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Fibre optic interconnecting devices and passive components – Summarising results of round robin on connector end face scratch recognition and verification by automated microscopes

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CONTENTS

FOREWORD 5
INTRODUCTION 7
1 Scope 8
2 Normative references 8
3 Terms and definitions 8
4 Round robin procedure 8
5 Specimen preparation 9
5.1 General 9
5.2 Multimode specimens 9
5.3 Single-mode specimens 11
6 Results 13
6.1 Reported data 13
6.2 Multimode specimens 13
Observations of specimen MM20-2 14
Observations of specimen MM12 15
Observations of MM14-4 16
6.3 Single-mode specimens 16
Observations of specimen SM9 17
Observations of specimen SM15-4 18
7 Observations and conclusions 18
7.1 Multimode observations 18
Remarks 19
7.2 Single-mode observations 19
Remarks 19
7.3 Conclusions 19
8 Items to be studied 20
Annex A (informative) Measurement procedure 21
Annex B (informative) Performance and geometry data of test specimens 23
Annex C (informative) Reported scratch results for all specimens 35
Bibliography 40

Figure 1 – Multimode single-fibre test specimen grouping 10
Figure 2 – Multimode multi-fibre test specimen grouping 11
Figure 3 – Single-mode single-fibre test specimen grouping 12
Figure 4 – Single-mode multi-fibre test specimen grouping 13
Figure 5 – Image of specimen end face MM20-2 14
Figure 6 – Number of out-of-specification scratches reported for multimode multi-fibre specimen MM20-2, zone A 14
Figure 7 – Image of specimen end face MM12 15
Figure 8 – Number of out-of-specification scratches reported for multimode single-fibre specimen MM12, zone A 15
Figure 9 – Image of specimen end face MM14-4 16
Figure 10 – Number of out-of-specification scratches reported for multimode multi-fibre specimen MM14-4, zone A 16
Figure 11 – Image of specimen end face SM9 17

Figure 12 – Number of out-of-specification scratches reported for single-mode single-fibre specimen SM9, zone A 17
Figure 13 – Image of specimen end face SM15-4 18
Figure 14 – Number of out-of-specification scratches reported for single-mode multi-fibre specimen SM15-4, zone A 18
Figure A.1 – Measurement procedure workflow 22
Figure B.1 – Initial attenuation of multimode single-fibre specimens 24
Figure B.2 – Initial return loss of multimode single-fibre specimens 24
Figure B.3 – Multimode multi-fibre test interface identification key 25
Figure B.4 – Initial attenuation of multimode multi-fibre specimens 27
Figure B.5 – Initial return loss of multimode multi-fibre specimens 27
Figure B.6 – Initial attenuation of single-mode single-fibre specimens 29
Figure B.7 – Initial return loss of single-mode single-fibre specimens 30
Figure B.8 – Single-mode multi-fibre test interface identification key 31
Figure B.9 – Initial attenuation of single-mode multi-fibre specimens 32
Figure B.10 – Initial return loss of single-mode multi-fibre specimens 33
Figure C.1 – (All specimens) – Number of out-of-specification scratches reported for multimode single-fibre specimens, zone A 35
Figure C.2 – (All specimens) – Number of out-of-specification scratches reported for multimode single-fibre specimens, zone B 36
Figure C.3 – (All specimens) – Number of out-of-specification scratches reported for multimode multi-fibre specimens, zone A 36
Figure C.4 – (All specimens) – Number of out-of-specification scratches reported for multimode multi-fibre specimens, zone B 37
Figure C.5 – (All specimens) – Number of out-of-specification scratches reported for single-mode single-fibre specimens, zone A 37
Figure C.6 – (All specimens) – Number of out-of-specification scratches reported for single-mode single-fibre specimens, zone B 38
Figure C.7 – (All specimens) – Number of out-of-specification scratches reported for single-mode multi-fibre specimens, zone A 38
Figure C.8 – (All specimens) – Number of out-of-specification scratches reported for single-mode multi-fibre specimens, zone B 39

