TARANA

BROADBAND REINVENTED

The Next Generation of Fixed Wireless Access

2024

Proprietary and Confidential

ngFWA

(next-generation fixed wireless access)

A Completely New Business Model with ngFWA

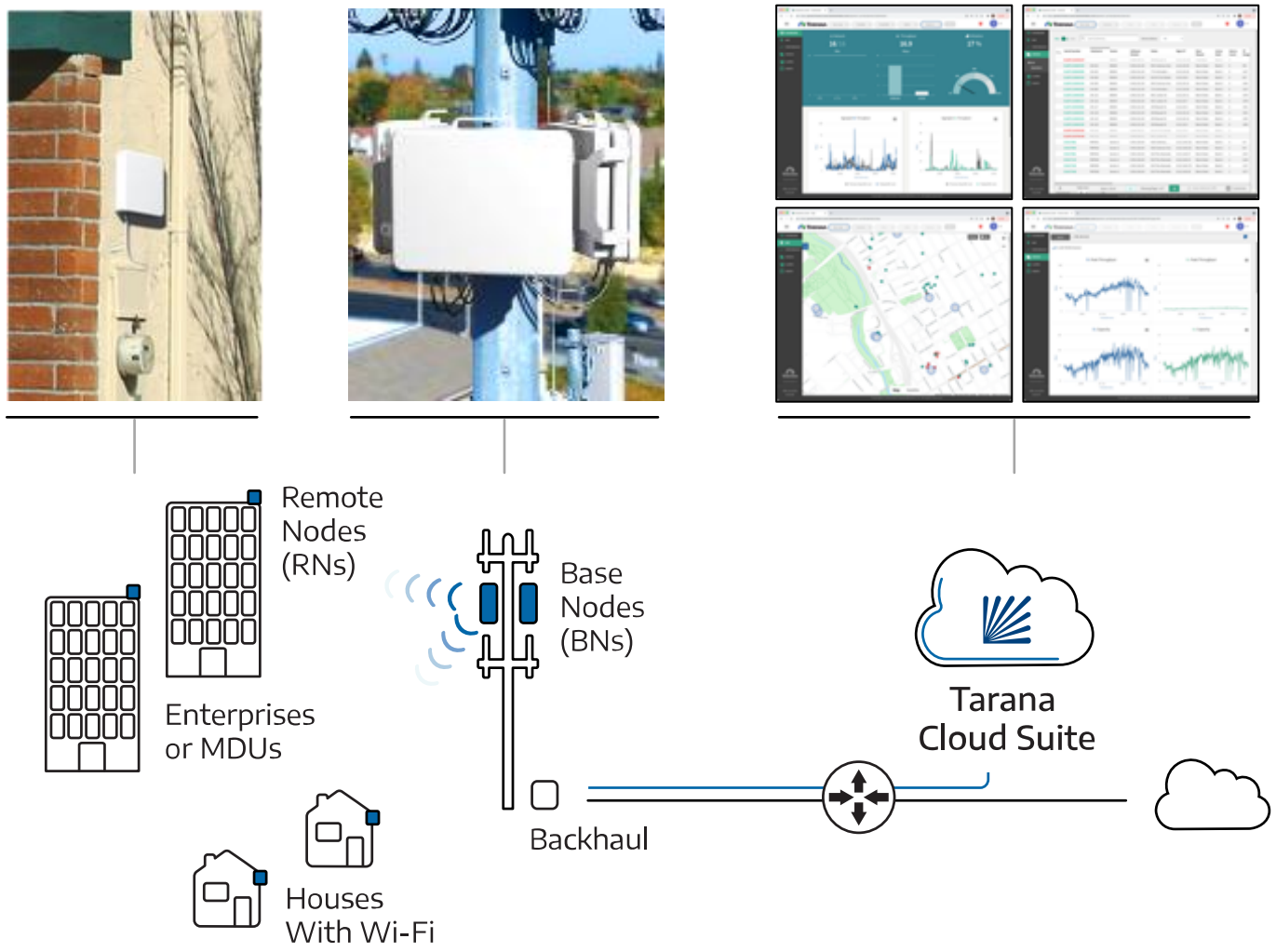
- **Fiber-class per-household speeds** (100 Mbps to 1+ Gbps) and low latency, with support for symmetric
- **High capacity** per neighborhood for economically scalable deployments
- Solid connections **despite obstacles** in the way (like other houses, trees, and vehicles moving on the streets) and interference from other wireless networks
- **Consistent service quality** throughout the neighborhood, to support subscription plan marketing, sales, and fulfillment
- High-quality service **in unlicensed spectrum** to avoid the high cost of licensed spectrum
- **Simple installation** at the home, and ideally customer self-installation

