Elliott Laboratories Inc.
www.elliottlabs.com
684 West Maude Avenue
Sunnyvale, CA 94086-3518
408-245-7800 Phone
408-245-3499 Fax

June 20, 2003

American TCB
6731 Whittier Ave.
Suite C110
McLean VA. 22101

Gentlemen:

The enclosed documents constitute a formal submittal and application for a Grant of Equipment Authorization pursuant to Subpart E of Part 15 of FCC Rules (CFR 47) regarding intentional radiators. Data within this report demonstrates that the equipment tested complies with the FCC limits for intentional radiators.

Elliott Laboratories, as duly authorized agent prepared this submittal. A copy of the letter of our appointment as agent is enclosed.
If there are any questions or if further information is needed, please contact Elliott Laboratories for assistance.

Sincerely,

Mark Briggs

Mark Briggs
Director of Engineering

MB/dmg
Enclosures: Agent Authorization Letter
Emissions Test Report with Exhibits

File: R51621

Elliott Laboratories Inc.
www.elliottlabs.com
684 West Maude Avenue
Sunnyvale, CA 94086-3518
408-245-7800 Phone
408-245-3499 Fax

Electromagnetic Emissions Test Report and Application for Grant of Equipment Authorization pursuant to FCC Part 15, Subpart E (UNII Devices) on the Aruba Networks Model: Aruba 52

FCC ID: Q9DARUBA52

GRANTEE: Aruba Networks
180 Great Oaks
San Jose, CA 95119

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

REPORT DATE: June 20, 2003

FINAL TEST DATE: June 10 and June 11, 2003

AUTHORIZED SIGNATORY: Mark Briggs

Mark Briggs
Director of Engineering

ACCREDITED

DECLARATIONS OF COMPLIANCE

Equipment Name and Model:
Aruba 52

Manufacturer:
Aruba Networks
180 Great Oaks
San Jose, CA 95119

Tested to applicable standards:
RSS-210, Issue 5, November 2001 (Low Power License-Exempt Radiocommunication Devices)
FCC Part 15 Subpart E (UNII Devices)

Departmental Acknowledgement Number: IC2845 **SV2** Dated August 12, 2001
Departmental Acknowledgement Number: IC2845 **SV4** Dated July 19, 2001

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of ANSI C63.4 as detailed in section 5.3 of RSS-210, Issue 5); and that the equipment performed in accordance with the data submitted in this report.

Signature	_____
Name	Mark Briggs
Title	Director of Engineering
Company	Elliott Laboratories Inc.
Address	684 W. Maude Ave Sunnyvale, CA 94086 USA
Date:	June 20, 2003

Maintenance of compliance with the above standards 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.).

TABLE OF CONTENTS

SCOPE

An electromagnetic emissions test has been performed on the Aruba Networks model Aruba 52 pursuant to Subpart E of Part 15 of FCC Rules for Unlicensed National Information Infrastructure (UNII) devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-1992 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 FCC 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 Aruba Networks model Aruba 52 and therefore apply only to the tested sample. The sample was selected and prepared by Loren Vorreiter of Aruba Networks

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart E of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their 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.

SUMMARY OF RESULTS

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
Operation in the 5.15 – 5.25 GHz Band				
15.407 (d)		As the device operates in the 5.15 – 5.25 GHz band the antenna must be integral to the device.	Antenna Gain = 4.5 dBi The antenna is integral to the device	COMPLIES
15.407(e)		Indoor operation only	Refer to user's manual in Exhibit 6	COMPLIES
15.407(a) (1)	6.2.2(q1)(i)	Bandwidth	36.0 MHz (26dB) 24.1 MHz (20dB) 19.3 MHz (99%)	N/A
15.407(a) (1)	6.2.2(q1)(i)	Output Power	10.7 dBm @ 5180 MHz	COMPLIES
15.407(a) (1))	6.2.2(q1)(i)	Power Spectral Density	2.1 dBm/MHz @ 5180 MHz	COMPLIES
15.407(b) (5) / 15.209	6.2.2(q1)(ii)	Spurious Emissions below 1GHz	25 dBuV/m @ 165.337 MHz (-5.0 dB)	COMPLIES
15.407(b) (2)	6.2.2(q1)(ii)	Spurious Emissions above 1GHz	73.4 dBuV/m @ 5150 MHz (-0.6 dB)	COMPLIES
Operation in the 5.25 – 5.35 GHz Band Note: The device is restricted to indoor use only, therefore the spectral density of spurious emissions in the 5.15 – 5.25 GHz band were limited to the power spectral limits for intentional signals detailed in FCC 15.407(a)(1) and RSS 210 6.2.2(q1) (i)				
		Maximum Antenna Gain /Integral Antenna	Antenna Gain = 4.5 dBi The antenna is integral to the device	COMPLIES
15.407(a) (2)	6.2.2(q1)(ii)	Bandwidth	23.3 MHz (26dB) 35.0 MHz (20dB) 18.3 MHz (99%)	N/A
15.407(a) (2)	6.2.2(q1)(ii)	Output Power	15 dBm @ 5320 MHz	COMPLIES
15.407(a) (2))	6.2.2(q1)(ii)	Power Spectral Density	7.3 dBm/MHz @ 5320 MHz	COMPLIES
15.407(b) (5) / 15.209	6.2.2(q1)(ii)	Spurious Emissions below 1GHz	25 dBuV/m @ 165.337 MHz (-5.0 dB)	COMPLIES
15.407(b) (2)	6.2.2(q1)(ii)	Spurious Emissions above 1GHz	72.3 dBuV/m @ 5350 MHz (-1.7 dB)	COMPLIES
Operation in the 5.725 – 5.825 GHz Band Note: The device is restricted to indoor use only, therefore the spectral density of spurious emissions in the 5.15 – 5.25 GHz band were limited to the power spectral limits for intentional signals detailed in FCC 15.407(a)(1) and RSS 210 6.2.2(q1) (i)				
		Maximum Antenna Gain /Integral Antenna	Antenna Gain = 4.5 dBi The antenna is integral to the device	COMPLIES
15.407(a) (2)	6.2.2(q1)(ii)	Bandwidth	21.8 MHz (26dB) 31.9 MHz (20dB) 18.3 MHz (99%)	N/A
15.407(a) (2)	6.2.2(q1)(ii)	Output Power	16.3 dBm @ 5785 MHz	COMPLIES
15.407(a) (2))	6.2.2(q1)(ii)	Power Spectral Density	14.4 dBm/MHz @ 5260 MHz	COMPLIES
15.407(b) (5) / 15.209	6.2.2(q1)(ii)	Spurious Emissions below 1GHz	25 dBuV/m @ 165.337 MHz (-5.0 dB)	COMPLIES
15.407(b) (2)	6.2.2(q1)(ii)	Spurious Emissions above 1GHz	72.8 dBuV/m @ 11,570 MHz (-1.2 dB)	COMPLIES

General requirements for all bands				
FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
	6.2.2(q1)(iv)(a)	Digital Modulation	Digital Modulation is used, refer to the "Theory of Operations" (Exhibit 9) for a detailed explanation.	COMPLIES
	6.2.2(q1)(iv)(b)	Peak Spectral Density	13.6 dBm/MHz	COMPLIES
15.407(a)(6)		Peak Excursion Ratio	< 13 dB	COMPLIES
	6.2.2(q1)(iv)(c)	Channel Selection	The device was tested on the following channels: 36, 52, 64, 149, 157, & 161. These channels represent the highest, lowest and center channels available.	N/A
15.407 (c)	6.2.2(q1)(iv)(d)	Automatic Discontinuation of Operation in the absence of information to transmit	Operation is discontinued in the absence of information to transmit, refer to the "Theory of Operations" in Exhibit 9 for a detailed explanation.	COMPLIES
15.407 (g)	6.2.2(q1)(iv)(e)	Frequency Stability	Frequency stability is 20 ppm, refer to the "Theory of Operations" in Exhibit 9 for a detailed analysis.	COMPLIES
	6.2.2(q1)(iv)(g)	User Manual information	All relevant statements have been included in the user's manuals. Refer to Exhibit 6 for details	COMPLIES
15.407 (f)	6.2.2(q1)(iv)(g)	RF Exposure Requirements	Refer to MPE Calculations	COMPLIES
15.407(b) / 15.207		AC Conducted Emissions	41.5 dBuV @ 0.265 MHz (-9.8 dB)	COMPLIES
	6.6	AC Conducted Emissions	41.5 dBuV @ 0.265 MHz (-6.5 dB)	COMPLIES

EIRP calculated using antenna gain of dBi (4.5) for the highest EIRP point-to-point system.

MEASUREMENT UNCERTAINTIES

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

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.6

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Aruba Networks model Aruba 52 is an Accesspoint Radio, which is designed to operate in home or office network environments. Normally, the EUT would be tabletop during operation. The EUT was treated as tabletop equipment during testing to simulate the end user environment.

The sample was received on June 10, 2003 and tested on June 10 and June 11, 2003. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Aruba 52	Aruba 52	Accesspoint Radio	-	TBD

OTHER EUT DETAILS

List any items from the test log.

ENCLOSURE

The EUT enclosure is primarily constructed of fabricated sheet steel. It measures approximately 25 cm wide by 15.5 cm deep by 5 cm high.

MODIFICATIONS

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

SUPPORT EQUIPMENT

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

Manufacturer	Model	Description	Serial Number	FCC ID
Compal	ACY131	Laptop	NZB02084015T14043	DoC
Hawking	PNY09TP	Hub	15B4000276	N/A
Keytronics	H2002	Mouse	24284	DoC

No equipment was used as remote support equipment for 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)
RS-232	Laptop	Multiwire	Shielded	2
Ethernet	Hub	Cat 5	Unshielded	1

EUT OPERATION DURING TESTING

ANTENNA REQUIREMENTS

As the device is intended to operate in the 5.15 – 5.25 GHz band an integral antenna as detailed in 15.407 (d) is required. The antenna for the device is an integral antenna as the connectors are located inside the device and there is no users need to open device.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on June 10 and June 11, 2003at the Elliott Laboratories Open Area Test Site #4 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Federal Communications Commission.

The FCC 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 FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4-1992. 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. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

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.

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.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde and 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 fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH 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.

POWER METER

A power meter and **peak** power sensor are used for all direct output power measurements from transmitters as they provide a broadband indication of the power output.

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 biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers.

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.

ANSI C63.4 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 FCC requires 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, 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.

RADIATED EMISSIONS

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

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. 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. Emissions which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements are performed 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.

Measurement bandwidths (video and resolution) are set in accordance with FCC procedures for the type of radio being tested.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions from the AC power port are given in units of microvolts, the limits for radiated electric field emissions are given in units of microvolts per meter at a specified test distance and the output power limits are given in temrs of Watts, milliwatts or dBm. 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.

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp) the following formula is used to determine the field strength limit in terms of microvolts per meter at a distance of 3m from the equipment under test:

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

where P is the eirp (Watts)

For reference, converting the voltage and electric field strength specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. Conversion of power specification limits from linear units (in milliwatts) to decibel form (in dBm) is accomplished by taking the base ten logarithm, then multiplying by 10.

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

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.

RS-210 6.2.2(q1) 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	200mW (23 dBm)	10 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

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.

SPURIOUS RADIATED EMISSIONS LIMITS

The table below shows the limits for unwanted (spurious) emissions falling in the restricted bands detailed in Part 15.205 and Industry Canada RSS-210 Table 2.

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

The table below shows the limits for unwanted (spurious) emissions outside of the restricted bands above 1GHz.

Operating Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength At 3m (dBuV/m)
5150 - 5250	-27 dBm	68.3 dBuV/m
5250 - 5350	-27 dBm (note 1)	68.3 dBuV/m
5725 – 5825	-27 dBm (note 2)	68.3 dBuV/m
	-17 dBm (note 3)	78.3 dBuV/m

Note 1: If operation is restricted to indoor use only then emissions in the band 5.15 – 5.25 GHz must meet the power spectral density limits for the intentional signals detailed in RSS 210 and FCC Subpart E for devices operating in the 5.15 – 5.25 Ghz band.
Note 2: Applies to spurious signals separated by more than 10 MHz from the allocated band.
Note 3: Applies to spurious signals within 10 MHz of the allocated band.

AC POWER PORT CONDUCTED EMISSIONS LIMITS

The table below shows the limits for emissions on the AC power line as detailed in FCC Part 15.205 and Industry Canada RSS-210 section 6.6.

Frequency Range (MHz)	Limit (uV)	Limit (dBuV)
0.450 to 30.000	250	48

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - B = C$$

and

$$C - S = M$$

where:

R_r = Receiver Reading in dBuV

B = Broadband Correction Factor*

C = Corrected Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

* Broadband Level - Per ANSI C63.4, 13 dB may be subtracted from the quasi-peak level if it is determined that the emission is broadband in nature. If the signal level in the average mode is six dB or more below the signal level in the peak mode, the emission is classified as broadband.

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, 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

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 dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Conducted and Radiated Emissions, 30-Jun-03
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Elliott Laboratories	FCC / CISPR LISN	LISN-3, OATS	304	12	6/5/2003	6/5/2004
Elliott Laboratories	LISN 2 x (Solar 8028 LISN + 6512 Caps)	LISN-5,Support	379	12	8/20/2002	8/20/2003
EMCO	Biconical Antenna, 30-300 MHz	773	801	12	5/13/2003	3/18/2004
EMCO	Log Periodic Antenna, 0.2-1 GHz	1321	1294	12	4/12/2003	3/31/2004
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	812	12	1/10/2003	1/10/2004
Rohde & Schwarz	Test Receiver, 0.009-2000 MHz	ESN	1316	12	11/5/2002	11/5/2003
Rohde & Schwarz	Test Receiver, 20-1300 MHz	ESVP	1222	12	7/11/2002	7/12/2003

Radiated Emissions, 1 - 25,000 GHz, 08-Jul-03
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Hewlett Packard	Microwave EMI test system (SA40, 9kHz - 40GHz)	84125C	1149	12	3/12/2003	3/12/2004

Power Output Measurement, 08-Jul-03
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1534	12	3/20/2003	3/20/2004
Rohde & Schwarz	Power Sensor 100uW - 10 Watts	NRV-Z53	1236	12	8/15/2002	8/15/2003

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T51481_UNII 48 Pages
T51481_Digital 12 Pages

Elliott

EMC Test Data

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Proj Eng:	Christine Vu
Contact:	Loren Vorreiter		
Emissions Spec:	FCC Part 15 C and E, RSS-210	Class:	B / Radio
Immunity Spec:	EN301 489-1	Environment:	-

EMC Test Data

For The

Aruba Networks

Model

Aruba 52

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Proj Eng:	Christine Vu
Contact:	Loren Vorreiter		
Emissions Spec:	FCC Part 15 C and E, RSS-210	Class:	B / Radio
Immunity Spec:	EN301 489-1	Environment:	-

EUT INFORMATION

General Description

The EUT is an Accesspoint Radio which is designed to operate in home or office network environments. The Accesspoint contains 802.11a and 802.11b transceivers. Normally, the EUT would be table-top during operation. The EUT was treated as table-top equipment during testing to simulate the end user environment.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Aruba Networks	Aruba 52	Accesspoint Radio	-	TBD
Phihong	PSA 18U-033A-1	switching AC adaptor	131300158A1	N/A

Antenna

The EUT uses an integral antenna with a gain of 4.5 dBi for the 5GHz and 1.5 dBi for the 2.4 GHz.
The antenna connector used is non-standard antenna Hiroshe and MMDX connections to meet the requirements of FCC Part 15.203 and RSS-210

EUT Enclosure

The EUT enclosure is primarily constructed of fabricated sheet steel. It measures approximately 25 cm wide by 15.5 cm deep by 5 cm high.

Modification History

Mod. #	Test	Date	Modification
1	-	-	None

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Proj Eng:	Christine Vu
Contact:	Loren Vorreiter		
Emissions Spec:	FCC Part 15 C and E, RSS-210	Class:	B / Radio
Immunity Spec:	EN301 489-1	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Compal	ACY131	Laptop	NZB02084015T14043	DoC
Hawking	PNY09TP	Hub	15B4000276	N/A
Keytronics	H2002	Mouse	24284	DoC

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

EUT Interface Cabling and Ports

		Cable(s)		
Port	Connected To	Description	Shielded or Unshielded	Length(m)
RS-232	Laptop	Multiwire	Shielded	2
Ethernet	Hub	Cat 5	Unshielded	1

EUT Operation During Emissions Testing (Radio)

EUT was set to low, middle, and high channel at full power

EUT Operation During Immunity

EUT was set to transmit mode. Transmissions were received by a local support EUT in the Receive mode. A laptop computer connected to the serial port of the support EUT reported the number of transmitted packets, Receive packets, number of errors, number of packets dropped, number of collisions, and number of Receive bytes.

Criteria A

The EUT shall continue to operate as intended without user intervention.

Criteria B

The EUT shall continue to operate as intended after the the application of the event.

Criteria C

User intervention is permitted to restore the EUT to normal operation conditions.

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Radiated Emissions

Test Specifics

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: 6/10/03
Test Engineer: jmartinez
Test Location: SVOATS #4

Config. Used: 1
Config Change: None
Host Unit Voltage 120Vac, 60Hz

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: 17 °C
Rel. Humidity: 56 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a	RE, 1000 - 40,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.407	Pass	-0.6 dB @ 5150 MHz
1b	RE, 1000 - 40,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.407	Pass	-11.9dB @ 6311.3 MHz
1c	RE, 1000 - 40,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.407	Pass	-1.7dB @ 5350 MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

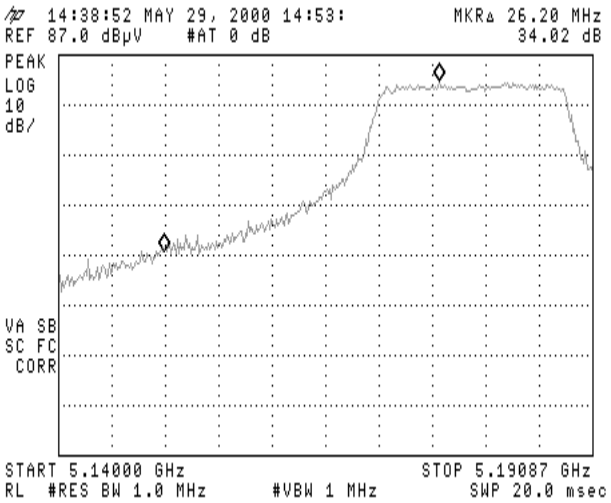
Deviations From The Standard

No deviations were made from the requirements of the standard.

