Global EMC Inc. Labs EMC Test Report

As per

ICES-003:2004

&

FCC Part 15 Subpart B:2006

Class B Equipment

on the

A102d, A200d

T1/E1 Interface cards

Ashwani Malhotra Global EMC Inc. 180 Brodie Dr, Unit 2 Richmond Hill, ON L4B 3K8 Canada Ph: (905) 883-3919 Testing produced for SANGOMA

See Appendix A for full customer & EUT details.



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Report issued:

7/10/2007





FCC REGISTRATION #612361

GEMC File #: GEMC-790092

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| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|--------------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE INTERNET |

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| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|---------|
| Product | A102d/A200d T1/E1 Interface cards | EMC 2 |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNA |

Report Scope

This report addresses the EMC verification testing and test results of the A102d and A200d T1/E1 interface cards, herein referred to as EUT (Equipment Under Test) performed at Global EMC Labs.

The EUT was tested for compliance against the following standards:

ICES-003 Issue 4:2004 / FCC Part 15 Subpart B 15:2006

Power line conducted and radiated emissions' testing was evaluated on the EUT. Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

The results contained in this report relate only to the item(s) tested.

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|------------|
| Product | A102d/A200d T1/E1 Interface cards | EMC 2 |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | A C IN CAR |

Summary

The results contained in this report relate only to the item(s) tested.

| Equipment under test | A102d/A200d T1/E1 interface cards | |
|---------------------------------|-----------------------------------|--|
| EUT Passed all tests performed. | Yes | |
| Tests conducted by | Ashwani Malhotra | |

Test Results Summary

| Standard/Method Description | | Class/Limit | Result |
|-----------------------------|-----------------------------------|-------------|--------|
| FCC 15.107 ICES-003:2004 | Power line conducted emissions | В | PASS |
| FCC 15.109 ICES-003:2004 | Radiated emissions | В | PASS |
| Over | all Result | | PASS |

All tests were performed by

If the product as tested complies with the specification, the EUT is deemed to comply with the standard and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' or 'FAIL' grade is independent of any measurement uncertainties.

A 'PASS' or 'FAIL' grade within measurement uncertainty is marked with a '*'.

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|---------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNA |

Justifications or Deviations

The following justifications for tests not performed or deviations from the above listed specifications apply:

No deviations are recorded.

Applicable Standards, Specifications and Methods

| ANSI C63.4:2003 | - Methods of Measurement of Radio-Noise Emissions from Low- Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |
|-----------------|---|
| CFR 47 FCC 15 | - Code of Federal Regulations – Radio Frequency Devices |
| CISPR 22:1997 | - Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement |
| ICES-003:2004 | - Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard |
| ISO 17025:2005 | - General Requirements for the competence of testing and calibration laboratories |

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|---------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNA |

Sample calculation(s)

 $\label{eq:margin} \begin{array}{l} Margin = limit - (received signal + antenna factor + cable loss - pre-amp gain) \\ Margin = 50.5 dBuV/m - (50 dBuV + 10 dB + 2.5 dB - 20 dB) \\ Margin = 8.5 \ dB \end{array}$

Document Revision Status

Revision 1 -

First revision issued on 8/22/2006.

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|----------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | A CINCLE |

Definitions and Acronyms

The following definitions and acronyms are applicable in this report. See also ANSI C63.14.

AE – Auxiallary Equipment.

Class A device – A digital device that is marketed for use in a commercial, industrial or business environment. A 'Class A' device should not be marketed for use by the general public. A 'Class A' device should contain the following or similar warning in it's user manual: "**Warning:** This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures."

Class B device – A digital device that is marketed for use in a residential environment and may also be used in a commercial, business or industrial environments. A 'Class B' device may also be defined as a device to which a broadcast radio or television receivers would be expected to be common within a distance of 10 m of the device concerned.

EMC – Electro-Magnetic Compatibility

EMI – Electro-Magnetic Immunity

EUT – Equipment Under Test

ITE – Information Technology Equipment with a primary function(s) of entry, storage, display, retrieval, transmission, processing, switching, or control, of data.

