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Radio Test Report

FCC Part 24 and RSS 133
(1850 MHz to 1910 MHz)
FCC Part 27 and RSS 139
(1710 MHz to 1755 MHz)

Model: CELFI-RS224WU

FCC ID:	YETCELFI-RS224WU
IC CERTIFICATION #:	9298A-CRS224WU
COMPANY:	Nextivity, Inc. 12230 World Trade Drive Suite 250 San Diego, CA 92128
TEST SITE(S):	NTS Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
REPORT DATE:	December 20, 2012
FINAL TEST DATES:	November 21, December 3, 6 and 10, 2012
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A2LA ACCREDITED
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REVISION HISTORY

Rev#	Date	Comments	Modified By
-		First release	

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SCOPE

Tests have been performed on the Nextivity, Inc. model CELFI-RS224WU, 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 and Industry Canada.

- Code of Federal Regulations (CFR) Title 47 Part 2
- Industry Canada RSS-Gen Issue 3, December 2010
- CFR 47 Part 24 Subpart E (Narrowband PCS)
- CFR 47 Part 27 Subpart C (Operation in 1710–1755 MHz, 2110–2155 MHz, and 2160–2180 MHz Bands)
- RSS 133 Issue 5, February 2009 (2GHz Personal Communications Services)
- RSS 139 Issue 2, February 2009 (Advanced Wireless Services Equipment Operating in the Bands 1710-1755 MHz and 2110-2155 MHz)

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 NTS Silicon Valley test procedures:

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

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

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 Nextivity, Inc. model CELFI-RS224WU and therefore apply only to the tested sample. The sample was selected and prepared by Michiel Lotter of Nextivity, Inc.

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. Prior to marketing in Canada, Class I transmitters, receivers and transceivers require 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 Nextivity, Inc. model CELFI-RS224WU 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 24E (Handset or other UE) and RSS-133

FCC	Canada	Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics					
§2.1033 (c) (5) § 24.229	RSS 133 6.1	Frequency Range	1857.4–1902.6 MHz	1850-1910 MHz	Pass
§2.1033 (c) (4) §2.1047	RSS 133 6.2	Modulation Type	WCDMA, F9W	Any allowed	Pass
§2.1033 (c) (6) §2.1033 (c) (7) §2.1046 § 24.232(c)	RSS 133 6.4 SRSP-510	EIRP	24.8 dBm	2 Watts 33 dBm	Pass
§24.232(d)	RSS 133 6.4	Peak to Average Ratio	10.3 dB	<= 13 dB	Pass
§2.1049 §24.238 (b)	RSS GEN 4.6.1	Occupied Bandwidth	13.86 MHz	Remain in Block	Pass
Transmitter spurious emissions[2]					
§2.1051 §2.1057 §24.238	RSS 133 6.5	At the antenna terminals	N/A – Integral Antenna	-13 dBm	-
§2.1053 §2.1057 §24.238	RSS 133 6.5	Field strength	-28.4 dBm	-13 dBm	Pass
Receiver spurious emissions[1]					
Other details					
§2.1055 §24.235	RSS 133 6.3	Frequency stability	0.71 ppm	2.5 ppm	Pass
§2.1093	RS 102	RF Exposure	0.242 mW/cm^2 at 20cm	1 mW/cm^2	Pass
§2.1033 (c) (8)	RSP 100 7.2 (a)	Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	Refer to operational description	-	-
-	-	Antenna Gain	4.4 dBi	-	-

Notes
Note 1 – As the frequency of operation is above 960 MHz there are no technical requirements for spurious emissions from the receiver.
Note 2 – The measurement at the channel edge is made in a reference bandwidth of at least 1% the emission bandwidth is used and the measured power is integrated over 1 MHz. For measurements more than 1MHz from the edge of the channel the measurement bandwidth is 1MHz.

FCC Part 27 (Handset or other UE Operating in 1710 – 1755 MHz) and RSS 139

FCC	Canada	Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics					
§2.1033 (c) (5) §27.5 (i) (2)	RSS 139 6.1	Frequency range(s)	1717.4 – 1747.6 MHz	1710-1755 MHz	Pass
§2.1033 (c) (4) §2.1047	RSS 139 6.2	Modulation Type	WCDMA	Any allowed	Pass
§2.1033 (c) (6) §2.1033 (c) (7) §2.1046 §27.50(d)	RSS 139 6.4	EIRP	27.6 dBm	1 Watt 30 dBm	Pass
§27.50(d) (6)	RSS 139	Peak to Average Ratio	10.2 dB	<= 13 dB	Pass
§2.1049 §27.53	RSS GEN 4.6.1	Occupied Bandwidth	13.8 MHz	Remain in Block	Pass
Transmitter spurious emissions[3]					
§2.1051 §2.1053 §2.1057 §27.53(h)	RSS 139 6.5	At the antenna terminals	N/A – Integral Antenna	-13 dBm	-
	RSS 139 6.5	Field strength	-26.7 dBm	-13 dBm eirp	Pass
Receiver spurious emissions[2]					
Other details					
§2.1055 §27.54	RSS 139 6.3	Frequency stability	0.69 ppm	2.5 ppm[1]	Pass
§2.1093	RSS 102	RF Exposure	0.242 mW/cm^2	1 mW/cm^2	Pass
§2.1033 (c) (8)		Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	Refer to operational description	-	-
-	-	Antenna Gain	4.4 dBi	-	-

Notes
Note 1 – The requirement for frequency stability is that the signal remains within the allocated band. A limit of 2.5ppm is being used to ensure the signal remains within the allocated band as defined by the spurious limits at the channel edges.
Note 2 – As the frequency of operation is above 960 MHz there are no technical requirements for spurious emissions from the receiver.
Note 3 – The measurement at the channel edge is made in a reference bandwidth of at least 1% the emission bandwidth is used. For measurements more than 1MHz from the edge of the channel the measurement bandwidth is 1MHz.

EXTREME CONDITIONS

Frequency stability is determined over extremes of temperature and voltage. The extremes of voltage were 85 to 115 percent of the nominal value.

The extremes of temperature were -30°C to +50°C as specified in FCC §2.1055(a)(1).

MEASUREMENT UNCERTAINTIES

ISO/IEC 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}
RF power, conducted	dBm	25 to 7,000 MHz	± 0.52 dB
Conducted emission of transmitter	dBm	25 to 40,000 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 40,000 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 40,000 MHz	± 2.5 dB
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 Nextivity, Inc. CELFI-RS224CU and CELFI-RS224WU comprise a WCDMA Cellular Repeater for indoor residential use. The system is composed of two units, the Window Unit (WU) and the Coverage Unit (CU) that connect wirelessly over a full-duplex wireless link in the RLAN band using a mixed OFDM and muxed cellular signal (up to three 5MHz cellular channels) over a 30 MHz channel in each direction. The Cel-Fi WU transmits and receives Cellular signals from the base station and operates similar to a cellular handset. The Cel-Fi CU transmits and receives signals with the cellular handset and operates on frequencies similar to the cellular base station. The EUT was treated as table-top equipment during testing to most closely simulate the end-user environment. The electrical rating of the EUT is 12 Volts DC, 1.5A. The AC Adapter rating is 100-240V, 0.7A (Max), 47-63 Hz.

The sample was received on November 19, 2012 and tested on November 21, December 3, 6 and 10, 2012. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Nextivity, Inc.	CELFI-RS224WU	CelFi Window Unit	159246000005	YETCELFI-RS224WU

OTHER EUT DETAILS

The antennas are integral to the product.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 157mm high x 145mm wide x 58mm deep.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

SUPPORT EQUIPMENT

No support equipment was used during testing. A computer was connected via the USB port to configure the radio for testing and disconnected while performing the tests.

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
DC Power	External pwr supply out	2 wire	Unshielded	2.0
External pwr supply in	AC Mains	Direct plug-in	NA	NA

Note: The USB port was not connected during testing. Nextivity stated that this is for setup purposes and therefore would not normally be connected.

EUT OPERATION

During emissions testing the EUT was transmitting continuously at full power on the channels called out in the specific test.

TESTING

GENERAL INFORMATION

Antenna port measurements were taken at the NTS Silicon Valley test site located at 41039 Boyce Road, Fremont, CA 94538-2435.

Radiated spurious emissions measurements were taken at the NTS Silicon Valley 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.

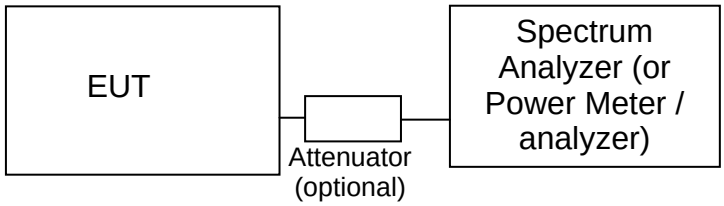
Site	Registration Numbers		Location
	FCC	Canada	
Chamber 4	211948	IC 2845B-4	41039 Boyce Road Fremont, CA 94538-2435
Chamber 5	211948	IC 2845B-5	
Chamber 7	A2LA Accredited	IC 2845B-7	

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

For devices with an integral antenna the output power and spurious emissions are measured as a field strength at a test distance of (typically) 3m and then converted to an eirp using a substitution measurement (refer to RADIATED EMISSIONS MEASUREMENTS). All other measurements are made as detailed below but with the test equipment connected to a measurement antenna directed at the EUT.

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.

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.

CONDUCTED SPURIOUS EMISSIONS

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 measurements). Where the limits are expressed as an average power the spectrum analyzer is tunes to that frequency with a narrow span (wide enough to capture the emission and its sidebands) and the resolution and video bandwidths are adjusted as required by the reference measurement standards. For transmitter measurements the appropriate detector (average, peak, normal ,sample, quasi-peak) is used when making measurements for licensed devices. For receiver conducted spurious measurements the detector is set to peak.

TRANSMITTER MASK MEASUREMENTS

The transmitter mask measurements are made using resolution bandwidths as specified in the pertinent rule part(s). Where narrower bandwidths are used the measurement is corrected to account for the reduced bandwidth by either using the adjacent channel power function of the spectrum analyzer to sum the power across the required measurement bandwidth. The frequency span of the analyzer is set to ensure the fundamental signal and all significant sidebands are displayed.

The top of the mask may be set by the total output power of the signal, the power of the unmodulated signal or the peak value of the signal in the reference bandwidth being used for the mask measurement.

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.

TRANSIENT FREQUENCY BEHAVIOR:

The TIA/EIA 603 procedure is used to determine compliance with transient frequency timing requirements as the radio is keyed on and off.

The EUTs rf output is connected via a combiner/splitter to the test receiver/spectrum analyzer and to a diode detector. The test receiver or spectrum analyzer video output is connected to an oscilloscope, which is triggered by the output from the diode detector.

Plots showing Ton, T1, and T2 are made when turning on the transmitter and showing T3 when turning off the transmitter.

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:

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

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, RSS 210 Table 2, RSS GEN Table 1 and RSS 310 Table 3. 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

Appendix A Test Equipment Calibration Data

Radiated Emissions, Cellular Bandedge, 21-Nov-12

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013

Radiated Emissions, 30 - 20,000 MHz, 03-Dec-12

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/19/2014
Hewlett Packard	High Pass filter, 8.2 GHz (Red System)	P/N 84300-80039 (84125C)	1152	8/2/2013
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	8/2/2013
Hewlett Packard	Head (Inc W1-W4, 1946 , 1947) Purple	84125C	1772	5/1/2013
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	4/17/2013
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2197	2/7/2014
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2013
Micro-Tronics	High Pass Filter 2700 MHz	HPM50111	2326	3/22/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/10/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012

Conducted Emissions and substitutions, 06-Dec-12

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Agilent	PSG Vector Signal Generator (250kHz - 20GHz)	E8267C	1877	5/11/2013
Micro-Tronics	High Pass Filter 2700 MHz	HPM50111	2326	3/22/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	2732	11/12/2013

Radio Antenna Port and Freq. stability, 10-Dec-12

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 9 KHz-26.5 GHz, Non-Program	8563E	284	1/13/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013

Appendix B Test Data

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Client:	Nextivity, Inc.	Job Number:	J89693
Product	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Emissions Standard(s):	FCC parts 15, 24 and 27	Class:	-
Immunity Standard(s):	-	Environment:	Radio

EMC Test Data

For The

Nextivity, Inc.

