Radio Test Report

FCC Part 95
MedRadio Transmitter

Model: Trial Stimulator

COMPANY:	Nevro Corporation 4040 Campbell Ave. Suite 210 Menlo Park, CA 94125
TEST SITE(S):	Elliott Laboratories 684 W. Maude Avenue Sunnyvale, CA 94085
and	41039 Boyce Road. Fremont, CA. 94538-2435
REPORT DATE:	February 24, 2011
RE-ISSUED DATE:	January 23, 2015
FINAL TEST DATES:	December 4 and 9, 2009

AUTHORIZED SIGNATORY:

David W. Bare
Chief Engineer
Elliott Laboratories LLC

A2LA ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	02-24-2011	First release	
1	12-11-2014	Revised to change the limit in the detailed results	DWB
2	12-19-2014	Revised to add notes concerning emissions 250 kHz from the band edges	DMG
3	1-13-2015	Revised to change radiated power emissions calculation and clarify in band and band edge emissions results	DWB
4	1-23-2015	Revised to change radiated power emissions calculation and clarify in band and band edge emissions results	DWB

TABLE OF CONTENTS

SCOPE

Tests have been performed on the Nevro Corporation model Trial Stimulator, pursuant to the relevant requirements of the following standard(s) in order to obtain device certification against the regulatory requirements of the Federal Communications Commission.

- Code of Federal Regulations (CFR) Title 47 Part 2
- CFR 47 Part 95 (Medical Device Radiocommunication Service) Subpart I

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in Elliott Laboratories test procedures:

ANSI C63.4-2003
ANSI TIA-603-C August 17, 2004

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Nevro Corporation model Trial Stimulator and therefore apply only to the tested sample. The sample was selected and prepared by Jon Parker of Nevro Corporation.

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, the device requires certification.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body’s review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Nevro Corporation model Trial Stimulator complied with the requirements of the standards and frequency bands declared in the scope of this test report.

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS

FCC Part 95

Rule Part	Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics				
§2.1033 (c) (5) § 95.628(c)	Frequency range(s)	402.45 – 404.55 MHz	402-405 MHz	Complies
§2.1033 (c) (6) §2.1033 (c) (7) §2.1046 § 95.639(f)	EIRP (Calculated from Field Strength)	0.046µW -43.4 dBm	25µW –16dBm	Complies
§2.1033 (c) (4) §2.1047 §95.635(d)(4) & (5)	Emission types	F1D	-	-
	Unwanted emissions (-20dBc)	0.022nW -66.5 dBm	0.46nW -63.4dBm	Complies
§2.1049 §95.628(d), §95.633(e)(1)	Authorized Bandwidth, 20dB	257 kHz	300 kHz	Complies
Transmitter spurious emissions				
§2.1053 §2.1057 §95.635(d)(1)	Field strength	28.3 dBµV/m (26.0µV/m)@ 161.67 MHz	See table	Complies
Receiver spurious emissions				
15.109	Field strength	28.3 dBµV/m (26.0µV/m)@ 161.67 MHz	See table	Complies
Other details				
95.628(a)	Frequency Monitoring	-	-	N/A
§2.1055 §95.628(g)(2)	Frequency stability	19.2 ppm	100 ppm	
§2.1093	RF Exposure	Refer to separate exhibit	-	Complies
§2.1033 (c)(8)	Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	2.5V, 6.5A	-	-
Notes				

EXTREME CONDITIONS

Frequency stability is determined over extremes of temperature and voltage. As the device is hand carried, battery powered equipment, the supply voltage was reduced to the battery operating end point of 5.8Vdc as specified by the manufacturer.

The extremes of temperature were 0°C to +55°C as specified in FCC §95.628(e)(2) for stations in the Medical Device Radiocommunication Service.

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2) and were calculated in accordance with NAMAS document NIS 81 and M3003.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF frequency	Hz	25 to 7,000 MHz	1.7×10^{-7}
Radiated emission (field strength)	dBμV/m	25 to 1,000 MHz 1 to 40 GHz	± 3.6 dB ± 6.0 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Nevro Corporation model Trial Stimulator is a body worn spinal cord stimulator that is designed to allow the evaluation of the therapy during a trial phase. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 7.2 Volts DC supplied by batteries.

The sample was received on December 4, 2009 and tested on December 4 and 9, 2009. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Nevro	Trial Simulator	Trial Spinal Cord Stimulator	14	XKYEXTS1000

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 12 cm wide by 8 cm deep by 3 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at Elliott.

SUPPORT EQUIPMENT

No support equipment was used during testing.

EUT INTERFACE PORTS

The I/O cabling configuration during testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Output 1	Not connected	-	-	0.4
Output 2	Not connected	-	-	0.4

EUT OPERATION

During emissions testing the EUT was set to transmit on the selected frequency for transmit modes tests and set to receive mode for all other tests.

TESTING

GENERAL INFORMATION

Radiated spurious emissions measurements were taken at the Elliott Laboratories Anechoic Chambers and/or Open Area Test Site(s) listed below. The sites conform to the requirements of ANSI C63.4: 2003 *American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz* and CISPR 16-1-4:2007 - *Specification for radio disturbance and immunity measuring apparatus and methods Part 1-4: Radio disturbance and immunity measuring apparatus Ancillary equipment Radiated disturbances*. They are on file with the FCC and industry Canada.

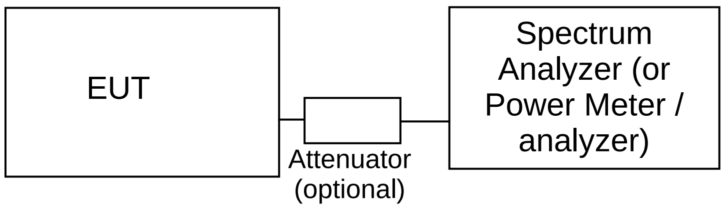
Site	Registration Numbers		Location
	FCC	Canada	
Chamber 4	211948	2845B-4	41039 Boyce Road Fremont, CA 94538-2435

In the case of Open Area Test Sites, ambient levels are at least 6 dB below the specification limits with the exception of predictable local TV, radio, and mobile communications traffic.

Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements.

RF PORT MEASUREMENT PROCEDURES

Conducted measurements are performed with the EUT's rf input/output connected to the input of a spectrum analyzer, power meter or modulation analyzer. When required an attenuator, filter and/or dc block is placed between the EUT and the spectrum analyzer to avoid overloading the front end of the measurement device. Measurements are corrected for the insertion loss of the attenuators and cables inserted between the rf port of the EUT and the measurement equipment.



Test Configuration for Antenna Port Measurements

OUTPUT POWER

Output power is measured using a power meter and an average sensor head, a spectrum analyzer or a power meter and peak power sensor head as required by the relevant rule part(s). Where necessary measurements are gated to ensure power is only measured over periods that the device is transmitting.

Power measurements made directly on the rf power port are, when appropriate, converted to an EIRP by adding the gain of the highest gain antenna that can be used with the device under test, as specified by the manufacturer.

For devices with an integral antenna the output power is measured as a field strength at a test distance of (typically) 3m and then converted to an eirp using far field equations as shown in SAMPLE CALCULATIONS –RADIATED POWER.

BANDWIDTH MEASUREMENTS

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS GEN. The measurement bandwidth is set to be at least 1% of the instrument's frequency span.

FREQUENCY STABILITY

The EUT is placed inside a temperature chamber with all support and test equipment located outside of the chamber. The temperature is varied across the specified frequency range in 10 degree increments with frequency measurements made at each temperature step. The EUT is allowed enough time to stabilize at each temperature variation.

The spectrum analyzer is configured to give a 5- or 6-digit display for the marker-frequency function. The spectrum analyzer's built-in frequency counter is used to measure the maximum deviation of the fundamental frequency at each temperature. Where possible the device is set to transmit an unmodulated signal. Where this is not possible the frequency drift is determined by finding a stable point on the signal (e.g. the null at the centre of an OFDM signal) or by calculating a centre frequency based on the upper and lower XdB points (where X is typically 6dB or 10dB) on the signal's skirts.

RADIATED EMISSIONS MEASUREMENTS

Receiver radiated spurious emissions measurements are made in accordance with ANSI ANSI C63.4:2003 by measuring the field strength of the emissions from the device at a specific test distance and comparing them to a field strength limit. Where the field strength limit is specified at a longer distance than the measurement distance the measurement is extrapolated to the limit distance.

Transmitter radiated spurious emissions are initially measured as a field strength. The eirp or erp limit as specified in the relevant rule part(s) is converted to a field strength at the test distance and the emissions from the EUT are then compared to that limit. Emissions within 20dB of this limit are the subjected to a substitution measurement.

All radiated emissions measurements are performed in two phases. A preliminary scan of emissions is conducted in either an anechoic chamber or on an OATS during which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed across the complete frequency range of interest and at each operating frequency identified in the reference standard. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. Initial scans are made using a peak detector (RBW=VBW) and using scan rates to ensure that the EUT transmits before the sweep moves out of each resolution bandwidth (for transmit mode).

During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit. For transmitter spurious emissions, where the limit is expressed as an effective radiated power, the eirp or erp is converted to a field strength limit.

Final measurements are made on an OATS or in a semi-anechoic chamber at the significant frequencies observed during the preliminary scan(s) using the same process of rotating the EUT and raising/lowering the measurement antenna to find the highest level of the emission. The field strength is recorded and, for receiver spurious emissions, compared to the field strength limit. For the final measurement the appropriate detectors (average, peak, normal, sample, quasi-peak) are used. For receiver measurements below 1GHz the detector is a Quasi-Peak detector, above 1GHz a peak detector is used and the peak value (RB=VB=1MHz) and average value (RB=1MHz, VB=10Hz) are recorded.

For transmitter spurious emissions, the radiated power of all emissions within 20dB of the calculated field strength limit are determined using a substitution measurement. The substitution measurement is made by replacing the EUT with an antenna of known gain (typically a dipole antenna or a double-ridged horn antenna), connected to a signal source. The output power of the signal generator is adjusted until the maximum field strength from the substitution antenna is similar to the field strength recorded from the EUT. The erp of the EUT is then calculated.

INSTRUMENTATION

An EMI receiver as specified in CISPR 16-1-1 is used for radiated emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 7000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary.

For measurements above the frequency range of the receivers and for all conducted measurements a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis.

Measurement bandwidths for the test instruments are set in accordance with the requirements of the standards referenced in this document.

Software control is used to correct the measurements for transducer factors (e.g. antenna) and the insertion loss of cables, attenuators and other series elements to obtain the final measurement value. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are exported in a graphic and/or tabular format, as appropriate.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the EUT antenna port or receiving antenna and the test receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A combination of biconical, log periodic or bi-log antennas are used to cover the range from 30 MHz to 1000 MHz. Broadband antennas or tuned dipole antennas are used over the entire 25 to 1000 MHz frequency range as the reference antenna for substitution measurements.

Above 1000 MHz, a dual-ridge guide horn antenna or octave horn antenna are used as reference and measurement antennas. The antenna calibration factors are included in site factors that are programmed into the test receivers and instrument control software when measuring the radiated field strength.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

Table mounted devices are placed on a non-conductive table at a height of 80 centimeters above the floor. Floor mounted equipment is placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. The EUT is positioned on a motorized turntable to allow it to be rotated during testing to determine the angel with the highest level of emissions.

