

Attachment E

Grantor Request

Technical capability statement: Applicants must include a statement relating to their experience providing broadband, whether they currently provide broadband at the minimum 100/100 Mbps speeds, the useful life of the facilities, and how the project will be resilient and sustainable in the long-term. This statement should also include the number of technical staff that will be dedicated to serving the project area once the project is complete, the level of technical ability of staff, the technological components used and which components may require more frequent repair or replacement, a detailed description of the proposed network architecture including homes passed, fiber miles, and the specific technology to be used to provide service to end users, a description of the applicant's technical capability to meet the requirement to provide a minimum 100/100 Mbps in all locations that receive grant funding, and their plans to meet the minimum statutory technical and speed requirements in place for the CPF throughout the fifteen-year period, and how the service area will be maintained throughout the useful life of the facilities, and any other relevant technical expertise of the applicant. (Attachment Letter: E)

Applicant Response

For this proposed project area, Nextlink will be using Tarana 6Ghz G1x2 to meet minimum speeds of 100/100 Mbps. For these wireless networks, site planning uses the following process. Nextlink starts by identifying vertical assets or potential sites for a vertical asset. Those sites are fed into Google Network planner (GNP) along with all the customer locations. GNP is programmed with the tower heights and RF constraints. GNP creates the coverages off existing sites and if there are coverage holes, it will choose one of the customer locations as a tower site assuming a 120' monopole placed at that location, and it will try multiple customer location sites until it finds the one that covers most of the customers. GNP models are custom and proprietary with clutter and terrain accuracy up to 1 meter. (For more information: <https://www.google.com/get/spectrumdatabase/network/>)

All identified tower sites for microwave backhaul are given to our Wireless Engineering team to create the backhaul links either with Microwave or Fiber. All links are designed as Aviat Networks equipment.

After the link design is complete, Nextlink looks at the loading of each tower and calculates the peak bandwidth utilization and oversell for each link going back to the core. If there are links that would be 70% saturated with a 70% take rate, they will convert that site to a fiber pop or add additional parallel wireless links to meet the obligation and demand.

The final radio plan defines the site locations and their respective configuration. The configuration involves base station, site height, number of sectors, assigned frequencies and bandwidth, types of antennae, azimuth and down tilt, equipment types and transmitted RF power. The final plan is tested against various KPIs requirements, coverage criteria and capacity (or signal quality) in support of the offered performance tiers.

The aim of the radio planning is to define a set of site locations and their respective configurations, that addresses the coverage and capacity requirements derived from the dimensioning.

The radio planning task is based on the outputs from the dimensioning, especially the calculated site densities in each clutter type. Network planning works with high levels of detail. The site count derived from radio planning can sometimes be significantly different from the site count derived dimensioning since the actual site coverage may differ significantly from the models.

When performing coverage and capacity dimensioning for fixed wireless broadband for the various performance tiers, Nextlink is taking full advantage of the capabilities of the equipment providers and places particular attention to:

Operating band

Channel bandwidth

Antenna gain and placement

Antenna configuration

a. Experience Providing Broadband

Nextlink Internet was co-founded by Bill Baker in rural North Texas in 2012 with a focus on serving the rural countryside with high quality internet and phone service along with great customer service. Bill continues as Nextlink's CEO today and keeps that philosophy front and center to how Nextlink conducts its business to this day. As a result of that philosophy, Nextlink Internet currently provides high-speed internet and voice services to almost 100,000 residential, business, and governmental subscribers across 12 states with approximately 1,000 employees. With the approach of serving the entire community and not cherry-picking certain types of customers or parts of town, Nextlink has received over 12,000 customer reviews on Google with a score of 4.8 out of 5.0 stars. We also maintain an A+ rating from the Better Business Bureau for our high-quality service.

In Texas, where Nextlink has operated the longest, it is the largest provider of internet service to rural school districts in the state. Nextlink's ultimate mission is to serve the unserved and underserved rural areas across the heartland of America with high-quality, high-speed broadband internet service. We pride ourselves on operating a company with a heavy focus on the overall customer experience and for treating our employees like family.

