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Town of Palm Beach – RTN No. 2024-18

Prepared for: Town of Palm Beach
Proposal submitted by: Crown Castle Fiber LLC

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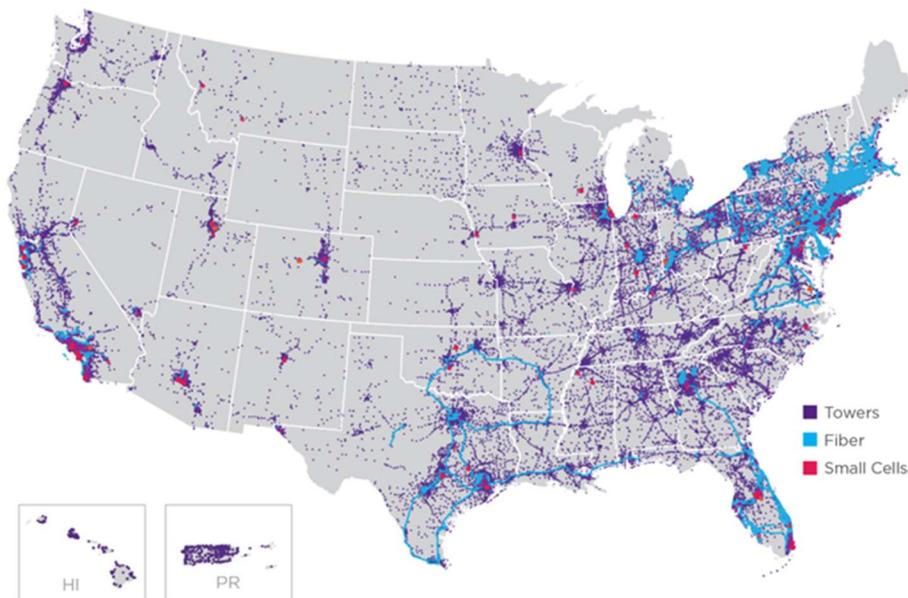
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Experience of Firm & Personnel/Ability of Personnel/Past Performance

Company Profile

Crown Castle Fiber LLC, the bidding entity, is a wholly-owned subsidiary of Crown Castle Inc., an S&P 500 company dedicated to the long-term ownership and operation of communications infrastructure. Crown Castle owns and operates approximately 40,000 cell towers, 125,000 small cells, 40,000 On-net building, and more than 85,000 route miles of fiber, supporting data solutions across major US markets. Our nationwide portfolio of communications infrastructure connects cities and communities to essential data, technology and wireless service – bringing information, ideas and innovations to the people and businesses that need them. Custom applications all demand a highly reliable network and Crown Castle delivers just that: a carrier-grade nationwide network that provides scalability, high availability, security, and performance backed by service levels.

ASSET PORTFOLIO FOOTPRINT



Company Experience

Crown Castle is a fiber solutions provider with nearly a 25-year history of owning and operating communications infrastructure across the country. With over 4,500 employees, we work closely with our customers to build a solution that allows them to run their organizations today, while setting the stage for tomorrow's transformative innovations. Through organic growth, strategic mergers and acquisitions, and an unwavering commitment to customer support and satisfaction, Crown Castle has positioned itself as a top provider of mission critical networking and broadband services utilizing end-to-end fiber connectivity.

Crown Castle's network also offers unparalleled local density and route diversity. Crown Castle is also proud to be one of the only fiber providers that can operate in the power space and diverse power line routes throughout most of our footprint. This makes it possible for customers to have diverse routing for their mission critical services. Crown Castle offers customers a complete suite of fiber-based networking solutions including

Dark Fiber, Wavelengths, Ethernet, Internet Access, Managed Services, SD-WAN, DDOS, Video, Collocation, and Cloud Based Services. We also provide Small Cell, DAS, Fixed Wireless, and CBRS solutions.

We partner with WISP's, Service Providers & Mobile Carriers, Technology Companies, Enterprises & Corporations, Schools & Universities, Governments, and Communities to deploy unique infrastructure solutions. As more devices require connectivity and advancements like 5G and IOT are deployed, Crown Castle provides the infrastructure that makes these and the transformative technologies of tomorrow possible.

Crown Castle is committed to providing exceptional support and care to customers while ensuring industry-leading levels of service and reliability for their networks. At a time when the fiber industry is going through great changes, we're committed to be a dependable, stable partner you can rely on today and in the future. Since we own our fiber network, we're directly invested in its integrity and are able to provide better response times and problem resolution. We also continue to receive high reviews for operations and customer support.

Your District, Our Expertise

Today's modern classrooms and libraries use advanced technologies and applications that require high-performing data network solutions. As a long-standing E-rate partner across major US markets and connectivity to more than 600 school districts and libraries, we have a depth of experience and expertise you can count on. With a broad portfolio of lit and dark fiber solutions, we're in a unique position to help you design the network you need today and the network you will need tomorrow.

Why Crown Castle?

Expertise:

- We're a nationwide service provider as well as a certified E-rate provider with experience implementing and managing both lit and dark fiber solutions.

Consultation:

- We take the time to carefully consider all your needs and deliver a solution that meets your business requirements and opens new opportunities.

Service:

- We have locally based service teams who are available to you whenever you need them, and with our around-the-clock Network Operations Center, you can be sure your network will always be in good hands.

Streamlined solution:

- With a single point of contact, you'll always know who to reach out to for all your network needs.

E-Rate Expertise

E-rate, the schools and libraries Universal Service support mechanism, provides discounts to assist eligible schools and libraries in the United States in obtaining affordable telecommunications and internet access solutions. With participation in the E-rate program for nearly 25 years and dedicated E-rate personnel, we are experts in the field and provide seamless support to customers who participate in the program. One of Crown Castle’s prime missions is to provide fiber-based WAN services for academic institutions through the E-rate program. Crown Castle currently serves over 600 educational institutions and is among the top 10 service providers across the country for E-rate funding.

Bidding entity: Crown Castle Fiber LLC
SPIN (498 ID) #143005274
FCCRN #0006-2544-03

Green Light Status



Commission Registration System (CORES)

Associate Username to FRN
 | Manage Existing
 FRNs & FRN Financial
 Register New FRN | Reset
 FRN Password
 | Search for FRN

FCC Registration

[FCC > FCC Registration > Manage Existing FRNs > FRN Financial](#)

Logged In As: [puc.correspondence@crowncastle.com](#) | [Logout](#)

FRN Financial

[Manage FRNs](#)

FRN Financial

Show 10 entries

Search:

FRN	FRN Name	Red Light Status	Action
0006254403	Crown Castle Fiber LLC	Green Light	View/Make Payments

Showing 1 to 1 of 1 entries

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Evidence of filed 473 SPAC Form

SPIN	Service Provider Name	Doing Business As	Status	Contact Name	Email	Phone	Spac Filed (FCC Form 473)
143005274	Crown Castle Fiber LLC	fka Lighttower Fiber Networks II, LLC	Active	Elzbieta Ciszewski	Elzbieta.Ciszewski@crowncastle.com	978-264-6004	1998,1999,2000,2001,2002,2003,2004,2005,2006,2007,2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020,2021,2022,2023

References

- **The School Board of Palm Beach County Florida**
Michael Sims, IT Infrastructure Manager - Network & Security
T: (561) 577-8702 | E: michael.sims@palmbeachschools.org
3300 Forest Hill Blvd.
West Palm Beach, FL 33406
DIA - Provide 2 x 50Gbps Diverse Internet Access. A total of 235 campuses served. Project Duration was between July 2022 and estimated completion in July 2025.
- **Nicklaus Children's Hospital**
Luis Encinosa, Director Network Systems Information Technology
T: (786) 856-2049 | E: Luis.Encinosa@nicklaushealth.org
3100 SW 62nd Avenue
Miami, FL 33155
DIA & Ethernet - Provide 2 x 10Gbps Dedicated Internet Access and 24 Site ELAN. Contract Project dates July 2022 to July 2025
- **City of Fort Lauderdale**
Tamecka McKay, Chief Information Officer
1901 W Cypress Creek Rd,
Ft. Lauderdale, Florida, 33309
T: (954) 828 - 3525 | M: (954) 818 -7637 | E: tmckay@fortlauderdale.gov
Dark fiber, Ethernet LAN, Ethernet point to point, internet and cloud connect.
- **City Of Riviera Beach**
Chris Gay, Chief Information Officer or Tim Jackson, IT Network
T: (561) 845- 4028 | E: Cgay@rivierabeach.org | E: tjackson@rivierabeach.org
600 W Blue Heron Blvd
Riviera Beach, Florida 33404
Dedicated Internet Access and an ELAN network. A total of 15 circuits – supply them with their main network.
- **Palm Beach County Sheriff's Office**
Dale Sisson, Bureau Director of Information Technology
E: sissond@pbso.org
3228 Gun Club Road
West Palm Beach, Florida 33406
DIA, DDoS, Ethernet, Wavelength & Dark Fiber.

Account Management

The Crown Castle team provides dedicated support for the proposed solution from Point of Sale through Implementation. We work hard to design solutions that not only meet today’s needs, but also provide scalability for tomorrow’s transformative innovations. Here in Florida and across the nation, our customers include:

- Schools and Universities
- Federal, State, and Local Governments
- Enterprises and Corporations
- Wireless Service Providers
- Carriers

Sales

Francine Resnick Margolis - Commercial Account Executive
Chris Carr- Manger Fiber Enterprise Sales
Jose Montes de Oca- Director Fiber Enterprise Sales
Lonnie Maier - Managing Director Fiber Sales
Dave Hurwitz - VP National Enterprise Sales
Scott Dalrymple - Business Development Manager Government, Education & Medical
Stacy Mountain - VP Government, Education & Medical

Engineering

Zenon Cespedes - Sr Sales Engineer
Michael Piazzisi- Sales Engineering Director
Paul Smith - Sales Engineering Managing Director
Jake Dacey - VP Sales Engineering

Client Services

Alexandra Johnson- Client Services Manager
Alexandra Quinn- Sr Manager Network Client Services
Dale Kammerich – Director Network Client Services
David Fagan - VP Sales Operations

Service Management

Janet Valencia - Regional Manager
Joe Seles - Director Project Delivery
Rick Perkins – VP Regional Implementation & Operations

Additionally, Crown Castle has a Florida team of qualified technicians and engineers to install, test, and troubleshoot circuits and services.

Organizational Chart

Credentials of Personnel Assigned to the Town

Chris Carr- Manger Fiber Enterprise Sales

- Chris started his career in telecommunications in 2007. Over the past seventeen years, all with Crown Castle, he has worked in Marketing Research, Wholesale & Enterprise Sales and Sales Management capacities. Originally, from the Northeast, Chris has spent the past three years in the South Florida market. For much of his career, his focus has been in Fiber Network Infrastructure – Internet, Ethernet, DWDM & Dark Fiber. However, over the past five years he has expanded his proficiency with Crown Castle’s Managed Solutions Portfolio, including SD-WAN, SASE & Security.

Scott Dalrymple - Business Development Manager Government, Education & Medical

- Mr. Dalrymple began his career in telecommunications in 1997. Throughout his career, he has developed expertise in wide area networks, metro access networks, terrestrial long haul, submarine cable systems, and wireless networks. From domestic and international Project/Program Management to Strategic Planning to Business Development, Mr. Dalrymple has enjoyed learning about every transport environment. The last five years he has focused on business development for K-12 customers in Texas up to the Great Lakes. Addressing customer requirements with rich, fiber-based, secure and highly scalable wide area networks leveraging E-rate dollars is his primary focus but also provides solutions to growing demands for internet services including dedicated internet access, direct cloud connectivity, Distributed Denial of Service (DDoS) and peering. Mr. Dalrymple

Francine Resnick Margolis, Senior Commercial Account Executive

- Francine Resnick Margolis is a Senior Account Executive for Crown Castle Fiber in the South Florida area. In this role, Francine is the local advocate and the direct point person for customizing enterprise solutions, while building and maintaining relationships. Francine has been working with Enterprise Customers at Crown Castle for almost 4 years as an Account Executive, also retired after working 22 years with AT&T as Lead Account Executive III working with South Florida and national accounts.

Zenon Gabriel Cespedes - Sr Sales Engineer

- Gabriel Cespedes joined Crown Castle Fiber in 2015. In his current role at Crown Castle Fiber, Gabriel is responsible for the design and support of complex telecommunications networks in the enterprise and local government space. Gabriel has over 34 years of experience in the telecommunications industry. Prior to joining Crown Castle Fiber, Gabriel was employed by Sprint, TW Telecom/Level-3 and Telefonica Data USA as a Global Solutions Engineer. At Telefonica, Gabriel was responsible for the technical support of multi-national corporations. Gabriel graduated from the University of Miami in Coral Gables, with a Bachelor of Science Degree in Computer Engineering. He earned his Master’s in International Business from Nova Southeastern University. In addition, Gabriel holds various technology professional certifications such as MEF-CECP as well as technical degree in Satellite and microwaves communications.

Alexandra Johnson- Client Services Manager

- Alex has 5+ years with Crown Castle and 6+ years focused on exceptional customer experiences within different corporate sectors. Her early career experience included executing corporate events with a keen attention to detail. Alex obtained her bachelor’s degree from Florida Atlantic University.

Management’s Credentials

Dave Hurwitz - VP National Enterprise Sales

- Mr. Hurwitz has more than 34 years’ experience in the competitive telecommunications industry (including 12-years with the Company), encompassing business development, general and operating executive management, strategic sales and marketing initiatives, and M&A. In his current position, Mr. Hurwitz runs sales of Crown Castle’s Fiber Division across the entire organization. Prior to joining Crown Castle, Mr. Hurwitz served as Vice President of Wholesale Services at Frontier Communications Corporation which provided regulated and unregulated voice, data, and video services to residential, business, and wholesale customers in the United States. During the 4-years prior to joining Frontier, Mr. Hurwitz served as Chief Operating Officer at \$100MM NasdaqNM Yak Communications and President of Yak’s VoIP initiatives. Prior to joining Yak, Mr. Hurwitz co-founded an integrated communications provider focused on Internet-based private label systems and distribution of traditional voice, data and Internet services, Intandem Communications, that was acquired by Cognigen Networks, Inc. Prior to co-founding Intandem, Mr. Hurwitz served as President and Chief Operating Officer of Capsule Communications, Inc. (US WATS), a \$80M publicly traded local and long-distance carrier that was acquired by Covista Communications, formerly TotalTel. From 1995 to 1996, David served as EVP of Sales and Marketing of Commonwealth Long Distance and for RCN Corporation, when it acquired CLD. Before the position with Commonwealth, Mr. Hurwitz served as EVP and COO of Internet Communications Services, Inc. and as General Manager of FiberNet, Inc. from 1992 to 1999, affiliated entrepreneurial start-ups. From 1985 to 1992 Mr. Hurwitz held sales and sales management positions with RCI Long Distance, a subsidiary of Rochester Telephone, which became Frontier Corporation. Mr. Hurwitz has a BA from Hobart College. During his career, David has served on the Board of Directors for several communications companies and currently sits on the Board of Directors of The Hills of Northampton, Northampton, PA and Paradise Cove, Wildwood, NJ Home Owners Associations, and the Council Rock Lacrosse Association.

Lonnie Maier - Managing Director Fiber Sales

- Lonnie Maier is Head of Fiber Sales at Crown Castle Fiber, a leading telecommunications company with operations throughout the United States. In this role, Ms. Maier is responsible for the Southeast Region and the 1,600+ clients they serve. Prior to her appointment, she served as the Vice President of Enterprise Sales & Marketing for FPL FiberNet, where she had oversight of the company’s sales and marketing strategies for the business and public sector segments, since joining the company in 2010. Ms. Maier graduated from Nova Southeastern University with a Master’s in Business Administration, Entrepreneurship, and earned her undergraduate degree from Florida State University.

Jose Montes de Oca - Director Fiber Enterprise Sales

- Jose Montes de Oca is Director of Enterprise Sales at Crown Castle. Jose is responsible for the Florida Enterprise Sales Organization and the 1500+ customers that it serves. The Enterprise Fiber Division provides fiber based, data communications, solutions for organizations across a wide range of industries including healthcare, financial, government, education and professional services. Jose has been with Crown Castle since 2014 and previously worked for AT&T. His 20-year career in the

technology and telecommunications sector includes technical and sales leadership responsibilities with an emphasis on rolling out leading edge products to the marketplace. Jose earned his B.S. in Zoology, at the University of Florida.

Chris Carr- Manger Fiber Enterprise Sales

- Chris started his career in telecommunications in 2007. Over the past seventeen years, all with Crown Castle, he has worked in Marketing Research, Wholesale & Enterprise Sales and Sales Management capacities. Originally, from the Northeast, Chris has spent the past three years in the South Florida market. For much of his career, his focus has been in Fiber Network Infrastructure – Internet, Ethernet, DWDM & Dark Fiber. However, over the past five years he has expanded his proficiency with Crown Castle’s Managed Solutions Portfolio, including SD-WAN, SASE & Security.

Jake Dacey - VP Sales Engineering

- Jake Dacey is the Vice President of Sales Engineering. Mr. Dacey has over 25 years in the telecommunications industry, with 18 years in Sales Engineering leadership roles. Jake has spent over 20 years with legacy Crown companies including NEON, RCN Metro, Sidera and Lightower prior to Crown’s acquisition of Lightower in 2017. At Lightower he served as Vice President of Sales Engineering for the Wholesale and Wireless verticals. After the Crown acquisition, Jake continued his role as Head of Sales Engineering for Wholesale and Wireless before being promoted to Vice President of Sales Engineering in March of 2021. Jake has responsibility over all sales channels including Enterprise, National, Wholesale, Wireless, Government and Indirect. Jake’s prior experience also includes Account Management and Project Management roles at Boston Communications Group, Inc and NaviPath.

Paul Smith - Sales Engineering Managing Director

- Paul Smith is the Managing Director of Sales Engineering for the Central and Mid-Atlantic Regions. Mr. Smith has over 25 years in the telecommunications industry, with 10 years in Sales Engineering leadership roles. Paul has worked in internetworking solution design for large and small companies including Bell Atlantic, Yipes, Level3, Abovenet, and Zayo before joining Crown Castle in 2012. As a solution engineer and leader, Paul has designed and helped implement hundreds of networks utilizing technologies such as Frame Relay, ATM, Ethernet, IP, and DWDM for medium and large enterprises demanding high capacity, high availability, and scalability. Paul is a graduate of Computer Science from Temple University and lives in the Philadelphia area.

Michael Piazzisi- Sales Engineering Director

- Michael’s is responsible for all Sales Engineers in the South Region. This includes Florida, Georgia, Alabama, and Texas Crown Castle. Michael oversees costs, designs and approvals required to deliver Crown Castle networks and solutions. Michael has been in the Crown Castle family for 8+ years working as a Senior Sales Engineer and Manager. Previous he held roles at Comcast as a Sales Engineer in the GEM group and was also a Sales Engineer at Zayo. Michael’s 14 years in Sales Engineering is preceded by over 15 years of experience as and IT Director, Network Architect, Business Continuity Planner and Help Desk technician. Michael attended Southern Illinois University and Harper College while in the United States Marine Corps. When in the US Marine Corps he was trained as an electronics repair technician and is a Gulf War Veteran.

Alexandra Quinn- Sr Manager Network Client Services

- Alexandra Quinn is a Senior Manager of Network Client Services. Mrs. Quinn’s Telecommunication career has spanned over the last 7+ years with a focus on ERATE, Government, and Healthcare clients. Her role supports the New York Metro, NJ, and Southern regions. Client Services is dedicated to fostering client relationships with superior post install support including, but not limited to, contract renewals, billing precision, and network optimization initiatives.

Dale Kammerich – Director Network Client Services

- Dale Kammerich is Director of Network Client Services. Dale brings over 30 years of Telecommunications experience to Crown Castle, primarily in Sales, Customer Success leadership and General Management roles. Mr. Kammerich spent the prior 15 years with the same Company that was acquired, starting in 2006 with Xpedius Communications which was acquired by tw telecom, subsequently acquired by Level 3 Communications in 2014, then acquired by CenturyLink in 2017. Most recently, Dale held the position of Vice President of Customer Success for CenturyLink and led a large Organization of customer success professionals aligned to enterprise customers and responsible for post-sales lifecycle experience. Previously, Dale held positions as President, Indirect sales & Customer relationship management, General Manager, Regional Vice President sales and Systems Engineer. Dale’s experience also includes several years with two start-up Companies, Columbia cellular and Gabriel Communications and over 9 years in the Wireless industry with Ameritech.

Janet Valencia – Project Delivery Regional Manager

- Janet has been with Crown Castle for over 14 years and spent the previous 9 years as an Outside Plant Engineer at AT&T. Janet has her MBA from Nova Southeastern University and is based in Miami, Florida.

Joe Seles - Director Project Delivery

- Joseph has over 18 years of demonstrated success in formulating and executing upon operational initiatives that achieve organizational goals. He has an extensive background in project and budget ownership, complex problem solving, financial acumen, team leadership and employee development. Joseph has been with Crown Castle since 2015 and had previously spent over 10 years at Verizon.

Rick Perkins – VP Regional Implementation & Operations South Region

- Rick Perkins is the South Region lead for all Fiber Engineering Operations. In this role, Mr. Perkins is responsible for all implementation and maintenance of Crown Castle Fiber’s network assets that serve 1,600+ clients across the region. Prior to his appointment, he served as the Director of Service Delivery for FPL FiberNet, where he had oversight of all Project Management for customer network implementation since joining the company in 2001. Mr. Perkins graduated from Nova Southeastern University with a Master’s in Business Administration, and earned his undergraduate degree from Florida International University in Industrial and Systems Engineering.