An Award-Winning Solution

- ChannelVision Magazine 2023 Visionary Spotlight Awards
  - **Innovations in Digital Transformation**
  - **International Deployment**
  - **Telecom Legal/Regulatory**
- LightReading 2023 Leading Lights Awards
  - **Company of the Year** (Private)
  - **Digital Equity All-Stars**
- LightReading 2022 Leading Lights Awards
  - **Most Innovative Broadband Access Solution**
- WISPA 2023 Awards
  - **Manufacturer of the Year**
  - **Product of the Year**
- WISPA 2022 Awards
  - **Manufacturer of the Year**
  - **Product of the Year**

Gigabit 1 (G1) Overview

- Complete end-to-end solution for large-scale fixed wireless deployments
- Fiber-class service
- Multi-kilometer range and easy k=1 cellular deployment model
- 3 GHz CBRS, 5 GHz, & 6 GHz spectrum
- Multiple fundamental advances in wireless performance
- Tarana Cloud Suite (TCS) for full-service automation and management
- Simple Broadband Forum network architecture



Gigabit 1 (G1) Overview

G1+6 GHz

New 6 GHz Support

- Flexible frequency bands and channel
  - UNII-3, 5, 7
  - 2 x 40 MHz in standard mode
  - 4 x 40 MHz in x2 (4-carrier) mode
  - Multi carrier provides flexibility in channel selection
- Full backward compatibility
  - Existing 5 GHz RNs in UNII-3
- Integrated AFC domain proxy in TCS
- Gigabit speed upgradeable
  - x2 (4-carrier) mode for gigabit speeds
- Integrated GPS module
  - Provide additional 6 dBi uplink system gain in UNII-5, 6, 7
- 802.3bt POE injector
  - Existing PoE injector support
  - Broken wire detection
  - Overvoltage protection (OVP)
  - Over current protection (OCP)

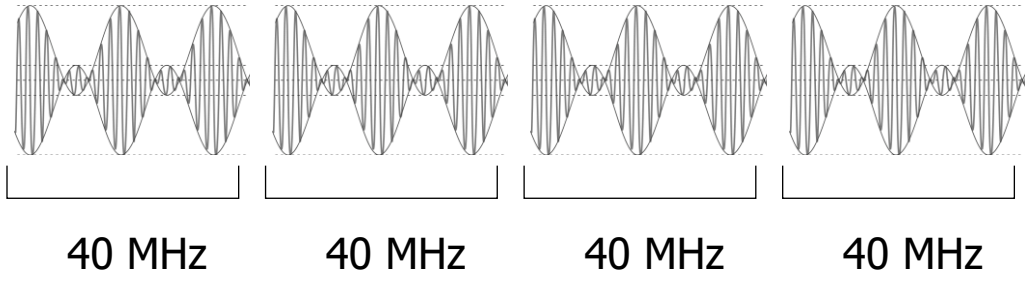
Gigabit 1 (G1) in x2 (4-Carrier) Mode

Base Node (BN)

- Operation in 5 and 6 GHz (6 GHz product models only)
- Up to 3.2 Gbps per sector

Remote Node (RN)

- Operation in 5 and 6 GHz (6 GHz product models only)
- Up to 1.6 Gbps



Four Independent 40 MHz Carriers

Gigabit 1 (G1) Overview

Base Node (BN)

- 3 GHz, 5 GHz, and 6 GHz support
- Up to 3.2 Gbps per BN*
- Up to 30 km LoS range
- Up to 5 km NLoS range
- 250 clients per sector
- 1000 clients per cell (4 BNs)
- Integrated Massive MIMO antenna array
- Multi-TFLOPS computation
- GPS receiver
- Distributed Massive MIMO on both ends
- Full Tx/Rx digital beamforming with IC
- 4D scheduler
- Compatible with LTE frame type 2, subtype 7 (share towers)
- 275 W, 48VDC power consumption
- Single frequency reuse — maximize your PAL license

*In x2 (4-carrier) mode (available in future software release for 6 GHz product models)

