



LTE Mobile Offload

September 12, 2015

IBC2015

Featuring
GatesAir's



Steve Rossiter
TV Applications Engineer

LTE Mobile Offload

September 12, 2015



Create



Transport



Transmit Television

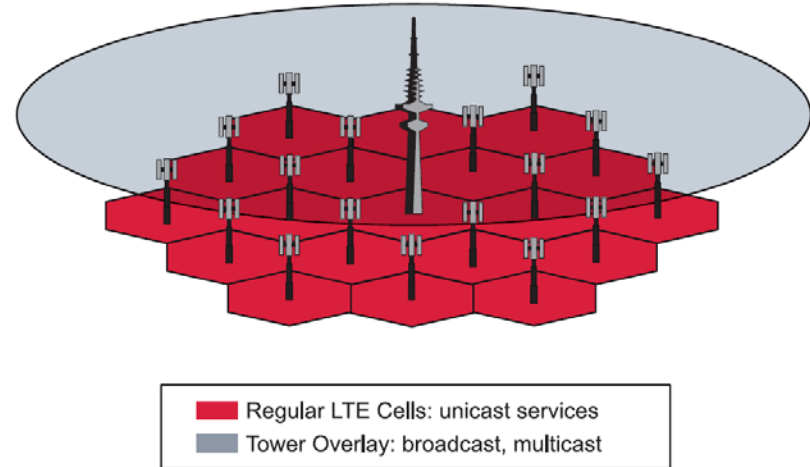


Transmit Radio



What is LMO?

- Technology envisioned / created by the Technische Universitaet Braunschweig. Known to industry as “Tower Overlay”.
- GatesAir partnering with TUBS to commercialize.
- It is realized using High Tower, High Power (HTHP) transmitters so that...
- HTHP transmitter coverage “over – lays” the many cellular towers
- The basic idea is to offload popular services, especially live video, from cellular networks

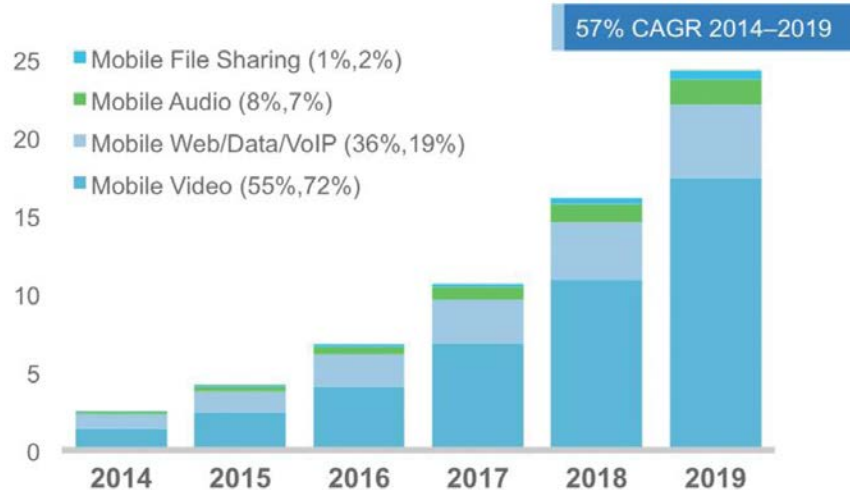


Why is LMO Useful?