Nextlink has millions of fixed wireless passings and tens of thousands of fiber passings currently across its twelve state footprint. The company's operating roots are in serving the rural markets with high-quality internet service. In 2018, Nextlink was the largest winner in the FCC (Federal Communications Commission) CAF2 (Connect America Fund Phase 2) auction program addressing the rural unserved. The FCC awarded Nextlink \$429,152,518 in 2022 through the RDOF (Rural Digital Opportunity Fund). As a result of the RDOF award, Nextlink is committed to meeting, and already delivering in some locations, the requirements to bring gigabit fiber and wireless internet to underserved rural communities across 12 states in the Midwest. Since the initial CAF2 and RDOF awards, Nextlink has exceeded the required

coverage and milestone requirements of the programs and built internet service networks covering hundreds of thousands of locations. During that service expansion, Nextlink added over 60,000 active subscribers and currently adds approximately 2,000 new subscribers every month.

In addition to the CAF2 and RDOF program expansion, Nextlink is investing millions of its own capital by independently expanding fixed wireless and fiber networks across many rural areas and small communities in multiple states.

Nextlink expands and upgrades its current service network daily and has an extensive sales and marketing team working to educate the market regarding increase of speed availability and expansion of services into new areas and markets. That marketing effort is comprised of a mix of traditional marketing such as billboards and mailers combined with digital marketing via Google and other digital platforms. Nextlink currently spends approximately 5% of its revenues on sales and marketing efforts. Beyond brand education and outreach efforts, Nextlink and our employees are continually active in the communities we serve with community engagement and charitable activities.

b. The Useful Life of the Facilities

Nextlink utilizes a variety of technologies and network architectures for the delivery of high-speed internet services to customers in rural communities. The services are delivered through both fiber and wireless technologies that are interconnected into multiple data centers across multiple states to provide customers with an exceptionally reliable and resilient customer experience. The fiber-related technologies and architectures used are further elaborated below.

Last Mile - For its near 100,000 subscribers across the twelve states, Nextlink utilizes last mile technologies using both fiber and fixed-wireless technologies. Internet speeds as high as 10Gbps are provided to subscribers. Nextlink is actively providing gigabit services to subscribers using **both** fiber and wireless technology methods.

Wireless - Nextlink’s last-mile wireless connections to the premises today utilize PtMP wireless connections utilizing CBRS (Citizens Broadband Radio Service) 3.5 GHz, 5Ghz and 6Ghz spectrum bands. (Note: To further enhance the Gigabit service tier, 6 GHz will transition from testing to full production for select areas using the Cambium ePMP6K and Tarana ngFWA product solution to provide wireless speed performance at the gigabit level.) Table-1 below summarizes the wireless technologies and associated performance tier. The subscriber equipment used has an average mean time before failure (MTBF) of over 11 years. This is backed in most cases by a 3-year manufacturing warranty from defects or performance problems. Nextlink takes great care during the installation process to ensure all equipment is properly installed and has a full quality assurance team that reviews installation photos to ensure it complies with operational standards.

Table 1 - Nextlink’s Last Mile Wireless Technology Currently In Use

Method	Technology	Max Performance Tier
Wireless	CBRS LTE	100/20 Mbps
Wireless	CBRS ngFWA	500x100 Mbps
Wireless	5 GHz	Up to 100 Mbps
Wireless	6 GHz	Up to Gigabit
Wireless	24 GHz	Up to Gigabit
Wireless	60 GHz	Up to Gigabit

Note: 100/20 (Above Baseline) Tier average 30-day peak usage is 5Mbps Down and 3Mbps up per subscriber. Gigabit Tier average 30-day peak usage is 5Mbps down and 3Mbps up

Nextlink’s core network (see Figure 1 for a Logical Architecture Diagram) is located across six states in multiple Tier 3 data centers are positioned in multiple states (see Table 2) and utilizes scalable, carrier-grade infrastructure including embedded redundancy within the core (primarily Nokia 7750 SR2 or SR12e with redundant route processors and switch fabric cards) with existing traffic capacity capable of 10x the current subscriber traffic levels. At those data centers, Nextlink has engineered its upstream traffic via numerous Internet transit vendors such as Hurricane Electric, Zayo and Cogent as well as peering relationships and direct connectivity at the data centers which improves latency.

