



**Test Report:**  
ATEMC000057

**Applicant:**  
Arrista Technologies Inc.  
5-55 Henlow Bay  
Winnipeg, MB, CA  
R3Y 1G4

**Equipment Under Test (EUT):**  
TDMA / CDMA / GSM  
Bi-Directional Cellular Signal Amplifier



**MODEL:**  
CR500

**FCC ID:**  
P35WYPCJTE6

**IN ACCORDANCE WITH:**  
FCC PART 2, FCC PART 24,  
CELLULAR BAND REPEATERS

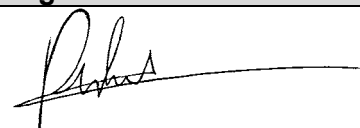


**TEST LAB PERSONNEL:**

Test Performed by:	Date	Signature
Paul Eberling, CNA	December 20, 2004	
Brent Griffiths	December 20, 2004	

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**APPROVALS:**

Date	Name	Title	Signature
12/20/2004	Roman Wroczynski	Director Development & Test	

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## 1. GENERAL INFORMATION

### 1.1. TEST FACILITIES DESCRIPTION

#### 1.1.1. INTERNAL FACILITIES

Arrista Product Compliance & Test (PCT) laboratory is located at 5-55 Henlow Bay, Winnipeg, Manitoba, Canada at Arrista main facility. The laboratory has test equipment for Electromagnetic Compatibility (EMC) testing i.e. ESD, EFT, Surge, and radiated emissions.

The PCT Laboratory is registered with the FCC and has submitted the information required by Section 2.948 of the FCC Rules for measuring devices. Test equipment used to perform all measurements listed in paragraph 1.3 of this test report.

**Letter of Certification**

**FEDERAL COMMUNICATIONS COMMISSION**

Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD 21046

AUG - 1 2003

July 25, 2003

Registration Number: 97780

Arrista Technologies  
5-55 Henlow Bay  
Winnipeg, MB, R3Y 1G4  
Canada

Attention: Elwood Friesen

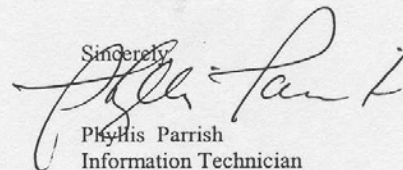
Re: Measurement facility located at Winnipeg  
Anechoic chamber (3 meters)  
Date of Renewal: July 25, 2003

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website [www.fcc.gov](http://www.fcc.gov) under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,



Phyllis Parrish  
Information Technician

**Applicant:** Arrista Technologies Inc.  
**Equipment:** CR500 Bi-Directional Cellular Signal Amplifier

### 1.1.2. RADIATED EMISSIONS TEST SITE

Radiated emissions testing was performed in Arrista's semi-anechoic 3m test chamber.

The site consists of a 28'x 20'x 20' shielded chamber with absorptive materials on the walls and ceiling. The floor of the chamber is a raised conductive ground plane and includes a 2 m conductive top turntable. The measuring antenna is mounted on a non-conductive mast, which can be raised between 1 to 4 meters. Measurement equipment is located in the adjacent control room which is a 12' x 12' x 8' shielded structure.

## 1.2. PURPOSE

This document details the results of the following tests performed by Arrista Technologies Inc. (Arrista) on Dec 2, 2003 – Jan 12, 2004 on the CR500 Bi-Directional Signal Repeater for Arrista Technologies Incorporated.

## 1.3. TEST METHODOLOGY

Arrista performed these tests on a production sample of the product for the purpose of demonstrating compliance with FCC Part 24. All conducted and radiated emissions testing were performed according to methods of ANSI C63.4:1992. This test report related only to the item(s) tested.