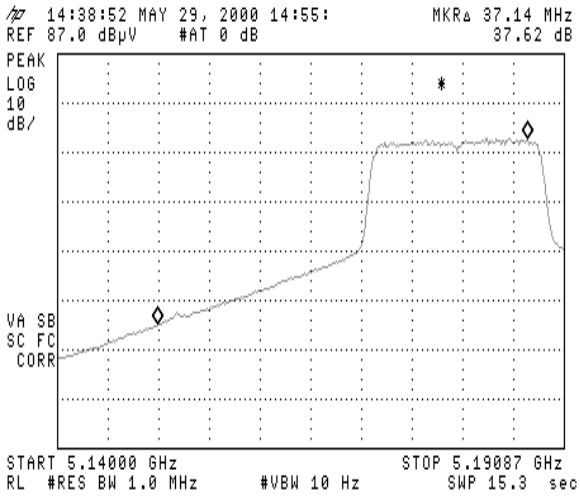
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Run #1: Low Channel @ 5180 MHz Bandedge.

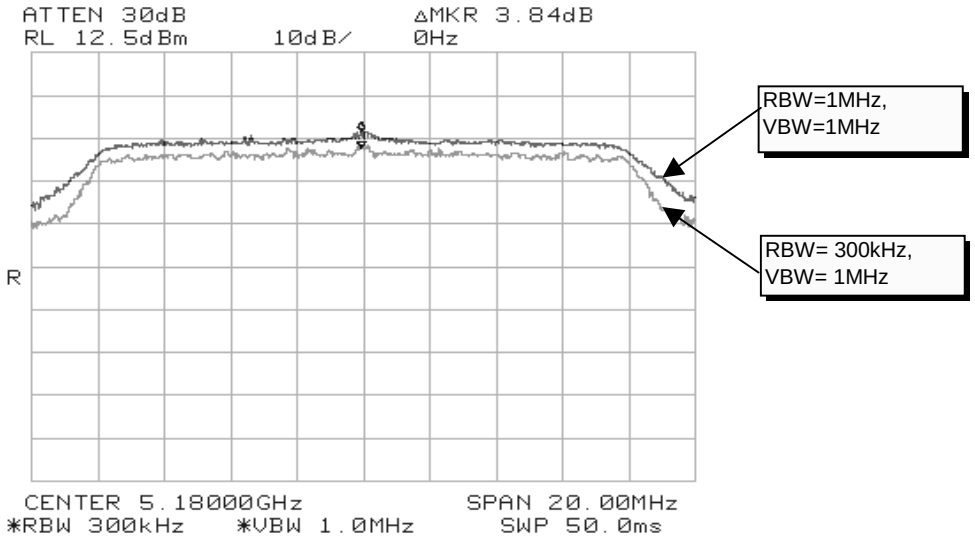
Peak Bandedge



Average Bandedge



Bandwidth Correction



Elliott

EMC Test Data

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Run #2: Radiated Spurious Emissions, 1000 - 40,000 MHz. Low Channel @ 5180 MHz

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10360.00	56.4	h	68.3	-11.9	Note 1	184	1.5	
15540.00	51.9	h	74.0	-22.1	Pk	70	1.0	
15540.00	38.6	h	54.0	-15.4	Avg	70	1.0	
10360.00	58.8	v	68.3	-9.5	Note 1	272	1.1	
15540.00	51.2	v	74.0	-22.9	Pk	360	1.0	
15540.00	38.3	v	54.0	-15.7	Avg	360	1.0	
5173.188	111.3	V	-	-	Pk	-	-	Fundamental
5173.368	94.6	V	-	-	Avg	-	-	Fundamental
5173.479	96.8	H	-	-	Pk	-	-	Fundamental
5173.557	79.8	H	-	-	Avg	-	-	Fundamental
5150.00	73.4	V	74.0	-0.6	Pk	-	-	(Run#1)Peak RBW=VBW=1MHz
5150.00	53.1	V	54.0	-0.9	Avg	-	-	(Run#1)Avg RBW=1MHz,VBW=10Hz
5150.00	58.9	H	74.0	-15.1	Pk	-	-	(Run#1)Peak RBW=VBW=1MHz
5150.00	38.3	H	54.0	-15.7	Avg	-	-	(Run#1)Avg RBW=1MHz,VBW=10Hz
6216.000	54.9	H	68.3	-13.4	Note 1	360	1.0	
6216.000	59.8	V	68.3	-8.5	Note 1	250	1.1	

Note 1:	Restricted Band Peak Measurements: Resolution and Video BW: 1 MHz, Restricted Band Average Measurements: Resolution Bw: 1MHz and Video Bw: 10 Hz. All other measurements, RBW = 1MHz and VBW = 3MHz, video averaging on (100 samples).
Note 2:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

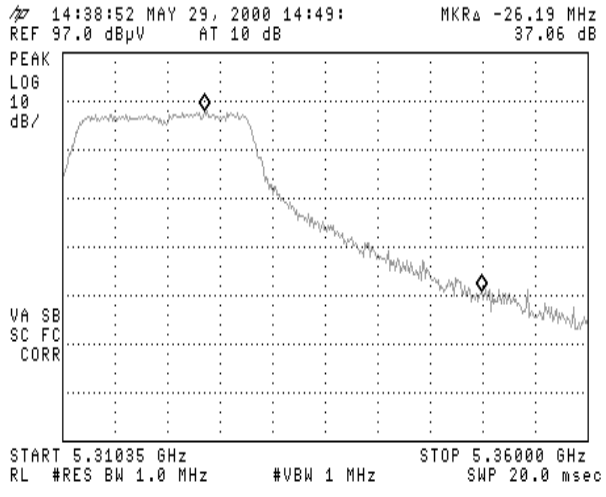
Run #3: Radiated Spurious Emissions, 1000 - 40,000 MHz. Center Channel @ 5260 MHz

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10520.00	40.4	h	68.3	-27.9	Note 1	269	1.0	
15780.00	50.5	h	74.0	-23.5	Pk	11	1.0	
15780.00	37.5	h	54.0	-16.5	Avg	11	1.0	
10520.00	39.0	v	68.3	-29.3	Note 1	57	1.2	
15780.00	50.8	v	74.0	-23.2	Pk	361	1.1	
15780.00	38.0	v	54.0	-16.0	Avg	361	1.1	
6311.300	56.4	V	68.3	-11.9	Note 1	361	1.1	
6294.500	52.4	V	68.3	-15.9	Note 1	256	1.2	

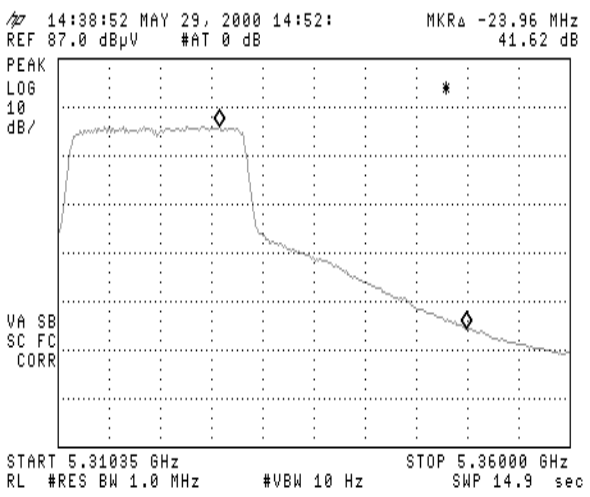
Note 1:	Restricted Band Peak Measurements: Resolution and Video BW: 1 MHz, Restricted Band Average Measurements: Resolution Bw: 1MHz and Video Bw: 10 Hz. All other measurements, RBW = 1MHz and VBW = 3MHz, video averaging on (100 samples).
Note 2:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.

Run #4: High Channel @ 5320 MHz Bandedge.

Peak Bandedge



Average Bandedge



Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Run #5: Radiated Spurious Emissions, 1000 - 40,000 MHz. High Channel @ 5320 MHz

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10640.00	52.6	v	74.0	-21.4	Pk	221	1.0	
10640.00	38.8	v	54.0	-15.2	Avg	221	1.0	
15960.00	50.5	v	74.0	-23.5	Pk	188	1.0	
15960.00	38.0	v	54.0	-16.0	Avg	188	1.0	
10640.00	55.5	h	74.0	-18.5	Pk	162	1.3	
10640.00	39.4	h	54.0	-14.6	Avg	162	1.3	
15960.00	51.1	h	74.0	-23.0	Pk	196	1.0	
15960.00	38.0	h	54.0	-16.0	Avg	196	1.0	
5322.737	96.5	H	-	-	Pk	-	-	Fundamental
5322.510	80.4	H	-	-	Avg	-	-	Fundamental
5315.858	109.4	V	-	-	Pk	-	-	Fundamental
5315.633	92.0	V	-	-	Avg	-	-	Fundamental
5350.000	59.4	H	74.0	-14.6	Pk	-	-	(Run#4)Peak RBW=VBW=1MHz
5350.000	38.8	H	54.0	-15.2	Avg	-	-	(Run#4)Avg RBW=1MHz,VBW=10Hz
5350.000	72.3	V	74.0	-1.7	Pk	-	-	(Run#4)Peak RBW=VBW=1MHz
5350.000	50.4	V	54.0	-3.6	Avg	-	-	(Run#4)Avg RBW=1MHz,VBW=10Hz
6384.000	60.2	V	68.3	-8.1	Note 1	184	1.0	
6384.000	58.2	H	68.3	-10.1	Note 1	0	1.0	

Note 1:	Restricted Band Peak Measurements: Resolution and Video BW: 1 MHz, Restricted Band Average Measurements: Resolution Bw: 1MHz and Video Bw: 10 Hz. All other measurements, RBW = 1MHz and VBW = 3MHz, video averaging on (100 samples).
Note 2:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Radiated Emissions

Test Specifics

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: 6/11/03
Test Engineer: jmartinez
Test Location: SVOATS #4

Config. Used: 1
Config Change: None
Host Unit Voltage 120Vac, 60Hz

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: 18 °C
Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a	RE, 1000 - 40,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.407	Pass	-7.2dB @ 11490 MHz
1b	RE, 1000 - 40,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.407	Pass	-1.2dB @ 11570.0MHz
1c	RE, 1000 - 40,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.407	Pass	-1.5dB @ 11610.0MHz

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:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Run #1a: Radiated Spurious Emissions, 1000 - 40,000 MHz. Low Channel @ 5745 MHz

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11490.00	66.5	h	74.0	-7.5	Pk	63	1.4	
11490.00	46.9	h	54.0	-7.2	Avg	63	1.4	
17235.00	54.6	h	74.0	-19.4	Pk	0	1.0	
17235.00	41.5	h	54.0	-12.5	Avg	0	1.0	
11490.00	65.9	v	74.0	-8.1	Pk	290	1.4	
11490.00	45.8	v	54.0	-8.3	Avg	290	1.4	
17235.00	52.8	v	74.0	-21.2	Pk	0	1.0	
17235.00	41.4	v	54.0	-12.6	Avg	0	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.
Note 2:	

Run #1b: Radiated Spurious Emissions, 1000 - 40,000 MHz. Center Channel @ 5765 MHz

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11570.00	72.8	h	74.0	-1.2	Pk	109	1.4	
11570.00	48.1	h	54.0	-5.9	Avg	109	1.4	
17355.00	57.7	h	74.0	-16.3	Pk	216	1.3	
17355.00	44.3	h	54.0	-9.7	Avg	216	1.3	
11570.00	68.1	v	74.0	-5.9	Pk	216	1.0	
11570.00	48.0	v	54.0	-6.0	Avg	216	1.0	
17355.00	57.4	v	74.0	-16.6	Pk	186	1.0	
17355.00	44.4	v	54.0	-9.6	Avg	186	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.
Note 2:	

Elliott

EMC Test Data

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Run #1c: Radiated Spurious Emissions, 1000 - 40,000 MHz. High Channel @ 5805 MHz

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11610.00	72.5	h	74.0	-1.5	Pk	101	1.5	
11610.00	50.9	h	54.0	-3.1	Avg	101	1.5	
17415.00	62.9	h	74.0	-11.1	Pk	100	1.2	
17415.00	45.9	h	54.0	-8.1	Avg	100	1.2	
11610.00	69.9	v	74.0	-4.1	Pk	69	1.0	
11610.00	48.1	v	54.0	-5.9	Avg	69	1.0	
17415.00	58.6	v	74.0	-15.4	Pk	0	1.0	
17415.00	44.2	v	54.0	-9.8	Avg	0	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20 dB below the level of the fundamental.
Note 2:	

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

FCC Part 15 Subpart E Tests

Test Specifics

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: 6/10/03
Test Engineer: jmartinez
Test Location: SVOATS #4
Config. Used: 1
Config Change: None
Host Unit Voltage 120Vac, 60Hz

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: 18 °C
Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Result	Comments
1	Output Power (5.15-5.25GHz)	15.407(a) (1), (2)	Pass	10.7 dBm
1	Output Power (5.25-5.35GHz)	15.407(a) (1), (2)	Pass	15 dBm
1	Output Power(5.725-5.825GHz)	15.407(a) (1), (2)	Pass	16.3 dBm
1	Power Spectral Density (PSD)	15.407(a) (1), (2)	Pass	14.4
1	26dB Bandwidth	15.407	Pass	> 20 MHz
1	20 dB Bandwidth	RSS 210	Pass	> 20 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	Peak to average excursion < 13dB
3	Antenna Conducted - Out of Band Spurious	15.407(b)	Pass	All emissions below the 27dBm/MHz limit
4	Bandedges	15.407(b)	Pass	Refer to plots

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:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

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

The minimum VBW required for power measurements using a spectrum analyzer is 1/T, where T is the pulse transmission rate.

Pulse Transmission Rate: 4.0 uS (Symbol Rate for 802.11a)

Minimum VBW: 250 kHz

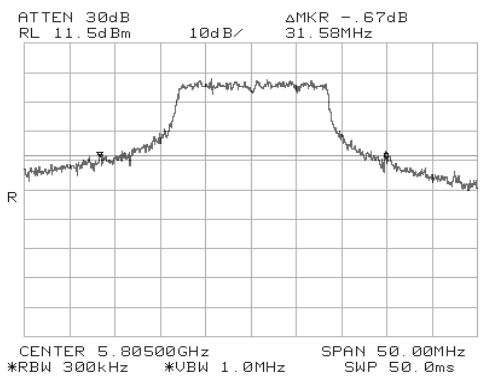
VBW Used: 300 kHz (Used Method# 3 from the UNII FCC Public Notice)

Antenna Gain: 4.5 dBi

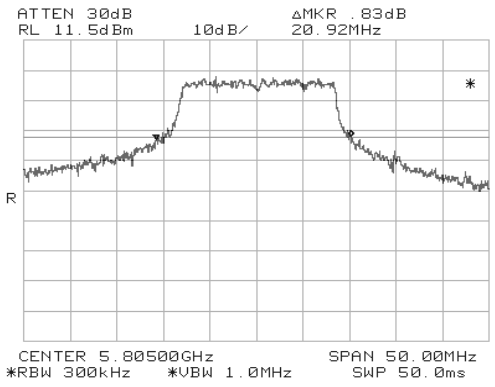
Frequency	Bandwidth (note 1) MHz			Output Power (note 2) dBm		Power (Watts)	PSD (FCC - note 3) dBm/MHz		PSD (RSS210 - note 3) dBm/MHz	
(MHz)	20dB	26dB	99%	Measured	Limit		Measured	Limit	Avg	Peak
5180	24.1	36.0	19.3	10.7	17.0	0.01175	2.1	4.0	0.6	1.8
5240							3.0	4.0		
5260	23.3	35.0	18.3	14.9	24.0	0.03090	7.3	11.0	0.8	6.6
5320	22.8	32.5	18.3	15.0	24.0	0.03162	7.6	11.0	0.8	7.1
5745	21.8	31.9	18.3	15.8	30.0	0.03802	3.4	17.0	0.9	3.1
5785	21.5	30.7	17.8	16.3	30.0	0.04266	14.4	17.0	0.9	13.6
5805	21.0	31.6	17.7	16.0	30.0	0.03981	11.6	17.0	0.9	11.9

Note 1	Bandwidth measured using RBW = 300kHz.
Note 2	Measured using spectrum analyzer's power measurement function (RBW = 1MHz, VBW = 300kHz). Detector was set to peak and trace max hold for 60 seconds per Method# 3.
Note 3	Measurement of peak power spectral density was made using RBW = 1MHz, VBW = 3MHz. The average value is the peak output power divided by the 99% bandwidth. For RSS210 the measured value must not exceed the average value by more than 6dB without reducing the limit for output power.

