5 MHz | Pass |
| | Mid Channel | 1.304 MHz | < 1.5 MHz | Pass |
| | High Channel | 1.312 MHz | < 1.5 MHz | Pass |

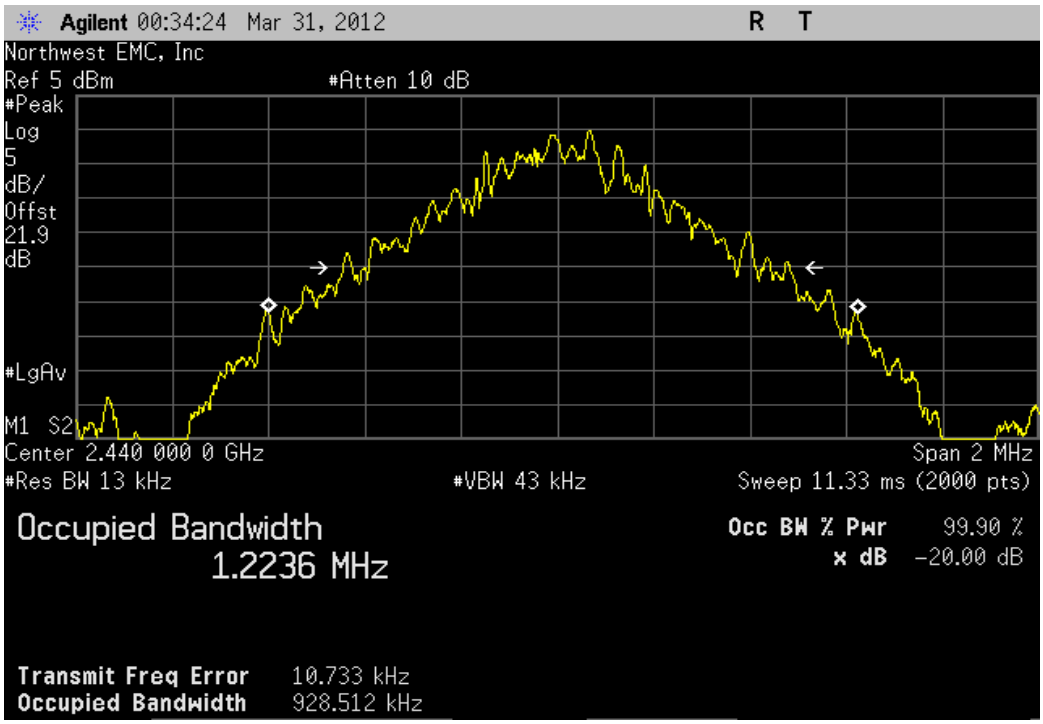
DH5, GFSK, Low Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | 926.718 kHz | < 1.5 MHz | Pass |



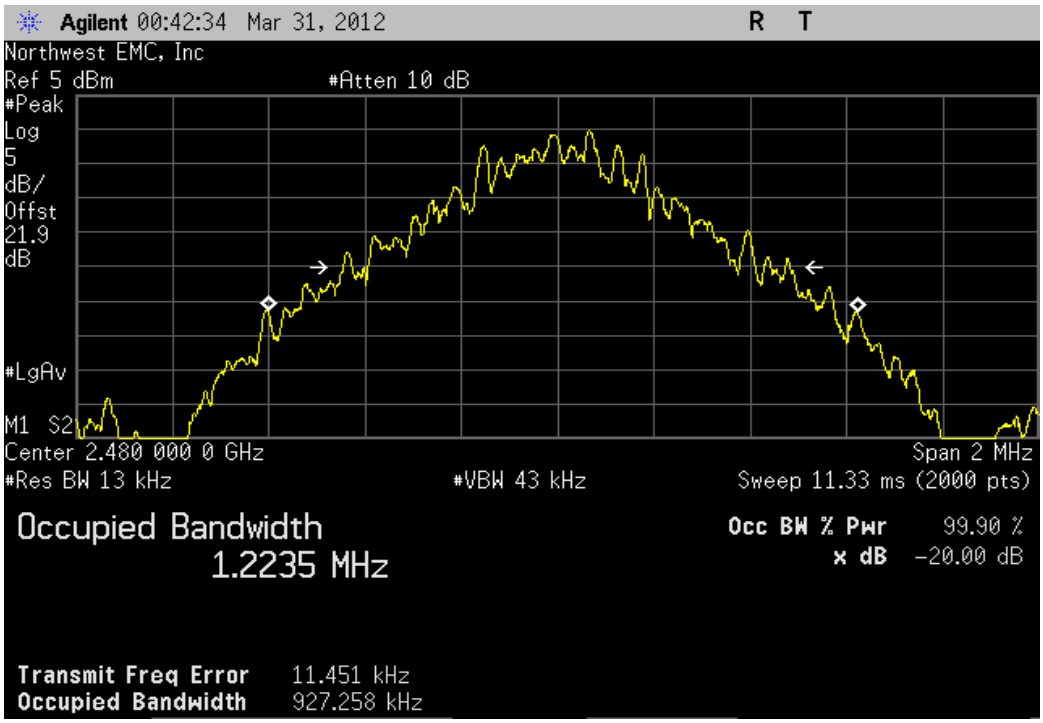

DH5, GFSK, Mid Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | 928.512 kHz | < 1.5 MHz | Pass |



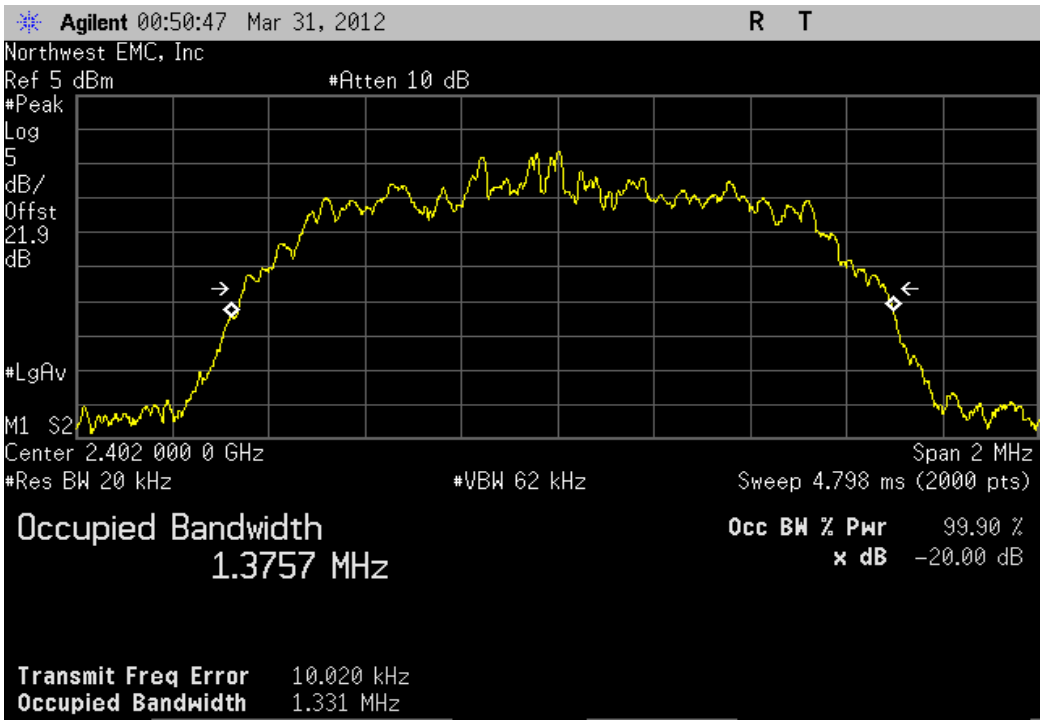
DH5, GFSK, High Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | 927.258 kHz | < 1.5 MHz | Pass |



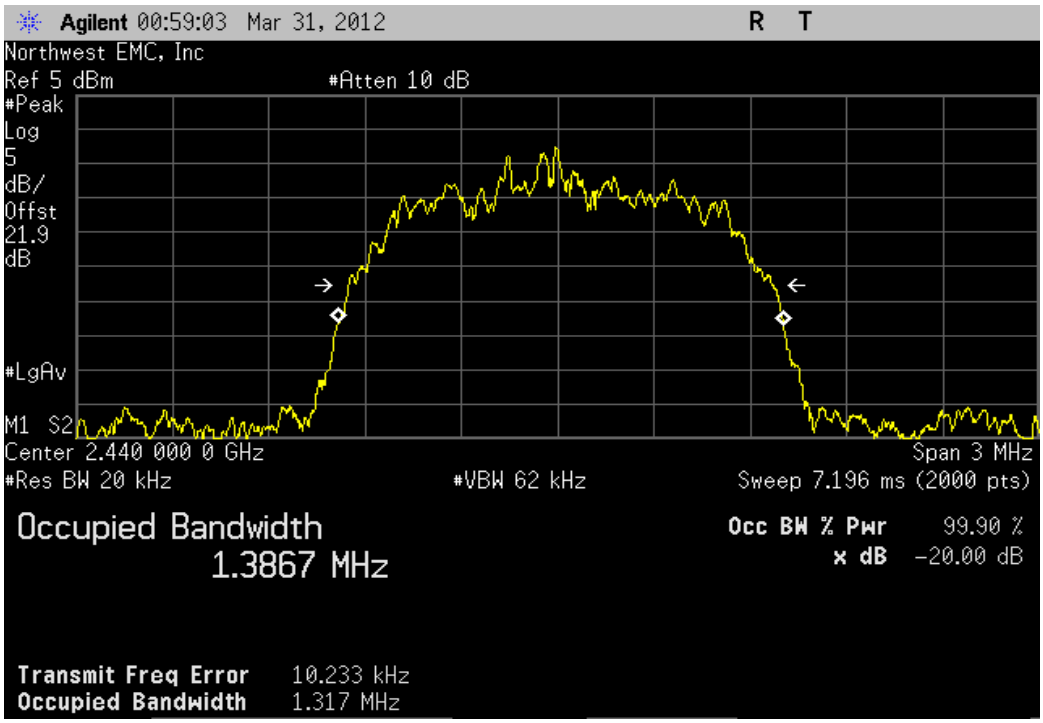

2DH5, 4-DQPSK, Low Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | 1.331 MHz | < 1.5 MHz | Pass |



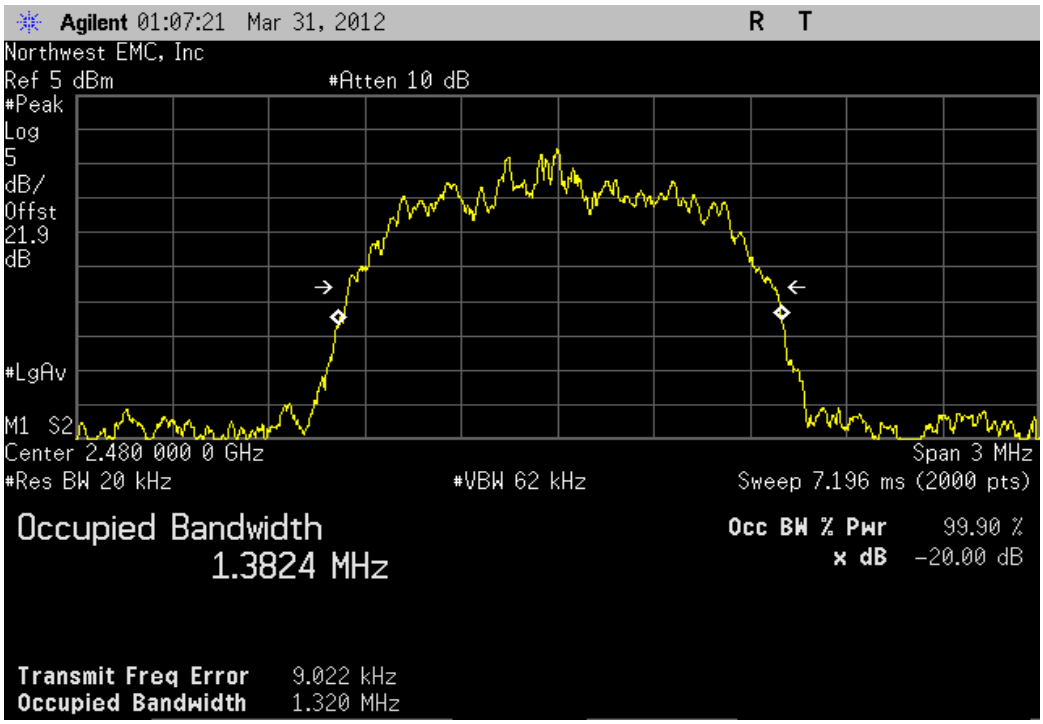
2DH5, 4-DQPSK, Mid Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | 1.317 MHz | < 1.5 MHz | Pass |



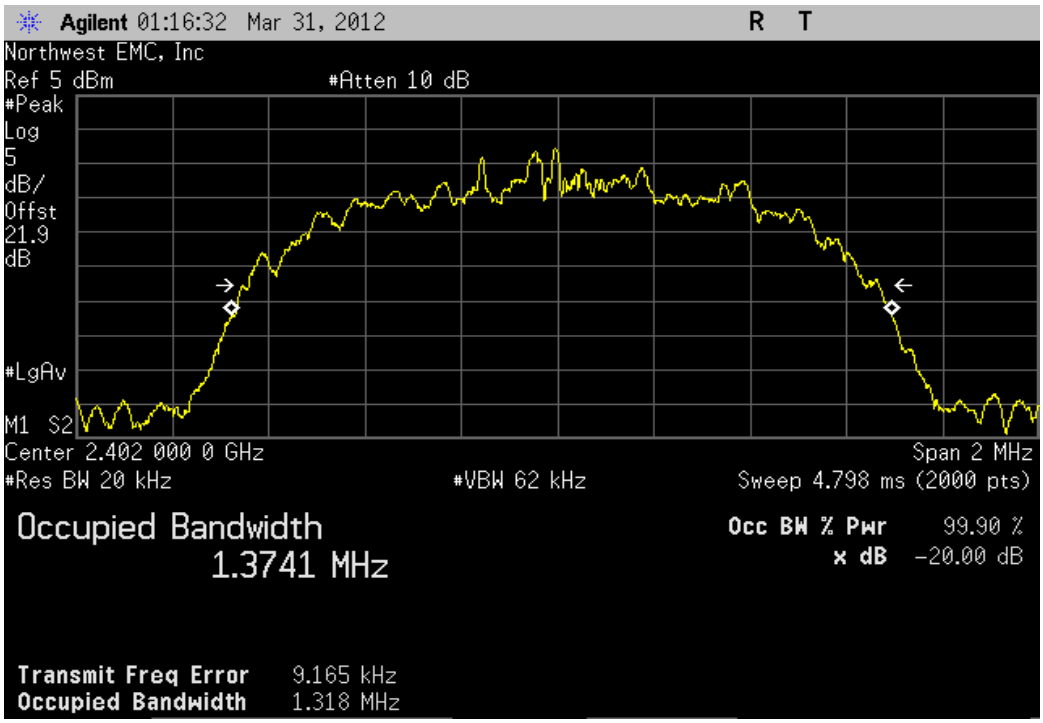

2DH5, 4-DQPSK, High Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | 1.32 MHz | < 1.5 MHz | Pass |



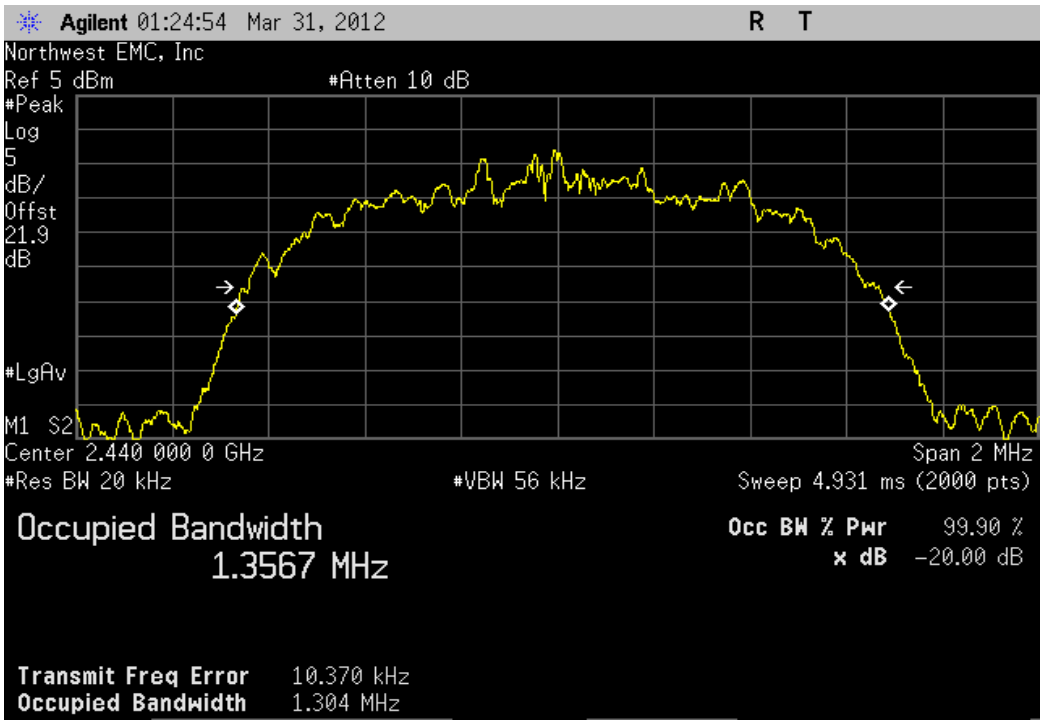
3DH5, 8-DPSK, Low Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | 1.318 MHz | < 1.5 MHz | Pass |



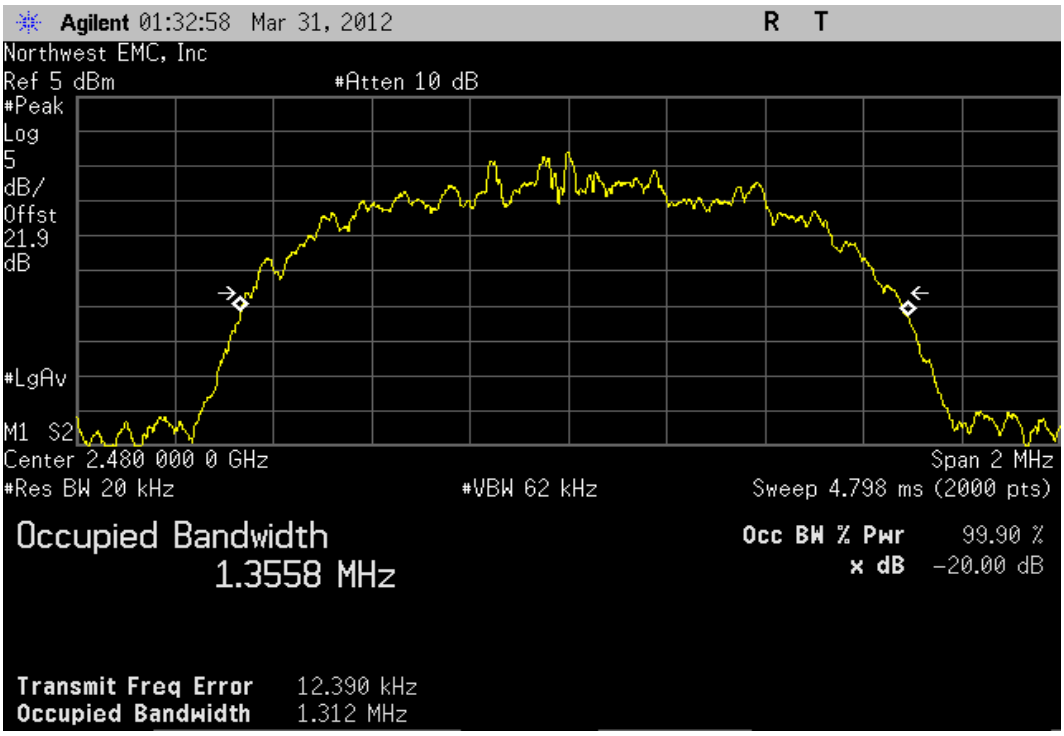

3DH5, 8-DPSK, Mid Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | 1.304 MHz | < 1.5 MHz | Pass |



# Occupied Bandwidth

| 3DH5, 8-DPSK, High Channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | Value | Limit | Result |
| | | | | | 1.312 MHz | < 1.5 MHz | Pass |



# Output Power

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.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| 40 GHz DC block | Fairview Microwave | SD3379 | AMI | 10/12/2011 | 12 |
| Attenuator - 20db, 'SMA' | SM Electronics | SA26B-20 | RFW | 6/2/2011 | 12 |
| Signal Generator | Agilent | N5183A | TIA | 1/27/2012 | 12 |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Conducted Power: +/- 0.41) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting in a no hop mode at its maximum data rate for each of the three different modulations available.

# Output Power

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Interstim Model 3537 (PTM) | | | **Work Order:** | MDTR0153 |
| **Serial Number:** | NLD001577N | | | **Date:** | 04/09/12 |
| **Customer:** | Medtronic Inc. | | | **Temperature:** | 22.83°C |
| **Attendees:** | Paul Wood | | | **Humidity:** | 17% |
| **Project:** | None | | | **Barometric Pres.:** | 1019.5 |
| **Tested by:** | Trevor Buls | **Power:** | Battery | **Job Site:** | MN05 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Payload size was set to 1024. Tx/Rx Mode: PRBS9.

**DEVIATIONS FROM TEST STANDARD**

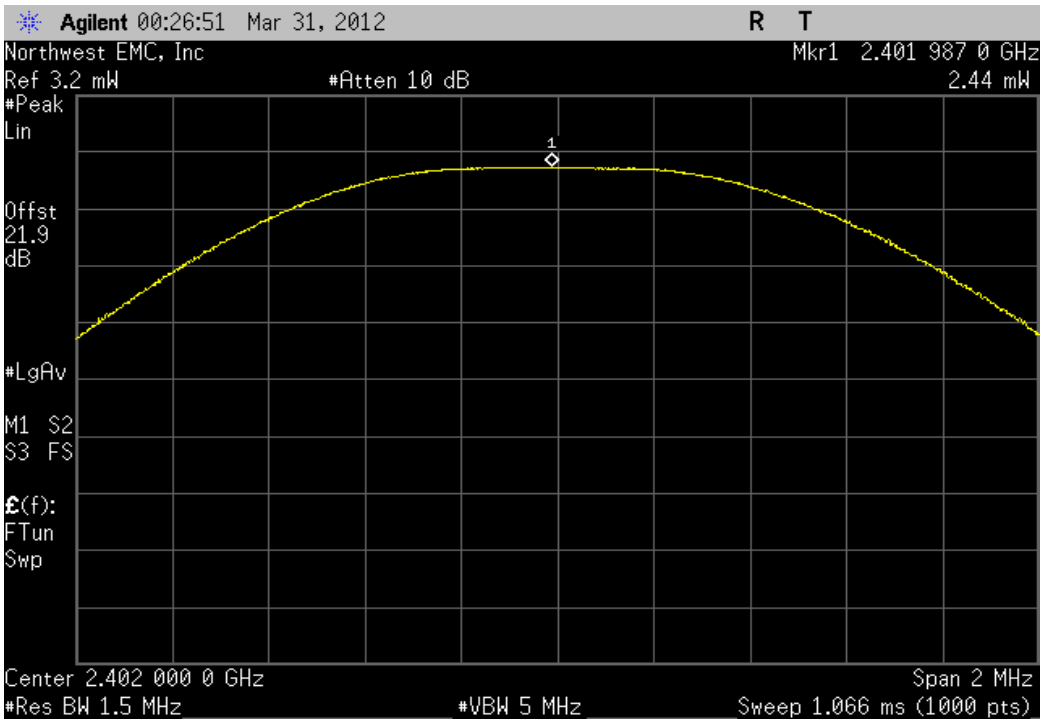
None

| Configuration # | 1 | Signature | Trevor Buls |
|---|---|---|---|

| | | Value | Limit | Result |
|---|---|---|---|---|
| DH5, GFSK | | | | |
| | Low Channel | 2.442 mW | < 125 mW | Pass |
| | Mid Channel | 2.747 mW | < 125 mW | Pass |
| | High Channel | 2.79 mW | < 125 mW | Pass |
| 2DH5, 4-DQPSK | | | | |
| | Low Channel | 1.826 mW | < 125 mW | Pass |
| | Mid Channel | 1.92 mW | < 125 mW | Pass |
| | High Channel | 1.927 mW | < 125 mW | Pass |
| 3DH5, 8-DPSK | | | | |
| | Low Channel | 1.916 mW | < 125 mW | Pass |
| | Mid Channel | 2.045 mW | < 125 mW | Pass |
| | High Channel | 2.06 mW | < 125 mW | Pass |

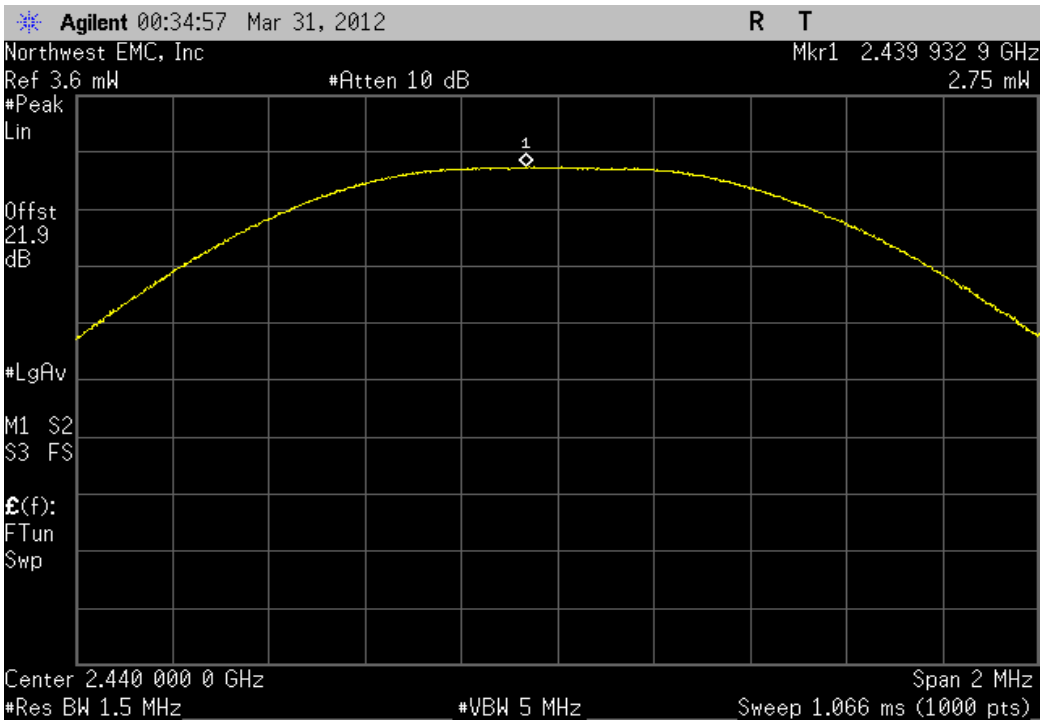
DH5, GFSK, Low Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | 2.442 mW | < 125 mW | Pass |



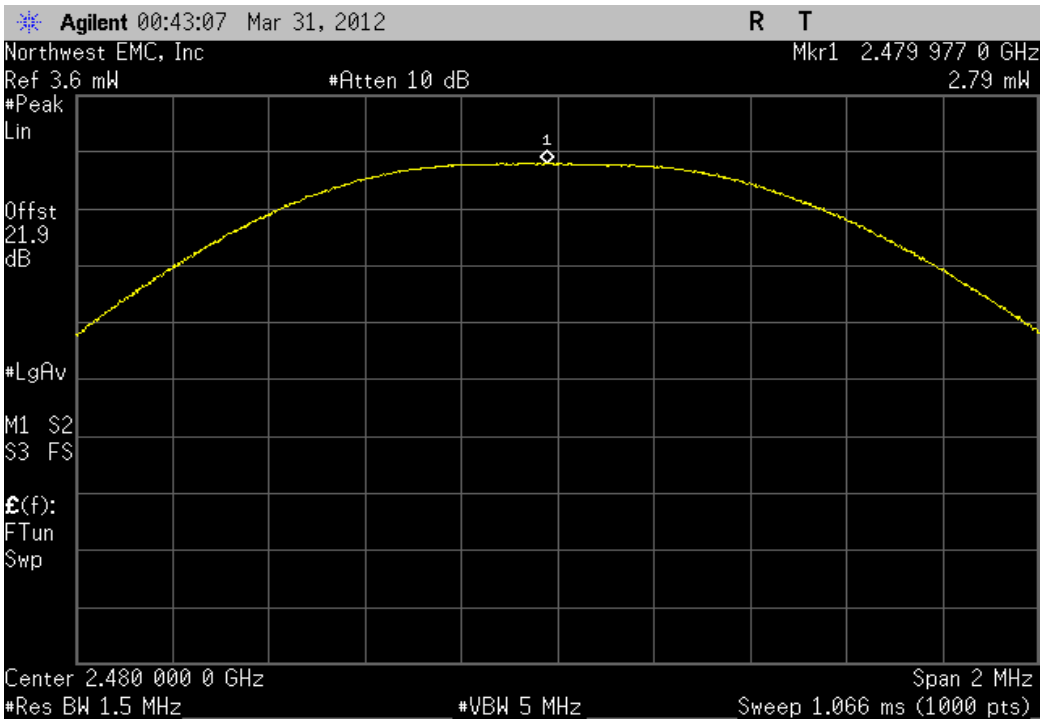

DH5, GFSK, Mid Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | 2.747 mW | < 125 mW | Pass |



