



# Qualification Test Report

## **45° Fiber Array**

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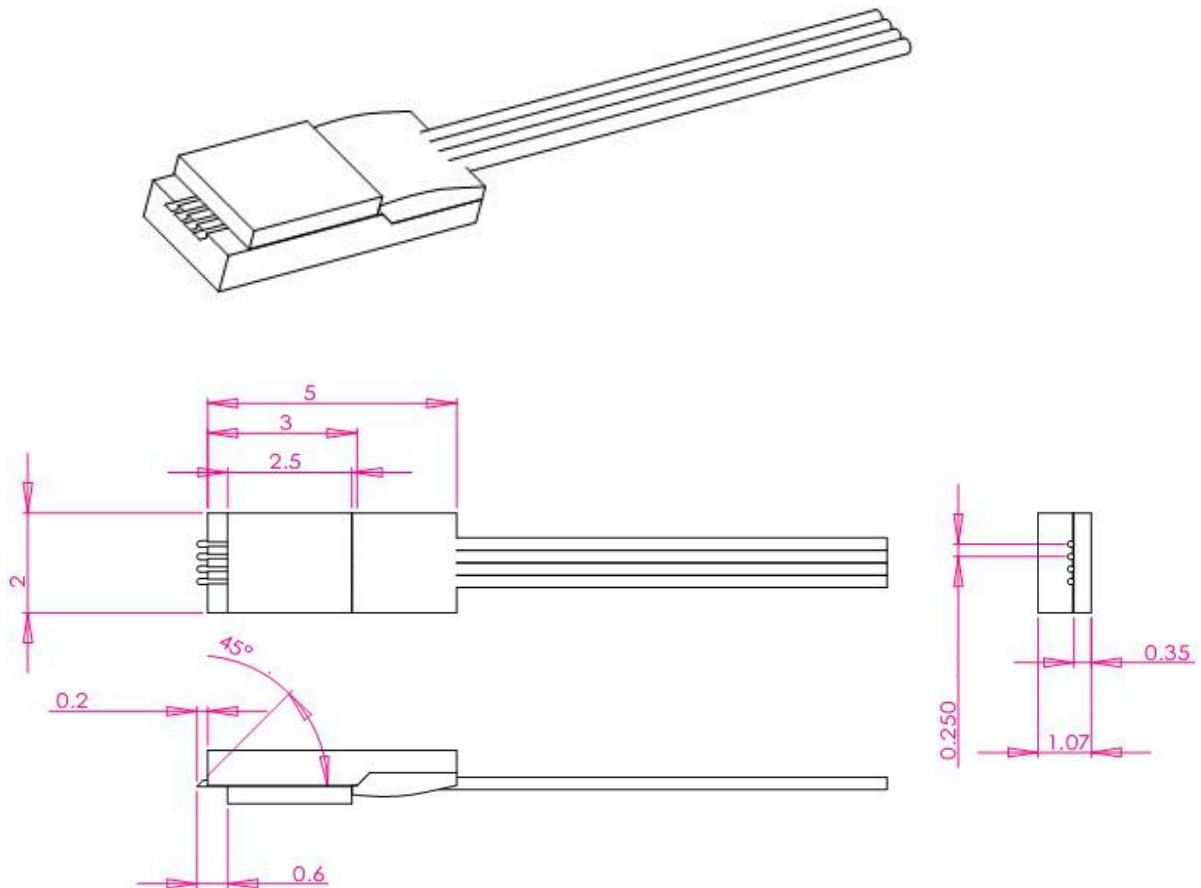
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## I. Introduction

This report presents the qualification test results of MESU 45° fiber Array products. The products chosen to performance the qualification testing are F4/45D fiber Array (G657A1 fiber) by following requirement of Telcordia GR1221-CORE.

As the similarity between the manufacturing process and material used for other type of Fiber Array type, the result of this qualification should also be applicable to other similar Fiber Array.

## II. Product Description and Specification



**Optical Parameter:** IL<0.8dB@1310nm for each channel.

### III. Telcordia GR-1221 Qualification Test

**1. Sample flow chart and number of allowed failures:** The following table shows the qualification flow chart used to evaluate planar splitters according to Telcordia GR-1221. The sample sizes have been divided in 2 groups to perform the tests in parallel.

Group	Sample Number	Test Condition	Number of Allowed Failures
A	11	Damp Heat	0
B	11	Temperature Cycling	0

**2. Optical parameters:** The following optical performances will be tested and monitored during the tests: Insertion Loss.

#### 3. Pass/ Fail criteria

Parameter	Pass/Fail Criteria
Insertion Loss change ( $\Delta IL$ )	$\leq 0.5dB$
Physical Damage	None

#### 4. Telcordia GR-1221 qualification summary

Heading	Test	Condition	Reference
Endurance	Damp Heat	85°C/85% RH, 2000 hours	GR1221, section 6.2.5
	Temperature Cycling	40°C to 85°C, 100 cycles for pass/fail, 500 cycles for info.	GR1221, section 6.2.7

#### 5. Test definitions

- **Damp Heat:** The high temperature storage (damp heat) test is based on the procedure stated in MIL-STD-883 Method 103 or EIA/TIA-455-5A, test type 1, with the following conditions:  
Temperature: 85°C ( $\pm 2^\circ C$ )  
Humidity: 85% ( $\pm 5\%$ ) RH
- **Temperature cycling:** The temperature cycling test is based on the procedures stated in MIL-STD-883, Method 1010, with the following conditions or EIA/TIA-455-3A, with the following conditions:  
Temperature: -40°C to 85°C ( $\pm 2^\circ C$ ) for RT/UNC  
Dwell Time at Extremes:  $\geq 15$  minutes  
Temperature Ramp Rate:  $\geq 1^\circ C$  per minute.  
Number of Cycles: 100 pass/fail, 500 for information for RT/UNC

