

TUV Telecom Services, Inc.

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TEST REPORT NO.

PART68/081701/99

Date: August 26, 1999

Total Number of Pages: 23

Equipment: **PM4351 Comet**

Client: **PMC-Sierra**

Address: **105-8555 Baxter Place
Burnaby, B.C. V5A 4V7
Canada**

Federal Communications Standard: **Part 68.300 / TSB31B**

Authorised Signature:

August 26, 1999

David A. Freemore

Lead Engineer

Date

Name

Title

Signature

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1 IDENTIFICATION SUMMARY

1.1 Test Laboratory

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1.2 Limits and Reservations

This test report satisfies European Standard EN 45001. The test results in this test report apply only to the particular System under Test (SUT) and component Implementations under Test (IUTs) declared in this test report.

1.3 Client Information

Name : **PMC-Sierra**
Street : **105-8555 Baxter Place**
City : **Burnaby, B.C. V5A 4V7**
Country : **Canada**
Phone : **+1 (604) 415-6000**
Fax : **+1 (604) 415-6206**

Contact Person : **Fayaz Khaki**
Phone : **+1 (604) 415-6000**
Fax : **+1 (604) 415-6206**

1.4 Product

Supplier's name : **PMC-Sierra**
Street : **105-8555 Baxter Place**
City : **Burnaby, B.C. V5A 4V7**
Country : **Canada**
Phone : **+1 (604) 415-6000**
Fax : **+1 (604) 415-6206**

1.4.1 IUT Identification

Name	PM4351 Comet
Version/Model	Comet Reference Design Board Rev. 2
Serial No.	83110-2-0018
Interface board	Evaluation Board
Chip set	PM4351 Comet Rev. F
Transformer	Midcom 50436
Connector types	Bantam
Interfaces	2 - T1
Software and Version	--

1.4.2 System under Test (SUT)

(If applicable)

SUT Configuration for testing (PC, Bus System, Clock etc.)	Motherboard used for microprocessor interface
Operating System	--
Version No.	--
Miscellaneous	--

1.4.3 Type of Product

Monolithic device which integrates software selectable full featured T1 and E1 framers and T1 and E1 shorthand and longhand line interfaces

1.5 Nature of Conformance Testing

The purpose of Conformance Testing is to increase the probability that different implementations can interwork. However, the complexity of OSI protocols makes exhaustive testing impractical on both technical and economic grounds. Furthermore, there is no guarantee that an IUT which has passed all the relevant tests conforms to a specification. Neither is there any guarantee that such an IUT will interwork with other real open systems. Rather, the passing of the tests gives confidence that the IUT has the stated capabilities and that its behaviour conforms consistently in representative instances of communication.

2 Test Conditions

2.1 Environmental Conditions

Temperature	: In the range of 15°C to 35°C	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Relative humidity	: In the range of 25% to 75%	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

2.2 Power Supply Limitations

All tests were carried out within +/- 5% of the normal operating voltage of + 5.0 Vdc.

3 System Report Summary

Compliance Standard: *Part 68.300*

Part 68.300 Conformance Test Report: *See Section 6*

Real Test system:

Executable Test Suite (ETS) Identification:

Oscilloscope HP 54502A
Multimeter HP 34401A
HP 3585A Spectrum Analyser
HP 37701A T1 Tester
Schaffner NSG2050 Surge Generator
Schaffner PNW2053 Pulse Module
Rod-L M100AU55
Power Line Decoupler (Impedance Matching Network C.2)

Custom build Test Jigs

Impedance Matching Network A1
100 Ohm Differential Terminator A2
1500 Ohm Terminator B2
Transverse Balance Jig A4

Conformance Status:

Static Conformance Errors : **No**
Dynamic Conformance Errors : **No**

Test cases run: 24

Passed : 24
Failed : 0

4 Observations

Date: **August 17, 1999**

Note 1: Surge tests and dielectric strength tests involving mains were not tested as is does not apply to this evaluation board.

5 Summary of Compliance

Date: **August 17, 1999**

The test results in this test report apply only to the particular System under Test (SUT) and component Implementations under Test (IUTs) declared in this test report.

The SUT/IUT has not been shown by the conformance assessment to be non-conforming to the specified protocol standard. The test campaign did not reveal errors in the SUT/IUT.

6 Part 68.300 Conformance Test Report

6.1 Dates

Receipt of SUT/IUT: **August 16, 1999**

Date of Test: **August 17, 1999**

6.2 Operator

Bill Crannick



(Signature)

6.3 Test System

Oscilloscope HP 54502A
Multimeter HP 34401A
HP 3585A Spectrum Analyser
HP 37701A T1 Tester
Schaffner NSG2050 Surge Generator
Schaffner PNW2053 Pulse Module
Rod-L M100AU55
Power Line Decoupler (Impedance Matching Network C.2)

Custom build Test Jigs

Impedance Matching Network A1
100 Ohm Differential Terminator A2
1500 Ohm Terminator B2
Transverse Balance Jig A4

6.4 Test Environment

Temperature : In the range of 15°C to 35°C Yes No

Relative humidity : In the range of 25% to 75% Yes No

All tests are carried out within +/- 5% of the normal operating voltage of +5.0 Vdc.