Cisco Global Mobile Data Forecast 2014-2019

Exabytes per Month

$1 \text{ EB} = 10^{18} \text{ bytes}$
= 1,000,000,000,000,000,000 bytes

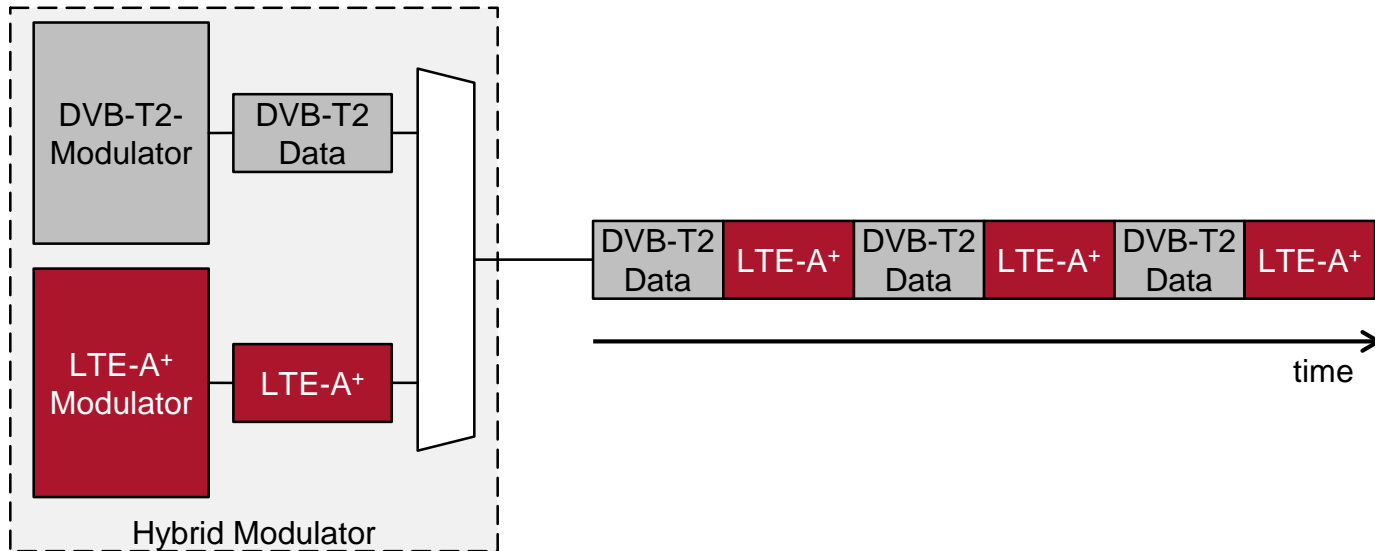


- Mobile phone bandwidth:
 - Ericsson and Cisco predict exponential growth of bandwidth needed - driven largely by video consumption
- Placing popular content on an HTHP network would reduce LTE network load
- LMO maximizes the use of existing spectrum and revenue opportunities for both broadcasters (network operators) and telecom operators