SAMPLE CALCULATIONS

SAMPLE CALCULATIONS - CONDUCTED SPURIOUS EMISSIONS

Measurements are compared directly to the conducted emissions specification limit (decibel form). The calculation is as follows:

$$R_r - S = M$$

where:

R_r = Measured value in dBm
S = Specification Limit in dBm
M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS –RADIATED FIELD STRENGTH

Measurements of radiated field strength are compared directly to the specification limit (decibel form). The receiver and/or control software corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor is sued when measurements are made at a test distance that is different to the specified limit distance by using the following formula:

$$F_d = 20*LOG_{10}(D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40*LOG_{10}(D_m/D_s)$$

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS –RADIATED POWER

The erp/eirp limits for transmitter spurious measurements are converted to a field strength in free space using the following formula and adding 6dB for sites using a reflective ground plane (per FCC 95.627(g)(3):

$$E = \frac{\sqrt{30 P G}}{d}$$

where:

E = Field Strength in V/m
P = Power in Watts
G = Gain of isotropic antenna (numeric gain) = 1
D = measurement distance in meters

The field strength limit is then converted to decibel form (dBuV/m) and the margin of a given emission peak relative to the limit is calculated (refer to *SAMPLE CALCULATIONS –RADIATED FIELD STRENGTH*).

When substitution measurements are required (all signals with less than 20dB of margin relative to the calculated field strength limit) the eirp of the spurious emission is calculated using:

$$P_{EUT} = P_S – (E_S – E_{EUT})$$

and

$$P_S = G + P_{in}$$

where:

P_S = effective isotropic radiated power of the substitution antenna (dBm)
P_{in} = power input to the substitution antenna (dBm)
G = gain of the substitution antenna (dBi)
E_S = field strength the substitution antenna (dBm) at eirp P_S
E_{EUT} = field strength measured from the EUT

Where necessary the effective isotropic radiated power is converted to effective radiated power by subtracting the gain of a dipole (2.2dBi) from the eirp value.

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

For MedRadio, the above limits also apply to the transmitter per §95.635(d).

Appendix A Test Equipment Calibration Data

Environmental Test, 04-Dec-09

Manufacturer	Description	Model	Asset #	Cal Due
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	12/30/2009
Thermotron	Temp Chamber (w/ F4 Watlow Controller)	S1.2	2170	6/29/2010

Radiated Emissions, 30 - 1,000 MHz, 10-Dec-09

Manufacturer	Description	Model	Asset #	Cal Due
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1549	6/4/2010
Hewlett Packard	Preamplifier, 100 kHz - 1.3 GHz	8447E	1606	4/30/2010
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	2/10/2010

Appendix B Test Data

T77541 10 Pages

Client:	Nevro	Job Number:	J77515
Model:	Trial Stimulator	T-Log Number:	T77541
		Account Manager:	Sheareen Washington
Contact:	Jon Parker	Project Engineer:	David Bare
Emissions Standard(s):	FCC 95, EN 301-839-1m EN 60601-1-2	Class:	B
Immunity Standard(s):	EN 401 489-1, EN 401 489-27, IEC/EN 60601-1-2	Environment:	Radio/Medical

EMC Test Data

For The

Nevro

Model

Trial Stimulator

Date of Last Test: 12/17/2009

Elliott An NTS company

EMC Test Data

Client:	Nevro	Job Number:	J77515
Model:	Trial Stimulator	T-Log Number:	T77541
		Account Manager:	Sheareen Washington
Contact:	Jon Parker		
Standard:	FCC 95, EN 301-839-1m EN 60601-1-2	Class:	N/A

FCC Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 12/9/2009
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #4

Config. Used: 2
Config Change: None
EUT Voltage: Battery

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 16.8 °C
Rel. Humidity: 35 %

Summary of Results - Device Operating in the 402-405 MHz Band

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a		low	02		Fundamental	85.2 dBµV/m	57.2 dBµV/m @ 402.450MHz (-31.0dB)
			02		Restricted Band Edge (402 MHz)	46.0 dBµV/m	24.4 dBµV/m @ 402.000MHz (-32.8dB)
			02		20dB Edge at +/-150 kHz	27.7 dBµV/m	26.0dBµV/m @ 402.270MHz (-1.7dB)
			02		Radiated Emissions, 25 - 4050 MHz	Part 95	28.3 dBµV/m @ 161.67MHz (-15.2dB)
1b		high	02		Fundamental	85.2 dBµV/m	57.8dBµV/m @ 404.550MHz (-27.4dB)
			02		Restricted Band Edge (405 MHz)	46.0 dBµV/m	21.3dBµV/m @ 405.000MHz (-24.7dB)
			02		20dB Edge at +/-150 kHz	28.1 dBµV/m	25.0dBµV/m @ 404.360MHz (-3.1dB)
			02		Radiated Emissions, 25 - 4050 MHz	Part 95	37.3dBµV/m @ 3242.32MHz (-16.7dB)
2		mid	02		20dB Bandwidth	300 kHz	257 kHz

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Nevro	Job Number:	J77515
Model:	Trial Stimulator	T-Log Number:	T77541
		Account Manager:	Sheareen Washington
Contact:	Jon Parker		
Standard:	FCC 95, EN 301-839-1m EN 60601-1-2	Class:	N/A

Run #1: Radiated Spurious Emissions, 25 - 4050 MHz.