26-dB Bw

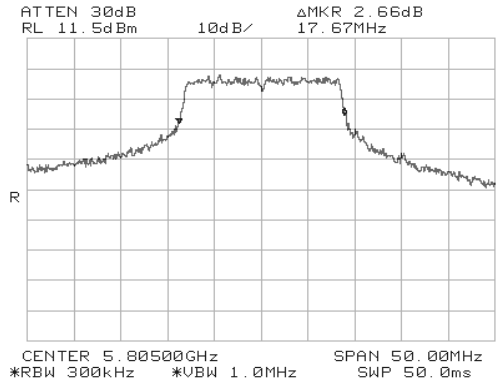


20-dB

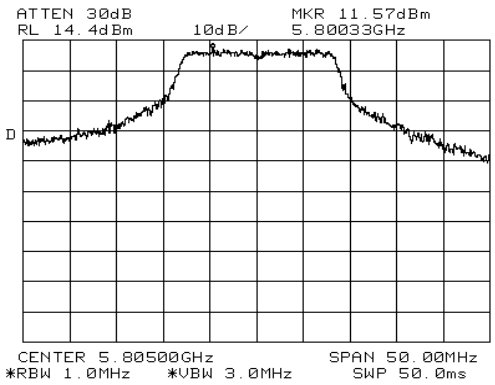


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

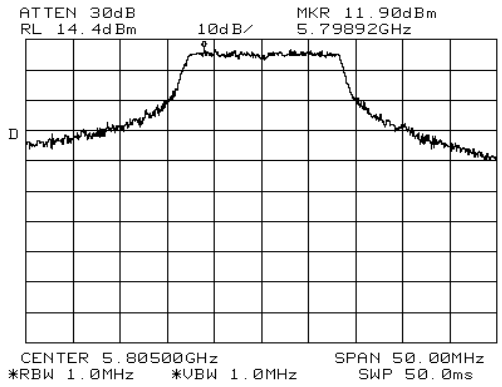
99%



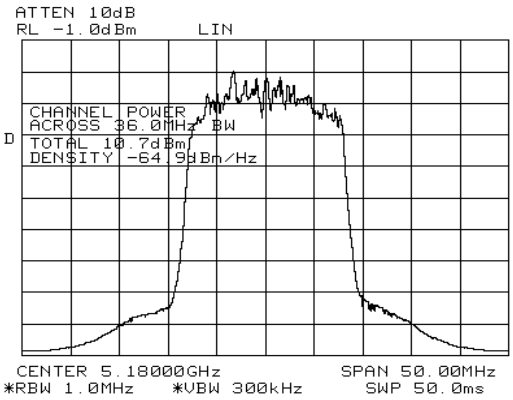
FCC PSD



Canada PSD

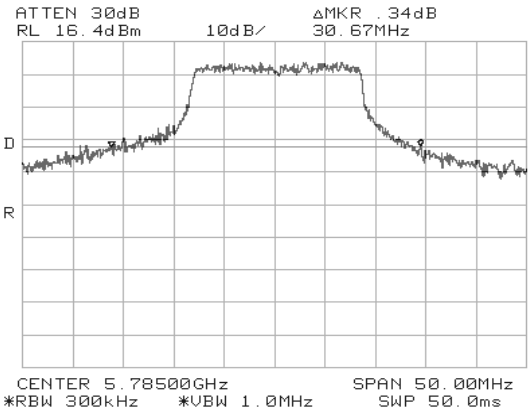


S.A Power Measurement

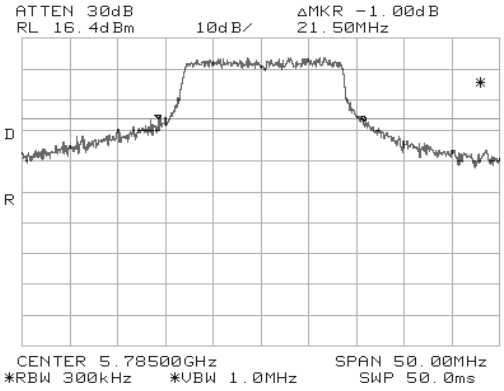


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

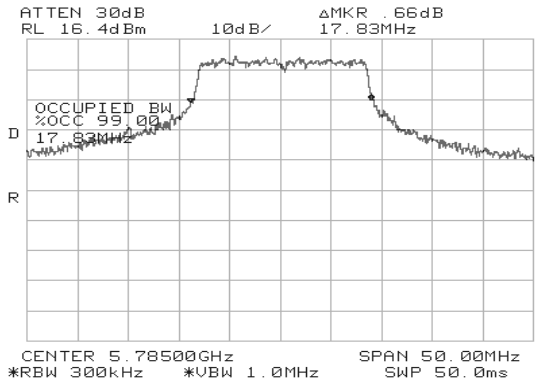
26-dB Bw



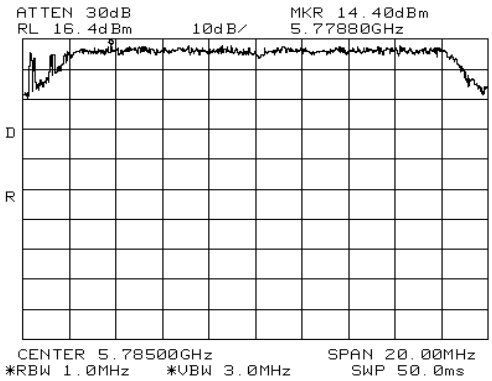
20-dB



99%

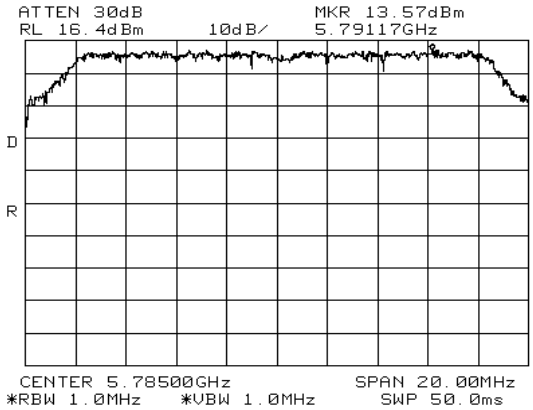


FCC PSD

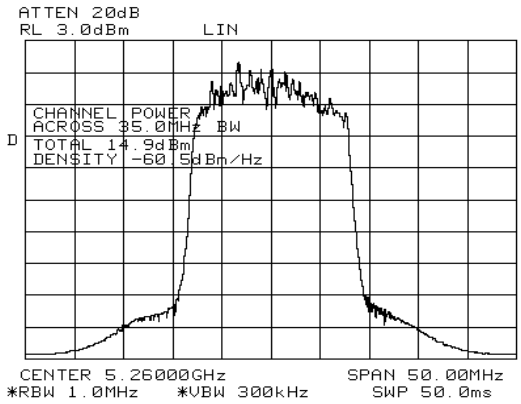


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Canada PSD

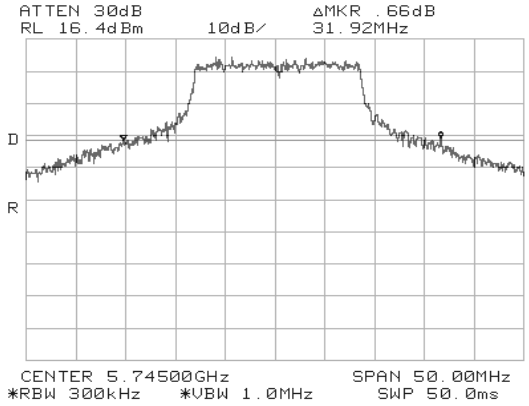


S.A. Power Measurement

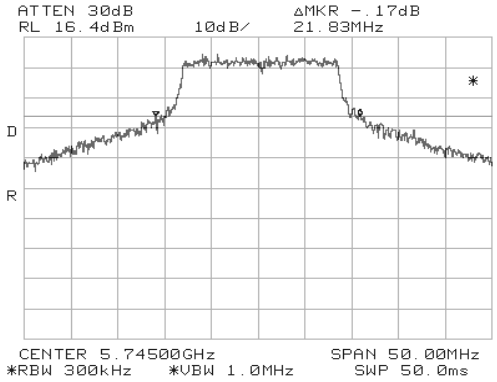


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

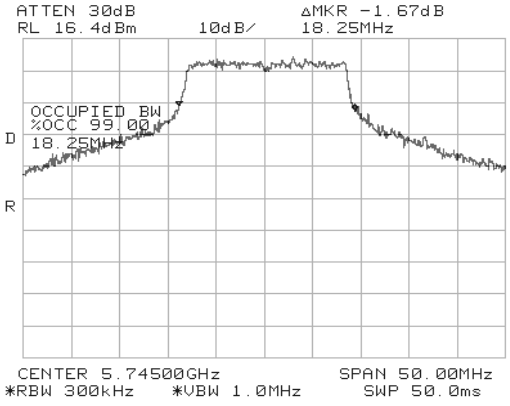
26-dB Bw



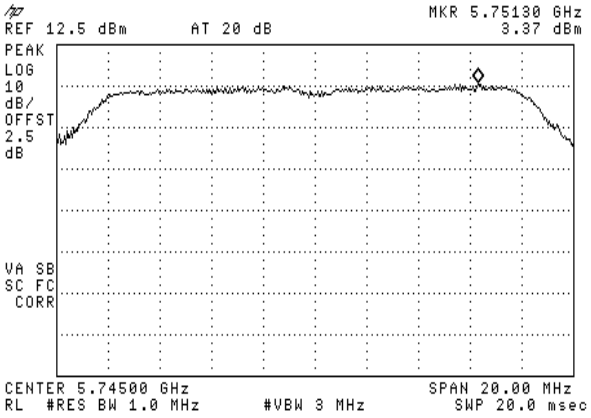
20-dB



99%

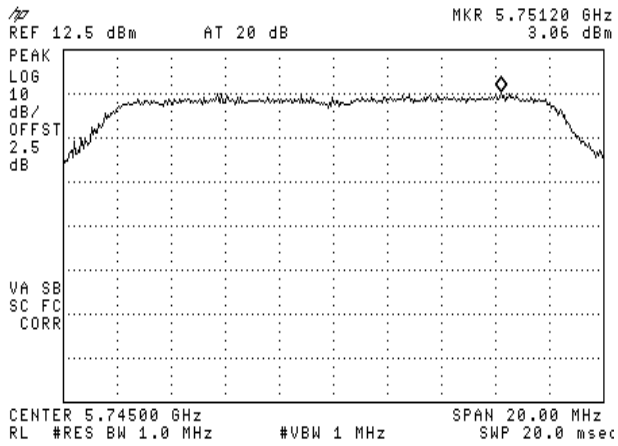


FCC PSD

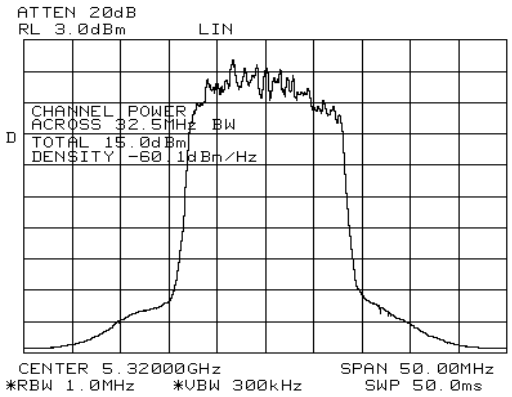


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Canada PSD

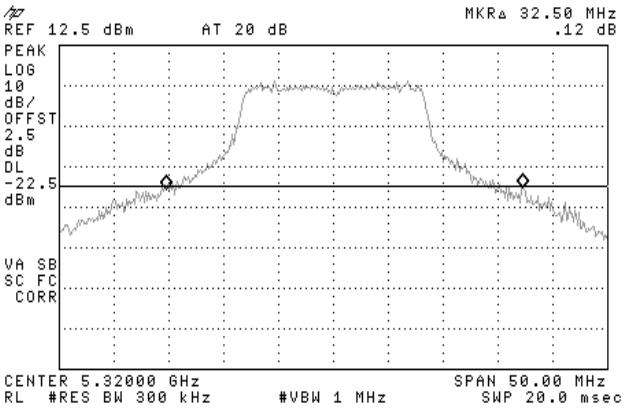


S.A. Power Measurement

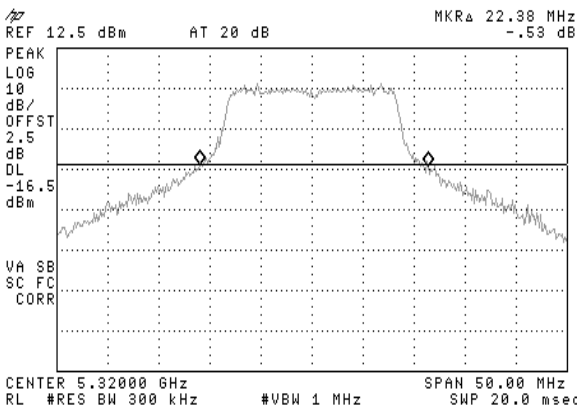


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

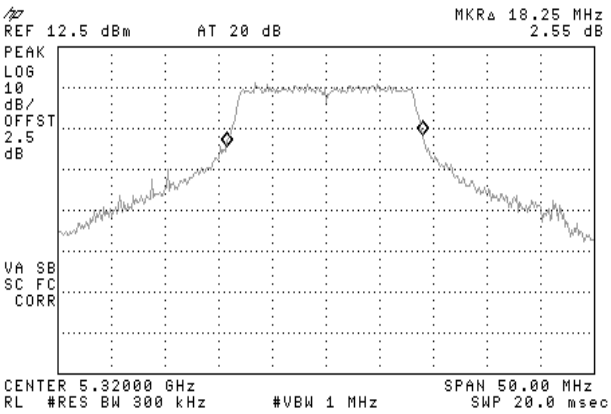
26-dB Bw



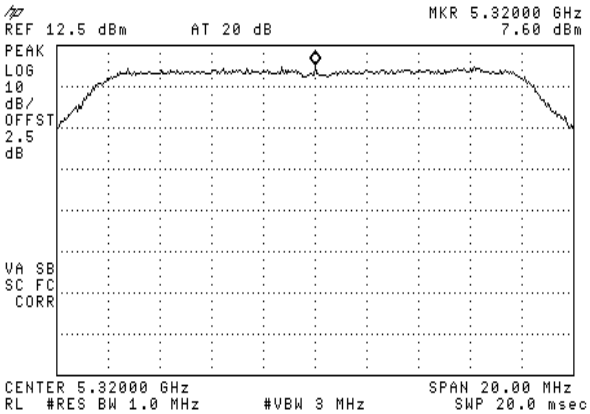
20-dB



99%

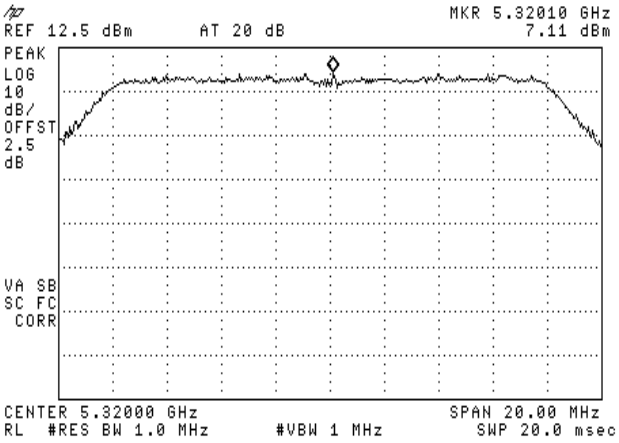


FCC PSD

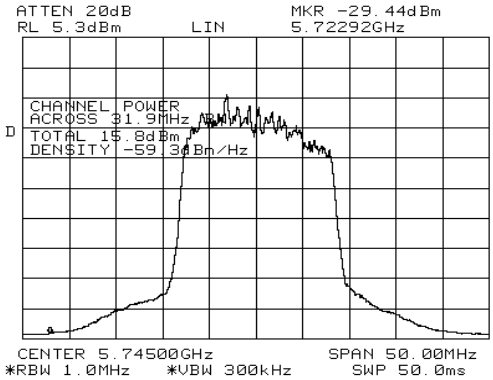


