TECHNICAL NOTE

Title: HDAS connector High-frequencency characterization Technical note n°: PCB-ER-025-EXT Revision : B, March 2025	**ISSUED BY:** **Amphenol Socapex** **948, Promenade de l'Arve – B.P. 29** **74311 Thyez Cedex - France** **Tél. : +33 (0) 4 50 89 28 00** **www.amphenol-socapex.com**

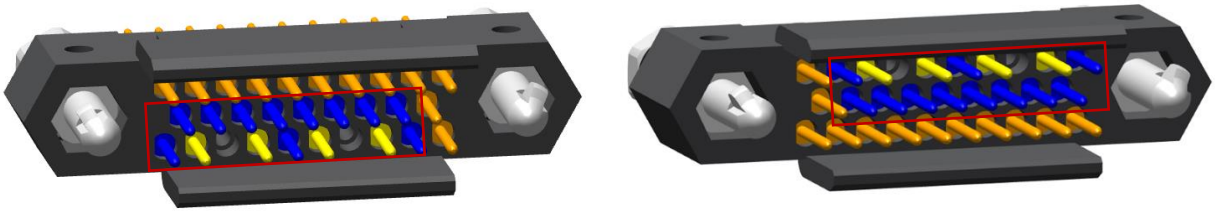
Dear Customer,

In accordance with the IEEE 802.3 standard, which specifies several protocols for an Ethernet 'backplane' transmission, we offer some arrangements of the HDAS connector for the eligibility of the following high-frequency protocols:

- 1GBASE-KX, defined for connectivity at 1 Gbps per transmission lane (IEEE 802.3 Annex 69B).
- 10GBASE-KX4, offers transmission at 10 Gbps using four transmission lanes at 2.5 Gbps each (IEEE 802.3 Annex 69B).
- XAUI, like 10GBASE-KX4, uses four transmission lanes to provide 10 Gbps connectivity. It is an extension of the 10 Gigabit Ethernet interface designed for shorter distance connections up to approximately 50 cm (IEEE 802.3 section 47.3.5.1).
- 10GBASE-KR/40GBASE-KX4, allows reaching 40 Gbps over four lanes (IEEE 802.3 Annex 69B).

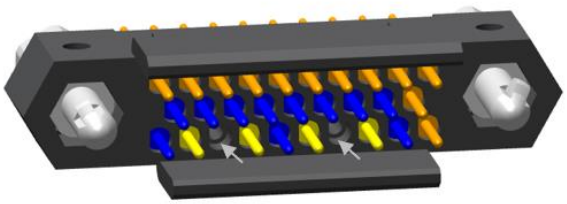
Three arrangements with YD contacts on both the plug and receptacle connectors have been studied. For each pattern, the alternation of grounding and differential contact along with empty cavities must be maintained, but their positions can be adjusted within the available contact slots of the connector.

Example of the same pattern:

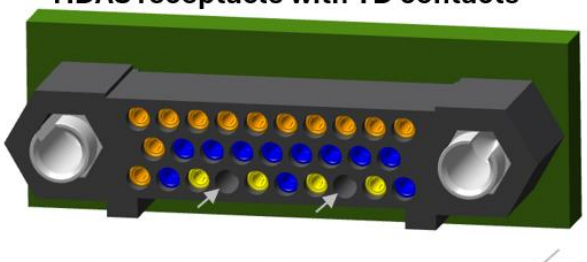


Arrangement #1 :