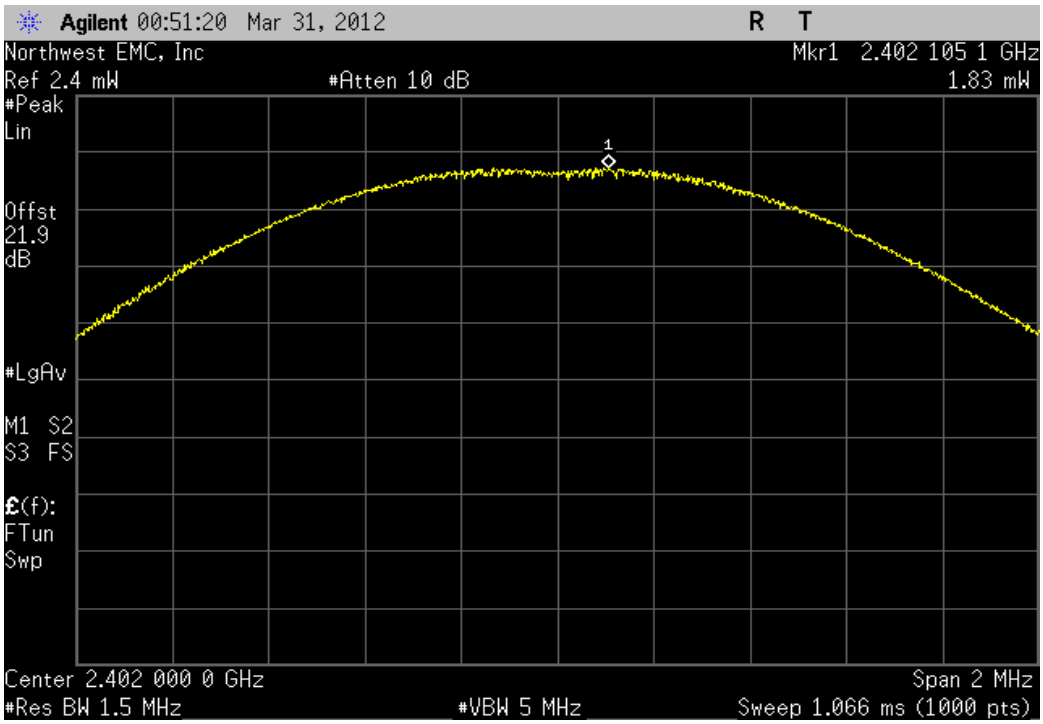
DH5, GFSK, High Channel

| Value | Limit | Result |
|---|---|---|
| 2.79 mW | < 125 mW | Pass |

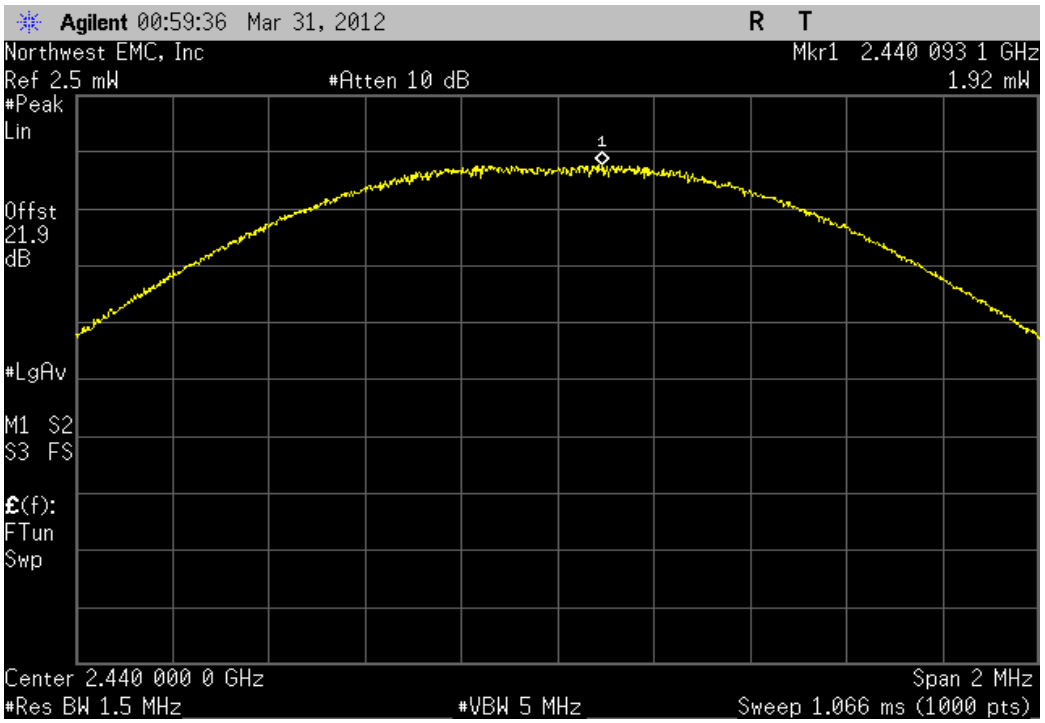



2DH5, 4-DQPSK, Low Channel

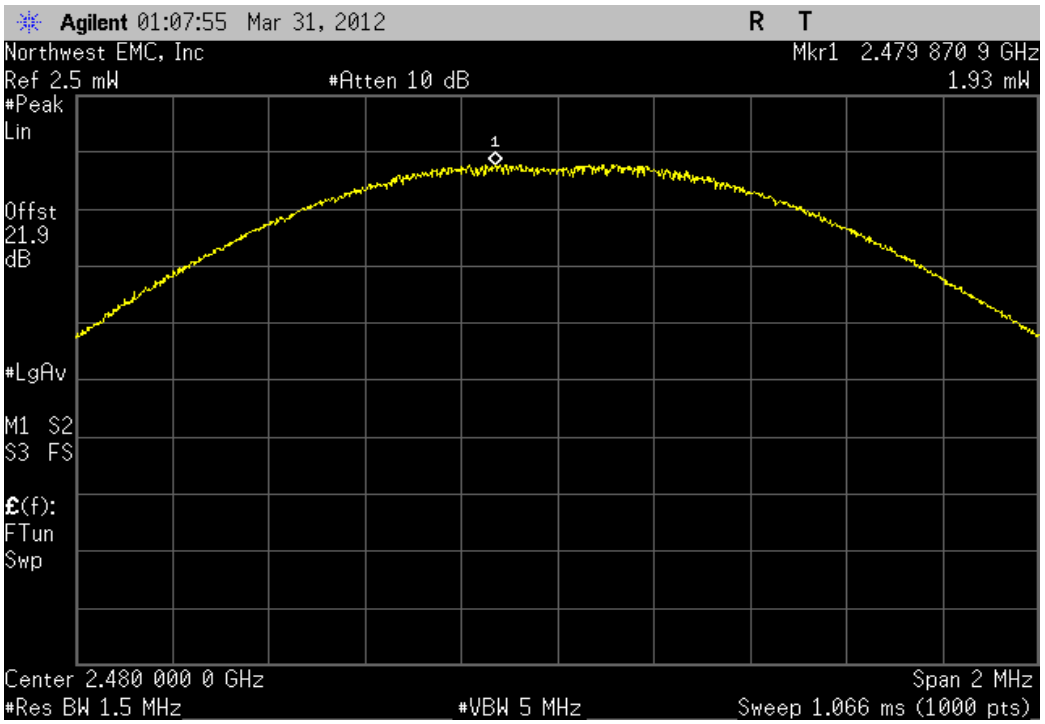
| Value | Limit | Result |
|---|---|---|
| 1.826 mW | < 125 mW | Pass |



| 2DH5, 4-DQPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Value | Limit | Result |
| | | | | 1.92 mW | < 125 mW | Pass |

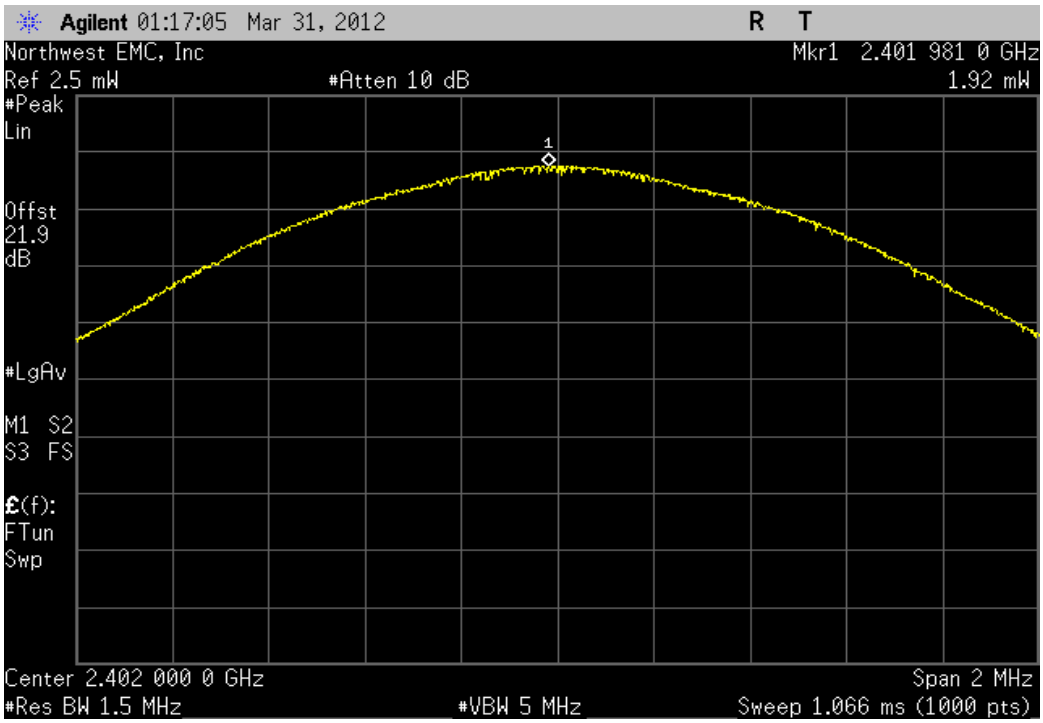



| 2DH5, 4-DQPSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Value | Limit | Result |
| | | | | 1.927 mW | < 125 mW | Pass |

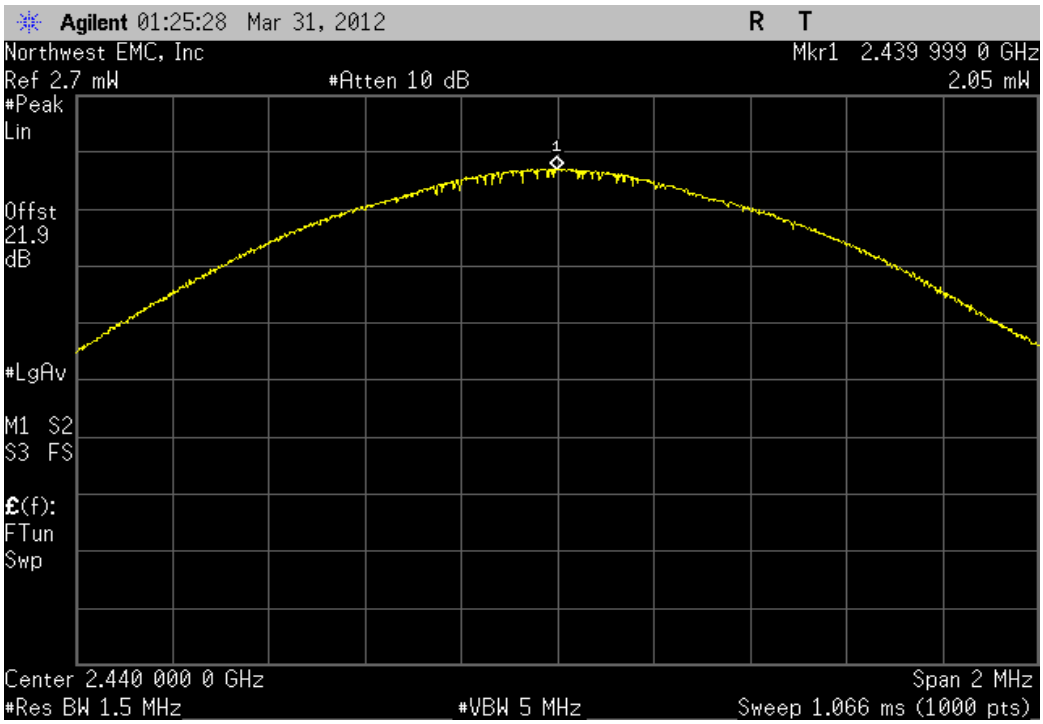


# Output Power

| 3DH5, 8-DPSK, Low Channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | Value | Limit | Result |
| | | | | | 1.916 mW | < 125 mW | Pass |

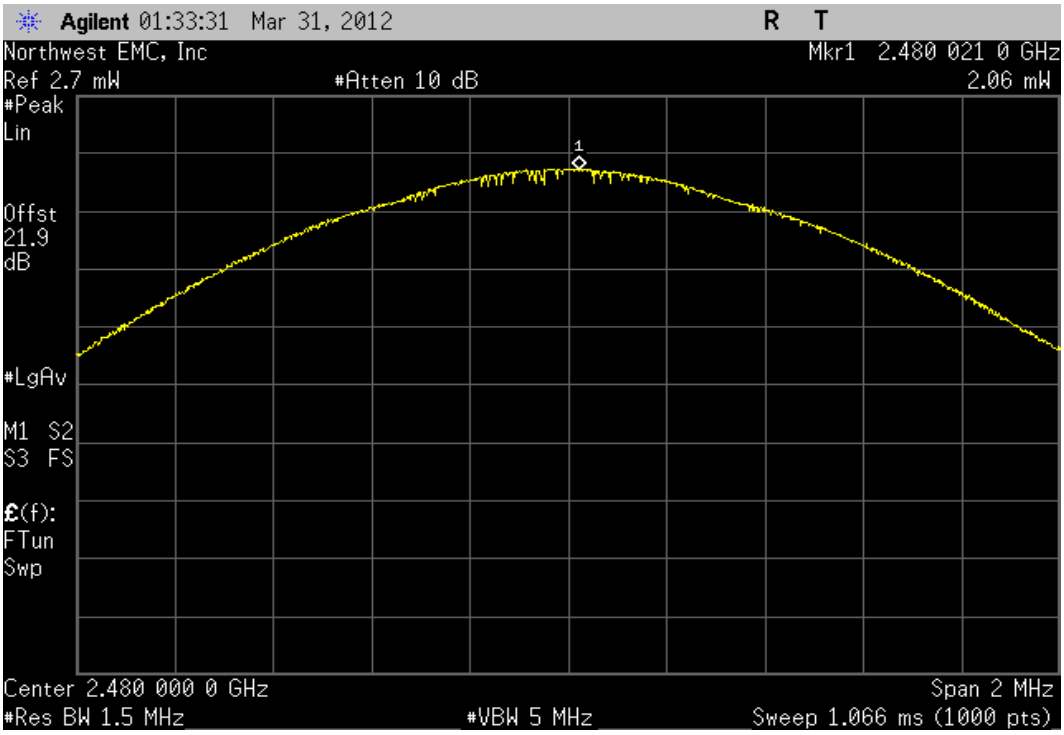



| 3DH5, 8-DPSK, Mid Channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | Value | Limit | Result |
| | | | | | 2.045 mW | < 125 mW | Pass |



# Output Power

| 3DH5, 8-DPSK, High Channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | Value | Limit | Result |
| | | | | | 2.06 mW | < 125 mW | Pass |



# Band Edge Compliance

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.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| 40 GHz DC block | Fairview Microwave | SD3379 | AMI | 10/12/2011 | 12 |
| Attenuator - 20db, 'SMA' | SM Electronics | SA26B-20 | RFW | 6/2/2011 | 12 |
| Signal Generator | Agilent | N5183A | TIA | 1/27/2012 | 12 |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Amplitude Accuracy: +/- 0.49) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

The requirements of FCC 15.247(d) for emissions at least 20dB below the carrier in any 100kHz bandwidth outside the allowable band was measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The channels closest to the band edges were selected. The spectrum was scanned across each band edge.

The EUT was transmitting at its maximum data rate using all three types of modulations available in Bluetooth EDR.

# Band Edge Compliance

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Interstim Model 3537 (PTM) | | | **Work Order:** | MDTR0153 |
| **Serial Number:** | NLD001577N | | | **Date:** | 04/09/12 |
| **Customer:** | Medtronic Inc. | | | **Temperature:** | 22.83°C |
| **Attendees:** | Paul Wood | | | **Humidity:** | 17% |
| **Project:** | None | | | **Barometric Pres.:** | 1019.5 |
| **Tested by:** | Trevor Buls | **Power:** | Battery | **Job Site:** | MN05 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Payload size was set to 1024. Tx/Rx Mode: PRBS9.

**DEVIATIONS FROM TEST STANDARD**

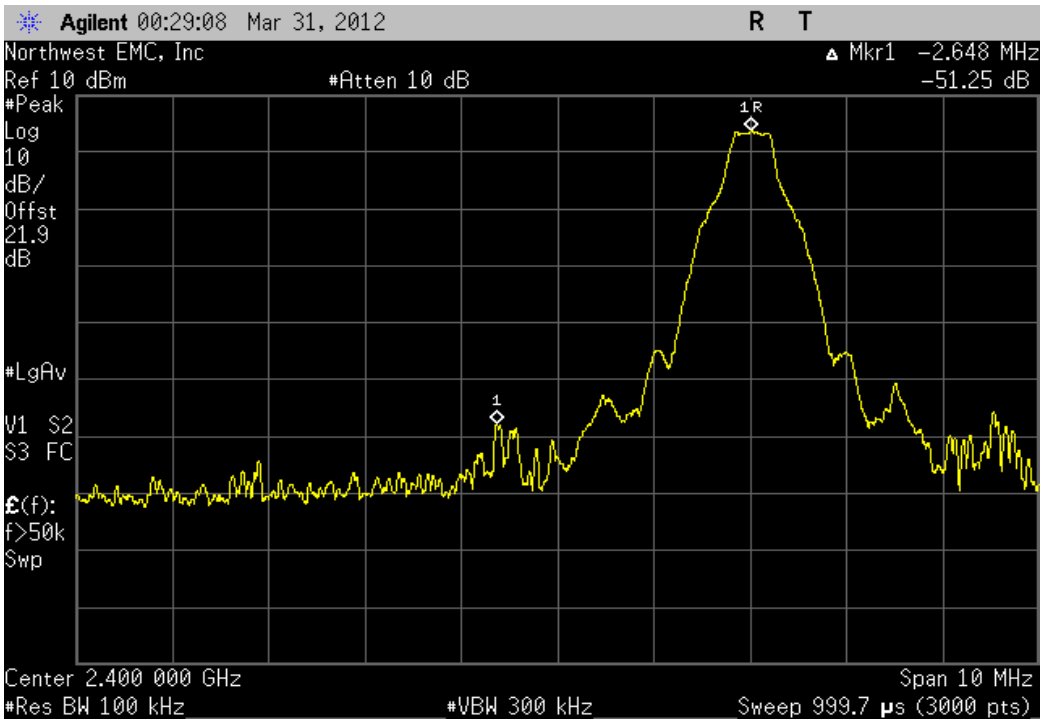
None

| Configuration # | 1 | Signature Trevor Buls |
|---|---|---|

| | | Value | Limit | Result |
|---|---|---|---|---|
| DH5, GFSK | | | | |
| | Low Channel | -51.25 dBc | ≤ -20 dBc | Pass |
| | High Channel | -58.01 dBc | ≤ -20 dBc | Pass |
| 2DH5, 4-DQPSK | | | | |
| | Low Channel | -49.38 dBc | ≤ -20 dBc | Pass |
| | High Channel | -57.8 dBc | ≤ -20 dBc | Pass |
| 3DH5, 8-DPSK | | | | |
| | Low Channel | -50.3 dBc | ≤ -20 dBc | Pass |
| | High Channel | -58.16 dBc | ≤ -20 dBc | Pass |

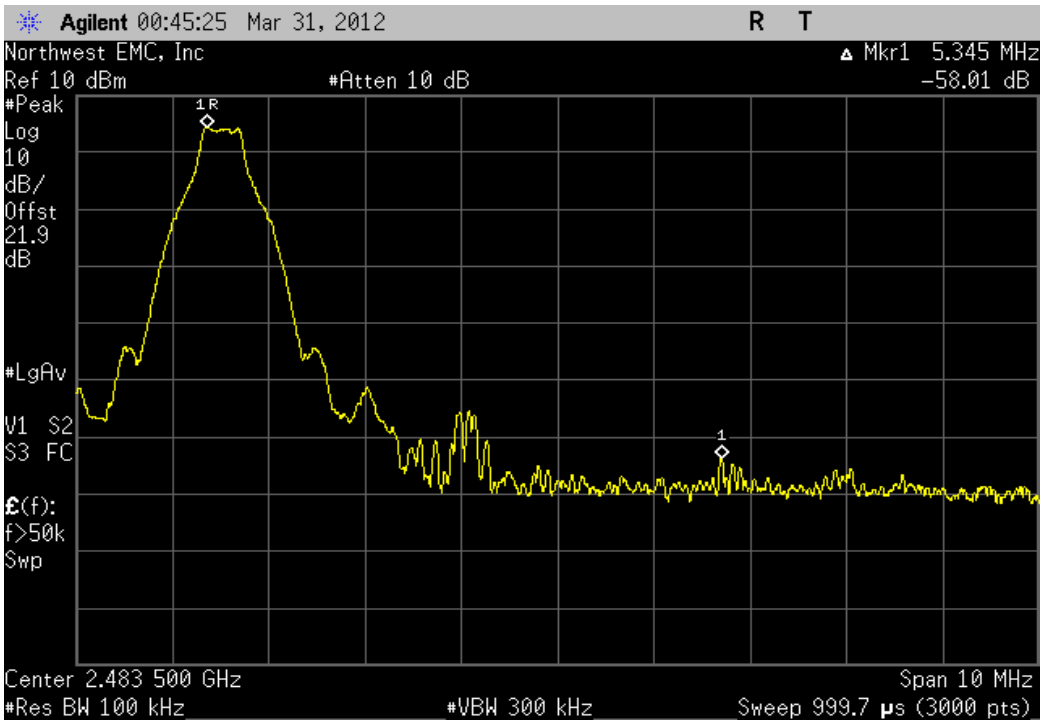
DH5, GFSK, Low Channel

| Value | Limit | Result |
|---|---|---|
| -51.25 dBc | ≤ -20 dBc | Pass |



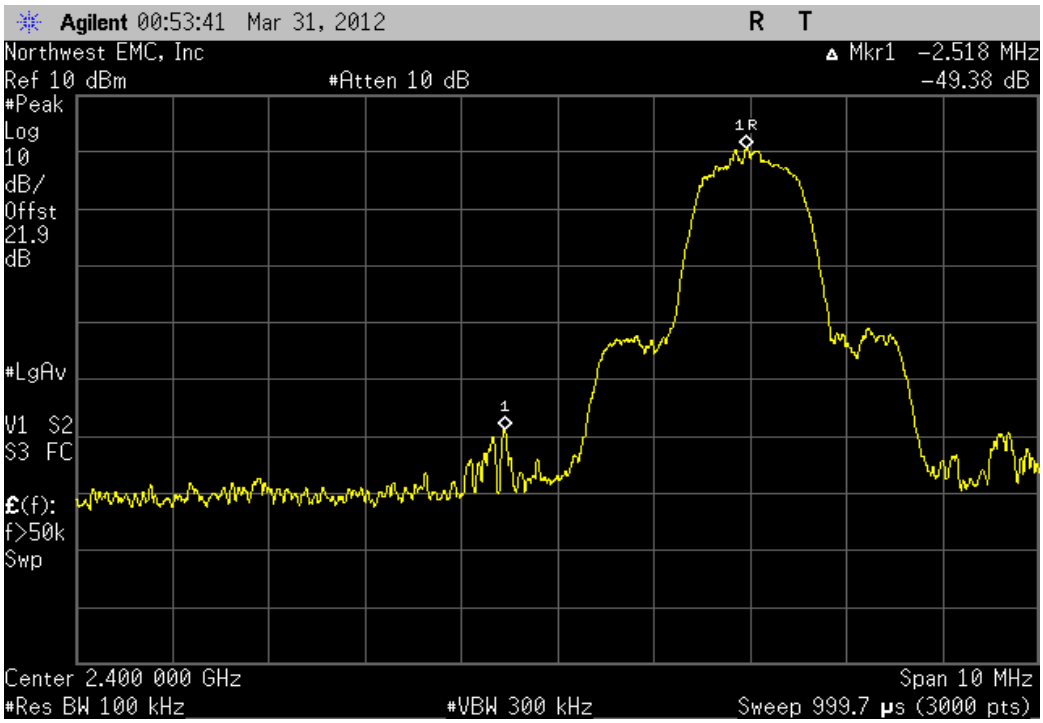

DH5, GFSK, High Channel

| Value | Limit | Result |
|---|---|---|
| -58.01 dBc | ≤ -20 dBc | Pass |



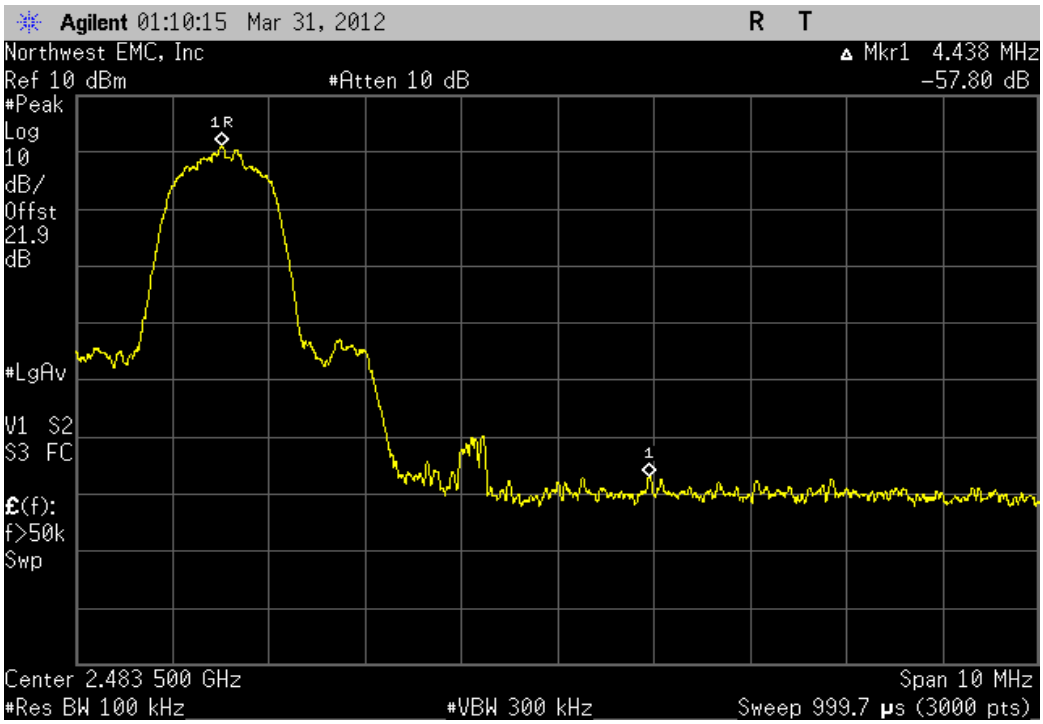
2DH5, 4-DQPSK, Low Channel

| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | -49.38 dBc | ≤ -20 dBc | Pass |

