



Engineering Standard

SAES-T-634

2 May 2012

Telecommunications - Cable Testing and Acceptance

Document Responsibility: Communications Standards Committee

Saudi Aramco DeskTop Standards

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Revised paragraphs are indicated in the right margin

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1 Scope

This Standard prescribes Mandatory Requirements governing the testing and acceptance of telecommunications cable and wire for quality assurance of new installations.

2 Conflicts and Deviations

Any deviations, providing less than the mandatory requirements of this standard require written waiver approval as per Saudi Aramco Engineering Procedure [SAEP-302](#).

3 References

All referenced Specifications, Standards and Codes, Forms, Drawings and similar material shall be of the latest issue (including all revisions, addenda and supplements) unless stated otherwise. Applicable references are listed below.

➤ Saudi Aramco References

Saudi Aramco Engineering Procedure

[SAEP-302](#)

*Instructions for Obtaining a Waiver of a
Mandatory Saudi Aramco Engineering
Requirement*

Saudi Aramco Engineering Standard

[SAES-T-624](#)

Telecommunications - OSP Fiber Optics

4 Definitions and Terms

AML: Actual Measured Loss at 1004 Hz. The measured value of transmission loss, expressed in decibels that include any impairment caused from attenuation, noise and bandwidth restrictions. The actual value is then compared to an objective or calculated value.

Balance: The amount of cancellation of current flowing along tip and ring conductors. Currents that are not cancelled are heard by the subscriber as noise metallic. Balance is in dB and can be calculated by:

Balance = (Noise-to-Ground + 40) - Noise Metallic

or

Balance = Power influence - Circuit Noise

BOC: Build Out Capacitance. This passive device is a capacitor that is bridged between the two conductors of a cable pair and is used to simulate the capacitance of a missing length of cable.

Cable Shield: A metallic layer located under the outer covering of a cable that protects the cable pair. It can be composed of woven, braided, foil wrap, or metal tube that, when bonded and grounded, prevents electromagnetic/electrostatic interference from being induced into the inner wire conductor.

Continuity: The continuity test determines if the tip and ring conductors are continuous.

Chromatic Dispersion: Chromatic dispersion occurs because different wavelengths (colors of light) travel along an optical medium at different speeds. Wavelengths (colors of light) reach the end of the medium at different times, causing the light pulse to spread.

Chromatic Dispersion Coefficient: This chromatic dispersion is expressed in picoseconds (of dispersion) per kilometer (of length) per nanometer (of source bandwidth). It is the sum of material and waveguide dispersion, ps/(nm.km).

Polarization Mode Dispersion (PMD): Polarization mode dispersion is a form of modal dispersion where two different polarizations of light in a waveguide, which normally travel at the same speed, travel at different speeds due to random imperfections and asymmetries, causing random spreading of optical pulses. Unless it is compensated, which is difficult, this ultimately limits the rate at which data can be transmitted over a fiber.

dBm: dB reference to the milliwatt. dBm is the amount of power relative to that represented by a 1004 Hz signal which will feed one milliwatt of power into a 600 ohm resistive load.

dBrn: A value of decibels above reference noise that begins at a "O" level dBrn - 90 dB. The measured value describes that power level of a noise as seen through a line weighting network of the test set.

dBrnC: dBrn with C message weighting. dBrnC is measure of the interfering effect of noise expressed as the dB above reference noise of -90 dBm at 1004 Hz.

EML: Expected Measured Loss - The EML is the 1004 Hz loss that is expected to be measured between specified test points.

Ground: A conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or to some conducting body that serves in place of the earth.

Hz: Hertz. Unit of frequency: on cycle per second.

Insertion Loss: The transmission loss caused by inserting a component or network in a circuit. The ratio of power received at a load before insertion to that received at a load after insertion, expressed in decibels.

Insulation Resistance: The insulation resistance test is taken to ensure that the value of resistance each conductor has to all other conductors in a cable and to the cable shield is a minimum of 1000 megohm-miles.