LISN – Line impedance stabilization network

NCR – No Calibration Required

RF – Radio Frequency

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|----------|
| Product | A102d/A200d T1/E1 Interface cards | EMIC Z |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNAS |

Testing Facility

Testing for EMC on the EUT was carried out at Global EMC labs in Toronto, Ontario, Canada. The testing lab consists of a 3m semi-anechoic chamber calibrated to be able to allow measurements on an EUT with a maximum width or length of up to 2m and height up to 3m. The chamber is equipped with a turn table that is capable of testing devices up to 3300lb in weight. This facility is capable of testing products that are rated for 120 Vac and 240Vac single phase, or 208 Vac 3 phase input. DC capability is also available. The chamber is equipped with an antenna mast that controls polarization and height from the control room adjoining the shielded chamber. Radiated emissions measurements are performed using a Bilog, and Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN.

Calibrations and Accreditations

The measurement site used is registered with Federal Communications Commission (FCC) and Industry Canada (IC). This site is calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The chamber used is lined with ferrite tiles and absorption cones to minimize any undesired reflections. Global EMC Inc is accredited to ISO 17025 by A2LA with Testing Certificate #2555.01. The laboratories current scope of accreditation listing can be found as listed on the A2LA website. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test.

Testing Environmental Conditions and Dates

| Date | Test | Init. | Temperature (°C) | Humidity (%) | Pressure (kPa) |
|-------------|------|-------|---------------------|--------------|-------------------|
| July 6 2007 | RE | AM | 23°C | 45% | 100.1kPa |
| July 6 2007 | CE | AM | 23°C | 45% | 100.1kPa |

Following were the environmental conditions in the facility during time of testing –

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|------------|
| Product | A102d/A200d T1/E1 Interface cards | EMC Z |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE CLARKE |

Detailed Test Results Section

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|--------------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE INTERNET |

Power Line Conducted Emissions

Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT's power line does not exceed the limits listed below as defined in the applicable test standard, as measured from a LISN. This helps protect lower frequency radio services such as AM radio, shortwave radio, amateur radio operators, maritime radio, CB radio, and so on, from unwanted interference.

Limits & Method

The limits are as defined in 47 CFR FCC Part 15 Section 15.107 Method is as defined in ANSI C64:2003

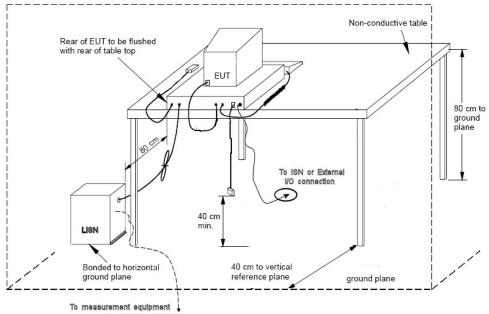
| Average Limits | | QuasiPeak Limits | | |
|---|---------|-------------------|---------------|--|
| 150 kHz – 500 kHz 56 to 46 dBuV | | 150 kHz – 500 kHz | 66 to 56 dBuV | |
| 500 kHz – 5 MHz | 46 dBuV | 500 kHz – 5 MHz | 56 dBuV | |
| 5 MHz – 30 MHz | 50 dBuV | 500 kHz - 30 MHz | 60 dBuV | |
| The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. | | | | |

Note: If the Peak or Quasi Peak detector measurements do not exceed the Average limits, then the EUT is deemed to have passed the requirements.

Both limits are applicable, and each is specified as being measured with a 9 kHz measurement bandwidth .

