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EMC Test Report

Application for Grant of Equipment Authorization

Industry Canada RSS-Gen Issue 3 / RSS 210 Issue 8
FCC Part 15 Subpart C

Model: P34-2/4/5/12CU

IC CERTIFICATION #:	9298A-P24512NU and 9298A-P24512CU
FCC ID:	YETP24512NU and YETP24512CU
APPLICANT:	Nextivity Inc. 12230 World Trade Drive Suite 250 San Diego, CA 92128
TEST SITE(S):	National Technical Systems - Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-3; 2845B-4, 2845B-5, 2845B-7
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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	05-02-2014	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Nextivity Inc. model P34-2/4/5/12CU, pursuant to the following rules:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

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 National Technical Systems - Silicon Valley test procedures:

ANSI C63.10-2009
FCC DTS Measurement Guidance KDB558074

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

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

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.

OBJECTIVE

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

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

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.).

Testing was performed only on model P34-2/4/5/12CU.

STATEMENT OF COMPLIANCE

The tested sample of Nextivity Inc. model P34-2/4/5/12CU complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

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.

The test results recorded herein are based on a single type test of Nextivity Inc. model P34-2/4/5/12CU and therefore apply only to the tested sample. The sample was selected and prepared by Michiel Lotter of Nextivity Inc.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6 dB Bandwidth	28.4 MHz	> 500 kHz	Complies
15.247 (b)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	19.4 dBm (87 mW) EIRP = 349.1 mW	1 Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	-3.9 dBm/100 kHz	Maximum permitted is 8 dBm/3 kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions –30 MHz – 40 GHz	Radiated Measurements performed	< -30 dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30 MHz – 40 GHz	36.5 dBµV/m @ 37.84 MHz (-3.5 dB)	15.207 in restricted bands, all others <-30 dBc Note 2	Complies
Note 2: Limit of -30 dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).					

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	The antenna is integral to the device.	Unique or integral antenna required	Complies
15.207	RSS GEN Table 4	AC Conducted Emissions CU	45.6 dBµV @ 0.466 MHz	Page 18	Complies (- 1.0 dB)
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	N/A	Page 19	N/A
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	MPE calculations in separate exhibit, RSS 102 declaration and User Manual statements.	OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.3	User Manual		Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.2	User Manual		Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.6.1	99% Bandwidth		Information only	N/A

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 and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Nextivity Inc. model P34-2/4/5/12CU is a part of WCDMA/LTE Cellular Repeater system for indoor residential use. The system is composed of two units, the Network Unit (NU) 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 5 MHz cellular channels) over a 30 MHz and 40 MHz channel in each direction.
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 12 Volts DC, 1.66 A. The AC Adapter rating is 100-240 V, 0.7 A (Max), 47-63 Hz.

The sample was received on December 9, 2013 and tested on December 9, 10, 11 and 12, 2013 and April 17, 2014. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Nextivity Inc.	P34-2/4/5/12CU	Coverage Unit (CU)	171341000100	-
Hon-Kwang	HK-AB-120A250-US	Power supply	DA0000057	-

ANTENNA SYSTEM

The antenna is integral to the device.

OTHER EUT DETAILS

Frequency List of EUT

EUT	Tx Frequency (MHz)	Band	Rule	DFS flag
NU	5207	5150 to 5250 MHz	U-NII-1	non-DFS
NU	5220	5150 to 5250 MHz	U-NII-1	non-DFS
NU[1]	5240	5150 to 5250 MHz	U-NII-1 + U-NII-2A	DFS
NU[1]	5260	5250 to 5350 MHz	U-NII-1 + U-NII-2A	DFS
NU	5280	5250 to 5350 MHz	U-NII-2A	DFS
NU	5293	5250 to 5350 MHz	U-NII-2A	DFS
CU	5525	5470 to 5725 MHz	U-NII-2C	DFS
CU	5540	5470 to 5725 MHz	U-NII-2C	DFS
CU	5560	5470 to 5725 MHz	U-NII-2C	DFS
CU	5580	5470 to 5725 MHz	U-NII-2C	DFS
CU[2]	5600	5470 to 5725 MHz	EUT does not operate. Terminal Doppler Weather Radars (TDWR)	
CU[2]	5620	5470 to 5725 MHz		
CU[2]	5640	5470 to 5725 MHz		
CU[2]	5660	5470 to 5725 MHz		
CU	5680	5470 to 5725 MHz	U-NII-2C	DFS
CU[3]	5715	5479 to 5725 MHz	U-NII-2C + U-NII-3	DFS
CU[3]	5735	5480 to 5725 MHz	U-NII-2C + U-NII-3	DFS
CU	5765	5725 to 5850 MHz	DTS	non-DFS
CU	5785	5726 to 5850 MHz	DTS	non-DFS
CU	5805	5727 to 5850 MHz	DTS	non-DFS
CU	5825	5728 to 5850 MHz	DTS	non-DFS
Note 1:	Emission Bandwidths of Center frequency of 5240 and 5260 MHz channels extend across 5250 MHz band edge for U-NII-2A, therefore measurements are performed per KDB 644545 D01 v01r02. DFS requirements also apply for these channels			
Note 2:	The operation of this frequency range is blocked per FCC KDB 443999 D01 Approval of DFS UNII Devices v01; Device will not transmit on channels which overlap the 5600 - 5650 MHz band to avoid Terminal Doppler Weather Radars (TDWR)			
Note 3:	Emission Bandwidths of Center frequency of 5715 and 5735 MHz channels extend across 5725 MHz band edge for U-NII 2C, therefore FCC 15.407 U-NII band rules apply for these channels per KDB 644545 D01 v01r02. DFS requirements also apply for these channels			

ENCLOSURE

The P34-2/4/5/12CU enclosure is primarily constructed of plastic. It measures approximately 157 mm H x 145 mm W x 58 mm D.

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.

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
External pwr supply in	AC Mains	Direct plug-in	NA	NA

Note 1: DELL Latitude D830 Laptop and Nextivity Chart Interface (V:2.0.0.2) software was used to configure the EUT's. The laptop was not connected during the tests.

EUT OPERATION

The EUT's were configured per the frequency list detailed in the EUT description with maximum rated RF power

TEST SITE

GENERAL INFORMATION

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

Site	Designation / Registration Numbers		Location
	FCC	Canada	
Chamber 4	US0027	2845B-4	41039 Boyce Road Fremont, CA 94538-2435

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.10. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 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. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20 Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000 MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a 50 µH Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 µH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

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

ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

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. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.10 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be 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 as specified in ANSI C63.4. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.10, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

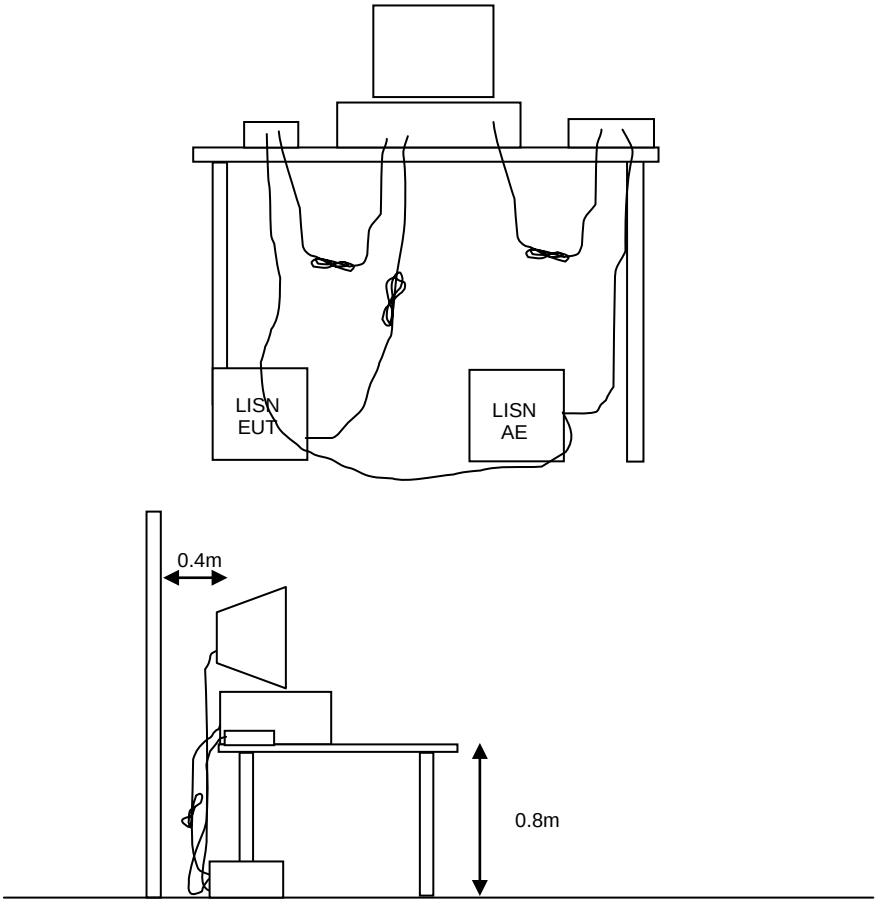


Figure 1 Typical Conducted Emissions Test Configuration

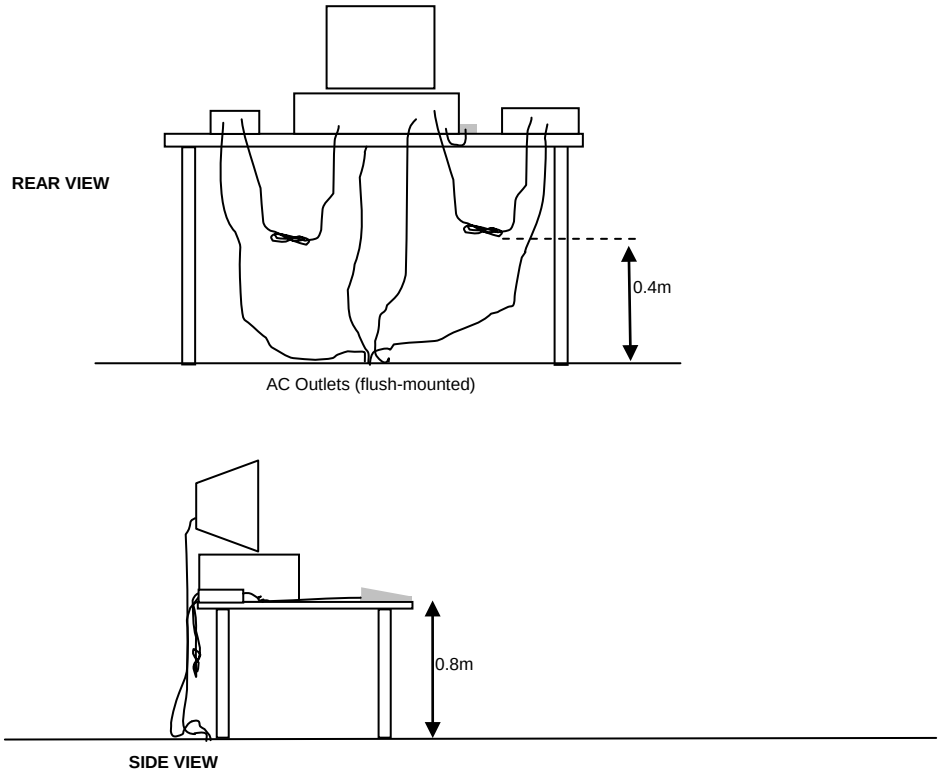
RADIATED EMISSIONS

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

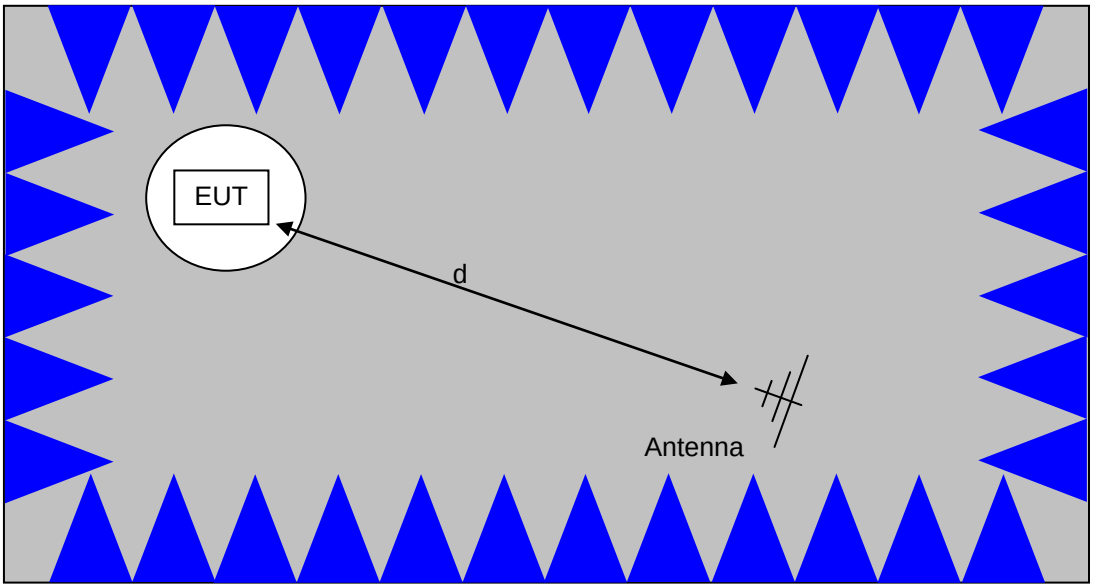
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1 m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

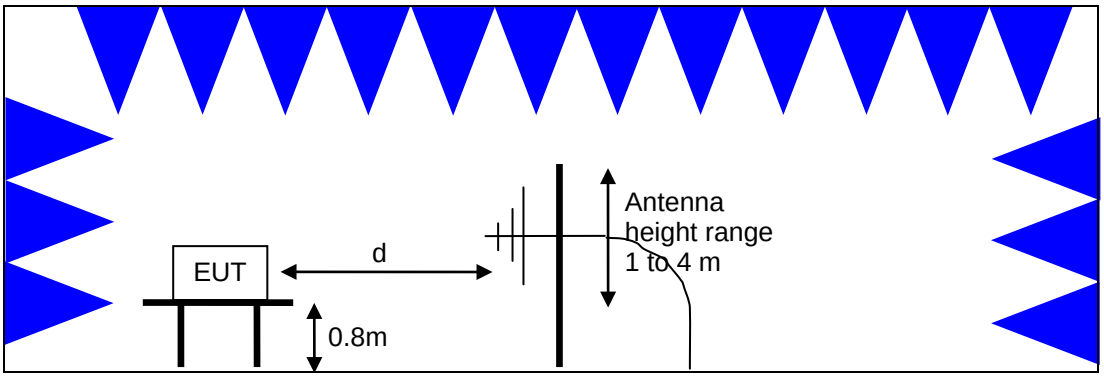


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

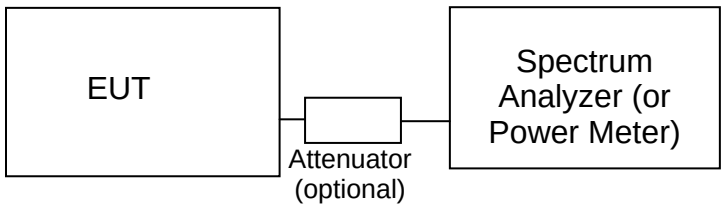
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, Plan and Side Views

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed, where possible, with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.



Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and NTS Silicon Valley's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

BANDWIDTH MEASUREMENTS

The 6 dB, 20 dB, 26 dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and RSS GEN.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBµV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBµV/m). The results are then converted to the linear forms of µV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBµV)	Quasi Peak Limit (dBµV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1] (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

Frequency Range (MHz)	Limit (μV/m)	Limit (dBμV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

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 (μV/m @ 3m)	Limit (dBμV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

[1] The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3 kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3 kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3 kHz

The maximum permitted output power is reduced by 1 dB for every dB the antenna gain exceeds 6 dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20 dB below the level of the highest in-band signal level (30 dB if the power is measured using the sample detector/power averaging method).

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBµV

S = Specification Limit in dBµV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally 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, when used for electric field measurements above 30 MHz, is calculated 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 30 MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

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

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

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 dBµV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBµV/m

L_s = Specification Limit in dBµV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of d (meters) from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{d} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

For a measurement at 3 m the conversion from a logarithmic value for field strength (dBμV/m) to an eirp power (dBm) is -95.3 dB.

