

CORNING

**Copper Cables and system
components**

Optical
Communications

Cable Classes & Cable Constructions:

Nomenclature to ISO/IEC 11801 Ed. 2 (2002)

U/UTP (UTP)

Unshielded core/Unshielded Twisted Pair

F/UTP (FTP)

Foiled core/Unshielded Twisted Pair

SF/UTP (S-FTP)

Shielded Foiled core/Unshielded Twisted Pair

U/FTP (STP)

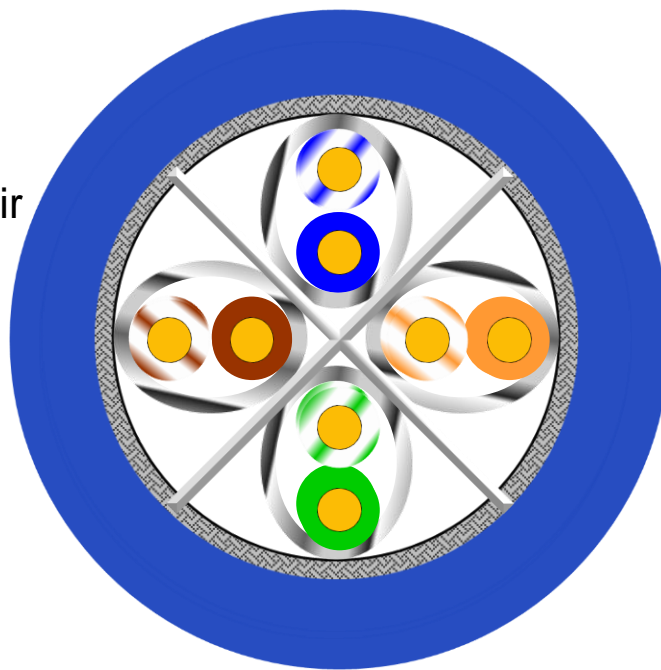
Unshielded core/Foiled Twisted Pair

F/FTP (STP)

Foiled core/Foiled Twisted Pair

S/FTP (S-STP)