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Canada PSD

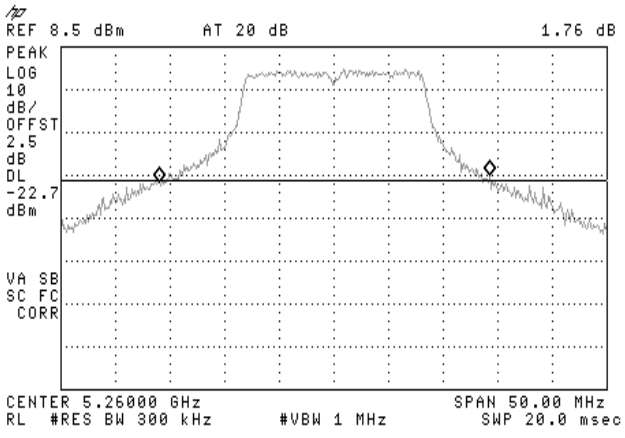


S.A. Power Measurement

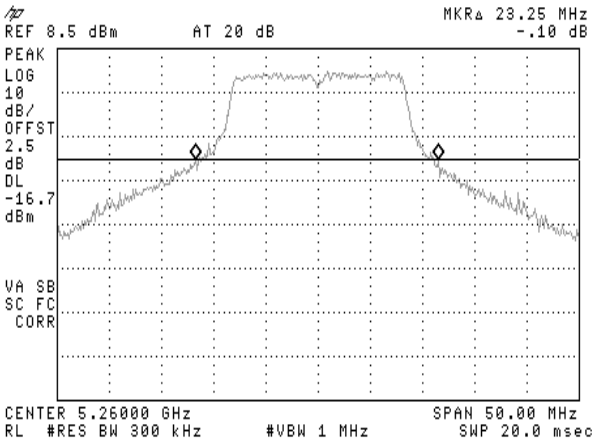


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

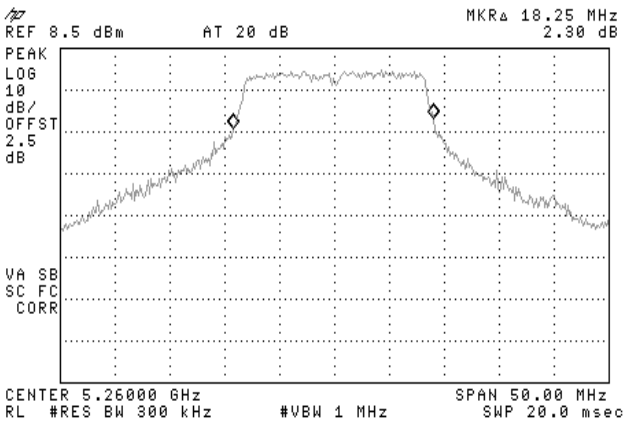
26-dB Bw



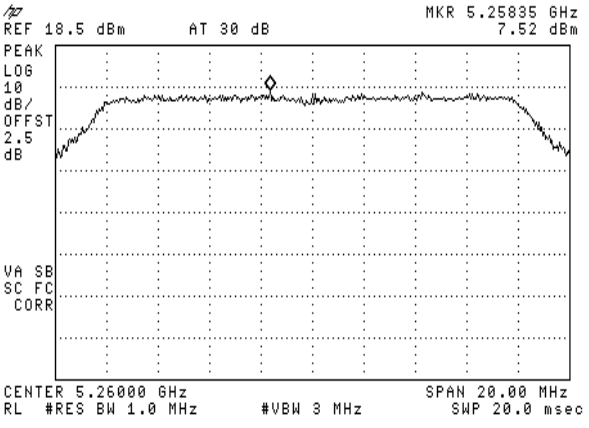
20-dB



99%

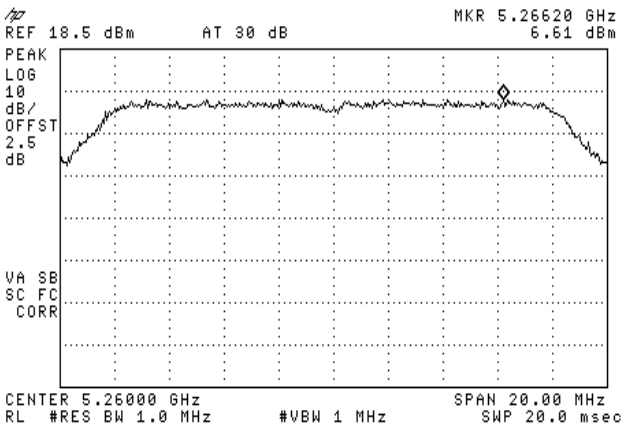


FCC PSD

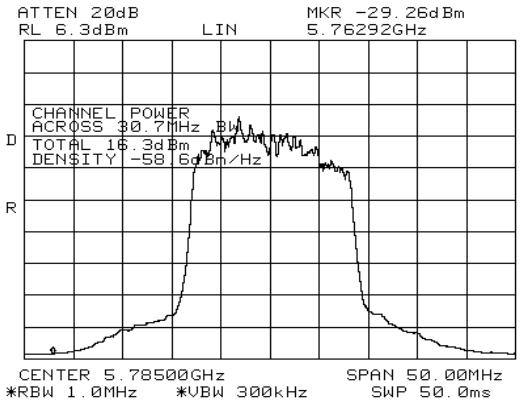


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Canada PSD

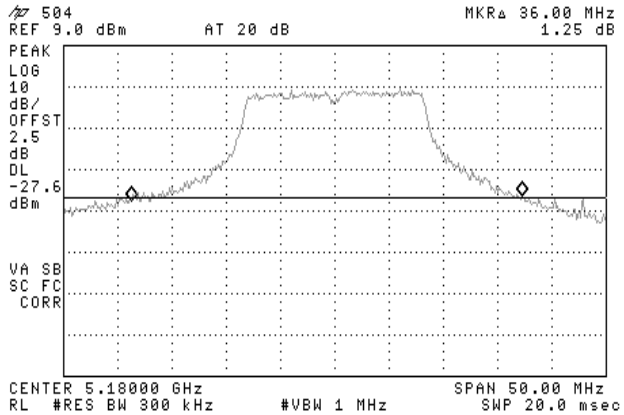


S.A. Power Measurement

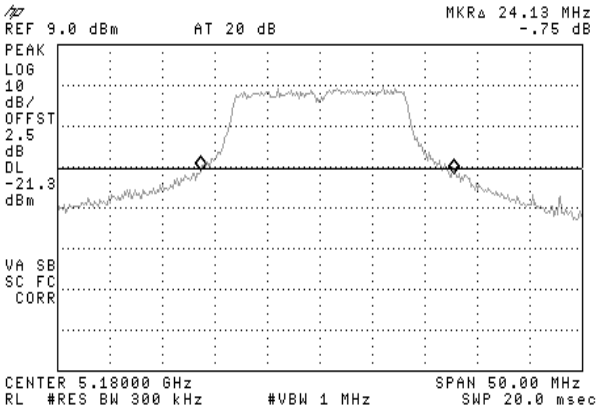


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

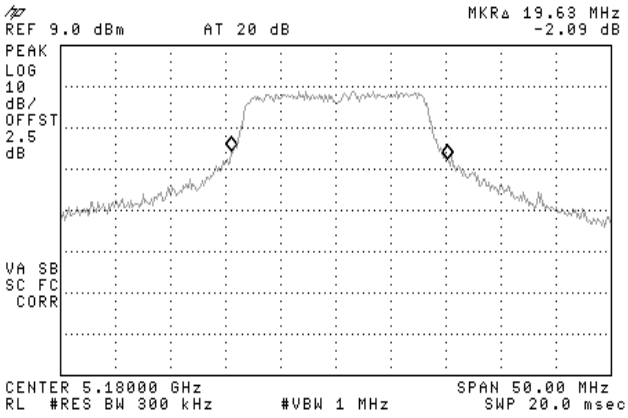
26-dB Bw



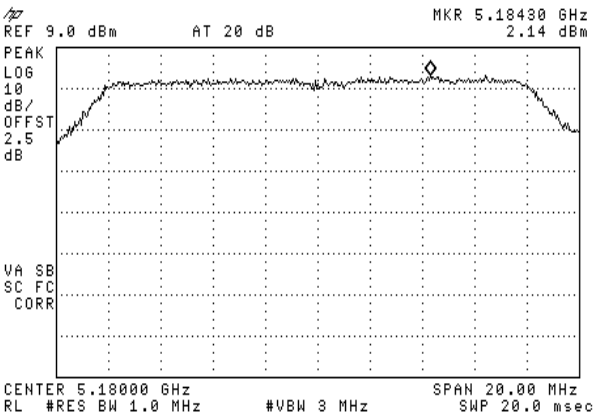
20-dB



99%

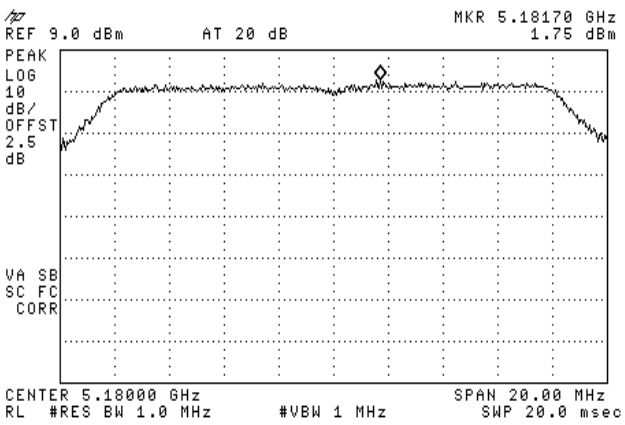


FCC PSD

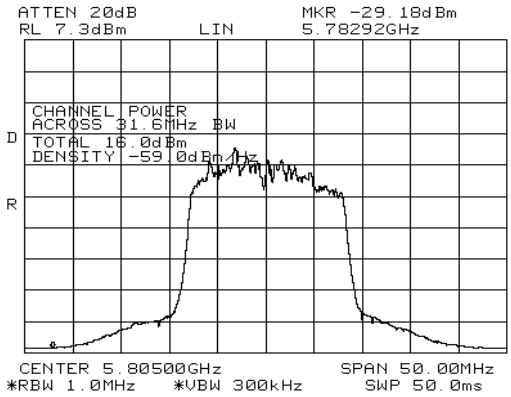


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

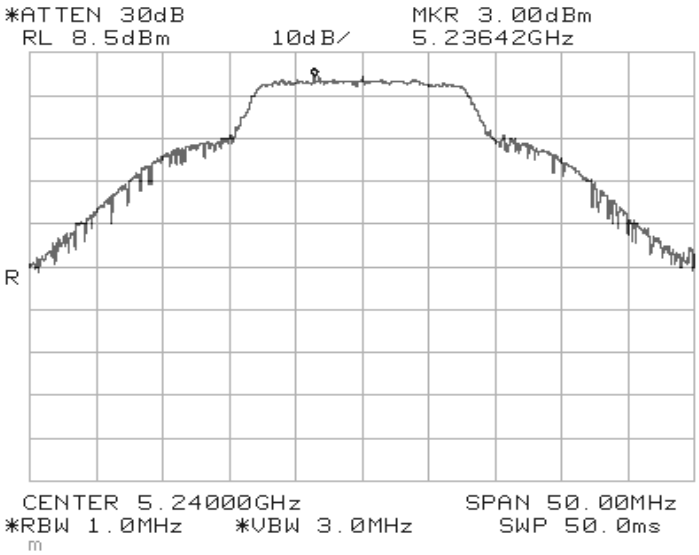
Canada PSD



S.A. Power Measurement



FCC PSD 5240 Mhz



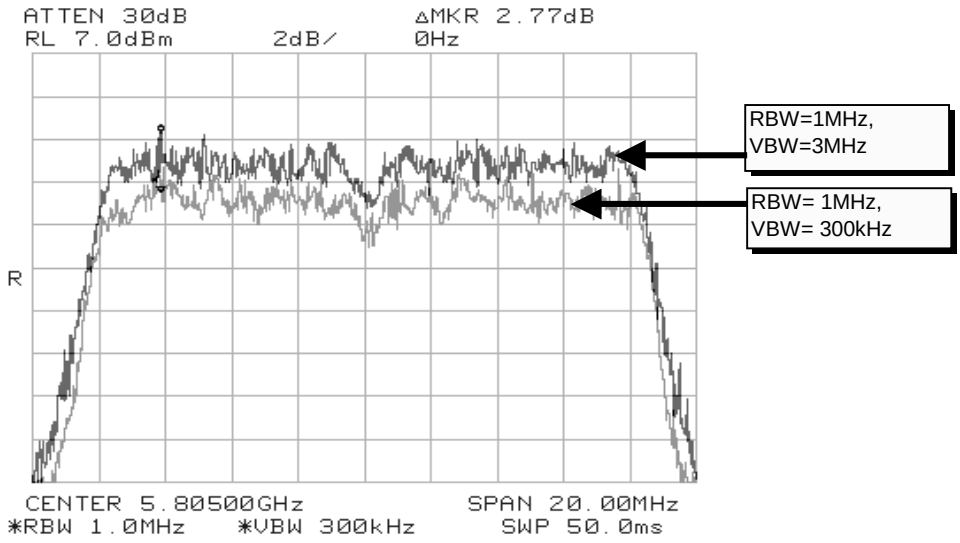
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Run #2: Peak Excursion Measurement

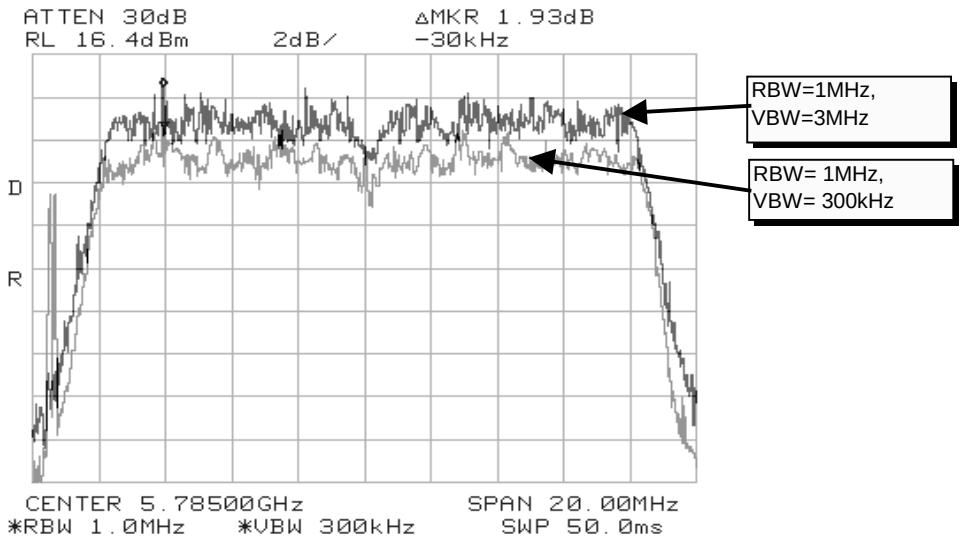
Plots Showing Peak Excursion

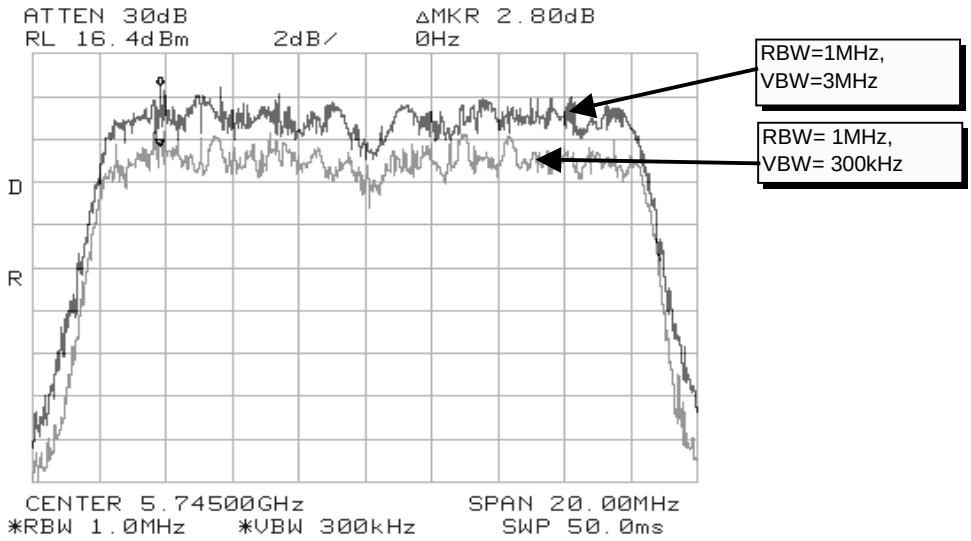
Trace A: RBW = 1MHz VBW = 3MHz

Trace B: RBW = 1 MHz, VBW = 300kHz (Used settings refered by method# 3)

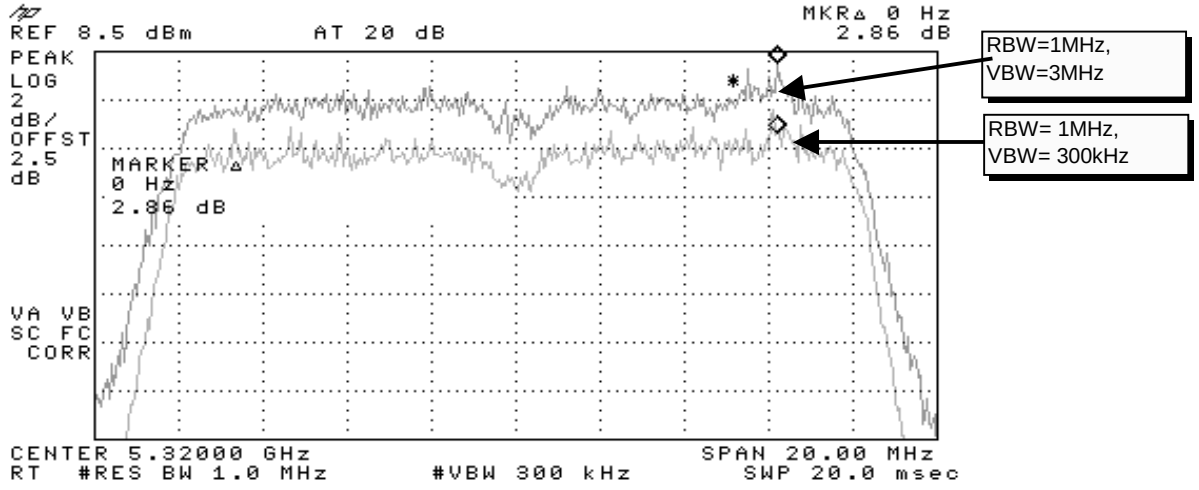


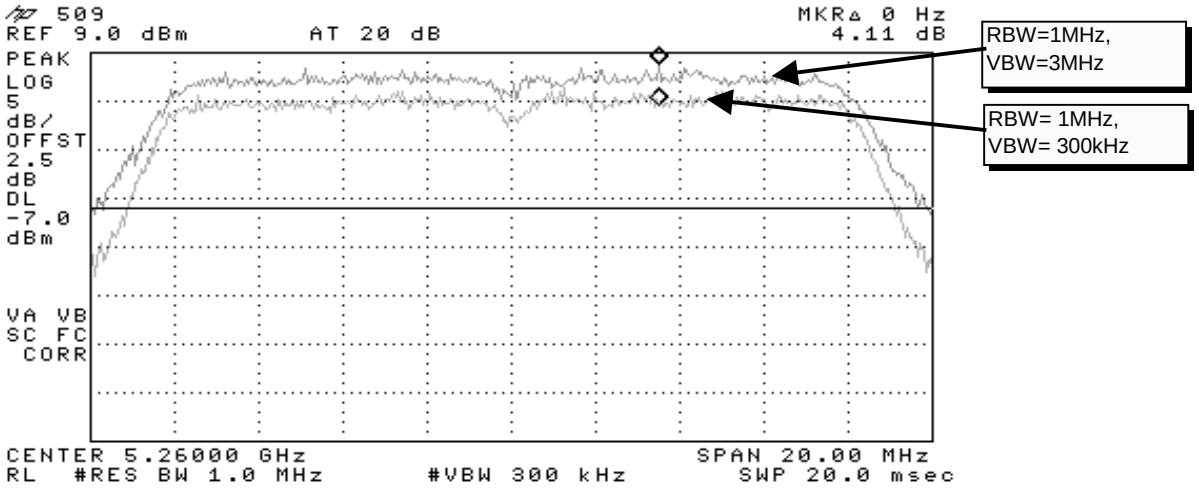
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A



