

SGNLSTRS

Advanced
Wireless
Solutions

Your
Wireless

SOLUTION PROVIDER

The logo for SGNLSTRS features the word "SGNLSTRS" in a bold, sans-serif font. The letters "SGNL" are blue, and "STRS" are red. A stylized graphic of a signal tower with three stars is positioned above the letter "L".



SAGE-STL

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Advanced Wireless Solutions

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While Signal matters, it's the People that Depend on that Signal that matter most. No matter the Environment or Hazard, from Class A Office Buildings to -40°F Refrigerated Food & Pharmaceutical Facilities we get the job done safely and professionally.

Sage-STL has partnered with Signal Stars to enhance their product offering to include the full suite of Enterprise In-Building turnkey wireless solutions. Signal Stars is a leading provider of wireless connectivity solutions. We specialize in wireless consulting, engineering, design, installation, and commissioning of all complexities of wireless systems. From Branch Fail-over to all Carrier Enterprise LTE & 5G NR Cellular Coverage, we deliver true full turn-key solutions. We partner with our customers throughout the project life-cycle to develop solutions that solve their unique wireless use cases as well as their corporate cultures. After all, while signal matters, it's the people that depend on that signal that matter most.

We specialize in multiple facets of wireless RF Solutions including:

- **Branch Endpoints**
- **Multi-Carrier Cellular DAS**
- **Exterior Cellular Deployments**
- **NFPA Public Safety DAS & AT&T FirstNet**
- **Wi-Fi**
- **New Technologies like 5G NR SA & NSA DSS, Licensed C-Band, CBRS, & mmWave**
- **Point to Point & Multi-point wireless networks**



Pictured above is an 85ft Rohn 45G Tower and gamma nu 20dBi Gain RF Cascade Link Donor Antenna serving one of four 20W ICS 1900MHz Band 2 LTE Cellular Repeaters Providing Exterior Cellular Voice, Text, Data, & IoT Coverage to over 250 acres at one of the world's largest food processing and distribution facilities. A Panel Antenna on this tower also serves as an RF Cascade Wireless Link relaying T-Mobile-Sprint signal to the facility's In-Building CEL-FI QUATRA 2000 Active DAS Hybrid.



Our Customers



Pictured below is one of four 20W ICS 1900MHz Band 2 LTE Cellular Repeaters Providing Exterior Cellular Voice, Text, Data, & IoT Coverage to over 250 acres at one the world's largest food processing and distribution facilities.



Environmental Attenuators

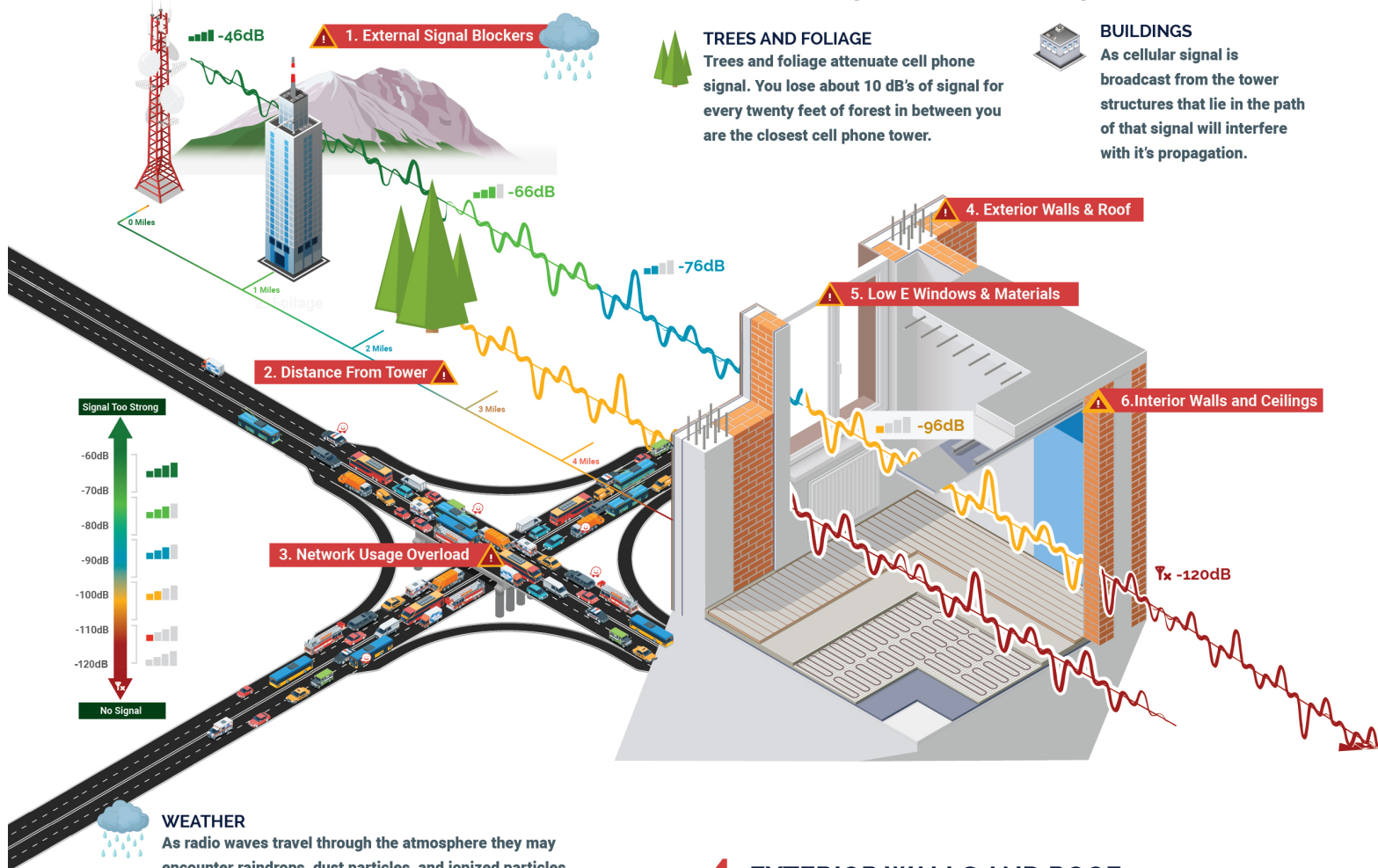
1. EXTERNAL SIGNAL BLOCKERS



TREES AND FOLIAGE
Trees and foliage attenuate cell phone signal. You lose about 10 dB's of signal for every twenty feet of forest in between you are the closest cell phone tower.



BUILDINGS
As cellular signal is broadcast from the tower structures that lie in the path of that signal will interfere with its propagation.



WEATHER
As radio waves travel through the atmosphere they may encounter raindrops, dust particles, and ionized particles which effect their propagation.

GEOGRAPHY
Hills, mountains and depressions that create natural bowls around your property can be a huge problem. Cellular signal will not pass through these natural structures.

2. DISTANCE FROM TOWER



A normal cell phone can theoretically reach a cell phone tower up to 25 miles away in ideal circumstances but because of the way Cell Carriers operate their networks this range is reduced to around 6 miles in rural areas and even less in urban environments.

3. NETWORK OVERLOAD



Traffic puts a huge load on the towers and with more people using cell phones for navigation, music, voice & text, and video streaming the problem is only getting worse. Cell loading has a serious impact on your mobile experience. If you experience reduced cell signal and data speeds at different times of the day, than this is the most likely cause.

4. EXTERIOR WALLS AND ROOF



Concrete, Steel, Tin, Wood, Stone are solid materials. Selected for exterior walls to create a strong barrier between us and the outside world. They also stop cellular signal in its tracks. To make matters worse modern building materials that are specifically designed to better insulate venues also severely attenuate Cellular Signal.

5. LOW E WINDOWS & MATERIALS



The latest advances in building materials are AMAZING. Modern building materials and windows are specifically engineered to reduce energy cost by blocking infrared electromagnetic waves (HEAT). That is great for your electric bill but, not so good for your interior cellular signal.

6. INTERIOR WALLS AND CEILINGS



Interior walls can be just as formidable signal attenuators as exterior walls. Compartmentalization of offices and interior design material choices all reduce cellular signal propagation

Remote Monitoring & Management

All of our Solutions support Remote Monitoring and Management (RMM). RMM supports real-time tracking of system performance and data as a whole and for each Backhaul Unit in the system. KPIs included are Cellular Frequency Bands being boosted, their uplink/downlink decibel Gain, and decibel levels of the key metrics of RSRP, SINR, RSRQ, and SINR. It includes automatic alarm notifications that alert our team and the manufacturer of any performance, equipment, or network issues. RMM enables our team to remotely push firmware updates to the system to ensure peak system health and performance. RMM offers Carrier-grade security. Affording peace of mind that the system is being managed without the need for on-site assistance from client IT or Networking teams and eliminating the need for service calls for software or firmware updates.



- **Monitor and manage devices**
- **Real-time data and performance metrics**
- **Alarm policies which email and text notifications**
- **Remotely Manage Software Updates**
- **Manage users and groups**
- **Carrier-grade security**

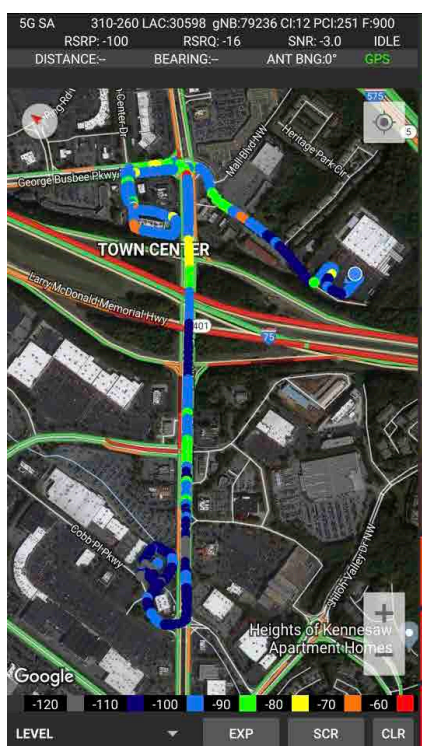
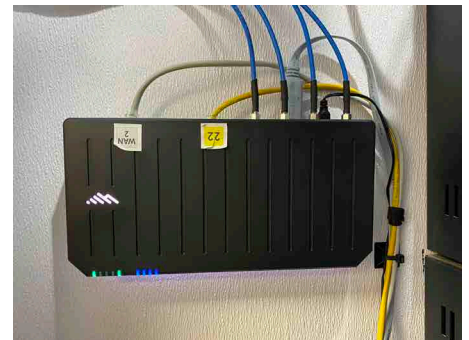
Remote Monitoring and Management Plans are offered as annual and monthly packages. Annual Site Visits to Inspect the Solution Architecture may be purchased as well. Extended Remote Monitoring & Management and Annual Site Visits to Inspect the Solution Architecture are included in any optional Extended Warranty purchased for the duration of their term.