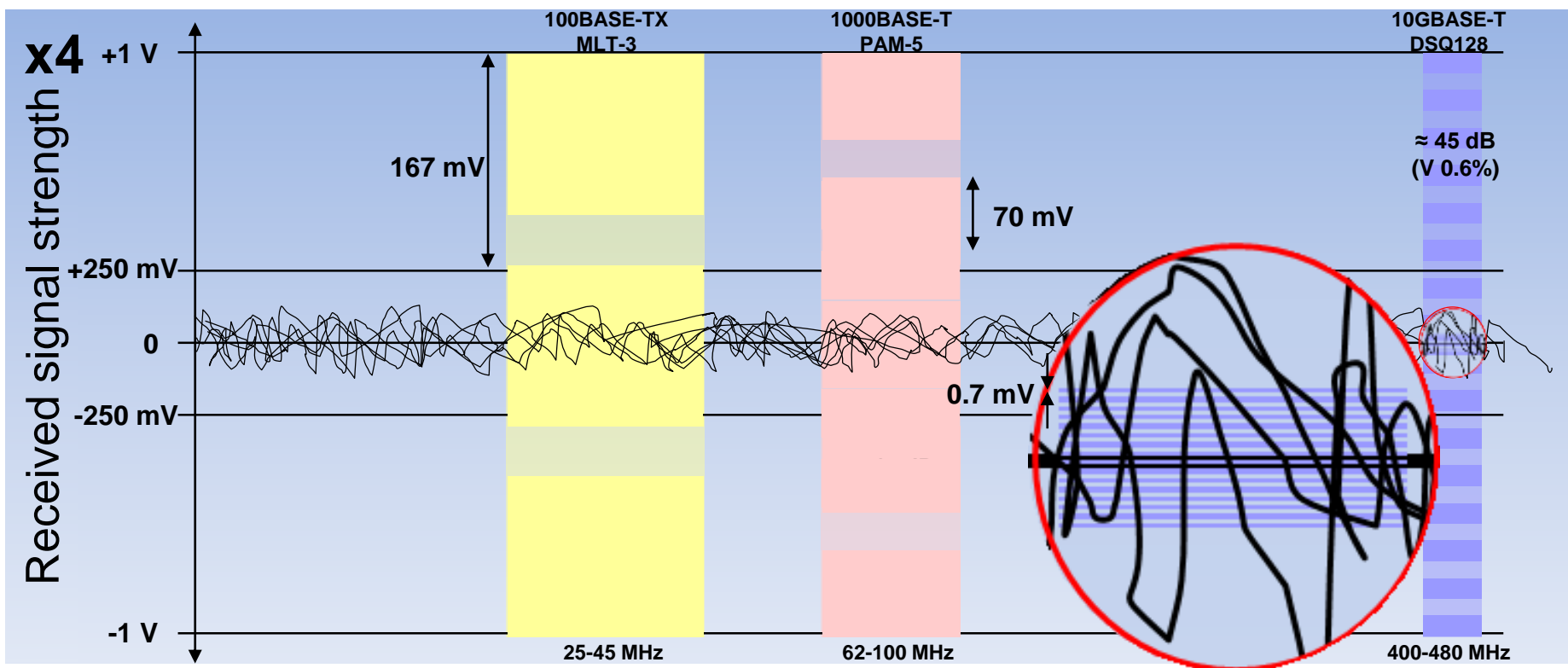
Shielded core/Foiled Twisted Pair



Advantages of S/FTP Cables: Noise Immunity

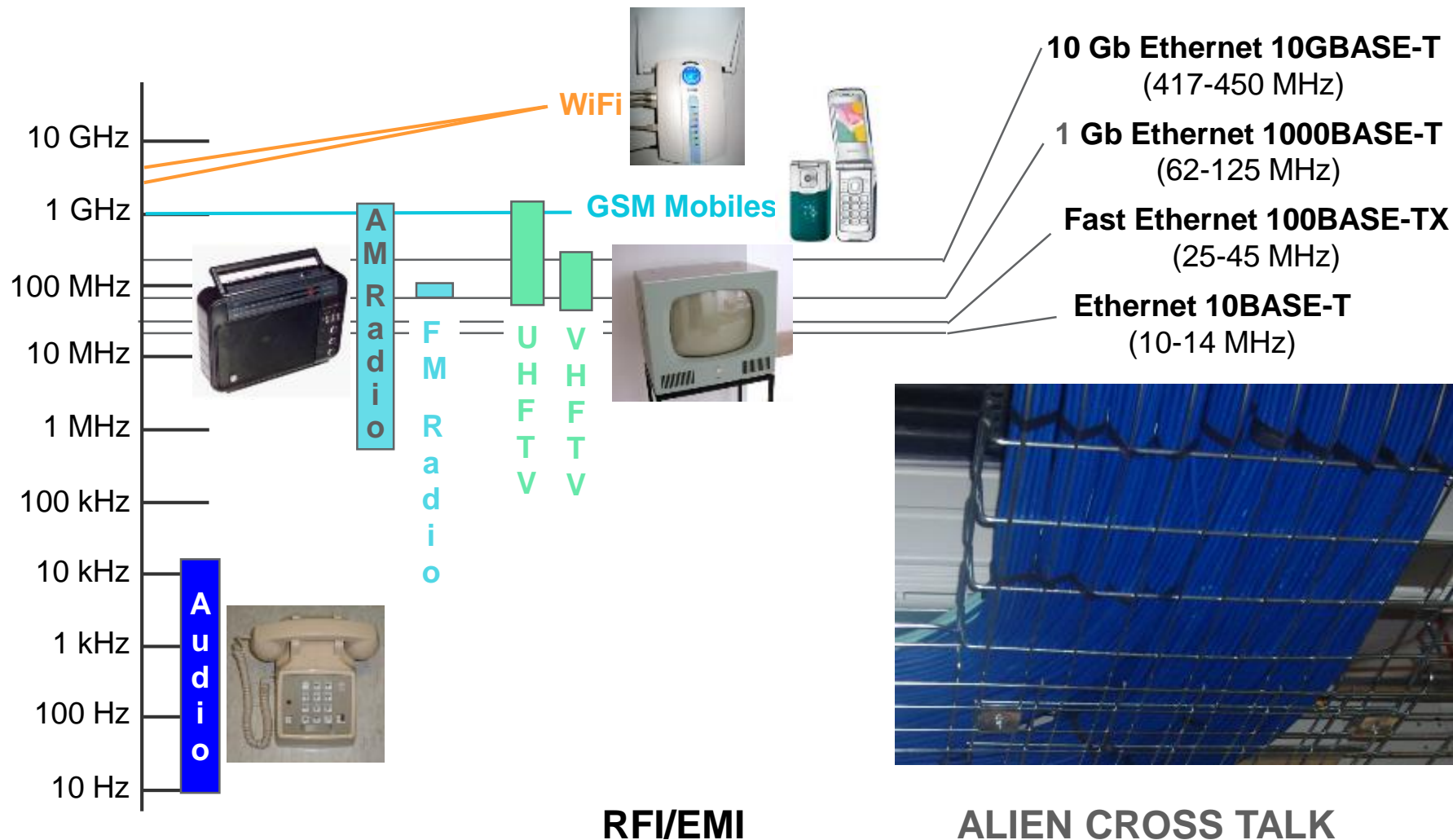
10GBASE-T & Noise

- Noise from pairs in the same cable (PSNEXT), (PSACR-F) and echo combine with received signal (can be removed by advanced DSP – technique)
- Aliens from adjacent cables (alien crosstalk) and from sources of Radio-Frequency and Electro-Magnetic Interference – RFI/EMI