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|----------|
| Product | A102d/A200d T1/E1 Interface cards | EMC 3 |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE LING |

Typical Setup Diagram



Note: The vertical reference plane is optional as per ANSI C63.4 section 5.2.2

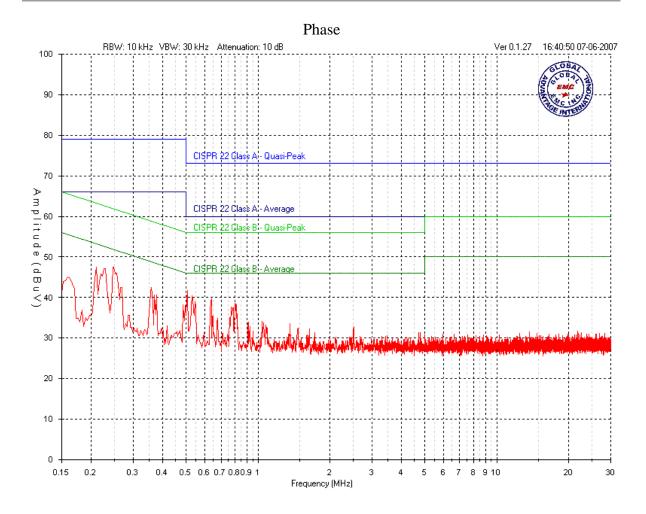
Measurement Uncertainty

The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is \pm -3.6 dB with a 'k=2' coverage factor and a %95 confidence level.

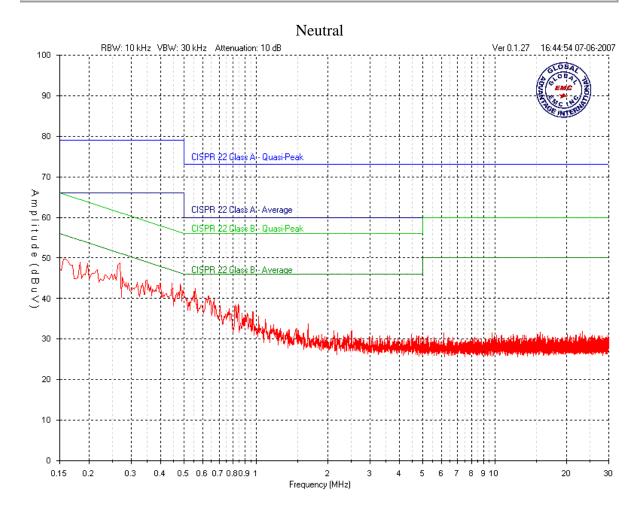
Preliminary Graphs

Note the graphs shown below are for graphical illustration only. For final measurements with the appropriate detector where applicable, please refer to the table. The graph shown below is a peak measurement graph, measured with a resolution bandwidth greater then or equal to the final required detector. This graphs are performed as a worst case measurement to enable the detection of frequencies of concern and for considerable time savings.

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|----------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | A C IN C |



| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|--------------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE INTERNET |



| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|------------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE CLARKE |

Final Measurements

Note: See 'Appendix B - EUT & Test Setup Photographs' for photos showing the test setup for the highest line conducted emission.

Since the EUT are PCI cards that are on the SELV of the desktop computer, all power line emissions recorded were from the power supply of the desktop computer. Since the recorded plots are from the power supply of the computer no further investigation was carried out once the peak limits met the Class B average limits.

All peak readings measured were below the average limits hence no Average or Quasi peak readings were recorded for these tests.

| Equipment | Model No. | Manufacturer | Last calibration date | Next calibration due date | Asset # |
|-----------------------|---------------------------------|--------------|-----------------------------|---------------------------------|---------|
| Spectrum Analyzer | 8566B | HP | 2006-08-09 | 2007-08-09 | GEMC 6 |
| Quasi Peak Adapter | 85650A | HP | 2006-08-07 | 2007-08-07 | GEMC 7 |
| LISN | FCC-LISN- 50/250-16-2- 01 | FCC | 2007-05-02 | 2008-05-02 | GEMC 65 |
| RF Cable 7m | LMR-400-7M- 50OHM-MN- MN | LexTec | NCR | NCR | GEMC 28 |
| RF Cable 1m | LMR-400-1M- 50OHM-MN- MN | LexTec | NCR | NCR | GEMC 29 |
| Attenuator 10 dB | FP-50-10 | Trilithic | NCR | NCR | GEMC 42 |

