ZOLL Medical Corp.

X Series

Bluetooth

Report No. LGPD0044.1 Rev 01

Report Prepared By

www.nwemc.com
1-888-EMI-CERT

EMC Test Report

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: November 16, 2011
Zoll Medical Corp.
Model: X Series

Emissions			
Test Description	**Specification**	**Test Method**	**Pass/Fail**
Occupied Bandwidth	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Output Power	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Band Edge Compliance	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Spurious Conducted Emissions	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Power Spectral Density	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Channel Spacing	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Number of Hoping Frequencies	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Time of Occupancy (Dwell Time)	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
Spurious Radiated Emissions	FCC 15.247:2011	ANSI C63.10:2009	**Pass**
AC Powerline Conducted Emissions	FCC 15.207:2011	ANSI C63.10:2009	**Pass**

Modifications made to the product
See the Modifications section of this report

Test Facility

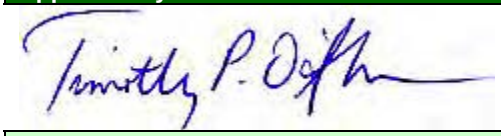
The measurement facility used to collect the data is located at:

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).

Approved By:



Tim O'Shea, Operations Manager

NVLAP®

NVLAP Lab Code: 200881-0

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 Number	Description	Date	Page Number
01	Corrected mfg information	1/20/12	8

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

Accreditations and Authorizations

FCC

Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

NVLAP

Northwest EMC, Inc. is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. NVLAP is administered by the National Institute of Standards and Technology (NIST), an agency of the U.S. Commerce Department. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

Industry Canada

Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-Gen, Issue 2 and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1)*

CAB

Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

Australia/New Zealand

The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).

Accreditations and Authorizations

VCCI

Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Numbers. - Hillsboro: C-1071, R-1025, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-3265, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634).*

BSMI

Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement (US0017).

GOST

Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (*Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157, Brooklyn Park: US0175)*

VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.

SCOPE

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/

Northwest EMC Locations

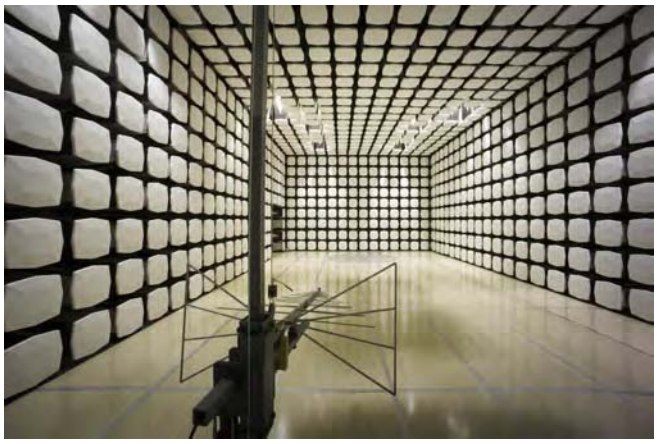
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796



Party Requesting the Test

Company Name:	ZOLL Medical Corp.
Address:	269 Mill Road
City, State, Zip:	Chelmsford, MA 01824
Test Requested By:	Curt McNamara - Logic Product Development
Model:	X Series
First Date of Test:	October 20, 2011
Last Date of Test:	November 16, 2011
Receipt Date of Samples:	October 19, 2011
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
Bluetooth radio

Testing Objective:
To demonstrate compliance under FCC 15.247 for operation in the 2.4 GHz band

CONFIGURATION 1 LGPD0044

Software/Firmware Running during test	
Description	**Version**
Iris Software	00.03.02.1002

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
CPA Board	Logic Product Development	1020247 rev B	L341100050
CP Board	Logic Product Development	1020246 rev B	L341100012

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Debug Board	Zoll Medical Corp.	None	None
DC Power Supply	Agilent	E3620A	MY40003282
Laptop	DELL	PP18L/KX335 A01	CN-0WM416-12961-81N-4502
Laptop Power Brick	DELL	DA130PE1-00/JU012	CN-0JU012-48661-09K-HHFR-A04

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power Cable	No	1.80 m	No	AC Mains	DC Power Supply
AC Power Cable	No	1.00 m	No	AC Mains	Laptop Power Brick
DC Power Cable	No	1.80 m	Yes	Laptop Power Brick	Laptop
DC Power Cable	No	0.50 m	No	DC Power Supply	CP Board
Serial Cable	Yes	2.0 m	No	Laptop	Debug Board
Ribbon Cable	No	0.13 m	No	CP Board	CPA Board
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 2 LGPD0044

Software/Firmware Running during test	
Description	**Version**
Iris Software	00.03.02.1002

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
X-series	Zoll Medical Corp.	X-Series	AR11J000137
X-series Power Brick	Propaq MD	8300-0004	4142F 0000587
Propaq.MD Battery Pack	Zoll Medical Corp.	8000-0580-01	AJ10BMV0059
X-series USB Board	Zoll Medical Corp.	None	None

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	V Infinity	3A-1WP05	None
Ethernet to USB Adapter	D-Link	DUB-E100	Q8031A9000586

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	DELL	PP18L/KX335 A01	CN-0WM416-12961-81N-4502
Laptop Power Brick	DELL	DA130PE1-00/JU012	CN-0JU012-48661-09K-HHFR-A04

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power Cable	No	1.00 m	No	AC Mains	Laptop Power Brick
DC Power Cable	No	1.80 m	Yes	Laptop Power Brick	Laptop
DC Power Cable	No	1.90m	No	X-series Power Brick	X-series
DC Power Cable	No	1.00m	Yes	DC Power Supply	X-series USB Board
AC Power Cable	No	1.80m	No	AC Mains	X-series Power Brick
3 ea. Invasive Pressure (8300-0787-01)	No	4.30m	No	X-series	Self Terminated
Manual Defib.	No	2.40m	No	X-series	Termination
2 ea. Temp. Leads, (11J40753 409B)	No	3.10m	No	X-series	Self Terminated
USB	Yes	0.30m	No	X-series	Unterminated
SpO2, (PS-10153D 0299)	No	0.95m	No	X-series	Self Terminated
ECG, (8300-0789-01, Lot:58646)	No	3.10m	No	X-series	Termination
Patient Leads, (8300-0790-01, Lot:57862)	No	0.80m	No	ECG, (8300-0789-01, Lot:58646)	Termination
USB	PA	0.15m	No	Ethernet to USB Adapter	X-series USB Board
USB	Yes	1.80m	No	X-series USB Board	Laptop
Cat5 Ethernet	No	7.50m	No	Ethernet to USB Adapter	Laptop
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 3 LGPD0044

Software/Firmware Running during test	
Description	**Version**
Iris Software	00.03.02.1002

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
X-series	Zoll Medical Corp.	X-Series	AR11J000137
X-series Power Brick	Propaq MD	8300-0004	4142F 0000587
Propaq.MD Battery Pack	Zoll Medical Corp.	8000-0580-01	AJ10BMV0059
X-series USB Board	Zoll Medical Corp.	None	None

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	V Infinity	3A-1WP05	None
Ethernet to USB Adapter	D-Link	DUB-E100	Q8031A9000586

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	DELL	PP18L/KX335 A01	CN-0WM416-12961-81N-4502
Laptop Power Brick	DELL	DA130PE1-00/JU012	CN-0JU012-48661-09K-HHFR-A04

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power Cable	No	1.00 m	No	AC Mains	Laptop Power Brick
DC Power Cable	No	1.80 m	Yes	Laptop Power Brick	Laptop
DC Power Cable	No	0.50 m	No	DC Power Supply	CP Board
DC Power Cable	No	1.90m	No	X-series Power Brick	X-series
DC Power Cable	No	1.00m	Yes	DC Power Supply	X-series USB Board
AC Power Cable	No	1.80m	No	AC Mains	X-series Power Brick
3 ea. Invasive Pressure (8300-0787-01)	No	4.30m	No	X-series	Self Terminated
Manual Defib.	No	2.40m	No	X-series	Termination
2 ea. Temp. Leads, (11J40753 409B)	No	3.10m	No	X-series	Self Terminated
USB	Yes	0.30m	No	X-series	Unterminated
SpO2, (PS-10153D 0299)	No	0.95m	No	X-series	Self Terminated
ECG, (8300-0789-01, Lot:58646)	No	3.10m	No	X-series	Termination
Patient Leads, (8300-0790-01, Lot:57862)	No	0.80m	No	ECG, (8300-0789-01, Lot:58646)	Termination
USB	PA	0.15m	No	Ethernet to USB Adapter	X-series USB Board
Cat5 Ethernet	No	0.90m	No	Ethernet to USB Adapter	Laptop
USB	Yes	1.80m	No	X-series USB Board	Laptop
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	10/20/2011	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.
2	10/20/2011	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.
3	10/20/2011	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.
4	10/20/2011	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.
5	10/20/2011	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.
6	10/25/2011	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.
7	10/27/2011	AC Powerline 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	11/16/2011	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.
9	11/16/2011	Number of Hoping Frequencies	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	11/16/2011	Time of Occupancy (Dwell Time)	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

BLUETOOTH APPROVALS

FCC Procedure Received from Joe Dichoso on 2-15-02

The following exhibit indicates the FCC Spread Spectrum requirements in Section 15.247 for devices meeting the Bluetooth Specifications in the 2.4 GHz band as of February 2001 operating in the USA. The purpose of this exhibit is to help expedite the approval process for Bluetooth devices. This exhibit provides items that vary for each device and also provides a list of items that are common to Bluetooth devices that explains the remaining requirements. The list of common items can be submitted for each application for equipment authorization. This exhibit only specifies requirements in Section 15.247, requirements in other rule Sections for intentional radiators such as in Section 15.203 or 15.207 must be also be addressed. A Bluetooth device is a FHSS transmitter in the data mode and applies as a Hybrid spread spectrum device in the acquisition mode.

For each individual device, the following items, 1-7 will vary from one device to another and must be submitted.

1) The occupied bandwidth in Section 15.247(a)(1)(ii).
2) Conducted output power specified in Section 15.247(b)(1).
3) EIRP limit in Section 15.247(b)(3).
4) RF safety requirement in Section 15.247(b)(4)
5) Spurious emission limits in Section 15.247(c).
6) Processing gain and requirements for Hybrids in Section 15.247(f) in the acquisition mode.
7) Power spectral density requirement in Section 15.247(f) in the acquisition mode.

For all devices, the following items, 1-12, are common to all Bluetooth devices and will not vary from one device to another. This list can be copied into the filing.

1 Output power and channel separation of a Bluetooth device in the different operating modes:

The different operating modes (data-mode, acquisition-mode) of a Bluetooth device don't influence the output power and the channel spacing. There is only one transmitter which is driven by identical input parameters concerning these two parameters.
Only a different hopping sequence will be used. For this reason, the RF parameters in one op-mode is sufficient.

2 Frequency range of a Bluetooth device:

The maximum frequency of the device is: **2402 – 2480 M**Hz.
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for devices which will be operated in the USA. Other frequency ranges (e.g. for Spain, France, Japan) which are allowed according the Core Specification must **not be** supported by the device.

3 Co-ordination of the hopping sequence in data mode to avoid simultaneous occupancy by multiple transmitters:

Bluetooth units which want to communicate with other units must be organized in a structure called piconet. This piconet consist of max. 8 Bluetooth units. One unit is the master the other seven are the slaves. The master co-ordinates frequency occupation in this piconet for all units. As the master hop sequence is derived from it's BD address which is unique for every Bluetooth device, additional masters intending to establish new piconets will always use different hop sequences.

4 Example of a hopping sequence in data mode:

Example of a 79 hopping sequence in data mode:
40, 21, 44, 23, 42, 53, 46, 55, 48, 33, 52, 35, 50, 65, 54, 67,
56, 37, 60, 39, 58, 69, 62, 71, 64, 25, 68, 27, 66, 57, 70, 59,
72, 29, 76, 31, 74, 61, 78, 63, 01, 41, 05, 43, 03, 73, 07, 75,
09, 45, 13, 47, 11, 77, 15, 00, 64, 49, 66, 53, 68, 02, 70, 06,
01, 51, 03, 55, 05, 04

5 Equally average use of frequencies in data mode and short transmissions:

The generation of the hopping sequence in connection mode depends essentially on two input values:
1. LAP/UAP of the master of the connection
2. Internal master clock

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24 MSB's of the 48 BD_ADDRESS. The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronization with other units, only the offsets are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5 µs. The clock has a cycle of about one day (23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire LAP (24 bits), 4 LSB's (4 bits) (Input 1) and the 27 MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the sequence. This will be done at the beginning of every new transmission.
Regarding short transmissions, the Bluetooth system has the following behavior:
The first connection between the two devices is established, a hopping sequence is generated. For transmitting the wanted data, the complete hopping sequence is not used and the connection ends. The second connection will be established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmission is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5 µs). The hopping sequence will always differ from the first one.

6 Receiver input bandwidth, synchronization and repeated single or multiple packets:

The input bandwidth of the receiver is 1 MHz.
In every connection, one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence (see chapter 5). The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection (e.g. single or multi-slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing is according to the packet type of the connection. Also, the slave of the connection uses these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence

7 Dwell time in data mode

The dwell time of 0.3797s within a 30 second period in data mode is independent from the packet type (packet length). The calculation for a 30 second period is a follows:
Dwell time = time slot length * hop rate / number of hopping channels *30s
Example for a DH1 packet (with a maximum length of one time slot)
Dwell time = 625 µs * 1600 1/s / 79 * 30s = 0.3797s (in a 30s period)

For multi-slot packet the hopping is reduced according to the length of the packet.
Example for a DH5 packet (with a maximum length of five time slots)
Dwell time = 5 * 625 µs * 1600 * 1/5 *1/s / 79 * 30s = 0.3797s (in a 30s period)
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for all Bluetooth devices. Therefore, all Bluetooth devices **comply** with the FCC dwell time requirement in the data mode.
This was checked during the Bluetooth Qualification tests.
The Dwell time in hybrid mode is approximately 2.6 mS (in a 12.8s period)

8 Channel Separation in hybrid mode

The nominal channel spacing of the Bluetooth system is 1Mhz independent of the operating mode.
The maximum “initial carrier frequency tolerance” which is allowed for Bluetooth is fcenter = 75 kHz.
This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/07-E) for three frequencies (2402, 2441, 2480 MHz).

9 Derivation and examples for a hopping sequence in hybrid mode

For the generation of the inquiry and page hop sequences the same procedures as described for the data mode are used (see item 5), but this time with different input vectors:
**For the inquiry hop sequence, a predefined fixed address is always used. This results in the same 32 frequencies used by all devices doing an inquiry but every time with a different start frequency and phase in this sequence.
**For the page hop sequence, the device address of the paged unit is used as the input vector. This results in the use of a subset of 32 frequencies which is specific for that initial state of the connection establishment between the two units. A page to different devices would result in a different subset of 32 frequencies.
So it is ensured that also in hybrid mode, the frequency is used equally on average.
Example of a hopping sequence in inquiry mode:
48, 50, 09, 13, 52, 54,41, 45, 56, 58, 11, 15, 60, 62, 43, 47, 00, 02, 64, 68, 04, 06, 17, 21, 08, 10, 66, 70, 12, 14, 19, 23
Example of a hopping sequence in paging mode:
08, 57, 68, 70, 51, 02, 42, 40, 04, 61, 44, 46, 63, 14, 50, 48, 16, 65, 52, 54, 67, 18, 58, 56, 20, 53, 60, 62, 55, 06, 66, 64

10 Receiver input bandwidth and synchronization in hybrid mode:

The receiver input bandwidth is the same as in the data mode (1 MHz). When two Bluetooth devices establish contact for the first time, one device sends an inquiry access code and the other device is scanning for this inquiry access code. If two devices have been connected previously and want to start a new transmission, a similar procedure takes place. The only difference is, instead of the inquiry access code, a special access code, derived from the BD_ADDRESS of the paged device will be, will be sent by the master of this connection. Due to the fact that both units have been connected before (in the inquiry procedure) the paging unit has timing and frequency information about the page scan of the paged unit. For this reason the time to establish the connection is reduced.

11 Spread rate / data rate of the direct sequence signal

The Spread rate / Data rate in inquiry and paging mode can be defined via the access code. The access code is the only criterion for the system to check if there is a valid transmission or not. If you regard the presence of a valid access code as one bit of information, and compare it with the length of the access code of 68 bits, the Spread rate / Data rate will be 68/1.

12 Spurious emission in hybrid mode

The Dwell in hybrid mode is shorter than in data mode. For this reason the spurious emissions average level in data mode is worst case. The spurious emissions peak level is the same for both modes.

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
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	12
Signal Generator	Agilent	N5183A	TIA	1/18/2011	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty 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.

NORTHWEST EMC

Occupied Bandwidth

XMit 2011.08.04
PsaTx 2011.09.28

EUT:	X Series			Work Order:	LGPD0044
Serial Number:	3411000112, 341100050			Date:	10/20/11
Customer:	ZOLL Medical Corp.			Temperature:	23.58C°C
Attendees:	Curt McNamara, Karl Karcht			Humidity:	25%
Project:	None			Barometric Pres.:	1014
Tested by:	Elaine Reeves	Power:	15VDC	Job Site:	MN08

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

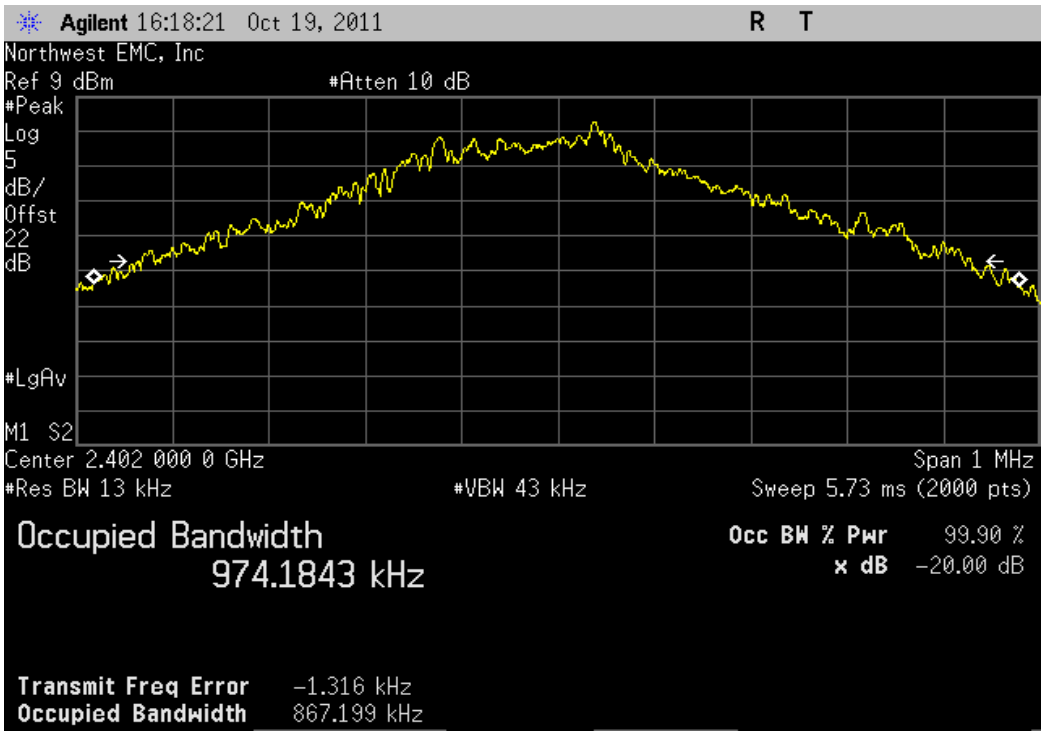
None

Configuration #	1	Signature	Trevor Buls

		Value	Limit	Result
DH5, GFSK				
	Low Channel	867.2 kHz	< 1.5 MHz	Pass
	Mid Channel	853.176 kHz	< 1.5 MHz	Pass
	High Channel	882.664 kHz	< 1.5 MHz	Pass
2DH5, 4-DQPSK				
	Low Channel	1.347 MHz	< 1.5 MHz	Pass
	Mid Channel	1.345 MHz	< 1.5 MHz	Pass
	High Channel	1.341 MHz	< 1.5 MHz	Pass
3DH5, 8-DPSK				
	Low Channel	1.351 MHz	< 1.5 MHz	Pass
	Mid Channel	1.352 MHz	< 1.5 MHz	Pass
	High Channel	1.346 MHz	< 1.5 MHz	Pass