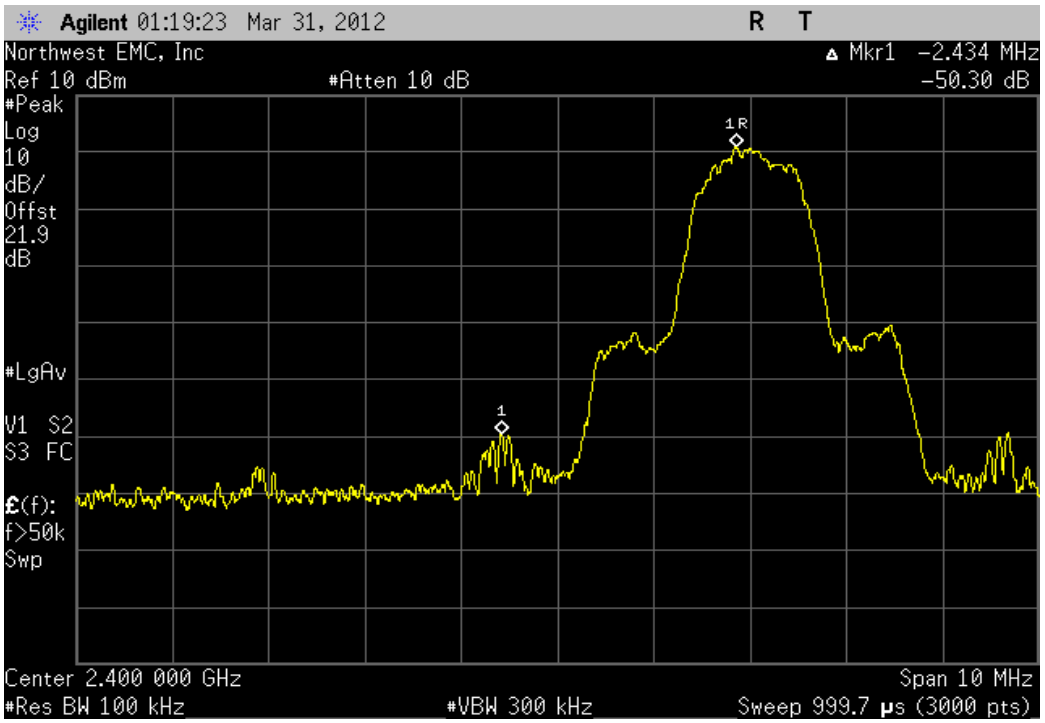



2DH5, 4-DQPSK, High Channel

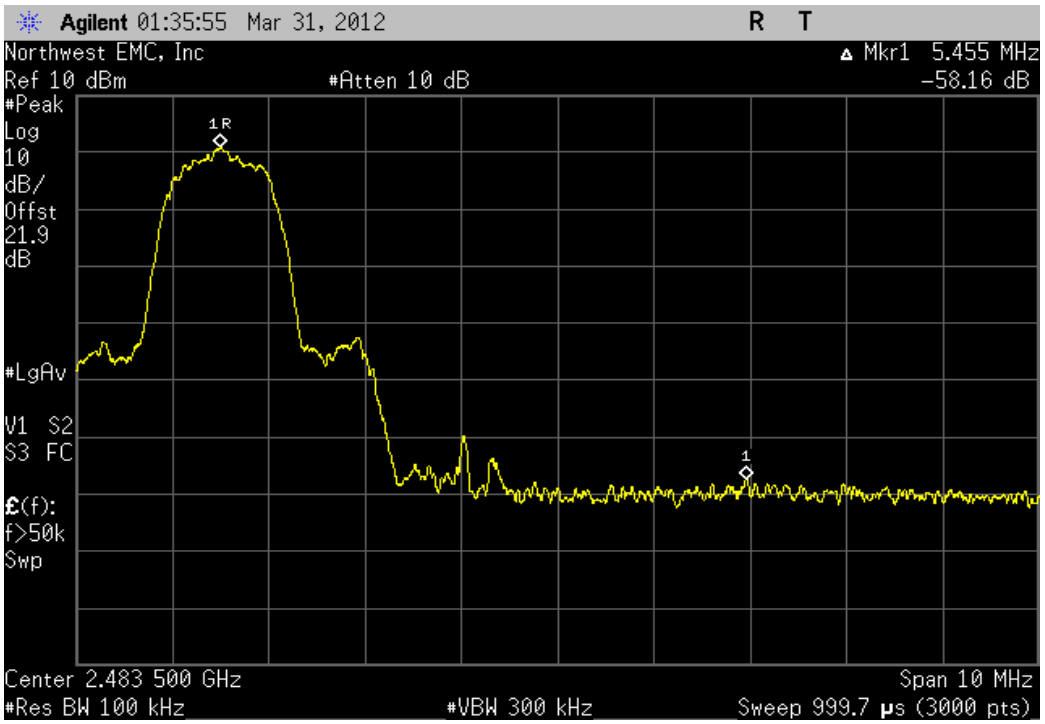
| | | | | Value | Limit | Result |
|---|---|---|---|---|---|---|
| | | | | -57.8 dBc | ≤ -20 dBc | Pass |



| 3DH5, 8-DPSK, Low Channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | Value | Limit | Result |
| | | | | | -50.3 dBc | ≤ -20 dBc | Pass |




| 3DH5, 8-DPSK, High Channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | Value | Limit | Result |
| | | | | | -58.16 dBc | ≤ -20 dBc | Pass |



# Band Edge Compliance

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.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| 40 GHz DC block | Fairview Microwave | SD3379 | AMI | 10/12/2011 | 12 |
| Attenuator - 20db, 'SMA' | SM Electronics | SA26B-20 | RFW | 6/2/2011 | 12 |
| Signal Generator | Agilent | N5183A | TIA | 1/27/2012 | 12 |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Amplitude Accuracy: +/- 0.49) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

# Band Edge Compliance

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Interstim Model 3537 (PTM) | | | **Work Order:** | MDTR0153 |
| **Serial Number:** | NLD001577N | | | **Date:** | 04/09/12 |
| **Customer:** | Medtronic Inc. | | | **Temperature:** | 22.83°C |
| **Attendees:** | Paul Wood | | | **Humidity:** | 17% |
| **Project:** | None | | | **Barometric Pres.:** | 1019.5 |
| **Tested by:** | Trevor Buls | **Power:** | Battery | **Job Site:** | MN05 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Payload size was set to 255. Tx/Rx Mode: PRBS9.

**DEVIATIONS FROM TEST STANDARD**

None

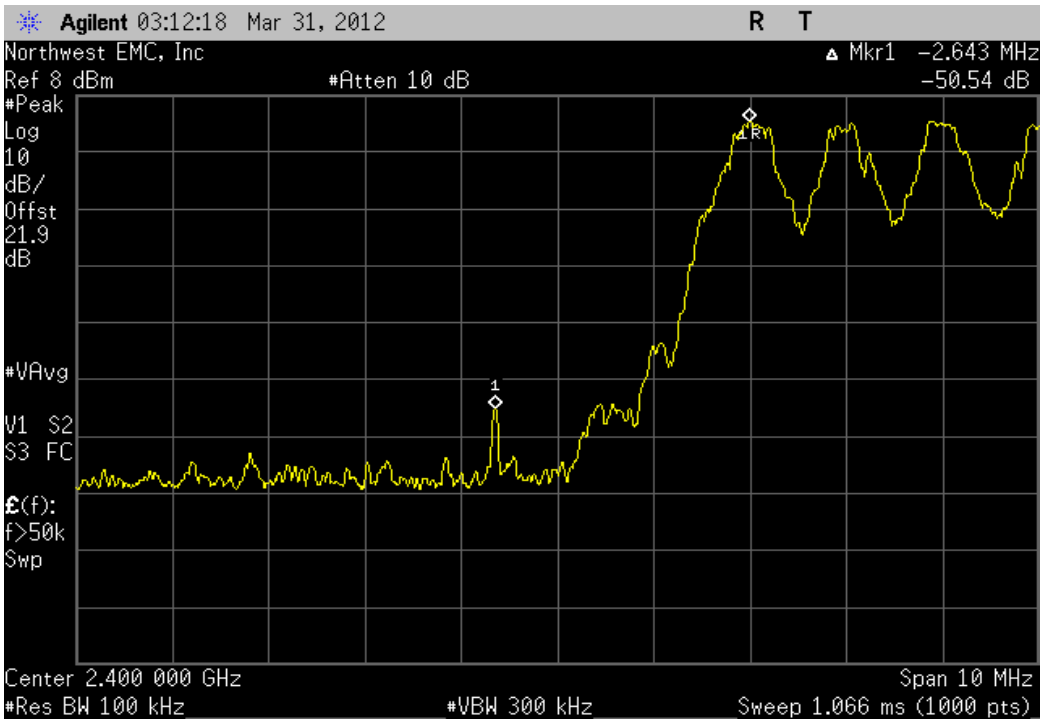
| Configuration # | 1 | Signature Trevor Buls |
|---|---|---|

| | | Value | Limit | Result |
|---|---|---|---|---|
| DH5, GFSK | | | | |
| | Low Channel | -50.54 dBc | ≤ -20 dBc | Pass |
| | High Channel | -59.99 dBc | ≤ -20 dBc | Pass |
| 2DH5, 4-DQPSK | | | | |
| | Low Channel | -53.09 dBc | ≤ -20 dBc | Pass |
| | High Channel | -54 dBc | ≤ -20 dBc | Pass |
| 3DH5, 8-DPSK | | | | |
| | Low Channel | -53.15 dBc | ≤ -20 dBc | Pass |
| | High Channel | -53.05 dBc | ≤ -20 dBc | Pass |

# Band Edge Compliance

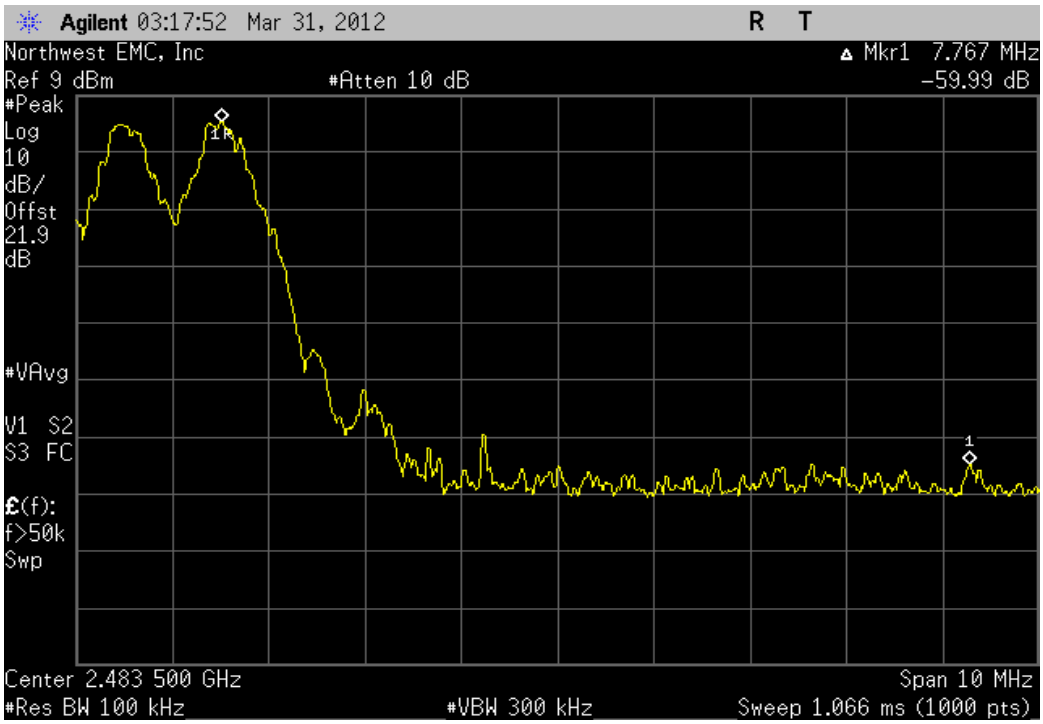
DH5, GFSK, Low Channel

| Value | Limit | Result |
|---|---|---|
| -50.54 dBc | ≤ -20 dBc | Pass |




DH5, GFSK, High Channel

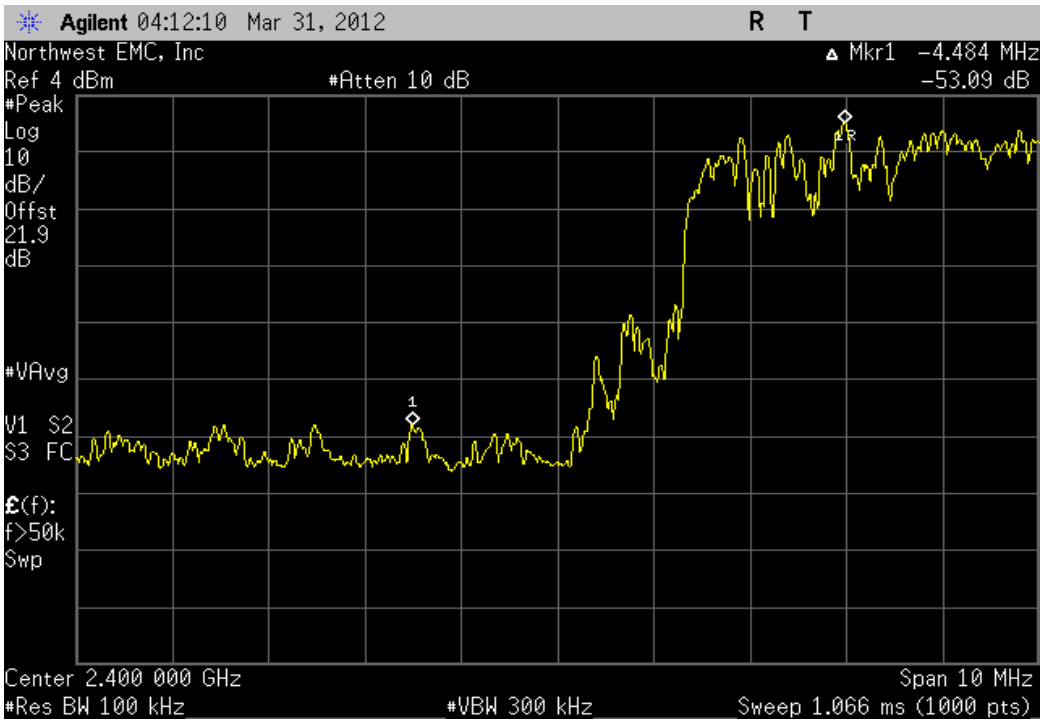
| Value | Limit | Result |
|---|---|---|
| -59.99 dBc | ≤ -20 dBc | Pass |



# Band Edge Compliance

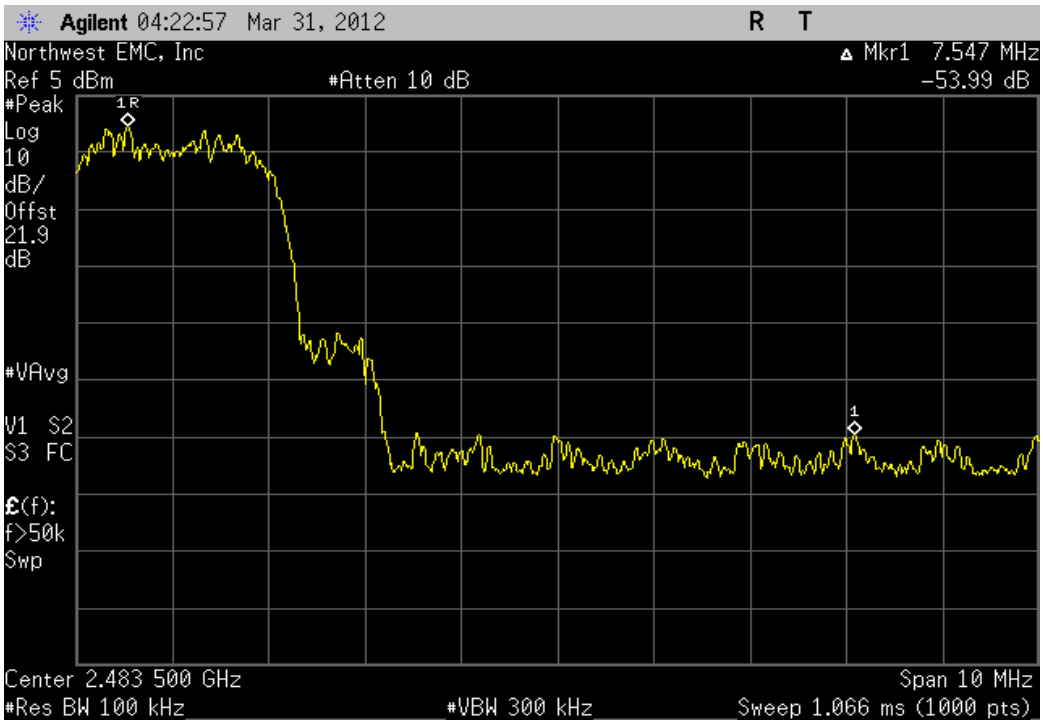
2DH5, 4-DQPSK, Low Channel

| Value | Limit | Result |
|---|---|---|
| -53.09 dBc | ≤ -20 dBc | Pass |




2DH5, 4-DQPSK, High Channel

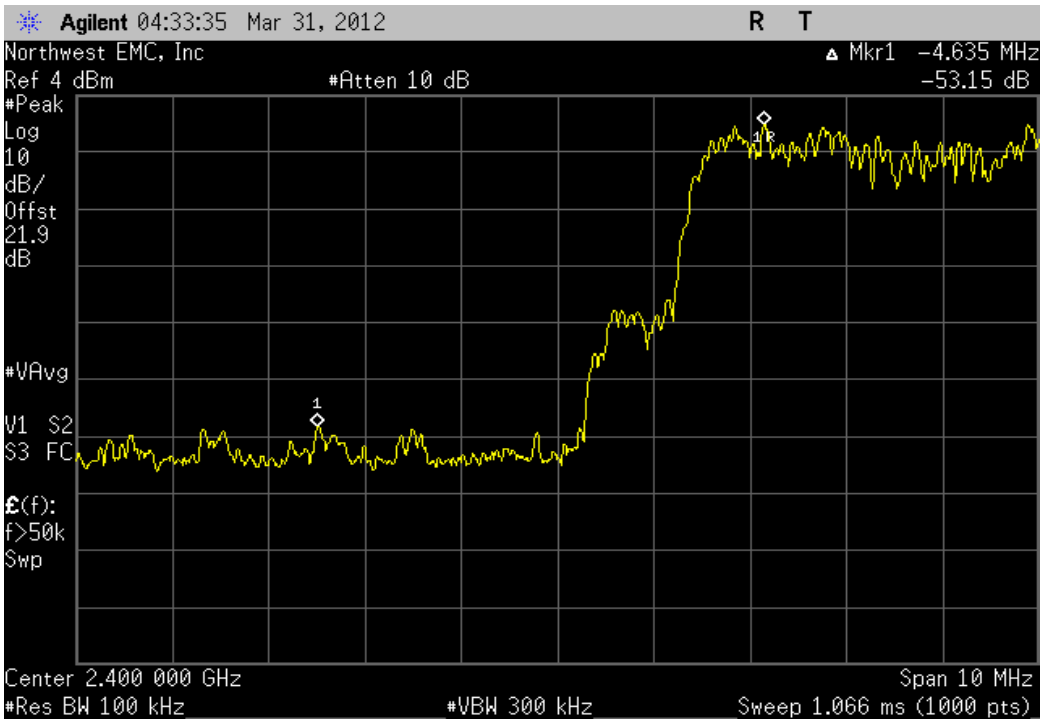
| Value | Limit | Result |
|---|---|---|
| -54 dBc | ≤ -20 dBc | Pass |



# Band Edge Compliance

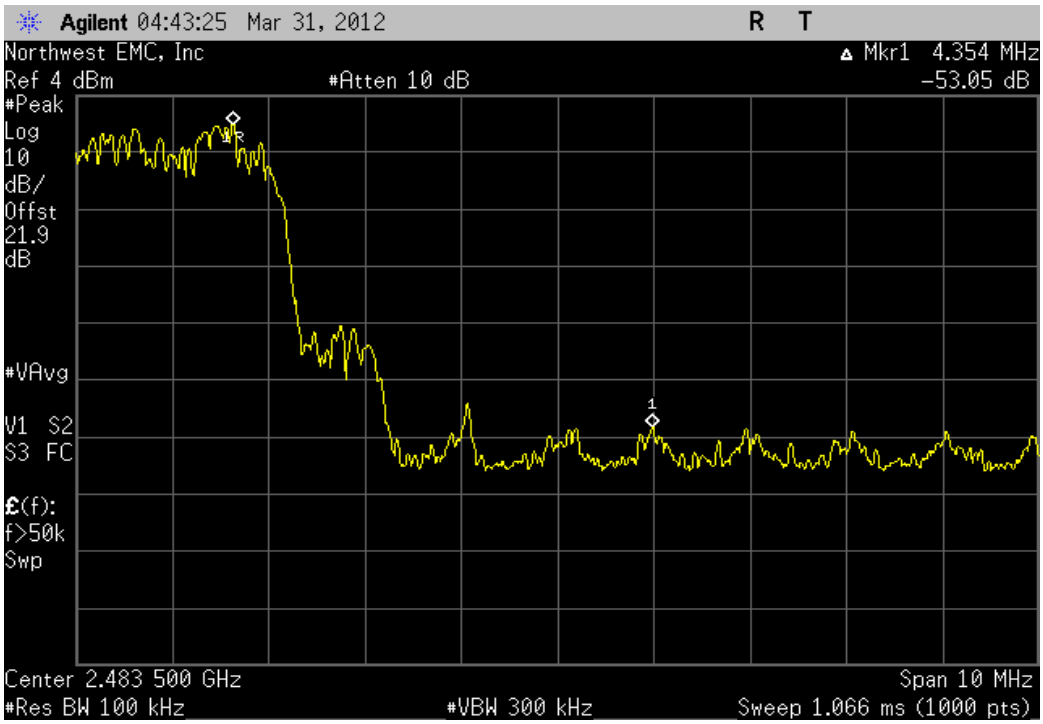
3DH5, 8-DPSK, Low Channel

| Value | Limit | Result |
|---|---|---|
| -53.15 dBc | ≤ -20 dBc | Pass |




3DH5, 8-DPSK, High Channel

| Value | Limit | Result |
|---|---|---|
| -53.05 dBc | ≤ -20 dBc | Pass |



# Spurious Conducted Emissions

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.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Attenuator - 20db, 'SMA' | SM Electronics | SA26B-20 | RFW | 6/2/2011 | 12 |
| 40 GHz DC block | Fairview Microwave | SD3379 | AMI | 10/12/2011 | 12 |
| Signal Generator | Agilent | N5183A | TIA | 1/27/2012 | 12 |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Amplitude Accuracy: +/- 0.49) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

The spurious RF conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

# Spurious Conducted Emissions

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Interstim Model 3537 (PTM) | | | **Work Order:** | MDTR0153 |
| **Serial Number:** | NLD001577N | | | **Date:** | 04/09/12 |
| **Customer:** | Medtronic Inc. | | | **Temperature:** | 22.83°C°C |
| **Attendees:** | Paul Wood | | | **Humidity:** | 17% |
| **Project:** | None | | | **Barometric Pres.:** | 1019.5 |
| **Tested by:** | Trevor Buls | **Power:** | Battery | **Job Site:** | MN05 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Payload size was set to 1024. Tx/Rx Mode: PRBS9.

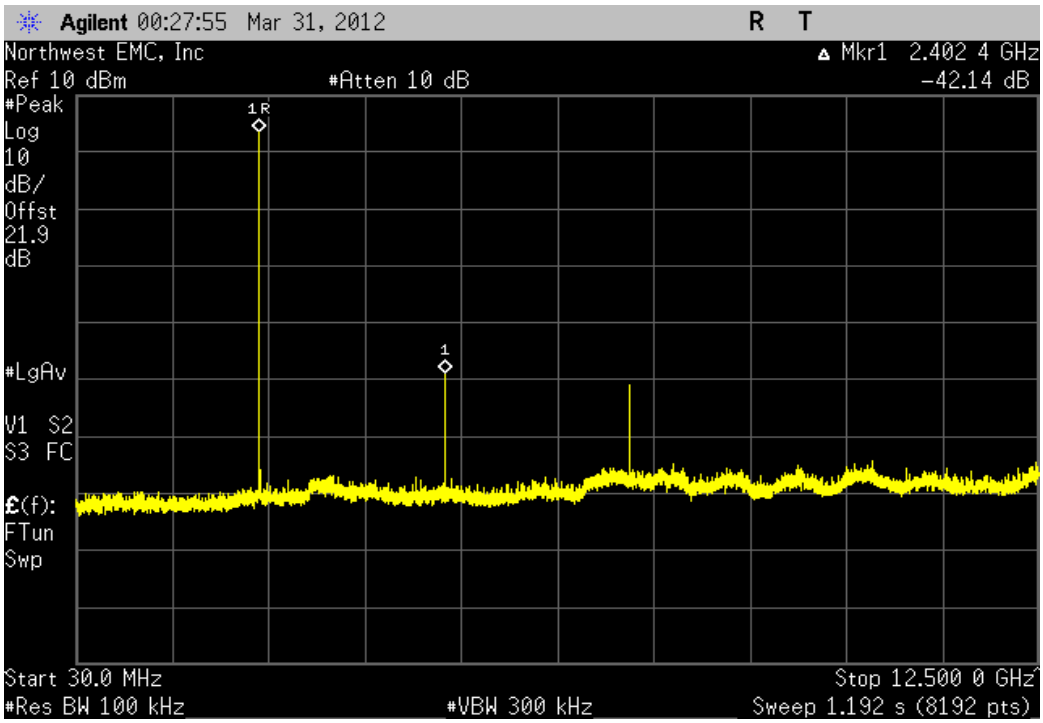
**DEVIATIONS FROM TEST STANDARD**

None

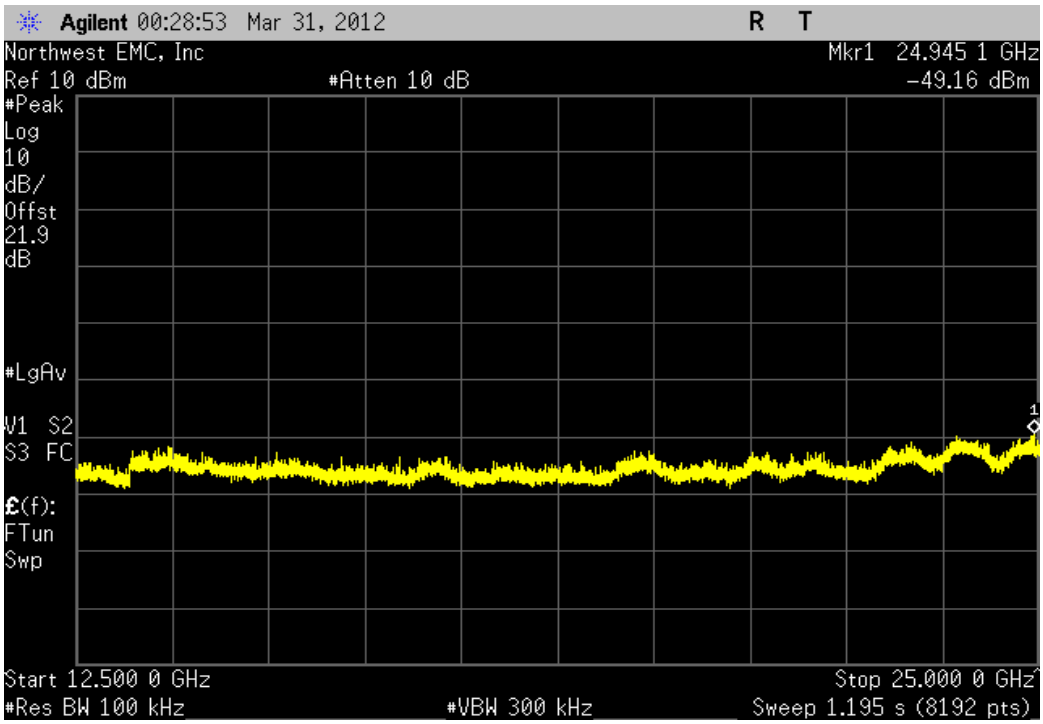
| Configuration # | 1 | Signature | Trevor Buls |
|---|---|---|---|

| | | Frequency Range | Value | Limit | Result |
|---|---|---|---|---|---|
| DH5, GFSK | | | | | |
| | Low Channel | 30 MHz - 12.5 GHz | -42.14 dBc | ≤ -20 dBc | Pass |
| | Low Channel | 12.5 GHz - 25 GHz | -52.53 dBc | ≤ -20 dBc | Pass |
| | Mid Channel | 30 MHz - 12.5 GHz | -44.68 dBc | ≤ -20 dBc | Pass |
| | Mid Channel | 12.5 GHz - 25 GHz | -53.6 dBc | ≤ -20 dBc | Pass |
| | High Channel | 30 MHz - 12.5 GHz | -43.5 dBc | ≤ -20 dBc | Pass |
| | High Channel | 12.5 GHz - 25 GHz | -53.05 dBc | ≤ -20 dBc | Pass |
| 2DH5, 4-DQPSK | | | | | |
| | Low Channel | 30 MHz - 12.5 GHz | -43.86 dBc | ≤ -20 dBc | Pass |
| | Low Channel | 12.5 GHz - 25 GHz | -49.23 dBc | ≤ -20 dBc | Pass |
| | Mid Channel | 30 MHz - 12.5 GHz | -43.89 dBc | ≤ -20 dBc | Pass |
| | Mid Channel | 12.5 GHz - 25 GHz | -47.95 dBc | ≤ -20 dBc | Pass |
| | High Channel | 30 MHz - 12.5 GHz | -47.07 dBc | ≤ -20 dBc | Pass |
| | High Channel | 12.5 GHz - 25 GHz | -49.16 dBc | ≤ -20 dBc | Pass |
| 3DH5, 8-DPSK | | | | | |
| | Low Channel | 30 MHz - 12.5 GHz | -43.26 dBc | ≤ -20 dBc | Pass |
| | Low Channel | 12.5 GHz - 25 GHz | -50.27 dBc | ≤ -20 dBc | Pass |
| | Mid Channel | 30 MHz - 12.5 GHz | -44.81 dBc | ≤ -20 dBc | Pass |
| | Mid Channel | 12.5 GHz - 25 GHz | -50.27 dBc | ≤ -20 dBc | Pass |
| | High Channel | 30 MHz - 12.5 GHz | -43.28 dBc | ≤ -20 dBc | Pass |
| | High Channel | 12.5 GHz - 25 GHz | -48.98 dBc | ≤ -20 dBc | Pass |