Gigabit 1 (G1) Overview

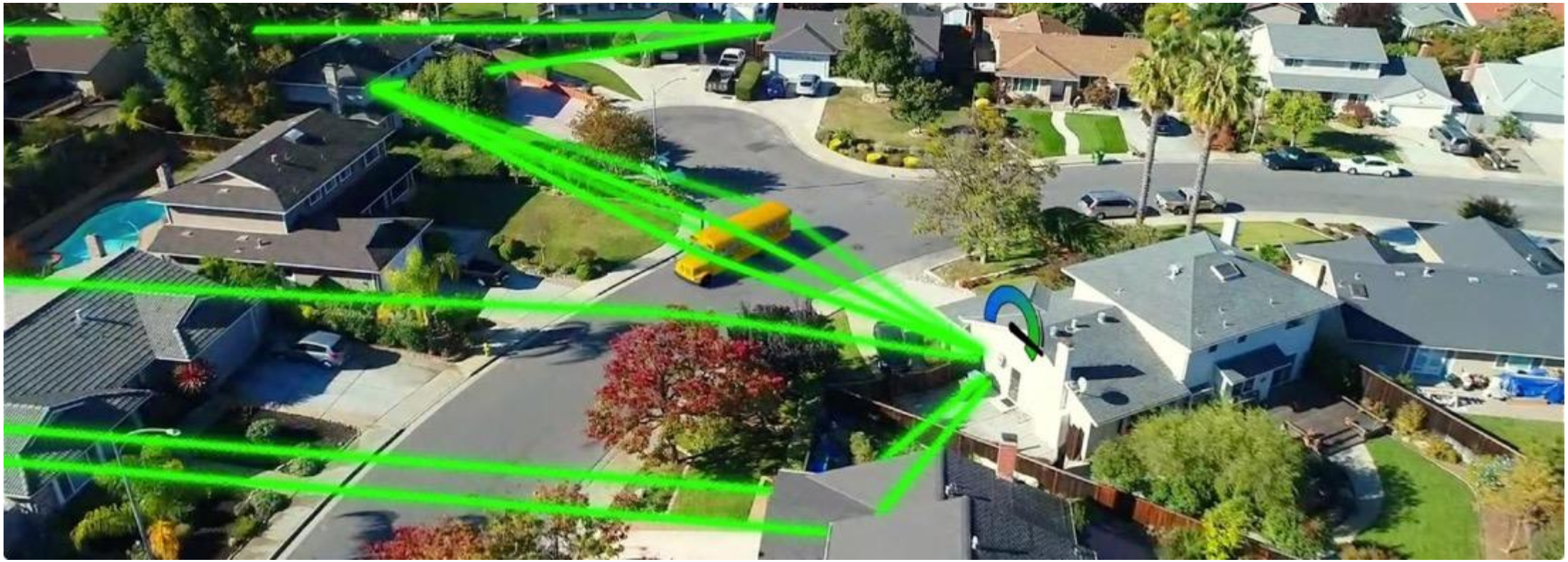
Remote Node (RN)

- 3 GHz, 5 GHz, and 6 GHz support
- Up to 1.6 Gbps*
- 4.5:1, 4:1, 2.67:1 or 1.75:1 profiles
- Up to 30 km LoS range
- Up to 5 km NLoS range
- Advanced Burst Interference Cancellation (ABIC)
- Integrated antenna with auto alignment (5,000/sec)
- PoE Powered (35W)
- Compact form factor

*In x2 (4-carrier) mode (available in future software release for 6 GHz product models)

NLoS Capabilities

Line-of-sight between endpoints is simple and easy. Non-line-of-sight is hard. We've mastered non-line-of-sight with unprecedented precision.



Asynchronous Burst Interference Cancellation (ABIC)

What all other radios hear in busy, unlicensed bands

What G1 radios hear — enabling unprecedented, full, unfettered use of the spectrum (results may vary)