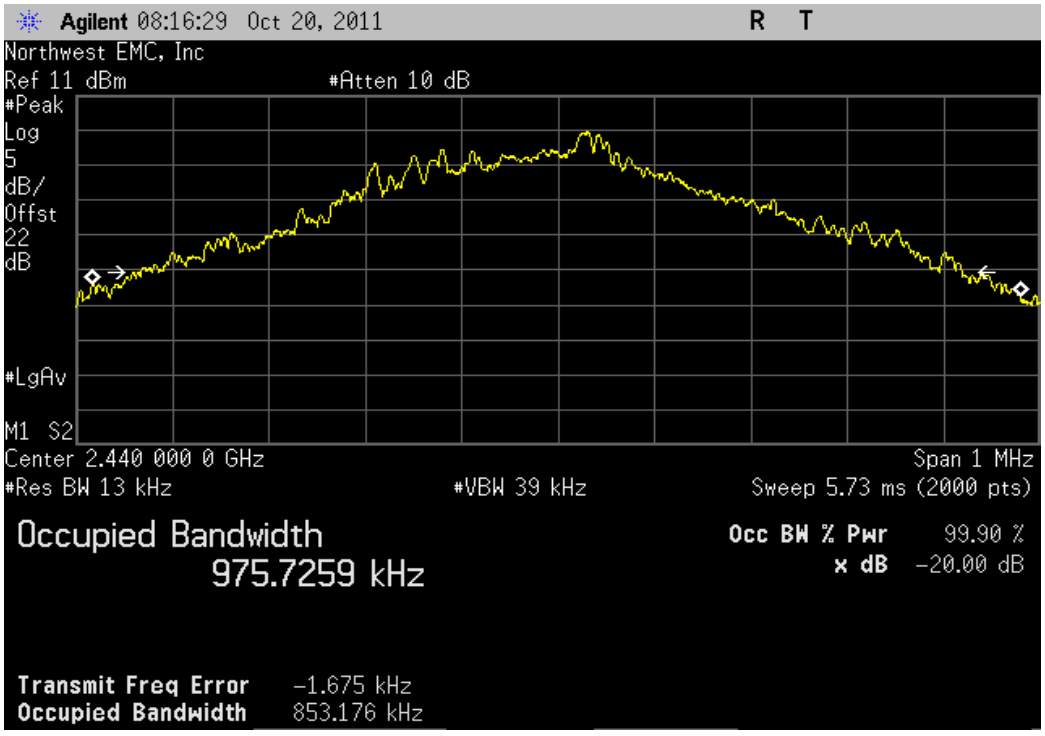
DH5, GFSK, Low Channel

				Value	Limit	Result
				867.2 kHz	< 1.5 MHz	Pass



DH5, GFSK, Mid Channel

				Value	Limit	Result
				853.176 kHz	< 1.5 MHz	Pass

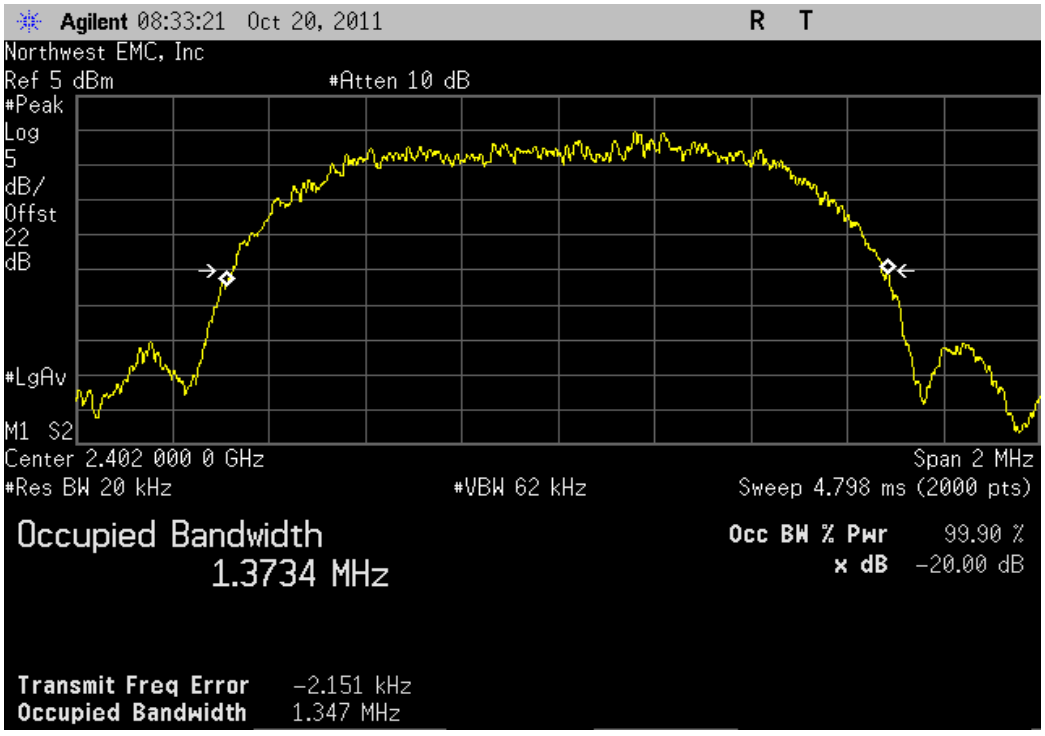


DH5, GFSK, High Channel

				Value	Limit	Result
				882.664 kHz	< 1.5 MHz	Pass

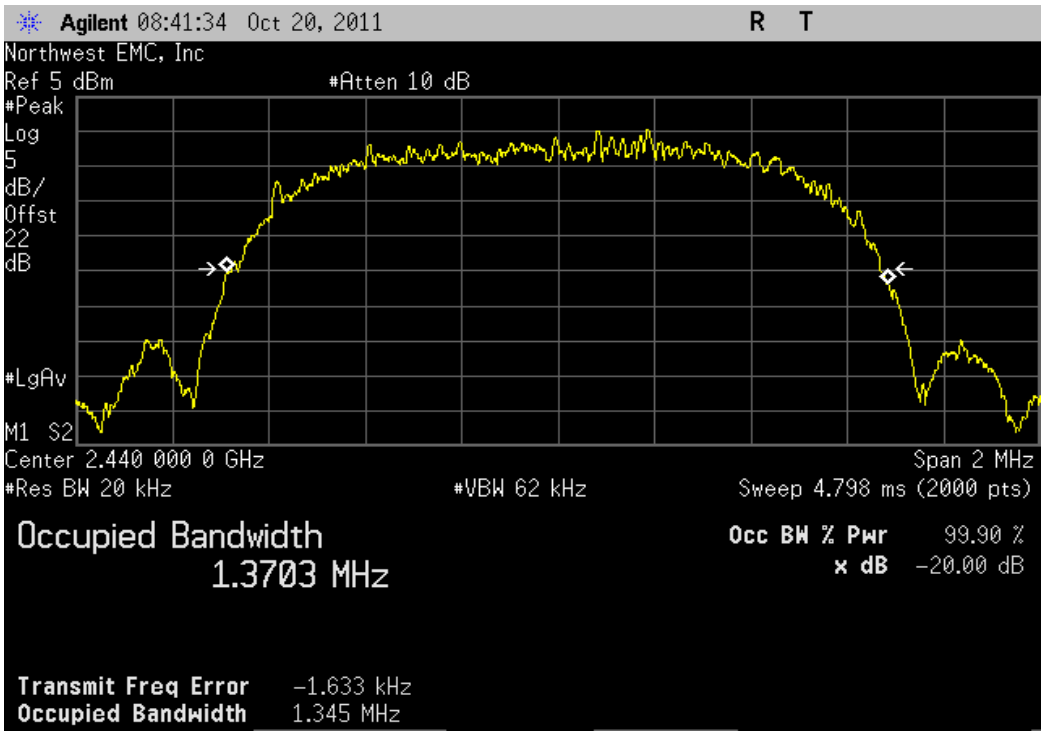
2DH5, 4-DQPSK, Low Channel

				Value	Limit	Result
				1.347 MHz	< 1.5 MHz	Pass



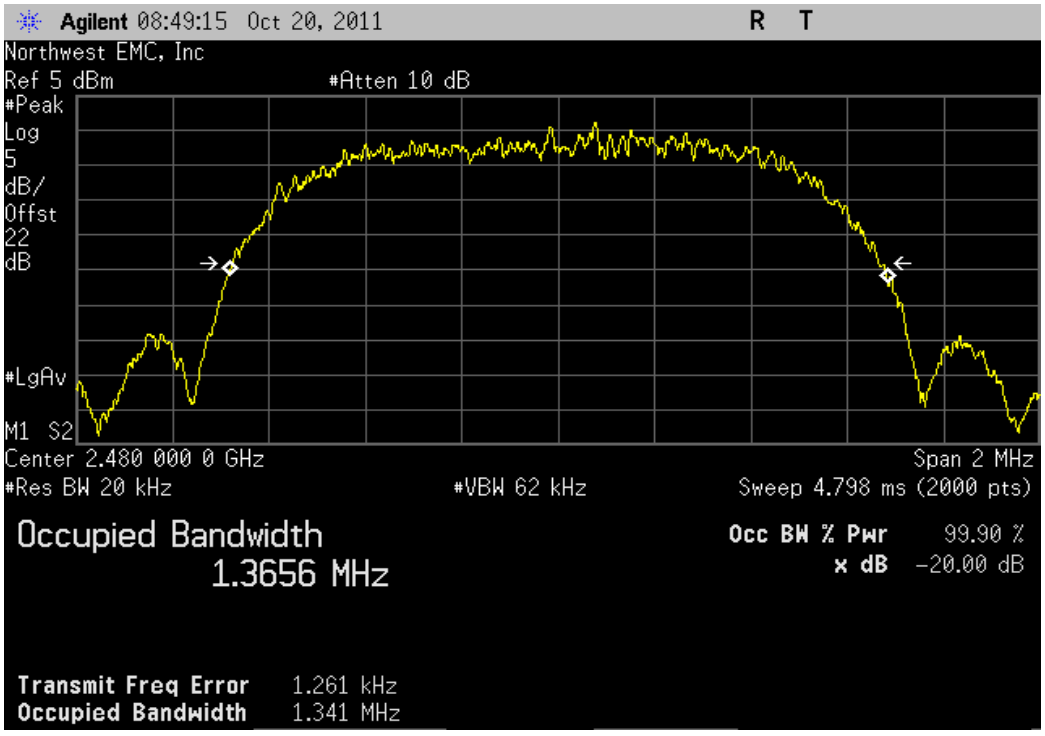
2DH5, 4-DQPSK, Mid Channel

				Value	Limit	Result
				1.345 MHz	< 1.5 MHz	Pass



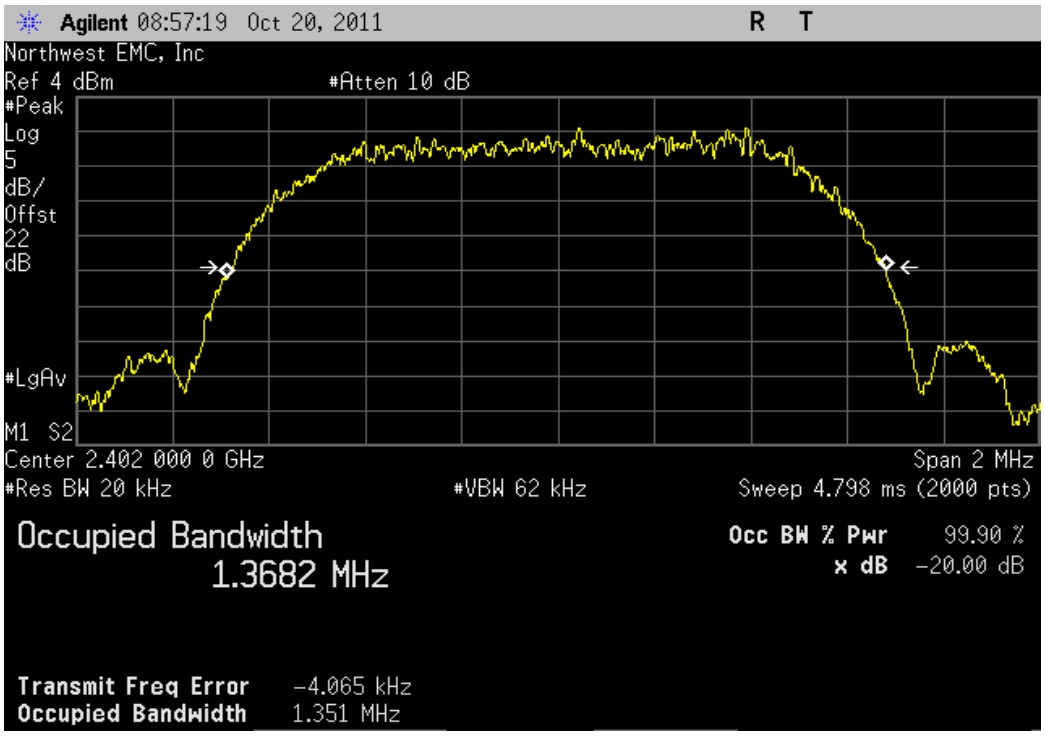
2DH5, 4-DQPSK, High Channel

				Value	Limit	Result
				1.341 MHz	< 1.5 MHz	Pass



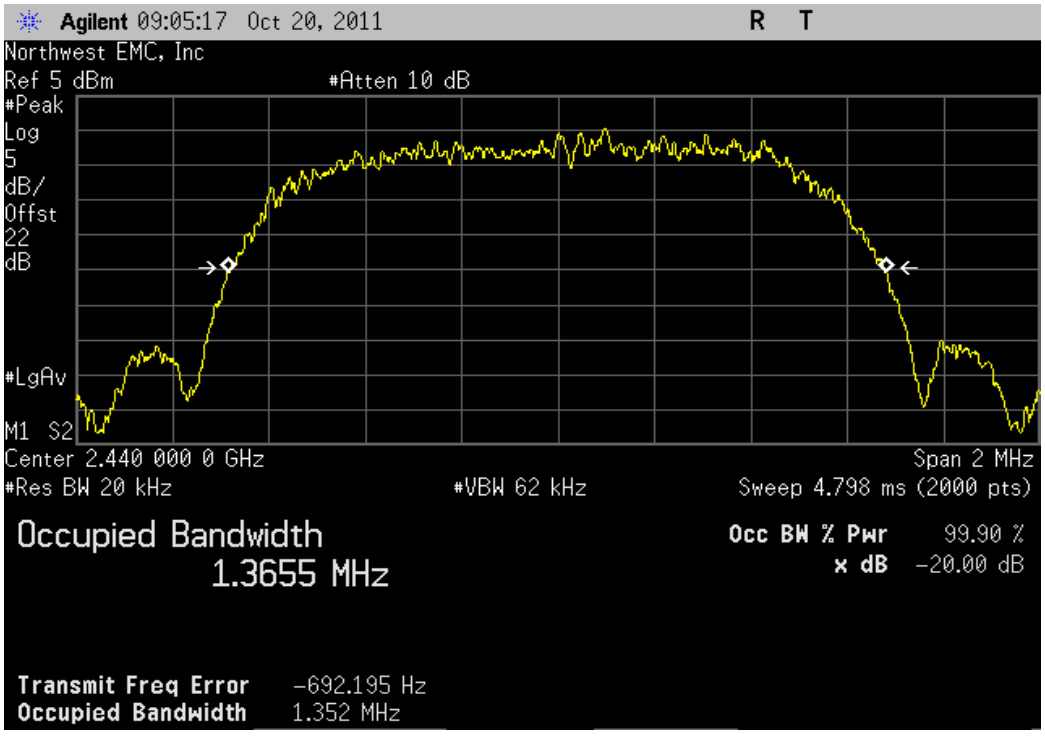
3DH5, 8-DPSK, Low Channel

				Value	Limit	Result
				1.351 MHz	< 1.5 MHz	Pass



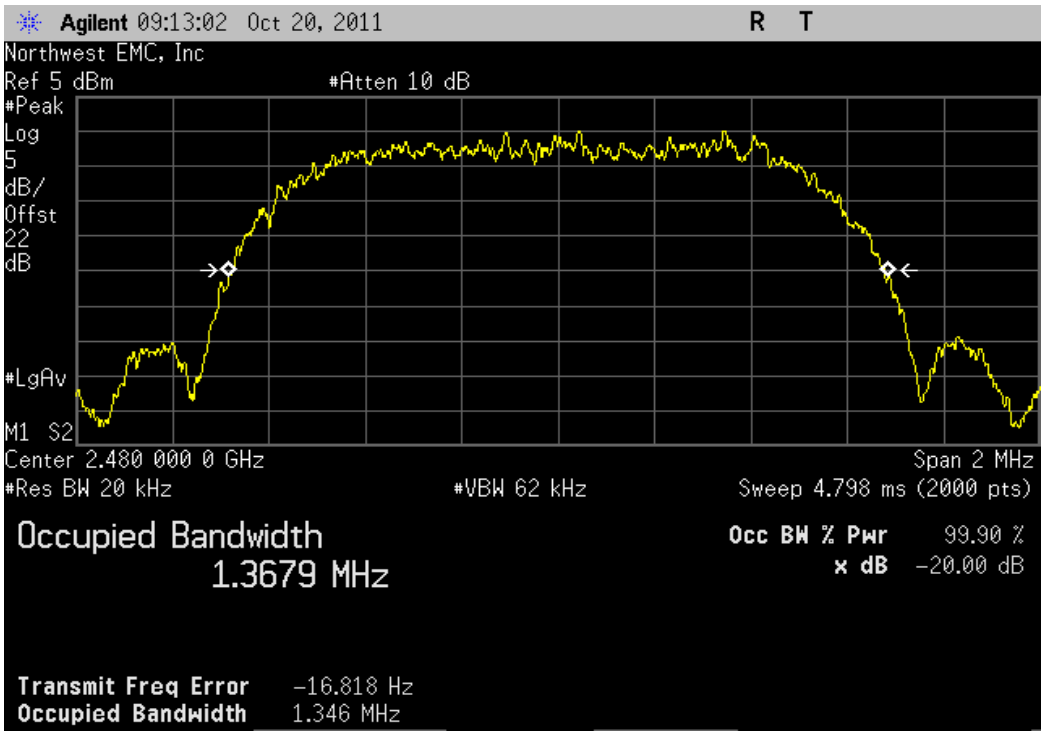
3DH5, 8-DPSK, Mid Channel

				Value	Limit	Result
				1.352 MHz	< 1.5 MHz	Pass



3DH5, 8-DPSK, High Channel

				Value	Limit	Result
				1.346 MHz	< 1.5 MHz	Pass



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
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/18/2011	12
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty 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.

NORTHWEST EMC

Output Power

XMit 2011.08.04
PsaTx 2011.09.28

EUT:	X Series			Work Order:	LGPD0044
Serial Number:	3411000112, 341100050			Date:	10/20/11
Customer:	ZOLL Medical Corp.			Temperature:	23.58C°C
Attendees:	Curt McNamara, Karl Karcht			Humidity:	25%
Project:	None			Barometric Pres.:	1014
Tested by:	Elaine Reeves	Power:	15VDC	Job Site:	MN08

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

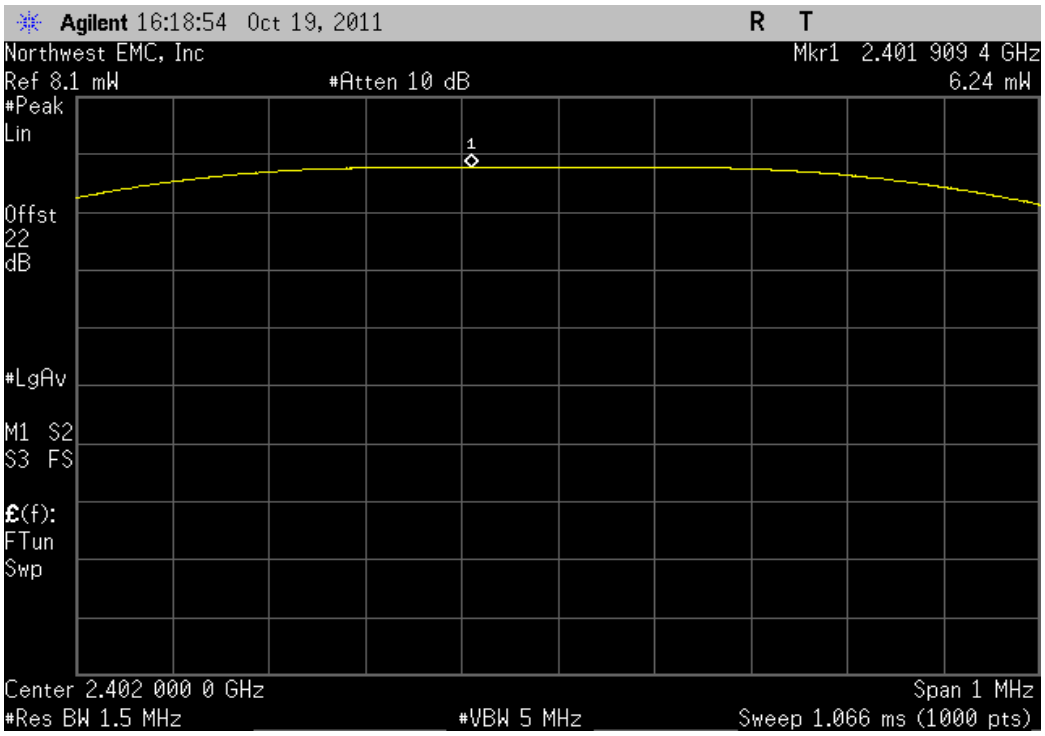
None

Configuration #	1	Signature	Trevor Bulls

		Value	Limit	Result
DH5, GFSK				
	Low Channel	6.242 mW	< 125 mW	Pass
	Mid Channel	6.931 mW	< 125 mW	Pass
	High Channel	7.665 mW	< 125 mW	Pass
2DH5, 4-DQPSK				
	Low Channel	6.107 mW	< 125 mW	Pass
	Mid Channel	6.78 mW	< 125 mW	Pass
	High Channel	7.501 mW	< 125 mW	Pass
3DH5, 8-DPSK				
	Low Channel	7.07 mW	< 125 mW	Pass
	Mid Channel	7.962 mW	< 125 mW	Pass
	High Channel	8.835 mW	< 125 mW	Pass

