

BL SMART ANTENNA SOLUTIONS

TEST CHALLENGES IN 5G

SEPTEMBER 2018



SECURE CONNECTIONS
FOR A SMARTER WORLD

COMPANY CONFIDENTIAL

AGENDA

1. [Introduction: BL SAS](#)
2. [Introduction: 5G](#)
3. [System partitioning](#)
4. [Test challenges](#)



An aerial view of a city skyline, likely New York City, featuring numerous skyscrapers and buildings. The sky is blue with scattered white clouds. A faint grid of white lines is overlaid on the image. The text "SMART ANTENNA SOLUTIONS" is prominently displayed in the upper center.

SMART ANTENNA SOLUTIONS

RF INTEGRATION WITHOUT COMPROMISE



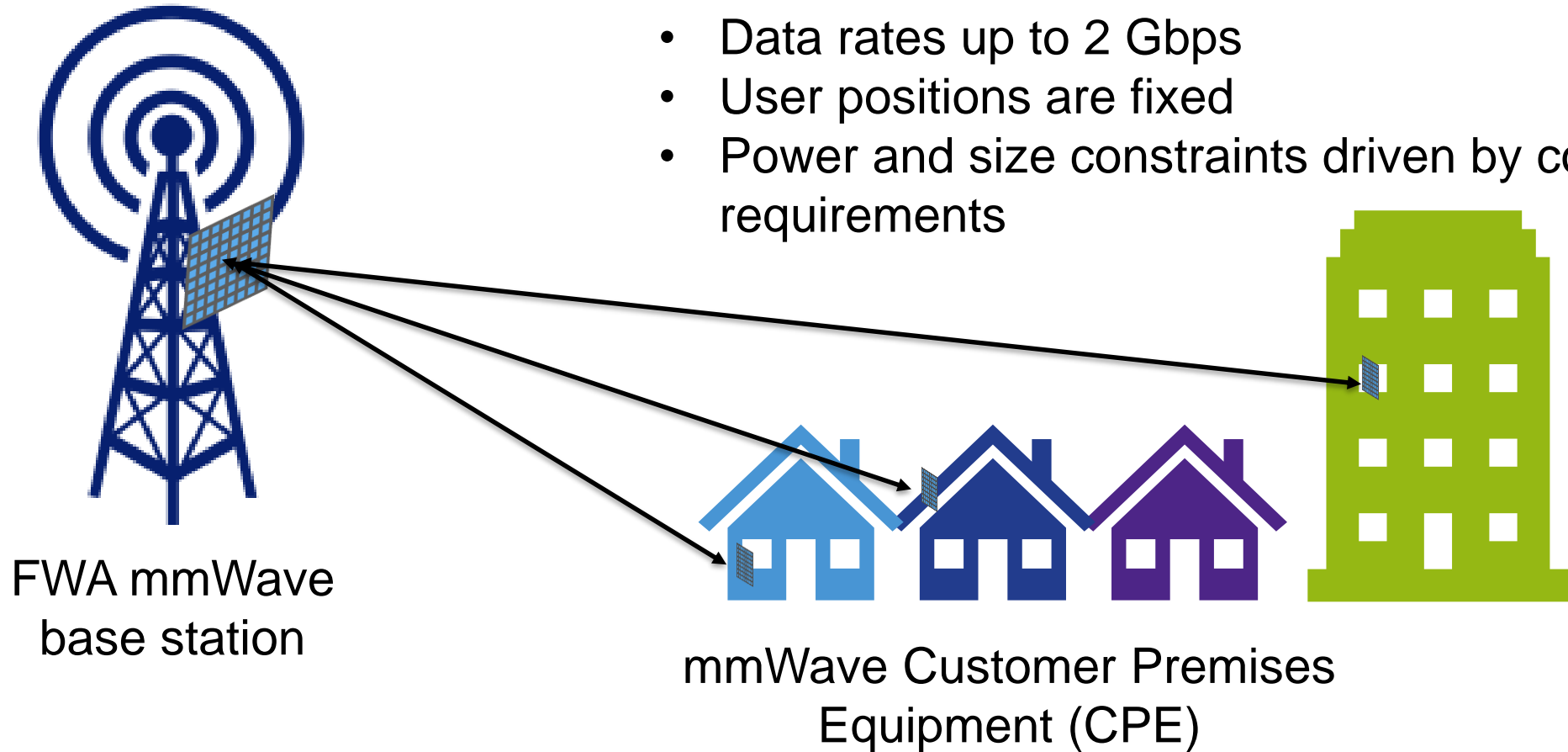
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Introduction 5G