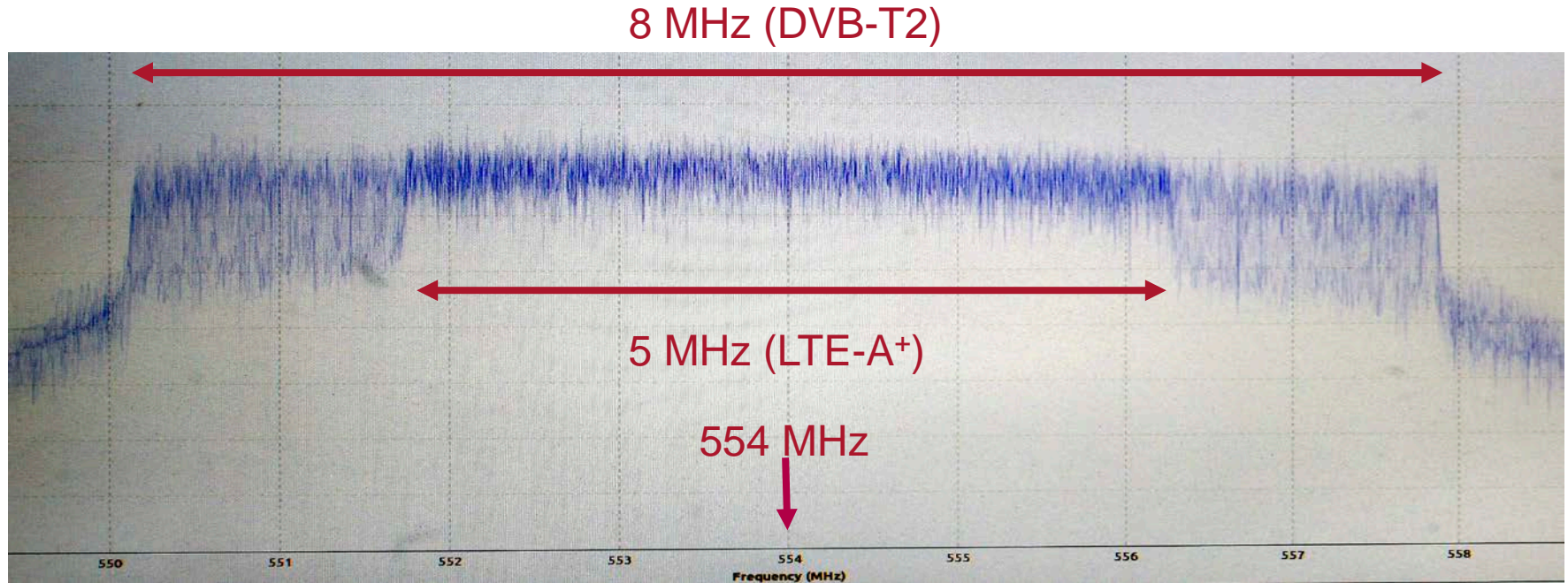
LMO – Hybrid DVB-T2 / LTE-A+ Carrier

- FEFs enable **cooperative spectrum use** of terrestrial broadcast and mobile access networks
- A variable length and number of both frame types (DVB-T2 und FEF) enable **flexible resource allocation**
- **ATSC 3.0** will include an equal concept as well!

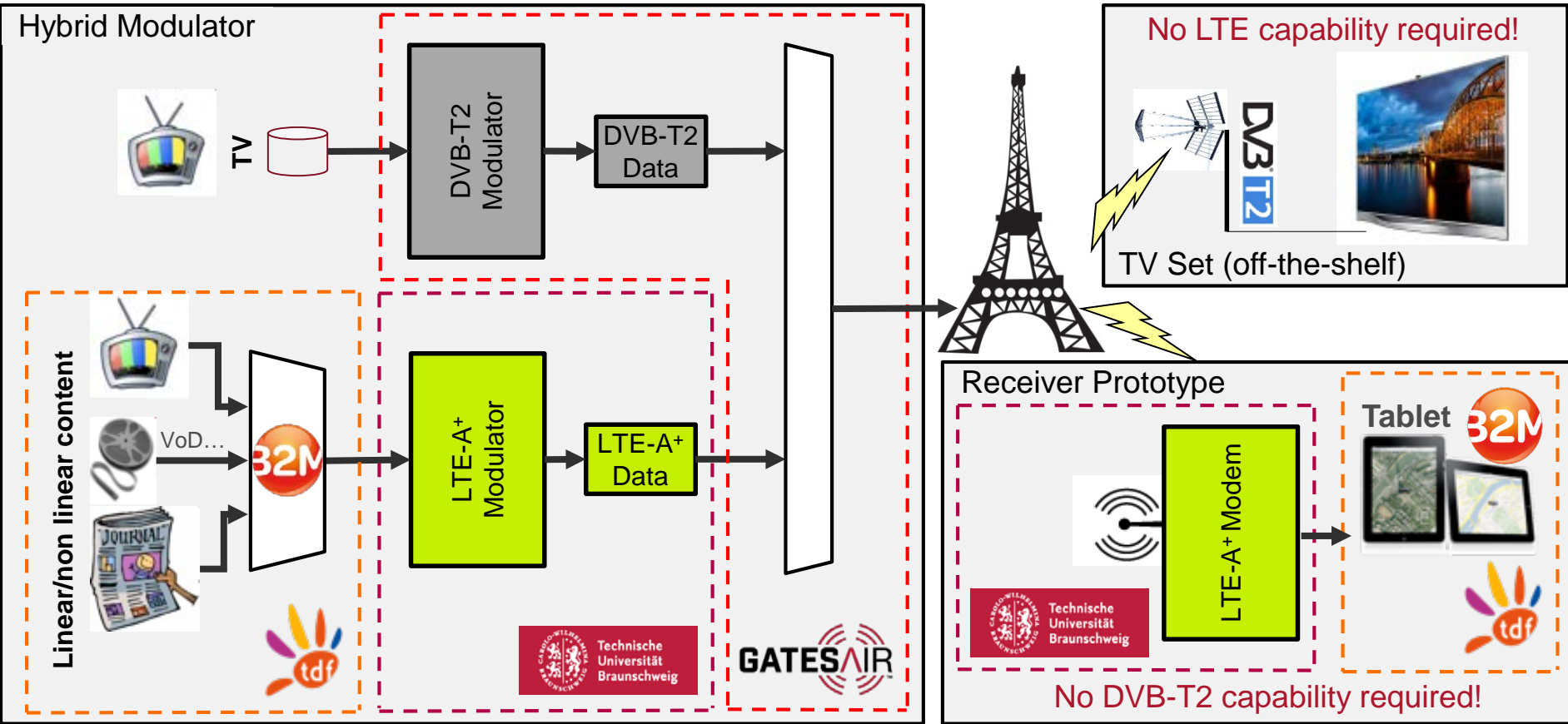


LMO - Having a look at the Spectrum

- We demonstrated the joint use of DVB-T2 and LTE-A+ in a single radio channel:



