



Request for State of Work and Quote

**QUATRA 4000C All-Carrier In-Building Cellular
Amplification System for**

**Crete High School
1750 Iris Ave
Crete, NU 68333**

This is for all carriers and the parking garage only

Prepared By:

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Executive Summary

ATG has been delivering In-Building Systems for Corporate and Government Clients for the past 20 years. Our solutions provide leading edge technology that that is delivered at a great value.

Based upon the requirements that you have detailed in your RFI, ATG is proposing Nextivity's Quatra 4000 product family which is a DAS Hybrid solution. This product family is a scalable solution that we have implemented in several very high-profile clients including Glaxo Smith Kline, US Department of Education, Veterans Administration Medical Facilities, and the Alcohol Tobacco & Firearms agency. Our solution is based upon an off-air capture design, which utilizes the capacity from the carrier's cellular network to provide the RF donor signal.

The proposed solution will deliver outstanding performance at a great value. The benefits our solution include the following:

- Much higher gain without overloading the network with amplified noise
- Larger coverage footprint per server antenna
- Simple, fast, hassle-free installation
- Lower cost per sq. ft. of coverage
- Simple to add future capacity without re-engineering
- System management options available for enterprises who want to implement alarms and alerts
- Programmable and upgradable
- FCC Approved
- No Requirement for Re-Transmission Agreements from Carriers

ATG has a proud history of delivering In-Building solutions to our enterprise clients over the past 20 years. Our team is comprised of highly trained professionals that will complete your project within the agreed upon time frames.

ATG looks forward to an opportunity to describe its solution in person and share with you the vision that we have proposed. Should you have any questions regarding the information in this proposal please contact our team.

[Delivery Date is 6-8 weeks ARO.](#)



Corporate Overview

For 20 years, ATG has been a successful turnkey Distributed Antenna Systems integrator involved in the design, installation, test, commissioning and maintenance of in-building, wireless communication systems for cell phone, 2-way radio and public-safety coverage.

The Department of Education buildings, ATF, Veterans Administration Facilities, Voice of America. Glaxo Smith Kline are among hundreds of our high-profile customers. The company serves federal, state, and local government, as well as commercial clients and wireless carriers. Much of the company's work over the years has been in the Mid-Atlantic region; however, the company has also completed several turn-key DAS projects nationwide.

QUICK FACTS

- Established 2002
- Privately Held
- Maryland LLC Corp
- Profitable and Bonding Capable

CORE COMPETENCIES

Cell Phone DAS Coverage

- Full-Bars Throughout the Structure
- Single or Multiple Carriers

2-Way radio Communications

- Public Safety Radio
- Maintenance, Security, Concierge

SERVICES

- IBW Engineering Consulting
- iBwave Design Services
- Test & Commissioning
- Service and Maintenance
- Cable Testing & Troubleshooting

MARKETS

- Commercial Real Estate Development
- High Rise Commercial & Residential
- Federal, State, Local Government
- Critical Infrastructure Buildings (C1)
- Schools, Hospitals, Courts, Jails
- Water And Wastewater Treatment Plants
- Fire, Police, EMS Facilities

TWENTYFOUR PERSON TEAM

- Three RF Design Engineers
- Three Project Supervisors
- Four Experienced Field RF Technicians
- Twelve Well Trained Installers
- Complete Administrative Infrastructure
- Up-to-date test equipment

HEADQUARTERS LOCATION

- Rockville, MD (HQ)

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Overview

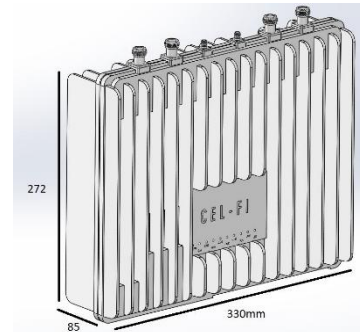
&
Services

DESCRIPTION OF WORK/MATERIALS

The overall project will encompass installation of an In-Building Solution at Crete High School located in Crete, NE.