We have developed Enterprise Branch Solutions for some of the nation's largest fast-food retailers. When Whataburger and Chick-Fil-A encountered poor cellular health and data speeds with their Cradlepoint Cellular Branch Routers they turned to us to develop a standard to improve the cellular health being reported in Net Cloud Manager, their Downlink/Uplink data speeds, and latency. In the case of Chick-Fil-A, we delivered a solution that met their current and future needs by installing a MIMO Donor Antenna that was aimed to optimize it's received cellular signal strength, access to LTE & 5G NR cellular signal / Data speeds, and latency. Should they elect to upgrade to 5G NR all they have to do is add an adapter next to their E300 in the MDF.

Case Study

By Installing a Dedicated Roof Mounted Wideband MIMO Donor Antenna we were able to achieve a 120x improvement in Verizon LTE Download speeds as compared to the pre-install download speed tests (0.04Mbps to 4.81Mbps). With the addition of the LTE T-Mobile SIM Card we were able to achieve a 475x improvement over the pre-install Verizon download speed tests (0.04Mbps on VZW to 19Mbps on TMo).

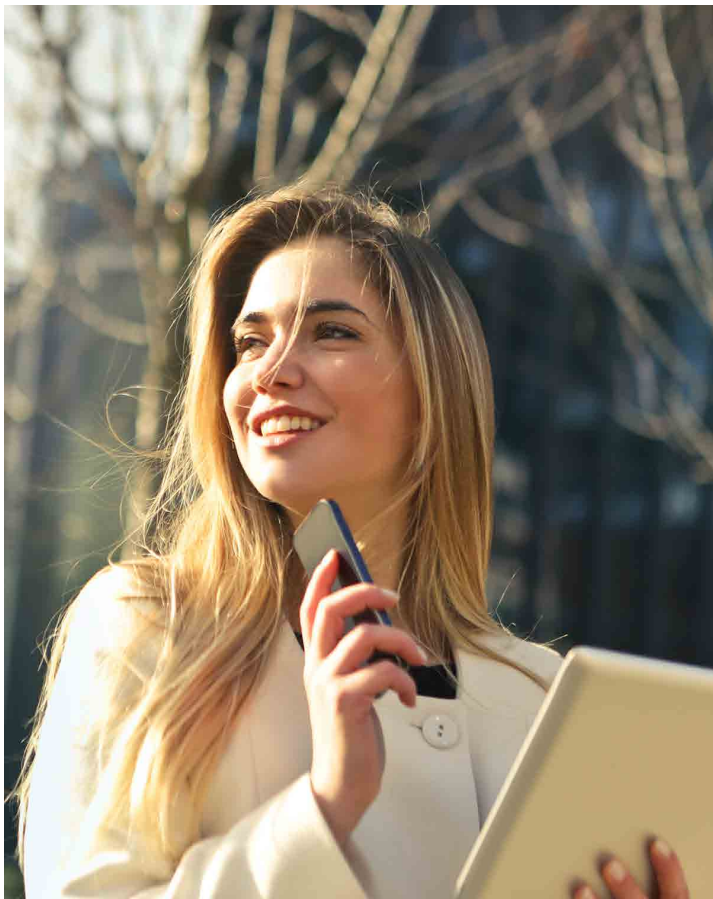
We recommended adding a Low to Mid Band 5G NR Adapter to this location as that would increase the available Download Speeds on T-Mobile to over 300Mbps.





Active DAS Hybrid

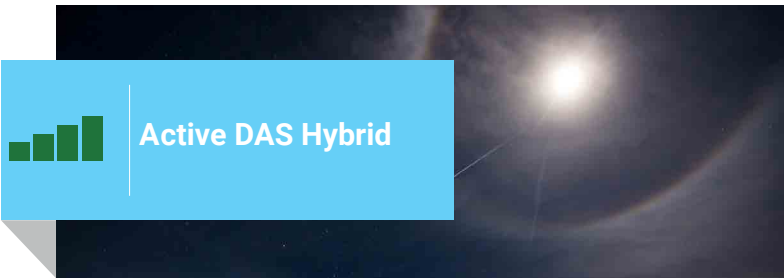
The Signal Stars Team of Wireless Engineers and Technicians are seasoned Preferred Partners and Integrators of CEL-FI by Nextivity. We offer Active DAS Hybrid (Distributed Antenna System) Solutions that are Carrier Pre-Approved and 100% unconditionally network safe for voice and data. As our solutions are FCC and Carrier Pre-Approved, there is no wait for approvals, Carrier backhaul integrations, or multiple Carrier specific systems. Using Signal Stars Active DAS Hybrid Solutions, you no longer have to deal with the extraordinary delays or expense of legacy Active/Hybrid systems. We understand that time is your most valuable asset. With our Active DAS Hybrid Solutions we will solve your cellular connectivity needs efficiently with minimal impact on your business operations.



Key Highlights

- 100dB max gain in each band simultaneously
- Carrier Pre-Approved
- LTE & sub3Ghz 5GNR NSA Capable
- Intelligent Antenna aiming that optimizes signal quality.
- Continuously self-optimizes and self-configures to environmental changes
- RF-over-Ethernet (RFoE) and power with Power-over-Ethernet (PoE)
- Real-Time Remote Monitoring and Management Enabled

Active DAS Hybrid Architecture

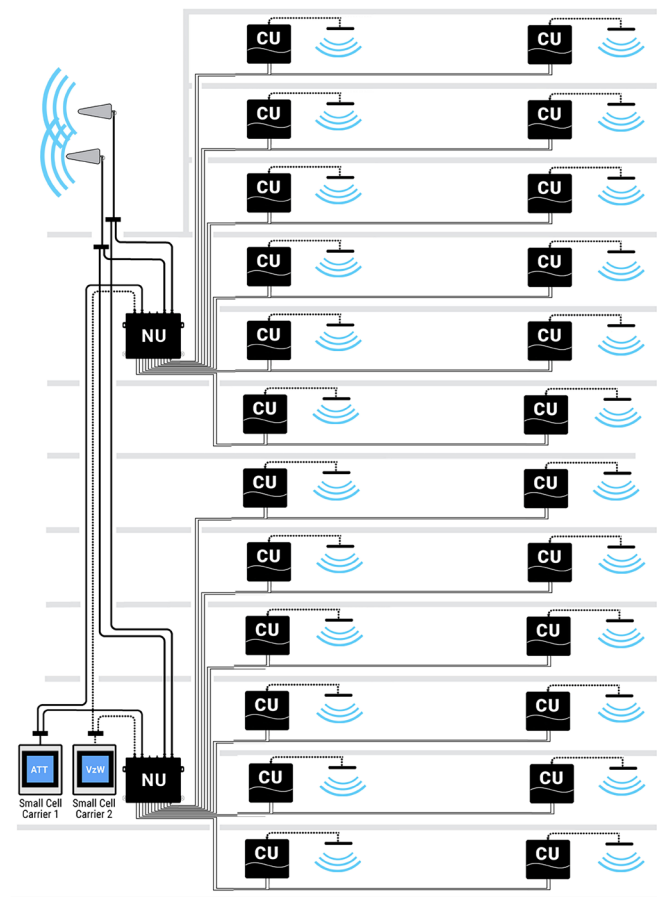


Signal Stars Active DAS Hybrid utilizes Cel-Fi QUATRA to deliver superior quality cellular signal coverage in buildings up to 200,000 sq.ft. It is a scalable solution compatible with single or multiple carrier environments. It is the ultimate cost efficient and scalable Active DAS Hybrid solution.

Cel-Fi QUATRA is an advanced solution that was designed and engineered to enhance indoor cellular connectivity without causing interference on the mobile network.

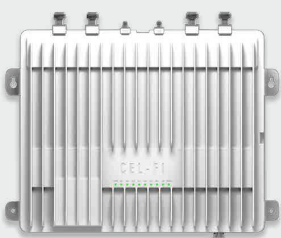
The system is comprised of an Intelligent Donor Antenna, a Network Unit (NU), and Coverage Units (CUs). Up to six Coverage Units (CUs) may be used per Network (NU). The system is powered from the NU and distributes RF and power over Ethernet from the NU to the CUs.

The system is unconditionally network safe as it self-optimizes and self-configures continuously to avoid any risk of interference between the CUs, Mobile Networks, and Wi-Fi networks. Cel-Fi QUATRA is both FCC and Carrier Pre-approved.