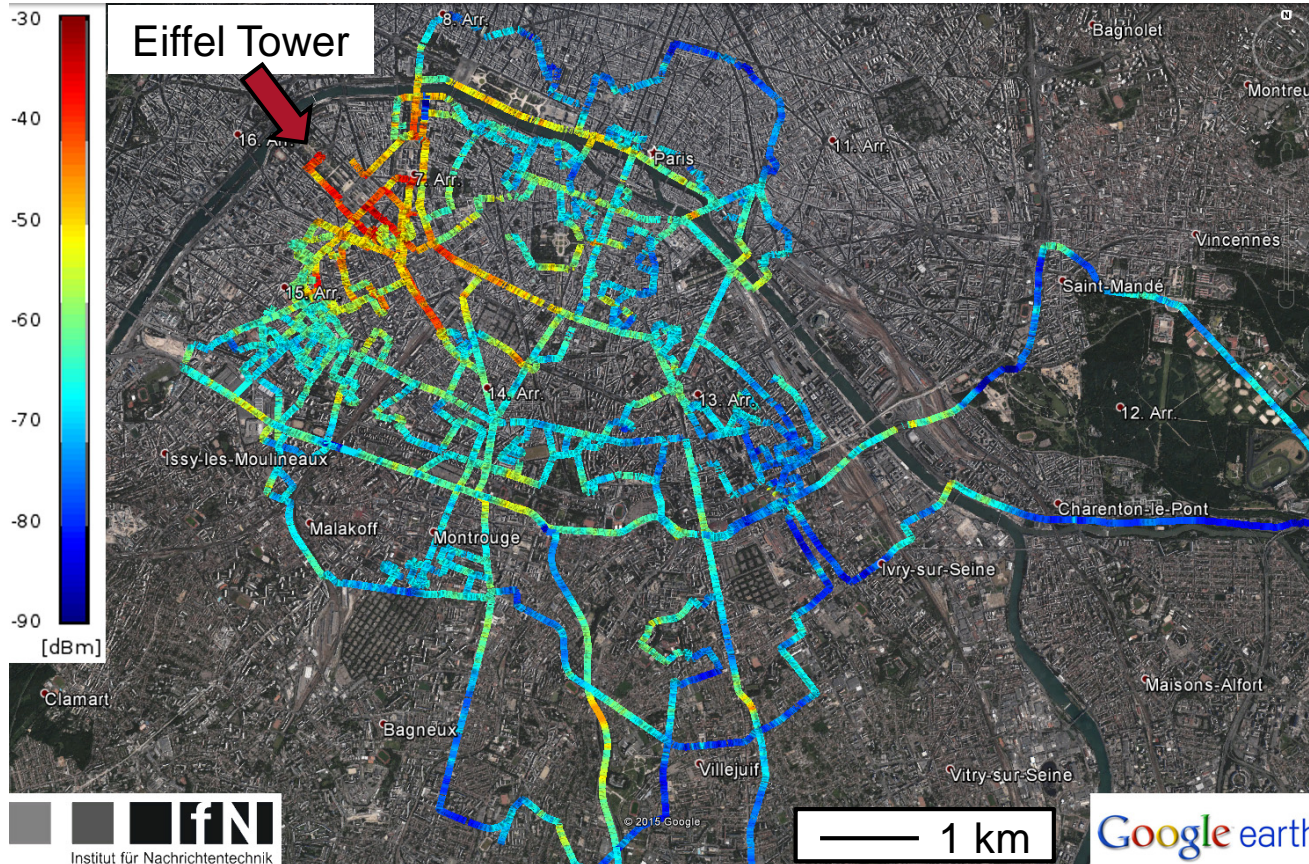
LMO Industry Activities – Paris Field Trial



