ENGINEERING TEST REPORT

MODELNUMBER: 6290

IN ACCORDANCE WITH:
TIA-968-B AUG 2009

REPORT NO.: 10233859_TRF_TIA968

TESTED FOR:
Boston Scientific Corporation
4100 Hamline Avenue North
St. Paul, MN 55112

TESTED BY:

NEMKO USA, INC.
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NVLAP
LAB CODE: # 100426-0

DATE: 31-JULY-2013

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This report applies only to the items tested and does not constitute endorsement by the United States of America.

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EQUIPMENT: Loop Start Interface

INTRODUCTION

This report provides results and analysis of tests performed in accordance with TIA-968-B on a representative sample of Boston Scientific Model Number 6290.

Test Procedures And Circuits

A separately bound manual - Test Procedures and Circuits for Equipment Evaluation in accordance with TIA-968-B, has been submitted to the ACTA (August 24, 2001).

Engineer

These tests were performed in accordance with TIA-96-B. In our engineering assessment, the Boston Scientific Model Number 6290 as tested meets and or exceeds all the applicable requirements of TIA-968-B.

THIS REPORT APPLIES ONLY TO THE ITEM(S) TESTED AND DOES NOT CONSTITUTE ENDORSEMENT BY THE UNITED STATES OF AMERICA.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATION HAVE BEEN MADE: NONE.

TESTED BY: Brian Boyea DATE: 22-July-2013
Brian Boyea, Telecom Engineer

APPROVED: DATE: 31-July-2013
Tom Tidwell, Reviewer

EQUIPMENT: Loop Start Interface

TEST MATRIX

EQUIPMENT DESCRIPTION : Loop Start Interface
CLASSIFICATION: MM

TEST PROCEDURE	SECTION	REQUIRED	COMPLETED
ENVIRONMENTAL SIMULATION	4.1		
MECHANICAL SHOCK	4.1.1	X	X
TYPE A SURGE	4.1.2	X	X
TYPE B SURGE	4.1.3	X	X
POWER LINE SURGE	4.1.4	X	X

			COMPLETED		
		REQUIRED	B.E.S.	A.B.S.	A.A.S
LEAKAGE CURRENT LIMITATIONS	4.2	X	X	X	X
HAZARDOUS VOLTAGE LIMITATIONS	4.3	X	X	X	X
GENERAL	4.3.1				
CONNECTION OF NON-APPROVED EQUIPMENT	4.3.2	X	X	X	X
NON-HAZARDOUS VOLTAGE SOURCES	4.3.3				
INTENTIONAL PATHS TO GROUND	4.3.4				
OPERATIONAL PATHS TO GND.	4.3.4.1				
PROTECTION PATHS TO GND.	4.3.4.2				
BILLING PROTECTION REQUIREMENTS	4.4				
CALL DURATION	4.4.1	X	X	X	X
ON-HOOK SIGNAL POWER	4.4.2	X	X	X	X
SIGNALLING INTERFERENCE REQUIREMENTS	4.4.3	X	X	X	X
TRANSVERSE BALANCE LIMITATIONS	4.6	X	X	X	X
SIGNAL POWER LIMITATIONS					
GENERAL	5.1.1				
SIGNAL POWER (NON-VOICE)	5.1.2				
SIGNAL POWER (DATA)	5.1.2.7	X	X	X	X
SIGNAL POWER LIMITIONS VOICEBAND (METALIC)	5.1.3				
INTERNAL SIGNAL SOURCES (NETWORK SIGNALING)	5.1.4	X	X	X	X
SIGNAL POWER THROUGH-PATH (DC)	5.1.5	X	X	X	X
SIGNAL POWER (3995-4005 Hz BAND)	5.1.6				
SIGNAL POWER (INTERNAL SIGNAL SOURCE)	5.1.6.1				
SIGNAL POWER LIMITATIONS THROUGH TRANSMISSION PATH	5.1.6.2	X	X	X	X
LONGITUDINAL AC VOLTAGE BELOW 4 kHz	5.1.7	X	X	X	X
VOLTAGES IN THE 4kHz TO 6MHz FREQUANCY RANGE	5.1.8	X	X	X	X
SECTIONS 4.5.4 4.5.5 and 4.5.6 APPLY TO THE FOLLOWING CONDITIONS	5.1.9,5.2.1.5				

EQUIPMENT: Loop Start Interface

ON-HOOK IMPEDANCE (GENERAL)	5.1.11.1, 5.1.12.1				
ON-HOOK IMPEDANCE LIMITATIONS (LOOP START)	5.1.11.2	X	X	X	X
ON-HOOK RESISTANCE (UP TO 100VDC)	5.1.11.2.1	X	X	X	X
ON-HOOK RESISTANCE (100 – 200 VDC)	5.1.11.2.2	X	X	X	X
DC CURRENT DURING RINGING	5.1.11.2.3	X	X	X	X
AC IMPEDANCE	5.1.11.2.4	X	X	X	X
RINGING FREQUENCY IMPEDANCE (LONGITUDINAL)	5.1.11.2.5	X	X	X	X
MAXIMUM RINGER EQUIVALENCE	5.1.11.2.8, 5.1.12.2.5	NOTED			
LOOP CURRENT REQUIREMENTS	5.1.11.4, 5.1.12.4	X	X	X	X