Product

CELFI-RS224WU

Date of Last Test: 12/11/2012

Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

RSS 133 and FCC Part 24

Power, Occupied Bandwidth and 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.

General Test Configuration

With the exception of the radiated spurious emissions tests, all measurements are made with the EUT's rf port connected to the measurement instrument via an attenuator or dc-block if necessary. All amplitude measurements are adjusted to account for the attenuation between EUT and measuring instrument. 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: 15-20 °C

Rel. Humidity: 40-50 %

Summary of Results

Run #	Spacing	Test Performed	Limit	Pass / Fail	Result / Margin
1		Output Power	-	-	24.8 dBm EIRP
2		99% and 26 dB Bandwidth	-	-	99% BW: 13.86 MHz 26 dB BW: 14.79 MHz
3		Spurious emissions	-13 dBm	Pass	-28.4 dBm @ 1850.0 MHz (-15.4 dB)

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:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

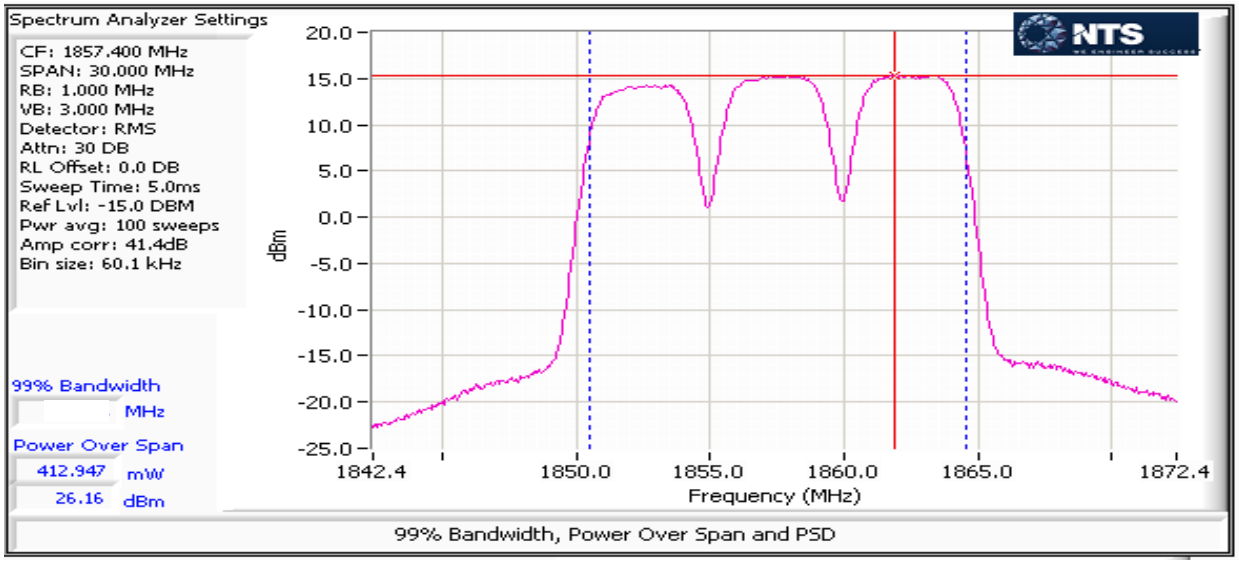
Run #1: Output Power (radiated) and substitution

Date: 11/21/12 Engineer: M. Birgani Location: FT Chamber #7

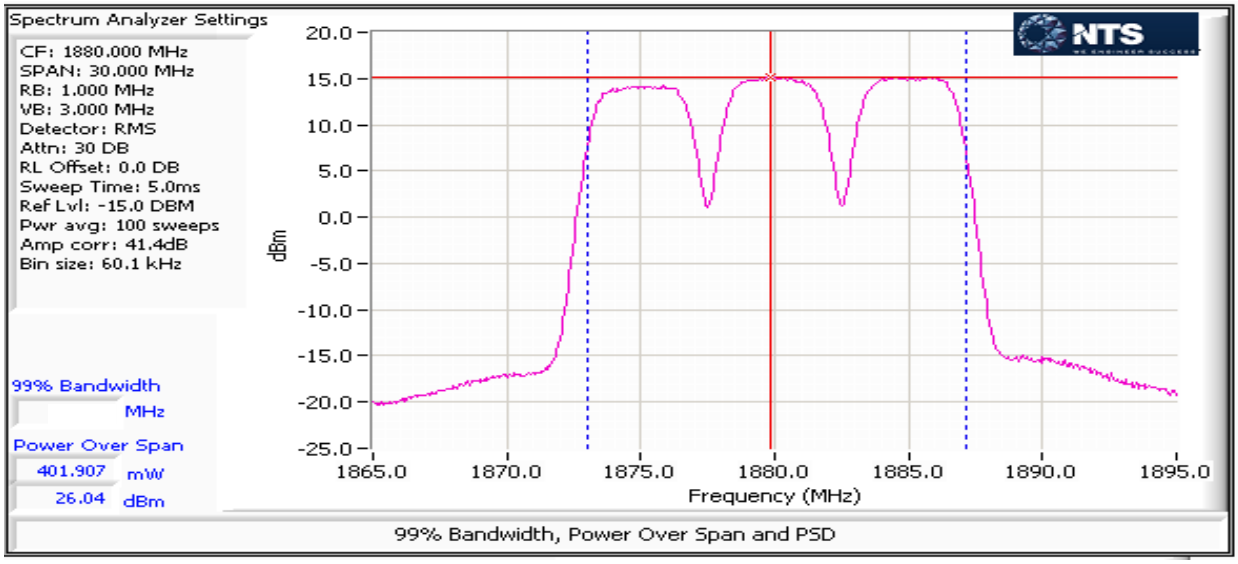
Substitution measurements
Date: 12/6/12 Engineer: Deniz Demirci

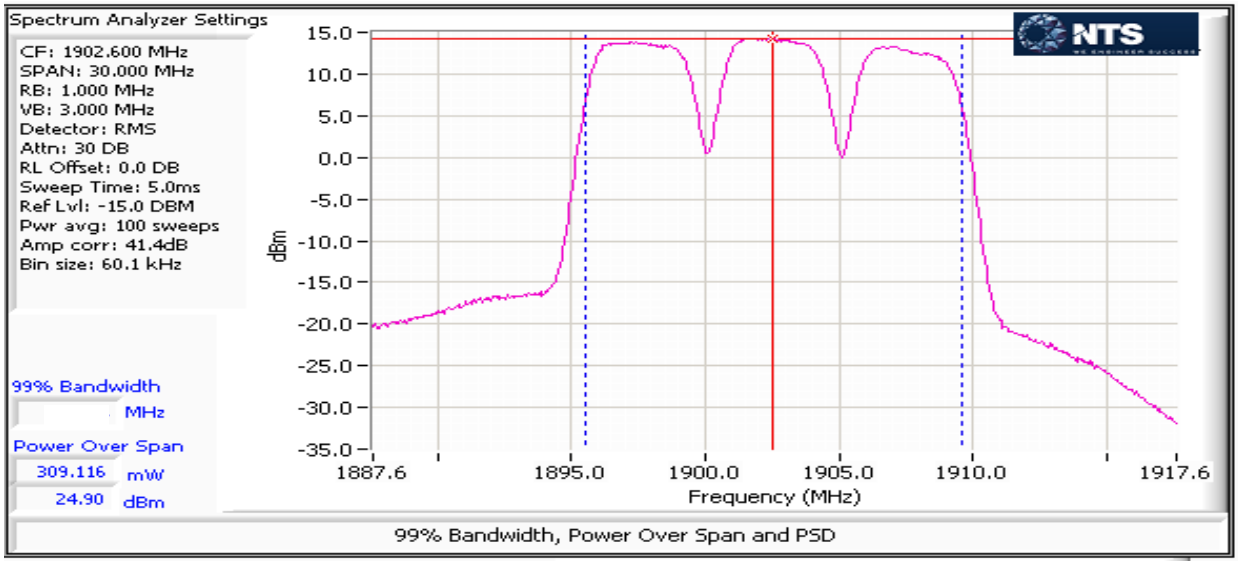
Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	Measured (dBm)[5]	eirp[6] (dBm)	mW	dBm	dBm	dB
1857.40	10.0	8.3	114.9	96.6	26.2	24.8	302.0			
1880.00	10.0	8.2	115.1	96.9	26.0	24.3	269.2			
1902.60	10.0	8.1	114.4	96.3	24.9	23.8	239.9			

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to adjust radiated power measurements taken to radiated power, including the presence of the ground plane
Note 5:	EUT power is measured with integrated power over span function using calculated free space conversion factor of E=√(30PG)/d. This conversion does not consider the presence of the ground plane
Note 6:	Adjusted eirp level using substitution measurement with the free space factor (95.2) used for the calculation



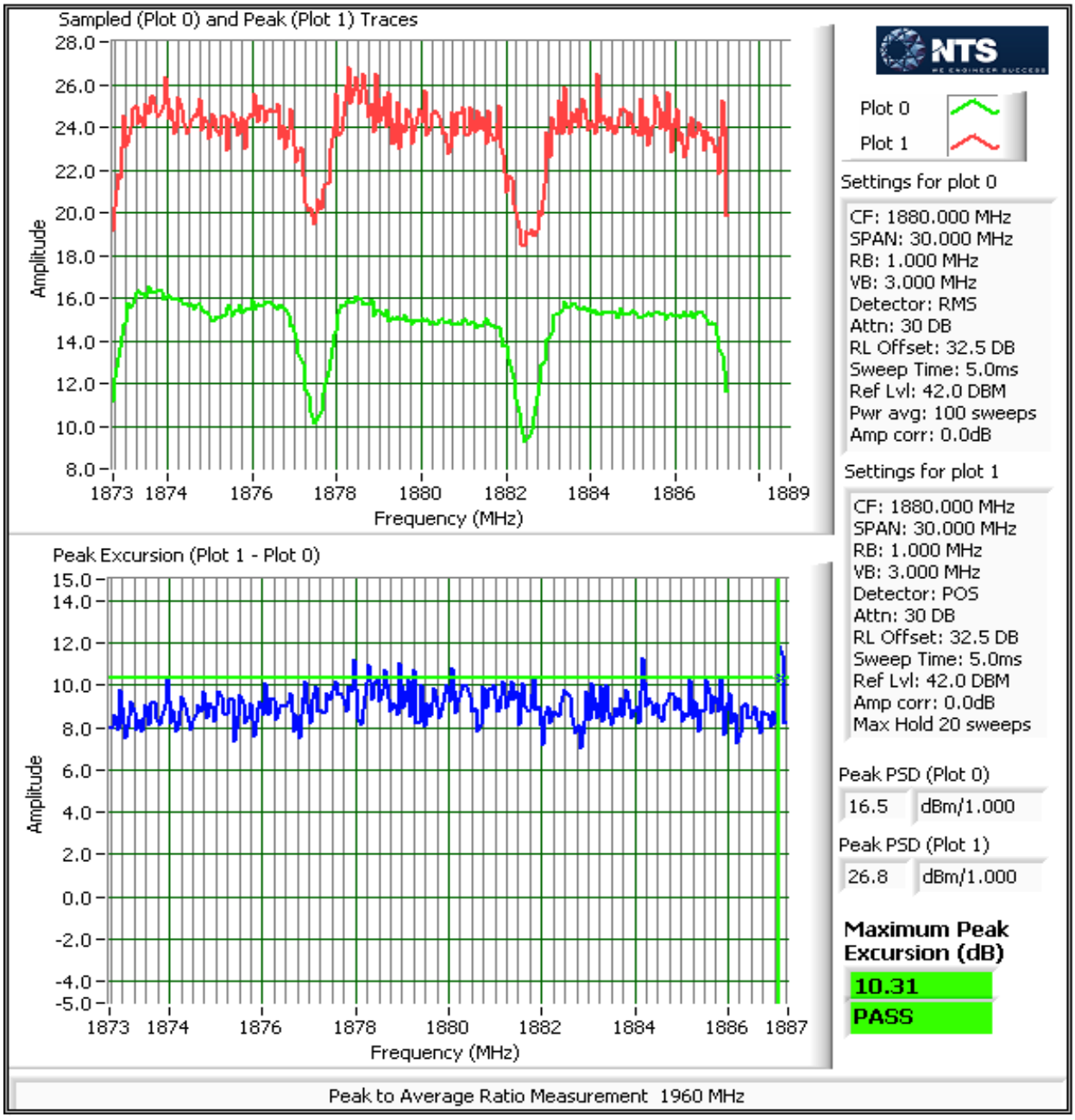
Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A





Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

Run #1b: Peak to average ratio



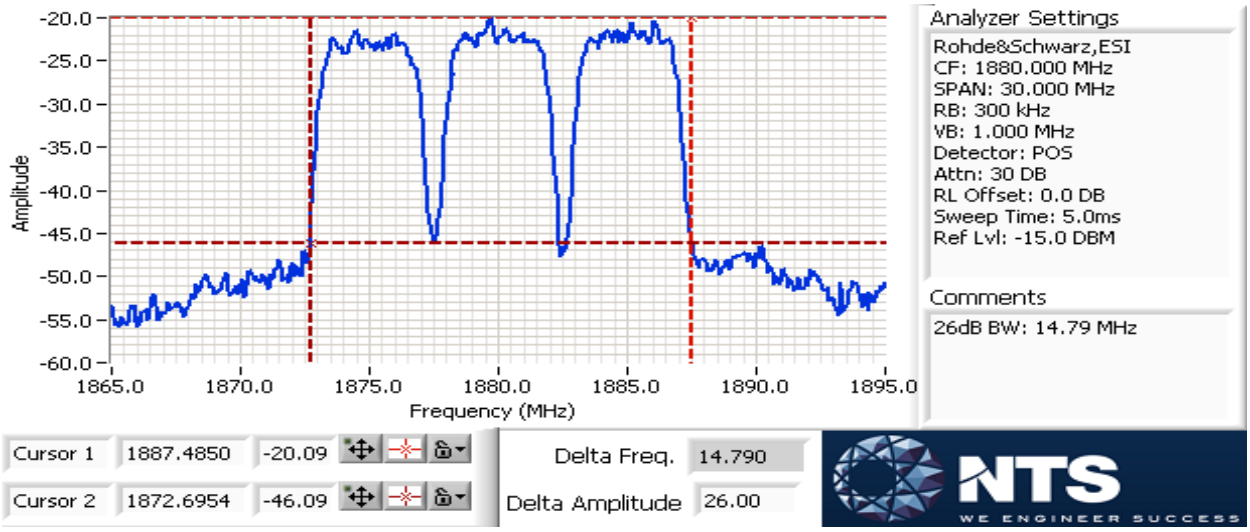
Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

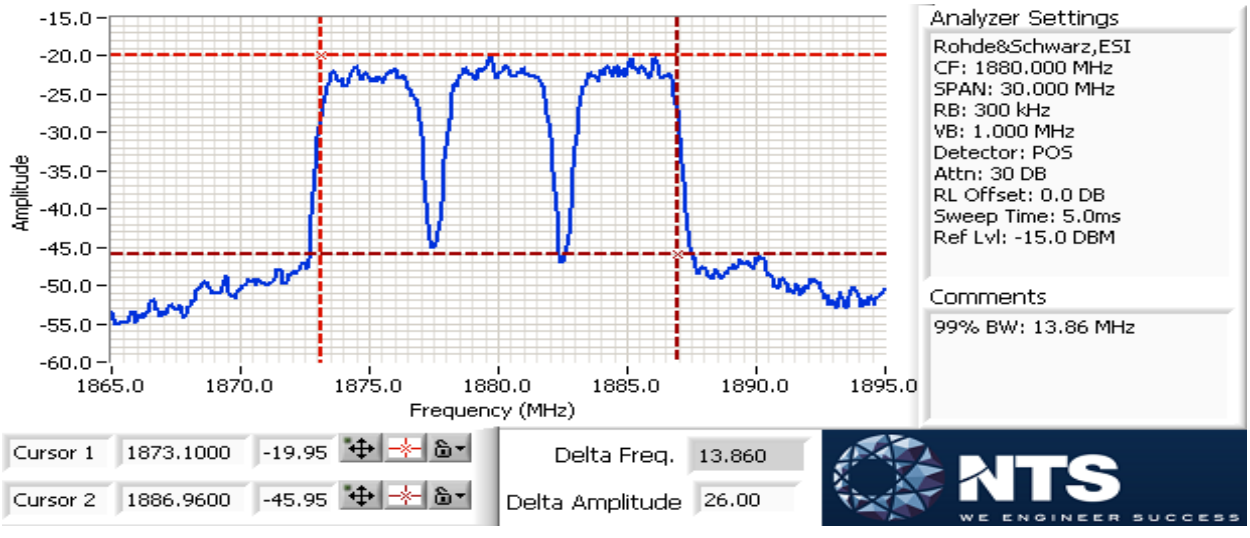
Run #2: Signal Bandwidth

Date: 11/21/12 Engineer: M. Birgani Location: FT Chamber #7

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 26dB	99%
Max	1857.4	300kHz	14.79	13.80
Max	1880.0	300kHz	14.79	13.86
Max	1902.6	300kHz	14.55	13.80

Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB





Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

Run #3: Out of Band Spurious Emissions, Radiated

Date of Test: 11/21/2012 Config. Used: 1
Test Engineer: David Bare Config Change: None
Test Location: FT Ch#7 EUT Voltage: 120V/60Hz
Conducted limit (dBm): -13
Approximate field strength limit @ 3m: 82.3 dBuV/m

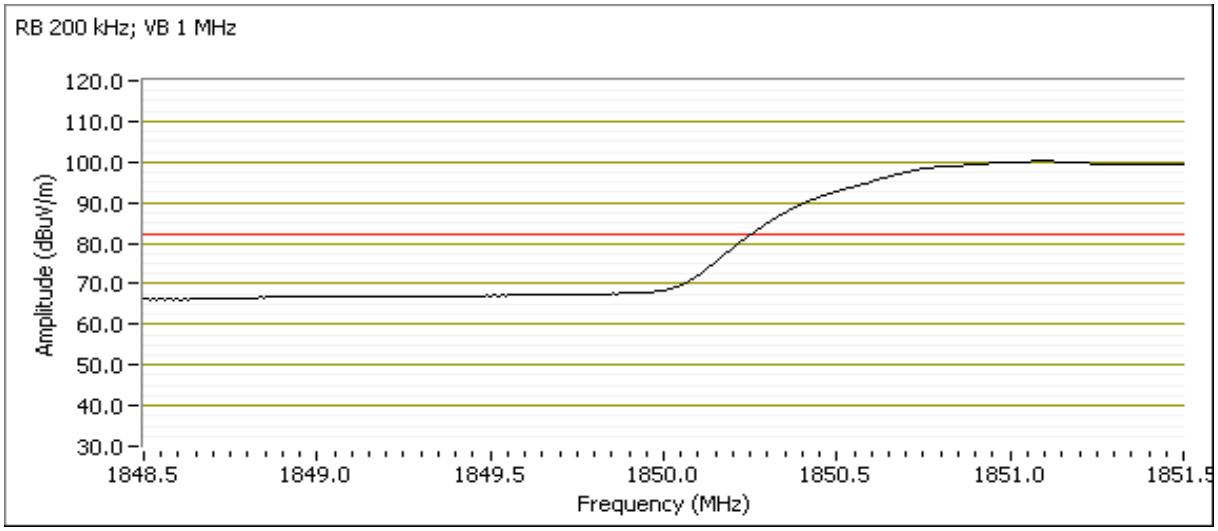
The limit is taken from FCC § 24.238, (1 MHz RB and 3 MHz VB). For BE plots 200kHz RB and 1MHz VB were used as RB can be 1% of the 26dB emissions bandwidth within 1 MHz of the channel edge. FCC § 24.238 does not specify the detector type but power may be made using average so an RMS detector was used for the out of band emisisons.

Run #3a - Final measurements

Date: 12/3/2012 Engineer: Deniz Demirci Location: FT Ch# 5

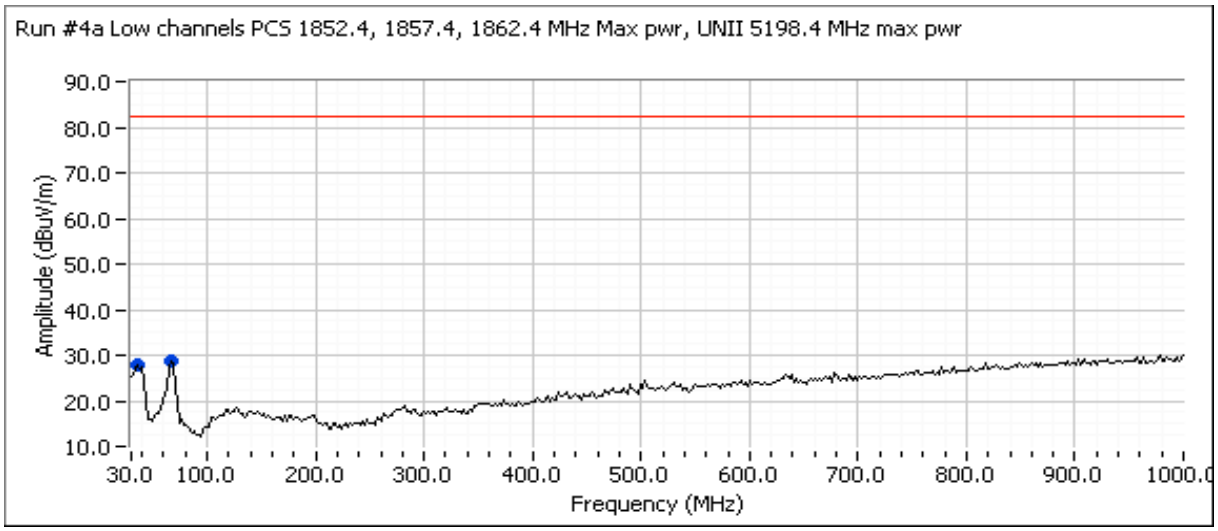
Plots for low channel, power setting = max