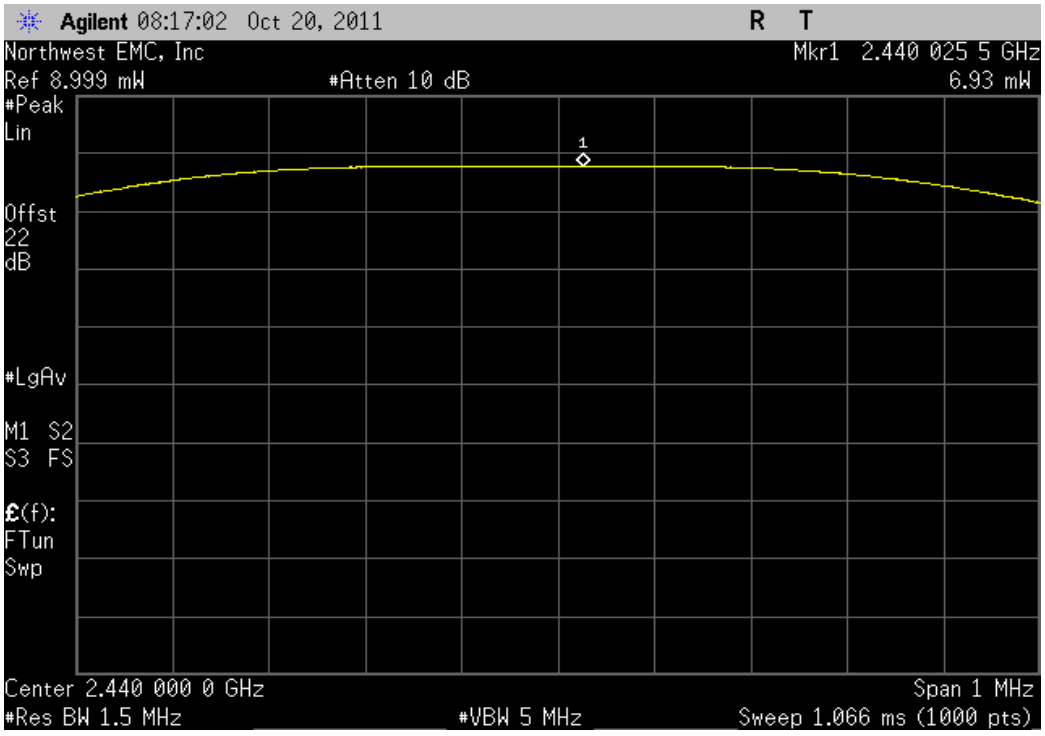
DH5, GFSK, Low Channel

				Value	Limit	Result
				6.242 mW	< 125 mW	Pass



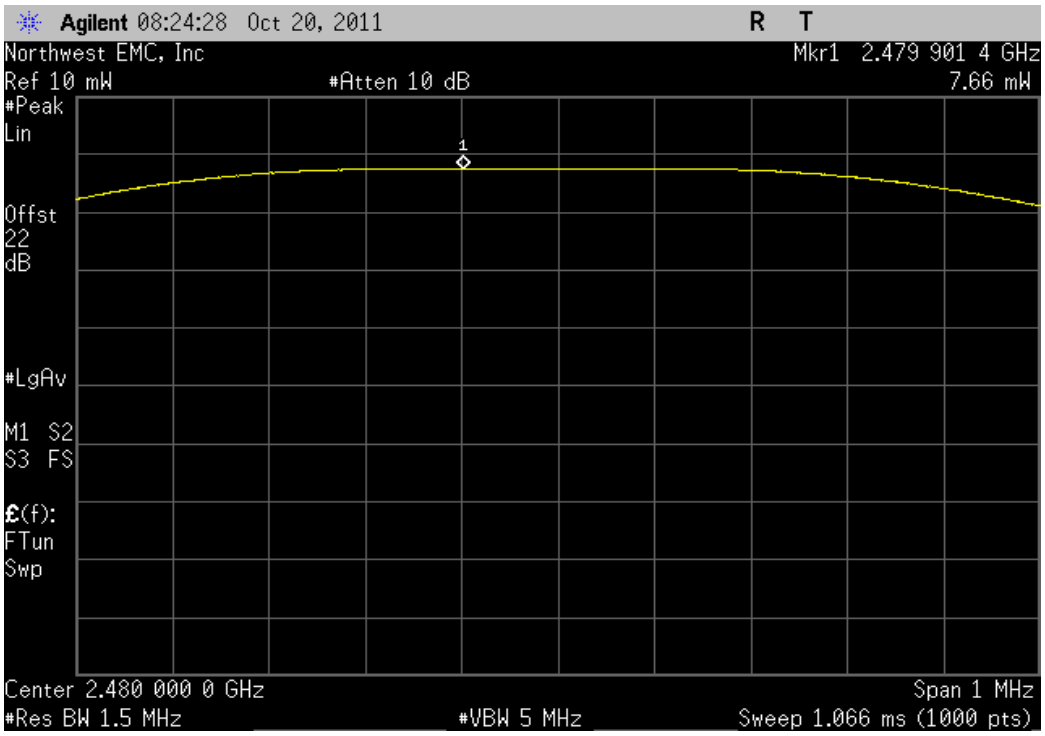
DH5, GFSK, Mid Channel

				Value	Limit	Result
				6.931 mW	< 125 mW	Pass



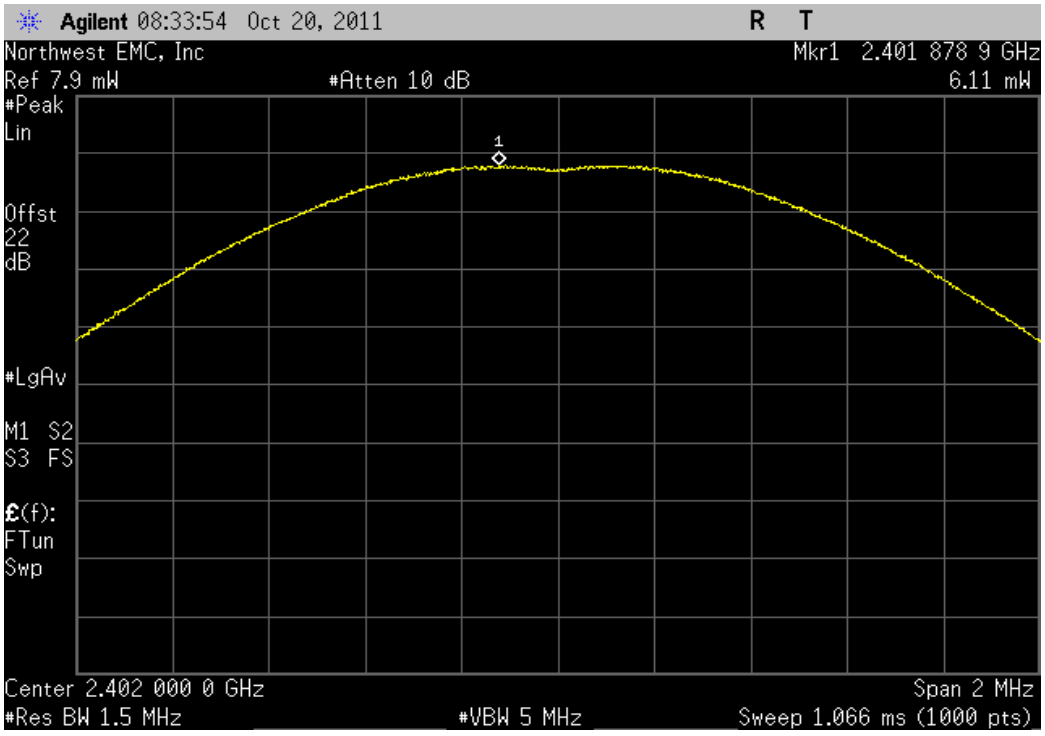
DH5, GFSK, High Channel

				Value	Limit	Result
				7.665 mW	< 125 mW	Pass



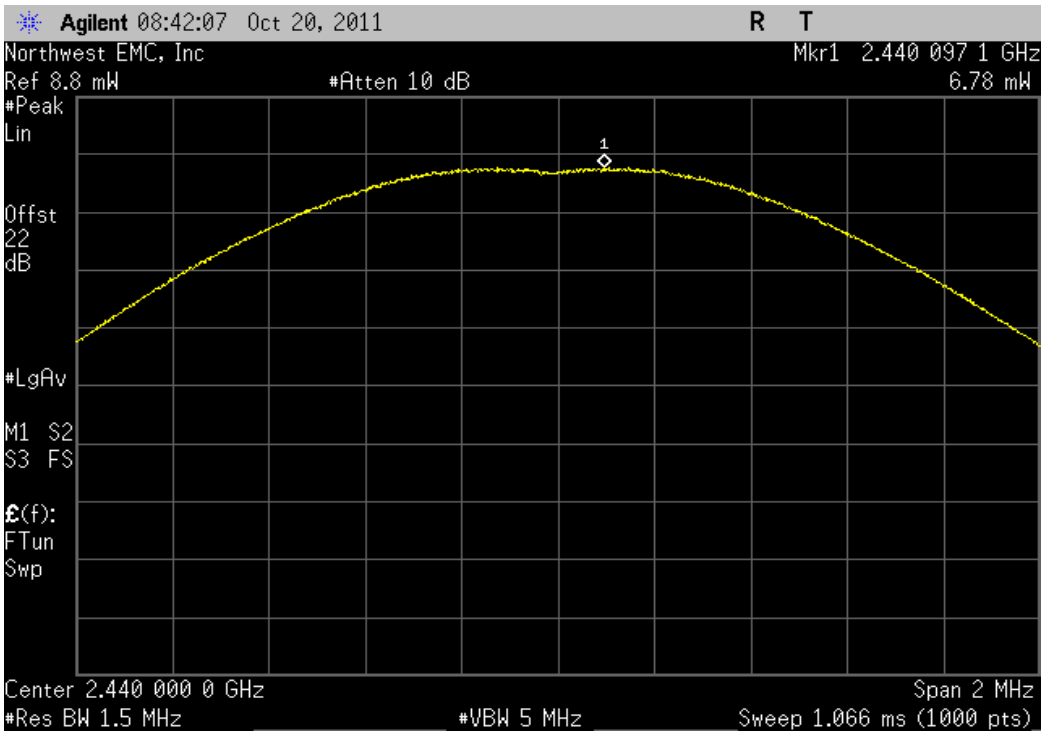
2DH5, 4-DQPSK, Low Channel

				Value	Limit	Result
				6.107 mW	< 125 mW	Pass



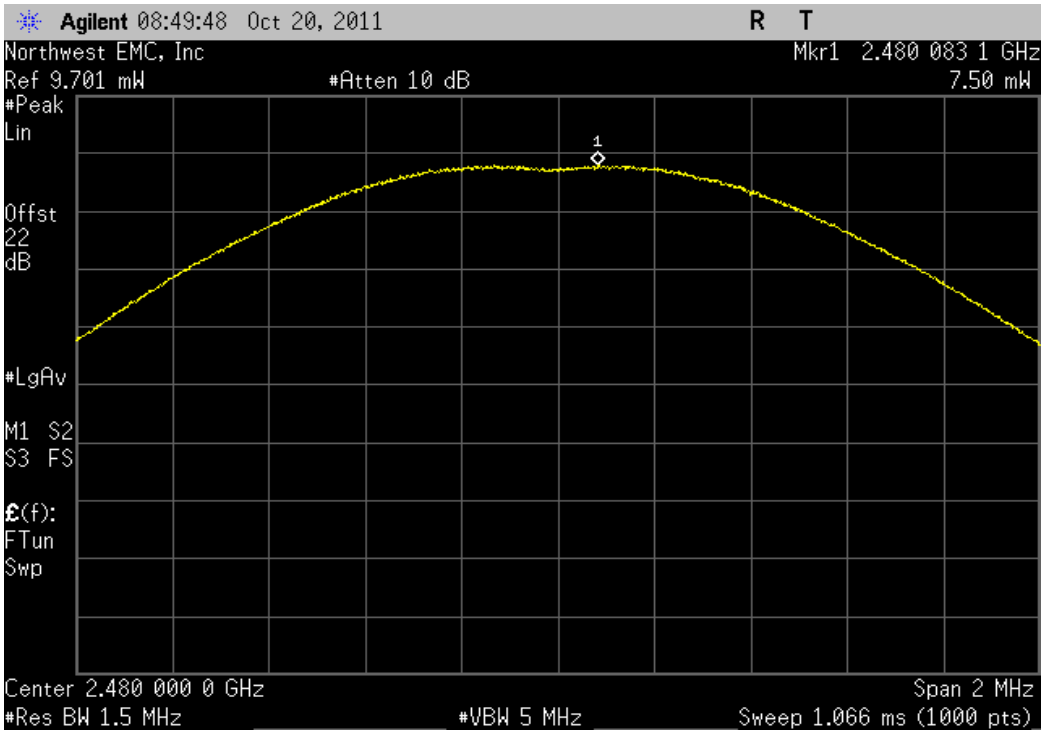
2DH5, 4-DQPSK, Mid Channel

				Value	Limit	Result
				6.78 mW	< 125 mW	Pass



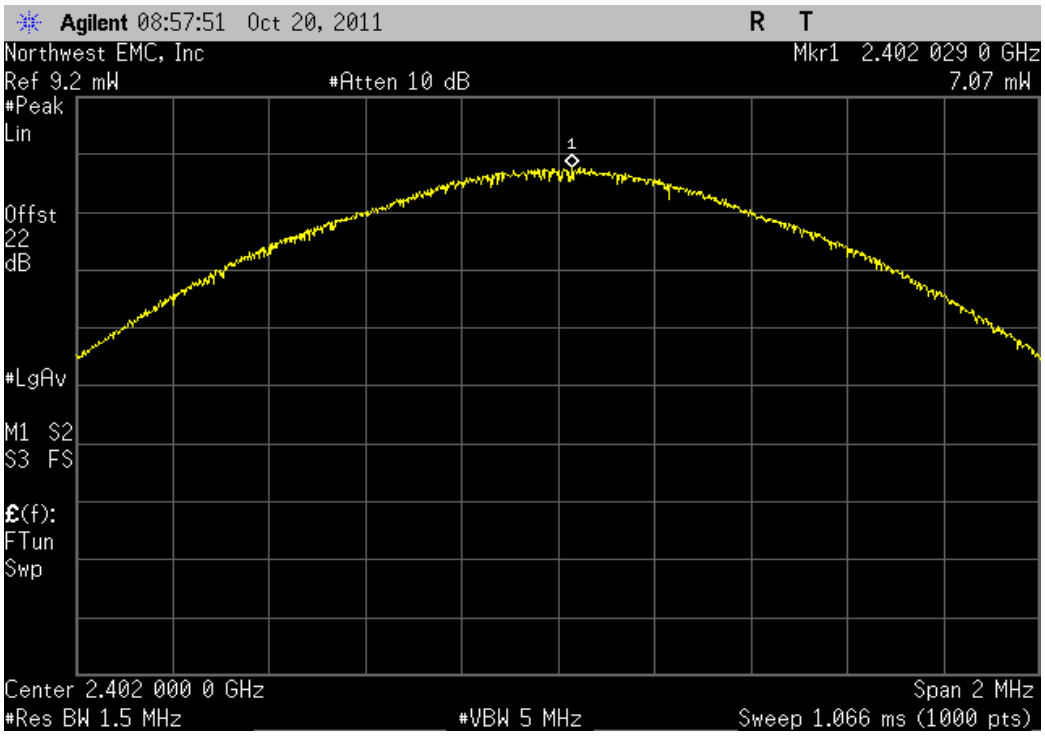
2DH5, 4-DQPSK, High Channel

				Value	Limit	Result
				7.501 mW	< 125 mW	Pass



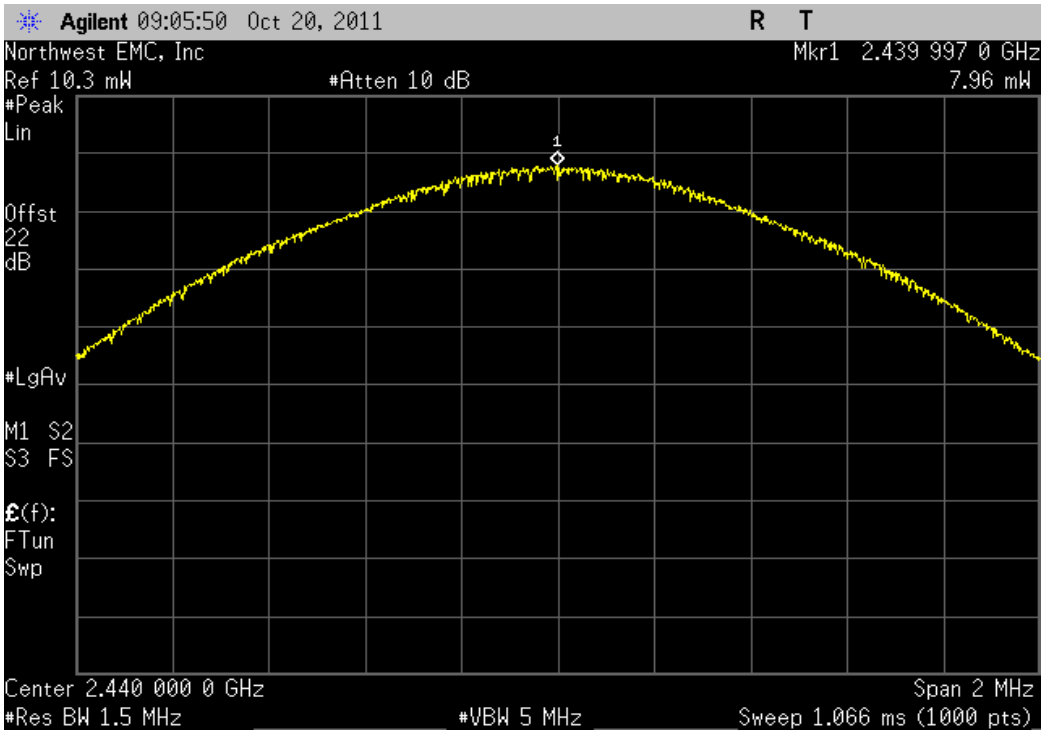
3DH5, 8-DPSK, Low Channel

				Value	Limit	Result
				7.07 mW	< 125 mW	Pass



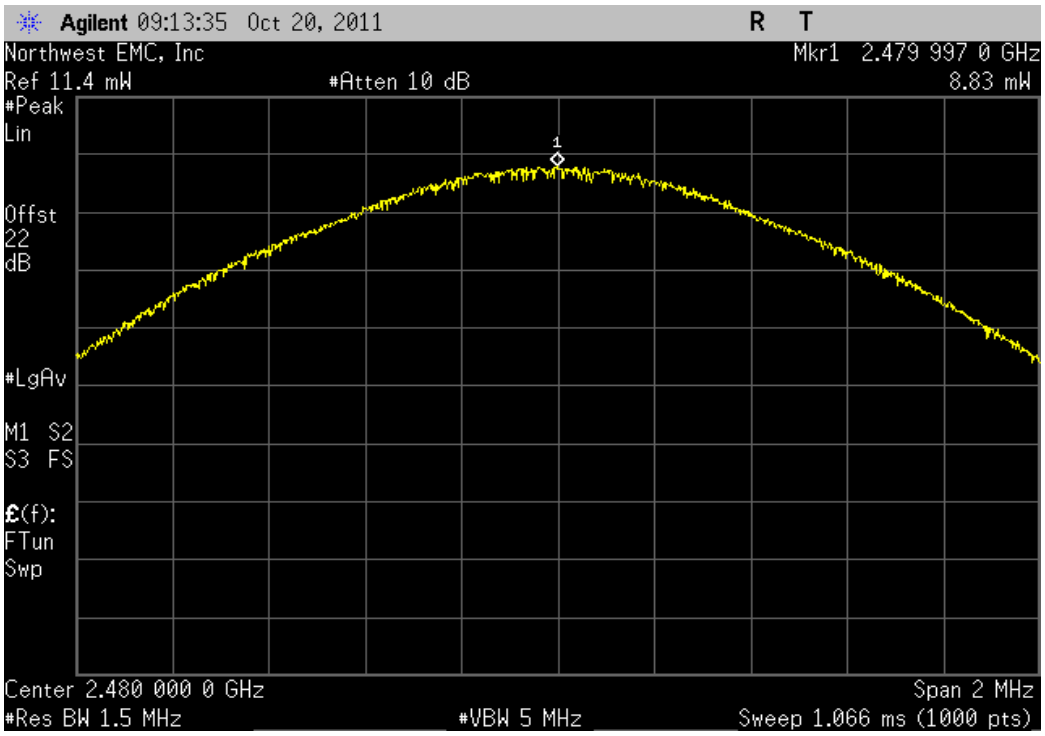
3DH5, 8-DPSK, Mid Channel

				Value	Limit	Result
				7.962 mW	< 125 mW	Pass



3DH5, 8-DPSK, High Channel

				Value	Limit	Result
				8.835 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
Signal Generator	Agilent	N5183A	TIA	1/18/2011	12
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty 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 from ~10 MHz below the band edge to ~10 MHz above the band edge.

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

NORTHWEST EMC

Band Edge Compliance

XMit 2011.08.04
PsaTx 2011.09.28

EUT:	X Series			Work Order:	LGPD0044
Serial Number:	3411000112, 341100050			Date:	10/20/11
Customer:	ZOLL Medical Corp.			Temperature:	23.23C°C
Attendees:	Curt McNamara, Karl Karcht			Humidity:	23%
Project:	None			Barometric Pres.:	1020.2
Tested by:	Trevor Buls	Power:	15VDC	Job Site:	MN08

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

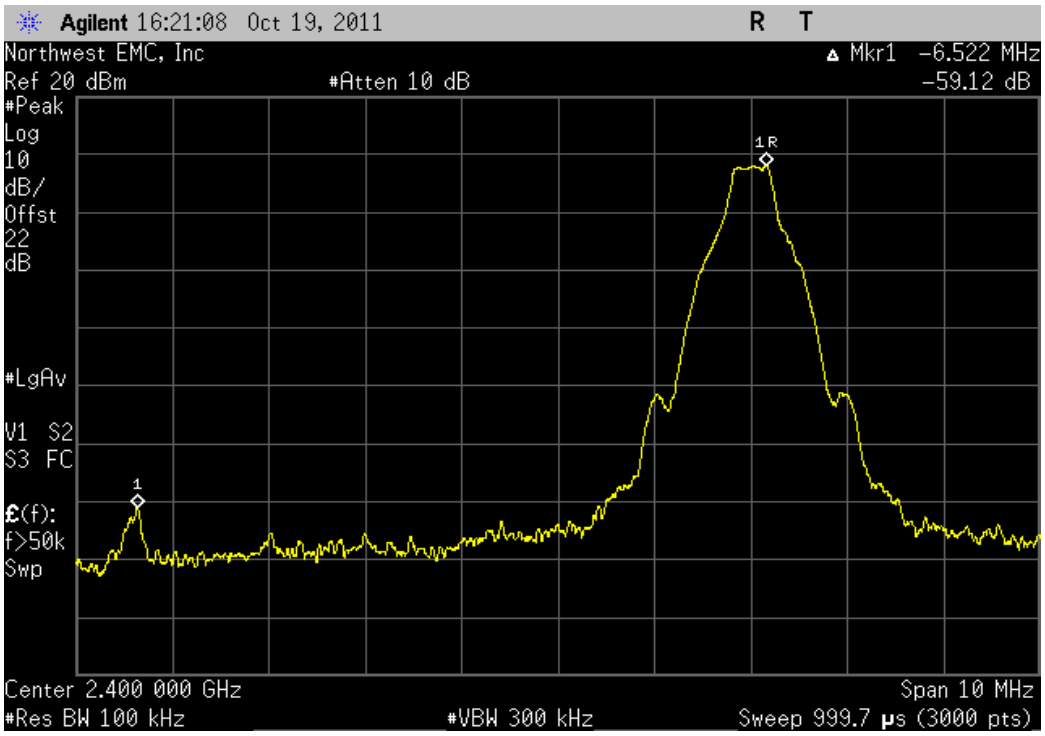
None

Configuration #	1	Signature	Trevor Buls

		Value	Limit	Result
DH5, GFSK				
	Low Channel	-59.12 dBc	≤ -20 dBc	Pass
	High Channel	-62.6 dBc	≤ -20 dBc	Pass
2DH5, 4-DQPSK				
	Low Channel	-43.89 dBc	≤ -20 dBc	Pass
	High Channel	-52.57 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK				
	Low Channel	-44.56 dBc	≤ -20 dBc	Pass
	High Channel	-53.82 dBc	≤ -20 dBc	Pass