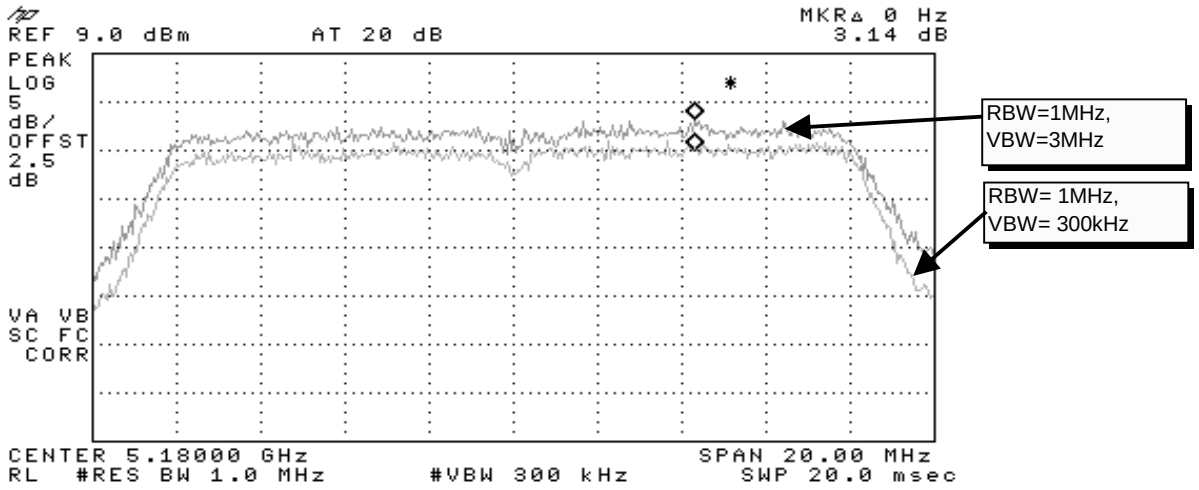


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A





Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A



Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

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

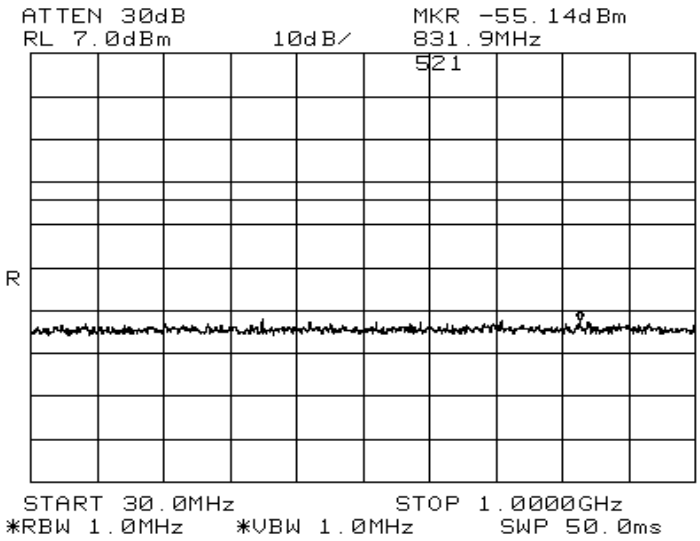
The antenna gain of the radios integral antenna is 4.5dBi. The EIRP limit is -27dBm/MHz for all out of band signals that do not fall in restricted bands. A limit of -31.5 dBm was, therefore, used for signals not in restricted bands and close to the intentional band with the assumption that the antenna gain was equal to 31.5 within 100 MHz of the upper and lower band edges. For signals removed from the band edge by more than 100MHz, radiated measurements were made (refer to run #6) if the signal amplitude exceeded -37dBm.

Channel	Frequency (MHz)	Frequency Range	Highest Spurious Signal	Graph reference #
	5805	30 - 1000 MHz	Note 4	521
		1 to 5.725 GHz	None	522
		5.825 to 10 GHz	-50.1dBm@6.1GHz	523
		10 GHz to 20 GHz	None	524
		20 GHz to 40 GHz	None	525
	5785	30 - 1000 MHz	Note 4	516
		1 to 5.725 GHz	-36.93dBm@5.5GHz	517
		5.825 to 10 GHz	-40.3dBm@6.1GHz	518
		10 GHz to 20 GHz	None	519
		20 GHz to 40 GHz	None	520
	5745	30 - 2921 MHz	Note 4	511
		2.921 to 5.725 GHz	-45.1dBm@5200MHz	512
		5.825 to 10 GHz	None	513
		10 GHz to 20 GHz	None	514
		20 GHz to 40 GHz	None	515
	5320	30 - 2921 MHz	Note 4	506
		2.921 to 5.15 GHz	-44.8dBm@5192MHz	507
		5.35 to 10 GHz	None	508
		10 GHz to 20 GHz	None	509
		20 GHz to 40 GHz	None	510
	5260	30 - 2921 MHz	Note 4	501
		2.921 to 5.15 GHz	-41.9dBm@5GHz	502
		5.35 to 10 GHz	None	503
		10 GHz to 20 GHz	None	504
		20 GHz to 40 GHz	None	505
	5180	30 - 2921 MHz	Note 4	496
		2.921 to 5.15 GHz	-37.6dBm@5150MHz	497
		5.35 to 10 GHz	None	498
		10 GHz to 20 GHz	None	499
		20 GHz to 40 GHz	None	500

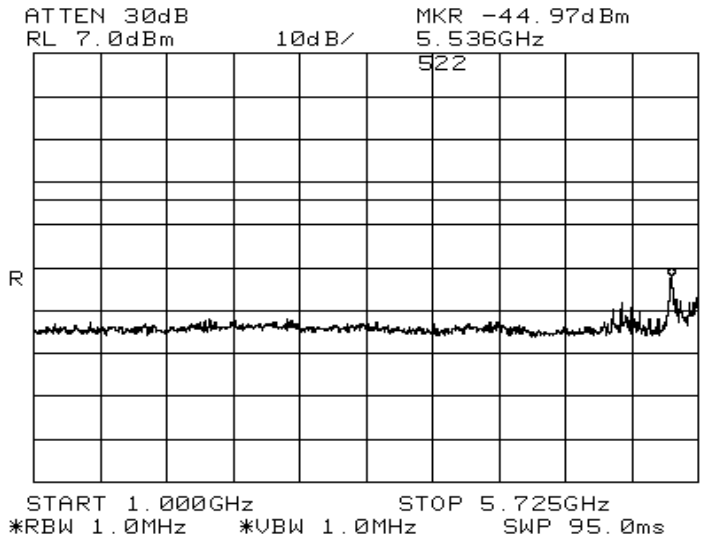
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

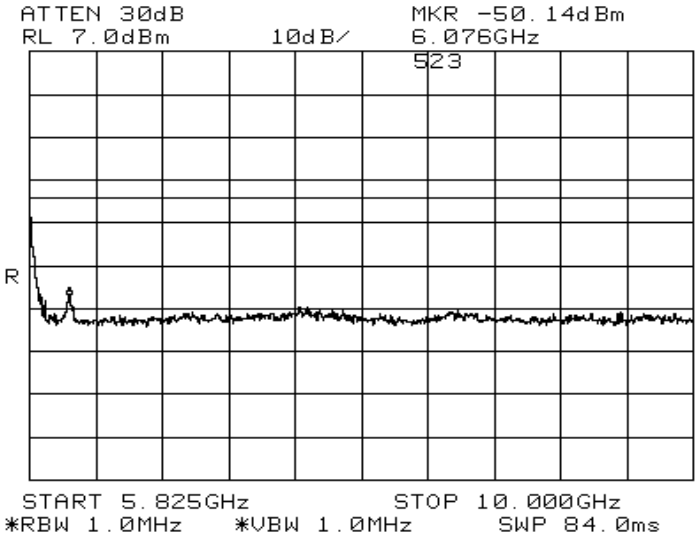
Note 1:	Signal is in a restricted band.
Note 2:	Signal is not in restricted band. Limit is -27dBm eirp. As the signal strength is significantly lower than -27dBm no field strength measurements required.
Note 3:	Signal is not in restricted band. Limit is -27dBm eirp. Although the signal strength is significantly lower than -27dBm field strength measurements were made (refer to run #6)
Note 4:	All spurious signals in this frequency band measured during digital device radiated emissions test.
Note 5:	Signal is within 10MHz of the 5.725 or 5.825 Band edge. Limit is -17dBm EIRP

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

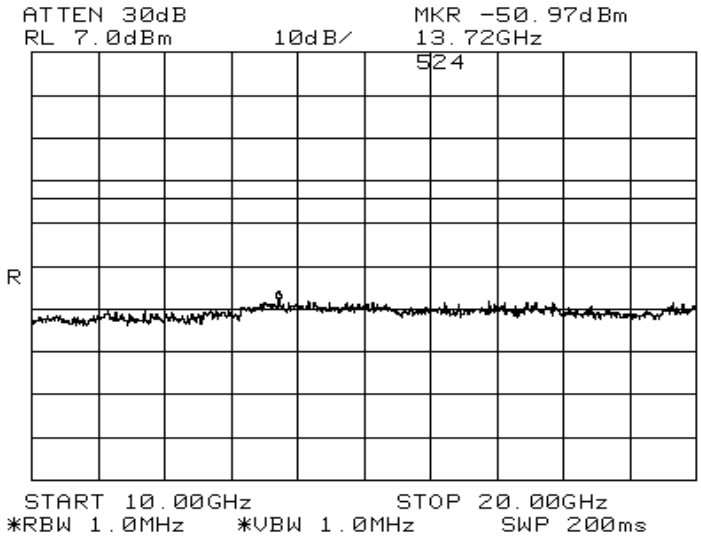


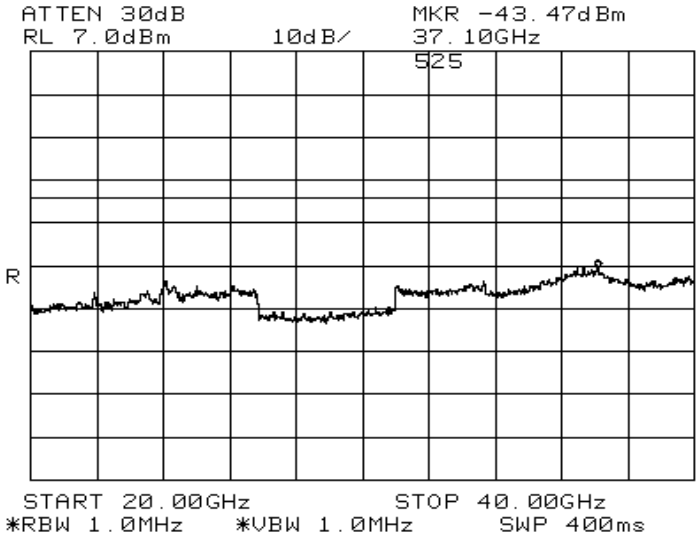
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A



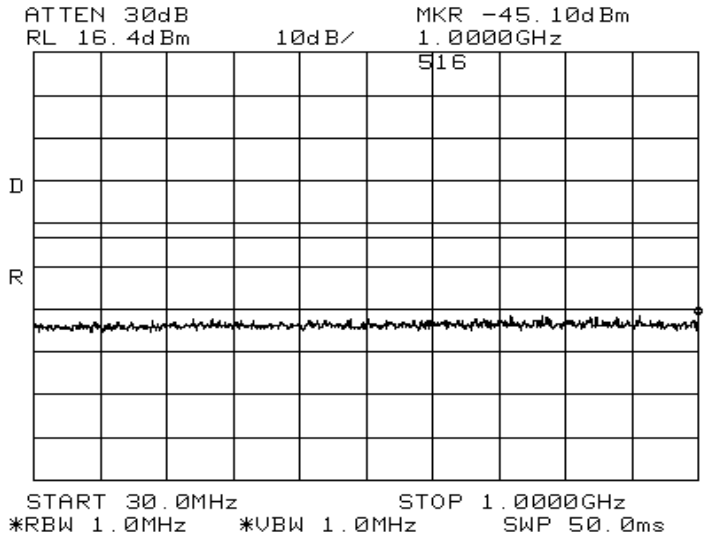


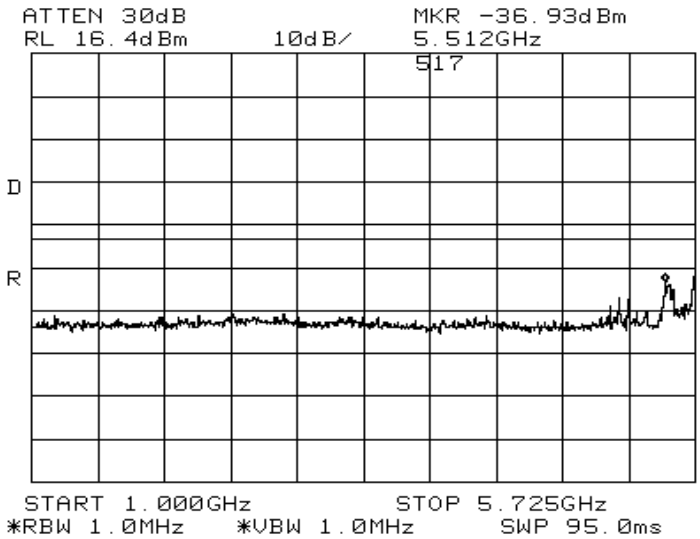
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A



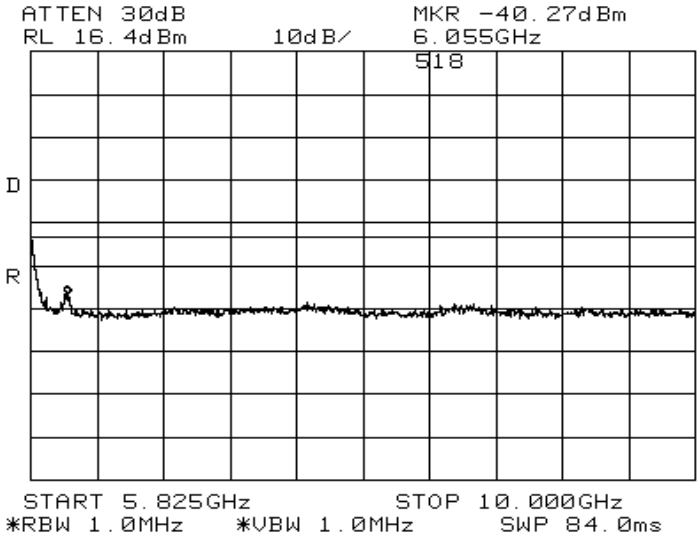


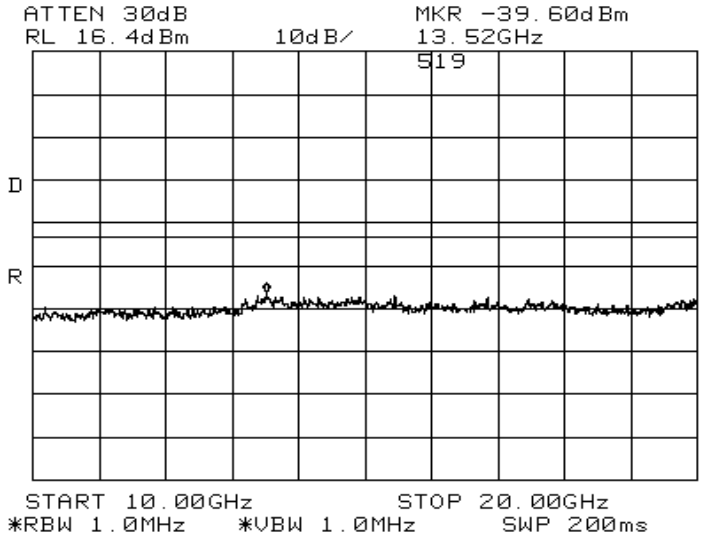
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A