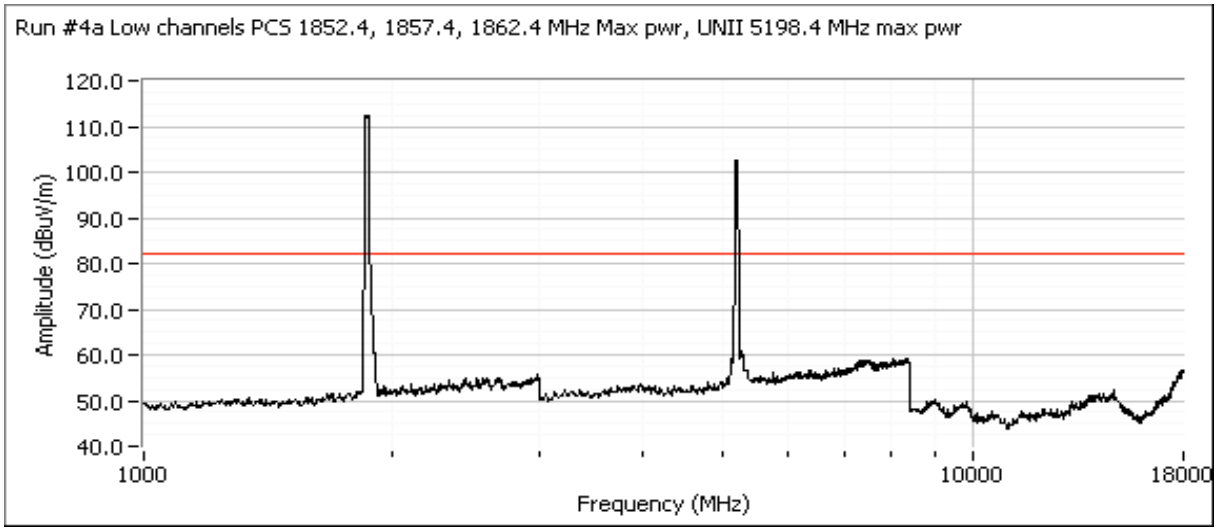
Bandedge



RMS detector 10 second sweep

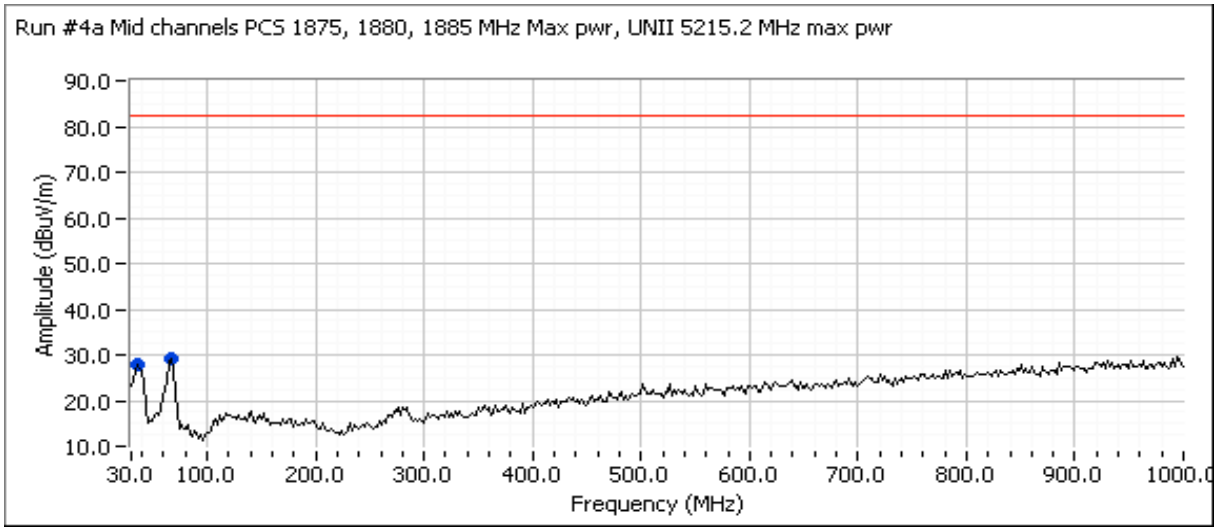
Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

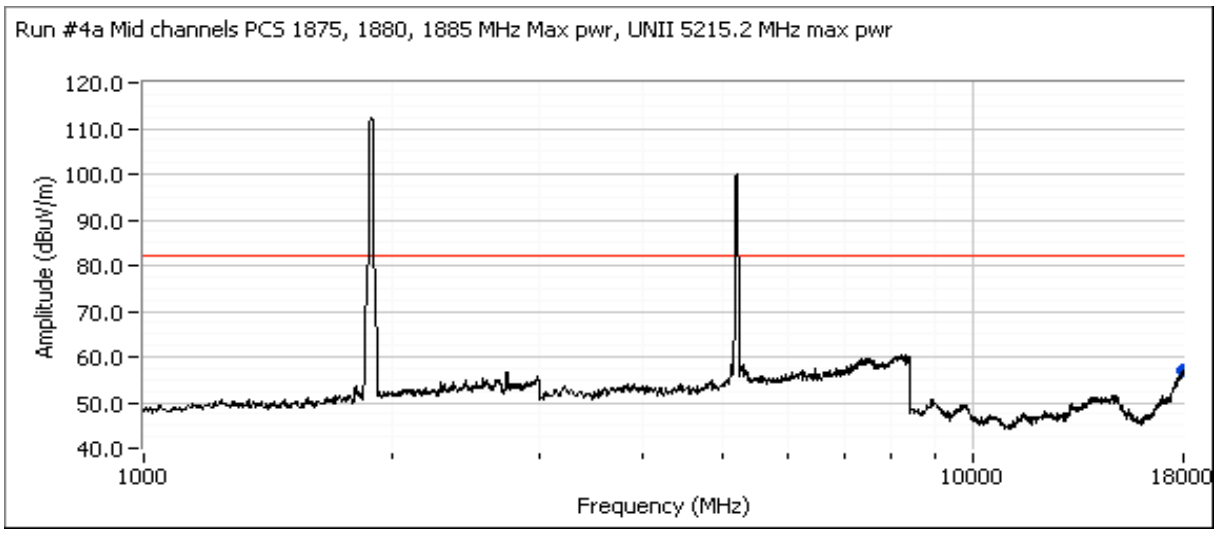




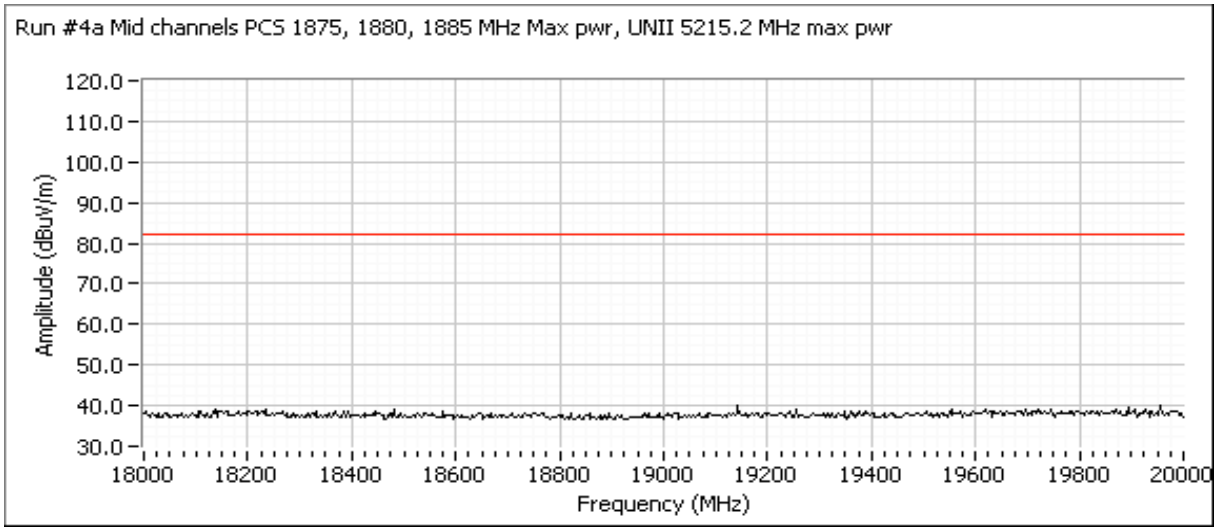
Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

Plots for center channel, power setting = Max



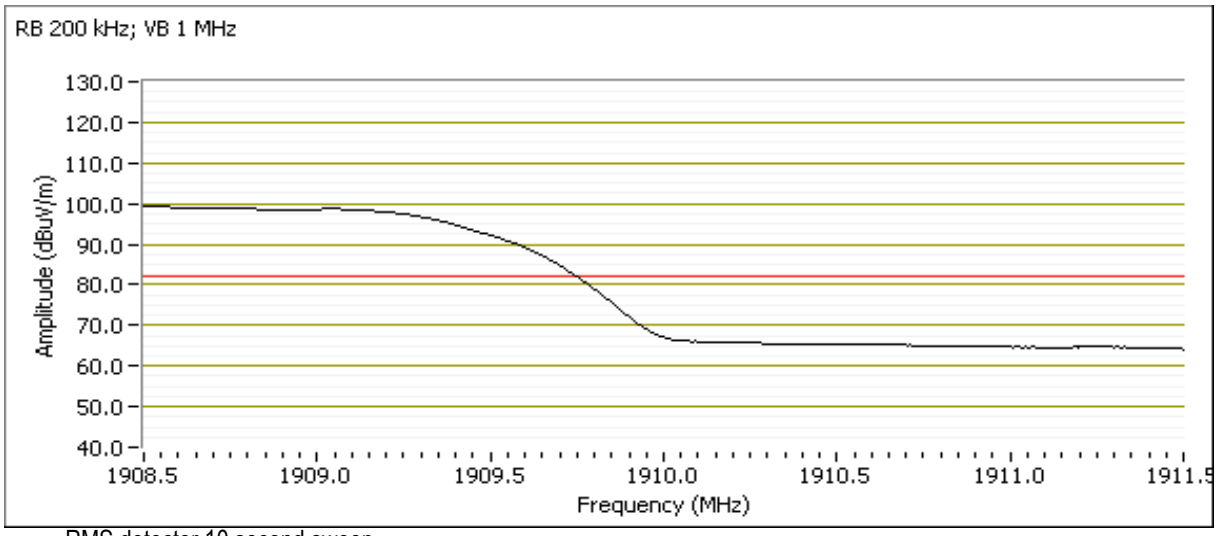


Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A



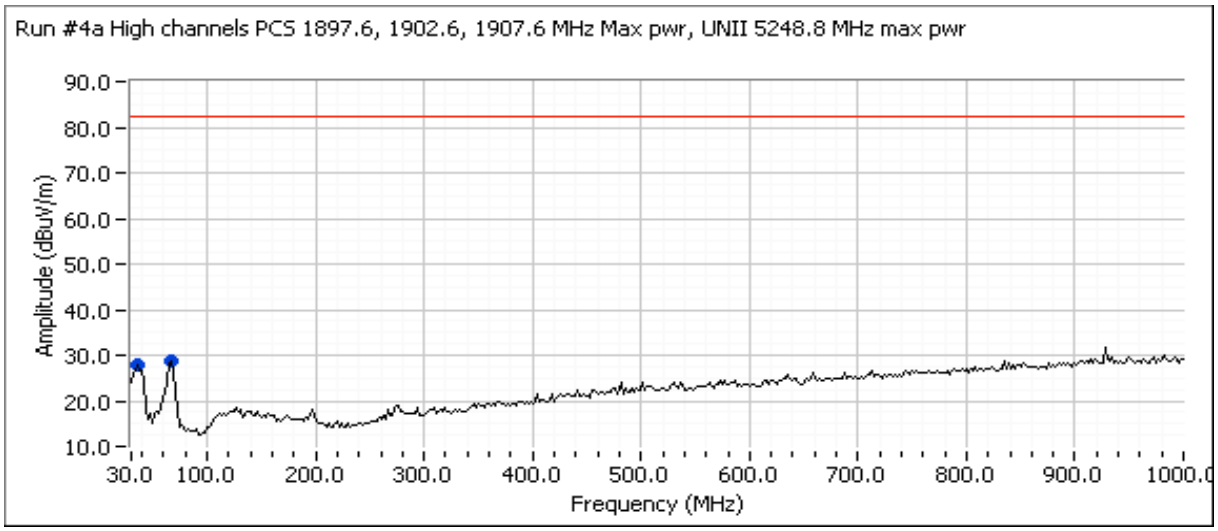
Plots for high channel, power setting = Max

