

ISO/IEC 14763-2:2012-02 (E)

Information technology - Implementation and operation of customer premises cabling - Part 2: Planning and installation

Contents	Page
FOREWORD.....	8
INTRODUCTION.....	10
1 Scope.....	13
2 Normative references	14
3 Terms, definitions and abbreviations	15
3.1 Terms and definitions	15
3.2 Abbreviations	21
3.3 Conventions	22
4 Conformance.....	22
5 Specification of installations	23
5.1 General	23
5.2 Installation specification	23
5.2.1 Requirements	23
5.2.2 Recommendations	25
5.3 Technical specification	25
5.3.1 General	25
5.3.2 Safety requirements	26
5.3.3 Security requirements.....	26
5.3.4 Performance and configuration – Requirements.....	26
5.3.5 Environmental conditions.....	27
5.4 Scope of work	27
5.4.1 Pre-installation	27
5.4.2 Installation.....	28
5.4.3 Post-installation.....	29
5.5 Quality assurance	29
6 Quality planning	30
6.1 Quality plan	30
6.2 Sampling	31
6.2.1 Balanced cabling	31
6.2.2 Optical fibre cabling.....	33
6.3 Treatment of marginal results	34
6.3.1 Balanced cabling	34
6.3.2 Optical fibre cabling.....	34
6.4 Treatment of non-compliant results	35
6.5 Change control.....	35
7 Installation planning	35
7.1 General	35
7.2 Safety	35
7.2.1 General	35
7.2.2 Mains power cabling.....	35
7.2.3 Optical fibre cabling.....	35
7.3 Environment.....	36
7.4 Points of electrical contact.....	36
7.5 External service provision	36
7.5.1 Requirements	36

7.5.2	Recommendations	36
7.6	Pathways and pathway systems	36
7.6.1	General	36
7.6.2	Inside buildings	39
7.6.3	Outside buildings.....	42
7.7	Spaces	46
7.7.1	Requirements	46
7.7.2	Recommendations	48
7.8	Functional elements	50
7.8.1	Requirements	50
7.8.2	Recommendations	51
7.9	Segregation of information technology cabling and mains power cabling	52
7.9.1	General	52
7.9.2	Requirements	53
7.9.3	Recommendations	59
7.10	Cabling – Requirements	59
7.10.1	General	59
7.10.2	Unscreened cabling	59
7.10.3	Screened cabling.....	60
7.10.4	Optical fibre cabling.....	60
8	Installation practices.....	60
8.1	General	60
8.2	Safety	60
8.2.1	General	60
8.2.2	Mains power cabling	60
8.2.3	Functional bonding	60
8.2.4	Optical fibre cabling.....	60
8.2.5	Guards and signs	61
8.2.6	Enclosed spaces	61
8.2.7	Maintenance holes	61
8.2.8	Closures	61
8.3	Environment.....	61
8.3.1	Storage	61
8.3.2	Installation – Requirements	61
8.4	Component inspection and testing – Requirements	61
8.5	Pathways	62
8.5.1	Requirements	62
8.5.2	Inside buildings – Requirements	62
8.5.3	Outside buildings.....	62
8.6	Spaces.....	63
8.6.1	Requirements	63
8.6.2	Entrance facilities	63
8.6.3	Rooms and enclosures intended to contain distributors	63
8.6.4	Cabinets, frames and racks	63
8.6.5	Closures	63
8.6.6	Outlets	63
8.7	Pathway system installation.....	63
8.7.1	General	63
8.7.2	Inside buildings	64

8.7.3	Outside buildings.....	64
8.8	Closure installation.....	64
8.9	Cable installation.....	65
8.9.1	Cable installation within pathway systems	65
8.9.2	General	65
8.9.3	Inside buildings	66
8.9.4	Cable installation in maintenance holes	66
8.9.5	Cable installation within closures – Requirements	67
8.10	Jointing and terminating of cables	67
8.10.1	Requirements	67
8.10.2	Balanced cabling	68
8.10.3	Screened balanced cabling.....	68
8.10.4	Optical fibre cabling.....	68
8.11	Cords and jumpers	68
8.12	Surge protective devices	68
8.13	Acceptance	68
8.13.1	Inspection.....	68
8.13.2	Testing	69
9	Documentation and administration.....	69
9.1	Symbols and preparation of documents	69
9.2	Administration	69
9.2.1	General	69
9.2.2	Administration system	70
9.2.3	Identifiers – Requirements.....	72
9.2.4	Component labelling	72
9.2.5	Records.....	75
9.2.6	Cable administration system.....	79
9.2.7	Reports	82
10	Testing	82
10.1	General	82
10.1.1	Links and permanent links	82
10.1.2	Channels	83
10.1.3	Cabling interface adaptors.....	84
10.1.4	Calibration.....	84
10.1.5	Equipment protection.....	84
10.1.6	Measurement conditions	84
10.2	Test procedures for balanced cabling	85
10.2.1	General	85
10.2.2	Measurement of length-related parameters.....	85
10.2.3	Treatment of marginal test results	85
10.2.4	Treatment of unacceptable test results	85
10.2.5	Test result format	85
10.2.6	Test result documentation	86
10.3	Test procedures for optical fibre cabling	86
10.3.1	General	86
10.3.2	Treatment of unacceptable test results	86
10.3.3	Test result documentation	87
11	Inspection.....	87
11.1	General	87

