Intertek ETL SEMKO

TEST REPORT

Report Number: 3077154-004
Project Number: 3077154
July 29, 2005

Testing performed on the
A102
to

AS/ACIF S016:2001

For
Sangoma Technologies Inc.

Test Performed by:
Intertek
7250 Hudson Blvd. Suite 100
Oakdale, MN 55128

Test Authorized by:
Sangoma Technologies Inc.
50 McIntosh Drive, Suite 120
Markham, ON L3R 9T3

Prepared by: _____ Date: 29 July 2005
Troy Ihle

Reviewed by: _____ Date: 29 July 2005
Roland Gubisch

Table of Contents

1. Introduction

This test report has been produced on behalf of :

Client	:	*Sangoma Technologies Inc.*
Contact	:	*David Mandelstam*
Telephone	:	*905-474-1990*
Address	:	*50 McIntosh Drive* *Suite 120* *Markham, ON L3R 9T3* *Canada*

2. Scope

Tests have been performed in accordance with the requirements of the Test Plan, a copy of which is contained in appendix A. The test plan details of the following apparatus:

Apparatus :	A102
Description :	PCI T1/E1 data/telephony card
Condition of apparatus :	Good
Manufacturer :	Sangoma Technologies Inc.
Hardware version as received :	Rev. A
Hardware version after modification :	N/A
Software version as received :	Special test bootable CD: No Version
Software version after modification :	Special test bootable CD: No Version (modified)

For full details of the item(s) tested see appendix D : Test samples used.

3. Test Schedule

Tests have been performed in accordance with the Test Plan, a copy of which is contained in appendix A.

4. Results Summary

The apparatus was found to meet the AS/ACIF S016 requirements of the Test Plan.

4.1. Non-compliances

No non-compliances were recorded after modification.

4.2. Laboratory Technical judgements

No technical judgements were made in the assessment.

The test results within this report only relate to the item(s) tested.

Appendix A – Test Plan

Assessment covered by this report has been performed in accordance with the 'Test Plan', which is contained in this section.

Job Number: 3077154
Issue: 1
Date: April 19, 2005

Apparatus : A102

Description : PCI T1/E1 data/telephony card

Manufacturer : Sangoma Technolgies Inc.

Specification	Clause	Comments
AS/ACIF S016-2001	5.1 5.2 5.3	

Notes:

Appendix B – Test Results

This appendix contains the following results, indicating a COMPLIED, DID NOT COMPLY, NOT TESTED, NOT APPLICABLE or NOTED verdict against each clause.

B.1 AS/ACIF S016 Clause 5.1 General Requirements, these test(s) were performed by Troy Ihle on June 20, 2005.

B.2 AS/ACIF S016 Clause 5.2 Configuration Requirements, these test(s) were performed by Troy Ihle on June 20, 2005 and July 29, 2005.

B.3 AS/ACIF S016 Clause 5.3 2048 kbit/s interface, these test(s) were performed by Troy Ihle on June 20-21, 2005 and July 29, 2005.

B.1 S016 Clause 5.1: General Requirements

General Requirements				
S016 Clause	**Description**	**Limit**	**Result**	**Verdict**
5.1	**GENERAL REQUIREMENTS**			
5.1.1	**Fail Safe Operation**		**(Yes/No)**	
	CE causes harm or damage to network on:			
	Failure of any single component?	Harm or damage not caused to the network under given conditions	No	Complied[1]
	Failure of any power supply?		No	Complied[1]
	Incorrect manual operation?		No	Complied[1]
	Operation of CE outside operating voltage and environmental conditions?		No	Complied[1]
	For battery powered CE, if batteries approach a critical point in life or if battery falls to a level causing the CE to malfunction?		-	Not Applicable
5.1.2	**Line Polarity and Line Conductor Polarisation**		**(Yes/No)**	
	CE operation independent of line conductor polarisation (balanced interfaces)?	CE complies with 5.3.4 & 5.3.5	Yes	Complied
5.1.3	**Interfaces**		**(Yes/No)**	
	SELV interfaces identified by label?	SELV interfaces identified by label	-	Not Applicable
	DC potential?	DC potential	No	Not Applicable

[1] Compliance based on attestation by Sangoma Technologies, Inc.