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6.5 Test Results

- Unit under test is connected to the protective earth conductor
- Unit under test is not connected to the protective earth conductor
- The power feeding pair is connected to the protective earth conductor
- The power feeding pair is not connected to the protective earth conductor
- All connecting arrangements have been supplied per Part 68 / 68.500
- Preliminary check indicates equipment is fully functional to perform tests

Pre Environmental / Electrical Stress

Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (i)	Pulse Repetition Rate	Yes	C

Requirement

Measured

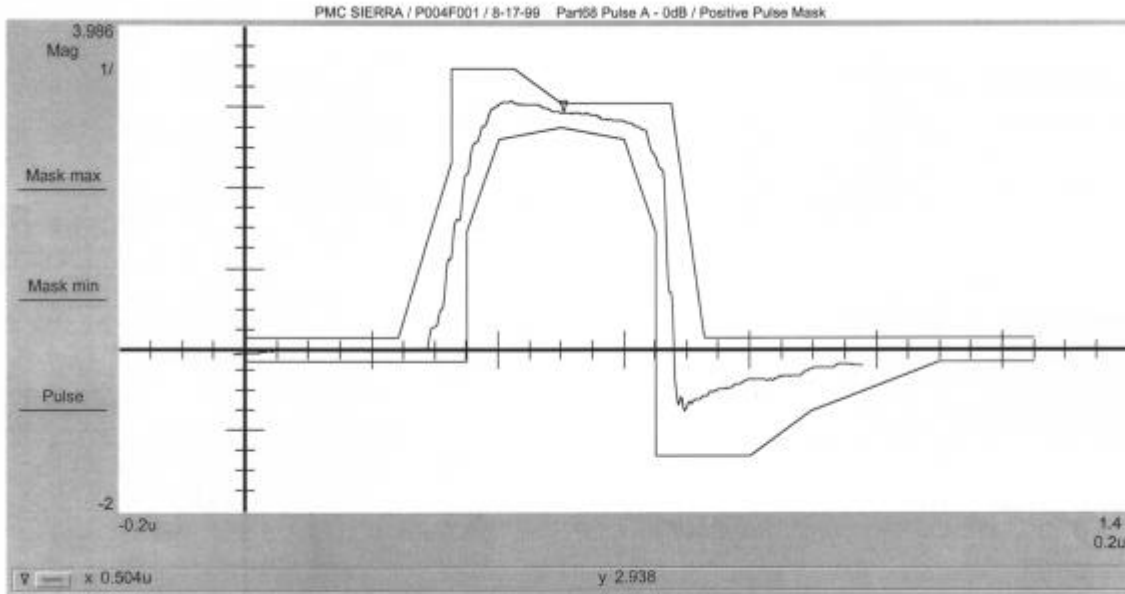
1,544,000 b/s
 +/- 75 b/s

1,543,987 b/s

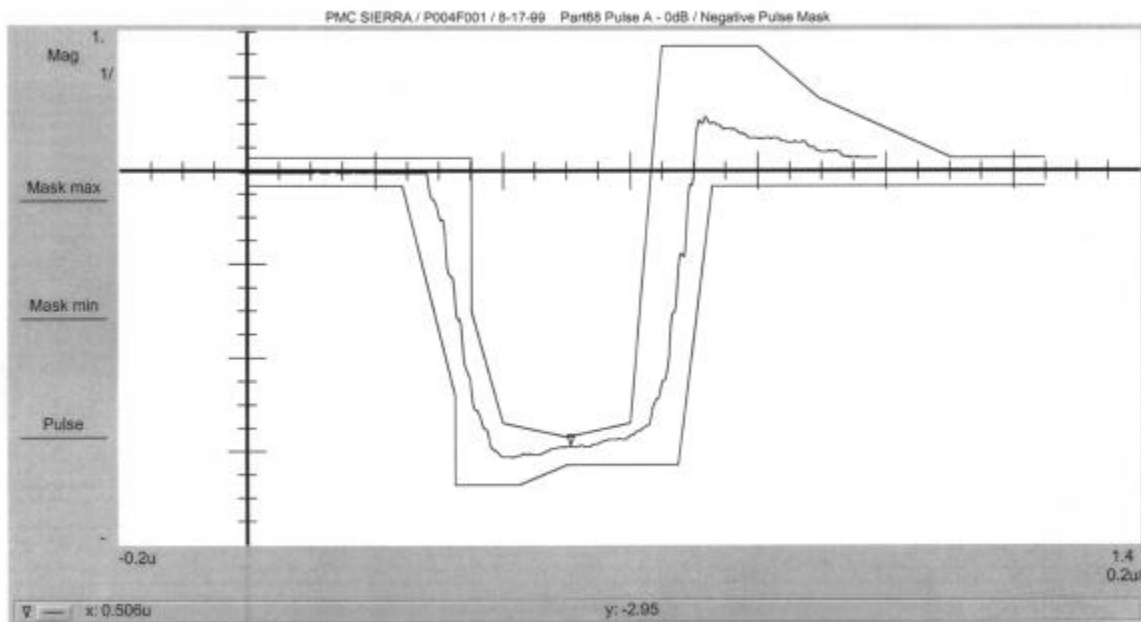
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Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template A (positive 0 dB loss)	Yes	C



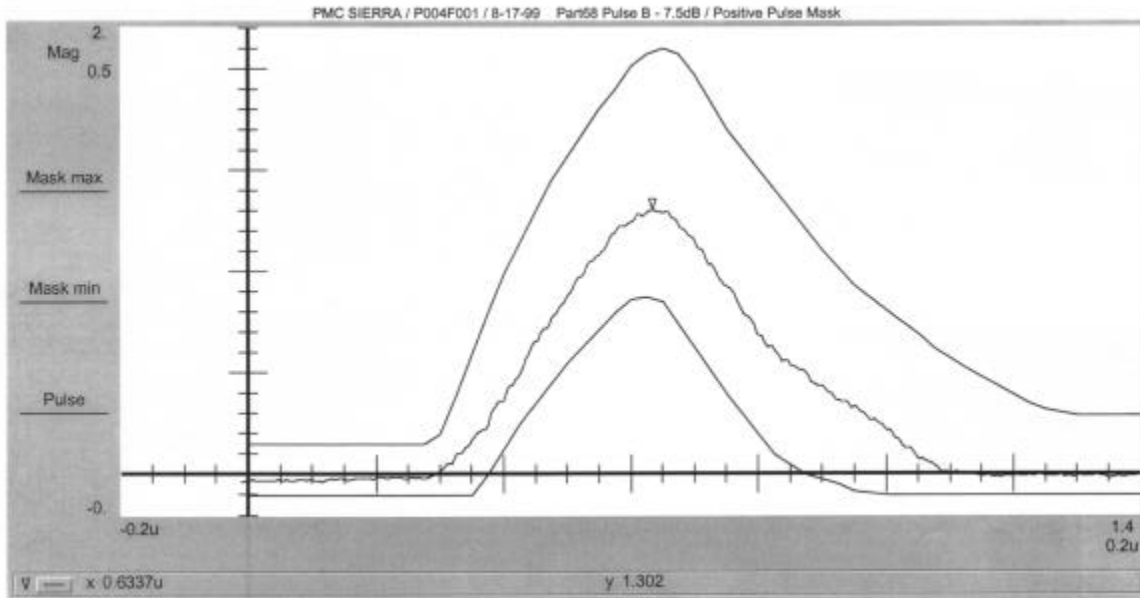
Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template A (negative 0 dB loss)	Yes	C