This solution will cover all carriers. Our solution is based upon the QUATRA 4000C Networked Smart Booster system, a safe active DAS that solves in- building coverage issues for LTE for all four carriers. The In- Building solution that will be used for each zone will be comprised of six main components. Those components of a “coverage zone” solution is:

- **Quatra 4000C Network Unit (NU).** The Cel-Fi QUATRA Network Unit (NU) is the hub of the Networked Smart Booster system. The scalable design works with one to six Coverage Units This will also distribute the amplified signal to the Coverage Units (CU).
 - Carrier Grade, Part 20 Compliant Smart Signal Booster
 - Support for AT&T, Verizon, T-Mobile, and Sprint, 2 simultaneous bands per operator
 - Independent donor ports for each operator allows for independent antenna optimization
 - Combined (CU) server port enables driving a serving antenna or Passive DAS segment
 - 100 dB max system gain
 - 140MHz relay bandwidth (6x20MHz + 2x10MHz)
 - Support for up to 6 CU via Cat5e cable
 - N-type RF connectors (donor and server)
 - Optional internal modem for remote management (SIM slot access)
 - 24dBm uplink power per operator per band
 - 17dBm downlink power per operator per band



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DESCRIPTION OF WORK/MATERIALS (cont.)

- **The Cel-Fi LPDA-R Antenna** offers a powerful 12 to 14 dBi gain (depending on carrier frequency) over 617–4000 MHz and is designed to reduce out of band noise, to improve SiNR and overall signal quality. Mounting is made simple with included U-Bolts. This Cel-Fi product also features a 10K ohm resistor that enables the antenna connection to be validated by Cel-Fi Network Units equipped with the capability.



- 12–14 dBi gain
- Narrow beamwidth to reduce noise
- Rugged construction for harsh environments

- **Coverage Unit (CU)** The scalable design works with one to six coverage Units to provide up to 75,000 sq. ft. of coverage per Network Unit. These Coverage Units will be used to send out the carriers signal within the designated coverage zone. These will be evenly distributed throughout the coverage zone.



- **Cabling** – Ethernet Cables, and QMA (quick connect) cables. Cel-Fi QUATRA Range Extender (QRE) may be needed for cable lengths over 100 meters. If cabling is needed, we will run Cat 5/6 out to the Coverage Units. (Incipio Devices will be running the cable prior to installation as discussed).
- **Installation, Tuning and Optimization** of the system. Cel-Fi WAVE Portal- A Cloud based remote management platform that allows you to manage multiple Cel-Fi Systems. Features include Cel-Fi Device & asset Management, Data Modeling & Reporting, Mobile & Computer application, globally trusted carrier-grade security, Access WAVE through dashboard interface or connect via APIs

DESCRIPTION OF WORK/MATERIALS (cont.)

ATG is proposing that we distribute the Network Units and Coverage Units as follows:

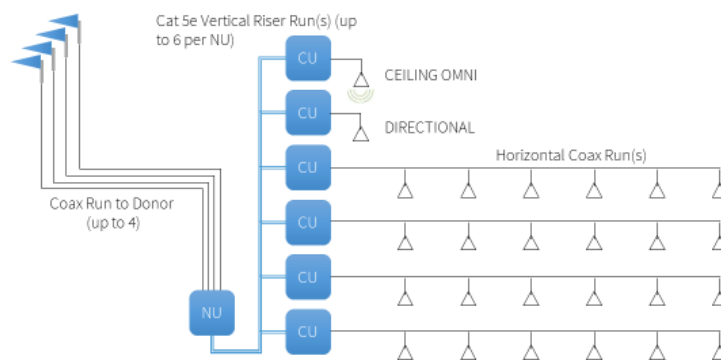
- **(1) Quatra 4000C Network Units**
- **(3) Quatra 4000C Coverage Units**
- **(3) LPDA Antenna's**

Each “Zone” solution using the Cel-Fi Quatra 4000 scalable design works will be configured with six of the Quatra Coverage Units to provide up to 75,000 sq. ft. of cellular coverage.

One exterior antenna, per coverage zone, will be placed on the outside of the building. Installation of the antennas will occur in an area that will be conducive to mounting the antenna and have access to conduit to bring the cable into the building. This directional antenna system captures signals in all carriers cellular LTE spectrum. There will need to be a non-penetrating mounting mast required to hold the antenna.

Each Network Unit will support up to Six Coverage Units that will be distributed throughout the floor. The Network Unit will be used as the tool to extend the signal that is being picked up on the roof out to designated coverage zone. Below is a sample design.