#### 6. Test results

**1). Damp/heat testing results:**  
85% RH and 85°C and 11 samples

Damp/Heat Testing Result Summary					
FA No.	Channel	Initial	168 Hrs	500 Hrs	1000 Hrs
		IL	$\Delta$ IL	$\Delta$ IL	$\Delta$ IL
		dB	dB	dB	dB
FA4DH01	ch1	0.55	0.11	0.15	0.17
	ch2	0.57	0.08	0.13	0.18
	ch3	0.36	0.07	0.1	0.15
	ch4	0.44	0.1	0.12	0.13
FA4DH02	ch1	0.47	0.12	0.17	0.21
	ch2	0.53	0.05	0.09	0.16
	ch3	0.55	0.11	0.18	0.25
	ch4	0.58	0.11	0.13	0.18
FA4DH03	ch1	0.38	0.06	0.12	0.14
	ch2	0.42	0.08	0.11	0.15
	ch3	0.46	0.1	0.17	0.24
	ch4	0.52	0.13	0.19	0.19
FA4DH04	ch1	0.46	0.09	0.14	0.19
	ch2	0.42	0.08	0.12	0.18
	ch3	0.5	0.12	0.1	0.16
	ch4	0.45	0.11	0.12	0.14
FA4DH05	ch1	0.39	0.11	0.19	0.22
	ch2	0.43	0.15	0.16	0.19
	ch3	0.48	0.1	0.16	0.21
	ch4	0.46	0.12	0.15	0.22
FA4DH06	ch1	0.42	0.09	0.13	0.23
	ch2	0.47	0.07	0.12	0.17
	ch3	0.46	0.11	0.15	0.18
	ch4	0.37	0.06	0.09	0.11
FA4DH07	ch1	0.51	0.15	0.2	0.21
	ch2	0.43	0.12	0.18	0.2
	ch3	0.45	0.13	0.17	0.23
	ch4	0.38	0.09	0.14	0.18
FA4DH08	ch1	0.49	0.07	0.12	0.14
	ch2	0.42	0.06	0.09	0.13
	ch3	0.46	0.1	0.12	0.19
	ch4	0.37	0.09	0.14	0.17
FA4DH09	ch1	0.47	0.12	0.21	0.17
	ch2	0.53	0.15	0.13	0.16
	ch3	0.46	0.09	0.16	0.19
	ch4	0.44	0.12	0.15	0.21
FA4DH10	ch1	0.37	0.06	0.09	0.11
	ch2	0.43	0.05	0.09	0.16
	ch3	0.48	0.08	0.1	0.15
	ch4	0.43	0.07	0.12	0.18
FA4DH11	ch1	0.48	0.08	0.11	0.14
	ch2	0.46	0.09	0.11	0.16
	ch3	0.41	0.1	0.14	0.19
	ch4	0.39	0.12	0.16	0.15

5). Temperature cycling testing results:

11 samples of Fiber Array temperature cycling from -40°C to +85°C testing results:

Temperature Cycle Testing Result Summary				
FA No.	Channel	Initial	100 cycles	500 cycles
		IL	$\Delta$ IL	$\Delta$ IL
		dB	dB	dB
FA4TC01	ch1	0.52	0.12	0.15
	ch2	0.45	0.09	0.13
	ch3	0.43	0.08	0.11
	ch4	0.41	0.11	0.12
FA4TC02	ch1	0.43	0.1	0.17
	ch2	0.47	0.11	0.12
	ch3	0.49	0.09	0.17
	ch4	0.52	0.08	0.13
FA4TC03	ch1	0.41	0.08	0.13
	ch2	0.38	0.08	0.16
	ch3	0.46	0.1	0.17
	ch4	0.42	0.09	0.15
FA4TC04	ch1	0.38	0.1	0.15
	ch2	0.35	0.11	0.18
	ch3	0.42	0.09	0.14
	ch4	0.41	0.08	0.1
FA4TC05	ch1	0.46	0.12	0.12
	ch2	0.37	0.11	0.15
	ch3	0.39	0.13	0.16
	ch4	0.43	0.14	0.14
FA4TC06	ch1	0.41	0.11	0.13
	ch2	0.46	0.14	0.17
	ch3	0.47	0.13	0.16
	ch4	0.43	0.13	0.18
FA4TC07	ch1	0.48	0.09	0.14
	ch2	0.46	0.12	0.18
	ch3	0.45	0.11	0.17
	ch4	0.49	0.13	0.15
FA4TC08	ch1	0.51	0.12	0.13
	ch2	0.47	0.13	0.15
	ch3	0.49	0.11	0.1
	ch4	0.42	0.12	0.09
FA4TC09	ch1	0.41	0.12	0.15
	ch2	0.36	0.09	0.11
	ch3	0.38	0.09	0.17
	ch4	0.39	0.08	0.12
FA4TC10	ch1	0.32	0.08	0.13
	ch2	0.37	0.09	0.12
	ch3	0.35	0.11	0.14
	ch4	0.33	0.09	0.18
FA4TC11	ch1	0.43	0.09	0.11
	ch2	0.38	0.11	0.13
	ch3	0.36	0.09	0.15
	ch4	0.39	0.1	0.13



#### **IV. Test Conclusions**

1. 45° fiber Array products can meet the Telcordia standards and the products specification.
2. Visual inspection shows no physical abnormal after the test.

#### **V. References**

GR-1221-CORE, “Generic Reliability Assurance Requirements for Passive Optical Components”, Issue 2, January 1999.