ACTIVE DAS HYBRID

CEL-FI QUATRA 4000 / 4 CARRIER SOLUTION



NU NETWORK UNIT



CU COVERAGE UNITS

- BOOSTS TALK, TEXT, & DATA
- ALL 2G, 3G, 4G, AND 4G/LTE STANDARDS ARE SUPPORTED
- LTE & SUB3GHZ 5G NR NSA CAPABLE
- UP TO 100 DECIBEL GAIN (1000X STRONGER)
- CARRIER PRE-APPROVED
- 100% UNCONDITIONALLY NETWORK SAFE
- REAL-TIME REMOTE CLOUD MONITORING & MANAGEMENT
- SELF-OPTIMIZING
- POWER & RF OVER ETHERNET

Example Active DAS Hybrid iBwave Design

Systems information legend

- AT&T / 700 MHz - LTE / 4 Sectors
- AT&T / 1900 MHz - PCS - LTE / 4 Sectors
- T-Mobile / 1900 MHz - PCS - LTE / 4 Sectors
- T-Mobile / 2100 MHz - AWS - LTE / 4 Sectors
- Verizon / 700 MHz - LTE / 4 Sectors
- Verizon / 2100 MHz - AWS - LTE / 4 Sectors

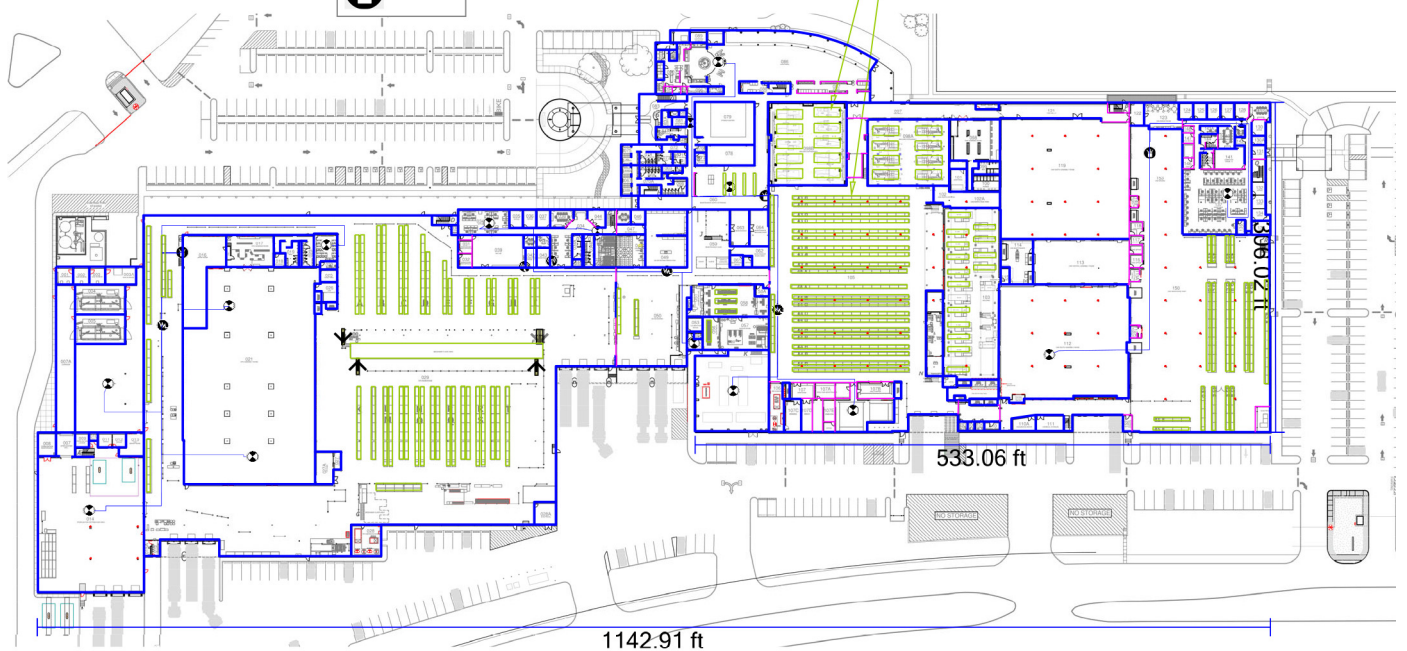
Pictograms legend

- Antenna
- Attenuator
- Offair
- Repeater
- Riser
- Via

Materials legend

- Concrete [Medium]
- Elevator cage
- Metal
- Partition [Plaster Board / Drywall Heavy]
- Concrete [Heavy]
- Concrete [Medium]
- Elevator cage
- Metal shutter
- Metal

Elevator Cage Used to Simulate Pallet Racks and Metal Equipment



Systems information legend

- AT&T / 700 MHz - LTE / 4 Sectors
- AT&T / 1900 MHz - PCS - LTE / 4 Sectors
- T-Mobile / 1900 MHz - PCS - LTE / 4 Sectors
- T-Mobile / 2100 MHz - AWS - LTE / 4 Sectors
- Verizon / 700 MHz - LTE / 4 Sectors
- Verizon / 2100 MHz - AWS - LTE / 4 Sectors

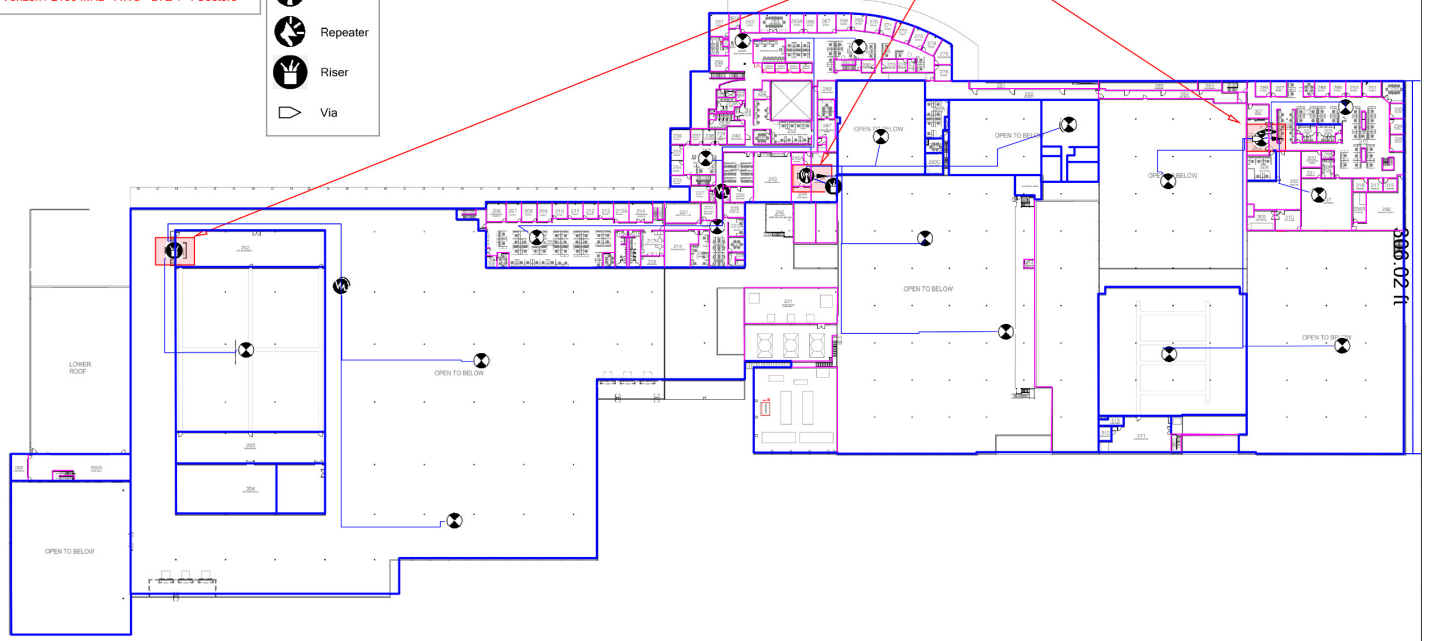
Pictograms legend

- Antenna
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- Offair
- Repeater
- Riser
- Via

Materials legend

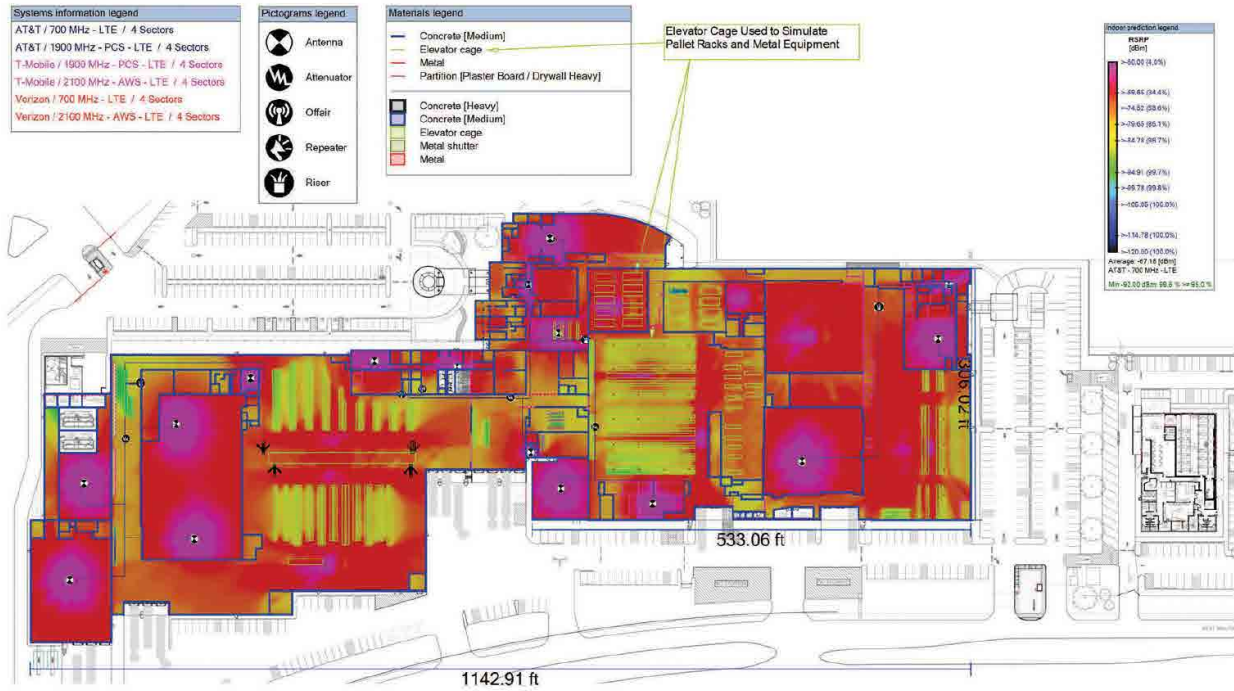
- Concrete [Medium]
- Partition [Plaster Board / Drywall Heavy]
- Concrete [Heavy]
- Concrete [Medium]

