



COVER SHEET

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Edition 01

Date 20041112

Change Note Creation

Approver

Company SNWGH

Function DEVELOPMENT MANAGER

Name M. KITCHING

Originator

Company SNWGH

Function PRINCIPAL ENGINEER

Name I. WATSON

Approvals			
Name	Gina Gambling	Neville Hazell	J. WHITE
Approval	Start Approval	Approver #3	
Date	20041116	20041116	
Name	Bill Connor	L. WEENS	G. WATERWORTH
Approval	Approver #1		
Date	20041116		
Name	Michael Kitching	F. TORTEY	
Approval	Approver #2		
Date	20041116		



1 ITEM/DOCUMENT RELATIONSHIPS

ITEM CHANGE STATUS

REF	RELATED NUMBER AND TITLES	DOCUMENT EDITIONS
001	29DQTR0800ADK1.N INDEX	01
002	29DQTR0800ADK0.N QTR for MARS CTA	01

2 DISTRIBUTION

R10

3 GENERAL INFORMATION

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4 HISTORY

Edition	Date (CCYYMMDD)	Change Note No.
01	20041112	Creation

END OF DOCUMENT

MARS CTA

QTR FOR MARS CTA

COVER SHEET

QUALIFICATION TEST REPORT

Title 1 QTR FOR MARS CTA

Title 2

Title 3

Class 1 MARS CTA

Class 2

Class 3

Class 4

Edition 01

Date 09-11-04

Change Note

Appraisal Authority

Company SNWCLS

Function Contract Manager

Name L. Weens

Originator

Company SNWGH

Function Principal Engineer

Name I. Watson

PREFACE

The MARS housed Cable Termination Assembly (CTA) is based upon qualified repeater and branching unit products. The purpose of this document is to detail the results of the qualification tests, undertaken in accordance with the MARS qualification plan ^[1], which show that the CTA design meets the requirements identified in the Technical Functional Specification (TFS) ^[2].

It is noted that the customer (MBARI) has ordered two CTA units of which CTA 01 was used to provide qualification information.

1 SCOPE

The MARS housed Cable Termination Assembly comprises of a 1-atmosphere housing providing an electrical and optical interface between OAL –C7 SAH cable and ODI wet mateable connectors attached to the housing via oil filled umbilical hoses and penetrators (see figure 1). The design of the CTA is based on existing product and as such qualification focussed only on the new parts and assemblies related to this product.

Reports detailing the relevant qualification of existing/related parts and assemblies are shown in Appendix A of the Qualification Plan ^[1].

Qualification of the wet mate optical and HV power connector/penetrator harnesses has been undertaken by ODI ^[3] and are supplied to ASN under C of C. Acceptance of these units was undertaken by optical and electrical performance confirmation tests on receipt by ASN and are detailed in the Greenwich RPR ^[4] shown in Appendix B of this report. The ODI child data for the above optical/electrical interconnects is detailed within appendix A of this report but will not be controlled by this documentation.

The following key areas of the CTA design were qualified and are summarised below and will be further expanded on within this report:

- ODI bulkhead (29PBQ00800AAA)
- CTA Flexi-Link Assembly 29RLK00800AAA)
- Earth Continuity Wire Gland Assembly (29YSV10800AAA)
- Final Housed CTA Assembly (29ECT00800AAA)
- Integrated CTA

The Housed and Final Housed CTA assembly were built to production standards. Together, with previous qualifications listed in Appendix A of the qualification plan ^[1], the CTA qualification report demonstrates that the CTA meets the pre-defined conditions experienced during the storage, handling, transportation, deployment, recovery and repair phases of the product lifespan.

2 REFERENCED DOCUMENTS

[1]	8BU 96007 0005 QAZZA	Qualification Plan for MARS CTA
[2]	8BU 96007 0005 DSZZA	Technical Functional Specification MARS CTA
[3]	29D DE00 800 AHR	QTR for ODI HV connector
[4]	8BU 5E HC00 AAA	Performance Report TIS
[5]	29D DE00 800 AAA	ETS for MARS CTA
[6]	29D DE00 800 AHQ	MARS Engineering Report
[7]	29DWPIE400AAA	Composite Gland Assembly manufacturing and test instructions
[8]	8CM 02099 0100 QZGE	Remote earth mechanical qualification report.
[9]	29D QTR00 700 ABF	Remote earth electrochemical qual report.
[10]	CETS 141-1-A	Calais Engineering Test Specification
[11]	CARP 141-1	MARS CTA Acceptance and Release Procedure
[12]	29D DE00 800 AHR	QTR for ODI HV connector
[13]	3CK 24067 0403 ASZZA	Decision Review Guidelines

3 RELATED DOCUMENTS

8BU 93003 0000 QRZZA	Optical Networks Division - Product Life Cycle
8BU 93003 0003 QRZZA	OND Product Life Cycle Documentation Guidelines
84-QM4-03-746	Environmental Test Specification for Submerged Equipment Assemblies
8BU 96007 0005 FLZZA	Feature List
8BU 96007 0005 DPZZA	Development Plan
29D QTS 0700 ABF	Remote earth electrochemical qualification plan
8CM 01099 01 00 QP GE	Remote earth mechanical qualification plan
8CM 03045 0307 QAGE	Remote earth industrial plan
8CM 03045 0307 QZGE	Remote earth industrial report
8CM 01197 0100 PSGE	Remote earth product specification
8BU 5E HC00 800 AAA	Product Qualification Report
8BU 1E HC00 AAA	Wet mate Harness Loss TIS
8BU 2E HC00 AAA	Wet mate Harness HV TIS
8BU 3E HC00 AAA	House Assembly TIS
8BU 4E HC00 AAA	HV proof TIS

4 QUALIFICATION RESULTS

The performance of the CTA was measured against the parameters detailed in the TFS ^[2], and the ETS ^[5]. The tests were conducted at the levels quoted in the ETS ^[5] and are detailed below.

4.1 ODI BULKHEAD AND BULKHEAD ASSEMBLY

The ODI bulkhead design was qualified using a combination of engineering evaluation o-seal/bulkhead pressure tests and paper study including Finite Element Analysis (FEA) calculations. The results of the qualification study are detailed within the MARS Engineering report ^[6]. This bulkhead design was used on both CTA production units, both of which were successfully subjected to a 3,000 PSI pressure test without failure. Material qualification is covered by similarity to existing product as detailed within appendix A of the MARS qualification plan.

Result: PASS

4.2 CTA SEA CASE

The CTA sea case (29PBJ00800AAA) comprises of a un-profiled housing with the existing BU single end bulkhead mounting and thread detail at each end of the casing. This sea case has no external profiling and as such has a larger wall thickness and thus better pressure resistance than standard product. This sea cases used on both production units was subjected to a 12,000 PSI pressure test without failure. Material qualification is covered by similarity to existing product as detailed within appendix A of the MARS qualification plan. The sea case was coated using the existing coating specification (29MOO00101NDB) as detailed in the coated sea case drawing 29PBJ00800CAA. Here only the base 350-450 micron base Fusion Bonded Epoxy (FBE) coat has been applied and finished with the current paint top coat as per the existing specification. As such no further qualification is required.

Result: PASS

4.3 CTA BULKHEAD AND BULKHEAD ASSEMBLY

The CTA bulkhead assembly (29YBQ00800BAA) is identical to the existing BU single end design except for minor changes to the earth continuity wire gland assembly (29YSV10800AAB), which will be covered separately as detailed in section 4.4. The composite gland arrangement is covered by existing design (29YSV10772AAA) ^[7]. As such no further qualification was required. Both production bulkheads were subjected to a 12,000 PSI pressure test without failure. Material qualification is covered by similarity to existing product as detailed within appendix A of the MARS qualification plan. As such no further qualification testing is required.

Result: PASS

4.4 ECW GLAND ASSEMBLY

A short form engineering qualification was undertaken on The Earth Continuity Wire Gland assembly (29YSV10800AAB) as the wire conductor of the gland was been changed to titanium grade 2 from copper in order to be compatible with the remote sea earth electrode, and as such the method of attachment to the tungum alpha brass tube was changed. Qualification of the ECW gland was undertaken as a sub assembly build of the qualification housed CTA assembly and is detailed in the MARS Engineering report ^[6]. Evaluation was undertaken against the normal manufacturing test requirements as detailed with the composite gland manufacturing instructions ^[7].

Result: PASS

4.5 CTA FLEXI-LINK ASSEMBLY

The CTA flexi-link Assembly (29RLK00800AAA) is based on the existing BU/repeater Flexi-link Assembly (29RLK00750AAB) and comprises of a double length coil with the existing bulkhead attachment design on both ends of the spring. The method of fibre routing using sleeved fibres around the external groove in the coil as per the repeater/BU is retained. The power and earth wire were both over sleeved and routed together as per current BU procedure using the existing BU clip arrangement (29PCL00750AAA) for the coil passage.

This design is qualified by similarity to existing repeater and BU practice. The design study for this component is detailed in the MARS Engineering Report ^[6].

Result: PASS

4.6 MARS HOUSED/FULLY HOUSED CTA

Qualification information was drawn from the production tests conducted on the MARS Fully Housed CTA, defined as 29EHC00800AAA. The sample was manufactured in accordance with the relevant sections of the normal manufacturing procedures adopted for Repeaters and BU's as detailed in the relevant manufacturing documentation.

4.6.1 Test Procedure

The test sample was subjected to the following qualification tests and checks in accordance with the ETS ^[5] and the test flow shown in Appendix J.

4.6.2 Documentation Check

The related documentation, test specifications, manufacturing drawings, process specifications and manufacturing standards were checked and found to be complete and consistent.

All assembly and test records conform to the manufacturing documentation.

Result: Pass

4.6.3 Initial Visual Inspection

All the components were visually examined prior to assembly and were found to comply with their relevant inspection criteria.

All assemblies used in the CTA were checked and were found to conform to their manufacturing drawings and/or related certificate of conformance. A full copy of dimensional inspection results for key components such as bulkheads and sea cases are held by the component supplier.

Result: Pass

4.6.4 Optical through loss and back reflection check of optical wet mate harness (acceptance)

Prior to assembly the optical insertion loss and back reflection of each of the 8 fibre paths of the mated connector harness were tested using the loop back test connector 29CQD00800AAC and compared with the child data presented by the supplier (see appendix A). The performance of the harness was measured against the parameters detailed in the TFS ^[2], and the ETS ^[5]. The tests were conducted at the levels quoted in the ETS ^[5].

Results are detailed in Appendix B of this report.

Result: Pass

4.6.5 Electrical continuity and leakage current check of HV wet mate harness (acceptance)

Prior to assembly the electrical continuity and leakage current of each of the 2 electrical conductor paths of the mated connector harness were tested using the HV test jumper (29CQD00800AAF) and compared with the child data presented by the supplier (see appendix A). The performance of the harness was measured against the parameters detailed in the TFS ^[2], and the ETS ^[5]. The tests were conducted at the levels quoted in the ETS ^[5].