Crown Castle Financial Summary

We are a wholly owned subsidiary of Crown Castle Inc., a Delaware corporation (“CCI”). CCI is an S&P 500 company and is a publicly traded company on the New York Stock Exchange (NYSE: CCI).

Key Financial Information about CCI:

- A Fortune 1000 company with approximately 4,800 employees nationwide
- Total assets of \$38.527 Billion as of December 31, 2023
- Net revenues of \$6.981 Billion for the year ending December 31, 2023; \$1.674 Billion for the quarter ending December 31, 2023
- Current market capitalization of approximately \$52 Billion

Crown Castle Inc. is publicly traded and subject to Sections 13 and 15(d) of the Securities Exchange Act of 1934. Annual reports on Form 10-K under SEC Filings, and Corporate Financial Statements under Earnings Materials can be found on the Crown Castle Investor Page at: <https://investor.crowncastle.com>

Detailed Technical Proposal

Crown Castle Fiber is recommending an Ethernet (E-LAN) Solution for the 12 locations of the Town of Palm Beach.

Crown Castle’s Ethernet Service

Crown Castle’s Ethernet services combine the reliability and ubiquity of Carrier Ethernet with next-generation metro area transport technology. The result is services that deliver an efficient, fully restorable, easily managed network that’s ready for any vertical or application requirement. Additionally, the natural flexibility of Carrier Ethernet allows you to decide the amount of bandwidth you need to support your applications within your budget now with the assurance that it can scale in the future. Crown Castle’s private diverse fiber backbone, along with protected access options, provides a robust solution set for your business continuity requirements. Our extensive Ethernet service footprint offers a total solution for businesses with a presence in multiple cities.

Crown Castle’s business Ethernet solutions include Metro-E Advanced Private Line (MAPL), E-Line, Ethernet Virtual Private Line (EVPL), and Ethernet Private LAN (E-LAN). With support for Layer 2 point-to-point, point-to-multipoint, and multipoint-to-multipoint topologies, Crown Castle enables you to seamlessly extend your Ethernet network from your building into the metro area and beyond. Crown Castle’s Metro-E Advanced Private Line does not traverse the Crown Castle switched network, making the service fully private from the equipment and fiber perspective. The EVCs/VLANs configuration can be easily adapted to match customer’s traffic pattern requirements as a Fully Mesh or Hub and Spoke topologies.

For this type of Ethernet services, Crown Castle will be implementing network devices with 10G port hand-off to meet 1G to 10G bandwidth requirements at each of the locations listed in the RFI and depicted in the network diagram. This network setup will give us the ability to provide different virtual topology options to meet customer’s traffic pattern/requirements.

Crown Castle’s Ethernet service includes:

- No protocol conversion is required, ensuring interoperability between LAN and MAN, simplifying installation & turn-up.
- Easier installation and management allow for rapid provisioning compared to other platforms.
- Flexible bandwidth allows you to grow as your business needs grow. Scalable for long term network evolution connectivity. Resilient, high availability core transport services for high reliability.
- Standards-based IEEE Ethernet service for Layer 2 transport.
- 802.1Q VLAN and 802.1 QinQ tunnelling supported.
- MEF 9 and MEF 14 certified technology

SPECIFICATION	METRO-E ADVANCED PRIVATE LINE	E-LINE	EVPL, E-LAN
Technology	Layer 2 Ethernet over private fiber	Layer 2 Ethernet over DWDM or fiber	Layer 2 Ethernet over MPLS or fiber
Throughput	1Gbps - 10Gbps	50Mbps - 100Gbps	10Mbps - 10Mbps
Interface	10 GigE	GigE or 10 GigE	GigE or 10 GigE
Framing	Jumbo Frames up to 9100	Jumbo Frames up to 9100	Jumbo Frames up to 9100
Network Management	24/7 monitoring and surveillance	24/7 monitoring and surveillance	24/7 monitoring and surveillance
Network Options	Metro configurations	Long-haul and metro configurations	Long-haul and metro configurations
Availability	Available at most on-net locations throughout the Crown Castle network	Available at most on-net locations throughout the Crown Castle network	Available at most on-net locations throughout the Crown Castle network
Architecture	Point-to-point	Point-to-point	Point-to-point, point-to-multipoint, multipoint-to-multipoint

The primary design goals for the Crown Castle network are Availability, Resiliency and Scalability. At the node level, Crown Castle is able to provide 99.99% availability by maximizing the use of redundant components and making spare components available that significantly reduce Meant Time to Repair (MTTR) any given node.

Crown Castle Ethernet aggregation POPs are always built in carrier hotels, data centers, LEC central offices, environmentally controlled huts/shelters, or other collocation facilities that meet a set of defined minimum requirements, including:

- Environmentally controlled spaces
- Diverse fiber routes
- Diverse points of entry
- Diverse DC power plants
- Generators

Crown Castle MPLS routers and switches at aggregation and core POPs are equipped with maximum hardware redundancy, including:

- A switched core architecture that provides resiliency and backbone efficiency
- Aggregation switches to help conserve ports on core routers
- Dual routing engines
- Redundant switch control boards
- Redundant power modules & Redundant fan trays

Network Diagram

Workload and Scheduling

Implementation Services Plan

Project Managers (PMs) are responsible for managing the delivery of services to Crown Castle customers. The PM role is comprised of four stages - Order Validation, Order Kickoff, Service Provisioning and Order Completion.

Project Managers (PMs) will:

- Coordinate and lead customer meetings, including customer kick-off calls and regularly scheduled customer status update calls.
- Manage the activities of internal Crown Castle operational and engineering groups to ensure proper planning, communications, and implementation of solutions.
- Communicate customer requirements to other project stake holders to achieve required results.
- Perform critical path analysis for projects to identify and manage all aspects of the service deployment and mitigate identified risks.
- Develop a relationship with the customer and serve as the primary point of contact for project status and deliverables.
- Resolve issues in a timely fashion as they present themselves during the project interval.
- Upon project completion ensure project documents are complete, accurate, and archived appropriately. Deliver all required customer turn-up documentation to identified point of contact.

Project Plan

Summarized below are the “key” milestones and activities that make up a significant portion of the implementation timeline for network installation. The plan below is flexible, and Crown Castle can adjust to meet the needs of the customer should you desire to meet with a project manager and other project team members more or less often.

“Key” milestones associated with the Project Plan:

Kickoff meeting: Once a signed contract is received, the designated project manager is assigned to the project and will schedule a kickoff meeting with all parties involved in the installation. Timelines and milestones will be discussed and agreed upon. Space and electrical requirements will be discussed for each individual site. Priority sites will be identified and receive precedence. Ongoing updates will be provided by the assigned project manager.

Aerial Network Extensions: This activity covers all required engineering, design, and documentation, the formal Right of Way and Municipal consent applications and approvals and the physical installation of the fiber optic cabling on utility infrastructure.

Building Entry Construction: Crown Castle will perform site surveys and document all engineering and construction work required to physically install the fiber optic network including outside conduit and inside extended wiring.

Splicing Termination and Testing: This activity takes place once construction of the aerial network and building entries are completed. Proposed WAN undergoes testing, acceptance and turn up.

Turn Over and Billing: Crown Castle will coordinate all testing of the network with the customer. Once the WAN is performing as contracted, Crown Castle will turn over the network to the customer and initialize billing.

Each of the above milestones includes numerous activities that will be completed by Crown Castle across the design/engineering and construction of the network:

System Design/Engineering

Crown Castle shall provide complete design services. These services include:

Fiber Route: The Fiber Route consists of all buildings, streets, poles, conduits and manholes used for routing connectivity. The routing includes:

- Overall Route Survey
- Trunk and Lateral Cabling Distances
- Pole & Span Measuring
- Conduit Evaluations
- Drafting and Strand Maps
- Ownership Submittals

Make Ready: Make Ready consists of all engineering and submittals for making the system compliant with the utilities guidelines for attaching or having fiber cable in the communications space. The make ready engineering specifies:

- Cable Clearances
- Utility Pole Replacement
- Conduit and Pole Permits

Service Entrance: Service Entrance Engineering determines where the service enters and terminates in a structure. The Service Entrance Engineering includes:

- Service Entrance Surveys
- Service Entrance Drawings

System Construction

Crown Castle shall provide all construction and make ready necessary to establish the service. The following procedures will be taken prior to installation:

- Develop a comprehensive overall design package
- Obtain all necessary permits
- Organize and direct pre-construction meetings
- Obtain all necessary insurance and bonding

Our service during the installation phase includes:

- Initial Project kick-off review meeting with the customers project staff
- Site visits with the customers project staff
- Contract schedule and equipment delivery monitoring
- Shop drawings and submittals review
- System design updates
- Make-ready pole work
- Demarcation extensions in each building to the predetermined equipment rack location
- System stranding and accessories
- Optical cabling and accessories to provide single mode fiber to each building
- Splicing
- Final system testing
- Power Meter
- OTDR

Loss Estimates: The Loss Estimates will be calculated based on the actual field conditions and will show the estimated loss and dispersion characteristics for each link. The calculations show:

- Fiber Optic Attenuation
- Fiber Optic Connector Loss
- Splice Loss
- Total Passive System Attenuation
- Chromatic Dispersion (ICB)

Test and Accept Example

At the completion of the Fiber Engineering and Provisioning tasks, Field Operations will be dispatched to complete the required Customer Premise Equipment (CPE) installation and RFC 2544 testing of the circuit (sample RFC testing below). Crown Castle’s dedicated Test and Turn Up group will work with Field Operations in the testing stages and with the customer for turn-up and acceptance.

Sample Test Results:

RFC 2544 Ethernet Test Report

Configuration Name	1g test
Customer	NYSE-Euronext
Technician	Adam Cohen
Location	777 Central Blvd
Comments	36244-et
Date	09/28/2012
Time Start	04:54:17 PM
Time End	05:09:46 PM
RFC 2544 Mode	Symmetric
Test Instrument Name	T-BERD/MTS5800
Serial Number	WMDF0100820045
Software Revision	BERT 3.0

RFC 2544 Ethernet Test Report

Test Set Setup

Termination	1GigE Layer 2 Traffic Term
Pause Advrt	Both
FDX Capable	Yes
HDX Capable	Yes
Framing	DIX
Encapsulation	None
Source Address	00:80:16:8A:69:90
Destination Address	00:80:16:8A:69:9D

Auto Negotiation Status

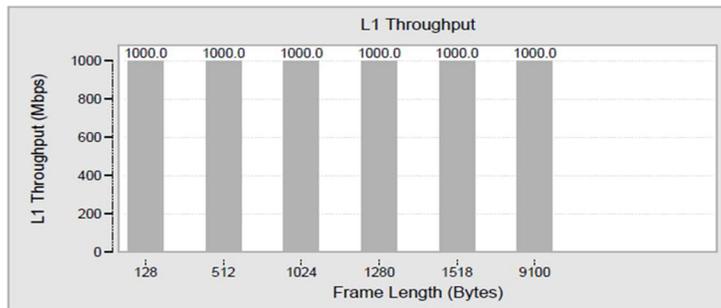
Pause Capable	Both Rx and Tx
FDX Capable	Yes
HDX Capable	Yes

Test Configuration

Tests to Run	Throughput
Maximum Test Bandwidth	Latency (RTD)
Frame Lengths	Frame Loss Rate
Bandwidth Measurement Accuracy	1000.00 Mbps
Throughput Zeroing-in Process	128, 512, 1024, 1280, 1518, 9100
Throughput Frame Loss Tolerance	To within 0.01 (Mbps)
Throughput Trial Duration	RFC 2544 Standard
Throughput Pass Threshold	0%
Number of Latency (RTD) Trials	20 seconds
Latency (RTD) Trial Duration	Not Selected
Latency (RTD) Load	2 trials
Latency (RTD) Pass Threshold	20 seconds
Frame Loss Test Procedure	100%
Frame Loss Trial Duration	Not Selected
Frame Loss Bandwidth Granularity	RFC 2544
	20 seconds
	100 Mbps

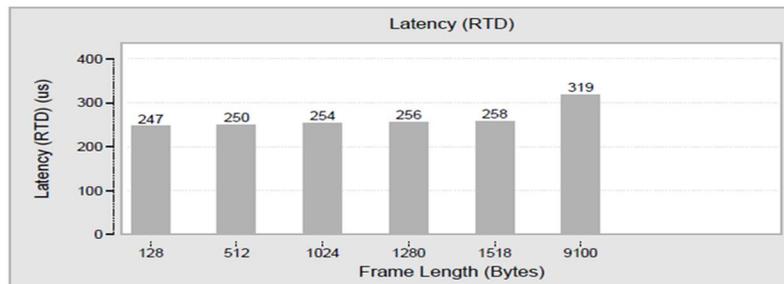
RFC 2544 Ethernet Test Report

Throughput Test Results:



RFC 2544 Ethernet Test Report

Latency (RTD) Test Results:



Frame Length (Bytes)	Latency (us)	Measured L1 Rate (Mbps)	Measured L1 (% of Line Rate)	Measured Rate (frms/sec)	Pause Detected
128	247	999.96	99.996	844561	No
512	250	999.96	99.996	234953	No
1024	254	999.96	99.996	119727	No
1280	256	999.96	99.996	96150	No
1518	258	999.97	99.997	81272	No
9100	319	999.99	99.999	13706	No

Timeline

The network is estimated to be complete approximately 150 days after the execution of an agreement.

Project Timeline - Estimated Time Frame:

- Day 1-Order signed
- Day 3-Order verified and in the system, task assignments begin
- Day 15-Initial engineering package to build laterals completed, submit to APS, local Agencies, etc
- Day 45-Engineering of fiber splicing and patch installation completed, assign tasks to splicing teams, schedule for after lateral build is completed
- Day 60-Follow up on new lateral applications, work through any concerns that any of the various agencies have
- Day 65-Verify BOM with vendor, place order for appropriate fiber and equipment (fiber termination panels)
- Day 70-Receive approval for build of new lateral, finalize construction design, and submit order to 3rd party construction firm
- Day 90-Lateral builds begins
- Day 105-Schedule splicing to coincide with completion of lateral build
- Day 135-Lateral build complete
- Day 140-Splicing complete, OTDR testing of fibers can begin
- Day 143-Testing of fibers complete, test results recorded.
- Day 145-Hand-over of network to customer
- Day 150-Customer accepts network, billing begins

Please note that above timeframes are estimates only.

Credentials of Project Manager

SLA Overview

Crown Castle has included a copy of Ethernet supplement, which include our SLA specifications. Please refer to our upload on the BonFire Hub Portal.

Crown Castle is committed to network excellence and superior customer support. We take pride in our customer-first culture which is reflected in the design of your solution, to service delivery, to pro-active service monitoring, and to on-going support. Any service affecting disruptions immediately trigger a new trouble ticket, emergency remediation, and a follow-up with the affected customer(s). Monitoring services vary by service but may include both in and out of band management, environmental conditions, and port activity and status.

If any problem is experienced, the Network Operations Center should be notified immediately by the customer. Upon receiving the report, Crown Castle's NOC will immediately begin coordinating efforts to make the appropriate troubleshooting, repairs, and restore service. A Crown Castle NOC technician will provide with timely and continuous updates through the entirety of the service inquiry.

Crown Castle Business Continuity

Today, there are many steps already being taken and actions defined within Crown Castle's standard operating policies and procedures that serve or act as business continuity guidelines.

- Diversity in Network Operations Centers from a systems and connectivity perspective, as well as geography.
- All NOC systems are supported by secondary power supplies, both UPS and generator.
- All NOC technicians are equipped with full remote secure logins and voice capability for remote access in all regions to perform their duties and responsibilities.
- Each region maintains maintenance spares depot for all core equipment technology hardware deployed within the network and region. Lessens our dependency on the manufacturer and decreases MTTR (mean time to repair).
- Operations team has a clear escalation and call-out policy and plan that is updated and reviewed weekly to determine coverage and back-up requirements.
- Emergency call-out agreements with retainer fees are established with prime vendors in all regions for support of the physical plant. This includes spare components and fiber cable to handle any network impact.
- All network equipment configurations are backed up and archived to facilitate immediate restoration in the event of network element failure.
- Establish a crisis conference bridge for all updates and information sharing during any event.

Network Management Services for Monitoring and Alerting

Geographic Diverse Locations

Generator & UPS Protected Facilities
On-Net Network Connectivity

- Canonsburg, Pennsylvania
- Melville, New York
- Rochester, New York
- Doral, Florida

Trouble Ticket Management

- 24x7 Onsite Management Support
- Tier I & II Troubleshooting
- Incident Management
- Customer Communications & Escalations
- Technical Support Engineers
- Tier III Troubleshooting
- Vendor TAC Engagement
- Engineering Engagement

Network Operations Center Systems and Tools

IBM Tivoli NETCOOL Network Management System

- Automation & Enhancements
- Alarm Filtering
- Alarm Enrichment
- Backbone Topology MAPS
- Customizable, dedicated customer alarm views

Microsoft Dynamics CRM Ticketing System

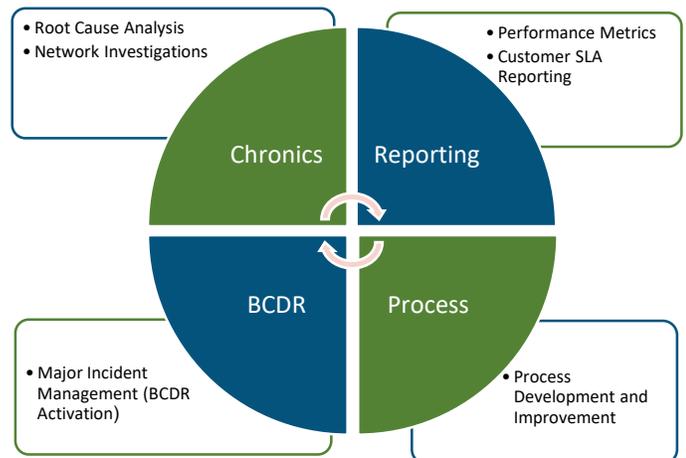
- Automation & Enhancements
- Automatic Notification upon ticket creation
- Standardize Templates for Communication
- Automatic Ticket Assignments
- Automated management escalation of unresolved Trouble tickets.

Customers may report problems by:

- Calling our NOC: 855-93-FIBER
- Via Email: FiberSupport@CrownCastle.COM
- Through the CCF Portal

Systems & Tools

- Microsoft CRM
- NETCRACKER
- OSP Insight GIS System
- Operations Data Warehouse
- Traffic / Taper Reporting Tool



MTTR:

Priority descriptions and response times are:

Priority 1: Services are down or severely degraded to the point of unusable. Continuous effort is applied until services are restored.

Time to repair: 4 hours
 Status Update Frequency: 1 hour

Priority 2: Services are in simplex condition (working or protect path down, but still operational) or service is errored but not to the point of service disrupting. Efforts made to restore service would be limited to those efforts that will not worsen the condition. Service affecting repair efforts would be reserved for scheduled, agreed upon, maintenance windows.

Time to repair: 10 hours
 Status Update Frequency: 2-4 hours

Priority 3: Non-Service affecting issues, requests for information, root cause analysis of previous service disruption that has cleared, requests for changes to service.

Time to repair: N/A
 Status Update Frequency: N/A

Please reference the NOC Escalation List below:

#	Title	Name	Email	Office #	Cell #
1st	Shift Managers	On duty	FiberSupport@crowncastle.com	Primary: 1-855-93-FIBER Secondary: (844) 583-4237 Non-toll free: (845) 458-7799	
2nd	Manager, NOC Operations	Tommy Fay	Thomas.Fay@crowncastle.com	(631) 300-3783	(516) 987-3578
	Manager, NOC Operations	Steve Cassianos	Steve.Cassianos@crowncastle.com	(212) 337-4083	(646) 745-4023
3rd	Sr. Manager, NOC Operations	Miles O'Shaughnessy	Miles.OShaughnessy@crowncastle.com	631) 300-3781	(631) 774-2412
4th	Director, Network Assurance	Steve George	Stephen.George@crowncastle.com	(978) 268-9370	(781) 254-8795
5th	Vice President, Network Operations	Sheldon Jordan	Sheldon.S.Jordan@crowncastle.com	(786) 701-7404	(305) 206-2976
6th	SVP Project Delivery and Design and Construction - Fiber	Karen Rohrkemper	Karen.Rohrkemper@crowncastle.com	(281) 640-3651	(513) 478-4448

Our standard practice for Change Management/Maintenance events is to proactively notify affected customers a minimum of 1 week in advance for any planned maintenance events. Emergency events are the exception. You may also contact your assigned Client Service Manager for this and other requests, such as: billing, moves, adds, and changes.

Change Management/Maintenance

Change Management's (CM's) mission is to coordinate and manage maintenance events within Crown Castle's Network to maximize network availability, to minimize disruption to its customer base, and to ensure that each affected customer receives timely notification of scheduled, service-affecting (SA) maintenance events.

Crown Castle's standard maintenance window is defined as 00:01 to 06:00 for all Service Affecting activities.

If a service-affecting maintenance event is scheduled, Crown Castle's Change Management Department will notify its impacted customers in advance of the pending maintenance event using the following guidelines:

- **Service Affecting Maintenance:**
 - **Minimum of 10 business day advance notice *****

- **Emergency:**
 - **As much notice as possible**

- **Vendor or SA Maintenance:** Crown Castle will send customer notifications no less than 10 business days in advance of the scheduled maintenance event, including scheduled vendor-initiated events. If Crown Castle does not receive more than 10 business days' notice from its vendors, Crown Castle will attempt to reschedule. If Crown Castle is unsuccessful, Crown Castle will provide customers as much notice as possible. If scheduling conflicts arise, Crown Castle will work with its vendors in an attempt to reach a mutually-agreed-upon reschedule date (whenever possible).
- **Emergency Maintenance:** In the event of a network emergency (active or pending), Crown Castle will provide customers affected by the maintenance as much notice as possible. Change Management will review emergency maintenance scheduling with senior CM management as required.
- **Maintenance Cancellation or Rescheduling:** Crown Castle will provide customers with as much notice as possible when maintenance events are either cancelled or rescheduled. Should the need to reschedule a maintenance event arise, the new date will adhere to the policies, as if it were a new maintenance request.
- **Status Notifications.** Crown Castle will send status notices to its customers at the beginning and completion of each maintenance.