Loaded Loop: A loop into which lumped inductance (loading coil) is introduced at fixed intervals to compensate for the distributed cable capacitance. The addition of loading coils properly placed, reduces mid-voice band loss, and flattens the frequency response over most of the voice band, but creates a sharp cut-off at the high-frequency band edge.

Loop Resistance: The actual DC resistance of the circuit.

Noise Metallic (Differential Noise): The noise measured across the tip and ring of a circuit; the noise the subscriber hears.

Noise-to-Ground (Common Mode Noise): A measure of the power influence on the cable conductors whose magnitude is a function of the power line current and voltage present at particular harmonic frequencies. Although the subscriber cannot hear noise-to-ground, its magnitude determines the level of noise metallic that is heard.

Noise to Ground = Power Influence - 40 dB.

PCM: Pulse Code Modulation

POTS: Plain Old Telephone Service.

Power Influence: The characteristics of power circuits and associated apparatus that determine the character and intensity of the fields they produce.

Resistance Unbalance: A measurement of the equality of the dc resistance of the tip-to-ground versus the ring-to-ground with the pair grounded at the far end.

Shield Continuity: Verifies the cable shield continuity for the entire length of cables being tested.

5 Design

5.1 Acceptance Testing – Cable Facility

5.1.1 Acceptance tests shall be performed on all new cables, additions or re-arrangements to existing cables when:

5.1.1.1 Adding 305 meters or more of cable

5.1.1.2 Altering the attenuation loss of a voice frequency circuit (loaded or non-loaded) by more than -0.5 dB at 1004 Hz.

5.1.2 For every pair with an irregularity, two or more pairs in the same complement shall be checked.

5.1.2.1 If one or both pairs show irregularities, then all pairs in the complement shall be checked.

5.1.2.2 If 25% or more of the tested pairs show irregularities, then all pairs of the cable shall be tested.

Exception:

If all irregular pairs are confined to one complement, test only the pairs in that complement.

5.2 Responsibilities

5.2.1 Engineering shall be responsible for:

5.2.1.1 Providing cable schematics showing:

- Test points
- Loading points
- Loop loss at 1000 Hz
- Loop resistance

5.2.1.2 Identifying all special testing requirements.

5.2.1.3 Providing loss budget for fiber loops.

5.2.1.4 Providing estimated measured loss for E1 Repeater sections.

5.2.1.5 Providing calculated resistance for E1 Repeater sections.

5.2.2 Outside Plant Construction shall be responsible for:

5.2.2.1 Performing the cable acceptance testing on all cables in accordance with:

- This SAES and any other tests specified on the work order by Engineering.

5.2.2.2 Ensuring that 100% of constructed facilities meet Saudi Aramco mandatory requirements for the type of facility being tested.

5.2.2.3 Testing facility extensions from terminated point to terminated point.

5.2.2.4 Reporting cable troubles identified while testing in existing cables to the Communications Operations and Maintenance Department.

5.2.2.5 Repairing any trouble detected during cable acceptance testing in the new facilities.

5.3 Cable Facility Acceptance Test Requirements

Before a cable is designated for voice frequency (VF) or E1 digital transmission, standard cable acceptance testing procedures shall be completed to verify dc and high frequency acceptability.

Commentary Note:

All cable acceptance tests from the central office must be performed from the cable side of the central office protector to the distribution terminal.

5.3.1 All cable pairs, including POTS, (Loaded & Unloaded), Special Service, and E1 digital on cable, shall meet the minimum acceptance test requirements listed in Table 1.

