



Nemko Test Report: 10247899RUS1

Applicant: Spinal Modulation, Inc.
1135 O'Brien Drive
Menlo Park, CA 94025
USA

Equipment Under Test: Patient Programmer MN20600-02
(E.U.T.)

FCC ID#: Y8L-MN20600-02

IC ID#: 11060A-20600-02

In Accordance With: **FCC Part 95, Subpart E and
Industry Canada RSS-243, Issue 3**
Medical Devices Operating in the
401-406 MHz Frequency Band

Personal Radio Devices.

Tested By: Nemko USA Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

TESTED BY:

A handwritten signature in black ink, appearing to read "David Light", written over a horizontal line.

David Light, Wireless Engineer

DATE:

29 October 2013

APPROVED BY:

A handwritten signature in black ink, appearing to read "Tom Tidwell", written over a horizontal line.

Tom Tidwell, Technical Manager

DATE:

30 October 2013

Total Number of Pages: 19

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Section 1. Summary Of Test Results

Manufacturer: Spinal Modulations, Inc.

Model No.: 20600-02

Serial No.: SP1023

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 95.627 and Industry Canada RSS-243, Issue 3. All tests were conducted using measurement procedure ANSI C63.4-2003. Radiated Emissions were made on an open area test site.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data".



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Summary Of Test Data

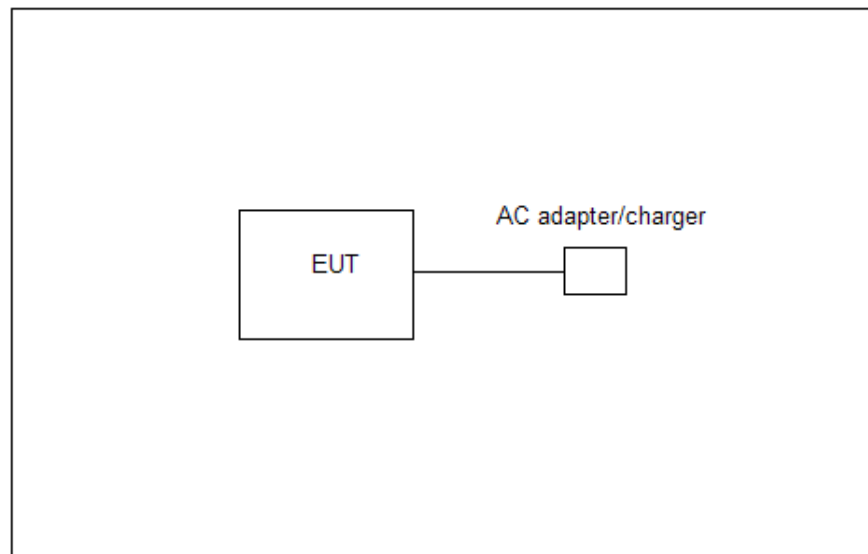
Test/Requirement Description	Pass / Fail	Applicable Rule Parts
Maximum RF Transmitting Power	Pass	2.1046, 95.135, 95.639(f)(1), 5.4
Modulation Characteristics	Pass	2.1047, 95.631(g), 95.637, 5.2
Occupied Bandwidth	Pass	2.1049, 95.627(d), 5.1
Unwanted Radiation	Pass	2.1053, 95.635(d), 5.5
Frequency Stability	Pass	2.1055, 95.627(d), 5.3

Test Result: The product as presented for testing complied with test requirements as shown above.

Description of EUT

The EUT is a wireless transceiver used to program medical implants.

System Diagram



Section 3. Maximum RF Transmit Power

NAME OF TEST: Maximum RF Transmit Power	PARA. NO.: 95.639 / 5.4
TESTED BY: David Light	DATE: 24 October 2013

Minimum Standard: §95.639(f)(1).

For transmitters operating in the 401-406 MHz band that are not excepted under § 95.627(b) from the frequency monitoring requirements of § 95.627(a), the maximum radiated power in any 300 kHz bandwidth by MedRadio transmitters operating at 402-405 MHz, or in any 100 kHz bandwidth by MedRadio transmitters operating at 401-402 MHz or 405-406 MHz shall not exceed 25 microwatts EIRP. For transmitters that are excepted under § 95.627(b) from the frequency monitoring requirements of § 95.627(a), the power radiated by any station operating in 402-405 MHz shall not exceed 100 nanowatts EIRP confined to a maximum total emission bandwidth of 300 kHz centered at 403.65 MHz, the power radiated by any station operating in 401-401.85 MHz or 405-406 MHz shall not exceed 250 nanowatts EIRP in any 100 kHz bandwidth and the power radiated by any station operating in 401.85-402 MHz shall not exceed 25 microwatts in the 150 kHz bandwidth.

