

Proposal for LPPI

Joel Goergen – Cisco Systems / Vasu Parthasarathy – Broadcom
Version r3
IEEE802.3bs 400GE
November 2014 San Antonio, TX

Overview

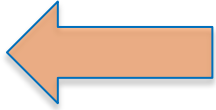
- What are the reaches and how should we cover those?
- Looks like C2EO is really the nPPI or eL'PPI in this case.
- Propose basic channel models for C2M and C2C.
- Proposal for LPPI.



Where is IEEE802.3bs 400GE in the Modulation Wars?

The following simplified process steps are used to build consensus:

- Defining / Discussing Reach
- System Architecture
- **Channel Loss**
- **Modulation**
- Equalization
- Error Correction
- Power



We Are About Here

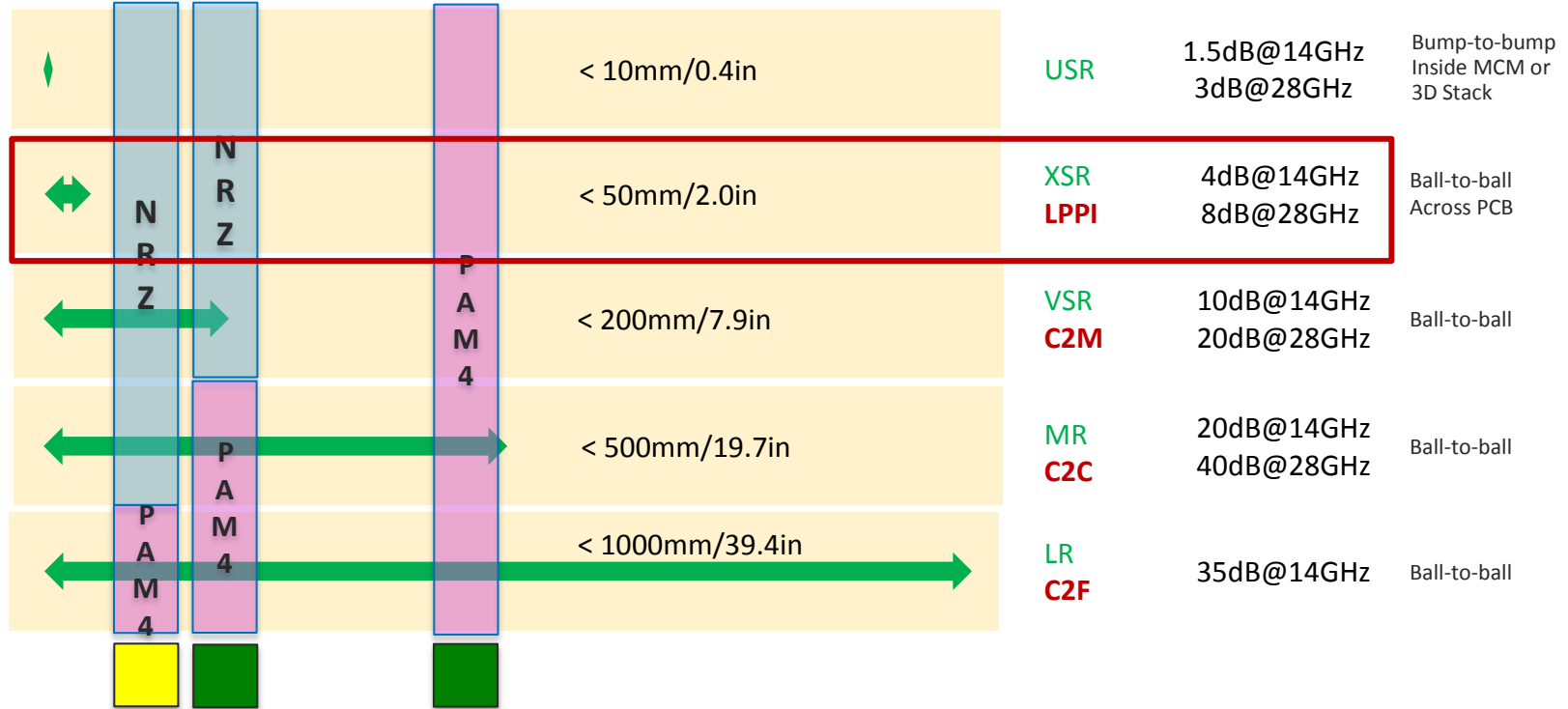
LPPI

IL

S
E
R
V
I
C
E
S

C
O