EUT and Test Configuration Details:

Fundamental level (Limit: 85.2 dBuV/m)

Level before 402MHz for low channel and after 405MHz for high channel (Limit= 46.0dBuV/m)

Level 250kHz away from fundamental (Limit: 46.0dBuV/m)

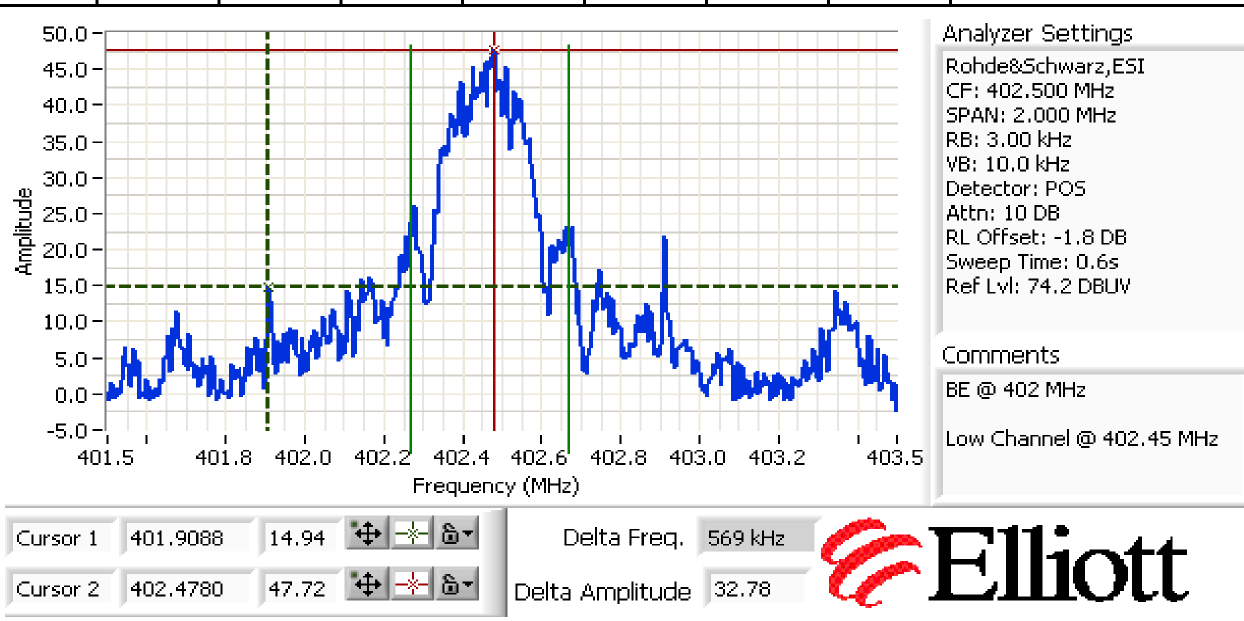
Run #1a: Low Channel @ 402.45 MHz

Fundamental Signal Field Strength: Peak values measured in 1 MHz

Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
402.450	57.2	H	85.2	-28.0	PK	233	1.0	EUT Flat
402.450	43.4	V	85.2	-41.8	PK	168	2.1	EUT Flat
402.450	54.6	H	85.2	-30.6	PK	251	1.0	EUT Side
402.450	46.7	V	85.2	-38.5	PK	130	2.1	EUT Side
402.450	54.9	H	85.2	-30.3	PK	103	1.0	EUT Upright
402.450	50.3	V	85.2	-34.9	PK	219	1.2	EUT Upright

In Band and Near Band Delta Measurments

Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
401.909	14.9	H	N/A	See note 1	PK	233	1.0	out of band < 250 kHz from edge
401.909	9.2	V	N/A	See note 1	PK	168	2.1	out of band < 250 kHz from edge
402.270	26.0	H	27.7	-1.7	PK	233	1.0	In band >150 kHz from 404.55 MHz
402.670	23.5	H	27.7	-4.2	PK	233	1.0	In band >150 kHz from 404.55 MHz