Test Results: Complies . .

Measurement Data: See attached table.

Method of Measurement:

The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to an isotropic radiator. This antenna is fed with a signal at the spurious frequency. The level of the signal is adjusted to repeat the previously measured level. The resulting eirp is the signal level fed to the reference antenna corrected for gain referenced to an isotropic radiator.

Test Data – Maximum RF Transmit Power

Frequency (MHz)	Meter Reading (dBm)	Substitution Level (dBm)		Pre-Amp Gain (dB)	Substitutio Antenna (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarity	Comments
402.15	-29.4	-26.8		0	0.0	-26.8	-16.0	-10.8	V	
402.15	-23.8	-27.8		0	0.0	-27.8	-16.0	-11.8	H	
404.85	-28.9	-26.3		0	0.0	-26.3	-16.0	-10.3	V	
404.85	-23.8	-27.8		0	0.0	-27.8	-16.0	-11.8	H	
Notes:										

Section 4. Occupied Bandwidth

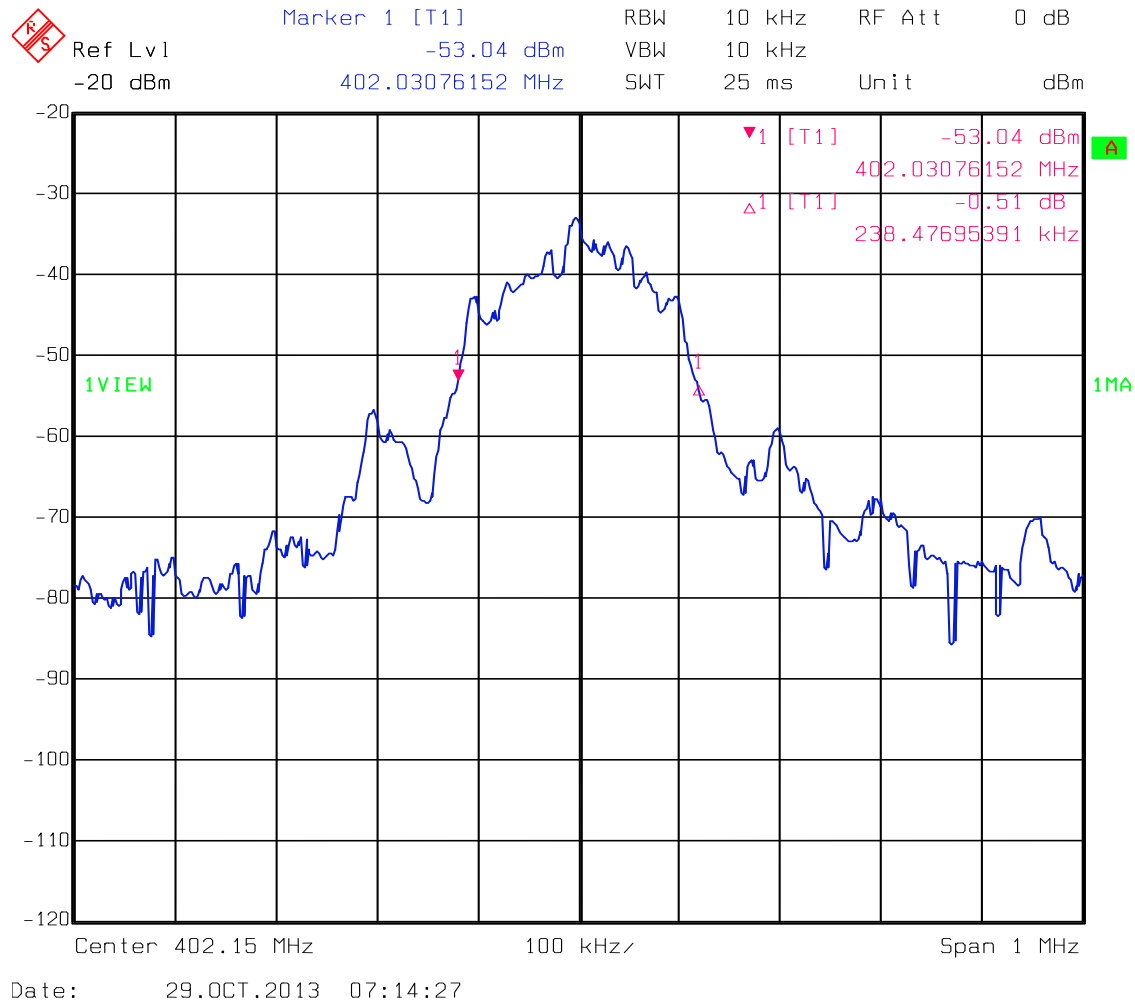
NAME OF TEST: Occupied Bandwidth	PARA. NO.: 95.627(d) / 5.1
TESTED BY: David Light	DATE: 29 October 2013

