

# Cel-Fi™ QUATRA

Improve voice and data coverage for 3G/4G/LTE



**Cel-Fi QUATRA is a scalable in-building cellular system that is cost-efficient and easy-to-deploy solution for delivering high quality signal in venues up to 200,000 sq. ft. It is a hybrid solution that combines the best of active DAS and Smart Booster technologies.**



**Cel-Fi QUATRA is designed to distribute Small Cell or Off-Air cellular service in mid-sized enterprise environments, quickly, easily, and cost effectively.**

## System Features

- Enterprise-class, carrier-grade, small footprint active DAS
- MIMO RF inputs for (a) small cell donor or (b) external off-air donor antenna
- Network Unit (NU) (Head End) attaches to Coverage Unit (CU) (Remote Radio Head) via Cat 5e cable
- A single NU and up to four (4) CUs may be attached (hub and spoke architecture) in a QUATRA system
- Multiple QUATRA systems may be deployed to increase coverage footprint
- Up to 100 meter range from NU to CU
- QUATRA Range Extender (QRE) (optional) may be used to increase NU-to-CU distance to 200 meters
- Remote Management through Nextivity's WAVE cloud platform
- Easiest installation in its class
- Glanceable LED User Interface (UI)
- Supporting smart phone application (QMT)
- Mounting hardware included

## Wireless Features

- 3G & 4G / LTE support (WCDMA / HSPA+ / LTE)
- Supports up to four (4) bands simultaneously from a single operator
- Supports FDD
- MIMO (in two bands)
- Up to 100dB system gain per band (in Off-Air mode)

- Peaceful coexistence with adjacent Wi-Fi (2.4 GHz & 5 GHz), femtocells, and cellular devices
- Advanced digital echo-cancellation (>30dB) and channel select filtering algorithms
- Active management of the cellular link between the Base Station and user devices
- Automatic Gain Control (AGC) based on fast real-time echo-cancellation
- Linear RF front end
- Adaptive signal equalization
- Uses Nextivity's 3rd-generation "ARES" chipset

## Mobile Network and Network Protection Features

- Global band combinations available for Americas, Europe, Asia, Oceania, and Africa
- Systems are pre-configured for a single carrier (network operator)
- Better integration, handover, and handoff with the macro network
- Supports multiple channels with bandwidths of 3.84/5/10/15/20 MHz per channel
- Works with any user equipment (UE) for the configured network (no whitelist/blacklist)
- Up to 75 MHz system relay bandwidth
- Support for 3GPP Release 10 features
- Provider-specific system: Cel-Fi distributes and boosts service only for the Operator PLMNIDs for which the device is authorized and configured
- Secure and ciphered provisioning
- System intelligence accurately establishes proper safe uplink power in real time

- Uplink Muting Mode automatically shuts down uplink cellular transmissions when no active user equipment is detected
- System shuts down upon Operator's network command or failure detection

## Benefits

- Easiest to deploy Active DAS
- Distribute and boost cellular coverage indoors
- 3G and 4G support, Voice and Data, network safe
- Coverage footprint provided via Power over Ethernet (PoE); no requirement for additional power source at CU (RRH)
- System can accept various Donor signal inputs: Small Cell; OTA (off-air) with external antenna; and, OTA via Internal Donor antenna
- Attach to Small Cell, mitigates local macro capacity and interference issues
- Simplest Installation: NU (Head End) and CU (RRH) connect with Cat 5e-rated (or better) cable
- Scalable architecture allows multiple QUATRA systems to be deployed in the same environment for larger coverage needs (Small Cell input required)
- LED cues provides visual feedback for ease of setup and status
- Works with any subscriber device from the configured Operator
- QMT (QUATRA Management Tool) smartphone app further simplifies installation
- System management from the cloud through the WAVE platform
- Wall and ceiling mounting options

## Wireless Benefits

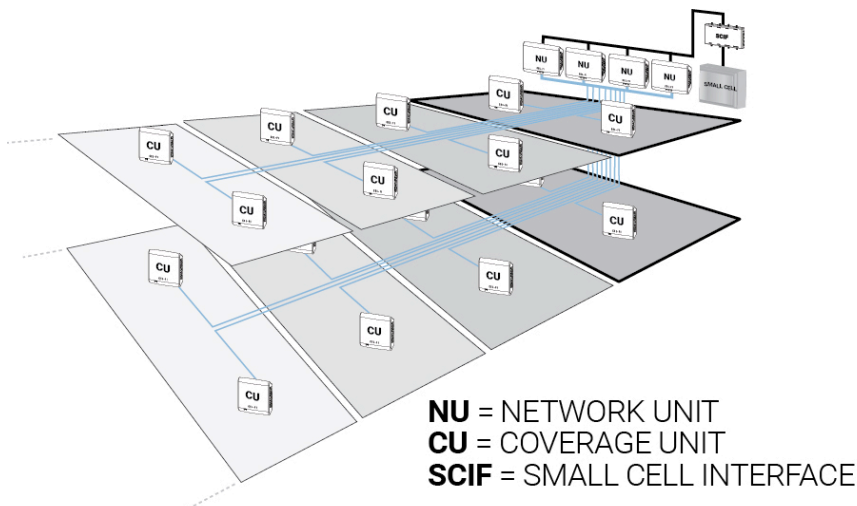
- Clear and reliable cellular connections within coverage area up to 50,000 ft<sup>2</sup> (5000 m<sup>2</sup>) per system
- Highest gain (100 dB) provides best coverage footprint
- Advanced Echo-Cancellation allows Cel-Fi to transmit more power without feedback interference
- Subscriber devices require less transmit power for improved battery life
- Linearity eliminates IMD desense issues
- Dynamic gain control ensures maximum gain – best coverage – at all times in ever changing RF environments, without user intervention
- Nextivity purpose-built, high-performance, six core ASIC processor, provides best performance at lowest cost

