ISO/IEC TR 11801-9905:2018-02 (E)

Information technology - Generic cabling systems for customer premises - Part 9905: Guidelines for the use of installed cabling to support 25GBASE-T application

Contents

Page

FOREWORD 5
INTRODUCTION 7
1 Scope 8
2 Normative references 8
3 Terms, definitions and abbreviations 8
4 Cabling channel specifications for 25 GBASE-T 9
4.1 General 9
4.2 25GBASE-T application specifications 9
4.2.1 Return loss 9
4.2.2 Insertion loss/attenuation 10
4.2.3 NEXT 11
4.2.4 Attenuation to crosstalk ratio at the near-end (ACR-N) 13
4.2.5 Attenuation to crosstalk ratio at the far-end (ACR-F) 13
4.2.6 Propagation delay 15
4.2.7 Delay skew 15
4.2.8 Unbalance attenuation and coupling attenuation 15
4.2.9 Alien crosstalk 16
4.3 Associated risk of 25GBASE-T operation over installed cabling 17
4.4 Characterization of balanced channels using Category 7_A components 17
4.4.1 General 17
4.4.2 Selection of channels for qualification 18
4.4.3 Return loss 18
4.4.4 Insertion loss 19
4.4.5 Near-end crosstalk loss (NEXT) 19
4.4.6 Attenuation to crosstalk loss ratio near-end (ACR-N) 21
4.4.7 Attenuation to crosstalk ratio far-end (ACR-F) 22
4.4.8 Alien (exogenous) crosstalk 24
4.4.9 Propagation delay 25
4.4.10 Delay skew 25
4.4.11 Coupling attenuation 25
4.4.12 Alien crosstalk and coupling attenuation 26
4.5 Characterization of balanced channels using Category 7 components 26
4.5.1 General 26
4.5.2 Selection of channels for qualification 27
4.5.3 Return loss 27
4.5.4 Insertion loss 28
4.5.5 Near-end crosstalk loss (NEXT) 28
4.5.6 Attenuation to crosstalk loss ratio near-end (ACR-N) 30
4.5.7 Attenuation to crosstalk ratio far-end (ACR-F) 31
4.5.8 Alien (exogenous) crosstalk 33
4.5.9 Propagation delay 34
4.5.10 Delay skew 34

4.5.11 Coupling attenuation 34
4.5.12 Alien crosstalk and coupling attenuation 35
4.6 Characterization of balanced channels using Category 6_A components 35
4.6.1 General 35
4.6.2 Selection of channels for qualification 36
4.6.3 Test specifications for channels made out of Category 6_A components 36
5 Guidance for mitigation procedures to improve the cabling of existing installations 36
5.1 General 36
5.2 Mitigation procedures related to internal noise 36
5.3 Mitigation procedures related to exogenous noise (alien crosstalk) 36
6 Guidance for cabling for new installations 37
Bibliography 38

Table 1 – Return loss for a channel 9
Table 2 –Return loss values for a channel at key frequencies 10
Table 3 – Insertion loss for a channel 10
Table 4 – Insertion loss values for a channel at key frequencies 11
Table 5 – NEXT for a channel 11
Table 6 – NEXT values for a channel at key frequencies 12
Table 7 – PS NEXT for a channel 12
Table 8 – PS NEXT values for a channel at key frequencies 13
Table 9 – ACR-F for a channel 13
Table 10 – ACR-F values for a channel at key frequencies 14
Table 11 – PS ACR -F for a channel 14
Table 12 – PS ACR-F values for a channel at key frequencies 14
Table 13 – Propagation delay for a channel 15
Table 14 – Propagation delay values for a channel at key frequencies 15
Table 15 – Delay skew for a channel 15
Table 16 – PS ANEXT for a channel 16
Table 17 – PS ANEXT values for a channel at key frequencies 16
Table 18 – PS AACR-F for a channel 17
Table 19 – PS AACR-F values for a channel at key frequencies 17
Table 20 – Risk of 25GBASE-T operation over installed cabling channels 17
Table 21 – Formulae for return loss limits for a channel 18
Table 22 – Return loss limits for a channel at key frequencies 18
Table 23 – Formula for insertion loss limits for a channel 19
Table 24 – Insertion loss limits for a channel at key frequencies 19
Table 25 – Formulae for pair-to-pair NEXT limits for a channel 19
Table 26 – Pair-to-pair NEXT limits for a channel at key frequencies 20
Table 27 – Formulae for PS NEXT limits for a channel 20
Table 28 –PS NEXT limits for a channel at key frequencies 20
Table 29 – ACR-N limits for a channel at key frequencies 21
Table 30 – PS ACR-N limits for a channel at key frequencies 22
Table 31 – Formulae for ACR-F limits for a channel 22
Table 32 – ACR-F limits for a channel at key frequencies 23
Table 33 – Formulae for PS ACR-F limits for a channel 23
Table 34 – PS ACR-F limits for a channel at key frequencies 23
Table 35 – Formulae for PS ANEXT limits for a channel 24
Table 36 – PS ANEXT limits for a channel at key frequencies 24

Table 37 – Formula for PS AACR-F limits for a channel 24
Table 38 – PS AACR-F limits for a channel at key frequencies 25
Table 39 – Formula for propagation delay limits for a channel 25
Table 40 – Propagation delay limits for a channel at key frequencies 25
Table 41 – Formula for coupling attenuation limits for a channel 26
Table 42 – Coupling attenuation limits for a channel at key frequencies 26
Table 43 – Alien crosstalk and coupling attenuation 26
Table 44 – Formulae for return loss limits for a channel 27
Table 45 – Return loss limits for a channel at key frequencies 27
Table 46 – Formula for insertion loss limits for a channel 28
Table 47 – Insertion loss limits for a channel at key frequencies 28
Table 48 – Formulae for pair-to-pair NEXT limits for a channel 28
Table 49 – Pair-to-pair NEXT limits for a channel at key frequencies 29
Table 50 – Formulae for PS NEXT limits for a channel 29
Table 51 – PS NEXT limits for a channel at key frequencies 29
Table 52 – ACR-N limits for a channel at key frequencies 30
Table 53- PS ACR-N limits for a channel at key frequencies 31
Table 54 – Formulae for ACR-F limits for a channel 31
Table 55 – ACR-F limits for a channel at key frequencies 32
Table 56 – Formulae for PS ACR-F limits for a channel 32
Table 57 – PS ACR-F limits for a channel at key frequencies 32
Table 58 – Formulae for PS ANEXT limits for a channel 33
Table 59 – PS ANEXT limits for a channel at key frequencies 33
Table 60 – Formula for PS AACR-F limits for a channel 33
Table 61 – PS AACR-F limits for a channel at key frequencies 34
Table 62 – Formula for propagation delay limits for a channel 34
Table 63 – Propagation delay limits for a channel at key frequencies 34
Table 64 – Formula for coupling attenuation limits for a channel 35
Table 65 – Coupling attenuation limits for a channel at key frequencies 35
Table 66 – Alien crosstalk and coupling attenuation for shielded channels 35