Table 1

Test	Requirement
Continuity and Polarity	Continuity test shall be made on all pairs for shorts, grounds, and opens. Shorts, grounds, and opens in all new cables shall be corrected; pairs shall be properly grounded. Continuity troubles identified in the existing cables tested shall be reported to the Saudi Aramco Communications Operations and Maintenance Department.
AC Longitudinal Induced Voltage	AC longitudinal voltage shall be a maximum of 10 volt (rms)
Insertion Loss (Frequency Run)	Insertion loss shall be computed and measured over (Frequency Run) the frequency band from 500 Hz to 2500 Hz. The 1 kHz-measured loss shall be within plus or minus 0.5 dB of the calculated loss value. A maximum loss of 8.5 dB (at 1 kHz) shall be acceptable.
Insertion Loss (Frequency Run)	For non-loaded cable, the measured loss at 2500 Hz shall be within 6 dB of the measured 1 kHz loss. For H88 loaded cable, the loss over the frequency band from 500 Hz to 2500 Hz shall be flat and be within: <ul style="list-style-type: none"> • Plus or minus 0.5 dB for up to four load points. • Plus or minus 1.5 dB for more than four load points.
Insulation Resistance (For POTS Service, 1 pair shall be tested in 25 pair group. For Special Services and Digital Systems, 100% of pairs shall be tested).	Insulation resistance shall be a minimum of 1000 meg-ohm miles at a potential of 500 volts for one minute measured at increments of 6000 feet or less.
Loop Resistance (100% of pairs shall be tested).	Loop resistance shall measure within plus or minus 10% of the actual calculated value, & all sample pairs shall measure within plus or minus 2% of the average.
Noise Metallic (For POTS Service, 1 pair shall be tested in 25 pair group. For Special Services, 100% of pairs shall be tested).	Circuit noise measurement shall not exceed 20 dBnC.
Power Influence (For POTS Service, 1 pair shall be tested in 25 pair group. For Special Services, 100% of pairs shall be tested).	Power influence shall not exceed 80 dBnC.
Resistance Unbalance (100% of vacant pairs shall be tested).	Resistance unbalance of exchange pairs shall not exceed 10 ohms.
Shield Continuity (100% of cable shield shall be tested).	Shield shall be continuous.

- 5.3.2 All POTs on loaded cable pairs only, shall meet the minimum Structural return loss test requirements listed in Table 2.

Table 2

Test	Requirement
Structural Return Loss (For POTS Service, 1 pair shall be tested in 25 pair group. For Special Services, 100% of pairs shall be tested).	
	19 gauge LC 23.0 dB 19 gauge HC 23.4 dB 22 gauge 25.6 dB 24 gauge 26.8 dB 26 gauge 28.1 dB LC = Low Capacitance HC = High Capacitance All facilities assume H-88 loading

- 5.3.3 All cable pairs on screened and/or non-screened cable used for E1 shall meet the minimum acceptance test requirements listed in Table 3.

Table 3

Test	Requirement															
Resistance Unbalance (100% of pairs shall be tested)	Resistance unbalance shall not exceed 3 ohms or 0.5% of the loop resistance, whichever is greater.															
AC Longitudinal Induced Voltage	AC longitudinal voltage shall be a maximum of 10 volt (rms)															
Insertion Loss @ 772 kHz (100% of pairs shall be tested)	Measured loss with an all 1s signal must not exceed the calculated maximum loss by more than 2.5 dB of the loss at 772 kHz for T1. Considering each direction separately, the range of losses among all pairs measured must not exceed 3.5 dB at 772 kHz for T1.															
Signal-to-Noise (T1 non-screened cable only)	The noise variance shall represent the difference between the reference and the measured readings using the Sierra 413 or equivalent equipment. <table> <thead> <tr> <th>Facility e/w Capacity</th> <th>S/N Margin</th> <th>Noise Variance</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>8 dB minimum</td> <td><1</td> </tr> <tr> <td></=49</td> <td>4 dB minimum</td> <td><2</td> </tr> <tr> <td>50-80</td> <td>4 dB minimum</td> <td><2</td> </tr> <tr> <td>>/=81</td> <td>4 dB minimum</td> <td><2</td> </tr> </tbody> </table>	Facility e/w Capacity	S/N Margin	Noise Variance	0	8 dB minimum	<1	</=49	4 dB minimum	<2	50-80	4 dB minimum	<2	>/=81	4 dB minimum	<2
Facility e/w Capacity	S/N Margin	Noise Variance														
0	8 dB minimum	<1														
</=49	4 dB minimum	<2														
50-80	4 dB minimum	<2														
>/=81	4 dB minimum	<2														

