

The C-RAN (Centralized Radio Access Network) Ecosystem: 2017 – 2030 – Opportunities, Challenges, Strategies & Forecasts

https://marketpublishers.com/r/C57D3FDFEF6EN.html

Date: July 2017

Pages: 430

Price: US\$ 2,500.00 (Single User License)

ID: C57D3FDFEF6EN

Abstracts

Centralized RAN or C-RAN is an architectural shift in RAN (Radio Access Network) design, where the bulk of baseband processing is centralized and aggregated for a large number of distributed radio nodes. In comparison to standalone clusters of base stations, C-RAN provides significant performance and economic benefits such as baseband pooling, enhanced coordination between cells, virtualization, network extensibility, smaller deployment footprint and reduced power consumption.

Initially popularized by Japanese and South Korean mobile operators, C-RAN technology is beginning to gain momentum worldwide with major tier 1 operators – including Verizon Communications, AT&T, Sprint, China Mobile, Vodafone, TIM (Telecom Italia Mobile), Orange and Telefonica – seeking to leverage the benefits of centralized baseband processing.

SNS Research estimates that global investments in C-RAN architecture networks will reach nearly \$9 Billion by the end of 2017. The market is further expected to grow at a CAGR of approximately 24% between 2017 and 2020. These investments will include spending on RRHs (Remote Radio Heads), BBUs (Baseband Units) and fronthaul transport network equipment.

The "C-RAN (Centralized Radio Access Network) Ecosystem: 2017 – 2030 – Opportunities, Challenges, Strategies & Forecasts" report presents an in-depth assessment of the C-RAN ecosystem including enabling technologies, key trends, market drivers, challenges, standardization, regulatory landscape, deployment models, operator case studies, opportunities, future roadmap, value chain, ecosystem player profiles and strategies. The report also presents forecasts for C-RAN infrastructure



investments from 2017 till 2030. The forecasts cover 3 individual submarkets and 6 regions.

The report comes with an associated Excel datasheet suite covering quantitative data from all numeric forecasts presented in the report.



Contents

1 CHAPTER 1: INTRODUCTION

- 1.1 Executive Summary
- 1.2 Topics Covered
- 1.3 Forecast Segmentation
- 1.4 Key Questions Answered
- 1.5 Key Findings
- 1.6 Methodology
- 1.7 Target Audience
- 1.8 Companies & Organizations Mentioned

2 CHAPTER 2: AN OVERVIEW OF C-RAN

- 2.1 What is C-RAN?
 - 2.1.1 Decoupling the Base Station
 - 2.1.2 Brief History
- 2.2 Competing RAN Architectures
 - 2.2.1 Traditional Macrocells
 - 2.2.2 Small Cells
 - 2.2.3 DAS (Distributed Antenna Systems)
- 2.3 Key Architectural Components for C-RAN
 - 2.3.1 RRH (Remote Radio Head)
 - 2.3.2 BBU (Baseband Unit)
 - 2.3.3 Fronthaul
- 2.4 Baseband Functional Split Approaches
 - 2.4.1 Fully Centralized Baseband Processing: PHY-RF Split
 - 2.4.2 Partially Centralized Functional Splits
 - 2.4.2.1 Intra-PHY Split
 - 2.4.2.2 MAC-PHY Split
 - 2.4.2.3 Intra-MAC Split
 - 2.4.2.4 RLC-MAC Split
 - 2.4.2.5 Intra-RLC Split
 - 2.4.2.6 PDCP-RLC Split
 - 2.4.2.7 RRC-PDCP Split
- 2.5 Fronthaul Interface Options & Technologies
 - 2.5.1 Interface Options
 - 2.5.1.1 CPRI (Common Public Radio Interface)