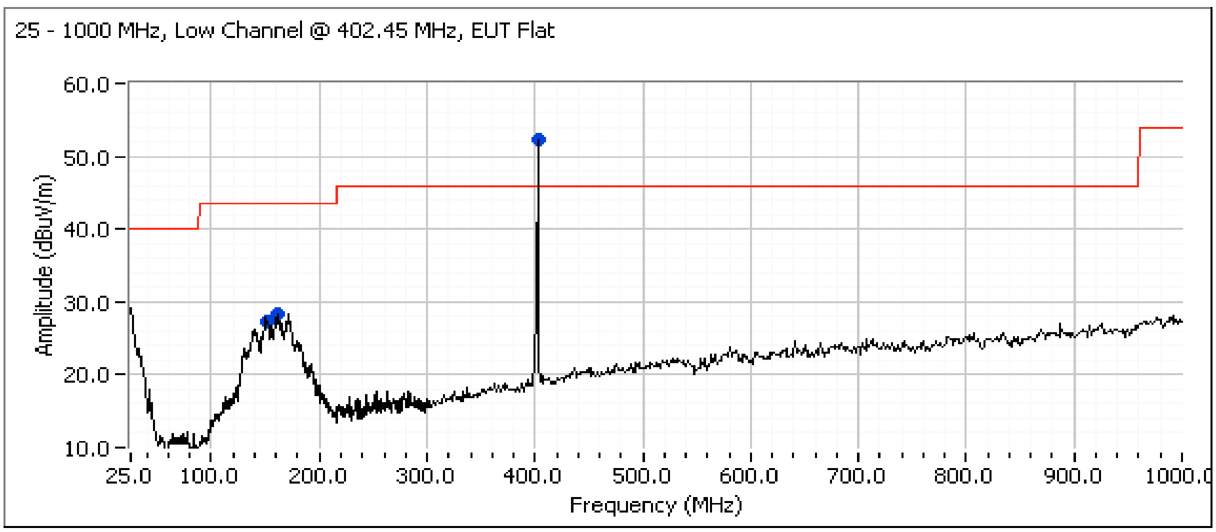
Elliott	EMC Test Data

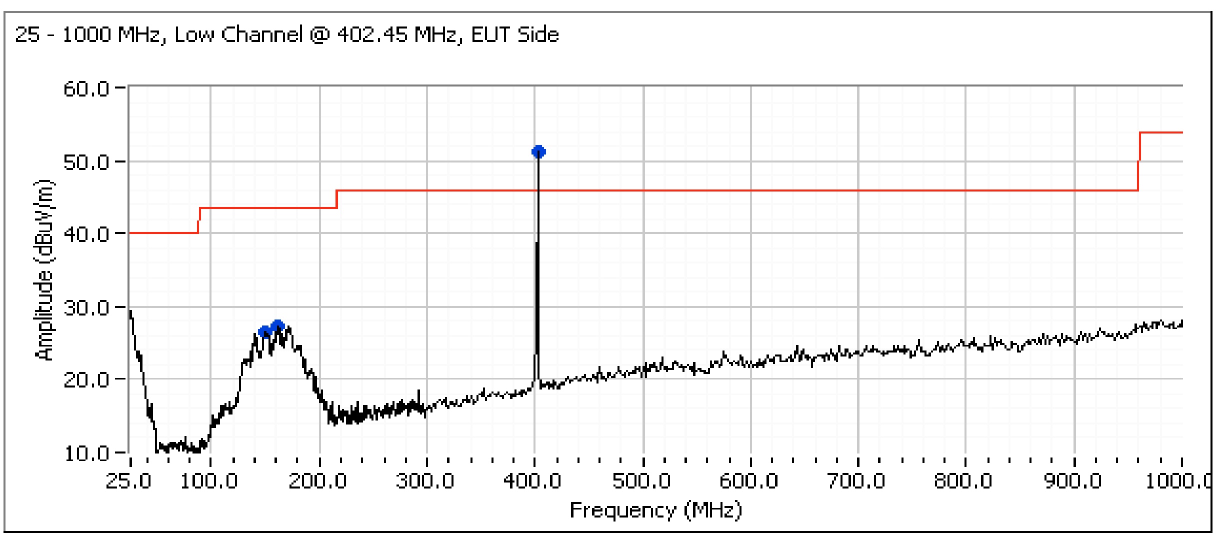
Client:	Nevro	Job Number:	J77515
Model:	Trial Stimulator	T-Log Number:	T77541
		Account Manager:	Sheareen Washington
Contact:	Jon Parker		
Standard:	FCC 95, EN 301-839-1m EN 60601-1-2	Class:	N/A

Note 1:	The delta in emissons level from the inband level to the level at 401.909 is 32.8 dB. Subtracting this from the field strength of the fundamental at 1 MHz gives a value of 24.4 dBuV/m which even complies with the out of band limit of 46 dBuV/m.

Other Spurious Emissions

Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
151.202	27.2	H	43.5	-16.3	Peak	218	2.0	EUT Flat
161.673	28.3	H	43.5	-15.2	Peak	223	1.5	EUT Flat
150.651	26.5	H	43.5	-17.0	Peak	43	2.0	EUT Side
161.673	27.2	H	43.5	-16.3	Peak	65	2.5	EUT Side
140.180	22.6	H	43.5	-20.9	Peak	52	2.0	EUT Upright
194.188	24.1	H	43.5	-19.4	Peak	228	2.0	EUT Upright





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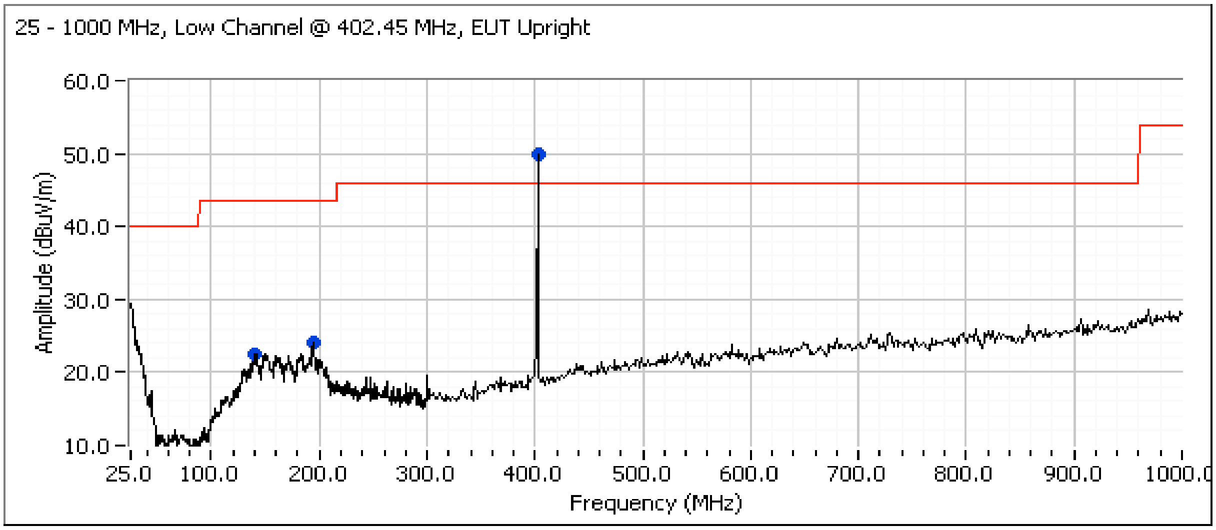
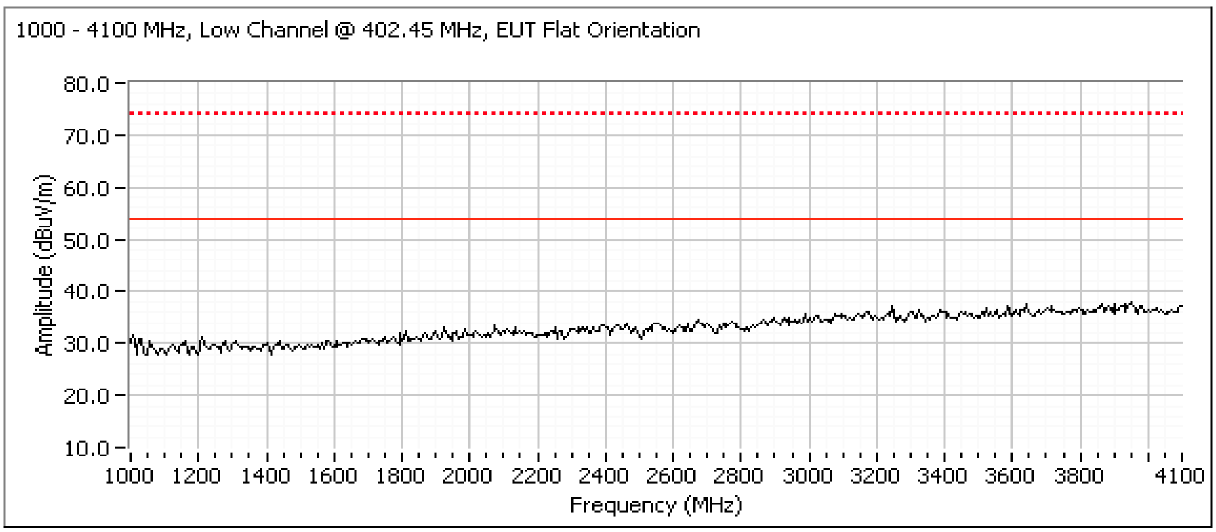
Model:	Trial Stimulator	T-Log Number:	T77541
		Account Manager:	Sheareen Washington
Contact:	Jon Parker		
Standard:	FCC 95, EN 301-839-1m EN 60601-1-2	Class:	N/A