FIXED WIRELESS ACCESS

Main characteristics:

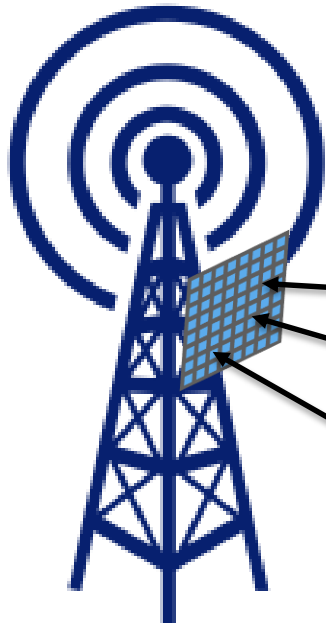
- Wireless broadband to the home connection
- Data rates up to 2 Gbps
- User positions are fixed
- Power and size constraints driven by cooling requirements



RADIO ACCESS NETWORK

Main characteristics:

- Mobile high data rate connection
- Users move around inside and between cells
- Heat and size constraints at base station driven by cooling requirements
- Heat and size constraints at UE side driven by power efficiency and cooling



Radio Access Network (RAN)
mmWave base station



mmWave Mobile User
Equipment (UE)

5G spectrum roll-out



Global snapshot of 5G spectrum

Around the world, these bands have been allocated or targeted

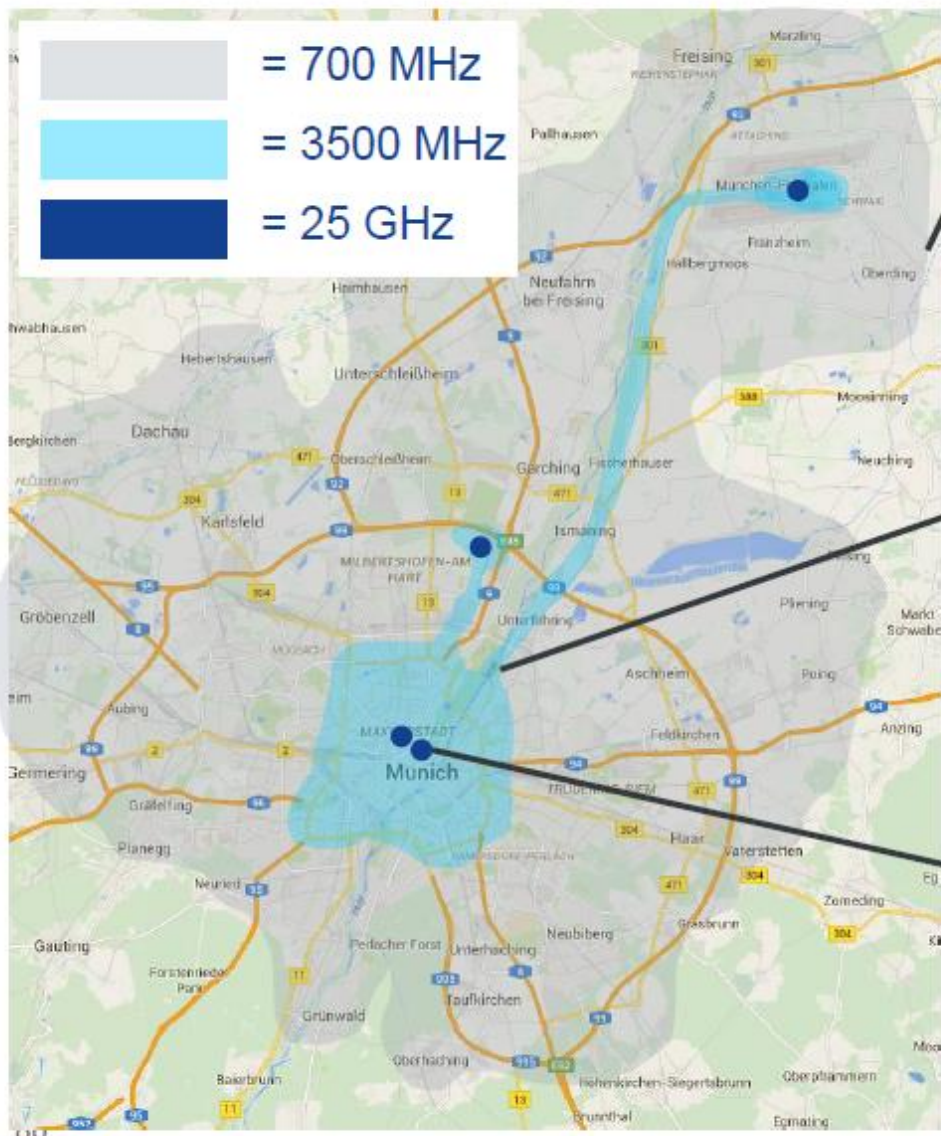
New 5G band

- █ Licensed
- █ Unlicensed / shared
- █ Existing band

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Source: Qualcomm website

Example 5G Spectrum Usage in Major European City



700 MHz layer

- Wide coverage with indoor penetration
- Massive IoT and ultra reliable low latency
- Reusing existing sites for 800/900 MHz