- 2.5.1.2 OBSAI (Open Base Station Architecture Initiative)
- 2.5.1.3 ORI (Open Radio Interface)
- 2.5.1.4 Ethernet
- 2.5.2 Transport Networking Technologies
 - 2.5.2.1 Dedicated Fiber (Dark Fiber)
 - 2.5.2.2 WDM (Wavelength Division Multiplexing)
 - 2.5.2.3 PON (Passive Optical Network)
 - 2.5.2.4 OTN (Optical Transport Network)
 - 2.5.2.5 Ethernet
 - 2.5.2.6 G.Fast
- 2.5.2.7 Microwave
- 2.5.2.8 Millimeter Wave
- 2.6 vRAN (Virtualized RAN): Transforming C-RAN to Cloud RAN
 - 2.6.1 Leveraging Commodity Technologies
 - 2.6.2 Moving RAN to the Cloud
- 2.7 Market Growth Drivers
 - 2.7.1 Capacity & Coverage Improvement: Addressing the Mobile Data Traffic Tsunami
 - 2.7.2 Towards Greener RANs: Cost Efficiency & Energy Savings
 - 2.7.3 Agile & Flexible Network Architecture
 - 2.7.4 Enhanced Support for Advanced RAN Coordination Features
 - 2.7.5 The Benefits of Virtualization
 - 2.7.6 Bringing Intelligence to the Edge: MEC (Mobile Edge Computing)
 - 2.7.7 Impact of 5G Rollouts
- 2.8 Market Barriers
 - 2.8.1 Fronthaul Investments
 - 2.8.2 Virtualization Challenges
 - 2.8.3 Vendor Proprietary Functional Splits
 - 2.8.4 Migration From Legacy Architectures

3 CHAPTER 3: STANDARDIZATION. REGULATORY & COLLABORATIVE INITIATIVES

- 3.1 3GPP (3rd Generation Partnership Project)
 - 3.1.1 Complementary Features to Support C-RAN
 - 3.1.2 Functional Splits for C-RAN Implementation in 5G Networks
- 3.2 Broadband Forum
 - 3.2.1 TR-069 for Radio Unit Management
- 3.3 CPRI Initiative
 - 3.3.1 CPRI Releases 1.4 to 7.0 for 3G & LTE Fronthaul



- 3.3.2 eCPRI for 5G Fronthaul
- 3.4 ETSI (European Telecommunications Standards Institute)
 - 3.4.1 ORI for Fronthaul
 - 3.4.2 NFV (Network Functions Virtualization) for Cloud RAN
 - 3.4.3 MEC (Multi-Access Edge Computing)
- 3.4.4 Millimeter Wave Transmission for Fronthaul & Other Work
- 3.5 IEEE (Institute of Electrical and Electronics Engineers)
 - 3.5.1 IEEE 802.1CM: TSN (Time-Sensitive Networking) for Fronthaul
- 3.5.2 IEEE P1904.3: Standard for RoE (Radio over Ethernet) Encapsulations and Mappings
 - 3.5.3 IEEE 1914: NGFI (Next Generation Fronthaul Interface) Working Group
 - 3.5.4 Other Standards & Work Groups
- 3.6 ITU (International Telecommunications Union)
 - 3.6.1 FG IMT-2020 (Focus Group on IMT-2020)
- 3.7 MEF (Metro Ethernet Forum)
 - 3.7.1 Ethernet Transport for Small Cells & C-RAN
- 3.8 NGMN (Next Generation Mobile Networks) Alliance
 - 3.8.1 P-CRAN (Project Centralized RAN)
 - 3.8.2 RAN Evolution Project
 - 3.8.3 5G Work Program & Other Work
- 3.9 ONF (Open Networking Foundation) & ON.Lab (Open Networking Lab)
 - 3.9.1 CORD (Central Office Re-Architected as a Datacenter)
 - 3.9.2 M-CORD (M-Central Office Re-Architected as a Datacenter)
- 3.10 OSA (OpenAirInterface Software Alliance)
 - 3.10.1 LTE vRAN Implementation
- 3.11 SCF (Small Cell Forum)
 - 3.11.1 Release 8: Small Cell Virtualization
 - 3.11.2 Release 9: Network Densification and Evolution to 5G
- 3.12 TIP (Telecom Infra Project)
 - 3.12.1 OpenCellular Wireless Access Design Platform
 - 3.12.2 Solutions Integration Unbundled RAN Architecture
 - 3.12.3 vRAN Fronthaul
 - 3.12.4 Open Optical Packet Transport & Other Projects
- 3.13 xRAN Consortium
 - 3.13.1 Standardization for Software-Based RAN