Deployment Options: Hybrid Deployment



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Cel-Fi Network Units will connect with the Cel-Fi Coverage Units via Cat 5/6 Ethernet cables and the Coverage Units will be Power-over Ethernet (POE) for ease of installation. Cel-Fi QUARTA Range Extender (QRE) is a Power over Ethernet (PoE) device that extends the maximum distance between the Network Unit and Coverage Unit. It allows NU-to-CU cable lengths of up to 200 meters.

We have the option of distributing the RF signal farther from the CU's by implementing coax runs from the CU to individual indoor dome antennas distributed through the coverage area.

The Cel-Fi WAVE Portal is a cloud based remote management platform that allows you to manage multiple Cel-Fi systems. Features of the platform include Cel-Fi Device & Asset Management, Data Modeling & Reporting, Mobile & Computer applications, globally trusted carrier-grade security, Access WAVE through the dashboard interface or connect via APIs.



ATG will then tune the Coverage Units, exterior antennas, and Network Unit to maximize improvements in network signal.

Atlantic Technology Group will supply the Cel-Fi LPDA Antennas, Cel-Fi Network Units, Cel-Fi Coverage(s) Units, mounting equipment, and installation services for this project.

Product Details:

ATG will be providing the following Cel-Fi Network Unit, Cel-Fi Coverage Units, and Cel-Fi LDPA Antenna.

1. Cel-Fi WAVE Portal - <http://www.cel-fi.com/quatra/>
2. Cel-Fi Quatra- <https://nextivityinc.com/products/quatra4000c/>

Scope of Services Per Solution:

- Installation of (1) Cel-Fi QUATRA 4000C
- Installation of (3) Cel-Fi Quatra 4000 Coverage Units
- Installation of (3) LPDA Antenna
- Installation of (0) Indoor Omni Antenna's
- Tuning of exterior, interior antennas, Cel-Fi Network Unit and Coverage Units to maximize coverage.
- Tuning of Network Unit and Coverage Units to maximize coverage.
- All interior cabling (fiber or coax) shall be installed above suspended ceiling tiles, or in cable trays where available.
- All cable installations shall be attached to the building structure by cable ties, batwing clips, j-hooks, or other means as appropriate to ensure adequate support. Installation of associated grounding wires, transient suppressor, and lightning arrestor for system protection.

Exclusions:

Mechanical, Civil, and Structural Documents.

Permit fees, city fees, municipality fees, and zoning package.

Conduit or Inner-duct materials and installation, except as mentioned in the Scope of Work above.

INSTALLATION ASSUMPTIONS

Suitable power and grounding are available within 5 feet of the proposed NU. Additional charges will apply if ATG, or its subcontractors, is required to provide outlets or grounding locations.

Client will receive any required approvals from the landlord to install cabling and antenna on the rooftop.

Client will ensure that resources are available to our installers to have access to both the IT closets, rooftop and the facilities.

If applicable - ATG will be responsible for repairing any drywall that needs to be cut to complete installation. ATG will make client aware of any pending cuts if necessary

If conduit is required, the client will provide

Quatra 4000c
Crete New High School

Qty	Part #	Description	Price	Totals
1	Q44-1M34CNU	Nextivity Cel-Fi QUATRA 4000c Networked Smart Booster NU - Bands 4/5/12/13/25/30/48/71	\$8,398.00	\$ 8,398.00
3	Q41-RECU	Nextivity Cel-Fi QUATRA 4000c Networked Smart Booster CU - Bands 4/5/12/13/25/30/48/71	\$4,513.00	\$ 13,539.00
3		LPDA Antenna	\$495.00	\$ 1,485.00
3		Cable Runs from Roof to IT Closet	\$695.00	\$ 2,085.00
6		Cat 6 Cable Runs	\$235.00	\$ 1,410.00
1		Non Penetrating Antenna Mount	\$625.00	\$ 625.00
3		Whip Antenna for Coverage Unit	\$129.00	\$387.00
1		Professional Services - Design, Install and Optimization	\$9,995.00	\$ 9,995.00
			Subtotal	\$ 37,924.00
		Note: Pricing does not include sales tax or scissor lift - if needed.	Shipping	\$ 425.00
			Total	\$ 38,349.00

CEL-FI QUATRA 4000/4000i

Enterprise Cellular Coverage



Multi-Carrier Hybrid Active DAS for 5G/4G/3G Voice and Data

Spotty cellular coverage, poor voice quality, dropped calls, and dead zones continue to plague employees and visitors in enterprise and middlerise buildings. To solve that problem, Cel-Fi QUATRA 4000 is an affordable, all-digital active DAS hybrid solution that provides uniform, high-quality cellular signal throughout any building. This industry-leading system is also carrier approved and guaranteed network safe.

