

5G mmWave for Transport and Smart City Applications

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CW Workshop : 'Spectrum: from scarcity to abundance in one WRC... but does that work for small cells?'

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Meeting the Connectivity Demand for Transport



Table 1: Estimated average data demand for a single train²

	2017	2025		
		<i>Low scenario</i>	<i>Medium scenario</i>	<i>High scenario</i>
550-passenger train (rising to 660 in 2025)	80 Mbit/s	400 Mbit/s	790 Mbit/s	1.7 Gbit/s
800-passenger train (rising to 960 in 2025)	120 Mbit/s	580 Mbit/s	1.2 Gbit/s	2.4 Gbit/s
1,200-passenger train (rising to 1,440 in 2025)	180 Mbit/s	860 Mbit/s	1.7 Gbit/s	3.6 Gbit/s

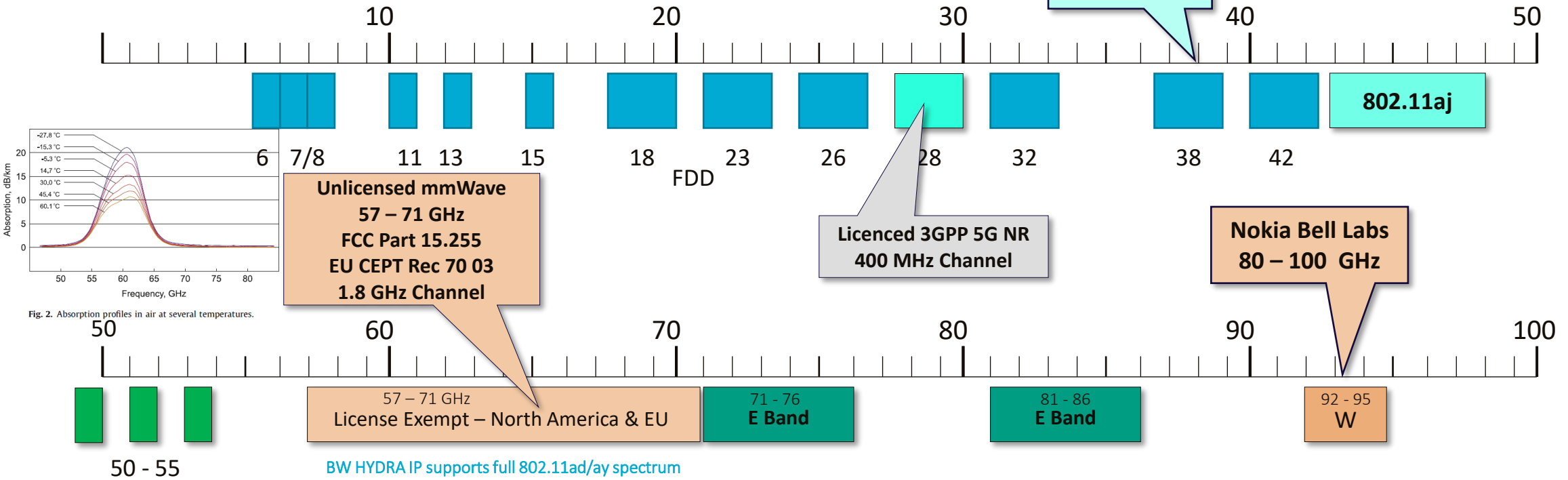
- User Demand doubling every 2 years
 - Increasing Global trend in user connection speeds*
 - Fixed BB 2018: 46 Mbps → 2023: 110 Mbps
 - Wi-Fi 2018: 30 Mbps → 2023: 92 Mbps
 - Mobile 2018: 13 Mbps → 2023: 44 Mbps
- OFCOM prediction for on-train demand**
 - Aug 2018 – assumed 2 Mbps/passenger

• Blu Wireless mmWave Track to Train

- Exploits License exempt mmWave spectrum (57-71 GHz) to deliver gigabit speeds
- Solves key mmWave challenges: range and mobility to >300 kmph
- Delivers within a Low power, small form factor and hardened to meet needs of rail industry