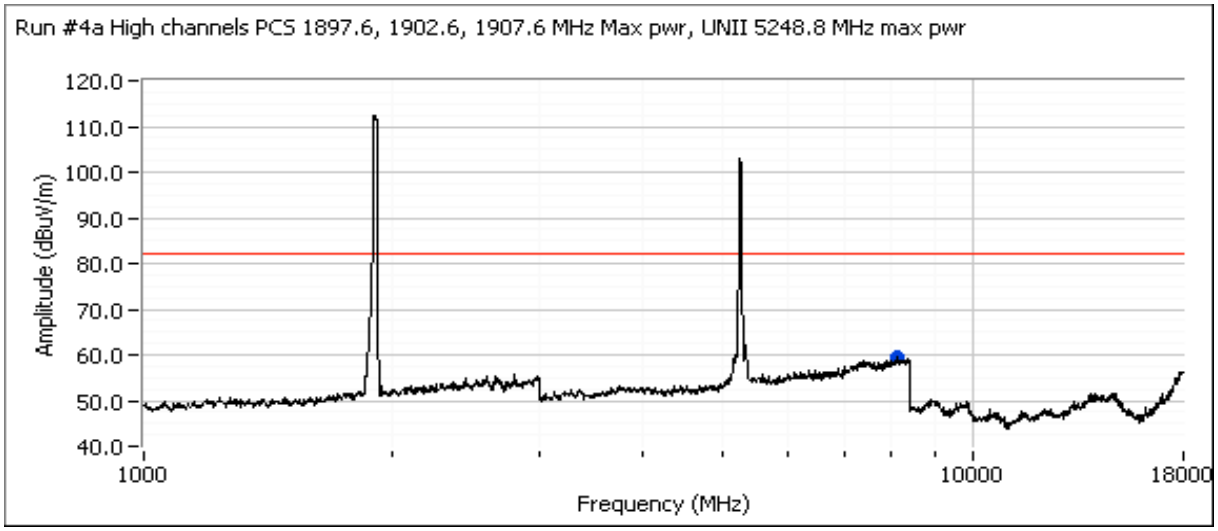
Bandedge



RMS detector 10 second sweep

Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A





Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

Run #3b: - Final Field Strength and Substitution Measurements

EUT Field Strength

Frequency	Level	Pol	FCC 27.53		Detector	Azimuth	Height	Comments	Channel
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
Band edge									
1850.000	70.4	V	82.2	-11.8	RMS	174	1.0	RMS; RB 200 kHz; VB: 1 MHz	
1910.000	66.7	V	82.2	-15.5	RMS	174	1.0	RMS; RB 200 kHz; VB: 1 MHz	
Low channel									
8391.000	58.3	V	82.2	-23.9	Pk	45	1.0	Noise floor	
Center channel									
2746.670	56.7	V	82.2	-25.5	Pk	186	1.5	POS; RB 1 MHz; VB: 3 MHz	
High Channel									
8139.000	59.4	H	82.2	-22.8	Pk	334	2.0	Noise floor	

Note 1:	The field strength limit in the tables above was calculated from the erp/eirp limit detailed in the standard using the free space propagation equation: E=√(30PG)/d. This limit is conservative - it does not consider the presence of the ground plane and, for erp limits, the dipole gain (2.2dBi) has not been included. The erp or eirp for all signals with less than **20dB** of margin relative to this field strength limit is determined using substitution measurements.
Note 2:	Measurements are made with the antenna.
Note 3:	Measurement between 18 GHz to 20 GHz was performed at center channels of PCS and UNII. There is no spurious emission observed, hence low channel and high channel measurements omitted

Substitution measurements

Date: 12/6/12 Engineer: Deniz Demirci

Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	FS[5]	eirp (dBm)	erp (dBm)	dBm	dBm	dB
1850.000	-20.0	8.3	84.9	96.6	70.4	-26.2	-28.4		-13.0	-15.4
1910.000	-20.0	8.1	84.4	96.3	66.7	-29.6	-31.8		-13.0	-18.8

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.
Note 5:	EUT field strength as measured during initial run.

Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

RSS 139 and FCC Part 27

Power, Occupied Bandwidth and 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.

General Test Configuration

With the exception of the radiated spurious emissions tests, all measurements are made with the EUT's rf port connected to the measurement instrument via an attenuator or dc-block if necessary. All amplitude measurements are adjusted to account for the attenuation between EUT and measuring instrument. 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: 15-20 °C

Rel. Humidity: 40-50 %

Summary of Results

Run #	Spacing	Test Performed	Limit	Pass / Fail	Result / Margin
1		Output Power	-	-	27.6 dBm EIRP
2		99% and 26 dB Bandwidth	-	-	99% BW: 13.80 MHz 26 dB BW: 14.73 MHz
3		Spurious emissions	-13 dBm	Pass	-26.7 dBm @ 1710 MHz (- 13.7 dB)

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:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

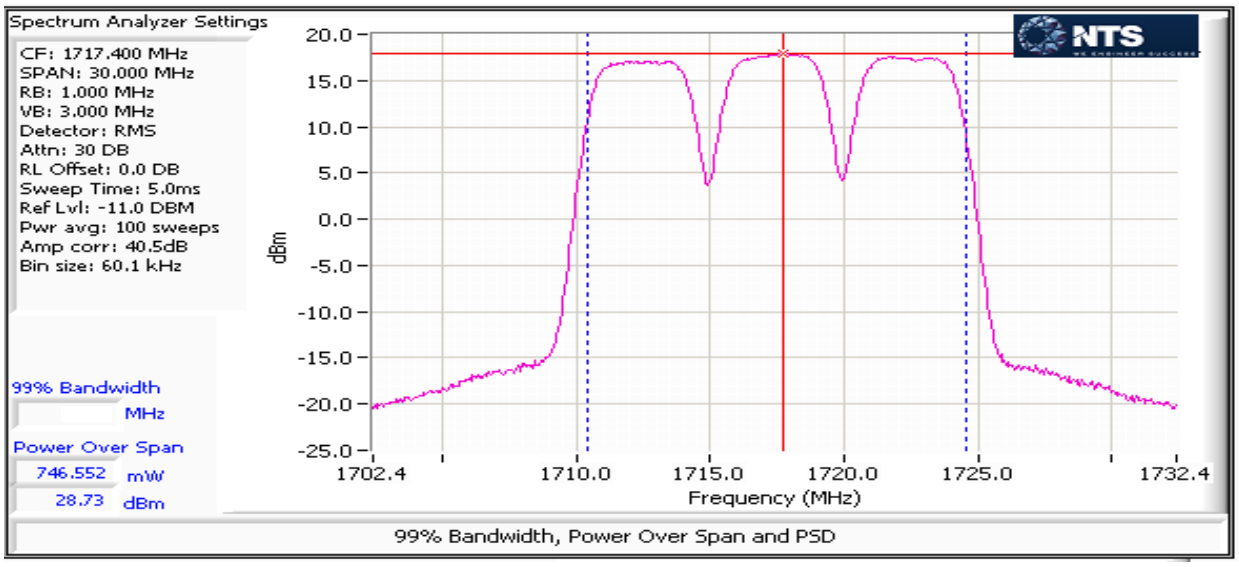
Run #1: Output Power (radiated) and substitution

Date: 11/21/12 Engineer: M. Birgani Location: FT Chamber #7

Substitution measurements
Date: 12/6/12 Engineer: Deniz Demirci

Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	Measured (dBm)[5]	eirp[6] (dBm)	mW	dBm	dBm	dB
1717.4	10.0	8.8	115.5	96.7	28.7	27.2	524.8			
1732.4	10.0	8.7	115.3	96.6	29.0	27.6	575.4			
1747.6	10.0	8.6	115.7	97.1	28.6	26.7	467.7			

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to adjust radiated power measurements taken to radiated power, including the presence of the ground plane
Note 5:	EUT power is measured with integrated power over span function using calculated free space conversion factor of E=√(30PG)/d. This conversion does not consider the presence of the ground plane
Note 6:	Adjusted eirp level using substitution measurement with the free space factor (95.2) used for the calculation



