Twitching your Antennas: The Role of Small Cells in 5G Deployments

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This year we will start to see the transition to the fifth generation wireless networks – known as 5G. For example, Etisalat, the UAE's biggest telecom operator, is already upgrading its network and infrastructure to be ready to provide the service as soon as the 5G mobile handsets are available in UAE.

5G is expected to deliver data upload and download speeds that are ten times faster than the current 4G (LTE – Long-Term Evolution) networks.

This big technology shift is not just about faster mobile. 5G will be important in facilitating the 'Internet of Things' – the network that will link not just our phones and computers but all manner of consumer products and infrastructure in our smart homes and smart cities.

A key factor in enabling 5G will likely be the use of low-power antennas known as 'small cells' and DAS (distributed antenna systems).

Such antenna have a very short range. Consequently, to reach the full potential of 5G technology, wireless providers will need to deploy thousands of small cells in communities across the countries in which they operate.
Etisalat has publically announced it is setting up some 600 small cell sites this year alone.

While wireless providers will likely engage with municipalities to locate small cells on lampposts, and traffic lights in public areas, in large private property developments and in high rise buildings the wireless providers will need agreements with the property owners to deploy small cells/DAS.

What are the Advantages of 5G?

5G will provide further benefits to consumers in three key ways:

- 5G will be very fast. This will be particularly noticeable in higher quality streaming video. Downloading a typical length movie, which can take six minutes using 4G, could take less than 20 seconds with 5G;
- 5G has low latency, or a low lag in time between a request and a response. 5G can cut response times down to one to two milliseconds (0.0001 or 0.0002 seconds). 4G's average response time is 50ms (0.05 seconds). If have an autonomous car, you do not want latency times to be too long; and
- 5G will offer connection density up to 100 times greater than 4G. That means people will be able to communicate at the same time without crowding out others.

The Importance of Small Cells and DAS

5G technology will, at least in part, utilise the part of the radio frequency spectrum between microwaves and infrared waves, which while providing a stronger connection, only supports service over short distances. Generally high-band radio spectrum is only useful for covering about 200 metres, (roughly a city block)

High band spectrum is less crowded than lower frequencies used by mobile phones, but there are disadvantages. At higher frequencies, signals are not as strong and experience interference from obstacles such as walls and trees.

Small cells and DAS will play key roles in boosting 5G network density – as the solution is to set up smaller antennas everywhere – on utility poles, rooftops, and throughout the interiors of buildings.

‘Small cells’ is a generic term for several types of low-power antennas (including femtocells, picocells and microcells) that are typically dedicated to a single wireless provider.

DAS systems have additional management functions that allow them to support more than one service provider.

Small cell units are generally connected to a fibre optic network. Once connected, a single unit can provide service for around 30 access points in high-density areas, and can extend service to access points anywhere from 10 metres to over a kilometre away. Small cell units are the size of a suitcase.

DAS comprises cabling, small remote units, and antennas that are distributed throughout a building and linked to a central distribution hub, which connects to the radio frequency source used by the wireless provider. Through DAS, a provider’s wireless signal is distributed to all parts of the building.

At present small cells/DAS are commonly used indoors, to provide adequate cell coverage to crowds at stadiums and conference facilities.

Cost Burdens

Deploying all these new antennas on mass will not be cheap, and, at least initially, commerciality and economics will influence where additional small cells and DAS are deployed.

Office buildings present a potential challenge with respect to who will bear the cost of 5G deployments. The quality of internet connectivity can be a key differentiator for landlords. When a tenant pays rent, they see wireless connectivity as a utility and do not want to pay extra.

All three parties (landlord, tenant, wireless provider) may have to be prepared to have to come up with creative ways to benefit from early deployment of the 5G network infrastructure in office buildings. Potentially, cost sharing may be one workable approach.

Location Agreements

Private agreements for locating small cells and DAS will not be ostensibly different from existing licensing and co-location agreements for telecommunications network infrastructure. Broadly, DAS/small cell licence agreements should cover:

- **Description of the work. Installation**. Location of DAS/small cell (and changes to location). Maps. Work standards. Removal on termination and restoration of site.
- **Permit, Limitations and Restrictions**. Limits of the authorisation. Requirement for the provider to obtain all necessary consents and permits. No real property interest created in any land. Whether the rights are non-exclusive. No grant or approval of co-location rights to third parties.
- **Limitations and Indemnification.** Limitation of liability of property owner. Obligation of the provider to indemnify the property owner. No interference.
- **Insurance; Fees; Termination and Compliance with laws**

Property owners need to be aware that the small cells/DSA will form part of the wireless provider's public telecommunication and may be subject to laws requiring sharing of facilities or sites.

First Phase

The new 5G network, which is a once in a decade upgrade, has the potential to radically change lives as a facilitator of the Internet of Things and smart cities.

We are currently in the first phase of the 5G launch, where the infrastructure for fixed wireless services and mobile services will be provided in selected locations. Some of these locations will depend on private property owners agreeing with the wireless providers as to where they can locate the low-power antennas needed for 5G to function.

Al Tamimi & Company's Technology, Media & Telecommunications team regularly advises on legal issues concerning the telecommunications sector. For further information please contact Martin Hayward (m.hayward@tamimi.com) or Andrew Fawcett (a.fawcett@tamimi.com).