

*Electromagnetic Emissions Test Report
and
Application for Grant of Equipment Authorization
pursuant to
FCC Part 15, Subpart E
on the
Meru Networks
Transmitter
Model: OAP 180*

FCC ID: RE7-OAP180R2

GRANTEE: Meru Networks
894 Ross Drive
Sunnyvale, CA 94089

TEST SITE: Elliott Laboratories
684 W. Maude Ave
Sunnyvale, CA 94086

REPORT DATE: March 4, 2008

FINAL TEST DATE: November 5, November 6, November 7,
November 16, November 30, 2007
and February 21, 2008

AUTHORIZED SIGNATORY:



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Testing Cert #2016-01

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REVISION HISTORY

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TABLE OF CONTENTS

COVER PAGE.....1

REVISION HISTORY2

TABLE OF CONTENTS3

SCOPE.....5

OBJECTIVE6

STATEMENT OF COMPLIANCE.....6

TEST RESULTS SUMMARY7

 UNII / LELAN DEVICES7

 GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS8

MEASUREMENT UNCERTAINTIES9

EQUIPMENT UNDER TEST (EUT) DETAILS10

 GENERAL.....10

 ANTENNA SYSTEM10

 ENCLOSURE.....10

 MODIFICATIONS.....10

 SUPPORT EQUIPMENT.....10

 EUT INTERFACE PORTS11

 EUT OPERATION11

TEST SITE.....12

 GENERAL INFORMATION.....12

 RADIATED EMISSIONS CONSIDERATIONS12

MEASUREMENT INSTRUMENTATION13

 RECEIVER SYSTEM13

 INSTRUMENT CONTROL COMPUTER13

 FILTERS/ATTENUATORS14

 ANTENNAS.....14

 ANTENNA MAST AND EQUIPMENT TURNTABLE.....14

 INSTRUMENT CALIBRATION.....14

TEST PROCEDURES14

 EUT AND CABLE PLACEMENT14

 RADIATED EMISSIONS.....15

 CONDUCTED EMISSIONS FROM ANTENNA PORT18

 BANDWIDTH MEASUREMENTS18

 SPECIFICATION LIMITS AND SAMPLE CALCULATIONS.....19

 GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS.....19

 FCC 15.407 (A) OUTPUT POWER LIMITS.....19

 OUTPUT POWER AND SPURIOUS LIMITS –LE-LAN DEVICES20

 OUTPUT POWER AND SPURIOUS LIMITS –UNII DEVICES20

 SAMPLE CALCULATIONS - RADIATED EMISSIONS21

 SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION22

TABLE OF CONTENTS (Continued)

EXHIBIT 1: Test Equipment Calibration Data..... 1
EXHIBIT 2: Test Measurement Data..... 2
EXHIBIT 3: Photographs of Test Configurations..... 3
EXHIBIT 4: Proposed FCC ID Label & Label Location 4
EXHIBIT 5: Detailed Photographs..... 5
EXHIBIT 6: Operator's Manual 6
EXHIBIT 7: Block Diagram..... 7
EXHIBIT 8: Schematic Diagrams..... 8
EXHIBIT 9: Theory of Operation 9
EXHIBIT 10: RF Exposure Information 10

SCOPE

An electromagnetic emissions test has been performed on the Meru Networks model OAP 180 pursuant to the following rules:

FCC Part 15, Subpart E requirements for UNII Devices (using FCC DA 02-2138, August 30, 2002)

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

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.

The test results recorded herein are based on a single type test of the Meru Networks model OAP 180 and therefore apply only to the tested sample. The sample was selected and prepared by John Dorsey of Meru Networks.

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.

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 Meru Networks model OAP 180 complied with the requirements of the following regulations:

FCC Part 15, Subpart E requirements for UNII Devices

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.).

TEST RESULTS SUMMARY**UNII / LELAN DEVICES****Operation in the 5.25 – 5.35 GHz Band**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a)(2)		26dB Bandwidth	23.4 MHz	N/A – limits output power if < 20MHz	N/A
15.407(a)(2)	A9.2(2)	Output Power	14.6 dBm (0.028 W)		Complies
15.407(a)(2))		Power Spectral Density	2.11 dBm/MHz	3.5 dBm/MHz	Complies

Operation in the 5.47 – 5.725 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a)(2)		26dB Bandwidth	24.0 MHz	N/A – limits output power if < 20MHz	N/A
15.407(a)(2)	A9.2(2)	Output Power	12.6 dBm (0.018 W)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a)(2))		Power Spectral Density	-0.17 dBm/MHz	3.5 dBm/MHz	Complies

General requirements for all bands

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
	A9.5a	Modulation	Digital Modulation is used	Digital modulation is required	Complies
15.407(b)(5) / 15.209	A9.3	Spurious Emissions below 1GHz	No emissions below 1 GHz were found	Refer to Standard	Complies
15.407(b)(2)	A9.3	Spurious Emissions above 1GHz	53.6dBμV/m (478.6μV/m) @ 5458.9MHz	Refer to Standard	Complies (- 0.4 dB)
15.407(a)(6)	-	Peak Excursion Ratio	11.5 dB	< 13dB	Complies
	A9.5 (3)	Channel Selection	Spurious emissions tested at outermost channels in each band	Device was tested on the top, bottom and center channels in each band	N/A
15			Measurements on three channels in each band		Complies
15.407 (c)	A9.5(4)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5 (5)	Frequency Stability	Frequency stability is better than 10ppm		Complies
15.407 (h1)	A9.4	Transmit Power Control	TPC is not required as the device operates at below 500mW eirp	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm	Complies

				(250mW)	
15.407 (h2)	A9.4	Dynamic frequency Selection (device with radar detection)	Refer to separate test report, reference R69788	Threshold -62dBm (-64dBm if eirp > 200mW) Channel Availability Check > 60s Channel closing transmission time < 260ms Channel move time < 10s Non occupancy period > 30minutes	Complies
	A9.9g	User Manual information	Refer to Exhibit 6 for details		Complies

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 system is professionally installed	Refer to Standard	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	44.0dB μ V/m (158.5 μ V/m) @ 1250.2MHz	Refer to standard	Complies (- 10.0 dB)
15.207	RSS GEN Table 2	AC Conducted Emissions		Refer to standard	Refer to DTS test report
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies

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	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS**GENERAL**

The Meru Networks model OAP 180 is a Out Door Dual Radio WLAN Access Point that is designed to provide wireless access. 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 POE.

The sample was received on November 5, 2007 and tested on November 5, November 6, November 7, November 16, November 30, 2007 and February 21, 2008. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Meru Network	OAP 180	Access Point	320AP180000E6 04027F	RE7-OAP180R2

ANTENNA SYSTEM

There are three antennas tested for the UNII bands: (1) 8dBi Omni for 5250-5350 MHz band, (2) 8dBi Omni for 5470-5725 MHz band and (3) 13.5 dBi Sector. The system is professionally installed, therefore complying with the requirements of 15.203.

ENCLOSURE

The EUT enclosure is primarily constructed of metal . It measures approximately 19 cm wide by 19 cm deep by 7 cm high.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for emissions testing:

Manufacturer	Model	Description	Serial Number	FCC ID
Acer	TravelMate 2300	Laptop	tlxt5605364508022ac em13	MCLT60N871
Netgear	5 Port 10/100/1000M Switch GS605 v2	Switch	1FE1715X00471	-
3com	PW130	I.T.E Power supply	P/N# 61-0127-001	-

No remote support equipment was used during emissions testing.

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
EUT/Console	Laptop	Serial	Shielded	2.0
EUT/LAN	3Com/POE	Cat 5	shielded	30.0
Switch/Ethernet	Laptop	Cat 5	Unshielded	2.0
3Com/Ethernet	Switch	Cat 5	Unshielded	2.0
3Com PW130	AC Mains	2Wire	Unshielded	1.5
Laptop	AC Mains	3Wire	Unshielded	1.5
Switch	AC Mains	2Wire	Unshielded	1.5

Note: The 5V DC port was not connected during testing. The manufacturer stated that they have the option of using POE, therefore, POE was used throughout all tests.

EUT OPERATION

During testing the EUT was configured to continuously transmit (or receive) on the desired channel.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on November 5, November 6, November 7, November 16, November 30, 2007 and February 21, 2008 at the Elliott Laboratories Open Area Test Site #1 and 2 located at 684 West Maude Avenue, Sunnyvale, California. 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.

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains 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 C63.4:2003.

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 C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 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 20Hz, 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 1000MHz 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.

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 C63.4:2003 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. 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 C63.4:2003, and the worst-case orientation is used for final measurements.

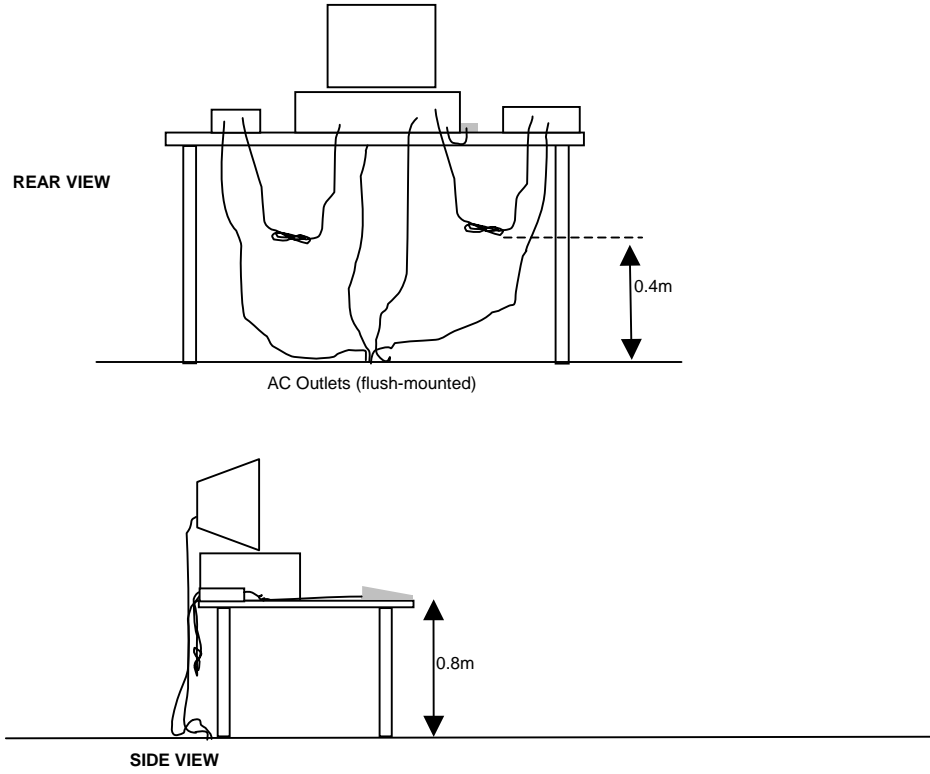
RADIATED EMISSIONS

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.

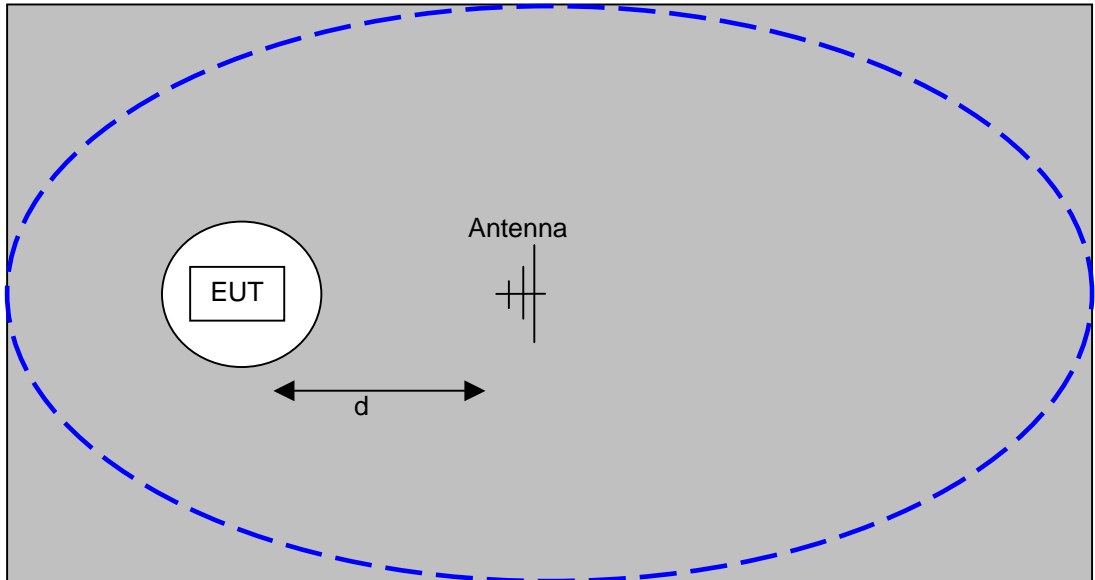
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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 1m). 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.

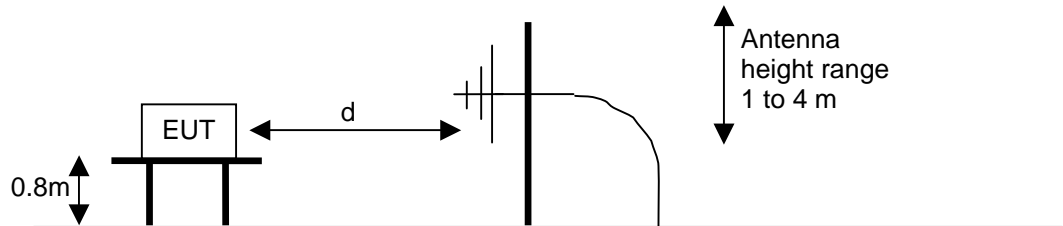
When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



Typical Test Configuration for Radiated Field Strength Measurements



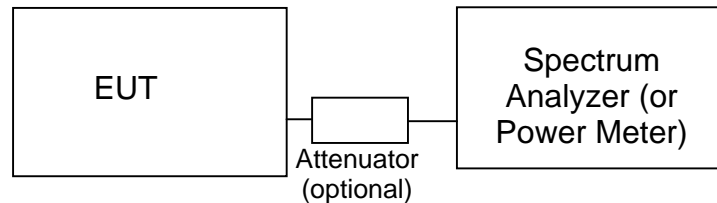
The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances (d) of 3m and 10m. Refer to the test data tables for the actual measurement distance.



Test Configuration for Radiated Field Strength Measurements
OATS- 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 Elliott'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 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.

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 (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV 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:

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands¹ (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 (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{\text{KHz}} @ 300\text{m}$	$67.6-20*\log_{10}(F_{\text{KHz}}) @ 300\text{m}$
0.490-1.705	$24000/F_{\text{KHz}} @ 30\text{m}$	$87.6-20*\log_{10}(F_{\text{KHz}}) @ 30\text{m}$
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

FCC 15.407 (a) OUTPUT POWER LIMITS

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
5150 - 5250	50mW (17 dBm)	4 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5725 - 5825	1 Watts (30 dBm)	17 dBm/MHz

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

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

OUTPUT POWER AND SPURIOUS LIMITS –LE-LAN DEVICES

The table below shows the limits for output power and output power density defined by RSS 210. 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
5150 - 5250	200mW (23 dBm) eirp	10 dBm/MHz eirp
5250 - 5350	250 mW (24 dBm) ¹ 1W (30dBm) eirp	11 dBm/MHz
5470 - 5725	250 mW (24 dBm) ² 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm) 4W eirp	17 dBm/MHz

In addition, the power spectral density limit shall be reduced by 1dB for every dB the highest power spectral density exceeds the “average” power spectral density, determined by dividing the output power by $10\log(99\% \text{ bandwidth})$, by more than 3dB.

Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

OUTPUT POWER AND SPURIOUS LIMITS –UNII DEVICES

The table below shows the limits for output power and output power density defined by FCC Part 15 Subpart E. 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
5150 - 5250	50mW (17 dBm)	10 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5470 - 5725	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

The peak excursion envelope is limited to 13dB.

¹ If EIRP exceeds 500mW the device must employ TPC

² If EIRP exceeds 500mW the device must employ TPC

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

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 30MHz, is calculated by using the following formula:

$$F_d = 20 * \text{LOG}_{10} (D_m/D_s)$$

where:

$$F_d = \text{Distance Factor in dB}$$

$$D_m = \text{Measurement Distance in meters}$$

$$D_s = \text{Specification Distance in meters}$$

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:

$$F_d = 40 * \text{LOG}_{10} (D_m/D_s)$$

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:

$$R_r = \text{Receiver Reading in dBuV/m}$$

$$F_d = \text{Distance Factor in dB}$$

$$R_c = \text{Corrected Reading in dBuV/m}$$

$$L_s = \text{Specification Limit in dBuV/m}$$

$$M = \text{Margin in dB Relative to Spec}$$

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 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 30 - 40,000 MHz, 06-Nov-07**Engineer: Rafael Varelas**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	07-Jun-08
Hewlett Packard	High Pass filter, 8.2 GHz (Blu System)	P/N 84300-80039 (84125C)	1392	29-May-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FMT (SA40) Blue	8564E (84125C)	1393	17-Jan-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	15-Nov-07

Radio Antenna Port (Power and Spurious Emissions), 06-Nov-07**Engineer: Suhaila Khushzad**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FMT (SA40) Blue	8564E (84125C)	1393	17-Jan-08

Radio Antenna Port (Spurious Emissions), 09-Nov-07**Engineer: Suhaila hushzad**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	780	09-Oct-08
EMCO	Antenna, Horn, 1-18GHz	3115	868	26-Apr-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	08-Oct-08

Spurious Emissions), 16-Nov-07**Engineer: Suhaila Khushzad**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	07-Jun-08
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FMT (SA40) Blue	8564E (84125C)	1393	17-Jan-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	06-Nov-08

Radio Antenna Port (Spurious Emissions), 21-Feb-08**Engineer: Wayne Fisher**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	24-May-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	08-Nov-08
Hewlett Packard	Spectrum Analyzer 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08
Hewlett Packard	High Pass filter, 8.2 GHz (Red System)	P/N 84300-80039 (84125C)	1152	15-Oct-08

EXHIBIT 2: Test Measurement Data

58 Pages



EMC Test Data

Client:	Meru Networks	Job Number:	J69679
Model:	OAP 180	T-Log Number:	T69814
		Account Manager:	Richard Gencev
Contact:	John Dorsey		-
Emissions Standard(s):	FCC Part 15.247/RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	

EMC Test Data

For The

Meru Networks

Model

OAP 180

Date of Last Test: 3/10/2008



EMC Test Data

Client:	Meru Networks	Job Number:	J69679
Model:	OAP 180	T-Log Number:	T69814
Contact:	John Dorsey	Account Manger:	Richard Gencev
Emissions Standard(s):	FCC Part 15.247/RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	enter on cover

EUT INFORMATION

The following information was collected during the test session(s).

General Description

The EUT is a Out Door Dual Radio WLAN Access Point that is designed to provide wireless access. 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 POE.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Meru Network	OAP 180	Access Point	320AP180000E604027F	RE7-OAP180R2

Other EUT Details

None

EUT Antenna (Intentional Radiators Only)

There are two antennas included in this testing: (1) 8dBi Omni and (2) 13.5 dBi Sector
 The antenna connects to the EUT via a non-standard reverse gender SMA antenna connector, thereby meeting the requirements of FCC 15.203.

EUT Enclosure

The EUT enclosure is primarily constructed of metal . It measures approximately 19 cm wide by 19 cm deep by 7 cm high.

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer or system.

Modification History

Mod. #	Test	Date	Modification
1			
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manger: Richard Gencev
Emissions Standard(s): FCC Part 15.247/RSS-210	Class: -
Immunity Standard(s): -	Environment: Enter on cover

Test Configuration #1

The following information was collected during the test session(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Acer	TravelMate 2300	Laptop	tlxt5605364508022acem1 3	MCLT60N871
Netgear	5 Port 10/100/1000M Switch GS605 v2	Switch	1FE1715X00471	-
3com	PW130	I.T.E Power supply	P/N# 61-0127-001	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	-	-	-	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
EUT/Console	Laptop	Serial	Shielded	2.0
EUT/LAN	3Com/POE	Cat 5	shielded	30.0
Switch/Ethernet	Laptop	Cat 5	Unshielded	2.0
3Com/Ethernet	Switch	Cat 5	Unshielded	2.0
3Com PW130	AC Mains	2Wire	Unshielded	1.5
Laptop	AC Mains	3Wire	Unshielded	1.5
Switch	AC Mains	2Wire	Unshielded	1.5

Note: The 5V DC port was not connected during testing. The manufacturer stated that they have the option of using POE, therefore, POE was used throughout all tests.

EUT Operation During Emissions Testing

During testing the EUT was configured to continuously transmit (or receive) on the desired channel.

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

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

Date of Test: 2/21/2008 16:05
 Test Engineer: Wayne Fisher
 Test Location: SVOATS #1

Config. Used: 1
 Config Change: None
 EUT Voltage: POE 48VDC

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT with all I/O connections running on top of the groundplane or routed in overhead in the GR-1089 test configuration.

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

Ambient Conditions: Temperature: 14 °C
 Rel. Humidity: 67 %

Summary of Results

Run #1	TX Mode	Channel	Power Setting	Pass/Fail	Result / Margin
1b	a	5600	15dBm	Pass	46.8dB μ V/m @ 11200.2MHz (-7.2dB)
1c	a	5700	10dBm	Pass	51.6dB μ V/m @ 11399.5MHz (-2.4dB)

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: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #1b: Radiated Spurious Emissions, 30 - 40,000 MHz. Center Channel @ 5600 MHz
Software Power Setting: 15dBm

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11200.170	46.8	V	54.0	-7.2	AVG	297	1.0	
11202.080	46.7	H	54.0	-7.3	AVG	226	1.4	
11202.080	59.5	H	74.0	-14.5	PK	226	1.4	
11200.170	58.9	V	74.0	-15.1	PK	297	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (-68dBuV/m).