EMC Test Data

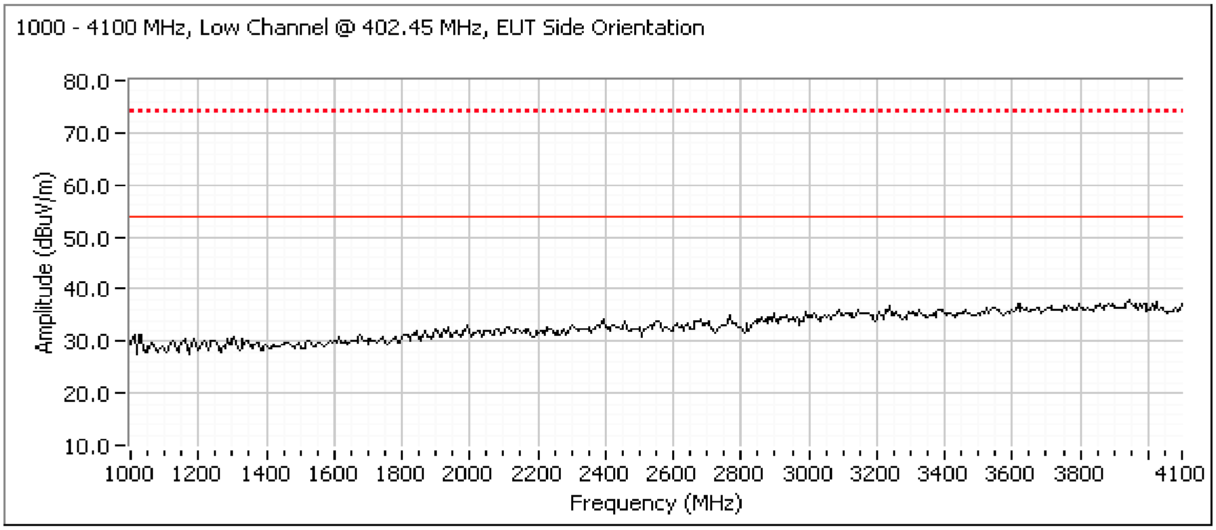


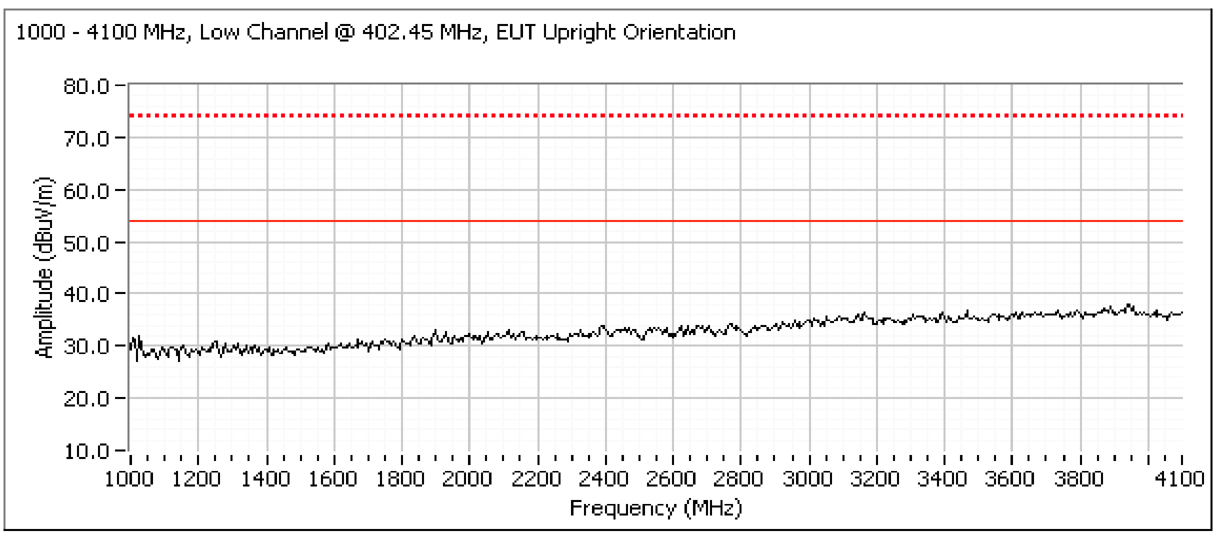


Elliott An NTS company

EMC Test Data

Client:	Nevro	Job Number:	J77515
Model:	Trial Stimulator	T-Log Number:	T77541
		Account Manager:	Sheareen Washington
Contact:	Jon Parker		
Standard:	FCC 95, EN 301-839-1m EN 60601-1-2	Class:	N/A