Asynchronous Burst Interference Cancellation (ABIC) Demo

- ABIC Demo
- 0.20 Mile Link Distance
- Milpitas, CA

Asynchronous Burst Interference Cancellation (ABIC) Demo

Heavy Interference ON

From 8 nearby laptops and
2 access points

ABIC (Interference Cancellation) OFF

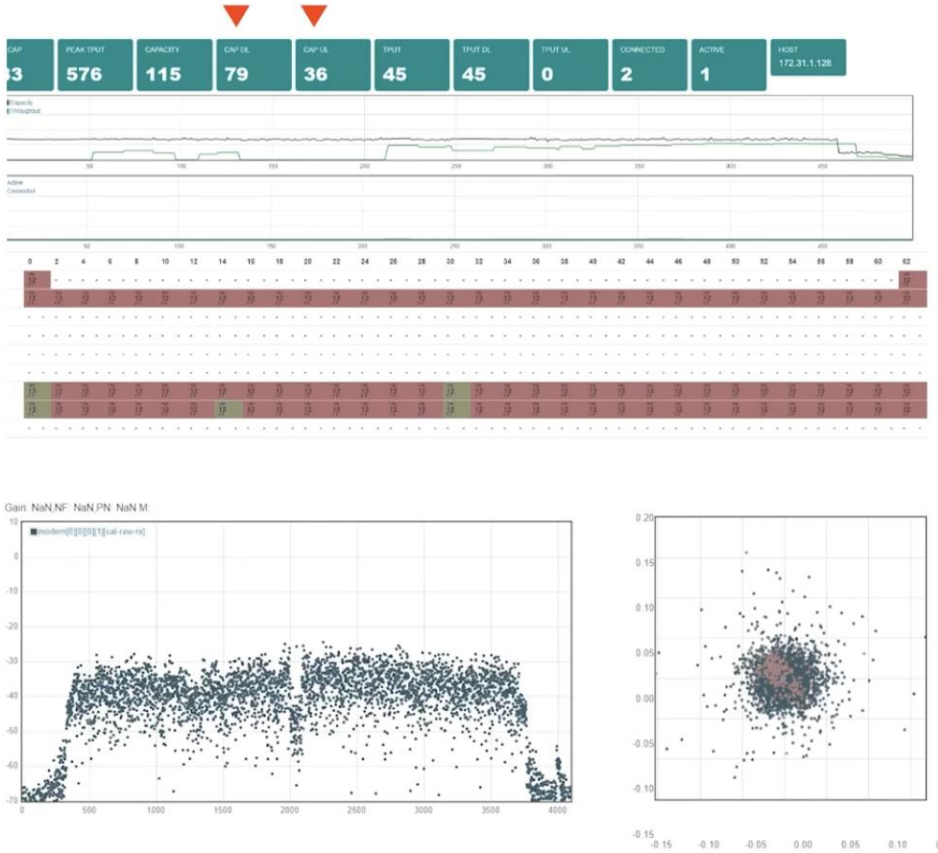
Uses asynchronous burst interference cancellation during transmission

Multipath Integration OFF

Allows multiple paths to reach the remote radio through reflections

Download Speed
79 Mbps

Upload Speed
36 Mbps



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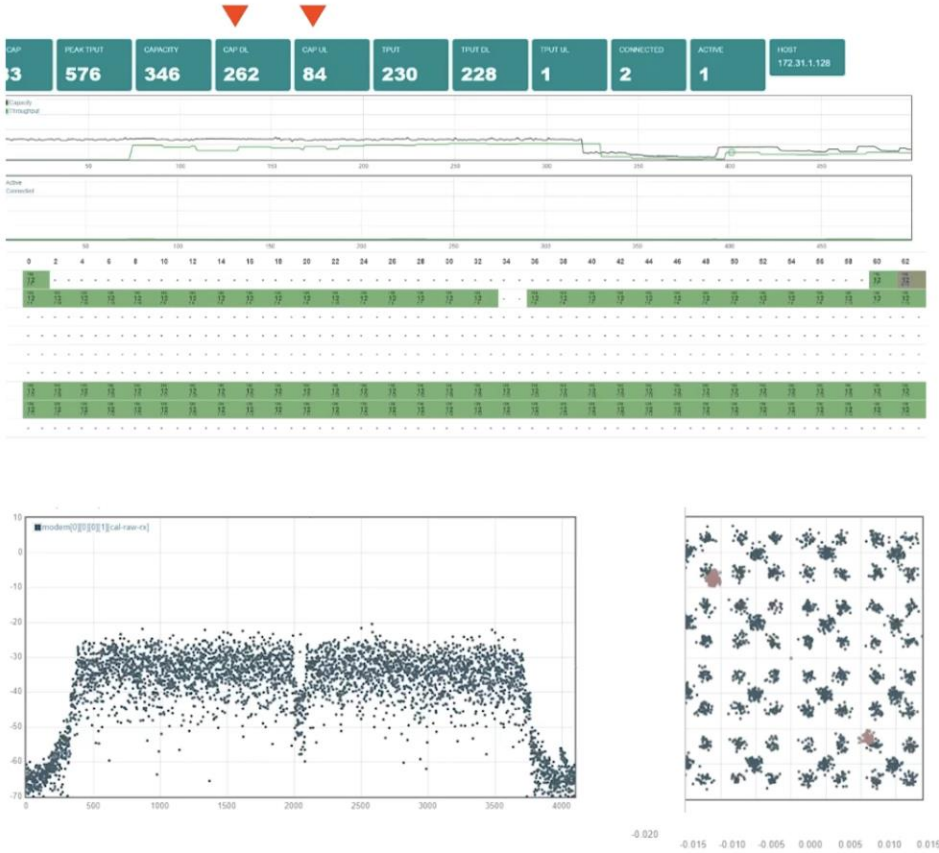
262 Mbps