Minimum Standard: Para no. 95.627(d)

The authorized bandwidth of the emission from a MedRadio station operating between 402-405 MHz shall not exceed 300 kHz, and no communications session involving MedRadio stations shall use more than a total of 300 kHz of bandwidth during such a session. The authorized bandwidth of the emission from a MedRadio station operating between 401-401.85 MHz or 405-406 MHz shall not exceed 100 kHz, and no communications session involving MedRadio stations shall use more than a total of 100 kHz of bandwidth during such a session. The authorized bandwidth of the emission from a MedRadio station operating between 401.85-402 MHz shall not exceed 150 kHz, and no communications session involving MedRadio stations shall use more than a total of 150 kHz of bandwidth during such a session.

Test Results: Complies**Measurement Data:** See attached graph.

Test Data – Occupied Bandwidth



Section 5. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 95.627(e) / 5.3
TESTED BY: David Light	DATE: 24 October 2013

Minimum Standard: Para no. 95.627(e)

Each transmitter in the MedRadio service must maintain a frequency stability of ± 100 ppm of the operating frequency over the range:

- (1) 25 °C to 45 °C in the case of medical implant transmitters; and
- (2) 0 °C to 55 °C in the case of MedRadio programmer/control transmitters and MedRadio body-worn transmitters.

Test Results: Complies**Measurement Data:**

Temp (°C)	Measured Frequency (MHz)		Test Voltage	Frequency Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	402.147200		3.8	-3	40215.0	-6.96	
20	402.147200		3.2	-2800	40215.0	-6.96	Battery shutoff
55	402.138300			-11700	40215.0	-29.09	
40	402.143300			-6700	40215.0	-16.66	
30	402.144000			-6000	40215.0	-14.92	
10	402.149100			-900	40215.0	-2.24	
0	402.150300			300	40215.0	0.75	
Notes:							

Section 6. Unwanted Radiation

NAME OF TEST: Unwanted Radiation	PARA. NO.: 95.635(d) / 5.5
TESTED BY: David Light	DATE: 24 October 2013

Minimum Standard: Para no. 95.635(d))

For transmitters designed to operate in the MedRadio service, emissions shall be attenuated in accordance with the following:

(1) Emissions from a MedRadio transmitter shall be attenuated to a level no greater than the field strength limits shown in the following table when they:

(i) Are more than 250 kHz outside of the 402-405 MHz band (for devices designed to operate in the 402-405 MHz band);

(ii) Are more than 100 kHz outside of either the 401-402 MHz or 405-406 MHz bands (for devices designed to operate in the 401-402 MHz or 405-406 MHz bands);

(iii) Are in the 406.000-406.100 MHz band (for devices designed to operate in the 401-402 MHz or 405-406 MHz bands); or

(iv) Are more than 2.5 MHz outside of the 413-419 MHz, 426-432 MHz, 438-444 MHz, or 451-457 MHz bands (for devices designed to operate in the 413-457 MHz band).

Frequency (MHz)	Field Strength (μ V/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Note—At band edges, the tighter limit applies.

(v) Are more than 2.5 MHz outside of the 2360-2400 MHz band (for devices designed to operate in the 2360-2400 MHz band).

(2) The emission limits shown in the table of paragraph (d)(1) are based on measurements employing a CISPR quasi-peak detector except that above 1 GHz, the limit is based on measurements employing an average detector. Measurements above 1 GHz shall be performed using a minimum resolution bandwidth of 1 MHz. See also § 95.605.

(3) The emissions from a MedRadio transmitter must be measured to at least the tenth harmonic of the highest fundamental frequency designed to be emitted by the transmitter.

