

Revision Page:



June 26, 2007

**Sangoma Technologies Corp.**

50 McIntosh Drive  
Markham, Ontario  
Canada, L3R 9T3

**ATTN.:** Mr. David Mandelstam

**SUBJECT:** COMPLIANCE VERIFICATION FOR DECLARATION OF CONFORMITY APPROVAL REQUIREMENTS

**Product:** T1 Card  
**Model:** A102d



0685



31040/SIT



C-1376



200093-0



SL2-IN-E-1119R

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Dear Mr.Mandelstam,

The product sample as provided by you was tested in accordance with **Industry Canada, CS-03, Issue 9 – Terminal Attachement Programme** and found to be in compliance with all the referenced technical requirements.

Enclosed you will find a copy of the engineering test report and application forms, submitted to Industry Canada.

In accordance with **DC-01, Issue 2 – Procedure for Declaration of Conformity and Registration of Terminal Equipment**, this report shall be kept in a Compliance Folder, retained for 10 years from the date of registration. This folder must include other details such as User's manual, schematics and parts list among others, and shall be made available to Industry Canada upon request.

It is also the responsibility of the applicant to apply to Industry Canada for Self-Marking of labels with appropriate fees depending on the number units intended to be marketed.

For additional details, please refer to Conditions for Declaration of Conformity on page 1 of this test report.

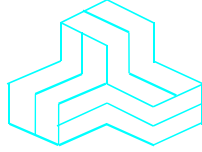
If you have any queries, please do not hesitate to contact us.

Yours truly,

Victor H. Kee, P. Eng.,  
V.P., Engineering

VHK/MT

Encl.



# ENGINEERING TEST REPORT

FOR

**Sangoma Technologies Corp.**  
**MODEL NO.(s): A102d**

**IN ACCORDANCE WITH**

**INDUSTRY CANADA  
TERMINAL ATTACHMENT PROGRAMME  
CS-03, ISSUE 9 - CERTIFICATION SPECIFICATIONS**

**UltraTech FILE NO.: SNG31-03**

**TESTED FOR:**

**Sangoma Technologies Corp.**  
50 McIntosh Drive  
Markham, Ontario  
Canada, L3R 9T3

**Issue Date:** June 26, 2007

*In the opinion of the qualifying engineer and as allowed by Engineering analysis and examination of the test data, the test results contained herein this report is to the best of my knowledge, true and correct and is hereby issued under the authority of:*

**VICTOR H. KEE, P.ENG.**



Date: June 26, 2007

**Victor H. Kee, P.Eng.,  
Vice President – Engineering**

Reviewed by: Mike Tom, Manager (Telecom)

Tested by: Santhosh Fernandez, Test Specialist

- The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.
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## UltraTech

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0685



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## CONDITIONS FOR DECLARATION OF CONFORMITY

Below is an outline of the obligations that must be met to retain a Declaration of Conformity with Industry Canada. For full details, please refer to DC-01, Issue 2, June 2007.

### 5. GENERAL CONDITIONS

- 5.1 A Declaration of Conformity can be made only for Terminal Equipment (TE) for which TE technical specifications have been promulgated by the Department.
- 5.2 Terminal Equipment, which is also a radio apparatus, requires certification under the Radiocommunication Act. Certification to the applicable Radio Standards Specifications (RSS) must be obtained before a Declaration of Conformity is submitted. The Department reserves the right to withhold registration until the radio interface has been properly certified.
- 5.3 All Terminal Equipment models shall be declared separately.
- 5.4 Terminal Equipment registered following this process does not require a Technical Acceptance Certificate (TAC).

### 6. DECLARATION OF CONFORMITY PROCESS

- 6.3.2 The Declaring Party shall retain on file, for a period of 10 years from the date of registration, a compliance folder which includes the test report.
- 6.3.3 Upon request, a compliance folder shall be submitted to the Department. The compliance folder shall contain the following information:
  - (a) a copy of the test report showing that the product fully meets the applicable technical specifications;
  - (b) a copy of the instruction manual(s) as supplied with the equipment. If not included in the instruction manual(s), the following information shall be attached:
    - (i) complete operating and maintenance instructions;
    - (ii) complete schematic diagrams and list of parts and components; and
    - (iii) sufficient photographs (approximately 20 cm x 25 cm) of the unit to show details of external appearance and internal construction;
  - (c) a copy of current advertising literature, if available; and
  - (d) a drawing, sample or illustration of the product label

#### Marking

- 6.4.1 The following requirements are established under section 69.3 of the *Telecommunications Act* for purposes of section 5 of the *Telecommunications Apparatus Regulations*.
- 6.4.2 The Declaring Party will be responsible for permanently affixing the registration number and model number on the TE. This information shall be affixed in such a manner as not to be removable except by destruction or defacement. The size of the lettering shall be legible without the aid of magnification but is not required to be larger than 8 point font size. If the device is too small to meet this condition, the information can be included in the user manual upon agreement with Industry Canada

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6.4.3 Registered equipment shall bear the following identifying marks:

(a) the registration number:

(i) for integrated devices (e.g. a modem) or devices that are intended to become sub-assemblies of host equipment (e.g. a data terminal, computer etc. that are designed to interface directly with the network), the registration number shall be affixed to the integrated device itself;

(ii) the registration number for a packaged TE will denote that the total package has been registered. However, the marking will normally be placed on the unit of the package that connects to the network. For example in a PBX, the marking will be placed on the common equipment which connects to the network, rather than on plug-in components which may be added later. The *Terminal Equipment List* (TEL) will show the common equipment but not the standard station apparatus or any proprietary station apparatus.