B.2 S016 Clause 5.2: Configuration Requirements

Configuration Requirements					
S016 Clause	**Description**	**Limit**	**Result**		**Verdict**
5.2.1	**TIMING FUNCTIONS**				
	SEE CLAUSE 5.3.2		-		Complied
5.2.2	**EARTHING OF OUTER CONDUCTOR OR SCREEN**				
5.2.2.1	**Earthing of outer conductor or screen**		**(Yes/No)**		
	Output port: outer conductor/screen connected to protective earth	Connected to earth at output port	-		Complied
	Input port: outer conductor/screen can be connected to/disconnected from protective earth	Can be connected to/disconnected from earth at output port	-		Complied
5.2.3	**ALARM INDICATION SIGNAL**				
5.2.3	**Alarm Indication Signal :**		**CE Transmits:**		
			AIS? (yes/no)	**RAI? (yes/no)**	
	Receipt of AIS	AIS not transmitted and RAI transmitted by CE on AIS and LOS	Yes	No	Complied
	Loss of input signal		Yes	No	Complied
	All '1's in a single timeslot	CE does not respond to all 1s in a single timeslot	No	No	Complied

Note : The EUT uses unscreened balanced pair cable.

B.3 S016 Clause 5.3: 2048kbit/s Interface

2048 kbit/s Interface					
S016 Clause	**Description**	**Limit**	**Result**		**Verdict**
5.3.1	**INTERFACES**				
5.3.1	**Interfaces**		**(Yes/No)**		
	2048 kbit/s interface provided as 75Ω unbalanced	2048kbit/s I/F provided as 75Ω or 120Ω	No		Not Applicable
	2048 kbit/s interface provided as 120Ω balanced		Yes		Complied
	75Ω unbalanced provided via coaxial presentation?	75Ω I/F via coax present'n	No		Not Applicable
	120Ω balanced presentation provided via symmetrical pair configuration?	120Ω via symmetrical pair present'n	Yes		Complied
5.2.1 5.3.2	**TIMING and BIT RATES**				
5.2.1.1	**Co directional Interface**		**(Yes/No)**		
	CE provides co-directional interface?	CE complies with 5.2.1.2 & 5.2.1.3	Yes		Complied
5.2.1.2 5.3.2	**Timing from Received Signal**		**Offset (ppm)**	**Tracks I/P? (Yes/No)**	
	Received signal offset = +50ppm	Tx signal timing tracks Rx signal timing	+50	Yes	Complied
	Received signal offset = 0ppm	Offset ≤ ± 50ppm	0	Yes	Complied
	Received signal offset = -50ppm		-50	Yes	Complied
5.2.1.3 5.3.2	**Timing from Internal Clock**		**Offset (ppm)**		
	Bit rate on Loss of Signal	Offset ≤ ± 50ppm	+17		Complied
	Bit rate on receipt of Alarm Indication Signal		**Offset (ppm)**	**Tracks I/P? (Yes/No)**	
	AIS offset = +50ppm	Tx signal timing doesn't track AIS signal timing	+13	No	Complied
	AIS offset = 0ppm	Offset ≤ ± 50ppm	+13	No	Complied
	AIS offset = -50ppm		+13	No	Complied

2048 kbit/s Interface				
S016 Clause	**Description**	**Limit**	**Result**	**Verdict**
5.3.3	**LINE CODING**			
5.3.3	**Receipt of HDB3**		**No. of errors**	
	Loopback supported			
	Number of test sequence errors	No. of TSEs = 0	0	Complied
	CRC supported		**(Yes/No)**	
	CE responds appropriately with E bits to CRC-4 errors?	CE responds appropriately	Yes	Complied
	Transmission of HDB3		**No. of code errors**	
	Number of code errors in transmitted signal	No. of code errors = 0	0	Complied
5.3.4	**OUTPUT SIGNAL PULSE SHAPE (120Ω INTERFACE)**			
5.3.4	**Pulseshape**		**+ve Pulse** **-ve Pulse** **(Yes/No)**	
	Pulseshape	Pulse within mask of S016 Figure 3	Yes/ Appendix C.1 Yes/ Appendix C.2	Complied
	Peak voltage of space		**Peak Amplitude (V)**	
	Space following +ve pulse	0 ± 0.3V	-0.045	Complied
	Space following –ve pulse	0 ± 0.3V	-0.041	Complied

