

**U.S. Outdoor Small
Cells Forecast, 2019 –
2025: *Even small cells
get sick***

Market Study
Second Quarter 2020





U.S. Outdoor Small Cell Forecast, 2019 – 2025: *Even small cells get sick*

Market Study

Published Second Quarter 2020
Version 1.0
Report Number: 02Q2020-06

iGR
12400 W. Hwy 71
Suite 350 PMB 341
Austin TX 78738

Table of Contents

Abstract	1
Executive Summary	3
The Forecasts	4
Table A: U.S. Outdoor Small Cell Actuals, Sub 6 GHz and mmWave, 2019-2025	5
Figure A: U.S. Outdoor Small Cell Actuals, Sub 6 GHz and mmWave, 2019-2025	5
What This Means	5
Methodology	7
Basic Mobile Operator Network Architecture	9
Figure 1: Basic Components of Cellular Voice/Data Network	9
Wireless Spectrum	11
Cell Sites	12
The Different Types of Haul	13
Figure 2: Cell Site Backhaul Capabilities and Use Cases, Wired and Wireless	15
Setting the Stage for Small Cells	16
Network “Pain Points”	17
Different Types of Small Cells	18
iGR’s Definitions of Small Cells	18
Table 1: Different Types of Small Cells, Licensed and Unlicensed Spectrum	18
Distributed Antenna Systems (DAS)	19
Figure 3: Basic DAS Configuration	20
Figure 4: DAS, BTS Hotels, and Remote Radio Heads	21
Hybrid Antenna System	21
DAS/Small Cell Architecture	22
DAS Lite	22
Neutral-Host DAS vs. Single Host DAS	23
Table 2: Benefits of Neutral-Host DAS	24
Changing Nature of DAS	24
Figure 5: Types of DAS	25
Signal Boosters	25
Femtocells and Picocells	26
Metrocells	27
Remote Radio Heads	28
Difference Between RRHs and oDAS	28
Difference between RRHs and Metrocells	29
Multi-band Small Cells	29
Figure 6: 3GPP Approaches to Network Sharing	30
Outdoor Small Deployment Issues	31
Small Cell deployment requirements	31
Small Cell Installations	32

Quoting information from an iGillottResearch publication: external — any iGillottResearch information that is to be used in press releases, sales presentations, marketing materials, advertising, or promotional materials requires prior written approval from iGillottResearch. iGillottResearch reserves the right to deny approval of external usage for any reason. Internal-quoting individual sentences and paragraphs for use in your company’s internal communications activities does not require permission from iGillottResearch. The use of large portions or the reproduction of any iGillottResearch document in its entirety does require prior written approval and may have some financial implications.

Copyright © 2020 iGillottResearch, Inc. Reproduction is forbidden unless authorized.

FOR INFORMATION PLEASE CONTACT IAIN GILLOTT (512) 263-5682.

Locations for Small Cells	33
Small Cell Deployment Issues	36
Figure 7: Possible Interference Sources in a Loaded Network	36
X2.....	37
COMP	38
Figure 8: Overview of COMP	38
ICIC and eICIC	39
Figure 9: Example of Intercell Interference.....	39
Figure 10: Example of Coordinated Resource Blocks via ICIC	40
Figure 11: Blanking of subframes in eICIC	41
Synchronization.....	41
Latency.....	41
5G Defined	43
URLLC	44
Massive IoT	45
5G Services and Use Cases	45
General Trends / Assumptions around Outdoor Small Cells	46
Market drivers.....	49
Market inhibitors.....	49
Summary of Small Cell-related Regulations and Legislation	51
Federal regulations.....	51
State legislation	52
Examples of State Legislation.....	53
Impact of regulations on small cell deployments.....	56
Outdoor Small Cells: TAM and Actual Deployments.....	57
Outdoor Small Cells: TAM Methodology	58
TAM for U.S. Small Cells.....	61
Table 3: U.S. Outdoor Small Cells TAM, Sub 6 GHz and mmWave, 2019-2025	61
Figure 12: Outdoor Small Cells TAM, Sub 6 GHz and mmWave, 2019-2025	61
Methodology: Forecast for Actually Deployed Outdoor Small Cells.....	62
U.S. Outdoor Small Cell Forecast: Actuals	63
Table 4: U.S. Actual Outdoor Small Cells, Sub 6 GHz and mmWave, 2019-2025	64
Figure 13: U.S. Actual Outdoor Small Cells, Sub 6 GHz and mmWave, 2019-2025	64
Table 5: U.S. Actual Outdoor Sub 6 GHz Small Cells by Type, 2019-2025	64
Figure 14: Actual U.S. Outdoor Sub 6 GHz Small Cells Deployments by Type, 2019-2025....	65
Table 6: Actual Outdoor Sub 6 GHz Small Cell Deployments by 4G and 5G, 2019-2025.....	65
Figure 15: Actual Outdoor Sub 6 GHz Small Cell Deployments by 4G and 5G, 2019-2025 ...	66
Small Cell Vendor Profiles.....	67
Accelleran.....	67
Airspan Networks	70
CommScope	73
Corning SpiderCloud Wireless.....	77
Druid Software	78
Ericsson	80

