

Motion: To address the concerns of the committee expressed in comments #149 (Thompson) #33(Dove), #64 (Barrass), specifically, and low-power concerns generally, the following changes will be made to the draft.

**1) #149 Accept in Principle**

- A consensus of the task force believes that your objectives can be achieved and that it will be possible to distinguish a short-reach solution in the market by providing a short-reach test channel to ensure compliance for PHYs configured in a low-power mode. See #33

**2) #64 Accept in Principle**

- See #33

**3) #33 Accept in Principle**

- Accept Resolution offered in attached slides as the basis for resolution with the following enhancements, and the understanding that the task force will continue to enhance the specific channel requirements on the next review of the draft.

Change "1.131.0" to indicate Short Reach Mode

Page 48 Add "45.2.1.62.3 Short Reach Mode (1.131.0)

Short Reach Mode of the 10GBASE-T PHY provides a means for operation on a cable plant that has parametric performance equivalent to 30m of Class F and Class  $E_A$

cabling as defined in xxx. If bit 1.131.0 is a one, the PHY is in Short Reach Mode. If bit 1.131.0 is a zero, this is the default state and the PHY is operating in normal mode."

Communicate the contents of 1.131.0 through an extended next page bit (left to the editor to assign)

Modifications to proposal as shown in attached slides.

M: Dove

S: Di Minico

Y:44

N: 11

A: 2

## 55.5.4.5 Short Reach Mode

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

The PHY short reach register setting 1.131.0 indicates whether the PHY is operating in the short reach mode.

### 55.5.4.5,1 Short reach test channels

One 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.

One 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 Category 6A component specifications.

Motion to amend!

## 55.5.4.5 Short reach test mode

In Short Reach Test Mode (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  $6.4 \times 10^{-9}$  for 800 octet frames (e.g., operate with a BER less than  $10^{-12}$ )

The PHY short reach register setting 1.131.0 indicates whether the PHY is operating in the short reach mode.

### 55.5.4.5,1 Short reach test channels

The short reach test channel specification is consistent with the transmission characteristics of a cabling link of 55 meters consisting of two connectors, 10 meters of cable cord, and a horizontal cable distance of 45 meters, that meets the ISO/IEC 11801 Category 7 component specifications.

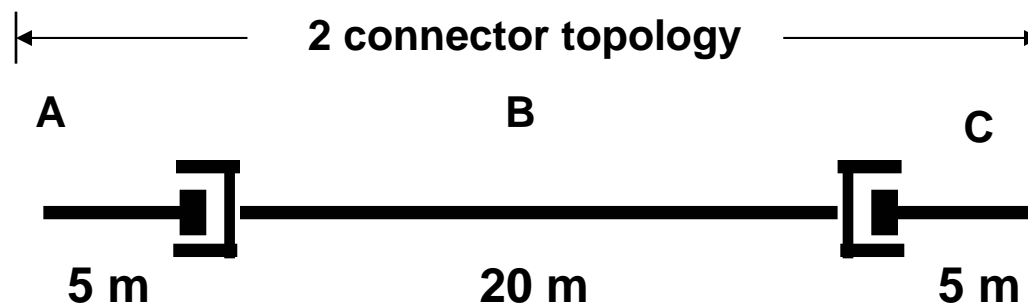
The short reach test channel specification is consistent with the transmission characteristics of a cabling link of 55 meters consisting of two connectors, 10 meters of cable cord, and a horizontal cable distance of 45 meters that meets the Category 6A component specifications.

M: Shimon S: Sanjay Y: 13 N: 34 A: 8

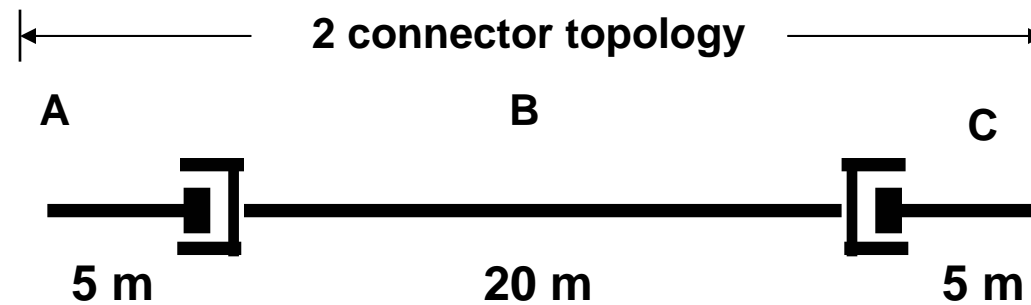
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# 55.5.4.5.1 Short reach test channel