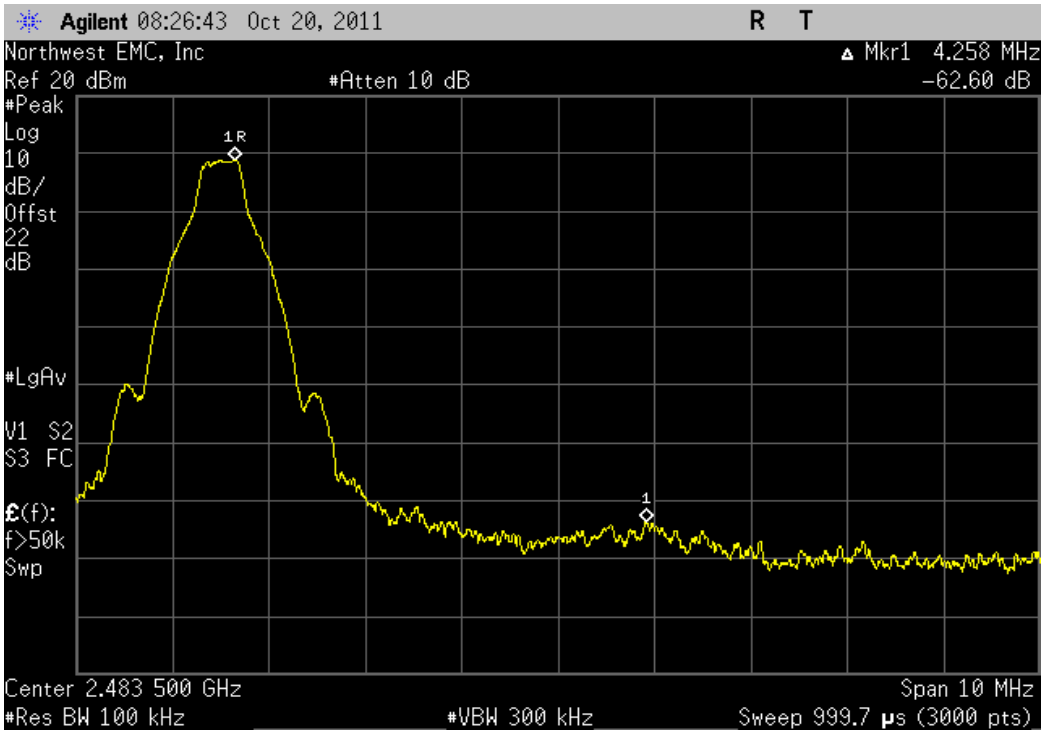
DH5, GFSK, Low Channel

				Value	Limit	Result
				-59.12 dBc	≤ -20 dBc	Pass



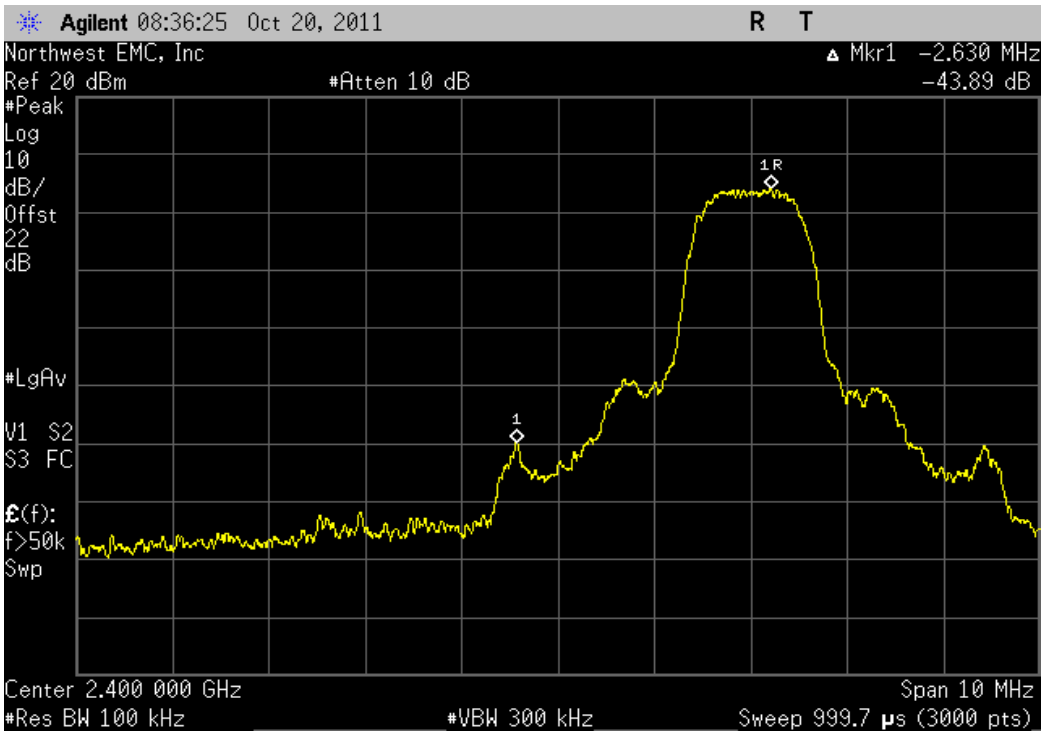
DH5, GFSK, High Channel

				Value	Limit	Result
				-62.6 dBc	≤ -20 dBc	Pass



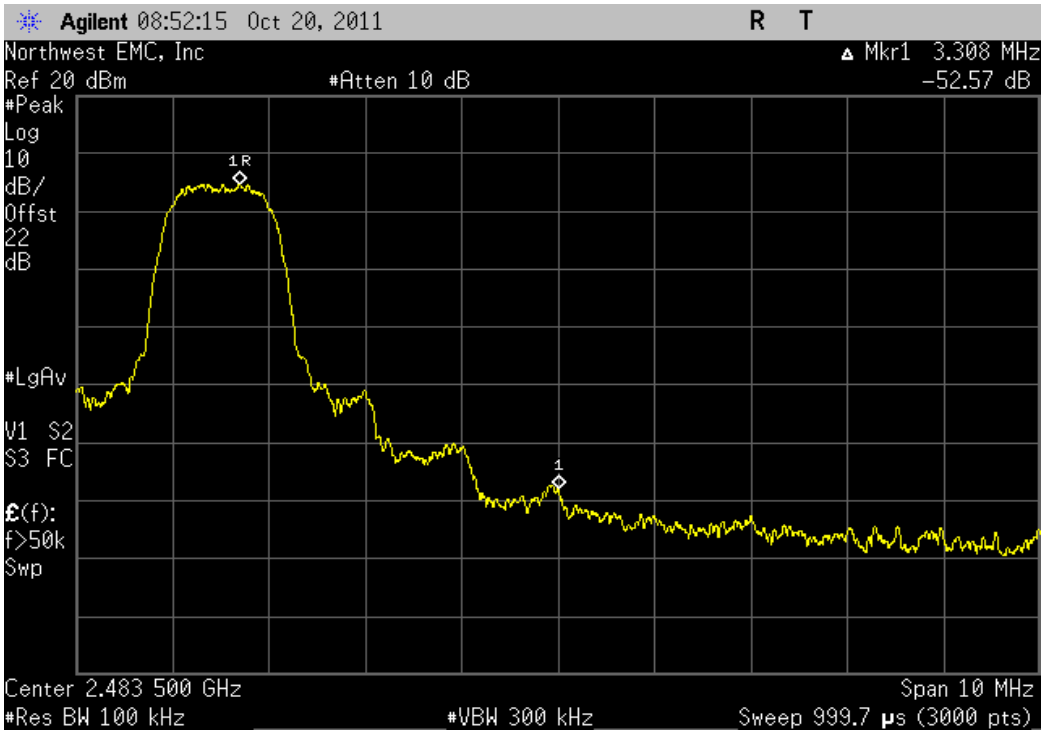
2DH5, 4-DQPSK, Low Channel

				Value	Limit	Result
				-43.89 dBc	≤ -20 dBc	Pass



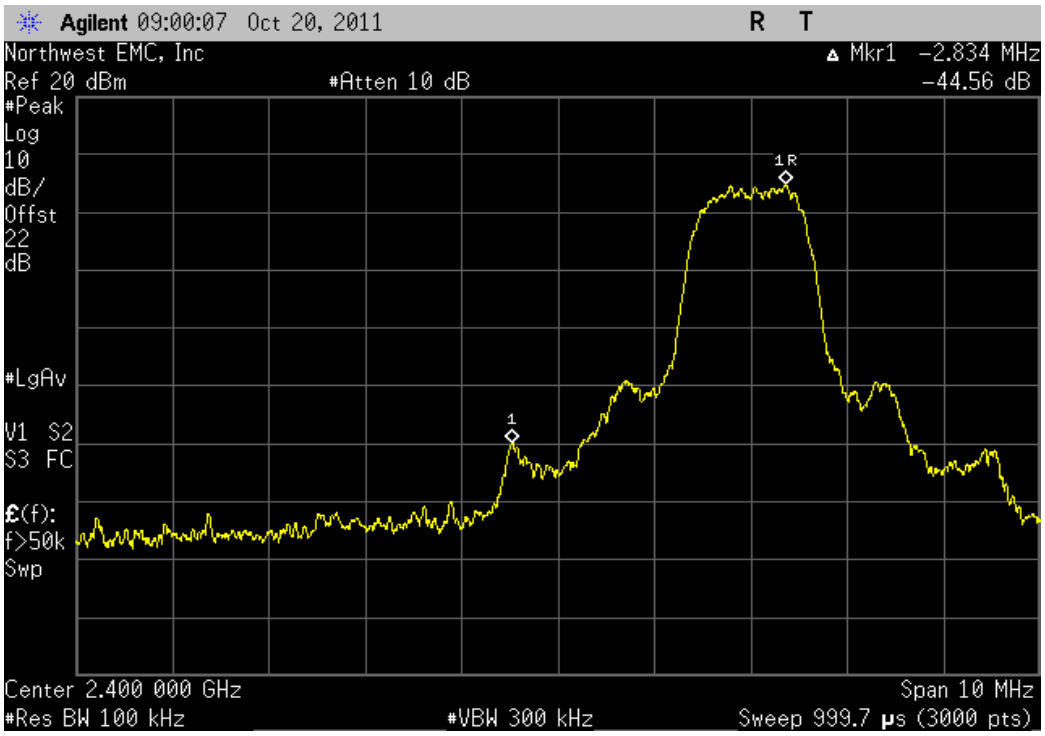
2DH5, 4-DQPSK, High Channel

				Value	Limit	Result
				-52.57 dBc	≤ -20 dBc	Pass



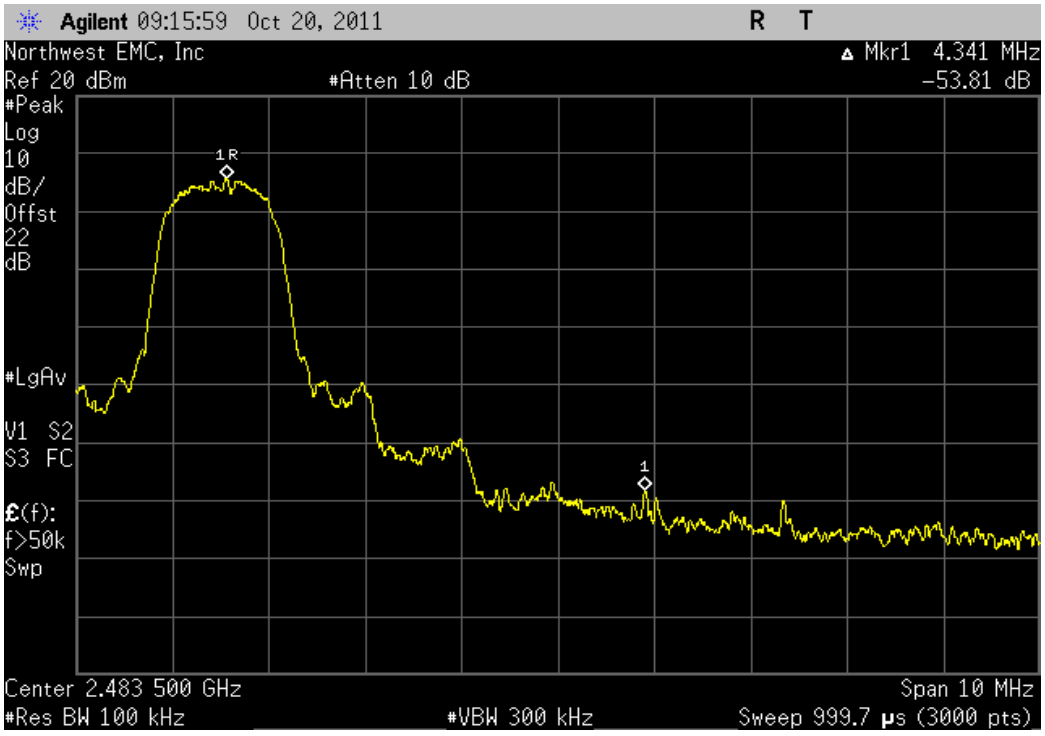
3DH5, 8-DPSK, Low Channel

				Value	Limit	Result
				-44.56 dBc	≤ -20 dBc	Pass



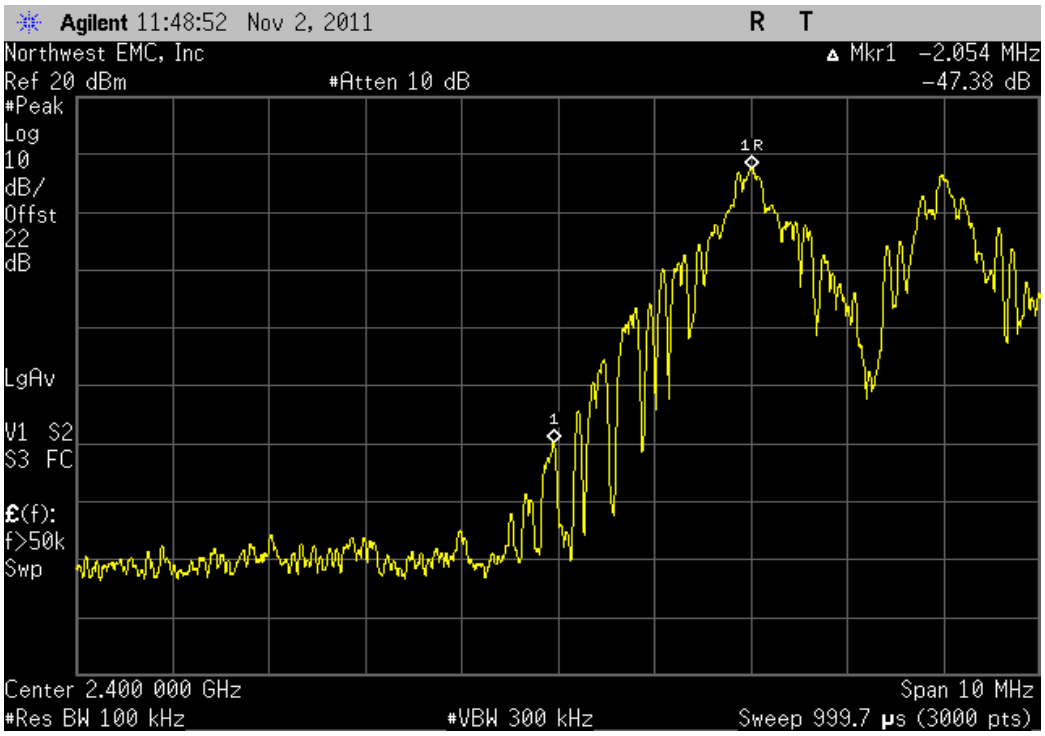
3DH5, 8-DPSK, High Channel

				Value	Limit	Result
				-53.82 dBc	≤ -20 dBc	Pass



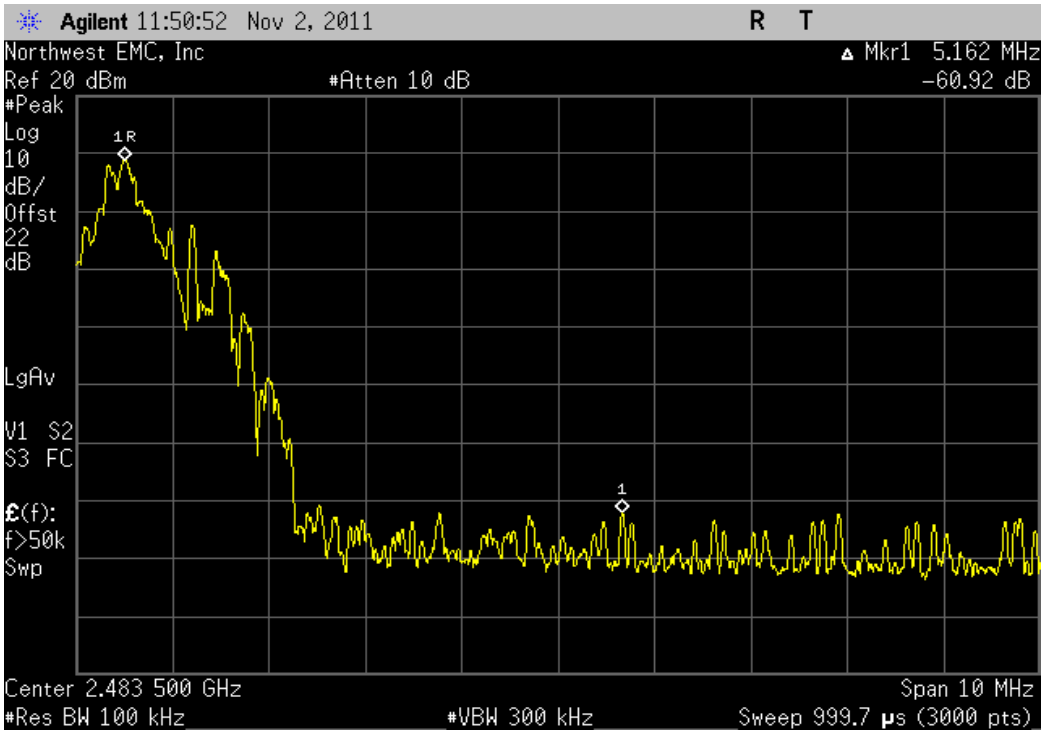
Frequency Hopping, Low Band Edge

				Value	Limit	Result
				-47.38 dBc	≤ -20 dBc	Pass



Frequency Hopping, High Band Edge

				Value	Limit	Result
				-60.92 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	1/18/2011	12
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty 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 in a no hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency.

NORTHWEST EMC

Spurious Conducted Emissions

XMit 2011.08.04
PsaTx 2011.09.28

EUT:	X Series			Work Order:	LGPD0044
Serial Number:	3411000112, 341100050			Date:	10/20/11
Customer:	ZOLL Medical Corp.			Temperature:	23.58C°C
Attendees:	Curt McNamara, Karl Karcht			Humidity:	25%
Project:	None			Barometric Pres.:	1014
Tested by:	Elaine Reeves	Power:	15VDC	Job Site:	MN08

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

None

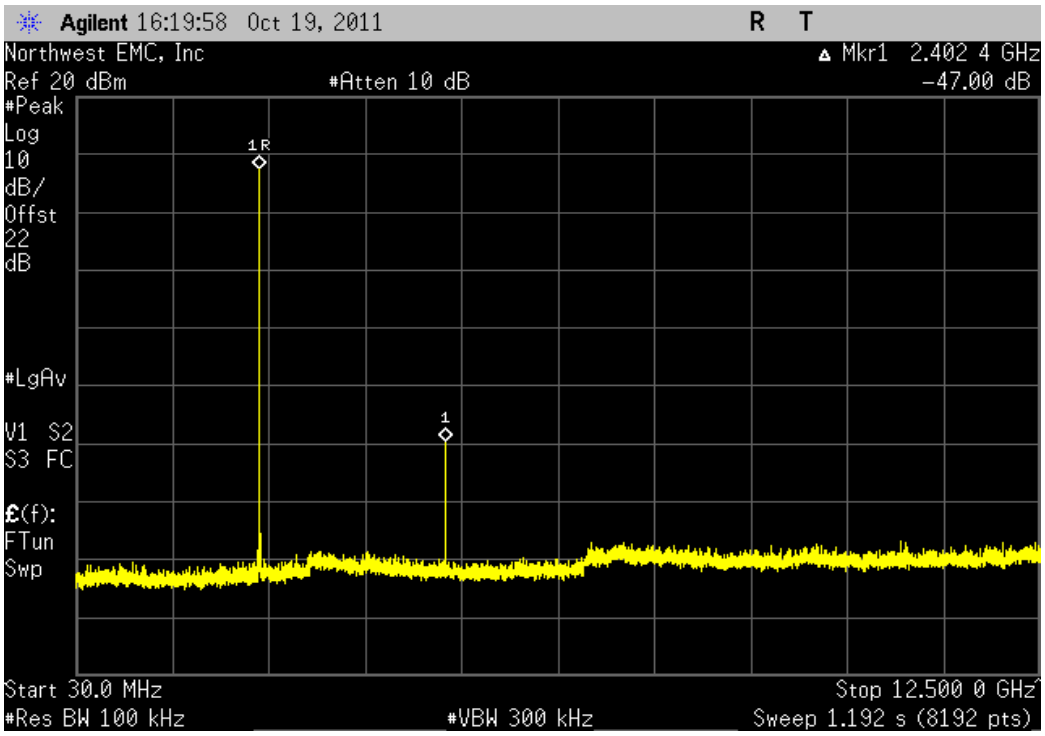
DEVIATIONS FROM TEST STANDARD

None

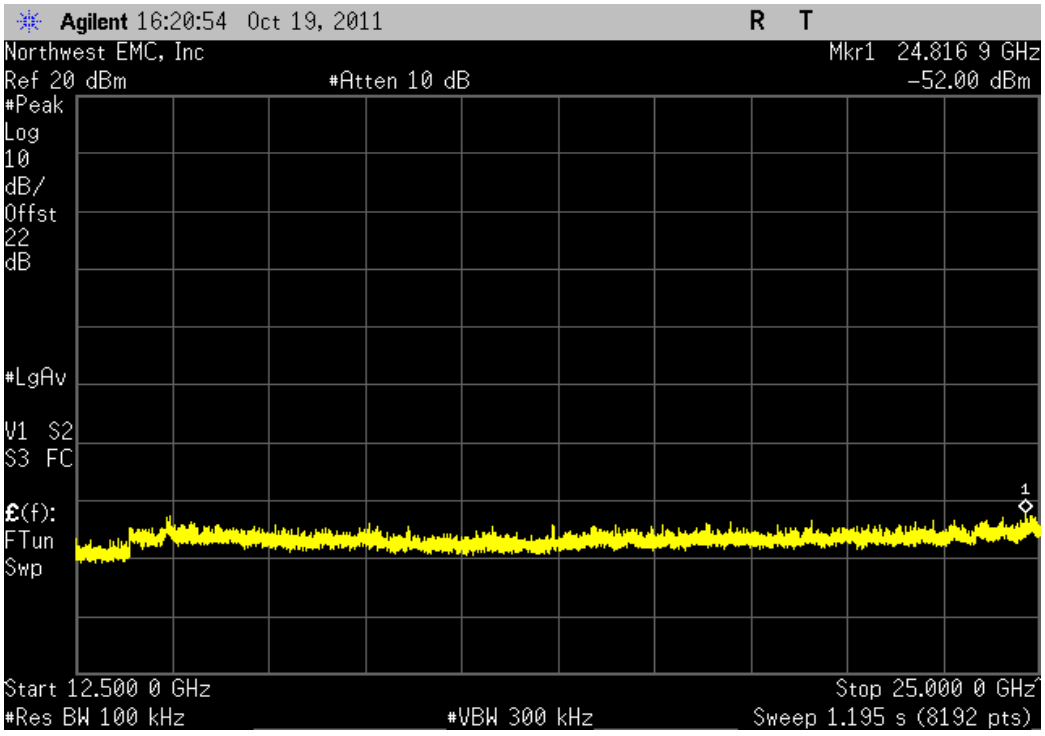
Configuration #	1	Signature	Trevor Buls

		Frequency Range	Value	Limit	Result
DH5, GFSK					
	Low Channel	30 MHz - 12.5 GHz	-47 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-59.54 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-49.97 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-58.09 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-52.66 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-57.07 dBc	≤ -20 dBc	Pass
2DH5, 4-DQPSK					
	Low Channel	30 MHz - 12.5 GHz	-55.21 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-55.49 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-56.01 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-56.99 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-55.89 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-56.23 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK					
	Low Channel	30 MHz - 12.5 GHz	-54.28 dBc	≤ -20 dBc	Pass
	Low Channel	12.5 GHz - 25 GHz	-56.63 dBc	≤ -20 dBc	Pass
	Mid Channel	30 MHz - 12.5 GHz	-54.99 dBc	≤ -20 dBc	Pass
	Mid Channel	12.5 GHz - 25 GHz	-56.3 dBc	≤ -20 dBc	Pass
	High Channel	30 MHz - 12.5 GHz	-56.23 dBc	≤ -20 dBc	Pass
	High Channel	12.5 GHz - 25 GHz	-56.84 dBc	≤ -20 dBc	Pass

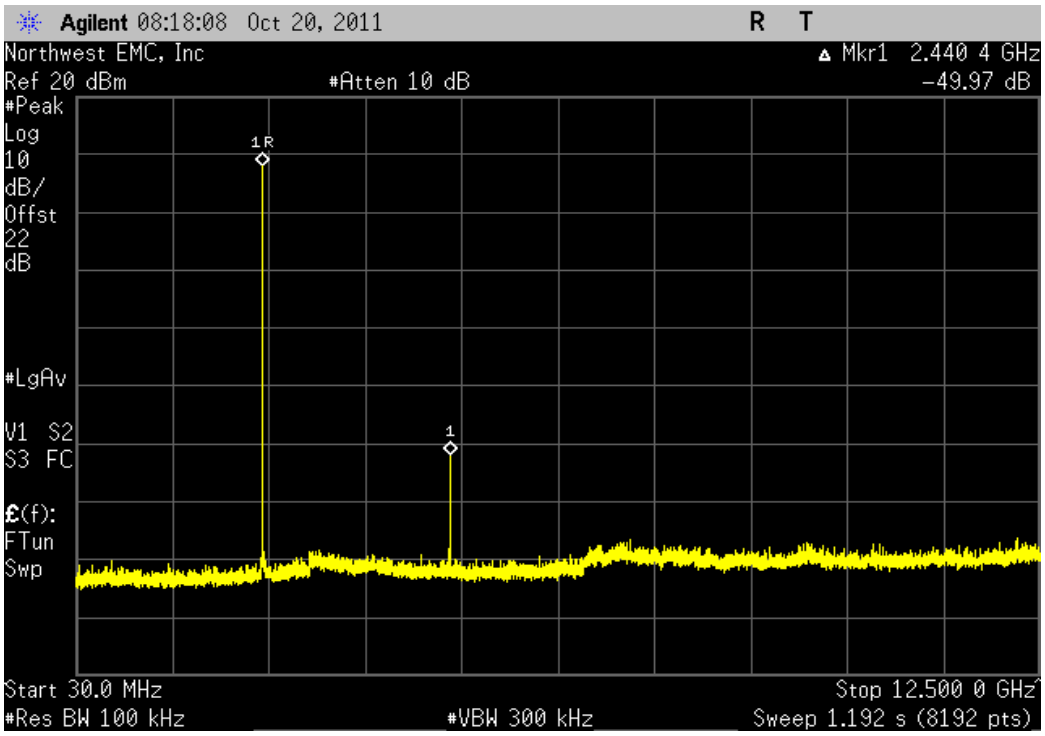
DH5, GFSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-47 dBc	≤ -20 dBc	Pass



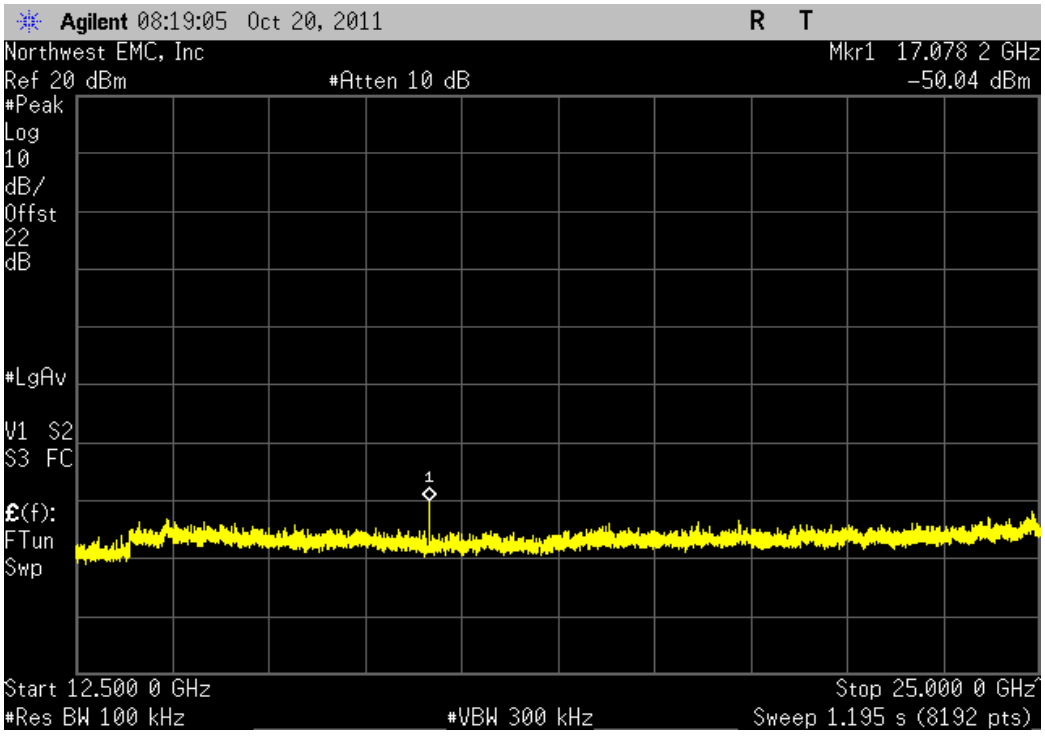
DH5, GFSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-59.54 dBc	≤ -20 dBc	Pass



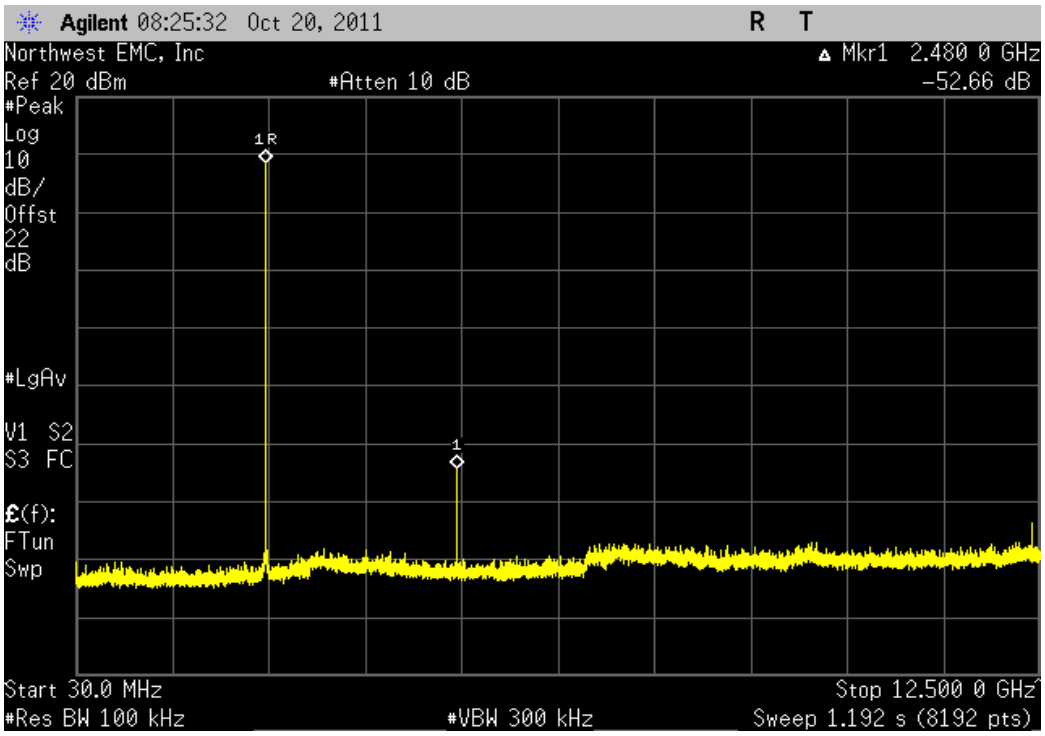
DH5, GFSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-49.97 dBc	≤ -20 dBc	Pass



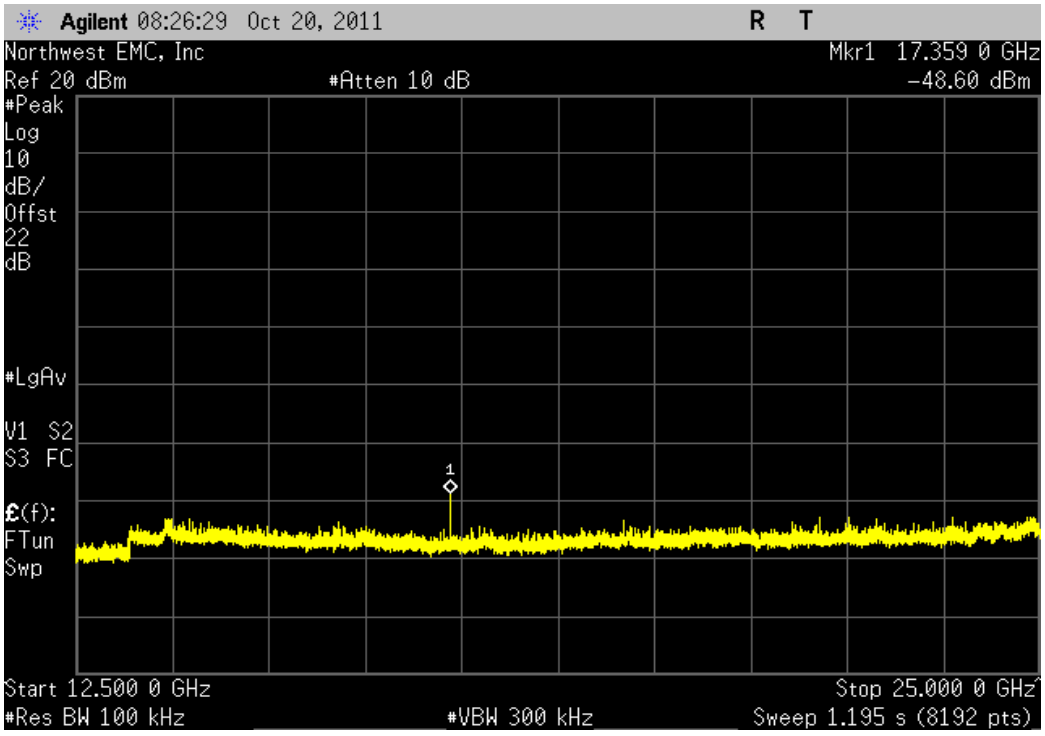
DH5, GFSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-58.09 dBc	≤ -20 dBc	Pass