Millimetre Wave Spectrum



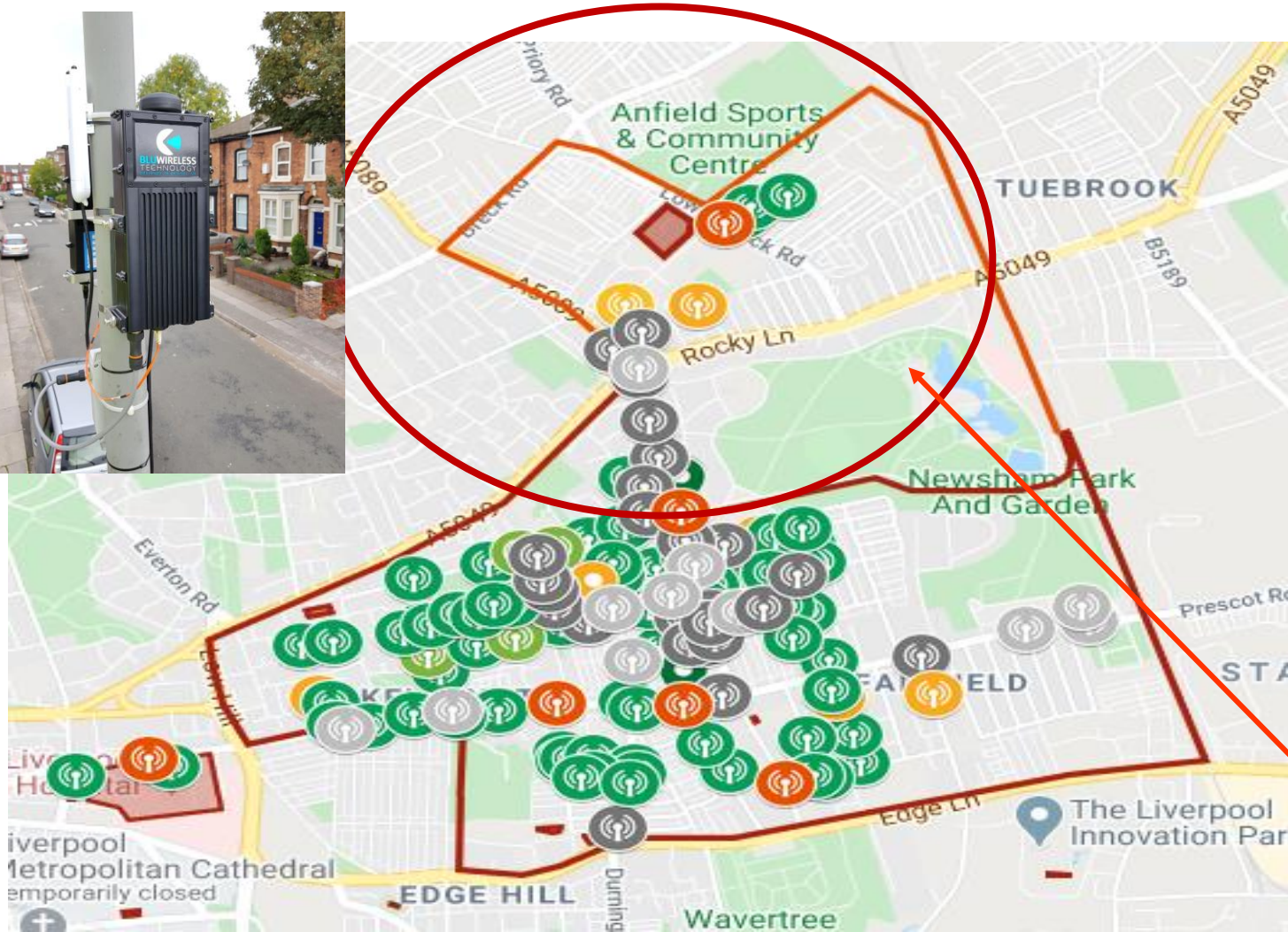
- 57-71 GHz license exempt spectrum is largest block of spectrum available from DC-100 GHz
- CEPT 70 03 recommendation now adopted under EU Law Directive 1345 from 1 Jan 2020
- Allows 6x2 GHz channels up to +40 dBm EIRP. Key is mmWave RF and gigabit BB technology

Mobility Testbed in Bedfordshire, UK

'AutoAir' V2X / V2I



L5G Network : Small Cell Deployment



- 220 mmWave nodes
- 120 outdoor sites
- 4 building installations
- 6 fibre connections
- 6 LoRa gateways
- Data-centre (Aimes)
- Internet Service Provider (Broadway Partners)
- New Project for 2020/21 – Add 5G NR band n77 Small Cells & extend to Anfield



Summary

- Connected Transport applications are driving demand for gigabit data for multiple use cases – road, rail, airborne and UAVs (HAPS)
- Spectrum is key- recent release within EU (UK) of License exempt mmWave provides 14 GHz of spectrum - well suited for private network applications
- Blu Wireless's mmWave products can deliver gigabit throughput, low latency and mobility support needed for and for connected private network applications
- Commercial deployment for 5G mmWave Track to Train in UK for delivery of enhanced internet connectivity to rail passengers

Opportunity for deployment of 5G mmWave license exempt private networks for smart city and high-speed transport applications

Thank you.

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