4 CHAPTER 4: C-RAN DEPLOYMENT MODELS & CASE STUDIES

4.1 Deployment Models



- 4.1.1 Localized
- 4.1.2 Enterprise & Indoor
- 4.1.3 Highly Centralized
- 4.1.4 Virtualized & Cloud RAN
- 4.2 Mobile Operator Case Studies
 - 4.2.1 America Movil Group
 - 4.2.2 AT&T
 - 4.2.3 BT Group
 - 4.2.4 China Mobile
 - 4.2.5 China Telecom
 - 4.2.6 China Unicom
 - 4.2.7 KDDI Corporation
 - 4.2.8 KPN
 - 4.2.9 KT Corporation
 - 4.2.10 LG Uplus
 - 4.2.11 MegaFon
 - 4.2.12 NTT DoCoMo
 - 4.2.13 Orange
 - 4.2.14 SK Telecom
 - 4.2.15 SoftBank Group & Sprint Corporation
 - 4.2.16 Telefonica Group
 - 4.2.17 Telenor Group
 - 4.2.18 Telus Corporation
 - 4.2.19 TIM (Telecom Italia Mobile)
 - 4.2.20 Verizon Communications
 - 4.2.21 Vodafone Group
 - 4.2.22 Zain Group

5 CHAPTER 5: INDUSTRY ROADMAP & VALUE CHAIN

- 5.1 Industry Roadmap
 - 5.1.1 2017 2020: Gaining Worldwide Traction
 - 5.1.2 2020 2025: The Cloud RAN Era Moving Towards RAN Virtualization
 - 5.1.3 2025 2030: Continued Investments with 5G Network Rollouts
- 5.2 Value Chain
 - 5.2.1 Enabling Technology Providers
 - 5.2.2 Radio Equipment Suppliers
 - 5.2.3 RAN Vendors
 - 5.2.4 Fronthaul Network Equipment Vendors



5.2.5 Mobile Operators

5.2.6 Test. Measurement & Performance Specialists

6 CHAPTER 6: KEY MARKET PLAYERS

- 6.1 3Roam
- **6.2 6WIND**
- 6.3 Accelink Technologies Corporation
- 6.4 Accelleran
- 6.5 Actelis Networks
- 6.6 ADLINK Technology
- 6.7 ADTRAN
- 6.8 ADVA Optical Networking
- 6.9 Advantech
- 6.10 Airspan Networks
- 6.11 Alpha Networks
- 6.12 Altiostar Networks
- 6.13 Amarisoft
- 6.14 Anritsu Corporation
- 6.15 APRESIA Systems
- 6.16 Aquantia Corporation
- 6.17 Argela
- 6.18 Aricent
- 6.19 ARM Holdings
- 6.20 ARRIS International
- 6.21 Artemis Networks
- 6.22 Artesyn Embedded Technologies
- 6.23 Artiza Networks
- **6.24 ASOCS**
- 6.25 ASTRI (Hong Kong Applied Science and Technology Research Institute)
- 6.26 Aviat Networks
- 6.27 Azcom Technology
- 6.28 Baicells Technologies
- 6.29 Benetel
- 6.30 Blu Wireless Technology
- 6.31 BluWan
- 6.32 Boomsense/Bangxun Technology
- 6.33 BridgeWave Communications
- 6.34 Broadcom



- 6.35 CableFree (Wireless Excellence)
- 6.36 Cadence Design Systems
- 6.37 Calix
- 6.38 Cambium Networks
- 6.39 Casa Systems
- 6.40 Cavium
- 6.41 CBNL (Cambridge Broadband Networks Ltd.)
- 6.42 CCI (Communication Components. Inc.)
- 6.43 CCS (Cambridge Communication Systems)
- 6.44 cellXica
- 6.45 Ceragon Networks
- 6.46 CEVA
- 6.47 Ciena Corporation
- 6.48 Cisco Systems
- 6.49 Clavister
- 6.50 Cobham Wireless
- 6.51 Coherent Logix
- 6.52 Collision Communications
- 6.53 Comcores
- 6.54 CommAgility
- 6.55 CommScope
- 6.56 Contela
- 6.57 Corecess
- 6.58 Coriant
- 6.59 Corning
- 6.60 Dali Wireless
- 6.61 DASAN Zhone Solutions
- 6.62 Datang Mobile
- 6.63 Dell Technologies
- 6.64 DragonWave
- 6.65 eASIC Corporation
- 6.66 E-Band Communications
- 6.67 EBlink
- 6.68 ECI Telecom
- 6.69 Ekinops
- 6.70 ELVA-1
- 6.71 Eoptolink Technology
- 6.72 Ericsson
- 6.73 Ethernity Networks