**** REFER TO FORM 730 INSTRUCTIONS.***
***** REFER TO CFR 47 SPECIFICATION (Pt 68 SUBPART D)***

EQUIPMENT: Loop Start Interface

EQUIPMENT DESCRIPTION AND RATIONALE FOR CIRCUIT SELECTION

Features:

1 Line
Tel Set Thru Path
DTMF Network Address

Remarks:

This report contains the test results for the Boston Scientific Model Number 6290, a single-line device. The unit is powered by SELV from the transformer.

The Boston Scientific Model Number 6290 interfaces the PSTN network via RJ11C for the Loop Start Interface.

The Boston Scientific Model Number 6290 operated in a normal and satisfactory manner following the application of Environmental Simulation Surges.

Modifications Performed During Assessment: None

Equipment Software test protocol: BSC document 1114037 Rev A.4.

Technical Judgement:
There is another model to the series:

Boston Scientific Model Number 6280

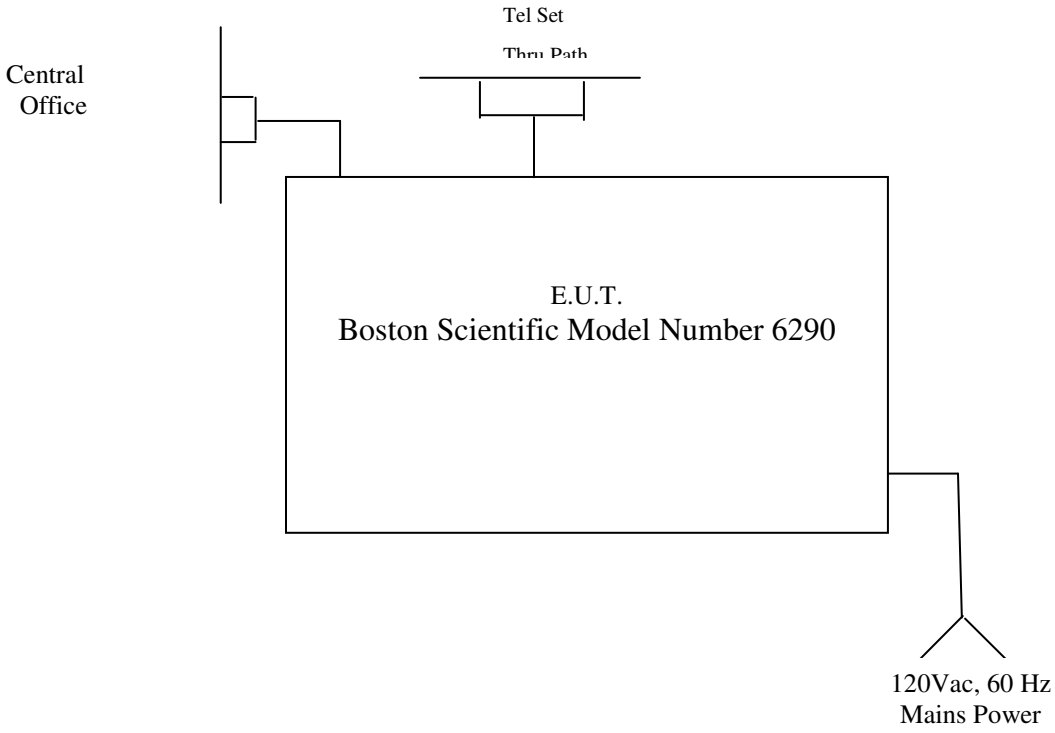
It was deemed that the Boston Scientific Model Number 6290 was the worst case model and the test results would represent both models.

ENGINEERING ANALYSIS

The equipment employs type in-line fusible resistor for supplementary protection.

EQUIPMENT: Loop Start Interface

BLOCK DIAGRAM OF TEST SET-UP:



EQUIPMENT: Loop Start Interface

4.1.1	ENVIRONMENTAL SIMULATION MECHANICAL SHOCK	4.1.1

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

TEST RESULTS:

Hand-Held Items: N/A The unit is not hand-held equipment.

Table (Desk) Top Equipment 0-5 kg: Complies
The unit operated in a normal and satisfactory menner following the application of Drop Stress.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

4.1.2	ENVIRONMENTAL SIMULATION TELEPHONE LINE SURGE TYPE A	4.1.2

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State
Off-hook State

(b)(1) Metallic: The unit operated in a normal and satisfactory manner following the application of Metallic Voltage Stress (Type A).