## 1.4. TEST EQUIPMENT LIST

All test equipment calibrations are NIST traceable to national standards. All calibration data can be made available on request

Test Equipment				
Description	Model	Serial Number	Last Cal Date	Cal Interval
EMI Receiver	Dynamic Sciences DSI-2020	603	02/19/2004	Annual
Turntable and Mast Controller	EMCO 2090	9812-1384	N/A	N/A
Antenna Mast	EMCO 2075-2 Mini-Mast	9812-2208	N/A	N/A
Bilog EMC Antenna	Schaffner-Chase CBL6112A	2308	02/04/2004	Annual
Dbl-Ridged Horn Antenna	EMCO 3115	9711-5345	04/05/2004	Annual
22 GHz Spectrum Analyzer	HP 8593E	3249A00377	06/23/2004	Annual

**Applicant:** Arrista Technologies Inc.

**Equipment:** CR500 Bi-Directional Cellular Signal Amplifier



Test Equipment				
Description	Model	Serial Number	Last Cal Date	Cal Interval
Metal Top Turntable	EMCO 2081-2.03	N/A	N/A	N/A
Microwave Coaxial Cable	Sucoflex Blue	498	02/21/2003	Bi-Annual
6 dB Attenuator	Hewlett-Packard	6dB	N/A	N/A
LISN	FCC-LISN-50/250	9708	02/23/2004	Annual
LISN	Wayne Kerr IXLSN30B	000343	N/A	N/A

## 1.5. EQUIPMENT UNDER TEST DESCRIPTION

The E.U.T. is sold under the following trade name:

### SignalReach CR500

The SignalReach™ CR500 Small Office Home Office (SOHO) Cellular Repeater extends cellular services into buildings, parking garages, tunnels and other poor coverage areas. The CR500 is designed for use with 1900MHz cellular telephones and offers a cost-effective solution for small business and residential applications. The repeater is useful in areas where cellular service is available outside of the building but marginal indoors.

The SignalReach™ CR500 is a stationary device that automatically reradiates signals from the base transmitters without channel translation, for the purpose of improving reliability of existing service by increasing the signal strength in dead spots. This product is designed to operate with CDMA, TDMA, and GSM signals from cellular service providers in the 1850 to 1990MHz cellular bands.

The repeater contains circuitry to ensure proper operating power levels, as well as including an automatic feedback and detection circuitry that detects poor isolation between the subscriber and donor antennae. In this condition the repeater will adjust its gain to compensate for the abnormality, and warn the user through a visual indicator LED. The CR500 will enhance the cellular telephone user's experience while complying with cellular network specifications. Linear operation is guaranteed under all conditions.

The product has three RF coaxial connection interfaces, one to an external uplink antenna (not sold with the product) and the other two connect to external downlink antennas (not sold with the product); see [Functional Block Diagram](#). The repeater can be powered by its AC adapter or through the in-building primary subscriber antenna port using an optional power inserter. A green LED indicates when power is applied to the unit.

The CR500 allows up to two indoor antennas to be used without the need of external components. Its auxiliary indoor antenna port allows a second indoor zone to be easily connected.

## 1.6. GENERAL EQUIPMENT SPECIFICATION

### 1.6.1. POWER SUPPLY SPECIFICATIONS

Input Voltage: 12 Vdc

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**Applicant:** Arrista Technologies Inc.

**Equipment:** CR500 Bi-Directional Cellular Signal Amplifier

Input Current: 1 Amp max

### 1.6.2. UPLINK

Frequency Range: 1850 – 1910 MHz  
Tunable Bands: Not Applicable  
Necessary Bandwidth: Not Applicable  
Type of Modulation: Not Applicable  
Internal/External Data Source: Not Applicable  
Emission Designator: DXW, F9W, GXW  
Output Impedance: 50 Ohms  
RF Power Output (rated): Single, leveled, up to 200 mWatts  
Number of Channels: Not Applicable  
Duty Cycle: Continuous, Linear Class A  
Channel Spacing: Not Applicable  
Band Selection Duplexer

### 1.6.3. DOWNLINK

Frequency Range: 1930 – 1990 MHz  
Tunable Bands: Not Applicable  
Necessary Bandwidth: Not Applicable  
Type of Modulation: Not Applicable  
Local Oscillator: Not Applicable  
Emission Designator: DXW, F9W, GXW  
Output Impedance: 50 Ohms  
RF Power Output (rated): Single/Dual; User Selectable; leveled; up to 30mW/port  
Number of Channels: Not Applicable  
Duty Cycle: Continuous, Linear Class A  
Channel Spacing: Not Applicable  
Band Selection Duplexer  
1<sup>st</sup> IF: Not Applicable  
2<sup>nd</sup> IF: Not Applicable