(iii) The marking format of the registration number is as follows:

IC: XXXXXX-YYYYYYYYYYYY

Where:

- “XXXXXX-YYYYYYYYYYYY” is the registration number;
- “XXXXXX” is the Company Number (CN), made of at most 6 alphanumeric characters (A-Z, 0-9), including a letter at the end of the CN to distinguish between different company addresses, assigned by Industry Canada;
- “YYYYYYYYYYYY” is the Unique Product Number (UPN), made of at most eleven (11) alphanumeric characters (A-Z, 0-9) assigned by the applicant; and
- The letters “IC” have no other meaning or purpose than to identify the Industry Canada certification number.

(iv) Permitted alphanumerical characters used in the CN and UPN are limited to capital letters (A-Z) and digits (0-9). Other characters, such as #, / or -, shall not be used. An example of the new format for a company having a CN of “21A” and wishing to use a UPN of “WILAN3” would thus be: IC: 21A-WILAN3.

(b) the model identification number under which the product was registered. Each equipment model shall be assigned a unique model identification number and the use of “wild card” characters is not allowed.

6.4.4 Equipment that has received registration but does not have the model number and the registration number as outlined above is not considered registered.

6.4.5 Certification numbers granted prior to the implementation of the above marking format are grandfathered.

6.4.5.1 For previously certified TE, the marking format shall consist of the old certification number preceded by “IC:” For example, if the certification number is “123 1234 A”, then the mark would read “IC: 123 1234 A”.

6.4.5.2 For a new model that is registered to a family of previously certified TE, the self-marking format shall be:

IC: XXXXXX-ZZZZZZZZZZZZ

Where:

- “XXXXXX” is the Company Number, as in Section 6.4.3; and

- “ZZZZZZZZZZ” is either the old certification number minus the old company number, or a new Unique Product Number assigned by the applicant.

For example, if a new model is registered to the family of products with certification number “123 1234 A”, and that the Company Number for the registration is “123A”, then the self-mark for this new model would read “IC: 123A-1234 A”. If the applicant decides to replace “1234 A” with a new UPN, say “5678”, then the self-mark would read “IC: 23A-5678”.

6.4.6 The Industry Canada corporate signature – which consists of the Canadian flag symbol and the words *Industry Canada* and *Industrie Canada* – shall not be reproduced, in whole or in part.

6.4.7 A statement of compliance with Industry Canada requirements, such as the one given below, shall accompany each unit of equipment whether registered under this procedure or previously certified:

***This product meets the applicable Industry Canada technical specifications/Le présent matériel est conforme aux spécifications techniques applicables d’Industrie Canada.***

6.4.8 For terminal equipment with interfaces defined in CS-03 Part I, using network provided analogue ringing, the Ringer Equivalence Number (REN) must be calculated as per Section 1.8 of Part I. A REN higher than that determined may be assigned by manufacturers to allow for production variations. The REN must be marked on the terminal equipment itself or added to the note below. A note similar to the following shall accompany each unit of equipment whether registered under this procedure or previously certified:

***The Ringer Equivalence Number is an indication of the maximum number of devices allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices does not exceed five/L’indice d’équivalence de la sonnerie (IES) sert à indiquer le nombre maximal de terminaux qui peuvent être raccordés à une interface téléphonique. La terminaison d’une interface peut consister en une combinaison quelconque de dispositifs, à la seule condition que la somme d’indices d’équivalence de la sonnerie de tous les dispositifs n’excède pas 5.***

## 6.6 Registration of a Family of Products

6.6.1 Registration may be granted to several models as a new family of products. Each model must be assigned a unique model identification number by the manufacturer. This type of service applies when a registration has never been granted to that equipment before. In the case of a family of products, all the models must be electrically identical and all have the same registration number. Only one registration application needs to be submitted for all equipment within the family of products.

6.6.2 Should additional products need to be added to an existing family, then a new registration application must be submitted. In this case, the equipment to be registered must have been assigned a unique model number by the manufacturer. Registration for this model must have never been granted before and the equipment must be electrically identical to the previously registered model(s). The original model and registration number must exist in the *Terminal Equipment List*. The registration number of the new equipment will be the same as the one assigned to previously registered equipment of the same family of products.

## 6.7 Multiple Listing

Multiple listing is required when a manufacturer or distributor wishes to list his/her unique model number under his/her name, or transfer to his/her name, a TE that was previously registered by an original equipment manufacturer or distributor. TE may be multiple listed under other manufacturers or distributors based upon the approval granted to the original Declaring Party. The original model and registration number must exist in the

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TEL database. The requester must provide a letter of authorization from the original Declaring Party. A new registration number must be assigned to the equipment multiple listed.

### 6.8 Transfer of Ownership

When a transfer of ownership of a product occurs, the subject product must obtain a new registration number by re-registering with the new company number. The previous owner's registration number and information will still be in the TEL to cover for products currently available in the market.

### 6.9 Modification of Terminal Equipment

6.9.1 TE that is modified shall be re-tested as per the technical requirements in effect at the time of modification, not necessarily those requirements in effect at the time the TE was declared. If the modification changes the information posted in the *Terminal Equipment List* (e.g. changes the REN value), the TE must be re-registered using a new model number.

6.9.2 Repair to the terminal equipment, that does not affect the information posted in the TEL, does not require re-registration.