Nextlink takes full Internet routing tables from all its upstream providers allowing the 7750 SRs to select the most optimal route to any destination on the Internet keeping under the 10 Autonomous System hop count target to any domestic (US) site. Nextlink is directly peered or connected with the top content providers in the nation such as Microsoft, Google, Netflix, Hulu and many more.

Figure 1 - Logical Architecture Diagram

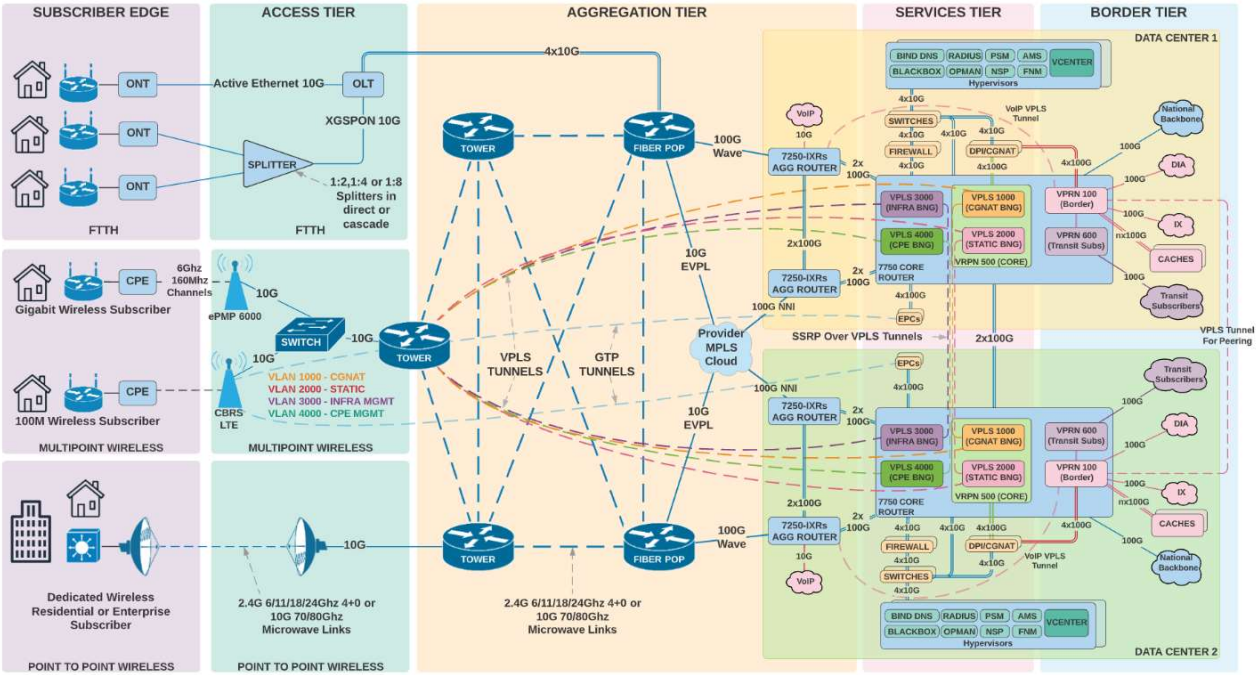


Table 2 - Nextlink Data Center Locations

State	Facility	Ownership	Address
Texas	Equinix	Leased	1950 Stemmons Fwy, Dallas, TX
Texas	QTS	Leased	6431 Longhorn Dr, Irving, TX
Oklahoma	Rack 59	Leased	7725 W Reno Ave Ste #304, Oklahoma City, OK
Kansas	Databank	Leased	14500 W 105 th St. Lenexa, KS
Illinois	Equinix	Leased	350 E Cermac, Chicago, IL
Iowa	Connect Des Moines	Leased	666 Walnut Ave, Des Moines, IA
Nebraska	1623 Farnham	Leased	1623 Farnham St, Omaha, NE