Appendix A Test Equipment Calibration Data

Radiated Emissions, 1000 - 40,000 MHz, 9-Dec-13

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/31/2014
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	6/26/2014
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2014
Hewlett Packard	High Pass filter, 8.2 GHz (Red System)	P/N 84300-80039 (84125C)	1152	8/2/2014
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/8/2014
A. H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	7/24/2014
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	9/18/2014

Radiated Emissions, 1 - 40 GHz, 11-Dec-13

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/31/2014
Hewlett Packard	Head (Inc flex cable, 1143, 2198) Red	84125C	1145	6/26/2014
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2014
Hewlett Packard	High Pass filter, 8.2 GHz (Red System)	P/N 84300-80039 (84125C)	1152	8/2/2014
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	8/20/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/8/2014
A. H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	7/24/2014
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	9/18/2014

Conducted Emissions - AC Power Ports, 17-Apr-14

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1401	5/15/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/8/2014
Com-Power	9KHz-30MHz, 50uH, 15Aac, 10Adc, max	LI-215A	2671	5/24/2014
Com-Power	9KHz-30MHz, 50uH, 15Aac, 10Adc, max	LI-215A	2672	5/24/2014

Appendix B Test Data

T94075 Pages 25 - 57

Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		-
Emissions Standard(s):	FCC Part 15.247 and RSS 210	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Nextivity Inc

Model

P34-2/4/5/12CU

Date of Last Test: 3/18/2014

Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

RSS-210 and FCC 15.247 (DTS)

Power, PSD, Peak Excursion and Bandwidth

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: 12/9/2013
Test Engineer: Deniz Demirci, Rafael Varelas
Test Location: FT Ch#4

Config. Used: 1
Config Change: None
EUT Voltage: 120 VAC

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1c	Power, 5725 - 5850 MHz	15.247	Pass	19.4 dBm (349.1 mW EIRP)
1d	PSD, 5725 - 5850 MHz	15.247	Pass	-3.9 dBm / 100 kHz
1c	6 dB Bandwidth	15.247	Pass	28.4 MHz
1c	99% Bandwidth (DTS)	RSS 210	Pass	37.1 MHz

General Test Configuration

The EUT was located on the turntable for radiated spurious emissions testing. DELL Latitude D830 Laptop and Nextivity Chart Interface (V:2.0.0.2) software was used to configure the EUT. The laptop was not connected during the tests.

The EUT was radiating through its internal antenna. The emission was maximized, & EIRP was measured as described in the notes below.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 21-24 °C
Rel. Humidity: 30-45 %

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:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

Run #1: Bandwidth, Output Power and Power Spectral Density - Single Chain Systems

Note 1:	Output power measured using a spectrum analyzer (see plots below). RBW=1 MHz, VB=3 MHz, RMS detector, Sweep Time Auto, 100 sweeps, Trigger, Free run, and power integration over 50 and 60 MHz. EUT is operating at 100% duty cycle. (UNII method SA-1 of KDB 789033 D01 v01r03 and DTS method AVGSA-1 of 558074 D01 v03r01)
Note 3:	DTS Power Spectral Density measured using a spectrum analyzer (see plots below). RBW=100 kHz, VB=300 kHz, RMS detector, Sweep Time Auto, 100 sweeps, Trigger, Free run. EUT is operating at 100% duty cycle. (DTS method AVGPSD-1 of 558074 D01 v03r01)
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	Measurements are performed with radiated emission method. Conducted power and PSD are calculated by subtracting the antenna gain from measured radiated values
Note 6:	Emission Bandwidths of Center frequency of 5715 and 5735 MHz channels extend across 5725 MHz band edge for U-NII 2C, therefore FCC 15.407 U-NII band rules apply for these channels per KDB 644545 D01 v01r02.

1c 5725- 5850 MHz Band 30 MHz Bandwidth

Frequency (MHz)	Software Setting	Output Power[1] dBm EIRP (Measured)	PSD dBm / 100kHz EIRP (Measured)
5765	-	23.3	0.4
5785	-	25.1	1.5
5825	-	25.4	2.1

Antenna Gain (dBi): 6 EIRP: 349.1 mW 25.4 dBm

Frequency (MHz)	Software Setting	Bandwidth 6 dB	Bandwidth 99%[4]	Output Power[1] dBm Calculated[5]	Output Power[1] dBm Limit	Power (Watts)	PSD[3] dBm / 100 kHz Calculated[5]	PSD[3] dBm / 100 kHz FCC Limit	PSD[3] dBm / 100 kHz RSS Limit	Result
5765	-	28.4	28.8	17.3	30.0	0.053	-5.7	8.0	8.0	Pass
5785	-	28.4	28.8	19.1	30.0	0.080	-4.5	8.0	8.0	Pass
5825	-	28.4	28.8	19.4	30.0	0.088	-3.9	8.0	8.0	Pass

1c 5725- 5850 MHz Band 40 MHz Bandwidth

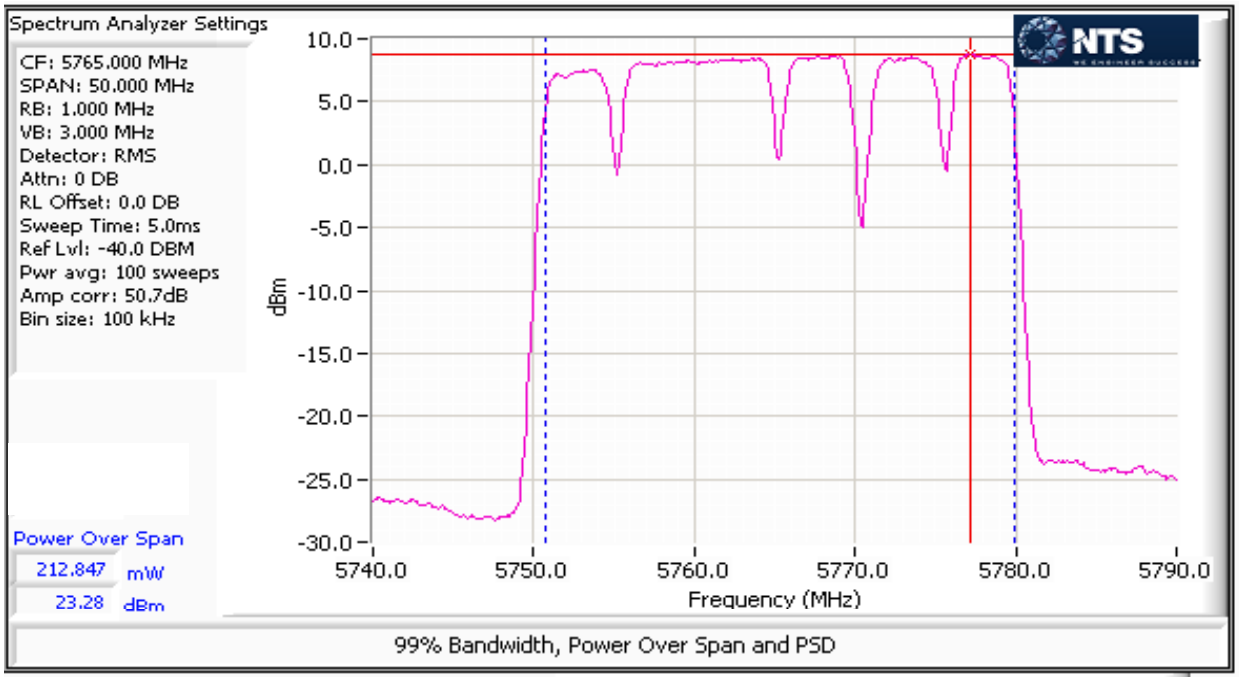
Frequency (MHz)	Software Setting	Output Power[1] dBm EIRP (Measured)	PSD dBm / 100kHz EIRP (Measured)
5765	-	23.5	-1.3
5785	-	23.5	-1.1
5825	-	23.9	0.4

Antenna Gain (dBi): 6 EIRP: 225.9 mW 23.5 dBm

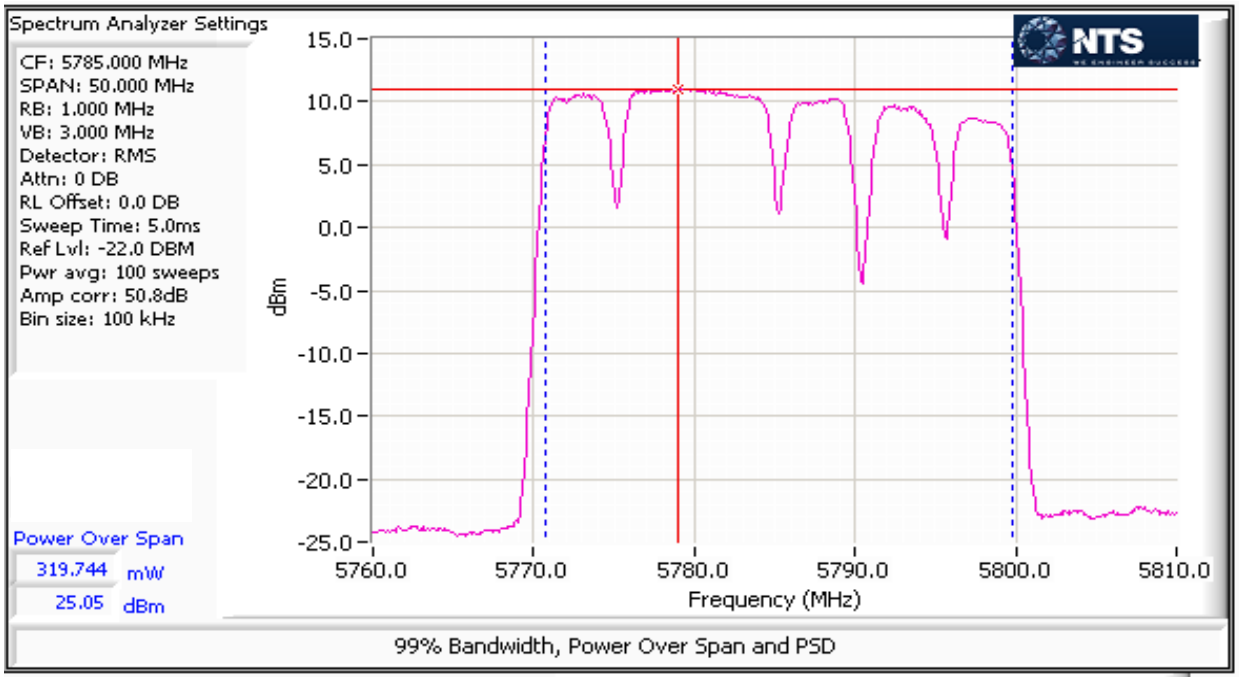
Frequency (MHz)	Software Setting	Bandwidth 6 dB	Bandwidth 99%[4]	Output Power[1] dBm Calculated[5]	Output Power[1] dBm Limit	Power (Watts)	PSD[3] dBm / 100 kHz Calculated[5]	PSD[3] dBm / 100 kHz FCC Limit	PSD[3] dBm / 100 kHz RSS Limit	Result
5765	-	36.1	37.0	17.5	30.0	0.056	-7.3	8.0	8.0	Pass
5785	-	35.0	36.8	17.5	30.0	0.057	-7.1	8.0	8.0	Pass
5825	-	36.9	37.1	17.9	30.0	0.062	-5.6	8.0	8.0	Pass

Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

CU Ch Freq 5765 MHz @ 30 MHz Bandwidth

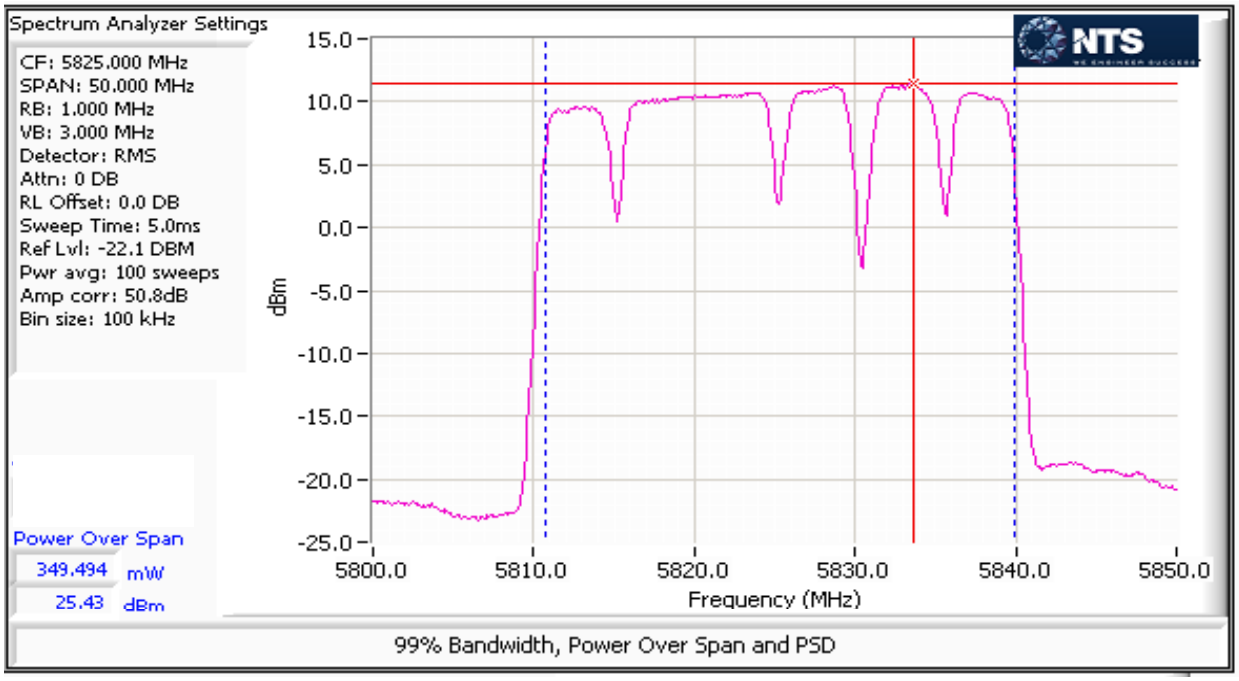


CU Ch Freq 5785 MHz @ 30 MHz Bandwidth

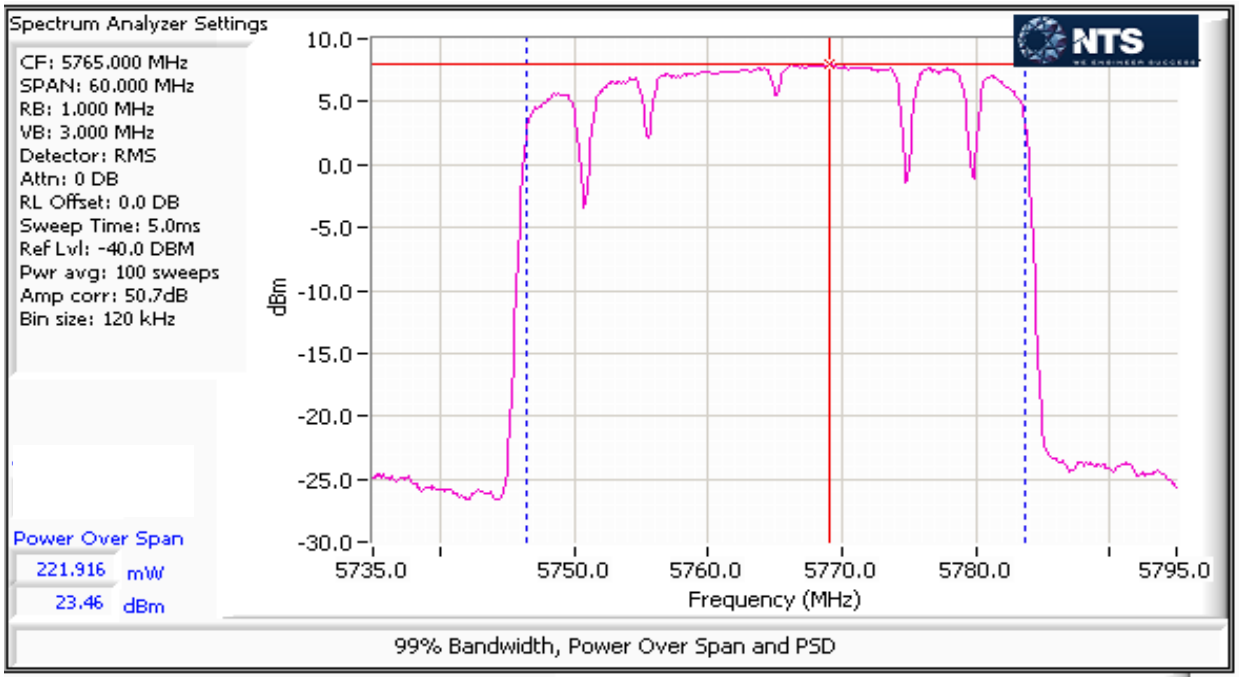


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

CU Ch Freq 5825 MHz @ 30 MHz Bandwidth

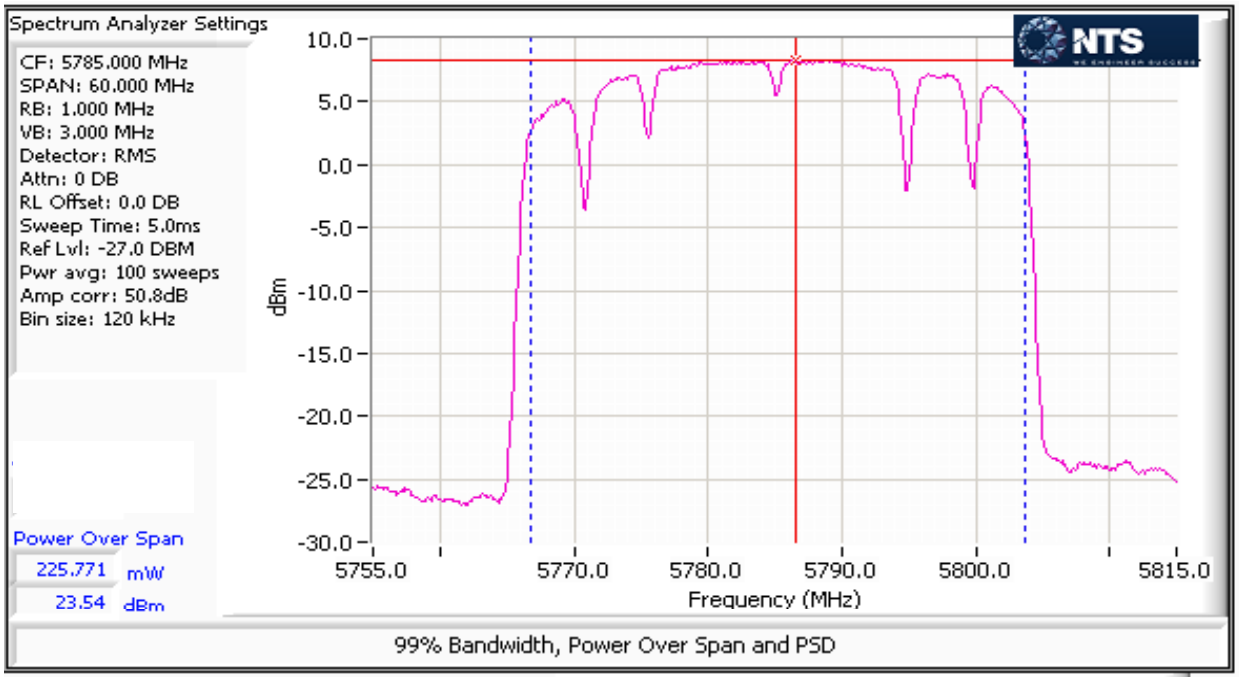


CU Ch Freq 5765 MHz @ 40 MHz Bandwidth

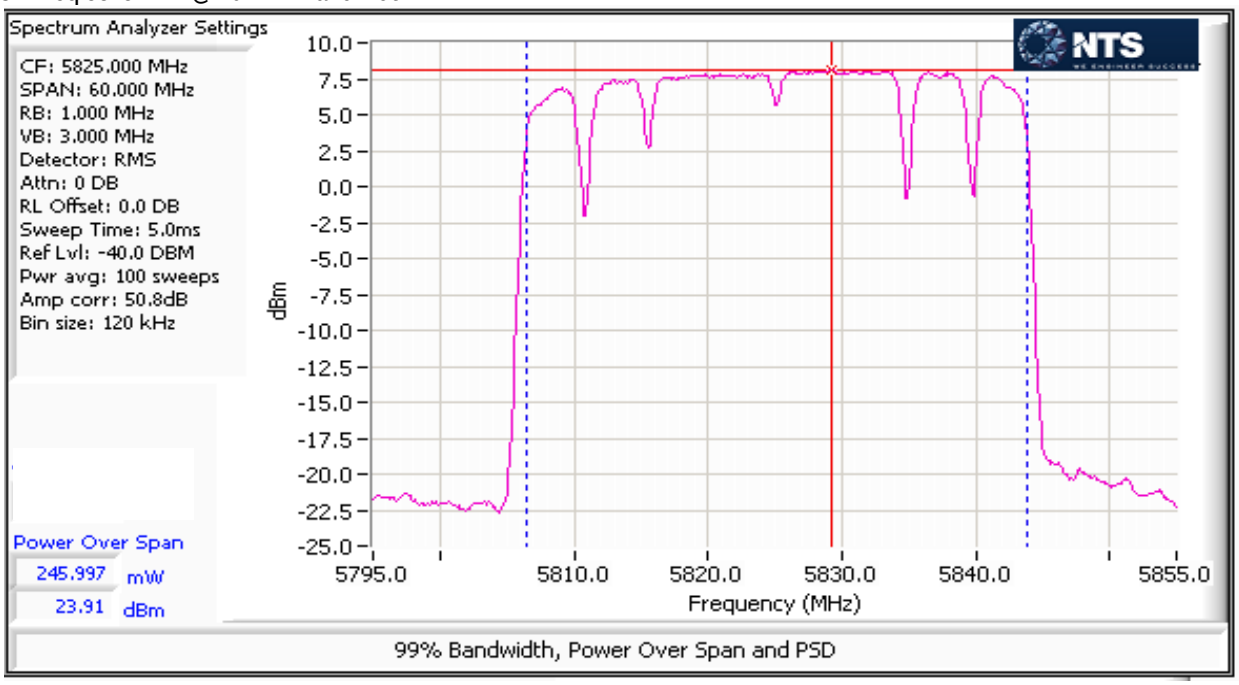


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

CU Ch Freq 5785 MHz @ 40 MHz Bandwidth

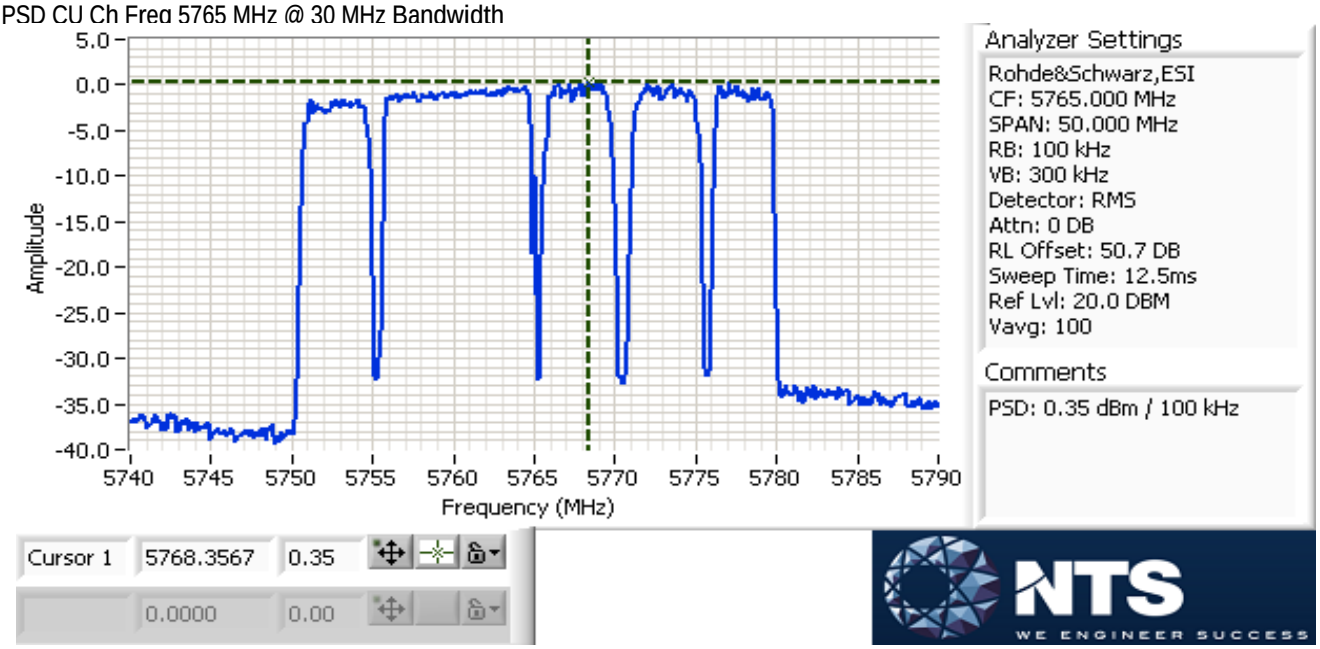


CU Ch Freq 5825 MHz @ 40 MHz Bandwidth

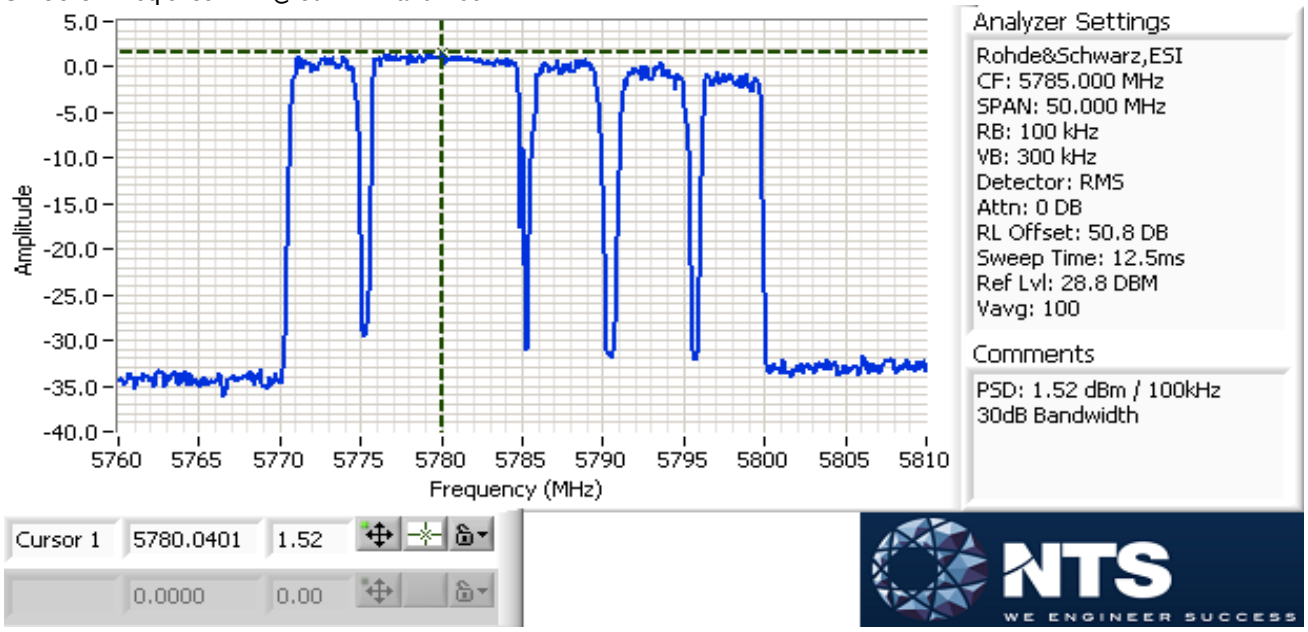


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

PSD CU Ch Freq 5765 MHz @ 30 MHz Bandwidth

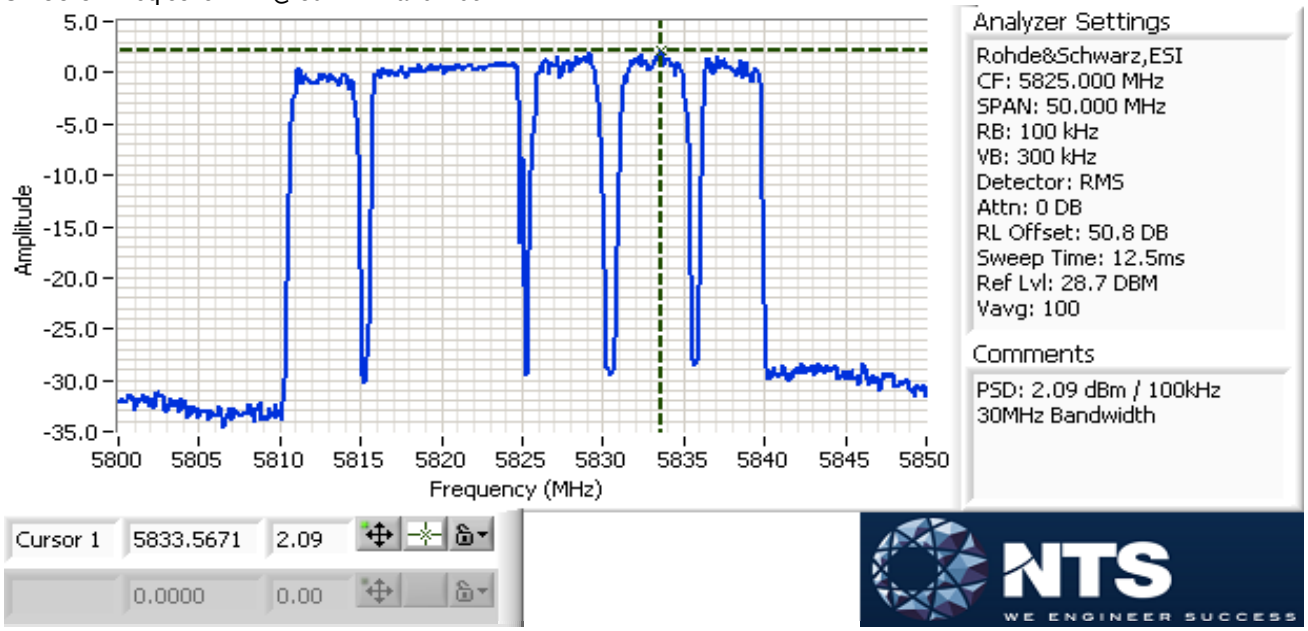


PSD CU Ch Freq 5785 MHz @ 30 MHz Bandwidth

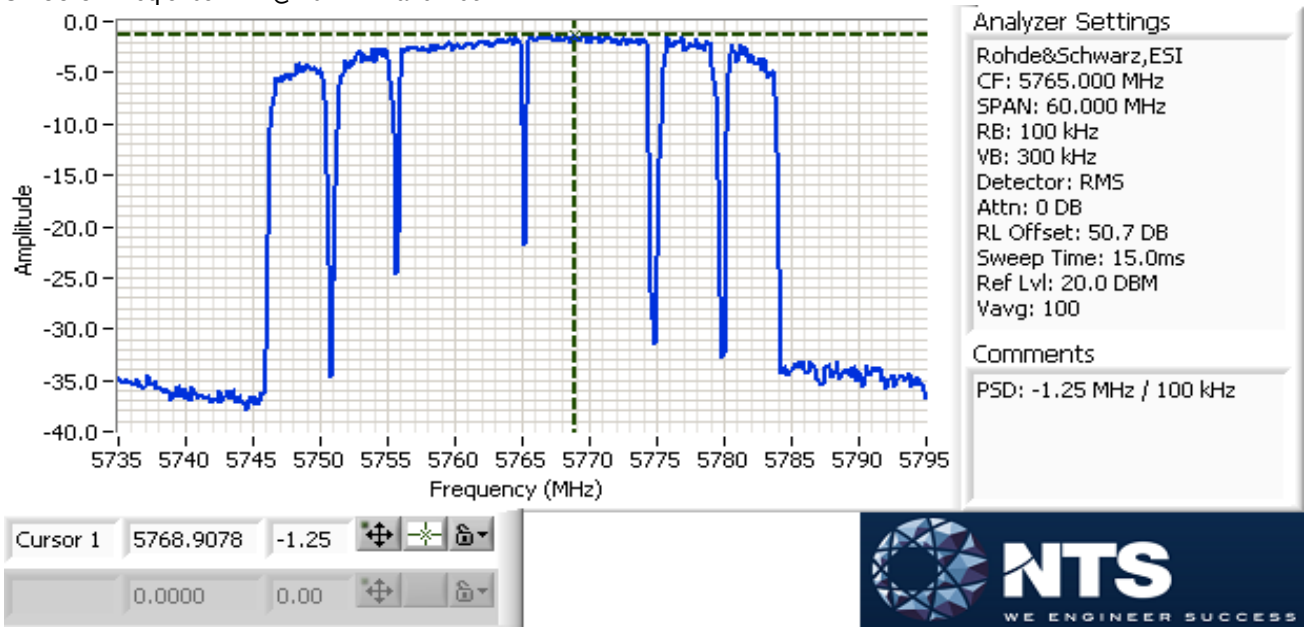


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

PSD CU Ch Freq 5825 MHz @ 30 MHz Bandwidth

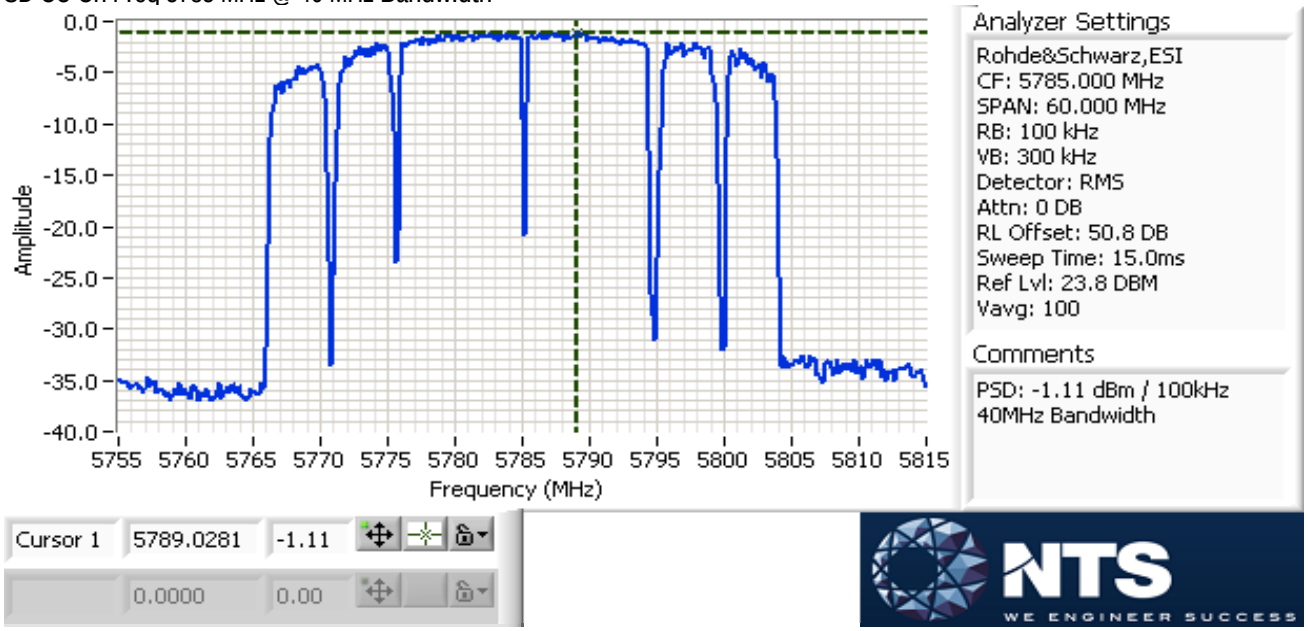


PSD CU Ch Freq 5765 MHz @ 40 MHz Bandwidth

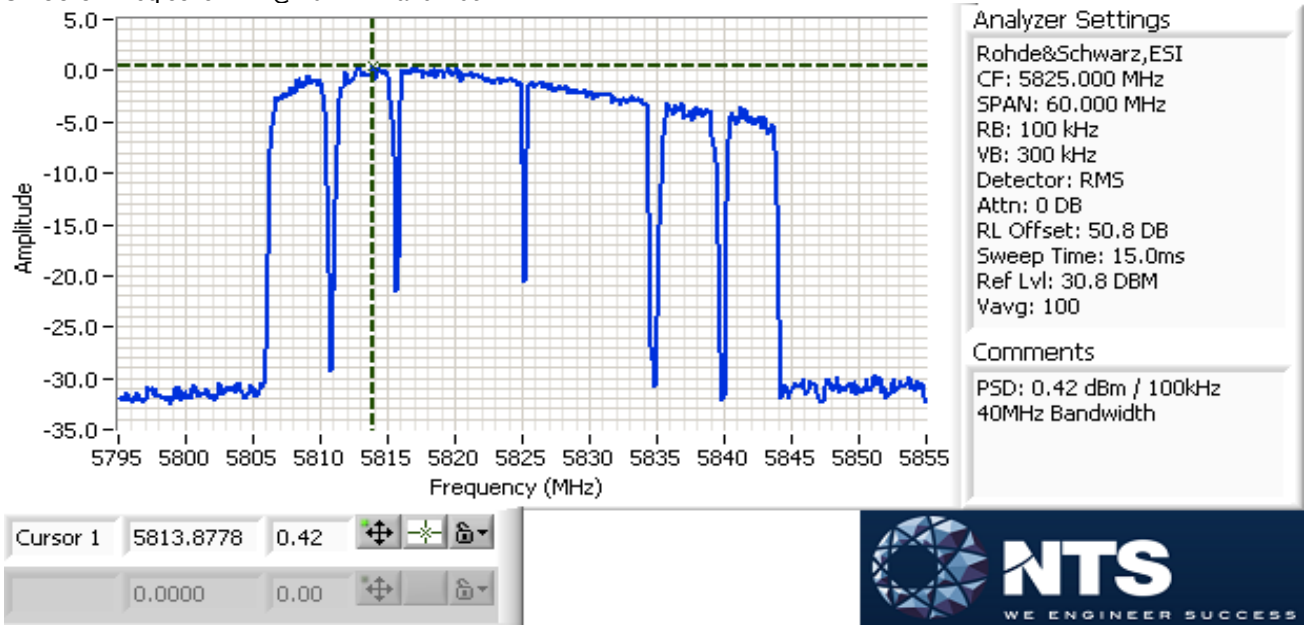


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

PSD CU Ch Freq 5785 MHz @ 40 MHz Bandwidth

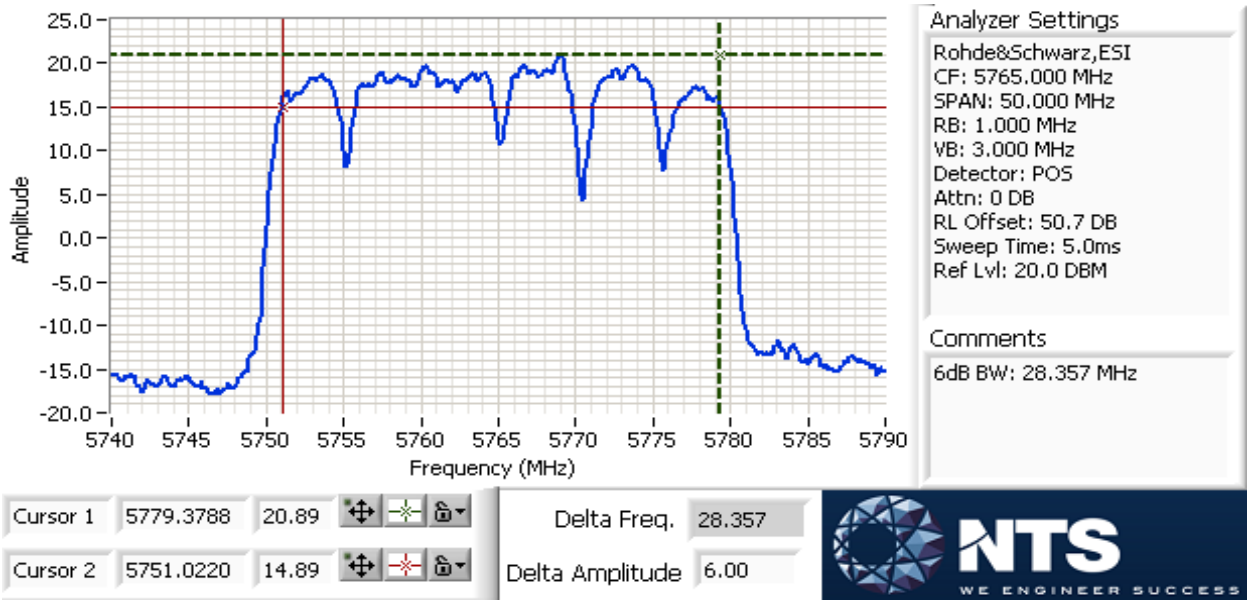


PSD CU Ch Freq 5825 MHz @ 40 MHz Bandwidth

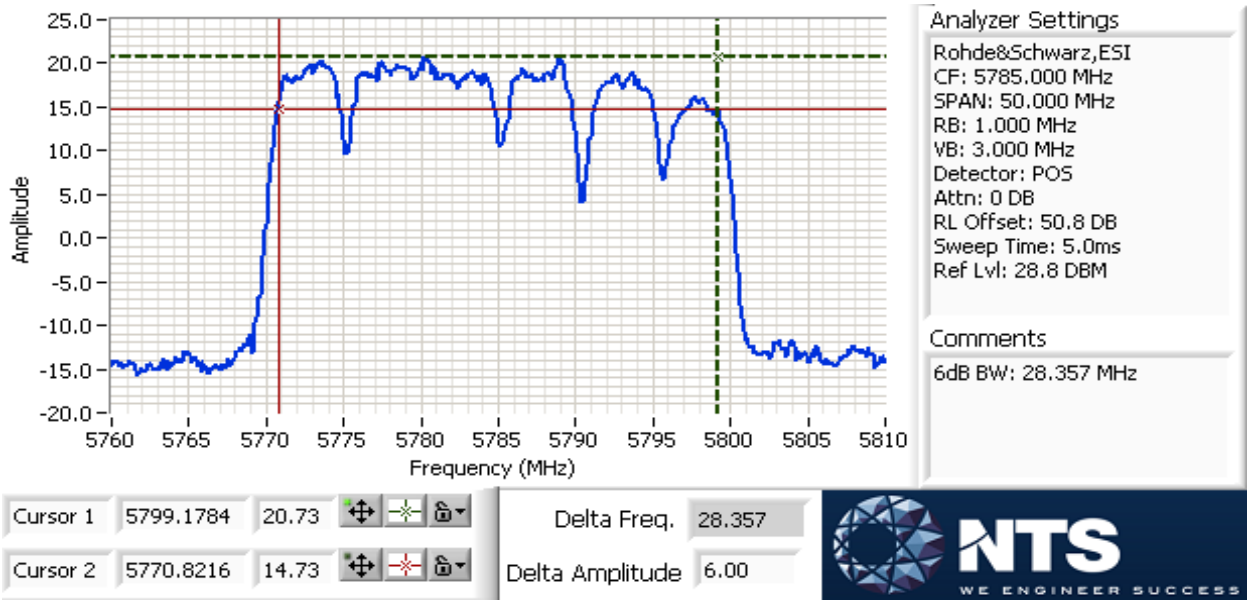


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

CU Ch Freq 5765 MHz @ 30 MHz Bandwidth

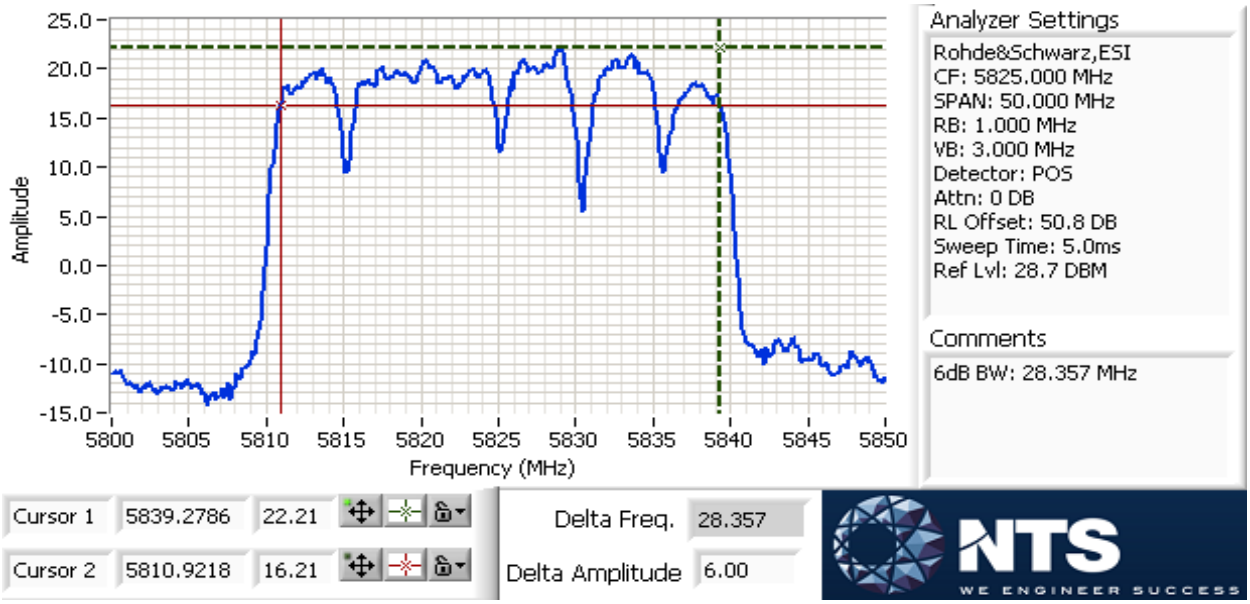


CU Ch Freq 5785 MHz @ 30 MHz Bandwidth

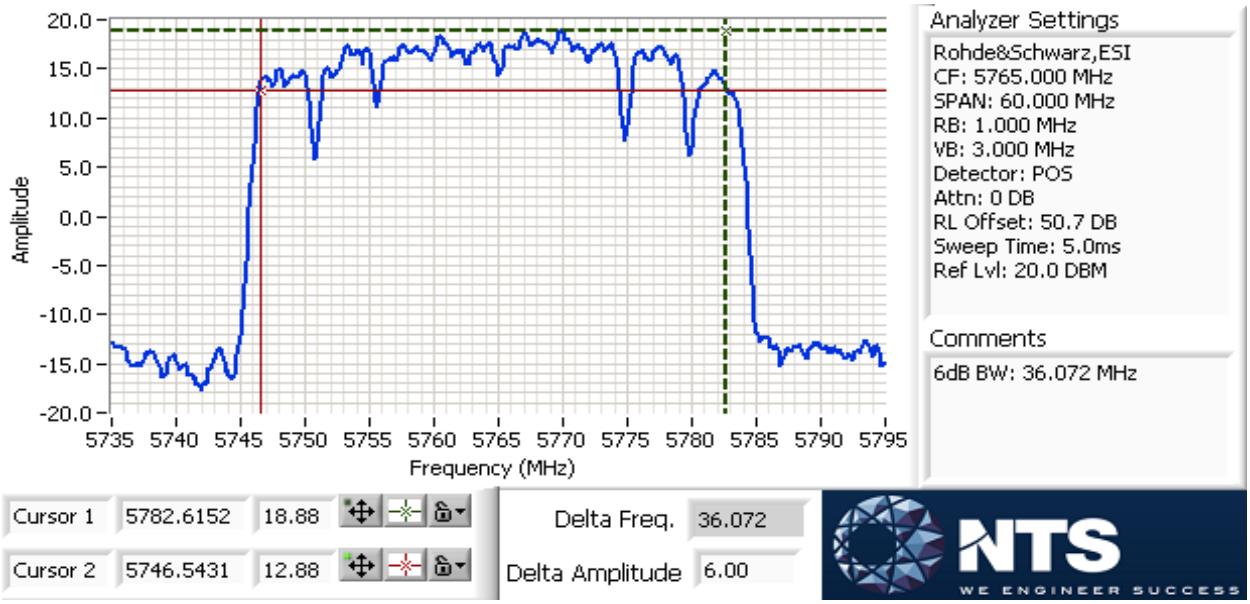


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

CU Ch Freq 5825 MHz @ 30 MHz Bandwidth