- 6.74 ETRI (Electronics & Telecommunications Research Institute. South Korea)
- 6.75 Exalt Wireless
- 6.76 EXFO
- 6.77 ExteNet Systems
- 6.78 Extreme Networks
- 6.79 Facebook
- 6.80 Fairwaves
- 6.81 Faraday Technology Corporation
- 6.82 FastBack Networks
- 6.83 FiberHome Technologies
- 6.84 FibroLan
- 6.85 Finisar Corporation
- 6.86 Flex Logix Technologies
- 6.87 Foxconn Interconnect Technology
- 6.88 Fraunhofer FOKUS (Institute for Open Communication Systems)
- 6.89 Fraunhofer HHI (Heinrich Hertz Institute)
- 6.90 Frog Cellsat
- 6.91 Fujian Sunnada Network Technology
- 6.92 Fujitsu
- 6.93 Furukawa Electric Group
- 6.94 GigaLight
- 6.95 GlobalFoundaries
- 6.96 Google
- 6.97 HCL Technologies
- 6.98 HFR
- 6.99 Hisense
- 6.100 Hitachi
- 6.101 HPE (Hewlett Packard Enterprise)
- 6.102 Huahuan
- 6.103 Huawei
- 6.104 HUBER+SUHNER
- 6.105 HXI
- 6.106 IBM Corporation
- 6.107 IDT (Integrated Device Technology)
- 6.108 Imec International
- 6.109 InCoax
- 6.110 Infineon Technologies
- 6.111 Infinera
- 6.112 InfiNet Wireless



- 6.113 InnoLight Technology
- 6.114 Intel Corporation
- 6.115 InterDigital
- 6.116 Intracom Telecom
- 6.117 IP Light
- 6.118 ip.access
- **6.119 IPITEK**
- 6.120 Iskratel
- 6.121 IS-Wireless
- 6.122 ITRI (Industrial Technology Research Institute. Taiwan)
- 6.123 JMA Wireless
- 6.124 JRC (Japan Radio Company)
- 6.125 Juni Global
- 6.126 Kathrein-Werke KG
- 6.127 KEYMILE
- 6.128 Keysight Technologies
- 6.129 Kisan Telecom
- 6.130 KMW
- 6.131 Lattice Semiconductor
- 6.132 LightPointe Communications
- 6.133 Lindsay Broadband
- 6.134 Loea Corporation
- 6.135 Lumentum
- 6.136 Luminate Wireless
- 6.137 MACOM Technology Solutions Holdings
- 6.138 Maja Systems
- 6.139 Maven Wireless
- 6.140 Mavenir Systems
- 6.141 MAX4G
- 6.142 MaxLinear
- 6.143 Mellanox Technologies
- 6.144 Microsemi Corporation
- 6.145 Microwave Networks
- 6.146 MIMOtech
- 6.147 Mitsubishi Electric Corporation
- 6.148 Mobiveil
- 6.149 Molex
- 6.15 Moseley Associates
- 6.151 MRV Communications