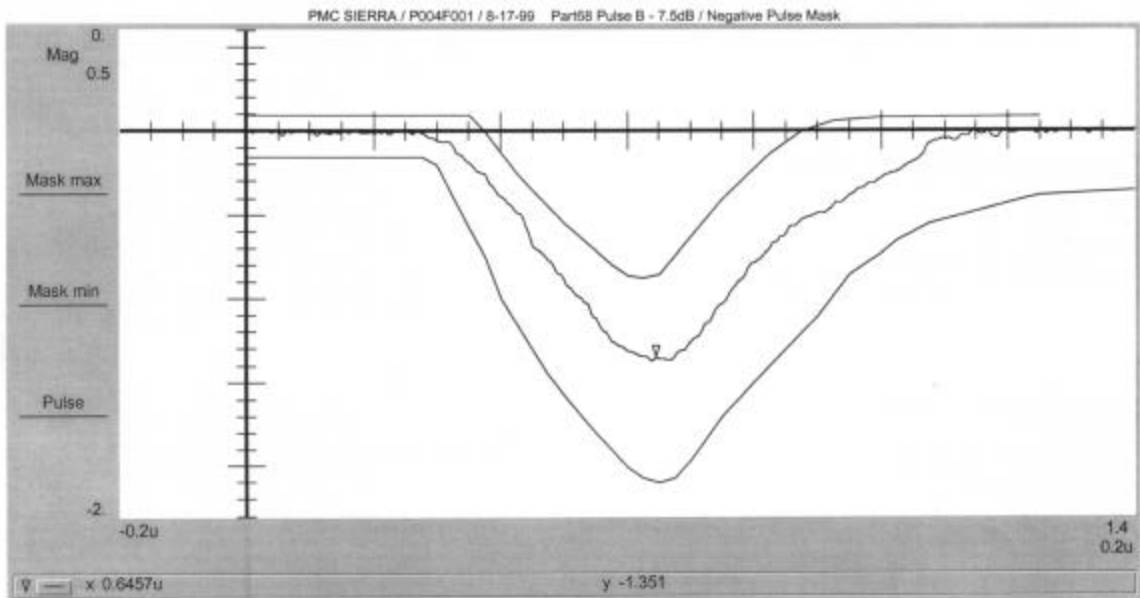
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Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template B (positive -7.5 dB loss)	Yes	C



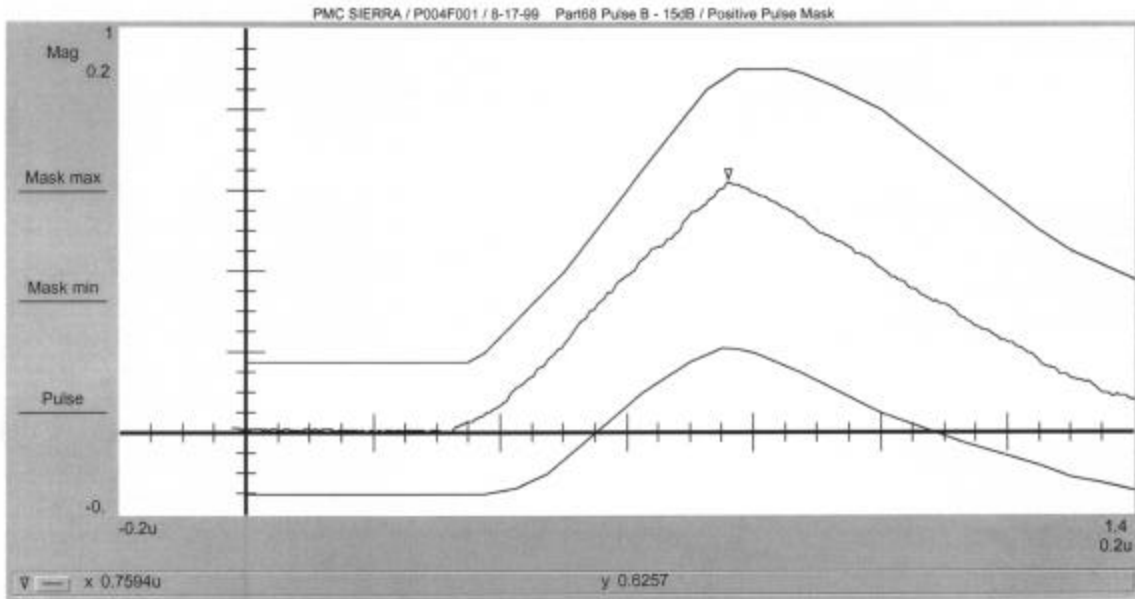
Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template B (negative -7.5 dB loss)	Yes	C