### 7. Audit Requirements

7.1 The Department reserves the right, in accepting a DoC, to conduct audits, request a copy of the compliance folder, or request that the equipment be re-tested to ensure that the terminal equipment entering the market complies with the applicable technical specifications.

7.2 The Declaring Party shall provide, in the Registration Request, the identity of a **representative in Canada** who is capable of responding to enquiries and who can provide audit samples at no charge to the Department.

7.3 Suppliers shall implement a suitable quality control program to ensure that the registered product continues to meet the applicable TE technical specifications.

### 8. Disclosure of Information

The Declaring Party shall indicate which information and documents provided in support of a DoC and registration are confidential. The provisions of the *Access to Information Act* apply.

### 9. Component Devices

9.1 Component devices can be declared and registered either as part of an equipment package or as individual component devices. To be eligible, it shall be demonstrated that the component device complies with the applicable TE technical specifications when tested in a registered host terminal equipment package or in a generic test bed.

9.2 The host equipment which the component device was tested with shall be identified in the Registration Request.

9.3 The user manual for the component device shall contain a list of host equipment which the component device is compatible with.

### 10. Maintaining Registration

Continuing compliance with the present document (DC-01(E)) is required to maintain registration in the *Terminal Equipment List*. Any non-conformance may result in removal of the terminal equipment from the TEL. Once removed from the TEL, re-registration will be required before the terminal equipment is added to the TEL again.



## SELF-MARKING SPECIFICATIONS

Below is a summary of the Self-Marking specifications. For complete details, please refer to Self-Marking, Issue 3 – Self-Marking of the Certification/Registration Number on Terminal Equipment.

### 3. General Conditions

This procedure applies to TAC holders for the self-marking of certified TE. After the Declaration of Conformity process is in place, this procedure will also apply to a company using the DoC process as well as to any Declaring Party (DP). Self-marking is the process of marking certified or self-declared TE with the requisite certification or registration number, in accordance with the procedure described herein.

### 4. Applicability Provisions

- (a) The equipment marked with Industry Canada labels prior to the coming into force of this agreement is not affected.
- (b) Upon implementation of a DoC, a DP must use this self-marking procedure until new processes and fee structure are implemented.
- (c) Industry Canada will stop issuing labels three months after a new fee structure and self-marking process are implemented. After this three month transition period, and when a TAC holder's inventory of Industry Canada labels has been exhausted, the only option available to that TAC holder will be self-marking.

### 5. Procedure for Application

A completed and signed Application for Self-Marking Agreement (see Appendix I), hereinafter referred to as the "Agreement", including an initial Request for Self-Marking (as per Schedule A of Appendix I) and the requisite fees, as calculated in the Request for Self-Marking, shall be submitted to the Certification and Engineering Bureau (the "Bureau") .

The above information requirements are further detailed in Section 7.

By signing the Agreement, the applicant agrees to be bound by the terms and conditions therein. If the Bureau approves the Agreement, the TAC holder or DP will be notified in writing that it may mark the certified or self-declared TE in accordance with the marking specifications (in Section 6) for the number and class of certified or self-declared TE products set out in the submitted Request(s) for Self-Marking.

### 7. Information to be submitted

7.1 Upon application for a Self-Marking Agreement, the following information must be submitted to the Bureau:

#### (a) Self-Marking Agreement

The applicant shall complete and sign the Agreement in Appendix I. This form includes the contact information for the applicant. By signing the Agreement, the applicant agrees to the terms and conditions therein.

#### (b) Requests for Self-Marking

The applicant shall fill out Appendix I: Schedule A, Request for Self-Marking, listing the specific certified or self-declared TE products, along with applicable certification or registration numbers and the quantity of each product that will be self-marked. The applicant shall pay the total fee for the TEs that will be self-marked, as generally set out in TRC-49, *Information on the Application of the Telecommunications Apparatus Technical Assessment and Testing Fees Order Made under the Financial Administration Act*, at the rate of:

- (i) in respect of single-line terminal equipment, \$110 per thousand labels or markings; and
- (ii) in respect of multi-line terminal equipment, \$500 per thousand labels or markings.

An initial Request for Self-Marking should be provided with the agreement. Subsequent

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Requests for Self-Marking must be submitted prior to self-marking additional or new TEs. The applicable fee must be paid upon submission of a Request for Self-Marking.

7.2 Review of the actual number of products marked will occur every six months from the date of approval by the Department of the signed agreement by the applicant; this is hereafter referred to as the Review Period. Within 30 days of the end of a Review Period, the TAC holder or DP shall submit to the Department, at the address set out in Section 2 of the Self-Marking Procedure, a copy of the TAC holder\*s or DP production records, certified as correct and complete, which contain the quantity of products for each TE model that has been self-marked over the Review Period, in accordance with the marking specifications. These records will be consolidated with the Requests for Self-Marking received during the review period.

#### **9. Methods of Payment**

Requests for Self-Marking along with the requisite fees, as calculated as per Section 7, must be submitted to the Bureau. Payment may be made by:

- (a) credit card; or
- (b) cheque, made payable to the Receiver General of Canada.

#### **11. Non-compliance**

In case of non-compliance with the marking requirements and this procedure, the TE of the applicant may be removed from the *Terminal Equipment List*.