Run #1c: Radiated Spurious Emissions, 30 - 40,000 MHz. High Channel @ 5700 MHz
Software Power Setting: 10dBm

Other Spurious Radiated Emissions:

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
11399.470	51.6	V	54.0	-2.4	AVG	95	1.1	
11404.390	47.9	H	54.0	-6.1	AVG	221	1.0	
11399.470	63.6	V	74.0	-10.4	PK	95	1.1	
11404.390	60.0	H	74.0	-14.0	PK	221	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (-68dBuV/m).

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

**Radiated Spurious Emissions
(FCC Part 15.E and RSS-210 A9)**

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.

Summary of Results

Run #	Freq MHz	Mode	Antenna	Power Setting	Limit	Margin/Result
1a	5270	a	8 dBi	18	15.209/15.407(b)/ RSS-210 A9 and 2.6	52.8dBµV/m (436.5µV/m) @ 5147.5MHz (-1.2dB)
1b	5300	a	8 dBi	18	15.209/15.407(b)/ RSS-210 A9 and 2.6	44.3dBµV/m (164.1µV/m) @ 15900.5MHz (-9.7dB)
1c	5320	a	8 dBi	15	15.209/15.407(b)/ RSS-210 A9 and 2.6	47.8dBµV/m (245.5µV/m) @ 15960.3MHz (-6.2dB)
2a	5500	a	8 dBi	20	15.209/15.407(b)/ RSS-210 A9 and 2.6	53.4dBµV/m (467.7µV/m) @ 5459.8MHz (-0.6dB)

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.

Antenna Information

Omni Antenna	4900-5350MHz	8dBi	P/N: ACC04-202130	S/N: 7I100037
Omni Antenna	5470-5875MHz	8dBi	P/N: MIN386628000E	S/N: 7K100143

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Date of Test: 11/30/2007 Config. Used: 1
 Test Engineer: Mehran Birgani Config Change: None
 Test Location: SVOATS #2 EUT Voltage: POE

Ambient Conditions: Temperature: 10 °C
 Rel. Humidity: 58 %

Run #1a: Radiated Spurious Emissions, 30 - 40000 MHz. Low Channel @ 5270 MHz
Software Power Setting: 18dBm

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	100.5	117.2	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	92.4	108.7	Average Measurement (RB=1MHz, VB=10Hz)

Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5147.500	52.8	V	54.0	-1.2	AVG	202	1.0	
5147.500	66.2	V	74.0	-7.8	PK	202	1.0	

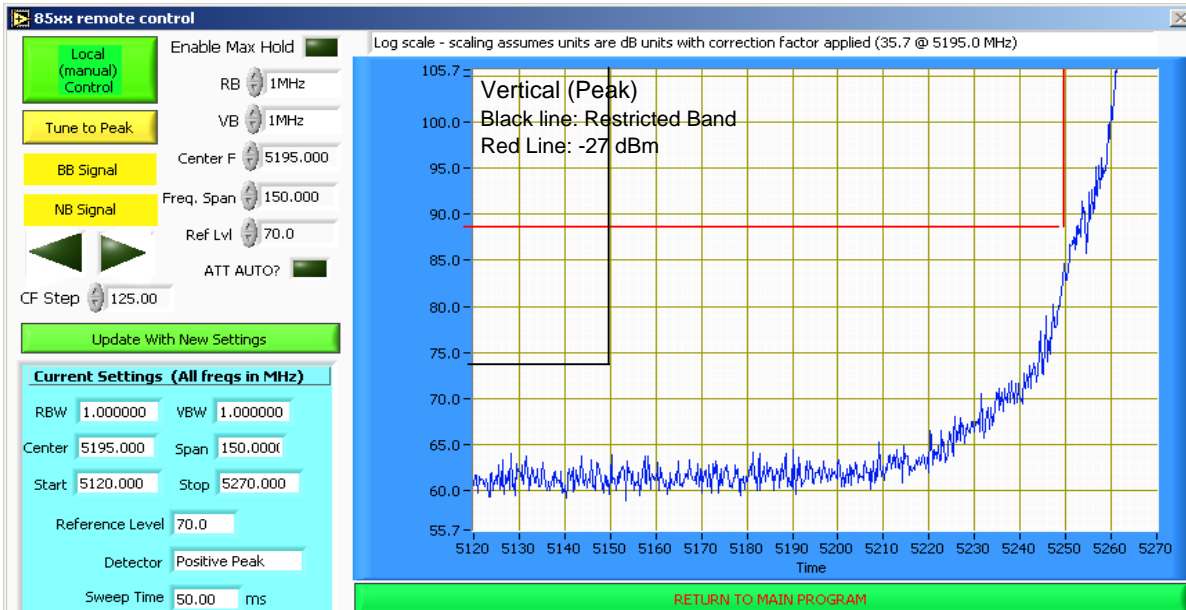
Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
10541.270	42.7	V	54.0	-11.3	AVG	344	1.0	Unrestricted with restricted limit
15814.770	42.5	V	54.0	-11.5	AVG	225	1.0	
15807.170	41.8	H	54.0	-12.2	AVG	300	1.0	
10541.400	39.4	H	54.0	-14.6	AVG	104	1.8	Unrestricted with restricted limit
15807.170	55.3	H	74.0	-18.7	PK	300	1.0	
15814.770	54.8	V	74.0	-19.2	PK	225	1.0	
10541.270	53.9	V	74.0	-20.1	PK	344	1.0	Unrestricted with restricted limit
10541.400	51.0	H	74.0	-23.0	PK	104	1.8	Unrestricted with restricted limit

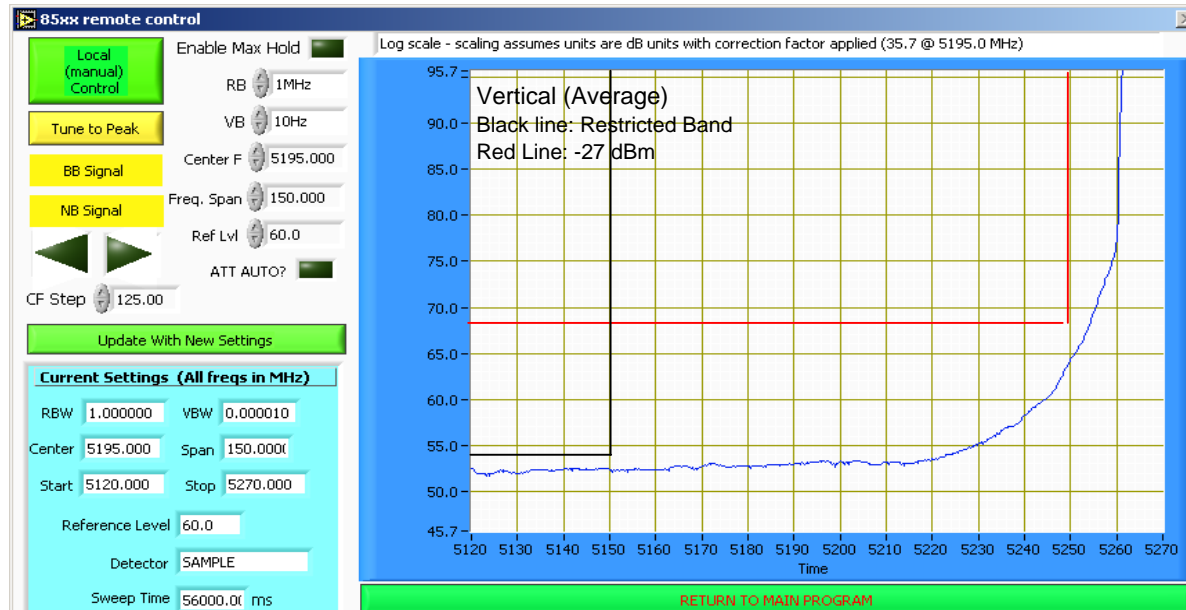
Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68.3dBuV/m).

Note 2: Band-edge measurement was performed radiated at 3m distance.

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #1b: Radiated Spurious Emissions, 30 - 40000 MHz. Center Channel @ 5300 MHz
Software Power Setting: 18dBm

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	101.2	116.8	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	91.5	108.3	Average Measurement (RB=1MHz, VB=10Hz)

Frequency MHz	Level dB μ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
15900.500	44.3	V	54.0	-9.7	AVG	127	1.0	
15898.230	42.4	H	54.0	-11.6	AVG	274	1.0	
10600.500	42.4	V	54.0	-11.6	AVG	40	1.0	
10599.070	40.7	H	54.0	-13.3	AVG	284	1.2	Unrestricted with restricted limit
15900.500	57.1	V	74.0	-16.9	PK	127	1.0	
15898.230	54.6	H	74.0	-19.4	PK	274	1.0	
10600.500	54.1	V	74.0	-19.9	PK	40	1.0	
10599.070	51.8	H	74.0	-22.2	PK	284	1.2	Unrestricted with restricted limit

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (-68.3dBuV/m).

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #1c: Radiated Spurious Emissions, 30 - 40000 MHz. High Channel @ 5320 MHz
Software Power Setting: 15dBm

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	97.6	116.5	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	88.6	108.5	Average Measurement (RB=1MHz, VB=10Hz)

Band Edge Signal Radiated Field Strength

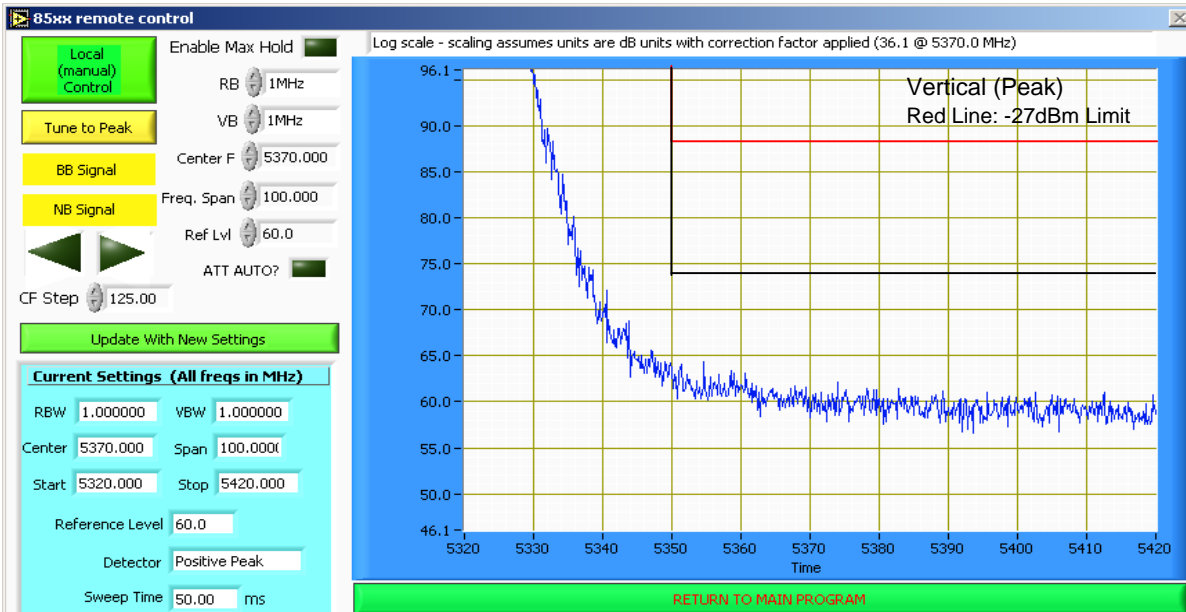
Frequency MHz	Level dB μ V/m	Pol V/H	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5350.140	53.6	V	54.0	-0.4	AVG	202	1.0	
5350.140	67.3	V	74.0	-6.7	PK	202	1.0	

Other Spurious Radiated Emissions:

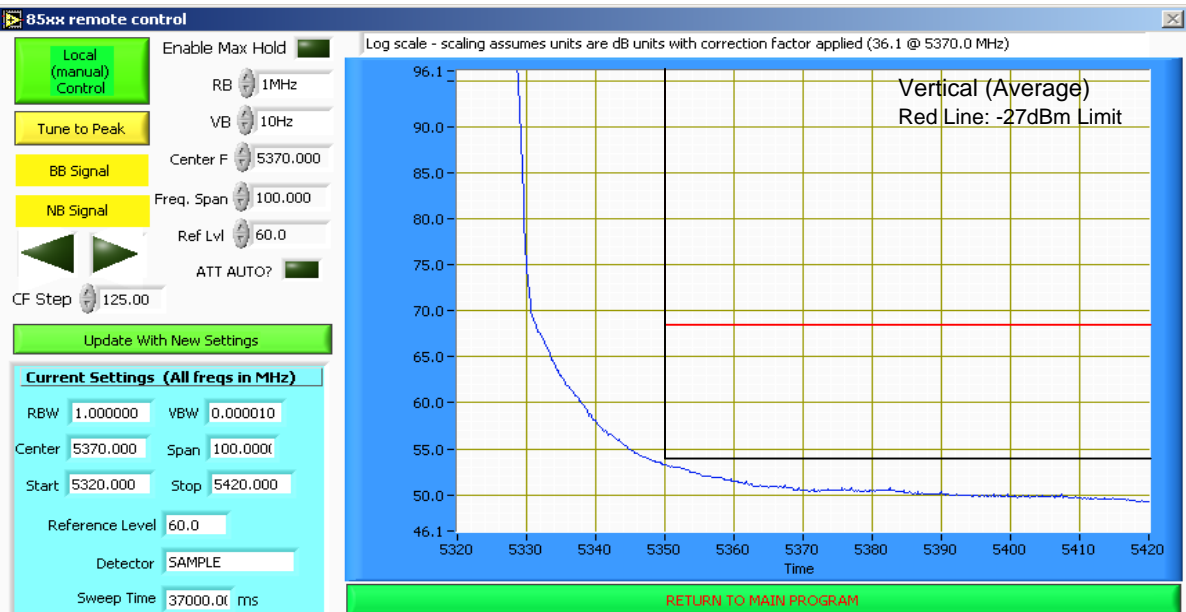
Frequency MHz	Level dB μ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
15960.270	47.8	V	54.0	-6.2	AVG	130	1.0	
10640.720	45.0	V	54.0	-9.0	AVG	356	1.1	
10645.300	41.3	H	54.0	-12.7	AVG	240	1.0	
15960.270	60.5	V	74.0	-13.5	PK	130	1.0	
10640.720	56.7	V	74.0	-17.3	PK	356	1.1	
10645.300	53.0	H	74.0	-21.0	PK	240	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (-68.3dBuV/m).

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.

Client:	Meru Networks	Job Number:	J69679
Model:	OAP 180	T-Log Number:	T69814
Contact:	John Dorsey	Account Manager:	Richard Gencev
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Date of Test: 11/30/2007 Config. Used: 1
 Test Engineer: Mehran Birgani Config Change: None
 Test Location: SVOATS #2 EUT Voltage: POE

Ambient Conditions: Temperature: 10 °C
 Rel. Humidity: 58 %

Run #2a: Radiated Spurious Emissions, 30 - 40000 MHz. Low Channel @ 5500 MHz
Software Power Setting: 20dBm

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	92.6	113.2	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	88.4	104.9	Average Measurement (RB=1MHz, VB=10Hz)

Band Edge Signal Radiated Field Strength

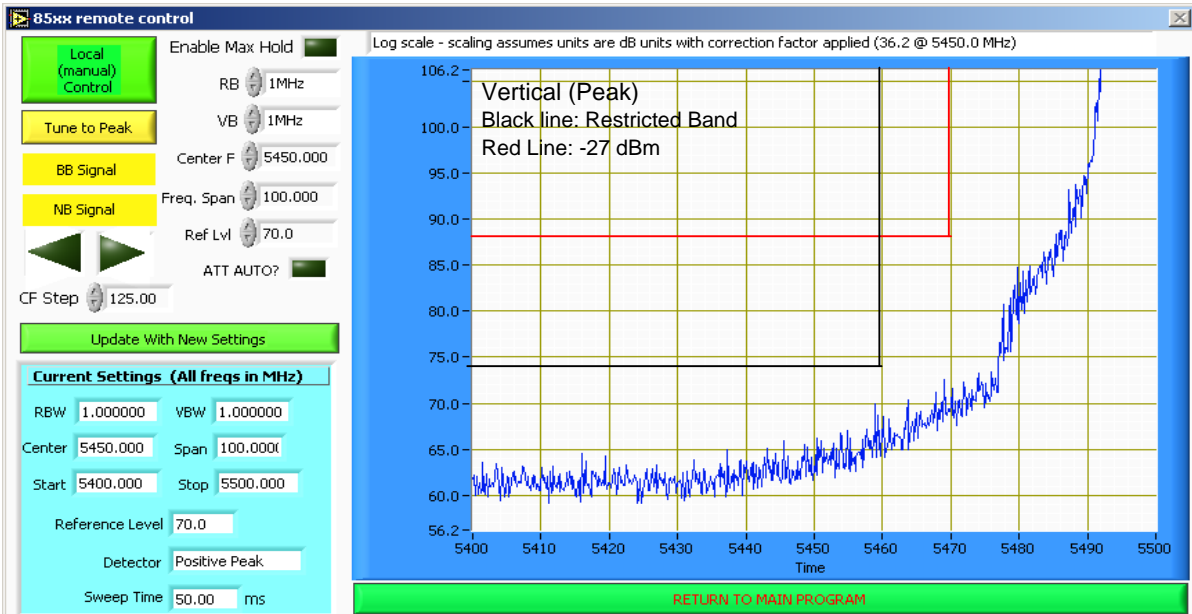
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5459.840	53.4	V	54.0	-0.6	AVG	213	1.2	
5459.840	66.8	V	74.0	-7.2	PK	213	1.2	

Other Spurious Radiated Emissions:

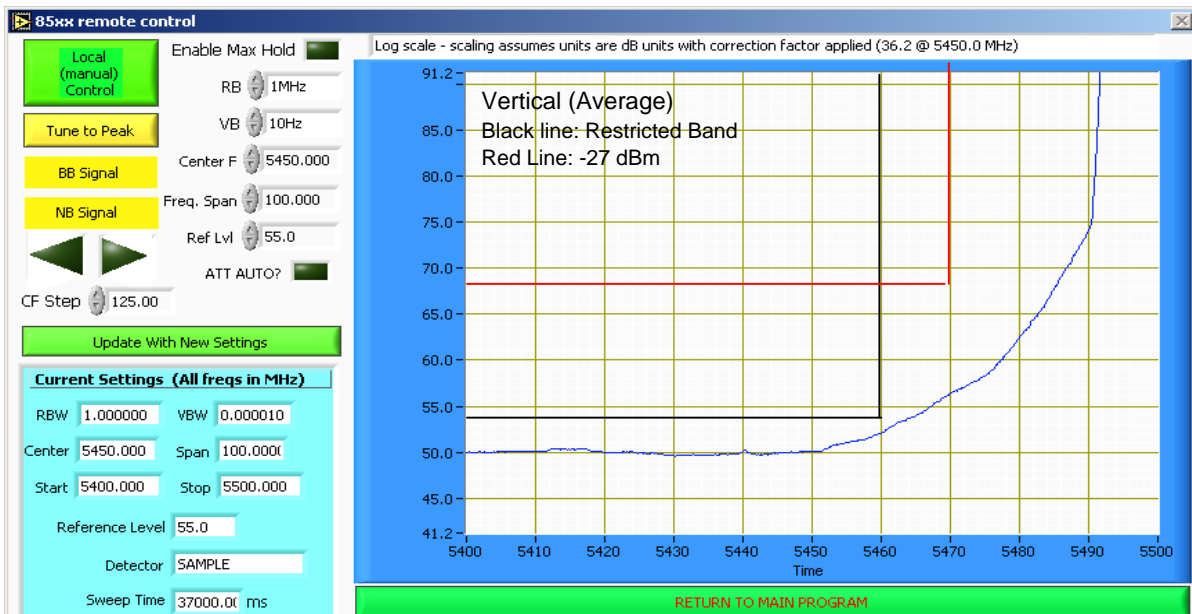
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
11001.970	50.4	V	54.0	-3.6	AVG	150	1.0	
11001.500	47.2	H	54.0	-6.8	AVG	241	1.5	
11001.970	63.9	V	74.0	-10.1	PK	150	1.0	
11001.500	59.3	H	74.0	-14.7	PK	241	1.5	
16502.330	52.1	V	68.3	-16.2	AVG	250	1.0	
16502.330	64.7	V	88.3	-23.6	PK	250	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (-68.3dBuV/m).
 Note 2: Band-edge measurement was performed radiated at 3m distance.

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Radiated Spurious Emissions - FCC Part 15.E and RSS-210 A9

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.

