



Fixed Broadband LTE in Unlicensed Spectrum

Telrad Networks is now offering its radical LTE innovation for the unlicensed 5 GHz spectrum. The unlicensed product suite extends the benefits of LTE technology to ISPs and telecom operators who either **don't have access to licensed spectrum or are interested in expanding coverage and capacity by supplementing their licensed spectrum with unlicensed spectrum.**

5 GHz unlicensed spectrum, which has up to 500 MHz of bandwidth available in many regions of the world, is a great option for operators to deploy reliable, cost-effective, high bandwidth broadband LTE networks.

Designed for high performance & low cost-of-ownership

With Telrad products, operators can leverage high data rates and high spectral efficiency, which will improve overall network performance to ensure a high-quality online experience for all users.

Always taking the operator needs into consideration, Telrad has designed their unlicensed LTE products to offer **cost-optimized configurations, lower total cost of ownership, NLOS capabilities and higher throughput.**

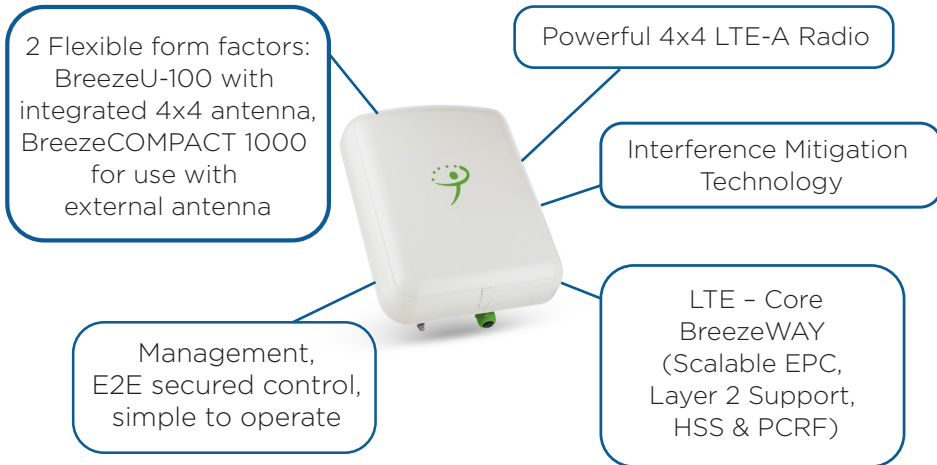
The Telrad unlicensed product suite includes the BreezeU-100 base station, the BreezeCOMPACT 1000 base station, the CPE12000U outdoor high-power CPE, BreezeVIEW network management, and BreezeWAY - the most flexible and scalable EPC on the market.

Unlicensed 5 GHz LTE

Telrad's revolutionary unlicensed LTE base stations enable any size customer to deploy a complete, fully standards-based LTE network.

The BreezeU-100 and BreezeCOMPACT 1000 are all-outdoor, simple-to-deploy solutions, requiring minimal tower space and easily maintained by an advanced LTE core and network management system.

Innovative Unlicensed LTE includes:



LTE Features

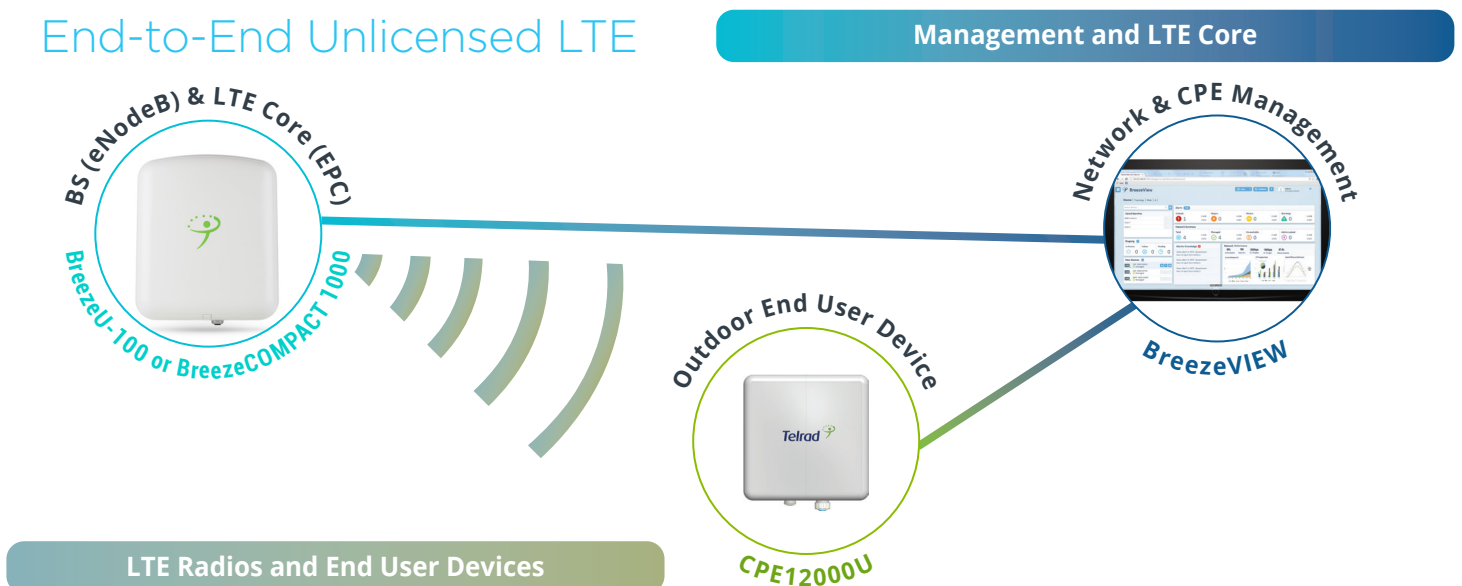
- LTE Advanced
- 4x4 Radio
- Dual Sector (BreezeCOMPACT)
- Carrier Aggregation or MU-MIMO
- Mobility
- AAA Support
- Time synchronization
- End user services
 - Guaranteed bit rate
 - Layer 2 support
- Secured management interface
- Spectrum analyzer
- Dynamic Frequency Selection (DFS)

The unlicensed network solution is fully featured and operates with the Telrad CPE12000U, an LTE standard end user device. The CPE12000U is an outdoor device with an integrated directional antenna for high capacity and coverage.

The Telrad LTE Core network, the BreezeWAY EPC, is standards-based with additional unique features designed specifically for fixed wireless service providers, such as PCRF (QoS), layer 2, and AAA/billing support. The product is managed with BreezeVIEW NMS, a secured system that supports the entire network for configuration, maintenance and performance monitoring of all the base station (eNodeB) and User Equipment (UE).

The BreezeU-100 and BreezeCOMPACT 1000 fully coexists with Telrad's BreezeWAY EPC and BreezeVIEW NMS solutions. They can be used as standalone 5 GHz deployments or as a capacity extension to existing BreezeCOMPACT networks.