- 6.152 MTI (Microelectronics Technology. Inc.)
- 6.153 N.A.T.
- 6.154 Nash Technologies
- 6.155 NEC Corporation
- 6.156 Netonomics
- 6.157 NETSCOUT Systems
- 6.158 New Postcom Equipment
- 6.159 Nexcomm Systems
- 6.16 NexxCom Wireless
- 6.161 Node-H
- 6.162 Nokia Networks
- 6.163 NuRAN Wireless
- 6.164 NXP Semiconductors
- 6.165 Octasic
- 6.166 OE Solutions
- 6.167 Omnitron Systems
- 6.168 OneAccess Networks
- 6.169 Parallel Wireless
- 6.17 Peraso Technologies
- 6.171 Phluido
- 6.172 PMN (Private Mobile Networks)
- 6.173 Polewall
- 6.174 Potevio
- 6.175 Proxim Wireless Corporation
- 6.176 Qualcomm
- 6.177 Qucell
- 6.178 Qwilt
- 6.179 RACOM
- 6.18 RAD Data Communications
- 6.181 Radisys Corporation
- **6.182 RADWIN**
- 6.183 Raisecom
- 6.184 Range Networks
- 6.185 Red Hat
- 6.186 Redline Communications
- 6.187 REMEC Broadband Wireless Networks
- 6.188 Saguna Networks
- 6.189 SAI Technology
- 6.19 Samji Electronics



- 6.191 Samsung Electronics
- 6.192 Sarokal Test Systems
- 6.193 SerComm Corporation
- 6.194 SIAE Microelectronica
- 6.195 Siklu Communication
- 6.196 Sistelbanda
- 6.197 SITRONICS
- 6.198 SK Telesys
- 6.199 SkyFiber
- 6.2 Solectek Corporation
- 6.201 SOLiD
- 6.202 Sooktha
- 6.203 Source Photonics
- 6.204 Spectronite
- 6.205 SpiderCloud Wireless
- 6.206 SRS (Software Radio Systems)
- 6.207 Star Solutions
- 6.208 Sumitomo Electric Industries
- 6.209 Sunwave Solutions
- 6.21 Tarana Wireless
- 6.211 Tata Elxsi
- 6.212 TEKTELIC Communications
- 6.213 Telco Systems
- 6.214 Tellabs
- 6.215 Tellion
- 6.216 Telrad Networks
- 6.217 TI (Texas Instruments)
- 6.218 Trango Systems
- 6.219 Transition Networks
- 6.22 Ubiquoss
- 6.221 UTStarcom
- 6.222 Vanu
- 6.223 Viavi Solutions
- 6.224 VMware
- 6.225 Vubiq Networks
- 6.226 Wave1
- 6.227 WiPro
- 6.228 Xelic
- 6.229 Xilinx



6.23 ZTE

7 CHAPTER 7: MARKET ANALYSIS & FORECASTS

- 7.1 Global Outlook for C-RAN Investments
- 7.2 Segmentation by Air Interface Technology
 - 7.2.1 3G & LTE
 - 7.2.2 5G NR (New Radio)
- 7.3 Segmentation by Network Architecture
 - 7.3.1 Non-Virtualized C-RAN
 - 7.3.2 vRAN/Cloud RAN
- 7.4 Segmentation by Submarket
 - 7.4.1 RRHs
 - 7.4.2 RRH Segmentation by Air Interface Technology
 - 7.4.2.1 3G & LTE
 - 7.4.2.2 5G NR
 - 7.4.3 RRH Segmentation by Deployment Model
 - 7.4.3.1 Indoor
 - 7.4.3.2 Outdoor
 - 7.4.4 RRH Segmentation by Cell Size
 - 7.4.4.1 Small Cells
 - 7.4.4.2 Macrocells
 - 7.4.5 BBUs
 - 7.4.6 BBU Segmentation by Air Interface Technology
 - 7.4.6.1 3G & LTE
 - 7.4.6.2 5G NR
 - 7.4.7 Fronthaul
 - 7.4.8 Fronthaul Segmentation by Transport Network Technology
 - 7.4.8.1 Dedicated Fiber
 - 7.4.8.2 WDM
 - 7.4.8.3 OTN & PON
 - 7.4.8.4 Ethernet
 - 7.4.8.5 Microwave
 - 7.4.8.6 Millimeter Wave
 - 7.4.8.7 G.Fast & Others
- 7.5 Segmentation by Region
 - 7.5.1 RRHs
 - 7.5.2 BBUs
 - 7.5.3 Fronthaul