Summary of Results

Run #	Freq MHz	Mode	Antenna	Power Setting	Limit	Margin/Result
1	5270	a	13.5dBi	16.5	15.209/15.407(b)/ RSS-210 A9 and 2.6	67.8dB μ V/m (2454.7 μ V/m) @ 5249.9MHz (-0.5dB)
1	5300	a	13.5dBi	16.5	15.209/15.407(b)/ RSS-210 A9 and 2.6	44.5dB μ V/m (167.9 μ V/m) @ 10598.7MHz (-9.5dB)
1	5320	a	13.5dBi	16.5	15.209/15.407(b)/ RSS-210 A9 and 2.6	53.7dB μ V/m (484.2 μ V/m) @ 5351.7MHz (-0.3dB)
2	5500	a	13.5dBi	16.5	15.209/15.407(b)/ RSS-210 A9 and 2.6	53.6dB μ V/m (478.6 μ V/m) @ 5458.9MHz (-0.4dB)
2	5600	a	13.5dBi	15	15.209/15.407(b)/ RSS-210 A9 and 2.6	53.2dB μ V/m (457.1 μ V/m) @ 11198.6MHz (-0.8dB)
2	5700	a	13.5dBi	16.5	15.209/15.407(b)/ RSS-210 A9 and 2.6	51.9dB μ V/m (393.6 μ V/m) @ 11400.9MHz (-2.1dB)
3	5300	RX	13.5dBi	-	RSS-GEN 4.10	43.8dB μ V/m (154.9 μ V/m) @ 1250.2MHz (-10.2dB)
3	5600	RX	13.5dBi	-	RSS-GEN 4.10	44.0dB μ V/m (158.5 μ V/m) @ 1250.2MHz (-10.0dB)

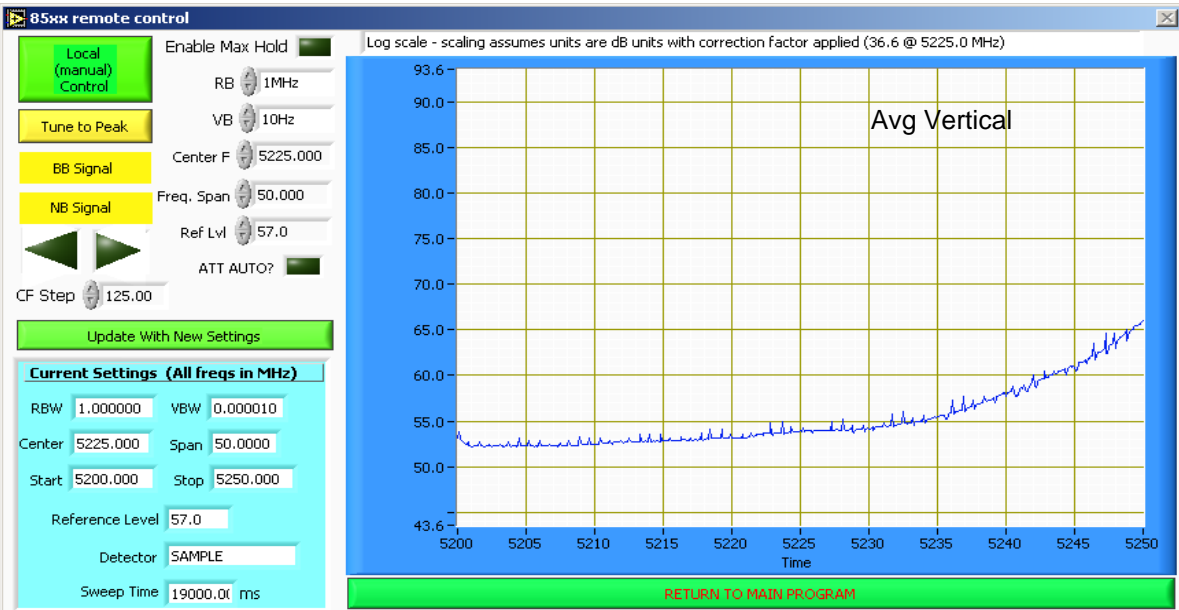
Modifications Made During Testing

No modifications were made to the EUT during testing

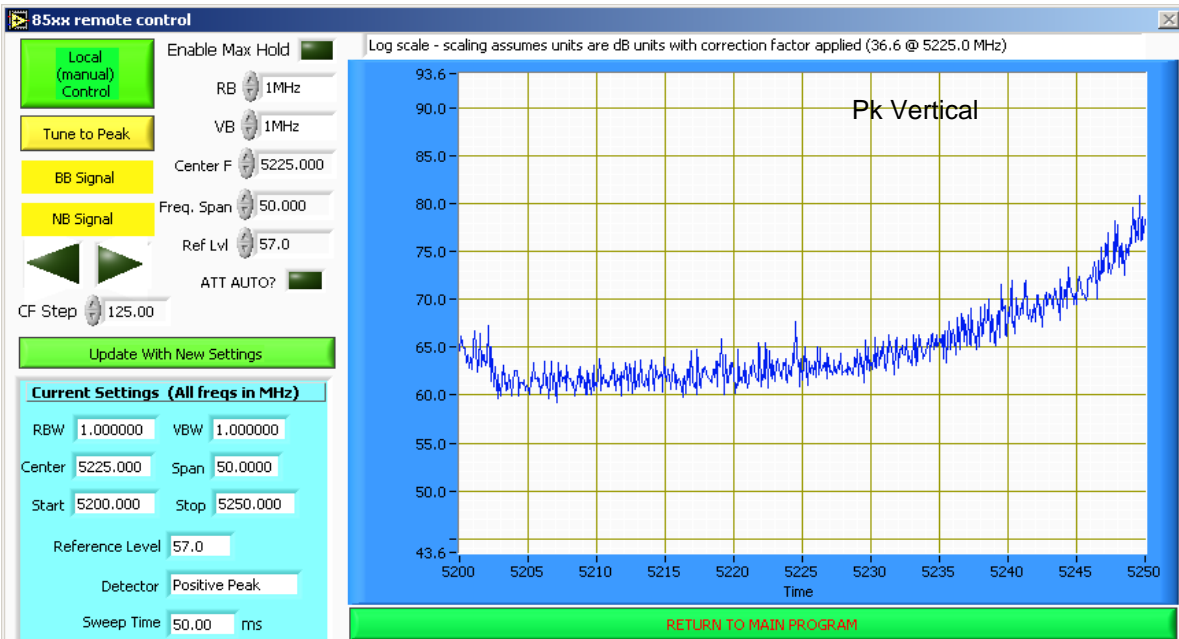
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A



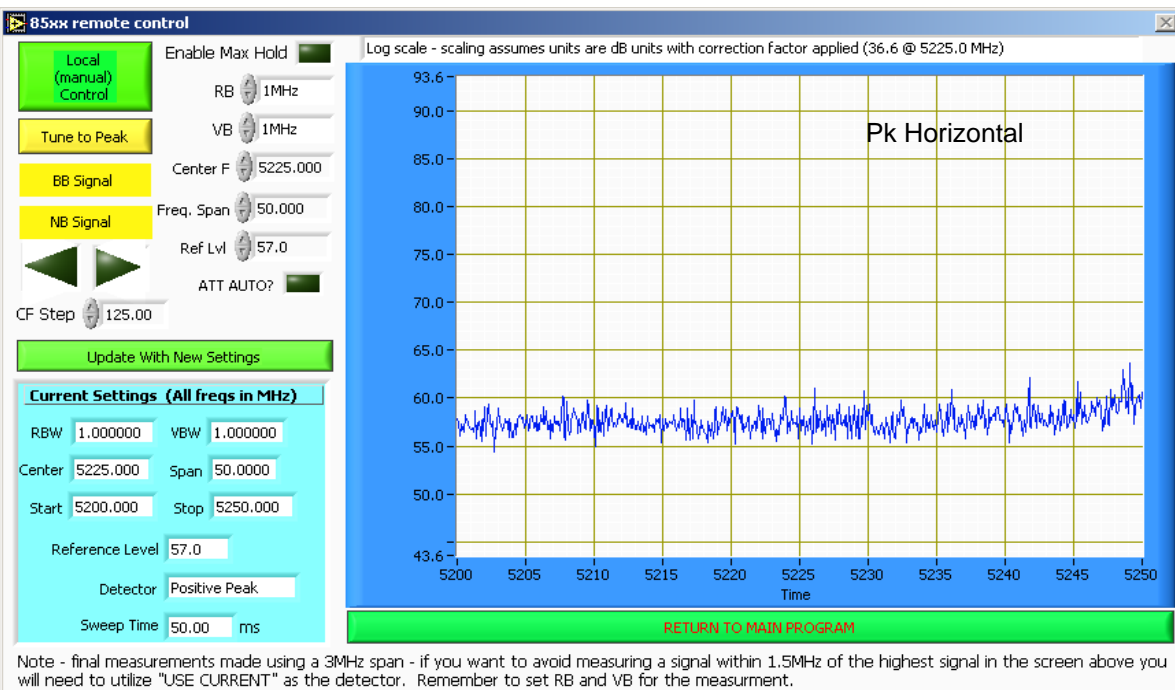
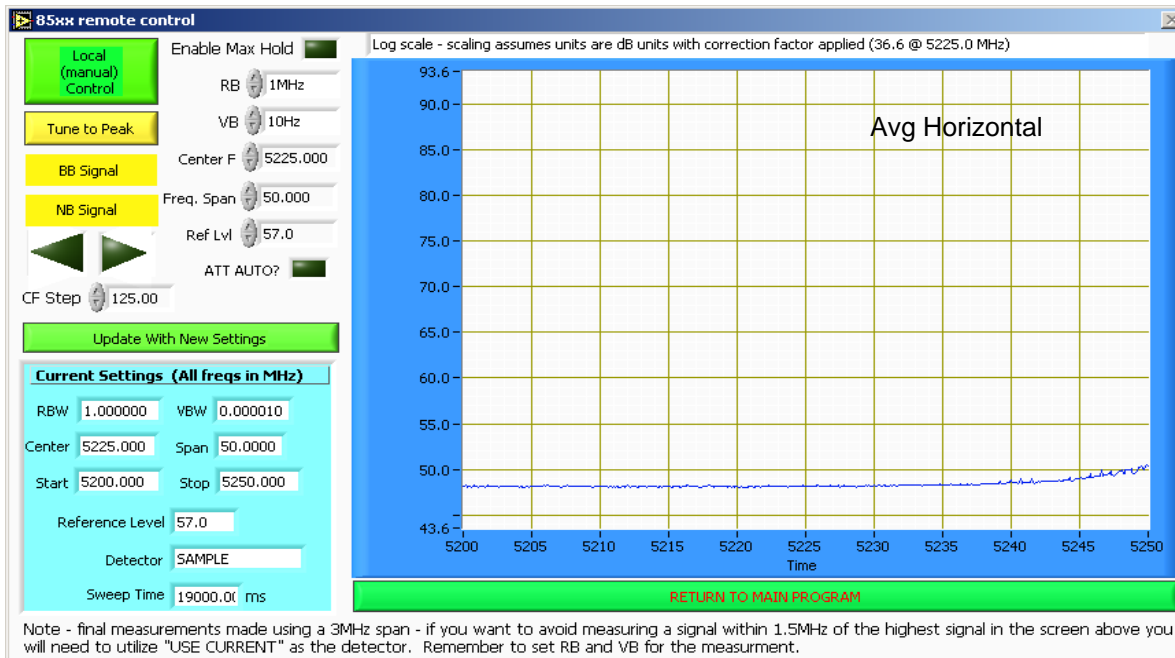
Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #1a: Continued



Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #1a: Continued

Other Spurious Radiated Emissions:

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10541.260	46.1	V	54.0	-7.9	AVG	308	1.0	
15808.510	41.8	V	54.0	-12.2	AVG	290	1.0	
10539.540	39.9	H	54.0	-14.1	AVG	316	1.0	
15808.710	39.2	H	54.0	-14.8	AVG	337	1.0	
10541.260	57.0	V	74.0	-17.0	PK	308	1.0	
15808.510	54.1	V	74.0	-19.9	PK	290	1.0	
10539.540	50.8	H	74.0	-23.2	PK	316	1.0	
15808.710	50.5	H	74.0	-23.5	PK	337	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).

Run #1b: TX Radiated Spurious Emissions, 30 - 40000 MHz. Center Channel @ 5300 MHz

Power Setting: 16.5

Antenna: 13.5dBi Sector with 0.5dB cable (LMR 400)

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10598.67	44.5	V	54.0	-9.5	AVG	304	1.0	
15899.21	42.3	V	54.0	-11.7	AVG	132	1.2	
10599.41	41.9	H	54.0	-12.1	AVG	293	1.1	
15898.67	40.2	H	54.0	-13.8	AVG	164	1.0	
10598.67	56.4	V	74.0	-17.6	PK	304	1.0	
10599.41	54.0	H	74.0	-20.0	PK	293	1.1	
15899.21	53.3	V	74.0	-20.7	PK	132	1.2	
15898.67	51.9	H	74.0	-22.1	PK	164	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).

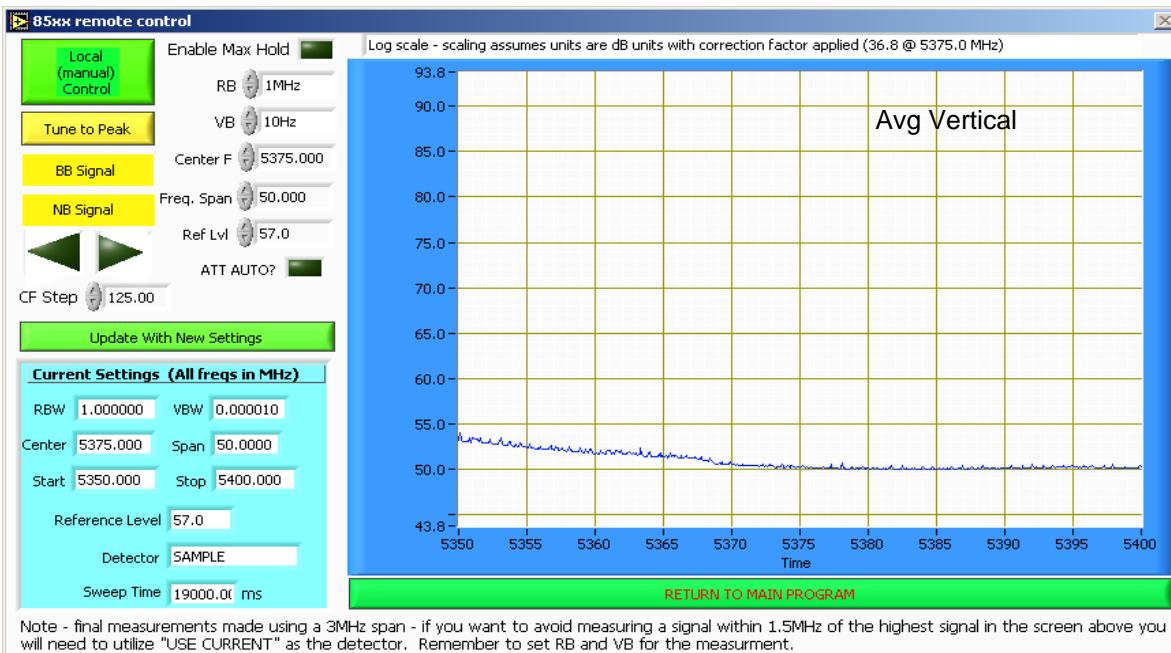
Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #1c: TX Radiated Spurious Emissions, 30 - 40000 MHz. High Channel @ 5320 MHz
 Power Setting: 16.5
 Antenna: 13.5dBi Sector with 0.5dB cable (LMR 400)

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5318.560	107.8	V	-	-	AVG	329	1.0	Fundamental
5318.560	116.9	V	-	-	PK	329	1.0	Fundamental
5319.520	87.9	H	-	-	AVG	308	1.1	Fundamental
5319.520	96.3	H	-	-	PK	308	1.1	Fundamental

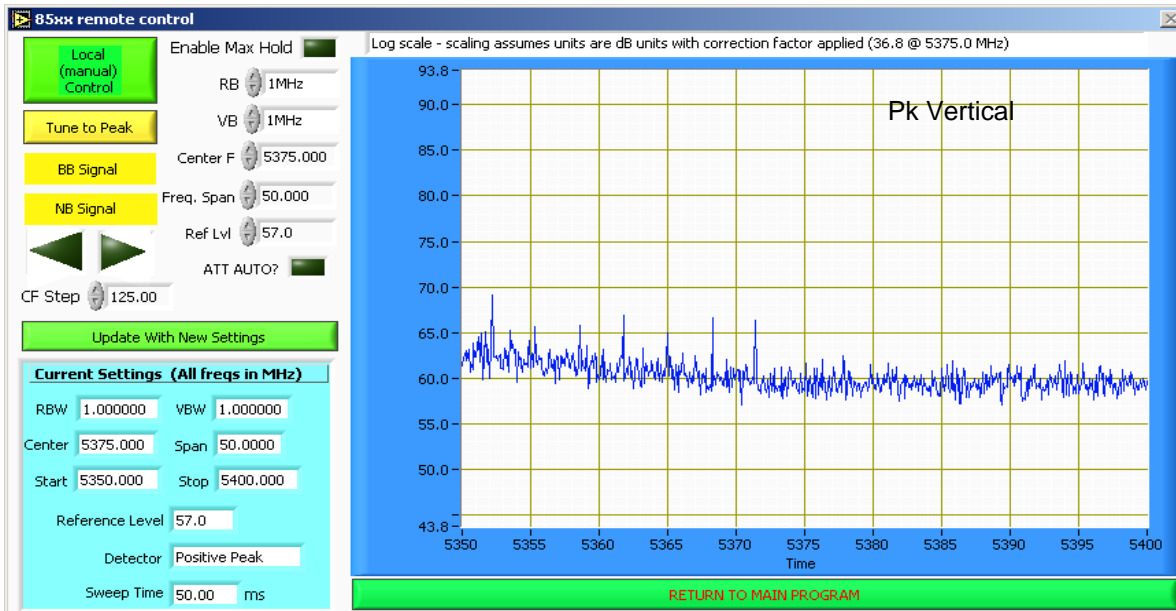
Band Edge Signal Radiated Field Strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5351.710	53.7	V	54.0	-0.3	Avg	329	1.0	
5352.880	71.3	V	74.0	-2.7	PK	329	1.0	
5350.730	48.2	H	54.0	-5.8	AVG	308	1.1	
5350.730	60.7	H	74.0	-13.3	PK	308	1.1	

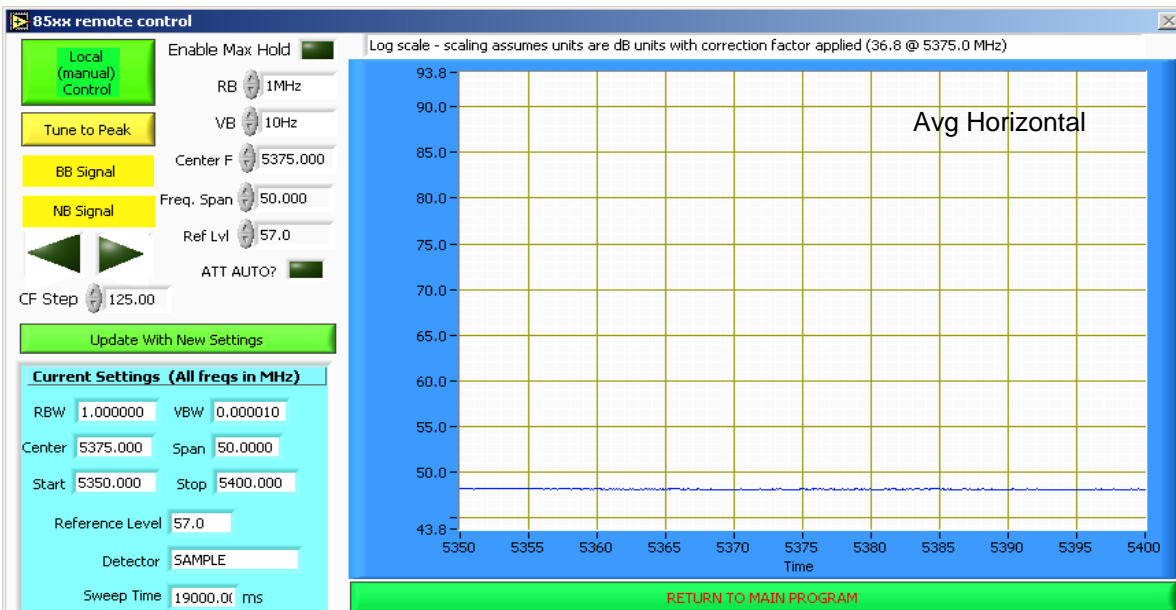


Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #1c: Continued



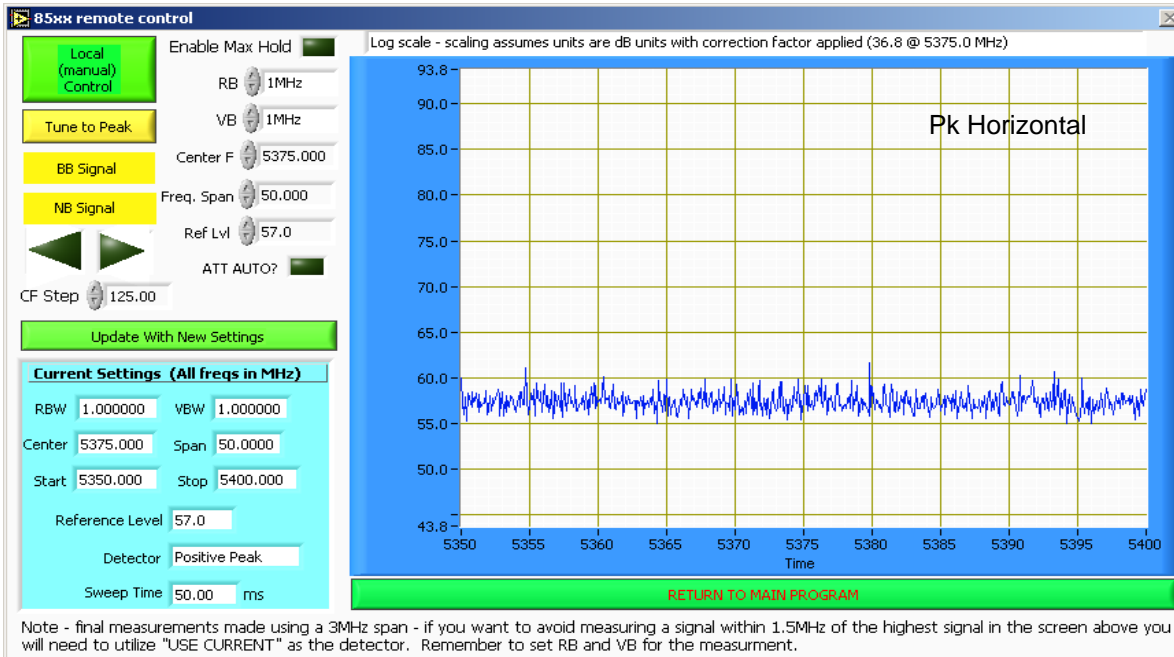
Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #1c: Continued



Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
10640.14	43.2	H	54.0	-10.8	AVG	316	1.0
10638.66	42.4	V	54.0	-11.6	AVG	331	1.0
15959.52	41.2	H	54.0	-12.8	AVG	108	1.2
15958.71	40.3	V	54.0	-13.7	AVG	300	1.0
10638.66	55.2	V	74.0	-18.8	PK	331	1.0
10640.14	54.5	H	74.0	-19.5	PK	316	1.0
15959.52	52.4	H	74.0	-21.6	PK	108	1.2
15958.71	51.2	V	74.0	-22.8	PK	300	1.0

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).