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

$$2C - ELFEXT = -20 \log_{10} \left( 10^{\frac{ELFEXT_{Cable\_dB}}{-20}} + 2 \times 10^{\frac{PSFEXT_{connector\_dB}}{-20}} \right)$$

$$2C - PSELFEXT = -20 \log_{10} \left( 10^{\frac{PSELFEXT_{Cable\_dB}}{-20}} + 2 \times 10^{\frac{PSFEXT_{connector\_dB}}{-20}} \right)$$

Where:

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

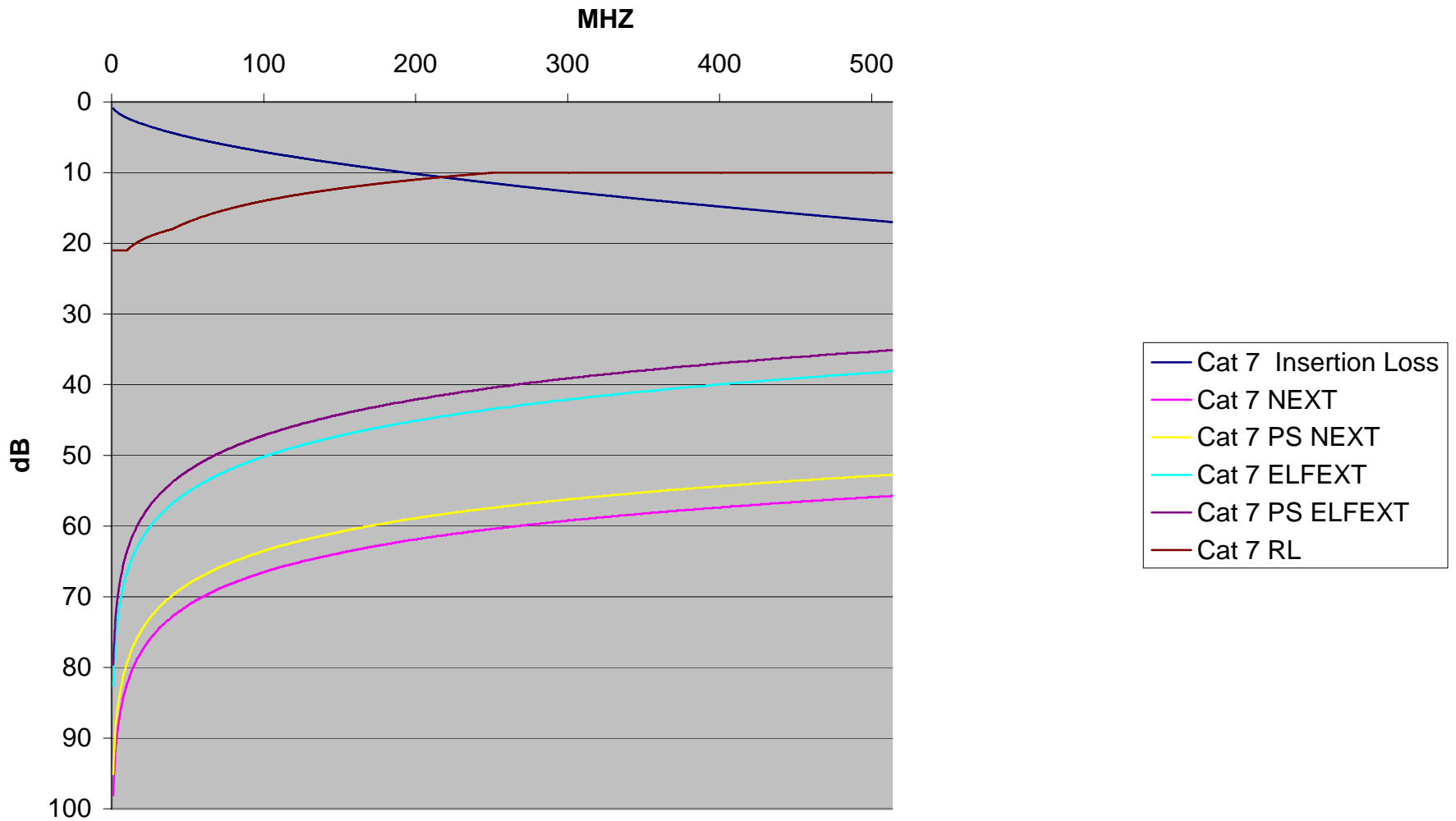
$$ELFEXT_{Cable,L} = ELFEXT_{Cable,100m} - 10 \log_{10} \left( \frac{Length\ Cable\ L}{100} \right)$$