Client:	Nevro	Job Number:	J77515
Model:	Trial Stimulator	T-Log Number:	T77541
		Account Manager:	Sheareen Washington
Contact:	Jon Parker		
Standard:	FCC 95, EN 301-839-1m EN 60601-1-2	Class:	N/A

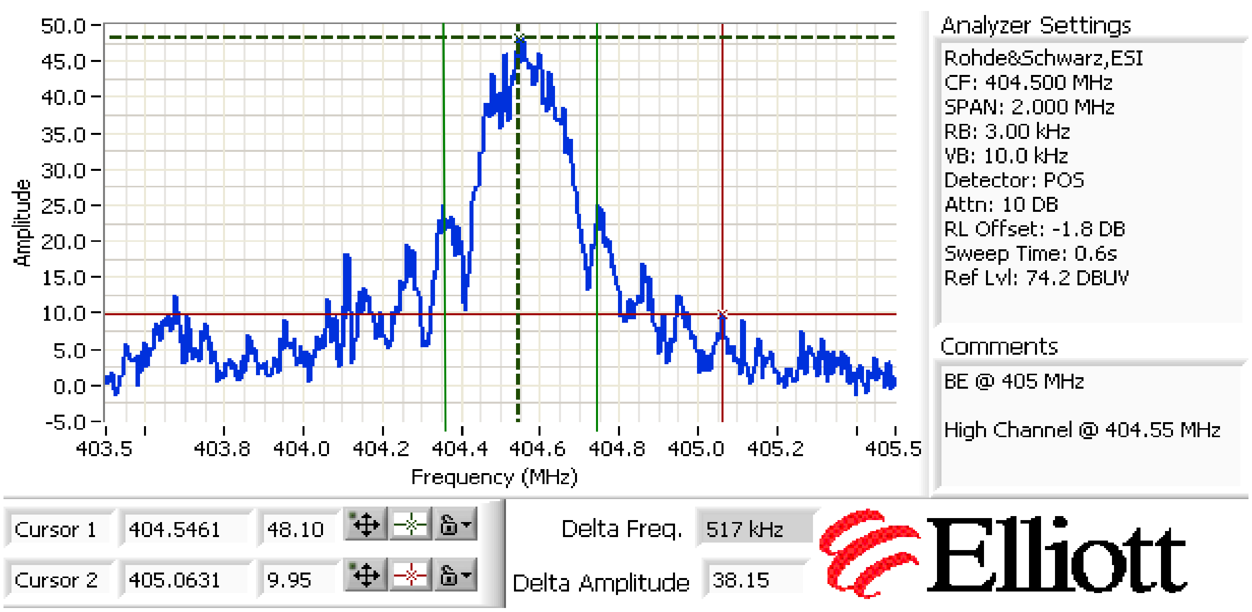
Run #1b: High Channel @ 404.55 MHz

Fundamental Signal Field Strength: Peak values measured in 1 MHz

Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
404.550	57.8	H	85.2	-27.4	PK	242	1.0	EUT Flat
404.550	46.6	V	85.2	-38.6	PK	240	1.0	EUT Flat

In Band and Near Band Delta Measurments

Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
405.063	11.6	H	N/A	See Note 2	PK	242	1.0	out of band < 250 kHz from edge
405.063	10.1	V	N/A	See Note 2	PK	240	1.0	out of band < 250 kHz from edge
404.360	25.0	H	28.1	-3.1	PK	240	1.0	In band >150 kHz from 404.55 MHz
404.745	25.0	H	28.1	-3.1	PK	240	1.0	In band >150 kHz from 404.55 MHz



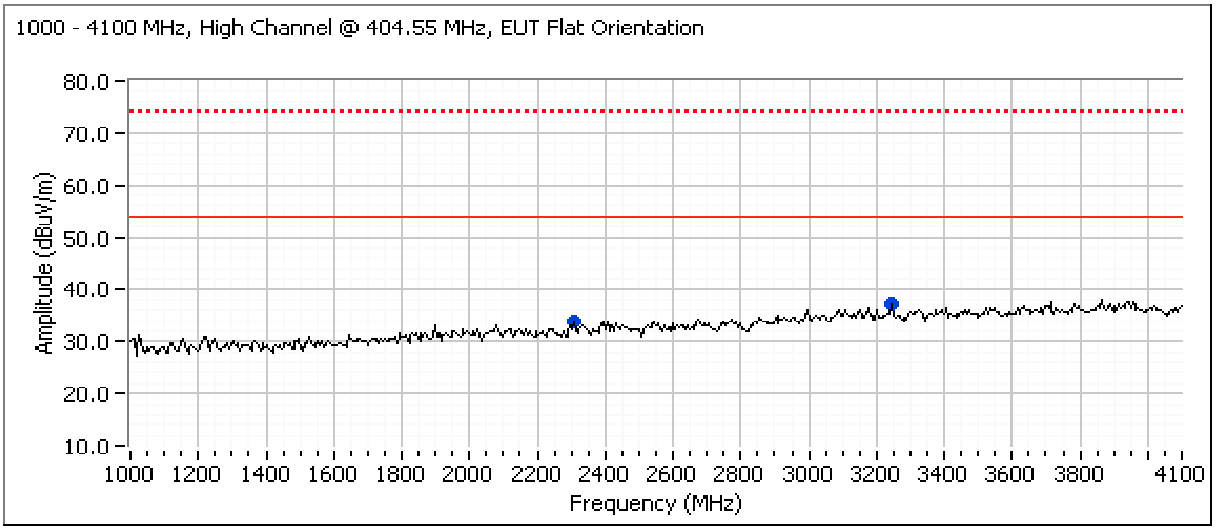
Note 1:	Spurious emissions for this high channel were the same as for the low channel, highest fundamental and spurious emissions were with the EUT flat.
Note 2:	The delta in emissons level from the inband level to the level at 405.063 is 36.5 dB. Subtracting this from the field strength of the fundamental at 1 MHz gives a value of 21.3 dBuV/m which even complies with the out of band limit of 46 dBuV/m.

