



Test Report
RF EXPOSURE INFORMATION

Applicant
ARRISTA TECHNOLOGIES INCORPORATED
5-55 HENLOW BAY
WINNIPEG, MB, R3Y 1G4

Equipment Under Test (EUT):
CELLULAR SIGNAL AMPLIFIER

Model:
SA300

FCC ID:
P35K7P9YE8S

In Accordance with
FCC PART 1
OET BULLETIN 65

FCC PART 1
OET Bulletin 65
Report No.: ATEMC00034



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TEST LAB PERSONNEL:

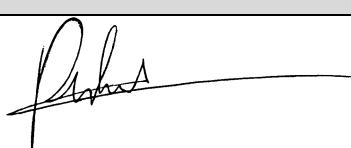
Test Performed by:	Date	Signature
Paul Eberling, CNA Electronic Technologist	March 6, 2003	

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REVISION HISTORY:

Date	Name	Revision	Description
01/31/2002	Elwood Friesen	1.0	Initial Release
04/15/2002	Paul Eberling	1.2	Reviewed

APPROVALS:

Date	Name	Title	Signature
March 6, 2003	Roman Wroczynski	Director; Development & Test	

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1. TEST LAB

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Arrista Technologies Incorporated (Arrista) performs tests to regulatory standards, and provides consultation to mitigate problems that arise during testing. Your product is tested to verify operation within its expected temperature, humidity and electromagnetic environmental conditions.

1.1. GENERAL

This document details the evaluation of compliance with FCC Specified Guidelines for human exposure to Radio frequency electromagnetic fields. Maximum Permissible Exposure (MPE) tests performed by Arrista Technologies on March 4 through March 6, 2003, on the: Arrista SA300 Cellular Signal Amplifier showed the product was in compliance.

1.2. EQUIPMENT UNDER TEST DESCRIPTION

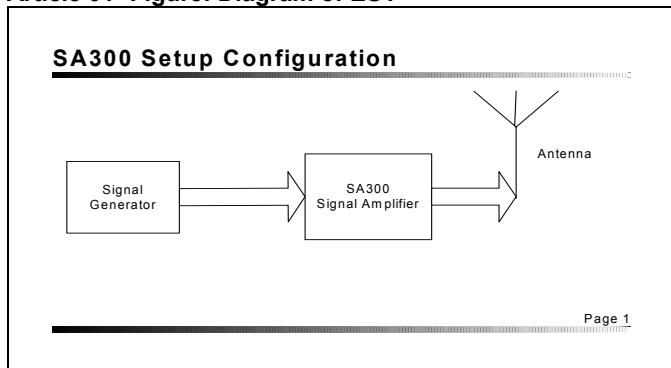
The EUT is sold under the following trade names:

- SA300

The equipment under test is listed below:

- SA300

Article 01- Figure: Diagram of EUT



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2. DESCRIPTION

2.1. APPLICATION AND EXCEPTIONS

All tests were performed using as the measurement standard, FCC 47CFR§1.1301; FCC OET Bulletin 65, 97-01 "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" and FCC OET Bulletin 65, Supplement C, 01-01, "Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions". Measurements are compared to the specifications in FCC 47CFR§1.1310.

The following change was instituted to allow the EUT meet requirements:

None

The EUT was operated under the following conditions:

- Signal Generator input signal to stimulate the rated maximum output power.
- External antenna rated at 3dBi w/1.5db cable loss
- Measurements taken at 50cm distance

This mode of operation was chosen by Arrista to simulate maximum operating conditions of this device.

All measurements were performed while the EUT was transmitting a CW signal, which is deemed to be worst case. No duty cycle correction factors for TDMA (DXW) were applied.

2.2. DEVIATIONS

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

None

2.3. TEST REQUIREMENTS AND RESULTS

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

Article 02- Table 2.3: Test Requirements

Test Reference	EUT Modifications	Results
ANSI C63.4-1992 Methods of measurement of radio-noise emissions	N/A	PASS Section 3 Test Results
FCC CFR 47 Part 1 Practice and Procedure	See Section 2.1	PASS Section 3 Test Results

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Test Reference	EUT Modifications	Results
FCC OET Bulletin 65	N/A	N/A

2.4. TEST FACILITIES DESCRIPTION

2.4.1. INTERNAL FACILITIES

Arrista Technologies Product Compliance & Test (PCT) laboratory facility has test equipment for Electromagnetic Compatibility (EMC) testing i.e. ESD, EFT, Surge, and radiated emissions. The laboratory is located at 5-55 Henlow Bay, Winnipeg, Manitoba, Canada at Arrista Technologies main facility. 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 subject to Certification under Parts 15 & 18. Test equipment used to perform all measurements listed in Section 1.7 Subsection 1.7.2 and 1.7.4.