- 7.6 Asia Pacific
 - 7.6.1 RRHs
 - 7.6.2 BBUs
 - 7.6.3 Fronthaul
- 7.7 Eastern Europe
 - 7.7.1 RRHs
 - 7.7.2 BBUs
 - 7.7.3 Fronthaul
- 7.8 Latin & Central America
 - 7.8.1 RRHs
 - 7.8.2 BBUs
 - 7.8.3 Fronthaul
- 7.9 Middle East & Africa
 - 7.9.1 RRHs
 - 7.9.2 BBUs
 - 7.9.3 Fronthaul
- 7.1 North America
 - 7.10.1 RRHs
 - 7.10.2 BBUs
- 7.10.3 Fronthaul
- 7.11 Western Europe
 - 7.11.1 RRHs
 - 7.11.2 BBUs
 - 7.11.3 Fronthaul

8 CHAPTER 8: CONCLUSION & STRATEGIC RECOMMENDATIONS

- 8.1 Why is the Market Poised to Grow?
- 8.2 Competitive Industry Landscape: Acquisitions. Alliances & Consolidation
- 8.3 Setting the Foundation for 5G NR (New Radio) Upgrades
- 8.4 Integration with MEC (Mobile Edge Computing)
- 8.5 Towards a User Centric RAN Architecture
- 8.6 RAN Disaggregation: Blurring the Lines Between Small Cells and C-RAN
- 8.7 The Emergence of Enterprise RAN Platforms
- 8.8 Prospects of Cloud RAN
- 8.9 RANaaS (RAN-as-a-Service): Envisioning the Future of C-RAN
- 8.1 Enabling RAN Slicing
- 8.11 What is the Cost Savings Potential of C-RAN?
- 8.12 Geographic Outlook: Which Countries Offer the Highest Growth Potential?



- 8.13 Which Submarket will Lead the Market?
- 8.14 Strategic Recommendations
 - 8.14.1 C-RAN Solution Providers
 - 8.14.2 Mobile Operators



List Of Figures

LIST OF FIGURES

Figure 1: C-RAN Architecture

Figure 2: Key Characteristics of Small Cells

Figure 3: Key RRH & BBU Functions

Figure 4: RAN Functional Split Options

Figure 5: Examples of Maximum Required Bitrate on a Fronthaul Link for Possible PHY-

RF Split

Figure 6: Performance Comparison of RAN Functional Split Options

Figure 7: CPRI Protocol Layers

Figure 8: vRAN Architecture

Figure 9: Cloud RAN Concept

Figure 10: Annual Global Throughput of Mobile Network Data Traffic by Region: 2017 –

2030 (Exabytes)

Figure 11: ETSI NFV Architecture

Figure 12: M-CORD Focus Areas

Figure 13: Small Cell Forum's Release Publication Process

Figure 14: nFAPI Interfaces

Figure 15: Localized C-RAN Deployment Model

Figure 16: Enterprise C-RAN Deployment Model

Figure 17: China Mobile's Cloud RAN Vision

Figure 18: NTT DoCoMo's Advanced C-RAN Architecture

Figure 19: Orange's Vision of C-RAN Fronthaul Implementation

Figure 20: SK Telecom's SDRAN (Software Defined RAN) Architecture

Figure 21: SoftBank's Virtualized Small Cell Trial

Figure 22: C-RAN Industry Roadmap

Figure 23: C-RAN Value Chain

Figure 24: Global C-RAN Revenue: 2017 – 2030 (\$ Million)

Figure 25: Global C-RAN RRH & BBU Revenue by Air Interface Technology: 2017 -

2030 (\$ Million)

Figure 26: Global C-RAN RRH & BBU Revenue in 3G & LTE Networks: 2017 - 2030 (\$

Million)

Figure 27: Global C-RAN RRH & BBU Revenue in 5G NR Networks: 2017 - 2030 (\$

Million)

Figure 28: Global C-RAN RRH & BBU Revenue by Network Architecture: 2017 – 2030

(\$ Million)

Figure 29: Global Non-Virtualized C-RAN Revenue: 2017 – 2030 (\$ Million)