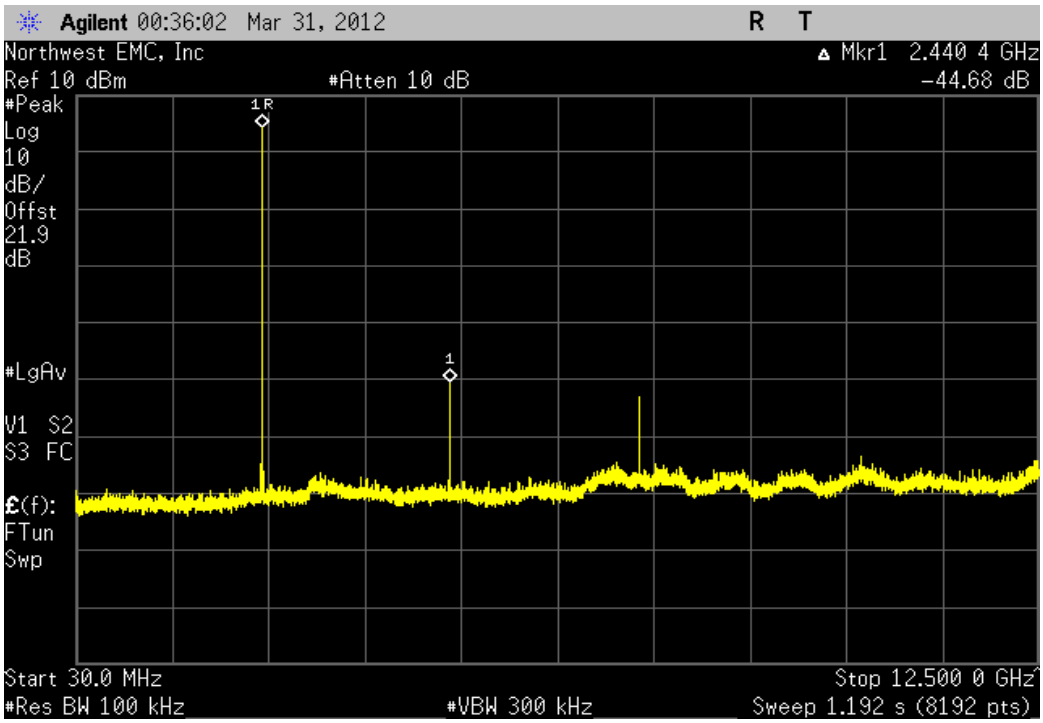
| DH5, GFSK, Low Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 30 MHz - 12.5 GHz | | -42.14 dBc | ≤ -20 dBc | Pass |



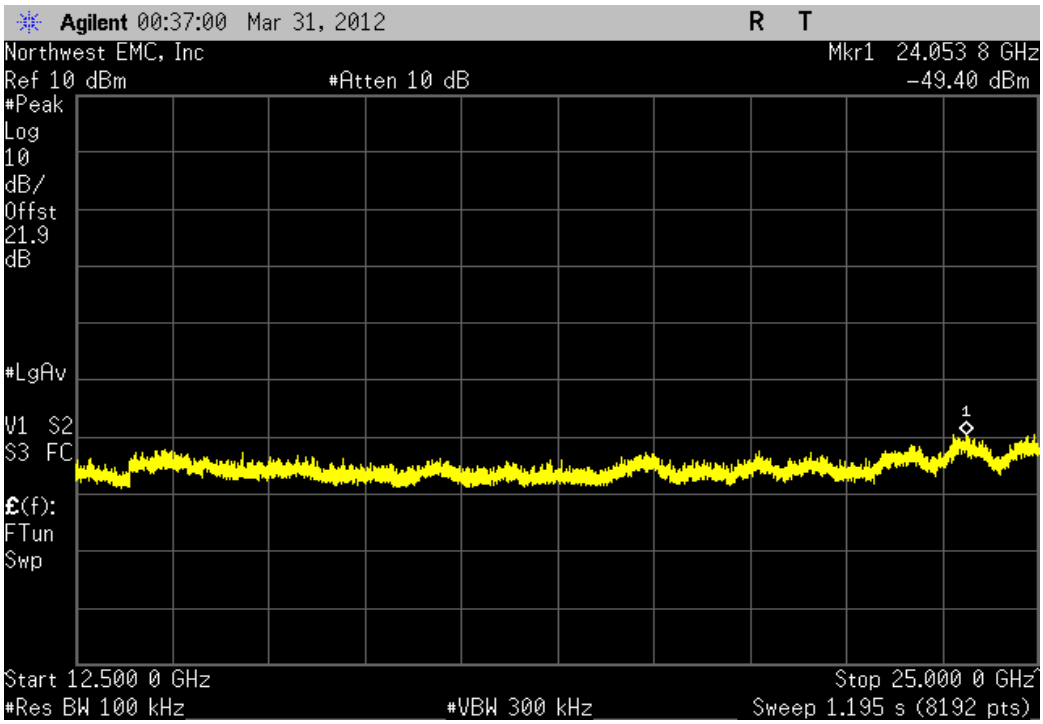

| DH5, GFSK, Low Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 12.5 GHz - 25 GHz | | -52.53 dBc | ≤ -20 dBc | Pass |



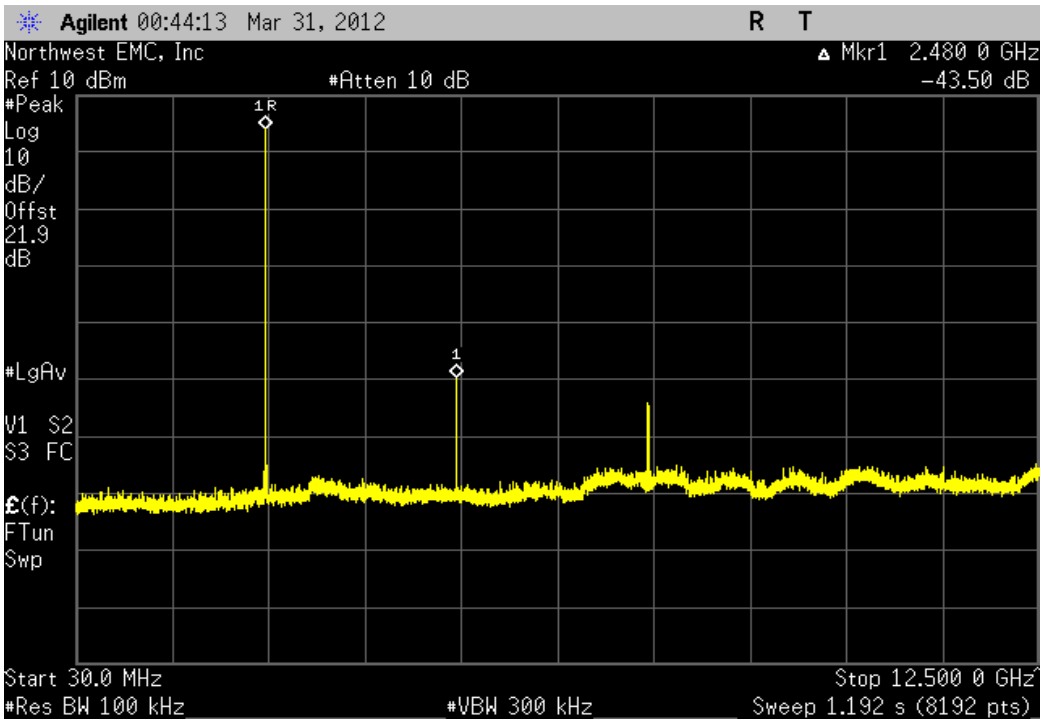
| DH5, GFSK, Mid Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 30 MHz - 12.5 GHz | | -44.68 dBc | ≤ -20 dBc | Pass |



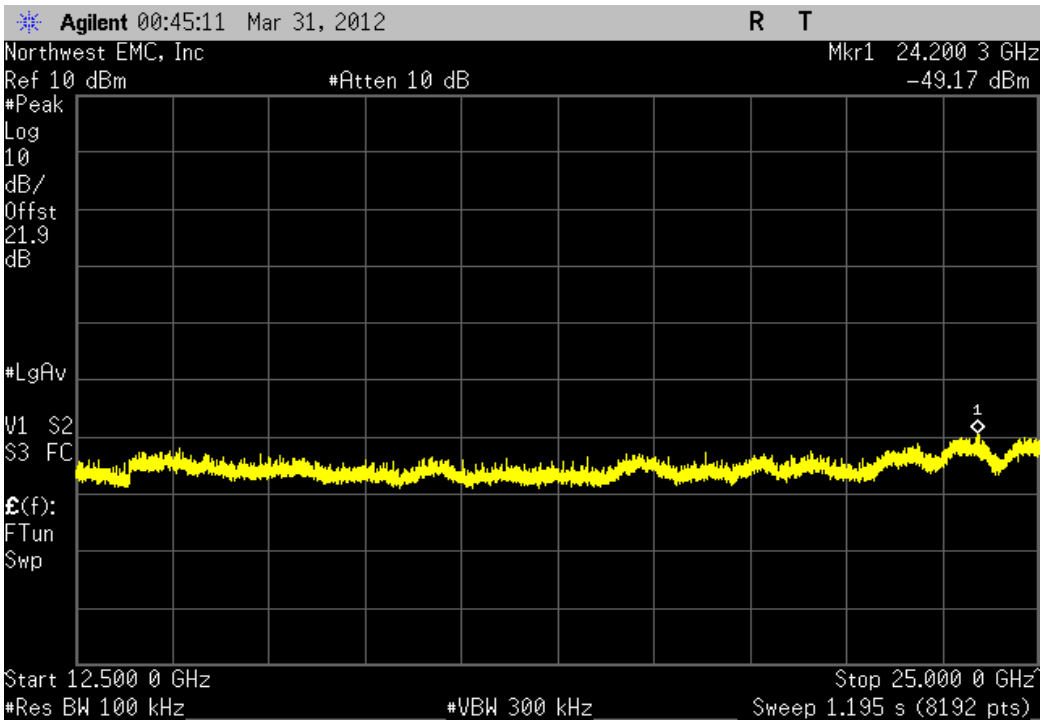

| DH5, GFSK, Mid Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 12.5 GHz - 25 GHz | | -53.6 dBc | ≤ -20 dBc | Pass |



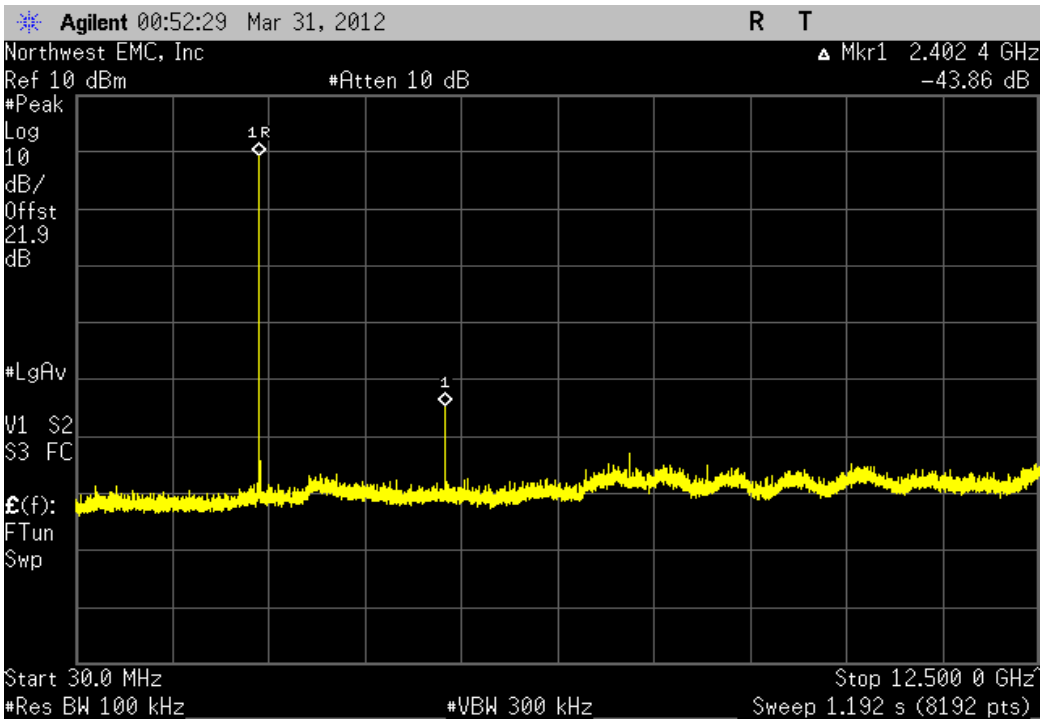
| DH5, GFSK, High Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 30 MHz - 12.5 GHz | | -43.5 dBc | ≤ -20 dBc | Pass |



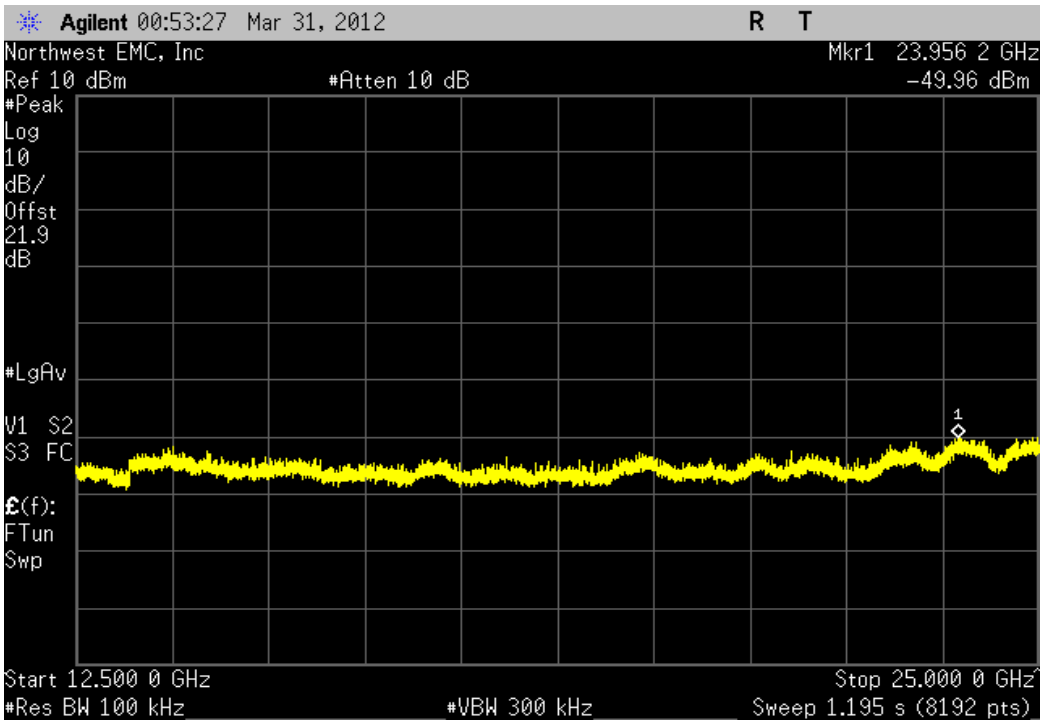

| DH5, GFSK, High Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 12.5 GHz - 25 GHz | | -53.05 dBc | ≤ -20 dBc | Pass |



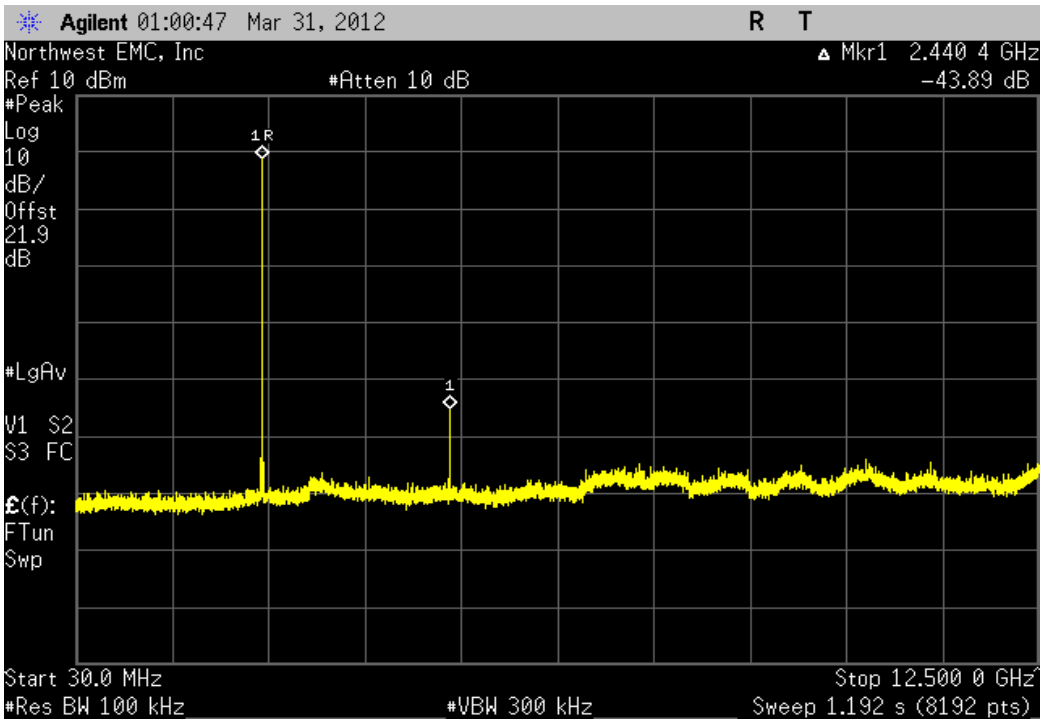
| 2DH5, 4-DQPSK, Low Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 30 MHz - 12.5 GHz | | -43.86 dBc | ≤ -20 dBc | Pass |



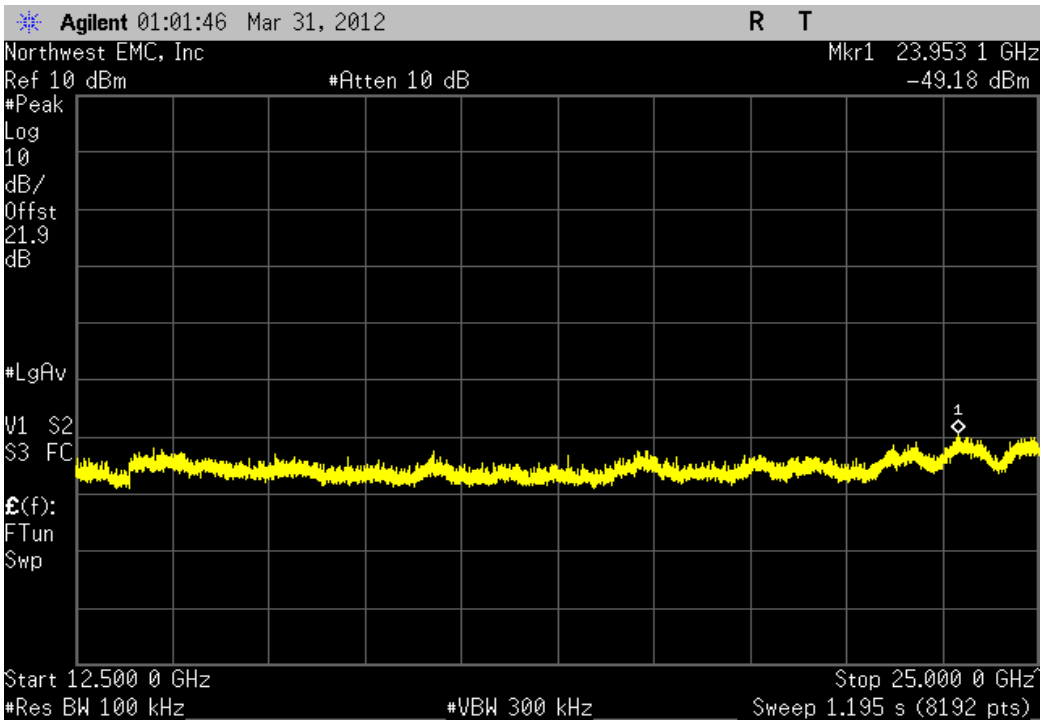

| 2DH5, 4-DQPSK, Low Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 12.5 GHz - 25 GHz | | -49.23 dBc | ≤ -20 dBc | Pass |



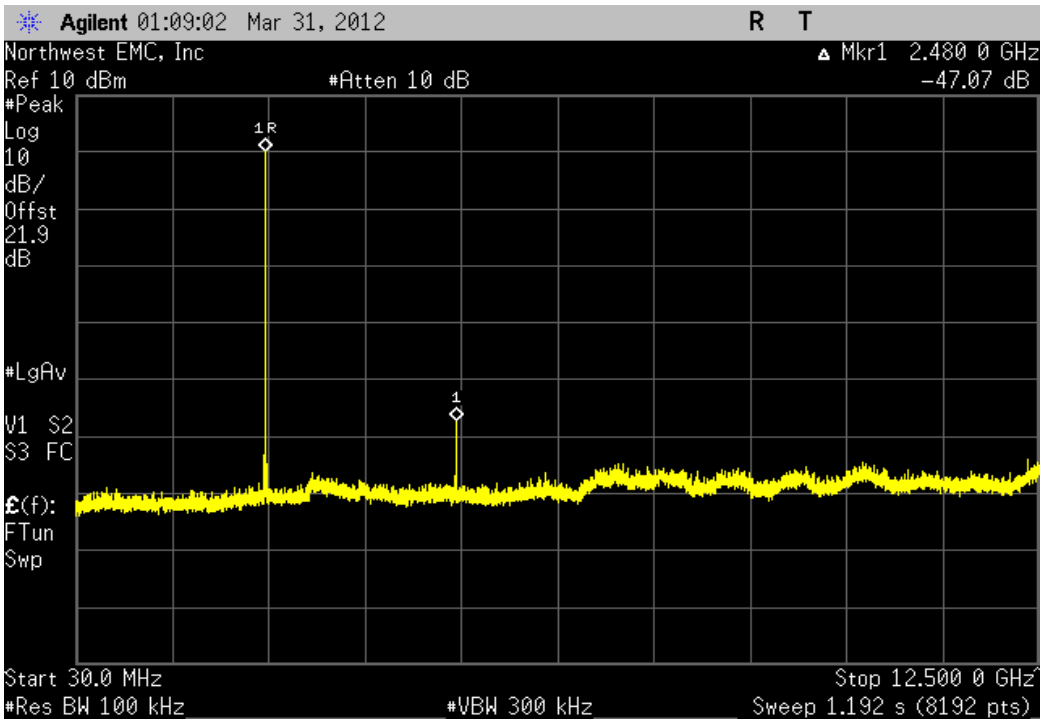
| 2DH5, 4-DQPSK, Mid Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 30 MHz - 12.5 GHz | | -43.89 dBc | ≤ -20 dBc | Pass |



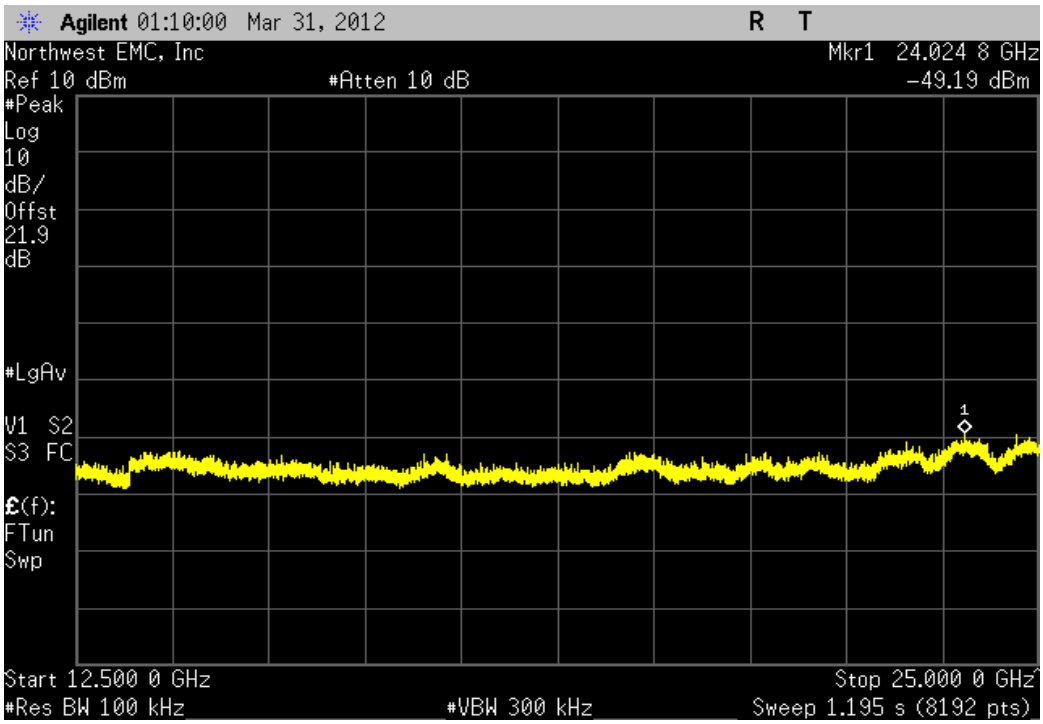

| 2DH5, 4-DQPSK, Mid Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 12.5 GHz - 25 GHz | | -47.95 dBc | ≤ -20 dBc | Pass |