Head End Locations

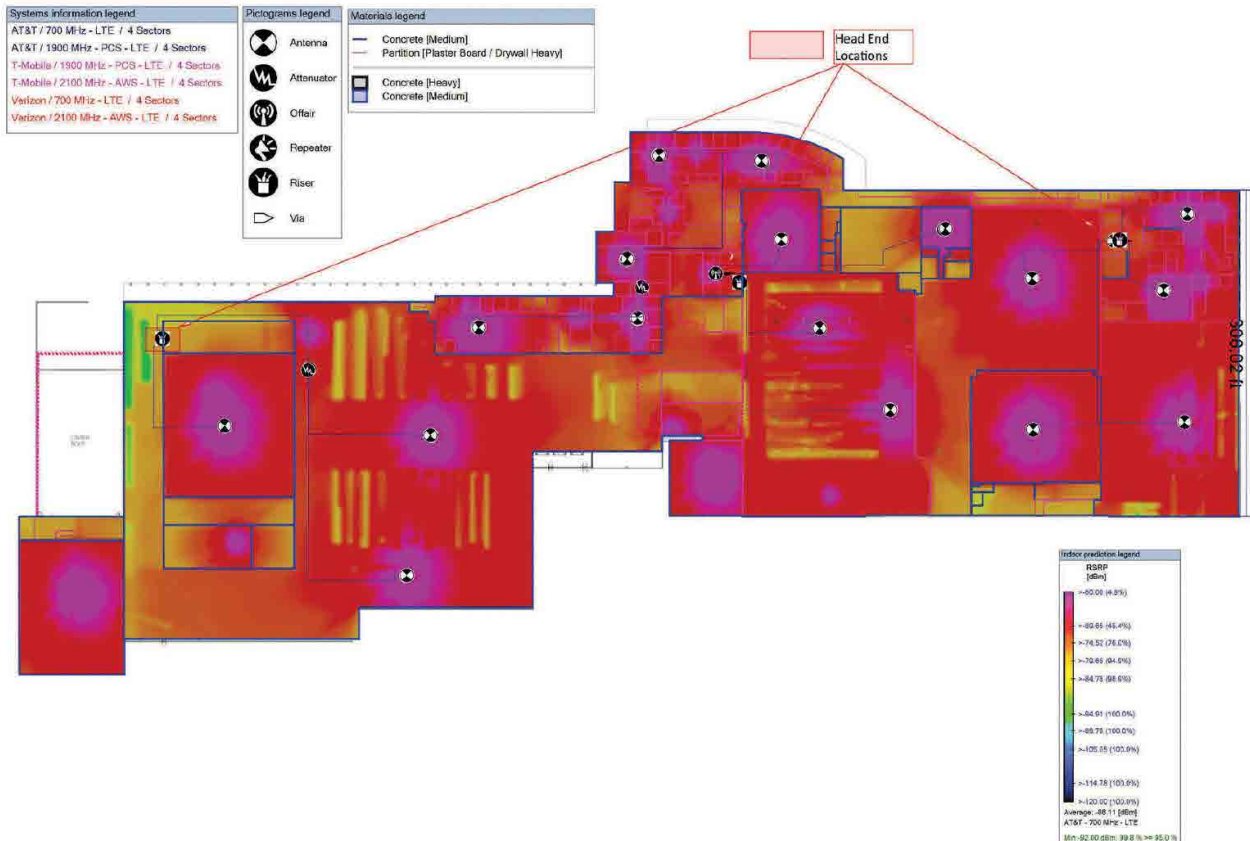


Example iBwave Design Signal Propagation Predictions

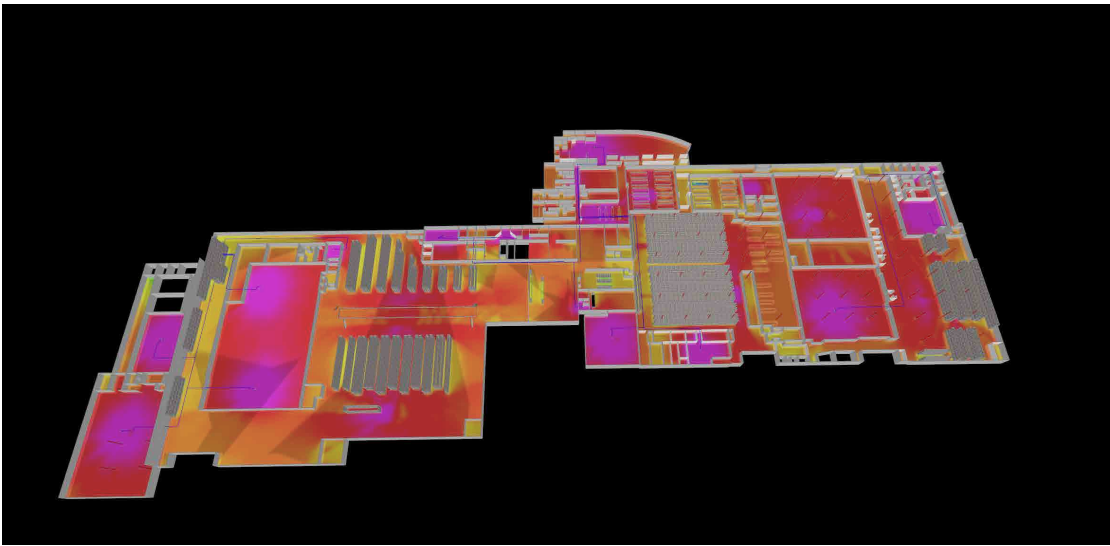
AT&T - 700 MHz - LTE / LTE RSRP



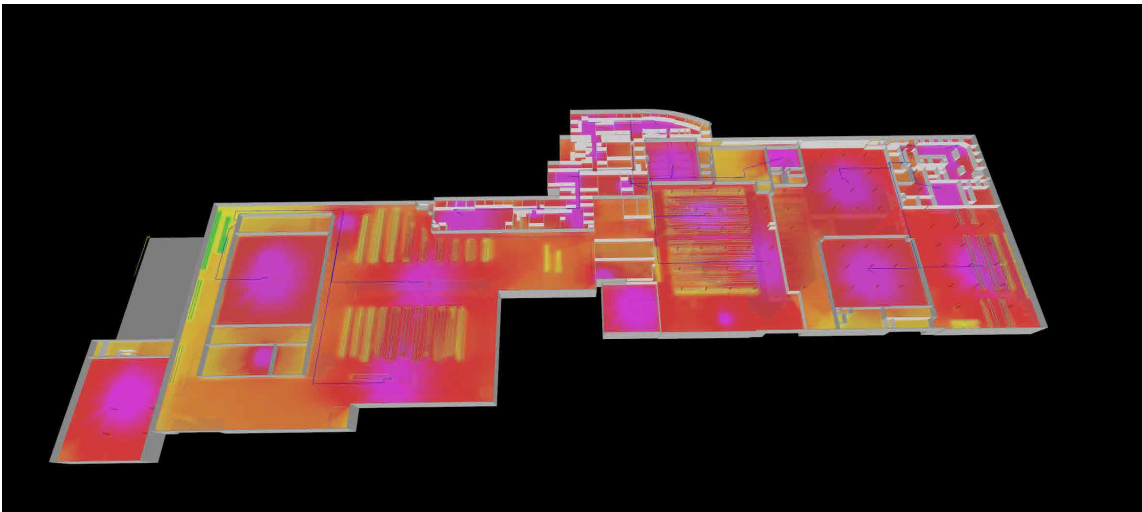
AT&T - 700 MHz - LTE / LTE RSRP



Example iBwave Design 3D Modeled Signal Propagation Predictions

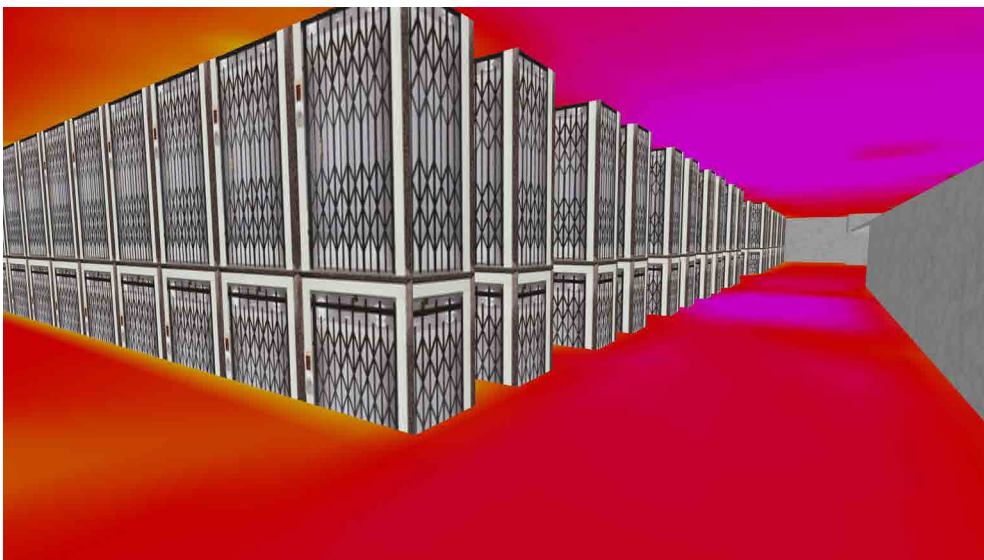


1st Floor



2nd Floor

3D Model Walk-through of Signal Propagation Predictions support Coverage Area Verification Client Reviews during Design Stage.



1st Floor

The Signal Stars Team of Wireless Engineers and Technicians are fully Certified with Corning as a preferred Wireless Integration Partner for their Carrier OEM RAN DAS, Open RAN, and E-RAN. We specialize in Designing and Delivering LTE and 5G NR Solutions for the major Carriers. This includes 5G NR mmWave using Corning's Everon Small Cell Solutions (SpiderCloud) and Corning's Everon 6200 Solution.

