U.S. Outdoor and Indoor DAS Forecast, 2017 – 2022: *DAS in a Soon-to-Be 5G World*

Market Study
Third Quarter 2018

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Abstract

All of the talk these days is about 5G – with good reason. This is the year (2018) that marks the start of the transition of 4G LTE to 5G New Radio (NR).

Will distributed antenna systems, indoor and outdoor, have a role in the 5G world? Absolutely. But just as the architecture of radio access networks (RANs) will change as operators move from LTE to 5G, so too will DAS change.

That said, DAS began years ago with passive systems, donor antennas and coaxial cable. Today's DAS may look a bit different – with remote units, fiber, maybe even a CPRI connection or a small cell as the radio source. But, the function is unchanged – provide coverage inside a building (iDAS) or in an outdoor area (oDAS).

In a 5G world, indoor DAS will perform the same function – provide coverage and capacity indoors – but the RF source and the processing will no longer be in the building. Outdoor DAS is already getting supplanted by what is now called Distributed RAN (DRAN) which is, simply, baseband processing at a centralized location (central office, macrocell site). Eventually, DRAN will get supplanted by Cloud RAN (CRAN). That transition will happen slowly over the next few years.

Today, buildings increasingly need indoor cellular coverage and capacity. Many of the venues that need DAS – stadiums, hotels, airports, etc., – already have it. From an outdoor perspective, *iG*R believes that the market for oDAS is fading because "RRH as small cells" (which is the DRAN model, essentially) provides a similar level of coverage/capacity with better future flexibility – i.e., moving toward CRAN. Also, mobile operators need coverage/capacity in different places in an urban/metro area so, as compared to indoors where shared antennas can enable lower costs, that same shared antenna model may not work quite as well outdoors.

*iG*R splits the DAS market by indoor and outdoor and then further divides the indoor market into commercial buildings and residential (multiple dwelling units or MDUs). *iG*R's oDAS forecast grows out of its "outdoor small cell" model and market study, while its iDAS forecast grows out of its "indoor small cell" model and market study. This market study highlights the DAS-specific portions of those models and market studies. The commercial building segment is where *iG*R believes most of the DAS growth will occur over the next five years.

This market study provides a brief overview of the different types of small cells, including DAS, and the goals around future iDAS and oDAS deployments. It then provides an explanation of the methodology used to create the actual iDAS and oDAS forecasts, both for nodes and DAS systems.

Note that CBRS is not included in these forecasts. Although *iG*R believes that CBRS (3.5 GHz) will have a major role to play in the growth of in-building cellular networks, the rules governing CBRS are in debate right now. *iG*R will not include CBRS in this DAS forecast until the FCC's rules are finalized and their impact can be reasonably judged.

Key questions addressed in this market study include:

- What is an outdoor small cell? What are metrocells, RRHs and oDAS?
- What is an indoor small cell? What are femtocells, picocells and iDAS?
- What is a DAS?
- Why do the mobile networks need iDAS and oDAS?
- How does DAS fit into operators' evolving networks?
- What are the issues with deploying DAS in the U.S.? How do these issues impact the number of small cells in the market?
- What is the role of CPRI with iDAS and oDAS?
- How is DAS changing/evolving?
- Where are DAS nodes most likely to be located? What's their role?

Who should read this market study?

- Mobile operators
- Infrastructure OEMs
- Small cell product and solution vendors
- Backhaul service providers and equipment OEMs
- Financial analysts and investors.