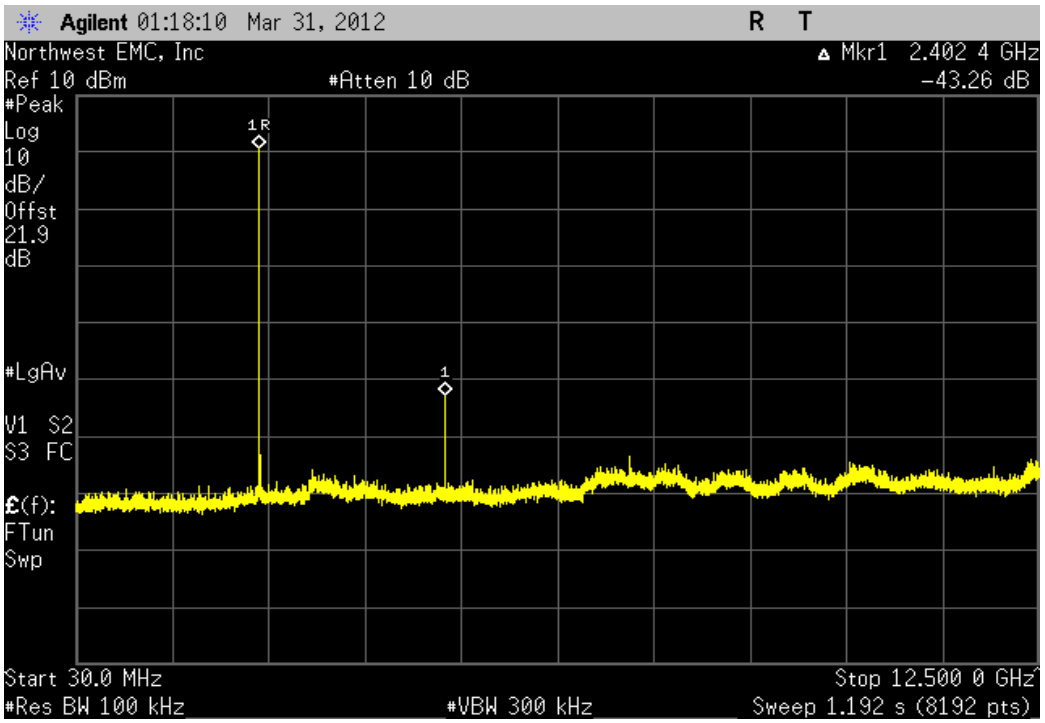
| 2DH5, 4-DQPSK, High Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 30 MHz - 12.5 GHz | | -47.07 dBc | ≤ -20 dBc | Pass |



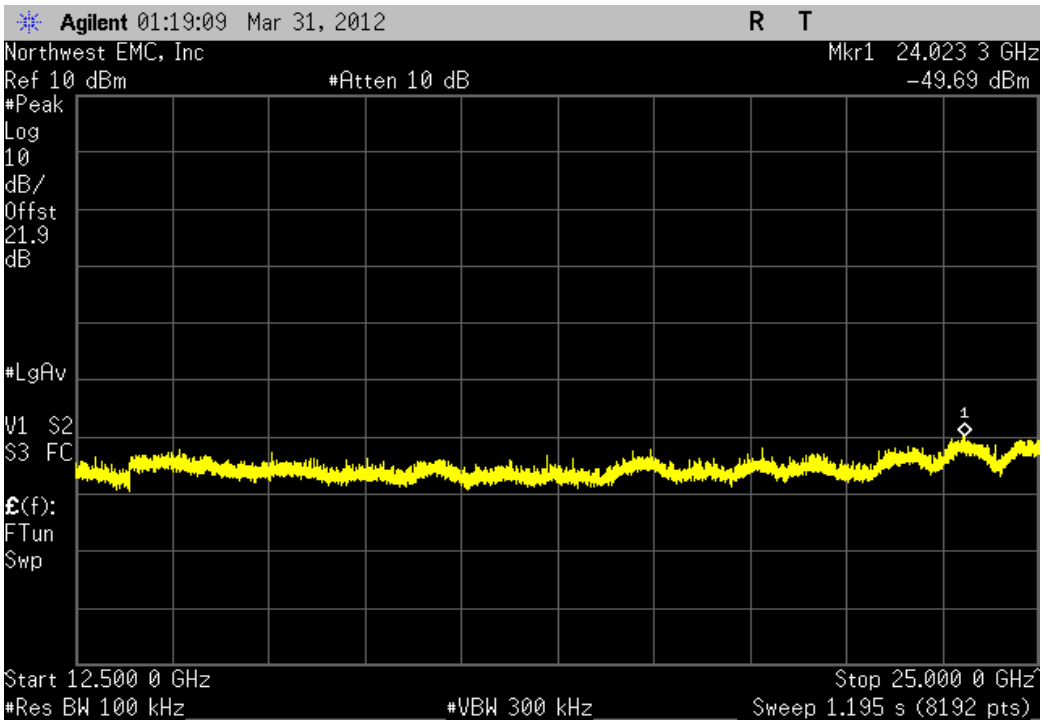

| 2DH5, 4-DQPSK, High Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 12.5 GHz - 25 GHz | | -49.16 dBc | ≤ -20 dBc | Pass |



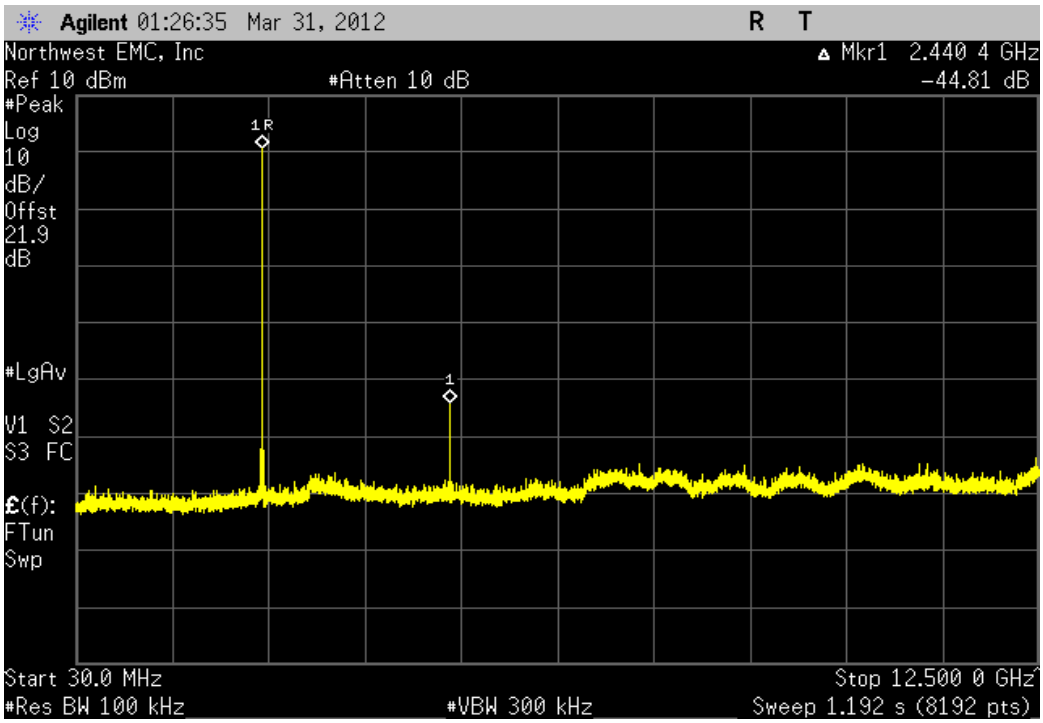
| 3DH5, 8-DPSK, Low Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 30 MHz - 12.5 GHz | | -43.26 dBc | ≤ -20 dBc | Pass |



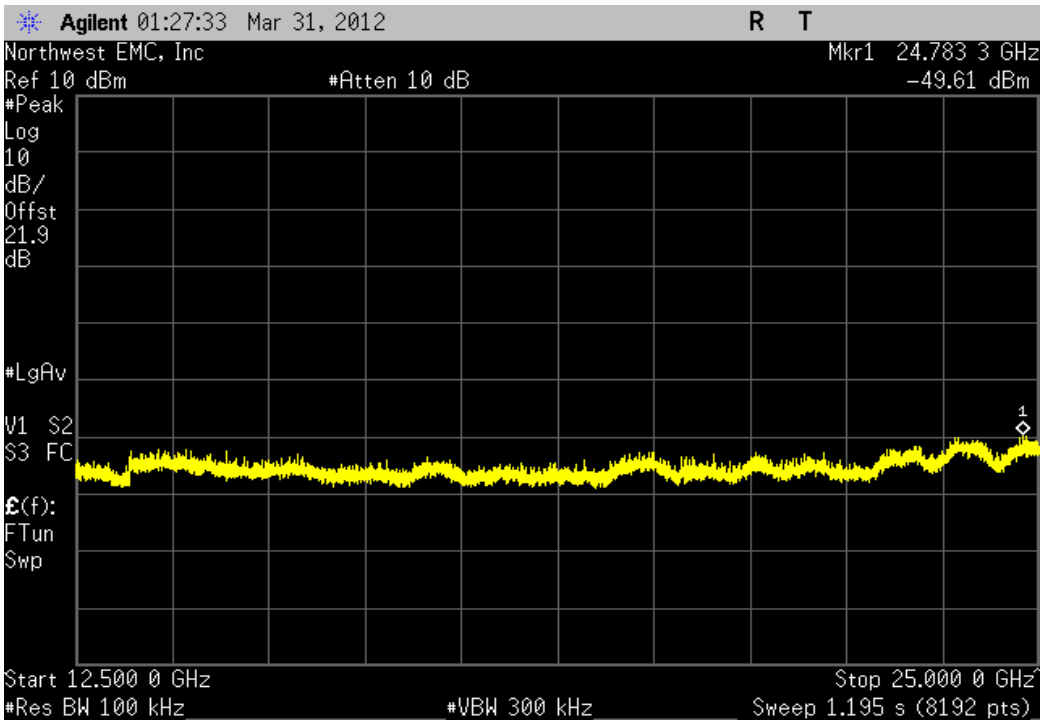

| 3DH5, 8-DPSK, Low Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 12.5 GHz - 25 GHz | | -50.27 dBc | ≤ -20 dBc | Pass |



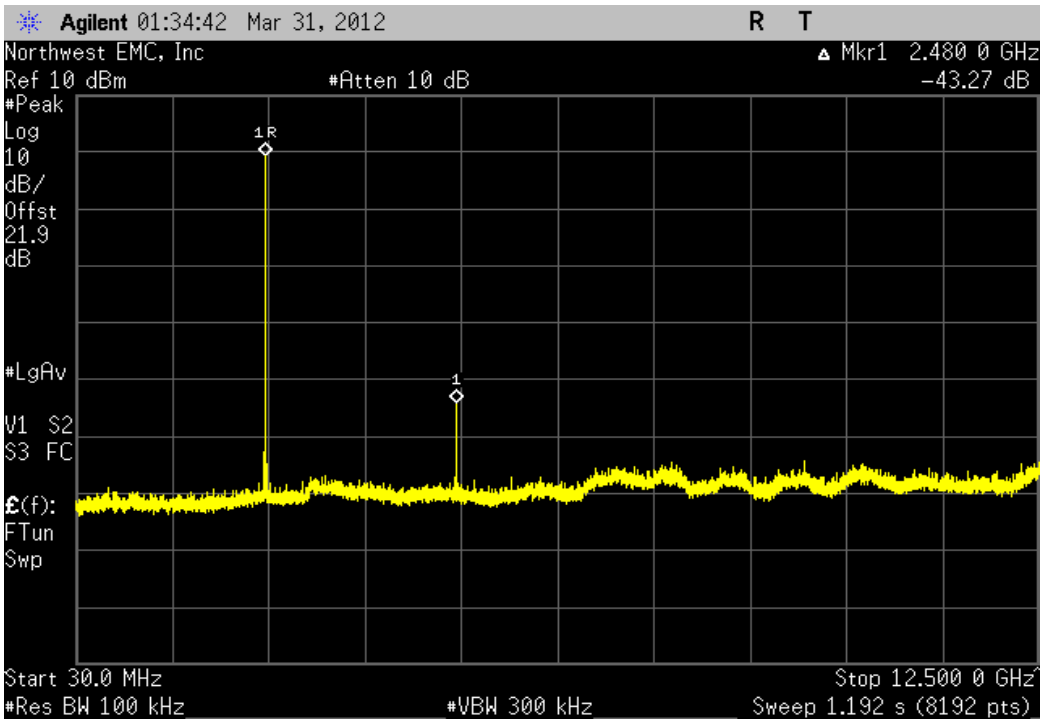
| 3DH5, 8-DPSK, Mid Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 30 MHz - 12.5 GHz | | -44.81 dBc | ≤ -20 dBc | Pass |



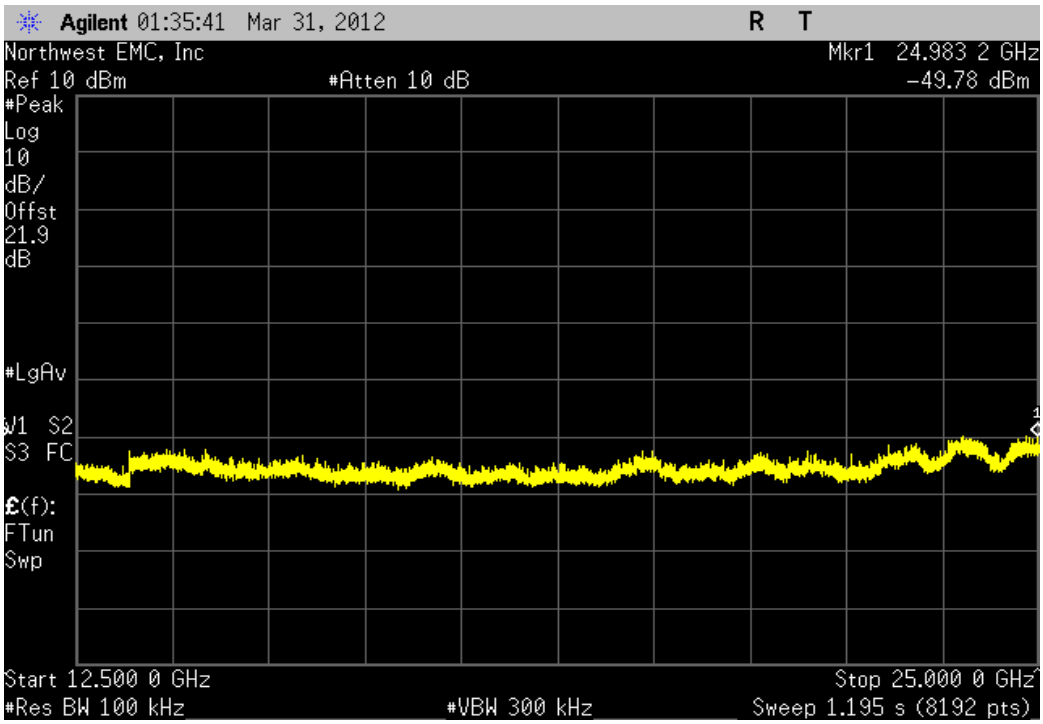

| 3DH5, 8-DPSK, Mid Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 12.5 GHz - 25 GHz | | -50.27 dBc | ≤ -20 dBc | Pass |



| 3DH5, 8-DPSK, High Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 30 MHz - 12.5 GHz | | -43.28 dBc | ≤ -20 dBc | Pass |




| 3DH5, 8-DPSK, High Channel | | | | |
|---|---|---|---|---|
| **Frequency Range** | | **Value** | **Limit** | **Result** |
| 12.5 GHz - 25 GHz | | -48.98 dBc | ≤ -20 dBc | Pass |



# Power Spectral Density

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.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| 40 GHz DC block | Fairview Microwave | SD3379 | AMI | 10/12/2011 | 12 |
| Attenuator - 20db, 'SMA' | SM Electronics | SA26B-20 | RFW | 6/2/2011 | 12 |
| Signal Generator | Agilent | N5183A | TIA | 1/27/2012 | 12 |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Conducted Power: +/- 0.41) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

The peak power spectral density measurements were measured with the EUT set to the required transmit frequencies in each band. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the lowest, middle, and maximum data rate for each modulation type available. Per the procedure outlined in FCC KDB 558074, March 23, 2005, the spectrum analyzer was used as follows:

The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span of 1.5 MHz, the sweep should be 1.5 x 106 ÷ 3 x 103 = 500 seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

“If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 34.8 dB for correction to 3 kHz.”

# Power Spectral Density

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Interstim Model 3537 (PTM) | | | **Work Order:** | MDTR0153 |
| **Serial Number:** | NLD001577N | | | **Date:** | 04/09/12 |
| **Customer:** | Medtronic Inc. | | | **Temperature:** | 22.83°C |
| **Attendees:** | Paul Wood | | | **Humidity:** | 17% |
| **Project:** | None | | | **Barometric Pres.:** | 1019.5 |
| **Tested by:** | Trevor Buls | **Power:** | Battery | **Job Site:** | MN05 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Payload size was set to 1024. Tx/Rx Mode: PRBS9.

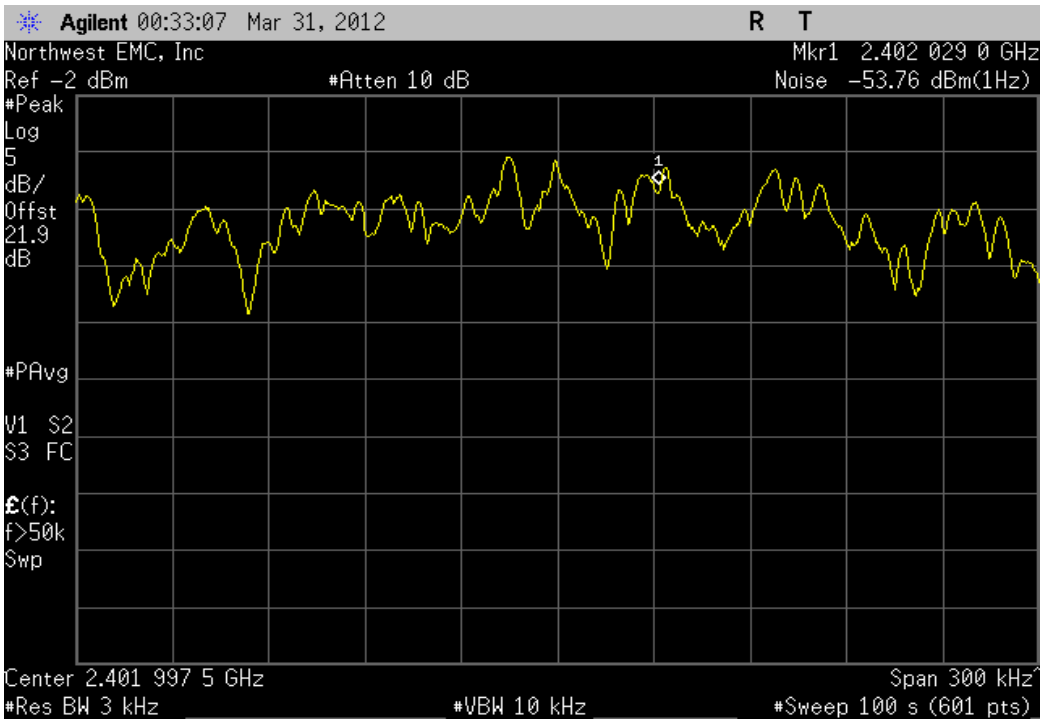
**DEVIATIONS FROM TEST STANDARD**

None

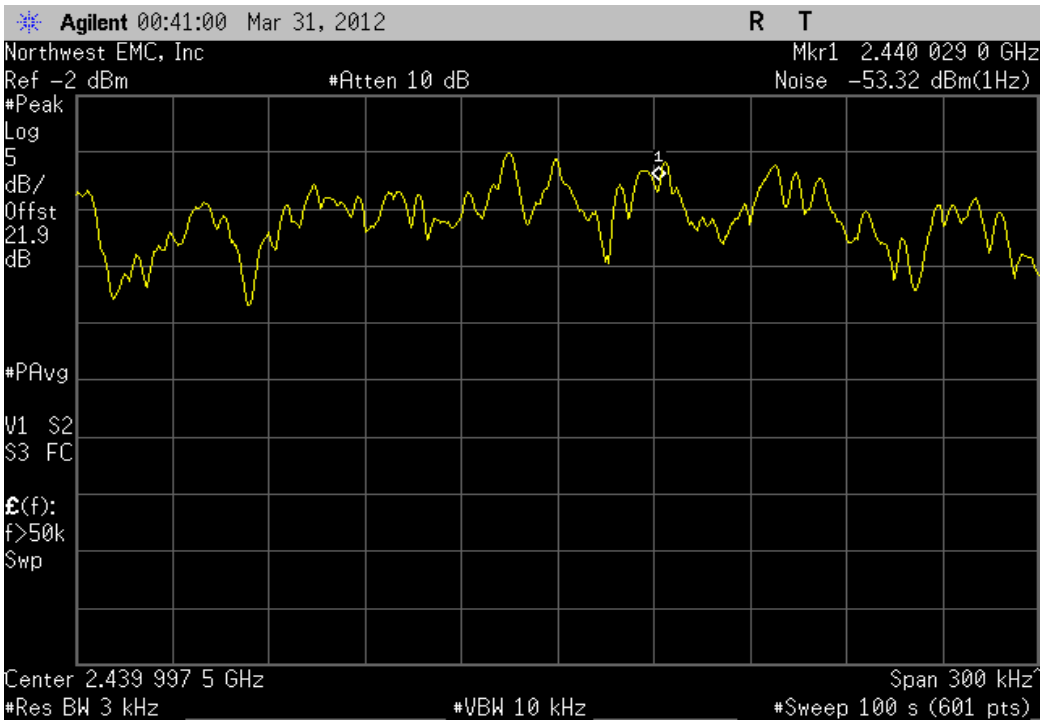
| Configuration # | 1 | Signature | Trevor Buls |
|---|---|---|---|

| | | Value (dBm / Hz) | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
|---|---|---|---|---|---|---|
| DH5, GFSK | | | | | | |
| | Low Channel | -53.755 | 34.8 | -18.955 | 8 | Pass |
| | Mid Channel | -53.317 | 34.8 | -18.517 | 8 | Pass |
| | High Channel | -53.219 | 34.8 | -18.419 | 8 | Pass |
| 2DH5, 4-DQPSK | | | | | | |
| | Low Channel | -59.002 | 34.8 | -24.202 | 8 | Pass |
| | Mid Channel | -59.021 | 34.8 | -24.221 | 8 | Pass |
| | High Channel | -59.027 | 34.8 | -24.227 | 8 | Pass |
| 3DH5, 8-DPSK | | | | | | |
| | Low Channel | -59.944 | 34.8 | -25.144 | 8 | Pass |
| | Mid Channel | -59.898 | 34.8 | -25.098 | 8 | Pass |
| | High Channel | -60.004 | 34.8 | -25.204 | 8 | Pass |

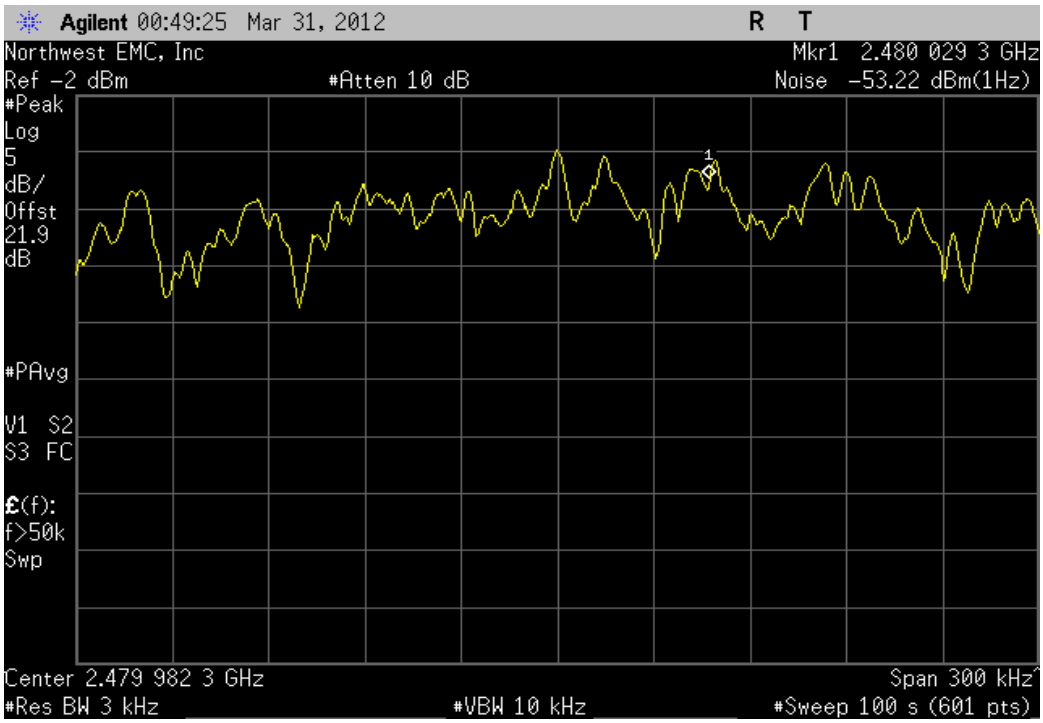
| DH5, GFSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | Value (dBm / Hz) | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
| | | -53.755 | 34.8 | -18.955 | 8 | Pass |



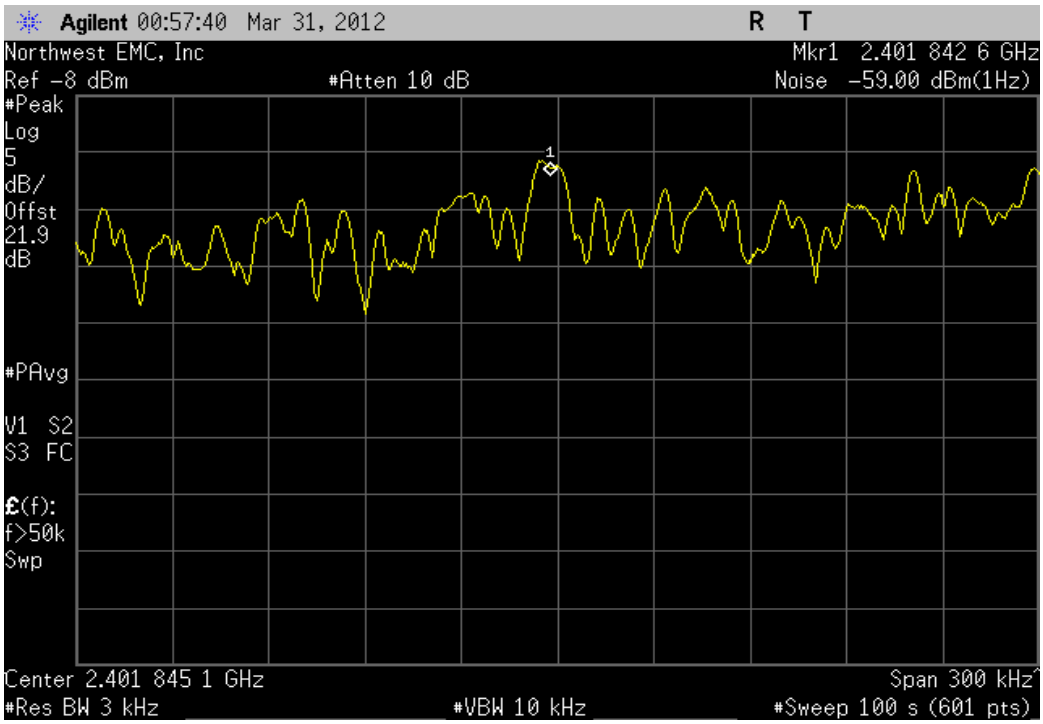

| DH5, GFSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | Value (dBm / Hz) | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
| | | -53.317 | 34.8 | -18.517 | 8 | Pass |



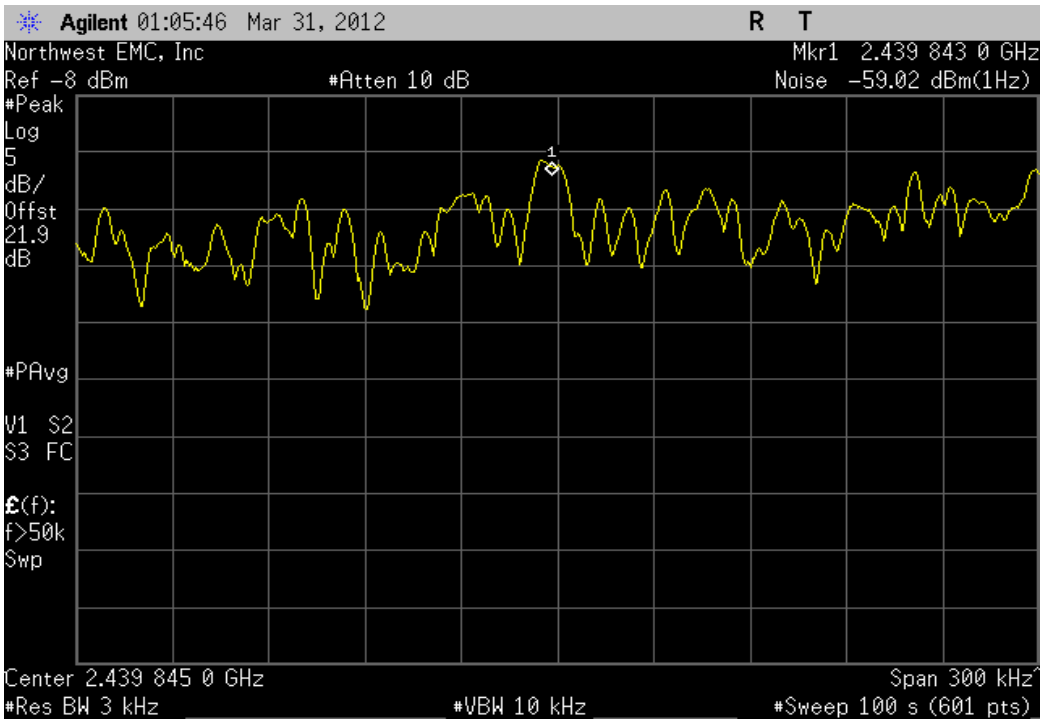
| DH5, GFSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | Value (dBm / Hz) | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
| | | -53.219 | 34.8 | -18.419 | 8 | Pass |



