

Needs of Plastic Optical Fiber for Automobile

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Motivation

- A contribution to exclude POF was proposed at Ad Hoc meeting on Feb. 23, 2021 (swanson_3cz_01_230221_Optical Fiber.pdf)
- This is a contribution to correct misunderstanding in it

Attribute	Glass optical fiber		Plastic optical fiber		Misunderstanding
Core/Clad (μm)	50/125		55/490		-
Wavelength of operation (nm)	850	980	850	980	-
EMB (MHz•km)	2000	950	200	200	-
Attenuation(dB/km)	3	2	100	85	-
Support for IEEE 802.3cz Objectives	Yes		No		✓
Industry support	High		Low		✓
Eye-Safe	Yes		Yes		-
Robustness at high temperature	Sustainable		Not sustainable		✓
EMI resistance	High		High		-

Source: P.6, swanson_3cz_01_230221_Optical Fiber.pdf

9. Define the performance characteristics of an automotive link segment and an optical PHY to support 2.5 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors for at least 40 m on at least one type of automotive optical cabling
10. Define the performance characteristics of an automotive link segment and an optical PHY to support 5 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors for at least 40 m on at least one type of automotive optical cabling
11. Define the performance characteristics of an automotive link segment and an optical PHY to support 10 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors for at least 40 m on at least one type of automotive optical cabling
12. Define the performance characteristics of an automotive link segment and an optical PHY to support 25 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors for at least 40 m on at least one type of automotive optical cabling
13. Define the performance characteristics of an automotive link segment and an optical PHY to support 50 Gb/s point-to-point operation over this link segment supporting up to 2 inline connectors for at least 15 m on at least one type of automotive optical cabling

- **The Objective states requirements of link segment for each data rates, 2.5 Gb/s, 5 Gb/s, 10 Gb/s, 25 Gb/s and 50 Gb/s respectively.**
- **Universal optical cabling to support all data rates is not a mandatory requirement**
- **The objective allows plural types of optical cabling for each data rates**
- **Because POF can support objectives up to 10 Gb/s, it is within our scope**

OEM's comment

Same medium from 2.5 Gb/s to 50 Gb/s is not MUST requirement if cost effective solution is available at lower data rate (By Hideki Goto, Toyota)

- **Industry support for POF is NOT LOW**
 - **POF has been used in automobile for 20 years**
 - **GI-POF has been used medical and industry application for 10 years**
- **It is welcome for OEM and Tier1s that they have wider selection for data transmission media (By Hideki Goto, Toyota and Naoshi Serizawa, Yazaki)**

- **“POF is not sustainable at high temperature” is stereotype and misunderstanding**
 - **POF has been used in automobile for 20 years**
 - **GI-POF has good thermal stability at 105°C**

https://www.ieee802.org/3/cz/public/9_feb_2021/watanabe_3cz_01_0902_21_gipof.pdf

- **Although POF cannot support 40 m with 4 connections at 25Gb/s and 15m with 2 connections at 50 Gb/s, it is not a reason to exclude POF from 802.3cz (POF can support 25 Gb/s over 15m with 2 or 4 connections depending on connection loss)**
- **One optical medium from 2.5 Gb/s to 50 Gb/s is one of OEM's opinion.**
- **Other OEM and Tier1 don't request same medium for all data rates**
- **“Low industry support” and “not sustainable at high temperature” is misunderstanding about POF**
- **It is welcome for OEM and Tier1s that they can have wider selection for data transmission media**
- **To select only GOF may reduce opportunity of optical system in automobile**

Thank you for your attention.