R
E

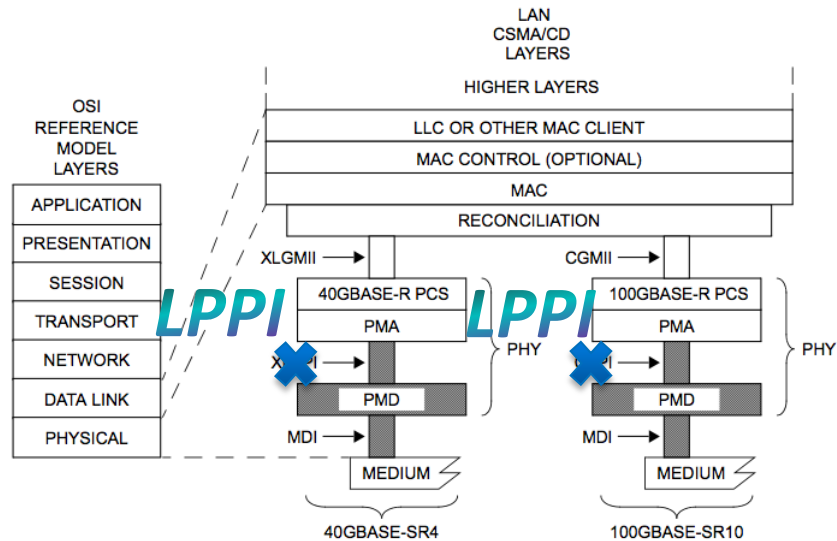
T
Y
P
E



C2C Reach is a Worry

Safe Bet Across Technologies

LPPI Architecture Block



CGMII = 100 Gb/s MEDIA INDEPENDENT INTERFACE
 CPPI = 100 Gb/s PARALLEL PHYSICAL INTERFACE
 LLC = LOGICAL LINK CONTROL
 MAC = MEDIA ACCESS CONTROL
 MDI = MEDIUM DEPENDENT INTERFACE
 PCS = PHYSICAL CODING SUBLAYER

PHY = PHYSICAL LAYER DEVICE
 PMA = PHYSICAL MEDIUM ATTACHMENT
 PMD = PHYSICAL MEDIUM DEPENDENT
 XLGMII = 40 Gb/s MEDIA INDEPENDENT INTERFACE
 XLPPi = 40 Gb/s PARALLEL PHYSICAL INTERFACE
 SR = PMD FOR MULTIMODE FIBER

Figure 86-1—40GBASE-SR4 and 100GBASE-SR10 PMDs relationship to the ISO/IEC Open Systems Interconnection (OSI) reference model and IEEE 802.3 CSMA/CD LAN model