End-to-End Unlicensed LTE



BreezeU-100 & BreezeCOMPACT Specs



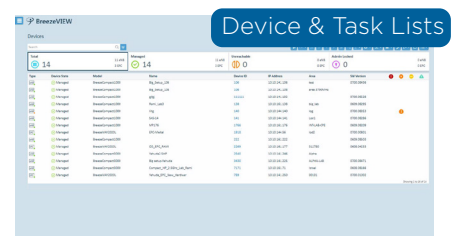
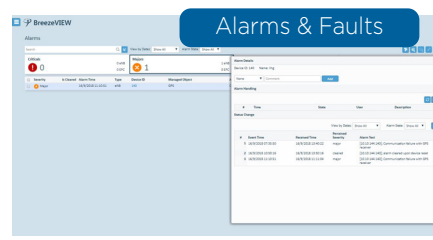
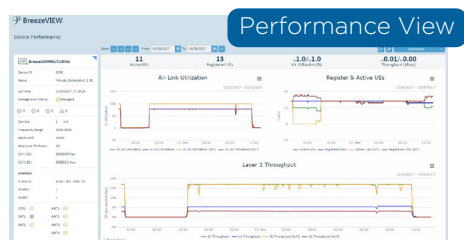
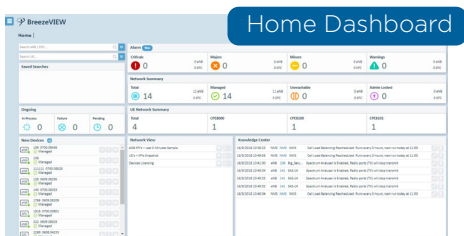
BreezeU-100 BreezeCOMPACT 1000		LTE Features	
Frequency	5.150-5.950 or 4.900-5.350 GHz	Standard Compliance	3GPP LTE-Advanced Release 10**
Radio Configuration	4TX x 4RX	EPC Interworking	BreezeWAY-2020, BreezeWAY-1010, or 3rd Party EPC
Channel Bandwidth	5, 10, 15, 20 MHz	Carrier Aggregation	Intraband contiguous & non-contiguous, Interband
Max Tx Power /Port	20 dBm	Mobility Support	Fixed, Nomadic and Mobile
Weight	12 kg / 26 lbs 8 kg / 18 lbs	Architecture	Full EPC - MME, SGW, PGW
Dimensions (HxWxL)	423 x 159 x 357 mm 310 x 165 x 240 mm 16.6 x 6.2 x 14.0 in 12.2 x 6.5 x 9.5 in	Added Value Package	iPCRF (QoS) Layer 2
Power Consumption	60W up to 100W	Authorization & Billing	AAA or iHSS
Power Input	48 VDC	Management	BreezeVIEW for base station and CPE management
Primary Interfaces	1G - Copper (RJ-45) / Optical SFP		
Antenna Gain	Integrate 17dBi external antenna*		
LEDs	Power, Alarm, GPS		
	* BreezeCOMPACT 1000 only		** Upgradeable to Release 12

BreezeVIEW - Network Management

The BreezeVIEW Management System is a comprehensive apparatus for building, managing and supporting the entire LTE device life-cycle - from initial installation to full service provisioning and ongoing maintenance and support activities.

BreezeVIEW is scalable for any network size, and can be deployed gradually in accordance with network needs.

The BreezeVIEW solution enables provisioning, monitoring and maintaining of the BreezeCOMPACT Family, BreezeWAY EPC & Telrad CPE portfolio.



CPE12000U - Cost-Efficient, High Performance 5 GHz CPE

The CPE12000U Series consists of flexible CPE units, designed to deliver extended coverage and high data throughput for virtually any deployment scenario. The CPE12000U units are designed to operate on license-free bands, enabling a more cost-effective operation. The units support a wide range of connectivity needs, and can be optimized for a triple-play service offering on LTE platforms.

LTE Specifications

LTE Interface	
Standard Compliance	3GPP Release 12
LTE UE Category	Cat 12
Duplex Mode	TDD
Frequency Bands	5.150-5.950 GHz
Channel bandwidth	5 MHz, 10 MHz, 15 MHz, 20 MHz
Uplink Modulation	QPSK, 16QAM, 64QAM
Downlink Modulation	QPSK, 16QAM, 64QAM, 256QAM (Future Release)
L1	DL MIMO 4x4
L2 & L3	Multiple APN PLMN and Cell Selection
Authentication	USIM SIM function (1.8V and 3.3V SIM and USIM card)
QoS	Non-GBR, GBR



Product Excellence

CPE12000U Features

- Unlicensed band operation
- Cost-effective, rugged CPEs
- One Data port
- Carrier Aggregation
- High gain 20dBi embedded Antenna
- Optional connectorized version
- Easy installation saves time and money
- Device Management – Web and TR69
- IPv4, IPv6 DS-Lite Support
- IP67 environmental rating - fully ruggedized - suitable for harshest outdoor deployment

CPE Specifications

CPE12000U Outdoor	
Dimensions (HxWxD)	330x330x72mm 12.9 x 12.9 x 2.8 in
Weight	< 3.5 Kg 7.7 lb
User Interface	1 RJ45 10/100M ETH LED - System, LAN, SIM, RF(4) SIM Support - SIM card slot
Maximum Transmit Power	21 dBm
Antenna	2TX/4RX, 20 dBi
Power Source	100-240 VAC
Environmental	IP67
Operating Temperature	-40° to 55° C -40° to 131° F

*Specification are provided solely for information purposes, but may change at any time

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