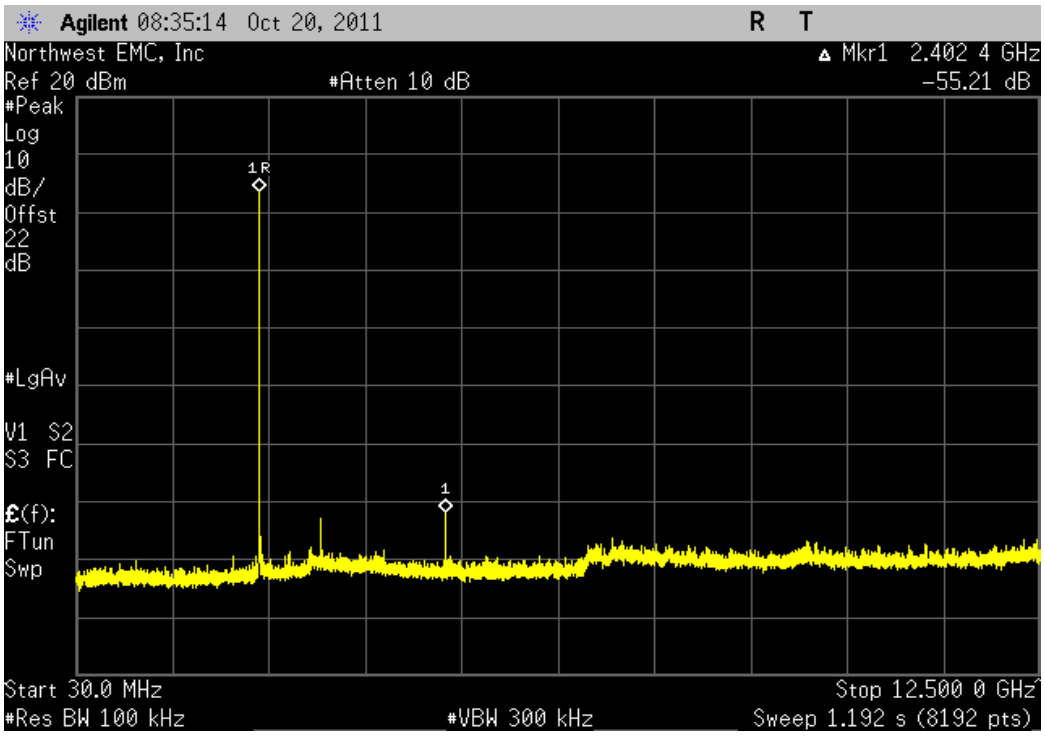
DH5, GFSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-52.66 dBc	≤ -20 dBc	Pass



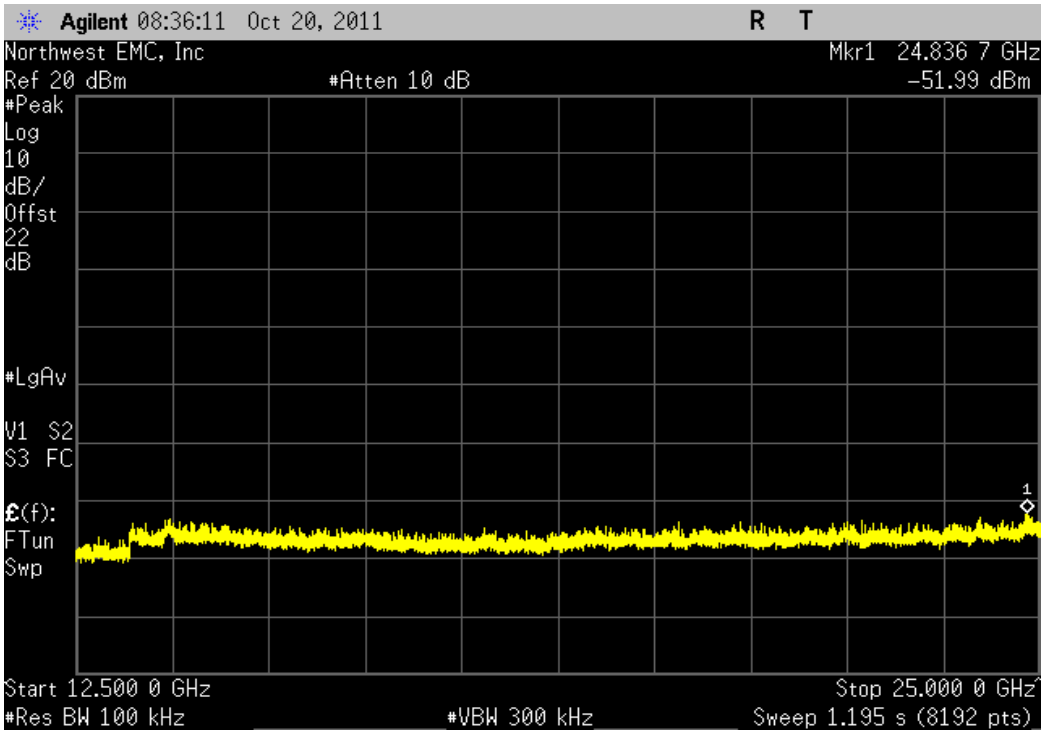
DH5, GFSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-57.07 dBc	≤ -20 dBc	Pass



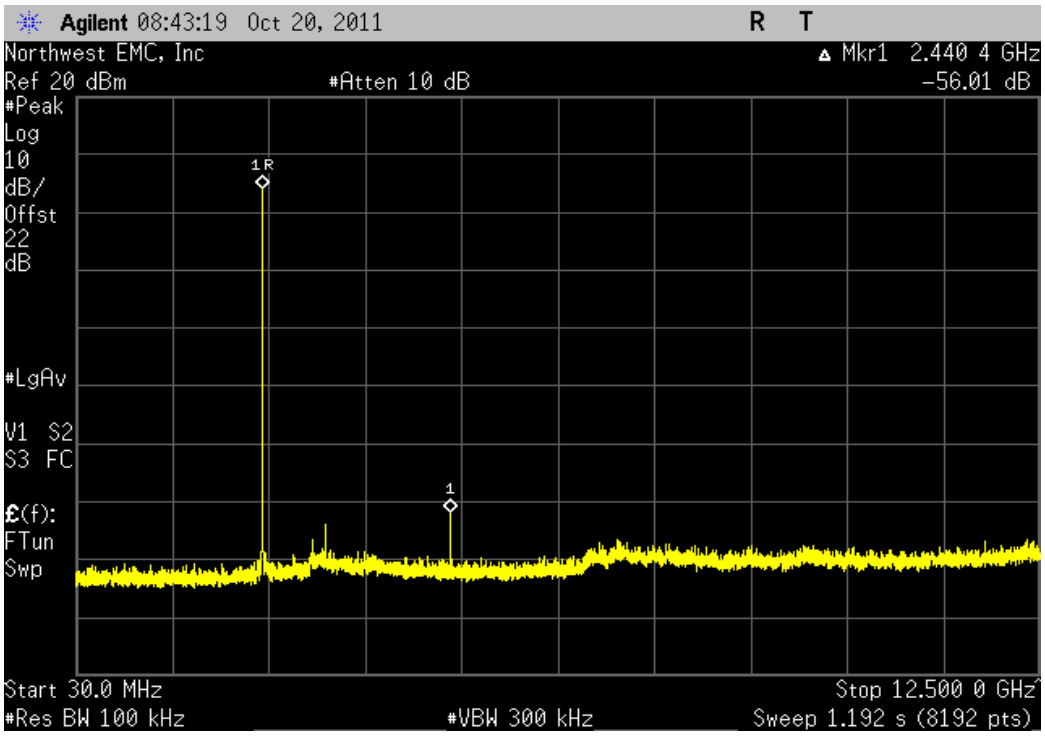
2DH5, 4-DQPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-55.21 dBc	≤ -20 dBc	Pass



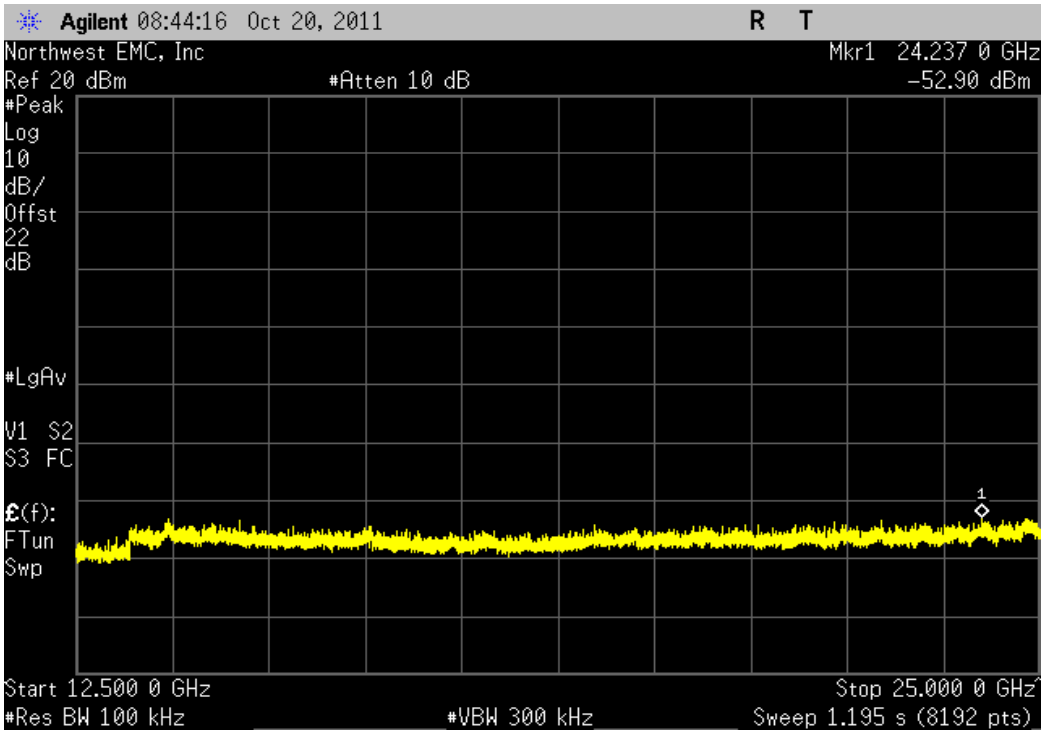
2DH5, 4-DQPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-55.49 dBc	≤ -20 dBc	Pass



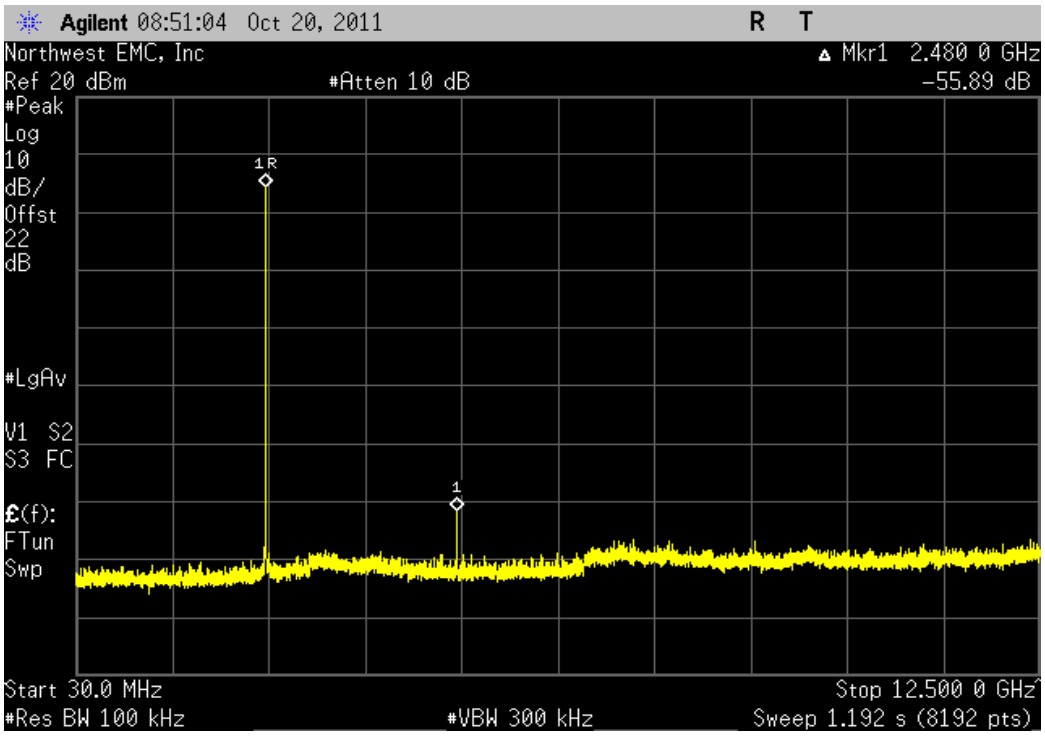
2DH5, 4-DQPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-56.01 dBc	≤ -20 dBc	Pass



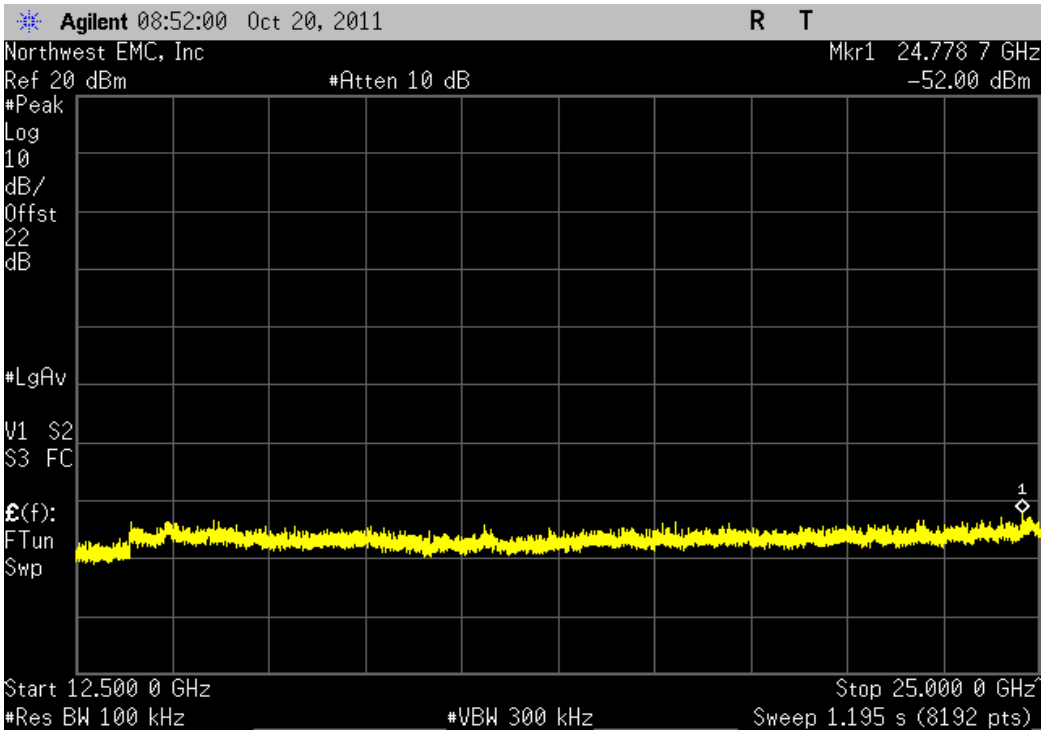
2DH5, 4-DQPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-56.99 dBc	≤ -20 dBc	Pass



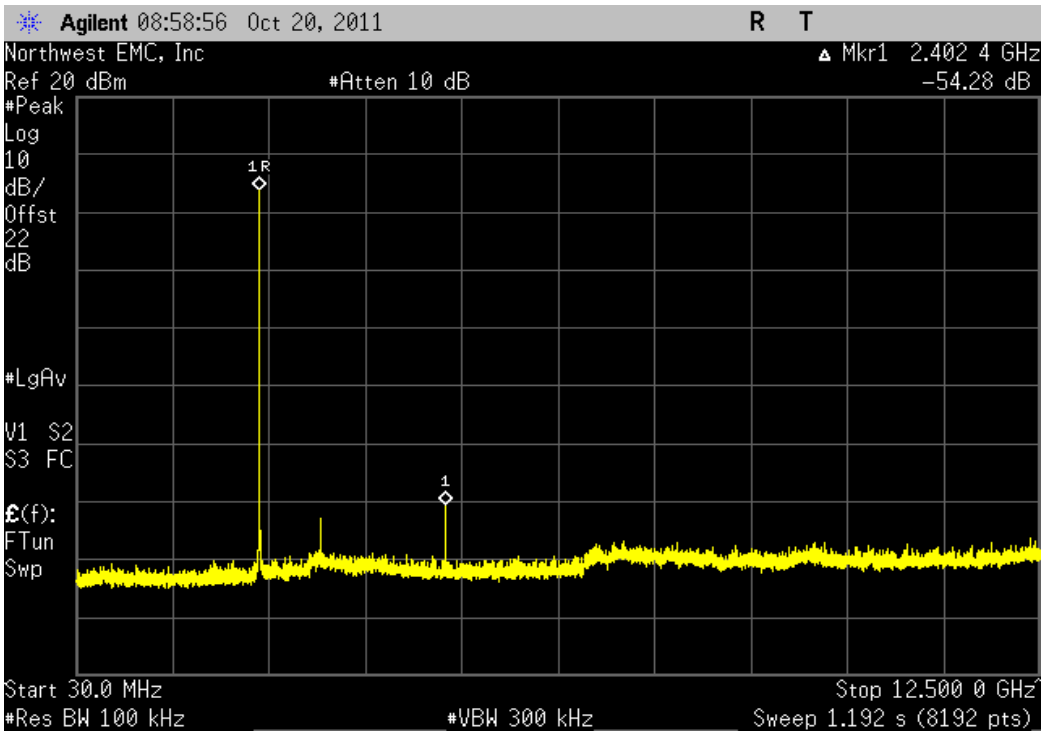
2DH5, 4-DQPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-55.89 dBc	≤ -20 dBc	Pass



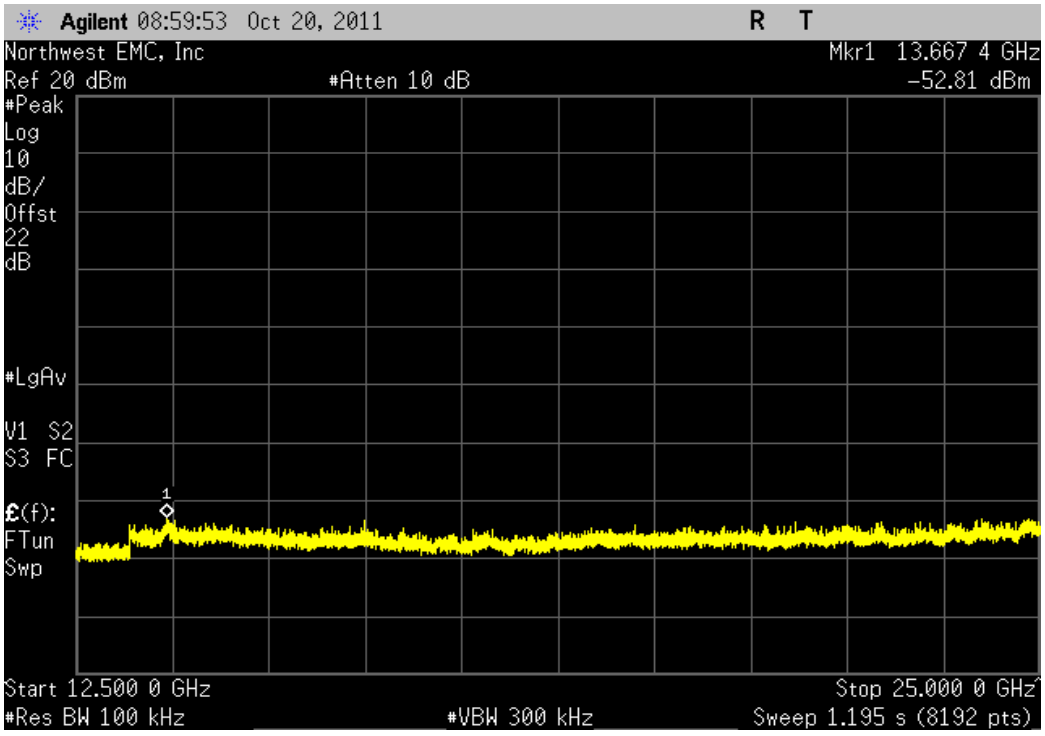
2DH5, 4-DQPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-56.23 dBc	≤ -20 dBc	Pass



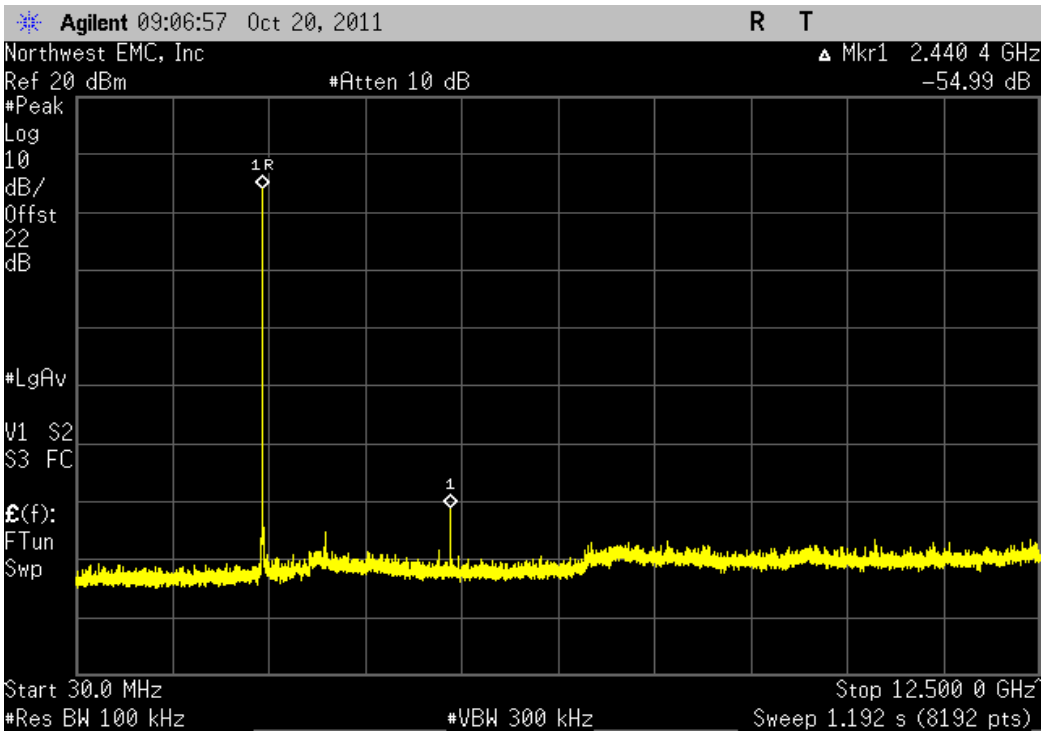
3DH5, 8-DPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-54.28 dBc	≤ -20 dBc	Pass



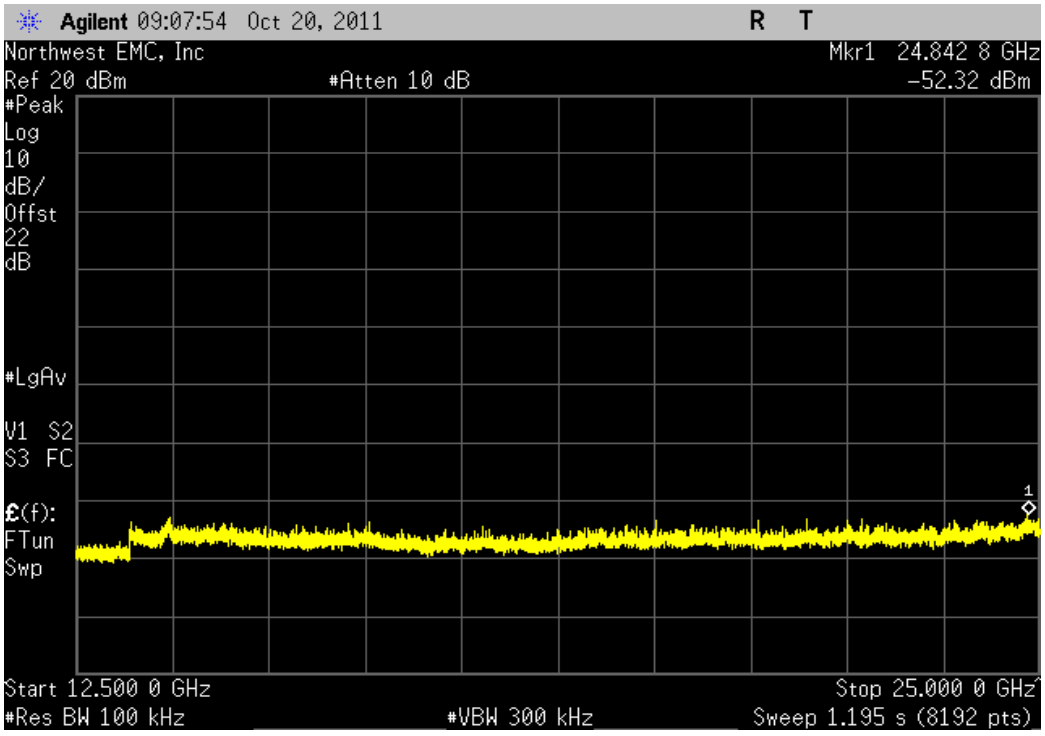
3DH5, 8-DPSK, Low Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-56.63 dBc	≤ -20 dBc	Pass



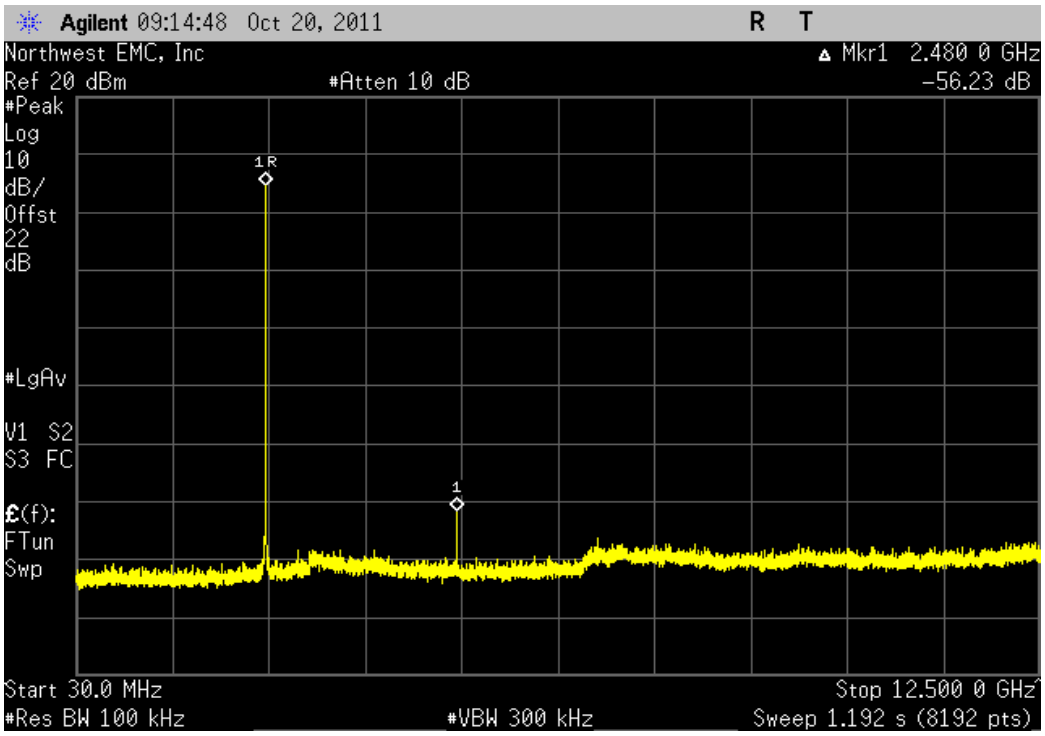
3DH5, 8-DPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-54.99 dBc	≤ -20 dBc	Pass