Reference IEEE 802.3-2012 Section 6, Clause 86

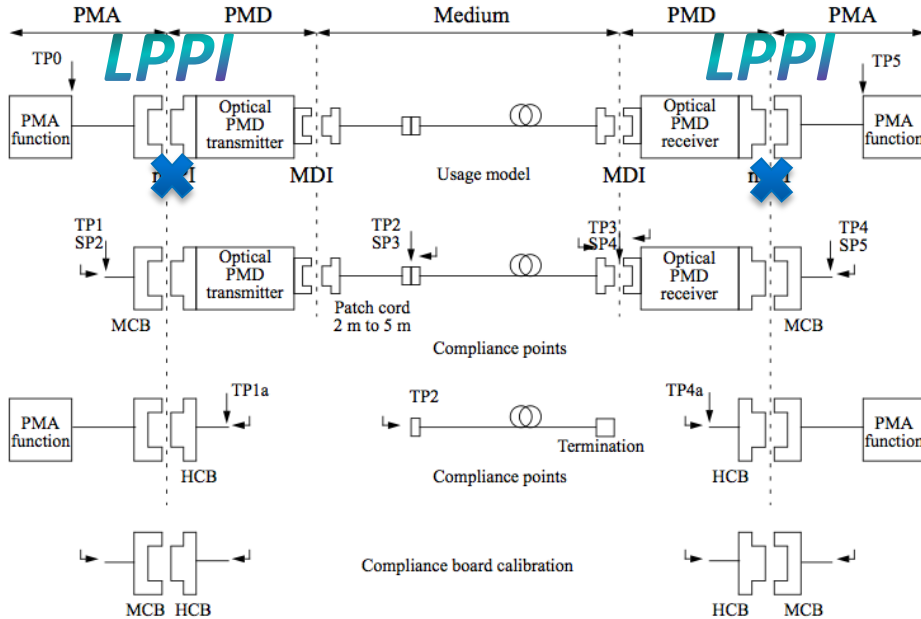
- Reference Clause 86 for basic text
- Waiting Optical PMD decisions to begin refreshing tables
- Extensive work done on this in other projects
- Reference ghiasi_03_0911 for feasibility study at 10Gb/s

Defining LPPI Test Points

IEEE STANDARD FOR ETHERNET

IEEE Std 802.3-2012
SECTION SIX

Table 86–10—Parameters defined at each test point



HCB = Host Compliance Board
 MCB = Module Compliance Board
 nPPI = 40 Gb/s or 100 Gb/s Parallel Physical Interface
 ↳ Instrument “looks” this way (e.g., direction of stimulus)

Figure 86–3—Test points for 40GBASE-SR4 and 100GBASE-SR10

Test point	Direction	Parameter
TP1	Looking downstream into LPPI PMD transmitter input	PMD transmitter input return loss
TP1a	Looking upstream into PMA transmitter output	PMA transmitter output signal and output return loss, PMD transmitter compliance signal calibration, PMA receiver compliance crosstalk signal calibration
TP2	Looking upstream into optical transmitter output	PMD transmitted signal, PMD transmitter reflectance
	Looking downstream into fiber	Optical return loss, connector reflections
TP3	Looking upstream into fiber	PMD receiver compliance signal
	Looking downstream into optical receiver input	PMD receiver reflectance
TP4	Looking upstream into PMD receiver output	PMD receiver output signal and output return loss, PMA receiver compliance signal calibration
TP4a	Looking downstream into PMA receiver input	PMA receiver input return loss

Reference IEEE 802.3-2012 Section 6, Clause 86

LPPI Channel Loss Proposal

IL

S
E
R
V
E
R
C
O
R
E
T
Y
P
E

	< 10mm/0.4in	USR	1.5dB@14GHz 3dB@28GHz	Bump-to-bump Inside MCM or 3D Stack
	< 50mm/2.0in	XSR LPPI	4dB@14GHz 8dB@28GHz	Ball-to-ball Across PCB
	< 200mm/7.9in	VSR C2M	10dB@14GHz 20dB@28GHz	Ball-to-ball
	< 500mm/19.7in	MR C2C	20dB@14GHz 40dB@28GHz	Ball-to-ball
	< 1000mm/39.4in	LR C2F	35dB@14GHz	Ball-to-ball



Thank you!

From:

Vasu Parthasarathy - Broadcom
Beth Kochuparambil – Cisco Systems
Vivek Telang - Broadcom
Joel Goergen – Cisco Systems