(4) For devices designed to operate in the 402-405 MHz band: Emissions within the band more than 150 kHz away from the center frequency of the spectrum the transmission is intended to occupy and emissions 250 kHz or less below 402 MHz or above 405 MHz band will be attenuated below the maximum permitted output power by at least 20 dB.

(5) For devices designed to operate in the 401-402 MHz or 405-406 MHz bands: Emissions between 401-401.85 MHz or 405-406 MHz within the MedRadio bands that are more than 50 kHz away from the center frequency of the spectrum the transmission is intended to occupy (or more than 75 kHz away from the center frequency of MedRadio transmitters operating between 401.85-402 MHz) and emissions 100 kHz or less below 401 MHz or above 406 MHz shall be attenuated below the maximum permitted output power by at least 20 dB.

(6) For devices designed to operate in the 413-419 MHz, 426-432 MHz, 438-444 MHz, and 451-457 MHz bands: In the first 2.5 megahertz beyond any of the frequency bands authorized for MMN operation, the EIRP level associated with any unwanted emission must be attenuated within a 1 megahertz bandwidth by at least 20 dB relative to the maximum EIRP level within any 1 megahertz of the fundamental emission.

(7) For devices designed to operate in the 2360-2400 MHz band: In the first 2.5 megahertz beyond any of the frequency bands authorized for MBAN operation, the EIRP level associated with any unwanted emission must be attenuated within a 1 megahertz bandwidth by at least 20 dB relative to the maximum EIRP level within any 1 megahertz of the fundamental emission.

(8) Compliance with the limits described in subparagraphs (4) through (6) are based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