Upload Speed
84 Mbps



Asynchronous Burst Interference Cancellation (ABIC) Demo

Heavy Interference ON

From 8 nearby laptops and
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ABIC (Interference Cancellation) ON

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Multipath Integration ON

Allows multiple paths to reach the remote radio through reflections

Download Speed
543 Mbps

Upload Speed
125 Mbps

Challenges Today with Fixed Wireless Access (FWA)

✗ **Obstructions**	→	✓ Tarana works in nLoS and NLoS
✗ **Unlicensed interference**	→	✓ Tarana has interference cancellation
✗ **Low throughput & capacity**	→	✓ Tarana has high throughput and spectral efficiency
✗ **Poor link reliability**	→	✓ Tarana has uniform service delivery
✗ **Spectrum scarcity**	→	✓ Tarana has spectrum reuse
✗ **Channel congestion**	→	✓ Tarana has k=1 channel reuse
✗ **Slow time to market**	→	✓ Tarana can be rapidly deployed

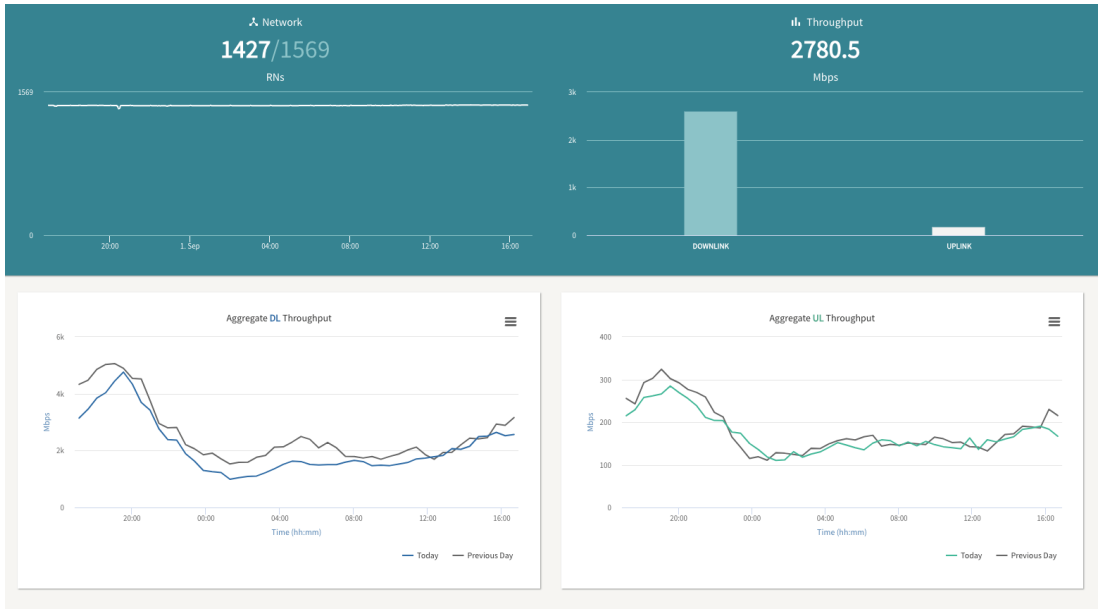
Tarana Cloud Suite (TCS)