LMO Industry Activities – Paris Field Trial

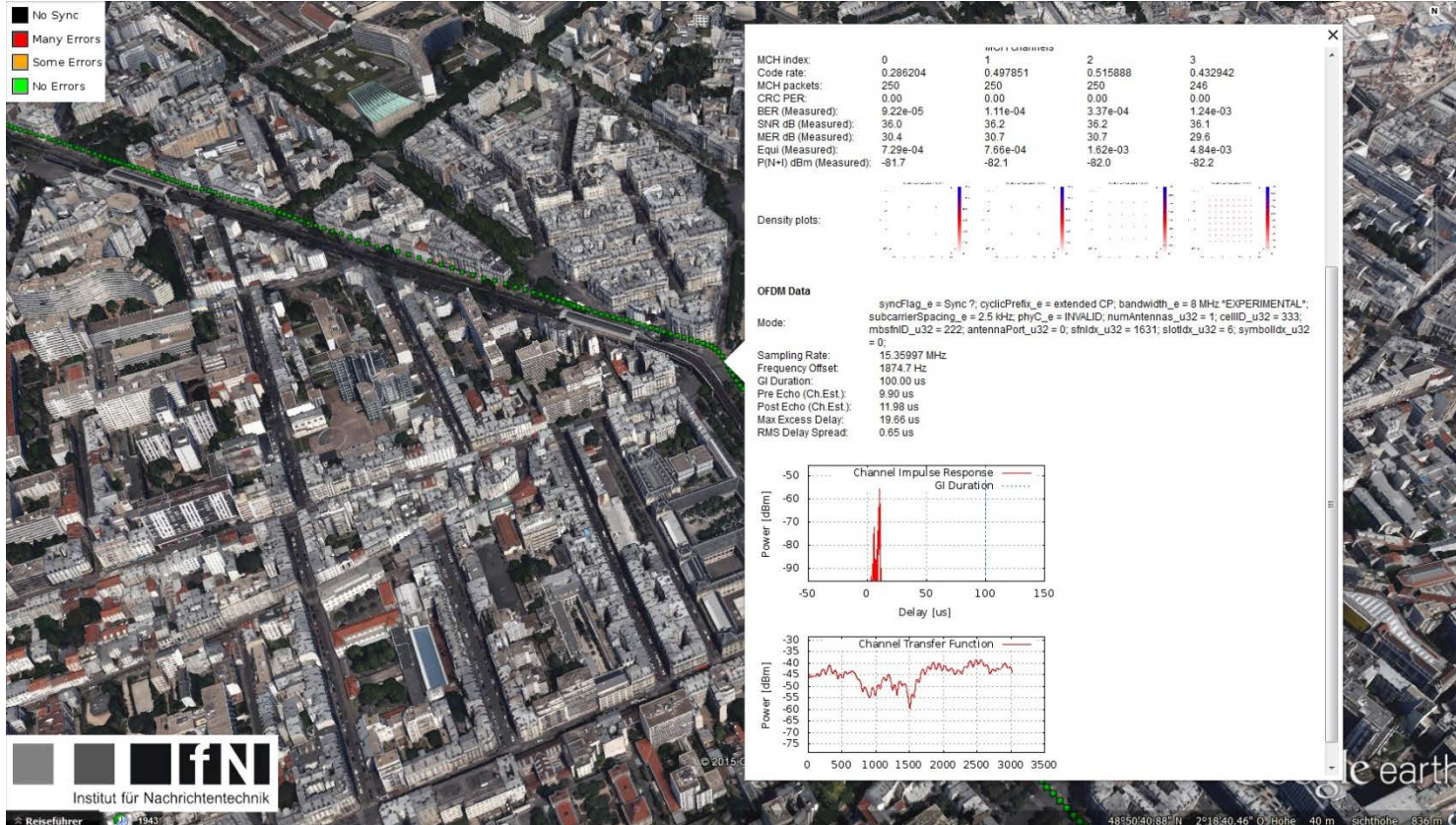
Parameter	DVB-T2	LTE-A+			
		PMCH 1	PMCH 2	PMCH 3	PMCH 4
Carrier Frequency	738.166 MHz (channel 54)				
Bandwidth	8 MHz				
TX Power	only 2.7 kW ERP				
MCS		4	7	14	18
Modulation	64 QAM	QPSK	QPSK	16 QAM	64 QAM
Coderate	0.5	0.28	0.49	0.51	0.43
Carrier Spacing	558 Hz	2.5 kHz; 7.5 kHz; 15 kHz			
FFT Size	16k (ext.)	6144, 2048, 1024			
TDM Share LTE-A+	50%, 75%, 100%				