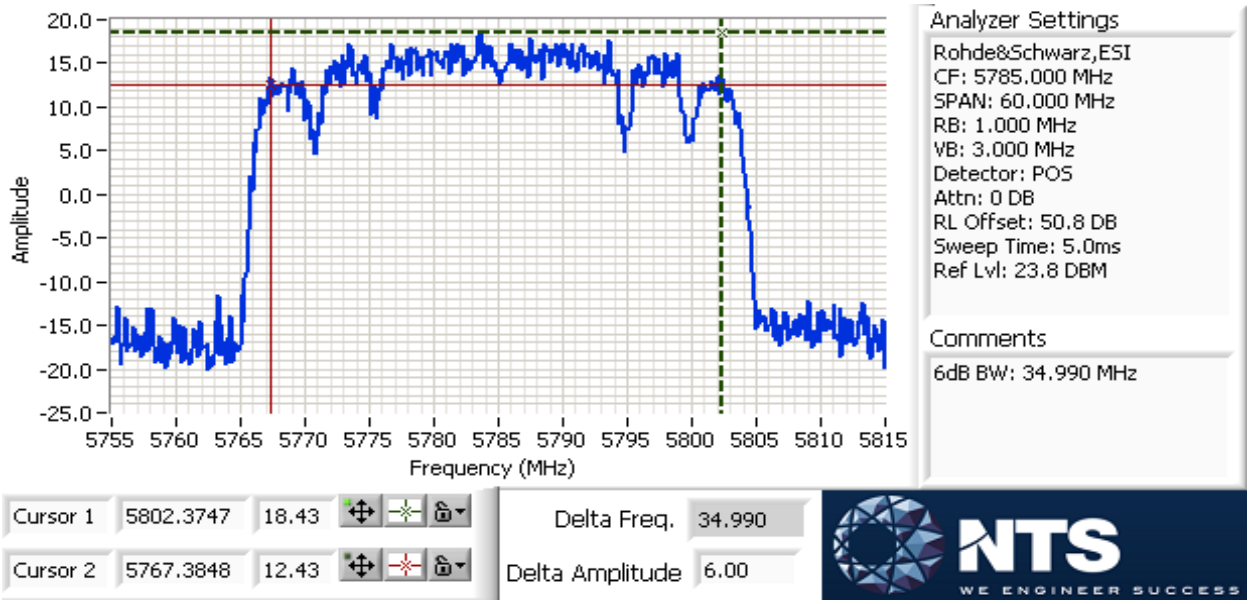


CU Ch Freq 5765 MHz @ 40 MHz Bandwidth

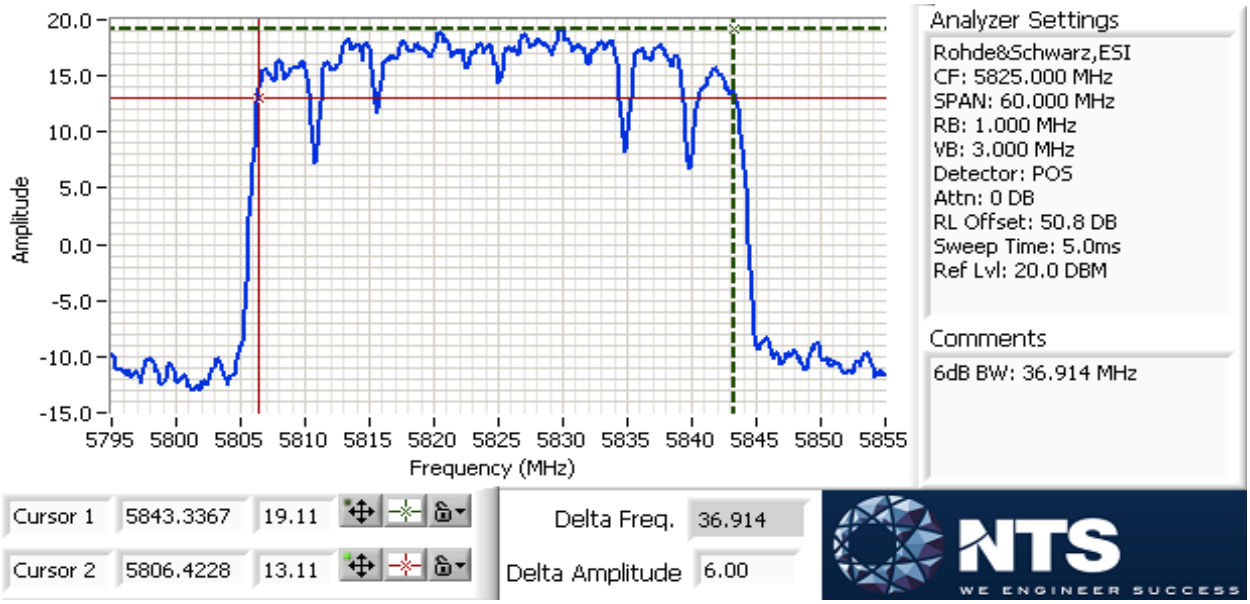


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

CU Ch Freq 5785 MHz @ 40 MHz Bandwidth

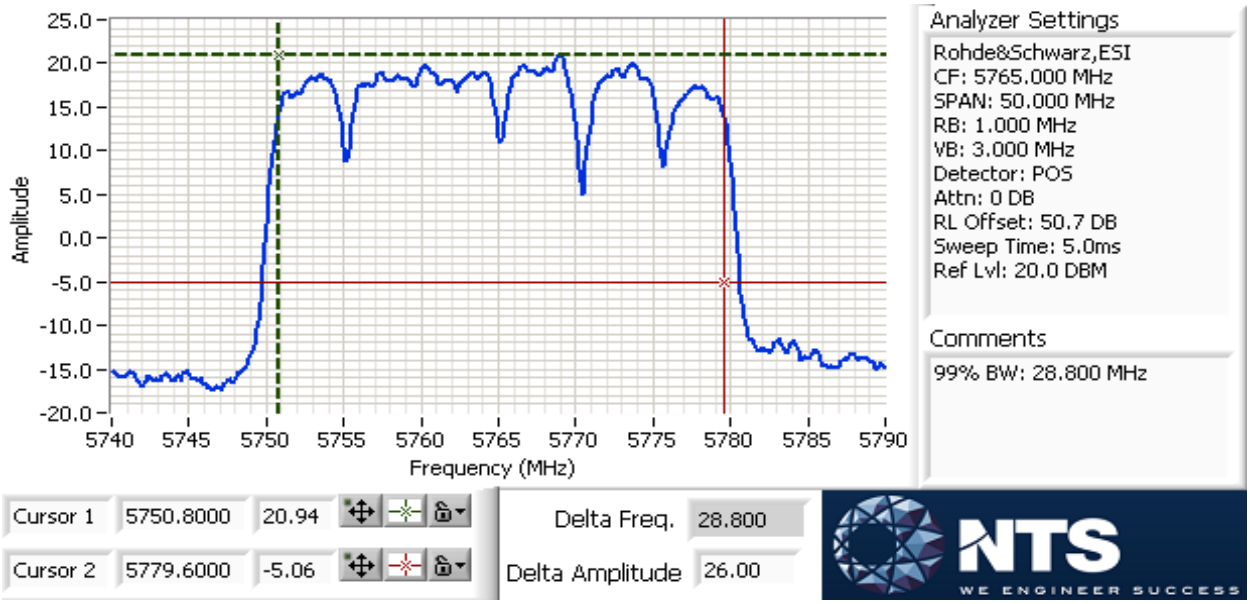


CU Ch Freq 5825 MHz @ 40 MHz Bandwidth

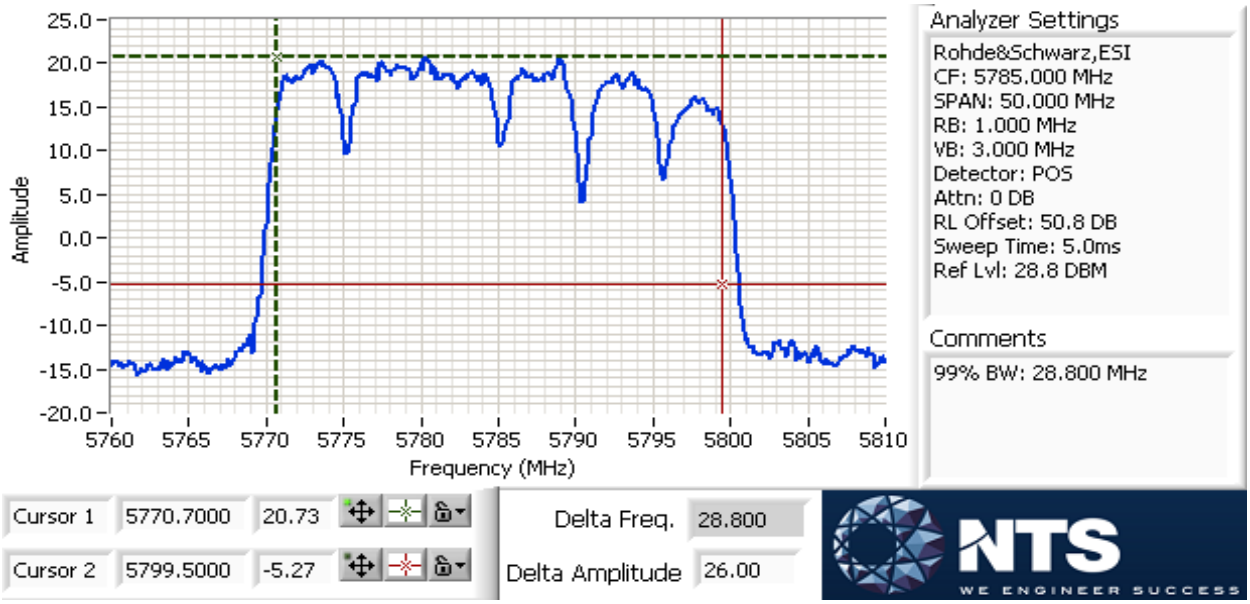


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

CU Ch Freq 5765 MHz @ 30 MHz Bandwidth

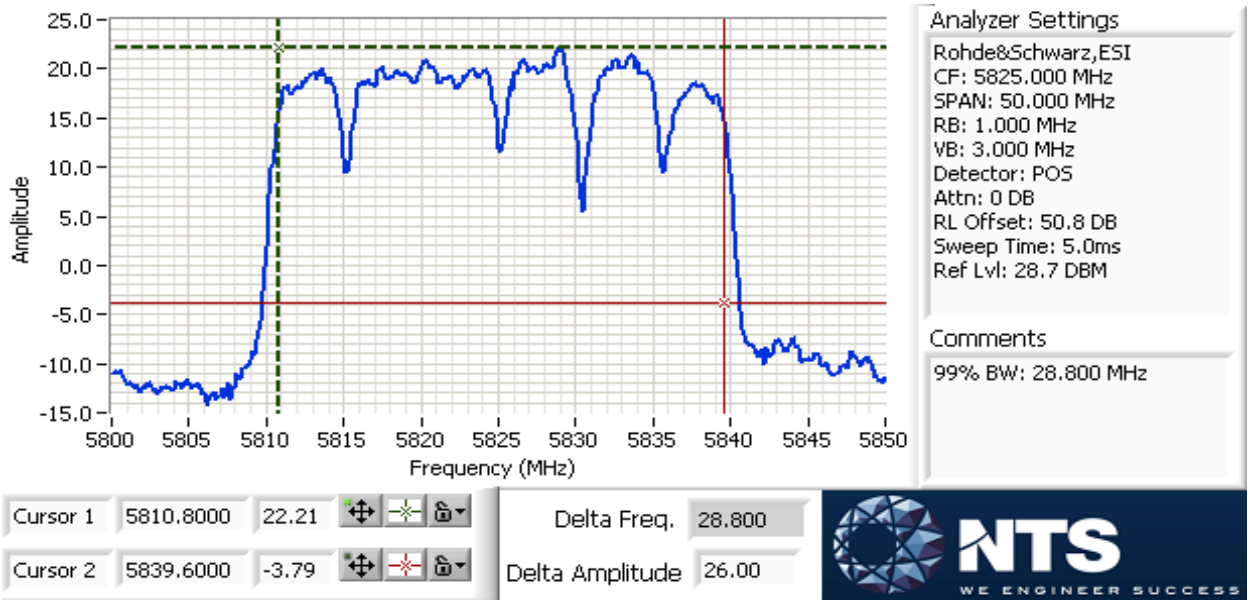


CU Ch Freq 5785 MHz @ 30 MHz Bandwidth

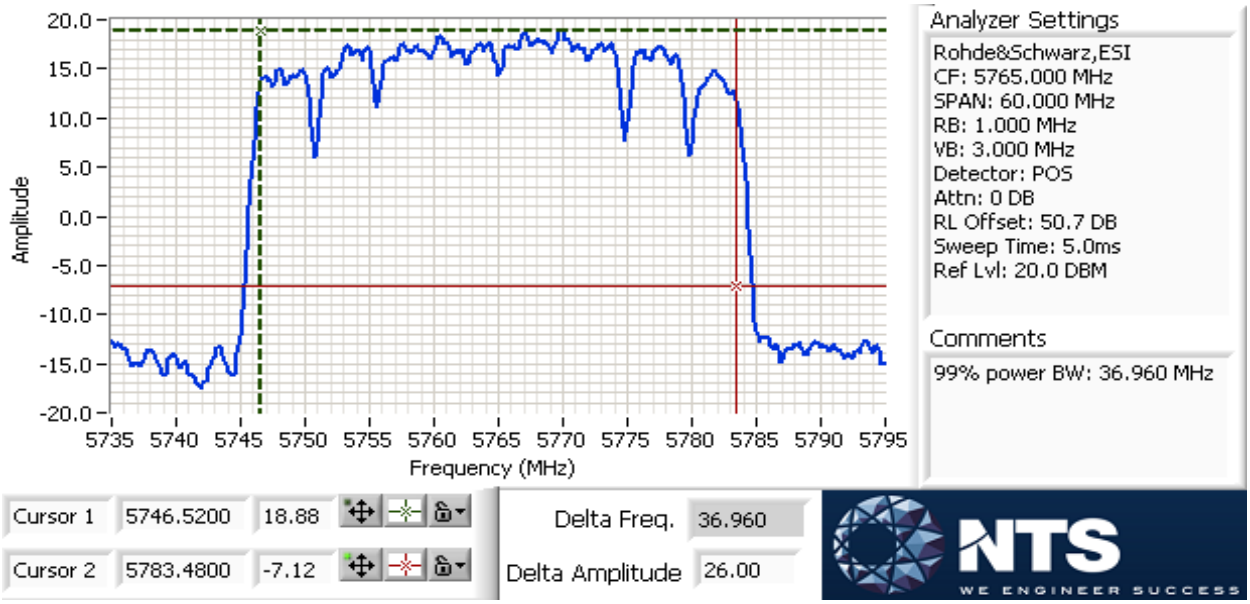


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

CU Ch Freq 5825 MHz @ 30 MHz Bandwidth

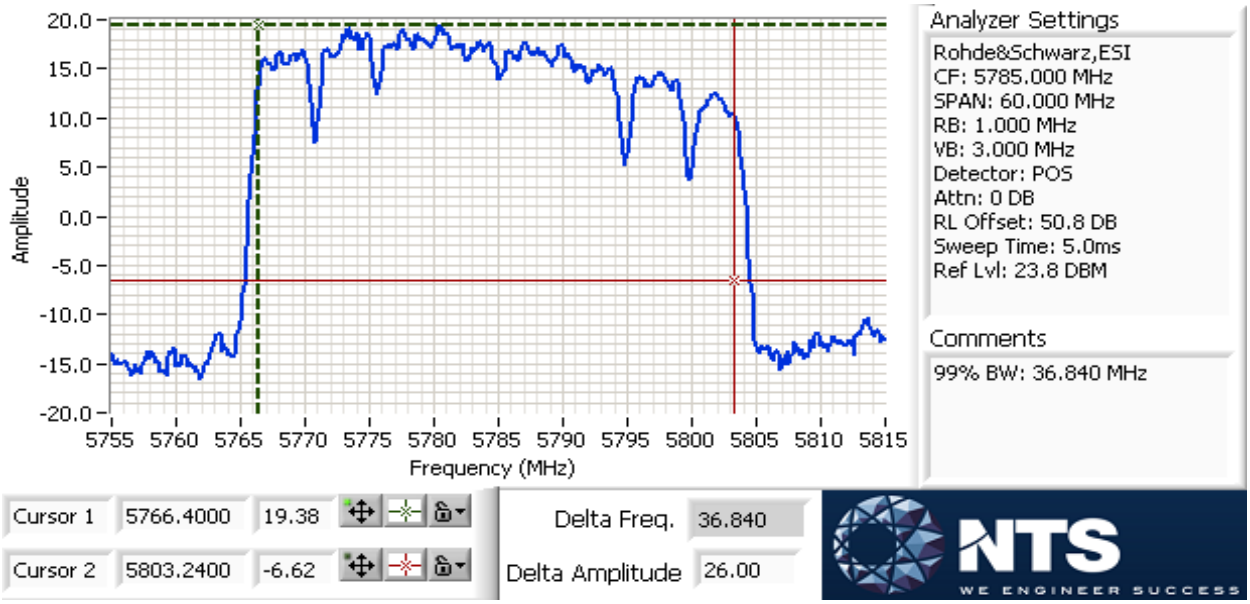


CU Ch Freq 5765 MHz @ 40 MHz Bandwidth

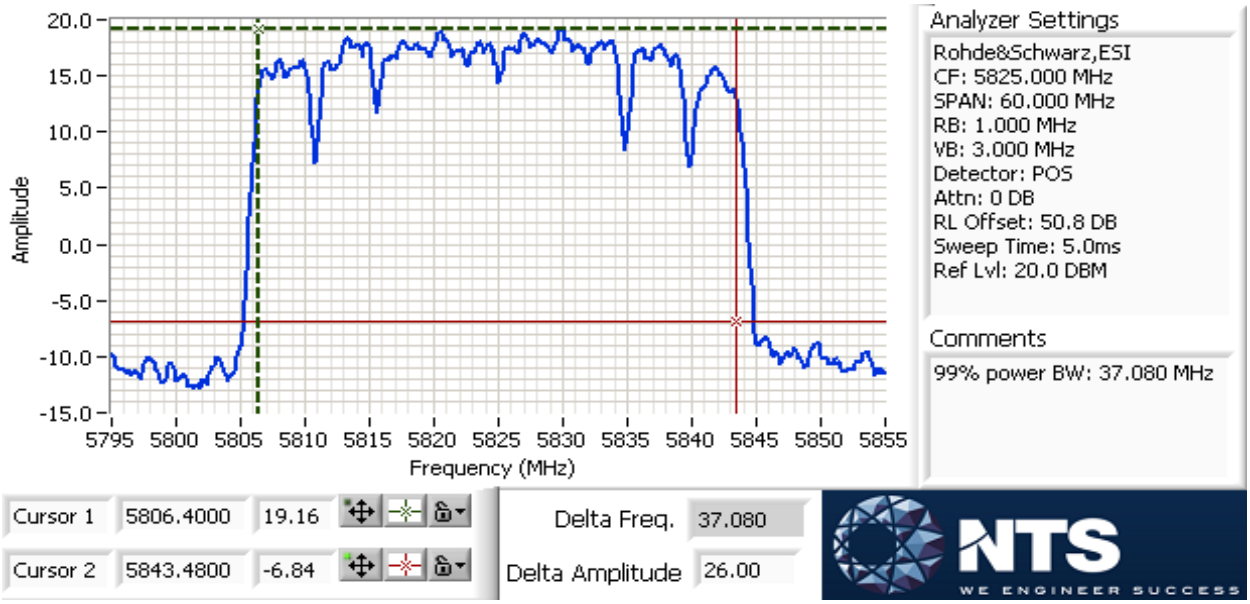


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

CU Ch Freq 5785 MHz @ 40 MHz Bandwidth



CU Ch Freq 5825 MHz @ 40 MHz Bandwidth



Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) 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.

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: 21-24 °C
Rel. Humidity: 30-45 %

Summary of Results (DTS bands)

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
2a DTS 5725-5850	Proprietary 30 MHz BW	Low 5765 MHz	Max	-	Band Edge at 5725 MHz	15.209	Pass / -40.89 dBc
				-	Radiated Emissions, 30 MHz - 40 GHz	FCC 15.209 / 15.247	35.8 dBµV/m @ 37.97 MHz (-4.2 dB)
		Center 5785 MHz		-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	46.5 dBµV/m @ 11570.0 MHz (-7.5 dB)
		High 5825 MHz		-	Band Edge at 5850 MHz	15.247	Pass / -30.02 dBc