Software Management and Support

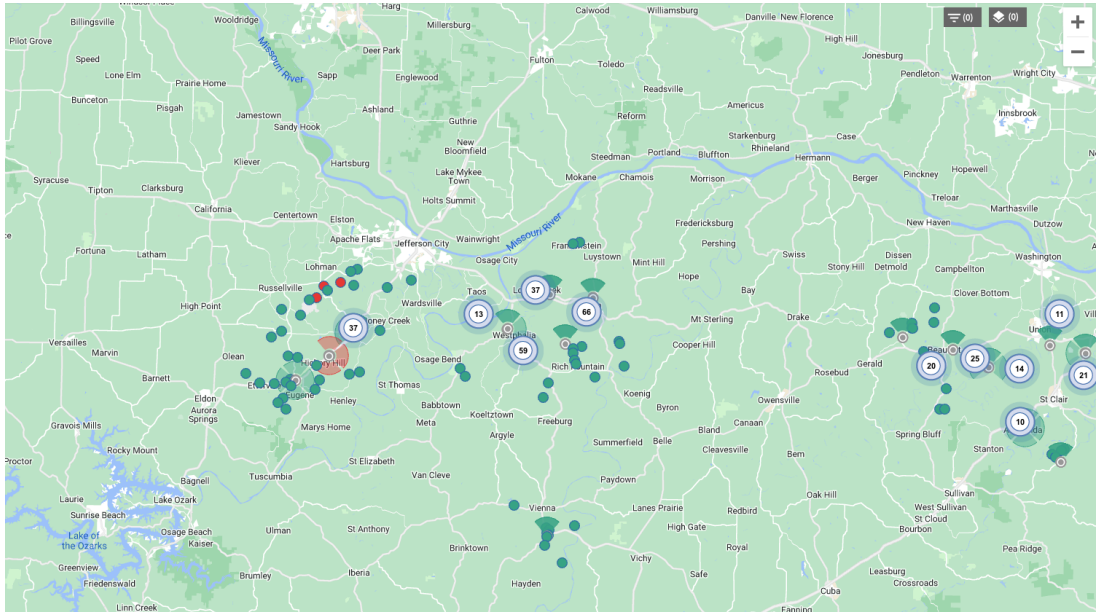
- BN and RN remote maintenance and technical support
- Full access to advanced features, including:
  - Asynchronous Burst Interference Cancellation (ABIC)
  - Carrier aggregation across (2) 40 MHz carriers
  - Distributed Massive MIMO (DM-MIMO)
  - Universal frequency reuse
  - 6 MU-MIMO layers at the BN
  - Multiple network profiles
  - Upcoming x2 (4-carrier) mode (future release)
- Software subscription for the BN and RN (bug fixes and minor features)
- AWS-hosted Tarana Cloud Suite (TCS) providing:
  - TCS software subscription plan (bug fixes and minor features)
  - Auto-config of RNs
  - Alarm management
  - Event management
  - RN and BN automated software upgrades
  - Performance monitoring and statistics

Tarana Cloud Suite (TCS)