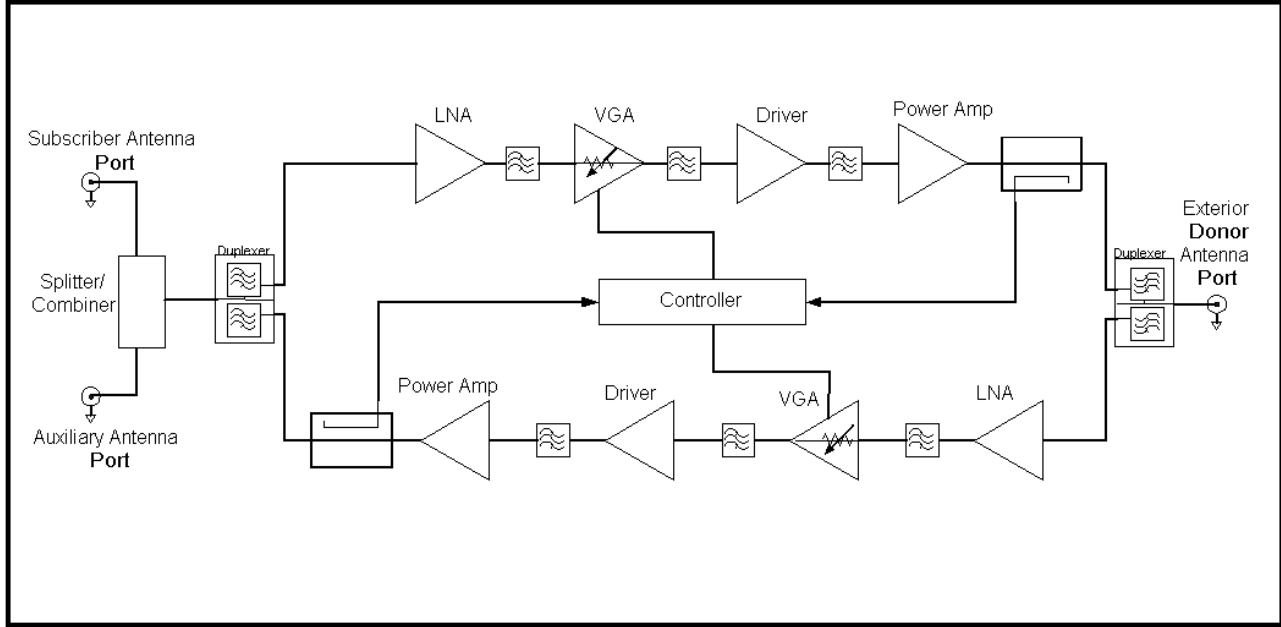
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**Applicant:** Arrista Technologies Inc.

**Equipment:** CR500 Bi-Directional Cellular Signal Amplifier

### 1.6.4. EUT FUNCTIONAL BLOCK DIAGRAM

#### Equipment Under Test



## 1.7. DEVIATIONS

The following deviations from, additions to, or exclusions from the test specifications have been made:

**None**

## 1.8. TEST SCHEDULE DESCRIPTION

Testing was performed using the procedures and requirements of CFR 47 Part 2 for type acceptance.

### 1.8.1. RF POWER OUTPUT

For transmitters other than SSB, ISB and controlled carrier radiotelephone, the power output shall be measured at the RF output terminals with electrical characteristics of the RF load attached.

### 1.8.2. EMISSIONS LIMITATION & OCCUPIED BANDWIDTH

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean power radiated are equal to 0.5 percent of the total mean power radiated by the given emission.

### 1.8.3. CONDUCTED SPURIOUS EMISSIONS AT ANTENNA TERMINALS

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminal when properly loaded with a suitable artificial antenna.

### 1.8.4. RADIATED FIELD STRENGTH OF SPURIOUS EMISSIONS

Measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and power.

## 1.9. TEST RESULT SUMMARY

Testing was performed using procedures or criteria contained in the regulatory documents and standards specified below.