Client:	Meru Networks	Job Number:	J69679
Model:	OAP 180	T-Log Number:	T69814
		Account Manager:	Richard Gencev
Contact:	John Dorsey		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2: TX Radiated Spurious Emissions for 5470 to 5725 MHz band, 30 - 40000 MHz

Date of Test: 11/5/2007	Config. Used: 1
Test Engineer: Rafael Varelas	Config Change: None
Test Location: SVOATS #1	EUT Voltage: POE

Ambient Conditions:

Temperature:	17.8 °C
Rel. Humidity:	60 %

Run #2a: TX Radiated Spurious Emissions, 30 - 40000 MHz. Low Channel @ 5500 MHz

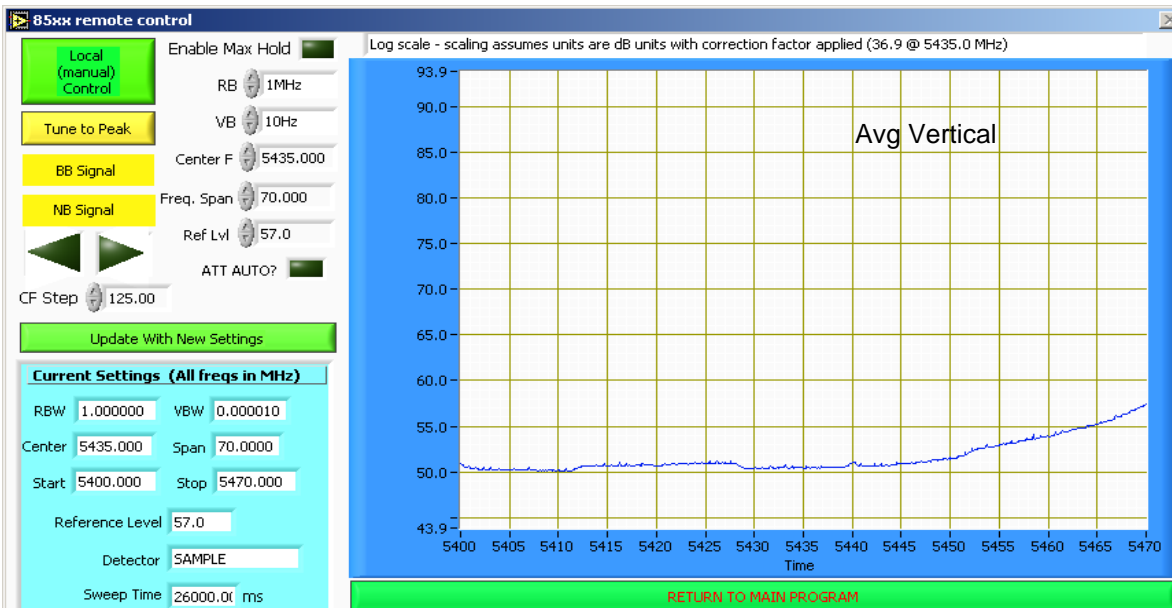
Power Setting: 16.5

Antenna: A (TX99)

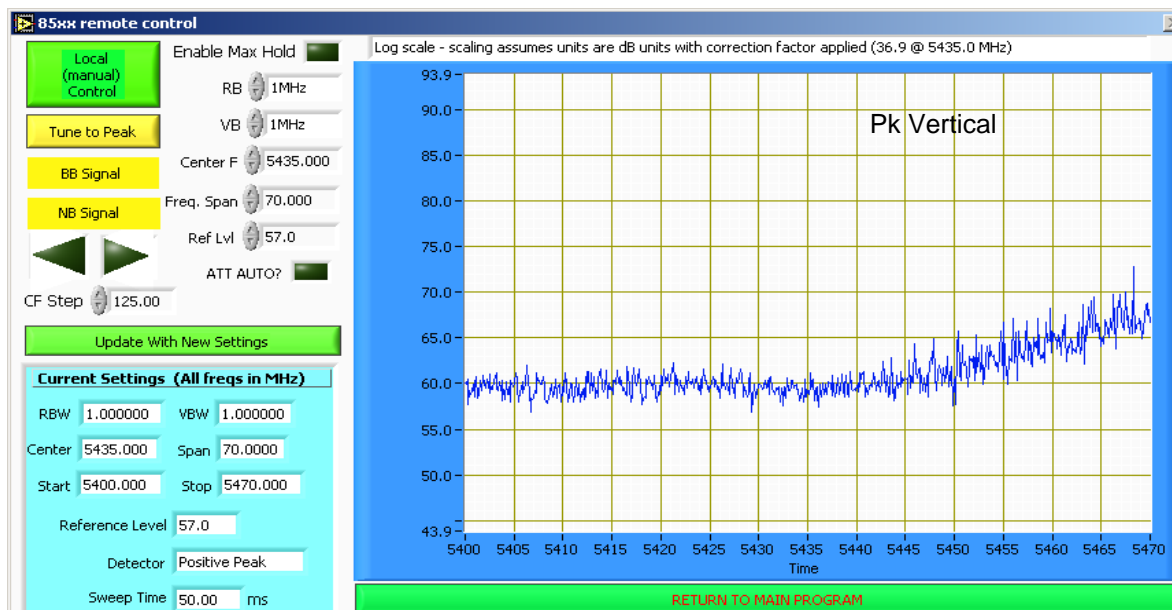
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5501.380	108.1	V	-	-	AVG	291	1.0	Fundamental
5501.380	117.2	V	-	-	PK	291	1.0	Fundamental
5501.210	87.9	H	-	-	AVG	168	1.2	Fundamental
5501.210	96.3	H	-	-	PK	168	1.2	Fundamental

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #2a: Continued



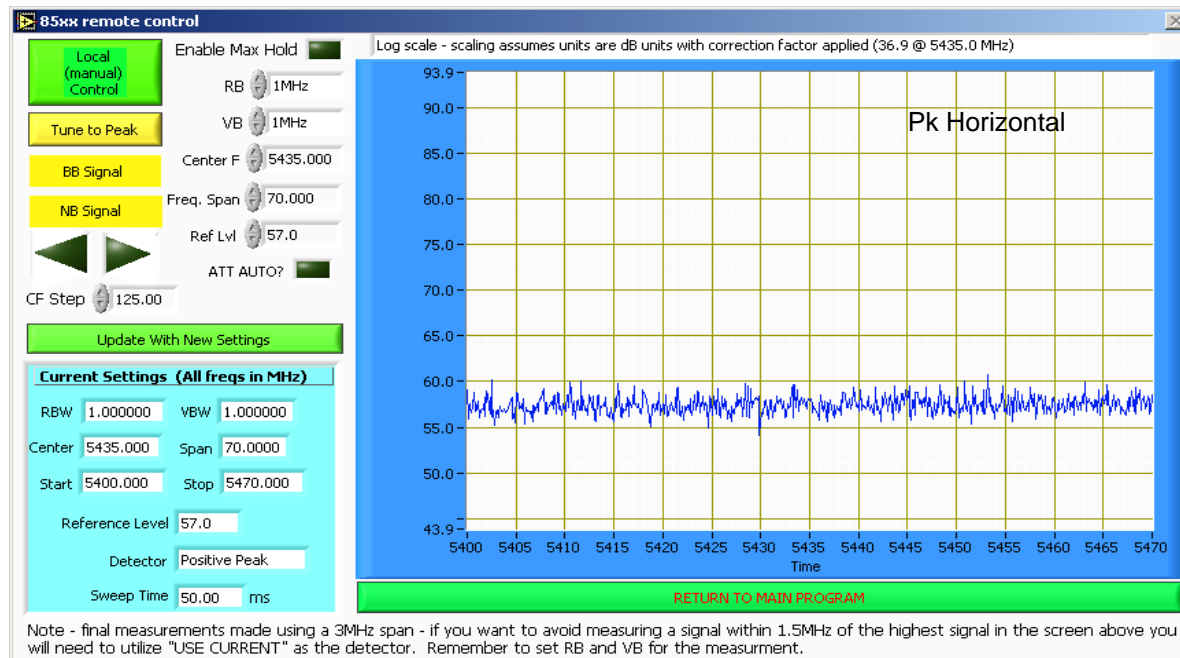
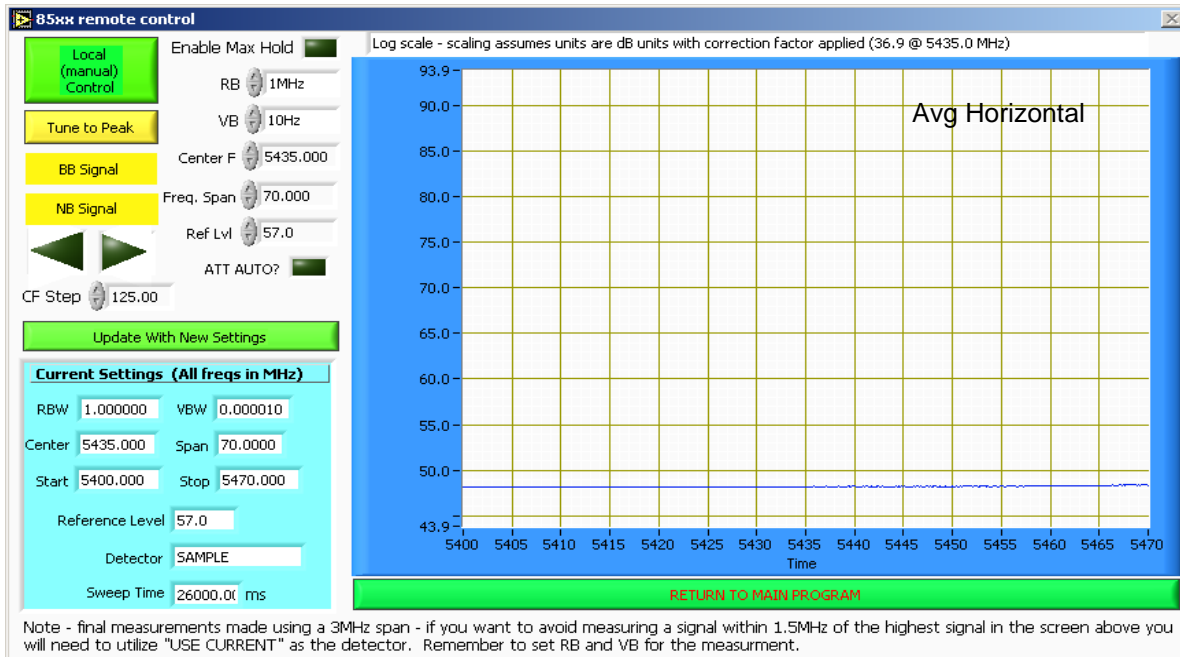
Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #2a: Continued



Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #2a: Continued

Band Edge Signal Radiated Field Strength - Restricted Band at 5.46 GHz

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5458.940	53.6	V	54.0	-0.4	Avg	291	1.0	
5459.560	71.6	V	74.0	-2.4	PK	291	1.0	
5459.850	48.5	H	54.0	-5.5	Avg	168	1.2	
5459.690	60.6	H	74.0	-13.4	PK	168	1.2	

Band Edge Signal Radiated Field Strength - 27dBm/MHz at 5470 MHz

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5469.750	60.2	V	68.3	-8.1	AVG	291	1.0	
5469.750	73.4	V	88.3	-14.9	PK	291	1.0	
5468.290	49.7	H	68.3	-18.6	AVG	168	1.2	
5468.290	60.9	H	88.3	-27.4	PK	168	1.2	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).

Run #2a: TX Radiated Spurious Emissions, 30 - 40000 MHz. Low Channel @ 5500 MHz

Power Setting: 16.5

Antenna: Tx 99

Other Spurious Radiated Emissions:

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10999.680	47.1	V	54.0	-6.9	AVG	315	1.0	
16498.740	45.2	V	54.0	-8.8	AVG	261	1.0	
11000.960	45.2	H	54.0	-8.8	AVG	283	1.0	
16499.710	44.7	H	54.0	-9.3	AVG	278	1.0	
10999.680	59.2	V	74.0	-14.8	PK	315	1.0	
16498.740	58.0	V	74.0	-16.0	PK	261	1.0	
11000.960	57.6	H	74.0	-16.4	PK	283	1.0	
16499.710	56.2	H	74.0	-17.8	PK	278	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dBuV/m).

Client:	Meru Networks	Job Number:	J69679
Model:	OAP 180	T-Log Number:	T69814
		Account Manager:	Richard Gencev
Contact:	John Dorsey		
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #2b: TX Radiated Spurious Emissions, 30 - 40000 MHz. Center Channel @ 5600 MHz
 Power Setting: Refer to test data below
 Antenna: Tx 99

Other Spurious Radiated Emissions:

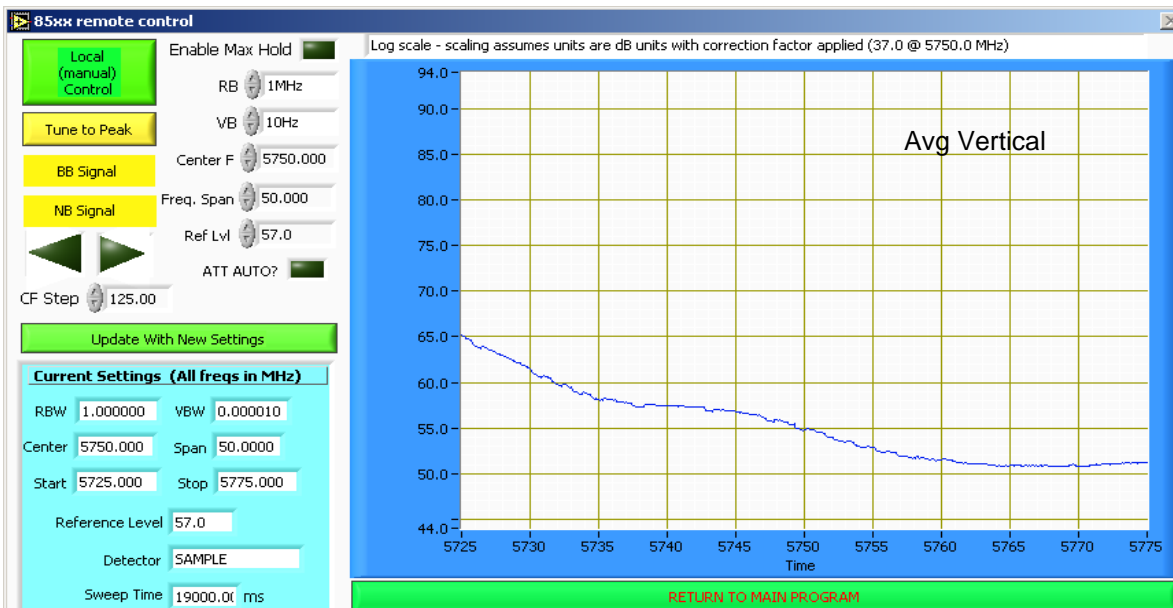
Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
Power setting = 15.0								
11198.620	53.2	V	54.0	-0.8	AVG	318	1.0	
11200.190	50.7	H	54.0	-3.3	AVG	132	1.3	
16798.670	47.9	H	54.0	-6.1	AVG	288	1.0	
16801.380	47.7	V	54.0	-6.3	AVG	281	1.0	
11198.620	65.0	V	74.0	-9.0	PK	318	1.0	
11200.190	63.3	H	74.0	-10.7	PK	132	1.3	
16798.670	60.7	H	74.0	-13.3	PK	288	1.0	
16801.380	59.3	V	74.0	-14.7	PK	281	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (-68dB μ V/m).

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #2c: TX Radiated Spurious Emissions, 30 - 40000 MHz. High Channel @ 5700 MHz
 Power Setting: 16.5
 Antenna: Tx 99

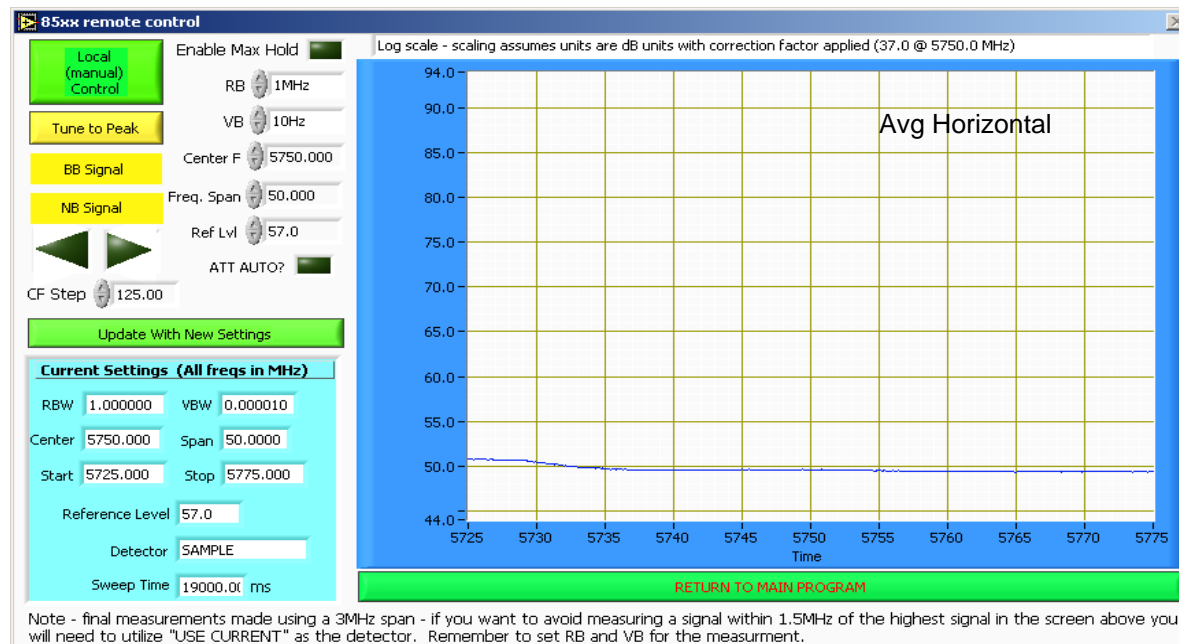
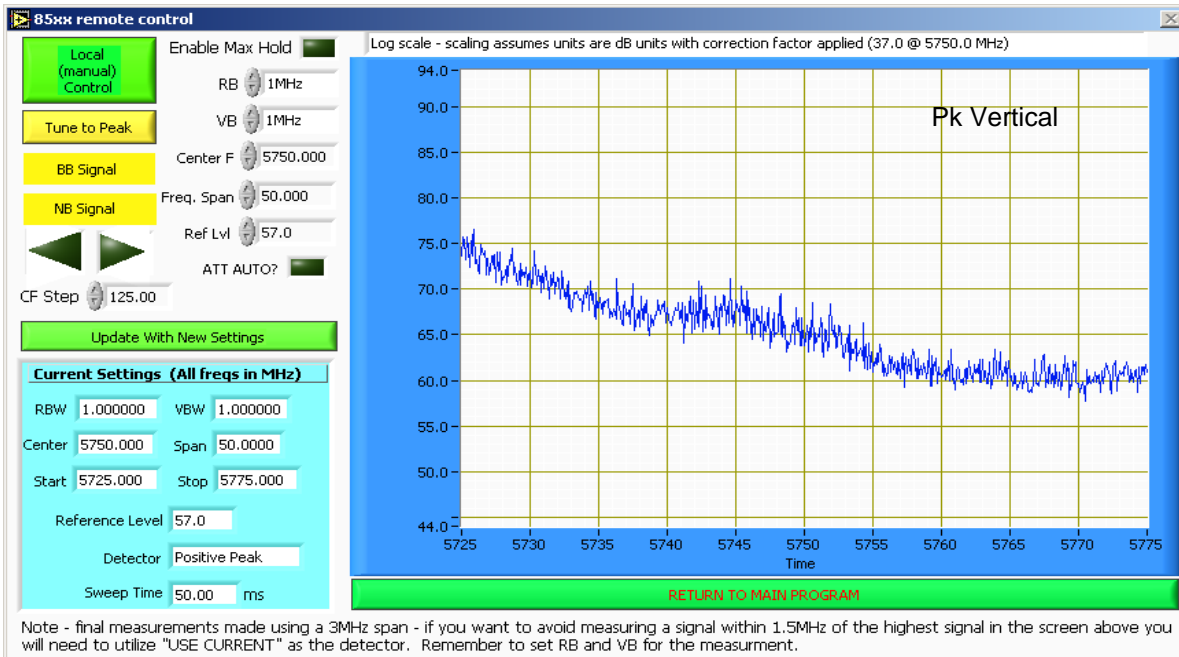
Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5698.830	109.2	V	-	-	AVG	284	1.0	Fundamental
5698.830	117.6	V	-	-	PK	284	1.0	Fundamental
5699.060	90.0	H	-	-	AVG	275	1.1	Fundamental
5699.060	98.2	H	-	-	PK	275	1.1	Fundamental



Note - final measurements made using a 3MHz span - if you want to avoid measuring a signal within 1.5MHz of the highest signal in the screen above you will need to utilize "USE CURRENT" as the detector. Remember to set RB and VB for the measurement.