Dashboard

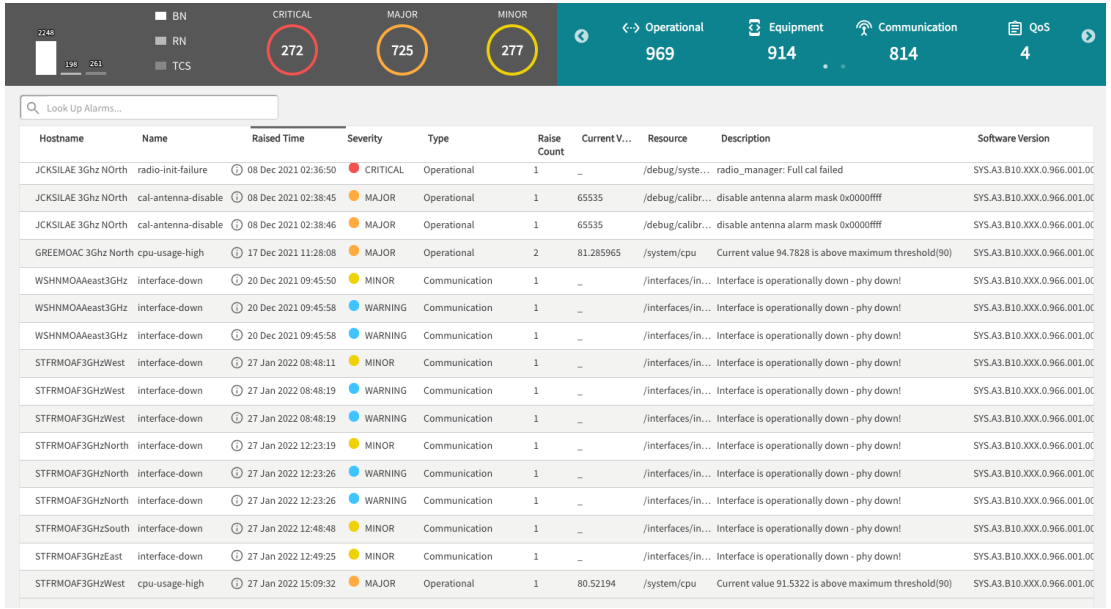


Integrated Map



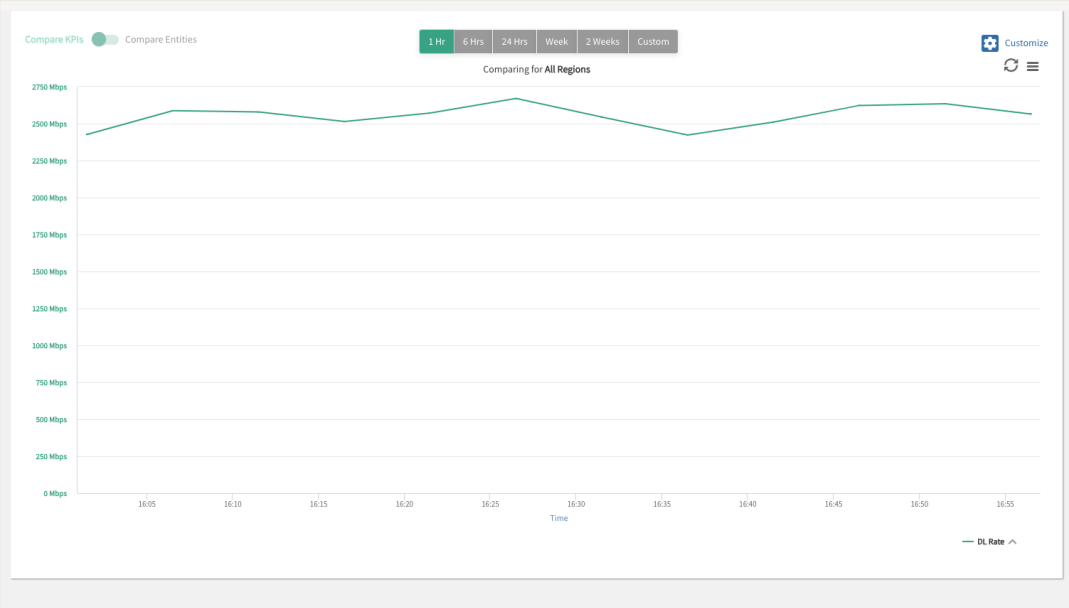
Tarana Cloud Suite (TCS)