***Crown Castle will work with its clients to attempt to reschedule an event if requested.

Crown Castle Customer Center Portal

The Customer Center portal provides around the clock access to information about your services from Crown Castle, including Billing, Orders, Services, Trouble Tickets/NOC Support and your Account Team contacts. Below are some sample screen shots.

CROWN CASTLE
CUSTOMER CENTER

FIRST.LAST@CROWNCastle.COM ACCOUNT NAME LOG OUT

1-855-93-FIBER

BILLING- ORDERS SERVICES- DOCUMENTS SUPPORT- ACCOUNT TEAM

MY PROFILE ACCOUNT ADMIN - ADMIN - USER ACTIVITY-

BILLING
View and print up to six months of billing history. View and print up to six months of billing history.
[RECENT INVOICES](#)
[ALL INVOICES >](#)

ORDERS
View order history and current order status.
[ALL ORDERS >](#)

SERVICES
View service history, details, and statuses.
[ALL SERVICES >](#)

DOCUMENTS
View Portal documents.
[DOCUMENTS >](#)

SUPPORT
View up to six months of support ticket history and statuses.
[GET SUPPORT >](#)

[How do I use this page?](#)

NOTIFICATION CENTER

You have 0 message(s).

[NO MESSAGES >](#)

Crown Castle Contacts

Services Screen: Circuit View example. Click any circuit to see specific Service Details

Circuit ID	Service Number	Order Number	Speed	Change Log	DDoS
123456-ABCD-AA		0123456	1Gbps	123456-WAVE-ABC	
123457-ABCD-AA		0123457	10Gbps	123457-WAVE-ABC	
123458-ABCD-AA		0123458	1Gbps	123458-INET-ABC	
123459-ABCD-AA		0123459	2Gbps	123459-INET-ABC	
123460-ABCD-AA		0123460	100GgE	123460-INET-ABC	
123461-ABCD-AA				123461-INET-ABC	
123462-ABCD-AA				123462-WAVE-ABC	
123463-ABCD-AA		0123463	1Gbps	123463-WAVE-ABC	
123464-ABCD-AA		0123464	1Gbps	123464-WAVE-ABC	
123465-ABCD-AA		0123465		123465-INET-ABC	

Open NOC ticket on any circuit.

Use advanced filters to search. Begin typing any circuit ID to locate specific ID.

Orders Screen: Here you will find pending and completed order information. Need status of a current order? Simply click on the Order# in column 1 and it will then show all information pertaining to that order.

Orders

Order #	Account	Order Type	Status	Legacy Order #	Term in Months	Creation Date	
0123456		Renewal/Replac...	Validation	2022-01234	30	Jul 14, 2022	
0123456		Change	Validation	2022-01234	9	Jul 12, 2022	
0123456		Change	Validation	2022-01234	8	Jul 12, 2022	
0123456		New Service	Provisioning	2022-01234	80	Jul 08, 2022	
0123456		New Service	Provisioning	2022-01234	30	Jun 15, 2022	
0123456		Change	Complete	2022-01234	23	Jun 02, 2022	
0123456			Provisioning	2022-01234	36	May 28, 2022	
0123456	Company Name	New Service	Provisioning	2022-01234	36	May 28, 2022	
0123456	Company Name	New Service	Complete	2022-01234	18	May 17, 2022	
0123456		Change	Complete	2022-01234	1x	May 17, 2022	

Advance/Go Back by page when searching numerous records.

Use advanced search features to sort or filter by status. Contact your account team for order type definitions.

Support Screen: This section of the site will allow you to create a new ticket, view pending and closed tickets, and interact directly with the NOC via integrated messaging.

Link to specific ticket detail.

Use advanced filters to narrow results.

Sort by circuit ID.

Ticket #	Status	Trouble Reported	Start Date	Service Number	Circuit ID	Customer Circuit ID
CCF12345678	In Progress	Sort Ascending	Jun 21, 2022	S 123456	123456-ABCD-E...	2022-12345
CCF12345678	In Progress	Sort Descending	Jun 21, 2022	S 123456	123456-ABCD-E...	
CCF12345678	Closed	Columns	Jun 20, 2022	S 123456	123456-ABCD-E...	
CCF12345678	Closed	Unlock	Jun 20, 2022	S 123456	123456-ABCD-E...	
CCF12345678	In Progress	Lock	Jun 20, 2022	S 123456	123456-ABCD-E...	
CCF12345678	Closed	Filters	Jun 20, 2022	S 123456	123456-ABCD-E...	
CCF12345678	Closed	Service Down			123456-ABCD-E...	
CCF12345678	Closed	Service Down			123456-ABCD-E...	
CCF12345678	Closed	Power			123456-ABCD-E...	2022-12345

Displaying orders 1 - 10 of 321

NOC Messaging Screen: Create Notes and view comments history.

Create Note:

Submit

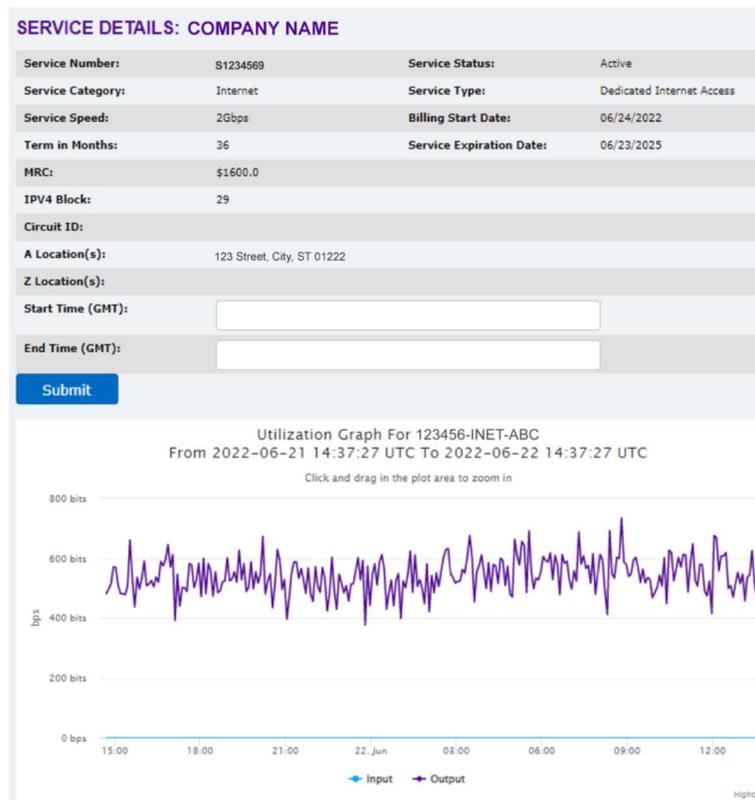
Customer Updates

Crown Castle Comment At: 2/9/2022 10:09 AM

Hello Valued Customer: The Crown Castle Fiber NOC received alarms indicating CPE Lost Power/Dying Gasp/Unrecoverable condition (e.g. a power failure) has occurred in CPE/Link Down. Please advise if there is any work or maintenance being performed that could be impacting this service. Please also verify power and equipment on site. You can get back to us at 855-933-4237 or by replying to this message. Thank you. Crown Castle Fiber Network Operations Center Results: Message sent successfully.

<< Back to Tickets

Service Utilization Statistics Screen: Utilization graphs are real-time statistics that allow you to monitor and manage your E-Line and Internet service bandwidth more effectively. You will be able to see your information in easy-to-view graphs, and you can display your information across multiple time periods:



***The above utilization graph is only an example. The Service Utilization Statistics Screen varies in certain Crown Castle Markets.

These graphs are useful for:

- Long Term Capacity Planning - Analyze your bandwidth across time to plan long-term resource allocation across your entire network.
- Short Term Capacity Management - View real-time graphs to understand how data is traversing your network and optimize your connections accordingly.
- End-User Experience Management - Make sure your internal customers are satisfied by detecting performance fall-off early and taking preemptive action to resolve service degradations before end-users are impacted.
- Non-Intrusive Visibility - Unlike other network reporting tools, Crown Castle Network Statistics does not need an in-line probe. The equipment that we deliver your bandwidth on supports Network Reporting.
- Executive Reporting - Provide easy-to-view graphs of your network to your internal customers.

Crown Castle Utilization Bandwidth graphing is just one more tool that Crown Castle provides. It empowers you and your organization to more effectively deploy, manage, solve, and optimize your network environment.

Response Highlights

HIGHLIGHT	YES/NO	COMMENTS
100% Owned Fiber	YES	All fiber spans/routes included in the Crown Castle response are owned and maintained by Crown Castle, unless otherwise noted.
Dedicated Project Team	YES	Crown Castle will provide a dedicated Project Management team that will assist you from start to finish, providing timely updates throughout the deployment of the new Network.
Implemented Networks of Similar Scope	YES	Crown Castle has deployed and is currently managing several large enterprise customers of similar size and scope.
Competitive Advantages	YES	<ul style="list-style-type: none"> • Crown Castle has extensive expertise and is solely focused on designing and deploying large, complex data networks for commercial corporations across all verticals, and other network providers. • Crown Castle designs networks for optimal latency measurements. • Crown Castle operates its own fiber plant and is not reliant on other network providers. We design our networks without reliance on carrier Central Offices. • Crown Castle core competency is building fiber into customer locations to create a complete design for the managed service. • Crown Castle will provide an experienced implementation team and 7x24x365 post cutover NOC support. • Crown Castle has standardized and offered the Ciena DWDM platform for years with hundreds of Ciena Nodes deployed across our Wave Network.

Crown Castle Legal Exceptions

TOWN OF PALM BEACH RTN NO. 2024-18 / METRO E/FIBER NETWORK

LEGAL EXCEPTIONS TO RFP TERMS AND CONDITIONS

Crown Castle Fiber LLC (“CCF”) responds to The Town of Palm Beach’s (“Town”) RFP subject to and conditioned upon the following exceptions to the RFP terms and conditions:

Definitive Agreement—Exception/Clarification: CCF proposes to contract pursuant to its standard terms and conditions contained in its Master Telecommunications License Agreement and related supplements (the “Agreement”), a copy of which is included with its RFP response. CCF requests the services and products described in the RFP be provided under the terms and conditions set forth in the Agreement as finally negotiated between and executed and delivered by the parties (the “Definitive Agreement”). All references in the RFP to the “agreement” or the “contract” shall mean the Definitive Agreement. In interpreting the agreement between the parties, the Definitive Agreement shall control and take precedence over the terms and conditions of the RFP and the RFP response. In the event, the Town requires the use of the agreement contained in the RFP, additional exceptions/clarifications are outlined below. In the event, the Town’s contractual terms contained in the RFP are in conflict with the proposed Agreement, CCF would like to further negotiate.

Service Level Agreement—Exception/Clarification: All service metrics, repair timeframes, and credits will be governed by the Definitive Agreement. To the extent there is a conflict between the RFP’s service level terms and those proposed in the Agreement, CCF takes exception.

IS-31: Termination—Exception/Clarification: The Town will not be able to terminate the contract without cause or for convenience, except in the event the Town agrees to reimburse all CCF capital expenditures made in reliance of the Definitive Agreement.

Insurance—Clarification: Full policies will not be provided unless a claim occurs and is denied. CCF will provide redacted policies (premiums will be redacted) upon request or complete policies can be made available for review at a mutually agreeable location. Furthermore, CCF will want to discuss removing any language of the following from any contract, *“If the service provider maintains higher limits than the shown below, the Town requires and shall be entitled to coverage for the higher limits maintained by the service provider.”*

Subcontractors—Exception/Clarification: Crown Castle Fiber LLC (CCF) cannot, at this time, provide a list of subcontractors contemplated being used on this project or their respective experience or qualifications. Contractor availability is variable and CCF does not know what contractor availability might be for a prospective project. CCF selects vendors prior to the work being commenced based upon, among other things, the type of work required, the complexity thereof, the availability of contractors and CCF’s recent experience therewith. As a result, CCF is unable to provide a complete list of the vendors/subcontractors it would ultimately utilize for this project in the event it is awarded thereto. If the project is awarded to CCF, it will provide a list of contemplated contractors as well as their experience and qualifications upon request.

Litigation, Claims, Settlements, Arbitrations or Investigations—Exception/Clarification: From time to time, Crown Castle Fiber LLC is involved in routine legal proceedings, but none that are material to the company’s daily operations. As such, Crown Castle Fiber LLC does not provide its customers with a list of outcomes or details pertaining to litigation, claims, settlements, arbitrations or investigations. Crown Castle Fiber LLC is not involved in any pending litigation, claims, settlements, arbitrations or investigations that would materially affect its ability to provide services in accordance with any contract ultimately negotiated by and among the parties.

Attachments

Customer Notifications and Scheduling
Disaster Recovery & Business Continuity
Ethernet Product Sheet
Equipment Spec Sheet ADVA MRV OS606 (OptiSwitch 606 – Network Interface Device)
Equipment Spec Sheet ADVA FSP 150-XG 300 Series
W-9
Memorandum of Insurance (MOI)
Florida Business License
Palm Beach County Business Tax Receipt
Crown Castle Florida Licenses
Tax Addendum & USF Form
Crown Castle’s Master Telecommunications License Agreement (MTLA)
Crown Castle’s Ethernet Supplement (SLA)



Customer Notifications and Scheduling

Change Management's (CM's) mission is to coordinate and manage maintenance events within Crown Castle's Network to maximize network availability, to minimize disruption to its customer base, and to ensure that each affected customer receives timely notification of scheduled, service-affecting (SA) maintenance events.

Crown Castle's standard maintenance window is defined as 00:01 to 06:00 for all Service Affecting activities.

If a service-affecting maintenance event is scheduled, Crown Castle's Change Management Department will notify its impacted customers in advance of the pending maintenance event using the following guidelines:

- **Service Affecting Maintenance:**
 - **Minimum of 10 business day advance notice ***
- **Emergency:**
 - **As much notice as possible**

**-Crown Castle will work with its clients to attempt to reschedule an event if requested.*

- **Vendor or SA Maintenance:** Crown Castle will send customer notifications no less than 10 business days in advance of the scheduled maintenance event, including scheduled vendor-initiated events. If Crown Castle does not receive more than 10 business days' notice from its vendors, Crown Castle will attempt to reschedule. If Crown Castle is unsuccessful, Crown Castle will provide customers as much notice as possible. If scheduling conflicts arise, Crown Castle will work with its vendors in an attempt to reach a mutually-agreed-upon reschedule date. (whenever possible)
- **Emergency Maintenance:** In the event of a network emergency (active or pending), Crown Castle will provide customers affected by the maintenance as much notice as possible. Change Management will review emergency maintenance scheduling with senior CM management as required.
- **Maintenance Cancellation or Rescheduling:** Crown Castle will provide customers with as much notice as possible when maintenance events are either cancelled or rescheduled. Should the need to reschedule a maintenance event arise, the new date will adhere to the aforementioned policies, as if it were a new maintenance request.
- **Status Notifications.** Crown Castle will send status notices to its customers at the beginning and completion of each maintenance.

Business Continuity Planning and Preparedness

Even the most robust networks can be challenged when extreme weather conditions or natural disasters strike, and an interruption in service can have significant impact on the operation of your organization. That's why Crown Castle thoroughly prepares for these scenarios with detailed plans and methodical processes in place, so that we can support and restore our customers without skipping a beat.

It's all hands on deck when emergency situations strike. Our teammates who work in areas prone to hurricanes are always prepared to shift their normal job functions and responsibilities to teams in unaffected areas so our customers can be their primary focus. The more predictable cadence of storm season is carefully anticipated and playbooks are in place to efficiently support natural disasters like hurricanes, wildfires, floods and gas and water leaks.

No matter the cause, our goal is to get the largest group of affected people back up and running as quickly as possible, which means our planning and preparation never stops.



SPOTLIGHT

Hurricane Ian response

Our engineering practices consider the specific climate risks at our sites and contribute significantly to the resilience of Crown Castle's assets. Although only 0.01% of our \$28 billion in property and equipment is spent annually on repairs and maintenance stemming from extreme weather events, ensuring that our communications infrastructure is resilient is monumental.

For example, immediately after Hurricane Ian made landfall in Southwest Florida, our teams assessed over 500 route miles of fiber and 677 tower sites. Within six days, we helped restore fiber and wireless connectivity in Florida's hardest hit areas, reconnecting these communities with an essential resource. Our locally based employees were also a top priority, and we provided \$142,000 in relief to 78 families through our Emergency Assistance Program and Disaster Relief Fund.

Taking the necessary steps to get you back up and running

Rigorous preparation

- › Mandatory annual readiness trainings for all teammates in targeted areas
- › Annual weather and disaster simulation testing for response teams
- › Advanced vendor agreements in place for drivers, vehicles and contract workers
- › Clear roles identified in advance including Storm Lead, Damage Assessment Team, Storm Restoration, Vendor Management and Logistics Management
- › 24/7/365 active network and weather monitoring by our Network Operations Centers to identify and resolve potential issues before they arise
- › Inventory of anticipated necessary items is acquired and maintained ahead of season in order to avoid long lead times
- › Coordinated effort among fiber, small cell and tower infrastructure teams

Plans based on experience

- › Defined set of 72, 48 and 24 hour tasks lists and customer communications
- › Pre-storm communications alerting customers of readiness
- › Resources staged based on anticipated conditions
- › Full preventative maintenance on all backup generators and other critical equipment
- › As soon as it is safe to do so, teams begin sweeping the affected region to assess damages

Efficient restoration

- › Regular communications to affected customers sent at pre-determined intervals
- › Necessary items like computer equipment, whiteboards, flip charts, power plugs, manual can openers, data jacks and first aid kits are all identified and ready to travel



Crown Castle owns, operates and leases more than 40,000 cell towers and approximately 90,000 route miles of fiber supporting small cells and fiber solutions across every major US market. This nationwide portfolio of communications infrastructure connects cities and communities to essential data, technology and wireless service—bringing information, ideas and innovations to the people and businesses that need them.

For more information, please contact 1-833-635-0941 or visit [CrownCastle.com](https://www.CrownCastle.com)

Ethernet

Ethernet has become the go-to technology for high-performance, reliable and cost-efficient connectivity. Healthcare providers use it to connect imaging facilities to hospitals and improve patient care, while banks rely on its ability to cost-effectively connect branches with regional headquarters.

Our Ethernet solutions combine the reliability and ubiquity of Carrier Ethernet with next-generation metro area transport technology. The result is an efficient, fully restorable network that's easy to manage and ready for any vertical or application requirement. Additionally, the natural flexibility of Carrier Ethernet allows us to offer you a range of solutions that give you varying levels of control to meet the bandwidth and security requirements you need—today and in the future.

Our business Ethernet solutions include MetroE Advanced Private Line, E-Line, Ethernet Virtual Private Line (EVPL) and Ethernet Private LAN (E-LAN). With support for Layer 2 point-to-point, point-to-multipoint and multipoint-to-multipoint

topologies, you can seamlessly extend your Ethernet network from your building into the metro area and beyond.

With a private, diverse fiber backbone, along with protected access options, we offer a robust solution set for your business continuity requirements. With approximately 85,000 route miles of fiber across every major metro area, you'll be tapping into one of the largest, densest Ethernet footprints in the country.

Our fully staffed Network Operations Center and locally based service teams proactively monitor your fiber network around-the-clock and respond to changing circumstances—giving you unmatched reliability and peace of mind.

More than
25 Years
of Expertise

**NYSE
S&P 500**

Our Solutions

- › Towers
- › Small cells
- › Dark Fiber
- › **Ethernet**
- › Wavelength
- › Managed SD-WAN
- › Internet Access
- › Private Networks
- › Colocation
- › Cloud Connect
- › Optical Encryption
- › DDoS Defense
- › Cyber Defense One
- › Bandwidth on Demand
- › Fixed Wireless
- › Ultra-Low Latency
- › Video Transport

“

Crown Castle has taken away the pain points when it comes to bringing in new applications. We've been impressed with their level of customer service on every level, and have been very happy with the performance and service of our network.

GREG KLOPP

Information Technology, Hershey Entertainment & Resorts

Key Benefits

- › Seamless interconnection with no additional equipment on your premises, reducing equipment capital costs
- › Simple installation and turn-up with no protocol conversion
- › Easier installation and management allows for rapid provisioning compared to other platforms
- › Flexible bandwidth allows you to pay as you grow
- › Scalability for long-term network evolution connectivity

Key Features*

- › Speeds from 10Mbps to 100Gbps
- › Switched and dedicated bandwidth configurations
- › Dedicated access links with multiple protection options
- › Bandwidth on Demand gives you the agility and control you need to upgrade bandwidth in near real-time
- › Standards-based IEEE Ethernet service for Layer 2 transport
- › 802.1Q VLAN and 802.1 QinQ tunneling supported
- › MEF Carrier Ethernet 2.0, MEF 9, and MEF 14 certified technology
- › 24/7 network monitoring

*Not all features are available in all markets. Please contact your sales representative for more information.