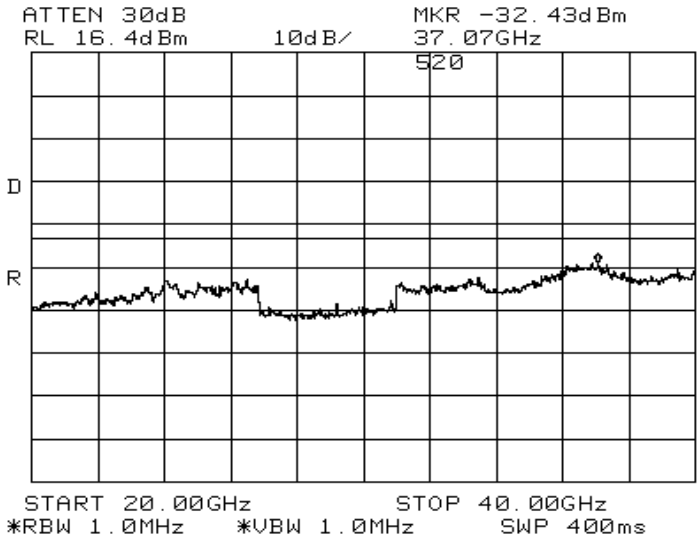


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

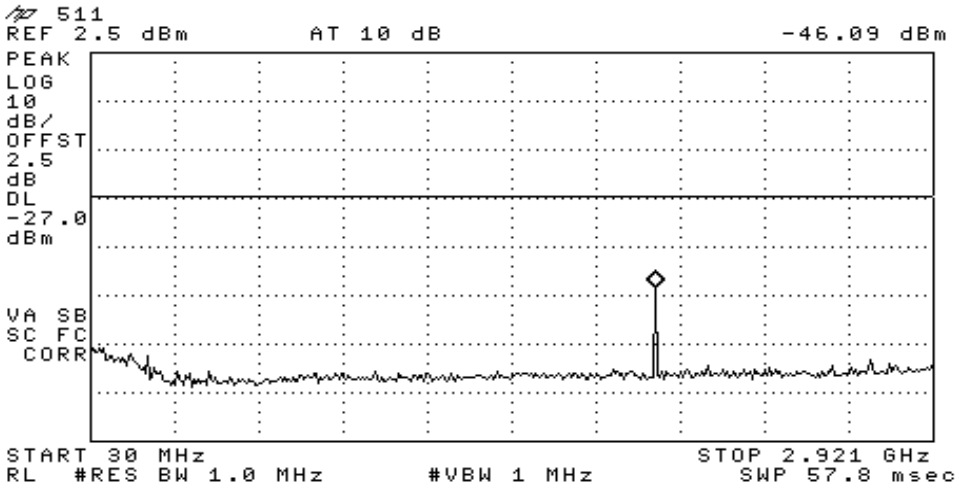


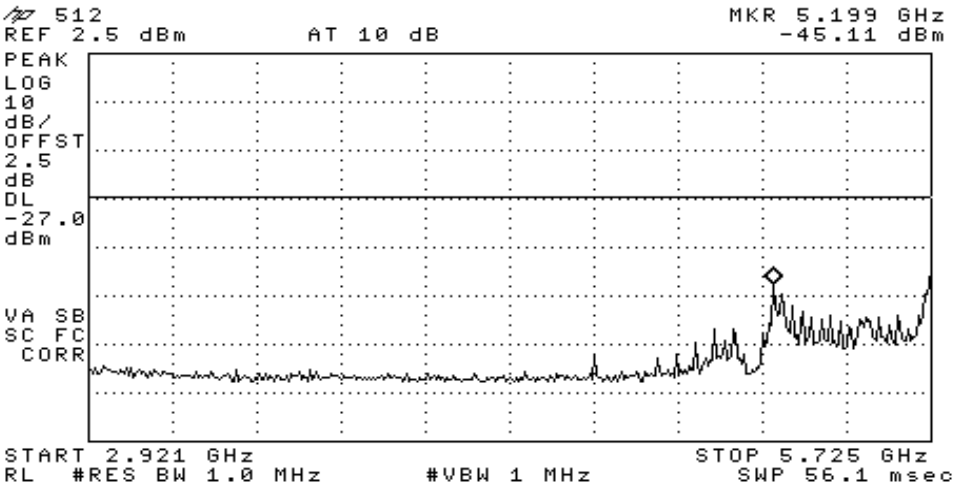


Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

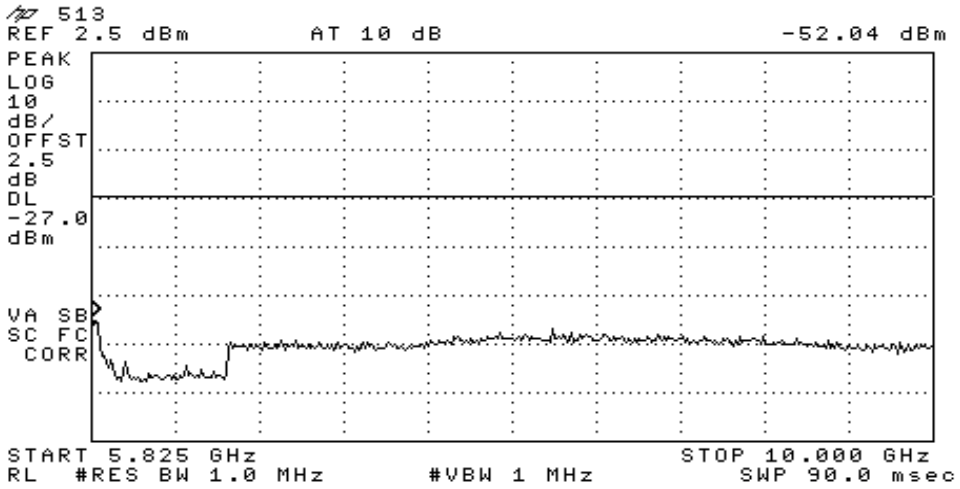


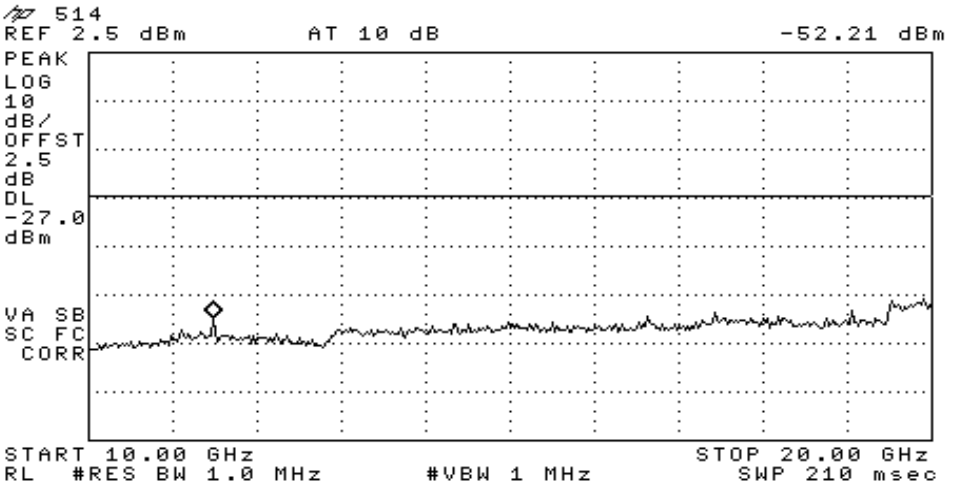
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A





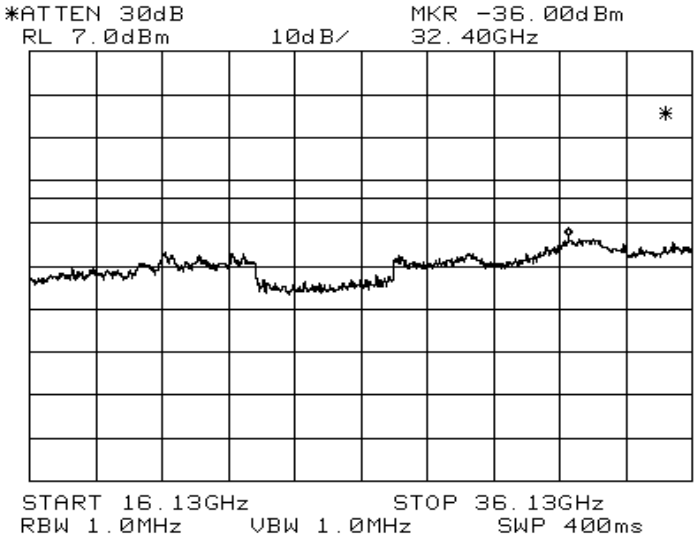
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A



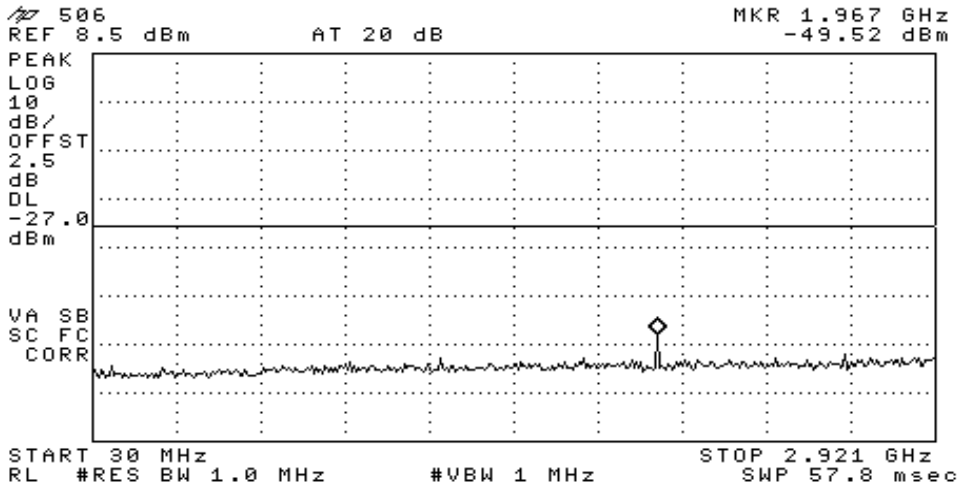


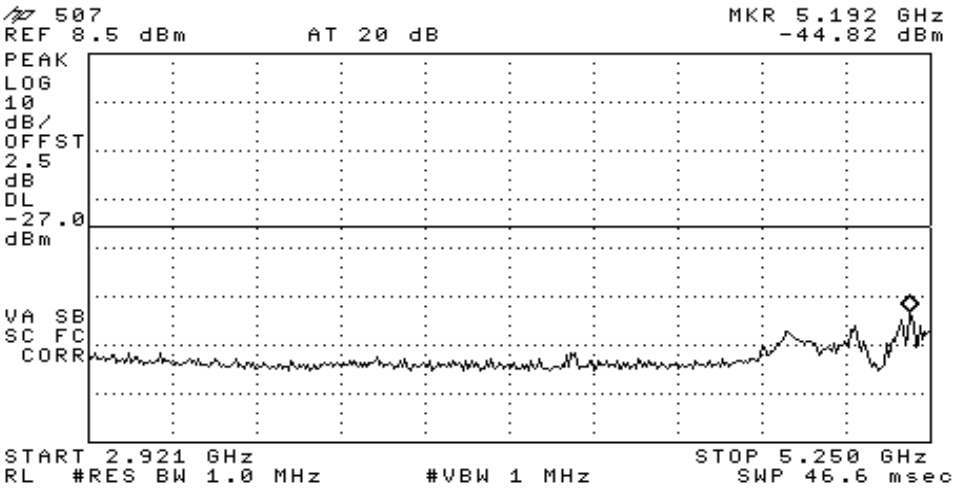
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

515

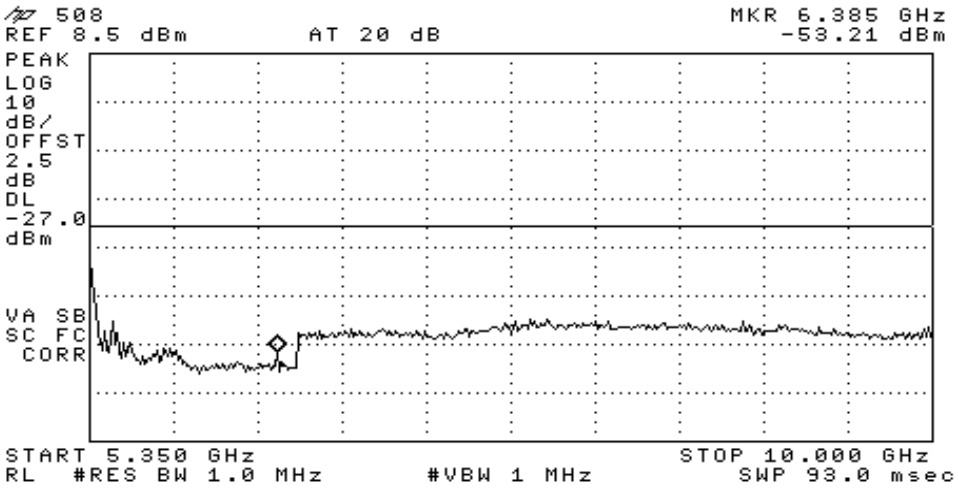


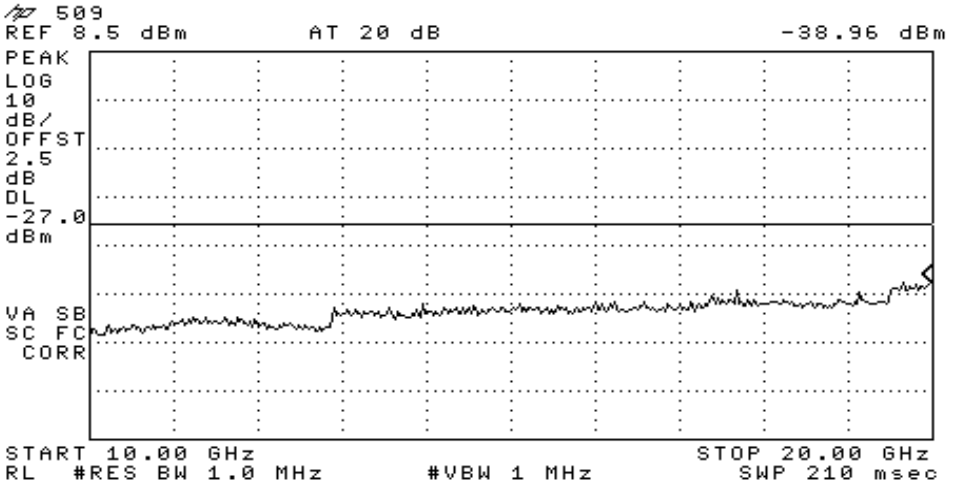
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A





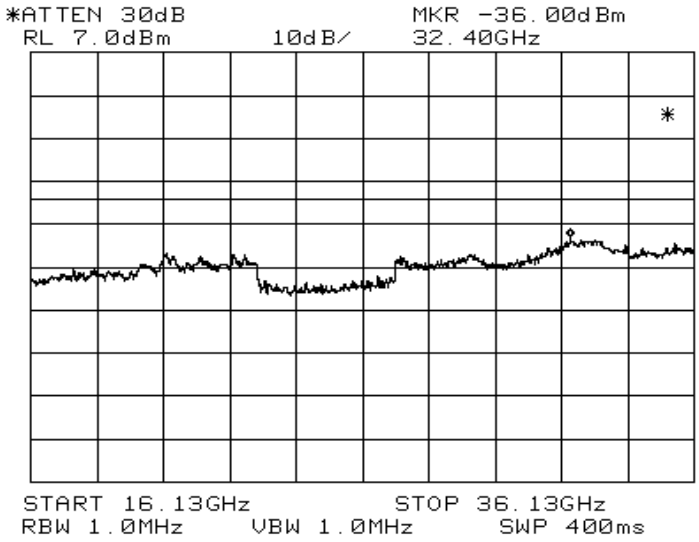
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A



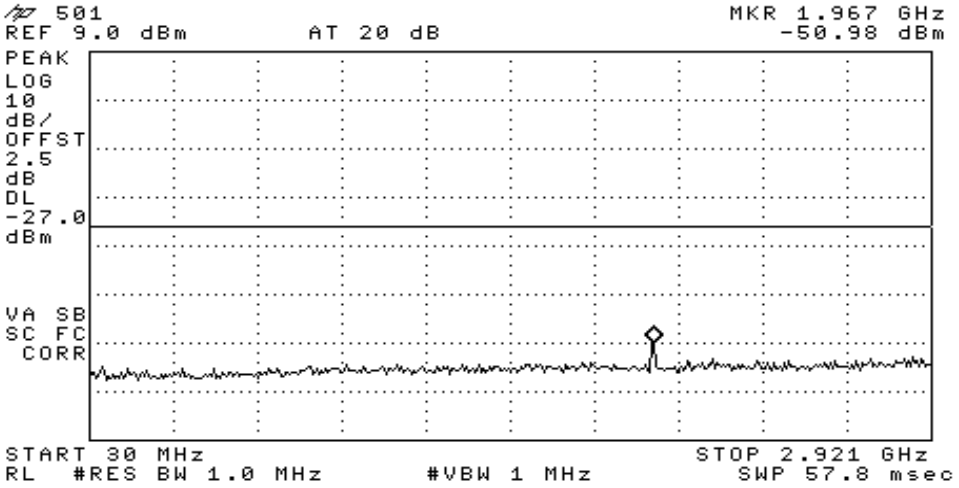


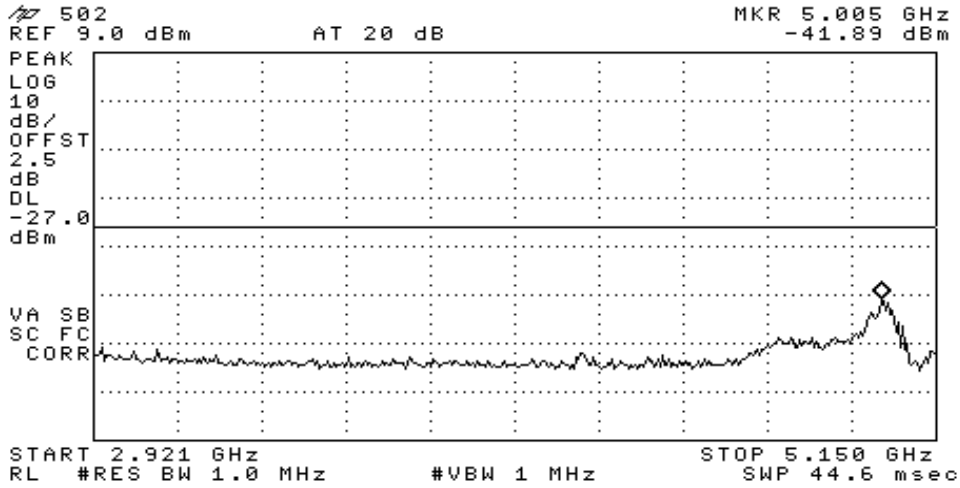
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

510

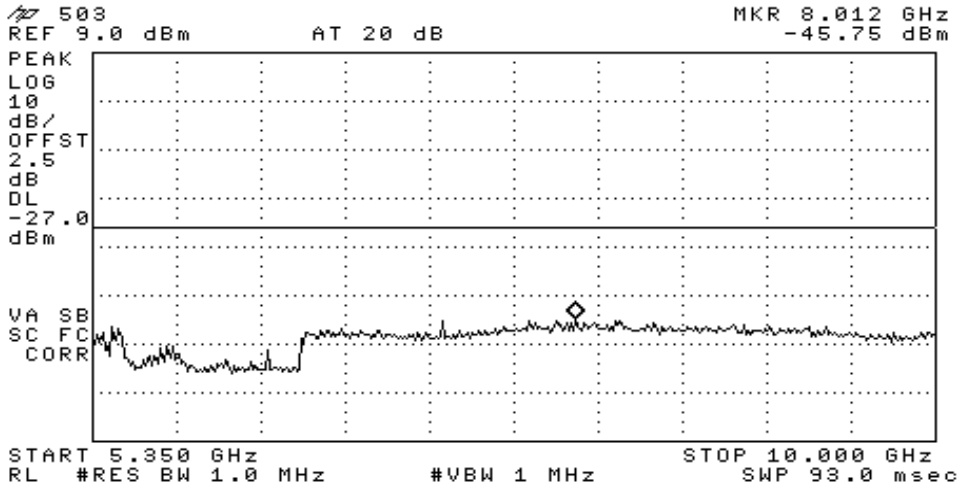


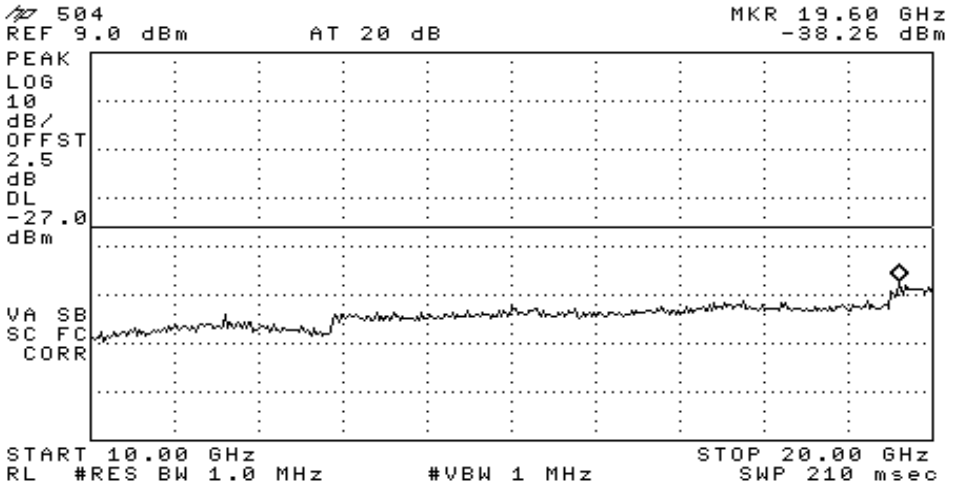
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A