5.3.4 All fibers shall meet acceptance test requirements listed in Table 4 prior to establishing service.

Table 4

Test	Requirement												
End-to-End Loss	<p>100% of fibers in both directions, and 100% of fiber splices and connections; (individual splice loss shall not exceed the following limits; (refer to SAES-T-624).</p> <p>The maximum attenuation of each fiber within a cable, when normalized to a length of 1 km. At wavelength = 1,300 nm, shall be 0.5 dB/km or less, and at wavelength = 1,550 nm, shall be 0.3 dB/km or less.</p> <p>Individual splice insertion loss shall be .05 dB average link splice loss with no single splice loss above 0.1 dB for fusion splices, and 0.1 dB average link splice loss with no single splice loss above 0.2 dB for mechanical splices; connectors shall have insertion losses of 0.5 dB or less).</p>												
Chromatic Dispersion Coefficient	<table border="1"> <thead> <tr> <th data-bbox="865 1041 1019 1092">Fiber Type</th> <th data-bbox="1019 1041 1187 1092">Wavelength Range (nm)</th> <th data-bbox="1187 1041 1412 1192">Maximum Chromatic Dispersion Coefficient [ps/(nm.km)]</th> </tr> </thead> <tbody> <tr> <td data-bbox="865 1203 1019 1274">Zero-Dispersion</td> <td data-bbox="1019 1203 1187 1274">1288-1339 1271-1360</td> <td data-bbox="1187 1203 1412 1274">3.5 5.3</td> </tr> <tr> <td data-bbox="865 1285 1019 1356">Dispersion Shifted</td> <td data-bbox="1019 1285 1187 1356">1525-1575</td> <td data-bbox="1187 1285 1412 1356">3.5</td> </tr> <tr> <td data-bbox="865 1367 1019 1438">Non-Zero Dispersion Shifted</td> <td data-bbox="1019 1367 1187 1438">1530-1565</td> <td data-bbox="1187 1367 1412 1438">6.0</td> </tr> </tbody> </table>	Fiber Type	Wavelength Range (nm)	Maximum Chromatic Dispersion Coefficient [ps/(nm.km)]	Zero-Dispersion	1288-1339 1271-1360	3.5 5.3	Dispersion Shifted	1525-1575	3.5	Non-Zero Dispersion Shifted	1530-1565	6.0
Fiber Type	Wavelength Range (nm)	Maximum Chromatic Dispersion Coefficient [ps/(nm.km)]											
Zero-Dispersion	1288-1339 1271-1360	3.5 5.3											
Dispersion Shifted	1525-1575	3.5											
Non-Zero Dispersion Shifted	1530-1565	6.0											
Polarization mode dispersion coefficient	PMD coefficient shall be below 0.5 ps/ $\sqrt{\text{km}}$												

5.4 Test Equipment

The person(s) performing testing shall ensure that all test equipment items being used have been periodically calibrated, or performance tested, and certified by either the Original Equipment Manufacturer (OEM), an organization designated as authorized by the OEM (such as an authorized manufacturer third party commercial service center, etc.), a third party commercial calibration laboratory duly accredited internationally according to

ISO/IEC 17025 or a third party commercial calibration laboratory certified nationally by the Saudi Arabian Standards Organization (SASO) as being ISO/IEC 17025 compliant. All measurements must be traceable to accepted international measurement standards where applicable. The maximum calibration interval between each subsequent recertification of the test equipment must be based upon either Saudi Aramco directed safety or performance guidelines (such as Loss Prevention directives, etc.), manufacturer specified recommended calibration intervals or internationally accepted practices and procedures. All documents and associated performance measurement records (such as calibration certificates, measurement data and uncertainty analysis etc.) must be maintained and made available to Saudi Aramco upon request. All equipment use must be in accordance with the OEM published data and guidelines for the test equipment item to ensure stated performance specifications are applicable to measurements and analysis being performed.

5.5 Testing Procedures

Cable testing shall be done as outlined in Table 5.