The system utilizes Cat5e cabling for RF and Power over Ethernet, with no signal attenuation to the Coverage Unit (CU) embedded service antennas. In addition to being the most powerful solution on the market, QUATRA is cost-effective and designed to be installed within days (compared to months typical of other solutions).

Perfect for creating the ideal system, Cel-Fi QUATRA 4000 is scalable to fit buildings of all sizes. Depending on the environment, size, and space, the system utilizes one or multiple Network Units (NUs), with each one providing power and distributing signal to up to six CUs. Together, the NUs and CUs support four operators.

IntelliBoost® Chipset

The Nextivity IntelliBoost® baseband processor is the first six-core processor designed specifically to optimize the indoor transmission and reception of 5G/4G/3G wireless signals. With advanced filtering, equalization and echo-cancellation techniques, Nextivity has developed an architecture that delivers unprecedented in-building data rates and pervasive 5G/4G/3G connectivity. The IntelliBoost® processor ensures Cel-Fi products never negatively impact the macro network and provide maximum coverage.



- Highest Coverage Gain:**
Up to 100 dB Max Gain for 5G/4G/3G Voice and Data
- All Digital:**
Cat5e PoE/RFoE Solution
- Scalable:**
Up to 125,000 ft² Coverage per Network Unit
- Multi Mode:**
Off-Air or Supercell Mode with Fiber Expansion
- Network Safe:**
Carrier Approved with No Noise Guarantee
- Cel-Fi WAVE Platform:**
Set Up, Remote Monitoring, and Management

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Cel-Fi QUATRA is designed to be scalable for installers.

CEL-FI WAVE COMPATIBILITY

Providing control and optimization insight, the Cel-Fi WAVE Portal is a web-based platform that enables an operator or integrator to remotely monitor equipment and system KPI's, such as channel configurations, RSRP, RSRQ, SINR, and system gains.

NETWORK SAFE

All Cel-Fi systems employ self-organizing edge intelligence to constantly monitor power levels and donor-to-server antenna RF feedback with active echo cancellation. This automatically ensures maximum coverage power without interfering with operator networks and other local radio systems.

OFF-AIR CONFIGURATION

Cel-Fi QUATRA systems are capable of retransmitting donor signals from outdoor directional antennas to indoor locations. Unlike typical BDA amplifiers, each operator channel is individually processed and power controlled to achieve full coverage power. This eliminates channel-to-channel coverage power variations due to differences in power of donor signals.

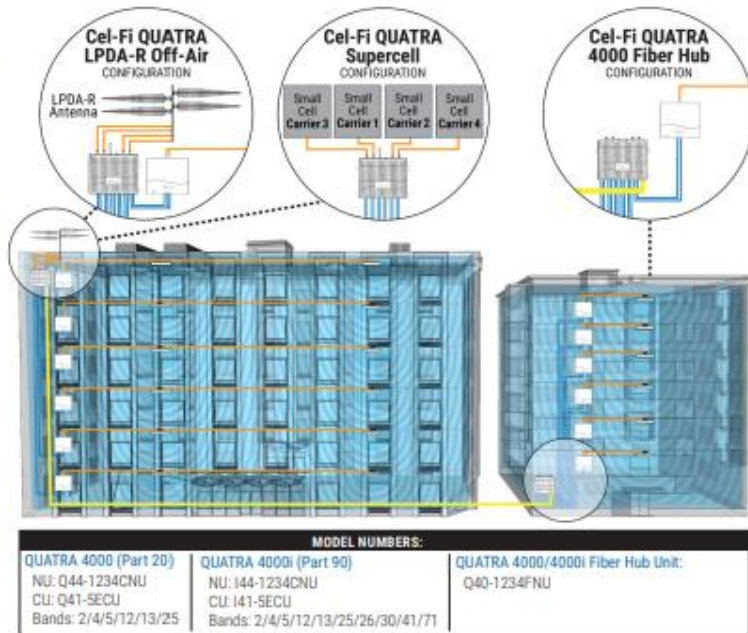
SUPERCCELL® CONFIGURATION







A Supercell is comprised of a Cel-Fi QUATRA system connected to a small cell. Multiple QUATRA systems can be connected to a single small cell, or multiple small cells, to form a Supercell. A Supercell with QUATRA is more efficient than multiple small cells, and the CUs of a Cel-Fi QUATRA system connected to a Supercell do not interfere with one another.