(b)(2) Longitudinal: The unit operated in a normal and satisfactory manner following the application of Longitudinal Voltage Stress (Type A).

ANALYSIS/COMMENT: Complies

EQUIPMENT: Loop Start Interface

4.1.3	ENVIRONMENTAL SIMULATION TELEPHONE LINE SURGE TYPE B	4.1.3

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State
Off-hook State

(c)(1) Metallic: The unit operated in a normal and satisfactory manner following the application of Metallic Voltage Stress (Type B).

(c)(2) Longitudinal: The unit operated in a normal and satisfactory manner following the application of Longitudinal Voltage Stress (Type B).

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

4.1.4	ENVIRONMENTAL SIMULATION POWER LINE SURGE	4.1.4

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

Power On

(d) Power Line Surge: The unit operated in a normal and satisfactory manner following the application of Power Line Stress.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

4.2 LEAKAGE CURRENT LIMITATIONS 4.2

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

TEST RESULTS

TEST COMBINATION VOLTAGE CONNECTION 60 Hz POINTS	PEAK CURRENT			
	SPEC. MAX.	MEASURED (mA)		
RMS VOLTS	mA	B.E.S.	A.B.S.	A.A.S.
1500 (a) and (b)	10	0.3	0.3	0.3
1000 (a) and (c)	10	0.3	0.3	0.3
1000 (a) and (d)	10			
1000 (a) and (e)	10			
1000 (a) and (f)	10			
1000 (a) and (g)	10			
1500 (b) and (c)	10	0.1	0.1	0.1
1500 (b) and (d)	10			
1500 (b) and (e)	10			
1500 (b) and (f)	10			
1500 (b) and (g)	10			
1000 (c) and (e)	10			
1000 (c) and (f)	10			
1000 (d) and (e)	10			
1000 (d) and (f)	10			
1000 (e) and (f)	10			
	COMPLIANCE:	Yes	Yes	Yes

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

4.3	**HAZARDOUS VOLTAGE LIMITATIONS**	**4.3**

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

4.3.1 General

The open circuit voltage on telephone connections shall not exceed 70Vp after 1 sec.
Measured: 10.4 mV

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

4.3.2	HAZARDOUS VOLTAGE LIMITATIONS CONNECTION OF NON-APPROVED EQUIPMENT	4.3.2

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

TEST RESULTS

(b) Connection to Non-Registered Equipment

(1) Are there any power leads? Yes

If yes
Network leads adequately separated from power leads? Yes

The network leads are a totally separate set of leads from the power leads.

Network leads not routed in the same cable and do not use the same connector as power leads? Yes

The network leads are a totally separate set of leads from the power leads.

(2) Are there any leads to non-registered equipment? Yes

If yes
Network leads adequately separated from non-registered equipment? Yes

The network leads are a totally separate set of leads from the non-registered equipment leads.

Network leads not routed in the same cable and do not use the same connector as non-registered equipment? Yes

The network leads are a totally separate set of leads from the non-registered equipment leads.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

4.4.1	BILLING PROTECTION REQUIREMENTS CALL DURATION	4.4.1

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

Off-hook state

TEST RESULTS

4.4.1.2

SPEC. MIN. (SEC.)	MEASURED (SEC.)		
	B.E.S.	A.B.S.	A.A.S.
2	2.3	2.2	2.1
COMPLIANCE:	Yes	Yes	Yes

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

4.4.2	**BILLING PROTECTION REQUIREMENTS ON-HOOK SIGNAL POWER**	4.4.2

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

TEST RESULTS

4.4.2 Voice and data equipment on-hook signal requirements

4.4.2.1 INPUT LEVEL =____ dBm.
10 dB above overload

SPEC. MAX. = -55 dBm

CONDITION	MEASURED (dBm)		
	B.E.S.	A.B.S.	A.A.S.
On-hook State	-75.0	-75.0	-75.0
COMPLIANCE	Yes	Yes	Yes

4.4.2.2 Reverse Battery Equipment.

SPEC. MAX. = -55 dBm

CONDITION	MEASURED (dBm)		
	B.E.S.	A.B.S.	A.A.S.
COMPLIANCE			

NOTE: Reading less than -75dBm are shown as -75dBm

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

4.4.3	SIGNALING INTERFERENCE REQUIREMENTS	4.4.3

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

The following states/modes/conditions were found to comply with the requirements when tested with the go/no-go test set described in Nemko Dallas, Inc. Test procedures Manual:

4.8.4 Signaling interference requirements
4.8.4.1 and 4.8.4.2

Spec: Power in the 2450Hz to 2750Hz band must be ≤ power in the 800Hz to 2450Hz band.