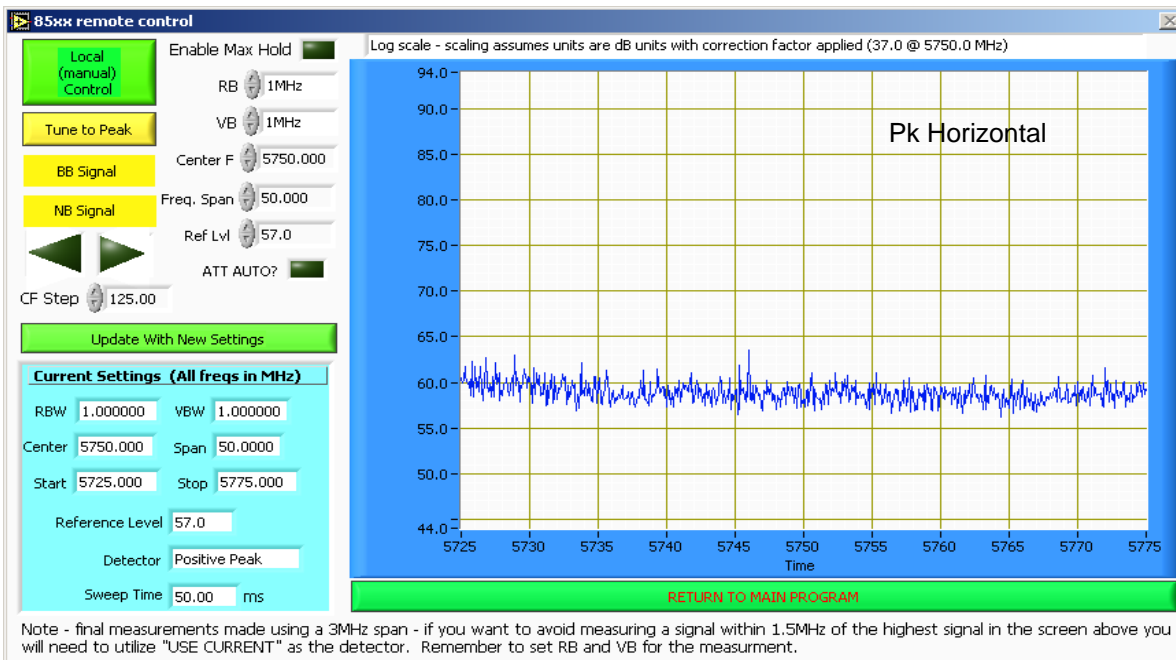
Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #2c: Continued



Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #2c: Continued



Band Edge Signal Radiated Field Strength - 27dBm/MHz at 5725 MHz

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5725.040	65.3	V	68.3	-3.0	Avg	284	1.0	Note 1
5725.040	80.3	V	88.3	-8.0	PK	284	1.0	Note 1
5727.510	52.2	H	68.3	-16.1	AVG	275	1.1	Note 1
5727.510	63.7	H	88.3	-24.6	PK	275	1.1	Note 1

Other Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11400.920	51.9	V	54.0	-2.1	AVG	327	1.0	
17101.180	49.5	H	54.0	-4.5	AVG	298	1.1	
11399.380	49.3	H	54.0	-4.7	AVG	295	1.2	
17099.680	49.1	V	54.0	-4.9	AVG	340	1.0	
11400.920	62.8	V	74.0	-11.2	PK	327	1.0	
17101.180	61.3	H	74.0	-12.7	PK	298	1.1	
17099.680	61.1	V	74.0	-12.9	PK	340	1.0	
11399.380	60.8	H	74.0	-13.2	PK	295	1.2	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set to -27dBm/MHz (~68dB μ V/m).

Client:	Meru Networks	Job Number:	J69679
Model:	OAP 180	T-Log Number:	T69814
Contact:	John Dorsey	Account Manager:	Richard Gencev
Standard:	FCC Part 15.247/RSS-210	Class:	N/A

Run #3: RX Radiated Spurious Emissions, 30 - 18000 MHz

Antenna: 13.5dBi

Date of Test: 11/9/2007	Config. Used: 1
Test Engineer: Suhaila Khushzad	Config Change: None
Test Location: SVOATS #1	EUT Voltage: POE

Ambient Conditions:

Temperature:	16 °C
Rel. Humidity:	64 %

Run #3a: RX Radiated Spurious Emissions, 30 - 18000 MHz. Center Channel @ 5300 MHz

Frequency MHz	Level dBuV/m	Pol v/h	RSS-GEN		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
1250.230	43.8	V	54.0	-10.2	AVG	125	1.1	
1250.220	43.3	H	54.0	-10.7	AVG	15	1.0	
2375.400	42.6	V	54.0	-11.4	AVG	25	1.0	
2375.380	41.0	H	54.0	-13.0	AVG	47	1.0	
1875.180	40.7	H	54.0	-13.3	AVG	67	1.0	
6595.240	40.0	V	54.0	-14.0	AVG	360	1.0	
6775.210	39.7	H	54.0	-14.3	AVG	341	1.0	
2186.620	39.2	V	54.0	-14.8	AVG	245	1.0	
1625.270	38.5	H	54.0	-15.5	AVG	103	1.0	
1625.240	38.4	V	54.0	-15.6	AVG	18	1.0	
2000.230	38.3	H	54.0	-15.7	AVG	360	1.1	
15866.000	37.9	H	54.0	-16.1	AVG	360	1.0	
2186.600	37.6	H	54.0	-16.4	AVG	146	1.0	
1125.190	37.1	V	54.0	-16.9	AVG	109	1.0	
10589.000	36.8	H	54.0	-17.2	AVG	0	1.0	
1500.310	35.5	V	54.0	-18.5	AVG	359	1.0	
1000.300	33.7	H	54.0	-20.3	AVG	109	1.0	
1000.233	33.4	V	54.0	-20.6	AVG	73	1.0	
15866.000	49.0	H	74.0	-25.0	PK	360	1.0	
10589.000	48.1	H	74.0	-25.9	PK	0	1.0	
1250.230	46.9	V	74.0	-27.1	PK	125	1.1	
6775.210	46.9	H	74.0	-27.1	PK	341	1.0	
1250.220	46.8	H	74.0	-27.2	PK	15	1.0	
2375.400	45.8	V	74.0	-28.2	PK	25	1.0	
6595.240	45.3	V	74.0	-28.7	PK	360	1.0	
2375.380	45.2	H	74.0	-28.8	PK	47	1.0	

Run # 3a Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #3: RX Radiated Spurious Emissions, 30 - 18000 MHz

Antenna: 13.5dBi

Frequency MHz	Level dB μ V/m	Pol v/h	RSS-GEN		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
1875.180	44.2	H	74.0	-29.8	PK	67	1.0	
1625.270	43.1	H	74.0	-30.9	PK	103	1.0	
1625.240	42.9	V	74.0	-31.1	PK	18	1.0	
2186.620	42.8	V	74.0	-31.2	PK	245	1.0	
2000.230	42.5	H	74.0	-31.5	PK	360	1.1	
2186.600	41.8	H	74.0	-32.2	PK	146	1.0	
1125.190	41.7	V	74.0	-32.3	PK	109	1.0	
1000.233	41.1	V	74.0	-32.9	PK	73	1.0	
1500.310	40.6	V	74.0	-33.4	PK	359	1.0	
1000.300	39.5	H	74.0	-34.5	PK	109	1.0	
30.000	12.0	V	40.0	-28.0	QP	0	1.0	
36.900	20.6	V	40.0	-19.4	QP	223	1.0	
125.000	22.5	V	43.5	-21.0	QP	175	1.0	
168.000	23.0	V	43.5	-20.5	QP	360	1.0	
216.500	23.5	V	46.0	-22.5	QP	275	1.0	
42.100	22.9	H	40.0	-17.1	QP	209	271.0	
125.000	20.6	H	43.5	-22.9	QP	182	1.0	

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #3b: RX Radiated Spurious Emissions, 30 - 18000 MHz. Center Channel @ 5600 MHz

Frequency MHz	Level dBμV/m	Pol v/h	RSS-GEN		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
1250.230	44.0	H	54.0	-10.0	AVG	16	1.0	
16799.330	41.7	H	54.0	-12.3	AVG	358	1.0	
16784.830	41.6	V	54.0	-12.4	AVG	1	1.0	
6595.110	40.1	V	54.0	-13.9	AVG	149	1.0	
1625.240	39.3	H	54.0	-14.7	AVG	350	1.1	
1625.250	38.8	V	54.0	-15.2	AVG	293	1.0	
2186.590	38.3	V	54.0	-15.7	AVG	328	1.5	
2125.330	38.2	H	54.0	-15.8	AVG	17	1.0	
11178.890	37.7	H	54.0	-16.3	AVG	358	1.0	
11201.830	37.6	V	54.0	-16.4	AVG	1	1.0	
1500.220	36.6	V	54.0	-17.4	AVG	63	1.0	
6775.200	35.9	H	54.0	-18.1	AVG	0	1.0	
3897.580	35.7	H	54.0	-18.3	AVG	192	1.0	
2750.400	33.9	V	54.0	-20.1	AVG	360	1.0	
1000.210	33.6	H	54.0	-20.4	AVG	92	1.0	
3000.270	33.5	V	54.0	-20.5	AVG	199	1.0	
16784.830	53.3	V	74.0	-20.7	PK	1	1.0	
16799.330	53.1	H	74.0	-20.9	PK	358	1.0	
1000.188	32.6	V	54.0	-21.4	AVG	28	1.0	
11178.890	49.4	H	74.0	-24.6	PK	358	1.0	
11201.830	49.0	V	74.0	-25.0	PK	1	1.0	
1250.230	47.6	H	74.0	-26.4	PK	16	1.0	
6595.110	46.5	V	74.0	-27.5	PK	149	1.0	
6775.200	45.3	H	74.0	-28.7	PK	0	1.0	
2125.330	43.4	H	74.0	-30.6	PK	17	1.0	
3897.580	43.3	H	74.0	-30.7	PK	192	1.0	
2186.590	43.1	V	74.0	-30.9	PK	328	1.5	
1625.240	42.9	H	74.0	-31.1	PK	350	1.1	
1625.250	42.1	V	74.0	-31.9	PK	293	1.0	
3000.270	41.6	V	74.0	-32.4	PK	199	1.0	
1500.220	41.1	V	74.0	-32.9	PK	63	1.0	
2750.400	41.1	V	74.0	-32.9	PK	360	1.0	
1000.188	40.3	V	74.0	-33.7	PK	28	1.0	
1000.210	39.3	H	74.0	-34.7	PK	92	1.0	

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

FCC Part 15 Subpart E Tests

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: 11/6/2007 0:00 Config. Used: 1
 Test Engineer: Suhaila Khushzad Config Change: None
 Test Location: EUT Voltage: POE

General Test Configuration

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators and cables used.

Ambient Conditions: Temperature: 12.8 °C
 Rel. Humidity: 79 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	13.8
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	12.6
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	2.11
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	-.17
1	26dB Bandwidth	15.407	Pass	> 20 MHz
1	99% Bandwidth	RSS 210	Pass	17.1
2	Peak Excursion Envelope	15.407(a) (6)	Pass	11.1 dB
3	Antenna Conducted - Out of Band Spurious	15.407(b)	Pass	-42.2dBµV/m @ 11200.6MHz (-1.7dB)

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: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run # 1: Bandwidth, Output Power and Power spectral Density

Antenna Gain: 13.5 dBi

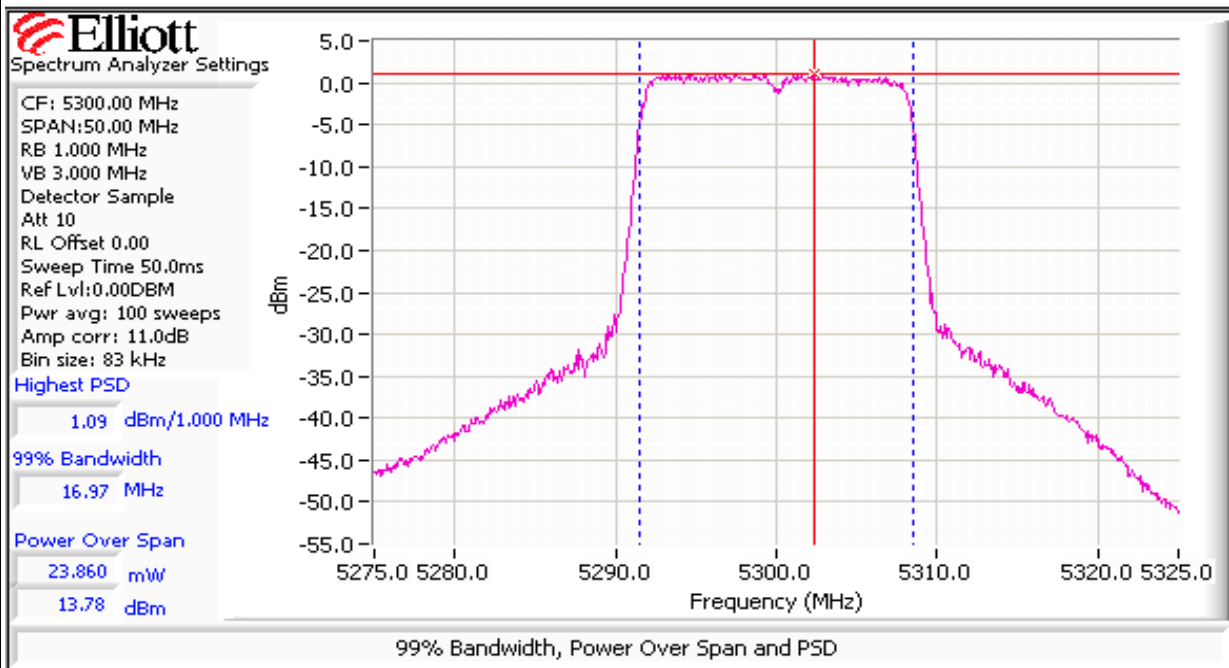
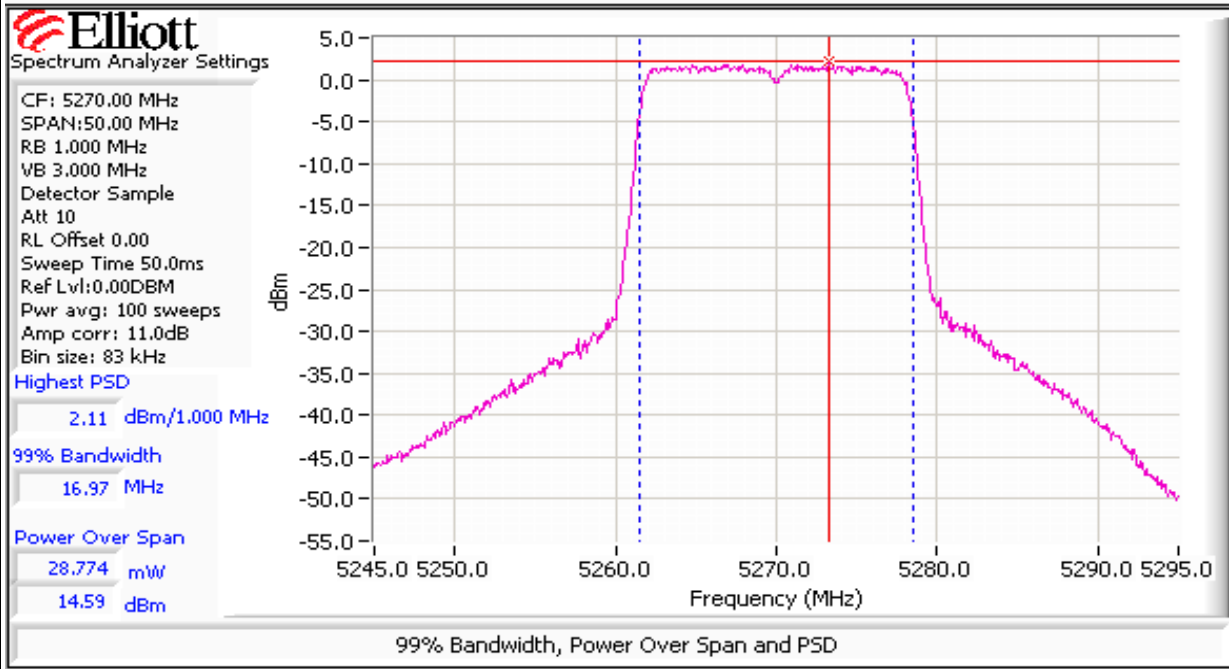
Frequency (MHz)	Software Setting	Bandwidth		Output Power ¹ dBm		Power (Watts)	PSD ² dBm/MHz			Result
		26dB	99% ⁴	Measured	Limit		Measured	FCC Limit	RSS Limit ³	
5270	16.5	24.4	17.0	14.6	16.5	0.029	2.11	3.5	5.3	Pass
5300	16.5	23.8	17.1	13.8	16.5	0.024	1.09	3.5	4.5	Pass
5500	15.0	24.0	16.9	10.8	16.5	0.012	-2.00	3.5	1.5	Pass
5600	15.0	24.2	17.0	12.6	16.5	0.018	-0.17	3.5	3.3	Pass

- Note 1: Output power measured using a spectrum analyzer (see plots below):
RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz
- Note 2: Measured using the same analyzer settings used for output power.
- Note 3: For RSS210 the measured value of the PSD (see note 3) must not exceed the average value (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB.
- Note 4: 99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB

Run # 1 Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

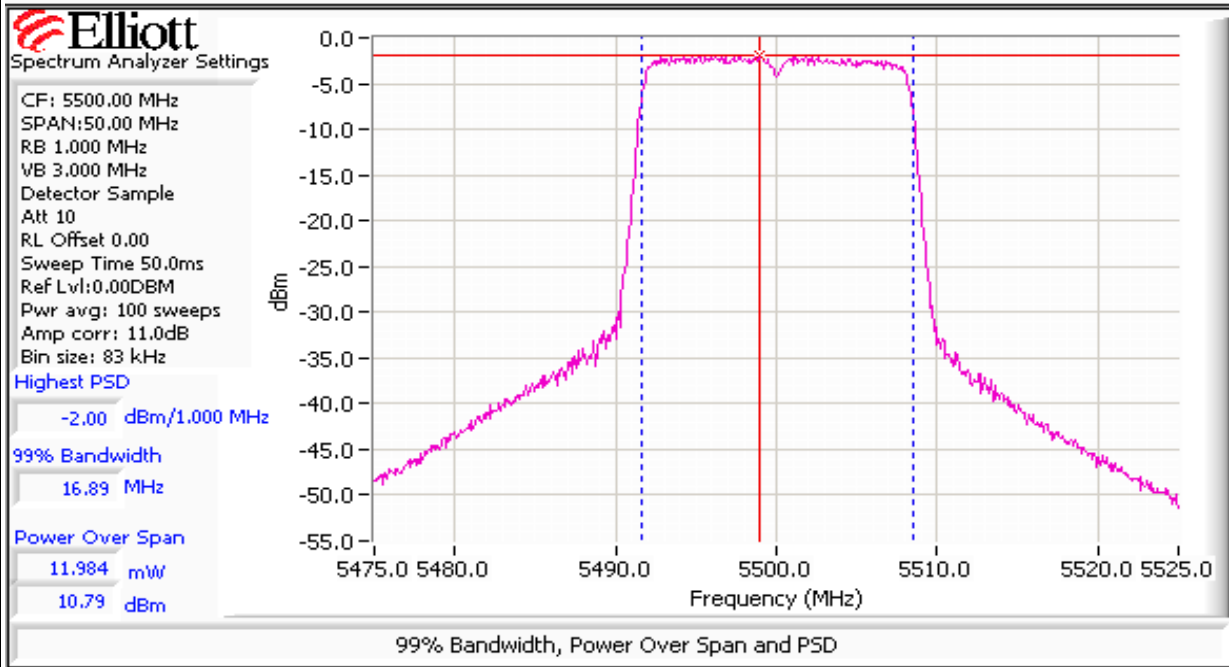
Run # 1: Bandwidth, Output Power and Power spectral Density



Run # 1 Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

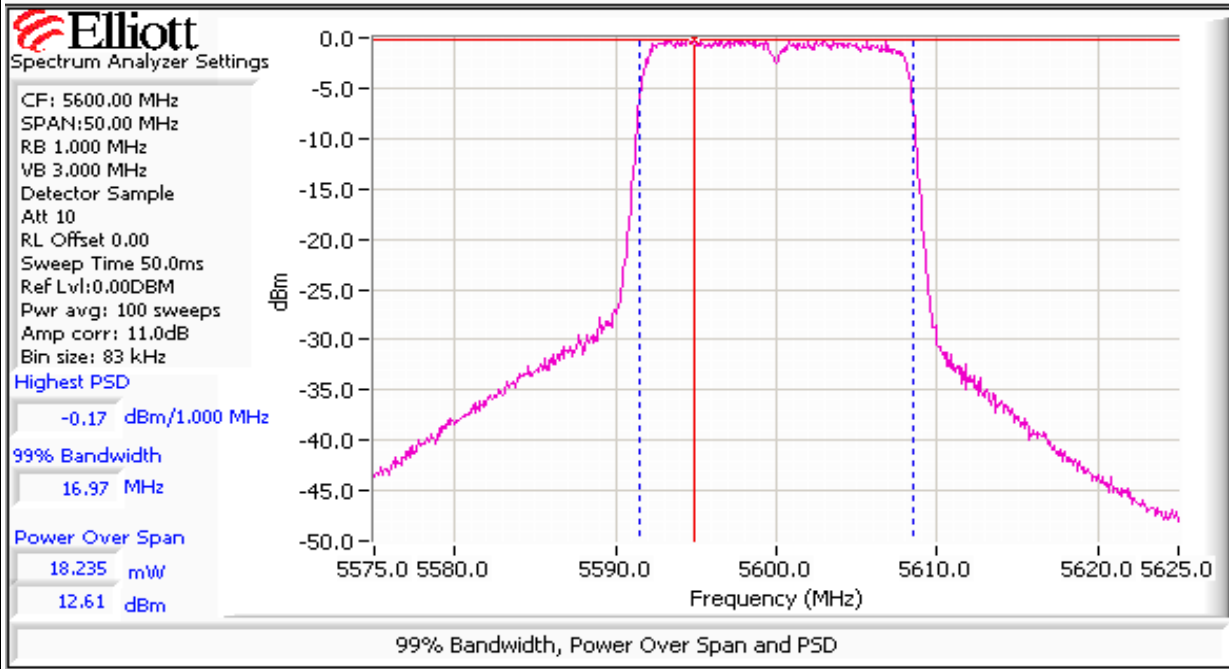
Run # 1: Bandwidth, Output Power and Power spectral Density