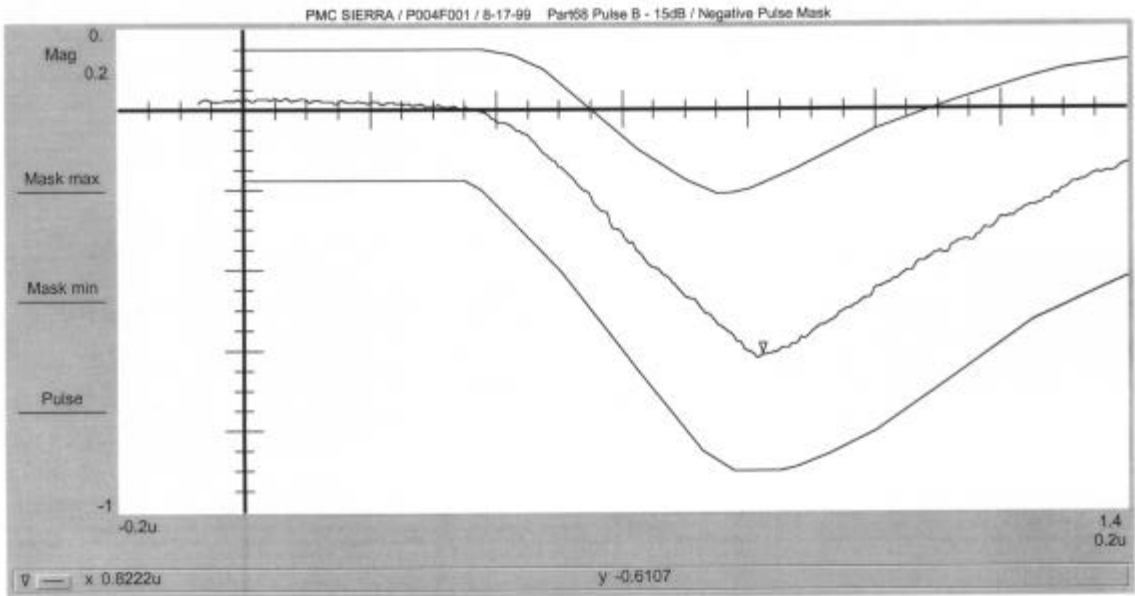
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Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template C (positive -15 dB loss)	Yes	C



Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template C (negative -15 dB loss)	Yes	C



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Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (iv)	Output Power	Yes	C

Signal Density Achieved: 100 %

Correction Factor dB: 0

Pulse Type	Freq kHz	Rule dBm	Measurement dBm	Correction Factor	Final Reading
A	772	+19 / +12	+15.9 dBm	0	+15.9 dBm
A	1,544	≤ -6 / -13	-11.6 dBm	0	-11.6 dBm
B	772	+11.5 / +4.5	+10.1 dBm	0	+10.1 dBm
B	1,544	≤ -13.5 / -20.5	-31.1 dBm	0	-31.1 dBm
C	772	+4 / -3	+2.7 dBm	0	+2.7 dBm
C	1,544	≤ -21 / -28	-49.8 dBm	0	-49.8 dBm

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Part 68 Paragraph	Description	Applicability	Verdict
68.310 (c)	Digital Longitudinal Balance	Yes	C

Freq. Hz	Rule dBm	Transmit Pair	Receive Pair
200	-40 dBm	-55.0 dBm	-55.5 dBm
10,000	-40 dBm	-97.4 dBm	-98.0 dBm
20,000	-35 dBm	-101.7 dBm	-107.1 dBm
50,000	-35 dBm	-92.7 dBm	-104.9 dBm
100 K	-35 dBm	-73.6 dBm	-71.7 dBm
200 K	-35 dBm	-81.8 dBm	-85.3 dBm
500 K	-35 dBm	-73.3 dBm	-83.5 dBm
1.0 M	-35 dBm	-67.7 dBm	-77.1 dBm
1.544 M	-35 dBm	-63.6 dBm	-70.4 dBm

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Environmental / Electrical Stress

Part 68	Description	Limit	Result	Verdict	Comment
68.302 (a)	<i>Mechanical Shock</i>				
	Weight of Tested Unit	lbs.	< 1.0 lb.		
	Hand-Held Units (18 random)	60 in.	--	NA	
	Customer Carried (6 random)	30 in.	--	NA	
	<i>Not Normally Carried 0-20lbs</i>				
	face drop	6 inch	✓	C	
drop on all other faces	3 inch	✓	C		
drop on all corners	3 inch	✓	C		

Part 68	Description	Limit	Result	Verdict	Comment
302(b)(1) 4 Surges	<i>Metallic "A" Surge</i>				
	Tip / Ring Positive	800 V	✓	C	
	Tip / Ring Negative		✓	C	
	Tip1 / Ring1 Positive	800 V	✓	C	
	Tip1 / Ring1 Negative		✓	C	
302(b)(2) T/R to Ground 4 Surges	<i>Longitudinal "A" Surge</i>				
	Tip / Ring Positive	1500 V	✓	C	
	Tip / Ring Negative		✓	C	
	Tip1 / Ring1 Positive	1500 V	✓	C	
	Tip1 / Ring1 Negative		✓	C	
T/R to non- reg. leads 4 Surges	Tip / Ring Positive	1500 V	--	NA	
	Tip / Ring Negative		--	NA	
	Tip1 / Ring1 Positive	1500 V	--	NA	
	Tip1 / Ring1 Negative		--	NA	
Aux to gnd & non-reg. Leads 4 Surges	Aux & Aux1 Positive / gnd	1500 V	--	NA	
	Aux & Aux1 Negative / gnd		--	NA	
	Aux & Aux1 Positive / nrl	1500 V	--	NA	
	Aux & Aux1 Negative / nrl		--	NA	

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Part 68	Description	Limit	Result	Verdict	Comment
302(d)(1)	<i>Power Line Surge</i>				
Pwr Off	3 Surges	2500 V	--	NT	Note 1
6 Surges	3 Surges (Reverse Polarity)		--	NT	
Pwr On	3 Surges	2500 V	--	NT	
6 Surges	3 Surges (Reverse Polarity)		--	NT	

Part 68	Description	Limit	Result	Verdict	Comment
68.302(c)(1)	<i>Metallic "B" Surge</i>				
2 Surges	Tip / Ring Positive	1000 V	✓	C	
	Tip / Ring Negative	1000 V	✓	C	
68.302(c)(2)	<i>Longitudinal "B" Surge</i>				
2 Surges	Tip / Ring to Gnd Positive	1500 V	✓	C	
	Tip / Ring to Gnd Negative	1500 V	✓	C	

Operational Check

Test shall be conducted as described in the manufacturer's manual to verify the EUT under test is fully functional after application of the "B" surges.