The delta in emissions level from the inband level to the highest level >150 kHz from the center is 23.1 dB. The power of this unwanted emmission is thus -66.5 dBm since the power of the wanted emission is -43.4 dBm calculated from the 57.8 dBuV/m FS.

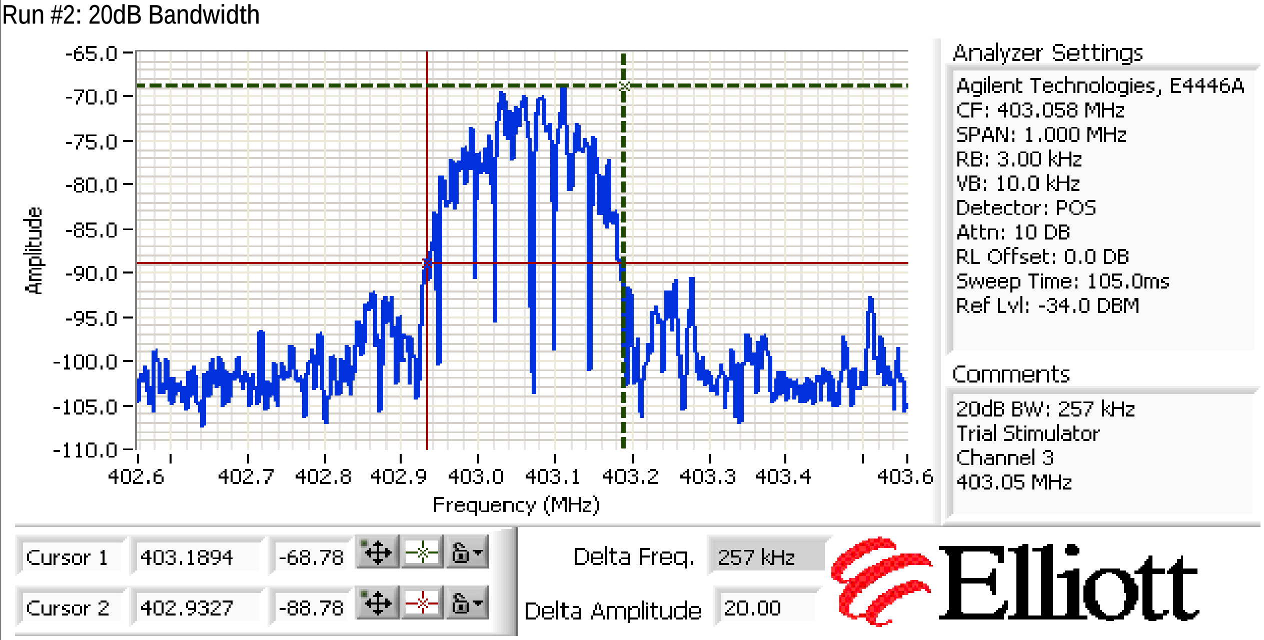
Client:	Nevro	Job Number:	J77515
Model:	Trial Stimulator	T-Log Number:	T77541
		Account Manager:	Sheareen Washington
Contact:	Jon Parker		
Standard:	FCC 95, EN 301-839-1m EN 60601-1-2	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	FCC		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2307.170	33.9	V	54.0	-20.1	Peak	212	1.0	
3242.330	37.3	V	54.0	-16.7	Peak	92	1.6	



Run #2: 20dB Bandwidth



Client:	Nevro	Job Number:	J77515
Model:	Trial Stimulator	T-Log Number:	T77541
		Account Manager:	Sheareen Washington
Contact:	Jon Parker		
Standard:	FCC 95, EN 301-839-1m EN 60601-1-2	Class:	B

FCC Part 95.628
Frequency Stability

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

With the exception of the radiated spurious emissions tests, all measurements are made with a probe. For frequency stability measurements the EUT was place inside an environmental chamber.

Radiated measurements are made with the EUT located on a non-conductive table, 3m from the measurement antenna.

Ambient Conditions:

Temperature: 20 °C
Rel. Humidity: 40 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result
1	Frequency Stability	100ppm	Pass	19.2ppm

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

EMC Test Data

Client:	Nevro	Job Number:	J77515
Model:	Trial Stimulator	T-Log Number:	T77541
		Account Manager:	Sheareen Washington
Contact:	Jon Parker		
Standard:	FCC 95, EN 301-839-1m EN 60601-1-2	Class:	B

Run #1: Frequency Stability

Date: 12/4/2009 Engineer: Mehran Birgani Location: Environmental Chamber

Nominal Frequency: 403.05 MHz

Frequency Stability Over Temperature

The EUT was soaked at each temperature for a minimum of 30 minutes prior to making the measurements to esnure the EUT and chamber had stabilized at that temperature.

Temperature	Frequency Measured	Drift	
(Celsius)	(MHz)	(Hz)	(ppm)
0	403.057723	7723	19.2
10	403.054402	4402	10.9
20	403.055413	5413	13.4
30	403.053967	3967	9.8
40	403.054272	4272	10.6
50	403.053597	3597	8.9
55	403.055231	5231	13.0
	Worst case:	7723	19.2

Frequency Stability Over Input Voltage

Battery endpoint is 5.8 Vdc

Voltage	Frequency Measured	Drift	
(Dc)	(MHz)	(Hz)	(ppm)
7.2	403.055413	5413	13.4
5.8	403.055413	5413	13.4

Note 1: Maximum drift of fundamental frequency before it shut down at 1.8 Vdc was 7.4kHz.