
10GBASE-T

Short reach test mode

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55.5.4.5 Short reach test mode

In test mode X (indicating operation over a short reach test channel) while receiving data from a transmitter compliant with specifications in 55.5.3, through the short reach test channel, a receiver shall operate with an Ethernet frame error rate less than 6.4×10^{-9} for 800 octet frames (e.g., operate with a BER less than 10^{-12})

The PHY short reach register setting X.XXX.X indicates that the PHY is operating in the short reach mode.

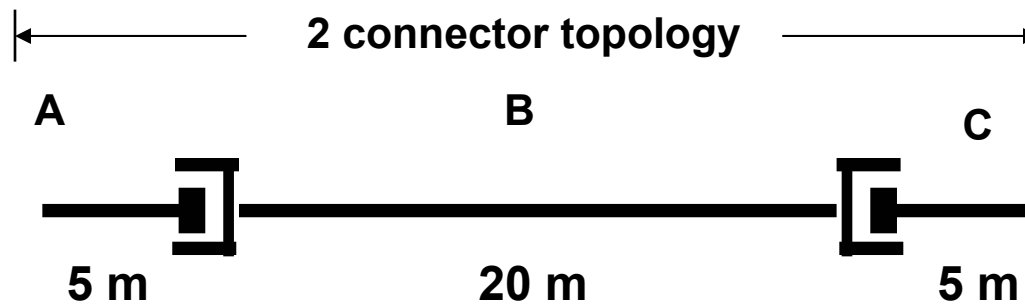
55.5.4.5,1 Short reach test channel

The short reach test channel specification is consistent with the transmission characteristics of a cabling link of 30 meters consisting of two connectors, 10 meters of cable cord, and a horizontal cable distance of 20 meters, that meets the ISO/IEC 11801 Category 7 component specifications.

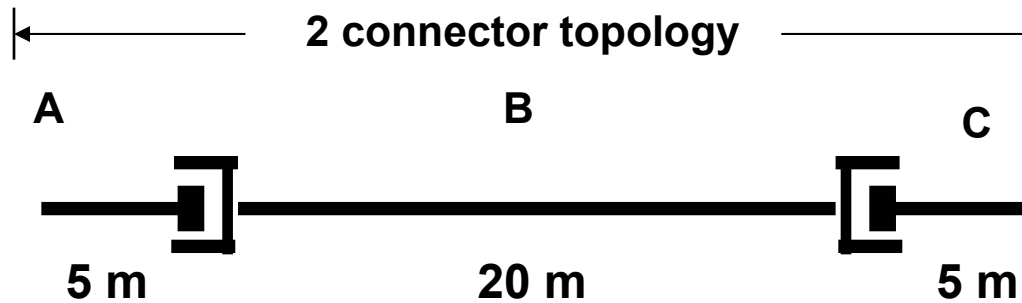
The short reach test channel specification is consistent with the transmission characteristics of a cabling link of xx meters consisting of two connectors, 10 meters of cable cord, and a horizontal cable distance of xx meters. that meets the Category 6A component specifications.

55.5.4.5.1 Short reach test channel

Figure 1. Short reach test channel



Short Reach Test Channel Model: 2 connector Topology



- Return loss = ISO/IEC 11801 RL for permanent link or CP link

$$2C - NEXT = -20 \log_{10} \left(\frac{NEXT_Cable_dB}{-20} + 10 \frac{NEXT_connector_dB}{-20} \right)$$

$$2C - PSNEXT = -20 \log_{10} \left(\frac{PSNEXT_Cable_dB}{-20} + 10 \frac{PSNEXT_connector_dB}{-20} \right)$$

