Cel-Fi QUATRA 1000 is a scalable in-building cellular solution that is both a cost-efficient and easy-to-deploy solution, delivering high-quality signal in venues up to 200,000 square feet (19,000 square meters). It is a hybrid solution that combines the best of active DAS and Smart Booster technologies. It operates in off-air mode or can be integrated with carrier small cell equipment and operated in distributed small cell mode, creating a Supercell.

**Benefits:**

- Lowest costs per ft²
- Scalable Coverage and Capacity for Up to 200,000 ft² (19,000 m²)
- Designed for Off-Air or Small Cell Applications
- Easiest-to-Deploy with Signal Quality Maximized by AntennaBoost
- Remote Monitoring and Management via Cel-Fi WAVE Portal

**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 Unit) via Cat 5e cable
  - A single NU and up to four (4) CUs may be attached (hub and spoke architecture) in a Cel-Fi QUATRA system
  - Multiple Cel-Fi QUATRA systems may be deployed to increase coverage footprint
  - Up to 325 ft (100 m) range from NU to CU
  - Cel-Fi QUATRA Range Extender (QRE) (optional) may be used to increase NU-to-CU distance to 650 ft (200 m)
  - Remote Management through Nextivity's Cel-Fi WAVE cloud platform
  - Easiest installation in its class
  - Glanceable LED User Interface (UI)
  - Supporting smart phone application (QMT)
  - Mounting hardware included

**Wireless Features**

- Supports up to four (4) bands simultaneously from a single operator
  - 3G/4G/LTE support (WCDMA / HSPA+ / LTE)
  - Supports FDD
  - MIMO (in two bands, see table below for specifics per model)
  - 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)
- 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 QUATRA 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 Hybrid
- 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 (RU)
System can accept various Donor signal inputs: Small Cell, OTA (off-air) via external antenna; and, OTA via internal donor antenna

**Donor Antenna**
*(Small Cell input required)*
Attach to Small Cell, mitigates local macro capacity and interference issues
Simplest Installation: NU (Head End) and CU (RU) connect with Cat 5e-rated (or better) cable
Scalable architecture allows multiple Cel-Fi QUATRA systems to be deployed in the same environment for larger footprint (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 Cel-Fi WAVE platform
Wall and ceiling mounting options

**Wireless Benefits**
Clear and reliable cellular connections within coverage area up to 50,000 ft² (5000 m²) per system
Highest gain (100dB) provides best coverage footprint
Advanced Echo-Cancelation allows Cel-Fi QUATRA 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 from 3.84 MHz to 20 MHz
Sufficient relay bandwidth (75 MHz) to support SISO and MIMO in multiple bands
Off-load the macro network, or use to improve macro capacity and building propagation/penetration
Cel-Fi 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)

### Variants

<table>
<thead>
<tr>
<th>Model Number (base)</th>
<th>Bands Supported</th>
<th>MIMO Support</th>
<th>Crossover Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q34-2/4/5/12</td>
<td>2, 4, 5, 12</td>
<td>4, 12</td>
<td>2, 5</td>
</tr>
<tr>
<td>Q34-2/4/5/13</td>
<td>2, 4, 5, 13</td>
<td>4, 13</td>
<td>2, 5</td>
</tr>
<tr>
<td>Q34-1/3/8/20</td>
<td>1, 3, 8, 20</td>
<td>3, 20</td>
<td>1, 8</td>
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<tr>
<td>Q34-1/3/7/8</td>
<td>1, 3, 7, 8</td>
<td>3, 7</td>
<td>1, 8</td>
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<tr>
<td>Q34-1/7/8/20</td>
<td>1, 7, 8, 20</td>
<td>7, 20</td>
<td>1, 8</td>
</tr>
<tr>
<td>Q34-3/5/7/28</td>
<td>3, 5, 7, 28</td>
<td>7, 28</td>
<td>3, 5</td>
</tr>
</tbody>
</table>

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

**Small Cell Interface Kit** *(SCIF)*
#Q34-SCI
The Cel-Fi QUATRA SCIF is designed to simplify connecting a Small Cell to one or two Cel-Fi QUATRA Network Units. The SCIF may be ordered separately (a second NU requires purchase of two additional connection cables)
Connects a small cell to up to four Cel-Fi QUATRAs (additional cables or splitters may apply)
Provides port isolation and attenuation
Supports small cells with one or two band dependent RF feeds per MIMO channel
SMA connectors (50 ohm)
Includes Input and Output cables
699–2690 MHz
1 watt max input power on all ports

**QUATRA Range Extender** *(QRE)*
#Q34-E1000
The Cel-Fi QUATRA Range Extender is a Power over Ethernet (PoE) device that allows Cel-Fi QUATRA Network Unit (NU) to Coverage Unit (CU) interconnect cable lengths up to 650 ft (200 m). Plug and Play installation.
Power over Ethernet (PoE)
Extends NU to CU cable to 200 meters
Supports Cel-Fi QUATRA proprietary protocols
Intuitive LED interface
Note: Will not support other (non Cel-Fi QUATRA) PoE devices

**Wideband MIMO Panel Antenna**
#A52-X12-100
The Wideband MIMO Panel Antenna may be used as an Off-Air (OTA) donor source
MIMO Directional Panel Antenna
Integrated antenna cables (200 cm)
Ceiling/Wall/Pole mount hardware included
Cel-Fi Mounts
Indoor/outdoor mounts designed to secure a donor signal antenna for Cel-Fi QUATRA and work with the Cel-Fi WAVE Antenna Positioning Application.