Test Equipment List

This report module is based on GEMC template "FCC - Power Line Conducted Emissions Class B_Rev1"

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|----------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE LING |

Radiated Emissions

Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

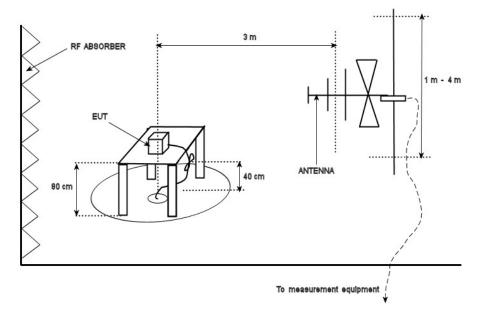
Limit(s)

The method is as defined in ANSI C63.4:2003. The limits are as defined in FCC Part 15, Section 15.109(g): 30 MHz - 230 MHz, 40 dBuV/m at 10m, 50.5 dBuV/m at $3m^1$ 230 MHz - 1000 MHz, 47 dBuV/m at 10m, 57.5 dBuV/m at $3m^1$ Above 1000 MHz³, 300 uV/m (49.5 dBuV/m) at 10m, 60 dBuV/m at $3m^2$

¹Limit is with 120 kHz measurement bandwidth and a using a Quasi Peak detector. ²Limit is with 1 MHz measurement bandwidth and using an Average detector ³The frequency range scanned was in accordance 15.33(b)

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|------------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE CLARKE |

Typical Radiated Emissions Setup



Note: In accordance with FCC Part 15, section 15.31(f)(1) testing was performed at a 3 meter test distance and an extrapolation factor of 10.5 dB was applied.

Measurement Uncertainty

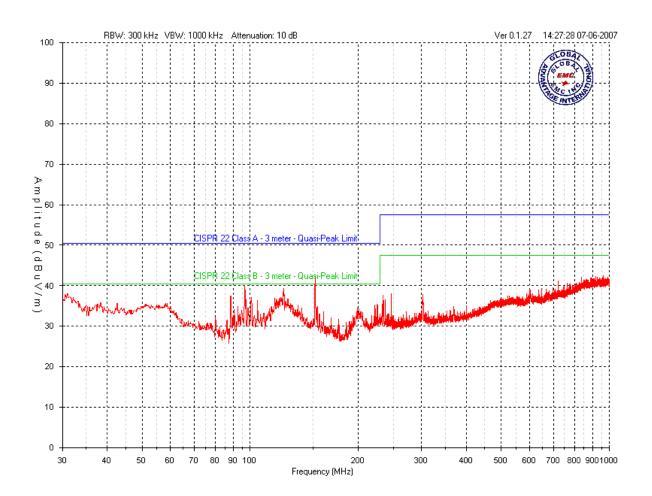
The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is \pm -4.4 dB with a 'k=2' coverage factor and a %95 confidence level.

Preliminary Graphs

Note the graphs shown below are for graphical illustration only. For final measurements with the appropriate detector, please refer to the final measurement table where applicable. The graph shown below is a maximized peak measurement graph, measured with a resolution bandwidth greater then the final required detector and over a full 0-360 rotation. This peaking process is done as a worst case measurement. This process enables the detection of frequencies of concern for final measurement, and provides considerable time savings.