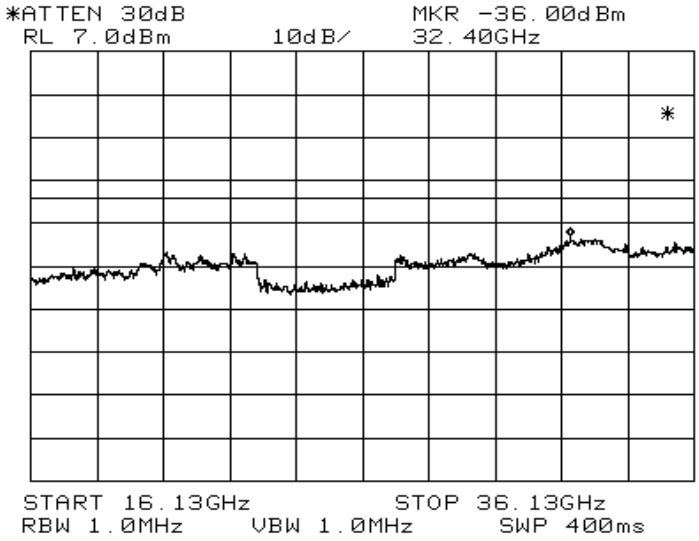
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A



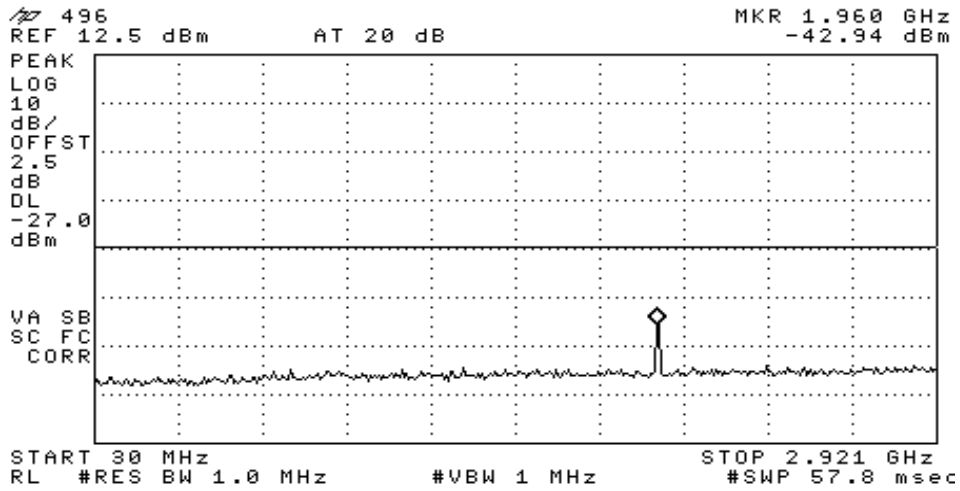


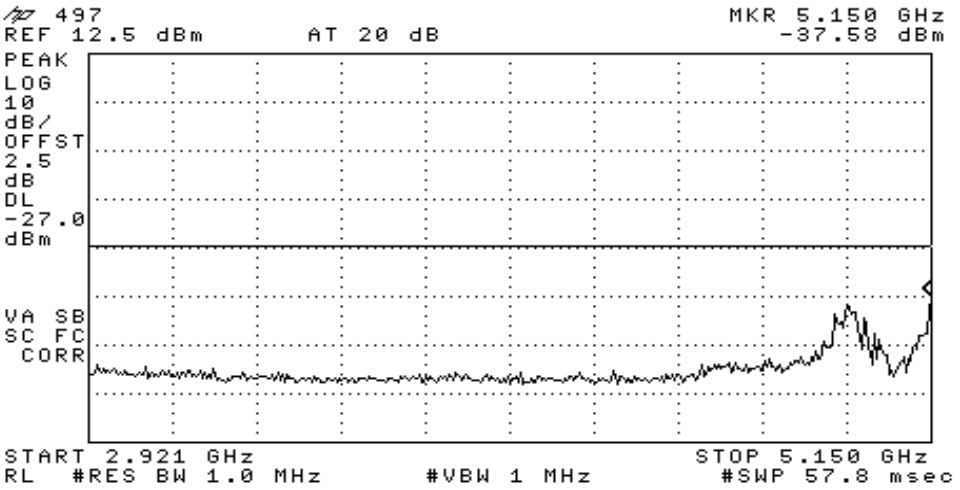
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

505

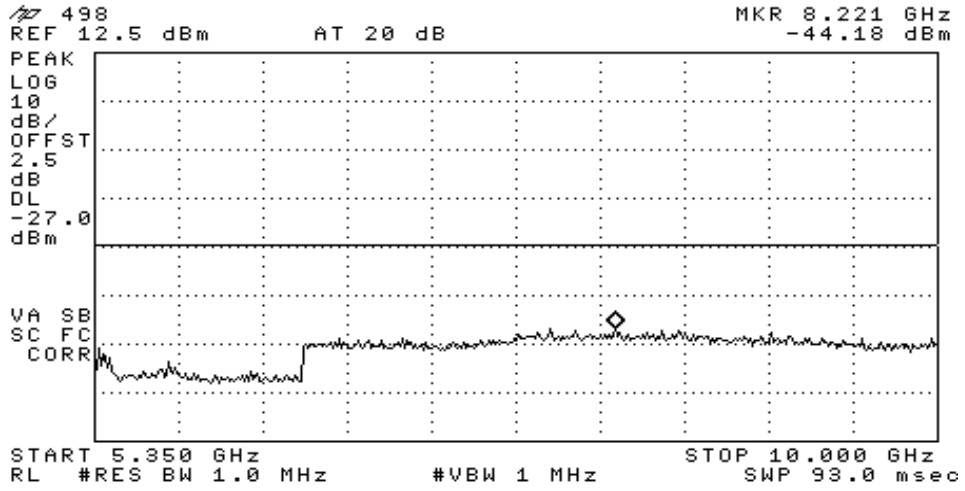


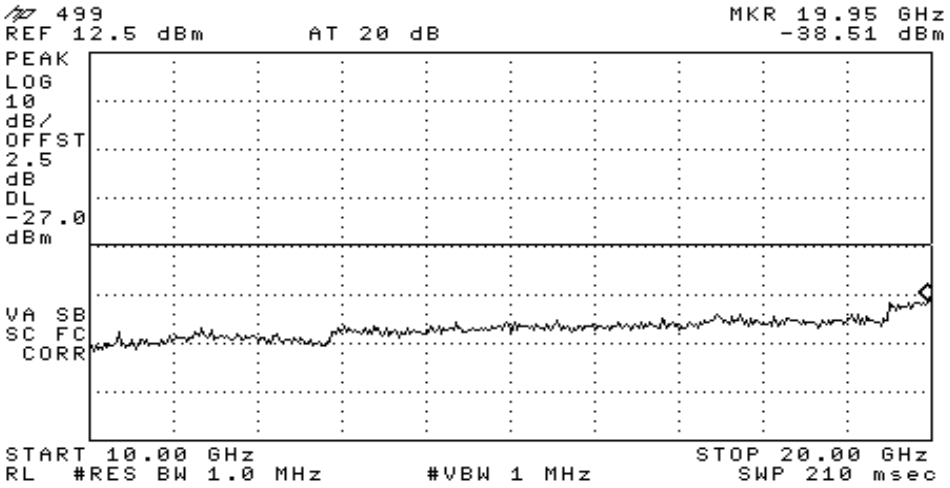
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A





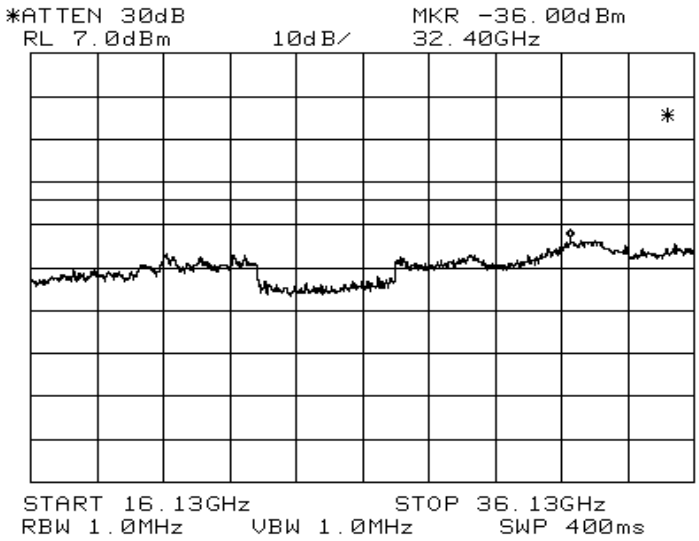
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A





Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

500

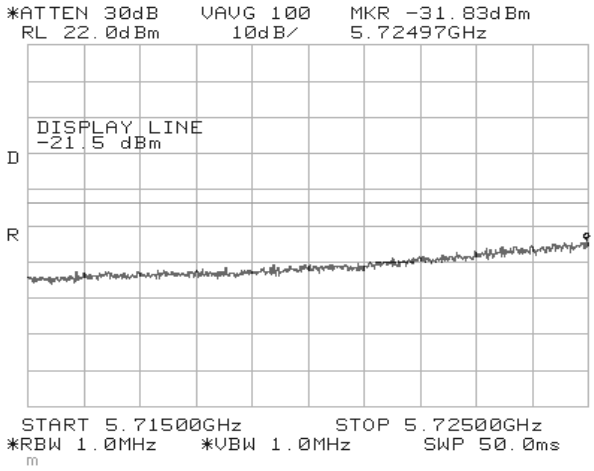


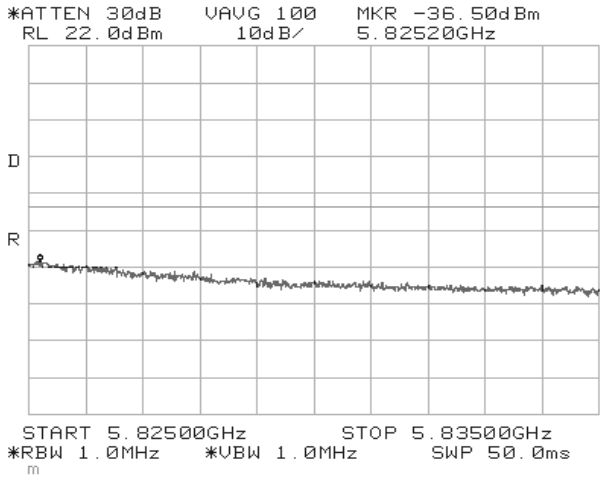
Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 C and E, RSS-210	Class:	N/A

Run# 4: Band Edge Measurements:

For signals in the restricted bands immediately above and below the 5.725 to 5.825 GHz allocated band measurements were made of the antenna conducted power. The EIRP was then calculated by adding the antenna gain (in dBi) to the measure power level with RBW = 1MHz, VBW = 1MHz, video averaging on. For signals at the band edge the resolution bandwidth was reduced and the total power in a 1MHz bandwidth calculated by sunning the individual power in each resolution bandwidth.

The limit for signals within 10MHz of the band edges is -17dBm/MHz. For signals further than 10MHz away from the band edge the limit is -27dBm/MHz.





Elliott

EMC Test Data

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Proj Eng:	Christine Vu
Contact:	Loren Vorreiter		
Emissions Spec:	FCC Part 15 B and E, RSS-210	Class:	B
Immunity Spec:	N/A	Environment:	-

EMC Test Data

For The

Aruba Networks

Model

Aruba 52

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Proj Eng:	Christine Vu
Contact:	Loren Vorreiter		
Emissions Spec:	FCC Part 15 B and E, RSS-210	Class:	B
Immunity Spec:	N/A	Environment:	-

EUT INFORMATION

General Description

The EUT is an Accesspoint Radio which is designed to operate in home or office network environments. Normally, the EUT would be table-top during operation. The EUT was treated as table-top equipment during testing to simulate the end user environment.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Aruba Networks	Aruba 52	Accesspoint Radio	-	TBD
Solar	PS-120	Power Supply	N/A	N/A

Antenna

The EUT uses an integral antenna with a gain of 4.5 dBi for the 5GHz and 1.5 dBi for the 2.4 GHz.
The antenna connector used is non-standard antenna Hiroshe and MMDX connections to meet the requirements of FCC Part 15.203 and RSS-210

EUT Enclosure

The EUT enclosure is primarily constructed of fabricated sheet steel. It measures approximately 25 cm wide by 15.5 cm deep by 5 cm high.

Modification History

Mod. #	Test	Date	Modification
1	-	-	None

Elliott

EMC Test Data

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Proj Eng:	Christine Vu
Contact:	Loren Vorreiter		
Emissions Spec:	FCC Part 15 B and E, RSS-210	Class:	B
Immunity Spec:	N/A	Environment:	-

Test Configuration #2

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hawking	PNY09TP	Hub	15B4000276	N/A

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Compal	ACY131	Laptop	NZB02084015T14043	DoC
Keytronics	H2002	Mouse	24284	DoC

EUT Interface Cabling and Ports

		Cable(s)		
Port	Connected To	Description	Shielded or Unshielded	Length(m)
RS-232	Unterminated	Multiwire	Shielded	2
Ethernet	Hub	Cat 5	Unshielded	1
DC input	AC source	2-wire	Unshielded	1.3

Support Interface Cabling and Ports

		Cable(s)		
Port	Connected To	Description	Shielded or Unshielded	Length(m)
Laptop Ethernet	Hub	Cat 5	Unshielded	30
Hub Ethernet	EUT	Cat 5	Unshielded	1

EUT Operation During Digital Emissions

EUT was set to the channel that produced full power.

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 B and E, RSS-210	Class:	N/A

Conducted Emissions - Power Ports

Test Specifics

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: 6/13/2003
Test Engineer: jmartinez
Test Location: SVOATS #2
Config. Used: 2
Config Change: None
EUT Voltage: Refer to individual run

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment. Remote support equipment was located approximately 30 meters from the test area. All I/O connections were routed overhead.

Ambient Conditions:

Temperature: 18 °C
Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 230V/50Hz	EN55022 B	Pass	-6.7dB @ 0.268MHz
2	CE, AC Power,120V/60Hz	EN55022 B	Pass	-9.8dB @ 0.265MHz

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.

Elliott

EMC Test Data

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 B and E, RSS-210	Class:	N/A

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.268	44.4	Line 1	51.1	-6.7	AV	
0.401	38.3	Line 1	47.8	-9.5	AV	
0.401	37.0	Neutral	47.8	-10.8	AV	
1.472	42.6	Neutral	56.0	-13.4	QP	
0.401	44.3	Line 1	57.8	-13.5	QP	
1.472	42.5	Line 1	56.0	-13.5	QP	
1.590	42.3	Neutral	56.0	-13.7	QP	
0.268	47.1	Line 1	61.1	-14.0	QP	
0.401	43.1	Neutral	57.8	-14.7	QP	
1.334	41.1	Line 1	56.0	-14.9	QP	
2.339	38.5	Line 1	56.0	-17.5	QP	
1.590	25.9	Neutral	46.0	-20.1	AV	
1.472	25.7	Neutral	46.0	-20.3	AV	
1.334	25.2	Line 1	46.0	-20.8	AV	
1.472	24.5	Line 1	46.0	-21.5	AV	
2.339	13.7	Line 1	46.0	-32.3	AV	

Note 1:	
Note 2:	

Elliott

EMC Test Data

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 B and E, RSS-210	Class:	N/A

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.265	41.5	Line 1	51.3	-9.8	AV	
0.401	35.6	Neutral	47.8	-12.2	AV	
0.663	32.4	Line 1	46.0	-13.6	AV	
0.663	42.3	Line 1	56.0	-13.7	QP	
2.480	41.2	Line 1	56.0	-14.8	QP	
1.592	40.5	Neutral	56.0	-15.5	QP	
0.265	45.3	Line 1	61.3	-16.0	QP	
0.401	41.6	Neutral	57.8	-16.2	QP	
2.556	38.4	Neutral	56.0	-17.6	QP	
1.074	27.1	Line 1	46.0	-18.9	AV	
1.592	25.4	Neutral	46.0	-20.6	AV	
2.480	23.6	Line 1	46.0	-22.4	AV	
2.556	21.4	Neutral	46.0	-24.6	AV	
1.074	9.0	Line 1	56.0	-47.0	QP	

Note 1:	
Note 2:	

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 B and E, RSS-210	Class:	N/A

Radiated Emissions

Test Specifics

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: 6/13/2003
Test Engineer: jmartinez
Test Location: SVOATS #2
Config. Used: 2
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing. Remote support equipment was located approximately 30 meters from the test area with all I/O connectionss routed overhead.

On the OATS, the measurement antenna was located 10 meters from the EUT for the measurement range 30 - 1000 MHz.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 18 °C
Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
2	RE, 30 - 1000MHz, Maximized Emissions	EN55022 B	Pass	-5dB @ 165.337MHz

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.