We are among the first Corning Integrators to be able to offer their new Everon 6200 and it's impressive N2RU Low Power Fiber Remote Units. The N2RU Remote unit is an ultra-compact fiber-to-the-edge module supporting up to 8 Bands from 360MHz to 3800MHz at 20dBm per band (pre-Antenna EIRP) any Carrier any Configuration with internal antenna. It's low profile blends seamlessly into almost any environment and can be configured to supply 5G NR NSA in the sub3GHz spectrum right out of the box. The Everon 6200 N2RU come in two main configurations; sub3GHz for LTE and Low-Mid 5G NR NSA and C-Band (3.4GHz to 3.8GHz) for Carrier Licensed C-Band 5G NR SA deployments or CBRS. It can be deployed as the Primary Solution or layered onto a SpiderCloud deployment to provide Carrier Licensed C-Band 5G NR SA.

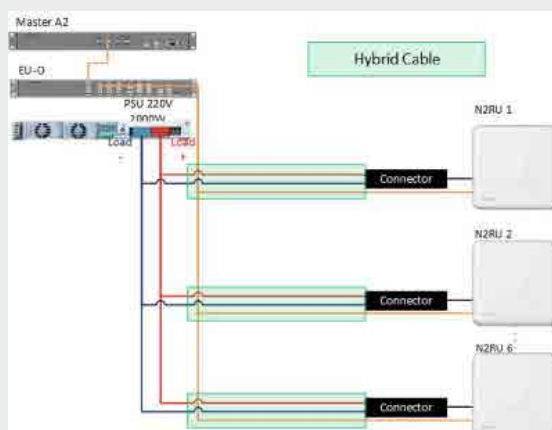
Remote Unit Config Example 1:

- ATT Band 2 1900MHz MIMO
- ATT Band 12 700MHz SISO
- ATT Band 14 700MHz FirstNet SISO
- VZW Band 13 700MHz MIMO
- VZW Band 4/66 2100MHz MIMO

Remote Unit Config Example 2 Adding in T-Mobile from the same device for no additional cost:

- TMO Band 41 2.5GHz MIMO
- ATT Band 2 1900MHz MIMO
- ATT Band 12 700MHz SISO
- VZW Band 13 700MHz SISO
- VZW Band 4/66 2100MHz MIMO

CORNING EVERON 6200



- FIBER TO THE EDGE
- WIDEBAND SUPPORT (360MHZ - 3800MHZ)
- 8 X 20 DBM RF MODULES PER REMOTE
- LTE & SUB3GHZ 5G NR NSA CAPABLE
- C-BAND LICENSED 5G NR SA OR CBRS
- UP TO 100MHZ OF RF SPECTRUM PER RF MODULE
- 10 GBPS SFP+ INTERFACE TO/FROM PARENT UNIT
- RJ45 SOCKET FOR GIGABIT ETHERNET SERVICE
- SUPPORTS BACKHAUL FOR IP SERVICES OR SMALL CELL EXPANSION WITH CORNING'S 5G NR SA MMWAVE SMALL CELLS

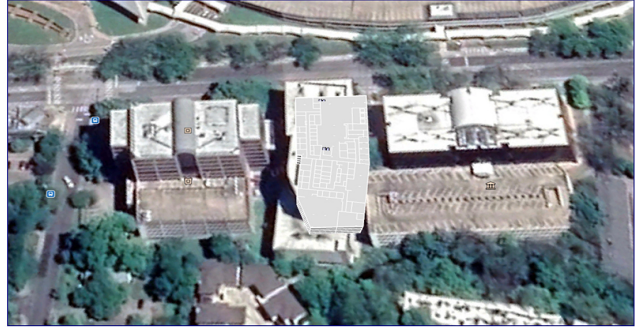
Example Active DAS iBwave Design Corning Everon Small Cell (SpiderCloud)

PROJECT NAME: Example
 PROJECT ADDRESS: 801 Barton Springs Rd
 PROJECT ADDRESS: Austin, TX 78704
 Project ID:XXXXX
 PROJECT LOCATION: 30.258931, -97.752433
 BUILDING SQUARE FOOTAGE: 80,169.83 SQ. FT.
 Project Main Contact: Brandon Holley / 978-902-9070 /
 brandon@signalstars.com

PROJECT INFORMATION:
 NUMBER OF SN'S - 1 MODEL # OF SN'S: SCSN 9000-1
 NUMBER OF RN'S - 21 MODEL # OF RN'S: SCRN-320-0246
 NUMBER OF POE SWITCHES - 00 MODEL # OF POE: Customer provided
 NUMBER OF AGGREGATION SWITCHES - 00 MODEL # OF AGG. SWITCH: Customer provided
 NUMBER OF SFP'S - 00 MODEL # OF SFP'S: Customer provided
 NUMBER OF SECTORS: 21

DESIGN BASED ON MOST LINK-BUDGET-LIMITED BAND & TECHNOLOGY
 LTE COVERAGE DESIGNED TO -92 dBm FOR 95% OF THE TARGET COVERAGE AREAS.

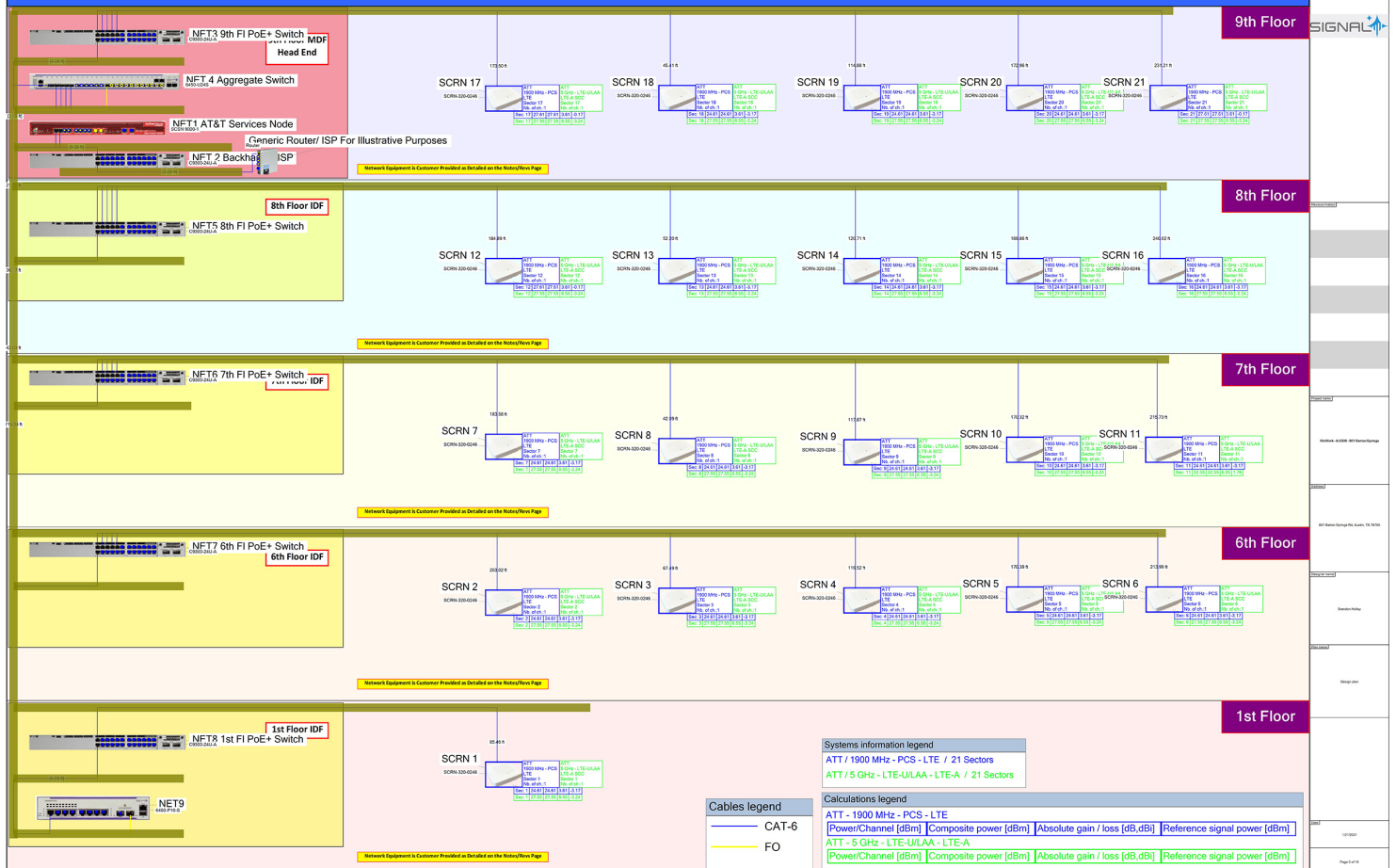
CUSTOMER: AT&T



SHEET INDEX:
 COVER SHEET / SHEET INDEX
 NOTES & CAVEATS / LIST OF REVISIONS
 FACILITY MAPS
 SYSTEM TOPOLOGY SHEET(S)
 FLOOR PLANS