Part 68.304	Description	Limit	Result	Verdict	Comment
	<i>Dielectric Strength</i>				
	Telephone to Surfaces 1000V	≤10 mA	< 1.0 mA	C	
	Telephone to Non-Reg 1000V	≤10 mA	--	NA	
	Telephone to Aux 1000V	≤10 mA	--	NT	
	Mains to Surfaces 1500V	≤10 mA	--	NT	Note 1
	Mains to Non-Reg 1500V	≤10 mA	--	NT	
	Mains to Secondaries 1500V	≤10 mA	--	NT	Note 1
	Surfaces to Aux Leads 1000V	≤10 mA	--	NT	
	Non-Reg to Aux Leads 1000V	≤10 mA	--	NT	

Part 68 Paragraph	Description	Applicability	Verdict
68.306 (b) (1)	Physical Separation of Leads	Yes	C

Attention is called to the fact that Tip and Ring are routed away from mains power leads.

A verification that a good separation is maintained between telephone leads and other leads to non-registered equipment with hazardous voltages, (greater than 42.4 volts peak or 80V dc).

Routing of leads is through the backpanel, then to the I/F circuit board.

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Part 68.306	Description	Limit	Result	Verdict	Comment
	<i>Hazardous Voltage Limitations (General)</i>				
	Tip to Ring Measurement	≤ 70 Vac	< 5.0 Vac	C	
	Tip to Gnd Measurement	≤ 70 Vac	< 3.0 Vac	C	
	Ring to Gnd Measurement	≤ 70 Vac	< 1.0 Vac	C	
	Tip1 to Ring1 Measurement	≤ 70 Vac	< 1.0 Vac	C	
	Tip1 to Gnd Measurement	≤ 70 Vac	< 3.0 Vac	C	
	Ring1 to Gnd Measurement	≤ 70 Vac	< 3.0 Vac	C	

Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (i)	Pulse Repetition Rate	Yes	C