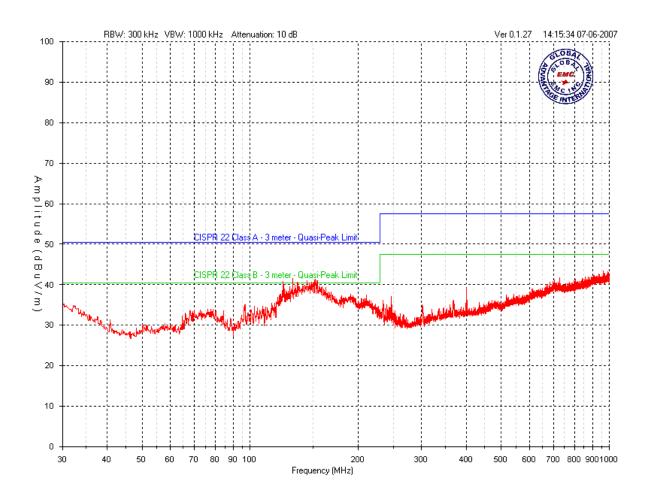
| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|----------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNAS |

Vertical – Peak Emissions Graph A102d



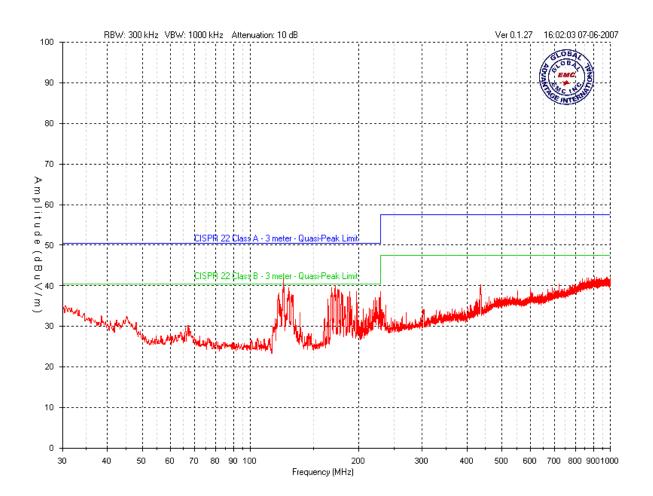
| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|----------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNAS |

Horizontal – Peak Emissions Graph A102d



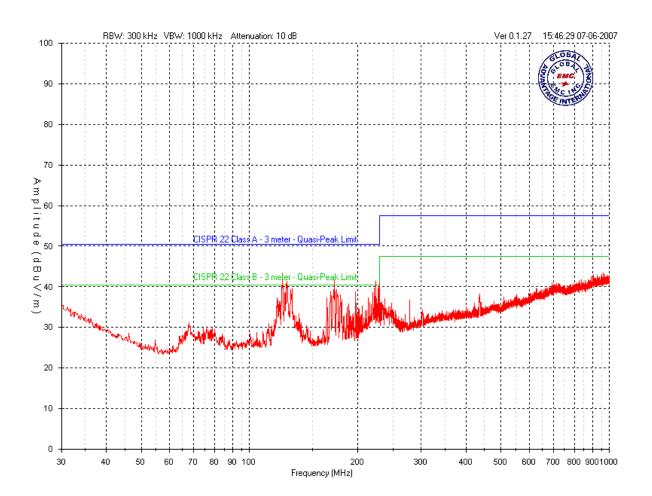
| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|----------|
| Product | A102d/A200d T1/E1 Interface cards | EMC 2 |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | A C IN C |

Vertical – Peak Emissions Graph A200d



| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|----------|
| Product | A102d/A200d T1/E1 Interface cards | EMC 2 |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | A C IN C |

Horizontal – Peak Emissions Graph A200d



| Client | Sangoma Technologies Corp. | OLOBAL |
|-------------|---|-------------|
| Product | A102d/A200d T1/E1 Interface cards | S (EMC) S |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | A CINGEN |