# 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

**\*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**



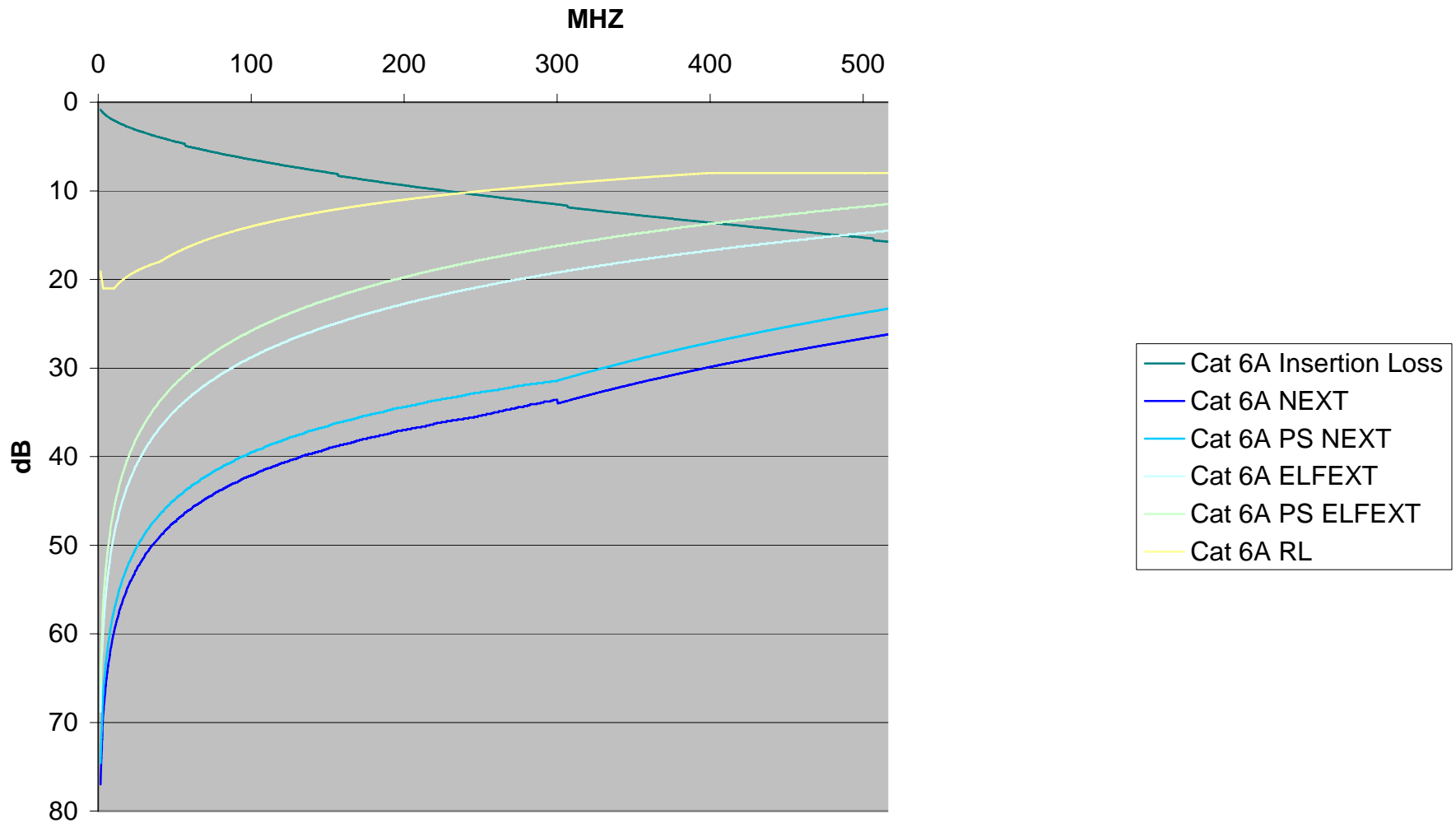


**Short Reach Test Channel – 2 connectors-10 m total patch cord-20 m horizontal cable**

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

**\*Category 6<sub>A</sub> – 2 connectors-10 m total patch cord-20 m horizontal cable**

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



## 55.5.4.5 Short reach test mode

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The PHY short reach register setting 1.131.0 indicates whether the PHY is operating in the short reach mode.

### 55.5.4.5,1 Short reach test channels

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 30 meters consisting of two connectors, 10 meters of cable cord, and a horizontal cable length of 20 meters that meets the Category 6A **or better** component specifications.

M: Koenen S :Sanjay Y: 17 N: 23 A:7