Requirement

Measured

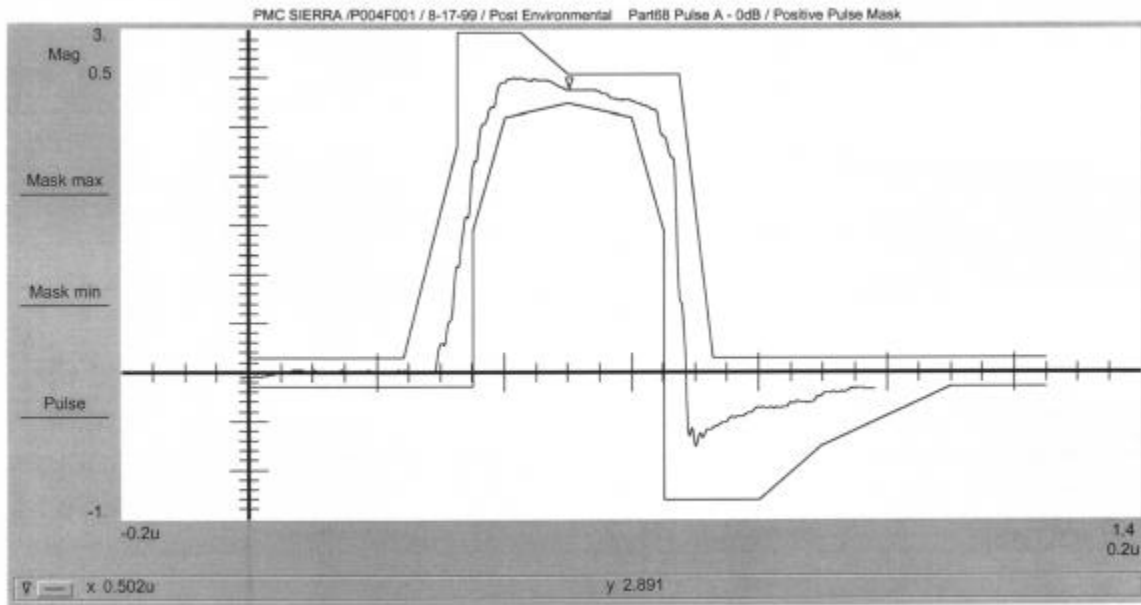
1,544,000 b/s
 +/- 75 b/s

1543984 b/s

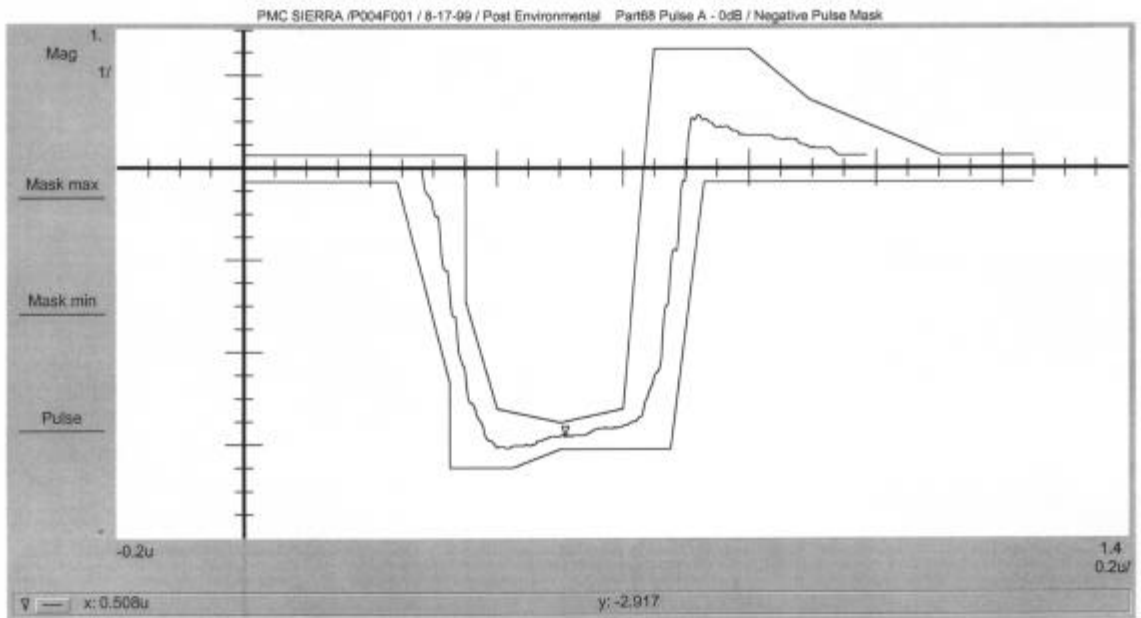
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Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template A (positive 0 dB loss)	Yes	C



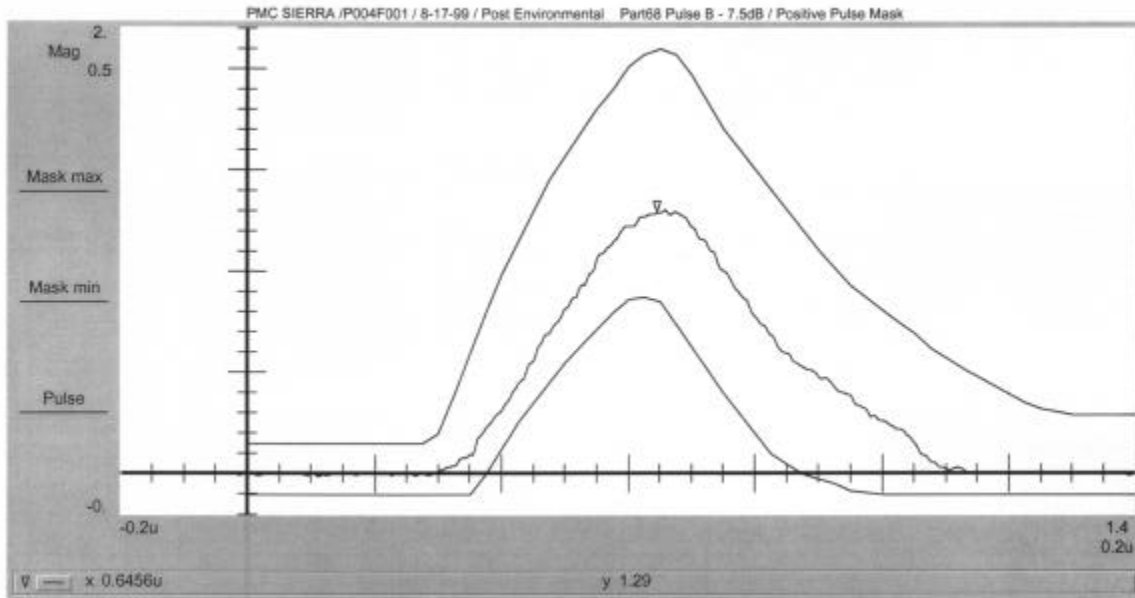
Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template A (negative 0 dB loss)	Yes	C



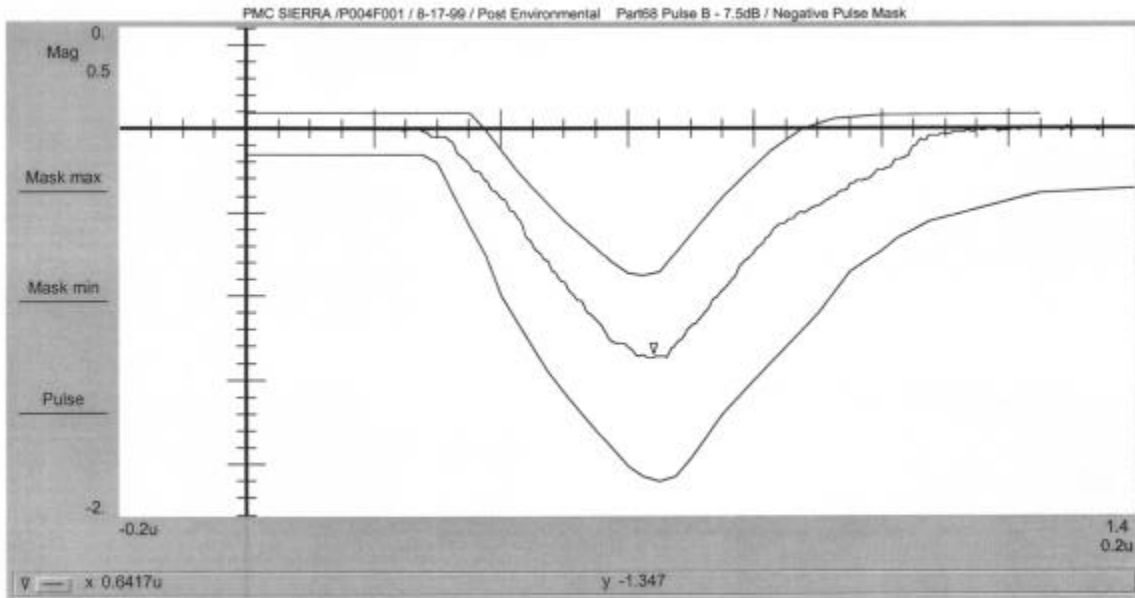
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Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template B (positive -7.5 dB loss)	Yes	C