HDAS plug with YD contacts

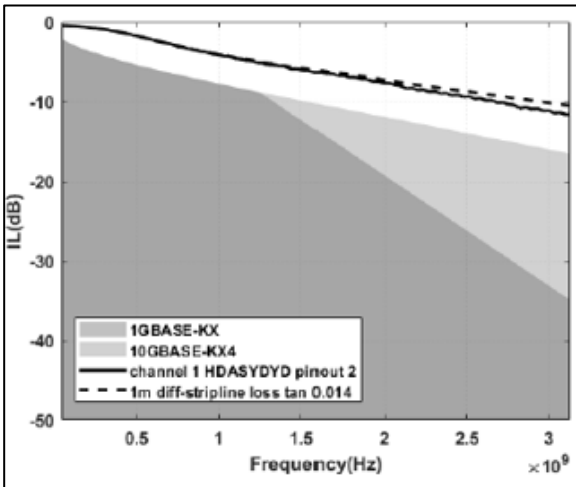


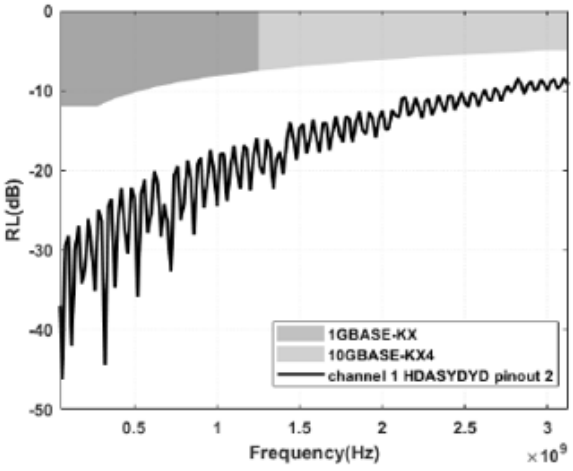
HDAS receptacle with YD contacts

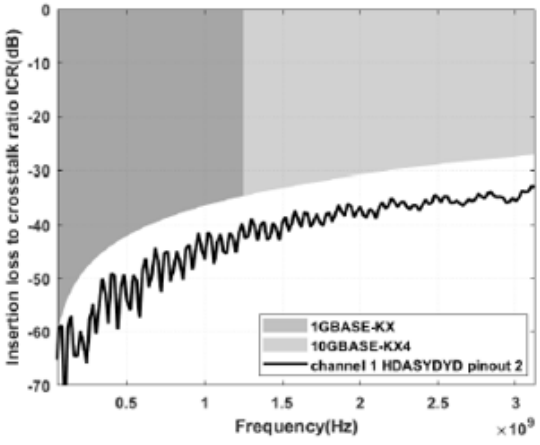


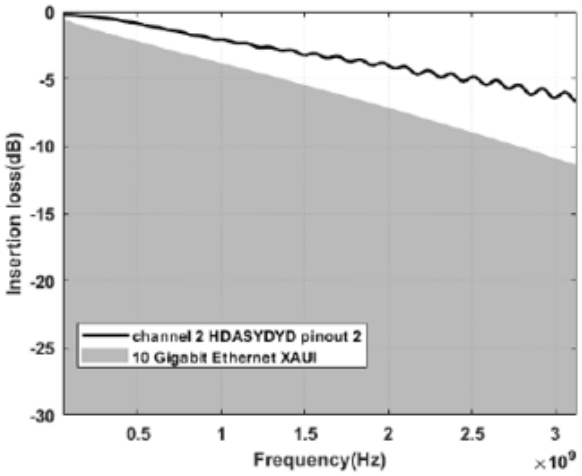
Signal contact Grounding contact Differential pair Empty cavities

1GBASE-KX	10GBASE-KX4	XAUI	10GBASE-KR / 40GBASE-KX4
ok	ok	ok	nok



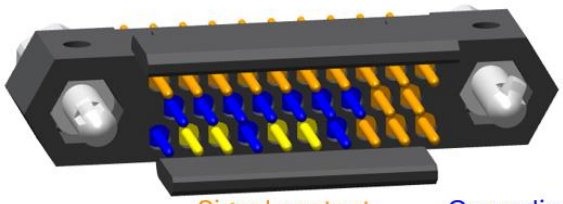




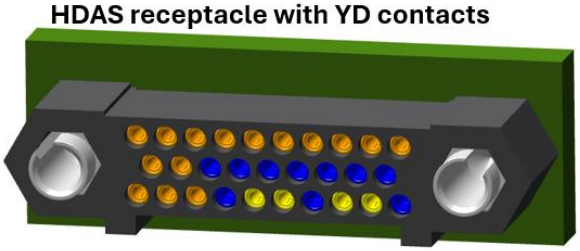


Arrangement #2 :