Advantages of S/FTP Cables: Noise Immunity

Noise Sources



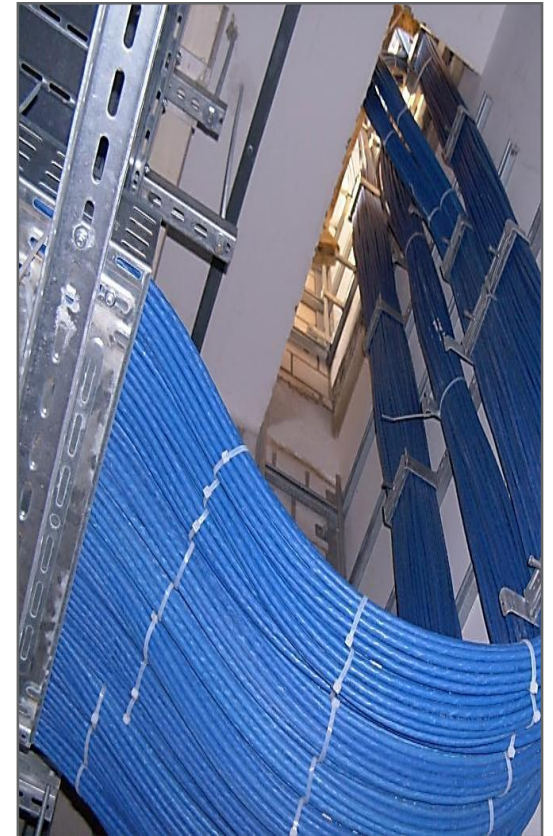
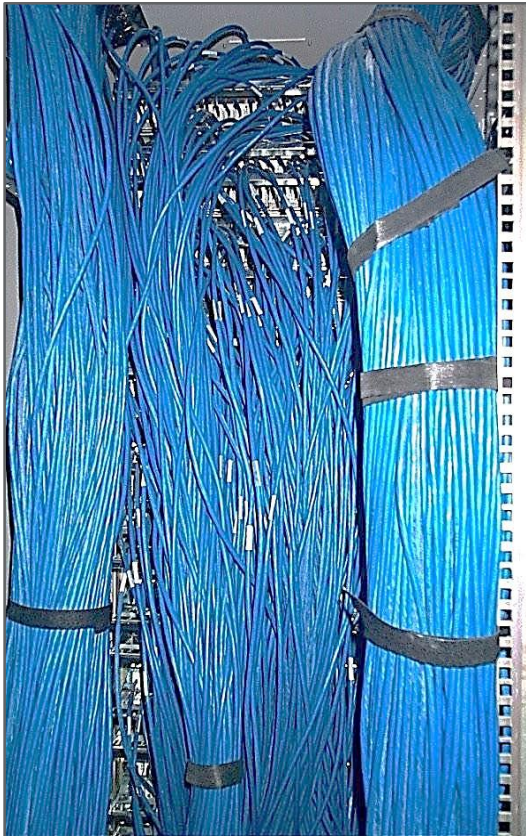
Advantages of S/FTP Cables: Noise Immunity Aliens and 10GBASE-T Transmission

- Alien Crosstalk (AXT) = undesired coupling from adjacent channels
 - In cables, cords and connectors
 - Cannot be electronically compensated
- RFI/EMI are caused by RF sources, power cables, electrical surges (industrial machines/lifts)
- Aliens overlays the signal \Rightarrow bit error

ONLY SHIELDED CABLES CAN ENSURE NOISE IMMUNITY

Data Centers and Alien Cross-Talk

Where you have no problem with shielded cabling ...



... count on them with unshielded!

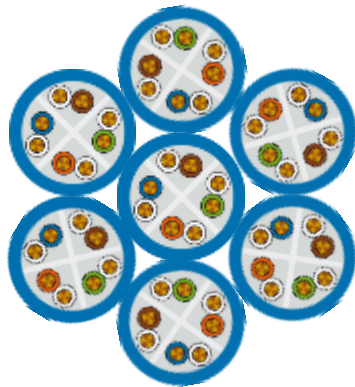
ANEXT makes the Difference

(ANEXT = Alien Near End X-Talk)

Measurement “6-around-1” Method: 6 disturbing cables around 1 victim cable

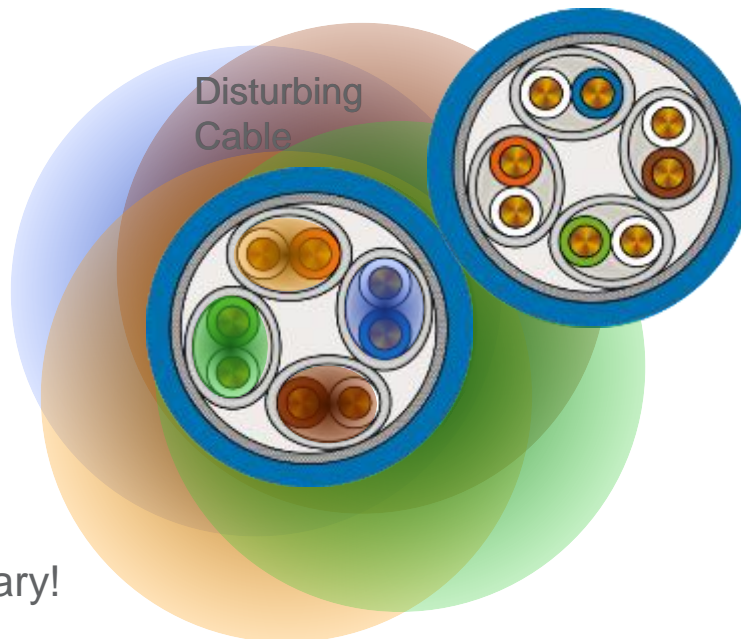
(Measurement of the influence of each pair of the disturbing cables on each pair of the victim cable)