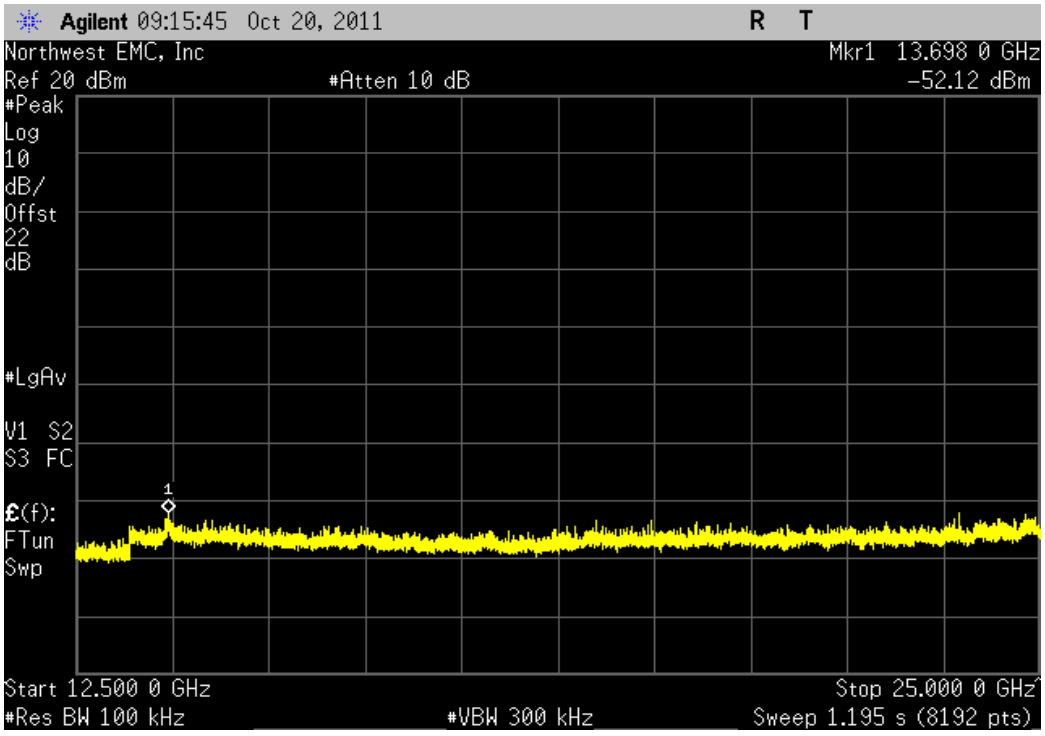
3DH5, 8-DPSK, Mid Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-56.3 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-56.23 dBc	≤ -20 dBc	Pass



3DH5, 8-DPSK, High Channel				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-56.84 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
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/18/2011	12
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The peak power spectral density measurements were measured with the EUT set to low, mid, 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 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 10^6 ÷ 3 x 10^3 = 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 35 dB for correction to 3 kHz."

NORTHWEST EMC

Power Spectral Density

XMit 2011.08.04
PsaTx 2011.09.28

EUT:	X Series			Work Order:	LGPD0044
Serial Number:	3411000112, 341100050			Date:	10/20/11
Customer:	ZOLL Medical Corp.			Temperature:	23.58C°C
Attendees:	Curt McNamara, Karl Karcht			Humidity:	25%
Project:	None			Barometric Pres.:	1014
Tested by:	Elaine Reeves	Power:	15VDC	Job Site:	MN08

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

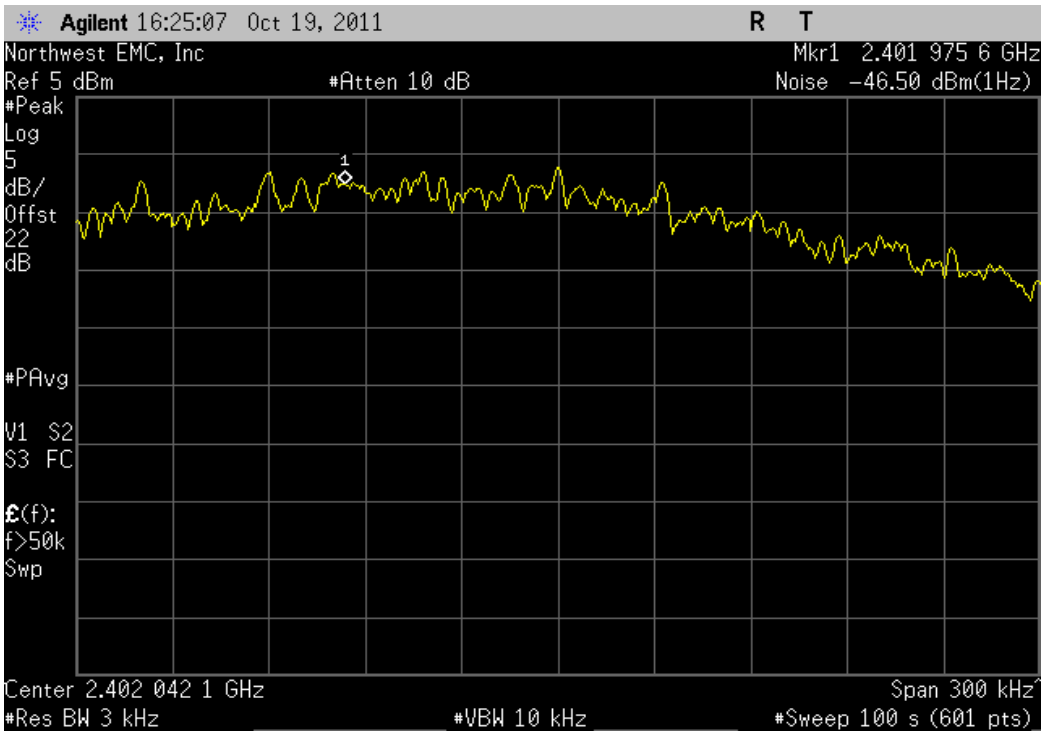
None

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	-46.497	34.8	-11.697	8	Pass
	Mid Channel	-46.074	34.8	-11.274	8	Pass
	High Channel	-45.622	34.8	-10.822	8	Pass
2DH5, 4-DQPSK						
	Low Channel	-54.034	34.8	-19.234	8	Pass
	Mid Channel	-53.487	34.8	-18.687	8	Pass
	High Channel	-53.366	34.8	-18.566	8	Pass
3DH5, 8-DPSK						
	Low Channel	-54.23	34.8	-19.43	8	Pass
	Mid Channel	-53.863	34.8	-19.063	8	Pass
	High Channel	-53.57	34.8	-18.77	8	Pass

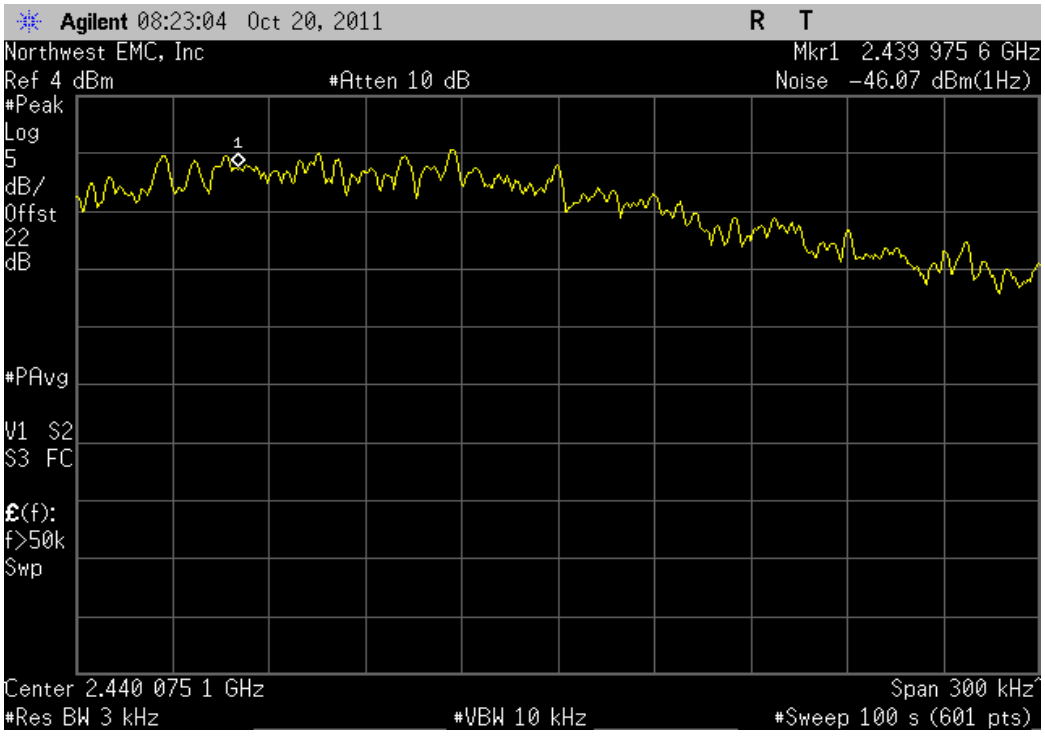
DH5, GFSK, Low Channel

		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-46.497	34.8	-11.697	8	Pass



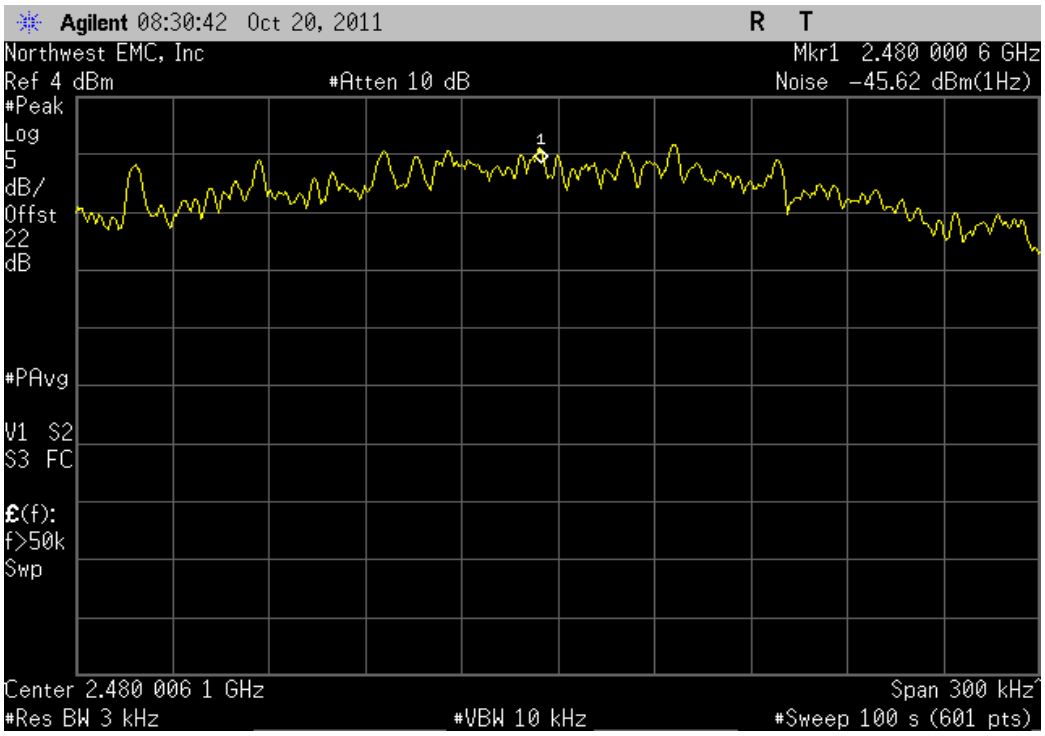
DH5, GFSK, Mid Channel

		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-46.074	34.8	-11.274	8	Pass



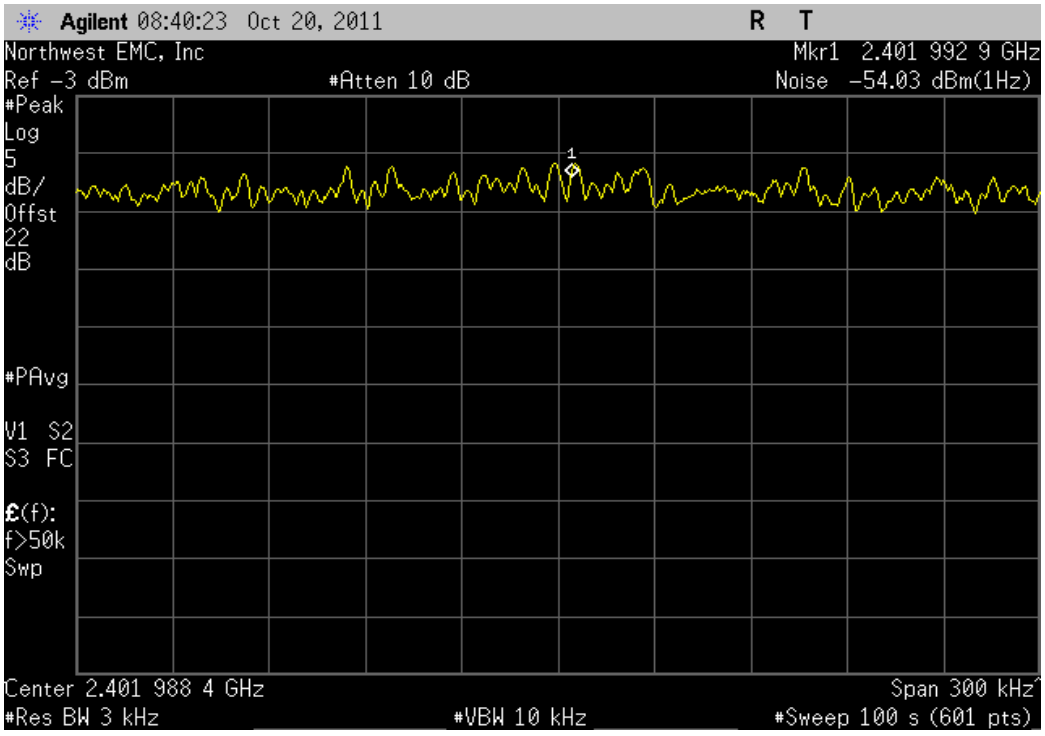
DH5, GFSK, High Channel

		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-45.622	34.8	-10.822	8	Pass

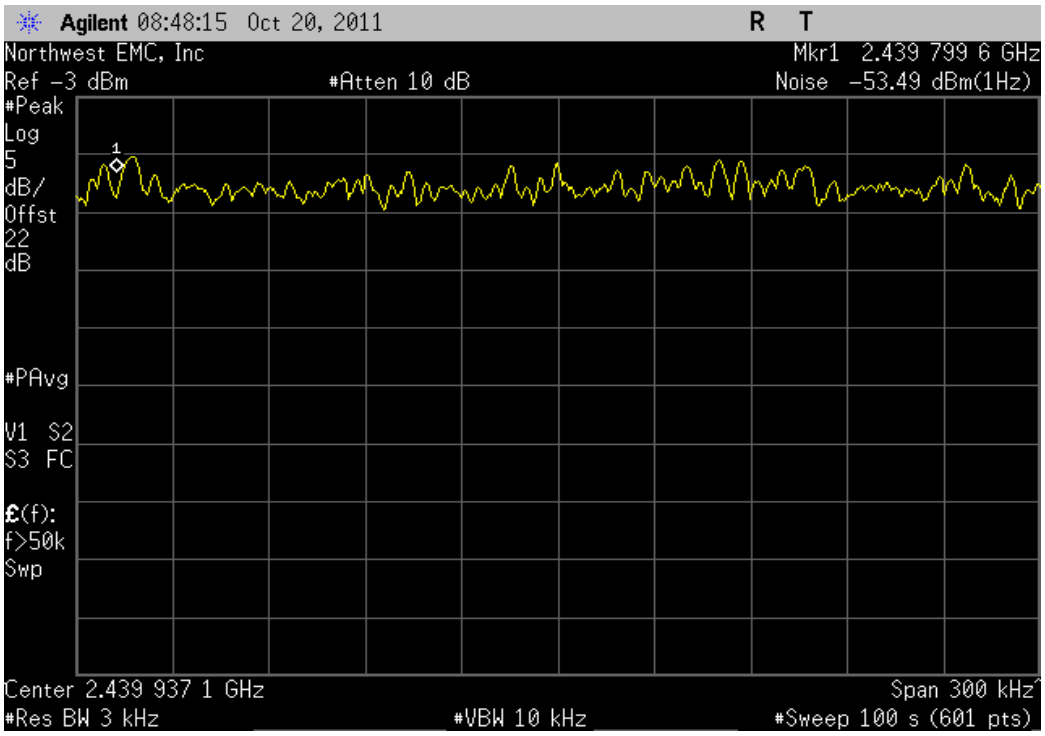


2DH5, 4-DQPSK, Low Channel

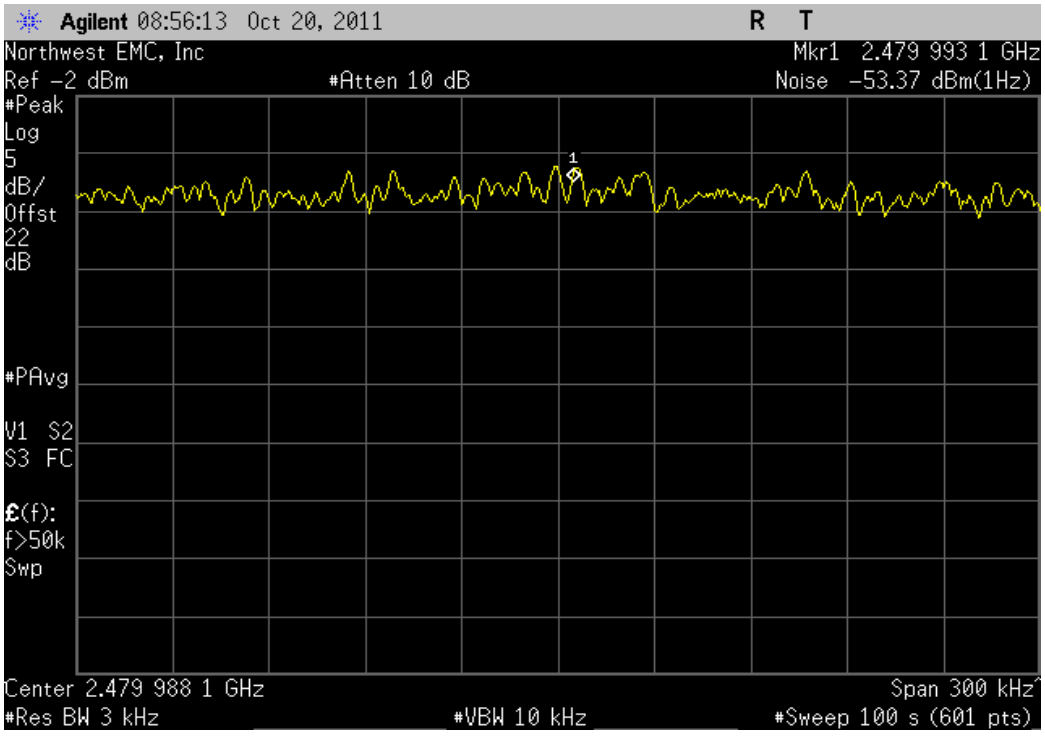
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-54.034	34.8	-19.234	8	Pass



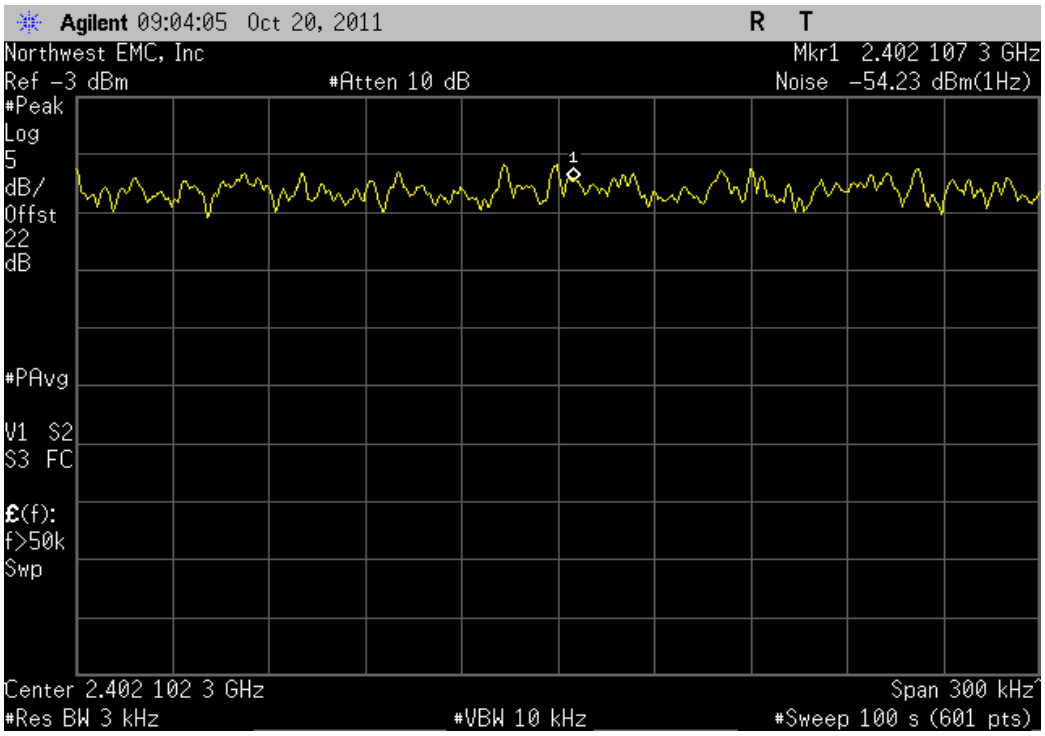
2DH5, 4-DQPSK, Mid Channel						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-53.487	34.8	-18.687	8	Pass



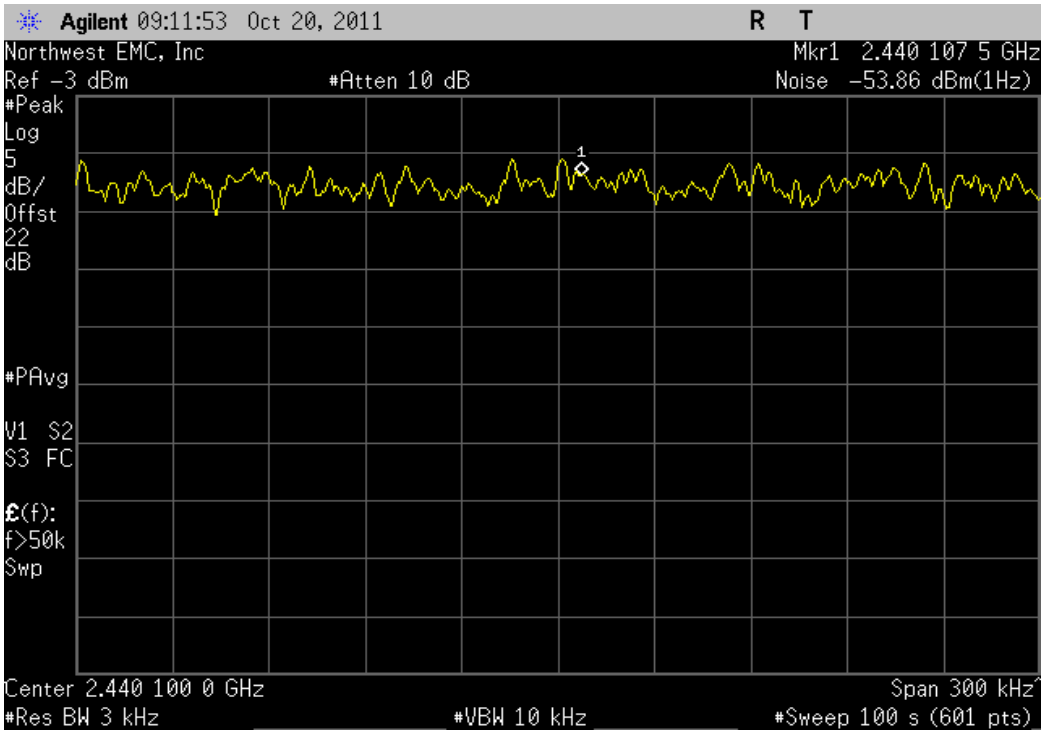
2DH5, 4-DQPSK, High Channel						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-53.366	34.8	-18.566	8	Pass



3DH5, 8-DPSK, Low Channel						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-54.23	34.8	-19.43	8	Pass

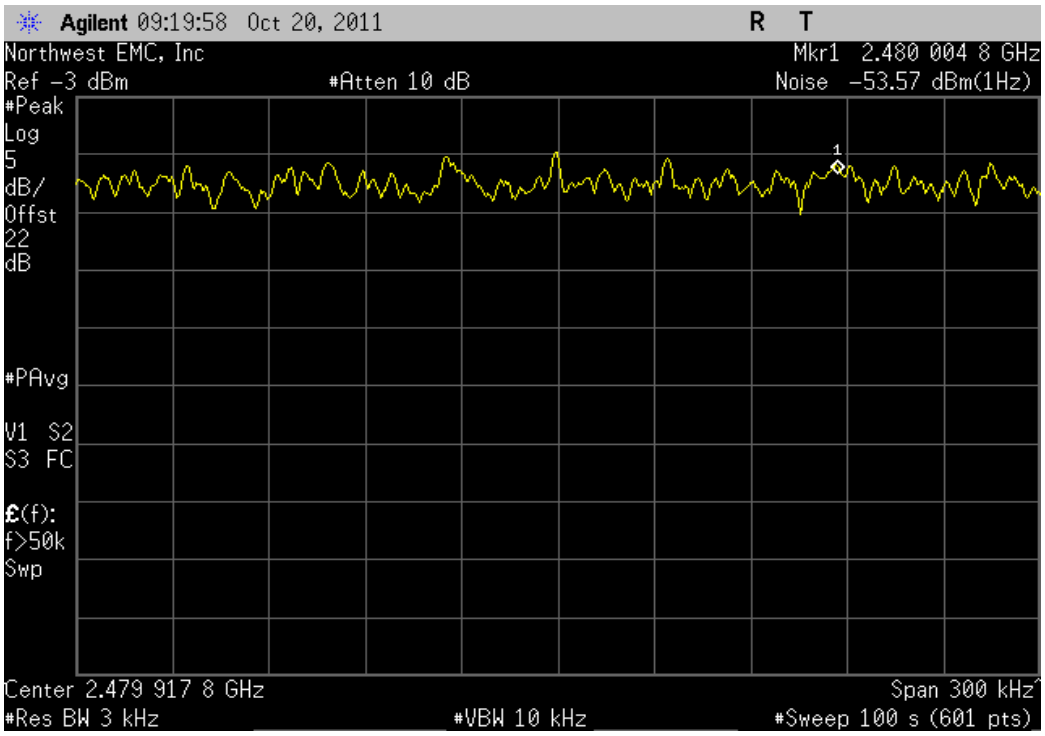


3DH5, 8-DPSK, Mid Channel						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-53.863	34.8	-19.063	8	Pass



3DH5, 8-DPSK, High Channel

		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-53.57	34.8	-18.77	8	Pass



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
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator - 20db, 'SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty 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.