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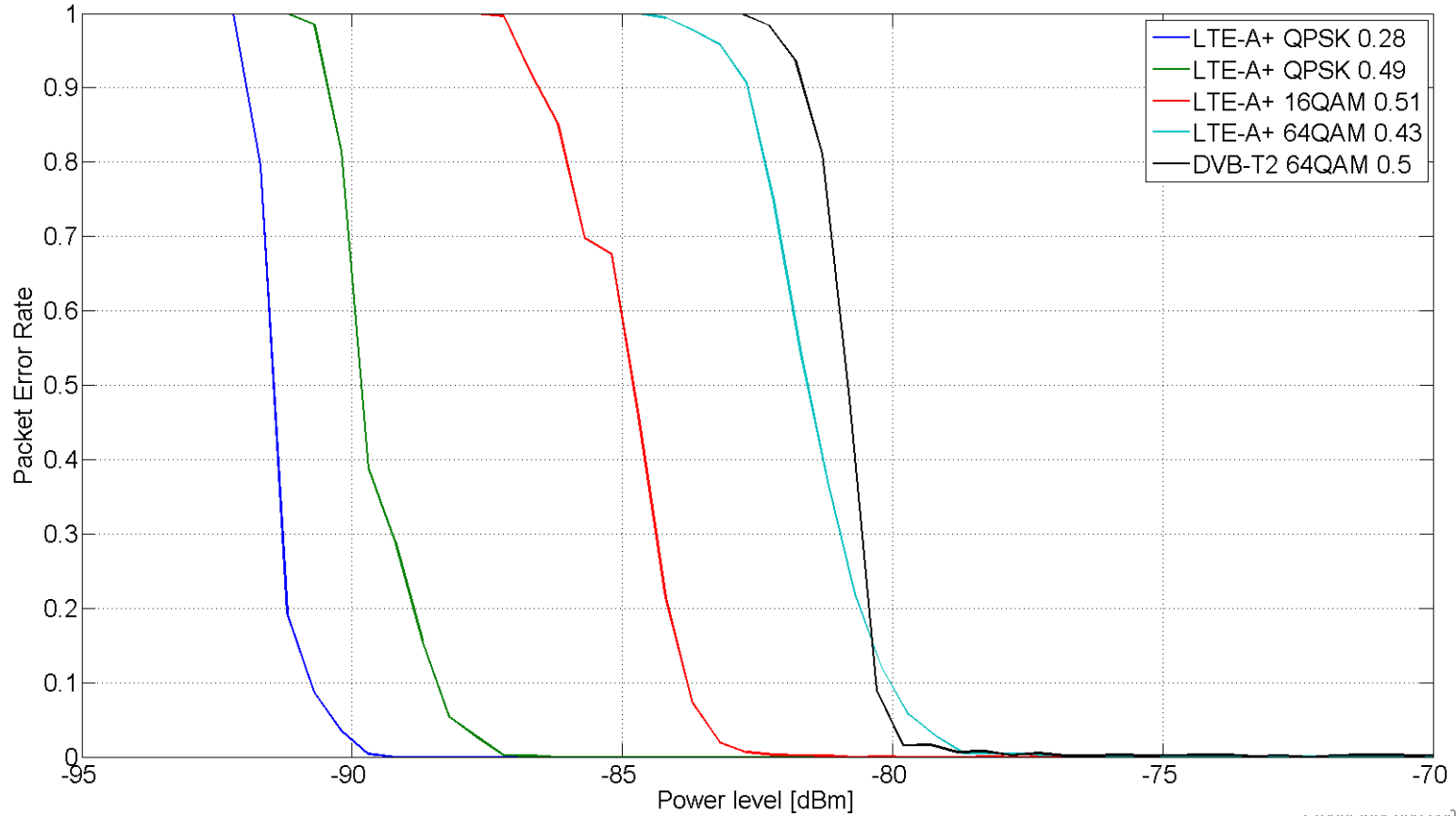