Unshielded Bundle
(U/UTP)

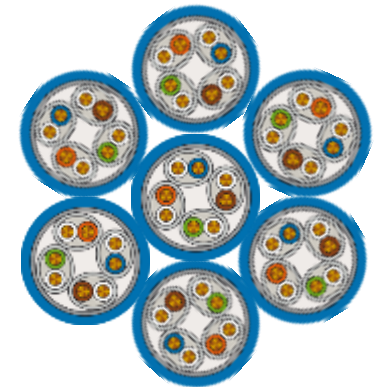


Measurements necessary!

Disturbed
Cable



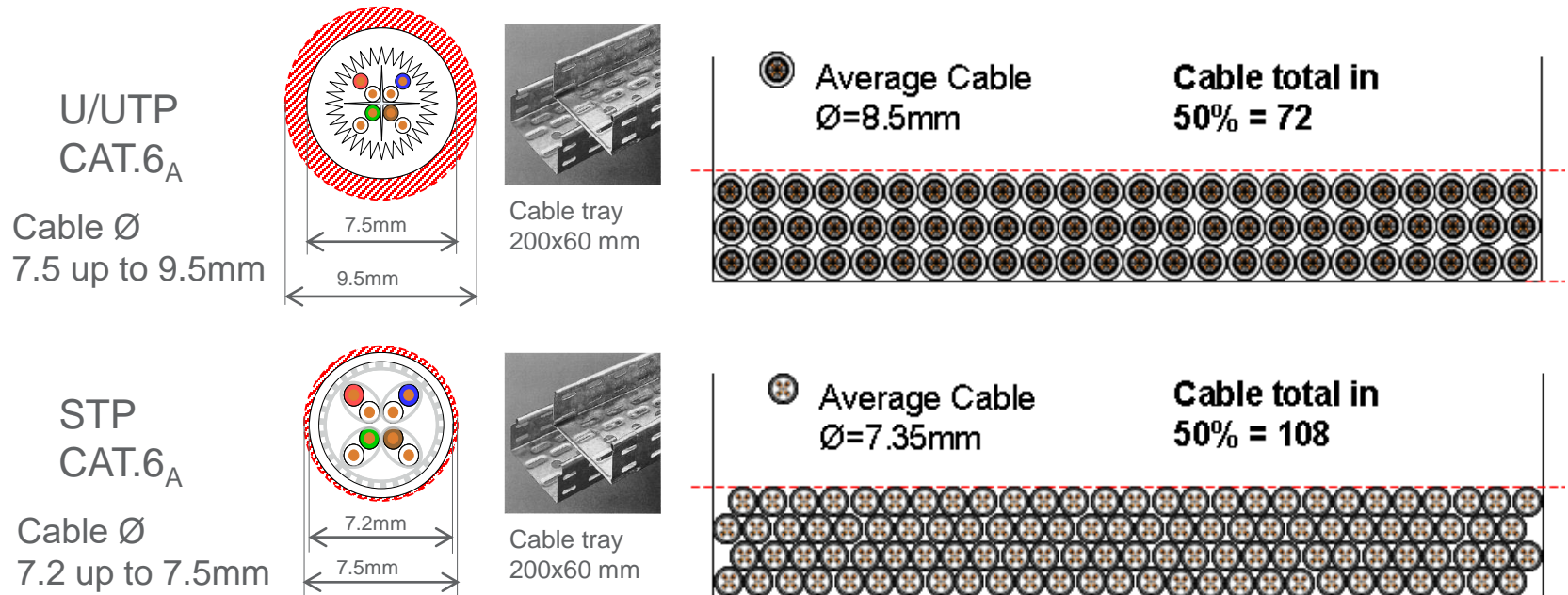
Shielded Bundle
(S/FTP)



No measurements necessary!

And all other ALIEN sources are not taken into account!!!