### Results Summary

NAME OF TEST	FCC PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	2.1046 (a) 24.232 (b)	Mobile spec; 2W e.i.r.p.	0.224W	Complies
Emissions Limitations: NADC	2.1049 (c) 24.238 (a)	Mask	Plots	Complies
Emissions Limitation: CDMA	2.1049 (c) 24.238 (a)	Mask	Plots	Complies
Emissions Limitation: GSM	2.1049 (c) 24.238 (a)	Mask	Plots	Complies
Occupied Bandwidth: NADC/CDMA/GSM	N/A	Input/Output	Plots	N/A
Conducted Spurious Emission at Antenna Terminals	2.1051 24.238 (a)	-13dBm	-30.3dBm,	Complies
Radiated Field Strength of Spurious Emissions	2.1053 24.238 (a)	-13dBm	Plots, Tables	Complies
Frequency Tolerance	24.235	1.5ppm	N/A [2]	N/A [2]

#### Notes:

- [1] Since the EUT does not contain modulation circuitry, modulation performance testing was not performed.
- [2] Since the EUT is not designed to generate or translate frequencies, and only amplifies the signal it receives, frequency stability was not tested.

### 1.9.1. RF POWER OUTPUT

<b>Test Type:</b>	RF Output Power
<b>FCC Para No.:</b>	2.1046, 24.232
<b>Tested By:</b>	Paul Eberling
<b>Date:</b>	December 20, 2004

#### 1.9.1.1. SPECIFICATION REQUIREMENT:

According to § 24.232 (b); The of Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

**Applicant:** Arrista Technologies Inc.

**Equipment:** CR500 Bi-Directional Cellular Signal Amplifier

### 1.9.1.2. MEASUREMENT PROCEDURE:

For transmitters other than SSB, ISB and controlled carrier radiotelephone, the power output shall be measured at the RF output terminals with electrical characteristics of the RF load attached.

The peak power at EUT antenna terminals is measured using an HP 8593E spectrum analyzer generator. See Appendix Figure A-1 for test set-up.

### 1.9.1.3. TEST RESULTS:

**Complies**

### 1.9.1.4. MEASUREMENT RESULTS

#### Up-Link RF Power Output

Port	Freq (MHz)	SA Reading (dBm)	Cable (dB)	Atten (dB)	Result (dBm)	EUT Output Power (Watts)	Limit (Watts)
Uplink Primary Port	1850	20.7	Corrected	Corrected	20.7	0.117	2.0 eirp
	1880	23.5	Corrected	Corrected	23.5	0.224	2.0 eirp
	1910	18.6	Corrected	Corrected	18.6	0.072	2.0 eirp
Uplink Secondary Port	1850	21.3	Corrected	Corrected	21.3	0.135	2.0 eirp
	1880	23.1	Corrected	Corrected	23.1	0.204	2.0 eirp
	1910	18.2	Corrected	Corrected	18.2	0.066	2.0 eirp

Note:

Attenuation of cable and attenuator is corrected automatically by spectrum analyzer correction function.

#### Down-Link RF Power Output

Port	Freq (MHz)	SA Reading (dBm)	Cable (dB)	Atten (dB)	Result (dBm)	EUT Output Power (Watts)	Limit (Watts) ERP
Dn-link Primary Port	1930	12.6	Corrected	Corrected	12.6	0.018	2.0 eirp
	1960	15.5	Corrected	Corrected	15.5	0.035	2.0 eirp
	1990	14.0	Corrected	Corrected	14.0	0.025	2.0 eirp
Dn-link Secondary Port	1930	9.0	Corrected	Corrected	9.0	0.008	2.0 eirp
	1960	12.4	Corrected	Corrected	12.4	0.017	2.0 eirp
	1990	11.6	Corrected	Corrected	11.6	0.014	2.0 eirp

Note:

Attenuation of cable and attenuator is corrected automatically by spectrum analyzer correction function.

See Annex 1 for spectrum analyzer Plot Data.

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**Equipment:** CR500 Bi-Directional Cellular Signal Amplifier

## 1.9.2. EMISSIONS LIMITATION & OCCUPIED BANDWIDTH

### 1.9.2.1. EMISSIONS LIMITATION & OCCUPIED BANDWIDTH; NADC:

<b>Test Type:</b>	Emissions Limits for Cellular (NADC)
<b>FCC Para No.:</b>	2.1049, 24.238
<b>Tested By:</b>	Paul Eberling
<b>Date:</b>	December 6, 2004

### 1.9.2.2. SPECIFICATION REQUIREMENT:

According to §22.238 (a) *Out of band emissions..* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### 1.9.2.3. MEASUREMENT PROCEDURE

According to §22.238 (b) *Measurement Procedure:* Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power..

### 1.9.2.4. TEST RESULTS:

**Complies**

### 1.9.2.5. MEASUREMENT RESULTS

See Annex 2 for Plot Data.