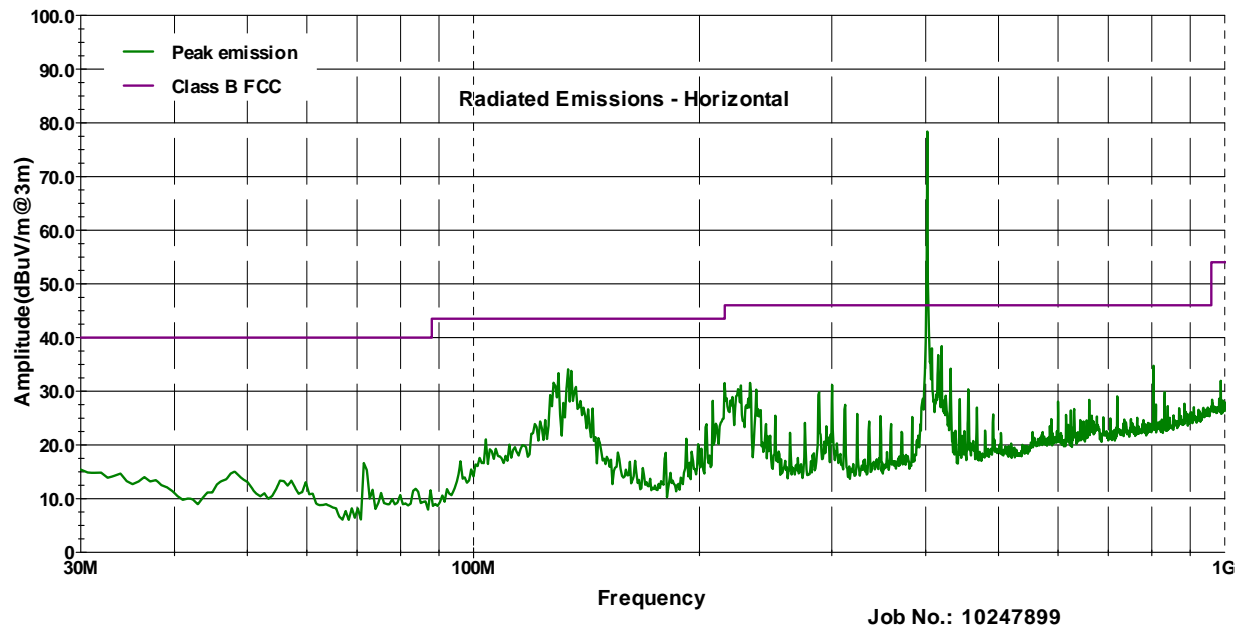
Test Results: Complies

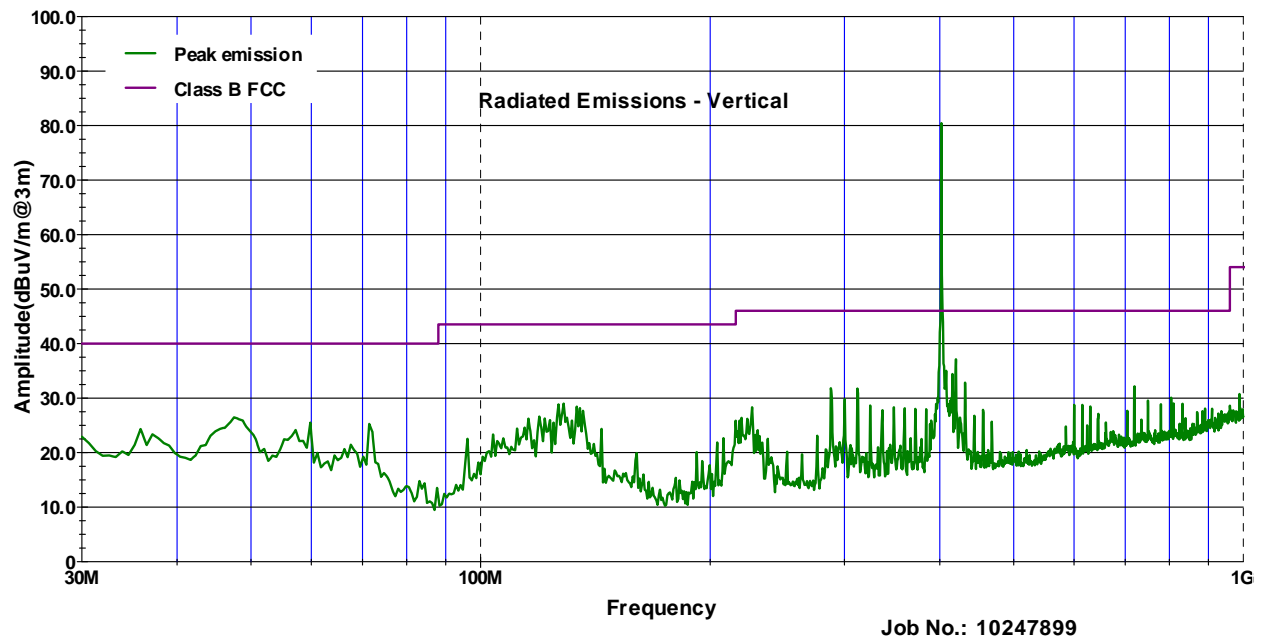
Measurement Data: See attached table.