Table 5

Test	Activity
Continuity and Polarity	<ol style="list-style-type: none"> 1. Place the ground on the tip side of the pair at the far end. 2. Measure the dc resistance between the tip and ground. 3. Place a ground on the ring side of the pair at the far end. 4. Measure the dc resistance between the ring and ground.
AC Longitudinal Induced Voltage	<ol style="list-style-type: none"> 1. Place the ground on the tip side of the pair at the far end. 2. Measure the AC voltage between the tip and ground. 3. Place a ground on the ring side of the pair at the far end. 4. Measure the AC voltage between the ring and ground.
Resistance Unbalance	<ol style="list-style-type: none"> 1. Clear the ends of all conductors on the far end (opposite the tested end). 2. Remove all protective devices from test pairs. 3. Bunch and ground all conductors on the testing end. 4. Remove one conductor at a time and measure that conductor to the bunched and grounded conductors.

Test	Activity
	5. After a conductor is tested, return it to the bunched group and select another conductor for testing.
Loop Resistance	1. Place a short on the pair at the far end. 2. Measure the dc resistance across the tip and ring.
Resistance Unbalance	1. Ground the ring side of the cable pair at the far end. 2. Read the ring-to-ground value. 3. Ground the tip side of the cable pair at the far end. 4. Read the tip-to-ground value.
Shield Continuity	1. Bunch and ground cable pairs of the cable being tested at the near and far ends. 2. Make a power influence reading. 3. Compare this reading to the power influence reading made during the noise measurements.
Continuity and Polarity	1. Place the ground on the tip side of the pair at the far end. 2. Measure the dc resistance between the tip and ground. 3. Place a ground on the ring side of the pair at the far end. 4. Measure the dc resistance between the ring and ground.
Insertion Loss	1. Send a 0 dBm signal using an oscillator at one of the required frequencies. 2. Use a terminated meter to measure loss at the opposite end of the cable pair.
Noise Metallic	1. Terminate one end of the circuit or cable pair with a 600 or 900 ohm in series with a 2.16 micro-farad capacitor. 2. Measure noise at the opposite end of the cable using a noise measuring set.
Power Influence	1. Connect cable pair or circuit to the 600 or the 900 ohms termination in series with a 2.16 microfarad capacitor at the central office end. 2. Use noise measuring set to make noise measurement from the field.
Structural Return Loss	1. Build out the far end to a full section 1829 meters with a BOC (build out capacitor). 2. Terminate the far end with a PN (precision network) representing the most dominant gauge or the cable being tested. 3. Terminate the near end with a BOC and PN which match the length and impedance of the near end section 4. Measure the structural return loss with return loss test set.

5.6 Documentation

Copies of used test equipment list and completed Test Record (Exhibits 1, 2 & 3) shall be attached to the MCC and PAC Forms. (This information must be available for quality reviews by Inspection, Communications Engineering, and the Operation and Maintenance Departments).

5.6.1 Exchange Cable

Cable acceptance test shall be recorded according to the instructions listed in Table 6, Exchange Cable Acceptance Test Record (Exhibit 1).

Table 6 – Exchange Cable Acceptance Test Record Instructions

In Term	Specify
A	The exchange location
B	Work Order number
C	The assigned test point number
D	The assigned cable number
E	The assigned cable count
F	Temperature factor, if applicable
G	The assigned "from" location
H	The assigned "to" location
I	Shield continuity test Pass/Fair
In Term	Specify
	<ul style="list-style-type: none"> • Resistance unbalance (T-R) • Insulation Resistance: <ul style="list-style-type: none"> - Conductor (between tip and ring) - Shield (tip to ground and ring to ground)
J	<ul style="list-style-type: none"> • Structural Return Loss (SRL) • Insertion Loss from 500 Hz to 2500 Hz • Conductor continuity tests, Pass/Fair • Signal-to-Noise margins: <ul style="list-style-type: none"> - Power Influence, Ng - Noise Metallic, Nm

5.6.2 Digital Line

After testing each pair between repeater housings, results shall be recorded on the Digital Test Data Acceptance Test Record (Exhibit 2) according to Table 7 instructions.