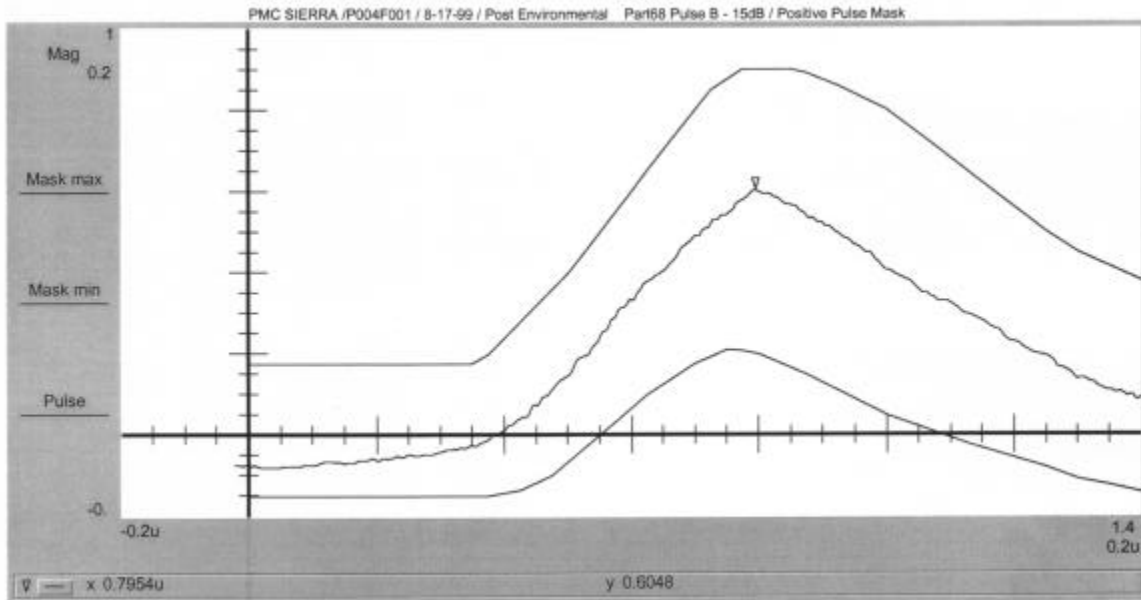
Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template B (negative -7.5 dB loss)	Yes	C



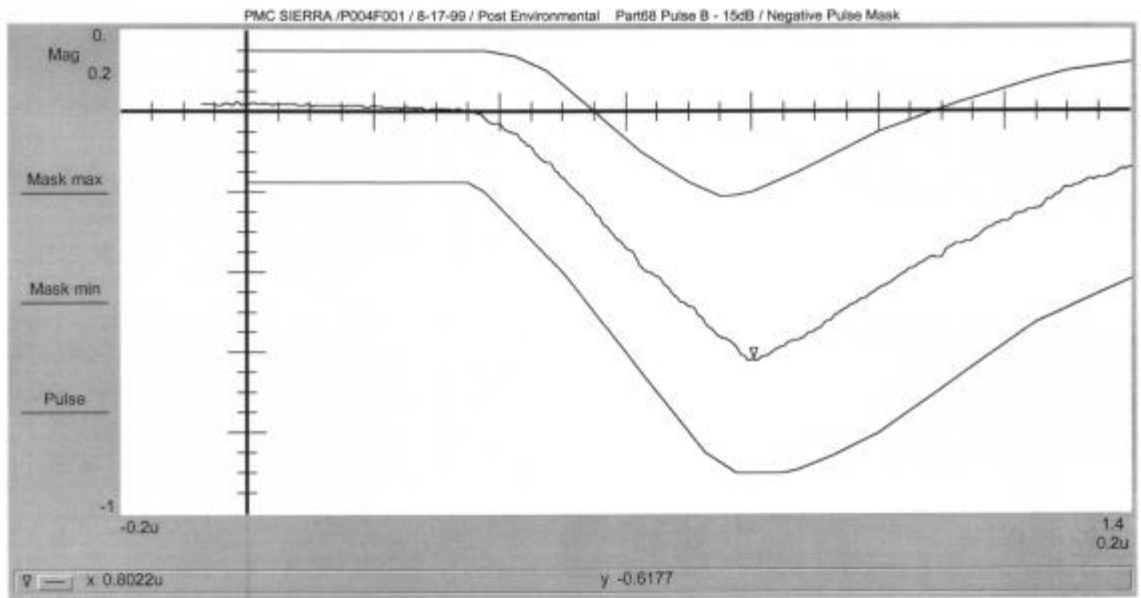
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Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template C (positive -15 dB loss)	Yes	C



Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (ii)	Pulse Template C (negative -15 dB loss)	Yes	C



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Part 68 Paragraph	Description	Applicability	Verdict
68.308 (h) (2) (iv)	Output Power	Yes	C

Signal Density Achieved: 100 %

Correction Factor dB: 0

Pulse Type	Freq kHz	Rule dBm	Measurement dBm	Correction Factor	Final Reading
A	772	+19/+12	+ 15.7 dBm	0	+15.7 dBm
A	1,544	≤ -6 / -13	-12.6 dBm	0	-12.6 dBm
B	772	+11.5 - +4.5	+8.2 dBm	0	+8.2 dBm
B	1,544	≤-13.5/-20.5	-39.2 dBm	0	-39.2 dBm
C	772	+4 / -3	+2.5 dBm	0	+2.5 dBm
C	1,544	≤ -21 / -28	-43.7 dBm	0	-43.7 dBm