- Figure 30: Global vRAN/Cloud RAN Revenue: 2017 2030 (\$ Million)
- Figure 31: Global C-RAN Revenue by Submarket: 2017 2030 (\$ Million)
- Figure 32: Global RRH Unit Shipments: 2017 2030 (Thousands of Units)
- Figure 33: Global RRH Unit Shipment Revenue: 2017 2030 (\$ Million)
- Figure 34: Global RRH Unit Shipments by Air Interface Technology: 2017 2030 (Thousands of Units)
- Figure 35: Global RRH Unit Shipment Revenue by Air Interface Technology: 2017 2030 (\$ Million)
- Figure 36: Global 3G & LTE RRH Unit Shipments: 2017 2030 (Thousands of Units)
- Figure 37: Global 3G & LTE RRH Unit Shipment Revenue: 2017 2030 (\$ Million)
- Figure 38: Global 5G NR RRH Unit Shipments: 2017 2030 (Thousands of Units)
- Figure 39: Global 5G NR RRH Unit Shipment Revenue: 2017 2030 (\$ Million)
- Figure 40: Global RRH Unit Shipments by Deployment Model: 2017 2030 (Thousands of Units)
- Figure 41: Global RRH Unit Shipment Revenue by Deployment Model: 2017 2030 (\$ Million)
- Figure 42: Global Indoor RRH Unit Shipments: 2017 2030 (Thousands of Units)
- Figure 43: Global Indoor RRH Unit Shipment Revenue: 2017 2030 (\$ Million)
- Figure 44: Global Outdoor RRH Unit Shipments: 2017 2030 (Thousands of Units)
- Figure 45: Global Outdoor RRH Unit Shipment Revenue: 2017 2030 (\$ Million)
- Figure 46: Global RRH Unit Shipments by Cell Size: 2017 2030 (Thousands of Units)
- Figure 47: Global RRH Unit Shipment Revenue by Cell Size: 2017 2030 (\$ Million)
- Figure 48: Global Small Cell RRH Unit Shipments: 2017 2030 (Thousands of Units)
- Figure 49: Global Small Cell RRH Unit Shipment Revenue: 2017 2030 (\$ Million)
- Figure 50: Global Macrocell RRH Unit Shipments: 2017 2030 (Thousands of Units)
- Figure 51: Global Macrocell RRH Unit Shipment Revenue: 2017 2030 (\$ Million)
- Figure 52: Global C-RAN BBU Shipments: 2017 2030 (Thousands of Units)
- Figure 53: Global C-RAN BBU Shipment Revenue: 2017 2030 (\$ Million)
- Figure 54: Global C-RAN BBU Shipments by Air Interface Technology: 2017 2030 (Thousands of Units)
- Figure 55: Global C-RAN BBU Shipment Revenue by Air Interface Technology: 2017 2030 (\$ Million)
- Figure 56: Global 3G & LTE C-RAN BBU Shipments: 2017 2030 (Thousands of Units)
- Figure 57: Global 3G & LTE C-RAN BBU Shipment Revenue: 2017 2030 (\$ Million)
- Figure 58: Global 5G NR C-RAN BBU Shipments: 2019 2030 (Thousands of Units)
- Figure 59: Global 5G NR C-RAN BBU Shipment Revenue: 2019 2030 (\$ Million)
- Figure 60: Global Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 61: Global Fronthaul Revenue by Transport Network Technology: 2017 2030 (\$ Million)