Table 1 – Multimode test specimen categorisation 9
Table 2 – Single-mode test specimen categorisation 12
Table A.1 – Scratch size limits 21
Table B.1 – Initial optical performance of multimode single-fibre specimens 23
Table B.2 – End-face geometry of multimode single-fibre specimens 25
Table B.3 – Attenuation of multimode multi-fibre specimens 26
Table B.4 – Return loss of multimode multi-fibre specimens 26
Table B.5 – End-face geometry parameter of multimode multi-fibre specimens 28
Table B.6 – Fibre height of multimode multi-fibre specimens 28
Table B.7 – Core dip of multimode multi-fibre specimens 28
Table B.8 – Initial optical performance of single-mode single-fibre specimens 29
Table B.9 – End-face geometry of single-mode single-fibre specimens 30
Table B.10 – Attenuation of single-mode multi-fibre specimens at 1 310 nm wavelength 31

Table B.11 – Attenuation of single-mode multi-fibre specimens at 1 550 nm wavelength 31
Table B.12 – Return Loss of single-mode multi-fibre specimens at 1 310 nm wavelength 32
Table B.13 – Return loss of single-mode multi-fibre specimens at 1 550 nm wavelength 32
Table B.14 – End-face geometry parameter of single-mode multi-fibre specimens 33
Table B.15 – Fibre height of single-mode multi-fibre specimens 33
Table B.16 – Fibre tip radii of single-mode multi-fibre specimens 34

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FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – SUMMARISING RESULTS OF ROUND ROBIN ON CONNECTOR END FACE SCRATCH RECOGNITION AND VERIFICATION BY AUTOMATED MICROSCOPES

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INTRODUCTION

It is known that contamination and scratches on connector end face can result in degradation of optical performance as described in IEC TR 62627-05. It is important to inspect and clean, when necessary, each connector before mating with another connector to ensure they are fit for function. The visual inspection methods and criteria for fibre optic connectors and fibre-stub transceivers are defined in IEC 61300-3-35. Three different methods can be used for visual inspection: direct view optical microscopy (method A), video microscopy (method B) and automated analysis microscopy (method C). All methods are susceptible to system variability: methods A and B are operator dependent; method C is operator independent but relies on software analysis for measurement results. The uncertainty inherent to imaging equipment, processing methods, and detection software can lead to measurement variability among different brands and even the same types of microscopy. For all methods, the fibre microscopes can be certified for use in either low- and high-resolution applications with a purpose-built certification artefact.

There is industry concern about the veracity of the results of the visual inspection of the same part using different automated inspection equipment and software for method C. The IEC SC 86B task force group on scratch recognition was organized to investigate automated inspection system variability and provide recommendations to improve repeatability and reproducibility of the inspection. The task force group specifically limited its investigation to inspection using method C.

The task force group consisted of the following members (in alphabetical order): Arden, CommScope, Corning, Data Pixel, Exfo, Fibre QA, Fluke Corporation, Sumix, University College of London, and decided to perform this investigation by means of a round robin. The round robin involved inspection systems from multiple vendors in a blind study to determine the baseline performance of the systems with regard to automated scratch detection relative to IEC criteria of pre-selected samples.

This report summarizes the results (data collection and analysis) of end face scratch recognition and verification round robin performed by the following task force contributors (5 fibre inspection system manufactures). The following sequence in which the contributors are listed does not represent the order in which the data is presented in the results section. One contributor provided results from four unique inspection systems, each having their own participant ID (eight ID’s in total):

- Data-Pixel;
- Exfo;
- FiberQA;
- Fluke Corporation;
- Sumix.

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – SUMMARISING RESULTS OF ROUND ROBIN ON CONNECTOR END FACE SCRATCH RECOGNITION AND VERIFICATION BY AUTOMATED MICROSCOPES

1 Scope

This document summarises the results of a round robin on connector end face scratch recognition and verification by automated microscopes. The prime objectives of the study were:

- determine the amount of variability (repeatability and reproducibility) when different state-of-the-art inspection systems are assessed against IEC 61300-3-35:2015;
- evaluate any system-to-system variation in the quantity of reported scratches;
- provide recommendations to improve the repeatability and reproducibility of fibre optic inspection systems.

2 Normative references

There are no normative references in this document.