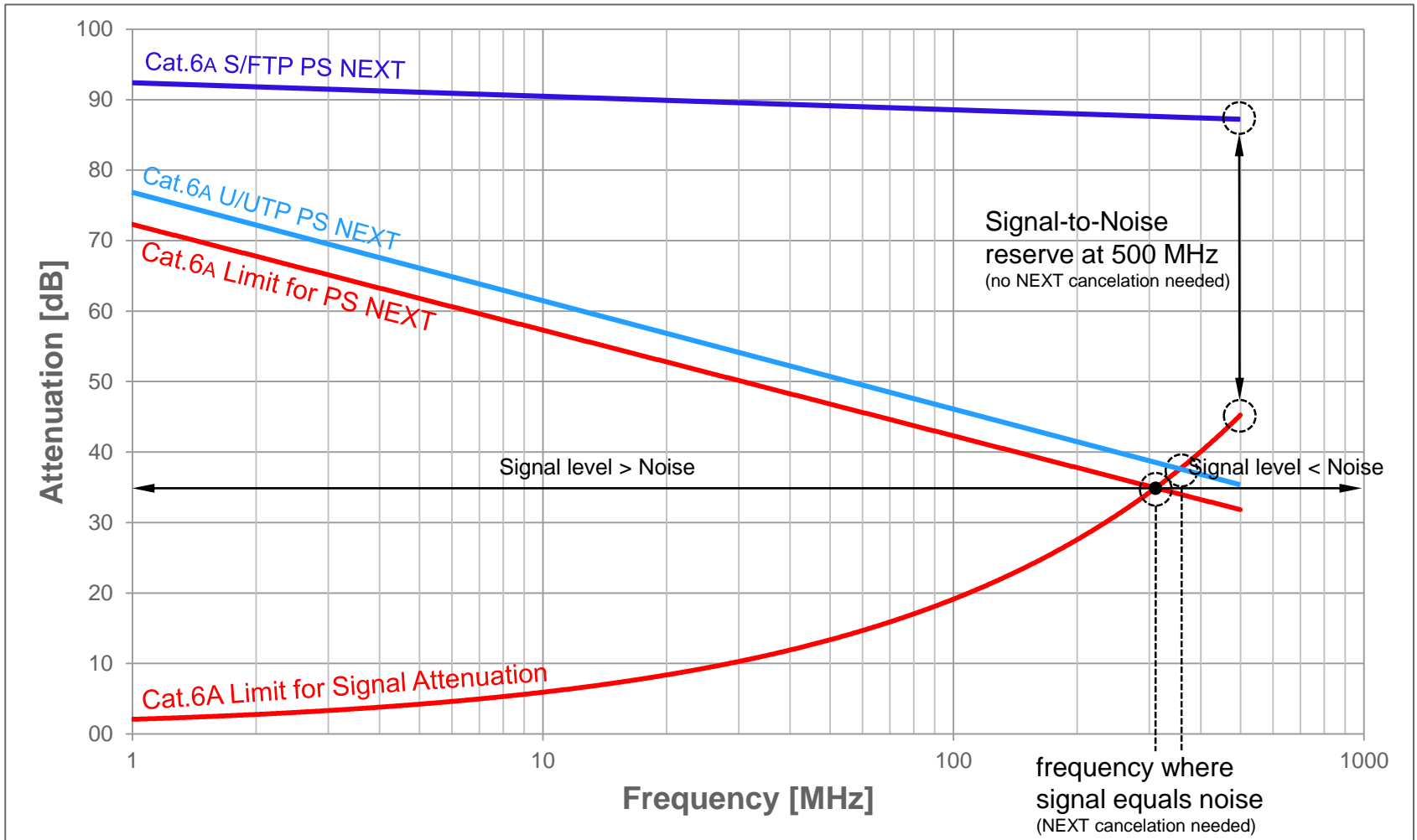
50% more S/FTP_{CAT.6_A} in same space as U/UTP_{CAT.6_A}



Category 6_A S/FTP cable is smarter than a Category 6_A U/UTP cable!

The Performance Triangle

defined by **Frequency**, **Signal Attenuation** and **PS NEXT** (PowerSum Near End X-Talk)



Interference Immunity in 10GBit operation mode

tested by GHMT AG

Parameter	U/UTP	S/FTP
Immunity to Electrostatic discharge IEC/EN 61000-4-2	✗	✓
Immunity to Radiated RF, EMF IEC/EN 61000-4-3	✗	✓
Immunity to Electric fast transient / burst IEC/EN 61000-4-4	✗	✓
Immunity to Conducted disturbances induced by RFF IEC/EN 61000-4-6	✗	✓







Influence on the system (break in data transmission)