Table 7 – Digital Test Data Acceptance Test Record Instructions

In Term	Specify
A	Type of PCM Test Set used
B	Work Order number
C	Work Order number (use when different from B)
D	<ul style="list-style-type: none"> • Cable pair number • Loss at 772 kHz • Loop resistance • Resistance unbalance • Repeater slot number • Signal-to-noise • Shield continuity
E	<ul style="list-style-type: none"> • Cable number • Repeater housing number • Noise readings
F	<ul style="list-style-type: none"> • Cable section under test • Test rules of loaded pairs
G	<ul style="list-style-type: none"> • Transmit direction • Tester's names

5.6.3 Optical Fiber Cable

5.6.3.1 After each fiber is tested in one direction (Office A to Office B or host-remote link), loss measurements shall be documented on the Optical Fiber Cable Acceptance Test Record (Exhibit 3). Upon test completion, transmitter and receiver shall be reversed, and test shall be repeated in the other direction (Office B to Office A or host-remote link).

Commentary Note:

The transmitter is located in Office B, the receiver is located in Office A.

- 5.6.3.2 Optical fiber cable acceptance test shall be recorded on the Optical Fiber Cable Acceptance Test Record (Exhibit 3) according to Table 8 instructions.

**Table 8 – Optical Fiber Cable
Acceptance Test Record Instructions**

In Term	Specify
A	End-to-end test or Splice Loss Data
B	The assigned span number designation
C	The assigned cable/trunk number
D	The assigned cable count
E	The type of fiber, i.e., multimode or singlemode
F	The designed wavelength, e.g., 1310 or 1550 nm
G	The calculated allowable loss
H	Central Office A
I	Central Office B
J	Fiber color, Buffer tube color

6 Installation

Cable installation shall be in accordance with other SAES's. Refer to Paragraph 3, Applicable Codes and Standards above.

7 Testing and Inspection

The testing and acceptance of new copper conductor and fiber optic telecommunication cables shall be done in accordance with this standard. The Inspection Department shall be notified prior to the testing of copper conductor or fiber optic telecommunication cables.

Revision Summary

21 February 2011	Minor revision to update Paragraph 5.4 (Test Equipment). Revised the "Next Planned Update."
2 May 2012	Editorial revision to change the primary contact.

Exhibit 1 – Exchange Cable Acceptance Test Record

Exchange:				Date:				Page: _____ of _____									
Street or Road Name:			Work Order No.:		Test Point:		Temperature:		Cable No.:		Cable Count:						
From:						To:						Shield Continuity Pass/Fail-P/E:					
Line No.:	Cable Pair No.	Loop Res. in Ohms (Must be within 10% of calcu. and 2 % of Avg.)	Res. Unba (T to R) Max. 10 Ohms for POTS & 3 Ohms for E1)	Cond. Cont. Test: (no shorts, opens, grnd's, or rever-sals)	Insulation Resistance: (Minimum of 1,000 Megohm Per Mile) (Measured in increments of 6,000 feet or less) (For POTS, 1 pair per 25 pair Complement must be measured)			Insertion Loss: (Maximum of 8.5 dB @ 1 kHz) (Measured 1 kHz +/- .5 dB of Calc.) (NL measured 2.5 kHz loss must be within 6 dB of measured 1 kHz loss) (For H88 - up to 4 Ld Pts - 500-2500 Hz. shall be flat, within .5 dB & for more than 4 Ld Pts within 1.5 dB)					Noise: dBrnc (For POTS, 1 pr. per 25 pair complement must be measured)	AC Longitudinal Induced Volts (Max. 10 volts rms)	SRL: (Ld'd Cable Only) (22 = 25.6; 24 = 26.8; 26 = 28.1 min.)	Load Coil Spacing (Load Coil spacing must be within 2 % of std. & avg. & avg. dev. .5% of avg.) Note: As-Built Ldng. Chart.	
					P/F	T to R	T to G	R to G	500 Hz	1,000 Hz	1500 Hz	2000 Hz					2500 Hz
Test/per 25 Complement	25	25	25		For POTS = 1; For Digital = 25			For POTS = 1; For Digital = 25					For POTS = 1; For Digital = 25		25	1	Ld. Avg. Dev.
1																	
2																	
3																	
4																	
5																	
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24																	
25																	
Avg. Res. =	< (Avg. Measured Loop Resistance)				(Show		< 1 kHz Calculated Loss)										
Calc. Res. =	< (Calculated Loop Resistance)				Temperature at which measurements were made =												
Notes: 1- For loaded cables to be used for Special Svcs or Digital Systems, do Insertion Loss test @ 772 kHz and Signal-to-Noise test, also.																	
2- For every pair with irregularity, 2 or more pairs in same complement must be tested. If bad, all pairs in complement shall be tested.																	
3- If 25% or more of tested pairs show irregularities, then all pairs of the cable shall be tested.																	
Tested by [Company Name] & [Individual Tester Name(s) & Signature(s)]:																	