Please check the Industry Canada website or this link for further information and forms.  
[http://strategis.ic.gc.ca/epic/site/smt-gst.nsf/vwapj/markinge.pdf/\\$FILE/markinge.pdf](http://strategis.ic.gc.ca/epic/site/smt-gst.nsf/vwapj/markinge.pdf/$FILE/markinge.pdf)

## EXHIBIT 1. GENERAL

### 1.1. APPLICANT AND MANUFACTURER INFORMATION

APPLICANT	
Company	Sangoma Technologies Corp.
Address	50 McIntosh Drive, Suite 120 Markham, Ontario Canada, L3R 9T3
Contact:	Mr. David Mandelstam
Phone:	905-474-1990

MANUFACTURER	
Company	Sangoma Technologies Corp.
Address	50 McIntosh Drive, Suite 120 Markham, Ontario Canada, L3R 9T3
Contact:	Mr. David Mandelstam
Phone:	905-474-1990

### 1.2. TEST SAMPLE INFORMATION

Trade Name/Product:	Sangoma Technologies Corp.
Model(s):	A102d
Serial #:	Pre-production
Equipment Type:	Digital Terminal Equipment
Interface Type	Digital 1.544 Mbps
Power Source:	Power is derived from host PC

ENGINEERING  
PROTOTYPE    \_\_\_

PRODUCTION  
PROTOTYPE    \_\_\_

PRODUCTION  
UNIT              X  

#### 1.2.1. Functional Description

Equipment is a WAN card for PC with T1/E1 DSU/CSU.

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### 1.3. TEST PROCEDURES

The test procedures used are those specified in **INDUSTRY CANADA CS-03, Issue 9**. The implementation of these test procedures at UltraTech Engineering Labs Inc. is on file with Industry Canada in Ottawa. Aspects of the procedure unique to this unit are described in the test plan below.

### 1.4. TEST PLAN

As per **INDUSTRY CANADA CS-03, Issue 9, Part II**

#### **General Requirements**

- 3.1 General
- 3.2 Line Rate
- 3.3 Pulse Shape
- 3.4 Transmitted Digital Signal Power

A discussion of the tests selection is attached overleaf followed by the test data.

### 1.5. MODIFICATIONS

None.

## 1.6. TECHNICAL REQUIREMENTS - DIGITAL

Test No.	CS-03 Sec.	Requirement	Complies? (Y/N)	
			Before Stress	After Stress
1	1.6	Connecting Arrangements	Y	Y
2	1.7	Operational Check	Y	Y
3	2.1	Mechanical Shock	N/A	N/A
4	2.2	Dielectric Strength	Y	Y
5	2.3.1	Hazardous Voltage Limitations - Requirements	Y	Y
6	2.3.6	Connection of Non-Certified Equipment to Certified TE or Protective Circuitry	N/A	N/A
7	2.3.7	Non-Hazardous Voltage Source	Y	Y
8	2.3.9	Intentional Paths to Ground	Y	Y
9	2.4.1	Metallic Voltage Surge	Y	Y
10	2.4.2	Longitudinal Voltage Surge	Y	Y
11	2.5	Power Line Surge	N/A	N/A
12	Part II, 3.2	Line Rate	Y	Y
13	Part II, 3.3	Pulse Shape	Y	Y
14	Part II, 3.4	Transmitted Digital Signal Power	Y	Y

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## 1.7. OPERATIONAL CHECK - Section 1.7

Feature Tested	Remarks	
	Before Stress	After Stress
Internal Signals	N/A	N/A
Transmit Levels	(1)	(2)
Pulse Shape	(1)	(1)
Line Build-out features	(1)	(1)

**NOTES:**

- (1) Fully operational.
- (2) Partly operational.  
Inoperable feature(s): None
- (3) Fully inoperable, Fuse F1 opened after surge.

**RESULTS:** MEETS THE REFERENCED TECHNICAL REQUIREMENTS

## EXHIBIT 2. ELECTRICAL AND MECHANICAL STRESSES – PART I, SECTION 2.0

### 2.1. MECHANICAL SHOCK - Section 2.1

#### Requirement:

Terminal equipment and network protection devices, unpackaged, shall comply with all the requirements specified in Sections 2.0 and 3.0 both prior to and after the application of all of the mechanical stresses specified in this Section, notwithstanding that certain of these stresses may result in partial or total destruction of the equipment.

#### Measurement Data:

#### EQUIPMENT CATEGORY:

- \_\_\_\_\_ Hand-Held Items Normally Used at Head Height:  
18 random drops from a height of 1.5 m onto concrete covered with 3 mm asphalt tile or similar surface.
  
- \_\_\_\_\_ Table (Desk) Top Equipment (0-5 kg):  
One 750 mm drop on each normal or designated rest face.  
One 750 mm drop on all other faces.  
One 750 mm corner drop on each corner.

**RESULTS & ANALYSIS:** NOT APPLICABLE.

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## 2.2. DIELECTRIC STRENGTH - Section 2.2

### Requirement:

If a voltage source is connected between any of the following points listed below and is gradually increased, from zero to the values listed in the table over a thirty second time period, then applied continuously for one minute, the current in the mesh formed by the voltage source and these points shall not exceed 10 mA peak at any time during this 90 second time interval.

### **Test Connections – AC voltage source connected between the following points:**

- (1) All telephone connections
- (2) All power connections
- (3) All possible combinations of exposed conductive surfaces on the exterior of such equipment or circuitry including grounding connection points, but excluding terminals for connection to other Terminal Equipment.
- (4) All terminals for connection to certified protective circuitry or non-certified equipment.
- (5) All auxiliary lead terminals
- (6) All E & M lead terminals
- (7) All PR, PC, CY1 and CY2 leads.

