

**U.S.
Front/Backhaul
Forecast, 2017 –
2022: *The
Functional Split***

Market Study
First Quarter 2018





U.S. Front/Backhaul Forecast, 2017 – 2022: *The Functional Split*

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Table of Contents

Abstract	1
Executive Summary	3
U.S. Front/Backhaul Forecast	4
Figure A: Front/Backhaul Links Deployed to U.S. Cell Sites by Type, 2017-2022	5
Methodology	6
Basic Mobile Operator Network Architecture	7
Figure 1: Basic Components of Cellular Voice/Data Network	7
Wireless Spectrum	9
Cell Sites	10
The Different Types of Haul	12
Figure 2: Cell Site Backhaul Capabilities and Use Cases, Wired and Wireless.....	13
Basics of Front-/Backhaul	14
Wired and Wireless Backhaul Options	16
Copper	17
xDSL	17
G.fast	18
Coaxial cable / HFC	18
Fiber	19
Fiber Deployment Options	20
PON and PTP	22
Figure 3: Simplified Example of an All Fiber PON	22
Figure 4: Simplified Example of a PTP Fiber Network	23
Carrier Ethernet	23
Wireless Backhaul	25
Figure 5: Wireless as a Mobile Backhaul Solution	26
Typical Mobile Backhaul Topologies	26
Figure 6: Typical Mobile Backhaul Deployment Configurations.....	27
Figure 7: Possible Small Cell Backhaul Topology, Dense Urban	28
Point to Point (PTP)	29
Figure 8: PTP Microwave Configuration	30
Point to Multipoint (PtMP)	30
Figure 9: Typical PtMP Configuration	31
Non Line-of-Sight (NLOS) vs. Line-of-Sight (LOS)	31
Licensed vs. Unlicensed Wireless	32
Briefly: Millimeter Wave versus Microwave	33
Figure 10: Millimeter Wave vs. Traditional Microwave	33
The Case for and Against Wireless Front/Backhaul	35
Strengths	35
Weaknesses	36



Summary	36
Fronthaul Today: CPRI	38
Figure 11: CPRI at the Macrocell and as Small Cell / CRAN	38
What is CPRI?	39
Figure 12: CPRI System & Interface Basics	39
Figure 13: Dimensioning CPRI 7.0 Links.....	41
Why Use CPRI / Fronthaul?	41
What is 5G?.....	43
Figure 14: Approximate Timeline of 5G Progress.....	44
Front-/Backhaul in the 5G World	45
The Functional Split	45
Table 1: CPRI/ORI Interface Specifications and projected bit-rates for RRH Links	46
eCPRI.....	47
Figure 15: eCPRI System and Interface Definition.....	48
Figure 16: eCPRI Functional Splits	48
Fronthaul Lite	49
NGIF / Xhaul	50
Figure 17: NGIF Diagram	51
Figure 18: Splitting the Processing	53
5G New Radio gNB and Functional Split Options.....	53
Figure 19: Examples of CU-DU Functional Split Configurations	55
In-band front/backhaul	55
U.S. Backhaul Forecast	56
Major Assumptions	56
U.S. Cell Sites Deployed	57
Table 2: Growth in Cell Sites, 2017-2022	58
Figure 20: Growth in Cell Sites, 2017-2022	59
Front/Backhaul by Type.....	60
Table 3: Front/Backhaul Links Deployed to U.S. Cell Sites by Type, 2017-2022.....	60
Figure 21: Front/Backhaul Links Deployed to U.S. Cell Sites by Type, 2017-2022	61
Figure 22: Front/Backhaul Links Deployed to U.S. Cell Sites by Type (Log), 2017-2022	62
Macrocell Front/Backhaul Forecast.....	62
Table 4: Front/Backhaul Links Deployed to U.S. Macrocells, by Type 2017-2022.....	64
Figure 23: Front/Backhaul Links Deployed to U.S. Macrocells, by Type 2017-2022	64
Outdoor Small Cell Front/Backhaul Forecast.....	64
Table 5: Front/Backhaul Links Deployed to U.S. Small Cells, by Type, 2017-2022	65
Figure 24: Front/Backhaul Links Deployed to U.S. Small Cells, by Type, 2017-2022.....	66
Mobile Data Demand by Network Generation and Backhaul Type.....	68
Table 6: U.S. Bandwidth to be delivered per month (TB), 2017-2022.....	68
Figure 25: U.S. Bandwidth to be delivered per month (TB), 2017-2022	68
Table 7: Mobile Data Demand by Cellular Generation, 2017-2022.....	69
Figure 26: Mobile Data Demand by Cellular Generation, 2017-2022	70
Table 8: Average Mobile Data Demand by Sector, 2017-2022	71
Figure 27: Average Mobile Data Demand by Sector, 2017-2022	71