Results are detailed in Appendix B of this report.

Result: Pass

4.6.6 Housed CTA optical insertion loss

Following completion of the housed CTA assembly the optical insertion loss through of each of the 8 fibre paths of the combined mated connector harness and housed unit were tested. The performance of the CTA was measured against the parameters detailed in the TFS ^[2], and the ETS ^[5]. The tests were conducted at the levels quoted in the ETS ^[5].

Results are detailed in Appendix C of this report along with their related certificates of conformity/release.

Result: Pass

4.6.7 Housed CTA HV Leakage current (soak) test

CTA 01 was subjected to a HV soak tested at 13 kV (DC) for 8 hours at both negative and positive polarity. The performance of the test sample was measured against the parameters detailed in the ETS ^[5]. The interval between monitoring measurements was 10 seconds. The measured steady state leakage current was found to be less than 10nA. This test was performed under controlled conditions within the engineering test facility, as production resource was unavailable.

Results are detailed in Appendix D of this report.

Result: Pass

4.6.8 Housed CTA HV Surge test

As the design of the CTA does not include sensitive optical and electrical components or circuitry, and given that the HV wet mate connectors are protected within the trawl resistant frame and will not be mated or demated whilst carrying current, the risk of damage due to surge is negligible. As such the HV requirement within the agreed TFS calls only for HV leakage testing as detailed within the ETS and is qualified by the testing detailed in section 4.6.7 above.

Result: N/A

4.6.9 Integrated CTA

The CTA was integrated into cable and tested in accordance with Calais engineering test specification and procedures ^{[10][11]}. The Calais acceptance test reports for both CTA 01 and CTA 02 are shown in Appendix F. Final performance reports for both units on completion of cable and sea earth integration are shown in Appendix G.

Result: PASS

4.6.10 ODI qualification of 10KV connector

The qualification of the 10KV wet mate connector harness 29CQD00800BAA was conducted by Ocean Design Incorporated (ODI) and is covered in detail under a separate engineering report ^[12]. The results of the engineering qualification are summarised in Appendix H. The ageing test data clearly shows the connector will operate at 10 KV over the service life of 25 years with a characteristic survival probability of 0.922.

Result: PASS

4.7 ACCEPTANCE LIMITS

The measured parameters are within the 'absolute limits' as defined in the ETS and CETS ^[5].

The results have been reviewed satisfactorily for the absence of any unusual trends.

Result: PASS

5 REMOTE SEA EARTH

The remote sea earth design is detailed under specification 8CM 01197 0100 PSGE and was successfully qualified as part of the R3.5 BU programme. The results of the mechanical and electrochemical qualification are documented under separate reports ^{[8][9]}. No further qualification work other than that related to the Earth Continuity Wire gland as detailed in section 4.4 was conducted under the MARS programme.

Result: PASS

6 CABLE ACCEPTANCE REPORT

The Calais cable acceptance report for the MARS system including the cable tails attached to each CTA is given in Appendix J.

Result: PASS

7 TEST PERSONNEL

The personnel involved with the qualification testing of the CTA were as follows:

- I. Watson – Technical leader (Greenwich)
- F. Tortey – Technical Leader (Calais)
- P. Nightingale – Industrial leader (Greenwich)
- M. Dubrulle – Industrial Leader Calais
- M. Parnham – Pre-Assembly supervisor (Greenwich)
- I. Parker – Pre- Assembly senior operator (Greenwich)
- D. Simpson - Housing supervisor (Greenwich)
- C. Makepeace – Housing senior operator (Greenwich)
- J. Ellis – Industrial Engineering Senior Test Engineer (Greenwich)
- P. Mejjasson – Principal Electrical Engineer (Greenwich)

8 TEST DATES

Manufacture and test of the MARS CTA samples occurred between 12-10-04 and 15-11-04.

9 EQUIPMENT & CALIBRATION STATUS

Traceability of equipment used and their calibration status is recorded in the related test documentation. For Greenwich:

8BU 1E HC00 AAA

Wet mate Harness Loss TIS

8BU 2E HC00 AAA

Wet mate Harness HV TIS

8BU 3E HC00 AAA

House Assembly TIS

8BU 4E HC00 AAA

HV proof TIS

8BU 5E HC00 AAA

Performance Report TIS

For Calais:

CETS 141-1-A

Calais Engineering Test Specification

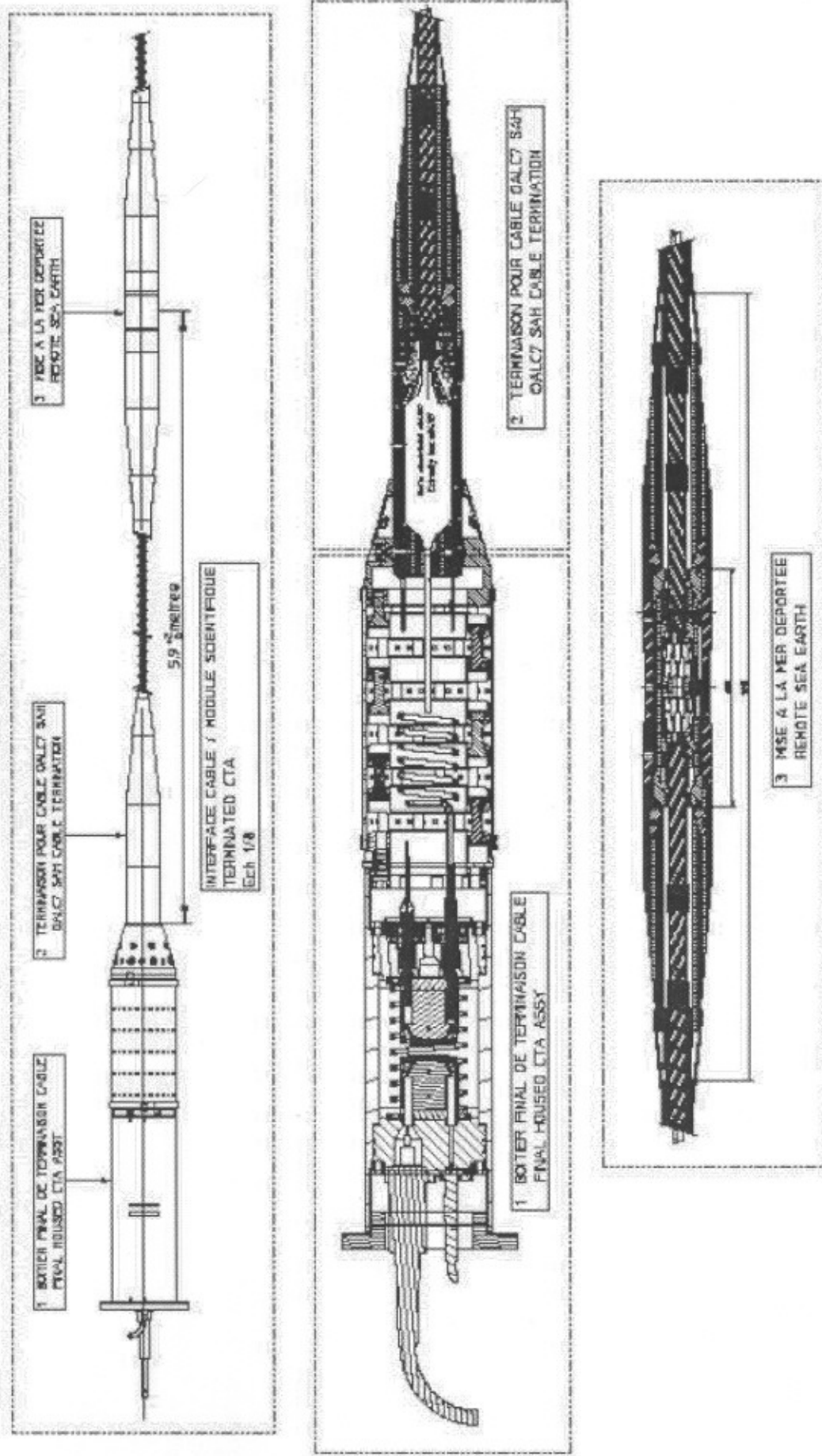
CARP 141-1

MARS CTA Acceptance and Release Procedure

10 CONCLUSION

In conclusion, the test results given in this report and related documents clearly show the design of the CTA meets the requirements identified in the Technical Functional Specification (TFS) ^[2]. The CTA design is therefore released for use on the MARS contract.

Figure 1.



APPENDIX A – ODI FAT results

Factory Acceptance Test Summary

ODI Part Number 1029909, s/n1029909 -2 (mated to test receptacle)

ROV Hybrid Bulkhead Plug, Type II Loop Back Test Connector

ASN Part Number 29CQD00800AAC

Test Results (Hydrostatic)

Equipment	Type	Serial No.	Cal. Due
Optical Power Meter	EXFO	OM-018-TA	March, 2005
Optical Power Source	EXFO	OM-019-FO	March, 2005
Test Gauge	Sensotec	PI-001-TA	October, 2004

Test Parameters

	Test 1	Test 2	Test 3	Test 4	Test 5
Test Pressure (PSI)	0	2000	3500	5000	n/a
Test Time (MIN)	n/a	5	5	15	n/a
Test Voltage (V)	n/a	n/a	n/a	n/a	n/a
Test Acceptance (G?)	n/a	n/a	n/a	n/a	n/a
Optical Test Wavelength (nm)	1550	n/a	n/a	1550	n/a
Optical Insertion Loss Test Acceptance (dB)	= 1.7dB	n/a	n/a	= 1.7dB	n/a
Optical Return Loss Test Acceptance (dB)	n/a	n/a	n/a	n/a	n/a

Optical Test Wavelength: 1550 nm

Circuit #	Optical Insertion Loss (dB)	
	0 psi	5000 psi
1	-0.33	-0.33
2 (looped w/1)	n/a	n/a
3	-0.30	-0.37
4 (looped w/3)	n/a	n/a
5	-0.38	-0.33
6 (looped w/5)	n/a	n/a
7	-0.81	-0.79
8 (looped w/7)	n/a	n/a

Factory Acceptance Test Summary

ODI Part Number 1033244, s/n1033244-1 (mated to production plug 1033240-2)

Hybrid Flying ROV Receptacle to Test Box

ASN Part Number 29CQD00800AAD

Test Results (Non - Hydrostatic)

Equipment	Type	Serial No.	Cal. Due
Optical Power Meter	Turbo Test 500	OM-033-FO	June, 2005
Optical Power Source	Turbo Test 500	OM-033-FO	June, 2005

Optical Test Wavelength: 1550nm

Circuit #	Optical Insertion Loss (dB)	Optical Return Loss (dB)
1	0.30	41.4
2	0.50	37.5
3	0.36	35.3
4	0.29	36.8
5	0.25	49.6
6	0.30	51.2
7	0.18	43.4
8	0.62	46.7