	2450 to 2750 Hz Band			800 to 2450 Hz Band			Compliance		
CONDITION	B.E.S.	A.B.S.	A.A.S.	B.E.S.	A.B.S.	A.A.S.	B.E.S.	A.B.S.	A.A.S.
Handshake Tones	-77.3 dBm	-76.9 dBm	-76.3 dBm	-11.3 dBm	-11.2 dBm	-11.2 dBm	Yes	Yes	Yes

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

4.6 TRANSVERSE BALANCE LIMITATIONS 4.6

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State
Off-hook State

TEST RESULTS

WORST CASE OFF-HOOK LOOP CURRENT 70 mA.

FREQUENCY	SPEC. MIN. (dB)		MEASURED (dB)					
			ON-HOOK			OFF-HOOK		
	ON-HOOK	OFF-HOOK	B.E.S.	A.B.S.	A.A.S.	B.E.S.	A.B.S.	A.A.S.
200	60	40	90.0	90.0	90.0	90.0	90.0	90.0
500	60	40	89.6	89.6	90.0	87.6	87.6	90.0
1000	40	40	90.0	90.0	86.9	81.2	81.2	84.2
2000	40	40	80.3	80.3	80.3	74.3	74.3	74.3
3000	40	40	71.6	71.6	71.6	70.1	70.1	70.1
4000	40	40	68.3	68.3	68.3	67.6	67.6	66.6
		COMPLIANCE:	Yes	Yes	Yes	Yes	Yes	Yes

NOTE: Readings greater than 90dB are shown as 90dB.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.2.7	SIGNAL POWER LIMITATIONS THROUGH - PATH (DATA)	5.1.2.7

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

Off-hook State

TEST RESULTS

CONDITION	SPEC. MAX. (dBm)	MEASURED (dBm)		
		B.E.S.	A.B.S.	A.A.S.
Data Xmit	-9	-10.8	-11.3	-11.3
	COMPLIANCE:	Yes	Yes	Yes

ANALYSIS/COMMENTS: Complies

5.1.4	INTERNAL SIGNAL SOURCES (NETWORK SIGNALING)	5.1.4

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

Off-hook State
(Dialing)

TEST RESULTS

DIGIT	AVERAGE OVER 3 SECONDS SPEC. MAX. dBm	MEASURED (dBm)		
		B.E.S.	A.B.S.	A.A.S.
1	0	-6.83	-6.83	-6.96
2	0	-6.83	-6.83	-6.96
3	0	-6.83	-6.83	-6.96
A	0	-6.83	-6.83	-6.96
4	0	-6.83	-6.83	-6.96
5	0	-6.83	-6.83	-6.96
6	0	-6.83	-6.83	-6.96
B	0	-6.83	-6.83	-6.96
7	0	-6.83	-6.83	-6.96
8	0	-6.83	-6.83	-6.96
9	0	-6.83	-6.83	-6.96
C	0	-6.83	-6.83	-6.96
0	0	-6.83	-6.83	-6.96
*	0	-6.83	-6.83	-6.96
#	0	-6.83	-6.83	-6.96
D	0	-6.83	-6.83	-6.96
Any Other Signal	-9	-----	-----	-----
	COMPLIANCE:	Yes	Yes	Yes

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.5	SIGNAL POWER LIMITATIONS THROUGH - PATH (DC)	5.1.5

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

$Station_1$ = Tel-set
CO_1 = Loop Start

TEST RESULTS

5.1.5.1 Current drawn through 200 ohms = 20mA
Current drawn through thru-path = 20mA

5.1.5.2 There is no programmed or universal data jack.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.5	SIGNAL POWER LIMITATIONS THROUGH - PATH (VOICEBAND)	5.1.5

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

$Station_1$ = Tel-set
CO_1 = Loop Start

TEST RESULTS

5.1.5.1

PORTS		SPEC. MAX.	MEASURED dB		
FROM	TO	(dB)	B.E.S.	A.B.S.	A.A.S.
$Station_1$	Co_1	3.0	-0.3	-0.3	-0.3
Co_1	$Station_1$	3.0	-0.3	-0.3	-0.3
		COMPLIANCE:	Yes	Yes	Yes

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.5	SIGNAL POWER LIMITATIONS THROUGH - PATH (VOICEBAND)	5.1.5

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

$Station_1$ = Tel-set
CO_1 = Loop Start

TEST RESULTS
5.1.5.2

PORTS		RANGE	SPEC. MAX.	MEASURED dB		
FROM	TO		dB	B.E.S.	A.B.S.	A.A.S.
$Station_1$	Co_1	a	REF+1	-0.3	-0.3	-0.3
		b	REF	-0.3	-0.3	-0.3
Co_1	$Station_1$	a	REF+1	-0.3	-0.3	-0.3
		b	REF	-0.3	-0.3	-0.3
			COMPLIANCE	Yes	Yes	Yes