3.5 GHz layer

- Dense urban coverage
- Supports enhanced mobile broadband
- Reusing existing sites for 1800/2100/2600 MHz

25 GHz layer

- Hot spots like airports and stadiums
- Supports full enhanced mobile broadband
- Data rate 10 Gbps



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BL SAS test challenge

Finding the right test platform

- Requirements:
 - Industrial solution
 - Scalable
 - Known NXP platform
 - Multisite capability
 - Max frequency up to 40GHz short term, up to 60+GHz long term
- Status:
 - No of the shelf solution available
 - Intermediate solution in place, not meeting the requirements above
 - Ongoing system evaluation at the most favorable turnkey solution
 - No decision yet



Contacting challenges

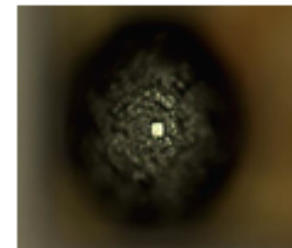
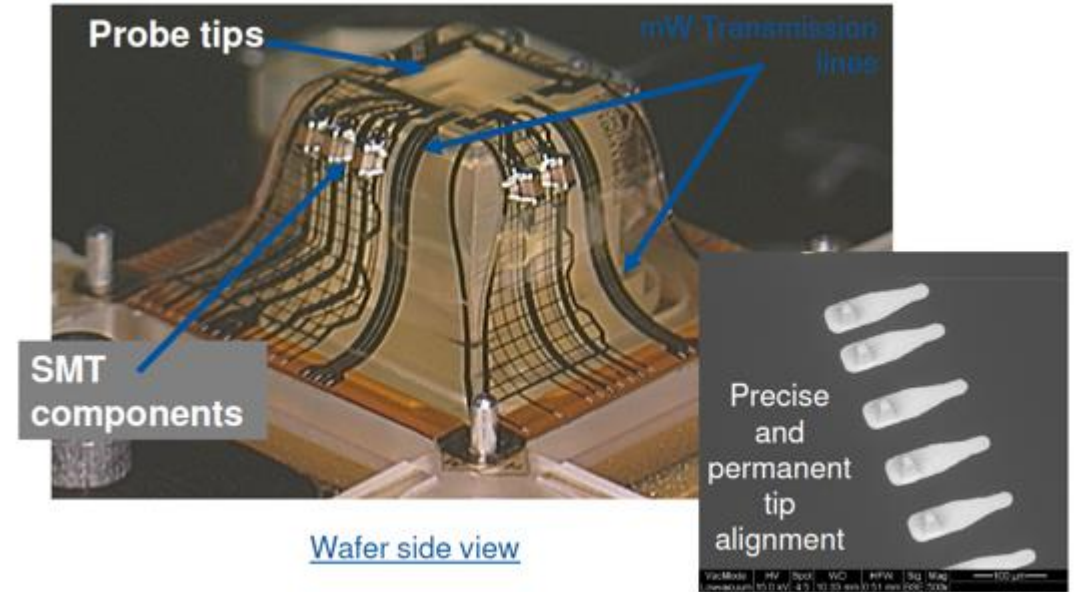
WLCSP

- High Frequency
- Low GND inductance
- Multisite capabilities
- Pitch between pillars / bumps
- RF Wafer Probe on bumps (imprint)

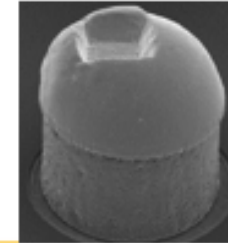
Final Test

- High frequency
- Low GND inductance

Pyramid Core for RF Testing



Imprint on a 260µm diameter Bump



Imprint on 60µm diameter pillar

Design For Testability

- DFT should simplify test challenges and lower cost of test
- BL SAS is adding DFT to simplify test and lower overall cost of test to our 5G products

BUT

Can we guarantee it with DC only?



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