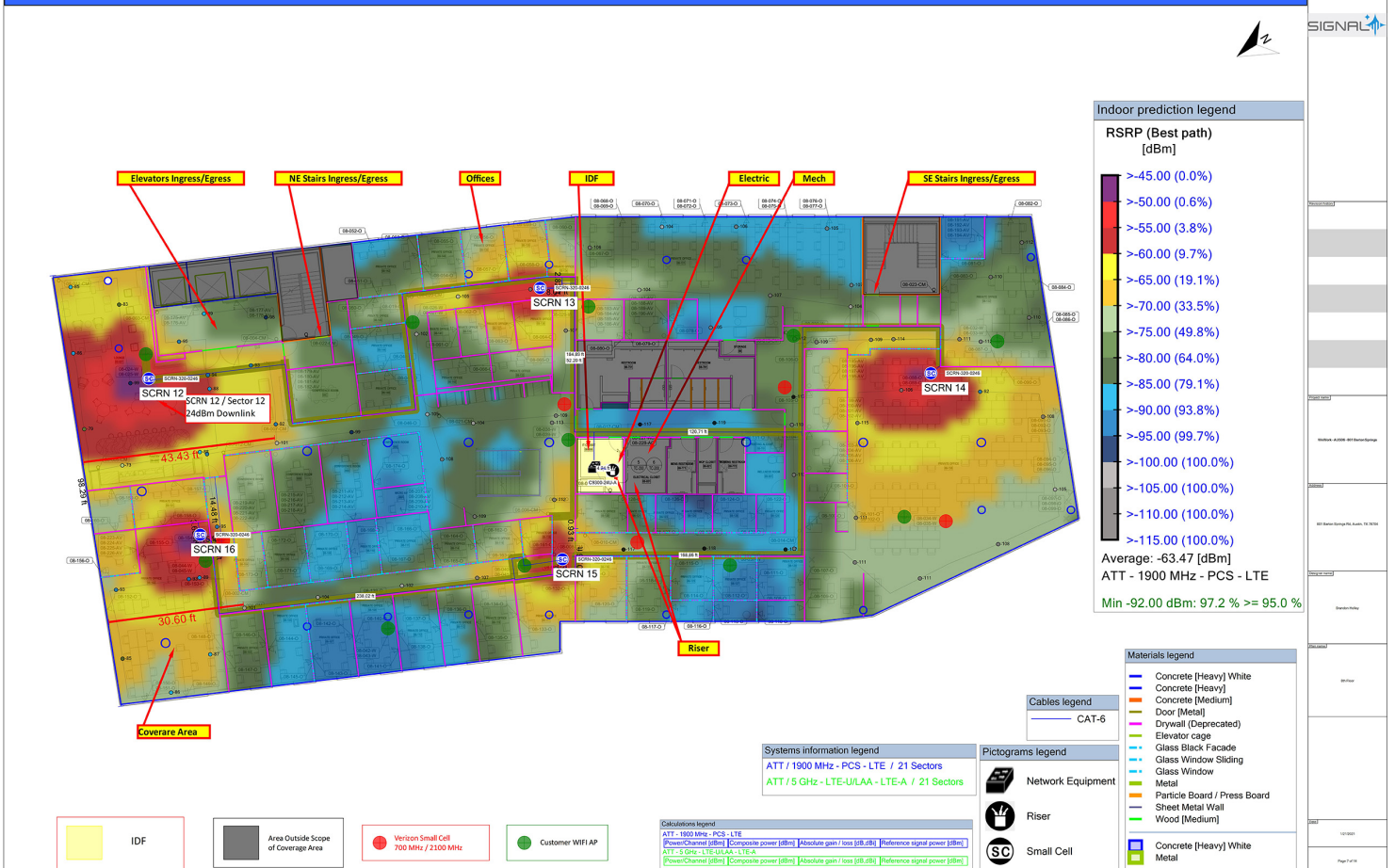
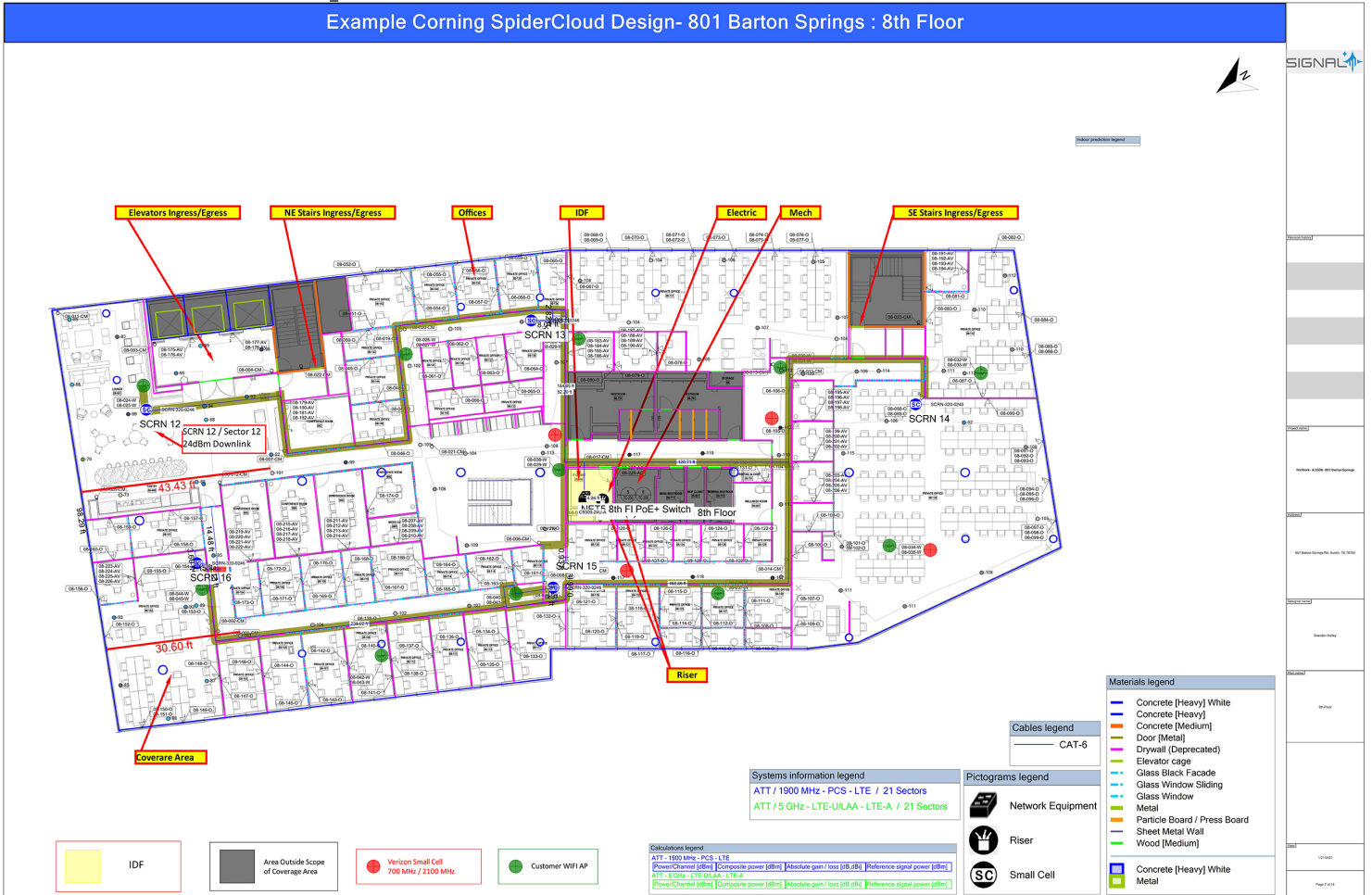
(Some sets contain Predictions for the entailed systems.)

Example Corning SpiderCloud System Topology

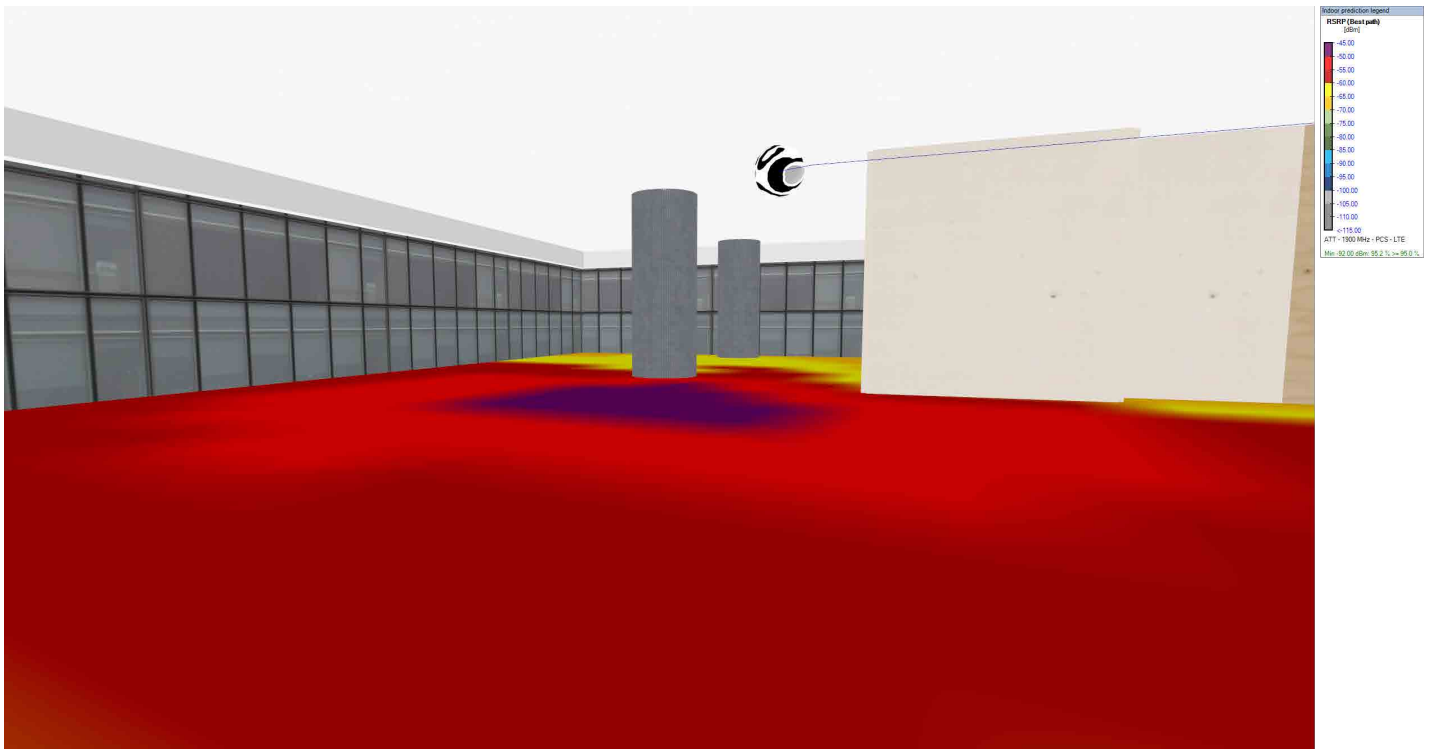
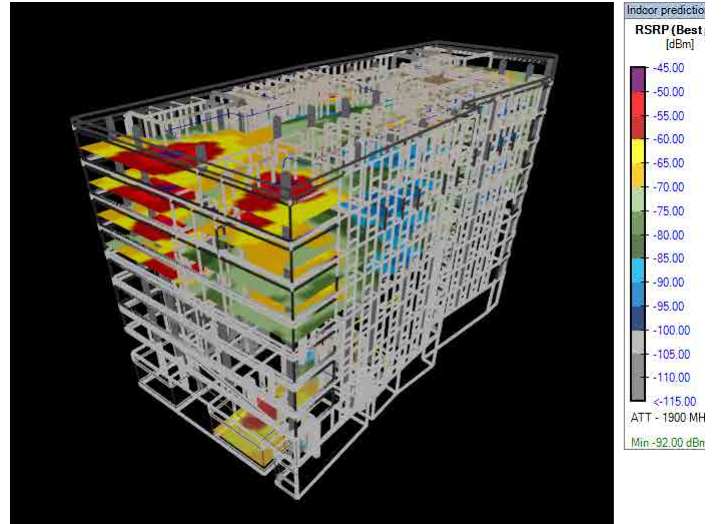
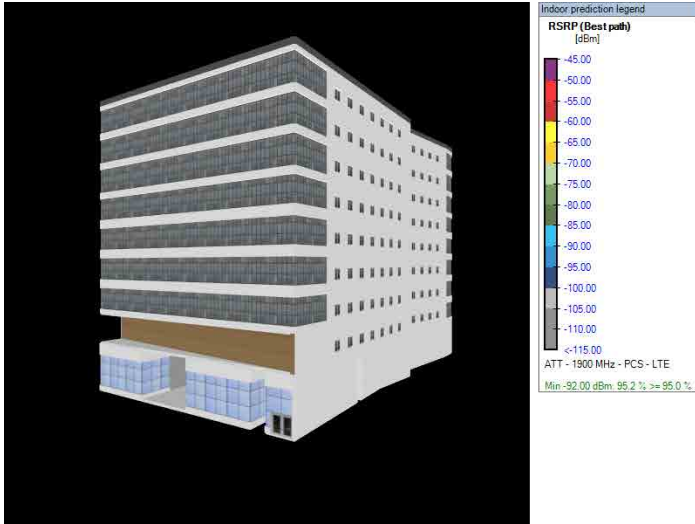