Alarms



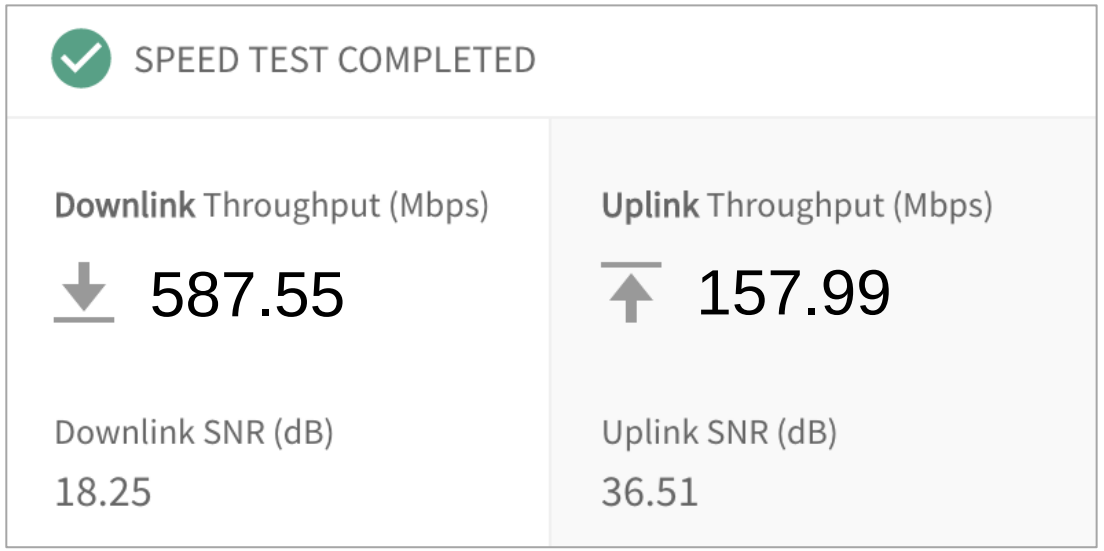
Hostname	Name	Raised Time	Severity	Type	Raise Count	Current V...	Resource	Description	Software Version
JCKSILAE 3Ghz NOrth	radio-init-failure	08 Dec 2021 02:36:50	CRITICAL	Operational	1	_	/debug/syste...	radio_manager: Full cal failed	SYS.A3.B10.XXX.0.966.001.00
JCKSILAE 3Ghz NOrth	cal-antenna-disable	08 Dec 2021 02:38:45	MAJOR	Operational	1	65535	/debug/calibr...	disable antenna alarm mask 0x0000ffff	SYS.A3.B10.XXX.0.966.001.00
JCKSILAE 3Ghz NOrth	cal-antenna-disable	08 Dec 2021 02:38:46	MAJOR	Operational	1	65535	/debug/calibr...	disable antenna alarm mask 0x0000ffff	SYS.A3.B10.XXX.0.966.001.00
GREEMOAC 3Ghz North	cpu-usage-high	17 Dec 2021 11:28:08	MAJOR	Operational	2	81.285965	/system/cpu	Current value 94.7828 is above maximum threshold(90)	SYS.A3.B10.XXX.0.966.001.00
WSHNMOAAeast3GHz	interface-down	20 Dec 2021 09:45:50	MINOR	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
WSHNMOAAeast3GHz	interface-down	20 Dec 2021 09:45:58	WARNING	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
WSHNMOAAeast3GHz	interface-down	20 Dec 2021 09:45:58	WARNING	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
STFRMOAF3GHzWest	interface-down	27 Jan 2022 08:48:11	MINOR	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
STFRMOAF3GHzWest	interface-down	27 Jan 2022 08:48:19	WARNING	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
STFRMOAF3GHzWest	interface-down	27 Jan 2022 08:48:19	WARNING	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
STFRMOAF3GHzNorth	interface-down	27 Jan 2022 12:23:19	MINOR	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
STFRMOAF3GHzNorth	interface-down	27 Jan 2022 12:23:26	WARNING	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
STFRMOAF3GHzNorth	interface-down	27 Jan 2022 12:23:26	WARNING	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
STFRMOAF3GHzSouth	interface-down	27 Jan 2022 12:48:48	MINOR	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
STFRMOAF3GHzEast	interface-down	27 Jan 2022 12:49:25	MINOR	Communication	1	_	/interfaces/in...	Interface is operationally down - phy down!	SYS.A3.B10.XXX.0.966.001.00
STFRMOAF3GHzWest	cpu-usage-high	27 Jan 2022 15:09:32	MAJOR	Operational	1	80.52194	/system/cpu	Current value 91.5322 is above maximum threshold(90)	SYS.A3.B10.XXX.0.966.001.00

KPI Chart

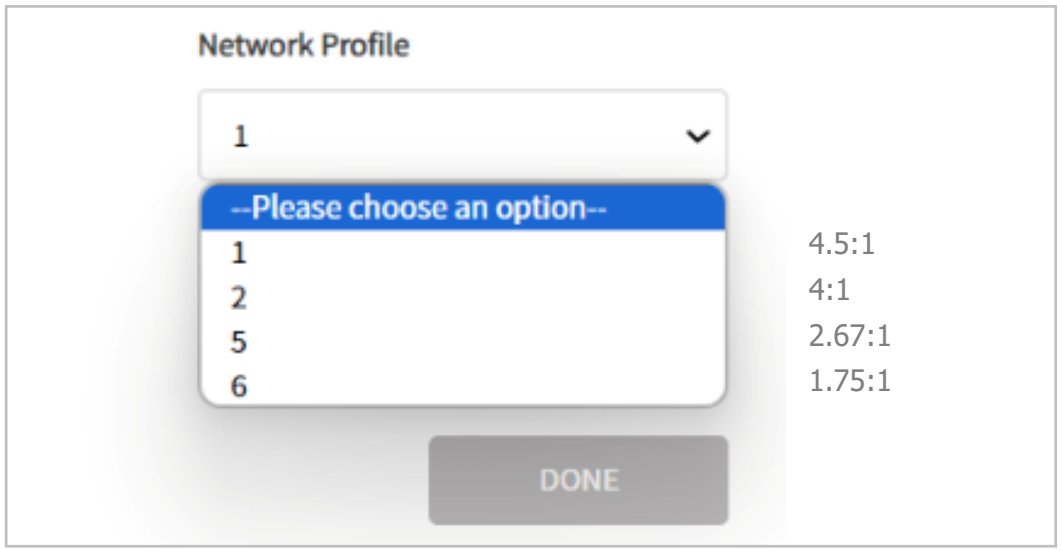


Tarana Cloud Suite (TCS)

Speed Test



Network Profiles



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Questions?

Thank you

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