11.2	Inspection Level 1	87
11.3	Inspection Level 2	88
11.4	Inspection Level 3	88
11.5	Inspection documentation – Requirements	88
12	Operation	89
12.1	Standard operating procedure	89
12.1.1	Requirements	89
12.1.2	Recommendations	89
12.2	Cords and jumpers	89
12.3	Optical fibre adaptors	89
13	Maintenance.....	89
13.1	Approaches to maintenance	89
13.1.1	General	89
13.1.2	Requirements	90
13.2	Maintenance procedures	90
13.2.1	Requirements	90
13.2.2	Recommendations	90
14	Repair	91
	Annex A (normative) Optical fibre polarity maintenance: connecting hardware for multiple optical fibres	92
	Annex B (normative) Common infrastructures within multi-tenant premises.....	101
	Annex C (normative) Cabling in accordance with ISO/IEC 11801	109
	Annex D (normative) Cabling in accordance with ISO/IEC 15018	116
	Annex E (normative) Cabling in accordance with ISO/IEC 24764	122
	Annex F (normative) Cabling in accordance with ISO/IEC 24702	135
	Annex G (normative) Cabling in accordance with ISO/IEC TR 24704	138
	Bibliography.....	139
	Figure 1 – Schematic relationship between ISO/IEC 14763-2 and other relevant standards.....	12
	Figure 2 – Quality assurance schematic.....	23
	Figure 3 – Example of conformant and non-conformant bend radius management	40
	Figure 4 – Example of use of curved corners in pathway systems	42
	Figure 5 – Example of cabling installations outside buildings	43
	Figure 6 – Dimensions of rooms intended to contain distributors.....	50
	Figure 7 – Process of determining cable separation	54
	Figure 8 – Flowchart for cable separation calculation.....	57
	Figure 9 – Separation of mains power and information technology cables without dividers.....	58
	Figure 10 – Separation of mains power and information technology cables with dividers.....	58
	Figure 11 – Examples of cord and jumper labelling	74
	Figure 12 – Cable administration database and possible linkages.....	80
	Figure 13 – Basic cabling administration	80
	Figure 14 – Examples of cabling permanent links	83
	Figure 15 – Reference planes for link and channels (point-to-point).....	83
	Figure 16 – Example of a cabling channel.....	84

Figure A.1 – Duplex connecting hardware plug	93
Figure A.2 – Duplex connecting adapter	93
Figure A.3 – Duplex patch cord.....	93
Figure A.4 – Views of crossover patch cords.....	94
Figure A.5 – Optical fibre sequences and adapter orientation in patch panel for the symmetrical position method.....	95
Figure A.6 – Optical fibre sequences and adapter orientation in patch panel for the reverse-pair position method.....	95
Figure A.7 – Array connector cable or patch cord (key-up to key-up)	97
Figure A.8 – Array adapter with aligned keyways	97
Figure A.9 – Transition assembly.....	98
Figure A.10 – Connectivity method for duplex signals	99
Figure A.11 – Connectivity method for parallel optics channels.....	100
Figure B.1 – Example of common pathways and spaces in a multi-tenant building	102
Figure B.2 – Example of a campus entrance facility	104
Figure B.3 – Example 1: Common equipment room.....	106
Figure B.4 – Example 1: Common telecommunications room	107
Figure B.5 – Example 2: Common telecommunications room	107
Figure C.1 – Connection of functional elements providing redundancy	110
Figure E.1 – Connection of functional elements providing redundancy	123
Figure E.2 – Example of layered cable trays with smaller width upper trays	126
Figure E.3 – Example of uncovered (accessible) row of floor tiles to provide access to lower tray.....	127
Figure E.4 – Dimensions of rooms intended to contain distributors	129
Figure E.5 – Example of "hot" aisles, "cold" aisles and cable pathway locations	131
Table 1 – Installed balanced cabling test parameters	31
Table 2 – Minimum sample sizes for alien (exogenous) crosstalk testing	33
Table 3 – Installed optical fibre cabling test parameters	33
Table 4 – Examples of pathway systems.....	37
Table 5 – Stacking height for non-continuous and interval support pathway systems	41
Table 6 – Design and planning of pathways outside buildings	43
Table 7 – Separation recommendations between metallic information technology cabling and specific EMI sources	53
Table 8 – Classification of information technology cables	55
Table 9 – Minimum separation S.....	55
Table 10 – Power cabling factor P	56
Table 11 – Level of installation complexity	70
Table 12 – Level of operational complexity	70
Table 13 – Minimum requirements of administration systems.....	71
Table 14 – Minimum requirements of operational administration systems	72
Table 15 – Labelling requirements	73
Table 16 – Labelling recommendations (additional).....	74
Table 17 – Infrastructure records for spaces, cabinets, racks, frames and closures	76

Table 18 – Infrastructure records for cables and termination points	77
Table 19 – Infrastructure records	78
Table 20 – Infrastructure records for pathways and premises.....	79
Table 21 – Recommendations of installation administration systems.....	81
Table 22 – Recommendations of operational administration systems	81
Table A.1 – Optical fibre colour code scheme of IEC 60794-2.....	92
Table B.1 – Summary of common spaces used to service a multi-tenant building.....	102
Table D.1 – Minimum requirements for dimensions of primary distribution spaces	118
Table D.2 – Requirements for dimensions of secondary distribution spaces.....	119
Table D.3 – Minimum dimensions of spaces allocated to junction boxes	120
Table D.4 – Recommendations for dimensions of primary distribution spaces	120
Table D.5 – Recommendations for dimensions of secondary distribution spaces.....	121
Table E.1 – Environmental requirements for data centres	124
Table F.1 – Risk elements for consideration in determining an appropriate maintenance approach.....	137