RANGE: a - 800-2450 Hz
b - 2450-2750 Hz

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.6.2	SIGNAL POWER LIMITATIONS THROUGH TRANSMISSION PATH	5.1.6.2

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

$Station_1$ = Tel-set
CO_1 = Loop Start

TEST RESULTS

5.1.6.2

SPEC. MAX.: 3 dB

PORT TO PORT PATH	FREQ. BAND Hz	MAX. LOSS FREQUENCY (Hz)			MAX. POWER LOSS (dB)		
		B.E.S.	A.B.S.	A.A.S.	B.E.S.	A.B.S.	A.A.S.
$Station_1 – CO_1$	600 - 4000	4000	4000	4000	-0.3	-0.3	-0.3
	3995 - 4005	4000	4000	4000	-0.3	-0.3	-0.3
$CO_1 – Station_1$	600 - 4000	4000	4000	4000	-0.3	-0.3	-0.3
	3995 -4005	4000	4000	4000	-0.3	-0.3	-0.3
				COMPLIANCE:	Yes	Yes	Yes

ANALYSIS/COMMENTS: Complies

5.1.7	LONGITUDINAL AC VOLTAGE BELOW 4 kHz	5.1.7

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

TEST DATE:JULY 22, 2013
TESTED BY: BRIAN BOYEA
REPORT NO:
SAMPLE NO:

5.1.7 LONGITUDINAL SIGNAL POWER LIMITATIONS

ON-HOOK B.E.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
.1-4 KHz	-30	-90	
4-12 KHz	-(18.4+(20 log f))	-90	
12-42 KHz	3.00-(40 log f)	-86	32
42-270 KHz	-62	-77	181
0.27-6 MHz	-30	-78	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

5.1.7 LONGITUDINAL SIGNAL POWER LIMITATIONS

OFF-HOOK DATA XMIT 70mA B.E.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
.1-4 KHz	-30	-81	
4-12 KHz	-(18.4+(20 log f))	-90	
12-42 KHz	3.00-(40 log f)	-82	32
42-270 KHz	-62	-82	60
0.27-6 MHz	-30	-76	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

EQUIPMENT: Loop Start Interface

TEST DATE:JULY 22, 2013
TESTED BY: BRIAN BOYEA
REPORT NO:
SAMPLE NO:

5.1.7 LONGITUDINAL SIGNAL POWER LIMITATIONS

ON-HOOK A.B.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
.1-4 KHz	-30	-90	
4-12 KHz	-(18.4+(20 log f))	-90	
12-42 KHz	3.00-(40 log f)	-81	32
42-270 KHz	-62	-80	60
0.27-6 MHz	-30	-79	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

5.1.7 LONGITUDINAL SIGNAL POWER LIMITATIONS

OFF-HOOK DATA XMIT 70mA A.B.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
.1-4 KHz	-30	-90	
4-12 KHz	-(18.4+(20 log f))	-90	
12-42 KHz	3.00-(40 log f)	-84	32
42-270 KHz	-62	-81	60
0.27-6 MHz	-30	-72	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

EQUIPMENT: Loop Start Interface

TEST DATE:JULY 22, 2013
TESTED BY: BRIAN BOYEA
REPORT NO:
SAMPLE NO:

5.1.7 LONGITUDINAL SIGNAL POWER LIMITATIONS

ON-HOOK A.A.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
.1-4 KHz	-30	-90	
4-12 KHz	-(18.4+(20 log f))	-90	
12-42 KHz	3.00-(40 log f)	-83	32
42-270 KHz	-62	-78	181
0.27-6 MHz	-30	-76	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

5.1.7 LONGITUDINAL SIGNAL POWER LIMITATIONS

OFF-HOOK DATA XMIT 70mA A.A.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
.1-4 KHz	-30	-62	
4-12 KHz	-(18.4+(20 log f))	-87	8
12-42 KHz	3.00-(40 log f)	-82	32
42-270 KHz	-62	-82	60
0.27-6 MHz	-30	-72	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

5.1.8	VOLTAGES IN THE 4 kHz TO 6 MHz FREQUENCY RANGE (METALLIC)	5.1.8

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

TEST DATE:JULY 22, 2013
TESTED BY: BRIAN BOYEA
REPORT NO:
SAMPLE NO:

5.1.8 METALLIC SIGNAL POWER LIMITATIONS

ON-HOOK B.E.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
4 KHz(+/-5 Hz)	-27	-90	
4-12 KHz	-(6.4+(12.6 log f))	-83	8
12-90 KHz	23-(40 log f)	-76	63
90-270 KHz	-55	-77	181
0.27-30 MHz	-15	-75	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

5.1.8 METALLIC SIGNAL POWER LIMITATIONS

OFF-HOOK DATA XMIT 70mA B.E.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
4 KHz(+/-5 Hz)	-27	-90	
4-12 KHz	-(6.4+(12.6 log f))	-83	8
12-90 KHz	23-(40 log f)	-76	63
90-270 KHz	-55	-77	181
0.27-30 MHz	-15	-76	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

EQUIPMENT: Loop Start Interface

TEST DATE:JULY 22, 2013
TESTED BY: BRIAN BOYEA
REPORT NO:
SAMPLE NO:

5.1.8 METALLIC SIGNAL POWER LIMITATIONS

ON-HOOK A.B.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
4 KHz(+/-5 Hz)	-27	-90	
4-12 KHz	-(6.4+(12.6 log f))	-80	8
12-90 KHz	23-(40 log f)	-76	63
90-270 KHz	-55	-77	181
0.27-30 MHz	-15	-73	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

5.1.8 METALLIC SIGNAL POWER LIMITATIONS

OFF-HOOK DATA XMIT 70mA A.B.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
4 KHz(+/-5 Hz)	-27	-90	
4-12 KHz	-(6.4+(12.6 log f))	-83	8
12-90 KHz	23-(40 log f)	-76	63
90-270 KHz	-55	-77	181
0.27-30 MHz	-15	-81	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

TEST DATE:JULY 22, 2013
TESTED BY: BRIAN BOYEA
REPORT NO:
SAMPLE NO:

5.1.8 METALLIC SIGNAL POWER LIMITATIONS

ON-HOOK A.A.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
4 KHz(+/-5 Hz)	-27	-90	
4-12 KHz	-(6.4+(12.6 log f))	-82	8
12-90 KHz	23-(40 log f)	-76	63
90-270 KHz	-55	-77	181
0.27-30 MHz	-15	-75	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

5.1.8 METALLIC SIGNAL POWER LIMITATIONS

OFF-HOOK DATA XMIT 70mA A.A.S.

FREQ. BAND (KHz)	SPEC. MAX. (dBV)	MEASURED (dBV)	NOISE FREQ. (KHz)
4 KHz(+/-5 Hz)	-27	-90	
4-12 KHz	-(6.4+(12.6 log f))	-83	8
12-90 KHz	23-(40 log f)	-76	63
90-270 KHz	-55	-77	181
0.27-30 MHz	-15	-71	

NOTE: ALL READINGS LESS THAN -90 dBV ARE SHOWN AS -90 dBV.

COMPLIANCE: YES

EQUIPMENT: Loop Start Interface

5.1.11.2	ON-HOOK IMPEDANCE LIMITATIONS (LOOP START)	5.1.11.2

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

TEST RESULTS

Ringer Equivalence Definition

QUOTIENT (5.1.11.2.1)	25 megohms / 19.92 megohms	=	1.26
QUOTIENT (5.1.11.2.2)	150 kilohms / 1000 megohms	=	0.15
QUOTIENT (5.1.11.2.3)	0.01 milliamps / 0.6 milliamps	=	0.02
QUOTIENT (5.1.11.2.4)	5 x 1600 kilohms (Ringing type) / 3000.0 kilohms	=	0.00

RINGER EQUIVALENCE NUMBER
R.E.N. (ac) = 0.0 B
R.E.N. (dc) = 1.3

5.1.11.2.8 Maximum Ringer Equivalence:

The sum of all such Ringer Equivalence on a given telephone line or loop shall not exceed 5. In some cases, a system that has a total Ringer Equivalence of 5 or more may not be usable on a given telephone line or loop.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.11.2.1 ON-HOOK RESISTANCE (UP TO 100VDC) 5.1.11.2.1

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

TEST RESULTS SPEC. MIN. 5 MΩ

5.1.11.2.1

	Measured Max. (µA) T - R			Calculated (MΩ) T - R		
Voltage Volts	BES	ABS	AAS	BES	A.B.S	AAS
0-10	0.48	0.48	0.48	20.83	20.83	20.83
10-20	0.88	0.88	0.91	22.73	22.73	21.97
20-30	1.42	1.42	1.44	21.13	21.13	20.83
30-40	1.84	1.84	1.84	21.74	21.74	21.74
40-50	2.41	2.41	2.41	20.75	20.75	20.75
50-60	2.93	2.93	2.93	20.48	20.48	20.48
60-70	3.42	3.42	3.42	20.47	20.47	20.47
70-80	3.95	3.95	3.95	20.25	20.25	20.25
80-90	4.46	4.46	4.46	20.17	20.17	20.17
90-100	5.11	5.11	5.12	19.57	19.57	19.53
			COMPLIANCE	Yes	Yes	Yes

NOTE: Readings greater than 100 megohms are shown as 100 megohms.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.11.2.1 ON-HOOK RESISTANCE (UP TO 100VDC) 5.1.11.2.1

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

TEST RESULTS SPEC. MIN. 5 MΩ

5.1.11.2.1

	Measured Max. (µA) T- Gnd			Calculated (MΩ) T - Gnd		
Voltage Volts	BES	ABS	AAS	BES	A.B.S	AAS
0-10	0.0	0.0	0.0	100	100	100
10-20	0.0	0.0	0.0	100	100	100
20-30	0.0	0.0	0.0	100	100	100
30-40	0.0	0.0	0.0	100	100	100
40-50	0.0	0.0	0.0	100	100	100
50-60	0.0	0.0	0.0	100	100	100
60-70	0.0	0.0	0.0	100	100	100
70-80	0.0	0.0	0.0	100	100	100
80-90	0.0	0.0	0.0	100	100	100
90-100	0.0	0.0	0.0	100	100	100
			COMPLIANCE	Yes	Yes	Yes