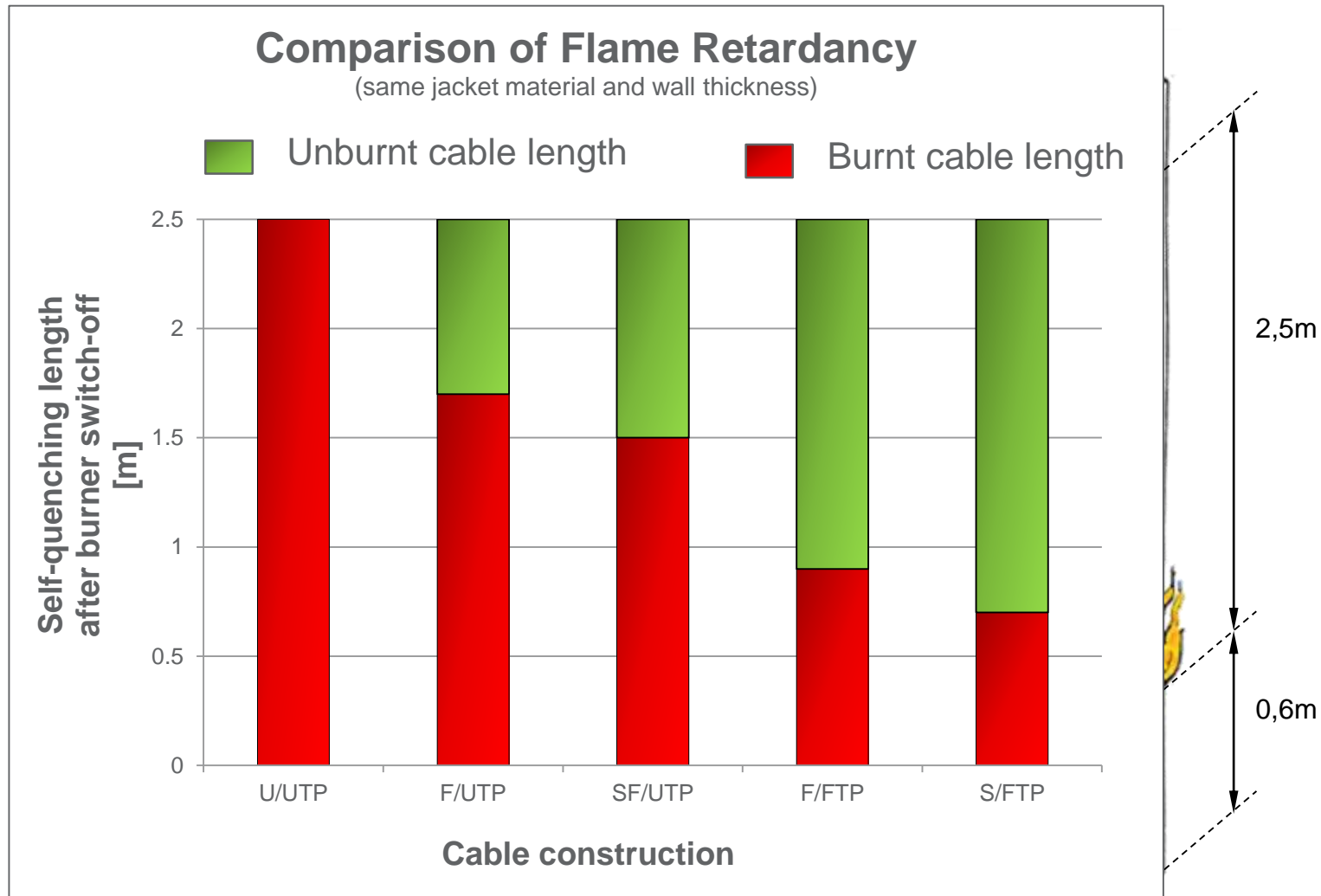
No influence on the system

Practical Tests during 10GBit data transmission

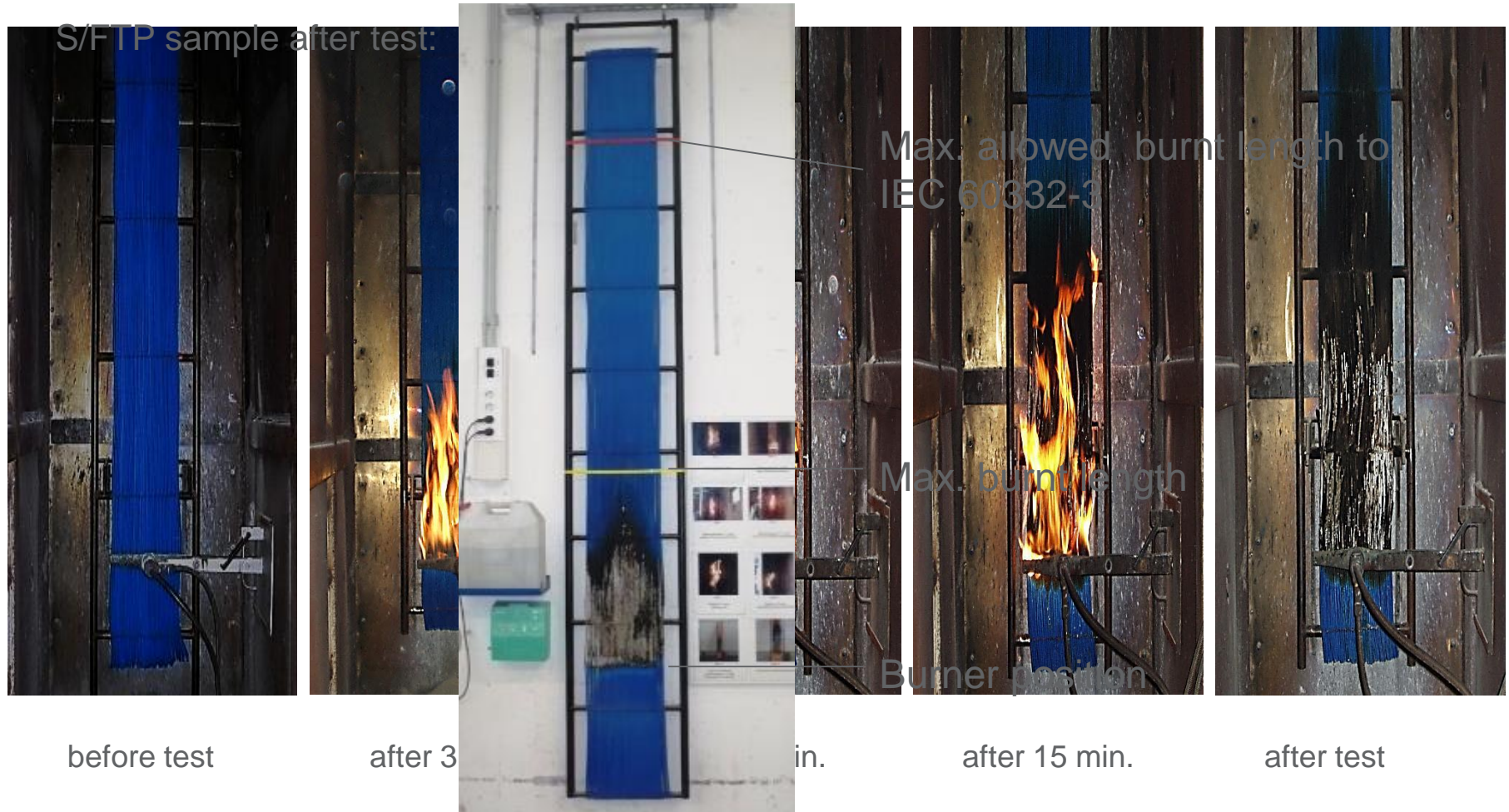
performed by GHMT lab

Practical Test	U/UTP	S/FTP	
	✗	✓	Walkie-Talkie Pressing „Talk“ button @ 3m distance
	✗	✓	Mobile Telephone Use of GSM card @ 3m distance
	✗	✓	Power Cable Power cable directly along Data cabling
	✗	✓	Fluorecent Tube Active neon tube @ 0,5 m distance

Flame Retardant Characteristics



Flame Retardance Test in Reality



FutureCom E

S250 Modules, Category 6

- Fully compatible with the modular LANscape outlets and patch panels