				-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	46.2 dBµV/m @ 11650.2 MHz (-7.8 dB)
2b DTS 5725-5850	Proprietary 40 MHz BW	Low 5765 MHz	Max	-	Band Edge at 5725 MHz	15.209	Pass / -31.66 dBc
				-	Radiated Emissions, 30 MHz - 40 GHz	FCC 15.209 / 15.247	36.5 dBµV/m @ 37.84 MHz (-3.5 dB)
		Center 5785 MHz		-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	46.6 dBµV/m @ 11570.1 MHz (-7.4 dB)
		High 5825 MHz		-	Band Edge at 5850 MHz	15.247	Pass / -31.13 dBc
				-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	49.1 dBµV/m @ 11650.1 MHz (-4.9 dB)

Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

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 Comments:

U-NII Bands

Unless otherwise noted, average measurements above 1 GHz were performed as documented in FCC KDB 789033 D01 v01r03 H) 1) c) and H) 2) c) for U-NII band measurements. Per H) 1) d), E(dBµV/m) = EIRP(dBm) + 95.2 for 3 meters radiated emission measurements

DTS Bands

Unless otherwise noted, average measurements above 1 GHz were performed as documented in FCC KDB558074 D01 v03r01 11 and 13.3.4 for DTS band measurements

Antenna: Connected. Integral antenna

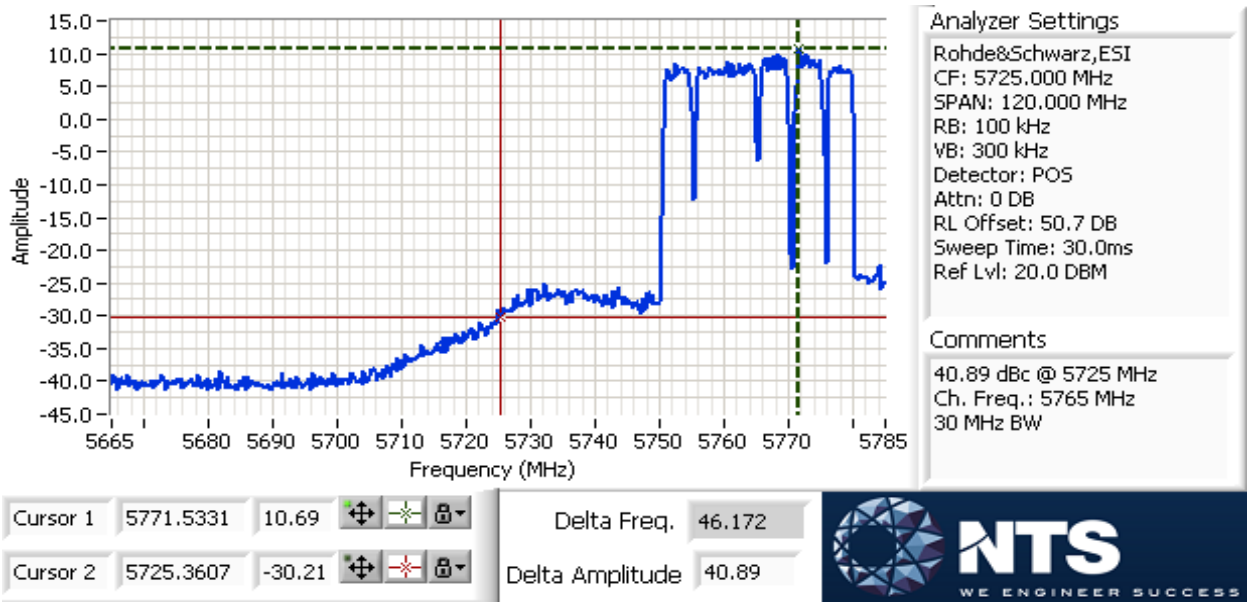
Duty Cycle: 100%

Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

Run #2a: Low Channel @ 5765 MHz 30 MHz BW (DTS)
Band Edge at 5725 MHz

Carrier frequency	Carrier level	Spurious frequency	Spurious Level	Spurious Level	Limit	Margin	Detector	Comments
MHz	dBm	MHz	dBm	dBc	dBc	dB	Pk/QP/Avg	
5771.533	10.6	5725.36	-30.2	-40.9	-30.0	-10.9	Pk	RB: 100 kHz, VB: 300 kHz

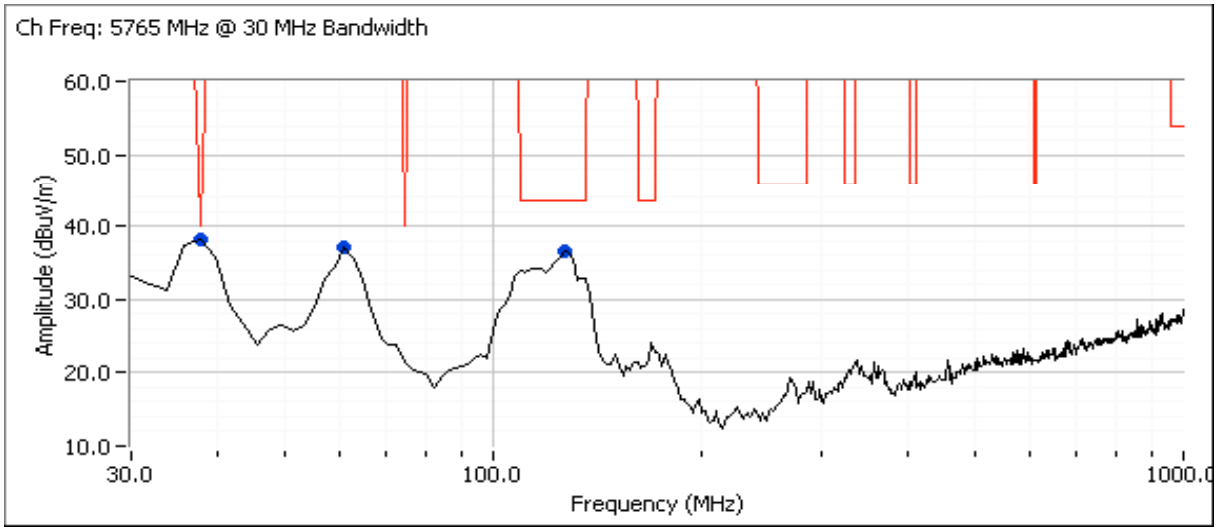
Note 1: Maximum average output power was used to demonstrate compliance hence peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz



Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

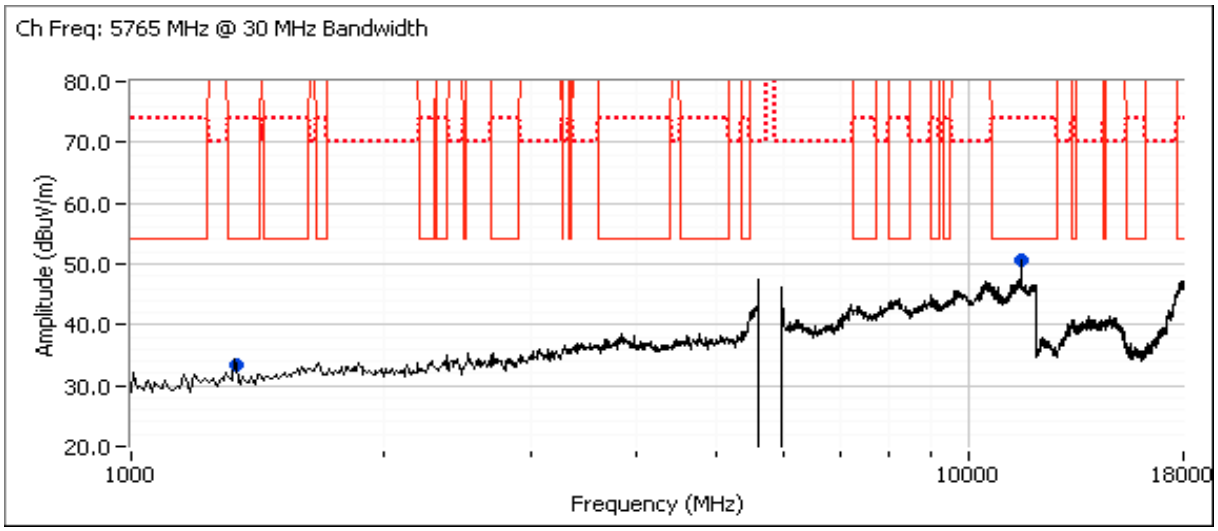
Low Channel @ 5765 MHz 30 MHz BW
Spurious Radiated Emissions:

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.968	35.8	V	40.0	-4.2	QP	292	1.0	QP (1.00s)
61.029	34.7	V	40.0	-5.3	QP	158	1.0	Non-restricted
127.538	34.6	H	43.5	-8.9	QP	76	2.1	QP (1.00s)
11530.070	45.4	H	54.0	-8.6	AVG	276	1.0	RB 1 MHz;VB 10 Hz;Peak
11529.670	55.6	H	74.0	-18.4	PK	276	1.0	RB 1 MHz;VB 3 MHz;Peak
1338.810	33.3	V	54.0	-20.7	Peak	315	1.3	RB 1 MHz;VB 3 MHz;Peak
Note 1:	Emissions in the 30-1000 MHz range are not radio related, they are the same regardless of channel.							
Note 2:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50 cm from the device indicated there were no significant emissions in this frequency range							



Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

Low Channel @ 5765 MHz 30 MHz BW

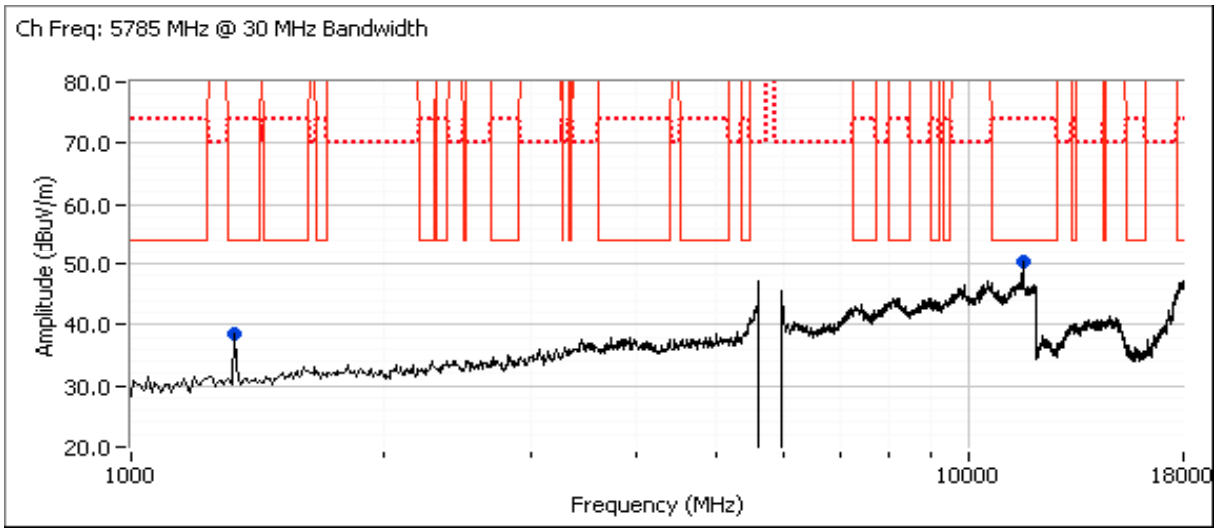


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

Run #2a: Center Channel @ 5785 MHz 30 MHz BW

Spurious Radiated Emissions:

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11570.010	46.5	H	54.0	-7.5	AVG	276	1.4	RB 1 MHz;VB 10 Hz;Peak
11570.210	55.1	H	74.0	-18.9	PK	276	1.4	RB 1 MHz;VB 3 MHz;Peak
1335.950	38.5	V	54.0	-15.5	Peak	192	1.0	RB 1 MHz;VB 3 MHz;Peak
Note 1:	Emissions in the 30-1000 MHz range are not radio related, they are the same regardless of channel.							
Note 2:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50 cm from the device indicated there were no significant emissions in this frequency range							