Proprietary and confidential. | 8

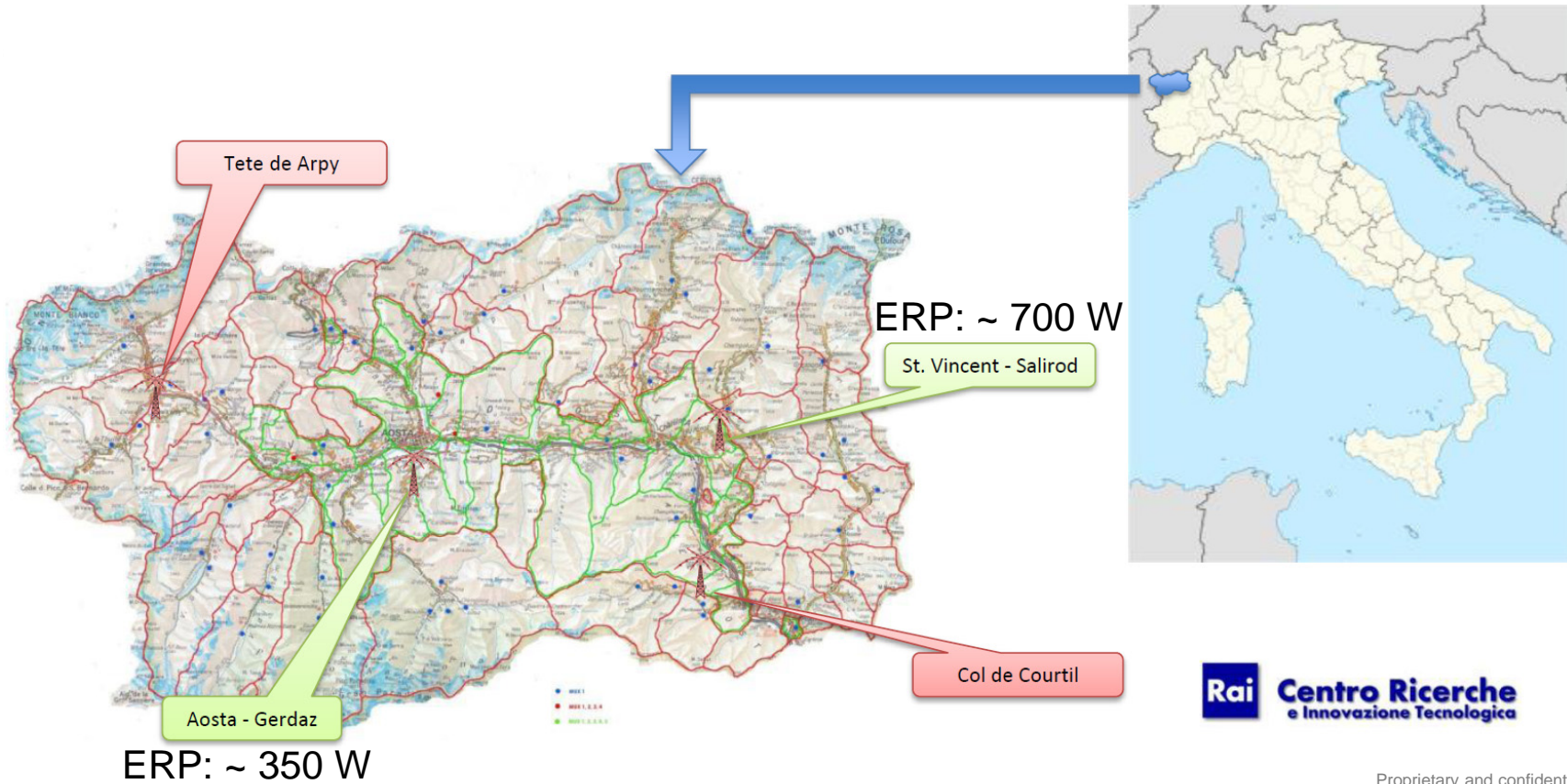
LMO Field Trial Results



LMO Field Trial Results



LMO Industry Activities – Aosta Valley Field Trial



- Visit us to discuss the technology and field trial results at the **Future Technologies Zone**