FIBER EXTENSION

Expanding the capabilities of Cel-Fi QUATRA systems, the Cel-Fi QUATRA Fiber Range Extender (QFRE) increases the distance between the Network Unit and Coverage Unit up to 1.24 miles (2.0 km). This solution is ideal for high-rise structures, long distances, or multi-building facilities.

QUATRA 4000 is also compatible with the Cel-Fi QUATRA 4000 Fiber Hub, which offers the same distance flexibility as the QFRE and allows a single NU to support up to 12 CUs.



ACCESSORIES:		ANTENNAS:			SOFTWARE:
Cel-Fi QUATRA 4000 Range Extender 	Cel-Fi QUATRA Fiber Range Extender 	Cel-Fi Blade Antenna (Included) 	Cel-Fi LPDA-R High-Gain Directional Antenna 	Cel-Fi Low-Profile Antenna 	Cel-Fi WAVE Management Portal  cel-fi.com/software



Nextivity Inc.
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Learn More



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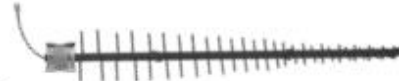
CEL-FI LPDA-R DONOR ANTENNA

With 10k Resistor Built-in

The Cel-Fi LPDA-R Antenna offers a powerful 12 to 14 dBi gain (depending on carrier frequency) over 617–4000 MHz and is designed to reduce out of band noise, to improve SINR and overall signal quality. Mounting is made simple with included U-Bolts. This Cel-Fi product also features a 10K ohm resistor that enables antenna monitoring when is used with Cel-Fi Public Safety line of products.

Key Features

- 12–14 dBi Gain
- Narrow Beam-width to Reduce Noise
- Rugged Construction for Harsh Environments
- 10k Ohms Resistor Built-in for Public Safety Applications



Works with the following Cel-Fi products:



Cel-Fi QUATRA
4000/4000i/4000e



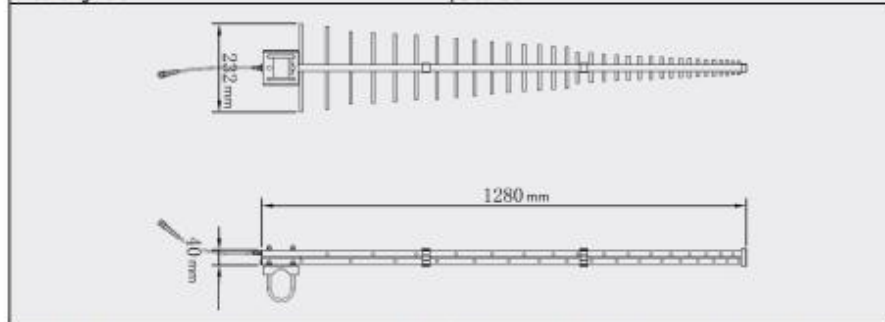
Cel-Fi QUATRA RED



Cel-Fi SOLO RED

ELECTRICAL SPECIFICATIONS			
Frequency Range (MHz)	617–960	1710–2700	3300–4000
Gain (dBi)	12	14	12
VSWR	≤2.5	≤2.0	≤2.0
Polarization	Vertical		
Front to Back Ratio (dB)	≥20	≥24	≥13
Horizontal Beam Width	55°	42°	36°
Vertical Beam Width	46°	34°	32°
Input Impedance	50 Ohms		
Maximum Input Power	50W		
Lightning Protection	DC Ground		

MECHANICAL SPECIFICATIONS	
Connector	N-Female
Dimensions	1280 mm
Weight	1.6 kg
Reflector Material	Aluminum
Rated Wind Velocity	210 km/h
Operating Temperature	-40°C to +65°C
Mounting Pole	Ø38–Ø52 mm



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