Due to the continued growth in traffic demand, all these links will start at the 100G size. As demand grows, Nextlink will expand to multiples of these 100G or 400G links as the need arises. In addition to Nextlink’s peering design, added care is provided via BGP routing with ample primary and redundant DIA (Virtual Private Routed Networks) connectivity to allow for 100% of traffic to route via Internet transit options or alternative data centers if all peering connections were to fail. Although engineered to handle a complete peering connection failure with no impact on traffic, we highlight that no such complete peering failure has ever occurred over Nextlink’s ten-year history. Additionally, each of Nextlink’s data centers are engineered for redundant power systems designed for 99.999% uptime.

The 7750 SR core routers house the BNG (Broadband Network Gateway) service with redundancy to other datacenters 7750 SRs in the event of a complete data center outage. When this happens, the routes for the BNG VPRN (Virtual Private Routed Networks) will be withdrawn from the VPRN 100 cloud and the secondary routes are inserted at the alternate BNG sites. Nextlink hosts both its authoritative and recursive DNS (Domain Name System) servers at its data centers using the open-source BIND (Berkeley Internet Name Domain) DNS system configured to be redundant across multiple data centers

These physical and logical components make up the framework of Nextlink’s product set. At a high level, Nextlink’s architecture consists of multiple core routers. WAN transport elements are comprised of multiple fiber rings and Layer 2 circuits and interconnect to the core routing infrastructure. This transport network allows Nextlink to operate routing protocols from the core routers to fiber-based transport POPs located throughout the Nextlink service footprint.

c. Network Sustainability and Resiliency

As part of its future-proofing strategy, Nextlink hosts multiple streaming traffic caches within its network providing the bulk of Netflix downloads to our subscriber base as well as Google server caches. We highlight this design as almost 50% of Nextlink’s data traffic at peak time is comprised of data coming from the Netflix and Google caches and direct peering relationships. All these in-network elements result in a more robust network with a lower latency level experience for the subscriber even in a highly rural environment. Nextlink’s latency target is sub-30ms RTT (Round Trip Time) for all subscribers regardless of their rural location or distance from the data center.

To strengthen our physical plant, Nextlink has invested in the hardware and gear needed to create a robust transport network and product offering. Nextlink maintains a centralized warehouse along with numerous warehouses across the diverse areas we serve in which spares for all types of network and transmission gear are maintained. This allows Nextlink to operate in a vibrant and secure network environment with high uptime and provide quick responses to outages.

Each level of the Nextlink network has the resiliency and redundancy needed to set the foundation for scalability built in. Here are just a few of the ways scalability is accomplished:

At the Core

Core Routers – Each core site has redundant core routers provided by the Nokia 7750 routing platform (<https://www.nokia.com/networks/products/7750-service-router/>). These routers perform several functions including border routing for the upstream peers as well as BNG functions such as DHCP (Dynamic Host Configuration Protocol) and customer traffic shaping. Each one of these routers can scale to at least 19.2Tbps of throughput capacity. If that capacity is reached, customer traffic can be failed over to their alternate sites through SRRP (Subscriber Router Redundancy Protocol). Then the under-capacity router can be replaced with a high-capacity model with zero impact to the subscriber. See Exhibit A below for technology currently used for these deployments.

Deep Packet Inspection (DPI) – Nextlink has deployed redundant DPI and QoE (Quality of Experience) devices provided by Procera iQ42300 platform. These devices provide CGNAT (Carrier Grade Network Address Translation), Access Point level shaping, customer level shaping, application prioritization, DSCP (Differentiated Services Code Point) traffic marking and customer and application performance reporting. Each one of these devices has a throughput capacity of 160Gbps. If an IQ starts to reach its capacity, another can be placed in parallel adding an additional 160Gbps of throughput capacity.

Aggregation Routers – These Nokia 7250 IXRs routers provide a point to aggregate the transport network connections to terminate at the datacenter. They also provide a place to tunnel traffic to the 7750s various internal VPRNs (Virtual Private Routed Networks) in the case of smaller 10G upstream peers. These can be scaled by adding more additional units and directly connecting them to the 7750 SRs.