NORTHWEST EMC

Channel Spacing

XMit 2011.10.26

EUT:	X-series			Work Order:	LGPD0044
Serial Number:	3411000112, 341100050			Date:	11/16/11
Customer:	ZOLL Medical Corp.			Temperature:	24.51°C
Attendees:	None			Humidity:	16%
Project:	None			Barometric Pres.:	1019.7
Tested by:	Trevor Buls	Power:	14.5VDC	Job Site:	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

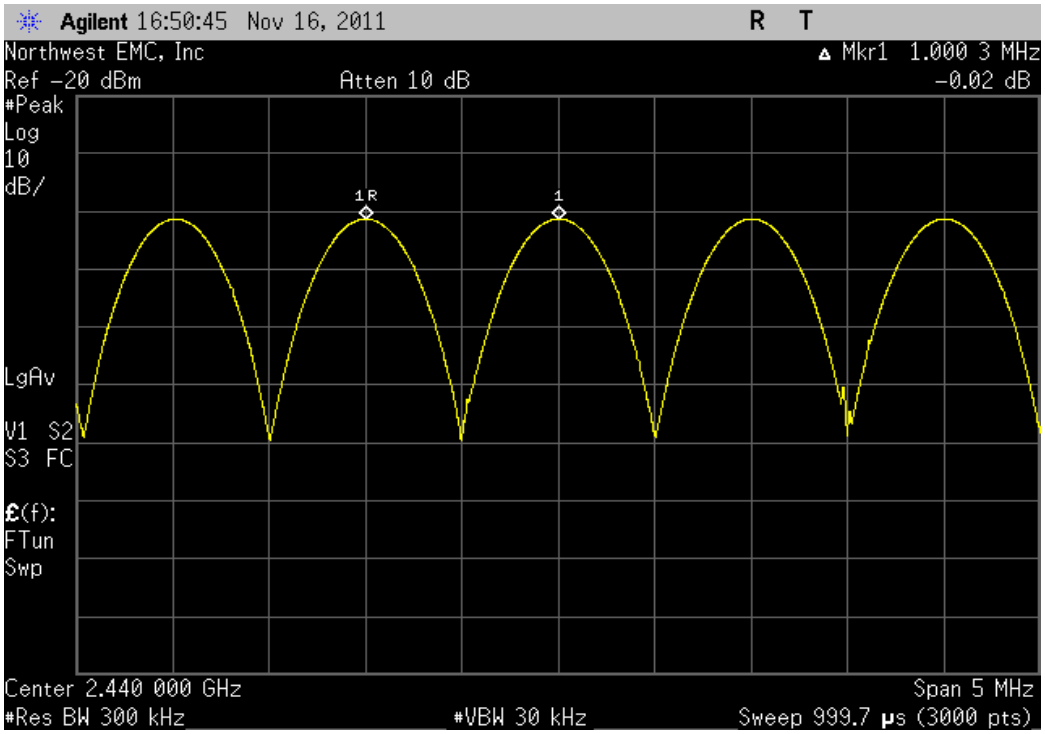
None

Configuration #	1	Signature	Trevor Buls

	Value	Limit	Result
Channel Spacing	1.000 MHz	1 MHz	Pass

Channel Spacing

Channel Spacing						
				Value	**Limit**	**Result**
				1.000 MHz	1 MHz	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
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty 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.

NORTHWEST EMC

Number of Hopping Frequencies

XMit 2011.10.26

EUT:	X-series			Work Order:	LGPD0044
Serial Number:	3411000112, 341100050			Date:	11/16/11
Customer:	ZOLL Medical Corp.			Temperature:	24.51°C
Attendees:	None			Humidity:	16%
Project:	None			Barometric Pres.:	1019.7
Tested by:	Trevor Buls	Power:	14.5VDC	Job Site:	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

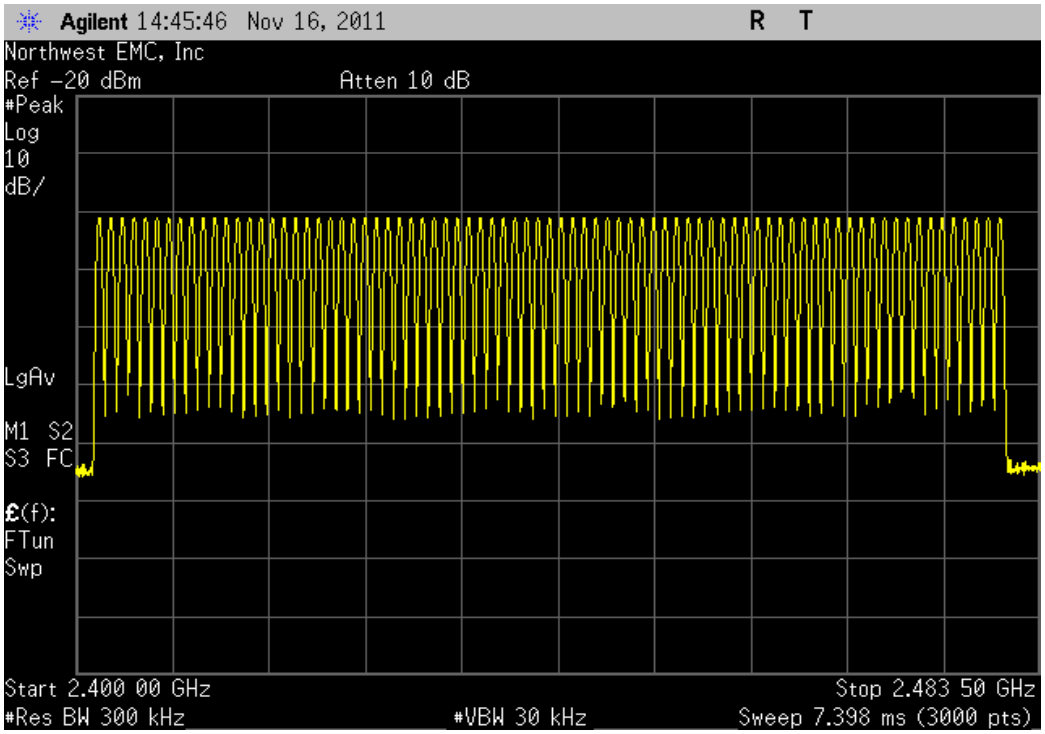
None

Configuration #	1	Signature	Trevor Buls

	Value	Limit	Result
Number of Hopping Frequencies	79	>75	Pass

Number of Hopping Frequencies

Number of Hopping Frequencies						
				Value	Limit	Result
				79	>75	Pass



Time of Occupancy (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
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty 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.

Time of Occupancy (Dwell Time)

EUT:	X-series	Work Order:	LGPD0044
Serial Number:	3411000112, 341100050	Date:	11/16/11
Customer:	ZOLL Medical Corp.	Temperature:	24.51°C
Attendees:	None	Humidity:	16%
Project:	None	Barometric Pres.:	1019.7
Tested by:	Trevor Buls	Power: 14.5VDC	Job Site: MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

Limit is based on a time domain of 0.4 Seconds * Number of Hopping channels (79) = 31.6 sec. Scale factor is based on 250ms window * 12.64 = 31.6 sec.

DEVIATIONS FROM TEST STANDARD

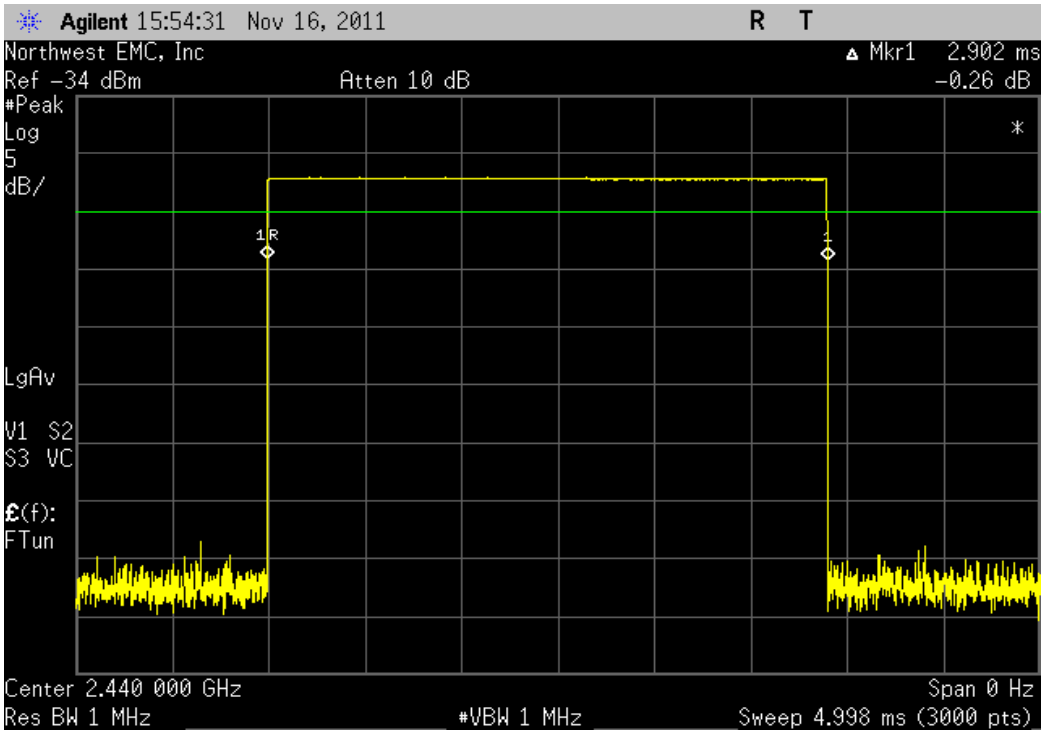
None

Configuration #	1	Signature	Trevor Buls

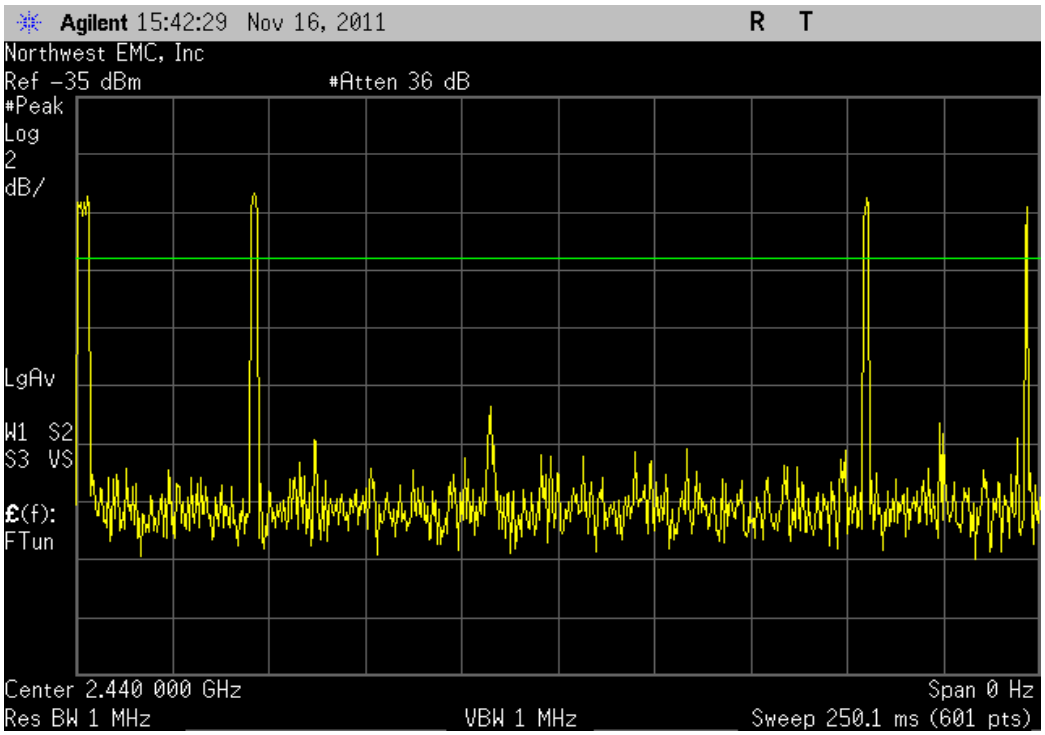
		Pulse Width (ms)	Number of Pulses	Worst Case High Time (ms)	Scale Factor	Value (mS)	Limit (mS)	Result
DH5								
	Pulse Width	2.902	1	N/A	N/A	2.902	400	Pass
	Worst Case High-Time	2.902	4	11.608	12.46	144.636	400	Pass
2DH5								
	Pulse Width	2.917	1	N/A	N/A	2.917	400	Pass
	Worst Case High-Time	2.917	4	11.668	12.46	145.383	400	Pass
3DH5								
	Pulse Width	2.915	1	N/A	N/A	2.915	400	Pass
	Worst Case High-Time	2.915	4	11.66	12.46	145.2836	400	Pass

Time of Occupancy (Dwell Time)

DH5, Pulse Width						
Pulse Width (ms)	Number of Pulses	Worst Case High Time (ms)	Scale Factor	Value (mS)	Limit (mS)	Result
2.902	1	N/A	N/A	2.902	400	Pass

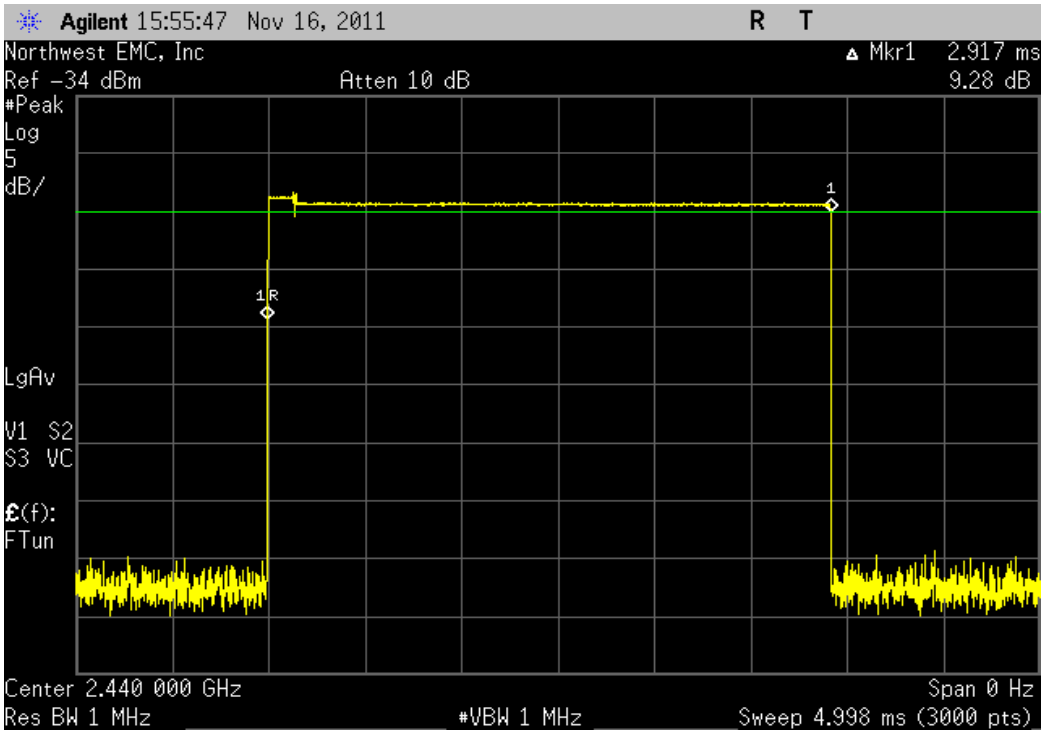


DH5, Worst Case High-Time						
Pulse Width (ms)	Number of Pulses	Worst Case High Time (ms)	Scale Factor	Value (mS)	Limit (mS)	Result
2.902	4	11.608	12.46	144.636	400	Pass

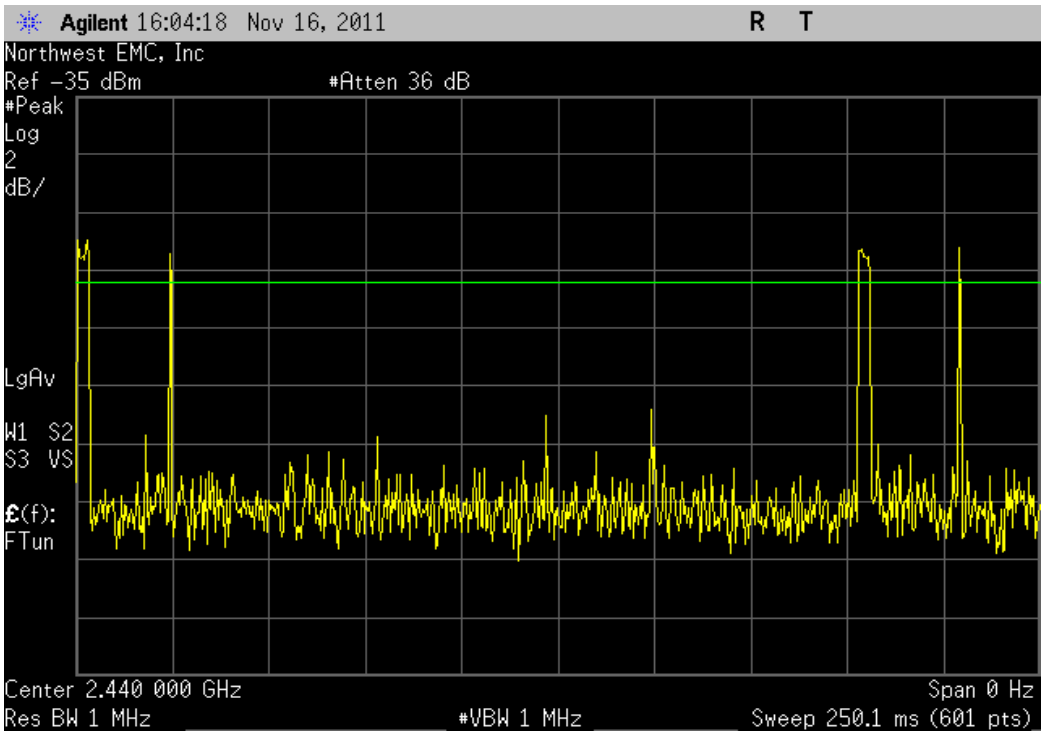


Time of Occupancy (Dwell Time)

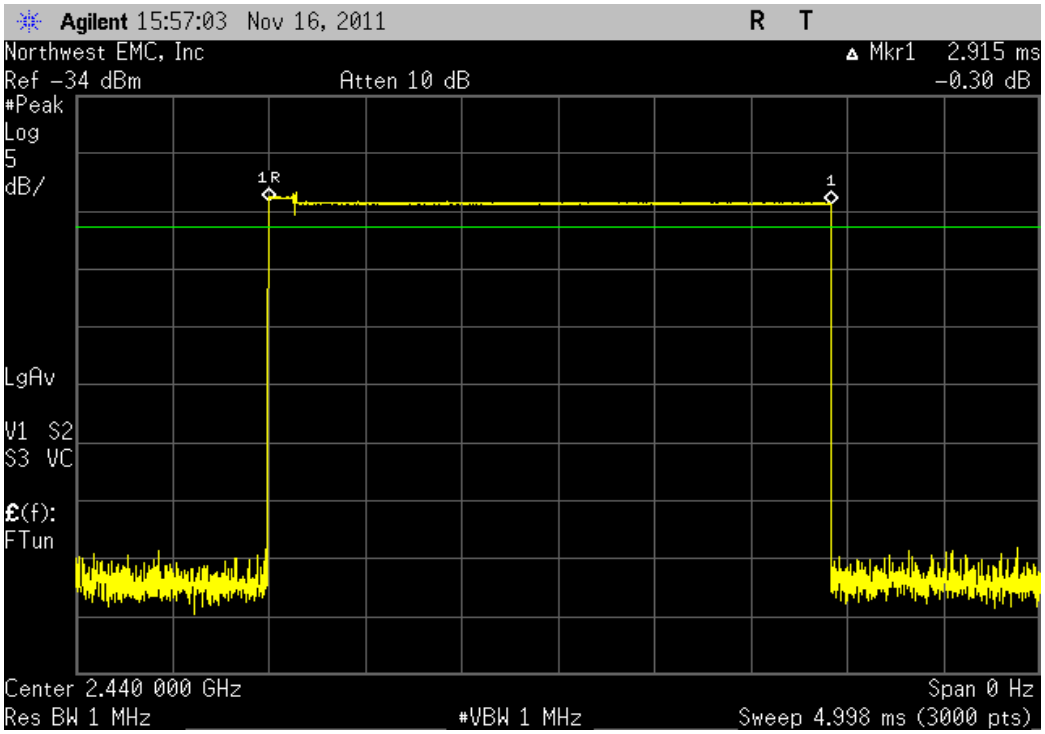
2DH5, Pulse Width						
Pulse Width (ms)	Number of Pulses	Worst Case High Time (ms)	Scale Factor	Value (mS)	Limit (mS)	Result
2.917	1	N/A	N/A	2.917	400	Pass



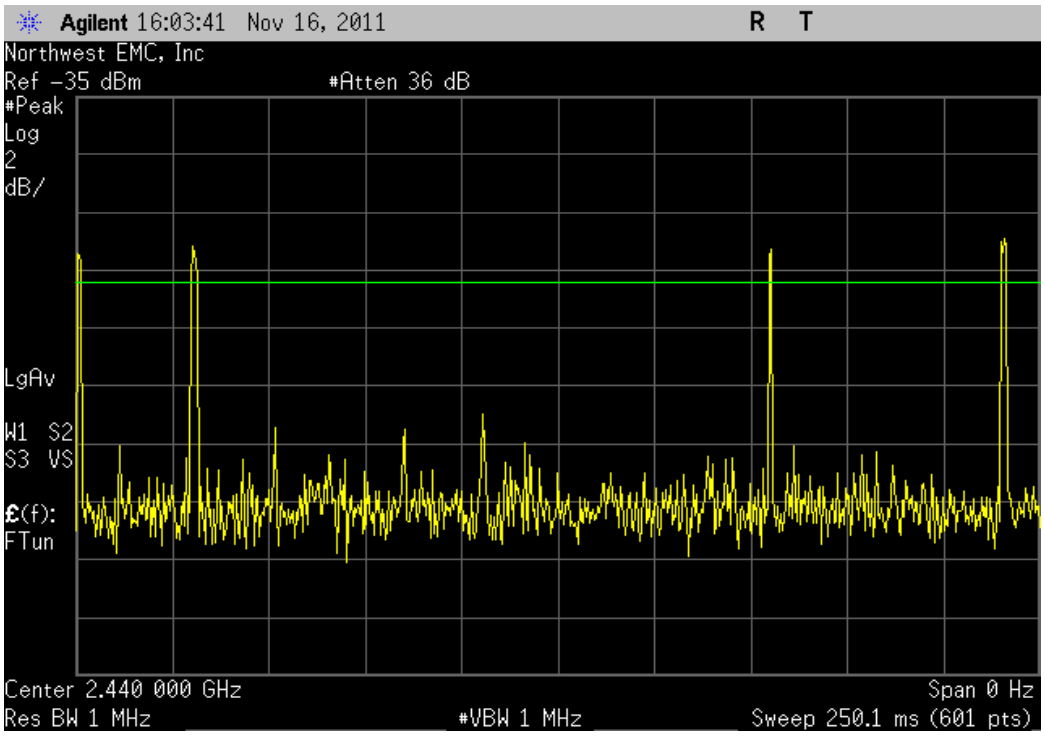
2DH5, Worst Case High-Time						
Pulse Width (ms)	Number of Pulses	Worst Case High Time (ms)	Scale Factor	Value (mS)	Limit (mS)	Result
2.917	4	11.668	12.46	145.383	400	Pass



3DH5, Pulse Width						
Pulse Width (ms)	Number of Pulses	Worst Case High Time (ms)	Scale Factor	Value (mS)	Limit (mS)	Result
2.915	1	N/A	N/A	2.915	400	Pass



3DH5, Worst Case High-Time						
Pulse Width (ms)	Number of Pulses	Worst Case High Time (ms)	Scale Factor	Value (mS)	Limit (mS)	Result
2.915	4	11.66	12.46	145.284	400	Pass



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 Bluetooth DH5, 2DH5, 3DH5, Low Channel 2402 MHz, Mid Channel 2440 MHz, High Channel 2480 MHz.