Factory Acceptance Test Summary

ODI Part Number 1033238, s/n1033238-1 (mated to 1033240-1 production plug)

Hybrid Flying ROV Receptacle

ASN Part Number 29CQD00800BAA

Test Results (Hydrostatic)

Equipment	Type	Serial No.	Cal. Due
Optical Power Meter	EXFO	OM-018-TA	March, 2005
Optical Power Source	EXFO	OM-019-FO	March, 2005
Test Gauge	Sensotec	PI-008-TA	March, 2005

Test Parameters

	Test 1	Test 2	Test 3	Test 4	Test 5
Test Pressure (PSI)	0	1000	2000	3000	0
Test Time (MIN)	n/a	5	5	480	n/a
Test Voltage (V)	n/a	n/a	n/a	n/a	n/a
Test Acceptance (G?)	n/a	n/a	n/a	n/a	n/a
Optical Test Wavelength (nm)	1550	n/a	n/a	1550	1550
Optical Insertion Loss Test Acceptance (dB)	= 1.5dB	n/a	n/a	= 1.5dB	= 1.5dB
Optical Return Loss Test Acceptance (dB)	n/a	n/a	n/a	n/a	n/a

Optical Test Wavelength: 1550nm

Circuit #	Optical Insertion Loss (dB)		
	0 psi	3000 psi	0 psi
1	-0.55	-0.48	-0.52
2	-0.70	-0.69	-0.68
3	-0.53	-0.47	-0.58
4	-0.69	-0.71	-0.64
5	-0.60	-0.63	-0.60
6	-0.74	-0.66	-0.67
7	-0.48	-0.47	-0.47
8	-0.58	-0.64	-0.56

Test Results (Optical)

Circuit	Insertion Loss @ 1550nm	Return Loss @ 1550nm
1	.57	39.9
2	.33	33.7
3	.37	42.3
4	.33	51.5
5	.47	39.3
6	.27	41.2
7	.58	48.7
8	.56	42.1

Factory Acceptance Test Summary

ODI Part Number 1033238, s/n1033238-1 (mated to loopback connector 1029909-2)

Hybrid Flying ROV Receptacle

ASN Part Number 29CQD00800BAA

Test Results (Optical)

Circuit	Insertion Loss @ 1550nm	Return Loss @ 1550nm
1	.37	34.2
2 (looped w/1)	n/a	n/a
3	.81	37.9
4 (looped w/3)	n/a	n/a
5	.37	39.2
6 (looped w/5)	n/a	n/a
7	.82	35.9
8 (looped w/7)	n/a	n/a

Factory Acceptance Test Summary

ODI Part Number 1033240, s/n1033240-1 (mated to 1033244-1 Hybrid ROV Test Receptacle)

Hybrid Penetrator to Hybrid Bulkhead ROV Plug

ASN Part Number 29CQD00800BAA

Test Results (Optical)

Circuit	Insertion Loss @ 1550nm	Return Loss @ 1550nm
1	.35	45.0
2	.17	33.9
3	.55	38.5
4	.17	37.0
5	.05	36.2
6	.42	45.5
7	.30	38.7
8	.41	54.4

Factory Acceptance Test Summary

ODI Part Number 1033238, s/n1033238-2 (mated to 1033240-2 production plug)

Hybrid Flying ROV Receptacle

ASN Part Number 29CQD00800BAA

Test Results (Hydrostatic)

Equipment	Type	Serial No.	Cal. Due
Optical Power Meter	EXFO	OM-018-TA	March, 2005
Optical Power Source	EXFO	OM-019-FO	March, 2005
Test Gauge	Sensotec	PI-002-TA	December, 2004

Test Parameters

	Test 1	Test 2	Test 3	Test 4	Test 5
Test Pressure (PSI)	0	1000	2000	3000	0
Test Time (MIN)	n/a	5	5	480	n/a
Test Voltage (V)	n/a	n/a	n/a	n/a	n/a
Test Acceptance (G?)	n/a	n/a	n/a	n/a	n/a
Optical Test Wavelength (nm)	1550	n/a	n/a	1550	1550
Optical Insertion Loss Test Acceptance (dB)	=1.5dB	n/a	n/a	=1.5dB	=1.5dB
Optical Return Loss Test Acceptance (dB)	n/a	n/a	n/a	n/a	n/a

Optical Test Wavelength: 1550nm

Circuit #	Optical Insertion Loss (dB)		
	0 psi	3000 psi	0 psi
1	-0.53	-0.26	-0.54
2	-0.34	-0.28	-0.26
3	-0.33	-0.37	-0.16
4	-0.39	-0.24	-0.36
5	-0.12	-0.10	-0.08
6	-0.54	-0.56	-0.21
7	-0.23	-0.23	-0.30
8	-0.43	-0.33	-0.36

Test Results (Optical)

Circuit	Insertion Loss @ 1550nm	Return Loss @ 1550nm
1	0.30	43.8
2	0.46	41.0
3	0.59	34.3
4	0.45	47.1
5	0.23	39.0
6	0.60	34.2
7	0.26	37.1
8	0.67	31.5

Factory Acceptance Test Summary

ODI Part Number 1033238, s/n1033238-2 (mated to loopback connector 1029909-2)

Hybrid Flying ROV Receptacle

ASN Part Number 29CQD00800BAA

Test Results (Optical)

Circuit	Insertion Loss @ 1550nm	Return Loss @ 1550nm
1	.48	31.9
2 (looped w/1)	n/a	n/a
3	.63	32.3
4 (looped w/3)	n/a	n/a
5	.41	32.4
6 (looped w/5)	n/a	n/a
7	.49	34.5
8 (looped w/7)	n/a	n/a



Factory Acceptance Test Summary

ODI Part Number 1033240, s/n1033240-2 (mated to 1033244-1 Hybrid ROV Test Receptacle)

Hybrid Penetrator to Hybrid Bulkhead ROV Plug

ASN Part Number 29CQD00800BAA

Test Results (Optical)

Circuit	Insertion Loss @ 1550nm	Return Loss @ 1550nm
1	0.30	41.4
2	0.50	37.5
3	0.36	35.3
4	0.29	36.8
5	0.25	49.6
6	0.30	51.2
7	0.18	43.4
8	0.62	46.7

Factory Acceptance Test Summary
 ODI Part Number 1033243, s/n1033243-1
 Hi-Power Fixed ROV Plug to Test Box
 ASN Part Number 29CQD00800AAF

Test Results

Equipment	Type	Serial No.	Cal. Due
Partial Discharge	Biddle	PD-001-RD	July, 2005
Force Gage	Sensotec	LC-015-TA	April, 2005

Circuit	Inception Voltage	Test Hold Voltage of 7.2 KV	Test Voltage of 6.2 KV	Extinction Voltage	Pass/Fail
1	Clean	Clean	Clean	Clean	Pass
2	Clean	Clean	Clean	Clean	Pass
3	Clean	Clean	Clean	Clean	Pass
4	Clean	Clean	Clean	Clean	Pass

Circuit	Continuity	Leakage Current
1	.39 Ω	10 nA
3	.44 Ω	10 nA

Factory Acceptance Test Summary
 ODI Part Number 1033245, s/n1033245-1
 Hi-Power Fixed ROV Receptacle to Test Box
 ASN Part Number 29CQD00800AAE

Test Results

Equipment	Type	Serial No.	Cal. Due
Partial Discharge	Biddle	PD-001-RD	July, 2005
Force Gage	Sensotec	LC-015-TA	April, 2005

Circuit	Inception Voltage	Test Hold Voltage of 7.2 KV	Test Voltage of 6.2 KV	Extinction Voltage	Pass/Fail
1	Clean	Clean	Clean	Clean	Pass
2	Clean	Clean	Clean	Clean	Pass
3	Clean	Clean	Clean	Clean	Pass
4	Clean	Clean	Clean	Clean	Pass

Circuit	Continuity	Leakage Current
1	.39 Ω	30 nA
3	.43 Ω	20 nA

Factory Acceptance Test Summary

ODI Part Number 1033239, s/n1033239-1 (sub component of 1034614 – Electrical Wet Mate Assembly)

Hi-Power Penetrator to Hi-Power Flying ROV Receptacle

ASN Part Number 29CQD00800AAA

Test Results (Hydrostatic)

Make	Model	Serial No.	Cal. Due
Megger	BMM80	ME-044-TA	March, 2005
Norma	Unilap ISO 5KV	ME-050-TA	July, 2005
Biddle	37000-111	PD-001-RD	July, 2005
Danbridge	13KV Insulation Tester SP30A	62321	August, 2005 (Alcatel)

Partial Discharge Test Voltage 7KV AC

	Pin 1	Pin 2	Pin 3	Pin 4
Inception Voltage	7.0	n/a	7.0	n/a
PD at Inception Point	0	n/a	0	n/a
Extinction Voltage	7.0	n/a	7.0	n/a
PD at Extinction Point	0	n/a	0	n/a

Continuity

Circuit	0 psi	3000 psi	0 psi
1	.78 Ω	.78 Ω	.77 Ω
2	n/a	n/a	n/a
3	.80 Ω	.79 Ω	.79 Ω
4	n/a	n/a	n/a

IR Values

Circuit	0 psi 1	0 psi 2	0 psi 3	0 psi 4	3000 psi 1	3000 psi 2	3000 psi 3	3000 psi 4	0 psi 1	0 psi 2	0 psi 3	0 psi 4
1												
2	n/a				n/a				n/a			
3	710G	n/a			660G	n/a			310G	n/a		
4	n/a	n/a	n/a		n/a	n/a	n/a		n/a	n/a	n/a	
Ground	530G	n/a	450G	n/a	300G	n/a	490G	n/a	263G	n/a	300G	n/a

Leakage Current

Circuit	0 psi	3000 psi	0 psi
1	60 nA	n/a	70 nA
2	n/a	n/a	n/a
3	70 nA	n/a	70 nA
4	n/a	n/a	n/a

Factory Acceptance Test Summary

ODI Part Number 1033239, s/n1033239-2 (sub component of 1034614 – Electrical Wet Mate Assembly)

Hi-Power Penetrator to Hi-Power Flying ROV Receptacle

ASN Part Number 29CQD00800AAA

Test Results (Hydrostatic)

Make	Model	Serial No.	Cal. Due
Megger	BMM80	ME-044-TA	March, 2005
Norma	Unilap ISO 5KV	ME-050-TA	July, 2005
Biddle	37000-111	PD-001-RD	July, 2005
Danbridge	13KV Insulation Tester SP30A	62321	August, 2005 (Alcatel)

Partial Discharge Test Voltage 7KV AC

	Pin 1	Pin 2	Pin 3	Pin 4
Inception Voltage	7.0	n/a	7.0	n/a
PD at Inception Point	0	n/a	0	n/a
Extinction Voltage	7.0	n/a	7.0	n/a
PD at Extinction Point	0	n/a	0	n/a