Server clusters – All of the network services such as DNS, RADIUS and monitoring are deployed on clusters of 3 VM hosts running VMware ESXi. As demand and new functions are required, new VMs and VM hosts can be deployed and added to the cluster increasing NextLink's data processing and service capacity.

Small Cell- A Small Cell site or tower is a vertical asset that primarily provides PtP and may also provide PtMP coverage to subscribers. A Small Cell site may be a fiber site or fed with microwave backhauls.

d. Technological Components Used, Maintenance, Repair, Replacement, Upgrades

As part of Nextlink's growth, quality has always been at the forefront. Nextlink has Nokia core and transport routers and Procera for QoS (Quality of Service) that are dynamic, scalable, and interactive with our users demands and built with a foundation for growth. Nextlink currently has a core capacity of 3.6Tbps which can be easily upgraded with additional cards in the 7750 chassis. The interstate transport network is currently capable of 200Gbps with scale to 800Gbps with circuit upgrades and additional 800Gbps with card updates with the Nokia 7750 and 7250 route/switch platforms.

Further to quality, Nextlink actively manages its networks in terms of distance from the furthest subscriber in an area to middle mile transport locations and works to ensure as the network grows that latency remains low by identifying where additional middle mile transport locations should be inserted into the network to ensure that hops whether over fiber or fixed wireless do not negatively impact quality and latency.

As mentioned above when additional capacity is needed and latency needs to be reduced due to circuit loading, we will introduce or convert our aggregation datacenters into IP transit facilities with local caching, peering and additional connections as demand dictates. The route/switch architecture is built in such a way that we are expecting to add additional Nokia 7750 core routers as the network demand suggests a call for action.

Nextlink is aggressive in working with platform applications to bring them physically into the Nextlink core if possible or direct peer in the data centers rather than transit such traffic through the internet exchange and add unnecessary latency and hops to the traffic.

Nextlink deploys and maintains carrier-grade equipment with a large MTBF (Mean Time Between Failure). Frequent repair or replacement is not expected from failure. In a more likely scenario upgrades as determined by network growth. As technology improves over the lifecycle of the program along with network growth. Nextlink continues to invest in upgraded technology to perpetually provide a best-in-class user experience.

e. Proposed Network Architecture

Nextlink will cover approximately **192 square miles** for this Wireless project. This endeavor will result in a total of 165 Tier 2 locations receiving 100/100Mbps or greater speeds. See Exhibit B below for further details.

f. Minimum statutory technical and speed requirements

Nextlink has multiple field offices throughout Nebraska, including a major operating hub in Lincoln with a total employee headcount of 53 across the state. We would expect to open at least three additional field offices in Nebraska within the next two years to support the expansion required for its Nebraska Broadband Bridge awards and continued CAF2 and RDOF network expansion. Each office would have between 10-15 field personnel including tower technicians, installation technicians and construction personnel. We currently have active broadband service in 37 counties in Nebraska, including Butler, Cass, Lancaster, and Seward.

The strength and resilience of Nextlink's overall network infrastructure, professional installations and proactive management systems is reflected in Nextlink's tremendous organic demand for service, low customer churn rates, and a Google review score of 4.8 out of 5.0 with over 12,000 customer reviews.

Our Nebraska operations are led by the Regional Director of Operations, Aaron Clark. Leading the construction of our fiber network to support this project will be our Fiber Infrastructure Supervisor for Nebraska, Justin Tatum.

Field Offices and Staff Technical Experience

Justin Tatum, Fiber Infrastructure Supervisor – Justin has over 11 years of fiber construction experience having worked for Infinity 8 Broadband prior to the acquisition of the company by Nextlink in early 2021. He played a significant role in the completion of the Hickman, Nebraska fiber project and leads one of Nextlink's nine fiber crews. He will lead one of the fiber teams that will help complete the project.

Aaron Clark, Regional Director of Operations – Aaron is Nextlink's Regional Director of Operations in the state of Nebraska and is the manager of the Lincoln, Nebraska office. He has over 15 years of combined fixed wireless, wireline, and network engineering experience. Aaron was heavily involved in ensuring the Hickman, Nebraska fiber project was completed on time and within budget. Aaron has significant project management experience.