- Low parts count
- No special tools required
- High density package
- Low noise susceptibility due to individual shielding of the modules
- Compatible with all FutureCom E and F cables



FutureCom EA xs500 Module, to Cat.6_A ISO/IEC 11801 Ed. 2.2

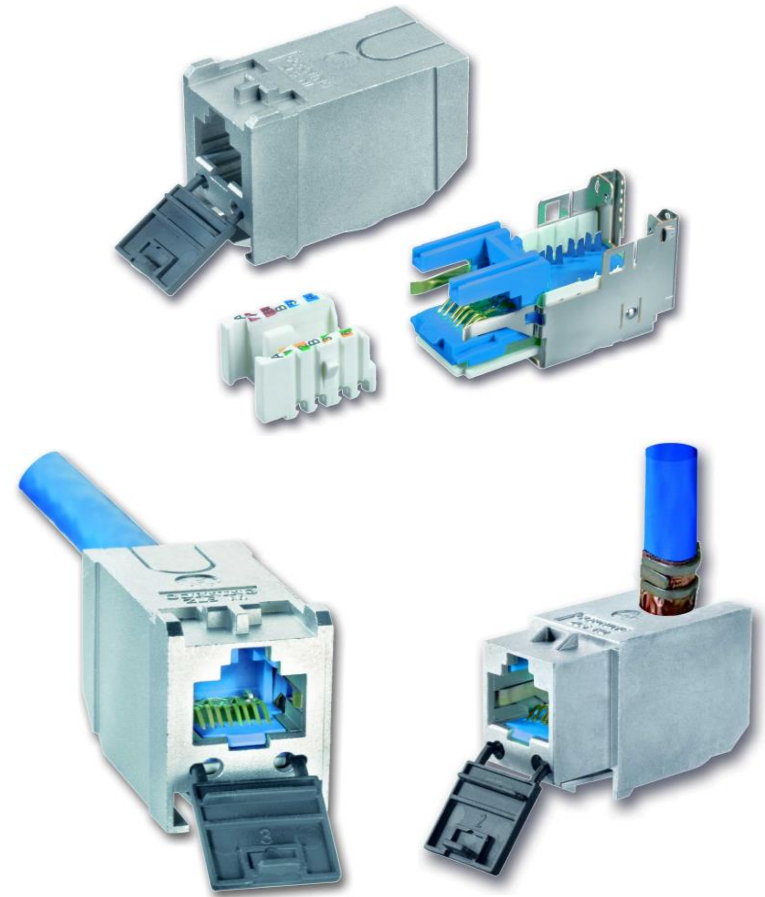
- Fully compatible with the keystone outlets and patch panels
- Only 2 parts (Cu tape separately)
- Available with Keystone footprint
- Additional LANscape adapter available
- Low noise susceptibility due to individual shielding of the modules
- Compatible with all FutureCom Cat.6_A up to Cat.7_A cables (AWG23 to AWG22)