Elliott

EMC Test Data

Client:	Aruba Networks	Job Number:	J51385
Model:	Aruba 52	T-Log Number:	T51481
		Account Manager:	Christine Vu
Contact:	Loren Vorreiter		
Spec:	FCC Part 15 B and E, RSS-210	Class:	N/A

Run #1: Preliminary Radiated Emissions, 30-1000 MHz

Frequency	Level	Pol	EN55022 B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
165.337	25.0	v	30.0	-5.0	QP	242	1.0	
165.337	22.5	h	30.0	-7.5	QP	278	3.3	
75.112	22.1	v	30.0	-7.9	QP	30	1.0	
65.102	20.2	v	30.0	-9.8	QP	0	1.0	
192.227	20.1	v	30.0	-9.9	QP	168	1.0	
67.030	20.0	v	30.0	-10.0	QP	360	1.0	
192.269	20.0	v	30.0	-10.0	QP	6	1.0	
85.885	18.0	v	30.0	-12.0	QP	360	1.0	
513.240	25.0	h	37.0	-12.0	QP	0	2.0	
160.623	17.1	h	30.0	-12.9	QP	171	3.2	
448.000	23.8	h	37.0	-13.2	QP	212	1.9	
71.072	16.4	v	30.0	-13.6	QP	360	1.0	
68.379	16.0	v	30.0	-14.0	QP	0	1.0	
287.880	21.5	v	37.0	-15.5	QP	360	1.0	
35.990	14.0	v	30.0	-16.0	QP	361	1.0	
767.830	20.2	v	37.0	-16.8	QP	6	1.0	
352.369	19.5	v	37.0	-17.5	QP	255	1.0	
416.958	16.0	h	37.0	-21.0	QP	19	2.0	
446.679	15.9	v	37.0	-21.1	QP	361	1.0	
385.536	15.0	h	37.0	-22.0	QP	0	2.0	
385.536	14.1	v	37.0	-22.9	QP	120	1.0	
352.369	13.1	h	37.0	-23.9	QP	360	2.0	

Run #2: Maximized Readings From Run #1

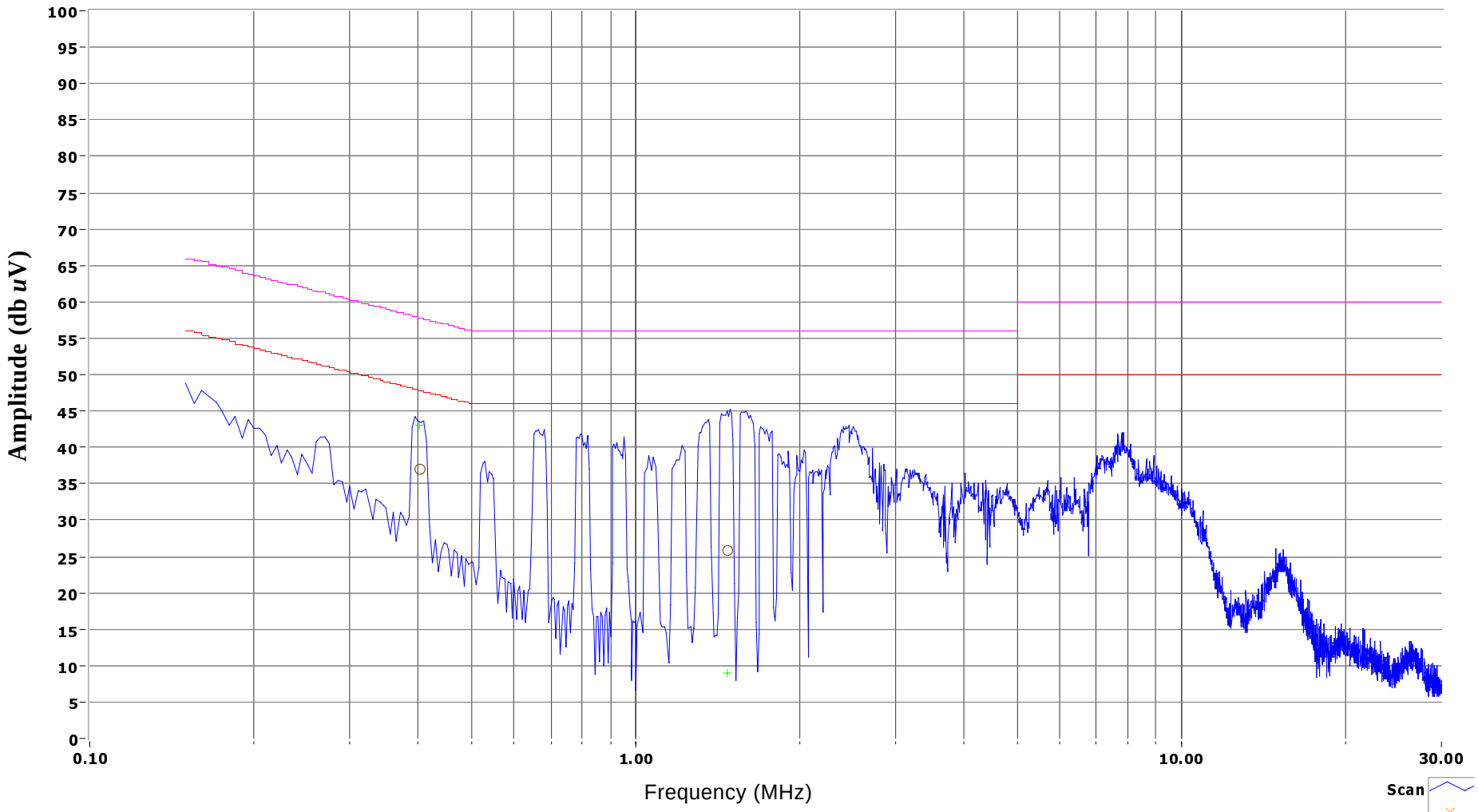
Frequency	Level	Pol	EN55022 B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
165.337	25.0	v	30.0	-5.0	QP	242	1.0	
165.337	22.5	h	30.0	-7.5	QP	278	3.3	
75.112	22.1	v	30.0	-7.9	QP	30	1.0	
65.102	20.2	v	30.0	-9.8	QP	0	1.0	
192.227	20.1	v	30.0	-9.9	QP	168	1.0	
67.030	20.0	v	30.0	-10.0	QP	360	1.0	

SVOATS# 2: Aruba Networks Accesspoint Run 3

Spec:

802.11 a/b/g Radio

Mains Lead
Neutral



230Vac, 50Hz

Scan
Peak
Quasi-peak
Average
Average Limit
QuasiPeak Limit

6/30/2003

Juan Martinez

Elliott

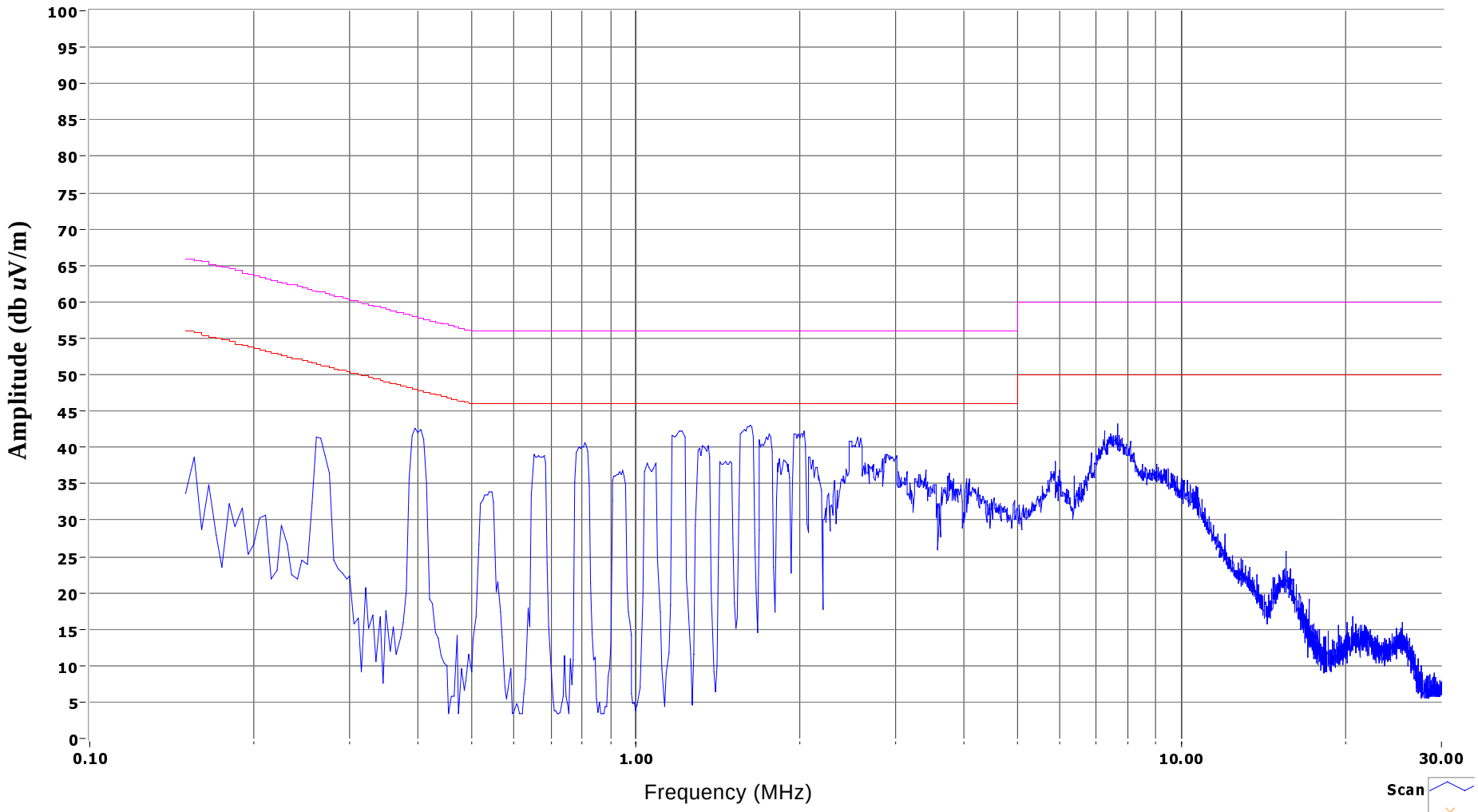
SVOATS# 2: Aruba Networks Accesspoint Run 2

Spec:

802.11 a/b/g Radio

Mains Lead

Line 1



120Vac, 60Hz

Scan

Peak

Quasi-peak

Average

Average Limit

QuasiPeak Limit

6/30/2003

Juan Martinez

Elliott

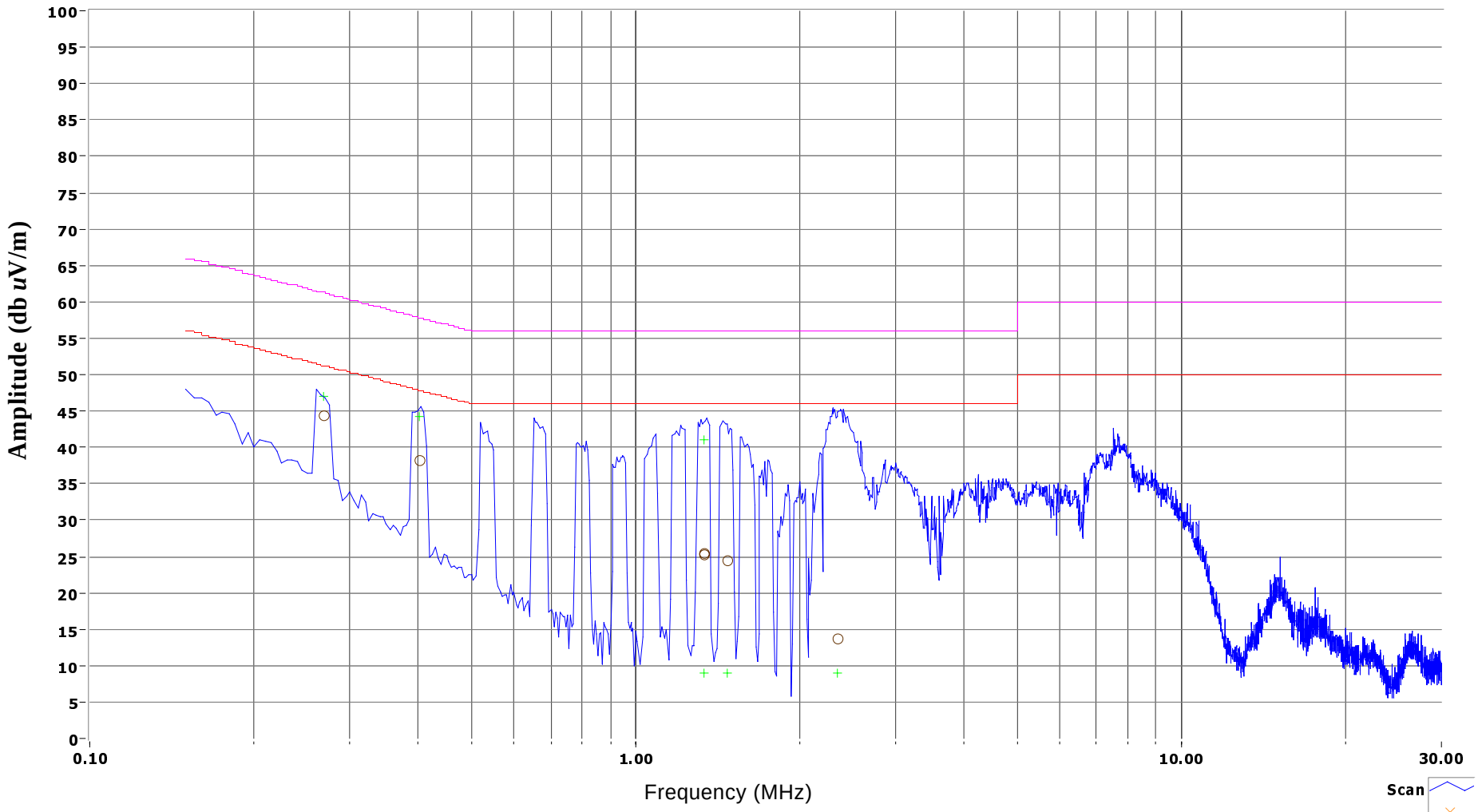
SVOATS# 2: Aruba Networks Accesspoint Run 4

Spec:

802.11 a/b/g Radio

Mains Lead

Line 1



230Vac, 50Hz

Scan

Peak

Quasi-peak

Average

Average Limit

QuasiPeak Limit

6/30/2003

Juan Martinez

Elliott

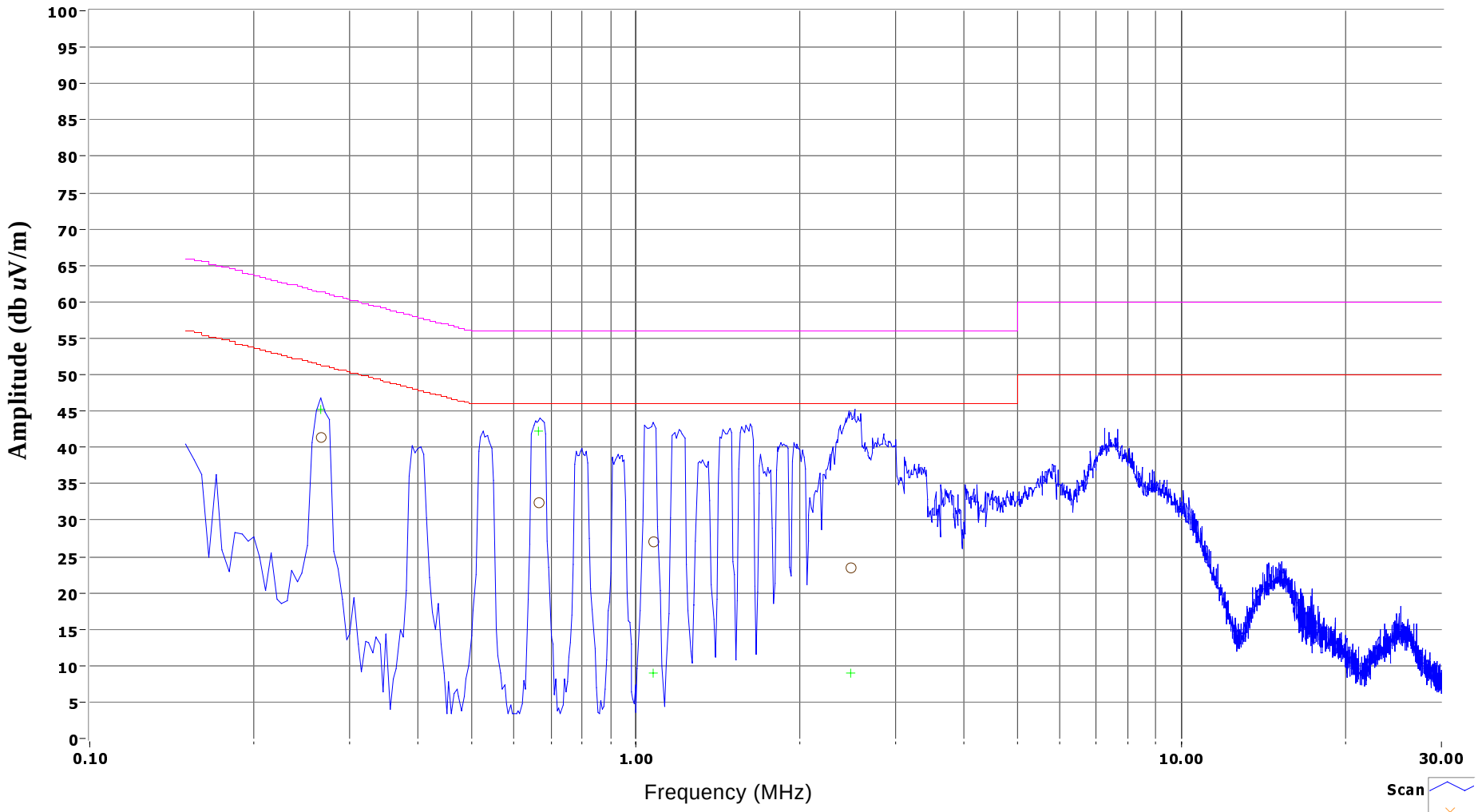
SVOATS# 2: Aruba Networks Accesspoint Run 1

Spec:

802.11 a/b/g Radio

Mains Lead

Line 1



120Vac, 60Hz

Scan

Peak

Quasi-peak

Average

Average Limit

QuasiPeak Limit

6/30/2003

Juan Martinez