## Mobile Network Benefits

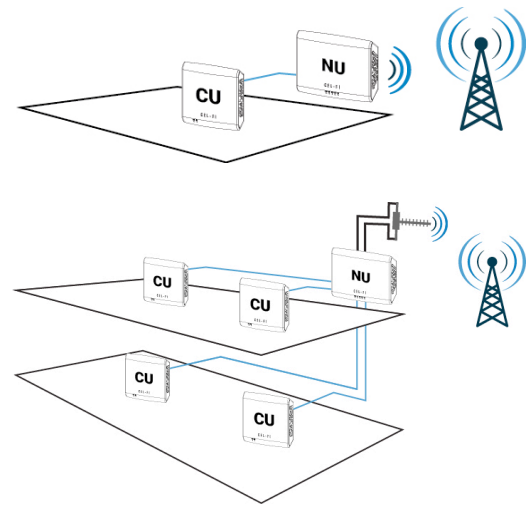
- Flexibly deploy in LTE, VoLTE, LTE-Advanced, and WCDMA networks, with multiple cellular bands, simultaneously
- Automatically adjusts channel bandwidths between 3.84MHz and 20MHz
- Sufficient relay bandwidth to support SISO and MIMO in multiple bands
- Off-load the macro network, or use to improve macro capacity and building propagation/penetration
- QUATRA system improves users' cellular experience while remaining invisible to networks and UEs: no gateways or third-party software needed
- UE control is transparent and remains centralized in the network core (no gateways or third-party software)

## CONFIGURATIONS

### Boosted Supercell



### Off-Air

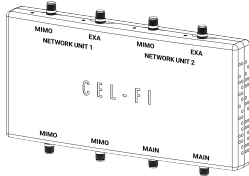


## Variants

Model Number	Q34-2/4/5/12	Q34-2/4/5/13	Q34-1/3/8/20	Q34-1/3/7/8	Q34-1/7/8/20
Bands Supported	2, 4, 5, 12	2, 4, 5, 13	1, 3, 8, 20	1, 3, 7, 8	1, 7, 8, 20
MIMO Support	4, 12	4,13	3,20	3, 7	7, 20
Crossover Support	2, 5	2, 5	1, 8	1, 8	1, 8

\*Crossover Support allows 3G and LTE to exist simultaneously in these bands

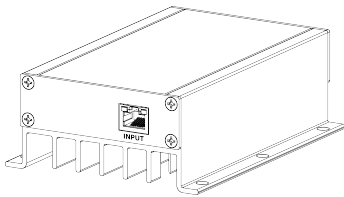
## PERIPHERALS (Optional)



### Small Cell Interface Kit (SCIF)

The QUATRA SCIF is designed to simplify connecting a Small Cell to one or two QUATRA Networks Units. The SCIF may be ordered separately (a 2nd NU requires purchase of two additional connection cables).

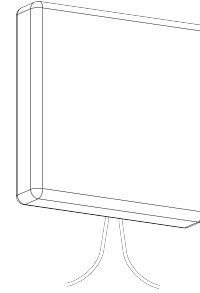
- Connects a small cell to up to four QUATRAs (additional cables or splitters may apply)
- Provides proper port isolation and attenuation
- Supports small cells with one or two band dependent RF feeds per MIMO channel
- SMA connectors (50 ohm)
- Kit includes Input and Output cables
- 699 – 2690 MHz
- 1 watt max input power on all ports



### QUATRA Range Extender (QRE)

The QUATRA Range Extender is a Power over Ethernet (PoE) device that allows QUATRA Network Unit (NU) to Coverage Unit (CU) interconnect cable lengths up to 200 meters. Plug and Play installation.

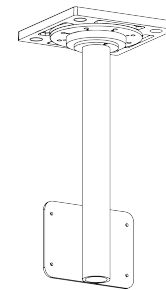
- Power over Ethernet (PoE)
- Extends NU to CU cable to 200 meters
- Supports QUATRA proprietary protocols
- Intuitive LED interface
- Will not support other (non-QUATRA) PoE devices



### Wideband MIMO Panel Antenna

The Wideband MIMO Panel Antenna may be used as an Off-Air (OTA) donor source.

