

# Summary of optical access work in ITU-T SG15

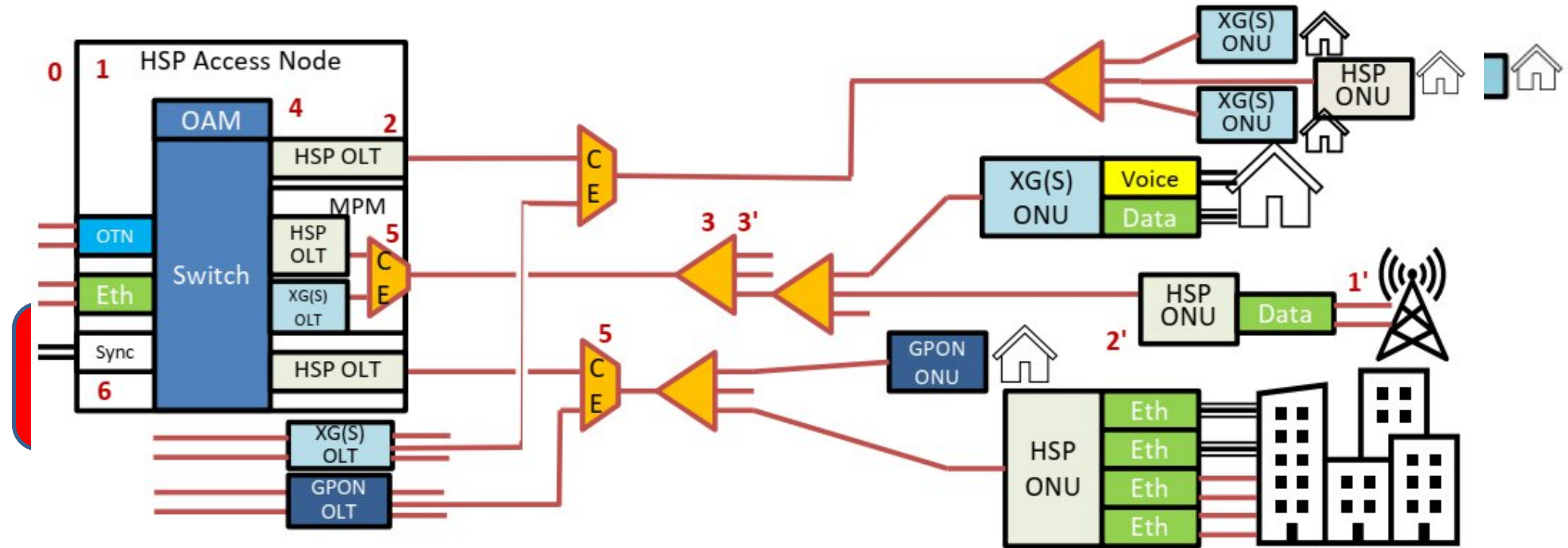
*Frank Effenberger*  
*13 July 2024*





# G.9804 HSP: Higher Speed Passive Optical Networks

- Full-service support – including voice, TDM, Ethernet (10/100/1000/10G/25G BASE), xDSL, wireless xhaul
- Basic physical reach is 20 km. Logical reach of up to 60 km. System is wavelength coexistent with G-PON, XG(S)-PON, 10G-EPON
- Support for bit-rate options, 50 Gbit/s downstream and 12.5 or 25 or 50 Gbit/s upstream
- Powerful OAM&P and system protection capabilities
- providing a feature rich and reliable service management system
- Advanced security features including authentication, rogue detection, and information privacy
- Power saving features on top of the already considerable low power nature of fibre access

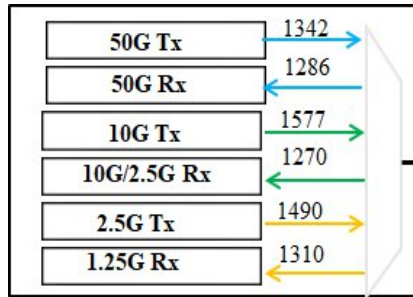


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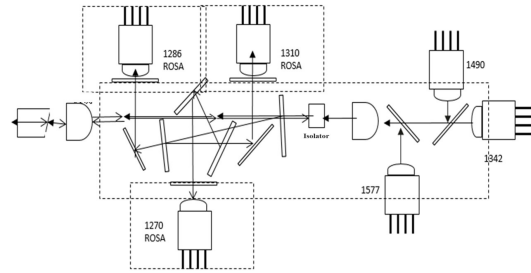


# 50G-PON Triple and dual generation coexistence Field Trial

## 50G-PON/XG-PON/GPON MPM field trial

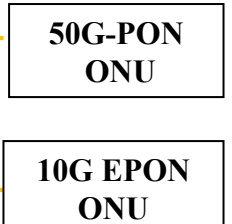
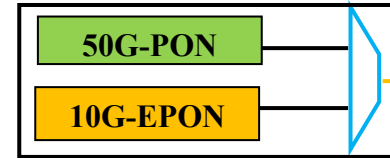