### 1.9.2.6. EMISSIONS LIMITATION & OCCUPIED BANDWIDTH; CDMA:

<b>Test Type:</b>	Emissions Limits for Cellular (CDMA)
<b>FCC Para No.:</b>	2.1049, 24.238
<b>Tested By:</b>	Paul Eberling
<b>Date:</b>	December 6, 2004

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**Equipment:** CR500 Bi-Directional Cellular Signal Amplifier



**1.9.2.7. SPECIFICATION REQUIREMENT:**

According to §22.238 (a) *Out of band emissions*.. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

**1.9.2.8. MEASUREMENT PROCEDURE**

According to §22.238 (b) *Measurement Procedure*: Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power..

**1.9.2.9. TEST RESULTS:**

**Complies**

**1.9.2.10. MEASUREMENT RESULTS**

See Annex 2 for Plot Data.

**1.9.2.11. EMISSIONS LIMITATION & OCCUPIED BANDWIDTH; GSM:**

<b>Test Type:</b>	Emissions Limits for Cellular (GSM)
<b>FCC Para No.:</b>	2.1049, 24.238
<b>Tested By:</b>	Paul Eberling
<b>Date:</b>	December 6, 2004

**1.9.2.12. SPECIFICATION REQUIREMENT:**

According to §22.238 (a) *Out of band emissions*.. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

**1.9.2.13. MEASUREMENT PROCEDURE**

According to §22.238 (b) *Measurement Procedure*: Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency

**Applicant:** Arrista Technologies Inc.

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block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power..

**1.9.2.14. TEST RESULTS:**

**Complies**

**1.9.2.15. MEASUREMENT RESULTS**

See Annex 2 for Plot Data.

**1.9.2.16. TWO-TONE INTERMODULATION TEST:**

<b>Test Type:</b>	Intermodulation Distortion Test
<b>FCC Para No.:</b>	2.1051, 24.238
<b>Tested By:</b>	Paul Eberling
<b>Date:</b>	December 6, 2004

**1.9.2.17. SPECIFICATION REQUIREMENT:**

§ 2.1051 (e) *Out of band emissions.* The mean power of emissions must be attenuated below the mean power of the un-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by: at least 43+10 log P dB.

Spur limit is defined in the following formula:

$$P_o - (43 + 10\log(P)) \quad [1]$$

**1.9.2.18. MEASUREMENT PROCEDURE:**

EUT was subjected to 2 simultaneous RF Carriers with the appropriate type of modulation. Two input signals are equal in level (and can be raised equally), were sent to the EUT. Input level was setup to achieve maximum EUT output power. The signal generator output was verified on a spectrum analyzer as shown in Annex 3. The signal generator output was then connected to the EUT uplink and downlink ports respectively. See Annex 3 for Plot Data..

**1.9.2.19. TEST RESULTS:**

**Complies**

**1.9.2.20. MEASUREMENT RESULTS**

**Up-Link IMD Results**

Modulation	Freq Fc (MHz)	Channel	Result (dBm)	Limit Absolute (Watts)
NADC	1850	LOW	<-13	-13
	1880	MID	<-13	-13
	1910	HIGH	<-13	-13
CDMA	1850	LOW	<-13	-13
	1880	MID	<-13	-13
	1910	HIGH	<-13	-13
GSM	1850	LOW	<-13	-13
	1880	MID	<-13	-13
	1910	HIGH	<-13	-13

**Down-Link IMD Results**

Modulation	Freq Fc (MHz)	Channel	Result (dBm)	Limit Absolute (Watts)
NADC	1930	LOW	<-13	-13
	1960	MID	<-13	-13
	1990	HIGH	<-13	-13
CDMA	1930	LOW	<-13	-13
	1960	MID	<-13	-13
	1990	HIGH	<-13	-13
GSM	1930	LOW	<-13	-13
	1960	MID	<-13	-13
	1990	HIGH	<-13	-13

See Annex 3 for Plot Data.

**1.9.3. CONDUCTED SPURIOUS EMISSIONS AT ANTENNA TERMINALS**

<b>Test Type:</b>	Spurious Emissions at Antenna Terminals
<b>FCC Para No.:</b>	2.1051(e), 24.238
<b>Tested By:</b>	Paul Eberling
<b>Date:</b>	December 6, 2004

**1.9.3.1. SPECIFICATION REQUIREMENT:**

According to § 2.1051 (e) *Out of band emissions*. The mean power of emissions must be attenuated below the mean power of the un-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by: at least 43+10 log P dB.