Article 03- Table: Test Equipment

Radiated Emissions Test Equipment				
Description	Model	Serial Number	Last Cal Date	Cal Interval
E-Field Meter	Holaday HI3012	87657	4-27-02	2 yrs
Turntable and Mast Controller	EMCO 2090	9812-1384	N/A	N/A
Metal Top Turntable	EMCO 2081-2.03	N/A	N/A	N/A
Desktop Computer	Dell Optiplex GX110	GZLAL	N/A	N/A
6 dB Attenuator	Hewlett-Packard	6dB	N/A	N/A

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3. TEST RESULTS

3.1. RF EXPOSURE LEVELS

Emissions were measured using a Holladay Electromagnetic Field meter; model HI3012. Field strengths were measured at distances from 0.5 to 3 meters. The receive antenna height was varied from 1 - 3 meters to determine maximum emission levels. The following relation was used to convert the measured field strength to Power Density:

$$S = E^2 / 3770$$

[1]

Where

S = power density (mW/cm²)

E = electric field strength (V/m)

This equation is given on page 9 of OET Bulletin 65 Edition 97-01.

3.2. EUT ORIENTATIONS

Measurements of the product are taken using eight EUT orientations. Azimuth angles are spaced by 45 degrees of turntable rotation, more specifically 0, 45, 90, 135, 180, 225, 270, 315 Degrees respectively. See Appendix A; Article 06 [Equipment Setup for MPE Measurements](#).

As a guide for future reference, equipment under test is configured as per **Fig 9(c) Test Configuration – Tabletop Equipment Radiated Emissions** in **ANSI C63.4-1992**.

3.2.1. IDEN BAND (806-824MHz)

Article 04- Table: MPE Calculations

Output Power of the amplifier:	1.58 W maximum	
Antenna Gain: Maximum antenna gain allowed as described in user/install manual.	3dBi	
Operational Frequency:	806-824MHz	
Minimum distance (Controlled): For personnel aware of radiofrequency equipment and who are able to limit their exposure time. (Installation Technicians)	50cm Antenna mounted on vehicle exterior	
Minimum distance (Uncontrolled): For personnel unaware of radiofrequency equipment and who are not able to limit their exposure time. (General Public)	50cm Antenna mounted on vehicle exterior	
Maximum Permissible Exposure (MPE):	Controlled 6 min avg 2.72mW/cm ²	Uncontrolled 30 min avg 0.54mW/ cm ²
Complies with MPE Limits	Yes	Yes

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3.2.2. CALCULATIONS

The power density calculations follow the formula below. It is noted that the antenna used incorporates a forward gain of 3 dBi and a 3 meter cable with an attenuation factor of 1.5 dB and expressed as a numeric attenuation of 1.41. This is shown as a corrected power output value.

$$S = P_T G / 4\pi R^2 \quad (1)$$

where:

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

$$S = 1390 * 2 / (4 * \pi * 50^2)$$

$$S = 2780 / 31415.927$$

$$S = 0.088490 \text{ mW/cm}^2$$

3.2.3. MEASUREMENT DATA

Article 05- Measurement Data: 815.0 MHz

Maximum Permissible Exposure Measurements

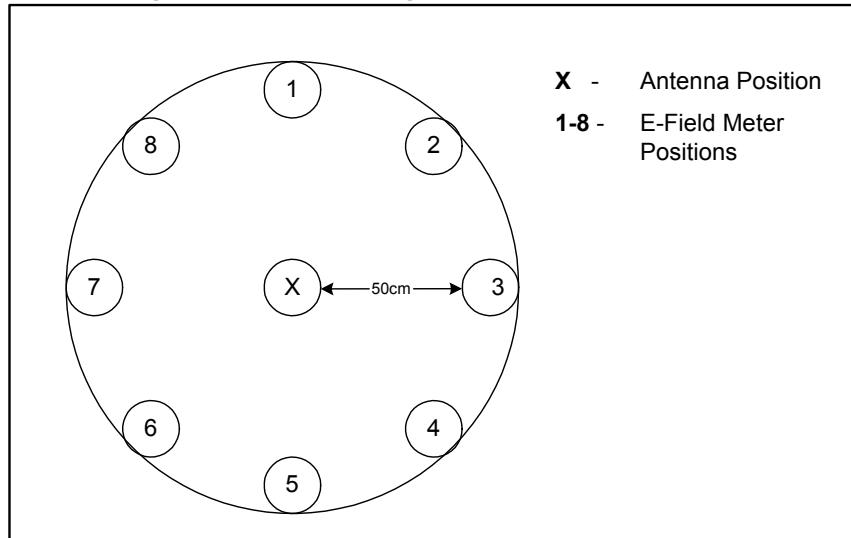
Fundamental: 815		RF Probe Dist. (cm)	Cable Corr (dB)	Meter Reading (V ² /m ²)	Field Strength (V/m)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
Measurement No.	TT Position (deg)						
1	0	50.00	2.00	75.0	8.7	0.01989	0.54333
2	45	50.00	2.00	70.0	8.4	0.01857	0.54333
3	90	50.00	2.00	75.0	8.7	0.01989	0.54333
4	135	50.00	2.00	70.0	8.4	0.01857	0.54333
5	180	50.00	2.00	65.0	8.1	0.01724	0.54333
6	225	50.00	2.00	70.0	8.4	0.01857	0.54333
7	270	50.00	2.00	75.0	8.7	0.01989	0.54333
8	315	50.00	2.00	70.0	8.4	0.01857	0.54333

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4. APPENDIX A

4.1. EQUIPMENT SETUP FOR MPE MEASUREMENTS

Article 06- Figure: Meter Positioning



Article 07- Figure: MPE Setup



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