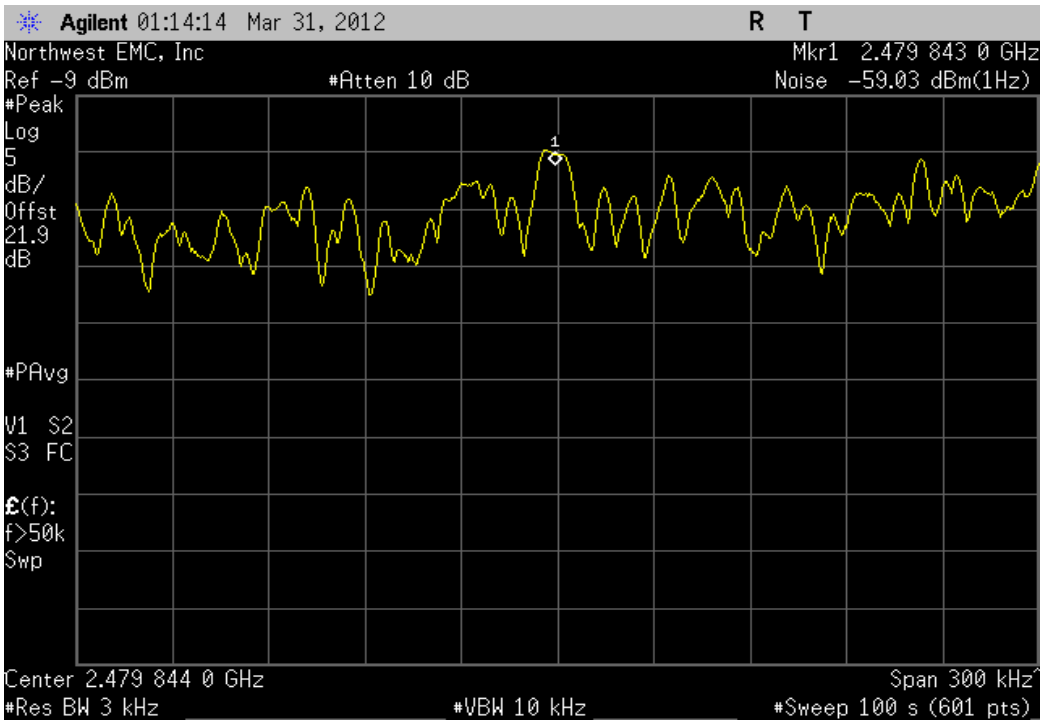

| 2DH5, 4-DQPSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | Value (dBm / Hz) | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
| | | -59.002 | 34.8 | -24.202 | 8 | Pass |



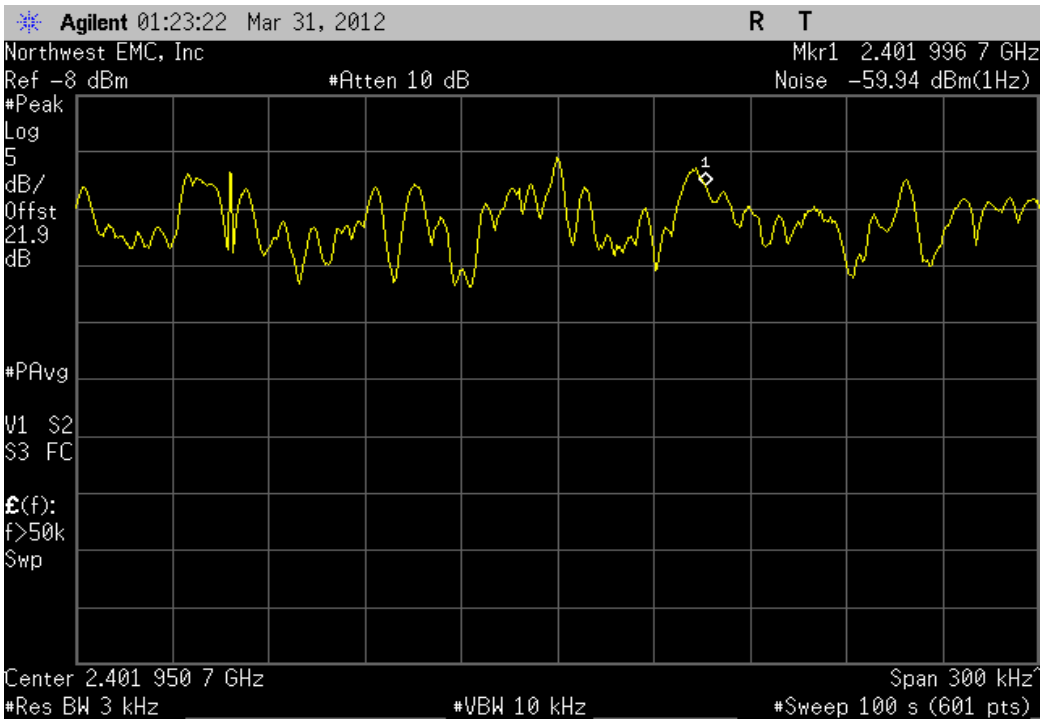
| 2DH5, 4-DQPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | Value (dBm / Hz) | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
| | | -59.021 | 34.8 | -24.221 | 8 | Pass |



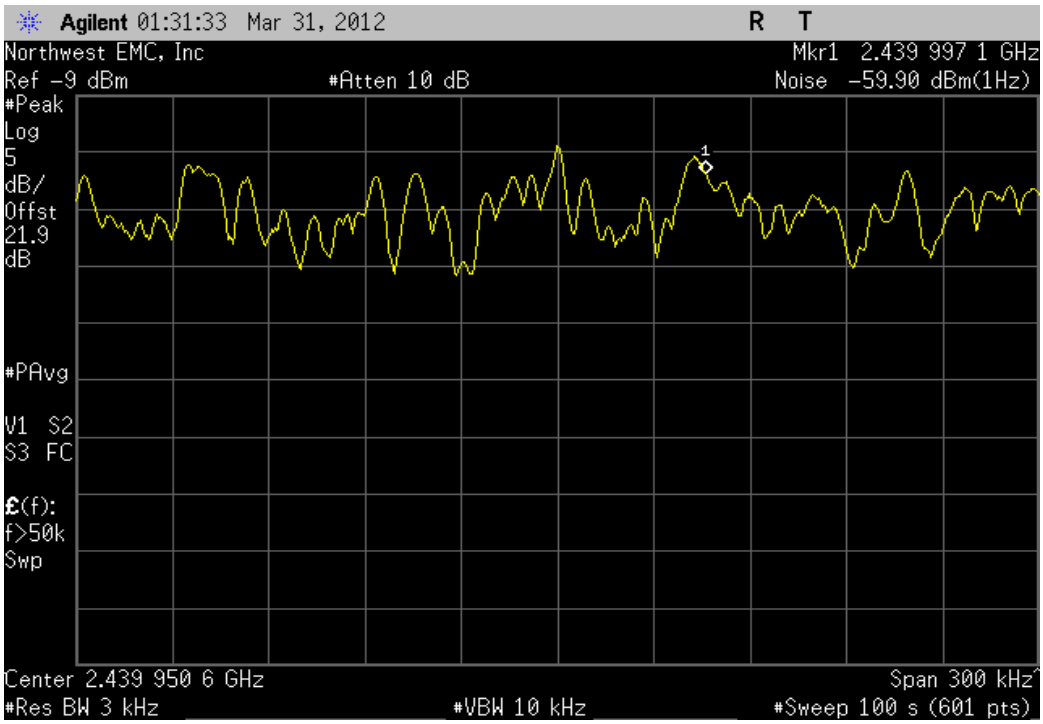

| 2DH5, 4-DQPSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | Value (dBm / Hz) | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
| | | -59.027 | 34.8 | -24.227 | 8 | Pass |



| 3DH5, 8-DPSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | Value (dBm / Hz) | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
| | | -59.944 | 34.8 | -25.144 | 8 | Pass |

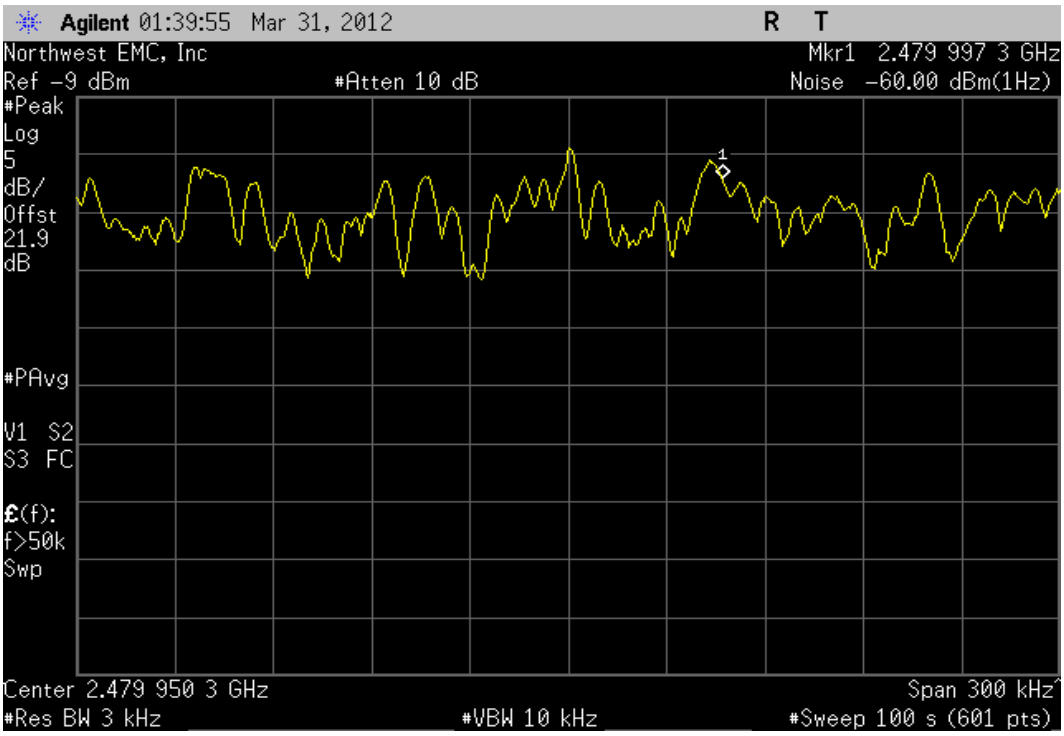



| 3DH5, 8-DPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | Value (dBm / Hz) | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
| | | -59.898 | 34.8 | -25.098 | 8 | Pass |



# Power Spectral Density

| 3DH5, 8-DPSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| | | Value (dBm / Hz) | (dBm / Hz) To (dBm / 3 kHz) | Value (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Result |
| | | -60.004 | 34.8 | -25.204 | 8 | Pass |



# Duty Cycle

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.

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| 40 GHz DC block | Fairview Microwave | SD3379 | AMI | 10/12/2011 | 12 |
| Attenuator - 20db, 'SMA' | SM Electronics | SA26B-20 | RFW | 6/2/2011 | 12 |
| Signal Generator | Agilent | N5183A | TIA | 1/27/2012 | 12 |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Frequency Accuracy: +0.12/- 0.01) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

For transmitters which are not operated at a continuous transmission of 100% duty cycle, a duty cycle correction must be measured and calculated to add to the data taken in other tests in this report.

The observed duty cycle is expressed in terms of a percentage and is calculated as:

Duty Cycle = (Tx on / (Tx on + Tx off))

The observed duty cycle was measured for each available modulation and data rate

# Duty Cycle

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Interstim Model 3537 (PTM) | | | **Work Order:** | MDTR0153 |
| **Serial Number:** | NLD001577N | | | **Date:** | 04/09/12 |
| **Customer:** | Medtronic Inc. | | | **Temperature:** | 22.83°C°C |
| **Attendees:** | Paul Wood | | | **Humidity:** | 17% |
| **Project:** | None | | | **Barometric Pres.:** | 1019.5 |
| **Tested by:** | Trevor Buls | **Power:** | Battery | **Job Site:** | MN05 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |
| | |

**COMMENTS**

Payload size was set to 1024. Tx/Rx Mode: PRBS9.

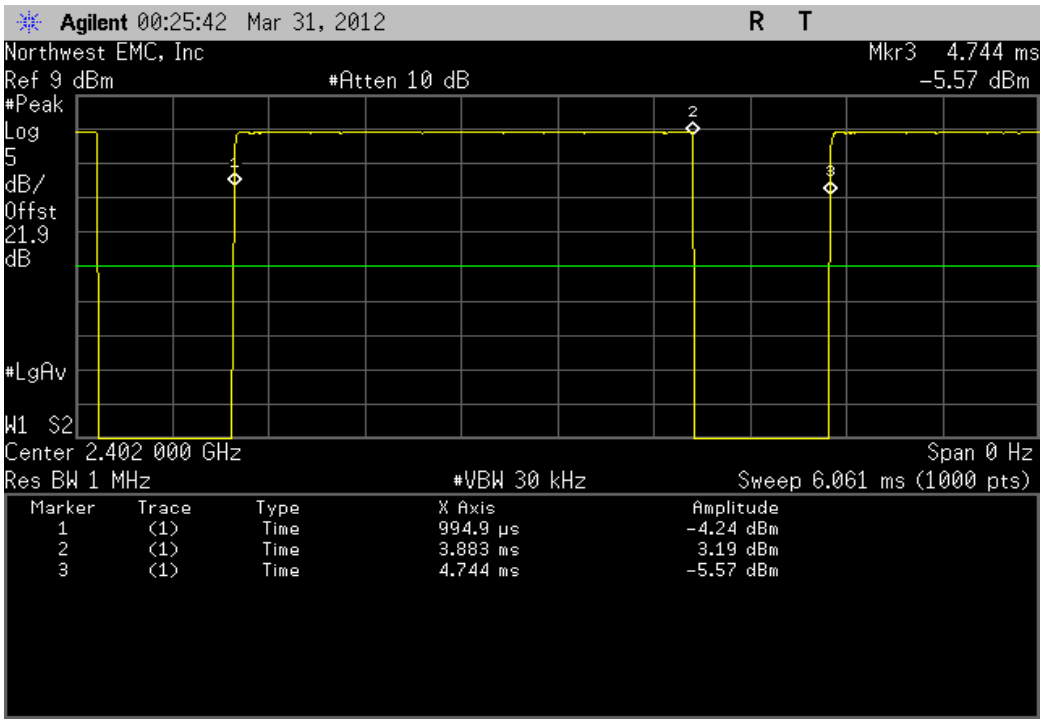
**DEVIATIONS FROM TEST STANDARD**

None

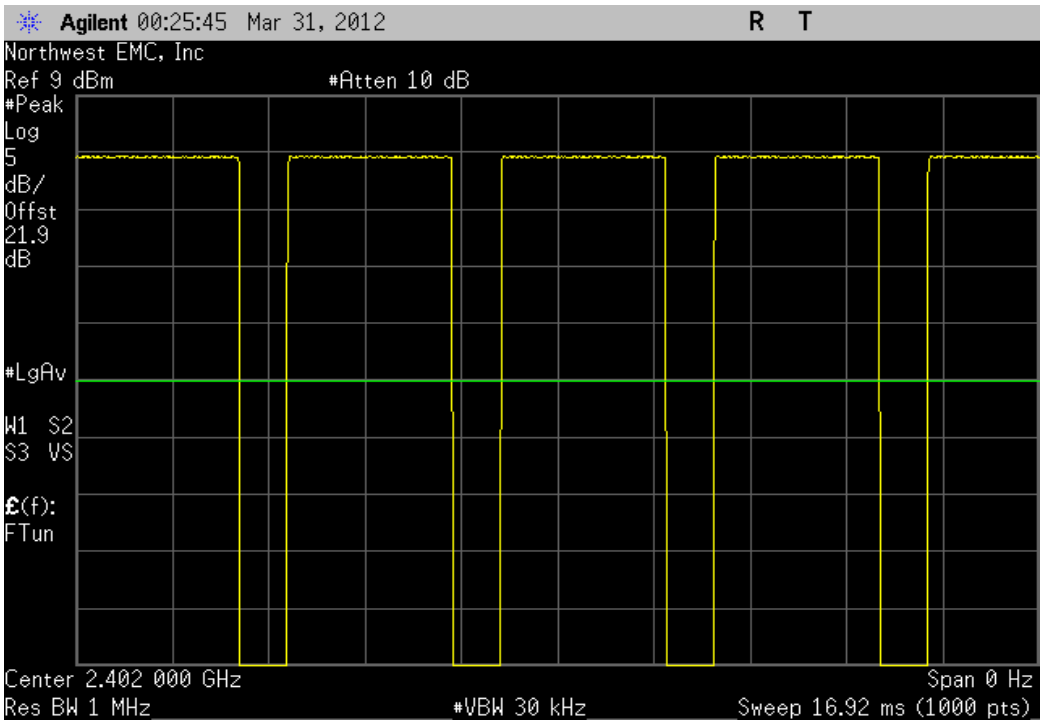
| Configuration # | 1 | Signature | Trevor Buls |
|---|---|---|---|

| | | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
|---|---|---|---|---|---|---|---|
| DH5, GFSK | | | | | | | |
| | Low Channel | 2.888 mS | 3.749 mS | 1 | 77% | N/A | N/A |
| | Low Channel | | | 5 | | N/A | N/A |
| | Mid Channel | 2.882 mS | 3.749 mS | 1 | 76.9% | N/A | N/A |
| | Mid Channel | | | 5 | | N/A | N/A |
| | High Channel | 2.888 mS | 3.749 mS | 1 | 77% | N/A | N/A |
| | High Channel | | | 5 | | N/A | N/A |
| 2DH5, 4-DQPSK | | | | | | | |
| | Low Channel | 2.888 mS | 3.749 mS | 1 | 77% | N/A | N/A |
| | Low Channel | | | 5 | | N/A | N/A |
| | Mid Channel | 2.888 mS | 3.749 mS | 1 | 77% | N/A | N/A |
| | Mid Channel | | | 5 | | N/A | N/A |
| | High Channel | 2.888 mS | 3.749 mS | 1 | 77% | N/A | N/A |
| | High Channel | | | 5 | | N/A | N/A |
| 3DH5, 8-DPSK | | | | | | | |
| | Low Channel | 2.894 mS | 3.749 mS | 1 | 77.2% | N/A | N/A |
| | Low Channel | | | 5 | | N/A | N/A |
| | Mid Channel | 2.894 mS | 3.749 mS | 1 | 77.2% | N/A | N/A |
| | Mid Channel | | | 5 | | N/A | N/A |
| | High Channel | 2.894 mS | 3.755 mS | 1 | 77.1% | N/A | N/A |
| | High Channel | | | 5 | | N/A | N/A |

| DH5, GFSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | 2.888 mS | 3.749 mS | 1 | 77% | N/A | N/A |



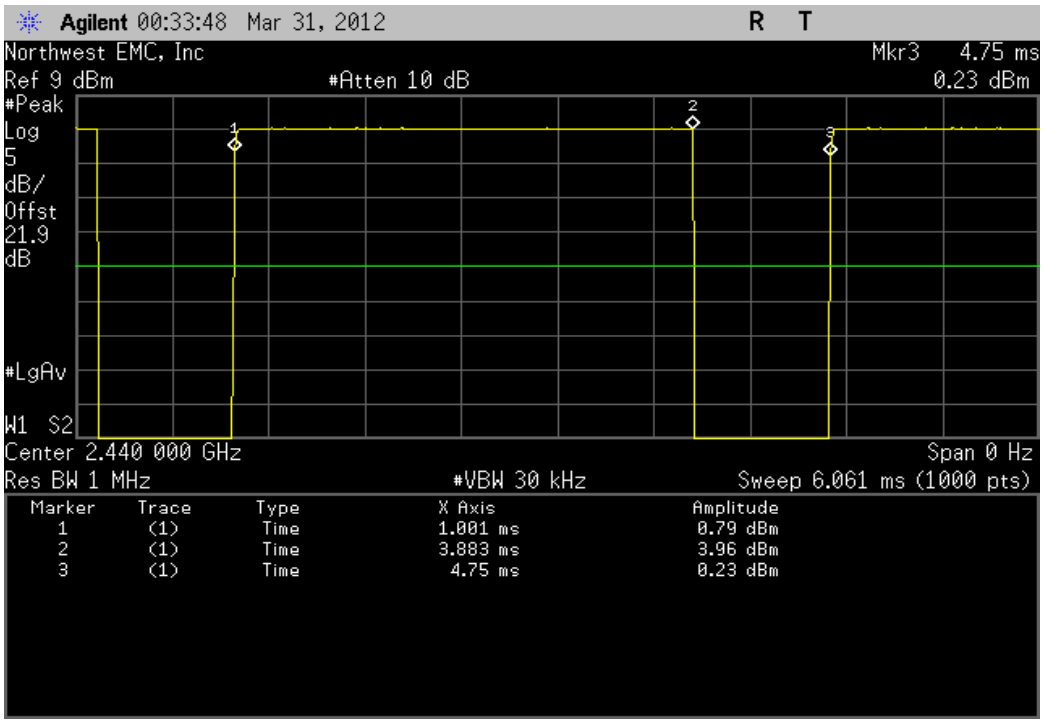

| DH5, GFSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | | | 5 | | N/A | N/A |



# Duty Cycle

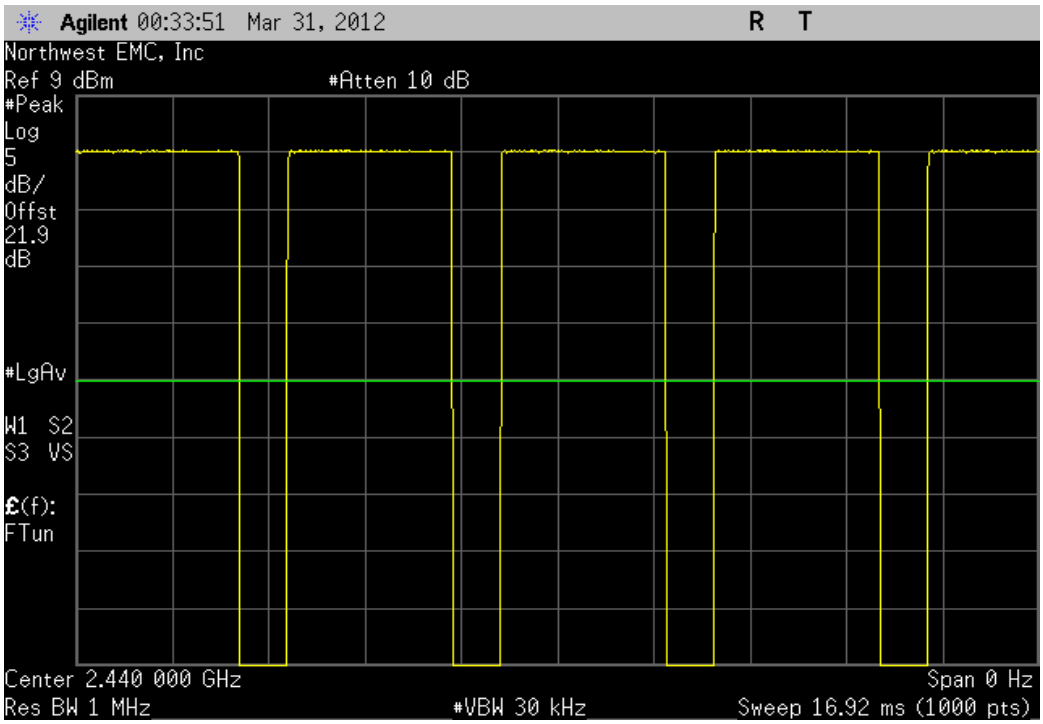
DH5, GFSK, Mid Channel

| Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
|---|---|---|---|---|---|
| 2.882 mS | 3.749 mS | 1 | 76.90% | N/A | N/A |




DH5, GFSK, Mid Channel

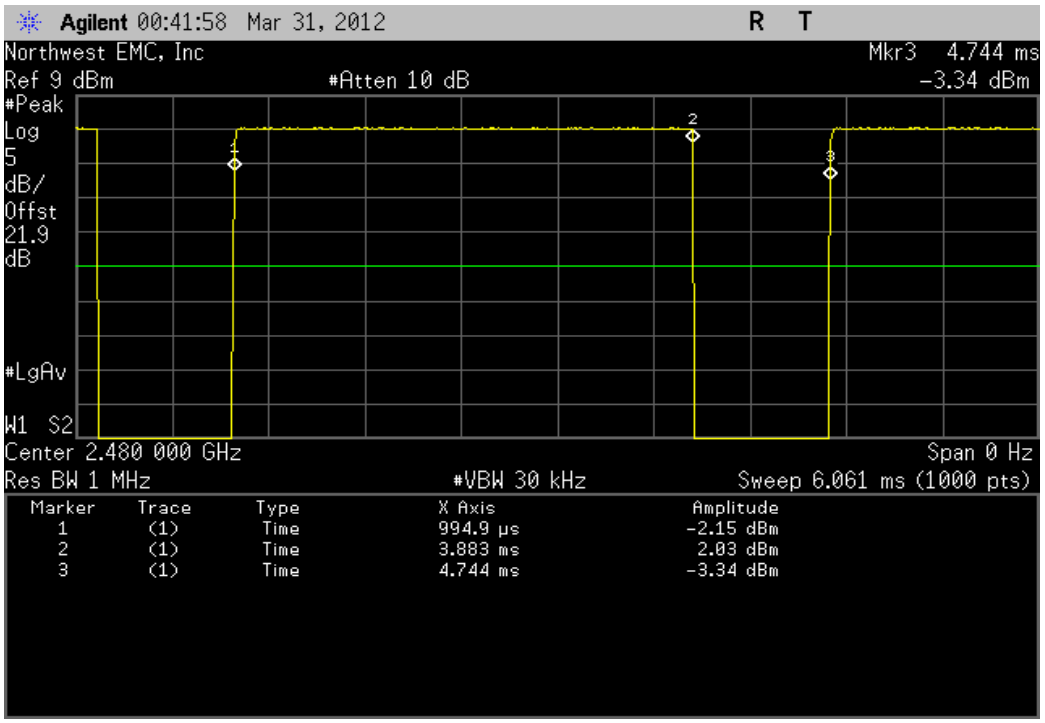
| Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
|---|---|---|---|---|---|
| | | 5 | | N/A | N/A |



# Duty Cycle

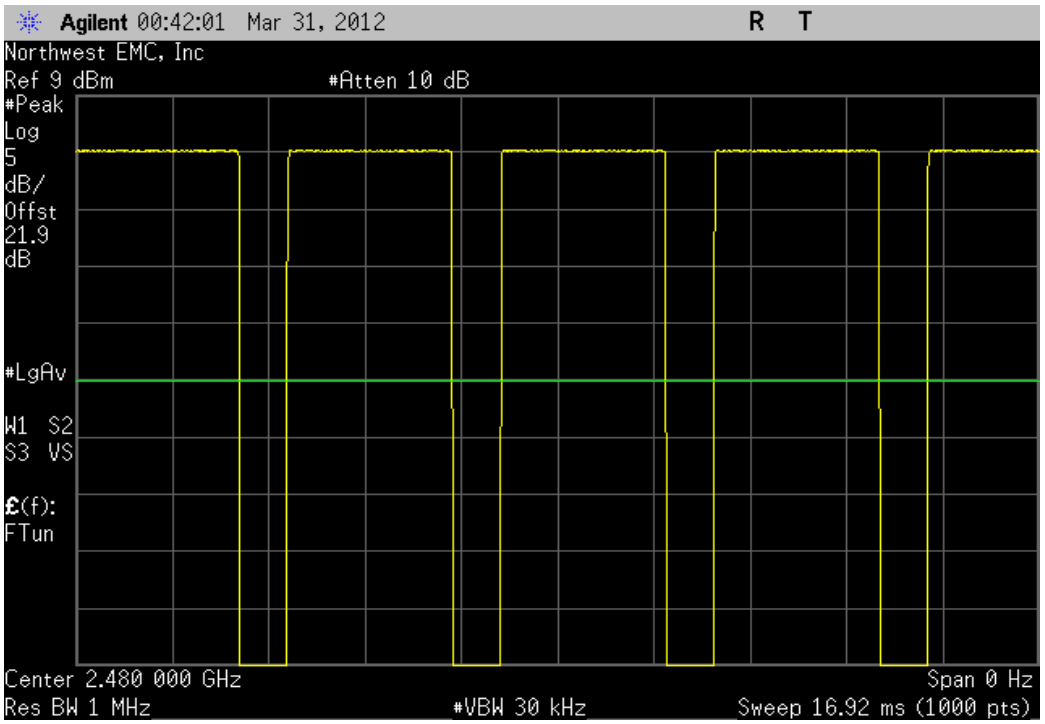
DH5, GFSK, High Channel

| Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
|---|---|---|---|---|---|
| 2.888 mS | 3.749 mS | 1 | 77% | N/A | N/A |