According to §22.238 (a) *Out of band emissions*. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

**1.9.3.2. MEASUREMENT PROCEDURE:**

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminal when properly loaded with a suitable artificial antenna.

EUT was subjected to an RF modulated carrier with the appropriate type of modulation. Input level was setup to achieve maximum EUT output power. For each uplink and downlink test the signal generator output was connected to the EUT uplink and downlink ports respectively. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic. See Appendix A, for test set-up.

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**Equipment:** CR500 Bi-Directional Cellular Signal Amplifier

Spur limit is defined in the following formula:

$$P_o - (43 + 10\log P) \quad [1]$$

Using the measured values the limit is calculated below:

$$23.5 - [43 + 10\log(0.224)] = -13.0 \quad [2]$$

The test data presented in this section is the worst case test configuration, EUT operating with CDMA modulation. This was determined by scanning the EUT operating in all different modulation schemes (CW, TDMA, CDMA, GSM, DXW, F9W, GXW).

#### 1.9.3.3. TEST RESULTS:

**Complies**

#### 1.9.3.4. MEASUREMENT RESULTS

All emissions were 20 dB below required limit (-13.0 dBm). See Annex 3 for Plot Data.

#### 1.9.4. RADIATED FIELD STRENGTH OF SPURIOUS EMISSIONS

<b>Test Type:</b>	Emissions Limits for Cellular
<b>FCC Para No.:</b>	2.1053, 24.238
<b>Tested By:</b>	Paul Eberling
<b>Date:</b>	December 6, 2004

#### 1.9.4.1. SPECIFICATION REQUIREMENT:

According to § 2.1051 (e) *Out of band emissions*. The mean power of emissions must be attenuated below the mean power of the un-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by: at least 43+10 log P dB.

According to §22.238 (a) *Out of band emissions*. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

#### 1.9.4.2. MEASUREMENT PROCEDURE:

Measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and power.

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**Applicant:** Arrista Technologies Inc.

**Equipment:** CR500 Bi-Directional Cellular Signal Amplifier

The EUT is placed in a 3-meter semi anechoic chamber on a wooden table resting on the metal turntable. The EUT is stimulated by a suitably modulated signal from a signal generator at three discrete frequencies for each mode of operation. More specifically, 1850, 1880 and 1910 MHz respectively for the uplink frequency band and 1930, 1960 and 1990 MHz respectively for the downlink band. Measurements were performed with full RF output and modulation.

The equivalent power into a dipole antenna was determined from the field intensity levels measured at 3 meters using the substitution method. The EUT's radiated field strength emissions is measured from 30MHz to the 10th harmonic of the radiated fundamental signal. Through turntable rotation (360 degrees), antenna orientation (V and H) and antenna height (1 to 4 meters) the highest emission level is located. The EUT is then replaced with a signal generator and dipole antenna that produces a known signal strength at a given distance. The signal generator output is increased until the amplitude of the radiated signal equals that obtained from the EUT. The absolute levels of the spurious emissions were measured by the substitution. Using the measured values the limit is calculated below:

$$\text{Rcv Power (dB)} = \text{Tx Power (dB)} - \text{Cable Atten (dB)} + \text{Tx Ant Gain (dB)} \quad [3]$$

Spurious emissions in dB is shown below:

$$\text{Emission(dB)} = 10 \text{ Log (Po Watts/0.001)} - \text{absolute level (dB)} \quad [4]$$

Spurious attenuation limit in dB is shown below:

$$\text{Limit(dB)} = 43 + 10 \text{ Log (Po Watts)} \quad [5]$$

#### 1.9.4.3. TEST RESULTS:

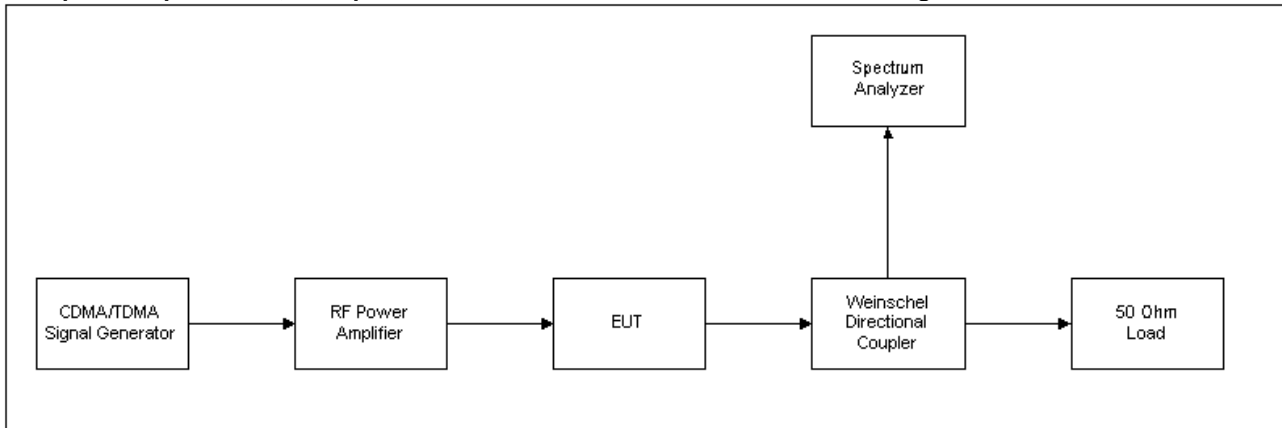
**Complies**

#### 1.9.4.4. MEASUREMENT RESULTS

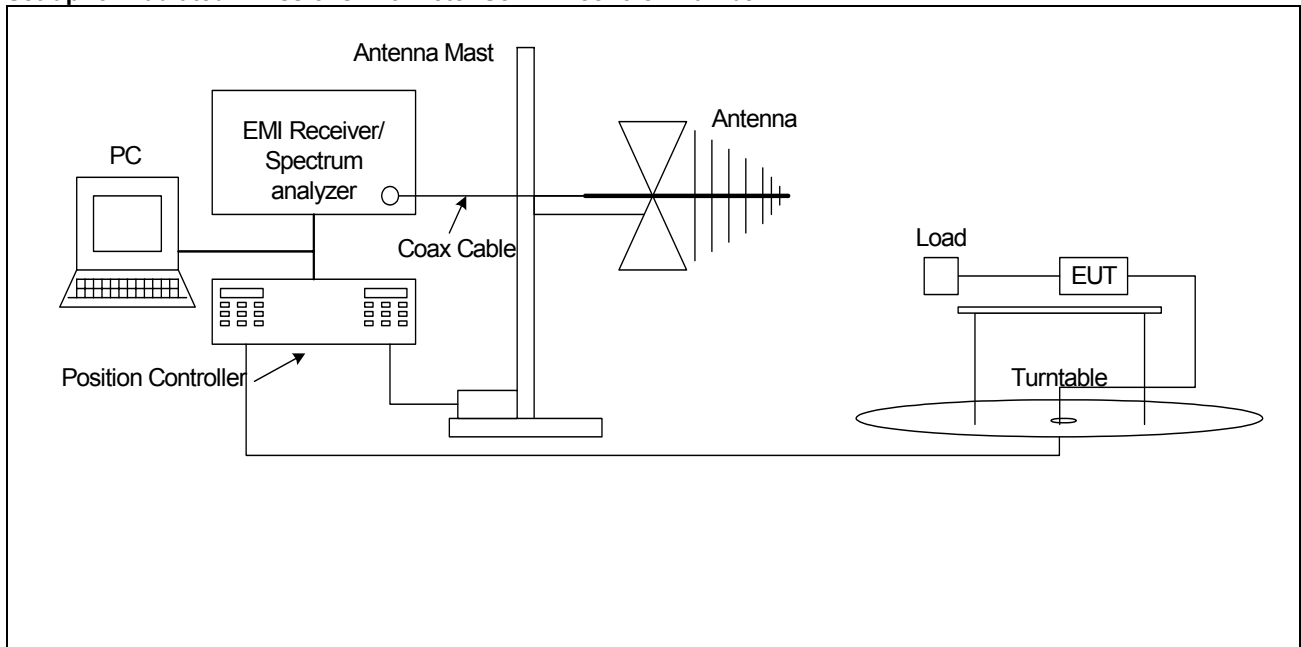
All emissions were 20 dB below required limit (-13.0 dBm). See Annex 4 for Plot Data.