Continuity

Circuit	0 psi	3000 psi	0 psi
1	.71 Ω	.77 Ω	.77 Ω
2	n/a	n/a	n/a
3	.74 Ω	.81 Ω	.81 Ω
4	n/a	n/a	n/a

IR Values

Circuit	0 psi 1	0 psi 2	0 psi 3	0 psi 4	3000 psi 1	3000 psi 2	3000 psi 3	3000 psi 4	0 psi 1	0 psi 2	0 psi 3	0 psi 4
1												
2	n/a				n/a				n/a			
3	670G	n/a			274G	n/a			430G	n/a		
4	n/a	n/a	n/a		n/a	n/a	n/a		n/a	n/a	n/a	
Ground	610G	n/a	310G	n/a	300G	n/a	226G	n/a	310G	n/a	360G	n/a

Leakage Current

Circuit	0 psi	3000 psi	0 psi
1	60 nA	n/a	70 nA
2	n/a	n/a	n/a
3	45 nA	n/a	60 nA
4	n/a	n/a	n/a

Factory Acceptance Test Summary

ODI Part Number 1033241, s/n1033241-1 (sub component of 1034614 – Electrical Wet Mate Assembly)

Hi-Power ROV Plug

ASN Part Number 29CQD00800AAA

Test Results (Hydrostatic)

Make	Model	Serial No.	Cal. Due
Megger	BMM80	ME-044-TA	March, 2005
Norma	Unilap ISO 5KV	ME-050-TA	July, 2005
Biddle	37000-111	PD-001-RD	July, 2005
Danbridge	13KV Insulation Tester SP30A	62321	August, 2005 (Alcatel)

Partial Discharge Test Voltage 7KV AC

	Pin 1	Pin 2	Pin 3	Pin 4
Inception Voltage	5.8	n/a	6.2	n/a
PD at Inception Point	5pc	n/a	5pc	n/a
Extinction Voltage	5.8	n/a	6.4	n/a
PD at Extinction Point	0	n/a	0	n/a

Continuity

Circuit	0 psi	3000 psi	0 psi
1	.78 Ω	.78 Ω	.78 Ω
2	n/a	n/a	n/a
3	.80 Ω	.79 Ω	.79 Ω
4	n/a	n/a	n/a

IR Values

Circuit	0 psi 1	0 psi 2	0 psi 3	0 psi 4	3000 psi 1	3000 psi 2	3000 psi 3	3000 psi 4	0 psi 1	0 psi 2	0 psi 3	0 psi 4
1												
2	n/a				n/a				n/a			
3	710G	n/a			660G	n/a			310G	n/a		
4	n/a	n/a	n/a		n/a	n/a	n/a		n/a	n/a	n/a	
Ground	530G	n/a	450G	n/a	300G	n/a	490G	n/a	263G	n/a	300G	n/a

Leakage Current

Circuit	0 psi	3000 psi	0 psi
1	60 nA	n/a	70 nA
2	n/a	n/a	n/a
3	70 nA	n/a	70 nA
4	n/a	n/a	n/a

Factory Acceptance Test Summary

ODI Part Number 1033241, s/n1033241-2 (sub component of 1034614 – Electrical Wet Mate Assembly)

Hi-Power ROV Plug

ASN Part Number 29CQD00800AAA

Test Results (Hydrostatic)

Make	Model	Serial No.	Cal. Due
Megger	BMM80	ME-044-TA	March, 2005
Norma	Unilap ISO 5KV	ME-050-TA	July, 2005
Biddle	37000-111	PD-001-RD	July, 2005
Danbridge	13KV Insulation Tester SP30A	62321	August, 2005 (Alcatel)

Partial Discharge Test Voltage 7KV AC

	Pin 1	Pin 2	Pin 3	Pin 4
Inception Voltage	7.0	n/a	7.0	n/a
PD at Inception Point	0	n/a	0	n/a
Extinction Voltage	7.0	n/a	7.0	n/a
PD at Extinction Point	0	n/a	0	n/a

Continuity

Circuit	0 psi	3000 psi	0 psi
1	.71 Ω	.77 Ω	.77 Ω
2	n/a	n/a	n/a
3	.74 Ω	.81 Ω	.81 Ω
4	n/a	n/a	n/a

IR Values

Circuit	0 psi 1	0 psi 2	0 psi 3	0 psi 4	3000 psi 1	3000 psi 2	3000 psi 3	3000 psi 4	0 psi 1	0 psi 2	0 psi 3	0 psi 4
1												
2	n/a				n/a				n/a			
3	670G	n/a			274G	n/a			430G	n/a		
4	n/a	n/a	n/a		n/a	n/a	n/a		n/a	n/a	n/a	
Ground	610G	n/a	310G	n/a	300G	n/a	226G	n/a	310G	n/a	360G	n/a

Leakage Current

Circuit	0 psi	3000 psi	0 psi
1	60 nA	n/a	70 nA
2	n/a	n/a	n/a
3	45 nA	n/a	60 nA
4	n/a	n/a	n/a

Factory Acceptance Test Summary

ODI Part Number 1033241, s/n1033241-2 (mated to 1033239, s/n 1033239-2)

ASN Part Number 29CQD00800AAA

Test Results

Make	Model	Serial No.	Cal. Due
Megger	BMM80	ME-044-TA	March, 2005
Danbridge	13KV Insulation Tester SP30A	62321	August, 2005 (Alcatel)

Circuit	Continuity	Leakage Current
1	.76 Ω	35 nA
3	.79 Ω	50 nA

Factory Acceptance Test Summary

ODI Part Number 1033241, s/n1033241-2 (mated to 1033245, s/n 1033245-1)

Test Results

Make	Model	Serial No.	Cal. Due
Megger	BMM80	ME-044-TA	March, 2005
Danbridge	13KV Insulation Tester SP30A	62321	August, 2005 (Alcatel)

Circuit	Continuity	Leakage Current
1	.76 Ω	65 nA
3	.79 Ω	50 nA

Factory Acceptance Test Summary

ODI Part Number 1033241, s/n1033241-1 (mated to 1033239, s/n 1033239-1)

ASN Part Number 29CQD00800AAA

Test Results

Make	Model	Serial No.	Cal. Due
Megger	BMM80	ME-044-TA	March, 2005
Danbridge	13KV Insulation Tester SP30A	62321	August, 2005 (Alcatel)

Circuit	Continuity	Leakage Current
1	.77 Ω	50 nA
3	.79 Ω	55 nA

Factory Acceptance Test Summary

ODI Part Number 1033241, s/n1033241-1 (mated to 1033245, s/n 1033245-1)

Test Results

Make	Model	Serial No.	Cal. Due
Megger	BMM80	ME-044-TA	March, 2005
Danbridge	13KV Insulation Tester SP30A	62321	August, 2005 (Alcatel)

Circuit	Continuity	Leakage Current
1	.76 Ω	50 nA
3	.78 Ω	45 nA

Factory Acceptance Test Summary

ODI Part Number 1033239, s/n1033239-1 (mated to 1033243, s/n 1033243-1)

Test Results

Make	Model	Serial No.	Cal. Due
Megger	BMM80	ME-044-TA	March, 2005
Danbridge	13KV Insulation Tester SP30A	62321	August, 2005 (Alcatel)

Circuit	Continuity	Leakage Current
1	.78 Ω	50 nA
3	.82 Ω	30 nA

Factory Acceptance Test Summary

ODI Part Number 1033239, s/n1033239-2 (mated to 1033243, s/n 1033243-1)

Test Results

Make	Model	Serial No.	Cal. Due
Megger	BMM80	ME-044-TA	March, 2005
Danbridge	13KV Insulation Tester SP30A	62321	August, 2005 (Alcatel)

Circuit	Continuity	Leakage Current
1	.77 Ω	40 nA
3	.81 Ω	35 nA

APPENDIX B

Connector Harness Acceptance Report

Sheet: 1 / 1	System: MARS	Connector Harness no: 10133239 - 2
Issue: 01	Test Box / Loopback Box ref No's:	1033243-1 / 1029909-2
Date: 21/10/04	Housed Unit: 29E-HC00-800-AAA	Customer Identification: 02

ETS Ref.	Result	Unit
----------	--------	------

Continuity test

4.1.1	Live Feed resistance	0.77	Ohm
4.1.1	System Ground resistance	0.80	Ohm

Leakage Current Test

4.1.2	HV Leakage (Live Feed)	25	nA
4.1.2	HV Leakage (System Gnd)	17	nA

Optical Insertion Loss at 1550nm (penetrator to penetrator using loopback test box)

4.2.1	Bk-Yl (1-2)	0.44	dB
4.2.1	Yl-Bk (2-1)	0.40	dB
4.2.1	Rd-Bn (3-4)	0.17	dB
4.2.1	Bn-Rd (4-3)	0.16	dB
4.2.1	Bl-Or (5-6)	0.13	dB
4.2.1	Or-Bl (6-5)	0.16	dB
4.2.1	Gn-Pk (7-8)	0.25	dB
4.2.1	Pk-Gn (8-7)	0.29	dB

FOR QC: *[Signature]*

DATE: 25/10/04

FOR QA: *[Signature]*

DATE: 25/10/04

Connector Harness Acceptance Report

Sheet: 1 / 1	System: MARS	Connector Harness no: 10133239 - 1
Issue: 01	Test Box / Loopback Box ref No's: 1033243-1 / 1029909-2	
Date: 21/10/04	Housed Unit: 29E-HC00-800-AAA	Customer Identification: 01

ETS Ref.	Result	Unit
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Continuity test

4.1.1	Live Feed resistance	0.90	Ohm
4.1.1	System Ground resistance	0.78	Ohm

Leakage Current Test

4.1.2	HV Leakage (Live Feed)	18	nA
4.1.2	HV Leakage (System Gnd)	16	nA

Optical Insertion Loss at 1550nm (penetrator to penetrator using loopback test box)

4.2.1	Bk-Yl (1-2)	0.17	dB
4.2.1	Yl-Bk (2-1)	0.19	dB
4.2.1	Rd-Bn (3-4)	0.58	dB
4.2.1	Bn-Rd (4-3)	0.59	dB
4.2.1	Bl-Or (5-6)	0.21	dB
4.2.1	Or-Bl (6-5)	0.18	dB
4.2.1	Gn-Pk (7-8)	0.14	dB
4.2.1	Pk-Gn (8-7)	0.16	dB

FOR QC: *[Signature]*

DATE: 25/10/04

FOR QA: *[Signature]*

DATE: 25/10/04

APPENDIX C



CERTIFICATE OF CONFORMITY/RELEASE

Certificate: **MARS CTA 01** iss 1

This is to certify that the Products/Services listed below are conforming to the requirements of the contract and specifications as shown:

Contract: MARS			
Customer: Monterey Bay Aquatic Research Institute			
Contract ref	Description	Ref/Serial no.	Quantity
N/A	Cable Termination Assembly	29E-HC00-800-AAA / 01	1
Specification & Issue Status: 29D DE00 800 AAA Edition 04			
Concessions/Notes/Deficiencies:			
For Alcatel: Alcatel Submarine Networks Ltd Christchurch Way London SE10 0AG UK Signature: <u><i>[Signature]</i></u> Name: <u>W J Connor</u> Date: <u>25/10/04</u>			
For Purchaser (where applicable): The signing of this Release Certificate by the Purchasers does not remove any responsibility from the supplier for the supply of these items or associated equipment in accordance with the contract/specification stated above. Signature: _____ Name: _____ Date: _____			

CTA Performance Report

Sheet: 1 / 1	System: MARS	Connector Harness no: 10133239 - 1
Issue: 01	Test Box / Loopback Box ref No's:	1033243-1 / 1029909-2
Date: 04/10/04	Housed Unit: 29E-HC00-800-AAA	Customer Identification: 01

ETS Ref.		Result	Unit
----------	--	--------	------

Continuity test

4.4	Live Feed resistance	-0.085	Ohm
4.4	System Ground resistance	0.470	Ohm

Leakage Current Test

4.5.1	HV Leakage (Live Feed +ve)	6	nA
4.5.1	HV Leakage (Live Feed -ve)	-8	nA

Optical Insertion Loss at 1550nm (penetrator to penetrator using loopback test box)

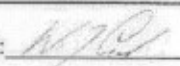
4.3	Bk+Yl (1+2) CTA Loss	-0.13	dB
4.3	Yl+Bk (2+1) CTA Loss	-0.13	dB
4.3	Rd+Bn (3+4) CTA Loss	0.05	dB
4.3	Bn+Rd (4+3) CTA Loss	0.05	dB
4.3	Bl+Or (5+6) CTA Loss	0.00	dB
4.3	Or+Bl (6+5) CTA Loss	0.03	dB
4.3	Gn+Pk (7+8) CTA Loss	-0.07	dB
4.3	Pk+Gn (8+7) CTA Loss	-0.03	dB

Mechanical Tests

4.6.1	Gland sub assembly electrical/pressure test	Pass	Pass/Fail
4.6.2	ODI penetrator O-seal integrity pressure test	Pass	Pass/Fail
4.6.3	Main bulkhead O-seal integrity pressure test	Pass	Pass/Fail

FOR QC: 

DATE: 25/10/04

FOR QA: 

DATE: 25/10/04

CERTIFICATE OF CONFORMITY/RELEASE

Certificate: **MARS CTA 02** iss1

This is to certify that the Products/Services listed below are conforming to the requirements of the contract and specifications as shown:

Contract: MARS			
Customer: Monterey Bay Aquatic Research Institute			
Contract ref	Description	Ref/Serial no.	Quantity
N/A	Cable Termination Assembly	29E-HC00-800-AAA / 02	1
Specification & Issue Status: 29D DE00 800 AAA Edition 04			
Concessions/Notes/Deficiencies:			
For Alcatel: Alcatel Submarine Networks Ltd Christchurch Way London SE10 0AG UK Signature: <u>W J Pennie</u> Name: <u>W J Pennie</u> Date: <u>25/10/04</u>			
For Purchaser (where applicable): The signing of this Release Certificate by the Purchasers does not remove any responsibility from the supplier for the supply of these items or associated equipment in accordance with the contract/specification stated above. Signature: _____ Name: _____ Date: _____			

CTA Performance Report

Sheet: 1 / 1	System: MARS	Connector Harness no: 10133239 - 2
Issue: 01	Test Box / Loopback Box ref No's: 1033243-1 / 1029909-2	
Date: 21/10/04	Housed Unit: 29E-HC00-800-AAA	Customer Identification: 02

ETS Ref.	Result	Unit
----------	--------	------

Continuity test

4.4	Live Feed resistance	-0.064	Ohm
4.4	System Ground resistance	0.502	Ohm

Leakage Current Test

4.5.1	HV Leakage (Live Feed +ve)	13	nA
4.5.1	HV Leakage (Live Feed -ve)	-13	nA

Optical Insertion Loss at 1550nm (penetrator to penetrator using loopback test box)

4.3	Bk+Yl (1+2) CTA Loss	-0.14	dB
4.3	Yl+Bk (2+1) CTA Loss	-0.13	dB
4.3	Rd+Bn (3+4) CTA Loss	0.16	dB
4.3	Bn+Rd (4+3) CTA Loss	0.15	dB
4.3	Bl+Or (5+6) CTA Loss	0.20	dB
4.3	Or+Bl (6+5) CTA Loss	0.20	dB
4.3	Gn+Pk (7+8) CTA Loss	0.07	dB
4.3	Pk+Gn (8+7) CTA Loss	0.11	dB

Mechanical Tests

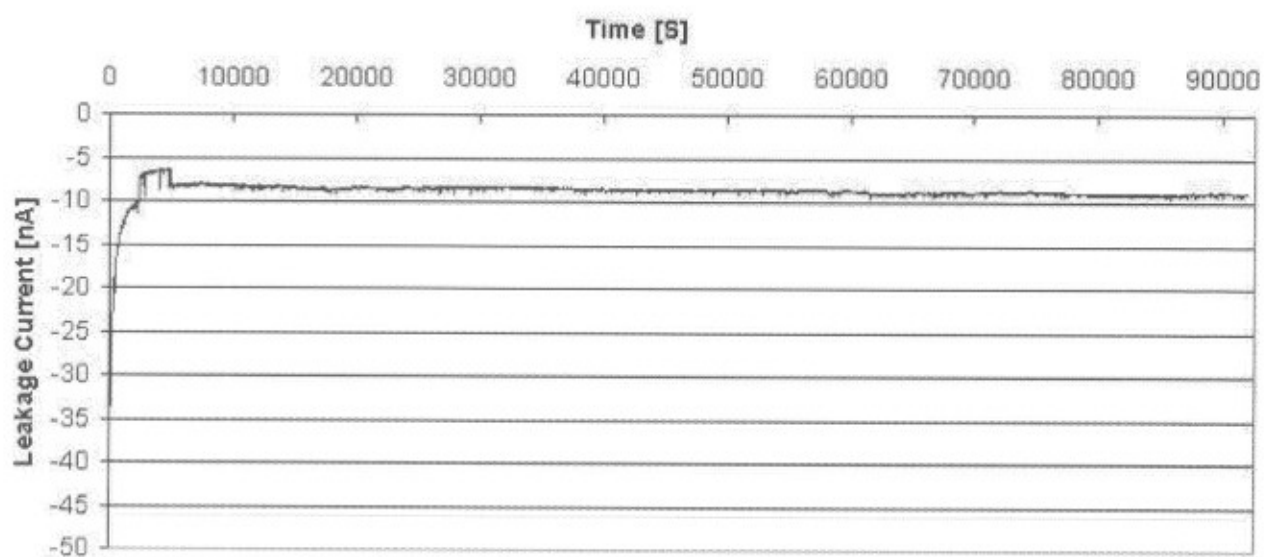
4.6.1	Gland sub assembly electrical/pressure test	Pass	Pass/Fail
4.6.2	ODI penetrator O-seal integrity pressure test	Pass	Pass/Fail
4.6.3	Main bulkhead O-seal integrity pressure test	Pass	Pass/Fail