Short Reach Test Channel Model: 2 connector Topology

$$2C - ELFEXT = -20 \log_{10} \left(\frac{\frac{ELFEXT_{Cable_dB}}{-20}}{+2 \times 10} \frac{PSFEXT_{connector_dB}}{-20} \right)$$

$$2C - PSELFEXT = -20 \log_{10} \left(\frac{\frac{PSELFEXT_{Cable_dB}}{-20}}{+2 \times 10} \frac{PSFEXT_{connector_dB}}{-20} \right)$$

Where:

$$NEXT_{Cable,L} = NEXT_{Cable,100m} - 10 \log_{10} \left(\frac{1 - 10^{\frac{-IL_{Cable,L}}{5}}}{1 - 10^{\frac{-IL_{Cable,100m}}{5}}} \right)$$

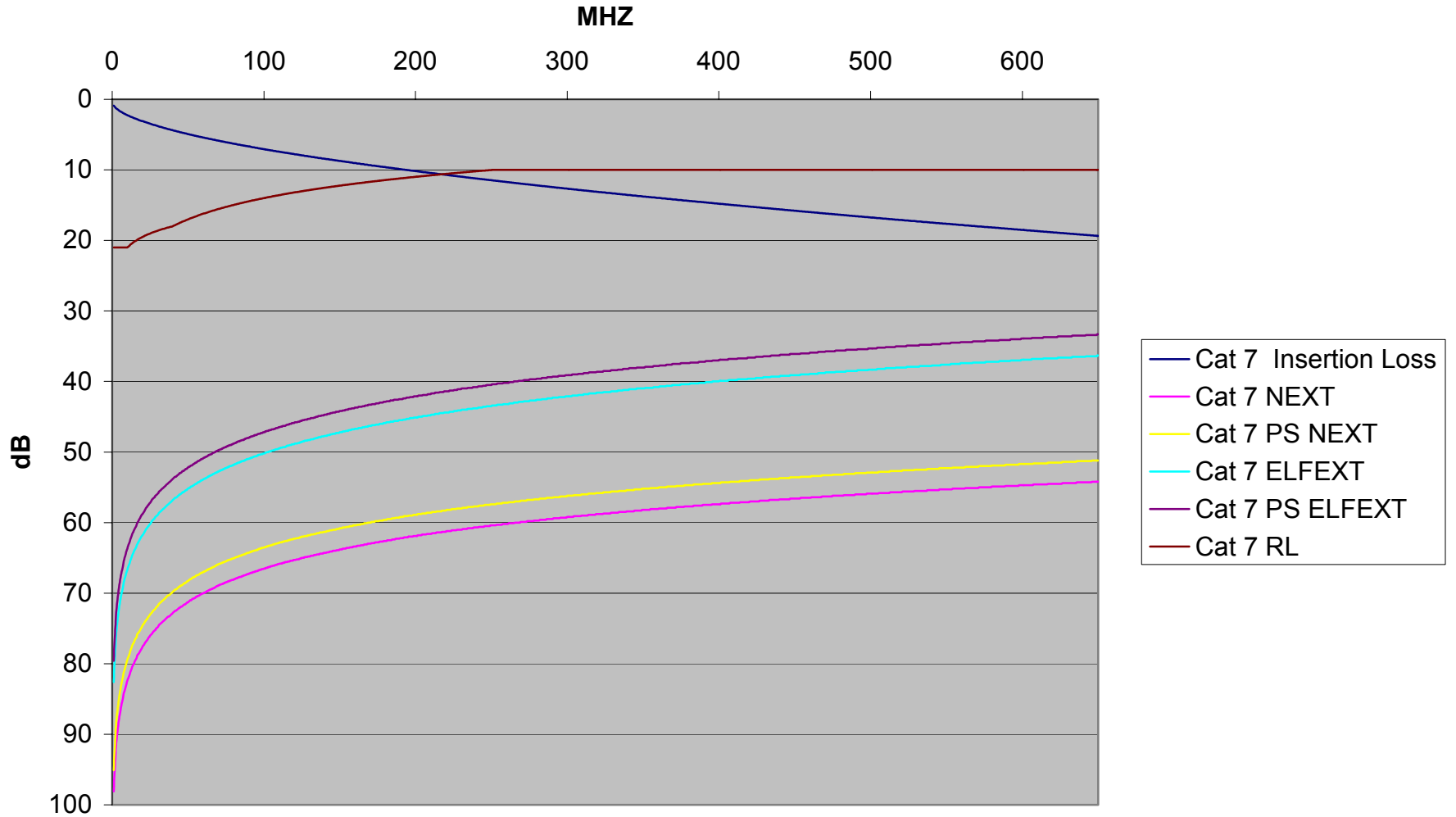
$$ELFEXT_{Cable,L} = ELFEXT_{Cable,100m} - 10 \log_{10} \left(\frac{Length\ Cable\ L}{100} \right)$$