## 2. APPENDIX A: TEST SET-UP DIAGRAMS

Set-up for Output Power, Occupied Bandwidth and Conducted Emissions Testing

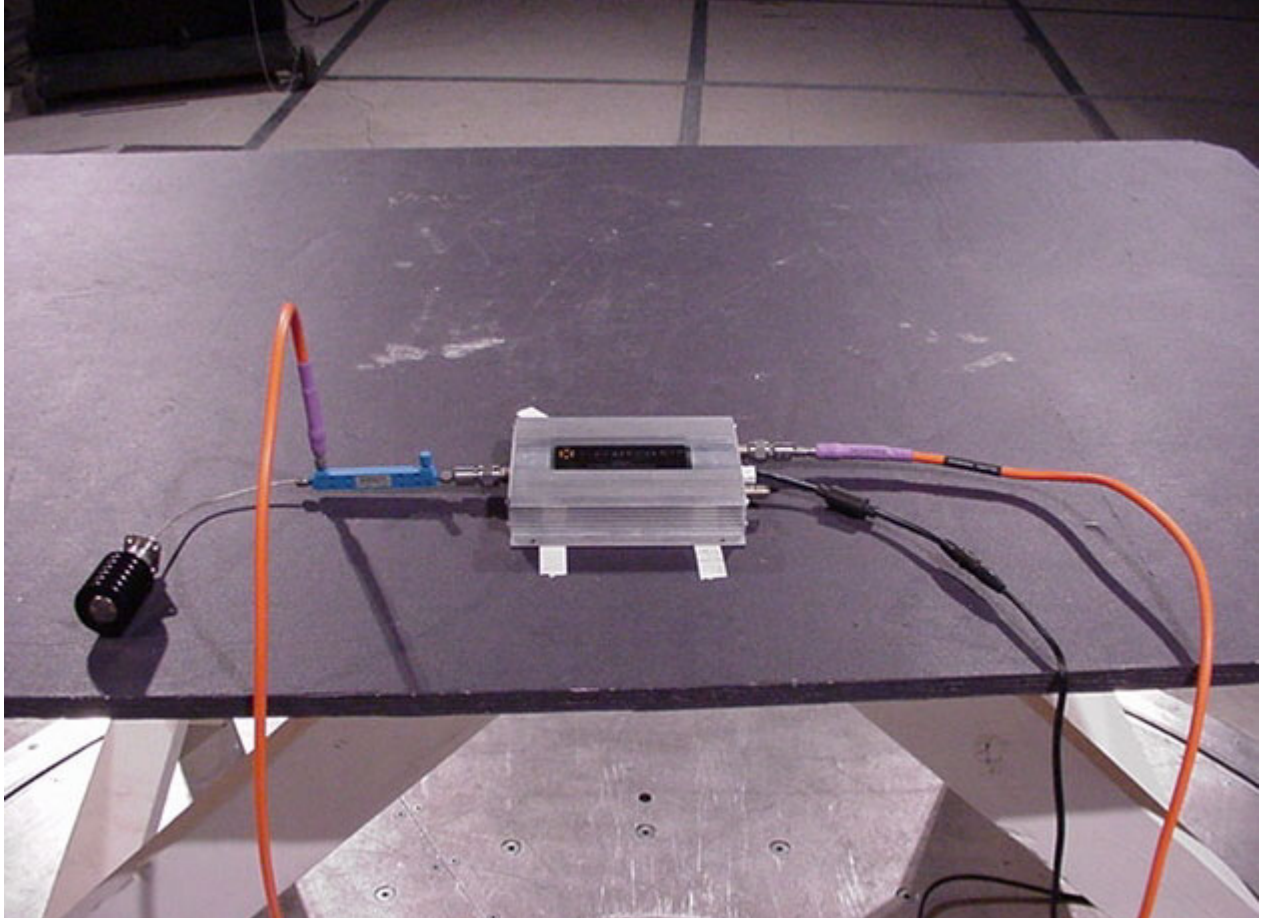


Set-up for Radiated Emissions in 3-meter Semi Anechoic Chamber



### 3. APPENDIX B: PICTURES OF EUT

EUT Set-up in 3-meter Anechoic





**EUT Set-up for Bench Top, Conducted Emissions, Power Output Testing.**