Our Solution

- › Our Ethernet solutions enable the extension of dedicated or virtual LAN infrastructures for WAN connectivity, with committed information rates from 10Mbps to 100Gbps and guaranteed network performance.
 - E-Line: Dedicated UNIs for point-to-point connections—simple and secure
 - EVPL: A flexible, virtualized option allowing multiple applications and connections to run over a converged interface
 - E-LAN: Transparent LAN service and multipoint VPNs
 - MetroE Advanced Private Line: Private Ethernet delivered over dedicated fiber with switches deployed at each end-user location across a metro area.
- › Four Classes of Service provide the routing options necessary to manage traffic while ensuring application performance:
 - Mission Critical: Ultra-high availability, superior performance, lowest latency
 - Business Critical: High-availability, high-performance
 - Business Priority: Enhanced performance
 - Standard: Standard performance



SPECIFICATION	METRO-E ADVANCED PRIVATE LINE	E-LINE	EVPL, E-LAN
Technology	Layer 2 Ethernet over private fiber	Layer 2 Ethernet over DWDM or fiber	Layer 2 Ethernet over MPLS or fiber
Throughput	1Gbps - 10Gbps	50Mbps - 100Gbps	10Mbps - 10Gbps
Interface	10 GigE	GigE or 10 GigE	GigE or 10 GigE
Framing	Jumbo Frames up to 9100	Jumbo Frames up to 9100	Jumbo Frames up to 9100
Network Management	24/7 monitoring and surveillance	24/7 monitoring and surveillance	24/7 monitoring and surveillance
Network Options	Metro configurations	Long-haul and metro configurations	Long-haul and metro configurations
Availability	Available at most on-net locations throughout the Crown Castle network	Available at most on-net locations throughout the Crown Castle network	Available at most on-net locations throughout the Crown Castle network
Architecture	Point-to-point	Point-to-point	Point-to-point, point-to-multipoint, multipoint-to-multipoint



Crown Castle owns, operates and leases more than 40,000 cell towers and approximately 85,000 route miles of fiber supporting small cells and fiber solutions across every major US market. This nationwide portfolio of communications infrastructure connects cities and communities to essential data, technology and wireless service—bringing information, ideas and innovations to the people and businesses that need them.

Datasheet

OptiSwitch® 606 - FE/GE Network Interface Device



MRV's OptiSwitch® 606 (OS606) is a highly price-competitive Carrier-Ethernet (CE) FE/GE Network Interface Device (NID) used to provide cost-effective mass deployment of 10 Mbps, 100 Mbps, and 1 Gbps MEF-based Ethernet services at customer premises with guaranteed SLAs.

Architected for graded enhancement and expansion, the OS606 is a choice candidate in the "pay-as-you-grow" business model.

Small Office-Home Office (SOHO) customers provided with access to an Ethernet-based cloud of services strongly tend to opt for medium bandwidths with simple SLAs that may include just protection and minimal service monitoring capabilities. In order to optimize services to these customers while allowing for their future demands for more bandwidth and advanced services, the OS606 offers service providers with two growth paths implemented by software alone: 1) Added mechanisms/features/capabilities, and 2) Increased service port speeds.

The OS606 meets MEF 9, 14, 17, and 21 specifications, and provides for easy deployment and management while maintaining full interoperability and guaranteed SLAs.

As a small form factor unit (just 1RU in height and 9-in wide), it can be placed on a desktop or mounted in a rack or on a wall side-by-side with other OS606s.

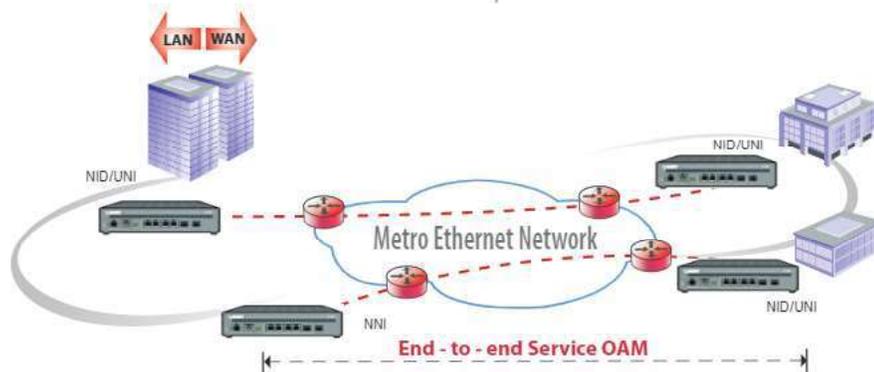
The fan-free design of the OS606 reduces CapEx. This reduces the already low power consumption further, and thereby OpEx while eliminating fan failure and operating noise.

The OS606 offers a unique combination of a rich set of features and interfaces that enable easy and flexible field configurations while making it ideal for maintenance and inventory.

Product Highlights

- **Compact 1RU 9" form factor for space saving**
- **MEF CE 2.0 Services Compliant**
- **Non-blocking hardware architecture**
 - 4x 10/100/1000Base-T RJ45 ports + 2x 100/1000FX SFP ports
 - All interfaces can be configured as UNI / NNI
 - Support for jumbo frames on all ports
- **Unmatched flexibility of Ethernet Virtual Circuits**
 - Selective Q-in-Q and inner/outer VLAN translation
 - Simplifies, monitors, and troubleshoots services/applications
- **OAM and PM toolset**
 - End-to-end hardware-based Ethernet service OAM to track SLAs
 - Standards compliance: IEEE802.3ah, IEEE802.1ag, ITU-T Y.1731, and MEF 17 IA
- **Pay-as-you grow model**
 - Capacity License: upgrading 10/100Base-T ports to 10/100/1000Base-T
 - Firmware upgrade license - L2+Master-OS® firmware
- **Rear pluggable external power adapter (power supply)**
- **MRV Unified Master-OS® firmware for CE service delivery**
 - Simplifies operation and management integration with Operation Support Systems (OSSs)
- **Protection mechanism**
 - Mesh, 1:1 (LOS), and n+1 (LAG)
 - Ring Protection based on MSTP
- **Supported by MRV's state-of-the-art Pro-Vision NMS and MegaVision EMS**

MEF-powered and SLA-based business Ethernet services



Enabling SOHO access to Cloud Services with accurate performance measurement for OpEx savings (foreseeing future advanced services)



Services Specifications

Configuration

- 4 x 10/100/1000Base-T RJ45 ports + 2 x 100FX/1000FX SFP ports
 - Any port can be used for a UNI or NNI service
- Industry Standard CLI
- Out-of-band management: Ethernet port
- Serial interface: RS-232 port
- External pluggable power adapter

MEF compliance

- MEF CE 2.0 Services Compliant
- EPL, E-Line, E-Tree & E-LAN – MEF 9
- EPL, E-Line, E-Tree & E-LAN Traffic Mgt. – MEF 14
- OAM Implementation Agreement (IA) – MEF 17
- Abstract Test Suite for UNI Type 2 Part 1 Link OAM - MEF 21

Packet Switching and Simple IP Services

- IEEE802.1Q and IEEE802.1ad provider bridges
 - 4K active VLANs / EVCs
 - Selective Q-in-Q stacking per ACL criteria
 - Tag swapping on egress and ingress traffic
 - Inner classification on double tagged frames
- Private VLAN, E-Tree services
- Transparent cross-connect mode
- Layer 2 control protocols tunneling

Traffic Management and QoS

- IEEE 802.1p (VPT), DiffServ (DSCP)
- Marking/remarking profiles between layers
- Eight hardware queues per port with configurable SLs
- Per flow SLA metrics
- Dual-rate 3-color rate limit per flow

Link protection Services

- Link Aggregation (LAG n+1) – static and IEEE 802.3ad LACP
 - Load balancing based on L2, L3, and/or L4 headers

- Link level 1:1 Loss of Signal (LOS) protection
- Bi-directional Link Fault Reflection

Management & Diagnostics Tools

- Industry standard CLI and MEF oriented CLI
- IPv4 & IPv6 based TELNET, SSHv2, SNMPv3, RMON
- RADIUS/TACACS+ AAA for management sessions
- Configuration load/save in File Transfer Protocol (FTP), Secure Copy Protocol(SCP)
- Internal/Remote Syslog
- Scripting tool for macro configurations & maintenance
- Action scheduler for automated rules (time/day/cycle)
- Supported by MRV's ProVision NMS

OAM

- EFM Link OAM (segment-based CO-to-CPE) per IEEE 802.3ah
 - discovery, port-loopback, remote failure indication, dying gasp
- Copper cable diagnostics TDR on RJ45 ports

“Extended” L2 Software includes the following additions:

Protection

- ERPS per ITU-T G.8032v2/Y.1344
- IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
- Protection based on CCM (UNI-to-UNI reflection, 1:1 protection)

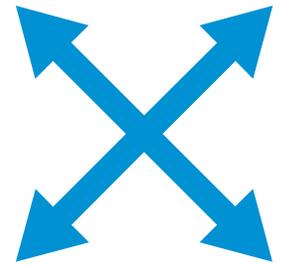
Advanced OAM

- End-to-end service OAM per IEEE 802.1ag
 - Connectivity Fault Management per service MEP/MIP
 - In-service EVC loopbacks & Linktrace
- Remote failure notification/reflection
- Extended frame generator RFC 2544 with L2, L3 traffic generation
- End-to-end Performance Measurement ITU-T Y.1731
 - Jitter, Latency & Loss per service

Technical Specifications	Standards compliance	FCC Part 15 (Class A); EMC Directive: Emission (Class A) and Immunity; LVD Directive: Electrical Safety; CE Marking; TUV-R Mark (Canada, USA); GOST (selected products); RoHS Directive, WEEE Directive.
	Environment	Operating Temp: 0° to 50°C (32° to 122°F) Storage Temp: -40° to 70°C (-40° to 158°F)
	Humidity	85% maximum , non-condensing
	Diagnostic LEDs	Global: Power, Management traffic link, Management traffic activity Per port: Service traffic link, Service traffic activity.
	Rack Mounting	19" or 23" racks , compact 1 RU height
	Maintainability	Front end user interfaces Eliminates the need to dismount the system for maintenance or installation of new hardware following initial installation
	Physical dimensions WxDxH	219.6 x 130 x 42mm (8.64 x 5.12 x 1.65 inch)
	Weight (kg. /lbs.)	1.2kg (2.64 lb)
	MTBF HRS @25C /77F	1088341 hr

Order Info	P/N	
	OS606	OS606 FE/GE NID - 4 x RJ45 10/100BaseT (upgrade option to 1000Base-T) and 2 x 100FX SFP (upgrade option to 1000FX) Ports, "Basic" L2 Master-OS™ version, external power supply should be ordered separately.
	LIC-606x1G	Upgrade license for OS606 - 1GE ports enabler
	LIC-606xL2+	Upgrade license for OS606 – L2+ MasterOS™ suite
	OS606/GE/L2+	FE/GE NID - 4 x RJ45 10/100/1000BaseT and 2 x 100FX/1000FX SFP Ports, "Extended" L2+ Master-OS™ version, external power supply should be ordered separately.
	EM606-PS/AC-EU	External AC Power Supply for the OptiSwitch® 606 (90-240VAC) for EU
	EM606-PS/AC-US	External AC Power Supply for the OptiSwitch® 606 (90-240VAC) for US
	EM606-PS/AC-UK	External AC Power Supply for the OptiSwitch® 606 (90-240VAC) for UK
	EM606-PS/AC-AU	External AC Power Supply for the OptiSwitch® 606 (90-240VAC) for AU
	Accessories	
EM606-BR-1	19" mounting brackets for Telco rack.	
EM606-BR-F	19" mounting brackets for side-by-side installation of dual OS606 - Two systems 19" rack.	
EM606-WBR	Wall mounting brackets for OS606 series	
* Future release		

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FSP 150-XG300 Series

High-port count 10G multi-layer demarcation, aggregation and edge computing

Bandwidth demand is growing by the day. Fueled by changing patterns in services such as mobility, cloud and video, metro network traffic is rapidly increasing. Communication service providers (CSPs) must quickly transition their infrastructure from 1Gbit/s to 10Gbit/s, and add intelligent demarcation and aggregation, as well as edge compute capabilities, without exceeding space and power consumption.

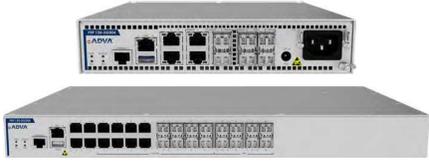
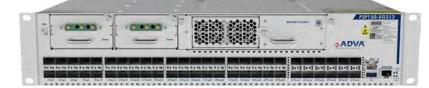
Today's networks need bandwidth for ever-increasing numbers of connected devices, business applications, cloud-based services, and enormous amounts of data. High-speed, high-bandwidth networking enables the aggregation, automation and analysis of this data. Offering higher bandwidth services impacts technology installed on the customer premises and creates the need for high-capacity, intelligent demarcation and aggregation capabilities to deliver SLA-based Carrier Ethernet and IP services. Our FSP 150-XG300 Series addresses this ongoing market demand to scale from 1GE to 10GE services and to offer price-competitive, high-performance 10GE customer access services. What's more, with an in-service upgradable server blade, this product range also offers seamless migration to NFV.



Your benefits

- ✔ **One device, multiple technologies**
Common hardware architecture for MEF 3.0, IPv4 / IPv6 and MPLS service demarcation
- ✔ **Smooth scalability to 10GbE**
1Gbit/s-to-10Gbit/s aggregation and 10Gbit/s demarcation in two product variants to better match capacity and footprint
- ✔ **Seamlessly introducing NFV**
In-service upgrade with high-performance server for edge-hosting of virtual network functions
- ✔ **Advanced traffic management**
Up to 2000 queues and up to five levels of hierarchical QoS with sophisticated traffic management and policing schemes
- ✔ **Multiple network interface options**
Fiber- and copper-based access networks with optional connection over 4G mobile networks
- ✔ **Hierarchical quality of service**
Using high-scale per-flow shaping and policing based on MEF 10.3 for enhanced bandwidth optimization

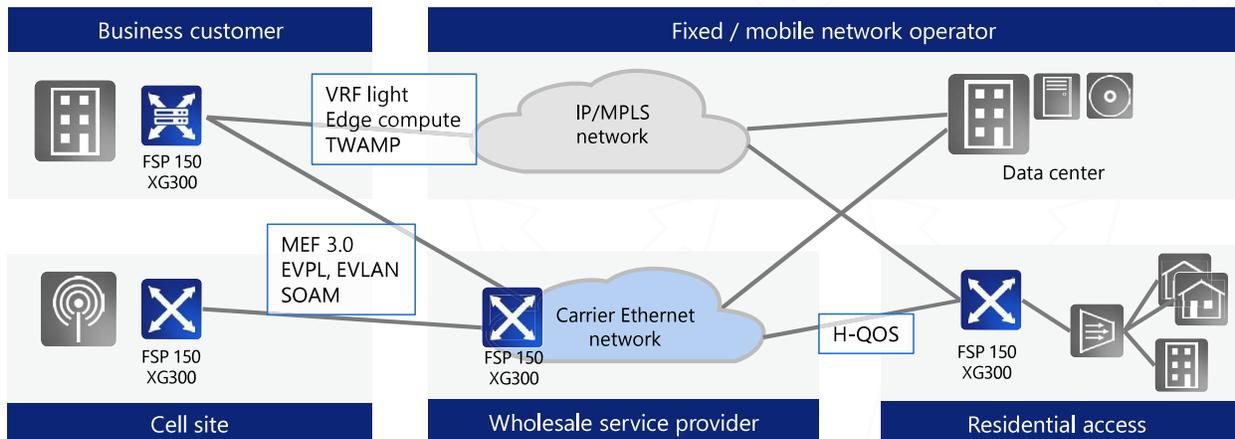
FSP 150-XG300 Series at a glance

	Product	Key application
	FSP 150-XG304 FSP 150-XG308	Fixed configuration, multi-tenant 10Gbit/s demarcation device for business services, mobile backhaul and cloud access, featuring redundant power supply (AC or DC)
	FSP 150-XG304H FSP 150-XG308H	Fixed configuration, multi-tenant 10Gbit/s demarcation device for business services, mobile backhaul and cloud access, featuring front-loaded redundant PS (AC/DC) and FAN unit in a compact 1RU design for 300mm ETSI racks
	FSP 150-XG304u modular series	Modular multi-tenant 10Gbit/s demarcation device for business services, mobile backhaul and cloud access, featuring redundant power supply (AC or DC) Expansion slot for additional, flexible functionality: VDSL link, integrated LTE modem for wireless backup and rapid deployment turn-up, X86 server module for VNF hosting
	FSP 150-XG312	1G/10G massive scale aggregation device for business services featuring front-loaded redundant PS (AC/DC) and FAN unit in a compact 2RU design for 300mm ETSI racks

Applications in your network

Multi-layer demarcation and aggregation in combination with edge computing

- Compact and cost-effective solution for CSPs to support increasing consumer demand and offer price-competitive and high-performance 10GbE (and sub-rates) access services
- Demarcation at cell sites and with mid-sized business customers as well as large multi-tenant enterprise sites
- Compact and efficient pre-aggregation solution for transport of up to 40 1Gbit/s services over 10Gbit/s metro networks
- Hosting of virtual network functions at the network edge
- Fast rollout in fiber- and copper-based access networks with optional connection over 4G mobile networks
- Full visibility of quality of service with comprehensive set of Ethernet and IP-SLA-based service OAM capabilities
- Optimized transport links with H-QoS



For more information please visit us at www.adva.com
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Product specifications are subject to change without notice or obligation.



Power consumption

	Ports and interfaces	Configuration options	Licensing options	Size	Typical power consumption(*)	Operating temperature
FSP 150-XG304 (OS-V8)	4 x 1/10GbE SFP+ ports , 2 x 1GbE combo ports, 2 x 1GbE copper ports	Variants: - Basic: 1GbE + 1GbE OAM - F: 10GbE + 10GbE OAM Power supply options (1+1): - AC or DC fixed power supply, and - AC to DC (12V) desktop power supply	10GbE ports, L3 routing protocols, MPLS	1RU, half width	20W or 25W for -F model variant	0°C to 50°C or -40°C to 65°C (***)
FSP 150-XG304H	4 x 1/10GbE SFP+ ports , 2 x 1GbE combo ports, 2 x 1GbE copper ports	Fixed OAM option: F: 10GbE + 10GbE OAM Power supply options (1+1): - AC Modular power supply - DC Modular power supply	10GbE ports, L3 routing protocols, MPLS	1RU, full width	29W	-40°C to 65°C
FSP 150-XG304u (OS-V8-M)	4 x 1/10GbE SFP+ ports, 2 x 1GbE combo ports, 2 x 1GbE copper ports, 1 x service slot	Variants: - Basic: 1GbE + 1GbE OAM - F: 10GbE + 10GbE OAM Power supply options (1+1): - AC modular power supply - DC modular power supply	10GbE ports, L3 routing protocols, MPLS	1RU, full width	29W(**)	0°C to 50°C or -40°C to 65°C (***)
FSP 150-XG308 (OS-V20)	8 x 1/10GbE SFP+ ports, 8 x 1GbE combo ports, 4 x 1GbE copper ports	Variants: - Basic: 1GbE + 1GbE OAM - F: 10GbE + 10GbE OAM Power supply options (1+1): - AC modular power supply - DC modular power supply	10GbE ports , L3 routing protocols, MPLS	1RU, full width	35W or 40W for -F model variant	0°C to 50°C
FSP 150-XG308H	8 x 1/10GbE SFP+ ports, 8 x 1GbE combo ports, 4 x 1GbE copper ports	Fixed OAM option: F: 10GbE + 10GbE OAM Power supply options (1+1): - AC Modular power supply - DC Modular power supply	10GbE ports , L3 routing protocols, MPLS	1RU, full width	40W	-40°C to 65°C

	Ports and interfaces	Configuration options	Licensing options	Size	Typical power consumption(*)	Operating temperature
FSP 150-XG312	12x 1/10GbE SFP+ ports 40x 1GbE SFP ports	Power supply options (1+1): - AC Modular power supply - DC Modular power supply	L3 routing protocols, MPLS and L3 routing protocols	2RU, full width	70W- 160W depending on fan speed	-40C - +65C

(*) Excluding optics, (**) Excluding modules: see below table for specific modules Power Consumption, (***) Extended temperature model variant
-F model variant provides 10Gbit/s line-rate OAM capabilities

FSP 150-XG304u service slot modules

	FSP 150-XG304u LTE (EM-V-LTE)	FSP 150-XG304u VDSL (EM-V-VDSL- X86)	FSP 150-XG304u NFV (EM-V-NFV)
Description	1 x port LTE wireless backup module	1 x port VDSL module	NFV server module
Services	Turn-up over wireless, before having a fiber. Managed failover services (secondary backup path using LTE)	CPE uplink connection to service provider POP locations. Managed failover services (secondary backup path using VDSL)	VNF handling network functions on virtual machines (VMs)
Dimensions (WxHxD)	155mm x 40.23mm x 236 mm	155mm x 40.23mm x 236mm	155mm x 40.23mm x 236 mm
Weight	0.350kg	0.450kg	0.650kg
Regulatory and standards compliance	Qualcomm MDM9230 LTE (Cat 6) DC-HSPA+ (Cat 24) HSPA+ HSPA UMTS TD-SCDMA GNSS	Broadcom BCM63138 RFC 2684 over ATM AAL5 RFC2364 PPP AAL5 (PPPoA) RFC2516 PPP over Ethernet RFC1577/2225 classical IP and ARP over ATM (IPoA) MER (IP Ethernet over AAL5) ALG (application level gateways) ITU G.992.5 (ADSL2+) ITU G.993.2(VDSL2) ITU-T G.9700/ G.9701(G.fast) IEEE802.3	Ensemble Connector
CPU capacity	Celeron, Dual Core 2.2 GHz, 2GB DDR, 8GB Flash	Celeron, Dual Core 2.2 GHz, 2GB DDR, 8GB Flash	XEON-D, 8/12/16 Cores, 1.3/1.5/1.6GHz, 16/32/64GB DDR, 256/512/1000GB SSD
Zero-touch configuration	For LTE and EoGRE	For VDSL and EoGRE	Ensemble Connector
Encapsulation	EoGRE	EoGRE	Ensemble Connector
Power consumption	17.3W	8.5W	Depending on model; max. 55W
IP fragmentation	Yes	Yes	Ensemble Connector
Management	SNMP, NETCONF, remote and local CLI	SNMP, NETCONF, remote and local CLI	Ensemble Connector
Connectors	2 x SMA female 50Ohm connectors for primary and secondary antenna	1 x RJ11 interface for xDSL port	3 x USB, 1 x RJ45 Ethernet and 1 x RJ45 RS-232