Test Data – Unwanted Emissions

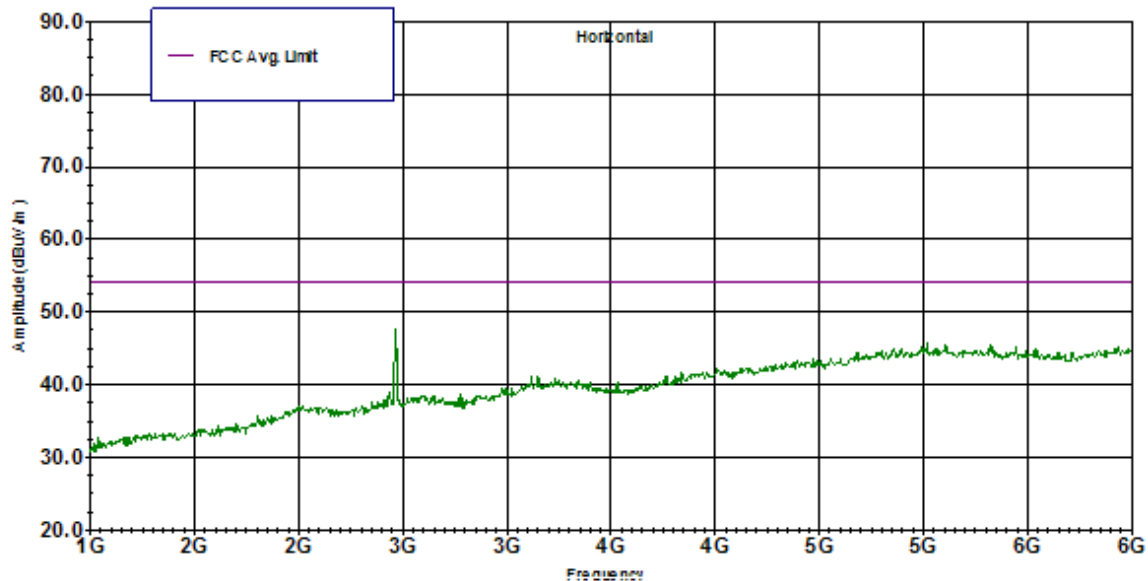
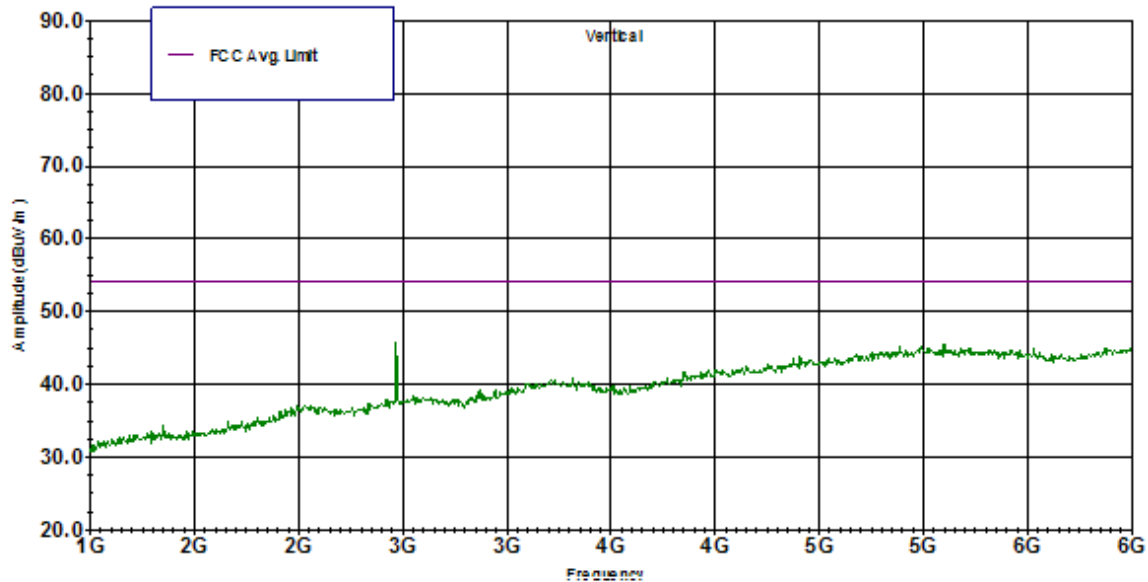
Band edge measurements

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Freq. (MHz)	Measured (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Gain (dB)	Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)
401.75	41.7	16.6	2.5	27.4	33.4	43.5	-10.1
405.25	42	16.7	2.6	27.2	34.1	43.5	-9.4
Calculations: (6) = (2)+(3)+(4)-(5) (8) = (6)-(7)							





Test Data – Unwanted Emissions



Section 7. Test Equipment List

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
572	Cable, 6.7m	Nemko USA, Inc.	RG223		01-Feb-2013	01-Feb-2014
802	Near Field Probe Set	EMCO	7405	103	N/R	
1016	Preamplifier	Hewlett Packard	8449A	2749A00159	20-Aug-2013	20-Aug-2014
1025	Preamplifier, 25dB	Nemko USA, Inc.	LNA25	399	05-Mar-2013	05-Mar-2014
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	15-Jul-2013	15-Jul-2015
1082	Cable, 2m	Astrolab	32027-2-29094-72TC		N/R	
1304	Antenna, Horn	Electro Metrics	RGA-60	6151	11-Dec-2012	11-Dec-2014
1763	Antenna, Bilog	Schaffner	CBL 6111D	22926	07-Mar-2013	07-Mar-2014
1767	Receiver, EMI	Rohde & Schwartz	ESIB26	837491/0002	19-Dec-2012	19-Dec-2013

Nemko USA, Inc.

**CFR 47, PART 95, Subpart E and
Industry Canada RSS-243, Issue 3**
Medical Devices Operating in
the 401-406 MHz Frequency Band

EQUIPMENT: 20600-02

PROJECT NO.: 10247899RUS1

ANNEX A

TEST DIAGRAMS

EQUIPMENT: 20600-02

Test Site For Radiated Emissions