Test Points	Voltage Level (Vac)	Operating Condition	Measured Leakage (mA)	
			Before Stress	After Stress
(1) - (3)	1000	Transmitting	0.5	0.51
(1) - (3)	1000	Idle	0.5	0.49

**RESULTS:** MEETS THE REFERENCED TECHNICAL REQUIREMENTS

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## 2.3. HAZARDOUS VOLTAGE LIMITATIONS - Section 2.3

### **Requirement:**

Under no failure of Terminal Equipment which can be conceived to occur in the handling, operation or repair of such equipment or circuitry, shall the open circuit voltage on telephone connections exceed 70 V peak after one second, except for voltages for network control signaling, alerting and supervision.

**RESULTS:** MEETS THE REFERENCED TECHNICAL REQUIREMENTS

### *2.3.1. Connection Of Non-Certified Equipment To Certified TE Or Certified Protective Circuitry - Section 2.3.6*

### **Requirement:**

Leads to, or any elements having a conducting path to telephone connections, auxiliary leads or E&M leads shall:

- (1) Be reasonably physically separated and restrained from, and be neither routed in the same cable as, nor use the same connector as leads or metallic paths connecting power connections.
- (2) Be reasonably physically separated and restrained from, and be neither routed in the same cable as, nor use adjacent pins on the same connector as metallic paths to lead to non-certified equipment, when specification details provided to the Equipment Certification Unit of Industry Canada, pursuant to the appropriate Section in CP-01, do not show that interface voltages are less than non-hazardous voltage source limits in Section 2.3.7.

**RESULTS:** NOT APPLICABLE.

### *2.3.2. Non-Hazardous Voltage Source - Section 2.3.7*

### **Requirements:**

A voltage source is considered a non-hazardous voltage source if it conforms with the requirements of Section 2.2 and either 2.4 or 2.5 of CS-03, Issue 8 with all connections to the source other than primary power connections treated as "telephone connections", and if such source supplies voltages no greater than the following under all modes of operation and of failure:

- (1) ac voltages less than 42.4 V peak;
- (2) dc voltages less than 60 V; and
- (3) combined ac and dc voltages less than 42.4 V peak when the absolute value of the dc component is less than 21.2 V and less than  $(32.8 + 0.454 \times V_{dc})$  when the absolute value of the dc component is between 21.2 and 60 V.

**RESULTS:** MEETS THE REFERENCED TECHNICAL REQUIREMENTS.

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2.3.3. Hazards Due To Intentional Paths To Ground - Section 2.3.9

**Requirements: - Section 2.3.9.2**

Terminal equipment having an intentional DC conducting path to earth ground for protection purposes at the leakage current test voltage that was removed during the longitudinal steady state voltage test of 2.3.1 shall have a 60 Hz voltage source applied between the following points:

- (1) Simplexed telephone connections, including tip and ring, tip1 and ring1, E&M leads and auxiliary leads; and
- (2) Earth grounding connections.

Gradually increase the voltage from 0 to 120 V for terminal equipment, or 300 V for protective circuitry, then maintain the voltage for one minute. The current between (1) and (2) shall not exceed 10 mA peak at any time.

**Measurement Data:**

Component Re-Installed	Measured Leakage Current ( $\mu$ A)				Maximum Leakage
	Before Stress		After Stress		
	Tip/Ring-Gnd	Tip1/Ring1-Gnd	Tip/Ring-Gnd	Tip1/Ring1-Gnd	
S1,S4,S6,S8 S9,S12,S14,S16	0.015	0.017	0.015	0.017	10 mA

**RESULTS:** MEETS THE REFERENCED TECHNICAL REQUIREMENTS.

## 2.4. SURGE VOLTAGE - Section 2.4

### 2.4.1. Metallic Voltage Surge - Section 2.4.1

#### 800 VOLT PEAK (10 $\mu$ S max. x 560 $\mu$ S min.) SURGES

Operation	Equipment Port	Tx Pair		Rx Pair	
		Normal	Reverse	Normal	Reverse
Transmitting	Port 1	(1)	(1)	(2)	(2)

**NOTES:**

- (1) No effect
- (2) The equipment is not fully functional, have limited abilities to transmit but no physical shorting or opening of components on the interface occurred.

**RESULTS:** MEETS THE REFERENCED TECHNICAL REQUIREMENTS

### 2.4.2. Longitudinal Voltage Surge - Section 2.4.2

#### 1500 VOLT PEAK (10 $\mu$ S max. x 160 $\mu$ S min.) SURGES

Operation	Equipment Port	Tx Pair		Rx Pair	
		Normal	Reverse	Normal	Reverse
Transmitting	Port 1	(1)	(1)	(2)	(2)

**NOTES:**

- (1) No effect
- (2) The equipment is not fully functional, have limited abilities to transmit but no physical shorting or opening of components on the interface occurred.

**RESULTS:** MEETS THE REFERENCED TECHNICAL REQUIREMENT

## 2.5. POWER LINE SURGE - Section 2.5

### Requirements:

*Three 2500 volt surges (2 $\mu$ s max. x10 $\mu$ S min.) of each polarity were applied between the phase and neutral terminals of the input AC power line in the equipment states listed below:*

**RESULTS:** NOT APPLICABLE

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## EXHIBIT 3. 1.544 Mbps DIGITAL FACILITIES – PART II, SECTION 3.0

### 3.1. PULSE REPETITION RATE – Section 3.2.1

**Requirement:**

The free running line rate of the digital signal shall be 1.544 Mbps with a tolerance of  $\pm 32$  ppm or  $\pm 50$  bps.