HDAS plug with YD contacts

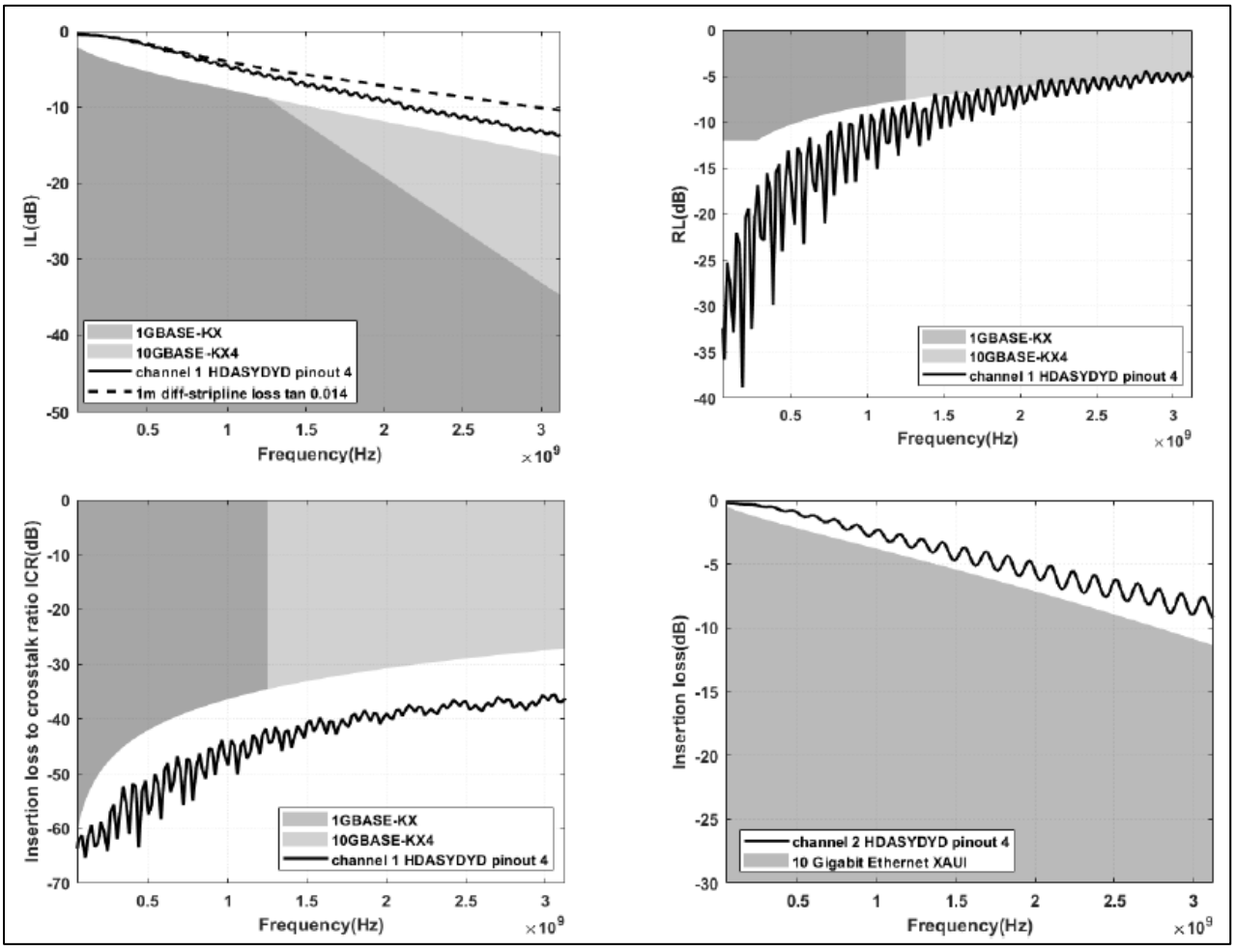


HDAS receptacle with YD contacts



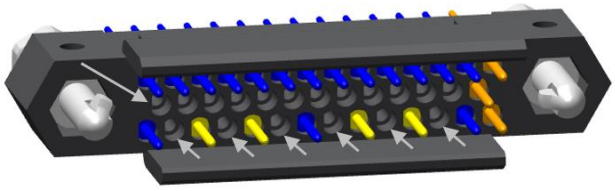
Signal contact Grounding contact Differential pair

1GBASE-KX	10GBASE-KX4	XAUI	10GBASE-KR / 40GBASE-KX4
ok	nok	ok	nok



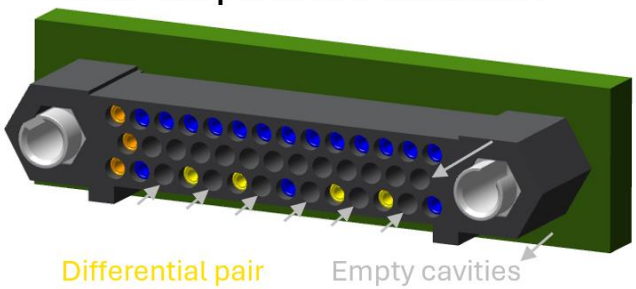
Arrangement #3 :