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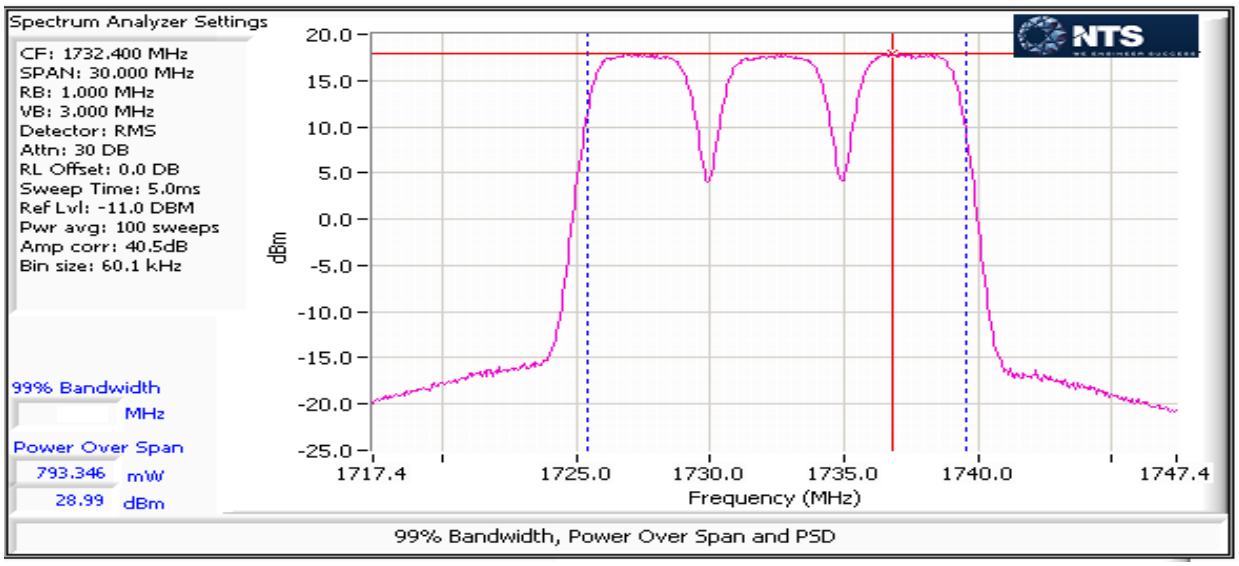
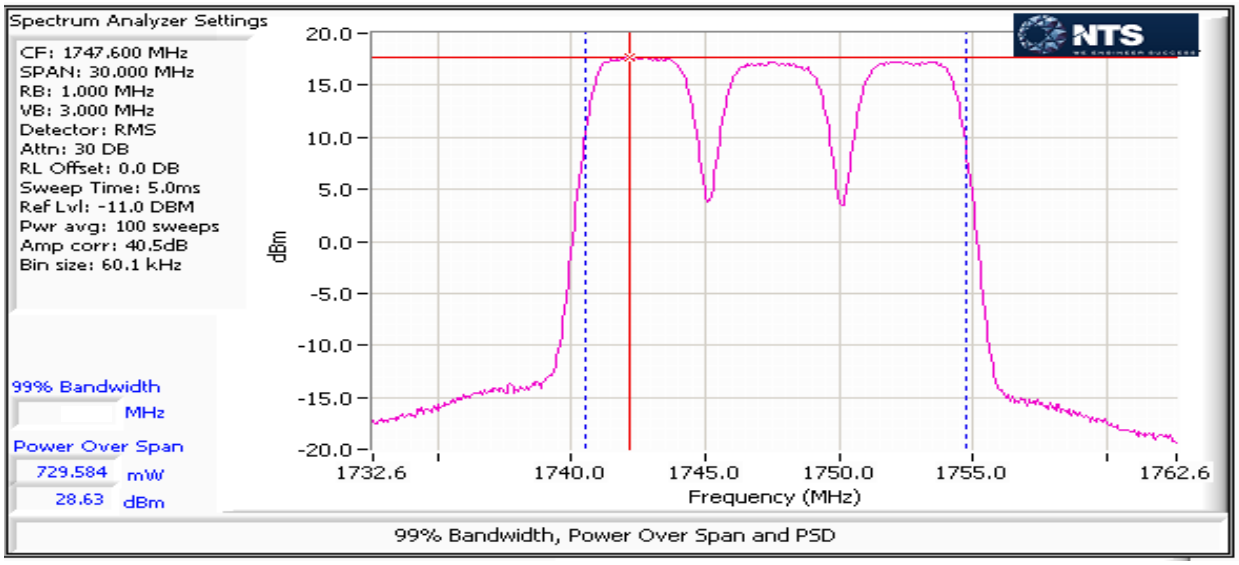
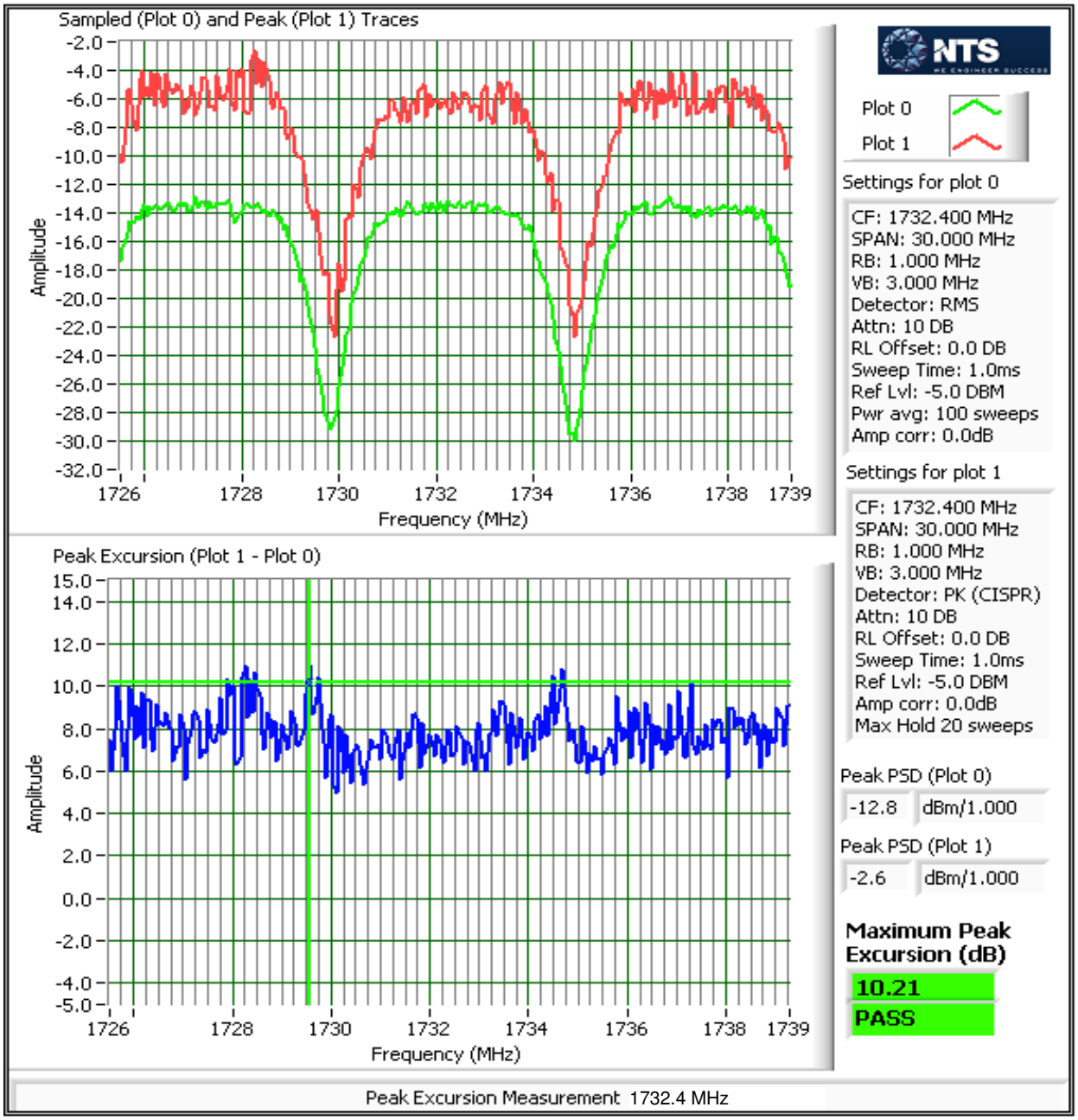
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A





Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

Run #1b: Peak to average ratio



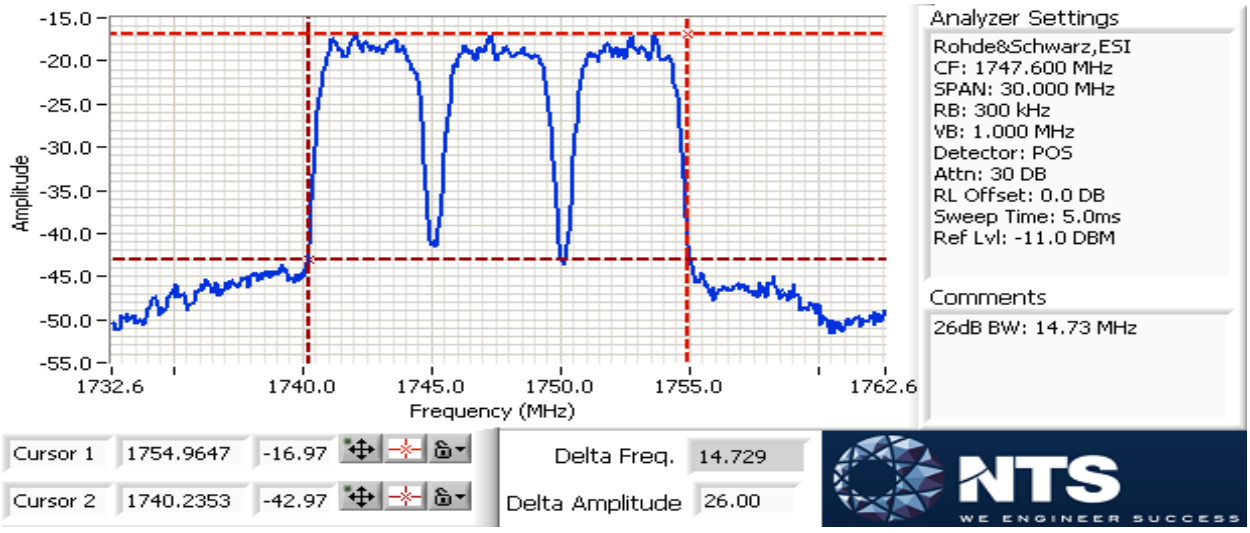
Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

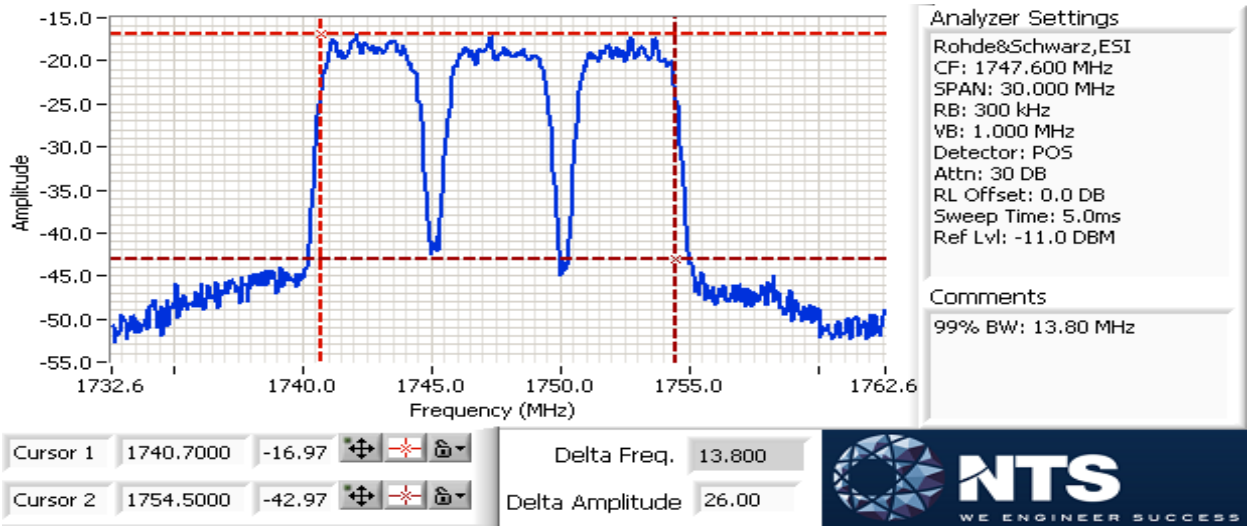
Run #2: Signal Bandwidth

Date: 11/21/12 Engineer: M. Birgani Location: FT Chamber #7

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 26dB	99%
Max	1717.4	300kHz	14.67	13.80
Max	1732.4	300kHz	14.67	13.80
Max	1747.6	300kHz	14.73	13.80

Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB





Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

Run #3: Out of Band Spurious Emissions, Radiated

Date: 11/21/2012 Engineer: David W. Bare Location: Fremont Ch #7

Conducted limit (dBm): -13

Approximate field strength limit @ 3m: 82.3 dBuV/m

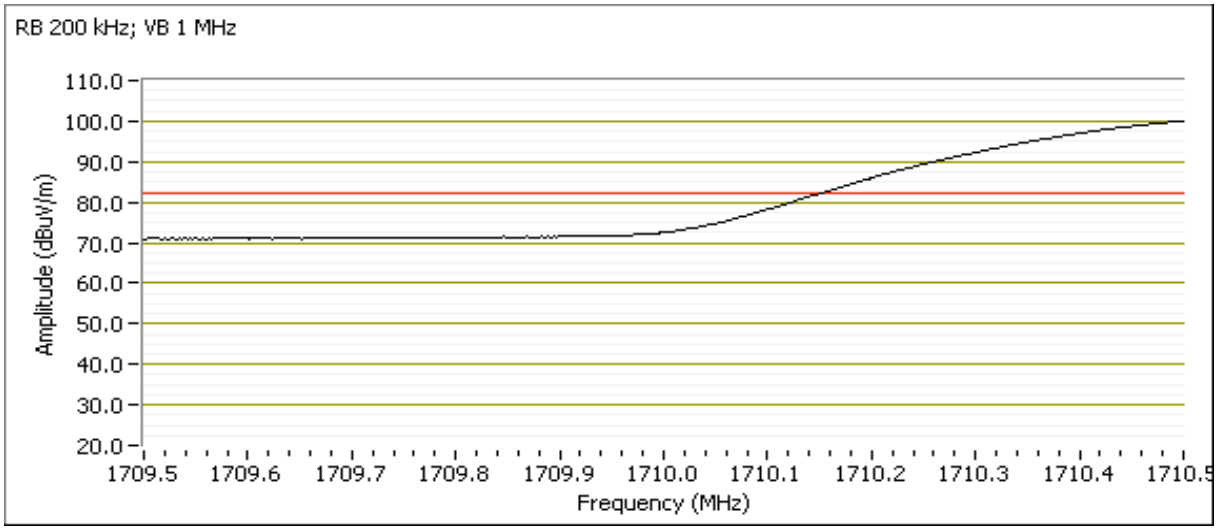
The limit is taken from FCC § 27.53(h), (1 MHz RB and 3 MHz VB). For BE plots 200kHz RB and 1MHz VB were used as RB can be 1% of the 26dB emissions bandwidth within 1 MHz of the channel edge. FCC § 27.53 specifies the detector type as either peak or average depending on the detector used for power measurments so an RMS detector was used for the out of band emisisons. EUT was transmitting on 3 channels simultaneously, at full power on each channel: 1712.5, 1717.5, 1722.5 MHz.