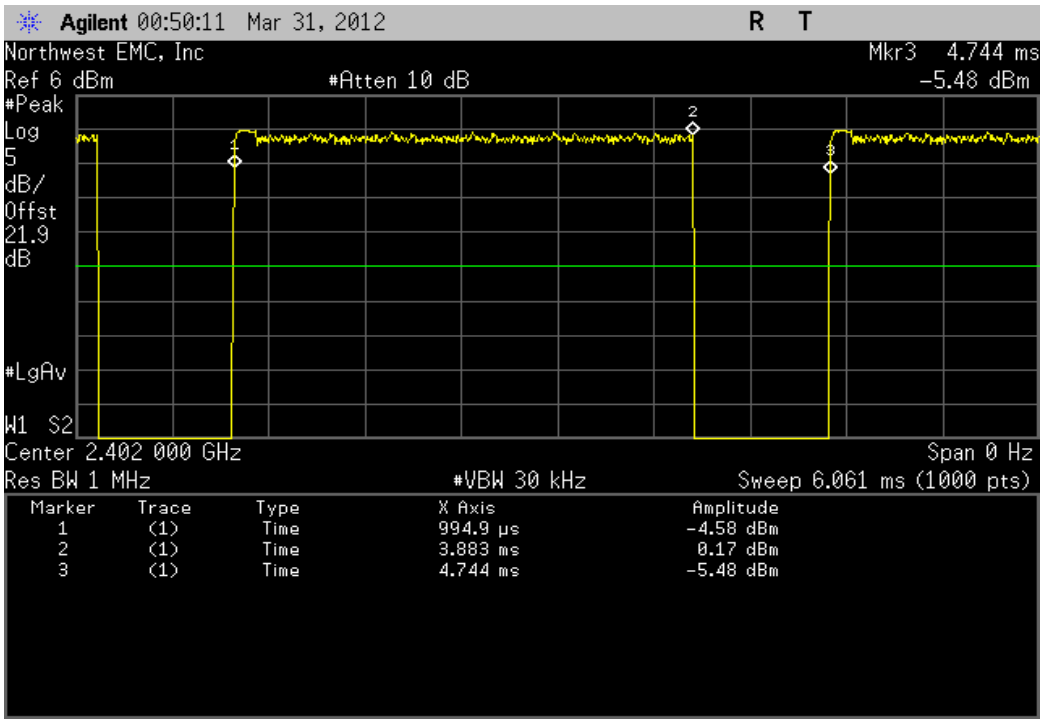

DH5, GFSK, High Channel

| Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
|---|---|---|---|---|---|
| | | 5 | | N/A | N/A |

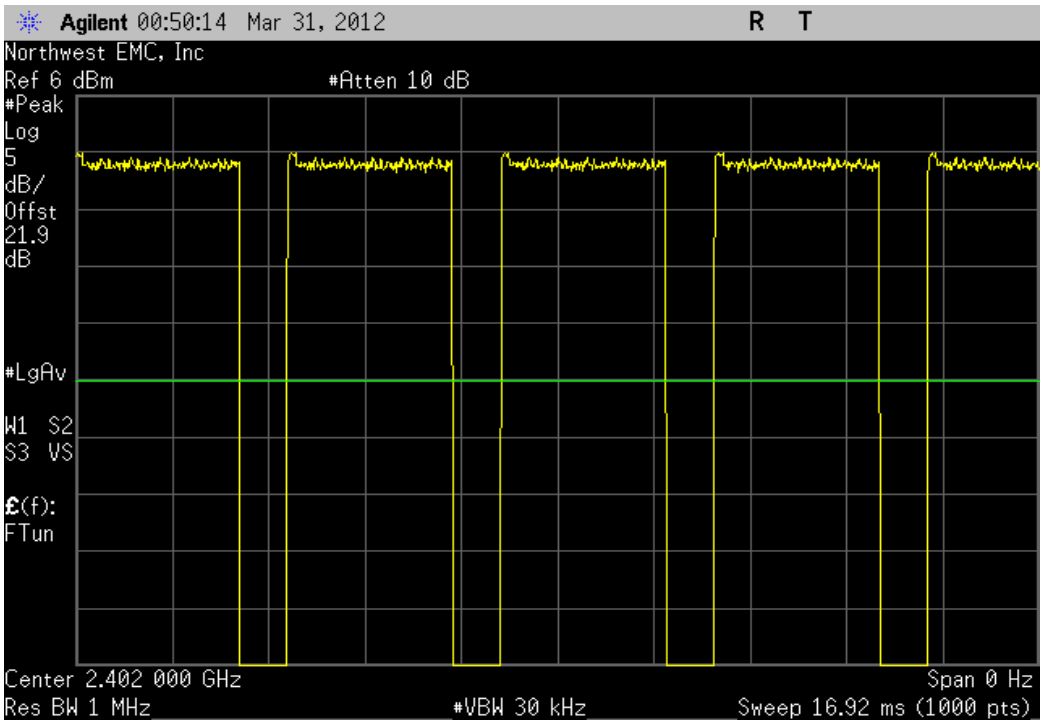


# Duty Cycle

| 2DH5, 4-DQPSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | 2.888 mS | 3.749 mS | 1 | 77% | N/A | N/A |

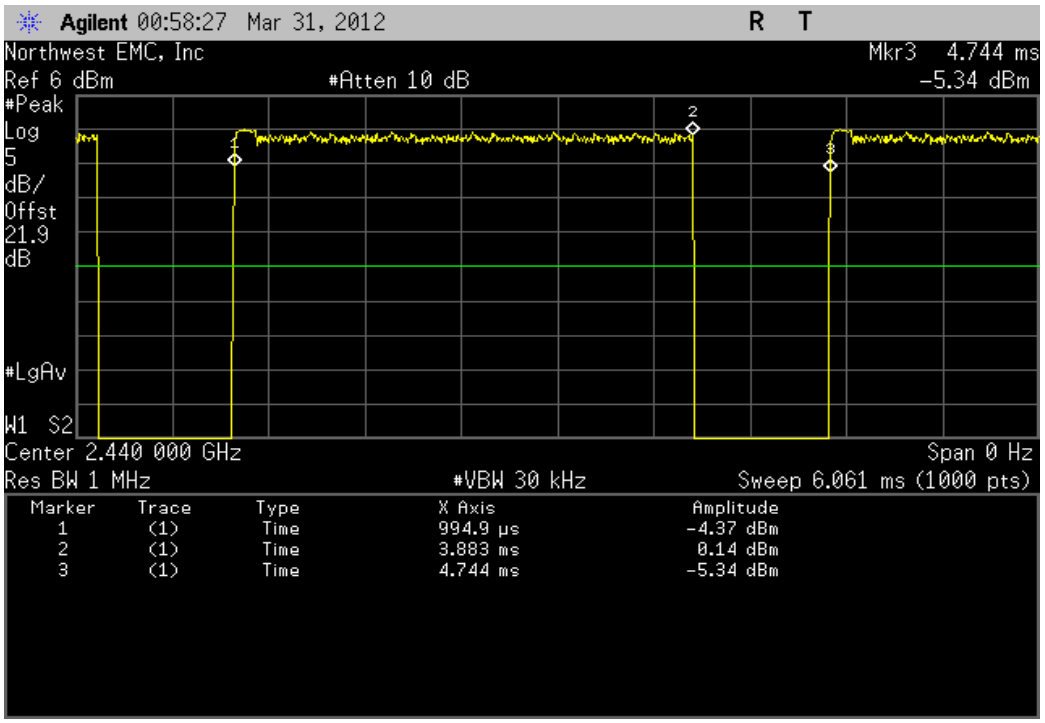



| 2DH5, 4-DQPSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | | | 5 | | N/A | N/A |

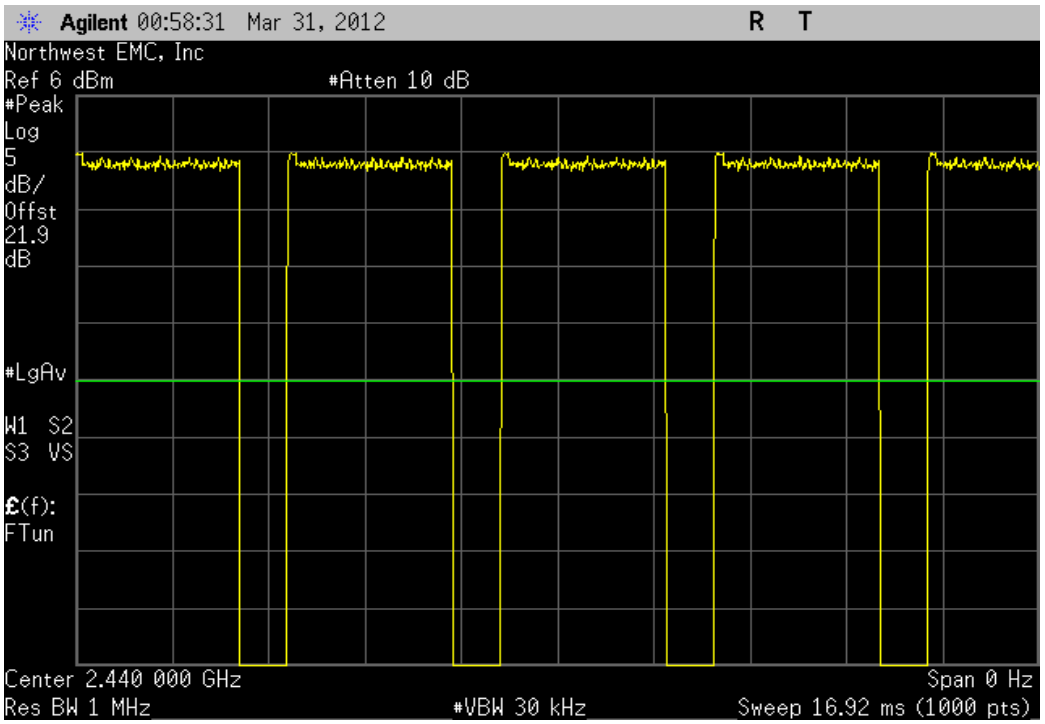


# Duty Cycle

| 2DH5, 4-DQPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | 2.888 mS | 3.749 mS | 1 | 77% | N/A | N/A |

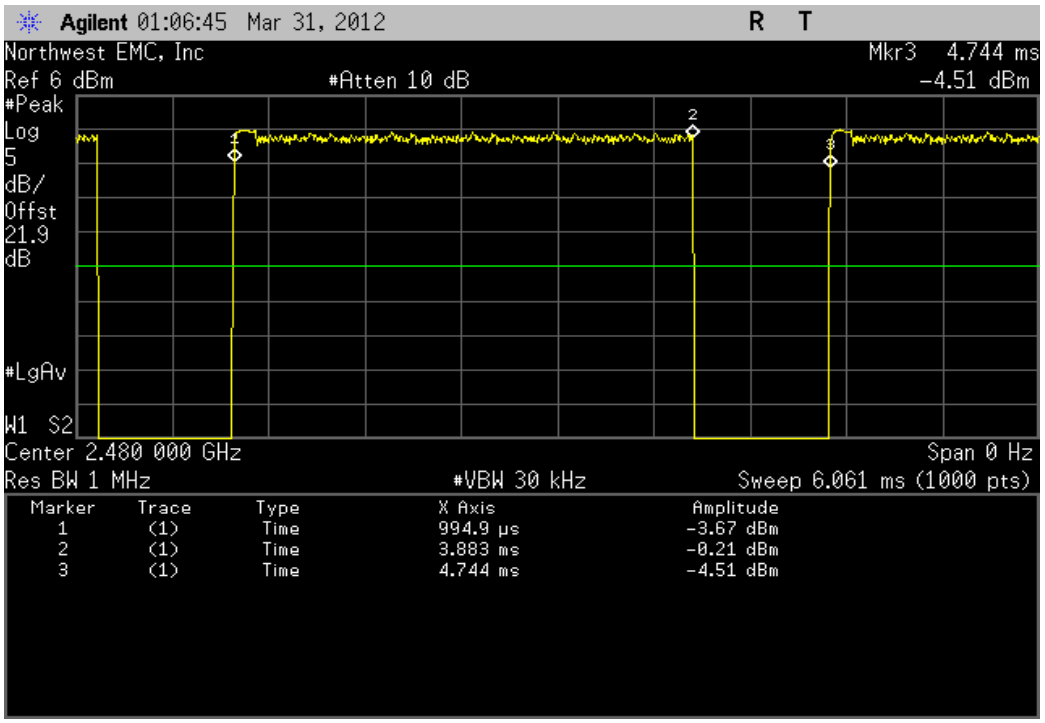



| 2DH5, 4-DQPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | | | 5 | | N/A | N/A |



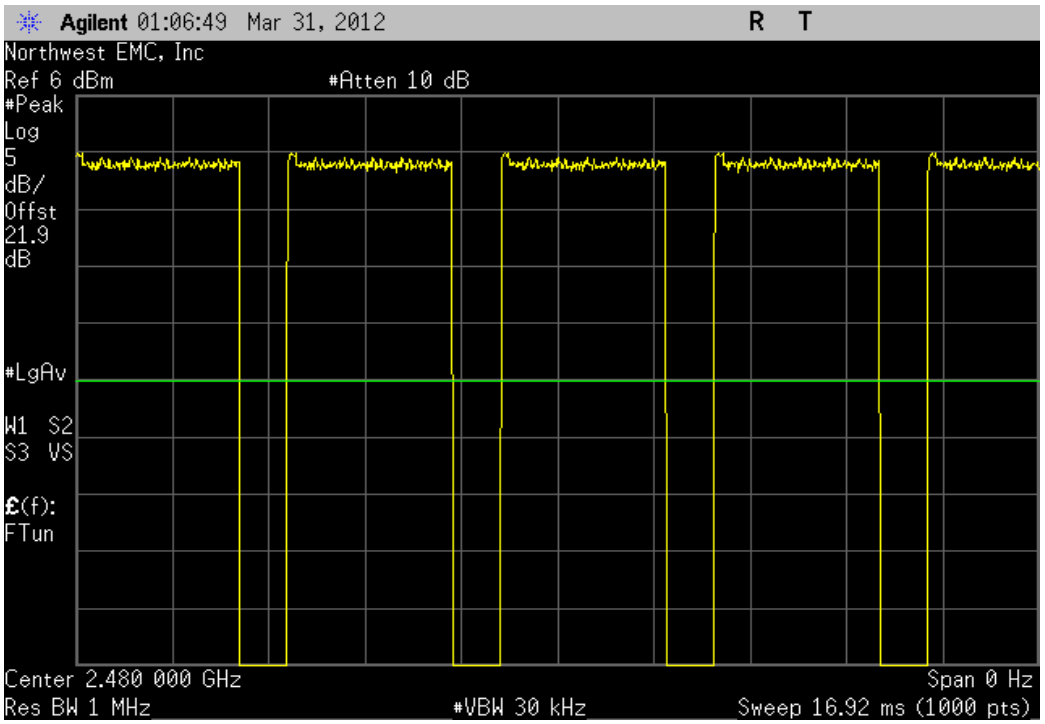
2DH5, 4-DQPSK, High Channel

| Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
|---|---|---|---|---|---|
| 2.888 mS | 3.749 mS | 1 | 77% | N/A | N/A |



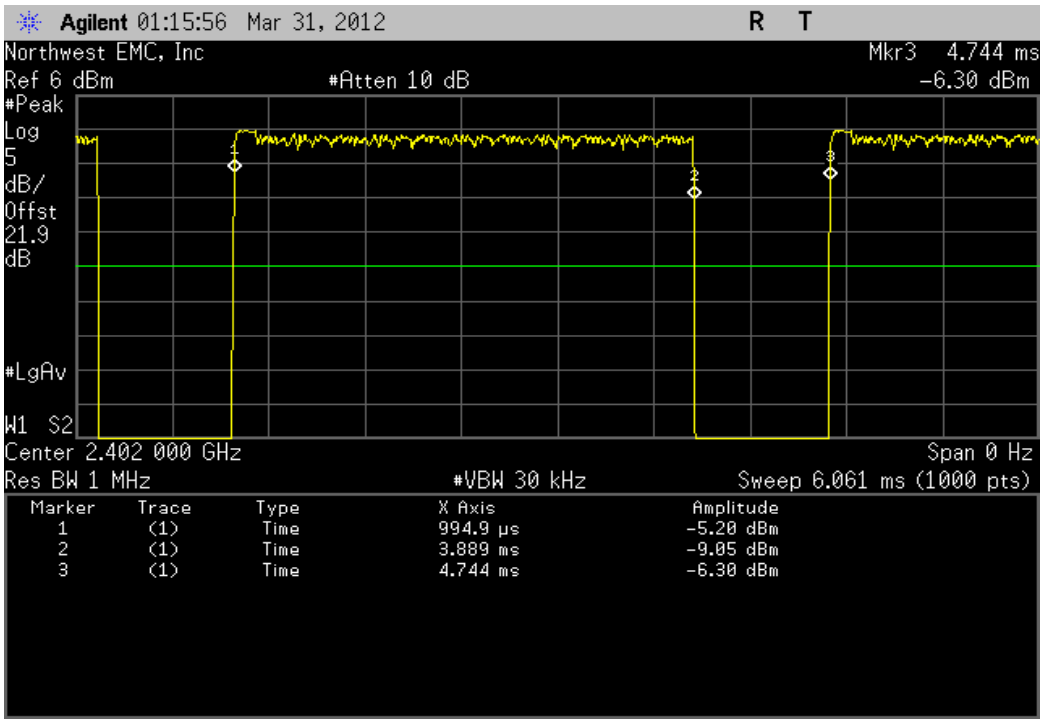

2DH5, 4-DQPSK, High Channel

| Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
|---|---|---|---|---|---|
| | | 5 | | N/A | N/A |

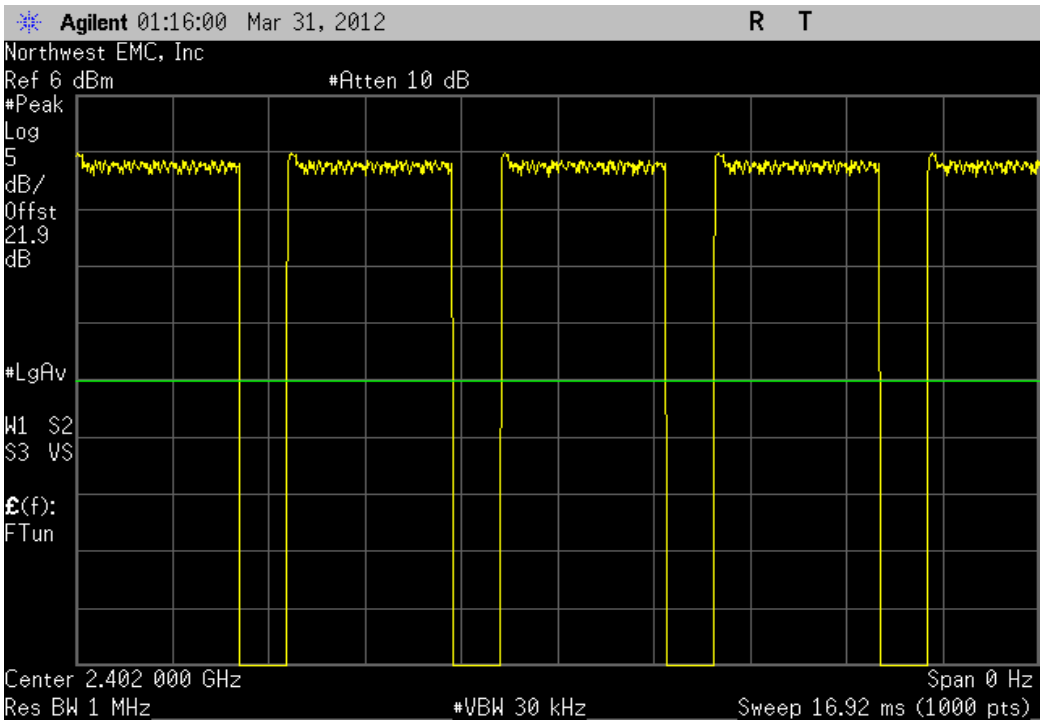


# Duty Cycle

| 3DH5, 8-DPSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | 2.894 mS | 3.749 mS | 1 | 77.20% | N/A | N/A |

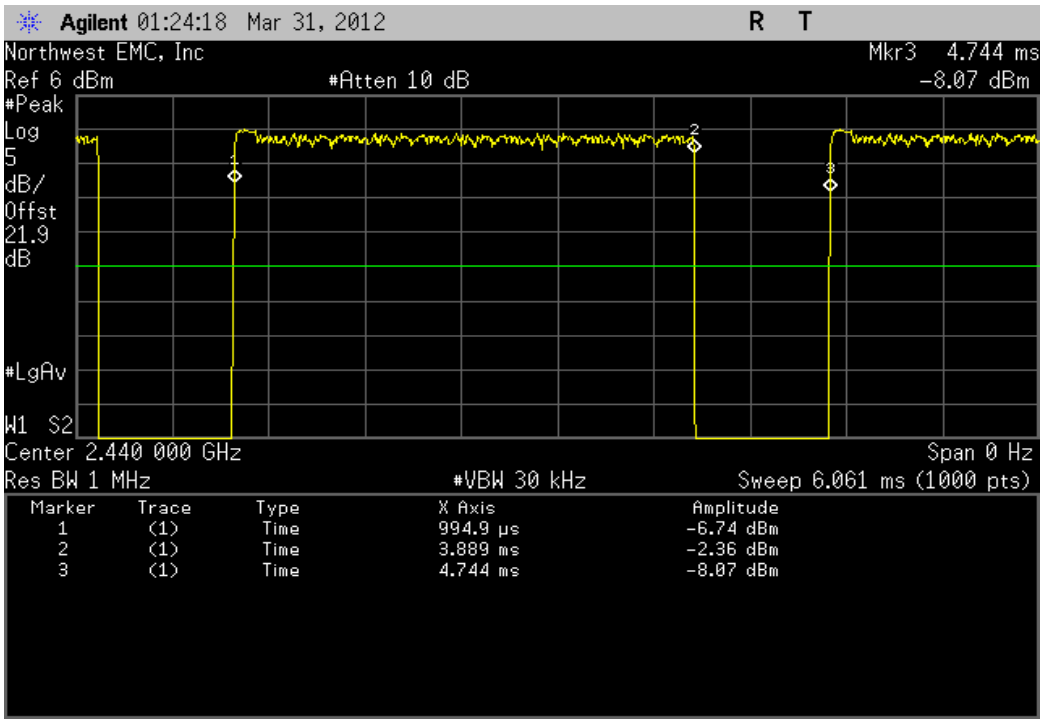



| 3DH5, 8-DPSK, Low Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | | | 5 | | N/A | N/A |

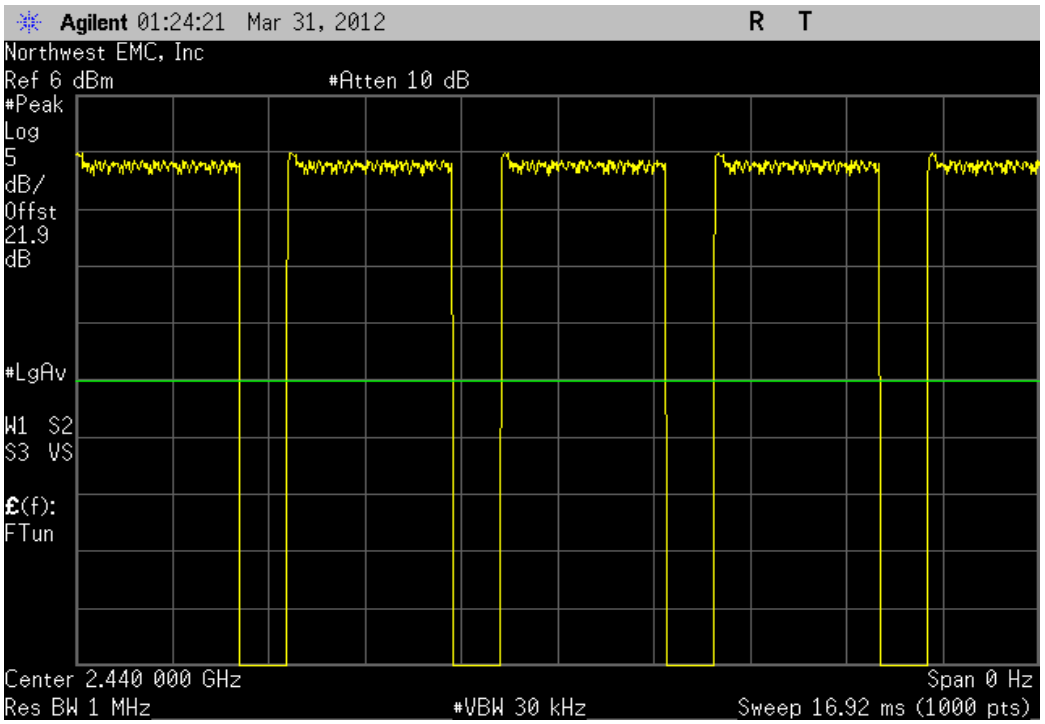


# Duty Cycle

| 3DH5, 8-DPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | 2.894 mS | 3.749 mS | 1 | 77.20% | N/A | N/A |

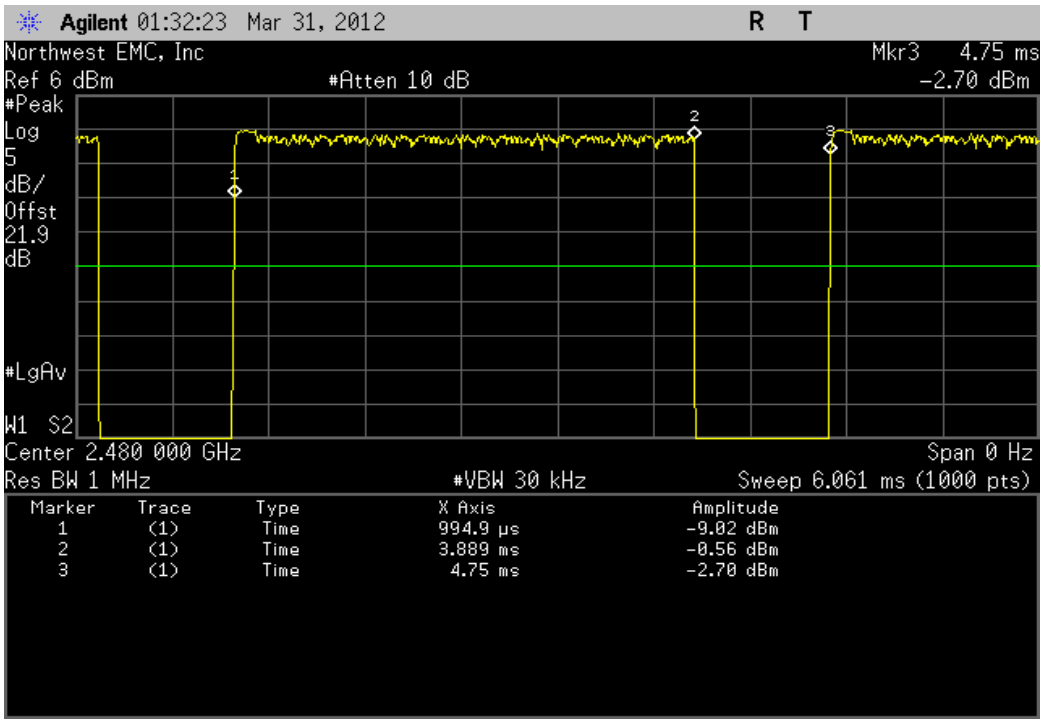



| 3DH5, 8-DPSK, Mid Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | | | 5 | | N/A | N/A |