2048 kbit/s Interface						
S016 Clause	**Description**		**Limit**	**Result**		**Verdict**
5.3.5	**INPUT PORT**					
5.3.5.1	**Input Port Return Loss**			**120Ω Return Loss (dB)**	**75Ω Return Loss (dB)**	
	Output Voltage Vm/Return Loss	f = 51 kHz	RL ≥ 12dB	33.0	-	Complied
		f = 64 kHz	RL ≥ 12dB	35.2	-	Complied
		f = 128 kHz	RL ≥ 18dB	42.6	-	Complied
		f = 256 kHz	RL ≥ 18dB	51.9	-	Complied
		f = 512 kHz	RL ≥ 18dB	41.5	-	Complied
		f = 1024 kHz	RL ≥ 18dB	32.0	-	Complied
		f = 2048 kHz	RL ≥ 18dB	25.3	-	Complied
		f = 3072 kHz	RL ≥ 14dB	22.0	-	Complied
5.3.5.2	**Sensitivity**			**(Yes/No)**		
	Loss of interconnecting Cable		Declared as 0-6dB at 1024kHz	Yes		Complied
5.3.5.3	**Immunity**			**Number of E Bits/TSE errors**		
	Atten. = 0 dB	Straight Connection	No. set E bits = 0	0		Complied
	Atten. = 6 dB	Straight Connection	Or	0		Complied
	Atten. = 0 dB	Wires Reversed	No. TSEs = 0	0		Complied
	Atten. = 6 dB	Wires Reversed		0		Complied
5.3.6	**INTRINSIC JITTER**					
5.3.6	**Intrinsic Jitter**			**Jitter (UIpk-pk)**		
	Atten. = 0dB	20Hz-100kHz filter +50ppm offset	Jitter ≤ 1.5UIpk-pk	0.015		Complied
		0ppm offset	Jitter ≤ 1.5UIpk-pk	0.015		Complied
		-50ppm offset	Jitter ≤ 1.5UIpk-pk	0.015		Complied
		18kHz-100kHz filter +50ppm offset	Jitter ≤ 0.2UIpk-pk	0.011		Complied
		0ppm offset	Jitter ≤ 0.2UIpk-pk	0.009		Complied
		-50ppm offset	Jitter ≤ 0.2UIpk-pk	0.009		Complied
	Atten. = 6dB	20Hz-100kHz filter +50ppm offset	Jitter ≤ 1.5UIpk-pk	0.015		Complied
		0ppm offset	Jitter ≤ 1.5UIpk-pk	0.015		Complied
		-50ppm offset	Jitter ≤ 1.5UIpk-pk	0.015		Complied
		18kHz-100kHz filter +50ppm offset	Jitter ≤ 0.2UIpk-pk	0.011		Complied
		0ppm offset	Jitter ≤ 0.2UIpk-pk	0.009		Complied
		-50ppm offset	Jitter ≤ 0.2UIpk-pk	0.011		Complied