Run #3a - Final measurements

Date: 12/3/2012 Engineer: Deniz Demirci Location: FT Ch# 5

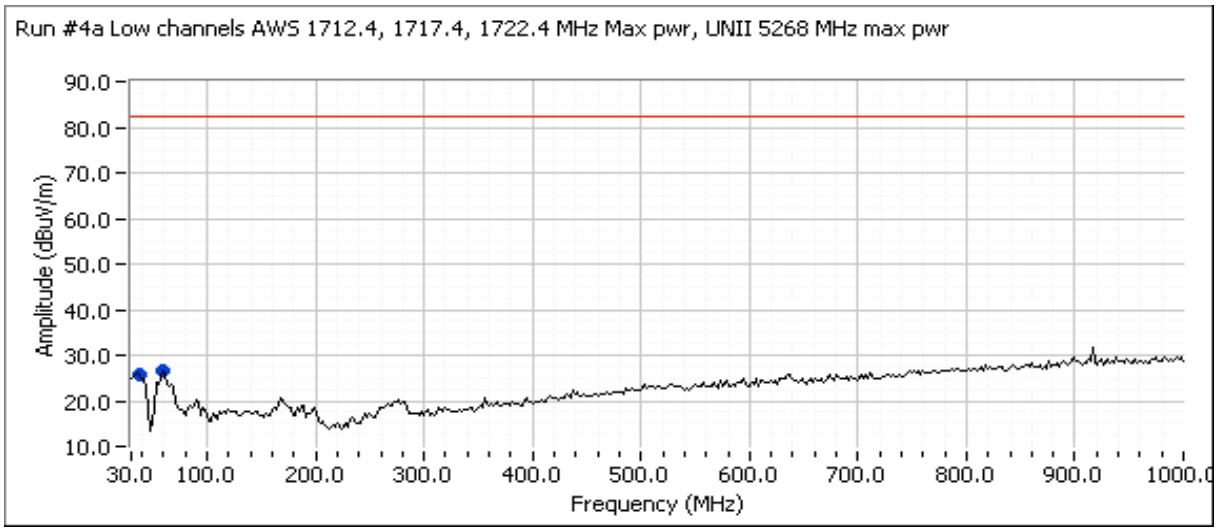
Plots for low channel, power setting = max

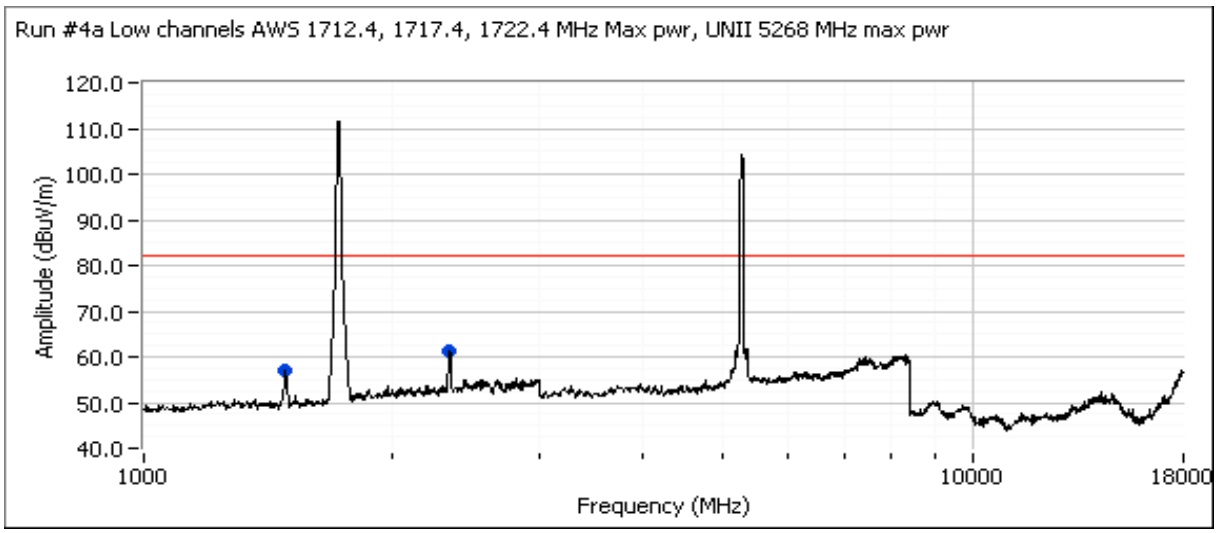
Bandedge



RMS detector 10 second sweep

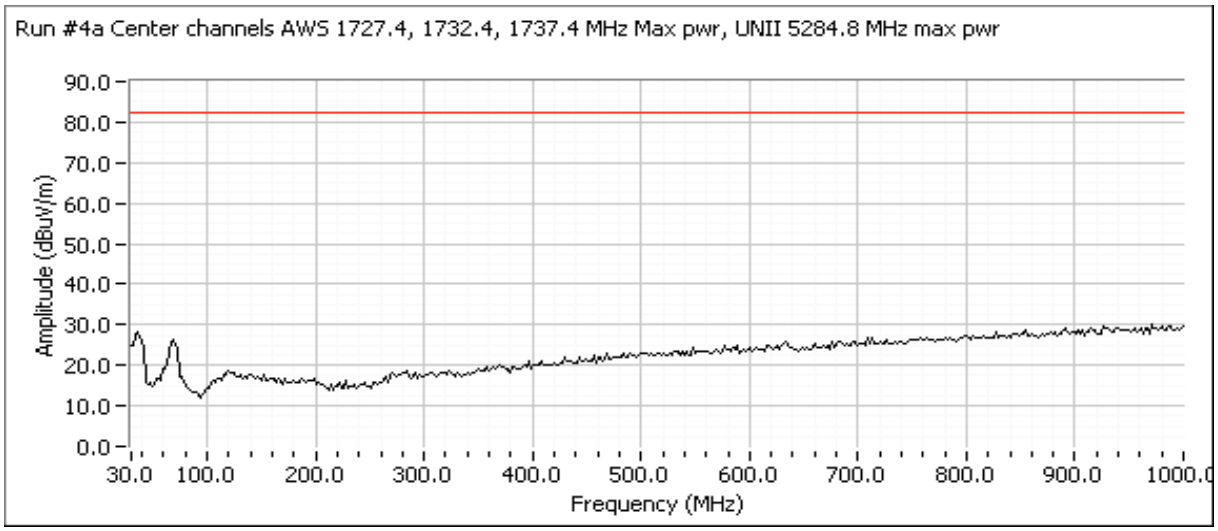
Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

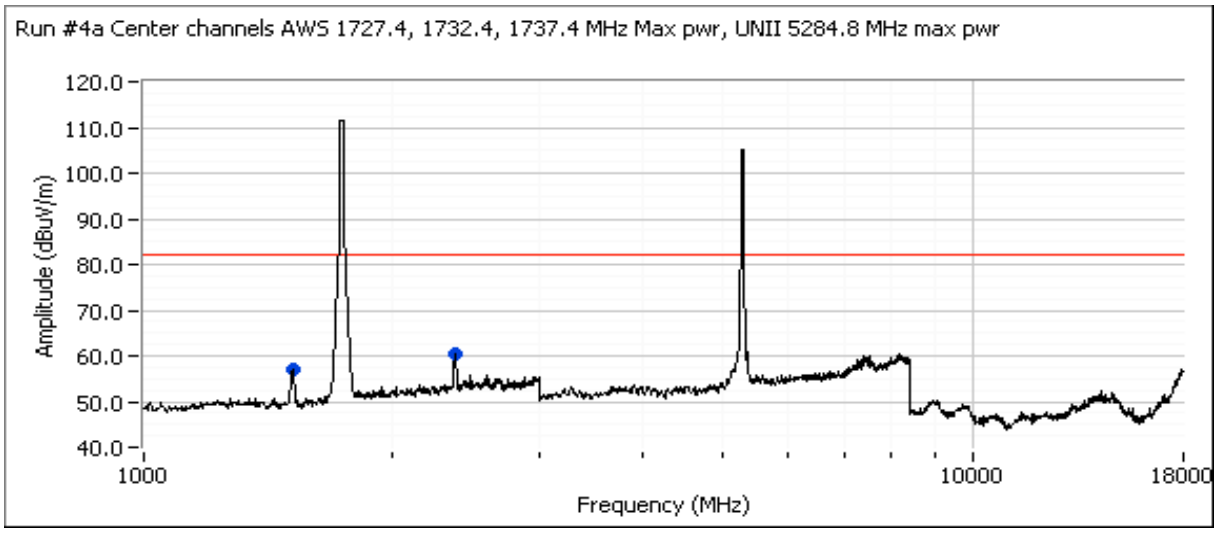




Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

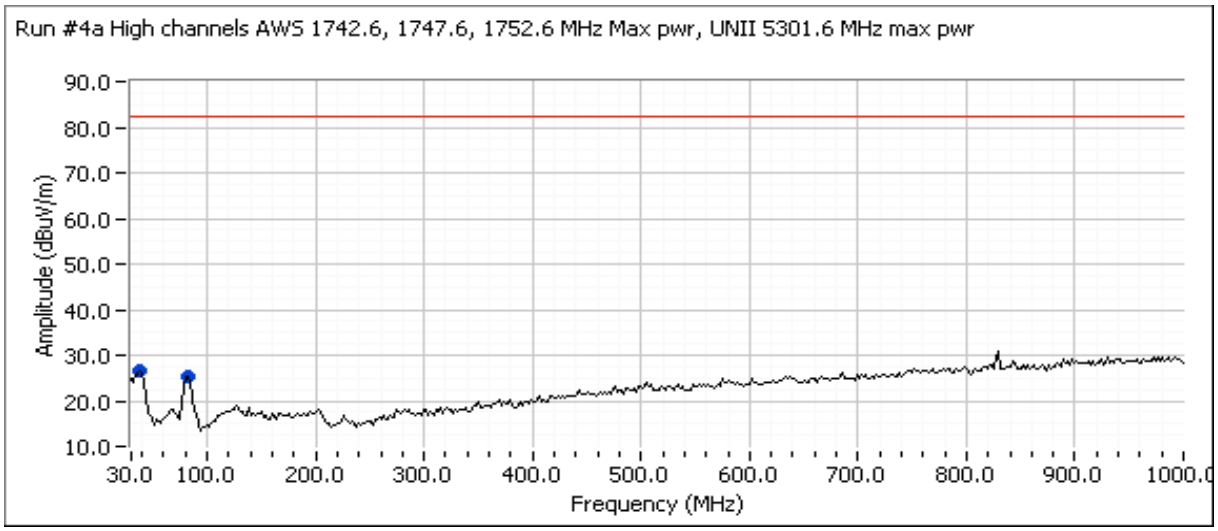
Plots for center channel, power setting = Max