Example Active DAS iBwave Design & Signal Propagation Predictions / Corning Everon Small Cell (SpiderCloud)

Example Corning SpiderCloud Design- 801 Barton Springs : 8th Floor

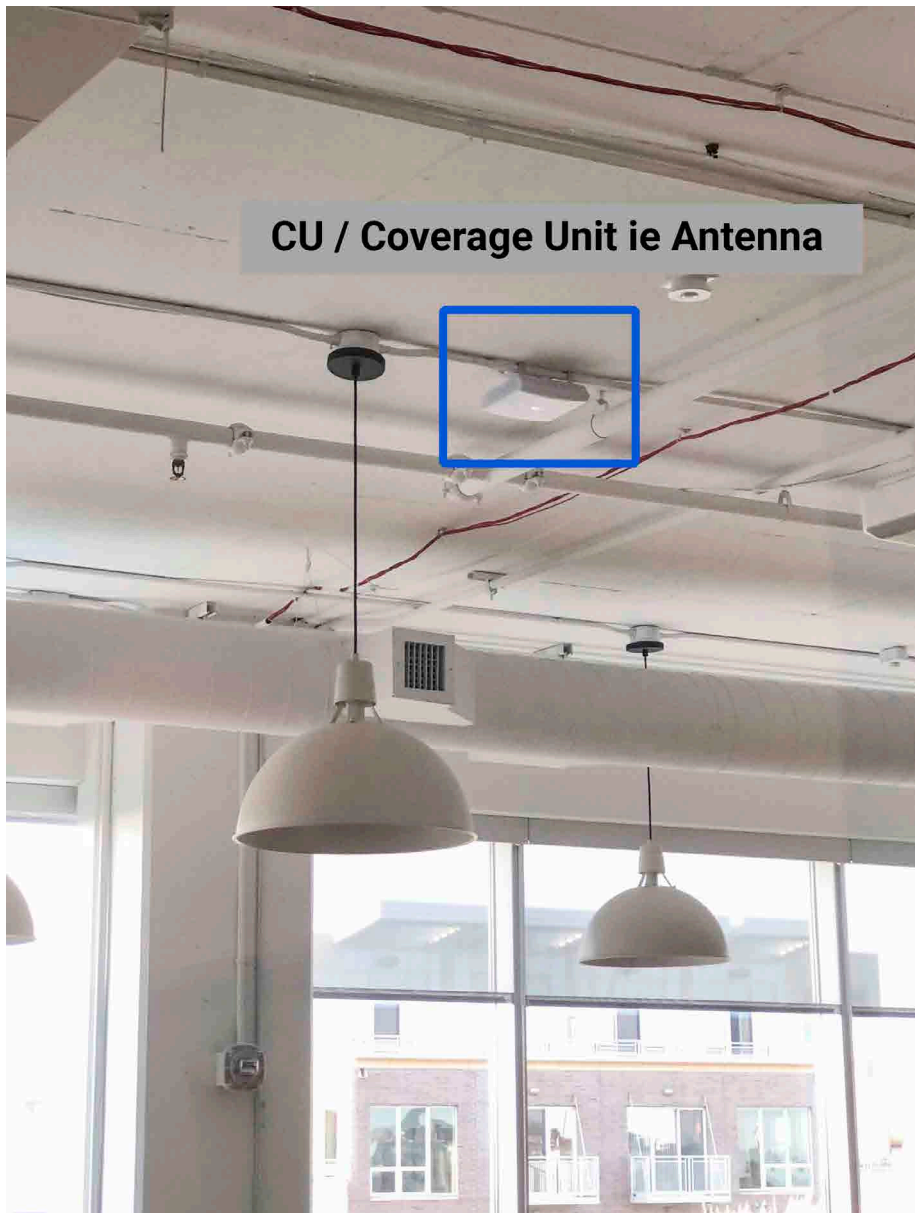


Example Active DAS iBwave Design 3D Modeled Signal Propagation Predictions Corning Everon Small Cell (SpiderCloud)



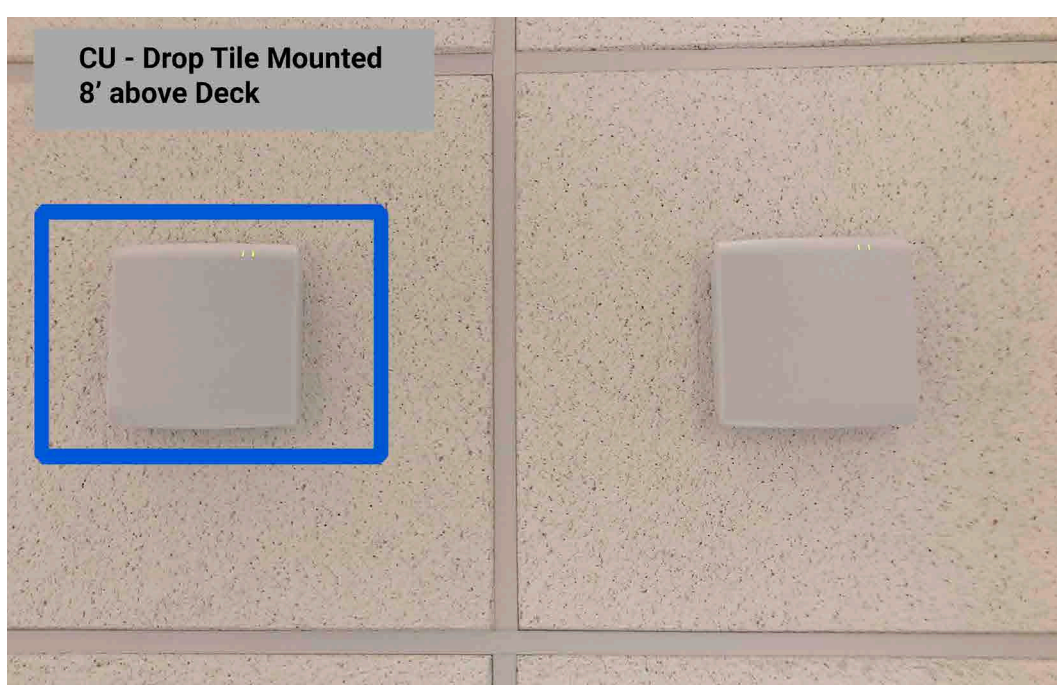
Project Name: WeWork - AUS06 - 801 Barton Springs