- MIMO Directional Panel Antenna
- Integrated antenna cables
- Ceiling/Wall/Pole mount hardware included
- Supported by WAVE/QMT advanced antenna aiming



### Cel-Fi Mount

An indoor/outdoor mount designed to secure a donor signal antenna for QUATRA and work with the Cel-Fi WAVE Antenna Positioning Application.

**Note:** Certifications are regional; not all products need or have the same certifications. Please check the specific model number to determine exactly which certifications it has.

Specifications subject to change without notice.

### Patents & Design

This product is covered by Nextivity, Inc., patents and patents pending. Designed by Nextivity, Inc. in San Diego, California, USA. Please refer to cel-fi.com for details.

# SPECIFICATIONS

## Power (Network Unit)

- 54 VDC @ 2.22 Amp via external supply (51.3 to 56.7 VDC tolerance)
- External supply: 100 to 240 VAC, 47 – 63Hz
- Power consumption less than 120W max
- Network Unit provides power to Coverage Units over Cat5e (PoE)

## Environmental

- Operating temperature: 0° to 40°C
- Storage temperature: -25° to 60°C
- Convection Cooling
- Relative humidity: 0% to 95%, noncondensing
- RoHS II 2011/65/EU
- IP20

## Installation

- Mounting hardware included
- NU may be wall mounted (solid or hollow)
- CUs may be wall or ceiling mounted
- 1 NU supports 1 to 4 CUs
- iBwave supported

## Radio Performance

*(check product version for specific band support)*

Band	DL	UL
1	2110-2170 MHz	1920-1980 MHz
Up to 20MHz contiguous boost BW, HSPA or LTE SISO		
2	1930-1990 MHz	1850-1910 MHz
Up to 20MHz contiguous boost BW, HSPA or LTE SISO		
3	1805-1880 MHz	1710-1785 MHz
Up to 20MHz contiguous boost BW, HSPA or LTE MIMO		
4	2110-2155 MHz	1710-1755 MHz
Up to 20MHz contiguous boost BW, HSPA or LTE MIMO		
5	869-894MHz	824-849 MHz
Up to 15MHz contiguous boost BW, HSPA or LTE SISO		
7	2620-2690MHz	2500-2570 MHz
Up to 20MHz contiguous boost BW, LTE MIMO		
8	925-960 MHz	880-915 MHz
Up to 15MHz contiguous boost BW, LTE SISO		
12	729-746 MHz	699-716 MHz
Up to 10MHz contiguous boost BW, LTE MIMO		
13	746-756 MHz	777-787 MHz
Up to 10MHz contiguous boost BW, LTE MIMO		
20	791-821 MHz	832-862 MHz
Up to 20MHz contiguous boost BW, LTE MIMO		

- Total boost all-channel bandwidth 75MHz (2x2 MIMO uses double bandwidth per channel).
- DL Maximum NU in-band donor level -40dBm
- DL Maximum NU survival donor level 30dBm
- UL Maximum CU donor level -20dBm.

- Maximum UL power 24dBm EIRP bands 1, 2, 3, 4, 7, 8
- Maximum UL power 20dBm EIRP band 5, 12, 13, 20
- Maximum DL power 12dBm per 5 MHz EIRP bands 1, 2, 3, 4, 7, 8
- Maximum DL power 10dBm per 5 MHz EIRP bands 5, 12, 13, 20
- LTE 5/10/15/20MHz and WCDMA 3.84/5MHz bandwidths

## Physical Specifications

### Network Unit:

264x185x62mm  
1.2 kg (40.8 oz.)

### Coverage Unit:

225x185x37mm  
0.83 kg (29.2 oz.)

## Connections

- 4x CU RJ45 Proprietary Gigabit link
  - 100m max CU cable length Cat5e
  - 200m max CU cable length with QUATRA Range Extender (Cat5e or Cat6)
  - PoE IEEE 802.3at
- RJ45 LAN management port (10/100 Fast Ethernet)
- RJ45 LAN management output port (10/100 Fast Ethernet)
- 2x MIMO External RF Input (*QMA Female 50 ohm*)

## Compliance

*(check individual product version for specific regional compliance)*

- 3GPP TS 25.143 Rel.10
- 3GPP TS 36.143 Rel.10
- CE
- FCC Part 15, 20, 22, 24, 27
- IC (Industre Canada).
- UL 2043
- Bluetooth BQB

## System Management (Software)

- QUATRA Management Tool (QMT).
- Supports WAVE cloud portal.
- Remote Management functionality:
  - Status (List and Map)
  - Commissioning
  - Diagnostics
  - Software Updates
  - Settings
  - Reporting
  - Alarms & Notifications