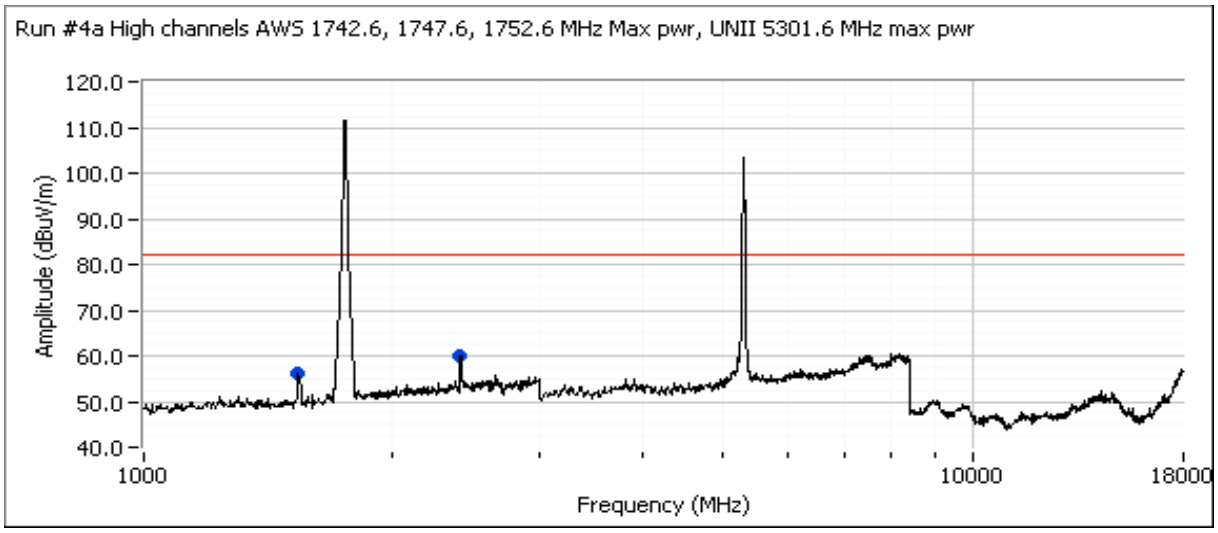




Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

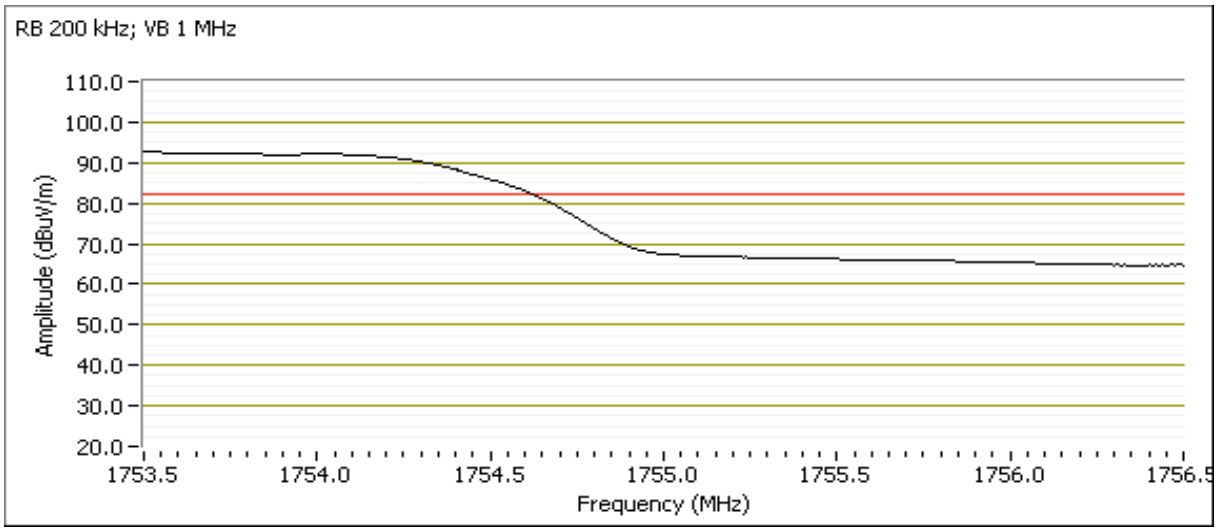
Plots for high channel, power setting = Max





Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

Bandedge



RMS detector 10 second sweep

Client:	Nextivity, Inc.	Job Number:	J89693
Model:	CELFI-RS224WU	T-Log Number:	T89741
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

Run #3b: - Final Field Strength Measurements and Substitution Measurements

EUT Field Strength

Frequency	Level	Pol	FCC 27.53		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1710.000	72.2	V	82.2	-10.0	RMS	162	1.0	RMS; RB 200 kHz; VB: 1 MHz
1755.000	69.7	V	82.2	-12.5	RMS	162	1.0	RMS; RB 200 kHz; VB: 1 MHz
Low channel								
1483.330	57.1	V	82.2	-25.1	Pk	184	1.3	POS; RB 1 MHz; VB: 3 MHz
2336.670	61.4	V	82.2	-20.8	Pk	184	1.3	POS; RB 1 MHz; VB: 3 MHz
Center channel								
1513.330	56.9	V	82.2	-25.3	Pk	196	1.3	POS; RB 1 MHz; VB: 3 MHz
2380.000	60.5	V	82.2	-21.7	Pk	185	1.3	POS; RB 1 MHz; VB: 3 MHz
High Channel								
1536.670	56.3	V	82.2	-25.9	Pk	189	1.2	POS; RB 1 MHz; VB: 3 MHz
2410.000	60.1	V	82.2	-22.1	Pk	192	1.2	POS; RB 1 MHz; VB: 3 MHz

Note 1:	The field strength limit in the tables above was calculated from the erp/eirp limit detailed in the standard using the free space propagation equation: $E=\sqrt{(30PG)}/d$. This limit is conservative - it does not consider the presence of the ground plane and, for erp limits, the dipole gain (2.2dBi) has not been included. The erp or eirp for all signals with less than **20dB** of margin relative to this field strength limit is determined using substitution measurements.
Note 2:	Measurements are made with the antennas.

Substitution measurements

Date: 12/6/12 Engineer: Deniz Demirci

Frequency	Substitution measurements			Site	EUT measurements			eirp Limit	erp Limit	Margin
MHz	Pin[1]	Gain[2]	FS[3]	Factor[4]	FS[5]	eirp (dBm)	erp (dBm)	dBm	dBm	dB
1710.000	-20.0	8.8	85.5	96.7	72.2	-24.5	-26.7		-13.0	-13.7
1755.000	-20.0	8.6	85.7	97.1	69.7	-27.4	-29.6		-13.0	-16.6

Note 1:	Pin is the input power (dBm) to the substitution antenna
Note 2:	Gain is the gain (dBi) for the substitution antenna.
Note 3:	FS is the field strength (dBuV/m) measured from the substitution antenna.
Note 4:	Site Factor - this is the site factor to convert from a field strength in dBuV/m to an eirp in dBm.
Note 5:	EUT field strength as measured during initial run.

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Standard:	FCC parts 15, 24 and 27	Class:	N/A

RSS 133, RSS 139, FCC Part 24, FCC Part 27
Frequency tolerance /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.

Date of Test: 12/10/2012
Test Engineer: Deniz Demirci
Test Location: NW Chamber# 3

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

Specifications

2.1055 Measurements required: Frequency stability;
(a) The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From −30° to +50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
(d) The frequency stability shall be measured with variation of primary supply voltage as follows:
(1) Vary primary supply voltage from 85 to 115 percent of the nominal value

AWS Mode

27.54 Frequency Stability:
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency band.

PCS Mode

24.235 Frequency stability;
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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.

Test Procedure:

The thermal chamber was set to -30°C. The EUT was kept turned off while the thermal balance achieved in the chamber. A period of time sufficient to stabilize all of the components of the EUT at each temperature level was allowed prior to frequency measurements, then the EUT was turned on and set to transmit CW signal at the carrier frequency of the center channel in the bands. The frequency was measured within one minute after application of primary power to the transmitter and at interval of one minute thereafter until ten minutes have elapsed. The highest deviation of frequency was recorded at the specified temperature. This process was repeated for every 10°C of temperature steps

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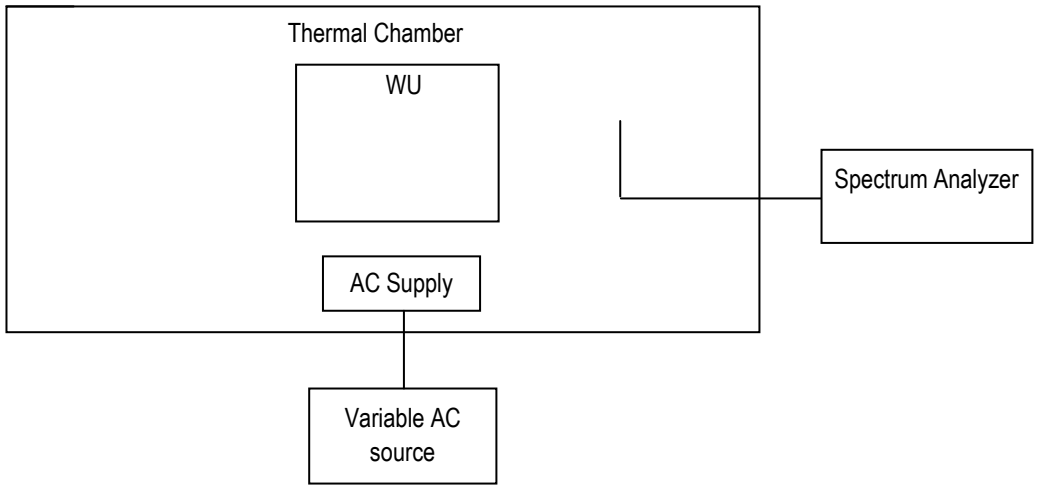
Standard:	FCC parts 15, 24 and 27	Class:	N/A

Test Setup:



Test Result:

Temperature (C)	Voltage (Vac)	AWS Carrier (MHz) 1732.4			PCS Carrier (MHz) 1880		
		Measured frequency (MHz)	Error (Hz)	Error (ppm)	Measured frequency (MHz)	Error (Hz)	Error (ppm)
20	120.00	1732.400000	0	0.00	1880.000070	70	0.04
20	102.00	1732.400000	30	0.02	1880.000040	100	0.05
20	138.00	1732.400000	30	0.02	1880.000080	60	0.03
-30	120.00	1732.399820	210	0.12	1879.999930	210	0.11
-20	120.00	1732.399930	100	0.06	1880.000000	140	0.07
-10	120.00	1732.400070	40	0.02	1880.000140	0	0.00
0	120.00	1732.400070	40	0.02	1880.000140	0	0.00
10	120.00	1732.400070	40	0.02	1880.000170	30	0.02
30	120.00	1732.400030	0	0.00	1880.000140	0	0.00
40	120.00	1732.400000	30	0.02	1880.000250	110	0.06
50	120.00	1732.401190	1160	0.67	1880.001330	1190	0.63
		Worst case:	1190	0.69	Worst case:	1330	0.71

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Contact:	Michiel Lotter		
Standard:	FCC parts 15, 24 and 27	Class:	N/A

FCC Part 24 and RSS-133 block edge compliance

Channel Frequency (MHz)	Error (Hz)	Actual Frequency (MHz)	99% BW (MHz)	Emission Extent (MHz)	Block edge (MHz)
1852.4	1330	1852.3987	4.000	1850.3987	1850.0000
1907.6	1330	1907.6013	4.000	1909.6013	1910.0000

FCC Part 27 and RSS-139 block edge compliance

Channel Frequency (MHz)	Error (Hz)	Actual Frequency (MHz)	99% BW (MHz)	Emission Extent (MHz)	Block edge (MHz)
1712.4	1190	1712.3988	4.000	1710.3988	1710.0000
1752.6	1190	1752.6012	4.000	1754.6012	1755.0000

The RF carrier frequency was also stayed within the specified reference frequency limit over the temperature and supply voltage ranges.

End of Report

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