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

LGPD0044 - 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
Attenuator, 20 dB, 'SMA'	SM Electronics	SA6-20	REO	7/1/2011	12 mo
High Pass Filter	Micro-Tronics	HPM50111	HGQ	7/9/2010	24 mo
Low Pass Filter	Micro-Tronics	LPM50004	HGK	7/9/2010	24 mo
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	4/15/2011	12 mo
MN05 Cables	N/A	18-26GHz Standard Gain Horn Cable	EVD	4/15/2011	12 mo
Antenna, Horn	ETS	3160-09	AHG	NCR	0 mo
Antenna, Horn	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVE	6/27/2011	12 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	2/2/2011	12 mo
Antenna, Biconilog	ETS Lindgren	3142D	AXN	12/30/2009	24 mo
Spectrum Analyzer	Agilent	E4446A	AAT	2/15/2011	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

Measurements were made using the IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth was used.

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

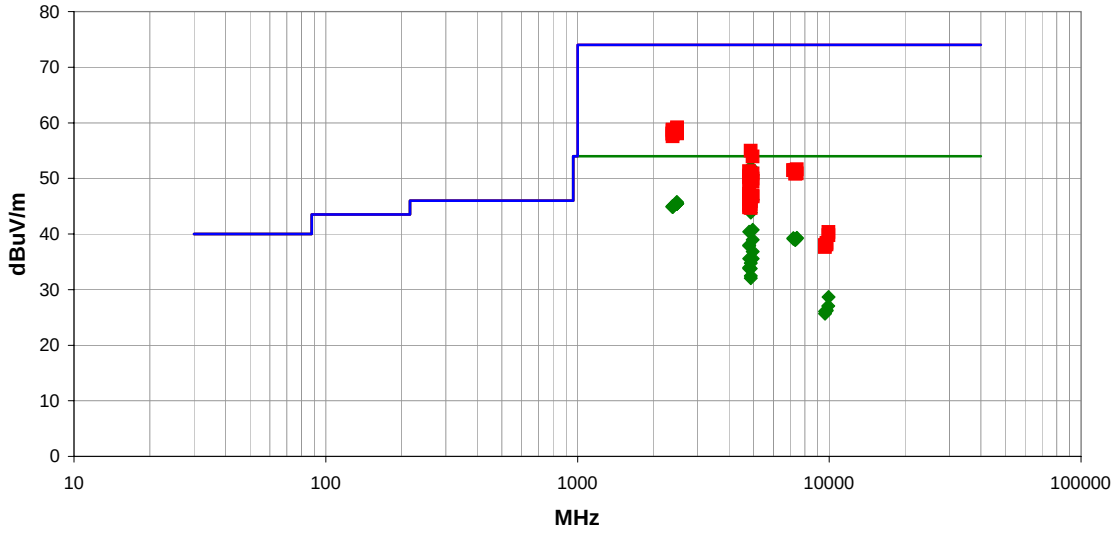
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify 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:	LGPD0044	**Date:**	10/25/11	Trevor Buls	
Project:	None	**Temperature:**	23.88 °C		
Job Site:	MN05	**Humidity:**	28.62% RH		
Serial Number:	AR11J000137	**Barometric Pres.:**	1011.4 mbar	**Tested by:**	Trevor Buls
EUT:	X Series				
Configuration:	2				
Customer:	ZOLL Medical Corp.				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Bluetooth DH5, 2DH5, 3DH5, Low Channel 2402 MHz, Mid Channel 2440 MHz, High Channel 2480 MHz.				
Deviations:	None				
Comments:	None				

Test Specifications	**Class B**	**Test Method**
FCC 15.247:2011		ANSI C63.10:2009

Run #	14	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4880.025	47.4	4.7	1.2	88.0	3.0	0.0	Horz	AV	0.0	52.1	54.0	-1.9	Mid, EUT Horizontal, DH5
4960.025	45.7	5.0	1.2	87.0	3.0	0.0	Horz	AV	0.0	50.7	54.0	-3.3	High, EUT Horizontal, DH5
4804.041	42.1	4.4	1.0	86.0	3.0	0.0	Horz	AV	0.0	46.5	54.0	-7.5	Low, EUT Horizontal, DH5
4960.025	41.2	5.0	1.2	193.0	3.0	0.0	Vert	AV	0.0	46.2	54.0	-7.8	High, EUT Horizontal, DH5
2484.158	29.2	-3.5	1.9	211.0	3.0	20.0	Vert	AV	0.0	45.7	54.0	-8.3	High, EUT Horizontal, 3DH5
2483.5	29.1	-3.5	1.0	201.0	3.0	20.0	Horz	AV	0.0	45.6	54.0	-8.4	High, EUT Horizontal, 2DH5
4804.016	41.1	4.4	1.2	55.0	3.0	0.0	Horz	AV	0.0	45.5	54.0	-8.5	Low, EUT Face Down, DH5
2486.525	28.9	-3.5	1.0	76.0	3.0	20.0	Vert	AV	0.0	45.4	54.0	-8.6	High, EUT Horizontal, DH5
2485.3	28.9	-3.5	1.0	267.0	3.0	20.0	Vert	AV	0.0	45.4	54.0	-8.6	High, EUT Horizontal, 2DH5
2484.317	28.9	-3.5	3.0	219.0	3.0	20.0	Horz	AV	0.0	45.4	54.0	-8.6	High, EUT Horizontal, DH5
2483.842	28.9	-3.5	1.0	329.0	3.0	20.0	Horz	AV	0.0	45.4	54.0	-8.6	High, EUT Horizontal, 3DH5
2385.142	28.7	-3.7	1.0	99.0	3.0	20.0	Vert	AV	0.0	45.0	54.0	-9.0	Low, EUT Horizontal, 3DH5
2385.5	28.7	-3.7	1.0	81.0	3.0	20.0	Horz	AV	0.0	45.0	54.0	-9.0	Low, EUT Horizontal, 3DH5
2385.058	28.6	-3.7	1.0	339.0	3.0	20.0	Vert	AV	0.0	44.9	54.0	-9.1	Low, EUT Horizontal, DH5
2385.208	28.6	-3.7	1.0	234.0	3.0	20.0	Horz	AV	0.0	44.9	54.0	-9.1	Low, EUT Horizontal, DH5
2385.6	28.6	-3.7	3.2	66.0	3.0	20.0	Vert	AV	0.0	44.9	54.0	-9.1	Low, EUT Horizontal, 2DH5
2385.825	28.6	-3.7	3.7	241.0	3.0	20.0	Horz	AV	0.0	44.9	54.0	-9.1	Low, EUT Horizontal, 2DH5
4804.016	40.2	4.4	1.0	55.0	3.0	0.0	Vert	AV	0.0	44.6	54.0	-9.4	Low, EUT Face Down, DH5
4804.032	40.0	4.4	1.5	124.0	3.0	0.0	Horz	AV	0.0	44.4	54.0	-9.6	Low, EUT on Side, DH5
4880.05	39.2	4.7	1.0	99.0	3.0	0.0	Vert	AV	0.0	43.9	54.0	-10.1	Mid, EUT Horizontal, DH5

AC Powerline 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.

MODES OF OPERATION
Transmitting Bluetooth, Channel 0, DH5
Transmitting Bluetooth, Channel 39, DH5
Transmitting Bluetooth, Channel 79, DH5

POWER SETTINGS INVESTIGATED
110VAC/60Hz

CONFIGURATIONS INVESTIGATED
LGPD0044 - 3

SAMPLE CALCULATIONS
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
MN03 Cables	ESM Cable Corp.	Conducted Cables	MNC	5/18/2011	12 mo
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	7/5/2011	12 mo
LISN	Solar	9252-50-R-24-BNC	LIQ	3/9/2011	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HGN	6/28/2010	24 mo
Attenuator, 20 dB	SM Electronics	SA01B-20	REF	1/3/2011	12 mo
Receiver	Rohde & Schwarz	ESCI	ARG	3/22/2011	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
Measurements were made using the bandwidths and detectors specified. No video filter was used.			

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10-2009.

NORTHWEST

EMC

AC Powerline Conducted Emissions

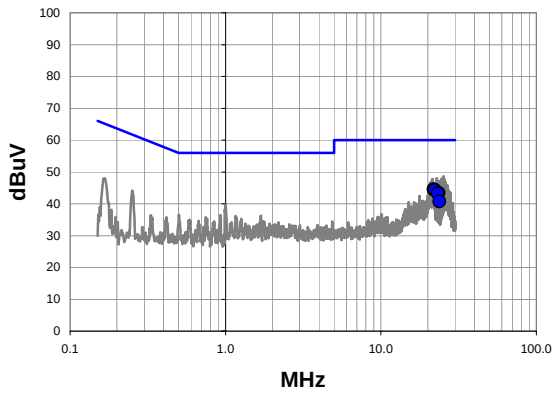
PSA-ESCI 2011.10.17
PSA-ESCI Version 2011.06.23

Work Order:	LGPD0044	**Date:**	10/27/11	Elaine L. Reeves	
Project:	None	**Temperature:**	23.84 °C		
Job Site:	MN05	**Humidity:**	26.4% RH		
Serial Number:	AR11J000137	**Barometric Pres.:**	1018 mbar	**Tested by:**	Elaine Reeves
EUT:	X Series				
Configuration:	3				
Customer:	ZOLL Medical Corp.				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Bluetooth, Channel 0, DH5				
Deviations:	None				
Comments:	None				

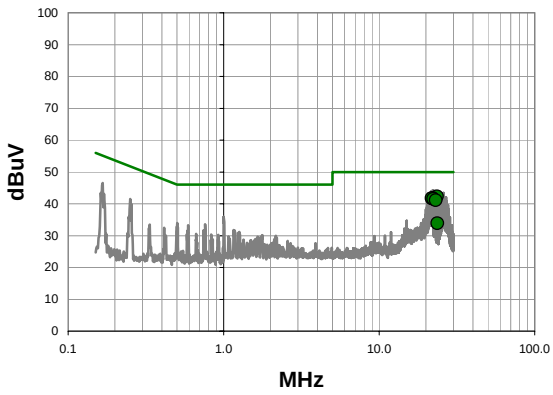
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

Run #	13	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
21.790	22.9	21.6	44.5	60.0	-15.5
22.020	22.8	21.7	44.5	60.0	-15.5
22.250	22.6	21.7	44.3	60.0	-15.7
23.520	21.6	21.8	43.4	60.0	-16.6
23.174	21.5	21.7	43.2	60.0	-16.8
23.720	18.9	21.8	40.7	60.0	-19.3

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
23.520	20.5	21.8	42.3	50.0	-7.7
22.020	20.1	21.7	41.8	50.0	-8.2
21.790	20.1	21.6	41.7	50.0	-8.3
22.250	19.8	21.7	41.5	50.0	-8.5
23.174	19.4	21.7	41.1	50.0	-8.9
23.720	12.1	21.8	33.9	50.0	-16.1

NORTHWEST

EMC

AC Powerline Conducted Emissions

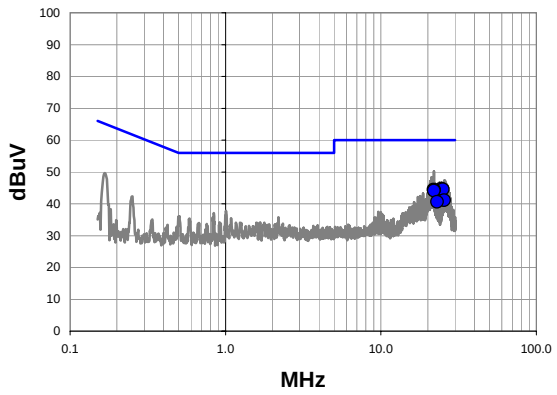
PSA-ESCI 2011.10.17
PSA-ESCI Version 2011.06.23

Work Order:	LGPD0044	**Date:**	10/27/11	Elaine L. Reeves	
Project:	None	**Temperature:**	23.84 °C		
Job Site:	MN05	**Humidity:**	26.4% RH		
Serial Number:	AR11J000137	**Barometric Pres.:**	1018 mbar	**Tested by:**	Elaine Reeves
EUT:	X Series				
Configuration:	3				
Customer:	ZOLL Medical Corp.				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Bluetooth, Channel 0, DH5				
Deviations:	None				
Comments:	None				

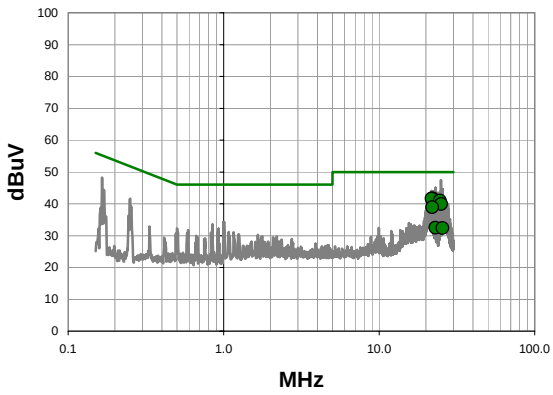
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

Run #	14	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
24.556	22.8	21.9	44.7	60.0	-15.3
25.018	22.6	22.0	44.6	60.0	-15.4
21.790	22.8	21.6	44.4	60.0	-15.6
22.020	22.7	21.7	44.4	60.0	-15.6
21.964	22.5	21.7	44.2	60.0	-15.8
25.574	19.1	22.0	41.1	60.0	-18.9
22.976	18.9	21.7	40.6	60.0	-19.4

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
22.020	20.0	21.7	41.7	50.0	-8.3
21.790	20.0	21.6	41.6	50.0	-8.4
24.556	19.1	21.9	41.0	50.0	-9.0
25.018	17.9	22.0	39.9	50.0	-10.1
21.964	17.2	21.7	38.9	50.0	-11.1
22.976	10.7	21.7	32.4	50.0	-17.6
25.574	10.3	22.0	32.3	50.0	-17.7

NORTHWEST

EMC

AC Powerline Conducted Emissions

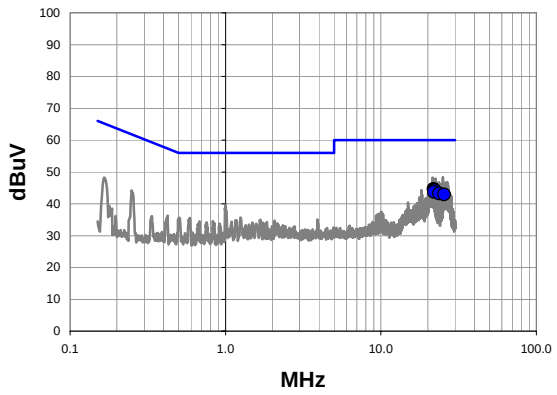
PSA-ESCI 2011.10.17
PSA-ESCI Version 2011.06.23

Work Order:	LGPD0044	**Date:**	10/27/11	Elaine L. Reeves	
Project:	None	**Temperature:**	23.57 °C		
Job Site:	MN05	**Humidity:**	26.92% RH		
Serial Number:	AR11J000137	**Barometric Pres.:**	1018.2 mbar	**Tested by:**	Elaine Reeves
EUT:	X Series				
Configuration:	3				
Customer:	ZOLL Medical Corp.				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Bluetooth, Channel 39, DH5				
Deviations:	None				
Comments:	None				

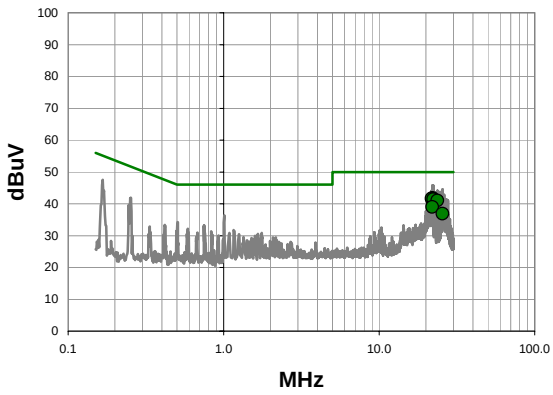
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

Run #	15	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
21.790	23.0	21.6	44.6	60.0	-15.4
22.020	22.8	21.7	44.5	60.0	-15.5
22.250	22.5	21.7	44.2	60.0	-15.8
21.964	22.1	21.7	43.8	60.0	-16.2
23.632	21.4	21.8	43.2	60.0	-16.8
25.578	20.9	22.0	42.9	60.0	-17.1

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
22.020	20.1	21.7	41.8	50.0	-8.2
21.790	20.0	21.6	41.6	50.0	-8.4
22.250	19.7	21.7	41.4	50.0	-8.6
23.632	19.2	21.8	41.0	50.0	-9.0
21.964	17.3	21.7	39.0	50.0	-11.0
25.578	14.9	22.0	36.9	50.0	-13.1

NORTHWEST
EMC

AC Powerline Conducted Emissions

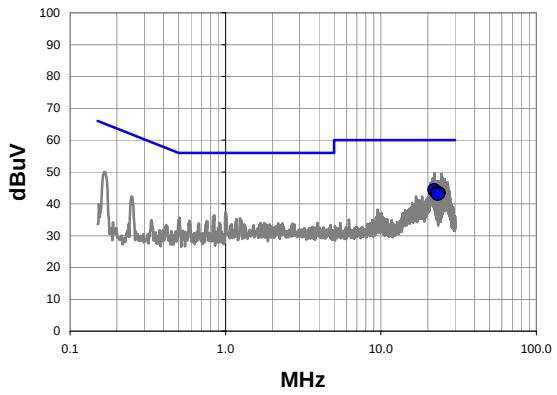
PSA-ESCI 2011.10.17
PSA-ESCI Version 2011.06.23

Work Order:	LGPD0044	**Date:**	10/27/11	Elaine L. Reeves
Project:	None	**Temperature:**	23.57 °C	
Job Site:	MN05	**Humidity:**	26.92% RH	
Serial Number:	AR11J000137	**Barometric Pres.:**	1018.2 mbar	**Tested by:** Elaine Reeves
EUT:	X Series			
Configuration:	3			
Customer:	ZOLL Medical Corp.			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth, Channel 39, DH5			
Deviations:	None			
Comments:	None			

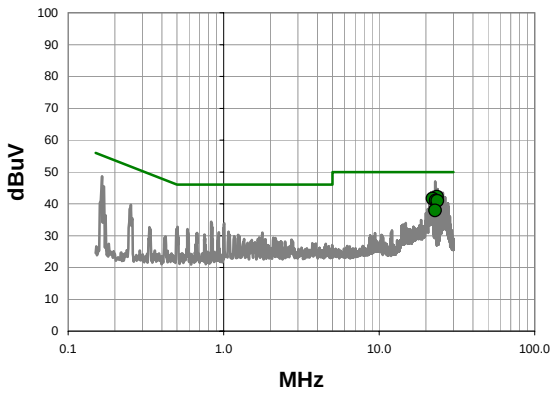
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

Run #	16	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
22.020	22.7	21.7	44.4	60.0	-15.6
22.886	21.7	21.7	43.4	60.0	-16.6
23.632	21.5	21.8	43.3	60.0	-16.7
23.520	21.5	21.8	43.3	60.0	-16.7
23.174	21.3	21.7	43.0	60.0	-17.0

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
23.520	20.4	21.8	42.2	50.0	-7.8
22.020	19.9	21.7	41.6	50.0	-8.4
23.174	19.3	21.7	41.0	50.0	-9.0
23.632	19.1	21.8	40.9	50.0	-9.1
22.886	16.2	21.7	37.9	50.0	-12.1

NORTHWEST

EMC

AC Powerline Conducted Emissions

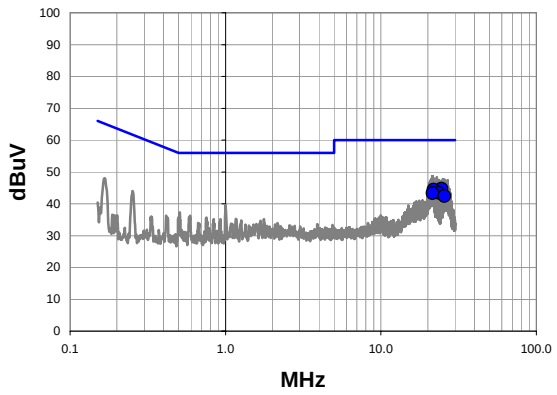
PSA-ESCI 2011.10.17
PSA-ESCI Version 2011.06.23

Work Order:	LGPD0044	**Date:**	10/27/11	Elaine L. Reeves	
Project:	None	**Temperature:**	23.57 °C		
Job Site:	MN05	**Humidity:**	26.92% RH		
Serial Number:	AR11J000137	**Barometric Pres.:**	1018.2 mbar	**Tested by:**	Elaine Reeves
EUT:	X Series				
Configuration:	3				
Customer:	ZOLL Medical Corp.				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Bluetooth, Channel 79, DH5				
Deviations:	None				
Comments:	None				

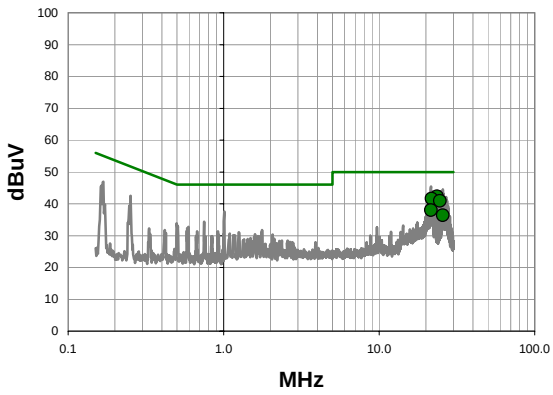
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

Run #	17	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
24.556	22.8	21.9	44.7	60.0	-15.3
21.790	22.8	21.6	44.4	60.0	-15.6
23.520	21.6	21.8	43.4	60.0	-16.6
21.500	21.7	21.6	43.3	60.0	-16.7
25.652	20.4	22.0	42.4	60.0	-17.6

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
23.520	20.5	21.8	42.3	50.0	-7.7
21.790	20.0	21.6	41.6	50.0	-8.4
24.556	19.0	21.9	40.9	50.0	-9.1
21.500	16.4	21.6	38.0	50.0	-12.0
25.652	14.4	22.0	36.4	50.0	-13.6

NORTHWEST

EMC

AC Powerline Conducted Emissions

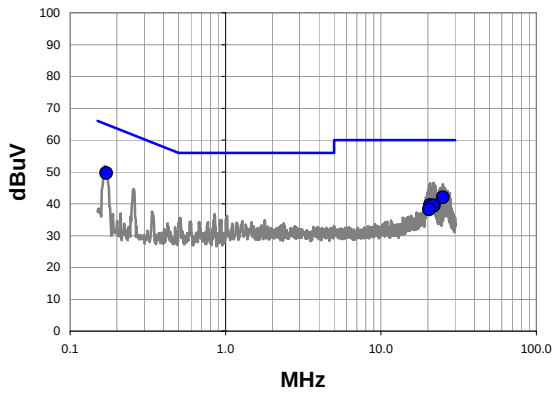
PSA-ESCI 2011.07.26
PSA-ESCI Version 2011.06.23

Work Order:	LGPD0044	**Date:**	11/09/11	Elaine L. Reeves	
Project:	None	**Temperature:**	24.94 °C		
Job Site:	MN03	**Humidity:**	19.36% RH		
Serial Number:	AR11J000137	**Barometric Pres.:**	1015 mbar	**Tested by:**	Elaine Reeves
EUT:	X Series				
Configuration:	3				
Customer:	ZOLL Medical Corp.				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Bluetooth, Channel 79, DH5				
Deviations:	None				
Comments:	None				

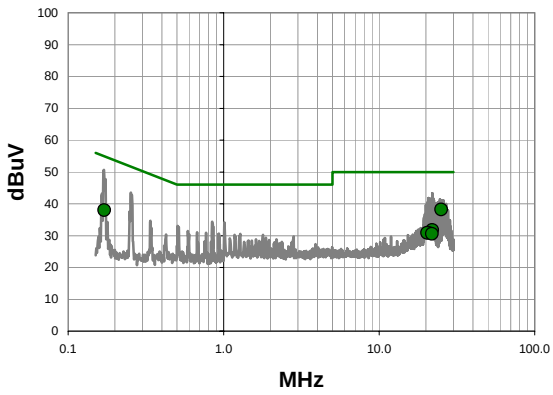
Test Specifications	**Test Method**
FCC 15.207:2011	ANSI C63.10:2009

Run #	42	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.171	29.4	20.2	49.6	64.9	-15.3
25.018	20.1	22.0	42.1	60.0	-17.9
20.754	18.0	21.6	39.6	60.0	-20.4
21.964	17.7	21.7	39.4	60.0	-20.6
21.864	17.7	21.7	39.4	60.0	-20.6
20.380	16.7	21.5	38.2	60.0	-21.8

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
25.018	16.2	22.0	38.2	50.0	-11.8
0.171	17.8	20.2	38.0	54.9	-16.9
21.964	10.1	21.7	31.8	50.0	-18.2
20.754	9.3	21.6	30.9	50.0	-19.1
20.380	9.3	21.5	30.8	50.0	-19.2
21.864	8.9	21.7	30.6	50.0	-19.4