**Measurement Data:**

Signal Type	Measured Pulse Rate (x 10 <sup>6</sup> )	
	Before Stress	After Stress
All Ones Signal	1.54403	1.54401

**RESULTS:** MEETS THE REFERENCED TECHNICAL REQUIREMENTS

### 3.2. OUTPUT PULSE TEMPLATES – Section 3.3.1

**Requirement:**

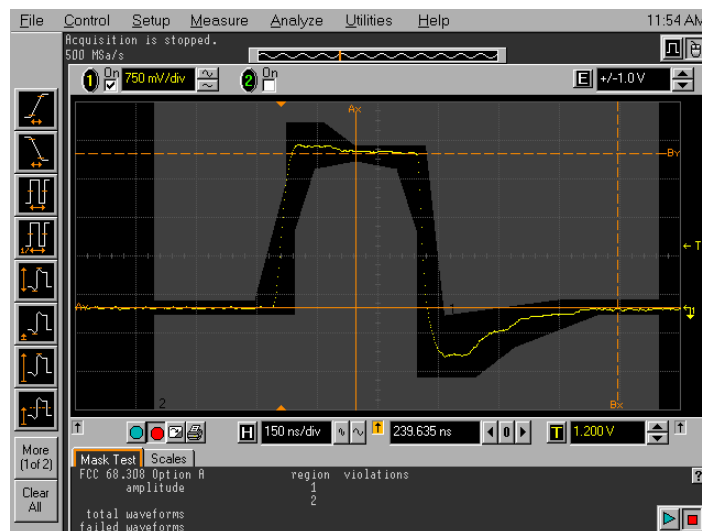
The shape of an isolated pulse both positive and negative (inverted) shall have an amplitude between 2.4 and 3.6 Volts, measured at the centre of the pulse, and fit a normalized template illustrated in Figure 3.3(a). The mask may be positioned horizontally as need to encompass the pulse, and the amplitude of the normalized mask may be uniformly scaled by any factor needed to encompass the pulse. The baseline of the mask shall coincide with the pulse baseline.