Final Measurements

| Product category | | Class B Group 1 | | | | | | | | | |
|----------------------------|-------------------------------|------------------------------------|-------------------------|-------------------------|---------------------|------------------|---------------------------|--------------------------------|-------------------------------|------------------|--------|
| Limits | | | | | FCC | C 15 Subpart B | | | | | |
| Test Frequency (MHz) | Detection mode (Q-Peak) | Antenna polarity (Horz/Vert) | Raw signal dB(μV) | Antenna factor dB | Cable loss dB | Attenuator dB | Pre- Amp Gain dB | Received signal dB(µV/m) | Emission limit dB(µV/m) | Margin dB(µV) | Result |
| | | | | | A102 | d | | | | | |
| 151.5 | QP | Horz | 40.6 | 9.6 | 1.1 | 3.0 | 21.6 | 32.7 | 40.5 | 7.8 | PASS |
| 127.1 | QP | Horz | 33.0 | 8.2 | 1.1 | 3.0 | 21.8 | 23.5 | 40.5 | 17.0 | PASS |
| 123.5 | QP | Horz | 43.6 | 8.2 | 1.1 | 3.0 | 21.8 | 34.1 | 40.5 | 6.4 | PASS |
| 151.6 | QP | Vert | 47.4 | 9.0 | 1.1 | 3.0 | 21.6 | 38.9 | 40.5 | 1.6 | PASS |
| 123.5 | QP | Vert | 46.7 | 6.9 | 1.1 | 3.0 | 21.8 | 35.9 | 40.5 | 4.6 | PASS |
| 96.2 | QP | Vert | 46.6 | 7.5 | 0.9 | 3.0 | 21.8 | 36.2 | 40.5 | 4.3 | PASS |
| 88.03 | QP | Vert | 43.9 | 8.1 | 0.9 | 3.0 | 21.8 | 34.1 | 40.5 | 6.4 | PASS |
| | | | | | A200 | d | | | | | |
| 122.8 | QP | Horz | 49.5 | 8.2 | 1.1 | 3.0 | 21.8 | 40.0 | 40.5 | 0.5 | PASS |
| 124.9 | QP | Horz | 40.3 | 8.2 | 1.1 | 3.0 | 21.8 | 30.8 | 40.5 | 9.7 | PASS |
| 172.03 | QP | Horz | 42.7 | 10.2 | 1.1 | 3.0 | 21.8 | 35.2 | 40.5 | 5.3 | PASS |
| 196.62 | QP | Horz | 41.4 | 10.1 | 1.1 | 3.0 | 21.8 | 33.8 | 40.5 | 6.7 | PASS |
| 229.4 | QP | Horz | 40.7 | 11.4 | 1.1 | 3.0 | 21.6 | 34.6 | 40.5 | 5.9 | PASS |
| 122.8 | QP | Vert | 48.1 | 8.2 | 1.1 | 3.0 | 21.8 | 38.6 | 40.5 | 1.9 | PASS |

Quasi Peak Emissions Table

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Report issue date: 7/10/2007

GEMC File #: GEMC-790092

| Client | Sangoma Technologies Corp. | OLOBA, |
|-------------|---|------------|
| Product | A102d/A200d T1/E1 Interface cards | EMC |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE INTERN |



| 124.9 | QP | Vert | 38.5 | 8.2 | 1.1 | 3.0 | 21.8 | 29.0 | 40.5 | 11.5 | PASS |
|--------|----|------|------|------|-----|-----|------|------|------|------|------|
| 167.54 | QP | Vert | 37.5 | 9.9 | 1.1 | 3.0 | 21.8 | 29.7 | 40.5 | 10.8 | PASS |
| 196.62 | QP | Vert | 42.5 | 10.1 | 1.1 | 3.0 | 21.8 | 34.9 | 40.5 | 5.6 | PASS |
| 231.45 | QP | Vert | 33.3 | 12.4 | 1.1 | 3.0 | 21.6 | 28.2 | 47.5 | 19.3 | PASS |

Note: See 'Appendix B - EUT & Test Setup Photographs' for photos showing the test set-up for the highest radiated emission

GEMC File #: GEMC-790092

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|---------|
| Product | A102d/A200d T1/E1 Interface cards | EMIC 2 |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNA |

Test Equipment List

| Equipment | Model No. | Manufacturer | Last calibration date | Next calibration due date | Asset # |
|-----------------------|--------------------------------------|--------------|-----------------------------|---------------------------------|---------|
| Spectrum Analyzer | 8566B | HP | 2006-08-09 | 2007-08-09 | GEMC 6 |
| Quasi Peak Adapter | 85650A | HP | 2006-08-07 | 2007-08-07 | GEMC 7 |
| BiLog Antenna | 3142-C | ETS | 2006-08-06 | 2008-08-06 | GEMC 8 |
| Attenuator 3 dB | FP-50-3 | Trilithic | NCR | NCR | GEMC 40 |
| Pre-Amplifier | PA-2.5-26 | Vican | 2006-09-12 | 2007-09-12 | GEMC 9 |
| RF Cable 7m | LMR-400-7M- 50OHM-MN- MN | LexTec | NCR | NCR | GEMC 28 |
| RF Cable 1m | LMR-400-1M- 50OHM-MN- MN | LexTec | NCR | NCR | GEMC 29 |
| RF Cable 0.5M | LMR-400- 0.5M- 500HM-MN- MN | LexTec | NCR | NCR | GEMC 31 |

This report module is based on GEMC template "FCC - Radiated Emissions Class A_Rev2"

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|---------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNA |

Appendix A – Customer Provided Details

General EUT Description

| Manufacturer Details | | | | |
|--|---|--|--|--|
| Organization | Sangoma Technologies Corp. | | | |
| Contact | Igor Arganovski | | | |
| Phone | 1-905-474-1990 x 111 | | | |
| Email | igor@sangoma.com | | | |
| Client | Details | | | |
| Organization | Sangoma Technologies Corp. | | | |
| Contact | Igor Arganovski | | | |
| Phone | 1-905-474-1990 x 111 | | | |
| Email igor@sangoma.com | | | | |
| EUT Name | A100d / A200d | | | |
| EUT Revision | Revision of previously tested product | | | |
| EUT Software version | Wanpipe driver 2.3.4 | | | |
| Equipment Category (Commercial / Residential / Medical) | Telecom equipment | | | |
| Input Voltage and Frequency | 3.3V, 5V for A102d; 3.3V, 5V, 12V for A200d | | | |
| Rated Input Current | 0.5A | | | |
| Intentional RF (If yes describe) | N/A | | | |
| Table Top / Wall mount / Floor standing | Installed inside desktop computer | | | |
| I/O Connectors available on EUT | A102d – RJ45 A200d – RJ11 | | | |
| Peripherals required for test | Desktop computer setup | | | |
| Types and lengths of all I/O cables | RJ45 and RJ11 cables used. Less than 9ft length | | | |
| Frequencies of all clocks and oscillators | 8.192 MHz, 12.352MHz, 33.3 MHz | | | |
| Release type & Condition | Final | | | |

Note the EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see 'Appendix B – EUT & Test Setup Photographs'.

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|-----------------|
| Product | A102d/A200d T1/E1 Interface cards | EMIC Z |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNA ANTERNA |

EUT Functional Description

A102d and A200d are telecom line cards that are installed inside the chassis of a desktop computer in a PCI slot. These cards are used to transfer voice and data over T1 and E1 lines.

EUT Configuration

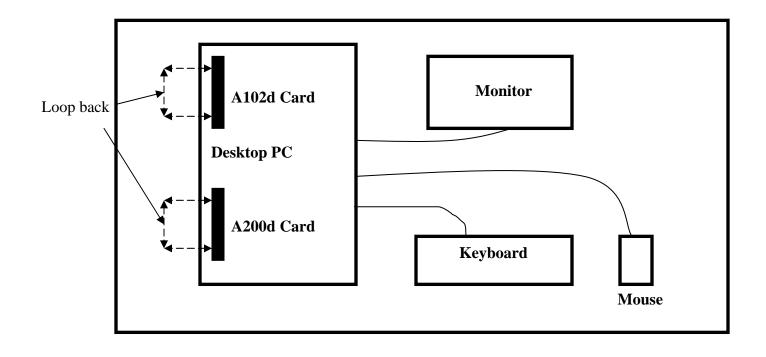
The EUT was configured in the following way during the tests as per manufacturer's specification.