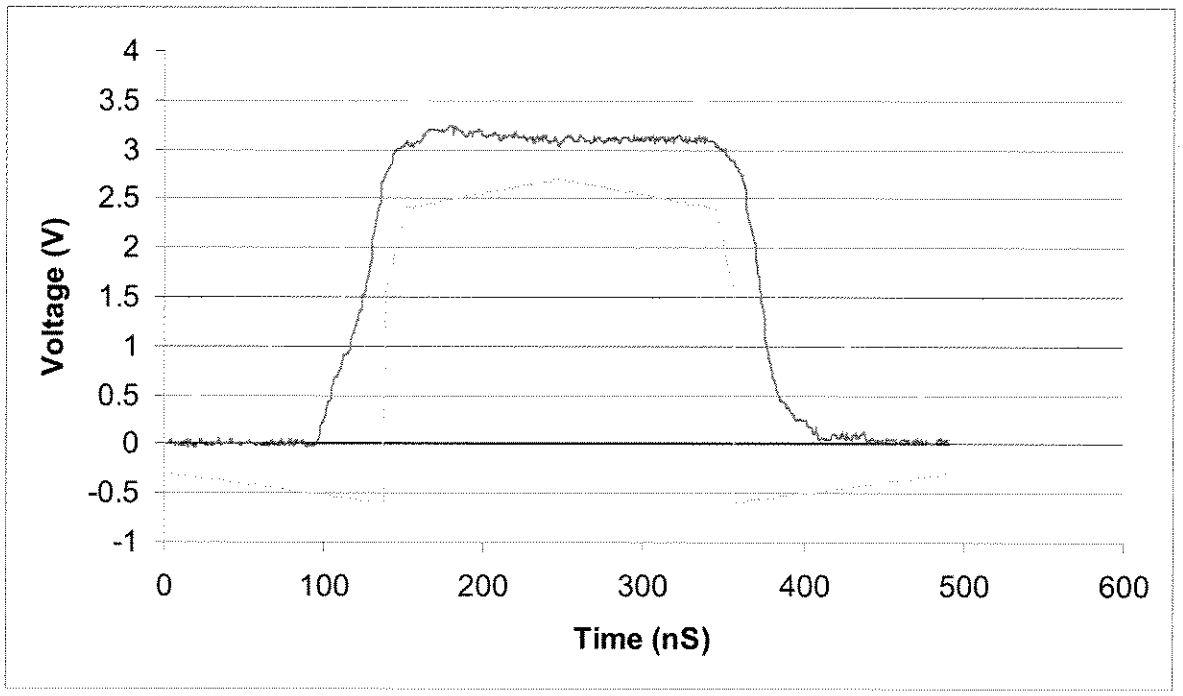
2048 kbit/s Interface						
S016 Clause	Description		Limit	Result		Verdict
5.3.7	INPUT JITTER AND WANDER TOLERANCE					
5.3.7	Input Jitter and Wander Tolerance			No of TSEs/Set E Bits		
				+50ppm	0ppm	-50ppm
	Attenuation = 0dB	f = 1 Hz	No. of TSEs = 0	0	0	0	Complied
		f = 2 Hz	Or	0	0	0	Complied
		f = 5 Hz	No of set E bits = 0	0	0	0	Complied
		f = 10 Hz		0	0	0	Complied
		f = 20 Hz		0	0	0	Complied
		f = 31 Hz		0	0	0	Complied
		F = 63 Hz		0	0	0	Complied
		F = 125 Hz		0	0	0	Complied
		F = 250 Hz		0	0	0	Complied
		F = 500 Hz		0	0	0	Complied
		F = 1 kHz		0	0	0	Complied
		F = 2 kHz		0	0	0	Complied
		f = 2.4 kHz		0	0	0	Complied
		f = 4 kHz		0	0	0	Complied
		f = 8 kHz		0	0	0	Complied
		f = 16 kHz		0	0	0	Complied
		f = 18 kHz		0	0	0	Complied
		f = 32 kHz		0	0	0	Complied
		f = 64 kHz		0	0	0	Complied
		f = 100 kHz		0	0	0	Complied
	Attenuation = 6dB	f = 1 Hz	No. of TSEs = 0	0	0	0	Complied
		f = 2 Hz	Or	0	0	0	Complied
		f = 5 Hz	No of set E bits = 0	0	0	0	Complied
		f = 10 Hz		0	0	0	Complied
		f = 20 Hz		0	0	0	Complied
		f = 31 Hz		0	0	0	Complied
		F = 63 Hz		0	0	0	Complied
		F = 125 Hz		0	0	0	Complied
		F = 250 Hz		0	0	0	Complied
		F = 500 Hz		0	0	0	Complied
		F = 1 kHz		0	0	0	Complied
		F = 2 kHz		0	0	0	Complied
		f = 2.4 kHz		0	0	0	Complied
		f = 4 kHz		0	0	0	Complied
		f = 8 kHz		0	0	0	Complied
		f = 16 kHz		0	0	0	Complied
		f = 18 kHz		0	0	0	Complied
		f = 32 kHz		0	0	0	Complied
		f = 64 kHz		0	0	0	Complied
		f = 100 kHz		0	0	0	Complied