HDAS plug with YD contacts



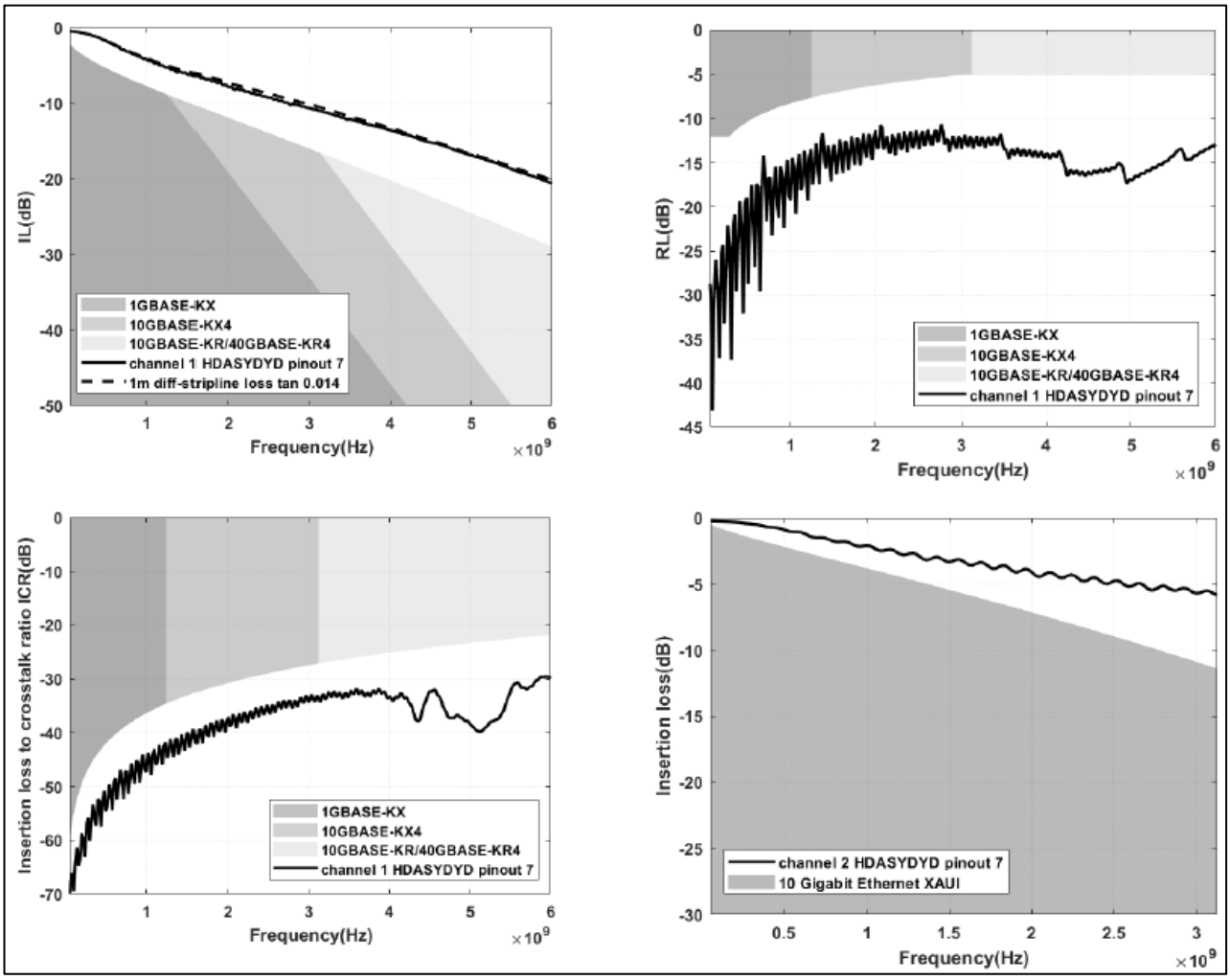
Signal contact Grounding contact

HDAS receptacle with YD contacts



Differential pair Empty cavities

1GBASE-KX	10GBASE-KX4	XAUI	10GBASE-KR / 40GBASE-KX4
ok	ok	ok	ok



S-parameters were obtained with numerical simulations that utilize both 3D electromagnetic (EM) simulation tools using “CST Studio Suite” and matrix calculation through “MATLAB”. We primarily rely on 3D EM simulation to assess the signal integrity performance of the connector, while matrix-based simulation is used for the channel approach, considering the impact of the PCB. This analysis is conducted under certain assumptions and approximations: The PCB is assumed to be perfectly impedance-matched, crosstalk’s on the PCB are neglected, and the influence of vias, soldering and other factors are considered negligible compared to the connector impact.

VNA measurement tests can be performed to validate any other arrangement you would need.

If you need further information or do not find the required material, please contact us at https://support.amphenol-socapex.com/.