FutureCom EA

S500 Module, to Cat.6_A ISO/IEC 11801 AMD:2 (2010)

- Fully compatible with the modular LANscape outlets and patch panels
- Only 3 parts (Cu tape separately)
- Available with LANscape modular footprint or with Keystone footprint
- Additional 90° strain relief available
- Low noise susceptibility due to individual shielding of the modules
- Compatible with all FutureCom Cat.6_A up to Cat.7_A cables



FutureCom

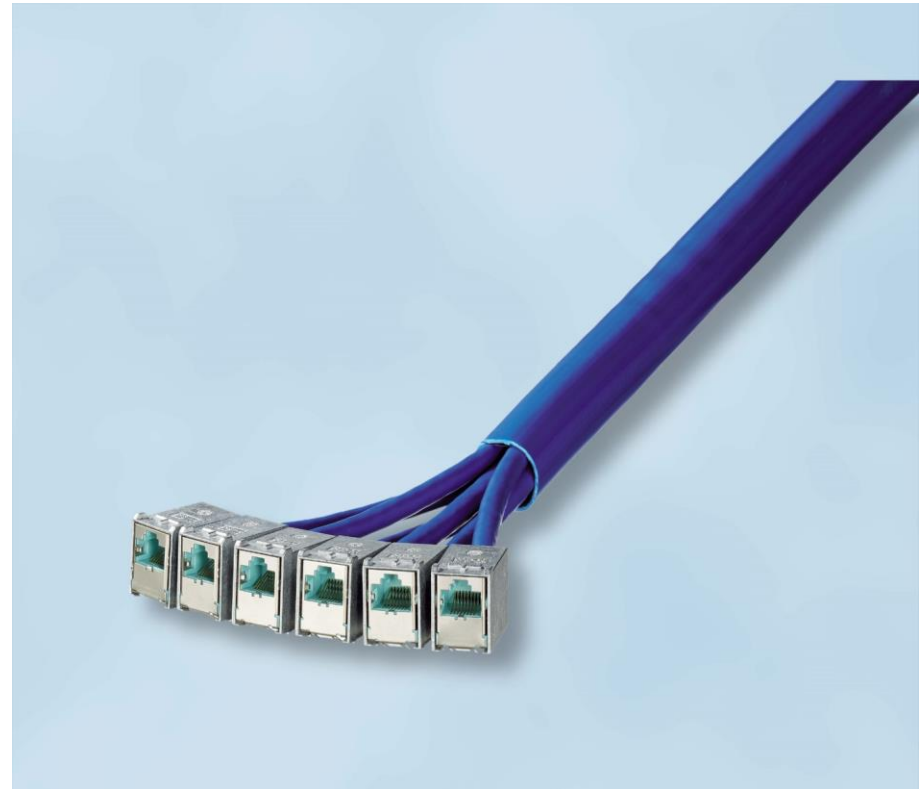
„Plug & Play“ Solutions

- Pre-assembled at the factory-
reduce the time to install
("Plug & Play")
- Prevention of assembly errors on
site by 100% quality testing in the
factory
- Specified according to the
system's Class
- Length in 5 m - steps from
10 m up to 95 m available



FutureCom Plug & Play Solutions

- Pre-assembled at the factory-
reduce the time to install
("Plug & Play")
- Prevention of assembly errors on
site by 100% quality testing in the
factory
- Specified according to the
system's Class
- Available overjacketed or sewn
- Length in 5 m - steps from
10 m up to 95 m available



FutureCom

Plug & Play Solutions Consolidation Point Cable

- Pre-assembled at the factory-
reduce the time to install
("Plug & Play")
- Prevention of assembly errors on
site by 100% quality testing in the
factory
- Specified according to the
system's Class
- Available in different lengths



FutureCom Modular: a complete Solution



Outlets

WAXWSE-S0201-C001



Patch panels

WAXWSV-02400-C001



Floor boxes mounting plates

CAXXSU-01200-C012



Consolidation point housings

WAXWSW-00008-C015

FutureCom

RJ45 Patch Cords

- Outstanding transmission performance
- RJ45 fully assigned for 1GbE or 10GbE according to the system Class
- S/FTP Patch cord cable, with high-performed RJ45 connector
- Specified according to the system Class
- Full range of colors, and different length available



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