FOR QC:
DATE: 25/10/04

FOR QA:
DATE: 25/10/04

APPENDIX D – Leakage current test CTA 01

Negative Leakage



Max over periode

-6.41599nA

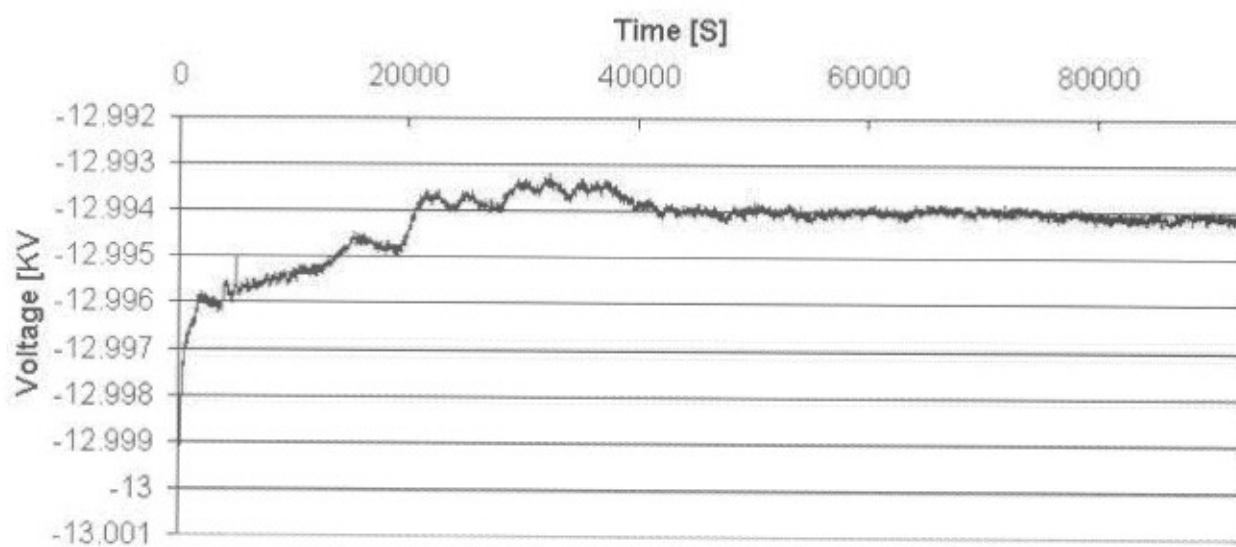
Min over periode

-43.2421nA

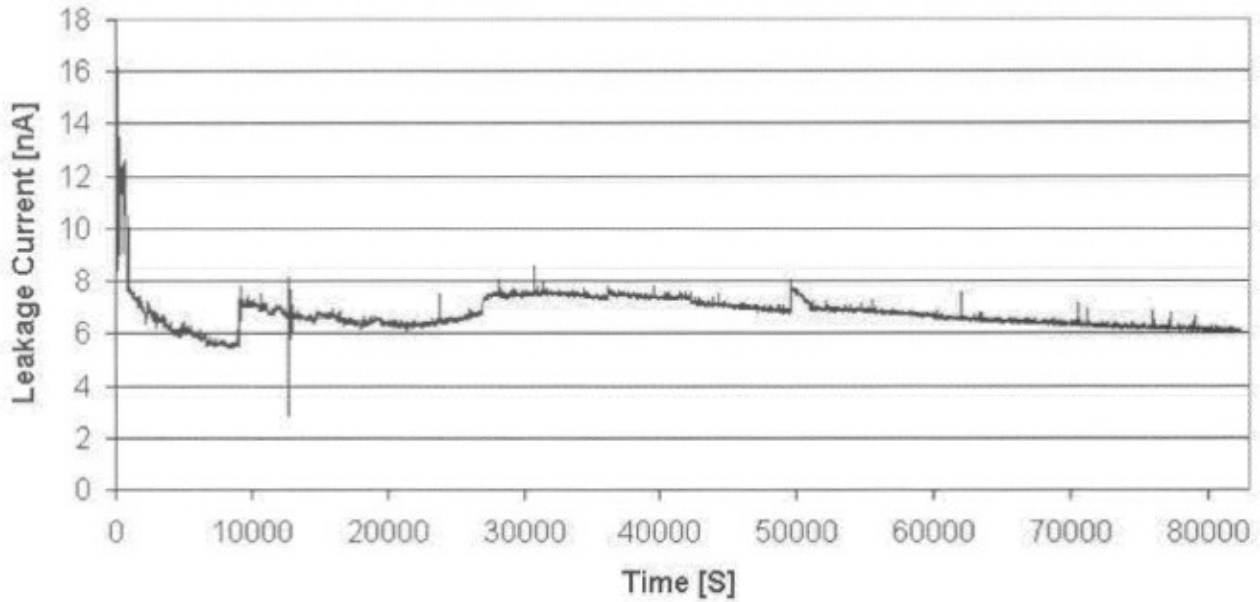
AVRG over periode

-8.77104nA

Applied Voltage

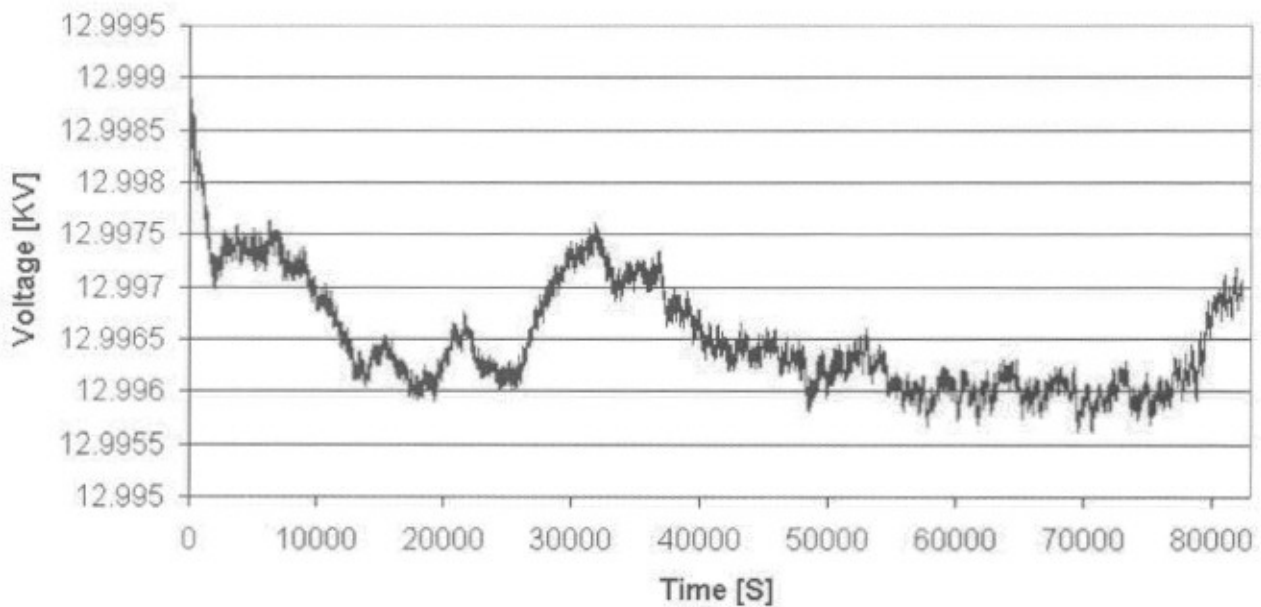


Positive Leakage



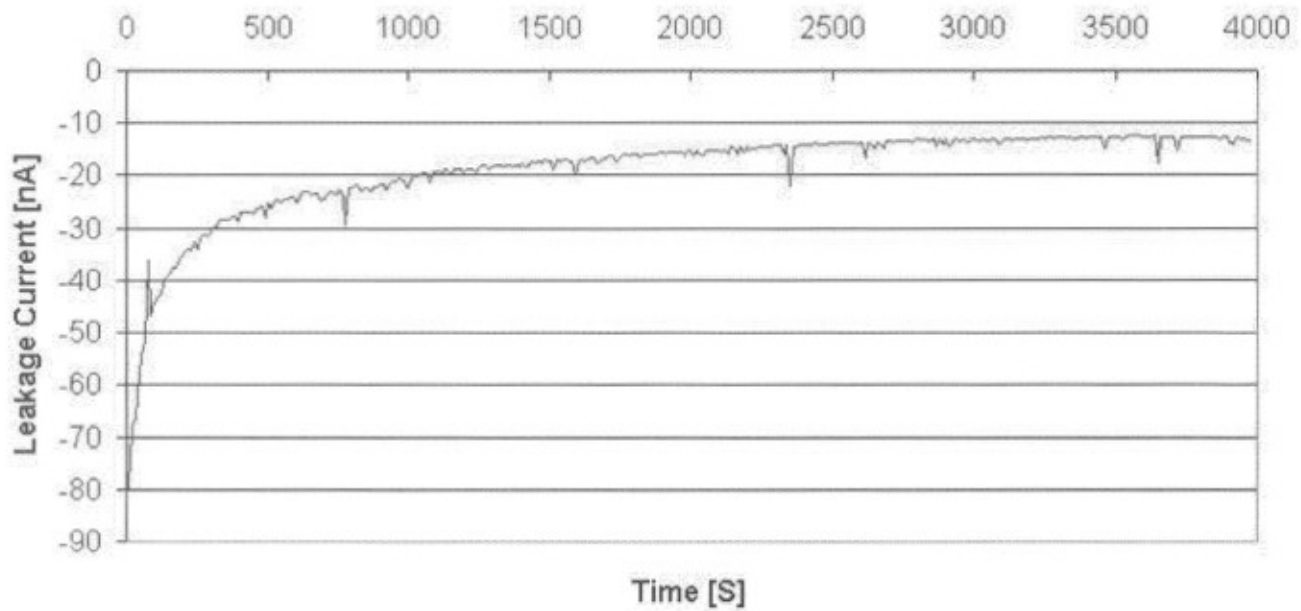
Max over periode	16.13067nA
Min over periode	2.860929nA
AVRG over periode	6.793568nA

Applied Voltage



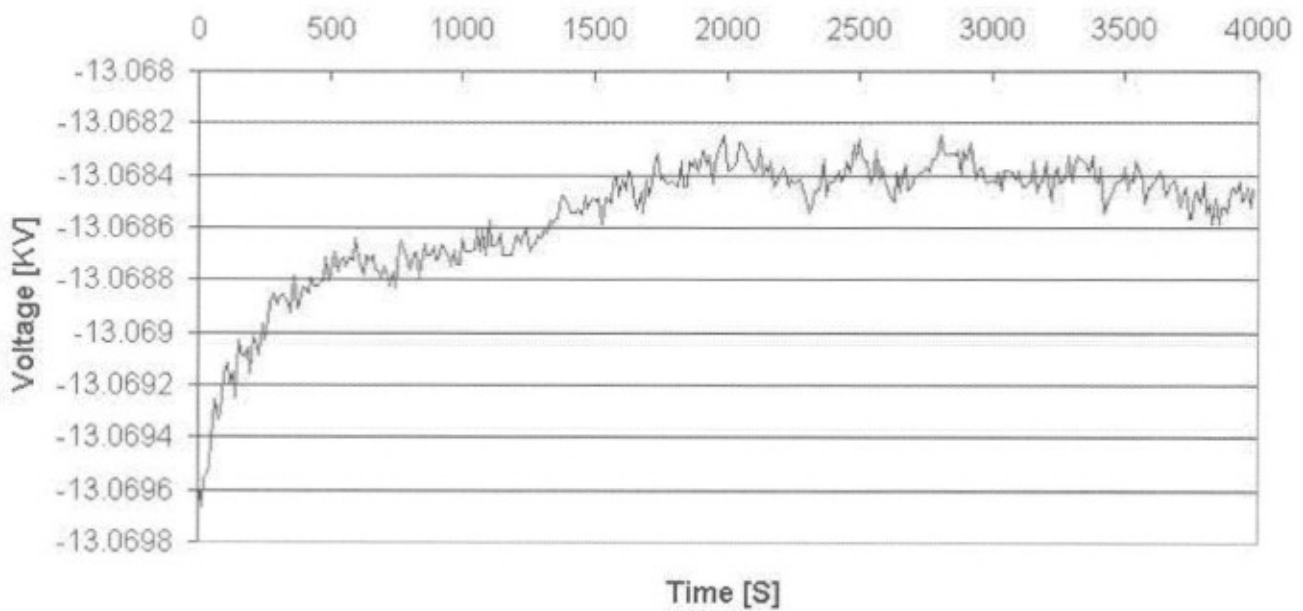
APPENDIX E – Leakage current test CTA 02