Short reach test channel*

FREQ	Insertion Loss	NEXT	PS NEXT	ELFEXT	PS ELFEXT	RL
MHz	db	dB	dB	dB	dB	dB
1.00	0.90	98.10	95.10	82.60	79.60	21.00
4.00	1.50	88.80	85.80	73.10	70.10	21.00
8.00	2.03	84.00	81.00	68.20	65.20	21.00
10.00	2.26	82.40	79.40	66.70	63.70	21.00
16.00	2.79	79.20	76.20	63.30	60.30	19.98
20.00	3.10	77.60	74.60	61.80	58.80	19.49
25.00	3.45	76.00	73.00	60.20	57.20	19.01
31.50	3.89	74.40	71.40	58.50	55.50	18.51
62.50	5.53	69.70	66.70	53.60	50.60	16.04
100.00	7.05	66.50	63.50	50.20	47.20	14.00
200.00	10.19	61.90	58.90	45.10	42.10	10.99
250.00	11.48	60.40	57.40	43.50	40.50	10.02
300.00	12.66	59.20	56.20	42.10	39.10	10.00
400.00	14.80	57.40	54.40	40.00	37.00	10.00
500.00	16.74	55.90	52.90	38.30	35.30	10.00
600.00	18.51	54.70	51.70	36.90	33.90	10.00
650.00	19.36	54.20	51.20	36.30	33.30	10.00

***Category 7 – 2 connectors-10 m total patch cord-20 m horizontal cable**

Category 7- 30 meters,10 meter patch ,20 meter horizontal, 2 connectors



Category 6A – 2 connectors-10 m total patch cord-20 m horizontal cable

FREQ	Insertion Loss	NEXT	PS NEXT	ELFEXT	PS ELFEXT	RL
MHz	db	dB	dB	dB	dB	dB
1.00	0.84	77.00	74.60	68.80	65.80	19.09
4.00	1.39	66.80	64.40	56.70	53.70	21.00
8.00	1.87	61.50	59.10	50.70	47.70	21.00
10.00	2.08	59.70	57.30	48.80	45.80	21.00
16.00	2.57	56.00	53.60	44.70	41.70	19.98
20.00	2.86	54.30	51.90	42.70	39.70	19.49
25.00	3.17	52.60	50.10	40.80	37.80	19.01
31.50	3.55	50.80	48.30	38.80	35.80	18.51
62.50	5.17	45.60	43.10	32.80	29.80	16.04
100.00	6.48	42.10	39.50	28.80	25.80	14.00
200.00	9.40	37.00	34.40	22.70	19.70	10.99
250.00	9.82	35.40	32.70	20.80	17.80	10.02
300.00	11.54	34.00	31.40	19.20	16.20	9.23
400.00	13.60	29.86	27.10	16.70	13.70	8.00
500.00	15.29	26.65	23.76	14.80	11.80	8.00
600.00	17.03	24.03	21.03	13.20	10.20	8.00
650.00	17.77	22.88	19.84	12.50	9.50	8.00

Category 6A - 30 meters,10 meter patch ,20 meter horizontal, 2 connectors