Appendix C – Plots and Printouts

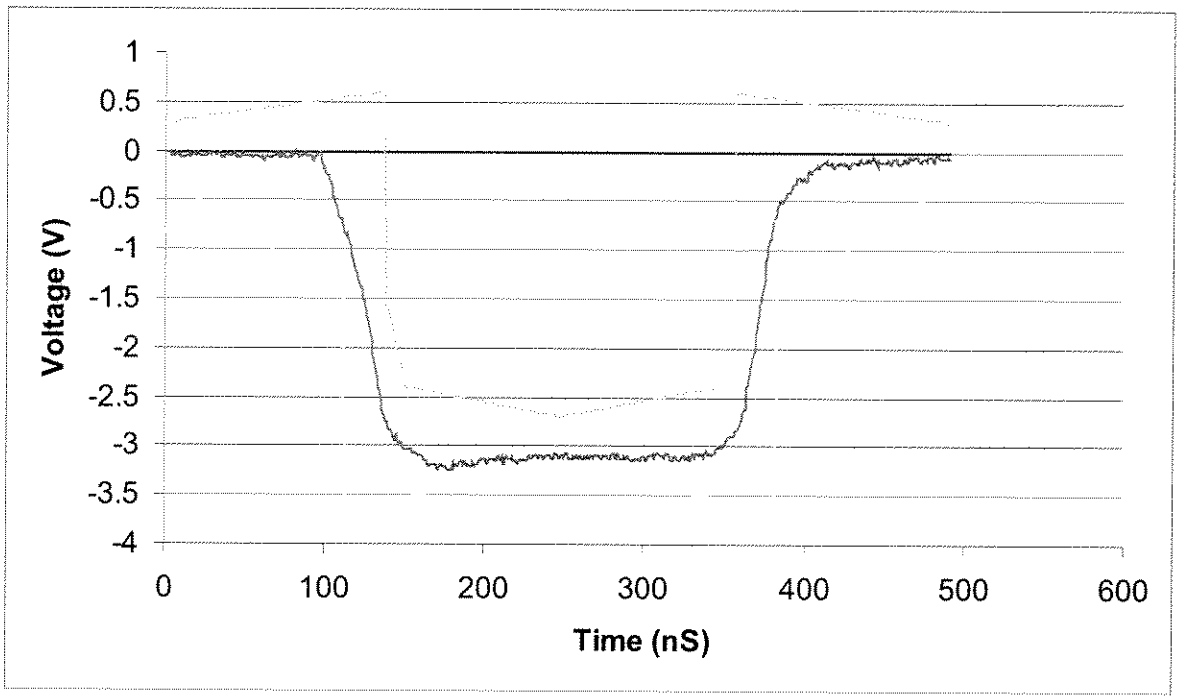
This appendix contains plots and printouts of results.

C.1 Waveform Shape –Positive (120 ohm Interface)
C.2 Waveform Shape – Negative (120 ohm Interface)

C.1 Waveform Shape –Positive (120 ohm Interface)



C.2 Waveform Shape – Negative (120 ohm Interface)



Appendix D – Test Samples Used

The following samples were submitted for testing on June 9, 2005. The assessment commenced on June 20, 2005 and completed on July 29, 2005.

Sample Reference	Description	Serial N°
3077154S01	A102 PCI T1/E1 data/telephony card	10202U0-01508

The sample listed above was tested when installed in a lab computer, Compaq Deskpro S/N: 6032DW46A354.

All relevant tests were performed on the above test samples - See appendix F : Test History for details.

Appendix E – Test Criteria

E.1 Environmental Conditions

All tests were performed under the following environmental conditions :

Test Condition	Specified Range
Temperature	15°C - 25°C
Humidity	30% - 75%

E.2 Test Equipment

The following test equipment was used for testing:

Manufacturer	Model	Description	Serial No.	Cal. Due date
W & G	ANT-20	Advanced Network Tester	AH-0139	11/03/2005
Tektronix	TDS680C	Digital Oscilloscope	B020153	06/16/2006
Tektronix	P6247	Differential Probe for TDS680C	B013010	01/10/2006
Mountain Engineering	ME1002	Transmission Line Simulator	02R999-09	06/16/2006
MarQuest	FRA1	Primary Rate Analyser	MQ9644	N/A
MarQuest	PTF1	Primary Rate/PDH Test Fixture	MQ9650	01/07/2006

All tests were performed using relevant equipment detailed above, with the exception of (Test Specification/Clause) - See appendix F : Test History for details.

Appendix F : Test History

F.1 Modification Record

The software was modified to comply with Clause's 5.2.1.4 and 5.2.3.

F.2 Changes in Test Sample

Sample Replaced	New Sample	Tests Affected	Date
None			

F.3 Changes in Test Equipment

Equipment Replaced	New Equipment	Tests Affected	Date
None			

F.4 Deviations from Test Procedure

Reason for Deviation	Details of Deviation	Tests Affected	Date
None			

F.5 Observations

No observations were noted.

F.6 Marginal Test Measurements

No marginal measurements were observed during testing.

F.7 Sub-contracting of tests

Clause	Laboratory	Accredited by	Test report number
None			

Appendix G – Information for Test Purposes

This section contains specific information regarding the apparatus under test, that is required for test purposes.