Example Coverage Unit (CU) Mounting Detail 1/3



CU / Coverage Unit ie Antenna

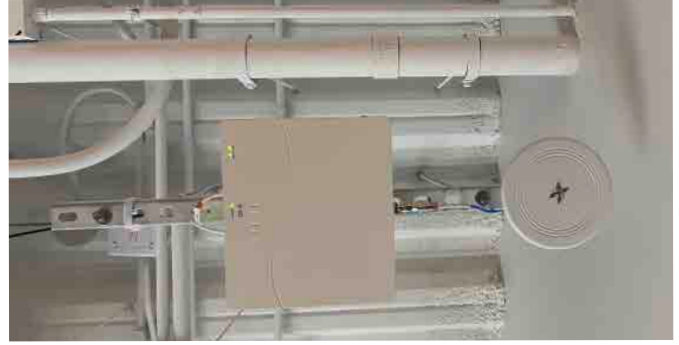
QUATRA 1000 & 2000
COVERAGE UNITS



CU - Drop Tile Mounted
8' above Deck

Example Coverage Unit (CU) Mounting Detail 2/3

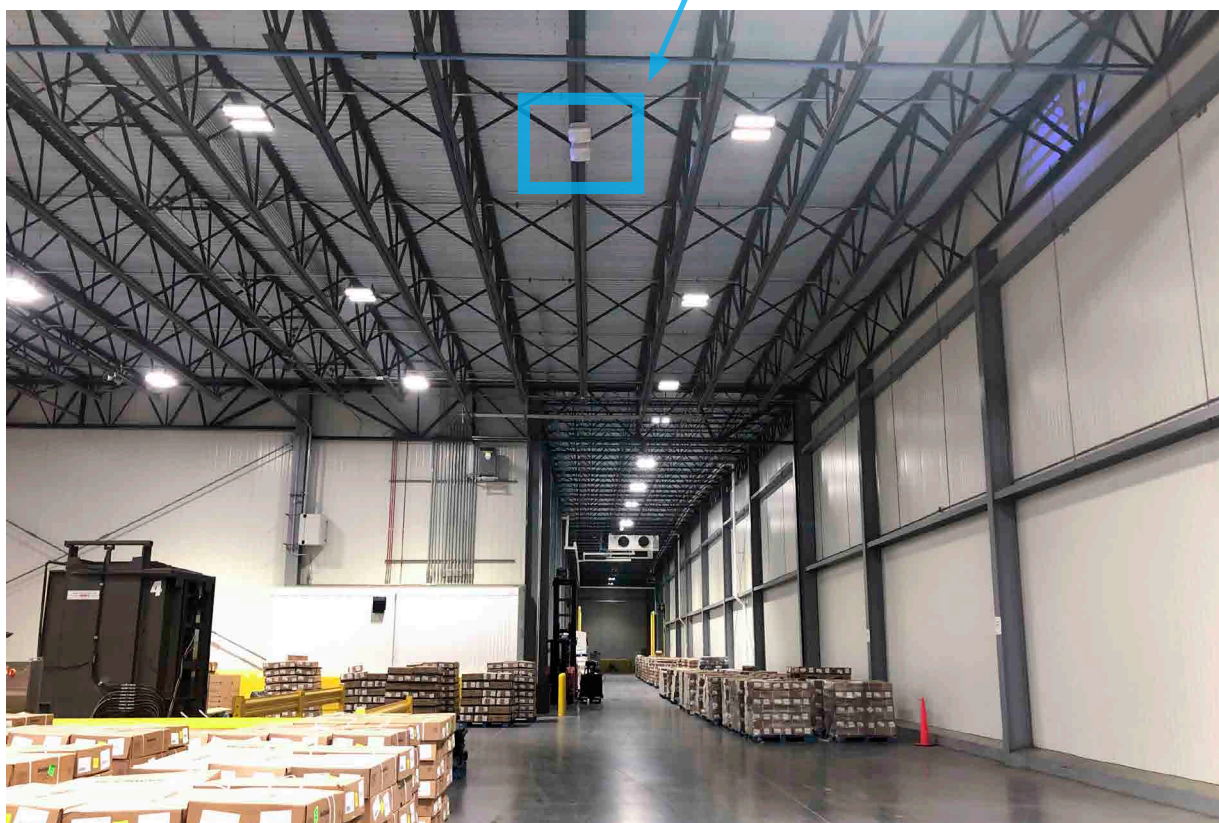
QUATRA 4000 COVERAGE
UNITS



Example Coverage Unit (CU) Mounting Detail 3/3

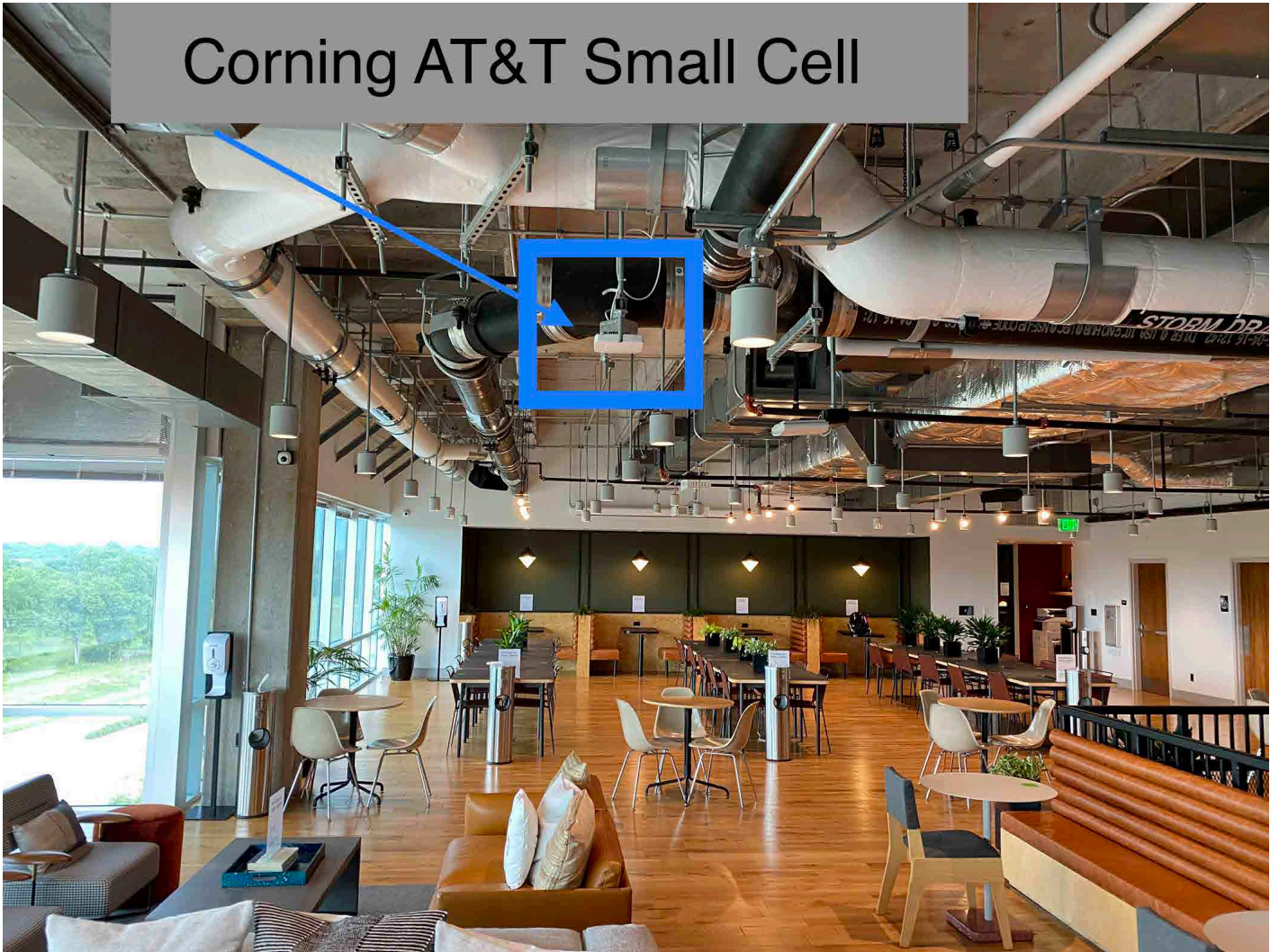


QUATRA 2000 NETWORK UNIT HEAD END installed in an Anhydrous Ammonia Refrigerated Food Distribution Center. These NUs serve CUs installed in NEMA Housings mounted to the ceiling truss pictured in the photo below. These CUs are operating in a constant 25°F environment.

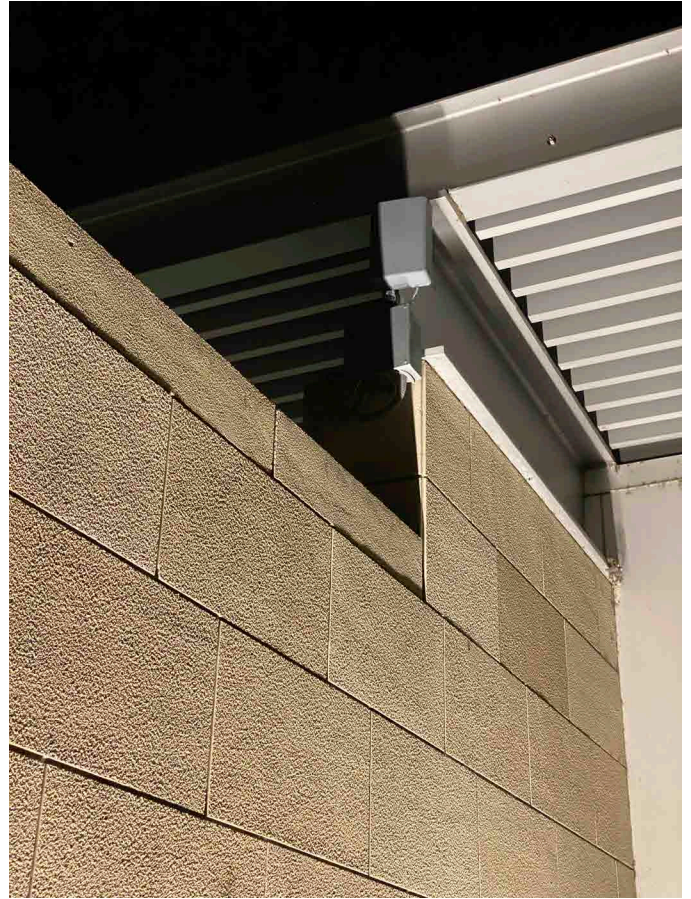


Example Active DAS / Small Cell Mounting Detail

Corning AT&T Small Cell



Example Donor Antenna



Only the best **TECHNOLOGY**

We take the guesswork out of solving your wireless connectivity problems by identifying which technology best serve your needs. We evaluate and test them all and only offer solutions our engineers absolutely love.



WE ARE INNOVATORS

The technology behind wireless communications is rapidly advancing and evolving. We never stop searching for the latest innovations.



WE DO OUR HOMEWORK

There are no 'one size fits all' solutions. Every customer, venue, and system environment have their own unique variables. We relentlessly test all available technology in the market so we can provide the best solutions for our customers.



WE KNOW WHAT WORKS

We've learned to never believe the writing on the box. Performance on spec-sheets do not always translate into real world performance.



THANK YOU !

F O R Y O U R C O N S I D E R A T I O N

**Whether you need Enterprise, Commercial, Government, or
Emergency Signal Solutions the Signal Stars Team of RF & Design
Engineers and Certified Integrators are your answer to all of your
Wireless RF Connectivity Needs.**



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