**Measurement Data:** PLEASE REFER TO ATTACHED SCOPE TRACES FOR DETAILS OF COMPLIANCE.

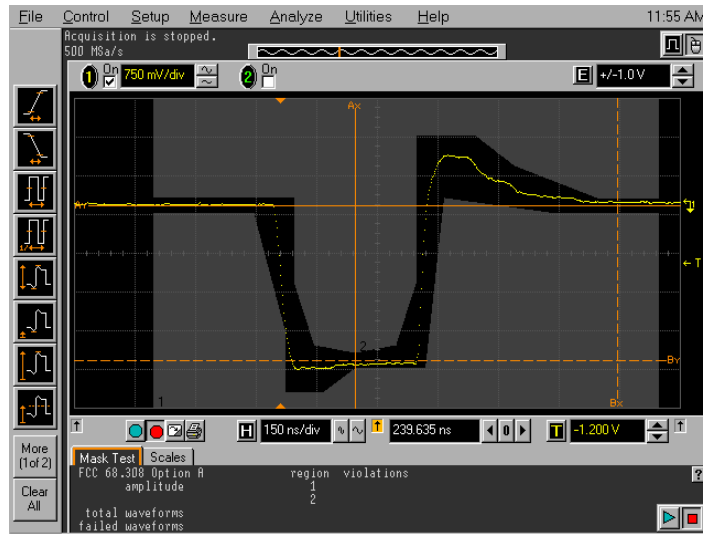
#### 3.2.1. OPTION A

##### 3.2.1.1. Before stress

Positive



### Negative



### 3.2.1.2. After stress

### Positive

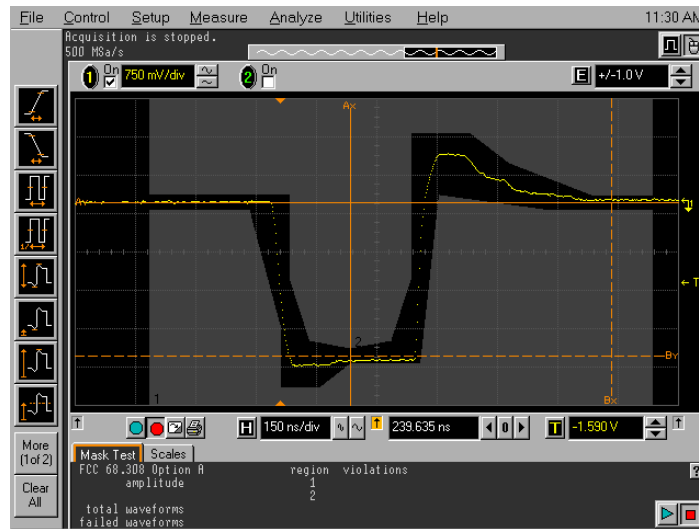


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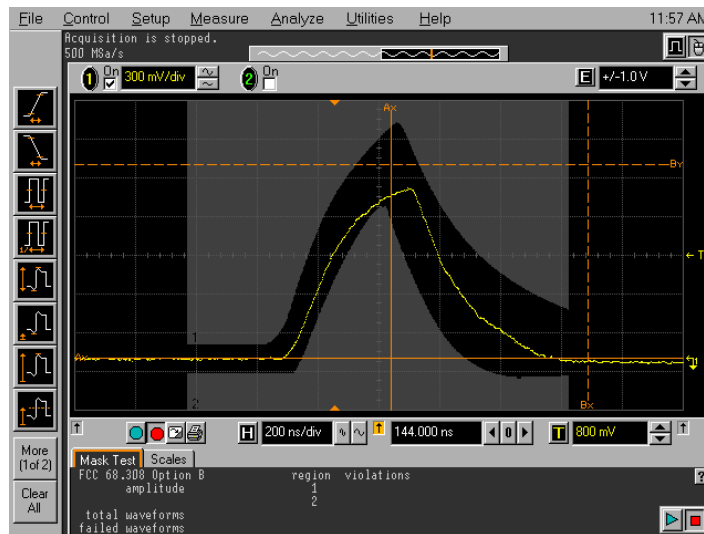
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### Negative



### 3.2.2. OPTION B 3.2.2.1. Before stress

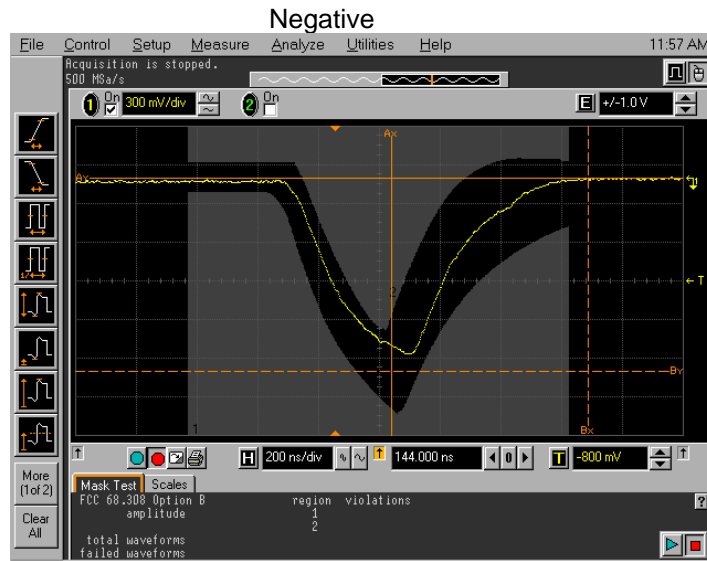
### Positive



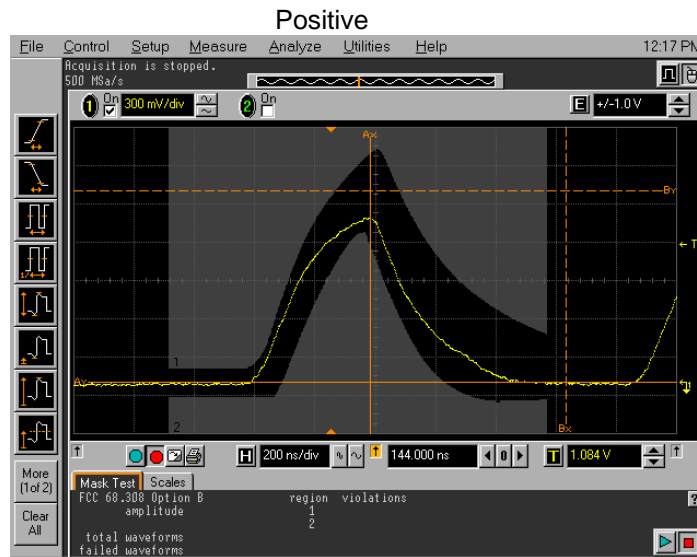
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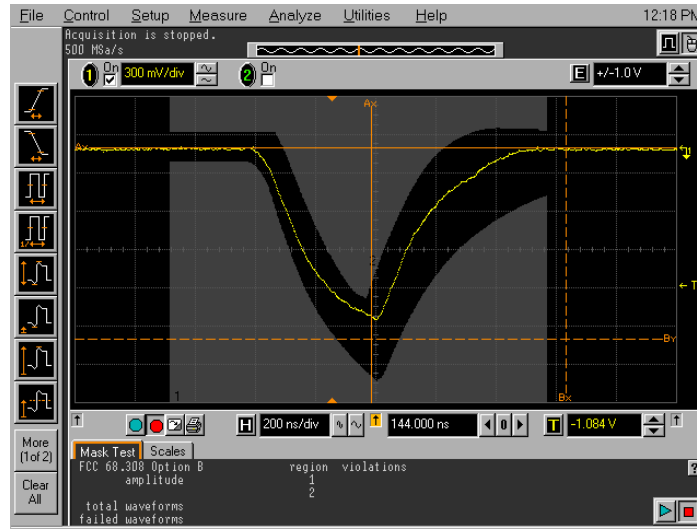
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### 3.2.2.2. After stress