G.1 AS/ACIF S016 Information for Test Purposes

G.1 AS/ACIF S016 Information for Test Purposes

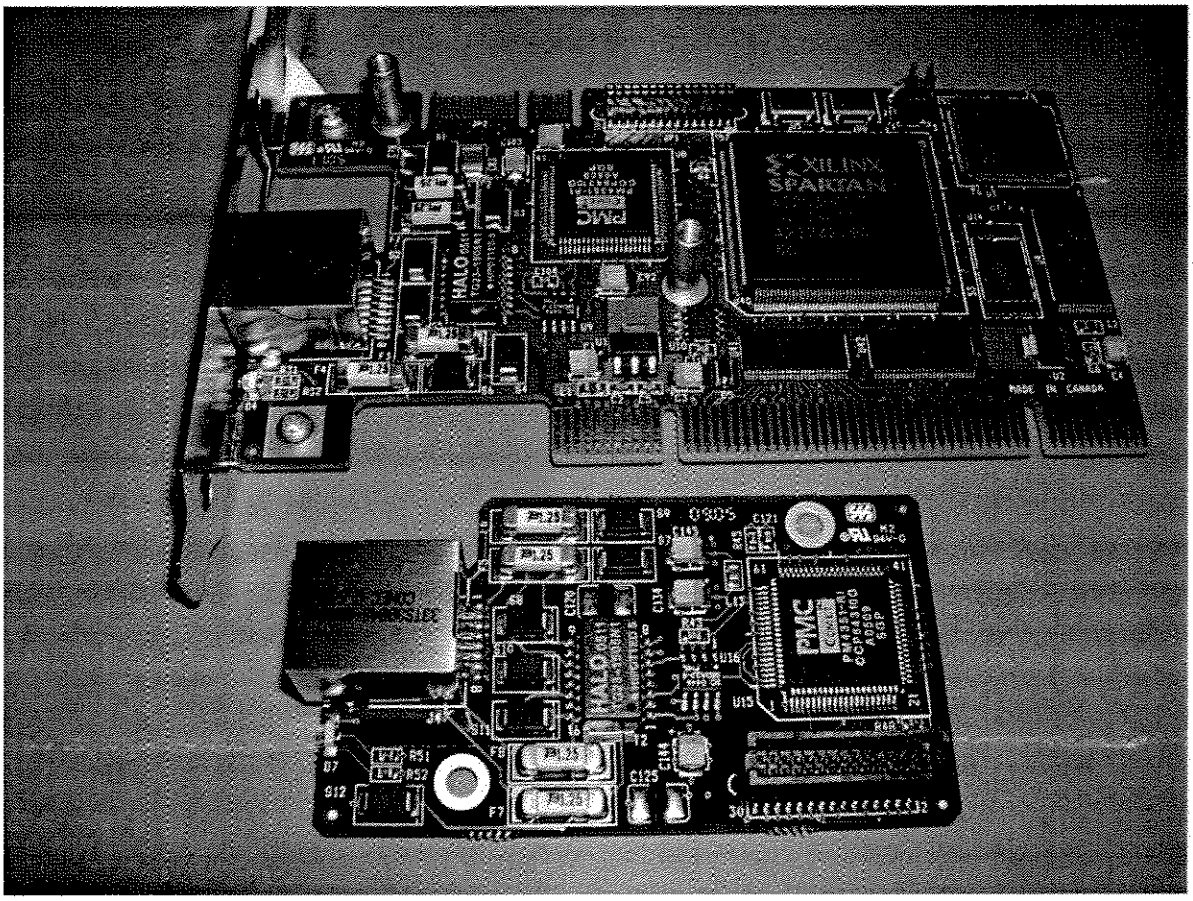
General	
Fail Safe Operation Does the CE cause harm or damage to the network on failure of any single component, power supply, incorrect manual operation or operation of CE outside the operating voltage and environmental conditions specified by the manufacturer?	No
Does battery powered CE fail safe and not cause any harm to the network if its batteries are approaching a critical point in life, or if the battery voltage falls to a level that will cause the CE to malfunction?	Not Applicable
SELV Do all network interface ports meet the requirements for SELV interfaces as detailed in AS/NZS 3260?	Yes
Is power feeding provided across any network interfaces?	No
2048kbit/s Interface	
Interfaces provided Does the CE provide 2048kbit/s interfaces?	Yes
If so, are they provided as 75Ω or 120Ω?	120 ohm only
Framing and CRC Is 2048kbit/s framing supported?	Yes
Is CRC-4 supported?	Yes
Test Modes Provided What loopback can be provided for test purposes and how is this configured?	payload
Alternatively if CRC supported, can the CE generate a suitable test pattern rather that provide a loopback?	
Means of connection Means of connection provided for connection to the network	RJ45
Is the attenuation of any interconnection cables within the range 0-6dB at 1024kHz and follows a √f law?	Yes