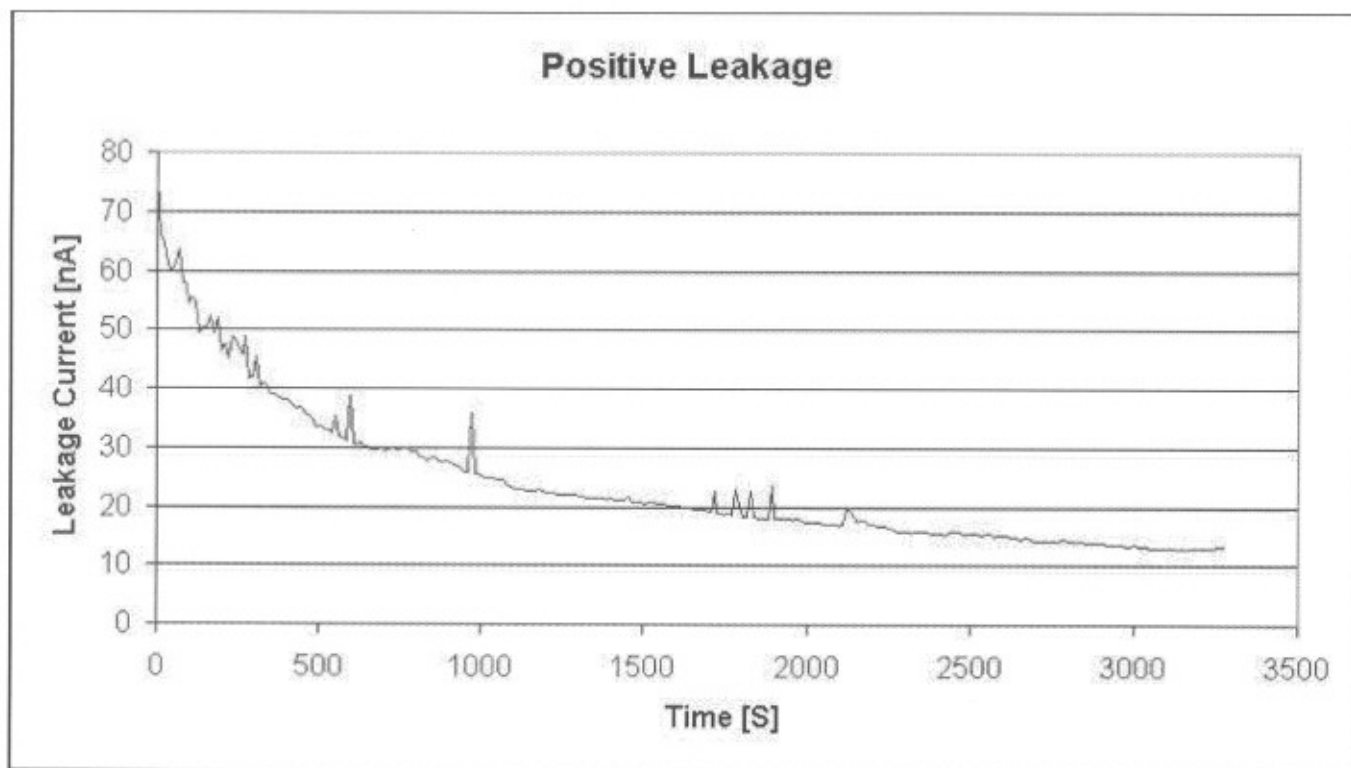
Negative Leakage



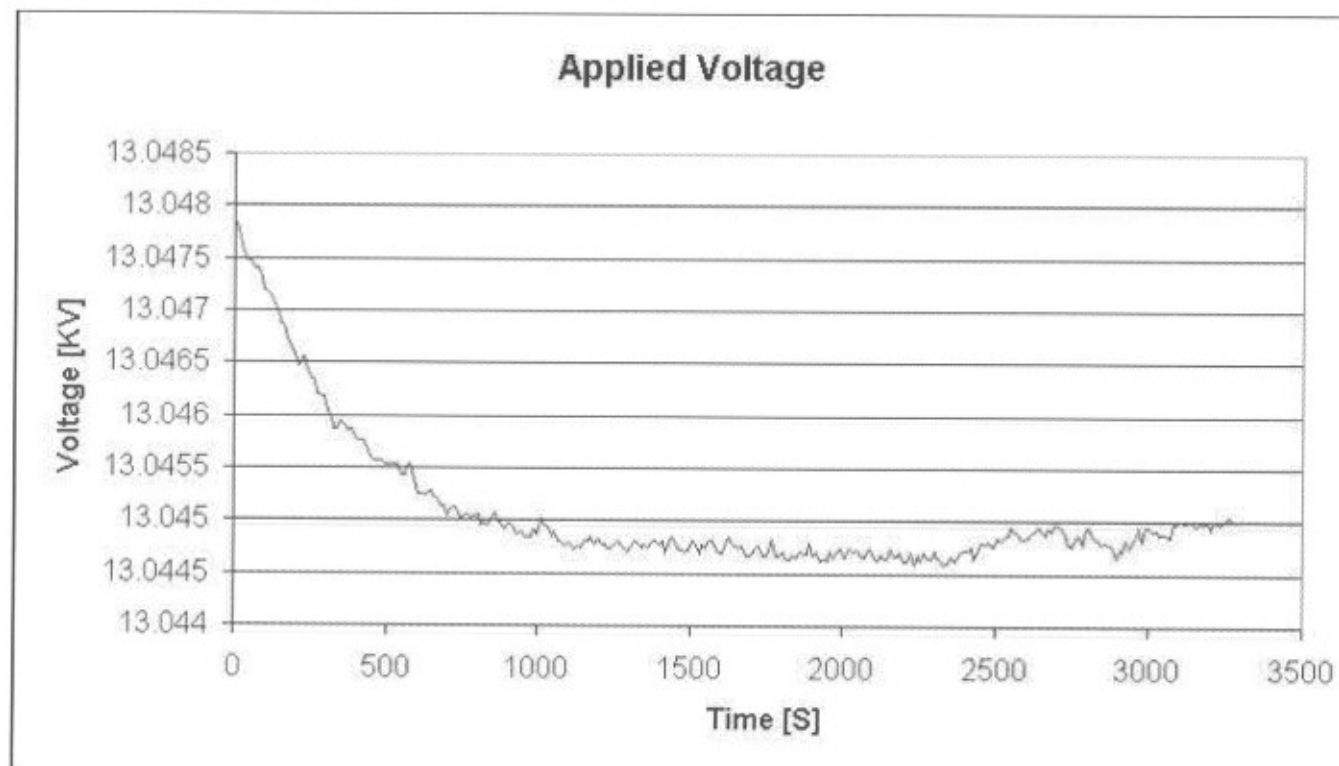
Max over periode	-12.4568nA
Min over periode	-82.1824nA
AVRG over periode	-18.9203nA

Applied Voltage





Max over periode	75.60533nA
Min over periode	12.67399nA
AVRG over periode	23.94071nA



APPENDIX F – Calais CTA acceptance reports

MARS PROJECT

CONTRACT 15 th January - 2004

CONTRACT du 15 Janvier 2004

CALAIS
CTA INCOMING TEST REPORT

System : MARS
 Factory : Calais
 Date : 02-nov-04
 Operator : Dugauquier Alain

Serial Number MARS/CTA/01

OPTICAL TEST

CTA Bulkhead colour	specification	black-yellow	Red-Brown	Blue-Orange	Green- Pink
Output power (dBm)		1,32	0,17	1,32	1,24
Input Power (dBm)		1,53	0,92	1,58	1,47
Loss (dB)	< 1,4 (matched)	0,21	0,75	0,26	0,23
Gh loss (dB)	< 1,4 (matched)	0,04	0,63	0,21	0,07
Δ (CEFS spec)	± 0.2 dB	0,17	0,12	0,05	0,16

ELECTRICAL TEST

	spec value	Current (A)	Voltage (V)	Resistance (ohm)
red electrical wire/copper tungun tube	< 1,8	1,000	0,730	0,73
White electrical wire/Ti ECW	< 2,2	1,000	1,420	1,42

CHECKED and ACCEPTED by the

QUALITY DEPARTMENT

QUALITY Dpt
04/11/2004Y. DEMARET
VISA >>




MARS PROJECT



CONTRACT 15 th January - 2004

CONTRAT du 15 Janvier 2004

CALAIS CTA INCOMING TEST REPORT

System : MARS
Factory : Calais
Date : 02-nov-04
Operator : Dugauquier Alain

Serial Number MARS/CTA/02

OPTICAL TEST

CTA Bulkhead colour	specification	black-yellow	Red-Brown	Blue-Orange	Green- Pink
Output power (dBm)		1,08	1,22	-1,71	-0,2
Input Power (dBm)		1,53	1,65	-1,42	0,12
Loss (dB)	< 1,4 (matched)	0,45	0,43	0,29	0,32
Gh loss (dB)	< 1,4 (matched)	0,3	0,33	0,33	0,32
Δ (CETS spec)	$\pm 0,2$ dB	0,15	0,1	-0,04	0

ELECTRICAL TEST

	spec value	Current (A)	Voltage (V)	Resistance (ohm)
red electrical wire/copper tungun tube	< 1,8	1,000	0,740	0,74
White electrical wire/Ti ECW	< 2,2	1,000	1,430	1,43

CHECKED and ACCEPTED by the

QUALITY DEPARTMENT

QUALITY Dpt
04/11/2004

Y. DEMARET
VISA >>

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APPENDIX G – Calais Integrated CTA performance

MARS PROJECT

CONTRACT 15 th January - 2004

CONTRAT du 15 Janvier 2004

CALAIS CTA FACTORY ACCEPTANCE TEST REPORT (CTA jointed to the cable tail and sea earth electrode)

System : MARS
Factory : Calais
Date : 15-nov-04
Operator : Charpentier R

Serial Number MARS/CTA/01

OPTICAL TEST

CTA Bulkhead colour	specification	black-yellow	Red-Brown	Blue-Orange	Green- Pink
Output power (dBm)		-2,48	-1,75	-3,07	-2,02
Input Power (dBm)		-1,73	-0,76	-2,26	-1,47
Loss (dB)	< 1,8 (matched)	0,75	0,99	0,81	0,55
<i>calais Incoming reference (connector +CTA)</i>		0,21	0,75	0,26	0,23
$\Delta =$ (CEIS spec)	+0,4 $\pm$ 0,2 dB	0,54	0,24	0,55	0,32

ELECTRICAL TEST

HV Test on the Moulded Extremity box	45 kV for 5 minutes	Test pass		
	spec value	Current (A)	Voltage (V)	Resistance (ohm)
red electrical wire/copper tungun tube	< 1,8	1,000	0,980	0,98
White electrical wire/Ti ECW	< 2,2	1,000	2,340	2,34

Depending of electrode position eg length and resistance of titanium wire (6 m instead of 5 m)

CHECKED and ACCEPTED by the

QUALITY DEPARTMENT

QUALITY Dpt
15/11/2004

V. DEMARET
VISA >>



MARS PROJECT

ALCATEL

CONTRACT 15 th January - 2004

CONTRAT du 15 Janvier 2004

CALAIS

CTA FACTORY ACCEPTANCE TEST REPORT

(CTA jointed to the cable tail and sea earth electrode)

System : MARS
 Factory : Calais
 Date : 15-nov-04
 Operator : Charpentier R

Serial Number **MARS/CTA/02**

OPTICAL TEST

CTA Bulkhead colour	specification	black-yellow	Red-Brown	Blue-Orange	Green- Pink
Output power (dBm)		-10,68	-3,36	-3,98	-4,25
Input Power (dBm)		-9,65	-2,6	-3,18	-3,58
Loss (dB)	< 1,8 (matched)	1,03	0,76	0,8	0,67
calais Incoming reference (connector +CTA)		0,45	0,43	0,29	0,32
Δ = (CETS spec)	+0,4 $\pm$ 0,2 dB	0,58	0,33	0,51	0,35

ELECTRICAL TEST

HV Test on the Moulded Extremity box

45 kV for 5 minutes

Test pass

	spec value	Current (A)	Voltage (V)	Resistance (ohm)
red electrical wire/copper tungun tube	< 1,8	1,000	0,970	0,97
White electrical wire/Ti ECW	< 2,2	1,000	2,320	2,32

Depending of electrode position eg length and resistance of titanium wire (6 m instead of 5 m)