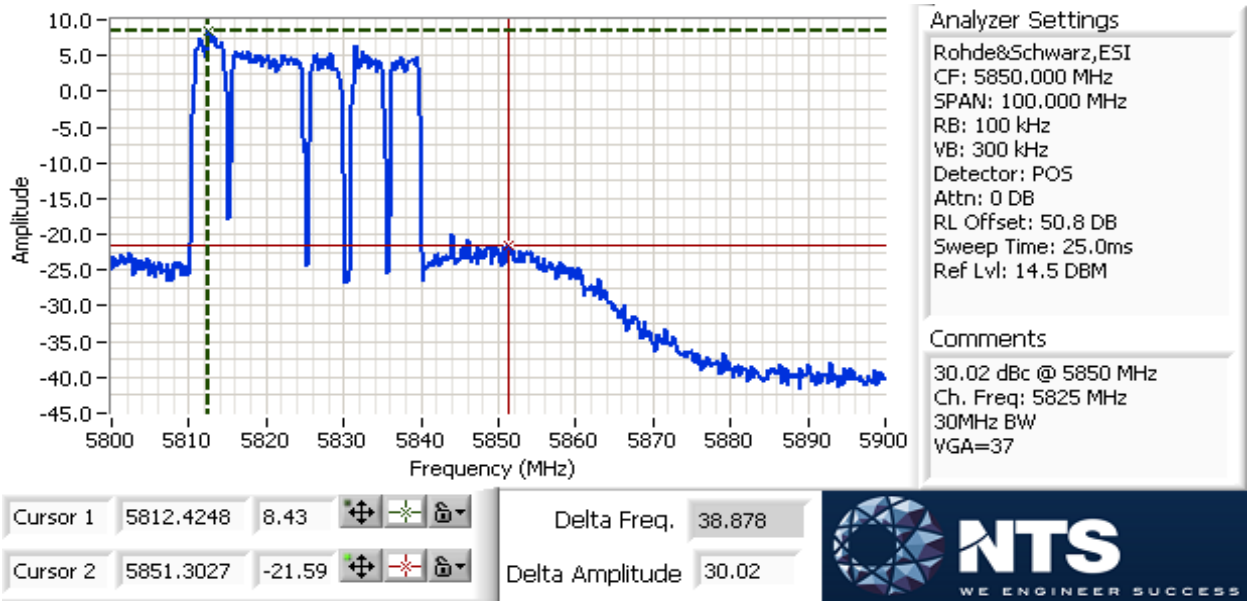


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

Run #2a: High Channel @ 5825 MHz 30 MHz BW
Band Edge at 5850 MHz

Carrier frequency	Carrier level	Spurious frequency	Spurious Level	Spurious Level	Limit	Margin	Detector	Comments
MHz	dBm	MHz	dBm	dBc	dBc	dB	Pk/QP/Avg	
5812.429	8.43	5851.303	-21.59	-30.02	-30.00	-0.02	Pk	RB: 100 kHz, VB: 300 kHz

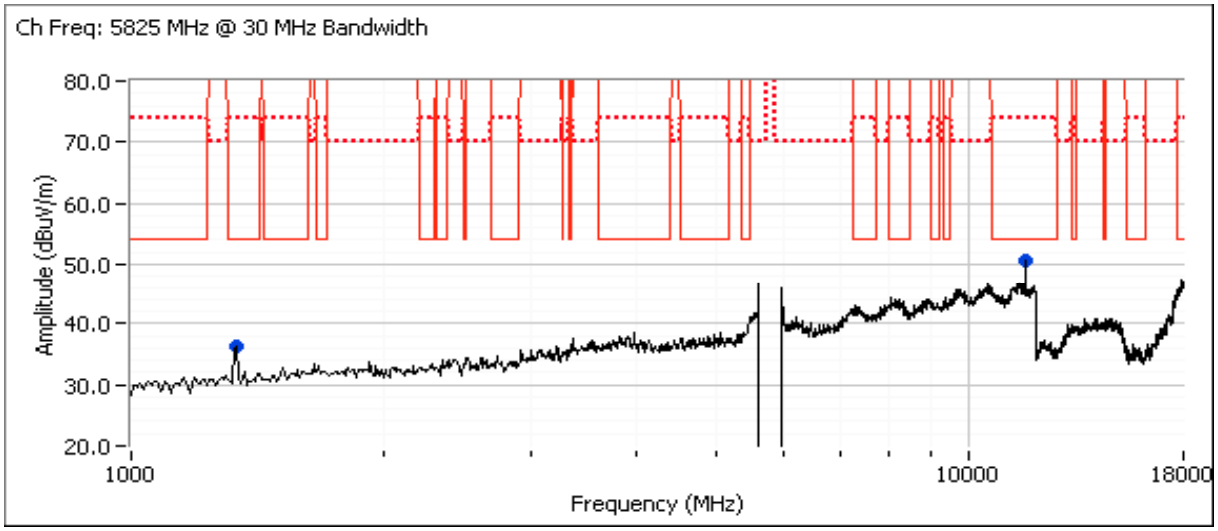
Note 1: Maximum average output power was used to demonstrate compliance hence peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz



Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

High Channel @ 5825 MHz 30 MHz BW
Spurious Radiated Emissions:

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11650.210	46.2	H	54.0	-7.8	AVG	271	1.5	RB 1 MHz;VB 10 Hz;Peak
11650.480	54.2	H	74.0	-19.8	PK	271	1.5	RB 1 MHz;VB 3 MHz;Peak
1327.650	36.3	V	54.0	-17.7	Peak	324	1.0	
Note 1:	Emissions in the 30-1000 MHz range are not radio related, they are the same regardless of channel.							
Note 2:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50 cm from the device indicated there were no significant emissions in this frequency range							

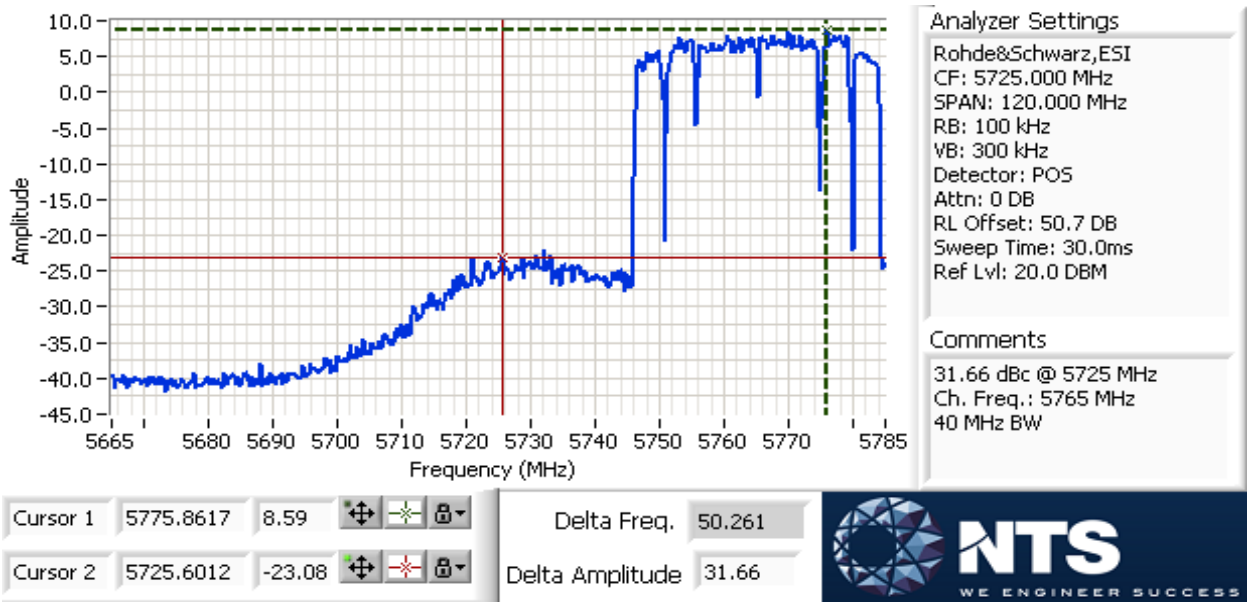


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

Run #2b: Low Channel @ 5765 MHz 40 MHz BW (DTS)
Band Edge at 5725 MHz

Carrier frequency	Carrier level	Spurious frequency	Spurious Level	Spurious Level	Limit	Margin	Detector	Comments
MHz	dBm	MHz	dBm	dBc	dBc	dB	Pk/QP/Avg	
5775.862	8.6	5725.601	-23.1	-31.7	-30.0	-1.7	Pk	RB: 100 kHz, VB: 300 kHz

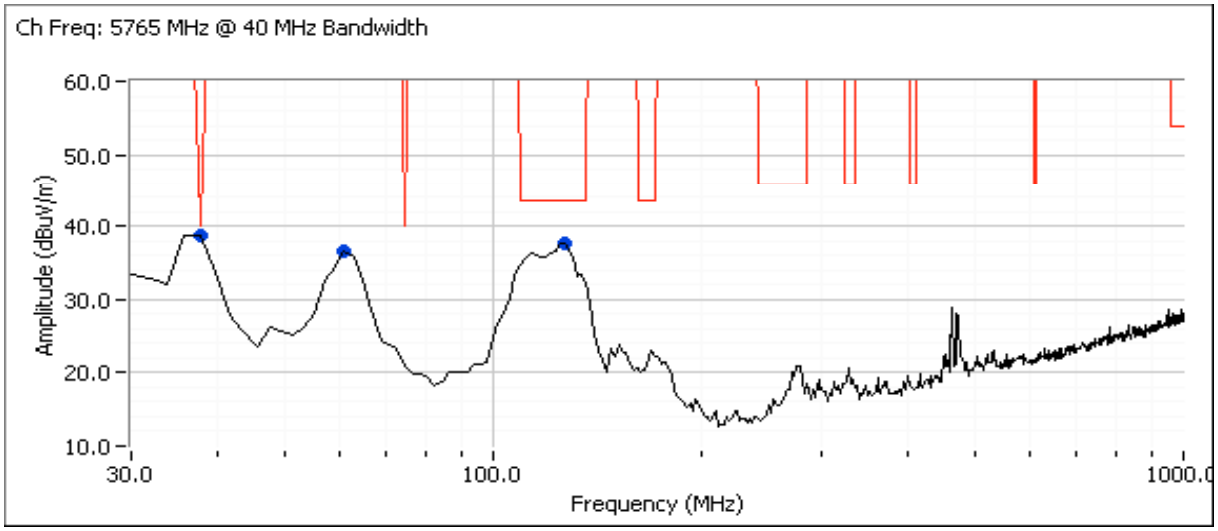
Note 1: Maximum average output power was used to demonstrate compliance hence peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz



Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

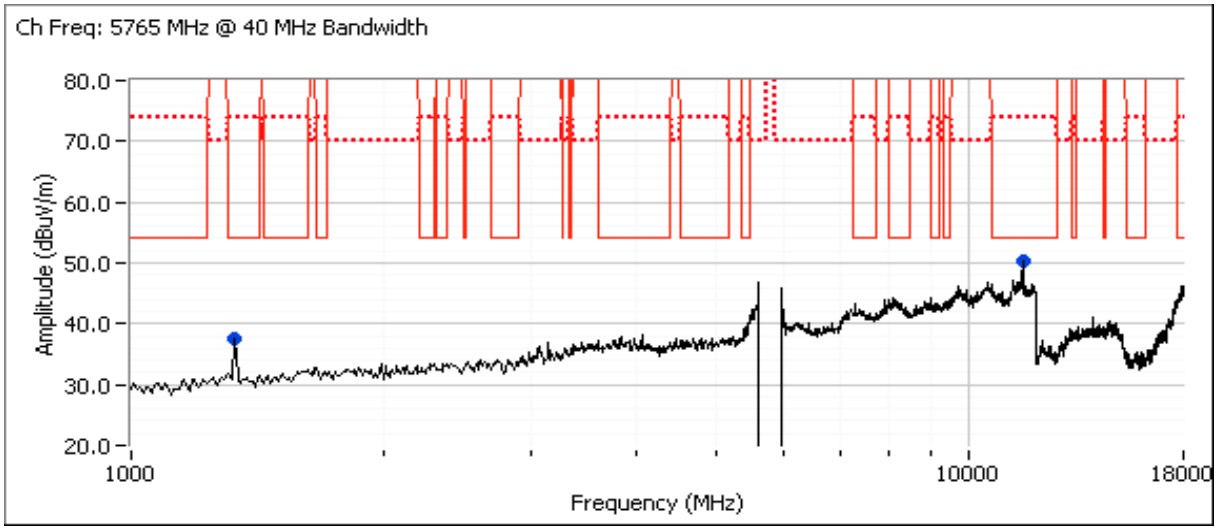
Low Channel @ 5765 MHz 40 MHz BW
Spurious Radiated Emissions:

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.838	36.5	V	40.0	-3.5	QP	20	1.0	QP (1.00s)
61.814	34.7	V	40.0	-5.3	QP	179	1.0	Non-restricted
127.548	35.9	H	43.5	-7.6	QP	73	2.2	QP (1.00s)
11530.030	46.3	H	54.0	-7.7	AVG	352	1.0	RB 1 MHz;VB 10 Hz;Peak
11530.480	56.6	H	74.0	-17.4	PK	352	1.0	RB 1 MHz;VB 3 MHz;Peak
1310.020	34.8	V	54.0	-19.2	Peak	97	1.0	RB 1 MHz;VB 3 MHz;Peak
Note 1:	Emissions in the 30-1000 MHz range are not radio related, they are the same regardless of channel.							
Note 2:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50 cm from the device indicated there were no significant emissions in this frequency range							



Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

Low Channel @ 5765 MHz 40 MHz BW

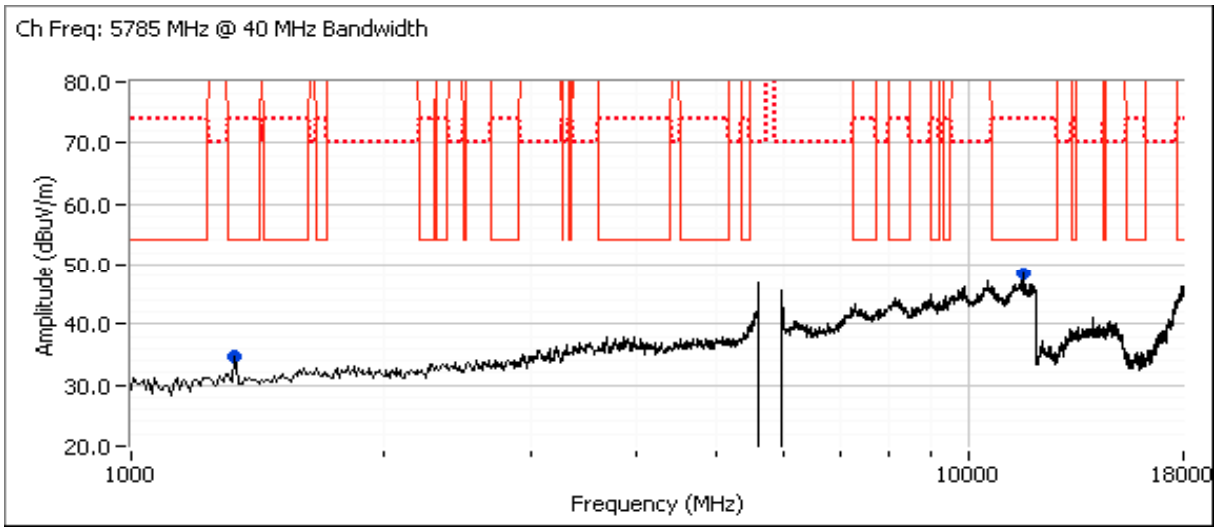


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

Run #2b: Center Channel @ 5785 MHz 40 MHz BW

Spurious Radiated Emissions:

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11570.060	46.6	H	54.0	-7.4	AVG	274	1.4	RB 1 MHz;VB 10 Hz;Peak
11570.100	55.9	H	74.0	-18.1	PK	274	1.4	RB 1 MHz;VB 3 MHz;Peak
1328.190	37.7	V	54.0	-16.3	Peak	257	1.0	
Note 1:	Emissions in the 30-1000 MHz range are not radio related, they are the same regardless of channel.							
Note 2:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50 cm from the device indicated there were no significant emissions in this frequency range							