Appendix H – Photographs

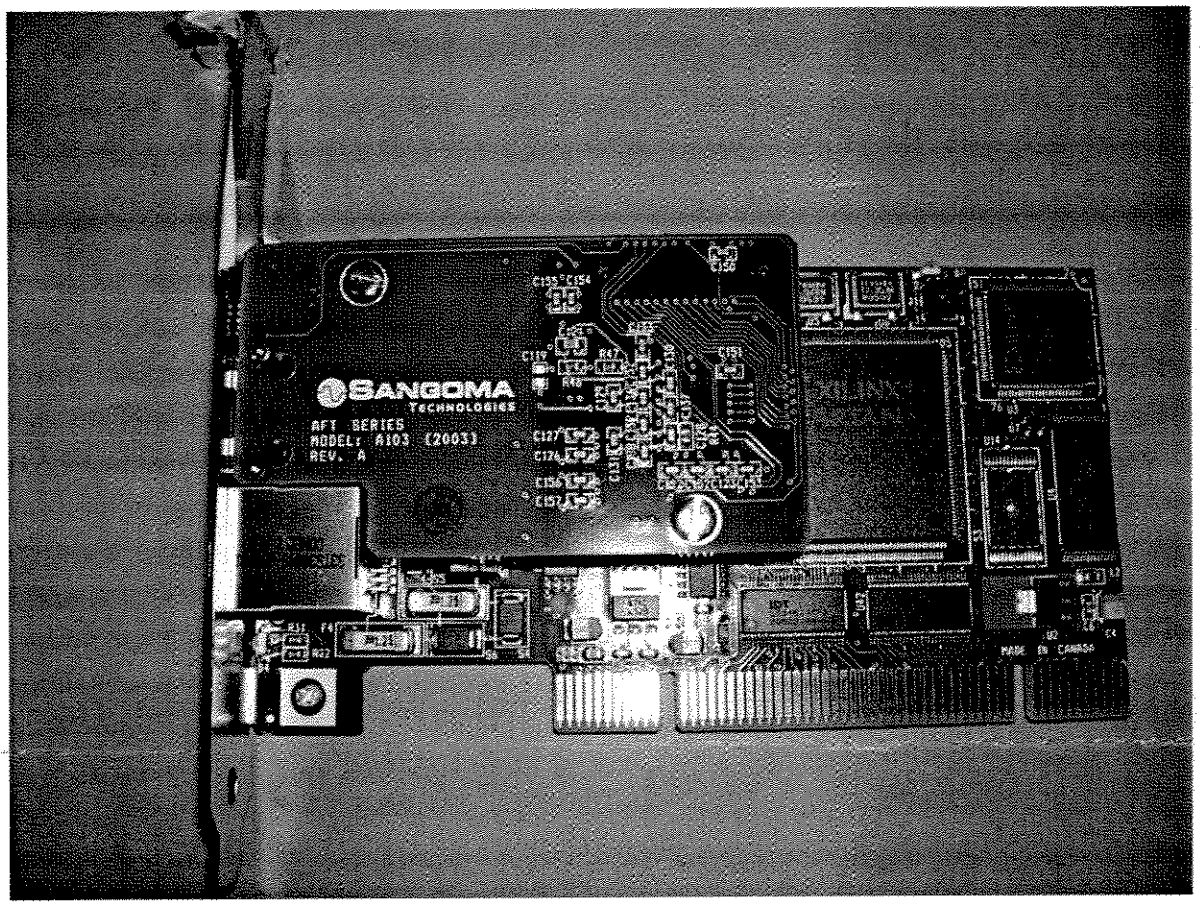
This section contains photographs of the test samples submitted to the laboratory.

H.1 Primary side; A102
H.2 Secondary side; A102
H.3 Secondary side; A102

H.1 Primary side; A102



H.2 Secondary side; A102



H.3 Secondary side; A102