- Figure 62: Global Dedicated Fiber Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 63: Global WDM Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 64: Global OTN & PON Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 65: Global Ethernet Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 66: Global Microwave Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 67: Global Millimeter Wave Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 68: Global G.Fast & Other Technologies Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 69: C-RAN Revenue by Region: 2017 2030 (\$ Million)
- Figure 70: RRH Unit Shipments by Region: 2017 2030 (Thousands of Units)
- Figure 71: RRH Unit Shipment Revenue by Region: 2017 2030 (\$ Million)
- Figure 72: C-RAN BBU Shipments by Region: 2017 2030 (Thousands of Units)
- Figure 73: C-RAN BBU Shipment Revenue by Region: 2017 2030 (\$ Million)
- Figure 74: Fronthaul Revenue by Region: 2017 2030 (\$ Million)
- Figure 75: Asia Pacific C-RAN Revenue: 2017 2030 (\$ Million)
- Figure 76: Asia Pacific RRH Unit Shipments: 2017 2030 (Thousands of Units)
- Figure 77: Asia Pacific RRH (Remote Radio Head) Unit Shipment Revenue: 2017 2030 (\$ Million)
- Figure 78: Asia Pacific C-RAN BBU Shipments: 2017 2030 (Thousands of Units)
- Figure 79: Asia Pacific C-RAN BBU Shipment Revenue: 2017 2030 (\$ Million)
- Figure 80: Asia Pacific Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 81: Eastern Europe C-RAN Revenue: 2017 2030 (\$ Million)
- Figure 82: Eastern Europe RRH Unit Shipments: 2017 2030 (Thousands of Units)
- Figure 83: Eastern Europe RRH Unit Shipment Revenue: 2017 2030 (\$ Million)
- Figure 84: Eastern Europe C-RAN BBU Shipments: 2017 2030 (Thousands of Units)
- Figure 85: Eastern Europe C-RAN BBU Shipment Revenue: 2017 2030 (\$ Million)
- Figure 86: Eastern Europe Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 87: Latin & Central America C-RAN Revenue: 2017 2030 (\$ Million)
- Figure 88: Latin & Central America RRH Unit Shipments: 2017 2030 (Thousands of Units)
- Figure 89: Latin & Central America RRH Unit Shipment Revenue: 2017 2030 (\$ Million)
- Figure 90: Latin & Central America C-RAN BBU Shipments: 2017 2030 (Thousands of Units)
- Figure 91: Latin & Central America C-RAN BBU Shipment Revenue: 2017 2030 (\$ Million)
- Figure 92: Latin & Central America Fronthaul Revenue: 2017 2030 (\$ Million)
- Figure 93: Middle East & Africa C-RAN Revenue: 2017 2030 (\$ Million)
- Figure 94: Middle East & Africa RRH Unit Shipments: 2017 2030 (Thousands of Units)



Figure 95: Middle East & Africa RRH Unit Shipment Revenue: 2017 – 2030 (\$ Million)

Figure 96: Middle East & Africa C-RAN BBU Shipments: 2017 – 2030 (Thousands of Units)

Figure 97: Middle East & Africa C-RAN BBU Shipment Revenue: 2017 – 2030 (\$ Million)

Figure 98: Middle East & Africa Fronthaul Revenue: 2017 – 2030 (\$ Million)

Figure 99: North America C-RAN Revenue: 2017 – 2030 (\$ Million)

Figure 100: North America RRH Unit Shipments: 2017 – 2030 (Thousands of Units)

Figure 101: North America RRH Unit Shipment Revenue: 2017 – 2030 (\$ Million)

Figure 102: North America C-RAN BBU Shipments: 2017 – 2030 (Thousands of Units)

Figure 103: North America C-RAN BBU Shipment Revenue: 2017 – 2030 (\$ Million)

Figure 104: North America Fronthaul Revenue: 2017 – 2030 (\$ Million)

Figure 105: Western Europe C-RAN Revenue: 2017 – 2030 (\$ Million)

Figure 106: Western Europe RRH Unit Shipments: 2017 – 2030 (Thousands of Units)

Figure 107: Western Europe RRH Unit Shipment Revenue: 2017 – 2030 (\$ Million)

Figure 108: Western Europe C-RAN BBU Shipments: 2017 – 2030 (Thousands of Units)

Figure 109: Western Europe C-RAN BBU Shipment Revenue: 2017 – 2030 (\$ Million)

Figure 110: Western Europe Fronthaul Revenue: 2017 – 2030 (\$ Million)

Figure 111: Global Enterprise RAN Investments: 2017 – 2030 (\$ Million)

Figure 112: Distribution of C-RAN Investments by Network Architecture: 2020 (%)

Figure 113: Conceptual Architecture for Network Slicing in Mobile Networks

Figure 114: TCO Comparison Between Conventional RAN. C-RAN and Cloud RAN Architectures (\$ per GB)

Figure 115: Global C-RAN Spending Breakdown by Submarket: 2020 (%)



I would like to order

Product name: The C-RAN (Centralized Radio Access Network) Ecosystem: 2017 - 2030 -

Opportunities, Challenges, Strategies & Forecasts

Product link: https://marketpublishers.com/r/C57D3FDFEF6EN.html

Price: US\$ 2,500.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer

Service:

info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page https://marketpublishers.com/r/C57D3FDFEF6EN.html