50G/XG/G-PON OLT MPM module

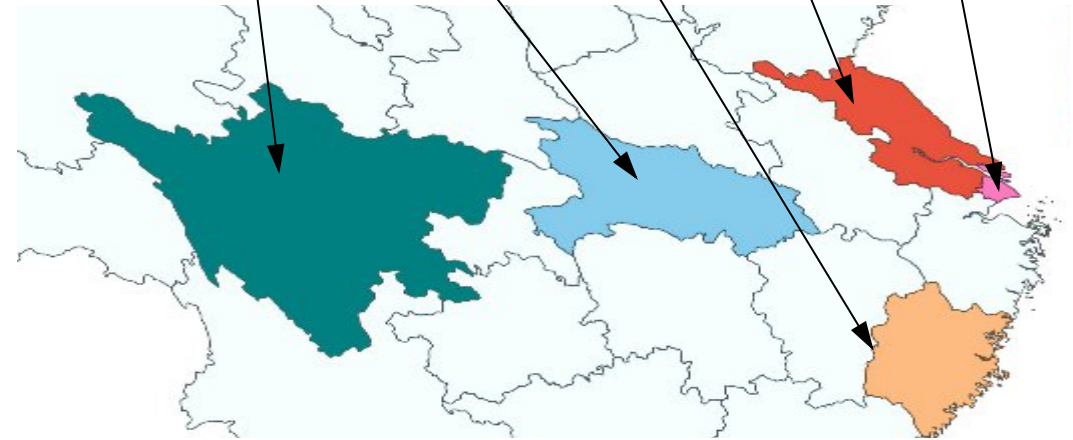


## 50G-PON/10G-EPON MPM field trial

50G-PON&10G-EPON MPM



Sichuan Hubei Fujian Jiangsu Shanghai



Five province 10G-EPON&50G-PON Field Trials with CTC in China

GPON Triple generation coexistence field trial



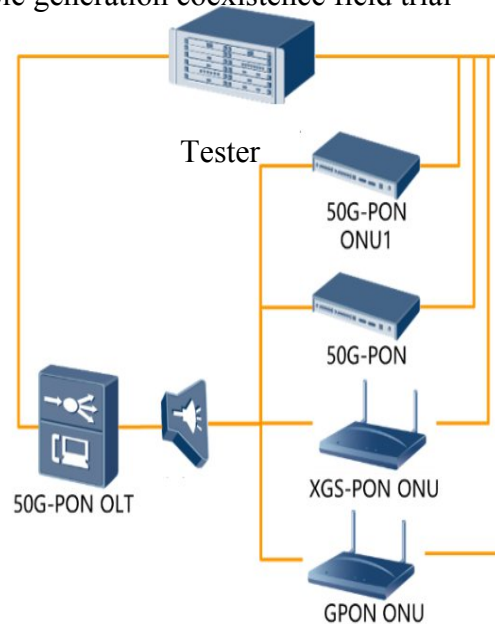
50G-PON OLT 设备

50G/XG/G MPM

XGS-PON ONU

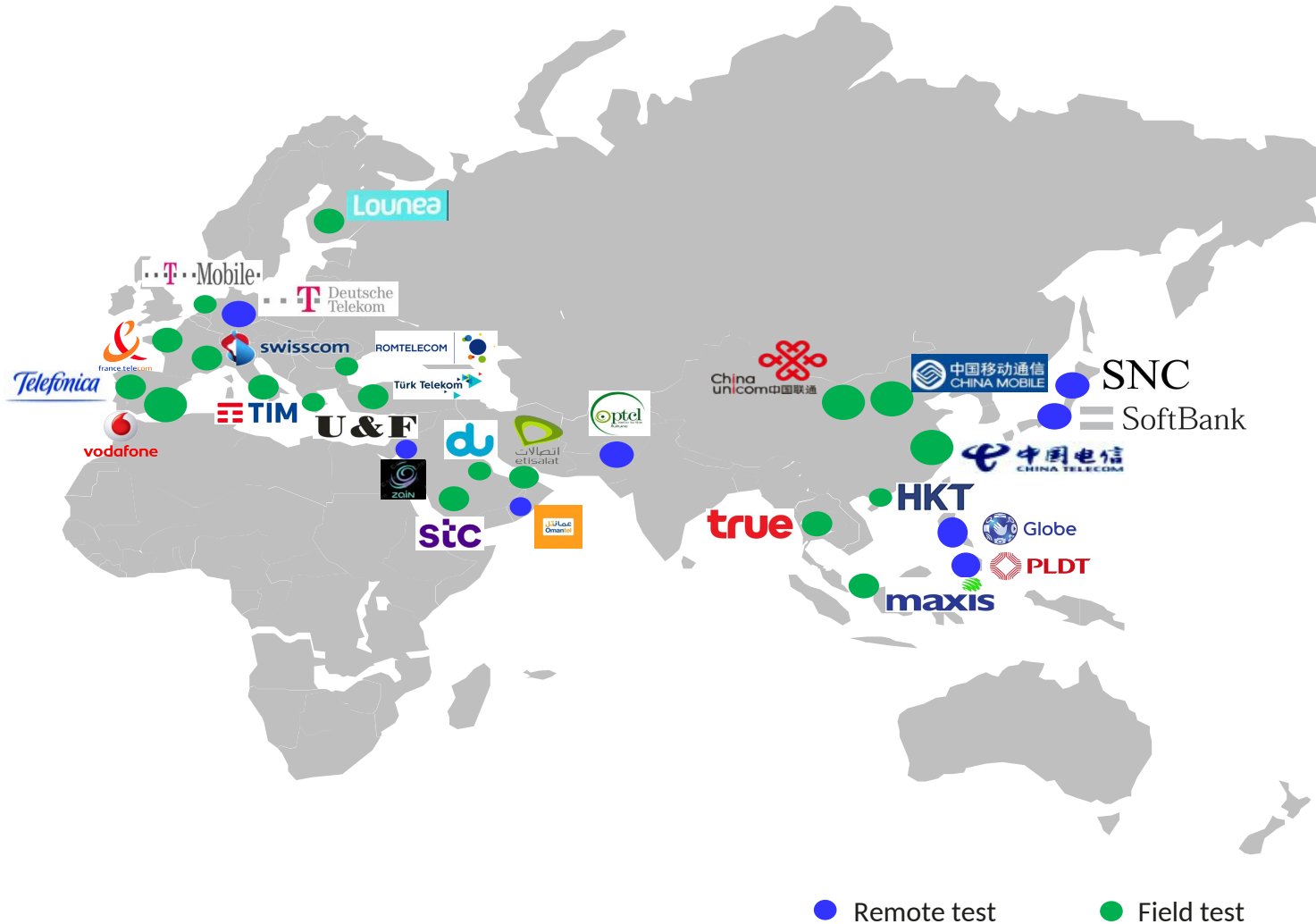
GPON ONU

50G-PON ONU\*2



Source : <https://www.c114.com.cn/4app/3542/a1238387.html>

# Global 50G-PON Field test by 2023



Region	Operators
Asia Pacific (15+)	CTC
	CMCC
	CUC
	HKT
	Trailhand TRUE
	Malaysia Maxis
	SoftBank
Europe (10+)	Swisscom
	Spain TDE/VDF
	Deutsche Telekom
	Orange
	Netherlands TMNL
	Tuckey telecom
	Finland Lounea
	Romania Telekom
	STC
middle East (3+)	UAE DU
	UAEET

Many operators over the world have done 50G-PON field tests

50G PON is deploying in 2024

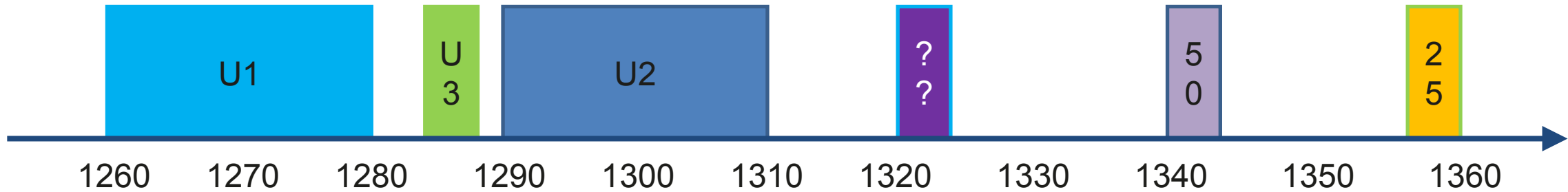


# Very High Speed PON supplement

- Now that 50G-PON is moving into deployment, the industry has started work to consider what comes next
- Approximate target is 200 Gb/s system payload capacity, with user interface rates up to 100 Gb/s
- The problem here is 200 Gb/s IM-DD is technically difficult using the same PON infrastructure