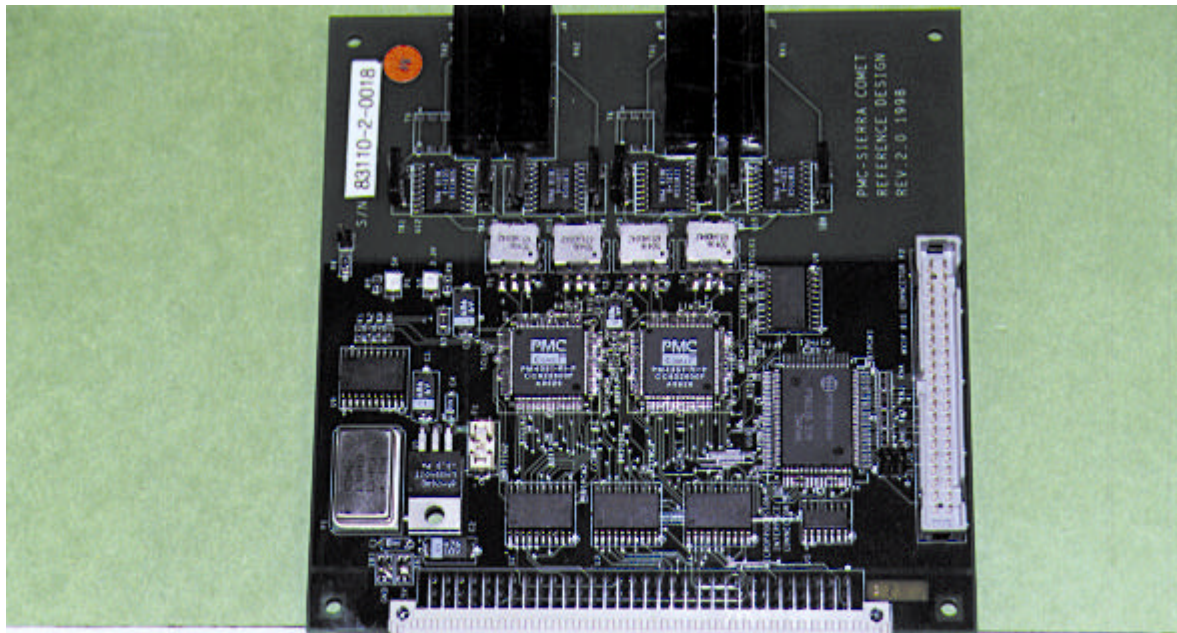
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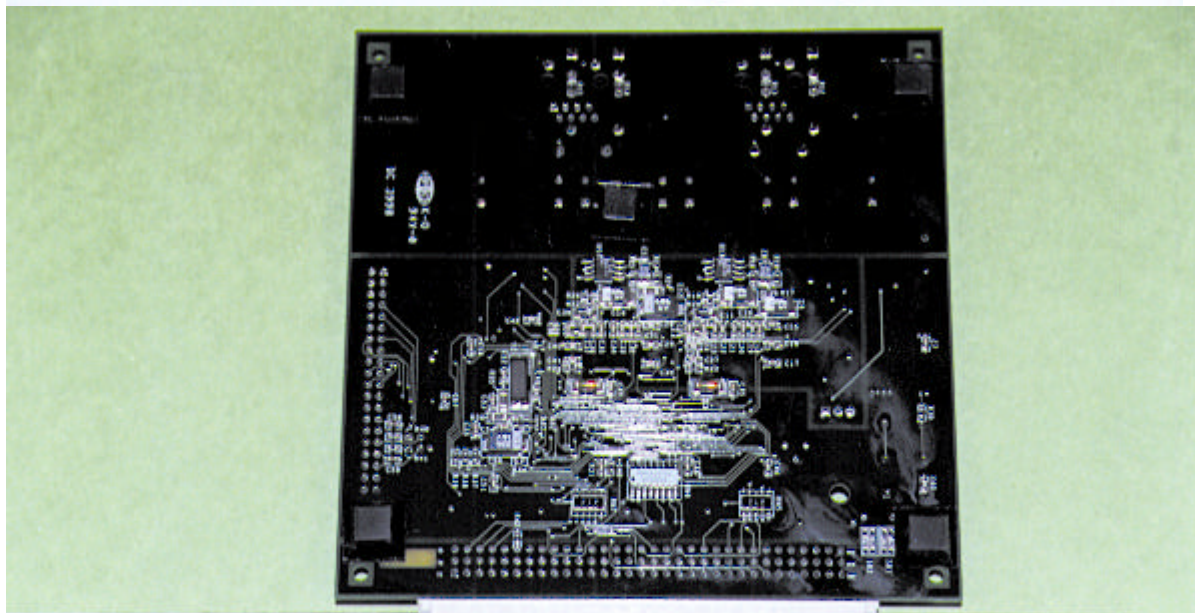
Part 68 Paragraph	Description	Applicability	Verdict
68.310 (c)	Digital Longitudinal Balance	Yes	C

Freq. Hz	Rule dBm	Transmit Pair	Receive Pair
200	-40 dBm	<u>-58.5 dBm</u>	<u>-58.9 dBm</u>
10,000	-40 dBm	<u>-105.5 dBm</u>	<u>-105.7 dBm</u>
20,000	-35 dBm	<u>-103.9 dBm</u>	<u>-104.8 dBm</u>
50,000	-35 dBm	<u>-97.2 dBm</u>	<u>-98.3 dBm</u>
100 K	-35 dBm	<u>-91.4 dBm</u>	<u>-91.5 dBm</u>
200 K	-35 dBm	<u>-86.2 dBm</u>	<u>-86.6 dBm</u>
500 K	-35 dBm	<u>-77.9 dBm</u>	<u>-79.7 dBm</u>
1.0 M	-35 dBm	<u>-72.3 dBm</u>	<u>-72.3 dBm</u>
1.544 M	-35 dBm	<u>-67.7 dBm</u>	<u>-67.9 dBm</u>

7 Photographs



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