

# In-building Small Cells Provisioning: Challenges and Opportunities

# Agenda

- Observations of indoor wireless at Crown Castle USA – a towerco and neutral host provider
  - Challenges and opportunities
  - Changing technical requirements
- Findings from the Neutral Hosts Value Proposition: Functions, Advantages, and Benefits (SCF248)
  - Goal
  - Examples of what went into the work
  - Some cases we studied that reinforces the value proposition
  - Methodology
- Joint Operators Technical Specifications - summary of position paper on JOTS (SCF250)

# Crown Castle Small Cells

## Challenges

- Construction permitting delays for vertical structures
- Construction permitting delays for fiber routes
- Construction aesthetics variations among municipalities
- Construction costs
- Post auction mid-band spectrum acquisition MNO financial challenges
- Macro first strategy of the MNOs- which is understandable

## Opportunities

- Colocation
- Multi-band small cells
- Shared infrastructure currently is limited to fiber optic routes, antennas and vertical structures ... Will it also include RAN?
- Existing dense fiber transport network (not colocation but next pole over)

# Crown Castle Small Cells

## Changing customer requirements

- We ask for customer feedback on how we can continue to create value
  - Towers, Small Cells, Fiber
- We also try to get ahead of our customers by
  - Seeing what they are up to – such as establishing strategic relationship with a particular vendor
  - Understanding what is important to them -- such as standardizing on Maximum Permissible Exposure
  - Identifying where they lack coverage -- to identify opportunities to offer our services
  - Looking at industry forecasts and trends – e.g., lower 5G SA and private wireless deployments
  - Listening to our co-opetition – other towercos, small cells, fiber, and data center providers
  - Assessing technology trajectories for who, what, where, when, and why - to buy, build, or partner
  - Being a partner even in areas where we might be competitors – win-win
- Some results
  - We continuously streamline our internal processes and reduce time to deploy – as per customer feedback
  - Customers now require fewer RF engineering, tower construction, and tower services – we adjusted
  - Densification follows capacity demand, 5G ULLC use cases, and our urban assets -- e.g., indoor mmW
  - Vendors/suppliers, customers, and us together -- bring sustainability principles more into focus
  - We too underwent/are undergoing digital transformation – because it is important and essential

# Neutral Hosts Value Proposition: Functions, Advantages, and Benefits (SCF248)

**Goal** - To understand the effective value proposition neutral hosts offer their customers or stakeholders

**Methodology** – We worked through the VP Canvas, which is a framework to identify the value proposition for four customer-stakeholders

- Mobile network operators, Property owners, Municipalities, Regulators

**Cases** - We studied several cases across regions that led us to, exemplified, and reinforced our findings

## **Benefits** of Neutral Hosts:

- MNOs: Optimized network expansion; Long-term investment; Traffic offload; Ease deployment constraints
- Market: Promote competition; Reduce barriers to entry through efficient spectrum usage
- Businesses: Ready for challenging environments; Indoor connectivity expertise, simplified deployment, scalability
- Local communities: Ubiquitous mobile coverage; Enhanced quality of life; Economic value
- Policy makers, regulators, and government: Digital inclusion; Economic growth; Simplified solutions; Efficient spectrum use
- Neutral hosts: Fixed long-term revenues; Economies of scale; Efficiencies through shared infrastructure; Innovation; New revenue opportunities

## **Future** expected benefits:

- Well-positioned for bringing even multi-Cloud connectivity to enterprises and network slicing
- Can extend business models to increase service offerings – managed services, active infrastructure, taking over MNO assets, Power-aaS

# Regulations and Policies for Small Cell deployments

- Simple and standard national procedures to optimize administrative flows of documentation processing
- Generic declaration of equipment on national, regional, and/or local level
- Generic certification of equipment by using internationally standardized classes of equipment
- Generic permits for installation and operation
- Generic installation permissions (as opposed to site-by-site permissions) and franchises for installation
- Access to commercial buildings for antenna and radio equipment installation
- Installation of equipment with consideration of the surrounding environment
- Exemptions-based installation based on generic criteria (such as antenna height, power levels, combination of power and height) in a region-based approach
- Taxes and fees only to cover administrative requirements
- Incentives for deployment of greener and more environmentally friendly equipment
- Lower or no taxes and local fees to encourage deployments – perhaps align rental fees with other ‘essential’ infrastructure like water, electricity, and natural gas)
- Site identification and planning permission support from local authorities

# Joint Operators Technical Specifications

Joint Operators Technical Specification Forum - comprehensive references on non-commercial design and test requirements – builds trust between mobile network operators, neutral hosts, and wholesalers, where applicable

- Distributed Antenna System specification
  - GSM, UMTS, LTE, 5G NR indoor cellular
- Neutral Host In-Building specification
  - Annexes: Architecture, Radio Requirements, Test & Acceptance, Operational Processes, Fulfilment
- Rail Coverage Solutions specification
- Work-in-progress: Neutral Host Outdoor specification

How we view JOTS:

- SCF250 describes neutral hosts' objectives to continue to support JOTS in the UK and raise awareness globally to drive similar models.
- Build confidence and trust (SCF231) for offerings between MNOs, neutral hosts, private networks, and other deployments.
- Capture deployment priorities (SCF244) and design requirements (SC245).
- Continue work with technology providers and policy makers to develop common frameworks for MNOs, neutral hosts, and others

# Concluding Remarks

- Change is the status quo – customer requirements, market pressures, and technology trends
- The direction of change points to digital infrastructure and platforms
- Neutral hosts continue to evolve and adapt
- The value proposition for small cell neutral hosts is far reaching – benefitting many stakeholders from a building to local communities up to regional socio-economic scale
  - It is like the answer to all your troubles. Let a neutral host take it from here.
- It is not easy to separate business from technology, it is really about business and technology for strategies that lead to real customer satisfaction



# Q&A

## Contact:

Dr. George G. Aguilera

Technology Strategy

Crown Castle USA

[george.aguilera@crowncastle.com](mailto:george.aguilera@crowncastle.com)