Mobile Front/Backhaul Vendor Profiles (Wireless and Wired)	72
Cisco	72
CommScope	74
Ericsson	76
Fujitsu	78
Huawei	80
NEC	82
Nokia Networks	84
ZTE Corporation	87
Wired Mobile Front/Backhaul Vendor Profiles	90
Accedian Networks	90
Actelis Networks	91
ADTRAN	93
ADVA Optical Networking	94
Calix	96
Canoga Perkins	98
Celtro Communication Ltd.	98
CenturyLink / Level 3 Communications	99
Charter Communications / Spectrum Business	100
Ciena	101
Coriant	103
Crown Castle	105
DASAN Zhone Solutions	106
ExteNet Systems	108
Fibrolan	109
Infinera	110
IPITEK	112
Juniper Networks	113
PalmettoNet, A Spirit Communications Company	116
Positron Access Solutions	117
RAD Data	118
SOLiD	120
TE Connectivity	121
Telco Systems	123
Windstream Communications	124
Zayo	126
Wireless Mobile Front/Backhaul Vendor Profiles	129
Airspan Networks	129
Aviat Networks	132
BridgeWave Communications	133
Cambium Networks	134
Cambridge Broadband Networks Limited (CBNL)	136
Communication Components, Inc. (CCI)	139
CCS	140
Ceragon Networks	142
DragonWave-X	144



E-Band Communications	146
EBlink	149
Exalt Wireless	151
Fastback Networks	152
Intracom Telecom	154
LightPointe Wireless	156
MAX4G	158
Proxim Wireless	159
RADWIN	161
Siklu	163
Tarana Wireless	166
Vubiq Networks	167
Definitions	170
Definitions Table	170
About iGR	189
Disclaimer	189



Abstract

5G looms over the network strategies of mobile operators, as does the ongoing move toward Cloud RAN (CRAN), software defined networking (SDN) and network function virtualization (NFV). All of this – along with many other factors – drives the need for reliable, scalable and cost effective fronthaul and backhaul.

Fiber is the primary physical medium for transporting control and user plane traffic among cell sites, the edge, the mobile core, data centers and the Internet. Wireless solutions have their place and scale reasonably well, but as traffic shifts from LTE to 5G and as mobile data demand grows, fiber is likely to remain the key medium for transporting user data (and control plane data) from cell sites to the core network. This is backhaul.

Remote radio heads (RRHs) are the mainstay of most RANs. Fiber links the RRHs to the baseband processing units (BBUs) at the bottom of the tower. This is fronthaul. Increasingly, those BBUs are being centralized at a place other than the bottom of each macrocell tower. The current technology of choice for linking BBUs and radios is CPRI. BBU centralization is the first step on the road toward Cloud RAN (C-RAN).

But, CPRI does not scale into tomorrow's world of MIMO and Massive MIMO. The amount of bandwidth required to transport CPRI signals (digitized version of analog radio traffic) scales in relation to the number of radios, and on a cell site with dozens of antennas (and radios) the amount of throughput required would quickly scale into the terabytes per second. And while this might technically be possible with fiber and multiplexing (WDM), the cost would likely be prohibitive.

So, in the last few years, there has been a push to, essentially, rethink CPRI and create a new “functional split” between the radio and the baseband processing. There are multiple efforts underway to define a new standard (eCPRI, NGFI, Fronthaul Lite) and it appears likely that some version of the functional split will become part of the 3GPP standards releases. Essentially the goal of the functional split concept is to minimize the amount of traffic that has to pass over the fronthaul links. This market study provides an overview of the different efforts to that end.

This market study also provides a five-year forecast of the number of front/backhaul links to cell sites by type of medium (fiber, copper, or wireless) and by type of cell (macrocell or outdoor small cell). Finally, it forecasts the amount of mobile data demand that flows over those links by generation (5G and non-5G).

Key questions addressed in this study:



- What is the anticipated growth of front/backhaul in the U.S. through 2022?
- How is traffic split between 4G LTE and 5G?
- What is the difference between fronthaul and backhaul?
- How is the type of front/backhaul split between fiber, wireless and copper?
- What is the forecast for front/backhaul to support outdoor small cell deployments?
- What are the major concerns of the mobile operators with regard to each type of backhaul and how can these concerns be addressed?
- What is the role for wired and wireless front/backhaul in small cell architectures?
- How is wired and wireless front/backhaul deployed?
- How do PTP, PMP, NLOS, millimeter wave and traditional microwave solutions differ?
- How do fiber (point to point and passive), VDSL2 and coaxial (hybrid fiber coax) differ?
- How does wireless backhaul compare to fiber backhaul?
- How does wireless fronthaul compare to fiber fronthaul?
- What is CPRI and how may it change?

This report is recommended for:

- Mobile operators, particularly those servicing the U.S. market
- Mobile backhaul providers, including telcos and cable MSOs
- Wired and wireless backhaul vendors and solution providers
- Mobile OEMs, particularly those servicing the U.S. market
- Wired and wireless infrastructure vendors, particularly those servicing the U.S. market
- Financial and investment analysts.