A102d/A200d card (one at a time) was installed inside the desktop and RJ45/RJ11 cables were used for loop back. Software on the desktop was initialized and executed to transfer data over the lines. This software was written and maintained by Sangoma Technologies Corp. (Wanpipe driver 2.3.4)

Both RJ45 and RJ11 cables were shielded in order to meet the Class B specifications.

Operational Setup

These devices are required to be attached to the EUT for its normal operation.



Report issue date: 7/10/2007

GEMC File #: GEMC-790092

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|---------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNA |

Test Signals Required For Test

Test signals generated by the TX and RX ports of the cards were looped back in to the card. These signals were generated from the software that was installed and executed on the host PC.

Modifications Required for Compliance

Shielded cables for RJ45 and RJ11 connectors were used in order to meet Class B specifications.

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|---------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNA |

Appendix B – EUT and Test Setup Photographs

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|------------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE CLARKE |

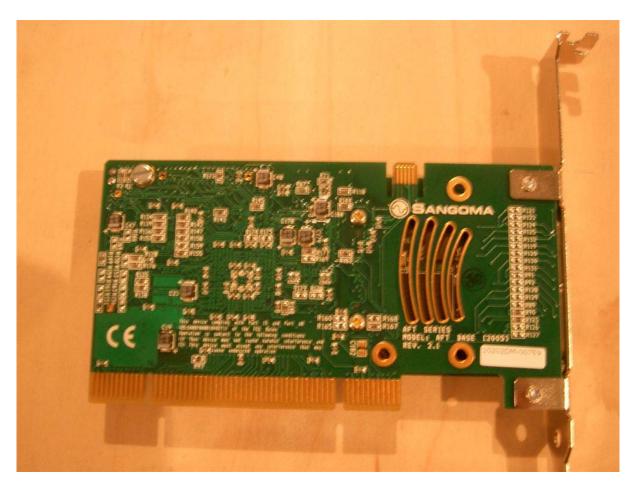


Figure 1: EUT – PCI card

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|--------------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE INTERNET |



Figure 2: EUT backview

| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|---------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | ANTERNA |

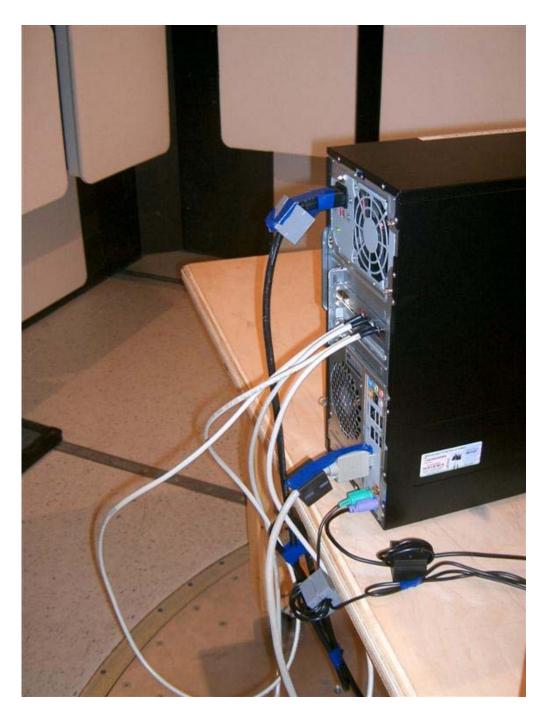


Figure 3: EUT installed inside the chassis with RJ11 shielded loop back cables shown.

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| Client | Sangoma Technologies Corp. | GLOBAL |
|-------------|---|------------|
| Product | A102d/A200d T1/E1 Interface cards | |
| Standard(s) | ICES-003 Issue 4:2004 / FCC Part 15 Subpart 15:2006 | THE CLARKE |



Figure 4: Conducted emissions setup