

# The Power of the Xtender

## Real-world examples of using LiveU's external antenna for increased bandwidth in challenging scenarios

### LiveU's Xtender

The LiveU Xtender is a portable external antenna unit that increases network reception and provides additional resiliency for live video transmission in extreme scenarios, such as heavily crowded locations. The Xtender essentially allows you to increase network reception of LiveU's LU70 field units whenever connected.



The LiveU Xtender adds seven additional network connections (six cellular modems and one Wi-Fi) to LiveU's LU professional-grade backpack and covers all current 3G/4G LTE cellular network bands worldwide. The combined LU70 and Xtender solution supports up to 15 network connections. The Xtender connects to LU70 units using any of the following options:

- LAN (for a direct connection between the LiveU Xtender and the LU device).
- USB (for direct connection to the LU70)
- Proprietary wireless connectivity

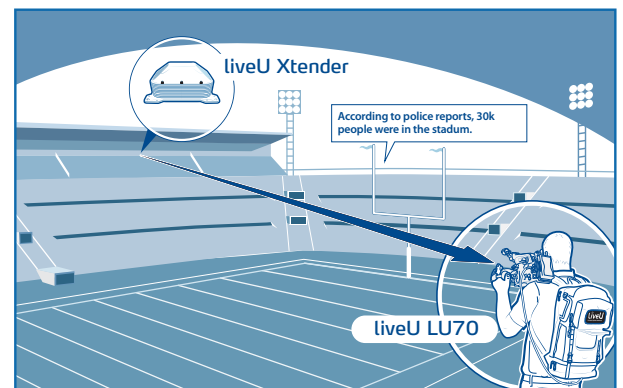
### Crowded stadiums (Sports and Concerts)

At two large multi-spectator (30,000 and 55,000 people) events, performance of LiveU's LU70 was tested with and without the LiveU Xtender. These events both took place in crowded stadiums in the center of a large city, where the large number of visitors was expected to cause cellular congestion.

*The tests at both events showed that the LiveU Xtender significantly increases streamed bandwidth performance, and that it does so especially in extremely crowded and congested areas.*

### Methodology

At one multi-spectator sports event (30,000 spectators), the LiveU LU70 was placed on the ground near the field in the stadium. The LiveU Xtender was positioned on top of the bleachers of the full stadium in a heavily crowded area at a distance of 110 meters (360 ft) from the LU70 device.



The LiveU Xtender and the LU70 were connected using the wireless connectivity kit to provide aggregated bonded bandwidth. Analysis of internal log files compared the LU70 performance alone versus its performance with a LiveU Xtender with the following results

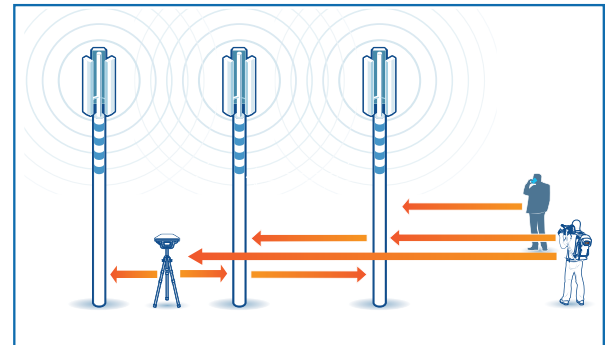
## Significant Additional Aggregated Bandwidth

LiveU Xtender Adds ~132% to Streamed Bandwidth		
Device	Aggregated Bandwidth	kbps per Modem
LU70 Alone	581.1 kbps	83.3
LU70 + Xtender	1.3 - 1.6 Mbps	193.37

Connecting the Xtender added an average of 132% to the streaming bandwidth versus the LU70 on its own. The aggregated bandwidth during the test was 1300 – 1600 kbps.

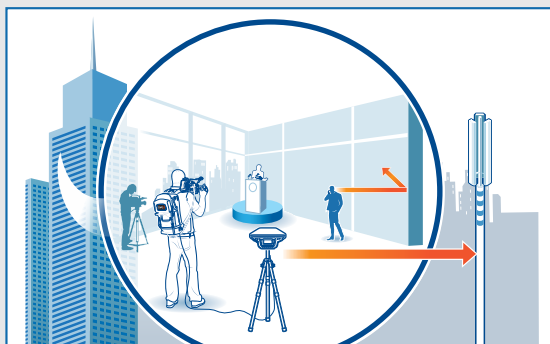
## Signals from Remote Cell Towers

The LiveU Xtender enabled reception from remote cell towers that were not accessible by the LU70 on the ground of the stadium. These remote cell towers were less congested than those in the area of the stadium, which was situated in the city center and was full of people. The additional modems provided by the LiveU Xtender and access to these remote cell towers added significantly to the streamed bandwidth.



## Using the Xtender from inside Buildings (Philippines)

The Xtender was recently tested while trying to transmit from a high-rise building in Makati City, Philippines. The test took place on the 14th floor of the Makati Regional Trial Court. Prior experience at this venue was that cellular signal reception was poor, and that to get any kind of signal, the LU70 had to be placed near the window – typically, aggregated bandwidth is from 200 to 400 kbps.



An Xtender was positioned near the window and was connected wirelessly to an LU70. During the test, the combined Xtender / LU70 provided a steady signal of 2Mbps up to 25 meters inside the office enclosed with concrete walls.