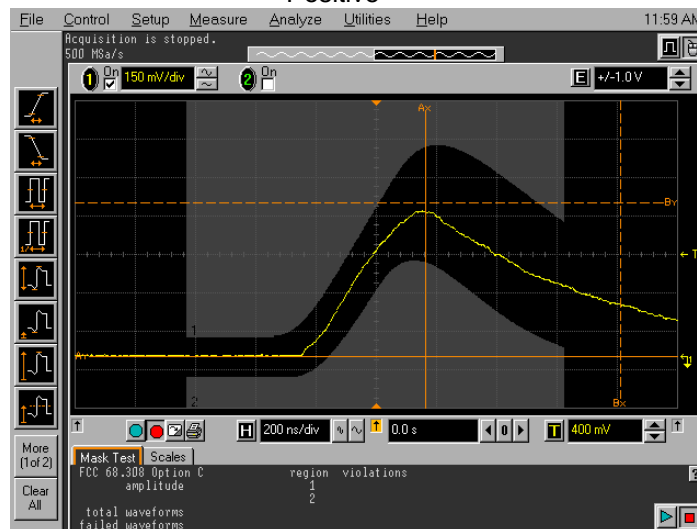
### Negative



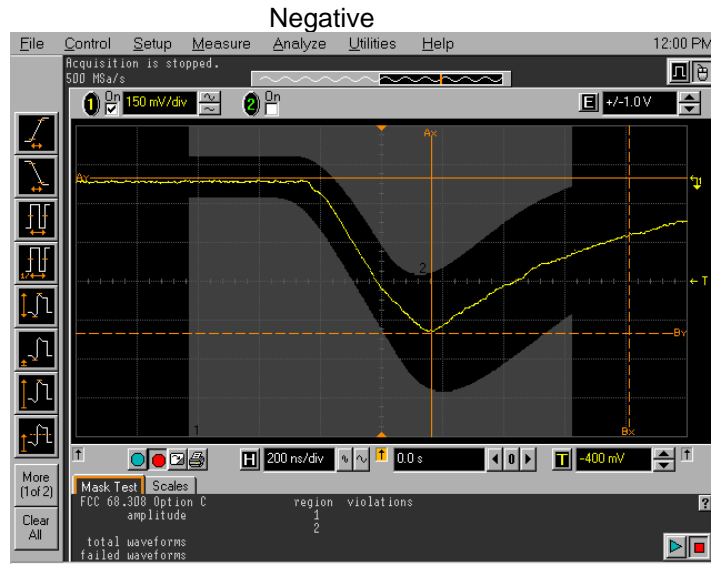
### 3.2.3. OPTION C

#### 3.2.3.1. Before stress

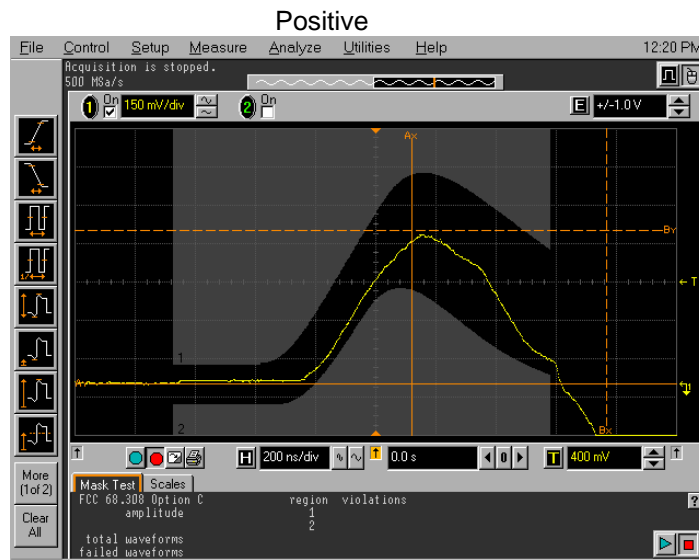
### Positive



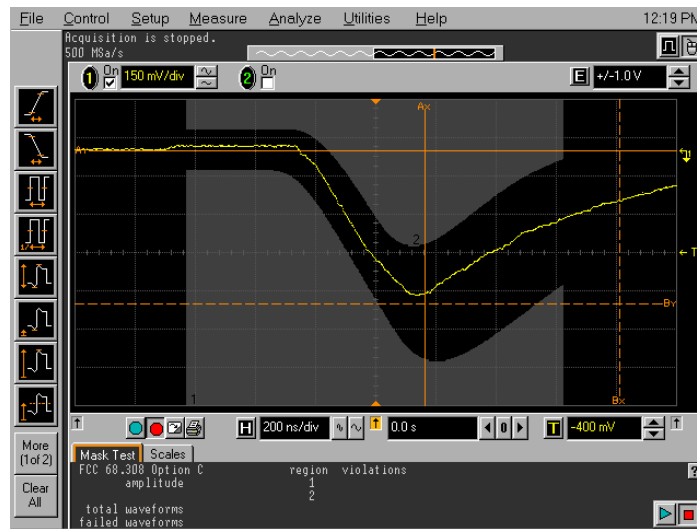




### 3.2.3.2. After stress



Negative



**RESULTS:** MEETS THE REFERENCED TECHNICAL REQUIREMENTS

### 3.3. TRANSMITTED DIGITAL SIGNAL POWER – Section 3.4.1

**Requirement:**

- (1) The output power in a 3kHz band centered on 772 kHz when an all ones signal sequence is being produced as measured across a 100 Ω terminating resistance shall not exceed +19 dBm.
- (2) The power in a 3 kHz band centered on 1.544 MHz shall be at least 25 dB below that in a 3 kHz band centered on 772 kHz.

**Measurement Data:**

Output Pulse Option	Frequency (kHz)	Measured Signal Power (dBm)		Specified Maximum (dBm)
		Before Stress	After Stress	
A (0 dB)	772	6.5	4.2	+19.0
	1544	-25.4	-31.6	at least 25 dB < @ 772 kHz

**RESULTS:** MEETS THE REFERENCED TECHNICAL REQUIREMENTS

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