MEF services

- E-LINE, E-TREE, E-LAN, E-ACCESS
- MEF 2.0 certified

Layer 1 functionality

- Virtual cable test – copper TDR
- SFP digital diagnostics
- Port mirroring
- Port protection
- Port reflection (LIN)
- Port speed and duplexity capabilities advertising

L2 and L2.5 functionality

- Bandwidth (Gbit/s) / forwarding rate (Mpps); non-blocking architecture
- MEF services and certifications
- All ports can serve as UNI/NNI
- Jumbo frames (up to 16,000 bytes) on all ports (per port/EVC)
- Configurable Ethertype values
- TLS, Q-in-Q, (802.1Q/802.1ad) - selective VLAN based on ACL + tag range rules
- VLAN translation based on inner/outer VLAN / 802.1p
- Tag swap over multi-point EVC
- Uni-directional link detection protocol (UDLD)
- Link layer discovery protocol (LLDP)
- <50ms protection (1:1 link and device protection), LACP 1+1 (802.3ad)
- MSTP (802.1s)
- ELPS - G.8031/Y.1342
- ERPS - G.8032/Y.1344 v2
- Protection and fault recovery based on service OAM messages/alarms
- Tunnel/filter of L2 protocols
- H-VPLS services: H-VPLS spoke MTU-s, MAC withdrawal
- Up to 64K MAC addresses
- Learning table limit per VLAN/port
- Link aggregation (EtherChannel)

L3 functionality

- Protocols: OSPFv2, OSPFv3, BGP4/BGP4+, IS-IS
- VRRP, and IP tracking for VRRP
- Longest prefix match (LPM) / next-hop (NH) tables
- Static configuration
- IPv6 routing
- BFD (bidirectional forwarding detection)
- VRF-Lite (requires the purchasing of L3 license)
- DHCP (client, server, relay, snooping)

Traffic management

- Hierarchical QoS (H-QoS)
- CIR/EIR bandwidth granularity (64Kbps steps)
- 802.1p and DSCP QoS queues no. (per port)
- Classification by physical port, MAC, Ethertype, protocol, VLAN, IP/TCP/UDP, 802.1p (VPT), DiffServ (IPv4 and IPv6 TC)
- Marking/remarking profiles between layers (802.1p, IP ToS / DSCP Bits)
- Scheduling strict priority and 2 levels SDWRR
- Color awareness UNI per EVC/CoS
- Egress shaping (per port/queue)
- In-service circuit parameters changes (on-the-fly ACLs)
- Per flow SLA metrics (traffic conditioner per service/total services)
- Statistics of L2 control protocols (STP, LACP, 802.3ah)
- L1 shaping

Operation, administration and maintenance (OAM)

- Link OAM -802.3ah EFM (discovery, config, fault, loopback and dying gasp)
- Service OAM 802.1ag CFM - MEP and MIP
- Service OAM ITU-T Y.1731 PM (latency, jitter) - microsecond accuracy
- Multi-point service OAM
- Service availability measurement (Y.1563, MEF 10.2)
- Service resiliency (MEF 10.2.1)
- MEF SOAM PM - MEF 35 (latency, jitter and synthetic loss per service - SLM) - microsecond accuracy
- Automatic scheduling for PM tests to increase utilization
- IP SLA - hardware-based measurement for IP VPN (L3) networks - microsecond accuracy
- L2 loopback with MAC swapping (per port/EVC)
- L2 loopbacks per L2, L3, L4 headers (source/destination swap)
- RFC 2544 test head throughput measurement, loss ratio (up to wire-speed GbE)
- Automated action scheduler for operation of any OAM
- ITU-T Y.1564 service activation testing
- Dying gasp message for power failure alarm (EFM-OAM and SNMP trap option)

Security

- UNI flood limit - DoS protection (broadcast, multicast and unicast rate control)
- Learning table limit - MAC control per EVC
- Wire-speed ACLs
- Restricted and controllable configuration access
- Optional console disable mode
- DHCP option 82
- Separate control and data plane
- 802.1x port based authentication
- Link flap guard
- Link flap damping

Management

- Out-of-band management
- IPv6 management
- Command line interface (CLI) via Serial, TELNET, or SSH V1 and 2
- Simple network management protocol (SNMPv1, v2, and v3)
- Remote monitoring (RMON) - Ethernet statistics (Group 1), history (Group 2), alarm (Group 3), and event (Group 9)
- RADIUS AAA for management
- TACACS+ AAA for management
- Upload/download/append configuration files with FTP and SCP
- Time of day + calendar + time zone
- Internal syslog + remote syslog + encrypted syslog
- Support MRV provisioning and network management platform

Additional protocols and features

- Internet control message protocol (ICMP)
- Linux shell
- Domain name server (DNS) client
- Network time protocol (NTP)
- Mobile backhaul (MBH)
- CLI/Linux shell commands scheduler
- Cross connect mode
- Bootstrap protocol (BOOTP)
- sFlow (previously RFC3176)

Dimensions and power

- Dimensions (H x D x W):
 - FSP 150-XG312: 88.1mm x 214mm x 443mm / 3.47in x 8.42in x 17.44in (full rack width)
 - FSP 150-XG304H, FSP 150-XG308H: 44mm x 215.2mm x 443mm / 1.73in x 8.47in x 17.44in (short depth, full rack width)
 - FSP 150-XG308, FSP 150-XG304u: 44.2mm x 325mm x 438.66mm / 1.74in x 12.79in x 17.27in (full rack width)
 - FSP 150-XG304: 43.65mm x 200mm x 217.60mm x / 1.72in x 7.87in x 8.57in (half rack width)
- Operating temperature:
 - FSP 150-XG304, FSP 150-XG304u and FSP 150-XG308: 0°C to 50°C / 32°F to 122°F
 - FSP 150-XG304, FSP 150-XG304u, FSP 150-XG304H, FSP 150-XG308H and FSP 150-XG312 with extended temperature: -40°C to 65°C / -40°F to 149°F
- Storage temperature: -40°C to 70°C / -40°F to 158°F
- Humidity: 85%, non-condensing
- Power supply:
 - AC input voltage: 90 to 240VAC, 50 – 60Hz
 - DC input voltage: 18 to 60V DC for FSP 150-XG304 and 40 to 60V DC for FSP 150-XG304u, FSP 150-XG308, FSP 150-XG304H, FSP 150-XG308H and FSP 150 XG312
- Power consumption: see table page 3

Weight

Net weight:

- FSP 150-XG304: 1.2kg
- FSP 150-XG304u: 5.5kg with 2 x AC PSU, fan
- FSP 150-XG308: 6.4kg with 2 x AC PSU, fan
- FSP 150-XG312: 7.4kg with 2 x AC PSU, fan
- FSP 150-XG304H, FSP 150-XG308H: 6.3kg with 2 x AC PSU, fan

Regulatory and standards compliance

Safety Agency Approvals

- UL 60950-1:2007 R10.14
- CAN/CSA-C22.2 NO. 60950-1-07+A1:2011+A2:2014
- EN 60950-1:2006+A11:2009+A1:2010+A12:2011+AC:2011+A2:2013; EN62368-1

Electromagnetic Emission

- FCC Part 15, Subpart B(class A) radiated emissions
- EN 55011/CISPR11 radiated emissions
- EN 55022/CISPR22 radiated emissions
- EN 55011/CISPR11 conducted emissions
- EN 55022/CISPR22 conducted emissions
- EN/IEC 61000-3-2 harmonic emissions
- EN/IEC 61000-3-3 voltage fluctuations
- EN 55032: 2012 + AC:2013

Immunity

- EN55024 Information technology equipment Immunity
- EN/IEC 61000-4-2 ESD
- EN/IEC 61000-4-3 radiated immunity
- EN/IEC 61000-4-4 electrical fast transient/burst immunity test
- EN/IEC 61000-4-5 conductive surges
- EN/IEC 61000-4-6 conductive disturbances
- EN/IEC 61000-4-8 immunity to magnetic fields
- EN/IEC 61000-4-11 voltage dips and short interruptions

Environmental

- EU 2002/95/EC RoHS2 directive
- REACH SVHC
- EU 2002/96/ECWEEE directive

Form **W-9**
(Rev. October 2018)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

▶ Go to www.irs.gov/FormW9 for instructions and the latest information.

Print or type.
See Specific Instructions on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.
Crown Castle Inc.

2 Business name/disregarded entity name, if different from above
Crown Castle Fiber LLC (EIN: 01-0570431)

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only **one** of the following seven boxes.

Individual/sole proprietor or single-member LLC

C Corporation

S Corporation

Partnership

Trust/estate

Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

Other (see instructions) ▶ _____

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) 8

Exemption from FATCA reporting code (if any) G

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.
8020 Katy Freeway

6 City, state, and ZIP code
Houston, TX 77024

7 List account number(s) here (optional)

Requester's name and address (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			-			-				
--	--	--	---	--	--	---	--	--	--	--

or

Employer identification number

7	6	-	0	4	7	0	4	5	8
---	---	---	---	---	---	---	---	---	---

Part II Certification

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
- I am a U.S. citizen or other U.S. person (defined below); and
- The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here Signature of U.S. person ▶ *Scott Zahorchak* DocuSigned by: **Date** ▶ 1/8/2024 | 11:30:38 AM EST

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)

- Form 1099-DIV (dividends, including those from stocks or mutual funds)
 - Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
 - Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
 - Form 1099-S (proceeds from real estate transactions)
 - Form 1099-K (merchant card and third party network transactions)
 - Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
 - Form 1099-C (canceled debt)
 - Form 1099-A (acquisition or abandonment of secured property)
- Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, later.



Crown Castle Inc. - Crown Castle Fiber LLC
Attachment to W-9

Crown Castle Fiber LLC (EIN: 01-0570431) is a single member limited liability company treated as a disregarded entity for federal tax purposes. It's owner Crown Castle Inc. (EIN: 76-0470458) is recognized as the corporate taxpayer for federal purposes. In accordance with IRS rules, Form W-9 for Crown Castle Fiber LLC has been completed to reflect Crown Castle Inc. as the taxpayer for federal purposes.

<p>PRODUCER</p> <p>Willis Towers Watson Northeast, Inc. c/o 26 Century Blvd P.O. Box 305191 Nashville, TN 372305191</p>	<p>THIS MEMORANDUM IS ISSUED AS A MATTER OF INFORMATION ONLY TO AUTHORIZED VIEWERS FOR THEIR INTERNAL USE ONLY AND CONFERS NO RIGHTS UPON ANY VIEWER OF THIS MEMORANDUM OTHER THAN THOSE PROVIDED FOR IN THE POLICY. THIS MEMORANDUM DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE DESCRIBED BELOW. THIS MEMORANDUM MAY ONLY BE COPIED, PRINTED AND DISTRIBUTED WITHIN AN AUTHORIZED VIEWER AND MAY ONLY BE USED AND VIEWED BY AN AUTHORIZED VIEWER FOR ITS INTERNAL USE. ANY OTHER USE, DUPLICATION OR DISTRIBUTION OF THIS MEMORANDUM WITHOUT PRIOR WRITTEN CONSENT IS PROHIBITED.</p>
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<p>INSURED</p> <p>Crown Castle Inc. See Attached Named Insured List 8020 Katy Freeway COIRequest@crowncastle.com Houston, USA, TX 77024</p>	<p style="text-align: center;">COMPANIES AFFORDING COVERAGE</p> <p>COMPANY A AIG Specialty Insurance Company COMPANY B Berkshire Hathaway Specialty Insurance Company COMPANY C Continental Casualty Company COMPANY D HDI Global Specialty SE COMPANY E Transportation Insurance Company</p>
--	---

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOT WITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS MEMORANDUM MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

GENERAL LIABILITY

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
C	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PROJECT <input type="checkbox"/> LOC <input type="checkbox"/> OTHER	7018331477	04/01/2024	04/01/2025	EACH OCCURRENCE \$ 2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 1,000,000 MED EXP (Any one person) \$ 10,000 PERSONAL & ADV INJURY \$ 2,000,000 GENERAL AGGREGATE \$ 4,000,000 PRODUCTS - COMP/OP AGG \$ 4,000,000

AUTO LIABILITY

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
C	<input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS ONLY	BUA 7018331432	04/01/2024	04/01/2025	COMBINED SINGLE LIMIT (Ea accident) \$ 2,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$

UMBRELLA/EXCESS LIABILITY

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
B	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> DED <input checked="" type="checkbox"/> RETENTION 25,000	47-UMO-303445-10	04/01/2024	04/01/2025	EACH OCCURRENCE \$ 5,000,000 AGGREGATE \$ 5,000,000

WORKERS COMPENSATION AND EMPLOYERS' LIABILITY

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
E	ANY <input type="checkbox"/> No PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	WC7018365273	04/01/2024	04/01/2025	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTHER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

ADDITIONAL COVERAGE

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
D	Architects & Engineers Prof Liab	FRL-H-P-PL-00002323-01	11/30/2023	11/30/2024	Each Claim \$ 5,000,000 Policy Aggregate \$ 5,000,000

ADDITIONAL COVERAGE

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	Cyber Liability/Tech E&O	01-773-74-09	11/30/2023	11/30/2024	\$ 2,000,000.

ADDITIONAL INFORMATION

If previously agreed and required by written agreement, the Certificate Holder(s) and others as deemed by the contract are included as Additional Insureds as their interest may appear and only with respect to the liability arising out of the operations performed by or on behalf of the Named Insured under the General Liability, Automobile Liability and Cyber Liability Policies. The Umbrella Liability Policy is follow form to the underlying.

It is further agreed that the General Liability and Automobile Liability, as afforded, shall be Primary and Non-Contributory with any other insurance in force for or which may be purchased by Additional Insured(s) if agreed in written contract.

The General Liability, Automobile Liability, Umbrella Liability, Workers Compensation, Cyber Technology E&O and Architects and Engineers Professional Liability policies include a Waiver of Subrogation in favor of the Additional Insured(s) when agreed in written contract prior to the loss or event, but always subject to the policy terms, conditions and exclusions as permitted by law.

Additional Documentation 

The Memorandum of Insurance serves solely to list insurance policies, limits and dates of coverage. Any modifications hereto are not authorized.

M001-2022



[Department of State](#) / [Division of Corporations](#) / [Search Records](#) / [Search by Entity Name](#) /

Detail by Entity Name

Foreign Limited Liability Company
CROWN CASTLE FIBER LLC

Filing Information

Document Number	M17000009395
FEI/EIN Number	01-0570431
Date Filed	11/02/2017
State	NY
Status	ACTIVE
Last Event	REINSTATEMENT
Event Date Filed	10/25/2018

Principal Address

8020 Katy Freeway
HOUSTON, TX 77024

Changed: 03/22/2022

Mailing Address

8020 Katy Freeway
HOUSTON, TX 77024

Changed: 03/22/2022

Registered Agent Name & Address

C T CORPORATION SYSTEM
1200 SOUTH PINE ISLAND ROAD
PLANTATION, FL 33324

Name Changed: 10/25/2018

Authorized Person(s) Detail

Name & Address

Title INTERIM PRESIDENT AND CHIEF EXECUTIVE OFFICER

MELONE, ANTHONY J
8020 KATY FREEWAY
HOUSTON, TX 77024

Title EXECUTIVE VICE PRESIDENT AND CHIEF OPERATING OFFICER – TOWERS

KAVANAGH, MIKE
8020 Katy Freeway
HOUSTON, TX 77024

Title EXECUTIVE VICE PRESIDENT - CORPORATE DEVELOPMENT AND STRATEGY

KELLEY, PHILIP M.
8020 Katy Freeway
HOUSTON, TX 77024

Title EXECUTIVE VICE PRESIDENT AND CHIEF FINANCIAL OFFICER

SCHLANGER, DANIEL K.
8020 Katy Freeway
HOUSTON, TX 77024

Title EXECUTIVE VICE PRESIDENT AND CHIEF OPERATING OFFICER – NETWORK

LEVENDOS, CHRISTOPHER
8020 Katy Freeway
HOUSTON, TX 77024

Title Secretary

REID, DONALD J
8020 Katy Freeway
HOUSTON, TX 77024

Title Asst. Secretary

BLANKENSHIP, MASHA
8020 Katy Freeway
HOUSTON, TX 77024

Title ASSISTANT SECRETARY

PASMAN, INGE
8020 Katy Freeway
HOUSTON, TX 77024

Title VICE PRESIDENT – TAX

ZAHORCHAK, SCOTT
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

Title VICE PRESIDENT AND CONTROLLER

COLLINS, ROBERT S.
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

Title EXECUTIVE VICE PRESIDENT AND GENERAL COUNSEL

ADAMS, JR., EDWARD B.
8020 Katy Freeway
HOUSTON, TX 77024

Title VICE PRESIDENT – LEASING AND REAL ESTATE OPERATIONS

LOWE, BENJAMIN
8020 KATY FREEWAY
HOUSTON, TX 77024

Title VICE PRESIDENT – CORPORATE DEVELOPMENT

MONAHAN, KEITH
301 N CATTLEMEN RD
SARASOTA, FL 34232

Title DIRECTOR - ACQUISITIONS

ANGEL, JONATHAN
301 N CATTLEMEN RD
SARASOTA, FL 34232

Title VICE PRESIDENT – TOWER OPERATIONS

DENENY, OWEN
900 CORPORATE BLVD. SUITE #2
NEWBURGH, NY 12550

Title DIRECTOR - PROGRAM MANAGEMENT

EMACIO, JOHN
8000 AVALON BOULEVARD
ALPHARETTA, GA 30005

Title DIRECTOR - FIELD OPERATIONS

ELKINS, JOSH
TWO CHASE CORPORATE DRIVE SUITE 105
BIRMINGHAM, AL 35244

Title TAX OFFICER

CRAWFORD, MIKE
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

Title TAX OFFICER

KELLY, DEBORAH
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

Title SENIOR VICE PRESIDENT – IMPLEMENTATION & OPERATIONS

ROHRKEMPER, KAREN
8020 Katy Freeway
HOUSTON, TX 77024

Title VICE PRESIDENT – TOWER SERVICES

SIROHEY, FAHD
6191 N STATE HIGHWAY 161 SUITE 200
IRVING, TX 75038

Title VICE PRESIDENT – NETWORK STRATEGY AND TECHNOLOGY

BREWER, KELLY
1800 W PARK DR SUITE 200
WESTBOROUGH, MA 01581

Title VICE PRESIDENT – NETWORK OPERATIONS

JORDAN, SHELDON
9250 W FLAGLER ST
MIAMI, FL 33174

Title VICE PRESIDENT – NETWORK ENGINEERING

FOTOUH, SHARIF
1800 W PARK DR , SUITE 200
WESTBOROUGH, MA 01581

Title VICE PRESIDENT – LEGAL

HARPER, MINDY
8020 KATY FREEWAY
HOUSTON, TX 77024

Title DIRECTOR – RISK MANAGEMENT

CHINIEWICZ, JESSICA
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

Title TAX OFFICER

HEATH, JENNIFER
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

Title VICE PRESIDENT – CORPORATE FINANCE AND TREASURER

HINSON, KRISTOFFER
8020 KATY FREEWAY
HOUSTON, TX 77024

Annual Reports

Report Year	Filed Date
2022	03/22/2022
2023	04/30/2023
2024	04/23/2024

Document Images

04/23/2024 -- ANNUAL REPORT	View image in PDF format
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06/24/2022 -- AMENDED ANNUAL REPORT	View image in PDF format
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04/26/2021 -- ANNUAL REPORT	View image in PDF format
06/12/2020 -- ANNUAL REPORT	View image in PDF format
10/09/2019 -- AMENDED ANNUAL REPORT	View image in PDF format
02/19/2019 -- ANNUAL REPORT	View image in PDF format
10/25/2018 -- REINSTATEMENT	View image in PDF format
05/17/2018 -- LC Name Change	View image in PDF format
11/02/2017 -- Foreign Limited	View image in PDF format



ANNE M. GANNON
 CONSTITUTIONAL TAX COLLECTOR
Serving Palm Beach County
 Serving you.

P.O. Box 3353, West Palm Beach, FL 33402-3353
 www.pbctax.com Tel: (561) 355-2264

****LOCATED AT****
 6420 CONGRESS AVE 2000
 BOCA RATON, FL 33434

TYPE OF BUSINESS	OWNER	CERTIFICATION #	RECEIPT #/DATE PAID	AMT PAID	BILL #
ADMINISTRATIVE OFFICE	CROWN CASTLE USA INC		U24.55809 11/08/2023	\$37.95	B40116187

This document is valid only when receipted by the Tax Collector's Office.