Run # 1 Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

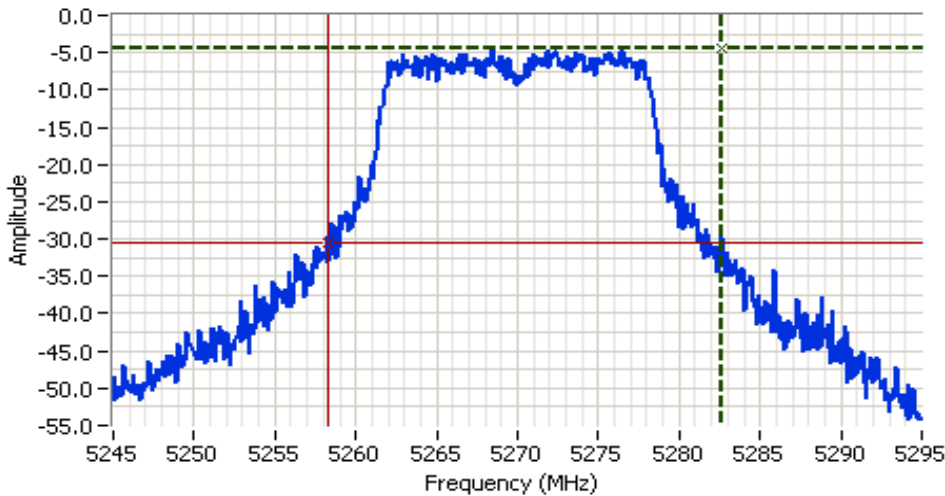
Run # 1: Bandwidth, Output Power and Power spectral Density



Run # 1 Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run # 1: Bandwidth, Output Power and Power spectral Density



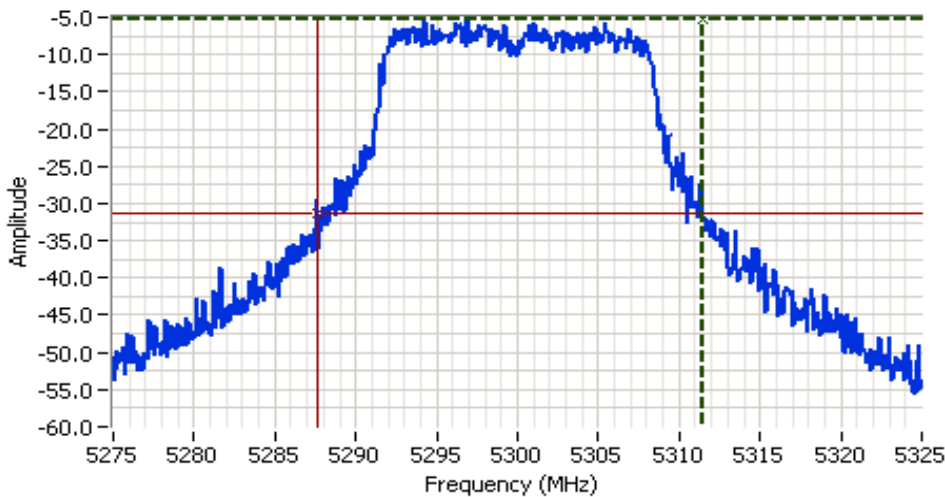
Analyzer Settings

HP8564E,EMI
CF: 5270.00 MHz
SPAN:50.00 MHz
RB 300 kHz
VB 1.000 MHz
Detector POS
Att 30
RL Offset 0.00
Sweep Time 50.0ms
Ref Lvl:11.00DBM

Comments

5270 MHz
26dB Bandwidth

Cursor 1 5282.66; -4.50 Delta Freq. 24.42
Cursor 2 5258.25; -30.50 Delta Amplitude 26.00



Analyzer Settings

HP8564E,EMI
CF: 5300.00 MHz
SPAN:50.00 MHz
RB 300 kHz
VB 1.000 MHz
Detector POS
Att 30
RL Offset 0.00
Sweep Time 50.0ms
Ref Lvl:11.00DBM

Comments

5300 MHz
26dB Bandwidth

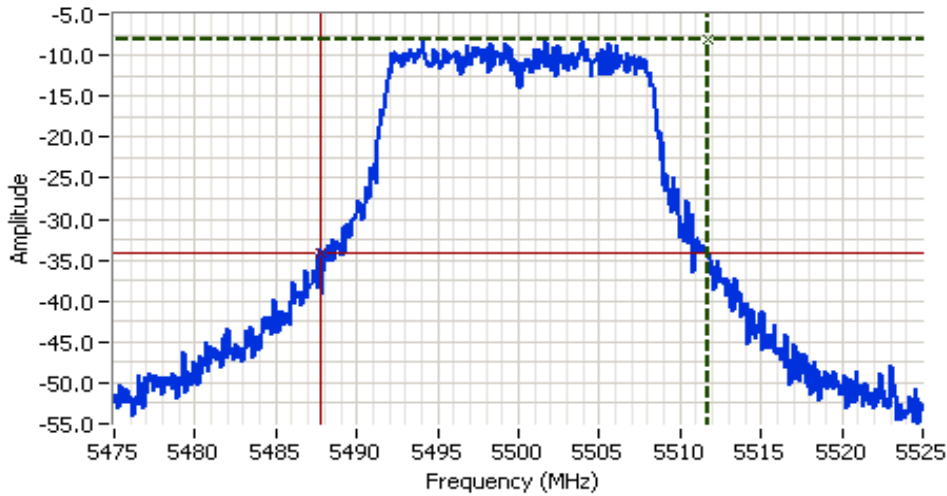
Cursor 1 5311.41; -5.33 Delta Freq. 23.83
Cursor 2 5287.58; -31.33 Delta Amplitude 26.00



Run # 1 Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run # 1: Bandwidth, Output Power and Power spectral Density



Analyzer Settings
 HP8564E,EMI
 CF: 5500.00 MHz
 SPAN:50.00 MHz
 RB 300 kHz
 VB 1.000 MHz
 Detector POS
 Att 30
 RL Offset 0.00
 Sweep Time 50.0ms
 Ref Lvl:11.00DBM

Comments
 5500 MHz
 26dB Bandwidth

Cursor 1	5511.750	-8.17	
Cursor 2	5487.750	-34.17	

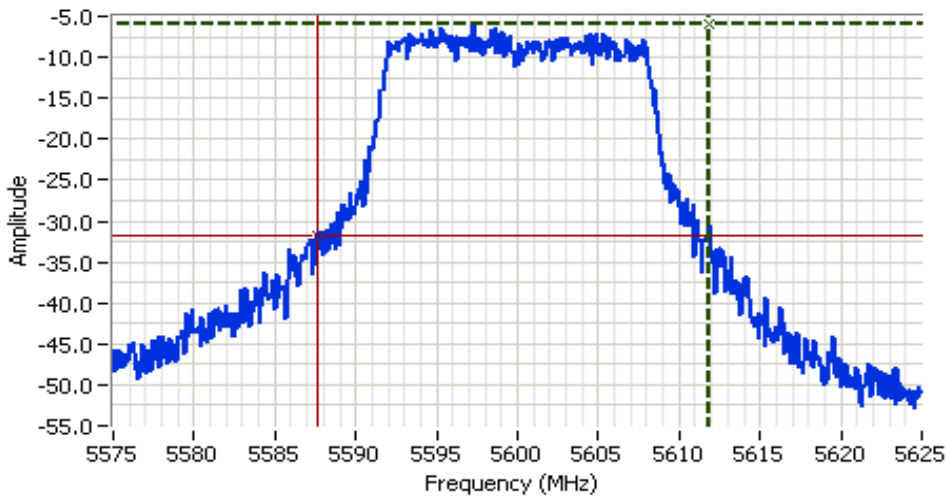
Delta Freq.	24.00
Delta Amplitude	26.00



Run # 1 Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run # 1: Bandwidth, Output Power and Power spectral Density



Analyzer Settings

- HP8564E,EMI
- CF: 5600.00 MHz
- SPAN:50.00 MHz
- RB 300 kHz
- VB 1.000 MHz
- Detector POS
- Att 30
- RL Offset 0.00
- Sweep Time 50.0ms
- Ref Lvl:11.00DBM

Comments

- 5600 MHz
- 26dB Bandwidth

Cursor 1	5611.83	-5.83		Delta Freq.	24.17
Cursor 2	5587.66	-31.83		Delta Amplitude	26.00



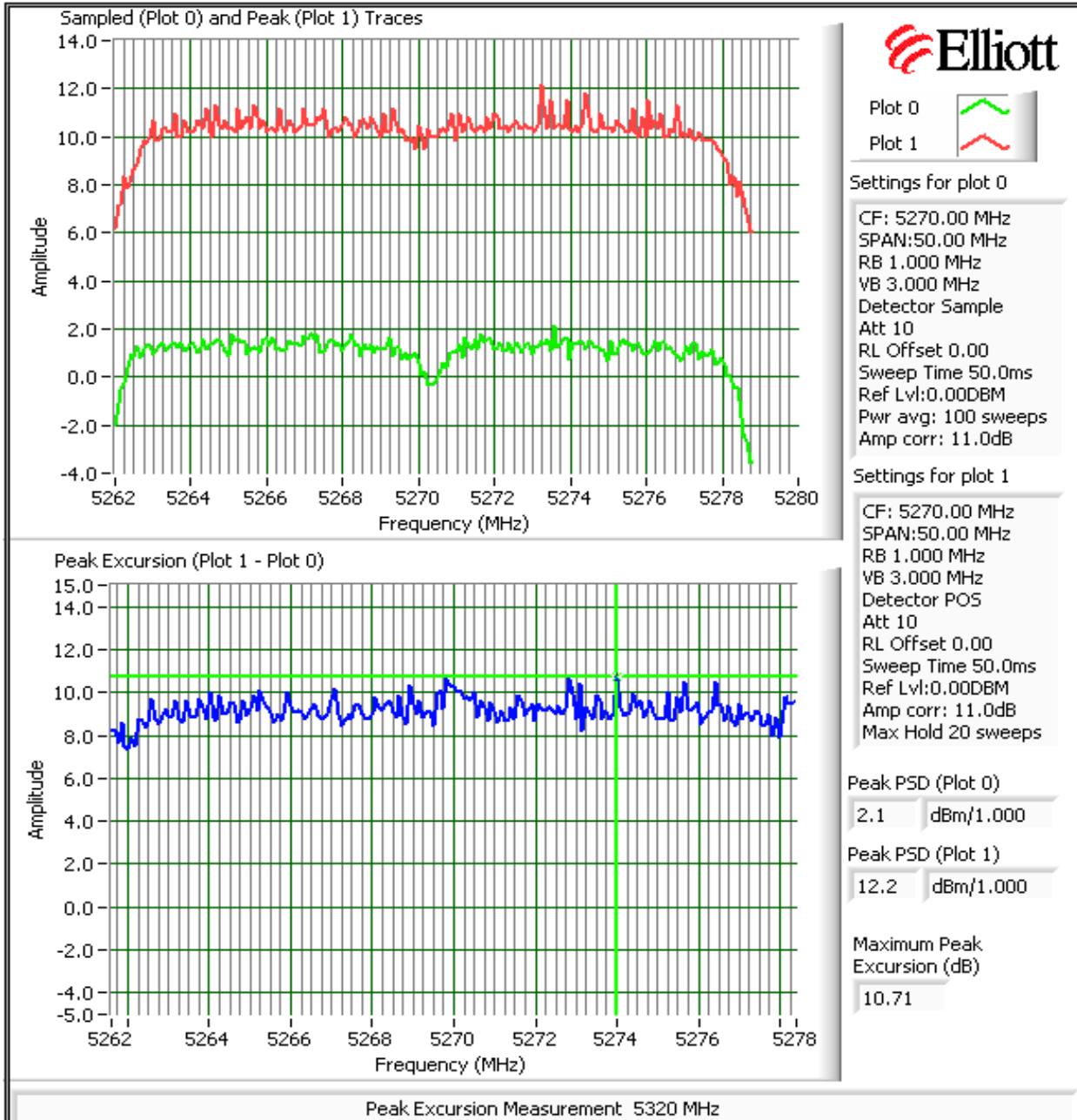
Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #2: Peak Excursion Measurement

Plots Showing Peak Excursion

Trace A: RBW = VBW = 1MHz

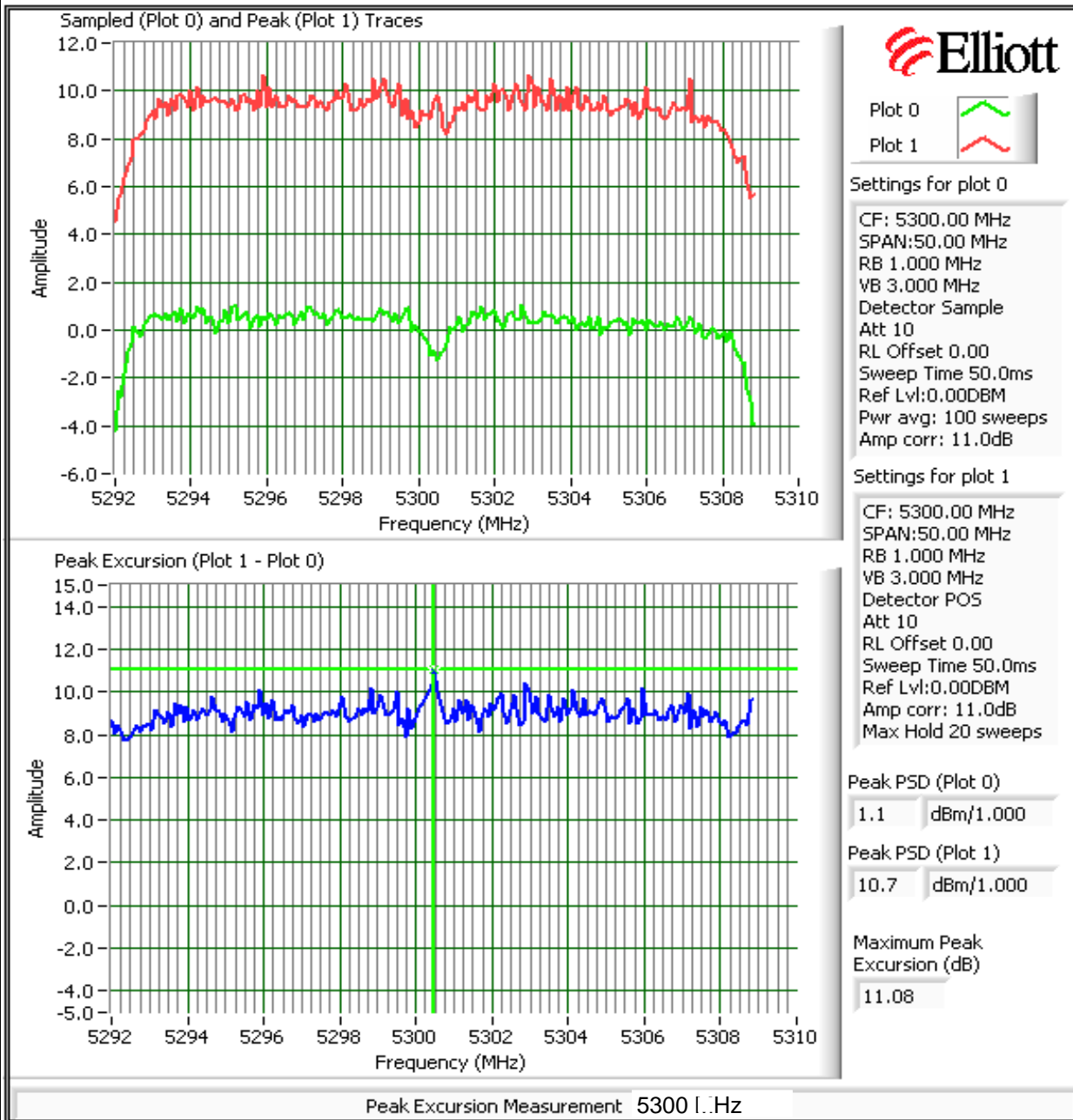
Trace B: RBW = 1 MHz, VBW = 30kHz



Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run # 2 Con't On Next Page

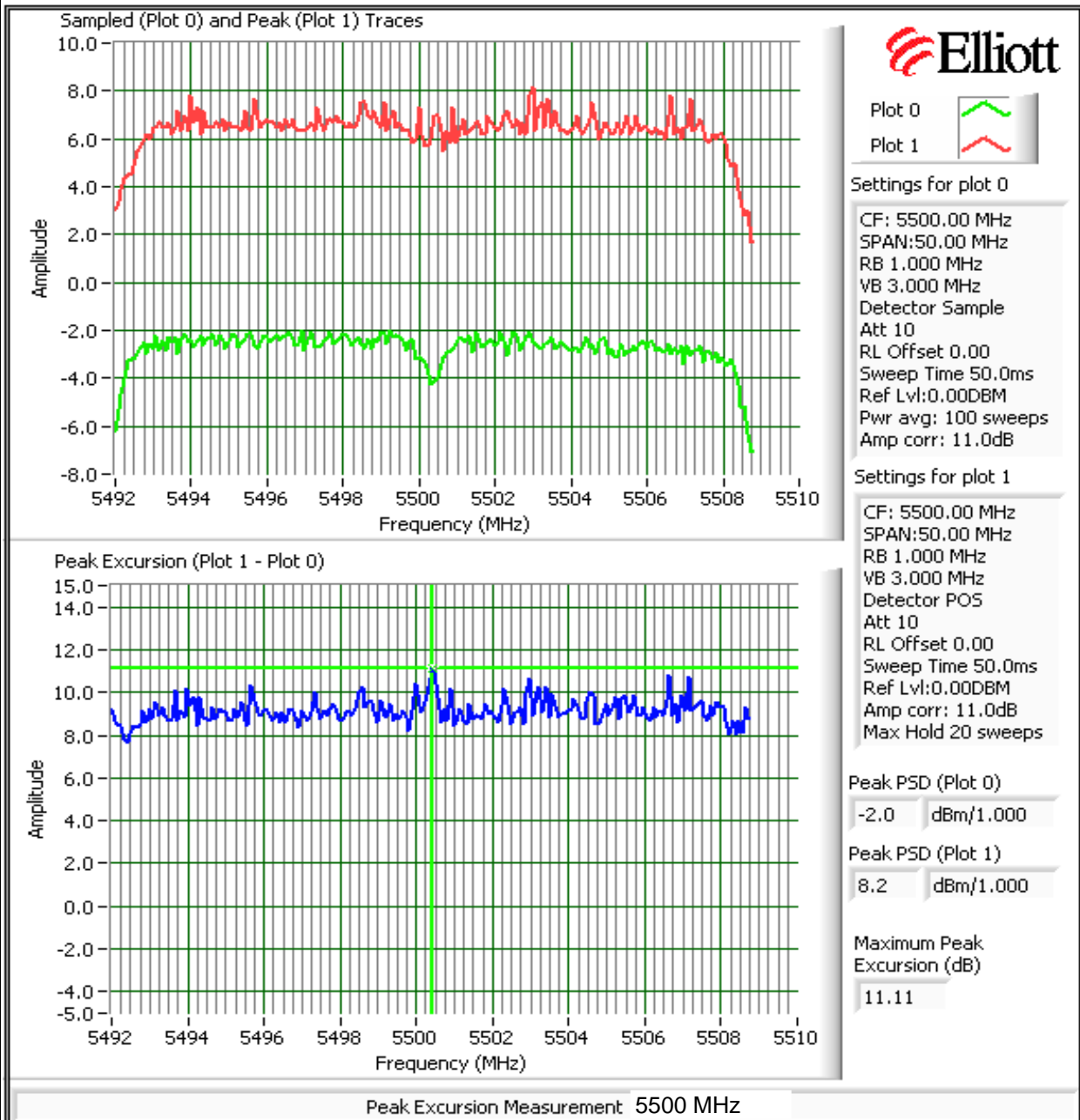
Run #2: Peak Excursion Measurement



Run # 2 Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

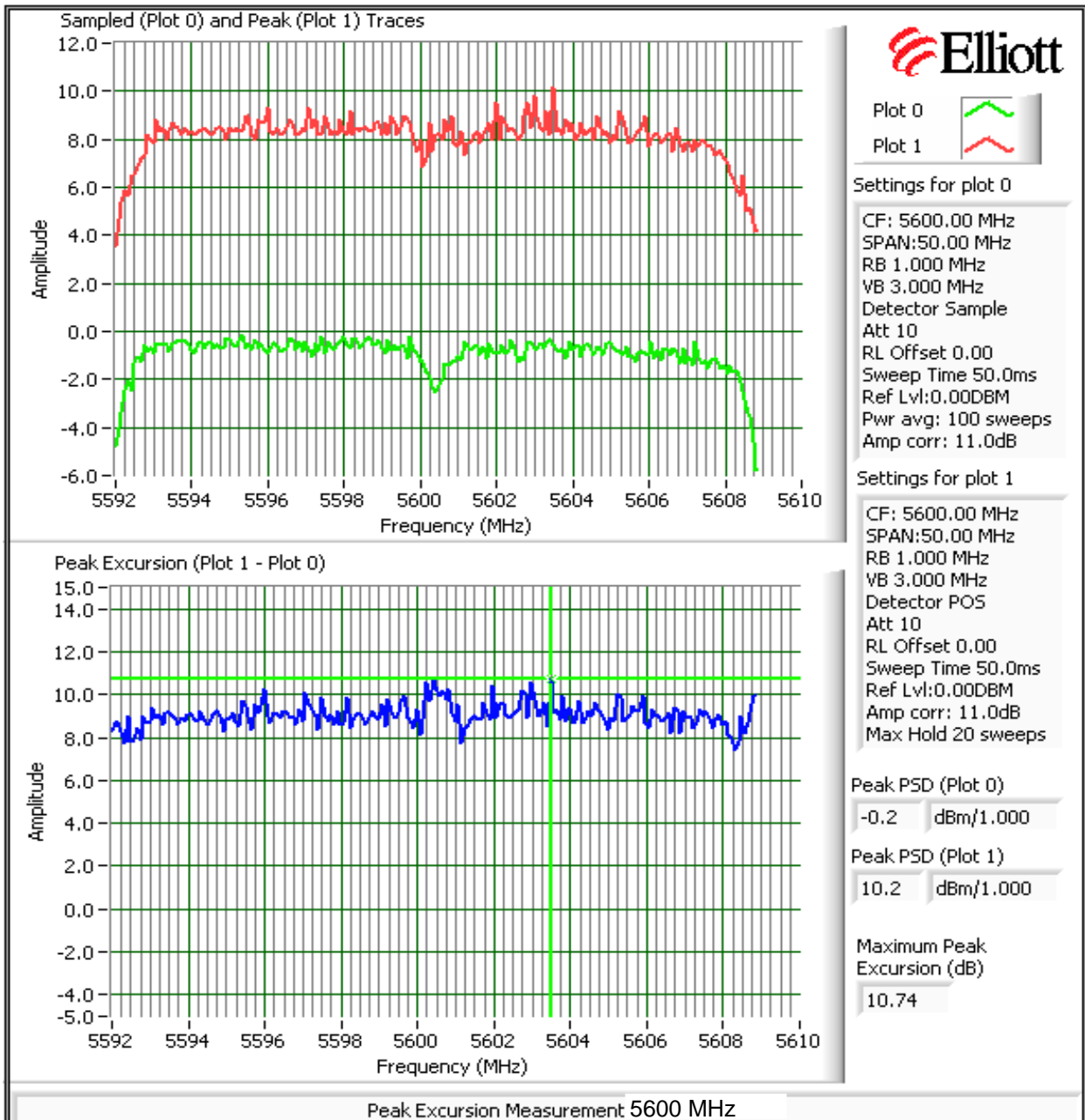
Run #2: Peak Excursion Measurement



Run # 2 Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #2: Peak Excursion Measurement