Exhibit 2 – Digital Test Data Acceptance Test Record

DIGITAL TEST DATA ACCEPTANCE TEST RECORDS										Page ____ of ____					
										Date: _____					
(A)															
W. O. # _____ (B)					W. O. # _____ (C)										
CA PR NO	LOSS dB @772 kHz	LOOP RES	VARLEY (RES UNBAL)	SIGN TO NOS	SHLD CONT.		REPT. SLOTS	SIDE 2							
					Y	N		CA PR No.	LOSS dB	LOOP RES.	VARLEY (RES UNBAL)	SIGN TO NOS	SHLD CONT.		
(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
CABLE NO. _____ (E)		RPTR HOUSING # _____ (E)			NOISE METALLIC _____ dBmrc (E)										
NOISE GRND _____ dBmrc															
CA SEC. BETWEEN _____ (F) AND _____															
ORDER WIRE PR. _____ - LOOP _____ - VARLEY _____															
FAULT PR. _____ - LOOP _____ - VARLEY _____															
MEG. TEST OK? YES _____ NO _____															
SIDE ONE TRANSMITS FROM _____ (G) TO _____															
TESTED BY: _____ (G) AND: _____															

Exhibit 3 – Optical Fiber Cable Acceptance Test Record

OPTICAL FIBER CABLE ACCEPTANCE TEST RECORDS										Page _____ of _____							
Area Location: _____						BI/ER #: _____				Date: _____							
Check One Box: (A) <input type="checkbox"/> A. End-to-End Fiber Test						<input type="checkbox"/> B. Splice Loss Data											
SPAN NUMBER _____ (B)			CABLE NUMBER _____ (C)			CABLE COUNT _____ (D)											
FIBER TYPE: _____ (E) <input type="checkbox"/> A. Single Mode <input type="checkbox"/> B. Multimode						WAVELENGTH (nm) _____ (F)		MAX. ALLOWABLE LOSS: (dB) _____ (G)									
A	OFFICE A _____ (H)		OPERATOR'S NAME _____			OFFICE B _____ (I)		OPERATOR'S NAME _____									
B	SPLICE LOCATION _____			TYPE TEST SET USED _____			DISTANCE TO SPLICE _____										
	TYPE OF TEST EQPT. USED _____			TEST SET LOCATION _____			TEST SET OPERATOR'S NAME: _____										
FIBER NO.	COLOR (J)		FINAL MEASURED LOSS (dB)		CHROMATIC DISPERSION COEFFICIENT (CD) ps/(nm·km)		POLARIZATION MODE DISPERSION COEFFICIENT (PMD) ps/√km		FIBER NO.	COLOR (J)		FINAL MEASURED LOSS (dB)		CHROMATIC DISPERSION COEFFICIENT (CD) ps/(nm·km)		POLARIZATION MODE DISPERSION COEFFICIENT (PMD) ps/√km	
	BUFFER	FIBER	A - B	B - A						BUFFER	FIBER	A - B	B - A				
1									19								
2									20								
3									21								
4									22								
5									23								
6									24								
7									25								
8									26								
9									27								
10									28								
11									29								
12									30								
13									31								
14									32								
15									33								
16									34								
17									35								
18									36								
Remarks: _____																	
<i>This form to be completed by Fiber Test Operator at receiving location</i>																	