CROWN CASTLE USA INC
 CROWN CASTLE USA INC
 2000 CORPORATE DR
 CANONSBURG PA 15317-8564

2
7 - 27



STATE OF FLORIDA
PALM BEACH COUNTY
2023 / 2024 LOCAL BUSINESS TAX RECEIPT
LBTR Number: 200708394
EXPIRES: 09/30/2024

This receipt grants the privilege of engaging in or managing any business profession or occupation within its jurisdiction and **MUST** be conspicuously displayed at the place of business and in such a manner as to be open to the view of the public.

THE OFFICIAL SITE OF THE FLORIDA DEPARTMENT OF BUSINESS & PROFESSIONAL REGULATION



Department of Business & Professional Regulation

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LICENSEE SEARCH OPTIONS

10:26:15 AM 4/22/2024

Data Contained In Search Results Is Current As Of 04/22/2024 10:25 AM.

Search Results - 6 Records

Please see our [glossary of terms](#) for an explanation of the license status shown in these search results.

For additional information, including any complaints or discipline, click on the name.

License Type	Name	Name Type	License Number/ Rank	Status/Expires
Engineering Business Registry	CROWN CASTLE USA, INC	Primary	28970 Registry	Current
Main Address*: 2000 CORPORATE DRIVE CANONSBURG, PA 15317				
Certified General Contractor	CROWN CASTLE USA, INC.	DBA	CGC1533967 Cert General	Current, Active 08/31/2024
License Location 4511 N HIMES AVE, STE210 TAMPA, FL 33614				
Address*: Main Address*: 1538 LAKE POLO DR ODESSA, FL 33556				
Certified General Contractor	CROWN CASTLE USA, INC.	DBA	CGC062125 Cert General	Current, Active 08/31/2024
Main Address*: 4511 N HIMES AVE TAMPA, FL 33614				
Certified Specialty Contractor	CROWN CASTLE USA, INC.	DBA	SCC131152078 Cert Specialty	Null and Void, 08/31/2020
Main Address*: 9368 PRIMROSE LN ROSEVILLE, CA 95661				
Construction Financial Officer	CROWN CASTLE USA, INC.	DBA	FRO12959 Fin Officer	Current
License Location 2000 CORPORATE DRIVE CANONSBURG, PA 15317				
Address*: Main Address*: 47 SABRINA CT HOLMES, NY 12531				
Construction Business Information	CROWN CASTLE USA, INC.	Primary	Business Info	Current

Main Address*: 4511 N HIMES AVE TAMPA, FL 33614[Back](#)[New Search](#)*** denotes**

Main Address - This address is the Primary Address on file.

Mailing Address - This is the address where the mail associated with a particular license will be sent (if different from the Main or License Location addresses).

License Location Address - This is the address where the place of business is physically located.

2601 Blair Stone Road, Tallahassee FL 32399 :: Email: **Customer Contact Center** :: Customer Contact Center: 850.487.1395

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Under Florida law, email addresses are public records. If you do not want your email address released in response to a public-records request, do not send electronic mail to this entity. Instead, contact the office by phone or by traditional mail. If you have any questions, please contact 850.487.1395. *Pursuant to Section 455.275(1), Florida Statutes, effective October 1, 2012, licensees licensed under Chapter 455, F.S. must provide the Department with an email address if they have one. The emails provided may be used for official communication with the licensee. However email addresses are public record. If you do not wish to supply a personal address, please provide the Department with an email address which can be made available to the public. Please see our [Chapter 455](#) page to determine if you are affected by this change.

Tax Exceptions to RFP Terms and Conditions

Interstate Usage

Licensee acknowledges that Company has no ability to determine whether the communications traffic carried via the licensed Ethernet is jurisdictionally interstate or intrastate. Unless otherwise stated in the applicable Order Form, Licensee acknowledges and agrees that the communications traffic to be carried via the Company Network shall be treated as jurisdictionally interstate, pursuant to the Federal Communications Commission's mixed-use "10% Rule" (47 CFR 36.154, 4 FCC Rcd. 1352).

Order Form clarification

All charges set forth in an Order Form(s) are exclusive of, and Licensee shall be responsible for and agrees to pay, any and all applicable international, federal, state and local use, excise, sales, value added, consumption, gross receipts, access, franchise and other taxes, fees, assessments, duties and surcharges (including, without limitation, any universal service fund surcharge) in connection with the provision, sale or use of the Product or facility furnished to Licensee (collectively referred to as "Taxes"). Licensee shall not be responsible for, and Taxes will not include, taxes on Crown Castle's net income. If Licensee believes it is exempt from Taxes, Licensee shall provide Crown Castle with a valid and duly executed exemption certificate and any other information with respect to such exemption as Crown Castle may require; such certificate will be honored from the date that Crown Castle receives such certificate and additional information from Licensee. If any such exemption is ruled invalid by the tax or governmental authority for any reason, Licensee shall reimburse Crown Castle for any Taxes, including without limitation any penalties and interest, arising from or in connection with such invalid claim of exemption.

RFP Exceptions/Clarification

In addition to the agreed upon fees, the Customer shall pay all taxes imposed upon the provision of the services it purchases that are not subject to the Customer's exemption. Taxes are not incorporated within or included in any prices quoted in Crown Castle's proposal. If Crown Castle's proposal does quote taxes, any such tax quote is an estimate and is not fixed over the term of the agreement. To the extent additional taxes are imposed that do not provide an exemption to the Customer, current exemptions are lost, or there are taxes other than the current sales, use or excise taxes imposed upon the provision of the services to the Customer, such taxes will be passed through to the Customer. The Customer shall pay all taxes, surcharges and fees at the then current rate.

MASTER TELECOMMUNICATIONS LICENSE AGREEMENT

LICENSEE:	
Address:	
State of Organization:	

This **MASTER TELECOMMUNICATIONS LICENSE AGREEMENT** is effective as of the last date of execution below ("Effective Date") by and between **CROWN CASTLE FIBER LLC** ("Crown Castle" or "Company"), and Licensee (as named above). This Master Telecommunication License Agreement and any and all Supplements (as defined herein) and exhibits hereto are collectively referred to as the "Agreement". Crown Castle and Licensee are collectively referred to as the "Parties" or individually as a "Party".

1. PRODUCTS, ORDER FORMS, AND SUPPLEMENTS.

1.1 Products and Order Forms. This Agreement applies to each telecommunications facility, or product, provided or licensed by Crown Castle to Licensee (each a "Product"). Each Product will be specified in an order form executed by the Parties (each an "Order Form"). Purchase orders issued by Licensee shall not be deemed to amend, modify or supplement this Agreement or any Order Form issued hereunder and shall not be legally binding on Crown Castle unless otherwise agreed in writing by Crown Castle.

1.2 Supplements. From time to time, the Parties may execute one or more supplements to this Agreement that may contain technical specifications, service level objectives, and other terms and conditions applicable to specific types of Products (each a "Supplement"). Upon execution by the Parties, each such Supplement shall be incorporated into this Agreement. In the event Crown Castle and Licensee have not executed a Supplement or Service Level Agreement applicable to the type of product contemplated by an Order Form, then the product-specific portion of the then-current version of the "Crown Castle Terms and Conditions" available at <https://www.crowncastle.com/terms-and-conditions> ("Online Terms") shall apply.

1.3 Crown Castle Affiliates. At Crown Castle's option, Products may be provided or licensed by Crown Castle, or by an Affiliate of Crown Castle. Any charges or other amounts received by Crown Castle under this Agreement, to the extent attributable to Products provided or licensed by an Affiliate of Crown Castle, shall be received by Crown Castle in its capacity as an agent on behalf of such Affiliate. Internet access will be provided by Crown Castle's affiliate, Crown Castle Fiber Enterprise LLC. In addition, Order Forms may be executed by an Affiliate of Crown Castle, and in such event, any and all references to "Crown Castle" herein shall be deemed to be a reference to the applicable Affiliate of Crown Castle that executed such Order Form. The term "Affiliate" as used hereunder shall mean, with respect to either Party, any entity controlled by, in control of, or under common control with such Party.

2. TERM.

2.1 Agreement Term. The term of this Agreement commences on the Effective Date, and continues through the later of (i) five (5) years from Effective Date, or (ii) latest expiration of active Order Forms, unless earlier terminated as provided herein. This Agreement is a set of general terms and conditions, and does not obligate either Party to provide or pay for any Product other than as reflected in a particular Order Form executed by the Parties.

2.2 Product Term. The term for each Product (each a "Product Term") begins on the Acceptance Date (as defined below) applicable to such Product, and remains in effect until the expiration of the initial Product Term specified in the applicable Order Form unless earlier terminated as provided herein. The Product Term shall automatically extend for consecutive one-year renewal terms, unless either Party notifies the other of its intent not to renew at least ninety (90) days prior to the expiration of the then-current initial or renewal Product Term.

2.3 Acceptance Date. The "Acceptance Date" for each Product shall be the earliest of (a) the date on which Licensee delivers written notice of acceptance, (b) the date on which Licensee begins to use the Product, other than for testing purposes, or (c) the second (2nd) business day following Crown Castle's delivery of notice of the installation of the Product (such notice, a "Connection Notice"), unless Licensee notifies Crown Castle in writing within said two-day period of a Defect in the Product, specifying in detail the nature of such Defect. A "Defect" exists if the Product fails to perform materially in accordance with its technical specifications as set forth in the applicable Supplement ("Specifications"). Upon receipt of notice of a Defect, Crown Castle and Licensee shall work cooperatively to promptly remedy such Defect, and Crown Castle shall deliver another Connection Notice, whereupon the process described in the first sentence of this Section shall apply again. If the Acceptance Date is delayed as a result of any failure, act or omission of Licensee, Crown Castle will give Licensee written notice to cure such failure within five (5) calendar days. If Licensee fails to cure within such period, the Acceptance Date will be deemed to be the end of such five (5) calendar-day period.

3. PAYMENT TERMS.

3.1 Charges. Crown Castle will invoice Licensee for any non-recurring charge ("NRC") associated with the Product upon or after execution of the applicable Order Form. The monthly-recurring charge ("MRC") associated with the Product shall begin to accrue on the Acceptance Date of such Product. Crown Castle will invoice Licensee the MRC associated with the Product in advance, except Crown Castle

will invoice Licensee usage based charges (if any) associated with the Product in arrears. An MRC for a partial month will be pro-rated. Licensee shall be responsible for payment of the MRC for the entire Product Term specified in the applicable Order Form.

3.2. Payments; Late Payments. Licensee shall pay each invoice within thirty (30) days of the date of the invoice (the “Due Date”), without setoff or deduction. In the event Licensee fails to make any payment by the Due Date, Licensee shall pay a late charge on all past due amounts at the rate of one and one-half percent (1.5%) per month, compounded monthly (or, if lower, the maximum rate allowed by law). Further, Crown Castle shall be entitled to recover from Licensee all collection costs, including attorney fees.

3.3 Disputed Payments. Licensee may in good faith dispute charges set forth in an invoice, provided Licensee notifies Crown Castle of such dispute in writing no later than sixty (60) days after the date of the invoice. Failure of Licensee to so notify Crown Castle of any dispute shall constitute a waiver by Licensee of any dispute. In the event Licensee so disputes any amount in good faith, Licensee must submit a documented claim in writing for the disputed amount and pay the undisputed amounts in accordance with Section 3.2. Licensee shall submit all documentation as may reasonably be required to support the claim. If the dispute is resolved in favor of Licensee and Licensee previously paid the disputed amount to Crown Castle, Crown Castle will apply a credit to Licensee’s account in the amount of the dispute. If the dispute is resolved in Crown Castle’s favor and Licensee has withheld the disputed amount, Licensee must pay the disputed amount (together with the late payment charge pursuant to Section 3.2) within five (5) business days following notice of the resolution of the dispute.

4. TAXES AND FEES.

4.1 Taxes and Fees. All charges set forth in an Order Form(s) are exclusive of, and Licensee shall be responsible for and agrees to pay, any and all applicable international, federal, state and local use, excise, sales, value added, consumption, gross receipts, access, franchise and other taxes, fees, assessments, duties and surcharges (including, without limitation, any universal service fund surcharge) levied or imposed upon Crown Castle or Licensee in connection with the provision, sale or use of the Product or facility furnished to Licensee and which Crown Castle is required or permitted to collect from Licensee (collectively referred to as “Taxes”). Licensee shall not be responsible for, and Taxes will not include, taxes on Crown Castle’s net income. If Licensee believes it is exempt from Taxes, Licensee shall provide Crown Castle with a valid and duly executed exemption certificate and any other information with respect to such exemption as Crown Castle may require; such certificate will be honored from the date that Crown Castle receives such certificate and additional information from Licensee. If any such exemption is ruled invalid by the tax or governmental authority for any reason, Licensee shall reimburse Crown Castle for any Taxes, including without limitation any penalties and interest, arising from or in connection with such invalid claim of exemption.

4.2 REIT Status. Licensee acknowledges that: (i) Crown Castle is directly or indirectly owned in whole or in part by an entity (“REIT Owner”) that qualifies as a “real estate investment trust” (“REIT”) under Sections 856 through 860 of the Internal Revenue Code of 1986, as amended (the “Code”); and (ii) Crown Castle and REIT Owner are therefore subject to operating and other restrictions under the Code. The Parties intend that this Agreement shall constitute a lease of the Products for purposes of Section 856 of the Code, and the Parties shall not take any position on any tax return inconsistent therewith except as required by law.

5. CROWN CASTLE EQUIPMENT AND NETWORK; LICENSEE EQUIPMENT.

5.1 Crown Castle Equipment; Crown Castle Network. The telecommunications devices, apparatus and associated equipment owned, leased, or otherwise obtained by Crown Castle to provide Products (“Crown Castle Equipment”) and Crown Castle’s fiber optic cable network and associated optical/electronic equipment used to deliver Products, whether owned, leased or otherwise obtained by Crown Castle (the “Crown Castle Network”) shall remain the sole and exclusive property of Crown Castle notwithstanding that it may be or become attached or affixed to real property, and nothing contained herein or in any Order Form grants or conveys to Licensee any right, title or interest in any Crown Castle Equipment or the Crown Castle Network. Licensee may not, and may not permit others to, alter, adjust, encumber, tamper, repair, rearrange, change, remove, relocate, or damage any Crown Castle Equipment or the Crown Castle Network without the prior written consent of Crown Castle. Licensee may not cause any liens to be placed on any Crown Castle Equipment or the Crown Castle Network, and will cause any such liens to be removed within ten (10) days of Licensee’s knowledge thereof. Licensee shall be liable to Crown Castle for any loss or damage to the Crown Castle Equipment or Crown Castle Network caused by Licensee or Licensee’s employees, contractors, agents or end users. Nothing herein shall prevent Crown Castle from using the Crown Castle Network and Crown Castle Equipment to provide products to other customers.

5.2 Extension of Network. To the extent an Order Form requires Crown Castle to complete construction, extend the Crown Castle Network and/or obtain additional Underlying Rights, Licensee shall use commercially reasonable efforts to assist Crown Castle in obtaining such Underlying Rights as necessary to provide the Product. Crown Castle may, without liability to either Party, terminate a Product prior to delivery, if Crown Castle encounters unexpected construction costs, or unavailability of or excess costs for Underlying Rights, that make the construction economically or legally unfeasible. Following the Acceptance Date of the Product, in the event that Crown Castle is unable to maintain any necessary Underlying Rights without incurring additional costs, unless Licensee bears the costs of obtaining such Underlying Rights, Crown Castle may cancel the applicable Order Form and shall incur no liability to Licensee hereunder. Without limiting the foregoing, Crown Castle shall not be deemed to be in breach of this Agreement for its failure to meet any anticipated Product installation or delivery date if such failure is caused, in whole or in part, by (i) a Force Majeure Event, (ii) failure to obtain, or delay in obtaining, any required Underlying Rights, (iii) construction delays, or (iv) any other circumstances beyond the control of Crown Castle. “Underlying Rights” means any and all agreements, licenses, conduit use agreements, pole attachment agreements, leases, easements, rights-of-way, franchises, permits, governmental and regulatory approvals and authorizations, and other rights, consents, and approvals that are necessary to construct, install, maintain, operate, and repair the Crown Castle Network and/or for Crown Castle to provide a Product other than building access rights described in Section 7.1. Without limiting the foregoing, Underlying Rights include agreements for Off-Net Products that are necessary for Crown Castle to provide a

Product. “Off-Net Product” shall mean any product provided by a third-party. “On-Net Product” shall mean any Product that uses transmission and related facilities owned and controlled by Crown Castle.

5.3 Licensee Equipment. Licensee shall, at its own expense, procure any equipment necessary to implement or receive each Product (“Licensee Equipment”). Crown Castle will have no obligation to install, maintain, or repair Licensee Equipment. Promptly upon notice from Crown Castle, Licensee shall eliminate any hazard, interference or Product obstruction that any such Licensee Equipment is causing or may cause as reasonably determined by Crown Castle.

6. MAINTENANCE.

6.1 Scheduled Maintenance. Crown Castle will endeavor to conduct (or cause to be conducted) scheduled maintenance that is reasonably expected to interrupt the Product between 12:00 midnight and 6:00 a.m. local time or, upon Licensee’s reasonable request, at a time mutually agreed to by Licensee and Crown Castle. Crown Castle will use commercially reasonable efforts to notify Licensee of scheduled maintenance that is reasonably expected to interrupt the Product via telephone or e-mail, no less than five (5) days prior to commencement of such maintenance activities. Licensee shall provide a list of Licensee contacts for maintenance and escalation purposes, which may be included on the Order Form, and Licensee shall provide updated lists to Crown Castle, as necessary.

6.2 Emergency Maintenance. Crown Castle may perform emergency maintenance in its reasonable discretion, with or without prior notice to Licensee, to preserve the overall integrity of the Crown Castle Network. Crown Castle will notify Licensee as soon as reasonably practicable of any such emergency maintenance activity that materially and adversely impacts a Product.

6.3 Product Issues. Licensee may notify Crown Castle’s Network Operating Center (“NOC”) of Product problems by telephone 1-855-93-FIBER (855-933-4237), or at the contacts listed in Crown Castle’s Customer Support Information provided to Licensee, which may be updated by Crown Castle from time to time. If Crown Castle dispatches a field technician to Licensee or an end-user location and the problem is caused by (i) the Licensee Equipment or any end-user’s equipment or (ii) any acts or omissions of Licensee or its end user, or of any of its or their invitees, licensees, customers or contractors, Licensee will pay Crown Castle for any and all associated time and materials at Crown Castle’s then-standard rates.

7. IMPLEMENTATION REQUIREMENTS.

7.1 Access to Premises. Unless otherwise provided in the applicable Order Form, Licensee, at its own expense, shall secure throughout the Product Term any easements, leases, licenses or other agreements necessary to allow Crown Castle to use pathways into and in each building at which Licensee’s or its end-user’s premises is located, to the Demarcation Point. Such access rights shall grant to Crown Castle the right to access such premises to the extent reasonably requested by Crown Castle to install, maintain, repair, replace and remove any and all equipment, cables or other devices Crown Castle deems necessary to provide the Product. Upon expiration or termination of the applicable Product Term, Licensee shall grant Crown Castle access to its premises as necessary to enable Crown Castle to remove the Crown Castle Equipment. Crown Castle, its employees, contractors and agents shall have access to any Crown Castle Equipment or facilities at a Licensee or end user premises. Notwithstanding anything to the contrary herein, Crown Castle shall have no liability for any delay or failure in its performance to the extent caused by any delay or failure of Licensee (including, but not limited to, the failure to provide Crown Castle prompt access) and/or caused by any notice or access restrictions or requirements. “Demarcation Point” shall mean the network interface point where Crown Castle hands off the Product to Licensee. The Demarcation Point delineates where responsibility for the Parties’ respective networks, equipment and/or maintenance obligations begin and end. Licensee is responsible, at its sole cost and expense, for connecting to the Demarcation Point.

7.2 Space and Power. Licensee shall procure and make available to Crown Castle, at Licensee’s locations and at end user locations where a Product is provided or licensed, at Licensee’s sole cost and expense, adequate space, AC power and HVAC for Crown Castle Equipment.

7.3 Property Owner Not Liable. Neither Licensee nor any of Licensee’s end-users shall have any recourse against any property owner or property manager of any premises to which any Product is delivered and/or at which Crown Castle Network or Equipment is located, as a result of or in reliance upon this Agreement. Without limiting the foregoing, this provision shall not be construed to impose any liability on Crown Castle, nor shall Crown Castle have any liability, for or on behalf of such property owner or property manager.

8. DEFAULT & REMEDIES

8.1 Default By Licensee; Suspension. In the event (i) Licensee fails to timely and fully make any payment required hereunder, and such payment breach is not cured within five (5) days after written notice thereof, or (ii) Licensee breaches any other provision of this Agreement and such breach is not cured within thirty (30) days after receipt of written notice thereof, then Crown Castle may, at its sole option, either (a) terminate any and all Products, (b) suspend the affected Product to which the breach is related without further notice to Licensee, and/or (c) pursue any other remedies available to Crown Castle at law, or in equity.

8.2 Default By Crown Castle. Licensee may terminate a Product in the event Crown Castle breaches this Agreement with respect to such Product and such breach is not cured within thirty (30) days after Crown Castle’s receipt of written notice thereof, provided that if a breach subject to this Section 8.2 cannot be cured within thirty (30) days, but is capable of being cured within a reasonable time thereafter, then Licensee may not terminate the Product if Crown Castle commences to cure within said thirty (30) days and thereafter diligently and continuously pursues such cure to completion, or Crown Castle provides Licensee reasonable assurance that the same breach to the same Product will not subsequently occur.