David Law, Vice President of Field Deployment – David joined Nextlink when the company started in 2012 as an Infrastructure Supervisor. David now manages all phases of planning and construction, through to activation of over 2,240 active towers serving close to 100,000 subscribers. He also has overall responsibility for Nextlink's field and operational deployment teams, including tower climbers, construction technicians, and electricians.

Mike Johnson, Vice President of Planning & Development – Mike joined Nextlink in 2019 as VP of Planning & Development. He has played a key role in the planning and development of Nextlink's fixed wireless and fiber deployment for CAF2, RDOF and expansion of the legacy network. Mike has planned and deployed over 1,300 wireless sites, hundreds of fiber circuits to meet CAF2 milestones and the operational needs of Nextlink. Prior to joining Nextlink, Mike was an enlisted Marine for 24 years. He led Marines in the planning, deploying, and executing of communication networks across the globe in hostile, humanitarian, and training environments supporting hundreds of Department of Defense personnel in austere conditions.

Seth Anderson, Chief Operating Officer – Seth joined Nextlink in 2019 as COO. He oversees the deployment and maintenance of the Nextlink network and customer-facing operations and is critical to meeting high quality service standards. Prior to Nextlink, Seth spent 20 years in the fixed wireless industry focused on deployment and maintenance of large-scale wireless networks and operations. Seth earned a degree from Weber State University.

Cameron Kilton, Chief Technology Officer – Cameron joined Nextlink in 2020 as CTO. He has experience designing, building, and operating wireless broadband, cellular, AMI (Advanced Metering Infrastructure), and fiber-optic networks. Prior to Nextlink, Cameron was Director of Sales at Alpha Wireless and Director of Engineering Services at Baicells Technologies.

Bill Baker, Chief Executive Officer - Bill co-founded Nextlink in 2012. He actively directs the operational and growth strategy, manages all aspects of the day-to-day operations, and sits on the boards of four other companies. Prior to Nextlink, Bill was a Senior Partner in KPMG’s Deal Advisory practice, served in management roles at startups, and was in corporate development at a Fortune 100 company. Bill earned a BBA in Accounting and an MBA in Finance from Baylor University and is a licensed CPA in Texas.

Engineering Services

Nextlink also expects to engage Black & Veatch to assist with engineering and other aspects of the proposed project. Black & Veatch is a long-time operating partner for Nextlink having assisted with numerous wireless and fiber projects.


Black & Veatch Bio: Black & Veatch has a proven history of serving the unique network integration needs of a variety of clients, including wireless carriers and government agencies. They have the required skills and background necessary to execute projects with the utmost quality, on time, and on budget. As a true turnkey service provider with nationwide scale, Black & Veatch integrates consulting, project management, site acquisition, engineering, procurement, construction, and program management capabilities to produce valuable solutions for a provider’s wireless and wireline network needs.

Black & Veatch is the service provider of choice for operators with complex network upgrades and expansion needs who face critical deadlines and tight budgets. Their self-performance model eliminates unnecessary markups and handoffs and improves quality, schedule, and overall cost.

Exhibit A


IP Routing Portfolio

7950 Extensible Routing System (ERS)




- Scalable to 100 Tbps
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

7750 Service Router (SR)




- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

7950 Interconnect Router (IXR)




- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

7210 Service Access System (SAS)



- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

7705 Service Aggregation Router (SAR)



- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

Portfolio Building Blocks

Nokia FPS 6.0 Tbit/s network processor

- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate


Service Router Operating System (SR OS)

- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

Network Services Platform (NSP)


- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

7950 Extensible Routing System (ERS)




- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

7750 Service Router (SR)




- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

7950 Interconnect Router (IXR)




- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

7210 Service Access System (SAS)




- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

7705 Service Aggregation Router (SAR)



- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

Virtualized Service Router (VSR)



- 100% 100 Gbps line rate
- 100% 100 Gbps line rate
- 100% 100 Gbps line rate

Exhibit B