Quoting information from an iGillottResearch publication: external — any iGillottResearch information that is to be used in press releases, sales presentations, marketing materials, advertising, or promotional materials requires prior written approval from iGillottResearch. iGillottResearch reserves the right to deny approval of external usage for any reason. Internal-quoting individual sentences and paragraphs for use in your company's internal communications activities does not require permission from iGillottResearch. The use of large portions or the reproduction of any iGillottResearch document in its entirety does require prior written approval and may have some financial implications.

Copyright © 2020 iGillottResearch, Inc. Reproduction is forbidden unless authorized.

FOR INFORMATION PLEASE CONTACT IAIN GILLOTT (512) 263-5682.

Gemtek	82
Huawei	83
ip.access	85
JMA Wireless	87
Microlab (Wireless Telecom Group)	90
NEC	91
Nokia Networks	92
Quortus	95
Samsung Electronics	96
Sercomm	99
TeleWorld Solutions	101
ZTE Corporation.....	102
Definitions	105
Definitions Table	105
About <i>iGR</i>.....	127
Disclaimer	127

Quoting information from an *iGillottResearch* publication: external — any *iGillottResearch* information that is to be used in press releases, sales presentations, marketing materials, advertising, or promotional materials requires prior written approval from *iGillottResearch*. *iGillottResearch* reserves the right to deny approval of external usage for any reason. Internal-quoting individual sentences and paragraphs for use in your company’s internal communications activities does not require permission from *iGillottResearch*. The use of large portions or the reproduction of any *iGillottResearch* document in its entirety does require prior written approval and may have some financial implications.

Copyright © 2020 *iGillottResearch*, Inc. Reproduction is forbidden unless authorized.

FOR INFORMATION PLEASE CONTACT IAIN GILLOTT (512) 263-5682.

Abstract

Over the past few years, the outdoor small cell market in the U.S. has grown substantially, and *iGR* forecasts a healthy future for it – despite the impact of COVID-19.

This version of the small cell forecast has been updated based on the expected impact of the virus as *iGR* understands it today. *iGR* expects to update this forecast in late 2020 when more is known about the virus, its impact, and the global economy has, ideally, begun recovering.

Because of the impact of COVID-19, *iGR* has reduced its forecast for the number of Sub 6 GHz and mmWave outdoor small cells to be installed in the U.S. throughout the forecast period (2019-2025).

In this market study, *iGR* presents a total addressable market forecast and an “actual” forecast for U.S. outdoor small cell nodes installed: metrocells, remote radio heads as small cells, outdoor DAS and mmWave-based small cells.

The assumptions underlying *iGR*’s outdoor small cell forecasts are explained in this market study. The forecasts are further based on *iGR*’s global connections forecast market study and *iGR*’s mobile data forecast market study, as well as *iGR*’s primary and secondary research, and various other sources.

Key questions addressed in this market study include:

- What is the effect of COVID-19 on outdoor small cell deployments?
- What is an outdoor small cell? What are metrocells, RRHs and oDAS?
- Why do the mobile networks need outdoor small cells to meet bandwidth demand?
- How do outdoor small cells fit into operators’ evolving networks?
- What are the issues with deploying outdoor small cells in the U.S.? How do these issues impact the number of small cells in the market?
- What is the regulatory environment for deploying small cells?
- What are the differences between oDAS, metrocells and remote radio heads?
- What is the role of CPRI with outdoor small cells?
- Where are outdoor small cells most likely to be located? What’s their role?
- How important is location to the effectiveness of an outdoor small cell?

- What is the total addressable market in the U.S. for outdoor small cells? How does this vary by small cells for mmWave and sub-6 GHz?
- How does the forecast for actual outdoor small cells deployments in the U.S. compare to the U.S. outdoor small cell total addressable market forecast? How does this vary by small cells for mmWave and sub-6 GHz?

Who should read this report?

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