9. INSURANCE.

9.1 **Insurance.** Each Party shall procure and maintain the following insurance coverage:

- Commercial General and Umbrella Liability Insurance. Commercial general liability (CGL) and, if necessary, commercial umbrella insurance with a limit of not less than \$5,000,000 for each occurrence. CGL insurance shall cover liability arising from premises, operations, independent contractors, products-completed operations, personal and advertising injury, and liability assumed under an insured contract. Each Party shall name the other Party as an additional insured to provide coverage for the additional insured on a primary and non-contributory basis. The coverage provided to the additional insured shall apply to the extent of the indemnification obligation identified in paragraph 10.2.
- Workers Compensation Insurance. Workers compensation and employers liability insurance as required by the laws and regulations applicable to the employees who are engaged in the performance of any activities hereunder or under an Order Form.

9.2 **Type and Proof of Insurance.** The insurance coverage required by this Section 9 shall be obtained on an occurrence basis from carriers having a Best Rating Product rating of A- or better. Upon request, a Party will provide the other Party a certificate of insurance or other proof of such insurance.

10. LIMITATION OF LIABILITY; INDEMNIFICATION.

10.1. **LIMITATION OF LIABILITY.** NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, CONSEQUENTIAL, SPECIAL, EXEMPLARY, INCIDENTAL, OR PUNITIVE DAMAGES, INCLUDING WITHOUT LIMITATION LOSS OF USE OR DATA, OR LOST BUSINESS, REVENUE, PROFITS OR GOODWILL, ARISING IN CONNECTION WITH THIS AGREEMENT OR ANY PRODUCT OR ANY ORDER FORM, EVEN IF THE PARTY KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES.

CROWN CASTLE'S TOTAL LIABILITY TO LICENSEE IN CONNECTION WITH THIS AGREEMENT FOR ANY AND ALL CAUSES OF ACTION AND CLAIMS, INCLUDING WITHOUT LIMITATION, BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE, STRICT LIABILITY, MISREPRESENTATION AND OTHER TORTS, SHALL BE LIMITED TO THE LESSER OF: (A) PROVEN DIRECT DAMAGES OR (B) THE AGGREGATE AMOUNT OF PAYMENTS MADE BY LICENSEE TO CROWN CASTLE FOR THE AFFECTED PRODUCT DURING THE TWELVE (12) MONTH PERIOD IMMEDIATELY PRECEDING THE MONTH IN WHICH THE CIRCUMSTANCES GIVING RISE TO THE CLAIM OCCURRED. IN NO EVENT SHALL CROWN CASTLE BE LIABLE FOR ANY DAMAGES ARISING OUT OF THE ACTS OR OMISSIONS OF UNAFFILIATED THIRD PARTIES, INCLUDING UNDERLYING PRODUCT PROVIDERS, OR ANY THIRD-PARTY EQUIPMENT OR PRODUCTS NOT PROVIDED OR LICENSED BY CROWN CASTLE.

10.2. **Indemnification.** Except to the extent of the other Party's negligence or willful misconduct, each Party shall indemnify, defend, release, and hold harmless the other Party, its Affiliates, directors, members, officers, employees, managers, agents, representatives, and contractors (collectively, "Indemnitees") from and against any third-party action, claim, suit, judgment, damage, demand, loss, or penalty, and any cost or expense associated therewith (including but not limited to reasonable attorneys' fees, expert fees and costs) (collectively, "Claims") imposed upon such Indemnitee(s) by reason of damage to real or tangible personal property or for bodily injury, including death, as a result of any willful misconduct or negligent act or omission on the part of the indemnifying Party in connection with the performance of this Agreement. In addition to the foregoing, Licensee shall indemnify, defend, release, and hold harmless Crown Castle and its Indemnitees from and against any third-party Claims brought against Crown Castle and its Indemnitees arising from or in connection with Licensee's (or its end users') unlawful use of a Product.

10.3. **Indemnification Process.** If a Party ("Indemnifying Party") is required to indemnify the other Party ("Indemnified Party") pursuant to Section 10.2, the Indemnified Party shall promptly notify the Indemnifying Party. The Indemnifying Party will be permitted to assume primary control of the defense of the action with counsel of the Indemnifying Party's choice. The Indemnified Party will cooperate in the defense of the action as requested by the Indemnifying Party. The Indemnified Party may, but shall not be required to, participate in the defense of the action with its own counsel, at its own expense. The Indemnifying Party will assume the cost of the defense on behalf of the Indemnified Party and its Affiliates (other than the expense of Indemnified Party's counsel pursuant to the immediately preceding sentence) and will pay all expenses and satisfy all judgments which may be incurred or rendered against the Indemnified Party or its Affiliates in connection therewith, provided that without the Indemnified Party's written consent, the Indemnifying Party shall not enter into or acquiesce to any settlement containing any admission of or stipulation to any guilt, fault, or wrongdoing on the part of the Indemnified Party, which would otherwise adversely affect the Indemnified Party, or which results in less than a full release of all claims.

11. REPRESENTATIONS AND WARRANTIES.

11.1 EXCEPT AS EXPRESSLY PROVIDED IN THIS AGREEMENT, CROWN CASTLE MAKES NO REPRESENTATIONS AND WARRANTIES UNDER THIS AGREEMENT, EITHER EXPRESS, IMPLIED OR STATUTORY, AND CROWN CASTLE HEREBY EXPRESSLY EXCLUDES AND DISCLAIMS ALL OTHER WARRANTIES, INCLUDING, WITHOUT LIMITATION, (i) NON-INFRINGEMENT, (ii) IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND (iii)

PERFORMANCE OR INTEROPERABILITY OF THE PRODUCT WITH ANY LICENSEE OR END-USER EQUIPMENT. NO WARRANTY IS MADE OR PASSED ON WITH RESPECT TO ANY PRODUCTS OR SERVICES PROVIDED BY OR FURNISHED BY ANY THIRD PARTY.

11.2 Each Party represents and warrants to the other that (a) it has the full right and authority to enter into, execute, deliver and perform its obligations under this Agreement, (b) it will comply with all applicable federal, state and local laws, statutes, rules and regulations in connection with the provision and use of the Products (including but not limited to the FCC’s “intermediate provider” requirements, 47 CFR § 64.2119, where applicable), and (c) this Agreement constitutes a legal, valid and binding obligation of such Party enforceable against such Party in accordance with its terms.

12. CONFIDENTIALITY; SERVICE MARKS; PUBLICITY.

12.1 Confidentiality. “Proprietary Information” means any information supplied by the disclosing Party, or its Affiliate, to a receiving Party, or its Affiliate, or obtained by the receiving Party, or its Affiliate, in the provision or receiving of a Product hereunder, in each instance relating to the disclosing Party, its Affiliates, and/or its customers which has been designated as confidential, proprietary or private or which, from the circumstances, in good faith should be treated as confidential, including but not limited to customer proprietary network information. Proprietary Information shall not include any of the following: (i) information that has been, or is subsequently, made public by the disclosing Party through no wrongful act of the receiving Party; (ii) information that is independently developed by the receiving Party without using any Proprietary Information of the disclosing Party; and (iii) information that has been previously known by or disclosed to the receiving Party by a third party not bound by confidentiality restrictions. Pricing information exchanged in connection with this Agreement, or included in any Order Form hereunder, and the terms and conditions of this Agreement, are hereby designated as confidential without further obligation on the part of either Party to mark or designate it as such. Each Party shall maintain in strict confidence all Proprietary Information of the other. Neither Party shall disclose Proprietary Information to any third person, except a receiving Party shall be permitted, without the disclosing Party’s prior written consent, to disclose Proprietary Information to its employees and Affiliates, financial, technical and professional advisors, representatives, contractors, subcontractors and consultants provided that the receiving Party has taken reasonable steps to ensure that such Proprietary Information is kept strictly confidential consistent with the confidentiality obligations hereunder. In addition, Crown Castle may use the Proprietary Information of Licensee to offer and/or discuss additional Products or other Crown Castle products to Licensee unrelated to the Products Licensee currently receives pursuant to this Agreement. If a receiving Party is required by any governmental authority or by applicable law to disclose any Proprietary Information, then to the extent permitted by applicable law, such receiving Party shall provide the disclosing Party with written notice of such requirement as soon as possible and prior to such disclosure. Upon receipt of written notice of the requirement to disclose Proprietary Information, the disclosing Party, at its expense, may then either seek appropriate protective relief in advance of such requirement to prevent all or part of such disclosure or shall waive the receiving Party’s compliance with the requirements of the foregoing sentence with respect to all or part of such Proprietary Information.

12.2 Service Marks, Trademarks and Publicity. Neither Party shall: (a) use the name, service mark, trademark, trade name, logo, or trade dress of the other Party; or (b) refer to the other Party in connection with any advertising, promotion, press release or publication, unless it obtains the other Party’s prior written approval.

13. ASSIGNMENT. Neither Party will assign or transfer this Agreement or any license or Order Form hereunder without the other Party’s prior written consent, such consent not to be unreasonably withheld. Any assignment made in violation of this requirement shall be void and invalid. Notwithstanding the foregoing, either Party may assign this Agreement without the other Party’s consent to a person or entity (i) that controls, is controlled by or is under common control with the assigning Party, (ii) which purchases all or substantially all of its assets or equity, or (iii) resulting from any merger, consolidation or other reorganization involving such Party.

14. FORCE MAJEURE. Neither Party shall be liable, nor shall any credit or other remedy be extended, for any delay or failure to fulfill any obligation under this Agreement or any Order Form due to any cause beyond a Party’s reasonable control, including, but not limited to: acts of God, flood, extreme weather, fire, natural calamity, terrorism, any moratorium, law, order, regulation, action or inaction of any governmental entity or civil or military authority, power or utility failures, fiber or cable cuts caused by third parties, unavailability of rights-of-way, national emergencies, insurrection, riots, wars, strikes, lock-outs, work stoppages or other labor difficulties, pole hits, or material shortages (each a “Force Majeure Event”).

15. NOTICES. Any request to terminate this Agreement, or any claim for breach thereof, shall be in writing and transmitted either via (i) overnight courier or hand delivery, or (ii) certified or registered mail, postage prepaid and return receipt requested, to the other Party at the following address. Notices shall be deemed delivered upon receipt.

Address for Licensee Notices:

Address for Crown Castle Notices:

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Attention: Legal Department – Networks

A Party may change the address for notices by notice to the other Party provided pursuant to this Section 15. All other notices, requests, or communications may be transmitted by email as specified in the relevant invoice or Order Form or as otherwise directed by Crown Castle.

16. MISCELLANEOUS

16.1 Governing Law. This Agreement shall be governed by the laws of the State of Delaware without regard to its choice of law principles.

16.2 No Third-Party Beneficiaries. The covenants, undertakings, and agreements set forth in this Agreement are solely for the benefit of and enforceable by the Parties or their respective successors or permitted assigns. It is the explicit intention of the Parties hereto that no person or entity other than the Parties (and, with respect to the provisions of Section 10, the Indemnitees) is or shall be entitled to any legal rights under this Agreement.

16.3 Relationship of the Parties. The relationship between the Parties hereunder is not that of partners or agents for one another and nothing contained in this Agreement shall be deemed to constitute or create a partnership, joint venture or similar relationship. Nothing in this Agreement shall be construed to authorize either Party to represent the other Party for any purpose whatsoever without the prior written consent of such other Party.

16.4 Order of Precedence. If any conflict or contradiction exists between these general terms and conditions and a Supplement, the terms of a Supplement will control. If any conflict or contradiction exists between a Supplement and the terms of an Order Form, the terms of the Order Form will control. If any conflict or contradiction exists between these general terms and conditions and the terms of an Order Form, the terms of the Order Form will control.

16.5 Non-Exclusivity. This Agreement is non-exclusive. Both Parties may enter into similar arrangements with others, and Crown Castle may, as part of its normal business undertakings, actively market its products to any person or entity anywhere in the world, including but not limited to in competition with Licensee and/or Licensee's end users.

16.6 Non-Waiver. The waiver by any Party hereto of a breach or a default under any of the provisions of this Agreement, any Supplement or any Order Form, or the failure of any Party, on one or more occasions, to enforce any of the provisions of this Agreement or to exercise any right or privilege hereunder shall not thereafter be construed as a waiver of any subsequent breach or default of a similar nature, or as a waiver of any such provision, right or privilege hereunder.

16.7 Survival. The terms and provisions contained in this Agreement that by their nature and context are intended to survive the performance thereof by the Parties hereto shall so survive the completion of performance and termination or early termination of this Agreement, including, without limitation, provisions for indemnification, confidentiality, and the making of payments due hereunder.

16.8 Headings. Section and subsection headings contained in this Agreement are inserted for convenience of reference only, shall not be deemed to be a part of this Agreement for any purpose, and shall not in any way define or affect the meaning, construction or scope of any of the provisions hereof.

16.9 Severability; Void or Illegal Provisions. If any part of this Agreement, Supplement or an Order Form shall be determined to be invalid or unenforceable by a court of competent jurisdiction, said part shall be ineffective to the extent of such invalidity or unenforceability only, without in any way affecting the remaining parts of this Agreement or such Order Form. The remainder of this Agreement will continue in full force and effect insofar as it remains a workable instrument to accomplish the intent and purposes of the Parties. The Parties will replace the severed provision with a provision that reflects the initial intention of the Parties.

16.10 Entire Agreement; Amendment. This Agreement, including all Supplements, Order Forms, exhibits and addenda attached hereto is the entire agreement between the Parties with respect to the subject matter hereof and supersedes any and all prior negotiations, understandings and agreements, whether oral or written, with respect to such subject matter. This Agreement may be amended only by a written instrument executed by the Parties.

16.11 Counterparts. This Agreement may be executed in one or more counterparts, all of which taken together shall constitute one and the same instrument. The Parties agree that fully-executed electronic copies or facsimile copies of this Agreement and corresponding Order Forms are legally binding and shall act as originals for the purpose thereof.

16.12 Disconnection Notice Requirement. Licensee shall submit all requests for disconnection of Products in writing to Crown Castle. The effective date of any such disconnection will be the later of (i) thirty (30) days from Crown Castle's receipt of such disconnection request, or (ii) the date requested by Licensee in the disconnection request. Each disconnection request must specify the Licensee name and address, email address and telephone number of the person authorizing the disconnect, the circuit ID for the Product to which the disconnect request applies, the product type, and requested disconnection date. Upon termination of a Product, Crown Castle shall have the right (but not the obligation) to act on behalf of and as agent for Licensee to terminate all cross-connects relating to such Product, including cross-connects ordered by Licensee. Upon request Licensee shall confirm to the applicable supplier of the cross-connect(s) that Crown Castle is authorized to terminate such cross-connects on Licensee's behalf. Disconnections shall not affect Licensee's obligation to make payments as agreed in each Order Form.

The Parties have executed this Agreement as of the last date of execution below.

LICENSEE:

CROWN CASTLE FIBER LLC

By: _____

By: _____

Print Name: _____

Print Name: _____

Title: _____

Title: _____

Date: _____

Date: _____

**ETHERNET SUPPLEMENT
TO THE
MASTER TELECOMMUNICATIONS LICENSE AGREEMENT
LICENSEE: _____**

This Ethernet Supplement (“Supplement”) is effective as of the last date of execution below (“Supplement Effective Date”) by and between **CROWN CASTLE FIBER LLC** (“Crown Castle”) and Licensee, and is hereby incorporated into and made a part of the **Master Telecommunications License Agreement** or Master Service Agreement between Licensee and Crown Castle (the “Agreement”). Unless otherwise defined herein, capitalized terms in this Supplement shall have the meanings given in the Agreement. Section and subsection headings contained in this Supplement are inserted for convenience of reference only, shall not be deemed to be a part of this Supplement for any purpose, and shall not in any way define or affect the meaning, construction or scope of any of the provisions hereof.

1. SCOPE OF SUPPLEMENT

This Supplement and any exhibit(s) attached hereto apply to Ethernet licensed to Licensee under an Order Form that specifies Ethernet. This Supplement shall not apply to other products, including dark fiber, wavelength, Internet, or colocation.

1.1 “Ethernet” or “Product” means a method of switched communication between or among two or more Locations using the Ethernet protocol defined by IEEE 802.3. Ethernet may be ordered and provisioned either as On-Net Products or Off-Net Products. Ethernet includes, without limitation, the following types of Products:

- (a) ***E-Line or Fixed Wireless E-Line (if fixed wireless technology is utilized)***: a port-based Product providing dedicated UNIs for point to point connections. E-Line supports a single EVC between two (2) UNIs.
- (b) ***Ethernet Virtual Private Line (EVPL) or Fixed Wireless Ethernet Virtual Private Line (EVPL) (if fixed wireless technology is utilized)***: a VLAN based Product providing multiplexed UNIs allowing multiple EVCs per UNI.
- (c) ***Ethernet LAN (E-LAN) or Fixed Wireless Ethernet LAN (E-LAN) (if fixed wireless technology is utilized)***: a VLAN based meshed Product providing many-to-many communication with dedicated or service-multiplexed UNIs. E-LAN supports transparent LAN and multipoint Layer 2 VPNs.
- (d) ***Metro-E Advanced Private Line or Fixed Wireless Metro-E Advanced Private Line (if fixed wireless technology is utilized)***: dedicated point-to-point switched Ethernet provided within a metro area over dedicated fiber transport and/or fixed wireless transport if fixed wireless technology is utilized.
- (e) ***ENNI (External Network to Network Interface)***: an interconnection point between the Crown Castle and Licensee Ethernet networks as defined in MEF Specification 26.
- (f) ***Ethernet Integrated with SD-WAN***: is a method of communication between or among two or more Locations using Ethernet protocol defined by IEEE 802.3 and TCP/IP based network connectivity enabling a software defined wide area network, an application aware, policy driven network, delivered by an Edge Device or virtual instance of such device at the Location.

1.2 “Class of Service” or “CoS”: Crown Castle offers CoS with Ethernet. CoS enables Licensee to differentiate traffic by assigning Bandwidth with various classes of network priority designated by Licensee. If Licensee elects CoS, (i) Licensee’s traffic must be marked by Licensee in accordance with Crown Castle’s available classes of network priority, and (ii) Licensee traffic will be prioritized in accordance with the assigned network priority. If Licensee does not elect CoS, Licensee’s traffic will be treated with the default network priority level. Crown Castle offers the following classes of CoS ranging from highest to lowest in terms of network priority:

- Mission Critical
- Business Critical
- Business Priority
- Standard (Default class for all Ethernet)

1.3 **Protection Options.** Ethernet comes with various Protection Options, as described below.

Protection Option	Description	Minimum Location Requirements			
		Space	Power	Environmental Control	Back Up Power
Unprotected (Level A Access)					
1	Level A Access means the access portion of the Ethernet (i.e. the segments from the last Crown Castle Network switching hub (or for Metro-E Advanced Private Line or Fixed Wireless Metro-E Advanced Private Line Products - the lateral segments supporting the respective Product) to the point of entry of the Location) is provided over a single transmission path by fiber and/or fixed wireless without protection. Level A Access consists of the following minimum requirements at each Location: (i) a single point of entry into the Location; (ii) one (1) Crown Castle Equipment chassis; (iii) one (1) port; (iv) a 2-fiber handoff to the Licensee from the Crown Castle Equipment; and (v) one (1) Crown Castle fixed wireless receiver equipment chassis if fixed wireless technology is utilized by Crown Castle for the applicable Product.	(1)	(2)	(4)	Not applicable
Optical Protection (Level AA Access)					
2	Level AA Access means the access portion of the Ethernet (i.e. the segments from the last Crown Castle Network switching hub to the point of entry of the Location) is provided over two (2) separate transmission paths by fiber and/or fixed wireless, one of which is the working (primary) path and the other the protect (secondary) path. Crown Castle is responsible for managing the Failover Switching at each Location. Level AA Protection consists of the following minimum requirements at each Location: (i) a single point of entry into the Location; (ii) one (1) Crown Castle Equipment chassis; (iii) one (1) port; (iv) a 2-fiber handoff to the Licensee from the Crown Castle Equipment; and (v) one (1) Crown Castle fixed wireless receiver equipment chassis if fixed wireless technology is utilized by Crown Castle for the applicable Product.	(1)	(2)	(4)	(6)
Dual Path Protection (Level AAA)					
3	Level AAA Access means the access portion of the Ethernet (i.e. the segments from the last Crown Castle Network switching hub to the point of entry of the Location) is provided over two (2) separate transmission paths by fiber and/or fixed wireless, one of which is the working (primary) path and the other the protect (secondary) path. Failover Switching at each Location will be provided by Licensee or by Crown Castle as specified in the Order Form. Level AAA Protection consist of the following minimum requirements at each Location: (i) two (2) separate points of entry into the Location; (ii) two (2) Crown Castle Equipment chassis; (iii) one (1) line card per chassis; (iv) 4-fiber handoff to the Licensee from the Crown Castle Equipment, with two fibers handed off from one of the Crown Castle Equipment chassis and two fibers handed off from the other Crown Castle Equipment chassis; (v) Licensee Equipment must have hardware redundancy (i.e., separate cards, one for one of the 2-fiber handoffs and the other for the second 2-fiber handoff); and (vi) two (2) Crown Castle fixed wireless receiver equipment chassis if fixed wireless technology is utilized by Crown Castle for the applicable Product.	(1)	(3)	(5)	(7)

(1) Secure space for Crown Castle Equipment at each Location with 24x7x365 access.

(2) Dedicated electrical circuit for Crown Castle Equipment (i.e. the circuit has no other load from the Crown Castle Equipment to a circuit breaker) at each Location from the public utility.

(3) Redundant, dedicated electrical circuit at each Location from the public utility (i.e. each power circuit is fed from a different circuit breaker panel and has its own circuit breaker).

(4) For Crown Castle Equipment installed indoors - Substantially dust free with temperature control that maintains temperature between 50 and 80 degrees Fahrenheit and humidity control that maintains relative humidity below 80%.