  - G.652 fiber dispersion becomes a very significant issue
  - Supporting ~30 dB loss budget continues to raise the difficulty
- Perhaps coherent techniques will be used for VHSP
- Alternatively, all sorts of multiplexing methods are fair game



# Triple coexistence O-band plan



- The O-band has become the most important spectrum for HSP
- Upstream has three options
  - U1: The XG-PON band
  - U2: The lower G-PON band
  - U3: Triple coexistence band
- Downstream has two bands defined
  - 25G at 1358 nm
  - 50G at 1342 nm
  - Future at 1322 nm?
- Coherent systems can operate anywhere, likely use C-band

# How to get to 200G-PON?

- Scaling from 50G to 200G requires 4x\* multiplexing

Option	TDM	WDM	MLM	Pol-Qdr	Issues
1	4x				Fiber impairments, loss budget
2		4x			Parts count, spectrum availability
3	2x	2x			Intermediate of #1 and #2
4	2x		2x		Impairments and budget similar to #1
5		2x	2x		Similar to #3
6	1.33x	2x	1.5x		Intermediate of #3 and #5
7				4x	Full coherent: parts count similar to #2
8	2x			2x	Half coherent: similar to #3
9			2x	2x	Half coherent: similar to #5
10	4x			1x	LC coherent: parts count similar to #1
11	2x		2x	1x	LC coherent: similar to #4



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