Indoor: #F66-100-000
Pole: #F26-100-000

Antenna Positioning Application

Pole:
A rugged outdoor pole mount, designed for mounting antenna externally to a pole, and supporting the Antenna Positioning Application.

Power
(Network Unit only)
54 VDC @ 2.22 Amp via external supply (51.3 to 56.7 VDC tolerance)
External supply: 100 to 240 VAC, 47 – 63 Hz
Power consumption less than 120W max
Network Unit provides power to Coverage Units over Cat 5e (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 VEX files available

Radio Performance
(check product version for specific band support)

<table>
<thead>
<tr>
<th>Band</th>
<th>Downlink MHz</th>
<th>Uplink MHz</th>
<th>Boost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2110-2170</td>
<td>1920-1980</td>
<td>Up to 20 MHz contiguous boost BW, HSPA or LTE SISO</td>
</tr>
<tr>
<td>2</td>
<td>1930-1990</td>
<td>1850-1910</td>
<td>Up to 20 MHz contiguous boost BW, HSPA or LTE SISO</td>
</tr>
<tr>
<td>3</td>
<td>1805-1880</td>
<td>1710-1785</td>
<td>Up to 20 MHz contiguous boost BW, HSPA or LTE MIMO</td>
</tr>
<tr>
<td>4</td>
<td>2110-2155</td>
<td>1710-1755</td>
<td>Up to 20 MHz contiguous boost BW, HSPA or LTE MIMO</td>
</tr>
<tr>
<td>5</td>
<td>869-894</td>
<td>824-849</td>
<td>Up to 15 MHz contiguous boost BW, HSPA or LTE SISO</td>
</tr>
<tr>
<td>7</td>
<td>2620-2690</td>
<td>2500-2570</td>
<td>Up to 20 MHz contiguous boost BW, LTE MIMO</td>
</tr>
<tr>
<td>8</td>
<td>925-960</td>
<td>880-915</td>
<td>Up to 15 MHz contiguous boost BW, LTE SISO</td>
</tr>
<tr>
<td>12</td>
<td>729-746</td>
<td>699-716</td>
<td>Up to 10 MHz contiguous boost BW, LTE MIMO</td>
</tr>
<tr>
<td>13</td>
<td>746-756</td>
<td>777-787</td>
<td>Up to 10 MHz contiguous boost BW, LTE MIMO</td>
</tr>
<tr>
<td>20</td>
<td>791-821</td>
<td>832-862</td>
<td>Up to 20 MHz contiguous boost BW, LTE MIMO</td>
</tr>
<tr>
<td>28</td>
<td>758-788</td>
<td>703-733</td>
<td>Up to 20 MHz contiguous boost BW, LTE MIMO</td>
</tr>
</tbody>
</table>

Total boost all-channel bandwidth 75 MHz (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 22dBm bands 1, 2, 3, 4, 7
Maximum UL power 20dBm bands 5, 8, 12, 13, 20, 28
Maximum DL power 10dBm per 5 MHz bands 1, 2, 3, 4, 7
Maximum DL power 10dBm per 5 MHz bands 5, 8, 12, 13, 20, 28
LTE 5/10/15/20 MHz and WCDMA 3.84/5MHz bandwidths

Physical Specifications

<table>
<thead>
<tr>
<th>Network Unit</th>
<th>Coverage Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>250x188x55mm</td>
<td>188x188x50mm</td>
</tr>
<tr>
<td>1.2 kg (40.8 oz.)</td>
<td>0.83 kg (29.2 oz.)</td>
</tr>
</tbody>
</table>

Connections
4x CU RJ45 Proprietary Gigabit link
100 m max CU cable length Cat 5e
200 m max CU cable length with Cel-Fi QUATRA Range Extender (Cat 5e or Cat 6)
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
3GPP TS 25.143 Rel.10
3GPP TS 36.143 Rel.10
CE
FCC Part 15, 20, 22, 24, 27
**Patents & Design**

Cel-Fi QUATRA products are 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 subject to change without notice.

**System Management (Software)**

Cel-Fi QUATRA Management Tool (QMT) (beta coming soon!)

Cel-Fi WAVE cloud portal

Cel-Fi WAVE Remote Management:

- Status (list and map)
- Commissioning
- Diagnostics
- Software Updates

- Settings
- Reporting
- Alarms & Notifications

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.

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