NOTE: Readings greater than 100 megohms are shown as 100 megohms.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.11.2.1 ON-HOOK RESISTANCE (UP TO 100VDC) 5.1.11.2.1

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

TEST RESULTS SPEC. MIN. 5 MΩ

5.1.11.2.1

	Measured Max. (µA) R - Gnd			Calculated (MΩ) R - Gnd		
Voltage Volts	BES	ABS	AAS	BES	A.B.S	AAS
0-10	0.0	0.0	0.0	100	100	100
10-20	0.0	0.0	0.0	100	100	100
20-30	0.0	0.0	0.0	100	100	100
30-40	0.0	0.0	0.0	100	100	100
40-50	0.0	0.0	0.0	100	100	100
50-60	0.0	0.0	0.0	100	100	100
60-70	0.0	0.0	0.0	100	100	100
70-80	0.0	0.0	0.0	100	100	100
80-90	0.0	0.0	0.0	100	100	100
90-100	0.0	0.0	0.0	100	100	100
			COMPLIANCE	Yes	Yes	Yes

NOTE: Readings greater than 100 megohms are shown as 100 megohms.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.11.2.2 ON-HOOK RESISTANCE (100 – 200VDC) 5.1.11.2.2

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

TEST RESULTS

5.1.11.2.2

SPEC. MIN. = 30 KILOHMS

MEASURED FROM	VOLTAGE AT MAX. I (V)	MEASURED MAX. (mA)			CALC. MIN. RESIST. (kΩ)		
		B.E.S.	A.B.S.	A.A.S.	B.E.S.	A.B.S.	A.A.S.
T - R	100	0.0	0.0	0.0	1000.0	1000.0	1000.0
T - G	100	0.0	0.0	0.0	1000.0	1000.0	1000.0
R - G	100	0.0	0.0	0.0	1000.0	1000.0	1000.0
T - R	150	0.0	0.0	0.0	1000.0	1000.0	1000.0
T - G	150	0.0	0.0	0.0	1000.0	1000.0	1000.0
R - G	150	0.0	0.0	0.0	1000.0	1000.0	1000.0
T - R	200	0.0	0.0	0.0	1000.0	1000.0	1000.0
T - G	200	0.0	0.0	0.0	1000.0	1000.0	1000.0
R - G	200	0.0	0.0	0.0	1000.0	1000.0	1000.0
				COMPLIANCE:	Yes	Yes	Yes

NOTE: Readings greater than 1000 kilohms are shown as 1000 kilohms.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.11.2.3	**DC CURRENT DURING RINGING**	**5.1.11.2.3**

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

TEST RESULTS

5.1.11.2.3

Spec. Max. = 3.0mA

Measured with +56.5 Vdc and –56.5 Vdc bias

RINGING FREQ. Hz	VOLTAGE (VOLTS)	MEASURED (mA)		
		B.E.S.	A.B.S.	A.A.S.
15.3	40	0.0	0.0	0.0
15.3	130	0.0	0.0	0.0
20	40	0.0	0.0	0.0
20	130	0.0	0.0	0.0
35	62	0.0	0.0	0.0
35	130	0.0	0.0	0.0
50	62	0.0	0.0	0.0
50	150	0.1	0.1	0.1
68	62	0.0	0.0	0.0
68	150	0.1	0.1	0.1
	COMPLIANCE:	Yes	Yes	Yes

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.11.2.4	**AC IMPEDANCE**	**5.1.11.2.4**

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

TEST RESULTS

5.1.11.2.4

Spec. Min. = 1.6 Kilohms

Measured with +56.5 Vdc and –56.5 Vdc bias

CONDITION	SIGNAL APPLIED		MEASURED					
	Freq. (Hz)	Voltage (V)	B.E.S.		A.B.S.		A.A.S.	
			mA	kΩ	mA	kΩ	mA	kΩ
T - R	15.3	40	0.01	4000.0	0.01	4000.0	0.01	4000.0
T - R	15.3	130	0.01	13000.0	0.01	13000.0	0.01	13000.0
T - R	20	40	0.01	4000.0	0.01	4000.0	0.01	4000.0
T - R	20	130	0.01	13000.0	0.01	13000.0	0.01	13000.0
T - R	35	62	0.01	6200.0	0.01	6200.0	0.01	6200.0
T - R	35	130	0.02	6500.0	0.02	6500.0	0.02	6500.0
T - R	50	62	0.01	6200.0	0.01	6200.0	0.01	6200.0
T - R	50	150	0.05	3000.0	0.04	3750.0	0.05	3000.0
T - R	68	62	0.01	6200.0	0.01	6200.0	0.01	6200.0
T - R	68	150	0.05	3000.0	0.04	3750.0	0.05	3000.0
		COMPLIANCE:		Yes		Yes		Yes