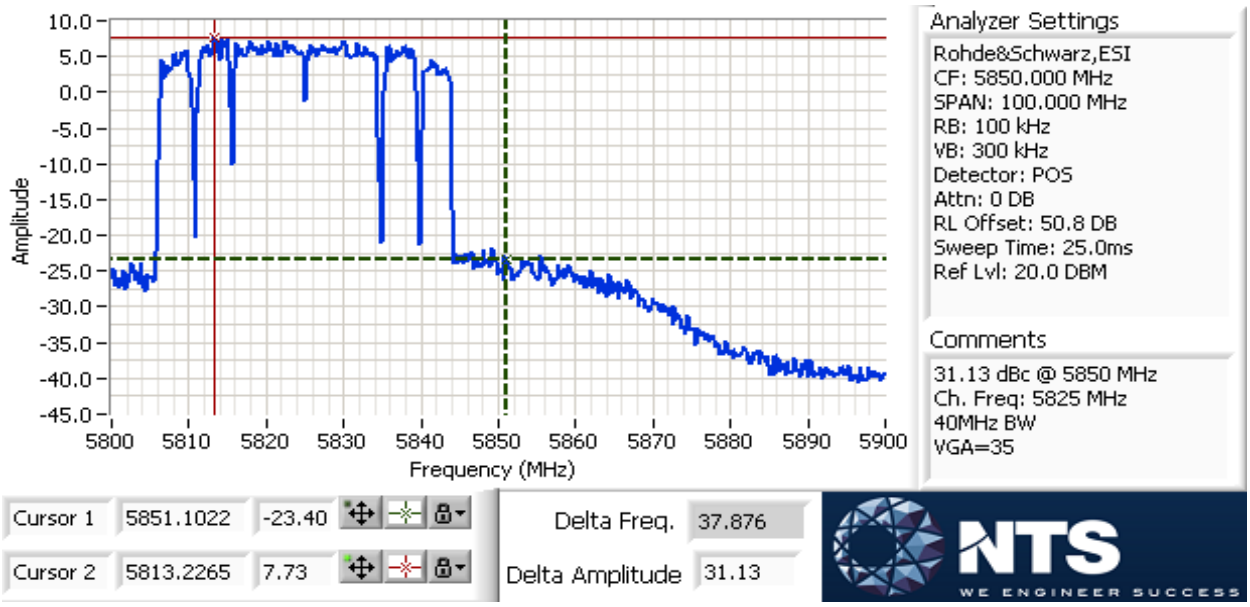


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

Run #2b: High Channel @ 5825 MHz 40 MHz BW
Band Edge at 5850 MHz

Carrier frequency	Carrier level	Spurious frequency	Spurious Level	Spurious Level	Limit	Margin	Detector	Comments
MHz	dBm	MHz	dBm	dBc	dBc	dB	Pk/QP/Avg	
5813.227	7.73	5851.1022	-23.40	-31.13	-30.00	-1.13	Pk	RB: 100 kHz, VB: 300 kHz

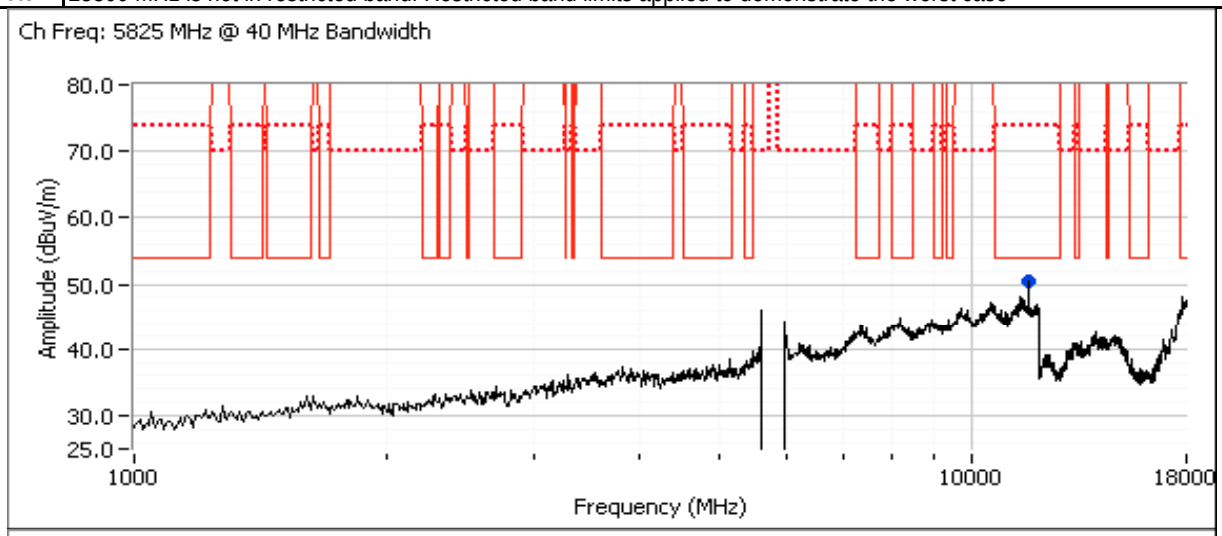
Note 1: Maximum average output power was used to demonstrate compliance hence peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz

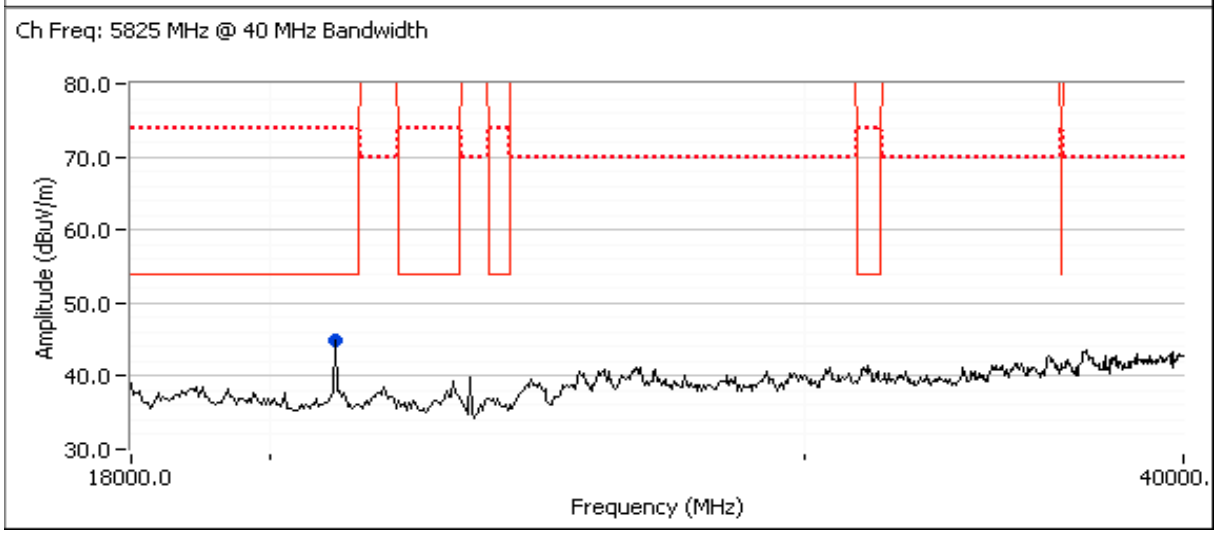


Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94075
		Account Manager:	Christine Krebill
Contact:	Michiel Lotter		
Standard:	FCC Part 15.247 and RSS 210	Class:	N/A

High Channel @ 5825 MHz 40 MHz BW
Spurious Radiated Emissions:

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11650.050	49.1	H	54.0	-4.9	AVG	39	1.7	RB 1 MHz;VB 10 Hz;Peak
11649.740	57.5	H	74.0	-16.5	PK	39	1.7	RB 1 MHz;VB 3 MHz;Peak
23300.000	37.4	H	54.0	-16.6	AVG	254	1.9	RB 1 MHz;VB 10 Hz;Peak
23300.090	46.8	H	74.0	-27.2	PK	254	1.9	RB 1 MHz;VB 3 MHz;Peak
Note 1:	Emissions in the 30-1000 MHz range are not radio related, they are the same regardless of channel.							
Note 2:	23300 MHz is not in restricted band. Restricted band limits applied to demonstrate the worst case							





Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94073
		Project Manager:	Christine Krebill
Contact:	Michiel Lotter	Project Coordinator:	-
Standard:	FCC Part 15 B	Class:	B

Conducted Emissions (CU)

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

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: 17/04/2014
Test Engineer: Deniz Demirci
Test Location: Fremont Chamber # 4
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80 cm from the LISN. A second LISN was used for all local support equipment. Remote support equipment was located outside of the semi-anechoic chamber. Cables running to remote support equipment where routed through metal conduit and passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:

Temperature: 21-23 °C
Rel. Humidity: 30-45 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	FCC Class B	Pass	45.6 dBµV @ 0.466 MHz (-1.0 dB)

Modifications Made During Testing

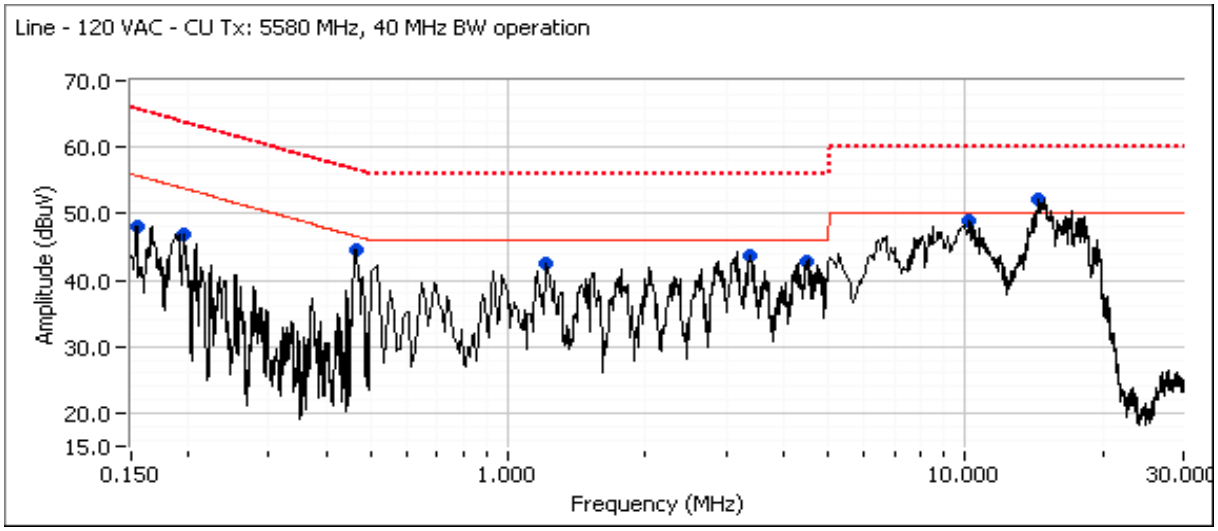
No modifications were made to the EUT during testing

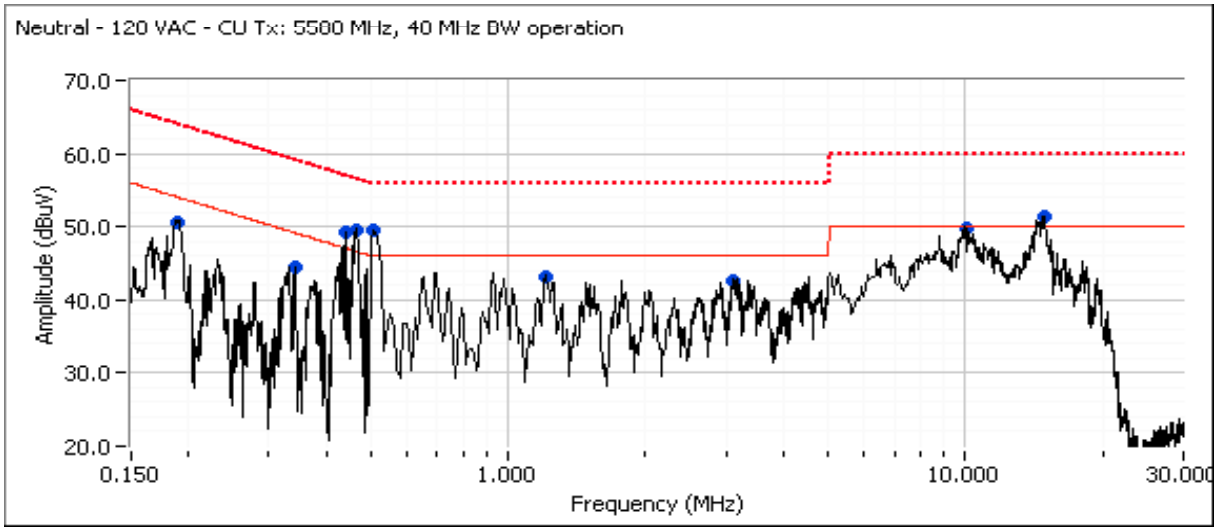
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94073
		Project Manager:	Christine Krebill
Contact:	Michiel Lotter	Project Coordinator:	-
Standard:	FCC Part 15 B	Class:	B

Run # 1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz





Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94073
		Project Manager:	Christine Krebill
Contact:	Michiel Lotter	Project Coordinator:	-
Standard:	FCC Part 15 B	Class:	B

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.464	*44.6*	*Line*	*46.6*	*-2.0*	*Peak*	
0.154	*48.2*	*Line*	*55.8*	*-7.6*	*Peak*	
0.196	*46.8*	*Line*	*53.8*	*-7.0*	*Peak*	
1.212	*42.4*	*Line*	*46.0*	*-3.6*	*Peak*	
3.368	*43.8*	*Line*	*46.0*	*-2.2*	*Peak*	
4.522	*42.8*	*Line*	*46.0*	*-3.2*	*Peak*	
10.210	*49.0*	*Line*	*50.0*	*-1.0*	*Peak*	
14.469	*52.1*	*Line*	*50.0*	*2.1*	*Peak*	
0.190	*50.7*	*Neutral*	*54.0*	*-3.3*	*Peak*	
0.342	*44.6*	*Neutral*	*49.2*	*-4.6*	*Peak*	
0.441	*49.2*	*Neutral*	*47.0*	*2.2*	*Peak*	
0.466	*49.4*	*Neutral*	*46.6*	*2.8*	*Peak*	
0.509	*49.4*	*Neutral*	*46.0*	*3.4*	*Peak*	
1.212	*43.2*	*Neutral*	*46.0*	*-2.8*	*Peak*	
3.106	*42.7*	*Neutral*	*46.0*	*-3.3*	*Peak*	
10.110	*49.9*	*Neutral*	*50.0*	*-0.1*	*Peak*	
14.870	*51.3*	*Neutral*	*50.0*	*1.3*	*Peak*	

Client:	Nextivity Inc	Job Number:	J94047
Model:	P34-2/4/5/12CU	T-Log Number:	T94073
		Project Manager:	Christine Krebill
Contact:	Michiel Lotter	Project Coordinator:	-
Standard:	FCC Part 15 B	Class:	B

Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.466	45.6	Neutral	46.6	-1.0	AVG	AVG (0.10s)
0.514	44.1	Neutral	46.0	-1.9	AVG	AVG (0.10s)
0.514	48.7	Neutral	56.0	-7.3	QP	QP (1.00s)
0.464	39.1	Neutral	46.6	-7.5	AVG	AVG (0.10s)
0.466	49.1	Neutral	56.6	-7.5	QP	QP (1.00s)
0.189	46.0	Neutral	54.1	-8.1	AVG	AVG (0.10s)
14.440	41.1	Neutral	50.0	-8.9	AVG	AVG (0.10s)
1.208	36.2	Neutral	46.0	-9.8	AVG	AVG (0.10s)
14.829	40.0	Line	50.0	-10.0	AVG	AVG (0.10s)
0.441	46.9	Line	57.0	-10.1	QP	QP (1.00s)
1.210	35.1	Neutral	46.0	-10.9	AVG	AVG (0.10s)
10.137	39.0	Neutral	50.0	-11.0	AVG	AVG (0.10s)
10.255	37.9	Neutral	50.0	-12.1	AVG	AVG (0.10s)
4.522	33.6	Line	46.0	-12.4	AVG	AVG (0.10s)
14.440	47.5	Line	60.0	-12.5	QP	QP (1.00s)
3.112	33.0	Neutral	46.0	-13.0	AVG	AVG (0.10s)
3.367	32.7	Line	46.0	-13.3	AVG	AVG (0.10s)
14.829	46.7	Neutral	60.0	-13.3	QP	QP (1.00s)
1.208	42.5	Line	56.0	-13.5	QP	QP (1.00s)
0.189	50.1	Neutral	64.1	-14.0	QP	QP (1.00s)
0.464	42.5	Line	56.6	-14.1	QP	QP (1.00s)
10.137	45.6	Line	60.0	-14.4	QP	QP (1.00s)
1.210	41.4	Neutral	56.0	-14.6	QP	QP (1.00s)
0.342	43.8	Neutral	59.2	-15.4	QP	QP (1.00s)
10.255	44.4	Line	60.0	-15.6	QP	QP (1.00s)
3.112	40.1	Neutral	56.0	-15.9	QP	QP (1.00s)
0.441	30.9	Line	47.0	-16.1	AVG	AVG (0.10s)
3.367	39.9	Line	56.0	-16.1	QP	QP (1.00s)
4.522	39.8	Line	56.0	-16.2	QP	QP (1.00s)
0.154	48.9	Line	65.8	-16.9	QP	QP (1.00s)
0.342	28.6	Line	49.2	-20.6	AVG	AVG (0.10s)
0.154	34.8	Line	55.8	-21.0	AVG	AVG (0.10s)
0.195	42.3	Line	63.8	-21.5	QP	QP (1.00s)
0.195	31.1	Line	53.8	-22.7	AVG	AVG (0.10s)

End of Report

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marks the last page of this test report.