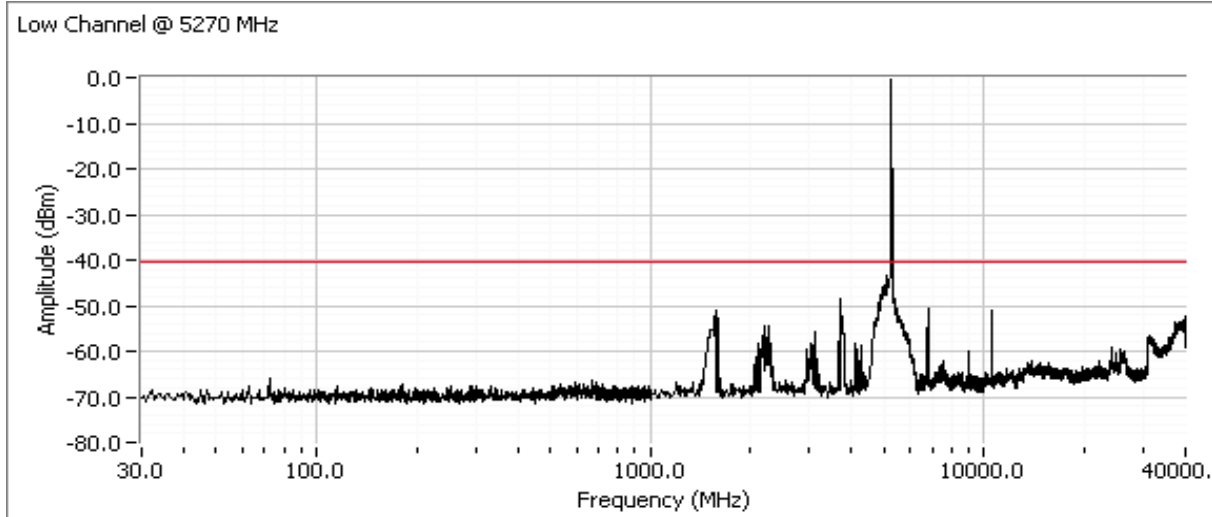
Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #3: Out Of Band Spurious Emissions - Antenna Conducted

Maximum Antenna Gain: 13.5 dBi
 Spurious Limit: -27 dBm/MHz eirp
 Limit Used On Plots ^{Note 1}: -40.5 dBm/MHz

- Note 1: The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.
- Note 2: All spurious signals below 1GHz are measured during digital device radiated emissions test.
- Note 3: Signals within 10MHz of the 5.725 or 5.825 Band edge are subject to a limit of -17dBm EIRP
- Note 4: If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.
- Note 5: Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.

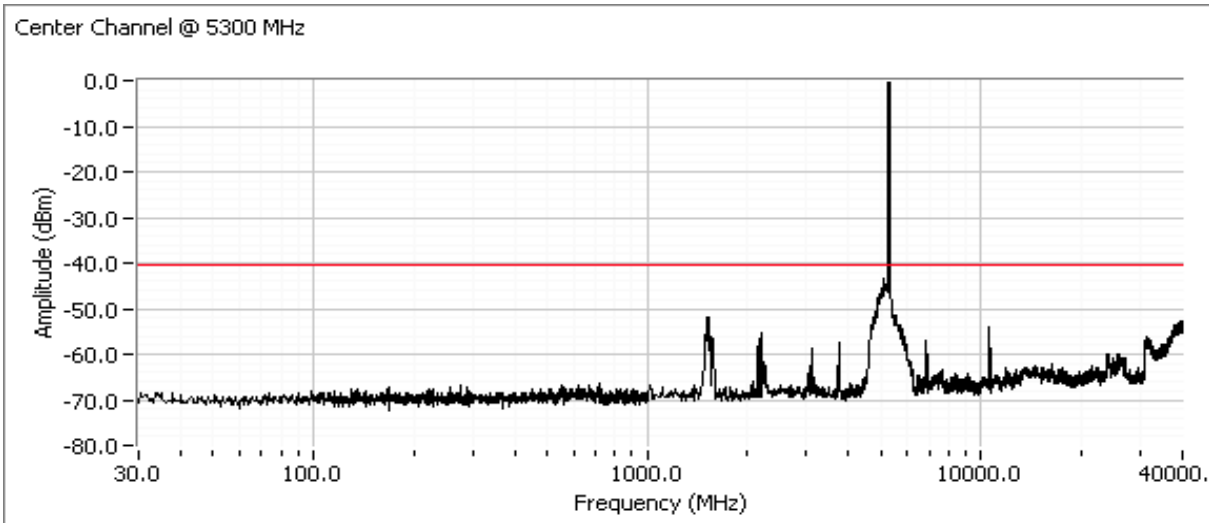
Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)



Run # 3 Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

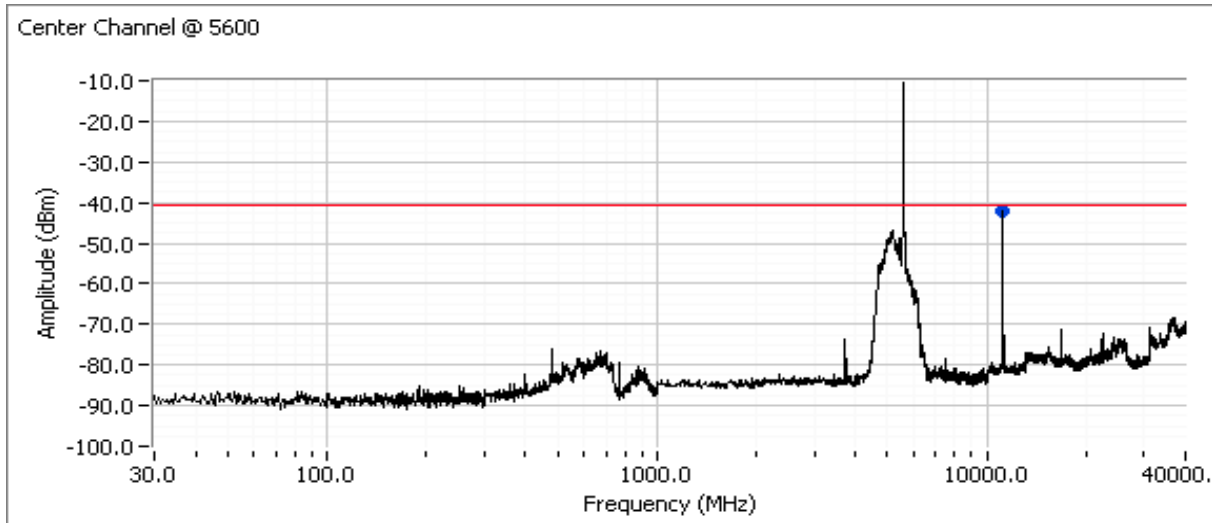
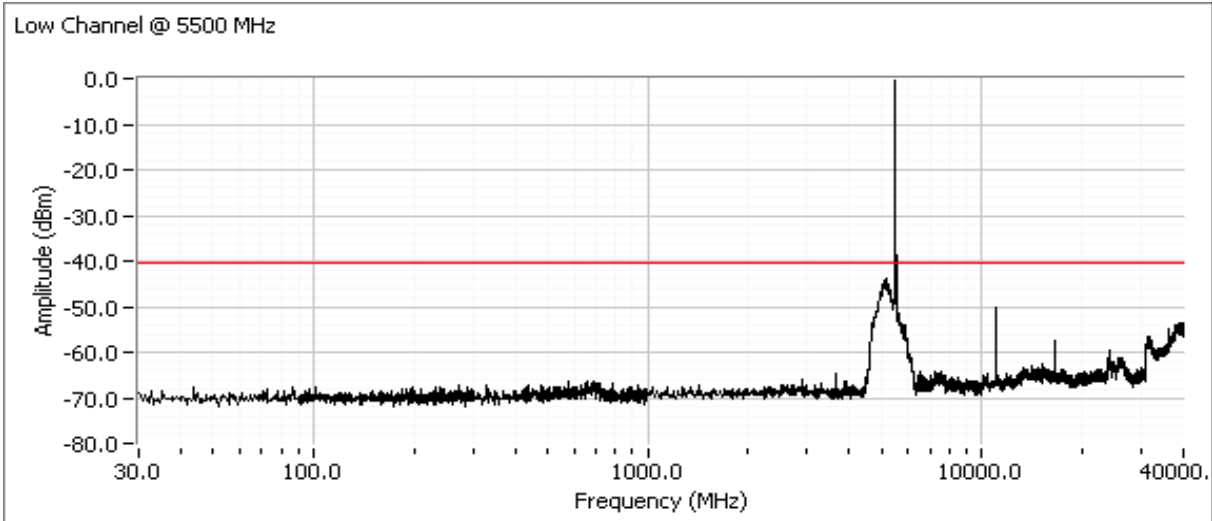
Run #3: Out Of Band Spurious Emissions - Antenna Conducted



Run # 3 Con't On Next Page

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #3: Out Of Band Spurious Emissions - Antenna Conducted



Frequency	Level	Pol			Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11200.580	-42.2	RF Port	-40.5	-1.7	-	-		

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

**RSS-210 (LELAN) and FCC 15.407(UNII)
Antenna Port Measurements
Power, PSD, Peak Excursion, 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.

Date of Test: 3/10/2008 19:17
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators and cables used.

Ambient Conditions: Temperature: 11 °C
Rel. Humidity: 56 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	11.3 dBm (13.0mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	5.4 dBm (3.0mW)
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	-1.5 dBm/MHz
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	-7.4 dBm/MHz
1	99% Bandwidth	RSS 210	-	17.1 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	11.5 dB
3	Antenna Conducted - Out of Band Spurious	15.407(b)	Pass	All emissions below the -27dBm/MHz limit

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.

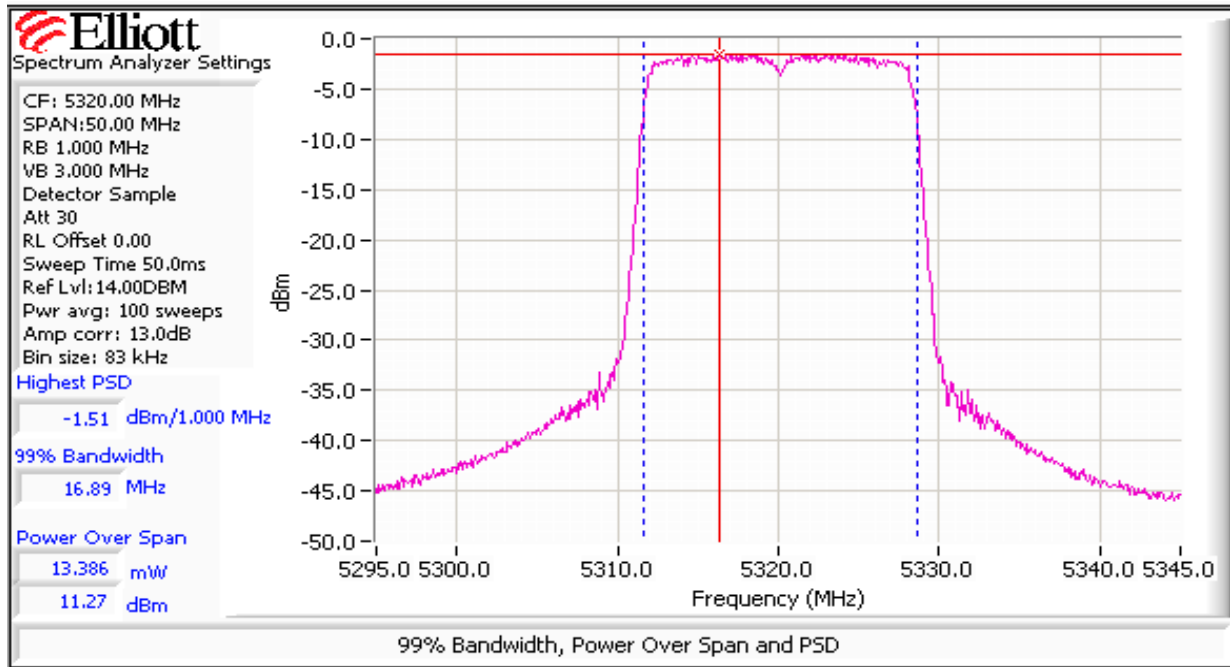
Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #1: Bandwidth, Output Power and Power spectral Density

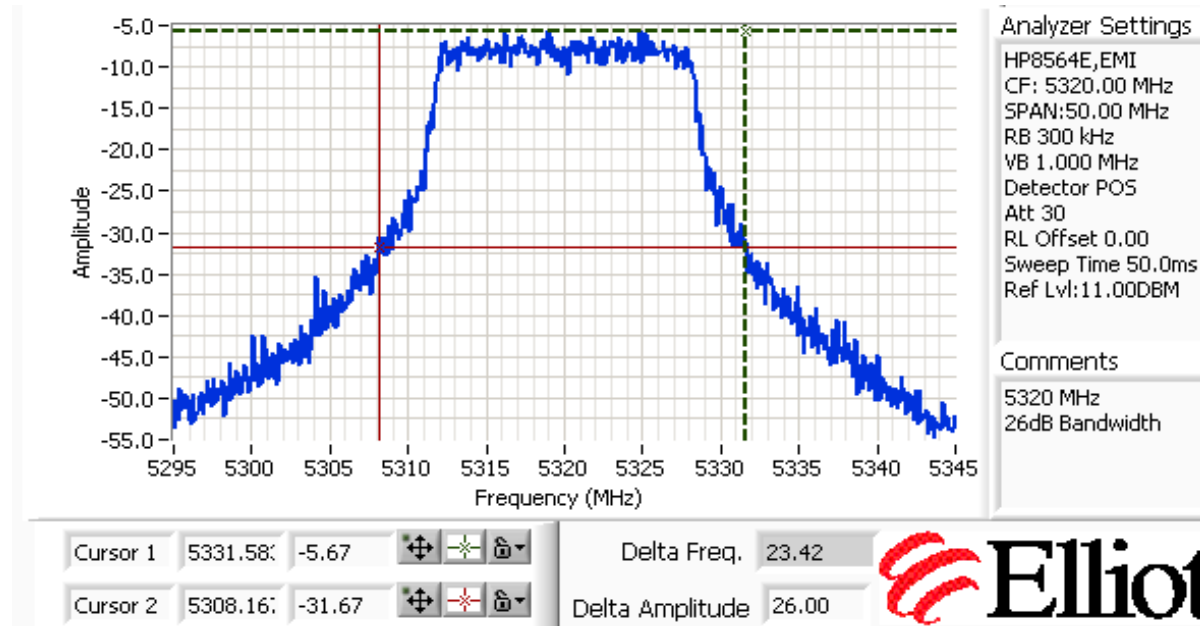
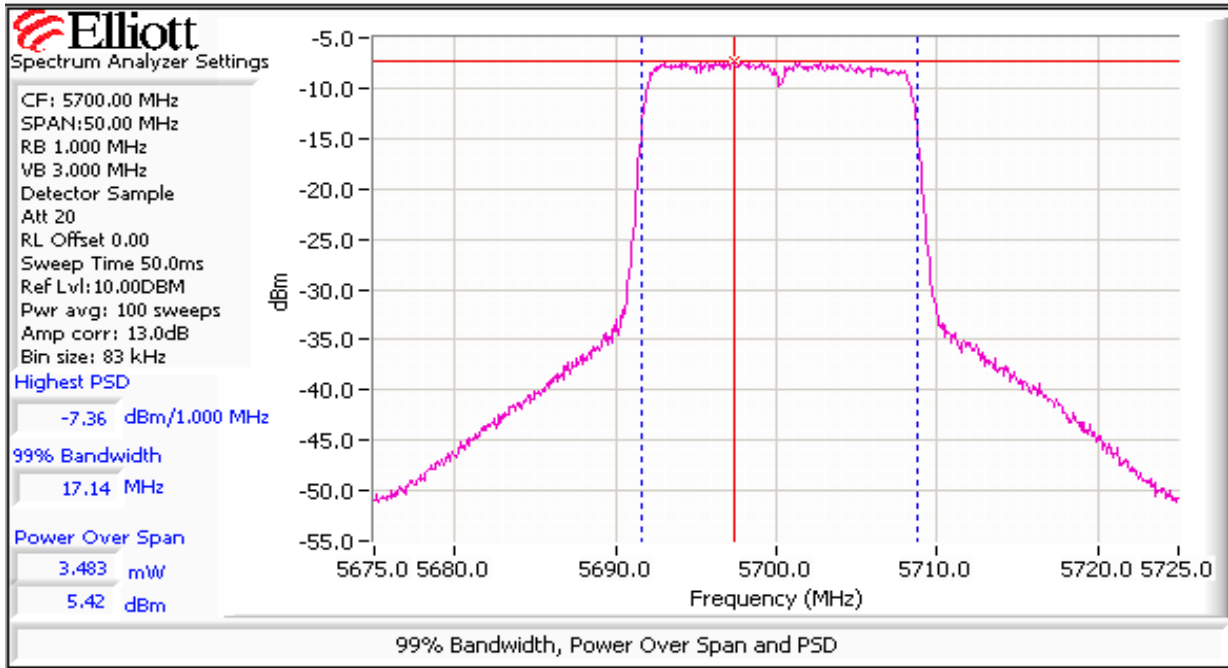
Antenna Gain (dBi): 13.5

Frequency (MHz)	Software Setting	Bandwidth		Output Power ¹ dBm		Power (Watts)	PSD ² dBm/MHz			Result
		26dB	99% ⁴	Measured	Limit		Measured	FCC Limit	RSS Limit ³	
5320	15.0	23.4	16.9	11.3	16.5	0.013	-1.5	3.5	2.0	Pass
5700	10.0	25.7	17.1	5.4	16.5	0.003	-7.4	3.5	-3.9	Pass

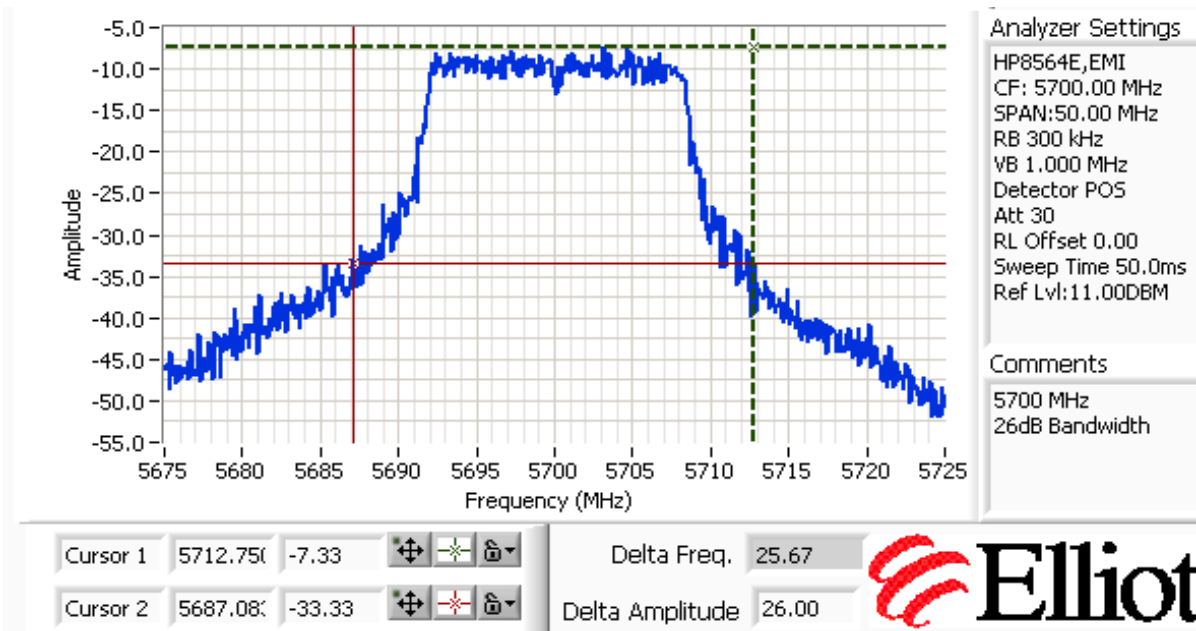
- Note 1: Output power measured using a spectrum analyzer (see plots below):
RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz
- Note 3: For RSS210 the measured value of the PSD (see note 3) must not exceed the average value (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB.
- Note 2: Measured using the same analyzer settings used for output power.
- Note 4: 99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB



Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A



Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A



Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

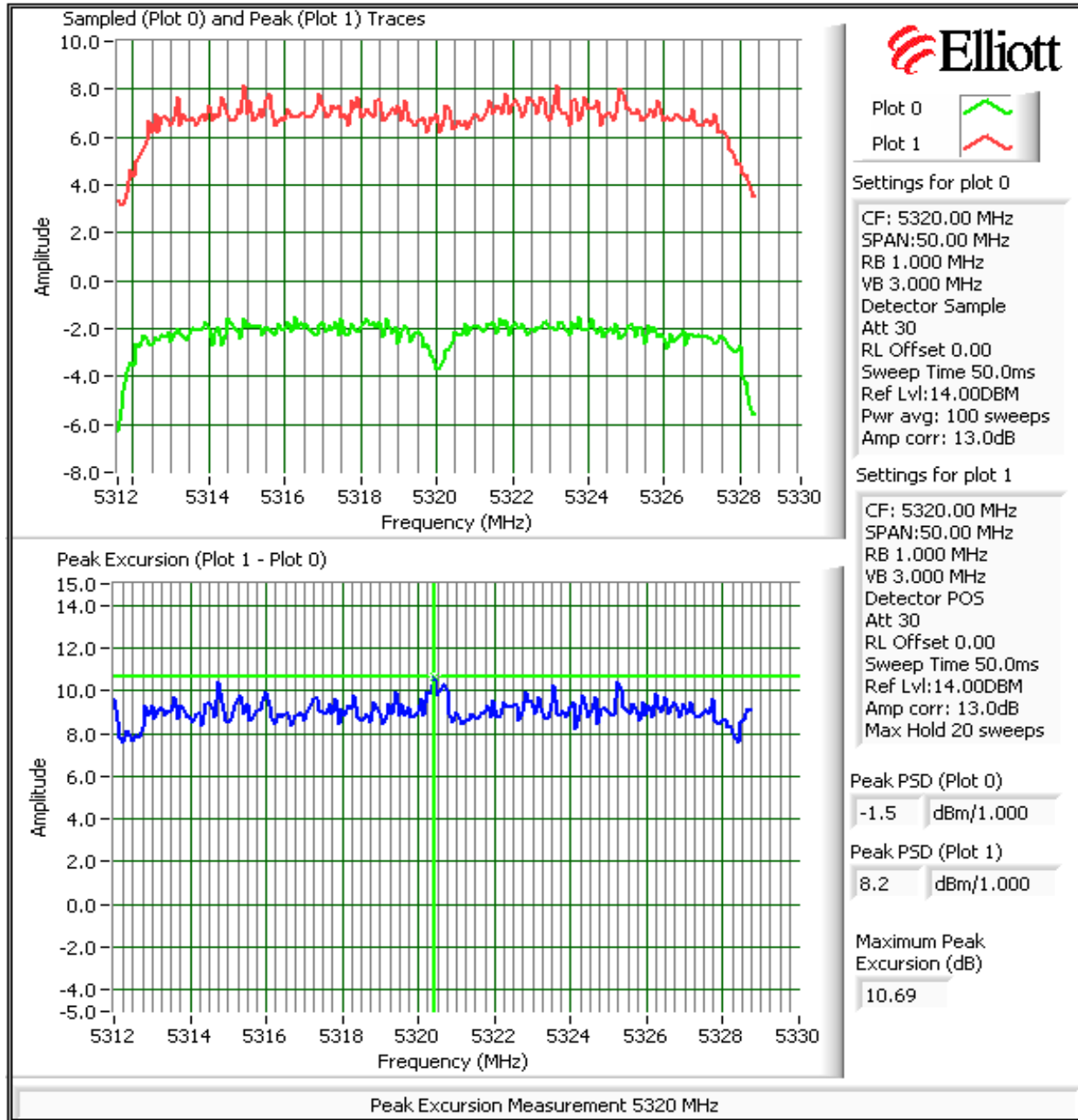
Freq		Peak Excursion(dB)		Freq		Peak Excursion(dB)		Freq		Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180		13.0	5260		13.0	5500		13.0			
5200		13.0	5300		13.0	5600		13.0			
5240		13.0	5320	10.7	13.0	5700	11.5	13.0			

Plots Showing Peak Excursion

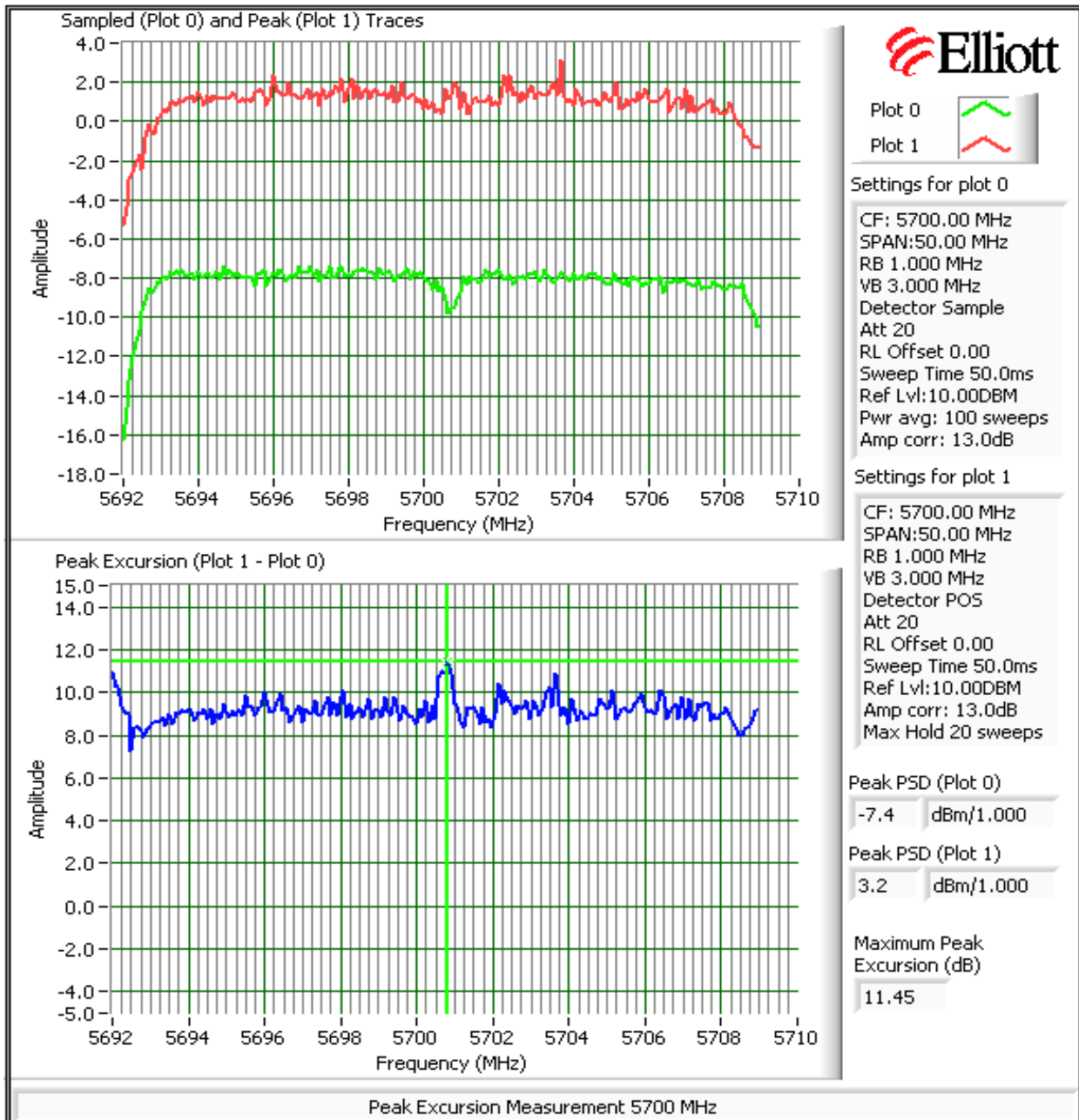
Trace A: RBW = VBW = 3MHz, Peak hold

Trace B: RBW = 1 MHz, VBW = 3MHz, Integrated average power

Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A



Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A



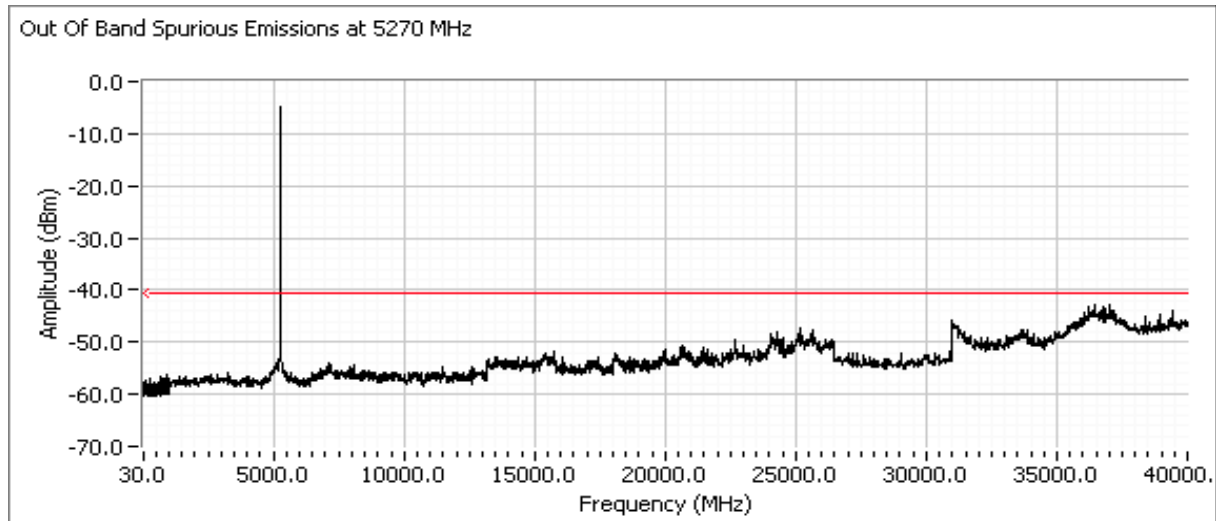
Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Run #3: Out Of Band Spurious Emissions - Antenna Conducted

Maximum Antenna Gain: 13.5 dBi
 Spurious Limit: -27 dBm/MHz eirp
 Limit Used On Plots ^{Note 1}: -40.5 dBm/MHz

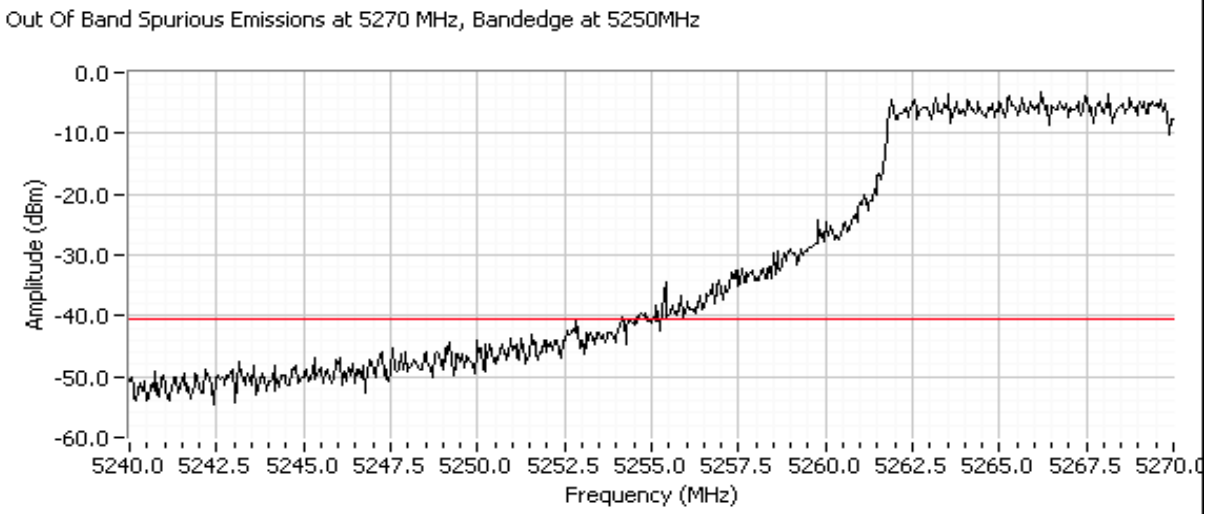
- Note 1: The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.
- Note 2: All spurious signals below 1GHz are measured during digital device radiated emissions test.
- Note 3: Signals within 10MHz of the 5.725 or 5.825 Band edge are subject to a limit of -17dBm EIRP
- Note 4: If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.
- Note 5: Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.

Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)

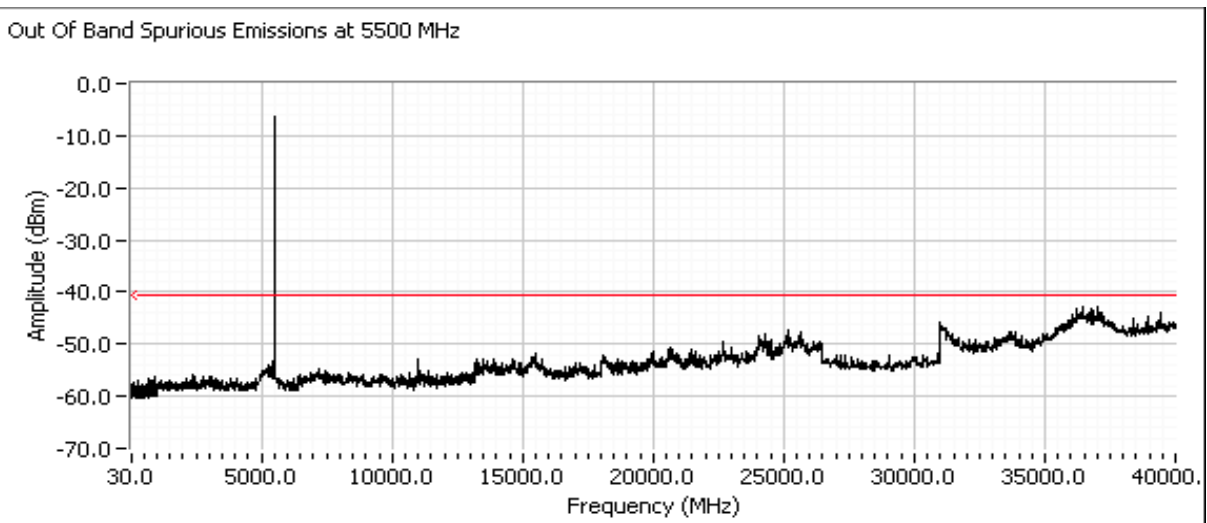


Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Plots Showing Out-Of-Band Emissions

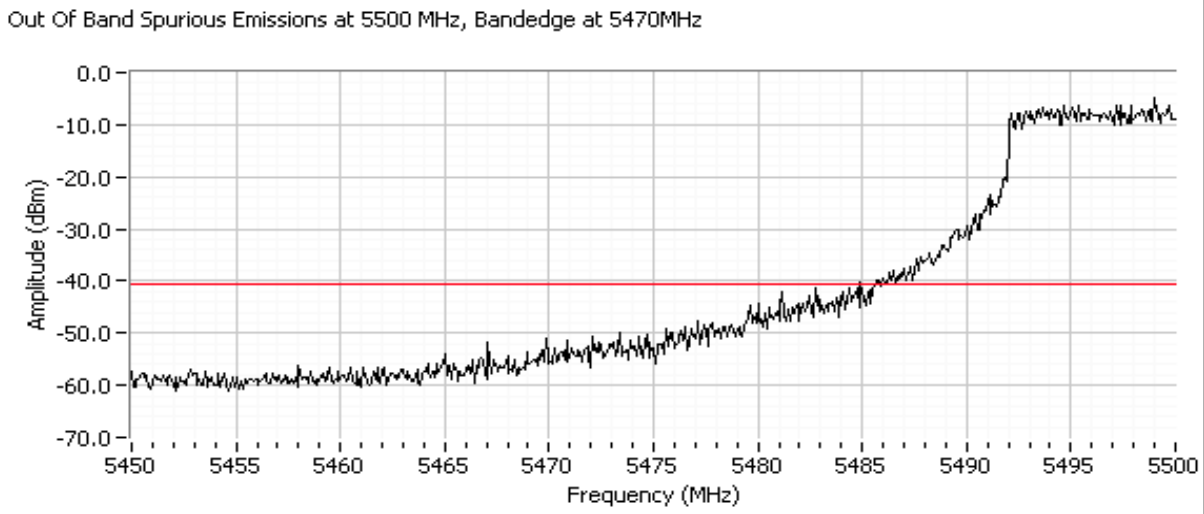


Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)

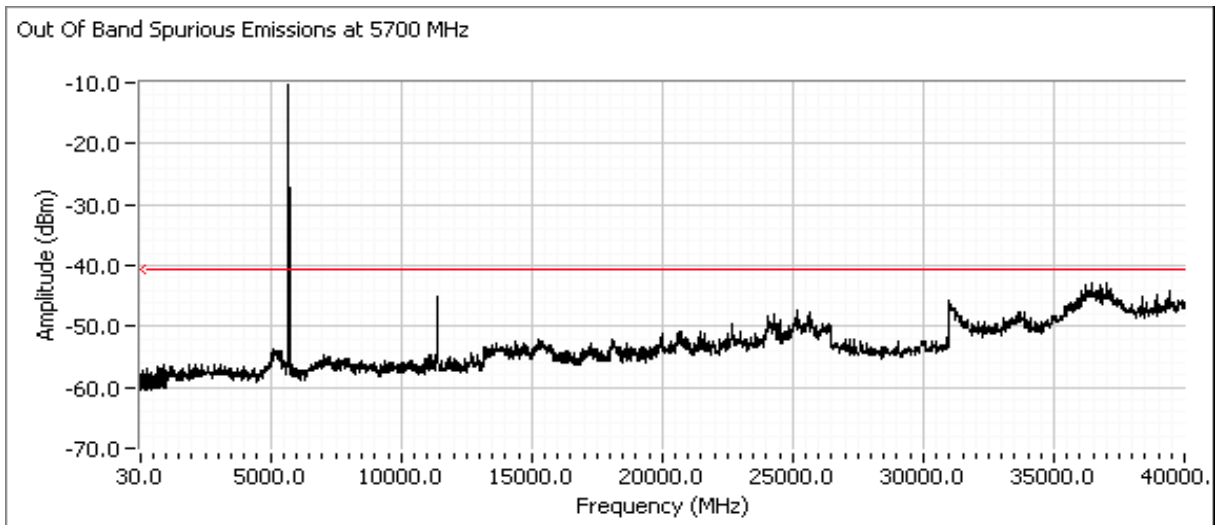


Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
Contact: John Dorsey	Account Manager: Richard Gencev
Standard: FCC Part 15.247/RSS-210	Class: N/A

Plots Showing Out-Of-Band Emissions



Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)



Client: Meru Networks	Job Number: J69679
Model: OAP 180	T-Log Number: T69814
	Account Manager: Richard Gencev
Contact: John Dorsey	
Standard: FCC Part 15.247/RSS-210	Class: N/A

Plots Showing Out-Of-Band Emissions

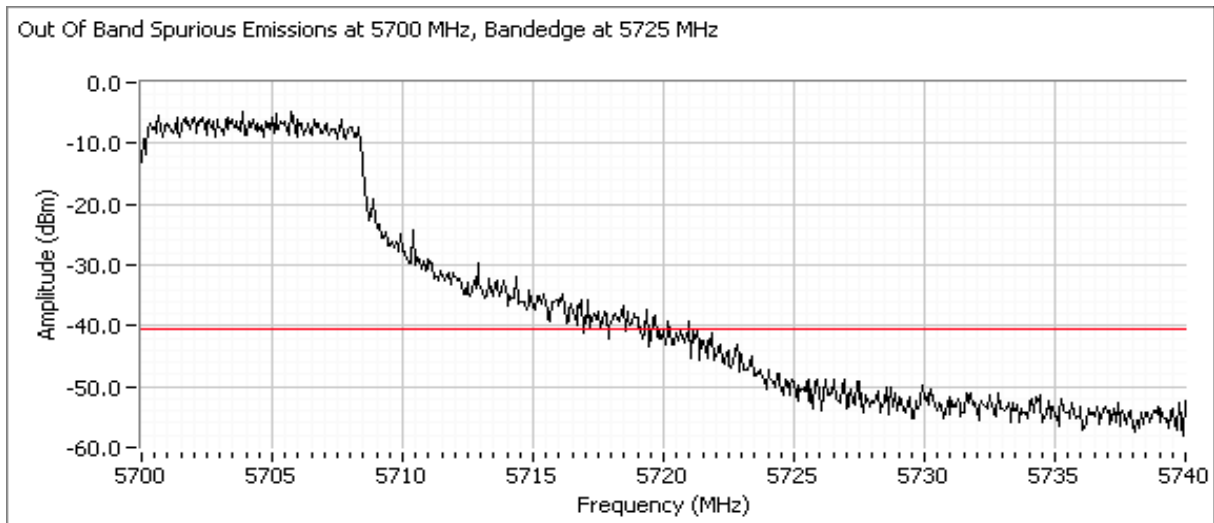


EXHIBIT 3: Photographs of Test Configurations

EXHIBIT 4: Proposed FCC ID Label & Label Location

*EXHIBIT 5: Detailed Photographs
of Meru Networks Model OAP 180 Construction*

*EXHIBIT 6: Operator's Manual
for Meru Networks Model OAP 180*

*EXHIBIT 7: Block Diagram
of Meru Networks Model OAP 180*

*EXHIBIT 8: Schematic Diagrams
for Meru Networks Model OAP 180*

*EXHIBIT 9: Theory of Operation
for Meru Networks Model OAP 180*

EXHIBIT 10: RF Exposure Information