ANALYSIS/COMMENTS: Complies

5.1.11.2.5 RINGING FREQUENCY IMPEDANCE 5.1.11.2.5

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

TEST RESULTS

5.1.11.2.5

Spec. Min. = 100 Kilohms

Measured with +56.5 Vdc and –56.5 Vdc bias

CONDITION	SIGNAL APPLIED		MEASURED					
	Freq. (Hz)	Voltage (V)	B.E.S.		A.B.S.		A.A.S.	
			mA	kΩ	mA	kΩ	mA	kΩ
T - GND	15.3	40	0.0	1000.0	0.0	1000.0	0.0	1000.0
T - GND	15.3	130	0.0	1000.0	0.0	1000.0	0.0	1000.0
T - GND	20	40	0.0	1000.0	0.0	1000.0	0.0	1000.0
T - GND	20	130	0.0	1000.0	0.0	1000.0	0.0	1000.0
T - GND	35	62	0.0	1000.0	0.0	1000.0	0.0	1000.0
T - GND	35	130	0.0	1000.0	0.0	1000.0	0.0	1000.0
T - GND	50	62	0.0	1000.0	0.0	1000.0	0.0	1000.0
T - GND	50	150	0.0	1000.0	0.0	1000.0	0.0	1000.0
T - GND	68	62	0.0	1000.0	0.0	1000.0	0.0	1000.0
T - GND	68	150	0.0	1000.0	0.0	1000.0	0.0	1000.0
		COMPLIANCE:		Yes		Yes		Yes

NOTE: Readings greater than 1000 kilohms are shown as 1000 kilohms.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.11.2.5	**RINGING FREQUENCY IMPEDANCE**	5.1.11.2.5

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

On-hook State

TEST RESULTS

5.1.11.2.5

Spec. Min. = 100 Kilohms

Measured with +56.5 Vdc and –56.5 Vdc bias

CONDITION	SIGNAL APPLIED		MEASURED					
	Freq. (Hz)	Voltage (V)	B.E.S.		A.B.S.		A.A.S.	
			mA	kΩ	mA	kΩ	mA	kΩ
R - GND	15.3	40	0.0	1000.0	0.0	1000.0	0.0	1000.0
R - GND	15.3	130	0.0	1000.0	0.0	1000.0	0.0	1000.0
R - GND	20	40	0.0	1000.0	0.0	1000.0	0.0	1000.0
R - GND	20	130	0.0	1000.0	0.0	1000.0	0.0	1000.0
R - GND	35	62	0.0	1000.0	0.0	1000.0	0.0	1000.0
R - GND	35	130	0.0	1000.0	0.0	1000.0	0.0	1000.0
R - GND	50	62	0.0	1000.0	0.0	1000.0	0.0	1000.0
R - GND	50	150	0.0	1000.0	0.0	1000.0	0.0	1000.0
R - GND	68	62	0.0	1000.0	0.0	1000.0	0.0	1000.0
R - GND	68	150	0.0	1000.0	0.0	1000.0	0.0	1000.0
		COMPLIANCE:		Yes		Yes		Yes

NOTE: Readings greater than 1000 kilohms are shown as 1000 kilohms.

ANALYSIS/COMMENTS: Complies

EQUIPMENT: Loop Start Interface

5.1.11.4 & 5.1.12.4 LOOP CURRENT REQUIREMENTS 5.1.11.4 & 5.1.12.4

MODEL: 6290
TEST PERFORMED BY: Brian Boyea DATE: 22-July-2013

THE UNIT WAS TESTED IN THE FOLLOWING STATES OR MODES:

Off-hook State

TEST RESULTS

THE EQUIPMENT UNDER TEST MUST COMPLY WITH THE REQUIREMENTS OF EITHER (1) OR (2).
5.1.11.4 & 5.1.12.4 Voice and data equipment loop current requirements

	CURRENT THROUGH 200 OHM RESISTOR					
	B.E.S.		A.B.S.		A.A.S.	
	20 mA	70 mA	20 mA	70 mA	20 mA	70 mA
	19.2					
COMPLIANCE	NO					

OR

REQUIREMENT @ 20 mA	STATE	MEASURED			COMPLIANCE		
		mA	mA after 5 sec.	%	B.E.S.	A.B.S.	A.A.S.
Line current shall not decrease by more than 25% in the first 5 seconds	Off-hook State	19.2	19.2	0	Yes	-----	-----
	Off-hook State	19.2	19.2	0	-----	Yes	-----
	Off-hook State	19.1	19.1	0	-----	-----	Yes

ANALYSIS/COMMENTS: Complies

Front Side View