(5) For Crown Castle Equipment installed indoors - Substantially dust free with temperature control that maintains temperature between 60 and 80 degrees Fahrenheit and humidity control that maintains relative humidity between 40% and 60%.
(6) Crown Castle (or Licensee if the Parties agree) to install and maintain a minimum of four (4) hours of standby power.
(7) Crown Castle (or Licensee if the Parties agree) to install and maintain a minimum of eight (8) hours of standby power and Licensee shall provide emergency power generation.

2. ADDITIONAL DEFINITIONS

“Bandwidth” or “BW” means the amount of data (quantified as “Mbps” or “Gbps”) made available to Licensee.

“Ethernet Virtual Connection” or “EVN” is a logical connection between two or more UNIs.

“Failover Switching” means the automatic restore and reroute of a Product to an alternate transmission path.

“Location” is an address wherein Crown Castle will hand off Ethernet to Licensee.

“Product Availability” means the percentage of minutes during a calendar month that the licensed Product has not incurred a Product Outage. Product Availability is calculated as follows: (43,200 - total number of minutes of Product Outage during the calendar month) divided by 43,200.

“Product Credit” means a credit that Licensee is eligible to receive if Crown Castle fails to meet the parameters set forth in Section 5.2 below.

“Product Outage” means a complete interruption of communications between any two (2) or more Locations.

“Product Performance Failure” means a failure of the Product to meet any performance parameters set forth in Section 5.2(B) through 5.2(D) below. Product Performance Failure is not a Product Outage.

“User Network Interface” or “UNI” means the interface used to interconnect Licensee to the Crown Castle Network which provides a reference point for demarcation between the Licensee’s network and the Crown Castle Network.

“Virtual Local Area Network” or “VLAN” means a data communication network, configured using the IEEE 802.1q standard that logically interconnects computers and network devices, allowing a group of hosts to communicate, regardless of Location, as if they were attached to the same physical media.

“VPN” means a virtual private network.

3. SPECIFICATIONS

3.1 The Specifications applicable to Ethernet are as follows:

Technical Specifications:

- IEEE 802.3

4. USE BY LICENSEE

4.1 **Interstate Traffic.** Licensee acknowledges that Crown Castle has no ability to determine whether the communications traffic carried via the licensed Ethernet is jurisdictionally interstate or intrastate. Licensee acknowledges and agrees that the communications traffic to be carried via the Crown Castle Network shall be treated as jurisdictionally interstate, pursuant to the Federal Communications Commission’s mixed-use “10% Rule” (47 CFR 36.154, 4 FCC Rcd. 1352), unless Licensee provides timely written certification on Crown Castle’s prescribed form that the traffic is jurisdictionally intrastate under the 10% Rule.

4.2 **Permitted Use.** Licensee may use the Ethernet for its own use. Licensee shall be solely liable and responsible for the content of any communications transmitted via the Ethernet.

5. SERVICE LEVEL AGREEMENT

5.1 Product Service Level. Subject to this Section 5, in the event of a Product Outage to any licensed Ethernet or a Product Performance Failure, Licensee may be entitled to a Product Credit in accordance with the applicable Service Level Objective set forth in Section 5.2 below. A Product Outage, or Product Performance Failure as the case may be, shall be deemed to begin upon the earlier of Crown Castle’s actual knowledge of the same or Crown Castle’s receipt of notice from Licensee of the same, and end when the Product is operational and in material conformance with the applicable Specifications. Notwithstanding anything to the contrary in this Supplement, the Agreement or any Order Form, in no event shall a Product Outage and/or Product Performance Failure and/or any other defect or failure in the Product be deemed to be or constitute a breach by Crown Castle of this Supplement, the Agreement or any Order Form.

5.2 Service Level Objectives.

A. Product Availability

If the total minutes of Product Outage in any month exceeds the number of minutes or hours set forth in the table below, Licensee shall be entitled to a Product Credit equal to the percentage of the applicable MRC set forth in the following table:

Quality Level	Product Availability Objective	Measurement Timeframe	Product Credit		
			Cumulative Duration of Product Outage(s)	% of MRC	
On-Net - Level A Access					
1	Product Availability	99.9%	One Month	0 to 43.2 mins.	0%
				>43.2 mins. to 10 hrs.	5%
				>10 hrs. to 16 hrs.	10%
				>16 hrs. to 24 hrs.	20%
				>24 hrs. to 36hrs.	40%
				> 36 hrs.	50%
On-Net - Level AA Access					
2	Product Availability	99.99%	One Month	0 to 4.32 mins.	0%
				>4.32 mins. to 30 mins.	5%
				>30 mins. to 1 hr.	10%
				>1hr. to 8 hrs.	20%
				>8 hrs. to 16 hrs.	30%
				>16 hrs. to 24 hrs.	40%
>24 hrs.	50%				
On-Net - Level AAA Access					
3	Product Availability	99.999%	One Month	0 to 43 secs.	0%
				> 43 secs. to 4 mins.	5%
				>4 mins. to 10 mins.	10%
				>10 mins. to 2 hrs.	20%
				>2 hrs. to 8 hrs.	40%
				>8 hrs.	50%

B. Network Latency

“Network Latency” is the average round-trip transmission time (in milliseconds) for packets to travel on the Crown Castle Network (including, but not limited to, link insertion delays, propagation delays and queuing delays in the Crown Castle Network). Network Latency is determined by Crown Castle by averaging sample measurements taken each calendar month between Crown Castle’s designated points of presence.

If Network Latency in any month exceeds the number of milliseconds set forth in the table below and such failure is quality-impacting, Licensee shall be entitled to a Product Credit equal to the percentage of the applicable MRC set forth in the following table:

NETWORK LATENCY				
	CoS Designation - % of MRC			
Domestic US	Standard	Business Priority	Business Critical	Mission Critical
>120ms	10%	20%	30%	50%

C. Frame Delivery Rate (Packet Delivery)

“Frame Delivery Rate” is the ratio of performance test frames successfully received from the Crown Castle Network relative to the number of performance test frames offered to the Crown Castle Network. Frame Delivery Rate is determined by Crown Castle by averaging sample measurements taken each calendar month between Crown Castle’s designated points of presence.

If Frame Delivery Rate in any month is less than the percentages set forth in the left column of the table below and such failure is quality-impacting, Licensee shall be entitled to a Product Credit equal to the percentage of the applicable MRC set forth in the following table:

FRAME DELIVERY RATE				
	CoS Designation - % of MRC			
Domestic US	Standard	Business Priority	Business Critical	Mission Critical
99.999% or greater	No Credit	No Credit	No Credit	No Credit
99.99% to 99.998%	No Credit	No Credit	No Credit	10%
99.9% to 99.98%	No Credit	No Credit	10%	20%
99% to 99.8%	No Credit	10%	20%	30%
Less than 99%	10%	20%	30%	50%

D. Frame Delay Variation (Jitter)

“Frame Delay Variation”, also known as packet jitter, is a measurement of the average variation (measured in milliseconds) in the time delay for packet transfers between two performance test frames. Frame Delay Variation is determined by Crown Castle by averaging sample measurements taken each calendar month between designated points of presence.

If Frame Delay Variation in any month exceeds the number of milliseconds set forth in the table below and such failure is quality-impacting, Licensee shall be entitled to a Product Credit equal to the percentage of the applicable MRC set forth in the following table:

FRAME DELAY VARIATION				
	CoS Designation - % of MRC			
Domestic US	Standard	Business Priority	Business Critical	Mission Critical
2ms or less	No Credit	No Credit	No Credit	No Credit
>2ms to 3ms	No Credit	No Credit	No Credit	10%
>3ms to 4ms	No Credit	10%	15%	30%
>4ms	10%	20%	30%	50%

5.3 Product Credits. Product Credits hereunder are calculated as a percentage of the MRC set forth in the Order Form, and may not be applied to usage charges, government fees, taxes, or surcharges, or any third party charges passed through to Licensee by Crown Castle. Product Credits hereunder may be paid only once per any given billing cycle. Product Credits issued to Licensee hereunder shall be Licensee’s sole and exclusive remedy at law or in equity on account of any Product Outage and/or Product Performance Failure and/or any other defect or failure in the Product. Product Credits will not be issued to Licensee if Licensee’s account with Crown Castle is in arrears. If an incident affects the performance of the Product and results in a period or periods of interruption, disruption, failure or degradation in quality, entitling Licensee to one or more credits under multiple quality level standards, only the single highest credit with respect to that incident will be applied, and Licensee shall not be entitled to credits under multiple quality level standards for the same incident. Notwithstanding anything to the contrary herein, the above-stated Product Credits shall not apply to Off-Net Products; in the event of a Product Outage or Product Performance Failure, Crown Castle agrees to pass through a credit equal to the credit received by Crown Castle from its underlying provider(s) for such Product Outage or Product Performance Failure, in lieu of the above-stated Product Credits. In no event shall Product Credits in any month for any

and all interruptions, disruptions, failures, and/or degradations in quality (including, without limitation, any Product Outage or Product Performance Failure) exceed fifty percent (50%) of the MRC for the affected Product for that month.

5.4 Product Credit Request. Licensee must submit a written request to claim a Product Credit no later than thirty (30) days following the event which gives rise to Licensee’s right to the Product Credit. Failure to request a Product Credit within such period shall constitute a waiver of any claim for a Product Credit.

5.5 Events Excepted From Product Credit. Notwithstanding the foregoing, Licensee shall not receive any Product Credit for any Product Outage, Product Performance Failure, failure to meet any objectives or parameters hereunder, or delay in performing repairs, arising from or caused, in whole or in part, by any of the following events:

- a. Licensee’s (including its agents, contractors and vendors) acts or omissions;
- b. Failure on the part of Licensee Equipment, Licensee provided optical fiber, Licensee’s end user equipment or Licensee’s vendor’s equipment;
- c. Failure of electrical power not provided by Crown Castle;
- d. Election by Licensee, after requested by Crown Castle, not to release the Product for testing and repair;
- e. Crown Castle’s inability to obtain access required to remedy a defect;
- f. Scheduled maintenance periods;
- g. Scheduled upgrade of Product at the request of Licensee;
- h. Force Majeure Event;
- i. Unavailability of spectrum not due to the fault or negligence of Crown Castle when fixed wireless is utilized in the provisioning of the Product;
- j. Unavailability of required Licensee personnel, including as a result of Licensee’s failure to provide Crown Castle with accurate, current contact information;
- k. Disconnection or suspension of the Product by Crown Castle pursuant to a right provided under this Agreement; and/or
- l. Crown Castle’s inability to repair due to utility safety restrictions.

The Parties have executed this Supplement as of the last date of execution below.

LICENSEE:

CROWN CASTLE FIBER LLC:

By: _____

By: _____

Print Name: _____

Print Name: _____

Title: _____

Title: _____

Date: _____

Date: _____

Exhibit A
Additional Terms and Conditions for Ethernet Integrated with SD-WAN Products

This **Exhibit A** is hereby incorporated into the Ethernet Supplement as of the Supplement Effective Date, and the following terms and conditions of **Exhibit A** shall only apply to Ethernet Integrated with SD-WAN Products provided by Crown Castle to Licensee.

1. ADD-ON OPTIONS

- (a) **High Availability:** Dual Edge Devices deployed at the Location setup in a configuration to provide redundancy. The Edge Devices, deployed in a high availability configuration, are connected to each other with a fallback mechanism based on pre-determined policies.
- (b) **Next-Gen Firewall:** Additional security features to the Ethernet Integrated with SD-WAN Product, namely SSL inspection, URL and IP reputation and filtering, and L7 application controls.
- (c) **Unified Threat Management:** Additional security features to the Ethernet Integrated with SD-WAN Product, namely anti-virus protection, intrusion detection system (IDS), intrusion prevention system (IPS), file filtering, and SSL decryption and encryption.

2. ADDITIONAL DEFINITIONS

“Edge Device” means Crown Castle Equipment which can be physical or virtual and is part of the Ethernet Integrated with SD-WAN Product solution.

“Logical Changes” means Licensee requested basic modifications or changes performed remotely by Crown Castle’s Network Operations Center to the Ethernet Integrated with SD-WAN Product following the installation and delivery of such Product including, but not limited to, changes to routing tables.

“Network Controller” means the Crown Castle Equipment which provides physical or virtual device management for all Edge Devices associated with the controller.

“Software” means software which is embedded in the Edge Device and used in connection with the Ethernet Integrated with SD-WAN Product.

3. SPECIFICATIONS

The Specifications applicable to Ethernet Integrated with SD-WAN Products are as follows:

- (i) **Technical Specifications:** IEEE 802.3
- (ii) **IP Address Allocation:** The Edge Device may use one or more IP address blocks depending on the number of transport services at the Location. Each Ethernet Integrated with SD-WAN Product will have a unique IP address block.
- (iii) **Network Traffic Management:** Crown Castle’s network traffic policies will restrict the traffic flows to the subscribed committed information rate (“CIR”) in connection with the Ethernet Integrated with SD-WAN Product.

4. IMPLEMENTATION AND CONFIGURATION

4.1 Configuration and Pre-Installation Technical Documentation. Licensee shall reasonably cooperate with Crown Castle in the installation and configuration of the Ethernet Integrated with SD-WAN Product, and Licensee shall also assist in the completion of technical documentation prior to commencement of installation of the Ethernet Integrated with SD-WAN Product. The documentation provides Crown Castle with the information needed to design and configure the Ethernet Integrated with SD-WAN Product, including, but not limited to, access type and bandwidth, local area network and wide area network (“WAN”) design, number of users, and traffic types and priorities.

4.2 Licensee Responsibilities. Licensee will provide: (i) an operating environment with temperatures not below fifty-five (55) or above eighty-five (85) degrees Fahrenheit, and humidity shall not exceed ninety (90) percent at eighty-five (85) degrees Fahrenheit; (ii) power including UPS AC power equipment, circuit sizing to be determined, if applicable; (iii) emergency local generator backup service, if applicable; (iv) if interfacing with a third party IP service, provide, install and maintain a device that is capable of routing network traffic between the Ethernet Integrated with SD-WAN Product and the Licensee’s WAN; and (v) a

point of contact for installation, Ethernet Integrated with SD-WAN Product activation, notices for Product Outages, configuration assistance, and any maintenance activities. Licensee is solely responsible for designating authorized Licensee representatives in connection with Licensee's use of the Ethernet Integrated with SD-WAN Product, account access, maintenance, and configuration permissions associated with the Ethernet Integrated with SD-WAN Product. Licensee shall promptly notify Crown Castle of any changes to permissions related to Licensee's authorized representatives on file with Crown Castle. In addition, Licensee is responsible for the performance of the applicable functions set forth on the Responsibility Matrix in Section 9 below.

4.3 Cross-Connections. As necessary for interconnection of the Ethernet Integrated with SD-WAN Product with service provided by others, Crown Castle may request (as applicable), and Licensee will provide to Crown Castle, circuit facility assignment information and design layout records necessary to enable Crown Castle to make the necessary cross-connection between the Ethernet Integrated with SD-WAN Product and Licensee's other service(s) from other provider(s). Crown Castle may charge Licensee non-recurring and monthly recurring cross-connect charges to make such connections.

4.4 Security Monitoring and Mitigation. Crown Castle monitors the Edge Device utilized in connection with the Ethernet Integrated with SD-WAN Product. Crown Castle does not provide monitoring of security events, any security event mitigation or advice regarding security issues or threats. Upon request by Licensee, Crown Castle will modify the configuration of the Ethernet Integrated with SD-WAN Product in accordance with the specifications provided by Licensee to attempt to mitigate security events and security threats identified by Licensee. Crown Castle's sole obligation is to implement the configuration settings requested by Licensee. Crown Castle makes no guarantees with respect to the detection or blocking of viruses/worms/malware or any other types of attacks, and is not responsible for any malicious data that may be transmitted over the Ethernet Integrated with SD-WAN Product.

4.5 Crown Castle Responsibilities. Crown Castle is responsible for the performance of the applicable functions as set forth on the Responsibility Matrix in Section 9 below. The Demarcation Point for the Ethernet Integrated with SD-WAN Product is the port on the Edge Device.

4.6 Proprietary Rights and Permitted Use. Licensee may use the Ethernet Integrated with SD-WAN Product(s) only for its own internal use. Licensee shall not assign, sell, transfer, distribute, lease, sublease, license, sub-license, or otherwise grant a right to use the Ethernet Integrated with SD-WAN Product to any third party. Licensee shall not use or copy any Software except as expressly permitted in the Agreement. Except to the extent such restrictions are not permitted under applicable law, Licensee agrees not to modify, adapt, alter, decompile, disassemble, reverse assemble, reverse engineer or otherwise attempt to derive source code for the Edge Device, Software or any other aspect of the Ethernet Integrated with SD-WAN Product. Licensee may not distribute, license, lease, rent, loan, or otherwise transfer the Software. Licensee shall not create derivative works based on the Software. Licensee may not export the Software or the underlying technology in contravention of the applicable U.S. and foreign export laws and regulations. Licensee acknowledges and agrees that portions of the Software, including but not limited to the source code and the specific design and structure of individual modules or programs, constitute or contain trade secrets of Crown Castle and its licensors. Any Software provided hereunder is licensed only and is subject to this Supplement, and Crown Castle or its providers retain title in all copies of the Software. Licensee will not obtain title to, or ownership of any intellectual property rights in the Software or any copies thereof. Licensee's rights in the Software will be limited to those expressly granted in this Supplement. Crown Castle reserves all rights not expressly granted to Licensee under this Supplement.

4.7 Content and Transportation of Ethernet Integrated with SD-WAN Product. Licensee accepts that Crown Castle does not control or operate the content that is transmitted or transported via the Ethernet Integrated with SD-WAN Product(s), and Licensee shall be solely liable and responsible for the content, data and communications applicable to the Ethernet Integrated with SD-WAN Product. Licensee acknowledges that Crown Castle will have network access to communicate with the Edge Device for purposes such as authentication and Software updates; and will have access to, and may utilize for any purpose all information regarding networking characteristics, usage, performance and related information involved in the use of the Ethernet Integrated with SD-WAN Product ("Key Performance Indicators" or "KPI"). Crown Castle will protect this KPI, and will not divulge to anyone outside of Crown Castle, or its subcontractors and agents, unless required by law via a subpoena.

4.8 Fraudulent Use of Product. Crown Castle shall not be held liable for any usage, charges and/or damages resulting from Licensee's fraudulent or unauthorized use of the Ethernet Integrated with SD-WAN Product, Software and/or Edge Devices. Licensee will not use the Ethernet Integrated with SD-WAN Product in any unlawful, abusive, or fraudulent manner. If Crown Castle has reason to suspect Licensee is abusing the Ethernet Integrated with SD-WAN Products or using them fraudulently or unlawfully, Crown Castle reserves the right to immediately suspend, restrict, or terminate the Ethernet Integrated with SD-WAN Products without notification. In such an event, Licensee will be held liable for all usage, including but not limited to, any and all fraudulent usage.

5. ETHERNET INTEGRATED WITH SD-WAN LICENSEE PORTAL

Crown Castle will provide the Licensee with a password-protected web portal to view performance information regarding Licensee’s Ethernet Integrated with SD-WAN Product.

6. FEES FOR ETHERNET INTEGRATED WITH SD-WAN PRODUCTS

In the event that amounts charged to Crown Castle under its underlying third party reseller agreement are increased in connection with the Ethernet Integrated with SD-WAN Products, Crown Castle shall have the right to charge Licensee for such increase, which shall be added to the MRCs to be paid by Licensee for the applicable term. In the event of any such increase, Crown Castle will provide prior written notice to Licensee, and any such increases in charges will not take effect until Licensee’s receipt of such notice.

7. EMERGENCY BLOCKING

The Parties agree that if either Party, in its reasonable sole discretion, determines that an emergency action is necessary to protect its own network, then the applicable Party may block any transmission path over its network by the other Party where transmissions do not meet material standard industry requirements and after engaging in reasonable and good faith efforts to notify the other Party of the need to block. Any such blockage will be without any liability or obligation to the other Party. The Parties further agree that none of their respective obligations to each other under the Agreement, Supplement and Order Form will be affected by such blockage, except if Licensee is the Party being blocked, then Licensee will not be obligated to make payments for the circuit(s) which is so blocked until such time as the blockage is removed.

8. CHANGES

During the Product Term, Crown Castle will perform certain Crown Castle configuration changes with respect to the Ethernet Integrated with SD-WAN Product upon request by Licensee, following installation and delivery of the Ethernet Integrated with SD-WAN Product and subject to additional charges, certain charges of which are detailed below.

Change Type	Time of Day	Rates Per Incident (Charged per Product)
Technician dispatch	7:01 AM to 6:59 PM	\$250 per hour, 4-hour minimum
Technician dispatch	7:00 PM to 7:00 AM	\$375 per hour, 4-hour minimum
Logical Changes – Remote	7:01 AM to 6:59 PM	\$200 per hour, 1-hour minimum
Logical Changes – Remote	7:00 PM to 7:00 AM	\$300 per hour, 1-hour minimum

The charges above may be increased once per contract year upon notice to Licensee by the percentage increase, if any, in the Consumer Price Index – Urban Wage Earners and Clerical Workers (U.S. City Average, All Items, Base 1982-1984 equals 100) as published by the United States Department of Labor, Bureau of Labor Statistics.

9. RESPONSIBILITY MATRIX - ETHERNET INTEGRATED WITH SD-WAN PRODUCT

Function	Crown Castle	Licensee
Strategic direction		X
Appropriate space, power, operating environment		X
Network design	X	X
Monitoring	X	
Fault isolation	X	
Fault restoration – Physical	X	
Fault restoration – Logical	X	
Break fix maintenance	X	
Change management – Physical	X	
Change management – Logical	X	
Configuration back-up	X	
Security policy and updates	X	
Utilization reporting	X	