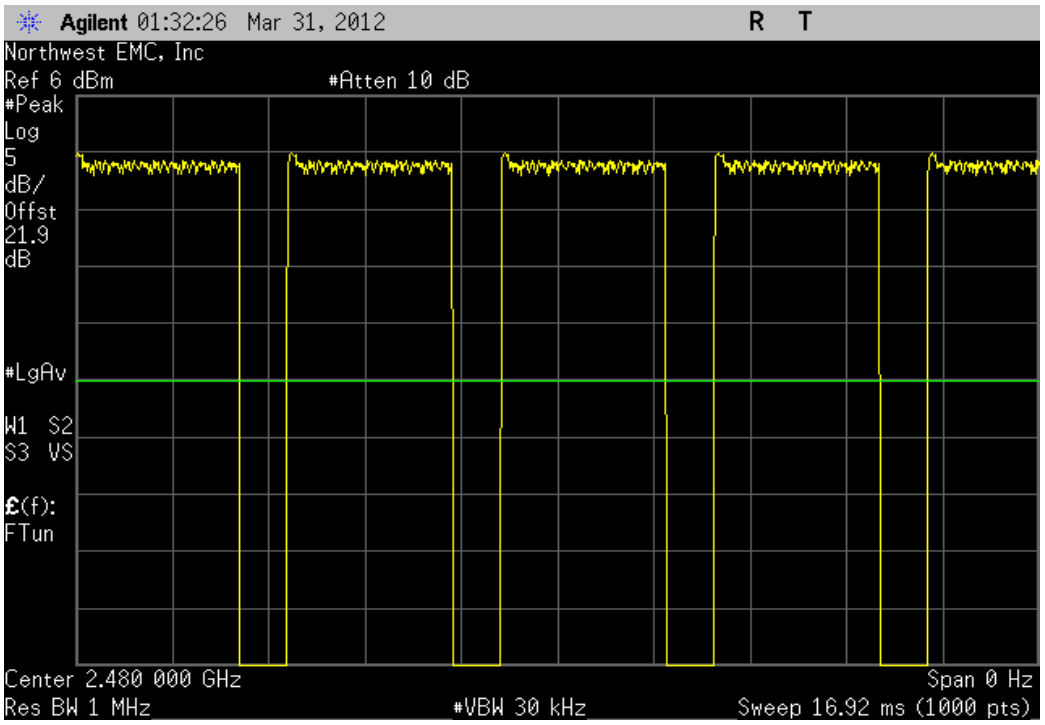


# Duty Cycle

| 3DH5, 8-DPSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | 2.894 mS | 3.755 mS | 1 | 77.10% | N/A | N/A |




| 3DH5, 8-DPSK, High Channel | | | | | | |
|---|---|---|---|---|---|---|
| | Pulse Width | Period | Number of Pulses | Value (%) | Limit | Result |
| | | | 5 | | N/A | N/A |



# Spurious Radiated Emissions

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 test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

**MODES OF OPERATION**

Transmitting Ch 0, 38, 78, DH5, Payload size 341, 2DH5, 3DH5 Payload size 986, PRBS9 (See comments)

**POWER SETTINGS INVESTIGATED**

Battery

**CONFIGURATIONS INVESTIGATED**

MDTR0153 - 2

**FREQUENCY RANGE INVESTIGATED**

| | | | |
|---|---|---|---|
| Start Frequency | 30 MHz | Stop Frequency | 25 GHz |

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Low Pass Filter | Micro-Tronics | LPM50004 | HGK | 7/9/2010 | 24 mo |
| High Pass Filter | Micro-Tronics | HPM50111 | HGQ | 7/9/2010 | 24 mo |
| Attenuator, 20 dB, 'SMA' | SM Electronics | SA6-20 | REO | 7/1/2011 | 12 mo |
| Pre-Amplifier | Miteq | JSD4-18002600-26-8P | APU | 2/6/2012 | 12 mo |
| MN05 Cables | N/A | 18-26GHz Standard Gain Horn Cable | EVD | 2/6/2012 | 12 mo |
| Antenna, Horn | ETS | 3160-09 | AHG | NCR | 0 mo |
| Pre-Amplifier | Miteq | AMF-6F-12001800-30-10P | AVW | 7/1/2011 | 12 mo |
| Antenna, Horn | ETS Lindgren | 3160-08 | AIQ | NCR | 0 mo |
| MN05 Cables | ESM Cable Corp. | Standard Gain Horn Cables | MNJ | 7/1/2011 | 12 mo |
| Pre-Amplifier | Miteq | AMF-6F-08001200-30-10P | AVV | 7/1/2011 | 12 mo |
| Antenna, Horn | ETS | 3160-07 | AXP | NCR | 0 mo |
| Pre-Amplifier | Miteq | AMF-3D-00100800-32-13P | AVX | 7/1/2011 | 12 mo |
| MN05 Cables | ESM Cable Corp. | Double Ridge Guide Horn Cables | MNI | 10/18/2011 | 12 mo |
| Antenna, Horn (DRG) | ETS Lindgren | 3115 | AIP | 6/29/2011 | 24 mo |
| Pre-Amplifier | Miteq | AM-1616-1000 | AVY | 7/1/2011 | 12 mo |
| MN05 Cables | ESM Cable Corp. | Bilog Cables | MNH | 1/24/2012 | 12 mo |
| Antenna X-Wing Bilog 30MHZ-2GHz | Teseq | CBL 6141B | AYD | 12/19/2011 | 12 mo |
| Spectrum Analyzer | Agilent | E4446A | AAT | 3/2/2012 | 12 mo |

**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 |

**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 has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) (Radiated Power via Substitution: +0.69, -0.68) for each test is on each data sheet. 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 16-4-1 as applicable), and are available upon request.

**TEST DESCRIPTION**

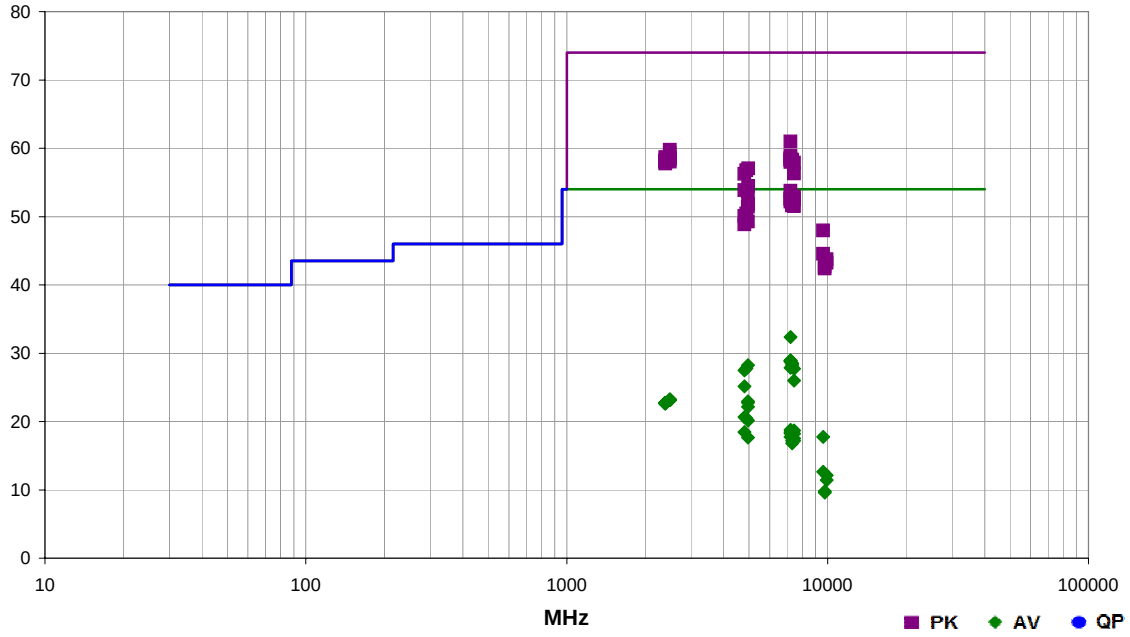
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

# Spurious Radiated Emissions

| | | | | | |
|---|---|---|---|---|---|
| **Work Order:** | MDTR0153 | **Date:** | 04/09/12 | Trevor Buls | |
| **Project:** | None | **Temperature:** | 22.88 °C | | |
| **Job Site:** | MN05 | **Humidity:** | 16.6% RH | | |
| **Serial Number:** | NLD001577N | **Barometric Pres.:** | 1019.5 mbar | **Tested by:** | Trevor Buls |
| **EUT:** | Interstim Model 3537 (PTM) | | | | |
| **Configuration:** | 2 | | | | |
| **Customer:** | Medtronic Inc. | | | | |
| **Attendees:** | Paul Wood | | | | |
| **EUT Power:** | Battery | | | | |
| **Operating Mode:** | Transmitting Ch 0, 38, 78, DH5, Payload size 341, 2DH5, 3DH5 Payload size 986, PRBS9 (See comments) | | | | |
| **Deviations:** | None | | | | |
| **Comments:** | DCCF added to average data because EUT is a FHSS. DCCF = 20 * Log(2.895ms * 2 / 100ms) = -24.7dB. | | | | |

| **Test Specifications** | **Test Method** |
|---|---|
| FCC 15.247:2012 | ANSI C63.10:2009 |

| **Run #** | 1 | **Test Distance (m)** | 3 | **Antenna Height(s)** | 1-4m | **Results** | Pass |
|---|---|---|---|---|---|---|---|




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Antenna Height (meters) | Azimuth (degrees) | Duty Cycle Correction Factor (dB) | External Attenuation (dB) | Polarity/ Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7205.445 | 49.4 | 11.6 | 1.1 | 145.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 61.0 | 74.0 | -13.0 | Ch 0, DH5, EUT on Side |
| 2488.408 | 43.2 | -3.4 | 3.1 | 200.0 | 0.0 | 20.0 | Vert | PK | 0.0 | 59.8 | 74.0 | -14.2 | Ch 78, 2DH5, EUT on Side |
| 2488.067 | 42.7 | -3.4 | 3.4 | 37.0 | 0.0 | 20.0 | Vert | PK | 0.0 | 59.3 | 74.0 | -14.7 | Ch 78, 3DH5, EUT on Side |
| 7205.578 | 47.3 | 11.6 | 1.0 | 84.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 58.9 | 74.0 | -15.1 | Ch 0, DH5, EUT Horizontal |
| 2386.867 | 42.4 | -3.7 | 1.0 | 195.0 | 0.0 | 20.0 | Horz | PK | 0.0 | 58.7 | 74.0 | -15.3 | Ch 0, 2DH5, EUT on Side |
| 7206.620 | 47.0 | 11.6 | 1.0 | 50.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 58.6 | 74.0 | -15.4 | Ch 0, DH5, EUT on Side |
| 2484.758 | 42.0 | -3.5 | 1.7 | 73.0 | 0.0 | 20.0 | Horz | PK | 0.0 | 58.5 | 74.0 | -15.5 | Ch 78, 2DH5, EUT on Side |
| 2486.600 | 41.9 | -3.5 | 2.1 | 94.0 | 0.0 | 20.0 | Horz | PK | 0.0 | 58.4 | 74.0 | -15.6 | Ch 78, DH5, EUT on Side |
| 7205.620 | 46.8 | 11.6 | 1.3 | 342.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 58.4 | 74.0 | -15.6 | Ch 0, DH5, EUT Vertical |
| 2487.117 | 41.8 | -3.5 | 1.0 | 239.0 | 0.0 | 20.0 | Horz | PK | 0.0 | 58.3 | 74.0 | -15.7 | Ch 78, 3DH5, EUT on Side |
| 7320.367 | 46.2 | 12.1 | 1.1 | 79.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 58.3 | 74.0 | -15.7 | Ch 38, DH5, EUT on Side |
| 7206.245 | 46.7 | 11.6 | 1.1 | 227.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 58.3 | 74.0 | -15.7 | Ch 0, DH5, EUT Horizontal |
| 2388.933 | 42.0 | -3.7 | 1.0 | 220.0 | 0.0 | 20.0 | Vert | PK | 0.0 | 58.3 | 74.0 | -15.7 | Ch 0, DH5, EUT on Side |
| 7320.699 | 46.1 | 12.1 | 1.1 | 75.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 58.2 | 74.0 | -15.8 | Ch 38, DH5, EUT on Side |
| 2389.050 | 41.8 | -3.7 | 1.3 | 272.0 | 0.0 | 20.0 | Horz | PK | 0.0 | 58.1 | 74.0 | -15.9 | Ch 0, DH5, EUT on Side |
| 2389.283 | 41.8 | -3.7 | 3.6 | 164.0 | 0.0 | 20.0 | Horz | PK | 0.0 | 58.1 | 74.0 | -15.9 | Ch 0, 3DH5, EUT on Side |
| 2485.433 | 41.5 | -3.5 | 1.0 | 333.0 | 0.0 | 20.0 | Vert | PK | 0.0 | 58.0 | 74.0 | -16.0 | Ch 78, DH5, EUT on Side |
| 7206.603 | 46.4 | 11.6 | 1.0 | 11.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 58.0 | 74.0 | -16.0 | Ch 0, DH5, EUT Vertical |
| 2388.300 | 41.7 | -3.7 | 3.3 | 18.0 | 0.0 | 20.0 | Vert | PK | 0.0 | 58.0 | 74.0 | -16.0 | Ch 0, 2DH5, EUT on Side |
| 7439.576 | 45.3 | 12.6 | 1.0 | 119.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 57.9 | 74.0 | -16.1 | Ch 78, DH5, EUT on Side |
| 2387.842 | 41.5 | -3.7 | 1.5 | 210.0 | 0.0 | 20.0 | Vert | PK | 0.0 | 57.8 | 74.0 | -16.2 | Ch 0, 3DH5, EUT on Side |
| 4960.271 | 52.1 | 5.0 | 1.0 | 21.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 57.1 | 74.0 | -16.9 | Ch 78, DH5, EUT on Side |

| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Antenna Height (meters) | Azimuth (degrees) | Duty Cycle Correction Factor (dB) | External Attenuation (dB) | Polarity/ Transducer Type | Detector | Distance Adjustment (dB) | Adjusted (dBuV/m) | Spec. Limit (dBuV/m) | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4879.954 | 52.1 | 4.7 | 1.3 | 21.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 56.8 | 74.0 | -17.2 | Ch 38, DH5, EUT on Side |
| 7439.586 | 43.7 | 12.6 | 1.0 | 139.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 56.3 | 74.0 | -17.7 | Ch 78, DH5, EUT on Side |
| 4803.799 | 51.9 | 4.4 | 1.1 | 184.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 56.3 | 74.0 | -17.7 | Ch 0, DH5, EUT Horizontal |
| 4960.121 | 49.5 | 5.0 | 1.0 | 22.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 54.5 | 74.0 | -19.5 | Ch 78, 3DH5, EUT on Side |
| 4804.066 | 49.5 | 4.4 | 1.3 | 117.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 53.9 | 74.0 | -20.1 | Ch 0, DH5, EUT on Side |
| 7205.653 | 42.2 | 11.6 | 1.3 | 124.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 53.8 | 74.0 | -20.2 | Ch 0, 2DH5, EUT on Side |
| 4960.029 | 48.7 | 5.0 | 1.0 | 187.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 53.7 | 74.0 | -20.3 | Ch 78, 2DH5, EUT on Side |
| 7440.160 | 40.3 | 12.6 | 1.0 | 90.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 52.9 | 74.0 | -21.1 | Ch 78, 2DH5, EUT on Side |
| 7319.920 | 40.6 | 12.1 | 2.6 | 71.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 52.7 | 74.0 | -21.3 | Ch 38, 2DH5, EUT on Side |
| 7205.870 | 41.1 | 11.6 | 1.0 | 75.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 52.7 | 74.0 | -21.3 | Ch 0, 3DH5, EUT Horizonta |
| 7440.101 | 40.0 | 12.6 | 1.0 | 81.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 52.6 | 74.0 | -21.4 | Ch 78, 3DH5, EUT on Side |
| 7320.174 | 40.5 | 12.1 | 1.0 | 42.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 52.6 | 74.0 | -21.4 | Ch 38, 3DH5, EUT on Side |
| 7205.312 | 41.0 | 11.6 | 1.9 | 230.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 52.6 | 74.0 | -21.4 | Ch 0, 2DH5, EUT on Side |
| 7441.528 | 39.8 | 12.6 | 1.0 | 16.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 52.4 | 74.0 | -21.6 | Ch 78, 3DH5, EUT on Side |
| 7206.053 | 45.5 | 11.6 | 1.1 | 145.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 32.4 | 54.0 | -21.6 | Ch 0, DH5, EUT on Side |
| 7206.337 | 40.6 | 11.6 | 1.0 | 173.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 52.2 | 74.0 | -21.8 | Ch 0, 3DH5, EUT Horizonta |
| 7321.467 | 39.9 | 12.1 | 1.1 | 74.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 52.0 | 74.0 | -22.0 | Ch 38, 3DH5, EUT on Side |
| 4960.221 | 46.9 | 5.0 | 1.0 | 268.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 51.9 | 74.0 | -22.1 | Ch 78, DH5, EUT on Side |
| 7318.399 | 39.5 | 12.1 | 1.0 | 345.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 51.6 | 74.0 | -22.4 | Ch 38, 2DH5, EUT on Side |
| 7440.686 | 38.9 | 12.6 | 1.0 | 62.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 51.5 | 74.0 | -22.5 | Ch 78, 2DH5, EUT on Side |
| 4959.788 | 46.5 | 5.0 | 1.0 | 62.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 51.5 | 74.0 | -22.5 | Ch 78, 2DH5, EUT on Side |
| 4880.104 | 45.8 | 4.7 | 1.1 | 232.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 50.5 | 74.0 | -23.5 | Ch 38, DH5, EUT on Side |
| 4803.599 | 45.7 | 4.4 | 1.0 | 66.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 50.1 | 74.0 | -23.9 | Ch 0, DH5, EUT on Side |
| 4960.021 | 44.3 | 5.0 | 1.2 | 272.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 49.3 | 74.0 | -24.7 | Ch 78, 3DH5, EUT on Side |
| 7206.045 | 42.1 | 11.6 | 1.0 | 84.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 29.0 | 54.0 | -25.0 | Ch 0, DH5, EUT Horizontal |
| 7206.045 | 42.1 | 11.6 | 1.3 | 342.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 29.0 | 54.0 | -25.0 | Ch 0, DH5, EUT Vertical |
| 4803.907 | 44.5 | 4.4 | 1.0 | 339.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 48.9 | 74.0 | -25.1 | Ch 0, DH5, EUT Horizontal |
| 7206.062 | 42.0 | 11.6 | 1.0 | 50.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 28.9 | 54.0 | -25.1 | Ch 0, DH5, EUT on Side |
| 7206.037 | 41.9 | 11.6 | 1.1 | 227.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 28.8 | 54.0 | -25.2 | Ch 0, DH5, EUT Horizontal |
| 7320.049 | 41.1 | 12.1 | 1.1 | 75.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 28.5 | 54.0 | -25.5 | Ch 38, DH5, EUT on Side |
| 7319.975 | 40.9 | 12.1 | 1.1 | 79.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 28.3 | 54.0 | -25.7 | Ch 38, DH5, EUT on Side |
| 4960.021 | 48.0 | 5.0 | 1.0 | 21.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 28.3 | 54.0 | -25.7 | Ch 78, DH5, EUT on Side |
| 9608.152 | 57.6 | -9.6 | 1.0 | 101.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 48.0 | 74.0 | -26.0 | Ch 0, DH5, EUT on Side |
| 7205.937 | 41.0 | 11.6 | 1.0 | 11.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 27.9 | 54.0 | -26.1 | Ch 0, DH5, EUT Vertical |
| 4880.063 | 47.8 | 4.7 | 1.3 | 21.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 27.8 | 54.0 | -26.2 | Ch 38, DH5, EUT on Side |
| 7440.068 | 39.8 | 12.6 | 1.0 | 119.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 27.7 | 54.0 | -26.3 | Ch 78, DH5, EUT on Side |
| 4804.091 | 47.8 | 4.4 | 1.1 | 184.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 27.5 | 54.0 | -26.5 | Ch 0, DH5, EUT Horizontal |
| 7439.970 | 38.1 | 12.6 | 1.0 | 139.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 26.0 | 54.0 | -28.0 | Ch 78, DH5, EUT on Side |
| 4804.032 | 45.5 | 4.4 | 1.3 | 117.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 25.2 | 54.0 | -28.8 | Ch 0, DH5, EUT on Side |
| 9608.402 | 54.2 | -9.6 | 1.2 | 130.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 44.6 | 74.0 | -29.4 | Ch 0, DH5, EUT on Side |
| 9920.257 | 52.5 | -8.7 | 1.2 | 106.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 43.8 | 74.0 | -30.2 | Ch 78, DH5, EUT on Side |
| 9920.507 | 52.0 | -8.7 | 1.3 | 92.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 43.3 | 74.0 | -30.7 | Ch 78, DH5, EUT on Side |
| 2486.083 | 31.4 | -3.5 | 1.0 | 239.0 | 24.7 | 20.0 | Horz | AV | 0.0 | 23.2 | 54.0 | -30.8 | Ch 78, 3DH5, EUT on Side |
| 2483.892 | 31.4 | -3.5 | 2.1 | 94.0 | 24.7 | 20.0 | Horz | AV | 0.0 | 23.2 | 54.0 | -30.8 | Ch 78, DH5, EUT on Side |
| 2487.908 | 31.3 | -3.4 | 3.1 | 200.0 | 24.7 | 20.0 | Vert | AV | 0.0 | 23.2 | 54.0 | -30.8 | Ch 78, 2DH5, EUT on Side |
| 2487.825 | 31.3 | -3.4 | 3.5 | 37.0 | 24.7 | 20.0 | Vert | AV | 0.0 | 23.2 | 54.0 | -30.8 | Ch 78, 3DH5, EUT on Side |
| 2486.608 | 31.3 | -3.5 | 1.7 | 73.0 | 24.7 | 20.0 | Horz | AV | 0.0 | 23.1 | 54.0 | -30.9 | Ch 78, 2DH5, EUT on Side |
| 2485.783 | 31.3 | -3.5 | 1.0 | 333.0 | 24.7 | 20.0 | Vert | AV | 0.0 | 23.1 | 54.0 | -30.9 | Ch 78, DH5, EUT on Side |
| 4960.004 | 42.7 | 5.0 | 1.0 | 187.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 23.0 | 54.0 | -31.0 | Ch 78, 2DH5, EUT on Side |
| 2385.267 | 31.2 | -3.7 | 1.0 | 195.0 | 24.7 | 20.0 | Horz | AV | 0.0 | 22.8 | 54.0 | -31.2 | Ch 0, 2DH5, EUT on Side |
| 4959.971 | 42.5 | 5.0 | 1.0 | 22.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 22.8 | 54.0 | -31.2 | Ch 78, 3DH5, EUT on Side |
| 9759.625 | 51.9 | -9.2 | 1.2 | 124.0 | 0.0 | 0.0 | Horz | PK | 0.0 | 42.7 | 74.0 | -31.3 | Ch 38, DH5, EUT on Side |
| 2385.425 | 31.1 | -3.7 | 1.3 | 272.0 | 24.7 | 20.0 | Horz | AV | 0.0 | 22.7 | 54.0 | -31.3 | Ch 0, DH5, EUT on Side |
| 2385.608 | 31.1 | -3.7 | 1.0 | 220.0 | 24.7 | 20.0 | Vert | AV | 0.0 | 22.7 | 54.0 | -31.3 | Ch 0, DH5, EUT on Side |
| 2385.742 | 31.1 | -3.7 | 3.3 | 18.0 | 24.7 | 20.0 | Vert | AV | 0.0 | 22.7 | 54.0 | -31.3 | Ch 0, 2DH5, EUT on Side |
| 2385.950 | 31.1 | -3.7 | 3.6 | 164.0 | 24.7 | 20.0 | Horz | AV | 0.0 | 22.7 | 54.0 | -31.3 | Ch 0, 3DH5, EUT on Side |
| 2388.783 | 31.1 | -3.7 | 1.5 | 210.0 | 24.7 | 20.0 | Vert | AV | 0.0 | 22.7 | 54.0 | -31.3 | Ch 0, 3DH5, EUT on Side |
| 9760.425 | 51.6 | -9.2 | 1.2 | 126.0 | 0.0 | 0.0 | Vert | PK | 0.0 | 42.4 | 74.0 | -31.6 | Ch 38, DH5, EUT on Side |
| 4960.021 | 41.9 | 5.0 | 1.0 | 268.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 22.2 | 54.0 | -31.8 | Ch 78, DH5, EUT on Side |
| 4804.007 | 41.0 | 4.4 | 1.0 | 66.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 20.7 | 54.0 | -33.3 | Ch 0, DH5, EUT on Side |
| 4880.004 | 40.5 | 4.7 | 1.1 | 232.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 20.5 | 54.0 | -33.5 | Ch 38, DH5, EUT on Side |
| 4959.988 | 39.9 | 5.0 | 1.0 | 62.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 20.2 | 54.0 | -33.8 | Ch 78, 2DH5, EUT on Side |
| 7206.262 | 31.9 | 11.6 | 1.3 | 124.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 18.8 | 54.0 | -35.2 | Ch 0, 2DH5, EUT on Side |
| 7440.043 | 30.8 | 12.6 | 1.0 | 81.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 18.7 | 54.0 | -35.3 | Ch 78, 3DH5, EUT on Side |
| 4804.049 | 38.8 | 4.4 | 1.0 | 339.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 18.5 | 54.0 | -35.5 | Ch 0, DH5, EUT Horizontal |
| 7206.078 | 31.6 | 11.6 | 1.0 | 75.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 18.5 | 54.0 | -35.5 | Ch 0, 3DH5, EUT Horizonta |
| 7205.937 | 31.4 | 11.6 | 1.0 | 173.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 18.3 | 54.0 | -35.7 | Ch 0, 3DH5, EUT Horizonta |
| 7440.043 | 30.3 | 12.6 | 1.0 | 90.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 18.2 | 54.0 | -35.8 | Ch 78, 2DH5, EUT on Side |
| 7320.124 | 30.7 | 12.1 | 1.0 | 42.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 18.1 | 54.0 | -35.9 | Ch 38, 3DH5, EUT on Side |
| 7319.884 | 30.5 | 12.1 | 1.1 | 74.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 17.9 | 54.0 | -36.1 | Ch 38, 3DH5, EUT on Side |
| 7205.970 | 30.9 | 11.6 | 1.9 | 230.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 17.8 | 54.0 | -36.2 | Ch 0, 2DH5, EUT on Side |
| 9607.827 | 52.1 | -9.6 | 1.0 | 101.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 17.8 | 54.0 | -36.2 | Ch 0, DH5, EUT on Side |
| 4959.996 | 37.4 | 5.0 | 1.2 | 272.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 17.7 | 54.0 | -36.3 | Ch 78, 3DH5, EUT on Side |
| 7440.295 | 29.6 | 12.6 | 1.0 | 16.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 17.5 | 54.0 | -36.5 | Ch 78, 3DH5, EUT on Side |
| 7439.995 | 29.3 | 12.6 | 1.0 | 62.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 17.2 | 54.0 | -36.8 | Ch 78, 2DH5, EUT on Side |
| 7320.240 | 29.8 | 12.1 | 1.0 | 345.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 17.2 | 54.0 | -36.8 | Ch 38, 2DH5, EUT on Side |
| 7320.600 | 29.4 | 12.1 | 2.6 | 71.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 16.8 | 54.0 | -37.2 | Ch 38, 2DH5, EUT on Side |
| 9607.927 | 47.0 | -9.6 | 1.2 | 130.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 12.7 | 54.0 | -41.3 | Ch 0, DH5, EUT on Side |
| 9920.040 | 45.6 | -8.7 | 1.2 | 106.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 12.2 | 54.0 | -41.8 | Ch 78, DH5, EUT on Side |
| 9919.965 | 44.9 | -8.7 | 1.3 | 92.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 11.5 | 54.0 | -42.5 | Ch 78, DH5, EUT on Side |
| 9760.000 | 43.7 | -9.2 | 1.2 | 126.0 | 24.7 | 0.0 | Vert | AV | 0.0 | 9.8 | 54.0 | -44.2 | Ch 38, DH5, EUT on Side |
| 9760.100 | 43.5 | -9.2 | 1.2 | 124.0 | 24.7 | 0.0 | Horz | AV | 0.0 | 9.6 | 54.0 | -44.4 | Ch 38, DH5, EUT on Side |