CHECKED and ACCEPTED by the

QUALITY DEPARTMENT

QUALITY Dpt
15/11/2004

Y. DEMARET
VISA >>



APPENDIX H

RAMP TEST DATA	
Breakdown Voltage (kV)	Time to Breakdown (secs)
119	119
83.2	83.2
89	89
49	49

WIEBULL PARAMETERS FOR RAMP DATA	
Characteristic failure voltage (kV)	94.19
Weibull slope for ramp conditions (b)	3.94

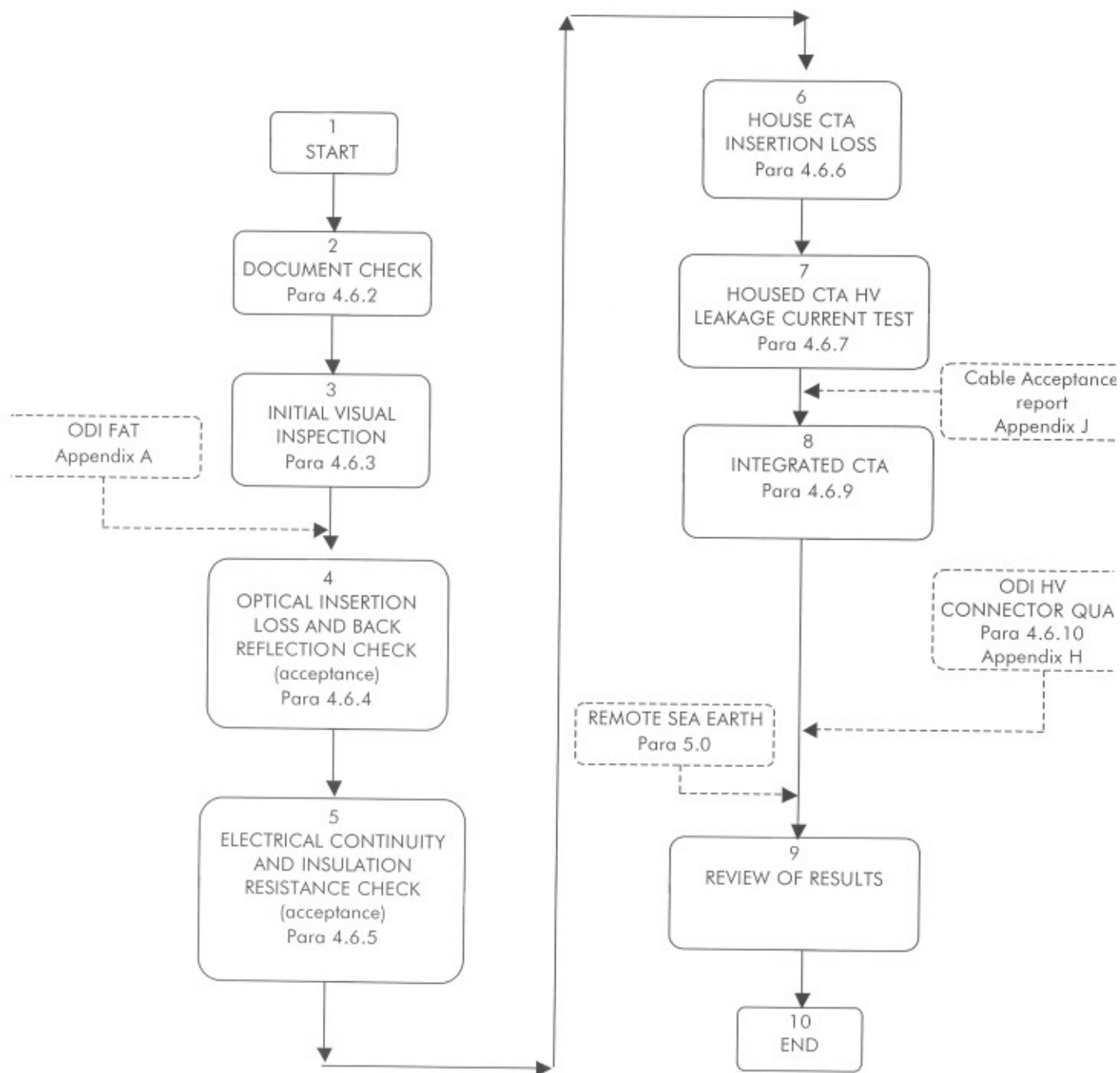
AGING TEST DATA @ 50 kV	
Time to Breakdown (hours)	Comments
18	Failed
23	Removed before failure
23	Removed before failure
23	Removed before failure
<i>Characteristic Breakdown Time from Weibull plot (hrs)</i>	
	30

AGING TEST DATA @ 37 kV	
Time to Breakdown (hours)	Comments
170	Failed
213	Failed
<i>Characteristic Breakdown Time from Weibull plot (hrs)</i>	
	201.23

WIEBULL SLOPE FROM AGING TEST DATA	
Weibull slope for aging test (a=b/N)	0.40

RELIABILITY PREDICTIONS	
Characteristic time at Service Voltage (hrs)	1.161E+08
Survival Probability for Service Voltage over Service Life	0.922
Failure Probability for Service Voltage over Service Life	0.078
Survival Probability during Ramp to Service Voltage	1.000

APPENDIX I – Qualification test sequence



APPENDIX J

ALCATEL	OPTICAL MEASUREMENTS				Manufacturing Site
Submarine Networks					
Division	<i>MESURES OPTIQUES</i>				CALAIS
					3/5
LAY SEGMENT :		CTA		LAY SECTION :	
SEGMENT DE POSE :				SECTION DE POSE :	
		CABLE LENGTH (km)		0.294	LONGUEUR CABLE (km)
ATTENUATION MEASUREMENTS					
<i>MESURES D'ATTENUATION</i>					
WAVELENGTH / LONGUEUR D'ONDE 1550 nm					
COLOUR - Couleur		Measured values		Remarks / Remarques	
		<i>Valeurs mesurées</i>			
		dB/km	dB		
		0.200	0.06	Corresponding	
Black (noire) / LEA		0.196	0.06	to the 8 Fibres	
Yellow (Jaune) / LEA		0.212	0.06		
Red (rouge) / RS		0.200	0.06		
Red 1 ring (rouge 1 anneau) / RS		0.200	0.06	selected for	
Blue 1 ring (Bleu 1 anneau) / RS		0.204	0.06		
Orange 1 ring (Orange 1 anneau) / RS		0.196	0.06		
Turquoise (Turquoise) / LS		0.200	0.06	The MARS CTA	
Pink (rose) / IS					
CHROMATIC DISPERSION READINGS AT 20° C WAVELENGTH IN VACUUM					
<i>DISPERSION CHROMATIQUE A 20°C DANS LE VIDE (**)</i>					
SPECIFIED WAVELENGTH 1550 nm - LONGUEUR D'ONDE SPECIFICATION 1550 nm					
COLOUR - Couleur		Lambda 0	Slope	Remarks / Remarques	
		Values	Values		
		nm	ps/nm ² /km		
		1580.00	0.1160	Corresponding	
Black (noire) / LEA		1581.80	0.1160	to the 8 Fibres	
Yellow (Jaune) / LEA		1597.10	0.0580		
Red (rouge) / RS		1594.40	0.0610		
Red 1 ring (rouge 1 anneau) / RS		1601.80	0.0700	selected for	
Blue 1 ring (Bleu 1 anneau) / RS		1592.00	0.0480		
Orange 1 ring (Orange 1 anneau) / RS		1585.70	0.0680		
Turquoise (Turquoise) / LS		1586.60	0.0670	The MARS CTA	
Pink (rose) / IS					
(**) Coef temperature = 0.03 nm per °C					

▼ ALCATEL	OPTICAL MEASUREMENTS		Manufacturing Site
Submarine Networks			
Division	MESURES OPTIQUES		CALAIS
			4/5
LAY SEGMENT : CTA SEGMENT DE POSE :		LAY SECTION : TAILS SECTION DE POSE :	
		CABLE LENGTH (km)	0,294
		LONGUEUR CABLE (km)	
POLARIZATION MODE DISPERSION			
DISPERSION DE POLARISATION (PMD)			
ps/square root km - ps/racine carrée km			
COLOUR - Couleur	Measured Mesurées	Remarks / Remarques	
Black (noire) / LEA	0.02	Corresponding	
Yellow (Jaune) / LEA	0.02		
Red (rouge) / RS	0.03	to the 8 Fibres	
Red 1 ring (rouge 1 anneau) / RS	0.03		
Blue 1 ring (Bleu 1 anneau) / RS	0.02	selected for	
Orange 1 ring (Orange 1 anneau) / RS	0.03		
Turquoise (Turquoise) / LS	0.05	The MARS CTA	
Pink (rose) / LS	0.03		
COLOUR of the 8 unselected and test fibres (Couleur des 8 fibres non utilisés) Brown (marron) / LEA Green 1 ring (Vert 1 anneau) / LEA Yellow 1 ring (Jaune 1 anneau) / LS White 1 ring (Blanc 1 anneau) / LS Vibrant Green (test) Pale Green (test) Light Blue (test) Clear (test)			

ALCATEL	OPTICAL MEASUREMENTS			Manufacturing Site
Submarine Networks				
Division	<i>MESURES OPTIQUES</i>			CALAIS
				5/5
LAY SEGMENT : CTA		LAY SECTION : TAILS		
<i>SEGMENT DE POSE</i>		<i>SECTION DE POSE</i>		
		CABLE LENGTH (km)	0,294	LONGUEUR CABLE (km)
BACKSCATTERING MEASUREMENTS				
<i>MESURES DE RETRODIFFUSION</i>				
Fibers / Fibres		Results <i>resultats</i>	Remarks / Remarques	
O.T.D.R. Traces of the Fibers Splices values and Attenuation Slopes		Conforms <i>Conformes</i>	No fibre splice in this section	
ELECTRICAL MEASUREMENTS				
<i>MESURES ELECTRIQUES</i>				
TYPE	UNIT	MEASURED VALUES		LIMITS VALUES
INSULATED CABLE - CABLE ISOLE	UNITE	VALEURS MEASUREES		VALEURS LIMITES
COMPOSITE CONDUCTEUR RESISTANCE LINEIQUE CONDUCTEUR INTERIEUR	Ω / km Ω	0.947 0.28		≤ 1.0 at 10° C
Coef temperature = 0.37% per °C				
INSULATION RESISTANCE 500 VDC RESISTANCE D'ISOLEMENT 500 V CONTINU	$M \Omega . KM$ $M \Omega KM$	Test pass the <i>Test fait le</i>	14/06/2004	> 100000
HIGH VOLTAGE TEST RIGIDITE DIELECTRIQUE	kV kV	Test pass the <i>Test fait le</i>	14/06/2004	45kV for 5 MINUTES 45kV PENDANT 5 MINUTES

t° ambiante	13.8
resistance	0.96
R à 10 °c	0.947
Date	14/06/2004



END OF DOCUMENT